

**Toshiba Personal Computer
Portege 2000
Maintenance Manual**

TOSHIBA CORPORATION

File Number 960-333

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Toshiba Portege 2000 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Portege 2000, referred to as Portege 2000 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 2000 system unit and each FRU.
- Chapter 2 Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3 Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4 Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices The appendices describe the following:
 - Handling the LCD module
 - Board layout
 - Pin assignment
 - Keyboard scan/character codes
 - Key layout
 - Wiring diagrams
 - BIOS/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 3410CT/3440CT 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 Portage 2000 is a ultra thin and lightweight PC realizing cable-less environment on a table by wireless function with a Pentium III processor realizing high performance.

Microprocessor

Pentium III-ULV

A 750/350MHz Pentium III-ULV processor with a 750/350MHz internal clock, 100MHz bus and 1.10/0.95V core operation.

Cache memory

A Pentium III has 32KB primary cache and 512KB secondary cache (in CPU)

Memory

One memory slot. Memory module can be installed to provide a maximum of 512MB. Memory modules in 256MB size is available.

VRAM

16MB VRAM in ALi/Trident NAPA2T.

HDD

Single 20GB internal drive. 1.8-inch, 8.0mm height

USB FDD

Three-mode 3.5 inch USB FDD supporting 720KB, 1.2MB and 1.44MB formats is prepared as option.

Display

LCD

Built-in 12.1 inch, 262,144 colors, XGA (1024×768 dots), thin type low temperature poly- silicon TFT color display. Video controller is included in North Bridge chip.

CRT

Supported via an RGB connector

Keyboard

Keyboards has 84(US)/85(UK)-key and supports Windows key.

 Touch pad

Touch pad is installed as a pointing device.

 Battery

The RTC battery is mounted inside computer.

The main battery is a detachable lithium polymer main battery (10.8V-1,600mAh) and the RTC battery is a lithium ion battery(3V-17mAH).

 USB (Universal Serial Bus)

Four USB ports supporting USB 2. Two of these are occupied and others are usable.

 PC card slot

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

 SD card slot

One SD card slot.

 Sound system

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

 One touch button

Internet button and Mail button are installed.

 Built-in Modem

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.

 LAN

The internal LAN supports 10BASE-T and 100BASE-TX.

Wireless LAN

The internal wireless LAN supports Mini PCI Type III(802.11B) made by Agere.

FIR(Fast Serial InfraRed) communication port

Fast Serial InfraRed(FIR) communication port supports IrDA1.1. 1.15Mbps or 4Mbps wireless communication is realized by this FIR.

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

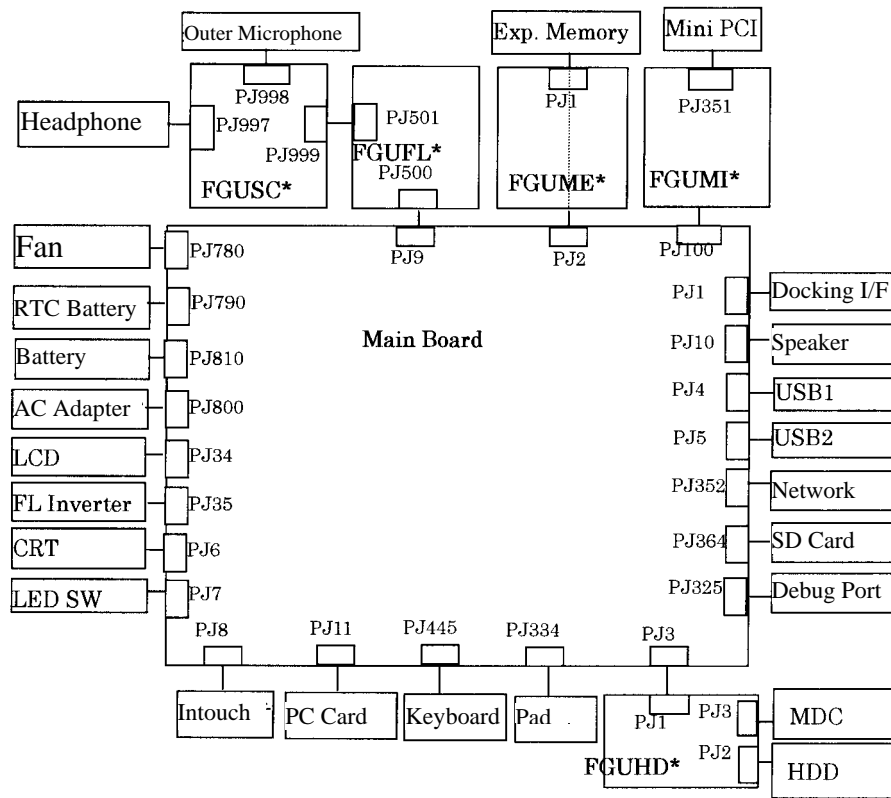


Figure 1-2 System units configuration

Figure 1-3 shows the system block diagram.

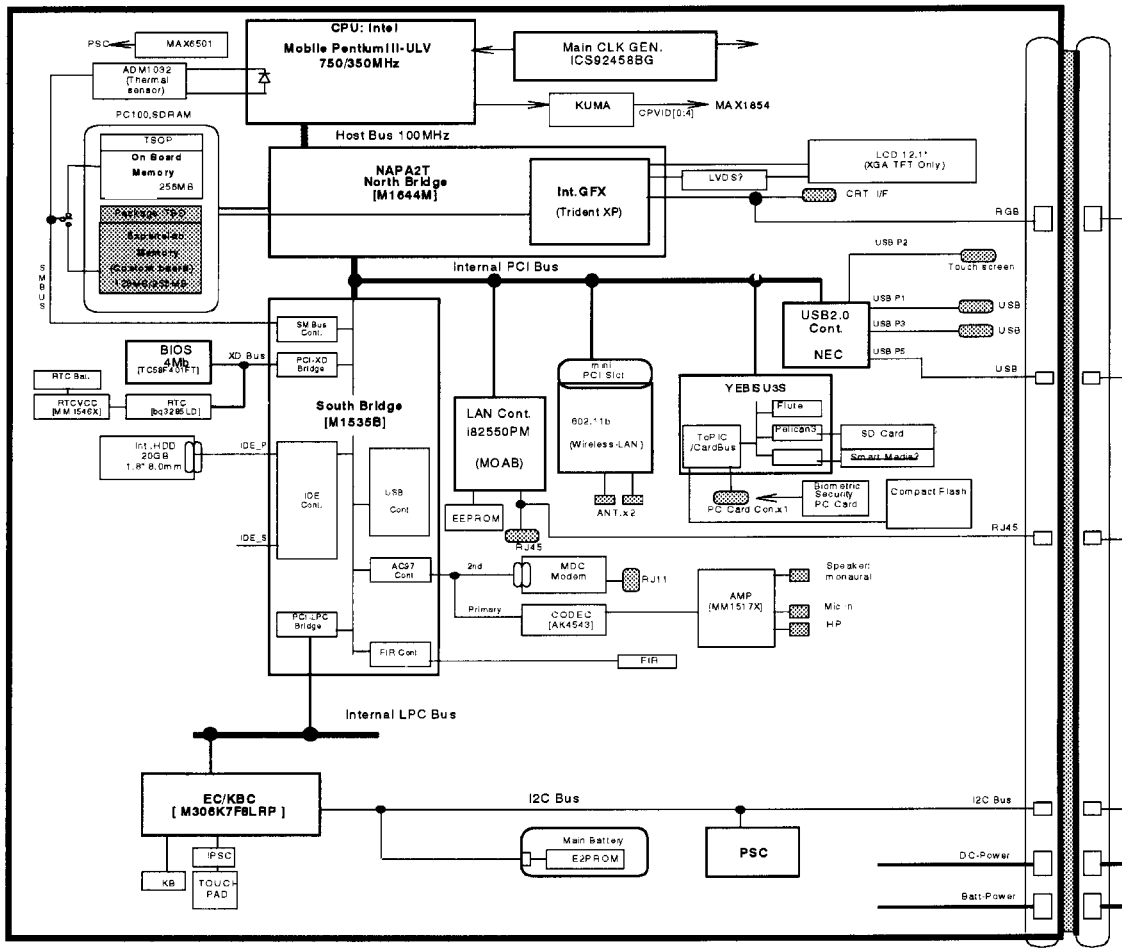


Figure 1-3 System Block Diagram

The PC contains the following components.

❑ CPU

Pentium III-ULV

- A 750/350MHz Pentium III processor with a 750/350MHz internal clock, 100MHz bus and 1.10V/0.95 core operation voltage (built-in NDP).
- Internal cache memory: 16KB Data and 16KB Instruction, Write-Back
- Secondary cache memory: 512KB (in CPU)

❑ Memory

One memory slot capable of accepting 256MB-memory module for a maximum of 512MB.

- 3.3V operation
- 140-pin exclusive memory board
- Access time : 6ns
- Memory Supporting PC-133(Operation is PC100)

❑ 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

PCI chipset

This gate array incorporates the following elements and functions

- North Bridge (Ali/Trident-made M1644T)
 - Pentium II/III supported
 - Maximum capacity of SDRAM or DDR-SDRAM is 3GB
 - DRAM control
 - Complies with AGP V2.0 x 4 modes
 - Complies with PCI R2.2
 - Complies with APCI 1.0b
 - PCI Mobile Busy#/STOP# supported
 - 555-ball 35x35mm BGA package

- South Bridge (Ali/Trident-made M1535B)
 - PCI 3.3V/5V tolerance interface
 - Provides Steerable PCI interrupts for PCI device Plug-and-Play
 - Enhanced DMA controller
 - Interrupt controller
 - Counter/timers
 - Distributed DMA supported
 - PC/PCI DMA supported
 - Serial IRQ supported
 - Low Pin Count (LPC) host controller
 - Plug-and-Play supported
 - Built-in KB controller
 - ACPI supporting features
 - Built-in PCI IDE controller
 - USB interface
 - SMBus interface
 - Super I/O interface
 - Audio system
 - SW modem interface
 - 352-ball (27mm x 27mm) BGA package

 VGA controller

Included in North Bridge

 PC card controller (YEBISU3S)

- PCI interface (PCI Revision2)
- Chipset interface
Intel serial interrupt
- CardBus/PC Card controller (Yenta Version2.2) :2 slots

Parallel power supply control (Toshiba style) and serial power supply control (Texas Instruments style)

- SD card controller (SDHC Ver.1.2)
- SDIO card controller (Ver.1.0)
- SmertMedia controller (SMHC Ver.01/SMIL 1.0)
- SmertCard interface
- SIO controller
- Docking station interface
- Q switch control, reset control
- External device interface
- FDD/IDE hot plugging and removal control

Other main system chips

- EC/KBC (Mitsubishi-made LPC microcontroller M306K5F8LRP x 1)
- PSC (TMP87PM48U x 1)
- Temperature sensor (ADM1032 x 1)
- E²PROM (BR93LC46F-Q (used for LAN MAC address))

Modem controller

Supported by MDC. Using of the secondary AC97 Line

LAN controller (MOAB-made Intel:82550PM)

Controls LAN, supports 100Base-TX and 10Base-T.

1.2 1.8-inch Hard Disk Drive

A compact, high-capacity HDD with a height of 8.0mm. Contains a 1.8-inch magnetic disk and magnetic heads.

Figure 1-4 shows a view of the 1.8-inch HDD and Tables 1-1 and 1-2 list the specifications.

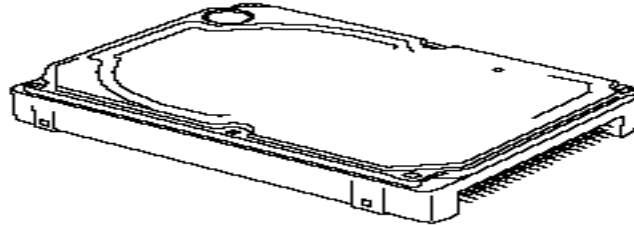


Figure 1-4 1.8-inch HDD

Table 1-1 1.8-inch HDD dimensions

Parameter		Standard value
		TOSHIBA MK2003GAH
Outline dimensions	Width (mm)	54.0
	Height (mm)	8.0
	Depth (mm)	78.5
	Weight (g)	62 (MAX)

Table 1-2 1.8-inch HDD Specifications

Parameter	Specification
	TOSHIBA MK2003GAH
Storage size (formatted)	20GB
Speed (RPM)	4,200
Data transfer speed (Mbits/s)	115.6 to 204.4
Interface transfer rate (MB/s)	100
Track density	
Track/mm(TPI)	2237 (56.8K) max.
Bit/mm	24.4K(621K) max.
Access time (msec)	
Track to track	3
Average time	15
Max seek	26
Start time (sec)	3.5 (Typ.) 20 (Max.)

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. See Appendix E about a layout of the 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 262,144 colors with 1024×768 resolution. The video controller is incorporated into the North Bridge (M1644M) chip and can control both internal and external XGA-support displays simultaneously.

Table 1-5 shows list the specifications.

Table 1-3 LCD module specifications (12.1 TFT)

Item	Specifications
	VF2095P01
Number of Dots	1024×768
Dot spacing (mm)	0.24(H) x 0.24(V)
Display range (mm)	245.76(H) x 184.32(V)
Outline dimensions	267.4(w) x 197.5(H) x 5.55Max(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	
	UA2040P02	
Input	Voltage (V)	DC 5
Output	Voltage (V)	750
	Current MAX (mA)	4.22
	Current MIN (mA)	0.412

1.5 Power Supply

The power supply supplies ten 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
PCOREV	1.35±0.1V	PIII-ULV
PGTLV	1.50±3%	PIII-ULV , M1644
B1R8V	1.8	M1644
B3V	3.30±5%	M1644,CLKGen(ICS94258), Memory slot1/2, YEBISUSS, PCMCIA slot1, MDC(Asky), LAN(REL8139CL)
B2R5V	2.5±5%	M1644M, CLKGen(ICS94258)
P3V	3.30±5%	CPU(ADM11032), M1535, LCD, BIOS(TC58F401FT), RTC(bq3285LD), Sound(YMF753),Mini PCI(Wireless LAN)
B5V	5.00±5%	M1644, PCMCIA slot1
VCC	5.00±5%	M1535, FLINV, YEBISUSS, Sound(YMF753), HDD, CD-R/W, USB, FAN
SNDVCC	5.00±5%	Sound(MMM1517)
S5V	5.00±5%	CPU(MAX6501), SB(M1535)

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 (XM2043P02)	Lithium ion	10.8V	1600mAh
Real time clock (RTC) battery	Nickel hydride	3.0 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 adaptor 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

	Charging Time
Normal charge	About 2 to 4 hours
Quick charge	About 2 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

		Time
Charging	AC adapter or main battery in use	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
Input voltage	AC 90 to 264V
Input frequency	47Hz/63Hz
Input current(MAX)	1.2A (100VAC)
Output voltage	DC 15V
Output current	3.0A

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

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

The FRUs covered are:

- | | |
|-----------------|------------------|
| 1. Power supply | 7. Touch pad |
| 2. Main Board | 8. Modem |
| 3. 3.5" USB FDD | 9. LAN |
| 4. 1.8" HDD | 10. Sound |
| 5. Keyboard | 11. SD card slot |
| 6. Display | 12. Wireless LAN |

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.

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

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[®] 98,2000 or XP 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.

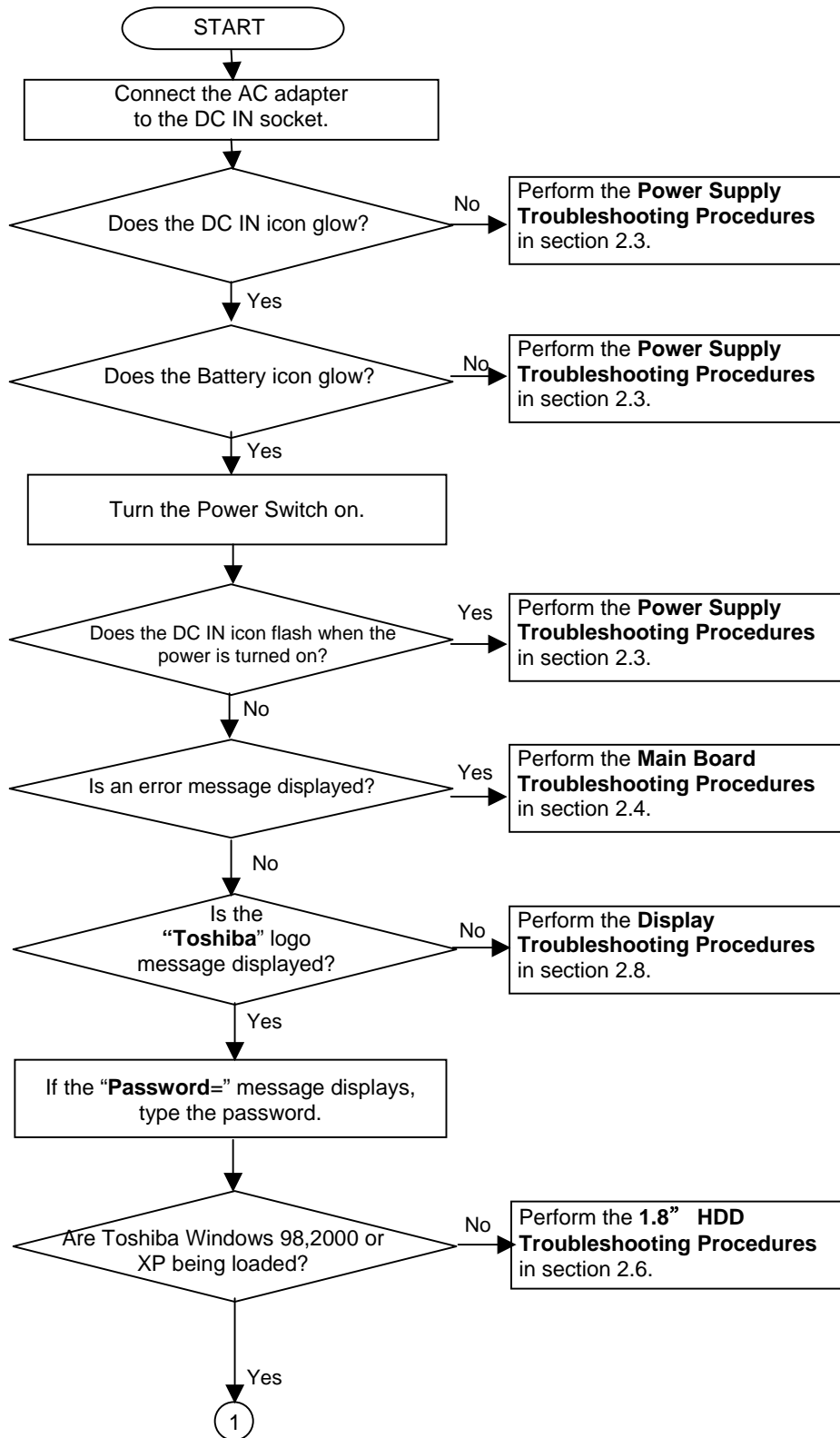


Figure 2-1 Troubleshooting flowchart (1/2)

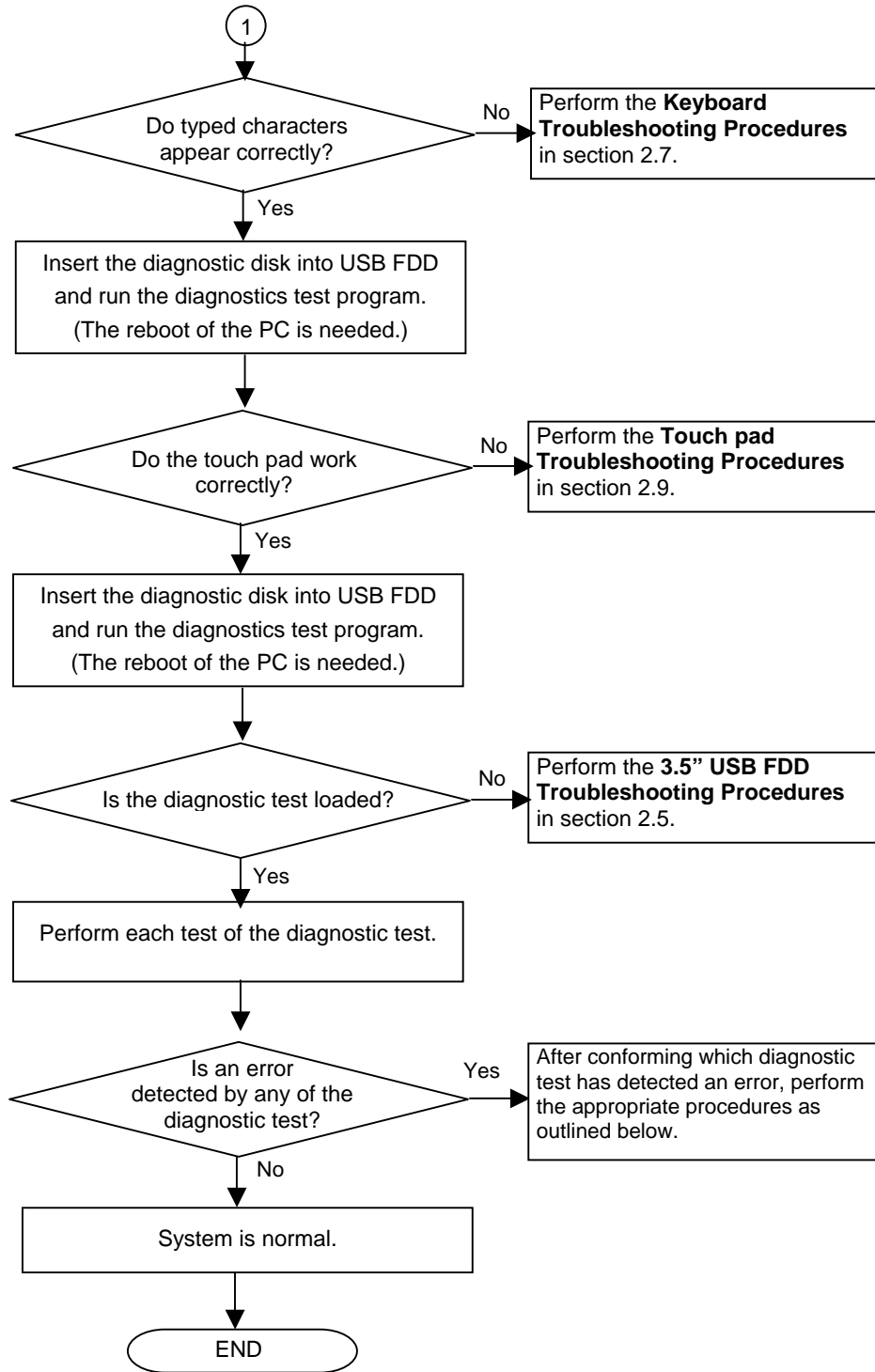


Figure 2-2 Troubleshooting flowchart (2/2)

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, display test, Expansion test, Real timer test or Sound/LAN/modem test, perform the Main Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.

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 * 3
Doesn't light	Any condition other than those above.

*3 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.

<p>CAUTION: Use a recommended AC adapter (ADP-45W) only.</p>

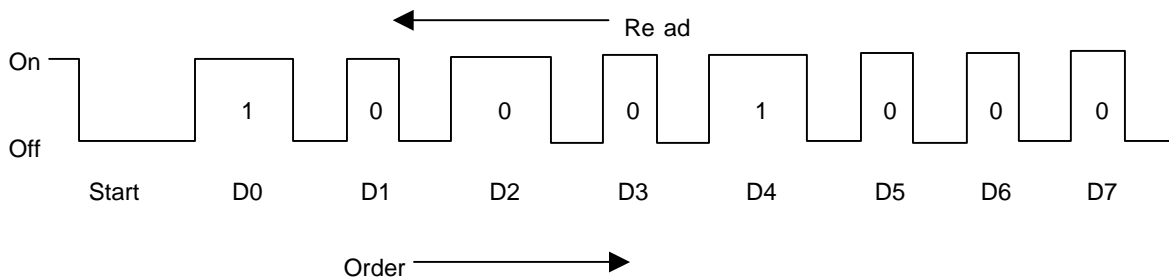
Procedure 2 Error Code Check

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

- Start Off for 2 seconds
- Error code (8 bit)
 - “1” On for one second
 - “0” On for half second
 - Interval between data bits 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	Commondock output voltage is over 16.5V.
12h	Current from the DC power supply is over 4.95A.
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.
21h	Main battery charge current is over 4.95A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 2.3A.
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.
31h	Main battery charge current is over 4.95A.
32h	Main battery discharge current is over 0.5A when there is no load.
33h	Main battery charge current is over 2.3A.
34h	Abnormal current has been sensed 0[A].
35h	Main battery charge current is over 0.3A.

S3V output

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

E5V output

Error code	Meaning
50h	E5V voltage is over 6.0V when the computer is powered on/off.
51h	E5V voltage is 4.5V or less when the computer is powered on.
52h	E5V voltage is 4.5V or less when the computer is booting up.
53h	E5V voltage is abnormal while the computer is suspended.
54h	E5V voltage is abnormal during shutdown (CV support)
55h	E5V voltage is 4.5V or less at power-on (CV support)

E3V output

Error code	Meaning
60h	E3V voltage is over 3.96V when the computer is powered on/off.
61h	E3V voltage is 2.81V or less when the computer is powered on.
62h	E3V voltage is 2.81V or less when the computer is booting up.
63h	E3V voltage is abnormal while the computer is suspended.
64h	E3V voltage is abnormal during shutdown (CV support)
65h	E3V voltage is 2.81V or less at power-on (CV support)

PPV output

Error code	Meaning
70h	PPV voltage is over 1.68V when the computer is powered on/off.
71h	PPV voltage is 0.68V or less when the computer is powered on.
72h	PPV voltage is 0.68V or less when the computer is booting up.
73h	PPV voltage is 0.68V or more when the computer is powered off.

PTV output

Error code	Meaning
80h	PTV voltage is over 1.50V when the computer is powered on/off.
81h	PTV voltage is 1.00V or less when the computer is powered on.
82h	PTV voltage is 1.00V or less when the computer is booting up.
83h	PTV voltage is 1.00V or more when the computer is powered off.

2R5-E2V output

Error code	Meaning
90h	2R5-E2V voltage is over 3.00V when the computer is powered on.
91h	2R5-E2V voltage is 2.125V or less when the computer is powered on.
92h	2R5-E2V voltage is 2.125V or less when the computer is booting up.
93h	2R5-E2V voltage is abnormal while the computer is suspended.

EMV output

Error code	Meaning
A0h	EMV voltage is over 3.00V when the computer is powered on.
A1h	EMV voltage is 1.53V or less when the computer is powered on.
A2h	EMV voltage is 1.53V or less when the computer is booting up.
A3h	EMV voltage is abnormal while the computer is suspended. EMV voltage is over 1.53V when the computer is powered off.

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.

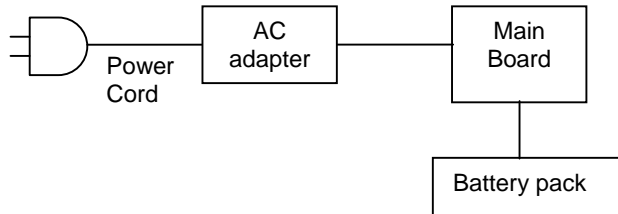
Check 3 In the case of error code 21h:

- 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 main board by the AC adapter. If either the AC adapter or the main 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 main board with a new one.

2.4 Main board Troubleshooting

This section describes how to determine if the main 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 main 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/2000/98 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 error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, perform Check 2.

