

Toshiba Personal Computer
TECRA M1
Maintenance Manual

TOSHIBA CORPORATION

File Number 960-436

Copyright

© 2003 by Toshiba Corporation. All rights reserved. Under the copyright laws, this manual cannot be reproduced in any form without the prior written permission of Toshiba. No patent liability is assumed with respect to the use of the information contained herein.

Toshiba Personal Computer TECRA M1 Maintenance Manual

First edition February 2003

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 TECRA M1 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.

Trademarks

Intel, Intel SpeedStep and Pentium are trade marks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries/regions.

Windows and Microsoft are registered trademarks of Microsoft Corporation.

Photo CD is a trademark owned by its proprietor and used by TOSHIBA under license.

Bluetooth is a trademark owned by its proprietor and used by TOSHIBA under license.

Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA M1.

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 TECRA M1 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
```

Table of Contents

Chapter 1 Hardware Overview

1.1	Features.....	1-1
1.2	System Unit Block Diagram.....	1-9
1.3	3.5-inch Floppy Disk Drive (USB External)	1-16
1.4	2.5-inch Hard Disk Drive	1-17
1.5	CD-ROM Drive	1-19
1.6	DVD-ROM Drive.....	1-20
1.7	CD-RW/DVD-ROM Drive	1-22
1.8	DVD Multi Drive	1-24
1.9	Keyboard	1-26
1.10	TFT Color Display.....	1-27
1.11	Power Supply	1-29
1.12	Batteries	1-32

Chapter 2 Troubleshooting Procedures

2.1	Troubleshooting	2-1
2.2	Troubleshooting Flowchart.....	2-2
2.3	Power Supply Troubleshooting.....	2-6
2.4	System Board Troubleshooting.....	2-16
2.5	FDD Troubleshooting.....	2-30
2.6	HDD Troubleshooting.....	2-33
2.7	Keyboard and Touch pad Troubleshooting.....	2-38
2.8	Display Troubleshooting	2-41
2.9	CD-ROM Drive Troubleshooting	2-43
2.10	DVD-ROM, CD-RW/DVD-ROM, and DVD Multi Drive Troubleshooting.....	2-45
2.11	Modem Troubleshooting	2-47

2.12	LAN Troubleshooting	2-49
2.13	Bluetooth Troubleshooting.....	2-50
2.14	Wireless LAN Troubleshooting	2-54
2.15	Sound Troubleshooting.....	2-58
2.16	SD Card Slot Troubleshooting.....	2-61

Chapter 3 Tests and Diagnostics

3.1	The Diagnostic Test.....	3-1
3.2	Executing the Diagnostic Test	3-3
3.3	Subtest Names.....	3-7
3.4	System Test	3-10
3.5	Memory Test	3-13
3.6	Keyboard Test.....	3-15
3.7	Display Test.....	3-19
3.8	Floppy Disk Test	3-23
3.9	Printer Test	3-25
3.10	Async Test.....	3-27
3.11	Hard Disk Test	3-29
3.12	Real Timer Test.....	3-32
3.13	NDP Test	3-34
3.14	Expansion Test.....	3-35
3.15	CD-ROM/DVD-ROM Test	3-36
3.16	Wireless LAN Test (Agere)	3-37
3.17	Wireless LAN Test (Atheros).....	3-42
3.18	Wireless LAN Test (Calexico)	3-45
3.19	Sound/Modem Test	3-46
3.20	IEEE1394 Test	3-50
3.21	Bluetooth Test.....	3-52
3.22	Error Code and Error Status Names.....	3-61
3.23	Hard Disk Test Detail Status	3-64
3.24	Head Cleaning	3-66
3.25	Log Utilities.....	3-67
3.26	Running Test.....	3-69
3.27	Floppy Disk Drive Utilities.....	3-71
3.28	System Configuration.....	3-76

3.29 SETUP 3-78

Chapter 4 Replacement Procedures

4.1	General.....	4-1
4.2	Battery Pack.....	4-9
4.3	Optional PC Card.....	4-12
4.4	Optional SD Card.....	4-14
4.5	HDD.....	4-15
4.6	Slim Select Bay Module.....	4-20
4.7	Modem Daughter Card.....	4-24
4.8	CPU.....	4-27
4.9	Keyboard.....	4-32
4.10	Memory Module.....	4-36
4.11	Sensor/Switch Board.....	4-38
4.12	Touch Pad.....	4-40
4.13	Wireless LAN Card.....	4-44
4.14	Bluetooth Module.....	4-47
4.15	Display Assembly.....	4-49
4.16	LED Board.....	4-53
4.17	Sound Board.....	4-55
4.18	System Board/RTC Battery/DC-IN Jack.....	4-57
4.19	USB Board.....	4-62
4.20	Fan.....	4-64
4.21	Display Mask.....	4-66
4.22	FL Inverter.....	4-68
4.23	LCD Module.....	4-70
4.24	Wireless LAN Antenna/Bluetooth Antenna/Display Cover/Speaker.....	4-74
4.25	Fluorescent Lamp.....	4-85

Appendices

Appendix A	Handling the LCD Module	A-1
Appendix B	Board Layout.....	B-1
Appendix C	Pin Assignments	C-1
Appendix D	Character Codes.....	D-1
Appendix E	Key Layout.....	E-1
Appendix F	Reliability	F-1
Appendix G	BIOS Rewrite Procedures.....	G-1
Appendix H	EC/KBC Rewrite Procedures	H-1
Appendix I	Reliability	I-1

Chapter 1

Hardware Overview

Chapter 1 Contents

1.1	Features	1-1
1.2	System Unit Block Diagram.....	1-9
1.3	3.5-inch Floppy Disk Drive (USB External).....	1-16
1.4	2.5-inch Hard Disk Drive	1-17
1.5	CD-ROM Drive	1-19
1.6	DVD-ROM Drive	1-20
1.7	CD-RW/DVD-ROM Drive	1-22
1.8	DVD Multi Drive.....	1-24
1.9	Keyboard.....	1-26
1.10	TFT Color Display.....	1-27
	1.10.1 LCD Module	1-27
	1.10.2 FL Inverter Board.....	1-28
1.11	Power Supply	1-29
1.12	Batteries	1-32
	1.12.1 Main Battery.....	1-32
	1.12.2 Battery Charging Control.....	1-33
	1.12.3 RTC battery.....	1-34

Figures

Figure 1-1	Front of the computer	1-7
Figure 1-2	System unit configuration.....	1-8
Figure 1-3	System unit block diagram.....	1-9
Figure 1-4	3.5-inch FDD (USB External).....	1-16
Figure 1-5	2.5-inch HDD.....	1-17
Figure 1-6	CD-ROM drive	1-19
Figure 1-7	DVD-ROM drive	1-20
Figure 1-8	CD-RW/DVD-ROM drive	1-22
Figure 1-9	DVD Multi drive	1-24
Figure 1-10	Keyboard.....	1-26
Figure 1-11	LCD module.....	1-27

Tables

Table 1-1	3.5-inch FDD specifications	1-16
Table 1-2	2.5-inch HDD specifications.....	1-17
Table 1-3	CD-ROM drive specifications	1-19
Table 1-4	DVD-ROM drive specifications	1-20
Table 1-5	CD-RW/DVD-ROM drive specifications.....	1-22
Table 1-6	DVD Multi drive specifications.....	1-24
Table 1-7	LCD module specifications	1-27
Table 1-8	FL inverter board specifications.....	1-28
Table 1-9	Power supply output rating	1-30
Table 1-10	Battery specifications	1-32
Table 1-11	Time required for quick charges	1-33
Table 1-12	RTC battery charging/data preservation time	1-34

1.1 Features

The Toshiba TECRA M1 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/CTO-compatible so that a system can be designed to suit a specific purpose.

❑ Microprocessor

The TECRA M1 computer is equipped with an Intel Banias Processor, which incorporates a math co-processor, a 32KB L1 cache memory and a 1MB L2 cache memory. The processor runs with one of the following speeds:

- Intel Banias Processor 1.30GHz (1.35V) / 1.20GHz (0.85V)
- 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)

This processor operates at 1.35V-0.8V and 100MHz bus clock. A 32KB level-1 cache memory and a 1MB level-2 cache memory are built in.

❑ Chipset

The TECRA M1 is equipped with Intel Odem, Intel ICH4-M and YEBISU3S.

❑ Video Controller

The computer has a Trident XP4-MCM VGA controller. The internal VRAM is 32MB (64MB is also supported.), DDR250MHz.

❑ Memory

Two expansion memory slots are provided to accommodate 2.5V drive PC2100 DDR-SDRAM memory units with a total capacity of 2GB (2,048MB) maximum.

The following four memory modules are available.

- 128 MB (16M×16bit×4, 2.5V, SDRAM)
- 256 MB (16M×16bit×8, 2.5V, SDRAM)
- 512 MB (32M×8bit×16, 2.5V, SDRAM)
- 1,024MB (32M×16bit×8, 2.5V, SDRAM)

Built-in HDD

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

- 30/40/50/60GB

 USB FDD

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

The FDD is connected to an external USB port.

 Slim Select Bay

A CD-ROM, DVD-ROM, CD-RW/DVD-ROM or DVD Multi drive, 2nd HDD or 2nd Battery can be installed in the Slim Select Bay. In addition, a second HDD may be purchased as an option for use in the system.

 CD-ROM Drive

A full-size, maximum 24-speed 640MB CD-ROM drive, contains an AT Attachment Packet Interface (ATAPI) controller, and supports the following formats: CD-DA, CD-ROM (Mode 1, Mode 2), CD-ROM XA Mode 2, Photo-CD (Single/multi-session), and Enhanced CD.

 DVD-ROM Drive

A full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. It plays DVDs at maximum 8-speed and reads CDs at maximum 24-speed.

 CD-RW/DVD Drive

A full-size, CD-RW/DVD drive that contains an AT Attachment Packet Interface (ATAPI) controller. This drive reads CD-R at maximum 24-speed and reads DVD-ROM at maximum 8-speed.

 DVD Multi 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. It plays DVDs at maximum 8-speed, writes CD-R at maximum 8-speed, writes CD-RW at maximum 4-speed, and reads CDs at maximum 24-speed.

❑ Display

The display comes in the following three types:

- 14.1" XGA-TFT color display, resolution 1,024×768, 16M colors
- 14.1" SXGA+-TFT color display, resolution 1,400×1,050, 16M colors

In addition, a video controller and an 32/64MB VRAM enables an external monitor to display 16M colors at a resolution of 1,024×768 pixels or 256 colors at a resolution of 1,400×1,050 pixels.

❑ 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/XP. It supports software that uses a 101- or 102-key enhanced keyboard.

❑ 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)

❑ Serial port

A standard, 9-pin, serial port enables connection of such serial devices as a serial printer, mouse or modem. A Universal Asynchronous Receiver/Transmitter (UART) is 16550A equivalent.

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.

 PS/2™ mouse/keyboard port

Either a PS/2 compatible keyboard or a PS/2 compatible mouse can be connected to the port.

 PC card slot

The PC card slot (PCMCIA) accommodates two 5mm Type II card or one Type III 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.

 Docking interface port

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

- RJ-45 LAN jack, RT11 Modem jack
- External monitor port
- Parallel port and Serial port
- PS/2 Mouse port and Keyboard port
- DC IN socket
- Security lock slot
- Audio line-in, line out jack
- Two USB ports and an IEEE 1394 port
- DVI port

 TOSHIBA Dual Pointing Device

The TOSHIBA Dual Pointing Device consists of Touch Pad and AccuPoint. The touch pad and control buttons enable control of the on-screen pointer and scrolling of windows. The pointer control stick, AccuPoint enables convenient control of the cuesor.

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 Link and AnalogDeveices AD1981A
- AMP: AN12490 and NSCLM4911
- 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) and Gigabit Ethernet LAN (1000megabits per second, 1000BASE-T). It also supports Wakeup on LAN (WOL) and Magic Packet.

Bluetooth (BTO)

The computer is equipped with Bluetooth (V1.1) communications standards enable wireless connection between electronic devices such as computers and printers.

 Mini PCI Card slot (1 slot, BTO)

In some models built to order (BTO), a Mini PCI Card with wireless LAN functions is available.

Wireless LAN: The Mini PCI Card for wireless LAN is compatible with other LAN systems based on Direct Sequence Spread Spectrum radio technology that complies with the IEEE 802.11 Standard (Revision B) only, and IEEE 802.11 Standard (Revision A, B). Revision A supports data transfer up to 54Mbit/s. Revision B supports data transfer up to 11Mbit/s. It has Frequency Channel Selection (5GHz: Revision A/2.4GHz: Revision B) and allows roaming over multiple channels.

 Presentation button

This button switches the display between internal display, external display, simultaneous display and multi-monitor display.

 Brightness sensor

The Brightness sensor adjusts the brightness of LCD to the adequate brightness according to the illuminant of the place where you are using the PC.

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

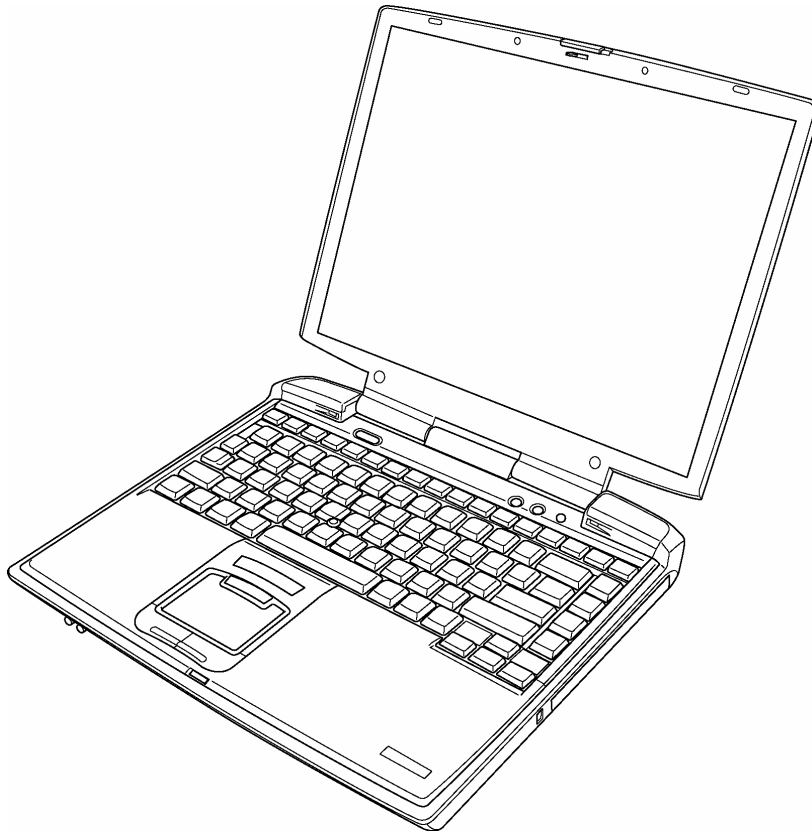


Figure 1-1 Front of the computer

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

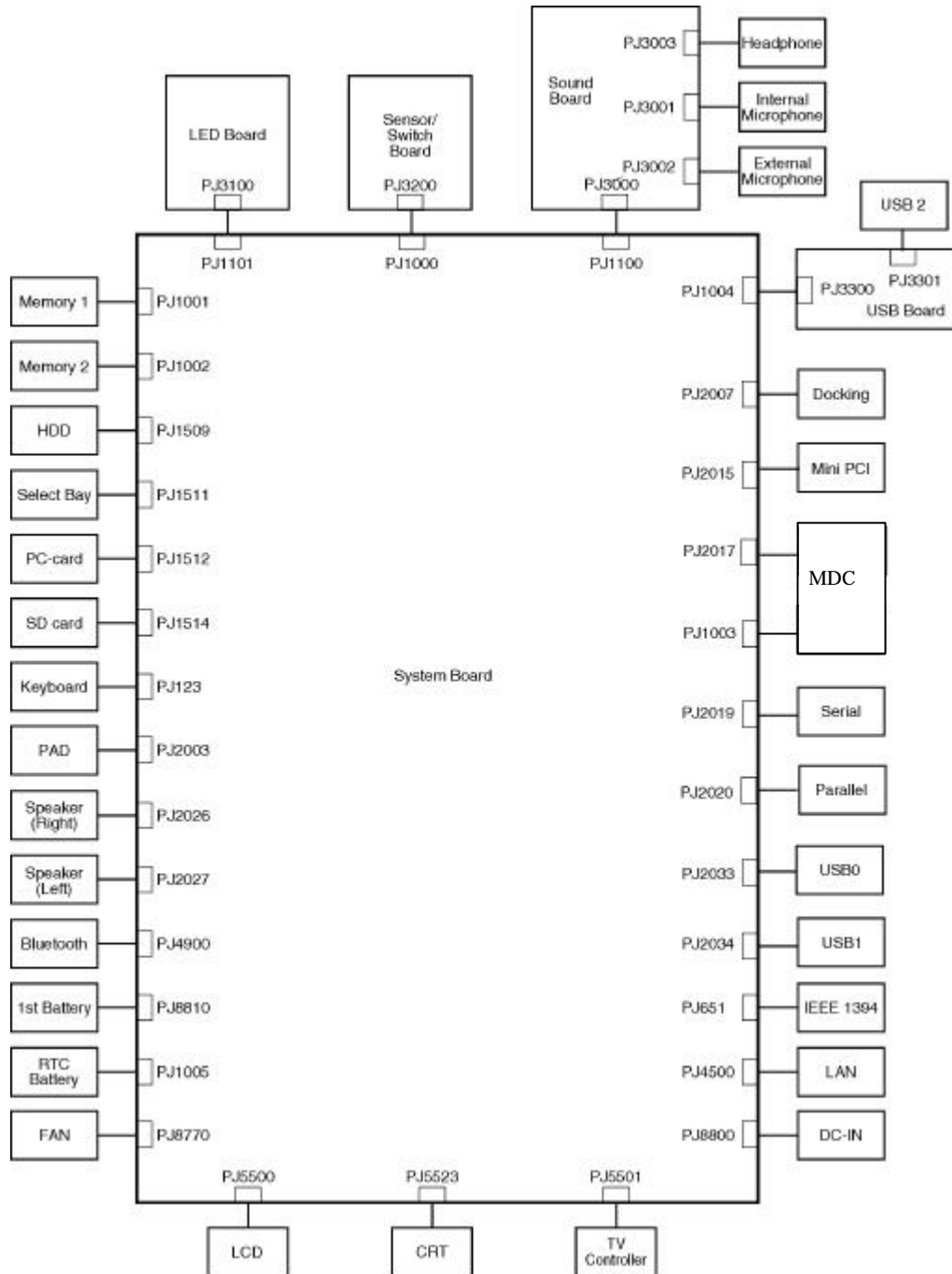


Figure 1-2 System unit configuration

1.2 System Unit Block Diagram

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

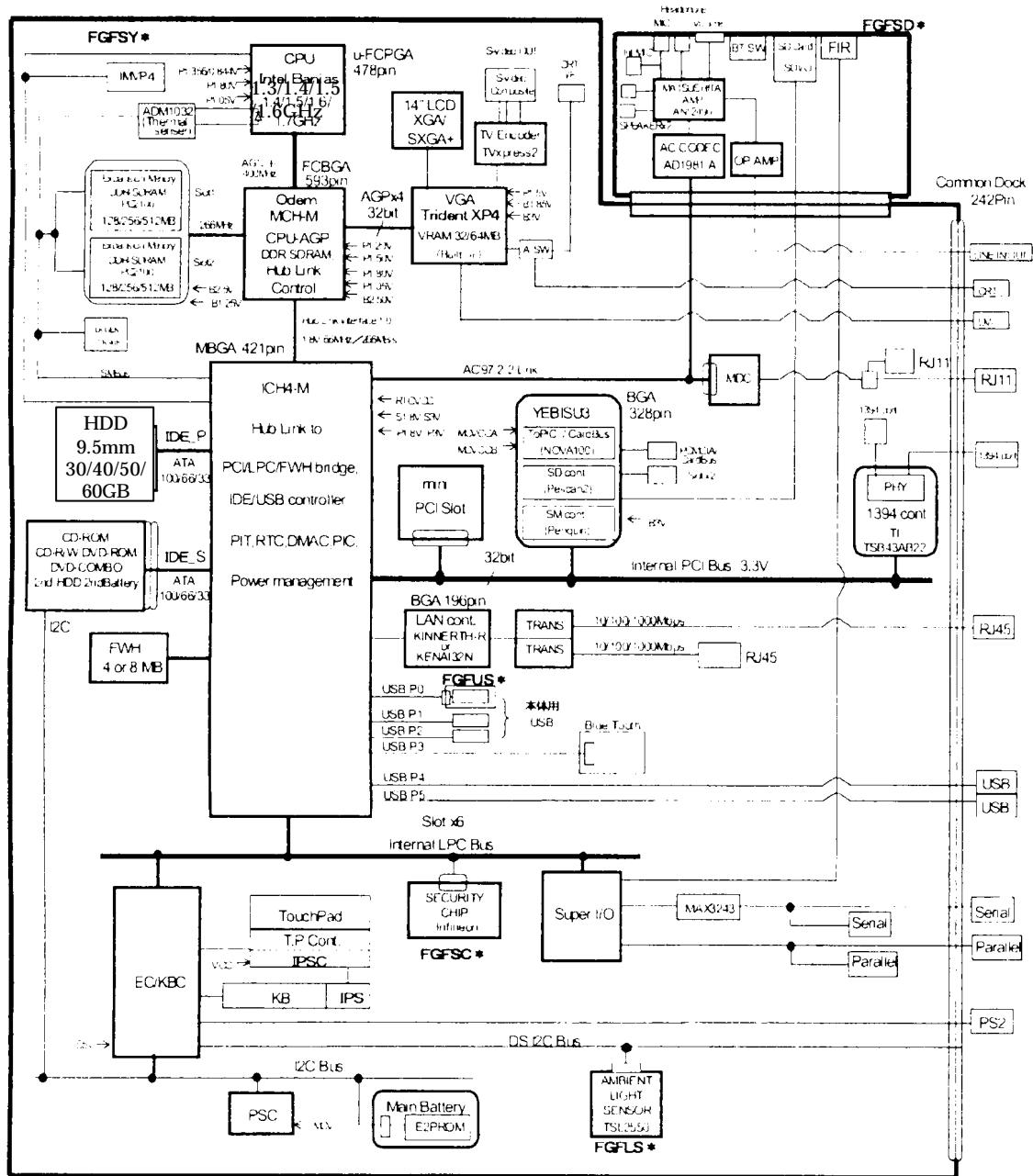


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel Baniyas Processor 1.30GHz
 - Processor core speed: 1.30GHz (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 Baniyas 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 Baniyas 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 Baniyas 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

❑ Memory

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

- DDR-SDRAM (Double Data Rate - Synchronous DRAM)
- 128 MB/256 MB/512 MB/1,024MB(1GB) selectable
 - 128 MB (16M×16bit×4)
 - 256 MB (16M×16bit×8)
 - 512 MB (32M×8bit×16)
 - 1,024MB (32M×16bit 8)
- 200 pin, SO Dual In-line Memory Modules (SO-DIMM)
- 2.5 volt operation
- Supports DDR CL2/2.5
- Supports PC2100 only

❑ Intel Odem (North Bridge)

- One Intel 82845MP is used.
- Features:
 - Banias Processor System Bus Support
 - DRAM Controller: DDR200/DDR266 Support, 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 YEBISU3S 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.

❑ VGA Controller

One Trident XP4-MCM chip is used. The video controller incorporates graphics accelerator, video accelerator.

- Internal VRAM, 32MB DDR 250MHz (64MB is also supported.)
- Connected to AGP bus R2.0
- LCD Interface LVDS 2ch
- TV Encoder: Tvexpress2
- DVI Supported by Dock

❑ Sound Controller

- One AC'97Codec AD1981A chip and AC-Link controller embedded in ICH4-M
- SW sound

❑ EC/KBC (Embedded Controller/Keyboard Controller)

- One Mitsubishi M306K 9FCLRP 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.

❑ RS232 Driver

- One MAXIM3243 chip is used.
- This driver converts signals for interface with external equipment.

❑ Clock Generator

- One ICS950810AG-T is used.
- This device generates the system clock.

❑ Modem Controller

- One built-in modem card with Xircom Lucent SCORPIO+CSP1037B is used.
- This controller has the following functions:
 - Digital line protection support
 - Ring wake up support
 - AC97 interface
 - The following communication codes are supported

Data:

V.90 (56K bps) data communication control

V.92 (56K bps) data communication control

V.34 (33.6 K~2400)

V.32 bis (14.4K, 12K, 9600)

V.22 bis (2400, 1200)

V.22 (1200)

V.23 (1200, 600, 75)

V.21 (300)

Fax:

V.17 (14.4K, 12K, 9600, 7200)

V.29 (9600, 7200, 4800)

V.27 ter (4800, 2400)

V.21 ch2 (300)

Internal LAN Controller

- One MAC incorporated with ICH4-M and PHY (Kinnereth-R 182562EP or Kenai32N) are used for the internal chip, and are connected with RJ11/RJ45 combo connector.
- This controller has the following functions:
- Full Duplex support at 10 Mbps/100 Mbps
 - WOL support
 - Magic Packet Support

 Wireless LAN

- One Mini PCI card for LAN with TI card bus controller, TI 1410 is used.

 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 chip is used.
- Light Sensor: One TSL2550 chip is used.

1.3 3.5-inch Floppy Disk Drive (USB External)

The 3.5-inch FDD is a thin, high-performance reliable drive that supports 720KB (formatted) 2DD, 1.2MB (formatted) and 1.44MB (formatted) 2HD disks.

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

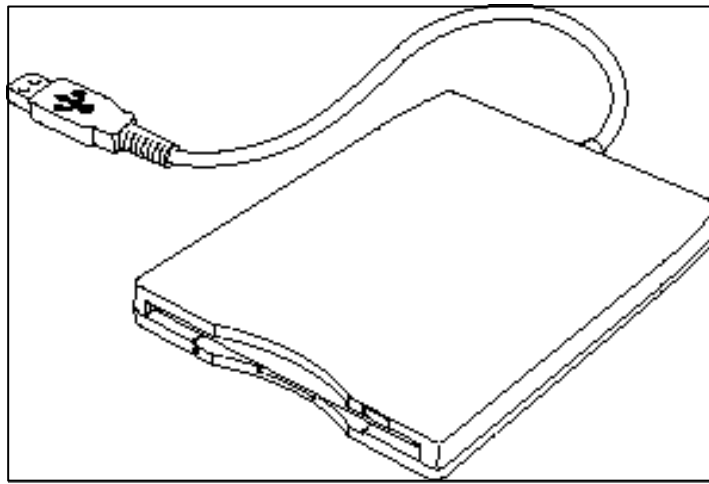


Figure 1-4 3.5-inch FDD (USB External)

Table 1-1 3.5-inch FDD specifications

Items		720KB mode	1.2MB 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	300rpm
Track density		5.3 track/mm (135TPI)		

1.4 2.5-inch Hard Disk Drive

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

The computer supports a 30GB, 40GB, 50GB and 60GB HDD.

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

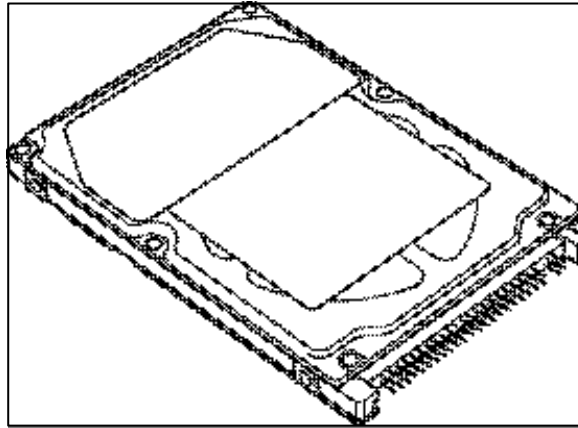


Figure 1-5 2.5-inch HDD

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

Items	Specifications			
	TOSHIBA HDD 2181B	TOSHIBA HDD 2171B	TOSHIBA HDD 2186B	TOSHIBA HDD 2184B
Storage size (formatted)	30GB	40GB	50GB	60GB
Speed (RPM)	4,200	5,400	7,200	5,400
Data transfer speed (Mbits/s)	154.3 - 298.0	200.8 - 333.2	249.4 - 440.5	202.9-373.3
Interface transfer rate (MB/s)	100			
Storage density (Kbpi)	618	607	572	632
Track density (Ktpi)	78.9	57.1	74.0	78.9
Average random seek time (read) (ms)	12			
Motor startup time (ms)	4			

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

Items	Specifications	
	HITACHI G8BC0000F310	HITACHI G8BC00009110
Storage size (formatted)	30GB	40GB
Speed (RPM)	4,200	5,400
Data transfer speed (Mbits/s)	22.1 – 42.8	27.8 – 44.1
Interface transfer rate (MB/s)	100 (MAX Ultra DMA mode)	
Storage density (Kbpi)	716	612
Track density (Ktpi)	70.0	63.0
Average random seek time (read) (ms)	13	
Motor startup time (ms)	5	

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

Items	Specifications	
	IBM G8BC00004210	IBM G8BC0000A110
Storage size (formatted)	30GB	40GB
Speed (RPM)	4,200	5,400
Data transfer speed (Mbits/s)	125 – 241	160 – 297
Interface transfer rate (MB/s)	100	
Storage density (Kbpi)	509	506 (MAX)
Track density (Ktpi)	66.4	
Average random seek time (read) (ms)	12	
Motor startup time (ms)	5	

1.5 CD-ROM Drive

The CD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CDs. They provide high-performance, twenty-four-speed plays on a maximum (reads 3,600 KB per second).

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



Figure 1-6 CD-ROM drive

Table 1-3 CD-ROM drive specifications

Item	TEAC specifications (G8CC0005410) 24 x mode (Max.)
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)
Access time (ms) Average Random Access Average Full Stroke Access	110 (except in Audio play mode) 240 (except in Audio play mode)
Rotation speed (rpm) (typ.)	5,136
Data Buffer Capacity (Kbytes)	128
Supported Format	CD-DA, CD-ROM Mode 1, Mode 2 CD-ROM XA Mode 2 (Form 1, Form 2) Photo CD (Single/multi-session), Enhanced CD

1.6 DVD-ROM Drive

The DVD-ROM drive accommodates either 12cm (4.72-inch) or 8cm (3.15-inch) DVDs. This drive plays DVDs at maximum 8-speed and reads CDs at maximum 24-speed.

The DVD-ROM drive is shown in figure 1-7. Specifications for the DVD-ROM drive are described in table 1-4.



Figure 1-7 DVD-ROM drive

Table 1-4 DVD-ROM drive specifications (1/2)

Item	HITACHI ZA2441P03	
	DVD-ROM mode	CD-ROM mode
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)	
Access time (ms) (Typ.)	90 (Single Layer) 130 (Dual Layer)	85
Rotation speed (rpm)	4,670 Max	5,100Max
Data Buffer Capacity (Kbytes)	512	
Supported Format	DVD-ROM (3.95GB, 4.7GB) (Read) CD-ROM Mode 1, Mode 2, CD-ROM XA, CD-I Digital Video, Photo-CD Multisession, CD-Audio, Mixed mode CD- ROM, CD-EXTRA, CD-TEXT, CD-R, CD-RW	

Table 1-4 DVD-ROM drive specifications (2/2)

Item	HITACHI G8CC00015410	
	DVD-ROM mode	CD-ROM mode
ATAPI Burst (Mbytes/s)	33.3 (U-DMA Transfer mode 2)	
Access time (ms) Average Random Access	110 (Typ.)	85 (Typ.)
Rotation speed (rpm)	4,594 Max	5,136Max
Data Buffer Capacity (Kbytes)	256	
Supported Format	DVD-ROM, DVD-R (Read) 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) CD-R (Read), CD-RW (Read)	

1.7 CD-RW/DVD-ROM Drive

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

The CD-RW/DVD-ROM drive is shown in figure 1-8. Specifications are listed in Table 1-5.



Figure 1-8 CD-RW/DVD-ROM drive

Table 1-5 CD-RW/DVD-ROM drive specifications (1/3)

Item	Specifications	
	TEAC G8CC0000Q410	
ATAPI Burst (Mbytes/s)	16.7 (Mode 0 to 2, Mode 0 to 4) 33.3 (Ultra DMA mode 2)	
Average access time (msec.)	CD-ROM	90
	DVD-ROM	110
Data Buffer Capacity	2MB	
Supported Formats	CD: CD-DA, CD-ROM Mode 1, Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Photo CD (single/multi-session), Enhanced CD, CD-TEXT DVD: DVD-ROM, DVD-Video, DVD-R (General, Authoring) DVD-RAM (4.7GB, 2.6GB)	

Table 1-5 CD-RW/DVD-ROM drive specifications (2/3)

Item		Specifications
		Panasonic G8CC00010410
ATAPI Burst (Mbytes/s)		16.6 (PIO Mode 4, DMA Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec.)	CD-ROM	130
	DVD-ROM	180
Data Buffer Capacity		2MB
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, CD-R, CD-RW Photo CD, Video CD, CD-EXTRA (CD+), CD-TEXT DVD: DVD-Video, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW, DVD-RAM (4.7GB)

Table 1-5 CD-RW/DVD-ROM drive specifications (3/3)

Item		Specifications
		HITACHI G8CC00016410
ATAPI Burst (Mbytes/s)		16.6 (PIO Mode 4, DMA MW Mode 2) 33.3 (Ultra DMA Mode2)
Average access time (msec.)	CD-ROM	120
	DVD-ROM	110
Data Buffer Capacity		2MB
Supported Formats		CD: CD-ROM Mode-1, CD-ROM XA, CD-Audio, Mixed Mode CD-ROM, Photo-CD, CD-I DV, Video CD, CD- Plus/CD-EXTRA, CD-TEXT, CD-R, CD-RW DVD: DVD-ROM (single layer 4.7GB, dual layer 8.5GB) DVD-R (3.95/4.7GB), DVD-RW (4.7GB)

1.8 DVD Multi Drive

The DVD Multi drive is capable of driving either 12cm (4.72-inch) or 8cm (3.15-inch) DVD and CD without using an adaptor. This drive plays DVDs at maximum 8-speed, reads CDs at maximum 24-speed, writes CD-R at maximum 8-speed, and writes CD-RW at maximum 4-speed.

The DVD Multi drive is shown in figure 1-9. Specifications are listed in Table 1-6.



Figure 1-9 DVD Multi drive

Table 1-6 DVD Multi drive specifications (1/2)

Item	Panasonic G8CC00012410		
	DVD-ROM mode	CD-ROM mode	CD-R/CD-RW (Write)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.6 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms) 1/3 Stroke Access (typ.)	180	130	-
Data Buffer Capacity (Mbytes)	2		
Supported Format	CD: CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), CD-I Ready, Photo CD (Multi session), Video CD, CD-EXTRA (CD+), CD-TEXT DVD: DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW (Ver.1.1), DVD-RAM		CD-R, CD-RW

Table 1-6 DVD Multi drive specifications (2/2)

Item	TEAC		
	DVD-ROM mode	CD-ROM mode	CD-R/CD-RW (Write)
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 0 to 2) 16.7 (PIO Mode 0 to 4, Multi-word DMA mode 0 to 2)		
Access time (ms)	110	130	-
Data Buffer Capacity (Mbytes)	2MB		
Supported Format	CD: CD-DA, CD-ROM Mode 1, CD-ROM XA Mode 2 (Form 1, Form 2), Multi-session Photo CD, CD-I, Video CD, Enhanced CD, CD-TEXT DVD: DVD-ROM, DVD-R (General, Authoring), DVD-Video, DVD-RW, DVD-RAM (4.7GB, 2.6GB/read only)		CD-R, CD-RW

1.9 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 1-10 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



Figure 1-10 Keyboard

1.10 TFT Color Display

The TFT color display consists of 14.1-inch XGA/SXGA+ LCD module and FL inverter board.

1.10.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 262,144 colors with 1,024 x 768 or 1,400 x 1,050 resolution. The Trident XP4-MCM can control both internal and external XGA- or SXGA+- support displays simultaneously.

Figure 1-11 shows a view of the LCD module and Table 1-7 lists the specifications.

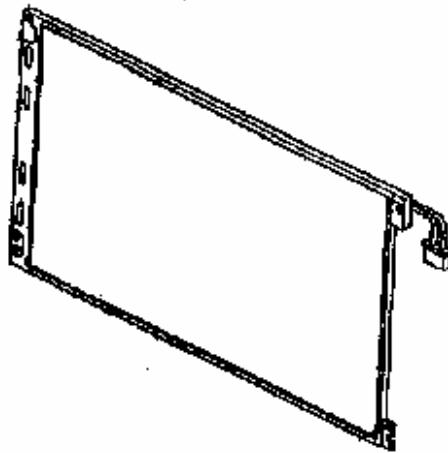


Figure 1-11 LCD module

Table 1-7 LCD module specifications (1/2)

Item	Specifications
	14.1-inch XGA TFT (VF2092P03)
Number of Dots	1,024 (W) x 768 (H)
Dot spacing (mm)	0.297 (H) x 0.297 (V)
Display range (mm)	285.696 (H) x 214.272 (V)

Table 1-7 LCD module specifications (2/2)

Item	Specifications 14.1-inch SXGA+ TFT (VF2074P01)
Number of Dots	1,400 (W) x 1,050 (H)
Dot spacing (mm)	0.204 (H) x 0.204 (V)
Display range (mm)	285.6 (H) x 214.2 (V)

1.10.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL. Table 1-8 lists the FL inverter board specifications.

Table 1-8 FL inverter board specifications

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

1.11 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 green)
 - Battery icon (sets LED to orange or green)
 - 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 1-9.

Table 1-9 Power supply output rating

Device	Name	DC Voltage (V)	Power supplied Yes/No		
			Power off Suspend	Power off Boot mode	No battery *1)
CPU	PPV	0.748-1.468	No	No	No
MCH-M	1R2-P1V	1.2	No	No	No
CPU, MCH-M, ICH4-M	PTV	1.05	No	No	No
LAN Cont (82540EP)	LAN-E2V	2.5	Yes	No	No
MCH-M, DDR MEM	2R5-B2V	2.5	Yes	No	No
VGA (XP4)	2R5-P2V	2.5	No	No	No
MCH-M, DDR MEM	1R25-B1V	1.25	Yes	No	No
ICH4-M, 82540EP	LAN-E3V	3.3	Yes	No	No
PC Card Cont (Yebisu3S), PC Card, Serial I/F	B3V	3.3	Yes	No	No
CPU Temperature Sensor (ADM1032), Clock Generator (CK408), ICH4-M, XP4, TV Encoder, LCD, DVI Encoder, 1394, FWH, Mini PCI, Sound Codec (AD1981), Super I/O, SD Card, Modem, FIR, Illumi Sensor	P3V	3.3	No	No	No
USB Port	E5V	5	Yes	No	No
PC Card	B5V	5	Yes	No	No
Dual Point, XP4, FL Inverter, Docking I/F, KB LED, Other LED's, HDD, Mini PCI, Bluetooth, Cooling, Slim Select Bay *2)	P5V	5	Yes	No	No
AD1981, Sound Amplifier	SND-P5V	5	No	No	No
Pull-ups	15-EBV	10-15	Yes	No	No
CPU, MCH-M, ICH4-M	1R8-P1V	1.8	No	No	No
ICH4-M, 82540EP	_AN1R5-E1V	1.5	Yes	No	No
MCH-M, ICH4-M	1R5-P1V	1.5	No	No	No
XP4	PGV	1.2-1.5	No	No	No
PSC	MCV	5	Yes	Yes	No
PS LED's, Battery E2PROM	M5V	5	Yes	Yes	No
Pull-ups	S5V	5	Yes	Yes	No
ICH4-M, EC/KBC	S3V	3.3	Yes	Yes	No

ICH4-M	1R5-S1V	1.5	Yes	Yes	No
ICH4-M (RTC)	R3V	3.3	Yes	Yes	Yes

*1) Both Main battery and Sub Battery are empty, and only RTC Battery is charged.

*2) CD-ROM or DVD-ROM drive Unit is attached.

1.12 Batteries

The computer has three types of batteries as follows:

- Main battery pack
- RTC battery
- Secondary battery pack (Optional Slim Select Bay Module)

The battery specifications are listed in Table 1-10.

Table 1-10 Battery specifications

Battery name		Material	Output voltage	Capacity
Main battery	9 cell	Lithium-Ion	10.8 V	6,600 mAh
	6 cell			4,400 mAh
RTC battery		Lithium-Ion	2.4 V	30 mAh
Secondary battery pack		Lithium-Ion	10.8 V	3,000/3,600 mAh

1.12.1 Main Battery

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

1.12.2 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 1-11 Time required for quick charges

Status		Charging time
Quick charge 1 (Power off)	9 cell	About 2.8 hours
	6 cell	About 2.5 hours
Quick charge 2 (Power on)	9 cell	About 7 hours (When Windows is idling.)
		About 15 hours (When DVD is being played.)
	6 cell	About 5 hours (When Windows is idling.)
		About 11 hours (When DVD is being played.)

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.

1.12.3 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 1-12 lists the charging time and data preservation period of the RTC battery.

Table 1-12 RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	15 hours
Data preservation period (full charge)	30 days

Chapter 2

Troubleshooting Procedures

2 Troubleshooting Procedures

Chapter 2 Contents

2.1	Troubleshooting	2-1
2.2	Troubleshooting Flowchart.....	2-2
2.3	Power Supply Troubleshooting.....	2-6
	Procedure 1 Icons in the LCD Check.....	2-6
	Procedure 2 Error Code Check	2-7
	Procedure 3 Connection Check.....	2-13
	Procedure 4 Charge Check	2-14
	Procedure 5 Replacement Check	2-15
2.4	System Board Troubleshooting.....	2-16
	Procedure 1 Message Check	2-17
	Procedure 2 Printer Port LED Check on Boot Mode.....	2-19
	Procedure 3 Diagnostic Test Program Execution Check.....	2-28
	Procedure 4 Replacement Check	2-29
2.5	FDD Troubleshooting	2-30
	Procedure 1 FDD Head Cleaning Check.....	2-30
	Procedure 2 Diagnostic Test Program Execution Check.....	2-31
	Procedure 3 Connector Check and Replacement Check.....	2-32
2.6	HDD Troubleshooting.....	2-33
	Procedure 1 Message Check	2-33
	Procedure 2 Partition Check	2-34
	Procedure 3 Format Check	2-35
	Procedure 4 Diagnostic Test Program Execution Check.....	2-36
	Procedure 5 Connector Check and Replacement Check.....	2-37
2.7	Keyboard and Touch pad Troubleshooting.....	2-38
	Procedure 1 Diagnostic Test Program Execution Check.....	2-38
	Procedure 2 Connector and Replacement Check	2-39
2.8	Display Troubleshooting	2-41
	Procedure 1 Diagnostic Test Program Execution Check.....	2-41

2 Troubleshooting Procedures

	Procedure 2	Connector and Cable Check.....	2-41
	Procedure 3	Replacement Check	2-42
2.9	CD-ROM Drive Troubleshooting.....		2-43
	Procedure 1	Diagnostic Test Program Execution Check.....	2-43
	Procedure 2	Connector Check and Replacement Check.....	2-44
2.10	DVD-ROM, CD-RW/DVD-ROM and DVD Multi Drive Troubleshooting.....		2-45
	Procedure 1	Diagnostic Test Program Execution Check.....	2-45
	Procedure 2	Connector Check and Replacement Check.....	2-46
2.11	Modem Troubleshooting		2-47
	Procedure 1	Diagnostic Test Program Execution Check.....	2-47
	Procedure 2	Connector Check and Replacement Check.....	2-48
2.12	LAN Troubleshooting.....		2-49
	Procedure 1	Connector Check and Replacement Check.....	2-49
2.13	Bluetooth Troubleshooting.....		2-50
	Procedure 1	Transmitting-Receiving Check.....	2-50
	Procedure 2	Antennas' Connection Check.....	2-51
	Procedure 3	Antenna Check	2-52
	Procedure 4	Replacement Check	2-53
2.14	Wireless LAN Troubleshooting.....		2-54
	Procedure 1	Transmitting-Receiving Check.....	2-54
	Procedure 2	Antennas' Connection Check.....	2-55
	Procedure 3	Antenna Check	2-56
	Procedure 4	Replacement Check	2-57
2.15	Sound Troubleshooting.....		2-58
	Procedure 1	Diagnostic Test Program Execution Check.....	2-58
	Procedure 2	Connector Check.....	2-59
	Procedure 3	Replacement Check	2-60
2.16	SD Card Slot Troubleshooting		2-61
	Procedure 1	Check on Windows.....	2-61
	Procedure 2	Connector/Replacement Check	2-61

Figures

Figure 2-1 Troubleshooting flowchart..... 2-3
Figure 2-2 Printer port LED..... 2-19
Figure 2-3 Antenna Test cable 2-52
Figure 2-4 Antenna Test cable 2-56

Tables

Table 2-1 Battery Icon..... 2-6
Table 2-2 DC IN Icon..... 2-6
Table 2-3 Printer port LED boot mode status 2-20
Table 2-4 FDD error code and status..... 2-31
Table 2-5 Hard disk drive error code and status 2-36

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. System Board | 6. CD-ROM Drive | 9. LAN |
| 2. Floppy Disk Drive | 7. DVD-ROM,
CD-RW/DVD-ROM and | 10. Bluetooth |
| 3. Hard Disk Drive | DVD Multi Drive | 11. Wireless LAN |
| 4. Keyboard | 8. Modem | 12. Sound components |
| 5. Display | | 13. 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
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. 2DD or 2HD formatted work disk for floppy disk drive testing
6. Cleaning kit for floppy disk drive troubleshooting
7. Serial port wraparound connector
8. PC card wraparound card
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. DVD-ROM TSD-1 (TOSHIBA EMI DVD Test Media)
17. Music CD
18. CD-RW Media (blank)
19. RJ11 connector checker
20. S/PDIF Speaker
21. Advanced Port Replicator
22. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting
23. Personal computer that can communicate by Bluetooth for Bluetooth troubleshooting
24. 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:

Connect the printer port in the Port Replicator, hold down the “P” key and turn the POWER switch on. The computer will override the password function by erasing the current password.

- Verify with the customer that Microsoft 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.

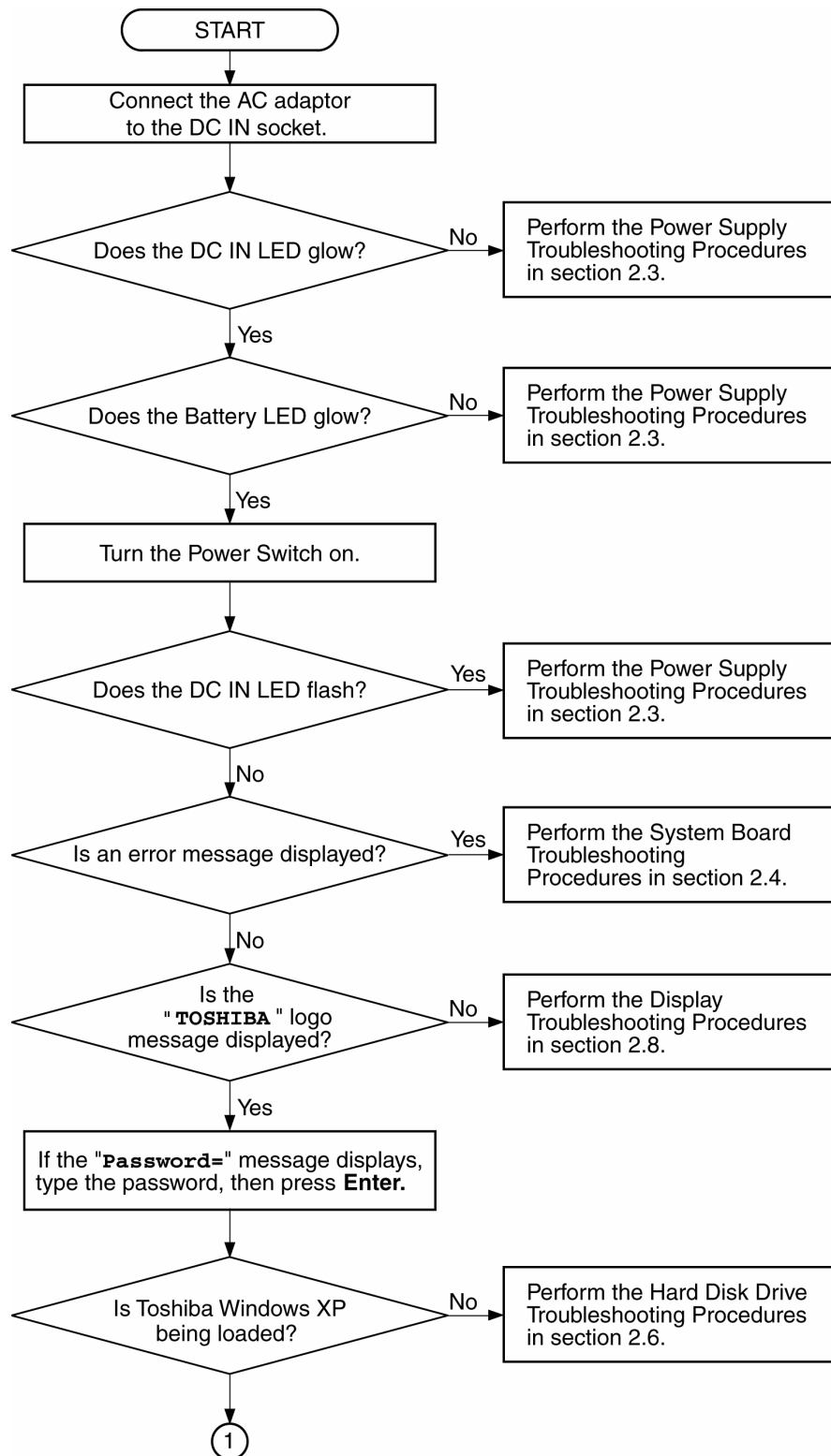


Figure 2-1 Troubleshooting flowchart (1/2)

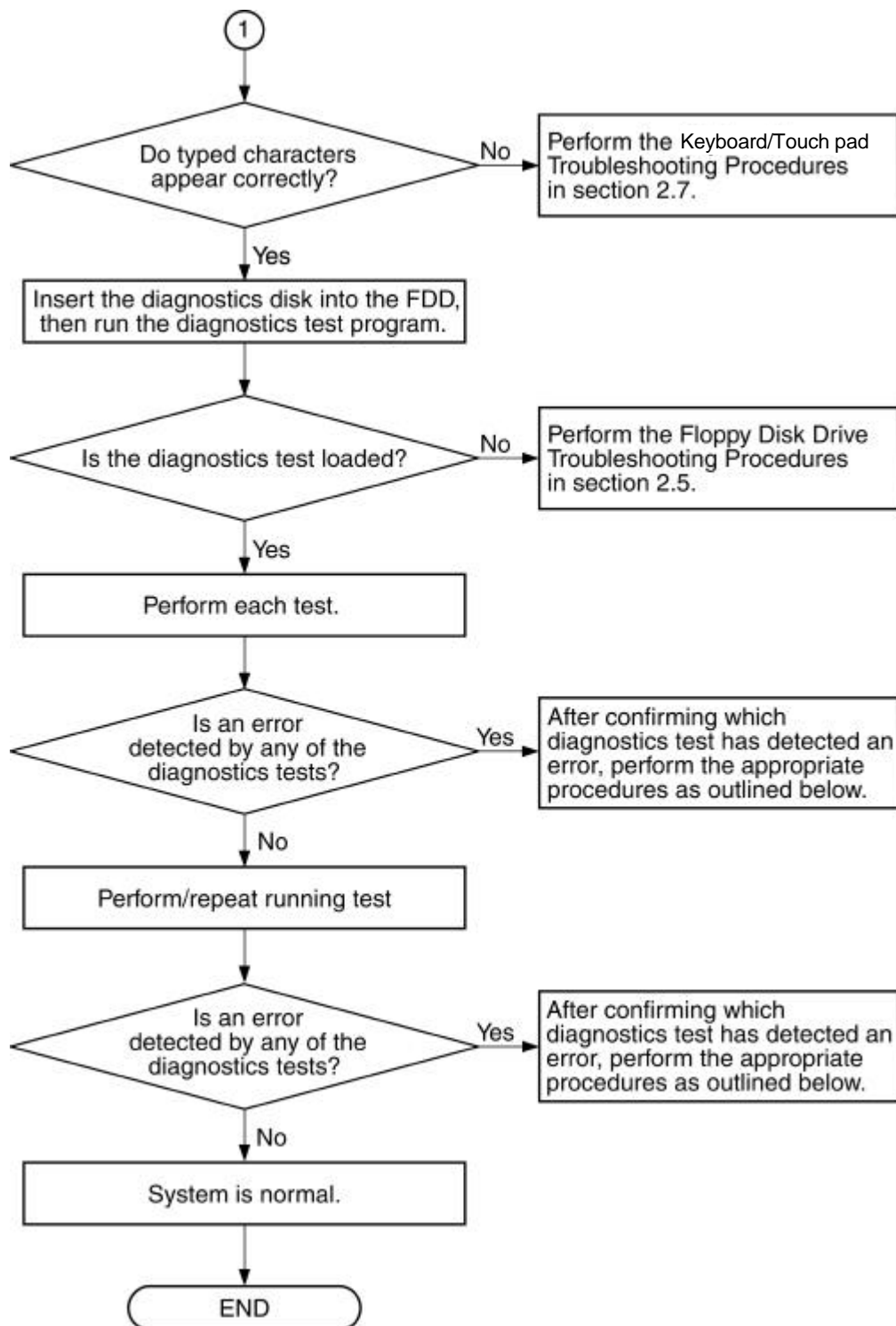


Figure 2-1 Troubleshooting flowchart (2/2)

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

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

2.3 Power Supply Troubleshooting

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

Procedure 1: Icons in the Sub LCD Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Charge Check

Procedure 5: Replacement Check

Procedure 1 Icons in the LCD Check

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

- Battery icon
- DC IN icon

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

Table 2-1 Battery Icon

Battery Icon	Power supply status
Lights Outline of the Battery	Main Battery is installed
Flashes / Lights	Charge / Full charge
Doesn't light	Main Battery is NOT installed

Table 2-2 DC IN Icon

DC IN icon	Power supply status
Lights	DC power is being supplied from the AC adaptor.
Doesn't light	Any condition other than those above.

Procedure 2 Error Code Check

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

The error code begins with the least significant digit.

Error code

Error code	Where Error occurs	
1 ^h	Adaptor (AC Adaptor, DS)	AC Adaptor is not connected. Error code begins with : 0x10 Error code ends with : 0x1F
2 ^h	The 1st battery	The 1st Battery is not connected. Error code begins with : 0x20 Error code ends with : 0x2F
3 ^h	The 2nd Battery	The 2nd Battery is not connected. Error code begins with : 0x30 Error code ends with : 0x3F
4 ^h	S3V output	Operating Power ON
5 ^h	1R5-C1V output	Error code begins with : 0x40
6 ^h	1R8-C1V output	Error code ends with : 0xDF
7 ^h	PPV output	
8 ^h	PGV output	
9 ^h	E5V output	
A ^h	E3V output	
B ^h	1R2-P1V output	
C ^h	PTV output	
D ^h	1R25-P1V output	
E ^h	2R5-E2V output	
F ^h		

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 16.5V.
11h	Common Dock voltage is over 16.5V.
12h	Current from the DC power supply is over 6.05A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Current sensing IC is not normal.

1st Battery

Error code	Meaning
20h	Main battery charge current is more than 6.05 A.
21h	Main battery charge current is over 6.05A.
22h	Main battery discharge current over 0.5A.
23h	Main battery charge current is over 4.3A.
24h	Current sensing IC is not normal.
25h	Main battery charge current is over 0.3A.

2nd Battery

Error code	Meaning
30h	Overvoltage is detected. (Not supported)
31h	Main battery charge current is over 6.05A.
32h	Main battery discharge current is over 0.5A.
33h	Main battery charge current is over 3.1A.
34h	Current sensing IC is not normal.
35h	Secondary battery charge current is over 0.3A.

❑ S3V output

Error code	Meaning
40h	S3V voltage is 3.14V or less when the computer is powered on/off.
45h	S3V voltage is 3.14V or less when the computer is booting up. (CV support)

❑ 1R5-C1V output

Error code	Meaning
50h	1R5-C1V voltage is over 1.80V.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1V voltage is 1.275V or less when the computer is suspended.
54h	1R5-C1V voltage is abnormal when the computer shuts down. (CV support)
55h	1R5-C1V voltage is 1.275V or less when the computer is booting up. (CV support)

❑ 1R8-C1V output

Error code	Meaning
60h	1R8-C1V voltage is over 2.16V when the computer is powered on/off.
61h	1R8-C1V voltage is 1.53V or less when the computer is powered on.
62h	1R8-C1V voltage is 1.53V or less when the computer is booting up.
63h	1R8-C1V voltage is 1.53V or less when the computer is suspended.
64h	1R8-C1V voltage is abnormal when the computer shuts down. (CV support)
65h	1R8-C1V voltage is 1.53V or less when the computer is booting up. (CV support)

❑ PPV output

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

PGV output

Error code	Meaning
80h	PGV voltage is over 1.92V when the computer is powered on/off.
81h	PGV voltage is 0.68V or less when the computer is powered on.
82h	PGV voltage is 0.68V or less when the computer is booting up.
83h	PGV voltage is 0.68V or more when the computer is powered off.
84h	PGV voltage is 0.68V or less 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 4.50V or less when the computer is powered on.
92h	E5V voltage is 4.50V or less when the computer is booting up.
93h	E5V voltage is 4.50V or more when the computer is powered off.
94h	E5V voltage is 4.50V or less when the computer is suspended.

E3V output

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

1R2-PIV output

Error code	Meaning
B0h	1R2-PIV voltage is over 1.44V.
B1h	1R2-PIV voltage is 1.02V or less when the computer is powered on.
B2h	1R2-PIV voltage is 1.02V or less when the computer is booting up.
B3h	1R2-PIV voltage is 1.02V or more when the computer is powered off.

PTV output

Error code	Meaning
C0h	PTV voltage is over 1.26V when the computer is powered on/off.
C1h	PTV voltage is 0.89V or less when the computer is powered on.
C2h	PTV voltage is 0.89V or less when the computer is booting up.
C3h	PTV voltage is 0.89V or more when the computer is powered off.
C4h	PTV voltage is 0.89V or less when the computer is suspended.

1R25-P1V output

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

2R5-E2V output

Error code	Meaning
E0h	2R5-E2V voltage is over 3.00V when the computer is powered on/off.
E1h	2R5-E2V voltage is 2.125V or less when the computer is powered on.
E2h	2R5-E2V voltage is 2.125V or less when the computer is booting up.
E3h	2R5-E2V voltage is 2.125V or more when the computer is powered off.
E4h	2R5-E2V voltage is 2.125V or less 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.

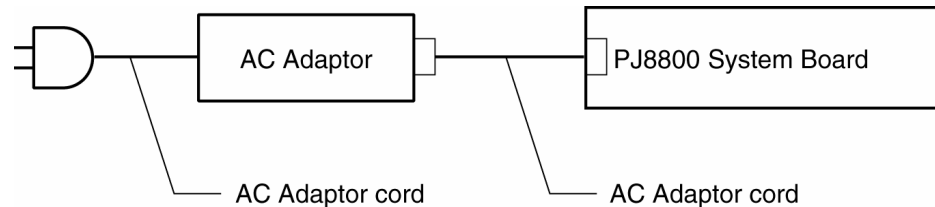
Check 3 In the case of error code 2Xh:

- 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 attached.	Check 1
3	The AC adaptor's output voltage is not normal.	Check 1
4	The battery is not installed.	Check 2
5	The battery's output voltage is not normal.	Check 3
6	The battery's temperature is not normal.	Check 4
7	A bad battery is installed.	Check 2
8	Any other problems.	Check 5

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

Procedure 5 Replacement Check

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

- Check 1 Replace the AC adaptor with a new one. If the AC adaptor is still not functioning properly, perform Check 2.
- Check 2 Use a multimeter to make sure that the F800, F810 and F820 fuse are not blown. If fuses are not blown, go to Check 3.
- Check 3 Replace the system board with a new one following the steps described in Chapter 4, *Replacement Procedures*.

2.4 System Board Troubleshooting

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

The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Printer Port LED Check on Resume Mode

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

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

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

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

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

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

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

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

If one of the following error messages (1) through (17), (24) or (25) appears, go to Procedure 5.

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

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

If the error message (21) appears, go to the CD-R/RW Drive Troubleshooting Procedures in Section 2.9 or the COMBO Drive Troubleshooting Procedures in Section 2.10

If the error message (22) or (23) appears, go to the FDD Troubleshooting Procedures in Section 2.5.

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

Procedure 2 Printer Port LED Check on Boot Mode

The printer port LED displays the IRT (Initial Reliability Test) status and test status by turning lights on and off as an eight-digit binary value for boot mode. Figure 2-2 shows the printer port LED.

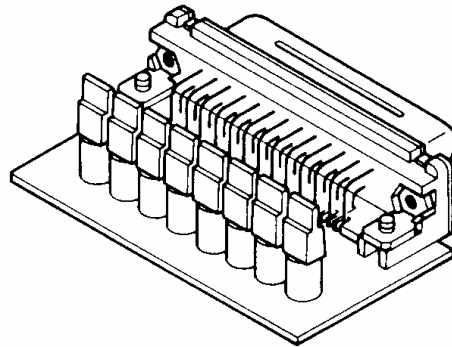


Figure 2-2 Printer port LED

To use the printer port LED, follow the steps below:

1. Plug the printer port LED into the parallel port of the Advanced Port Replicator 2001.
2. Read the LED status from left to right as you are facing the back of the computer.
3. Convert the status from binary to hexadecimal notation.
4. If the final LED status is FFh (normal status), go to Procedure 4.
5. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

NOTE: If an error is detected by the IRT test, the printer port LED displays an error code after the IRT test ends. For example, when the printer port LED displays B2 and halts, the IRT test has already completed the KBC initialization. In this instance, the IRT indicates an error has been detected during the BIOS rewrite.

Table 2-3 Printer port LED boot mode status (1/8)

LED Status	Test item	Message
FFh	Start	Register initialization for boot block
		Clearance of software reset bit
		Permission of A20 line
		Initialization for special register and Intel chip set
B0H	Flash ROM check	PIT CH0 initialization (for HOLD_ON)
		BIOS rewrite flag initialization
		Checksum check
		Transition to protected mode
		Boot block checksum (HLT when check error occurred.)
B1H	EC/KBC rewrite check	Checksum check except boot block
		Transition to BIOS rewriting when required
		Enabling KB
B2H	BIOS rewrite request check	[tilde][TAB] key check
		Transition to BIOS rewriting when checksum error other than Boot Block is detected, or user requested rewriting.
B3H	System BIOS rewrite transition to IRT	
	Rewriting BIOS	
	H/W initialization	Setting of base for Power Management I/O Space
		Enabling BIOS writing
		Serial interrupt control
		Disabling BIOS rewrite protection
		Enabling SM Bus I/O space
		Enabling SM Bus access
		Opening work I/O for SDRAM initialization
		Setting FDC prohibition
	Initialization of HW for each model	
	Initialization of PIT channel 1 (Setting refresh interval to 30ms)	
	Initialization of PIT, DMAC, PIC	
	DRAM configuration	
	Enabling L1 cache	
	Memory clear	
Transition to real mode, copy BIOS to RAM		

Table 2-3 Printer port LED boot mode status (2/8)

LED Status	Test item	Message
B5H	Storing key scan code	
	Setting of TASK_1ms_TSC	
	Display initialization	
B6H	FAN control	
	Sound controller initialization (for beep)	Enabling system speaker
		Disabling mute
		Setting volume to max
	Message display	CEC/KBC UPDATE/DAMAGED, BIOS UPDATE/DAMAGED
	Key input	Disabling USB
		Sound beep
		Waiting for key input
	Reading CHGBIOSA.EXE/CHGFIRMA.EXE	FDC reset
		Setting of parameter for 2HD (1.44MB), transmission rate
		Reading first sector
		Setting of parameter for 2DD (720KB), transmission rate
		Search of CHGBIOSA.EXE from route directory
		Calculation of directory start head, sector
		Reading contents of route directory by one sector
Search of entry for "CHGBIOSA.EXE"/ "CHGFIRMA.EXE", from the sector read		
Reading of EXE header of "CHGBIOSA.EXE"/ "CHGFIRMA.EXE" key input when an error occurred		
Execute "CHGBIOSA.EXE"/"CHGFIRMA.EXE"		
B3H	Prohibition of cache	Prohibition of cache
		Initialization of special register
00H	PIT CH1 initialization	(Setting refresh interval to 30ms)
01H	Check of DRAM type and size	(at Cold Boot)
		(HLT when the DRAM type is 0)
	SM-RAM stack area test	(HLT when the stack area can not be used.)
02H	Cache configuration	
	Enabling L1 cache	
	CMOS access test	(at Cold Boot) (HLT when an error is detected.)
	Battery level check of CMOS	
	CMOS checksum check	

Table 2-3 Printer port LED boot mode status (3/8)

LED Status	Test item	Message
(02H)	Initialization of CMOS data (1)	
	Setting of IRT status	(Boot status and IRT busy flag, the remaining bit is 0.)
03H	Resume branch (at Cold Boot)	Storing DRAM size in CMOS
		Not resume when a CMOS error occurred
		Not resume when resume status code is not set
		Resume error check
		1CH Power Failure error (Resume error 7AH)
		SM-RAM checksum check (Resume error 73H)
		Check of memory configuration change (Resume error 73H)
		RAM area checksum check in system BIOS (Resume error 79H)
		PnP RAM checksum check (Resume error 77H)
		Transition to RESUME-MAIN
	Resume error	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
Designating the area of C0000h-EFFFFh to PCI (Prohibition of DRAM)		
Setting of resume error request		
System BIOS ROM/RAM copy		
04H	SM RAM initialization	
		Check of Wake Up factor
		Rewriting of SMRAM base and
		Storing CPU state map for BIOS
		Enabling SMI only by ASMI
05H	Initialization of a device which needs initialization before initialization of PCI bus	PIT test (at Cold Boot) and initialization
		Setting of test pattern for PIT#0 CH0
		Check whether the test pattern set can be read.
		Initialization of PIT CH0 (Setting of timer interrupt interval to 55ms)
		Initialization of PIT CH2 (Setting of sound generator frequency to 664Hz)
		Test of PIT CH1 (Check whether a refresh signal is working properly when refresh interval is set to 30ms. HLT when the time is out.)

Table 2-3 Printer port LED boot mode status (4/8)

LED Status	Test item	Message
(05H)	(Initialization of a device which needs initialization before initialization of PCI bus)	Test of PIT CH2 (Check whether the speaker gate is working properly.)
		Measuring of CPU clock
		Enabling SMI except for auto-off function
		Control of battery discharge current (10mA)
		Division process of measuring IRT time
		Setting for clock generator
		Check of parameter block A
		CPU initialization
		Update of micro code
		Check of Geyserville support
		Setting of CPU clock to high
		Setting of Graphics Aperature Size
06H	Storing memory configuration in buffer	
	Reading EC version	
	Update of flash ROM type	
	Evaluation of destination (home/overseas) by DMI data	
	Setting default when a CMOS default error (Bad Battery, Bad Checksum (ROM, CMOS)) occurred	
	Initialization of ACPI table (for executing an option ROM)	
	Initialization of a device that needs initialization before PCI bus initialization	AC'97 control
		Initialization of temperature control information
		KBC initialization
		VGA display off and reset control
		Sound initialization
		Acquisition of status
HC initialization, Recognition of USB device connection and initialization		
	Control of interval LAN enable/disable	
PIC initialization		
PIC test		

Table 2-3 Printer port LED boot mode status (5/8)

LED Status	Test item	Message
(06H)		Check whether self test is necessary or not (at Cold Boot) (Check of space key and printer wraparound connector)
		Password initialization
07H	PCI Bus initialization	PCI Bus initialization (Connection of DS Bus)
		Initialization of LAN information
		Check of Wakeup factor
08H	CMOS data initialization	Running a task waiting for the end of INIT PCI
		CMOS data initialization (2)
		PnP initialization
		Setting of setup item
		Waiting for the end of Multi Box status check
		H/W configuration from PnP resource
09H	Initialization of PnP H/W	Running a task waiting for the end of PnP resource
		Serial interrupt control (before using interrupt)
		Initialization of PnP H/W
		Initialization of PC card slot
		SIO initialization
		FIR initialization
		PCI automatic configuration
		Creating a work area for auto configuration
		Acquisition of PCI IRQ
		Configuration
		Storing the results of VGA configuration
0AH	Initialization of H/W that is necessary after PCI configuration	Running a task waiting the end of PCI_CONFIGURATION
		Initialization of H/W that is necessary after PCI configuration
		Printer port setting
		Start of HDD initialization sequence
		SD initialization
		Creating output code
0BH	First 6KB memory check	
0CH	Vector initialization	
0DH	NDP initialization	

Table 2-3 Printer port LED boot mode status (6/8)

LED Status	Test item	Message
0EH	System initialization	Storing CMOS error status in IRT error status buffer
		Start of TIMER initialization
		Initialization of buffer for power save
		Update of system BIOS (model name, EDID of the LCD)
0FH	Display initialization	Waiting for the end of VGA chip initialization
10H	LOGO display	
11H	Conventional memory check	(Boot)
12H	Extension memory check	Check of exceptional cases in protected mode (Boot)
13H	Conventional memory initialization (Reboot)	
	(LED=14H when an error is detected in check of exceptional cases in protected mode)	
15H	DMA Page Register check	(Boot)
16H	DMAC check	(Boot)
17H	DMAX initialization	(Boot)
18H	Printer check	
19H	SIO check	
1AH	Password check	(Reboot)
		Waiting for the end of HDD initialization
		Key input check during IRT (Waiting for the end of KBC initialization)
		ATA priority initialization
		(Boot)
		BM loading
		BM initialization
		Key input check during IRT (Waiting for the end of KBC initialization)
		Password input
Enabling BM		
1BH	Extension I/O ROM check	
1CH	Final setting up prior to boot-up	Storing the value of 40:00h (for SIO save/store)
		Font address setting for resume password
		Setting of parameter for character repeat on a USB keyboard

Table 2-3 Printer port LED boot mode status (7/8)

LED Status	Test item	Message
(1CH)	(Final setting up prior to boot-up)	Getting keys pressed during the IRT
		Storing shadow RAM size
		Update of system resources information prior to boot-up
		Rewriting memory map data for INT15h E820h
		Waiting for the end of AC-Link initialization
		Updating a table for DMI
		Copying an ACPI table to the top of an expansion memory
		Waiting for the end of writing PSC version on BIOS
		Waiting for the end of clock generator setting (Stop at LED=1DH when an error occurred)
		Waiting for the end of serial port initialization
		Canceling NMI Mask
		Examining the checksum of TIT
		Clearance of IRT running flag for runtime
		Updating checksum for runtime
		Branching to hibernation
		Bluetooth initialization
		Check whether a target maintenance card is set
		Disabling a PC card not used
		HW initialization prior to boot, Waiting for the end of HW initialization
		Notifying the condition of DVI connection to VGA BIOS
		Setting battery save mode
		Setting of date
		Waiting for the end of Bluetooth initialization
		Updating DMI Wakeup factor and SM-BIOS structure table
		Closing configuration space for PCI device
		Cache control
Updating of parameter block A		
Process for CPU		

Table 2-3 Printer port LED boot mode status (8/8)

LED Status	Test item	Message
(1CH)	(Final setting up prior to boot-up)	Setting the clock speed of CPU to the appointed value by setup
		Waiting for motor off of a disabled HDD
		Final decision of USB FDD drive information
		After-treatment of setup prior to boot-up
		Clearance of power button status
		Enabling power button
		Taking a measure against USB operation
		Failure at high temperature
FFH	End	

Check 1 If the following error codes are displayed, go to Procedure 5.

B0h, B1h, B2h, B3h, B4h, B5h, B6h, 00h, 01h, 02h, 03h, 04h, 05h, 06h, 07h, 08h, 09h, 0Ah, 0Bh, 0Ch, 0Dh, 0Eh, 0Fh, 10h, 11h, 12h, 13h, 14h, 15h, 16h, 17h, 18h, 19h, 1Bh, 1Ch, 1Dh, 1Eh

Check 2 If the error code 81h or 82h is displayed, go to Section 2.5 FDD Troubleshooting and Section 2.6 HDD Troubleshooting.

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

If an error is detected during these tests, go to Procedure 3.

Procedure 4 Replacement Check

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

Check 1 Visually check for the following:

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

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

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

2.5 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 2-3. 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 2-4 FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media 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 appears, disable the write protect tab on the floppy disk. If any other message appears, perform Check 2.

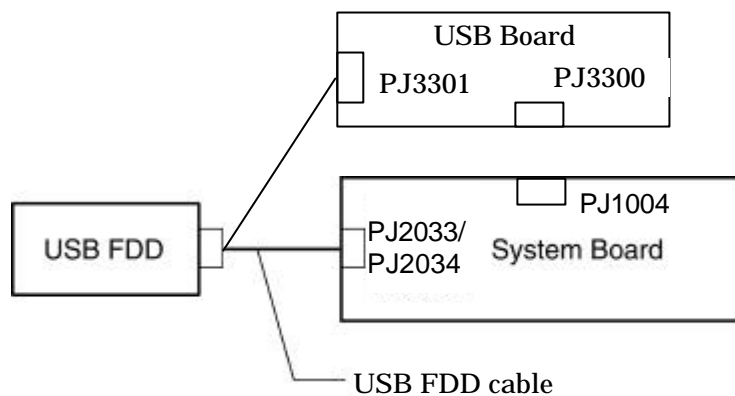
Write protected

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

Procedure 3 Connector Check and Replacement Check

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

- Check 1 When using the USB port 0 or 1, make sure the USB FDD cable is firmly connected to PJ2033 or PJ2034 on the system board. When using the USB port 2, make sure the USB FDD cable is connected to PJ3301, and the USB cable is firmly connected to PJ1004 on the system board and PJ3300 on the USB board.



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

- Check 2 The USB FDD or USB FDD cable may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform 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.
- Check 5 Using the **SYS** command on the Toshiba MS-DOS system disk, install system files on the HDD.

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

System transferred

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

Procedure 3 Format Check

The computer's HDD is formatted using the low level format program and the 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 2-4. If an error code is not generated or the problem still exists, go to Procedure 5.

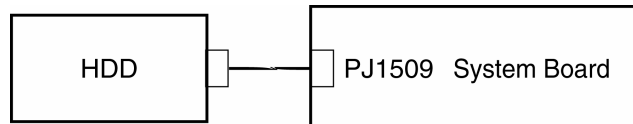
Table 2-5 Hard disk drive error code and status

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
E Eh	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 PJ1509 on the system board.



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

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

2.7 Keyboard and Touch pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector 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.

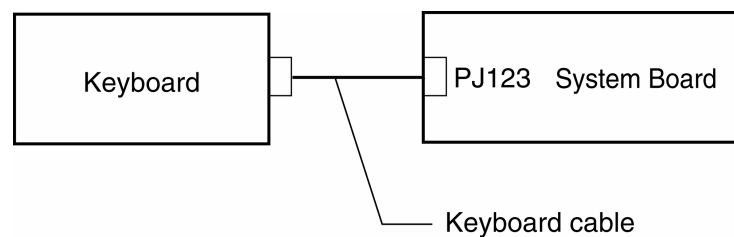
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

Procedure 2 Connector and Replacement Check

The keyboard, touch pad or sensor/switch board 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 or AccuPoint malfunctions, start with Check 1.
2. If the touch pad malfunctions, start with Check 3.
3. If the power switch, InTouch button or Presentation button malfunctions, start with Check 5.

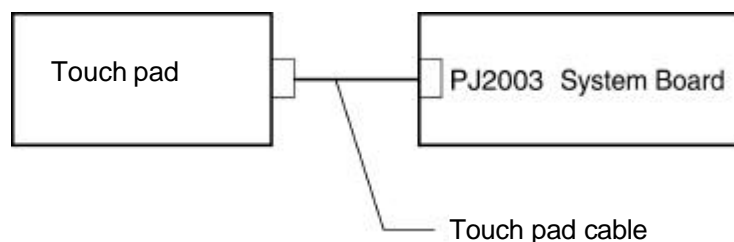
Check 1 Make sure the keyboard cable is securely connected to PJ123 on the system board.



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

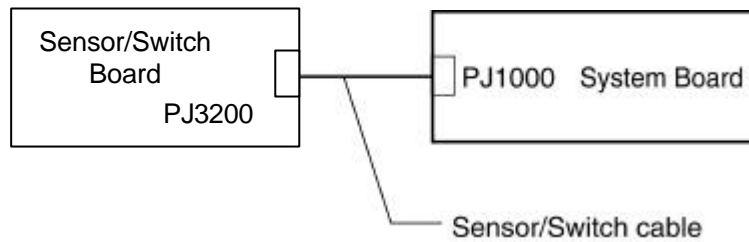
Check 2 The keyboard or its cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 7.

Check 3 Make sure the touch pad cable is firmly connected to PJ2003 on 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 touch pad or the touch pad 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 7.
- Check 5 Make sure the cable of the Sensor/Switch board is firmly connected to PJ1000 on the system board, and the sensor/switch board cable is connected to PJ3200 on the sensor/switch board.



If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 6.

- Check 6 The Sensor/Switch board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If there is still an error, go to Check 7.
- Check 7 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.8 Display Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Cable Check

Procedure 3: Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

Procedure 2 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. 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*.

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

Procedure 3 Replacement Check

The 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:

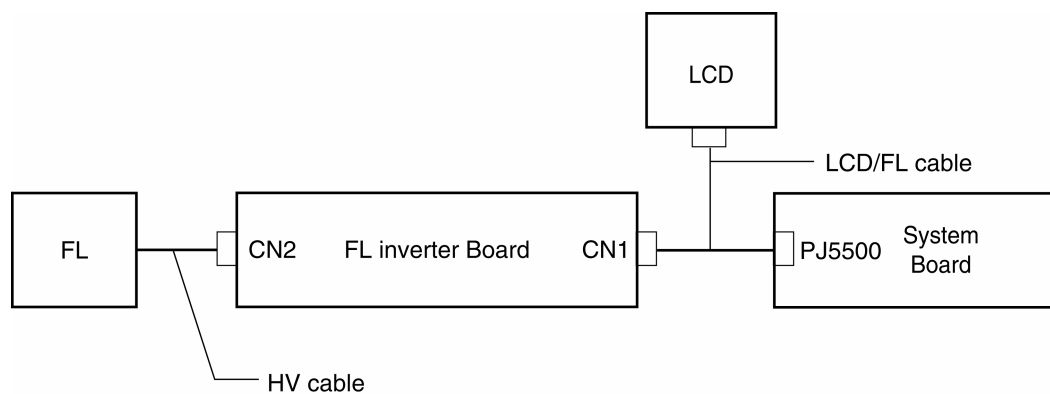
If the FL does not light, perform Check 1.

If characters or graphics are not displayed clearly, perform Check 1.

If some screen functions do not operate properly, perform Check 3.

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 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 Check 3.

Check 3 Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 4.

Check 4 Replace the display cable (FL cable and LCD cable) with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 5.

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

2.9 CD-ROM Drive Troubleshooting

This section describes how to determine if the computer's internal CD-ROM 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 CD-ROM test, prepare a test CD-RW.

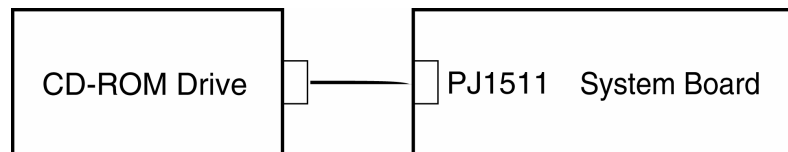
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

Procedure 2 Connector Check and Replacement Check

The CD-ROM 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 CD-ROM drive is firmly connected to PJ1511 on 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 CD-ROM 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 DVD-ROM, CD-RW/DVD-ROM and DVD Multi Drive Troubleshooting

This section describes how to determine if the DVD-ROM, CD-RW/DVD-ROM or DVD Multi drive in the Slim Select Bay is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

For the test, prepare a test DVD-ROM and CD-RW Media (branch).

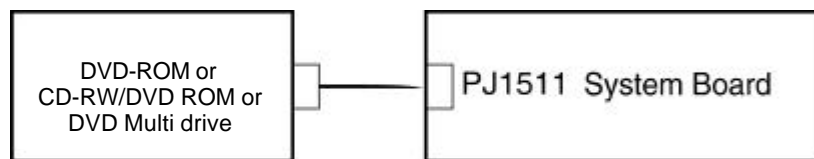
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

Procedure 2 Connector Check and Replacement Check

The DVD-ROM, CD-RW/DVD-ROM or DVD Multi drive is connected to the system board. The connectors may be disconnected from the system board or may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the drive to test is firmly connected to PJ1511 on the systemboard.



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

Check 2 The 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*.

2.11 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/Modem test program is stored in the Diagnostics 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 more information about the diagnostics test procedures.

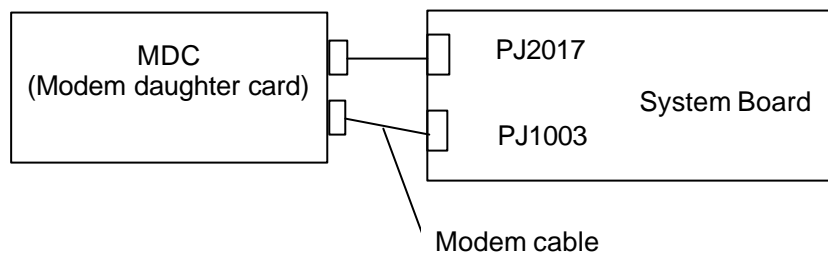
If any errors occur while executing the Sound/Modem test, go to Procedure 2.

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 is firmly connected to PJ2017 on the systemboard, and the modem cable is connected to PJ1003 on the system board and the connector of the MDC.



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 or modem cable 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*.

2.12 LAN Troubleshooting

This section describes how to determine if the computer's LAN is functioning properly. Perform Procedure 1.

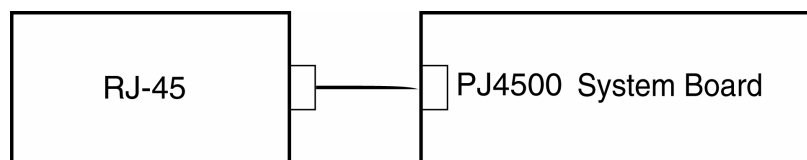
Procedure 1: Connector Check and Replacement Check

Procedure 1 Connector Check and Replacement Check

An RJ45 jack with LAN cable is connected to the system board. If the LAN malfunctions, the system board might be damaged.

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

Check 1 Make sure the RJ-45 jack is firmly connected to PJ4500 on the system board.



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

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

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

2.13 Bluetooth Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Antenna Check

Procedure 4: Replacement Check

Procedure 1 Transmitting-Receiving Check

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

Check 1 Execute test program **ICH_BT73.EXE** to check the BD_ADDR of the Bluetooth. Perform the test following the instructions described in Chapter 3, *Bluetooth Test Program (ICH_BT73.EXE)*.

If the computer passes the test, the function is correctly working. If the computer does not pass the test, the Bluetooth board may be disconnected or damaged. Make sure the connector on the Bluetooth board is firmly connected to PJ4900 on the system board. And perform the test program **ICH_BT73.EXE** again. If the computer still does not pass the test, go to check 3.

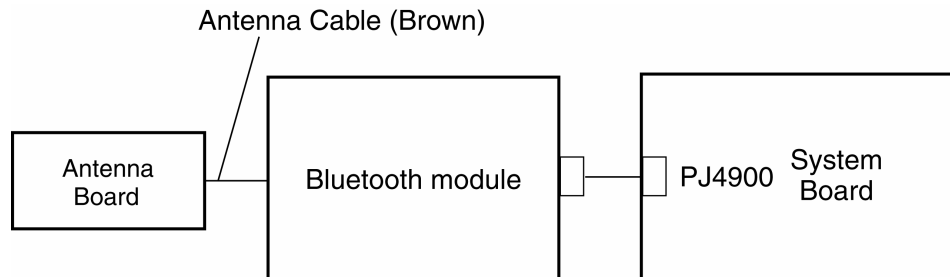
Check 2 Execute test program **ICH_BT53.EXE** to check the transmitting-receiving function of the Bluetooth. You will need a second computer that can communicate by the Bluetooth. Perform the test following the instructions described in Chapter 3, *Bluetooth Test Program (ICH_BT53.EXE)*.

If the computer passes *the* test, the function is correctly working. If the computer does not pass the test, go to check 3.

Check 3 The Bluetooth board may be defective or damaged. Replace it with a new one. And perform the test program again. If the computer still does not pass the test, go to Procedure 2.

Procedure 2 Antennas' Connection Check

The Bluetooth function wiring diagram is shown below:



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

Check 1 Make sure the wireless communication switch on the side of the computer is set to “On”.

If the switch is set to “Off”, turn it “On”. If the Bluetooth module is still not functioning properly, perform Check 2.

Check 2 Make sure the Bluetooth module is firmly connected to PJ4900 on the system board.

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

Check 3 Make sure the Bluetooth antenna cable (brown) is firmly connected to the Bluetooth module.

If the Bluetooth antenna cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function is still not functioning properly, go to 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 Bluetooth slot cover and lift it off. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling.
 2. Disconnect the Bluetooth antenna cable connected to the Bluetooth module.
 3. Connect the end of the antenna test cable to the multimeter.
 4. Connect the Bluetooth antenna cable to the antenna test cable. One clip is connected to the end of the Bluetooth antenna cable. The other is connected to the opposite side of the Bluetooth antenna cable.
 5. Determine the resistance. The cable passes the test when the resistance is less than 5Ω . If it is more than 5Ω , the Bluetooth antenna cable fails the test.

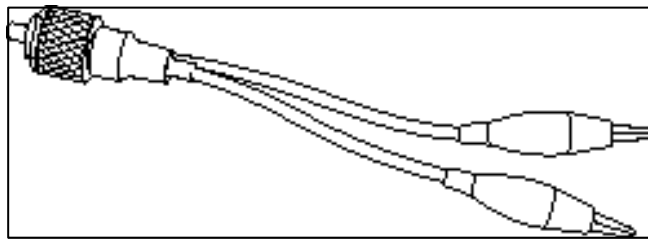


Figure 2-3 Antenna Test cable

- 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 0.5-0.8 ohm.*
 2. *The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.*

If the Bluetooth antenna cable pass the test, connect it to the Bluetooth module and cover the slot, then perform Procedure 1.

If the Bluetooth antenna cable does not pass the test, go to Procedure 4.

Procedure 4 Replacement Check

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

2.14 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 switch on the left side of the computer is turned ON. If it is not, slide the switch toward the back of the computer to turn it on.

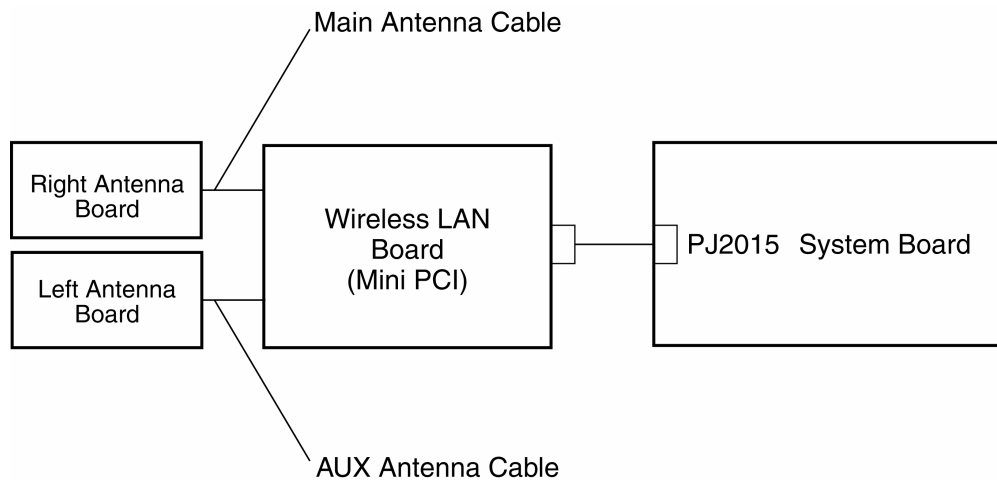
Check 1 Execute the test program to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN. Perform the test following the instructions described in Section 3.16-18, *Wireless LAN Test Program*.

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:



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 Bluetooth module is still not functioning properly, perform Check 2.

Check 2 Make sure the wireless LAN board is firmly connected to PJ2015 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 board.

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, go to 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 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 less than 5 ohm. If it is more than 5 ohm, the Bluetooth antenna cable fails the test.
 6. Change the antenna cable. Perform from step 3 to check the black antenna cable.

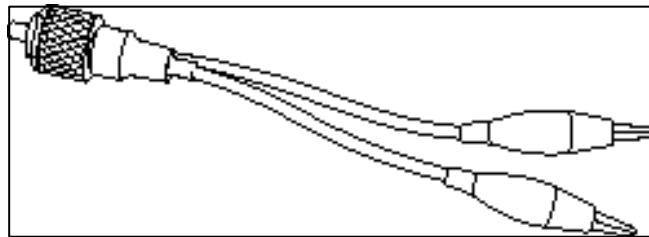


Figure 2-4 Antenna Test cable

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 0.5-0.8 ohm.
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, and the system board are connected to the circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

- Check 1 The wireless LAN board may be defective or damaged. Replace the board with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check2.
- Check 2 The system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

2.15 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

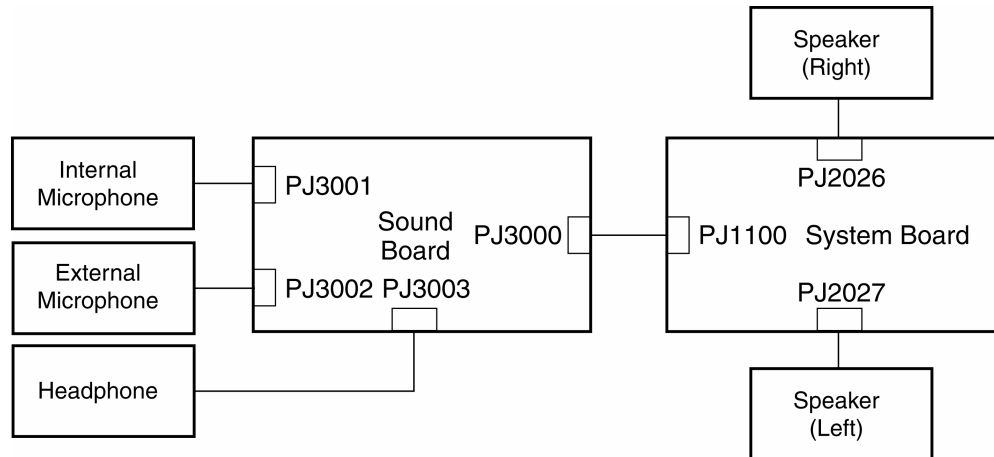
Procedure 1 Diagnostic Test Program Execution Check

The Sound/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 the headphone do not work correctly, perform Check 2.

If the microphone 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 right speaker cable is firmly connected to PJ2026 on the system board and the left speaker cable is firmly connected to PJ2027 on the system board. If the stereo speakers are still not functioning properly, go to Procedure 3.
- Check 2** If the headphone do not work properly, the headphone cable may be disconnected. Make sure the headphone cable is firmly connected to PJ3003 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 microphone function does not work properly, the internal microphone cable or external microphone cable may be disconnected. When the internal microphone malfunctions, make sure the internal microphone cable is firmly connected to PJ3001 on the sound board, and PJ3000 on the sound board is firmly connected to PJ1100 on the system board. When using the external microphone, make sure the external microphone cable is firmly connected to PJ3002 on the system board. If the microphone is still not functioning properly, go to Procedure 3.

Procedure 3 Replacement Check

- Check 1 If the stereo speakers do not sound properly, the right or left speaker may be defective or damaged. Replace it with a new one. If the stereo speakers still do not work properly, go to Check 5.
- Check 2 If the headphone don't sound properly, the headphone jack may be defective or damaged. Replace it with a new one. If the sound function still does not work properly, go to Check 5.
- Check 3 If the microphone does not work properly, the microphone cable may be defective or damaged. Replace it with a new one. If the microphone still does not work properly, go to Check 4.
- Check 4 The sound board or system board may be defective or damaged. Replace it with a new one.

2.16 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

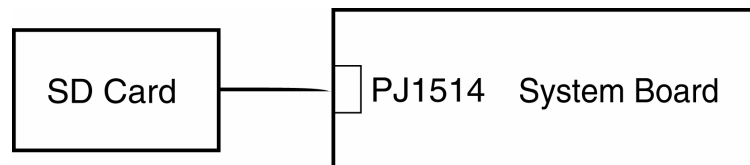
Procedure 1 Check on Windows

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

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

Procedure 2 Connector/Replacement Check

The SD card is connected to PJ1514 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 PJ1514 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

3.1	The Diagnostic Test.....	3-1
3.2	Executing the Diagnostic Test	3-3
3.3	Subtest Names.....	3-7
3.4	System Test	3-10
3.5	Memory Test.....	3-13
3.6	Keyboard Test.....	3-15
3.7	Display Test.....	3-19
3.8	Floppy Disk Test	3-23
3.9	Printer Test	3-25
3.10	Async Test.....	3-27
3.11	Hard Disk Test	3-29
3.12	Real Timer Test.....	3-32
3.13	NDP Test.....	3-34
3.14	Expansion Test.....	3-35
3.15	CD-ROM/DVD-ROM Test	3-36
3.16	Wireless LAN Test (Agere)	3-37
3.17	Wireless LAN Test (Atheros).....	3-42
3.18	Wireless LAN Test (Caelxico)	3-45
3.19	Sound/Modem Test	3-46
3.20	IEEE1394 Test.....	3-50
3.21	Bluetooth Test.....	3-52
3.22	Error Code and Error Status Names.....	3-61
3.23	Hard Disk Test Detail Status	3-64
3.24	Head Cleaning	3-66
	3.24.1 Function Description.....	3-66
	3.24.2 Operations	3-66
3.25	Log Utilities.....	3-67
	3.25.1 Function Description.....	3-67

3.25.2	Operations	3-67
3.26	Running Test.....	3-69
3.26.1	Function Description.....	3-69
3.26.2	Operations	3-69
3.27	Floppy Disk Drive Utilities.....	3-71
3.27.1	Function Description.....	3-71
3.27.2	Operations	3-72
3.28	System Configuration.....	3-76
3.28.1	Function Description.....	3-76
3.28.2	Operations	3-77
3.29	SETUP	3-78
3.29.1	Function Description.....	3-78
3.29.2	Accessing the SETUP Program.....	3-80

Tables

Table 3-1	Subtest names.....	3-7
Table 3-2	Error code for Bluetooth test (BD_ADDR).....	3-55
Table 3-3	Error code for Bluetooth test (BD_ADDR of the DUT)	3-59
Table 3-4	Error codes and error status names.....	3-61
Table 3-5	Hard disk controller status register contents	3-64
Table 3-6	Error register contents	3-65

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).

NOTE: 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 eight functions.

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

The DIAGNOSTIC TEST MENU contains the following eleven functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST
- CD-ROM/DVD-ROM TEST

Other tests as follows

- WIRELESS LAN (Agere) TEST
- WIRELESS LAN (Atheros) TEST

- WIRELESS LAN (Calexico) TEST
- SOUND/MODEM TEST
- IEEE1394 TEST
- BLUETOOTH 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) (Rev.B or higher)
- A printer wraparound connector for the printer wraparound test (Printer test)
- A CD test media (TOSHIBA CD-ROM TEST DISK ZA1217P01/P000204190) (CD-ROM/DVD-ROM test)
- A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1) (CD-ROM/DVD-ROM test)
- CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)
- External CRT (Display test)
- PS/2 or compatible keyboard (Keyboard test)
- PS/2 or compatible mouse (Keyboard test)
- Serial port wraparound connector (ASYNC 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)
- An access point and a cross cable (Wireless LAN (Calexico) test)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.24 through 3.29 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 **U**.
(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  xxxxxxxx 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
0 - SETUP
```

