

**Toshiba Personal Computer
Satellite A10/TECRA A1/
Satellite Pro A10 (not released in U.S.)
Maintenance Manual**

TOSHIBA CORPORATION

File Number 960-445

Copyright

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

Toshiba Satellite A10/TECRA A1/Satellite Pro A10 Maintenance Manual

First edition May 2003

Disclaimer

The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the Satellite A10/TECRA A1/Satellite Pro A10 at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Therefore, Toshiba assumes no liability for damages incurred directly or indirectly from errors, omissions, or discrepancies between any succeeding product and this manual.

Trademarks

Intel, Intel Speed Step, Pentium and Celeron are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries/regions.

Windows and Microsoft are registered trademarks of Microsoft Corporation.

Photo CD is a trademark of Eastman Kodak

Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite A10/TECRA A1/Satellite Pro A10.

NOTE: *This Satellite A10/TECRA A1/Satellite Pro A10 is a BTO-support personal computer. Each model of Satellite A10/TECRA A1/Satellite Pro A10 has a different configuration. For each model's configuration, refer to the parts list dedicated to it.*

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 Satellite A10/TECRA A1/Satellite Pro A10 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
- Display codes
- Key layout
- Wiring diagrams
- BIOS/KBC/EC Update
- Reliability

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

Text generated by the Satellite 1870 that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

Table of Contents

Chapter 1 Hardware Overview

1.1	Features	1-1
1.2	System Block Diagram	1-5
1.3	3.5-inch Floppy Disk Drive	1-9
1.4	2.5-inch Hard Disk Drive.....	1-10
1.5	CD-ROM.....	1-13
1.6	DVD-ROM Drive	1-14
1.7	Combo Drive.....	1-16
1.8	Combo+2 Drive	1-19
1.9	DVD Multi Drive.....	1-20
1.10	Keyboard.....	1-21
1.11	TFT Color Display	1-22
1.12	Power Supply	1-25
1.13	Batteries	1-27
1.14	AC Adapter	1-30

Chapter 2 Troubleshooting Procedures

2.1	Troubleshooting	2-1
2.2	Troubleshooting Flowchart.....	2-2
2.3	Power Supply Troubleshooting.....	2-6
2.4	System Board Troubleshooting.....	2-16
2.5	3.5" FDD Troubleshooting	2-39
2.6	2.5" HDD Troubleshooting.....	2-42
2.7	Keyboard Troubleshooting	2-47
2.8	Display Troubleshooting.....	2-48
2.9	Touch Pad Troubleshooting.....	2-50
2.10	Optical drive Troubleshooting	2-51
2.11	Modem Troubleshooting.....	2-52

2.12	LAN Troubleshooting.....	2-53
2.13	Sound Troubleshooting.....	2-54
2.14	Wireless LAN Troubleshooting.....	2-56

Chapter 3 Tests and Diagnostics

3.1	The Diagnostic Test.....	3-1
3.2	Executing the Diagnostic Test.....	3-3
3.3	Subtest Names.....	3-7
3.4	System Test.....	3-9
3.5	Memory Test.....	3-12
3.6	Keyboard Test.....	3-14
3.7	Display Test.....	3-18
3.8	Floppy Disk Test.....	3-21
3.9	Printer Test.....	3-23
3.10	ASYNc Test.....	3-25
3.11	Hard Disk Test.....	3-28
3.12	Real Timer Test.....	3-31
3.13	NDP Test.....	3-33
3.14	Expansion Test.....	3-34
3.15	CD-ROM/DVD-ROM Test.....	3-36
3.16	LAN Test.....	3-37
3.17	Sound/LAN/Modem Test.....	3-38
3.18	Wireless LAN Test(Agere).....	3-42
3.19	Wireless LAN Test(Atheros).....	3-47
3.20	Error Code and Error Status Names.....	3-50
3.21	Hard Disk Test Detail Status.....	3-53
3.22	FDD Cleaning.....	3-55
3.23	Log Utilities.....	3-56
3.24	Running Test.....	3-58
3.25	Floppy Disk Drive Utilities.....	3-60
3.26	System Configuration.....	3-65
3.27	SETUP.....	3-67

Chapter 4 Replacement Procedures

4.1	Overview.....	4-1
4.2	Battery Pack/PC Card	4-8
4.3	Memory Module	4-12
4.4	HDD	4-14
4.5	MDC Modem	4-18
4.6	Mini PCI Card.....	4-20
4.7	Fan Module/Cooling Fin/CPU	4-22
4.8	Keyboard.....	4-28
4.9	Optical Drive.....	4-32
4.10	Display Assembly	4-35
4.11	Touch Pad	4-39
4.12	BAT CON Holder	4-41
4.13	System Board/DC-IN Jack/RTC Battery	4-42
4.14	BAT LOCK ASSY/HDD UPPER ASSY	4-46
4.15	Touch pad Switch	4-49
4.16	LCD Unit/FL Inverter	4-50
4.17	Wireless LAN Antenna/Display Cover/Display Cable.....	4-54
4.18	Fluorescent Lamp.....	4-64

Appendices

Appendix A	Handling the LCD Module	A-1
Appendix B	Board Layout	B-1
Appendix C	Pin Assignment	C-1
Appendix D	Display Codes	D-1
Appendix E	Key Layout.....	E-1
Appendix F	Wiring Diagrams.....	F-1
Appendix G	BIOS/KBC/EC Update	G-1
Appendix H	Reliability.....	H-1

Chapter 1

Hardware Overview

Chapter 1 Contents

1.1	Features	1-1
1.2	System Block Diagram	1-5
1.3	3.5-inch Floppy Disk Drive	1-9
1.4	2.5-inch Hard Disk Drive.....	1-10
1.5	CD-ROM.....	1-13
1.6	DVD-ROM Drive	1-14
1.7	Combo Drive.....	1-16
1.8	Combo+2 Drive	1-19
1.9	DVD Multi Drive.....	1-20
1.10	Keyboard.....	1-21
1.11	TFT Color Display.....	1-22
	1.11.1 LCD Module	1-22
	1.11.2 FL Inverter Board.....	1-24
1.12	Power Supply	1-25
1.13	Batteries	1-27
	1.13.1 Main Battery.....	1-27
	1.13.2 Battery Charging Control.....	1-28
	1.13.3 RTC Battery	1-29
1.14	AC Adapter	1-30

Figures

Figure 1-1	Front of the computer and the system units configuration	1-4
Figure 1-2	System block diagram.....	1-5
Figure 1-3	3.5-inch USB FDD.....	1-9
Figure 1-4	2.5-inch HDD.....	1-10
Figure 1-5	CD-ROM Drive	1-13
Figure 1-6	DVD-ROM Drive	1-14
Figure 1-7	Combo Drive.....	1-16
Figure 1-8	Combo+2 Drive	1-19
Figure 1-9	DVD Multi Drive.....	1-20
Figure 1-10	Keyboard.....	1-21
Figure 1-11	LCD module.....	1-23

Tables

Table 1-1	Difference of each model.....	1-1
Table 1-2	3.5-inch USB FDD specifications.....	1-9
Table 1-3	2.5-inch HDD dimensions	1-10
Table 1-4	2.5-inch HDD specification	1-11
Table 1-5	CD-ROM Drive specifications	1-13
Table 1-6	DVD-ROM Drive dimensions	1-15
Table 1-7	Combo Drive specifications.....	1-16
Table 1-8	Combo+2 Drive specifications	1-19
Table 1-9	DVD Multi Drive speciifcations.....	1-20
Table 1-10	LCD module specifications.....	1-22
Table 1-11	FL inverter board specifications	1-23
Table 1-12	Power supply output rating	1-26
Table 1-13	Battery specifications.....	1-27
Table 1-14	Time required for charges of main battery	1-28
Table 1-15	Data preservation time	1-28
Table 1-16	Time required for charges of RTC battery.....	1-29
Table 1-17	AC adapter specifications	1-30

1.1 Features

The Satellite A10/TECRA A1/Satellite Pro A10 is a high performance all-in-one PC running a Pentium 4 or Celeron processor.

There are five models of Satellite A10/TECRA A1/Satellite Pro A10 according to the combination of CPU and LCD. Table 1-1 lists the difference of each model.

Table 1-1 Difference of each model

	Model A	Model B	Model C	Model D	Model E	Model F
CPU	Pentium 4	Pentium 4	Pentium 4	Celeron	Celeron	Celeron
LCD	15inchTFT (SXGA+)	15-inchTFT (XGA)	14-inchTFT (XGA)	15-inchTFT (SXGA+)	15-inchTFT (XGA)	14-inchTFT (XGA)

The HDD, FDD, Optical devices and Wireless LAN support CTO.

Other features are listed below.

Microprocessor

Microprocessor used is different from each model.

Mobile Intel® Pentium® 4-M model

A 1.80/1.90/2.00/2.20GHz Pentium 4 processor with a 1.80/1.90/2.00/2.20/1.20GHz internal clock, 400MHz bus and 1.30/1.20V core operation

Mobile Intel Celeron model

A 1.80/2.00/2.20GHz Celeron processor with a 1.80/2.00/2.20GHz internal clock, 400MHz bus and 1.30V core operation

Cache memory

Mobile Intel® Pentium® 4-M model

12KB primary cache (in CPU) and 512KB secondary cache (in CPU)

Mobile Intel Celeron model

12KB primary cache (in CPU) and 256KB secondary cache (in CPU)

Memory

Two DDR266 SO-DIMM slots. Memory modules can be installed to provide a maximum of 1GB. Memory modules are available in 128MB, 256MB and 512MB sizes.

VRAM

The computer has VGA imbedded in North Bridge and VRAM in 16-64MB.

HDD

Single 20GB, 30GB, 40GB, or 60GB internal drive. 2.5 inch x 9.5mm height.

USB FDD

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

Display

LCD

Built-in 14.1- or 15.0-inch, XGA (1,024 x 768 dots), or 15-inch, SXGA+ (1,400 x 1,050 dots), 262,144 colors, amorphous silicon TFT color display.

CRT

Supported via an RGB connector.

TV-out

The S-Video terminal supports VIDEO-OUT.

Keyboard

An easy-to-use 85(US)-/86(UK)-key keyboard (101 Key emulation). Windows key is supported.

The keyboard also supports touchpad as a pointing device.

Optical devices

A CD-ROM, DVD-ROM, Combo, Combo+2 or DVD Multi Drive is supported.

Battery

The RTC battery is mounted inside the computer.

The main battery is a detachable lithium ion battery (3,600mAh: Li-Ion, 6cell or 4,400mAh: Li-Ion, 6cell).

 USB (Universal Serial Bus)

The computer has two USB ports which support USB2.0.

 PC card slot

The PC card slot accepts one Type II (5mm thick) card. The slot is equipped with an ejector and supports ToPIC-100 (3.3V/CardBus).

 Sound system

The computer has an external monaural microphone connector, stereo headphone connector and internal stereo speakers.

 Wireless LAN (Mini PCI slot)

The wireless LAN (802.11b or 802.11a/b Combo) is equipped on the mini PCI slot.

 LAN/MODEM

Connectors for LAN and Modem are separately mounted.

 Printer/PS2

Ports for Printer and PS2 are separately mounted.

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

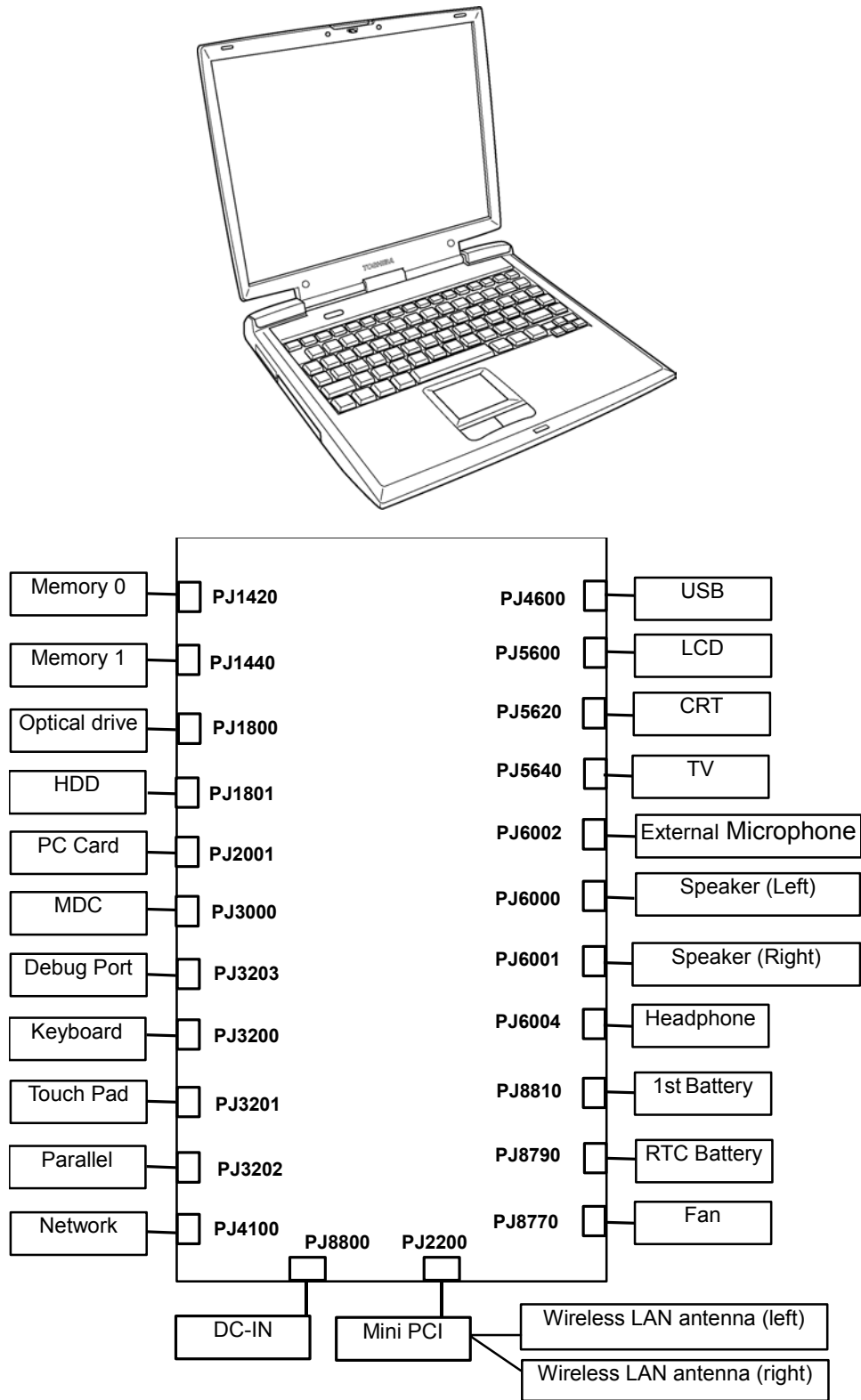


Figure 1-1 Front of the computer and the system units configuration

1.2 System Block Diagram

Figure 1-2 shows the system block diagram.

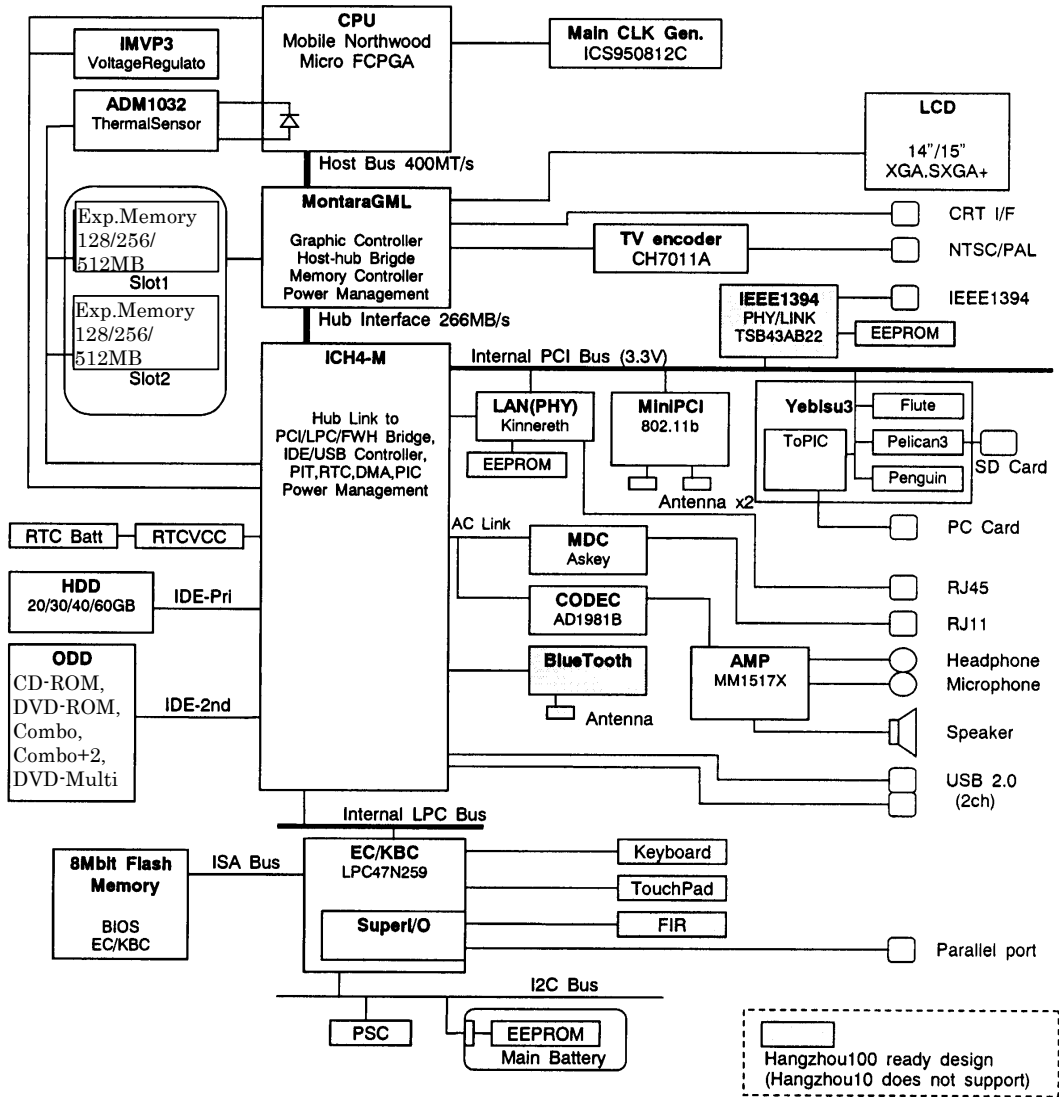


Figure 1-2 System Block Diagram

The PC contains the following components.

❑ CPU

Intel® Mobile Pentium® 4-M model

- 1.80/1.90/2.00/2.20GHz (Internal clock: 1.80/1.90/2.00/2.20GHz, Bus: 400MHz, Core voltage: 1.30/1.20V, Built-in NDP)
- Internal cache memory: 12KB (in CPU)
- Secondary cache memory: 512KB (in CPU)

Intel Mobile Celeron model

- 1.80/2.00/2.20GHz (Internal clock: 1.80/2.00/2.20GHz, Bus: 400MHz, Core voltage: 1.30V, Built-in NDP)
- Internal cache memory: 12KB (in CPU)
- Secondary cache memory: 256KB (in CPU)

❑ Memory

Two memory slots capable of accepting 128MB, 256MB or 512MB memory modules for a maximum of 1GB.

- 200-pin DDR-SDRAM (PC2100)
- Pipeline configuration
- 3.3V operation
- Support PC133

❑ BIOS ROM

- 8Mbit (Flash memory)
 - 64KB used for logo
 - 32KB 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
 - 128KB are reserved
- 5.0V operation
- Access time : 120 ns or 90 ns
- Data transfer: 8-bit

❑ Chipset

This gate array has the following elements and functions.

- North Bridge (Intel Montara-GML)
 - CPU interface and controller
 - Host bus support
 - System memory SDRAM controller
 - Hub interface
 - AGP interface
 - Power management
 - Graphic controller
- South Bridge (Intel ICH4-M)
 - LAN controller
 - IDE controller
 - DMA controller
 - USB interface
 - SM Bus interface
 - Interrupt controller
 - Power management
 - Firmware Hub interface
 - Low Pin count (LPC) interface
 - Real time clock
 - AC'97 interface
 - Audio controller
 - Hub interface

❑ PC card controller (YEBISUSS)

- PCI interface (PCI Revision 2.2)
- Deeper Sleep control interface
- Chipset interface
- Intel serial interrupt
- Card Bus /PC card controller (Yenta Version 2.2: 1 slot)
- Parallel power control (Toshiba style)
- SD memory card controller (SDHC Version 1.2)
- SD IO card controller (Version 1.1)
- Smart Card interface debug port
- Docking station interface
- Q Switch control, reset control
- External device interface
- FDD/IDE hot plug plug-and-play control

VGA controller

Imbedded in North Bridge

Super I/O (SMSC-made LPC-47N259)

- FDC (765B FDC)
- Parallel port control (PS/2 bi-directional compatible, EPP compatible, IEEE1284 ECP)

Other main system chips

- EC/KBC (SMSC-made LPC microcontroller LPC47N259 x 1)
- PSC (Toshiba-made TMP87PM48U x 1)
- Thermal sensor (AnalogDevice-made ADM1032 x 1)
- Audio AMP (Mitsumi-made MM1517X x1)
- AC97-CODEC (AnalogDevice-made AD1981B x1)

Mini PCI (802.11b: made by Agere or Cisco, 802.11a/b Combo: made by Atheros x 1)

2.4 GHz DSSS wireless LAN card is equipped in the mini PCI card slot. Conformity with IEEE 802.11b. Transfer speed is maximum of 11Mbit/sec. Supports 128bit WEP.

LAN (Intel-made Kinnereth (ED82562 x 1)

Controls LAN.

Supports 100Base-TX and 10Base-T.

MODEM (Askey-made 1456VQL4A (INT) x 1)

Supported by MDC.

Uses secondary AC97 line.

Data and FAX transmission is available.

Supports ITU-TV.90 and V.92.

The transfer speed of data receiving is 56kbps, of data sending is 33.6kbps and of FAX is 14,400bps. Actual speed depends on the quality of the line used.

Connected to telephone line through RJ11 modem jack.

1.3 3.5-inch USB Floppy Disk Drive

This compact, lightweight and high-reliability FDD can be used with 720KB, 1.2MB and 1.44MB floppy disks.

Figure 1-3 shows the 3.5-inch FDD. Table 1-2 lists the specifications.

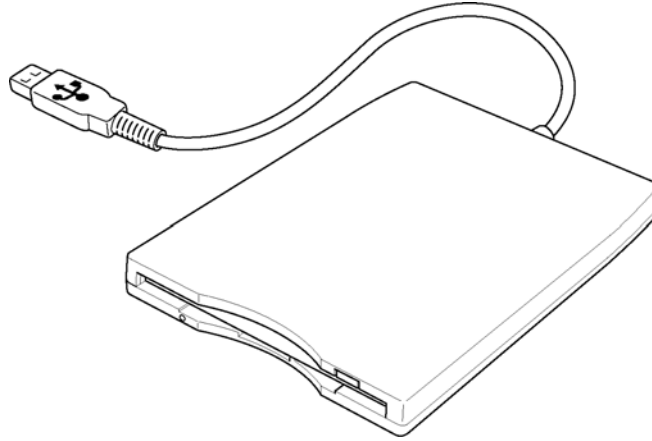


Figure 1-3 3.5-inch USB FDD

Table 1-2 3.5-inch USB FDD specifications

Item	Specifications		
Disk used	2DD	2HD	2HD
Unformatted capacity	1.0MB	1.6MB	2.0MB
Formatted capacity	720KB	1.2MB	1.44MB
Data transfer speed (Kb/s)	250	500	500
Rotation speed (rpm)	300	360	300

1.4 2.5-inch Hard Disk Drive

The computer has a compact, high-capacity HDD with a height of 9.5 mm. The HDD contains a 2.5-inch magnetic disk and magnetic heads.

Figure 1-4 shows a view of the 2.5-inch HDD and Tables 1-3 and 1-4 list the dimensions and specifications.

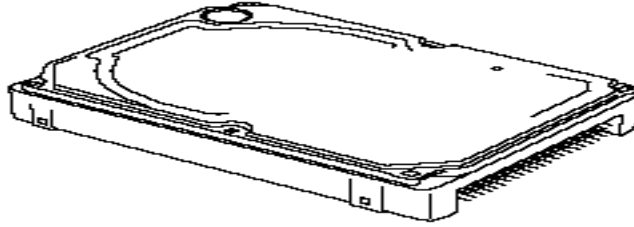


Figure 1-4 2.5-inch HDD

Table 1-3 2.5-inch HDD dimensions (1/3)

Item	Standard			
	TOSHIBA			
	HDD2187B	HDD2181B	HDD2182B	HDD2183B
Width (mm)	69.85			
Height (mm)	9.5			
Depth (mm)	100.0			
Weight (g) (MAX)	95			99

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

Item	Standard		
	IBM		
	G8BC0000Z310	G8BC0000Z410	G8BC0000Z610
Width (mm)	69.85		
Height (mm)	9.5		
Depth (mm)	100.2		
Weight (g) (MAX)	95		99

Table 1-3 2.5-inch HDD dimensions (3/3)

Item	Standard			
	HITACHI			
	G8BC0000F210	G8BC0000F310	G8BC0000F410	G8BC0000F610
Width (mm)	70			
Height (mm)	9.5			
Depth (mm)	100.0			
Weight (g)	91		95	

Table 1-4 2.5-inch HDD Specifications (1/3)

Item	Specifications			
	TOSHIBA			
	HDD2187B	HDD2181B	HDD2182B	HDD2183B
Storage size (formatted)	20GB	30GB	40GB	60GB
Rotation speed (RPM)	4,200			
Data transfer rate (Mb/s)	164.6-257.1	154.3-298.0	154.3-298.0	
Interface transfer rate (MB/s)	100			
Storage density (Kbpi)	543	618	618	
Track density (Ktpi)	72	78.9	78.9	
Average random seek time (read) (ms)	12			
Average random seek time (write) (ms)	-			
Motor startup time (ms)	4			

Table 1-4 2.5-inch HDD Specifications (2/3)

Item	Specifications		
	IBM		
	G8BC0000Z310	G8BC0000Z410	G8BC0000Z610
Storage size (formatted)	30GB	40GB	60GB
Rotation speed (RPM)	4,200		
Data transfer rate (MB/s)	-		
Interface transfer rate (MB/s)	100		
Storage density (Kbpi)	-		
Track density (Ktpi)	63		
Average random seek time (read) (ms)	12		
Average random seek time (write) (ms)	14		
Motor startup time (ms)	5.0		

Table 1-4 2.5-inch HDD Specifications (3/3)

Item	Specifications			
	HITACHI			
	G8BC0000F210	G8BC0000F310	G8BC0000F410	G8BC0000F610
Storage size (formatted)	20GB	30GB	40GB	60GB
Rotation speed (RPM)	4,200			
Data transfer rate (MB/s)	19.4-37.1			22.1-42.8
Interface transfer rate (MB/s)	100 (MAX Ultra DMA mode)			
Storage density (Kbpi)	644 (MAX)			716 (MAX)
Track density (Ktpi)	70.0			
Average random seek time (read) (ms)	13			
Average random seek time (write) (ms)	-			
Motor startup time (ms)	5.0			

1.5 CD-ROM Drive

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

The CD-ROM drive is shown in Figure 1-5. The specifications of the CD-ROM drive are described in Table 1-5.