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

Check 2 If the following error message is displayed on the screen press any key as the message instructs.
The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the main 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 main 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 1.8" 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 Check on Boot Mode

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

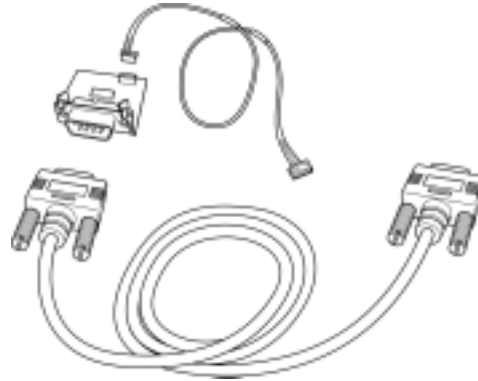
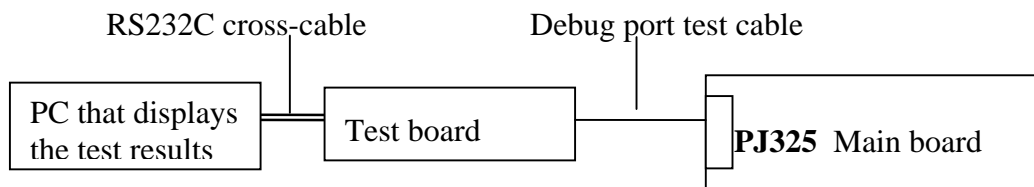


Figure 2-3 A set of tool for debug port test

The test procedures are follows;

1. Connect the debug test cable to the connector PJ325 of the main 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_INI\SYSI_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 (1/6)

D port status	Inspection items	details
F000h	Start	Clearing a software reset bit
		Enabling address line A20
		Initializing special registers and Intel chipset
	Checking a flash memory	Initializing the CH0 of a PIT
		Initializing flags determining whether BIOS is rewritten
		Switching to protected mode
		Examining the checksum of BootBlock
F001h	Initializing a KBC (1)	Examining the checksum of other data in a flash memory
		Checking if EC/KBC firmware is to be rewritten
		Initializing a KBC
		Disabling network connecting
		Sending command bytes
		Sending scan enable command
F002h	Checking whether BIOS rewrite is requested	Checking whether BIOS rewrite is requested
F003h	Rewriting BIOS	Checking F12 key-in
		Initializing GPIO I/O space
		Enabling BIOS writing
		Serial interrupt control
		Disabling BIOS write protection
		Enabling SMBus I/O space
		Enabling SMBus access
		Setting up FDC port
		Configuring DRAM
		Enabling L1 cache memory
F004h		Clearing memory
		Storing key scan code
		Setting up TASK_1ms_TSC
		Enabling FDC interrupt

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

D port status	Inspection items	details
F005h	Executing CHGBIOSA	Loading CHGBIOSA.EXE and CHGFIRMA.EXE
		Executing CHGBIOSA.EXE and CHGFIRMA.EXE
		Transferring system BIOS handling to IRT
F100h	Checking system	Disabling cache memory
		Initializing special registers
		Initializing the Ch1 of a PIT
F101h	Checking the size and type of DRAM Testing the stack area of SMRAM	Checking the size and type of DRAM
		Testing the stack area of SMRAM
F102h	Checking and initializing CMOS	Configuring cache memory
		Enabling L1 cache memory
		Testing CMOS for access
		Checking the voltage of a CMOS backup battery
		Examining the checksum of CMOS
		Initializing data in CMOS (1)
		Setting up IRT status
		Storing the size of DRAM
F103h	Checking for branch of resuming Copying the contents of ROM to RAM	Checking for branch of resuming
		ICH2-M Power Failure
		Examining the checksum of SMRAM
		Checking whether the memory configuration have been changed
		Examining the checksum of system BIOS RAM area
		Examining the checksum of PnP RAM
		Conducting resuming
		Disabling all SMIs
		Clearing resuming status
		Setting a request for a resuming error
		Copying system BIOS from ROM to RAM
F104h	Initializing SMRAM	Initializing SMRAM
		Checking the factor of WakeUp
		Changing SMRAM base
		Enabling SMI

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

D port status	Inspection items	details
F105h	Initializing a PIT and a CPU	Initializing the channel 0 of a PIT
		Initializing the channel 2 of a PIT
		Testing the channel 1 of a PIT
		Testing the channel 2 of a PIT
		Measuring the clock speed of a CPU
		Enabling SMIs except auto-off feature
		Handling events from an EC
		Performing timeshared process for time measurement of
		Updating microcodes
		Enabling or disabling the function of processor serial
		Checking whether Geyserville is supported
		Switching CPU clock speed to high
		F106h
Reading EC version		
Updating the type of flash memory		
Determining what country the computer is designed to be		
Checking the default settings of CMOS		
Initializing ACPI table		
Setting up a clock generator		
AC'97 control		
Initializing information of thermal control		
Initializing a KBC		
Turning VGA display off and controlling reset		
Initializing sound function		
Starting the computer multiple box status check		
Initializing a PCI		
Testing a PIC		
Initializing self-test control status		
Initializing password		
F107h	Initializing PCI	Initializing PCI
	Initializing a LAN	Initializing information of LAN
		Checking the factor of WakeUp

Table 2-3 D port status (4/6)

D port status	Inspection items	details
F108h	Initializing the data in CMOS Initializing PnP Setting up the setup	Running a task waiting for the end of INIT_PCI
		Initializing the data in CMOS (2)
		Initializing PnP
		Setting up the setup parameters
		Waiting for the end of multiple box states check
		Setting up the hardware parameters based on resources
F109h	Serial interrupt control Initializing PnP hardwares Configuration	Serial interrupt control
		Initializing PC Card Slots
		Initializing SIO
		Initializing FIR
		Creating a work area for auto configuration
		Configuration
		Storing the results of VGA configuration
F10Ah	Initializing drives	Starting an HDD initialization sequence
		Starting an FDD initialization sequence
		Initializing a USB Host Controller, and recognizing a device
		Generating output codes
F10Bh	Checking the first 64KB of	Checking the first 64KB of memory
F10Ch	Initializing interrupt vectors	Initializing interrupt vectors
F10Dh	Initializing a NDP	Initializing a NDP
F10Eh	Setting up system	Storing CMOS error information in SMRAM
		Initializing timer
		Initializing a buffer for power saving
		Initializing an EC, and reading battery information
		Updating system BIOS (model name, and EDID of the LCD)
F10Fh	Initializing the display	Initializing VGA BIOS
F110h	Displaying a logo	Displaying a logo on the screen
F111h	Checking system memory	Checking system memory
F112h	Checking an expansion	Checking an expansion memory
F113h	Initializing system memory	Initializing system memory
F114h	Initializing an expansion	Initializing an expansion memory
F115h	Checking DMA pages	Checking DMA pages

Table 2-3 D port status (5/6)

D port status	Inspection items	Details
F116h	Checking a DMAC	Checking a DMAC
F117h	Setting up DMA	Initializing DMA
F118h	Checking a printer port	Checking a printer port
F119h	Checking SIO	Checking a SIO port
F11Ah	Checking password	Waiting for the end of the FDD initialization process
		Waiting for the end of the HDD initialization
		Checking key-in pressed during the IRT
		Loading BM
		Prioritizing ATA
		Initializing BM
		Entering password
		Canceling BM
F11Bh	Checking optional I/O ROM	Checking optional I/O ROM
F11Ch	Final setting up prior to boot-up	Storing the value of 40;00
		Setting up the address of font data for resuming password
		Setting up the parameters for character repeat on a USB
		Getting keys pressed during the IRT
		Storing shadow RAM size
		Updating system resources information prior to boot-up
		Renewing memory mapping data for INT15h E820h
		Updating a table for DMI
		Copying an ACPI table to the top of an expansion memory
		Waiting for the end of writing PSC version on BIOS
		Waiting for the end of serial port initialization
		Canceling NMI mask
		Examining the checksum of TIT
		Clearing IRT running flag for runtime
		Update checksum for runtime
		Branching to hibernation
		Initializing Bluetooth
Checking whether a CPU, an HDD or other component		
Disabling a PC Card that is not being used		

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

D port status	Inspection items	details
		Setting up battery safe mode
		Setting up date
		Waiting for the end of AC-Link initialization
		Waiting for the end of Bluetooth initialization
		Updating DMI Wakeup factor and SM-BIOS structure table
		Closing configuration space of PCI devices
		Cache control
		Updating parameter block A
		Setting up the clock speed of the CPU to the appointed value by the Setup
		Waiting for the motor off of a disabled HDD
		Concluding FDD information
		Clearing power button status
		Enabling the power button
F11Dh	Waiting for setting up of a clock generator	Waiting for setting up of a clock generator
FFFFh	Completion	Completion of checking DPORT status

Check 1 If the D port status error code F11Ah is displayed, go to the 3.5" USB FDD Troubleshooting Procedures in Section 2.5 or the 1.8" 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 statuses are following:

Error code	Contents
F160h	Timer CH2 error
F161h	PIT error
F162h	PIC #1 error
F163h	PIC #2 error
F11Eh	Clock generator setting error

Procedure 3 Diagnostic Test Program Execution Check

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

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

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

Procedure 4 Replacement Check

I/O units or main board may be damaged. Replace the I/O units or disassemble the computer following the steps described in Chapter 4 and replace the main board with a new one.

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

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

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

Procedure 2 Diagnostic Test Program Execution Check

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-4. 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.

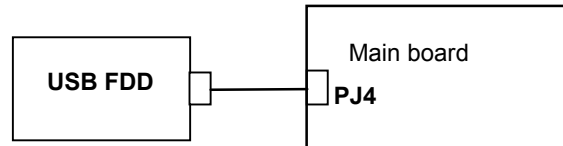
Write protected

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 main board. Check visually that the connector is connected firmly.

- Check 1 Make sure the following cable and connector are firmly connected to the main 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 main board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.6 1.8" HDD Troubleshooting

This section describes how to determine if the 1.8" 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 1.8" hard disk will be erased when the 1.8" 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 1.8" 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 1.8" 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 1.8" HDD and the connector of the main 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 1.8" HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 1.8" 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 1.8" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

 If the 1.8" HDD can not be formatted, perform Check 2.

Check 2 Using the MS-DOS FDISK command, set the 1.8" HDD partition. If the partition is not set, go to Check 3. If it is set, format the 1.8" HDD using MS-DOS FORMAT command.

Check 3 Using the Diagnostic Disk, format the 1.8" HDD with a format option (physical format). If the 1.8" HDD is formatted, set the 1.8" HDD partition using MS-DOS FDISK command.

 If you cannot format the 1.8" 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.

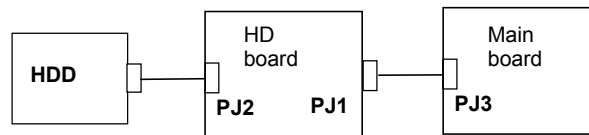
Table 2-5 1.8" HDD error code and status

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 PJ3 of the main 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 following connector is firmly connected to the HDD and main board.



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

Check 2 The 1.8" 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 main 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

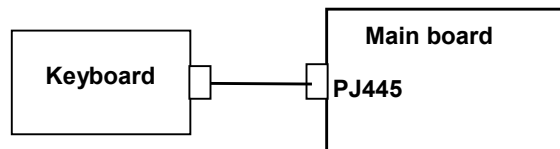
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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 main 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 main 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 main 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 main board. If an error is detected, go to Procedure 3.

Procedure 2 Connector and Cable Check

The LCD module is connected to the main 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 F1 and F2 near the I/F connector (PJ34/PJ35), 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, Main 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 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 main board may be damaged. Replace the main board with a new one.

2.9 Touch Pad

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

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector checking and replacement checking

Procedure 3: Replacement Check

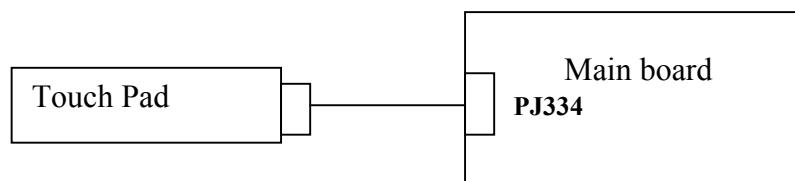
Procedure 1 Diagnostic Test Program Execution Check

Execute the keyboard test program, or maintenance test program, because the pointing device 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 checking and replacement checking

The touch pad is connected to the main board (PJ334) with a flexible cable. This cable may have come off the connector or the connector may have come off the main 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

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.

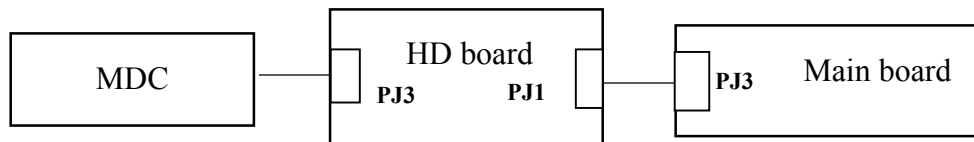
If any error is detected by the test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The Modem jack is connected to the MDC board and MDC board is connected to the main board. If the modem malfunctions, these connections may be bad or the MDC or main 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 has been firmly connected to the PJ3 on the HD board. And make sure the PJ1 on the HD board has been firmly connected to the PJ3 on the Main 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 Modem jack may be faulty. Replace it with a new one. If the modem function is still not working properly, perform Check 3.
- Check 3 The MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the modem function is still not working properly, perform Check 4.
- Check 4 The main board may be faulty. Replace it with a new one following the instructions in Chapter 4.

2.11 LAN

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 Modem test program subtest 03 (LAN loop-back test). See Chapter 3 for information on how to perform the test.

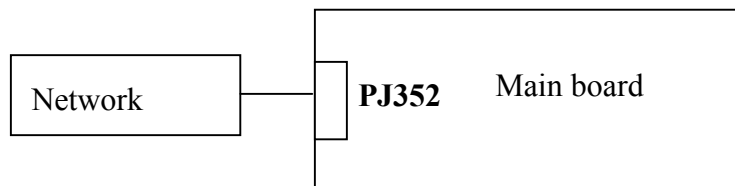
If any error is detected by the test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The LAN function is installed on the main board. The modem/LAN jack is connected to the main board by the cable. If the LAN malfunctions, the connection is bad or the main board might be faulty.

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

- Check 1 Check if the LAN jack is connected firmly to the connector PJ352 of the main board.



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

- Check 2 The LAN jack may be defective. Replace the LAN jack with a new one. If the problem persists, perform Check 3.
- Check 3 The main board may be faulty. Replace the Main board following the steps described in Chapter 4.

2.12 Sound

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 2 Replacement Check

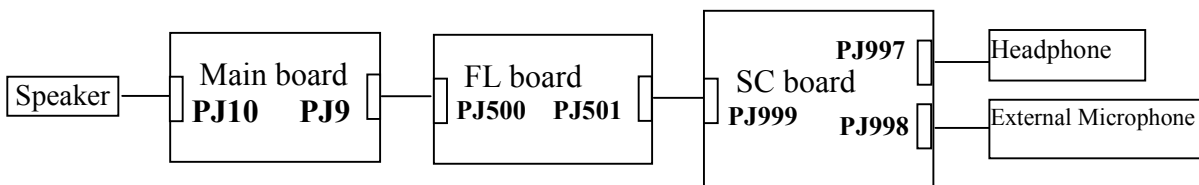
Procedure 1 Diagnostic Test Program Execution Check

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 speakers are connected to the main board shown in the following figure.



These connectors may have come off. Disassemble the computer and check the connector connections.

Execute Chapter 1 if the speaker is not working properly.

Go to Check 2 if the external Microphone terminal and the Headphone are not working properly.

Check 1 If the speaker is not working properly, the speaker cable may come off. Make sure the speaker cables are connected to the Main board PJ10 firmly. If there is still an error, perform Check 3

Check 2 If external Microphone terminal and the Headphone are not working properly, the cable between the Main board and SC board, or the Main board and FL board may come off. Or the cable between the SC board and the Microphone terminal or the SC board and the Headphone may come off. Make sure those cables are connected firmly. If there is still an error, perform Check 3.

Procedure 3 Replacement Check

- Check 1 If the speaker is not working properly, the speaker may be faulty. Replace it with a new one following the steps in Chapter 4. If the speaker is still not working properly, go to Check 2.
- Check 2 The main board may be faulty. Replace it with a new one following the instructions in Chapter 4.
- Check 3 The external Microphone terminal and the Headphone are not working properly, the Main board, the FL board or the SC board may be faulty. Replace those boards with new ones following the steps in Chapter 4.

2.13 SD card slot

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

Procedure 1 Check on Windows

Procedure 2 Connector/Replacement Check

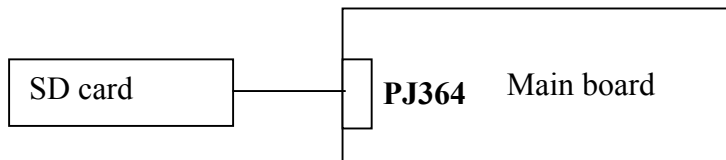
Procedure 1 Check on Windows

Insert a SD card into the slot. Check if the installed Windows XP 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 PJ364 of the main board.



- Check 1 Check the SD card is firmly inserted to the connector PJ364 of the main board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.
- Check 2 The SD card may be faulty. Replace it with a new one in order. If the problem persists, perform Check 3.
- Check 3 The main board may be faulty. Replace it with a new one.

2.14 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: Antennas' Capability 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.

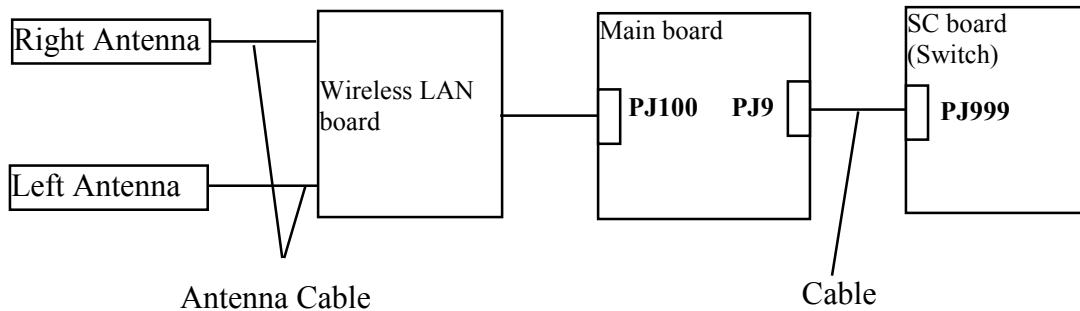
Check 1 Execute test program CERT201T.EXE to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN

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 Make sure the connection between the Wireless board and the Main board (the Main board connector PJ100).

If the connector is disconnected, connect firmly then 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, go to Check 3.

Check 3 Make sure the connection between the SC board PJ999 and the Main board PJ9.

If the cable is 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. Remove the wireless LAN slot cover and lift it off. Refer to Chapter 4 for detailed procedure.
2. Disconnect the wireless LAN antenna (white and black) from the wireless LAN board.
3. Connect the tester set up for impedance measurement to the antenna jig. Measure the white antenna's resistance
4. Determine the resistance. The antenna passes the test when the resistance is less than 5Ω . If it is more than 5Ω , the antenna is faulty.
5. Measure the black antenna's resistance. Check if there is faulty.

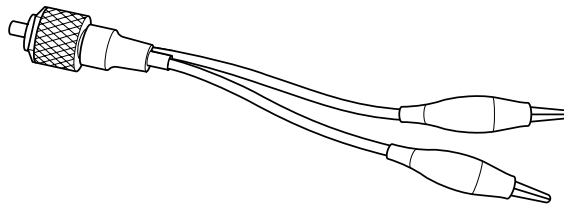


Figure 2-4 Antenna Test jig

Measurement Value	Pass/fail	Comment
Less than 5Ω	Pass	Include cable loss
More than 5Ω	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 $0.5-0.8\Omega$.
2. The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.

If each wireless antenna pass 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, the SC board and the Main board are connected properly. 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 SC 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 3.
- Check 3 The Main board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

Chapter 3

Tests and Diagnostics

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3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. They are grouped into the Service Program Modules and the Test Program Modules and the Diagnostic Test consists of 10 programs.

NOTE: To start the diagnostics, follow these steps:

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

The DIAGNOSTIC MENU consists of the following 6 test programs.

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

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

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

- The Diagnostics Disk (all tests, 3 disks)
- A formatted working disk (Floppy disk test)
- A cleaning kit to clean the floppy disk drive heads (FDD Head Cleaning)
- A PC card wraparound connector (Expansion test)
- An external CRT monitor (Expansion test)
- Headphone (Sound/LAN/Modem test)
- A microphone (Sound/LAN/Modem test)
- FAT-MODE inspection device (Sound/LAN/Modem test)

The following sections detail the tests of the DIAGNOSTIC TEST MENU. Refer to Sections 3.17 through 3.21 for detailed information on the remaining Service Program Module functions.

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. Turn on the computer by pressing the F12 key and, select the FDD in the display for selecting booting unit. Then press ENTER. The following menu will appear:

```
TOSHIBA personal computer XXXX DIAGNOSTICS  
version X.XX (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
```

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

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

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

```
TOSHIBA personal computer XXXX DIAGNOSTICS
Version X.XX (c) copyright TOSHIBA Corp. 20XX
DIAGNOSTIC TEST MENU :
```

```
1 - SYSTEM TEST
2 - MEMORY TEST
3 - KEYBOARD TEST
4 - DISPLAY TEST
5 - FLOPPY DISK TEST
6 -
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).

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

4. 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:

TEST NAME XXXXXXXX

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

SUB-TEST : XX

PASS COUNT: XXXXX

ERROR COUNT: XXXXX

WRITE DATA: XX

READ DATA : XX

ADDRESS : XXXXXX

STATUS : XXX

SUB-TEST MENU :

01 - ROM checksum

02 -

03 -

04 - Fan ON/OFF

05 -

06 - Quick charge

07 - DMI read

08 - DMI write

99 - Exit to DIAGNOSTIC TEST MENU

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

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

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

TEST LOOP : YES (or NO)

ERROR STOP : YES (or NO)

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

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

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

Use the up and down arrow keys to move the cursor to “**ERROR STOP**”.
Use the right and left arrow keys to move the cursor to the desired option and press **Enter**.

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

```
ERROR STATUS NAME    [ [ HALT OPERATION ] ]  
  
1: Test end  
2: Continue  
3: Retry
```

Press [1] Terminates the test program and returns to the subtest menu.

Press [2] Continues the test.

Press [3] Restarts the test from the error.

Selecting **NO** of ERROR STOP keeps the test running even if an error is found.
When an error occurred, the error status is displayed and the error counter is increased by one.

6. Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-2 in section 3.15 describes the error codes and error status for each error.

3.3 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
		04	Fan ON/OFF
		06	Quick charge
		07	DMI read
		08	DMI write
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	Pointing Stick
		05	USB test
		07	Intouch key
		08	Internet key
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
		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	ASYNCR	06	FIR/SIR point to point (send)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		06	Write specified address
		07	Read specified address
		09	Sequential write
		10	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP test
11	EXPANSION	01	PCMCIA wraparound
		03	RGB monitor ID
	SOUND/MO	01	Microphone recording & play
	DEM/	02	DOREMI
	LAN	03	LAN
		04	MODEM

3.4 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 contains five 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 04 Fan On/Off

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

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

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

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

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

Subtest 06 Quick charge

This subtest checks the status for the quick charge.

Subtest 07 DMI read

The information in the Flash-ROM is displayed in the following format.

```
Model Name       : DyanBook SS S4/275PNH  
Version Number   : XAS4275PNH  
Serial Number    : Y1055826
```

```
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 ?”

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

2. “Enter Version Number ?”

Input the computer’s version number and press **Enter**. (e.g. XP341C401A86)

3. “Enter Serial Number ?”

Input the computer’s serial number and press **Enter**. (e.g. Z9012374)

4. “Enter Model Number ?”

Input the computer’s sales model number and press **Enter**. (e.g. XP341C401A86)

5. “Enter Bundle Number ?”

Input the computer’s PCN/bundle number and press **Enter**. (e.g. PCN0482TOZ01/S2A0281D990)

6. When you press **Enter**, the DMI information is written to the Flash-ROM.

3.5 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 contains five subtests that test the memory module. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Conventional Memory

This subtest writes data to conventional memory (0 to 640 KB). Then reads and compares the result with the original data. The test address is displayed each 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 then 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 ('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

Read/Write/ Compare data directly by G.A. operation for the TAG-RAM.

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.

3.6 Keyboard Test

To execute the Keyboard Test, select 3-KEYBOARD TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Keyboard test contains six subtests that test the computer's keyboard actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Pressed Key Display

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key character that was pressed. Holding a key down enables the auto-repeat function which causes the key's display character to blink.

Subtest 02 Pressed Key Code Display

This test displays scan code, character code and key top of the pressed key.

Subtest 04 Pointing Stick

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

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

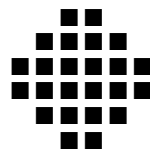
This test reports the response of touch pad, and touch pad switch . When you touch the touch pad and slide your finger towards the upper left, the <DIRECTION> display changes according to the following illustration.

When a touch pad switch is pressed, the <LAT> displays appear on the right side one by one.

The parameters appear on the center of the display. If the IPS switches are pressed at the same time, the subtest menu displays.

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

```
<POINTING>
```



```
<PARAMETER>
```

```
STATUS:0008h  
X-RATE:0000h  
Y-RATE:0000h
```

```
<BUTTONS>
```

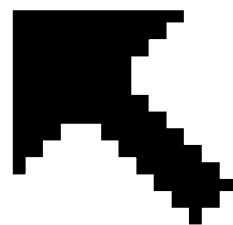
```
(1) (2)
```



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

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

```
< DIRECTION >
```



```
< PARAMETER > <LAT>
```

```
STATUS:0018 B t n U P  
X R A T E : 0 0 F F B t n D W  
Y - R A T E : 0 0 0 1 B t n - I
```

```
<BUTTONS>
```

```
(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 Intouch key test

This subtest checks moving of the Intouch key.

Subtest 08 Internet key test

This subtest checks moving of the Internet key.

3.7 Display Test

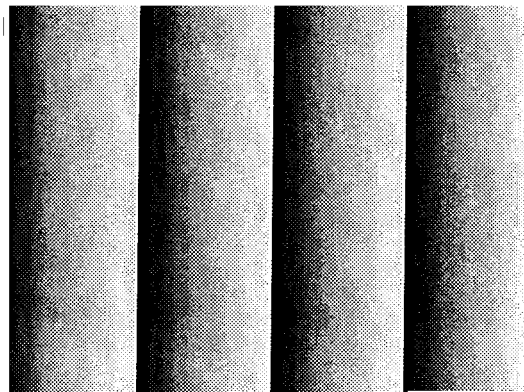
To execute the Display Test, select 4-DISPLAY TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains eight subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

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]
```

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.

3.8 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 drive, the kind of media, the media mode and the start track of the floppy disk drive to be tested, press **Enter**.

```
Test drive number select (1:FDD#1,2:FDD#2,0:FDD#1&2)?
Media in drive #1 mode (0:2DD,1:2D,2:2D-2HD/2DD,3:2HD)?
2HD Media mode (1:1.20MB/2:1.44MB)
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.

3.9 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 one subtest 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.

System	Asynchronous
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 from the computer to the other computer infrared port.

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.

3.10 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 to be tested.

```
Test drive number select    1:HDD#1
                             2:HDD#2
                             0:HDD1&2
```

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

```
HDC F/W error retry        1:yes
                             2:no
```

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

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


4. This message is used to select whether or not the HDC status is displayed on the screen. The HDC status is described in section 3.16. Select yes or no.

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

5. 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
```

<pre>xxx DIAGNOSTIC TEST VX.XX [Ctrl]+[Break] ; test end [Ctrl]+[C] ; key stop</pre>

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 3-2.

