

**Toshiba Personal Computer**  
**PORTEGE M100**  
**Maintenance Manual**

**TOSHIBA CORPORATION**

**File Number 960-452**

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Toshiba Personal Computer PORTEGE M100 Maintenance Manual

First edition July 2003

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## Preface

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE M100, referred to as M100 in this manual.

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

### SAFETY PRECAUTIONS

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

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

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

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

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

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

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

The manual is divided into the following parts:

- Chapter 1 Hardware Overview describes the PORTEGE M100 system unit and each FRU.
- Chapter 2 Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3 Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4 Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices The appendices describe the following:

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

## Conventions

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

### *Acronyms*

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

Read Only Memory (ROM)

### *Keys*

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

### *Key operation*

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

### *User input*

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

**DISKCOPY A: B:**

### *The display*

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

```
Format complete  
System transferred
```

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# Table of Contents

---

## Chapter 1 Hardware Overview

1.1	Features .....	1-1
1.2	System Unit Block Diagram .....	1-6
1.3	3.5-inch Floppy Disk Drive (USB External) .....	1-10
1.4	2.5-inch Hard Disk Drive.....	1-11
1.5	DVD-ROM Drive .....	1-13
1.6	CD-RW/DVD-ROM Drive .....	1-14
1.7	Power Supply .....	1-15
1.8	Batteries .....	1-18

## 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.....	2-17
2.5	FDD Troubleshooting .....	2-28
2.6	HDD Troubleshooting .....	2-31
2.7	Keyboard Troubleshooting .....	2-36
2.8	Display Troubleshooting.....	2-38
2.9	DVD-ROM Drive Troubleshooting.....	2-41
2.10	CD-RW/DVD-ROM Drive Troubleshooting .....	2-43
2.11	Modem Troubleshooting.....	2-45
2.12	LAN Troubleshooting .....	2-47
2.13	Bluetooth Troubleshooting .....	2-48
2.14	Wireless LAN Troubleshooting.....	2-52
2.15	Sound Troubleshooting.....	2-56

## 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.....	3-9
3.5	Memory Test.....	3-12
3.6	Keyboard Test.....	3-13
3.7	Display Test .....	3-16
3.8	Floppy Disk Test.....	3-19
3.9	Printer Test.....	3-21
3.10	Async Test .....	3-23
3.11	Hard Disk Test .....	3-25
3.12	Real Timer Test.....	3-28
3.13	NDP Test.....	3-30
3.14	Expansion Test.....	3-31
3.15	CD-ROM/DVD-ROM Test .....	3-32
3.16	Error Code and Error Status Names.....	3-33
3.17	Hard Disk Test Detail Status .....	3-36
3.18	Head Cleaning.....	3-38
3.19	Log Utilities .....	3-39
3.20	Running Test.....	3-41
3.21	Floppy Disk Drive Utilities.....	3-43
3.22	System Configuration .....	3-48
3.23	SETUP .....	3-50
3.24	Wireless LAN Test Program (Cisco).....	3-70
3.25	Wireless LAN Test Program (Atheros) .....	3-73
3.26	Wireless LAN Test Program (Calexico).....	3-76
3.27	Sound/LAN/Modem Test Program.....	3-77
3.28	Bluetooth Test Program .....	3-81
3.29	IEEE1394 Test Program .....	3-91

## Chapter 4 Replacement Procedures

4.1	General.....	4-1
4.2	HDD.....	4-12
4.3	Slim Select Bay Options.....	4-16
4.4	Wireless LAN Card.....	4-18
4.5	RTC Battery.....	4-23
4.6	Keyboard.....	4-27
4.7	Memory Module.....	4-31
4.8	Palm Rest and IPS Board.....	4-33
4.9	Bluetooth Board.....	4-38
4.10	Sound/FIR Board.....	4-40
4.11	Modem Daughter Card.....	4-43
4.12	Wireless Communication Switch Board.....	4-45
4-13	Top Cover with Display Assembly.....	4-47
4.14	Speakers.....	4-52
4.15	System Board.....	4-55
4.16	PC Card Slot.....	4-59
4.17	I/O Board.....	4-62
4.18	Display Mask.....	4-65
4.19	FL Inverter Board.....	4-68
4.20	LCD Module.....	4-70
4.21	LCD/LED Cable.....	4-73
4.22	Antenna Coaxial Cables.....	4-77
4.23	TFT FL (Model 12.1 Toshiba).....	4-82



## Appendices

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



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# **Chapter 1**

## **Hardware Overview**

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## Chapter 1 Contents

---

1.1	Features.....	1-1
1.2	System Unit Block Diagram.....	1-6
1.3	3.5-inch Floppy Disk Drive (USB External).....	1-10
1.4	2.5-inch Hard Disk Drive .....	1-11
1.5	DVD-ROM Drive.....	1-13
1.6	CD-RW/DVD-ROM Drive.....	1-14
1.7	Power Supply.....	1-15
1.8	Batteries.....	1-18
1.8.1	Main Battery .....	1-18
1.8.2	Battery LED (Main Battery / 2 <sup>nd</sup> Battery) .....	1-18
1.8.3	Battery Charging Control.....	1-19
1.8.4	RTC battery.....	1-20

## Figures

Figure 1-1	Front of the computer .....	1-5
Figure 1-2	System unit configuration.....	1-5
Figure 1-3	System unit block diagram .....	1-6
Figure 1-4	3.5-inch FDD .....	1-10
Figure 1-5	2.5-inch HDD .....	1-11
Figure 1-6	DVD-ROM drive.....	1-13
Figure 1-7	CD-RW/DVD-ROM drive .....	1-14

## Tables

Table 1-1	3.5-inch FDD specifications.....	1-10
Table 1-2	2.5-inch HDD dimensions .....	1-11
Table 1-3	2.5-inch HDD specifications .....	1-12
Table 1-4	DVD-ROM drive specifications .....	1-13
Table 1-5	CD-RW/DVD-ROM drive specifications .....	1-14
Table 1-6	Power supply board output rating.....	1-16
Table 1-7	Battery specifications .....	1-18
Table 1-8	Time required for quick charges.....	1-19
Table 1-9	RTC battery charging/data preservation time.....	1-20

## 1.1 Features

The Toshiba PORTEGE M100 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.

### Processor

PORTEGE M100 computer is equipped with an Intel Pentium® M Processor.

#### Intel Pentium® M Processor

A 1.20GHz Intel Pentium® M Processor with a 1.20GHz internal clock, 400MHz FSB and 1.180V/0.956V core operation

### Cache Memory

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

### Memory

Two DDR SO-DIMM slots are available for installation of PC2100 compatible 128, 256, 512MB and 1GB memory modules. The memory is expandable up to 2GB.

### HDD

Single 40GB or 60GB internal drive. 2.5 inch x 9.5mm height.

### FDD

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

### DVD-ROM

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

### CD-RW/DVD-ROM Drive

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

Keyboard

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

 AccuPoint II

This pointer control stick, located in the center of the keyboard, provides convenient control of the cursor without requiring desk space for a mouse. The computer also has two mouse buttons and two scroll buttons on this side of the keyboard.

 Display

The display comes in the following type:

- 12.1" XGA-TFT color display, resolution 1024(H)×768(V), 16M colors

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

 Batteries

The computer has two batteries: a lithium-ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory). The secondary Battery can be used, which is attached in the slim select bay.

 Slot for expansion memory

One SO-DIMM slots are available for expansion memory of 128, 256, 512MB and 1GB-memory modules. One module must be installed in slot A as standard memory.

 Universal Serial Bus (USB)

The computer comes with two USB ports supporting USB 2.0. The USB enables daisy-chain connection of up to 127 USB-equipped devices. It is designed for easy configuration by a Plug-and-Play operating system and provides hot insertion/ejection capability.

 Infrared port

The infrared port is compatible with Fast InfraRed (FIR) standards enabling wireless up to 4Mbps data transfer with Infrared Data Association (IrDA) 1.1 compatible devices.

 IEEE1394

Depending on the model, one port of IEEE1394 connector is mounted. I/O devices (digital video camera, etc) supporting IEEE1394 can be connected.



Bluetooth

Bluetooth wireless technology eliminates the need for cables between electronic devices such as computers and printers. Bluetooth provides fast, reliable, and secure wireless communication in a small space.

 Internal LAN

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

 Wireless LAN (mini PCI Card slot (1 slot, BTO))

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

This function can be switched on and off by a switch on the computer.

 PC Card Slot

A PC Card Slot accommodates two 5mm cards (Type II) or one 10.5mm card (Type III). The computer supports the PC Card Standard Release 2.01 cards and for advanced cards, including PC Card 16's Multifunction cards and CardBus 32-bit cards.

 Slim Select Bay

The Slim Select Bay can accommodate the following modules: DVD-ROM drive, CD-RW/DVD-ROM drive, optional secondary battery pack and optional Slim Select Bay HDD Adaptor.

An optional battery pack can be installed in the Slim Select Bay to increase the computer's battery power and operating time.

An optional 2.5" HDD can be installed in the Slim Select Bay to increase the computer's data storage capacity. The capacity of the optional HDD is 40GB or 60GB.

 SD Card Slot

The computer is equipped with a SD Card slot that can accommodate Secure Digital flash memory cards with capacities of 8MB, 16MB, 32MB, 64MB, 256MB and 512MB. SD cards let the user easily transfer data from devices, such as digital cameras and Personal Digital Assistants, that use SD Card flash-memory. The cards have a high-level of security and copy protection features.

Sound system

This computer includes sound controllers that support AC'97 I/F (AC-Link) Revision 2.2. The sound system is equipped with the following:

- Stereo speakers
- Built-in Microphone
- Volume control knob
- Headphone jack
- External microphone jack

 Internal modem

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

The internal modem provides capability for data and fax communication and supports ITU-TV.90. 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. 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.

 Presentation button

This button changes the display by LCD to by LCD+CRT and vice versa.

 TOSHIBA Console button

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

The computer is shown in Figure 1-1. The system unit configuration is shown in Figure 1-2.

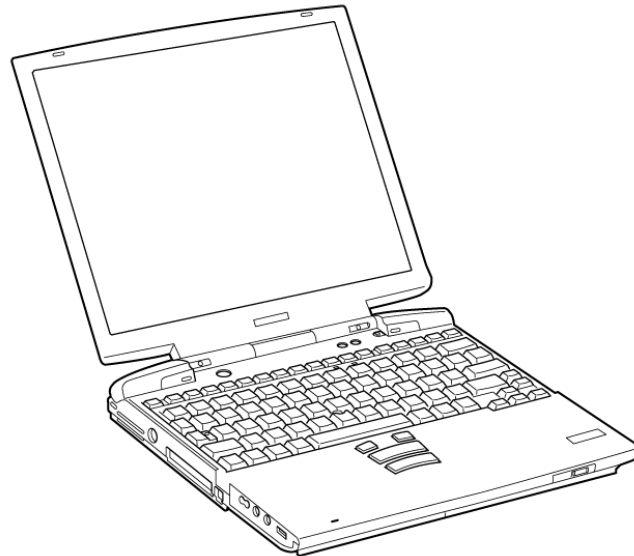


Figure 1-1 Front of the computer

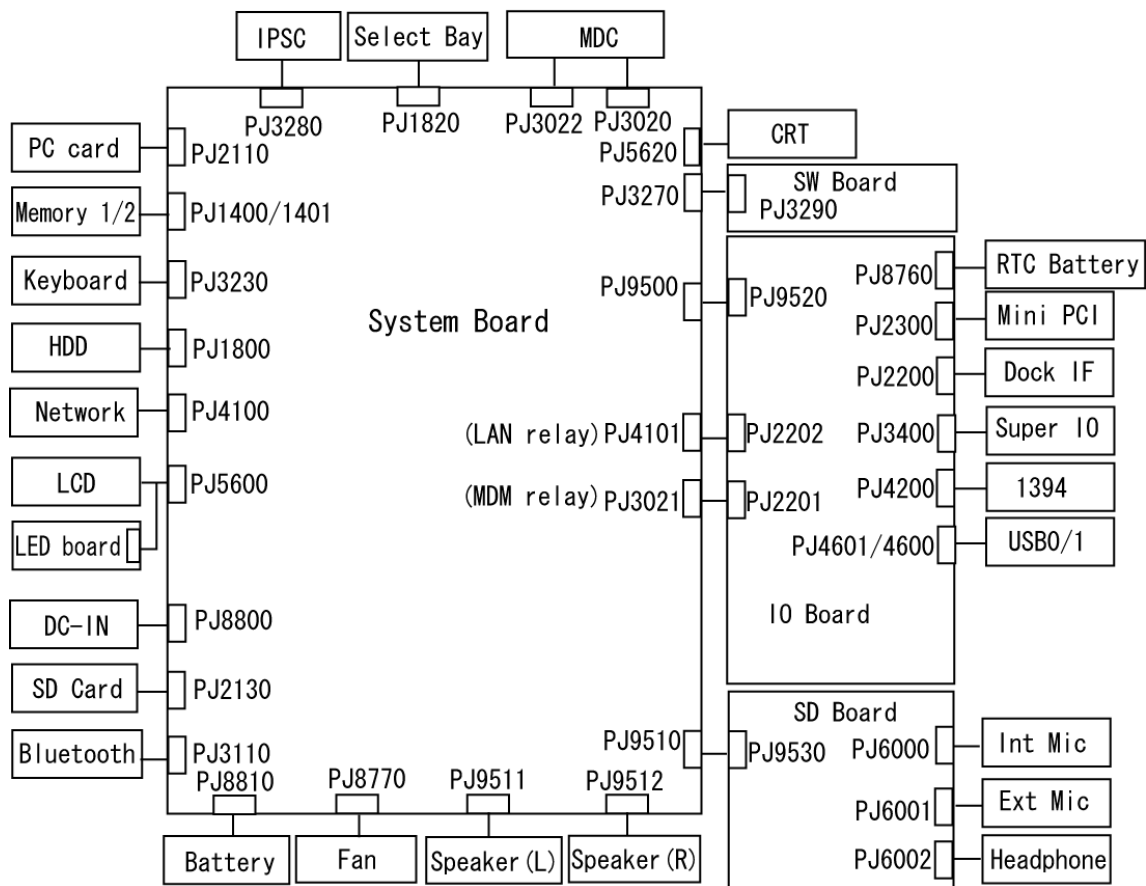


Figure 1-2 System unit configuration

## 1.2 System Unit Block Diagram

Figures 1-3 is block diagrams of the system unit.

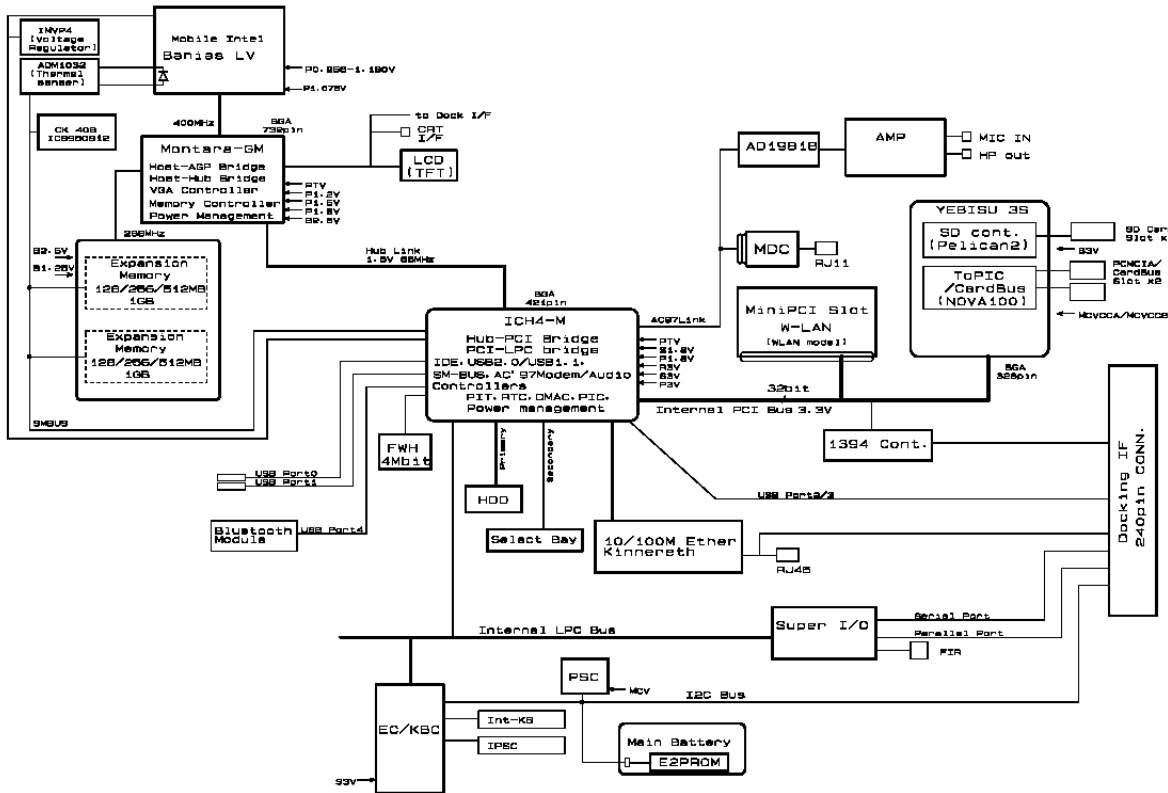


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- A 1.20GHz Intel Pentium® M Processor 1.2GHz
  - Processor core speed: 1.20GHz at 1.20V
  - Integrated L1 cache memory: 64KB
  - Integrated L2 cache memory: 1MB
  - Integrated NDP

❑ PCI Chip Set

- North Bridge: Intel MontaraGM
  - Features:
    - Supports Banias Processor System Bus.
    - DRAM Controller supporting DDR200/DDR266
    - AGP Interface (AGP R2.0)
    - Hub Link Interface
    - Internal Graphics
    - 732-ball 37.5×37.5mm FC-BGA Package
- South Bridge: Intel ICH4-M
  - Features:
    - Hub Link Interface
    - PCI Rev2.2 Interface (6 PCI REQ/CNT Paris)
    - Bus master IDE Controller (Ultra ATA 100/66/33)
    - USB 1.1/2.0 controller with 6 ports
    - I/O APIC (ACPI 1.0b compatible)
    - SM Bus 2.0 controller
    - FWH Interface (BIOS)
    - LPC Interface (EC/KBC, Super I/O)
    - IRQ controller
    - Serial Interrupt function
    - Power Management function
    - Supports Deeper Sleep (4).
    - Suspend/Resume control
    - AC'97 2.2 Interface
    - Internal RTC
    - 421-ball (31mm×31mm) BGA Package

PC Card Controller:

- YEBISU3S

## Features:

- PCI Interface (PCI Rev. 2.2)
- CardBus Controller (Yenta2 Ver. 2.2)
- SD IO card controller (Ver. 1.0)
- SD card controller (SDHC Ver. 1.2)
- SIO controller
- Docking Station Interface
  - Q-SW control, Rest control
- External Device Interface

 VGA Controller: inside in the North Bridge. Memory

Two DDR SO-DIMM slots are available for 128,256,512MB and 1GB memory modules, consisting of SDRAM chips.

- Supports CL2/2.5
- Supports PC2100
- 128/256/512 MB, 1GB selectable
  - 128MB: 256Mbit (16M × 16bit) chips ×4
  - 256MB: 256Mbit (16M × 16bit) chips ×8
  - 512MB: 512Mbit (32M × 16bit) chips ×16
  - 1GB: 512Mbit (64M × 8 bit) chips × 16

 Super I/O

- One SMSC LPC47n227-MN-B is used.

 IPSC

- TWM7000 (HOSIDEN made)

 KBC/EC (Keyboard Controller/Embedded Controller)

- One M306K7F8LRP chip functions as both KBC and EC.

 PSC (Power Supply Controller)

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

- ❑ Thermo Sensor
  - One ADM1032 is used.
  
- ❑ IEEE1394
  - One TI made TSB43AB22PDT is used.
  
- ❑ LAN
  - One I82559 kinnereth-R (PCI) or I82551 chip is used.
  - Supports 10/100Mbit Ethernet.
  - Supports WOL.
  
- ❑ Slim Select Bay
  - This device supports the following components.
    - IDE Device: DVD-ROM, CD-RW/DVD-ROM, 2<sup>nd</sup> HDD
    - 2<sup>nd</sup> Battery
  
- ❑ Sound CODEC
  - One AD1981B chip is used.
  - Internal Audio Controller in ICH4-MBoth chips are used as the CODEC chip.
  
- ❑ Clock Generator
  - One ICS950812 is used.This device generates the system clock.

### 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 and 1.2 MB or 1.44MB (formatted) 2HD disks.

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

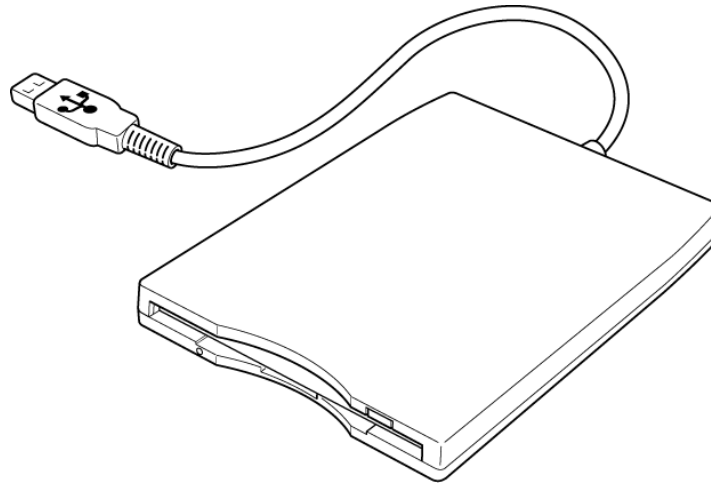


Figure 1-4 3.5-inch FDD

Table 1-1 3.5-inch FDD specifications

Item	720KB mode	1.2MB mode	1.44MB mode
Storage capacity (KB) Formatted	720 (KB)	1,200 (KB)	1,440 (KB)
Number of heads	2		
Number of cylinders	80		
Recording method	MFM (Modified Frequency Modulation)		



## 1.4 2.5-inch Hard Disk Drive

The removable HDD is a random-access, non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports a 40GB and 60GB HDD.

The HDD is shown in Figure 1-5. Specifications are listed in Table 1-2 and 1-3.

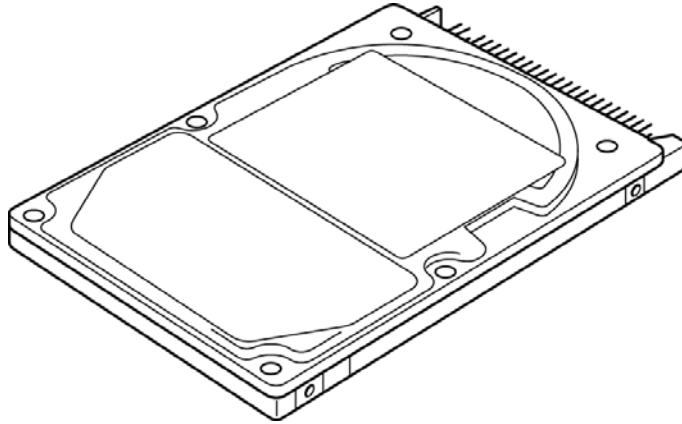


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD dimensions

Parameter		Standard value		
		TOSHIBA HDD2171	TOSHIBA HDD2184	HITACHI G8BC00009110
Outline dimensions	Width (mm)	69.85	69.85	70.1 max
	Height (mm)	9.5	9.5	9.5
	Depth (mm)	100	100	100
	Weight (g)	102 max.	102 max.	95

Table 1-3 2.5-inch HDD specifications

Parameter	Specifications		
	TOSHIBA HDD2171	HITACHI G8BC00009110	TOSHIBA HDD2184
Storage size (formatted)	40GB		60GB
Speed (RPM)	5400±0.1%		
Data transfer speed	200.8~333.2	222.4~352.8	202.9~373.3
Interface transfer rate (MB/s)	100 max. (Ultra DMA mode)		
Track density (Ktpi)	57.1	63.0	78.9
Access Time			
Track to track	2	-	2
Average seek	12	13	12
Max seek	22	24	22
Start time (sec)	4 typ. 10 max.	5 typ.	4 typ. 10 max.

## 1.5 DVD-ROM Drive

The DVD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CDs. It is a high-performance drive that reads at a maximum 24-speed (3,600 KB per second).

The DVD-ROM drive is shown in Figure 1-6. Specifications for the DVD-ROM drive are described in table 1-4.

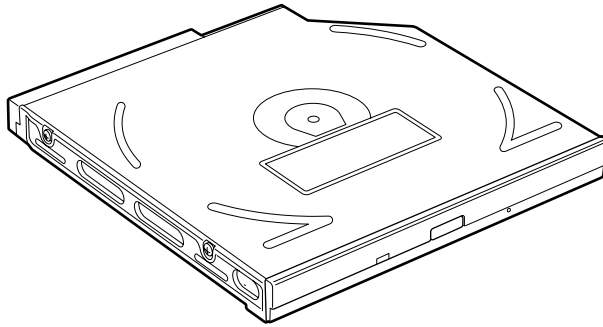


Figure 1-6 DVD-ROM drive

Table 1-4 DVD-ROM drive specifications

Item	Toshiba SD-C2612		
	DVD-ROM mode	CD-ROM mode	DVD-RAM mode
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7(PIO mode 4, Multi word DMA mode 2)		
Access time (ms)			
Average Random Access	100	95	170
Average Full Stroke Access	160	160	350
Rotation speed (rpm)	4,670 Max	5,100 Max	4800 Max
Data Buffer Capacity (Kbytes)	128		
Supported Format	DVD: DVD-ROM(DVD-5, DVD-9, DVD-10, DVD-18) DVD-R (read,single border), DVD-RW, DVD-RAM CD : CD-DA,CD+(E)G,CD-MIDI,CD-TEXT,CD-ROM, CD-ROM XA, CD-I, CD-I Bridge(Photo-CD, Video-CD), Multisession CD (PhotoCD, CD-EXTRA,CD-R, CD-RW),CD-R (read),CD-RW(read)		

## 1.6 CD-RW/DVD-ROM Drive

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

The CD-RW/DVD-ROM drive is shown in Figure 1-7. Specifications for the CD-RW/DVD-ROM drive are listed in table 1-5.

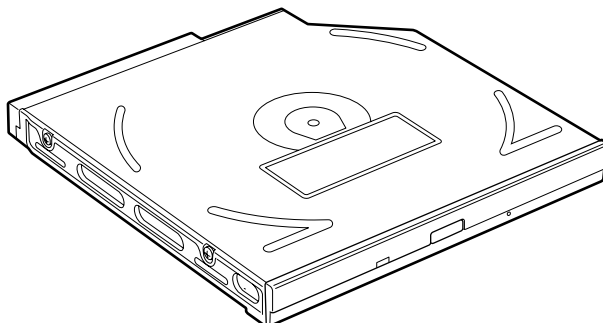


Figure 1-7 CD-RW/DVD-ROM drive

Table 1-5 CD-RW/DVD-ROM drive specifications

Item	TEAC DW-224E-A		
	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 0 to 4, Multi word DMA mode 0 to 2)		
Average Access time (ms)	110	90	
Data Buffer Capacity (Mbytes)	2		
Supported Format	CD: CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA Mode 2, Photo CD, Enhanced CD, CD-TEXT  DVD: DVD-VIDEO, DVD-ROM, DVD-R		CD-R, CD-RW

## 1.7 Power Supply

The power supply distributes 27 different voltages to the system board and performs the following functions:

1. Input port management
  - AC adaptor connection
  - Battery pack installation
  - The voltage of AC adaptor (both IN and OUT)
2. Power supply internal control
  - Battery pack charging status (ON/OFF)
  - Controls DC voltage output by the of AC Adaptor
  - Regulates power supply to system components (load and logic circuits)
  - Controls circuit breakers in event of a power supply malfunction
3. Management of power to logic circuits
  - Controls power to the CPU
  - Regulates power supplied to gate arrays
  - Controls ON/OFF power
4. Status indicators
  - DC IN LED
  - Battery LED
5. External device interface
  - Monitors I<sup>2</sup>C bus connections through EC/KBC on the system board.
  - Transmits the power supply mode.
6. Monitors power output
  - Power to systems components (load and logic circuits)
  - Battery pack voltage, overvoltage and I/O current
  - Battery pack internal temperature
  - PWRGD from the CPU; 100 signal (power supply healthy)

The power supply output rating is specified in Table 1-6.

Table 1-6 Power supply board output rating (1/2)

Use	Name	Voltage (V)	Power supplied Yes/No		
			Stand by	Power off	No battery
CPU	PPV	1.30-1.00	NO	NO	NO
CPU, GMCH, ICH4-M	PTV	1.075	NO	NO	NO
GMCH	1R2-P1V	1.20	NO	NO	NO
GMCH	A1R2-P1V	1.20	NO	NO	NO
DDR-SDRAM Termination	1R25-P1V	1.25	NO	NO	NO
DDR-SDRAM, GMCH	MR1R25-B1V	1.25	YES	NO	NO
TV, GMCH, ICH4-M	1R5-P1V	1.51	NO	NO	NO
ICH4-M, LAN Power	1R5-S1V	1.51	YES	YES*	NO
GMCH, DDR-SDRAM	2R5-B2V	2.5	YES	NO	NO
GMCH	Q2R5-B2V	2.5	YES	NO	NO
Clock Generator, Thermal Sensor, GMCH, SDRAM(SPD), TV, LCD, ICH4-M, AD1981B, mini-PCI, IEEE1394, SD Card Power, Super I/O	P3V	3.3	NO	NO	NO
YEBISU3S, PC Card Power, mini-PCI, MDC (connected directly to E3V)	B3V	3.3	YES	YES*	NO
ICH4-M, KINNERETH (connected directly to E3V)	LAN-E3V	3.3	YES	YES*	NO
Bluetooth	BT-P3V	3.3	NO	NO	NO
LAN Power	E3V	3.3	YES	YES*	NO
ICH4-M, LAN Power	LAN1R5-E1V	1.5	YES	YES*	NO
ICH4-M, PSC	S3V	3.3	YES	YES	NO
ECKBC	M3V	3.3	YES	YES	NO

Table 1-6 Power supply board output rating (2/2)

Use	Name	Voltage (V)	Power supplied Yes/No		
			Stand by	Power off	No battery
CRT, ICH4-M, FL inverter, LEDs, HDD, ODD, KB, PAD, Bluetooth Power	P5V	5	NO	NO	NO
MM1517A(Amp)	SND-P5V	5	NO	NO	NO
AD1981B, Line IN, Amp, Head Phone, Ring Phone, (CAUDIO)	A4R7-P4V	4.7	NO	NO	NO
PC Card Power (connected directly to E5V)	B5V	5	YES	YES*	NO
USB POWER	E5V	5	YES	YES*	NO
ICH4-M, LEDs	S5V	5	YES	YES	NO
MAX6501, ECKBC (connected directly to S5V)	M5V	5	YES	YES	NO
PSC	MCV	5	YES	YES	NO
ICH4-M(RTC)	R3V	2.0 - 3.5	YES	YES	YES

\* ...YES only for "Wake Up Enable"

## 1.8 Batteries

The computer has two types of batteries:

- Main battery
- RTC battery
- 2<sup>nd</sup> battery (Option)

The battery specifications are listed in Table 1-7.

*Table 1-7 Battery specifications*

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	10.8 V	4,000mAh
2 <sup>nd</sup> battery	Lithium-Ion	10.8 V	3,600mAh
RTC battery	Lithium-Ion	2.4 V	30mAh

### 1.8.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached.

### 1.8.2 Battery LED (Main Battery / 2<sup>nd</sup> Battery)

The battery LED displays the status of the battery pack with some colors and flashing. About the status of Main battery, the LED displays it, which is equipped in the computer. About the status of the 2<sup>nd</sup> battery, it is displayed in the LED, which is equipped in the Slim Select Bay.

- Orange Main battery is charging. (with AC Adaptor)
- Green Main battery is fully charged. (with AC Adaptor)
- Orange / Flashing Power ON (without AC Adaptor) and the charge level of main battery is low.
- LED Off All others



### 1.8.3 Battery Charging Control

Battery charging is controlled by a power supply microprocessor mounted on the system board. The power supply microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery (both Main battery and 2<sup>nd</sup> battery) are attached to the computer. The system charges the battery using quick charge or trickle charge.

#### □ Battery Charge

When the AC adaptor is attached, battery Charge starts.

The times required for quick charges are listed in Table 1-8.

*Table 1-8 Time required for quick charges*

Status	Charging time	
	Main Battery	2 <sup>nd</sup> Battery
Power off	2.5 hours	2.5 hours
Power on	4 to 12 hours or longer	4 to 12 hours or longer

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

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

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The AC adaptor or battery voltage is abnormal
4. The charging current is abnormal.

**❑ Detection of full charge**

A full charge is detected when the battery is charging at charge, and under any of the following conditions:

1. The battery charging current drops under the predetermined limit.
2. The charging time exceeds the limit.
3. The battery's temperature is over 60°C.

**1.8.4 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 1-9 lists the charging time and data preservation period of the RTC battery. The RTC battery is charged by the adapter or main battery, while the computer is powered on.

*Table 1-9 RTC battery charging/data preservation time*

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

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## **Chapter 2**

# **Troubleshooting Procedures**

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## Chapter 2 Contents

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2.1	Troubleshooting.....	2-1
2.2	Troubleshooting Flowchart .....	2-2
2.3	Power Supply Troubleshooting .....	2-6
	Procedure 1 Power LED Check .....	2-6
	Procedure 2 Error Code Check .....	2-8
	Procedure 3 Connection Check .....	2-14
	Procedure 4 Charge Check.....	2-15
	Procedure 5 Replacement Check.....	2-16
2.4	System Board Troubleshooting .....	2-17
	Procedure 1 Message Check .....	2-18
	Procedure 2 Printer Port LED Check.....	2-20
	Procedure 3 Diagnostic Test Program Execution Check .....	2-26
	Procedure 4 Replacement Check.....	2-27
2.5	FDD Troubleshooting.....	2-28
	Procedure 1 FDD Head Cleaning Check.....	2-28
	Procedure 2 Diagnostic Test Program Execution Check .....	2-29
	Procedure 3 Connector Check and Replacement Check.....	2-30
2.6	HDD Troubleshooting .....	2-31
	Procedure 1 Message Check .....	2-31
	Procedure 2 Partition Check.....	2-32
	Procedure 3 Format Check.....	2-33
	Procedure 4 Diagnostic Test Program Execution Check .....	2-34
	Procedure 5 Connector Check and Replacement Check.....	2-35
2.7	Keyboard Troubleshooting.....	2-36
	Procedure 1 Diagnostic Test Program Execution Check .....	2-36
	Procedure 2 Connector and Replacement Check .....	2-37
2.8	Display Troubleshooting .....	2-38

	Procedure 1	External Monitor Check.....	2-38
	Procedure 2	Diagnostic Test Program Execution Check.....	2-38
	Procedure 3	Connector and Cable Check.....	2-39
	Procedure 4	Replacement Check.....	2-40
2.9	DVD-ROM Drive Troubleshooting .....		2-41
	Procedure 1	Diagnostic Test Program Execution Check.....	2-41
	Procedure 2	Connector Check and Replacement Check.....	2-42
2.10	CD-RW/DVD-ROM Drive Troubleshooting.....		2-43
	Procedure 1	Diagnostic Test Program Execution Check.....	2-43
	Procedure 2	Connector Check and Replacement Check.....	2-44
2.11	Modem Troubleshooting .....		2-45
	Procedure 1	Diagnostic Test Program Execution Check.....	2-45
	Procedure 2	Connector Check and Replacement Check.....	2-46
2.12	LAN Troubleshooting .....		2-47
	Procedure 1	Diagnostic Test Program Execution Check.....	2-47
	Procedure 2	Connector Check and Replacement Check.....	2-47
2.13	Bluetooth Troubleshooting.....		2-48
	Procedure 1	Transmitting-Receiving Check .....	2-48
	Procedure 2	Antennas' Connection Check.....	2-49
	Procedure 3	Antenna Check.....	2-50
	Procedure 4	Replacement Check.....	2-51
2.14	Wireless LAN Troubleshooting .....		2-52
	Procedure 1	Transmitting-Receiving Check .....	2-52
	Procedure 2	Antennas' Connection Check.....	2-53
	Procedure 3	Antenna Check.....	2-54
	Procedure 4	Replacement Check.....	2-55
2.15	Sound Troubleshooting .....		2-56
	Procedure 1	Diagnostic Test Program Execution Check.....	2-56
	Procedure 2	Connector Check.....	2-57
	Procedure 3	Replacement Check.....	2-58

**Figures**

Figure 2-1 Troubleshooting flowchart ..... 2-3  
Figure 2-2 Printer port LED ..... 2-20  
Figure 2-3 Printer port LED board ..... 2-20  
Figure 2-4 Antenna test cable ..... 2-50  
Figure 2-5 Antenna test cable ..... 2-54

**Tables**

Table 2-1 Battery Icon ..... 2-6  
Table 2-2 DC IN LED ..... 2-7  
Table 2-3 Error code ..... 2-9  
Table 2-4 Printer port LED boot mode status ..... 2-21  
Table 2-5 FDD error code and status ..... 2-29  
Table 2-6 Hard disk drive error code and status ..... 2-34





## 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      | 5. Display             | 9. LAN               |
| 2. Floppy Disk Drive | 6. DVD-ROM Drive       | 10. Bluetooth        |
| 3. Hard Disk Drive   | 7. CD-RW/DVD-ROM Drive | 11. Wireless LAN     |
| 4. Keyboard          | 8. Modem               | 12. Sound components |

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)
5. Formatted work disk for floppy disk drive testing
6. Cleaning kit for floppy disk drive troubleshooting
7. Serial port wraparound connector
8. Parallel port wraparound connector
9. PC card wraparound connector
10. Multimeter
11. External USB FDD
12. External USB keyboard and Mouse
13. Headphone
14. Microphone
15. USB test module and USB cable
16. TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)
17. CD-RW Media (RICOH-made x4 recommended)
18. DVD-ROM TSD-1 (TOSHIBA-EMI DVD Test Media)
19. Music CD
20. RJ11 connector checker
21. Speaker
22. Advanced Port Replicator
23. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting
24. Personal computer that can communicate by Bluetooth for Bluetooth troubleshooting
25. 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 Advanced 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 Toshiba Windows is installed on the hard disk. Non-Windows operating systems can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the External USB floppy disk drive is empty.

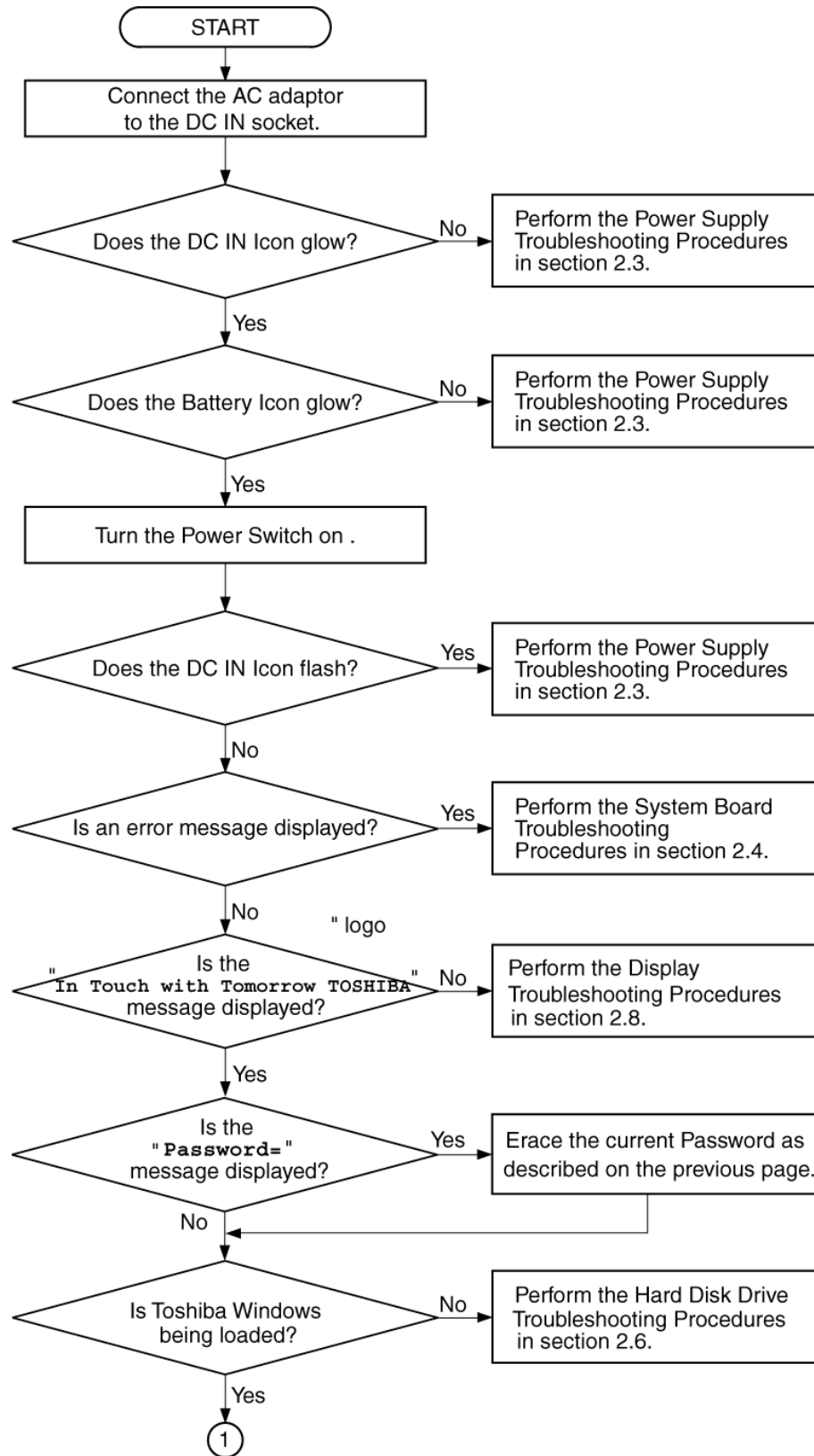


Figure 2-1 Troubleshooting flowchart (1/2)

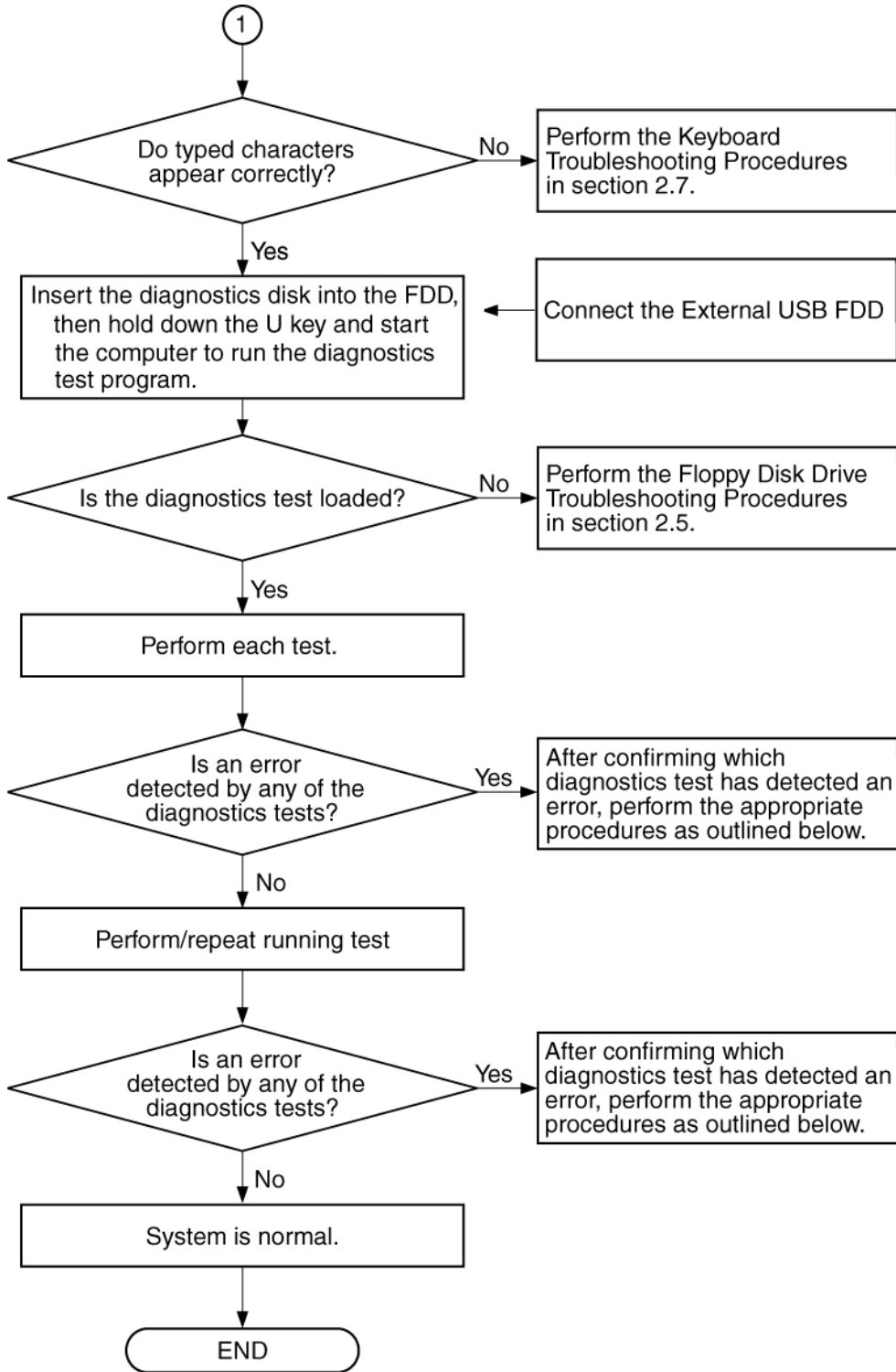


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the system test, memory test, real timer test, perform the System Board and Processor Module Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the DVD-ROM test, perform the DVD-ROM Drive Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-RW/DVD-ROM test, perform the CD-RW/DVD-ROM Drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the Bluetooth test, perform the Bluetooth Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.14.
12. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.15.

## 2.3 Power Supply Troubleshooting

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

- Procedure 1: Power LED Check
- Procedure 2: Error Code Check
- Procedure 3: Connection Check
- Procedure 4: Charge Check
- Procedure 5: Replacement Check

### Procedure 1 Power LED Check

The following Icons indicate the power supply status:

- Battery icon
- DC IN icon

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

*Table 2-1 Battery Icon*

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

\*1 Low Battery Hibernation will be executed soon.

\*2 Low Battery Hibernation has already been executed.

Table 2-2 DC IN LED

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

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

If the LED blinks, execute the followings:

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

If the LED still blinks, perform the followings:

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

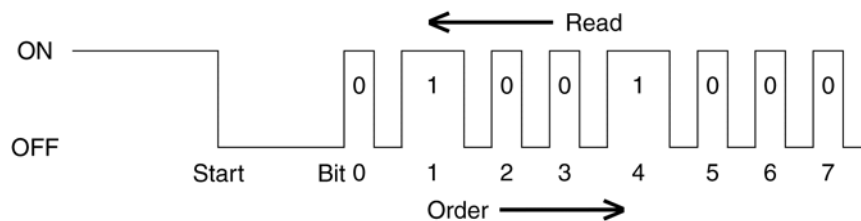
## Procedure 2 Error Code Check

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

- |   |                       |
|---|-----------------------|
| <input type="checkbox"/> Start              | Off for 2 seconds     |
| <input type="checkbox"/> Error code (8 bit) |                       |
| “1”   | On for one second     |
| “0”   | On for a half second  |
| Interval between data bits                  | Off for a half second |

The error code begins with the least significant digit.

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





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

The error code begins with the least significant digit.

Error code

Table 2-3 Error code

Error code	Where Error occurs	
1*h	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  Error code begins with : 0x40 Error code ends with : 0x4F
5*h	1R5-C1V output	
6*h	1R8-C1V output	
7*h	PPV output	
8*h	PTV 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-B2V output	

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

DC IN

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5 V.
11h	Advanced Port Replicator output voltage is over 16.5 V.
12h	Current from the DC power supply is over the limit (6.05 A).
13h	Current from the DC power supply is over the limit (0.5 A), when there is no load.
14h	Current sensing IC is not normal, when there is no load.

Main Battery

Error code	Meaning
21h	Main battery charge current is over 6.05 A.
22h	Main battery discharge current is over 0.5 A, when there is no load.
23h	Main battery charge current is over 3.10 A, when the AC adapter is not directly connected.
24h	Current sensing IC is not normal, when there is no load.
25h	Main battery charge current is over 0.3 A.

2nd Battery

Error code	Meaning
31h	2nd Battery charge current is over 6.05 A.
32h	2nd Battery discharge current is over 0.5 A, when there is no load.
33h	2nd Battery charge current is over 3.1 A, when the AC adapter is not directly connected.
34h	Current sensing IC is not normal, when there is no load.
35h	2nd Battery charge current is over 0.3 A.

S3V output

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

❑ 1R5-C1V output

Error code	Meaning
50h	1R5-C1V voltage is over 1.80 V, when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or under, when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or under, when the computer is booting up.
53h	1R5-C1V voltage is 1.275V or under, when the computer is suspended.

❑ 1R8-C1V output

Error code	Meaning
60h	1R8-C1V voltage is over 2.16 V, when the computer is powered on/off.
61h	1R8-C1V voltage is 1.53 V or under, when the computer is powered on.
62h	1R8-C1V voltage is 1.53 V or under, when the computer is booting up.
63h	1R8-C1V voltage is 1.53 V or under, when the computer is suspended.

❑ PPV output

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

❑ PTV output

Error code	Meaning
80h	PTV voltage is over 1.26 V, when the computer is powered on/off.
81h	PTV voltage is 0.89 V or under, when the computer is powered on.
82h	PTV voltage is 0.89 V or under, when the computer is booting up.
83h	PTV voltage is 0.89 V or over, when the computer is powered off.
84h	PTV voltage is 0.89 V or under, when the computer is suspended.

❑ E5V output

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

❑ E3V output

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

❑ 1R2-P1V output

Error code	Meaning
B0h	1R2-P1V voltage is over 1.44 V, when the computer is powered on/off.
B1h	1R2-P1V voltage is 1.02 V or under, when the computer is powered on.
B2h	1R2-P1V voltage is 1.02 V or under, when the computer is booting up.
B3h	1R2-P1V voltage is 1.02 V or over, when the computer is powered off.

❑ PTV output

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

1R25-P1V output

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

2R5-B2V output

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

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

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

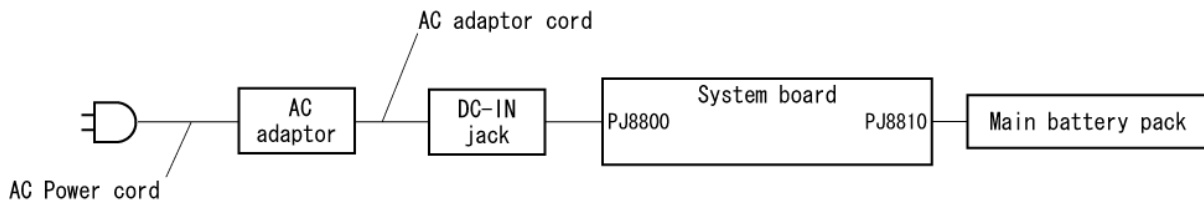
Check 3 In the case of error code 2Xh:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

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

### Procedure 3 Connection Check

The power supply wiring diagram is shown below:



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

- Check 1 Disconnect the AC power cord from the wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.
- Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the PJ8800 DC IN 15 V socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure the DC IN input port where an AC adaptor's DC output plug is connected is firmly secured to the system board.
- If the DC IN input port is loose, go to Procedure 5.
  - If it is not loose, go to Check 4.
- Check 4 Use a multimeter to make sure the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.
- Check 5 Connect a new AC adaptor or AC power cord.
- If the DC IN icon does not light, go to Procedure 5.
  - If the battery icon does not light, go to Check 6.
- Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

**Procedure 4 Charge Check**

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

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test, go to System test and execute subtest 06 (Quick charge) described in Chapter 3.
4. When charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

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

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

**Procedure 5 Replacement Check**

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

- Check 1 Replace the AC adaptor with a new one. If the AC adaptor still does not function properly, perform Check 2.
- Check 2 Replace the system board with a new one following the steps described in Chapter 4, *Replacement Procedures*.



## **2.4 System Board Troubleshooting**

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

Procedure 1: Message Check

Procedure 2: Printer Port LED Check

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

### Procedure 1 Message Check

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

- If an error message is shown on the display, perform Check 1.
- If nothing is displayed, go to Procedure 2.
- If an operating system is properly loaded, go to Procedure 3.

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

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

- (a) \*\*\* Bad time function \*\*\*  
Check system. Then press [F1] key
- (b) \*\*\* Bad check sum (ROM) \*\*\*  
Check system. Then press [F1] key
- (c) \*\*\*RTC battery is low or CMOS checksum is inconsistent\*\*\*  
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) displays, go to Procedure 5.

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

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

If error message (21) displays, go to the DVD-ROM Drive Troubleshooting Procedures in Section 2.9 or the CD-RW/DVD-ROM Drive Troubleshooting Procedures in Section 2.10

If error message (22) or (23) displays, 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**

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.