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

NOTE: To exit the DIAGNOSTIC TEST MENU, press **Esc**. If a test program is in progress, press **Ctrl + Break** to exit the test program, 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 XXXX 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 -
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU
```

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

Refer to sections 3.4 through 3.15 for detailed descriptions of each Diagnostic Tests 1 through 13. Function 88 sets the floppy disk drive and hard disk drive error retry count. Function 99 exits the submenus of the Diagnostic Test and returns to the Diagnostic Menu.

3. Select the option you want to execute and press **Enter**. When “1-SYSTEM TEST” is selected, the following message will appear:

SYSTEM TEST XXXXXXXX

<pre> XXXX DIAGNOSTIC TEST VX.XX [Ctrl]+[Break] : test end [Ctrl]+[C] : key stop </pre>
--

```

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

```

SUB-TEST MENU :

```

01 - ROM checksum
02 -
03 -
04 - Fan ON/OFF
05 - Gerserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 - CPU Temperature
99 - Exit to DIAGNOSTIC TEST MENU

```

```

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

```

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

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 the subtest menu to the main menu after the test is complete.

5. The following message will appear:

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

Then, use the left or right arrow keys to move the cursor to the desired option and press **Enter**.

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 3-4 in section 3.21 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 (1/3)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		04	Fan ON/OFF
		05	Gerserville
		06	Quick charge
		07	DMI read
		08	DMI write
		09	CPU Temperature
2	MEMORY	01	Conventional memory
		02	Protected mode
		03	PS/2 Mouse connect check
		04	Touch Pad/IPS
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		03	PS/2 Mouse connect check
		04	Touch Pad/IPS
		05	USB test
		07	InTouch/Presentation key
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
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wrap around

Table 3-1 Subtest names (2/3)

No.	Test Name	Subtest No.	Subtest Name		
7	ASYNC	01	Wrap around (board)		
		02	Point to point (send)		
		03	Point to point (receive)		
		04	Interrupt test		
		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		
		07	RW 1point W/R/C		
-	Wireless LAN (Agere)	1	Transmit & Receive test [Responder]		
		2	MAC Address test [Mini-PCI Wireless LAN]		
		3	Wireless LAN (WEP64/128) test		
		0	Transmit & Receive test [Initiator]		
-	Wireless LAN (Atheros)	1	Test PC [Initiator]		
		0	[Responder]		
-	Wireless LAN	1	Communication test		
		2	MAC address test		
-	SOUND/ MODEM	1	Microphone recording & play		
		2	Sin wave		
		4	Modem		
-	IEEE1394	1	IEEE1394 test		

		2	Responder test
		3	ID check

Table 3-1 Subtest names (3/3)

No.	Test Name	Subtest No.	Subtest Name
-	Bluetooth	1	BD_ADDR check
		2	Communication test

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 on the System Board.

Subtest 04 Fan On/Off

This subtest checks CPU fan operation using the on/off command. The following message will appear when this subtest is executed. 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 Gerserville

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

Reads the factory setting for the serial and DMI numbers.

```
Model Name           : XXXXXXXX
Version Number       : XXXXXXXX-XXXXXX
Serial Number        : XXXXXXXXXXXX
Model Number         : XXXXXXXX-XXXXXX
PCN/BND Number       : XXXXXXXXXXXXXXXXXXXX
UUID Number          : XXXXXXXXXXXXXXXXXXXX
```


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

Subtest 08 DMI write

The following messages appear in order. When this subtest is executed. 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. TECRA M1)

2. "Enter Version Number ?"

Input the computer's version number and press **Enter**. (e.g. PS245U-AAA13)

3. "Enter Serial Number ?"

Input the computer's serial number and press **Enter**. (e.g. Z2020855JU)

4. "Enter Model Number ?"

Input the computer's sales model number and press **Enter**. (e.g. PS245U-AAA13)

5. "Enter Bundle Number ?"

Input the computer's PCN/Bundle number and press **Enter**. (e.g. PCN1190CCZ01/S3A1320D990)

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

When **Y** is press, the DMI information is written to the Flash-ROM.

Subtest 09 CPU Temperature

This subtest measures the CPU temperature to see if the cooling functions of the computer are effectively working.

When the subtest starts, the following message appears on the display:

```
CPU TEMP = XX deg C   Throttling level = XXXXh
```

The number of the CPU TEMP indicates the CPU temperature at the moment in decimal notation. For example, if the number is 57, the CPU temperature is 57 degrees.

The number of “Throttling level” indicates how much the CPU has slowed. This number takes one of the following three values:

0000h : The CPU is running full speed.

4000h : The CPU has slowed to 75% of its maximum speed.

8000h : The CPU has slowed to 50% of its maximum speed.

The subtest displays the message five times at intervals of one minute; therefore, it takes five minutes to complete the test. The computer passes the test if the CPU temperature is less than 70 degrees at the end of the test. If the temperature is 70 degrees or more, the computer fails the test, and an error message appears on the display.

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 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 to extended memory (maximum address 100000h) then reads the new data and compares the result with the original data.

The constant data is FFh, AAh, 55h, and 00h.

Subtest 04 **Cache Memory**

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

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → Fail

Subtest 05 **L2 Cache Memory**

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

Subtest 06 **Stress**

The conventional memory is provided with a write/read buffer (size 1b30 h) and creates write data in the write buffer. Subsequent to 1 MB, the data is written in the write buffer and is read into the read buffer, followed by a data comparison up to the maximum memory size.

3.6 Keyboard Test

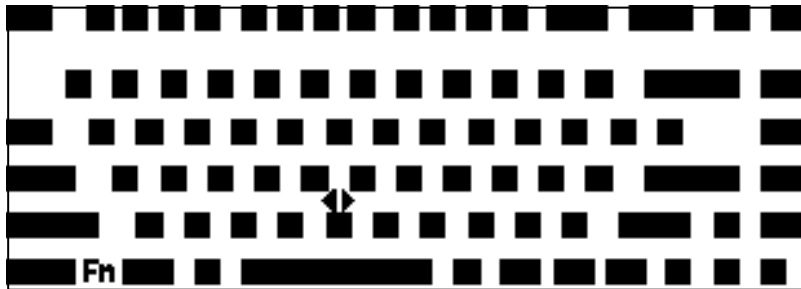
To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Pressed Key Display

***NOTE:** The **Num Lock** and the **Overlay** mode must be off to execute this subtest.*

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 that was pressed. Holding a key down enables the auto-repeat function, which causes the key's display character to blink.

To exit this subtest, press **Del + Enter**.



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**, **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 03 PS/2 Mouse Connect Check

NOTE: To execute the PS/2 mouse connect check, a PS/2 mouse must be connected to the computer before the power is turned on.

This subtest checks whether a PS/2 mouse is connected or not.
If this test does not detect an error, it returns to the subtest menu.
If this test detects an error, the following message appears.

DATA COMPARE ERROR

[[HALT OPERATION]]

1: Test end
2: Continue
3: Retry

Subtest 04 Touch Pad/IPS

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

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

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

```

***** IPS (4-Button) TEST (Vx. xx) *****
< DIRECTION >      < PARAMETER > <LAT>
                    STATUS:0000
                    X-RATE:0000
                    Y-RATE:0000
                    Z-RATE:0000
o  [ < BUTTONS > ]
    <                >
        <                >
<< Press Bt1+Bt2+UP+DW (Lat) Then exit >>

```

```

***** IPS (4-Button) TEST (Vx. xx) *****
< DIRECTION >      < PARAMETER > <LAT>
                    STATUS:0018  [Bt nUP]
                    X-RATE:00FF  [Bt nDW]
                    Y-RATE:0001  [Bt n-1]
                    Z-RATE:0000  [Bt n-2]
o  [ < BUTTONS > ]
    [BtUP]          [BtDW]
    < [Button1-ON] >
      [Button1-ON]
    < [Bt2-ON]    >
      [Bt2-ON]
<< Press Bt1+Bt2+UP+DW (Lat) Then exit >>

```


To check only the USB mouse, follow the procedures below:

Connect the USB mouse to the computer's USB connector.

Next, set up the computer's hardware as follows:

PERIPHERAL

Internal Pointing Device = Simultaneous
USB Legacy Emulation = Enabled

Then, perform the Pointing Stick Diagnostic Test and make sure:

- The cursor moves in the direction that you move the USB mouse.
- The display reverses when you click the right button or left button

To stop this test, press the two IPS buttons on the computer at the same time. (You cannot use the USB mouse to stop the test.)

Subtest 05 USB 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, 3:Port2) ?
```

If the test ends successfully, OK is displayed. If nothing is displayed, there may be a problem with the USB port. Check the wraparound connection and repeat the test.

Subtest 07 InTouch/Presentation key

When this subtest displays messages shown below in order, press the corresponding button.

NOTE: This subtest must be completed within 10 seconds.

```
Press [ InTouch ] key  
Press [ Presentation ] key
```

3.7 Display Test

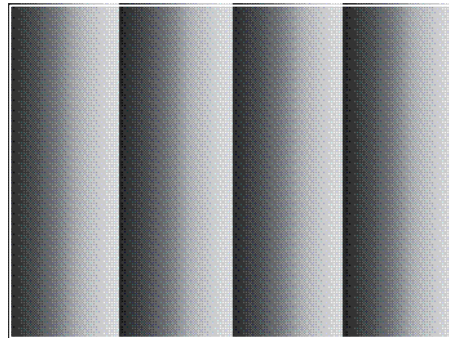
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains seven subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM Read/Write for VGA

This subtest writes constant data AAh and 55h and address data to video RAM 8MB. This data is then read from the video RAM 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 several horizontal bands of multiple color, followed by red, green and blue bars. Each bar displays black on the top and the brightest color at the bottom.

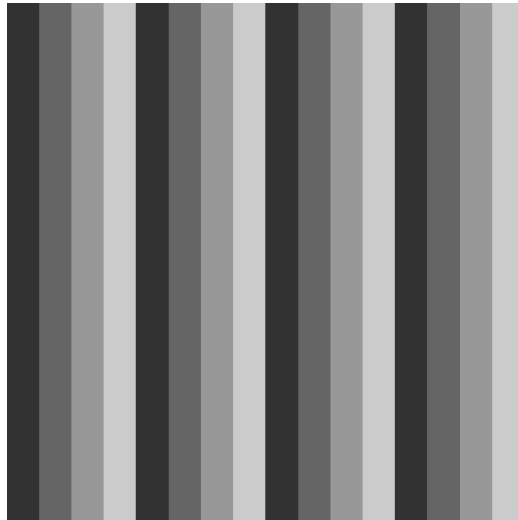
Next, this subtest displays full screen of eight colors: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white.

Each color displays for three seconds.

Subtest 04 Gradation & Mode test for VGA

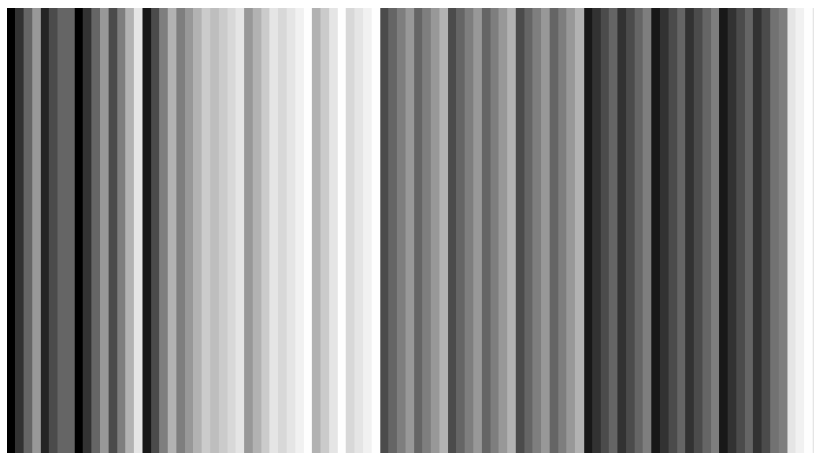
This subtest displays gradations for each mode. Execute the test, then press **Enter** to change the mode.

The display below appears on the screen when this subtest is executed. Pressing **Enter** changes the size of the displayed image.



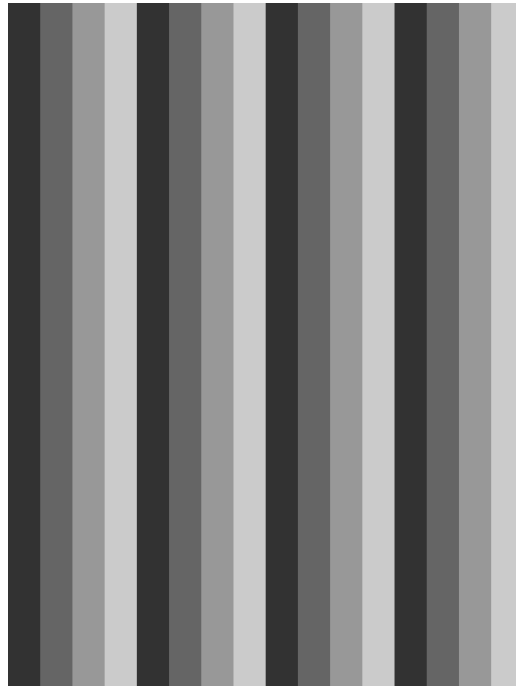
[Mode 12]

Pressing **Enter** changes the size of the displayed image.



[Mode 13]

Pressing **Enter** changes the size of the displayed image.



[Mode 3]

Pressing **Enter** changes the size of the displayed image in the following order:

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 111 640*480 64K]

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break**.

Subtest 05 All Dot On /Off for LCD

This subtest displays an all-white screen (all dots on) for three seconds then an all-black screen (all dots off) for three seconds.

Subtest 06 “H” Pattern Display

This subtest displays a full screen of “H” patterns.

```

HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH

```

To exit this subtest and return to the DISPLAY TEST menu, **Ctrl + Break**.

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

Subtest 07 LCD Brightness

The LCD brightness changes in the following order:

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

The display switches automatically every three seconds and returns to the DISPLAY TEST menu.

3.8 Floppy Disk Test

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

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter**.

1. The following messages will appear. Specify the start track of the floppy disk drive to be tested.

```
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.

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

```
Floppy Disk      XXXXXXXX

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

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

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.

The start track is specified at the start of the FDD test. Refer to 1. in this section.

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 place pointed by track, head, and address.

Subtest 05 Read specified address

This subtest reads data from a place pointed by 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 Printer Test contains three subtests that test the output of the printer connected to the computer. 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 when the printer test is selected:

```
channel#1 = XXXXh
channel#2 = XXXXh
channel#3 = XXXXh
Select the channel number (1-3) ?
```

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

Subtest 01 Ripple Pattern

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

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


Subtest 02 Function

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

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

This subtest prints the various print types shown below:

```

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

```

Subtest 03 Wrap around

***NOTE:** To execute this subtest, a printer wraparound connector must be connected to the printer port in the Port Replicator. The printer wraparound connector (34M741986G01) 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.

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. The Async test contains two subtests that test the asynchronous communication functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtests require the following data format:

Method:	Asynchronous
Speed:	9600BPS (Subtests 01 to 04) 38400BPS (Subtests 06, 07)
Data:	8 bits and one parity bit (EVEN)
Data pattern:	20h to 7Eh

The following message will appear at the bottom of the screen when the subtest 01, 02 or 03 are selected.

```
Channel#1 = XXXXh  
Channel#2 = XXXXh  
Channel#3 = XXXXh  
Select the Channel number (1/2/3)
```

The serial I/O port address is specified by the XXXXh number. Select the serial port channel number and press **Enter** to start the subtest.

Subtest 01 Wraparound (board)

NOTE: To execute this subtest an RS-232C wraparound connector (34M741621G01) must be connected to the RS-232C port. The RS-232C wraparound connector wiring diagram is described in Appendix F.

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

Subtest 02 Point to Point (send)

NOTE: To execute this subtest, two machines must be connected with an RS-232C direct cable. One machine should be set as “send”(subtest 02) and the other set as “receive” (subtest 03). The wiring diagram for the RS-232C direct cable is described in Appendix F.

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

Subtest 03 Point to Point (receive)

This subtest is used with subtest 02 described above. This subtest receives the data from the send side, then sends the received data.

Subtest 04 Interrupt Test

This subtest checks the Interrupt Request Level of IRQ 4, 3 and 5 from the send side.

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. The hard disk test contains ten subtests that test the hard disk drive functions.

NOTE: To execute the subtest 02,03,04,06,09 or 10, the system requires you to enter password.

The contents of the hard disk will be erased when the subtest 02, 03, 04, 06,09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy 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.

After selecting the hard disk test from the DIAGNOSTIC TEST MENU, answer each of the questions with an appropriate response to execute the test.

1. Select the hard disk drive number to be tested.

Test drive number select (1:HDD#1, 2:HDD#2, 0:HDD1&2)

2. This message is used to select the retry operation when the hard disk controller detects an error. Select **yes** or **no**.

HDC F/W error retry (1:yes, 2:no) ?

3. 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) ?

4. This message is used to select whether or not the HDD status is displayed on the screen. The HDD status is described in section 3.19. Select yes or no.