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).

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

Subtest 06 Write Specified Address

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

Subtest 07 Read Specified Address

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

Subtest 09 Sequential Write

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

Subtest 10 W-R-C Specified Address

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

3.11 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

A new date and time can be input during this subtest. 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 and press **Enter**. The time is updated.

The date and the time are displayed alternately by pressing **Enter**. To exit, press **Ctrl + Break**.

Subtest 02 Backup Memory

This subtest checks the following backup memories:

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

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

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

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

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.

3.12 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:

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

Press **Ctrl + Break** to exit.

3.13 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 PCMCIA Wraparound

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

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

This subtest is executed in the following order:

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

NOTE: When 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)?
```

Select the number.

Subtest 03 RGB monitor ID test

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

3.14 Wireless LAN Test Program (CERT201T.EXE)

This section describes about the wireless LAN transmitting-receiving test program, CERT201T.EXE.

Note: Use another computer that can communicate by the wireless LAN as a reference machine to perform this test.

Follow the steps below to perform the test program, (CERT201T.EXE). Refer to Section 2.14, *Wireless LAN Troubleshooting*, for a detailed description of the troubleshooting procedures for the wireless LAN.

1. Preparing the target machine for Ping Pong Responder
 - (a) Insert a floppy disk containing the test program into the target machine and turn the target machine.
 - (b) Prompts are displayed as shown in Figure 3-1, if it is the first time the program has run. Input parameters are shown below:

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

Figure 3-1 Wireless LAN test Menu

(c) The Program **Ping Pong Responder** runs. It is shown below.

```
WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Function:          Ping Pong Responder
Parameters:       Rate (Fixed:1/2/4/5 Auto:3/6/7):      3

ESC  ENTER
```

Figure 3-2 Prompt for Ping Pong Responder

(d) Leave the Rate as default (**3**). Press **Enter** twice to start Ping Pong Responder as shown below. The target machine is ready to test when this screen is displayed.

```
WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Function:          Ping Pong Responder
Parameters:       Rate (Fixed:1/2/4/5 Auto:3/6/7):      3

----- Transmit counters -----
Total   Ok      Exc   Retry  Aged   Discon Form
200     200     0     0     0     0     0
----- Receive counters -----
Total   Normal  MiM1   MiM2   NoAntDiv
200     200     0     0     0
DatErr  DupErr  Retry   FCS     Length  Rate
0       0       0       0     1400    2.0

--- Loop error counters ---
      HEC     FCS     |   SL     NL
      0       0     |  -23  (7E)  -98  (33)

<SPACE>Stop      <ESC>Abort      <TAB>Swap screen

ESC  ENTER
```

Figure 3-3 Ping Pong Responder

(e) Enter the command below:

cert201t

```

WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Function:          Setup iobase/irq          ----

Parameters:       Skip PCIC setup = No
                  I/O Base = 1040
                  IRQ      = B

Result:           Ready

ESC  F2  ENTER

```

Figure 3-4 Setup iobase/irq

(f) Main Menu shown below is displayed after you set the parameters or if they have set already.

```

WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

                                Main Menu
Initialise (FW defaults)  Synchronise Addresses
Set channel                Show Local Address
Tx continuous on          Set Remote Address
Rx continuous on / Stop  Versions
Testpatterns              Erase MAC Address
Transmit                   Restore MAC Address
Receive                    Call Code Display
Ping Pong Initiator        Setup iobase/irq
Ping Pong Responder

ESC  F3  ENTER MENU

```

Figure 3-5 Main Menu

- (g) Select **Initialise (FW defaults)** from Main Menu to initialize the wireless LAN card. Main Menu appears again soon.
- (h) Select **Set channel** from Main Menu to display Set channel menu shown below.

```

WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Function:          Set channel

                Select a Channel
                  1 (2412 MHz)
                  2 (2417 MHz)
                  3 (2422 MHz)
                  4 (2427 MHz)
                  5 (2432 MHz)
                  6 (2437 MHz)
                  7 (2442 MHz)
                  8 (2447 MHz)
                  9 (2452 MHz)
                 10 (2457 MHz)
                 11 (2462 MHz)
                 12 (2467 MHz)
                 13 (2472 MHz)
                 14 (2484 MHz)

ESC  ENTER MENU

```

Figure 3-6 Set channel menu

- (i) Select a communication channel **10 (2457 MHz)** and press **Enter**. Result is displayed as below.

```

Result:          Channel 10 Selected
                Vgdac = 65, refdac = 6f
                Hit any key to proceed

```

Figure 3-7 Result of setting channel

- (j) Press **Enter** to return to Main Menu.
2. Preparing the reference machine for Ping Pong Initiator and starting the test
- (a) Insert a floppy disk containing the test program into the reference machine and turn it on to start MS-DOS.
- (b) Enter the command below:

cert201t

- (c) Prompts are displayed as shown Figure 3-1, if it is the first time the program has run. Input parameters as described in step 1.(c).
- (d) Main Menu is displayed.
- (e) Select **Initialise (FW defaults)** from Main Menu to initialize the wireless LAN card. Main Menu appears again soon.
- (f) Select **Set channel** from Main Menu to display Set channel menu shown in Figure 3-3.
- (g) Select communication channel **10 (2457 MHz)** and press **Enter**. The result is displayed.
- (h) Press **Enter** again to return to Main Menu.
- (i) Select **Ping Pong Initiator** from Main Menu to display prompts for parameters as shown below.

```

WaveLAN-II TELEC Testprogram                (V02.01 Sep 11 2000 09:28:45)

Function:      Ping Pong Initiator

Parameters:    No of frames                :      200
               Length (13-2244)           :      1400
               Delay (ms)                  :       30
               Rate (Fixed:1/2/4/5 Auto:3/6/7):       3

ESC  ENTER

```

Figure 3-8 Prompts for Ping Pong Initiator

- (k) Input parameters as shown below:

No of frames **200**

Length (13-2244) **1400**

Delay (ms) **30**

Rate (Fixed:1/2/4/5 Auto:3/6/7) **3**

- (l) Press **Enter** to start Ping Pong Initiator as shown below. The test has finished when Total of the Transmit counters reaches 200.

```

WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Function:          Ping Pong Initiator

Parameters:       No of frames           :      200
                  Length (13-2244)      :      1400
                  Delay (ms)             :        30
                  Rate (Fixed:1/2/4/5 Auto:3/6/7):      3

----- Transmit counters -----
Total   Ok       Exc   Retry  Aged   Discon Form
200     200      0     0     0     0     0
----- Receive counters -----
Total   Normal   MiM1   MiM2   NoAntDiv
200     200      0     0     0
DatErr  DupErr  Retry   FCS    Length  Rate
0       0       0       0     1400    2.0

--- Loop error counters ---
      HEC      FCS      |   SL      NL
      0       0       |  -22    (7F)  -99  (32)

<SPACE>Stop      <ESC>Abort      <TAB>Swap screen
ESC  ENTER

```

Figure 3-9 Ping Pong Initiator

3. Concluding the test result and finishing the test

- (a) The target computer passes the test if the results displayed on the reference computer are the same as those below:

Transmit counters, Total **200**

Transmit counters, Ok **200**

Receive counters, Total **200**

Receive counters, Normal **200**

Note: Do not look at the target machine but at the **reference machine** to confirm the results shown above.

- (b) If any of the results is different from those above, return to Main Menu on the reference machine and perform steps 2.(e) through 2.(l) again.
- (c) If the results are incorrect again, the target machine fails in test.

Note: Perform the test in a place free from any electrical noise or waves.

- (d) Press **Enter** to quit the test. Return to Main Menu and wait the test end command shown below.

```
WaveLAN-II TELEC Testprogram          (V02.01 Sep 11 2000 09:28:45)

Press q to really quit, Enter to return to main menu

ENTER q/Q
```

Figure 3-10 Quit message

- (e) Press **Q** key to quit the test program. Turn the computer off to finish the test.

3.15 Sound/LAN/Modem Test

To execute the Sound/LAN/Modem Test, use the Test Diagnostics disk (No.2). Finish the tests of the Diagnostics disk (No.1) by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Test program disk (No.2) in the floppy disk drive and turn on the power. The following message will appear:

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

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

NOTE: To execute Subtest 01, the external microphone is required. 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.

Subtest 01 Microphoned recording & play

Executed by the load format of Playwave/recwave.

The sound is recorded automatically from microphone if following message appear.

Recording(Press "S" to stop)

The sound is played automatically if following message appear.

Playing(Press "S" to stop)

Subtest 02 DOREMI

This subtest is executed by loading Playwave. In this subtest, the control of the sound volume can be also tested.

Connect headphones and make sure the sound (musical scale: do, re, mi, fa, so, la, si, do) is come out from the right and left headphones.

Subtest 03 LAN LOOPBACK test

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 04 MODEM test

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
- Modem Sound Test
- External Loopback test
- RJ11 Connector Test (LED)

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

3.16 Error Status Code

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

Table 3-2 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 3-2 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

3.17 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 3-3 and 3-4.

Table 3-3 Hard disk controller status register contents

Bit	Name	Description
7	BSY (Busy)	"0" ... HDC is ready. "1" ... HDC is busy.
6	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 3-4 Error register contents

Bit	Name	Description
7	BBK (Bad block mark)	"0" ... Not used "1" ... A bad block mark is detected.
6	UNC (Uncorrectable)	"0" ... There is no uncorrectable data error. "1" ... Uncorrectable data error has been detected.
5	—	Not used
4	IDN (Identification)	"0" ... Not used "1" ... There 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.

3.18 FDD Cleaning

3.18.1 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.

3.18.2 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.

3.19 Log Utilities

3.19.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can 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)

3.20 Running Test

3.20.1 Function Description

This function automatically executes the following tests in sequence:

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

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

3.20.2 Operations

CAUTION: Do not forget to load a 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.

```
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.

3. 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.]
```

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

3.21 Floppy Disk Drive Utilities

3.21.1 Function Description

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

1. FORMAT

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.

3.21.2 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**. A 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 : VX.XX
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 will appear, indicating the program has started.

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

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

- (d) 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 : VX.XX  
Drive type select (1:FDD, 2:HDD) ?
```

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

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:

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

- (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) Set 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 (j) 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 ] = XXXXXXXXX  
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 displays the following HDD ID configuration:

```
[HDD ID Read (V5.10)] [Drive #X]
  ID code (h)           = XXXX
  No. of Cylinders      = XXXX XXXX
  Removable Cylinders  = XXXX XXXX
  No. of Heads         = XXXX XXXX
  Unformat Bytes/Track = XXXX XXXX
  Unformat Bytes/Sector = XXXX XXXX
  Sectors/Track        = XXXX XXXX
  Gap Length           = XXXX XXXX
  Sync. Bytes          = XXXX XXXX
  Reserved (h)         = XXXX
  Serial No.           = YYY...
  Controller Type (h)  = XXXX
  Sector Buffers       = XXXX XXXX
  ECC Bytes            = XXXX XXXX
  Firmware Rev.        = YYYYYY..
  Model No.            = YYYY...
  Reserved (h)         = XXXX
  Double Word Capability = XXXX XXXX

  Press [Enter] key
```

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

3.22 System Configuration

3.22.1 Function Description

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

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM version (1st ID, 2nd ID)
5. BOOT ROM version
6. KBC version
7. PS Micon Version
8. Total Memory Size
9. Battery Code
10. Sound System
11. The number of printer ports
12. The number of ASYNC ports
13. The number of math co-processors
14. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. FDD Information
18. The number of HDD
19. Date/Time

3.22.2 Operations

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

```

System Configuration Display : Ver 5.xx0 [Machine Name : 2000 ]

** - Processor Type      = P3 - 750 (C0)
** - VGA Controller     = xxxxxx
*  - MS-DOS Version     = Vxxxxx
*  - BIOS-ROM Version   = Vxxxxx 1st ID = FCH, 2nd ID = 73H
*  - BOOT-ROM Version   = Vxxxxx
*  - KBC Version        = Vxxxxx
*  - PS Micom Version   = Vxxxxx (EC Version = V0.51)
*  - Total Memory Size  = xxxxxMB(Conventional Memory = 00639KB)
*  - Battery Code      =
** - Sound System       = M1535
*  - 0 Printer Adapter  LPT1 =      LPT2 =      LPT3 =
*  - 0 ASYNC Adapter    COM1 = XXX COM2 =      COM3 =
*  -
*  - 1 Math Co-Processor
*  - 1 PCMCIA Slot
*  - Modem / LAN       = None
*  - 1 Floppy Disk Drive(s) Track =000      Sector =18
*  - 1 Hard Disk Drive(s) #1 Sectors = 0009780750 (05007MB)
*  -                   #2 Sectors =          (          MB)
*  -
Press Enter Key          [Date = YYYY-MM-DD, HH:MM:SS]

```

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

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.

4-2 Battery pack			
4-2 PC card	4.3 Memory module	4.4 HDD	4.13 LCD/FL inverter/ LCD mask/ LCD cable
4.5 Keyboard/Bottom cover			
4.6 Speaker/RTC battery			4.15 Fluorescent lamp
4.7 Wireless LAN board/MDC board/HDD cable			
4.8 PC card slot			
4.9 Main board/FAN			
4.10 Sound board/SW knob			
4.11 Touch pad/MODEM jack/LED SW membrane			
4.12 Power membrane SW/Wireless LAN antenna			
4.14 Hinge			

■ Chart Notation

The chart shows the case for the following example:

◆ Removing the main board

All FRUs down to the “4.10 FR Board/CON Holder” to “4.16 Fan Module/CPU” units immediately above the main board must be removed.

Similarly, as this requires the removal of “4.9 Display Assembly”, all the units from “4.2.1 Battery Pack” to “4.8 IPS Switch/Touchpad” must be also removed.

4.2.2 PC Card	4.2.1 Battery Pack					
	4.3 Memory Module	4.4 HDD	4.5 MDC Modem	4.6 Mini PCI Card	4.7 Keyboard 4.8 IPS Switch/ Touchpad	
4.9 Display Assembly						
4.10 FR Board/ CON Holder	4.11 Speakers	4.12 RTC Battery/ VL Board	4.13 BAT CON Holder/ BT Board	4.16 Fan module/ CPU	4.18 LCD Unit/FL Inverter/ CB Board	
			4.14 CD-ROM Drive		4.19 Wireless LAN Antenna/ Display Cover/ Display Cable	4.20 Florescent Lamp
			4.15 FDD			
4.1.7 Main 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 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

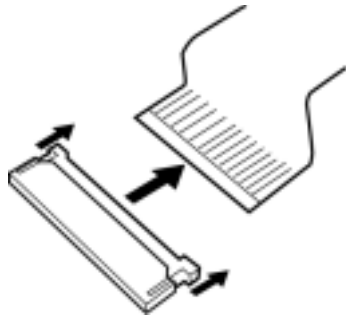
Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section “4.2.1 Battery Pack”.

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.

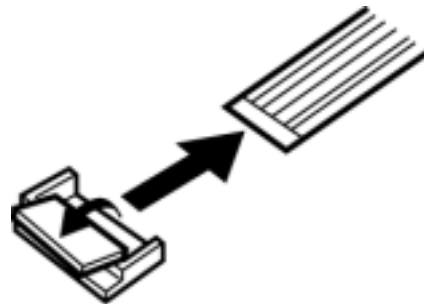
Disassembly Procedures

Three main types of cable connector are used.

- Pressure plate connector
 - Spring connector
 - Normal pin connector
1. 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.
 2. 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.
 3. 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)
- One screwdriver for LH sticks (for Mini PCI card cover)
- 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

Screw Tightening Torque

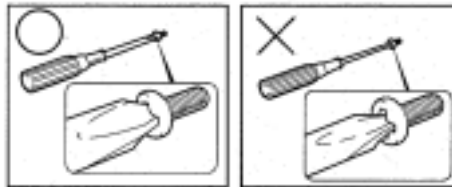
Use the following torque when tightening screws.

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, press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).



Grip Color

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

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



“Special length screw” means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.8 mm and so on.

Screw Notation

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

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw

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/PC card

4.2.1 Battery pack

Removing the battery pack

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

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

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Turn the computer upside down.
4. Slide the battery latch in the direction indicated by the arrow and open the lock. Pull the battery slightly.

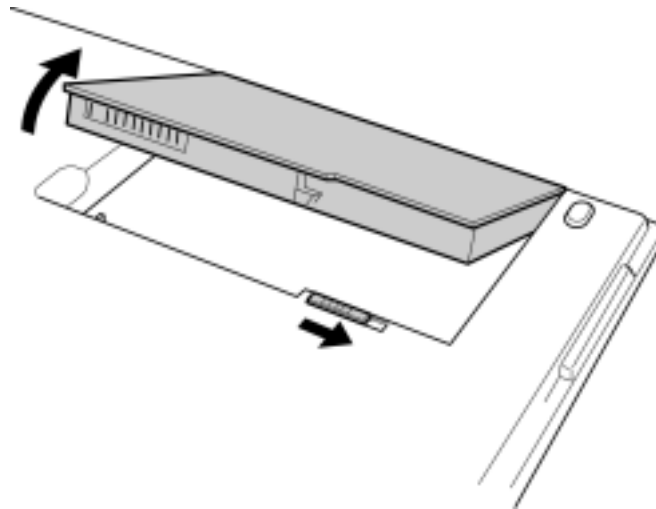


Figure 4-1 Removing the battery pack

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 always the used battery pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

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

1. Turn off the power of the computer.
2. Connect the AC adapter and all other external devices to the computer.
3. Inset the battery fitting the guides.

4.2.2 PC card

Removing the PC card

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

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

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

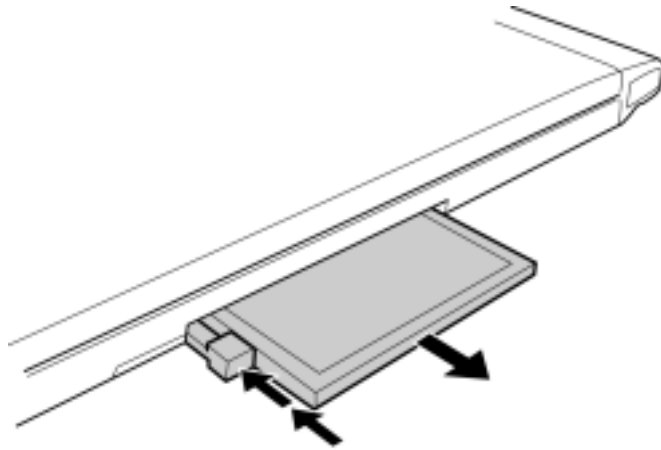


Figure 4-2 Removing the PC card

Installing the PC card

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

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

4.3 Memory module

Caution: The power of the computer must be turned off when you remove the memory module. Removing a memory module with the power on risks damaging the module or the computer itself.

Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.

Never press hard or bend the memory module.

Removing the memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See. Figure 4-3, 4-4)

1. Turn the computer upside down.
2. Remove the following screws fixing the memory slot cover.
 - M2×2.5B SPECIAL HEAD screw x2

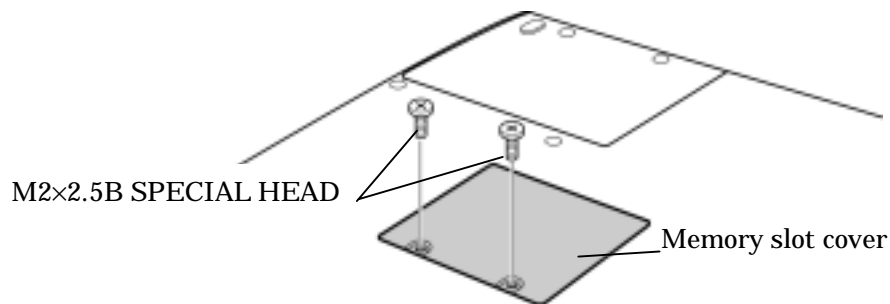


Figure 4-3 Removing the memory slot cover

3. Remove the memory slot cover.

4. Remove the following screw and the memory module.

- M2×3S S-THIN HEAD screw x1

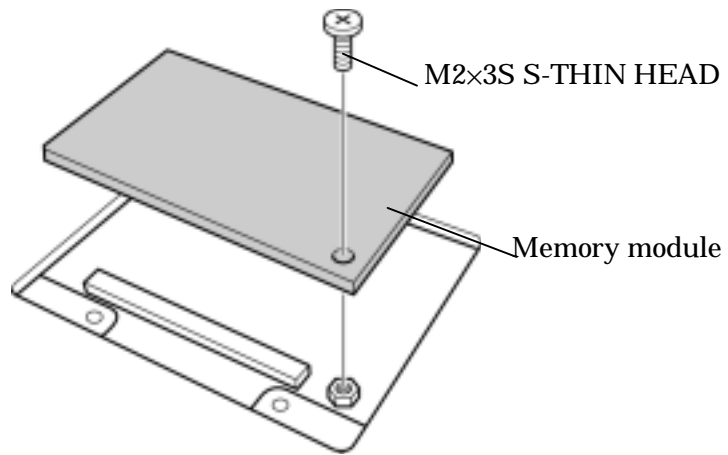


Figure 4-4 Removing the memory module

Installing the memory module

To install the memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-3,4-4)

1. Install the memory module to the main board and secure it with the following screw.

- M2×3S S-THIN HEAD screw x1

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.

2. Install the memory slot cover.
3. Secure the following screws to fix the memory slot cover.

- M2×2.5B SPECIAL HEAD screw x2

4.4 HDD

Removing the HDD

The following describes the procedure for removing the HDD (See Figure 4-5,4-6,4-7)

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. Remove the following screws fixing the HDD slot cover and remove the cover.

- M2×4B BIND screw x2

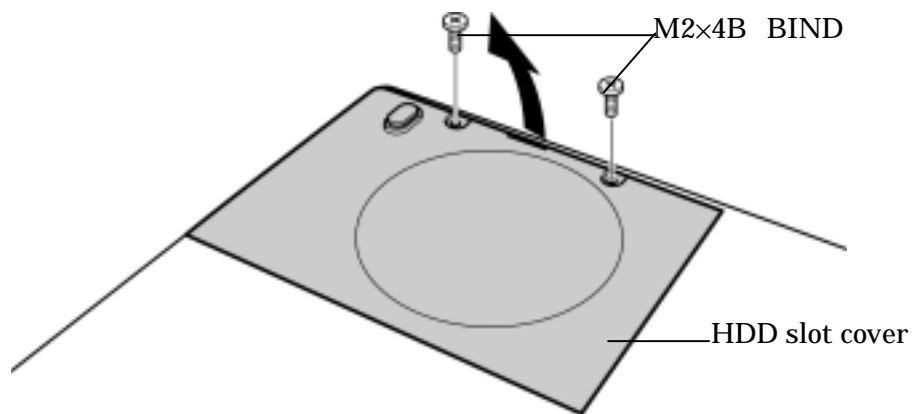


Figure 4-5 Removing the HDD slot cover

3. Hold the HDD holder handle and remove the HDD ASSY from the connector of the main board

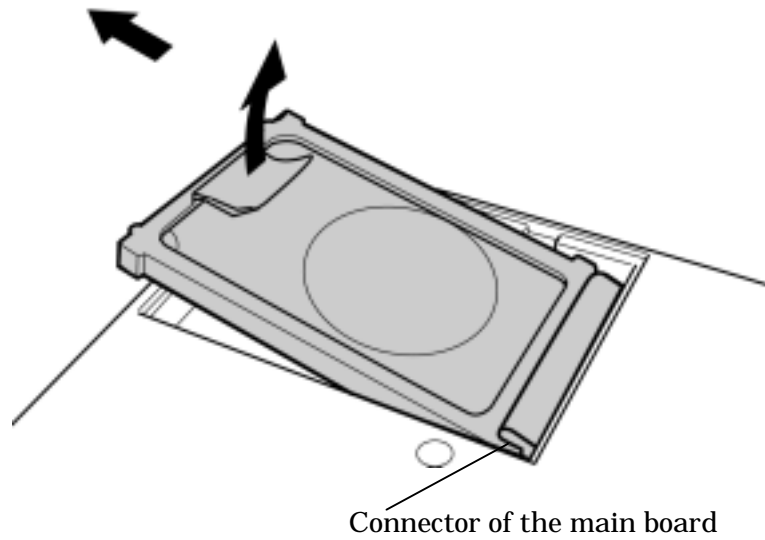


Figure 4-6 Removing the HDD ASSY

4. Detach the HDD holder from the HDD.

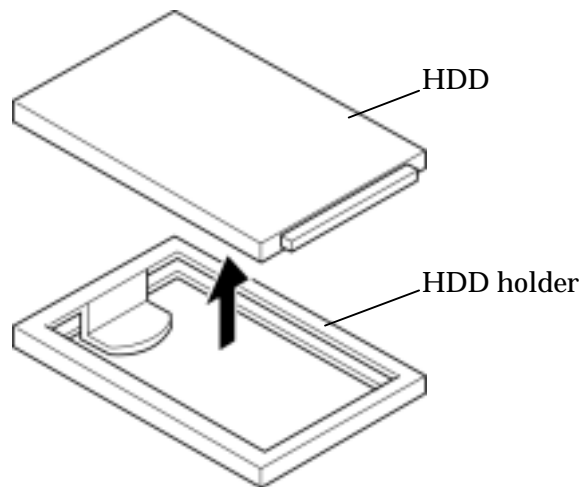


Figure 4-7 Removing the HDD

Installing the HDD

The following describes the procedure for installing an HDD (See Figure 4-5,4-6,4-7).

1. Install the HDD to the HDD holder.
2. Insert the HDD into the connector of the main board with holding the HDD holder handle and set the HDD ASSY
3. Install the HDD slot cover and secure it with the following screws.
 - M2×4B BIND screw x2

4.5 Keyboard/Bottom cover

4.5.1 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard (See Figure 4-8,4-9).

Caution: As the keytop may fall out, when handling the keyboard always hold it by the frame and do not touch the keytop.

1. Remove the following screw fixing the bottom cover

- M2×3B S-THIN HEAD screw x1

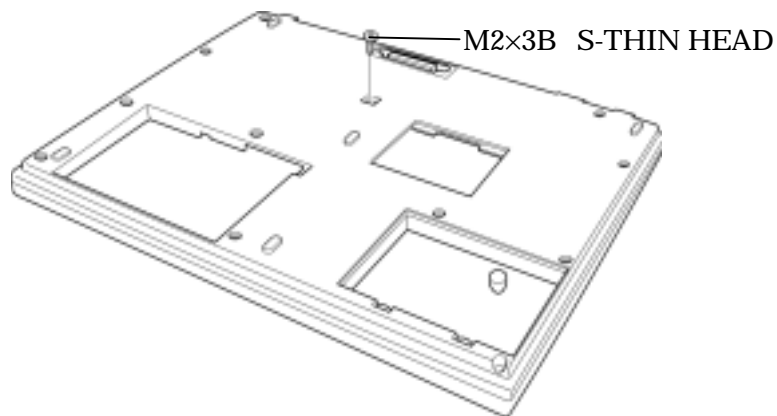


Figure 4-8 Removing the bottom cover

2. Open the display.

3. Insert your nails in the slot of the right topside and left topside of the keyboard holder and lift it up to remove.
4. Remove the following screws fixing the keyboard.