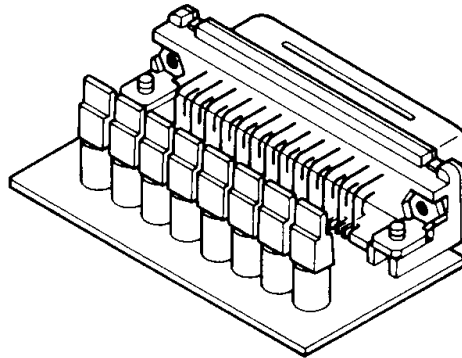


Figure 2-2 Printer port LED

Figure 2-3 shows the function of the printer port LED board.

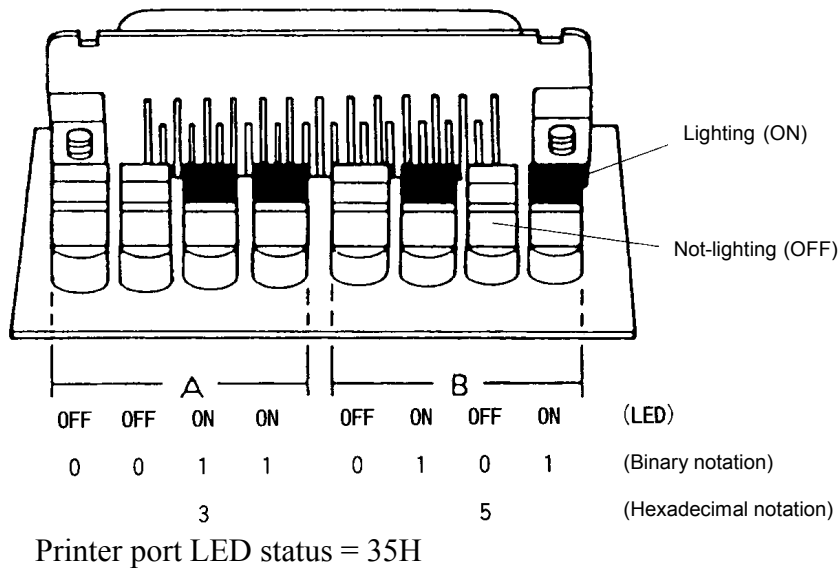


Figure 2-3 Printer port LED board

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.
2. Turn on the computer.
3. Read the LED status from left to right as you are facing the back of the computer.
4. Convert the status from binary to hexadecimal notation.
5. If the final LED status is FFh (normal status), go to Procedure 3.
6. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

**NOTE:** *If an error condition 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 13h and halts, it indicates that the system memory test has already completed and an error has been detected during the expansion memory test.*

Table 2-4 Printer port LED boot mode status (1/5)

LED Status	Test item	Message
FFh	Start	Register initialization for boot block
B0h	Flash ROM check	PIT ch.0 initialization
		BIOS rewrite flag initialization
		Transition to protected mode
		Boot block checksum
		Checksum check except boot block
B1h	EC/KBC rewrite check	KBC initialization
B2h	BIOS rewrite	BIOS rewrite request check
B5h	System BIOS rewrite transition to IRT	System BIOS rewrite transition to IRT
	BIOS rewrite process	BIOS rewrite register initialization
		PIT channel 1 initialization
		PIT, DMAC, PIC initialization
		Memory type check
		Cache bus, L2 initialization, configuration
		Enabling L1 cache
		Memory clear
Protecting flash ROM area cache		

B6h	BIOS signature check	BIOS signature check
-----	----------------------	----------------------

Table 2-4 Printer port LED boot mode status (2/5)

LED Status	Test item	Message
B7h	BIOS rewriting check	Key input check
		Check sum error check
		Signature error check
00h	IRT Check system	IRT Check system Protecting cache Special register, Intel chip set initialization PIT ch.1 initialization
01h	Memory check	DRAM type and size check
	SM-RAM stack area test	SM-RAM stack area test
02h	CMOS check and initialization	Enabling L1 cache
		CMOS access test
		CMOS battery level check
		CMOS checksum
		CMOS data initialization (1)
		Set IRT status
		DRAM size storing in CMOS
03h	Resume branch	Resume branch check
		SM-RAM checksum
		SMI control flag clear
		System BIOS RAM area checksum
		System BIOS ROM to RAM copy
04h	SMRAM initialization	SMRAM initialization
		Wake Up check
		SMRAM base rewrite and BIOS CPU state map store
		Set SMI handler to runtime
05h	Storage of CPU state map	Rewriting of SRAM base
		Storage of CPU state map
06h	Advance processing before initializing PCI bus	Setting of device necessary before initializing of PCI bus

Table 2-4 Printer port LED boot mode status (3/5)

LED Status	Test item	Message
07h		Read EC version
		CMOS default setup check
		ACPI table initialization
		KBC initialization
		PCI initialization
		PIC test
		Check if self test is required
		Password initialization
08h		Initializing LAN information
		Wake UP check
09h	CMOS data initialization	CMOS data initialization(2)
		PnP initialization
	SET UP	Set SETUP item
		Wait for VGA EC access process completion
		Power-off switch check
		EC wake up conditions clear
		Set processing speed
		Set panel power On / Off mode
		H/W configuration from PnP resource
0Ah	Initializing PnP devices	Automatic configuration of PnP devices
	Initializing PCI devices	PCI device open and vender ID rewrite
		PCI automatic configuration
0Bh	Error code generation	Setting the power switch to "Enable"
		Error code generation
0Ch	First 64KB memory check	First 64KB memory check
0Dh	Interrupting vector initialization	Interrupting vector initialization
0Eh	NDP initialization	NDP initialization
0Fh	System initialization	Store CMOS error information to SMRAM
		Timer initialization
		Read power supply system information
		EC initialization
		Get Battery information
		Get LCD EDID information
10h	Display initialization	VGA BIOS initialization



Table 2-4 Printer port LED boot mode status (4/5)

LED Status	Test item	Message
11h	Display logo	Display logo
12h	System memory check	Conventional memory check
	System memory initialization	Conventional memory initialization
13h	Extension memory check	Extension memory check
14h	DMA page check	DMA page check
17h	DMAC check	DMAC check
18h	DMAC initialization	DMAC initialization (Boot)
	DMAC initialization	DMAC initialization (Reboot)
19h	Printer check	Printer check
1Ah	SIO check	SIO check
		Wait for SIO initialization process completion
1Bh	Boot password	Password check
		Wait for KBC initialization process completion
	FDD initialization	Wait for FDD initialization process completion
	HDD initialization	Wait for HDD initialization process completion
		IRT key input check
		ATA priority initialization
		Password input
		Wait for KBC / Mouse initialization completion
1Ch	Extension I/O ROM check	Extension I/O ROM check

Table 2-4 Printer port LED boot mode status (5/5)

LED Status	Test item	Message
1Fh	Pre boot SETUP	Store 40: 00h value (for SIQ save / restore)
		Set font address for resume password
		Set USB/KB repeat parameter
		T shadow RAM size store
		Extended memory store in CMOS
		System source update
		DMI table update
		INT 15h E820h function memory map rewrite
		DMI wake up update and SM-BIOS structure table update
		ACPI table update
		MMI mask release
		Wait for PSC version writing on BIOS
		TIT checksum
		Runtime IRT flag clear
		Runtime checksum update
		Hibernation branch
		CPU, HDD upgrade check
		Set battery save mode
		Set date
		Close PCI device configuration area
Cache control		
Wait for serial port initialization completion		
Runtime checksum update		
Set thermal duty		
FFh	End	

**Procedure 3 Diagnostic Test Program Execution Check**

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

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

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

**Procedure 4 Replacement Check**

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

Check 1 Visually check for the following:

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

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

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

## 2.5 FDD Troubleshooting

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

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### Procedure 1 FDD Head Cleaning Check

FDD head cleaning operation details are given in Chapter 3, *Tests and Diagnostics*.

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

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

## Procedure 2 Diagnostic Test Program Execution Check

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

Floppy disk drive test error codes and their status names are listed in Table 2-3. 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 2-5 FDD error code and status

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

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

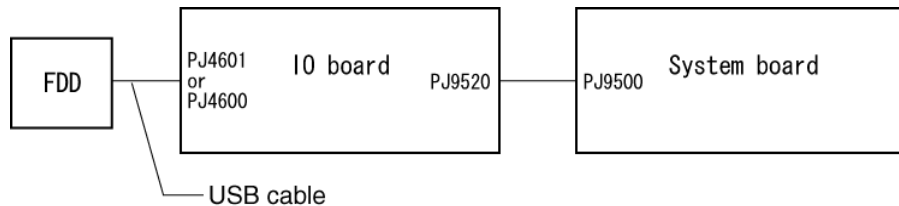
FDD-Write protected

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

**Procedure 3 Connector Check and Replacement Check**

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

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



Also, check the cables between connector board, I/O board and system board.

- Whether cables are disconnected
- Whether connectors are squarely connected
- Whether connectors are firmly connected
- Whether connectors are defective

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

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

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

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

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

## 2.6 HDD Troubleshooting

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

Procedure 1: Message Check

Procedure 2: Partition Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

### Procedure 1 Message Check

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

Check 1 If either of the following messages appear, go to Procedure 5. If other messages appear, perform Check 2.

HDC ERROR (After 5 seconds this message will disappear.)

or

IDE #0 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 See whether the Hard Disk option is set to "Not Used". If it is set to "Not Used", choose another setting and restart the computer. If the problem still exists, go to Procedure 2.



**Procedure 2 Partition Check**

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

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 3.
- Check 4 Remove the FD and restart the computer. If the problem still exists, go to Procedure 3.

**Procedure 3    Format Check**

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

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

Format complete

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

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

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

Format complete

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

#### Procedure 4 Diagnostic Test Program Execution Check

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

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

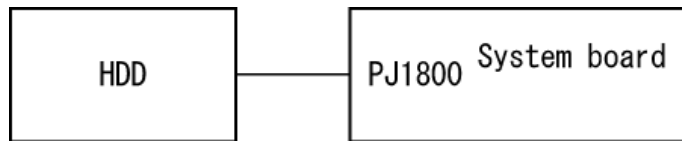
Table 2-6 Hard disk drive error code and status

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

**Procedure 5 Connector Check and Replacement Check**

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

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



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*.

## 2.7 Keyboard Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Replacement Check

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

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

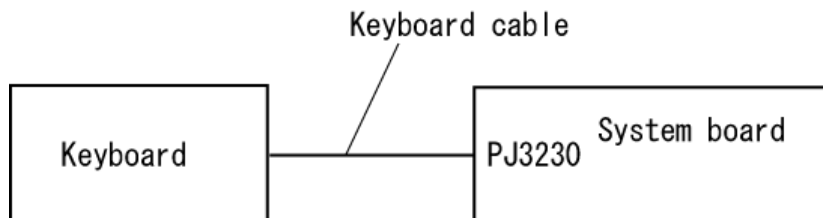
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

**Procedure 2 Connector and Replacement Check**

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

1. If the keyboard malfunctions, start with Check 1.
2. If the PAD switch malfunctions, start with Check 3.

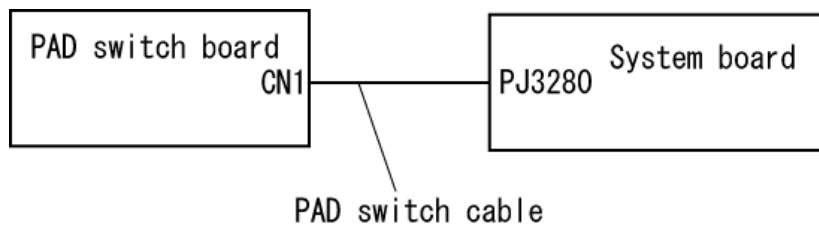
Check 1 Make sure the keyboard cable is securely connected to the system board.



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

Check 2 The keyboard or its cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.

Check 3 Make sure the PAD switch cable is firmly connected to the system board.



If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 4.

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

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

## 2.8 Display Troubleshooting

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

Procedure 1: External Monitor Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector and Cable Check

Procedure 4: Replacement Check

### Procedure 1 External Monitor Check

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

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

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

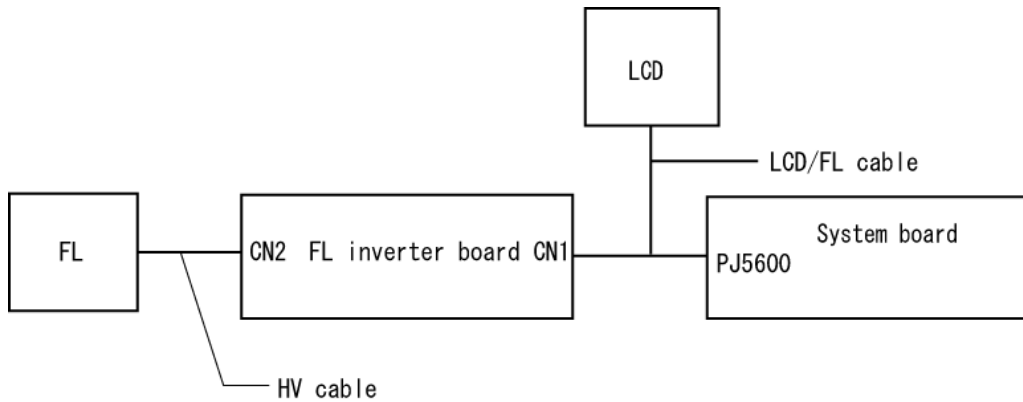
### Procedure 2 Diagnostic Test Program Execution Check

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

**Procedure 3 Connector and Cable Check**

The LCD Module is connected to the system board by an LCD/FL cable. The FL inverter board is also connected to the system board by an LCD/FL cable. 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 4.





**Procedure 4 Replacement Check**

The FL, FL inverter board, LCD module, and system board are connected to display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

If the FL does not light, perform Check 1.

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

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

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

- Check 1 Replace the FL with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check2.
- Check 2 The LCD/FL cable or HV cable may be defective or damaged. Replace the FL/LCD or HV cable with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check3.
- Check 3 The FL inverter board may be defective or damaged. Replace the FL inverter board with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check4.
- Check 4 The LCD module may be defective or damaged. Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedure* and test the display again. If the problem still exists, perform Check 5.
- Check 5 The system board may be defective or damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedure*.

## 2.9 DVD-ROM Drive Troubleshooting

This section describes how to if the DVD-ROM 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.

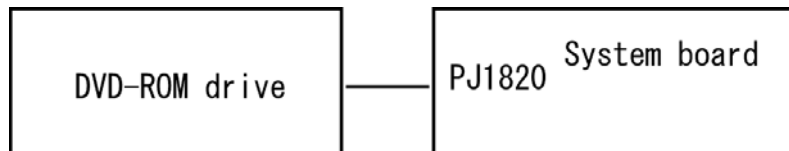
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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 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 DVD-ROM drive is firmly connected to the system board.



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

Check 2 The DVD-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 CD-RW/DVD-ROM Drive Troubleshooting

This section describes how to determine if the CD-RW/DVD-ROM 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).

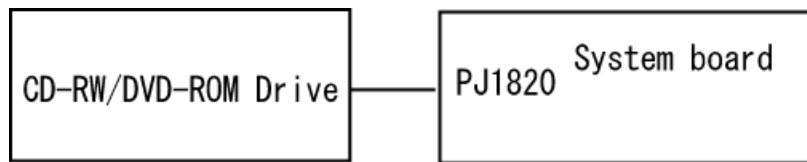
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

**Procedure 2 Connector Check and Replacement Check**

The CD-RW/DVD-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-RW/DVD-ROM Drive is firmly connected to the system board.



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

- Check 2 The CD-RW/DVD-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*.

## 2.11 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/LAN/Modem test program is stored in the Diagnostics Disk.

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

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

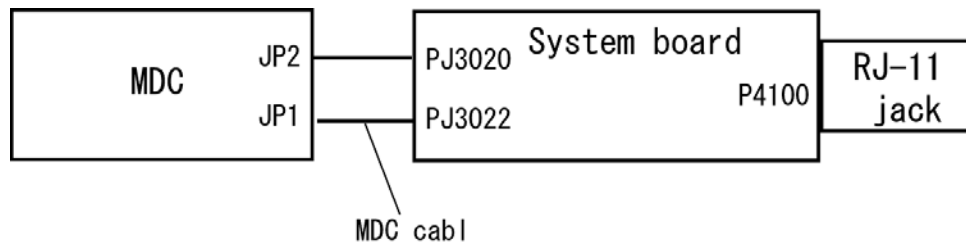
If any errors occur while executing the Sound/LAN/Modem test, go to Procedure 2.

## Procedure 2 Connector Check and Replacement Check

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

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

- Check 1 Make sure the MDC cable is firmly connected to PJ3022 on the System Board and make sure the MDC is firmly connected to PJ3020 on the System Board.



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

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

## 2.12 LAN Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

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

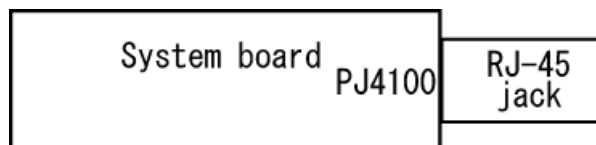
Then insert the Diagnostics Disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

### Procedure 2 Connector Check and Replacement Check

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

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





## 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 to check the BD\_ADDR of the Bluetooth. Perform the test following the instructions described in Chapter 3, *Bluetooth Test Program*.

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 PJ3110 on the System board. And perform the test program again.

If the computer still does not pass the test, go to check 3.

Check 2 Execute test program 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*.

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

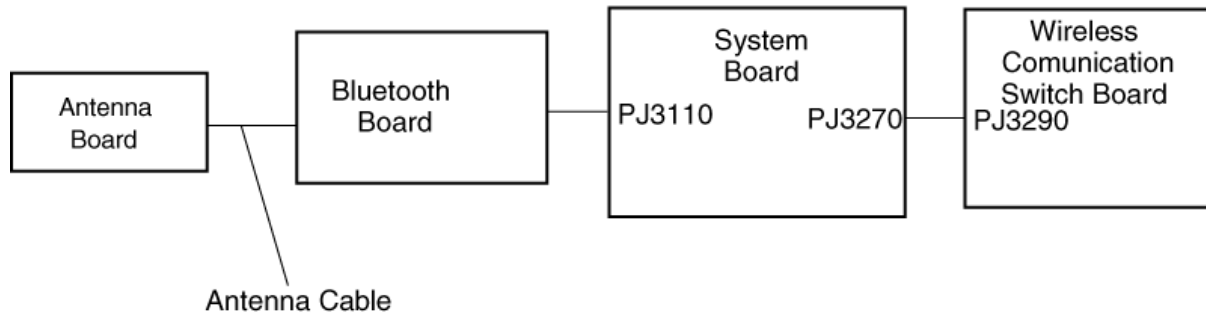
If the computer does not pass the test, go to check 3.

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 Bluetooth board is firmly connected to PJ3110 on the system board.
- If the connector is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth board is still not functioning properly, perform Check 2.
- Check 2** Make sure the Bluetooth antenna cable (brown) is firmly connected to the Bluetooth board.
- If the Bluetooth antenna cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function is still not functioning properly, perform Check 3.
- Check 3** Make sure the connector PJ3290 on the Wireless communication switch board is firmly connected to connector PJ3270 on the system board.
- In any connections are disconnected, connect them firmly and perform Procedure 1. If the Bluetooth 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 board.
  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  $5\Omega$ . If it is more than  $5\Omega$ , the Bluetooth antenna cable fails the test.

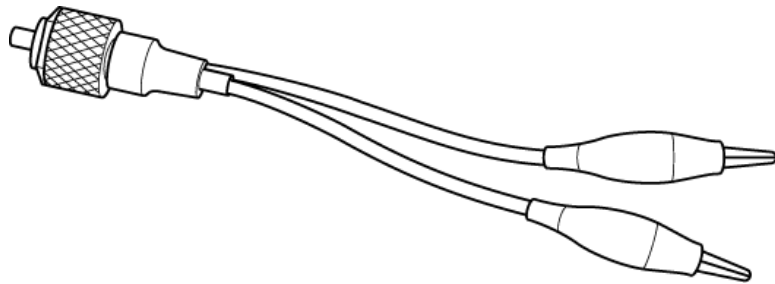


Figure 2-4 Antenna Test cable

- 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  $0.5-0.8\Omega$ .
  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 board 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 board may be defective or damaged. Replace the Bluetooth board 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 BT 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.

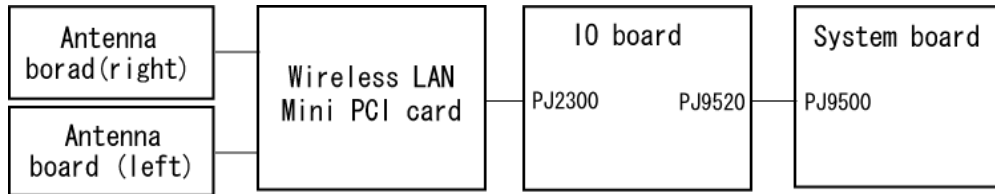
Check 1 Execute test program to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN. Perform the test following the instructions described in Section 3.24 to 26, *Wireless LAN Test Program*.

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 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 LAN board is firmly connected to PJ2300 on the I/O 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 2.
- Check 2** Make sure the wireless LAN antenna cables (black and white) are firmly connected to the Wireless LAN card.
- If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN function is still not functioning properly, perform Check 3.
- Check 3** Make sure the Wireless Communication Switch board is firmly connected to connector PJ3270 on the system board, PJ3290 on Wireless communication switch board. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling.
- In any connections are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN 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 white antenna cable. The other is connected to the opposite side of the antenna cable.
  5. Determine the resistance. The cable passes the test when the resistance is less than  $5\Omega$ . If it is more than  $5\Omega$ , the Bluetooth antenna cable fails the test.
  6. Change the antenna cable. Perform from step 3 to check the black antenna cable.

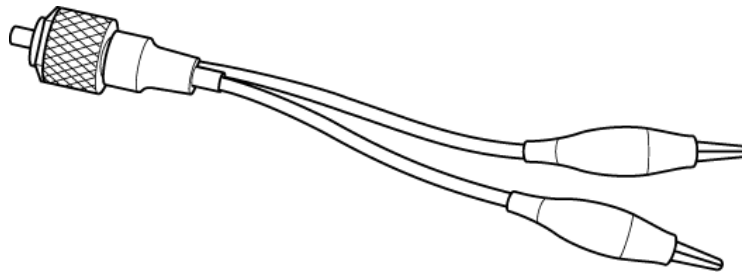


Figure 2-5 Antenna Test cable

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

- Check 1 Replace the wireless LAN board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check2.
- Check 2 The Wireless communication switch board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check3.
- Check 3 Replace the I/O board 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 system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.



## 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

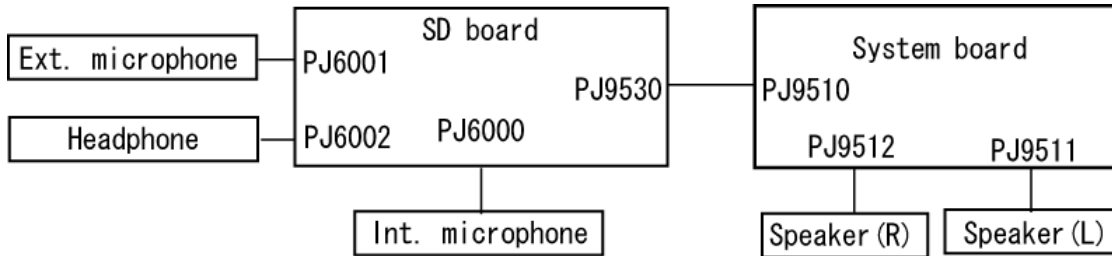
### **Procedure 1 Diagnostic Test Program Execution Check**

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

If an error is detected, go to Procedure 2.

## Procedure 2 Connector Check

The sound function wiring diagram is shown below:



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

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

If headphones do not work correctly, perform Check 2.

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

- Check 1 If the stereo speakers do not work properly, the speaker cables may be disconnected. Make sure the speaker cables are firmly connected to PJ9512, PJ9511 on the system board. If the stereo speakers are still not functioning properly, go to Procedure 3.
- Check 2 If headphones do not work properly, the SD board may be disconnected or damaged. Make sure connector PJ9530 on the SD board is firmly connected to PJ9510 on the system board. If the sound function still does not work properly, replace it with a new one. Go to Procedure 3.
- Check 3 If the sound recording function does not work properly, the Internal microphone cable or external Internal microphone cable may be disconnected. Make sure the microphone cable is firmly connected to PJ6000, PJ6001 on the SD board. If recording is still not functioning properly, go to Procedure 3.

**Procedure 3 Replacement Check**

- Check 1 If the stereo speakers do not sound properly, they may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, go to Check 5.
- Check 2 If headphones don't sound properly, the headphone jack may be defective or damaged. Replace the SD board with a new one. If the headphone still does not work properly, go to Check 5.
- Check 3 If the recording function does not work properly, the microphone cable may be defective or damaged. Replace it a new one. If the recording function still does not work properly, go to Check 4.
- Check 4 The SD board may be defective or damaged. Replace it with a new one. If there is still an error, go to Check 5.
- Check 5 The system board may be defective or damaged. Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

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## **Chapter 3**

# **Tests and Diagnostics**

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## Chapter 3 Contents

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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 .....	3-9
3.5	Memory Test .....	3-12
3.6	Keyboard Test .....	3-13
3.7	Display Test .....	3-16
3.8	Floppy Disk Test .....	3-19
3.9	Printer Test .....	3-21
3.10	Async Test .....	3-23
3.11	Hard Disk Test .....	3-25
3.12	Real Timer Test .....	3-28
3.13	NDP Test .....	3-30
3.14	Expansion Test .....	3-31
3.15	CD-ROM/DVD-ROM Test .....	3-32
3.16	Error Code and Error Status Names .....	3-33
3.17	Hard Disk Test Detail Status .....	3-36
3.18	Head Cleaning .....	3-38
	3.18.1 Function Description .....	3-38
	3.18.2 Operations .....	3-38
3.19	Log Utilities .....	3-39
	3.19.1 Function Description .....	3-39
	3.19.2 Operations .....	3-40
3.20	Running Test .....	3-41
	3.20.1 Function Description .....	3-41
	3.20.2 Operations .....	3-41
3.21	Floppy Disk Drive Utilities .....	3-43
	3.21.1 Function Description .....	3-43
	3.21.2 Operations .....	3-44
3.22	System Configuration .....	3-48

3.22.1	Function Description .....	3-48
3.22.2	Operations .....	3-49
3.23	SETUP .....	3-50
3.23.1	Function Description .....	3-50
3.23.2	Accessing the SETUP Program.....	3-52
3.24	Wireless LAN Test Program (Cisco).....	3-70
3.25	Wireless LAN Test Program (Atheros) .....	3-73
3.26	Wireless LAN Test Program (Calexico).....	3-76
3.27	Sound/LAN/Modem Test Program.....	3-77
3.28	Bluetooth Test Program .....	3-81
3.28.1	Ich_bt73.....	3-81
3.28.2	Ich_bt53.....	3-85
3.29	IEEE1394 Test Program .....	3-91

**Figures**

Figure 3-1	Initializing for Ich_bt73 .....	3-81
Figure 3-2	Test pass.....	3-82
Figure 3-3	Test fail .....	3-82
Figure 3-4	Initializing for Ich_bt53 .....	3-85
Figure 3-5	BD_ADDR of the DUT is displayed .....	3-86
Figure 3-6	Test completed.....	3-86
Figure 3-7	Test incomplete (failure).....	3-87

**Tables**

Table 3-1	Subtest names.....	3-7
Table 3-2	Error codes and error status names .....	3-33
Table 3-3	Hard disk controller status register contents.....	3-36
Table 3-4	Error register contents.....	3-37
Table 3-5	Error code (Ich_bt73).....	3-83
Table 3-6	Error code (Ich_bt53).....	3-88
Table 3-7	Common Error code .....	3-90





## 3.1 The Diagnostic Test

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

**NOTES:** To start the diagnostics, follow these steps:

1. Check all cables for loose connections.
2. Exit any application you may be using and close Windows.

The DIAGNOSTIC MENU consists of the following 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 twelve functional tests:

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

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)
- Port Replicator
- A printer wraparound connector for the printer wraparound test (Printer test)
- A CD test media (TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190) and music CD) (CD-ROM test)
- A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1)
- External CRT (Display test)
- PS/2 or compatible keyboard (Keyboard test)
- PS/2 or compatible mouse (Keyboard test)
- 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)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.18 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.  
(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 the **Esc** key. If a test program is in progress, press **Ctrl + Fn + Break** to exit the test program, or press **Ctrl + C** to stop the test program.

2. To execute the DIAGNOSTIC TEST MENU from the DIAGNOSTICS MENU, set the highlight bar to **1**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

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

```
DIAGNOSTIC TEST MENU :
```

```
1 - SYSTEM TEST
2 - MEMORY TEST
3 - KEYBOARD TEST
4 - DISPLAY TEST
5 - FLOPPY DISK TEST
6 - PRINTER TEST
7 - ASYNC TEST
8 - HARD DISK TEST
9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 -
13 - CD-ROM/DVD-ROM TEST
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 (0-255).

To return to the Diagnostics Menu, set the highlight bar to Function 99 and press **Enter**.

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

```
SYSTEM TEST      XXXXXXXX
```

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

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

SUB-TEST MENU :

```
01 - ROM checksum
02 -
03 -
04 - Fan ON/OFF
05 -
06 - Quick charge
07 - DMI read
08 - DMI write
09 -
10 - Temperature surveillance test
11 - BT/W-LAN switch test
12 - Battery F/W test
13 - Option battery F/W test
99 - Exit to DIAGNOSTIC TEST MENU
```

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

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

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

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

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

Selecting **NO** returns 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 3-2 in section 3.16 describes the error codes and error status for each error.

### 3.3 Subtest Names

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

*Table 3-1 Subtest names (1/2)*

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		04	Fan ON/OFF
		06	Quick charge
		07	DMI read
		08	DMI write
		10	Temperature surveillance test
		11	BT / W-LAN switch test
		12	Battery F / W test
		13	Option battery F / W test
2	MEMORY	01	Conventional memory
		02	Protected Mode
		04	Cache memory
		05	L2 cache memory
		06	Stress
3	KEYBOARD	02	Pressed key code display
		05	USB Port 0,1 test
		06	IPS Button test
		07	TOSHIBA CONSOLE button test
		08	Presentation button test
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
		08	CRT Shadow
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address



Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER	01	Ripple pattern
		02	Function
		03	Wrap around
7	ASYNC	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

### 3.4 System Test

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

#### Subtest 01 ROM Checksum

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

#### Subtest 04 Fan On/Off

This subtest checks fan operation using the on/off command.

The following message will appear. Make sure the rotation of the fan stops and press **Enter**.

```
*** Fan ON *** : Press [Enter] key?
```

The following message will appear. Make sure the rotation of the fan starts and press **Enter**.

```
*** Fan OFF *** : Press [Enter] key?
```

When you press **Enter**, the fan should stop.

#### Subtest 06 Quick Charge

This subtest checks the status for the quick charge.

#### Subtest 07 DMI read

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

```
Model Name       : XXXXXXXXXXXX
Version Number   : XXXXXXXXXXXX
Serial Number    : XXXXXXXX
Model Number     : XXXXXX-XXXXXX
PCN/BND Number  : XXXXXXXXXXXX/XXXXXXXXXX
UUID Number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXX
Press [Enter] to EXIT
```

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

## Subtest 08 DMI write

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

1. “Enter Model Name ?” is displayed.

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

2. “Enter Version Number ?” is displayed.

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

3. “Enter Serial Number ?” is displayed.

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

4. “Enter Model Number ?” is displayed.

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

5. “Enter Bundle Number ?” is displayed.

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

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

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

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

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

## Subtest 10 Temperature surveillance test

## Settings at the start of test

- BIOS test mode (FAN-forced high speed, prohibition of SM interruption etc.)
- Prohibition of TCC throttling ( $T_j = 100C$ )
- Turns off the LCD panel and FL inverter.
- Set the charge prohibition mode

## Details of during the test

- For the first One minute, CPU throttling is maximum. (87.5% throttle)
- For fourteen minutes after that, CPU throttling is prohibited. (0% throttle)

## Method and time of Test

Total for 15 minutes

The test result (OK or NG) is judged from the gap between the temperature of the outside and temperature of the inside. The parameter of the temperature is different in each system, so use data informed by the system department.

## Subtest 11 BT/W-LAN Switch test

This subtest checks Bluetooth switch On/Off. The following messages appear.

Blue-tooth Switch "ON", and press [Enter] key

Blue-tooth Switch "OFF", and press [Enter] key

## Subtest 12 Battery F/W test

This subtest reads F/W data from the battery and compares it with correct constant data. The following message appears.

\* Get! Battery Data \*

Battery Type = XXXXXXXXXXXXX

## Subtest 13 Option Battery F/W test

This subtest reads F/W data from the option battery and compares it with correct constant data. The following message appears.

\* Get! Battery Data \*

Battery Type = XXXXXXXXXXXXX

## 3.5 Memory Test

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

Subtest 01      Conventional memory

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

Subtest 02      Protected Mode

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

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

Subtest 04      Cache Memory

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

Number of misses < Number of hits → OK  
Number of misses ≥ Number of hits → Fail

Subtest 05      L2 Cache Memory

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

Subtest 06      Stress

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

## 3.6 Keyboard Test

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

### Subtest 02 Pressed key code display

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

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

PRESS [Enter] KEY
```

### Subtest 05 USB port 0, 1 test

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

If the test is completed 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.

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

Connect the USB mouse to the USB connector of the computer.

Next, set the computer's hardware Setup as follows: (Refer to 3.23 SETUP)

```
PERIPHERAL
  Pointing Devices = 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 (connected to PJ3280) at the same time. (You cannot use the USB mouse to stop the test.)



**Subtest 07**    TOSHIBA CONSOLE button test

This subtest checks the functions of the TOSHIBA CONSOLE button.

A direction that indicates to press the button will be displayed. Follow the direction to start the test. When a wrong button is pressed, wrong data is displayed until the correct button is pressed.

**Subtest 08**    Presentation button test

This subtest checks the functions of the Presentation button.

A direction that indicates to press the button will be displayed. Follow the direction to start the test. When a wrong button is pressed, wrong data is displayed until the correct button is pressed.

**Subtest 10**    Dock USB Port 0,1 test

This subtest checks the USB (same as the USB port 0, 1 test) via Dock.



### 3.7 Display Test

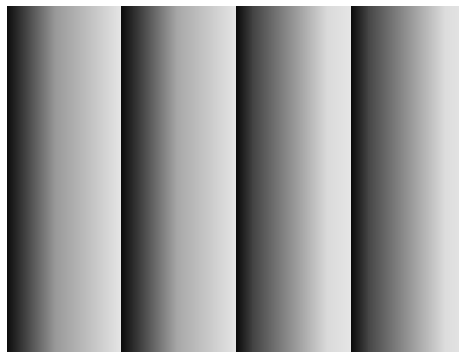
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

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

Subtest 02 Gradation for VGA

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



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

Subtest 03 Gradation for LCD

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

**Subtest 04 Gradation & Mode test for VGA**

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

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

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



(Display example: Mode 12)

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

**Subtest 05 All dot on/off for LCD**

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



## 3.8 Floppy Disk Test

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

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

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

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

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

```
FLOPPY DISK          XXXXXXXX
```

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

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

```
SUB-TEST MENU :
```

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

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

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

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

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

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

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

**Subtest 01** Sequential read

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

**Subtest 02** Sequential read/write

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

**Subtest 03** Random address/data

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

**Subtest 04** Write specified address

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

**Subtest 05** Read specified address

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

### 3.9 Printer Test

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

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

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

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

Select the channel number (1-3) ?

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

#### Subtest 01     Ripple Pattern

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

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

## Subtest 02      Function

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

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

This subtest prints the various print types shown below:

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

## Subtest 03      Wraparound

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

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

### 3.10 Async Test

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

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

Subtests 01 through 07 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 subtests 01, 02, and 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, connecting a RS-232C wraparound connector is necessary. The connector wiring diagram is described in Appendix F.

This subtest checks the data send/receive function through the wraparound connector (34M741621G01).



**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 IRQ (Interrupt Request) level 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.

**CAUTION:** *The contents of the hard disk will be erased when subtest 02, 03, 04, 05, 06, 08, 09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.*

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

*Refer to the operating system instructions.*

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

```
Test drive number select      (1:HDD#1, 2:HDD#2, 0:HDD#1&2)
Data compare error dump      (1:no, 2:yes)?
Detail status display         (1:no, 2:yes)?
```

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

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

```
Data compare error dump : no / yes
```

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

```
Detail status display : yes / no
```

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

```
HARD DISK TEST XXXXXXXX
```

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

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

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

The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in table 3-2 of the section 3.16.

#### Subtest 01 Sequential read

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

#### Subtest 02 Address uniqueness

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

1. Forward sequential
2. Reverse sequential
3. Random

#### Subtest 03 Random Address/Data

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

**Subtest 04** Cross talk & peak shift

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

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

**Subtest 06** Write specified address

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

**Subtest 07** Read specified address

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

**Subtest 09** Sequential write

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

**Subtest 10** W-R-C specified address

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

## 3.12 Real Timer Test

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

### Subtest 01 Real Time

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

1. Select subtest 01 and the following 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.

Pressing **Enter** toggles between the time and the date. To exit, press **Ctrl + Fn + Break**.

### Subtest 02 Backup Memory

This subtest checks the following backup memories:

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

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

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

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

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

## Subtest 03 Real Time Carry

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

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

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

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

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

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

Press **Ctrl + Fn + Break** to exit.

### 3.13 NDP Test

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

Subtest 01    NDP

This test checks the following functions of NDP:

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

Press **Ctrl + Fn + 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.

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

#### Subtest 01 PCMCIA Wraparound

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

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

This subtest is executed in the following order:

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

**NOTE:** Select the subtest number 01, The following message will appear:  
Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

#### Subtest 03 RGB monitor ID

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



### 3.15 CD-ROM/DVD-ROM Test

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

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

Subtest 01 Sequential read

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

Subtest 02 Read specified address

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

Subtest 03 Random address/data

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

Subtest 04 Playback Music (CD only)

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

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

Subtest 07 RW 1Point W/R/C

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

### 3.16 Error Code and Error Status Names

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

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

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

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

Device name	Error code	Error status name
ASYNC	01	DSR On Time Out
	02	CTS On Time Out
	04	RX-READY Time Out
	08	TX-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	
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 3-2 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
	CB	ZV Port Error
	CD	No PCMCIA
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	

### 3.17 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

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

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

Table 3-4 Error register contents

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

## 3.18 Head Cleaning

### 3.18.1 Function Description

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

### 3.18.2 Operations

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

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

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

## 3.19 Log Utilities

### 3.19.1 Function Description

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

The error information is displayed in the following order:

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

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





## 3.20 Running Test

### 3.20.1 Function Description

This function automatically executes the following tests in sequence:

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

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

### 3.20.2 Operations

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

1. Remove the diagnostics disk from the floppy disk drive and insert the formatted work disk.
2. Select **6** from the Diagnostic Menu and press **Enter**, the following message displays:

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

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

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

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

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

4. Select **Y** or **N** and press **Enter**.
5. This program is executed continuously. To terminate the program, press **Ctrl + Fn + Break**.

## 3.21 Floppy Disk Drive Utilities

### 3.21.1 Function Description

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

#### 1. FORMAT

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

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

- (a) 2D: Double-sided, double-density, 48/67.5 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (b) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (c) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

#### 2. COPY

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

#### 3. DUMP

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

#### 4. HDD ID READ

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

### 3.21.2 Operations

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

```
[ FDD UTILITIES ]

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

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

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

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

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

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

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

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

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

Format start

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

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

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

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

### 3. COPY program

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

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

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

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

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

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

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

- (d) The following message will appear.

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

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

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

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

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

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

## 4. DUMP program

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

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

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

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

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

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

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

```
2HD media mode (1:1.20MB, 2:1.44MB, 3:1.23MB)?
Select drive number (1:C, 2:D)?
```

- (e) The following message will appear:

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

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

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

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

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

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

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

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

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

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

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

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

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

## 5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #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.                  = YYY...
Reserved (h)              = XXXX
Double Word Capability     = XXXX XXXX
```

Press [Enter] key

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



## 3.22 System Configuration

### 3.22.1 Function Description

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

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

### 3.22.2 Operations

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

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

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

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

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

## 3.23 SETUP

### 3.23.1 Function Description

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

1. Memory
2. System Date/Time
3. Battery
4. Password
5. HDD Password
  - (a) HDD
  - (b) HDD Password Mode
  - (c) User Password
  - (d) Master Password
6. Boot Priority
  - (a) Boot Priority
  - (b) HDD Priority
  - (c) Network Boot Protocol
7. Display
  - (a) Power On Display
  - (b) LCD Display Stretch
8. Others
  - (a) Power-up Mode
  - (b) CPU Cache
  - (c) Level 2 Cache
  - (d) Dynamic CPU Frequency Mode
  - (e) Auto Power On
  - (f) Panel Power On/Off
9. Configuration
10. I/O Ports
  - (a) Serial
  - (b) Parallel
11. Drives I/O
  - (a) Built-in HDD
  - (b) Select Bay
12. PCI Bus
13. PC Card

## 14. Peripheral

- (a) Pointing Device
- (b) Ext Keyboard "Fn" key
- (c) Parallel Port Mode
- (d) Hard Disk Mode

## 15. USB Legacy Emulation

- (a) USB Keyboard/Mouse Legacy Emulation
- (b) USB-FDD Legacy Emulation

## 16. PCI LAN

### 3.23.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the SETUP screen. The SETUP screen is divided into two pages.

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

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

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

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

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

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

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

### 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** or **BkSp** to change the value.

### Accepting Changes and Exiting the SETUP Window

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

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

Are you sure? (Y/N)

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

Are you sure? (Y/N)  
The change 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*

## 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

This option is used to set the date and the time of the computer.

**System Date**                Sets the date.

**System Time**              Sets the time.

### 3. Battery

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

**Full Power**                The following shows full power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= High
CPU Sleep Mode	= Enabled
Display Auto off	= 30Min.
HDD Auto off	= 30Min.
LCD Brightness	= Bright (*1) Super-Bright (*2)
Cooling Method	= Maximum Performance

**Low Power**                The following shows low power settings.

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

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

(\*1) Operating the battery

(\*2) Using the AC adapter

**User Setting** Use this option to set the battery save parameters on the sub-window, **BATTERY SAVE OPTIONS**. For details, see *Battery Save Options* below.

(a) Battery Save Options

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.

**Low** CPU operates at low speed.

CPU Sleep Mode

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

**Enabled** Enables sleep mode.

**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.

**Performance** Uses a combination of fan and lowering the CPU processing speed.

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

#### 4. Password

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

**Registered**                      The user password has been registered.

**Not registered**                The user password has not been registered.

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

#### 5. HDD Password

This option registers, resets or change the HDD password.

Registering the HDD Password

1. Move the highlight bar to the "Not Registered" of the "User Password" and press **space bar** or **BkSp**.
2. Enter a new password within 50 characters and press **Enter**.
3. Enter the same password to confirm and press **Enter**.

A new password is registered. If the password entered first time is different from one entered the second time, an error message is displayed. Retry procedure 2 above.

Deleting the HDD Password

1. Move the highlight bar to the "Registered" of the "User Password" and press **space bar** or **BkSp**.
2. Enter the registered password and press **Enter**.  
"User Password" is displayed instead of the "New User Password".
3. Press **Enter**.

"New User Password" is displayed instead of the "Verify User Password".

4. Press **Enter**.

The password is deleted. If the password entered in procedure 2 above is different from the registered password, error message is displayed with beep sound. Retry procedure 2 above.

**NOTE:** When "Master+User" is selected in "HDD Password Mode", deleting the Master HDD password deletes User HDD password at the same time. User HDD Password can not be deleted alone.

### Changing HDD Password

1. Move the highlight bar to the “Registered” of the “User Password” and press **space bar** or **BkSp**.
2. Enter the registered password and press **Enter**.  
“User Password” is displayed instead of the “New User Password”.  
If the entered password is different from the registered password, an error message is displayed. Retry this procedure.
3. Enter a new password and press **Enter**.  
“New User Password” is displayed instead of the “Verify User Password”.
4. Enter the password entered in the procedure 3 above again and press **Enter**.  
The password is changed. If the password entered in the procedure 3 above is different from the password entered in the procedure 4, error message is displayed. Retry procedure 3 above.

**NOTE:** When “Master+User” is selected in “HDD Password Mode”, enter Master HDD password in procedure 2. Master HDD password can be entered instead of User HDD password. In this case, User HDD password can be changed by using Master HDD password.

### Entering the HDD Password

When the HDD password is set, the following message is displayed at the time the PC is turned on.

HDD Password =

1. Enter the registered password and press **Enter**.

**NOTE:** Set the Arrow Mode and Numeric Mode to the condition when the password was registered. Check it by the Arrow Mode LED and Numeric Mode LED.  
If the wrong HDD password is entered three consecutive times, the computer will boot from drives other than HDD. When a drive other than HDD is not set, the computer will turn off automatically. Turn on the computer again.

**CAUTION:** HDD password can not be released by maintenance service. If you forget the HDD password, HDD must be changed to solve this problem. Changing a HDD is charged.

## (a) HDD

Selects hard disk for setting the password.

**Built-in HDD**            The password is set to Built-in HDD.

**Second HDD**            The password is set to Second HDD.

## (b) HDD Password Mode

Select the HDD password to be registered. This can be selected only when the user HDD password or master password is not registered. When the user HDD password or master password is registered, once delete it and select the mode.

**User Only**                Sets the User HDD Password only. (Default)

**Master+User**            Sets the Master HDD Password and User HDD Password.

## (c) User Password

Sets the User HDD Password.

## (d) Master Password

Sets the Master Password.

## 6. Boot Priority

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

### (a) Boot Priority Options

- 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.

When booting the computer, the order shown above can be changed temporarily by pressing the key shown below:

- [N]** Looks for the LAN (Network) first.
- [U]** Looks for the USB FDD first.
- [C]** Looks for CD-ROM Drive first.
- [P]** Looks for the PC card HDD first.
- [1]** Looks for the computer's built-in HDD first.
- [2]** Looks for the Slim Select Bay's secondary HDD first.

This method does not affect the setting.

## (b) HDD Priority

Use this option to set the priority for booting of the computer when a device connected via PC card.

**Built-in HDD→Second HDD→PC card:**

When HDD occurs in the boot priority in the following order: built-in HDD, optional secondary HDD and PC card. (Default)

**Second HDD→Built-in HDD→PC card:**

When HDD occurs in the boot priority in the following order: optional secondary HDD, built-in HDD and PC card.

**Built-in HDD→PC card→Second HDD:**

When HDD occurs in the boot priority in the following order: built-in HDD, PC card and optional secondary HDD.

**Second HDD→PC card→Built-in HDD:**

When HDD occurs in the boot priority in the following order: optional secondary HDD, PC card and built-in HDD.

**PC card→Built-in→HDD Second HDD:**

When HDD occurs in the boot priority in the following order: PC card, built-in HDD and optional secondary HDD.

**PC card→Second HDD→Built-in HDD:**

When HDD occurs in the boot priority in the following order: PC card, optional secondary HDD and built-in HDD.

## (c) Network Boot Protocol

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

**PXE**                      Sets to PXE protocol. (Default)

**RPL**                      Sets to RPL protocol.

## 7. Display

This group of options configures the computer's display.

### (a) Power On Display

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

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

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

### (b) LCD Display Stretch

LCD Display Stretch enables or disables a larger display area of the screen.

**Enabled** Enables the LCD display stretch feature. (Default)

**Disabled** Disables the LCD display stretch feature.

## 8. Others

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

### (a) Power-up Modes

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.

### (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 from the following settings:

**Dynamically Switchable**

Enables Mobile Pentium® III processor featuring Intel® SpeedStep™ technology. (Default)

**Always High**

Disables Mobile Pentium® III processor featuring Intel® SpeedStep™ technology and always runs the processor at its maximum speed.

**Always Low**

Disables Mobile Pentium® III processor featuring Intel® SpeedStep™ technology and always runs the processor at its default speed.

## (e) Auto Power On

This option displays the condition of setting auto power on function. The auto power on function is available only once. After booting, the setting is released.

When Windows XP is used, the “Auto Power On” is disabled. Use task scheduler of Windows.

**Disabled**

Both the auto power on and Wake-up on LAN functions are not set.

**Enabled**

Both the auto power on and Wake-up on LAN function are set.

When “Enabled” is set, the following sub-window appears.

Auto power on and Wake-up on LAN is set in the options sub-window. To set alarm time, use **Space** and **BackSpace**. To switch between time and minute, month and date, use **↑** and **↓**.

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

Alarm Time

Alarm Time sets a time for automatic power on.

**Disabled**

Does not set a time.



Alarm Date Option

The Alarm Date Option sets a month and date to power on automatically. When Alarm Time is set to “Disabled”, The alarm date is not set.

**Disabled** Does not set the alarm date.

Wake-up on LAN

Calling from the administrator of LAN automatically turns on the computer. When the Built-in LAN is “Enabled”, this option can be set. An AC adapter is required for this option.

**Enabled** Uses Wake-up on LAN function.

**Disabled** Does not use Wake-up on LAN function. (Default)

## (f) Panel Power On/Off

This option is displayed only in the resume mode.

**Enabled** Enables the Panel Power On/Off.

**Disabled** Disables the Panel Power On/Off. (Default)

## 9. Configuration

This field displays the configuration method.

The devices are initialized when the PNP OS loads.

**Setup by OS** Initializes devices, which is needed to load an operating system. Operating system initializes other devices. When this option is selected, the setting in the “PC Card” becomes “Auto-Selected” and it can not be changed. (Default)

**All Devices** All devices will be initialized.

**NOTE:** When the installed OS is used, selecting “Set by OS” is recommended. But, when setting “PC CARD-Controller Mode” to other than “Auto-Selected”, select “All Devices”.

## 10. I/O ports

This option controls settings for the serial and parallel ports and the sound system.

**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** 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 port	

When you select one of the above options, except for **Not Used**, a sub-window 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

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

## 11. Drives I/O

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

<b>Built-in HDD</b>	This cannot be changed.
<b>Select Bay</b>	This cannot be changed.

## 12. PCI Bus

This item displays the interrupt level for the Card Bus in the computer and the PCI bus in the Desk Station. It is for information only and cannot be changed.

<b>PCI Bus</b>	This cannot be changed.
----------------	-------------------------

## 13. PC Card

This option lets you set the PC Card Controller mode.

When the “All Device” is selected in the “Device Config.” of the “9.Configuration”, this option can be changed.

<b>Auto-Selected</b>	If you are using an operating system which support Plug&Play, use this setting for all PC card. (Default)
<b>Card Bus/16 bit</b>	If the card does not work properly with the Auto-Selected setting, use this setting.
<b>PCIC Compatible</b>	If the card does not work properly with the Auto-Selected and CardBus/16 bit setting, use this setting.

## 14. Peripheral

Use this option to select the peripheral's mode.

## (a) Pointing Devices

This option enables or disables the Pointing Device.

<b>Enabled</b>	Enables the Pointing Device. (Default)
<b>Disabled</b>	Disables the Pointing Device.

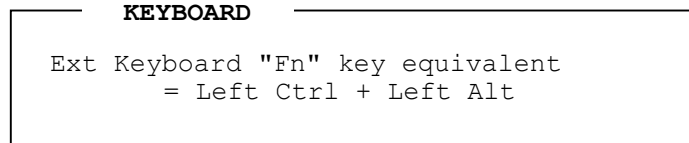
## (b) Ext Keyboard "Fn"

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

**Enabled** Enables the feature.

**Disabled** Disables the feature. (Default)

Selecting this option displays the following sub-window.



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**

## (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. Use this setting normally.  
(Default)

**Standard IDE**

Select this mode when using an operating system that does not support the Enhanced IDE. When this mode is selected, up to 528MB is logically available and the rest of the capacity is not usable.

**NOTE:** *If you change this setting, you will have to reformat the partition of the hard disk for the appropriate setting.*

## 15. Legacy Emulation.

## (a) USB keyboard/Mouse Legacy Emulation.

Use this option to enable or disable USB keyboard/mouse Legacy Emulation.

**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.

## 16. PCI LAN

This option sets the enable/disable of the built-in LAN functions.

**Enabled**            Enable Built-in LAN functions. (Default)

**Disabled**          Disable Built-in LAN functions.

### 3.24 Wireless LAN Test Program (Cisco)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program (Cisco)

**NOTE:** Use another computer that can communicate by the wireless LAN as a reference machine to perform this test. AP is also necessary.

Follow the steps below to perform the test program (Cisco). Refer to Section 2.14, *Wireless LAN Troubleshooting*, for a detailed description of the troubleshooting procedures for the wireless LAN.

1. Preparing the target machine for Ping Pong Responder

- (a) Insert a floppy disk containing the test program into the target machine and turn on the target machine.

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

- (b) Prompts are displayed as shown in below:

```
#####
#####          Cisco wireless LAN sub system test program V0.50          #####
#####
*                                                                    *
*                                                                    *
*   1 ..... MAC Address test [Mini-PCI Wireless LAN]                    *
*                                                                    *
*   0 ..... Transmit & Receive test                                       *
*                                                                    *
*****
.... Press test number[1,0] ?
```

**Mac Address test [Mini-PCI Wireless LAN**

This checks the Mac address.

If any of following improper address is detected, “NG” is displayed.

```

Multicast address   b0=1
Local address      b1=0
Broadcast address   FF: FF: FF: FF: FF: FF

```

When this test is selected, the following menu is displayed

```

+-----+
===== MAC ADDRESS READ TEST =====
+-----+
RADINFO Radio Information - Rev. 1.58
I/O Base Address: 0xE800
Product Code: VENUS
Hardware Version: Rev. B0
Processor Version: A504
Bootblock Revision: Rev. 1.59
Firmware Revision: Rev. 5.00.03
MAC Address: 00 D0 59 C9 A0 24
Serial Number: amt06380007

```

This test is automatically executed and “OK” or NG” is displayed..

**Transmit & Receive test**

This checks the main antenna or auxiliary antenna.

The test is executed in the order of main antenna and auxiliary antenna.

The following menu is displayed.