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

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

```
HARD DISK TEST      XXXXXXXX

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 3-4.

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:

- Forward sequential
- Reverse sequential
- Random

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on the HDD cylinder, head and sector. 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.

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 that 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. The real timer test contains three Subtests that test the computer's real timer functions. 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 the subtest 01 and the following message 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**. To enter ":", press **Shift + ;**. The date is updated and the following prompt will appear:

```
Enter new time :
```

3. If the current time is not correct, input the correct time in 24-hour format and press **Enter**. The time is updated.

Subtest 02 Backup Memory

This Subtest performs the following backup memory check:

```
Writes 1-bit of "on" data to address 01h through 80h
```

```
Writes 1-bit of "off" data to address 0Eh through 80h
```

```
Writes the data pattern AAh and 55h to the RTC 114-byte memory  
(address 0Eh to 7Fh)
```

The Subtest reads and compares this data with the original data.

To exit, press **Ctrl + Break**.

Subtest 03 Real Time Carry

CAUTION: *When you execute this Subtest, 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 : 12-31-2001
Current time : 23:59:58

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. The NDP test contains one Subtest that tests the computer's NDP functions.

Subtest 01 NDP

This test checks the following functions of the coprocessor:

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

Press **Ctrl + Break** to exit.

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. The expansion test contains two subtests.

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

Subtest 01 PCMCIA Wraparound

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

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

This subtest is executed in the following order:

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

NOTE: When the subtest 01 is executed, the following message will appear: Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

Select the slot to test.

Subtest 03 RGB monitor ID

For this test, the computer must be in CRT mode. Connect the CRT (an RGB monitor) with the external monitor port.

3.15 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The CD-ROM/DVD-ROM test contains six Subtests that test the computer's CD-ROM/DVD-ROM functions.

NOTE: Make sure the CD-ROM driver (CDRNEW.COM) is installed and insert the test menu media CD (TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)). For the DVD-ROM test, insert the media CD (Toshiba-EMI TEST DISK TSD-1).

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)

NOTE: You cannot use the Toshiba-EMI DVD-ROM TEST DISK TSD-1 for Subtest 04. For this test, use an ordinary music CD.

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

Subtest 05 RW 1 point W/R/C

This subtest performs the CD-RW drive test.

NOTE: For the CD-RW drive test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)

3.16 Wireless LAN Test (Agere)

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

NOTE: Use another computer (with Agere wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform this test.

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

NOTE: 1) 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.)
2) Release the write-protection of the floppy disk for the test.

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

```
#####
#### Wireless LAN sub system repair test VX.XX ####
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test            *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****
...Press test number [1-3,0] ?
```

Press 1, 2 or 3, and the **Enter** to perform the corresponding sub test. To quit the Wireless LAN test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest 01 Transmit & Receive test

This sub test checks transmit and receive functions.

Transmit test

Press **1** to select the test and press **Enter** in the target machine as a responder. The following message will appear:

```
#####
#### Wireless LAN sub system repair test VX.XX ####
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test            *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****

...Press test number [1-2,0] ?1

===== RESPONDER SET =====

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
```

To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **0** to select the test and press **Enter** in the initiator machine. The following message will appear:

```
#####
#### Wireless LAN sub system repair test VX.XX ####
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****

...Press test number [1-2,0] ?1

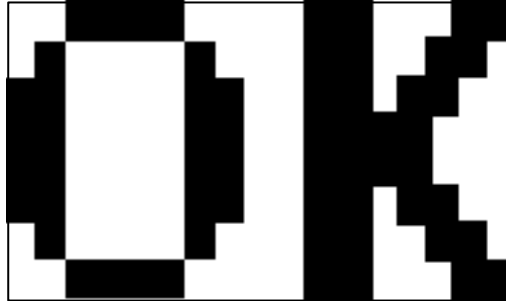
===== RESPONDER SET =====

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbp
  PASS : 134 ERROR : 0
```

When the machine has passed the test, “OK” message will appear in the test machine.



Then press **Enter** in the target machine; the “OK” message will appear also in the target machine.

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

Receive test

In receive test reverse the procedures of the transmit test. To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **1** to select the test and press **Enter**. The following message will appear:

```
#####
### Wireless LAN sub system repair test VX.XX ###
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test            *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****

...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
  PASS : 134 ERROR : 0
```

Press **0** to select the test and press **Enter** in the target machine. The following message will appear:

```
#####
#### Wireless LAN sub system repair test VX.XX ####
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test           *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****

...Press test number [1-2,0] ?1
===== RESPONDER SET =====

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
```

When the machine has passed the test, “OK” message will appear in the target machine.



Then press **Enter** in the test machine; the “OK” message will appear also in the test machine.

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

Subtest 02 Mac Address test

This subtest reads MAC Address. If there is no problem, the “OK” message will appear.

Subtest 03 Wireless LAN (WEP64/128) test

This subtest reads the WEP of the wireless LAN card installed in the target machine. A message similar to the following will appear:

```
***** This CARD is WEP *****  
Press any key to continue
```

3.17 Wireless LAN Test (Atheros)

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

NOTE: Use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform this test.

In this test, the following items are tested:

- * Test PC [Initiator] side
 - (1) SKU (destination code) check
 - (2) Mac Address check
 - (3) Communication test (802.11a Main antenna)
 - (4) Communication test (802.11a Sub antenna)
 - (5) Communication test (802.11b)

- * [Responder] side
 - (1) Communication test (802.11b)

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.

NOTE: This program takes a long time until the test ends.

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 FDD for 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 FDD of the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

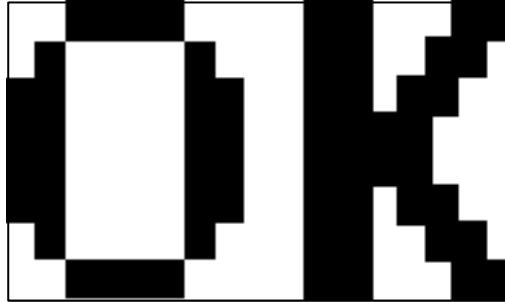
```
#####
####   Atheros WLAN sub system repair test  VX.XX   ####
#####
*
*       1 .....Test PC [Initiator]                    *
*
*       0 .....[Responder]                             *
*
*****
...Press test number [1,0] ?
```

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.

3.18 Wireless LAN Test (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 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 !" message 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 !!
*
*****
```

3.19 Sound/Modem Test

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

CAUTION: *The system is capable of producing high volume sound. When you use a headphone, be careful to set the volume low and adjust it as necessary. Using a headphone at full volume might damage your ears.*

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

- (a) Insert the test program 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:

```
#####
####          XXXXXXXXXXXX  DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)  #####
#####
*
*          1      ( Microphoned Recording & play )          *
*          2      ( Sin wave )                               *
*          4      ( MODEM )                                  *
*
*****
....Press test number [1-4] ? _
```

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

Subtest 01 Microphoned recording & play

This subtest checks the function of the CODEC A/D D/A converter. Both the microphone and headphone terminal 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[1-4] ? pause
```

Press any key, and the following two messages appear.

```
Press any key to continue...
....Press test number[1-4] ? call micrec
```

The sound is recorded for five seconds automatically from the microphone. After the recording is completed, the computer immediately plays back the sound recorded. When the playing is finished, a message similar to the one below appears.

```
Completing            SoundMAX/ICH microphone capture test
End time             XXX XXX XX XX*XX:XX XXXX
System Status        0x0
```

```
Performing SoundMAX/ICH play buffer to line out
Start Time:         XXX XXX XX XX:XX:XX XXXX
```

```
Play to destination is LINEOUT
Volume requested is X.XXX dB
Play from buffer name is BUFFER0
Requested play time is 5.000 seconds.
Actual play time will be 5.000 seconds.
```

```
Completing SoundMAX/ICH play buffer to line out
End Time XXX XXX XX :XX:XX XXXX
System Status        0x0
```

```
Test completed at XXX XXX XX :XX:XX XXXX
System completion code was 0x0
```

Then, the screen returns to the main menu and the following message will appear.

```
....Press test number[1-4] ?
```

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 the computer off.

Subtest 02 Sin Wave

This subtest is executed by the load format of COM file (ADSIN.COM). The program expands sin wave data table to data in 16-64KB, and creates play data (It sounds like continuous beep). By using wave measuring devices such as an oscilloscope, this program can read sine wave without expanding.

When the subtest is executed, the following message appears.

```
....Press test number[1-4] ? pause  
Press any key to continue...
```

Press any key, and the following message appears. Then sin wave is expanded to 16-64KB data and is played.

```
....Press test number[1-4] ? call sin
```

When the beep sound finished, the screen returns to the main menu and the following message appears.

```
....Press test number [1-4] ?
```

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

Subtest 04 Modem Test

- (a) Select **4** to execute and press **Enter**. The following message will appear:

```
ICHX MDC Test Program with Modem Sound ( PCB Interface )
Version X.X

* Scorpio Modem Initialize           :OK
* Digital Loopback Test             :OK
* Modem Sound Test                   :( Operator's Check!! )
```

- (b) 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.*

- (c) After you press Y or N, the RJ11 Connection Check (LED) ((Operator's Check LED)) test will execute, 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**.

Press **Enter** to return to Main Menu.

3.20 IEEE1394 Test Program

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

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:

```

*****
*          -----
*          IEEE1394 [TSB!"LV28] test menu ( For Repair ) VX.XX
*          -----
*
*          =====          Select test No. and[Enter]          =====
*
*          1  : ... Ieee1384 test
*          2  : ... Responder tool
*          3  : ... ID Check
*
*****
Select [1-3]?

```

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

Subtest 01 IEEE1394 test

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

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

Subtest 02 Responder tool

This program initializes the machine responder.

Subtest 03 ID Check

This program checks the GUID.

3.21 Bluetooth Test

This section describes how to perform the Bluetooth test program to check if the Bluetooth functions of computer are working properly. To start the Bluetooth test program, follow the steps below:

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

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

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

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

Subtest 01 BD_ADDR check

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

```

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

Initializing ...

```

When the machine has passed the test, it displays **BD_ADDR**. If **BD_ADDR** has no problem, the following message is displayed.

```

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

My BD_ADDR = XXXXXXXXXXXX [h]

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

```

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

```
-----  
-  
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.  
-----  
-  
  
My BD_ADDR = XXXXXXXXXXXX [h]  
  
FFFFF  A    III  L  
F      A A   I   L  
F      A  A   I   L  
FFFFF  A    A   I   L  
F      AAAAAA I   L  
F      A  A   I   L  
F      A  A   III  LLLLLL
```

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

The error code begins with the least significant digit.

Error code

Table 3-2 Error code for Bluetooth test (BD_ADDR) (1/2)

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

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

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

```

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

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

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

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

```

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

  CCCC   OOO   M   M PPPPPP L   EEEEEEE TTTTTTT EEEEEEE DDDDD
  C  C  O  O MM  MM P   P L   E           T   E           D   D
  C     O    O M M M M P   P L   E           T   E           D   D
  C     O    O M  M  M PPPPPP L   EEEEEEE T   EEEEEEE D   D
  C     O    O M   M P     L   E           T   E           D   D
  C  C  O  O M   M P     L   E           T   E           D   D
  CCCC   OOO   M   M P     LLLLLLL EEEEEEE T   EEEEEEE DDDDD

Testing is finished
    
```

```
A>_
```

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

```

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

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

                                Testing is finished

_Press any key to continue. . .

```

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

The error code begins with the least significant digit.

Error code

Table 3-3 Error code for Bluetooth test (BD_ADDR of the DUT) (1/2)

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

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

Table 3-3 Error code for Bluetooth test (BD_ADDR of the DUT) (2/2)

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

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

3.22 Error Code and Error Status Names

Table 3-4 lists the error codes and error status names for the Diagnostic Test.

Table 3-4 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
Memory	01 02 14 DD DE DF	Parity Error Protected Mode Not Changed Memory Read/Write Error Cache Memory Error 2 Cache Error TAG-RAM Error
FDD	01 02 03 04 06 08 09 10 20 40 60 80 EE	Bad Command Address Mark Not Found Write Protected Record Not Found Media Removed DMA Overrun Error DMA Boundary Error CRC Error FDC Error Seek Error FDD Not Drive Error Time Out Error Write Buffer Error
Printer	01 08 10 20 40 80	Time Out Fault Select Line Out Of Paper Power Off Busy Line

Table 3-4 Error codes and error status names (2/3)

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

Table 3-4 Error codes and error status names (3/3)

Device name	Error code	Error status name
Expansion	C1	Address Line Error
	C2	REG# Line Error
	C3	CE#1 Line Error
	C4	CE#2 Line Error
	C5	DATA Line Error
	C6	WAIT Line Error
	C7	BSY# Line Error
	C8	BVD1 Line Error
	CD	No PCMCIA
	CE	Card Type Error
CD/DVD-ROM	01	Bad Command
	02	Illegal Length
	03	Unit Attention
	04	Media Change Request
	05	Media Detected
	06	Additional Sense
	09	Boundary Error
	11	Corrected Data Error
	20	Drive Not Ready
	40	Seek Error
	80	Time Out
90	Reset Error	
BO	Address 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

3.23 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 3-5 and 3-6.

Table 3-5 Hard disk controller status register contents

Bit	Name	Description
7	BSY (Busy)	"0" ... HDC is ready. "1" ... HDC is busy.
6	DRDY (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	CORR (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 3-6 Error register contents

Bit	Name	Description
7	BBK1 (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	IDNF (Identification)	"0" ... Not used "1" ... There was no ID field in the requested sector.
3	—	Not used
2	ABRT (Abort)	"0" ... Not used "1" ... Illegal command error or a drive status error occurred.
1	TK00 (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.

3.24 Head Cleaning

3.24.1 Function Description

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

3.24.2 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 following message appears, the FDD head cleaning has begun.

```
cleaning start
```

4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

2. The error information displayed on the screen can be manipulated by the following number keys:
 - 1** scrolls the display to the next page.
 - 2** scrolls the display to the previous page.
 - 3** returns to the Diagnostic Menu.
 - 4** erases all error log information in RAM.
 - 5** outputs the error log information to a printer.
 - 6** reads the log information from a floppy disk.
 - 7** 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.

3.26 Running Test

3.26.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 04, and 06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01 and 05)
7. Printer test (subtest 03) if selected
8. Async test (subtest 01) (not supported in this model)

3.26.2 Operations

***NOTE:** 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 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 **No** and press **Enter**. The following message will appear:

```
Mount the work disk(s) on the drive(s),  
then press [Enter] key.  
[Warning : The contents of the disk(s),  
will be destroyed.]
```

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

3.27 Floppy Disk Drive Utilities

3.27.1 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 5.25-inch or 3.5-inch floppy disk in the following formats:

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

2. COPY

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

3. DUMP

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

4. HDD ID

This program reads the hard disk ID and displays the hard disk ID, serial number and other hard disk information.

3.27.2 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.

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

Copy start

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

- (d) Remove the source disk from the FDD, insert a formatted work disk and press any key. The [[track, head = XXX X]] message will appear and start copying to the target disk. When the amount of data is too large to be copied in one operation, the message from step (b) displays again. After the floppy disk has been copied, the following message will appear:

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

- (e) To copy another disk, type **1** and the message from step (a) displays 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) When FDD is selected, the following message appears. Select a format type number. When HDD is selected, the display will go to step (g).

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

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

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

- (d) Select a media type number and the following message will appear:

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

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

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

- (f) Set the track number, head number and sector number you want to dump. The system will access the disk and dump a list and the following message appears. Select
- 3**
- to end the list display.

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

- (g) When HDD is selected in step (a), the following message appears.

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

- (h) Select a drive number. Then the following message appears.

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

- (i) Enter a LBA number, Then the system accesses the disk and dumps a list.

- (j) The following message appears. Select 3 to end the list display.

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

(k) The following message appears. Select 2 to return to the FDD UTILITIES menu.

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

5. HDD-ID READ

Selecting HDD ID READ 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.

3.28 System Configuration

3.28.1 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
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. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. The number of floppy disk drives
18. The number of hard disk drives
19. Date/Time

3.28.2 Operations

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

```

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

* - Processor Type           = XXXX
**- VGA Controller          = XXXX
* - MS-DOS Version           = VX.XX
* - BIOS ROM Version         = VX.XX 1st ID = XXH, 2nd ID = XXH
* - BOOT ROM Version         = VX.XX
* - KBC Version              = VX.XX
* - PS Micom Version         = VX.XX ( EC Version = VX.XX )
* - Total Memory Size        = XXXXXMB ( Conventional Memory = XXXXXKB )
* - Battery Code             = XXXXXXXXXXXXX
**- Sound System            = XXXXX
* - X Printer Adapter        LPT1=XXXX LPT2=XXXX LPT3=XXXX
* - X ASYNC Adapter          COM1=XXXX COM2=XXXX COM3=XXXX
* -
* - X Math Co-Processor
* - X PCMCIA Slot
* - Modem                    = XXX
* - LAN                      = XXX
* - X Floppy Disk Drive(s)   Track =XX, Head =XX, Sector =XX
* - X Hard Disk Drive(s)     #1 Sectors =XXXXX (XX GB)
                             #2 Sectors =XXXXX (XX GB)

* -

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

```

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

3.29 SETUP

3.29.1 Function Description

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

1. Memory
 - (a) Total

2. System Date/Time
 - (a) Date (MM-DD-YYYY)
 - (b) Time (HH:MM:SS)

3. Battery
 - (a) Battery Save Mode

4. Password

5. Boot Priority
 - (a) Boot Priority
 - (b) HDD Priority

6. Display
 - (a) Power On Display
 - (b) TV Type

7. Others
 - (a) Power-up Mode
 - (b) CPU Cache
 - (c) Level 2 Cache
 - (d) Dynamic CPU Frequency Mode
 - (e) Auto Power On
 - (f) Panel Power On/Off

8. Configuration
 - (a) Device Config.

9. I/O Ports
 - (a) Serial

 - (b) Parallel

- 10. Drives I/O
 - (a) Built-in HDD
 - (b) Select Bay
- 11. PCI Bus
 - (a) PCI Bus
- 12. PC Card
 - (a) Controller Mode
- 13. Peripheral
 - (a) Internal Pointing Device
 - (b) Ext keyboard "Fn"
 - (c) Paralla Port Mode
 - (d) Hard Disk Mode
- 14. Legacy Emulation
 - (a) USB keyboard/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation
- 15. PCI LAN
 - (a) Built-in LAN
- 16. HDD Password
 - (a) HDD
 - (b) HDD Password Mode
 - (c) User Password

3.29.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the TSETUP screen. The TSETUP screen is divided into two pages: SYSTEM SETUP (1/2) and SYSTEM SETUP (2/2).

SYSTEM SETUP (1/2)		ACPI BIOS version = X.XX	
MEMORY Total = XXXXXXXKB		BOOT PRIORITY Boot Priority =HDD→FDD→CD-ROM→LAN HDD Rriority =Built-in HDD→Second HDD→PC Card	
SYSTEM DATE/TIME Date (MM-DD-YYYY) =XX-XX-XXXX Time (HH:MM:SS) =XX:XX:XX		DISPLAY Power On Display = Auto-Selected TV Type = NTSC	
BATTERY Battery Save Mode = Full Power		OTHERS Power-up mode = Boot CPU Cache = Enabled Level 2 Cache = Enabled Dynamic CPU Frequency Mode = Dynamically Switchable Auto Power On = Disabled Panel Power On/Off = Disabled	
PASSWORD Not Registerd			
HDD PASSWORD HDD = Built-in HDD HDD Password Mode = User only User Password = Not Registered			
SYSTEM SETUP (2/2)		ACPI BIOS version = X.XX	
CONFIGURATION Device Config. = Setup by OS		PC CARD Controller Mode = Auto-Selected	
I/O PORTS Serial = COM1(3F8H/IRQ4) Parallel = LPT1(378/IRQ7/ch3)		PERIPHERAL Internal Fancing Device =Enabled Ext keyboard "Fn" =Disabled Parallel Port Mode =ECP Hard Disk Mode =Enhanced	
DRIVES I/O Built-in HDD = Primary IDE(1F0H/IRG14) Select Bay =Secondary IDE(170H/IRQ15)		LEGACY EMULATION USB KB/Mouse Legacy Emulation = Enabled USB-FDD Legacy Emulation = Enabled	
PCI BUS PCI BUS = IRQ11		PCI LAN Built-in LAN = Enabled	

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

NOTE: 1) *Panel Power On/Off under OTHERS appears only when the Power-up Mode is in Resume mode.*

2) *USB FDD Legacy Emulation under LEGACY EMULATION appears only when Floppy Disk I/O is set to Disabled.*

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press **PgDn** and **PgUp** to move between the two pages. Press ↑ and ↓ to move between items in a column.
2. Press either the **space bar** to change the value.

Accepting Changes and Exiting the SETUP Window

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

The following message is displayed:

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

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

NOTE: You can press **Esc** to quit at any time without saving changes. *SETUP* asks you to confirm that you do not want to save your changes toward User.

The Factory Preset Configuration

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

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

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

```
HDD Mode
Password
Write Policy in the CPU Cache
```

SETUP Options

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

1. Memory

This group of options displays the computer's memory.

(a) Total

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

2. System Date/Time

Use this option to set the computer's system date/time. Press \rightarrow to move the cursor to the right and press \leftarrow to move the cursor to the left. Press the **space bar** to increase the number and press **BkSp** to decrease the number.

(a) Date

Use this option to set the system date of the computer.

(b) Time

Use this option to set the system time of the computer.

3. Battery

This option is used to select Full Power, Low Power or User Setting of the battery save mode.

(a) Battery Save Mode

When User Setting is selected, the sub-window, BATTERY SAVE OPTION is displayed. The following set of options can be selected in the submenu.

Processing Speed

This feature changes the CPU processing speed.

High CPU operates at high speed. (Default)

Low CPU operates at low speed.

CPU Sleep Mode

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

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel's illumination off if you make no entry for the set period of time.

Disabled Disables display automatic power off.

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

HDD Auto Off

Use this option to set the duration of the HDD automatic power off function.

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

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility.

Semi-Bright Less than full brightness for saving power.

Cooling Method

If the CPU becomes too hot, the fan turns on or the processing speed is lowered automatically. When the CPU temperature falls to a normal range, the fan turns off.

Maximum performance Turns on fan first, then if necessary lowers CPU processing speed.

Battery optimized

Lowers the CPU processing speed first, then if necessary turns on the fan.

4. Password

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

Not Registered Change or remove the password. (Default)

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

5. Boot Priority

This tab sets the priority for booting the computer and the priority for the built-in HDD or optional secondary HDD.

(a) Boot Priority

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

NOTE: CD-ROM refers to a CD-ROM, DVD-ROM, CD-RW/DVD or DVD Multi drive.

(b) HDD Priority

This option enables to select the priority for the Built-in HDD, optional second HDD or PC card.

Built-in HDD ® Second HDD ® PC Card (Default)
Second HDD ® Built-in HDD ® PC Card
Built-in HDD ® PC Card ® Second HDD
Second HDD ® PC Card ® Built-in HDD
PC Card ® Built-in HDD ® Second HDD
PC Card ® Second HDD ® Built-in HDD

6. Display

This group of options configures the computer's display.

(a) Power On Display

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

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

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

NOTE: 1) When starting the computer in Resume mode, the last configuration is remembered. If data does not appear on the display you are using after starting in Resume mode, pressing **Fn+F5**.
2) Pressing **Fn+F5** changes the display setting in the order of internal LCD to simultaneous to external monitor.

(b) TV Type

This option lets you make settings for television display.

NTSC (Default)

PAL

7. Others

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

(a) Power-up Mode

Use this option to choose between resume and boot mode. This option can also be set by hotkeys.

Boot Turns on boot mode. (Default)

Resume Turns on resume mode.

(b) CPU Cache

Use this option to enable or disable the CPU cache.

Enabled Enables the CPU cache. (Default)

Disabled Disables the CPU cache.

When enabled is selected, a subwindow similar to the one below is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

OPTION	
Write policy	= Write-back

Write-back policy provides better system performance, because main memory is accessed only when necessary to update the cache contents with changes in main memory. Write-through policy accesses main memory every time data is handled by the processor.

(c) Level 2 Cache

Use this option to enable or disable the level 2 cache.

Enabled Enables the level 2 cache. (Default)

Disabled Disables the level 2 cache.

(d) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings.

Dynamically Switchable

Enables Intel SpeedStep technology. When the computer is in use, the CPU power consumption and clock speed are automatically switched when necessary. (Default)

Always High Disables Intel SpeedStep technology and always runs the processor at its fastest speed.

Always Low Disables Intel SpeedStep technology and always runs the processor at low power consumption and low speed.

(e) Auto Power On

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

OPTIONS	
Alarm Time	= 00:00:00
Alarm Date Option	= Disabled
Ring Indicator	= Disabled*
Wake-up on LAN	= Disabled**

* only for Modem Model **only for LAN Model

Alarm Time is set in the sequence of hours and minutes. Seconds cannot be changed. **Alarm Date Option** is set in the sequence of month and day. If Alarm Date is set to Disabled, the computer will be powered on at the same time every day. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

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

(f) Panel Power On/Off

This option sets the Panel Power On/Off function. It is effective only when Power-up Mode is set to Resume.

Enabled Enables the Panel Power On/Off.

Disabled Disables the Panel Power On/Off (Default)

8. Configuration

This option displays the configuration method.

The devices are initialized when the PNP OS loads.

Setup by OS First, devices necessary for loading the OS will be initialized. After the PNP OS loads, other devices will be initialized by the OS. In this case, setup of PC Cards will be fixed to “Auto-Selected,” and cannot be changed.
 (Default)

All Devices All devices will be initialized.

If you are using an OS that does not have PNP capacity, select “All Devices.”

The Display shows the following message:

Device Config. = All Devices

9. I/O ports

This option controls settings for the parallel port.

NOTE: Do not assign the same interrupt request level and I/O address to the serial port and PC card.

(a) Serial

Use this option to set the COM level for the serial port. The serial port interrupt request level (IRQ) and I/O port base address for each COM level is shown below:

COM level	Interrupt level	I/O address	
COM1	4	3F8H	(Serial port default)
COM2	3	2F8H	
COM3	4	3E8H	
COM3	5	3E8H	
COM3	7	3E8H	
COM4	3	2E8H	
COM4	5	2E8H	
COM4	7	2E8H	
Not Used	Disables port		

(b) Parallel

This option sets the interrupt request level (IRQ) and I/O port base address for the parallel port. When the Printer Port Mode is set to **Std. Bi-direct**, the options are:

LPT setting	Interrupt level	I/O address
LPT 1	7	378H
LPT 2	5	278H
LPT 3	7	3BCH
Not Used	Disables port	

When the Printer Port Mode (see settings below) is set to **ECP**, the DMA channel can also be set to **1**, **2** or **3**. The default is 3.

LPT setting	Interrupt level	I/O address	DMA channel
LPT 1	7	378H	3 (Parallel port default)
LPT 2	5	278H	3
LPT 3	7	3BCH	3
Not Used	Disables the port		

When you select one of the above options, except for **Not Used**, a subwindow similar to the one below appears to let you set the DMA. The options for this setting are Channel 1 and Channel 3 (Default).

OPTIONS	
DMA	= Channel 3 (Default)

For most printers, the port should be set to **ECP**. With some other parallel devices, the setting should be **Std. Bi-Direct**.

10. Drives I/O

This option displays the address and interrupt level for hard disk drive, CD/DVD-ROM drive and PC card. It is for information only and cannot be changed.

(a) Built-in HDD

Primary IDE (1F0H/IRQ14) The Built-in HDD is ready for use.

No Drive The Built-in HDD is not installed.

(b) Select Bay

This option is displayed only when the hard disk drive or optical disk drive is installed to the select bay. **Secondary IDE (170H/IRQ15)** Computer Selectable Bay HDD.

(c) PC Card

When an ATA card is installed in IN13h, the sub window below is displayed.

DRIVES I/O	
Built-in HDD	= Primary IDE (1F0H/IRQ14)
ATA Card	= Others (190H/IRQ)

11. PCI Bus

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

PCI BUS = IRQ11

12. PC Card

This option sets the PC Card Controller mode. This option can be changed when "Device Config." is set to "All Devices".

Auto-Selected Use this setting for all PC Cards when OS supports Plug&Play. (Default)

PCIC Compatible Use this setting for PCIC compatible PC card.

CardBus/16-bit Use this setting when CardBus does not work properly in "Auto-Selected", or PC card supports 16-bit.

13. Peripheral

Use this option to select the parallel port mode and hard disk mode.

(a) Internal Pointing Device

This option enables and disables the Touch Pad.

Enabled Enables the Touch Pad. (Default)

Disabled Disables the Touch Pad.

(b) Ext Keyboard "Fn"

Use this option to set the Fn key equivalent when you are using an external keyboard. Selecting this option displays the following subwindow.

Enabled Enables the feature.

```

KEYBOARD
-----
Ext Keyboard "Fn" key equivalent
= Left Ctrl + Left Alt
  
```

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting an **Fn** key equivalent will enable

you to use “Hotkeys” by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

Left Ctrl + Left Alt*
Right Ctrl + Right Alt*
Left Alt + Left Shift
Right Alt + Right Shift
Left Alt + Caps Lock

*If these selections are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.

Disabled Disables the feature. (Default)

(c) Parallel Port Mode

The options in this tab are ECP and Standard Bi-directional.

ECP Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default)

Std. Bi-Direct.
 This setting should be used with some other parallel devices.

(d) Hard Disk Mode

Use this item to select the hard disk mode.

Enhanced IDE (Normal) Select this mode when using an operating system that supports Enhanced IDE. (Default)

Standard IDE Select this mode when using an operating system that does not support Enhanced IDE.

***NOTE:** Formats for Enhanced IDE and Standard IDE are different, so if you change the setting, you will have to reformat the hard disk for the appropriate setting.*

14. Legacy Emulation.

(a) USB keyboard/Mouse Legacy Emulation.

Use this option to enable or disable USB KB/Mouse Legacy Emulation. If your operating system does not support USB, you can still use a USB mouse and keyboard by setting the **USB KB/Mouse Legacy Emulation** item to **Enabled**.

Enabled USB Legacy Support can be used. (Default)

Disabled USB Legacy Support cannot be used.

(b) USB-FDD Legacy Emulation.

Use this option to enable or disable USB-FDD Legacy Emulation.

Enabled USB Legacy Support can be used. (Default)

Disabled USB Legacy Support cannot be used.

15. PCI LAN (Not used)

This option enables/disables the Built-in LAN functions.

(a) Built-in LAN

Enabled Enables Built-in LAN functions. (Default)

Disabled Disables Built-in LAN functions.

16. HDD Password

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

(a) HDD

This item selects the hard disk to set HDD password.

Built-in HDD Sets HDD password for the built-in HDD (Default)

Second HDD Sets HDD password for the second HDD

(b) HDD Password Mode

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

User Only Sets only User HDD Password (Default)

Master+User Sets Master HDD Password and User HDD Password

(c) User Password

This item sets User password.

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

Chapter 4

Replacement Procedures

4 Replacement Procedures

Chapter 4 Contents

4.1	General.....	4-1
4.2	Battery Pack.....	4-9
4.3	Optional PC Card.....	4-12
4.4	Optional SD Card.....	4-14
4.5	HDD.....	4-15
4.6	Slim Select Bay Module.....	4-20
4.7	Modem Daughter Card.....	4-24
4.8	CPU.....	4-27
4.9	Keyboard.....	4-32
4.10	Memory Module.....	4-36
4.11	Sensor/Switch Board.....	4-38
4.12	Touch Pad.....	4-40
4.13	Wireless LAN Card.....	4-44
4.14	Bluetooth Module.....	4-47
4.15	Display Assembly.....	4-49
4.16	LED Board.....	4-53
4.17	Sound Board.....	4-55
4.18	System Board/RTC Battery/DC-IN Jack.....	4-57
4.19	USB Board.....	4-62
4.20	Fan.....	4-64
4.21	Display Mask.....	4-66
4.22	FL Inverter.....	4-68
4.23	LCD Module.....	4-70
4.24	Wireless LAN Antenna/Bluetooth Antenna/Display Cover/Speaker.....	4-74
4.25	Fluorescent Lamp.....	4-85
4.25.1	Replacing the 14.1 Inch XGA TOSHIBA Fluorescent Lamp.....	4-86
4.25.2	Replacing the 14.1 Inch SXGA+ Sharp Fluorescent Lamp.....	4-98

Figures

Figure 4-1	Releasing the Battery pack	4-10
Figure 4-2	Removing a PC card	4-12
Figure 4-3	Removing an SD card	4-14
Figure 4-4	Removing the HDD cover	4-16
Figure 4-5	Removing the HDD pack	4-17
Figure 4-6	Removing the HDD bracket	4-18
Figure 4-7	Removing the Slim select bay module.....	4-21
Figure 4-8	Disassembling the Slim select bay module	4-22
Figure 4-9	Removing the Modem daughter card cover.....	4-24
Figure 4-10	Removing the Modem daughter card	4-25
Figure 4-11	Removing the CPU cover	4-27
Figure 4-12	Removing the Fin	4-28
Figure 4-13	Unlocking the CPU.....	4-29
Figure 4-14	Applying new grease	4-30
Figure 4-15	Removing the Keyboard brace	4-32
Figure 4-16	Removing the Keyboard.....	4-33
Figure 4-17	Removing the Keyboard support plate.....	4-34
Figure 4-18	Removing the Memory module	4-36
Figure 4-19	Removing the Sensor/Switch board	4-38
Figure 4-20	Removing the Palm rest (1).....	4-40
Figure 4-21	Removing the Palm rest (2).....	4-41
Figure 4-22	Removing the Touch pad and Touch pad switch.....	4-42
Figure 4-23	Removing the Wireless LAN card cover.....	4-44
Figure 4-24	Removing the Wireless LAN card	4-45
Figure 4-25	Removing the Bluetooth module.....	4-48
Figure 4-26	Removing the Display assembly (1).....	4-49

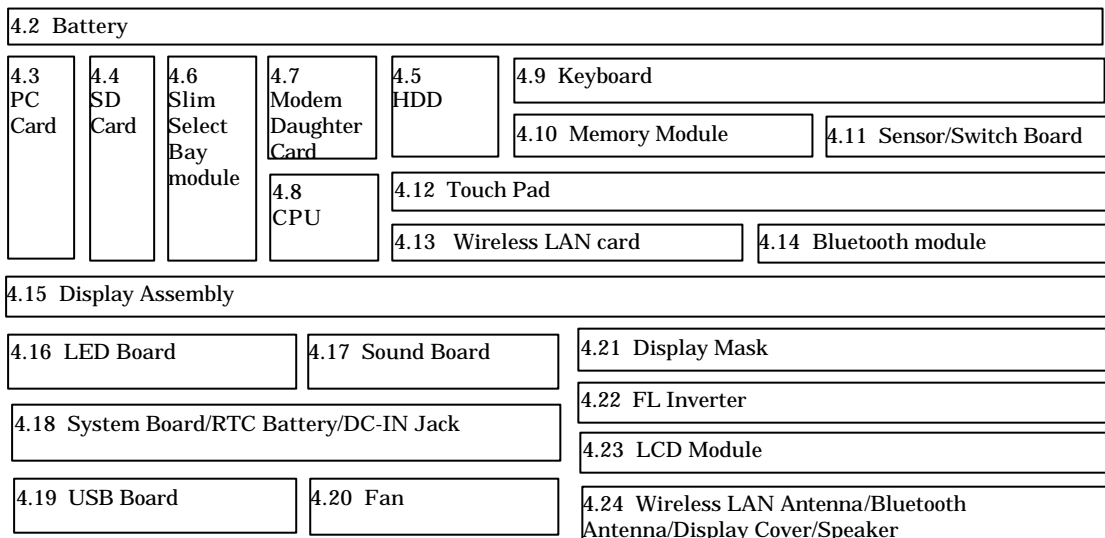
Figure 4-27	Removing the Display assembly (2).....	4-50
Figure 4-28	Removing the Display assembly (3).....	4-51
Figure 4-29	Removing the LED board.....	4-53
Figure 4-30	Removing the Sound board.....	4-55
Figure 4-31	Removing the System board/RTC battery/DC-IN jack (1).....	4-58
Figure 4-32	Removing the System board/RTC battery/DC-IN jack (2).....	4-59
Figure 4-33	Removing the DC-IN jack.....	4-60
Figure 4-34	Removing the USB board.....	4-62
Figure 4-35	Removing the Fan.....	4-64
Figure 4-36	Removing the Display mask (1).....	4-66
Figure 4-37	Removing the Display mask (2).....	4-67
Figure 4-38	Removing the FL inverter.....	4-68
Figure 4-39	Removing the LCD module (1).....	4-71
Figure 4-40	Removing the LCD module (2).....	4-72
Figure 4-41	Removing the Insulator.....	4-74
Figure 4-42	Removing the Cable holder.....	4-75
Figure 4-43	Removing the cables.....	4-76
Figure 4-44	Removing the Hinge (1).....	4-77
Figure 4-45	Removing the Wireless LAN/Bluetooth antenna.....	4-78
Figure 4-46	Removing the LCD cable.....	4-79
Figure 4-47	Removing the Speaker cable.....	4-80
Figure 4-48	Removing the Speaker and Side cover.....	4-81
Figure 4-49	Removing the Hinge (2).....	4-82
Figure 4-50	Installing the Wireless LAN/Bluetooth antenna.....	4-83
Figure 4-51	Replacing TOSHIBA fluorescent lamp (XGA) (1).....	4-87
Figure 4-52	Replacing TOSHIBA fluorescent lamp (XGA) (2).....	4-88
Figure 4-53	Replacing TOSHIBA fluorescent lamp (XGA) (3).....	4-89
Figure 4-54	Replacing TOSHIBA fluorescent lamp (XGA) (4).....	4-90
Figure 4-55	Replacing TOSHIBA fluorescent lamp (XGA) (5).....	4-91
Figure 4-56	Replacing TOSHIBA fluorescent lamp (XGA) (6).....	4-92

4 Replacement Procedures

Figure 4-57	Replacing TOSHIBA fluorescent lamp (XGA) (7)	4-93
Figure 4-58	Replacing TOSHIBA fluorescent lamp (XGA) (8)	4-94
Figure 4-59	Replacing TOSHIBA fluorescent lamp (XGA) (9)	4-95
Figure 4-60	Replacing TOSHIBA fluorescent lamp (XGA) (10).....	4-96
Figure 4-61	Replacing TOSHIBA fluorescent lamp (XGA) (11).....	4-97
Figure 4-62	Replacing Sharp fluorescent lamp (SXGA+) (1).....	4-98
Figure 4-63	Replacing Sharp fluorescent lamp (SXGA+) (2).....	4-99
Figure 4-64	Replacing Sharp fluorescent lamp (SXGA+) (3).....	4-100
Figure 4-65	Replacing Sharp fluorescent lamp (SXGA+) (4).....	4-101
Figure 4-66	Replacing Sharp fluorescent lamp (SXGA+) (5).....	4-102
Figure 4-67	Replacing Sharp fluorescent lamp (SXGA+) (6).....	4-103
Figure 4-68	Replacing Sharp fluorescent lamp (SXGA+) (7).....	4-104
Figure 4-69	Replacing Sharp fluorescent lamp (SXGA+) (8).....	4-105
Figure 4-70	Replacing Sharp fluorescent lamp (SXGA+) (9).....	4-106
Figure 4-71	Replacing Sharp fluorescent lamp (SXGA+) (10).....	4-107

4.1 General

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

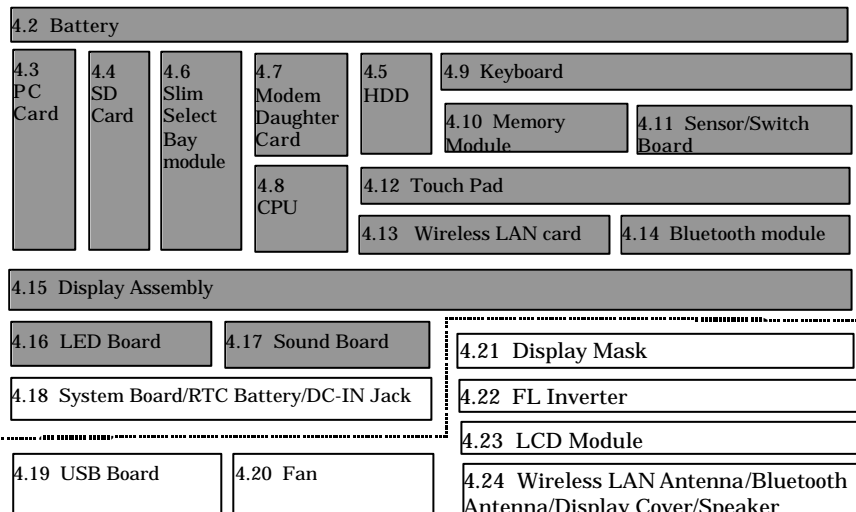


How to See the Chart

Two examples of referring to the chart are shown below.

•Removing the System Board

First, 4.2 Battery to 4.14 Bluetooth must be removed. Then remove 4.15 Display Assembly, 4.16 LED Board and 4.17 Sound Board to remove the System Board.



Safety Precautions

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

- DANGER:**
- 1) *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.*
 - 2) *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock.
Also, do not disassemble individual components in first-level maintenance.*

- WARNING:**
- 1) *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*
 - 2) *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*
 - 3) *Be careful of edges and corners as these may cut.*

- CAUTION:**
- 1) *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*
 - 2) *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*
 - 3) *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*
 - 4) *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*
 - 5) *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*
 - 6) *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

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

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
 - Dust and contaminants
 - Static electricity
 - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

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

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

Coaxial cables should be disconnected with an antenna coaxial disconnecter.

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

Assembly Procedures

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

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

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

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

Tools and Equipment

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

- One M2 point size 0 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.
- Plastic card of the size of credit card.
- Antenna coaxial cable disconnect

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 screw driver 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
<input type="checkbox"/> BIND screw	B
<input type="checkbox"/> FLAT HEAD screw	F
<input type="checkbox"/> SUPER FLAT HEAD screw	S
<input type="checkbox"/> TAPPING screw	T
<input type="checkbox"/> Other screws (Unique screws, STUD, etc.)	U

Examples:

- 6 mm BIND screw B6
- 12 mm BIND screw B12
- 5 mm FLAT HEAD screw F5
- (Indicates the screwed length in round number regardless the length of the stud.)

4.2 Battery Pack

Removing the Battery Pack

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

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

1. Turn off the computer.
2. Disconnect the AC cable and other external devices from the computer.
3. Turn the computer face down.

4. While sliding the battery latch, insert your finger into the slot, then pull the battery pack to the arrow direction in the figure below and lift it out.

NOTE: For environmental reasons, do not throw away a spent battery pack. Collect the spent battery packs.

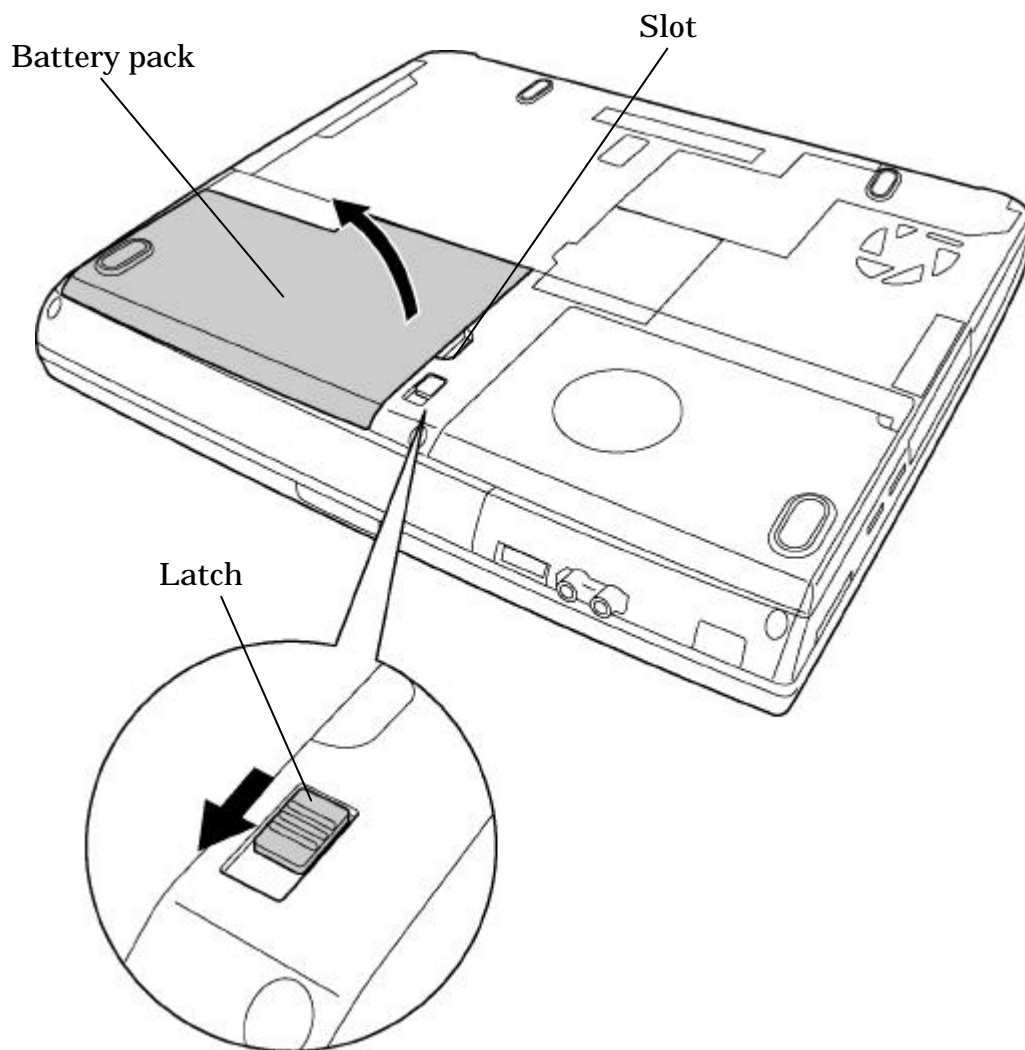


Figure 4-1 Removing the Battery pack

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. Insert the battery pack into the opposite side of the battery connector.
2. Push the battery pack toward the connector. Make sure the battery pack is installed securely.

4.3 Optional PC Card

Removing an Optional PC Card

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

CAUTION: Before you remove a PC 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. Press the eject button for the PC card you want to remove to extend the button.
3. Press the extended eject button to pop the PC card out slightly.
4. Grasp the PC card and pull it out.

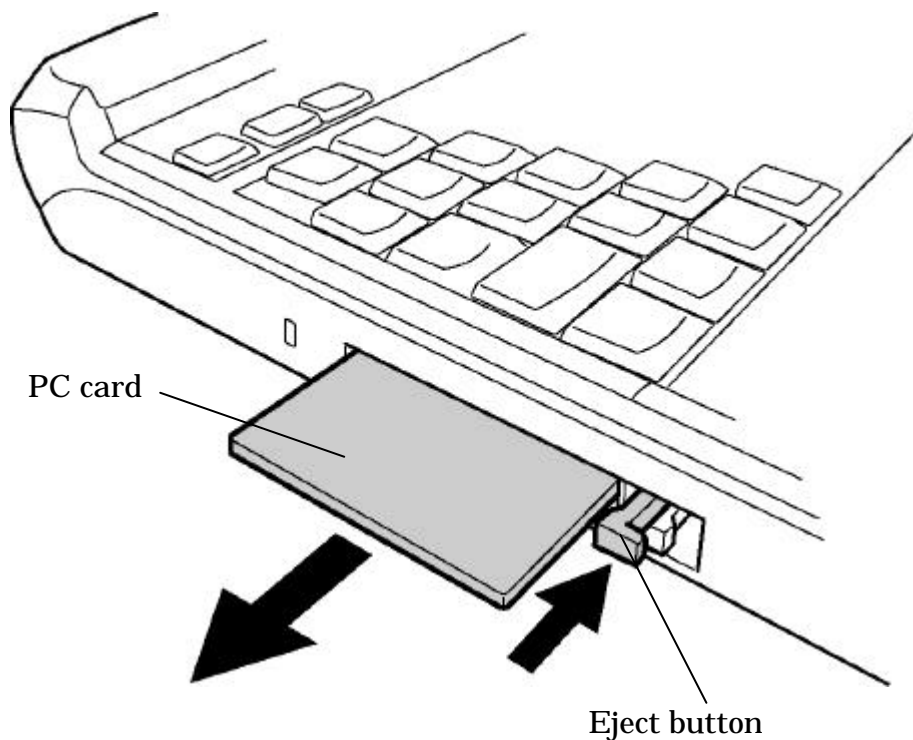


Figure 4-2 Removing a PC card

Installing an Optional PC Card

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

1. Insert a PC card.
2. Push it carefully to ensure a firm connection.

4.4 Optional SD Card

Removing an Optional SD Card

To remove an SD card (option), follow the steps below and refer to figure 4-3.

CAUTION: Before you remove an 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 in (indicated as "1" in the figure below) and release it to pop the card out slightly.
3. Grasp the SD card and pull it out (indicated as "2" in the figure below).

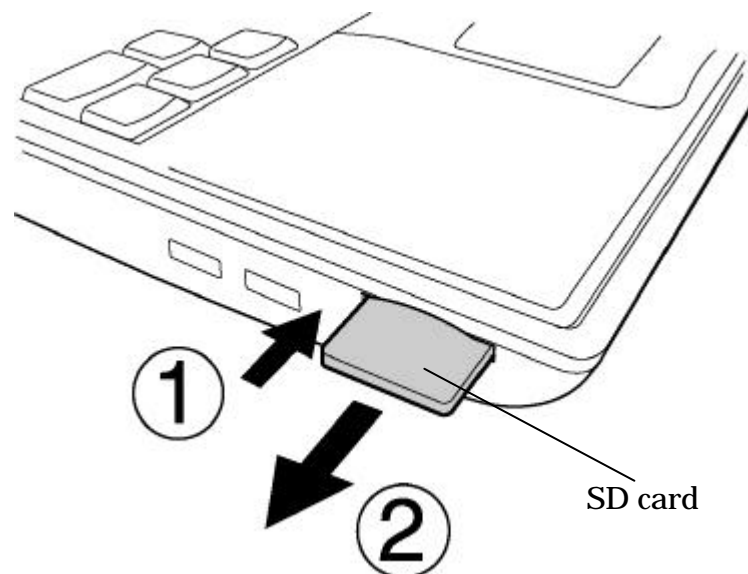


Figure 4-3 Removing an SD card

Installing an Optional SD Card

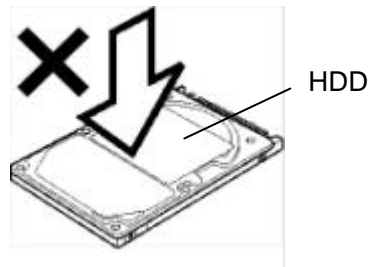
To install an SD card (option), follow the steps below and refer to figure 4-3.

1. Insert an SD card.

2. Push it carefully to ensure a firm connection.

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 to 4-6.

1. Turn the computer upside down.

2. Remove the following screw securing the HDD cover. Remove the HDD cover by lifting up.

- M2.5×4 FLAT HEAD screw ×1

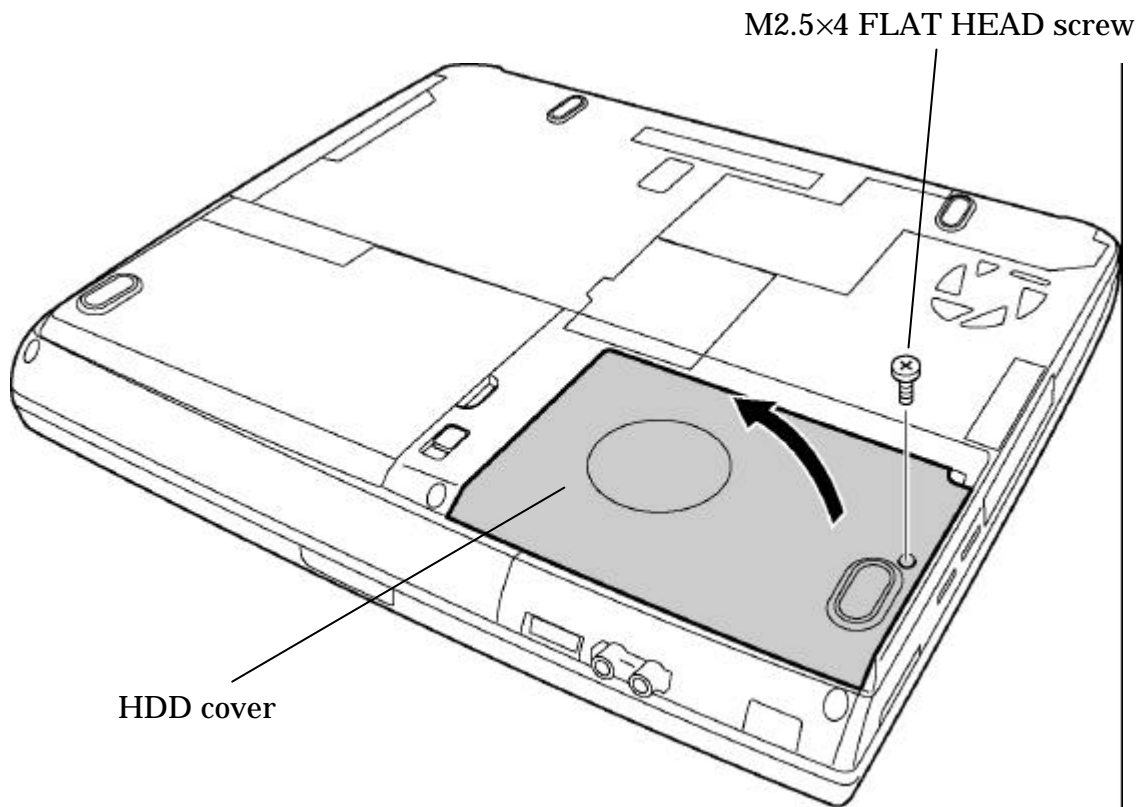


Figure 4-4 Removing the HDD cover

3. Pull the guide of the HDD pack and remove HDD pack. Be careful not to damage the connector.

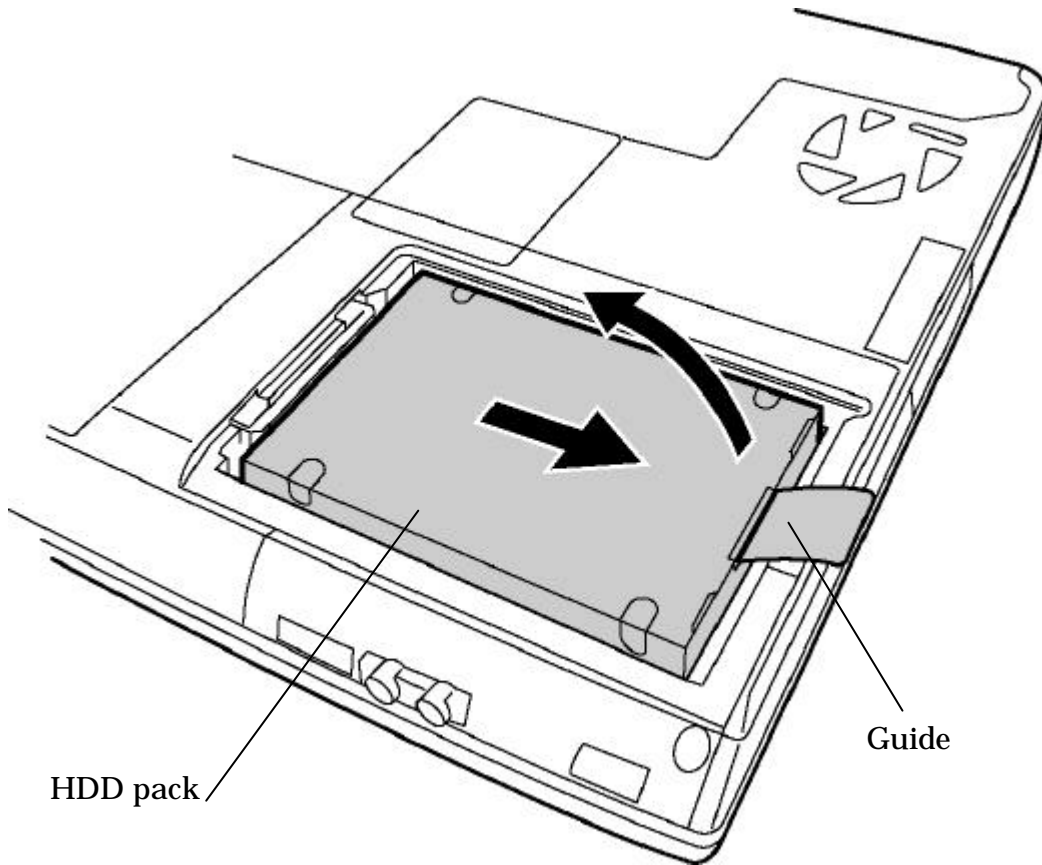


Figure 4-5 Removing the HDD pack

NOTE: The following steps describe how to disassemble the HDD pack; however, do not disassemble if the HDD is working properly.

5. Place the HDD pack on a flat surface, and remove the following screws.

- M3×4 FLAT screw ×4

6. Remove the HDD bracket.

CAUTION: Do not apply pressure to the top or bottom of the HDD.

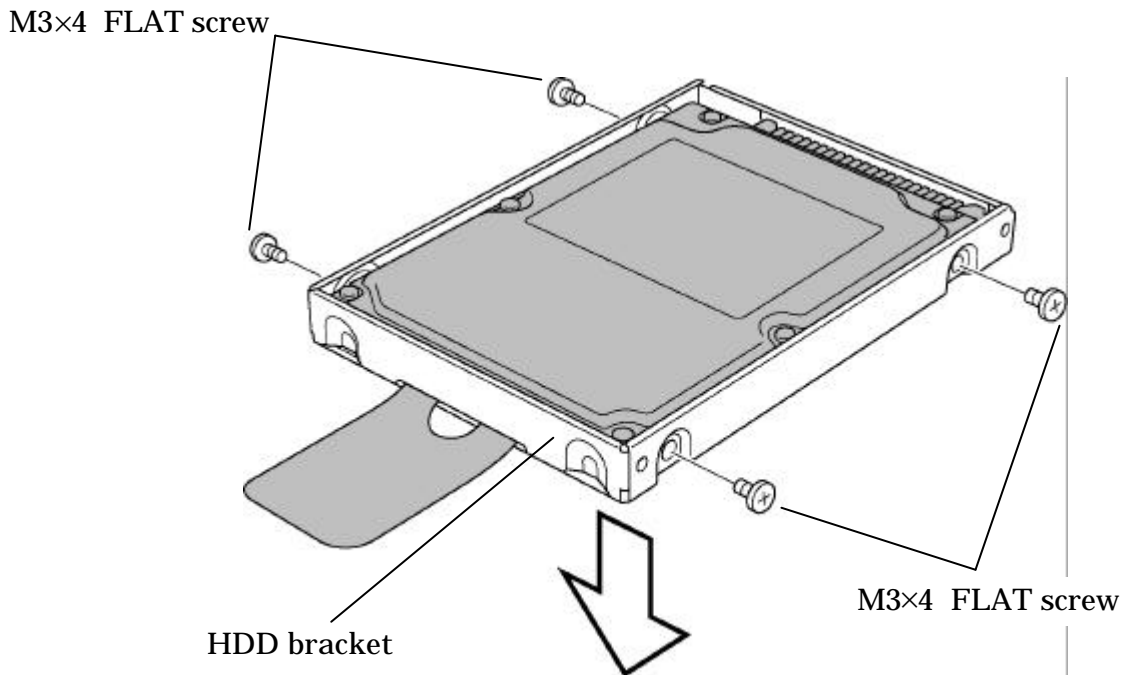


Figure 4-6 Removing the HDD bracket

Installing the HDD

To install the HDD, follow the steps below and refer to figures 4-4 to 4-6.

CAUTION: Do not hold the HDD by its top and bottom flat surfaces. It may damage the HDD.

1. Seat the HDD in the bracket.
2. Secure the HDD to the HDD bracket with the following screws.
 - M3×4 FLAT 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.

3. Hold the HDD pack by its corners and place it in the dent. Slide the HDD pack to the connector of the computer to connect. Press to ensure a firm connection.
4. Fold the guide not to cover the screw hole on the HDD cover. Seat the HDD cover and secure it with the following screw.
 - M2.5×4 FLAT HEAD screw ×1

4.6 Slim Select Bay Module

Removing the Slim Select Bay Module

To remove the slim select bay module, follow the steps below and refer to figures 4-7 and 4-8.

CAUTION: *The slim select bay module can become hot with use. Be careful when removing the module.*

1. Remove the following screw securing the slim select bay module from the screw hole for lock, and tighten the removed screw in the screw hole for release. (The slim select bay is unlocked.)
 - M2.5×4 FLAT HEAD screw ×1

2. While sliding the latch toward the arrow direction in the figure, slide the slim select bay module outward to disconnect it from PJ1511 on the system board.