- M2×3S S-THIN HEAD screw x2

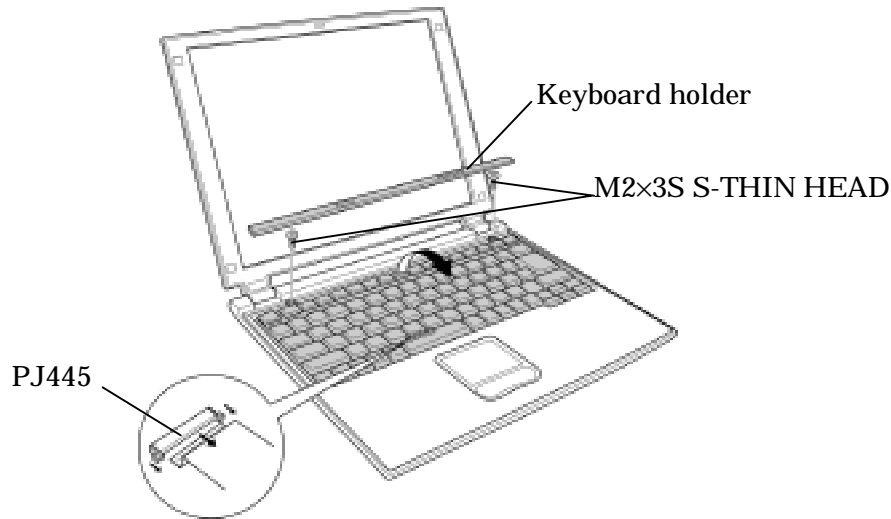


Figure 4-9 Removing the keyboard holder

5. Pick up the top of the keyboard to the front and disconnect the flexible keyboard cable from PJ445 on the main board.

Installing the keyboard

The following describes the procedure for installing the keyboard (See Figure 4-8,4-9).

1. Connect the flexible keyboard cable to PJ445 on the main board.
2. Install the keyboard and secure it with the following screws.
 - M2×3S S-THIN HEAD screw x2
3. Install the keyboard holder.
4. Close the display
5. Install the bottom cover and secure it with the following screw.

- M2×3B S-THIN HEAD screw x1

4.5.2 Bottom cover

Removing the bottom cover

The following describes the procedure for removing the bottom cover. (See Figure 4-10,4-11)

1. Disconnect the following cables from the connector of the main board.

PJ9, PJ8, PJ334, PJ7

2. Remove the following screws.

- M2×4S S-THIN HEAD screw x6

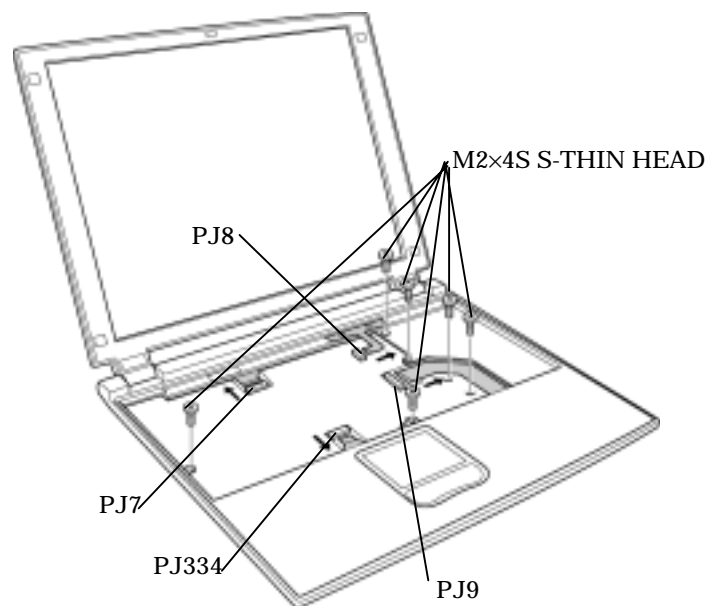


Figure 4-10 Removing the bottom cover(1)

3. Turn the computer upside down and remove the following screws.

- M2.5×6B FLAT BIND screw x2
- M2×6B BIND screw x8
- M2×4B BIND screw x2
- M2×4Z S-THIN HEAD screw x1

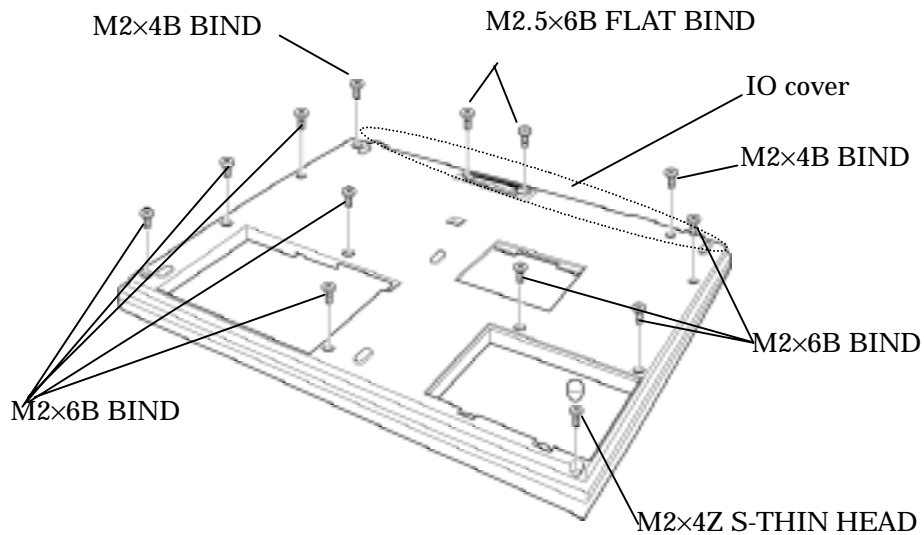


Figure 4-11 Removing the bottom cover(2)

4. Open the IO cover and remove the bottom cover.

Installing the bottom cover

The following describes the procedure for installing the bottom cover. (See Figure 4-10,4-11)

1. Turn over the computer and install the bottom cover from the IO connector side first.

2. Secure the following screws.

- M2.5×6B FLAT BIND screw x2
- M2×6B BIND screw x8
- M2×4B BIND screw x2
- M2×4Z S-THIN HEAD screw x1

3. Turn the computer face it up and secure the following screws.

- M2×4S S-THIN HEAD screw x6

4. Connect the following cables to the connector of the main board.

PJ9, PJ8, PJ334, PJ7

4.6 Speaker/ RTC battery

4.6.1 Speaker

Removing the speaker

The following describes the procedure for removing the speaker (See Figure 4-12,4-13).

1. Peel off the three glass tapes fixing the RTC battery cable, speaker cable and MDC cable.

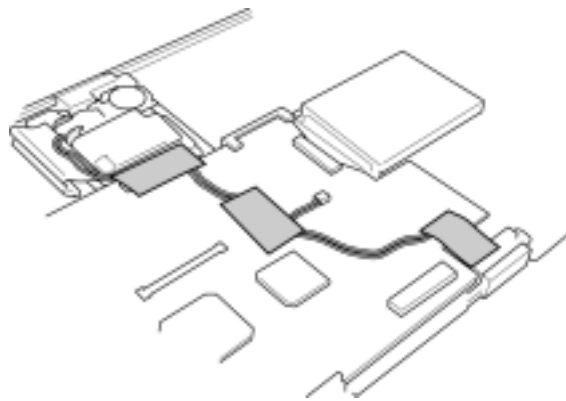


Figure 4-12 Removing the glass tapes

2. Remove the speaker cable from the connector PJ10 on the main board and remove the speaker rubber holder from the speaker slot.
3. Remove the speaker from the rubber holder.

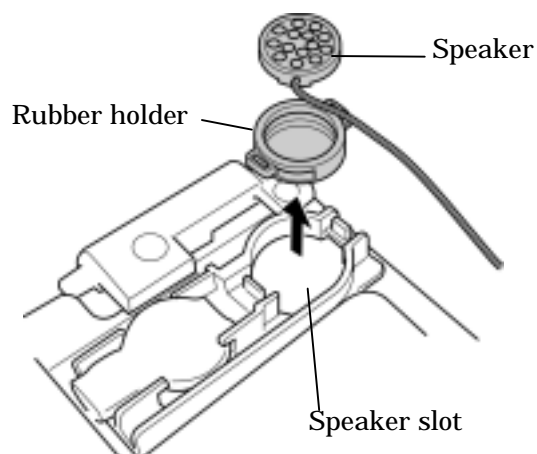


Figure 4-13 Removing the speaker

Installing the speaker

The following describes the procedure for installing the speaker (See Figure 4-12,4-13).

1. Set the speaker in the rubber holder.
2. Install the speaker rubber holder on the speaker slot and connect the speaker cable on the PJ10 on the main board.
3. Stick the three glass tapes to fix the RTC battery cable, speaker cable and MDC cable.

4.6.2 RTC battery

Removing the RTC battery

The following describes the procedure for removing the RTC battery. (See Figure 4-14)

1. Disconnect the RTC battery cable from the connector PJ790 on the main board and remove the RTC battery from the RTC battery slot.

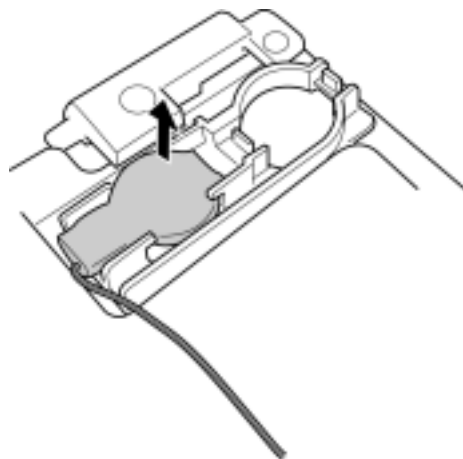


Figure 4-14 Removing the RTC battery

Installing the RTC battery

The following describes the procedure for installing the RTC battery (See Figure 4-14).

1. Install the RTC battery in the RTC battery slot and connect the RTC battery cable to the connector PJ790 on the main board.

4.7 Wireless LAN board/MDC board/HDD cable

4.7.1 Wireless LAN board

Removing the wireless LAN board

The following describes the procedure for removing the wireless LAN board. (See Figure 4-15)

1. Remove the wireless LAN board upward and remove the two wireless LAN cables from the wireless LAN board.

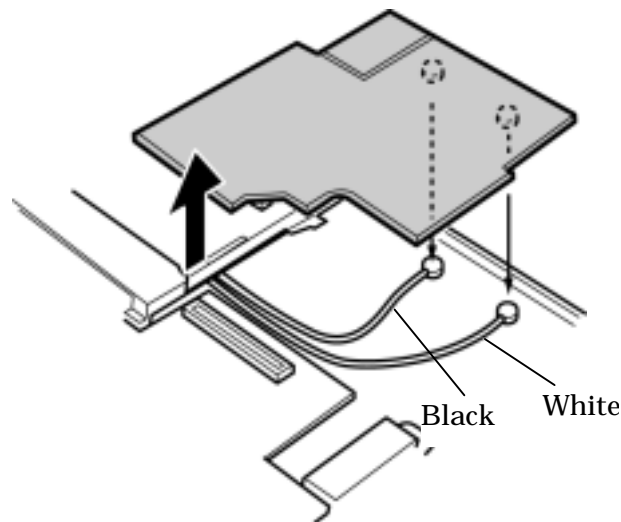


Figure 4-15 Removing the wireless LAN board

Installing the wireless LAN board

The following describes the procedure for installing the wireless LAN board (See Figure 4-15).

1. Connect the two wireless LAN cables to the wireless LAN board and connect the wireless LAN board to the main board.

4.7.2 MDC board

Removing the MDC board

The following describes the procedure for removing the MDC board. (See Figure 4-16)

1. Peel off the three glass tapes fixing the MDC cable. (See Figure 4-12)
2. Remove the following screws fixing the MDC board.
 - M2×4Z BIND screw x2
3. Disconnect the MDC cable from the MDC board.

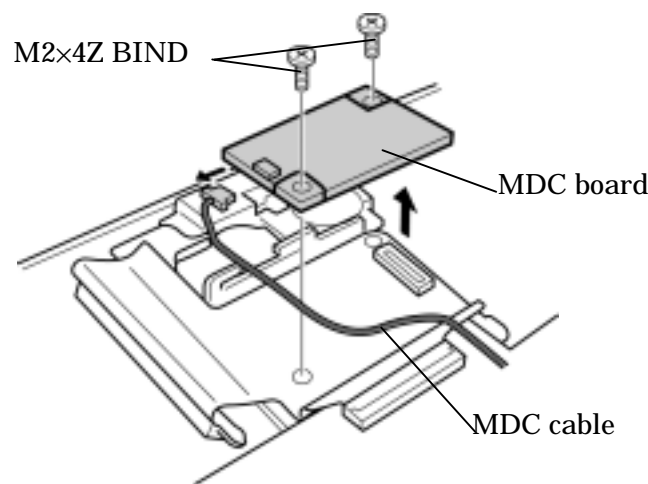


Figure 4-16 Removing the MDC board

Installing the MDC board

The following describes the procedure for installing the MDC board. (See Figure 4-16)

1. Connect the MDC cable to the MDC board.
2. Install the MDC board and secure it with the following screws.
 - M2×4Z BIND screw x2
3. Stick the three glass tapes to fix the MDC cable. (See Figure 4-12)

4.7.3 HDD cable

Removing the HDD cable

The following describes the procedure for removing the HDD cable. (See Figure 4-17)

1. Disconnect the connector PJ13 from the main board and remove the HDD cable.

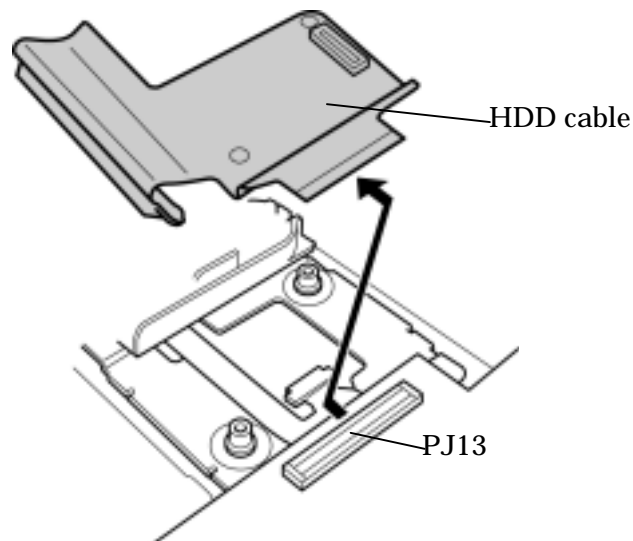


Figure 4-17 Removing the HDD cable

Installing the HDD cable

The following describes the procedure for installing the HDD cable. (See Figure 4-17)

1. Connect the connector PJ13 to the main board and install the HDD cable.

4.8 PC card slot

Removing the PC card slot

The following describes the procedure for removing the PC card slot. (See Figure 4-18)

1. Remove the following screws fixing the PC card slot.
 - M2×4Z BIND screw x2
2. Disconnect the connector PJ11 from the main board and remove the PC card slot.

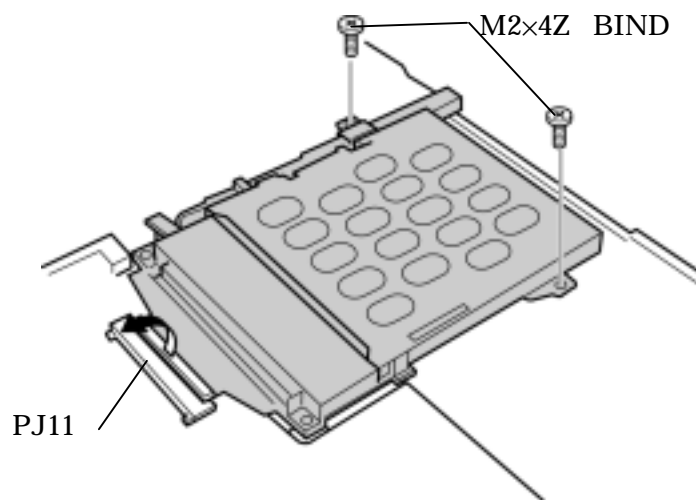


Figure 4-18 Removing the PC card slot

Installing the PC card slot

The following describes the procedure for installing the PC card slot. (See Figure 4-18)

1. Connect the connector PJ11 to the main board.
2. Install the PC card slot and secure it with the following screws.
 - M2×4Z BIND screw x2

4.9 Main board/ FAN

4.9.1 Main board

Removing the main board

The following describes the procedure for removing the main board. (See Figure 4-19)

1. Disconnect the connector PJ34, PJ35, PJ352 from the main board.
2. Remove the following screws fixing the main board.

- M2×4Z S-THIN HEAD screw x2

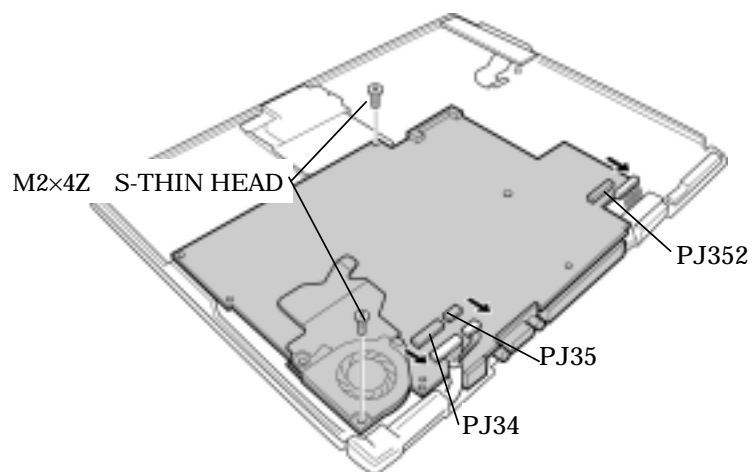


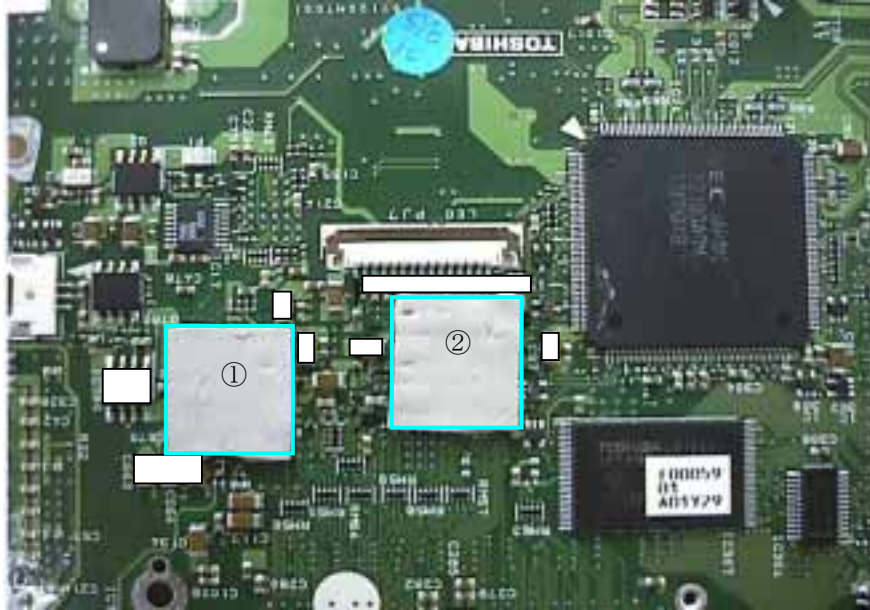
Figure 4-19 Removing the main board

Installing the main board

The following describes the procedure for installing the main board. (See Figure 4-19)

1. Stick the radiation sheet ① ② as shown in the drawing below.

Caution: Do not overlap the radiation sheet on the prohibited area shown in the following rectangles.



2. Install the main board and secure it with the following screws.
 - M2×4Z S-THIN HEAD screw x2
3. Connect the connector PJ34, PJ35, PJ352 to the main board.

4.9.2 FAN

Removing the FAN

The following describes the procedure for removing the FAN. (See Figure 4-20)

1. Remove the FAN cable from the connector PJ780 on the main board.
2. Remove the following screws fixing the FAN.

- M2×4Z BIND screw x3

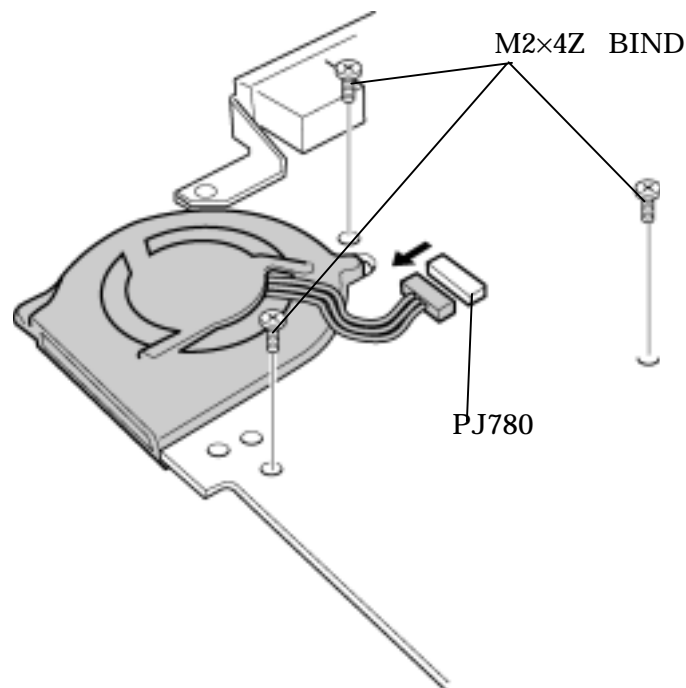


Figure 4-20 Removing the FAN

Installing the FAN

The following describes the procedure for installing the FAN. (See Figure 4-20)

1. Install the FAN and secure it with the following screws
 - M2×4Z BIND screw x3
2. Install the FAN cable to the connector PJ780 on the main board.

4.10 Sound board/SW knob

4.10.1 Sound board

Removing the sound board

The following describes the procedure for removing the sound board. (See Figure 4-21)

1. Remove the sound board.

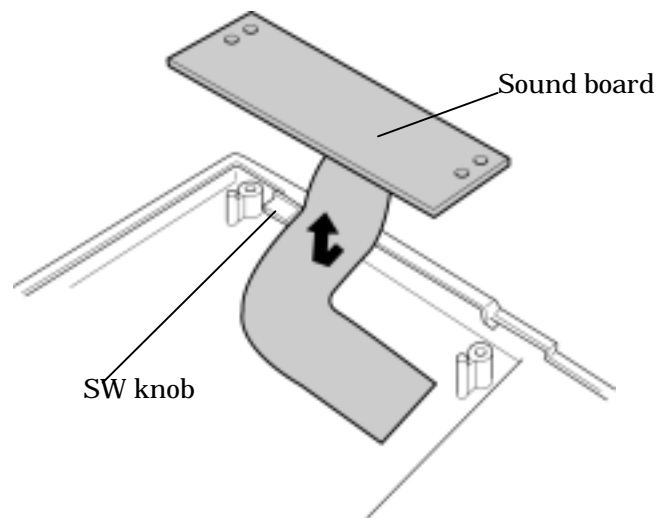


Figure 4-21 Removing the sound board

Installing the sound board.

The following describes the procedure for installing the sound board. (See Figure 4-21)

1. Install the sound board with fitting the SW lever to the SW knob slot.

4.10.2 SW knob

Removing the SW knob

The following describes the procedure for removing the SW knob. (See Figure 4-22)

1. Remove the SW lever.

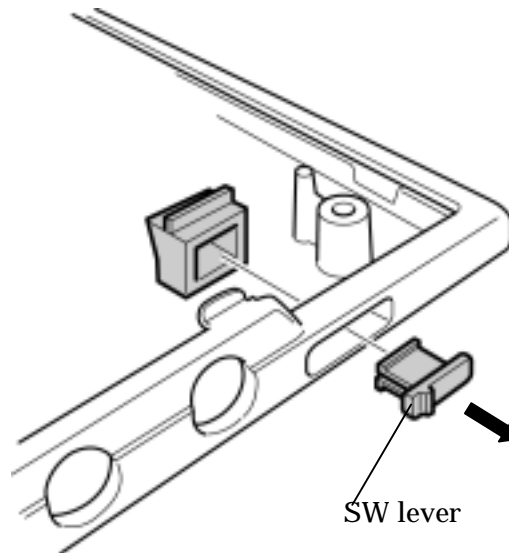


Figure 4-22 Removing the SW knob

Installing the SW knob

The following describes the procedure for installing the SW knob. (See Figure 4-22)

1. Install the SW lever.

4.11 Touch pad/ MODEM Jack/LED SW membrane

4.11.1 Touch pad

Removing the touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-23,4-24)

1. Remove the following screw and remove the latch assembly with holding the latch.

- M2×4Z BIND screw x1

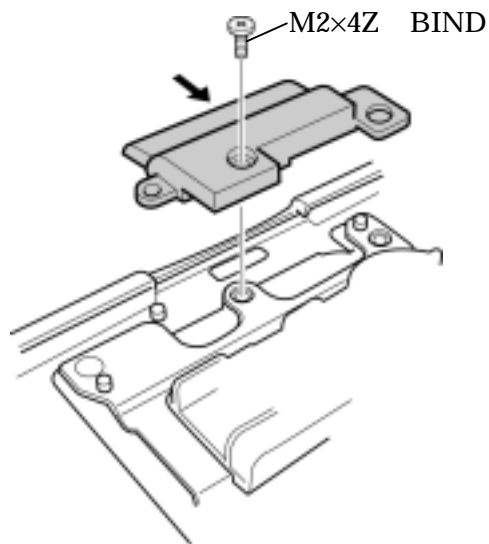


Figure 4-23 Removing the latch assembly

2. Remove the following screws fixing the touch pad and the touch pad cover.

- M2×3S S-THIN HEAD screw x3

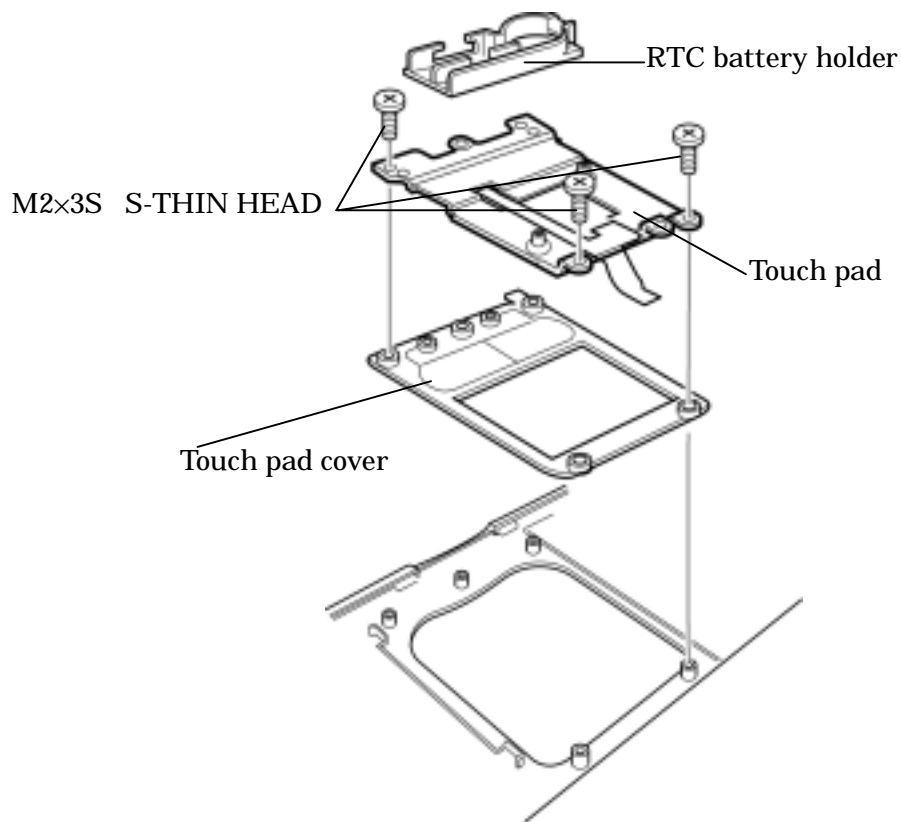


Figure 4-24 Removing the touch pad

3. Disconnect the RTC battery holder from the touch pad.

Installing the touch pad

The following describes the procedure for installing the touch pad. (See Figure 4-23,4-24)

1. Connect the RTC battery holder to the touch pad.
2. Install the touch pad and the touch pad cover and secure them with the following screws.