Figure 1-5 CD-ROM drive

Table 1-5 CD-ROM drive specifications

Item	Specifications TEAC G8CC00005810
Data transfer rate (MB/s)	16.7 (PIO Mode 0 to 4) 16.7 (Multiple word DMA Mode 0 to 2) 33.3 (Ultra DMA)
Average random access time	110 ms
Average full stroke access time	240 ms
Data buffer capacity	128 MB
Supported formats	CD-DA, CD-ROM Mode 1, Mode 2, CD-ROM XA Mode 2 (Forum 1, Forum 2) Photo CD (single/multi-session), Enhanced CD

1.6 DVD-ROM Drive

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

The DVD-ROM drive is shown in Figure 1-6. The specifications of the DVD-ROM drive are described in Table 1-6.

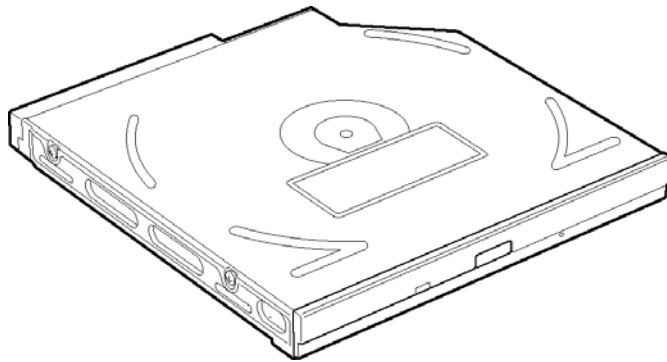


Figure 1-6 DVD-ROM drive

Table 1-6 DVD-ROM drive dimensions (1/2)

Item		Specifications Toshiba G8CC0000R810		
		DVD-ROM	CD-ROM	DVD-RAM
Burst data transfer rate (MB/s)		16.7 (PIO Mode 4) 16.7 (Multi-word DMA Mode 2) 33.3 (Ultra DMA Mode 2)		
Average random access time (ms)		100	95	170
Average random seek time (ms)		95	90	120
Average random full strike access time (ms)		160	160	350
Data buffer capacity (KB)		192		
Supported formats	DVD	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18) DVD-R (read), DVD-RW (read), DVD-RAM (read, Version 2.1), DVD-RAM (read, Version 1.0)		
	CD	CD-Audio, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW), CD-R (read), CD-RW (read)		

Table 1-6 DVD-ROM drive dimensions (2/2)

Item		Specifications Hitachi G8CC00015H10		
		DVD-ROM	CD-ROM	DVD-RAM
Burst data transfer rate (MB/s)		33.3 (Ultra DMA Mode 2)		
Transfer rate (MB/s)		10.8 (Single/Dual layer)	3.6	2.7 (2.6GB/4.7GB Disc)
Average random access time (ms)		90 (Single) 130 (Dual)	85	250 (4.7 GB Disc)
Data buffer capacity (KB)		256		
Supported formats	DVD	DVD-ROM, DVD-RAM (2.6GB/4.7GB, read only), DVD-R (3.95GB/4.7GB, read only), DVD-RW (4.7GB, read only)		
	CD	CD-ROM Mode 1/Mode 2, CD-ROM XA, CD-I Digital Video, Photo-CD Multisession, CD-Audio disc, Mixed mode CD-ROM, CD-EXTRA, CD-TEXT, CD-R (read only), CD-RW (read only)		

1.7 Combo Drive

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

The Combo drive is shown in Figure 1-7. The specifications of the Combo drive are described in Table 1-7.

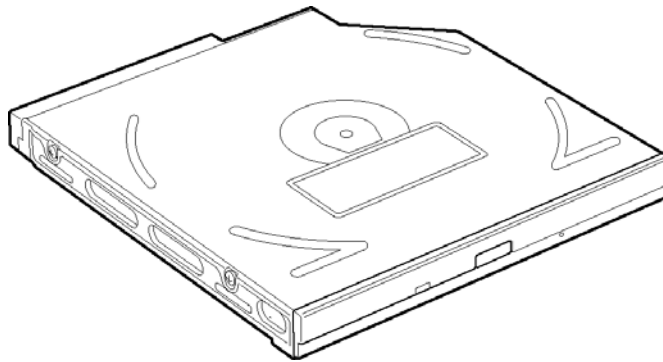


Figure 1-7 Combo drive

Table 1-7 Combo drive specifications (1/5)

Item		Specifications
		Toshiba SDR2412OAA
Burst data transfer rate (MB/s)		16.7 (PIO Mode 4) 16.7 (Multi-word DMA Mode 2) 33.3 (Ultra DMA Mode 2)
Average random access time (ms)		CD-ROM: 105, DVD-ROM: 120, DVD-RAM: 130 (Typ.)
Average random seek time (ms)		CD-ROM: 105, DVD-ROM: 120, DVD-RAM: 130 (Typ.)
Average full stroke access time (ms)		CD-ROM: 105, DVD-ROM: 120, DVD-RAM: 130 (Typ.)
Data buffer capacity		2,048KB
Supported formats (for play)	CD	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio), CD-R, CD-RW
	DVD	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R (Ver.1.0, Ver.2.1)

Table 1-7 Combo drive specifications (2/5)

Item		Specifications
		TEAC G8CC0000Q810
Transfer rate	For read (CD-ROM)	1,545 to 3,600 KB/sec.
	For read (DVD-ROM)	4,469 to 10,816 KB/sec.
Average access time (ms)	CD-ROM	90
	DVD-ROM	110
Data buffer capacity		2MB
Supported formats	CD	CD-DA, CD-ROM Mode1, Mode2, CD-ROM XA Mode 2 (Form 1, Form 2), Photo CD (single/multi-session), Enhanced CD, CD-TEXT
	DVD	DVD-ROM, DVD-Video, DVD-R (General, Authoring) DVD-RAM (4.7GB, 2.6GB)

Table 1-7 Combo drive specifications (3/5)

Item		Specifications
		Panasonic G8CC00010810
Transfer rate	For read (CD-ROM)	MAX 8x CAV (MAX 10,800KB/sec.)
	For read (DVD-ROM)	MAX 24x CAV (MAX 3,600KB/sec.)
	For write (CD-R)	4x, 8x (CLV), MAX 16x, MAX 24x (ZCLV)
	For write (CD-RW)	4x (CLV)
Average access time (ms)	CD-ROM	130
	DVD-ROM	180
Data buffer capacity		2MB
Supported formats	CD	CD-DA, CD-ROM, CD-ROM XA, CD-R, CD-RW, Photo CD, Video CD, CD-EXTRA (CD+), CD-TEXT
	DVD	DVD-Video, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW, DVD-RAM (4.7GB)

Table 1-7 Combo drive specifications (4/5)

Item		Specifications
		TEAC G8CC0001D810
Transfer rate	For read (CD-ROM)	1,545 to 3,600KB/sec.
	For read (DVD-ROM)	4,469 to 10,816KB/sec.
Average access time (ms)	CD-ROM	90
	DVD-ROM	110
Data buffer capacity		2MB
Supported formats	CD	CD-DA, CD-ROM Mode 1, CD-ROM XA Mode 2 (Form 1, Form 2), Multi-session Photo CD, CD-I, Video CD,
	DVD	DVD-ROM, DVD-R, (General, Authoring), DVD-Video, DVD-RW, DVD-RAM(4.7GB, 2.6GB)

Table 1-7 Combo drive specifications (5/5)

Item		Specifications
		Panasonic G8CC0001C810
Transfer rate	For read (CD-ROM)	MAX 24 × CAV(MAX 3600KB/s)
	For read (DVD-ROM)	MAX 8 × CAV(MAX 10800KB/s)
Average access time (ms)	CD-ROM	130
	DVD-ROM	180
Data buffer capacity		2MB
Supported formats	CD	CD-DA, CD-ROM XA, CD-R, CD-Extra(CD+), CD-RW, Photo CD, Video CD, CD-text
	DVD	DVD-Video, DVD-ROM, DVD-R(3.9GB, 4.7GB), DVD-RW, DVD-RAM(4.7GB)

1.8 Combo+2 drive

The Combo+2 drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD, CD-R/RW and DVD. It is a high-performance drive that reads DVD at maximum 8-speed, writes DVD-R/-RW at 1-speed, and reads CD at maximum 24-speed (3,600 KB per second).

The Combo+2 drive is shown in Figure 1-8. The specifications of the Combo+2 drive are described in Table 1-8.



Figure 1-8 Combo+2 drive

Table 1-8 Combo+2 drive specifications

Item	Specifications Toshiba G8CC0000ZH10		
	DVD-ROM	CD-ROM	DVD-RAM
Burst data transfer rate (MB/s)	33.3 (Ultra DMA) 16.7 (PIO mode 4) 16.7 (Multi word DMA Mode 2)		
Average random access time (ms)	100	95	170
Average random seek time (ms)	95	90	120
Average full stroke access time (ms)	160	160	350
Data buffer capacity	2MB		
Supported formats	DVD (read)	DVD-ROM (DVD-5/-9/-10/-18), DVD-R (Ver.1.0, Ver.2.0), DVD-RW (Ver.1.0, Ver.1.1), DVD-RAM Ver.2.1/1.0	
	CD (read)	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge (Photo-CD, Video-CD), Multisession CD (Photo-CD, CD-EXTRA, CD-R, CD-RW, Portfolio), CD-R, CD-RW	

1.9 DVD Multi drive

The DVD Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD, CD-R/RW and DVD. It is a high-performance drive that reads DVD at maximum 8-speed, writes DVD-R/-RW at 1-speed, and reads CD at maximum 24-speed (3,600 KB per second).

The DVD Multi drive is shown in Figure 1-9. The specifications of the DVD Multi drive are described in Table 1-9.

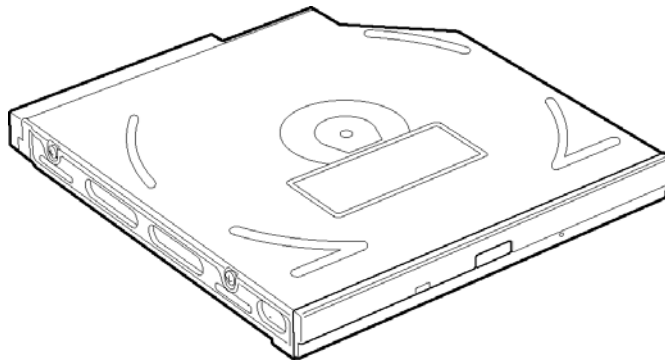


Figure 1-9 DVD Multi drive

Table 1-9 DVD Multi drive specifications

Item		Specifications Panasonic G8CC00019810		
		DVD-ROM	CD-ROM	DVD-RAM
Burst data transfer rate (MB/s)		33.3 (Ultra DMA mode 2) 16.6 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms) 1/3 Stroke Access (typ.)		180	130	-
Data buffer capacity		2MB		
Supported formats	DVD	DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW (Ver.1.1), DVD-RAM		CD-R, CD-RW
	CD	CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), CD-I Ready, Photo CD (Multi session), Video CD, CD-EXTRA (CD+), CD-TEXT		

1.10 Keyboard

An 85(US)-/86(UK)- key (101 emulation) keyboard is mounted on the system unit. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-10 shows a view of the keyboard.

See Appendix E for details of the keyboard layout.



Figure 1-10 Keyboard

1.11 TFT Color Display

The TFT color display has a 14.1-inch (XGA) or 15.0-inch (XGA, SXGA+) LCD module and the FL inverter board.

1.11.1 LCD Module

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

Figure 1-11 shows a view of the LCD module and Table 1-10 lists the specifications.

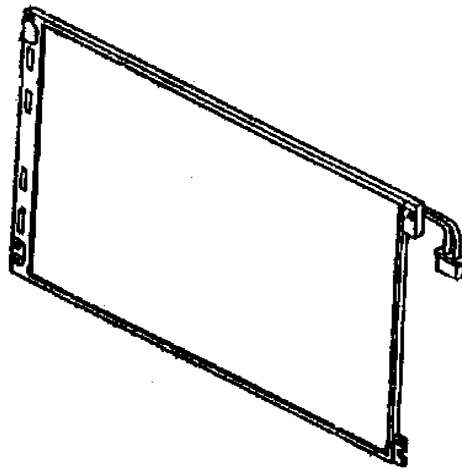


Figure 1-11 LCD module

Table 1-10 LCD module specifications (14.1-inch XGA TFT) (1/3)

Item	Specifications
	G33C00012210, G33C00013110, G33C00014110, VF2093P01, VF2058P01, VF2048P01, VF2062P01
Number of Dots	1,024(W) x 768(H)
Dot spacing (mm)	0.279(H) x 0.279(V)
Display range (mm)	285.696(H) x 214.272(V)

Table 1-10 LCD module specifications (15.0-inch XGA TFT) (2/3)

Item	Specifications			
	G33C0000L110	G33C0000G110	G33C0000M110	G33C0000Q110
Number of Dots	1,024(W) x 768(H)			
Dot spacing (mm)	0.297(H) x 0.297(V)			
Display range (mm)	304.128(H) x 228.096(V)			

Table 1-10 LCD module specifications (15.0-inch SXGA+ TFT) (3/3)

Item	Specifications		
	G33C0000P110	G33C0000N110	G33C0000R110
Number of Dots	1,400(W) x 1,050(H)		
Dot spacing (mm)	0.2175(H) x 0.2175(V)		
Display range (mm)	304.5(H) x 228.375(V)		

1.11.2 FL Inverter Board

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

Table 1-11 lists the FL inverter board specifications.

Table 1-11 FL inverter board specifications

Item		Specifications
Input	Voltage (V)	DC5
	Power (W)	7
Output	Voltage (V)	750
	Current (mA)	6.00
	Power (W)	5W/7VA

1.12 Power Supply

The power supply supplies 28 different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges if 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 1-12 lists the power supply output specifications.

Table 1-12 Power supply output rating

Name	Voltage [V]	Name/Use
PPV	1.30 - 1.00	CPU, Montara-GML, ICH4-M
1R5-C1V	1.5	Power 1.5V&1.2V
1R5-S1V	1.5	ICH4-M
LAN1R5-E1V	1.5	ICH4-M (LAN)
1R5-P1V	1.5	Montara-GML, ICH4-M
1R2-P1V	1.2	Montara-GML
1R2VID-P1V	1.2	CPU
2R5-B2V	2.5	Montara-GML, Memory
2R5-P2V	2.5	Montara-GML
1R25-B1V	1.25	Memory
MR1R25-B1V	1.25	Memory
E3V	3.3	YEBISU3S-GA, Mini-PCI, MDC
LAN-E3V	3.3	ICH4-M (LAN)
B3V	3.3	YEBISU3S-GA, Mini PCI, PC-Card
P3V	3.3	Montara-GML, ICH4-M
PNL-P3V	3.3	LCD
E5V	5.0	USB Power, RGB
B5V	5.0	PC-Card
P5V	5.0	TouchPad, HDD, ODD, FAN, LEDs
FL-P5V	5.0	FL-inverter
SND-P5V	5.0	Sound
A4R7-P4V	4.7	Sound
15-EBV	9.0-11.5	Pull-ups
M5V	5.0	LEDs, Battery
S3V	5.0	EC/KBC, ICH4-M
S5V	5.0	ICH4-M
MCV	5.0	PSC
R3V	2.0-3.5	ICH4-M (RTC)

1.13 Batteries

The PC has the following two batteries.

- Main battery
- Real time clock (RTC) battery

Table 1-13 lists the specifications for these two batteries.

Table 1-13 Battery specifications

Battery Name		Battery Element	Output Voltage	Capacity
Main battery	G71C0002N210	lithium ion	10.8V	3,600mAh
	G71C0002N110			
	G71C0002P210	lithium ion	10.8V	4,400mAh
	G71C0002P110			
Real time clock (RTC) battery	P71035017110	Nickel metal hydride	3.0V	17mAh

1.13.1 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.

1.13.2 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.

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. Table 1-14 shows the time required for charges of main battery.

Table 1-14 Time required for charges of main battery

Condition		Charging Time
Normal charge	3,600mAh	About 3.5 to 9 hours or longer
	4,400mAh	About 4 to 12 hours or longer
Quick charge	3,600mAh	About 2.6 hours
	4,400mAh	About 2.6 hours

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

Data preservation time

When turning off the power in being charged fully, the preservation time is as follows:

Table 1-15 Data preservation time

Condition		Preservation time
Standby Mode	3,600mAh	About 3 days
	4,400mAh	About 3.6 days
Boot Mode	3,600mAh	About 25 days
	4,400mAh	About 30 days

1.13.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory.

Table 1-15 lists the Time required for charges of RTC battery.

Table 1-16 Time required for charges of RTC battery

Condition	Time
Power ON (Lights Power LED)	8 hours
Power OFF (Doesn't light Power LED)	Doesn't charge

1.14 AC Adapter

The AC adapter is used to charge the battery.

Table 1-17 lists the AC adapter specifications.

Table 1-17 AC adapter specifications

Item	Specifications	
	G71C00002T	G71C00002S
Input voltage	AC100V/240V	100V/240V
Input frequency	50Hz/60Hz	50Hz/60Hz
No load input power	0.5W or less	0.5W or less
Output voltage	15.0V	15.0V
Output current	5.0A	4.0A

Chapter 2

Troubleshooting Procedures

Chapter 2 Contents

2.1	Troubleshooting	2-1
2.2	Troubleshooting Flowchart.....	2-2
2.3	Power Supply Troubleshooting.....	2-6
	Procedure 1 Power Status Check	2-6
	Procedure 2 Error Code Check	2-8
	Procedure 3 Connection Check.....	2-14
	Procedure 4 Charging Check	2-14
	Procedure 5 Replacement Check	2-15
2.4	System Board Troubleshooting.....	2-16
	Procedure 1 Message Check	2-17
	Procedure 2 Printer Port LED Check on Boot Mode.....	2-19
	Procedure 3 Printer Port LED Check on Suspend/Resume Mode	2-30
	Procedure 4 Diagnostic Test Program Execution Check	2-38
	Procedure 5 Replacement Check	2-38
2.5	3.5" FDD Troubleshooting	2-39
	Procedure 1 FDD Head Cleaning Check	2-39
	Procedure 2 Diagnostic Test Program Execution Check	2-40
	Procedure 3 Connector Check and Replacement Check.....	2-41
2.6	2.5" HDD Troubleshooting.....	2-42
	Procedure 1 Partition Check.....	2-42
	Procedure 2 Message Check	2-43
	Procedure 3 Format Check.....	2-44
	Procedure 4 Diagnostic Test Program Execution Check	2-45
	Procedure 5 Connector Check and Replacement Check.....	2-46
2.7	Keyboard Troubleshooting	2-47
	Procedure 1 Diagnostic Test Program Execution Check	2-47
	Procedure 2 Connector Check and Replacement Check.....	2-47

2 Troubleshooting Procedures

2.8	Display Troubleshooting.....	2-48
	Procedure 1 Diagnostic Test Program Execution Check	2-48
	Procedure 2 Connector and Cable Check.....	2-48
	Procedure 3 Replacement Check	2-49
2.9	Touch Pad Troubleshooting.....	2-50
	Procedure 1 Diagnostic Test Program Execution Check	2-50
	Procedure 2 Connector and Cable Check.....	2-50
	Procedure 3 Replacement Check	2-50
2.10	Optical Drive Troubleshooting	2-51
	Procedure 1 Diagnostic Test Program Execution Check	2-51
	Procedure 2 Connector Check and Replacement Check.....	2-51
2.11	Modem Troubleshooting.....	2-52
	Procedure 1 Diagnostic Test Program Execution Check	2-52
	Procedure 2 Connector Check and Replacement Check.....	2-52
2.12	LAN Troubleshooting.....	2-53
	Procedure 1 Diagnostic Test Program Execution Check	2-53
	Procedure 2 Connector Check and Replacement Check.....	2-53
2.13	Sound Troubleshooting.....	2-54
	Procedure 1 Diagnostic Test Program Execution Check	2-54
	Procedure 2 Connector Check.....	2-54
	Procedure 3 Replacement Check	2-55
2.14	Wireless LAN Troubleshooting.....	2-56
	Procedure 1 Transmitting-Receiving Check	2-56
	Procedure 2 Antennas' Connection Check	2-57
	Procedure 3 Antenna Check.....	2-58
	Procedure 4 Replacement Check	2-59

Figures

Figure 2-1	Troubleshooting flowchart.....	2-3
Figure 2-2	Printer port LED	2-19
Figure 2-3	Printer port LED board	2-19
Figure 2-4	Antenna Test cable.....	2-58

Tables

Table 2-1	Battery icon.....	2-6
Table 2-2	DC IN icon.....	2-7
Table 2-3	Printer port LED boot mode status	2-21
Table 2-4	Printer port LED suspend mode error status.....	2-31
Table 2-5	Printer port LED resume mode error status	2-34
Table 2-6	FDD error code and status	2-40
Table 2-7	2.5” Hard disk drive error code and status.....	2-45

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. System Board | 8. Optical Drive |
| 3. 3.5” USB FDD | 9. Modem |
| 4. 2.5” HDD | 10. LAN |
| 5. Keyboard | 11. Sound |
| 6. Display | 12. Wireless LAN |

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

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 USB FDD testing)
5. Cleaning disk kit (for USB FDD head cleaning)
6. Printer port LED
7. Wraparound connector for PC card
8. Tester
9. External CRT
10. External USB FDD (for no internal-FDD model)
11. External USB keyboard
12. External USB mouse
13. External USB test module
14. External USB cable
15. PS2 mouse
16. Headphone
17. Microphone
18. Toshiba CD-ROM test disk (ZA1217P01/P000204190)
19. Toshiba-EMI DVD-ROM test disk TSD-1
20. Music CD
21. CD-RW media (recommended :RICOH, Mitsubishi Kagaku supporting 4x media)
22. DVD-ROM media (normal media on the market)
23. RJ-11 connector checker LED
24. LAN wraparound connector
25. Speaker with an input terminal for S/PDIF
26. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting
27. Antenna test cable

2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedure is executed. Before going through the flowchart steps, check the following:

- Make sure that Toshiba Windows[®] 2000/XP-HE/XP-PRO 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 external floppy disk drive is empty.