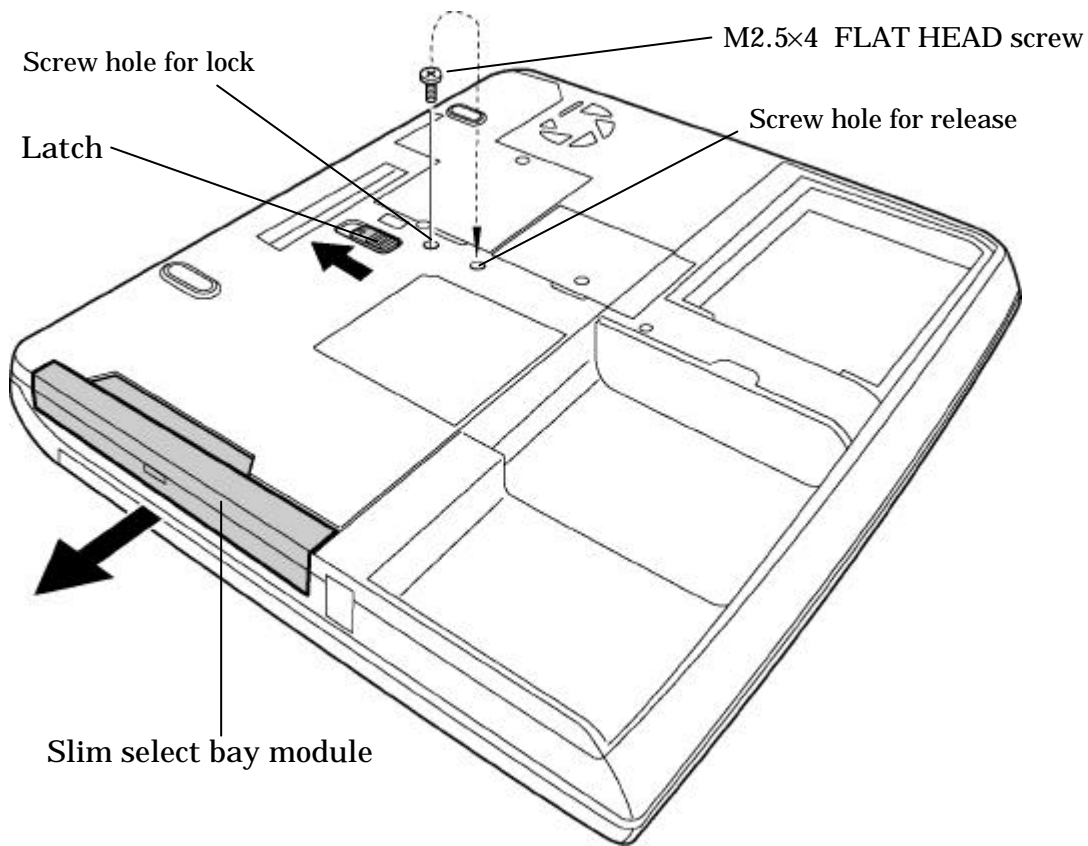


Figure 4-7 Removing the Slim select bay module (for example DVD-ROM drive)

3. Remove the following screws securing the connector and plastic brace.
 - M2×8 BIND screw ×2
4. Remove the connector and plastic brace from the slim select bay module.
5. Remove the following screws securing the plastic frame.
 - M2×3 SUPER FLAT screw ×5

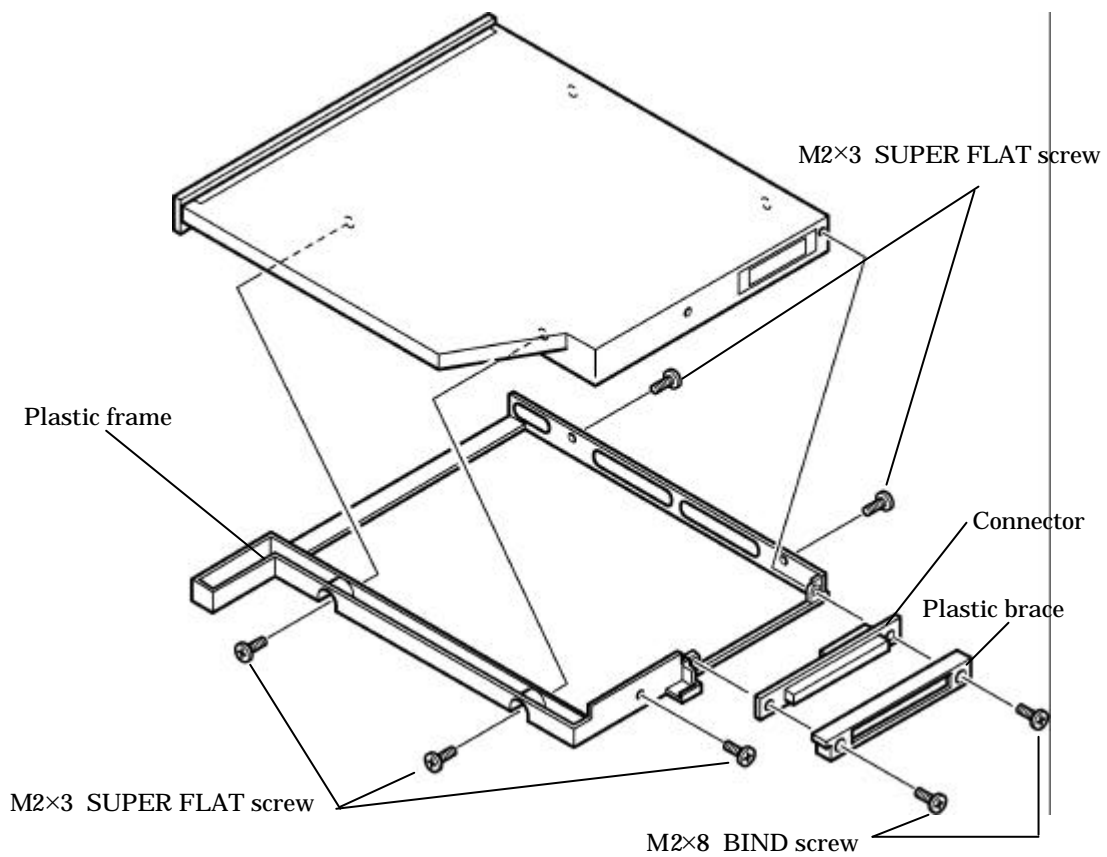


Figure 4-8 Disassembling the Slim select bay module (for example DVD-ROM drive)

Installing the Slim Select Bay Module

To install the slim select bay module, follow the steps below and refer to figures 4-7 and 4-8.

1. Seat the plastic frame on the side of the slim select bay module, and secure it with the following screws.
 - M2×3 SUPER FLAT screw ×5
2. Install the connector and plastic brace and secure them with the following screws.
 - M2×8 BIND screw ×2
3. Slide the slim select bay module into the computer to connect it to PJ1511 on the system board.
4. Remove the following screw tightened when removing the slim select bay module. Then secure the removed screw in the next screw hole. (The slim select bay is locked.)
 - M2.5×4 FLAT HEAD screw ×1

4.7 Modem Daughter Card

Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to figure 4-9 and 4-10.

1. Remove the following screw securing the modem daughter card cover. Insert your finger into the slot and remove the cover by lifting it up from the side of screw hole.

- M2.5×4 FLAT HEAD screw ×1

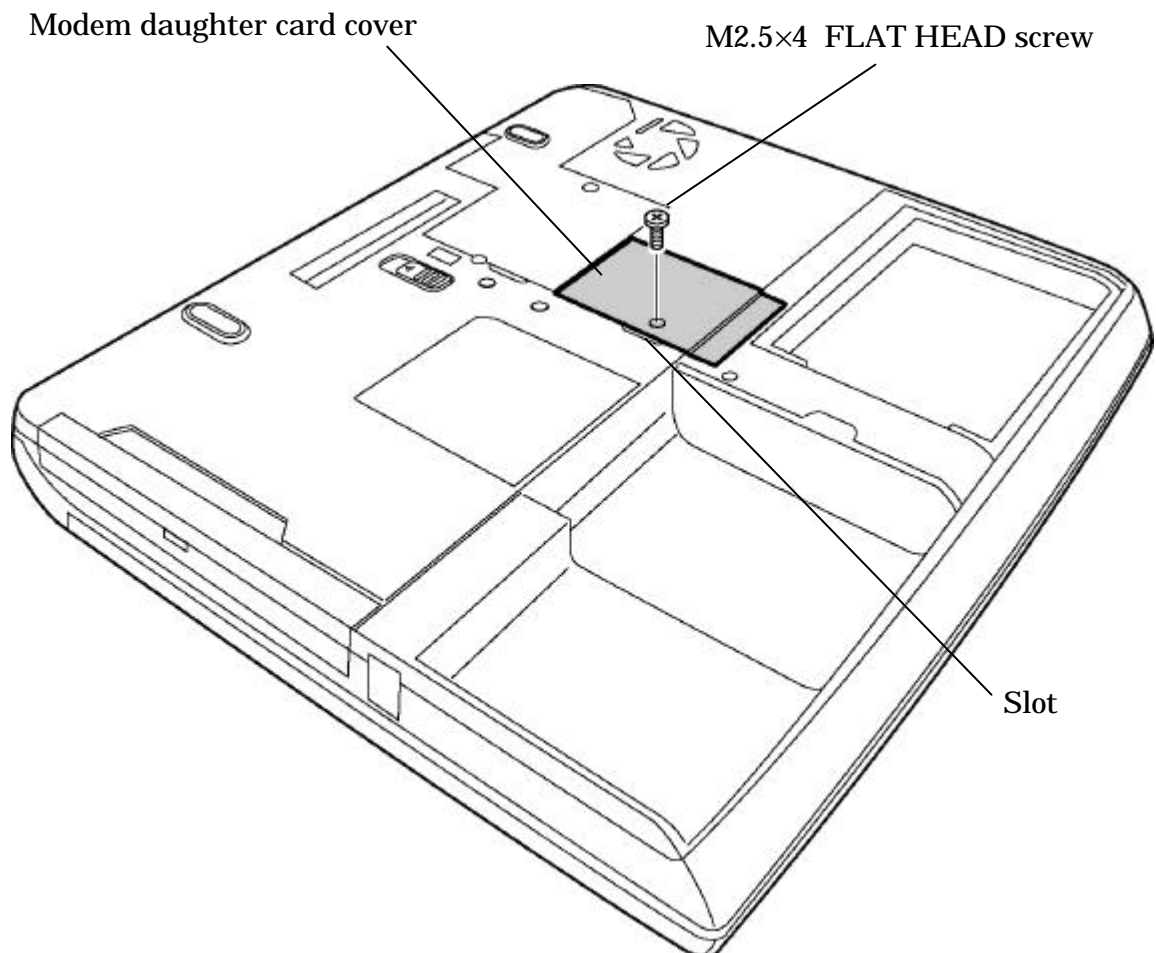


Figure 4-9 Removing the Modem daughter card cover

2. Remove the following screws securing the modem daughter card.
 - M2×4 BIND screw ×2
3. Lift up the modem daughter card to disconnect it from PJ2017 on the sound board by pulling up the insulator.
4. Disconnect the modem cable from JP1 on the modem daughter card.

NOTE: To remove the modem cable from the system board, refer to 4.22 System Board/RTC Battery/DC-IN jack.

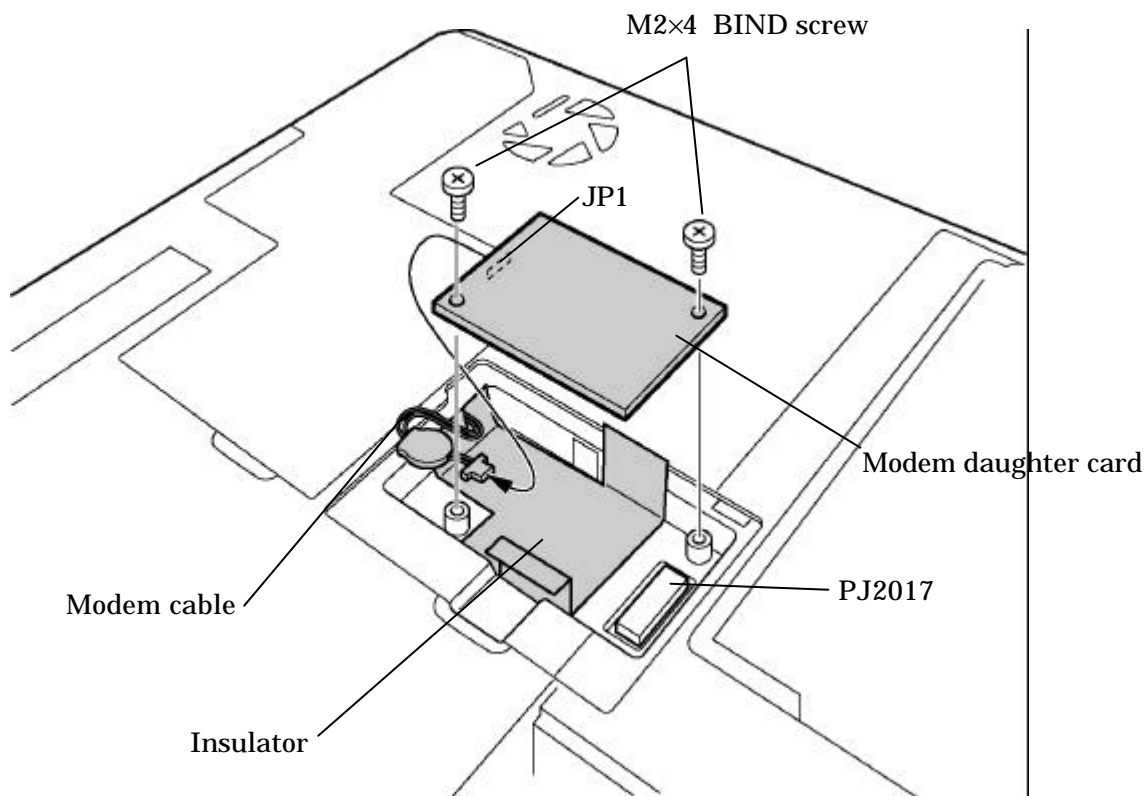


Figure 4-10 Removing the Modem daughter card

Installing the Modem Daughter Card

To install the modem daughter card, follow the steps below and refer to figures 4-9 and 4-10.

NOTE: To install the modem cable to the system board, refer to 4.22 System Board/RTC Battery/DC-IN Jack.

1. Connect the modem cable to JP1 on the modem daughter card.
2. Seat the modem daughter card and press carefully on the card to connect it to PJ2017 on the sound board. Be careful not to damage the card or connector.
3. Secure the modem daughter card with the following screws.
 - M2×4 BIND screw ×2
4. Place the modem daughter card cover and secure it with the following screw.
 - M2.5×4 FLAT HEAD screw ×1

4.8 CPU

Removing the CPU

To remove the CPU, follow the steps below and refer to figures 4-11 to 4-13.

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 cover. Insert your finger into the slot and remove the CPU cover while supporting the “A” side in the figure below.
 - M2.5×4 FLAT HEAD screw ×3
 - M2.5×16 FLAT HEAD screw ×1

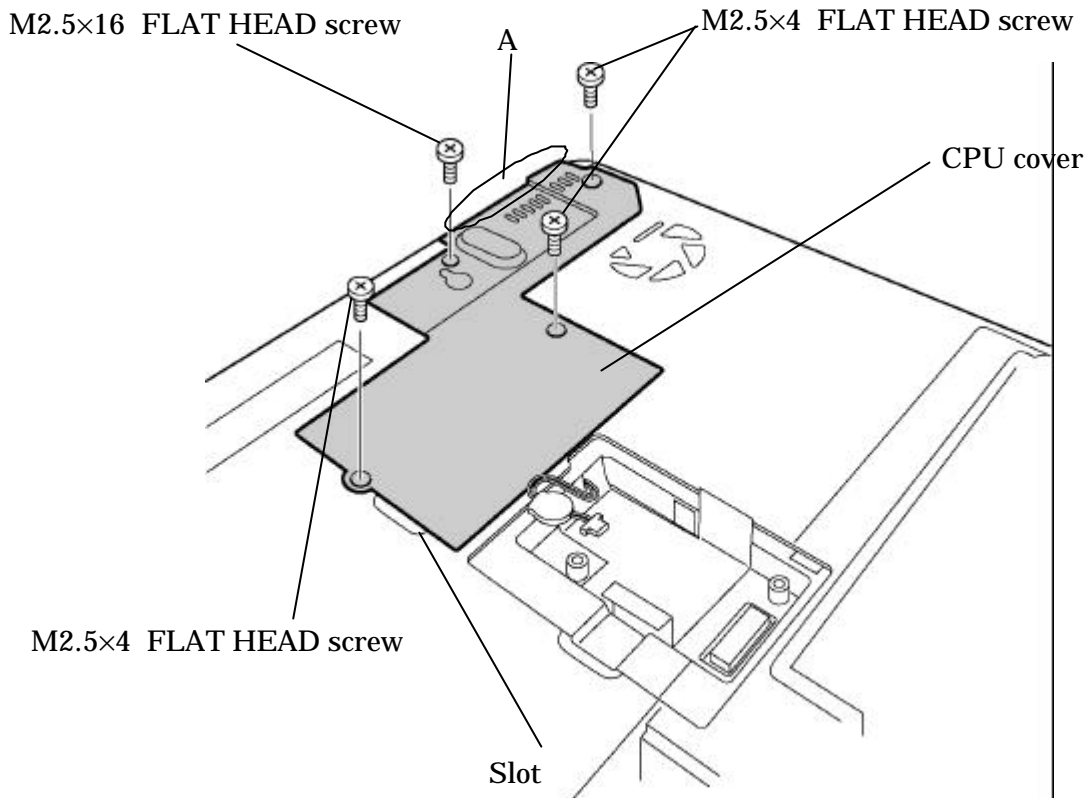


Figure 4-11 Removing the CPU cover

2. Remove the following screws securing the CPU holder. Lift the “2” side of the CPU holder first, then rotate the holder 90 degrees counterclockwise. Then lift the “1” side of the CPU holder and remove the holder.

- M2×6 BIND screw ×4

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.

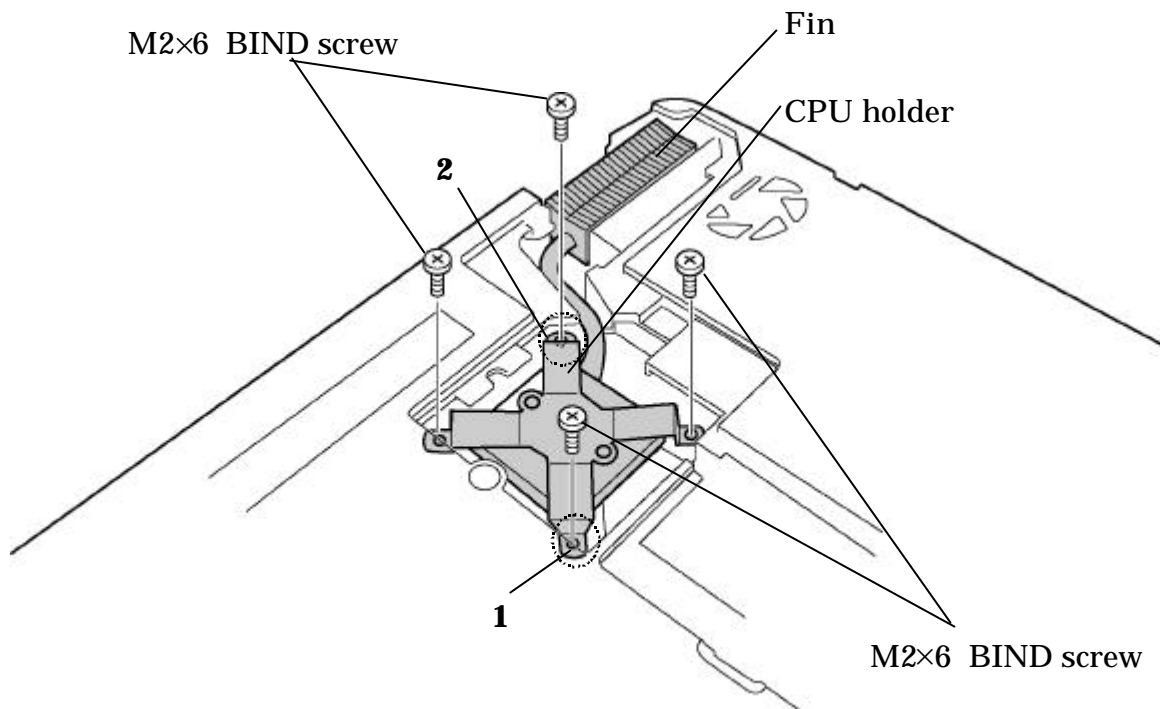


Figure4-12 Removing the Fin

4. Turn the cam to the unlock position with a flat-blade screwdriver to unlock the CPU.

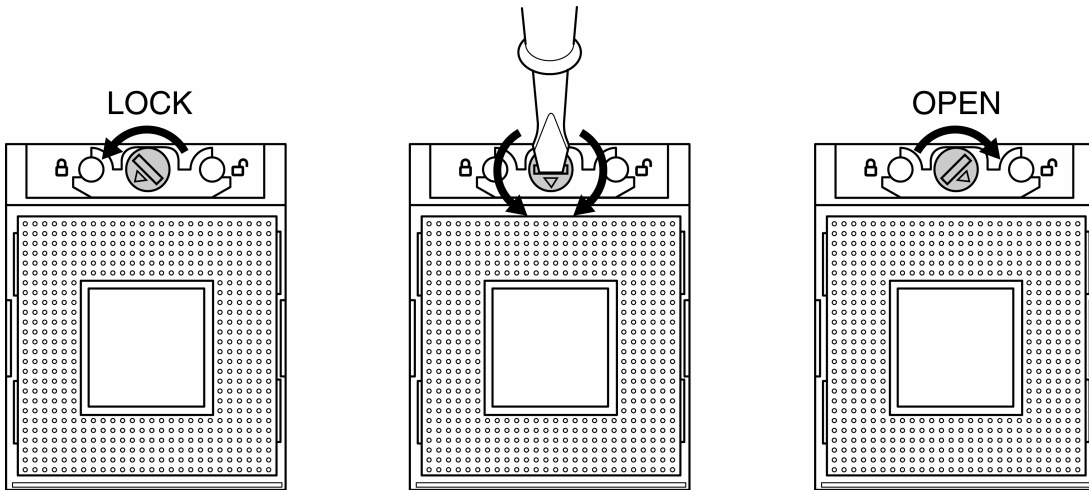


Figure 4-13 Unlocking the CPU

4. Lift up the CPU.

Installing the CPU

To install the CPU, follow the steps below and refer to figures 4-11 to 4-14.

1. Make sure the cam is in the open position.
2. Seat the CPU in the CPU socket. Make sure the alignment is exact to avoid damaging pins on the CPU.
3. Press the interposer gently with your fingers and turn the cam on the CPU socket to the lock position with a flat-blade screwdriver to secure the CPU.
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 cloth 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.

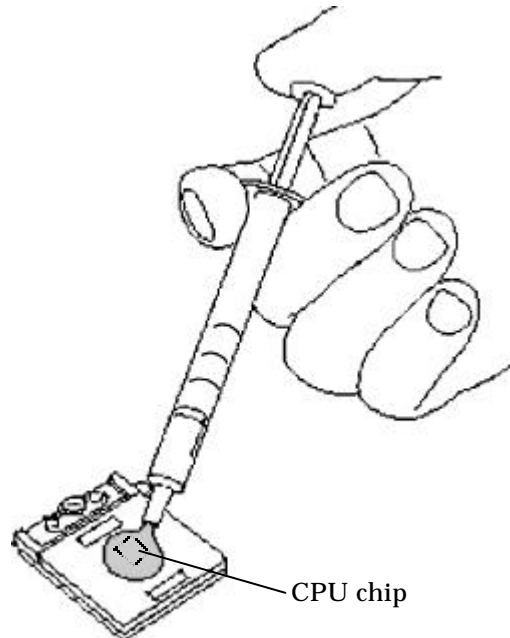


Figure 4-14 Applying new grease

5. Install the fin.
6. Insert the “1” side of the CPU holder into the empty space, with rotated 90 degrees counterclockwise first. Then rotate it 90 degrees clockwise and fit the two holes of the CPU holder to the bosses on the fin.
7. Secure the CPU holder with the following screws.
 - M2×6 BIND screw ×4
8. Place the CPU cover and secure it with the following screws.
 - M2.5×4 FLAT HEAD screw ×3
 - M2.5×16 FLAT HEAD screw ×1

4.9 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to figures 4-15 to 4-17.

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.

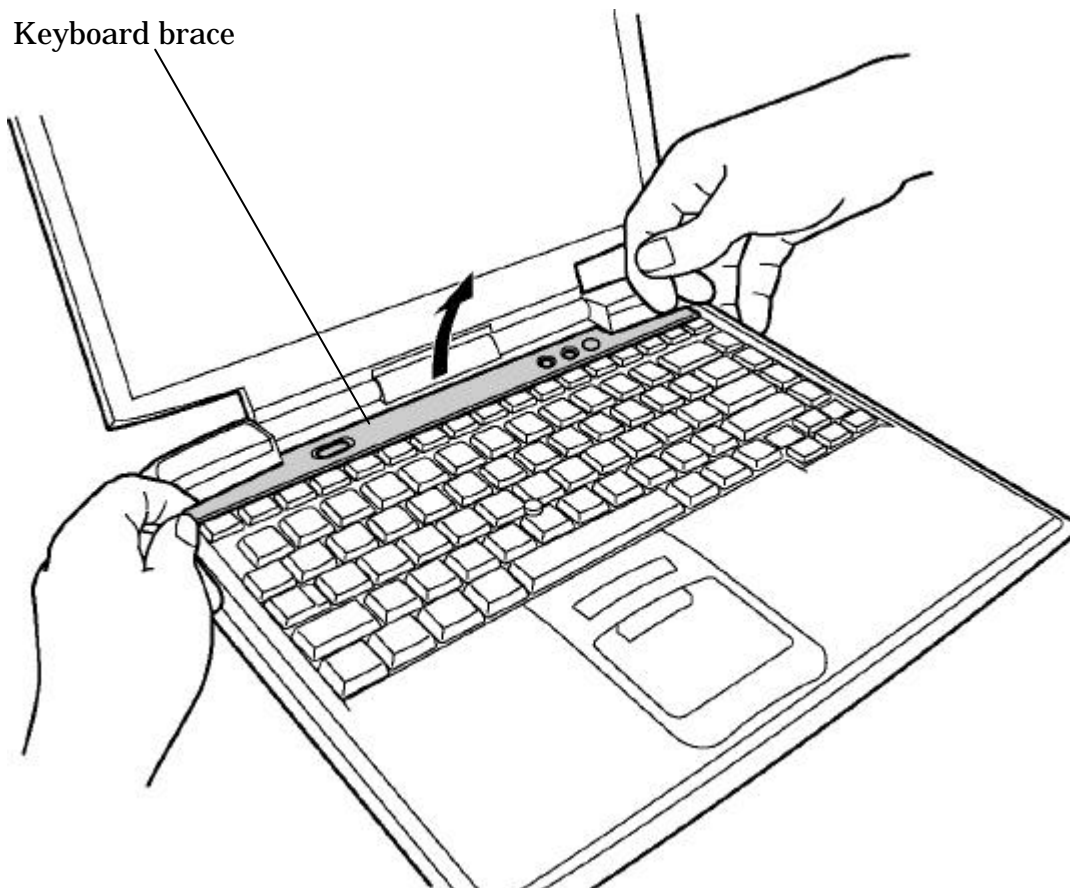


Figure 4-15 Removing the Keyboard brace

3. Remove the following screws securing the keyboard.
 - M2.5×2.8 FLAT HEAD screw ×2
4. Remove the following screw securing the keyboard hold plate and remove the keyboard hold plate.
 - M2.5×2.8 FLAT HEAD screw ×1

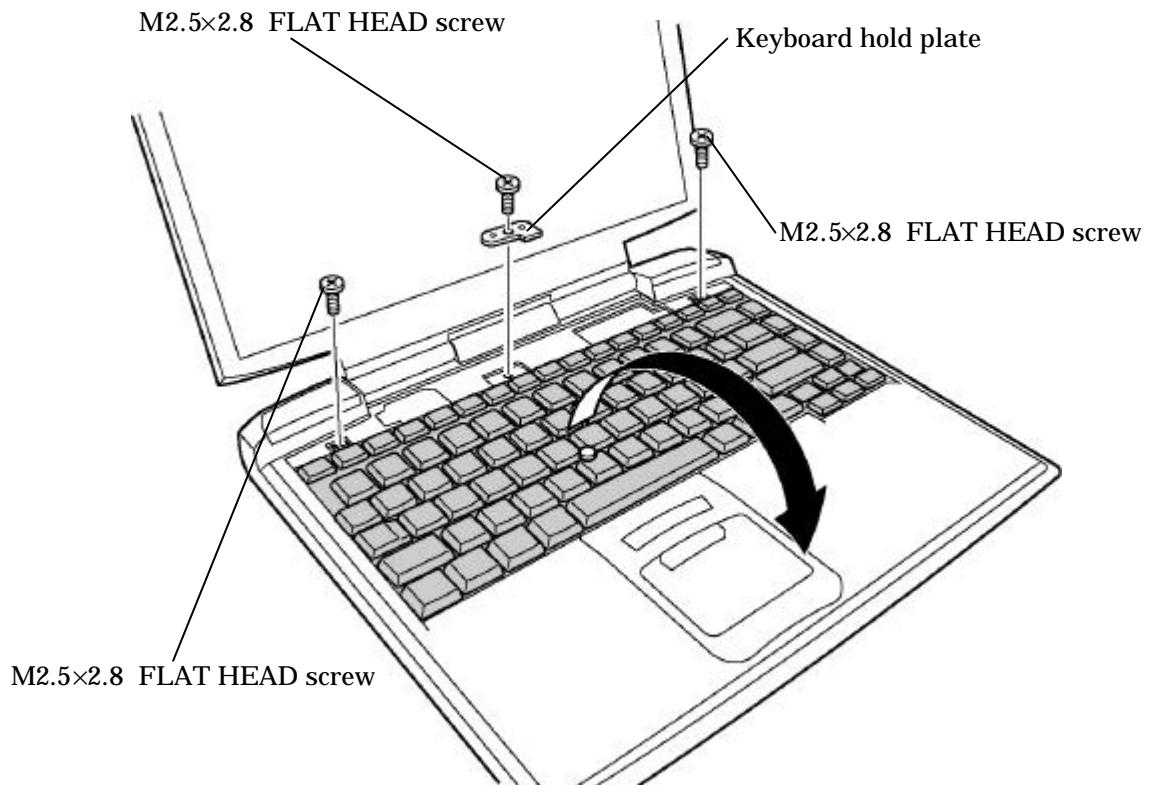


Figure 4-16 Removing the Keyboard

5. Rotate out the keyboard and lay it on top of the palm rest.

6. Remove the following screw securing the keyboard support plate and remove the keyboard support plate.
 - M2.5×6 FLAT HEAD screw ×1

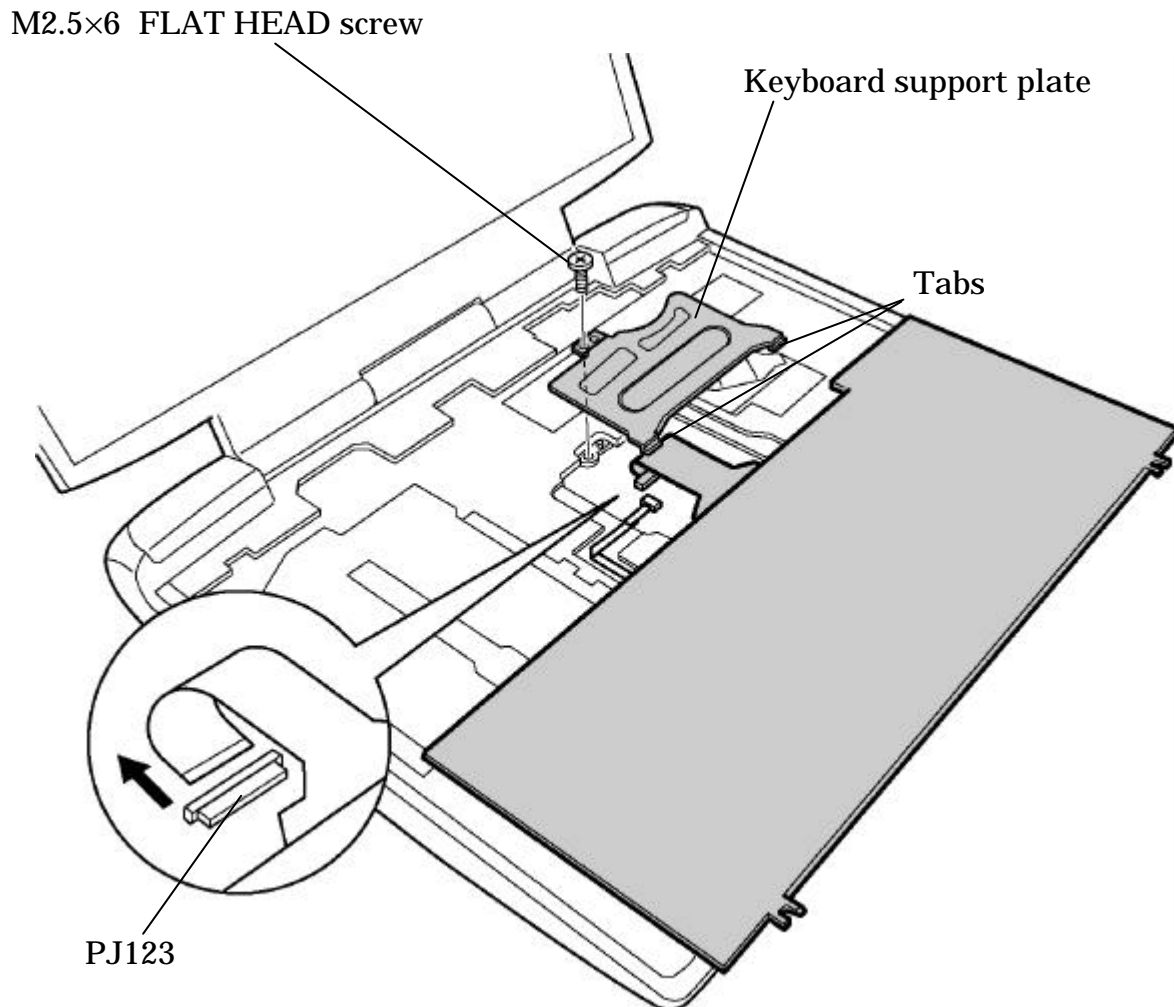


Figure 4-17 Removing the Keyboard support plate

7. Disconnect the keyboard cable from PJ123 on the system board, and remove the keyboard.

Installing the Keyboard

To install the keyboard, follow the steps below and refer to figures 4-15 to 4-17.

1. Place the keyboard face down on the palm rest.
2. Connect the keyboard cable to PJ123 on the system board.
3. Insert the tabs on the keyboard support plate first, then place the keyboard support plate on the keyboard cable. Secure the keyboard support plate with the following screw.
 - M2.5×6 FLAT HEAD screw ×1
4. Align the tabs on the bottom of the keyboard with the holes on the top cover and rotate the keyboard down.
5. Secure the keyboard with the following screws.
 - M2.5×2.8 FLAT HEAD screw ×2
6. Place the keyboard hold plate on the keyboard. Then secure the keyboard hold plate with the following screw.
 - M2.5×2.8 FLAT HEAD screw ×1
7. Install the keyboard brace and press to secure the latches.

4.10 Memory Module

Removing a Memory Module

To remove a memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to figure 4-18.

CAUTION: 1) Do not try to remove a memory module with the computer turned on. The computer or the memory might be damaged.
2) Do not touch the connectors on the memory module(s) or on the computer. Debris on the connectors may cause memory access problems.

1. Turn up the insulator covering the memory slots.
2. Press the two latches outward. One end of the memory module will pop up.
3. Grasp the memory module and pull it out to remove the memory module from PJ1001 (Slot A) or PJ1002 (Slot B) on the system board.

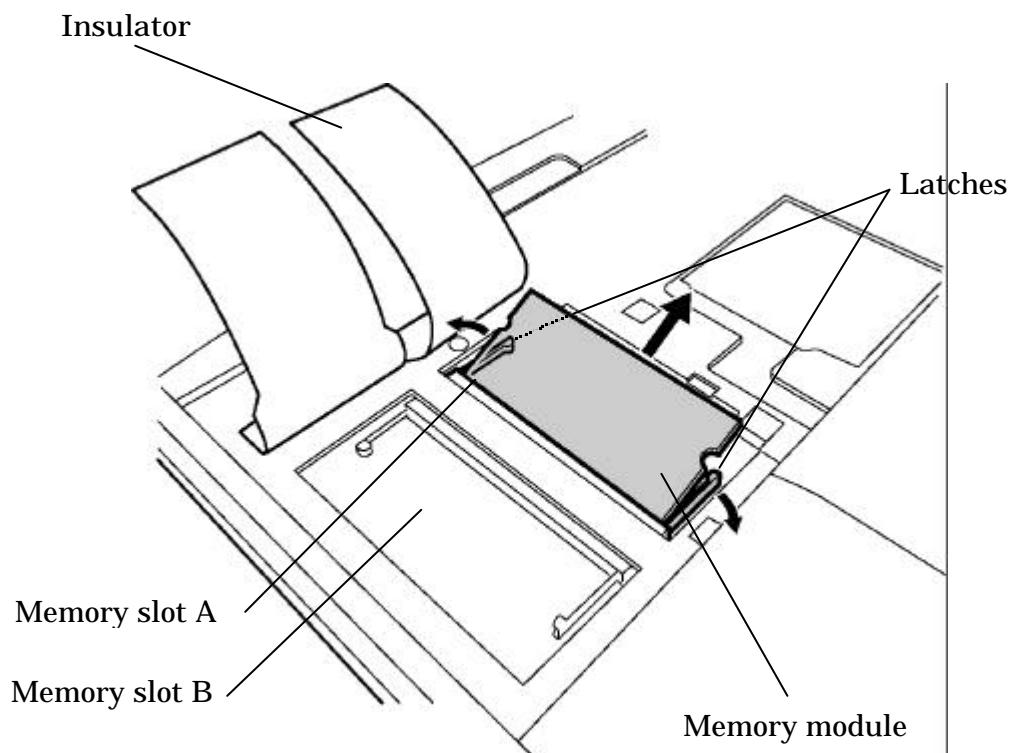


Figure 4-18 Removing the Memory module

Installing a Memory Module

To install a memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figure 4-18.

CAUTION: 1) Do not install a memory module in slot B only. Use slot A prior to slot B. Otherwise, the computer or the memory may be damaged.

2) Do not touch the connectors on the memory module or on the computer. Debris on the connectors may cause memory access problems.

1. Turn up the insulator and insert a memory module into PJ1001 (Slot A) or PJ1002 (Slot B) on the system board at an angle of 45 degrees and press carefully to ensure firm connection.
2. Push the memory module down until the latches on either side engage the memory module to hold it in place.
3. Seat the insulator.

4.11 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 4-19.

1. Remove the following screws securing the sensor/switch board.
 - M2.5×2.8 FLAT HEAD screw ×2
2. Remove the sensor/switch board by lifting it up.

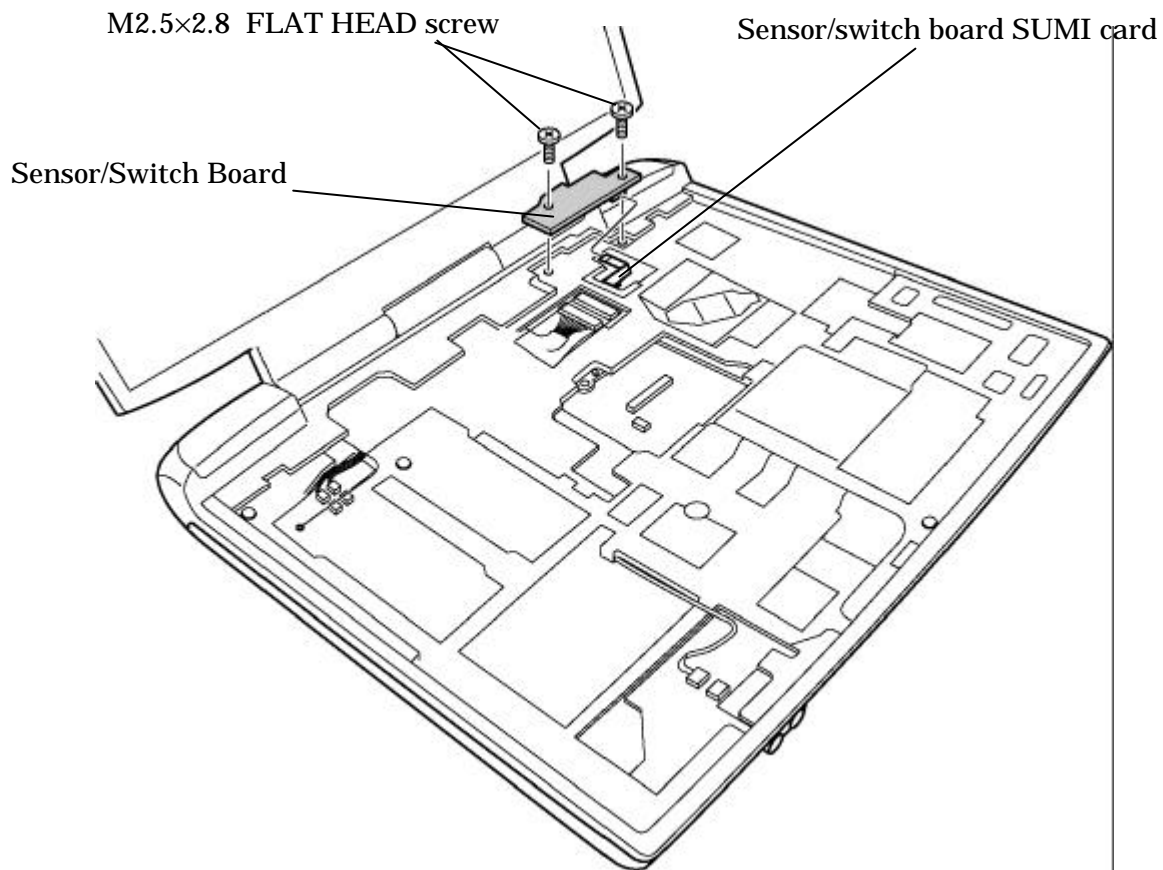


Figure 4-19 Removing the Sensor/Switch board

3. Disconnect the sensor/switch board SUMI card from PJ3200 on the back of the sensor/switch board.

NOTE: For removing the sensor/switch board SUMI card from the system board, refer to 4.22 System Board/RTC Battery/DC-IN Jack.

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 4-19.

NOTE: For installing the sensor/switch board SUMI card to the system board, refer to 4.22 System Board/RTC Battery/DC-IN Jack.

1. Connect the sensor/switch board SUMI card on the system board to PJ3200 on the back of the sensor/switch board.
2. Seat the sensor/switch board. Attach the two holes of the board to the bosses of the chassis.
3. Secure the sensor/switch board with the following screws.
 - M2.5×2.8 FLAT HEAD screw ×2

4.12 Touch Pad

Removing the Touch Pad

To remove the touch pad, follow the steps below and refer to figures 4-20 to 4-22.

1. Turn the computer face down and remove the following nine screws securing the palm rest to the display assembly.
 - M2.5×4 FLAT HEAD screw ×2 (“4” in the figure below)
 - M2.5×6 FLAT HEAD screw ×3 (“6” in the figure below)
 - M2.5×10 FLAT HEAD screw ×2 (“10” in the figure below)
 - M2.5×16 FLAT HEAD screw ×2 (“16” in the figure below)

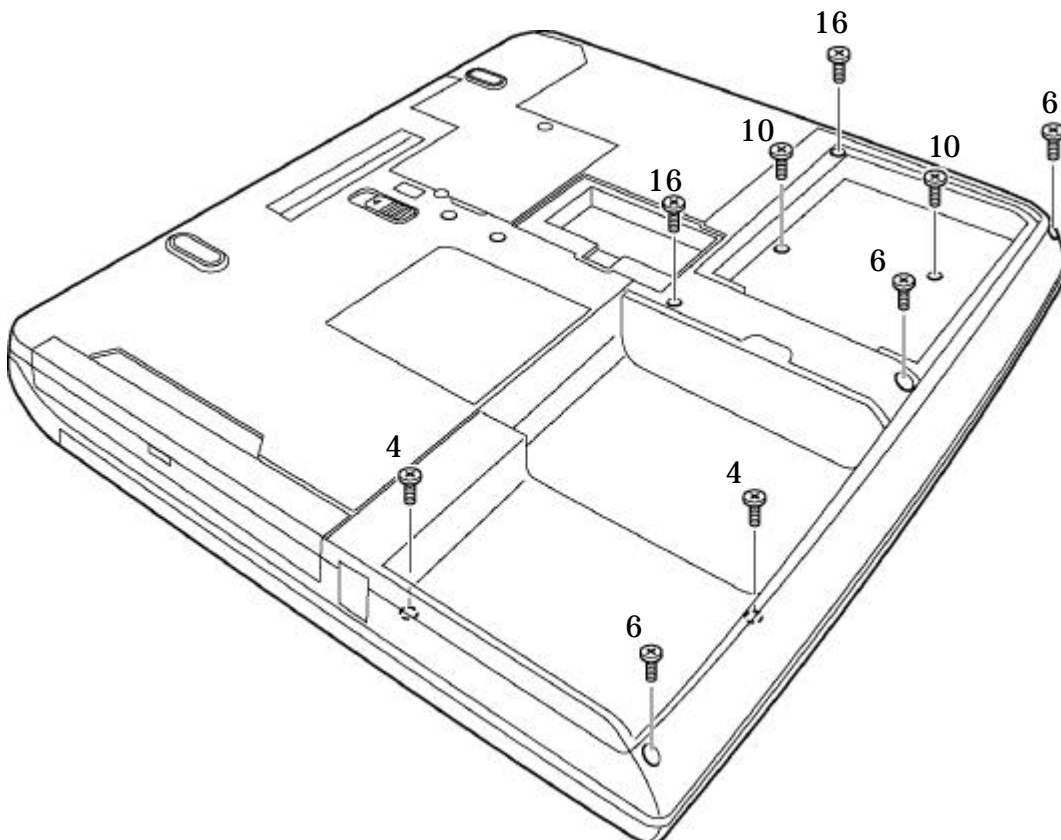


Figure 4-20 Removing the Palm rest (1)

2. Disconnect the touch pad SUMI card from PJ2003 on the system board.
3. Remove the following screw securing the palm rest to the display assembly. Remove the palm rest by rotating it up toward the front of the computer.
 - M2.5×4 FLAT HEAD screw ×1

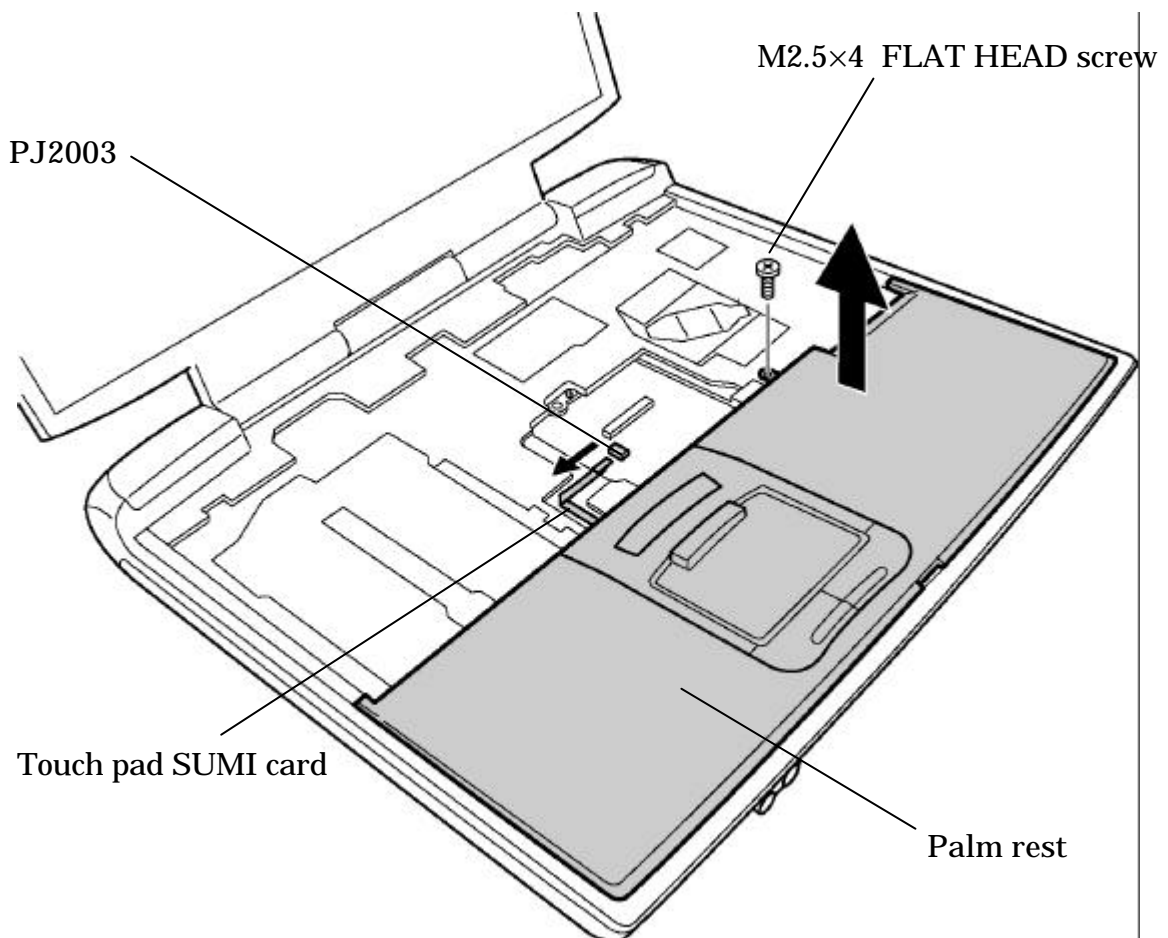


Figure 4-21 Removing the Palm rest (2)

4. Remove the following screws securing the touch pad and touch pad switch to the palm rest.
 - M2.5×4 FLAT HEAD screw ×2
 - M2.5×4 TAPPING screw ×2
5. Remove the touch pad and touch pad switch from the front of the palm rest.

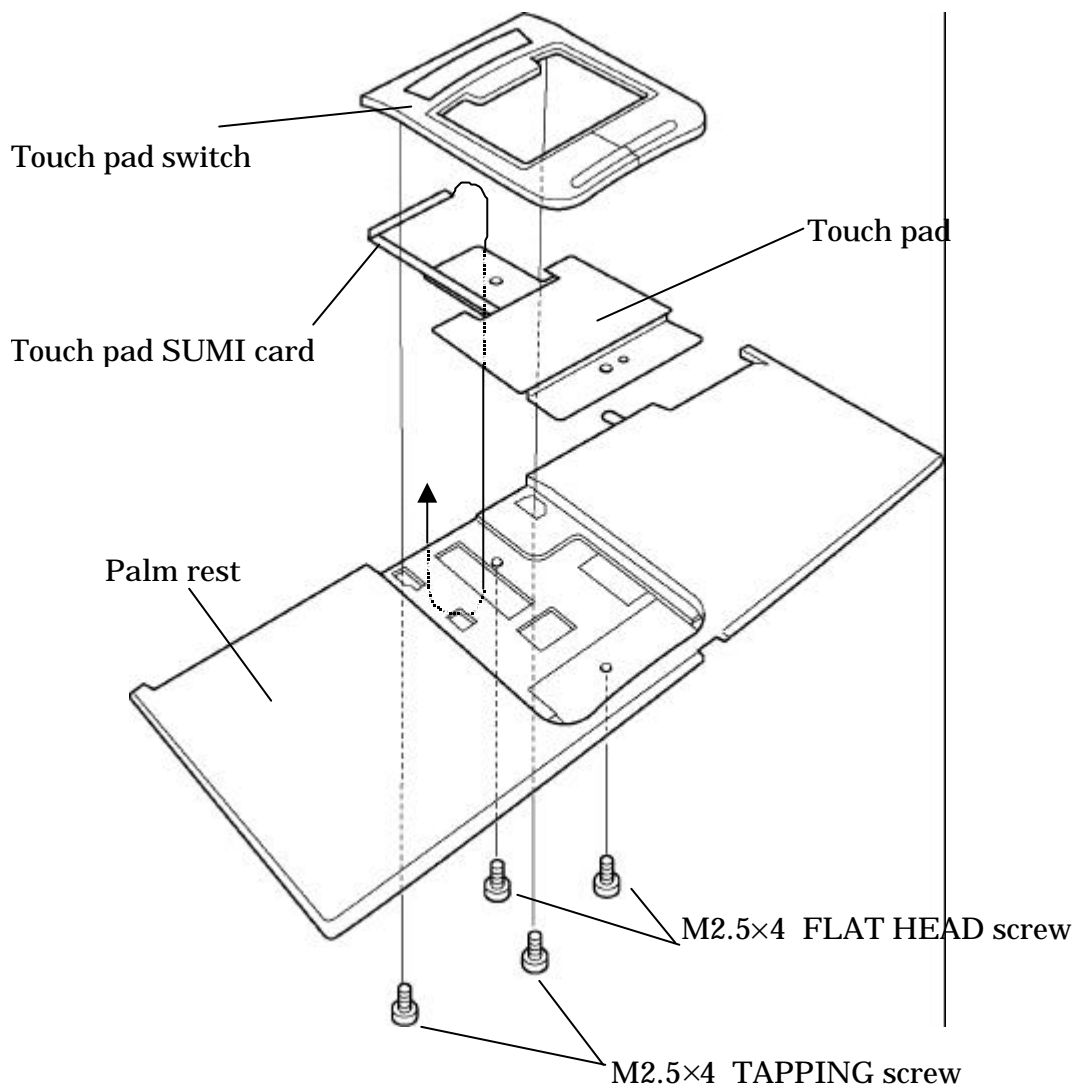


Figure 4-22 Removing the Touch pad and Touch pad switch

6. Disconnect the touch pad SUMI card from CN1 on the touch pad.

Installing the Touch Pad

To install the touch pad, follow the steps below and refer to figures 4-20 to 4-22.

1. Connect the touch pad SUMI card to CN1 on the touch pad.
2. Install the touch pad and touch pad switches on the palm rest and pass the touch pad SUMI card into the hole of the palm rest. Secure them with the following screws.
 - M2.5×4 FLAT HEAD screw ×2
 - M2.5×4 TAPPING screw ×2
3. Place the palm rest on the display assembly and secure the latches by pressing it. Secure the palm rest with the following screw.
 - M2.5×4 FLAT HEAD screw ×1
4. Connect the touch pad SUMI card to PJ2003 on the system board.
5. Close the display panel and turn the computer face down. Secure the palm rest with the following screws to the display assembly.
 - M2.5×4 FLAT HEAD screw ×2
 - M2.5×6 FLAT HEAD screw ×3
 - M2.5×10 FLAT HEAD screw ×2
 - M2.5×16 FLAT HEAD screw ×2

4.13 Wireless LAN Card

Removing the Wireless LAN Card

To remove the wireless LAN card, make sure the computer is in boot mode and powered off, follow the steps below and refer to figures 4-23 and 4-24.

NOTE: The wireless LAN card is an option in some models. This computer supports two types of wireless LAN card (802.11/b or 802.11a/b combo). In this section, removing/installing a wireless LAN card for a/b combo model is described for example.

CAUTION: Do not try to remove the wireless LAN card with the computer turned on. You can damage the computer or the wireless LAN card. Do not touch the connectors on the wireless LAN card module on the computer. Debris on the connectors may cause wireless LAN card access problems.

1. (For a/b combo models only)
Remove the following screw securing the wireless LAN card cover.

- M2×4 OSG screw ×1

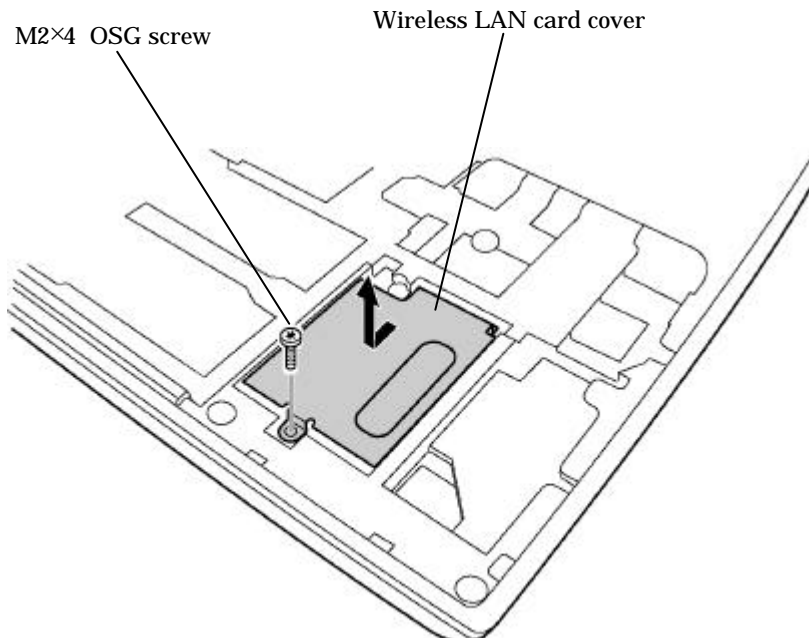


Figure 4-23 Removing the Wireless LAN card cover

2. Disconnect the wireless LAN antenna cables (black and white) from the wireless LAN card using an antenna coaxial cable disconnecter.