- M2×3S S-THIN HEAD screw x3

3. Install the latch assembly with holding the latch and secure it with the following screw.

- M2×4Z BIND screw x1

4.11.2 MODEM jack

Removing the MODEM jack

The following describes the procedure for removing the MODEM jack. (See Figure 4-25)

1. Remove the following screw fixing the MODEM jack holder and MODEM jack.

- M2×4Z BIND screw x1

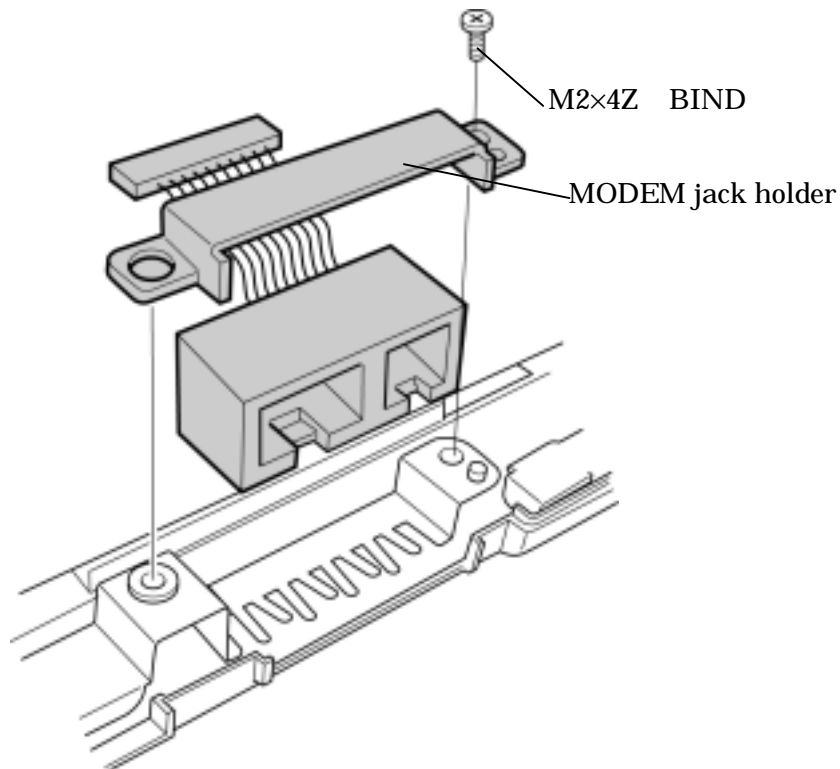


Figure 4-25 Removing the MODEM jack

Installing the MODEM jack

The following describes the procedure for installing the MODEM jack. (See Figure 4-25)

1. Install the MODEM jack holder and the MODEM jack and secure them with the following screw.

- M2×4Z BIND screw x1

4.11.3 LED SW membrane

Removing the LED SW membrane

The following describes the procedure for removing the LED SW membrane. (See Figure 4-26)

1. Lift the insulation sheet and remove the following screws fixing the LED SW membrane and the LED lens.

- M2×3S S-THIN HEAD screw x3
- M2×4Z S-THIN HEAD screw x1

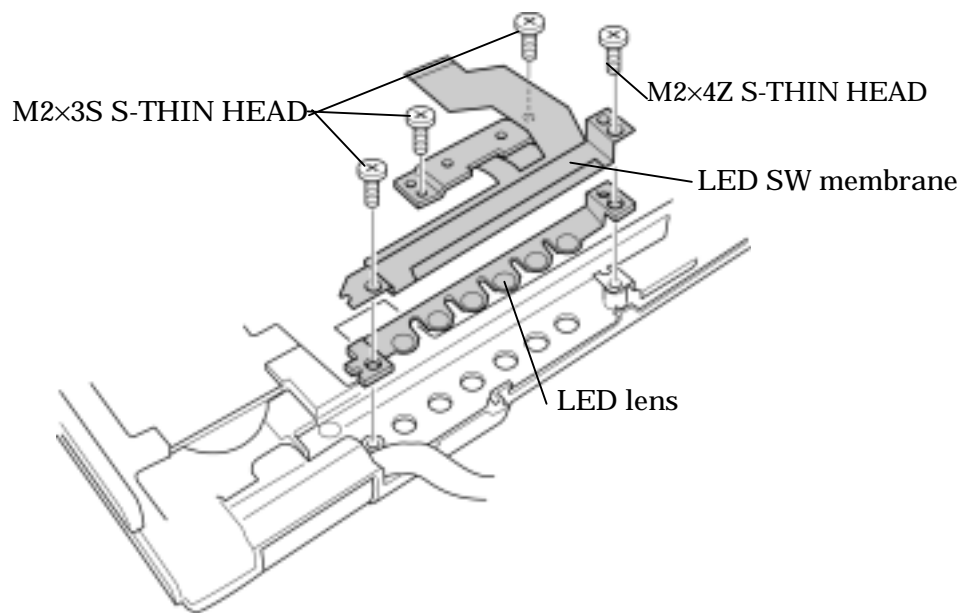


Figure 4-26 Removing the LED SW membrane

Installing the LED SW membrane

The following describes the procedure for installing the LED SW membrane. (See Figure 4-26)

1. Lift the insulation sheet and Install the LED SW membrane and the LED lens with the following screws.

- M2×3S S-THIN HEAD screw x3
- M2×4Z S-THIN HEAD screw x1

4.12 Power membrane SW/Wireless LAN antenna

4.12.1 Power membrane SW

Removing the power membrane SW

The following describes the procedure for removing the power membrane SW. (See Figure 4-27,4-28)

1. Remove the following screw fixing the plastic holder.

- M2×4Z BIND screw x1

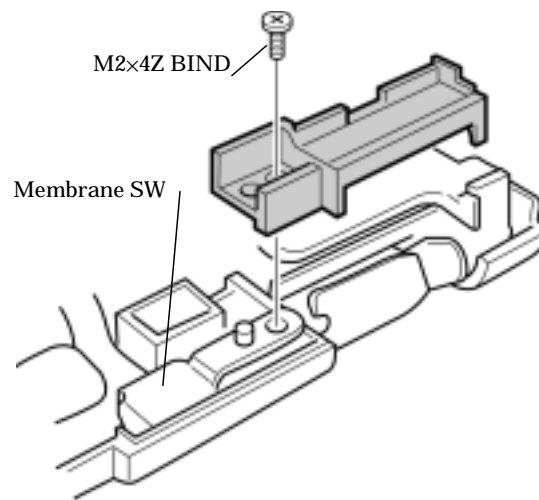


Figure 4-27 Removing the plastic holder

2. Open the display cover and remove the following screws fixing the membrane and the power membrane SW.

- M2×3S S-THIN HEAD screw x2

M2×3S S-THIN HEAD

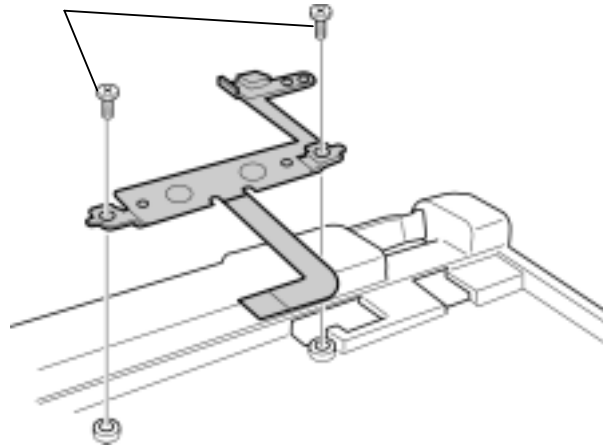


Figure 4-28 Removing the power membrane SW

Installing the power membrane SW

The following describes the procedure for installing the power membrane SW. (See Figure 4-27,4-28)

1. Close the display cover and secure the following screw and the plastic holder to fix the membrane to the hole. Also install the SW.

- M2×4Z BIND screw x1

2. Open the display cover and secure the following screws to fix the membrane.

- M2×3S S-THIN HEAD screw x2

4.12.2 Wireless LAN antenna

Removing the wireless LAN antenna

The following describes the procedure for removing the wireless LAN antenna. (See Figure 4-29,4-30,4-31)

1. Peel off the three glass tapes

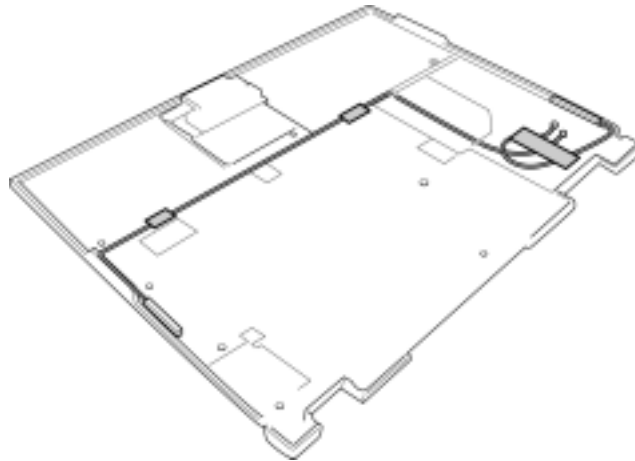


Figure 4-29 Peeling off the three glass tapes

2. Remove the right side cover. (black wire cable side) and the wireless LAN antenna. (The wireless LAN antenna is stuck to the frame)

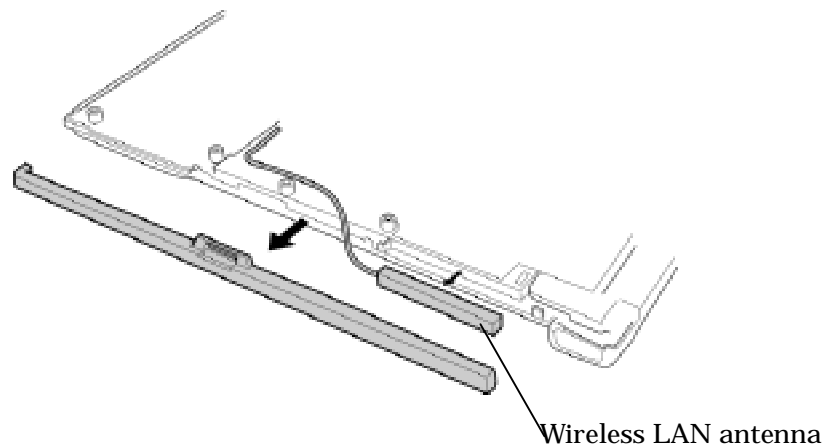


Figure 4-30 Removing the right side wireless LAN antenna

3. Remove the left side cover. (white wire cable side) and the wireless LAN antenna. (The wireless LAN antenna is stuck to the frame)

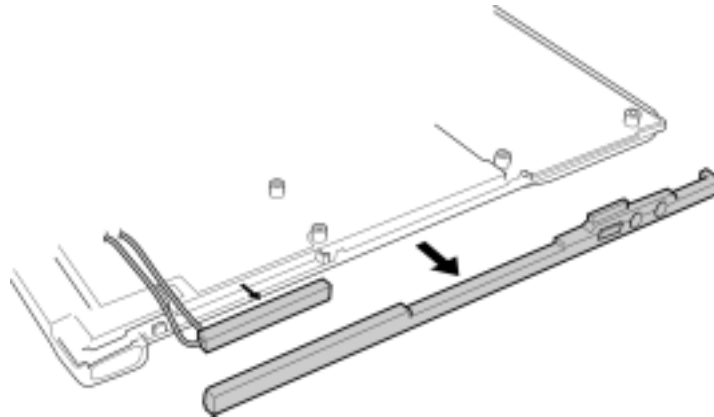


Figure 4-31 Removing the left side wireless LAN antenna

Installing the wireless LAN antenna

The following describes the procedure for installing the wireless LAN antenna. (See Figure 4-29,4-30,4-31)

1. Install the left side wireless LAN antenna. (Stick the wireless LAN antenna to the frame)
2. Install the left side cover. (white wire cable side)
3. Install the right side wireless LAN antenna. (Stick the wireless LAN antenna to the frame)
4. Install the right side cover. (black wire cable side)
5. Stick the three glass tapes

4.13 LCD mask/FL inverter/LCD/LCD cable

4.13.1 LCD mask

Removing the LCD mask

The following describes the procedure for removing the LCD mask. (See Figure 4-32)

1. Remove the seven screw masks of the LCD mask and remove the following screws.
 - M2×3S S-THIN HEAD screw x6
 - M2×3B SPECIAL HEAD screw x1
2. Remove the LCD mask

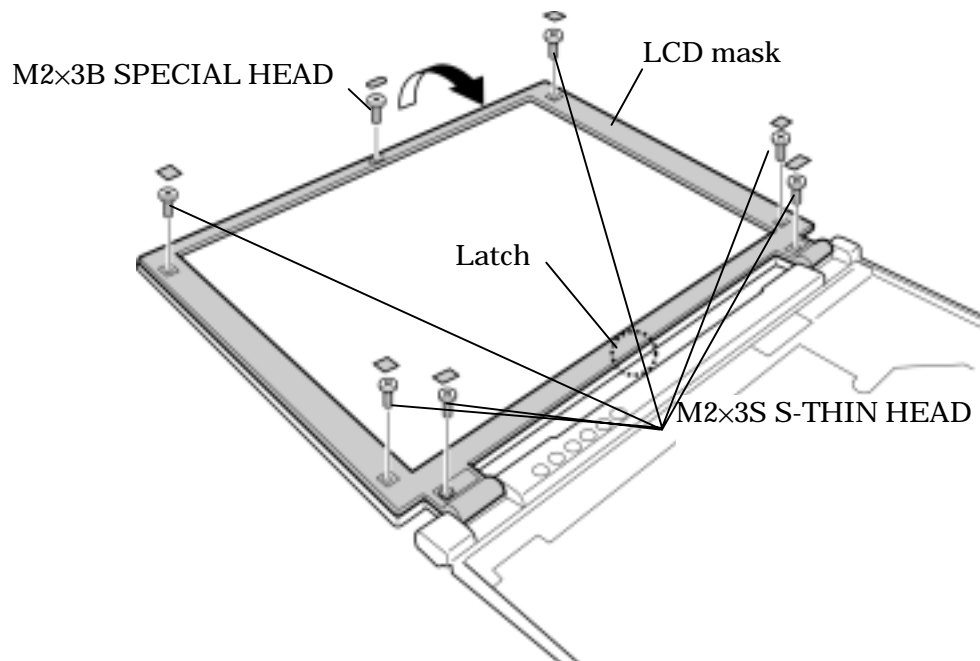


Figure 4-32 Removing the LCD mask

Installing the LCD mask

The following describes the procedure for installing the LCD mask. (See Figure 4-32)

1. Install the LCD mask
2. Secure the following screws and install the seven screw masks of the LCD mask.
 - M2×3S S-THIN HEAD screw x6
 - M2×3B SPECIAL HEAD screw x1

4.13.2 FL inverter

Removing the FL inverter

The following describes the procedure for removing the FL inverter. (See Figure 4-33)

1. Remove the following screw fixing the FL inverter.
 - M2×3S S-THIN HEAD screw x1
2. Disconnect the both sides of the cable and remove the FL inverter.

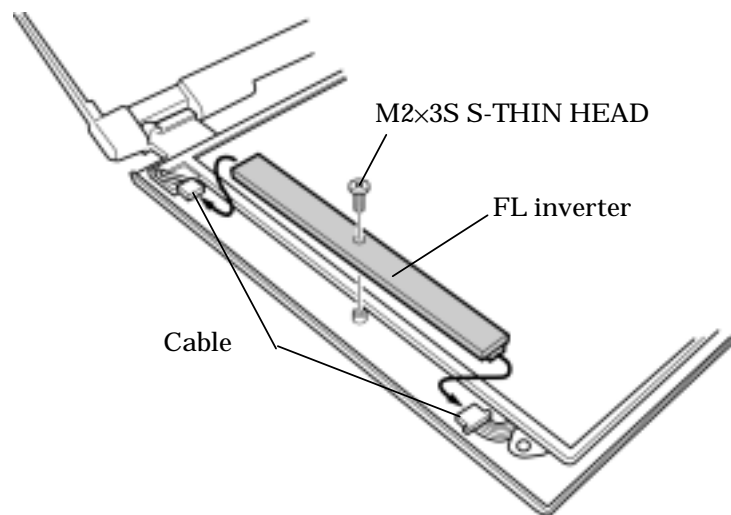


Figure 4-33 Removing the FL inverter

Installing the FL inverter

The following describes the procedure for installing the FL inverter. (See Figure 4-33)

1. Connect the both sides of the cable and install the FL inverter.
2. Install the following screw to fix the FL inverter.
 - M2×3S S-THIN HEAD screw x1

4.13.3 LCD

Removing the LCD

The following describes the procedure for removing the LCD. (See Figure 4-34)

1. Lift the top of the LCD and disconnect the LCD cable on the backside of the LCD.
2. Remove the LCD.

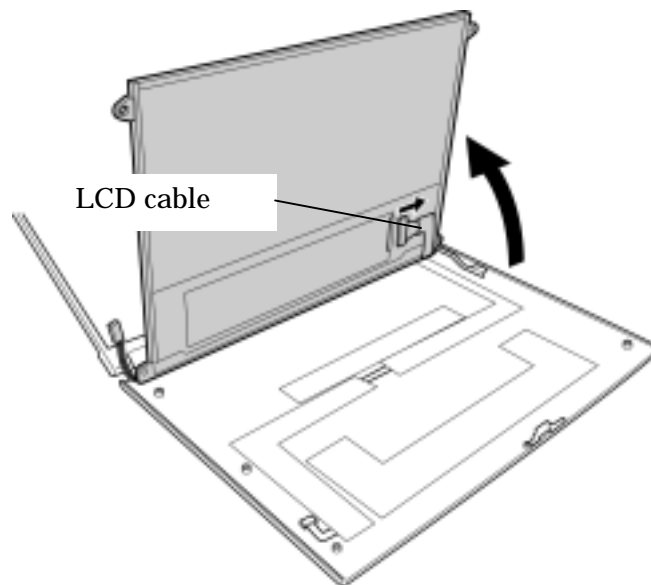


Figure 4-34 Removing the LCD

Installing the LCD

The following describes the procedure for installing the LCD. (See Figure 4-34)

1. Lift the top of the LCD and connect the LCD cable on the backside of the LCD.
2. Install the LCD.

4.13.4 LCD cable

Removing the LCD cable

The following describes the procedure for removing the LCD cable. (See Figure 4-35,4-36)

1. Remove the following screw fixing the LCD cable holder.

- M2×4Z S-THIN HEAD screw x1

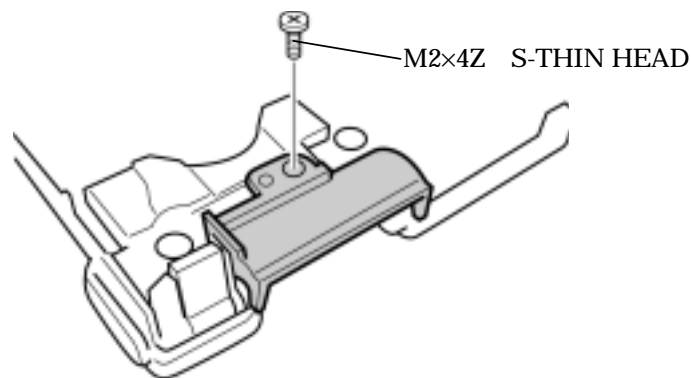


Figure 4-35 Removing the LCD cable holder

2. Remove the following screw.

- M4×5Z BIND screw x1

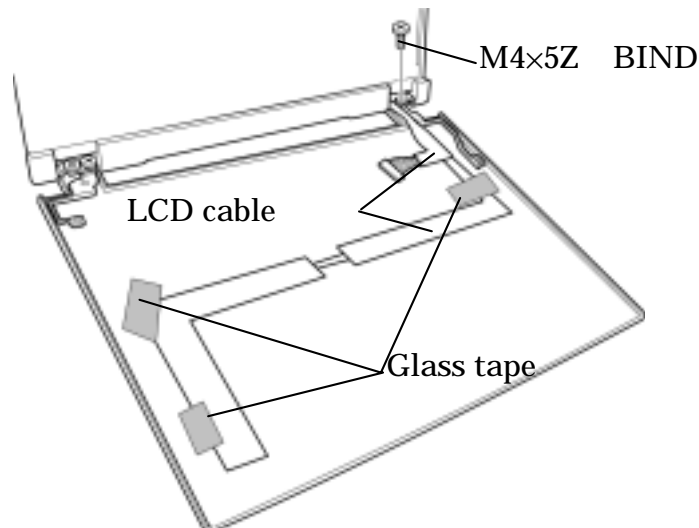


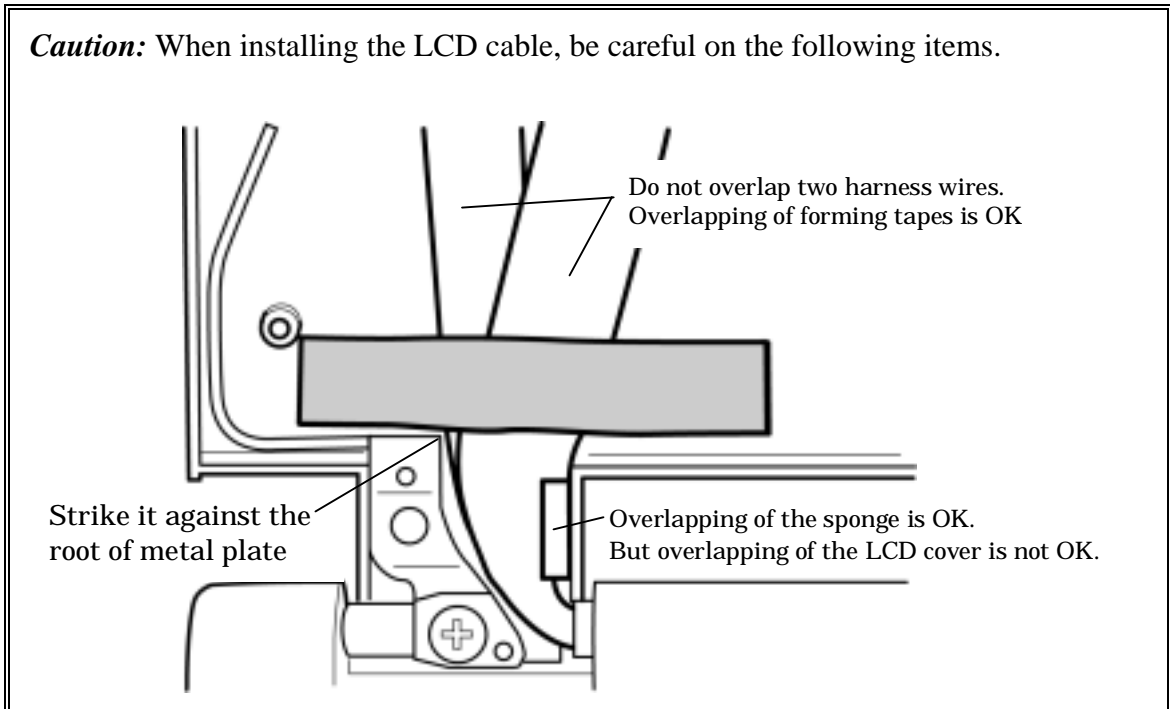
Figure 4-36 Removing the screw

3. Peel off the four glass tapes and remove the LCD cable

Installing the LCD cable

The following describes the procedure for installing the LCD cable. (See Figure 4-35,4-36)

1. Connect the LCD cable and stick the four glass tapes.



2. Secure the following screw on the palm rest cover side.

- M4×5Z BIND screw x1

3. Install the LCD cable holder and secure it with the following screw.

- M2×4Z S-THIN HEAD screw x1

4.14 Hinge

Removing the LCD cover hinge

The following describes the procedure for removing the LCD cover hinge. (See Figure 4-37,4-38)

1. Remove the following screws and separate the palm rest cover.

- M2.5×5Z BIND screw x2

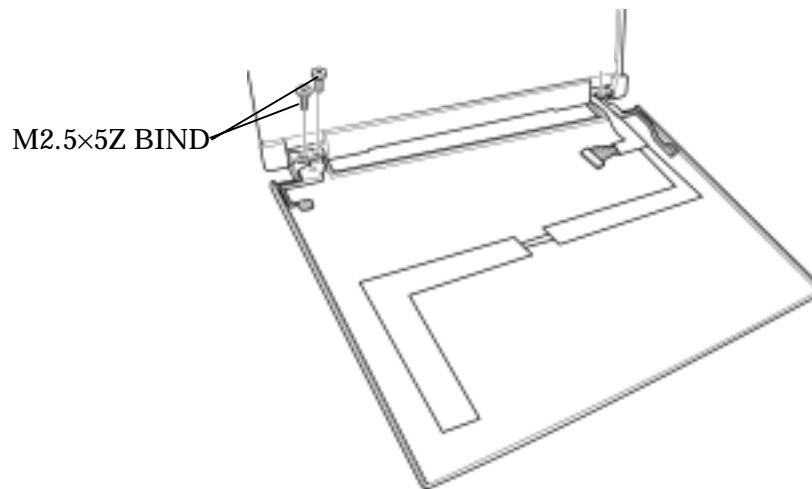


Figure 4-37 Separating the palm rest cover

2. Remove the following screws fixing the both sides of the hinge.

- M2×3S S-THIN HEAD screw x2

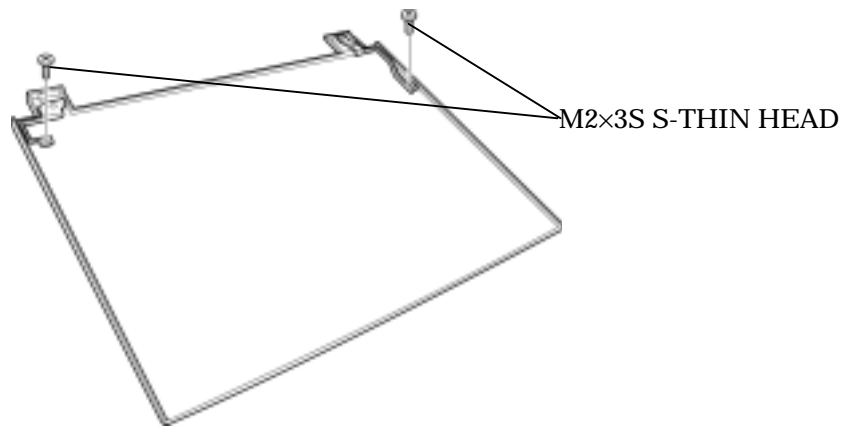


Figure 4-38 Removing the LCD cover hinge

Installing the LCD cover hinge

The following describes the procedure for installing the LCD cover hinge. (See Figure 4-37,4-38)

1. Install the both sides of the hinge and secure them with the following screws.

- M2×3S S-THIN HEAD screw x2

2. Install the palm rest cover and secure it with the following screws.

- M2.5×5Z BIND screw x2

Removing the palm rest cover hinge

The following describes the procedure for removing the palm rest cover hinge. (See Figure 4-39,4-40)