```

*****
*                                     *
*          MAIN ANTENNA TEST          *
*                                     *
*****
*Echo Packet Transmit/receive Test Rev.1002**

PCI A504 Device Detected
Radio Reset in progress..
Booting Firmware..
Debixe FW Rev 5.00.03 , HW Rev0.23, Boot Blocd Rev 1.59

Waiting for Radio to Associate      .....

```

When it is NG, the following message is displayed.



```
!Error -Radio could not achieve required state ->
Associaon Status =No Receive

*****
*
*   MAIN ANTENNA ERROL           *
*
*                               *
*****
*                               *
*   MAIN ANTENNA TEST           *
*
*                               *
*****
```

The end code is:

- 0: End of test
- 1: Transmission error
- 2: Reception error
- 3: Other errors

### 3.25 Wireless LAN Test Program (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.

### 3.26 Wireless LAN Test Program (Calexico)

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

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

In this test, the following items are tested.

- (1) Communication test (Main antenna, Aux antenna)
- (2) MAC address Check

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

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

#### Setting the responder machine

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

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

#### Setting the target machine

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

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

Press any key to exit the test.

When an error is detected during the test, "NG !" 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 !!
*
*****
```

## 3.27 Sound/LAN/Modem Test Program

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

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

```
#####
#####          XXXXXX DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST) #####
#####
*
* 1 ..... ( Microphoned recording & play ) *
*
* 2 ..... ( Sign wave ) *
*
* 3 ..... ( LAN ) *
*
* 4 ..... ( Modem ) *
*****
.... Press test number[1-4] ?
```

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

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

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

**Subtest 01    Microphoned recording & play**

[Recording & play test !]

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

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

When the subtest is selected, the following message appears.

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

Press any key, and the following message appear.

```
Record from source name is MIC  
Requested Sampling Rate is 22025 Hz  
Volume requested is 0,000dB  
Record to buffer is BUFFER0  
Record Time requested is 5.000 seconds  
Actual record time will be 5.000
```

When the above message is displayed, the screen is fixed for a while. Then record the sound with the microphone.

When the following message appears, make sure the recorded sound is replayed.

```
Play to destination is LINEOUT  
Volume requested is 0,000dB  
Play from buffer name is BUFFER0  
Requested play time is 5.000 seconds  
Actual play time will be 5.000
```

```
Completing SoundMAX/ICH play buffer0 to line out  
End time   XXX XXX XX  XX:XX:XX XXXX  
System Status 0X0
```

```
Test completed at XXX XXX XX XX:XX:XX  XXXX  
System completion code was 0X0
```

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

## Subtest 02 Sign Wave

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

When the subtest is executed, the following message appears.

```
[Sign wave test !]
```

Sign wave is expanded from 16KB to 64KB data and is played.

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

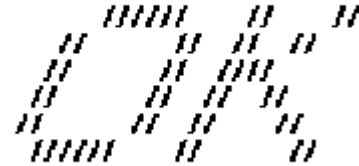
## Subtest 03 LAN

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

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

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

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



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

Check that the message “OK” appears.



**Subtest 04 Modem**

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

Select **4** to execute and press **Enter**. The following message will appear:

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize      :OK
* Digital Loopback Test        :OK
* Modem Sound Test             : (Operator's Check!!)
```

After a few seconds, the following message will appear:

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

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

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

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

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

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

## 3.28 Bluetooth Test Program

### 3.28.1 Ich\_bt73

Follow the steps below to perform the test program, **Ich\_bt73**. This Program checks the **BD\_ADDR** function. Refer to Section 2.13, *Bluetooth Troubleshooting*, for a detailed description of the troubleshooting procedures for the *Bluetooth*.

1. Preparing the target machine for **Ich\_bt73**
  - (a) Insert a floppy disk containing the test program into the target machine and turn on the target machine.
  - (b) Prompts are displayed as shown in figure 3-1, if it is the first time the program has run.

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

*Figure 3-1 Initializing for Ich\_bt73*

- (c) When the machine has passed the test, it displays **BD\_ADDR**. If **BD\_ADDR** is normal, the following message is shown.

```

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

My BD_ADDR = 00037A003196 [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

```

*Figure 3-2 Test pass*

- (d) If the target machine has any problem, it displays **Error CODE**. The following message is shown.

```

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

My BD_ADDR = 00037A003196 [h]

FFFFFF  A    III  L
F      A A    I  L
F      A  A    I  L
FFFFFF  A    A    I  L
F      AAAAAAA  I  L
F      A    A    I  L
F      A    A    III  LLLLLL

```

*Figure 3-3 Test fail*

**Error code**

If the machine detects a malfunction, it indicates the error code as shown below.  
The error code begins with the least significant digit.

*Table 3-5 Error code (Ich\_bt73) (1/2)*

<b>Error code</b>	<b>Meaning</b>
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 3-5 Error code (Ich\_bt73) (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.

### 3.28.2 Ich\_bt 53

Follow the steps below to perform the test program, **Ich\_bt 53**. This Program checks the function. Refer to Section 2.13, *Bluetooth Troubleshooting*, for a detailed description of the troubleshooting procedures for the *Bluetooth*.

1. Preparing the target machine for **Ich\_bt 53**.
  - (b) Insert a floppy disk containing the test program into the target machine and turn the target machine.
  - (c) Prompts are displayed as shown in figure 3-4, if it is the first time the program has run.

The Program **Ich\_bt 53** runs.

- (d) When the machine is initializing, the following message is shown.

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

Figure 3-4 Initializing for Ich\_bt 53



- (g) If the target machine has any problem, the following message shown in figure 3-7 "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  TTTTTT  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  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     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      LLLLLL  EEEEEE  T     EEEEEEE

                                Testing is finished

A>_
    
```

Figure 3-7 Test incomplete (failure)



If the machine detects a malfunction, it indicates the error code as shown below.  
The error code begins with the least significant digit.

### Error code

Table 3-6 Error code (Ich\_bt53) (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	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

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

Table 3-6 Error code (Ich\_bt53) (2/2)

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

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

Table 3-7 Common Error code

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

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

## 3.29 IEEE1394 test program

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

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

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

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

The following menu will appear:

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

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

Subtest 01    Transmit & Receive test

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

Subtest 02    Responder set

This program initializes the machine responder.

Subtest 03    1394 GUID Display

This program checks the GUID.



---

## **Chapter 4**

# **Replacement Procedures**

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## Chapter 4 Contents

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4.1	General.....	4-1
	Safety Precautions.....	4-2
	Before You Begin.....	4-3
	Disassembly Procedures.....	4-4
	Assembly Procedures.....	4-4
	Tools and Equipment.....	4-5
	Screw Tightening Torque.....	4-6
	Color of Screw Shaft.....	4-7
	Marking of Screws on the Computer Body.....	4-7
	Removing the Battery Pack.....	4-8
	Installing the Battery Pack.....	4-9
	Removing the Optional PC Card.....	4-10
	Installing the Optional PC Card.....	4-11
	Removing the Optional SD Card.....	4-11
	Installing the Optional SD Card.....	4-11
4.2	HDD.....	4-12
	Removing the HDD.....	4-12
	Installing the HDD.....	4-15
4.3	Slim Select Bay Options.....	4-16
	Removing the Slim Select Bay Options.....	4-16
	Installing the Slim Select Bay Options.....	4-17
4.4	Wireless LAN Card.....	4-18
	Removing the Wireless LAN Card.....	4-18
	Installing the Wireless LAN Card.....	4-21
4.5	RTC Battery.....	4-23
	Removing the RTC Battery.....	4-24
	Installing the RTC Battery.....	4-26



4.6	Keyboard.....	4-27
	Removing the Keyboard .....	4-27
	Installing the Keyboard.....	4-30
4.7	Memory Module .....	4-31
	Removing the Main/Expansion Memory Module .....	4-31
	Installing the Main/Expansion Memory Module.....	4-32
4.8	Palm Rest and IPS Board.....	4-33
	Removing the Palm Rest and IPS Board .....	4-33
	Installing the IPS Board and the Palm Rest.....	4-37
4.9	Bluetooth Board.....	4-38
	Removing the Bluetooth Board .....	4-38
	Installing the Bluetooth Board.....	4-39
4.10	Sound/FIR Board .....	4-40
	Removing the Sound/FIR Board.....	4-40
	Installing the Sound/FIR Board .....	4-42
4.11	Modem Daughter Card (MDC).....	4-43
	Removing the Modem Daughter Card.....	4-43
	Installing the Modem Daughter Card .....	4-44
4.12	Wireless Communication Switch Board.....	4-45
	Removing the Wireless Communication Switch Board .....	4-45
	Installing the Wireless Communication Switch Board.....	4-46
4.13	Top Cover with Display Assembly.....	4-47
	Removing the Top Cover with Display Assembly .....	4-47
	Installing the Top Cover with Display Assembly.....	4-50
4.14	Speakers .....	4-52
	Removing the Speakers.....	4-52
	Installing the Speakers .....	4-54
4.15	System Board.....	4-55
	Removing the System Board .....	4-55
	Installing the System Board.....	4-57
4.16	PC Card Slot .....	4-59

---

	Removing the PC card slot .....	4-59
	Installing the PC card slot.....	4-61
4.17	I/O Board .....	4-62
	Removing the I/O Board.....	4-62
	Installing the I/O board .....	4-64
4.18	Display Mask .....	4-65
	Removing the display mask .....	4-65
	Installing the display mask .....	4-67
4.19	FL Inverter Board .....	4-68
	Removing the FL inverter board.....	4-68
	Installing the FL inverter board .....	4-69
4.20	LCD Module .....	4-70
	Removing the LCD module .....	4-70
	Installing the LCD module .....	4-72
4.21	LCD/LED Cable .....	4-73
	Removing the LCD/LED cable.....	4-73
	Installing the LCD/LED cable .....	4-76
4.22	Antenna Coaxial Cables.....	4-77
	Removing the Antenna Coaxial Cables .....	4-77
	Installing the Antenna Coaxial Cables.....	4-81
4.23	TFT FL (Model 12.1 Toshiba).....	4-82
	Removing the TFT FL (Model 12.1 Toshiba) .....	4-82
	Installing the TFT FL (Model 12.1 Toshiba).....	4-86

## Figures

Figure 4-1	Removing the battery pack .....	4-8
Figure 4-2	Removing a PC Card.....	4-10
Figure 4-3	Removing a SD Card .....	4-11
Figure 4-4	Removing the HDD cover.....	4-12
Figure 4-5	Removing the HDD pack .....	4-13
Figure 4-6	Removing screws and HDD bracket.....	4-14
Figure 4-7	Removing the connector .....	4-14
Figure 4-8	Removing a Slim Select bay module .....	4-16
Figure 4-9	Removing the wireless LAN card slot cover .....	4-18
Figure 4-10	Disconnecting the antenna coaxial cables.....	4-19
Figure 4-11	Disconnecting the Wireless LAN Card.....	4-20
Figure 4-12	Connecting the Wireless LAN cables .....	4-21
Figure 4-13	Removing the RTC battery cover .....	4-24
Figure 4-14	Removing the RTC battery .....	4-25
Figure 4-15	Removing the keyboard brace.....	4-27
Figure 4-16	Removing two screws .....	4-28
Figure 4-17	Removing the keyboard .....	4-29
Figure 4-18	Removing the memory module(s).....	4-31
Figure 4-19	Removing the screws securing the bottom of the palm rest .....	4-33
Figure 4-20	Removing the screws securing the top of the palm rest.....	4-34
Figure 4-21	Removing the palm rest .....	4-35
Figure 4-22	Removing the IPS Board.....	4-36
Figure 4-23	Removing the Bluetooth board .....	4-38
Figure 4-24	Removing the sound/FIR board .....	4-40
Figure 4-25	Disconnecting microphone cable .....	4-41
Figure 4-26	Removing the modem daughter card .....	4-43
Figure 4-27	Removing the Wireless Communication Switch Board.....	4-45
Figure 4-28	Removing four screws from the bottom of the computer .....	4-47
Figure 4-29	Disconnecting cables.....	4-48
Figure 4-30	Remove eight screws and top cover with display assembly .....	4-49

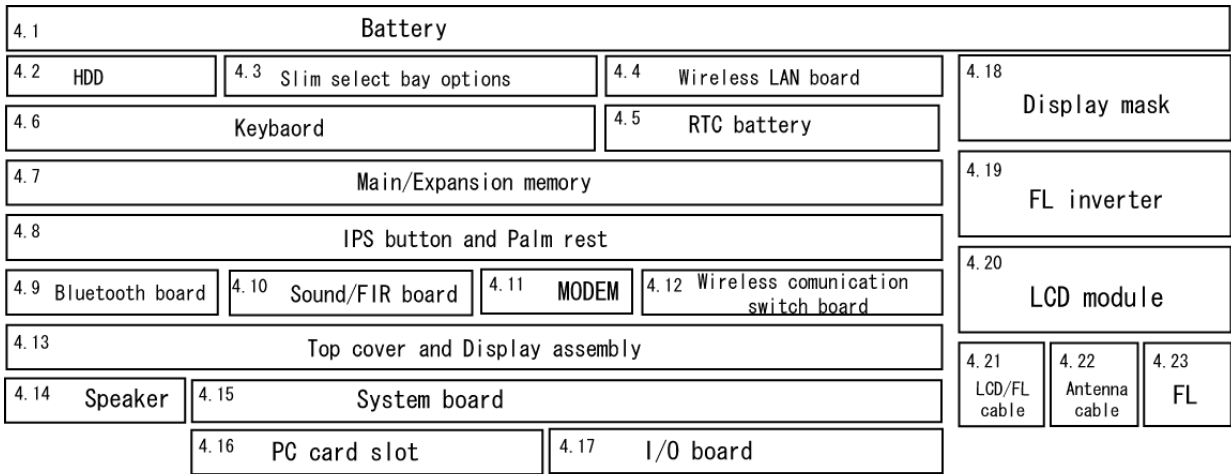
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Figure 4-31	Route the Left Speaker cable .....	4-50
Figure 4-32	Route the Right Speaker cable .....	4-51
Figure 4-33	Removing the glass tape .....	4-52
Figure 4-34	Removing Speakers.....	4-53
Figure 4-35	Removing the screws securing the system board.....	4-55
Figure 4-36	Removing the system board.....	4-56
Figure 4-37	Seating the cables.....	4-57
Figure 4-38	Removing four screws securing PC card slot .....	4-59
Figure 4-39	Removing the PC card slot.....	4-60
Figure 4-40	Removing six screws securing the I/O Board.....	4-62
Figure 4-41	Removing the modem/LAN cable .....	4-63
Figure 4-42	Removing the rubber seals and screws .....	4-65
Figure 4-43	Removing the display mask.....	4-66
Figure 4-44	Removing two screws .....	4-68
Figure 4-45	Removing four screws.....	4-70
Figure 4-46	Removing the LCD module .....	4-71
Figure 4-47	Removing two screws and the top cover .....	4-73
Figure 4-48	Removing one screw and plastic brace .....	4-74
Figure 4-49	Removing the LED board and the tape securing LED cable .....	4-75
Figure 4-50	Removing the LED cable from LED board .....	4-75
Figure 4-51	Removing two screws and the top cover .....	4-77
Figure 4-52	Removing one screw and plastic brace .....	4-78
Figure 4-53	Removing the LED board and the tape securing LED cable .....	4-79
Figure 4-54	Removing the tape and the antenna .....	4-80
Figure 4-55	Removing the tapes and sheet.....	4-82
Figure 4-56	Removing the Copper-ground.....	4-83
Figure 4-57	Removing the frame.....	4-84
Figure 4-58	Separating the panel.....	4-85
Figure 4-59	Laying a new backlight unit.....	4-86
Figure 4-60	Laying the LCD panel with PCB-ASSY (1/2).....	4-87
Figure 4-61	Laying the LCD panel with PCB-ASSY (2/2).....	4-88
Figure 4-62	Securing the latches .....	4-89

Figure 4-63 Moving the PCB.....	4-90
Figure 4-64 Inserting Copper-ground.....	4-91
Figure 4-65 Securing the screws (right side).....	4-92
Figure 4-66 Securing the screws (left side).....	4-92
Figure 4-67 Applying new blue tape .....	4-93
Figure 4-68 Applying the PCB tape .....	4-94
Figure 4-69 Securing the wire with light-green tape.....	4-95
Figure 4-70 Applying the transparent PCB cover .....	4-96

## 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, optional mini PCI card and optional memory module, 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

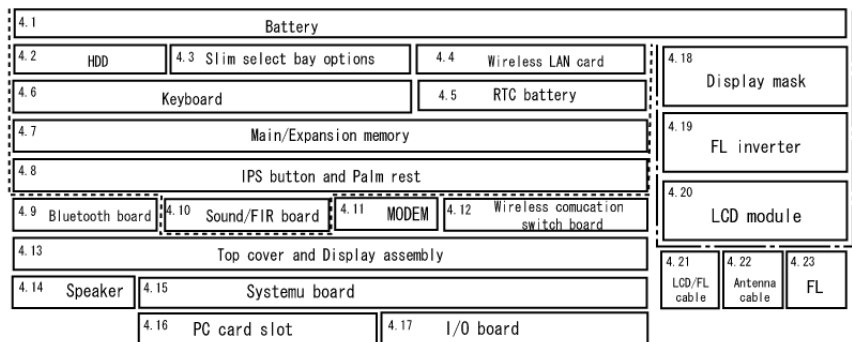
Two examples of referring to the chart are shown below.

#### •Removing the Sound/FIR Board.

The HDD, Slim Select Bay Options, Wireless LAN Card, RTC battery, keyboard, Memory Modules, IPS board and Palm Rest must be removed before removing the Sound/FIR board.

#### •Removing the LCD Module

The FL inverter board and display mask above the LCD module must be removed to access the LCD Module.



----- Sound/FIR board  
 - - - - - LCD module

## 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
- 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.

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 no cables will be pinched by screws or the FRU.
- 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.
- One LH-STIX screw driver
- Tools for disconnecting Antenna cable
- Tweezers.

## 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.*

- |   |                              |
|---|------------------------------|
| <input type="checkbox"/> M2                 | 0.17 N·m (1.7 kgf·cm)        |
| <input type="checkbox"/> M2.5               | 0.30 N·m (3.0 kgf·cm)        |
| <input type="checkbox"/> FDD                | 0.22 N·m (2.2 kgf·cm)        |
| <input type="checkbox"/> HDD                | 0.3 N·m (3.1 kgf·cm) or less |
| <input type="checkbox"/> LCD (internal use) | 0.176 N·m ± 0.22 N·m         |

**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 stud U5  
(Indicates the screwed length in round number regardless the length of the stud.)

## 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 otherwise apply impact; do not scratch or break the casing and do not twist or bend the battery pack.

1. Turn the computer upside down with the back of the computer facing you.
2. Lift up the **battery lock** and slide the **battery release latch** to free the battery pack for removal.
3. Pull the **battery pack** forward to remove it.

**NOTE:** For environmental reasons, do not throw away a spent battery pack. Please follow local ordinances or regulations for its disposal.

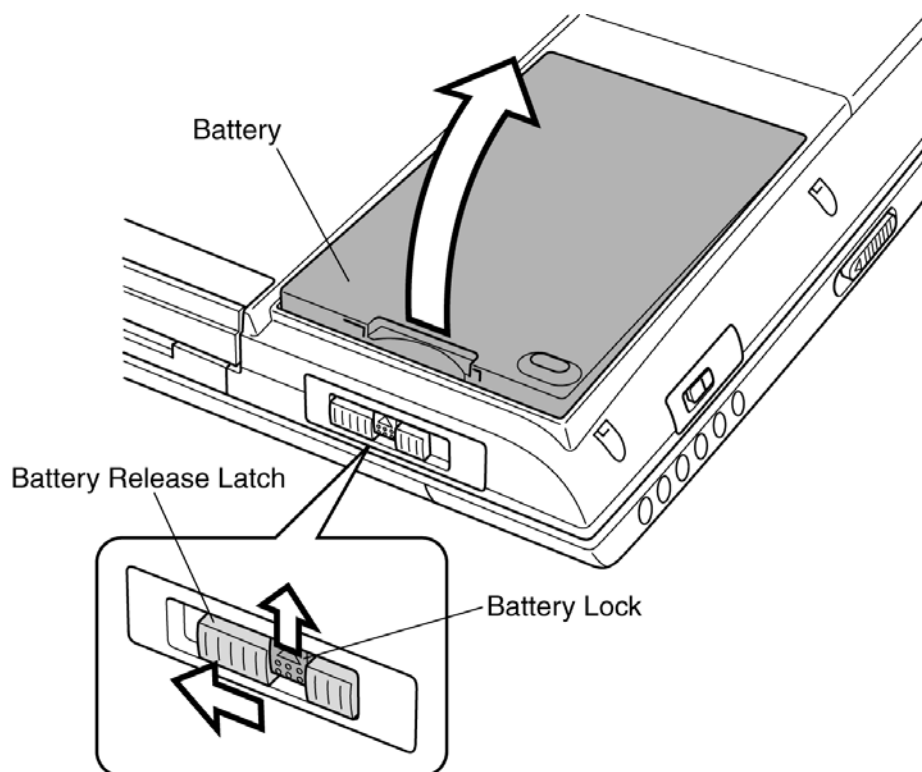


Figure 4-1 Removing the battery pack

### 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. Dispose of the battery as required by local ordinances or regulations. 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. Seat a new or recharged **battery pack**.
2. Secure **the battery lock**.

## Removing the Optional PC Card

To remove the PC Card (option), make sure the computer is in boot mode, then 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. Press the **eject button** of the **PC card** you want to remove to extend the button.
2. Press the extended **eject button** to pop the card out slightly.
3. Grasp the **PC card** and remove it.
4. When the **eject button** is pressed again, it is put in.

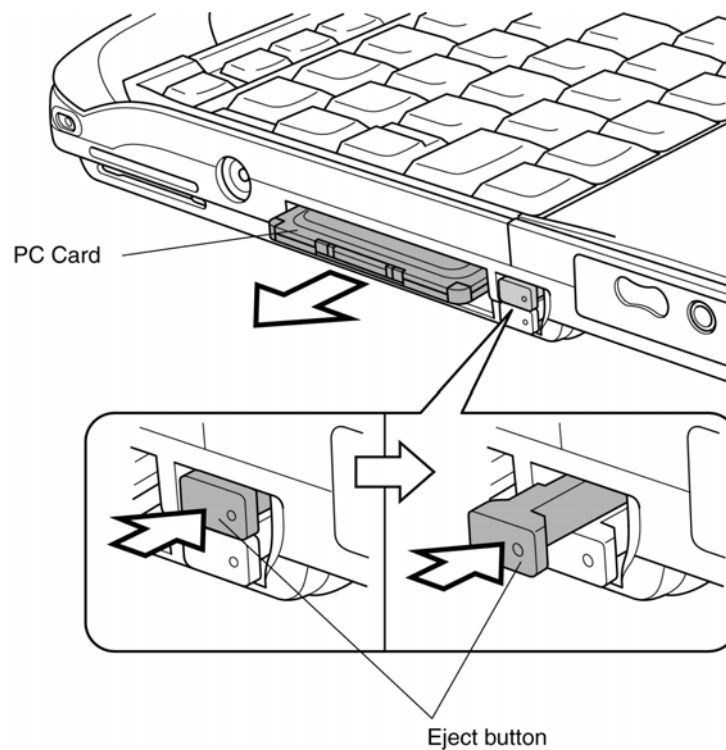


Figure 4-2 Removing a PC Card

### Installing the Optional PC Card

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

1. Make sure that the **eject button** is out.
2. Insert the **PC card**. Press gently to ensure a firm connection.

### Removing the Optional SD Card

To remove the SD Card (option), make sure the computer is in boot mode, then 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. Push in the **SD card** and release it to pop the card out slightly.
2. Grasp the **SD card** and remove it.

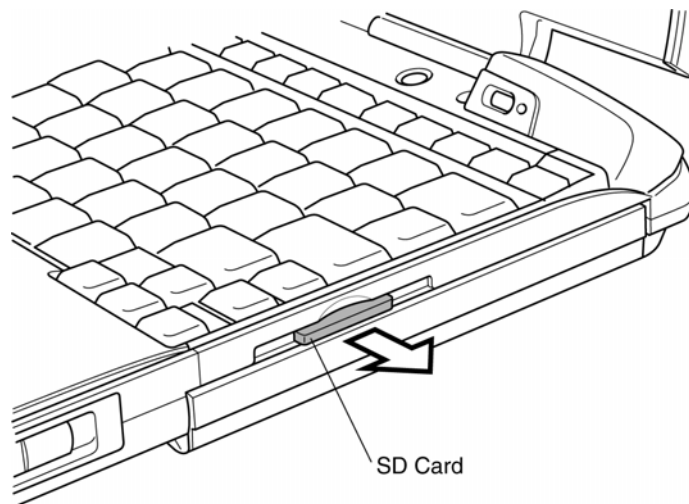


Figure 4-3 Removing a SD Card

### Installing the Optional SD Card

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

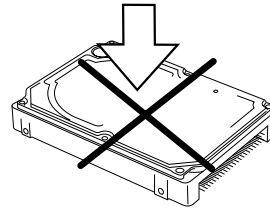
1. Insert the **SD card**.
2. Press gently to ensure a firm connection.



## 4.2 HDD

### Removing the HDD

**CAUTION:** Be very careful not to press on the top or bottom of the HDD. Pressure can destroy data or damage the drive.



To remove the HDD, follow the steps below and refer to figures 4-4 to 4-7.

1. Turn the computer upside down.
2. Remove two **M2×4 silver screws** securing the HDD cover.
3. Lift off the **HDD cover**.

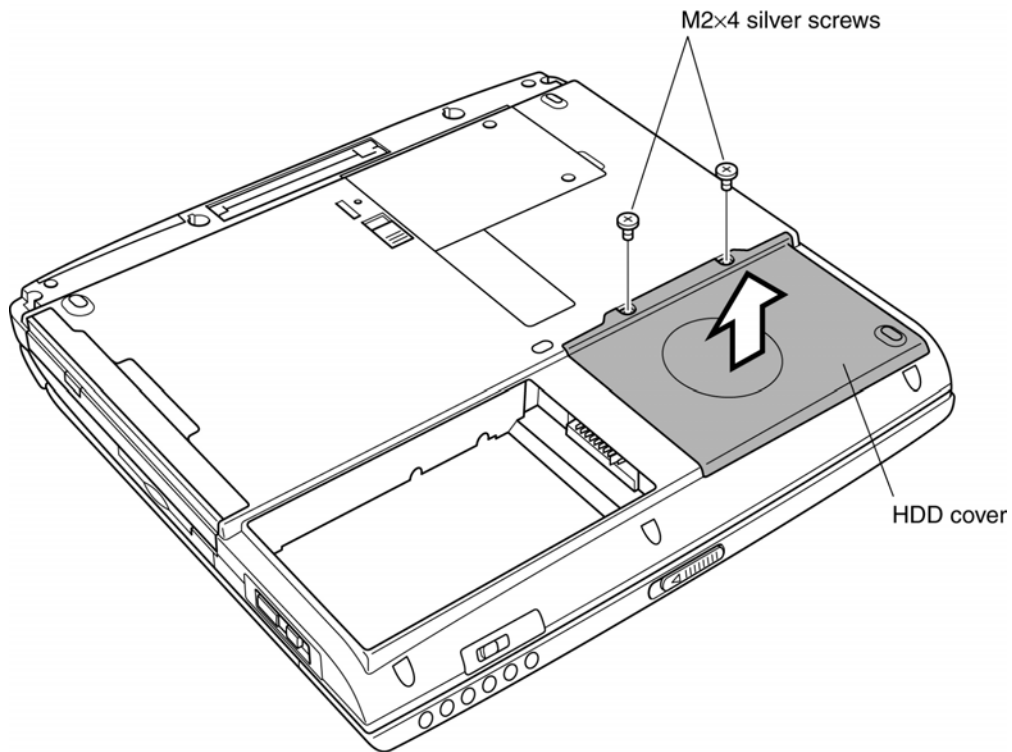


Figure 4-4 Removing the HDD cover

4. Grasp the **plastic tab** on the **HDD**. As indicated by the arrow, pull to disconnect the **HDD** from **PJ1800** on the system board, then pull the **HDD**.

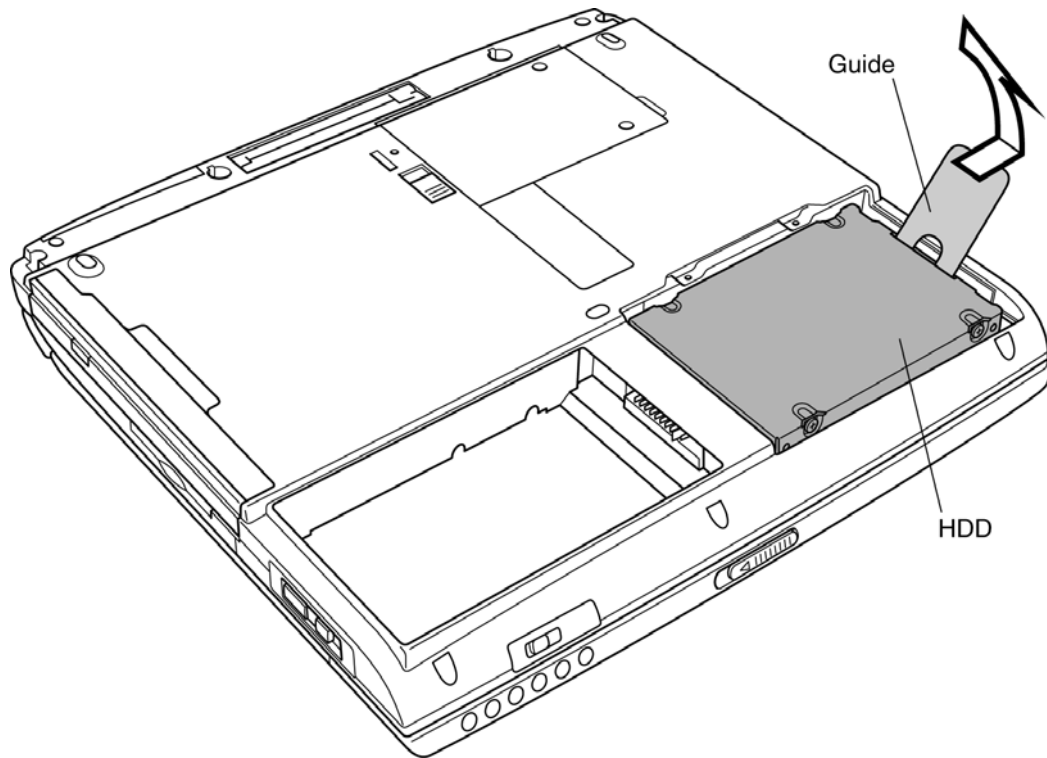


Figure 4-5 Removing the HDD pack

**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 **four M3×4 flat-head screws**.
6. Remove the **HDD bracket**.

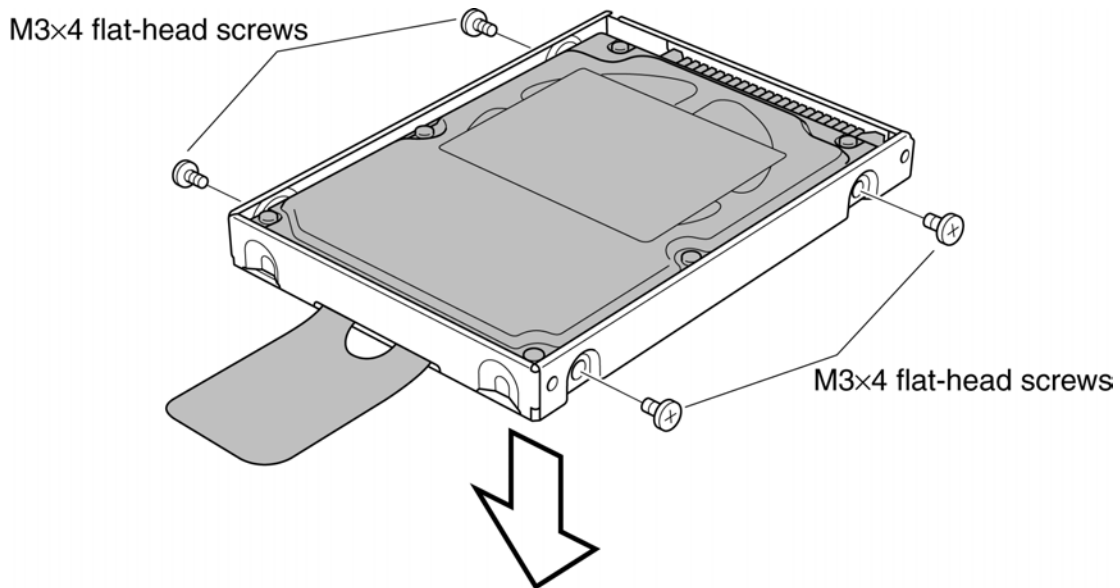


Figure 4-6 Removing screws and HDD bracket

7. Remove the **connector**.

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

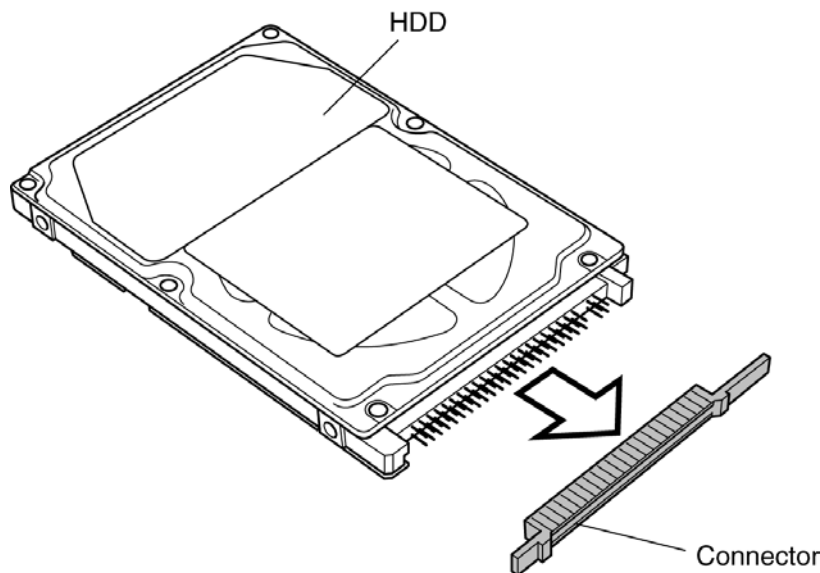


Figure 4-7 Removing the connector

## Installing the HDD

To install the HDD, follow the steps below and refer to figures 4-4 to 4-7.

**CAUTION:** *Don't hold the HDD by its top and bottom flat surfaces.  
It may damage the HDD.*

1. Connect the **connector**.
2. Seat the **HDD** bracket.
3. Secure **four M3×4 flat-head screws**.

**CAUTION:** *Do not apply pressure to the middle part of the HDD pack.  
It may damage the HDD bracket. Hold the HDD by its corners.*

4. Hold the **HDD** pack by its corners, insert and press it into the computer, to fit the connector of the **HDD pack** into the connector of the computer.
5. Insert the white plastic tab into the gap between the computer top cover and **HDD**, and seat the cover.
6. Secure the **HDD cover** with **two M2×4 silver screws**.

## 4.3 Slim Select Bay Options

### Removing the Slim Select Bay Options

**NOTE:** This section explains how to change modules in the Slim Select Bay. The illustration shows replacement of the DVD-ROM drive as an example. The procedures are the same for any of the modules: DVD-ROM drive, CD-RW/DVD-ROM drive, optional Slim Select Bay HDD adaptor or optional secondary battery pack with separate tray.

To remove the Slim Select Bay module, follow the steps below and refer to figure 4-8.

1. Turn the computer upside down.
2. Slide the **Slim Select Bay latch** to the unlock position.
3. Grasp the **DVD-ROM drive** and slide it out.

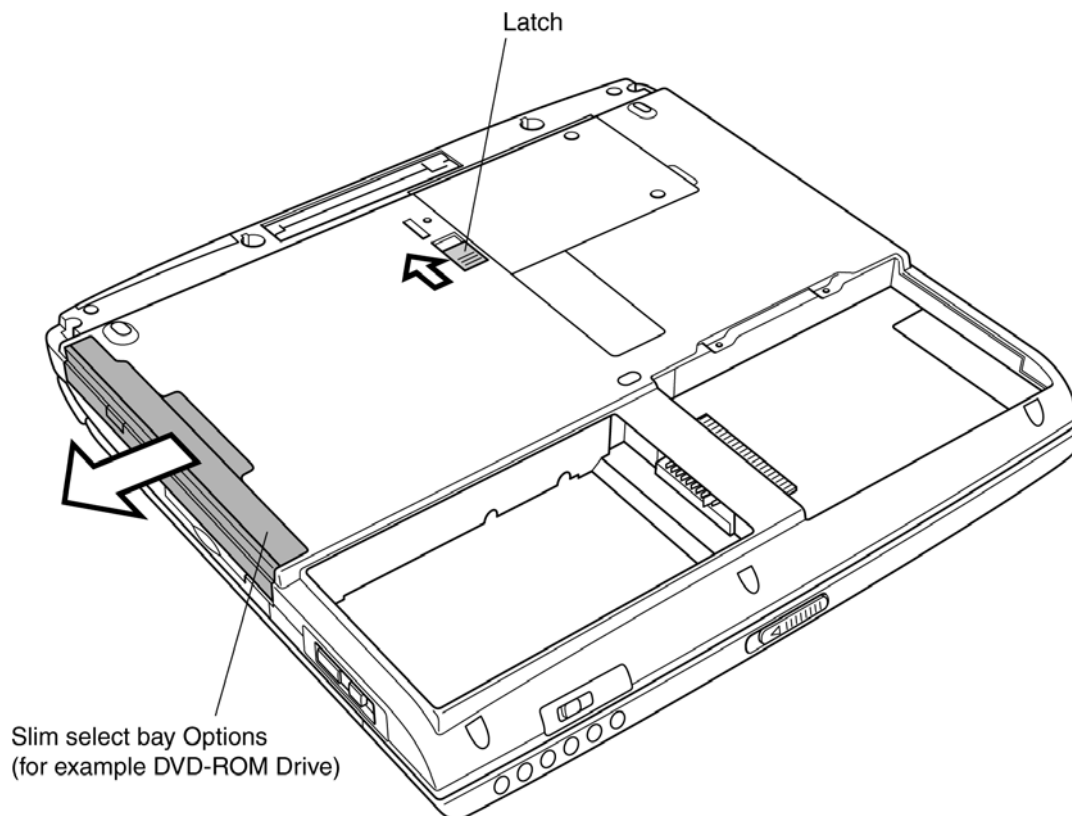


Figure 4-8 Removing a Slim Select bay module

**CAUTION:** *The Slim Select Bay modules can become hot with use.  
Be careful when removing the module.*

### **Installing the Slim Select Bay Options**

Install the Slim Select Bay modules as described below and refer to figure 4-8.

1. Insert the module in the **Slim Select Bay module**.
2. Push it in till it clicks.

## 4.4 Wireless LAN Card

### Removing the Wireless LAN Card

To remove the wireless LAN card (option) make sure the computer is in boot mode and powered off, follow the steps below and refer to figures 4-9 to 4-11.

**CAUTION:** Do not try to remove the wireless LAN card with the computer turned on. You can damage the computer and wireless LAN card.

1. Turn the computer upside down.
2. Remove following screws using a LH-STIX screwdriver or ordinary driver.
  - **M2×4 LH-STIX** ×2 (for Atheros card, but not for Toshiba direct PC)
  - **M2×4 silver** ×2 (for cards other than Atheros card)
3. Remove the **wireless LAN card slot cover**.

**CAUTION:** Do not touch the connectors on the Wireless LAN Card module or on the computer. Debris on the connectors may cause Wireless LAN Card access problems.

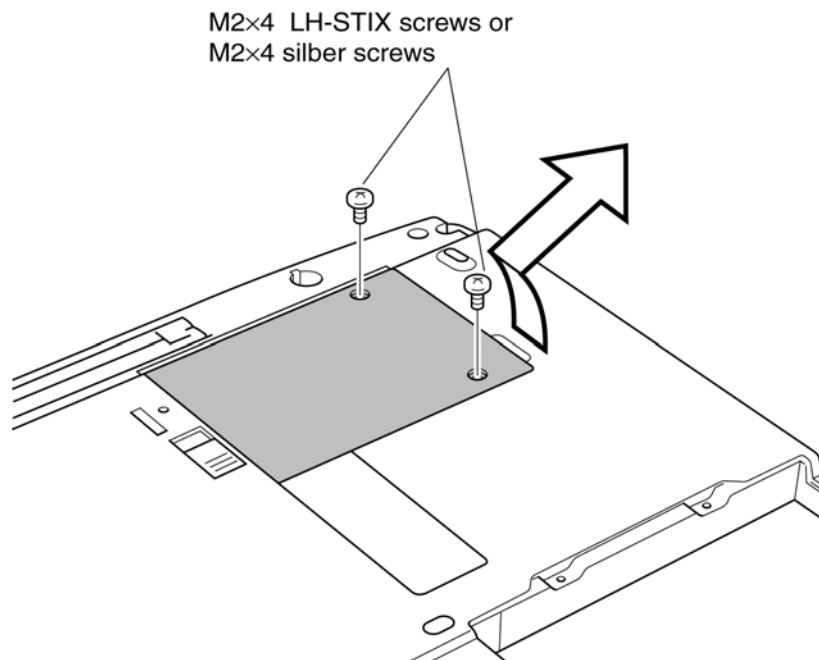


Figure 4-9 Removing the wireless LAN card slot cover

4. Disconnect the **antenna coaxial cables** (black and white) from the **wireless LAN card** using a tool to disconnect an antenna coaxial cable.

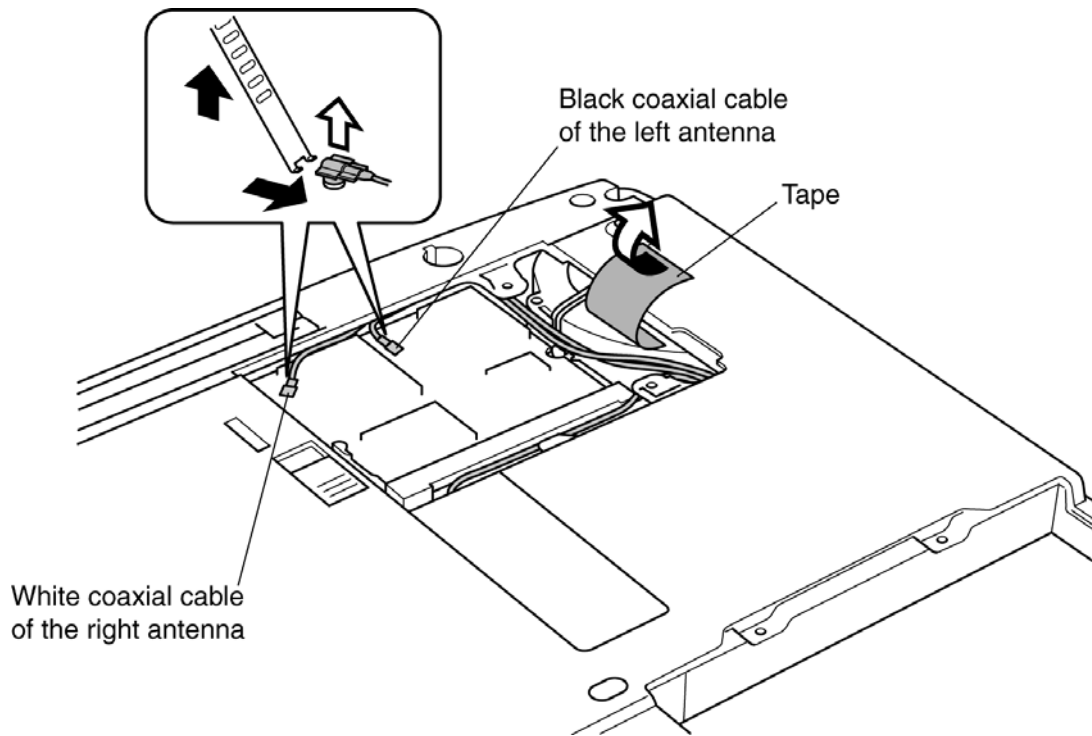


Figure 4-10 Disconnecting the antenna coaxial cables

**CAUTION:** The position of the terminal depends on the wireless LAN card (the manufacturer), but the white coaxial is connected to the left terminal viewing from the front side and the black one to the right.

**CAUTION:** When disconnecting the antenna coaxial cables, use a dedicated tool. Do use a pair of tweezers it may damage the connector portion of antenna.



5. Push the **wireless LAN card lock latches** outward to release the **wireless LAN card**. It will pop up to about a 45 degrees angle.

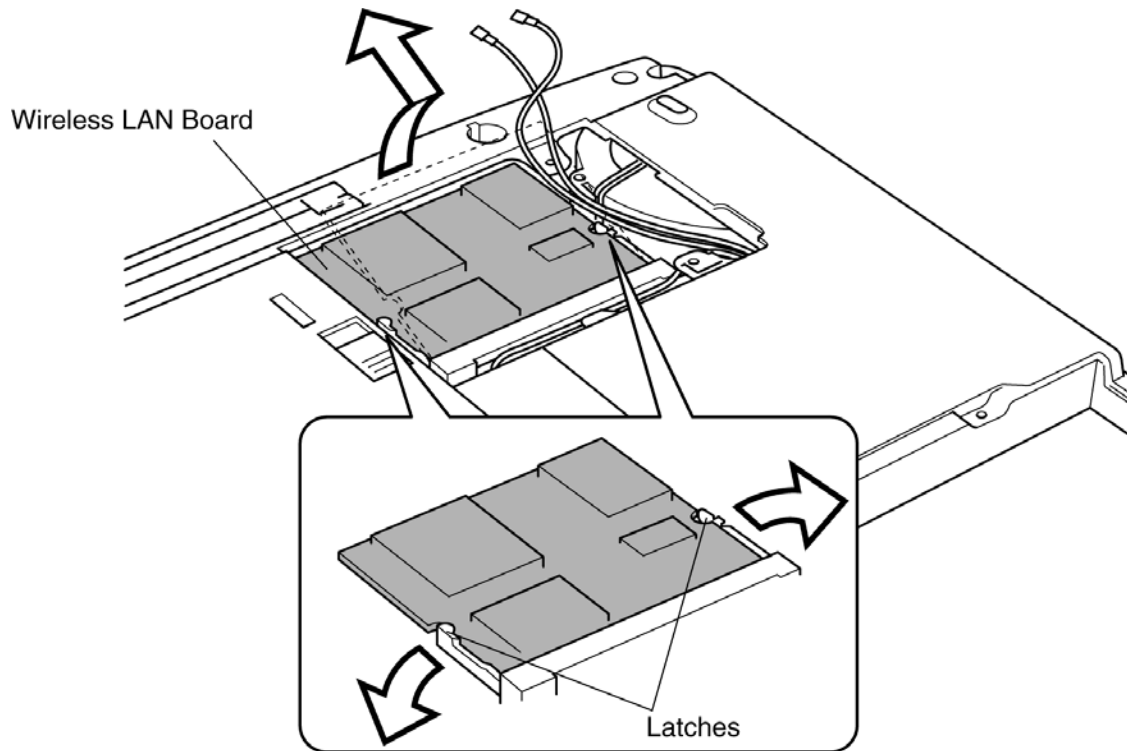


Figure 4-11 Disconnecting the Wireless LAN Card

6. Pull out the **wireless LAN card**. Be careful not to damage the connector.

**CAUTION:** Do not touch the connectors on the Wireless LAN Card. Debris on the connectors may cause Wireless LAN Card access problems.

### Installing the Wireless LAN Card

To install the wireless LAN card (option), make sure that the computer is in boot mode and powered off, follow the steps below and refer to figures 4-9 to 4-12.

**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 latches on both sides engage the **wireless LAN card** to hold it in place.
3. Connect the antenna coaxial cable to the connectors on the **wireless LAN card**.
4. Route the **antenna coaxial cables** inside the guide and secure it with a glass tape.

**CAUTION:** Make sure the cables lie inside the guide. Be careful not to damage or pinch the cables when you seat the wireless LAN card. Refer to Figure 4-12.

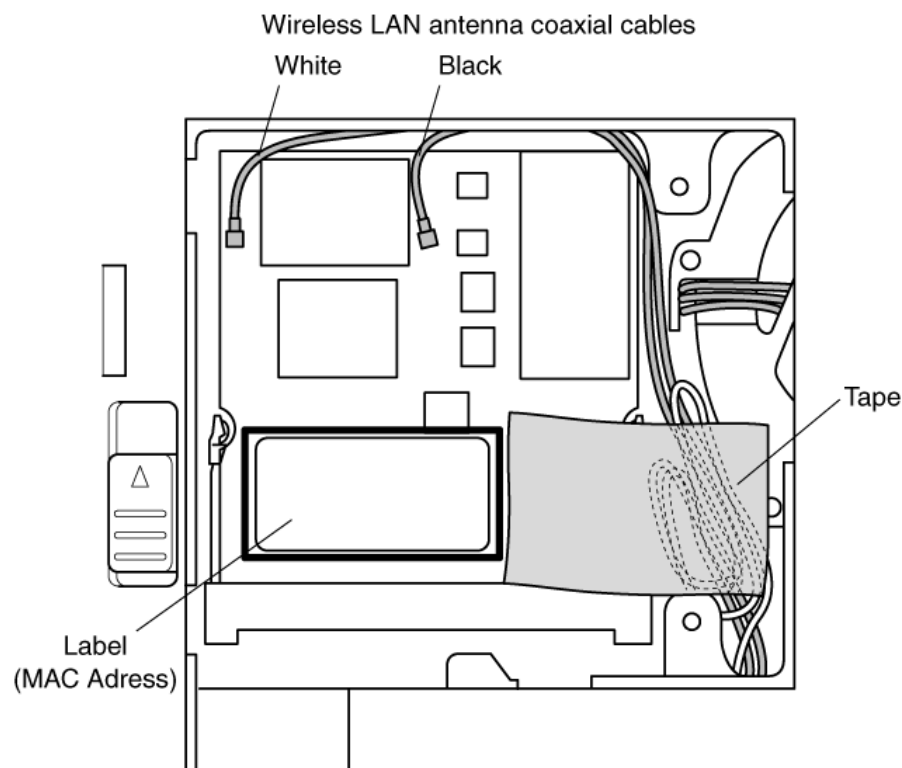


Figure 4-12 Connecting the Wireless LAN cables

5. Secure the **wireless LAN antenna cables with the tape** together.

**CAUTION:** *The position of the terminal depends on the wireless LAN card (the manufacturer), but the white coaxial shall be connected to the left terminal viewing from the front side and the black one to the right.*

**CAUTION:** *Be careful not to let the edge of the tape touch the cooling fan or overlap the label of the MAC address.*

6. Seat the **wireless LAN card slot cover**.

**CAUTION:** *Be careful not to damage or pinch the wireless LAN cables when you seat the slot cover.*

7. Secure the slot cover with **two M2×4 LH-STICKS screws** (for Atheros card, but not for Toshiba direct PC) or **two M2×4 silver screws** (for cards other than Atheros card).

**CAUTION:** *There are two MAC address barcode labels in the package containing the new Wireless LAN card. Apply one label to the bottom of the computer and one to 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.*

## 4.5 RTC Battery

**WARNING:** *When it is necessary to replace the RTC battery, be sure to use a genuine battery or a battery 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*

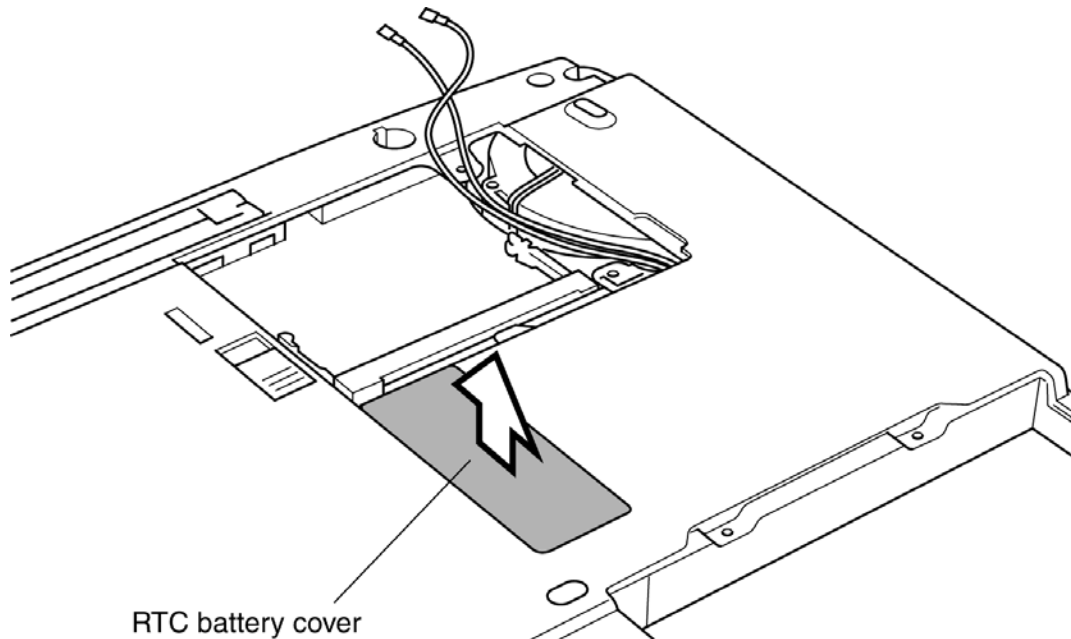
*If any powder or liquid is found in or around the battery tray, clean it. Be very careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.*

*If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.*

## Removing the RTC Battery

To remove the RTC battery, follow the steps below and refer to figure 4-13, 4-14.