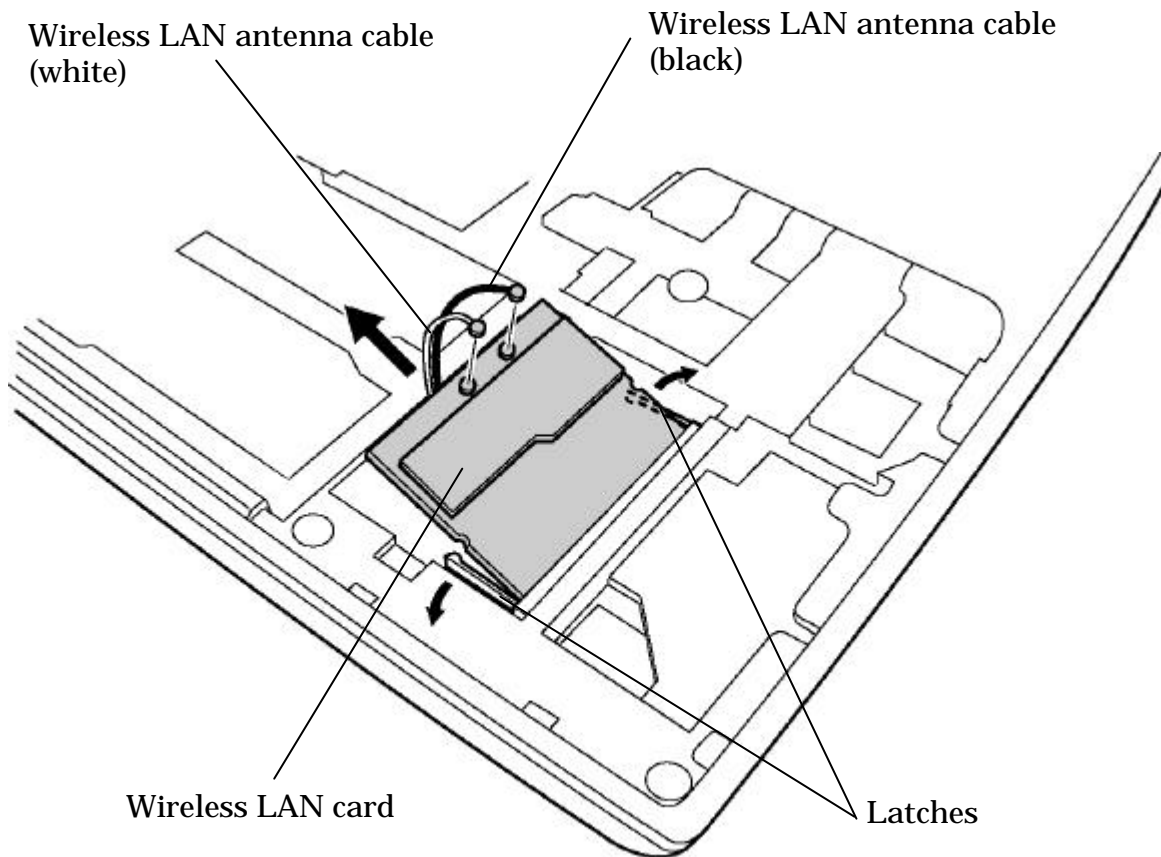


Figure 4-24 Removing the Wireless LAN card

3. Press the latches outward to release the wireless LAN card. It will pop up to about a 45-degree angle.
4. Disconnect the wireless LAN card from PJ2015 on the system board. Be careful not to damage the connector.

Installing the Wireless LAN Card

To install the wireless LAN card, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figures 4-23 and 4-24.

CAUTION: *Be sure to switch the computer off before removing the wireless LAN card. Otherwise, the computer or the wireless LAN card may be damaged.*

1. Insert the wireless LAN card into the connector at an angle of 45 degrees.
2. Gently push the wireless LAN card down until the latches on both sides engage the wireless LAN card to hold it in place.
3. Connect the wireless LAN antenna cables (black and white) to the connectors on the wireless LAN card.
4. (For a/b combo models only)
Install the wireless LAN card cover and secure it with the following screw.
 - M2×4 OSG screw ×1

CAUTION: *There are two MAC address barcode labels in the package containing the new wireless LAN card. Apply one label next to the wireless LAN socket and one on the box the computer was shipped in. Before you apply the new labels, remove the old ones from the computer and the box. The computer may have MAC address barcode labels for both wired and wireless LANs. Be sure to replace the correct label.*

4.14 Bluetooth Module

Removing the Bluetooth Module

To remove the Bluetooth module, follow the steps below and refer to figure 4-25.

CAUTION: Do not try to remove the Bluetooth module with the computer turned on. You can damage the computer or Bluetooth module. Do not touch the connectors on the Bluetooth module on the computer. Debris on the connectors may cause Bluetooth access problems.

1. Remove the Bluetooth coaxial cable (brown) from the Bluetooth module using an antenna coaxial cable disconnecter.
2. Remove the following screw securing the Bluetooth module.
 - M2×3 SUPER FLAT screw ×1
3. Lift up the Bluetooth module and disconnect the Bluetooth SUMI card from PJ4900 on the system board.
4. Remove the Bluetooth SUMI card from the connector on the Bluetooth module.

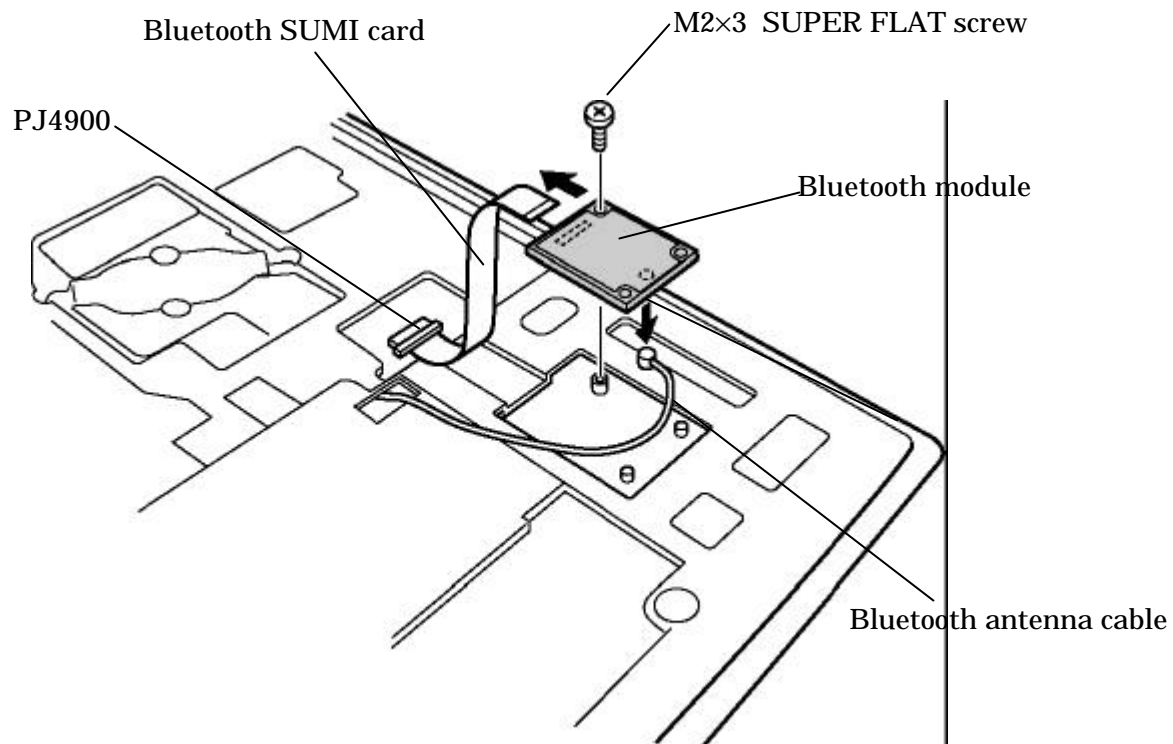


Figure4-25 Removing the Bluetooth module

Installing the Bluetooth Module

To install the Bluetooth module, follow the steps below and refer to figure 4-25.

1. Connect the Bluetooth SUMI card to the connector on the Bluetooth module.
2. Connect the Bluetooth SUMI card to PJ4900 on the system board.
3. Place the Bluetooth module.
4. Secure the Bluetooth module with the following screw.
 - M2x3 SUPER FLAT screw ×1
5. Connect the Bluetooth coaxial cable (brown) to the Bluetooth module.

4.15 Display Assembly

Removing the Display Assembly

To remove the display assembly, follow the steps below and refer to figures 4-26 to 4-28.

1. Turn the computer face down, and remove the following nine screws:
 - M2.5×4 FLAT HEAD screw ×3 (“4” in the figure below)
 - M2.5×16 FLAT HEAD screw ×6 (“16” in the figure below)

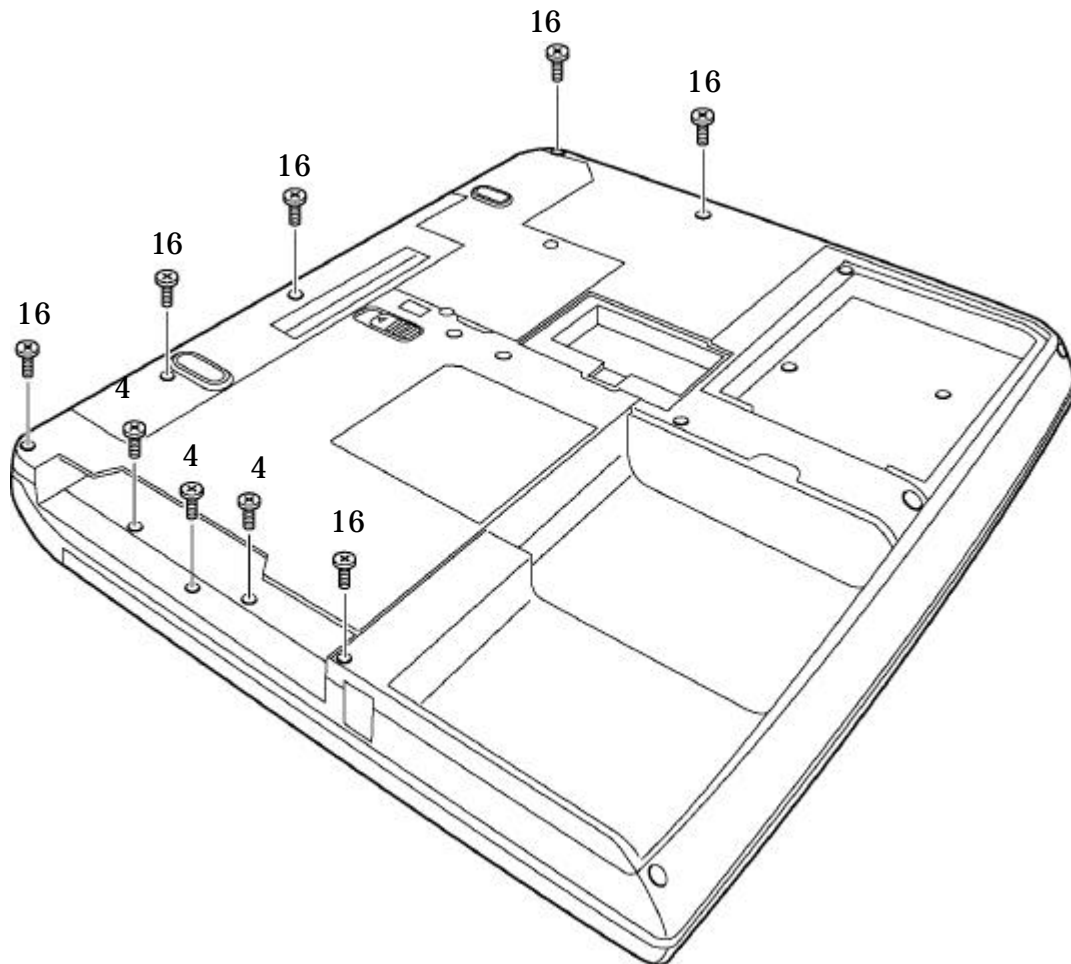


Figure 4-26 Removing the Display assembly (1)

2. Turn the computer face up and open the display panel.
3. Remove the following screws securing the display assembly.
 - M2.5×6 FLAT HEAD screw ×2
 - M2.5×4 FLAT HEAD screw ×1
4. Turn up the insulator covering the LCD cable and disconnect the LCD cable from PJ5500 on the system board.
5. Turn up the insulator covering the speaker cables and disconnect the two speaker cables from PJ2026 (R, red) and PJ2027 (L, blue) on the system board.
6. Remove the glass tape covering the internal microphone cable. Disconnect the internal microphone cable from PJ3001 on the sound board.

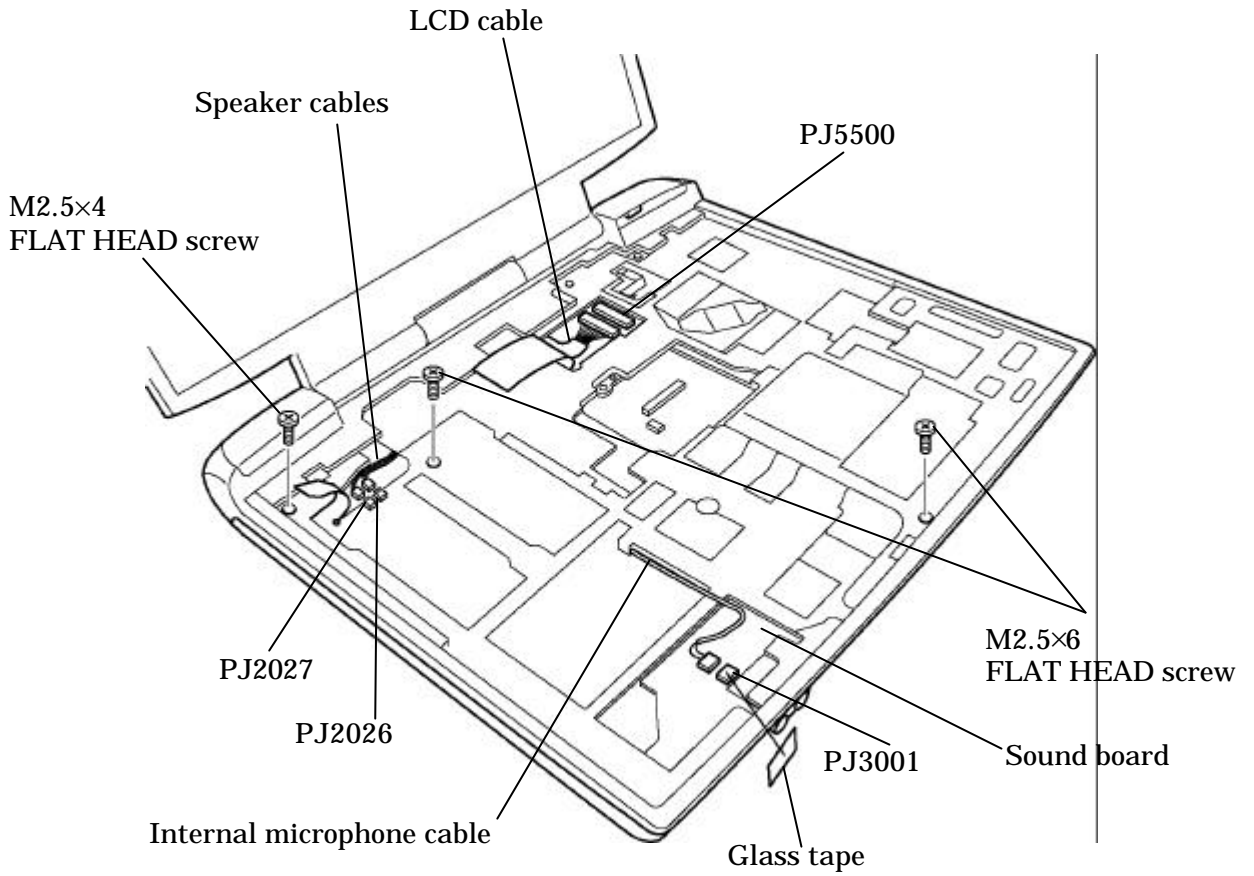


Figure 4-27 Removing the Display assembly (2)

7. Remove the display assembly from the base assembly .

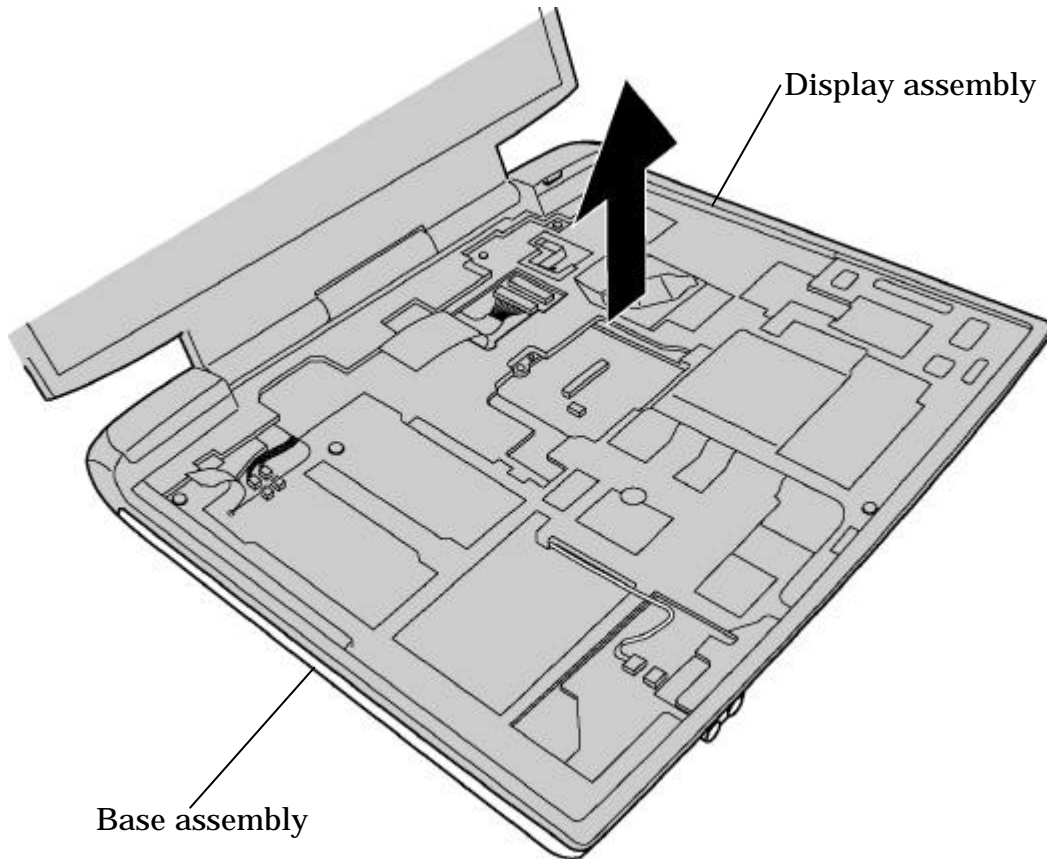


Figure 4-28 Removing the Display assembly (2)

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 4-26 and 4-28.

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 internal microphone cable to PJ3001 on the sound board and stick the glass tape on it.
4. Turn up the insulator and connect the LCD cable to PJ5500 on the system board.
5. Turn up the insulator and connect the two speaker cables to PJ2026 (R, red) and PJ2027 (L, blue) on the system board.
6. Secure the display assembly with the following screws.
 - M2.5×6 FLAT HEAD screw ×2
 - M2.5×4 FLAT HEAD screw ×1
7. Turn the computer face down and secure the display assembly with the following nine screws:
 - M2.5×4 FLAT HEAD screw ×3
 - M2.5×16 FLAT HEAD screw ×6

4.16 LED Board

Removing the LED Board

To remove the LED board, follow the steps below and refer to figure 4-29.

1. Remove the glass tape securing the LED board SUMI card and USB cable.
2. Disconnect the LED board SUMI card from PJ1101 on the system board.
3. Remove the following screws securing the LED board and remove the LED board.
 - M2.5×4 FLAT HEAD screw ×2
4. Disconnect the LED board SUMI card from PJ3100 on the LED board.

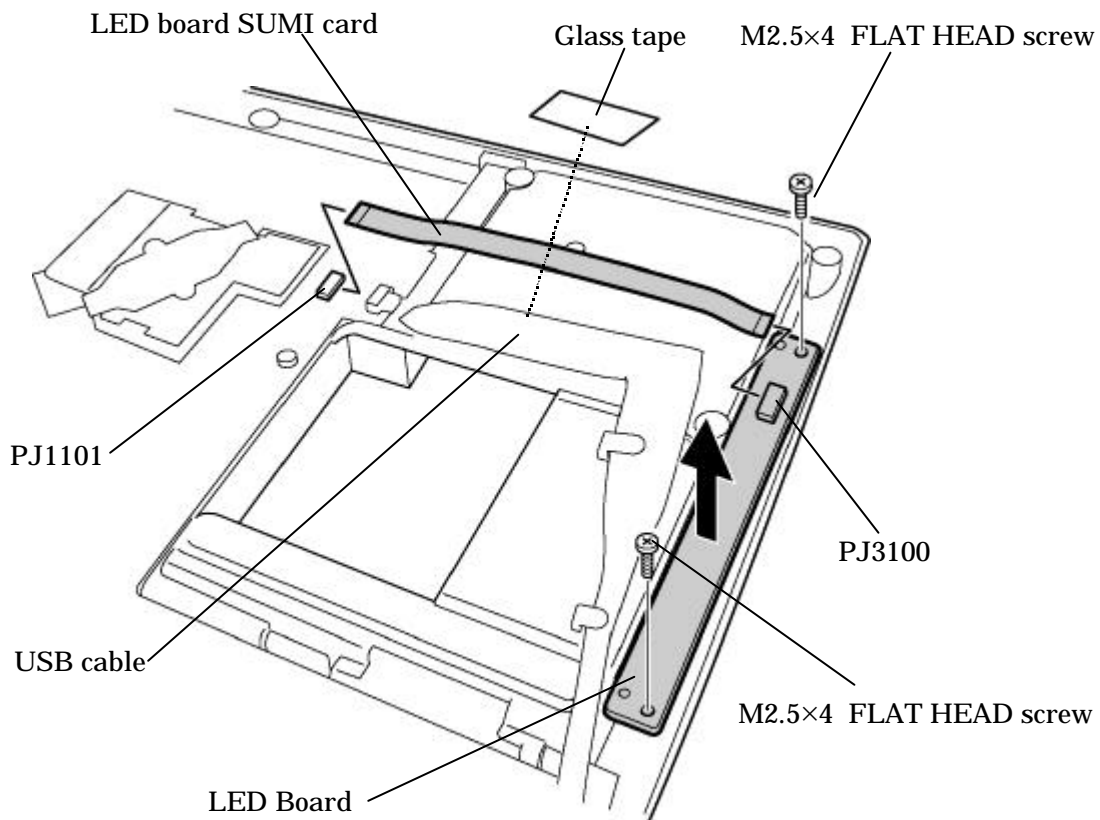


Figure 4-29 Removing the LED board

Installing the LED Board

To install the LED board, follow the steps below and refer to figure 4-29.

1. Connect the LED board SUMI card to PJ3100 on the LED board.
2. Place the LED board and secure it with the following screws.
 - M2.5×4 FLAT HEAD screws ×2
3. Connect the LED board SUMI card to PJ1101 on the system board.
4. Stick the glass tape to secure the LED board SUMI card and USB cable.

4.17 Sound Board

Removing the Sound Board

To remove the sound board, follow the steps below and refer to figure 4-30.

CAUTION: When the sound board is installed on the system board outside of the chassis, do not connect or disconnect a cable to the headphone or microphone jack repeatedly for check. Before checking the jacks, install the sound board on the system board, and secure them with one screw. Otherwise, load might be applied to PJ3000 on the sound board or PJ1100 on the system board and cause solder crack.

1. Remove the following screw securing the sound board.
 - M2.5×4 FLAT HEAD screw ×1
2. Lift up the sound board to disconnect PJ3000 on the back of the sound board from PJ1100 on the system board. Lift up the board toward the side of jacks.

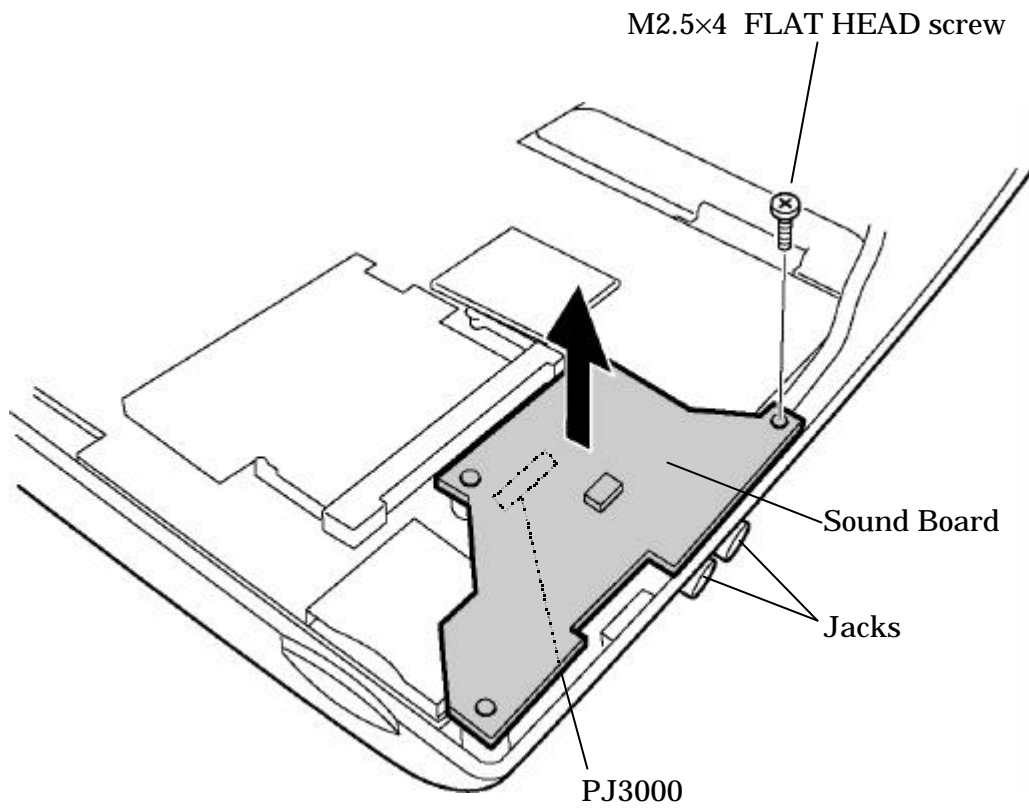


Figure 4-30 Removing the Sound board

Installing the Sound Board

To install the sound board, follow the steps below and refer to figure 4-30.

1. Install the sound board and press it to connect PJ3000 on the back of the sound board to PJ1100 on the system board. When installing the sound board, insert the two jacks and a volume controller into the hole of the chassis first.
2. Secure the sound board with the following screw.
 - M2.5×4 FLAT HEAD screw ×1

4.18 System Board/RTC Battery/DC-IN Jack

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 System Board/RTC Battery/DC-IN Jack

To remove the system board/RTC battery/DC-IN jack, follow the steps below and refer to figures 4-31 to 4-33.

1. Disconnect the sensor/switch board SUMI card from PJ1000 on the system board.
2. Disconnect the DC-IN cable from PJ8800 on the system board.
3. Disconnect the RTC battery cable from PJ1005 on the system board and remove the RTC battery.
4. Remove the glass tape securing the USB cable. Then disconnect the USB cable from PJ1004 on the system board.
5. Remove the glass tape securing the fan cable. Then disconnect the fan cable from PJ8770 on the system board.

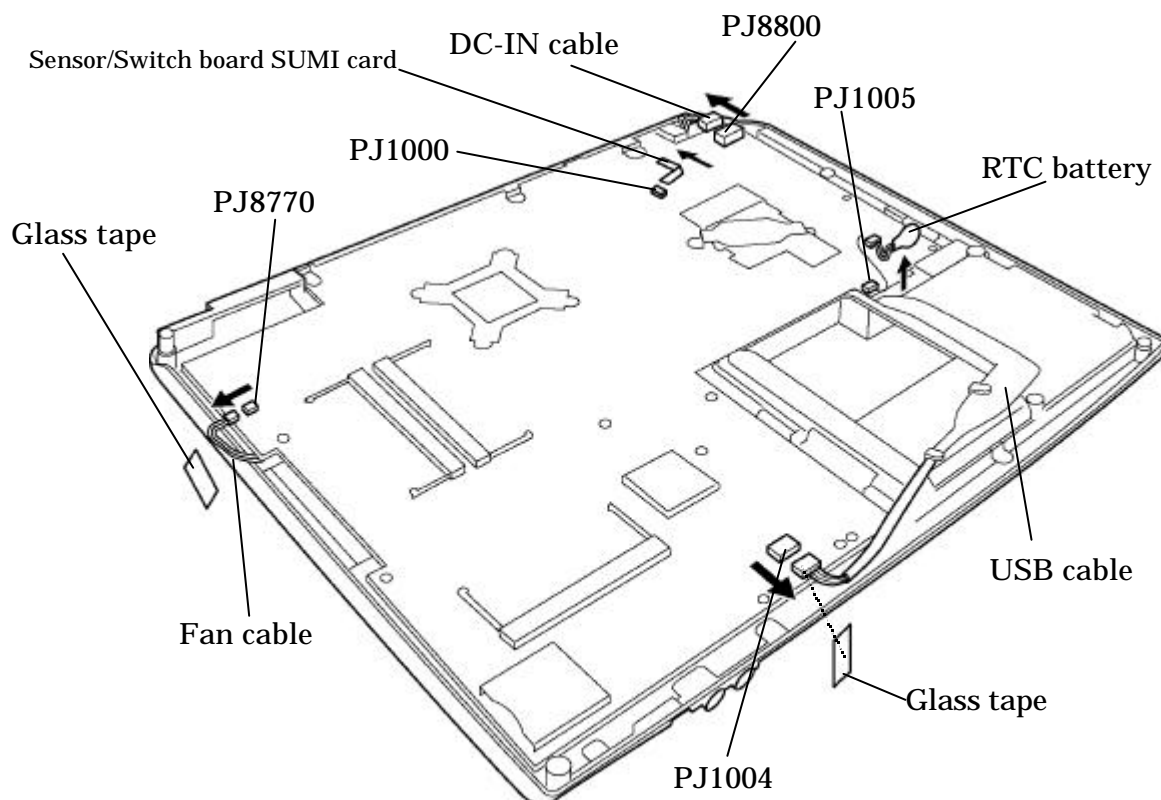


Figure 4-31 Removing the System board/RTC Battery/DC-IN Jack (1)

6. Remove the following screws securing the system board.

- M2.5×4 FLAT HEAD screw ×4
- M2.5×10 FLAT HEAD screw ×1

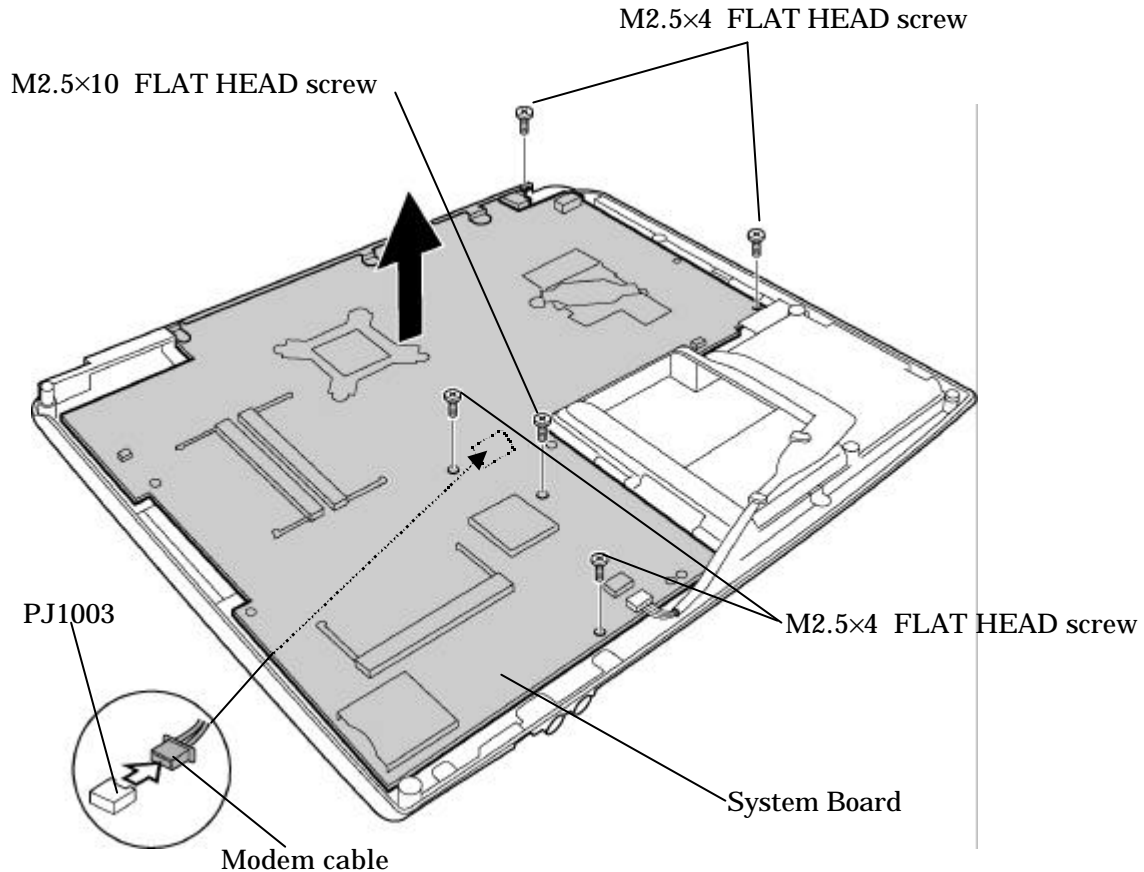


Figure 4-32 Removing the System board/RTC Battery/DC-IN Jack (2)

7. Lift up the system board and remove it.

NOTE: When removing the system board, be careful not to damage the modem cable on the back of the system board.

8. Disconnect the modem cable from PJ1003 on the back of the system board and remove the modem cable.

9. Remove the DC-IN jack from the chassis.

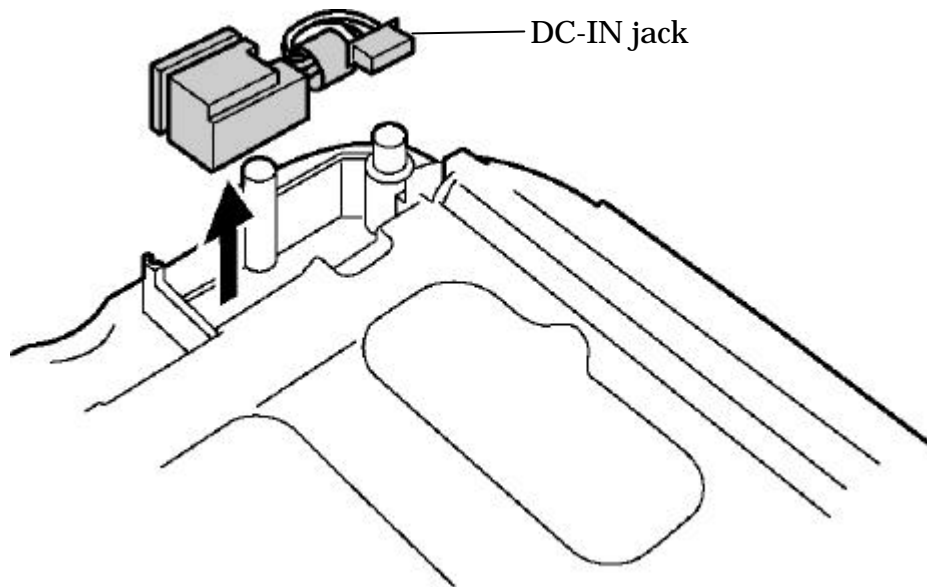


Figure 4-33 Removing the DC-IN jack

Installing the System Board/RTC Battery/DC-IN Jack

To install the system board/RTC battery/DC-IN jack, follow the steps below and refer to figures 4-31 to 4-33.

1. Install the DC-IN jack on the chassis.
2. Connect the modem cable to PJ1003 on the back of the system board and pass the cable under the insulator on the side of the CPU.
3. Install the system board. Pass the modem cable toward back through the hole for the CPU of the chassis. Set the cable into the hole of the insulator for modem daughter card.

NOTE: When installing the system board, be careful not to pinch or damage the USB cable, DC-IN cable, modem cable or RTC battery cable.

4. Secure the system board with the following screws.
 - M2.5×4 FLAT HEAD screw ×4
 - M2.5×10 FLAT HEAD screw ×1
5. Connect the fan cable to PJ8770 on the system board. Then stick the glass tape to secure the fan cable.
6. Connect the USB cable to PJ1004 on the system board. Then stick the glass tape to secure the USB cable.
7. Connect the RTC battery cable to PJ1005 on the system board. Install the RTC battery vertically into the empty space between the system board and chassis.
8. Connect the DC-IN cable to PJ8800 on the system board.
9. Connect the sensor/switch board SUMI card to PJ1000 on the system board.

4.19 USB Board

Removing the USB Board

To remove the USB board, follow the steps below and refer to figure 4-34.

1. Remove the following screw securing the USB board.
 - M2.5×4 FLAT HEAD screw ×1
2. Remove the USB cable from the two guides and remove the USB board by lifting it up directly.

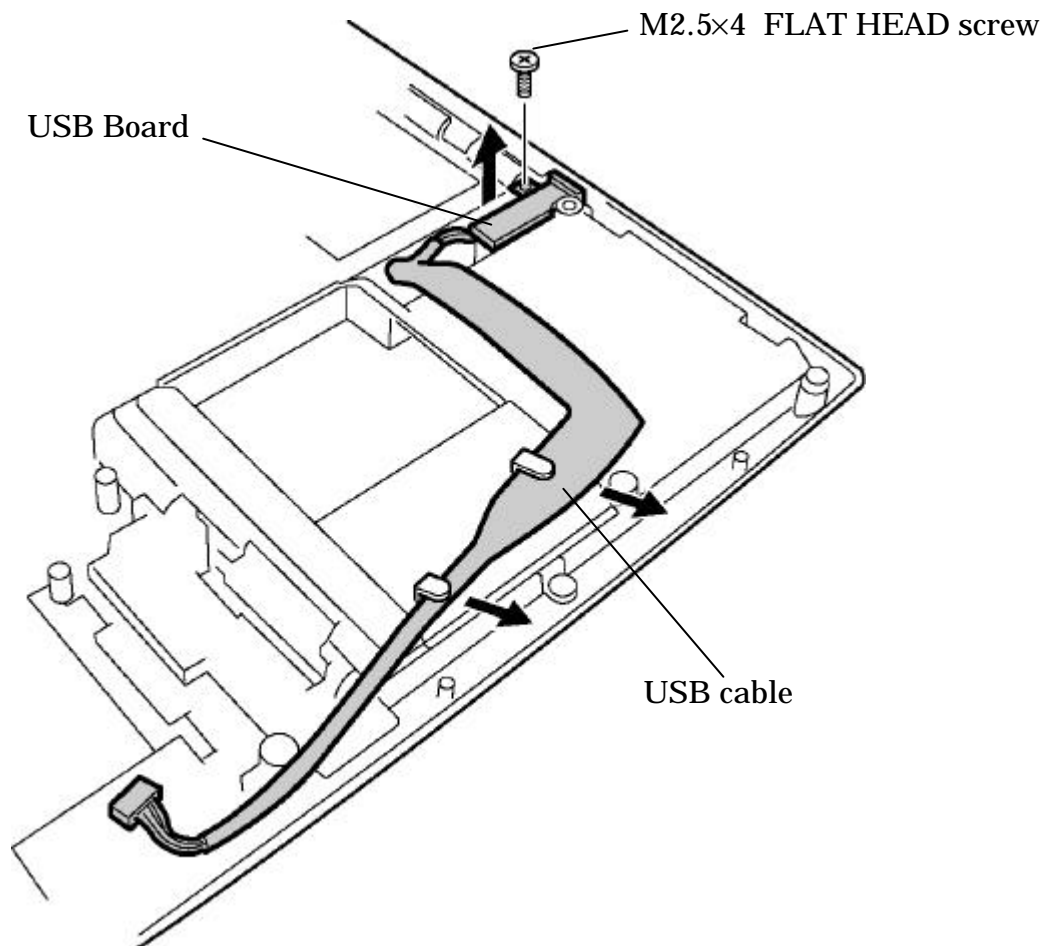


Figure 4-34 Removing the USB board

Installing the USB Board

To install the USB board, follow the steps below and refer to the figure 4-34.

1. Fit the USB cable to the two guides and install the USB board with its hole attached to the boss of the chassis.
2. Secure the USB board with the following screw.
 - M2.5×4 FLAT HEAD screw ×1

4.20 Fan

Removing the Fan

To remove the fan, follow the steps below and refer to figure 4-35.

1. Remove the following screws securing the fan.
 - M2.5×6 FLAT HEAD screw ×2
2. Remove the fan.

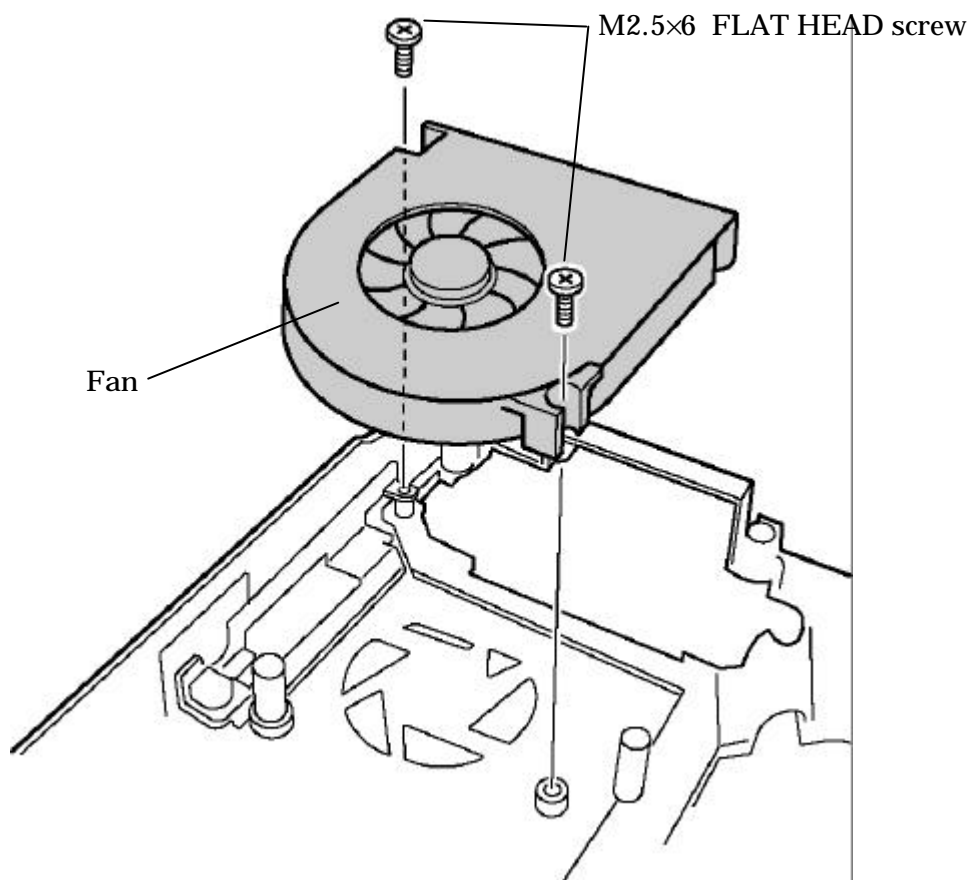


Figure4-35 Removing the Fan

Installing the Fan

To install the fan, follow the steps below and refer to figure 4-35.

1. Place the fan.
2. Secure the fan with the following screws.
 - M2.5×6 FLAT HEAD screw ×2

4.21 Display Mask

Removing the Display Mask

To remove the display mask, follow the steps below and refer to figures 4-36 and 4-37.

1. Remove the two mask seals at the lower part of the display mask.
2. Remove the following screws securing the display mask.
 - M2.5×6 FLAT HEAD screw ×2

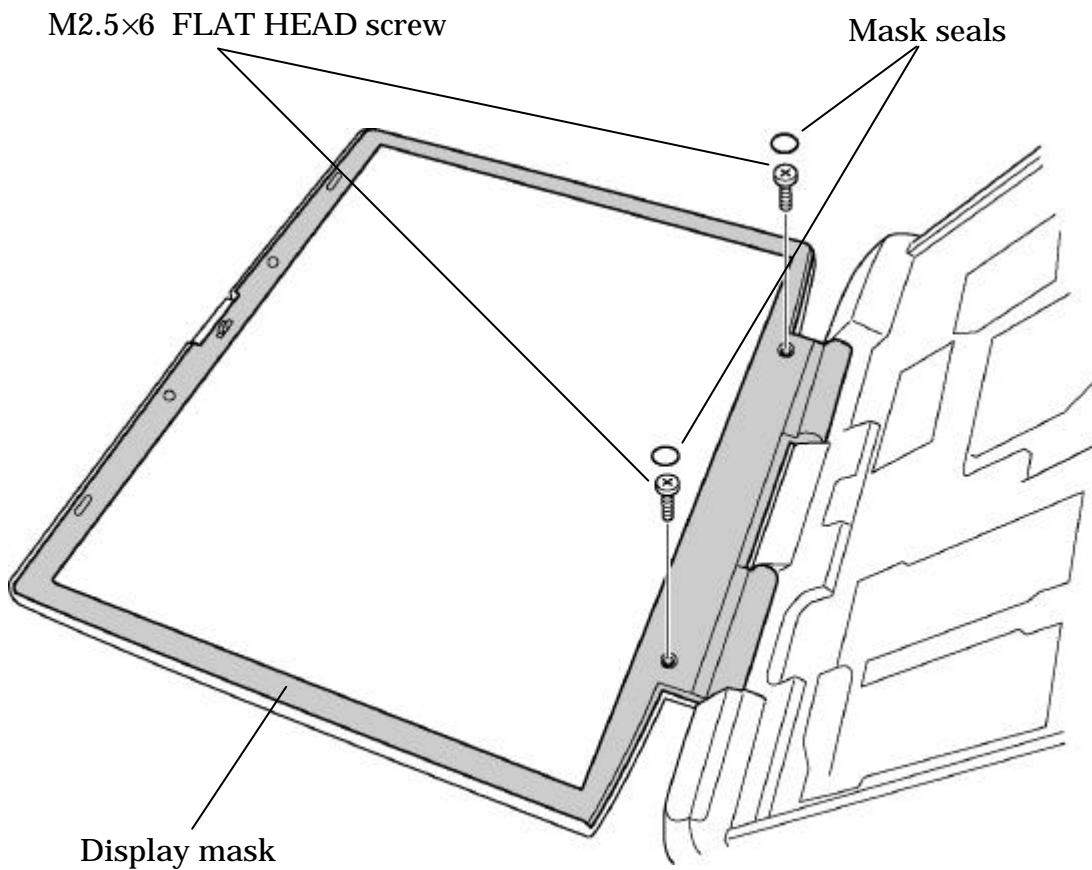


Figure 4-36 Removing the Display mask (1)

3. Release the latches on the display mask and remove the display mask.

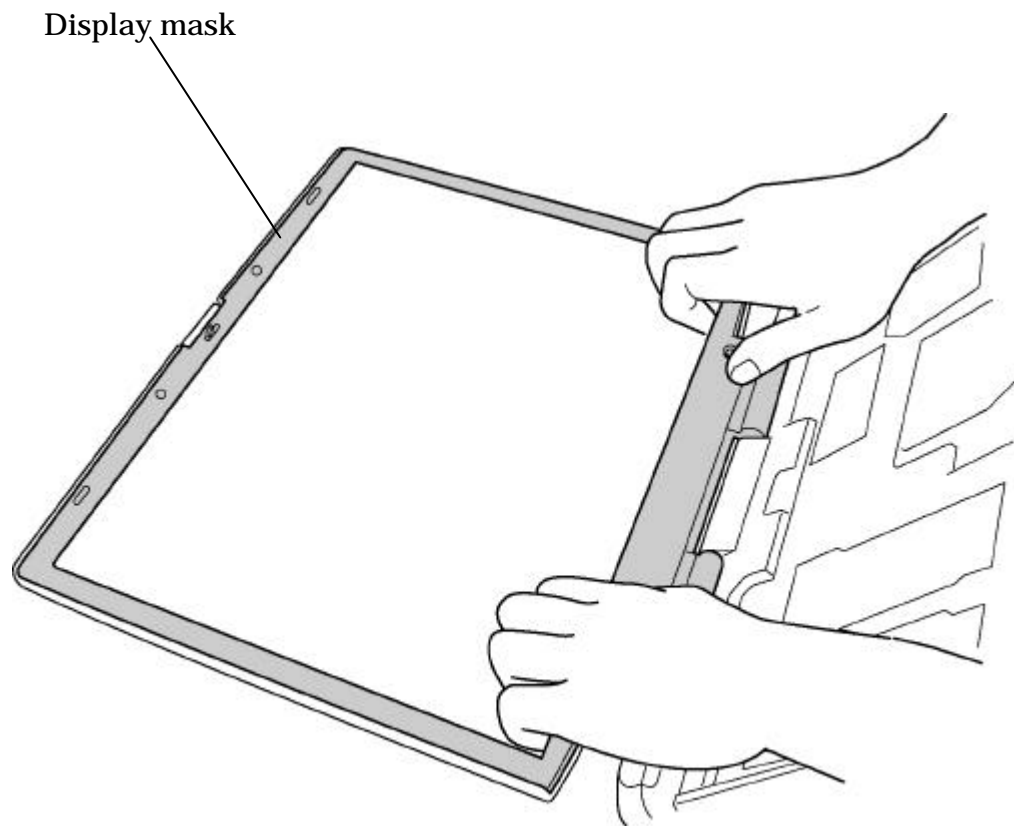


Figure 4-37 Removing the Display mask (2)

Installing the Display Mask

To install the display mask, follow the steps below and refer to figures 4-36 and 4-37.

1. Install the display mask on the LCD module.
2. Fasten the latches of the display mask.
3. Secure the display mask with the following screws.
 - M2.5×6 FLAT HEAD screw ×2

4. Stick the two mask seals on the top of screws.

4.22 FL Inverter

Removing the FL Inverter

To remove the FL inverter, follow the steps below and refer to figure 4-38.

1. Remove the following screw securing the FL inverter.
 - M2×3 SUPER FLAT screw ×1
2. Disconnect the FL cable under the insulator from the FL inverter.
3. Disconnect the HV cable from the FL inverter.
4. Remove the FL inverter.

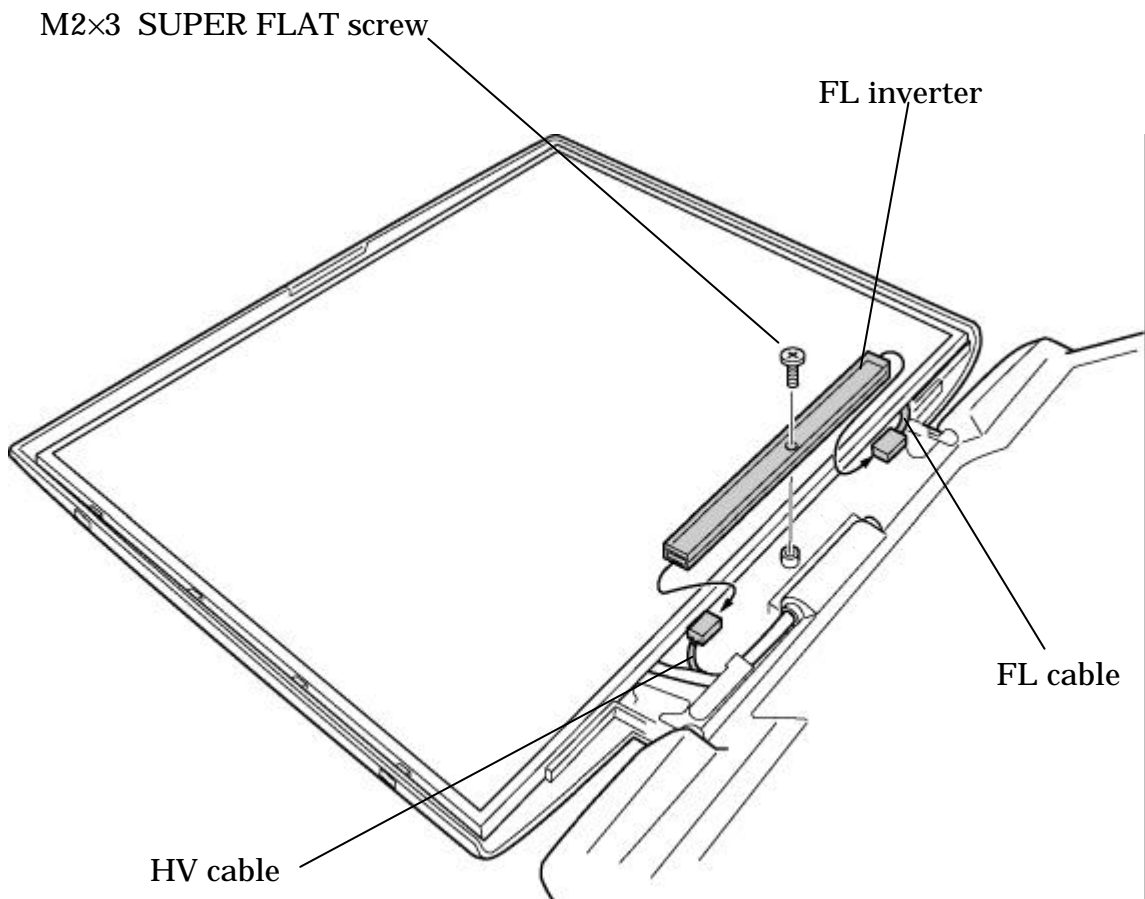


Figure 4-38 Removing the FL inverter

Installing the FL Inverter

To install the FL inverter, follow the steps below and refer to figure 4-38.

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.
 - M2×3 SUPER FLAT screw ×1

4.23 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 4-39 and 4-40.

1. Remove the four mask seals on the sides of the LCD module.
2. Remove the following screws securing the LCD module.
 - M2×3 SUPER FLAT screw ×4
2. Carefully rotate out the top of the LCD module to access the LCD cable.

NOTE: When rotating the top of the LCD module, hold the corners of the LCD module. The top edge of LCD module is sensitive area.

3. (For SXGA+ models only)
Remove the copper tape securing the LCD cable.
4. Remove the grass tape securing the LCD cable.

5. Disconnect the LCD cable and remove the LCD module.

CAUTION: When removing the LCD cable, be careful not to damage the connector.

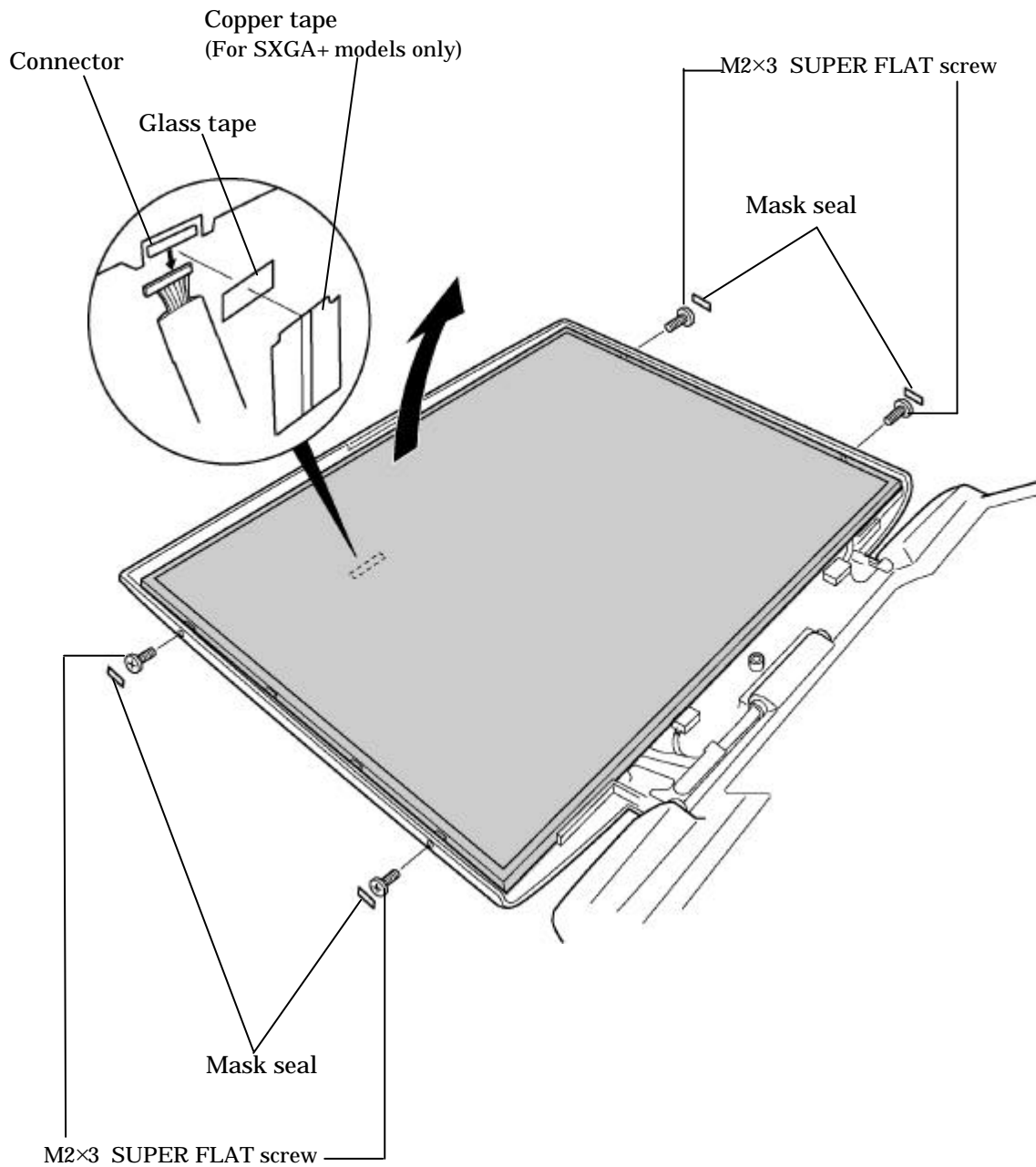


Figure 4-39 Removing the LCD module (1)

6. Remove the following screws securing the two metal braces to the LCD module.

- M2×3 SUPER FLAT screw ×4

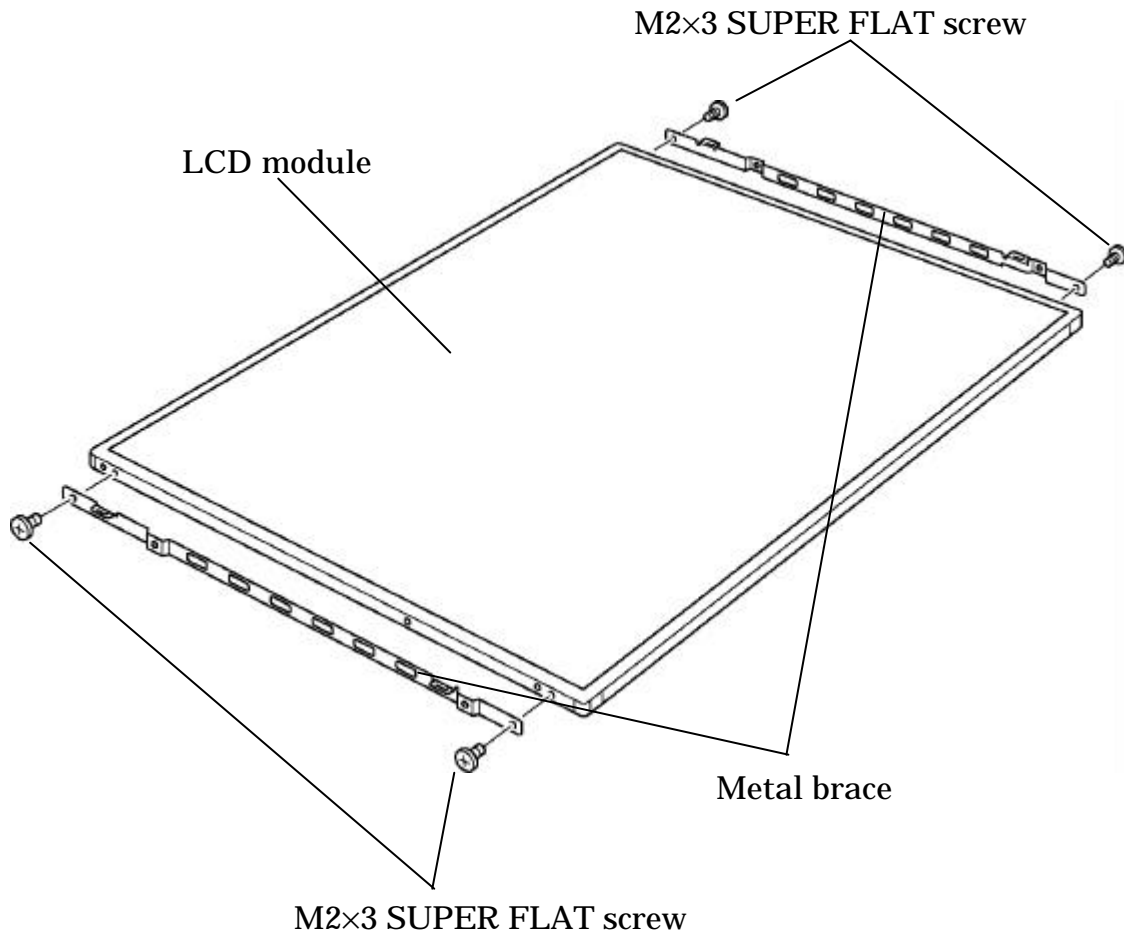


Figure 4-40 Removing the LCD module (2)

Installing the LCD Module

To install the LCD module, follow the steps below and refer to figures 4-39 and 4-40.

