

**Toshiba Personal Computer  
Portege M200  
Maintenance Manual**

**TOSHIBA CORPORATION**

**File Number 960-457**

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Toshiba Portege M200 Maintenance Manual

First edition November 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 M200, referred to as Portege M200 in this manual.

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

### SAFETY PRECAUTIONS

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

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

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

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

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

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

- ❑ Be sure to fasten screws securely with the right screwdriver. Be sure to use the PH Point size “0” and “1” screwdrivers complying with the ISO/DIS 8764-1:1996. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- ❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1      Hardware Overview describes the Portege M200 system unit and each FRU.
- Chapter 2      Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3      Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4      Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices    The appendices describe the following:

- Handling the LCD module
- Board layout
- Pin assignment
- Keyboard scan/character codes
- Key layout
- BIOS/KBC/EC Update
- Reliability
- Key FD



## 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 Portege M200 that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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# **Chapter 1**

## **Hardware Overview**

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## 1.1 Features

The Portege M200 is an ultra thin and lightweight PC realizing cable-less environment on a table by wireless function with a Pentium-M processor realizing high performance.

Microprocessor

A 1.4/1.5/1.6/1.7GHz Mobile Pentium-M (Banias) processor with a 1.4/1.5/1.6/1.7GHz internal clock, 400MHz bus and 1.48/0.96V core operation, supporting SpeedStep III.

Chipset

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

Cache memory

A Banias has 32KB primary cache and 1MB secondary cache (in CPU.)

GPU Controller

The computer has an nVIDIA MAP34-232 controller. The internal VRAM is 32MB.

Memory

Two DDR SO-DIMM slots support DDR333 (standard)/DDR226. Memory modules can be installed to a maximum of 2GB (2,048MB). Memory modules in 128MB (only for expansion), 256MB, 512MB and 1GB sizes are available.

HDD

Single 40/60/80GB internal drive. 2.5-inch x 9.5mm height

USB FDD

Three-mode 3.5 inch USB FDD supports 720KB, 1.2MB and 1.44MB formats.

Display

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

LCD

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

- CRT

Supported via an RGB connector
- Digitizer

Digitizer is installed at the rear of LCD. The supplied Tablet pen enables pen computing.
- Keyboard

Keyboard has 84(US)/85(UK)-key and supports Windows key and Hot key.
- Touch pad

Touch pad is installed as a pointing device.
- Tablet pen (Tablet PC pen)

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

Reserve pen can be used instead of the tablet pen at the time of loss or breakage. Some computers in the series are equipped with a Reserve pen.
- Batteries

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

The adopted chip for this computer equips six USB ports supporting USB 2.0. Three of them are occupied by the internal system, one is not used and others are usable as external ports.
- PC card slot

A PC card Type II is acceptable. Supports ToPIC-100 (3.3V/CardBus).
- SD card slot

One SD card slot. Supports only memory card.

Sound system

Incorporates an internal speaker, three internal microphones, an external monaural microphone connector and a stereo headphone connector.

 One touch buttons

Windows Security tablet button (Ctrl+Alt+Del), ESC/Rotation button and Cross Function button (Enter, Menu, scroll) are installed.

 Internal Modem

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

The computer contains a MDC, enabling data and fax communication. It supports ITU-TV.90. The transfer rates are 56 Kbps for data reception, 33.6 Kbps for data transmission, and 14,400 bps for fax transmission. However, the actual speed depends on the line quality. The RJ11 modem jack is used to accommodate a telephone line. In U.S., Canada and Australia, the MDC supports V.90 and V.92.

 LAN

The internal LAN supports 10/100Mbit Ethernet.

 Wireless LAN

The internal wireless LAN supports Mini PCI Type III. The 802.11b/g (Atheros) mini PCI card is supported.

 FIR(Fast Serial InfraRed) communication port

Fast Serial InfraRed (FIR) communication port supports IrDA1.1. and realizes 115Kbps or 1.15Mbps wireless communication.

 Bluetooth

The computer is equipped with Bluetooth communication standards supporting Host interface and USB v1.1. It enables the communication between devices supporting Bluetooth version 1.1. The switch on the computer can switch on/off the communication function.

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



Figure 1-1 Front of the computer

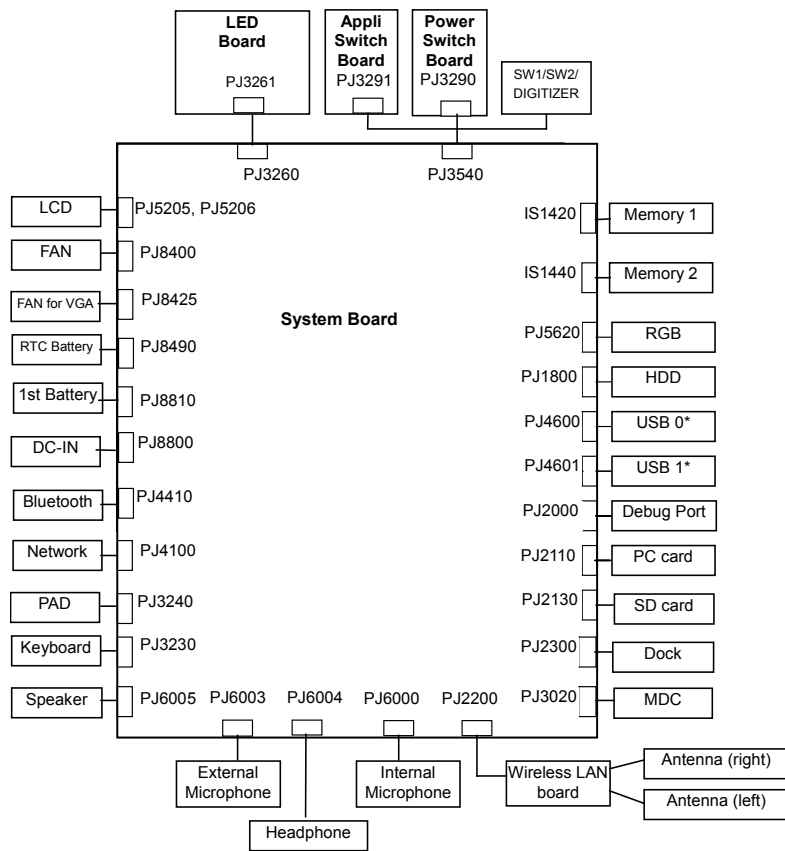


Figure 1-2 System units configuration

\* The drawing above shows the physical configuration of USB ports. In the logical configuration, the connector PJ4600 is assigned to USB 1 and PJ4601 is assigned to USB0.

Figure 1-3 shows the system block diagram.

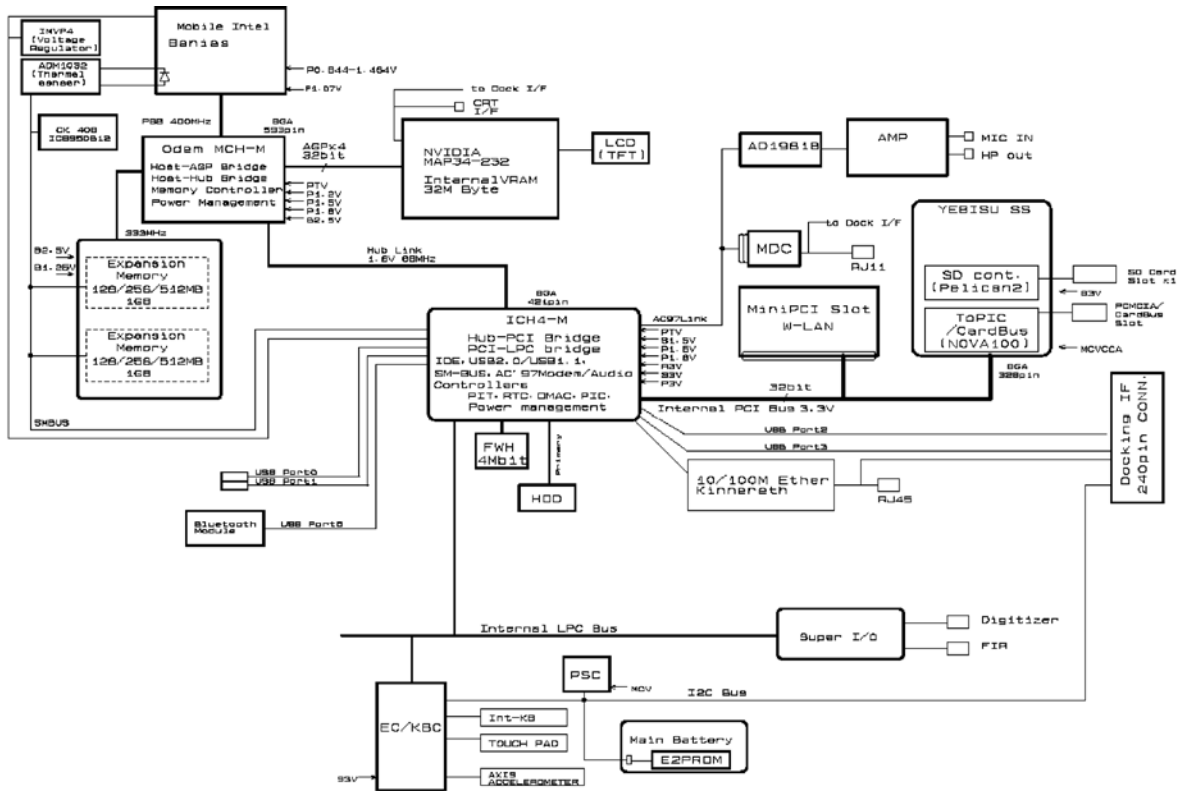


Figure 1-3 System Block Diagram

The PC contains the following components.

❑ CPU

Mobile Pentium-M (Banias)

- A 1.4/1.5/1.6/1.7GHz Pentium-M (Banias) processor with a 1.4/1.5/1.6/1.7GHz internal clock, 400MHz bus and 1.48/0.96V core operation voltage (built-in NDP), supporting SpeedStep III.
- Internal cache memory: 32KB Data and 32KB Instruction, Write-Back
- Secondary cache memory: 1MB (in CPU)

❑ Memory

Two DDR SO-DIMM slots support DDR333 (standard)/DDR226. Memory modules in 256MB, 512 MB and 1GB can be installed to a maximum of 2GB (2,048MB).

- 3.3V operation
- 200 pin, SO Dual In-line Memory Modules (SO-DIMM)
- Supports PC2700
- Access time : 6ns

❑ BIOS ROM (Flash memory)

- 4Mbit (256K×16-bit chip)
  - 64KB used for logo
  - 64KB used for setup and checksum
  - 128KB used for system BIOS
  - 64KB used for VGA-BIOS
  - 64KB used for ACPI
  - 8KB used for PnP
  - 8KB used for password security
  - 16KB used for booting
  - 64KB used for LAN
  - 32KB are reserved
- 5.0V operation
- Access time : 120 ns or 90 ns
- Data transfer: 8-bit



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❑ PCI chipset

This gate array incorporates the following elements and functions

- Intel Odem+(855PM Bstep) (North Bridge)
  - Baniyas/Dothan Processor System Bus Support
  - DRAM Controller supporting DDR333/DDR266, 2GB max
  - Accelerated Graphics Port Interface: adheres to AGP2.0, AGP×4 mode
  - Hub Link Interface
  - 593-ball 37.5×37.5 mm FC-BGA package
  
- Intel ICH4-M (South Bridge)
  - Hub Link Interface
  - PCI Rev2.2 Interface (6 PCI REQ/GNT Pairs)
  - BusMaster IDE Controller (Ultra ATA 100/66/33)
  - USB 1.1/2.0 Controller 6 Ports (EHCI: Enhanced Host Controller)
  - I/O APIC (ACPI 1.06)
  - SMBus2.0 Controller
  - FWH Interface (BIOS)
  - LPC Interface (EC/KBC, Super I/O)
  - IRQ Controller
  - Serial Interrupt Controller
  - Power Management Controller
  - Deeper Sleep (C4) Support
  - Suspend/Resume Control
  - AC'97 2.2 Interface
  - Internal RTC
  - Internal LAN Controller (WfM2.0)
  - 421-ball 31×31mm BGA Package

❑ PC Card Controller Gate Array (YEBISU-SS)

- PCI interface (PCI Revision2.2)
- CardBus/PC Card controller (Yenta2 Version2.2)
- SD memory card controller (SDHC Ver.1.2)
- SD IO card controller (Ver.1.0)
- SmartMedia controller (SMHC Ver.01/SMIL1.0)
- SIO (UART) controller (MS Debug Port Specification Ver.1.0)
- Docking station interface
- Q switch control, reset control
- External device interface

GPU Controller (nVIDIA MAP34-232)

- VRAM 32MB (4M × 32 × 2) DDR200MHz
- AGP bus R2.0 x 4
- LCD Interface LVDS 2ch

 Batteries

The main battery is a detachable lithium ion main battery (10.8V-4,400mAh) and the RTC battery is a lithium ion battery (2.4V-17mAh).  
The RTC battery is mounted inside computer.

 Other main system chips

- EC/KBC (Mitsubishi-made LPC microcontroller M306K5F8LRP x 1)
- PSC (Toshiba-made TMP87PM48U x 1)
- Temperature sensor (AND-made ADM1032 x 1)
- Temperature switch(for forcible CPU stop)(Maxim-made MAX6501UKP x 1)
- Super I/O (SMsC-made LPC47N217-JN x 1)
- SOUND CODEC (AND-made AD1981B x 1)
- CLK Generator (ICS-made ICS950812CGT x 1)
- FWH (Intel-made E82802AB8 x 1)

 Modem controller

Supported by MDC. Using of the secondary AC97 Line

 LAN controller (ICH4-M + Kinnerth)

Controls LAN and supports 10/100Base-T.

## 1.2 2.5-inch Hard Disk Drive

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

Figure 1-4 shows a view of the 2.5-inch HDD and Tables 1-1 and 1-2 list the specifications.

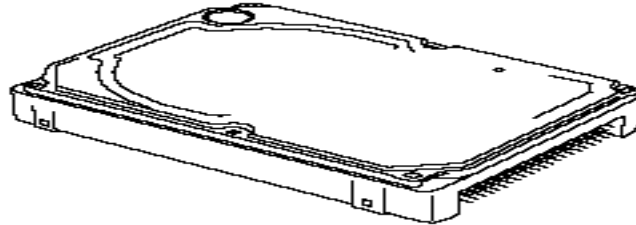


Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD dimensions

Parameter		Standard value			
		TOSHIBA HDD2193B	TOSHIBA HDD2171B	TOSHIBA HDD2184B	TOSHIBA HDD2194B
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100.0			
	Weight (g)	95.5 (MAX)	102 (MAX)		

Parameter		Standard value			
		HITACHI GST G8BC00014410	HITACHI GST G8BC00014610	HITACHI GST G8BC00015610	HITACHI GST G8BC00014810
Outline dimensions	Width (mm)	69.85			
	Height (mm)	9.5			
	Depth (mm)	100.2			
	Weight (g)	95	102 (MAX)	115 (MAX)	102 (MAX)

Table 1-2 2.5-inch HDD Specifications

Parameter	Specification			
	TOSHIBA HDD2193B	TOSHIBA HDD2171B	TOSHIBA HDD2184B	TOSHIBA HDD2194B
Storage size (formatted)	40GB	40GB	60GB	60GB
Speed (RPM)	5,400			
Data transfer speed (Mbits/s)	154.3- 298.0	200.8- 333.2	202.9- 373.3	258-394
Interface transfer rate (MB/s)	100			
Storage density(Kbpi)	618	607	632	652
Track density (Ktpi)	78.9	57.1	78.9	88.8
Average seek time (Read) (ms)	12			
Average seek time (Write) (ms)	-			
Start time (sec)	4			

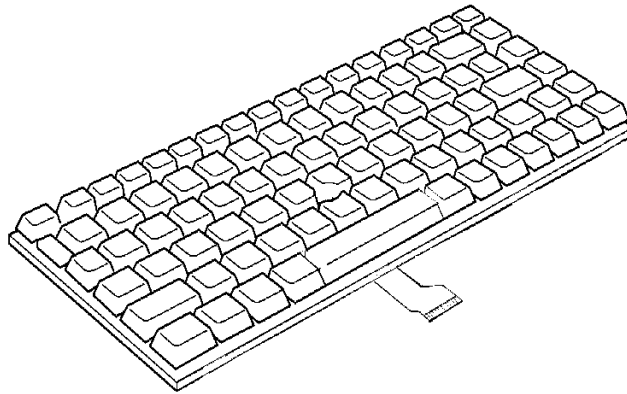
Parameter	Specification			
	HITACHI GST G8BC00014410	HITACHI GST G8BC00014610	HITACHI GST G8BC00015610	HITACHI GST G8BC00014810
Storage size (formatted)	40GB	60GB	60GB	80GB
Speed (RPM)	5,400	5,400	7,200	5,400
Data transfer speed	450 (Mbps)	450 (Mbps)	507 (Mbps)	450 (Mbps)
Interface transfer rate (MB/s)	100			
Storage density(Kbpi)	712	712	624	712
Track density (Ktpi)	96.0	96.0	88.2	96.0
Average seek time (Read) (ms)	12	12	10	12
Average seek time (Write) (ms)	14	14	11	14
Start time (sec)	3.5	3.5	4	3.5

## **1.3 Keyboard**

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

Figure1-5 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



*Figure 1-5 Keyboard*

## 1.4 TFT Color Display

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

### 1.4.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display images and characters of 16M colors with 1400×1050 resolution.

Table 1-5 shows list the specifications.

*Table 1-3 LCD module specifications (12.1 TFT)*

Item	Specifications
	<b>G33C00019110</b>
Number of Dots	1,400 (W) x 1,050 (H)
Dot spacing (mm)	0.176 (H) x 0.176 (V)
Display range (mm)	245.76 (H) x 184.32 (V)
Outline dimensions	269 (w) x 199 (H) x 6.7 Max (D)

### 1.4.2 FL Inverter Board

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

Table 1-4 lists the FL inverter board specifications.

*Table 1-4 FL inverter board specifications*

Item	Specifications	
	G71C00011110	
Input	Voltage (V)	DC 5
	Power (W)	7
Output	Voltage (V)	750
	Current (mA)	6.00
	Power	5W/7VA

## **1.5 Power Supply**

The power supply supplies 26 different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges that the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the battery icon, and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.



Table 1-5 lists the power supply output specifications.

*Table 1-5 Power supply output specifications*

Name	Voltage [V]	Name/Use
PPV	1.000 - 0.748	CPU
MCH1R2-P1V	1.2	MCH-M
PTV	1.075	CPU, MCH-M, ICH4-M
2R5-P2V	2.5	GPU
2R5-B2V	2.5	MCH-M, SDRAM
1R25-P1V	1.25	MCH-M, SDRAM
PGV	1.2-1.5	GPU
LAN-E3V	3.3	ICH4-M, KINNERETH
S3V	3.3	ICH4-M, EC/KBC
B3V	3.3	YEBISUSS, PC Card, MDC
P3V	3.3	Clock Generator, ADM1032, ICH4-M, FWH, Mini PCI, GPU, LCD, AD1981B, Super I/O
SD-B3V	3.3	SD
E5V	5	USB
B5V	5	PC card
P5V	5	ICH4-M, KB, LED, FL INVERTER, HDD
IF-P5V	5	DOCK
A4R7-P4V	4.7	AD1981B, Headphone, Int-Mic, Ext-Mic
1R8-P1V	1.8	CPU, MCH-M, ICH4-M
1R5-P1V	1.5	MCH-M, ICH4-M, GPU
1R5-S1V	1.5	ICH4-M
LAN1R5-E1V	1.5	ICH4-M
M5V	5	LM26CIM5, LED
S5V	5	ICH4-M, DOCK
MCV	5	PSC
A4R7-P4V	4.7	AD1981B, MIC
R3V	2.0-3.3	ICH4-M

## 1.6 Batteries

The PC has the following two batteries.

- Main battery
- Real time clock (RTC) battery

Table 1-6 lists the specifications for these two batteries.

*Table 1-6 Battery specifications*

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0003D110	Lithium ion	10.8 V	4,400 mAh
	G71C0003D210			
Real time clock (RTC) battery	GDM710000003	Lithium ion	2.4 V	17 mAh

### 1.6.1 Main Battery

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

### 1.6.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The power supply microprocessor controls power supply and detects a full charge when the AC adapter and battery are connected to the computer. The system charges the battery using quick charge or trickle charge.

Quick Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off or in suspend mode. (See Table 1-7)

*Table 1-7 Time required for charges of main battery*

	<b>Charging Time</b>
Normal charge	About 3 to 10 hours or longer
Quick charge	About 2.5 hours

Quick battery charge is stopped in the following cases.

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

Trickle charge

When the main battery is fully charged and the AC adapter is plugged in, the power supply microcontroller automatically switches from quick charge to trickle charge.

### 1.6.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory. Table 1-8 lists the battery charging time and data preservation times.

*Table 1-8 RTC battery charging/data preservation time*

		<b>Time</b>
Charging time	AC adapter or main battery in use (Power ON)	8 hours (approx.)
Data preservation time (when fully charged)		1 month

## 1.7 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-9 lists the AC adapter specifications.

*Table 1-9 AC adapter specifications*

Parameter	Specification
	<b>G71C0002S310</b>
Input rated voltage	100V/240V
Input voltage range	AC 90 to 264V
Input frequency range	50Hz to 60Hz
Input current	1.5A or less (100VAC, 240VAC/4A load)
Output rated voltage	DC 15V
Output current	0A to 4A

---

## **Chapter 2**

# **Troubleshooting Procedures**

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## 2.1 Troubleshooting

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

The FRUs covered are:

1. Power supply
2. System Board
3. 3.5" USB FDD
4. 2.5" HDD
5. Keyboard
6. Display
7. Touch pad
8. Modem
9. LAN
10. Sound
11. SD card slot
13. Tablet pen
14. Wireless LAN
15. Bluetooth

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

The following tools are necessary for implementing the Diagnostics procedures:

1. Diagnostics Disk (Test program for maintenance)
2. Phillips screwdrivers

**NOTE:** Be sure to use the PH point size “0” screwdriver complying with the ISO/DIS 8764-1:1996. Use, however, the PH point size “1” screwdriver for screws fixing the expansion memory slot cover and the keyboard.

3. Screwdriver for LH sticks
4. Toshiba MS-DOS system FD
5. Work disk (for FDD testing)
6. Cleaning disk kit (for FDD head cleaning)
7. A set of tools for debug port test (test cable, test board, RS-232C cross cable, display, D port FD)
8. PC with a serial port (for displaying debug port test result)
9. Wraparound connector for PC card
10. Tester
11. External CRT
12. External USB Keyboard
13. External USB mouse
14. Headphone
15. Microphone
16. RJ-11 connector checker LED
17. LAN wraparound connector
18. PC (for infrared communication test and wireless LAN test)

## **2.2 Troubleshooting Flowchart**

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

- Make sure that Toshiba Windows® XP Tablet PC Edition is installed on the hard disk. Non-Toshiba operating systems can cause the computer malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the USB FDD is empty.

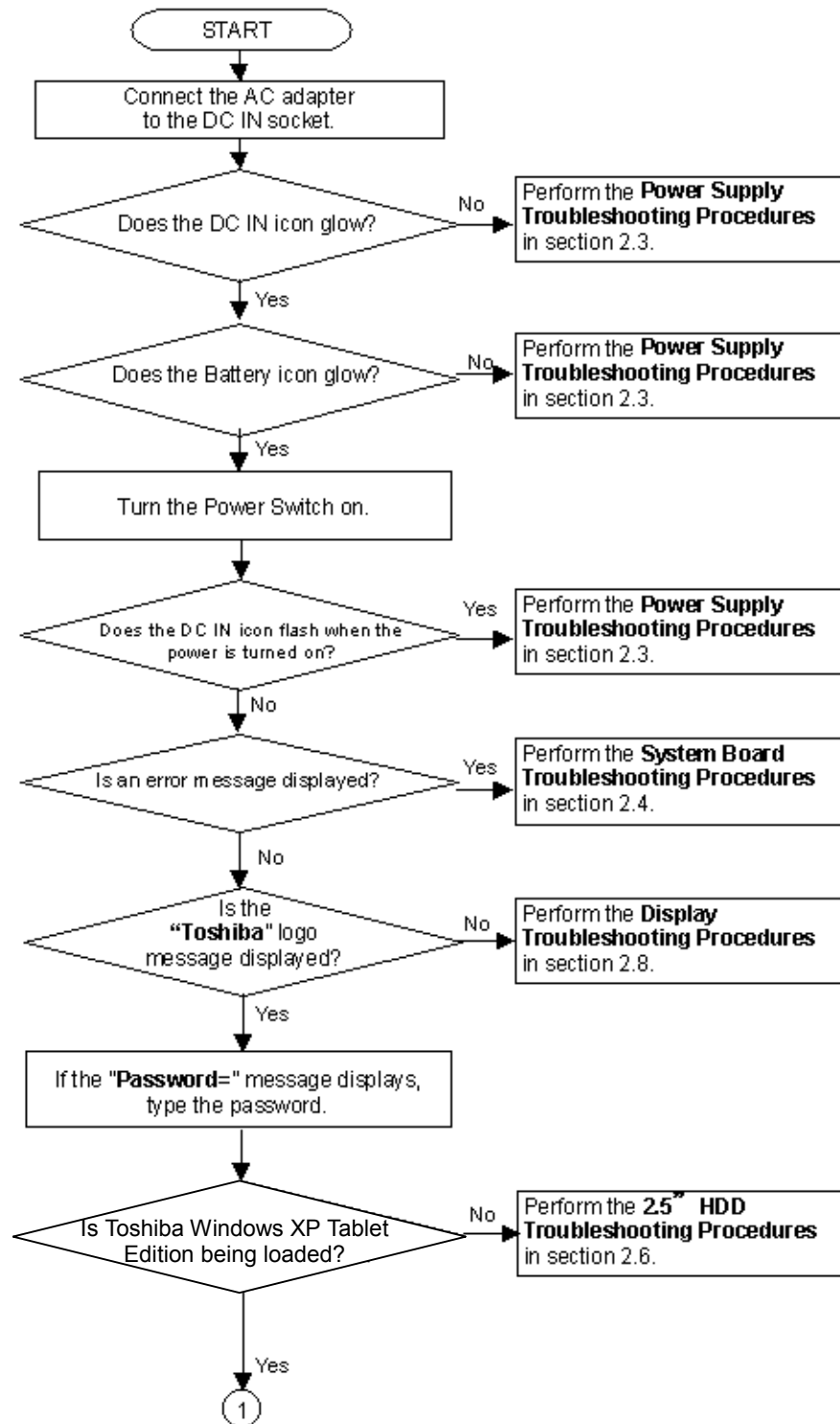


Figure 2-1 Troubleshooting flowchart (1/2)

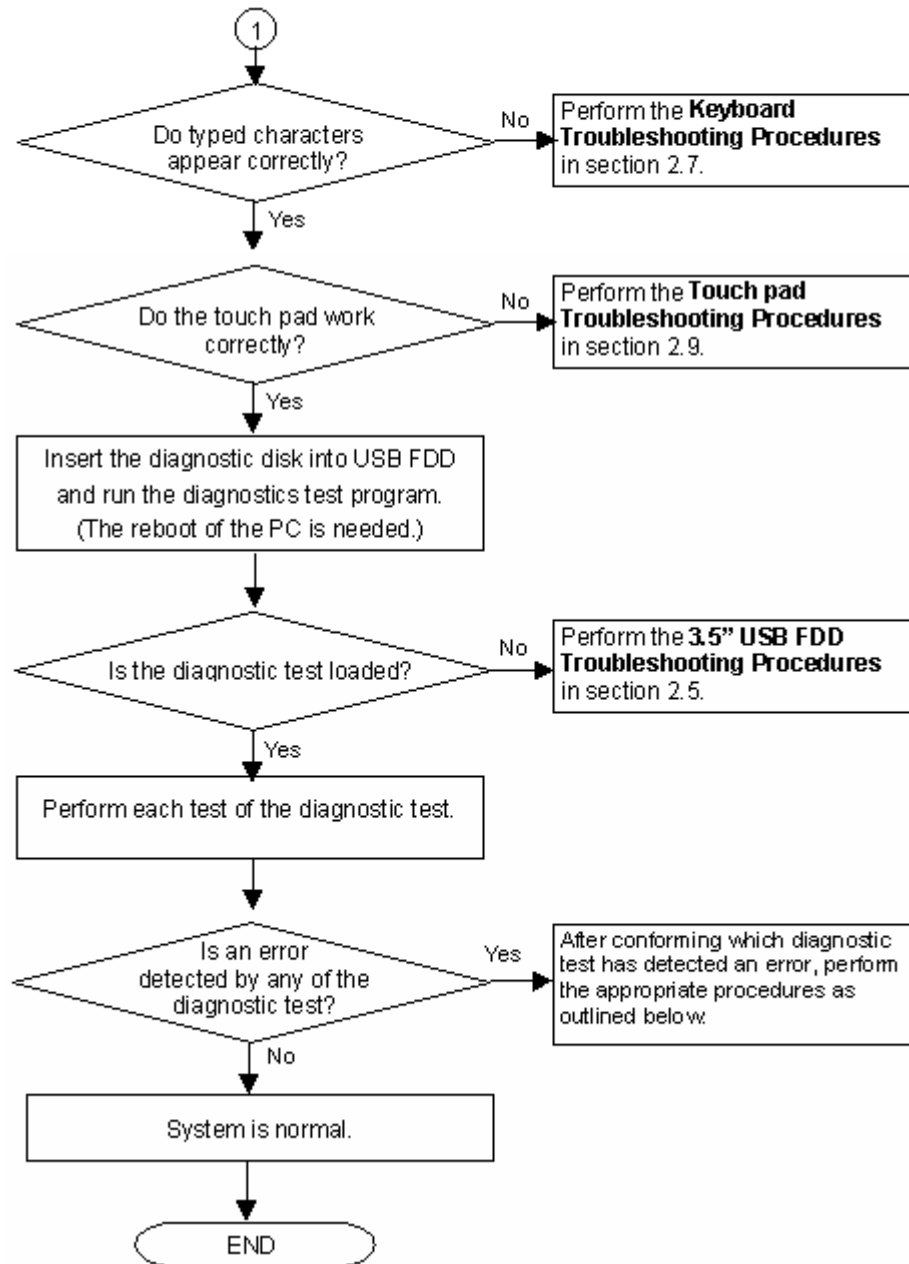


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected on the System test, Memory test, ASYNC test, Real timer test, NDP test or expansion test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the Keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.
3. If an error is detected on the Display test, perform the Display Troubleshooting Procedures in Section 2.8.
4. If an error is detected on the Floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
5. If an error is detected on the Hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
6. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.
7. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.11.
8. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.12.
9. If an error is detected on the wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.15.

## 2.3 Power Supply Troubleshooting

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

Procedure 1: Power Supply Icon Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Quick Charge Check

Procedure 5: Replacement Check



### Procedure 1 Power Supply Icon Check

The following two icons indicate the power supply status:

- Battery icon
- DC IN icon

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

*Table 2-1 Battery icon*

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights green	Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power.
Blinks orange (even intervals)	The battery level is low while the system power is ON.
Flashes orange	The battery level is low and the power switch is pressed on in the battery driving.
Doesn't light	Any condition other than those above.

*Table 2-2 DC IN icon*

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

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

When icons are blinking, perform the following procedure.

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

If icons are still blinking after the operation above, check the followings:

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

**CAUTION:** Use a recommended AC adapter (G71C0002S310).

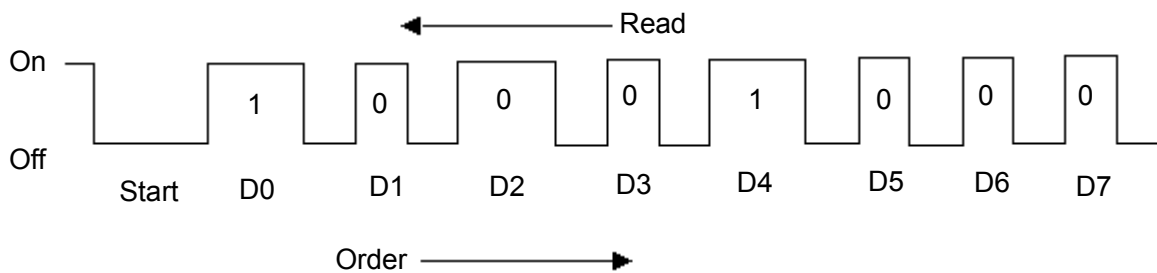
## Procedure 2 Error Code Check

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

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

The error code begins with LSB (Least Significant bit)

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



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

- DC power supply (AC adapter)

Error code	Meaning
10h	AC Adapter output voltage is over 16.5V.
11h	Tablet multi dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 7.0A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Abnormal current has been sensed 0[A].

Main Battery

Error code	Meaning
20h	Overvoltage is detected. (This is not supported.)
21h	Main battery charge current is over 7.00A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 3.1A when AC adapter is not connected.
24h	Abnormal current has been sensed 0[A].
25h	Main battery charge current is over 0.3A.

Second Battery

Error code	Meaning
30h	Overvoltage is detected. (This is not supported.)
31h	Second battery charge current is over 7.00A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.1A when AC adapter is not connected.
34h	Abnormal current has been sensed 0[A].
35h	Second battery charge current is over 0.3A.

S3V output (P60)

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

❑ 1R5-C1V output (P61)

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

❑ 1R8-C1V output (P62)

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

❑ PPV output (P63 : MUX\_CH0)

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

❑ PGV output (P64 : MUX\_CH0)

Error code	Meaning
80h	PGV voltage is over 1.62V when the computer is powered on/off.
81h	PGV voltage is 0.68V or less when the computer is powered on.
82h	PGV voltage is 0.68V or less when the computer is booting up.
83h	PGV voltage is 0.68V or more when the computer is powered off.
84h	PGV voltage is 0.68V or less when the computer is suspended.

❑ E5V output (P65 : MUX\_CH0)

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

❑ E3V output (P66 : MUX\_CH0)

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

❑ 1R2-P1V output (P63 : MUX\_CH1)

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

- 2R5-P2V output (P64 : MUX\_CH1)

Error code	Meaning
C0h	2R5-P2V voltage is over 3.00V when the computer is powered on.
C1h	2R5-P2V voltage is 2.125V or less when the computer is powered on.
C2h	2R5-P2V voltage is 2.125V or less when the computer is booting up.
C3h	2R5-P2V voltage is 2.125V or more when the computer is powered off.
C4h	2R5-P2V voltage is 2.125V or less while the computer is suspended.

- 1R25-P1V output (P65 : MUX\_CH1)

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

- 2R5-B2V output (P66 : MUX\_CH1)

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

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

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

Check 3 In the case of error code 21h:

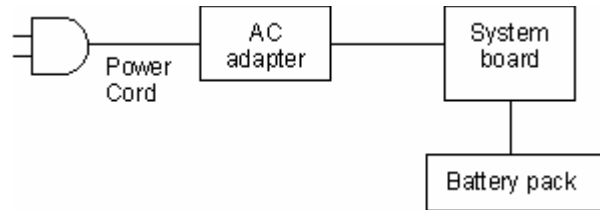
- Go to Procedure 3.

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



### Procedure 3 Connection Check

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



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

- Check 1 Make sure the AC adapter and the AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If these cables are connected correctly, go to Check 2.
- Check 2 Replace the AC adapter and the AC power cord with new ones.
- If the DC IN icon does not light, go to Procedure 5.
  - If the battery icon does not light, go to Check 3.
- Check 3 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

### Procedure 4 Quick Charge Check

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

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

**Procedure 5 Replacement Check**

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

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

Check 1 Replace the AC adapter with a new one. If the AC adapter is still not functioning properly, perform Check 2.

Check 2 Replace the system board with a new one.

## **2.4 System Board Troubleshooting**

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

Procedure 1: Message Check

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

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

**Procedure 1 Message Check**

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

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

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

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

- (a)\*\*\* Bad HDD type \*\*\*  
Check system. Then press [F1] key .....
- (b)\*\*\* Bad configuration \*\*\*  
Check system. Then press [F1] key .....
- (c)\*\*\* Bad memory size \*\*\*  
Check system. Then press [F1] key .....
- (d)\*\*\* Bad time function \*\*\*  
Check system. Then press [F1] key .....
- (e)\*\*\* Bad check sum (CMOS) \*\*\*  
Check system. Then press [F1] key .....
- (f)\*\*\* Bad check sum (ROM) \*\*\*  
Check system. Then press [F1] key .....
- (g)RTC battery is low or CMOS checksum is inconsistent  
Press [F1] key to set Date/Time

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

```
WARNING: RESUME FAILURE.  
PRESS ANY KEY TO CONTINUE.
```

If any other error message is displayed, perform Check 3.