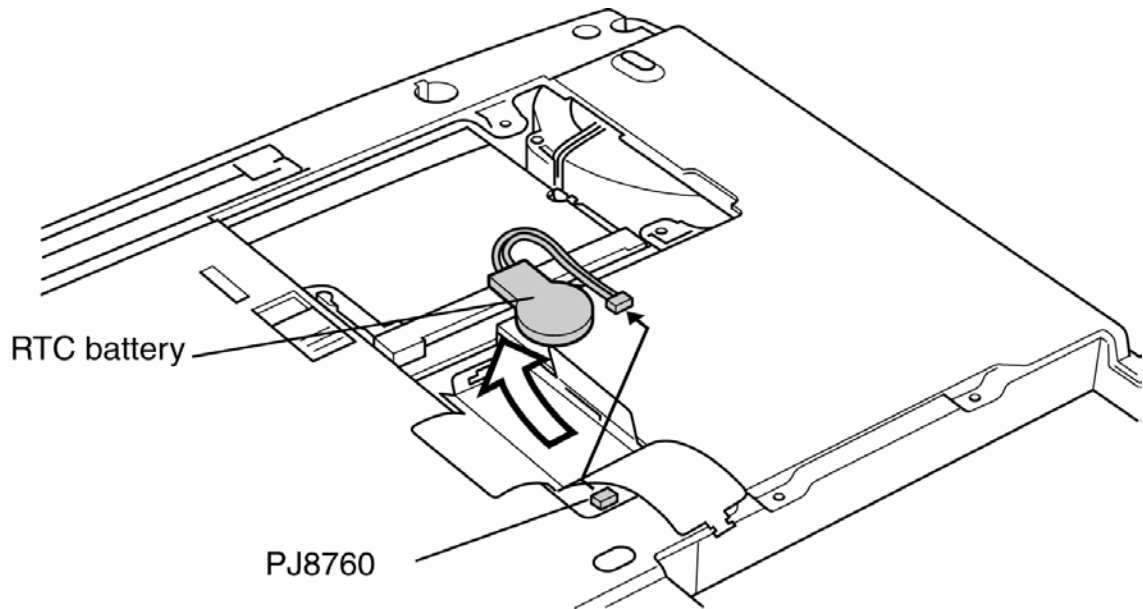
1. Remove the **RTC battery cover**.



*Figure 4-13 Removing the RTC battery cover*

2. Disconnect the **RTC battery cable** from connector **PJ8760** on the IO board.
3. Lift up the insulator covering the RTC battery.

4. Lift out the **RTC battery**.



*Figure 4-14 Removing the RTC battery*

### Installing the RTC Battery

To install the RTC battery, follow the steps below and refer to figure 4-13, 4-14.

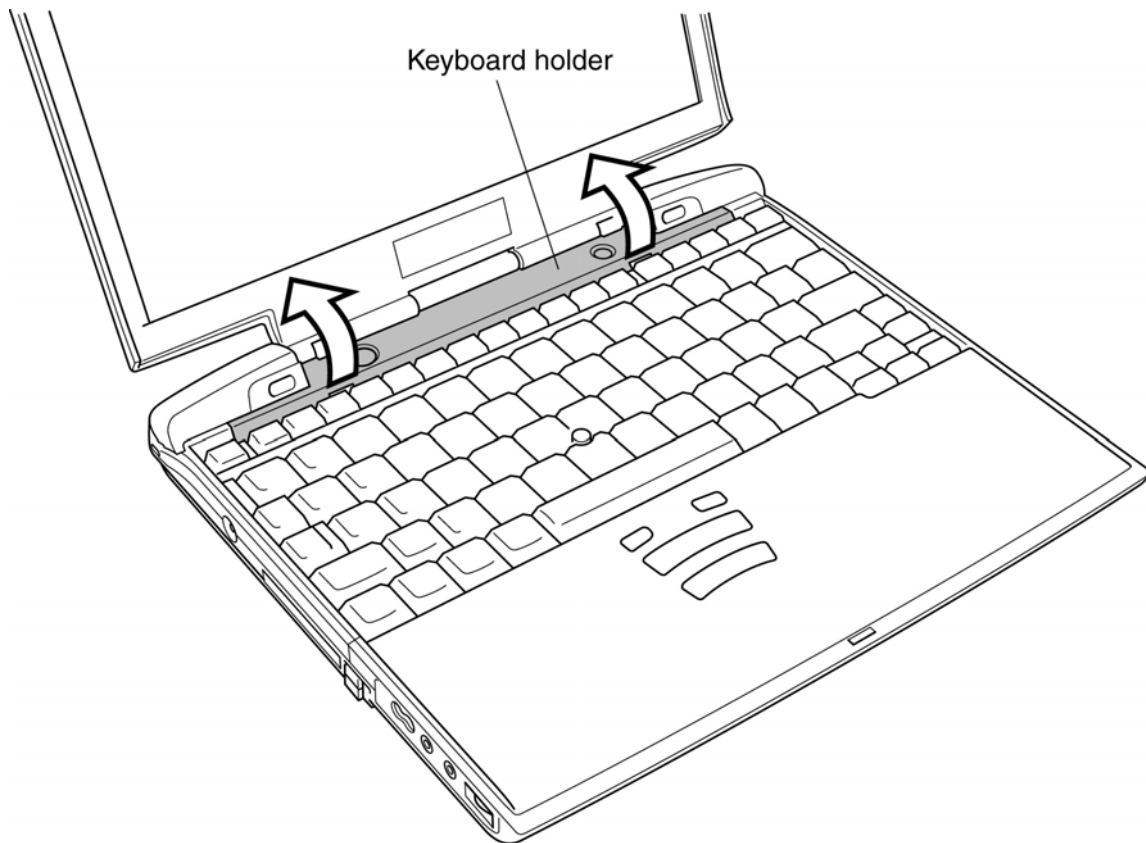
1. Lift up the **insulator** and seat the **RTC battery**.
2. Connect the **RTC battery cable** to connector **PJ8760** on the IO board.
3. Set the **RTC battery cover**.

## 4.6 Keyboard

### Removing the Keyboard

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

1. Open the **display panel**.
2. Insert your fingernail into the gap between the **keyboard holder** and the computer and pry up the keyboard holder.



*Figure 4-15 Removing the keyboard brace*



3. Remove **two M2×4 black screws** and one **M2×4 flat-head screw**.
4. Remove the **harness plate** and move the **keyboard** in the arrow direction till the keyboard connector is exposed. Be careful not to damage the keyboard cable.

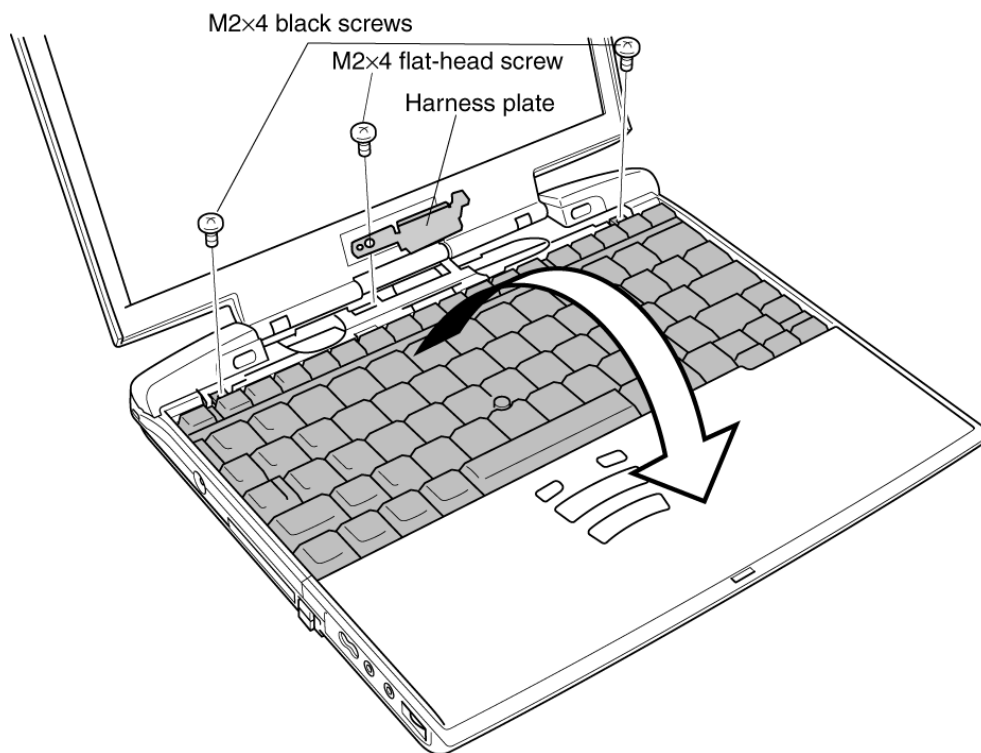


Figure 4-16 Removing two screws

5. Disconnect the **keyboard cable** from **PJ3230** on the system board, and remove the keyboard.

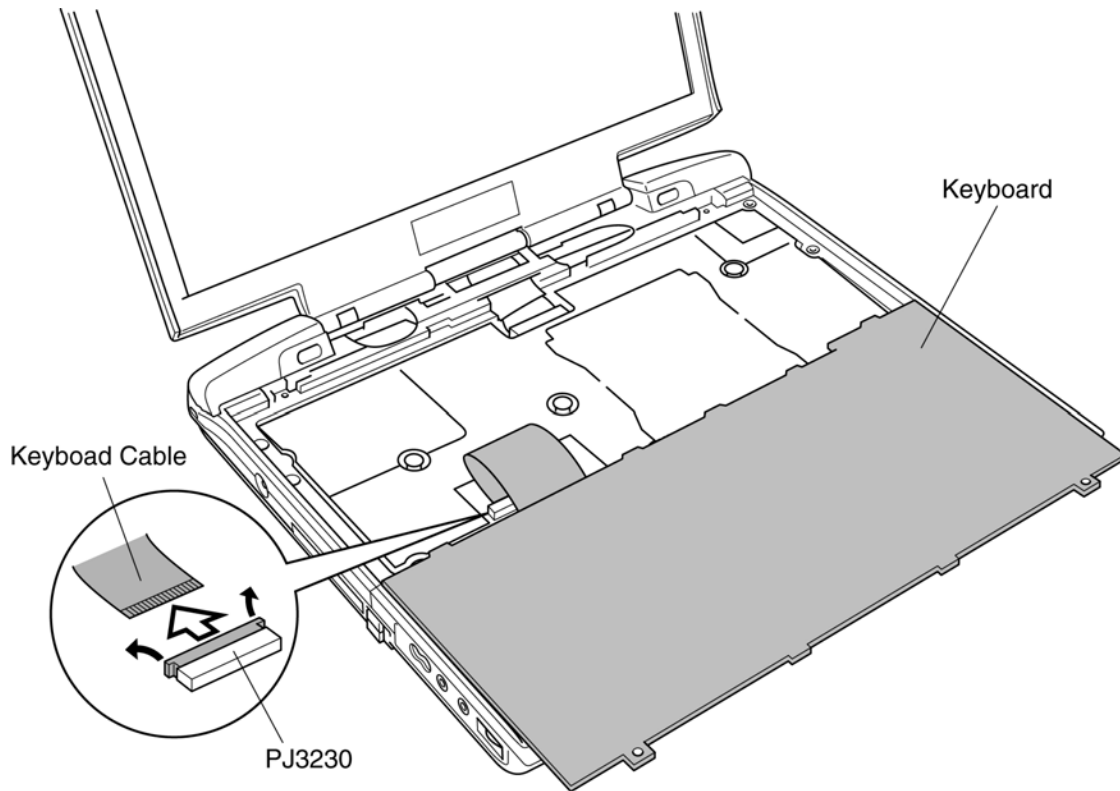


Figure 4-17 Removing the keyboard

## Installing the Keyboard

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

1. Put the **keyboard** with the backside up on the palm rest.
2. Connect the **keyboard cable** to **PJ3230** on the system board.
3. Seat the **keyboard** in position and secure it with **two M2×4 black screws** and the **harness plate** with **one M2×4 flat-head screw**.
4. Seat the **keyboard holder** and press to secure latches.

## 4.7 Memory Module

### Removing the Main/Expansion Memory Module

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

**CAUTION:** Do not try to remove a main/expansion memory module with the computer turned on. You may damage the computer and the memory module.

1. Gently press out on **two latches**. One end of the **main/expansion memory module** will pop up.
2. Grasp the **main/expansion memory module** and pull it out.

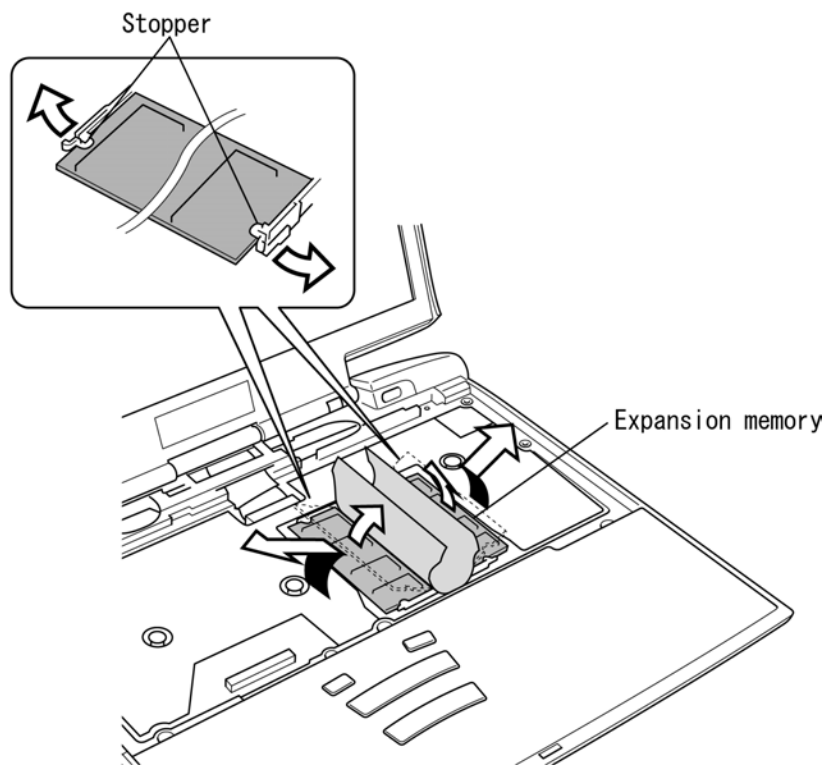


Figure 4-18 Removing the memory module(s)

**CAUTION:** Do not touch the connectors on the memory module(s) or on the computer. Debris on the connectors may cause memory access problems.

### Installing the Main/Expansion Memory Module

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

**CAUTION:** *Do not touch the connectors on the memory module or on the computer. Debris on the connectors may cause memory access problems.*

1. Fit the **main/expansion memory module**'s connectors into the memory slots and press carefully to ensure firm contact.
2. Gently, push the **main/expansion memory module** down until **latches** on either side engage the **main/expansion memory module** to hold it in place.

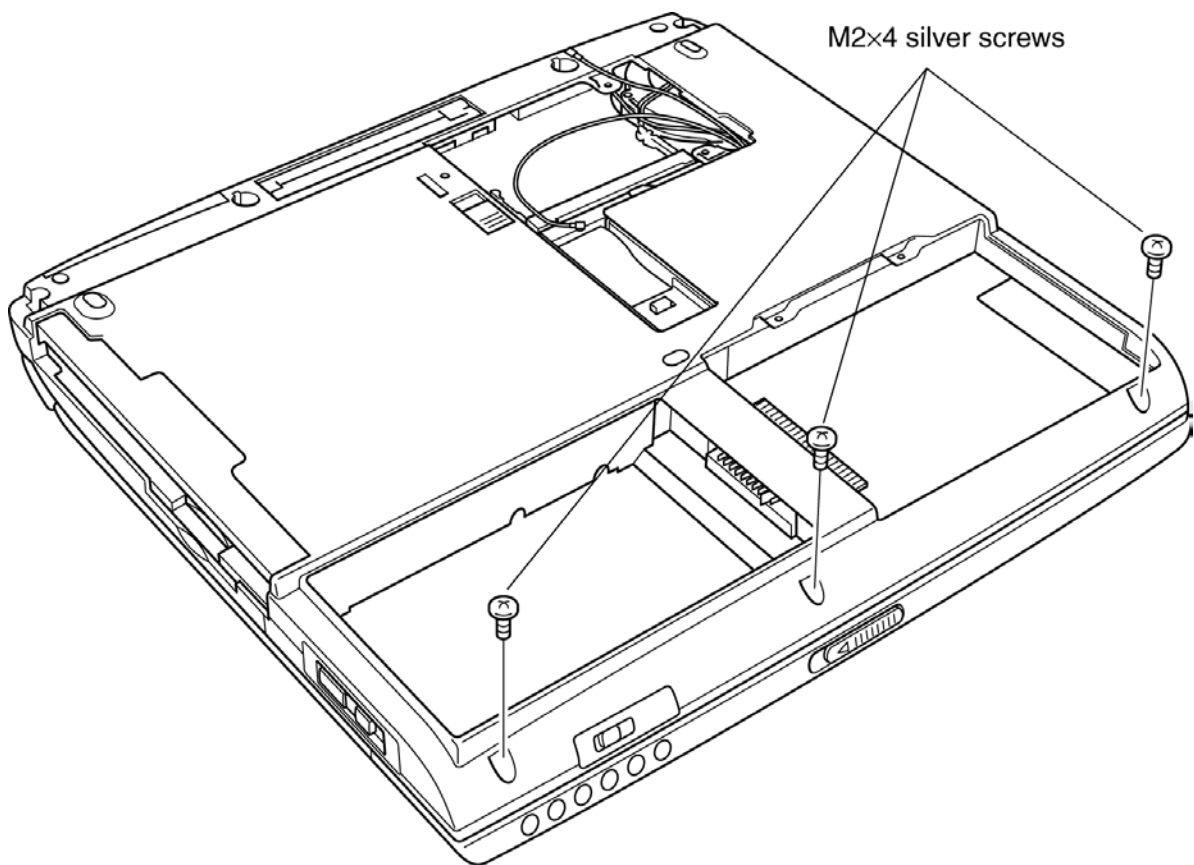
**CAUTION:** *Do not install a memory module in slot B only. Use the slot A prior to slot B.*

## 4.8 Palm Rest and IPS Board

### Removing the Palm Rest and IPS Board

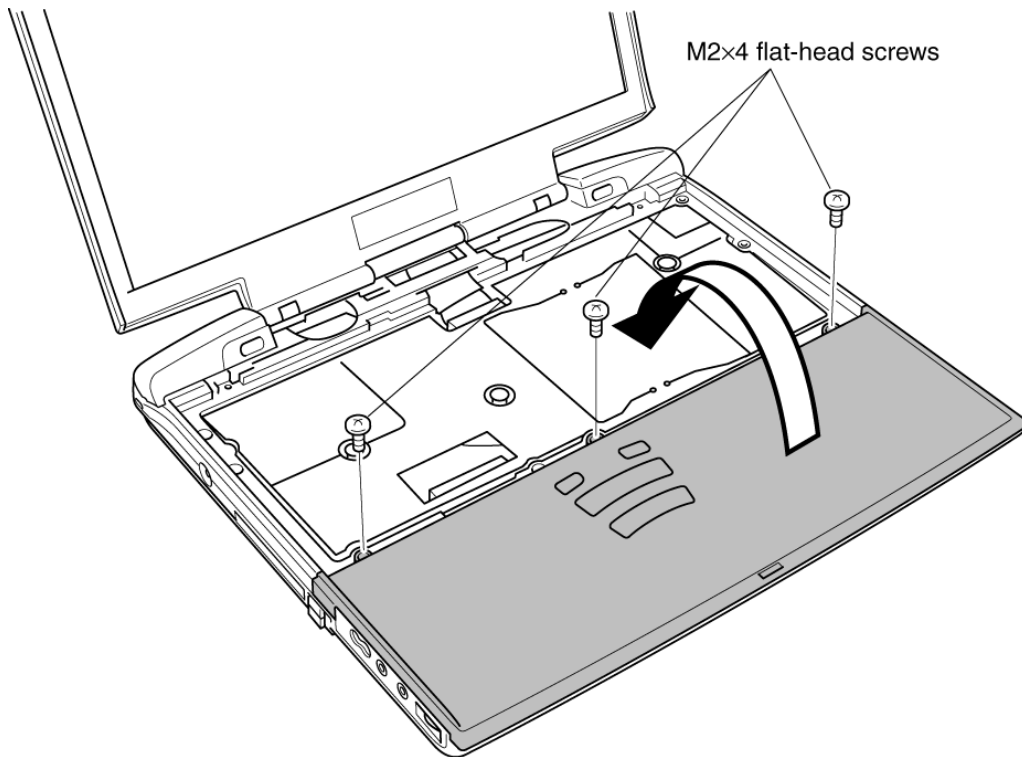
To remove the palm rest and IPS board, follow the steps below and refer to Figure 4-19 to 4-22.

1. Lay the **computer** upside down.
2. Remove **three M2×4 silver screws** securing the **palm rest**.
3. Turn the computer right side up and open the **display** so that it lies flat.



*Figure 4-19 Removing the screws securing the bottom of the palm rest*

4. Remove **three M2×4 flat-head screws** securing the **palm rest**.



*Figure 4-20 Removing the screws securing the top of the palm rest*

5. Lift the **palm rest** out and turn it face down on the **top cover**. Be careful not to apply pressure to the **cables** or **connectors**.

6. Disconnect the **IPS cable** from **PJ3280** on the system board, and remove the **palm rest**.

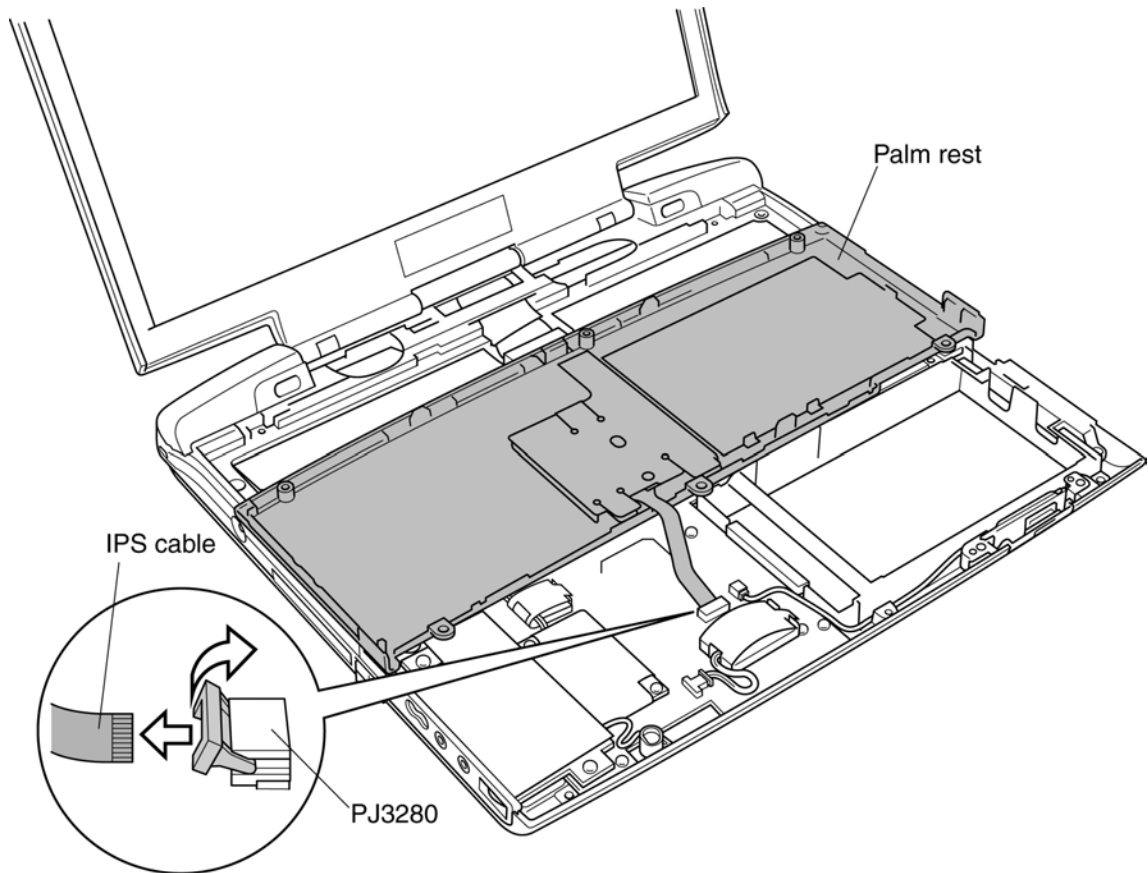
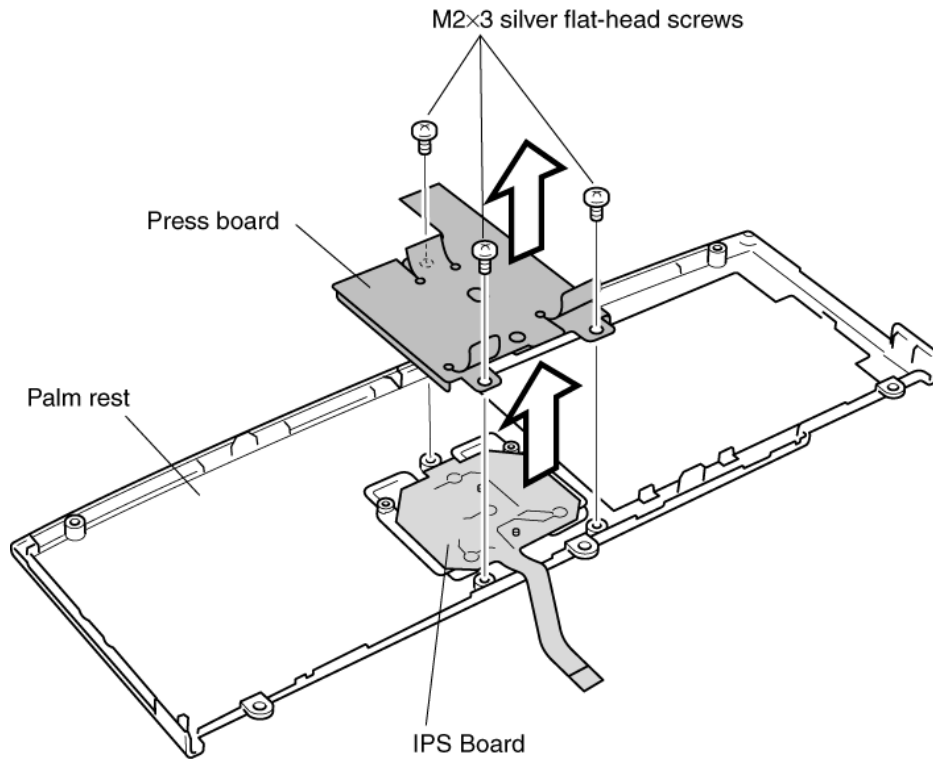


Figure 4-21 Removing the palm rest



7. Lay the **Palm rest** upside down.
8. Remove **three M2×3 silver flat head screws** securing the **IPS Board**.
9. Remove the **IPS Board**.



*Figure 4-22 Removing the IPS Board*

**Installing the IPS Board and the Palm Rest**

To install the **IPS board** and the **palm rest**, follow the steps below and refer to Figures 4-19 to 4-22.

1. Lay the **palm rest** upside down.
2. Seat the **IPS board** and secure it with **three M2×3 silver flat-head screws**.
3. Connect the **IPS cable**.
4. Seat the **palm rest** and secure it with **three M2×4 flat-head screws**.
5. Turn the computer upside down.
6. Secure the **palm rest** with **three M2×4 silver screws**.

## 4.9 Bluetooth Board

### Removing the Bluetooth Board

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

**CAUTION:** Do not try to remove the Bluetooth board with the computer turned on. You can damage the computer and the Bluetooth Board.

1. Disconnect the **Bluetooth flexible flat cable** from the connector **PJ3110** on the system board.
2. Remove **two M2x3 silver flat head screws** and the Bluetooth board.
3. Disconnect the **Bluetooth flexible flat cable** from the Bluetooth board.

**CAUTION:** Do not touch the connectors on the Bluetooth. Debris on the connectors may cause access problems.

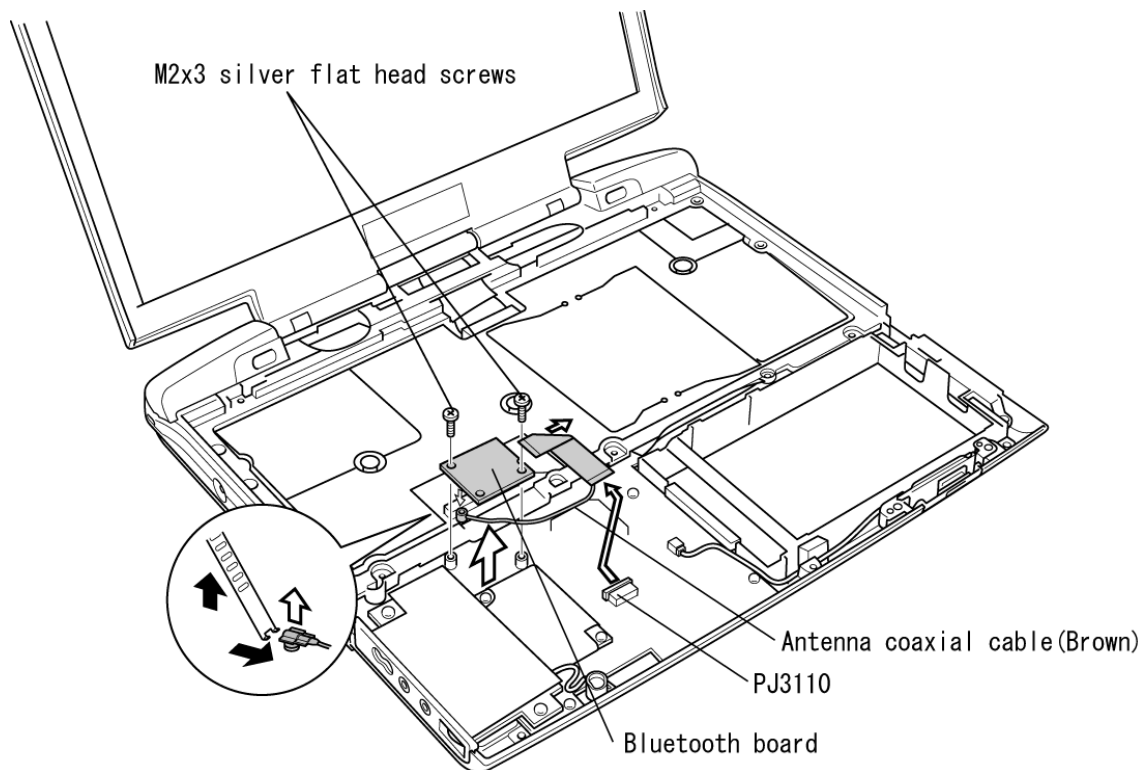


Figure 4-23 Removing the Bluetooth board

4. Disconnect the **antenna coaxial cable** from the **Bluetooth board** using a tool to disconnect an antenna coaxial cable.

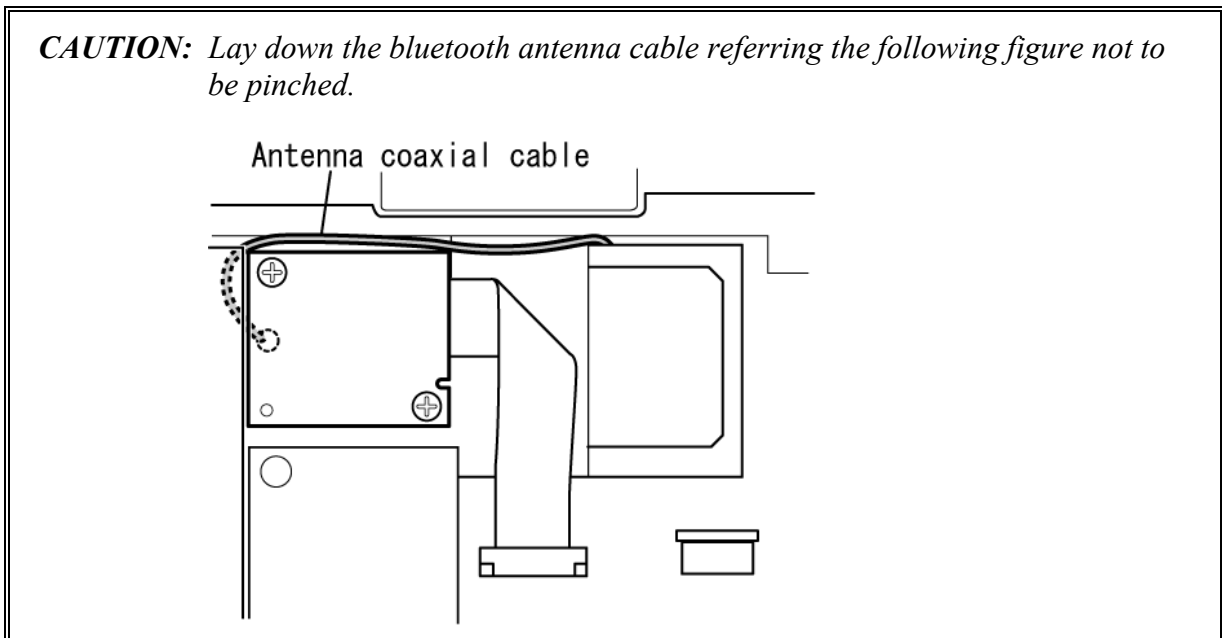
### Installing the Bluetooth Board

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

**CAUTION:** Be sure to switch the computer off before removing the Bluetooth board. Otherwise, the computer or the Bluetooth board may be damaged.

1. Connect the **antenna coaxial cable** to the connector on the Bluetooth board.

**CAUTION:** Lay down the bluetooth antenna cable referring the following figure not to be pinched.



2. Connect the one side of **bluetooth flexible flat cable** to the Bluetooth board.
3. Fix the bluetooth board on the system board with **two M2x3 silver flat head screws**.
4. Connect the other side of **bluetooth flexible flat cable** to the connector **PJ3110** on the system board.

## 4.10 Sound/FIR Board

### Removing the Sound/FIR Board

To remove the **sound/FIR board**, follow the steps below and refer to figures 4-24 and 4-25.

1. Remove **two M2×4 screws** securing the **sound/FIR board**.
2. Lift out the **sound/FIR board** with the **internal microphone**.

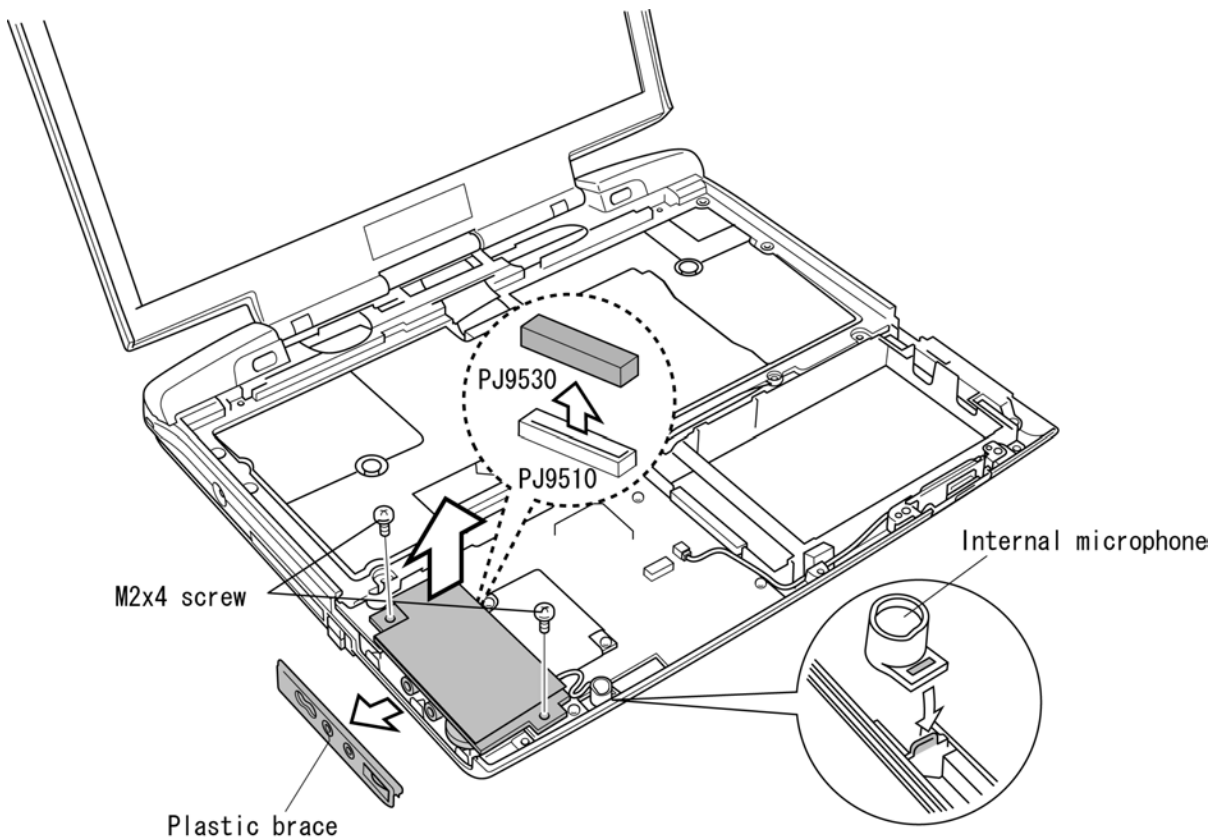


Figure 4-24 Removing the sound/FIR board

**CAUTION:** The sound/FIR board is connected to the system board by stacking connectors. When connecting or disconnecting a headphone or microphone to the jack on the sound/FIR board, be sure to do it after securing the sound/FIR board to the system board with screws. Otherwise the connector may be cracked.

3. When you lift out the **sound/FIR board**, the **plastic brace** may separate.
4. Lift up the corner of the insulator and disconnect the internal microphone cable from **PJ6000** on the **sound/FIR board**.

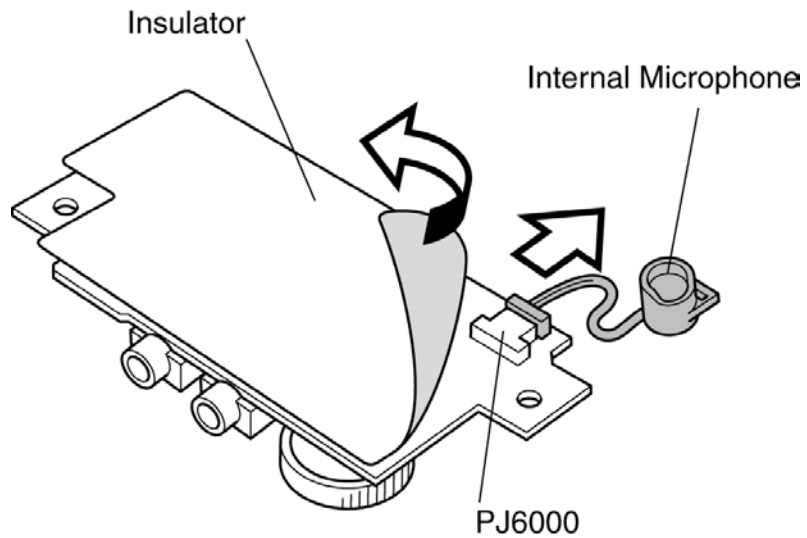


Figure 4-25 Disconnecting microphone cable

### Installing the Sound/FIR Board

To install the **Sound/FIR Board**, follow the steps below and refer to figures 4-24 and 4-25.

1. Connect the sound cable to **PJ6000** on the **sound/FIR board**.
2. Fit the plastic cover onto the **sound/FIR board**.
3. Seat the **sound/FIR board**.
4. Seat the **microphone** in position.

**CAUTION:** *Be careful to route the cable so that the Top cover will not pinch it. Make a small loop on the board and set the microphone.*

5. Secure the **sound/FIR board** with **two M2×4 screws**.

## 4.11 Modem Daughter Card (MDC)

### Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to figure 4-26.

1. Remove **two M2x4 screws** securing the **modem daughter card**.
2. Carefully lift up just above the **modem daughter card** to disconnect it from **PJ3020** on the system board.
3. Disconnect the **MDC cable** from the modem daughter card.

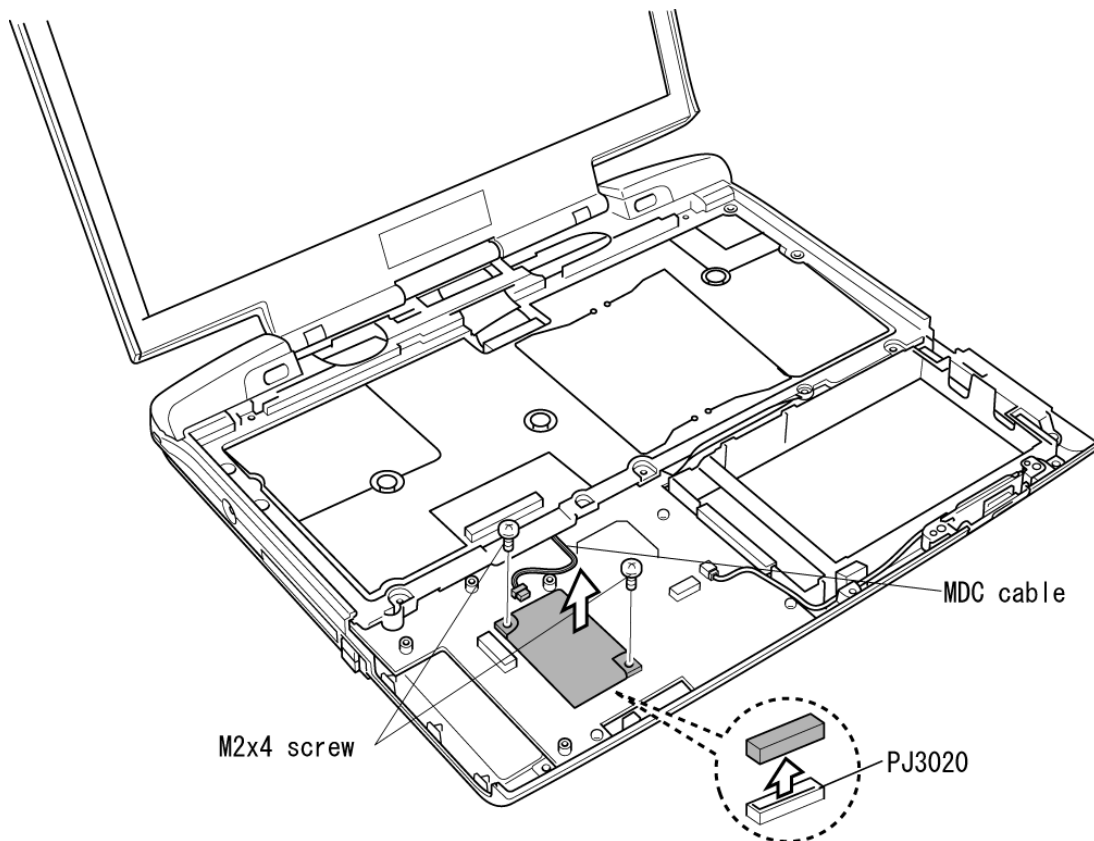


Figure 4-26 Removing the modem daughter card



### Installing the Modem Daughter Card

To install the modem relay board, follow the steps below and refer to figures 4-26.

1. Connect the **MDC cable** to the modem daughter card
2. Seat the **modem daughter card** and press carefully on the end of the card to connect it to **PJ3020** on the system board. Be careful not to damage the card or connector.
3. Secure the **modem daughter card** with **two M2×4 screws**.

## 4.12 Wireless Communication Switch Board

### Removing the Wireless Communication Switch Board

To remove the **Wireless communication switch board**, follow the steps below and refer to figure 4-27.

1. Disconnect the  **cable** from **PJ3270** on the system board.
2. Remove **one M2×4 screw** securing the **Wireless communication switch board**.
3. Lift out the **Wireless communication switch board**.
4. Disconnect the  **cable** from **PJ3290** on the **Wireless communication switch board**.

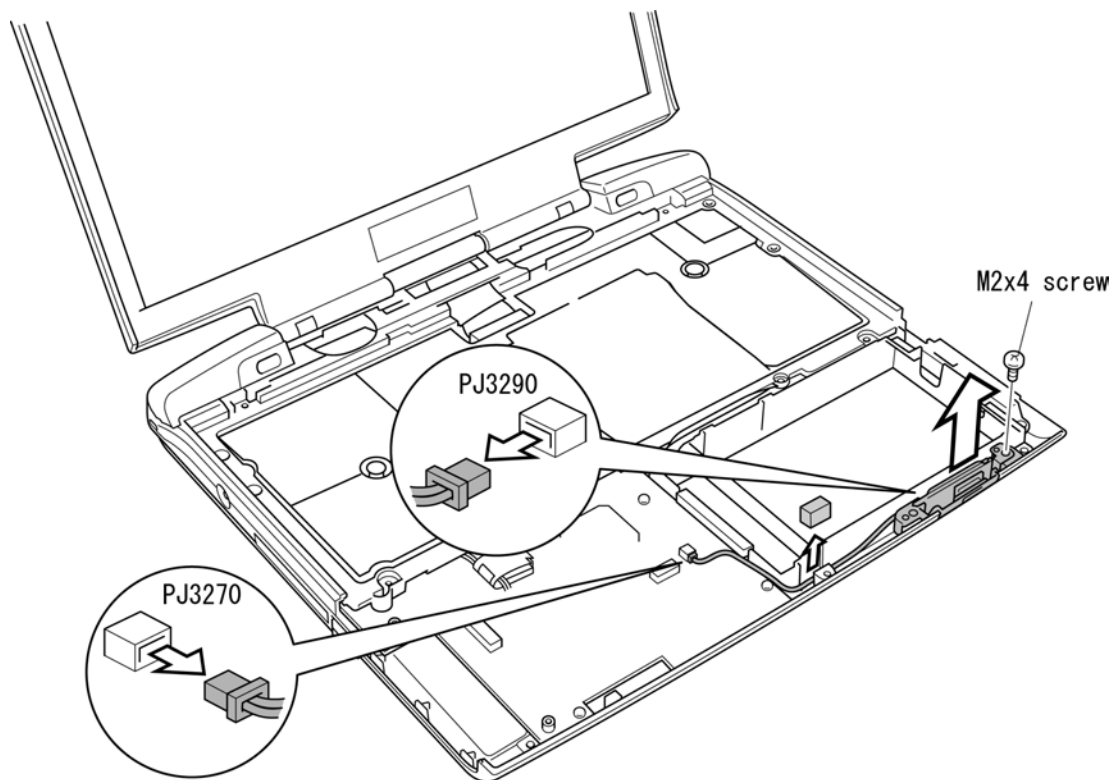


Figure 4-27 Removing the Wireless Communication Switch Board

### Installing the Wireless Communication Switch Board

To install the **Wireless communication switch board**, follow the steps below and refer to figure 4-27.

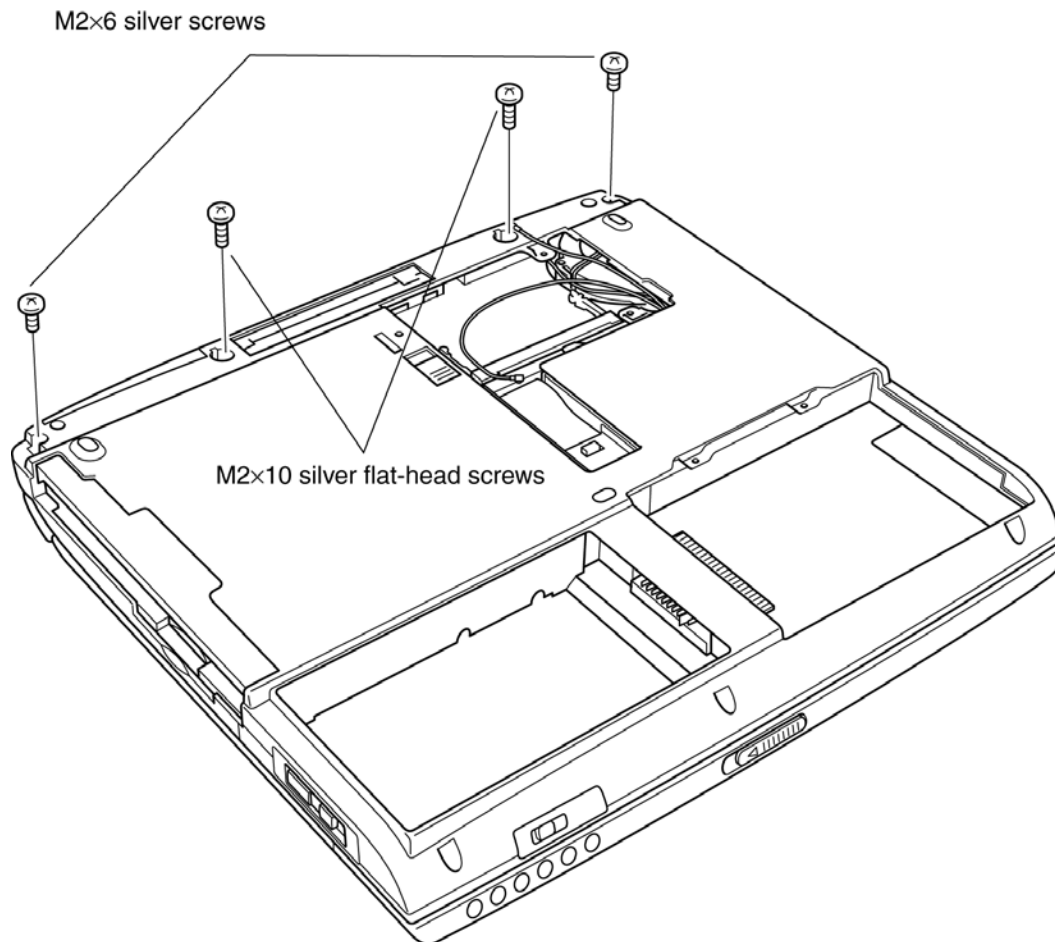
1. Connect the  **cable** to **PJ3290** on the **Wireless communication switch board**.
2. Seat the **Wireless communication switch board** in place.
3. Connect the  **cable** to **PJ3270** on the system board.
4. Secure the **Wireless communication switch board** with **one M2×4 screw**.

## 4.13 Top Cover with Display Assembly

### Removing the Top Cover with Display Assembly

To remove the top cover with display assembly, follow the steps below and refer to figures 4-28 to 4-30.

1. Turn the computer upside down, and remove the following **four screws**:
  - **Two M2×6 silver screws**
  - **Two M2×10 silver flat-head screws**



*Figure 4-28 Removing four screws from the bottom of the computer*

2. Turn the computer right side up and open the **display panel**.
3. Disconnect the **LCD/LED cable** from **PJ5600**.
4. Disconnect the **Speaker cables** from **PJ9511** and **PJ9512** on the system board.