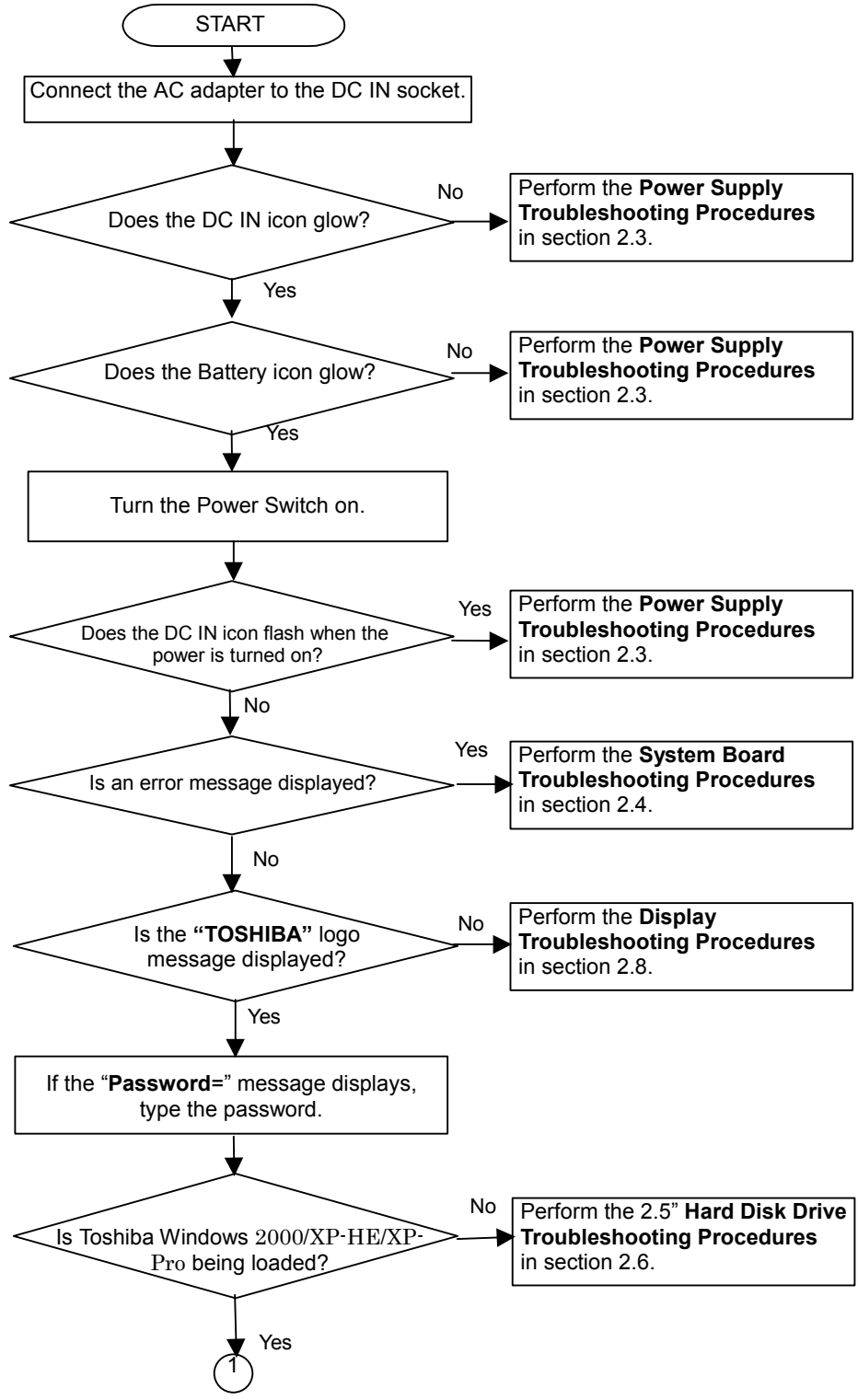


Figure 2-1 Troubleshooting flowchart (1/2)

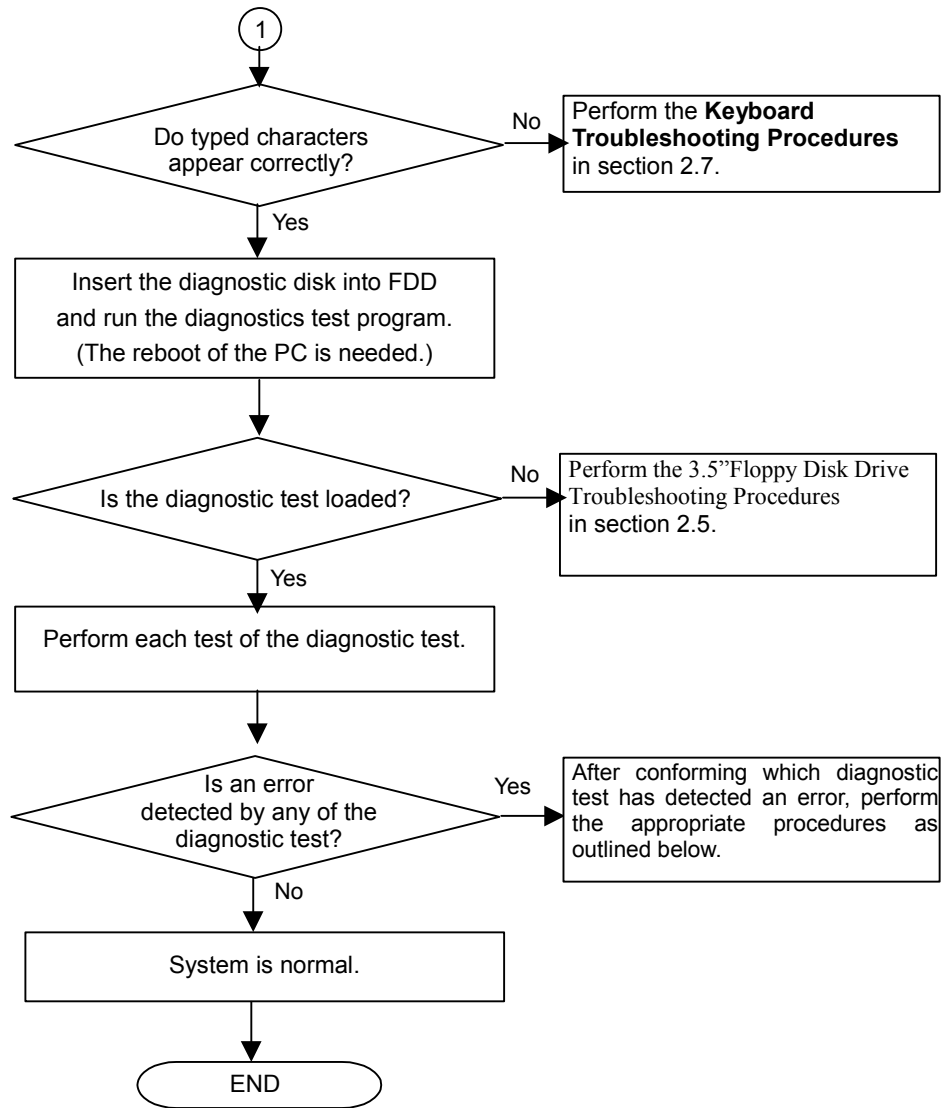


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The 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, CD-ROM/DVD-ROM test, printer test, Async test, expansion test, real timer test or Sound/Modem/LAN test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the keyboard test, perform the Keyboard 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 Status Check
- Procedure 2: Error Code Check
- Procedure 3: Connection Check
- Procedure 4: Charging Check
- Procedure 5: Replacement Check

Procedure 1 Power Status Check

The following icons indicate the power supply status:

- Battery icon
- DC IN icon

The power supply controller displays 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.
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 ^{*1}
Doesn't light	Any condition other than those above.

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

When the icon is blinking, perform the following procedure.

1. Remove the battery pack and the AC adapter.
2. Re-attach the battery pack and the AC adapter.

If the icon is 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.

NOTE: Use the supplied AC adapter (G71C0002T210 or G71C0002S210).

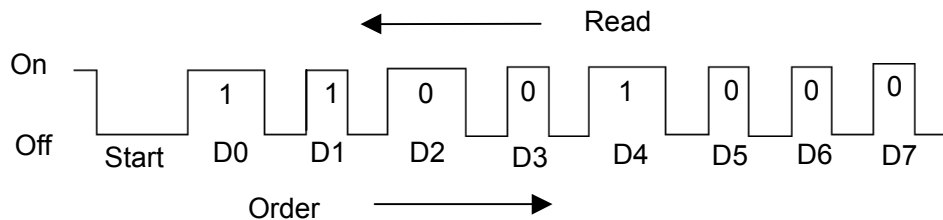
Procedure 2 Error Code Check

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 Off for half second

The error code begins with the least significant digit.

Example: Error code 13h (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	Common Dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 6.60A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Abnormal current has been sensed.

Main Battery

Error code	Meaning
21h	Main battery charge current is over 6.60A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is over 3.9A when AC adapter is not connected.
24h	Abnormal current has been sensed.
25h	Main battery charge current is over 0.3A.

Second Battery

Error code	Meaning
31h	Second battery charge current is over 6.60A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.9A. when AC adapter is not connected.
34h	Abnormal current has been sensed.
35h	Second battery charge current is over 0.3A.

S3V output

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

1R5-C1V output (P61)

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

1R5-C1V output (P62)

Error code	Meaning
60h	1R5-C1V voltage is over 1.80V when the computer is powered on/off.
61h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
62h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
63h	1R5-C1V voltage is 1.275V or less while the computer is suspended.
64h	1R5-C1V voltage is abnormal while the computer is shutdown. (CV support)
65h	1R5-C1V voltage is 1.275V or less when the computer is booting up. (CV support)

PPV output

Error code	Meaning
70h	PPV voltage is over 1.56V 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.

1R2VID-P1V output

Error code	Meaning
80h	1R2VID-P1V voltage is over 1.44 when the computer is powered on/off.
81h	1R2VID-P1V voltage is 1.02 or less when the computer is powered on.
82h	1R2VID-P1V voltage is 1.02 or less when the computer is booting up.
83h	1R2VID-P1V voltage is 1.02 or more when the computer is powered off.
84h	1R2VID-P1V voltage is 1.02 or less when the computer is suspended.

E5V output

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

E3V output

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

PPV output

Error code	Meaning
B0h	PPV voltage is over 1.56V when the computer is powered on/off.
B1h	PPV voltage is 0.68V or less when the computer is powered on.
B2h	PPV voltage is 0.68V or less when the computer is booting up.
B3h	PPV voltage is 0.68V or more when the computer is powered off.

1R2-P1V output

Error code	Meaning
C0h	1R2-P1V voltage is over 1.44V when the computer is powered on/off.
C1h	1R2-P1V voltage is 1.02V or less when the computer is powered on.
C2h	1R2-P1V voltage is 1.02V or less when the computer is booting up.
C3h	1R2-P1V voltage is 1.02V or more when the computer is powered off.
C4h	1R2-P1V voltage is 1.02V or less when the computer is suspended.

❑ 1R25-B1V output

Error code	Meaning
D0h	1R25-B1V voltage is over 1.50V when the computer is powered on/off.
D1h	1R25-B1V voltage is 1.063V or less when the computer is powered on.
D2h	1R25-B1V voltage is 1.063V or less when the computer is booting up.
D3h	1R25-B1V voltage is 1.063V or more when the computer is powered off.
D4h	1R25-B1V voltage is 1.063V or less when the computer is suspended.

❑ 2R5-B2V output

Error code	Meaning
C0h	2R5-B2V voltage is over 3.00V when the computer is powered on/off.
C1h	2R5-B2V voltage is 2.125V or less when the computer is powered on.
C2h	2R5-B2V voltage is 2.125V or less when the computer is booting up.
C3h	2R5-B2V voltage is 2.125V or more when the computer is powered off.
C4h	2R5-B2V voltage is 2.125V or less when the computer is suspended.

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

- Make sure the AC 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.

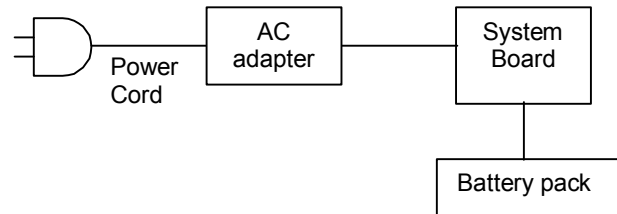
Check 3 In the case of error code 21h:

- 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 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 Charging Check

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

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

Procedure 5 Replacement Check

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

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

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

Check 2 Replace the system board with a new one.

2.4 System Board Troubleshooting

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

Procedure 1: Message Check

Procedure 2: Printer Port LED Check on Boot Mode

Procedure 3: Printer Port LED Check on Suspend/Resume Mode

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Replacement Check

Procedure 1 Message Check

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

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If MS-DOS or Windows 2000/XP-HE/ XP-PRO 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. If any other error message displays, perform Check 3. The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

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


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

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

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

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

If error message (22) or (23) is displayed, go to the 3.5" 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 Printer Port LED Check on Boot Mode

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

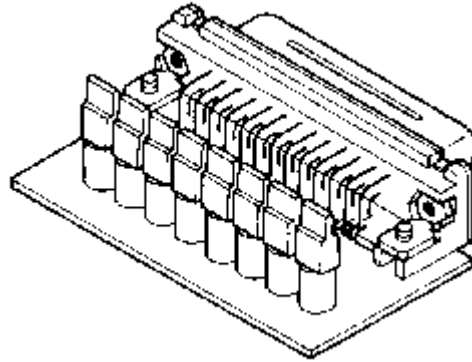


Figure 2-2 Printer port LED

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

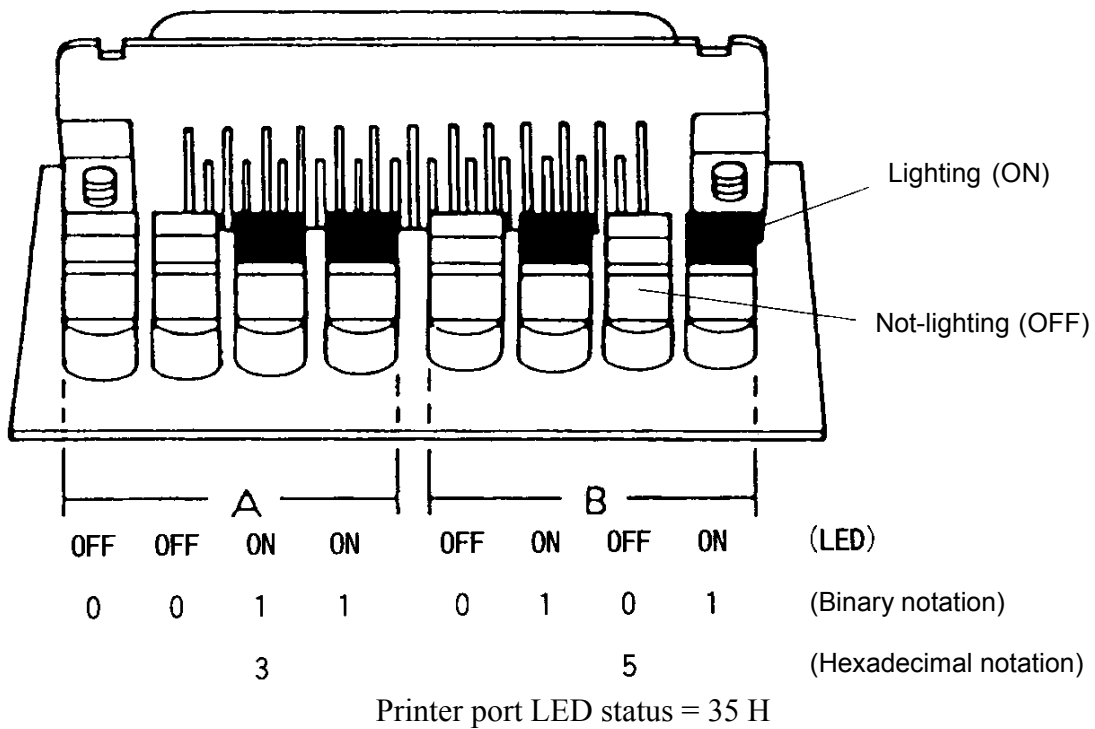
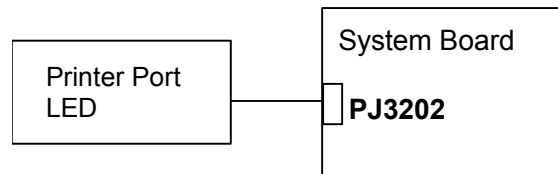


Figure 2-3 Printer port LED board

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



1. Turn on the computer's power and set it to boot mode.
2. Turn off the computer's power.
3. Plug the printer port LED into the parallel port.
4. While holding down the space bar, turn on the computer's power.
5. Read the LED status from left to right.
6. Convert the status from binary to hexadecimal notation.
7. If the final LED status is FFh (normal status), go to Procedure 4.
8. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

NOTE: If an error condition is detected by the IRT test, the printer port LED displays the status for the last test item which ended correctly. For example, when the printer port LED displays 0Ch and halts, the IRT test has already completed the Vector initialization. In this instance, the IRT indicates an error has been detected during the NDP initialization.

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

LED Status	Test item	Contents
	Start	Clear of software reset bit
		Prohibition of APIC
		Initialization of MCHM
		Initialization of ICHM
		Initialization of Super I/O
		Initialization of debug port
		Dummy read of 3 rd Bus data
B0h	Flash ROM check	PIT CH0 initialization (for HOLD_ON)
		BIOS rewrite factor flag initialization
		CHECK SUM CHECK
		Transition to protected mode
		Boot block checksum (skip when returned to S3)
		The program halts when checksum error occurred.
		Checksum other than boot block (skip when returned to S3)
B1h	KBC initialization	EC/KBC rewrite check
		If "rewrite" is requested, go to "BIOS rewrite process".
		Transition of process to System BIOS IRT when returned to S3)
		Key input
		Check of Tilde key (半/全 key) and Tab key if a key is pressed
B2h	BIOS rewrite request check	BIOS rewrite request check if Checksum check error occurred on except Boot Block or rewrite is required by user. "BIOS rewrite process".
B3h	BIOS rewrite (1)	Transits to System BIOS IRT.
		Initialization of ICHM. D31
		DRAM configuration
		Permission of cache (L1 cache only)
		Memory clear
		Transition to real mode and copy of BIOS to RAM
B5h		Saving of key scan code
		Setting of TASK_1ms_TSC
B6h	BIOS rewrite	FAN control
		Sound initialization (for BEEP sound)
		System speaker enable

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

LED Status	Test item	Contents
(B6H)	(BIOS rewrite)	Cancel of sound mute
		Setting of volume to max.
		Display of messages (EC/KBC UPDATE/DAMAGED, BIOS UPDATE/DAMAGED)
		Key input
		Prohibition of USB
		BEEP
		Waiting for Key input
		Reading of CHGBIOSA.EXE/CHGFIRMA.EXE
		FDC RESET
		Setting of parameters for 2HD (1.44MB)
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.
		Setting of parameters for 2DD (720KB)
		Retrieval of "CHGBIOSA.EXE" from the root directory.
		Calculates the directory start header and sector.
		Reads one sector of the root directory.
		Retrieval the entry of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" from the sector read.
Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE", key input when error occurred.		
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"		
(B3h)	(BIOS rewrite)	Prohibition of cache
		Initialization of H/W (before DRAM recognition)
		Initialization of MCHM
		Initialization of ICH4M.D31.Func0
		Initialization of ICH4M.D31.Func1
		Initialization of USB.Func0,1,2,7
		Initialization of ICH4M.D31.Func3
		Initialization of ICH4M.D31.Func5
		Initialization of FLUTE
00h	Initialization of PIT channel 1	Initialization of PIT channel 1 (Setting the refresh interval "30μs")

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

LED Status	Test item	Contents
01h	Memory check	DRAM type and size check (at Cold boot)
		If RAM size is "0", the program halts
		SM-RAM stack area test
		If the SM-RAM cannot be used as stack, the program halts
		Cache configuration
02h	CMOS check and initialization	Permission of cache (L1/L2 cache)
		CMOS access test (at Cold boot only)
		If any error occurred, the program halts
		CMOS battery level check
		CMOS checksum check
		CMOS data initialization (1)
		IRT status setting (Setting of "Boot status" and "IRT busy flag" and "0" to the remaining bits)
		Storing of DRAM size
		In the case of CMOS error, no resume occurs.
03h	Resume branch check (at Cold boot only)	If "resume status code" is not set, no resume occurs
		Resume error check
		S3 return error Resume error F17AH
		SM-RAM checksum check Resume error F173H
		Memory configuration change check
		Resume error F173H
		Checksum check of system BIOS RAM area
		Resume error F179H
		Checksum check of Expanded Memory
		Resume error F176H
		Checksum check of PnP RAM
		Resume error F177H
To resume process (RESUME_MAIN)		
Resume error process		
Returns the CPU clock to "Low"		
Prohibition of all SMI		
Clears resume status		
Returns to ROM		

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

LED Status	Test item	Contents
(03h)		Forwards the area of C0000h to EFFFFh to PCI (prohibition of DRAM)
		Sets resume error request
		Copying ROM/RAM of system BIOS (HLT when error occurred)
04h	SMRAM initialization	SMRAM initialization
		WakeUp factor check
		SMRAM base rewriting and CPU state map saving for BIOS
		Permission of SMI based on ASMI
05h	Initialization of devices which need initialization before PCI initialization	PIT test (at Cold boot only) and initialization
		Setting of test pattern to channel 0 of PIT#0
		Check whether the set test pattern can be read
		Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms)
		Initialization of PIT channel 2(Setting of the sound generator frequency to 664Hz)
		Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval.) The system halts when the time is out.
		Test of PIT channel 2 (Check whether the speaker gate works normally.)
		CPU clock measurement
		Permission of SMI except auto-off function
		Battery discharge current control (1CmA)
		AC adapter rated over current control
		Dividing procedures for time measuring by IRT
		Setting for clock generator
		Check of parameter block A
		CPU Initialization
		microcode update
		Judgement of CPU type
		Geyserville support check
		Setting of CPU clock to "high"
Graphics Aperture Size setting		

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

LED Status	Test item	Contents
06h		Saving memory configuration to buffer
		Reading of EC version
		Update of flash ROM type
		Judging of destination (Japan or except Japan) based on DMI data
		CMOS default setting check (Default set if Bad battery, Bad checksum (ROM, CMOS) is detected)
		ACPI table initialization (for execution of option ROM)
		Initialization of devices which need initialization before PCI bus initialization
		AC'97 control
		Initialization of temperature control information
		KBC initialization
		VGA display off, Reset control
		Sound initialization
		PC multi-box status acquisition
		HC initialization, USB Device recognition and initialization
		Control of built-in LAN permission/prohibition
		PIC initialization
		PIC test
Password Initialization		
07h		PCI bus initialization (connection of DS Bus)
		Initialization of LAN information
		WakeUp factor check
08h		Task generation for waiting INIT_PCI completion
		CMOS data initialization (2)
		PnP initialization
		Setting of setup items
		Waiting for the completion of Multi-box status check
		H/W setting based on PnP resource

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

LED Status	Test item	Contents
09h	Task generation for waiting PnP resource making completion	Task generation for waiting PnP resource making completion
	Serial interruption control	(before use of interruption)
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		PCI configuration
Saving of VGA configuration result		
0Ah	Task generation for waiting PCI_CONFIGURATION completion	Task generation for waiting PCI_CONFIGURATION completion
	Initialization of H/W needed after PCI configuration	Printer port setting (for models supporting printer port)
		HDD initialization sequence start
	Enabling power off	
	Output code generation	
0Bh	FIRST_64KB_CHECK	Check of first 64KB memory
0Ch	INIT_INT_VECTOR	Initialization of vectors
0Dh	INIT_NDP	Initialization of NDP
0Eh	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF
		Timer initialization start
		Initialization of buffers for power saving
		EC initialization & Reading of battery information
		Update of system BIOS (Update of model name and EDID information for LCD)
0Fh	INIT_DISPLAY	Waiting for VGA chip initialization completion
		VGA BIOS initialization
10h	DISP_LOGO	Logo display

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

LED Status	Test item	Contents		
11h	SYS_MEM_CHECK	Check of conventional memory (Cold boot only)		
12h	EXT_MEM_CHECK	Exception check in protected mode (Cold boot only)		
13h (14h)	INIT_SYS_MEM (LED=14h if error occurred during exception check in protected mode)	Initialization of conventional memory (Reboot only)		
15h	CHK_DMA_PAGE	Check of DMA Page Register (Cold boot only)		
16h	CHECK_DMAC	Check of DMAC (Cold boot only)		
17h	INIT_DMAC	Initialization of DMAC (Cold boot only)		
18h	CHECK_PRT	Check of printer port existence (for models supporting PRIT)		
19h	CHECK_SIO	Check of SIO (for models supporting SIO)		
1Ah	BOOT_PASSWORD (In the case of "Reboot")	Check of password		
		Waiting for HDD initialization completion		
		Check of key input during IRT (waiting for KBC initialization completion)		
	(In the case of "Boot")	ATA priority initialization		
		BM loading process (for models supporting fingerprint certification function)		
		Initialization of BM (for models supporting fingerprint certification function)		
		Check of key input during IRT (waiting for KBC initialization completion)		
		Input of password		
	1Bh	EX_IO_ROM_CHECK	BM open (for models supporting fingerprint certification function)	
			Check of option I/O ROM	
1Ch			PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
				Setting of font address for resume password
				Setting of repeat parameter for USB KB
				Final check of key input during IRT
				Storing of T_SHADOW_RAM_SIZE
	Update of system resource before boot			
Rewriting of memory map data of INT15h E820h function				
Waiting for AC-Link initialization completion				

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

LED Status	Test item	Contents
(1Ch)	(PRE_BOOT_SETUP)	Updating of table for DMI
		Copy of ACPI table to top of expansion memory
		Waiting for completion writing of PSC version to BIOS
		Waiting for clock generator setting completion (The system halts in LED = 1DH when an error is detected.)
		Waiting for serial port initialization completion (for models supporting SIO)
		Cancel of NMI Mask
		TIT check sum
		Clearance of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (For models supporting Bluetooth)
		Check of existence of object maintenance cards
		Prohibition of unused PC cards
		Setting of WAKEUP status data for ACPI
		HW initialization before Boot, Waiting for initialization completion
		Notifies the DVI connection status to VGA BIOS (for models supporting DVI)
		Setting of battery save mode
		Setting of date
		Waiting for Bluetooth initialization completion (for models supporting Bluetooth)
		Update of DMI Wakeup factor, Update of SM-BIOS structure table
		PCI device configuration space close
		Cache control
		Update of parameter block A
Process for CPU (Make the CPU clock to be set by SETUP)		
Waiting of motor-off completion of disabled HDD		
Final decision of USB FDD drive information		
Post processing of PRE_BOOT_SETUP Clearance of PWRBTN_STS, Enabling POWER		
FFh	End	Button

NOTE: The printer port LED outputs the status of an item in which an error is occurred. If the printer port LED outputs "0Ch" and then halts, it indicates memory check of first 64KB is completed and an error occurred during initialization of vector.

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

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

Check 2 If error code 0Ah is displayed, go to the following Sections:

Section 2.5 3.5" FDD Troubleshooting
Section 2.6 2.5" HDD Troubleshooting

Procedure 3 Printer Port LED Check on Suspend/Resume Mode

The printer port LED displays the IRT status and error status by turning lights on and off as an eight-digit binary value after turning on of the power.

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

1. Turn on the computer's power and set it to the resume mode.
2. Turn off the computer's power.
3. Plug the printer port LED into the parallel port (printer port).
4. Read the LED status from left to right as you face the computer.
5. Convert the status from binary to hexadecimal notation.
6. If the final LED status is FFh (normal status), go to Procedure 4.
7. If the final LED status matches any of the test status values in Table 2-4, perform Procedure 5.

Table 2-4 Printer port LED suspend mode error status (1/3)

LED Status	Test item	Contents
		Sets the parallel port to D0 state.
2Bh	Release resources used for identification of fingerprint.	(For model supporting the fingerprint identification)
2Ch	Prohibition of THERMAL DUTY (to prevent not generating of SMI).	
	When powering-off request from OS is required, waiting for the completion of dividing process because waiting in SUSPEND of Runtime returns the process to OS.	
	Forced execution of dividing	(Permission of SMI for dividing)
	Waiting for completion of dividing	
2Dh	After prohibiting of all SMI, permits I/O trap(EHCI) and external SMI.	
	Starts dividing to transmit periodically extension command (every 25 seconds) not to generate time-out of power-off.	
	When in recovery from hibernation, turn off the power, without doing anything.	
	Clears resume/power-off status.	
	Storing and initializing of special configuration register	
	Prohibits clock control.	
	Prohibits forced-power-off by detection of LB2.	
	Recognition of suspending for boot/resume	
	Branch of resume mode (LED=2EH) or boot mode(LED=33H)	
2Eh	Powering-off during resuming	Halts HC.
	If in password process, recovers display information.	
	Starts sequence for storing display system.	