1. Secure the two metal braces to the LCD module with the following screws.
 - M2×3 SUPER FLAT screw ×4
2. Lean the LCD module against the lower side of the display cover.
3. Connect the LCD cable to the connector on the back of the LCD module. Stick the glass tape on the LCD cable.
4. (For SXGA+ models only)
Stick the copper tape on the LCD cable and glass tape. Make sure the copper tape covers the connector on the display cover and the LCD cable.
5. Seat the LCD module and secure it with the following screws.
 - M2×3 SUPER FLAT screw ×4
6. Stick the four mask seals on the sides of the LCD module.

4.24 Wireless LAN Antenna/Bluetooth Antenna/Display Cover/Speaker

Removing the Wireless LAN Antenna/Bluetooth Antenna/Display Cover/Speaker

To remove the wireless LAN antenna/Bluetooth antenna/display cover/speaker, follow the steps below and refer to figures 4-41 to 4-49.

NOTE: The left speaker cable and acetate tape securing the left speaker cable are installed on the insulator depending on the type of the computer.

1. Turn the display assembly face down. Remove the acetate tape securing the right speaker cable. Then remove the right speaker cable from the insulator. Remove the insulator from the display assembly.

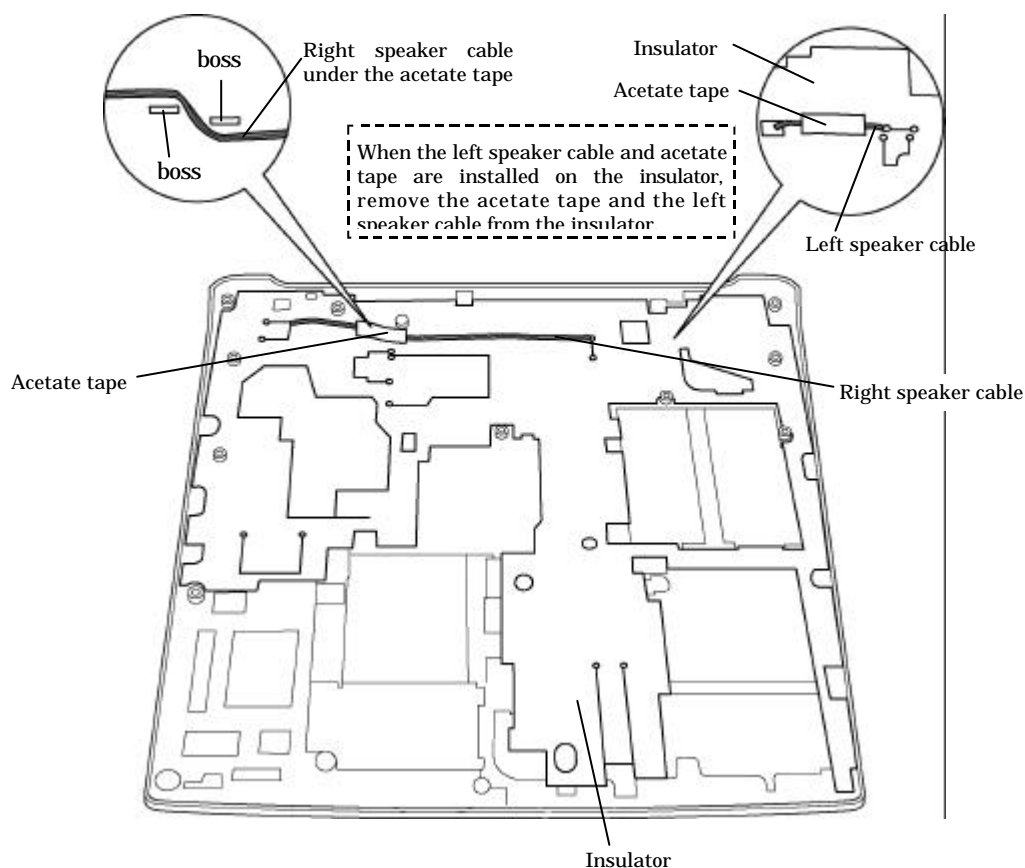


Figure 4-41 Removing the Insulator

2. Remove the following screws securing the cable holder and remove the cable holder.

- M2.5×4 TAPPING screw ×2

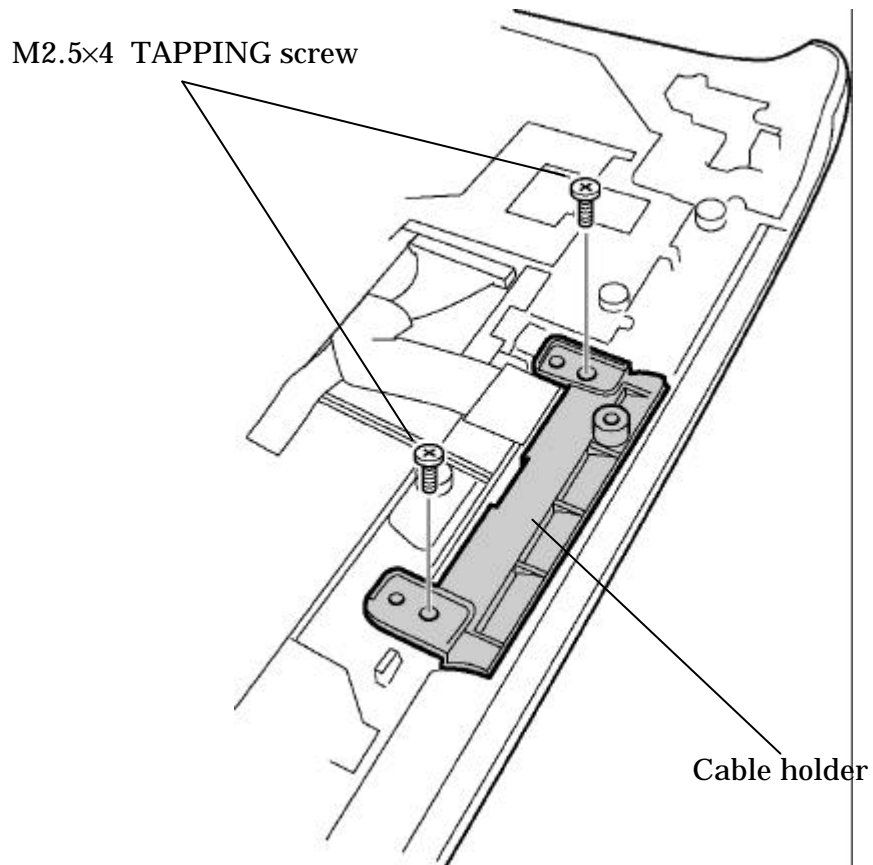


Figure 4-42 Removing the Cable holder

3. Remove the two acetate tapes securing the wireless LAN antenna cables, Bluetooth antenna cable (for wireless LAN/Bluetooth models only), and internal microphone cable. Remove these cables from the guides and pull them from the side of the display cover.

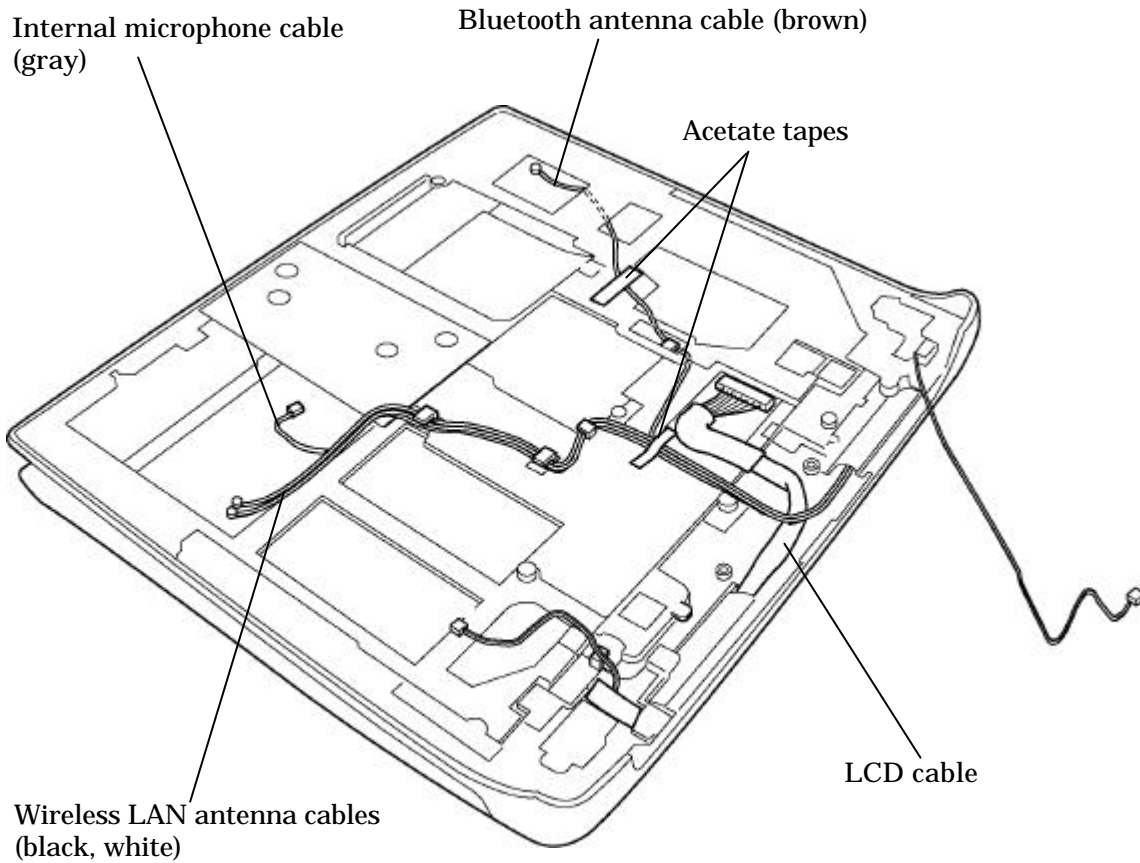


Figure 4-43 Removing the cables

4. Turn the display assembly face up and open the display cover. Remove the following screws securing the two hinges to the display cover.
 - M2.5×5 FLAT HEAD screw ×2

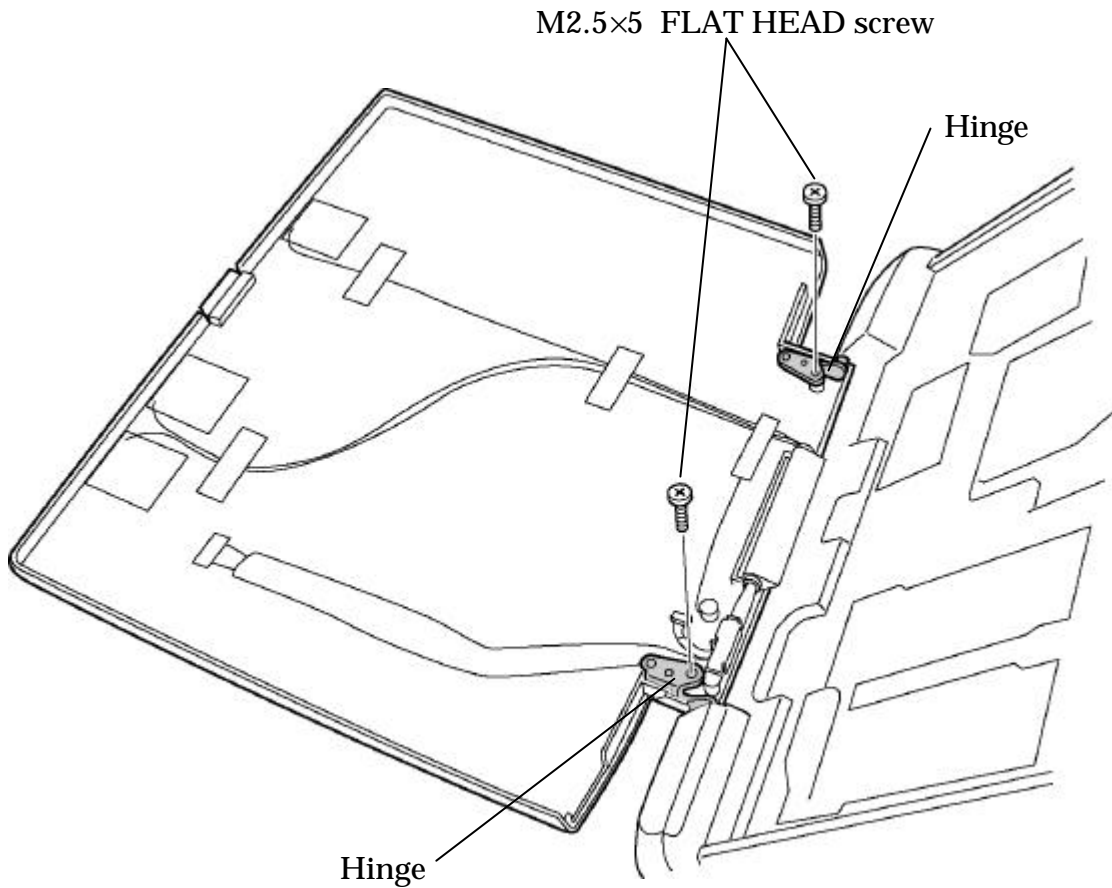


Figure 4-44 Removing the Hinge (1)

5. Remove the display cover from the display assembly. Be careful not to pinch or damage the LCD cable.
6. Remove the internal microphone from the guide pin.

7. (for Wireless LAN/Bluetooth models only)

Remove four acetate tapes, then remove the wireless LAN antennas and Bluetooth antenna from the display cover.

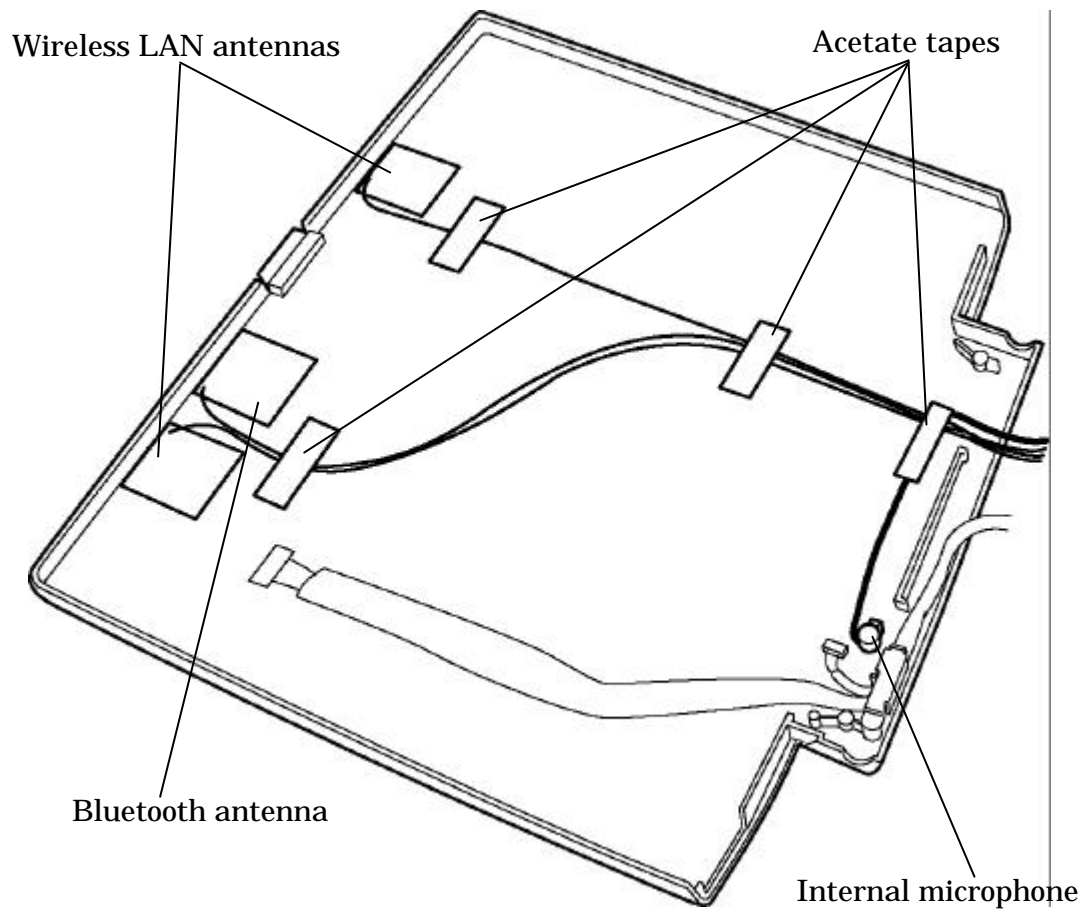


Figure 4-45 Removing the Wireless LAN/Bluetooth antenna

8. Remove the following screw securing the metal plate on the LCD cable and remove the metal plate. Remove the LCD cable from the display assembly.

- M2.5×4 TAPPING screw ×1

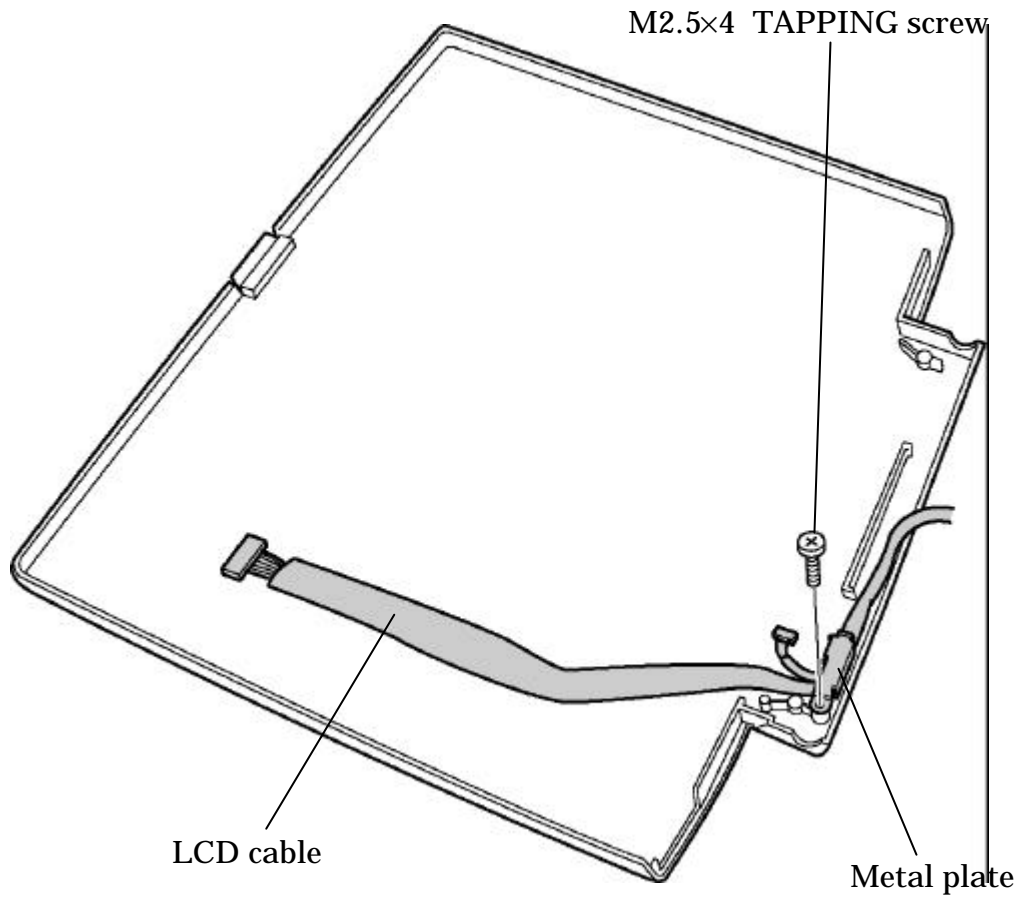


Figure 4-46 Removing the LCD cable

9. Lay the display assembly face down. Remove the acetate tape securing the left speaker cable. Release the cable from the guides.

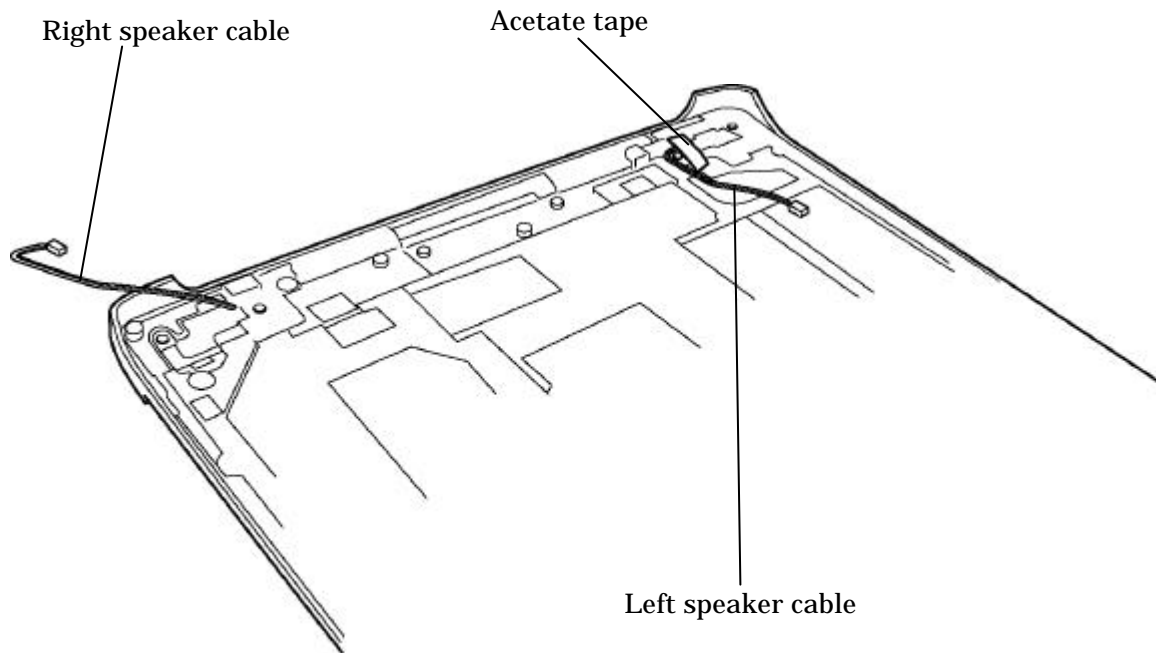


Figure 4-47 Removing the Speaker cable

10. Remove the following screws securing the speakers and side covers. Remove the speakers and side covers.

- M2.5×4 FLAT HEAD screw ×2
- M2.5×6 FLAT HEAD screw ×4

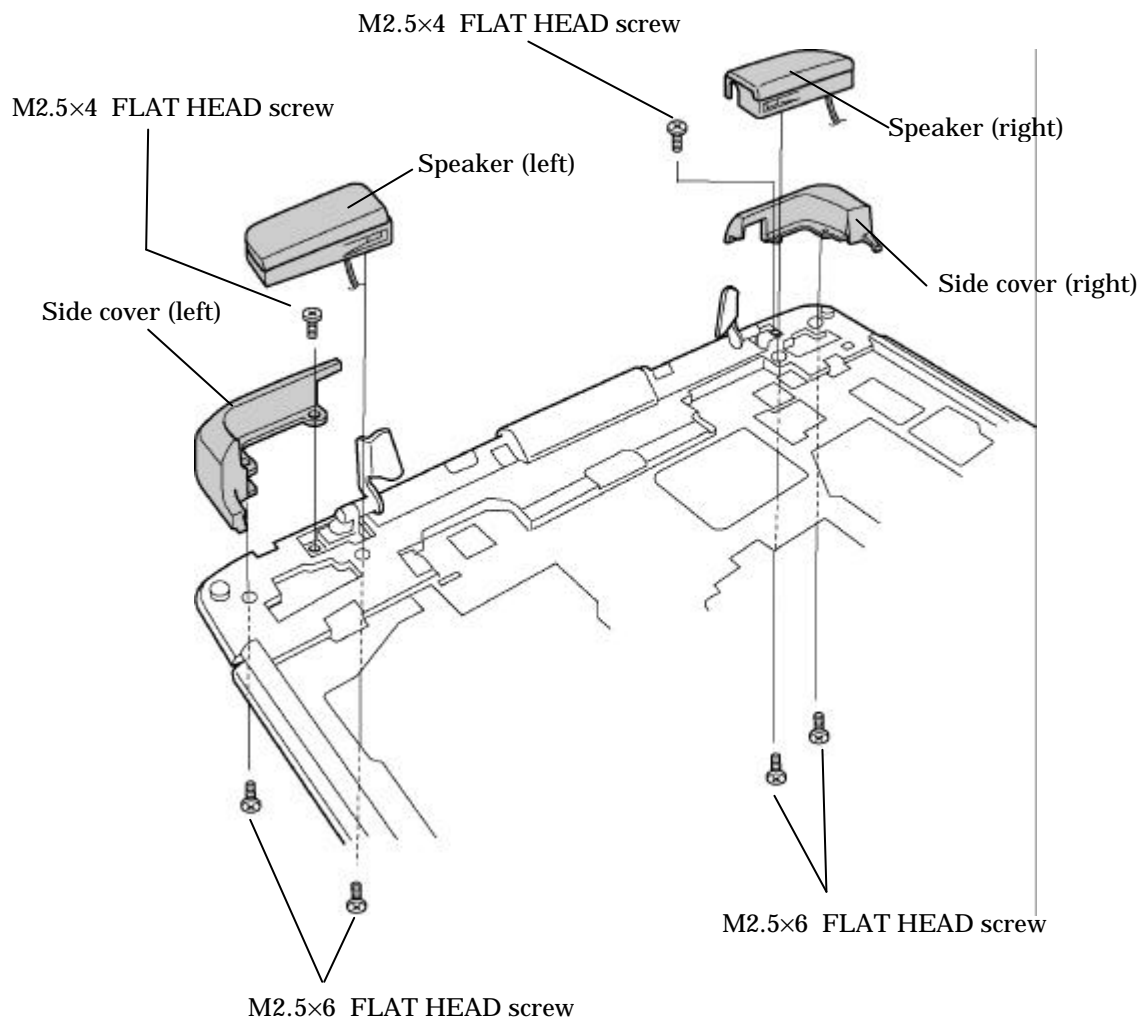


Figure 4-48 Removing the Speaker and Side cover

11. Remove the following screws securing the two hinges to the display cover and remove the hinges.

- M2.5×6 FLAT HEAD screw ×2

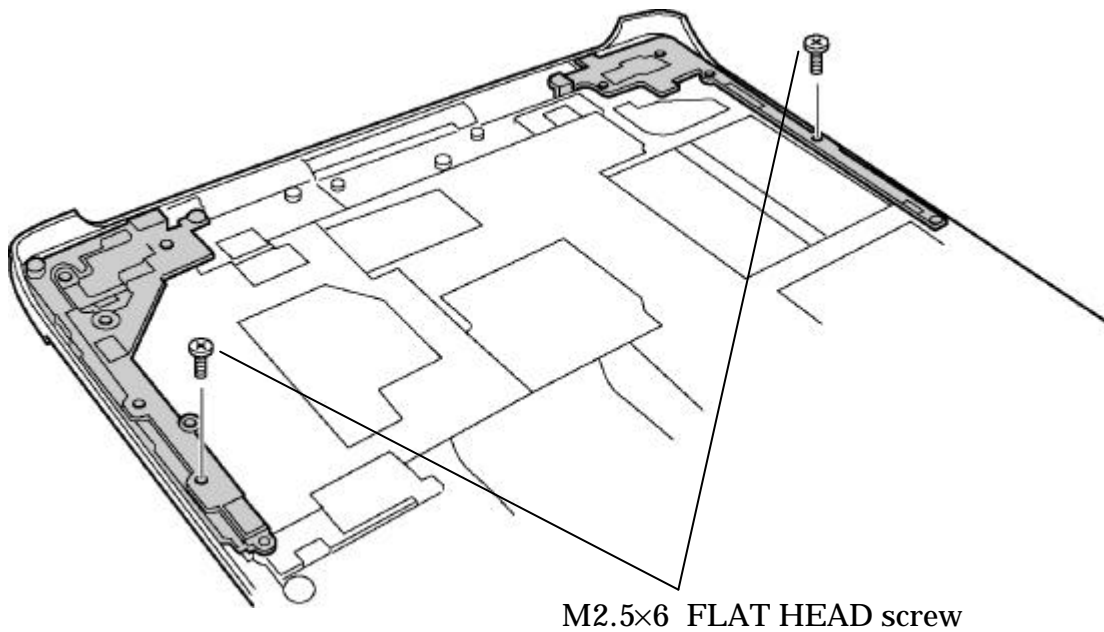


Figure 4-49 Removing the Hinge (2)

Installing the Wireless LAN Antenna/Bluetooth Antenna/Display Cover/Speaker

To install the wireless LAN antenna/Bluetooth antenna/display cover/speaker, follow the steps below and refer to figures 4-41 to 4-50.

1. Install the two hinges into the hole on the back of the display assembly and secure the hinges with the following screws.
 - M2.5×6 FLAT HEAD screw ×2
2. Install the side covers and speakers. Pass the speaker cables through the hole on the display assembly. Secure the side covers and speakers with the following screws.
 - M2.5×4 FLAT HEAD screw ×2
 - M2.5×6 FLAT HEAD screw ×4
3. Stick the acetate tape to secure the left speaker cable.
4. Install the LCD cable and the metal plate on the display cover and secure it with the following screw.
 - M2.5×4 TAPPING screw ×1
5. (For wireless LAN/Bluetooth models only)
Attach the following antennas with double-sided adhesive tapes in the order of the main wireless LAN antenna (with white cable), Bluetooth antenna (with brown cable) and sub wireless LAN antenna (with black cable) at the rear of the display cover.

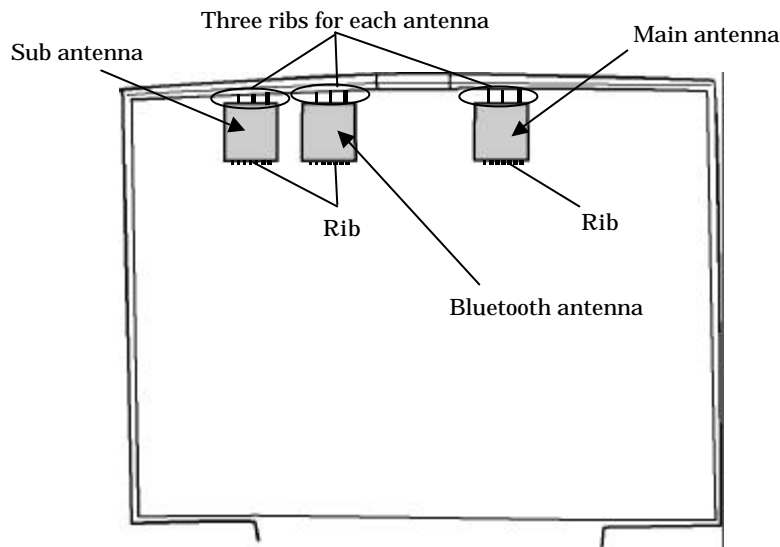


Figure 4-50 Installing the wireless LAN/Bluetooth antenna

6. Install the internal microphone with its hole attached to the guide pin of the back of the display cover.
7. Install the display cover to the display assembly. Pass the LCD cable through the hole from the front of the display assembly toward the bottom. Secure the two hinges on the display assembly to the display cover with the following screws.
 - M2.5×5 FLAT HEAD screw ×2
8. Pass the wireless LAN cables, Bluetooth cable (for wireless LAN/Bluetooth models only) and internal microphone cable through the hole from the front toward the back of the display assembly.
9. Hook the wireless LAN cables, Bluetooth cable (for wireless LAN/Bluetooth models only) and internal microphone cable on the guides on the back of the display assembly. Stick the two acetate tapes on these cables.
10. Install the cable holder on the wireless LAN antenna cables, Bluetooth antenna cable (for wireless LAN/Bluetooth models only), internal microphone cable. Secure the holder with the following screws.
 - M2.5×4 TAPPING screw ×2
11. Install the insulator to cover the back of the display assembly. Pass the right speaker cable through the guides of the insulator.

NOTE: The left speaker cable and acetate tape securing the left speaker cable are installed on the insulator depending on the type of the computer.

4.25 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
14.1-inch (XGA)	VF2092P03	TOSHIBA	4.25.1
14.1-inch (SXGA+)	VF2074P01	Sharp	4.25.2

- NOTE:**
- *When working with an 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.*

4.25.1 Replacing the 14.1-inch XGA TOSHIBA 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 14.1-inch XGA TOSHIBA Fluorescent Lamp

To disassemble the 14.1-inch XGA TOSHIBA 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.

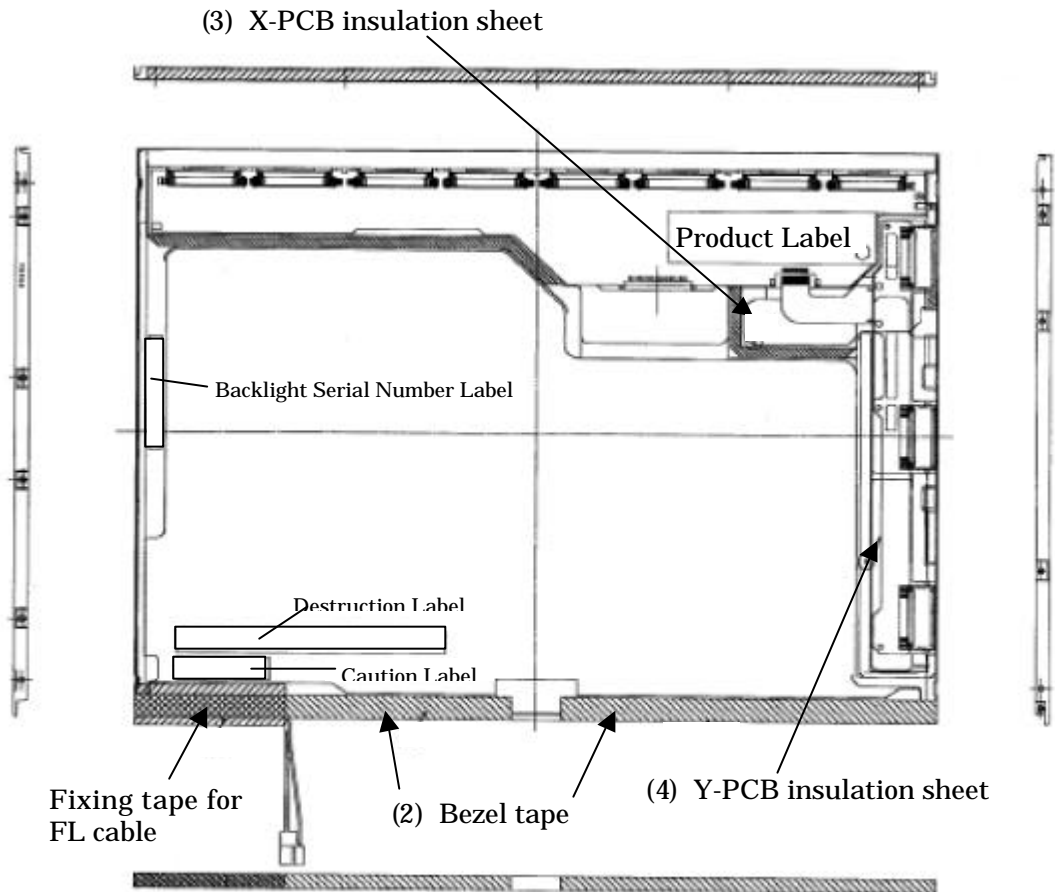


Figure 4-51 Replacing TOSHIBA fluorescent lamp (XGA) (1)

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.

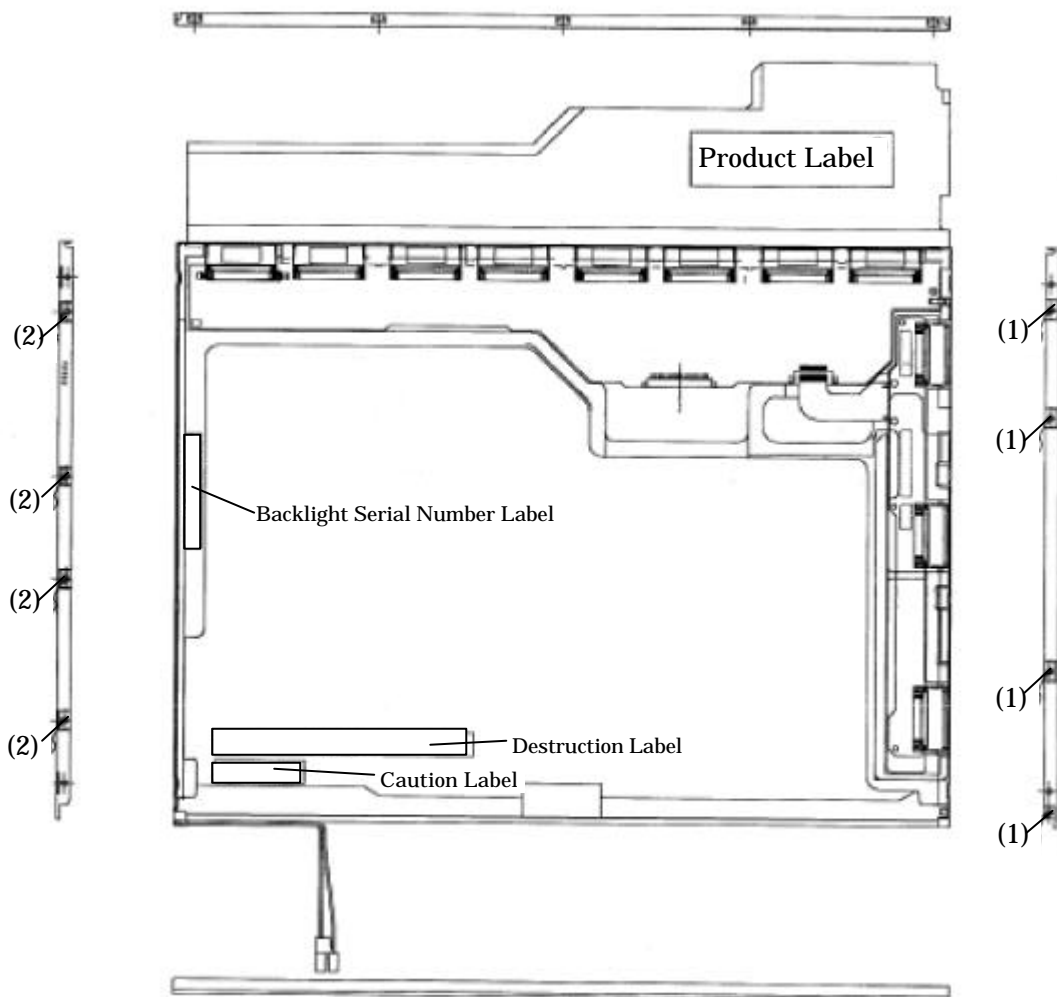


Figure 4-512 Replacing TOSHIBA fluorescent lamp (XGA) (2)

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.

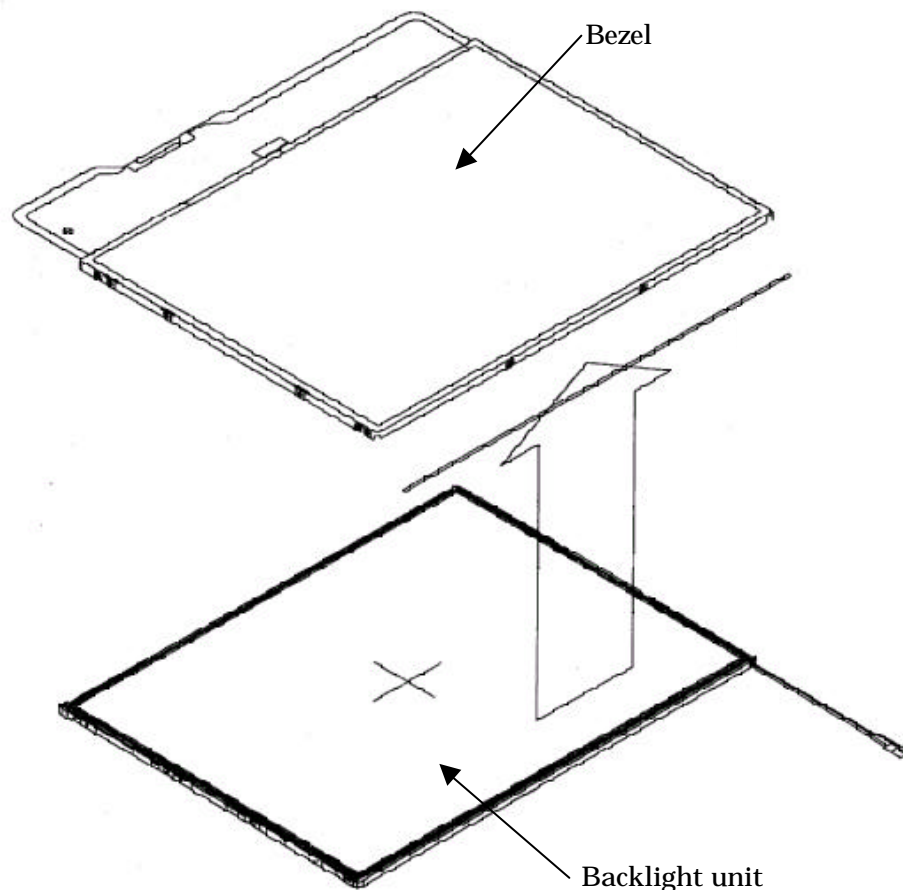


Figure 4-53 Replacing TOSHIBA fluorescent lamp (XGA) (3)

4. Spreading out PCB

- 1) Spread out the X-PCB and Y-PCB horizontally in order.

NOTE: Be careful not to damage the TAB.

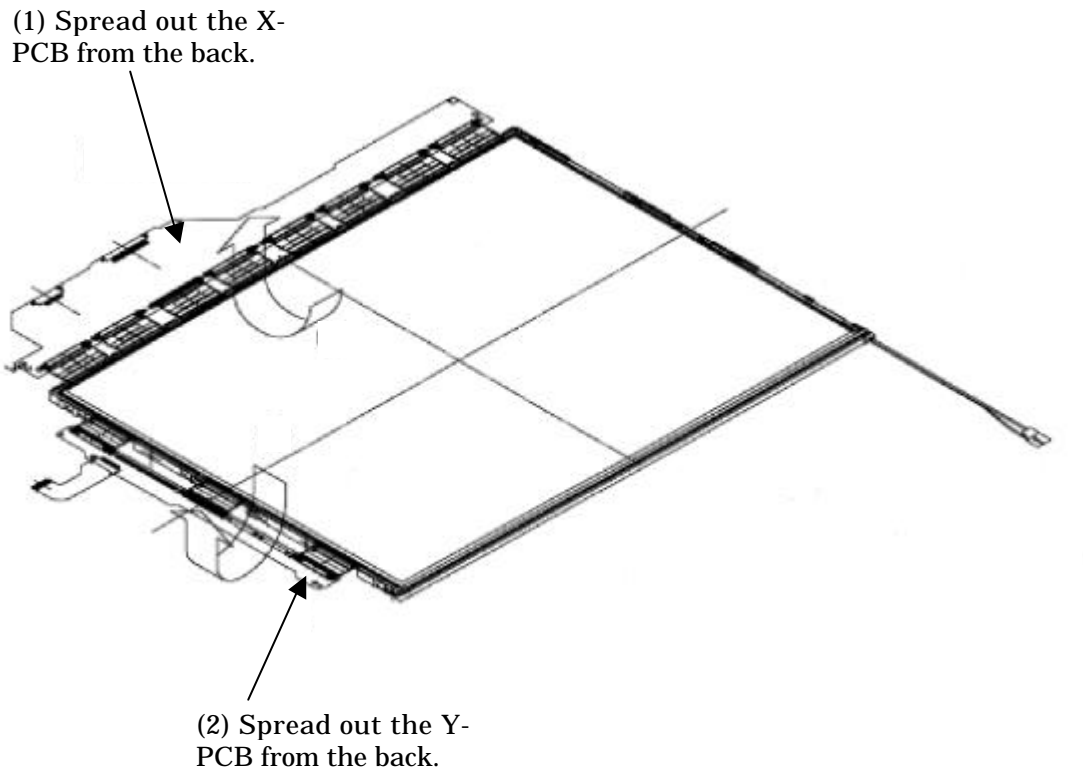


Figure 4-54 Replacing TOSHIBA fluorescent lamp (XGA) (4)

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.

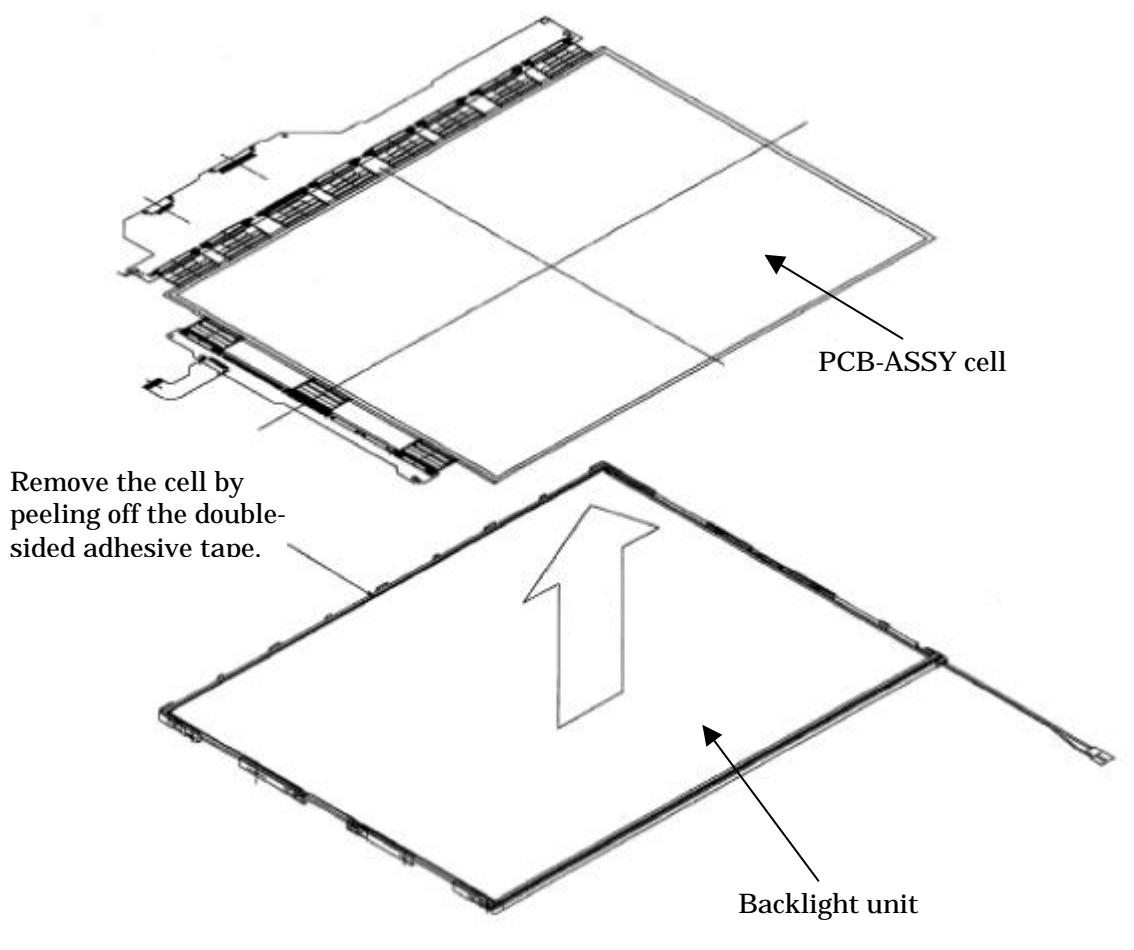


Figure 4-55 Replacing TOSHIBA fluorescent lamp (XGA) (5)

Assembling the 14.1-inch XGA TOSHIBA Fluorescent Lamp

To assemble the 15.0-inch XGA TOSHIBA 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.

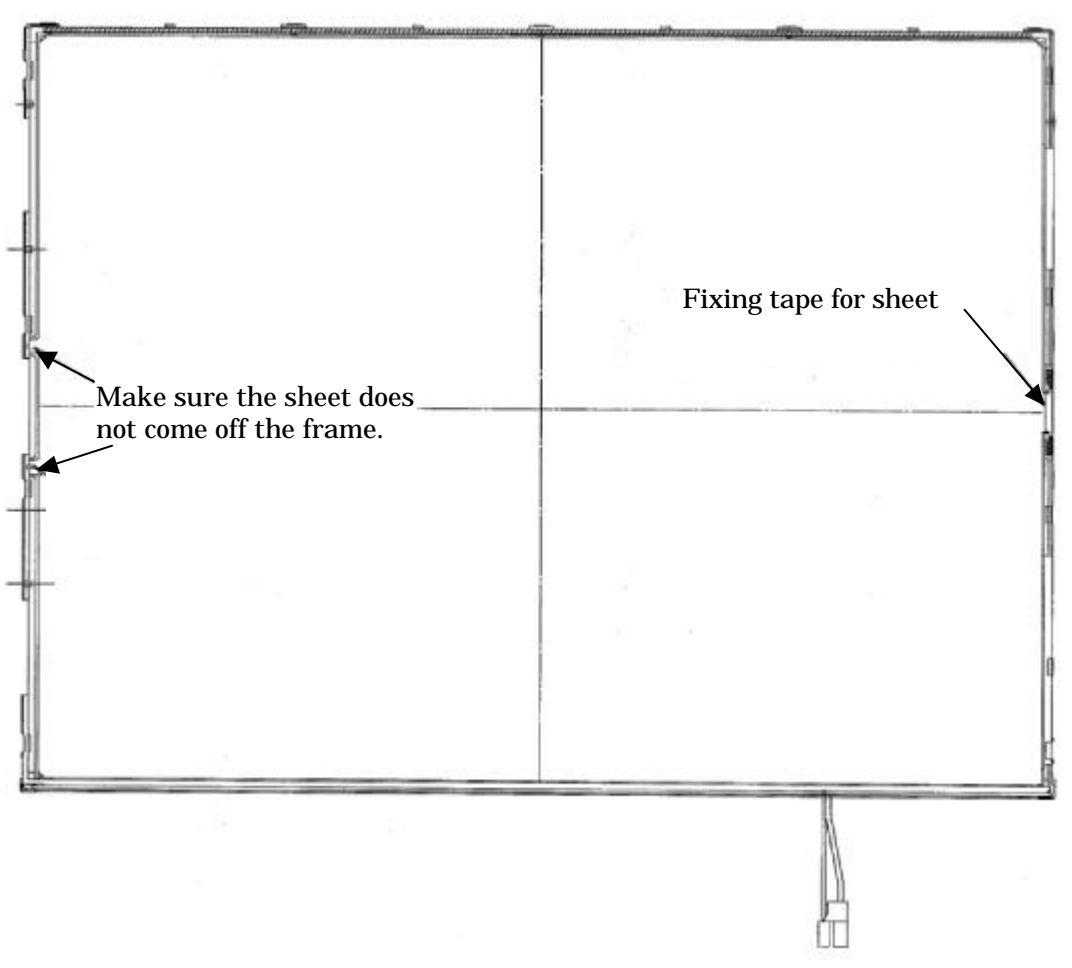


Figure 4-56 Replacing TOSHIBA fluorescent lamp (XGA) (6)

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.

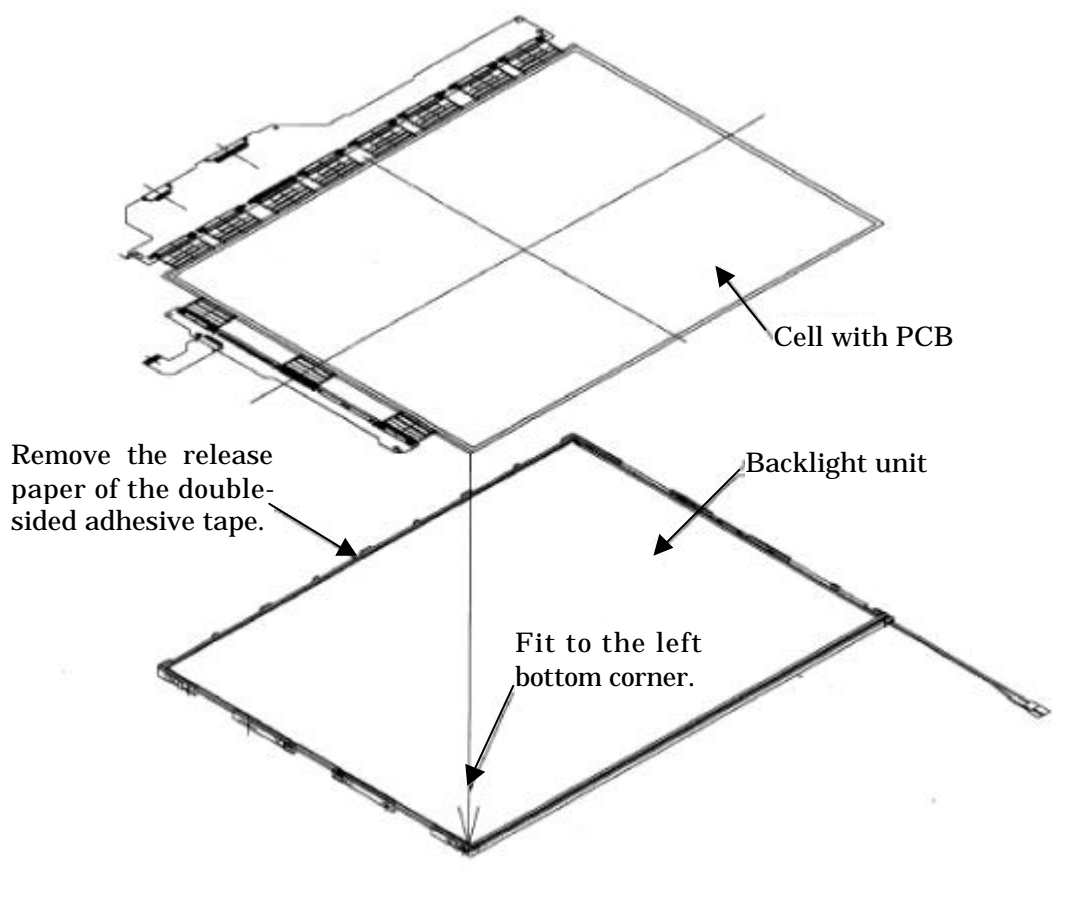


Figure 4-57 Replacing TOSHIBA fluorescent lamp (XGA) (7)

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.