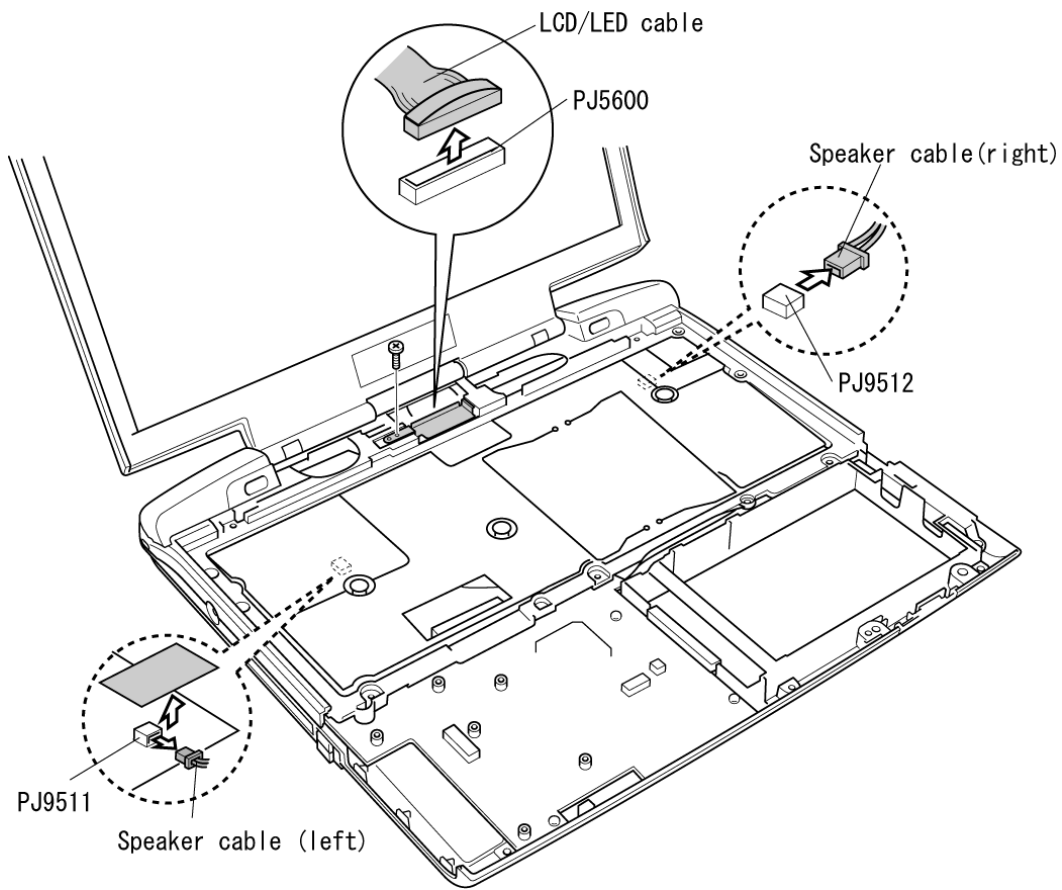
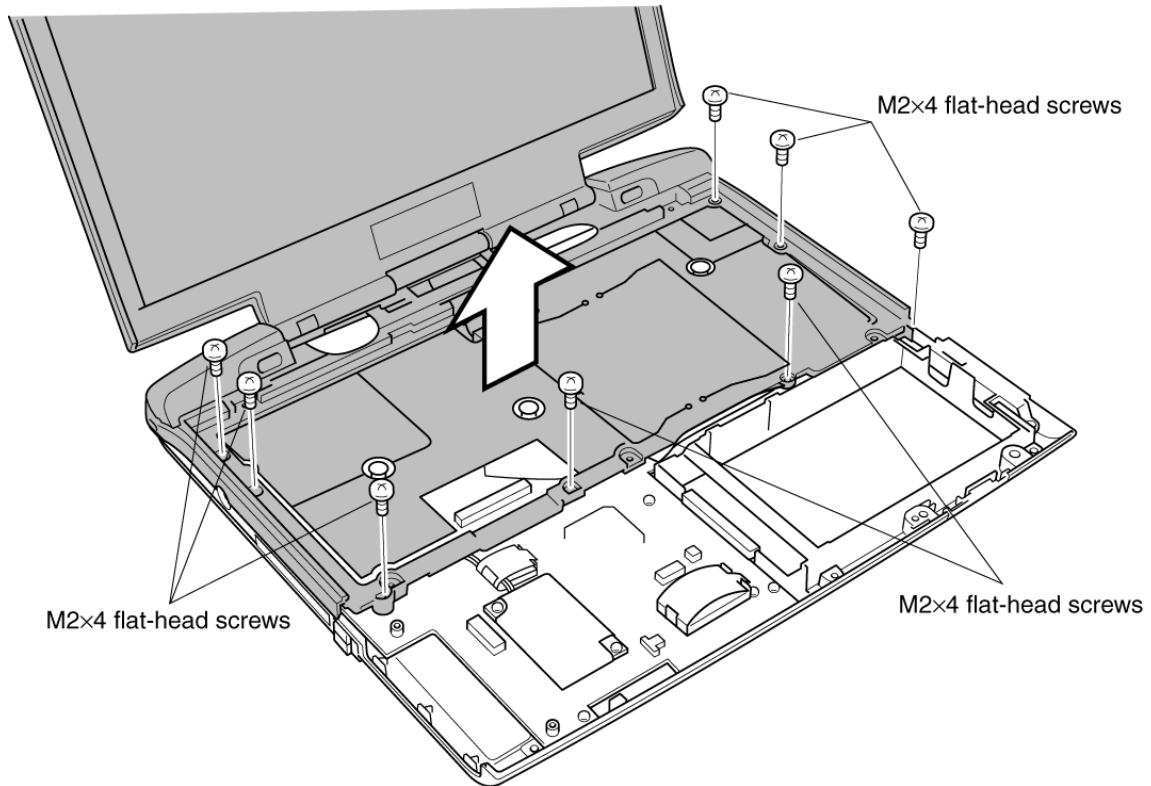


Figure 4-29 Disconnecting cables

5. Remove **eight M2×4 flat-head screws**.
6. Remove the **top cover with display assembly**. Be careful not to damage the Bluetooth and wireless LAN antenna coaxial cables.



*Figure 4-30 Remove eight screws and top cover with display assembly*

## Installing the Top Cover with Display Assembly

To install the top cover with display assembly, follow the steps below and refer to figures 4-28to 4-32.

1. Be careful to route the wireless LAN antenna coaxial cables so that the **display assembly** will not pinch it.
2. Seat the **top cover with display assembly**.
3. Route the Left speaker cable and connect to the connector **PJ9511**.
4. Route the **Wireless LAN cables** and **Bluetooth cable**.
5. Secure the **cables** with the **tape**.

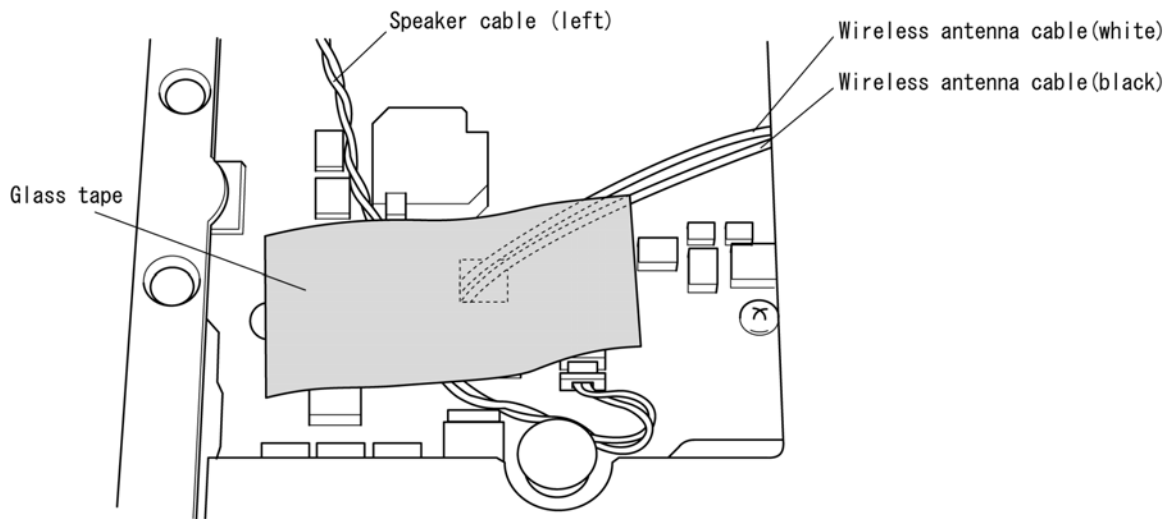


Figure 4-31 Route the Left Speaker cable

**CAUTION:** Be careful to route the cable so that the Top cover will not pinch it. Make sure it lies between the two chips. Refer to Figure 4-31.

6. Route the **Right speaker cable** and connect it to the connector **PJ9512**.

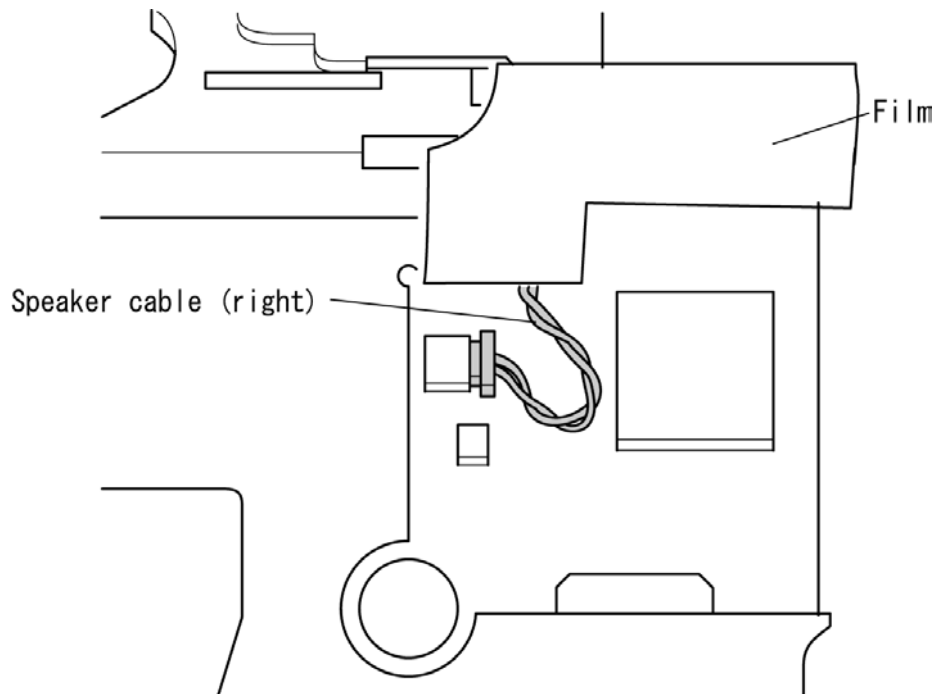


Figure 4-32 Route the Right Speaker cable

**CAUTION:** Be careful to route the cable so that the Top cover will not pinch it. Make sure it lies to the left of the IC 312. Refer to Figure 4-32.

7. Press along the edges of the **top cover with display assembly** to secure latches.
8. Connect the **LCD/LED cable** to **PJ5600**.
9. Secure **eight M2×4 flat-head screws**.
10. Close the **top cover with display assembly** and turn the computer upside down.
11. Secure the following four screws:
  - **Two M2×6 silver screws**
  - **Two M2×10 silver flat-head screws**

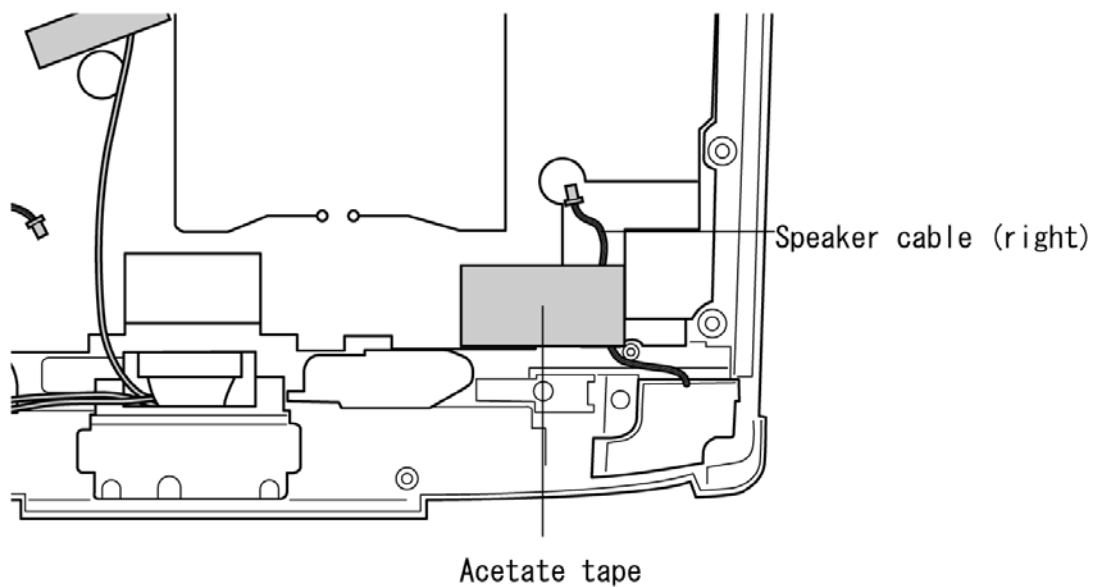


## 4.14 Speakers

### Removing the Speakers

To remove the speakers, follow the steps below and refer to figure 4-33, 4-34.

1. Seat the **top cover and display assembly**.
2. Remove the **acetate tape** fixing the speaker cable (right) on the back.



*Figure 4-33 Removing the glass tape*

3. Remove **two M2x3 silver flat head screws**.
4. Grasp the **speakers** and lift up to remove it.

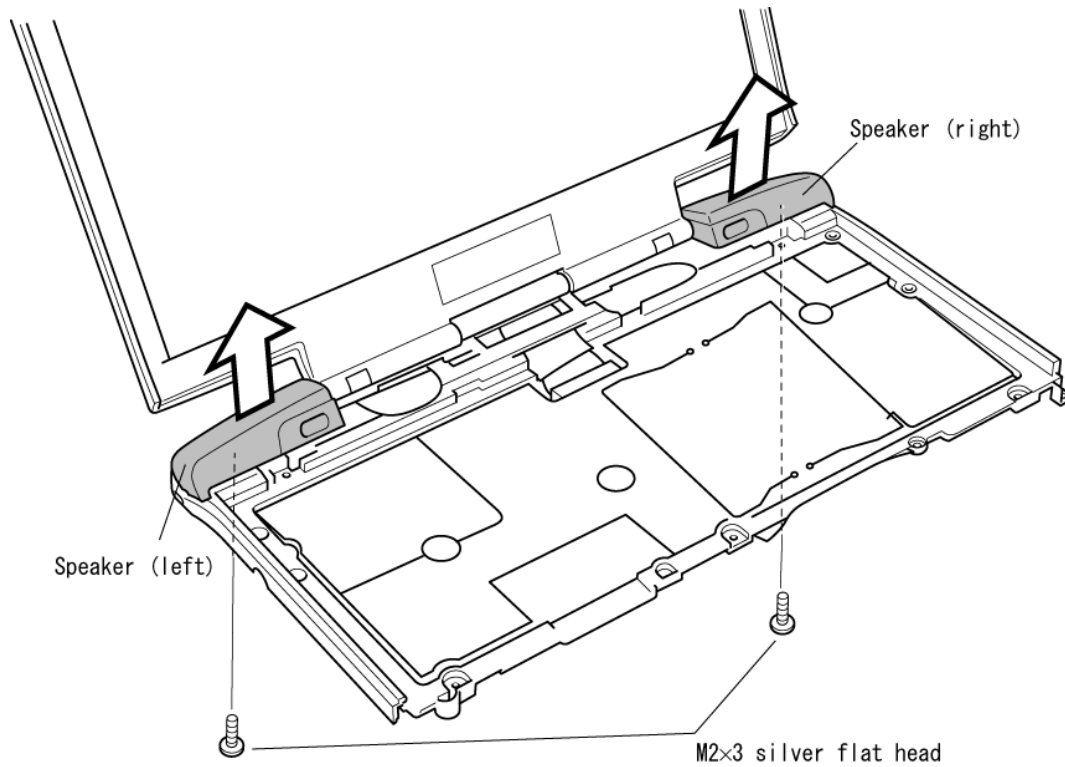


Figure 4-34 Removing Speakers

### **Installing the Speakers**

To install the speakers, follow the steps below and refer to figure 4-33, 4-34.

1. Pass each **speaker cable** through the hole and seat each **speaker**.
2. Secure each speaker with a **M2x3 silver flat head** screw.
3. Fix the speaker cable (right) with an acetate tape on the back.

## 4.15 System Board

### Removing the System Board

To remove the system board, follow the steps below and refer to figures 4-35 and 4-36.

1. Remove **two M2×4 screws** securing the **system board**.
2. Remove the **glass tapes** securing the **MDC cable** and **Modem/LAN cable**.
3. Disconnect the **MDC cable** from the connector **PJ3022** on the system board.
4. Disconnect the **Modem/LAN cable** from **PJ3021** and **PJ4101** on the system board.

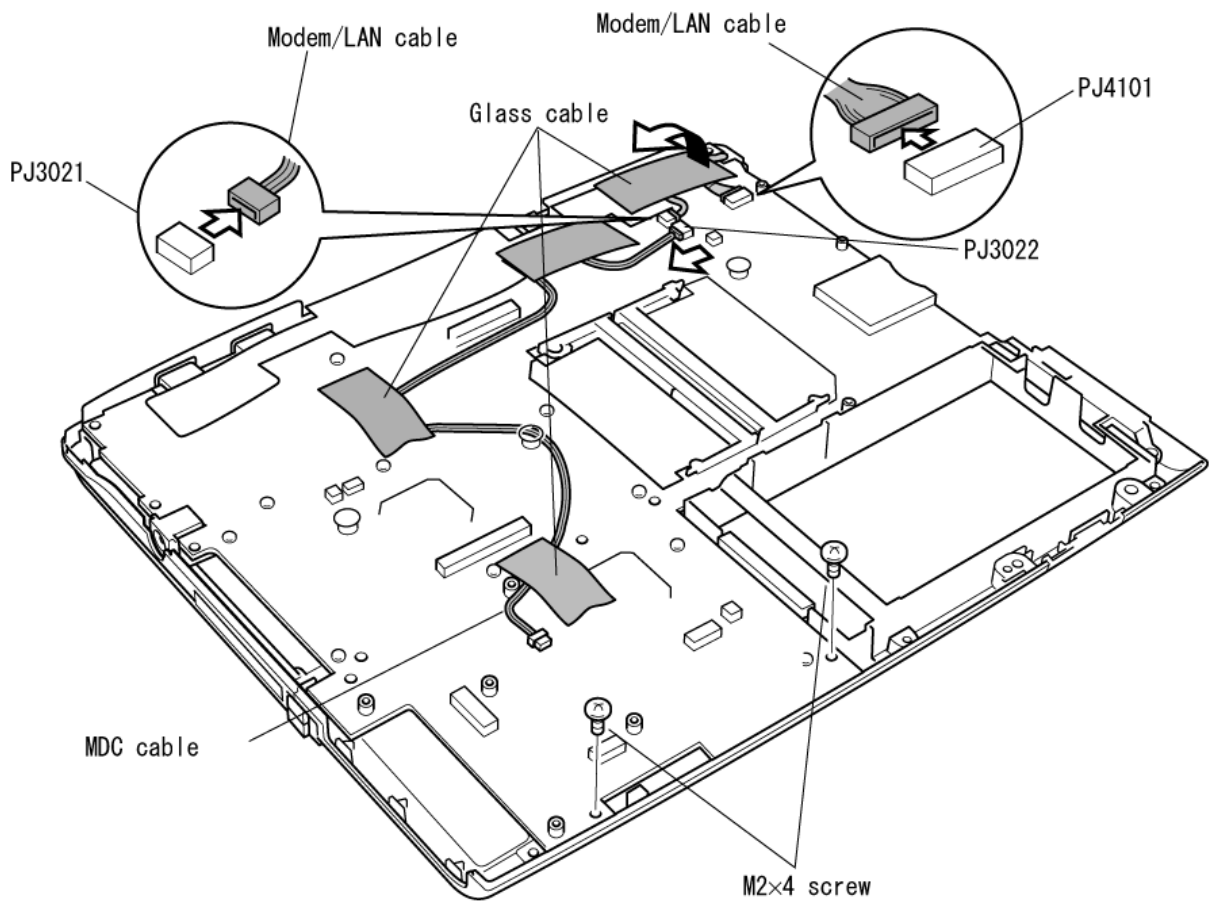


Figure 4-35 Removing the screws securing the system board

5. Carefully lift up the **system board** to disconnect it from **PJ9500** on the **I/O board**.

**CAUTION:** *The system board is connected to the IO board by stacking connectors. When removing the system board, be sure to lift up the system board perpendicularly and gently. Do not to give excessive stress to the connectors. Otherwise the soldered portions of connectors may be damaged*

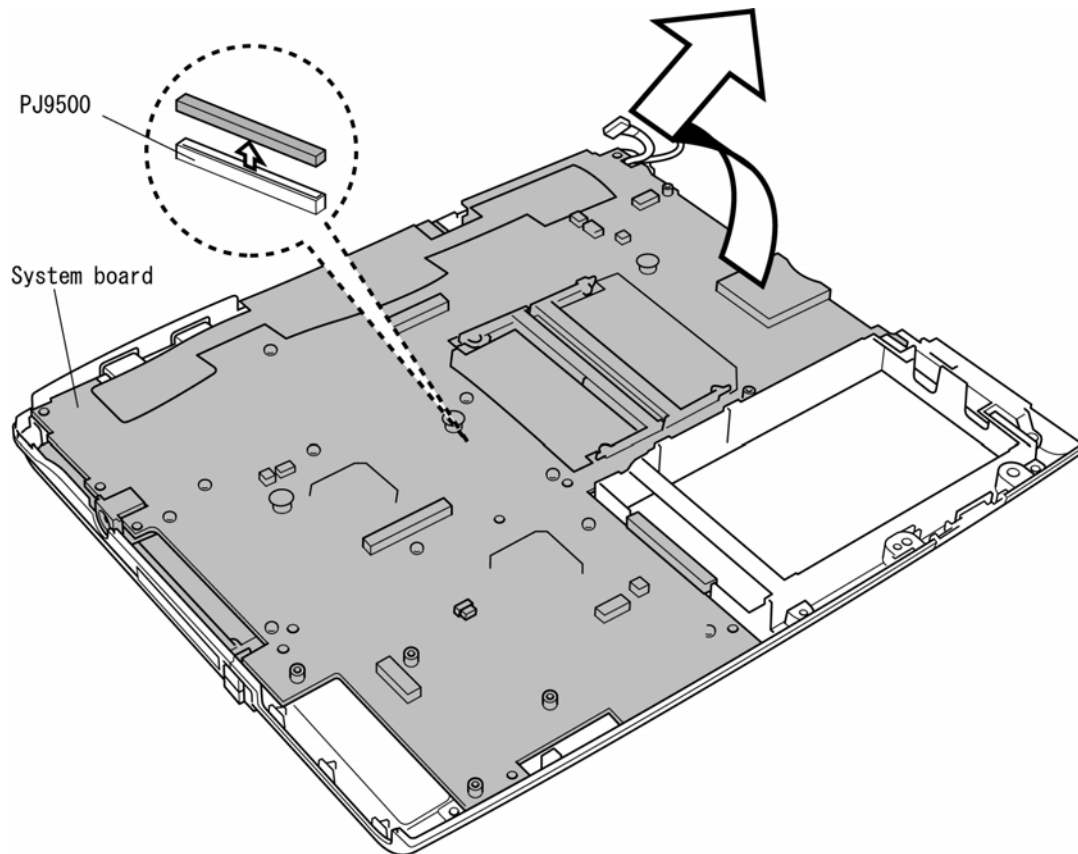


Figure 4-36 Removing the system board

## Installing the System Board

To install the system board, follow the steps below and refer to figures 4-35 to 4-37.

1. Seat the **system board**.
2. Connect the **system board** to **PJ9500** on the **I/O board**.
3. Route the **Modem/LAN cable** through the **notch of the system board**.
4. Connect the **MDC cable** to the connector **PJ 3022** and **Modem/LAN cable** to the connector **PJ3021/PJ4101** on the **system board**.
5. Secure the **cables** with **glass tapes**.

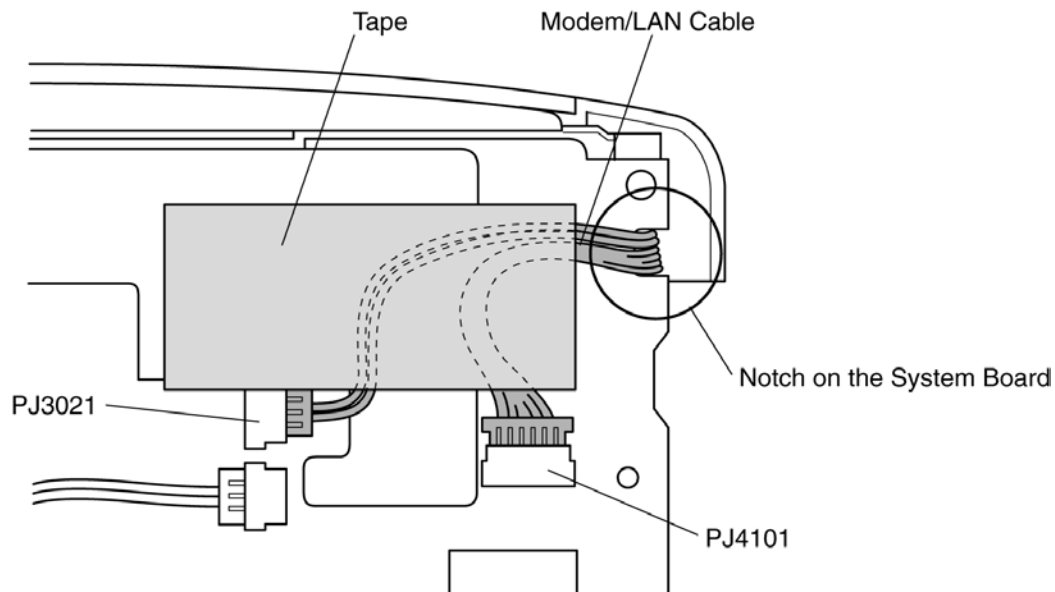


Figure 4-37 Seating the cables

**CAUTION:** Make sure the cable lies inside the notch. Be careful not to damage or pinch the cables when you seat the system board in the bottom case. Secure the cable with a glass tape referring to Figure 4-37. Be careful not to lay the cable on the lead of DIP of the RJ11/RJ45 connector.

6. Secure the **system board** with **two M2×4 screws**.

**CAUTION:** *Make sure you connect the boards securely. A loose connection could cause damage to the boards. Also, if the connectors are not fully seated the boards could be bent and damaged when you secure them with screws.*

**CAUTION:** *There are two MAC address barcode labels in the package containing the new system board. Apply one label to the bottom of the computer and one to 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.*

## 4.16 PC Card Slot

### Removing the PC card slot

To remove the PC card slot, follow the steps below and refer to figures 4-38 and 4-39.

1. Lay the **system board** right side up.
2. Remove **four M2×12 screws**.

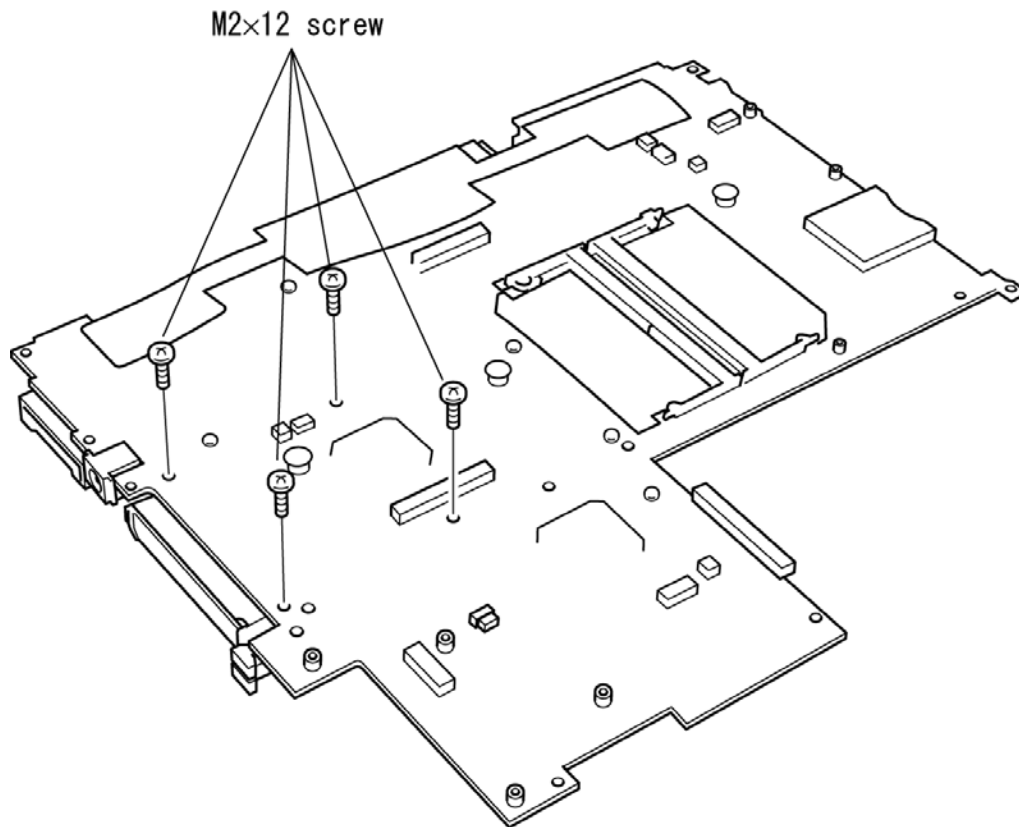
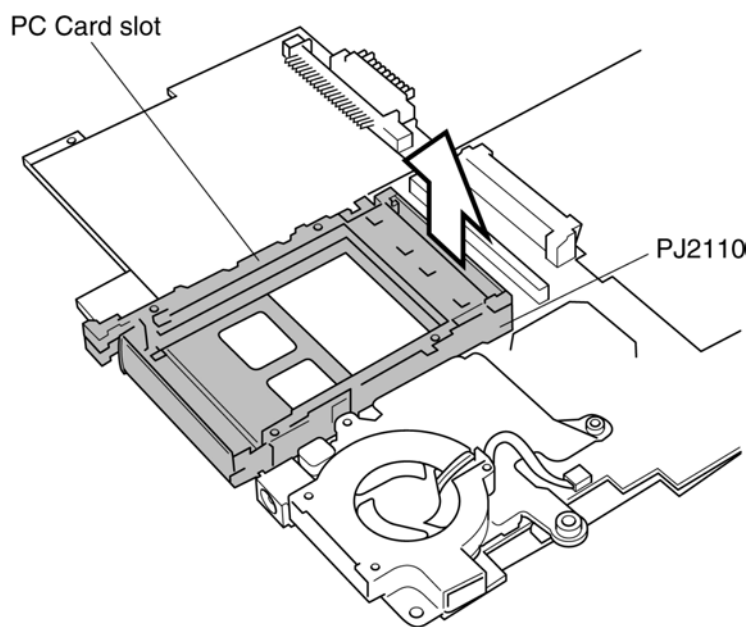


Figure 4-38 Removing four screws securing PC card slot



3. Lift up the **PC card slot** to disconnect from the connector **PJ2110**.



*Figure 4-39 Removing the PC card slot*

**Installing the PC card slot**

To install the PC card slot, follow the steps below and refer to figures 4-38 and 4-39.

1. Fit the **PC card slot** into the connector **PJ2110** on the system board.

**CAUTION:** *If you do not seat the PC card slot completely, you might not be able to connect the system board properly. Make sure the plastic part of the PC card slot is flush with the connector.*

2. Secure **four M2×12 screws**.

## 4.17 I/O Board

### Removing the I/O Board

To remove the I/O Board, follow the steps below and refer to figures 4-40 and 4-41.

1. Remove **five M2×4 screws** securing the **I/O Board**.
2. Lift out the **I/O Board**.

**CAUTION:** When removing the IO board, be sure to lift up it perpendicularly and gently. Do not to give excessive stress to the stacking connectors. Otherwise the soldered portions of connectors may be damaged.

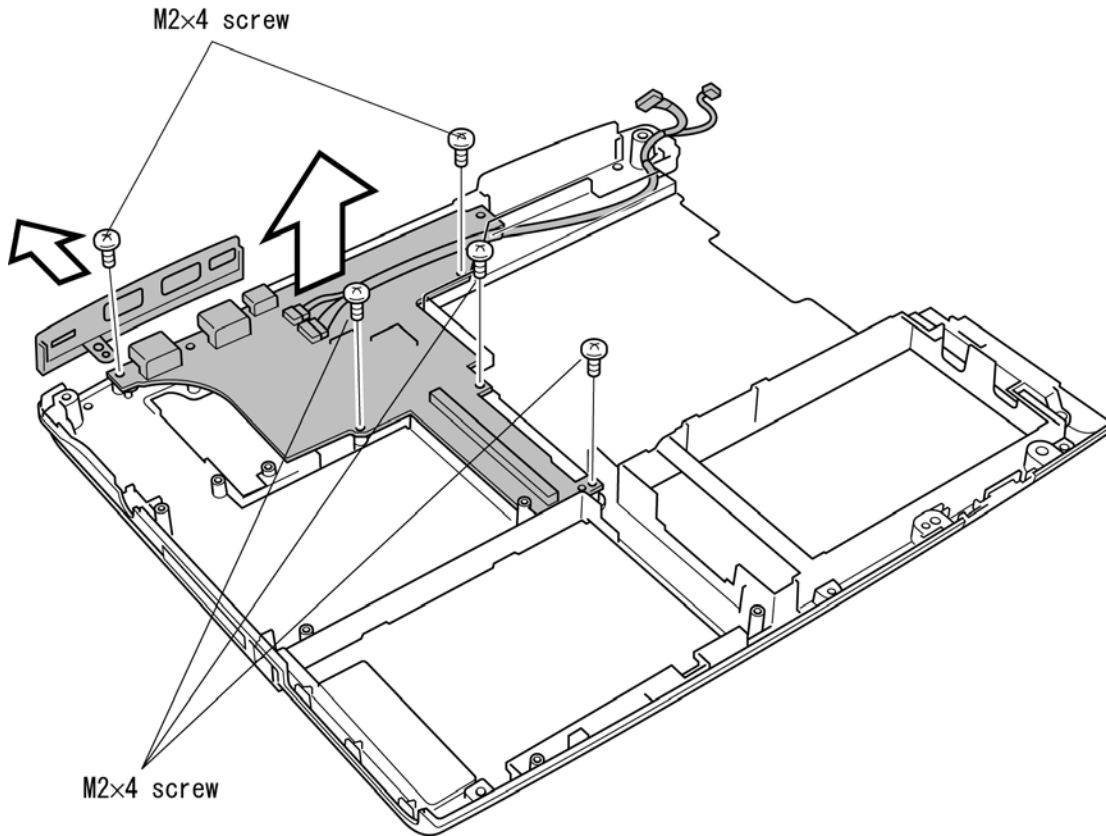
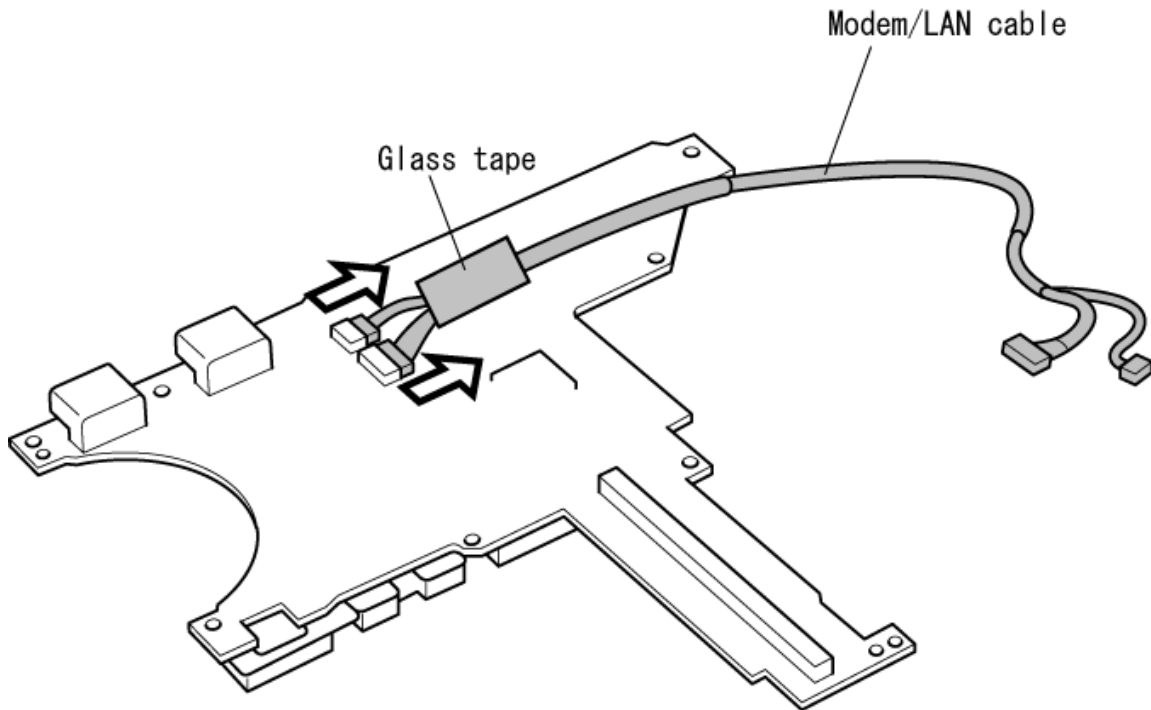


Figure 4-40 Removing six screws securing the I/O Board

3. If necessary, remove the **Modem/LAN cable** with peeling off the glass tape.



*Figure 4-41 Removing the Modem/LAN cable*

**Installing the I/O board**

To install the I/O board, follow the steps below and refer to figures 4-40 and 4-41.

1. Connect the **Modem/LAN cable** to the I/O board and fix it with the glass tape.
2. Seat the **I/O board**.
3. Secure the **I/O board** with **five M2×4 screws**.

**CAUTION:** *Make sure you connect the boards securely. A loose connection could cause damage to the boards. Also, if the connectors are not fully seated the boards could be bent and damaged when you secure them with screws.*

## 4.18 Display Mask

### Removing the display mask

To remove the display mask, follow the steps below and refer to figures 4-42 and 4-43.

1. Remove the **rubber seals** with tweezers.
2. Remove **two M2×4 screws** securing display mask.

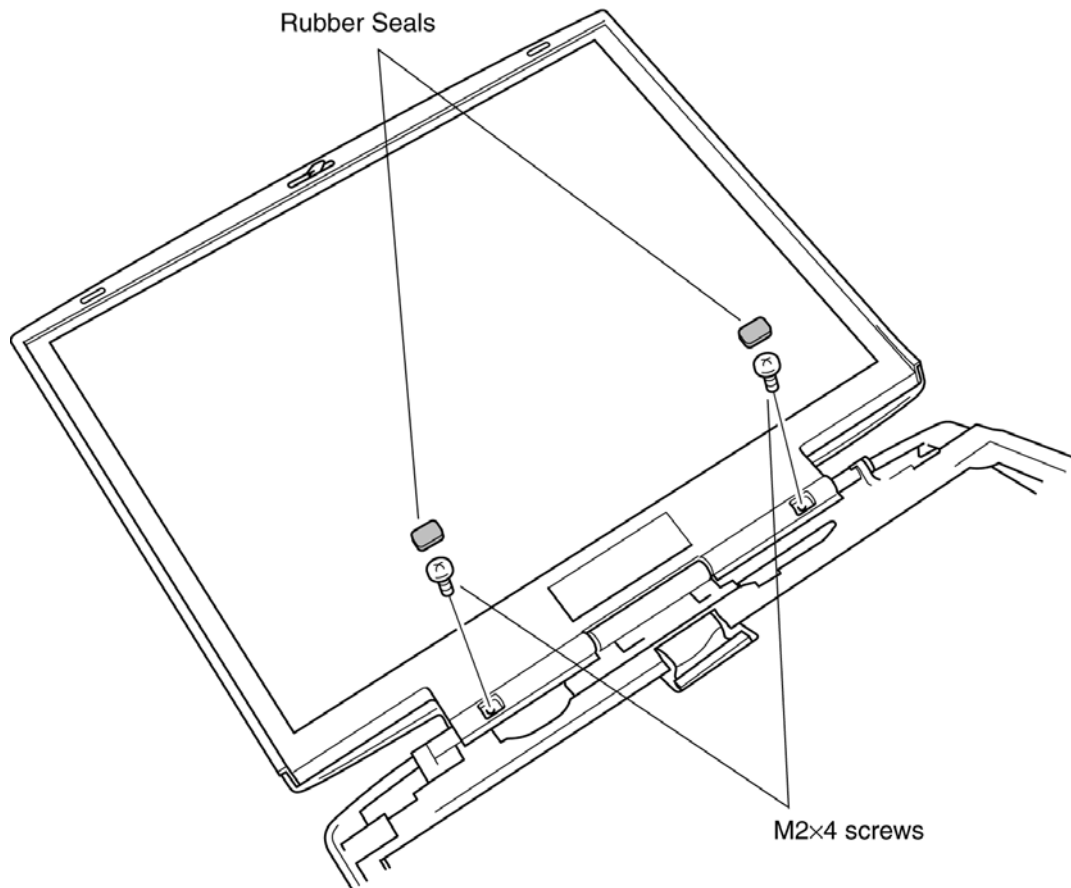


Figure 4-42 Removing the rubber seals and screws

3. Release **latches** securing the **display mask** and remove the mask.

**CAUTION:** When releasing latches, do not give excessive force to the thin parts of display mask.

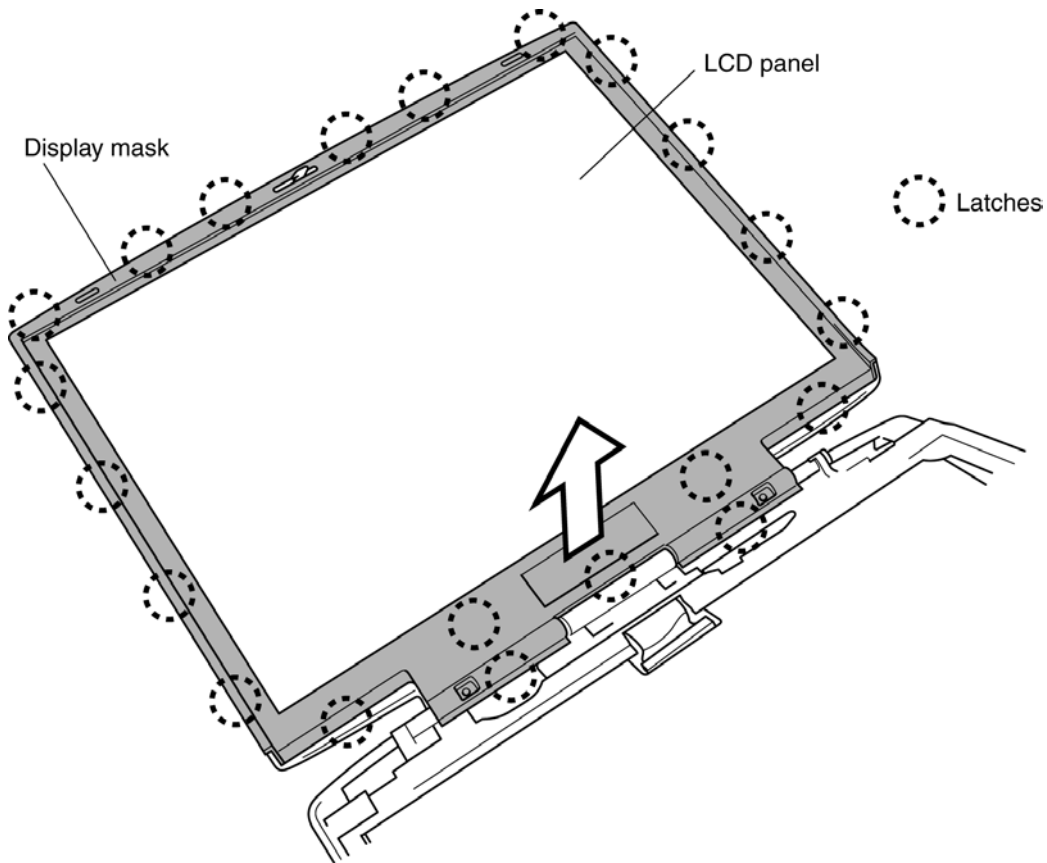


Figure 4-43 Removing the display mask

**Installing the display mask**

To install the system board, follow the steps below and refer to figures 4-42 and 4-43.

1. Seat the **display mask** and press to secure latches in the order of upper, right, left and lower side.
2. Secure the **display mask** with **two M2×4 screws**.
3. Secure the **rubber seals** with tweezers.



## 4.19 FL Inverter Board

### Removing the FL inverter board

To remove the FL inverter board, follow the steps below and refer to figure 4-44.

1. Remove one **M2x4 flat-head screw** securing the **FL inverter board**.

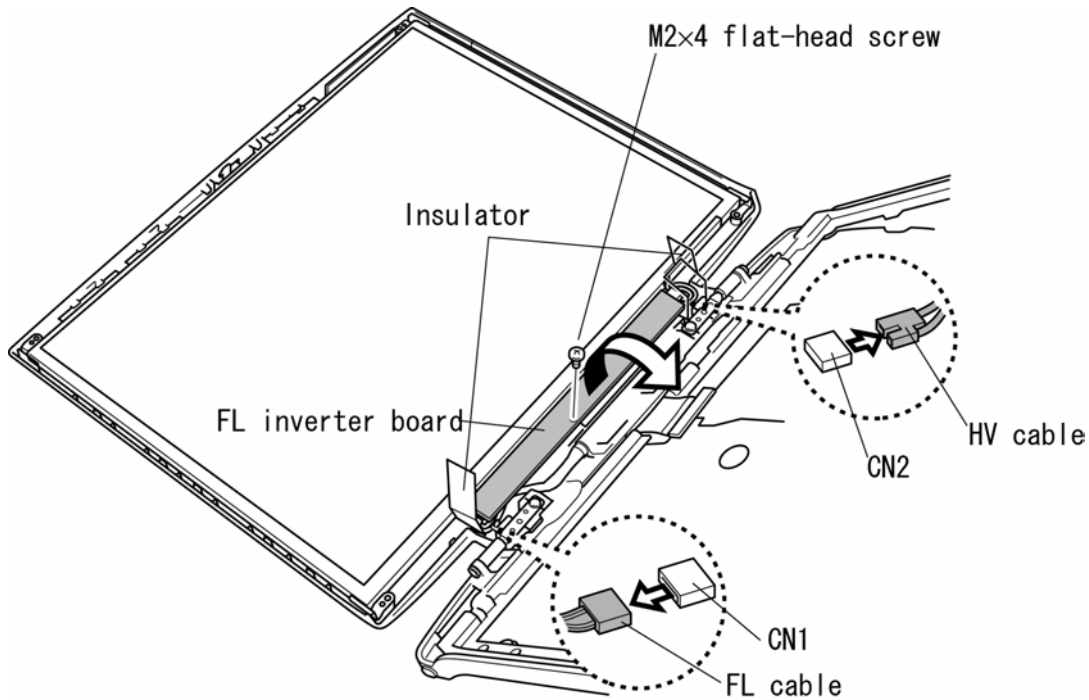


Figure 4-44 Removing two screws

2. Peel off **insulators** on both the sides of FL inverter board.
3. Disconnect the **FL cable** from **CN1** on the **FL inverter board**.
4. Disconnect the **HV cable** from **CN2** on the **FL inverter board**.
5. Remove the **FL inverter board**.

**Installing the FL inverter board**

To install the FL inverter board, follow the steps below and refer to figure 4-44.

1. Connect the **HV cable** to **CN2** on the **FL inverter board**.
2. Connect the **FL cable** to **CN1** on the **FL inverter board**.
3. Seat the **FL inverter board** and secure it with **one M2x4 flat-head screw**.
4. Stick **insulators** to both sides of FL inverter board.

## 4.20 LCD Module

### Removing the LCD module

To remove the LCD module, follow the steps below and refer to figures 4-45 and 4-46.

**CAUTION:** You do not need to remove the LCD module's metal fittings unless you are going to change the LCD module or FL.

1. Remove **four M2×4 screws** securing the **LCD module**.

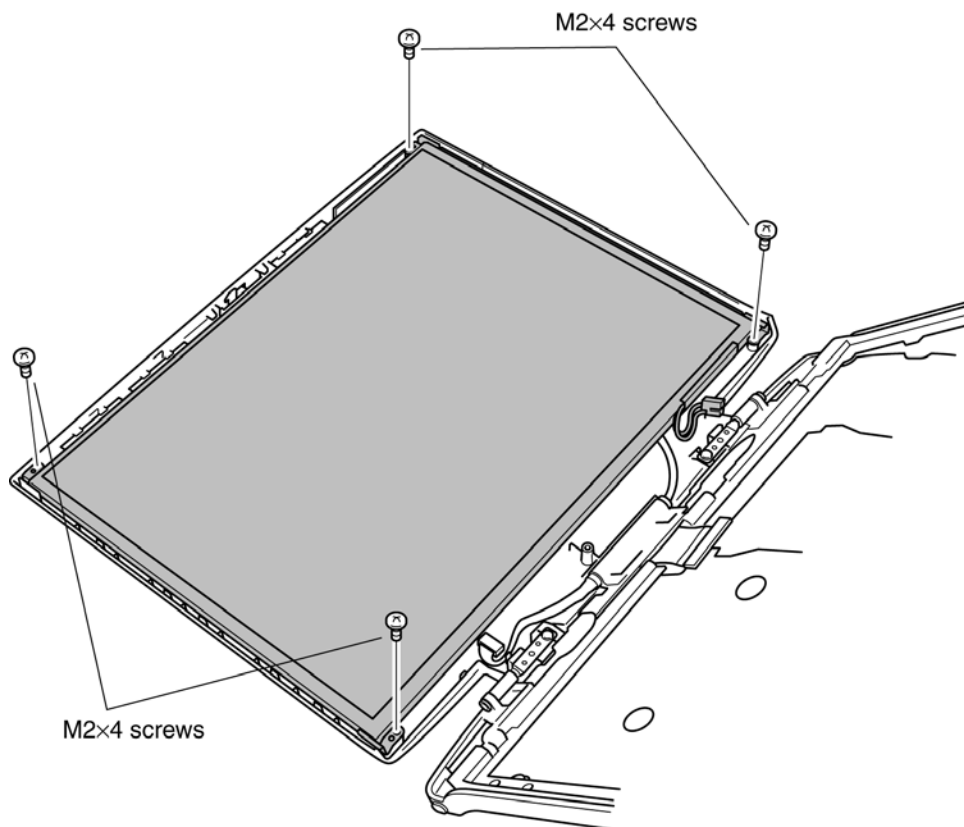


Figure 4-45 Removing four screws

2. Lift up the left side of the **LCD module** as indicated by the arrow in the figure below.
3. Peel off the **glass tape** fixing the LCD connector.
4. Disconnect the **LCD cable** from the LCD connector and remove the **LCD module**.

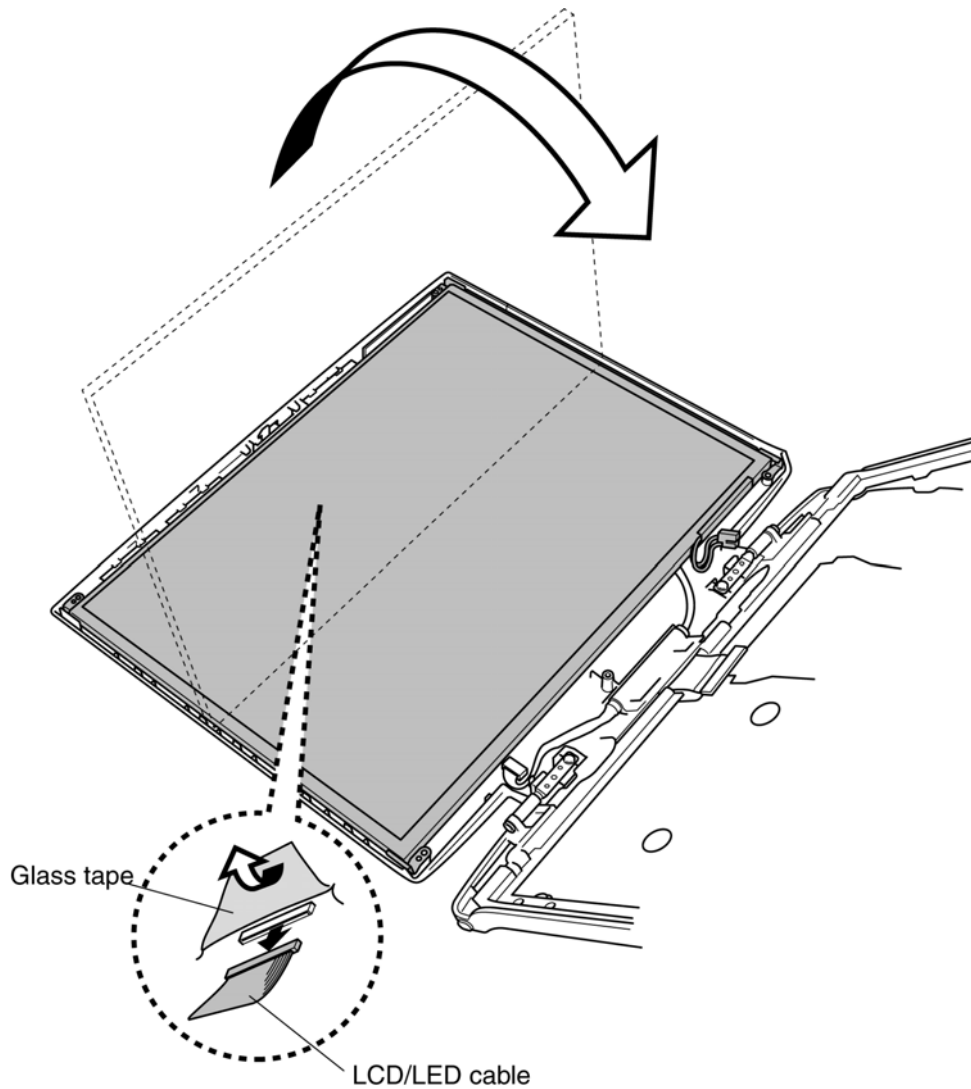


Figure 4-46 Removing the LCD module

**Installing the LCD module**

To install the LCD module, follow the steps below and refer to figures 4-45 and 4-46.