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

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

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

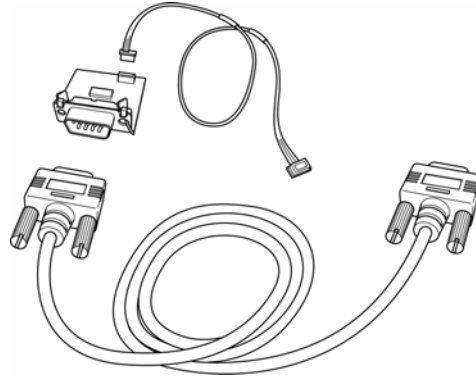
If error message (19), (20) or (21) is displayed, go to the 2.5" HDD Troubleshooting Procedures in Section 2.6.

If error message (22) or (23) is displayed, go to the 3.5" USB 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) HDD #0 ERROR
- (21) HDD #1 ERROR
- (22) NO FDD ERROR
- (23) FDC ERROR
- (24) TIMER INTERRUPT ERROR
- (25) RTC UPDATE ERROR

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

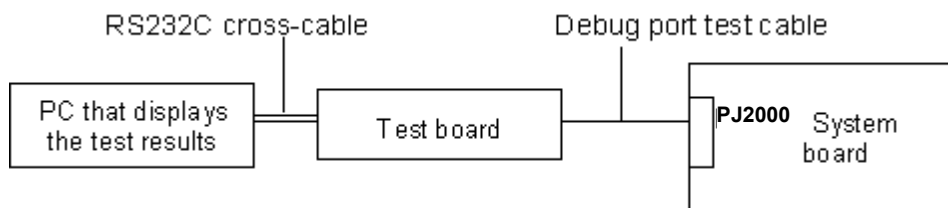
Check the D port status by a debug port test. The tool for debug port test is shown below.



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

The test procedures are follows;

1. Connect the debug test cable to the connector PJ2000 of the system board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C cross-cable to the PC that displays the results.



4. Boot the computer in MS-DOS mode.

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

<u>F100</u>	<u>: 000.000382</u>	<u>IRT_CHK_INMSYSI_START</u>
D port status	Time (second) to process	Contents of process

- When the D port status is FFFFh (normal status), go to Procedure 3.
- When the D port status falls into any status in Table 2-3, execute Check 1.

Table 2-3 D port status (1/7)

D port status	Details	Remarks
F000h	Clearing software reset bit	
	Enabling address line A20	
	Initializing special registers and M1535	
	Initializing the CH0 of a PIT (for HOLD_ON)	
	Initializing flag for BIOS rewriting factor	
	CHECK SUM CHECK (FEFC0000h to FEFF7FFFh)	
	Shifting to protected mode	
	Examining the checksum of Boot Block	HALT when checksum is not correct.
	Examining the checksum of data except Boot Block	
F001h	Checking if EC/KBC firmware is to be rewritten	Shifting to BIOS rewriting process if BIOS rewriting request exists
	Executing KBC initializing sequence	
	Sending KBC enable command	
	Checking F12 key-in	
F002h	Initializing security controller	
F003h to F005h	Checking whether BIOS rewrite is requested	Checksum error except Boot Block or rewriting request by F12key-in
F006H	Checking BIOS signature	
F007h	Shifting process to System BIOS IRT side	For BIOS rewriting process
	BIOS rewriting process	
	Initializing unique HW for this model	
	Initializing GPIO I/O space	
	Enabling BIOS writing	
	Serial interrupt control	
	Canceling BIOS write protection	
	Enabling SMBus I/O space	
	Enabling SMBus access	
	Configuring DRAM	
	Enabling L1 cache memory	
	Clearing memory	
F008h	Changing ROM BIOS to RAM BIOS	
F009h	Storing key scan codes	
	Setting up TASK_1ms_TSC	
	Displaying message on navipanel (EC/KBC UPDATE, BIOS UPDATE/DAMAGED)	



Table 2-3 D port status (2/7)

D port status	Details	Remarks
F009h	Key inputting	
	Loading CHGBIOSA.EXE and CHGFIRMA.EXE	
	Resetting FDC	
	Setting parameter for 2HD (1.44MB) and transmission rate	
	Reading the first sector	When it is sector for 2HD, media type is determined.
	Setting parameter for 2DD (720KB)and transmission rate	
	Searching CHGBIOSA.EXE in the root directory	
	Calculating start head and sector of directory	
	Reading contents of root directory by one sector	
	Searching entry of "CHGBIOSA.EXE"/ "CHGFIRMA.EXE" in the sector	
	Reading EXE header of "CHGBIOSA.EXE"/ "CHGFIRMA.EXE"	If error occurs, process goes to key input.
	Executing CHGBIOSA.EXE and CHGFIRMA.EXE	
	F100h	Disabling cache
Initializing special registers		
Initializing Ch1 of a PIT (Refresh interval ->30 micro seconds)		
F101h	Checking size and type of DRAM (on Cold Booting)	
	Checking DRAM size	HALT when DRAM size is 0.
	Testing stack area of SMRAM	HALT when it can be used as stack area.

Table 2-3 D port status (3/7)

D port status	Details	Remarks
F102h	Configuring cache memory	
	Enabling L1 cache memory	
	Testing CMOS for access (on Cold Booting)	
	Checking remaining of CMOS backup battery	
	Examining checksum of CMOS	
	Initializing data in CMOS (1)	
	Setting up IRT status (Set "1" for Boot status and IRT busy flag bit. Set "0" for other bits.)	
	Storing size of DRAM	
F103h	Checking for branch of resuming (only on Cold Boot)	No resume 1. when CMOS error occurs. 2. when Resume Status Code is not set.
	Checking resume error	
	ICH4-M Power Failure	Resume error 7Ah
	Examining the checksum of SMRAM	Resume error 73h
	Checking whether the memory configuration have been changed	Resume error 73h
	Examining the checksum of system BIOS RAM area	Resume error 79h
	Shifting to resuming process (RESUME_MAIN)	
	Resume error process	
	Disabling all SMIs	
	Clearing resuming status	
	Returning to ROM	
	Setting up area from C0000h to EFFFFh for PCI (disabling DRAM)	
	Setting a request for resuming error	
	Copying system BIOS from ROM to RAM	HALT when error occurs.

Table 2-3 D port status (4/7)

D port status	Details	Remarks
F104h	Initializing SMRAM	
	Checking factor of WakeUp	
	Rewriting SMRAM base and storing CPU state map for BIOS	
	Enabling SMI by ASMI	
F106h	Initializing devices which need initialization before initializing PCI bus	
	Testing (only on COLD booting) and Initializing PIT	
	Setting test pattern to channel 0 of PIT#0	
	Checking whether the test pattern can be read	
	Initializing PIT channel 0 (Interval of timer interrupt -> 55ms)	
	Initializing PIT channel 2 (frequency for sound generator -> 664Hz)	
	Testing PIT channel 1 (checks whether the refresh signal operates correctly in refresh interval of 30 micro seconds)	HALT when time out occurs.
	Testing PIT channel 2 ( checks whether the speaker gate operates correctly)	
	Measuring CPU clock	
	Enabling SMIs except auto-off function	
	Control of battery discharging current	
	Performing timeshared process for time measurement of IRT	
	Initializing CPU	
	Updating P6 micro-code	
	Enabling or disabling function of processor serial number ID	
	Checking whether Geyserville is supported	
	Switching CPU clock speed to high	
Setting Graphics Aperture Size		

Table 2-3 D port status (5/7)

D port status	Details	Remarks
F107h	Storing memory size of ROM in buffer	
	Reading EC version	
	Updating the type of flash ROM	
	Determining the destination based on DMI data	
	Checking default setting of CMOS	Set to default value to CMOS if Bad Battery or Bad Checksum (ROM, CMOS) exists.
	Initializing ACPI table (for optional ROM)	
	Storing results of VGA configuration	
F108h	Generating task waiting for completion of PCI_CONFIGURATION	
	Initializing H/W needed after PCI configuration	
	Enabling/Disabling IEEE1394	
	Generating output codes	
F10Ch	FIRST_64KB_CHECK (Checking first 64KB of memory)	
F10Dh	INIT_INT_VECTOR (Initializing interrupt vectors)	
F10Eh	INT_NDP (Initializing NDP)	
F10Fh	INIT_SYSTEM (Initializing system)	
	Storing CMOS error information in IRT_ERR_STS_BUF	
	Initializing timer	
	Initializing buffer for power saving	
	Initializing an EC, and reading battery information	
	Updating system BIOS (model name, and EDID of the LCD)	
F110h	INIT_DISPLAY (Waiting for completion of initializing VGA chip and pre-processing for initializing VGA BIOS)	
F111h	Initializing VGA BIOS	
F112h	Post-processing for Initializing VGA BIOS	
F113h	DISP_LOGO (Displaying logo)	
F114h	SYS_MEM_CHECK (Checking conventional memory)	

Table 2-3 D port status (6/7)

D port status	Details	Remarks
F115h	EXT_MEM_CHECK (Checking exception in protect mode)	
F116h	CHK_DMA_PAGE (Checking DMA Page Register)	
F117h	CHECK_DMA (Checking DMAC)	
F11Ah	INT_DMACH (Initializing DMAC)	
F11Bh	BOOT_PASSWORD (Checking password)	
	Waiting for end of divided FDD initialization (INT_FDD) process	
	Waiting for the end of HDD initialization	
	Checking key input pressed during IRT	Waiting for completion of KBC initializing
	Initializing ATA prioritizing	
F11Eh	EX_IO_ROM_CHECK (Checking optional I/O ROM)	
F11Fh	PRE_BOOT_SETUP	
	Storing value of 40:00 (for saving/restoring SIO)	
	Setting up address of font data for resume password	
	Setting up parameters for character repeat on USB keyboard	
	Getting keys pressed during IRT	
	Storing T_SHADOW_RAM_SIZE (shadow RAM size)	
	Updating system resources information prior to boot-up	
	Rewriting memory mapping data for INT15h E820h function	
	Updating table for DMI	
	Copying ACPI table to top of expansion memory	
	Waiting for completion of writing PSC version on BIOS	
	Waiting for completion of setting for clock generator	If error occurs, process stops with D port = 1Eh.

Table 2-3 D port status (7/7)

D port status	Details	Remarks
(F11Fh)	Canceling NMI mask	
	Calculating checksum of TIT	
	Clearing IRT running flag for runtime	
	Update checksum for runtime	
	Checking whether CPU, HDD or other components have been upgraded	
	Disabling PC Card not being used	
	Initializing HW prior to BOOT, Waiting for completion of initializing	
	Setting up battery save mode	
	Setting up date	
	Waiting for completion of AC-Link initialization	
	Updating DMI Wakeup factor and SM-BIOS structure table	
	Closing configuration space of PCI devices	
	Cache control	
	Processing related to CPU	
	Updating parameter block A	
	Setting up CPU clock speed to designated value by Setup	
	Waiting for motor off of disabled HDD	
	Post processing of PRE_BOOT_SETUP	
	Clearing power button status (PWRBTN)	
	Enabling power button	
F121h	Checking request for starting SETUP (by pressing ESC key or CMOS error)	SETUP starts if any request exists.
FFFFh		

Check 1 If the D port status error code F119h is displayed, go to the 3.5" USB FDD Troubleshooting Procedures in Section 2.5 or the 2.5" HDD Troubleshooting Procedures in Section 2.6.

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

D port error status is as follows:

<b>Error code</b>	<b>Contents</b>
F160h	Timer CH2 error
F161h	PIT error
F162h	PIC #1 error
F163h	PIC #2 error
F120h	Clock generator setting error

**Procedure 3 Diagnostic Test Program Execution Check**

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

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. USB Floppy Disk test
6. ASYNC test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. Wireless LAN test
12. Bluetooth test
13. Sound/LAN/Modem test

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

**Procedure 4 Replacement Check**

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

Check 1 Visually check for the following:

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

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

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



## 2.5 USB 3.5" FDD Troubleshooting

This section describes how to determine if the USB 3.5" FDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### Procedure 1 FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program.

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

Detailed operation is given in Chapter 3, *Tests and Diagnostics*.

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

## Procedure 2 Diagnostic Test Program Execution Check

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-4. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-4 FDD error code and status

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

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

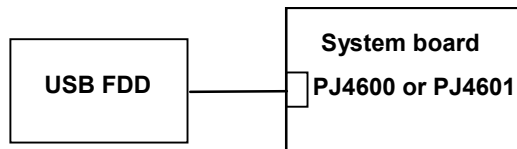
Write protected

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

**Procedure 3 Connector Check and Replacement Check**

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

- Check 1 Make sure the USB FDD cable is firmly connected to the PJ4600 or PJ4601 of the system board.



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

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

## 2.6 2.5" HDD Troubleshooting

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

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

### Procedure 1 Partition Check

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

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still exists, go to Procedure 2.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.
- Check 4 Remove the system disk from the FDD and reboot the computer. If the problem still exists, go to Procedure 2. Otherwise, the HDD is operating normally.

## Procedure 2 Message Check

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

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

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

HDC ERROR

or

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

Check 2 If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 5.

Insert system disk in drive  
Press any key when ready .....

or

Non-System disk or disk error  
Replace and press any key when ready

Check 3 Check SETUP to see whether the Hard Disk option is set to Not used. If it is set to Not used, choose another setting and return to Check 1. If it is not set to Not used, go to Check 4.

Check 4 Using the SYS command of the MS-DOS, transfer the system to the 2.5" HDD. If the system is not transferred, go to Procedure 3. Refer to the MS-DOS Manual for detailed operation.

If the following message appears on the display, the system program has been transferred to the HDD.

System Transferred

If an error message appears on the display, perform Check 5.

Check 5 The 2.5" HDD and the connector of the system board may be disconnected (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling.). Insert the connectors firmly. If they are firmly connected, go to Procedure 3.

**Procedure 3    Format Check**

The computer's 2.5" HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 2.5" HDD, start with Check 1 below and perform the other steps as required.

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

Check 1    Format the 2.5" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

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

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

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

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

#### Procedure 4 Diagnostic Test Program Execution Check

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

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

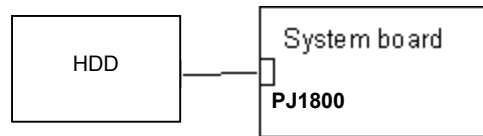
Table 2-5 2.5" HDD error code and status

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

**Procedure 5 Connector Check and Replacement Check**

The HDD is connected to the connector PJ1800 of the system board. The connecting portion may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks to check the connecting portion:

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



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

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

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



## 2.7 Keyboard Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

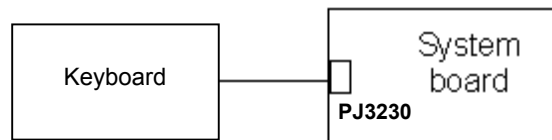
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

### Procedure 2 Connector Check and Replacement Check

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

Check 1 Make sure the keyboard cable is firmly connected to the 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 may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

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

## 2.8 Display Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Cable Check

Procedure 3: Fuse Conduction Check

Procedure 4: Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

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

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

### Procedure 2 Connector and Cable Check

The LCD module is connected to the system board through the LCD harness. The cable may be disconnected from each board or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Procedure 3.

### Procedure 3 Fuse Conduction check

Some fuses may be blown. To test the conduction of the fuse F2, F5000 and F5001 near the LCD I/F connector (PJ5205, PJ5206), disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If either fuse is blown, replace the system board repeat Procedure 3. If there is still an error, go to Procedure 4.

**Procedure 4 Replacement Check**

The display unit has a FL inverter board, Display module, System board, LCD harness and Display ON/OFF switch. Any of the components may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, then perform the following checks:

- (1) If characters or graphics are not displayed on the internal display, perform Check 1.
- (2) If characters are displayed on the internal display but the display is not normal, perform Check 2.
- (3) If characters are displayed on the internal display but the display is dark (the back-light does not light), perform Check 5.

Check 1 The display ON/OFF switch may be damaged. Remove the display ON/OFF switch and repeat Procedure 4. If there is still an error, go to Check 2.

Check 2 The LCD harness may be damaged. Replace the damaged harness with a new one and repeat Procedure 4. If there is still an error, go to Check 3.

Check 3 The display module may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 4.

Check 4 The FL inverter board may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 5.

Check 5 The FL tube may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 6.

Check 6 The display controller of the system board may be damaged. Replace the system board with a new one.

## 2.9 Touch Pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 3: Replacement Check

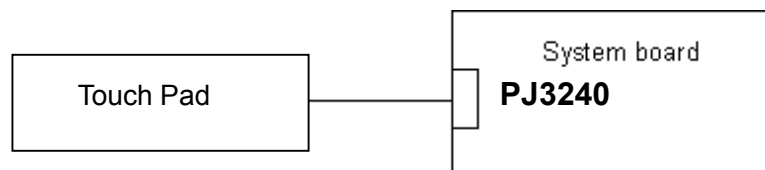
### Procedure 1 Diagnostic Test Program Execution Check

Execute the keyboard test program, or maintenance test program, because the pointing device (touch pad) test program is a component of the keyboard test program. For the operating procedure, see Chapter 3.

If any error is detected, perform Procedure 2. The pointing device is operating normally if no error is detected.

### Procedure 2 Connector Check and Replacement Check

The touch pad is connected to the system board (PJ3240) with a flexible cable. This cable may have come off the connector or the connector may have come off the system board. Disassemble the computer and check the cable connections. See Chapter 4 for the disassembly procedure. If the connector has come off, connect firmly and make sure the operation. If there is still an error, go to Procedure 3.



### Procedure 3 Replacement Check

The touch pad may be damaged. Replace the touch pad.

## 2.10 Modem Troubleshooting

To check if the modem is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Execute the Modem test program available as part of the maintenance test program. This program checks the modem. See Chapter 3 for information on how to perform the test.

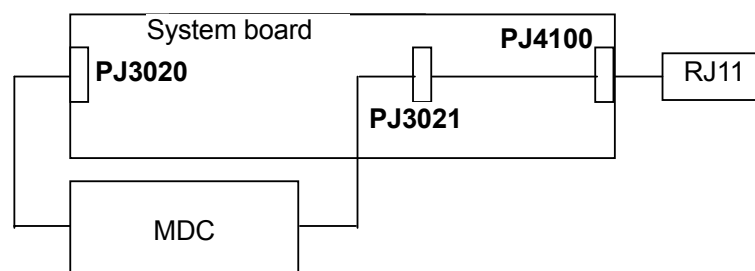
If any error is detected by the test, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

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

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

Check 1 Make sure the MDC is firmly connected to the PJ3020 and the MDC cable is connected to the PJ3021 on the system board.



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

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

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

## 2.11 LAN Troubleshooting

To check if the computer's LAN is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

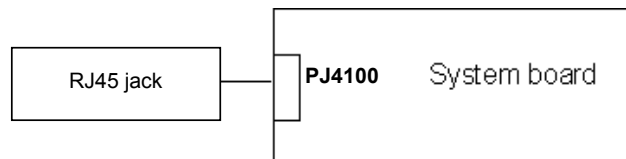
To check the LAN function, execute the Sound/LAN/modem test program subtest 04 (LAN test). See Chapter 3 for information on how to perform the test.

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

### Procedure 2 Connector Check and Replacement Check

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

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



## 2.12 Sound Troubleshooting

To check if the sound function is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

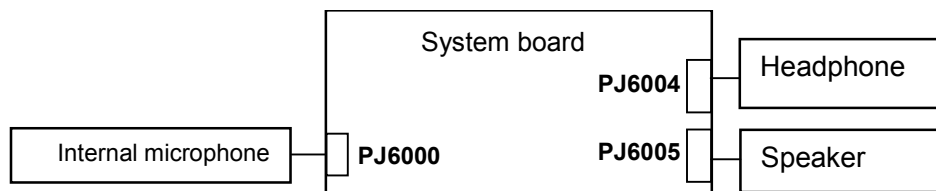
### Procedure 1 Diagnostic Test Program Execution Check

Execute the Sound test program available as part of the maintenance test program. See Chapter 3 for information on how to perform the test.

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

### Procedure 2 Connector Check

The speaker, internal microphones and headphone are connected to the system board shown in the following figure.



Check 1 Make sure the headphone cable is firmly inserted to the headphone jack (PJ6004 on the system board). If there is still an error, perform Check 2.

Check 2 The speaker cable may be disconnected. . Disassemble the computer following the steps described in Chapter 4 and make sure the speaker cable is connected to the PJ6005 of the system board. If there is still an error, perform Check 3.

Check 3 The internal microphone cables may be disconnected. . Disassemble the computer following the steps described in Chapter 4 and make sure the internal microphone cables are connected to the PJ6000 of the system board. If there is still an error, perform Procedure 3.

**Procedure 3 Replacement Check**

- Check 1 If any of the speaker and internal microphones is not working properly, the part may be faulty. Replace it with a new one following the step in Chapter 4. If there is still an error, go to Check 2.
- Check 2 The system board may be faulty. Replace it with a new one following the step in Chapter 4. If there is still an error, perform Check 3.
- Check 3 The headphone may be faulty. Replace it with a new one.



## 2.13 SD Card Slot Troubleshooting

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

Procedure 1: Check on Windows XP Tablet PC Edition

Procedure 2: Connector/Replacement Check

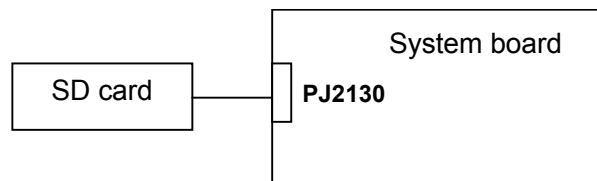
### Procedure 1 Check on Windows XP Tablet PC Edition

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

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

### Procedure 2 Connector/Replacement Check

The SD card is connected to the connector PJ2130 of the connector board.



- Check 1 The SD card and the system board may be disconnected. Make sure the SD card is firmly inserted to the PJ2130 of the system board. If the SD card is still not functioning properly, perform Check 2.
- Check 2 The SD card may be faulty. Replace it with a new one following the step in Chapter 4. If the problem continues, perform Check 3.
- Check 3 The system board may be faulty. Replace it with a new one following the step in Chapter 4.

## 2.14 Tablet Pen Troubleshooting

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

**CAUTION:** Use the supplied Tablet Pen in this test.

Procedure 1: Check on Windows XP Tablet PC Edition

Procedure 2: Replacement Check

Procedure 3: Connector/Replacement Check

### Procedure 1 Check on Windows XP Tablet PC Edition

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

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

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

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

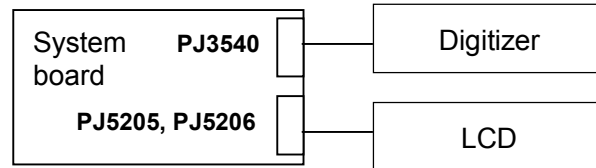
### Procedure 2 Replacement Check

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

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

**Procedure 3 Connector/Replacement Check**

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



- Check 1 The Digitizer might not be connected. Make sure the Digitizer is connected to the PJ3540 on the system board. If there is still an error, go to Check 2.
- Check 2 The LCD might not be connected. Make sure the LCD is connected to the PJ5205 and PJ5206 on the system board. If there is still an error, go to Check 3.
- Check 3 The Digitizer, the LCD or the system board might be defective. Replace it with a new one following the steps in Chapter 4. Then check the tablet pen is working properly.

## 2.15 Wireless LAN Troubleshooting

To check if the Wireless LAN is good or no good, follow the troubleshooting procedures below as instructed.

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

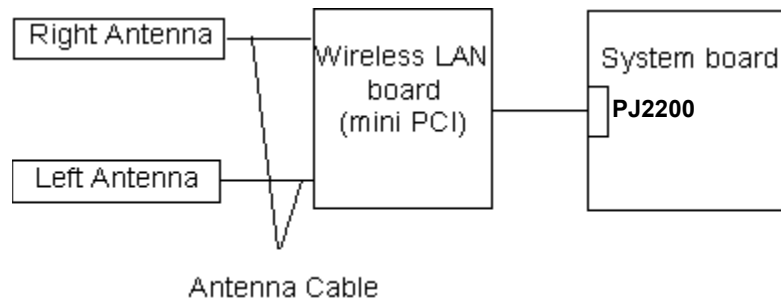
Check 1 Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN.

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

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

### Procedure 2 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, perform the following checks:

**Check 1** The wireless LAN board and the system board may be disconnected. Make sure the wireless LAN board is firmly connected to the PJ2200 of the system board.

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

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

### Procedure 3 Antenna Check

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

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

1. Disassemble the computer and disconnect the wireless LAN antennas (white and black) from the wireless LAN board. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling
2. Connect the tester set up for impedance measurement to the antenna jig. Measure the white antenna's resistance
3. Determine the resistance. The antenna passes the test when the resistance is  $5\Omega$  or less. If it is more than  $5\Omega$ , the antenna is faulty.
4. Measure the black antenna's resistance. Check if there is faulty.

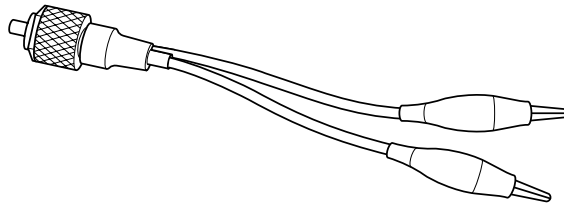


Figure 2-3 Antenna Test jig

Measurement Value	Pass/fail	Comment
$5\Omega$ or less	Pass	Include cable loss
More than $5\Omega$	Fail	The digital tester shows 0L ,etc. if there is a broken wire.

**NOTE:**

1. The resistances determined with the steps above may not be stable according to the length of the antenna. The impedance of the antenna itself is about 0.5 to 0.8 ohm.
2. The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.

If each wireless antenna passes the above test, return the Wireless LAN module back, then perform Procedure 1.

If the wireless LAN has still an error, go to Procedure 4.

**Procedure 4      Replacement Check**

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

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

## 2.16 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

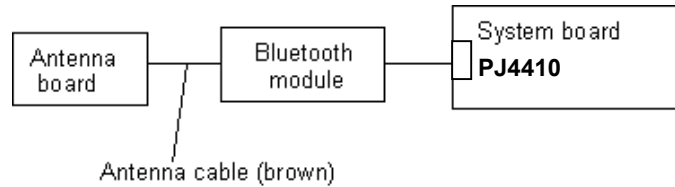
Make sure the wireless switch on the left side of the computer is turned ON. If it is not, slide the switch toward the back of the computer to turn it on.

- Check 1 Execute test program IMCSPC73.EXE to check the BD\_ADDR of the Bluetooth. Perform the test following the instructions described in Chapter 3, Bluetooth Test Program (IMCSPC73.EXE).  
If the computer passes the test, the function is correctly working. If the computer does not pass the test, the Bluetooth board may be disconnected or damaged. Make sure the connector on the Bluetooth board is firmly connected to PJ4900 on the system board. And perform the test program IMCSPC73.EXE again.  
If the computer still does not pass the test, go to check 2.
- Check 2 Execute test program IMCSPC53.EXE to check the transmitting-receiving function of the Bluetooth. You will need a second computer that can communicate by the Bluetooth. Perform the test following the instructions described in Chapter 3, Bluetooth Test Program (IMCSPC53.EXE).  
If the computer passes the test, the function is correctly working.  
If the computer does not pass the test, go to check 3.
- Check 3 The Bluetooth board may be defective or damaged. Replace it with a new one. And perform the test program again.  
If the computer still does not pass the test, go to Procedure 2.



## Procedure 2 Antennas' Connection Check

The Bluetooth function wiring diagram is shown below:



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

**Check 1** Make sure the wireless communication switch is “On”.

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

**Check 2** Make sure the Bluetooth module is firmly connected to PJ4410 on the system board.

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

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

If the Bluetooth antenna cable is disconnected, connect it firmly and perform Procedure 1. If the Bluetooth function is still not functioning properly, go to Procedure 3.

### Procedure 3 Antenna Check

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

1. Disassemble the computer and disconnect the Bluetooth antenna cable connected to the Bluetooth module. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling
2. Connect the end of the antenna test cable to the multimeter.
3. 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.
4. Determine the resistance. The cable passes the test when the resistance is  $5\Omega$  or less. If it is more than  $5\Omega$ , the Bluetooth antenna cable fails the test.

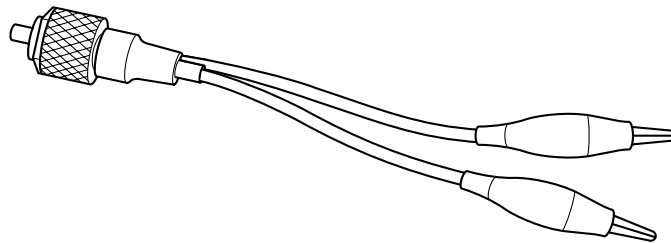


Figure 2-4 Antenna Test cable

**NOTE:**

1. The resistances determined with the steps above may not be stable according to the length of the antenna. The impedance of the antenna itself is about 0.5 to 0.8 ohm.
2. The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.

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

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

### Procedure 4 Replacement Check

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

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



---

## **Chapter 3**

# **Tests and Diagnostics**

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### 3.15 Wireless LAN Test (Atheros)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program. (Atheros 11b/g)

**NOTE:** Use another computer (with Atheros 11b/g) that can communicate by the wireless LAN as a responder machine to perform this test.

When conducting this test, make sure that any wireless network device using 2.4GHz band other than IEEE 802.11b, such as Bluetooth, is not used nearby.

In this test, the following items are tested:

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

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

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

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

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

## Setting the responder machine

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

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

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

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

```
Waiting for transmitter to ring the bell in 11a mode.
Input or output error (EIO) : rxDatBegin : nothing receive within
3000millisecs (waitTime)
```

The responder machine is ready for the test.

## Setting the tester machine

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

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

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

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

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

To proceed the test, press any key.

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



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

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

```
*****  
*  
*           11g Throughput test : NG !!  
*  
*****
```

Then the test returns to the main menu automatically.



- (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**. And 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*

2. Messages when BD\_ADDR is invalid are as follows:

Message	Meaning
Invalid BD_ADDR (all 00)	0x000000000000
Invalid BD_ADDR (all FF)	0xFFFFFFFFFFFF
Invalid BD_ADDR (bit0=1)	bit40=1b
Invalid BD_ADDR (bit1=1)	bit41=1b
Invalid BD_ADDR (define in the file)	BD_ADDR is the one already defined in the file.

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

The error code begins with the least significant digit.

Error code

*Table 3-2 Error code for NICSPC73.EXE (1/2)*

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

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

Table 3-2 Error code for NICSPC73.EXE (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.







- (g) If the target machine has any problem, the following message shown in the following figure "INCOMPLETE" is displayed with the **Error CODE**.

```

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

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

III  N      N  CCCC   OOO  M      M  PPPPPP  L      EEEEE  TTTTTT  EEEEE
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      EEEEE  T     EEEEE
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  EEEEE  T     EEEEE

                                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 3-3 Error code for NICSPC53.EXE (1/2)

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

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

Table 3-3 Error code for NICSPC53.EXE (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.

### 3.17 Sound/LAN/Modem Test

To execute the Sound/LAN/Modem Test, use the Test Diagnostics disk (Sound/LAN/Modem). Finish the tests of the Diagnostics disk (T&D) by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

**NOTE:** To execute the Tablet Dock CD Test, attach the computer to the Tablet Multi Dock before turning on the computer.

Insert the Test program disk (Sound/LAN/Modem) in the floppy disk drive and turn on the power. The following message will appear:

```
#####
#####   XXXX DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)   #####
#####
*
*  1 ..... (Microphoned recording&play Mic 2&4)          *
*  2 ..... (Microphoned recording&play Mic 3&4)          *
*  3 ..... (Sin Wave)                                     *
*  4 ..... (LAN)                                          *
*  5 ..... (MODEM)                                       *
*  6 ..... (Tablet Dock CD TEST)                         *
*****
.... Press test number[1-6] ?
```

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

**NOTE:** To record the sound from the specified microphone in Subtest 01, scratch each hole of the microphones lightly with a sharp-pointed thing to make sure the specified microphone catches the sound. 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.

There are one microphone on the upper side of the LCD and two microphones on the lower side. Microphone numbers are assigned as following.

Right upper side of the LCD	-Mic 2
Left lower side of the LCD	-Mic 3
Right lower side of the LCD	-Mic 4

Subtest 01      Microphoned recording & play Mic 2&4

Executed by the load format of Playwave/recwave.

The sound is recorded automatically from microphone when the following message appears.

Press any key to continue ...

After a while, the recorded sound is replayed automatically.

Subtest 02    Microphoned recording & play Mic 3&4

This subtest is executed in the same way as Microphoned recording & play Mic 2&4.

Subtest 03    Sin wave

This subtest is executed by loading the COM file (ADSIN.COM.) The program expands sin 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 sin wave. (It sounds like a continuous beep.) By using wave measuring devices such as an oscilloscope, the data can be measured as a sin wave.

When the subtest is executed, the following message appears.

Press any key to continue....

When you press any key, the sin wave is expanded from 16KB to 64KB data and is played.

The sound is heard and the test returns to the menu.

Subtest 04    LAN

This subtest checks the operation of mini-PCI I/F by the loopback in the chip.

The large "OK" is displayed if no error occurred.

Subtest 05    MODEM

For this subtest, connect the modem PCB and RJ11 connector with a harness. This subtest contains the following tests. They are tested with the dedicated "FAT-MODE inspection device(Product Code QE2000P01 made by Nittou Denki Seisakusyo)

- Scorpio Modem Initialize
- Digital Loopback Test

## Subtest 06 Tablet Dock CD TEST

**NOTE:** This subtest needs the test media (CD-R) created by wiring the data, CDTEST.DAT, in the SOUND/LAN/MODEM disk (Test Diagnostics disc (No.2)). Also before selecting this subtest, set the test media in the drive of the Tablet Dock.

This subtest compares the data of the test program and the data in the test media to check whether the data from the drive can be read correctly.

When the test starts, the following message will appear.

```
TEST LOOP : Y=[Y], N=[N] ..?
```

Select either (press **Y** or **N**) and press **Enter**.

When the message "OK" or "NO" appears, press **Enter** to return to the menu screen.

To finish the Sound/LAN/Modem test, the computer power should be off.

## 3.18 Thermal Radiation Control Test

This thermal radiation control test checks the temperature of the CPU and GPU. To execute this test, use the diagnostics disk (Thermal radiation control) and follow the procedures below.

1. Turn on the computer and start the Windows.
2. Insert the diagnostic disk for the thermal radiation control test to the USB FDD.
3. Open the [EXPLORE] window and double-click the [THERMAL.bat] file in the diagnostic disk.
4. The input field appears on the screen. Then, input the temperature around the computer and click [OK] button. The thermal radiation control test starts.
5. The display counting from 900 to 0 seconds (for 15 minutes) appears on the screen. When the test ends normally, the following message appears in the display.

```
[Status:pass]
```

When an error is found, the following message appears in the display.

```
[Status:CPU:FAIL GPU:FAIL]
```

When the error message appears in the display, there is a possibility of breakage of CPU, GPU or FAN.

**NOTE:** *The display on the screen changes while executing this test. This is not an error. Do not touch any key and keep executing the test, for this change applies some load to CPU and GPU for the test.*

Close the test menu to end the thermal radiation control test.



### 3.19 Error Status Code

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

*Table 3-4 Error status codes names (1/2)*

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 02 03	ROM Checksum Error Location ID Error Serial ID Writer Error
Memory	01 02 14 DD DE DF	Parity error Protected mode not change Memory write/read error Cache memory error 2nd Cache error TAG-RAM error
Keyboard	01 02 03 04 05 06	Mouse interface error IPS interface error Interface error Retransmit error Mouse handler not support PS/2 mouse & IPS not
FDD	01 02 03 04 06 08 09 10 20 40 60 80 EE	Bad Command Error Address Mark Not Found Write Protected Record Not Found Media Removed DMA Overrun Error DMA Boundary Error CRC Error FDC Error Seek Error Not Drive Error Time Out Error Write Buffer Error

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

Device name	Error code	Error status name
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 error
	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	
PCMCIA	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
NDP	01	No Co-Processor
	02	Control Word Error
	03	Status Word Error
	04	Bus Error
	05	Addition Error
	06	Multiplay Error

## 3.20 HDC Status

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

```
HDC status = XXXX
```

The hard disk test error status is displayed on the screen by a four-digit number.

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

The contents of the HDC error status register and error register are listed in Tables 3-5 and 3-6.

*Table 3-5 Hard disk controller status register contents*

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

*Table 3-6 Error register contents*

<b>Bit</b>	<b>Name</b>	<b>Description</b>
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 was no ID field.
3	—	Not used
2	ABT (Abort)	"0" ... Not used "1" ... Illegal command error or a command abort error.
1	TK0 (Track zero)	"0" ... The hard disk detected track 0. "1" ... The hard disk could not detect track 0.
0	—	Not used.

## 3.21 FDD Cleaning

### 3.21.1 Function Description

This function cleans the heads in the 3.5-inch FDD by executing a series of head load/seek and read operations. A cleaning disk is necessary to perform this program.

### 3.21.2 Operations

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

```
DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : V6.00
```

```
Mount cleaning disk(s) on drive(s).
```

```
Press any key when ready.
```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.
3. When the following message appears, the FDD head cleaning has begun.