1. Remove the following screws fixing the left side hinge.

- M2.5×5Z BIND screw x1
- M2.5×3Z S-THIN HEAD screw x2

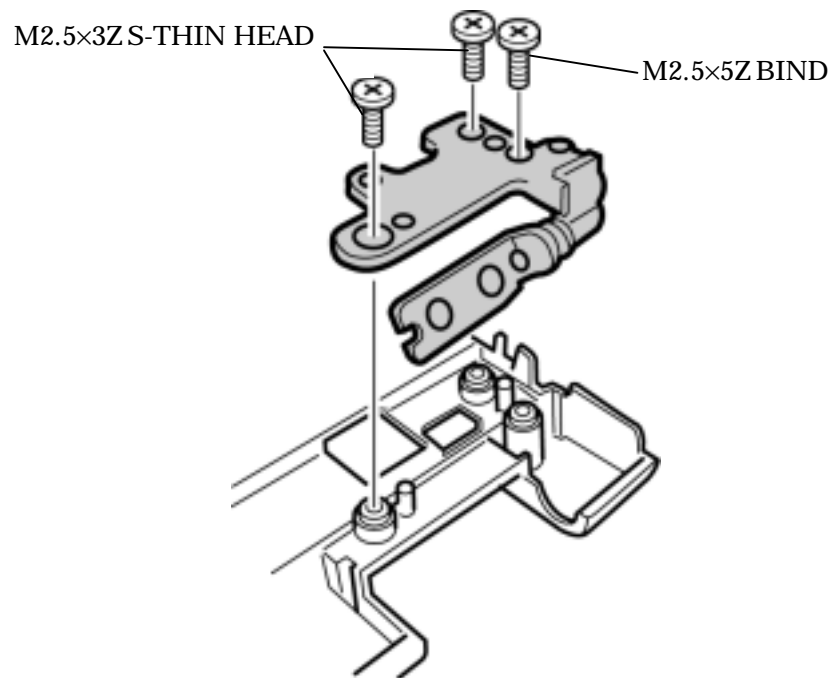


Figure 4-39 Removing the palm rest cover left side hinge

2. Remove the following screws fixing the right side hinge and the latch metal fitting.

- M2.5×5Z BIND screw x1
- M2.5×3Z S-THIN HEAD screw x2

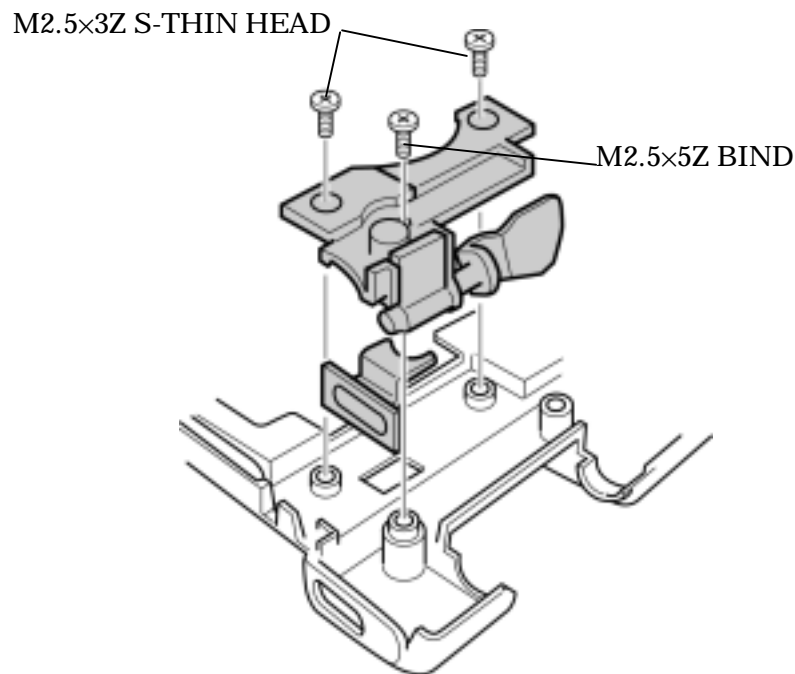


Figure 4-40 Removing the palm rest cover right side hinge

Installing the palm rest cover hinge

The following describes the procedure for installing the palm rest cover hinge. (See Figure 4-39,4-40)

1. Install the left side hinge and secure it with the following screws.

- M2.5×5Z BIND screw x1
- M2.5×3Z S-THIN HEAD screw x2

2. Install the right side hinge and the latch metal fitting and secure them with the following screws.

- M2.5×5Z BIND screw x1
- M2.5×3Z S-THIN HEAD screw x2

4.15 Fluorescent Lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part.No	Supplier	Section
14.1 inch	VF2095P01	Toshiba	4.15.1

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.

4.15.1 Replacing the 14.1 Inch Toshiba Fluorescent Lamp

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-41 to 4-51).

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) Remove the items indicated by the diagonal line in the drawing (①: FL cable holding tape (x1), ②: bezel tapes for lamp (x2), and ③: X-PCB insulation sheet (x1)).

Caution: 1) Be careful not to damage the FPC, PCB, B/L and reflection sheet.
2) Leave the insulation sheet on the bezel to reuse later.

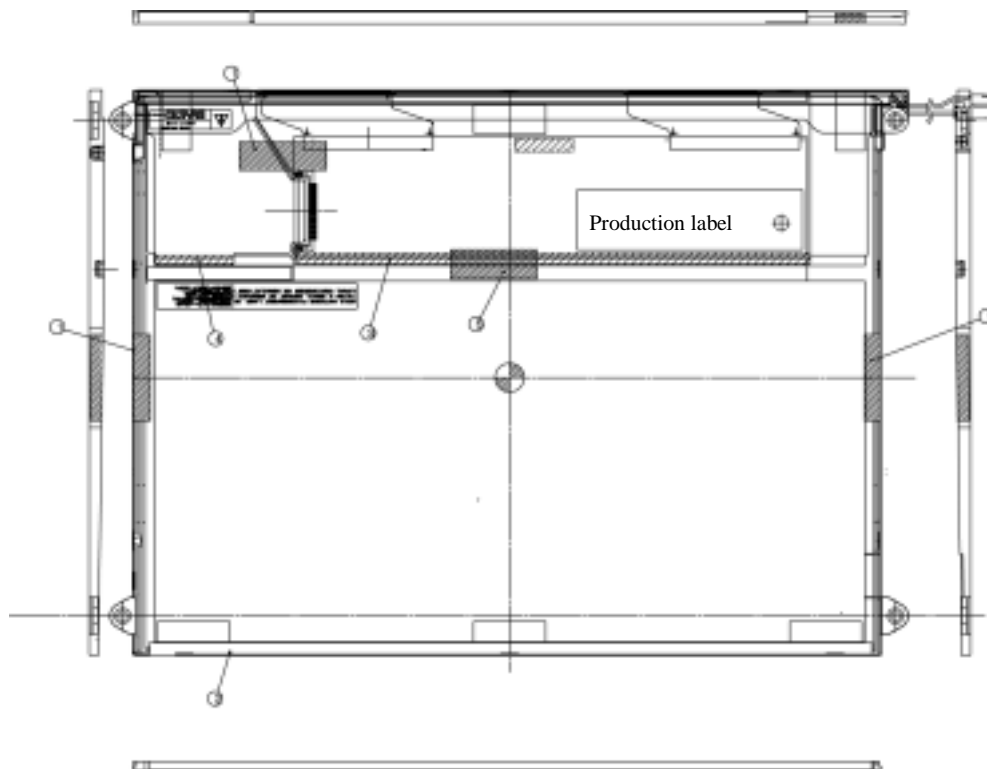


Figure 4-41 Replacing Toshiba fluorescent lamp(1)

2. Removing screws

1) Spread out the insulation sheet 1, 2 without detaching from the bezel side, as shown in the drawing below.

2) Remove the left side screws and right side screws in the order ① shown in the drawing below.

Caution: Use a Philips screwdriver with type 0 bit to remove the screws.

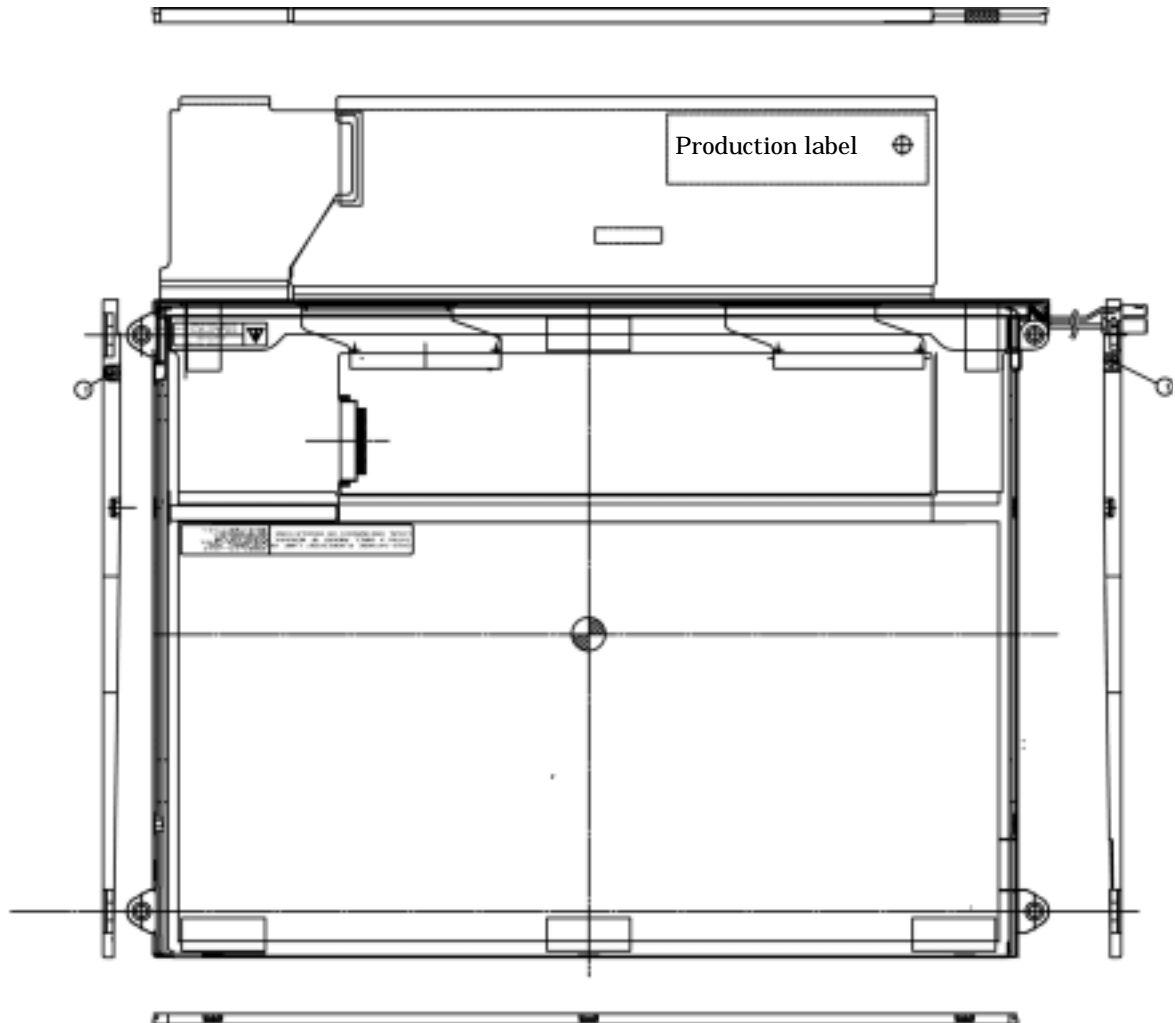


Figure 4-42 Replacing Toshiba fluorescent lamp(2)

3. Removing the bezel

- 1) Place the module with the insulation sheet facing upwards.
- 2) Unhook latches (five at the top edge and two at the bottom edge) between the bezel and frame.
- 3) Peel off slowly the double-adhesive tape of the bezel bottom and remove the bezel.

Caution:1) When peeling off the latches and the double-faced tapes, be careful not to damage the FPC.

- 2) When removing the bezel, do not break it and do not deform the bezel.

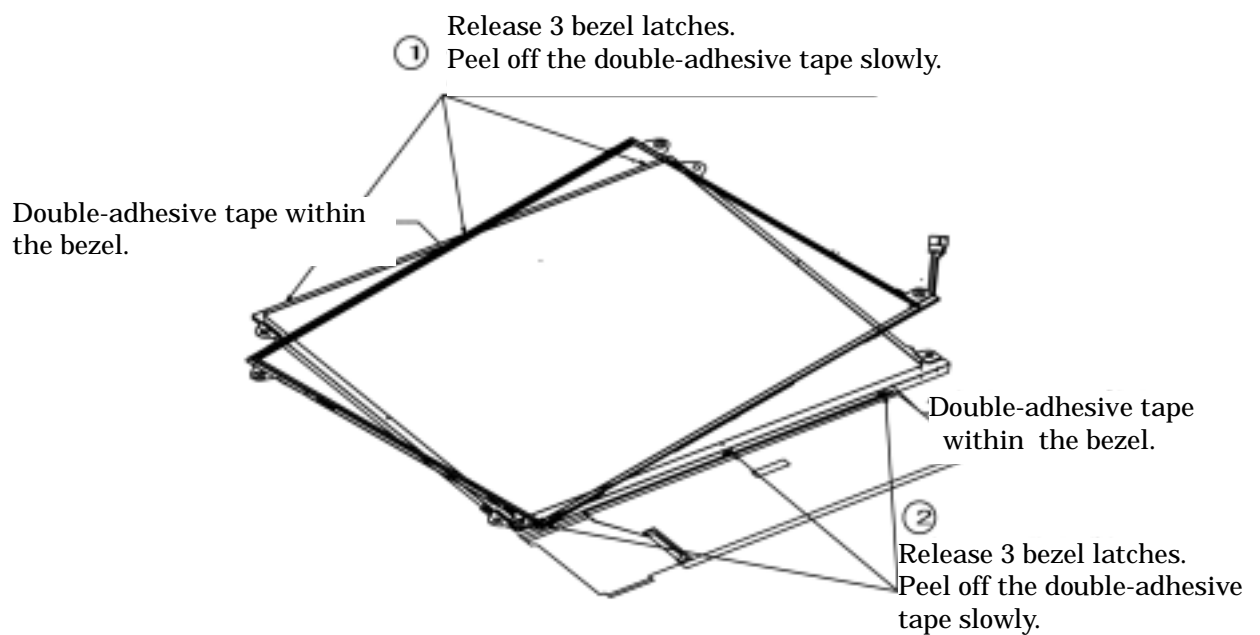


Figure 4-43 Replacing Toshiba fluorescent lamp(3)

4. Opening up the PCB
 - 1) Open the PCB to the horizontal position as shown in the drawing below.

Caution: Be careful not to damage the FPC.

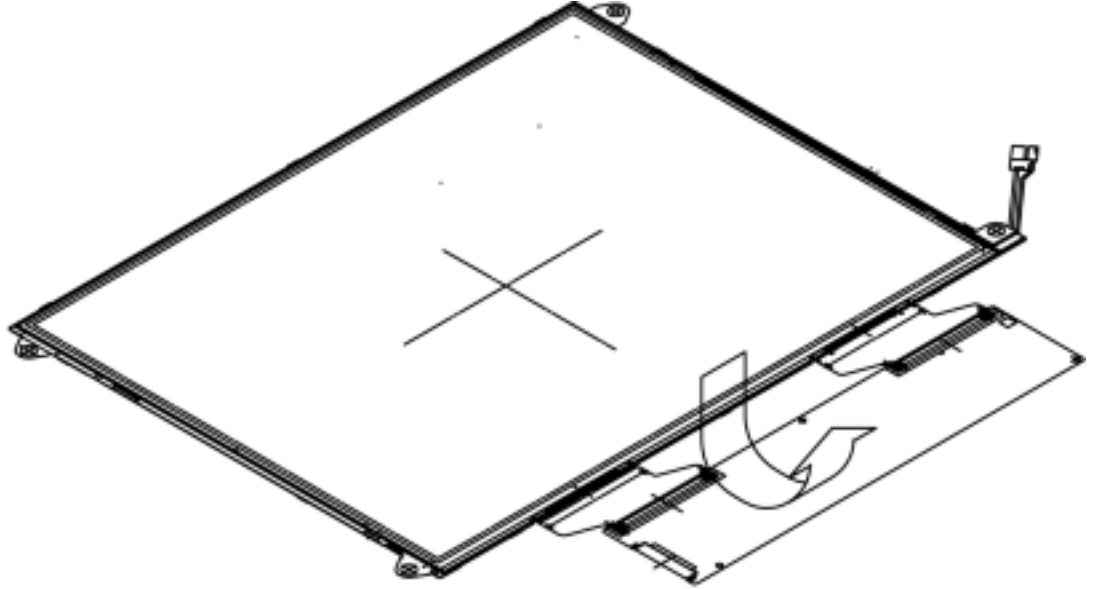


Figure 4-44 Replacing Toshiba fluorescent lamp(4)

5. Removing the cell with the PCB
 - 1) Remove the cell with the PCB from the backlight unit as shown in the drawing below.

Caution: 1) Peel off the cell carefully not to break it.

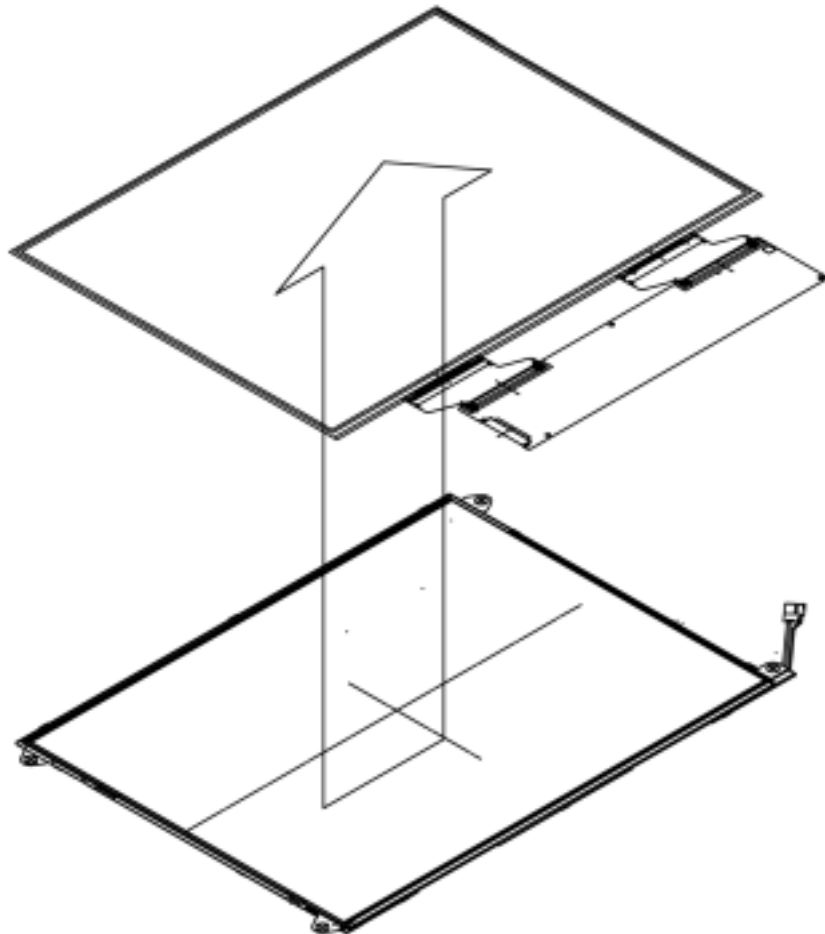


Figure 4-45 Replacing Toshiba fluorescent lamp(5)

Assembling the module

6. Checking the backlight

- 1) Check the items shown in the drawing below.

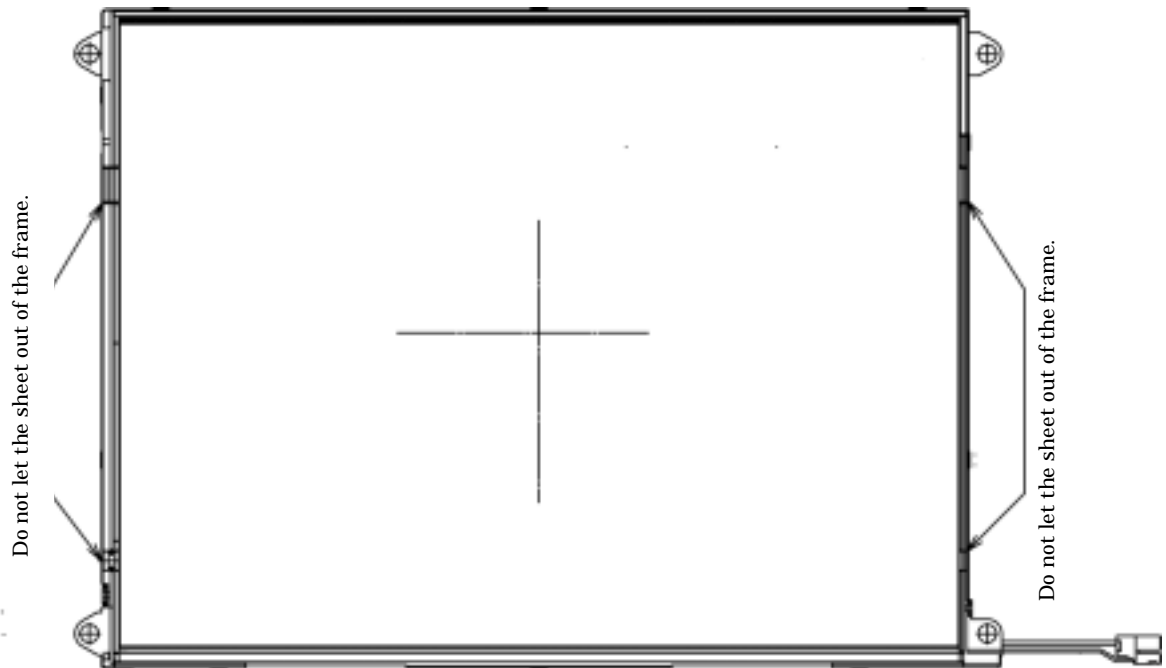


Figure 4-46 Replacing Toshiba fluorescent lamp(6)

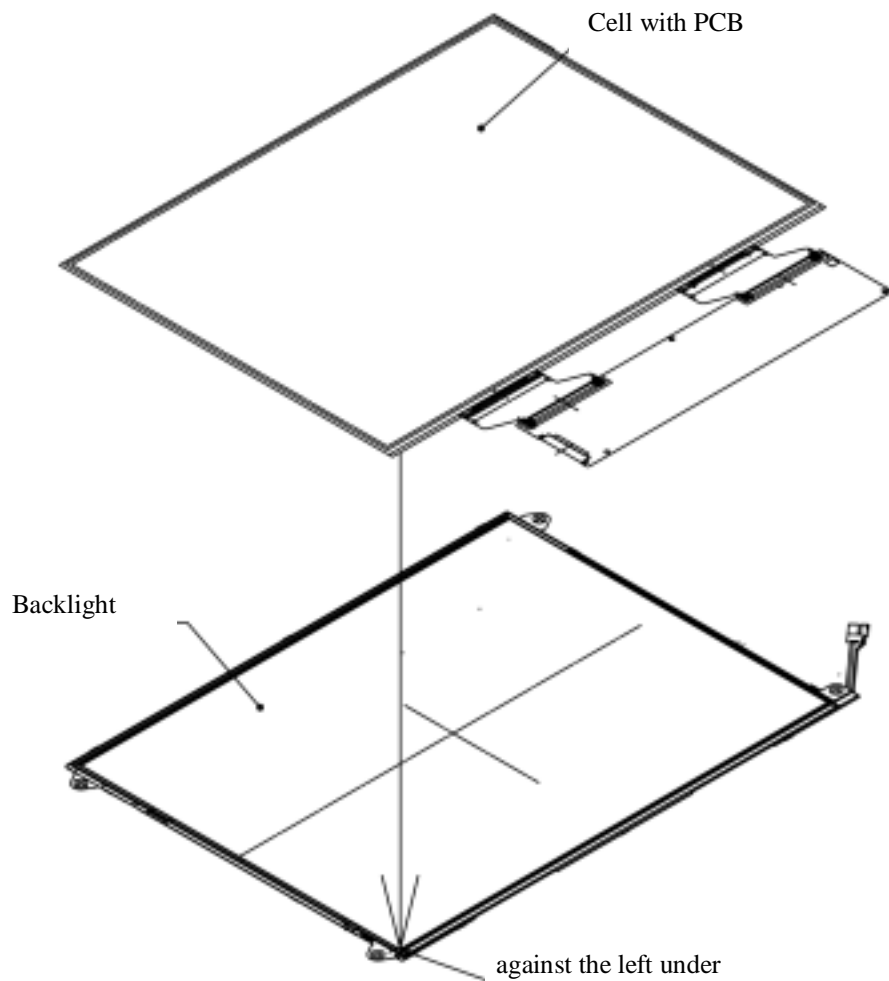
7. Assembling the cell with the PCB

1) Illuminate the backlight.

2) 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 the left under corner as shown below.

2) Be careful not to damage the FPC.

*Figure4-47 Replacing Toshiba fluorescent lamp(7)*

8. Folding and temporary fixing the FPC (PCB).
 - 1) Fold the FPC (PCB) around the back of the backlight unit as shown in the drawing below.

Caution: 1) Be careful not to damage the FPC.

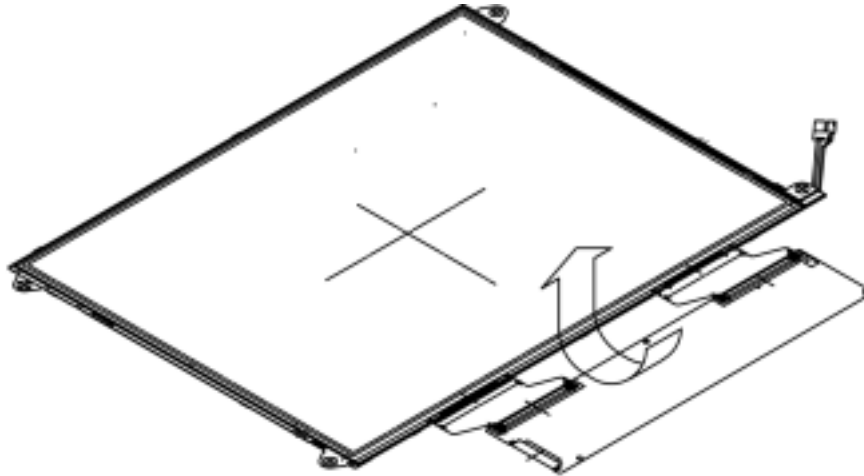


Figure 4-48 Replacing Toshiba fluorescent lamp(8)

- 2) Stick the bezel tape² and fix the PCB and frame temporary as shown in the drawing below.

Caution: 1) Be careful not to damage the B/L and not to Stick to the parts of the PCB.