Table 2-4 Printer port LED suspend mode error status (2/3)

LED Status	Test item	Contents
2Fh	Resume error check in suspend mode.	Checks if in IRT.
	Checks if external cards are connected	(If PNP OS exists, does not check.)
	Execution of driver for suspend	
	Clearing of data for Remote Lockout	
	Storing of FDD register	(Models supporting built-in FDD)
	Storing of USB register	
	Halt of HC.	
	Storing CPU register	
	Permission of system area, memory cache	(to work at high-speed)
	Suspending of HDD	
	Storing KBC,SCC and MOUSE	
	Storing of PCI device	
	Storing of PIT	
	Starts sequence for storing display system.	
	Storing of PIC	
	Storing of DMAC	
	Storing of system status command port	
	Storing of SIO	
	Storing of PCMCIA card	
	Storing of RTC	
Calculation of check sum	(conventional memory)	
31h	Hibernation if requested.	
32h	Marks in CMOS that suspending is completed normally for resume function.	(to LED=34H)
33h	Suspending for boot mood	
	Processing of VGA –off (boot)	
	Suspending of HDD (boot)	
	Transition to S5 of Bluetooth (boot)	(For models supporting Bluetooth)
34h	Suspending of boot/ resume for PnP	(Stores PnP resource information into Flash ROM.)
	Suspending of boot /resume for password	(Stores password information into Flash ROM.)
35h	Waiting for completion of suspending for HDD password	

Table 2-4 Printer port LED suspend mode error status (3/3)

LED Status	Test item	Contents
36h	Prohibition of PCI arbiter	
	Setting of Wakeup event	
	Power-off of PC card	
	Re-setting backup current	
	Forced off of fan	
	Checks whether off-process for resume is needed	
	Power LED control during suspending	
	Isolates built-in LAN.	
	Makes the power of sound off.	
	Makes the power of Dock off.	(Models supporting Dock)
37h	Model-unique processing just before suspending	Setting the corresponding-time of power switch to 50ms
		Setting the corresponding-time of panel opening to 50ms
		Setting Speed Step to Low
	Waiting for completion of dividing for suspending	
Stops dividing of extension command for power off.		
38h	Measure for USB over current	
	Serial interrupt control	
	Calculation of check sum of PnP RAM area	(Not work in suspending for boot)
	Acquires how to turn the power off.	
	Resets by EC.	(when required)
	Makes not to send Eject Power Off command when turn the power off by the date check of alarm power on.	
	Prohibition of all SMI	
	Initializing of special register in suspending	
	Calculates the check sum of SMRAM and stores it in SMRAM.	
39h	Calculates the checksum of system BIOS in the IRT side.	(Checksum does not match during IRT)
	Setting status of suspend completion	
	Prohibition of L1&L2	Power off (completion of BIOS))

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

LED Status	Test item	Contents
00h	Refer to IRT printer LED error status.	
01h	Refer to IRT printer LED error status.	
02h	Refer to IRT printer LED error status.	
03h	Refer to IRT printer LED error status.	
	Clears flag for SMI control.	
	Renewal of Resume counter	
1F	Checks the WakeUp factors.	
	Rewriting of SMRAM BASE	
20h	Initializing devices necessary for initialization before initializing PCI bus (1)	Initializing of PIT
		Initializing of PIT channel 0 (Sets the interval of timer interruption to 55ms)
		Initializing of PIT channel 2 (Sets the sound generator frequency to 664Hz)
		Measuring CPU clock
		Permission of SMI other than auto-off function
		Control of battery discharging current (1CmA)
		Dividing for measuring of IRT time
		Setting to clock generator
		Check of parameter block A
		Initializing of CP
		Updating P6 micro-code
		Check of supporting Geyserville
		Sets the CPU clock to High.
	Setting of Graphics Aperture Size	
	Recovery of PIC register	
	Initialization of devices necessary for initialization before initializing PCI bus (2)	AC'97 control
		Initializing of temperature control information
		Initializing of KBC
		VGA display-off and Reset control, Starts VGA recovery.
		Initializing of sound
	Acquires the multi-box status.	
	Initializing of HC , recognizing of USB devices connection and initializing the USB devices	

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

LED Status	Test item	Contents
		Control of permission/prohibition for built-in LAN
	Check of the checksum of conventional memory	Resume error 74H
21h	Initializing of PCI devices	
	Check of WakeUp factors after initializing PCI bus	
22h	Waiting for initializing of devices which have to be initialized before setting HW by PnP resource	Waiting for completion of MultiBox status check
	Recovery of each device (1)	Processing of RESUME for PnP
		Tentative initialization of printer port
		Serial interrupt control
		Waiting for the completion of VGA power-down control (because the VGA configuration can not be seen)
		Processing of RESUME for PCI
		Recovery of FDC
		Checks slots that were in ON status during suspending (for fingerprint identification)
		Recovery of PCMCIA card
		Error when an ATA card is pulled out Resume error 7BH
		Executing of dividing process of device detection of PC card
		Initializing COM
		Initializing FIR
	Check of HDD pack connection	Resume error 72H when HDD is mounted
	Start of IDE device resume sequence	
23h	Recovery of user alarm setting and cancel of alarm power-on function	(only one time)
	Initializing buffer for power saving	
	Initializing EC and start of reading battery information	
	Recovery of each device (2)	Setting items to be set up
		Initializing DMAC
		Initializing printer mode
	Recovery of display system, but not displayed	(only when internal VGA is enabled in suspending)
24h	Processing of password for RESUME	

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

LED status	Test item	Contents
25h	Recovery of each device(3)	Recovery of COM register
		Recovery of DMAC register
		PnP Resume processing 2
	Turns the disabled HDD motor off.	
26h	Waiting for completion of KBC initializing	(not in ACPI mode)
	Recovery of USB register	(not in ACPI mode)
	Recovery of CPU register	
	Processing of SIO dummy-reading	
	Resetting NDP interruption	
	Recovery of system, status, command and port	
	Wakeup check	Notifies the device change status to the high rank.
		Setting WAKEUP status data for ACPI
	Initializing HW just before booting or waiting for the completion	Notifies the DVI connection status to VGA BIOS
		Setting battery saving mode
		Setting date
		Waiting for the completion of Bluetooth initializing (models supporting Bluetooth)
		Renewal of Wakeup factor of DMI and SM-BIOS structure table
		Closing PCI device configuration area
		Cache control
		Renewal of parameter block A
		Process related to CPU
		Setting of CPU to SETUP designation
		Waiting for motor-off of disabled HDD
		Final decision of USB FDD information
After process of PRE_BOOT_SETUP		
Clears PWRBTN_STS.		
Enables Power Button.		
Measures against USB failure at high temperature		

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

LED status	Test item	Contents
	Waiting for the completion of recovery of VGA register	
	Recovery of PIT register	
	Recovery of PCI configuration register	
	Recovery of PIC MASK	
	Executing of driver for RESUME	
	Waiting for the completion of recovery of FDD	(models supporting built-in FDD)
27h	Turns the power off if required during Hibernation.	
	Checks if the power-off switch is pressed or not during resume processing/	(Suspends if pressed.)
	Executes HOTKEY F1 when booting in instant security	
28h	Clears key buffer	(Not in ACPI mode)
29h	Clears IRT status.	(In ACPI mode)
2Ah	(In ACPI mode)	
	Clears flag in Resume process	
	Acquires Wake Up Vector address.	
	Clears key buffer.	
	Renewal of date/time	
	ACPI mode on	
	Recovery of write-protected status before.	
FFh	(In ACPI mode / not in ACPI mode)	
	Initializing printer port	
	Returning to the main process	

Procedure 4 Diagnostic Test Program Execution Check

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

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

If an error is detected during these tests, go to Procedure 5.

Procedure 5 Replacement Check

The system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and replace the system board with a new one.

2.5 3.5" FDD Troubleshooting

This section describes how to determine if the 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 external floppy disk drive, turn on the computer and run the test. And then clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 2.

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

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

Procedure 2 Diagnostic Test Program Execution Check

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

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-6. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-6 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.

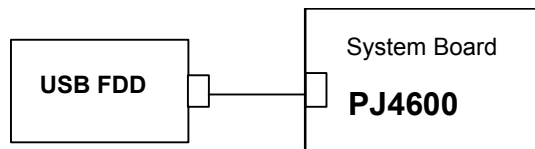
Write protected

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 connector may be disconnected from the system board. Check visually that the connector is connected firmly.

- Check 1 Make sure the following cable and connector are firmly connected to the system board.



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

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

2.6 2.5" HDD Troubleshooting

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

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

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

Procedure 1 Partition Check

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

- Check 1 Type **C:** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still exists, go to Procedure 2.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.
- Check 4 Remove the system disk from the FDD and reboot the computer. If the problem still exists, go to Procedure 2. Otherwise, the 2.5" HDD is operating normally.

Procedure 2 Message Check

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

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

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

HDC ERROR

or

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

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

Insert system disk in drive

Press any key when ready

or

Non-System disk or disk error

Replace and press any key when ready

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

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

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

System Transferred

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

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

Procedure 3 Format Check

The computer's HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 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 an 2.5" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

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

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

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

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

Procedure 4 Diagnostic Test Program Execution Check

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

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are described in Table 2-7. If an error code is not displayed but the problem still exists, go to Procedure 5.

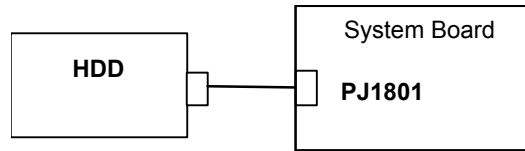
Table 2-7 2.5" Hard disk drive error code and status

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
FFh	Data compare error

Procedure 5 Connector Check and Replacement Check

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

Check 1 Make sure the following connectors are firmly connected to the system board.



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

Check 2 The 2.5" HDD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures* and check the operation. If the problem still exists, perform Check 3.

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

2.7 Keyboard Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

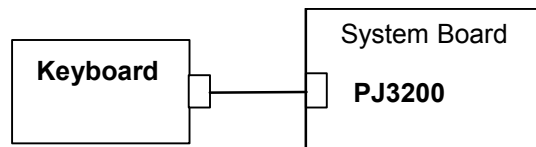
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

Procedure 2 Connector Check and Replacement Check

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

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



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

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

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

2.8 Display Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Cable Check

Procedure 3: Replacement Check

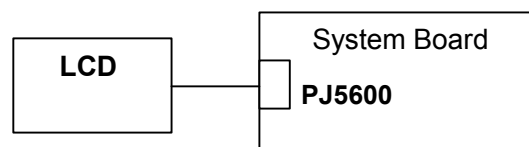
Procedure 1 Diagnostic Test Program Execution Check

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

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

Procedure 2 Connector and Cable Check

The LCD module is connected to the system board through the LCD harness. The cable may be disconnected from the board or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. Check that the pin of the LCD I/F connector is not bent or broken. If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Procedure 3.



Procedure 3 Replacement Check

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

If characters or graphics are not displayed on the internal display, perform Check 1.

If characters are displayed on the internal display but the display is not normal, perform Check 2.

If characters are displayed on the internal display but the display is dark (the back-light does not light), perform Check 5.

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

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

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

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

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

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

2.9 Touch Pad Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Cable Check

Procedure 3: Replacement Check

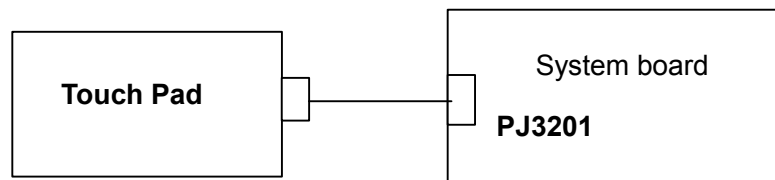
Procedure 1 Diagnostic Test Program Execution Check

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

If any error is detected, perform Procedure 2.

Procedure 2 Connector and Cable Check

The touch pad is connected to the system board with a cable respectively. The cable may have come off the connector or the connector may have come off the system board. Disassemble the computer and check the cable connections. See Chapter 4 for the disassembly procedure. If there is still an error, go to Procedure 3.



Procedure 3 Replacement Check

The touch pad may be damaged. Disassemble the computer and replace the touch pad with a new one.

2.10 Optical Drive Troubleshooting

To check if the optical drive (CD-ROM, DVD-ROM, Combo, Combo+2 or DVD Multi drive) 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 CD-ROM/DVD-ROM Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

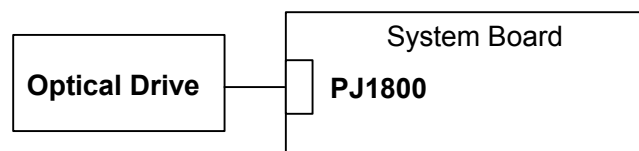
Prepare the tools before the test. (Refer to tools for implementing the Diagnostics procedures on page 2-1.)

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

Procedure 2 Connector Check and Replacement Check

The optical drive is connected to the system board by the connector. The connector may be disconnected from the system board or faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1 Make sure the following connector has been firmly connected to the CD-ROM drive and the system board.



If the connection is loose, reconnect it firmly and return to Procedure 2. If there is still an error, perform Check 2.

Check 2 The optical drive may be faulty. Replace the CD-ROM drive with a new one following the steps in Chapter 4. If the CD-ROM drive is still not functioning properly, perform Check 3.

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

2.11 Modem Troubleshooting

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

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

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

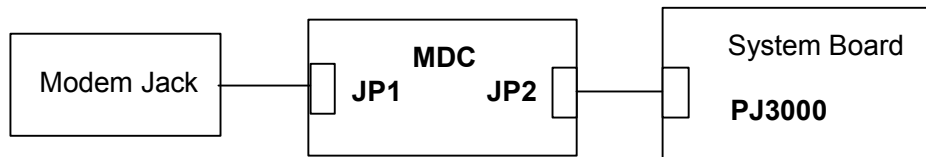
If any error is detected, perform Procedure 2.

Procedure 2 Connector Check and Replacement Check

An MDC (Modem Daughter Card) is used as the modem for this computer. The MDC is connected to the system board by connector. If the modem malfunctions, these connections may be bad or the MDC or system board might be faulty.

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

Check 1 Make sure the MDC has been firmly connected to the PJ3000 on the system board and the modem jack cable has been firmly connected to the JP1 on the modem.



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

2.12 LAN Troubleshooting

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

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Execute the LAN Test in the Diagnostic Program. (Sound/LAN/Modem test Program subtest 03 LAN test) Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

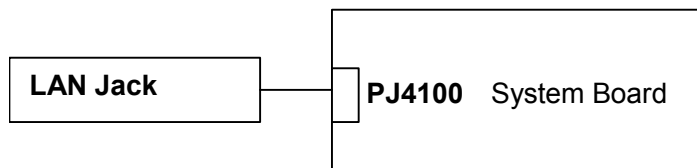
If any error is detected by the test, go to Procedure 2

Procedure 2 Connector Check and Replacement Check

The LAN function is mounted on the system board. The modem/LAN jack is connected to the system board by the cable. If the LAN malfunctions, the connection is bad or the system 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 PJ4100 on the system 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 system board may be faulty. Disassemble the computer following the steps described in Chapter 4.

2.13 Sound Troubleshooting

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

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check

Procedure 3 Replacement Check

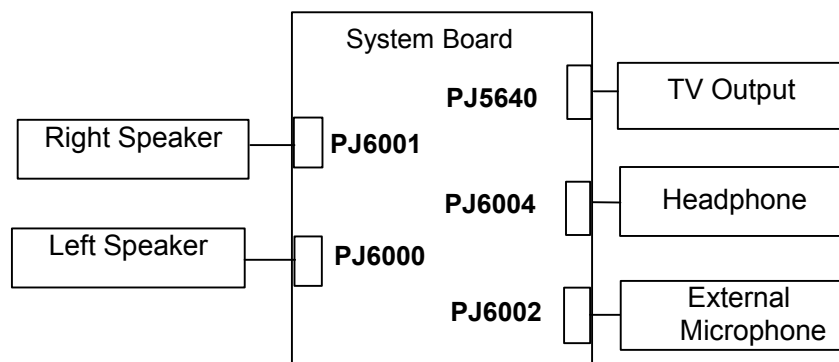
Procedure 1 Diagnostic Test Program Execution Check

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

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

Procedure 2 Connector Check

The connection of sound system is shown in the following figure.



As the connection may be bad, disassemble the PC and check each connection.

If the speaker does not operate correctly, go to Check 1.

If the headphone, external microphone or TV output does not operate correctly go to Check 3 of the procedure 3.

Check 1 Make sure the speaker cables are firmly connected to PJ6001 and PJ6000 on the system board. If the sound is still not functioning properly, perform Procedure 3.

Procedure 3 Replacement Check

- Check 1 The speaker may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem persists, perform Check 2.

- Check 2 The system board may be faulty. Replace it with a new one following the instructions in Chapter 4.

2.14 Wireless LAN Troubleshooting

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

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Antenna Check

Procedure 4: Replacement Check

Procedure 1 Transmitting-Receiving Check

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

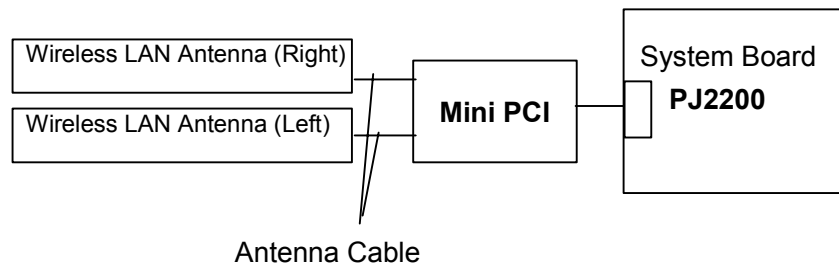
Check 1 Execute test program to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN. Perform the test following the instructions described in section 3.18 Wireless LAN test program.

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

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

Procedure 2 Antennas' Connection Check

The wireless LAN function-wiring diagram is shown below:



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

- Check 1 Make sure the wireless communication switch is “On”.
- If the switch is “Off”, turn it “On”. If there is still an error, perform Check 2.
- Check 2 Make sure the Mini PCI card is firmly connected to the PJ2200 on the system board.
- If the connector is disconnected, connect it firmly and perform Procedure 1. If the Wireless LAN is still not functioning properly, perform Check 3.
- Check 3 Make sure the wireless LAN antenna cables (black and white) are firmly connected to the Mini PCI card.
- If the wireless LAN antenna cables are disconnected, connect them firmly and perform Procedure 1. If the wireless LAN is still not functioning properly, go to Procedure 3.

Procedure 3 Antenna Check

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

1. Remove the Mini PCI slot cover and lift it off. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling.
2. Disconnect the wireless LAN antenna cables (white and black) from the Mini PCI card.
3. Connect the end of the antenna test cable to the multimeter.
4. Connect the Main antenna cable to the antenna test cable. One clip is connected to the end of the antenna cable. The other is connected to the opposite side of the antenna cable.
5. Determine the resistance. The cable passes the test when the resistance is less than 5Ω . If it is more than 5Ω , the antenna cable fails the test.
6. Change the antenna cable. Perform from step 3 to check the black antenna cable.

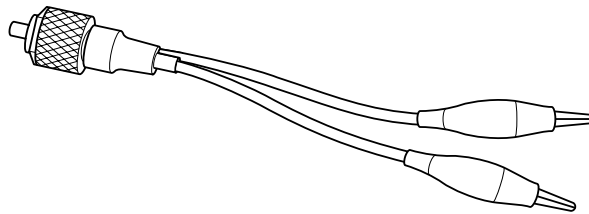


Figure 2-4 Antenna Test cable

NOTE:

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

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

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

Procedure 4 Replacement Check

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

- Check 1 The Mini PCI card may be defective or damaged. Replace the Mini PCI card with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

- Check2 Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

Chapter 3

Tests and Diagnostics

Chapter 3 Contents

3.1	The Diagnostic Test	3-1
3.2	Executing the Diagnostic Test	3-3
3.3	Subtest Names.....	3-7
3.4	System Test.....	3-9
3.5	Memory Test.....	3-12
3.6	Keyboard Test.....	3-14
3.7	Display Test	3-18
3.8	Floppy Disk Test.....	3-21
3.9	Printer Test.....	3-23
3.10	ASYNC Test.....	3-25
3.11	Hard Disk Test	3-28
3.12	Real Timer Test.....	3-31
3.13	NDP Test.....	3-33
3.14	Expansion Test.....	3-34
3.15	CD-ROM/DVD-ROM Test	3-36
3.16	LAN Test	3-37
3.17	Sound/LAN/Modem Test	3-38
3.18	Wireless LAN Test (Agere).....	3-42
3.19	Wireless LAN Test (Atheros).....	3-47
3.20	Error Code and Error Status Names.....	3-50
3.21	Hard Disk Test Detail Status.....	3-53
3.22	FDD Cleaning	3-55
	3.22.1 Function Description.....	3-55
	3.22.2 Operations	3-55
3.23	Log Utilities	3-56
	3.23.1 Function Description.....	3-56
	3.23.2 Operations	3-56

3.24	Running Test.....	3-58
3.24.1	Function Description.....	3-58
3.24.2	Operations	3-58
3.25	Floppy Disk Drive Utilities.....	3-60
3.25.1	Function Description.....	3-60
3.25.2	Operations	3-61
3.26	System Configuration	3-65
3.26.1	Function Description.....	3-65
3.26.2	Operations	3-66
3.27	SETUP	3-67
3.27.1	Function Description.....	3-67
3.27.2	Accessing the SETUP Program.....	3-68

Tables

Table 3-1	Subtest names	3-7
Table 3-2	Error codes and error status names	3-50
Table 3-3	Hard disk controller status register contents.....	3-53
Table 3-4	Error register contents.....	3-54

3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. The Diagnostic Programs are stored on the Diagnostic Disks. There are Service Program Modules (DIAGNOSTIC MENU) and the Test Program Modules (DIAGNOSTIC TEST MENU) on the Diagnostic Disks.

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 functions.

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

The DIAGNOSTIC TEST MENU contains the following functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST
- NDP TEST
- EXPANSION TEST
- CD-ROM/DVD-ROM TEST
- LAN TEST
- SOUND/LAN/MODEM TEST (Sound/LAN/Modem test disk for maintenance.)
- Wireless LAN TEST (Wireless LAN test disk for maintenance.)

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

- The Diagnostic Disks (three disks for all tests (T&D for maintenance, Sound/LAN/Modem for maintenance, wireless LAN for maintenance))
- A formatted working disk (Floppy disk test)
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- A printer port wraparound connector for the printer wraparound test (Printer test)
- A RS-232C wraparound connector (ASYNC test)
- A PC card wraparound connector (Expansion test)
- An external CRT monitor (Expansion test)
- A CD test media (TOSHIBA CD-ROM TEST DISK) (CD-ROM/DVD-ROM test)
- A DVD test media (DVD-ROM TEST DISK TSD-1) (CD-ROM/DVD-ROM test)
- A music CD (CD-ROM/DVD-ROM test)
- A PS/2 mouse (Keyboard test)
- A USB test module (Keyboard test)
- A USB cable (Keyboard test)
- Headphones (Sound/LAN/Modem test)
- A microphone (Sound/LAN/Modem test)
- A FAT-MODE inspection device (Sound/LAN/Modem test)
- An IBM compatible printer (Printer test)
- A PC for wraparound test
- USB FDD

The following sections detail the tests in the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.20 through 3.27 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. Turn off the computer and connect a USB FDD to the computer. Insert the Diagnostics disk (No.1) in the floppy disk drive.
2. Turn on the computer by pressing the power switch while pressing **U**. The following menu will appear:

```
TOSHIBA Personal Computer XXXXXX 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  
0 - SETUP
```

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

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

* When no built-in FDD is mounted, begin the test program in the following procedure:

1. Turn off the power of the PC.
2. Connect a USB FDD to the PC and insert the test program in the USB FDD.
3. Press the power button while pressing **U**. Then, the test program starts.

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

```
TOSHIBA Personal Computer XXXXXX DIAGNOSTICS  
version X.XX (C) Copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTIC TEST MENU :
```

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

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

Functions 1 through 14 are the Diagnostic Tests. Function 88 sets the floppy disk drive and hard disk drive error retry count (0-255).

To exit the submenus of the Diagnostic Test and returns to the Diagnostics Menu, set the highlight bar to function 99 and press **Enter**.

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

```

SYSTEM TEST NAME      XXXXXXXX      xxxxxxxx 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      : XXXXXXXX  STATUS      : XXX

```

SUB-TEST MENU :

```

01 - ROM checksum
02 - Geyserville
03 -
04 - Fan ON/OFF
05 - Thermister Check
06 - Quick charge
07 - DMI read
08 - DMI write
09 -
10 - CPU Temperature
11 - Wake Up Check
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** 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
```

These three selections have the following functions respectively:

1. Terminates the test program and exits to the subtest menu.
2. Continues the test.
3. Restarts the test from the error.

Selecting **NO** keeps the test running even if an error is found. 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 3.21 describes the error codes and error status for each error.