```
Cleaning start
```

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

## 3.22 Log Utilities

### 3.22.1 Function Description

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

If the power switch is turned off, the error information will be lost. 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 code (STS)
5. FDD/HDD or memory address (ADDR)
6. Write data (WD)
7. Read data (RD)
8. HDC status code (HSTS)
9. Error status name (ERROR STATUS NAME)

### 3.22.2 Operations

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

```

0003 ERRORS
CNT  TS-No PASS STS ADDR  WD RD HSTS [ERROR STATUS NAME]
001  FDD 01 0000 110 24015 00 00      FDD-CRC ERROR
002  FDD 01 0001 110 30108 00 00      FDD-CRC ERROR
003  FDD 03 0003 110 23106 00 00      FDD-CRC ERROR

```

FDD/HDD or
HDC status

Error status
memory address
Read data
Error status name

Pass count
Write data

Subtest number

Test name

Error count

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

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

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

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

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

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

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

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

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

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

## 3.23 Running Test

### 3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 04, 06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01, 05)

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

### 3.23.2 Operations

**Caution:** Do not forget to remove the diagnostics disk and load a formatted 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-RUNNING TEST** from the DIAGNOSTIC MENU and press **Enter**. The following message is displayed.

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

Select **Y (yes)** to execute the Printer wraparound test or **N (NO)** not to execute, then press **Enter**. A printer wraparound connector must be connected to the parallel port of the computer to execute properly this test.

3. When the selecting of the Printer wraparound test is completed, the following message is displayed.

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

Select **Y (yes)** to execute the Serial #A test or **N (NO)** not to execute, then press **Enter**. A RS-232C wraparound connector must be connected to the serial port of the computer to execute properly this test.



4. After specifying of the **Serial #A** test, the following message will appear:

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

5. This program is executed in the above mentioned ways. To exit the program, press **Ctrl + Break**.

## 3.24 Floppy Disk Drive Utilities

### 3.24.1 Function Description

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

#### 1. FORMAT

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

This program formats the floppy disk in the following formats.

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

#### 2. COPY

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

#### 3. DUMP

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

#### 4. HDD-ID

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

### 3.24.2 Operations

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

```
[ FDD UTILITIES ]  
  
1 - FORMAT  
2 - COPY  
3 - DUMP  
4 - HDD-ID  
9 - EXIT TO DIAGNOSTICS MENU
```

2. **FORMAT** program

- (a) When **FORMAT** program is loaded, the following message is displayed:

```
DIAGNOSTICS - FLOPPY DISK FORMAT : V6.00  
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**. The following message will be displayed:

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

- (d) Remove the Test program Disk from the FDD, insert the work disk and press any key. The following message will be displayed and 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 FORMAT program is loaded, the following message is displayed:

```
FLOPPY DISK FORMAT & COPY : V6.00
Type select (0:2DD,3:2HD) ?
```

- (b) Selecting a media/drive type number will display a message 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 appears and copying of the disk starts.

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

Copy start

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

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

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

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

- (e) 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) ?
```

- (f) 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 program is loaded, the following message appears:

```
DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : V7.00
Drive type select (1:FDD, 2:HDD) ?
```

- (b) Select a format type number. If 2:HDD is selected, the display will go to step (h).

If 1:FDD is selected, the following message appears:

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

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

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

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

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

- (e) Select a media mode and 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) Select the track number, the head number and the 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.

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

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

```
— Max. address —
[LBA ] = XXXXXXXXXXX
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

Loading HDD ID READ program displays the following HDD ID configuration:

```
[HDD ID Read (VX.XX)] [Drive #X]
  ID code (h)           = XXXX
  No. of Cylinders      = XXXXXXXXX
  Removable Cylinders  = XXXXXXXXX
  No. of Heads         = XXXXXXXXX
  Unformat Bytes/Track = XXXXXXXXX
  Unformat Bytes/Sector = XXXXXXXXX
  Sectors/Track        = XXXXXXXXX
  Gap Length           = XXXXXXXXX
  Sync. Bytes          = XXXXXXXXX
  Reserved (h)         = XXXX
  Serial No.           = YYY...
  Controller Type (h)  = XXXX
  Sector Buffers       = XXXXXXXXX
  ECC Bytes            = XXXXXXXXX
  Firmware Rev.        = YYYYYY..
  Model No.            = YYYY...
  Reserved (h)         = XXXX
  Double Word Capability = XXXXXXXXX

  Press [Enter] key
```

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

## 3.25 System Configuration

### 3.25.1 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 Micon Version
8. Total Memory Size
9. Battery Code
10. Sound System
11. The number of printer adapters
12. The number of ASYNC adapters
13. The number of Co-processors
14. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. The number of FDDs
18. The number of HDDs
19. Date/Time



### 3.25.2 Operations

1. Selecting 8-SYSTEM CONFIGURATION from the DIAGNOSTIC MENU and pressing **Enter** displays the following system configuration:

```

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

** - Processor Type           = XX - XXXXX
** - VGA Controller           = xxxx
*  - MS-DOS Version           = Vxxxx
*  - BIOS-ROM Version         = Vxxxx 1st ID = XXH, 2nd ID = XXH
*  - BOOT-ROM Version         = Vxxxx
*  - KBC Version               = Vxxxx
*  - PS Micom Version          = Vxxxx (EC Version = VX.XX)
*  - Total Memory Size=      xxxxxMB(Conventional Memory = 00639KB)
*  - Battery Code              =
** - Sound System              = XXXXX
*  - 0 Printer Adapter         LPT1=      LPT2=      LPT3=
*  - 0 ASYNC Adapter           COM1=      COM2=      COM3=
*  -
*  - 1 Math Co-Processor
*  - 1 PCMCIA Slot
*  - Modem                     = MDC (AS KEY)
*  - LAN                        = Kinnerth
*  - X Floppy Disk Drive(s)     Tracks=XX, Head=XX, Section=XX
*  - 1 Hard Disk Drive(s)      #1 Sectors = XXXXXXXXXXXX (XXXXXMB)
*                               #2 Sectors =                (      MB)
*  -
Press [Enter] Key              [Date = YYYY-MM-DD, HH:MM:SS]

```

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

## 3.26 SETUP

### 3.26.1 Function Description

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

1. Memory
  - (a) Total
2. System Date/Time
  - (a) System Date
  - (b) System 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) CPU Cache
  - (b) Level 2 Cache
  - (c) Dynamic CPU Frequency Mode
  - (d) Auto Power On
9. Configuration
10. Drives I/O
  - (a) Built-in HDD
  - (b) PC Card
11. PCI bus
12. PC Card
13. Peripheral
  - (a) Internal Pointing Device
  - (b) Hard Disk Mode
14. Legacy Emulation
  - (a) USB KB/Mouse Legacy Emulation

(b) USB-FDD Legacy Emulation

15. PCI LAN

16. SD

### 3.26.2 Accessing the SETUP Program

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

SYSTEM SETUP (1/2) ACPI BIOS version = x.xx

<p><b>MEMORY</b></p> <p>Total = XXXXX KB (*1)</p>	<p><b>BOOT PRIORITY</b></p> <p>Boot Priority =HDD→FDD→CD-ROM→LAN HDD Priority =Built-in HDD→PC card Network Boot Protocol = PXE</p>
<p><b>SYSTEM DATE/TIME</b></p> <p>System Date =XX-XX-XXXX System Time =XX:XX:XX</p>	<p><b>DISPLAY</b></p> <p>Power On Display = Auto-Selected LCD Display Stretch = Enabled</p>
<p><b>BATTERY</b></p> <p>Battery Save Mode = Full Power</p>	<p><b>Others</b></p> <p>CPU Cache = Enabled Level 2 Cache = Enabled Dynamic CPU Frequency Mode = Dynamically Switchable = Dynamically Auto Power On = Disabled</p>
<p><b>PASSWORD</b></p> <p>Not Registered</p>	
<p><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

<p><b>CONFIGURATION</b></p> <p>Device Config. = Setup by OS</p>	<p><b>PC CARD</b></p> <p>Controller Mode = Auto-Selected</p>
<p><b>DRIVERS I/O</b></p> <p>Built-in HDD = Primary IDE(1F0H/IRQ14) PC Card = Others (190H/IRQ3)</p>	<p><b>PERIPHERAL</b></p> <p>Internal Pointing Device = Enabled Hard Disk Mode = Enhanced IDE(Normal)</p>
<p><b>PCI BUS</b></p> <p>PCI BUS = IRQ10, IRQ11</p>	<p><b>LEGACY EMULATION</b></p> <p>USB KB/Mouse Legacy Emulation = Enabled USB-FDD Legacy Emulation = Enabled</p>
	<p><b>PCI LAN</b></p> <p>Built-in LAN = Enabled</p>
	<p><b>SD</b></p> <p>SD Controller = 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:** (\*1) This depends on model.

### Moving Within the SETUP Menu and Changing Values

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

### Accepting Changes and Exiting the SETUP Window

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

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

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

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

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

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

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

### The Factory Preset Configuration

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

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

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

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

## SETUP Options

The SETUP screen is divided into 16 functionally related groups. This section describes each group and its option.

### 1. Memory

#### (1) Total

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

### 2. System Date/Time

#### (a) System Date/Time

Use this option to set the date (month-day-year).

#### (b) System Date/Time

Use this option to set the time (hour : minute).

### 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.

#### Battery Save Options

##### Processing Speed

This feature changes the CPU processing speed.

**High** CPU operates at 1.4/1.5/1.6/1.7GHz (Pentium-M)  
(Default in Full Power Mode)

**Low** CPU operates at half processing speed.  
(Default in Low Power Mode)

##### CPU Sleep Mode

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

**Enabled** Enables sleep mode. (Default)

**Disabled** Disables sleep mode.

##### Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel's illumination off if you make no entry (including no operation of a tablet pen or touch pad) for the set period of time.

**Disabled** Disables display automatic power off.

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

##### HDD Auto Off

Use this option to set the duration of the HDD automatic power off function. This option stops the rotation of the HDD if you do not read or write to the HDD more than the duration set.

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

LCD Brightness

Use this option to set the level of LCD brightness.

**Super-Bright** Full brightness for maximum visibility.

**Bright** Full brightness for high visibility.

**Semi-Bright** Less than full brightness for saving power.

Cooling Method

**Maximum Performance** If the CPU becomes too hot, the fan turns on automatically in a high speed to cool down the CPU.

**Performance** If the CPU becomes too hot, the fan turns on automatically. When the CPU temperature falls to a normal range, the fan turns off.

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

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

## 4. Password

When the incorrect password is continuously entered three times, the cursor does not move to this option. In this case, reboot the computer and register the password again.

**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

***NOTE:** The contents of this option cannot be changed when the setup is started from the test program.*

## (1) HDD

This option specifies the HDD to which the password is set. The built-in HDD is specified and you cannot change it.



## (2) HDD Password Mode

This option selects the type of HDD password you want to register. You can select the type when any HDD passwords (user HDD password or master HDD password) are not set. If any HDD password is set, cancel it and select the type.

**User Only**            Only the user password is registered. (Default)

**Master+User**        Both the master password and the user password are registered.

## (3) User Password

Use this option to set the user password.

## (4) Master Password

This option appears when "HDD Password mode" is set to "Master+User".

Set the master password first and then set the user password.

## 6. Boot Priority

## (a) Boot Priority

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

**FDD→HDD→CD-ROM→LAN:** The computer looks for bootable files in the following order: FDD (\*1), HDD (\*2), CD-ROM (\*3) and LAN

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

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

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

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

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

(\*1) The FDD is looked for when the boot disk is contained in the external FDD. When an SD memory card is set as the boot disk, the external FDD is looked for first. Next, the SD memory card is looked for.

(\*2) The HDDs are looked for in the order specified in "HDD Priority".

(\*3) The CD-ROM is available only with the optional optical disk drive.

(b) HDD Priority

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

**Built-in HDD -> PC Card** The computer will look for the built-in HDD first, next the PC card. (Default)

**PC Card -> Built-in HDD** The computer will look for the PC card first, next the 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+Analog RGB** Selects both the internal LCD and the external CRT for simultaneous display.

**System LCD only** Selects the internal monitor even if the external LCD is connected.

**NOTE:** When *LCD+Analog RGB* is selected while connecting the external display not corresponding to *SVGA* mode, no image appears on the 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) CPU Cache

Use this option to enable or disable the CPU cache.

**Enabled** Enables the CPU cache. (Default)

**Disabled** Disables the CPU cache.

When "Enabled" is selected, the following subwindow is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

OPTION	
Write policy	= Write-back

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

## (b) Level 2 Cache

Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option cannot be changed.

**Enabled** Enables the level 2 cache. (Default)

**Disabled** Disables the level 2 cache.

## (c) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings.

**Dynamically Switchable**

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

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

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

(d) Auto Power On

This option displays setting for Wake-up on LAN.

**Disabled** Indicates auto power on and Wake-up on LAN is not set.

**Enabled** Indicates auto power on and Wake-up on LAN is set.

When “Enabled” is set, the following subwindow appears.

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

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

Alarm Time sets a time and date for automatic power on. Second cannot be set. When this option is set to “Disabled”, the time for automatic power on is not set.

Alarm Date Option sets a month and date in order for automatic power on. When Alarm Time is set to “Disabled”, month and date for automatic power on is not set.

Wake-up on LAN automatically turn on the computer when accessed by the administrator of LAN. When Built-in LAN is “Enabled”, this option can be set to “Enabled”. AC adapter is required for this option.

- NOTE:**
1. Do not remove the AC adapter and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.
  2. If you have set a password and the computer starts up by the Auto Power On function from the hibernation condition, the message “**password =**” is displayed. Enter the password to return to the Windows screen from the hibernation condition.
  3. This option is enabled only once, the setting is reset, after booting up

## 9. Configuration

This option lets you set the device configuration.

<b>All Devices</b>	BIOS sets all devices.
<b>Setup by OS</b>	Operating system sets devices that it can control. (Default)

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

## 10. Drives I/O

## (a) Built-in HDD

This option displays setting for hard disk drive. It is for information only and cannot be changed.

## (b) PC Card

This option displays the interruption level of the PC card HDD. The setting cannot be changed.

## 11. PCI Bus

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

## 12. PC Card

This option displays the PC Card Controller mode. When “Device Config.” is set to “All Devices”, it can be changed.

<b>Auto-Selected</b>	Use this setting when OS supports Plug&Play. (Default)
<b>Card Bus/16-bit</b>	Use this setting when PC card which supports Card Bus does not work properly in “Auto-Selected”.
<b>PCIC Compatible</b>	Use this setting when 16-bit PC card does not work properly in “Auto-Selected” or “CardBus/16-bit”.

## 13. Peripheral

This option set the HDD and other devices.

## (1) Internal Pointing Device

Use this option to set whether the touch pad is available or not.

**Enabled** Enables touch pad. (Default)

**Disabled** Disables touch pad.

## (2) Hard Disk Mode

Use this item to select the hard disk mode.

**Enhanced IDE (Normal)** Select this mode when the HDD is used for Windows XP Tablet PC Edition. (Default)

**Standard IDE** Select this mode when using an OS which 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:** Formats for Enhanced IDE and Standard IDE are different, so if you change the setting, you will have to reformat the hard disk for the appropriate setting.*

## 14. Legacy Emulation

## (a) USB KB/Mouse Legacy Emulation

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

**Enabled** Enables legacy support. (Default)  
USB keyboard and USB mouse are available without the driver.

**Disabled** Disables legacy support

## (b) USB-FDD Legacy Emulation

This option sets the Legacy support condition of the USB floppy disk drive.

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

To start the computer by FD, set this option to "Enabled".

**Disabled** Disables legacy support

## 15. PCI LAN

This option sets the Enable / Disable of the built-in LAN functions.

**Enabled** Enables built-in LAN functions. (Default)

**Disabled** Disables built-in LAN functions.

## 16. SD

This option sets the Enable / Disable of the SD controller functions.

**Enabled** Enables SD controller functions. (Default)

**Disabled** Disables SD controller functions.

## 3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program which tests the functions of the computer's hardware modules and the Hardware Initial information Setting Tool which sets the configurations needed after repairing.

The Diagnostic Test Program is grouped into the Service Program Modules and the Test Program Modules. The Diagnostic Test consists of 10 programs. Wireless LAN test, Sound/LAN/modem test and Bluetooth test are also supported.

The Hardware Initial information Setting Tool consists of some programs which writes the hardware information or displays the current information of the computer.

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

1. Check all cables for loose connections.
2. Exit any application and close Windows.

### 3.1.1 Diagnostics menu

The DIAGNOSTICS MENU consists of the following 7 test programs.

- DIAGNOSTIC TEST
- HEAD CLEANING
- LOG UTILITIES
- RUNNING TEST
- FDD UTILITIES
- SYSTEM CONFIGURATION
- SETUP

The DIAGNOSTIC TEST MENU contains the following 10 functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST

Other tests are as follows.



- WIRELESS LAN TEST
- SOUND/LAN/MODEM TEST
- BLUETOOTH TEST

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

- The Diagnostics Disk (all tests, 5 disks (T&D, Sound/LAN/modem, Wireless LAN, Bluetooth, Thermal radiation control))
- A USB floppy disk drive (all tests)
- A formatted working disk (Floppy disk test)
- A cleaning kit to clean the floppy disk drive heads (FDD Head Cleaning)
- A RS-232C wraparound connector (ASYNC test)
- A PC card wraparound connector (Expansion test)
- An external CRT monitor (Expansion test)
- A USB test module (Keyboard test)
- A USB cable (Keyboard test)
- Headphone (Sound/LAN/modem test)
- A microphone (Sound/LAN/modem test)
- FAT-MODE inspection device (Sound/Modem /LAN test)
- A test media (Sound/Modem /LAN test)
- A LAN wraparound connector (Expansion test)
- Bidirectional machine for wraparound test

### 3.1.2 H/W (Hardware) initial information setting tool

The H/W initial information setting tool consists of the following 3 programs.

- Initial configuration
- System configuration display
- Digitizer FW write
- E2PROM test (MAC/DMI)

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

- The Diagnostics Disk (all test (T&D))
- A USB floppy disk drive (all tests)
- A LAN wraparound connector (E2PROM test)

## 3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the test program disk (No.1) in the floppy disk drive.
2. Release the lock of the power switch and turn on the computer by pressing the **F12**. Select the FDD in the display for selecting booting unit. Then press **Enter** and the following menu appears:

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

Enter a choice: 1
```

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

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

### 3.2.1 Diagnostics menu (T&D)

The following menu appears.

```
TOSHIBA personal Computer XXXX DIAGNOSTICS
version XXX (c) Copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 -
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING 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**. If a test program is in progress, press **Ctrl+Break** to exit the test program. If a test program is in progress, press **Ctrl+C** to stop the test program.

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

```
TOSHIBA Personal Computer XXXX DIAGNOSTICS
Version XXX (c) Copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTIC TEST MENU :
```

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

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

Functions 1 through 14 are the Diagnostic Tests. 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**.

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

```
SYSTEM TEST      XXXXXXXX
```

```
XXXX DIAGNOSTIC TEST VXXX
[Ctrl]+[Break] : test end
[Ctrl]+[C]     : key stop
```

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

SUB-TEST MENU :

```
01 - ROM checksum
02 - Dock/Undock
03 -
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 -
10 - Calibration
11 -
12 - Second FAN ON/OFF
99 - Exit to DIAGNOSTIC TEST MENU
```

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

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

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

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

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

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

Selecting **NO** in TEST LOOP terminates the test and returns to the subtest menu after one test cycle is complete.

Use the up and down arrow keys to move the cursor to “**ERROR STOP**”.

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

Selecting **YES** in ERROR STOP stops the test program when an error is occurred and displays the error status. The operation guide will appear on the right side of the display as shown below:

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                                1: Test end
                                2: Continue
                                3: Retry

```

```

Press [1]  Terminates the test program and returns to the subtest menu.
Press [2]  Executes the next test.
Press [3]  Restarts the test from the error.

```

Selecting **NO** in ERROR STOP displays the error status and increases error counter by one if an error is occurred, and executes the next step.

The sections on and after 3.5 detail the tests of the DIAGNOSTIC TEST MENU. Refer to Sections 3.21 through 3.26 for detailed information on the remaining Service Program Module functions.

Table 3-1 in section 3.4 describes the function of each test on the subtest menu. Table 3-4 in section 3.19 describes the error codes and error status for each error.

### 3.2.2 H/W initial information setting tool

The following menu appears in the display.

```

#####
####      H/W initial information setting tool          VX.XX  ####
#####
*  1 ..... Initial configuration                        *
*  5 ..... Digitizer FM write                          *
*  8 ..... System configuration display                 *
*  9 ..... E2PROM test (MAC/DMI)                      *
*****
.... Press test number[1,5,8,9] ?

```

For more details on this test, refer to the section 3.3.

### 3.3 Setting of the hardware configuration

To execute this program, select 2-Repair initial config test from the startup menu, press **Enter** and follow the directions on the screen. The H/W initial information setting tool consists of three subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

#### Subtest 01 Initial configuration

This subtest executes the following items and shows their contents in the display. When an item ends normally, the program proceeds automatically to the next item. When an error is found, the program stops and waits for key input. (After solving the problem, it starts executing the item again.)

However, input the information when the DMI information appears. For details of inputting DMI information, refer to "Subtest 08, DMI write" in the System test.

- Setting of the CPU set table
- Setting of the micro code
- Inputting or writing of DMI information (RAM, text)
- Setting of the HWSC
- Setting of the UUID
- Display of the DMI information (including UUID)

After completion of the above settings, the DMI information and the H/W configuration & DMI information are appear in order. Check the contents and press **Enter**.

#### Subtest 05 Digitizer FM write

This subtest rewrites the digitizer's firmware. When the version of the firmware is under 45, this subtest rewrites the firmware. If the firmware's version is 45 or more, no rewrite is executed in this subtest.

When the test ends, the display returns to the H/W initial information setting tool menu automatically.

#### Subtest 08 System configuration display

This subtest displays the information of the system configuration.

When the following message appears, press **Enter**.

Press [Enter] key

For details of the system configuration information, refer to "3.25 System configuration".

Subtest 09 E2PROM test (MAC/DMI)

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

This subtest checks whether the LAN function works correctly.

When the following message appears, press **Enter**.

COMPLETED\_

After that, it checks automatically whether the MAC address and DMI information are written.

### 3.4 Subtest

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

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

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Dock/Undock
		04	Fan ON/OFF
		05	Geyserville
		06	Quick charge
		07	DMI read
		08	DMI write
		10	Calibration
		12	Second Fan ON/OFF
2	MEMORY	01	Conventional memory
		02	Protected mode
		04	Cache memory
		05	L2 Cache memory
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		04	Touch Pad
		05	USB (Port0, Port1) test
		07	Toshiba scroller test
		08	Windows security 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
7	ASYNC	06 07	FIR/SIR point to point (send) FIR/SIR point to point (receive)
8	HARD DISK	01 02 03 04 06 07 09 10	Sequential read Address uniqueness Random address/data Cross talk & peak shift Write specified address Read specified address Sequential write W-R-C specified address
9	REAL TIMER	01 02 03	Real time Backup memory Real time carry
10	NDP	01	NDP test
11	EXPANSION	01 03	PC Card wraparound RGB monitor ID
-	Wireless LAN	1 2 3 0	Transmit & Receive test [Responder] MAC Address test [Mini-PCI Wireless LAN] Wireless LAN (WEP64/128) test Transmit & Receive test [Initiator]
-	BLUETOOTH	-	-
-	SOUND/ LAN/ MODEM	01 02 03 04 05 06	Microphone recording & play 2 & 3 Microphone recording & play 3 & 4 Sin Wave LAN MODEM Tablet Dock CD Test
-	THERMAL RADIATION CONTROL	-	-

## 3.5 System Test

To execute the System Test, select 1-SYSTEM TEST from the DIAGNOSTIC TEST menu, press **Enter** and follow the directions on the screen. The System test consists of nine subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 ROM Checksum

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

### Subtest 02 Dock/Undock

**NOTE:** To execute this subtest, attach the computer to the Tablet Multi Dock before selecting the subtest number.

The following message will appear. Then press the eject button of Tablet Multi Dock and **Enter**.

Slide Eject-SW, and press [Enter] key

The following message will appear. Press **Enter** without pressing the eject button of Tablet Multi Dock.

Release Eject-SW, and press [Enter] key

If the test ends successfully, the display returns to the SYSTEM TEST menu.

After returning to the SYSTEM TEST menu, disconnect the computer from Tablet Multi Dock.

### Subtest 04 Fan On/Off

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

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

\*\*\* Test Fan Revolution 0000RPM Start

Press [Enter] key

The following message will appear. Make sure the low-speed revolution of the fan starts and press **Enter**.

\*\*\* Test Fan Revolution Low Speed Start

Press [Enter] key

The following message will appear. Make sure the high-speed revolution of the fan starts and press **Enter**.

```
*** Test Fan Revolution High Speed Start
```

```
Press [Enter] key
```

#### Subtest 05 Geyserville

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

#### Subtest 06 Quick charge

This subtest checks the status for the quick charge.

#### Subtest 07 DMI read

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

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

```
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. Portege)

2. “Enter Version Number ?” is displayed.

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

3. “Enter Serial Number ?” is displayed.

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

4. “Enter Model Number ?” is displayed.

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

5. “Enter Bundle Number ?” is displayed.

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

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

To write the DMI information to the Flash ROM, press **Y**, and then **Enter**. After that, the message "Create DMIInfo.TXT (Y/N)?" is displayed. Press **N** and **Enter** because the data is not needed for maintenance test.

#### Subtest 10 Calibration

This subtest sets the standard position for the automatic display layout change with tablet display.

Before starting this subtest, disconnect all the connector form the computer and set the display to the tablet style.

An arrow appears on the display. Then place the computer on the flat table with the arrow head to the bottom and press the Cross Function Button.

Continuously, the arrow points other directions. Then execute the test same way as the above.

**NOTE:** *When placing the computer, make sure the computer stands vertically.*

After executing the subtest for each of four directions, the result appears in the screen.

Press **Cross Function Button** to return to the select menu display.

#### Subtest 12 Second Fan ON/OFF

This subtest check that the computer controls the Second Fan by the command.

Following message appears in the display. Then confirm the fan stops completely and press **Enter**.

Test 2nd Fan Revolution 0000RPM Start

PRESS [Enter] KEY

The following message appears in the display. Then confirm the fan starts operating and press **Enter**.

Test 2nd Fan Revolution LEVEL 5 speed Start

PRESS [Enter] KEY

## 3.6 Memory Test

To execute the Memory Test, select 2-MOMORY TEST from the DIAGNOSTIC TEST menu, press **Enter** and follow the directions on the screen. The Memory test consists of five subtests. Set the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 Conventional Memory

This subtest writes test data to conventional memory (0 to 640 KB), and reads and compares the result with the original data. The test address is displayed per 4 KB.

### Subtest 02 Protected Mode

**NOTE:** The CONFIG.SYS file must be configured without extended 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 '5A' data is run repeatedly to the test area (from '7000': 'Program' size to '7000': '7EEE' (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory.

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → NG

## Subtest 05 L2 Cache Memory

To test the L2 cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for L2 cache memory.

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → NG

## Subtest 06 Stress

This test prepares the write/read buffer (size:1b30h) and produce write date in the write buffer. The write data is written in the area larger than 1 MB and read into the read buffer then repeated to compare until maximum size.

Test data:

ffh, ffh, ffh, ffh, ffh  
00h, 00h, 00h, 00h, 00h  
ffh, ffh, ffh, 00h, ffh  
00h, 00h, 00h, ffh, 00h  
00h, ffh, ffh, ffh, ffh  
00h, 00h, 00h, 00h, aah

These data are generated repeatedly by 1b30h size.





## Subtest 04 Touch Pad

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

- A) Direction of touch pad.
- B) Touch pad switch function check.

This test reports the response of touch pad, and touch pad switch. When you touch the touch pad and slide your finger towards the upper left, the <POINTING> display changes according to the following illustration. When a touch pad switch is pressed, the color of the <BUTTON> being pressed changes.

The parameters appear on the right side of the display. If the touch pad switches are pressed at the same time, the subtest menu displays.

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

```
<POINTING>
```



```
<PARAMETER>
```

```
STATUS:0000h  
X-RATE:0000h  
Y-RATE:0000h
```

```
<BUTTON>
```

```
(1) (2)
```



```
<<Press BUTTON1 + BUTTON2 THEN END>>
```

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

```
<POINTING>
```



```
< PARAMETER >
```

```
STATUS:0018  
X-RATE: OK  
Y-RATE: OK
```

```
<BUTTON>
```

```
(1) (2)
```



```
<<Press BUTTON1 + BUTTON2 THEN END>> >
```

## Subtest 05 USB test

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

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

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

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

#### Subtest 07 Toshiba scroller test

This subtest checks functioning of the Toshiba scroller.

The following messages appear on the display in order. Move the 4D button (cross function button) to the indicated direction in the following order.

```
KB Test = Down -50
```

```
KB Test = Up -48
```

```
KB Test = Left -4B
```

```
KB Test = Right -4D
```

After the following message appears, press the 4D button.

```
KB Test = Enter -1C
```

After the following message appears, press the ESC (ESC/Rotation) button on the right side of the 4D button.

```
KB Test = ESC -01
```

If the test ends successfully, the display returns to the KEYBOARD TEST menu.

#### Subtest 08 Windows security button test

This subtest checks functioning of the Windows security button.

Press the Windows security button after the following message appears.

```
Press [ Windows Security ] button
```

If the test ends successfully, the display returns to the KEYBOARD TEST menu.

## 3.8 Display Test

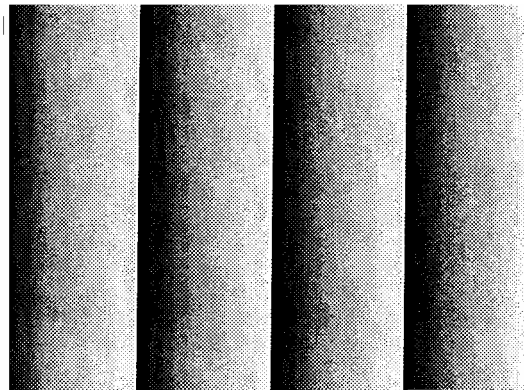
To execute the Display Test, select 4-DISPLAY TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains seven subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 VRAM Read/Write for VGA

This subtest writes the constant data (AAh and 55h) and the address data to the video RAM (16MB). 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**.

**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.



## 3.9 USB 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. Otherwise, the contents of the floppy disk will be erased.

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

1. The following message will appear. Select the kind of media and the start track of the floppy disk drive to be tested, then press **Enter**.

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

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

```
SUB-TEST MENU:

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

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

```
Floppy Disk      XXXXXXXX

SUB-TEST

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

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

Subtest 01 Sequential read

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

The start track is specified at the start of the FDD test. Refer to 2. in this chapter.

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.

### 3.10 ASYNC Test

To execute the ASYNC Test, select 7-ASYNC TEST from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen. The ASYNC Test contains two subtests that test the ASYNC functions.

Move the highlight bar to the subtest you want to execute and press **Enter**.

The following shows the subtest 06 format.

SystemAsynchronous  
Speed: 9600BPS  
Data: Eight data bits and one parity bit (Even parity)  
Data pattern From 20h to 7Eh

Subtest 06 FIR/SIR Point to Point (send)

**CAUTION:** *This test needs to access to the other computer infrared port from the computer.*

Send from 20h to 7Eh data to the other by using FIR/SIR port and compare original data with data received from the other computer.

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-HARD DISK TEST** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen. The hard disk test contains eight subtests that test the hard disk drive functions.

**CAUTION:** *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 09 or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to another one by executing BACKUP.EXE or others.*

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

1. Select the hard disk test drive number.

```
Test drive number select (1:HDD#1, 2:HDD#2, 0:HDD1&2)
HDC F/W error retry (1: yes, 2:no)
```

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

```
Data compare error dump 1:no
                        2:Yes
```

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

```
Detail status display 1:No
                        2:Yes
```

4. After setting is completed, select the number of the subtest and press Enter. The following message will appear.

```
HDD DISK TEST IN PROGRESS  XXXXXXXX
```

```
SUB-TEST:XX
```

```
PASS COUNT:XXXXX  ERROR COUNT:XXXXX
```

```
WRITE DATA:XXXXX  READ DATA  :XX
```

```
ADDRESS  :XXXXXX  STATUS      :XXX
```

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

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 number being tested and the last two digits indicate the error status code as explained in Table 3-5.

**Subtest 01 Sequential read**

This subtest is a sequential reading of all the tracks on the HDD starting at track 0 to maximum track. 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 (to check the data interference in the neighbor track) to compare. After the third pass, it tests the motor-off function (HDD motor is turned off, stops for 20 minutes and is turned on).

<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-REAL TIMER TEST** from the **DIAGNOSTIC TEST MENU**, press **Enter** and follow the directions on the screen. The real timer test contains three subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

### Subtest 01 Real time

This subtest displays and changes the current date and time stored in the real time clock. To execute the real time subtest follow these steps:

Step 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
```

Step 2: If the current date is not correct, input the correct date and press **Enter**. The date is updated and the following prompt will appear:

```
Enter new time :
```

Step 3: If the current time is not correct, input the correct time in 24-hour format. The time is updated and the following message appears.

The date and time switches by pressing **Enter**. To exit this subtest, press **Enter** during “Enter new time : ” display.

### Subtest 02 Backup memory

This subtest checks the following backup memories:

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

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

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

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

Subtest 03 Real time carry

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

This subtest checks the real time clock increments. Make sure the date and time are displayed in the following format and they move forward correctly.

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

PRESS [Enter] KEY TO EXIT TEST

Press **Enter** to exit.

### 3.13 NDP Test

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

#### Subtest 01    NDP

This test checks the following functions of NDP. This test can be executed when NDP is installed. NDP is installed when the bit 1 of configuration byte is "1".

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

### 3.14 Expansion Test

To execute the expansion test, select 11-EXPANSION TEST from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The expansion test contains two subtests.

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

#### Subtest 01 PC Card Wraparound

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

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

This subtest is executed in the following order:

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

**NOTE:** When selecting the subtest number 01, the following message will appear. Specify the slot you want to use.