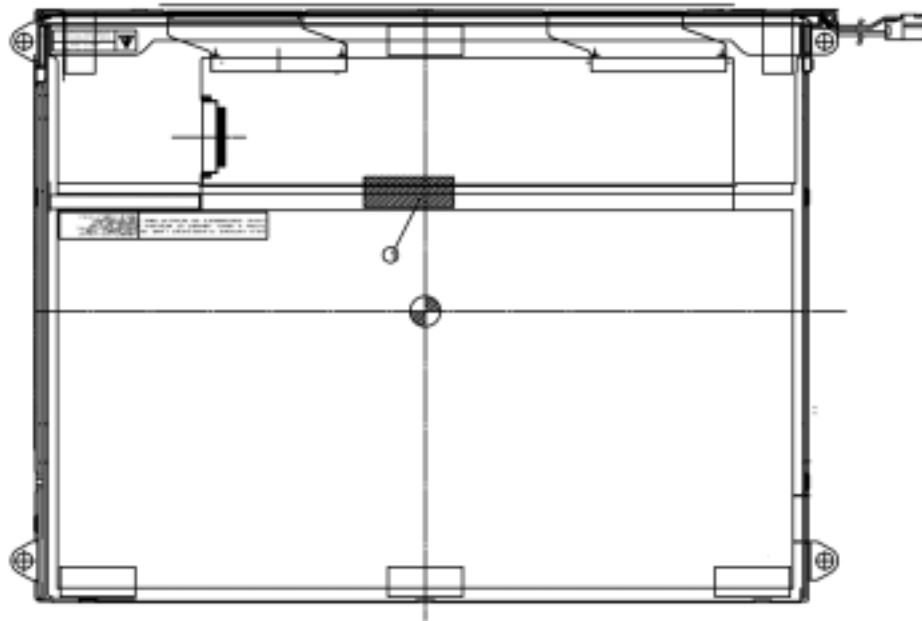


Figure 4-49 Replacing Toshiba fluorescent lamp(9)

9. Installing the bezel

1) Install the bezel to the left under the frame as shown in the drawing below ①

1) *Be careful not to damage the cell and the FPC.*

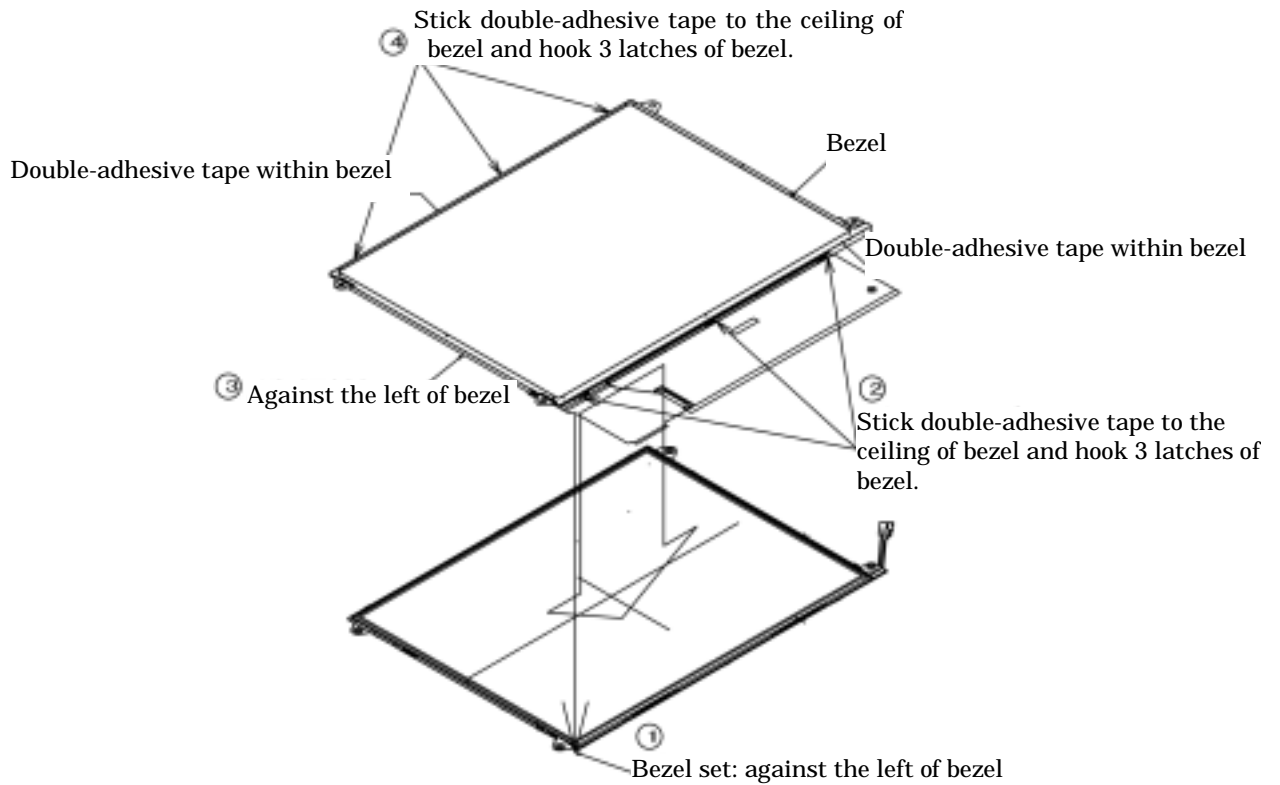


Figure 4-50 Replacing Toshiba fluorescent lamp(10)

10. Screwing the PCB and the bezel

- 1) Use two screws to secure the left and right edge in the order of ④.

Caution: 1) The screw tightening torque is $0.167\text{N}\cdot\text{m}$ ($1.7\text{kgf}\cdot\text{cm}$) for all screws.
2) Use a Philips screwdriver with type 0 bit.

11. Installing the tapes and insulation sheets

- 1) Stick the double-faced tape of the insulation sheet 1 and 2 in the drawing below ②
- 2) Stick the bezel tape 1 to the bottom edge of the lamp side in the drawing below ③.
- 3) Stick the bezel tape 2 to the.
- 4) Stick the bezel tape 2 to the insulation tape 1 and 2 in the drawing below ⑤

Caution: 1) Refer to the drawing below.
2) When the tapes and insulation sheets are installed, be careful not to damage the cell and B/L.

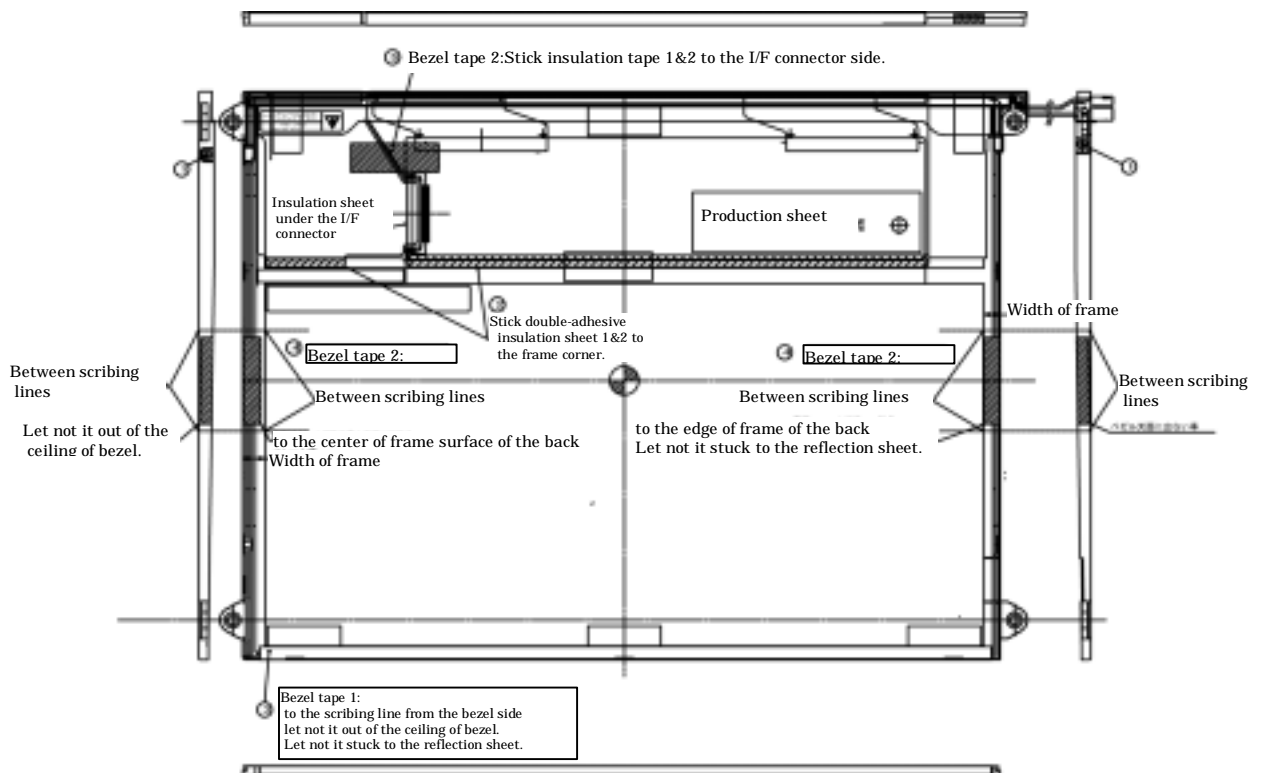


Figure 4-51 Replacing Toshiba fluorescent lamp(11)

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Table D-1 Display codes D-1

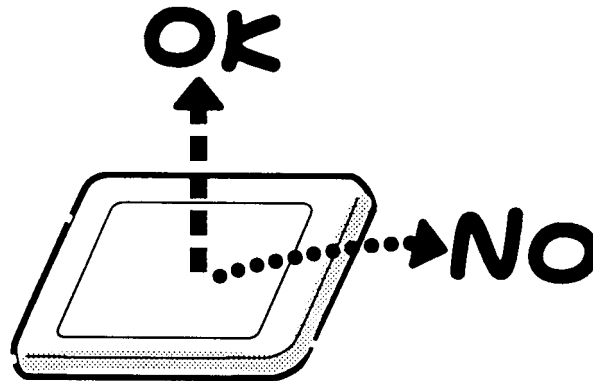
Table G-1 MTBF G-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



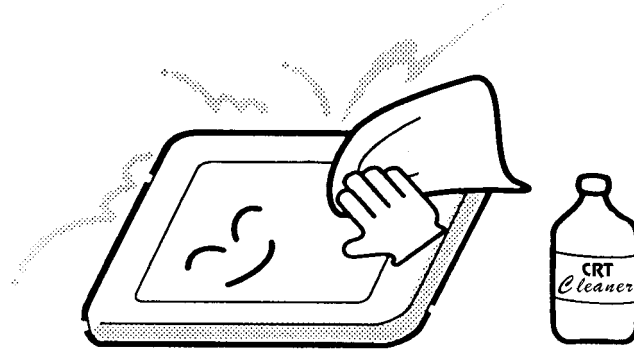
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

Also, the panel's polarized surface is easily scarred, so be careful when handling it.

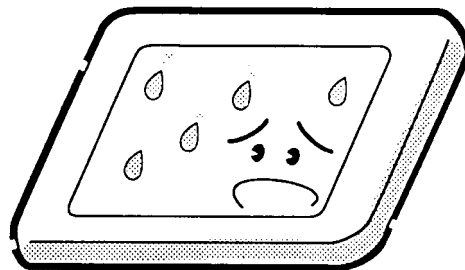


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

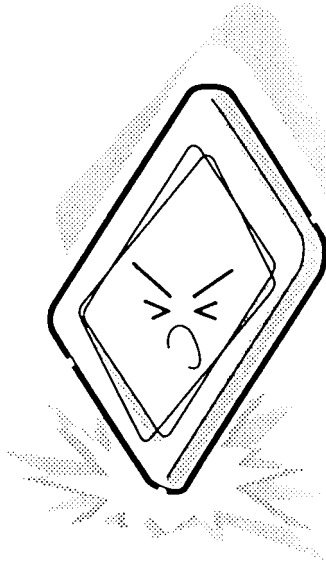
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



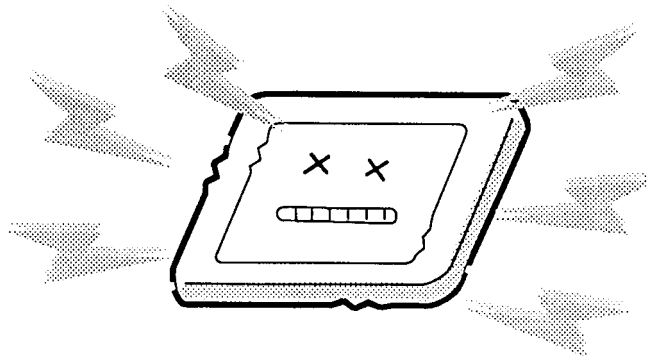
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



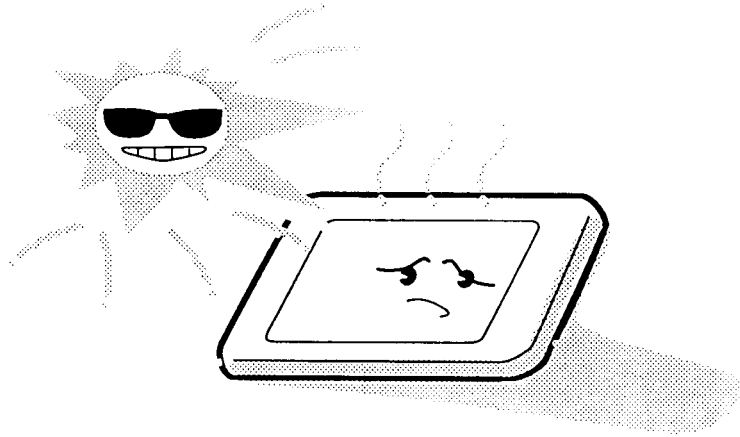
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



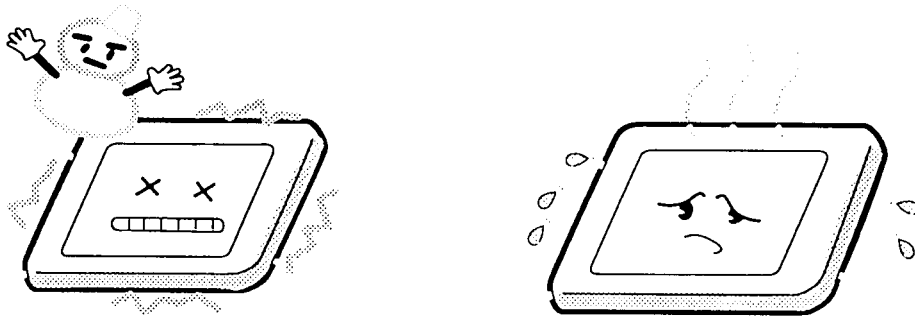
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



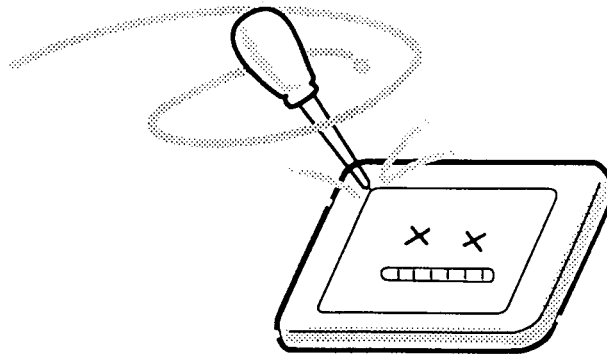
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



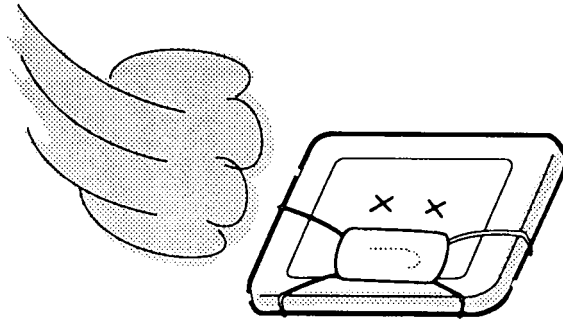
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 Main Board Front View

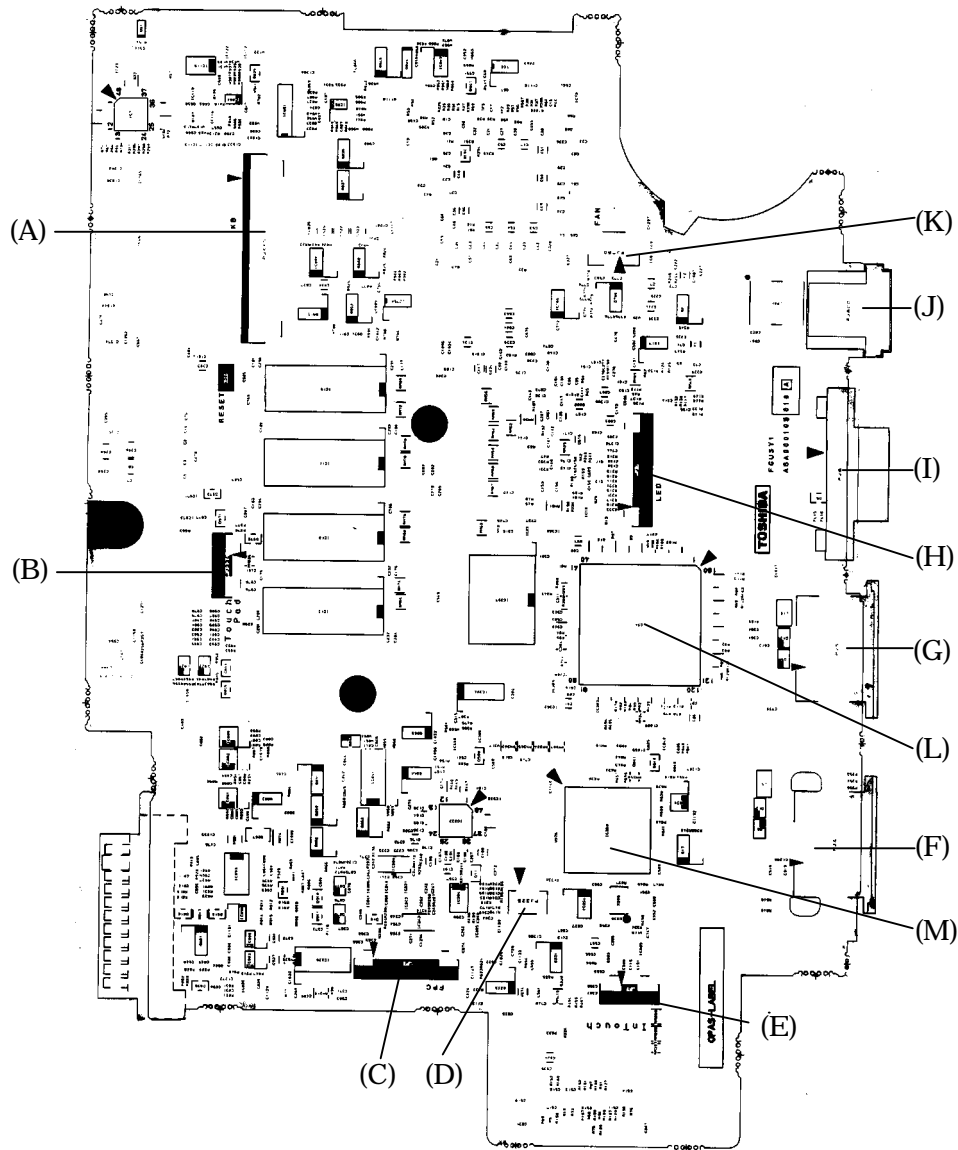


Figure B-1 Main board layout (front)

Table B-1 Main board (front)

Mark	Number	Name
(A)	PJ445	Keyboard connector
(B)	PJ334	Touch pad connector
(C)	PJ9	ME board I/F connector
(D)	PJ325	Debug connector
(E)	PJ8	Intouch button connector
(F)	PJ4	USB1 connector
(G)	PJ5	USB2 connector
(H)	PJ7	LED SW connector
(I)	PJ6	Outside CRT connector
(J)	PJ800	AC adapter connector
(K)	PJ780	Cooling fan connector
(L)	IC24	USB controller
(M)	IC353	LAN controller

B.2 Main Board Back View

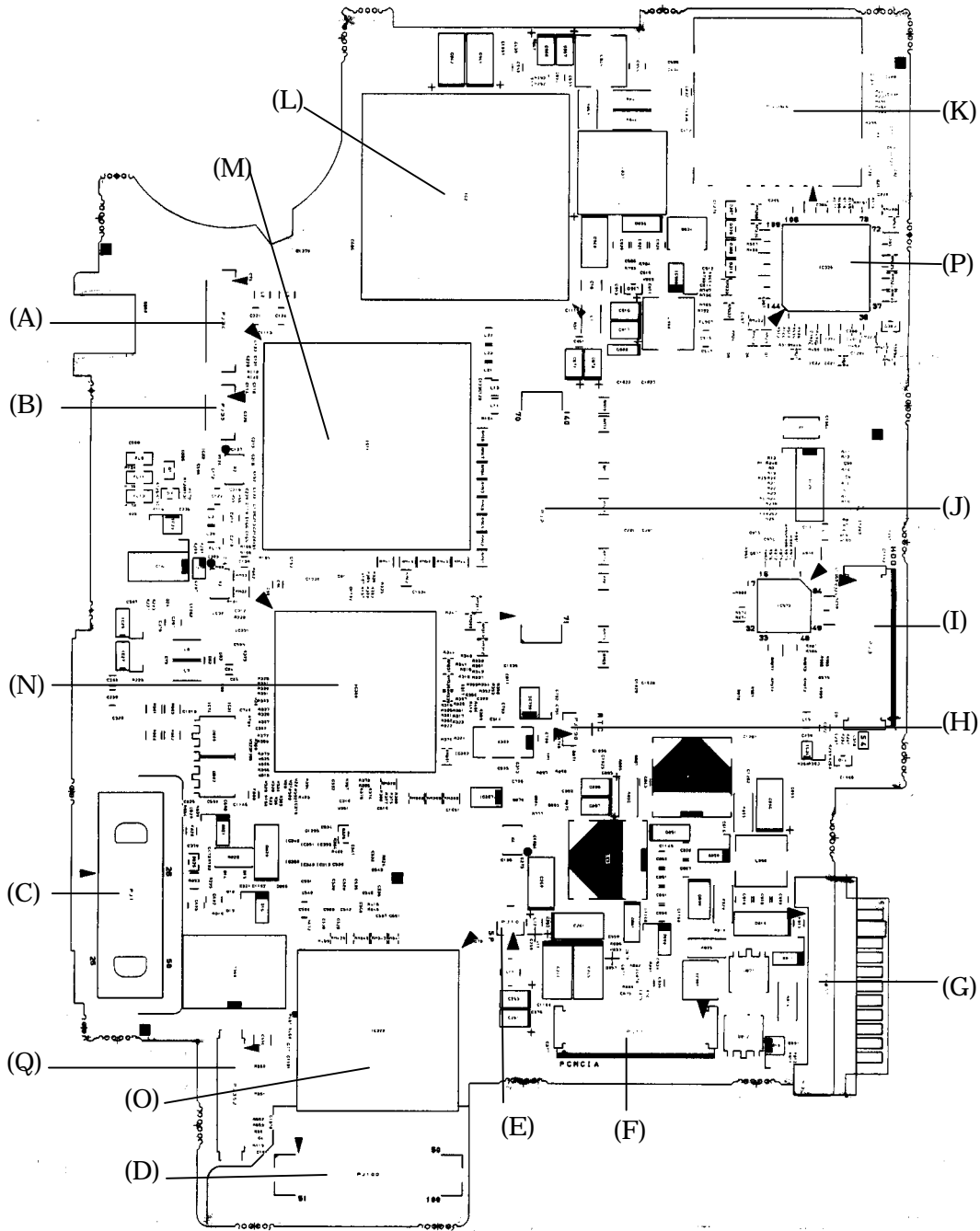
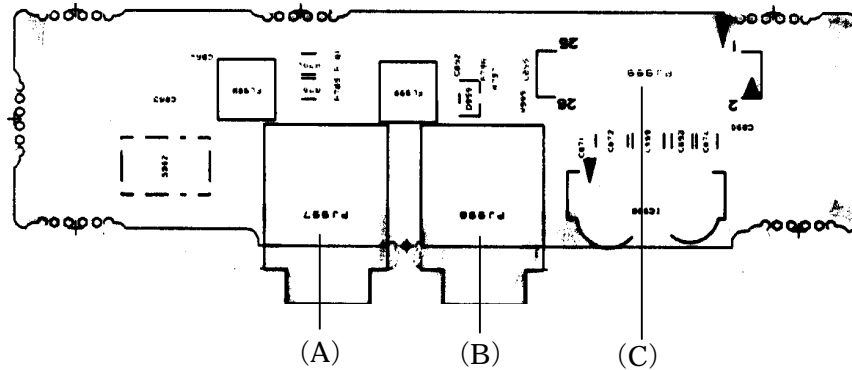


Figure B-2 Main board layout (Back)

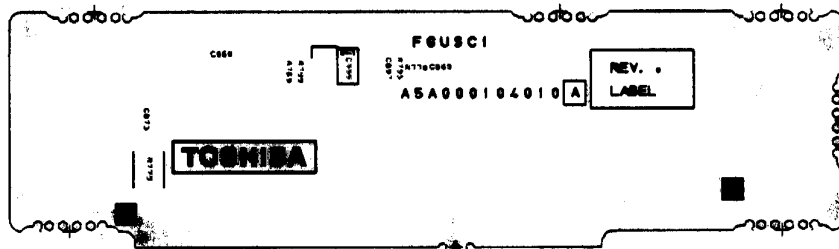
Table B-2 Main board (back)

Mark	Number	name
(A)	PJ34	LCD I/F connector
(B)	PJ35	FL inverter connector
(C)	PJ1	Docking I/F connector
(D)	PJ100	MI board I/F connector
(E)	PJ10	Speaker connector
(F)	PJ11	PC card connector
(G)	PJ810	Battery connector
(H)	PJ790	RTC battery connector
(I)	PJ3	HD board connector
(J)	PJ2	ME board I/F connector
(K)	PJ364	SD card HD board I/F connector
(L)	IC2	CPU
(M)	IC11	M1644m
(N)	IC300	M1535
(O)	IC322	YEBISU3
(P)	IC326	EC/KBC
(Q)	PJ352	Network connector

B.4 SC Board Front and Back View



(Front)



(Back)

Figure B-4 Connector board layout

Table B-4 Connector board

Mark	Number	Name
(A)	PJ997	Headphone connector
(B)	PJ998	Outside microphone connector
(C)	PJ999	IL board I/F connector

Appendix C Pin Assignment

System Board

C.1 PJ34 LCD connector (15pin)

Table C-1. LCD connector (15pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	P3V	-	2	P3V	-
3	TX0-B3N	I	4	TX0-B3P	I
5	GND	-	6	TX1-B3N	I
7	TX1-B3P	I	8	GND	-
9	TX2-B3N	I	10	TX2-B3P	I
11	GND	-	12	TCLK-B3N	O
13	TCLK-B3P	O	14	GND	-
15	GND	-			

C.2 PJ35 FL Inverter connector (7pin)

Table C-2 FL Inverter connector (7pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	P5V	-
3	GND	-	4	GND	-
5	BRT2DA-P5P	O	6	BRT1-P5P	O
7	BRT0-P5P	O			

C.3 PJ6 CRT I/F connector (15pin)*Table C-3 CRT I/F connector (15pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	RED:110	O	2	LGREN:110	O
3	BLUE:110	O	4	N.C	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	-	10	GND	-
11	N.C	-	12	DDCSD1-	O
13	SHSYNC-P5P	O	14	SVSYNC	O
15	DDCSC1	O			

C.4 PJ4 USB1 connector (4pin)*Table C-4 USB1 connector (4pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	USBV-E5V	-	2	USBDM1-B3N	I/O
3	USBDP1-B3P	I/O	4	GND	-