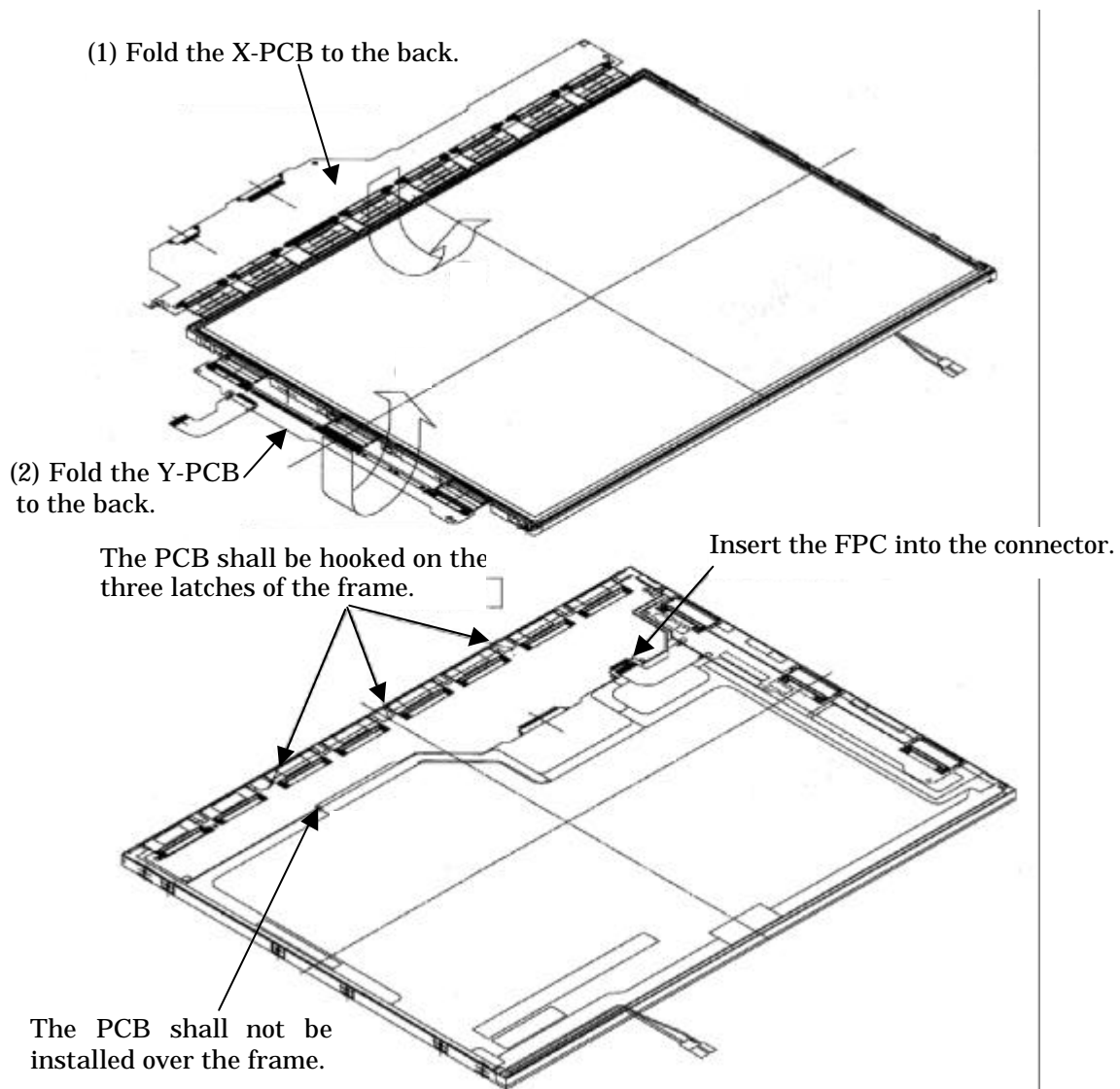


Figure 4-58 Replacing TOSHIBA fluorescent lamp (XGA) (8)

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.

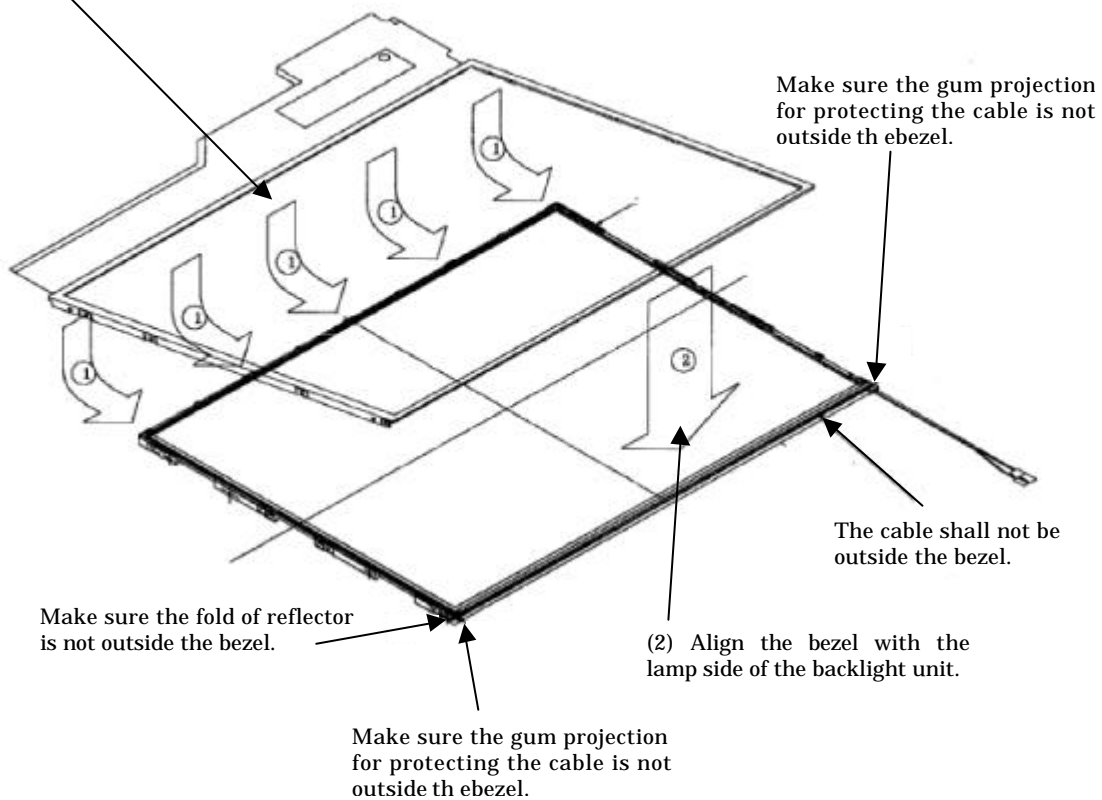


Figure 4-59 Replacing TOSHIBA fluorescent lamp (XGA) (9)

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 $0.147\text{mN}\cdot\text{m}$ ($1.5\text{kgf}\cdot\text{cm}$).
3) Use a Philips screwdriver with type 0 bit.

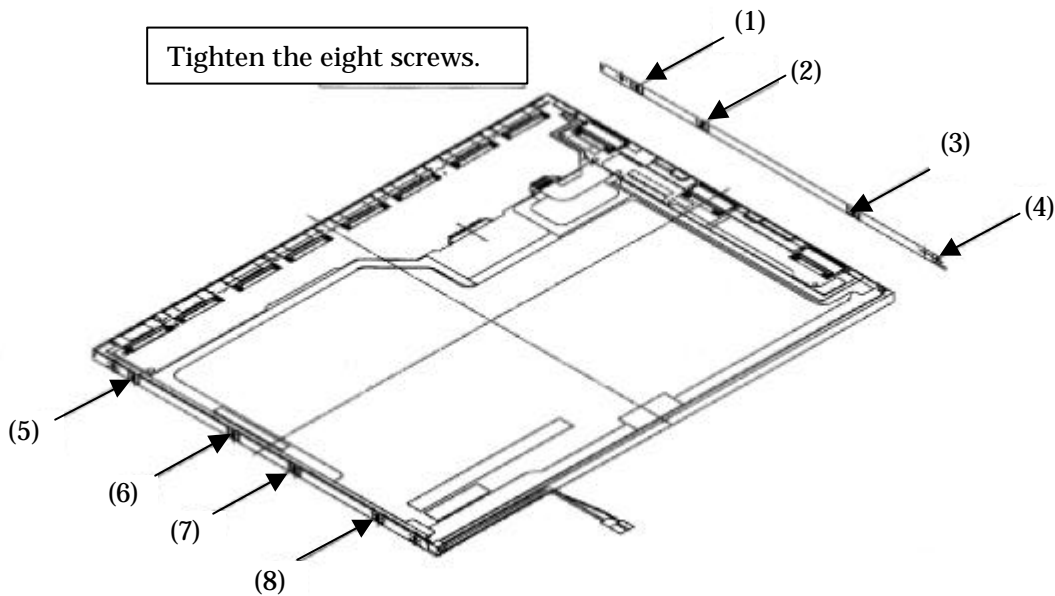


Figure 4-60 Replacing TOSHIBA fluorescent lamp (XGA) (10)

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.

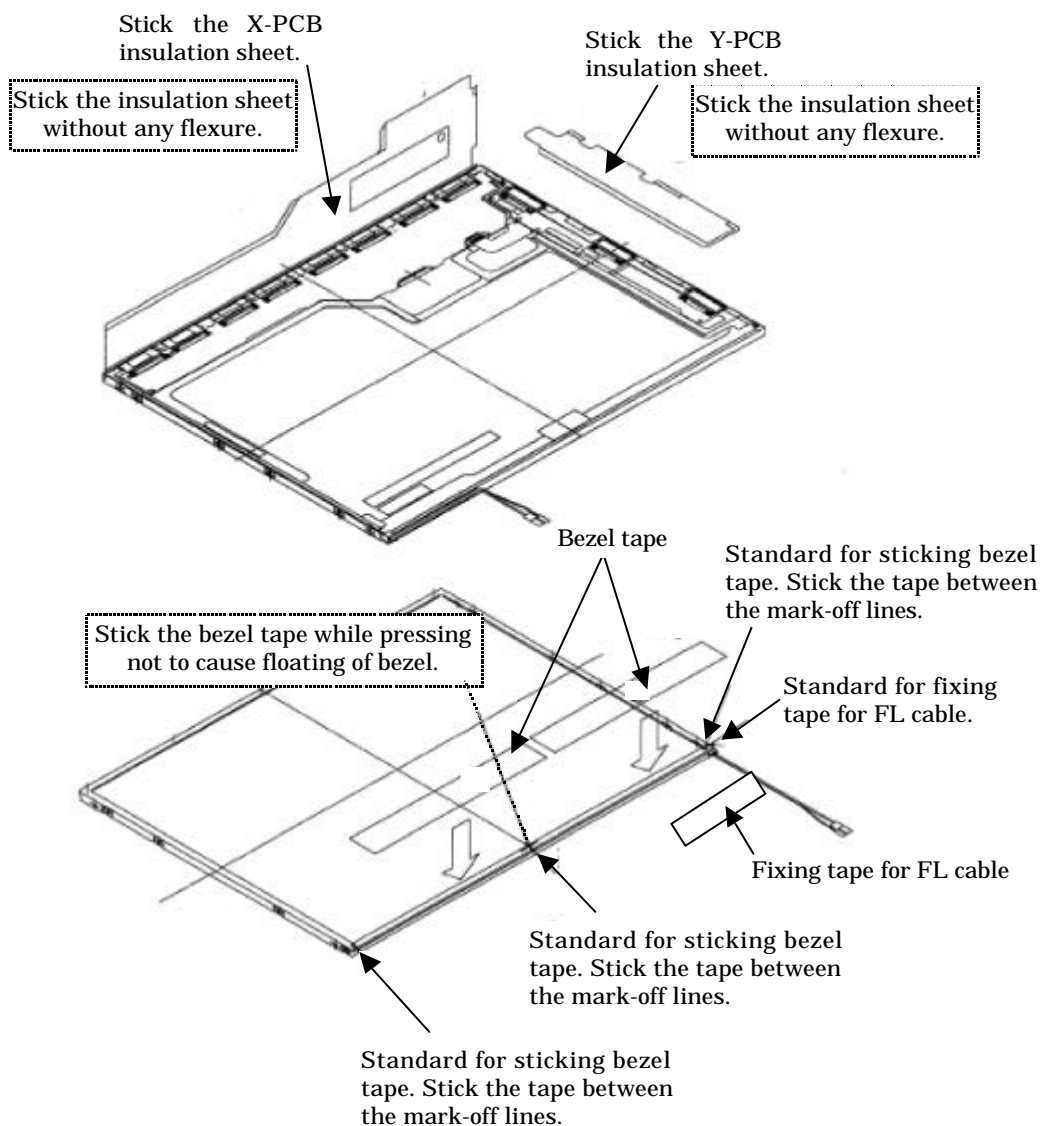


Figure 4-61 Replacing TOSHIBA fluorescent lamp (XGA) (11)

4.25.2 Replacing the 14.1-inch SXGA+ Sharp 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 14.1-inch SXGA+ Sharp Fluorescent Lamp

To disassemble the 14.1-inch SXGA+ Sharp fluorescent lamp, follow the steps below and refer to figures 4-62 to 4-71.

1. Turn the LCD module face down, and remove the protection cover S (A), protection cover G (B), aluminum tape (C) and fixing tape for lead wire (D).

NOTE: 1) Be careful not to damage the TCP or chips.
2) Discard the tapes removed.

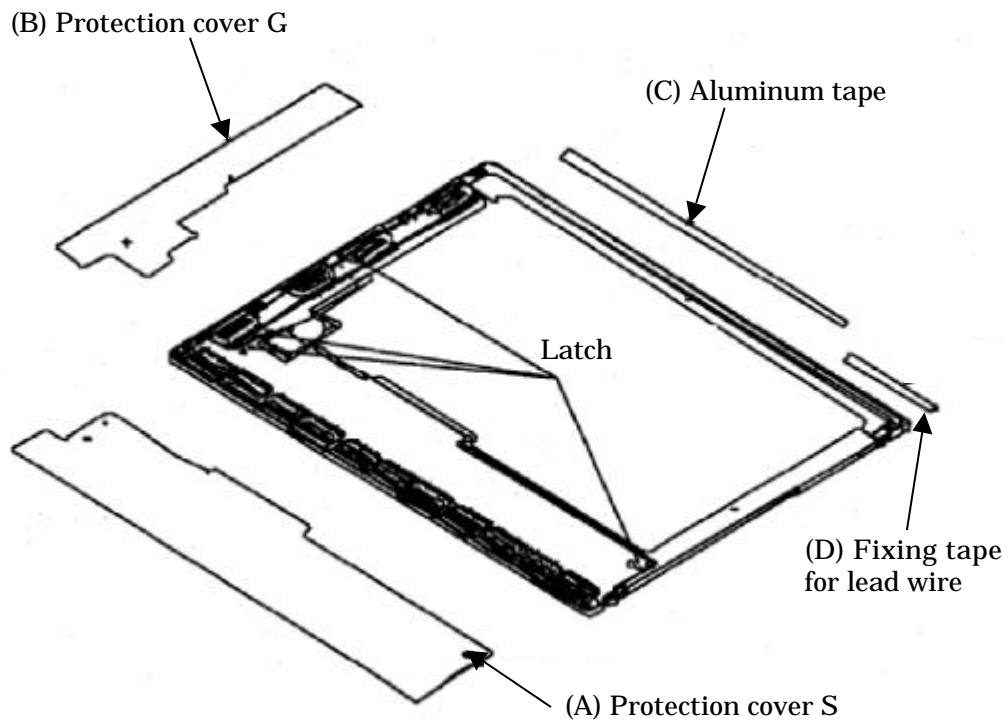


Figure 4-62 Replacing Sharp fluorescent lamp (SXGA+) (1)

2. Remove the four screws (E) on the sides.

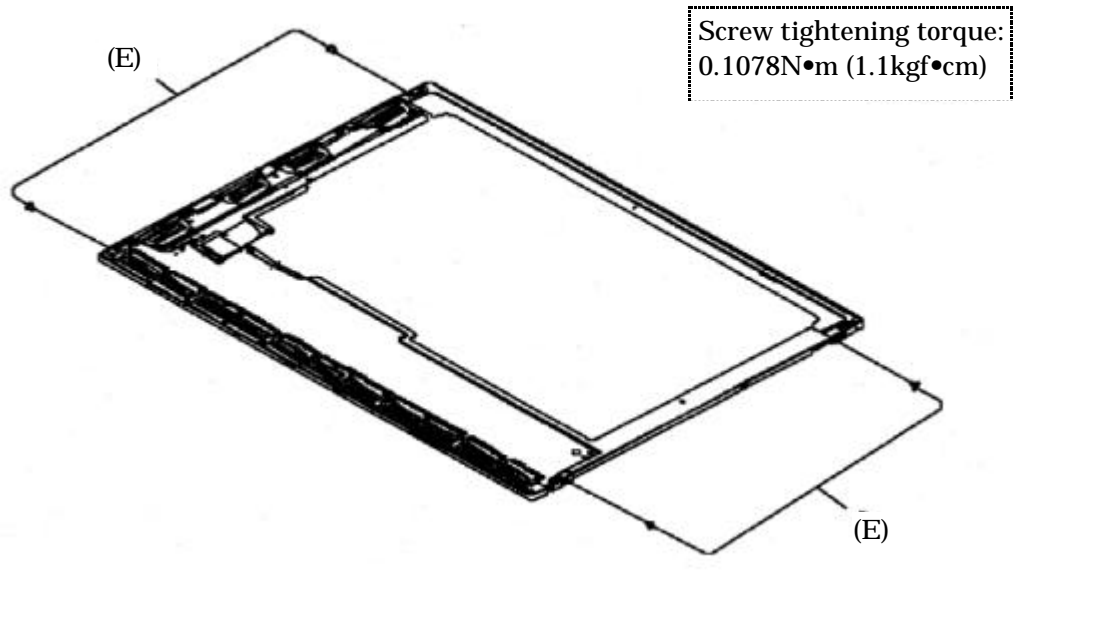


Figure 4-63 Replacing Sharp fluorescent lamp (SXGA+) (2)

3. Turn the LCD module face up and release the two latches on the side of lamp.

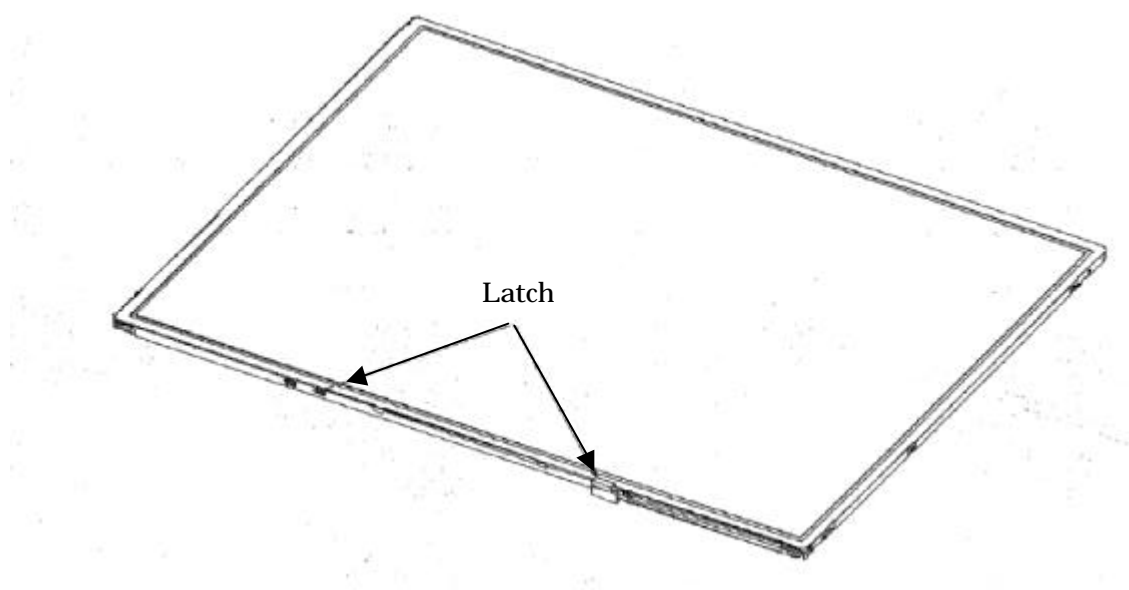


Figure 4-64 Replacing Sharp fluorescent lamp (SXGA+) (3)

4. Remove the bezel with having the U-shape side of bezel a supporting point, by lifting up the bezel from the side of lamp.

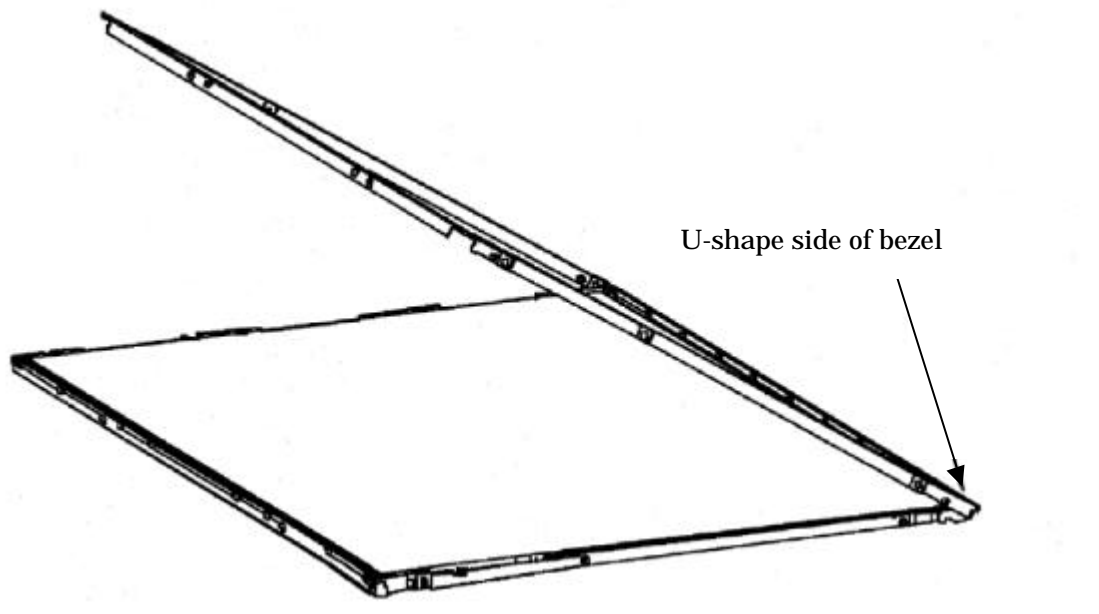


Figure 4-65 Replacing Sharp fluorescent lamp (SXGA+) (4)

5. Turn the bezel face down, and remove the two screws (E) fixing the lamp cover (F) and remove the lamp cover. Then replace the lamp unit (G) with a new one.

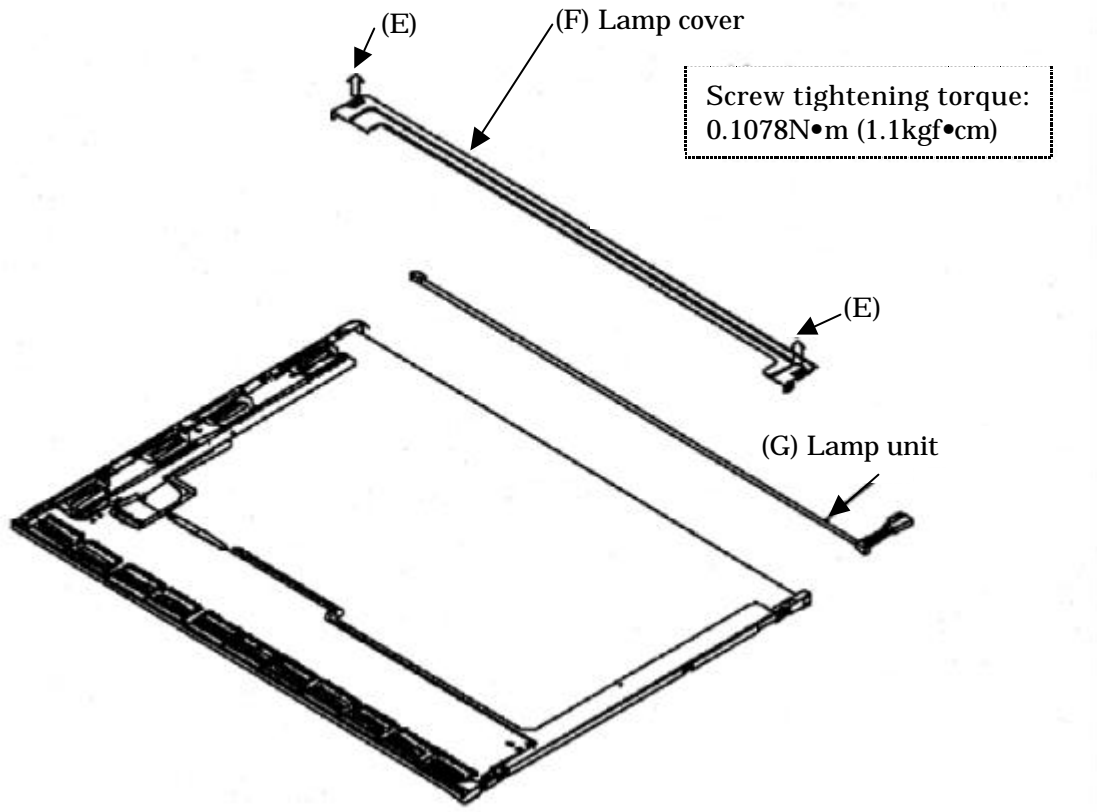


Figure 4-66 Replacing Sharp fluorescent lamp (SXGA+) (5)

6. Install the lamp cover (F) and secure it with the two screws (E).

NOTE: Be careful not to make the lamp cover over the fitting pin. Around the pulling-out part of the lead wire, attach so that the P chassis is outside.

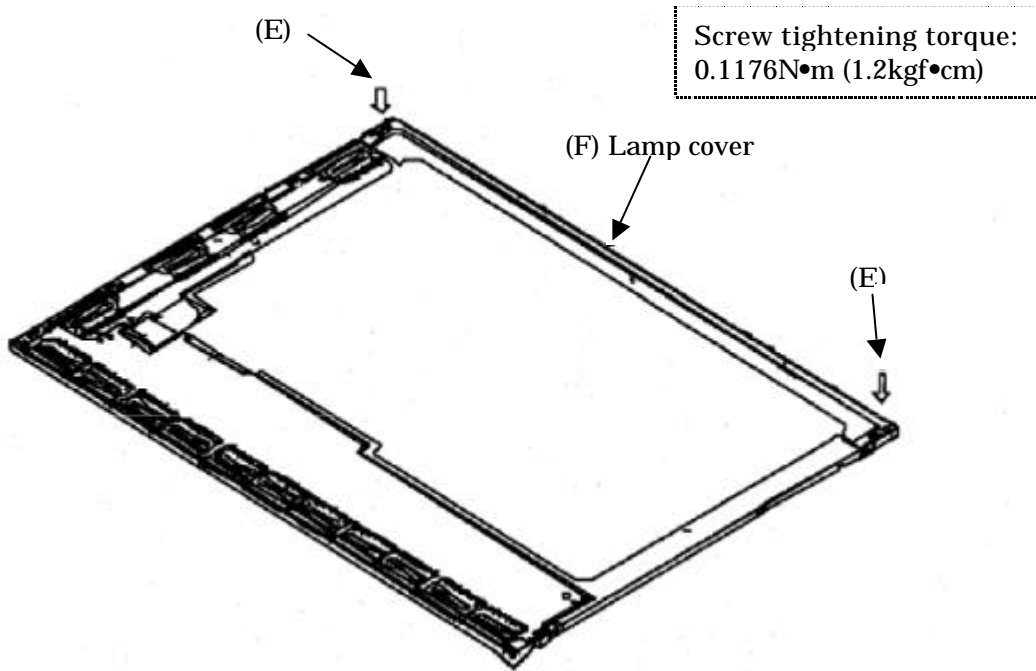


Figure 4-67 Replacing Sharp fluorescent lamp (SXGA+) (6)

7. Install the bezel. Make sure the bezel does not cover the guide rib. Hook the U-shape side of bezel first, then engage the two latches at the side of lamp.

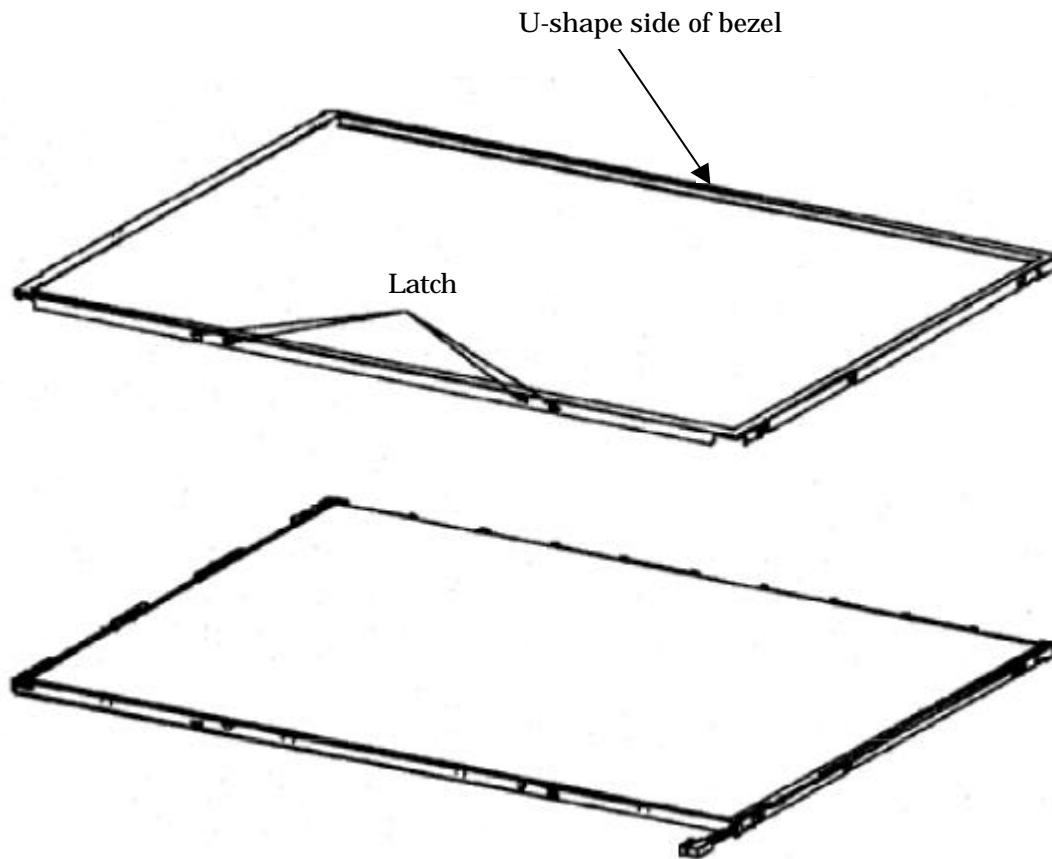


Figure 4-68 Replacing Sharp fluorescent lamp (SXGA+) (7)

8. Tighten the four screws (E) on the sides. Make sure the two latches are precisely mated.

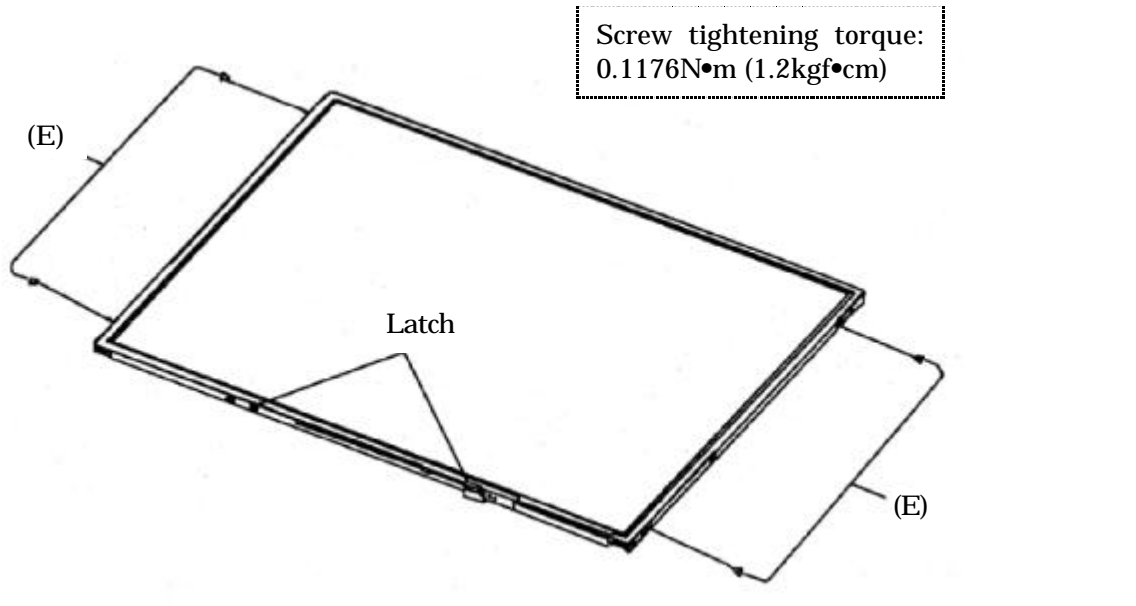


Figure 4-69 Replacing Sharp fluorescent lamp (SXGA+) (8)

9. Install the protection cover S (A), protection cover G (B), aluminum tape (C) and fixing tape for lead wire (D). Use new parts.
- Stick the protection covers in the order of (B), (A) to the standard line for fitting pin.
 - Stick the aluminum tape (C) following the sticking standards.
Long sides: Stick to the mark-off line of the lamp cover on the back of bezel.
Short sides: Stick to the edge of lamp cover.
 - Stick the fixing wire for lead wire following the sticking standards.
Long sides: Stick to the outline of the LCD module.
Short sides: Stick so that the wire covers the screws.

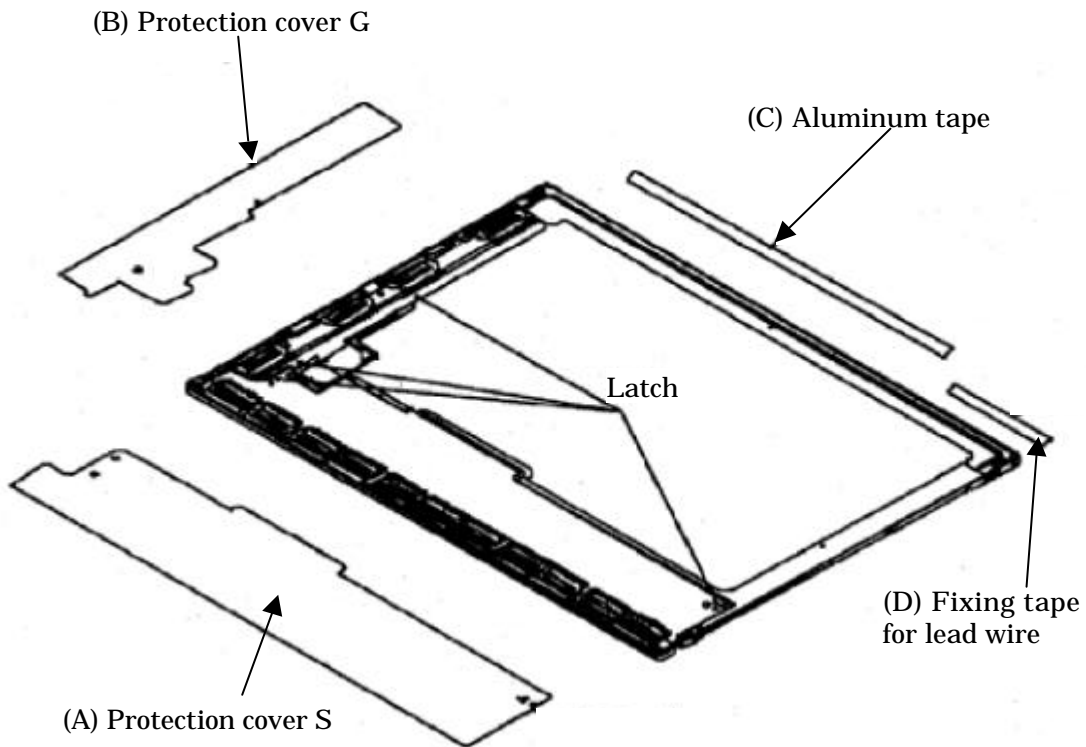


Figure 4-70 Replacing Sharp fluorescent lamp (SXGA+) (9)

10. Perform appearance inspection after assembling the module.

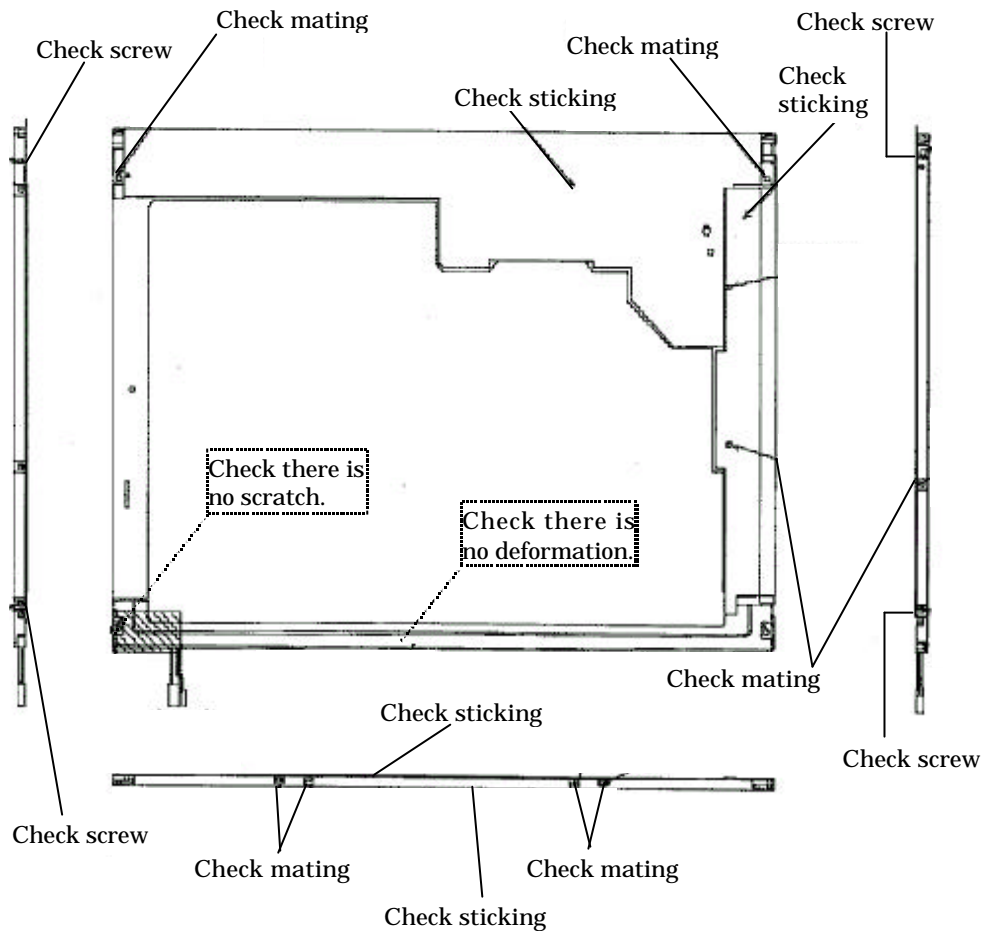


Figure 4-71 Replacing Sharp fluorescent lamp (SXGA+) (10)

Assembling the 14.1-inch SXGA+ Sharp Fluorescent Lamp

To assemble the 14.1-inch Sharp SXGA+ fluorescent lamp, follow the steps below and refer to figures 4-62 to 4-71.

Appendices

Appendix Contents

Appendix A Handling the LCD Module.....	A-1
Appendix B Board Layout.....	B-1
B.1 System Board (FGFSY*) Front View.....	1
B.2 System Board (FGFSY*) Back View	3
B.3 Sound Board (FGFSD*) Front and Back View	5
B.4 LED Board (FGFLE*) Front and Back View	6
B.5 Sensor/Switch Board (FGFLS*) Front and Back View.....	7
B.6 USB Board (FGFUS*) Front and Back View.....	8
Appendix C Pin Assignments.....	C-1
C.1 PJ1001 Memory 1 connector (200-pin).....	C-1
C.2 PJ1002 Memory 2 connector (200-pin).....	C-4
C.3 PJ1509 HDD interface connector (44-pin).....	C-7
C.4 PJ1511 Select Bay interface connector (72-pin).....	C-8
C.5 PJ1512 PC-Card interface connector (150-pin).....	C-9
C.6 PJ1514 SD Card interface connector (12-pin)	C-11
C.7 PJ123 Keyboard interface connector (34-pin).....	C-11
C.8 PJ2003 PAD interface connector (8-pin)	C-12
C.9 PJ1101 LED board interface connector (14-pin).....	C-12
C.10 PJ1000 Sensor/Switch board interface connector (10-pin)	C-12
C.11 PJ2026 Speaker (Right) connector (3-pin).....	C-12
C.12 PJ2027 Speaker (Left) connector (2-pin).....	C-13
C.13 PJ2007 Docking connector (240-pin)	C-14
C.14 PJ2015 Mini PCI interface connector (124-pin)	C-17
C.15 PJ2017 MDC 1 interface connector (30-pin).....	C-19
C.16 PJ1003 MDC 2 interface connector (2-pin)	C-19
C.17 PJ2019 Serial interface connector (9-pin).....	C-19
C.18 PJ2020 Parallel interface connector (25-pin).....	C-20

C.19	PJ2033	USB 0 interface connector (4-pin).....	C-20
C.20	PJ2034	USB 1 interface connector (4-pin).....	C-20
C.21	PJ1004	USB baord interface connector (6-pin).....	C-20
C.22	PJ4900	Bluetooth interface connector (20-pin).....	C-21
C.23	PJ1100	Sound board interface connector (30-pin)	C-21
C.24	PJ651	IEEE1394 interface connector (4-pin).....	C-22
C.25	PJ4500	LAN interface connector (14-pin)	C-22
C.26	PJ8800	DC-IN connector (4-pin).....	C-22
C.27	PJ8810	1st Battery connector (10-pin)	C-22
C.28	PJ1005	RTC Battery connector (2-pin)	C-23
C.29	PJ8770	FAN interface connector (3-pin)	C-23
C.30	PJ5500	LCD interface connector (41-pin)	C-23
C.31	PJ5523	CRT interface connector (15-pin).....	C-24
C.32	PJ5501	TV connector (4-pin)	C-24
C.33	PJ3000	System board interface connector (30-pin)	C-25
C.34	PJ3001	Internal Microphone connector (2-pin)	C-25
C.35	PJ3002	External Microphone connector (6-pin)	C-25
C.36	PJ3003	Headphone connector (6-pin)	C-26
C.37	PJ3100	System board interface connector (14-pin)	C-27
C.38	PJ3200	System board interface connector (10-pin)	C-28
C.39	PJ3300	System board interface connector (6-pin).....	C-29
C.40	PJ3301	USB port 2 interface connector (4-pin)	C-29

Appendix D Keyboard Scan/Character Codes..... D-1

Appendix E Key Layout..... E-1

E.1	United Kingdom (UK) Keyboard	E-1
E.2	United States (US) Keyboard.....	E-1

Appendix F Wiring Diagrams F-1

F.1	Parallel Port Wraparound Connector	F-1
-----	--	-----

F.2	Serial Port Wraparound Connector.....	F-1
F.3	LAN Loopback Connector	F-2
Appendix G BIOS Rewrite Procedures		G-1
Appendix H EC/KBC Rewrite Procedures		H-1
Appendix I Reliability.....		I-1

Figures

Figure B-1 System board (FGFSY*) layout (front).....1
Figure B-2 System board (FGFSY*) layout (back)3
Figure B-3 Sound board (FGFSD*) layout (front/back).....5
Figure B-4 LED board (FGFLE*) layout (front/back).....6
Figure B-5 Sensor/Switch board (FGFLS*) layout (front/back)7
Figure B-6 USB board (FGFUS*) layout (front/back).....8

Figure E-1 UK keyboardE-1
Figure E-2 US keyboardE-1

Figure F-1 Parallel port wraparound connector.....F-1
Figure F-2 Serial port wraparound connectorF-1
Figure F-3 LAN loopback connectorF-2

Tables

Table B-1	System board (FGFSY*) ICs and connectors (front)	2
Table B-2	System board (FGFSY*) ICs and connectors (back).....	4
Table B-3	Sound board (FGFSD*) ICs and connectors (front/back)	5
Table B-4	LED board (FGFLE*) connectors (front).....	6
Table B-5	Sensor/Switch board (FGFLS*) ICs and connectors (front/back).....	7
Table B-6	USB board (FGFUS*) connectors (back)	8
TableC-1	Memory 1 connector (200-pin)	C-1
TableC-2	Memory 2 connector (200-pin)	C-4
TableC-3	HDD interface connector (44-pin)	C-7
TableC-4	Select Bay interface connector (72-pin)	C-8
TableC-5	PC-Card interface connector (150-pin)	C-9
TableC-6	SD Card interface connector (12-pin)	C-11
TableC-7	Keyboard interface connector (34-pin).....	C-11
TableC-8	PAD interface connector (8-pin).....	C-12
TableC-9	LED board interface connector (14-pin)	C-12
TableC-10	Sensor/Switch board interface connector (10-pin).....	C-12
TableC-11	Speaker (Right) connector (3-pin)	C-12
TableC-12	Speaker (Left) connector (2-pin).....	C-13
TableC-13	Docking interface connector (240-pin)	C-14
TableC-14	Mini PCI interface connector (124-pin).....	C-17
TableC-15	MDC 1 interface connector (30-pin).....	C-19
TableC-16	MDC 2 interface connector (2-pin).....	C-19
TableC-17	Serial interface connector (9-pin).....	C-19
TableC-18	Parallel interface connector (25-pin).....	C-20
TableC-19	USB 0 interface connector (4-pin)	C-20
TableC-20	USB 1 interface connector (4-pin)	C-20

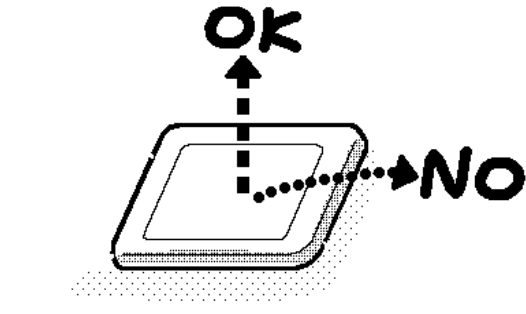
TableC-21	USB board interface connector (6-pin)	C-20
TableC-22	Bluetooth interface connector (20-pin).....	C-21
TableC-23	Sound board interface connector (30-pin).....	C-21
TableC-24	IEEE1394 interface connector (4-pin).....	C-22
TableC-25	LAN interface connector (14-pin).....	C-22
TableC-26	DC-IN interface connector (4-pin)	C-22
TableC-27	1st Battery connector (10-pin).....	C-22
TableC-28	RTC Battery connector (2-pin).....	C-23
TableC-29	FAN interface connector (3in)	C-23
TableC-30	LCD interface connector (41-pin).....	C-23
TableC-31	CRT interface connector (15-pin)	C-24
TableC-32	TV interface connector (4-pin).....	C-24
TableC-33	System board interface connector (30-pin).....	C-25
TableC-34	Internal Microphone connector (2-pin).....	C-25
TableC-35	External Microphone connector (6-pin).....	C-25
TableC-36	Headphone connector (6-pin).....	C-26
TableC-37	System board interface connector (14-pin).....	C-27
TableC-38	System board interface connector (10-pin).....	C-28
TableC-39	System board interface connector (6-pin).....	C-29
TableC-40	USB port 2 interface connector (4-pin).....	C-29
Table D-1	Scan codes (set 1 and set 2)	D-1
Table D-2	Scan codes with left Shift key.....	D-5
Table D-3	Scan codes in Numlock mode	D-6
Table D-4	Scan codes with Fn key.....	D-6
Table D-5	Scan codes in overlay mode	D-7
Table D-6	No.124 key scan code.....	D-7
Table D-7	No.126 key scan code.....	D-8
Table I-1	MTBF	I-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. For 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.

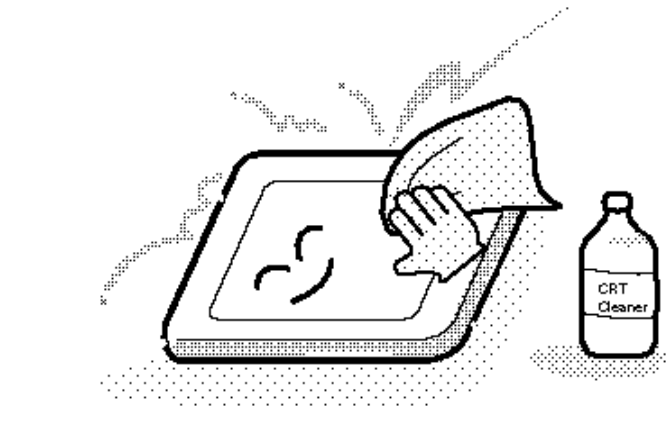
Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be carefully when handling it.

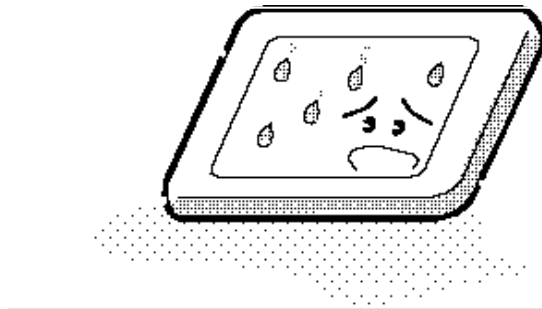


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

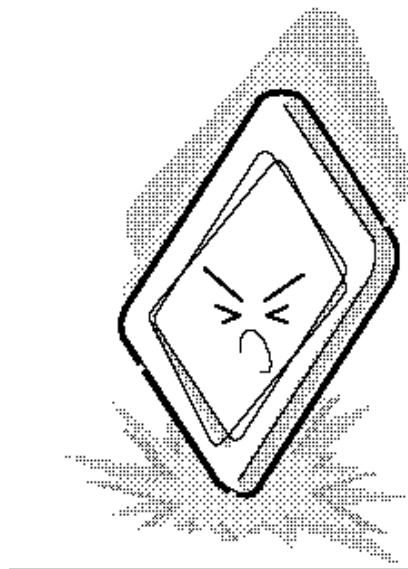
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



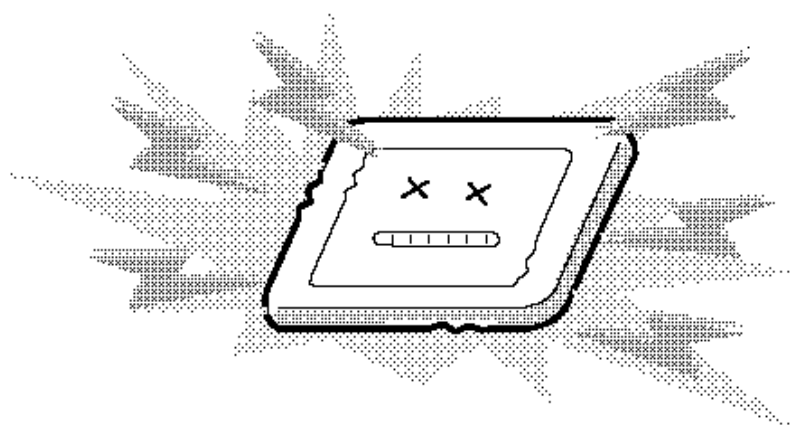
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



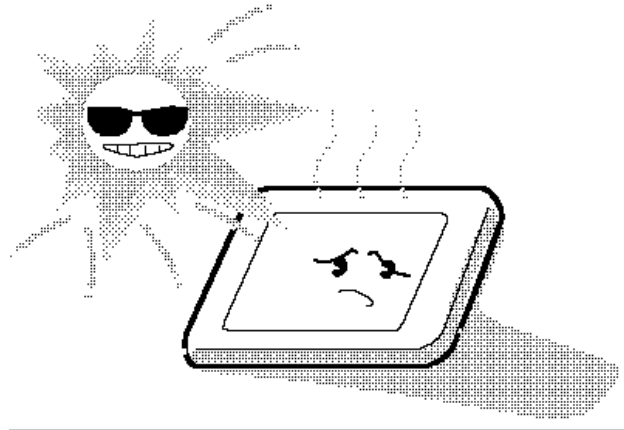
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



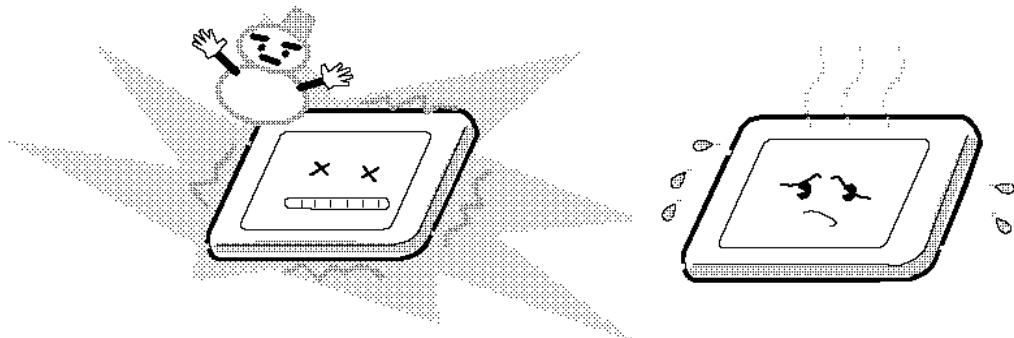
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



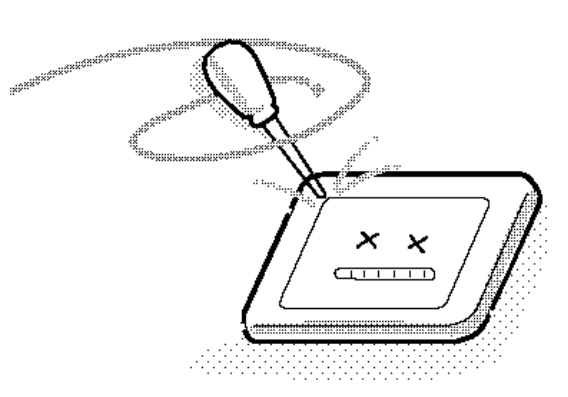
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



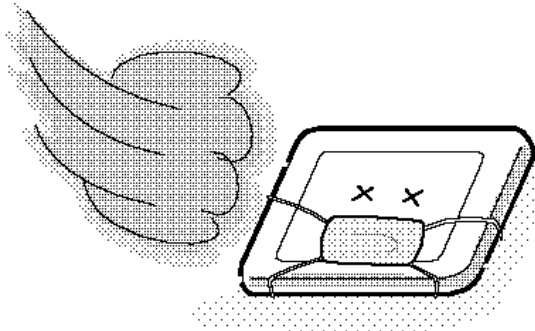
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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 (FGFSY*) Front View

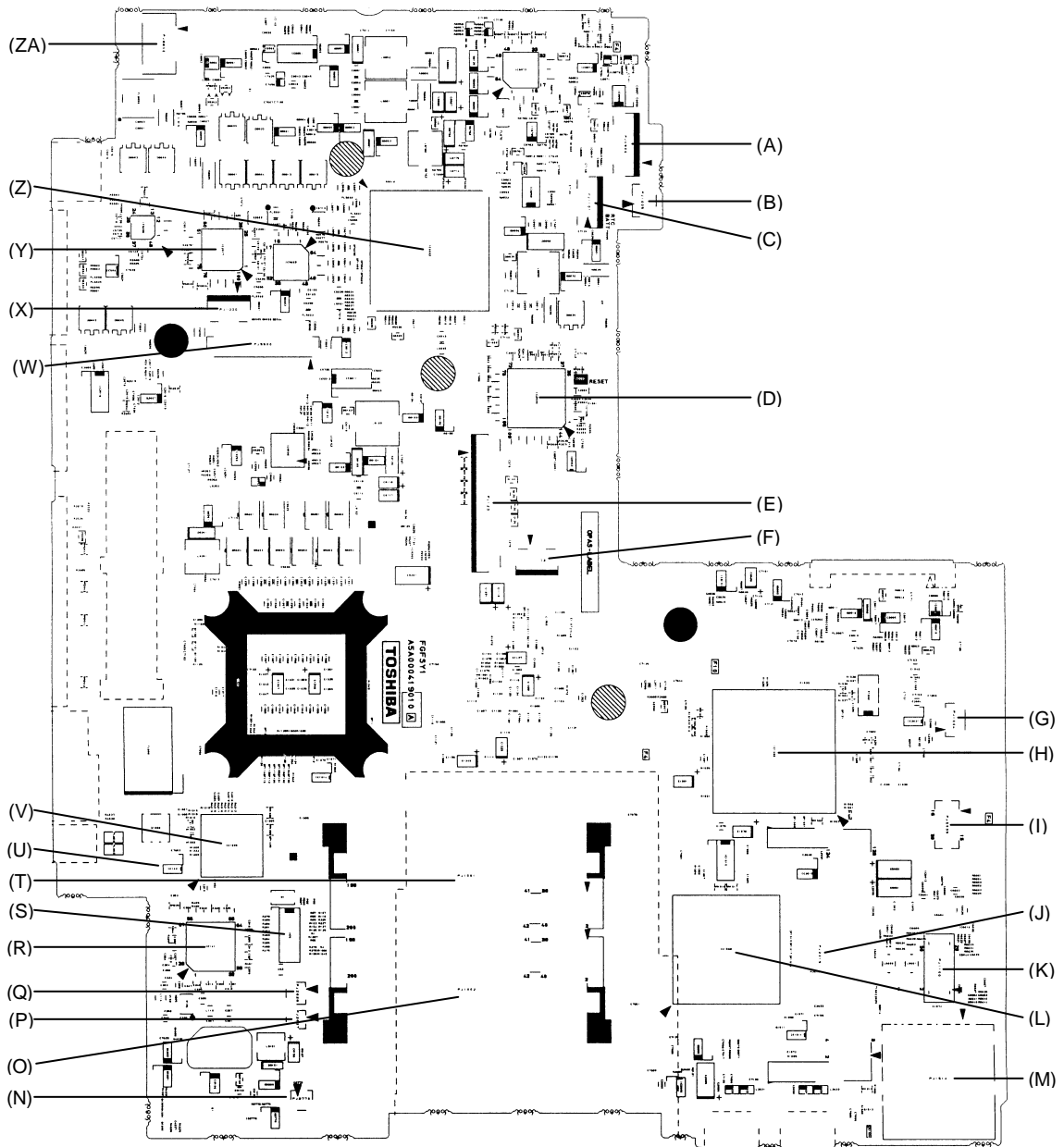


Figure B-1 System board (FGFSY*) layout (front)