```
Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?
```

Subtest 03     RGB monitor ID test

Connect a CRT monitor for this subtest. This subtest is conducted with VESA commands.



---

## **Chapter 4**

# **Replacement Procedures**

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### 4.1 Overview

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

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

4.3 PC card SD memory card		4.2 Battery pack										
		4.6 Memory module				4.7 HDD						
4.4 Keyboard												
4.8 Base cover assembly								4.5 Touch pad		4.19 LCD/FL inverter		
4.9 Mini PCI	4.10 MDC modem	4.6 FAN/ CPU	4.12 RTC battery	4.13 Blue tooth module	4.14 Hinge cable	4.18 Pen holder/ Battery lock/ Base latch assembly	4.17 Second FAN					
4.15 System board								4.21 Digitizer		4.8 Application Switch/ Power switch/ LCD latch assembly		4.22 LCD harness/ Hinge assembly
4.16 Speaker/LED board								4.24 Florescent lamp				4.23 Hinge Switch board

(Example)

■ Chart Notation

The chart shows the case for the following example:

◆ Removing the system board

All FRUs down to the “4.9 Mini PCI” to “4.14 Hinge cable” units immediately above the system board must be removed.

Similarly, as this requires the removal of all the units from “4.3 PC card” to “4.8 Base cover assembly” must be also removed.

4.3 PC card/ SD memory card		4.2 Battery pack										
		4.6 Memory module				4.7 HDD						
4.4 Keyboard												
4.8 Base cover assembly								4.5 Touch pad		4.19 LCD/FL inverter		
4.9 Mini PCI	4.10 MDC modem	4.6 FAN/ CPU	4.12 RTC battery	4.13 Blue tooth module	4.14 Hinge cable	4.18 Pen holder/ Battery lock/ Base latch assembly	4.17 Second FAN					
4.15 System board								4.21 Digitizer		4.8 Application Switch/ Power switch/ LCD latch assembly		4.22 LCD harness/ Hinge assembly
4.16 Speaker/LED board								4.24 Florescent lamp				4.23 Hinge Switch board

## Safety Precautions

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

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

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

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



**Before You Begin**

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section “4.2.1 Battery Pack”.

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

## Disassembly Procedures

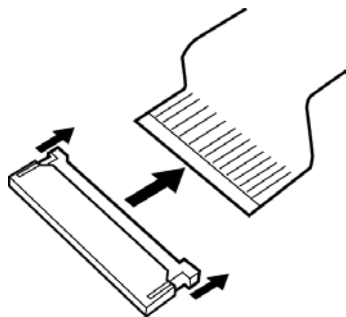
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

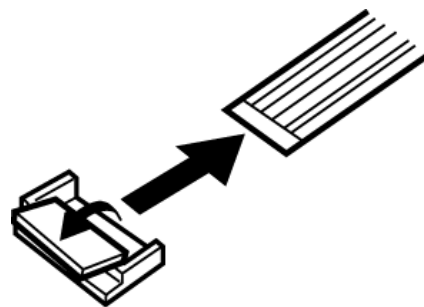
When disconnecting a pressure plate connector, draw the tab on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, draw enough the pressure plate and insert the cable into the connector. Press both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you draw enough the pressure plate to insert fully the cable.

For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

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



Pressure plate connector



Spring connector

### Assembly Procedure

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

- Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.
- Check that all cables and connectors are securely connected.
- Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.
- Check that all latches are securely closed.
- Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

### Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

- One Philips screwdriver with type 0 bit (for THIN HEAD screws)
- One Philips screwdriver with type 1 bit (for screws other than above)
- Tweezers (for lifting screws)
- ESD mats (lay on work table or floor)
- An ESD wrist strap and heel grounder
- Anti-static carpet or flooring
- A pair of needle-nose pliers
- Air-ionizers in highly static sensitive areas
- Antenna coaxial cable disconnecter

## Screw Tightening Torque

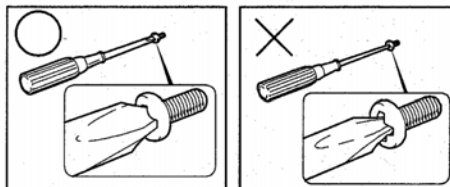
Use the following torque when tightening screws.

**Caution:** Overtightening may damage screws or parts. Undertightening may allow screws to loosen (and possibly fall out) causing a short circuit or other damage.

**Note:** To tighten screws quickly and accurately, an electric screwdriver is recommended.

- M2 (2mm) 0.167 N•m (1.7 kgf•cm)
- M2.5 (2.5mm) 0.294 N•m(3.0 kgf•cm)
- M3 (3mm) 0.549 N•m(5.6 kgf•cm)

**Note:** To prevent damage to THIN HEAD screws, use type 0 pit philips screwdriver. Use, however, the PH point size “1” screwdriver for screws fixing the expansion memory slot cover and the keyboard.. Press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).



## Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

- Even numbered length screws: Brown
- Odd numbered length screws: White
- Special length screw: Blue



“Special length screw” means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.6 mm and so on.

### Screw Notation

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

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw

F: Flat head screw

S: Super thin head screw

T: Tapping screw

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

Example: B6 ... 6mm BIND screw

## 4.2 Battery pack

### Removing the battery pack

The following describes the procedure for removing the battery pack. (See Figure 4-1.)

**Caution:** Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Turn the computer upside down.
4. Release the battery lock switch.
5. Slide the battery latch in the direction indicated by the arrow to loosen the lock. Pull out the battery to remove.

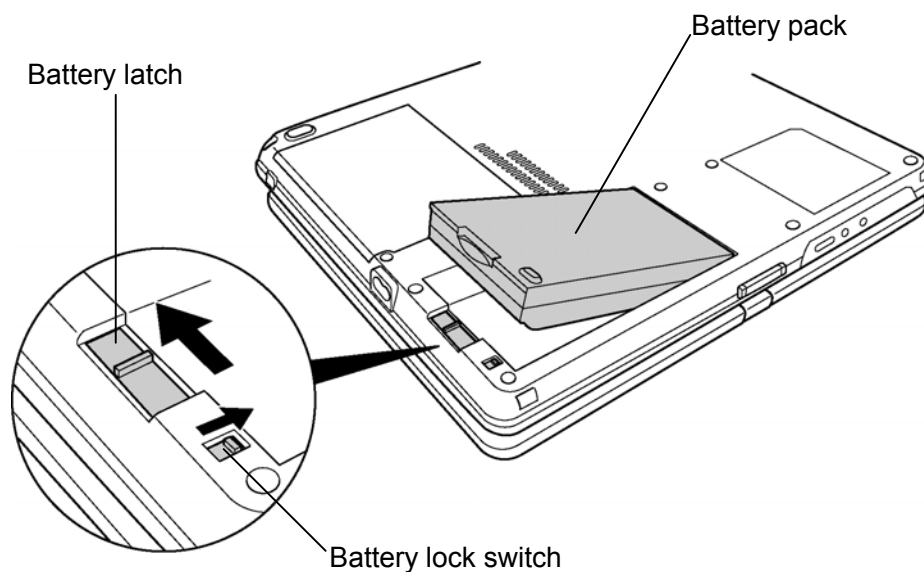


Figure 4-1 Removing the battery pack

**Note:** Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.

### Installing the battery pack

The following describes the procedure for installing the battery pack. (See Figure 4-1.)

**Caution:** *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose of the used batteries pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

**Note:** *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Inset the connector of the battery to the connector of the computer. Press the battery pack until the battery is locked.
4. Secure the battery lock.

## 4.3 PC Card/SD memory card

### 4.3.1 PC Card

#### Removing the PC Card

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

**Caution:** Insert or remove the PC Card in accordance with any instructions in the PC Card manual or the manuals of the computer system you are using.

1. Push the ejection button. It will pop out when you release it. Press it once more to eject the PC Card.
2. Pull out the and remove it.

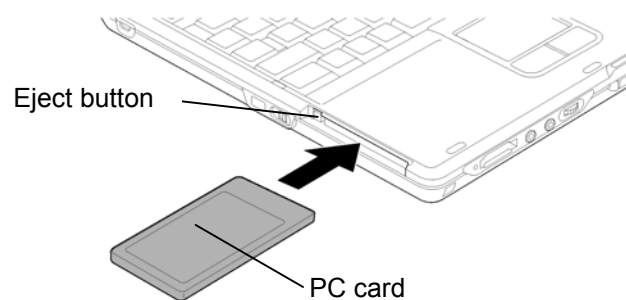


Figure 4-2 Removing the PC card

#### Installing the PC Card

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

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

### 4.3.2 SD memory card

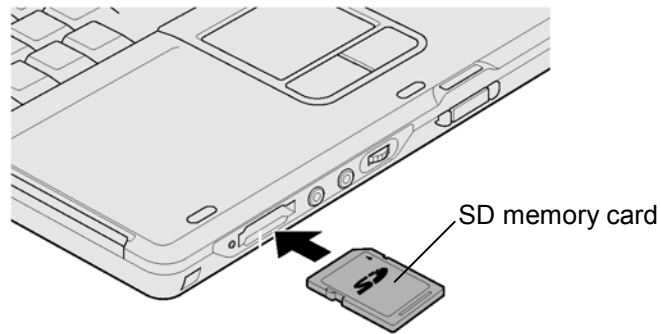
#### Removing the SD memory card

The following describes the procedure for removing the SD memory card. (See Figure 4-3.)



**Caution:** Insert or remove the SD card in accordance with any instructions in the SD card manual or the manuals of the computer system you are using.

1. Push the SD memory card. It will pop out partly when you release, so pull out the card.



*Figure 4-3 Removing the SD memory card*

### **Installing the SD memory card**

The following procedure describes the procedure for installing the SD memory card. (See Figure 4-3.)

1. Insert the SD memory card and press it until it securely connected.

## 4.4 Keyboard

### Removing the keyboard

The following describes the procedure for removing the keyboard. (See Figure 4-4.)

1. Open the display.
2. Insert your nails in the slot of both sides of the keyboard holder and lift it up to remove.
3. Remove the following screws securing the keyboard.

- M2.5x2.8B FLAT BIND screw x2

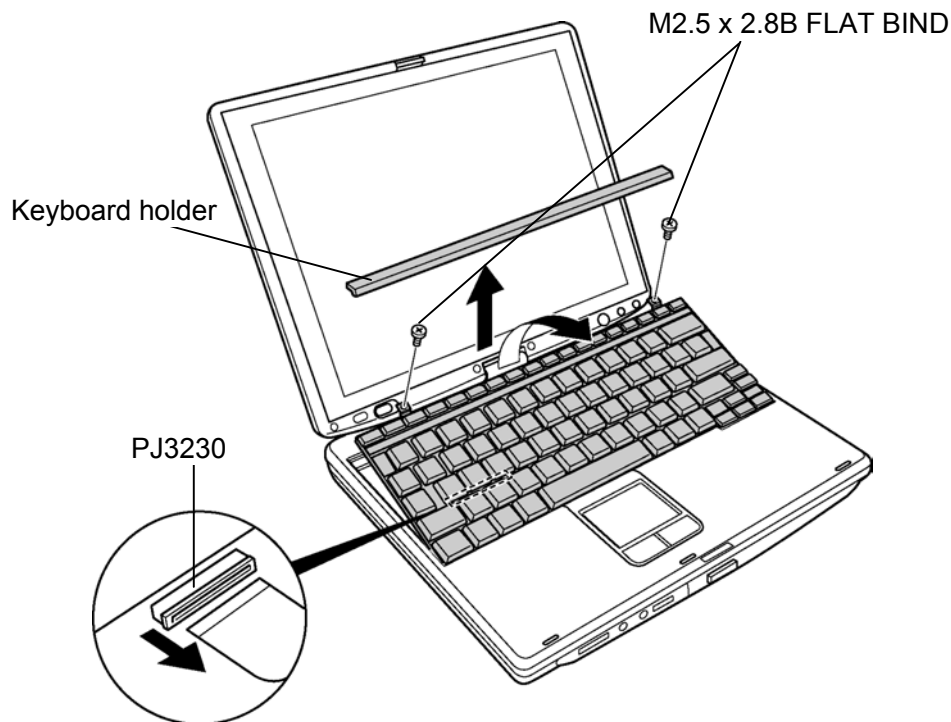


Figure 4-4 Removing the keyboard

4. Lift the top edge of the keyboard and bring the edge to the front to lay on the computer. Unlock the connector and disconnect the flexible keyboard cable from the connector on the system board.
5. Remove the keyboard.

**Installing the keyboard**

The following describes the procedure for installing the keyboard. (See Figure 4-4.)

1. Put the keyboard on the palm rest as its face is down. Connect the flexible keyboard cable to PJ3230 on the system board and lock the connector.
2. Hook the bottom edge of the keyboard to the palm rest. Place the keyboard on the computer and secure it with the following screws.

- M2.5×2.8B FLAT BIND screw x2

3. Install the keyboard holder.

## 4.5 Touch pad

### Removing the touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-5.)

1. Disconnect the flat cable from the connector on the system board.
2. Pull the touch pad holder slantwise from the computer.
3. Remove the following screws securing the touch pad.
  - M2.5×3B S-THIN screw x2
4. Remove the touch pad from the computer.
5. Disconnect the flat cable from the touch pad.

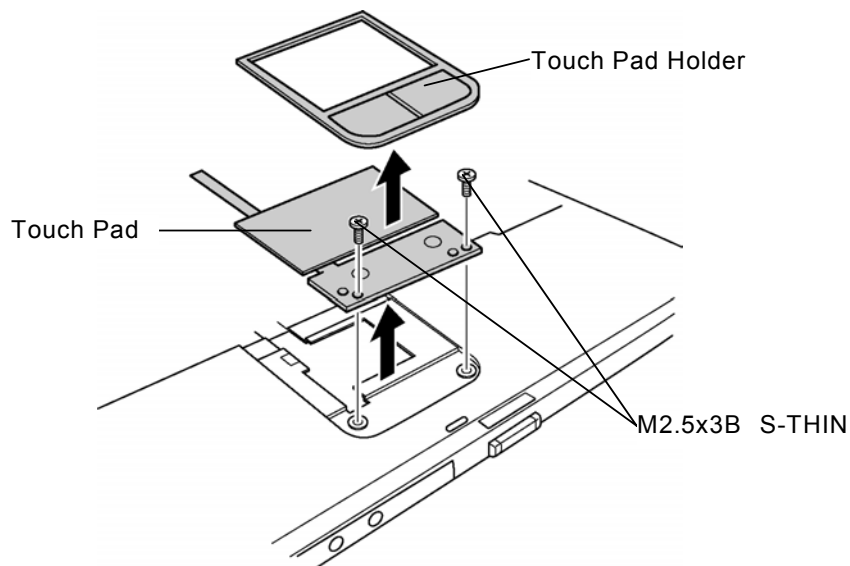


Figure 4-5 Removing the Touch Pad

### Installing the touch pad

The following describes the procedure for installing the touch pad (See Figure 4-5.).

1. Connect the flat cable to the touch pad.
2. Install the touch pad on the computer.
3. Secure the touch pad with the following screws.
  - M2.5×3B S-THIN screw x2
4. Insert the touch pad holder into the touch pad slot slantwise.
5. Connect the flat cable to the connector PJ3240 on the system board.

## 4.6 Memory module

**Caution:** The power must be turned off when you remove the memory module. Removing a memory module with the power on risks damaging the module or the computer itself.

Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.

Never press hard or bend the memory module.

### Removing the memory module

To remove the memory module(s), confirm that the computer is in boot mode. Then perform the following procedure. (See Figure 4-6.)

1. Turn the computer upside down.
2. Loosen the screw with e-ring fixing the memory slot cover.
3. Remove the memory slot cover.
4. Open the left and right latches and remove the memory module(s).

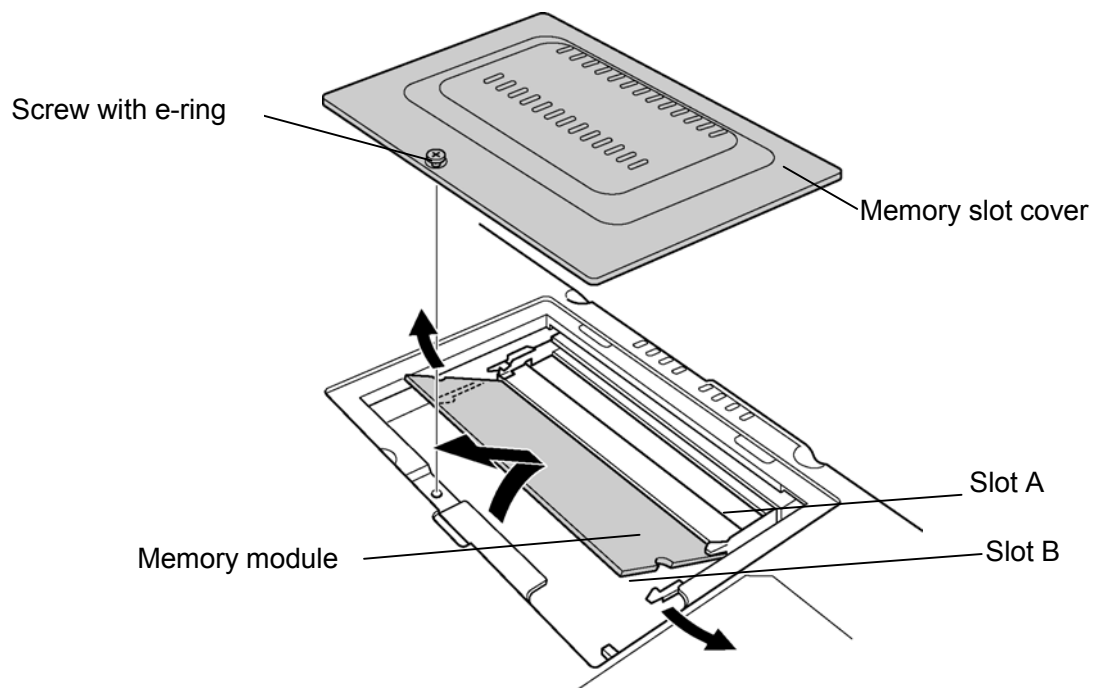


Figure 4-6 Removing the memory module

### Installing the memory module

To install the memory module(s), confirm that the computer is in boot mode. Then perform the following procedure. (See Figure 4-6.)

1. Insert the memory module into the connector of the computer slantwise (terminal side first) and press it to connect firmly.

**Caution:** *The power must be turned off when you insert the memory module. Inserting a memory module with the power on risks damaging the module or the computer itself.*

*Never press hard or bend the memory module.*

*When installing a memory module, be sure to install the memory module into the slot B.*

2. Install the memory slot cover.
3. Secure the screw with e-ring to fix the memory slot cover.

## 4.7 HDD

### Removing the HDD

The following describes the procedure for removing the HDD. (See Figure 4-7 to 4-8.)

**Caution:** Take care not to press on the top or bottom of the HDD. Pressure may cause data loss or damage to the device.

1. Turn the computer upside down.
2. Loosen the screw with e-ring securing the HDD slot cover and remove the cover.
3. Hold the HDD holder tab and pull the HDD assembly to the arrow direction (1) in the figure below and remove the HDD assembly.

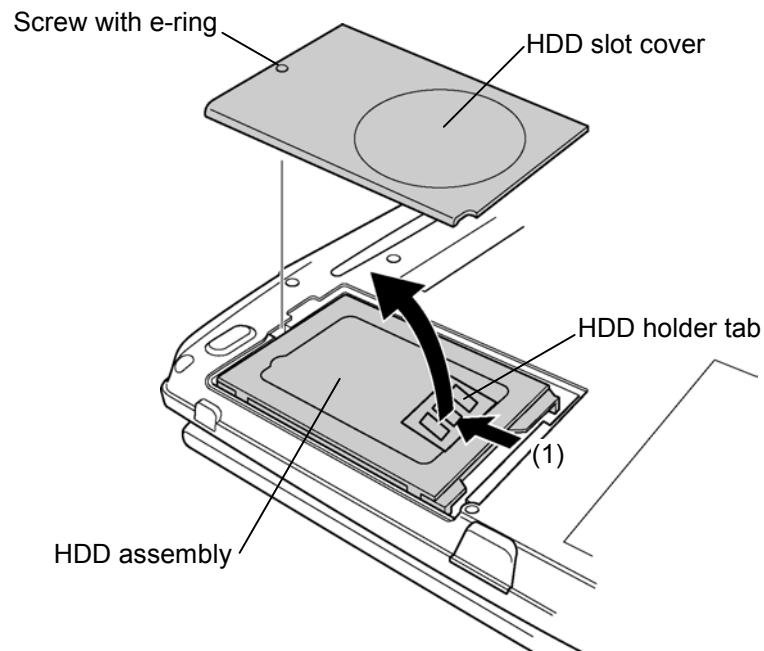
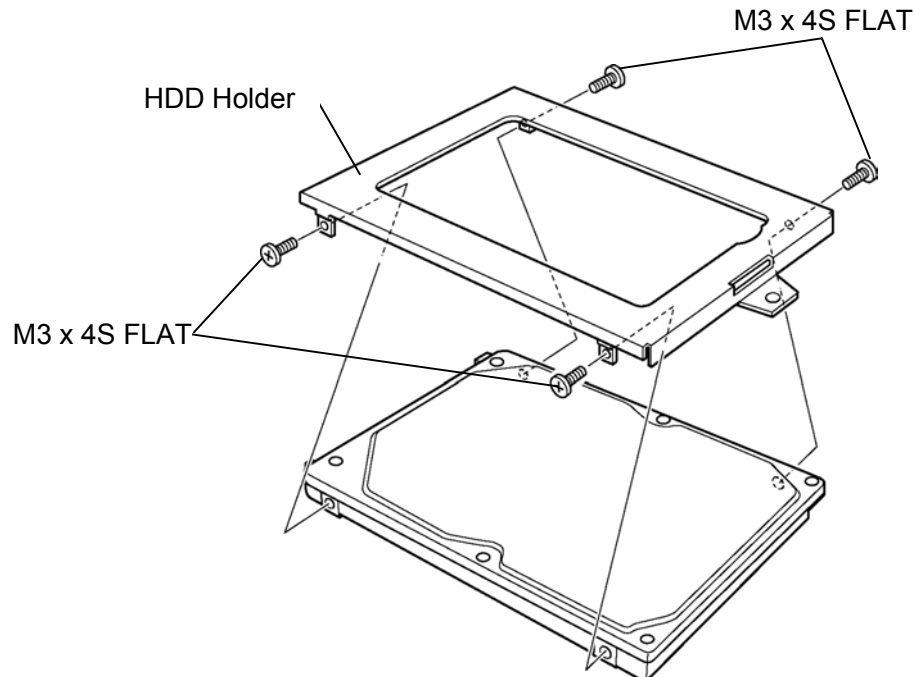


Figure 4-7 Removing the HDD cover

4. Remove the following screws fixing the HDD holder.

- M3×4S FLAT screw x4

5. Detach the HDD holder from the HDD.



*Figure 4-8 Removing the HDD holder*

### Installing the HDD

The following describes the procedure for installing the HDD. (See Figure 4-7 to 4-8.)

1. Install the HDD holder to the HDD with the following screws.

- M3×4S FLAT screw x4

2. Set the HDD assembly to the HDD slot from the opposite side of the connector.

3. Insert the HDD assembly into the connector on the system board with holding the HDD holder tab.

4. Install the HDD slot cover from the opposite side of the screw and secure it with the screw with e-ring.



## 4.8 Base cover assembly

### Removing the base cover assembly

The following describes the procedure for removing the base cover assembly. (See Figure 4-9 to 4-11.)

1. After Peeling off the glass tape, turn up the insulator and disconnect the speaker cable.
2. After turning up the insulator, unlock the connector and disconnect the LED flexible cable and the Touch Pad flexible cable.

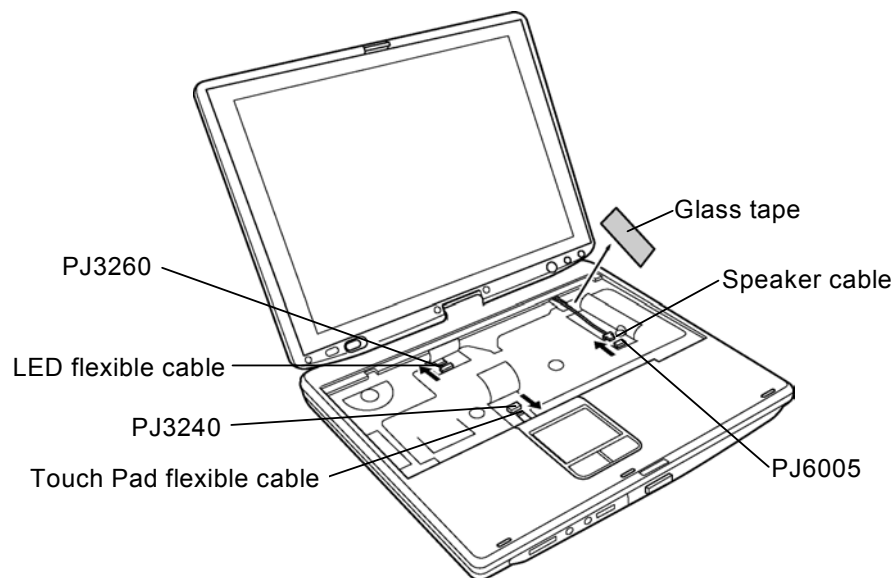


Figure 4-9 Disconnecting the cables

3. Close the display and turn the computer upside down.
4. Disconnect the second FAN cable from the system board near the memory slot.

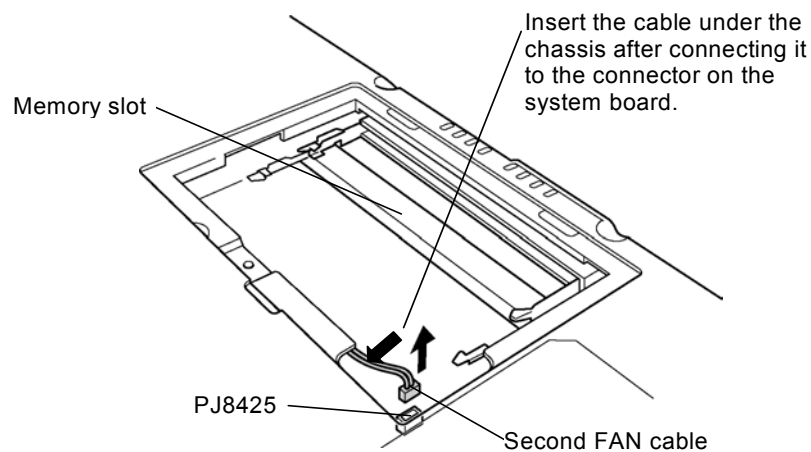


Figure 4-10 Disconnecting the second FAN cable

5. Remove the following screws from the bottom of the computer.

- M2.5×6B FLAT BIND screw x19 (Described as 6 in the figure)
- M2.5×3B S-THIN screw x1 (Described as 3 in the figure)

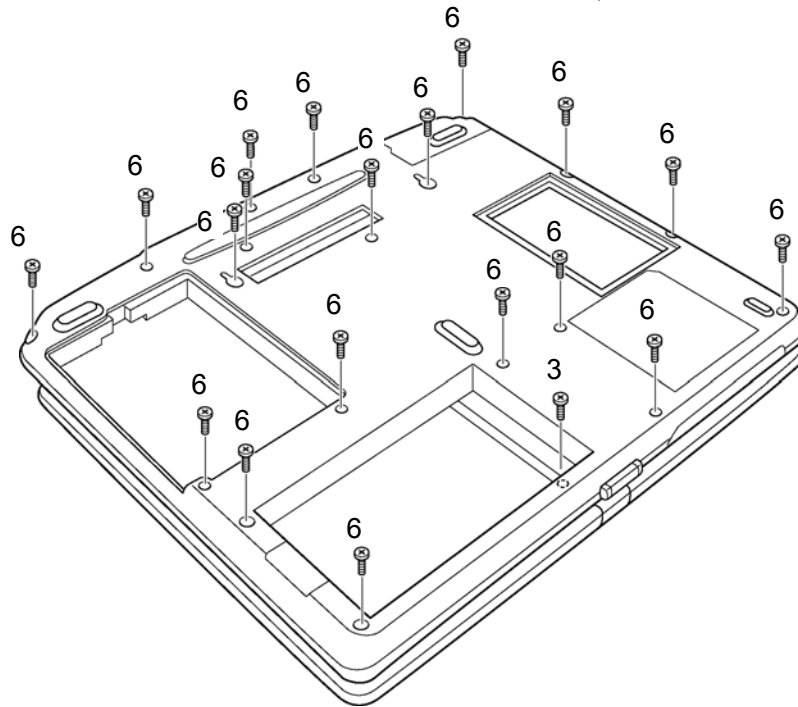


Figure 4-11 Removing screws

6. Pull up the base cover assembly to remove.

### Installing the base cover assembly

The following describes the procedure for installing the base assembly. (See Figure 4-9 to 4-11.)

1. Install the base cover assembly on the base assembly and hook the latches.
2. Secure the base cover assembly with the following screws.
  - M2.5×6B FLAT BIND screw x19
  - M2.5×3B S-THIN screw x1
3. Connect the second FAN cable to the connector on the system board near the memory slot and push the cable into the slot of the computer.
4. Turn over the computer.
5. Turn up the insulator and connect the LED flexible cable and Touch Pad flexible cable to the connector PJ3260 and PJ3240.
6. Turn up the insulator and connect the speaker cable to the connector PJ6005. Stick the glass tape to secure the insulator on the speaker cable.

## 4.9 Mini PCI

### Removing the Mini PCI

The following describes the procedure for removing a Mini PCI. (See Figure 4-12.)

**Caution:** *The power must be turned off when you remove the mini PCI. Removing a mini PCI with the power on risks damaging the module or the computer itself.*

*Never press hard or bend the mini PCI.*

1. Remove the following screws securing the mini PCI cover and remove the mini PCI cover.
  - M2×4Z BIND screw x2
  - or
  - M2×4B LH STICK screw x2
2. Disconnect the wireless LAN antenna cables from the mini PCI.
3. Open the left and right latches securing the mini PCI and remove the mini PCI.

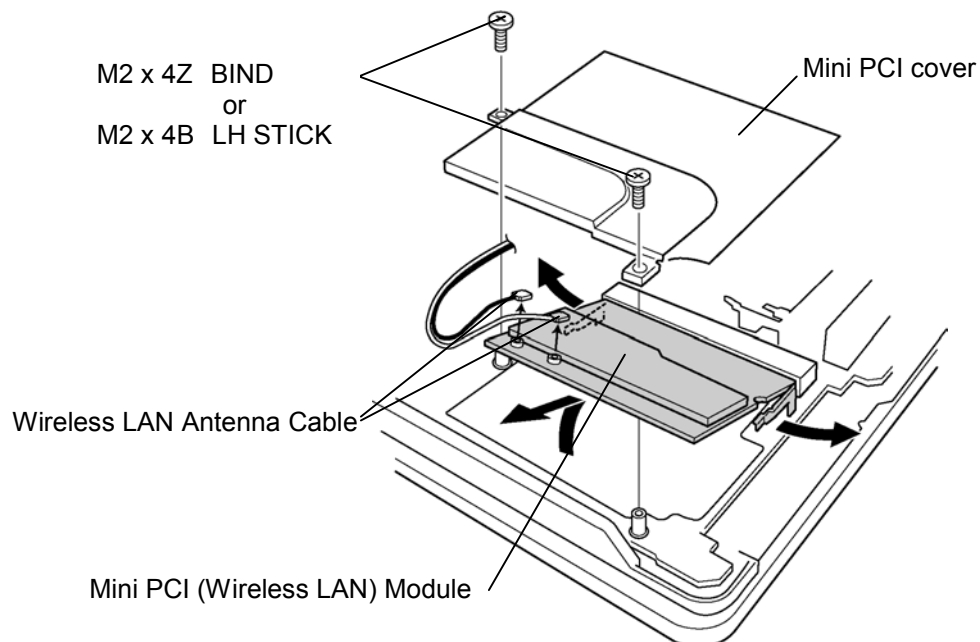


Figure 4-12 Removing the Mini PCI

### Installing the Mini PCI

The following describes the procedure for removing a Mini PCI. (See Figure 4-12 to 4-13.)