3.3 Subtest Names

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

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name		
1	SYSTEM	01	ROM checksum		
		02	Geyserville		
		04	Fan ON/OFF		
		05	Thermister Check		
		06	Quick charge		
		07	DMI read		
		08	DMI write		
		10	CPU Temperature		
		11	Wake Up Check		
		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)		
		03	PS/2 Mouse connect check		
		04	Touch pad		
		05	USB (Port0,Port1) test		
		06	USB (Port2,Port3) test		
4	DISPLAY	01	VRAM read/write for VGA		
		02	Gradation for VGA		
		03	Gradation for LCD		
		04	Gradation & Mode test for VGA		
		05	All dot on/off for LCD		
		06	"H" pattern display		
		07	LCD Brightness		
5	FDD	01	Sequential read		
		02	Sequential read/write		
		03	Random address/data		
		04	Write specified address		
		05	Read specified address		
6	PRINTER	01	Ripple pattern		
		02	Function		
		03	Wrap around		

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name		
7	ASYNC	01	Wraparound (board)		
		02	Point to point (send)		
		03	Point to point (receive)		
		04	Interrupt test		
		06	FIR/SIR Point to point (send)		
		07	FIR/SIR Point to point (receive)		
		8	HDD	01	Sequential read
02	Address uniqueness				
03	Random address/data				
04	Cross talk & peak shift				
06	Write specified address				
07	Read specified address				
09	Sequential write				
10	W-R-C specified address				
9	REAL TIMER			01	Real time
				02	Backup memory
		03	Real time carry		
10	NDP	01	NDP test		
11	EXPANSION	01	PCMCIA wrap around		
		03	RGB monitor ID		
13	CD-ROM/ DVD-ROM	01	Sequential read		
		02	Read specified address		
		03	Random address/data		
		04	Playback Music		
		05	RW 1point W/R/C		
14	LAN	01	LAN MAC ADDRESS DISPLAY		
-	SOUND/LAN/ MODEM	01	Microphoned recording & play		
		02	Sin wave		
		03	LAN		
		04	MODEM		
-	Wireless LAN (Agere)	1	Transmit & Receive test [Responder]		
		2	MAC Address test[Mini-PCI Wireless LAN]		
		3	Wireless LAN (WEP 64/128) test		
-	Wireless LAN (Atheros)	1	Communication test		
-	Wireless LAN (Calexico)	1	Communication test		
		2	Mac Address check		

3.4 System Test

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

Subtest 01 ROM Checksum

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

Subtest 02 Geyserville

This subtest confirms the CPU clock can be changed. When the CPU of the computer is Celeron, the following message appears:

```
*** This chip is not supported. ***
```

Subtest 04 Fan On/Off

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

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

```
*** Test Fan Revolution 0000RPM Start
```

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

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

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

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

Subtest 05 Thermister Check

This subtest reads the status (normal/open/short) of the [Thermister connect check] of the PS micon. When it is not normal, an error message is displayed. When it is normal, the display returns to the main menu.

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.

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

```
Model Name       :XXXXXXXXXX
Version Number   :XXXXXXX-XXXXXX
Serial Number    :XXXXXXXXXXXX
Model Number     :XXXXXXXXXXXXXX
PCN/BND Number  :XXX
UUID Number     :XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

```
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. Satellite A10)

2. "Enter Version Number ?"

Input the computer's version number and press **Enter**. (e.g. PSA10U-AAA12)

3. "Enter Serial Number ?"

Input the computer's serial number and press **Enter**. (e.g. 33030317JU)

4. "Enter Model Number ?"

Input the computer's sales model number and press **Enter**. (e.g. PCN1252CCZ01)

5. "Enter Bundle Number ?"

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

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

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

Subtest 10 CPU Temperature

This subtest checks the CPU temperature.

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

```
EXT. TEMP =
```

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

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

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

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

Subtest 11 Wake Up Check

Set “Wake-up LAN” to “Enabled” in the SETUP menu and restart the computer. Make sure the computer starts without fail.

3.5 Memory Test

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

Subtest 01 Conventional Memory

This subtest writes a 256-byte unit of constant data to conventional memory (0 to 640 KB). Then reads the new data and compares the result with the original data. The content of the memory to be tested is saved before the test and it is restored after the test.

The constant data is FFFFh, AAAAh, 5555h, 0101h and 0000h.

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 (FFh, AAh, 55h, 00h) and address data (FFFFh, FFFEh, ... 0000h) to from 1MB to the maximum MB then reads the new data and compares the result with the original data and executes the address bit test (in 64KB unit. FFh, FEh, ...).

Subtest 04 Cache Memory

To test the cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF' (32KB)) 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 → Fail

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 → Fail

Subtest 06 Stress

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

3.6 Keyboard Test

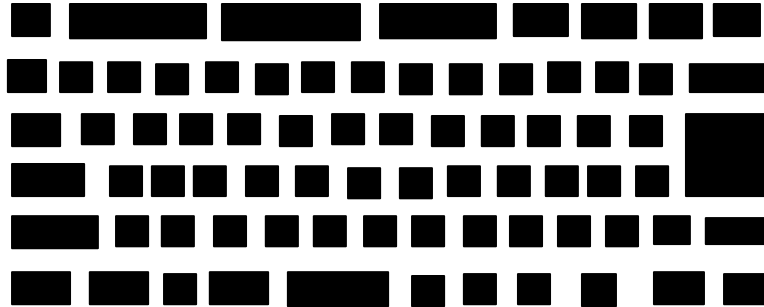
To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Keyboard test contains some subtests that test the computer's keyboard and Touch pad actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

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.

Press **Del + Enter** to end the test.

```
<<<<<< Press Key Display >>>>>>
```



IF test OK, Press [Del] [Enter] Key

Subtest 02 Pressed Key Code Display (Only for non-Japanese models)

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

```

Scan code      = SS
Character code  = CC
Keytop         = NNNNNN

Ins   Caps Lock  Num Lock  Scroll Lock
Alt   Ctrl       Left Shift Right Shift
```

Subtest 03 PS/2 Mouse Connect Check

NOTE:

1. The touch pad and the PS/2 mouse cannot be tested simultaneously. Select the PS/2 mouse in the SETUP setting.
2. To execute the PS/2 mouse connect check, a PS/2 mouse must be connected to the computer before the power is turned on.

This subtest checks the operation of a PS/2 with a PS/2 mouse.

If this test does not detect an error, it returns to the subtest menu. If it detects an error, the following message appears:

DATA COMPARE ERROR

[[HALT OPERATION]]

- 1: Test end
- 2: Continue
- 3: Retry

Subtest 04 Touch Pad

NOTE: The touch pad and the PS/2 mouse cannot be tested simultaneously. Select the touch pad in the SETUP setting.

This subtest checks the functions of the touch pad as shown below.

- A) Touch Pad pressure sensing direction and parameter.
- B) Touch Pad function check.

This test displays the response from the touch pad and touch pad switch. When moving your finger on the touch pad towards the upper left, the <POINTING> display changes according to the following illustration. If a touch pad switch is pressed, the <BUTTON> displays appear on the right side one by one. The parameters appear above the <BUTTON> (1) or (2) corresponding to the pressed touch pad switch highlights. If two touch pad switches are pressed at the same time, the subtest menu appears.

Subtest 06 USB (Port2,Port3) test

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

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

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

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

3.7 Display Test

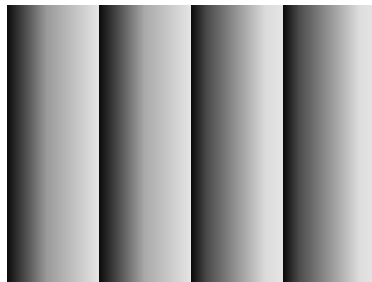
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM Read/Write for VGA

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

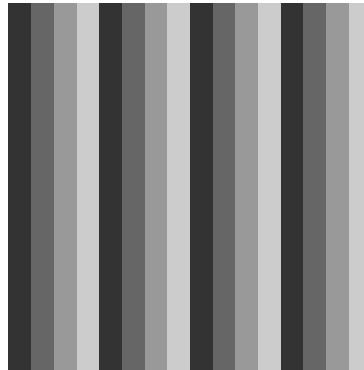
This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. The display of each color switches automatically every three seconds.

Subtest 04 Gradation & Mode test for VGA

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

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

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



[Mode 12]

(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 (all dots on) then an all-black screen (all dots off). The display changes automatically every three seconds and returns to the DISPLAY TEST menu.

3.8 Floppy Disk Test

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

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

1. The following messages will appear. Select the drive type, the media type and the start track of the floppy disk drive to be tested.

```
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)?
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 TEST IN PROGRESS XXXXXXXX
SUB-TEST :XX
PASS COUNT:XXXXX ERROR COUNT :XXXXX
WRITE DATA:XX READ DATA :XX
ADDRESS :XXXXX 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 place pointed by track, head, and address.

Subtest 05 Read specified address

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

3.9 Printer Test

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Printer Test contains subtests that test the output of the printer connected to the computer. The following messages will appear after selecting the Printer Test from the DIAGNOSTIC TEST MENU. Move the highlight bar to the subtest you want to execute and press **Enter**.

```
SUB-TEST MENU:

01-Ripple pattern
02-Function
03-Wrap around
99-Exit to DIAGNOSTIC TEST MENU
```

NOTE: An IBM compatible printer must be connected to the system to execute this test.

The following message will appear when the sub test is selected:

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

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

Subtest 01 Ripple Pattern

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

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

Subtest 02 Function

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

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

This subtest prints the various print types shown below:

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

Subtest 03 Wrap around

NOTE: To execute this subtest, a printer wraparound connector must be connected to the computer's printer port.

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

3.10 Async Test

NOTE: This test can not be executed since the computer is not equipped with a serial port and FIR port. The FIR port will be equipped in a succeeding model of this computer.

NOTE: The subtests 01 to 04 are not supported since the computer has no serial port.

To execute the Async Test, select **7** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. The async test contains subtests that test the asynchronous communication functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtests 01 through 07 require the following data format:

Method: Asynchronous
Speed: 9600BPS
Data: 8 bits and one parity bit (EVEN)
Data pattern: 20h to 7Eh

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

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

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

The following message will appear at the bottom of the screen when subtest 06 or 07 is selected:

```
Enter desired speed [1=0.576 Mbps, 2=1.152 Mbps, 3=4.0 Mbps]
```

Select the speed for sending or receiving the data and press **Enter** to start the subtest.

Subtest 01 Wrap around (board)

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

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

Subtest 02 Point to point (Send)

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

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

Subtest 03 Point to point (Receive)

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

Subtest 04 Interrupt test

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

The IRQ level 4, 3 and 5 is determined automatically only when the wraparound connector is connected.

Subtest 06 FIR/SIR Point to point (Send)

NOTE: To execute subtests 06 and 07, each computer must have access to the other computer's infrared port.

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

Subtest 07 FIR/SIR Point to point (Receive)

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

3.11 Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen. The hard disk test contains subtests that test the hard disk drive functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

NOTE: *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 09 or 10 is executed. Before running the test, 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 drive number to be tested.

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

2. The setting by this message is used to select the error dump operation when a data compare error is detected. Select yes or no.

Data compare error dump (1:No, 2:Yes)

3. This message is used to select whether or not the HDC status is displayed on the screen. The HDC status is described in section 3.20. Select yes or no.

Detail status display (1:No, 2:Yes)

4. Select the number of the subtest you want to execute and press **Enter**. The following message will appear.

```
HARD DISK TEST  IN PROGRESS  XXXXXXXX
SUB-TEST      :XX
PASS COUNT:XXXXX      ERRORCOUNT  :XXXXXX
WRITE DATA:XX        READ DATA   :XX
ADDRESS      :XXXXXXXXX STATUS      :XXX
```

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

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

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

Subtest 01 Sequential read

This subtest reads sequentially all the track data on the HDD starting at track 0 (forward reading). When all the tracks on the HDD have been read, the test reads the maximum track data and continuous to read the track data on the HDD sequentially back to track 0 (reverse read).

Subtest 02 Address uniqueness

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

- Forward sequential
- Reverse sequential
- Random

Subtest 03 Random address/data

This subtest writes random data 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.

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 from a specified cylinder and head on the HDD.

Subtest 09 Sequential write

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

Subtest 10 W-R-C specified address

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

3.12 Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The real timer test contains subtests that test the computer's real timer functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Real time

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

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. If the current data is correct, press **Enter**.

```
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. To enter ":", press **Shift + ;**.

To exit this subtest, 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.

3.13 NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The NDP test contains one subtest that tests the computer's NDP functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 NDP

This test checks the following functions of NDP:

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

Press **Ctrl + Break** to exit.

3.14 Expansion Test

To execute the expansion test, select **11** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

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)?

Subtest 03 RGB monitor ID test

Connect a CRT monitor to the computer for the test of ID acquisition.

To check whether the ID is acquired or not is judged by the data from the monitor. Therefore, this test will fail when it is performed in simultaneously display mode or panel display mode. Make sure the CRT used for this test is the one with ID and only the CRT is selected for display device before the test.

3.15 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM Test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The CD-ROM/DVD-ROM Test contains subtests that test the modem functions. Move the highlight bar to the subtest you want to execute and press **Enter**.

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

- | | | |
|------------|--------------------------|---|
| Subtest 01 | Sequential read | This subtest reads one-block (2K-byte) data from logical address 0 to the last address in order and compare them. |
| Subtest 02 | Read specified address | This subtest reads one-block data from the specified address. |
| Subtest 03 | Read random address/data | This subtest reads one-block data from 200 random addresses. |
| Subtest 04 | Playback music | This subtest replays a music CD. When the track (piece) number to replay is asked, enter a track number. |
| Subtest 05 | RW 1point W/R/C | This subtest writes, reads and compares data at one point on a CD-RW. |

3.16 LAN Test

To execute the LAN test, select 14-LAN TEST from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 LAN MAC ADDRESS DISPLAY

 This subtest reads MAC ADDRESS and displays it.

 Press **Enter** to exit.

3.17 Sound/LAN/Modem Test

To execute the Sound/LAN/Modem Test, use the 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 Diagnostics disk (No.2) in the floppy disk drive and turn on the power while pressing **F** or **U** (when the USB FDD is used). The following message will appear:

```
#####
#####   XXXXXX DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST) #####
#####
*  1 ..... (Microphoned recording&play) *
*                                           *
*  2 ..... (Sin wave) *
*                                           *
*  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 and headphone are 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.

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

Subtest 01 Microphoned recording & play

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

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

When the subtest is selected, the following message appears.

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

Press any key, and the following message appear.

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

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

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

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

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

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

Subtest 02 Sin Wave

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

When the subtest is executed, the following message appears.

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

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

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

Subtest 03 LAN Test

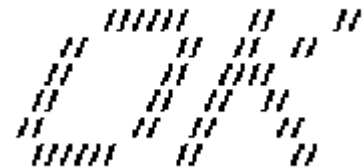
This subtest checks the operation of mini-PCI I/F by the loopback in the chip. Select **3** to execute and press **Enter**. The following message will appear:

```
COMPLETED Repeat count = 00000
Error count = 00000
```

```
LOOPBACK TEST
```

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

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



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

Check that the message “OK” appears.

Subtest 03 Modem Test

For this subtest, connect the modem PCB and RJ11 connector with a harness.

This subtest contains the following tests. Use the dedicated “FAT-MODE inspection device (product code: QE2000P01 made by Nitto Denki Seisakusyo)” for the tests.

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

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

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

After a few seconds, the following message will appear:

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

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

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

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

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

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

3.18 Wireless LAN Test (Agere)

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

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

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

NOTE: 1) Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)
2) Release the write-protection of the floppy disk for the test.

Turn off the computer and connect a USB FDD to the computer. Insert a floppy disk containing the test program into the floppy disk drive of the target machine and turn on the target machine while pressing **U**. The Wireless LAN test menu will appear.

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

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

Subtest 01 Transmit & Receive test

This sub test checks transmit and receive functions.

Transmit test

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

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

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

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

[[[ Responder Mode ]]]

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

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

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

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

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

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

[[[ Responder Mode ]]]

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

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



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

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

Receive test

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

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

```
#####
### Wireless LAN sub system repair test VX.XX ###
#####
*
*      1 Transmit & Receive test [Responder]      *
*      2 MAC Address test [Mini-PCI Wireless LAN] *
*      3 Wireless LAN (WEP64/128) test           *
*
*      0 Transmit & Receive test [Initiator]      *
*
*****
...Press test number [1-2,0] ?1
===== RESPONDER SET =====
ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...
[[[ Responder Mode ]]]
MAC address : XXXXXXXXXXXXX
Ad-hoc mode
  SS ID : PHN Test
  Channel : 10
  Tx ratio : 2 Mbps
  PASS : 134 ERROR : 0
```

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

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

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

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

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

[[[ Responder Mode ]]]

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

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



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

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

Subtest 02 Mac Address test

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

Subtest 03 Wireless LAN (WEP64/128) test

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

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

3.19 Wireless LAN Test (Atheros)

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

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

In this test, the following items are tested:

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

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

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

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

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

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

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

Setting the responder machine

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

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

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

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

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

The responder machine is ready for the test.

Setting the tester machine

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

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

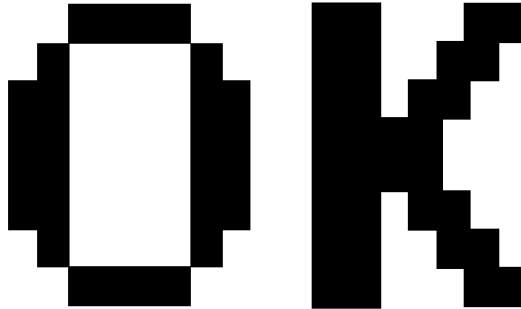
```
#####
####   Atheros WLAN sub system repair test   VX.XX   ####
#####
*
*       1 .....Test PC [Initiator]                *
*
*       0 .....[Responder]                        *
*
*
*
*****
....Press test number [1,0] ?
```

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

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

To proceed the test, press any key.

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



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

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

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

Then the test returns to the main menu automatically.

3.20 Error Code and Error Status Names

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

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

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 02 03 04 FE 0A 0B 88	ROM Checksum Error Location ID Error Serial ID Write Error Thermister Error EC READ Error LAN LOOPBACK Error 1394 data Error FAN test Error
Memory	01 02 0D	RAM parity error Protected mode not change Cache memory error
USB	00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15	USB-NO DESCR. ERROR USB-GET DESCR. ERROR(FIRST) USB-SET ADDRESS. ERROR HUB-GET DESCR. ERROR(Top8B) HUB-GET DESCR. ERROR(Whole) HUB-SET CONFIGURATION ERROR HUB-GET DESCR. ERROR(DESCR.) HUB-SET FEATURE ERROR(P ON) HUB-GET STATES ERROR HUB-SET FEATURE ERROR(RESET) HUB-CLEAR FEATURE ERROR HUB-CLEAR FEATURE1 ERROR HUB-SET FEATURE ERROR(Enab.) HUB-CLEAR FEATURE2 ERROR USB-OVER CURRENT ERROR USB-GET DESCR. ERROR(SECOND)

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

Device name	Error code	Error status name
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
Printer	01 08 10 20 40 80	Time Out Fault Select Line Out Of Paper Power Off Busy Line
ASYNC	01 02 04 08 10 20 40 80 88	rs232c DSR off time out CTS off time out RX EMPTY time out TX BUFFER FULL time out parity error framing error overrun error line status error modem status error
HDD	01 02 04 05 07 08 09 0A 0B 10 11 20 40 80 AA BB CC E0 EE	Bad Command Error Address Mark Not Found Record Not Found HDC Not Reset Error Drive Not Initialize HDC overrun (DRQ) DMA Boundary Error Bad Sector Bad Track Error ECC Error ECC recover enable HDC Error Seek Error Time Out Error Drive Not Ready Undefined Error Write Fault Status Error Access Time Out Error

	DA	No HDD
--	----	--------

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

Device name	Error code	Error status name
PCMCIA	C1	ADDRESS 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
	CE	CARD TYPE ERROR
	CF	ZV_CONT\ ERROR
NDP	01	No Co-Processor
	02	Control Word Error
	03	Status Word Error
	04	Bus Error
	05	Addition Error
	06	Multiply Error
CD-ROM	01	BAD COMMAND
	02	ILLEGAL LENGTH
	03	UNIT ATTENTION
	04	MEDIA CHANGE REQUEST
	05	MEDIA DETECTED
	06	ADDITIMAL SENSE
	09	BOUNDARY ERROR
	11	CORRECTED DATA ERROR
	20	DRIVE NOT READY
	40	SEEK ERROR
	80	TIME OUT
	90	RESET ERROR
	B0	ADDRESS ERROR

3.21 Hard Disk Test Detail Status

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

```
HDC status = XXXX
```

Detailed information about the hard disk test error 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 in hexadecimal form and the second byte displays the HDC error register.

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	DRY (Drive ready)	"0" Hard disk drive is not ready to accept any command. "1" Hard disk drive is ready.
5	DWF (Drive write fault)	"0" DWF error is not detected. "1" Write fault condition occurred.
4	DSC (Drive seek complete)	"0" The hard disk drive heads are not settled over a track. "1" The hard disk drive heads are settled over a track.
3	DRQ (Data request)	"0" Drive is not ready for data transfer. "1" Drive is ready for data transfer.
2	COR (Corrected data)	"0" Not used "1" Correctable data error is corrected.
1	IDX (Index)	"0" Not used "1" Index is sensed.
0	ERR (Error)	"0" 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 is no ID field in the requested sector.
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 found track 0 during a recalibrate command. "1" The hard disk could not find track 0 during a recalibrate command.
0	—	Not used.

3.22 FDD Cleaning

3.22.1 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.

3.22.2 Operations

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

```
DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX
```

```
Mount cleaning disk(s) on drive(s).  
Press any key when ready.
```

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

```
Cleaning start
```

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

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

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

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

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

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

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

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

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

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

3.24 Running Test

3.24.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01,02,04,06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01,05)
7. Printer test (subtest 03) if selected

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

3.24.2 Operations

NOTE: 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** from the DIAGNOSTIC MENU and press **Enter**. The following message is displayed.

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

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

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

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

Selecting **Y (yes)** executes the Serial #A test. An RS-232C wraparound connector must be connected to the serial port of the computer to execute properly this test. The Serial #A test can not be executed since the computer is not equipped with a serial port. Press **N**.

4. Select **Yes** or **No** and press **Enter**. The following message will appear:

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

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

3.25 Floppy Disk Drive Utilities

3.25.1 Function Description

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

1. FORMAT

NOTE: This program is only for testing a floppy disk drive. The option is different from the 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 READ

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

3.25.2 Operations

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

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

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

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

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

- (c) Select a media/drive type number, then the following message appears.

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

- (d) Remove the Diagnostics Disk from the FDD, insert the work disk and press any key. The following message will be displayed and the FDD format is executed:

```
[ FD TYPE ] : TRACK = XXX  
[ FD TYPE ] : HEAD = X  
[ FD TYPE ] : SECTOR = XX  
  
Format start  
[[track, head = XXX X]]
```

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

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

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

3. COPY program

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

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

- (b) Select a drive type number. Selecting 3:2HD will display a message similar to the one below. Select a media type number.

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

- (c) The following message will appear:

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

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

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

```
Copy start
```

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

- (d) Remove the source disk from the FDD, insert a formatted work disk and press any key. The 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 (c) 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 is selected, the following message appears:

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

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

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

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

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

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

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

- (e) Select a format type 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 ] = XXX
[ 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 (k) will appear.

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

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

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

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

Selecting HDD ID displays the following HDD ID configuration:

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

Press [Enter] key

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

3.26 System Configuration

3.26.1 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. The number of floppy disk drives
18. The number of hard disk drives
19. Date/Time

3.26.2 Operations

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

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