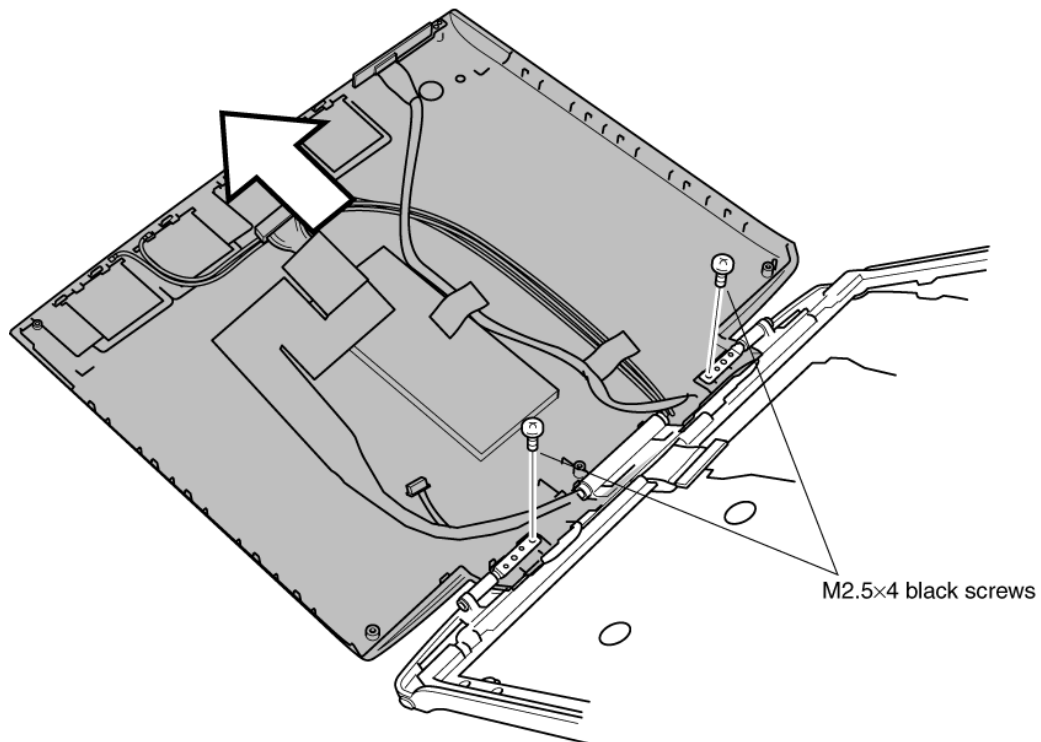
1. Connect the **LCD cable** to the **LCD connector** on the back of the **LCD module**.
2. Fix the **connected part of the LCD cable** with a glass tape.
3. Seat the **LCD module** in the **display panel**.
4. Secure the **LCD module** with **four M2×4 screws**.

## 4.21 LCD/LED Cable

### Removing the LCD/LED cable

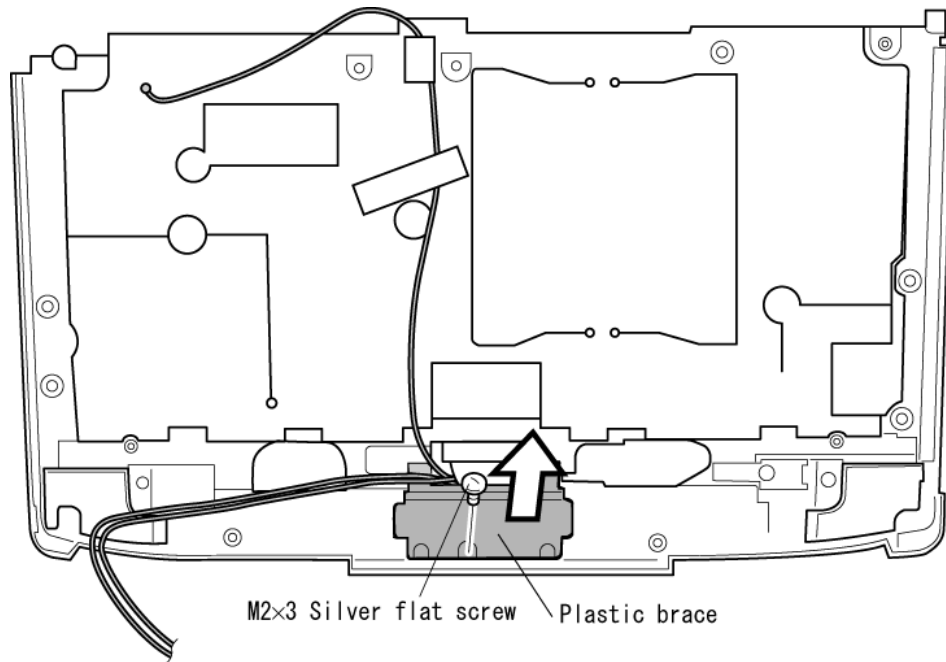
To remove the LCD cable, follow the steps below and refer to figures 4-47 to 4-50.

1. Remove two **M2.5×4 black screws** securing the **display hinge**.
2. Remove the **top cover**.



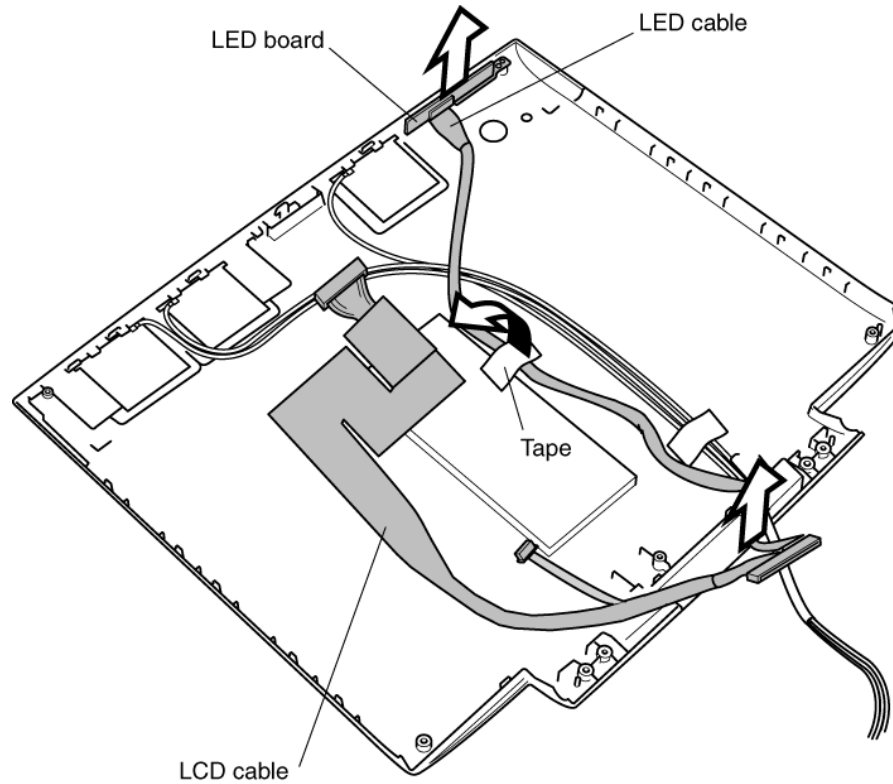
*Figure 4-47 Removing two screws and the top cover*

3. Remove **one M2×3 silver flat-head screw** securing a **plastic brace**.



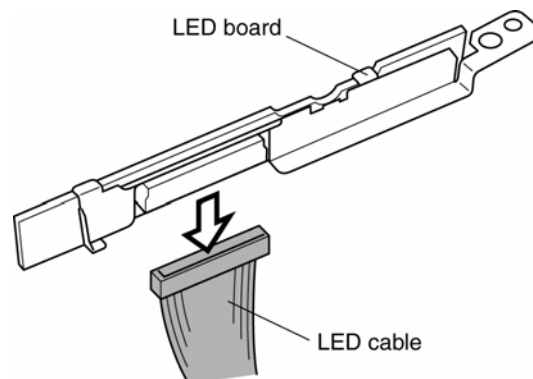
*Figure 4-48 Removing one screw and plastic brace*

4. Lift out the **LED board** from the hook.
5. Peel off the **tape** and remove the **LED cable** and the **LCD cable** together.



*Figure 4-49 Removing the LED board and the tape securing LED cable*

6. If necessary, remove the **LED cable** from the **LED board**.



*Figure 4-50 Removing the LED cable from LED board*



### Installing the LCD/LED cable

To install the LCD/LED cable, follow the steps below and refer to figures 4-47 to 4-50.

**CAUTION:** Do not bend or scrub the LCD/LED cable. A slight damage may cause break down of it. Be careful not to damage it.

1. Route the **LCD/LED cable** through the display hinge and seat the plastic brace.
2. Seat the **LED board** in the **display panel**.
3. Seat the **display hinge** in the **display panel**.
4. Seat the **plastic brace** and secure it with **one M2×3 silver flat-head screw**.

**CAUTION:** When seating the plastic brace, make sure the LCD/LED cable, wireless LAN antenna and bluetooth antenna are not pinched. Be careful not to damage them.

5. Secure the **display hinge** with **two M2.5×4 black screws**.

## 4.22 Antenna Coaxial Cables

### Removing the Antenna Coaxial Cables

To remove the antenna coaxial cables, follow the steps below and refer to figures 4-51 to 4-54.

1. Remove two **M2.5×4 black screws** securing the **display hinge**.
2. Remove the **top cover**.

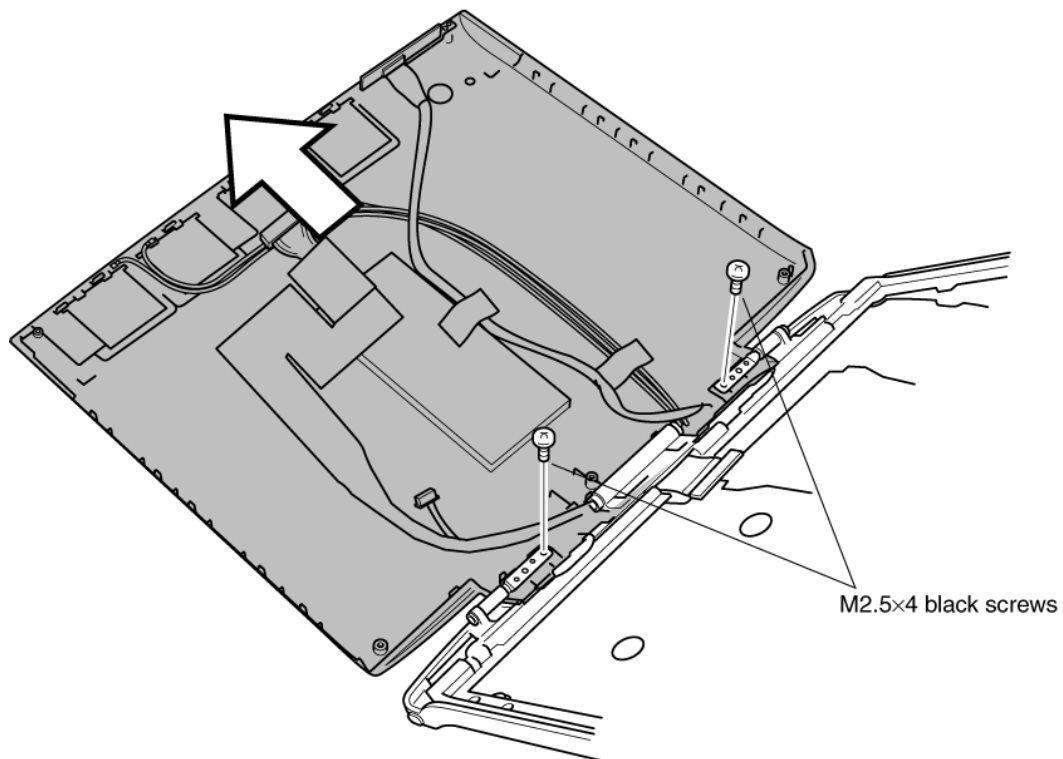
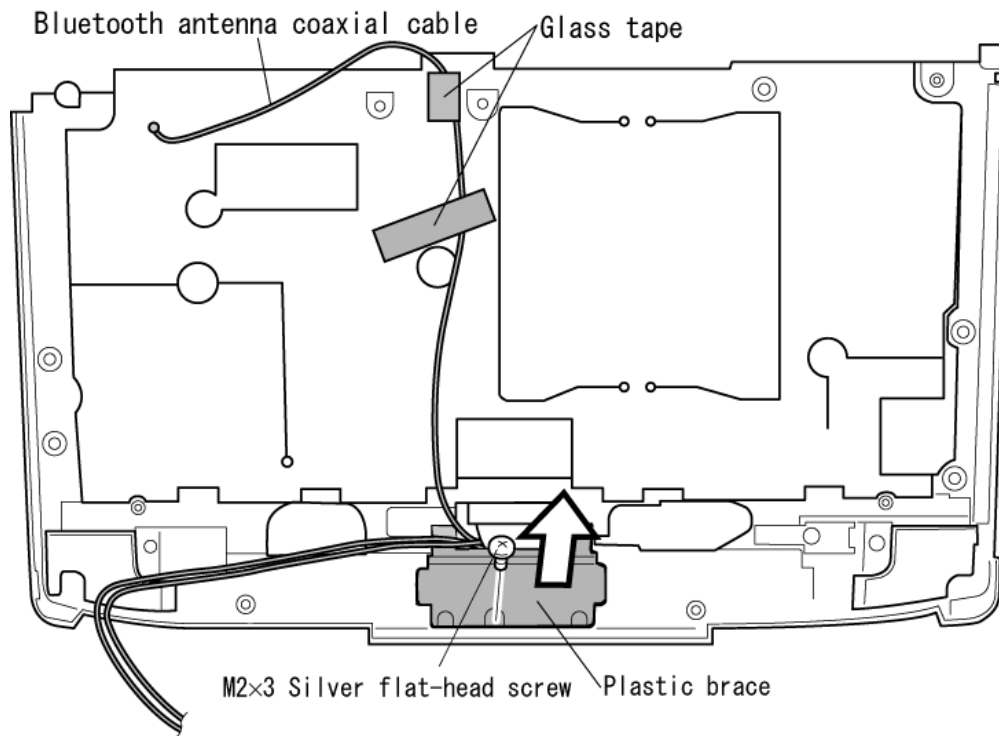


Figure 4-51 Removing two screws and the top cover

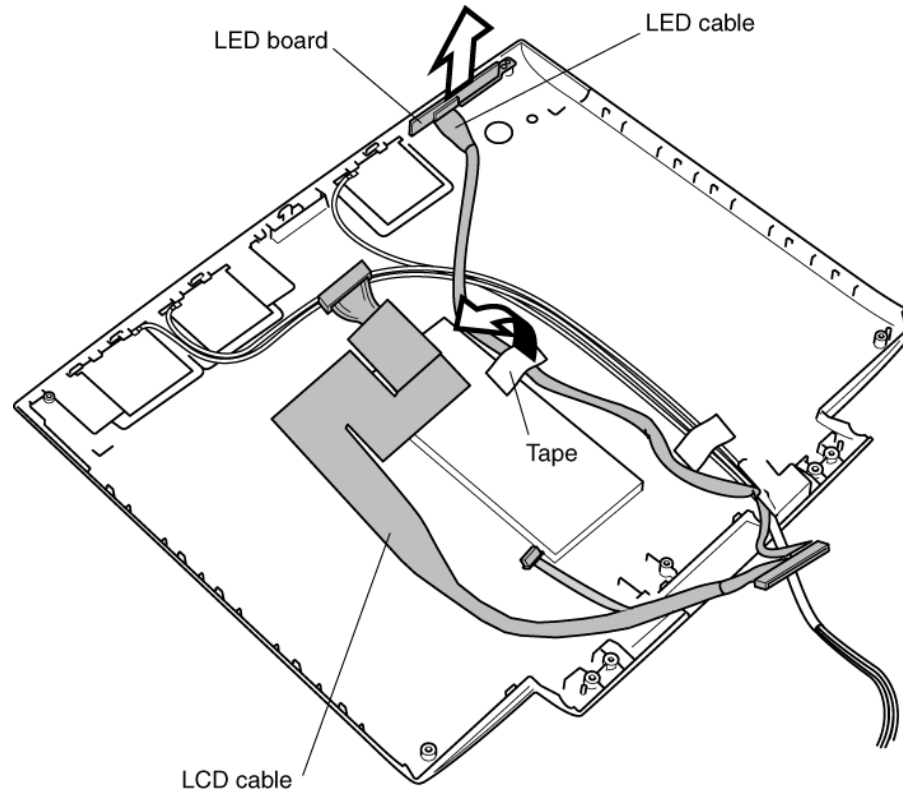
3. Remove **one M2×3 silver flat-head screw** securing **one plastic brace**.



*Figure 4-52 Removing one screw and plastic brace*

4. Remove two **glass tapes** securing the **Bluetooth antenna coaxial cable**.

5. Lift out the **LED board** from the hook.
6. If necessary, peel off the **tape** fixing the **LED cable**.



*Figure 4-53 Removing the LED board and the tape securing LED cable*

**CAUTION:** You do not need to remove the LCD/LED cable from the hinge unless you are going to change the LCD/LED cable.

7. Peel off the **tape** and remove **the antenna coaxial cables**.

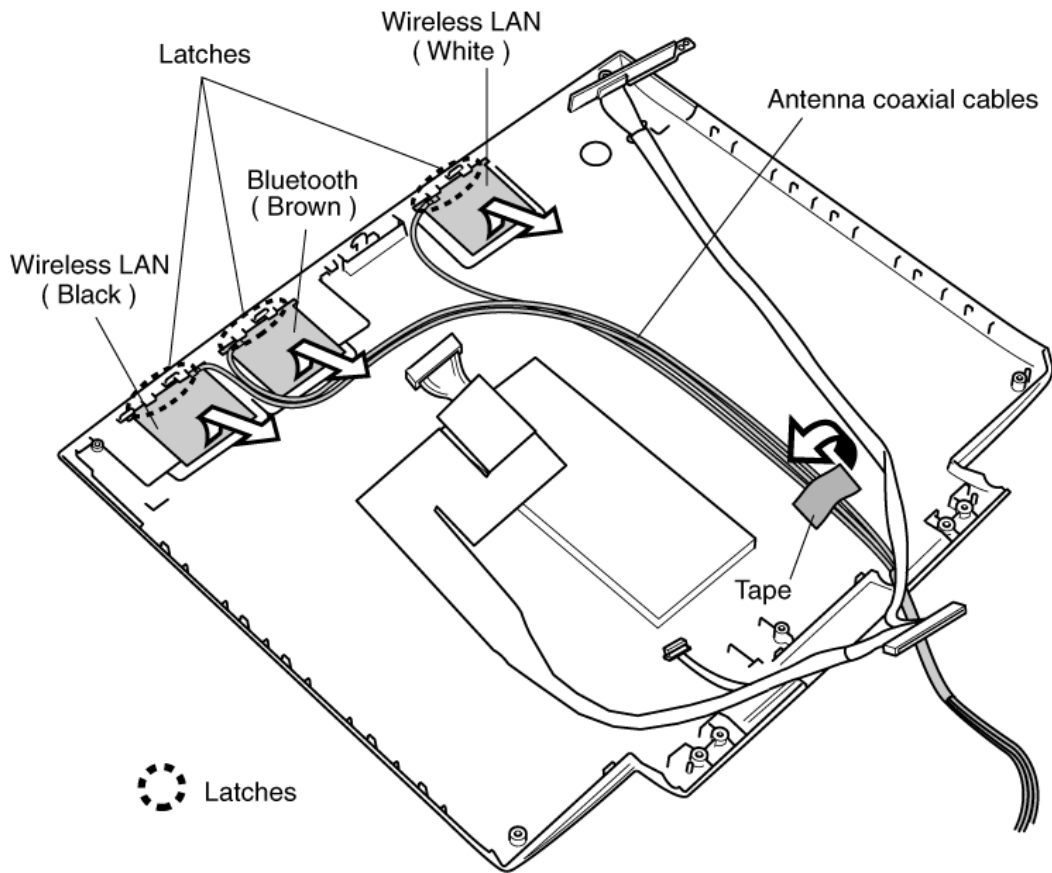


Figure 4-54 Removing the tape and the antenna

**CAUTION:** The tip of antenna is like film and is fit in the latch portion. Do not bent or scrub it. A slight damage may cause break down of tip. Be careful not to damage it.

### Installing the Antenna Coaxial Cables

To install the antenna coaxial cables, follow the steps below and refer to figure 4-51 to 4-54.

**CAUTION:** *The tip of antenna is like film and is fit in the latch portion. Do not bent or scrub it. A slight damage may cause break down of tip. Be careful not to damage it.*

1. Route the **antenna coaxial cables** through the display hinge and seat the plastic brace.
2. Route the **LCD/LED cable and seat the LED board.**
3. Seat the **display hinge** in the **display panel.**
4. Seat the **plastic brace** and secure it with **one M2×3 silver flat-head screw.**

**CAUTION:** *When seating the plastic brace, make sure the LCD/LED cable, wireless LAN antenna and bluetooth antenna are not pinched. Be careful not to damage them.*

5. Secure the display hinge with **two M2.5×4 black screws.**

## 4.23 TFT FL (Model 12.1 Toshiba)

### Removing the TFT FL (Model 12.1 Toshiba)

To remove the TFT FL (Model 12.1 Toshiba), follow the steps below and refer to Figures 4-55 to 4-58.

1. Carefully, turn the LCD module upside down on the flat surface of the table. To avoid damaging the surface of the LCD module, lay it on a protective, dust-free sheet such as a soft, clean cloth.
2. Remove the light-green tape securing the wire.
3. Remove the FPC protective sheet, the blue tape and the PCB sheet. Keep the PCB sheet for reuse.
4. Remove four screws.

**CAUTION:** Do not damage the FPC.

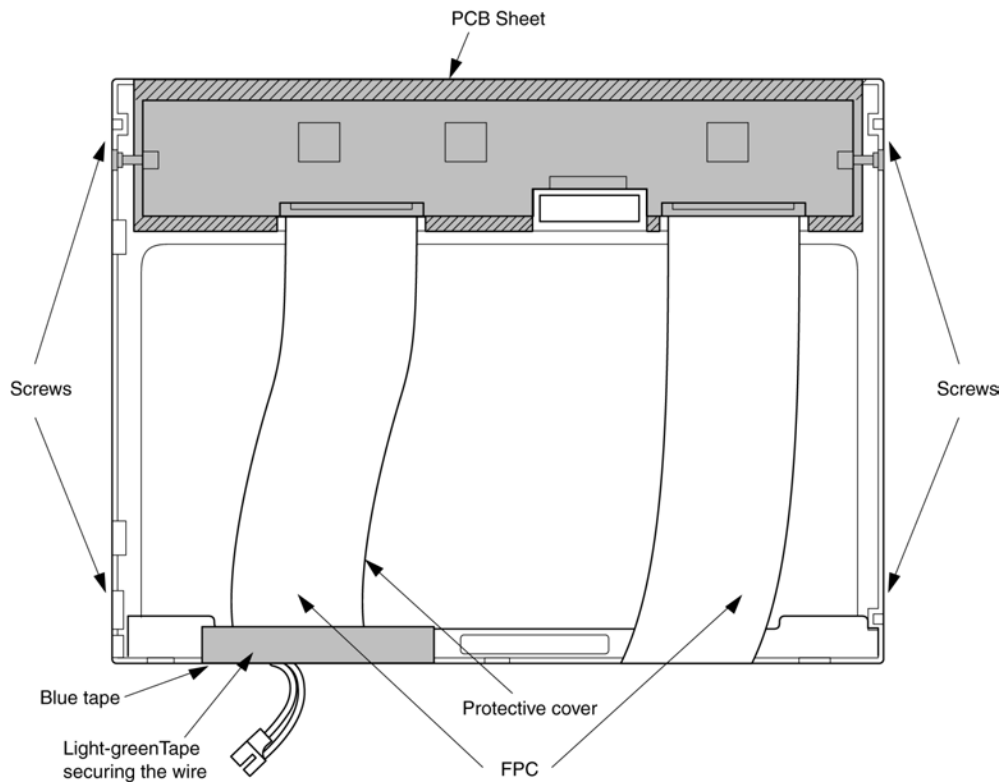


Figure 4-55 Removing the tapes and sheet

**CAUTION:** Use a point size 0 Phillips screwdriver to remove the screws. Do not damage the PCB when you pull the FPC out of the hook on the frame.

5. Remove copper ground.
6. Remove the PCB from the backlight frame.

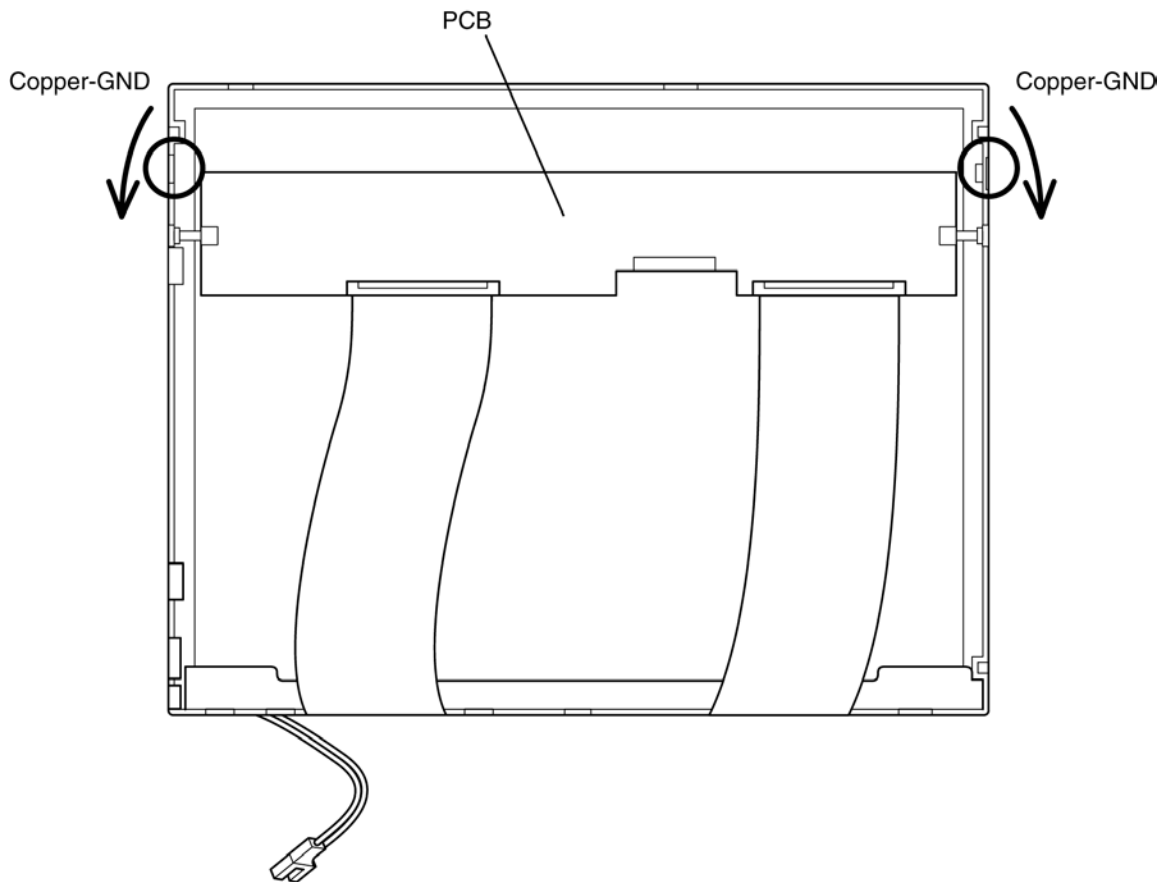


Figure 4-56 Removing the Copper-ground



7. Turn the LCD module right side up.
8. Release **three latches** on the lamp side of the frame.
9. Release **three latches** on the opposite side of the frame.

**CAUTION:** Do not damage the FPC with the bend parts on the top side of the frame when you remove the frame.

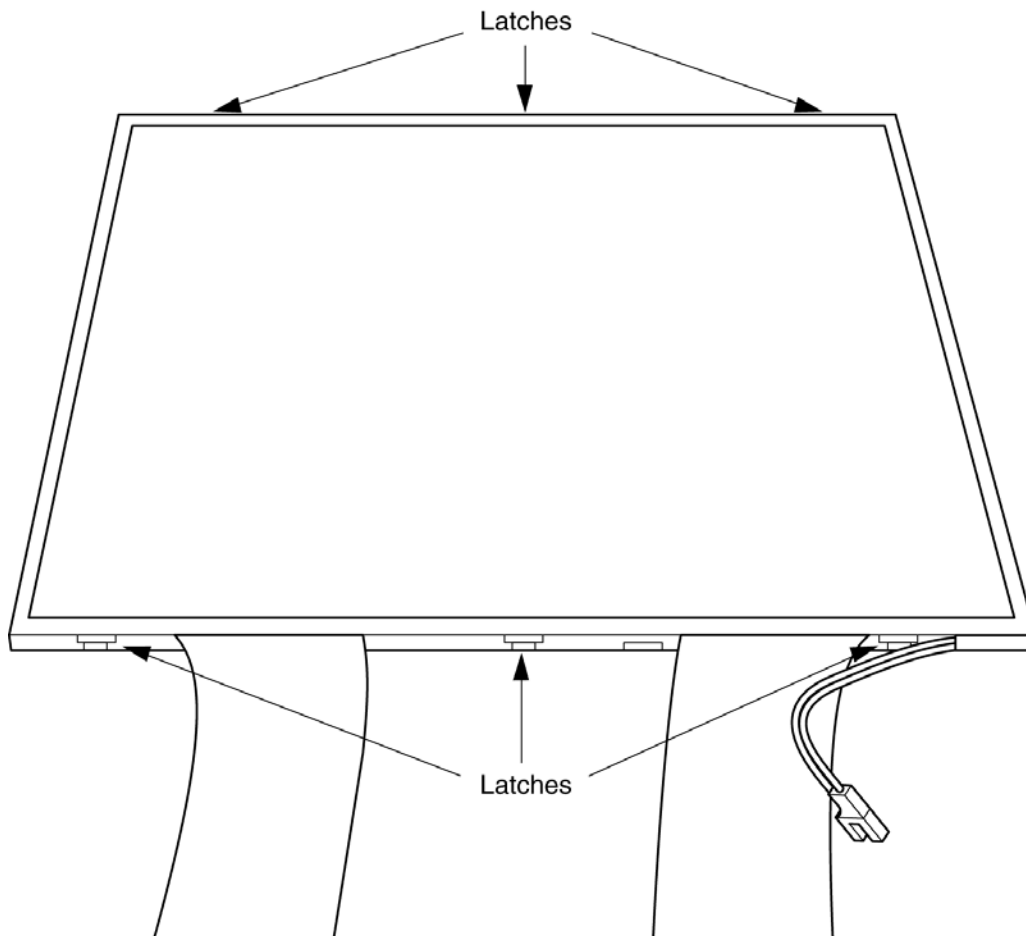


Figure 4-57 Removing the frame

10. Separate the PCB-ASSY cell from the backlight unit in the illustrated below.

**CAUTION:** Do not damage the FPC. The TAB and the panel are connected with the PCB.

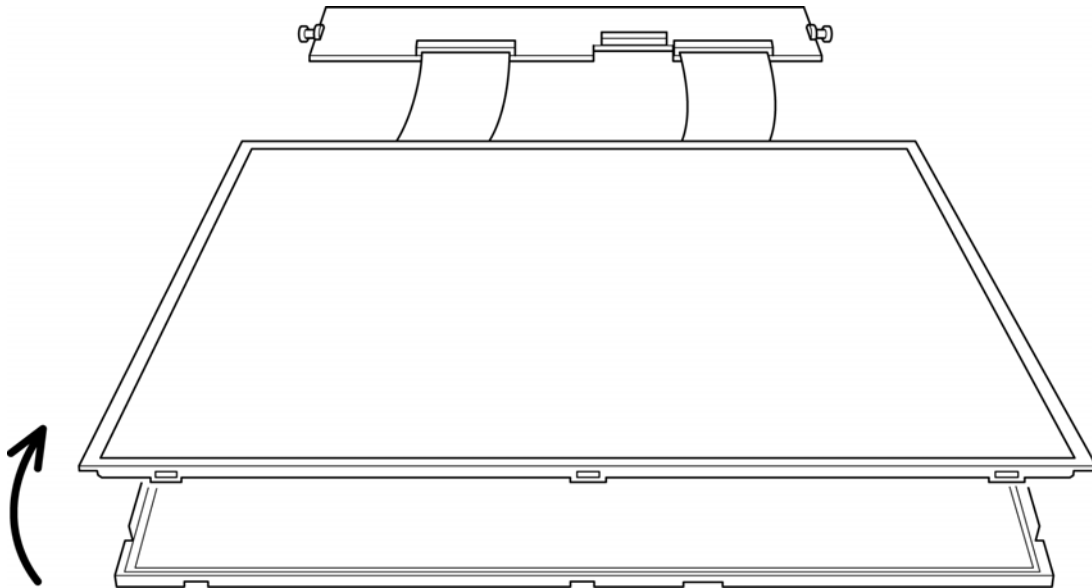
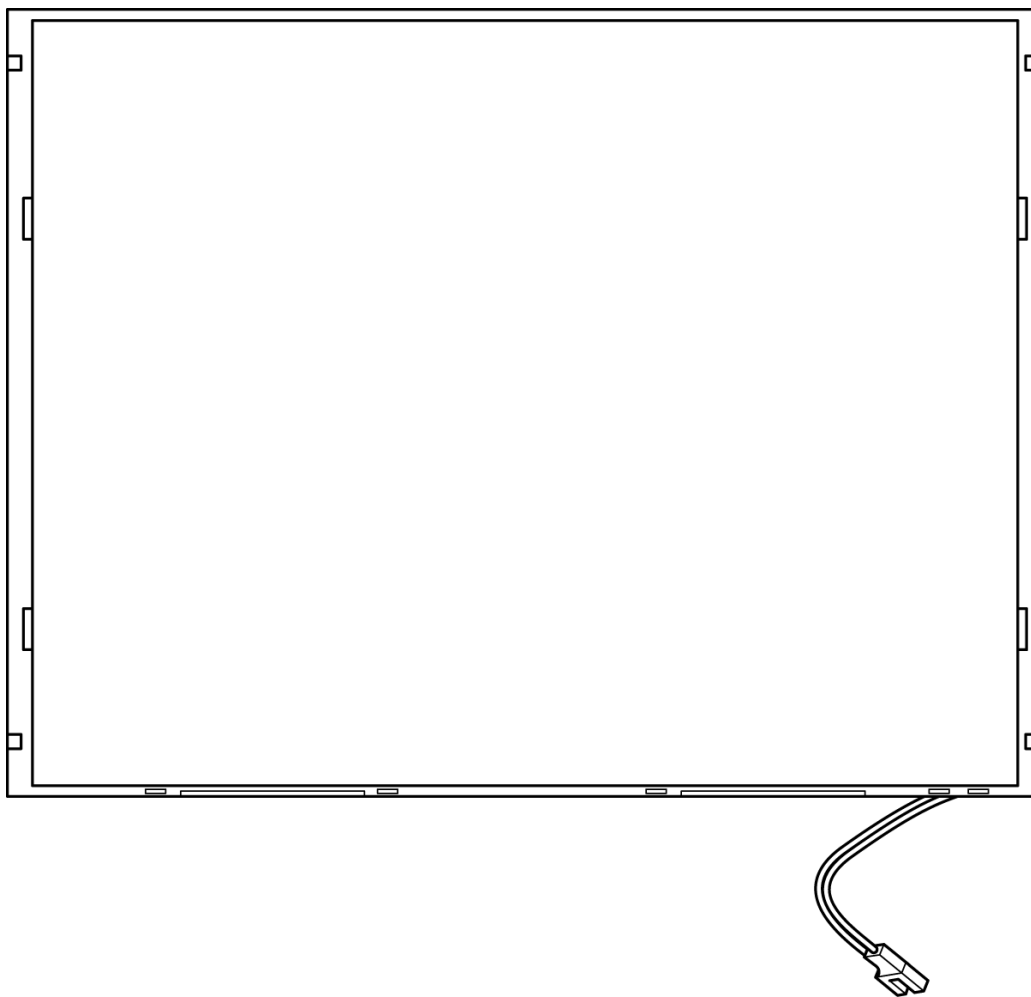


Figure 4-58 Separating the panel

### Installing the TFT FL (Model 12.1 Toshiba)

To install the TFT FL (Model 12.1 Toshiba), follow the steps below and refer to Figures 4-59 to 4-70.

1. Lay a new backlight unit face up.
2. Remove the liner from the double-faced tape.
3. Make sure there is no dust, foreign matter or damage on the backlight or back side of the cell, then install the PCB-ASSY cell to the backlight unit.



*Figure 4-59 Laying a new backlight unit*

4. Lay the LCD panel with PCB-ASSY on top of the backlight unit.
  - a. Fit the top edge first.

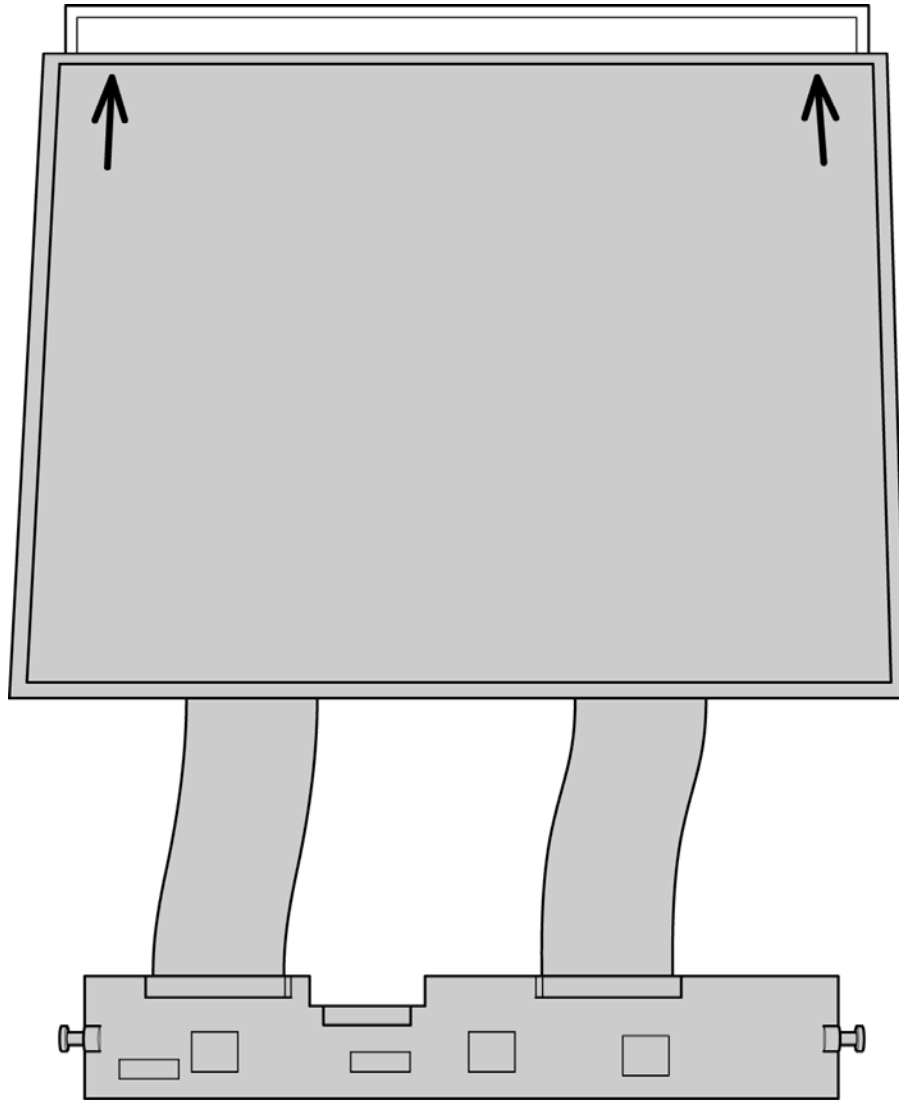


Figure 4-60 Laying the LCD panel with PCB-ASSY (1/2)

- b. Lay the LCD panel in place.

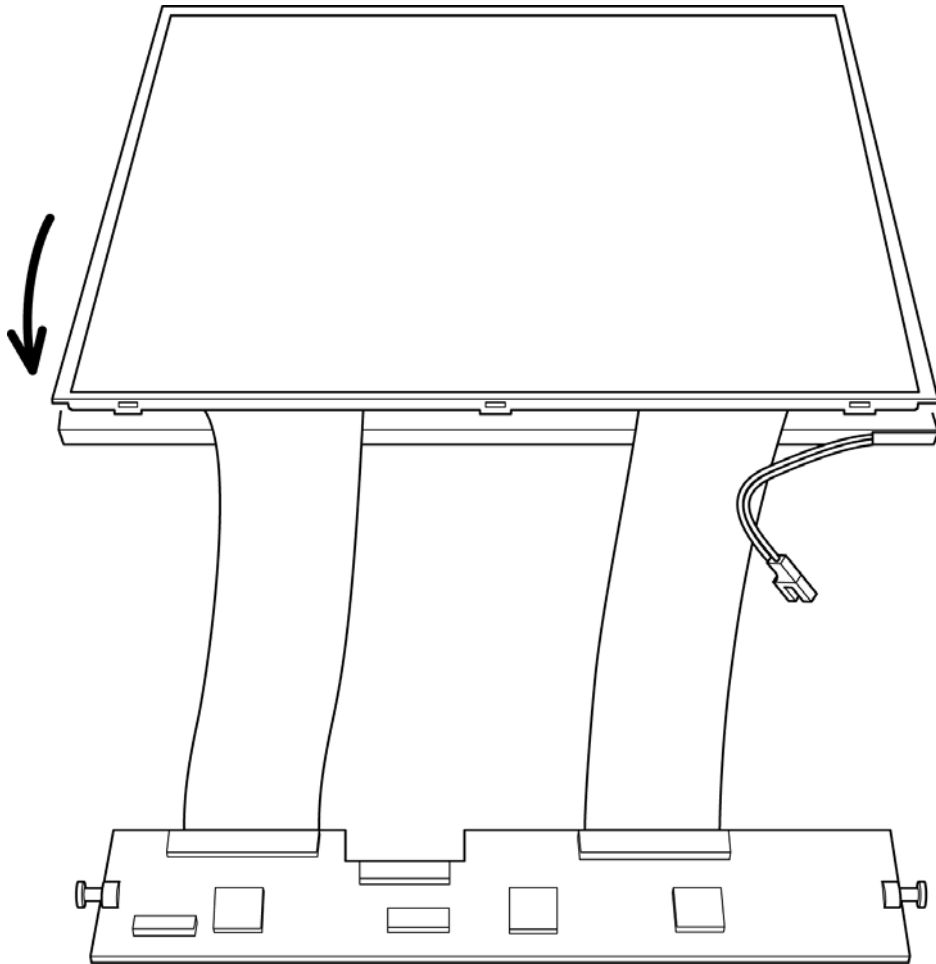


Figure 4-61 Laying the LCD panel with PCB-ASSY (2/2)

- 5. Secure the latches.

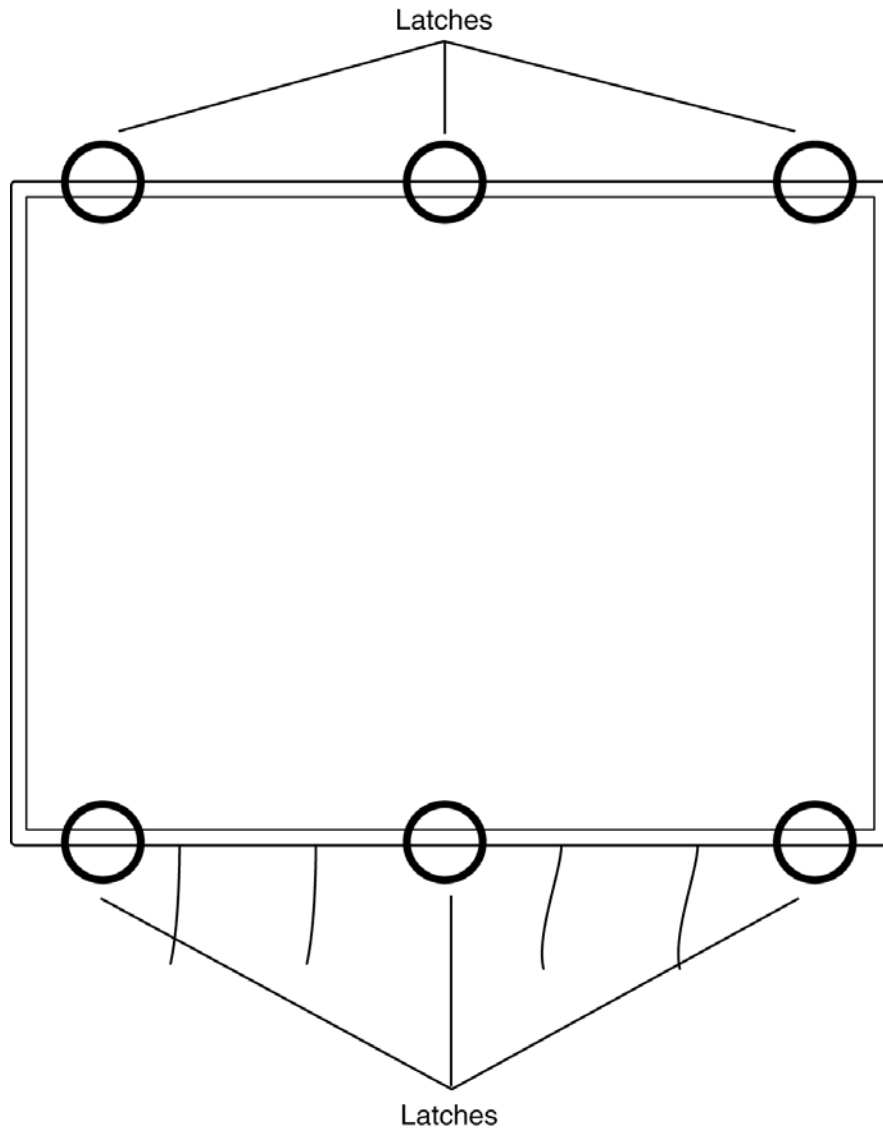
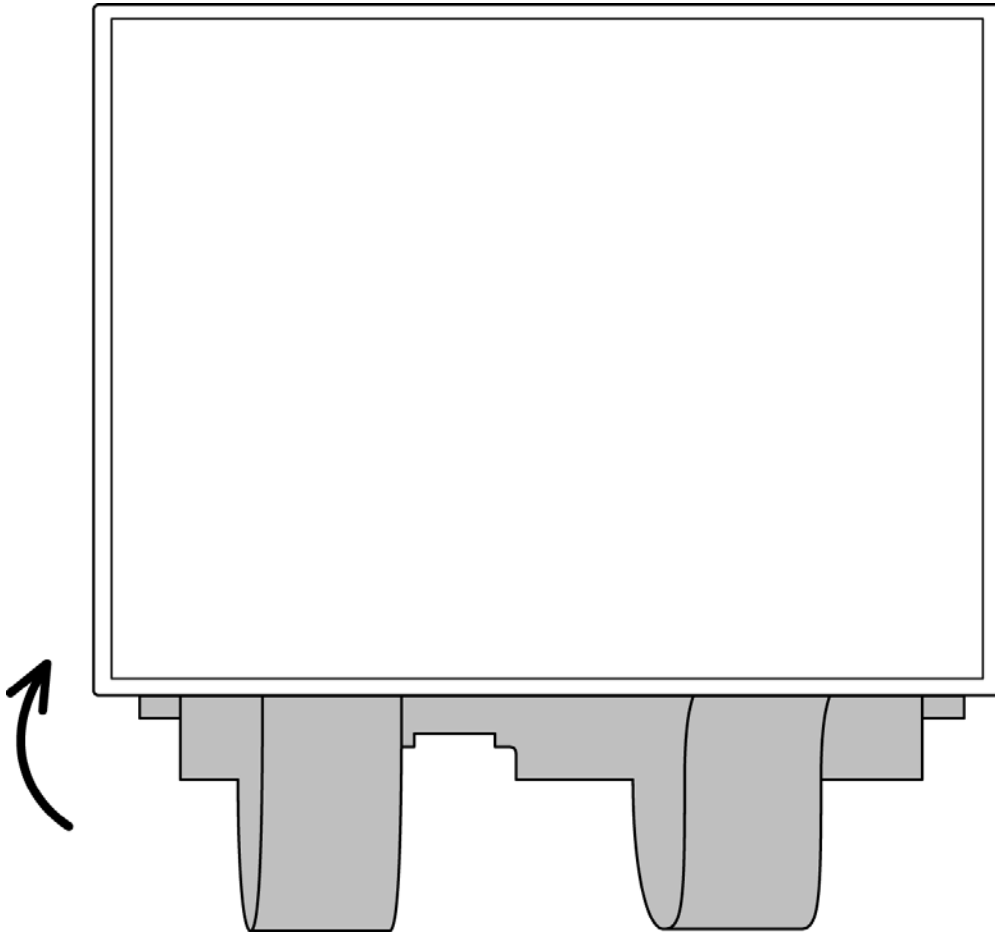


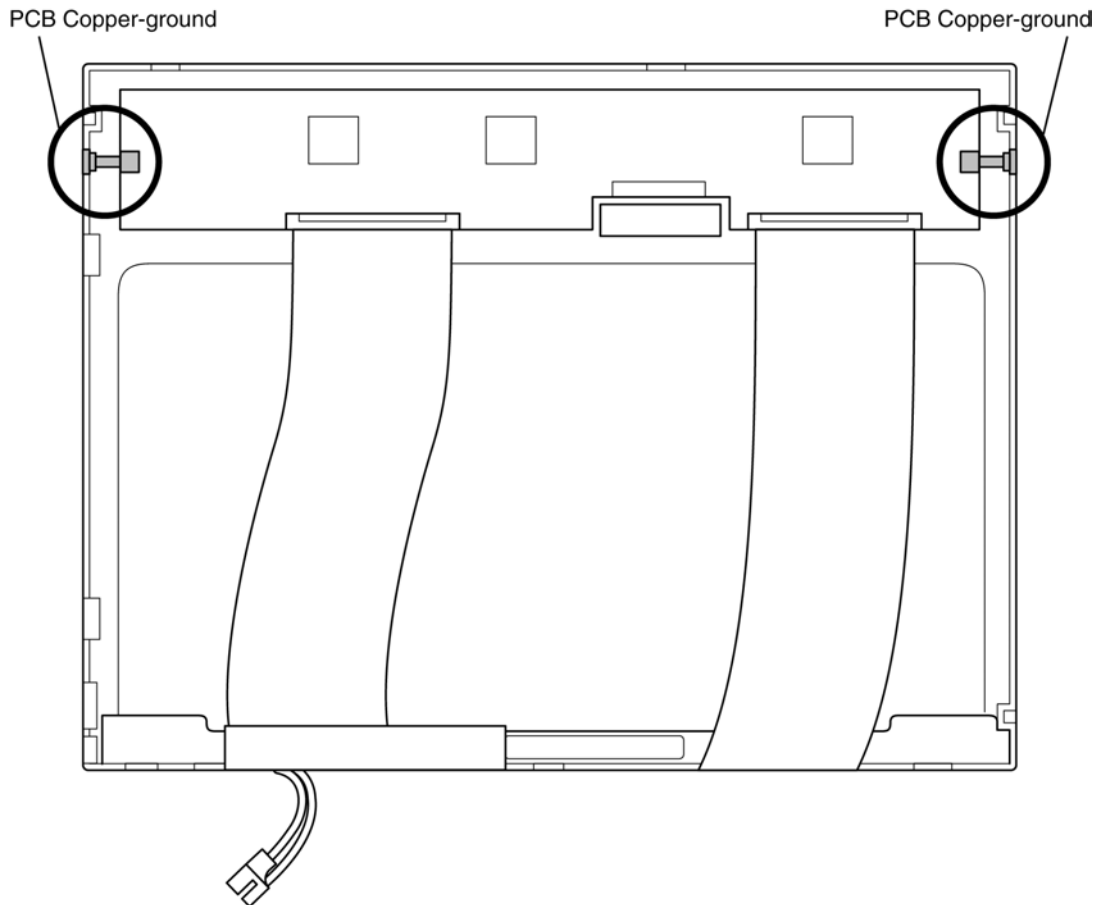
Figure 4-62 Securing the latches

6. Move the PCB behind the LCD module.



*Figure 4-63 Moving the PCB*

7. Turn the LCD module face down.
8. Insert copper ground between the backlight unit and frame.



*Figure 4-64 Inserting Copper-ground*



9. Secure the screws (right side).

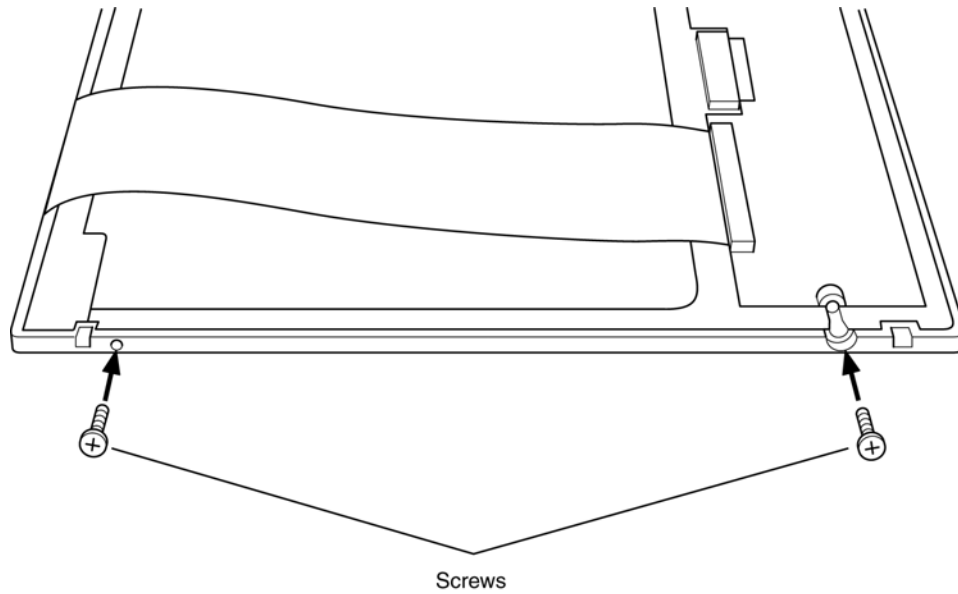


Figure 4-65 Securing the screws (right side)

10. Secure the screws (left side).

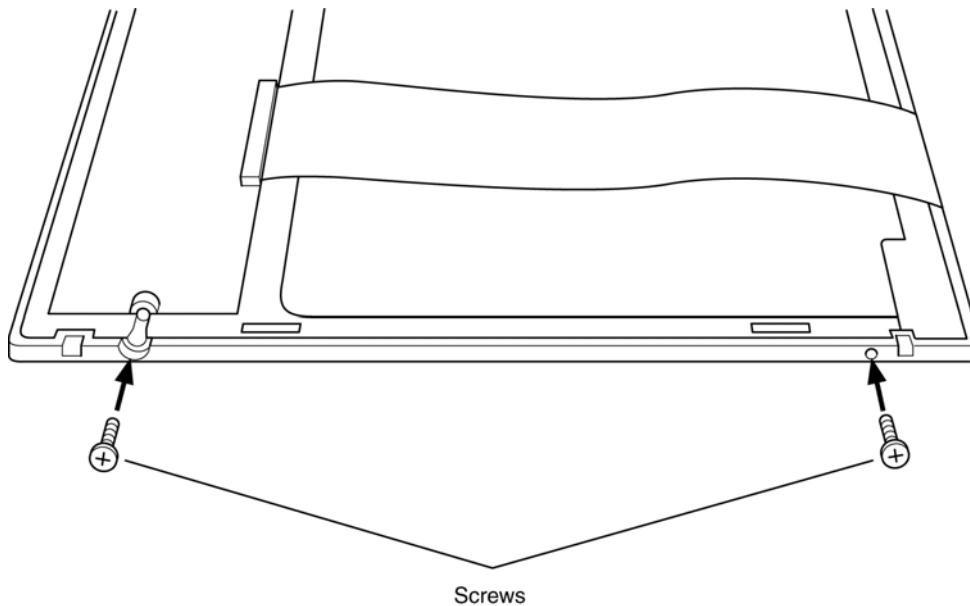
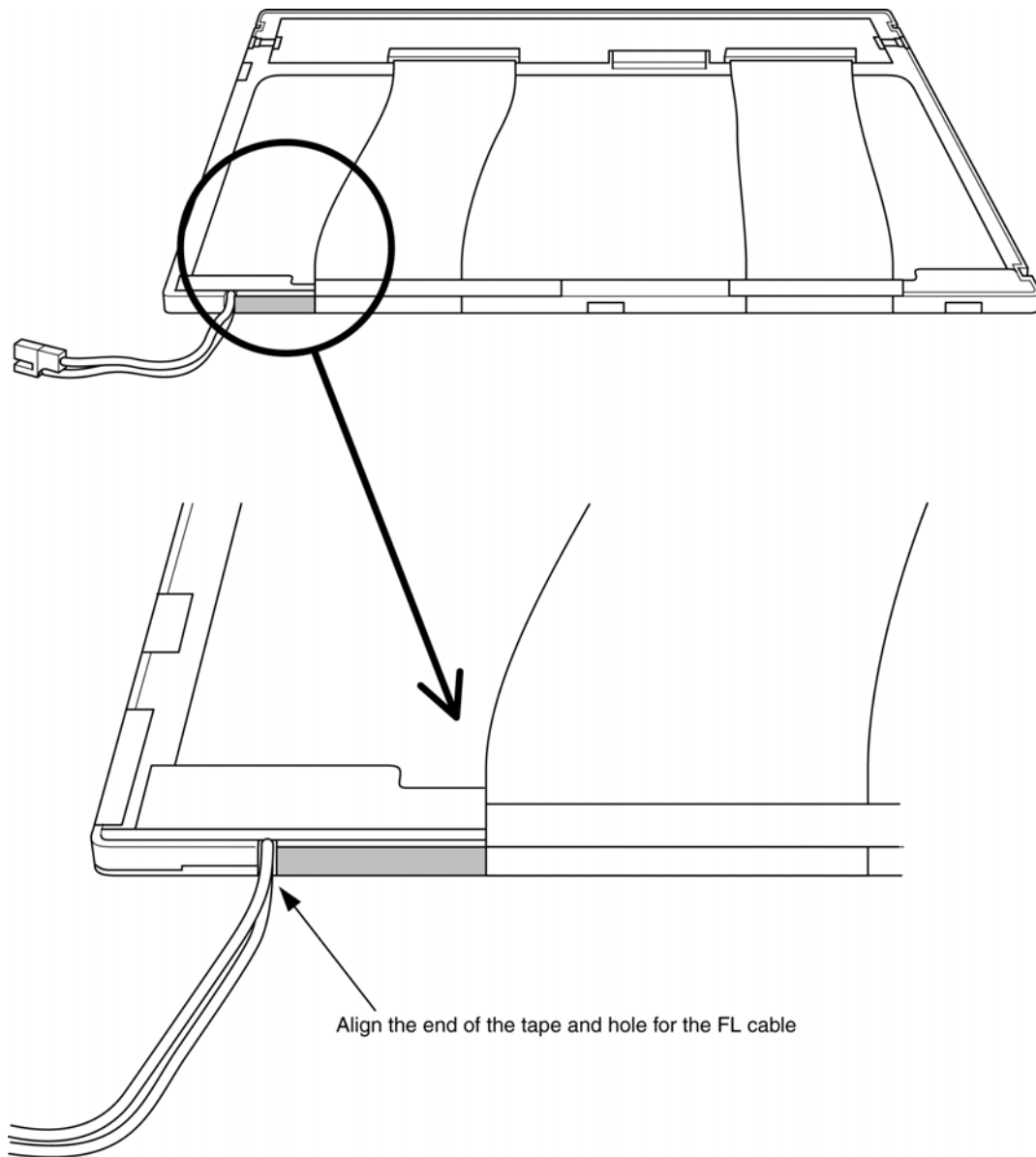


Figure 4-66 Securing the screws (left side)

11. Apply new blue tape, aligning it with the hole for the FL cable. It must not protrude beyond the module surface. Be sure to cover the edge of the frame.