1. Insert the mini PCI slantwise into the connector on the system board. Press the mini PCI until it hooks surely.
2. Connect the Wireless LAN antenna cable to the mini PCI. Connect the white cable to the Main connector and the black one to the Sub connector.

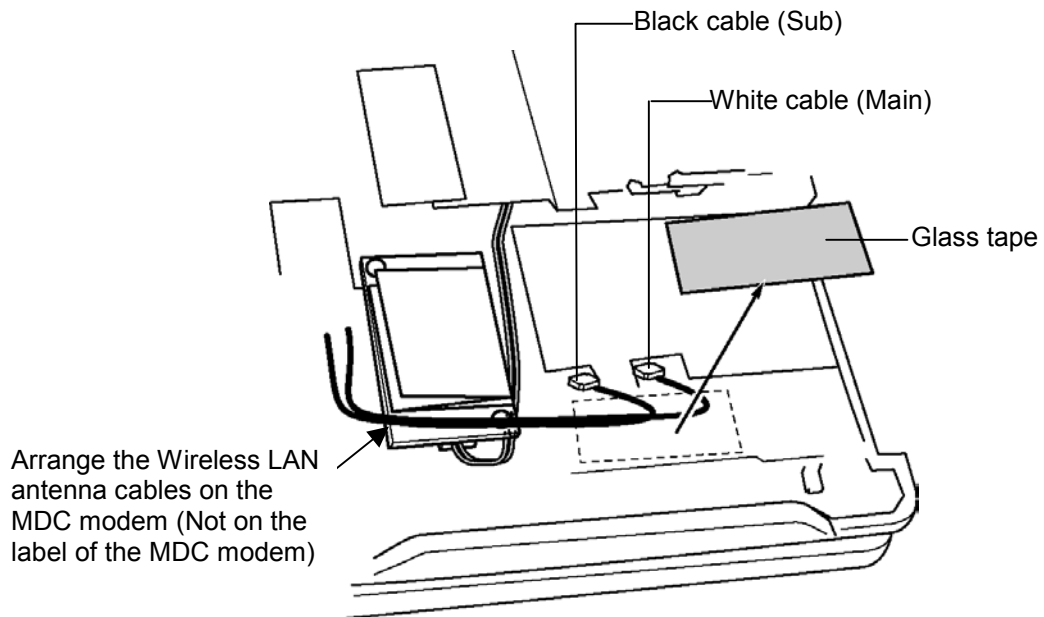


Figure 4-13 Installing the Wireless LAN antenna cables

3. Secure the mini PCI cover with the following screws.
  - M2×4Z BIND screw x2
  - or
  - M2×4B LH STICK screw x2

## 4.10 MDC modem

### Removing the MDC modem

The following describes the procedure for removing an MDC modem. (See Figure 4-14.)

**Caution:** *The power must be turned off when you remove the MDC modem. Removing an MDC modem with the power on risks damaging the modem or the computer itself.*

1. Remove the following screws securing the MDC modem.
  - M2×4Z BIND screw x2
2. Remove the MDC modem from the connector on the system board.
3. Disconnect the cable from the MDC modem.
4. After peeling off the glass tape, turn up the insulator and disconnect the MDC modem cable from the connector on the system board.

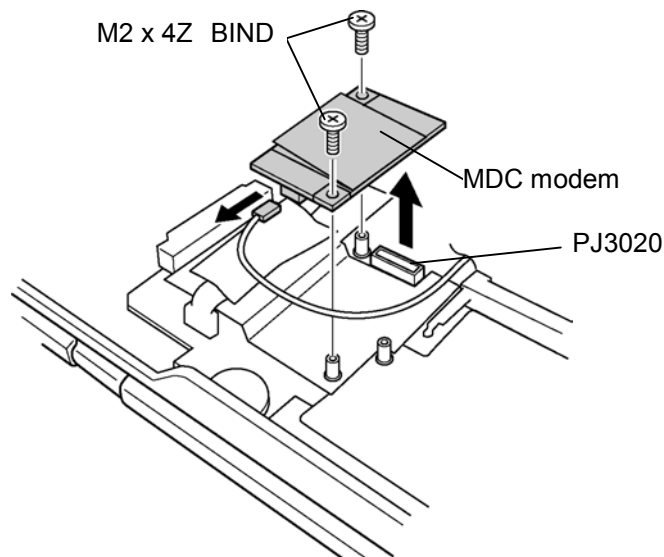


Figure 4-14 Removing the MDC Modem

### Installing the MDC modem

The following describes the procedure for installing an MDC modem. (See Figure 4-14 to 4-15.)

1. Connect the MDC modem cable to the MDC modem.
2. Connect the MDC modem to the connector PJ3020 on the system board and secure it with the following screws
  - M2×4Z BIND screw x2
3. After turning up the insulator, arrange the MDC modem cable and connect to the connector PJ3021 on the system board. Stick the glass tape.

**Caution:** When installing the MDC modem cable, make sure the cable does not cover screw holes and is caught by the Fan.

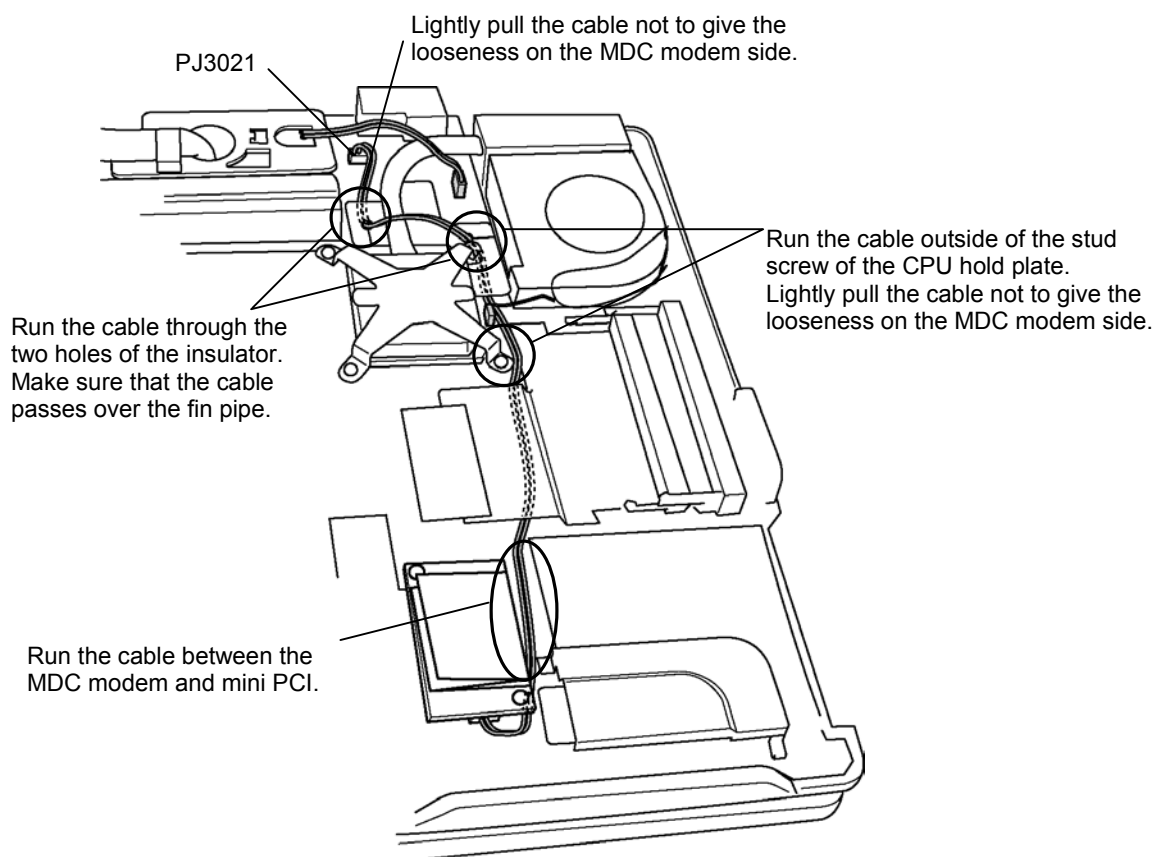


Figure 4-15 Installing the MDC Modem

## 4.11 FAN/CPU

### Removing the FAN/CPU

The following describes the procedure for removing the FAN/CPU. (See Figure 4-16 to 4-18.)

1. Remove the following screws securing the FAN unit.
  - M2.5×4B FLAT BIND screw x2
2. Disconnect the FAN cable from the connector on the system board.
3. Remove the FAN and peel off the glass tape covering the FAN cable.
4. Disconnect the rotation sensor cable from the connector on the system board.

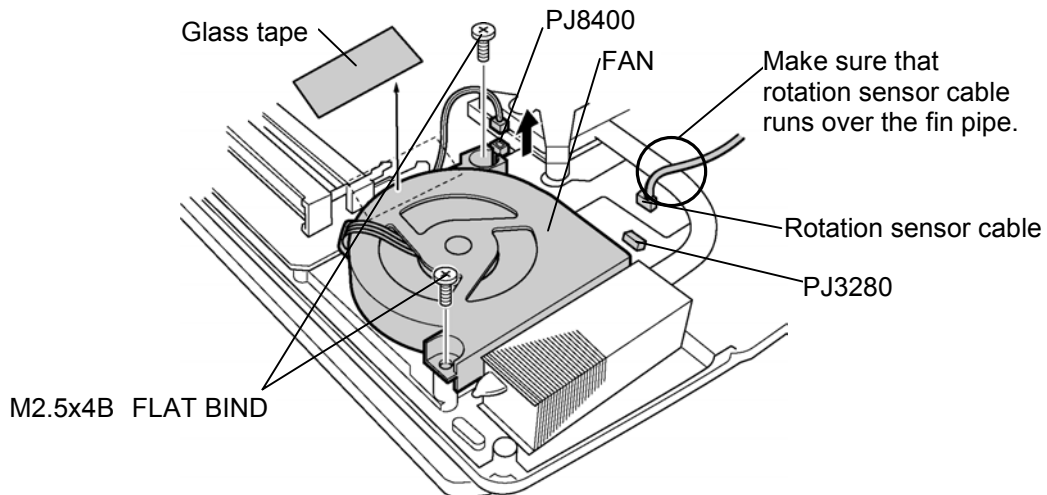


Figure 4-16 Removing the FAN

5. Remove the following screws securing the CPU holder in the order of the marks (4 to 1) on the CPU hold plate.
  - M2×4Z BIND screw x4
6. Remove the FIN on the CPU.

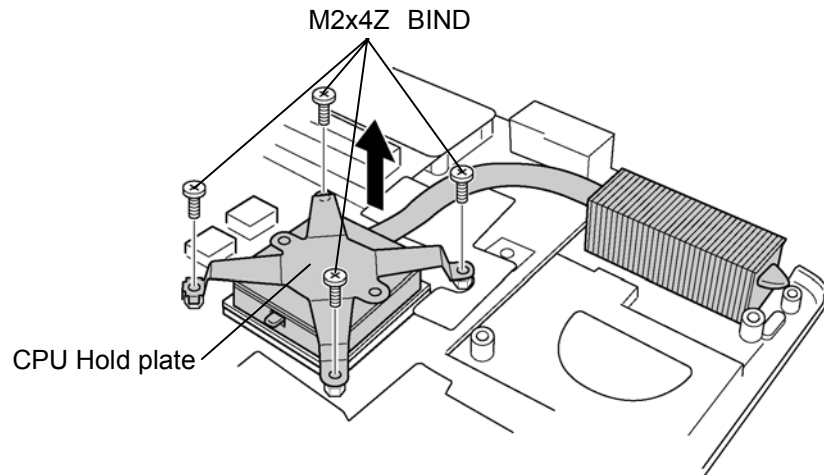


Figure 4-17 Removing the FIN

7. Unlock the CPU by rotating counterclockwise the cam on the CPU socket by 90 degrees with a flat-blade driver.
8. Remove the CPU.

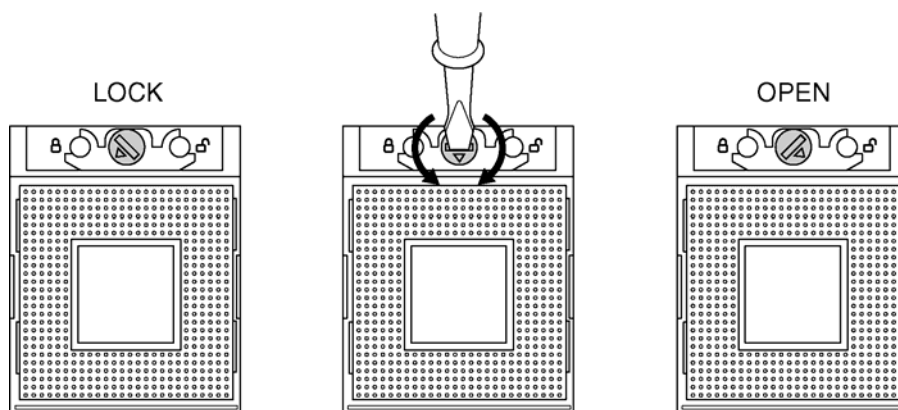


Figure 4-18 Removing the CPU

### Installing the FAN/CPU

The following describes the procedure for installing the FAN/CPU. (See Figure 4-16 to 4-20.)

1. Make sure that the cam of the CPU socket is in the unlock position.
2. Install the CPU on the CPU socket and check the CPU is installed on the right position.
3. Lock the CPU by rotating clockwise the cam on the CPU socket by 90 degrees with a flat-blade driver.



4. If there is already silicon grease on the CPU and FIN, clean it with a cloth. Using a special applicator, apply silicon grease so that the CPU chip on the CPU is completely covered.

**Note:** Apply the silicon grease enough to cover the chip surface using the special applicator. The amount is 0.25ml.

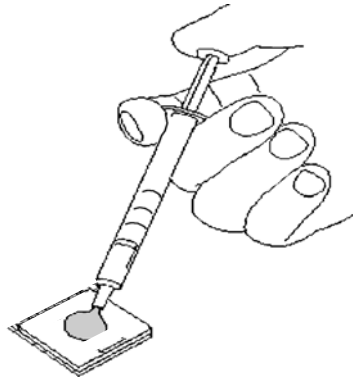


Figure 4-19 Applying Silicon Grease

5. Install the FIN on the CPU. Install the CPU hold plate on them and secure it with the following screws in the order of the marks (1 to 4) on the CPU hold plate.
  - M2×4Z BIND screw x4
6. Connect the rotation sensor cable to the connector PJ3280 on the system board.
7. Set the FAN cable along the side of the FAN and secure it with the glass tape.
8. Connect the FAN cable to the connector PJ8400 on the system board.

**Caution:** Make sure the FAN cable does not pass on the memory connectors.

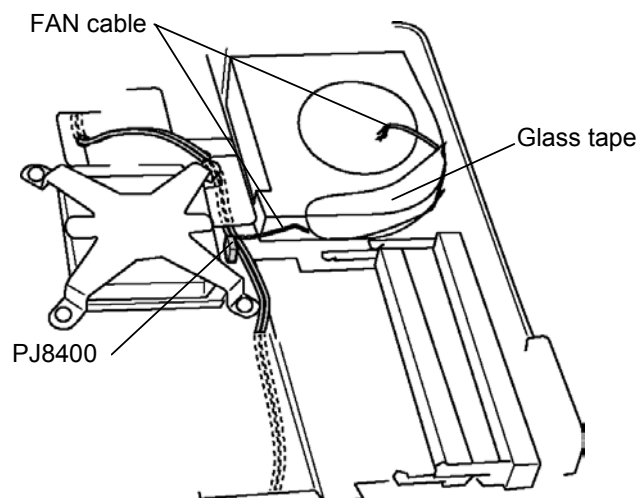


Figure 4-20 Installing the FAN cable

9. Install the FAN and secure it with the following screws.

- M2×4B BIND screw x4

## 4.12 RTC battery

### Removing the RTC battery

The following describes the procedure for removing the RTC battery. (See Figure 4-21.)

1. Remove the RTC battery from the Battery holder.
2. Disconnect the RTC battery cable from the connector on the system board.

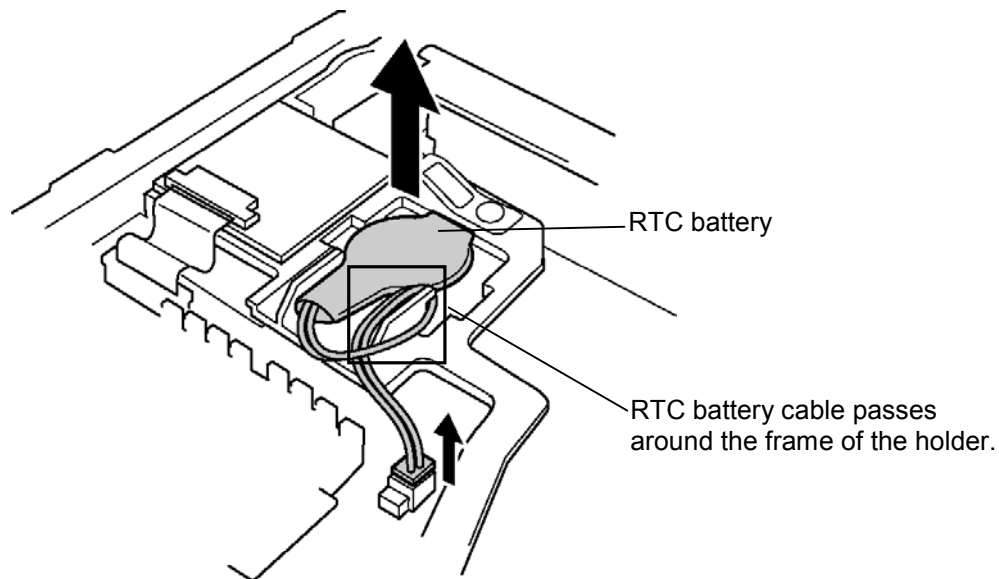


Figure 4-21 Removing the RTC battery

### Installing the RTC battery

The following describes the procedure for installing the RTC battery. (See Figure 4-21.)

1. Connect the RTC battery cable to the connector on the system board.
2. After arranging the cable passing around the frame of the holder, install the RTC battery in the RTC battery holder.

## 4.13 Bluetooth module

### Removing the Bluetooth module

The following describes the procedure for removing the Bluetooth module. (See Figure 4-22.)

1. Peel off the insulator.
2. After releasing the connector lock, disconnect the flat cable from the connector on the system board and Bluetooth module.
3. Remove the Bluetooth antenna harness from the Bluetooth module.
4. Remove the following screws securing Bluetooth module.

- M2×4Z BIND screw x1

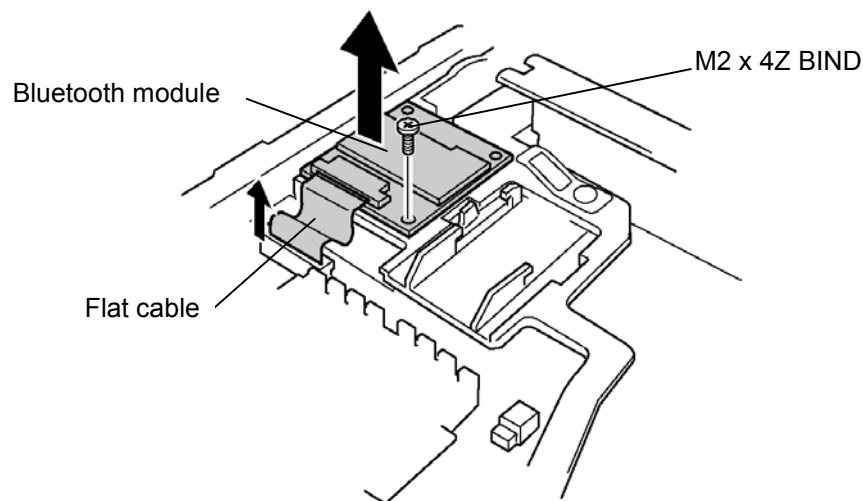


Figure 4-22 Removing the Bluetooth module

### Installing the Bluetooth module

The following describes the procedure for installing the Bluetooth module. (See Figure 4-22.)

1. Install the Bluetooth module and secure it with following screw.
  - M2×4Z BIND screw x1
2. Connect the Bluetooth antenna harness to the Bluetooth module.
3. Connect the flat cable to the connector PJ4410 on the system board and Bluetooth module and lock the connectors.

4. Stick the insulator.

**Note:** *When the Bluetooth module is not installed, secure the antenna harness with the glass tape on the insulator.*

## 4.14 Hinge cables

### Removing the hinge cables

The following describes the procedure for removing the hinge cables. (See Figure 4-23.)

1. Peel off two glass tapes securing the hinge cables.
2. Disconnect the microphone cable and LCD cable from the connector on the system board.
3. Disconnect the Digitizer cable and LCD power cable.
4. Remove carefully the hinge cables from the guide of the base assembly.

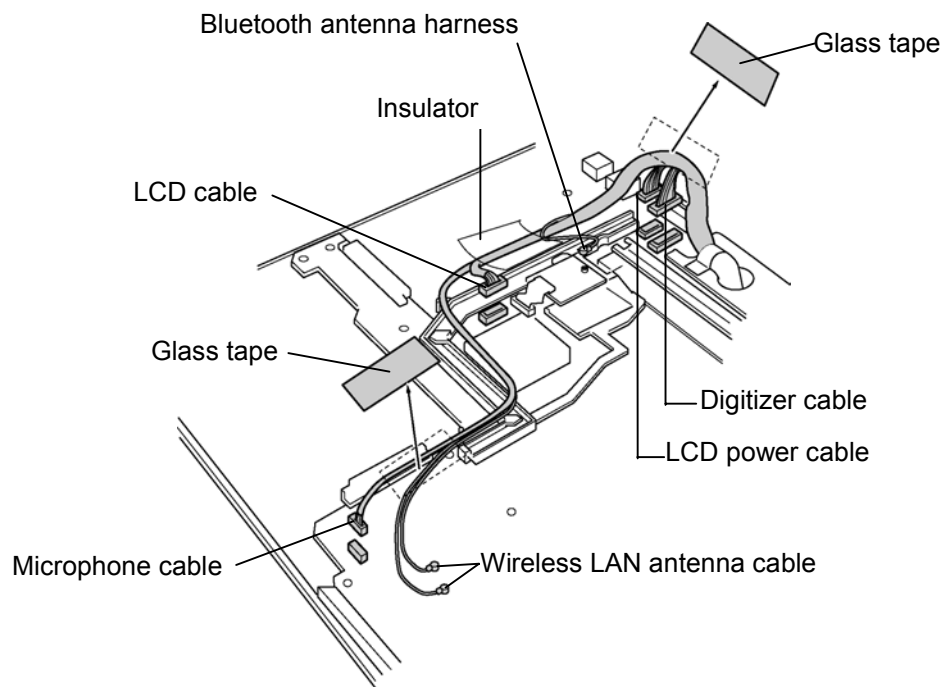


Figure 4-23 Removing the hinge cable

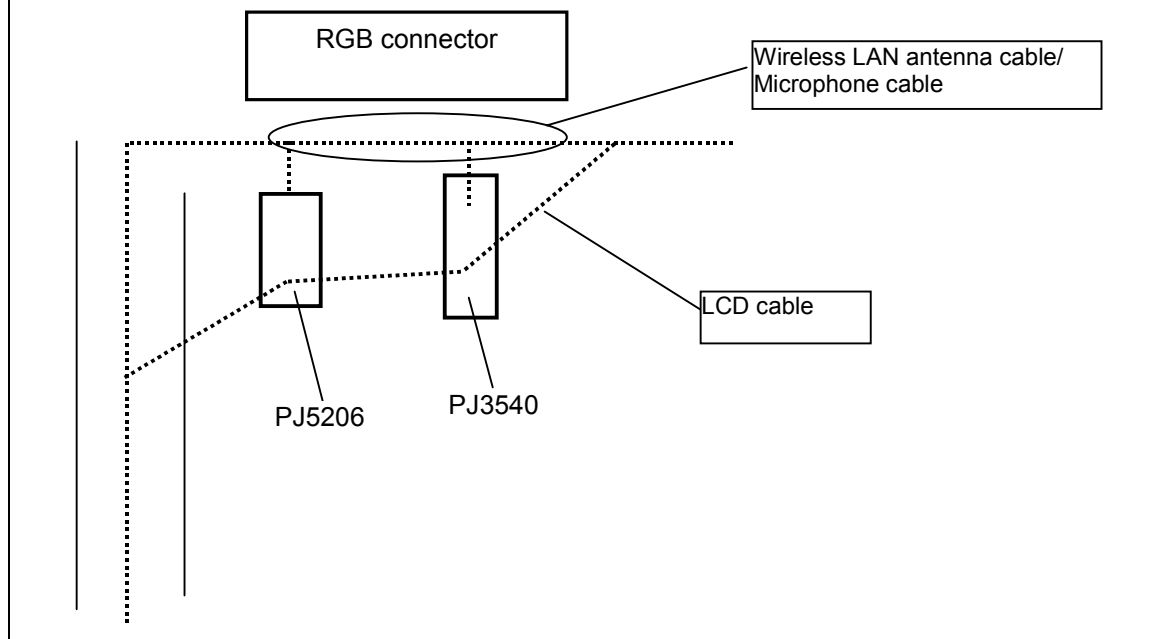
### Installing the hinge cables

The following describes the procedure for installing the hinge cables (See Figure 4-23).

1. Connect the Digitizer cable and LCD power cable to the connector on the system board.
2. Install carefully the hinge cables in the guide of the base assembly.

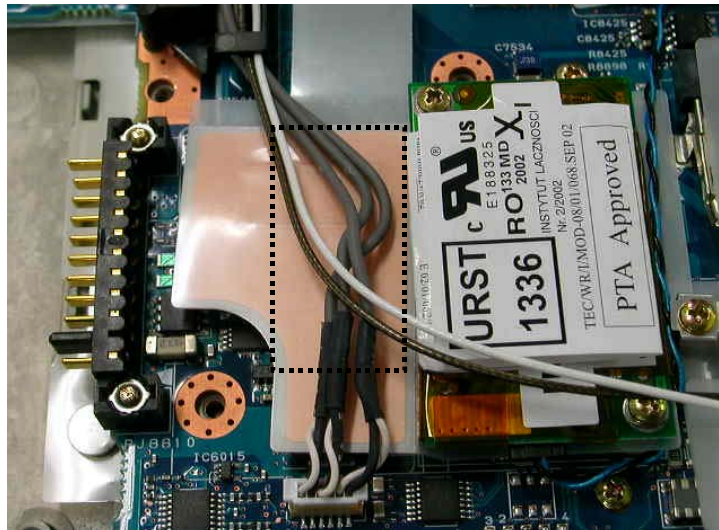
**Note:** Arrange the Wireless LAN antenna cable and microphone cable running between RGB connector and the connectors PJ3540, PJ5206.

Arrange the LCD cable running over the connectors PJ3540, PJ5206.



3. Connect the microphone cable and LCD cable to the connector PJ6000 and PJ5205 on the system board. Stick the two glass tapes to secure them.

**Caution:** Arrange the microphone cable running in the copper portion on the laminate sheet.



**Caution:** Make sure that the glass tape covering the digitizer cable and LCD power cable is lower than the connector panel.

## 4.15 System board

### Removing the system board

The following describes the procedure for removing the system board. (See Figure 4-24.)

**NOTE:** When removing/installing the system board, be careful not to scratch the cables.

1. Remove the following screws securing the system board and remove the system board.
  - M2.5x4B FLAT BIND screw x6
2. Remove the sound JACK cover from the system board.
3. Remove the FIR cover ASSY from the base assembly.

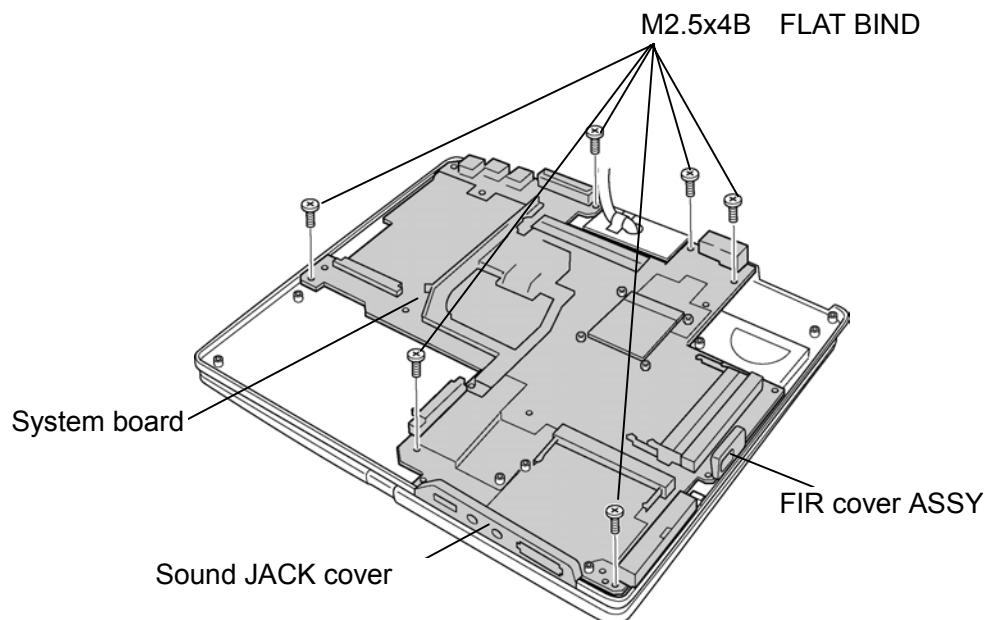


Figure 4-24 Removing the system board



### Installing the system board

The following describes the procedure for installing the system board. (See Figure 4-24.)

1. Install the sound JACK cover to the system board.
2. Install the system board to the base assembly from the hinge side and secure it with the following screws.

- M2.5×4B FLAT BIND screw      x6

**NOTE:** *When installing the system board, make sure that the switch of the system board fits to the FIR cover ASSY and works correctly.  
And also, confirm the rotation sensor cable is on the system board.*

3. Install the FIR cover ASSY to the base assembly.

## 4.16 Speaker/LED board

### 4.16.1 Speaker

#### Removing the speaker

The following describes the procedure for removing the speaker. (See Figure 4-25.)

1. Remove the following screws securing the speaker holder and remove the speaker holder.

- M2.5×3B S-THIN screw x2

2. Remove the speaker from the speaker holder.

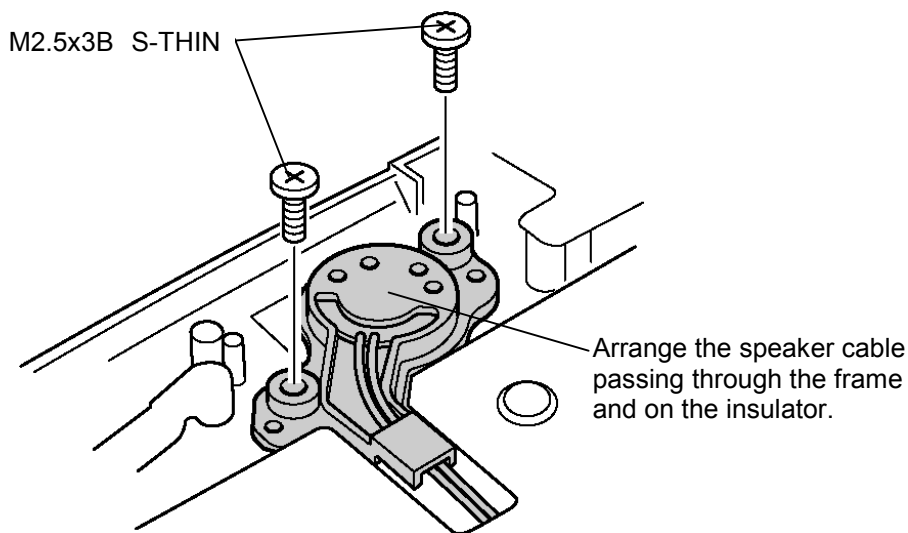


Figure 4-25 Removing the speaker

#### Installing the speaker

The following describes the procedure for installing the speaker. (See Figure 4-25.)

1. Set the speaker to the speaker holder.
2. Install the speaker holder on the base assembly and secure it with the following screws.

- M2.5×3B S-THIN screw x2

### 4.16.2 LED board

#### Removing the LED board

The following describes the procedure for removing the LED board. (See Figure 4-26.)

1. Remove the following screws securing the LED board and remove LED lens holder.
  - M2.5×2.8B FLAT BIND screw x1
2. Disconnect the flat cable from the LED board.
3. Remove the LED board from the LED lens holder.

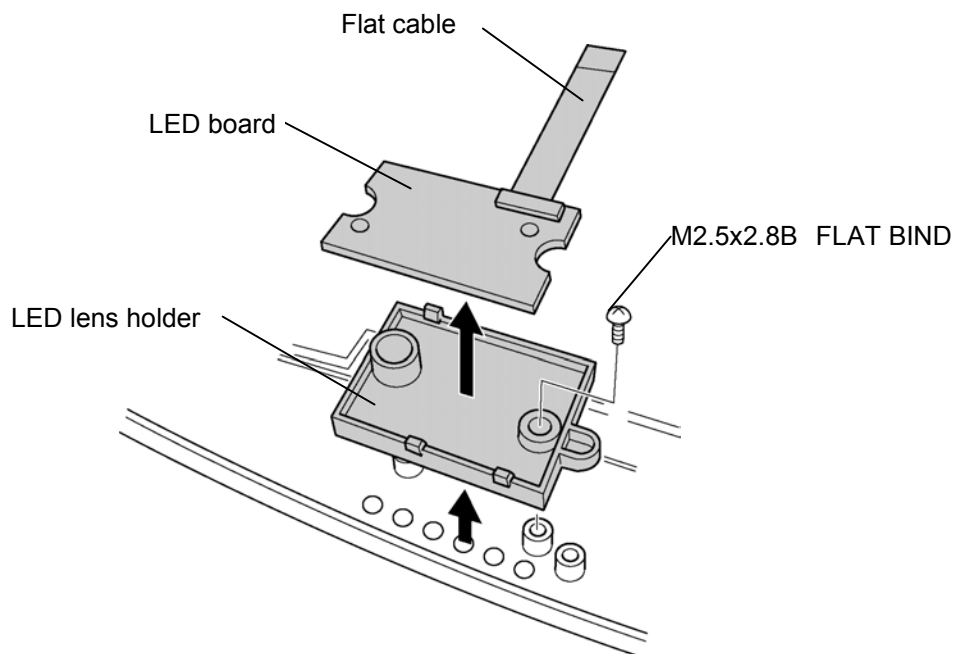


Figure 4-26 Removing the LED board

#### Installing the LED board

The following describes the procedure for installing the LED board. (See Figure 4-26.)

1. Install the LED board to the LED lens holder.
2. Connect the flat cable to the LED board and system board.
3. Install the LED lens holder to the base assembly and secure it with the following screws.

- M2.5×2.8B FLAT BIND screw x1

**NOTE:** *After installing the LED lens holder, make sure the flat cable comes on the insulator of the base cover assembly.*

## 4.17 Second FAN

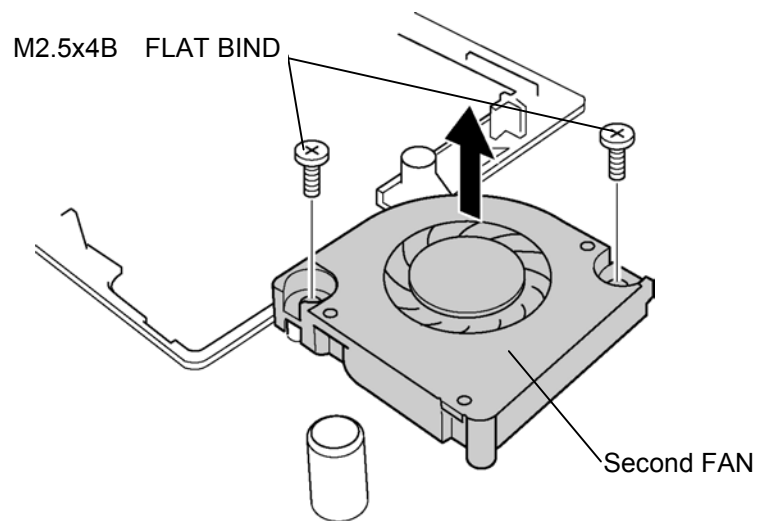
### Removing the Second FAN

The following describes the procedure for removing the Second FAN. (See Figure 4-27.)

1. Remove the following screws securing the Second FAN unit.

- M2.5×4B FLAT BIND screw x2

2. Remove the Second FAN unit from the base cover assembly.



*Figure 4-27 Removing the Second FAN*

### Installing the Second FAN

The following describes the procedure for installing the Second FAN. (See Figure 4-27.)

1. Install the Second FAN unit on the base cover assembly.

2. Secure the Second FAN unit with the following screws.

- M2.5×4B FLAT BIND screw x2

## 4.18 Pen holder/Battery lock/Latch assembly

### 4.18.1 Pen holder

#### Removing the Pen holder

The following describes the procedure for removing the Pen holder. (See Figure 4-28.)

1. Remove the following screws securing the pen holder.

- M2.5×4B FLAT BIND screw x2

2. Remove the pen holder from the base cover.

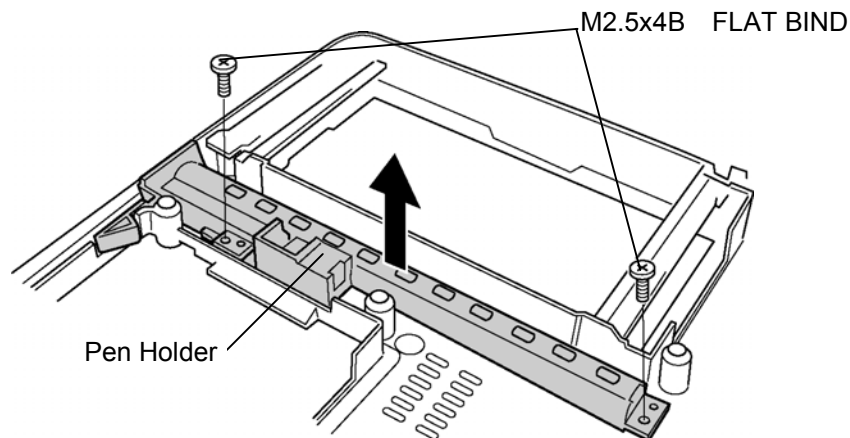


Figure 4-28 Removing the Pen holder

#### Installing the Pen holder

The following describes the procedure for installing the Pen holder. (See Figure 4-28.)

1. Install the pen holder on the base cover.

2. Secure the pen holder with the following screws.

- M2.5×4B FLAT BIND screw x2

### 4.18.2 Battery lock

#### Removing the Battery lock

The following describes the procedure for removing the Battery lock (See Figure 4-29.)

1. Remove the following screws securing the Battery lock.

- M2.5×4B FLAT BIND screw x2

2. Remove the Battery lock from the base cover.

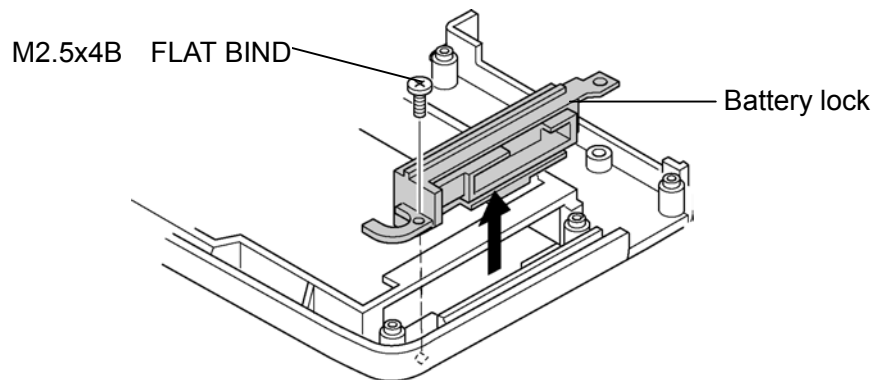


Figure 4-29 Removing the Battery lock

#### Installing the Battery lock

The following describes the procedure for installing the Battery lock (See Figure 4-29)

1. Install the Battery lock on the base cover.

2. Secure the Battery lock with the following screws.

- M2.5×4B FLAT BIND screw x2

### 4.18.3 Base latch assembly

#### Removing the Base latch assembly

The following describes the procedure for removing the Base latch assembly (See Figure 4-30.)

1. Remove the following screws securing the base latch assembly.

- M2.5×4B FLAT BIND screw x2

2. Remove the base latch assembly from the base cover.

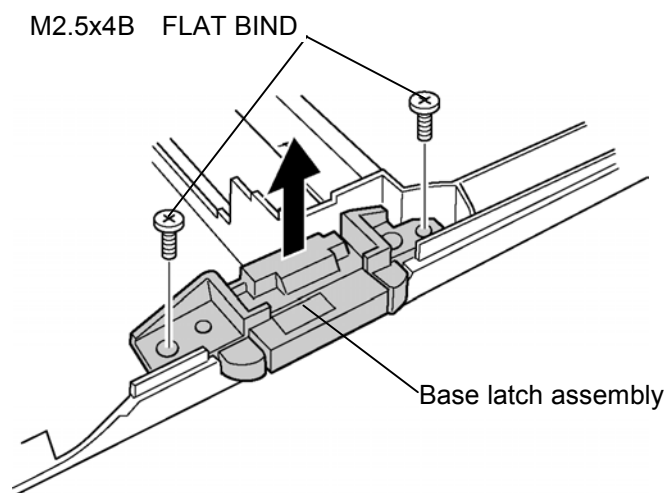


Figure 4-30 Removing the latch assembly

#### Installing the Base latch assembly

The following describes the procedure for installing the Base latch assembly (See Figure 4-30)

1. Install the base latch assembly to the base cover.

2. Secure the base latch assembly with the following screws.

- M2.5×4B FLAT BIND screw x2



## 4.19 LCD unit/FL inverter

### Removing the LCD unit and FL inverter

The following describes the procedure for removing the LCD unit and FL inverter. (See Figure 4-31 to 4-34.)

**NOTE:** When removing the LCD unit or FL inverter, do not press the LCD part of the base cover assembly. It may cause the breakage of the hinge assembly. Use a stand or something to make the LCD part flat for installing the LCD unit and FL inverter, and to make the base assembly floating from the ground.

1. Remove the four mask cushions from the LCD cover by using a needle.  
Remove the two mask seals from the display mask.
2. Remove the following screws securing the LCD cover.
  - M2.5×6B FLAT BIND screw x6 (Described as 6 in the figure)
3. Open the display until LCD and the base assembly become horizontal. Insert your nails into slit of the LCD and release the latches from the bottom side of the LCD.

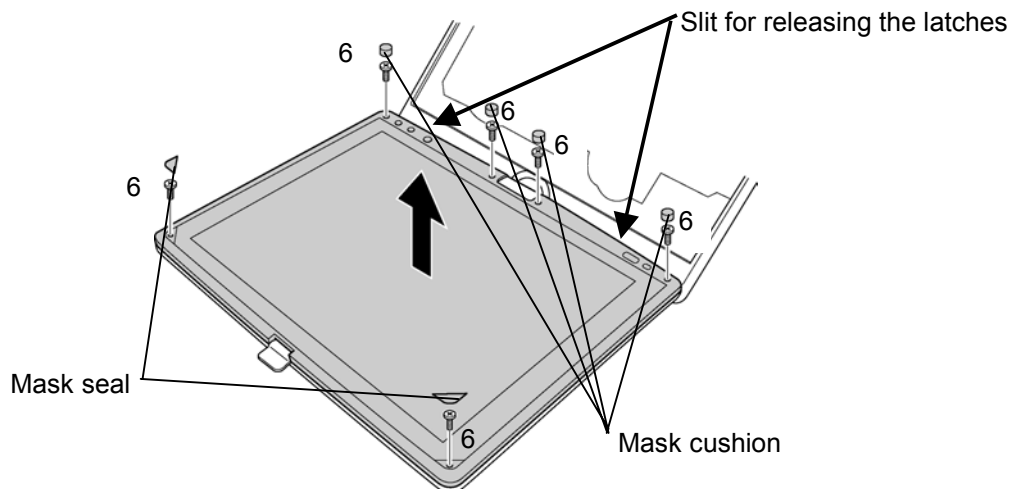


Figure 4-31 Removing the LCD mask

4. Remove the Cross function button.

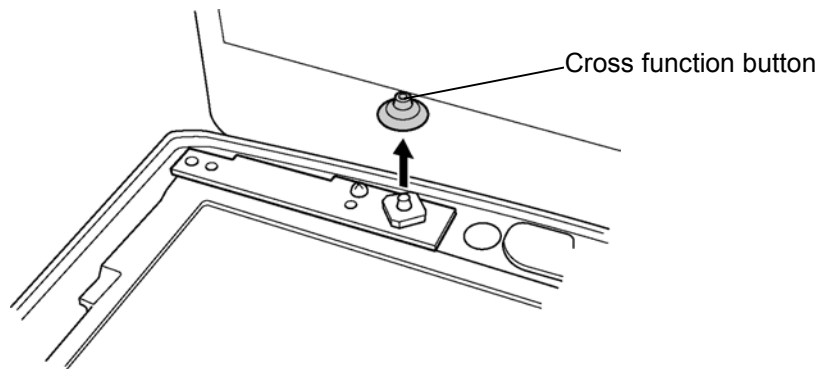


Figure 4-32 Removing the Cross function button

5. Remove the following screw fixing the FL inverter. After peeling off the insulator, remove the harness from both sides and remove the FL inverter.

- M2×4Z BIND screw x1

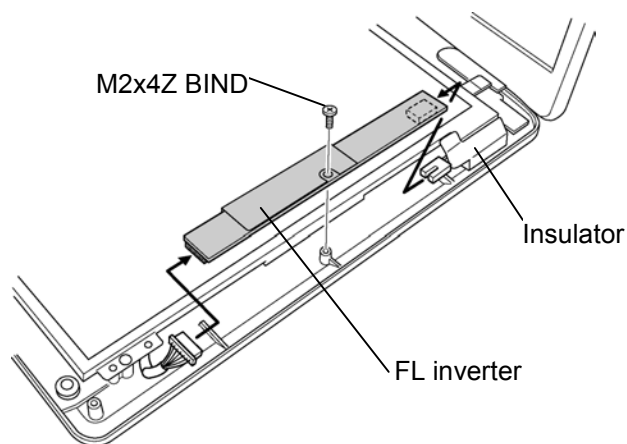


Figure 4-33 Removing the FL Inverter

6. Remove the following screws fixing the LCD unit.

- M2 ×4Z BIND screw x4

7. With the bottom edge of the LCD unit on the display cover, raise the top edge of the LCD unit. Remove the glass tapes to remove two LCD cables from the connector on the back of the LCD.

**NOTE:** When putting the LCD unit on the display cover, lay a mat or something on under the LCD unit to protect the computer and the LCD from a scratch or breakage.

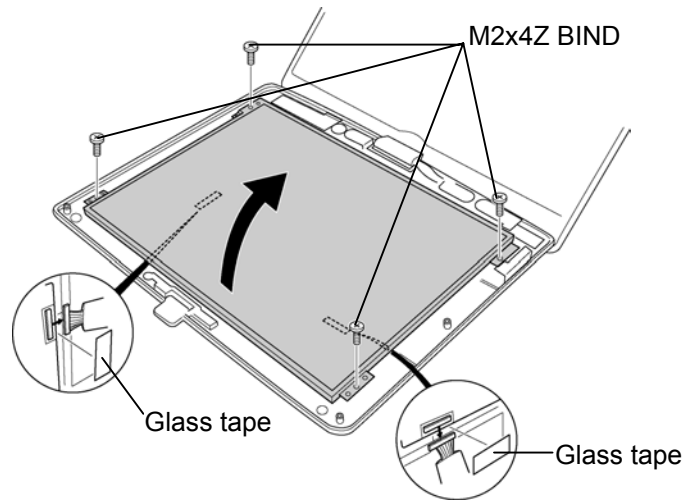


Figure 4-34 Removing the LCD