Table B-1 System board (FGFSY*) ICs and connectors (front)

Mark	Number	Name
(A)	PJ4900	Bluetooth interface connector
(B)	PJ1005	RTC Battery connector
(C)	PJ1101	LED board connector
(D)	IC2000	EC/KBC
(E)	PJ123	Keyboard interface connector
(F)	PJ2003	Dual Point interface connector
(G)	PJ1004	USB 2 interface connector
(H)	IC1500	ICH4-M
(I)	PJ2035	SC board interface connector
(J)	PJ2015	Mini PCI interface connector
(K)	PJ1100	Sound board interface connector
(L)	IC1508	YEBISU3S
(M)	PJ1514	SD card interface connector
(N)	PJ8770	FAN interface connector
(O)	PJ1002	Memory 2 connector
(P)	PJ2027	Speaker (Left) connector
(Q)	PJ2026	Speaker (Right) connector
(R)	IC141	1394 PHY/LINK
(S)	IC9	CK408
(T)	PJ1001	Memory 1 connector
(U)	IC142	1394 EEPROM
(V)	IC1008	LAN controller
(W)	PJ5500	LCD interface connector
(X)	PJ1000	Light Sensor board connector
(Y)	IC2017	SUPER I/O
(Z)	IC5502	XP4
(ZA)	PJ8800	DC-IN

B.2 System Board (FGFSY*) Back View

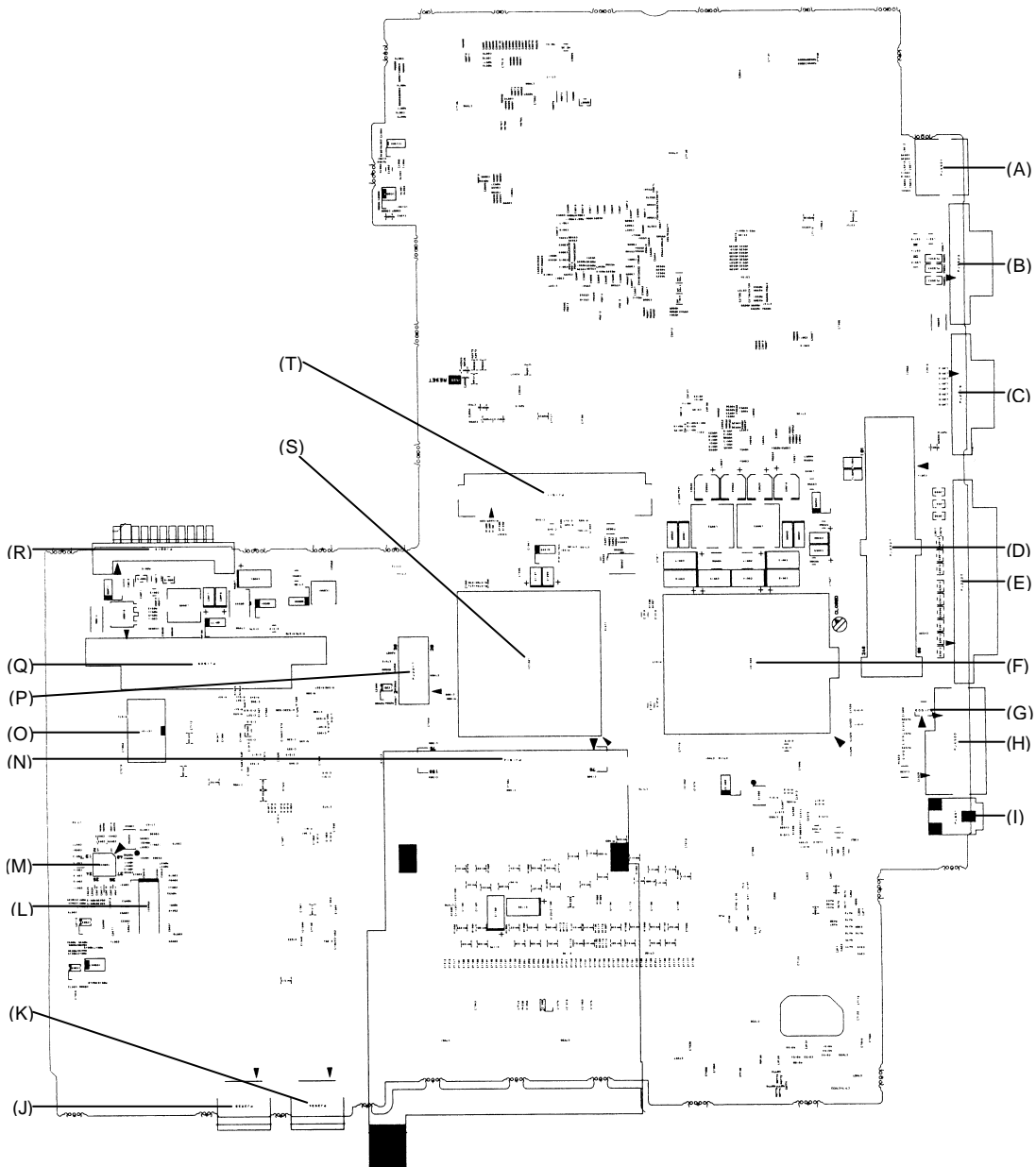


Figure B-2 System board (FGFSY*) layout (back)

Table B-2 System board (FGFSY*) ICs and connectors (back)

Mark	Number	Name
(A)	PJ5501	TV controller connector
(B)	PJ5523	CRT interface connector
(C)	PJ2019	Serial interface connector
(D)	PJ2007	Docking interface connector
(E)	PJ2020	Parallel interface connector
(F)	IS1000	CPU
(G)	PJ1003	Modem 2 interface connector
(H)	PJ4500	LAN interface connector
(I)	PJ651	IEEE1394 interface connector
(J)	PJ2033	USB 0 interface connector
(K)	PJ2034	USB 1 interface connector
(L)	IC6003	AN12940
(M)	IC6000	AD1981B
(N)	PJ1512	PC-card interface connector
(O)	IC1101	FWH
(P)	PJ2017	Modem 1 interface connector
(Q)	PJ1509	HDD interface connector
(R)	PJ8810	1st Battery connenctor
(S)	IC1001	MCH-M
(T)	PJ1511	Select Bay interface connector

B.3 Sound Board (FGFSD*) Front and Back View

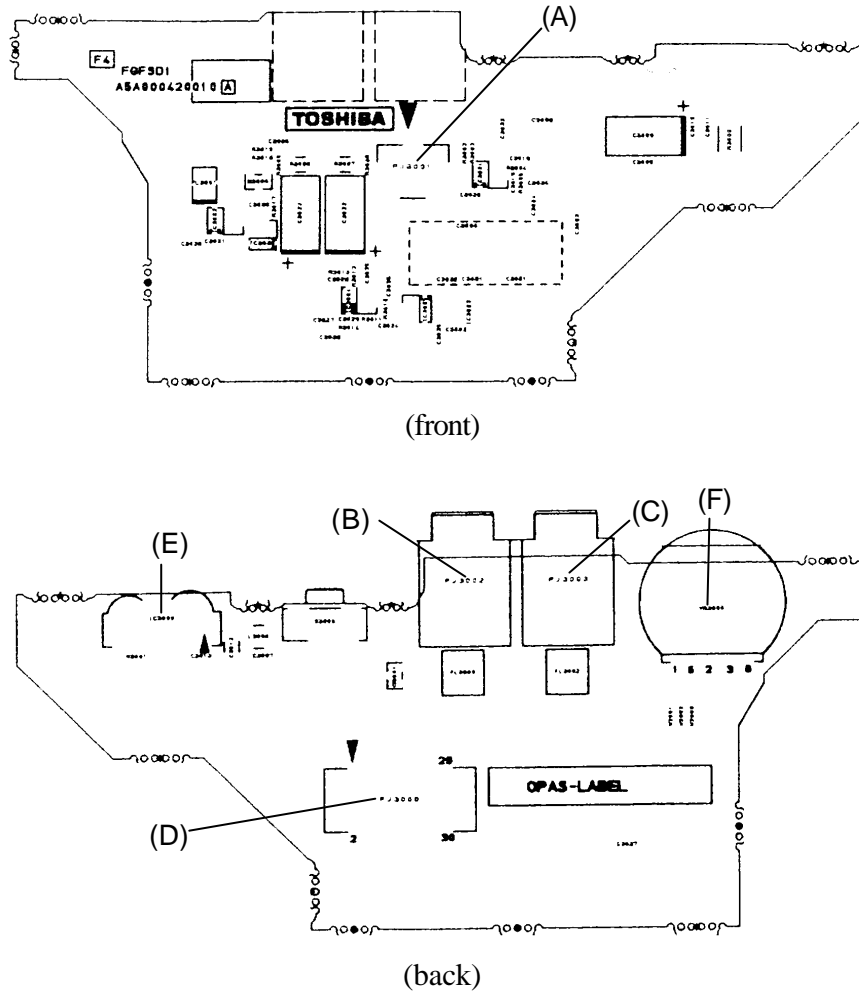


Figure B-3 Sound board (FGFSD*) layout (front/back)

Table B-3 Sound board (FGFSD*) ICs and connectors (front/back)

Mark	Number	Name
(A)	PJ3001	Internal Microphone connector
(B)	PJ3002	External Microphone connector
(C)	PJ3003	Headphone connector
(D)	PJ3000	System board interface connector
(E)	IC3000	FIR

(F)	VR3000	Volume
-----	--------	--------

B.4 LED Board (FGFLE*) Front and Back View

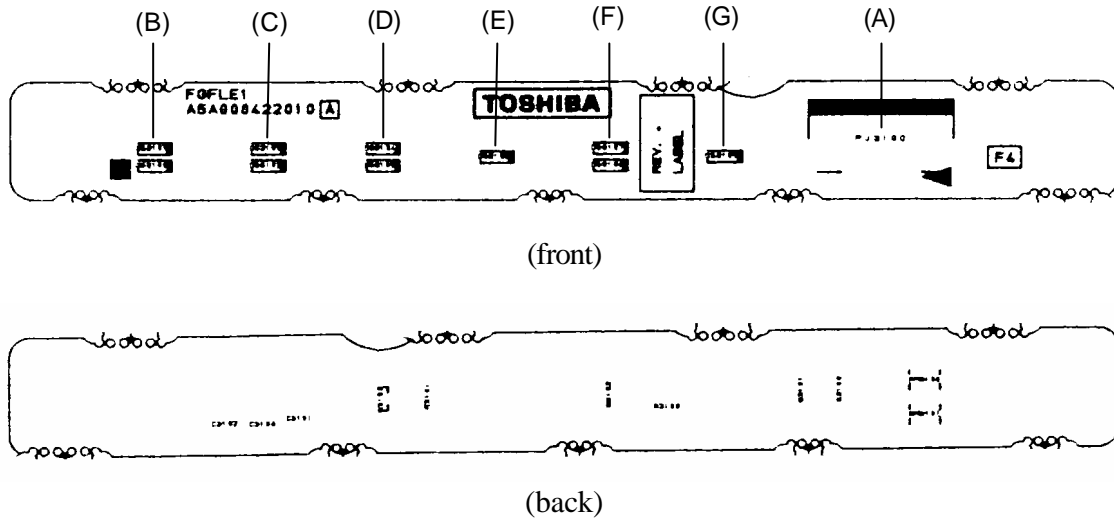


Figure B-4 LED board (FGFLE*) layout (front/back)

Table B-4 LED board (FGFLE*) connector (front)

Mark	Number	Name
(A)	PJ3100	System board interface connector
(B)	DS3100/3101	DC IN LED
(C)	DS3102/3103	Power On LED
(D)	DS3104/3105	Main battery LED
(E)	DS3106	HDD LED
(F)	DS3107/3108	Select Bay LED
(G)	DS3109	Bluetooth/Wireless LAN LED

B.5 Sensor/Switch Board (FGFLS*) Front and Back View

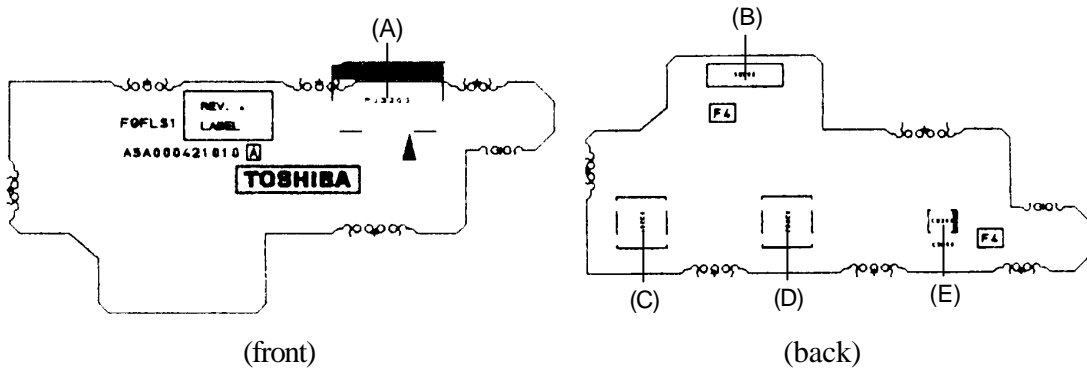


Figure B-5 Sensor/Switch board (FGFLS*) layout (front/back)

Table B-5 Sensor/Switch board (FGFLS*) ICs and connectors (front)

Mark	Number	Name
(A)	PJ3200	System board interface connector
(B)	S3200	LCD open/close sensor
(C)	S3201	In touch button
(D)	S3202	Presentation button
(E)	IC3200	Light sensor

B.6 USB Board (FGFUS*) Front and Back View

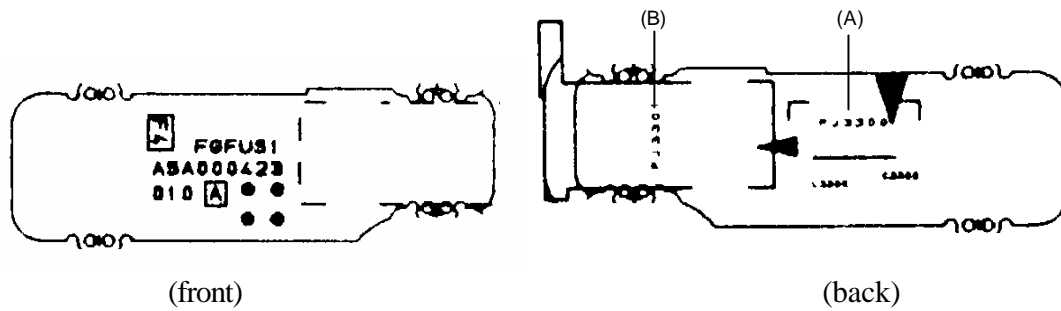


Figure B-6 USB board (FGFUS*) layout (front/back)

Table B-6 USB board (FGFUS*) connectors (back)

Mark	Number	Name
(A)	PJ3300	System board interface connector
(B)	PJ3301	USB port 3 connector

Appendix C Pin Assignments

System Board

C.1 PJ1001 Memory 1 connector (200-pin)

Table C-1 Memory 1 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-P1V	-	2	MR1R25-P1V	-
3	GND	-	4	GND	-
5	SDQ04R-B2P	I/O	6	SDQ01R-B2P	I/O
7	SDQ00R-B2P	I/O	8	SDQ03R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ06R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ05R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ14R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ15R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ09R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ12R-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	SDQ22R-B2P	I/O	42	SDQ16R-B2P	I/O
43	SDQ18R-B2P	I/O	44	SDQ20R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ23R-B2P	I/O	50	SDQ17R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ19R-B2P	I/O	54	SDQ21R-B2P	I/O
55	SDQ27R-B2P	I/O	56	SDQ24R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ26R-B2P	I/O	60	SDQ25R-B2P	I/O

61	SDQS3R-B2P	I/O	62	GND	-
----	------------	-----	----	-----	---

Table C-1 Memory 1 connector (200pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	GND	-	64	GND	-
65	SDQ30R-B2P	I/O	66	SDQ29R-B2P	I/O
67	SDQ31R-B2P	I/O	68	SDQ28R-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	NC	-	86	NC	-
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	SCKE0-B2P	I
97	NC	-	98	NC	-
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	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ38R-B2P	I/O	128	SDQ36R-B2P	I/O
129	SDQ34R-B2P	I/O	130	SDQ37R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-

133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ39R-B2P	I/O	136	SDQ33R-B2P	I/O
137	GND	-	138	GND	-

Table C-1 Memory 1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	SDQ35R-B2P	I/O	140	SDQ32R-B2P	I/O
141	SDQ45R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ44R-B2P	I/O	146	SDQ42R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ41R-B2P	I/O	152	SDQ43R-B2P	I/O
153	SDQ40R-B2P	I/O	154	SDQ47R-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	SDQ51R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ52R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ49R-B2P	I/O	172	SDQ55R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ54R-B2P	I/O	176	SDQ50R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ62R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ63R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-
187	SDQ57R-B2P	I/O	188	SDQ59R-B2P	I/O
189	SDQ61R-B2P	I/O	190	SDQ58R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.2 PJ1002 Memory 2 connector (200-pin)*Table C-2 Memory 2 connector (200-pin) (1/3)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-P1V	-	2	MR1R25-P1V	-
3	GND	-	4	GND	-
5	SDQ04R-B2P	I/O	6	SDQ01R-B2P	I/O
7	SDQ00R-B2P	I/O	8	SDQ03R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ06R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ05R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ14R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ15R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ09R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ12R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK3-B2P	I	36	2R5-B2V	-
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ22R-B2P	I/O	42	SDQ16R-B2P	I/O
43	SDQ18R-B2P	I/O	44	SDQ20R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ23R-B2P	I/O	50	SDQ17R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ19R-B2P	I/O	54	SDQ21R-B2P	I/O
55	SDQ27R-B2P	I/O	56	SDQ24R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ26R-B2P	I/O	60	SDQ25R-B2P	I/O
61	SDQS3R-B2P	I/O	62	GND	-

Table C-2 Memory 2 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	GND	-	64	GND	-
65	SDQ30R-B2P	I/O	66	SDQ29R-B2P	I/O
67	SDQ31R-B2P	I/O	68	SDQ28R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	NC	-	98	NC	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMA05-B2P	I	108	SMA04-B2P	I
109	SMA03-B2P	I	110	SMA02-B2P	I
111	SMA01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS2-B2N	I	122	SCS3-B2N	I
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ38R-B2P	I/O	128	SDQ36R-B2P	I/O
129	SDQ34R-B2P	I/O	130	SDQ37R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	GND	-

135	SDQ39R-B2P	I/O	136	SDQ33R-B2P	I/O
137	GND	-	138	GND	-

Table C-2 Memory 2 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
139	SDQ35R-B2P	I/O	140	SDQ32R-B2P	I/O
141	SDQ45R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ44R-B2P	I/O	146	SDQ42R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ41R-B2P	I/O	152	SDQ43R-B2P	I/O
153	SDQ40R-B2P	I/O	154	SDQ47R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ51R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ52R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ49R-B2P	I/O	172	SDQ55R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ54R-B2P	I/O	176	SDQ50R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ62R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ63R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-
187	SDQ57R-B2P	I/O	188	SDQ59R-B2P	I/O
189	SDQ61R-B2P	I/O	190	SDQ58R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	P3V	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.3 PJ1509 HDD interface connector (44-pin)*Table C-3 HDD interface connector (44-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	GND	-
3	P5V	-	4	P5V	-
5	GND	-	6	HDDLED-P5P	I
7	PDCS3-P3N	O	8	PDCS1-P3N	O
9	PDA2-P3P	I	10	PDA0-P3P	I
11	NC	-	12	PDA1-P3P	I
13	NC	-	14	IRQ14-P3P	O
15	GND	-	16	PDDACK-P3N	O
17	NC	-	18	PIORDY-P3P	O
19	GND	-	20	PDIOR-P3N	O
21	GND	-	22	PDIOW-P3N	O
23	GND	-	24	PDDREQ-P3P	O
25	NC	-	26	GND	-
27	PDD15-P3P	I/O	28	PDD00-P3P	I/O
29	PDD14-P3P	I/O	30	PDD01-P3P	I/O
31	PDD13-P3P	I/O	32	PDD02-P3P	I/O
33	PDD12-P3P	I/O	34	PDD03-P3P	I/O
35	PDD11-P3P	I/O	36	PDD04-P3P	I/O
37	PDD10-P3P	I/O	38	PDD05-P3P	I/O
39	PDD09-P3P	I/O	40	PDD06-P3P	I/O
41	PDD08-P3P	I/O	42	PDD07-P3P	I/O
43	GND	-	44	IDRSTA-P5N	I

C.4 PJ1511 Select Bay interface connector (72-pin)

Table C-4 Select Bay interface connector (72-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	CDAUDR-PXP	O	4	CDAUDL-PXP	O
5	GND	-	6	CD-GND	-
7	IDRSTB-P5N	O	8	GND	-
9	GND	-	10	SDD07-P3P	I/O
11	SDD08-P3P	I/O	12	SDD06-P3P	I/O
13	SDD09-P3P	I/O	14	SDD05-P3P	I/O
15	SDD10-P3P	I/O	16	GND	-
17	GND	-	18	SDD04-P3P	I/O
19	SDD11-P3P	I/O	20	SDD03-P3P	I/O
21	SDD12-P3P	I/O	22	SDD02-P3P	I/O
23	SDD13-P3P	I/O	24	SB-P5V	-
25	SB-P5V	-	26	SDD01-P3P	I/O
27	SDD14-P3P	I/O	28	SDD00-P3P	I/O
29	SDD15-P3P	I/O	30	GND	-
31	GND	-	32	SDDREQ-P3P	O
33	GND	-	34	SDIOW-P3N	O
35	GND	-	36	SDIOR-P3N	O
37	GND	-	38	SIORDY-P3P	O
39	NC	-	40	SDDACK-P3N	O
41	GND	-	42	IRQ15-P5P	O
43	NC	-	44	SDA1-P3P	I
45	SB-P5V	-	46	SB-P5V	-
47	SB-P5V	-	48	SDA0-P3P	I
49	SDA2-P3P	I	50	SDCS1-P3N	O
51	SDCS3-P3N	O	52	CDRLED-P5N	O
53	GND	-	54	MBSTS2-S3N	O
55	MBSTS1-S3N	O	56	MBSTS0-S3N	O
57	GND	-	58	DBT20V-S3N	O
59	PSDA-S5P	O	60	BT2VD	I
61	PSCL-S5P	O	62	BTMP2-SXP	O
63	CDCHG2-S5P	I	64	GND	-
65	GND	-	66	NC	-
67	GND	-	68	NC	-

69	GND	-	70	GND	-
71	GND	-	72	PVBAT2	I

C.5 PJ1512 PC-Card interface connector (150-pin)

Table C-5 PC-Card interface connector (150-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	BCCD1-B3N	I	4	BCAD00-BYP	I/O
5	BCAD02-BYP	I/O	6	BCAD01-BYP	I/O
7	BCAD04-BYP	I/O	8	BCAD03-BYP	I/O
9	GND	-	10	BCAD06-BYP	I/O
11	BCAD05-BYP	I/O	12	BCD14-BYP	I/O
13	BCAD07-BYP	I/O	14	BCAD08-BYP	I/O
15	BCCBE0-BYN	I/O	16	BCAD10-BYP	I/O
17	GND	-	18	BCAD09-BYP	I/O
19	BCVS1-B3P	I/O	20	BCAD11-BYP	I/O
21	BCAD13-BYP	I/O	22	BCAD12-BYP	I/O
23	BCAD15-BYP	I/O	24	BCAD14-BYP	I/O
25	GND	-	26	BCAD16-BYP	I/O
27	BCCBE1-BYN	I/O	28	BCA18-BYP	I/O
29	BCPAR-BYP	I/O	30	BCLOCK-BYN	I/O
31	BCPERR-BYN	I/O	32	BCSTOP-BYN	I/O
33	GND	-	34	BCGNT-BYN	I
35	BCDEVS-BYN	I/O	36	BCINT-BYN	O
37	MCVCCB-BYV	-	38	MCVCCB-BYV	-
39	MCVPPB-BYV	-	40	BCCLK-BYP	I/O
41	BCTRDY-BYN	I/O	42	BCIRDY-BYN	I/O
43	GND	-	44	BCFRAM-BYN	I/O
45	BCCBE2-BYN	I/O	46	BCAD17-BYP	I/O
47	BCAD18-BYP	I/O	48	BCAD19-BYP	I/O
49	BCAD20-BYP	I/O	50	BCVS2-B3P	I/O
51	GND	-	52	BCAD21-BYP	I/O
53	BCRST-BYN	I/O	54	BCAD22-BYP	I/O
55	BCSERR-BYN	I/O	56	BCAD23-BYP	I/O
57	BCREQ-BYN	O	58	BCAD24-BYP	I/O
59	GND	-	60	BCCBE3-BYN	I/O

61	BCAD25-BYP	I/O	62	BCAUDI-BYP	O
63	BCAD26-BYP	I/O	64	BCSTSC-BYP	O
65	BCAD27-BYP	I/O	66	BCAD28-BYP	I/O
67	GND	-	68	BCAD29-BYP	I/O
69	BCAD30-BYP	I/O	70	BCD02-BYP	I/O
71	BCAD31-BYP	I/O	72	BCCLKR-BYN	I/O
73	BCCD2-B3N	O	74	GND	-

Table C-5 PC-Card interface connector (150-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
75	GND	-	76	GND	-
77	GND	-	78	ACCD1-B3N	O
79	ACAD00-BYP	I/O	80	ACAD02-BYP	I/O
81	ACAD01-BYP	I/O	82	ACAD04-BYP	I/O
83	ACAD03-BYP	I/O	84	GND	-
85	ACAD06-BYP	I/O	86	ACAD05-BYP	I/O
87	ACD14-BYP	I/O	88	ACAD07-BYP	I/O
89	ACAD08-BYP	I/O	90	ACCBE0-BYN	I/O
91	ACAD10-BYP	I/O	92	GND	-
93	ACAD09-BYP	I/O	94	ACVS1-B3P	I/O
95	ACAD11-BYP	I/O	96	ACAD13-BYP	I/O
97	ACAD12-BYP	I/O	98	ACAD15-BYP	I/O
99	ACAD14-BYP	I/O	100	GND	-
101	ACAD16-BYP	I/O	102	ACCBE1-BYN	I/O
103	ACA18-BYP	I/O	104	ACPAR-BYP	I/O
105	ACLOCK-BYN	I/O	106	ACPERR-BYN	I/O
107	ACSTOP-BYN	I/O	108	GND	-
109	ACGNT-BYN	I	110	ACDEVS-BYN	I/O
111	ACINT-BYN	O	112	MCVCCA-BYV	-
113	MCVCCA-BYV	-	114	MCVPPA-BYV	-
115	ACCLK-BYP	I/O	116	ACTRDY-BYN	I/O
117	ACIRDY-BYN	I/O	118	GND	-
119	ACFRAM-BYN	I/O	120	ACCBE2-BYN	I/O
121	ACAD17-BYP	I/O	122	ACAD18-BYP	I/O
123	ACAD19-BYP	I/O	124	ACAD20-BYP	I/O
125	ACVS2-B3P	I/O	126	GND	-
127	ACAD21-BYP	I/O	128	ACRST-BYN	I/O
129	ACAD22-BYP	I/O	130	ACSERR-BYN	I/O
131	ACAD23-BYP	I/O	132	ACREQ-BYN	O
133	ACAD24-BYP	I/O	134	GND	-
135	ACCBE3-BYN	I/O	136	ACAD25-BYP	I/O
137	ACAUDI-BYP	O	138	ACAD26-BYP	I/O
139	ACSTSC-BYP	O	140	ACAD27-BYP	I/O
141	ACAD28-BYP	I/O	142	GND	-
143	ACAD29-BYP	I/O	144	ACAD30-BYP	I/O
145	ACD02-BYP	I/O	146	ACAD31-BYP	I/O

147	ACCLKR-BYN	I/O	148	ACCD2-B3N	O
149	GND	-	150	GND	-

C.6 PJ1514 SD Card interface connector (12-pin)

Table C-6 SD Card interface 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-P3V	-
5	SDCLK-B3P	I	6	GND	-
7	SDAT0-B3P	I/O	8	SDAT1-B3P	I/O
9	SDAT2-B3P	I/O	10	SDCD-B3N	O
11	SDWP-B3P	O	12	GND	-

C.7 PJ123 Keyboard interface connector (34-pin)

Table C-7 Keyboard interface connector (34-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NUMLED-P5N	O	2	ARWLED-P5N	O
3	CAPLED-P5N	O	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	NC	-	30	SP-P5V	-
31	SPX-PXP	I	32	SP-GND	-
33	SPY-PXP	I	34	NC	-

C.8 PJ2003 PAD interface connector (8-pin)*Table C-8 PAD interface connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	IPDDAT-P5P	I/O
3	IPDCLK-P5P	I/O	4	GND	-
5	SP-GND	-	6	SPY-PXP	O
7	SPX-PXP	O	8	SP-P5V	-

C.9 PJ1101 LED board interface connector (14-pin)*Table C-9 LED board interface connector (14-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	E5V	-	2	PWLEOR-S3P	I
3	PWLEGR-S3P	I	4	M5V	-
5	DCINOR-S5N	I	6	DCINGR-S5N	I
7	BAT1OR-S5N	I	8	BAT1GR-S5N	I
9	BAT2OR-S5N	I	10	BAT2GR-S5N	I
11	P5V	-	12	HDDLED-P5P	O
13	BTLED-S3P	I	14	GND	-

C.10 PJ1000 Sensor/Switch board interface connector (10-pin)*Table C-10 Sensor/Switch board interface connector (10-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P3V	-	2	ILUOUT-PXP	O
3	NC	-	4	PNLOFF-S3N	O
5	KBSC16-S3N	I	6	KBRT00-S3N	O
7	KBRT03-S3N	O	8	NC	-
9	NC	-	10	GND	-

C.11 PJ2026 Speaker (Right) connector (3-pin)*Table C-11 Speaker (Right) connector (3-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTR-PXP	I	2	SPOTR-PXN	I

3	NC	-			
---	----	---	--	--	--

C.12 PJ2027 Speaker (Left) connector (2-pin)

Table C-12 Speaker (Left) connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTL-PXP	I	2	SPOTL-PXN	I

C.13 PJ2007 Docking interface connector (240-pin)*Table C-13 Docking interface connector (240-pin) (1/4)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	O	4	IF-P5V	-
5	MOUSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	PHYRST-E3N	O
9	DPCCONF-S5P	O	10	GND	-
11	GND	-	12	DDCSCL-P5P	I/O
13	DRED-PXP	O	14	DGREEN-PXP	O
15	DBLUE-PXP	O	16	DVSYNC-P5P	O
17	DVISCL-P5P	I/O	18	NC	-
19	GND	-	20	NC	-
21	NC	-	22	DVITX2-P3P	O
23	DVITX2-P3N	O	24	DVITX1-P3P	O
25	DVITX1-P3N	O	26	DVITX0-P3P	O
27	DVITX0-P3N	O	28	GND	-
29	GND	-	30	DVITXC-P3P	O
31	DVITXC-P3N	O	32	DVIDET-S3N	O
33	NC	-	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	NC	-
41	GND	-	42	NC	-
43	NC	-	44	NC	-
45	GND	-	46	NC	-
47	NC	-	48	NC	-
49	GND	-	50	NC	-
51	NC	-	52	NC	-
53	Not Mount	-	54	Not Mount	-
55	BIDDP-EXP	O	56	BIDDN-EXN	O
57	Not Mount	-	58	Not Mount	-
59	MDMRNG-B3P	I/O	60	MDMTIP-B3P	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	MOUSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	GND	-

69	DILSON-E3P	O	70	NC	-
71	GND	-	72	DDCSDA-P5P	I/O
73	GND	-	74	GND	-

Table C-13 Docking interface connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
75	GND	-	76	DHSYNC-P5P	I
77	DVISDA-P5P	I/O	78	NC	-
79	GND	-	80	NC	-
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	NC	-	86	NC	-
87	NC	-	88	GND	-
89	GND	-	90	NC	-
91	NC	-	92	NC	-
93	NC	-	94	NC	-
95	NC	-	96	NC	-
97	GND	-	98	NC	-
99	NC	-	100	NC	-
101	GND	-	102	NC	-
103	NC	-	104	NC	-
105	GND	-	106	NC	-
107	NC	-	108	NC	-
109	GND	-	110	NC	-
111	NC	-	112	NC	-
113	Not Mount	-	114	Not Mount	-
115	BIDCN-EXN	O	116	Not Mount	-
117	BIDCP-EXP	O	118	Not Mount	-
119	Not Mount	-	120	Not Mount	-
121	DCOUT	-	122	DCOUT	-
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	S5V	-	126	DTPA-P3P	I/O
127	GND	-	128	DTPB-P3P	I/O
129	USBON1-E5N	I	130	USBOC1-S3N	I
131	GND	-	132	USBON2-E5N	I
133	USBOC2-S3N	I	134	SNDMUT-S3N	O
135	NC	-	136	DOU TL-PXP	I
137	DINL-PXP	O	138	DINR-PXN	O
139	GND	-	140	PWRSW-S3N	O

141	DCD-PYP	O	142	DSR-PYP	O
143	TXD-PYN	I	144	RING-BYP	O
145	PE-P5P	O	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O

Table C-13 Docking interface connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	I
155	NC	-	156	NC	-
157	GND	-	158	NC	-
159	NC	-	160	NC	-
161	GND	-	162	NC	-
163	NC	-	164	NC	-
165	GND	-	166	NC	-
167	NC	-	168	NC	-
169	GND	-	170	NC	-
171	NC	-	172	NC	-
173	GND	-	174	Not Mount	-
175	LAN-E3V	-	176	Not Mount	-
177	Not Mount	-	178	NC	-
179	BIDAP-EXP	O	180	BIDAN-EXN	O
181	DCOUT	-	182	DCOUT	-
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	NC	-	186	DTPA-P3N	I/O
187	GND	-	188	DTPB-P3N	I/O
189	USBP2-E3P	I/O	190	USBP2-E3N	I/O
191	GND	-	192	USBP3-E3P	I/O
193	USBP3-E3N	I/O	194	DOU-TR-PXP	I
195	DOU-TR-PXN	I	196	DOU-TR-PXN	I
197	DINL-PXN	I	198	DINR-PXP	I
199	GND	-	200	RXD-PYN	O
201	RTS-PYP	I	202	CTS-PYP	O
203	DTR-PYP	I	204	SELCT-P5P	O
205	BUSY-P5P	O	206	ACK-P5N	O
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	I	212	PINIT-P5N	I
213	ERROR-P5N	O	214	AUTFD-P5N	I
215	NC	-	216	NC	-
217	GND	-	218	NC	-
219	NC	-	220	NC	-
221	GND	-	222	NC	-
223	NC	-	224	NC	-

225	GND	-	226	NC	-
227	NC	-	228	NC	-
229	GND	-	230	NC	-

Table C-13 Docking interface connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
231	NC	-	232	NC	-
233	GND	-	234	ACT-E3N	O
235	LINK-E3N	O	236	DOCDT2-S3N	O
237	Not Mount	-	238	Not Mount	-
239	BIDBP-EXP	O	240	BIDBN-EXN	O

C.14 PJ2015 Mini PCI interface connector (124-pin)

Table C-14 Mini PCI interface connector (124-pin) (1/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	WLON-S3N	O	14	NC	-
15	GND	-	16	NC	-
17	PIRQA-P3N	I	18	P5V	-
19	P3V	-	20	PIRQD-P3N	I
21	NC	-	22	NC	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	I	26	PCIRST-S3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	O	30	PGNT2-P3N	I
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	I/O
35	AD29-P3P	I/O	36	NC	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	-
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	NC	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD26-P3P	I/O
49	GND	-	50	GND	-

51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O

Table C-14 Mini PCI interface connector (124-pin) (2/2)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I/O	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I/O	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O
69	GND	-	70	P3V	-
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I/O	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	I/O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	NC	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	NC	-
99	AD01-P3P	I/O	100	NC	-
101	GND	-	102	GND	-
103	NC	-	104	GND	-
105	NC	-	106	NC	-
107	NC	-	108	NC	-
109	NC	-	110	NC	-
111	NC	-	112	NC	-
113	GND	-	114	GND	-
115	NC	-	116	NC	-
117	GND	-	118	NC	-
119	GND	-	120	GND	-
121	NC	-	122	NC	-

123	NC	-	124	B3V	-
-----	----	---	-----	-----	---

C.15 PJ2017 MDC1 interface connector (30-pin)*Table C-15 MDC1 interface connector (30-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	GND	-
3	GND	-	4	PHONE-BXN	I
5	NC	-	6	NC	-
7	NC	-	8	GND	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	NC	-	14	NC	-
15	GND	-	16	MDC-B3V	-
17	B3V	-	18	NC	-
19	GND	-	20	GND	-
21	NC	-	22	M97SY2-B3P	O
23	M97OT2-P3P	O	24	NC	-
25	M97RS2-S3N	O	26	M97IN2-B3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	O

C.16 PJ1003 MDC2 interface connector (2-pin)*Table C-16 MDC2 interface connector (2-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MDMTIP-B3P	I/O	2	MDMRNG-B3P	I/O

C.17 PJ2019 Serial interface connector (9-pin)*Table C-17 Serial interface connector (9-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD-PYP	I	2	RXD-PYN	I
3	TXD-PYN	O	4	DTR-PYP	O
5	GND	-	6	DSR-PYP	I
7	RTS-PYP	O	8	CTS-PYP	I
9	RING-BYP	I			

C.18 PJ2020 Parallel interface connector (25-pin)*Table C-18 Parallel interface connector (25-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	STROB-P5N	O	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.19 PJ2033 USB0 interface connector (4-pin)*Table C-19 USB0 interface connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	I	2	USBP0-E3N	I/O
3	USB0-E3P	I/O	4	GND	-

C.20 PJ2034 USB1 interface connector (4-pin)*Table C-20 USB1 interface connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	I	2	USBP1-E3N	I/O
3	USBP1-E3P	I/O	4	GND	-

C.21 PJ1004 USB board interface connector (6-pin)*Table C-21 USB board interface connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	I	2	USB1PS-E5V	I

3	USBP4-E3N	I/O	4	USBP4-E3P	I/O
5	GND	-	6	GND	-

C.22 PJ4900 Bluetooth interface connector (20-pin)

Table C-22 Bluetooth interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	BTMDL-P3N	O	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	BTRST-S3P	I
9	NC	-	10	NC	-
11	GND	-	12	NC	-
13	BTIFOF-S3N	O	14	NC	-
15	NC	-	16	USBP5-E3P	I/O
17	USBP5-E3N	I/O	18	NC	-
10	NC	-	20	BT-P3V	-

C.23 PJ1100 Sound board interface connector (30-pin)

Table C-23 Sound board interface connector (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	GND	-
3	LOUTL-PXP	O	4	GND	-
5	LOUTR-PXP	O	6	IRRX-P3N	O
7	A-GND	-	8	IRTX-P3P	I
9	HPOUTL-PXP	I	10	P3V	-
11	HPOUTR-PXP	I	12	P3V	-
13	A-GND	-	14	IRMODE-P3P	I/O
15	MICIN-PXP	O	16	GND	-
17	A-GND	-	18	GND	-
19	AGCL-PXP	O	20	BTSWON-S3P	O
21	AGCR-PXP	O	22	SV3	-
23	VREF1-P2V	-	24	SND-P5V	-
25	A4R7-P4V	-	26	SNDMUT-S3N	I
27	A4R7-P4V	-	28	SPKEN-P5P	I
29	A4R7-P4V	-	30	A-GND	-

C.24 PJ651 IEEE 1394 interface connector*Table C-24 IEEE 1394 interface connector*

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.25 PJ4500 LAN interface connector (14-pin)*Table C-25 LAN interface connector (14-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	BIDAP-EXP	O	A2	BIDAN-EXN	O
A3	BIDBP-EXP	I	A4	BIDCP-EXP	I
A5	BIDCN-EXN	I	A6	BIDBN-EXN	I
A7	BIDDP-EXP	O	A8	BIDDN-EXN	O
A9	ACT-E3N	I	A10	LAN-E3V	-
A11	LINK-E3N	I	A12	LAN-E3V	-
B1	MDMTIP-B3P	I/O	B2	MDMRNG-B3P	I/O

C.26 PJ8800 DC-IN connector (4-pin)*Table C-26 DC-IN connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	ADPDC	-	4	ADPDC	-

C.27 PJ8810 1st Battery connector (10-pin)*Table C-27 1st Battery connector (10-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PVBL1	-	2	BTMP1	I
3	DCHG	-	4	M5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT10V-S5N	I
9	GND	-	10	PVBL1	-

C.28 PJ1005 RTC Battery connector (2-pin)*Table C-28 RTC Battery connector (2-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZS-PWCHKF	-	2	GND	-

C.29 PJ8770 FAN interface connector (3-pin)*Table C-29 FAN interface connector (3-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	GND	-
3	FANG-P3P	O			

C.30 PJ5500 LCD interface connector (41-pin)*Table C-30 LCD interface connector (41-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNL-P3V	-	2	PNL-P3V	-
3	PNL2-P3P	I	4	GND	-
5	GND	-	6	PNL1-P3P	I
7	GND	-	8	GND	-
9	TB2-P3N	O	10	TB2-P3P	O
11	GND	-	12	TCLK2-P3N	O
13	TCLK2-P3P	O	14	GND	-
15	TC2-P3N	O	16	TC2-P3P	O
17	GND	-	18	TA2-P3N	O
19	TA2-P3P	O	20	GND	-
21	TC1-P3N	O	22	TC1-P3P	O
23	GND	-	24	TCLK1-P3N	O
25	TCLK1-P3P	O	26	GND	-
27	TA1-P3N	O	28	TA1-P3P	O
29	GND	-	30	TB1-P3N	O
31	TB1-P3P	O	32	GND	-
33	BRT0-P5P	O	34	BRT1-P5P	O
35	BRT2DA-S3P	O	36	GND	-
37	GND	-	38	PNL0-P3P	I
39	FL-P5V	-	40	FL-P5V	-

41	FL-P5V	-			
----	--------	---	--	--	--

C.31 PJ5523 CRT interface connector (15-pin)*Table C-31 CRT interface connector (15-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RED-PXP	O	2	GREEN-PXP	O
3	BLUE-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	-	10	GND	-
11	NC	-	12	CRTSCL-P5P	I/O
13	SHSYNC-P5P	O	14	SVSYNC-P5P	O
15	CRTSDA-P5P	I/O			

C.32 PJ5501 TV connector (4-pin)*Table C-32 TV connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TVLUMA-PXP	I	2	TVCHRO-PXP	I
3	GND	-	4	GND	-

Sound Board

C.33 PJ3000 System board interface connector (30-pin)

Table C-33 System board interface connector (30-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	FIR-GND	-
3	LOUTL-PXP	O	4	FIR-GND	-
5	LOUTR-PXP	O	6	IRRX-P3N	O
7	A-GND	-	8	IRTX-P3P	I
9	HPOUTL-PXP	O	10	P3V	-
11	HPOUTR-PXP	O	12	P3V	-
13	A-GND	-	14	IRMODE-P3P	I
15	MICIN-PXP	O	16	GND	-
17	A-GND	-	18	GND	-
19	AGCL-PXP	I	20	BTSWON-S3P	O
21	AGCR-PXP	I	22	S3V	-
23	VREF1-P2V	-	24	SND-P5V	-
25	A4R7-P4V	-	26	SNDMUT-S3N	O
27	A4R7-P4V	-	28	SPKEN-P5P	O
29	A4R7-P4V	-	30	A-GND	-

C.34 PJ3001 Internal Microphone connector (2-pin)

Table C-34 Internal Microphone connector (2-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	VREF1-P2V	I	2	A-GND	-

C.35 PJ3002 External Microphone connector (6-pin)

Table C-35 External Microphone connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	MICIN-PXP	I
3	VREF1-P2V	I	4	NC	-
5	NC	-	6	MICIN-PXP	I

C.36 PJ3003 Headphone connector (6-pin)*Table C-36 Headphone connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	A-GND	-
5	SPKEN-P5P	I	6	NC	-

LED Board**C.37 PJ3100 System board interface connector (14-pin)***Table C-37 System board interface connector (14-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	BTLED-S3P	I
3	HDDLED-P5P	I	4	P5V	-
5	BAT2GR-S5N	I	6	BAT20R-S5N	I
7	BAT1GR-S5N	I	8	BAT10R-S5N	I
9	DCINGR-S5N	I	10	DCINOR-S5N	I
11	M5V	-	12	PWLEGR-S3P	I
13	PWLEOR-S3P	I	14	E5V	-

Sensor/Switch Board**C.38 PJ3200 System board interface connector (10-pin)***Table C-38 System board interface connector (10-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	NC	-	4	KBRT03-S3N	I/O
5	KBRT00-S3N	I/O	6	KBSC16-S3N	I/O
7	PNLOFF-S3N	O	8	NC	-
9	ILUOUT-PXP	O	10	P3V	-

USB Board

C.39 PJ3300 System board interface connector (6-pin)

Table C-39 System board interface connector (6-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	Not Mount	-	4	Not Mount	-
5	GND	-	6	GND	-

C.40 PJ3301 USB port 2 connector (4-pin)

Table C-40 USB port 2 connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	Not Mount	-
3	Not Mount	-	4	GND	-

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	13	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
29	\	2B	AB	5D	F0 5D	*5
30	Caps Lock	3A	BA	58	F0 58	
31	A	1E	9E	1C	F0 1C	
32	S	1F	9F	1B	F0 1B	
33	D	20	A0	23	F0 23	
34	F	21	A1	2B	F0 2B	
35	G	22	A2	34	F0 34	
36	H	23	A3	33	F0 33	
37	J	24	A4	3B	F0 3B	*2
38	K	25	A5	42	F0 42	*2
39	L	26	A6	4B	F0 4B	*2
40	; :	27	A7	4C	F0 4C	*2
41	' "	28	A8	52	F0 52	
43	Enter	1C	9C	5A	F0 5A	*3
44	Shift (L)	2A	AA	12	F0 12	
45	No.102 key	56	D6	61	F0 61	
46	Z	2C	AC	1A	F0 1A	
47	X	2D	AD	22	F0 22	
48	C	2E	AE	21	F0 21	
49	V	2F	AF	2A	F0 2A	
50	B	30	B0	32	F0 32	
51	N	31	B1	31	F0 31	
52	M	32	B2	3A	F0 3A	*2
53	, <	33	B3	41	F0 41	*2
54	. >	34	B4	49	F0 49	*2
55	/ ?	35	B5	4A	F0 4A	*2
57	Shift (R)	36	B6	59	F0 59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
58	Ctrl	1D	9D	14	F0 14	*3
60	Alt (L)	38	B8	11	F0 11	*3
61	Space	39	B9	29	F0 29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0 11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0 70	*1
76	Del	E0 53	E0 D3	E0 71	E0 F0 71	*1
79	←	E0 4B	E0 CB	E0 6B	E0 F0 6B	*1
80	Home	E0 47	E0 C7	E0 6C	E0 F0 6C	*1
81	End	E0 4F	E0 CF	E0 69	E0 F0 69	*1
83	↑	E0 48	E0 C8	E0 75	E0 F0 75	*1
84	↓	E0 50	E0 D0	E0 72	E0 F0 72	*1
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0 7D	*1
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0 7A	*1
89	→	E0 4D	E0 CD	E0 74	E0 F0 74	*1
110	Esc	01	81	76	F0 76	
112	F1	3B	BB	05	F0 05	
113	F2	3C	BC	06	F0 06	
114	F3	3D	BD	04	F0 04	
115	F4	3E	BE	0C	F0 0C	
116	F5	3F	BF	03	F0 03	
117	F6	40	C0	0B	F0 0B	
118	F7	41	C1	83	F0 83	
119	F8	42	C2	0A	F0 0A	
120	F9	43	C3	01	F0 01	
121	F10	44	C4	09	F0 09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57		D7		78		F0 78		*3
123	F12	58		D8		07		F0 07		*3
124	PrintSc	*6		*6		*6		*6		*6
126	Pause	*7		*7		*7		*7		*7
202	Fn	—		—		—		—		*4
203	Win	E0	5B	E0	DB	E0	1F	E0	F0 1F	
204	App	E0	5D	E0	DD	E0	2F	E0	F0 2F	

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combined with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
55	/	E0 AA	E0 35	E0 B5	E0 2A	E0 F0 12	E0 4A	E0 F0 4A	E0 12
75	INS	E0 AA	E0 52	E0 D2	E0 2A	E0 F0 12	E0 70	E0 F0 70	E0 12
76	DEL	E0 AA	E0 53	E0 D3	E0 2A	E0 F0 12	E0 71	E0 F0 71	E0 12
79	←	E0 AA	E0 4B	E0 CB	E0 2A	E0 F0 12	E0 6B	E0 F0 6B	E0 12
80	Home	E0 AA	E0 47	E0 C7	E0 2A	E0 F0 12	E0 6C	E0 F0 6C	E0 12
81	End	E0 AA	E0 4F	E0 CF	E0 2A	E0 F0 12	E0 69	E0 F0 69	E0 12
83	↑	E0 AA	E0 48	E0 C8	E0 2A	E0 F0 12	E0 75	E0 F0 75	E0 12
84	↓	E0 AA	E0 50	E0 D0	E0 2A	E0 F0 12	E0 72	E0 F0 72	E0 12
85	PgUp	E0 AA	E0 49	E0 C9	E0 2A	E0 F0 12	E0 7D	E0 F0 7D	E0 12
86	PgDn	E0 AA	E0 51	E0 D1	E0 2A	E0 F0 12	E0 7A	E0 F0 7A	E0 12
89	→	E0 AA	E0 4D	E0 CD	E0 2A	E0 F0 12	E0 74	E0 F0 74	E0 12
203	Win	E0 AA	E0 5B	E0 DB	E0 2A	E0 F0 12	E0 1F	E0 F0 1F	E0 12
204	App	E0 AA	E0 5D	E0 DD	E0 2A	E0 F0 12	E0 2F	E0 F0 2F	E0 12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A	E0 52	E0 D2	E0 AA	E0 12	E0 70	E0 F0	70 E0 F0 12
76	DEL	E0 2A	E0 53	E0 D3	E0 AA	E0 12	E0 71	E0 F0	71 E0 F0 12
79	←	E0 2A	E0 4B	E0 CB	E0 AA	E0 12	E0 6B	E0 F0	6B E0 F0 12
80	Home	E0 2A	E0 47	E0 C7	E0 AA	E0 12	E0 6C	E0 F0	6C E0 F0 12
81	End	E0 2A	E0 4F	E0 CF	E0 AA	E0 12	E0 69	E0 F0	69 E0 F0 12
83	↑	E0 2A	E0 48	E0 C8	E0 AA	E0 12	E0 75	E0 F0	75 E0 F0 12
84	↓	E0 2A	E0 50	E0 D0	E0 AA	E0 12	E0 72	E0 F0	72 E0 F0 12
85	PgUp	E0 2A	E0 49	E0 C9	E0 AA	E0 12	E0 7D	E0 F0	7D E0 F0 12
86	PgDn	E0 2A	E0 51	E0 D1	E0 AA	E0 12	E0 7A	E0 F0	7A E0 F0 12
89	→	E0 2A	E0 4D	E0 CD	E0 AA	E0 12	E0 74	E0 F0	74 E0 F0 12
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop	Code set 1		Code set 2		
		Make	Break	Make	Break	
09	8 (8)	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

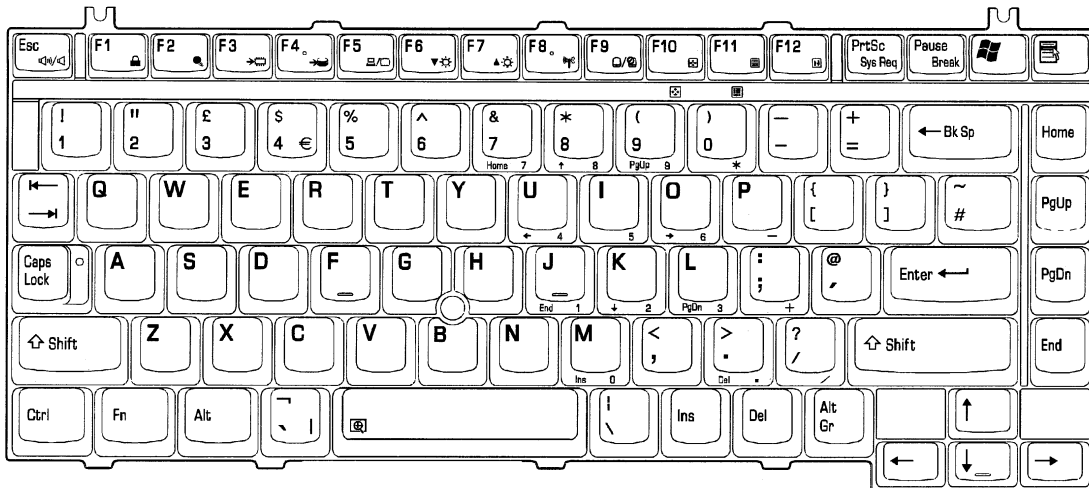


Figure E-1 UK keyboard

E.2 United States (US) Keyboard

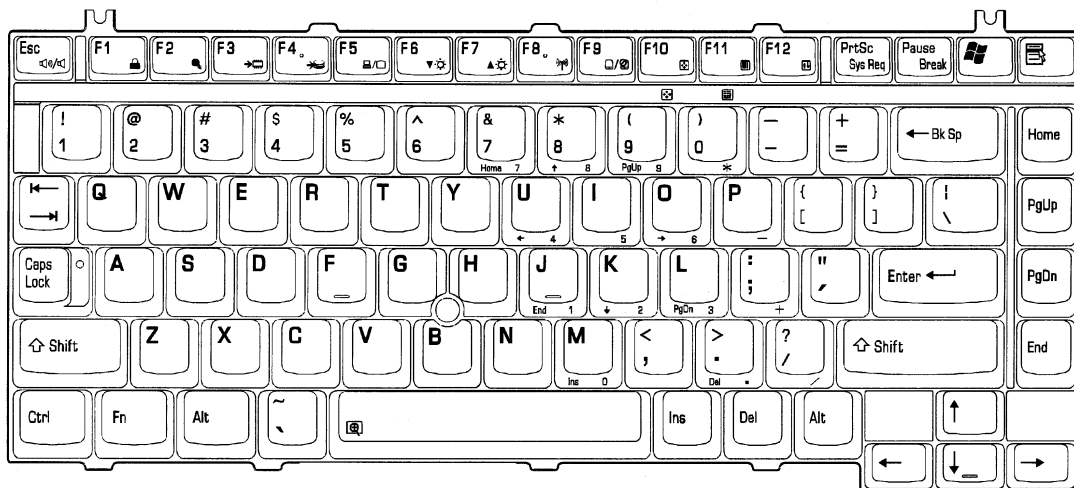


Figure E-2 US keyboard

Appendix F Wiring Diagrams

F.1 Parallel Port Wraparound Connector

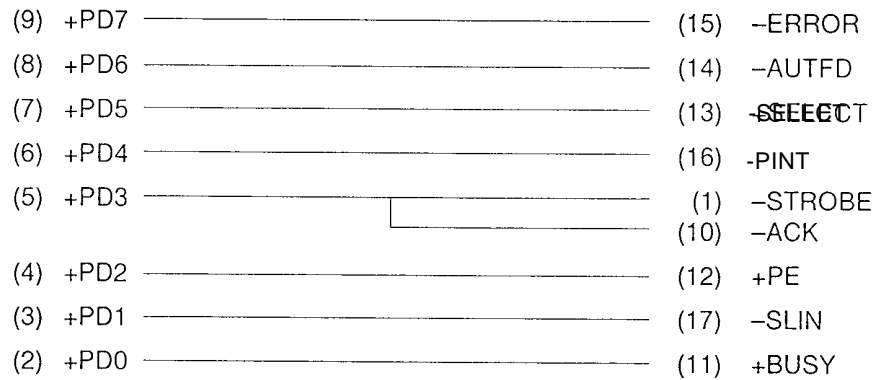


Figure F-1 Parallel port wraparound connector

F.2 Serial Port Wraparound Connector

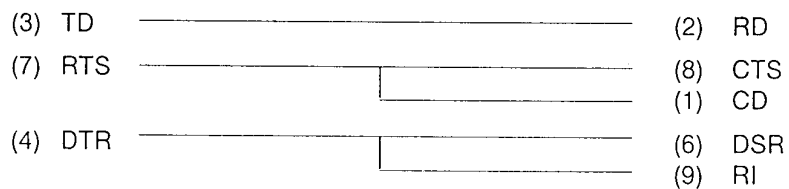


Figure F-2 Serial port wraparound connector

F.3 LAN Loopback Connector

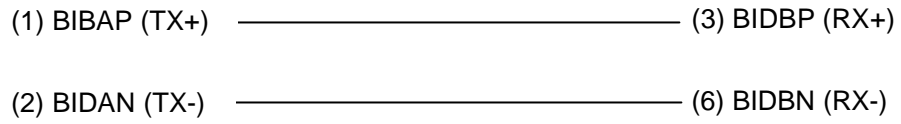


Figure F-3 LAN loopback Connector

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 H EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

- BIOS/EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
 2. Connect the AC adaptor to the computer when you rewrite the EC/KBC.
 3. Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.
 4. If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC has been erased. In this case, insert the BIOS/EC/KBC rewriting disk, and the EC/KBC will be rewritten.
 5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC Card.
4. Connect an external FDD and insert the BIOS/EC/KBC rewriting disk into either the external or built-in FDD.
5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a message appears on the screen.) The BIOS/EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures).

Table I-1 MTBF

	Time (hours)
MTBF	5,336