*Figure 4-67 Applying new blue tape*

12. Apply the transparent PCB tape. Align the tape with the edge of the sheet. It must not protrude beyond the module surface. Cover the edge of the frame.

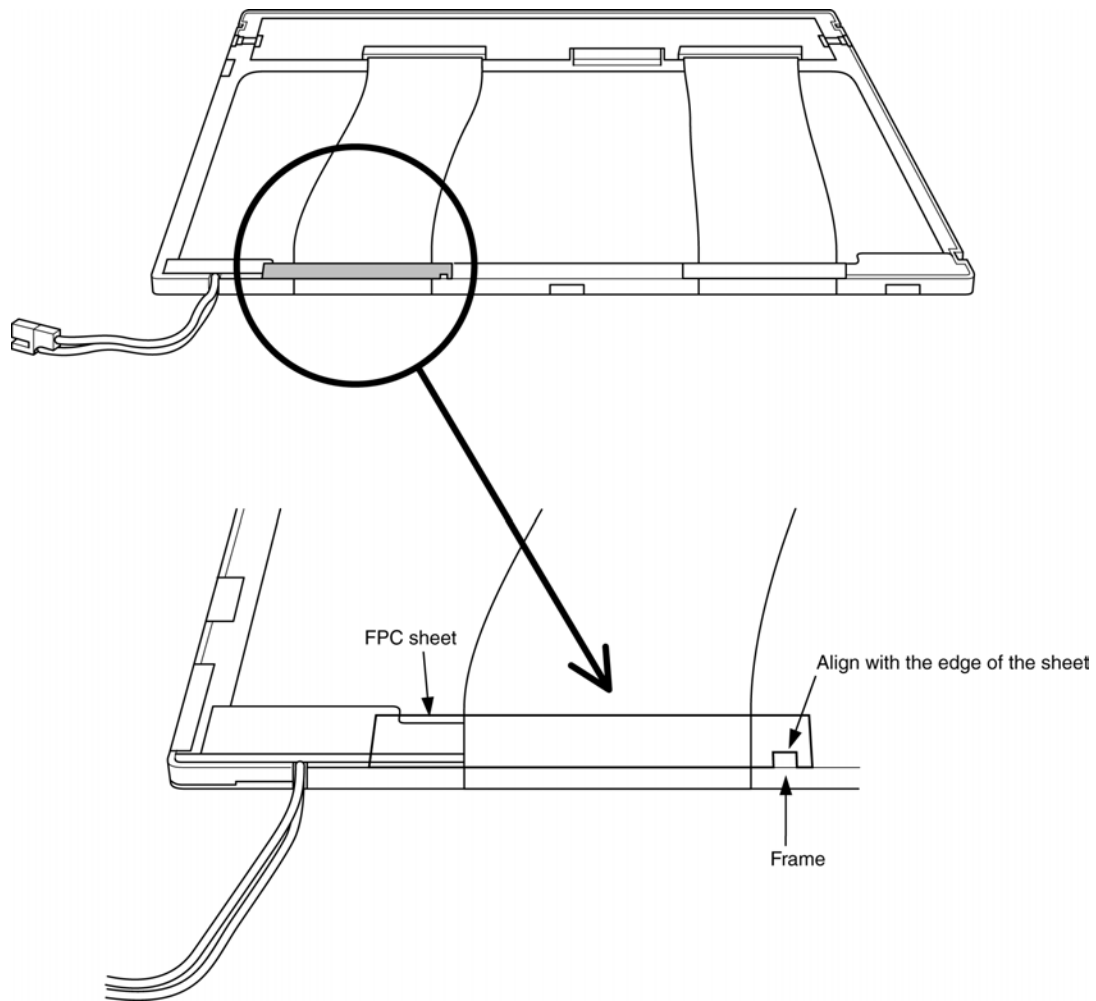


Figure 4-68 Applying the PCB tape

13. Secure the wire with light-green tape as shown below.

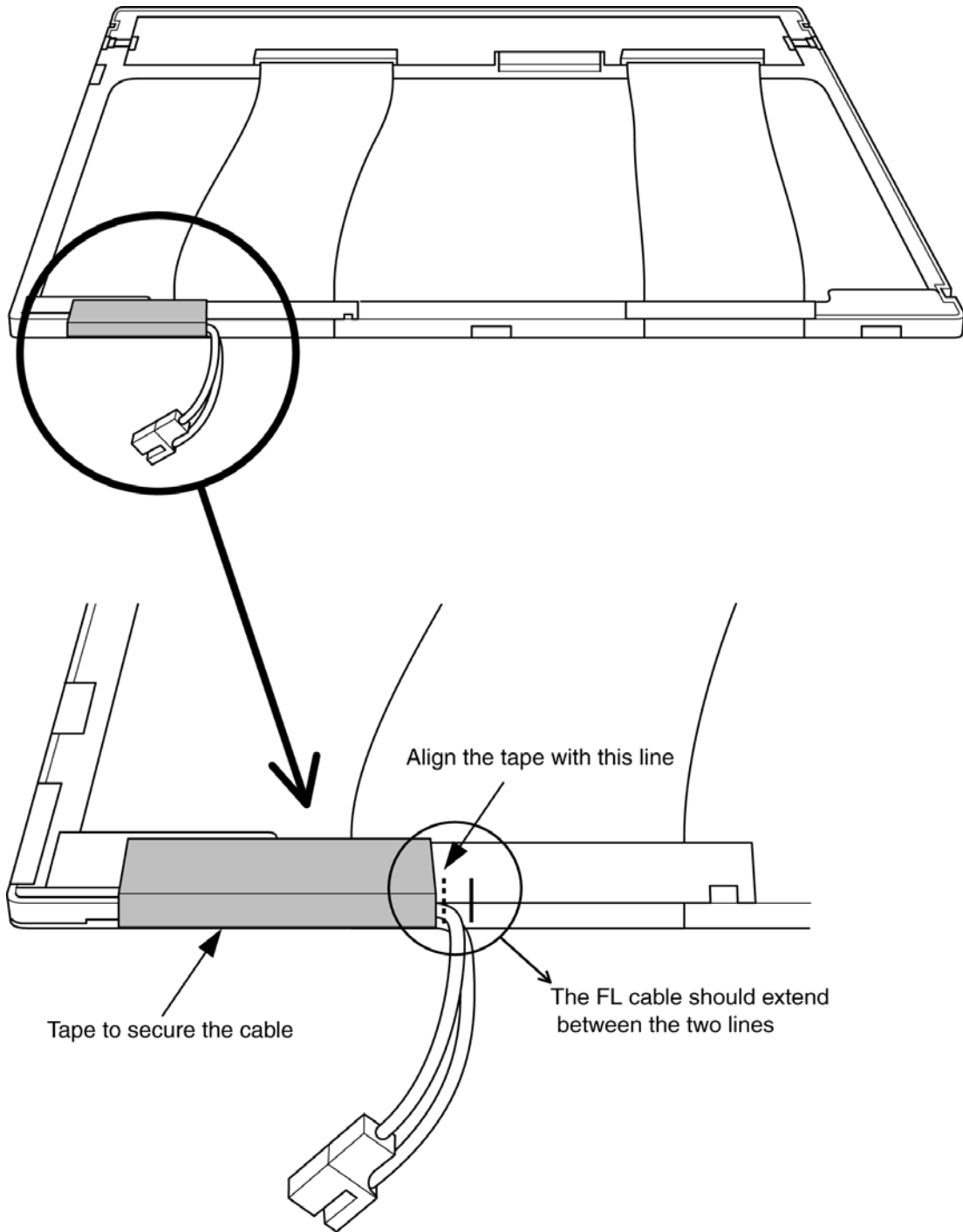
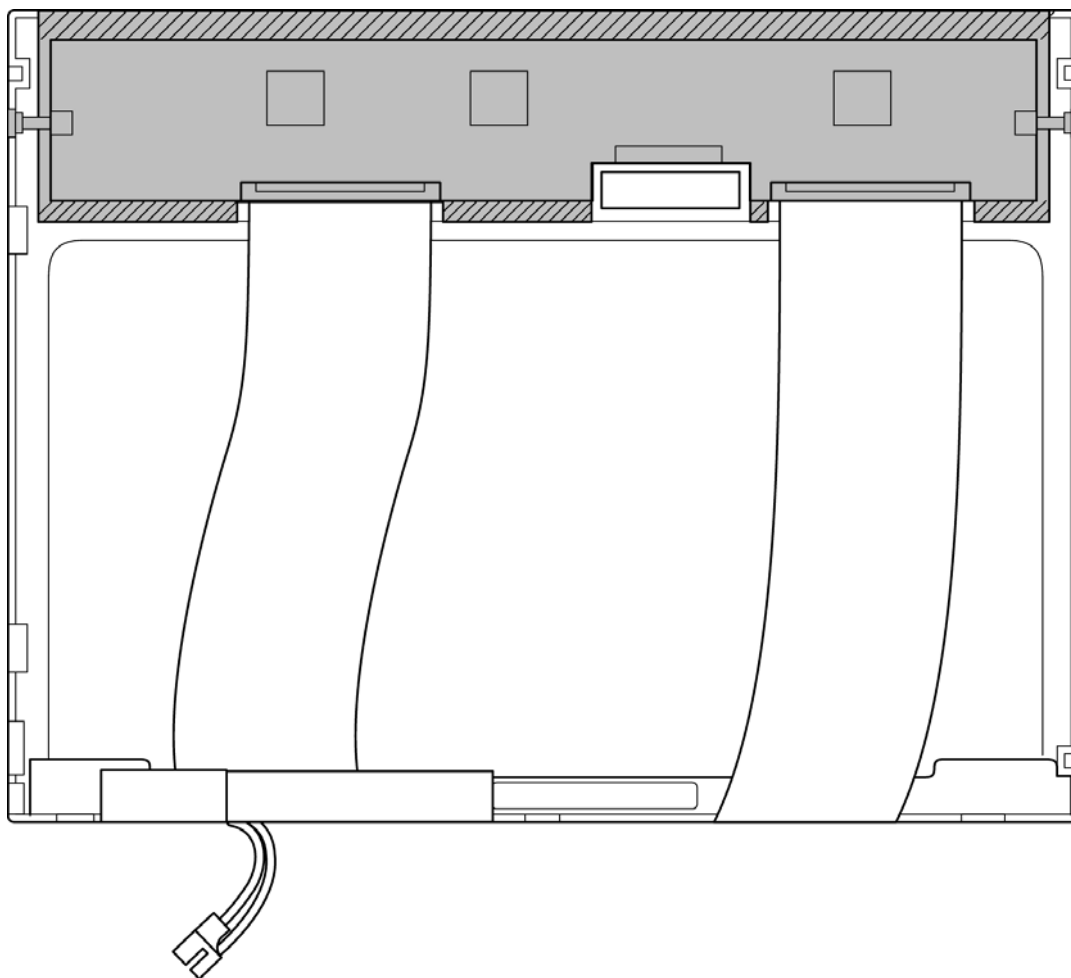


Figure 4-69 Securing the wire with light-green tape

14. Apply the transparent PCB cover sheet removed in step 3. Be sure it covers the PCB properly.



*Figure 4-70 Applying the transparent PCB cover*

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# Appendices

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## Appendix Contents

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**Appendix A Handling the LCD Module ..... A-1**

**Appendix B Board Layout .....B-1**

B.1 System Board (FIBSY\*) Front View .....B-1

B.2 System Board (FIBSY\*) Back View .....B-2

B.3 I/O Board (FIBIO\*) Front View .....B-5

B.4 I/O Board (FIBIO\*) Back View.....B-6

B.5 Sound/FIR Board (FIBSD\*) Front View .....B-7

B.6 Sound/FIR Board (FIBSD\*) Back View.....B-7

B.7 Switch Board (FIBSW\*) Front View.....B-8

B.8 Switch Board (FIBSW\*) Back View .....B-8

B.9 LED Board (FIBLE\*) Front View .....B-9

B.10 LED Board (FIBLE\*) Back View.....B-9

**Appendix C Pin Assignments..... C-1**

C.1 PJ1400/1401 Memory connector (200pin).....C-1

C.2 PJ1800 HDD I/F connector (44pin) .....C-4

C.3 PJ1820 Select Bay I/F connector (72pin).....C-5

C.4 PJ2110 PC Card I/F connector (150pin) .....C-6

C.5 PJ2130 SD Card connector (12pin).....C-9

C.6 PJ3110 Bluetooth connector (20pin).....C-9

C.7 PJ3230 Keyboard connector (34pin).....C-10

C.8 PJ3270 Bluetooth SW ON connector (2pin) .....C-10

C.9 PJ3280 IPSC connector (5pin).....C-11

C.10 PJ4100/PJ4101 Network I/F connector.....C-11

C.11 PJ5600 LCD connector (50pin).....C-12

C.12 PJ5620 CRT I/F connector (15pin) .....C-13

C.13 PJ8800 DC-IN connector (2pin) .....C-13

C.14 PJ8810 1st Battery connector (10pin).....C-13



C.15	PJ8770 FAN connector (3pin).....	C-14
C.16	PJ9500 FIBIO Board I/F connector (240pin).....	C-14
C.17	PJ9510 FIBSD Board I/F connector (50pin).....	C-18
C.18	PJ9511 Speaker (L) connector (2pin).....	C-19
C.19	PJ9512 Speaker (R) connector (2pin) .....	C-19
C.20	PJ2300 Mini PCI I/F connector (124pin).....	C-20
C.21	PJ2200 Docking I/F connector (240pin) .....	C-22
C.22	PJ2201 MDM Relay Board I/F connector (2pin).....	C-26
C.23	PJ2202 LAN Relay Board I/F connector (5pin).....	C-26
C.24	PJ4200 1394 I/F connector (4pin).....	C-26
C.25	PJ4600 USB1 connector (4pin).....	C-26
C.26	PJ4601 USB0 connector (4pin).....	C-27
C.27	PJ8760 RTC battery connector (3pin).....	C-27
C.28	PJ9540 LED I/F connector (14pin) .....	C-28
C.29	PJ6000 Internal Microphone connector (2pin) .....	C-29
C.30	PJ6001 External Microphone connector (5pin) .....	C-29
C.31	PJ6002 Headphone connector (5pin) .....	C-29
C.32	PJ3290 BT Switch Board I/F connector (2pin).....	C-30

**Appendix D Keyboard Scan/Character Codes..... D-1**

**Appendix E Key Layout .....E-1**

**Appendix F Wiring Diagrams ..... F-1**

**Appendix G BIOS Rewrite Procedures ..... G-1**

**Appendix H EC/KBC Rewrite Procedures..... H-1**

**Appendix I Reliability .....I-1**

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**Figures**

Figure B-1	System board (FIBSY*) layout (front) .....	B-1
Figure B-2	System board (FIBSY*) layout (back) .....	B-2
Figure B-3	I/O board (FIBIO*) layout (Front).....	B-5
Figure B-4	I/O board (FIBIO*) layout (back).....	B-6
Figure B-5	Sound board (FIBSD*) layout (front).....	B-7
Figure B-6	Sound board (FIBSD*) layout (back).....	B-7
Figure B-7	Switch board (FIBSW*) layout (Front) .....	B-8
Figure B-8	Switch board (FIBSW*) layout (back) .....	B-8
Figure B-9	LED board (FIBLE*) layout (front) .....	B-9
Figure B-10	LED board (FIBLE*) layout (back).....	B-9
Figure E-1	US keyboard.....	E-1
Figure E-2	UK keyboard.....	E-1
Figure E-3	GR keyboard .....	E-2
Figure E-4	FR keyboard.....	E-2
Figure E-5	SP keyboard .....	E-3
Figure E-6	IT keyboard.....	E-3
Figure E-7	SC keyboard.....	E-4
Figure E-8	SL keyboard.....	E-4
Figure F-1	Parallel port wraparound connector .....	F-1
Figure F-2	Serial port wraparound connector.....	F-1
Figure F-3	Serial Port Direct Cable (9-Pin to 9-Pin) .....	F-2
Figure F-4	Serial Port Direct Cable (9-Pin to 25-Pin).....	F-2

**Tables**

Table B-1	System board (FIBSY*) ICs and connectors (front) .....	B-3
Table B-2	System board (FIBSY*) ICs and connectors (back).....	B-4
Table B-3	I/O board (FIBIO*) ICs and connectors (front).....	B-5
Table B-4	I/O board (FIBIO*) connectors (back) .....	B-6
Table B-5	Sound board (FIBSD*) ICs and connectors (front/back) .....	B-7
Table B-6	Switch board (FIBSW*) connector (back) .....	B-8
Table B-7	LED board (FIBLE*) connector (back).....	B-9
Table C-1	Memory connector (200pin).....	C-1
Table C-2	HDD I/F connector (44pin).....	C-4
Table C-3	Select Bay I/F connector (72pin) .....	C-5
Table C-4	PC Card I/F connector (150pin).....	C-6
Table C-5	SD card connector (12pin) .....	C-9
Table C-6	Bluetooth connector (20pin) .....	C-9
Table C-7	Keyboard connector (34pin) .....	C-10
Table C-8	Bluetooth SW ON connector (2pin).....	C-10
Table C-9	IPSC connector (5pin).....	C-11
Table C-10-1	Network I/F connector (12pin).....	C-11
Table C-10-2	Network I/F connector (5pin).....	C-11
Table C-11	LCD connector (50pin) .....	C-12
Table C-12	CRT I/F connector (15pin).....	C-13
Table C-13	DC-IN connector (2pin) .....	C-13
Table C-14	1st Battery connector (10pin).....	C-13
Table C-15	FAN connector (3pin) .....	C-14
Table C-16	FIBIO Board I/F connector (240pin) .....	C-14
Table C-17	FIBSD Board I/F connector (50pin) .....	C-18
Table C-18	Speaker (L) connector (2pin) .....	C-19
Table C-19	Speaker (R) connector (2pin).....	C-19

Table C-20	Mini PCI I/F connector (124pin) .....	C-20
Table C-21	Docking I/F connector (240pin) .....	C-22
Table C-22	MDM Relay Board I/F connector (2pin) .....	C-26
Table C-23	LAN Relay Board I/F connector (5pin) .....	C-26
Table C-24	1394 I/F connector (4pin) .....	C-26
Table C-25	USB1 connector (4pin) .....	C-26
Table C-26	USB0 connector (4pin) .....	C-27
Table C-27	RTC battery connector (3pin) .....	C-27
Table C-28	LED I/F connector (14pin) .....	C-28
Table C-29	Internal Microphone connector (2pin) .....	C-29
Table C-30	External Microphone connector (5pin) .....	C-29
Table C-31	Headphone connector (5pin) .....	C-29
Table C-32	BT Switch Board I/F connector (2pin) .....	C-30
Table D-1	Scan codes .....	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



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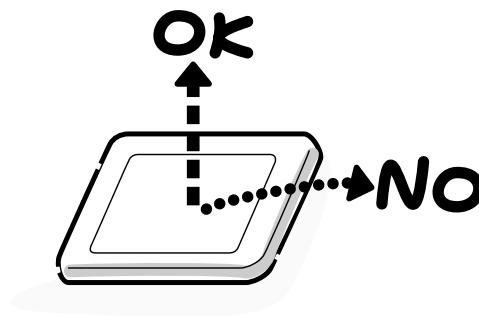
## Appendix A Handling the LCD Module

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### Precautions for handling the LCD module

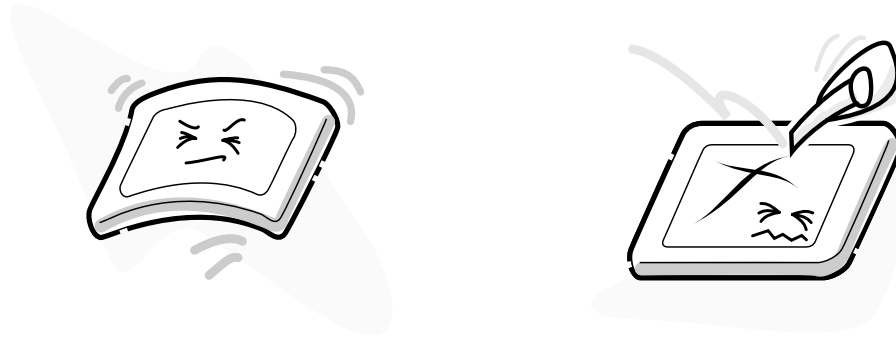
The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. For the LCD module, 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.

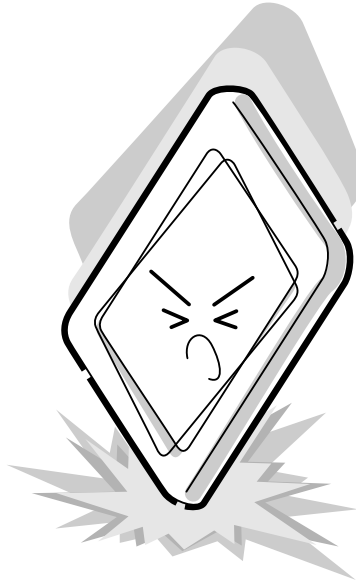
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



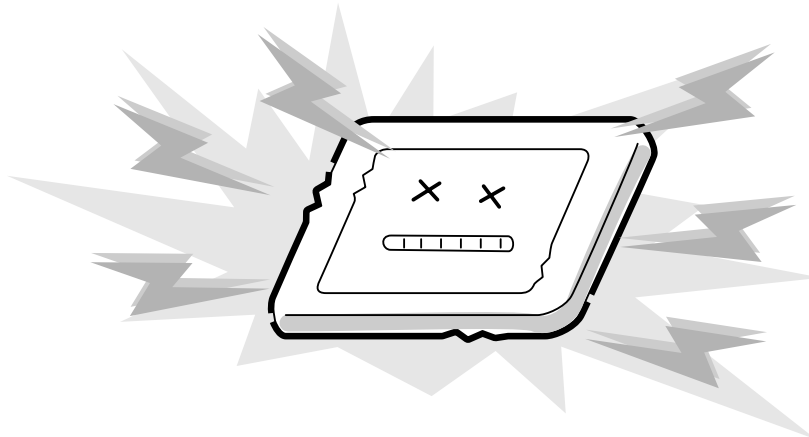
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



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.

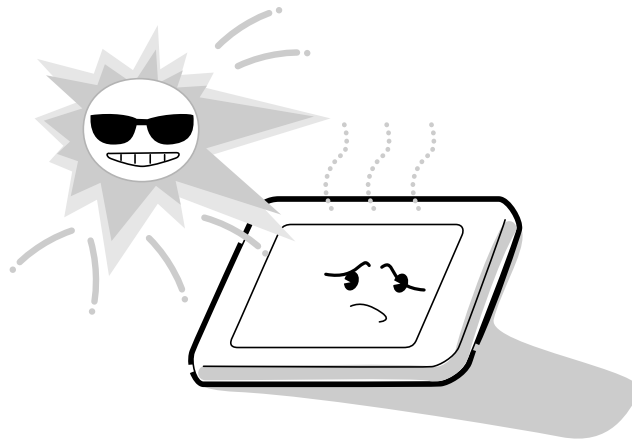


6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.

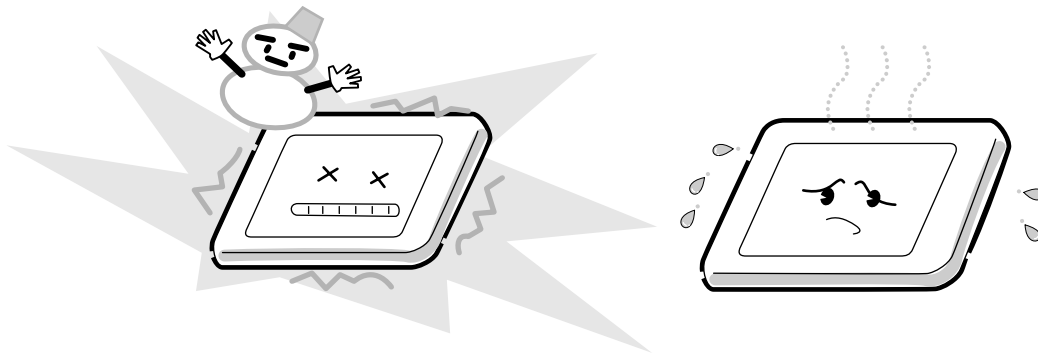




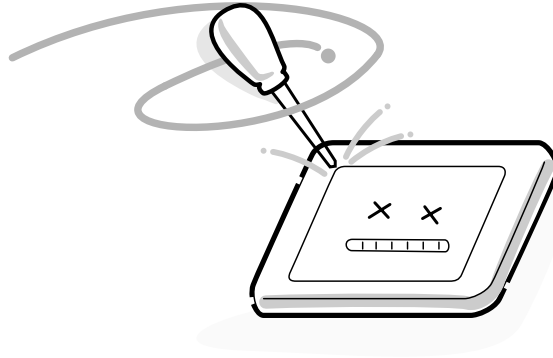
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



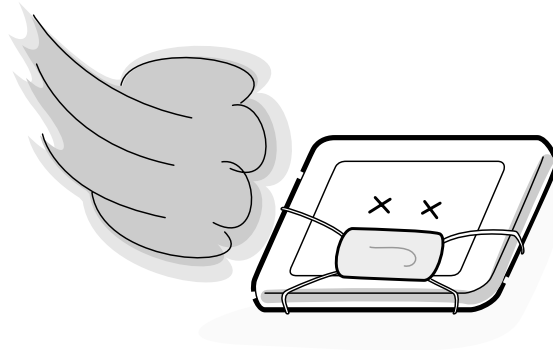
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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.





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## Appendix B Board Layout

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### B.1 System Board (FIBSY\*) Front View

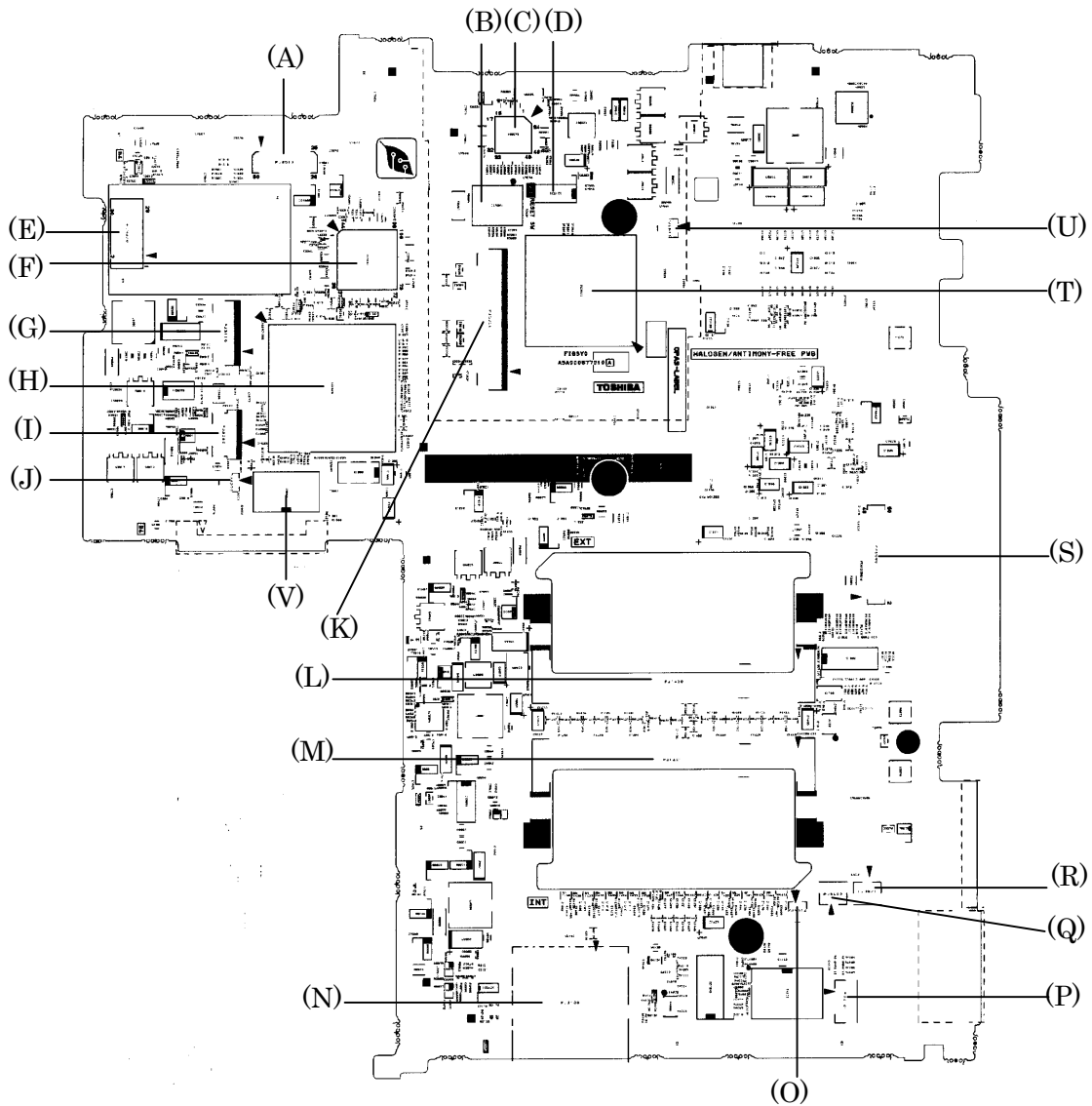


Figure B-1 System board (FIBSY\*) layout (front)

## B.2 System Board (FIBSY\*) Back View

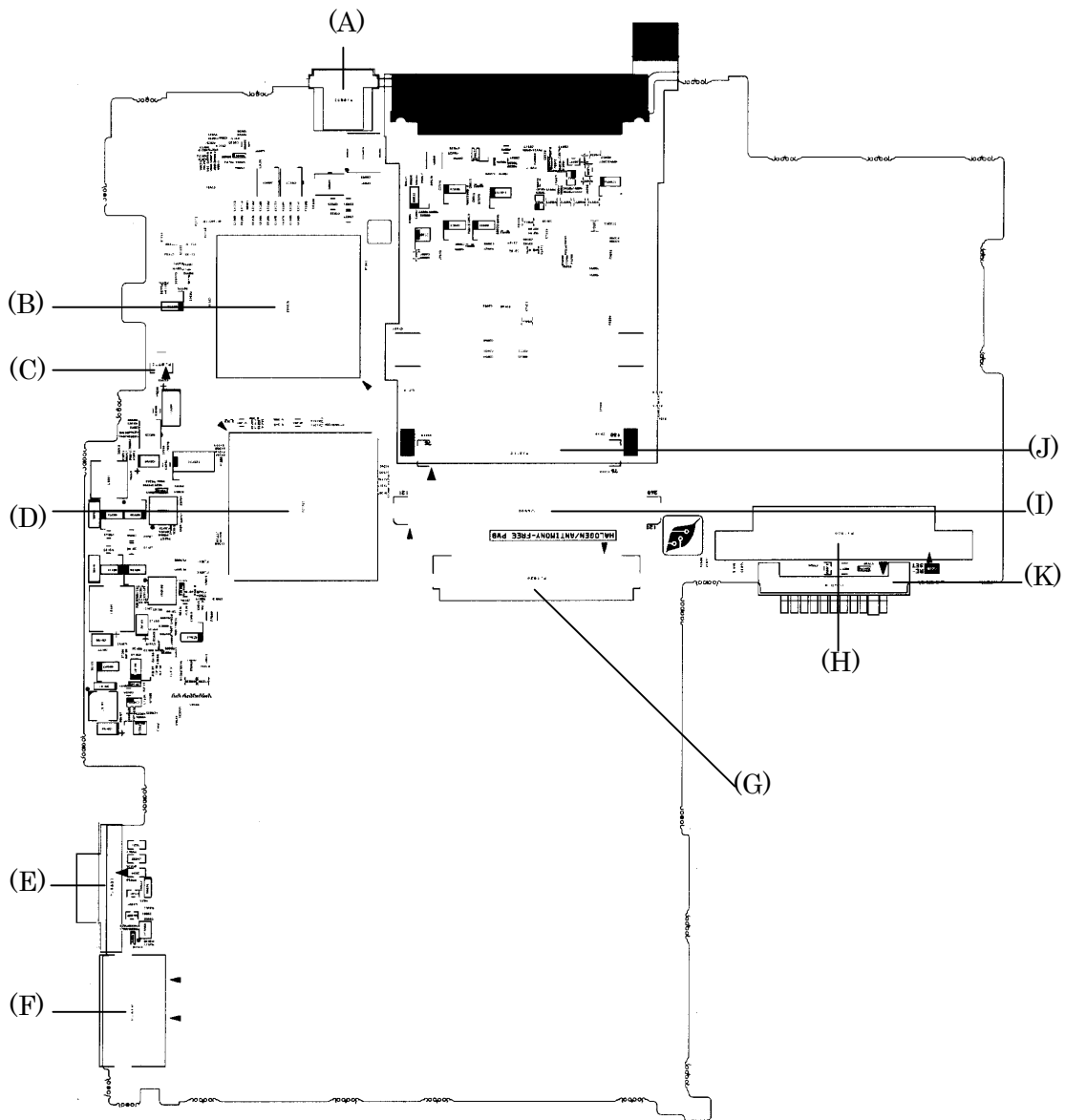


Figure B-2 System board (FIBSY\*) layout (back)

Table B-1 System board (FIBSY\*) ICs and connectors (front)

Mark	Number	Name
(A)	PJ9510	SD board I/F connector
(B)	IC3281	IPSC
(C)	IC8972	PSC
(D)	IC2100	PC card power
(E)	PJ3020	MDC connector
(F)	IC3200	EC/KBC
(G)	PJ3110	Bluetooth board I/F connector
(H)	IC1600	ICH4-M
(I)	PJ3280	IPSC connector
(J)	PJ3270	BT switch board I/F connector
(K)	PJ3230	Keyboard connector
(L)	PJ1400	Memory1 connector
(M)	PJ1401	Memory2 connector
(N)	PJ2130	SD card connector
(O)	PJ9512	Speaker cable(R) connector
(P)	PJ4101	LAN relay connector
(Q)	PJ3022	MDC relay connector
(R)	PJ3021	MDM relay connector
(S)	PJ5600	LCD connector
(T)	IC2000	YEBISU3S
(U)	PJ9511	Speaker cable(L) connector
(V)	IC3000	BIOS ROM

Table B-2 System board (FIBSY\*) ICs and connectors (back)

Mark	Number	Name
(A)	PJ8800	DC-IN connector
(B)	IC1005	Banias(CPU)
(C)	PJ8770	Cooling FAN connector
(D)	IC1200	Montara-GM
(E)	PJ5620	External CRT connector
(F)	PJ4100	Network connector
(G)	PJ1820	Select Bay connector
(H)	PJ1800	HDD connector
(I)	PJ9500	IO board I/F connector
(J)	PJ2110	PC card connector
(K)	PJ8810	Battery connector

### B.3 I/O Board (FIBIO\*) Front View

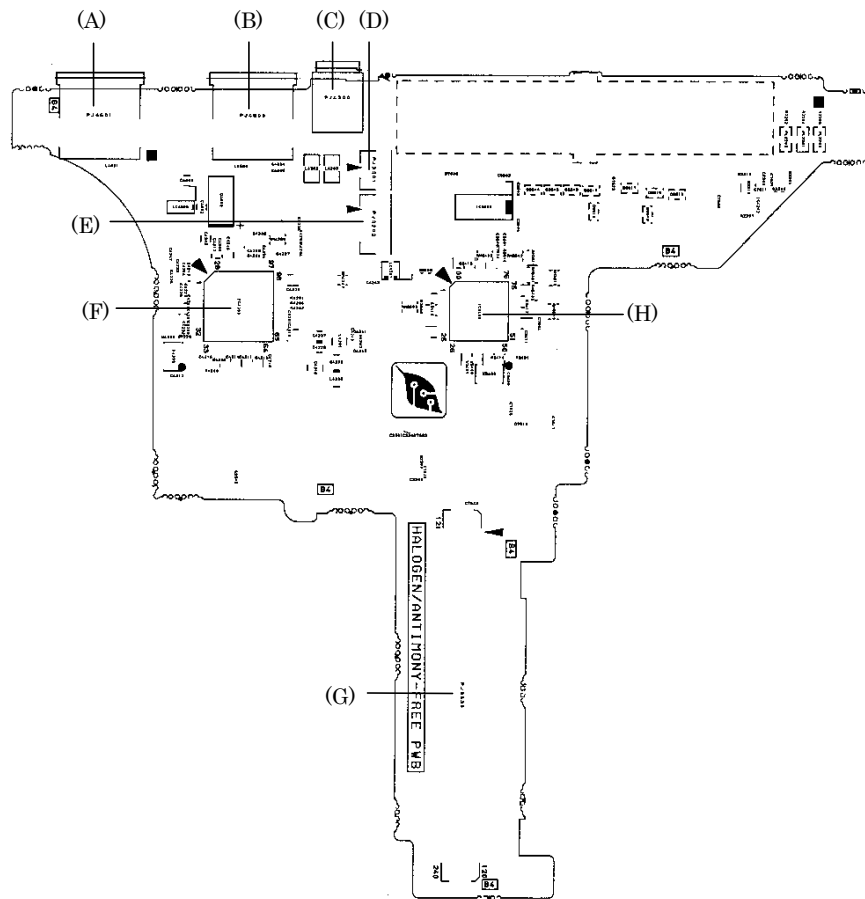


Figure B-3 I/O board (FIBIO\*) layout (front)

Table B-3 I/O board (FIBIO\*) ICs and connectors (front)

Mark	Number	Name
(A)	PJ4601	USB connector PORT 0
(B)	PJ4600	USB connector PORT 1
(C)	PJ4200	IEEE 1394 connector
(D)	PJ2201	MDM relay connector
(E)	PJ2202	LAN relay connector
(F)	IC4200	1394 PHY/LINK
(G)	PJ9520	IO board I/F connector
(H)	IC3400	Super I/O



### B.4 I/O Board (FIBIO\*) Back View

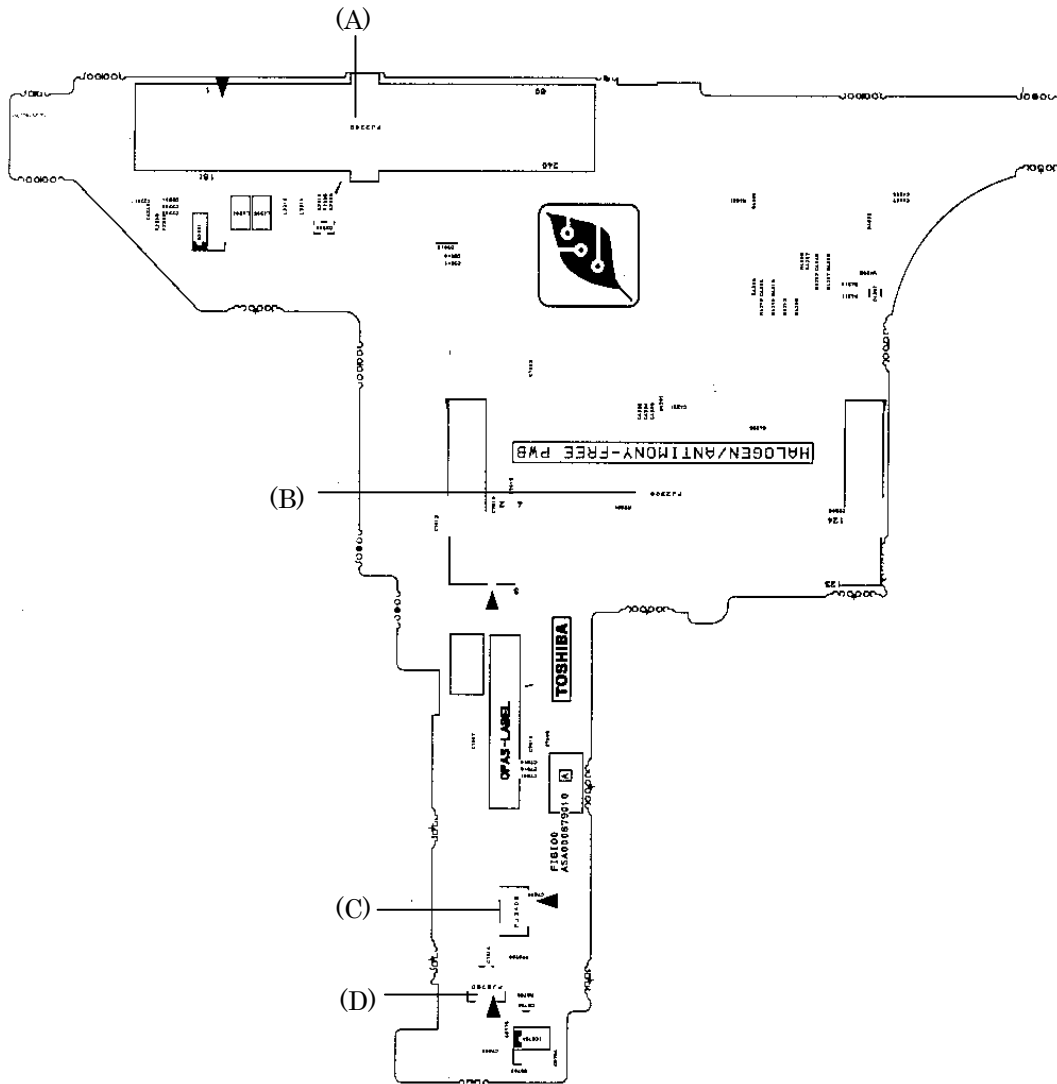


Figure B-4 I/O board (FIBIO\*) layout (back)

Table B-4 I/O board (FIBIO\*) connectors (back)

Mark	Number	Name
(A)	PJ2200	Docking I/F connector
(B)	PJ2300	Mini PCI connector
(C)	PJ3400	Super I/O connector (Not mounted)
(D)	PJ8760	RTC battery connector

### B.5 Sound/FIR Board (FIBSD\*) Front View

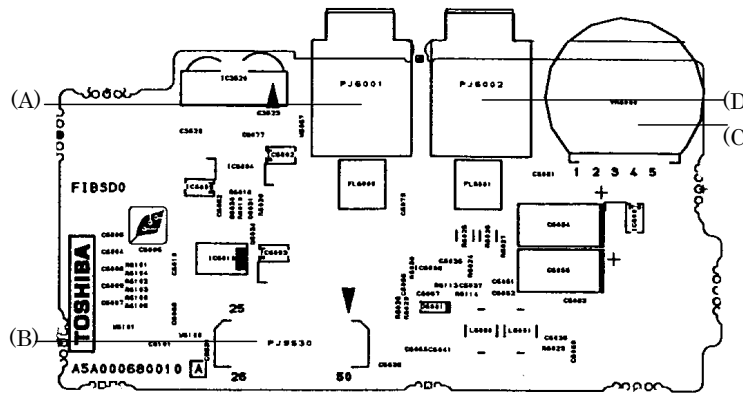


Figure B-5 Sound/FIR board (FIBSD\*) layout (front)

### B.6 Sound/FIR Board (FIBSD\*) Back View

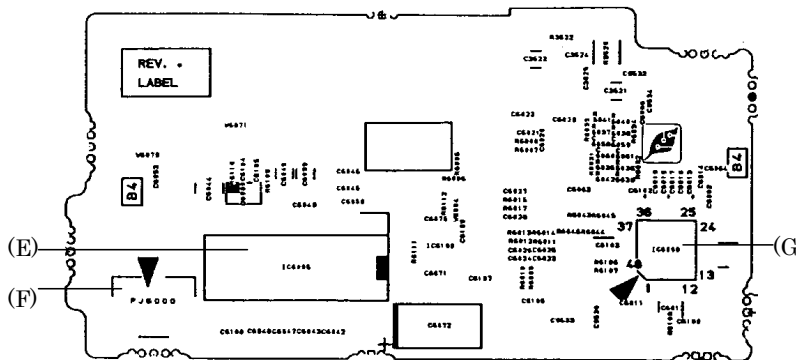


Figure B-6 Sound/FIR board (FIBSD\*) layout (back)

Table B-5 Sound/FIR board (FIBSD\*) ICs and connectors (front/back)

Mark	Number	Name
(A)	PJ6001	External microphone jack
(B)	PJ9530	SD board I/F connector
(C)	VR6000	Volume
(D)	PJ6002	Headphone jack
(E)	IC6006	MM1517X
(F)	PJ6000	Internal microphone jack
(G)	IC6000	AD1981B

**B.7 Switch Board (FIBSW\*) Front View**

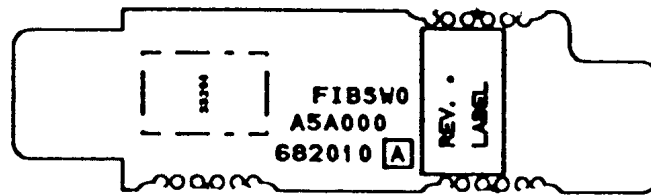


Figure B-7 Switch board (FIBSW\*) layout (front)

**B.8 Switch Board (FIBSW\*) Back View**

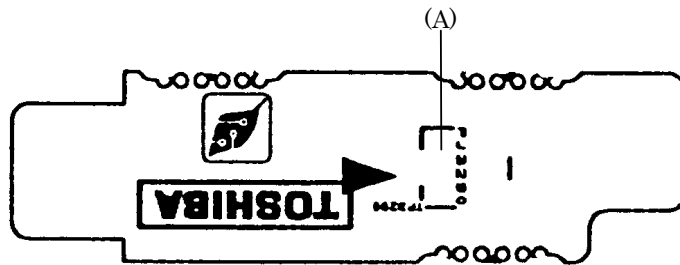


Figure B-8 Switch board (FIBSW\*) layout (back)

Table B-6 Switch board (FIBSW\*) connector (back)

Mark	Number	Name
(A)	PJ3290	FIBSW* board Bluetooth switch connector

### B.9 LED Board (FIBLE\*) Front View



Figure B-9 LED board (FIBLE\*) layout (front)

### B.10 LED Board (FIBLE\*) Back View

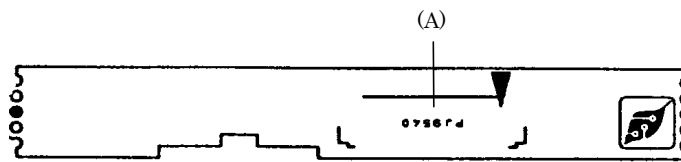


Figure B-10 LED board (FIBLE\*) layout (back)

Table B-7 LED board (FIBLE\*) connector (back)

Mark	Number	Name
(A)	PJ9540	FIBLE* board LED I/F



## Appendix C Pin Assignment

### System Board

#### C.1 PJ1400/1401 Memory connector (200pin)

Table C-1 Memory connector (200pin)(1/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	VREF	-	2	VREF	-
3	GND	-	4	GND	-
5	SDQ05R-B2P	I/O	6	SDQ01R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ00R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	SDM00R-B2P	I/O
13	SDQ06R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ07R-B2P	I/O	18	SDQ03R-B2P	I/O
19	SDQ09R-B2P	I/O	20	SDQ13R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ12R-B2P	I/O
25	SDQ51R-B2P	I/O	26	SDM01R-B2P	I/O
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ10R-B2P	I/O
31	SDQ11R-B2P	I/O	32	SDQ15R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK0-B2P	I	36	2R5-B2V	-
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ21R-B2P	I/O
43	SDQ17R-B2P	I/O	44	SDQ16R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	SDM02R-B2P	I/O
49	SDQ18R-B2P	I/O	50	SDQ23R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ22R-B2P	I/O	54	SDQ19R-B2P	I/O