### Installing the LCD unit and FL inverter

The following describes the procedure for installing the LCD unit and FL inverter. (See Figure 4-31 to 4-34.)

1. With the LCD unit standing on the display cover, connect two LCD cables on the back of LCD and secure them with two glass tapes.
2. Lay down the LCD on the LCD cover and secure it with the following screws.
  - M2×4Z BIND screw x4
3. Connect the two harnesses to the connector of the FL inverter. Secure the FL inverter with the following screw. Secure the FL inverter with the following screw.
  - M2×4Z BIND screw x1
4. Install the cross function button
5. Install the LCD mask. Press the LCD mask until latches fasten securely.

**NOTE:** When installing the LCD mask, wipe the LCD mask with a soft cloth and make the back of the LCD mask clean with an ionizer. And also, make sure that the cross function button is installed.

6. Secure the LCD mask with the following screws and put the mask seals and mask cushions on them.

- M2.5×6B FLAT BIND screw x6

## 4.20 Application switch board/Power switch board/LCD latch assembly

### 4.20.1 Application switch board/Power switch board

#### Removing the Application switch board/Power switch board

The following describes the procedure for removing the Application switch board/Power switch board. (See Figure 4-35 to 4-36.)

1. Remove the following screws securing the application switchboard and remove the application switchboard.

- M2 x4Z BIND screw x1

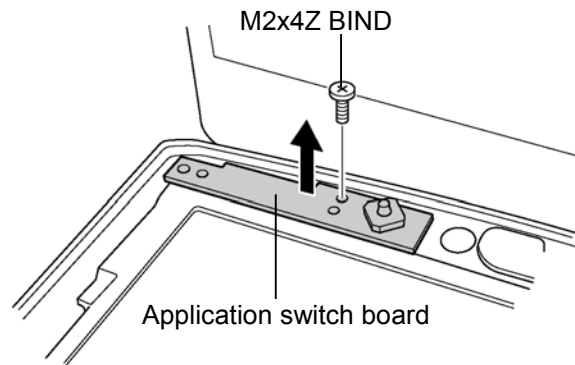


Figure 4-35 Removing the application switch board

2. Disconnect the harness from the connector on the application switchboard.
3. Remove the following screws securing the Power switchboard and remove the Power switchboard.

- M2 x4Z BIND screw x1

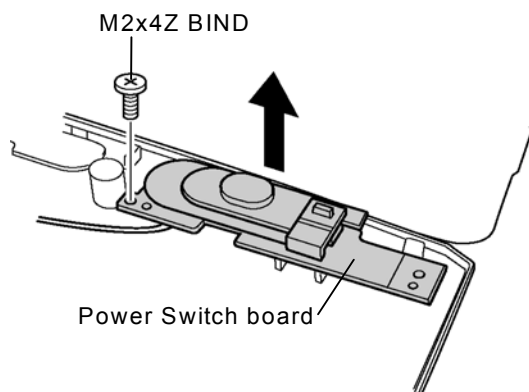


Figure 4-36 Removing the power switch board

### Installing the Application switchboard/Power switchboard

The following describes the procedure for installing the Application switchboard/Power switchboard (See Figure 4-35 to 4-36.)

1. Connect the harness to the connector on the application switchboard. Install the application switchboard along the guide pin on the both side and secure it with the following screws.

- M2×4Z BIND screw x1

2. Connect the harness to the connector on the power switchboard. Install the power switchboard along the guide pin on the both side and secure it with the following screws.

- M2×4Z BIND screw x1

### 4.20.2 LCD latch assembly

#### Removing the LCD latch assembly

The following describes the procedure for removing the LCD latch assembly (See Figure 4-37.)

1. Remove the following screws securing the LCD latch assembly and remove the LCD latch assembly.

- M2.5×4Z FLAT BIND screw x1

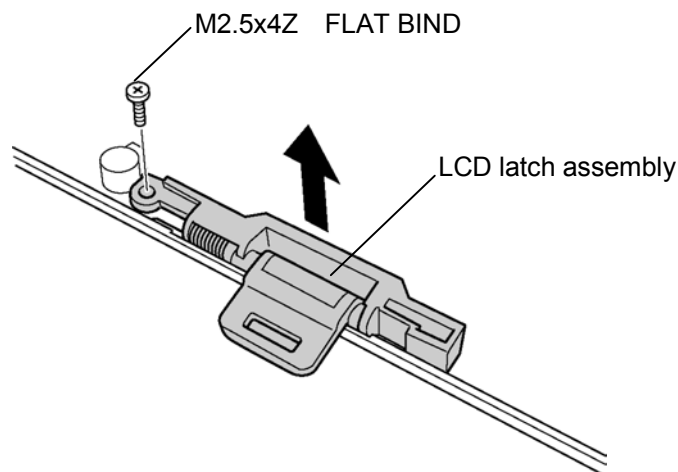


Figure 4-37 Removing the LCD latch assembly

### **Installing the LCD latch assembly**

The following describes the procedure for installing the LCD latch assembly (See Figure 4-37.)

1. Install the LCD latch assembly and secure it with the following screw.

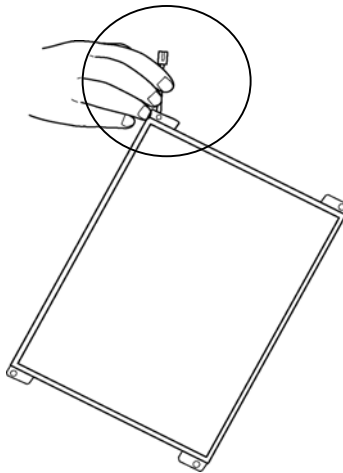
- M2.5×4Z FLAT BIND screw                    x1

## 4.21 Digitizer

**Caution:** Read following instructions before handling the Digitizer.

Do not carry the LCD module by holding the FL cable in one's hand because it may result to cut the FL cable, and cause display function failure or lighting failure.

**NO**

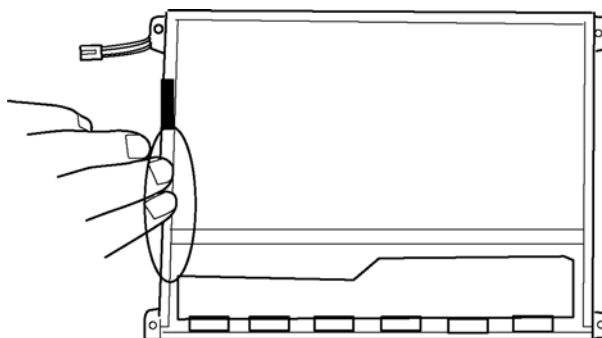


Do not carry the LCD module by holding the FL cable in one's hand.

Be careful to use the bezel guide.

There is a portion where the bezel is sticking out because of the digitizer guide. Do not press and rub the portion with bare hands or it may result cut your finger.

**NO**

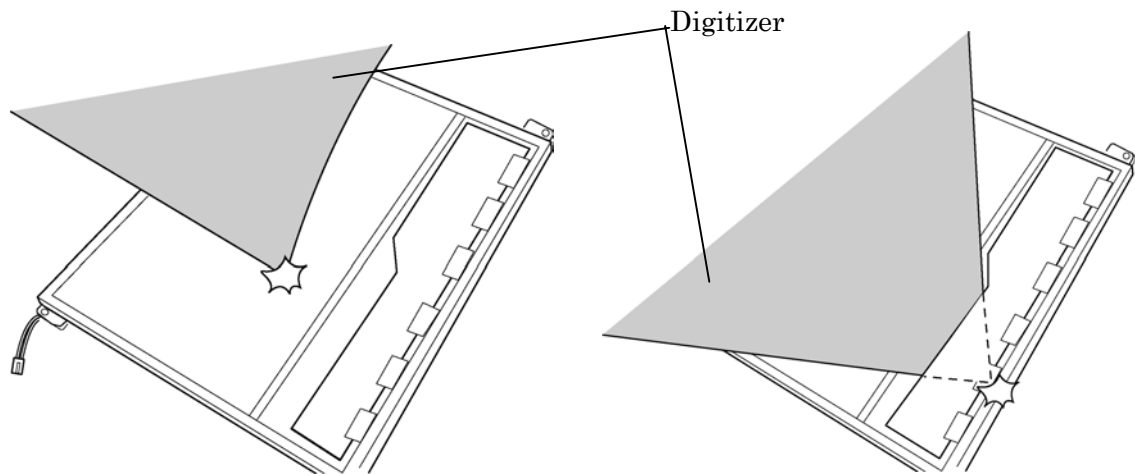


Be careful to use the bezel guide.



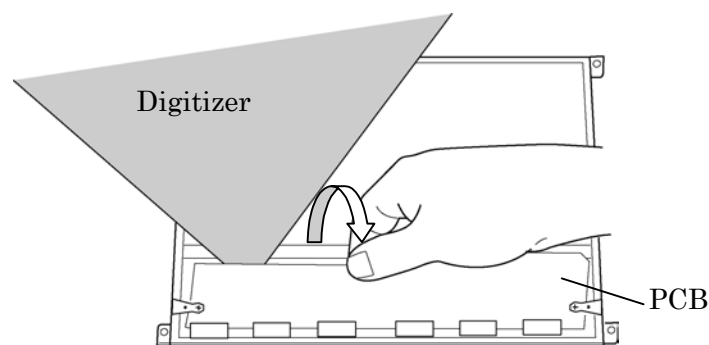
*Do not make any scratches on the B/L and TAB by the edge of the digitizer when installing the digitizer because it may result to break the TAB or make scratches on the B/L and cause display function failure.*

**NO**



*Do not pull up the PCB hardly when installing the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.*

**NO**

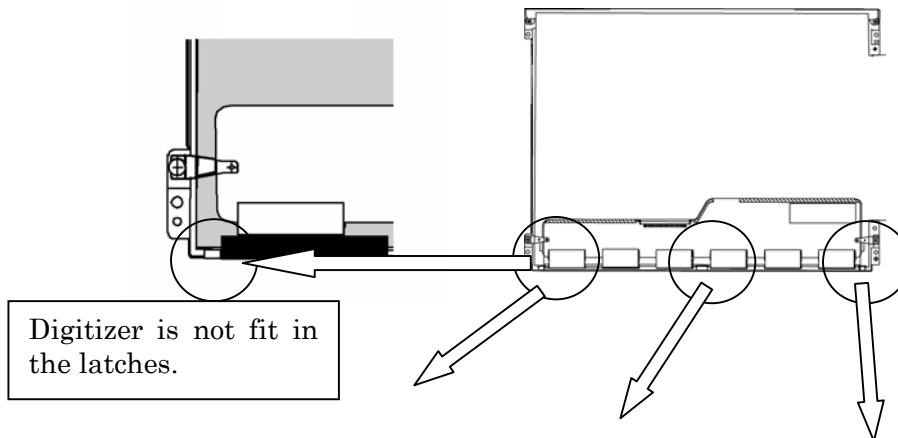


Do not pull up the PCB.

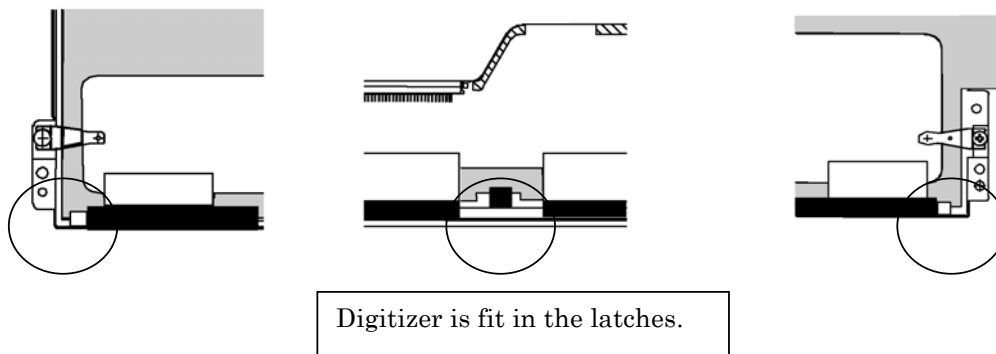
Make sure that three latches fit the digitizer securely.

If the latches are not locked securely, it may result to move the digitizer and give stress on the TAB or PCB and cause the display function failure.

**NO**

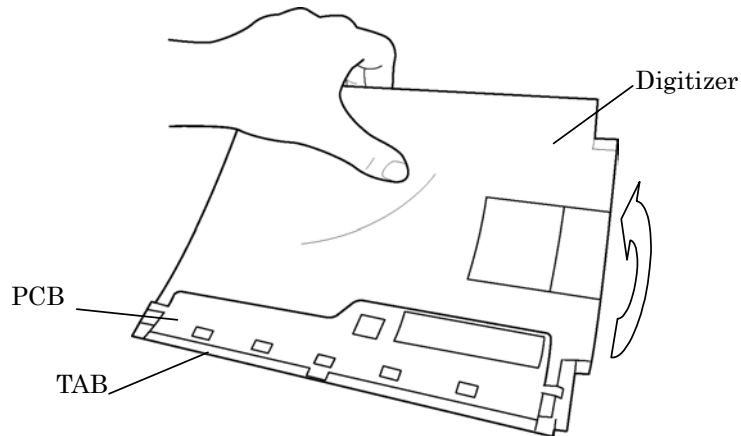


**OK**



*Do not turn up the digitizer because it may result to give stress on the TAB or PCB and cause the display function failure.*

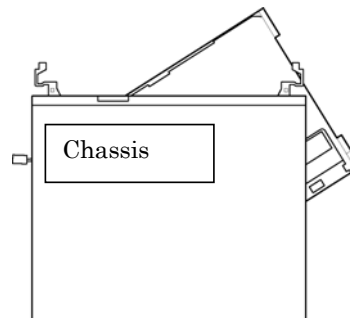
**NO**



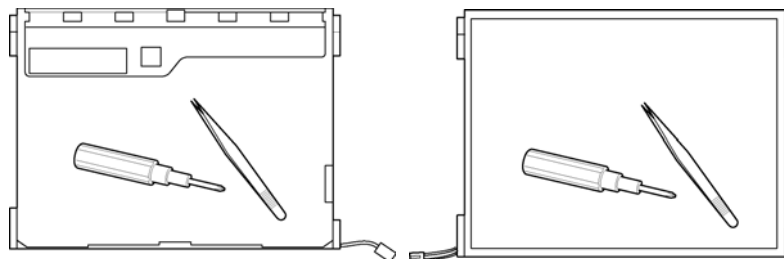
Do not turn up the digitizer to avoid the warp of the PCB.

*Do not put any instrument on the LCD module because it may result to make scratch on the cell, polarization sheet or B/L and break the TAB and may cause the display function failure.*

**NO**



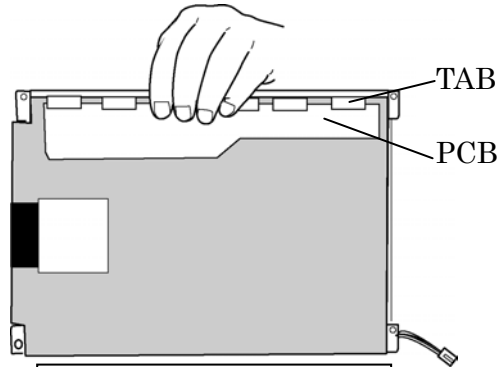
Do not put the chassis on the LCD.



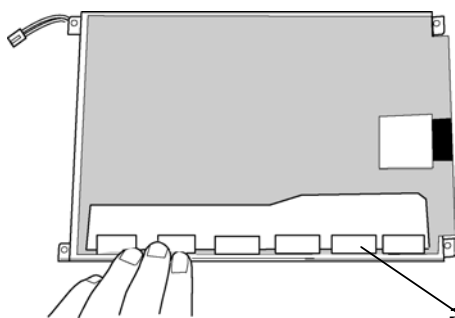
Do not put the instrument on the LCD.

*Do not hold, press and rub the TAB because it may result to break the TAB and cause the display function failure.*

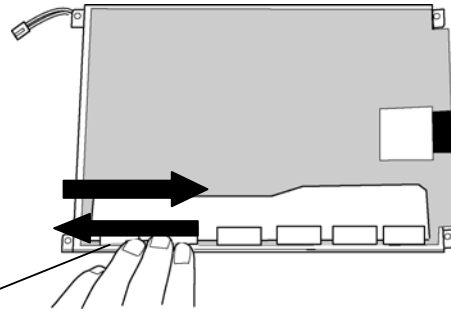
**NO**



Do not hold the TAB.



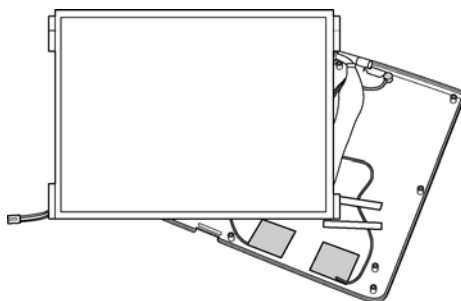
Do not press the TAB.



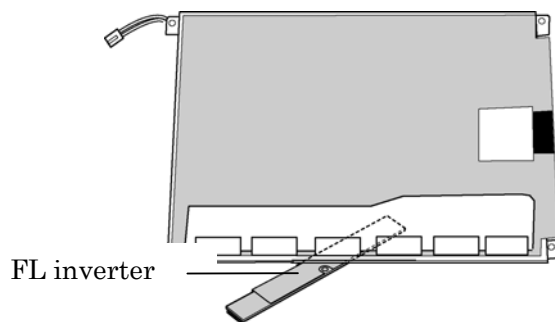
Do not rub the TAB.

*Make sure to put the LCD module on the flat place. If the LCD module is put on the uneven place, it may result to break the TAB, make scratch on the B/L or polarization sheet and cause the display function failure.*

**NO**



Do not put the LCD on the chassis when the LCD is not installed to the computer.



Do not put the LCD on the FL inverter.

### Removing the Digitizer

The following describes the procedure for removing the digitizer. (See Figure 4-38.)

1. Peel off two tapes securing the digitizer.
2. Remove the following screws securing the digitizer.

- M2×4Z BIND screw x2

3. Pull the digitizer toward the arrow direction in the figure below and remove the digitizer.

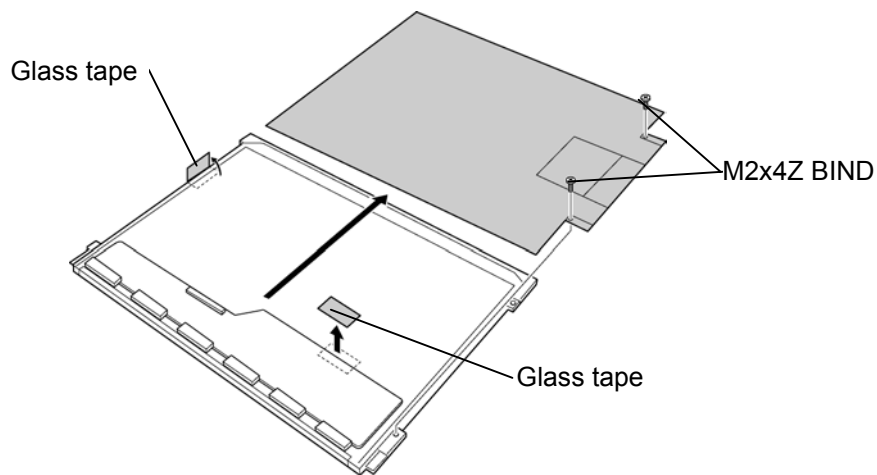


Figure 4-38 Removing the Digitizer

### Installing the digitizer

The following describes the procedure for installing the digitizer. (See Figure 4-38.)

1. Slide the digitizer into the back of the LCD.
2. Secure the digitizer with the following screws.

- M2×4Z BIND screw x2

3. Stick two glass tapes to secure the digitizer.

## 4.22 LCD harness / Hinge assembly

### Removing the LCD harness and hinge assembly

The following describes the procedure for removing the LCD harness and hinge assembly. (See Figure 4-39.)

1. Remove the following screws securing the hinge assembly.
  - M2.5×6B FLAT BIND screw x2 (Described as 6B in the figure)
  - M2.5×6C FLAT BIND screw x2 (Described as 6C in the figure)
2. Remove the hinge rear cover and hinge assembly from the base assembly by turning the hinge counterclockwise by 90 degrees.
3. Remove the following screw securing the LCD harness hold plate.
  - M2×2.8B FLAT BIND screw x1 (Described as 2.8 in the figure)
4. Remove the following screws securing the hinge on the both sides.
  - M2.5×6B FLAT BIND screw x4 (Described as 6B in the figure)

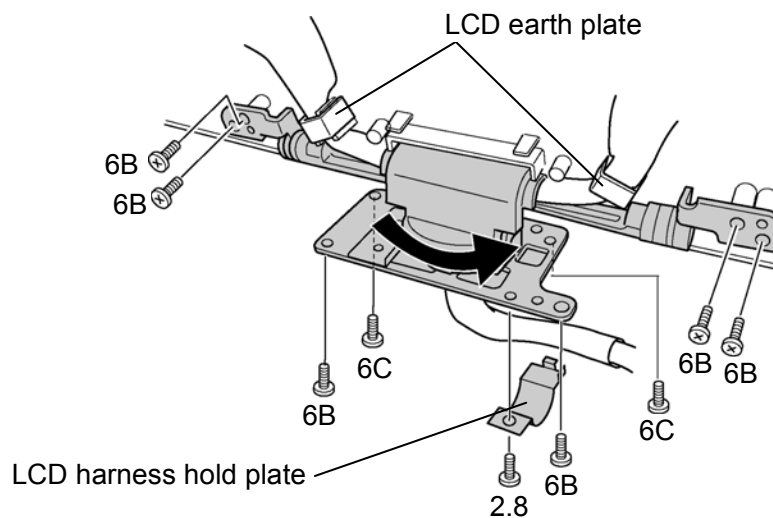


Figure 4-39 Removing the hinge

5. Remove the LCD earth plates securing the both sides of the cables.
6. Peel off the six acetate tapes securing the wireless LAN antenna cables, Bluetooth cable and microphone cable.
7. Remove the microphone cables.
8. Remove the LCD harness.

### Installing the LCD harness and the hinge assembly

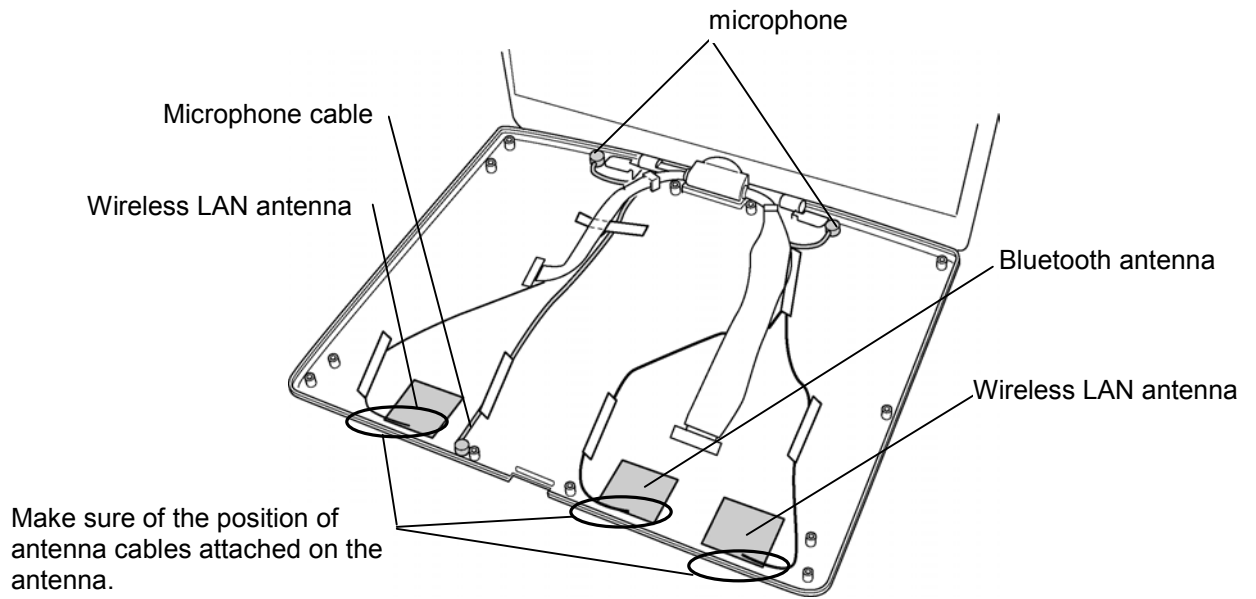
The following describes the procedure for installing the LCD harness and the hinge assembly. (See Figure 4-39 to 4-40.)

1. Pass the LCD harness and microphone cable through the hole of the hinge.
2. Install the hinge assembly and secure it with the following screws.
  - M2.5×6B FLAT BIND screw x4 (Described as 6B in the figure)
3. Arrange the cables along the guide to the both sides and secure them with the LCD earth plate.
4. Install the LCD harness hold plate for holding the LCD harness and secure it with the following screw.
  - M2×2.8B FLAT BIND screw x1 (Described as 2.8 in the figure)
5. Turn the hinge plate counterclockwise by 90 degrees. Install the hinge rear cover and secure it with the following screws.
  - M2.5×6B FLAT BIND screw x2 (Described as 6B in the figure)
  - M2.5×6C FLAT BIND screw x2 (Described as 6C in the figure)
6. Hold the LCD cover facing you and attach the following antennas with double-faced tapes in the order of the main wireless LAN antenna (with white cable), Bluetooth antenna (with brown cable) and sub wireless LAN antenna (with black cable).

**NOTE:** When installing the Wireless LAN antennas and Bluetooth antenna, make sure to install them along the mark line of the computer.  
And also, make sure of the position of each antenna cable installed on the antenna.

7. Install the microphones to the guide pin.
8. Arrange the cables from each antenna and stick six acetate tapes for securing the cables.

**Caution:** Place each cable from the hinge assembly in the order of wireless LAN cable, microphone cable and LCD harness.



*Figure 4-40 Installing the Wireless LAN antenna/Bluetooth antenna*



## 4.23 Hinge Switch Board

### Removing the hinge switch board

The following describes the procedure for removing the hinge switch board. (See Figure 4-41.)

1. Remove the following screw to remove the hinge switch board.
  - M2×3B FLAT BIND screw x2
2. Remove the plate placed under the hinge switch board.

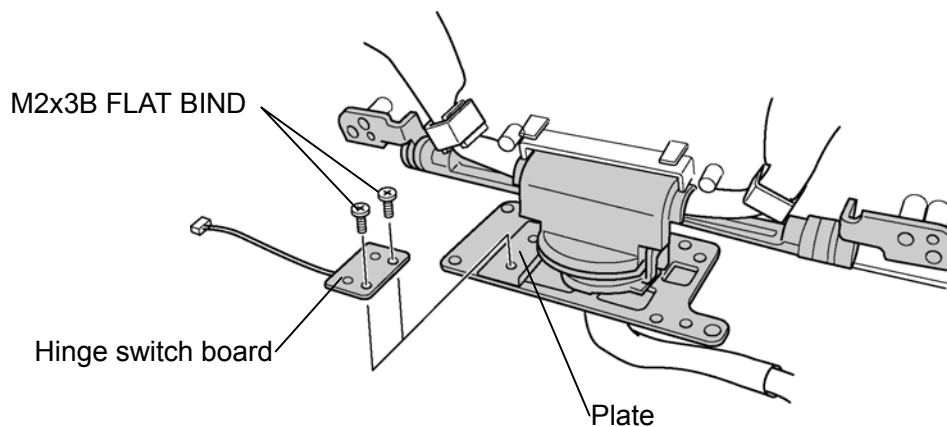


Figure 4-41 Removing the hinge switch board

### Installing the hinge switch board

The following describes the procedure for installing hinge switch board. (See Figure 4-41.)

1. Install the plate fitting to the bosses on the hinge assembly and put the hinge switch board on it.
2. Secure the hinge switch board with the following screws.
  - M2×3B FLAT BIND screw x2)

## 4.24 Fluorescent Lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part.No	Supplier	Section
12.1 inch	G33C00019110	Toshiba	4.24.1

- Note:** - *When working with an LCD module, always use a flat, grounded table.*
- *Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.*
  - *Use an anti-static or protective sheet.*
  - *When replacing the FL unit, cover with a finger protector or similar to prevent dirtying or scratching the LCD panel.*
  - *Take care when handling the lamp. Excessive force may break the lamp.*
  - *Take care not to dirty or deform the lamp reflector.*
  - *Ensure always that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.*

### 4.24.1 Replacing the 12.1 Inch Toshiba Fluorescent Lamp

The following describes the procedure for replacing the fluorescent lamp. (See Figure 4-42 to 4-53.)

#### Disassembling the module

1. Peel off tapes and insulating sheets.

- 1) Place carefully the module face up on a clean and flat worktable. To avoid scratching the face of the LCD module, make sure the table is free of dirt and dust. Place a protection sheet (soft cloth or similar one) over the front of the module.
- 2) Peel off the double-faced tape of the insulation sheet side. (Do not peel off the tape on the bezel side.)

**Caution:** 1) Be careful not to damage the TAB, PCB, B/L and reflection sheet.  
2) Leave the insulation sheet on the bezel to reuse it later.  
3) Be careful not to damage the TAB and PCB when peeling off double-faced tape on the insulation sheet.

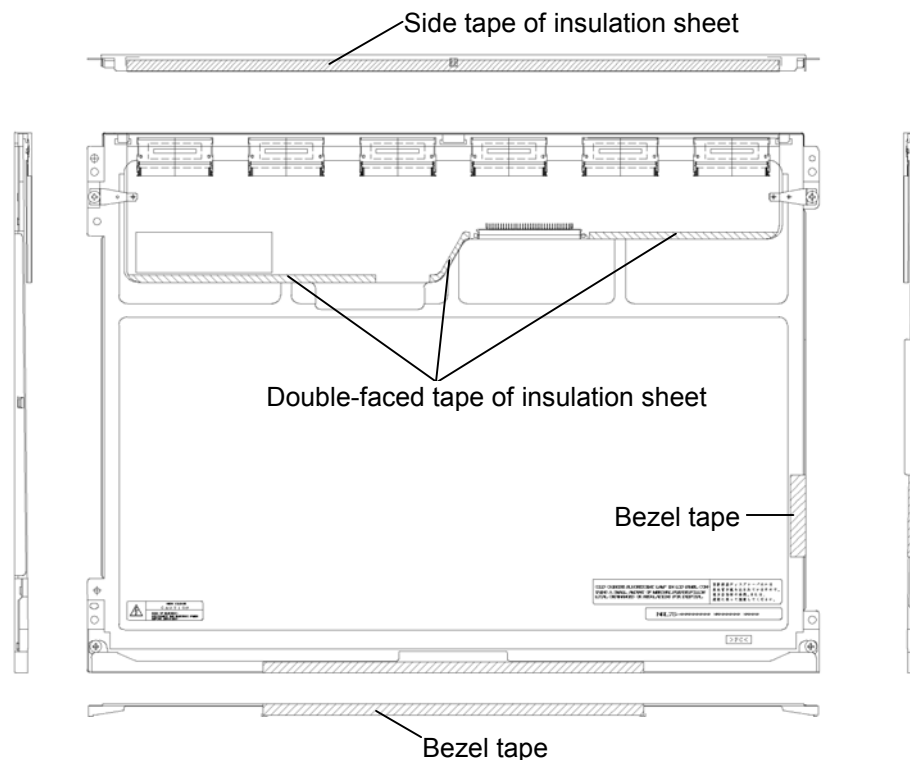


Figure 4-42 Replacing Toshiba fluorescent lamp(1)

## 2. Removing screws

- 1) Peel off the bezel tapes
- 2) Spread out the insulation sheet without detaching from the bezel side, as shown in the drawing below.

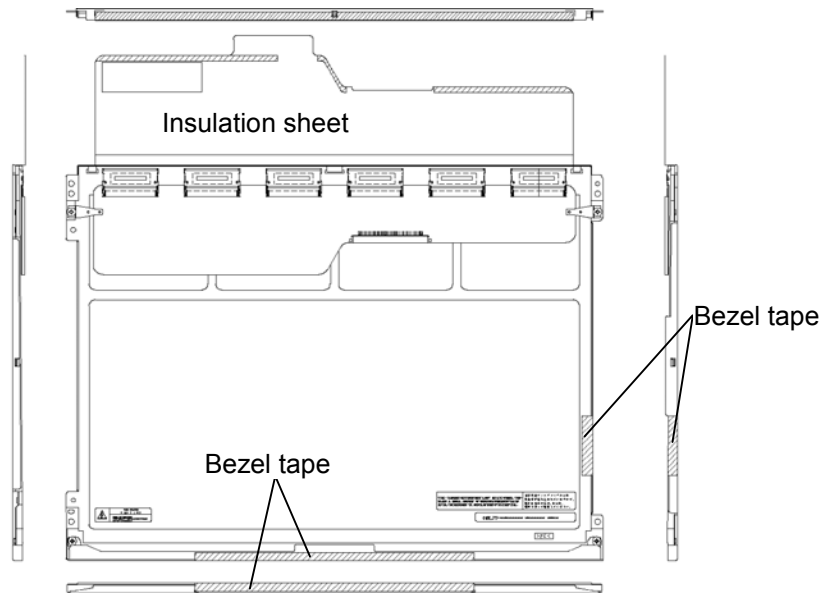


Figure 4-43 Replacing Toshiba fluorescent lamp(2)

- 3) Remove the screws.(4 screws)

**Caution:** Use a Philips screwdriver with type 0 bit to remove the screws.

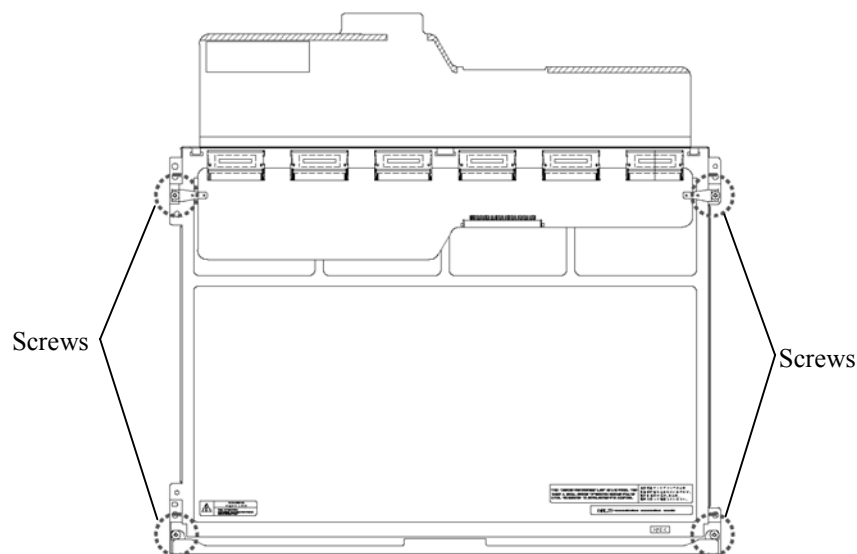


Figure 4-44 Replacing Toshiba fluorescent lamp(3)

## 3. Removing the bezel

- 1) Place the module with the insulation sheet facing upwards.
- 2) Release two latches for the side edge of the bezel and frame. Pulling up the bezel from the bottom side (FL lamp side), release four latches for the top edge of the bezel and remove the bezel from the cell.  
(The bezel with double-faced tape will be reused.)

**Caution:** 1) When peeling off the double-faced tapes, be careful not to damage the TAB.  
2) When removing the bezel, peel off the double-faced tape on the bezel bottom carefully and do not break it and do not deform the bezel. (The bezel with double-faced tape will be reused.)

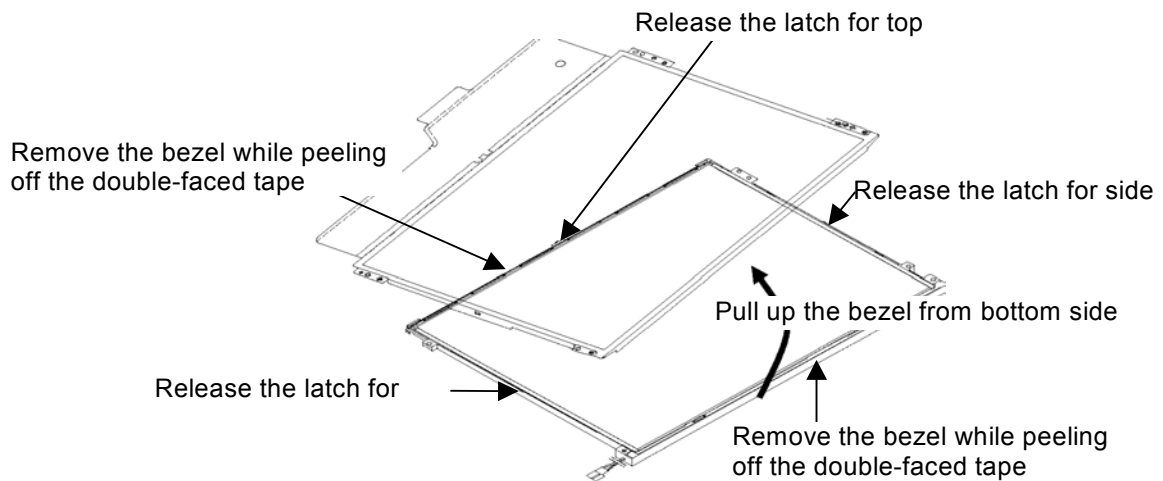


Figure 4-45 Replacing Toshiba fluorescent lamp(4)

## 4. Spread out the PCB

- 1) Spread out the PCB horizontally as shown in the drawing below.

**Caution:** Be careful not to damage the TAB.

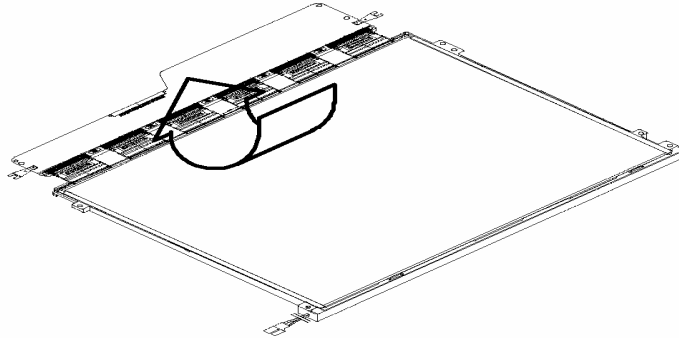


Figure 4-46 Replacing Toshiba fluorescent lamp(5)

#### 5. Removing the cell with the PCB

- 1) Remove the cell with the PCB from the backlight unit as shown in the drawing below.
- 2) Peel off the double-faced tape on the back of the cell cleanly.

**Caution:** 1)The cell in the top side is attached to the frame with double-faced tape so that remove the cell carefully not to break it.  
2)Be careful not to peel off the shading tape on the four sides.  
3)Be careful not to damage the TAB.

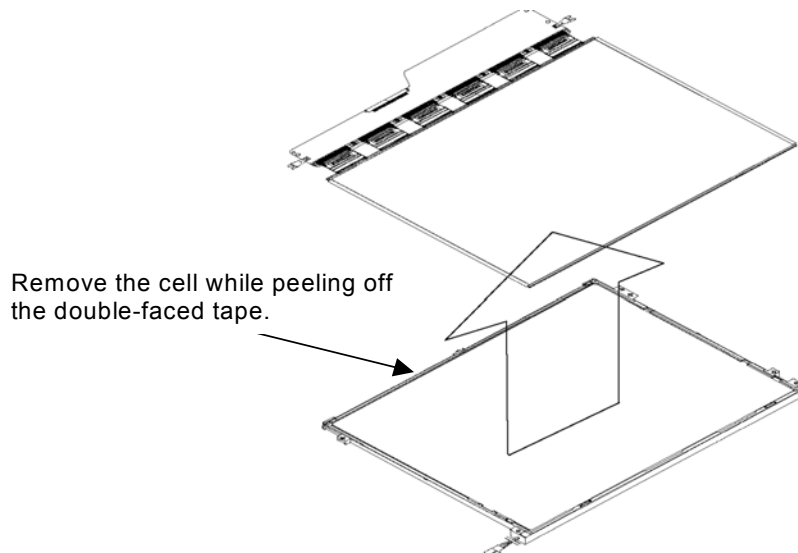


Figure 4-47 Replacing Toshiba fluorescent lamp(6)

### Assembling the module

Assembling procedure is a same as the preceding paragraph “Disassembling the module” but practice in reverse.

#### 1. Checking the backlight

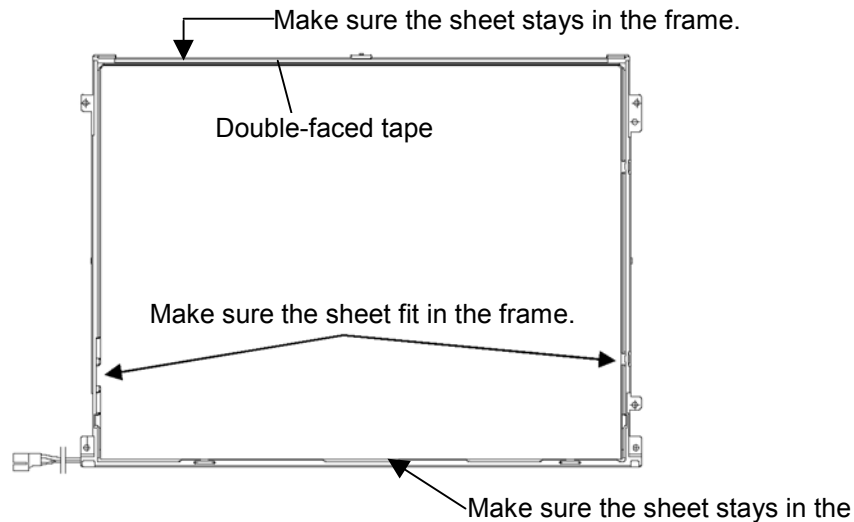


Figure 4-48 Replacing Toshiba fluorescent lamp(7)

#### 2. Assembling the cell with the PCB

- 1) Peel off the separation sheet of the double-faced tape on the top of the frame.
- 2) Illuminate the backlight.
- 3) Make sure there is no scratch or dirt on the backlight. Also check the back of the cell. Next, install the cell with the PCB to the backlight unit.

**Caution:** 1) Install by aligning to the bottom left corner as shown below.

2) Be careful not to damage the TAB.

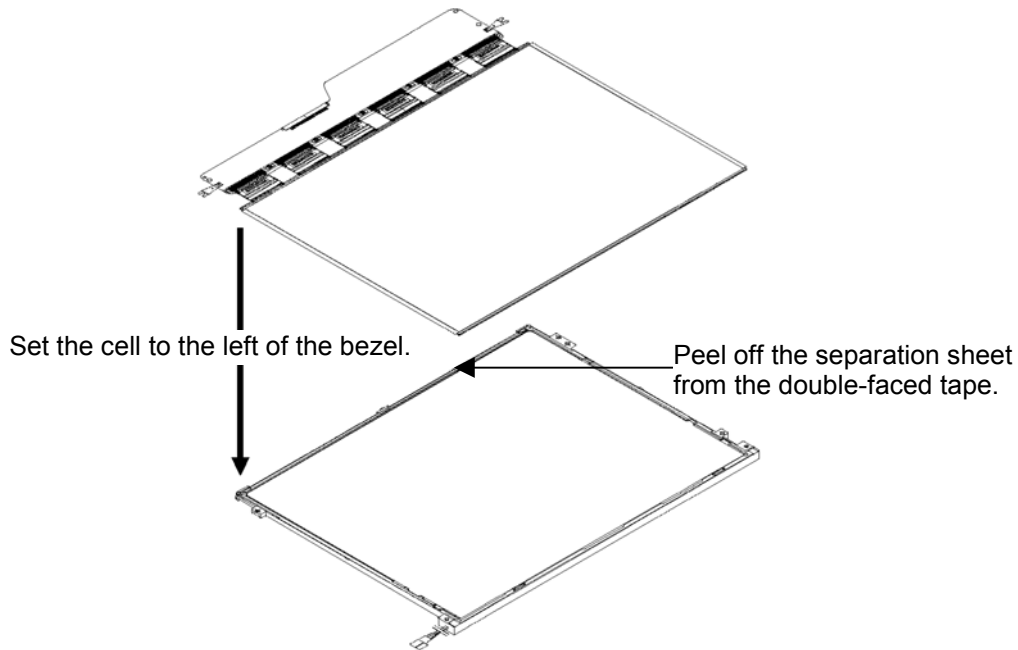


Figure 4-49 Replacing Toshiba fluorescent lamp(8)

### 3. Folding and temporary fixing the TAB / PCB

- 1) Fold the TAB (PCB) around the back of the backlight unit as shown below.