```
* - Processor Type           = XXXXXXXX
** - VGA Controller         = XXXXX
* - MS-DOS Version          = VX.XX
* - BIOS-ROM Version        = VX.XX 1st ID = XXH, 2nd ID = XXH
* - BOOT-ROM Version        = VX.XX
* - KBC Version             = VX.XX
* - PS Micom Version         = VX.XX (EC Version = VX.XX)
* - Total Memory Size=     XXXXXMB (Conventional Memory = 00639KB)
* - Battery Code            = XXXXXXXX
** - Sound System           = XXXXXX
* - 1 Printer Adapter       LPT1 = XXXLPT2 =      LPT3 =
* - 0 ASYNC Adapter         COM1 = XXX   COM2 =      COM3 =
* -
* - 1 Math Co-Processor
* - 1 PCMCIA Slot
* - Modem                   = XXX
* - LAN                     = XXX
* - 1 Floppy Disk Drive(s)  Track = , Head = , Sector =
* - 1 Hard Disk Drive(s) #1 Sectors =
                           #2 Sectors =
```

Press [Enter] Key [Date = YYYY-MM-DD, HH:MM:SS]

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

3.27 SETUP

3.27.1 Function Description

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

1. Memory
 - (a) Total
2. System Date/Time
3. Battery
4. Password
5. Boot Priority
 - (a) Boot Priority
 - (b) HDD Priority
 - (a) Network Boot Protocol
6. Display
 - (b) Power On Display
 - (c) TV Type
7. Others
 - (a) Power-up Mode
 - (b) CPU Cache
 - (c) Level 2 Cache
 - (d) Dynamic CPU Frequency Mode
 - (e) Auto Power On
8. Configuration
9. I/O Ports
 - (a) Parallel
10. Drives I/O
 - (a) Built-in HDD
 - (b) CD-ROM
11. PCI Bus
12. PC Card
13. Peripheral
 - (a) Internal Pointing Device
 - (b) Parallel Port Mode
 - (c) Hard Disk Mode

14. LEGACY Emulation

15. PCI LAN

3.27.2 Accessing the SETUP Program

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

SYSTEM SETUP (1/2)

ACPI BIOS version = X.XX

MEMORY		BOOT PRIORITY	
Total	= XXXXX KB (*1)	Boot Priority	=HDD→FDD→CD-ROM→LAN
SYSTEM DATE/TIME		HDD Priority	=Built-in HDD→PC Card
Date (MM-DD-YY)	= XX-XX-XXXX	Network Boot Protocol	= PXE
Time (HH:MM:SS)	= XX:XX:XX	DISPLAY	
BATTERY		Power On Display	= Auto-Selected
Battery save Mode	= Full Power	TV Type	= NTSC (Japan)
PASSWORD		Others	
Not Registered		Power-up mode	= Boot
		CPU Cache	= Enabled
		Level 2 Cache	= Enabled
		Dynamic CPU Frequency Mode (*2)	= Dynamically Switchable
		Auto Power On	= Disabled
		Panel Power On/Off	= Disabled (*3)

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

SYSTEM SETUP (2/2)

ACPI BIOS version = X.XX

CONFIGURATION		PC CARD	
Device Config.	= Setup by OS	Controller Mode	= Auto-Selected
I/O PORTS		PERIPHERAL	
Parallel	= LPT1 (378H/IRQ7/CH3)	Internal Pointing Device	= Enabled
DRIVERS I/O		Parallel Port Mode	= ECP
Built-in HDD	= Primary IDE (1F0H/IRQ14)	Hard Disk Mode	= Enhanced IDE (Normal)
CD-ROM	= Secondary IDE (170H/IRQ15)	LEGACY EMULATION	
PCI BUS		USB KB/Mouse Legacy Emulation	= Enabled
PCI Bus	= IRQ10, IRQ11	USB FDD Legacy Emulation	= Enabled
		PCI LAN	
		Built-in LAN	= Enabled

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

NOTE: 1. (*1) This depends on model.
 2. (*2) This is displayed only for Intel Pentium4-M processor model.
 3. (*3) This is displayed only in the resume mode.

Moving Within the SETUP Menu and Changing Values

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

Accepting Changes and Exiting the SETUP Window

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

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

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

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

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

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

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

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

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

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

- HDD mode
- Password
- Write Policy

SETUP Options

The SETUP screen is divided into 15 functionally related groups. This section describes each group and its options.

1. Memory

This group of options displays the computer's memory.

(a) Total

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

2. System Date/Time

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

System Date Sets the date.

System Time Sets the time.

3. Battery

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

Full Power The following shows full power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= High
CPU Sleep Mode	= Enabled
Display Auto off	= 30Min.
HDD Auto off	= 30Min.
System Auto off	= Disabled (*1)
LCD Brightness	= Bright (*2) Super-Bright (*3)
Cooling Method	= Maximum Performance

Low Power The following shows low power settings.

BATTERY SAVE OPTIONS	
Processing Speed	= Low
CPU Sleep Mode	= Enabled
Display Auto off	= 03Min.
HDD Auto off	= 03Min.
System Auto off	= 30Min. (*1)
LCD Brightness	= Semi-Bright (*2) Bright (*3)
Cooling Method	= Battery Optimized

NOTE: In boot mode, the System Auto Off (*1) item does not appear.
 Display of the LCD Brightness will be changed in the condition below:
 (*2) Operating the battery
 (*3) Using the AC adapter

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

(a) Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

High CPU operates at 1.80/1.90/2.00/2.20GHz (Pentium 4),
 1.80/2.00/2.20GHz (Celeron)
 (Default in Full Power Mode)
Low CPU operates at half processing speed.
 (Default in Low Power Mode)

CPU Sleep Mode

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

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

Display Auto Off

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

Disabled Disables display automatic power off.

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

HDD Auto Off

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

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

System Auto Off

Use this option to disable or set the duration of the system automatic off function in Resume mode. In Boot mode, it is disabled.

Disabled Disables system automatic power off.

xx Min. Automatically turns off the power to the system if it is not used for the duration set. The duration **xx** can be set to **10, 20, 30, 40, 50** or **60** minutes.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility.

Semi-Bright Less than full brightness for saving power.

Cooling Method

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

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

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

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

4. Password

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

Registered The user password has been registered.

Not registered The user password has not been registered.

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

5. Boot Priority

(a) Boot Priority

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

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

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

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

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

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

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

(*1) CD-ROM refers to a CD-ROM, DVD-ROM, Combo, Combo+2 or DVD-Multi drive.

(b) HDD Priority

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

Built-in HDD→PC Card :The computer looks for bootable files in the built-in HDD first.

PC Card→Built-in HDD The computer looks for bootable files in the PC card first.

(c) Network Boot Protocol

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

PXE Sets to PXE protocol. (Default)

RPL Sets to RPL protocol.

6. Display

This group of options configures the computer's display.

(a) Power On Display

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

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

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

***NOTE:** When starting the computer in Resume mode, the last configuration is remembered. If data does not appear on the display you are using after starting in Resume mode, pressing **Fn+F5**.*

*Pressing **Fn+F5** changes the display setting as follows in order: the internal LCD, the external CRT, both the internal LCD and the external CRT and TV display.*

*You cannot select TV display in HW Setup. To display on a TV screen, use **Fn+F5**.*

When an external CRT display which does not support SVGA mode is connected and "LED+AnalogRGB" is selected, the external display is not displayed.

(b) TV Type

This option allows you to select the type of TV.

NTSC (Japan) TV in Japanese system (Default)

NTSC (US) TV in the U.S. system

PAL TV in Europe system

7. Others

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

(a) Power-up Mode

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

Boot Turns on boot mode. (Default)

Resume Turns on resume mode.

(b) CPU Cache

Use this option to enable or disable the CPU cache.

Enabled Enables the CPU cache. (Default)

Disabled Disables the CPU cache.

(c) Level 2 Cache

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

Enabled Enables the level 2 cache. (Default)

Disabled Disables the level 2 cache.

(d) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings. When the CPU of the computer is Celeron, this option is not displayed.

Dynamically Switchable

Enables Pentium 4 processor featuring Intel SpeedStep technology.

Always High Disables Pentium 4 processor featuring Intel SpeedStep technology and always runs the processor at its maximum speed.

Always Low Disables Pentium 4 processor featuring Intel SpeedStep technology and always runs the processor at its default speed.

(e) Auto Power On

This option shows the setting for the Auto Power On function and Wake-up LAN function.

Disabled Parameters for the Auto Power On function and Wake-up LAN function are set. (Default)

Enabled Parameters for the Auto Power On function and Wake-up LAN function are not set. (Default)

When the “Enable” is selected, the following menu appears.

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

Set the parameters for the Auto Power On (automatic power on) function and the Wake-up on LAN in the “OPTIONS” window. To set the time, use **Space** or **BackSpace**. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

For the **Alarm Time**, set the time to turn on the power automatically. The “second” cannot be set. When it is set to “Disabled”, the time to turn on automatically is not set.

For the **Alarm Date Option**, set the date to turn on the power automatically. When it is set to “Disabled”, the time to turn on automatically is not set.

The **Ring Indicator** is displayed only when the computer is in Resume mode and this function cannot be used for a PC card-type modem. When any modem is not installed, it is not displayed.

The **Wake-up on LAN** is a function to turn on the power automatically by the call from the administrator. It can be set to “Enabled” only when “Built-in LAN” is set to “Enabled”. To activate this function, use the AC adapter.

NOTE:

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

(f) Panel Power On/Off

This option is displayed in the resume mode.

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

8. Configuration

This option lets you set the device configuration.

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

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