Table C-1 Memory connector (200pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
55	SDQ25R-B2P	I/O	56	SDQ31R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	SDM03R-B2P	I/O
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ29R-B2P	I/O
67	SDQ30R-B2P	I/O	68	SDQ27R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	N.C	-	86	N.C	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE1-B2P	I	96	SCKEO-B2P	I
97	N.C	-	98	N.C	-
99	SMA12R-B2P	I	100	SMA11R-B2P	I
101	SMA09R-B2P	I	102	SMA08R-B2P	I
103	GND	-	104	GND	-
105	SMA07R-B2P	I	106	SMA06R-B2P	I
107	SMA05R-B2P	I	108	SMA04R-B2P	I
109	SMA03R-B2P	I	110	SMA02R-B2P	I
111	SMA01R-B2P	I	112	SMA00R-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10R-B2P	I	116	SBS1R-B2P	I
117	SBS0R-B2P	I	118	SRASR-B2N	I
119	SWER-B2N	I	120	SCASR-B2N	I
121	SCS0-B2N	I	122	SCS1-B2N	I
123	N.C	-	124	N.C	-

Table C-1 Memory connector (200pin)(3/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ32R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ33R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	SDM04R-B2P	I/O
135	SDQ35R-B2P	I/O	136	SDQ34R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	-	140	SDQ39R-B2P	I/O
141	SDQ44R-B2P	I	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ45R-B2P	I/O	146	SDQ41R-B2P	I/O
147	SDQS5R-B2P	I/O	148	SDM05R-B2P	I/O
149	GND	-	150	GND	-
151	SDQ43R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ40R-B2P	I/O	154	SDQ42R-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	SDQ53R-B2P	I/O	164	SDQ52R-B2P	I/O
165	SDQ48R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ50R-B2P	I/O	172	SDQ51R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55R-B2P	I/O	176	SDQ54R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	SDM07R-B2P	I/O
185	GND	-	186	GND	-
187	SDQ59R-B2P	I/O	188	SDQ58R-B2P	I/O
189	SDQ63R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-



Table C-1 Memory connector (200pin)(4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
195	SMBCLK-P3P	I/O	196	GND	-
197	P3V	-	198	GND	-
199	N.C	-	200	N.C	-

## C.2 PJ1800 HDD I/F connector (44pin)

Table C-2 HDD I/F connector (44pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C	-	2	GND	-
3	P5V	-	4	P5V	-
5	GND	-	6	HDDLED-P5N	I
7	PDCS3-P3N	O	8	PDCS1-P3N	I
9	PDA2-P3P	O	10	PDAO-P3P	I
11	N.C	-	12	PDA1-P3P	I
13	N.C	-	14	IRQ14-P3P	I
15	GND	-	16	PDDACK-P3N	I
17	GND	-	18	PIORDY-P3P	I
19	GND	-	20	PDIOR-P3N	I
21	GND	-	22	PDIOW-P3N	I
23	GND	-	24	PDDREQ-P3P	I
25	N.C	-	26	GND	-
27	PDD15-P3P	O	28	PDD00-P3P	I
29	PDD14-P3P	O	30	PDD01-P3P	I
31	PDD13-P3P	O	32	PDD02-P3P	I
33	PDA12-P3P	I	34	PDD03-P3P	I
35	PDD11-P3P	O	36	PDD04-P3P	I
37	PDD10-P3P	O	38	PDD05-P3P	I
39	PDD09-P3P	O	40	PDD06-P3P	I
41	PDD08-P3P	O	42	PDD07-P3P	I
43	GND	-	44	IDRSTA-P5N	I

**C.3 PJ1820 Select Bay I/F connector (72pin)***Table C-3 Select Bay I/F connector (72pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	CDAUDR-PXP	I	4	CDAUDL-PXP	I
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	I
33	GND	-	34	SDIOW-P3N	O
35	GND	-	36	SDIOR-P3N	O
37	GND	-	38	SIORDY-P5P	I
39	N.C	I	40	SDDACK-P3N	O
41	GND	I	42	IRQ15-P5P	I
43	N.C	-	44	SDA1-P3P	O
45	SB-P5V	-	46	SB-P5V	-
47	SB-P5V	-	48	SDA0-P3P	O
49	SDA2-P3P	O	50	SDCS1-P3N	O
51	SDCS3-P3N	O	52	CDRLED-P5N	I/O
53	GND	-	54	MBSTS2-S3N	I
55	MBSTS1-S3N	I	56	MBSTS0-S3N	I
57	GND	-	58	DBT20V-S5N	I
59	PSDA-S5P	I	60	BT2VD	-
61	PSCL-S5P	I	62	BTMP2-SXP	I
63	CDCHG2-S5P	I	64	GND	-
65	GND	-	66	N.C	-
67	GND	-	68	N.C	-
69	GND	-	70	GND	-
71	GND	-	72	PVBAT2	-

**C.4 PJ2110 PC Card I/F connector (150pin)***Table C-4 PC Card I/F connector (150pin)(1/3)*

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		8	BCAD03-BYP	I/O
9	GND	-	10	BCAD05-BYP	I/O
11	BCAD05-BYP	I/O	12	BCD14-BYP	I/O
13	BCAD07-BYP	I/O	14	BCAD08-BYP	I/O
15	BCCBEO-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	O
35	BCDEVS-BYN	I/O	36	BCINT-BYN	I
37	MCVCCB	-	38	MCVCCB	-
39	MCVPPB	-	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	I	58	BCAD24-BYP	I/O
59	GND	-	60	BCCBE3-BYN	I/O
61	BCAD25-BYP	I/O	62	BCAUDI-BYP	I

Table C-4 PC Card I/F connector (150pin)(2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	BCAD26-BYP	I/O	64	BCSTSC-BYP	I
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		72	BCCLKR-BYN	I/O
73	BCCD2-B3N	I	74	GND	-
75	GND	-	76	GND	-
77	GND	-	78	ACCD1-B3N	I/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	ACCBEO-BYN	
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	O	110	ACDEVS-BYN	I/O
111	ACINT-BYN	I	112	MCVCCA	-
113	MCVCCA	-	114	MCVPPA	-
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

Table C-4 PC Card I/F connector (150pin)(3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
129	ACAD22-BYP	I/O	130	ACSERR-BYN	I/O
131	ACAD23-BYP	I/O	132	ACREQ-BYN	I
133	ACAD24-BYP	I/O	134	GND	-
135	ACCBE3-BYN	I/O	136	ACAD25-BYP	I/O
137	ACAUDI-BYP	I	138	ACAD26-BYP	I/O
139	ACSTSC-BYP	I	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	ACCD02-B3N	I/O
149	GND	-	150	GND	-

**C.5 PJ2130 SD Card connector (12pin)***Table C-5 SD Card connector (12pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SDAT3-B3P	I/O	2	SDCMD-B3P	I/O
3	GND	-	4	SD-B3V	-
5	SDCLK-B3P	O	6	GND	-
7	SDAT0-B3P	I/O	8	SDAT1-B3P	I/O
9	SDAT2-B3P	I/O	10	SDCD-B3N	I
11	SDWP-B3P	I	12	GND	-

**C.6 PJ3110 Bluetooth connector (20pin)***Table C-6 Bluetooth connector (20pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BT-E3V	-	2	N.C.	-
3	N.C.	-	4	USBDM4-B3N	I/O
5	USBDP4-B3P	I/O	6	N.C.	-
7	N.C.	-	8	(BTIFDF-S3N)	O
9	N.C.	-	10	GND	-
11	N.C.	-	12	N.C.	-
13	BTRST-S3N	I	14	N.C.	-
15	N.C.	-	16	N.C.	-
17	N.C.	-	18	BTMDL-P3N	O
19	N.C.	-	20	GND	-

**C.7 PJ3230 Keyboard connector (34pin)***Table C-7 Keyboard connector (34pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3P	I
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3P	I
17	KBRT02-S3P	I	18	KBRT03-S3P	I
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3P	I	22	KBRT05-S3P	I
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3P	I	26	KBRT07-S3P	I
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	N.C	-	30	P5V	-
31	IP SX-PXP	I	32	GND	-
33	IP SV-PXP	I	34	N.C	-

**C.8 PJ3270 Bluetooth SW ON connector (2pin)***Table C-8 Bluetooth SW ON connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BTSWON-S3P	I	2	S3V	-

**C.9 PJ3280 IPSC connector (5pin)***Table C-9 IPSC connector (5pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IPSSWD-P5P	I	2	IPSSWRP5P	I
3	IPSSWL-P5P	I	4	GND	-
5	IPSSWD-P5P	I			

**C.10 PJ4100/PJ4101 Network I/F connector***Table C-10-1 PJ4100 Network I/F connector (12pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	TX+	O	A2	TX-	O
A3	RX+	I	A4	N.C	-
A5	N.C	-	A6	RX-	I
A7	N.C	-	A8	N.C	-
A9	ACT-E3N	O	A10	(LAN-E3V)	-
A11	LNK-E3N	O	A12	(LAN-E3V)	-
B1	MDMTIP-B3P	O	B2	MDMRING-B3P	O

*Table C-10-2 PJ4101 Network I/F connector (5pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TX-EXN	O	2	TX-EXP	O
3	RX-EXN	O	4	RX-EXN	O
5	N.C	-			



**C.11 PJ5600 LCD connector (50pin)***Table C-11 LCD connector (50pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	BTLED-S5N	I	4	SBAYLD-S5N	O
5	BAT202-S5N	O	6	HDLEDD-P5N	O
7	BAT1G2-S5N	O	8	BAT102-S5N	O
9	PWLEGR-S5N	O	10	PWLEOR-S5N	O
11	DCLEG2-S5N	O	12	DCLED2-S5N	O
13	M5V	-	14	P5V	-
15	N.C	-	16	N.C	-
17	GND	-	18	GND	-
19	N.C	-	20	GND	-
21	FL-P5V	-	22	GND	-
23	FL-P5V	-	24	BRT2DA-S3P	O
25	N.C	-	26	BRT1-P5P	O
27	GND	-	28	BRT0-P5P	O
29	GND	-	30	GND	-
31	N.C	-	32	N.C	-
33	PNL-P3V	-	34	PNL-P3V	-
35	N.C	-	36	N.C	-
37	GND	-	38	GND	-
39	TXDTA0-PYN	O	40	(TXCLKA-PYN)	O
41	TXDTA0-PYP	O	42	(TXCLKA-PYP)	O
43	GND	-	44	GND	-
45	TXDAT1-PYN	O	46	(TXDTA2-PYN)	O
47	TXDTA1-PYP	O	48	(TXDTA2-PYP)	O
49	GND	-	50	GND	-

**C.12 PJ5620 CRT I/F connector (15pin)***Table C-12 CRT I/F connector (15pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MRED-BXP	I	2	MGREEN-BXP	I
3	MBLUE-BXP	I	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	-	10	GND	-
11	N.C	-	12	DDCADA-P5P	I/O
13	MHSYNC-B5P	I/O	14	MVSYNC-B5P	O
15	DDCACK-P5P	O			

**C.13 PJ8800 DC-IN connector (2pin)***Table C-13 DC-IN connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(ADPDC)	-	2	(GND)	-

**C.14 PJ8810 1st Battery connector (10pin)***Table C-14 1st Battery connector (10pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(+)	-	2	BTMP1	O
3	DCHG	-	4	(M5V)	-
5	PSCL-S5P	I	6	PSDA-S5P	I
7	GND	-	8	DBT10V-S5N	O
9	GND	-	10	GND	-

**C.15 PJ8770 FAN connector (3pin)**

*Table C-15 FAN connector (3pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FAN VCC	-	2	GND	-
3	FANG-P3P	I			

**C.16 PJ9500 FIBIO Board I/F connector (240pin)**

*Table C-16 FIBIO Board I/F connector (240pin)(1/5)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	DSKDC	-	2	DSKDC	-
3	DSKDC	-	4	DSKDC	-
5	DSKDC	-	6	DSKDC	-
7	DSKDC	-	8	DSKDC	-
9	DSKDC	-	10	DSKDC	-
11	DSKDC	-	12	DSKDC	-
13	DSKDC	-	14	DSKDC	-
15	DSKDC	-	16	DSKDC	-
17	DSKDC	-	18	DSKDC	-
19	DSKDC	-	20	DSKDC	-
21	DSKDC	-	22	N.C	-
23	DCOUT	-	24	DCOUT	-
25	DCOUT	-	26	DCOUT	-
27	DCOUT	-	28	DCOUT	-
29	DCOUT	-	30	N.C	-
31	S5V	-	32	N.C	-
33	S3V	-	34	N.C	-
35	GND	-	36	GND	-
37	GND	-	38	GND	-
39	GND	-	40	GND	-

Table C-16 FIBIO Board I/F connector (240pin)(2/5)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
41	DDCSCL-P3P	I/O	42	DDCSDA-P3P	I/O
43	DHSYNC-P5P	O	44	DVSYNC-P5P	O
45	GND		46	DRED-PXP	I/O
47	DGREEN-PXP	I/O	48	DBLUE-PXP	I/O
49	GND	-	50	IRMODE-P3P	I/O
51	IRTX-P3P	I	52	IRRX-P3N	O
53	GND	-	54	DINR-PXN	I/O
55	DINR-PXP	I/O	56	DINL-PXP	I/O
57	DINL-PXN	I/O	58	GND	-
59	DOUTL-PXP	I/O	60	DOUTL-PXN	I/O
61	DOUTR-PXN	I/O	62	DOUTR-PXP	I/O
63	GND	-	64	EXMSDT-P5P	I/O
65	EXMSCK-P5P	I/O	66	EXKBDT-P5P	I/O
67	EXKBCK-P5P	I/O	68	DOCDT2-S3N	I
69	PWRSW-S3N	I	70	GND	-
71	SNDMUT-S3N	O	72	DPCONF-S5P	I
73	DSSCL-S5P	I/O	74	DSSDA-S5P	I/O
75	DOCDT1-S3N	I	76	EJECTRQ-S3N	I
77	GND	-	78	PVON-S5P	I
79	DOCVON-S5N	O	80	N.C	-
81	PHYRST-E3N	O	82	N.C	-
83	N.C	-	84	GND	-
85	PERR-P3N	I/O	86	LINK-E3N	O
87	ACT-E3N	O	88	WLON-S3N	O
89	RSWAKE-S3N	I	90	DILSON-S3P	O
91	E5V	-	92	E5V	-
93	E5V	-	94	E5V	-
95	E5V	-	96	E5V	-
97	E5V	-	98	USBON0-E5N	O
99	USBOC0-E3N	I	100	USBON1-E5N	O

Table C-16 FIBIO Board I/F connector (240pin)(3/5)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
101	USBOC1-E3N	I	102	USBON2-E5N	O
103	USBOC2-E3N	I	104	GND	-
105	USBP0-S3P	I/O	106	USBP0-S3N	I/O
107	GND		108	USBP1-S3P	I/O
109	USBP1-S3N	I/O	110	GND	-
111	USBP2-S3P	I/O	112	USBP2-S3N	I/O
113	GND	-	114	USBP3-S3P	I/O
115	USBP3-S3N	I/O	116	GND	-
117	N.C	-	118	R3V	-
119	N.C	-	120	GND	-
121	GND	-	122	GND	-
123	GND	-	124	GND	-
125	GND	-	126	GND	-
127	GND	-	128	GND	-
129	GND	-	130	GND	-
131	GND	-	132	GND	-
133	GND	-	134	GND	-
135	GND	-	136	GND	-
137	GND	-	138	NC	-
139	GND	-	140	GND	-
141	GND	-	142	GND	-
143	GND	-	144	GND	-
145	NC	-	146	GND	-
147	GND	-	148	GND	-
149	GND	-	150	N.C	-
151	N.C	-	152	N.C	-
153	N.C	-	154	N.C	-
155	N.C	-	156	N.C	-
157	P3V	-	158	P3V	-
159	P3V	-	160	N.C	-
161	E3V	-	162	N.C	-
163	LAN-E3V	-	164	N.C	-

Table C-16 FIBIO Board I/F connector (240pin)(4/5)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
165	X33MPC-P3P	O	166	GND	-
167	X33IE3-P3P	O	168	X33SI0	I/O
169	GND	-	170	X14SI0	O
171	GND	-	172	CBE3-P3N	I/O
173	AD25-P3P	I/O	174	AD27-P3P	I/O
175	AD28-P3P	I/O	176	AD29-P3P	I/O
177	AD30-P3P	I/O	178	AD25-P3P	I/O
179	AD31-P3P	I/O	180	AD24-P3P	I/O
181	AD23-P3P	I/O	182	GND	-
183	AD22-P3P	I/O	184	AD21-P3P	I/O
185	AD20-P3P	I/O	186	AD19-P3P	I/O
187	AD18-P3P	I/O	188	AD17-P3P	I/O
189	AD16-P3P	I/O	190	PAR-P3P	I/O
191	FRAME-P3N	I/O	192	PNT2-P3N	O
193	GND	-	194	PREQ2-P3N	O
195	PME-S3N	O	196	PIRQD-P3N	O
197	PIRQF-P3N	I	198	PCIRST-P3N	I
199	PIRQG-P3N	I	200	PGNT0-P3N	O
201	PREQ0-P3N	O	202	TRDY-P3N	I/O
203	CBE2-P3V	I/O	204	GND	-
205	IRDY-P3N	I/O	206	STOP-P3N	I/O
207	DEVSEL-P3N	I/O	208	CLKRUN-P3N	I/O
209	SERR-P3N	I/O	210	AD13-P3P	I/O
211	AD15-P3P	I/O	212	AD14-P3P	I/O
213	AD12-P3P	I/O	214	CBE1-P3P	I/O
215	GND	-	216	AD10-P3P	I/O
217	AD11-09P3P	I/O	218	AD09-P3P	I/O
219	AD08-P3P	I/O	220	CBE0-P3P	I/O
221	AD07-P3P	I/O	222	AD06-P3P	I/O
223	AD05-P3P	I/O	224	AD04-P3P	I/O
225	AD03-P3P	I/O	226	GND	-

Table C-16 FIBIO Board I/F connector (240pin)(5/5)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
227	AD02-P3P	I/O	228	AD01-P3P	I/O
229	AD00-P3P	I/O	230	SERIRQ-P3P	I/O
231	LAD0-P3P	I/O	232	LAD1-P3P	I/O
233	LAD2-P3P	I/O	234	LAD3-P3P	I/O
235	LPDRQ0-P3N	I	236	LPCFRM-P3N	I/O
237	GND	-	238	GND	-
239	GND	-	240	GND	-

**C.17 PJ9510 FIBSD Board I/F connector (50pin)**

Table C-17 FIBSD Board I/F connector (50pin)(1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPOUTR-PYP	O	2	SPOUTR-PYP	O
3	SPOUTR-PYN	O	4	SPOUTR-PYN	O
5	SPOUTL-PYN	O	6	SPOUTL-PYN	O
7	SPOUTL-PYP	O	8	SPOUTL-PYP	O
9	GND	-	10	GND	-
11	DOU TL-PXP	I	12	DOU TL-PXN	I
13	DOU TR-PXN	I	14	DOU TR-PXP	I
15	DINL-PXP	O	16	DINL-PXN	O
17	DINR-PXN	O	18	DINR-PXP	O
19	CD-GND	-	20	CDAUDR-PXP	O
21	CDAUDL-PXP	O	22	CD-GND	-
23	GND	-	24	CAUDIO-B3P	O
25	ATBEEP-B3P	I	26	P3V	-
27	P3V	-	28	IRMODE-P3P	O
29	IRRX-P3P	I	30	IRTX-P3P	O
31	GND	-	32	GND	-
33	GND	-	34	GND	-

Table C-17 FIBSD Board I/F connector (50pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
35	GND	-	36	GND	-
37	PHONE-BXN	O	38	PHONE-BXP	I
39	M97RS1-P3N	O	40	A97SY1-P3P	O
41	A97OT1-P3P	O	42	M97BCK-P3P	I/O
43	A97IN1-P3P	I	44	AMPSD-S3N	O
45	SNDMUT-S3N	O	46	X14SND-P3P	O
47	SND-P5V	-	48	SND-P5V	-
49	SND-P5V	-	50	SND-P5V	-

**C.18 PJ9511 Speaker (L) connector (2pin)**

Table C-18 Speaker (L) connector (2pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPOUTL-PYN	O	2	SPOUTL-PYP	O

**C.19 PJ9512 Speaker (R) connector (2pin)**

Table C-19 Speaker (R) connector (2pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPOUTR-PYN	O	2	SPOUTR-PYP	O



## IO Board

## C.20 PJ2300 Mini PCI I/F connector (124pin)

Table C- 20 Mini PCI I/F connector (124pin)(1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C	-	2	N.C	-
3	N.C	-	4	N.C	-
5	N.C	-	6	N.C	-
7	N.C	-	8	N.C	-
9	N.C	-	10	N.C	-
11	N.C	-	12	N.C	-
13	P3V	-	14	N.C	-
15	GND	-	16	N.C	-
17	PIRQD-P3N	I/O	18	P5V	-
19	P3V	-	20	PIRDG-P3N	I/O
21	N.C	-	22	N.C	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	O	26	PCIRST-S3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	I
35	AD29-P3P	I/O	36	N.C	-
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	N.C	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD27-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-

Table C-20 Mini PCI I/F connector (124pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	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	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	N.C	-
99	AD01-P3P	I/O	100	N.C	-
101	GND	-	102	GND	-
103	N.C	-	104	GND	-
105	N.C	-	106	N.C	-
107	N.C	-	108	N.C	-
109	N.C	-	110	N.C	-
111	N.C	-	112	N.C	-
113	GND	-	114	GND	-
115	N.C	-	116	N.C	-
117	GND	-	118	N.C	-
119	GND	-	120	GND	-
121	N.C	-	122	N.C	-
123	N.C	-	124	B3V	-

**C.21 PJ2200 Docking I/F connector (240pin)**

Table C- 21 Docking I/F connector (240pin)(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	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	EVER3V	I
9	DPCONF-S5P	O	10	DNVPON-S3P	O
11	GND	-	12	DDCSCL-P3P	I/O
13	RED ; 111	I	14	LGREN ; 111	I
15	BLUE ; 111	I	16	DHSYNC-P5P	I
17	(DVISC-P3P)	-	18	N.C	-
19	GND	-	20	N.C	-
21	N.C	-	22	(DVITX2-P3P)	-
23	(DVITX2-P3N)	-	24	(DVITX1-P3P)	-
25	(DVITX1-P3N)	-	26	(DVITX0-P3P)	-
27	(DVITX0-P3N)	-	28	GND	-
29	GND	-	30	(DVITXC-P3P)	-
31	(DVITXC-P3N)	-	32	(DVIDET-PS3N)	-
33	(DVIPD1-P3N)	-	34	N.C	-
35	(QSWON-B3P)	-	36	(DIRQD-S3N)	-
37	GND	-	38	(PCM2SP-B3N)	-
39	(DPMRST-S3N)	-	40	(DAD00-P3P)	-
41	GND	-	42	(DAD02-P3P)	-
43	(DAD04-P3P)	-	44	(DAD06-P3P)	-
45	GND	-	46	(XDRCI-P3P)	-
47	(DAD09-P3P)	-	48	(DAD11-P3P)	-
49	GND	-	50	(DAD13-P3P)	-
51	(DAD15-P3P)	-	52	(DINTA-P3N)	-
53	GND	-	54	N.C	-
55	N.C	-	56	N.C	-

Table C- 21 Docking I/F connector (240pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
57	VOID	-	58	VOID	-
59	MDMRNG-B3P	I/O	60	MDMTIP-B3P	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	EXMSDT	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	DNVSON-S3P	I
69	DILSON-E3P	I	70	(NVPCNF-S5P)	-
71	GND	-	72	DDCSDA-P3P	I/O
73	VGAGND	-	74	VGAGND	-
75	VGAGND	-	76	DVSYNC-P5P	I
77	(DVISD-P3P)	-	78	(DVIPRTCT3)	-
79	GND	-	80	(DVITX5-P3P)	-
81	(DVITX5-P3N)	-	82	(DVITX4-P3P)	-
83	(DVITX4-P3N)	-	84	(DVITX3-P3P)	-
85	(DVITX3-P3N)	-	86	(DVI16)	-
87	(DVI17)	-	88	GND	-
89	GND	-	90	N.C	-
91	N.C	-	92	N.C	-
93	(DVIPD0-P3N)	I	94	(DVIPRTCT4)	-
95	(DCADIO-S3P)	-	96	(DSMI-S3N)	-
97	GND	-	98	(DCKRUN-P3N)	-
99	(PME-S3N)	-	100	(DAD01-P3P)	-
101	GND	-	102	(DAD03-P3P)	-
103	(DAD05-P3P)	-	104	(DAD07-P3P)	-
105	GND	-	106	(DAD08-P3P)	-
107	(DAD10-P3P)	-	108	(DAD12-P3P)	-
109	GND	-	110	(DAD14-P3P)	-
111	(DCBE1-P3N)	-	112	(DPAR-P3P)	-
113	GND	-	114	N.C	-
115	N.C	-	116	N.C	-
117	VOID	-	118	VOID	-

Table C- 21 Docking I/F connector (240pin)(3/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
119	VOID	-	120	VOID	-
121	N.C	-	122	N.C	-
123	N.C	-	124	B3V	-
125	S5V	-	126	DTPA-B3P	I/O
127	GND	-	128	DTPB-B3P	I/O
129	USBON0	I	130	USBOC0	I
131	GND	-	132	USBON1-S3P	I
133	USBOC1-E3N	I	134	SNDMUT-S3N	O
135	N.C	-	136	DOU TL-PXP	O
137	DINL-PXP	O	138	DINR-PXN	O
139	GND	-	140	PWRSW ; 000	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
153	PDB00-P5P	I/O	154	STROB-P5N	I
155	(DPGNT-P3N)	-	156	(DAD30-P3P)	-
157	GND	-	158	(DAD28-P3P)	-
159	(DAD26-P3P)	-	160	(DAD24-P3P)	-
161	GND	-	162	(DAD31-P3P)	-
163	(DAD22-P3P)	-	164	(DAD20-P3P)	-
165	GND	-	166	(DCBE0-P3N)	-
167	(DAD18-P3N)	-	168	(DAD16-P3N)	-
169	GND	-	170	(DCBE2-P3N)	-
171	(DTRDY-P3N)	-	172	(DSTOP-P3N)	-
173	GND	-	174	N.C	-
175	LANE3V	I	176	VOID	-
177	VOID	-	178	N.C	-
179	TXP-EXP	O	180	TXN-EXN	O
181	DCOUT	-	182	DCOUT	-

Table C- 21 Docking I/F connector (240pin)(4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
183	DSSDA-S5P	I/O	184	DCOUT	-
185	N.C	-	186	DTPA-B3N	I/O
187	GND	-	188	DTPB-B3N	I/O
189	USBD0-E3P	I/O	190	USBD0-E3N	I/O
191	GND	-	192	USBD1-E3P	I/O
193	USBD1-E3N	I/O	194	DOU-TR-PXP	O
195	DOU-TR-PXN	O	196	DOU-TL-PXN	O
197	DINL-PXN	O	198	DINR-PXP	O
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/O	212	PINIT-P5N	I
213	ERROR-P5N	O	214	AUTFD-P5N	I
215	(DPREQ-P3N)	-	216	(DAD31-P3P)	-
217	GND	-	218	(DAD29-P3P)	-
219	(DAD27-P3P)	-	220	(DAD25-P3P)	-
221	GND	-	222	(DCBE3-P3N)	-
223	(DAD23-P3P)	-	224	(DAD21-P3P)	-
225	GND	-	226	(DCPCLR-B3N)	-
227	(DAD19-P3P)	-	228	(DAD17-P3P)	-
229	GND	-	230	(DFRAME-P3N)	-
231	(DORDY-P3N)	-	232	(DDEVSL-P3N)	-
233	GND	-	234	ACT-E3N	O
235	LNK-E3N	O	236	DOCDT2-S3N	O
237	VOID	-	238	VOID	-
239	RXP-EXP	I	240	RXN-EXN	I

**C.22 PJ2201 MDM Relay Board I/F connector (2pin)***Table C-22 MDM Relay Board I/F connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MDMRNG-B3P	I/O	2	MDMTIP-B3P	I/O

**C.23 PJ2202 LAN Relay Board I/F connector (5pin)***Table C-23 LAN Relay Board I/F connector (5pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TXN-EXN	O	2	TXP-EXP	O
3	RXP-EXP	I	4	RXN-EXN	I
5	TERMPL-GND	-			

**C.24 PJ4200 1394 I/F connector (4pin)***Table C-24 1394 I/F connector (4pin)*

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 PJ4600 USB1 connector (4pin)***Table C-25 USB1 connector (4pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(E5V)	-	2	USBP1-S3N	I/O
3	USBP1-S3P	I/O	4	GND	-

**C.26 PJ4601 USB0 connector (4pin)***Table C-26 USB0 connector (4pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(E5V)	-	2	USBP0-S3N	I/O
3	USBP0-S3P	I/O	4	GND	-

**C.27 PJ8760 RTC battery connector (3pin)***Table C-27 RTC Battery connector (3pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	Vbat	-	2	N.C	-
3	GND	-			



**LE Board****C.28 PJ9540 LED I/F connector (14pin)***Table C- 28 LED I/F connector (14pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	DCINOR-S5N	I	4	DCINGR-S5N	I
5	PWLEOR-S5N	I	6	PWLEGR-S5N	I
7	BAT1OR-S5N	I	8	BAT1GR-S5N	I
9	HDDLED-P5N	I	10	BAT2OR-S5N	I
11	SBAYLD-S5N	I	12	BTLED-S5N	I
13	M5V	-	14	P5V	-

**SD Board****C.29 PJ6000 Internal Microphone connector (2pin)***Table C- 29 Internal Microphone connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(MICIN-PXP)	I	2	A-GND	-

**C.30 PJ6001 External Microphone connector (5pin)***Table C-30 External Microphone connector (5pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(A-GND)	-	2	(MICIN-PXP)	I
3	REF	-	4	N.C	-
5	N.C	-			

**C.31 PJ6002 Headphone connector (5pin)***Table C-31 Headphone connector (5pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(A-GND)	-	2	(HEDL-PXP)	O
3	(HEDR-PXP)	O	4	A-GND	-
5	(SPKEN)	O			

**SW Board****C.32 PJ3290 BT Switch Board I/F connector (2pin)***Table C-32 BT Switch Board I/F connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(BTSWON-S3P)	O	2	(S3V)	-

## 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 <b>Shift</b>	With right <b>Shift</b>
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59



Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A E0 52	E0 D2 E0 AA	E0 12 E0 70	E0 F0 70 E0 F0 12				
76	DEL	E0 2A E0 53	E0 D3 E0 AA	E0 12 E0 71	E0 F0 71 E0 F0 12				
79	←	E0 2A E0 4B	E0 CB E0 AA	E0 12 E0 6B	E0 F0 6B E0 F0 12				
80	Home	E0 2A E0 47	E0 C7 E0 AA	E0 12 E0 6C	E0 F0 6C E0 F0 12				
81	End	E0 2A E0 4F	E0 CF E0 AA	E0 12 E0 69	E0 F0 69 E0 F0 12				
83	↑	E0 2A E0 48	E0 C8 E0 AA	E0 12 E0 75	E0 F0 75 E0 F0 12				
84	↓	E0 2A E0 50	E0 D0 E0 AA	E0 12 E0 72	E0 F0 72 E0 F0 12				
85	PgUp	E0 2A E0 49	E0 C9 E0 AA	E0 12 E0 7D	E0 F0 7D E0 F0 12				
86	PgDn	E0 2A E0 51	E0 D1 E0 AA	E0 12 E0 7A	E0 F0 7A E0 F0 12				
89	→	E0 2A E0 4D	E0 CD E0 AA	E0 12 E0 74	E0 F0 74 E0 F0 12				
203	Win	E0 2A E0 5B	E0 DB E0 AA	E0 12 E0 1F	E0 F0 1F E0 F0 12				
204	App	E0 2A E0 5D	E0 DD E0 AA	E0 12 E0 2F	E0 F0 2F E0 F0 12				

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

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.

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## Appendix E Key Layout

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### E.1 United States (US) Keyboard

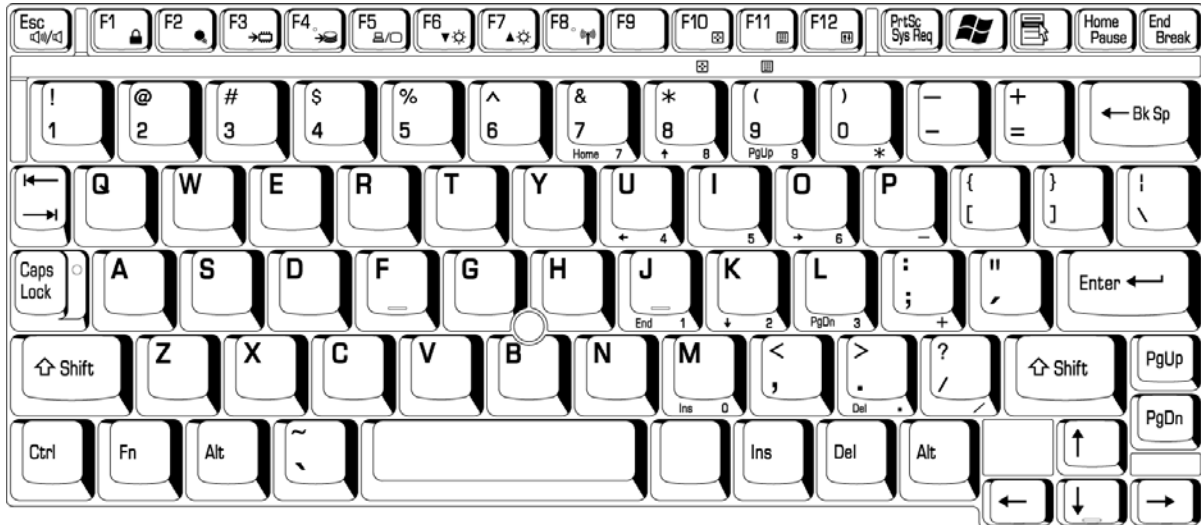


Figure E-1 US keyboard

### E.2 United Kingdom (UK) Keyboard

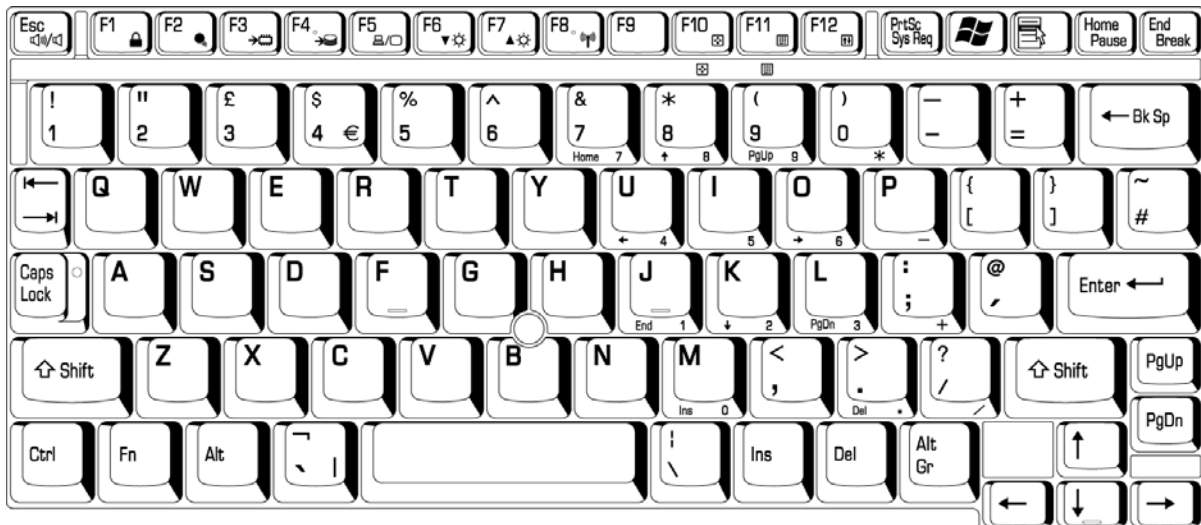


Figure E-2 UK keyboard

### E.3 German (GR) Keyboard

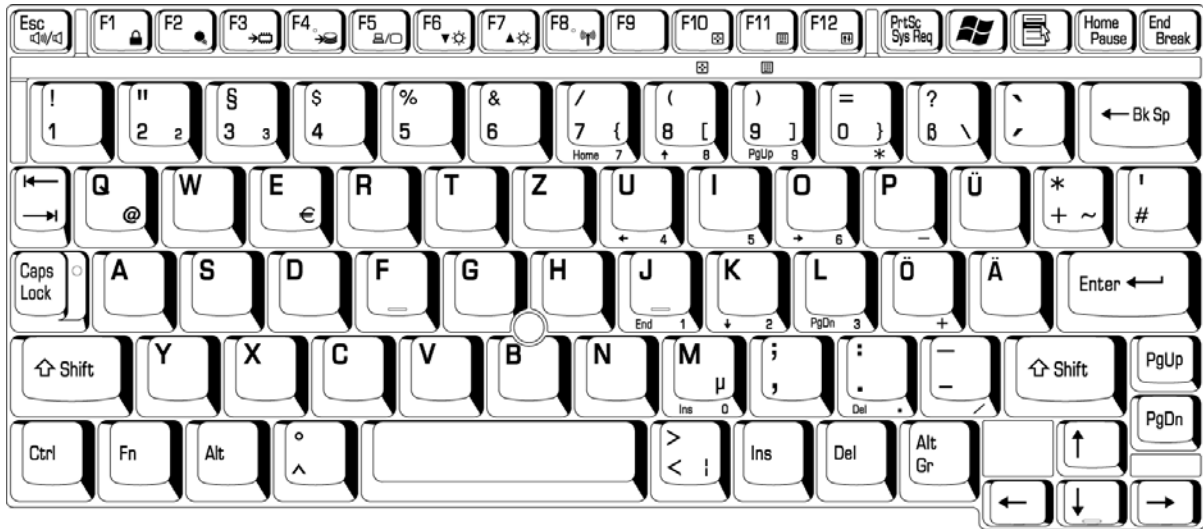


Figure E-3 GR keyboard

### E.4 French (FR) Keyboard

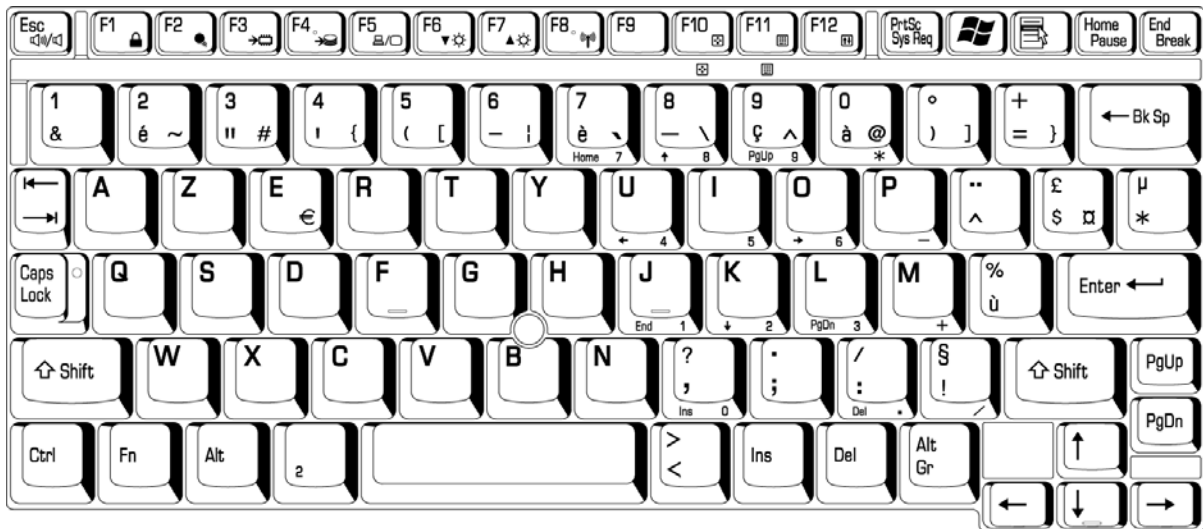


Figure E-4 FR keyboard

### E.5 Spanish (SP) Keyboard

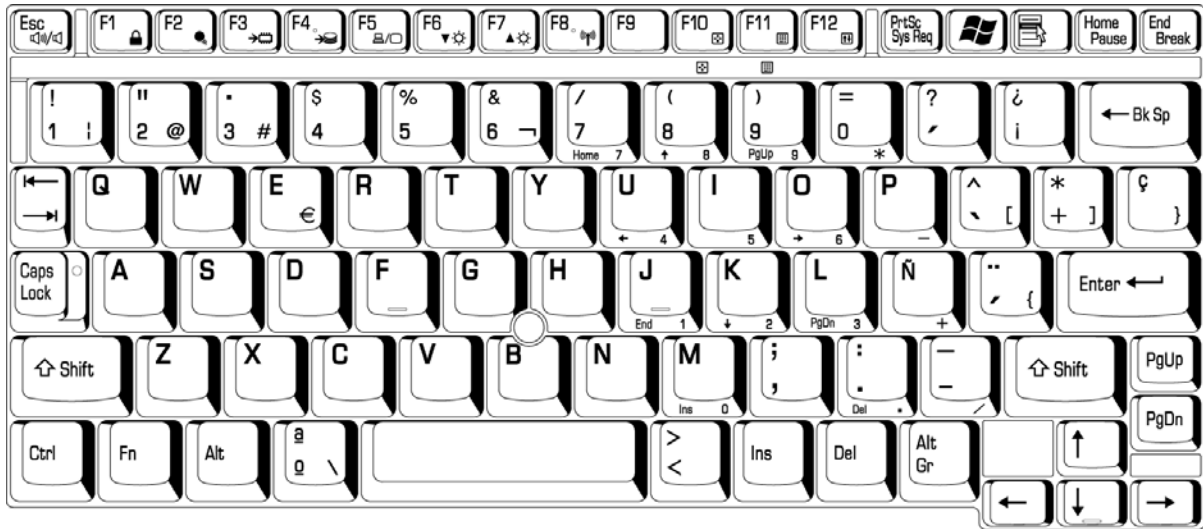


Figure E-5 SP keyboard

### E.6 Italian (IT) Keyboard

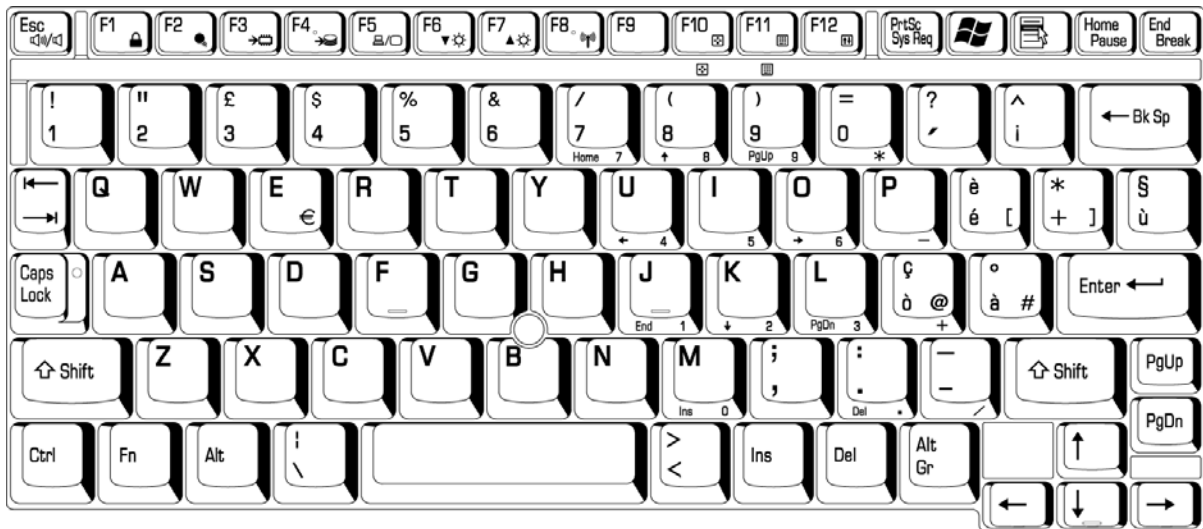


Figure E-6 IT keyboard

### E.7 Scandinavian (SC) Keyboard

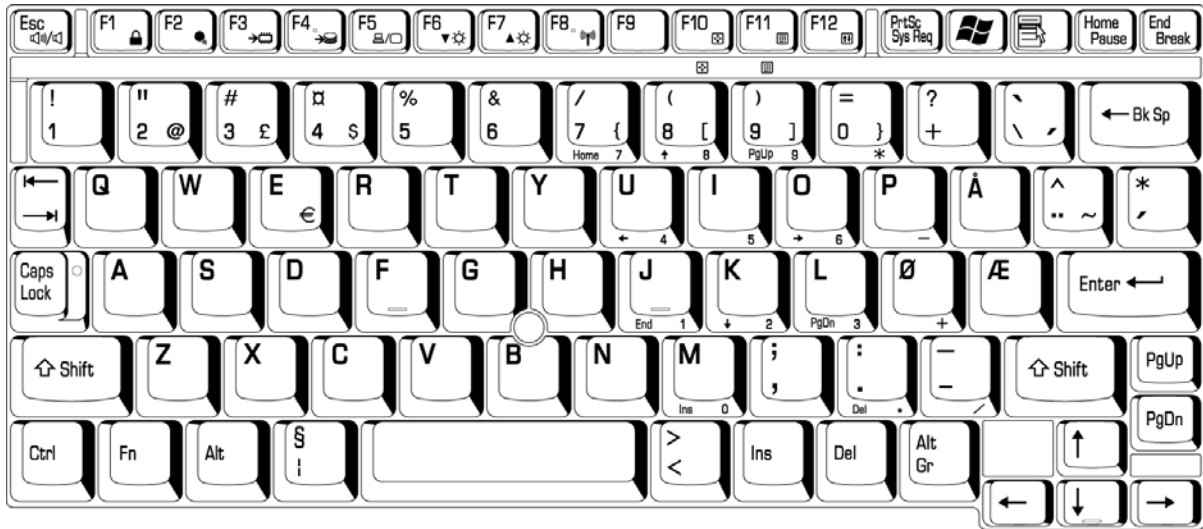


Figure E-7 SC keyboard

### E.8 Swiss-German (SL) Keyboard

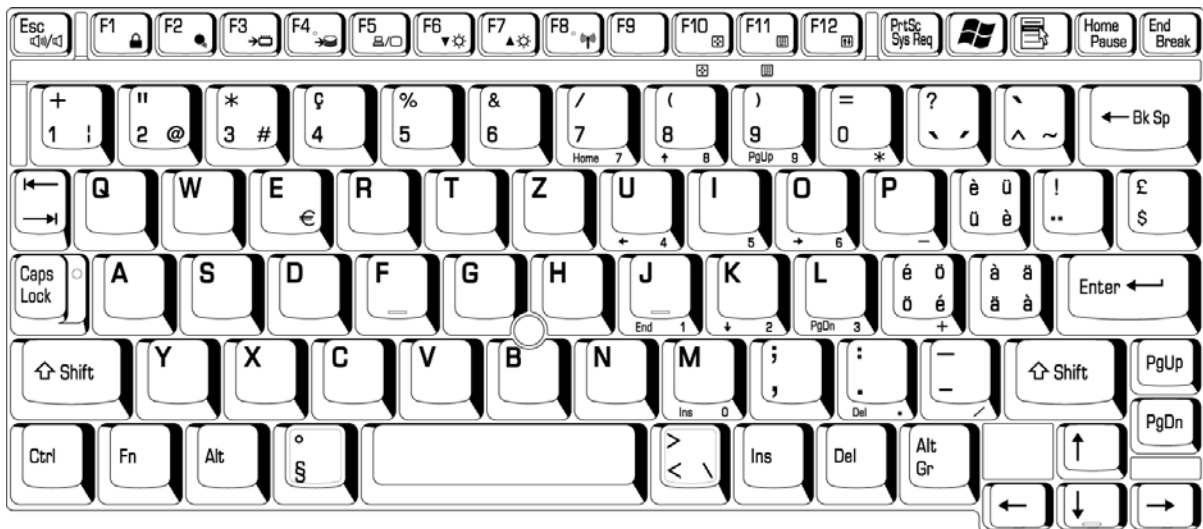


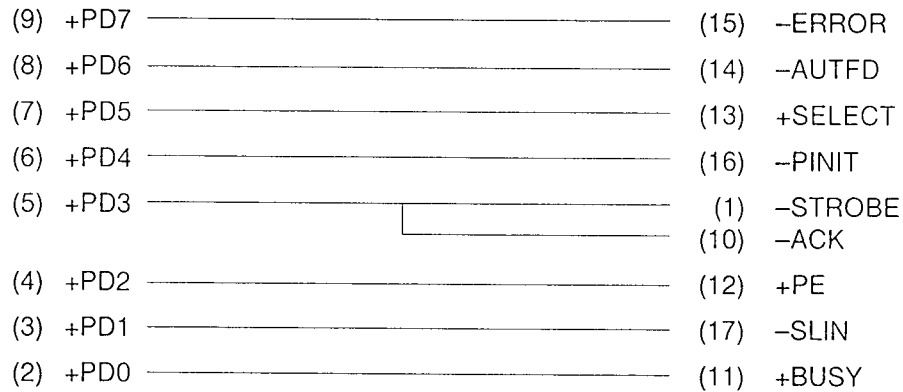
Figure E-8 SL keyboard

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## Appendix F Wiring Diagrams

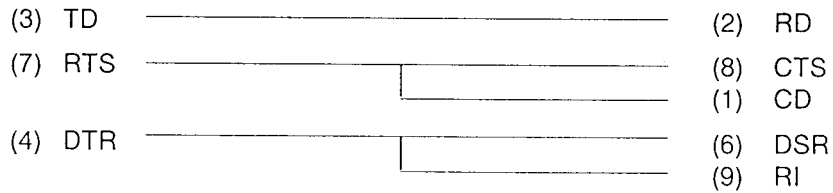
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### F.1 Parallel Port Wraparound Connector



*Figure F-1 Parallel port wraparound connector*

### F.2 Serial Port Wraparound Connector



*Figure F-2 Serial port wraparound connector*



### F.3 Serial Port Direct Cable (9-Pin to 9-Pin)

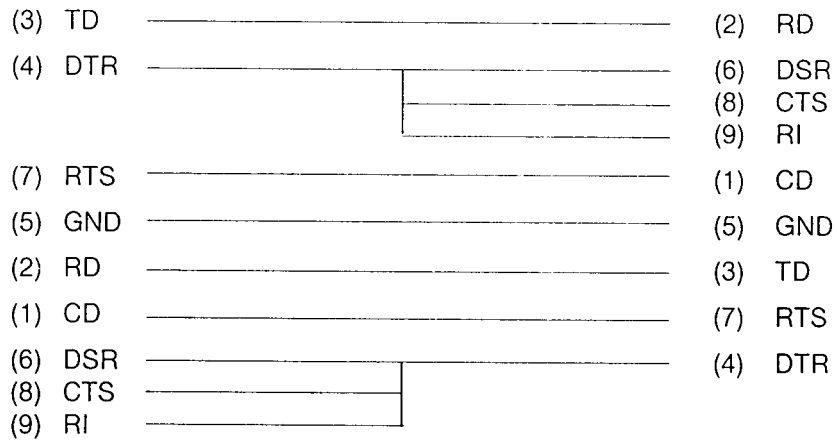


Figure F-3 Serial port direct cable (9-pin to 9-pin)

### F.4 Serial Port Direct Cable (9-Pin to 25-Pin)

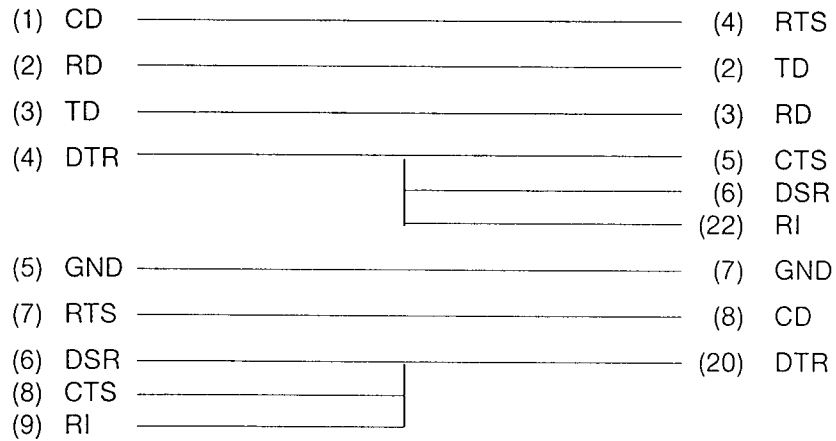


Figure F-4 Serial port direct cable (9-pin to 25-pin)

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## Appendix G BIOS Rewrite Procedures

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This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

### Tools

To rewrite the BIOS, you need the following tool:

- ❑ BIOS/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 following 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, the system automatically reboots.



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## Appendix H EC/KBC Rewrite Procedures

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This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

### Tools

To rewrite the EC/KBC, you need the following tool:

- 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 EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.



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## Appendix I Reliability

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The following table shows MTBF (Mean Time Between Failures) in maximum configuration.

*Table I-1 MTBF*

<b>Component</b>	<b>Time (hours)</b>
System	5,885.4