**Caution:** Be careful not to damage the TAB.

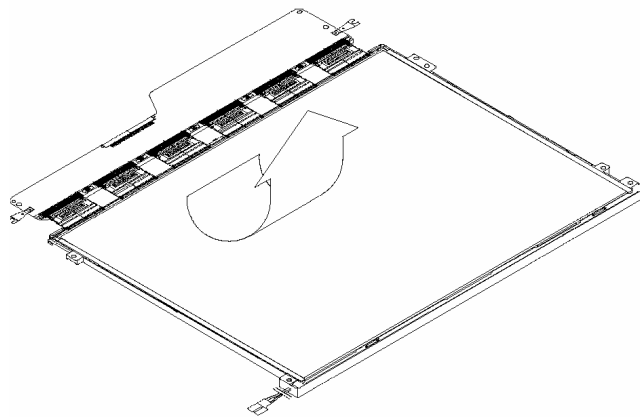


Figure 4-50 Replacing Toshiba fluorescent lamp(9)

### 4. Installing the bezel

- 1) Hook the latch on the top of the bezel (TAB side).
- 2) Hook the two latches on the side of the bezel (one latch for each side).
- 3) Set the bezel on the frame from the bottom side.



**Caution:** Be careful not to damage the cell, TAB and B/L.

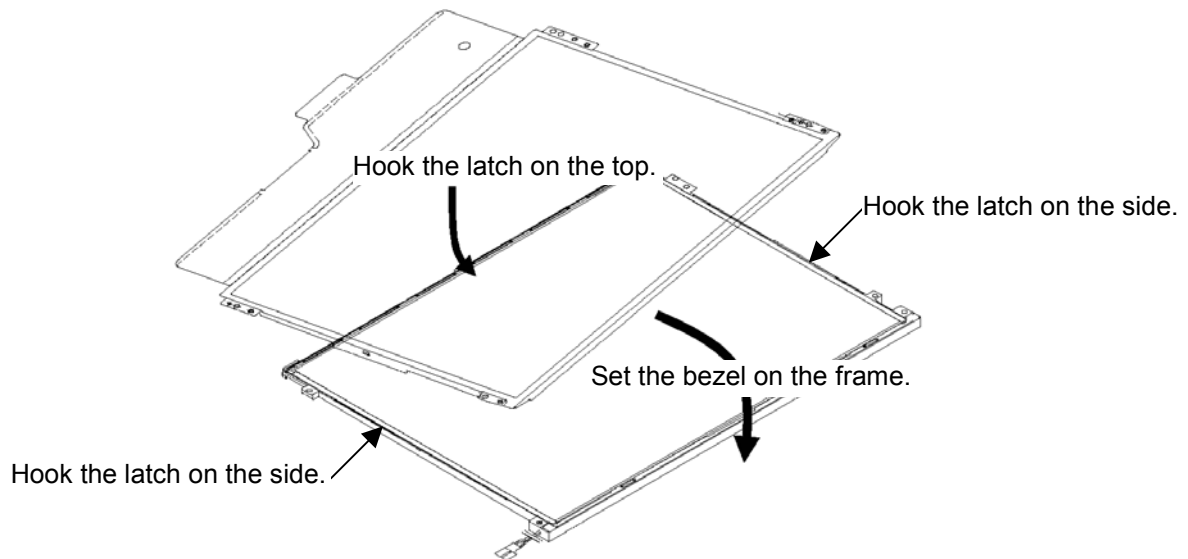


Figure 4-51 Replacing Toshiba fluorescent lamp(10)

#### 5. Screwing the PCB and the bezel

- 1) Use four screws to secure the left and right edge.

**Caution:** 1) The screw tightening torque is 0.147N·m (1.5kgf·cm) for all screws.  
Be careful not to float the screw.

- 2) Use a Philips screwdriver with type 0 bit.

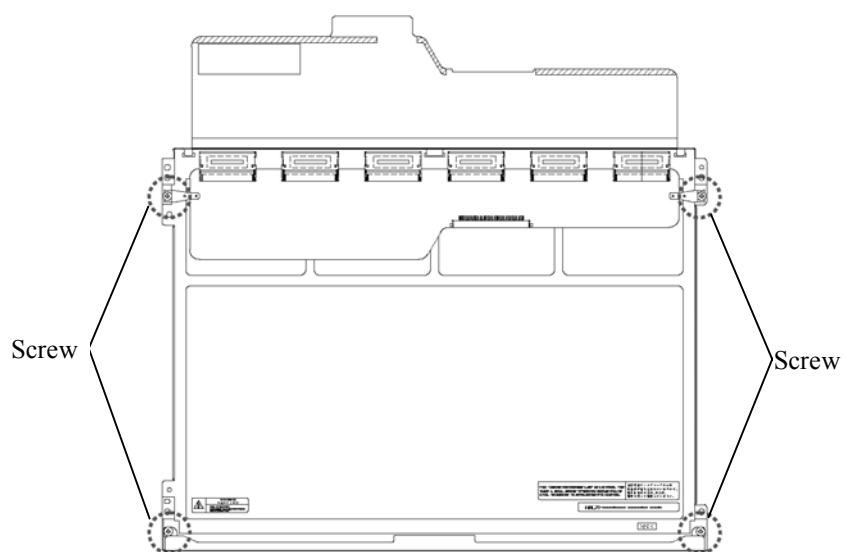


Figure 4-52 Replacing Toshiba fluorescent lamp(11)

## 6. Installing the tapes and insulation sheets

- 1) Stick the double-faced tape of the insulation sheet.
- 2) Stick two bezel tapes. (bottom side first)

**Caution:** 1) Refer to the drawing below.

- 2) When the tapes and insulation sheets are installed, be careful not to damage the PCB, cell and B/L.

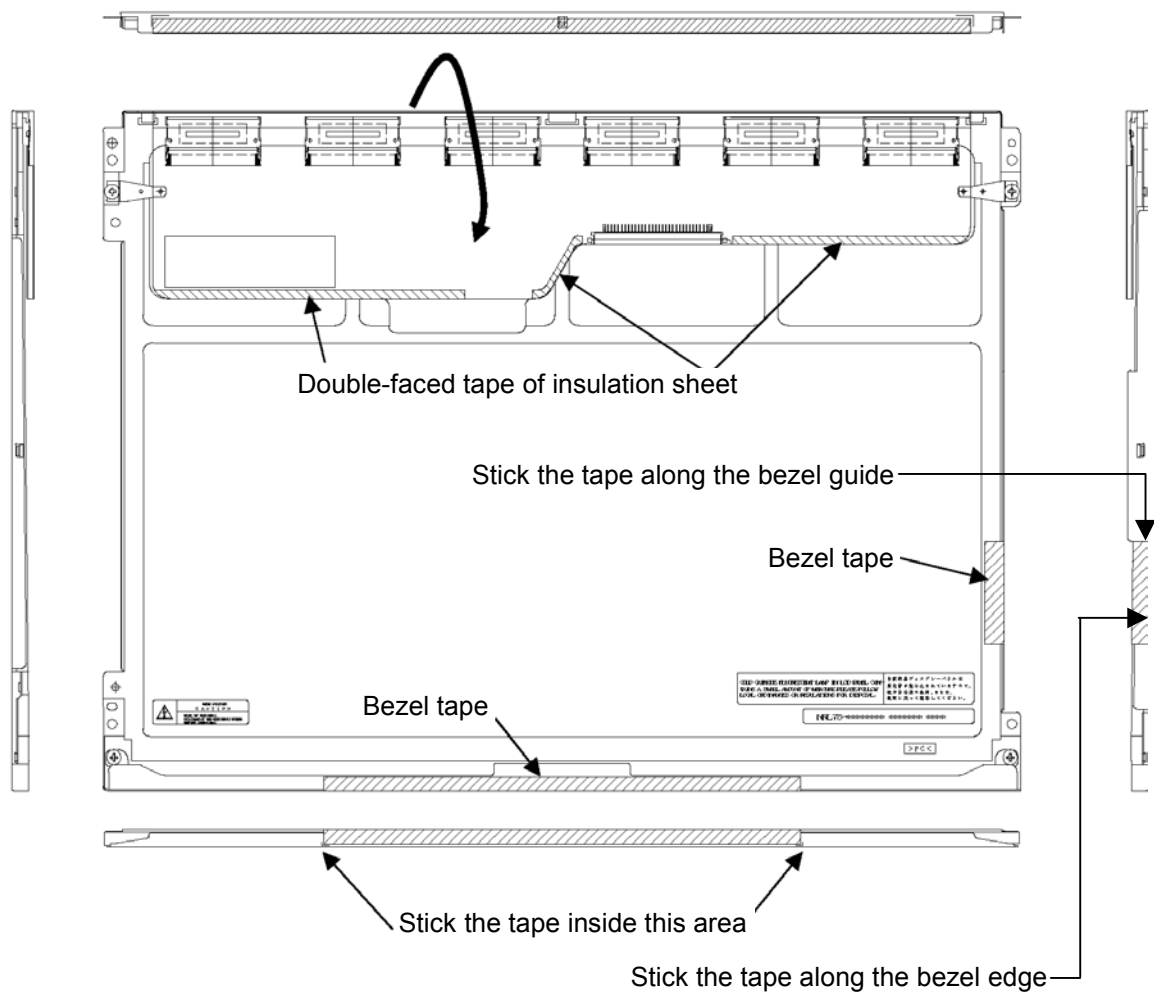


Figure 4-53 Replacing Toshiba fluorescent lamp(12)

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# Appendices

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System Board

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Application Switch Board

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Power Switch Board

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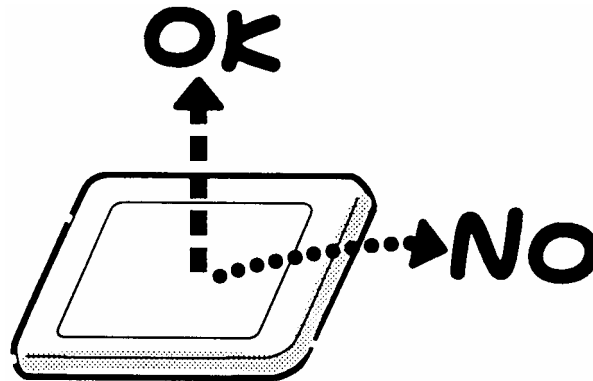
## Appendix A Handling the LCD Module

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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.



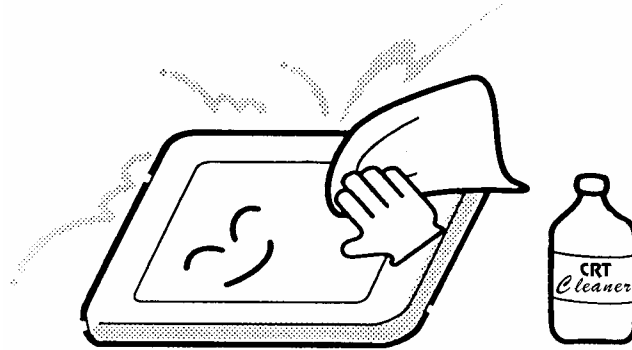
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

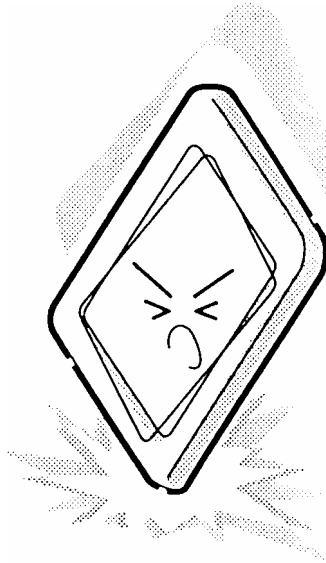
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



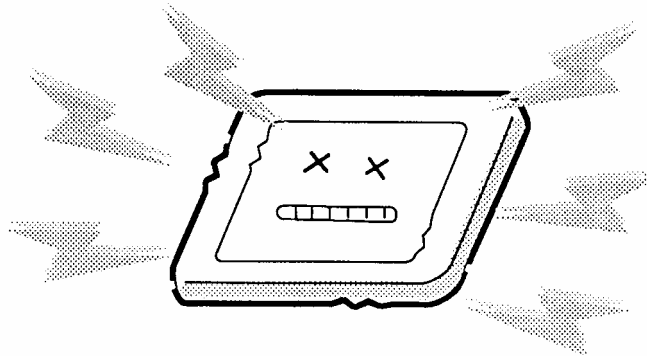
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



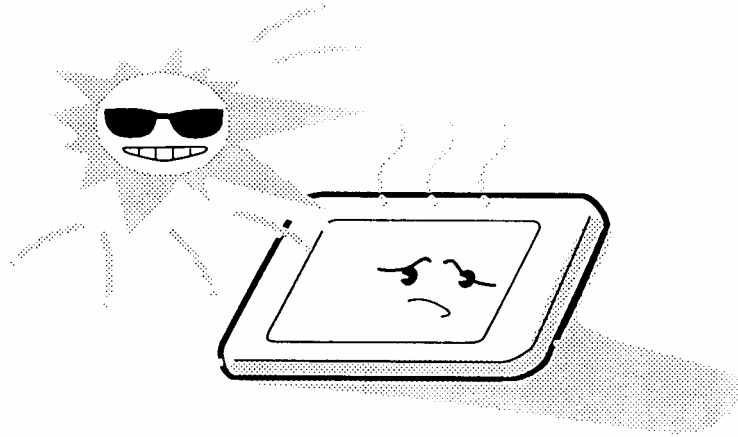
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



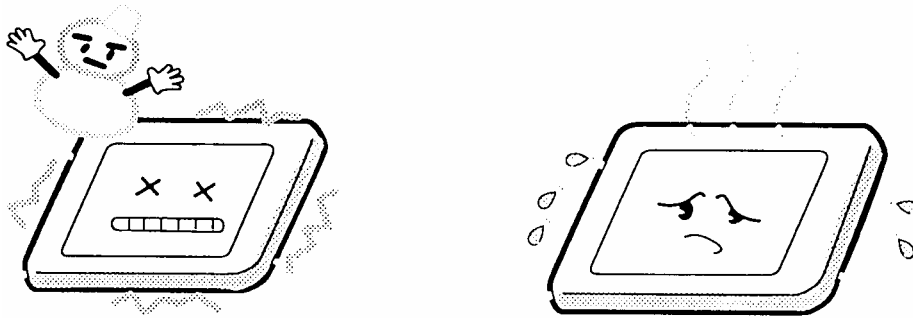
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



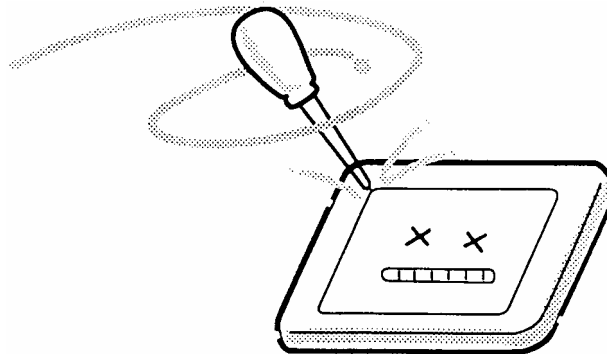
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



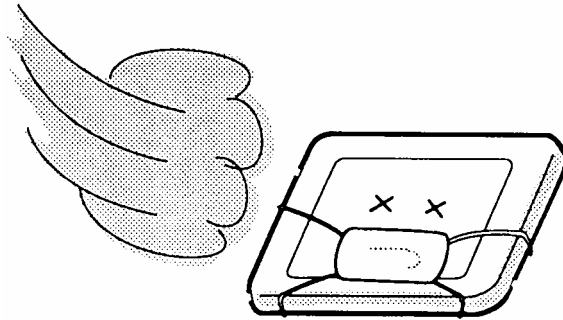
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.







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## Appendix B Board Layout

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### B.1 System Board Front View

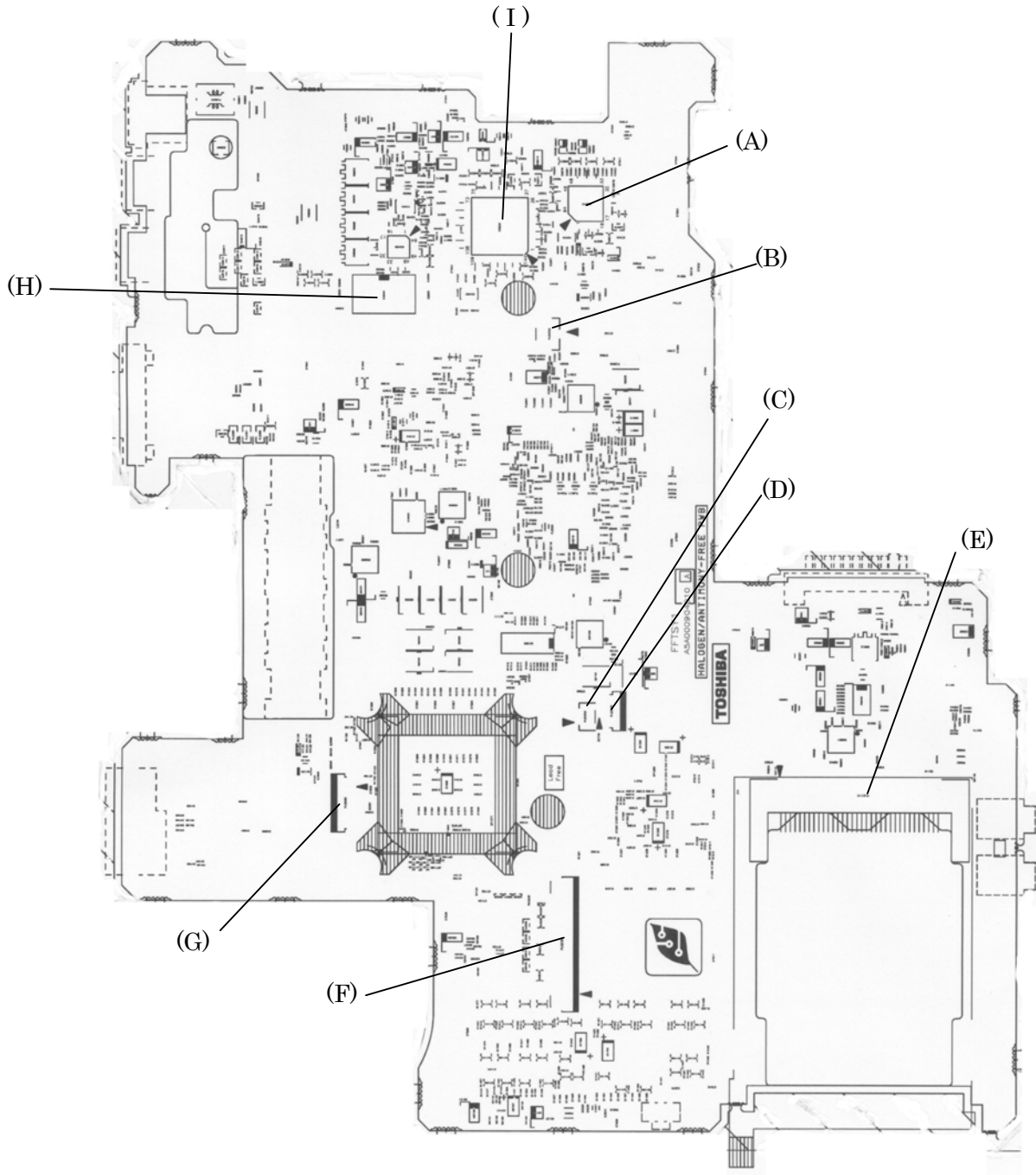


Figure B-1 System board layout (front)

Table B-1 System board (front)

Mark	Number	Part's name
(A)	IC8972	PSC
(B)	PJ6005	Speaker connector
(C)	PJ2000	Debug port connector
(D)	PJ3240	Touch pad connector
(E)	PJ2110	PCMCIA I/F connector
(F)	PJ3230	Keyboard connector
(G)	PJ3260	LED board I/F connector
(H)	IC3000	BIOS
(I)	IC3200	EC/KBC

### B.2 System board Back View

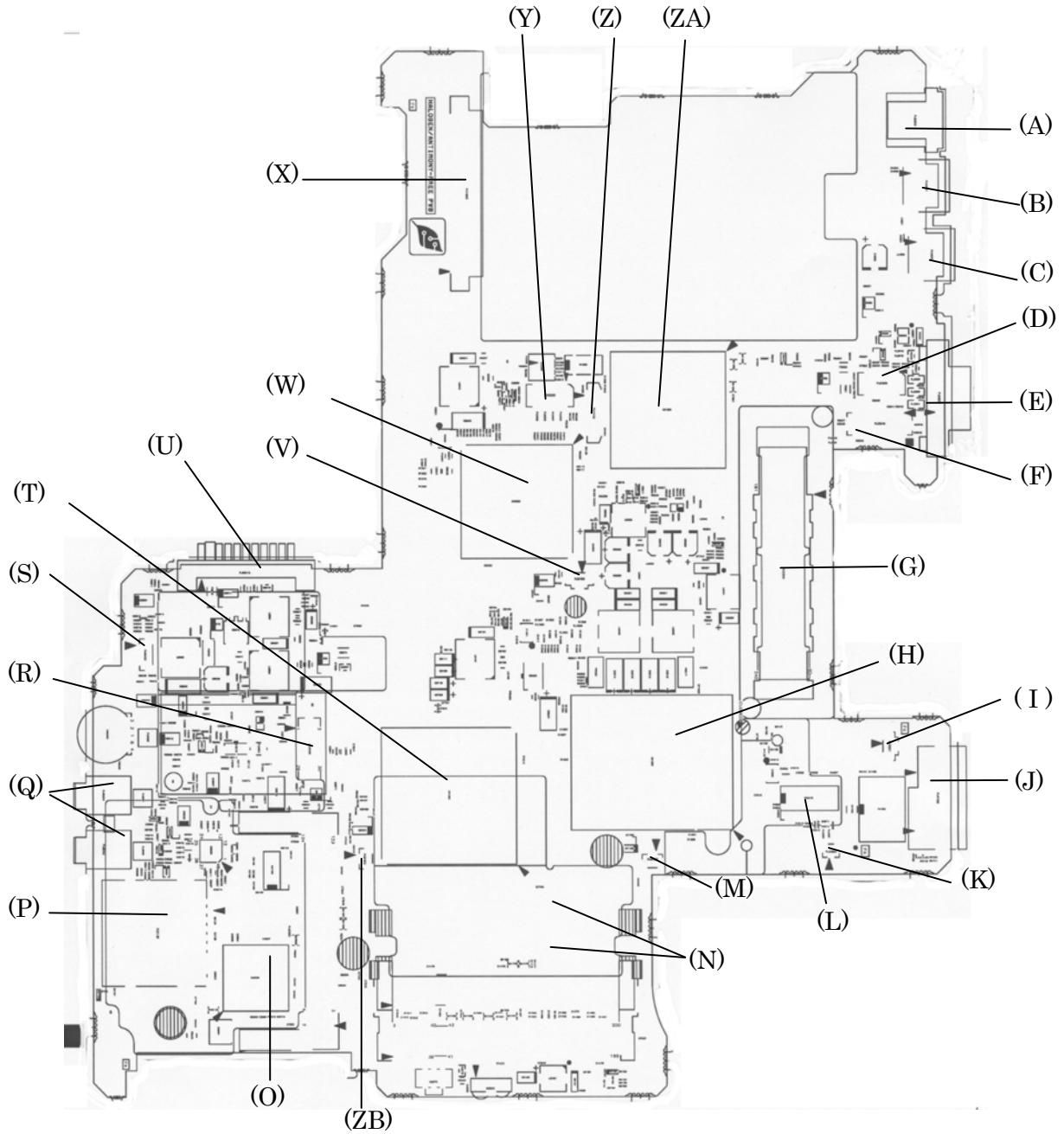
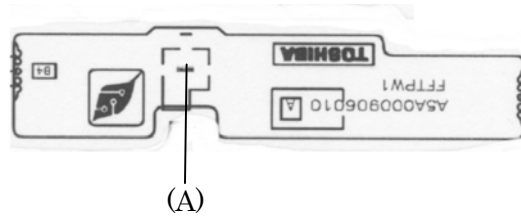


Figure B-2 System board layout (Back)

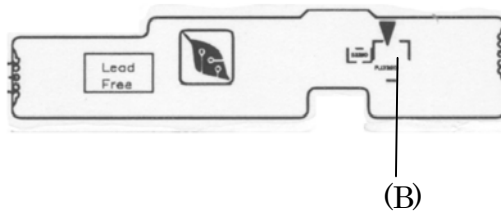
Table B-2 System board (back)

Mark	Number	Name
(A)	PJ8800	DC IN connector
(B)	PJ4601	USB connector 1
(C)	PJ4600	USB connector 0
(D)	PJ5206	LCD (PS)/FLINV
(E)	PJ5620	RGB connector
(F)	PJ3540	SW1/SW2/digitizer connector
(G)	PJ2300	Docking connector
(H)	IS1050	CPU
(I)	PJ3021	RJ11 relay connector
(J)	PJ4100	RJ11/RJ45 connector
(K)	PJ3280	Panel rotation sensor connector
(L)	IC4010	Kinnerth
(M)	PJ8400	FAN (for CPU)
(N)	IS1440, IS1420	Memory connector
(O)	IC2000	YEBISU-SS
(P)	PJ2130	SD card I/F connector
(Q)	PJ6003, PJ6004	Sound jack
(R)	PJ3020	MDC connector
(S)	PJ6000	Internal microphone connector
(T)	IC1200	North Bridge
(U)	PJ8810	Battery connector
(V)	PJ8490	RTC battery connector
(W)	IC5000	VGA
(X)	PJ1800	HDD I/F connector
(Y)	PJ5205	LCD (LVDS)
(Z)	PJ4410	Bluetooth connector
(ZA)	IC1600	South Bridge
(ZB)	PJ8425	Second FAN (for VGA Chip)

**B.3 Power Switch Board Front and Back View**



(Front)



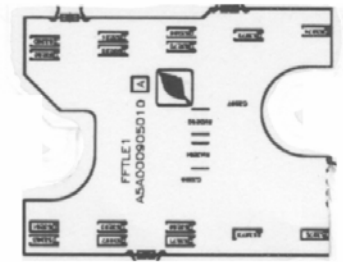
(Back)

*Figure B-3 Power Switch board layout*

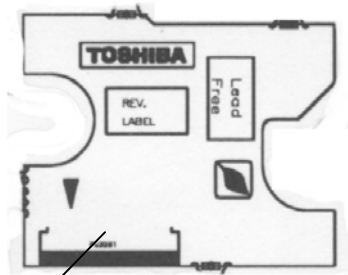
*Table B-3 Power Switch Board*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	S3290	Power switch
(B)	PJ3290	System board I/F connector

### B.4 LED Board Front and Back View



(Front)



(A)

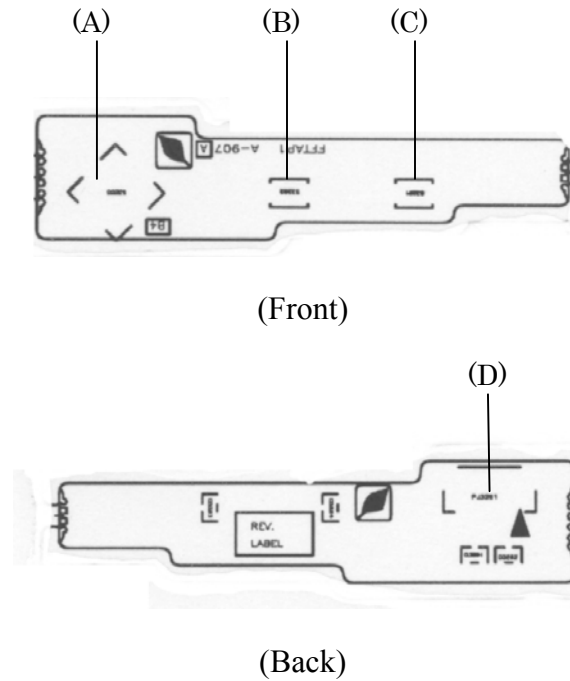
(Back)

Figure B-4 LED Board layout

Table B-4 LED Board

Mark	Number	Name
(A)	PJ3261	System board I/F connector

### B.5 Application Switch Board Front and Back View



*Figure B-5 Application Switch Board layout*

*Table B-5 Application Switch Board*

<b>Mark</b>	<b>Number</b>	<b>Name</b>
(A)	S3293	4-direction button + Push switch (for Cross function button)
(B)	S3292	Rotation + ESC key (for ESC/Rotation button)
(C)	S3291	Ctrl + Alt + Del key (for Windows Security tablet button)
(D)	PJ3291	System board I/F connector





## Appendix C Pin Assignment

### System Board

#### C.1 IS1420 Memory1 connector (200-pin)

Table C-1 Memory1 connector (200-pin)(1/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-B1V	I	2	MR1R25-B1V	I
3	GND	-	4	GND	-
5	SDQ00R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ01R-B2P	I/O
9	2R5-B2V	I	10	2R5-B2V	I
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ05R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ03R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ12R-B2P	I/O
21	2R5-B2V	I	22	2R5-B2V	I
23	SDQ08R-B2P	I/O	24	SDQ09R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ11R-B2P	O
31	SDQ15R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	I	34	2R5-B2V	I
35	SCK0-B2P	I	36	2R5-B2V	I
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ22R-B2P	I/O
43	SDQ16R-B2P	I/O	44	SDQ21R-B2P	I/O
45	2R5-B2V	I	46	2R5-B2V	I
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ17R-B2P	I/O	50	SDQ19R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18R-B2P	I/O	54	SDQ23R-B2P	I/O

Table C-1 Memory1 connector (200-pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
55	SDQ25R-B2P	I/O	56	SDQ29R-B2P	I/O
57	2R5-B2V	I	58	2R5-B2V	I
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	-
61	SDQS3R-B2P	I/O	62	GND	-
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ30R-B2P	I/O
67	SDQ27R-B2P	I/O	68	SDQ31R-B2P	I/O
69	2R5-B2V	I	70	2R5-B2V	I
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	I
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	I	90	GND	-
91	GND	-	92	2R5-B2V	I
93	2R5-B2V	I	94	2R5-B2V	I
95	SCKE1-B2P	I	96	SCKE0-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	I	114	2R5-B2V	I
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 Memory1 connector (200-pin)(3/4)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ33R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ32R-B2P	I/O
131	2R5-B2V	I	132	2R5-B2V	I
133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ34R-B2P	I/O	136	SDQ39R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ35R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ41R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	I
145	SDQ45R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ46R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ42R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	I	156	2R5-B2V	I
157	2R5-B2V	I	158	SCK1-B2N	I
159	GND	-	160	SCK1-B2P	I
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ54R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	I	168	2R5-B2V	I
169	SDQS6R-B2P	-	170	GND	-
171	SDQ51R-B2P	I/O	172	SDQ50R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ52R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	I	180	2R5-B2V	I
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-

Table C-1 Memory1 connector (200-pin)(4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
187	SDQ58R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	I	192	2R5-B2V	I
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	I	198	GND	-
199	N.C	-	200	N.C	-

## C.2 IS1440 Memory2 connector (200-pin)

Table C-2 Memory2 connector (200-pin)(1/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-B1V	I	2	MR1R25-B1V	I
3	GND	-	4	GND	-
5	SDQ00R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ01R-B2P	I/O
9	2R5-B2V	I	10	2R5-B2V	I
11	SDQS0R-B2P	I/O	12	GND	-
13	SDQ05R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ03R-B2P	I/O	18	SDQ07R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ12R-B2P	I/O
21	2R5-B2V	I	22	2R5-B2V	I
23	SDQ08R-B2P	I/O	24	SDQ09R-B2P	I/O
25	SDQS1R-B2P	I/O	26	GND	-
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ11R-B2P	O
31	SDQ15R-B2P	I/O	32	SDQ10R-B2P	I/O
33	2R5-B2V	I	34	2R5-B2V	I
35	SCK3-B2P	I	36	2R5-B2V	I
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ22R-B2P	I/O
43	SDQ16R-B2P	I/O	44	SDQ21R-B2P	I/O
45	2R5-B2V	I	46	2R5-B2V	I
47	SDQS2R-B2P	I/O	48	GND	-
49	SDQ17R-B2P	I/O	50	SDQ19R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ18R-B2P	I/O	54	SDQ23R-B2P	I/O

Table C-2 Memory2 connector (200-pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
55	SDQ25R-B2P	I/O	56	SDQ29R-B2P	I/O
57	2R5-B2V	I	58	2R5-B2V	I
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	-
61	SDQS3R-B2P	I/O	62	GND	-
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ30R-B2P	I/O
67	SDQ27R-B2P	I/O	68	SDQ31R-B2P	I/O
69	2R5-B2V	I	70	2R5-B2V	I
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	I	82	2R5-B2V	I
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	I	90	GND	-
91	GND	-	92	2R5-B2V	I
93	2R5-B2V	I	94	2R5-B2V	I
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	N.C.	-	98	N.C.	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMA05-B2P	I	108	SMA04-B2P	I
109	SMA03-B2P	I	110	SMA02-B2P	I
111	SMA01-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	I	114	2R5-B2V	I
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I
121	SCS2-B2N	I	122	SCS3-B2N	I
123	N.C.	-	124	N.C.	-

*Table C-2 Memory2 connector (200-pin)(3/4)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ33R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ32R-B2P	I/O
131	2R5-B2V	I	132	2R5-B2V	I
133	SDQS4R-B2P	I/O	134	GND	-
135	SDQ34R-B2P	I/O	136	SDQ39R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ35R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ41R-B2P	I/O
143	2R5-B2V	I	144	2R5-B2V	I
145	SDQ45R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	GND	-
149	GND	-	150	GND	-
151	SDQ46R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ42R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	I	156	2R5-B2V	I
157	2R5-B2V	I	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ54R-B2P	I/O
165	SDQ53R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	I	168	2R5-B2V	I
169	SDQS6R-B2P	I/O	170	GND	-
171	SDQ51R-B2P	I/O	172	SDQ50R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ52R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	I	180	2R5-B2V	I
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	GND	-
185	GND	-	186	GND	-

Table C-2 Memory2 connector (200-pin)(4/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
187	SDQ58R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ59R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	I	192	2R5-B2V	I
193	SMBDAT-P3P	I/O	194	P3V	I
195	SMBCLK-P3P	I	196	GND	-
197	P3V	I	198	GND	-
199	N.C	-	200	N.C	-



**C.3 PJ5206 LCD connector (20-pin)**

*(XGA model)*

*Table C-3 LCD connector (20-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	GND	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	GND	-	10	GND	-
11	GND	-	12	PNL2-P3P	I
13	BRT1-P5P	I	14	BRT2DA-S3P	I
15	BRT0-P5P	I	16	FL-P5V	I
17	PNL-P3V	I	18	FL-P5V	I
19	PNL-P3V	I	20	FL-P5V	I

*(SXGA+ model)*

*Table C-4 LCD connector (20-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	TXCK0-P3P	I	4	TXCK1-P3P	I
5	TXCK0-P3N	I	6	TXCK1-P3N	I
7	TXDT0-P3P	I	8	TXDT5-P3N	I
9	TXDT0-P3N	I	10	TXDT5-P3P	I
11	TXDT2-P3N	I	12	TXDT4-P3N	I
13	TXDT2-P3P	I	14	TXDT4-P3P	I
15	TXDT1-P3N	I	16	TXDT6-P3N	I
17	TXDT1-P3P	I	18	TXDT6-P3P	I
19	GND	-	20	GND	-

**C.4 PJ5620 CRT I/F connector (15-pin)***Table C-5 CRT I/F connector (15-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	RED-PXP	I	2	GREEN-PXP	I
3	BLUE-PXP	I	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	I	10	GND	-
11	N.C	-	12	CRTSDA-P5P	I
13	AHSYNC-P3P	I	14	AVSYNC-P3P	I
15	CRTSCL-P5P	I			

**C.5 PJ4600 USB0 connector (4-pin)***Table C-6 USB0 connector (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USBV0-E5V	I	2	USBP0-S3N	I
3	USBP0-S3P	I	4	GND	-

**C.6 PJ4601 USB1 connector (4-pin)***Table C-7 USB1 connector (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USBV0-E5V	I	2	USBP1-S3N	I
3	USBP1-S3P	I	4	GND	-

**C.7 PJ1800 HDD I/F connector (44-pin)***Table C-8 HDD I/F connector (44-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IDRSTA-P5N	I	2	GND	-
3	PDD07-P3P	I	4	PDD08-P3P	O
5	PDD06-P3P	I	6	PDD09-P3P	O
7	PDD05-P3P	I	8	PDD10-P3P	O
9	PDD04-P3P	I	10	PDD11-P3P	O
11	PDD03-P3P	I	12	PDD12-P3P	O
13	PDD02-P3P	I	14	PDD13-P3P	O
15	PDD01-P3P	I	16	PDD14-P3P	O
17	PDD00-P3P	I	18	PDD15-P3P	O
19	GND	-	20	N.C	-
21	PDDREQ-P3P	I	22	GND	-
23	PDIOW-P3N	I	24	GND	-
25	PDIOR-P3N	I	26	GND	-
27	PIORDY-P3P	I	28	GND	-
29	PDDACK-P3N	I	30	GND	-
31	IRQ14-P3P	I	32	N.C	-
33	PDA1-P3P	I	34	N.C	-
35	PDA0-P3P	I	36	PDA2-P3P	O
37	PDCS1-P3N	I	38	PDCS3-P3N	O
39	HDDLED-P5N	I	40	GND	-
41	P5V	-	42	P5V	-
43	GND	-	44	N.C	-

**C.8 PJ2000 Debug Port connector (4-pin)***Table C-9 Debug Port connector (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	B3V	-	2	DBGTX-B3P	O
3	DBGTX-B3P	I	4	GND	-

**C.9 PJ2110 PC Card I/F connector (68-pin)***Table C-10 PC Card I/F connector (68-pin)(1/2)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	ACAD00-BYP	I/O
3	ACAD01-BYP	I/O	4	ACAD03-BYP	I/O
5	ACAD05-BYP	I/O	6	ACAD07-BYP	I/O
7	ACCBEO-BYN	I/O	8	ACAD09-BYP	I/O
9	ACAD11-BYP	I/O	10	ACAD12-BYP	I/O
11	ACAD14-BYP	I/O	12	ACCBE1-BYN	I/O
13	ACPAR-BYP	I/O	14	ACPERR-BYN	I/O
15	ACGNT-BYP	I/O	16	ACINT-BYN	I/O
17	MCVCCA	I/O	18	MCVPPA	I/O
19	ACCLK-BYP	I/O	20	ACIRDY-BYN	I/O
21	ACCBE2-BYN	I/O	22	ACAD18-BYP	I/O
23	ACAD20-BYP	I/O	24	ACAD21-BYP	I/O
25	ACAD22-BYP	I/O	26	ACAD23-BYP	I/O
27	ACAD24-BYP	I/O	28	ACAD25-BYP	I/O
29	ACAD26-BYP	I/O	30	ACAD27-BYP	I/O
31	ACAD29-BYP	I/O	32	ACD02-BYP	I/O
33	ACCLKR-BYN	I/O	34	GND	-
35	GND	-	36	ACCD1-B3N	I/O
37	ACAD02-BYP	I/O	38	ACAD04-BYP	I/O
39	ACAD06-BYP	I/O	40	ACD14-BYP	I/O

Table C-10 PC Card I/F connector (68-pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
41	ACAD08-BYP	I/O	42	ACAD10-BYP	I/O
43	ACVS1-B3P	I/O	44	ACAD13-BYP	I/O
45	ACAD15-BYP	I/O	46	ACAD16-BYP	I/O
47	ACA18-BYP	I/O	48	ACLOCK-BYN	I/O
49	ACSTOP-BYN	I/O	50	ACDEVS-BYN	I/O
51	MCVCCA-BYV	I	52	MCVPPA-BYV	I/O
53	ACTRDY-BYN	I/O	54	ACFRAM-BYN	I/O
55	ACAD17-BYP	I/O	56	ACAD19-BYP	I/O
57	ACVS2-B3P	I/O	58	ACRST-BYN	I/O