9. I/O ports

This option controls settings for the parallel port.

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

(a) Parallel

This option sets the interrupt request level and I/O port base address for the parallel port. When the parallel port mode is set to **Std. Bi-direct**, the options are as follows:

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

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

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

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

OPTIONS

DMA = Channel 3 (Default)

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

10. Drives I/O

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

- Built-in HDD** The setting for the built-in HDD is displayed.
- CD-ROM** The setting for the built-in CD-ROM is displayed.
- PC Card** This is displayed, when a PC card type HDD that can boot system is inserted to PC card slot.

11. PCI Bus

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

PCI BUS = IRQ10, IRQ11

12. PC Card

This option displays the PC Card Controller mode.

- Auto-Selected** Use this setting for all PC Card if you are using Windows 98/2000/XP which support Plug&Play. (Default)
- CardBus/16-bit** If you are using Windows for Workgroups or Windows NT 4 or lower or if the card does not work properly with the Auto-Selected setting, use this setting for Card Bus PC card.
- PCIC Compatible** If you are using Windows for Workgroups or Windows NT 4 or lower or if the card does not work properly with the Auto-Selected and CardBus/16 bit setting.

13. Peripheral

Use this option to select the peripheral's mode.

(a) Internal Pointing Device

This option enables or disables the touch pad

- Enabled** Enables the touch pad. (Default)
- Disabled** Disables the touch pad.

(b) Parallel Port Mode

Use this option to set information of ECP and Standard Bi-directional.

- ECP** Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default)
- Std. Bi-Direct.** Sets the bi-directional setting. This setting should be used with some other parallel devices.

NOTE: When the Windows is used, the setting in “Toshiba HW setup” has the priority. The setting in “Parallel Port Mode” is ignored.

(c) Hard Disk Mode

Use this item to select the hard disk mode.

Enhanced IDE (normal)

Select this mode when the HDD is used for MS-DOS®, Windows 95/98/2000/XP, or OS/2®. (Default)

Standard IDE

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

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

14. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

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

- Enabled** Enables LEGACY support. (Default)
USB keyboard/USB mouse are available without the driver.
- Disabled** Disables LEGACY support

(b) USB-FDD Legacy Emulation

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

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

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

Disabled Disables LEGACY support

15. PCI LAN

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

Enabled Enables built-in LAN functions. (Default)

Disabled Disables built-in LAN functions.

Chapter 4

Replacement Procedures

Chapter 4 Contents

4.1	Overview	4-1
	Safety Precautions	4-2
	Before You Begin	4-3
	Disassembly Procedures	4-4
	Assembly Procedures	4-5
	Tools and Equipment	4-5
	Screw Tightening Torque	4-6
	Grip Color	4-6
	Screw Notation	4-7
4.2	Battery Pack/PC Card	4-8
4.2.1	Battery Pack	4-8
4.2.2	PC Card	4-11
4.3	Memory Module	4-12
4.4	HDD	4-14
4.5	MDC Modem	4-18
4.6	Mini PCI Card	4-20
4.7	Fan Module/Cooling Fin/CPU	4-22
4.8	Keyboard	4-28
4.9	Optical Drive	4-32
4.10	Display Assembly	4-35
4.11	Touch Pad	4-39
4.12	BAT CON Holder	4-41
4.13	System Board/DC-IN Jack/RTC Battery	4-42
4.14	BAT LOCK ASSY/HDD UPPER ASSY	4-46
4.15	Touch Pad Switch	4-49
4.16	LCD Unit/FL Inverter	4-50
4.17	Wireless LAN Antenna/Display Cover/Speaker	4-54

4 Replacement Procedures

4.18	Fluorescent Lamp.....	4-64
4.18.1	Replacing the 14.1 Inch XGA TMD Fluorescent Lamp.....	4-65
4.18.2	Replacing the 14.1 Inch XGA CHIMEI Fluorescent Lamp	4-77
4.18.3	Replacing the 14.1 Inch XGA Samsung Fluorescent Lamp (VF2058P01).....	4-81
4.18.4	Replacing the 14.1 Inch XGA Samsung Fluorescent Lamp (VF2048P01).....	4-87
4.18.5	Replacing the 14.1 Inch XGA LG.Philips Fluorescent Lamp	4-92
4.18.6	Replacing the 15.0 Inch XGA LG.Philips Fluorescent Lamp	4-100
4.18.7	Replacing the 15.0 Inch XGA Samsung Fluorescent Lamp.....	4-107
4.18.8	Replacing the 15.0 Inch XGA Sharp Fluorescent Lamp	4-113
4.18.9	Replacing the 15.0 Inch XGA CHIMEI Fluorescent Lamp	4-128
4.18.10	Replacing the 15.0 Inch SXGA+ LG.Philips Fluorescent Lamp.....	4-133
4.18.11	Replacing the 15.0 Inch SXGA+ Samsung Fluorescent Lamp	4-139
4.18.12	Replacing the 15.0 Inch SXGA+ Sharp Fluorescent Lamp.....	4-145

Figures

Figure 4-1 Removing Battery Cover.....	4-8
Figure 4-2 Removing Battery Pack.....	4-9
Figure 4-3 Removing PC Card	4-11
Figure 4-4 Removing Memory Slot Cover	4-12
Figure 4-5 Removing Memory Module.....	4-13
Figure 4-6 Removing HDD Slot Cover	4-14
Figure 4-7 Removing HDD ASSY	4-15
Figure 4-8 Removing HDD	4-16
Figure 4-9 Removing MDC Modem.....	4-18
Figure 4-10 Removing Mini PCI Slot Cover.....	4-20
Figure 4-11 Removing Mini PCI Card	4-21
Figure 4-12 Removing CPU Cover.....	4-22
Figure 4-13 Removing Fan Module.....	4-23
Figure 4-14 Removing CPU Holder	4-24
Figure 4-15 Removing Cooling fin.....	4-25
Figure 4-16 Removing CPU	4-25
Figure 4-17 Installing CPU.....	4-26
Figure 4-18 Applying Silicon Grease	4-27
Figure 4-19 Removing Keyboard Holder	4-28
Figure 4-20 Removing Keyboard Hold Plate	4-29
Figure 4-21 Keyboard Support Plate	4-30
Figure 4-22 Removing CD-RO M Drive (1)	4-32
Figure 4-23 Removing CD-ROM Drive (2)	4-33
Figure 4-24 Removing Display Assembly (1).....	4-35
Figure 4-25 Removing Display Assembly (2).....	4-36
Figure 4-26 Removing Display Assembly (3).....	4-37
Figure 4-27 Removing Touch Pad.....	4-39
Figure 4-28 Removing BAT CON Holder.....	4-41
Figure 4-29 Removing System Board.....	4-43

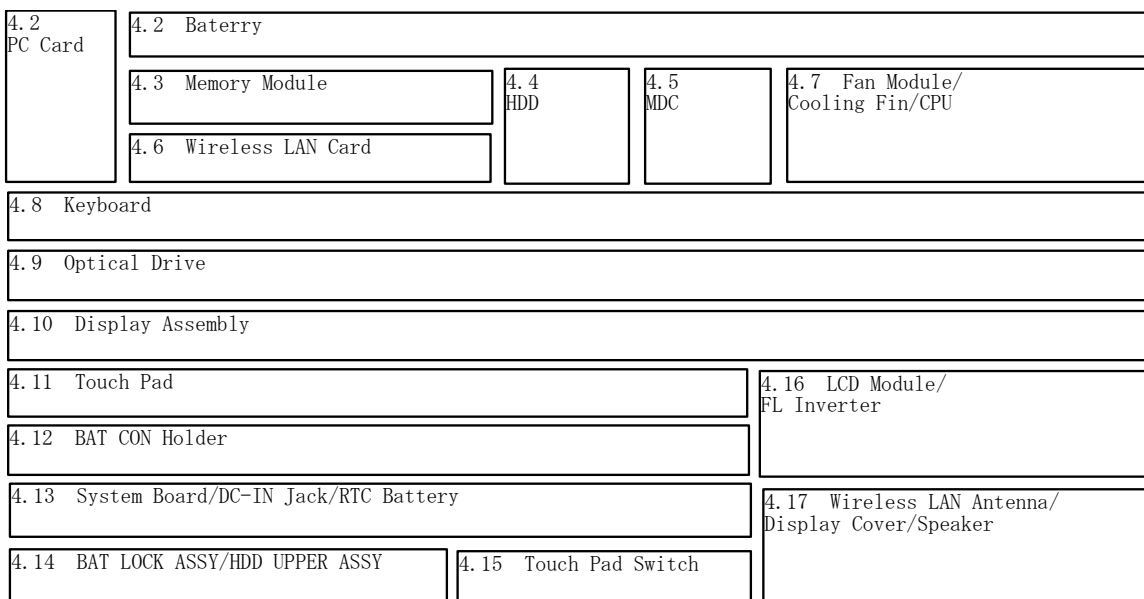
Figure 4-30 Removing FIR Dummy Cover.....	4-44
Figure 4-31 Removing BAT LOCK ASSY.....	4-46
Figure 4-32 Removing HDD UPPER ASSY.....	4-47
Figure 4-33 Removing Touch Pad Switch.....	4-49
Figure 4-34 Removing Display Mask.....	4-50
Figure 4-35 Removing FL Inverter and LCD Unit.....	4-51
Figure 4-36 Removing LCD Bracket.....	4-52
Figure 4-37 Removing Latch Assembly.....	4-54
Figure 4-38 Removing Speaker Cable.....	4-55
Figure 4-39 Removing Wireless LAN Antennas.....	4-56
Figure 4-40 Removing Hinge Cover.....	4-57
Figure 4-41 Removing Speakers.....	4-58
Figure 4-42 Removing LCD Cable Holder.....	4-59
Figure 4-43 Removing Display Cover.....	4-60
Figure 4-44 Removing Hinges.....	4-61
Figure 4-45 to 4-56 Replacing 14.1 Inch TMD fluorescent lamp (1) to (12).....	4-65 to 4-76
Figure 4-57 to 4-63 Replacing 14.1 Inch CHIMEI fluorescent lamp (1) to (7).....	4-77 to 4-80
Figure 4-64 to 4-71 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (1) to (8).....	4-81 to 4-86
Figure 4-72 to 4-81 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (1) to (10).....	4-87 to 4-91
Figure 4-82 to 4-89 Replacing 14.1 Inch LG.Philips fluorescent lamp (XGA) (1) to (8)	4-92 to 4-99
Figure 4-90 to 4-97 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (1) to (8)	4-101 to 4-106
Figure 4-98 to 4-106 Replacing 15.0 Inch Toshiba fluorescent lamp (XGA) (1) to (9)	4-107 to 4-111
Figure 4-107 to 4-129 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (1) to (23)	4-113 to 4-127
Figure 4-130 to 4-135 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (1) to (6)	4-128 to 4-131
Figure 4-136 to 4-143 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (1) to (8)	4-133 to 4-138
Figure 4-144 to 4-152 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (1) to (9)	4-139 to 4-144

Figure 4-153 to 4-177 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (1) to (25)
.....4-145 to 4-160

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.



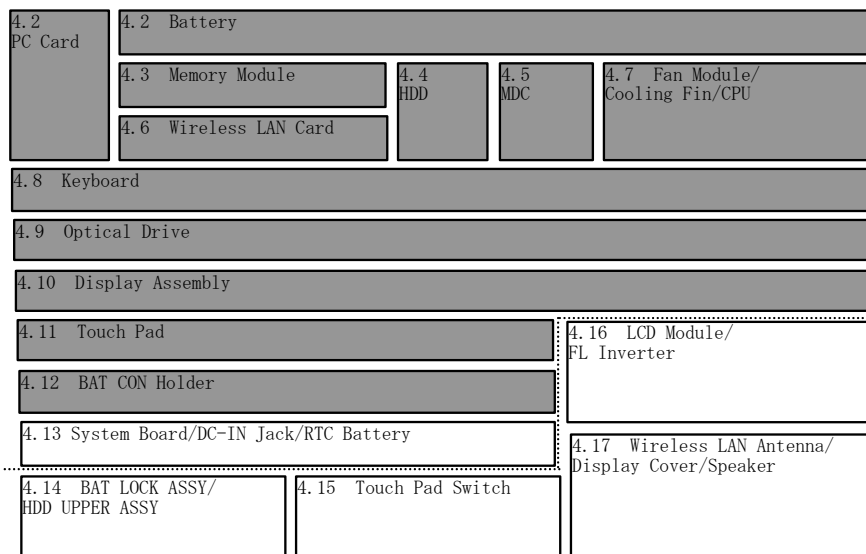
• Chart Notation

The chart shows the case for the following example:

• Removing System Board

All FRUs down to the “4.2 Battery/PC Card” to “4.10 Display Assembly” units must be removed.

Similarly, “4.11 Touch Pad” and “4.12 BAT CON Holder” must be also removed to remove the system 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 reassembly procedures in this manual.
6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.
7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.
8. When reassembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.
9. As all parts have sharp edges and corners, take care not to cut yourself.
10. After replacing an FRU, check that the computer and replaced part operate correctly.

Disassembly Procedures

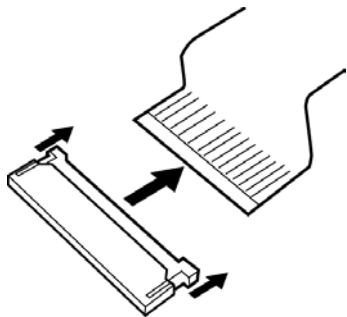
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

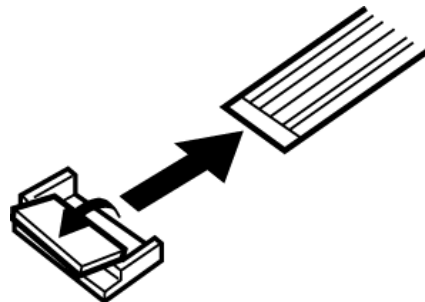
When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector. Press down on 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 lift the pressure plate high enough to insert fully the cable.

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

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



Pressure plate connector



Spring connector

Assembly Procedure

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

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

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

After installing FRUs, check that the computer operates correctly.

Tools and Equipment

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

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

Screw Tightening Torque

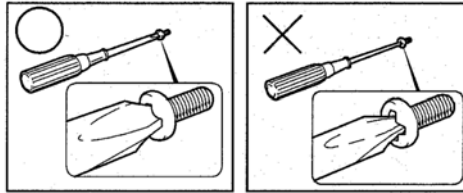
Use the following torque when tightening screws.

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: Thin 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, 4-2).

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 lock in the direction indicated by the arrow and open the lock.
5. Slide the battery latch towards the direction indicated by the arrow. Insert your finger into the slot and lift up the battery cover.

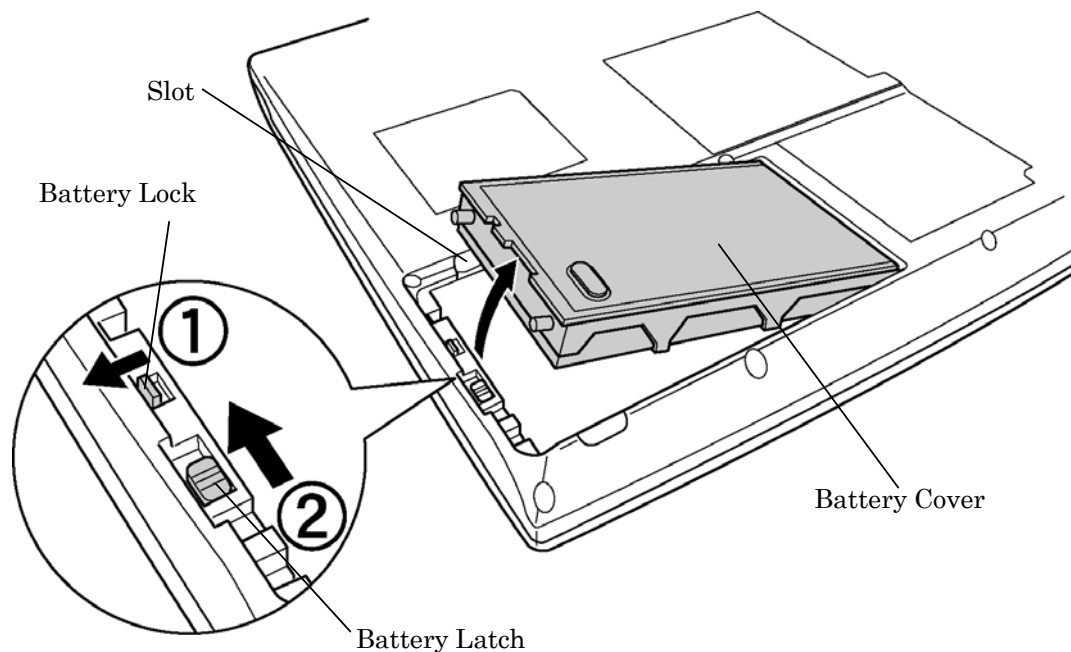


Figure 4-1 Removing Battery Cover

1. Push the latches on the back of the battery cover and remove the battery pack.

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

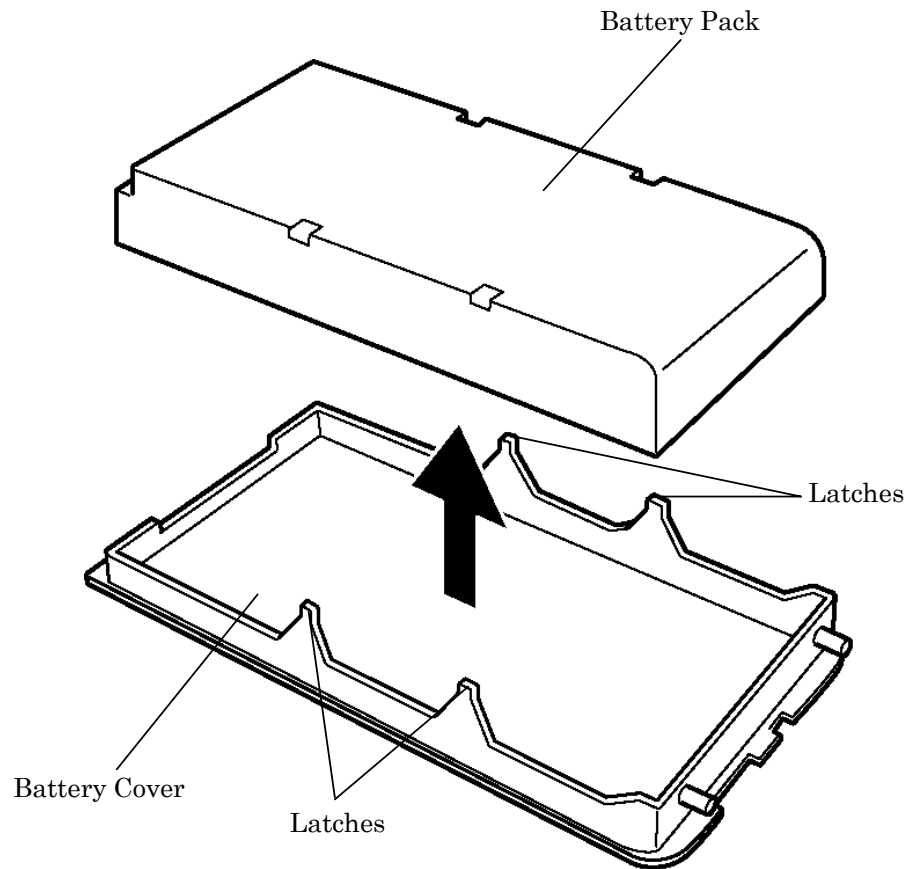


Figure 4-2 Removing Battery Pack

Installing the battery pack

The following describes the procedure for reinstalling the battery pack (See Figure 4-1, 4-2).

CAUTION: *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Collect the spent battery packs. Use only the batteries approved by Toshiba.*

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

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Check that the battery lock is in the open position.
Insert the battery cover on the computer from the connector side and press the battery cover to secure.
4. Slide the battery lock into the lock position.

4.2.2 PC Card

Removing the PC card

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

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.

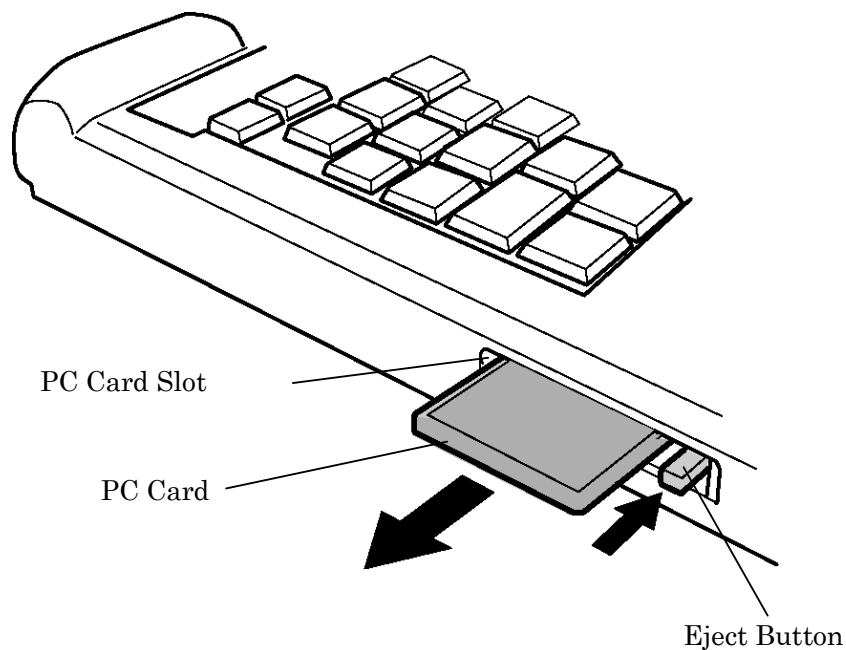


Figure 4-3 Removing PC Card

Installing the PC card

The following describes the procedure for inserting a PC card (See Figure 4-3).