C.5 PJ5 USB2 connector (4pin)*Table C-5 USB2 connector(4pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	USBV-E5V	-	2	USBDM2-B3N	I/O
3	USBDP2-B3P	I/O	4	GND	-

C.6 PJ325 Debug port connector (4pin)

Table C-6 Debug port connector (4pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	B3V	-	2	DBGRX-B3P	I
3	V5	O	4	GND	-

C.7 PJ11 PC Card Slot connector (80pin)

Table C-7 PC Card Slot connector (80pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	ACAD00:100	I/O	4	ACCD1:000	I
5	ACAD01:100	I/O	6	ACADD2:100	I/O
7	ACAD03:100	I/O	8	ACAD4:100	I/O
9	ACAD05:100	I/O	10	ACAD06:100	I/O
11	ACAD10:100	I/O	12	GND	-
13	ACD14:100	I/O	14	ACCBE0:000	I/O
15	AAD08:100	I/O	16	ACAD9:100	I/O
17	ACAD10:100	I/O	18	ACAD11:100	I/O
19	ACVS1	I/O	20	GND	-
21	ACAD12:100	I/O	22	ACAD13:100	I/O
23	ACAD14:100	I/O	24	ACAD15:100	I/O
25	ACCBE1:000	I/O	26	ACAD16:100	I/O
27	ACPA8:100	I/O	28	GND	-
29	ACA18:100	I/O	30	ACPERR:000	I/O
31	ACLOCK:000	I/O	32	ACGNT:000	O
33	ACSTOP:000		34	ACINT:000	I
35	ACCEVS:000		36	MCVCCA	-
37	MCVCCA	-	38	MCVCCA	-
39	MCVCCA	-	40	MCVCCA	-
41	MCVPPA	-	42	MCVPPA	-
43	MCVPPA	-	44	MCVPPA	-
45	MCVPPA	-	46	ACCLOCK:100	I/O
47	ACTBDY:000	I/O	48	ACIRDY:000	I/O
49	ACFRAM:000	I/O	50	ACCRF2:000	I/O
51	ACAD17:100	I/O	52	ACAD18:100	I/O
53	CAD19:100	I/O	54	GND	-
55	ACAD20:100	I/O	56	ACVS2:100	I/O
57	ACAD21:100	I/O	58	ACRST:000	I/O
59	ACAD22:100	I/O	60	ACSFERR:000	I/O
61	ACAD23:100	I/O	62	GND	-
63	ACREQ:000		64	ACAD24:100	I/O
65	ACCBF3:000	I/O	66	ACAD25:100	I/O
67	ACAUDI:100	I	68	ACAD26:100	I/O
69	ACSTSC:100	I	70	GND	-
71	ACAD27:100	I/O	72	ACAD28:100	I/O
73	ACAD29:100	I/O	74	ACAD30:100	I/O
75	ACD02	I/O	76	ACAD31:100	I/O
77	ACCLKR:000		78	ACCD2:000	I
79	and	-	80	GND	-

C.8 PJ364 SD Card connector (12pin)*Table C-8 SD Card I/F connector (12pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SDAT3-B3P	I/O	2	SDCMD-B3P	I/O
3	GND	-	4	SD-B3V	-
5	SDCLK	O	6	GND	-
7	SDAT0-B3P	I/O	8	SDAT1-B3P	I/O
9	SDAT2-B3P	I/O	10	SDCD-B3N	I
11	SDWP-B3P	I	12	GND	-

C.9 PJ7 LED SW connector (15pin)*Table C-9 LED SW connector (15pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	BTLED-S3P	O	2	HDDLED-P5N	O
3	BAT2GR-S5N	O	4	BAT2DR-S5N	O
5	BAT1GR-S5N	O	6	BAT1DR-S5N	O
7	PWLEGR-S3P	O	8	PWLEDR-S3P	O
9	DCINGR-S5N	O	10	DCINOR-S5N	O
11	P5V	-	12	S5V	-
13	S5V	-	14	PWRSW-S3N	O
15	GND	-			

C.10 PJ445 Keyboard connector (28pin)

Table C-10 Keyboard connector (28pin)

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	KBSAC14-S3N	O
9	KBRT07-S3P	I	10	KBRT06-S3P	I
11	KBSC13-S3N	O	12	KBRT12-S3N	O
13	KBRT05-S3P	I	14	KBRT04-S3P	I
15	KBSC11-S3N	O	16	KBRT10-S3N	O
17	KBRT03-S3P	I	18	KBRT02-S3P	I
19	KBRT01-S3P	I	20	KBSC09-S3N	O
21	KBSC08-S3N	O	22	KBSC07-S3N	O
23	KBRT00-S3P	I	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	-	32	CAPLED	O
33	ARWLED	O	34	NUMLED	O

C.11 PJ334 PAD connector (5pin)

Table C-11 PAD connector (5pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	PADCLK-P5P	I/O
3	PADDAT-P5P	I/O	4	N.C.	-
5	P5V	-			

C.12 PJ8 In touch Button connector (4pin)*Table C-12 In touch Button connector (4pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF-S3N	I	2	GNBTN1-S3N	I
3	GNBTN2-S3N	I	4	GND	-

C.13 PJ9 FL board I/F connector (26pin)*Table C-13 PJ800 DC-IN connector (26pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	A-P5V	-	2	A-P5V	-
3	N.C.	-	4	HPIN-P5P	I
5	25VREF-P2V	-	6	N.C.	-
7	N.C.	-	8	MIKIN-PXP	I
9	A-GND	-	10	A-GND	-
11	HEADR-PXP	O	12	N.C.	-
13	HEADL-PXP	O	14	GND	-
15	N.C.	-	16	GND	-
17	GND	-	18	BTSWON-S3P	I
19	IRMODE-P3P	O	20	S3V	-
21	P3V	-	22	P3V	-
23	IRTX-P3P	O	24	IRRX-P3N	I
25	GND	-	26	GND	-

C.14 PJ10 Speaker I/F connector (2pin)*Table C-14 Speaker I/F connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	VO-	O	2	VO+	O

C.15 PJ100 MI Board I/F connector (100pin)*Table C- 15 MI Board I/F connector (100pin) (1/2)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	PINTC-P3N	
5	N.C.	-	6	PCIRST-B3N	
7	P3V	-	8	GNT2-P3N	
9	GND	-	10	PME-S3N	
11	N.C.	-	12	AD30-P3P	I/O
13	P3V	-	14	AD28-P3P	I/O
15	AD26-P3P	I/O	16	AD24-P3P	I/O
17	AD27-P3P	I/O	18	GND	-
19	AD22-P3P	I/O	20	AD20-P3P	I/O
21	PAR-P3P		22	AD18-P3P	I/O
23	AD16-P3P	I/O	24	GND	-
25	FRAME-P3N	I/O	26	TRDY-P3N	I/O
27	STOP-P3N	I/O	28	P3V	-
29	DEVSEL-P3N	I/O	30	GND	-
31	AD15-P3P	I/O	32	AD13-P3P	I/O
33	AD11-P3P	I/O	34	GND	-
35	AD09-P3P	I/O	36	CBEO-P3N	I/O
37	P3V	-	38	AD06-P3P	I/O
39	AD04-P3P	I/O	40	AD02-P3P	I/O
41	AD00-P3P	I/O	42	GND	-
43	N.C.	-	44	MPA3V	-
45	MPA3V	-	46	MPA3V	-
47	GND	-	48	N.C.	-
49	P5V	-	50	P5V	-
51	GND	-	52	XPCT1-P3P	O
53	GND	-	54	WLON-S3N	O
55	PINTD-P3N	O	56	REQ2-P3N	I
57	AD31-P3P	I/O	58	GND	-
59	AD29-P3P	I/O	60	AD27-P3P	I/O
61	AD25-P3P	I/O	62	P3V	-
63	CBE3-P3N	I/O	64	AD23-P3P	I/O
65	GND	-	66	AD21-P3P	I/O
67	AD19-P3P	I/O	68	GND	-
69	AD17-P3P	I/O	70	CBE2-P3N	I/O
71	IRDY-P3N	I/O	72	GND	-

Table C-15 MI Board I/F connector (100pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
73	CLKRUN-P3N	I/O	74	SERR-P3N	I/O
75	P3V	-	76	PERR-P3N	I/O
77	CBE1-P3N	I/O	78	AD14-P3P	I/O
79	GND	-	80	AD12-P3P	I/O
81	N.C.	-	82	GND	-
83	N.C.	-	84	N.C.	-
85	P3V	-	86	AD10-P3P	I/O
87	AD08-P3P	I/O	88	GND	-
89	AD07-P3P	I/O	90	AD05-P3P	I/O
91	P3V	-	92	N.C.	-
93	GND	-	94	AD03-P3P	I/O
95	AD01-P3P	I/O	96	GND	-
97	GND	-	98	N.C.	-
99	P5V	-	100	P5V	-

C.16 PJ352 Network I/F connector (14pin)

Table C-16 Network I/Fconnector (14pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TX+	O	2	TX-	O
3	TERM	O	4	TERM	O
5	AX+	+	6	AX-	O
7	TERM	O	8	TERM	O
9	RCT	-	10	RCT	-
11	RX-	I	12	TERM	-
13	TERM	-	14	N.C	-

C.17 PJ1 Docking I/F connector (50pin)*Table C-17 Docking I/F connector (50pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	DOCDT2-S3N	I	2	BT2VD-S5N	O
3	BT2VD-S5N	O	4	PSCL-S5P	I
5	D-E3V	-	6	CDCHG2-	I
7	GND	-	8	GND	-
9	GND	-	10	GND	-
11	DOCSCL-P5P	O	12	D-E5V	-
13	D-E5V	-	14	D-E5V	-
15	RED:111	O	16	LGREN:111	O
17	BLUE:111	O	18	DHSYNC-	O
19	GND	-	20	ACT-E3N	O
21	EJCTRQ-S3N	I	22	VOID	-
23	VOID	-	24	TXP-EXP	OP
25	TXN-EXN	O	26	GND	-
27	DBT20V-S5N	O	28	BTMP2-SXP	O
29	PSDA-S5P	I/O	30	D-E3V	-
31	PWRSW-S3N	I/O	32	GND	-
33	USBDP3-B3P	I/O	34	USBDM3-	I/O
35	GND	-	36	DOCSDA-	O
37	D-E5V	-	38	D-E5V	-
39	D-E5V	-	40	GND	-
41	GND	-	42	GND	-
43	DVSYNC-P5P	O	44	LAN-E3V	-
45	LNK-E3N	O	46	DOCOT1-	I
47	VOID	-	48	VOID	-
49	RXP-EXP	O	50	RXN-EXN	O

C.18 PJ800 DC-IN connector (2pin)*Table C-18 DC-IN connector (2pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(PVDC)	-	2	(GND)	-

C.19 PJ810 Battery connector (10pin)*Table C-19 Battery connector (10pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	[+]	-	2	BTMP1	I
3	DCHG	O	4	VDD	-
5	PSCL-S5P	I	6	PSDA-S5P	I
7	GND	-	8	DBT10V-S5N	O
9	GND	O	10	GND	-

C.20 PJ790 RTC battery connector (3pin)*Table C-19 RTC battery connector (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	(Vbat)	-	2	N.C	-
3	GND	-			

C.21 PJ780 FAN connector (3pin)*Table C-20 FAN connector (3pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FAN VCC	O	2	GND	-
3	FANG—P3P	I			

FL Board

C.22 PJ501 SC board I/F connector (26pin)

Table C-22 SC board I/F connector (26pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FIR	-	2	FIR-GND	
3	IRRX-P3N		4	IRTX-P3P	O
5	P3V	-	6	P3V	-
7	S3V	-	8	IRMODE-P3P	O
9	BTSWON-S3P	I	10	GND	-
11	GND	-	12	N.C.	-
13	GND	-	14	HEADL-PXP	O
15	N.C.	-	16	HEADR-PXP	O
17	A-GND	-	18	A-GND	-
19	MIKIN-PXP	I	20	N.C.	-
21	N.C.	-	22	25VREF-P2V	-
23	HPIN-P5P	I	24	N.C.	-
25	A-P5V	-	26	A-P5V	-

HD Board

C.23 PJ2 HDD I/F connector (44pin)

Table C-23 HDD I/F connector (44pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	IDRSTA-P5N	I	2	GND	-
3	PDD07-P5P	I	4	PDD08-P5P	O
5	PDD06-P5P	I	6	PDD09-P5P	O
7	PDD05-P5P	I	8	PDD10-P5P	O
9	PDD04-P5P	I	10	PDD11-P5P	O
11	PDD03-P5P	I	12	PDD12-P5P	O
13	PDD02-P5P	I	14	PDD13-P5P	O
15	PDD01-P5P	I	16	PDD14-P5P	O
17	PDD00-P5P	I	18	PDD15-P5P	O
19	GND	-	20	N.C	-
21	PDDREQ-P5P	I	22	GND	-
23	PDLOW-P5N	I	24	GND	-
25	PDIOR-P5N	I	26	GND	-
27	PIORDY-P5P	I	28	GND	-
29	PDDACK-P5N	I	30	GND	-
31	PDIRQ-P5P	I	32	N.C	-
33	PDA1-P5P	I	34	N.C	-
35	PDA0-P5P	I	36	PDA2-P5P	O
37	PDCS1-P5N	I	38	PDCS3-P5N	O
39	HDDLED;100	I	40	GND	-
41	P5V	-	42	P5V	-
43	GND	-	44	N.C	-

C.24 PJ3 MDC I/F connector (30pin)*Table C-24 MDC I/F connector (30pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C	-	2	GND	-
3	N.C	-	4	MDMP-BXP	I/O
5	N.C	-	6	NC	-
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	-
17	MDC-B3V	-	18	N.C	-
19	GND	-	20	GND	-
21	N.C	-	22	A97SYC-P3P	I
23	A97SD0-P3P	I	24	N.C	-
25	A97RST-P3N	I	26	A97DI1-B3P	O
27	GND	-	28	GND	-
29	GND	-	30	M97BCK-P3P	I/O

ME Board

C.25 PJ1 Memory connector (140pin)

Table C-25 Memory connector (140pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	MMD04-B3P	I/O
3	MMD05-B3P	I/O	4	MMD06-B3P	I/O
5	MMd07-B3P	I/O	6	B3V	-
7	MMD36-B3P	I/O	8	MMD37-B3P	I/O
9	MMD38-B3P	I/O	10	MMD39-B3P	I/O
11	GND	-	12	MDQM4-B3P	
13	MDQM5-B3P	I/O	14	B3V	-
15	MMD12-B3P	I/O	16	MMD13-B3P	I/O
17	MMD14-B3P	I/O	18	MMD15-B3P	I/O
19	GND		20	MMD44-B3P	I/O
21	MMD45-B3P	I/O	22	MMD46-B3P	I/O
23	MMD47-B3P	I/O	24	B3V	-
25	GND	-	26	XSDR3-P3P	O
27	GND	-	28	MCS3-B3N	
29	MMWE-B3N	O	30	MSRAS-B3N	O
31	MSCAS-B3N	O	32	B3V	-
33	MBS0-B3P	O	34	GND	-
35	MMA07-B3P	O	36	MMA06-B3P	O
37	MMA05-B3P	O	38	MMA04-B3P	O
39	B3V	-	40	MMA08-B3P	O
41	MMA12-B3P	O	42	N.C.	-
43	GND	-	44	MMD20-B3P	I/O
45	MMD21-B3P	I/O	46	MMD22-B3P	I/O
47	MMD23-B3P	I/O	48	B3V	-
49	MMD52-B3P	I/O	50	MMD53-B3P	I/O
51	MMD54-B3P	I/O	52	MMD55-B3P	I/O
53	GND	-	54	MDQM6-B3P	
55	MDQM7-B3P	I/O	56	B3V	-
57	MMD28-B3P	I/O	58	MMD29-B3P	I/O
59	MMD30-B3P	I/O	60	MMD31-B3P	I/O
61	GND	-	62	MMD60-B3P	I/O
63	MMD61-B3P	I/O	64	MMD62-B3P	I/O
65	MMD63-B3P	I/O	66	B3V	-

Table C-25 Memory connector (140pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
67	N.C.	-	68	GND	-
69	GND	-	70	B3V	-
71	GND	I/O	72	MMD00-B3P	I/O
73	MMD01-B3P	I/O	74	MMD02-B3P	I/O
75	MMD01-B3P	I/O	76	B3V	-
77	MMD32-B3P	I/O	78	MMD33-B3P	I/O
79	MMD34-B3P	I/O	80	MMD35-B3P	I/O
81	GND	-	82	MDQM0-B3P	I/O
83	MDQM1-B3P	I/O	84	B3V	-
85	MMD08-B3P	I/O	86	MMD09-B3P	I/O
87	MMD10-B3P	I/O	88	MMD11-B3P	I/O
89	GND	-	90	MMD40-B3P	I/O
91	MMD41-B3P	I/O	92	MMD42-B3P	I/O
93	MMD43-B3P	I/O	94	B3V	-
95	GND	-	96	XSDR2-P3P	
97	GND	-	98	MCKE3-B3P	O
99	MCKE2-B3P	O	100	MCS2-B3N	O
101	GND	-	102	B3V	-
103	MBS1-B3P	O	104	GND	-
105	MMA03-B3P	O	106	MMA02-B3P	O
107	MMA01-B3P	O	108	MMA00-B3P	O
109	B3V	-	110	MMA11-B3P	O
111	MMA10-B3P	O	112	MMA09-B3P	O
113	GND	-	114	MMD16-B3P	I/O
115	MMD17-B3P	I/O	116	MMD18-B3P	I/O
117	MMD19-B3P	I/O	118	B3V	-
119	MMD48-B3P	I/O	120	MMD49-B3P	I/O
121	MMD50-B3P	I/O	122	MMD51-B3P	I/O
123	GND	-	124	MDQM2-B3P	I/O
125	MDQM3-B3P	I/O	126	B3V	-
127	MMD24-B3P	I/O	128	MMD25-B3P	I/O
129	MMD26-B3P	I/O	130	MMD27-B3P	I/O
131	GND	-	132	MMD56-B3P	I/O
133	MMD57-B3P	I/O	134	MMD58-B3P	I/O
135	MMD59-B3P	I/O	136	B3V	-
137	N.C.	-	138	GND	-
139	GND	-	140	B3V	-

MI Board

C.26 PJ351 MINI PCI I/F connector (124pin)

Table C-26 MINI PCI I/F connector (124pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	N.C	-	2	N.C	-
3	N.C	-	4	N.C	-
5	N.C	-	6	N.C	-
7	N.C	-	8	N.C	-
9	N.C	-	10	N.C	-
11	N.C	-	12	N.C	-
13	WLON-S3N	I	14	N.C	-
15	GND	-	16	N.C	-
17	PINTD-P3N	I	18	P5V	-
19	P3V	-	20	PINTC-P3N	O
21	N.C	-	22	N.C	-
23	GND	-	24	P3V	-
25	XPCIO-P3P	I	26	PCIRST-P3N	O
27	GND	-	28	P3V	-
29	PREQ3-P3N	I	30	PGNT3-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I	34	PME-S3N	O
35	AD29-P3P	I	36	N.C	-
37	GND	-	38	AD30-P3P	O
39	AD27-P3P	I	40	P3V	-
41	AD25-P3P	I	42	AD28-P3P	O
43	N.C	-	44	AD26-P3P	O
45	CBE3-P3N	I	46	AD24-P3P	O
47	AD23-P3P	I	48	AD27-P3P	O
49	GND	-	50	GND	-
51	AD21-P3P	I	52	AD22-P3P	O
53	AD19-P3P	I	54	AD20-P3P	O
55	GND	-	56	PAR-P3P	O
57	AD17-P3P	I	58	AD18-P3P	O
59	CBE2-P3N	I	60	AD16-P3P	O
61	IRDY-P3N	I	62	GND	-
63	P3V	-	64	FRAME-P3N	O
65	CLKRUN-P3N	I	66	TRDY-P3N	O
67	SERR-P3N	I	68	STOP-P3N	O
69	GND	-	70	P3V	-
71	P3V	-	72	DEVSEL-P3N	O

Table C-26 MINI PCI I/F connector (124pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I	76	AD15-P3P	O
77	GND	-	78	AD13-P3P	O
79	AD12-P3P	I	80	AD11-P3P	O
81	AD10-P3P	I	82	GND	-
83	GND	-	84	AD09-P3P	O
85	AD08-P3P	I	86	CBE0-P3N	O
87	AD07-P3P	I	88	P3V	-
89	P3V	-	90	AD06-P3P	O
91	AD05-P3P	I	92	AD04-P3P	O
93	N.C	-	94	AD02-P3P	O
95	AD03-P3P	I	96	AD00-P3P	O
97	P5V	-	98	N.C	-
99	AD01-P3P	I	100	N.C	-
101	GND	-	102	GND	-
103	N.C	-	104	GND	-
105	N.C	-	106	N.C	-
107	N.C	-	108	N.C	-
109	N.C	-	110	N.C	-
111	N.C	I	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	P5V	-	124	P3V	-

SC Board**C.27 PJ997 Headphone connector (6pin)***Table C-27 Headphone connector (6pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	GND	-
5	HPON	I	6	N.C	-

C.28 PJ998 Outside Microphone connector (6pin)*Table C-28 Outside Microphone connector (6pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	EXTMIC	I
3	REFV	O	4	N.C	-
5	N.C	-	6	INTMIC	I

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*2
09	8 *	09	89	3E	F0	3E	*2
10	9 (0A	8A	46	F0	46	*2
11	0)	0B	8B	45	F0	45	*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 Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1								Code set 2									
		Make				Break				Make				Break					
75	INS	E0	2A	E0	52	E0	D2	E0	AA	E0	12	E0	70	E0	F0	70	E0	F0	12
76	DEL	E0	2A	E0	53	E0	D3	E0	AA	E0	12	E0	71	E0	F0	71	E0	F0	12
79	←	E0	2A	E0	4B	E0	CB	E0	AA	E0	12	E0	6B	E0	F0	6B	E0	F0	12
80	Home	E0	2A	E0	47	E0	C7	E0	AA	E0	12	E0	6C	E0	F0	6C	E0	F0	12
81	End	E0	2A	E0	4F	E0	CF	E0	AA	E0	12	E0	69	E0	F0	69	E0	F0	12
83	↑	E0	2A	E0	48	E0	C8	E0	AA	E0	12	E0	75	E0	F0	75	E0	F0	12
84	↓	E0	2A	E0	50	E0	D0	E0	AA	E0	12	E0	72	E0	F0	72	E0	F0	12
85	PgUp	E0	2A	E0	49	E0	C9	E0	AA	E0	12	E0	7D	E0	F0	7D	E0	F0	12
86	PgDn	E0	2A	E0	51	E0	D1	E0	AA	E0	12	E0	7A	E0	F0	7A	E0	F0	12
89	→	E0	2A	E0	4D	E0	CD	E0	AA	E0	12	E0	74	E0	F0	74	E0	F0	12
203	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
204	App	E0	2A	E0	5D	E0	DD	E0	AA	E0	12	E0	2F	E0	F0	2F	E0	F0	12

Table D-4 Scan codes with Fn key

Cap No.	Keytop	Code set 1				Code set 2				
		Make		Break		Make		Break		
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	LALT	E0	38	E0	B8	E0	11	E0	F0	11
121	ARROW		45		C5		77		F0	77
122	NUMERIC		45		C5		77		F0	77
123	Scrl		46		C5		7E		F0	7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
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

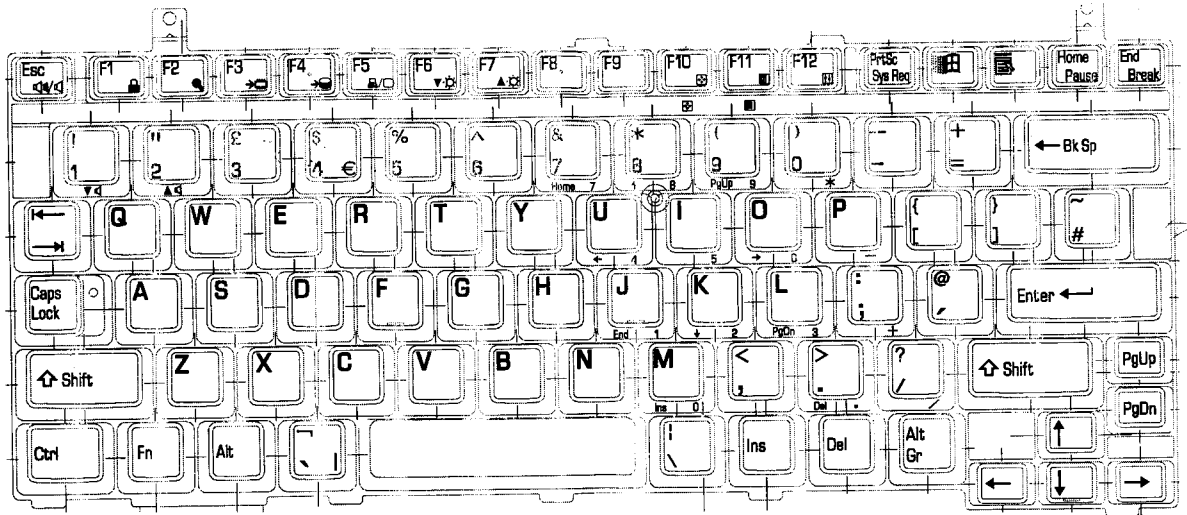


Figure E-1 Key layout (UK)

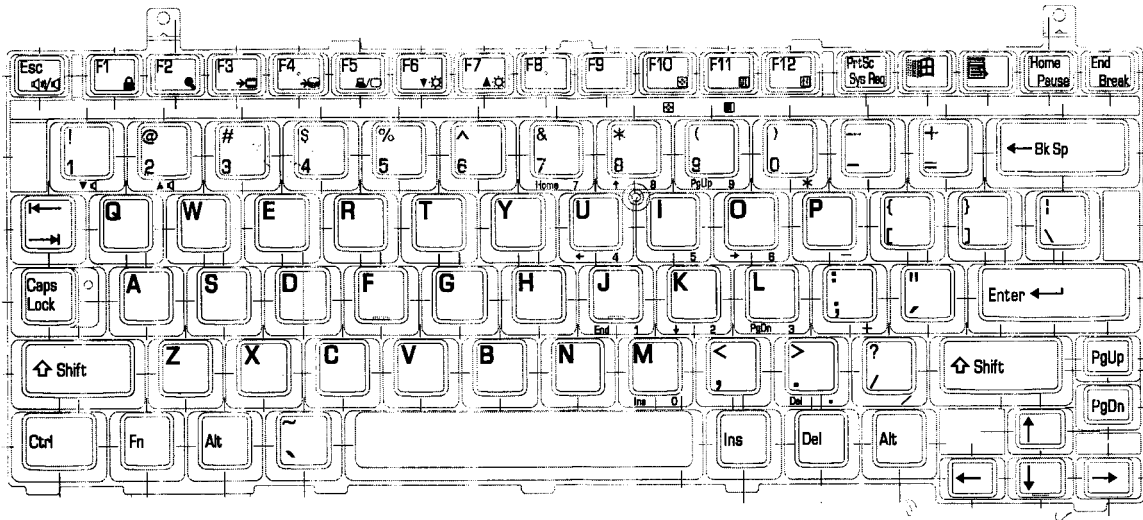


Figure E-2 Key layout (US)

Appendix F BIOS/KBC/EC Update

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 **F12**
- 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

- 1) The power must not be turned off during the rewrite. If the write operation fails, the machine may not start up.

Appendix G Reliability

The following table shows MTBF (Mean Time Between Failures) for each component.

Table G-1 MTBF

Component	Time (hours)
System	6,000 or more

Appendix H Key FD

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.