59	ACSERR-BYN	I/O	60	ACREQ-BYN	I/O
61	ACCBE3-BYN	I/O	62	ACAUDI-BYP	O
63	ACSTSC-BYP	O	64	ACAD28-BYP	I/O
65	ACAD30-BYP	I/O	66	ACAD31-BYP	I/O
67	ACCD2-B3N	O	68	GND	-

**C.10 PJ3230 Keyboard connector (34-pin)***Table C-11 Keyboard connector (34-pin)*

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	KBSC15-S3N	O	8	KBSC14-S3N	O
9	KBRT07-S3N	O	10	KBRT06-S3N	O
11	KBSC13-S3N	O	12	KBSC12-S3N	O
13	KBRT05-S3N	O	14	KBRT04-S3N	O
15	KBSC11-S3N	O	16	KBSC10-S3N	O
17	KBRT03-S3N	O	18	KBRT02-S3N	O
19	KBRT01-S3N	O	20	KBSC09-S3N	O
21	KBSC08-S3N	O	22	KBSC07-S3N	O
23	KBRT00-S3N	O	24	KBSC06-S3N	O
25	KBSC05-S3N	O	26	KBSC04-S3N	O
27	KBSC03-S3N	O	28	KBSC02-S3N	O
29	KBSC01-S3N	O	30	KBSC00-S3N	O
31	P5V	I/O	32	CAPLED-P5N	I
33	ARWLED-P5N	I	34	NUMLED-P5N	I

**C.11 PJ3240 PAD connector (8-pin)***Table C-12 PAD connector (8-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P5V	I/O	2	P5V	I/O
3	IPDDAT-P5P	I/O	4	IPDCLK-P5P	I/O
5	N.C.	-	6	GND	-
7	GND	-	8	GND	-

**C.12 PJ3280 Panel Sensor connector (2-pin)***Table C-13 Panel Sensor connector (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PNLTRN-S3N	O	2	GND	-

**C.13 PJ4100 Network I/F connector (14-pin)***Table C-14 Network I/F connector (14-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	TDP-E3P	I	A2	TDN-E3N	I
A3	RDP-E3P	I	A4	CND	-
A5	GND	-	A6	RDN-E3N	I
A7	GND	-	A8	N.C.	-
A9	ACT-E3N	I	A10	LAN-E3V	I
A11	LNK-E3N	I	A12	LAN-E3V	I
B1	MDMTIP-B3P	I/O	B2	MDMRNG-B3P	I/O

**C.14 PJ2200 Mini PCI I/F connector (124-pin)***Table C- 15 Mini PCI I/F connector (124-pin)(1/2)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C.	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	WLON-S3N	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIRQA-P3N	I	18	P5V	I
19	P3V	I	20	PIRQC-P3N	O
21	N.C.	-	22	N.C.	-
23	GND	-	24	B3V	I
25	X33MPC-P3P	I	26	PCIRS1-P3N	O
27	GND	-	28	P3V	I
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	I	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	O
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	I
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD21-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I	60	AD16-P3P	I/O



Table C-15 Mini PCI I/F connector (124-pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
61	IRDY-P3N	I	62	GND	-
63	P3V	I	64		
65	CLKRUN-P3N	I	66	TDRY-P3N	O
67	SERR-P3N	I	68	STOP-P3N	O
69	GND	-	70	P3V	I
71	PERR-P3N	I	72	DEVSEL-P3N	O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	I
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	I	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	-	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	GND	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	B3V	I

**C.15 PJ4410 Bluetooth connector (20-pin)***Table C-16 Bluetooth connector (20-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	N.C.	-
3	BTMDL-P3N	O	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	BTRST-S3N	I
9	N.C.	-	10	N.C.	-
11	GND	-	12	N.C.	-
13	BTIFOF-S3N	I	14	N.C.	-
15	N.C.	-	16	USBP4-S3P	I/O
17	USBP4-S3N	I/O	18	N.C.	-
19	N.C.	-	20	BT-P3V	I

**C.16 PJ8800 DC-IN connector (2-pin)***Table C-17 DC-IN connector (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PVL	O	2	PVL	O

**C.17 PJ8810 1st Battery connector (10-pin)***Table C-18 1st Battery connector (10-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PVBH1	I	2	BTMP1	I
3	PVBL1	I	4	M5V	I
5	PSCL-S5P	I	6	PSDA-S5P	I
7	GND	-	8	DBT10V-S5N	I
9	GND	-	10	GND	-

**C.18 PJ8490 RTC battery connector (2-pin)**

*Table C-19 RTC Battery connector (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	ZS-PWCHKF	-	2	R3V	I

**C.19 PJ8400 FAN connector (3-pin)**

*Table C-20 FAN connector (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P5V	I	2	GND	-
3	FANG0-P3P	I			

**C.20 PJ6005 Speaker connector (2-pin)**

*Table C-21 Speaker connector (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(VO+)	I	2	(VO-)	I

**C.21 PJ6003 External Microphone connector (6-pin)**

*Table C-22 External Microphone connector (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	4	A-GND	I
2	EMICL-PXP	O	5	EMICSL-P5P	I
3	25VREF-P2V	-	6	25VREF-P2V	I

**C.22 PJ6000 Internal Microphone connector (6-pin)***Table C-23 Internal Microphone connector (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	Int MicA	O	4	A-GND	-
2	A-GND	-	5	Int MicC	O
3	Int MicB	O	6	A-GND	-

**C.23 PJ6004 Headphone connector (6-pin)***Table C-24 Headphone connector (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	4	A-GND	-
2	HEADL-PXP	I	5	HPIN-P3N	I
3	HEADR-PXP	I	6	N.C.	-

**C.24 PJ2130 SD card I/F connector (12-pin)***Table C-25 SD card I/F connector (12-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SDAT3-B3P	I/O	2	SDCMD-B3P	I/O
3	GND	-	4	SD-B3V	I
5	SDCLK-B3P	I	6	GND	-
7	SDAT0-B3P	I/O	8	SDAT1-B3P	I/O
9	SDAT2-B3P	I/O	10	SDCD-B3N	O
11	SDWP-B3P	O	12	GND	-

**C.25 PJ3020 MDC I/F connector (30-pin)***Table C-26 MDC I/F connector (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C.	-	2	GND	-
3	GND	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	GND	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	N.C.	-	14	N.C.	-
15	GND	-	16	MDC-B3V	I
17	MDC-B3V	I	18	N.C.	-
19	GND	-	20	GND	-
21	N.C.	-	22	M97SY2-P3P	I
23	M97OT2-P3P	I	24	N.C.	-
25	M97RS2-P3N	I	26	M97IN2-B3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BC2-P3P	I/O

**C.26 PJ2300 Docking I/F connector (240-pin)***Table C-27 Docking I/F connector (240-pin)(1/4)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	DSKDC	I	A2	GND	-
1	DCOUT	I	2	DCOUNT	I
3	DOCDT1-S3N	O	4	P5V	I
5	N.C.	-	6	N.C.	-
7	GND	-	8	N.C.	-
9	DPCONF-S5P	O	10	GND	-
11	GND	-	12	NVDSCL-P5P	I/O
13	DRED-PXP	I	14	DGREEN-PXP	I
15	DBLUE-PXP	I	16	DVSYNC-P5P	I
17	(DVISC-P3P)	I/O	18	Reserved	-
19	GND	-	20	(DVI-PRTCT2)	-
21	(DVI-PRTCT1)	-	22	(DVITX2-P3P)	I
23	(DVITX2-P3N)	I	24	(DVITX1-P3P)	I
25	(DVITX1-P3N)	I	26	(DVITX0-P3P)	I
27	(DVITX0-P3N)	I	28	GND	-
29	GND	-	30	(DVITXC-P3P)	I
31	(DVITXC-P3N)	I	32	(DVIDET-S3N)	-
33	(DVIPD1-P3N)	I	34	Reserved	-
35	(QSWON-B3P)	I	36	(DIRQD-S3N)	-
37	GND	-	38	(PCM2SP-B3P)	-
39	(DPMRST-S3N)	I	40	(DADOO-P3P)	-
41	GND	-	42	(DADO2-P3P)	-
43	(DADO4-P3P)	-	44	(DADO6-P3P)	-
45	GND	-	46	(XDPCI-P3P)	I
47	(DAD09-P3P)	-	48	(DAD11-P3P)	-
49	GND	-	50	(DAD13-P3P)	-
51	(DAD15-P3P)	-	52	(DINTA-P3N)	-
53	N.C.	-	54	VOID	-
55	(BIDOP-EXP)	-	56	BIDON-EXN	I/O
57	VOID	-	58	VOID	-

Table C-27 Docking I/F connector (240-pin)(2/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
59	MDMRNG-B3P	I/O	60	MDMTIP-B3P	I/O
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	I
65	N.C.	-	66	N.C.	-
67	GND	-	68	N.C.	-
69	N.C.	-	70	(NVPCNF-S3P)	O
71	GND	-	72	NVSDA-P5P	I/O
73	GND	-	74	GND	-
75	GND	-	76	(DHSYNC-P5P)	
77	(DVISD-P3P)	-	78	(DVI_PRTCT3)	-
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	(DOC_ON_LED1)	-
91	Reserved	-	92	(DOC_ON_LED2)	-
93	(DVIPD0-P3N)	I	94	(DVI_PRTCT4)	-
95	(DCADIO-S3P)	O	96	(DSMI-B3P)	-
97	GND	-	98	(DCKRUN-P3N)	-
99	(PME-S3P)		100	(DADO1-P3P)	-
101	GND	-	102	(DADO3-P3P)	-
103	(DADO5-P3P)	-	104	(DADO7-P3P)	-
105	GND	-	106	(DADO8-P3P)	-
107	(DAD10-P3P)	-	108	(DAD12-P3P)	-
109	GND	-	110	(DAD14-P3P)	-
111	(DCBE1-P3N)	-	112	(DPAR-P3P)	-
113	VOID		114	VOID	-
115	BIDCN-EXN	I/O	116	VOID	-
117	BIDCP-EXP	I/O	118	VOID	-
119	VOID	-	120	VOID	-

Table C-27 Docking I/F connector (240-pin)(3/4)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
121	DCOUT	I	122	DCOUT	I
123	DSSCL-S5P	I/O	124	IF-P5V	I
125	S5V	I	126	(DTPA-P3P)	-
127	GND	-	128	(DTPB-P3P)	-
129	USBON1-E5N	I	130	USBOC1-E3N	O
131	GND	-	132	USBON2-E5N	I
133	USBOC2-E3N	O	134	SNDMUT-S3N	I
135	DMBCHG-S3P	O	136	DOUTL-PXP	I/O
137	DINL-PXP	I/O	138	DINR-PXN	I/O
139	GND	-	140	PWRSW-S3N	O
141	(DCD-PYP)	O	142	(DSR-PYP)	O
143	(TXD-PYN)	I	144	(RING-BYP)	O
145	PE-P5P	O	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	I
155	(DPGNT-P3N)	I	156	(DAD30-P3P)	-
157	GND	-	158	(DAD28-P3P)	-
159	(DAD26-P3P)	-	160	(DAD24-P3P)	-
161	GND	-	162	(DIDSL-P3P)	-
163	(DAD22-P3P)	-	164	(DAD20-P3P)	-
165	GND	-	166	(DCBE0-P3N)	-
167	(DAD18-P3P)	-	168	(DAD16-P3P)	-
169	GND	-	170	(DCBE2-P3N)	-
171	(DTRDY-P3N)	-	172	DSTOP-P3N)	-
173	GND	-	174	VOID	-
175	LAN-E3V	I	176	VOID	-
177	VOID	-	178	N.C.	-
179	BIDAP-EXP	O	180	BIDAN-EXN	O



*Table C-27 Docking I/F connector (240-pin)(4/4)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
181	DCOUT	I	182	DCOUT	I
183	DSSDA-S5P	I/O	184	IF-P5V	I
185	Reserved	-	186	N.C.	-
187	GND	-	188	N.C.	-
189	USBP2-S3P	I/O	190	USBP2-S3N	I/O
191	GND	-	192	USBP3-S3P	I/O
193	USBP3-S3N	I/O	194	DOU-TR-PXP	I/O
195	DOU-TR-PXN	-	196	DOU-TL-PXN	I/O
197	DINL-PXN	-	198	DINR-PXP	I/O
199	GND	-	200	RXD-PYN	-
201	(RTS-PYP)	I	202	CTS-PYP	-
203	(DTR-PYP)	I	204	SELECT-P5P	O
205	BUSY-P5P	O	206	ACK-P5N	O
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	I	212	PINIT-P5N	I
213	ERROR-P5N	O	214	AUTFD-P5N	I
215	(DPREQ-P3N)	-	216	(DAD31-P3P)	-
217	GND	-	218	(DAD29-P3P)	-
219	(DAD27-P3P)	-	220	(DAD25-P3P)	-
221	GND	-	222	(DCBE23-P3N)	-
223	(DAD23-P3P)	-	224	(DAD21-P3P)	-
225	GND	-	226	(DCPCLR-P3P)	-
227	(DAD19-P3P)	-	228	(DAD17-P3P)	-
229	GND	-	230	(DFRAME-P3N)	-
231	(DIRDY-P3N)	-	232	(DDEVSL-P3N)	-
233	GND	-	234	ACT-E3N	O
235	LNK-E3N	O	236	DOCDT2-S3N	O
237	VOID	-	238	VOID	-
239	BIDBP-EXP	I	240	BIDBN-EXN	I

**C.27 PJ3540 DIGITIZER SW I/F connector (30-pin)***Table C-28 DIGITIZER SW I/F connector (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	DGPWS1-P3P	O
3	DGPWS2-P3P	O	4	DGPWS3-P3P	O
5	DGPWS4-P3P	O	6	N.C.	I/O
7	DGDTR-P3N	I	8	DGRTS-P3N	I
9	DGRXD-P3P	O	10	DGTXD-P3P	I
11	GND	-	12	PCIRS2-S3N	I
13	P3V	I	14	GND	-
15	PWRSW-S3N	I	16	GND	-
17	GND	-	18	KBRT00-S3N	O
19	KBRT01-S3N	O	20	KBRT02-S3N	O
21	KBRT03-S3N	O	22	KBRT04-S3N	O
23	KBRT05-S3N	O	24	KBRT06-S3N	O
25	GND	-	26	KBSC16-S3N	I
27	N.C.	-	28	N.C.	
29	N.C.	-	30	N.C.	-

## LED Board

## C.28 PJ3261 System Board I/F connector (18-pin)

Table C-29 System Board I/F connector (18-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BTLED-S3N	O	2	HDDLED-P3N	O
3	GND	-	4	GND	-
5	BAT1GR-S5N	O	6	BAT1OR-S5N	O
7	PWLEGR-S3N	O	8	PWLE0R-S3N	O
9	DCINGR-S5N	O	10	DCINOR-S5N	O
11	N.C.	-	12	P5V	I
13	N.C.	O	14	N.C.	-
15	N.C.	O	16	N.C.	-
17	N.C.	-	18	M5V	I

## Application Switch Board

### C.29 PJ3291 System Board I/F connector (8-pin)

Table C-30 System Board I/F connector (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	KBSC16-S3N	O	2	KBRT00-S3N	O
3	KBRT01-S3N	O	4	KBRT02-S3N	O
5	KBRT03-S3N	O	6	KBRT04-S3N	O
7	KBRT05-S3N	O	8	KBRT06-S3N	O

## **Power Switch Board**

### **C.30 PJ3290 System Board I/F connector (2-pin)**

*Table C-31 System Board I/F connector (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND (switch)	I	2	GND	-



## Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (	0A	8A	46	F0	46	*2
11	0 )	0B	8B	45	F0	45	*2
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*2
24	I	17	97	43	F0	43	*2
25	O	18	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[ {	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		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. \* Combination with the **Fn** key makes different codes.
4. \* **Fn** key does not generate a code by itself.
5. \* This key corresponds to key No. 42 in a 102-key model.
6. \* Refer to Table D-6, No. 124 key scan code.
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	
08	7	(7)	47		C7		6C	F0	6C	
09	8	(8)	48		C8		75	F0	75	
10	9	(9)	49		C9		7D	F0	7D	
11	0	(*)	37		B7		7C	F0	7C	
23	U	(4)	4B		CB		6B	F0	6B	
24	I	(5)	4C		CC		73	F0	73	
25	O	(6)	4D		CD		74	F0	74	
26	P	(-)	4A		CA		7B	F0	7B	
37	J	(1)	4F		CF		69	F0	69	
38	K	(2)	50		D0		72	F0	72	
39	L	(3)	51		D1		7A	F0	7A	
40	;	(+)	4E		CE		79	F0	79	
52	M	(0)	52		D2		70	F0	70	
54	.	(.)	53		D3		71	F0	71	
55	/	(/)	E0 35		E0 B5		40 4A	E0 F0	4A	

*Table D-6 No.124 key scan code*

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0 7C	E0 F0 12
	Ctrl+	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift+	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt+		54	D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

\*: This key generates only make codes.

## Appendix E Key Layout



Figure E-1 Key layout (UK)



Figure E-2 Key layout (US)





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## **Appendix F BIOS/KBC/EC Update**

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When updating the BIOS and EC/KBC set floppy diskette including updated program into the floppy drive and turn on the computer while holding down following key.

- In case of updating the BIOS                      ~ (Tilde key)
- In case of updating the KBC/EC                      **Tab**

The power is automatically turned off as soon as the beep sound is heard and completion message is displayed when updating has been finished. Make sure with T&D whether updating has been done.

***CAUTION:*** *The power must not be turned off during the rewrite. If the write operation fails, the machine may not start up.*



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## **Appendix G Reliability**

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The following table shows MTBF (Mean Time Between Failures) for each component.

*Table G-1 MTBF*

<b>Component</b>	<b>Time (hours)</b>
System	5,401.5 or more



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## Appendix H Key FD

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This Appendix explains how to make a key FD.

1. Start the setup program.
2. Set the cursor to `Not Registered` of `PASSWORD` and press **Space** or **BackSpace** key. The screen to input the password appears.

If the password has been set, `Registered` is displayed `PASSWORD` item. Then cancel the password first and set a new one.

3. Enter a password.  
The number of words shall be within ten. The character "\*" is displayed as you enter a word.
4. Press **Enter** key.  
The first password is recognized and the second one is required.
5. Enter the second password.  
Enter the same password as the first one. . The character "\*" is displayed as you enter a word.
6. Press **Enter** key.  
The password is registered. When the second password differs from the first one, the input of the password is required again. Then enter the password same as the first one.
7. When the password is set, press **Fn** + **→** keys. Then the following message appears.

```
Are you sure ? (Y/N)
The changes you made will cause the system to reboot.
Insert password service disk if necessary.
```

8. Insert a FD into the USB FDD and press **Y** key. Then the following message appears.

```
Password Service Disk Type ? (1:2HD,2:2DD)
```

When the set FD is 2HD, press **1** key. For 2DD, press **2** key.

The data is written to the FD. (If no FD is set, this procedure is finished.)

When the wiring to the FD is completed, the following message appears.

```
Remove the password service disk, then press any key.
```

Remove the FD and finish the procedure by pressing any key.