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 4-4, 4-5).

1. Turn the computer upside down.
2. Remove the screw fixing the memory slot cover. (This screw is fixed to the memory slot cover and can not be removed.)
3. Remove the memory slot cover from the screw side.

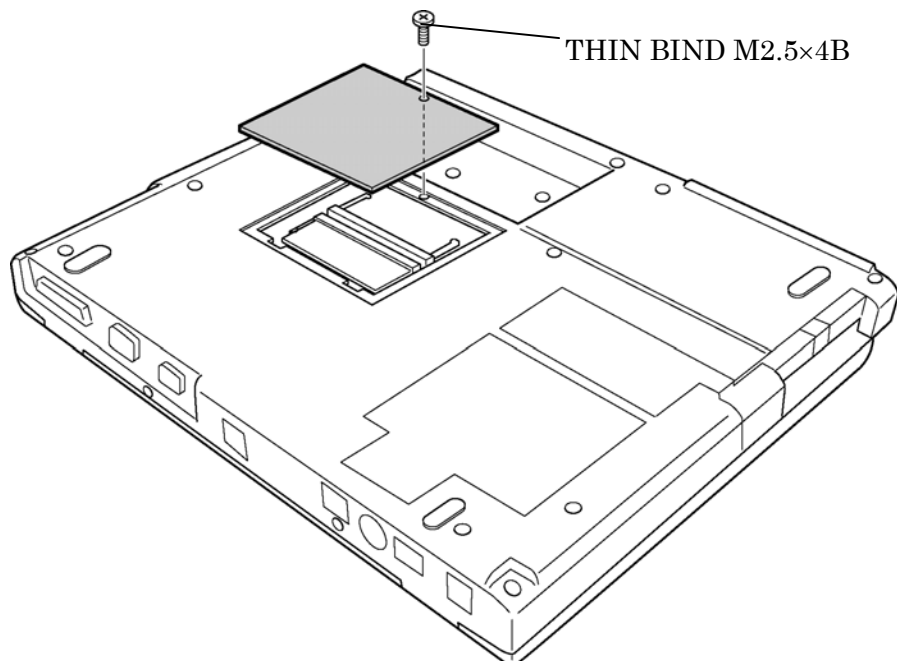


Figure 4-4 Removing Memory Slot Cover

4. Open the left and right latches and remove the memory module.

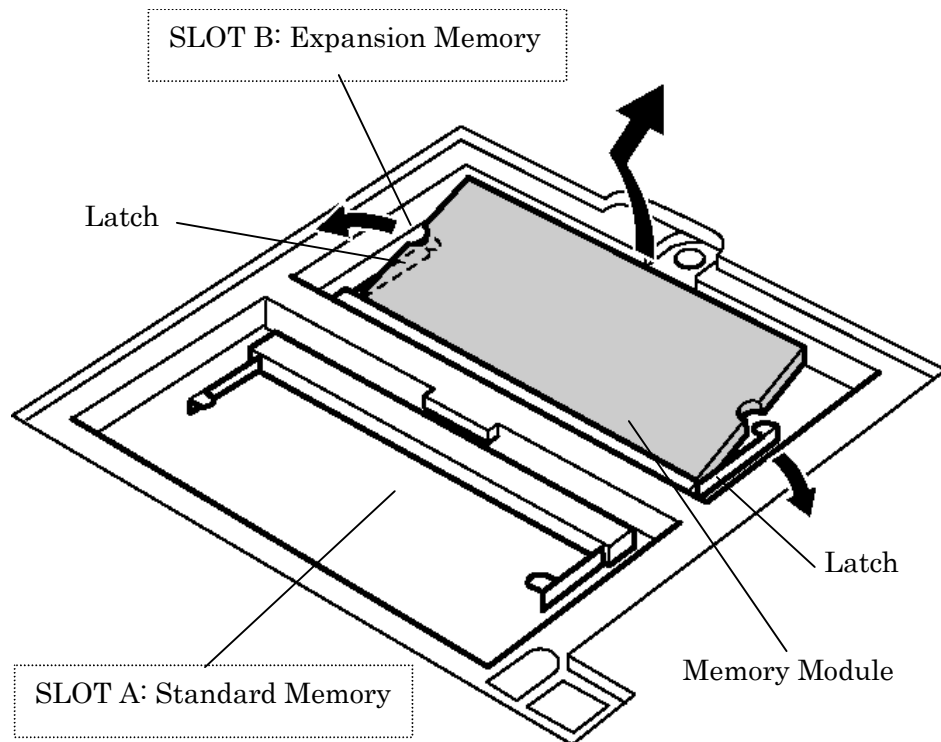


Figure 4-5 Removing Memory Module

Installing the memory module

To install the memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figure 4-4, 4-5).

1. Insert the memory module into the connector of the computer slantwise (terminal side first) and press it to connect firmly.

CAUTION: *The power must be turned off when you insert the memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

Never press hard or bend the memory module.

2. Install the memory slot cover and secure it with the supplied screw.
3. When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly.
4. If the memory is not detected, make sure it is connected surely.

4.4 HDD

Removing the HDD

The following describes the procedure for removing an HDD (See Figure 4-6 to 4-8).

CAUTION: Take care not to press on the top or bottom of the HDD. Pressure may cause data loss or damage to the device.

1. Turn the computer upside down.
2. Remove the following screws fixing the HDD slot cover and remove the cover by pressing it in the direction indicated by the arrow.

- M2.5x16 THIN BIND screw x2

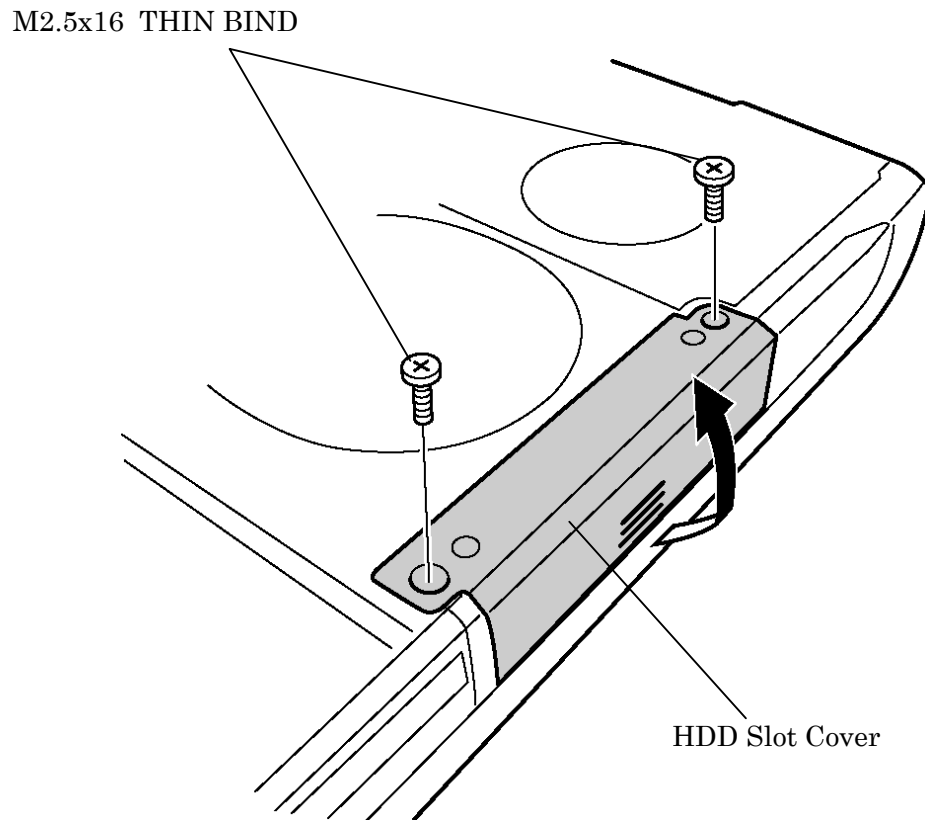


Figure 4-6 Removing HDD Slot Cover

3. Remove the following screw fixing the HDD ASSY.
 - M2.5x5 THIN BIND screw x1
4. Pull the tab of the HDD holder from the inside of the computer.
5. Hold the HDD tab and pull out the HDD ASSY in the direction indicated by the arrow.

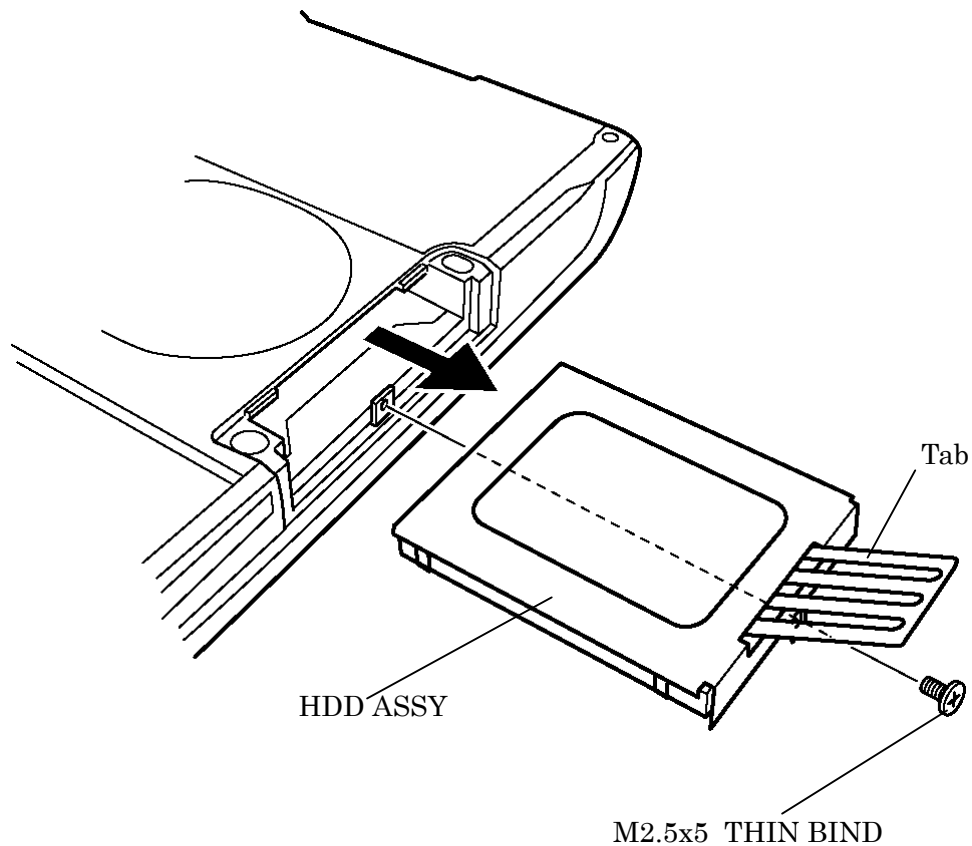


Figure 4-7 Removing HDD ASSY

6. Remove the following screws fixing the HDD.
 - M3x4 THIN BIND screw x4
7. Remove the HDD holder from the HDD.

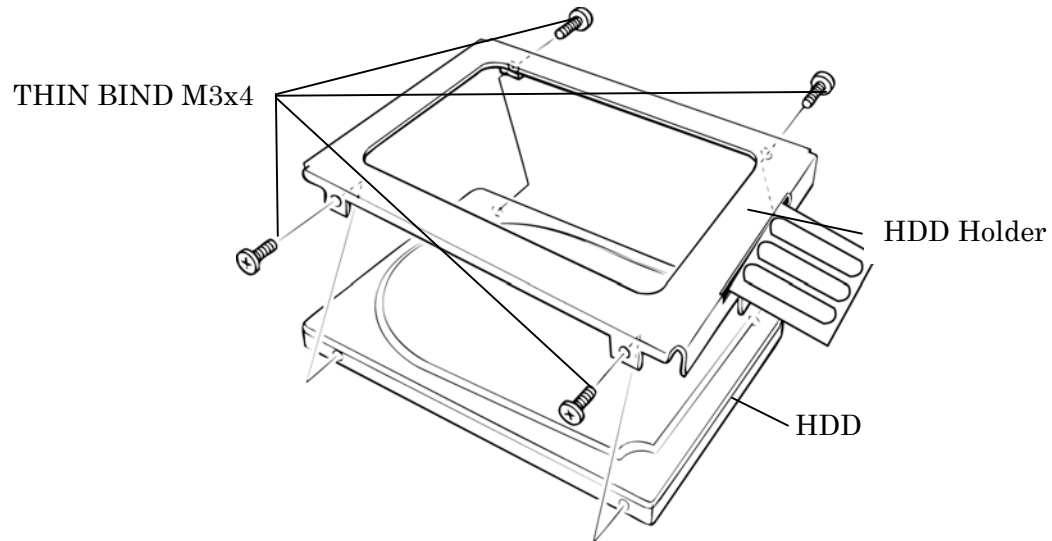


Figure 4-8 Removing HDD

Installing the HDD

The following describes the procedure for installing an HDD (See Figure 4-6 to 4-8).

1. Install the HDD to the HDD holder with the following screws.
 - M3x4 THIN BIND screw x4
2. Insert the HDD ASSY into the HDD slot.
3. Fix the HDD ASSY with the following screw.
 - M2.5x5 THIN BIND screw x1
4. Install the HDD slot cover and secure it using the following screws.
 - M2.5x16 THIN BIND screw x2

4.5 MDC Modem

Removing the MDC Modem

The following describes the procedure for removing an MDC modem (See Figure 4-9).

CAUTION: The power must be turned off when you remove the MDC modem. Removing an MDC modem with the power on risks damaging the modem or the computer itself.

1. Turn the computer upside down.
2. Remove the screw fixing the MDC slot cover and remove the cover. (This screw is fixed to the MDC slot cover and can not be removed.)
3. Remove the following screws fixing the MDC modem.
 - M2x4 BIND screw x2
4. Lift up the MDC modem and remove the MDC modem from the connector PJ3000 on the system board.
5. Remove the MDC jack cable from JP1 on the MDC modem.

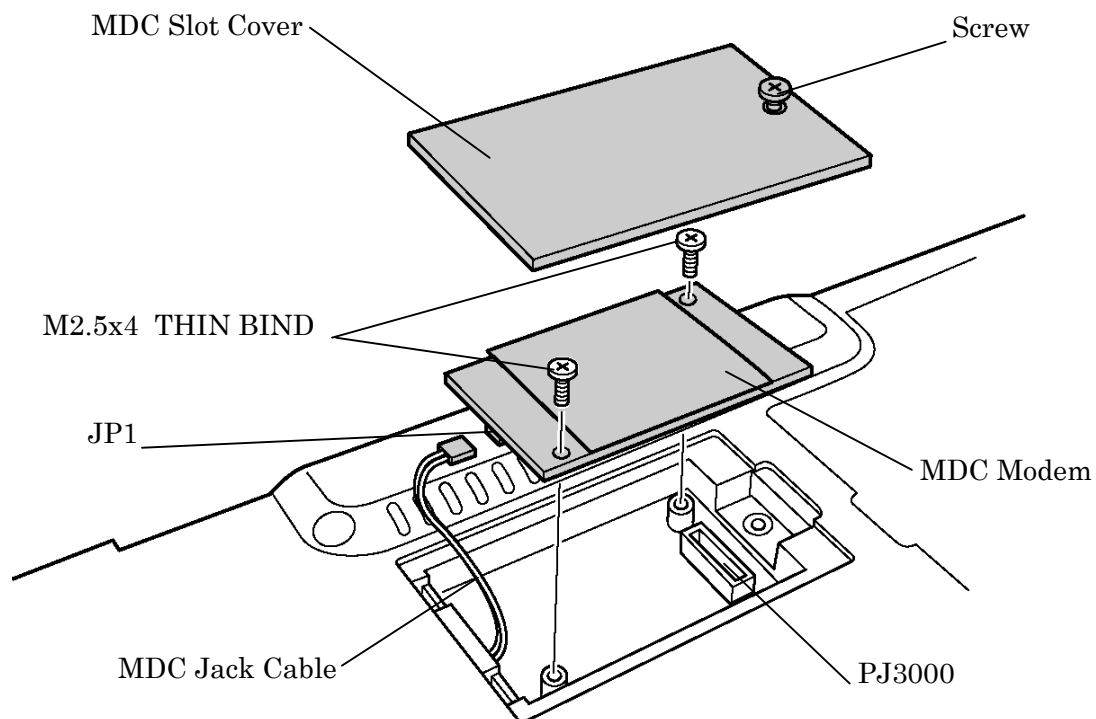


Figure 4-9 Removing MDC Modem

Installing the MDC Modem

The following describes the procedure for installing an MDC modem (See Figure 4-9).

1. Connect the MDC jack cable to JP1 on the MDC modem.
2. Set the MDC modem on the slot and connect the MDC modem to the connector PJ3000 on the system board by pressing it from the top.
3. Install the modular jack in the modular jack slot.
4. Fix the MDC modem using the following screws.
 - M2x4 BIND screw x2
5. Install the MDC slot cover and secure it with the supplied screw.

4.6 Mini PCI Card

CAUTION:

- (1) The power must be turned off when you remove a mini PCI card. Removing a mini PCI card with the power on risks damaging the card or the computer itself.
- (2) Never press hard or bend the mini PCI card.

Removing the Mini PCI Card

The following describes the procedure for removing the mini PCI card (See Figure 4-10, 4-11). The explanation in this section uses a model with wireless LAN as an example.

1. Turn the computer upside down.
2. Remove the following screw fixing the mini PCI slot cover and remove the cover.

- M2.5x4 BIND or OSG x1

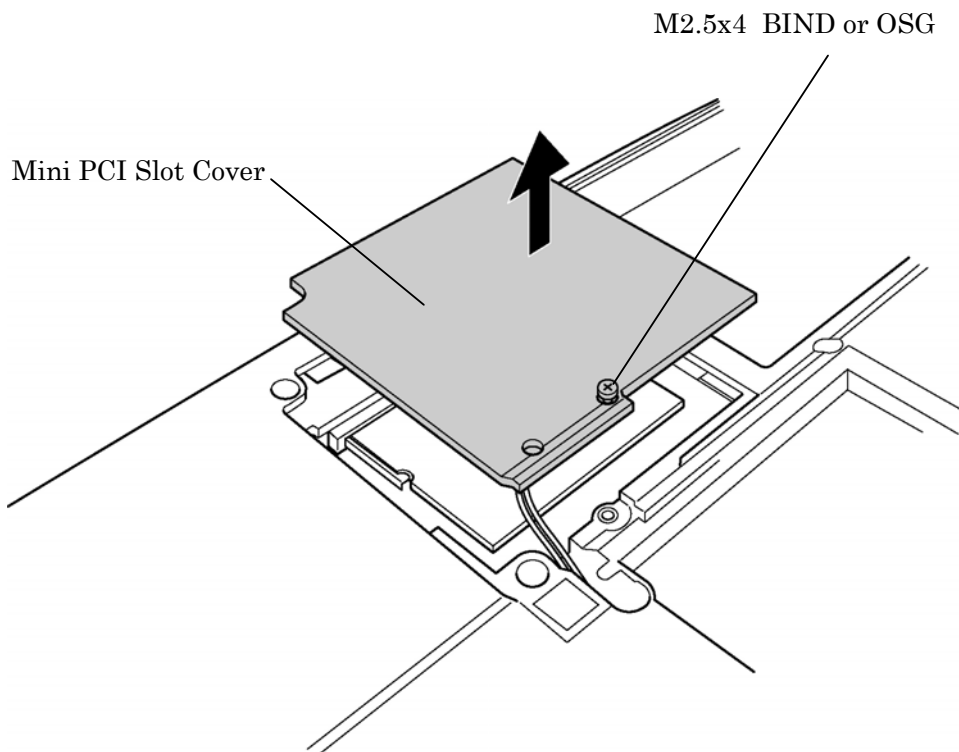


Figure 4-10 Removing Mini PCI Slot Cover

3. Remove the glass tape and disconnect two wireless LAN cables from JP1 and JP2 on the mini PCI card.
4. Open the left and right latches holding the mini PCI card and remove the mini PCI card.

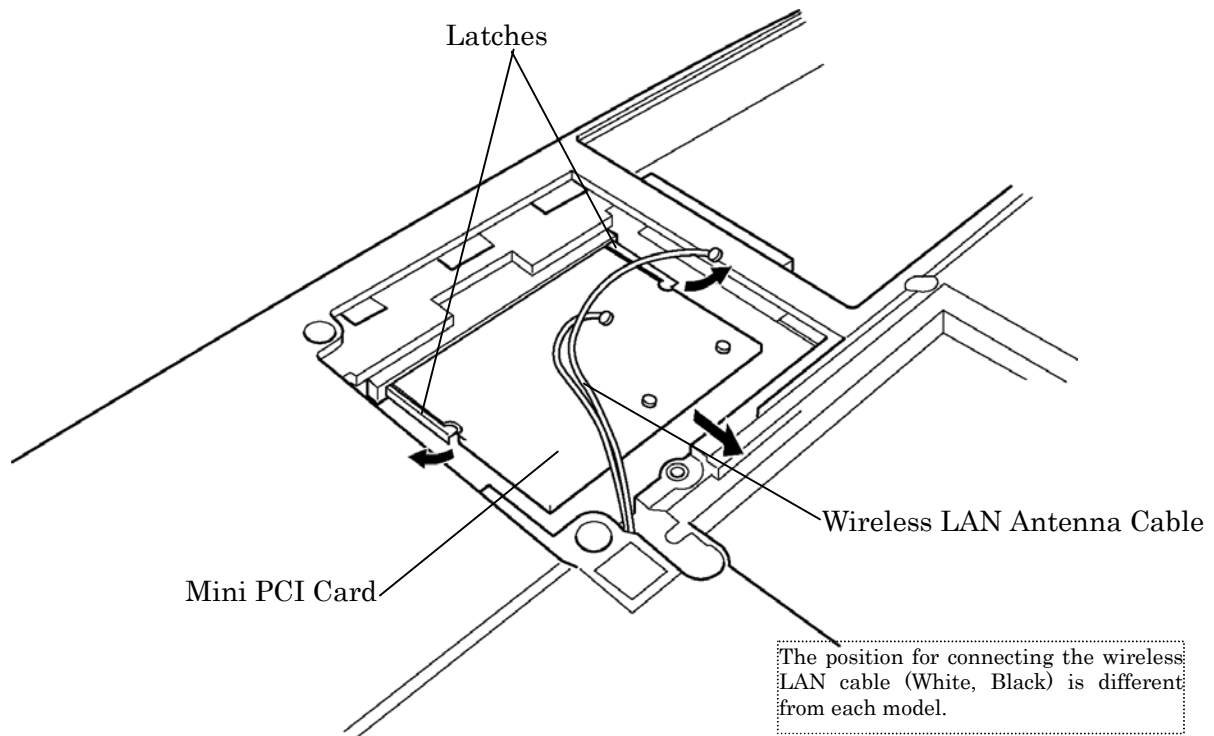


Figure 4-11 Removing Mini PCI Card

Installing the Mini PCI Card

The following describes the procedure for installing a mini PCI card (See Figure 4-10, 4-11). The explanation in this section uses a model with wireless LAN as an example.

1. Insert the mini PCI card terminals at 45-degree slant into the connector on the computer and press the mini PCI card from the top to secure.
2. Connect the white and black wireless LAN cables to the J1 and J2 terminals respectively on the mini PCI card. Then stick the glass tape on the cables.
3. Attach the mini PCI slot cover and secure it with the following screw.

- M2.5x4 BIND or OSG x1

4.7 Fan Module/Cooling Fin/CPU

NOTE: If silicon grease has already been applied to the CPU and fan module, wipe clean with a cloth and apply new silicon grease. The computer will not operate correctly if the CPU is not firmly in contact with the fan module.

Removing the Fan Module/Cooling Fin/CPU

The following describes the procedure for removing the fan module/cooling fin/CPU (See Figure 4-12 to 4-16).

1. Remove the following screws fixing the CPU cover and remove the CPU cover.

- M2.5x5 THIN BIND screw x2
- M2.5x16 THIN BIND screw x1

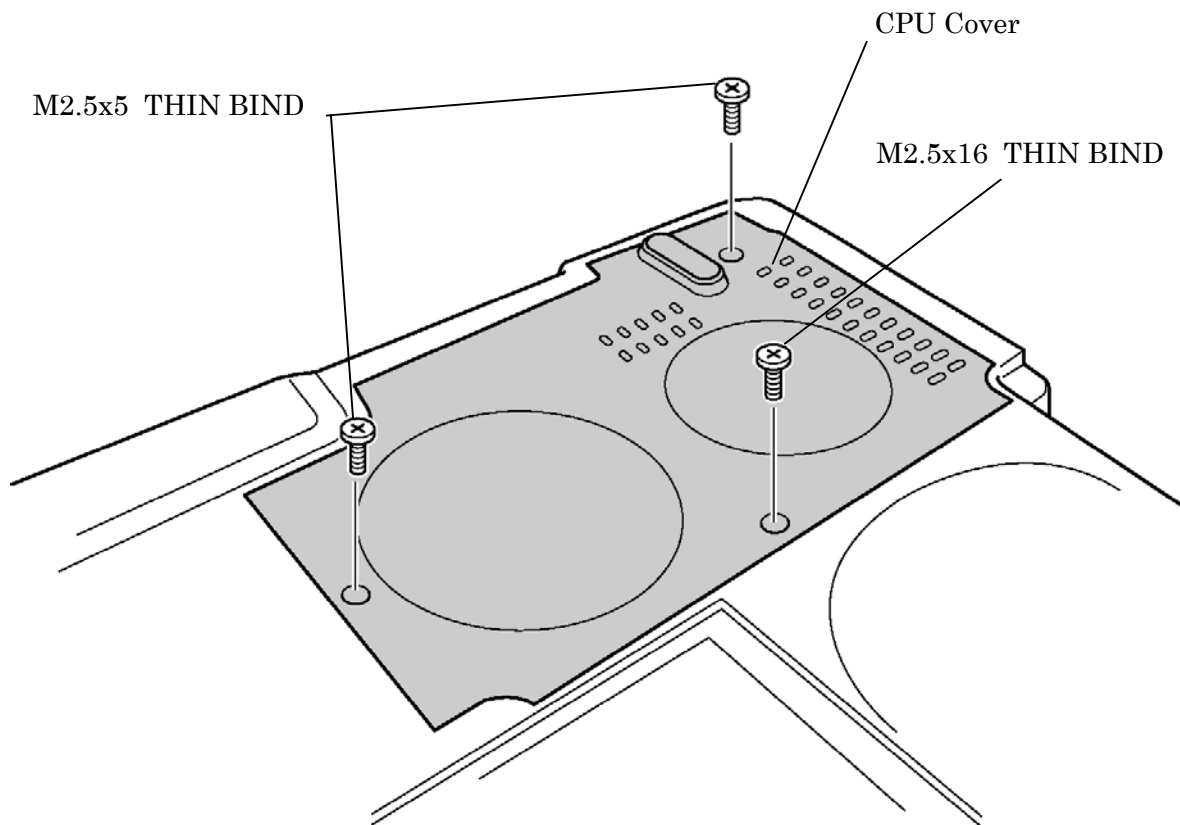


Figure 4-12 Removing CPU Cover

2. Remove the following screws fixing the fan module.
 - M2.5x5 THIN BIND screw x2
3. Lift up the fan module and disconnect the fan module cable from the PJ8770 on the system board.

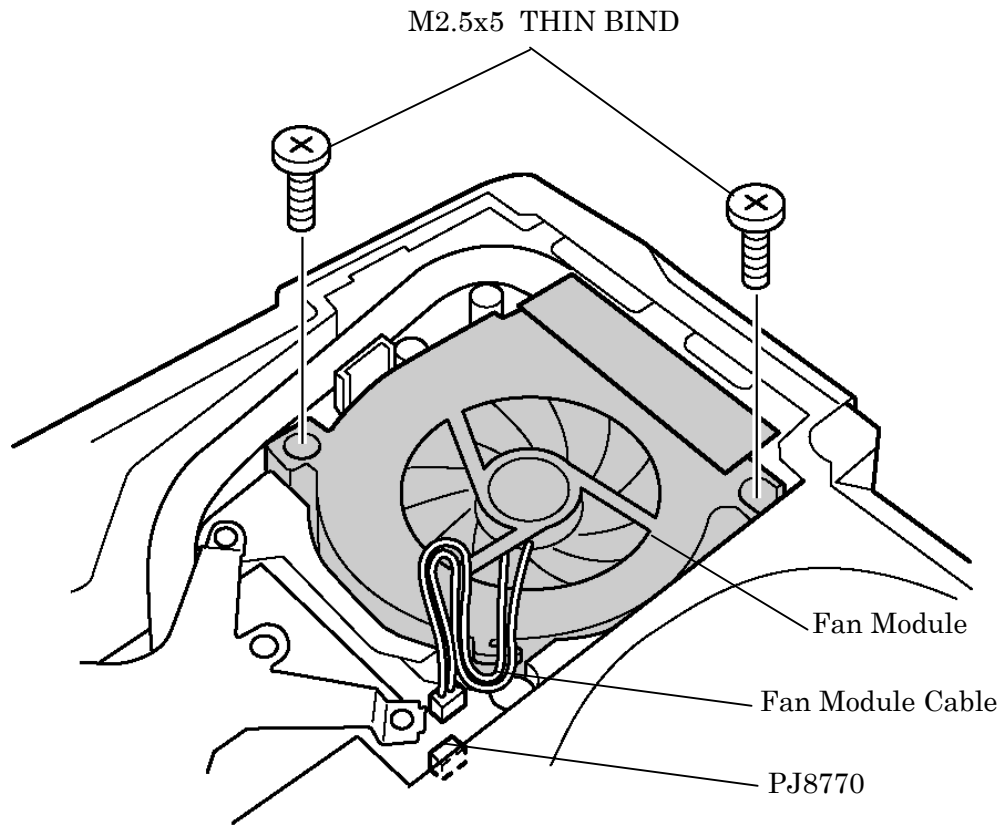


Figure 4-13 Removing Fan Module

4. Remove the following screws securing the CPU holder in the opposite order of the marks (1 to 4) on the CPU holder.

- M2x6 BIND screw x4

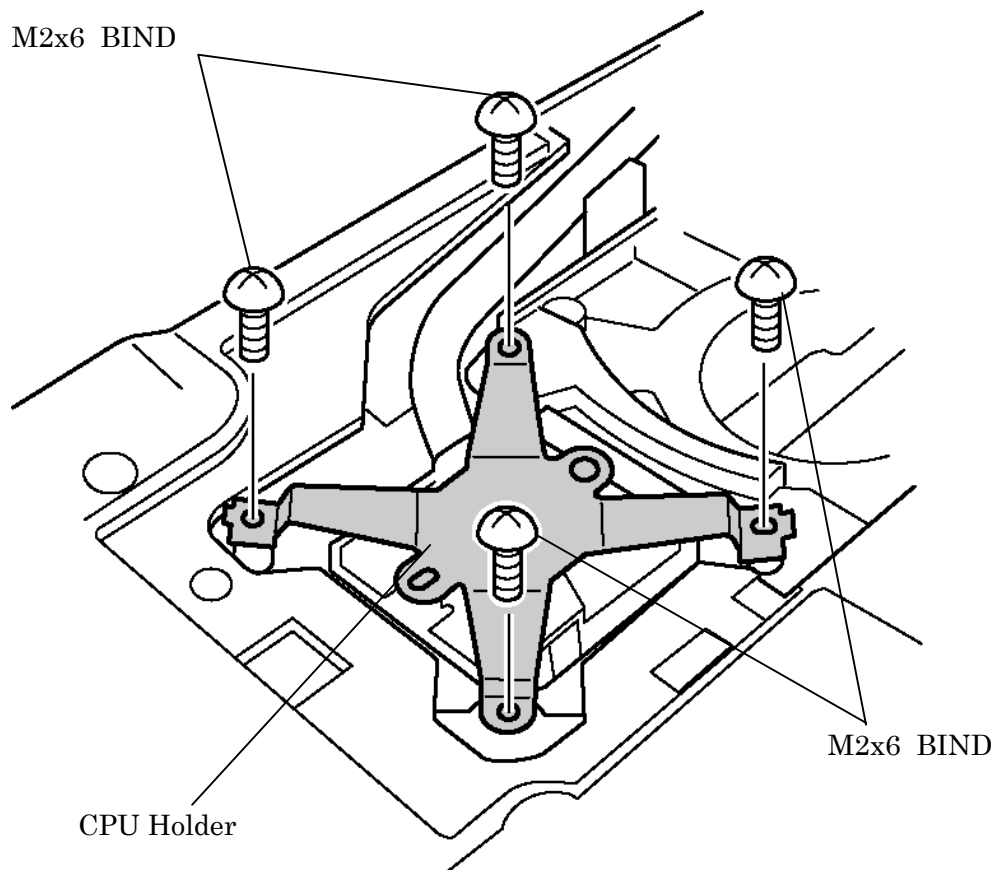


Figure 4-14 Removing CPU Holder

5. Lift up the cooling fin in the direction indicated by the arrow and remove the cooling fin.

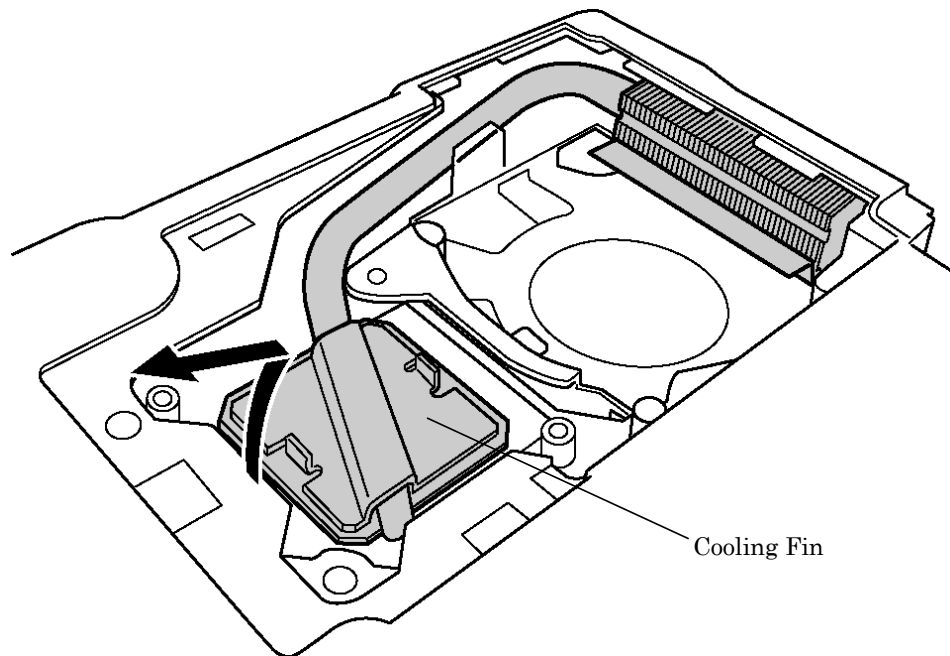


Figure 4-15 Removing Cooling Fin

6. Unlock the CPU by rotating counterclockwise the cam on the CPU socket by 90 degrees with a flat-blade screwdriver (in the order shown in the figure below).
7. Remove the CPU.

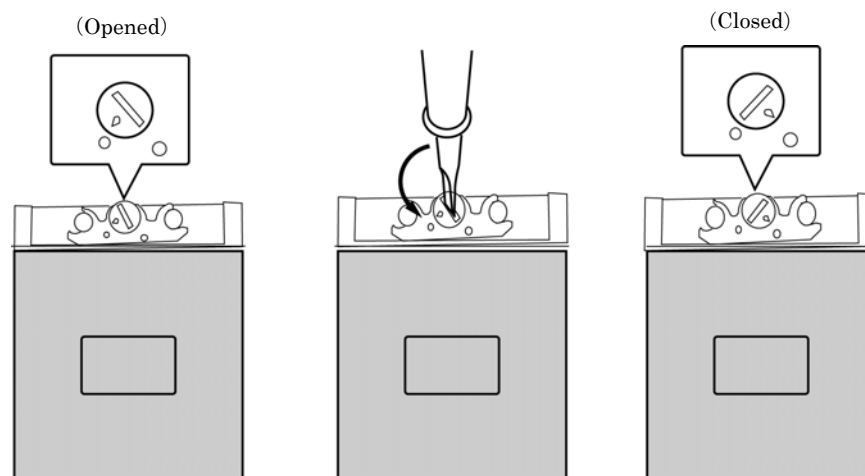


Figure 4-16 Removing CPU

Installing the Fan Module/Cooling Fin/CPU

The following describes the procedure for installing the fan module/cooling fin/CPU (See Figure 4-12 to 4-18).

1. Check that the mark on the cam is in the unlocking position.
2. Attach the CPU to the correct position in the CPU socket.

CAUTION: Place the CPU in such direction as shown below. (Pay attention to the position of the triangle mark on the CPU.)

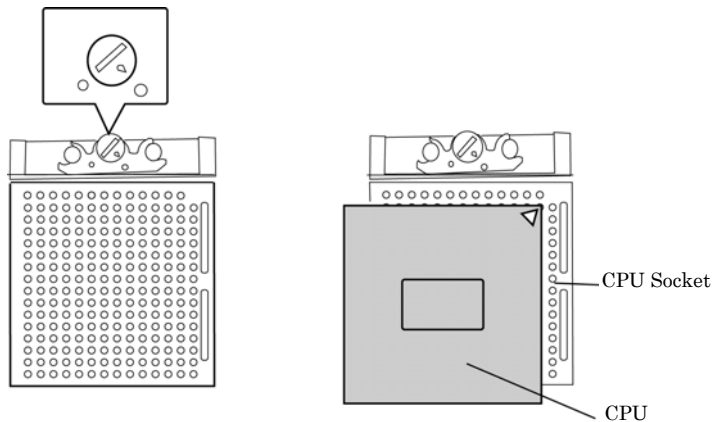


Figure 4-17 Installing the CPU

3. Fix the CPU by rotating clockwise the cam by 90 degrees with a flat-blade screwdriver.
4. If there is already silicon grease on the CPU and fan module, clean it with a cloth. Using a special applicator, apply quarter of scale (0.25ml) of silicon grease evenly on the CPU chip.

NOTE: Apply the silicon grease enough to cover the chip surface using the special applicator. When installing the fin, make sure the bottom of the fin covers the top of CPU.

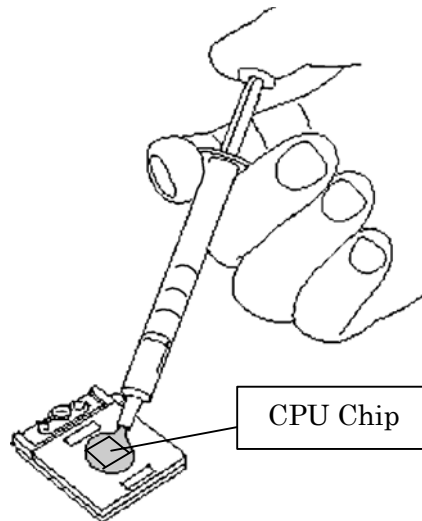


Figure 4-18 Applying Silicon Grease

5. Install the cooling fin.
6. Place the CPU holder on the cooling fin with its holes (small and large) attached to the bosses of the cooling fin. Fix the CPU holder with following screws in the order of the marks (1 to 4) on the CPU holder.
 - M2x6 BIND screw x4
7. Connect the fan module cable to PJ8770 on the system board.
8. Install the fan module and fix it with the following screws.
 - M2.5x5 THIN BIND screw x2
9. Attach the CPU cover and fix it with the following screws.
 - M2.5x5 THIN BIND screw x2
 - M2.5x16 THIN BIND screw x1

4.8 Keyboard

Removing the keyboard

The following describes the procedure for removing the keyboard (See Figure 4-19 to 4-21).

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

1. Open the display.
2. Hold the both ends of the keyboard holder and lift it up to remove.

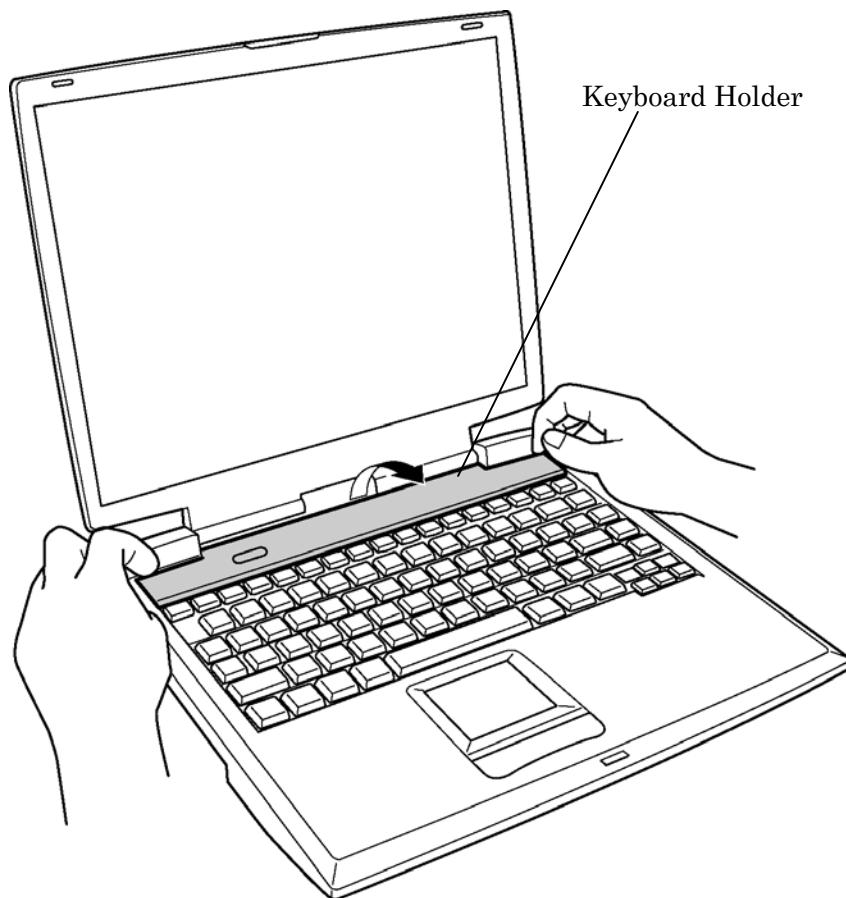


Figure 4-19 Removing Keyboard Holder

3. Remove the following screws holding the keyboard.
 - M2.5×2.8 THIN BIND screw x2
4. Remove the following screw fixing the keyboard hold plate and remove the keyboard hold plate.
 - M2.5×2.8 THIN BIND screw x1
5. Lift the upper side of the keyboard out and turn it face down on the palm rest.

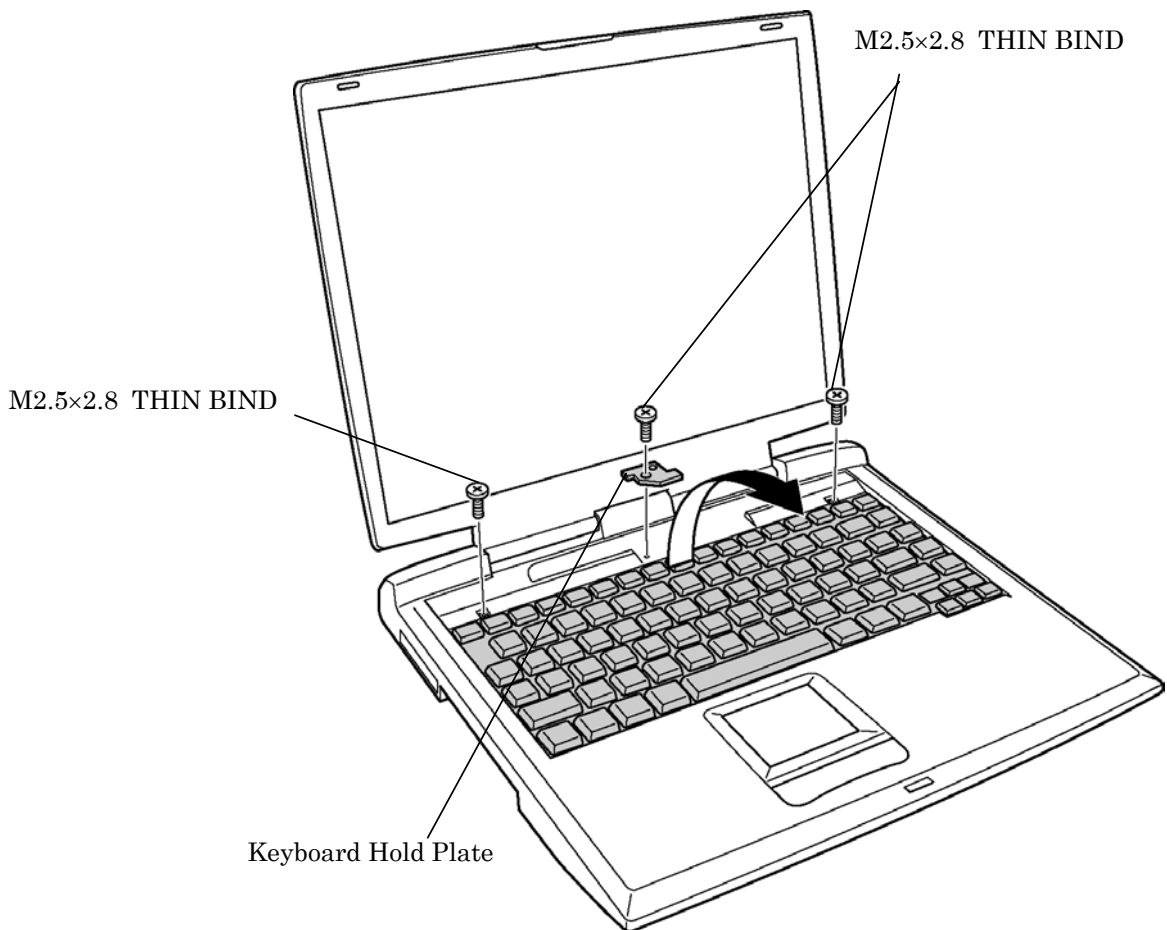


Figure 4-20 Removing Keyboard Hold Plate

6. Remove the following screw fixing the keyboard support plate underneath the keyboard.
 - M2.5x8 THIN BIND screw x1
7. Remove the keyboard support plate by lifting it up toward the left side.
8. Lift up the insulator and disconnect the keyboard flexible cable from PJ3200 on the system board.

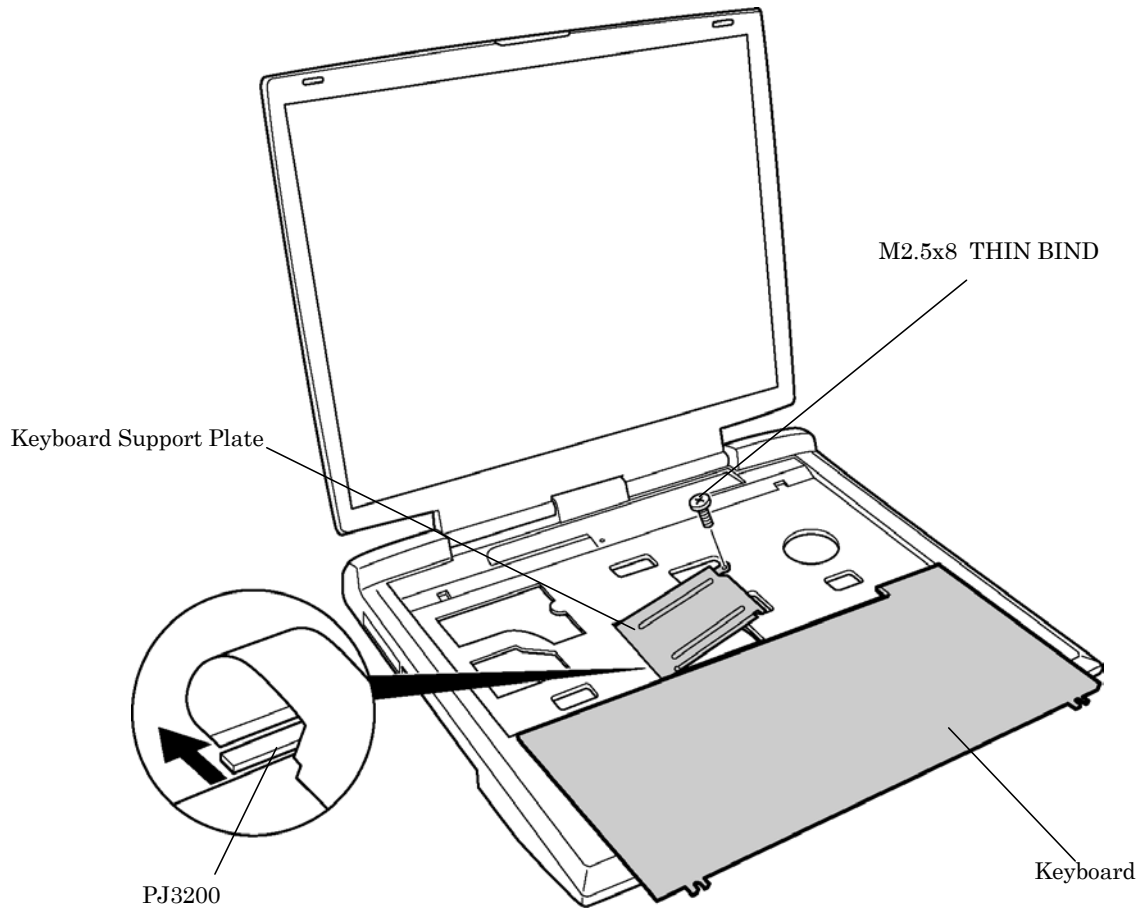


Figure 4-21 Removing Keyboard Support Plate

Installing the keyboard

The following describes the procedure for installing the keyboard (See Figure 4-19 to 4-21).

1. Turn the keyboard upside down and place it on the palm rest as its face is down. Turn up the insulator and connect the keyboard flexible cable to PJ3200 on the system board.
 - M2.5x8 THIN BIND screw x1
2. Install the keyboard support plate on the insulator covering the keyboard flexible cable and secure it with the following screw.
 - M2.5x8 THIN BIND screw x1
3. Turn the keyboard face up and put it on the computer. Make sure that there is no gap between the keyboard and the computer.
4. Insert the left side of the keyboard hold plate into the slot of the chassis. Set the plate with its hole attached to the guide pin on the chassis. Secure the keyboard hold plate with the following screw. When installing, make sure the “UP” mark on the keyboard hold plate is on the upper side and the plate holds the center tab on the keyboard.
 - M2.5x2.8 THIN BIND screw x1
5. Secure the keyboard with the following screws.
 - M2.5x2.8 THIN BIND screw x2
6. Install the keyboard holder by pressing it from the top side.

4.9 Optical Drive

This section describes how to remove and install a CD-ROM drive as an example. The procedure for a DVD-ROM, Combo, Combo+2 or DVD-Multi drive is the same.

NOTE: Do not apply excessive force to the top of an optical drive.

Removing the Optical Drive

The following describes the procedure for removing the Optical drive (See Figure 4-22, 4-23).

1. Turn the computer face down and remove the following screw securing the CD-ROM drive.
 - M2.5x5 THIN BIND screw x1
2. Turn the computer face up and open the display. Press the CD-ROM drive assembly towards the direction indicated by the arrow and disconnect the CD-ROM drive assembly from the PJ1800 on the system board.

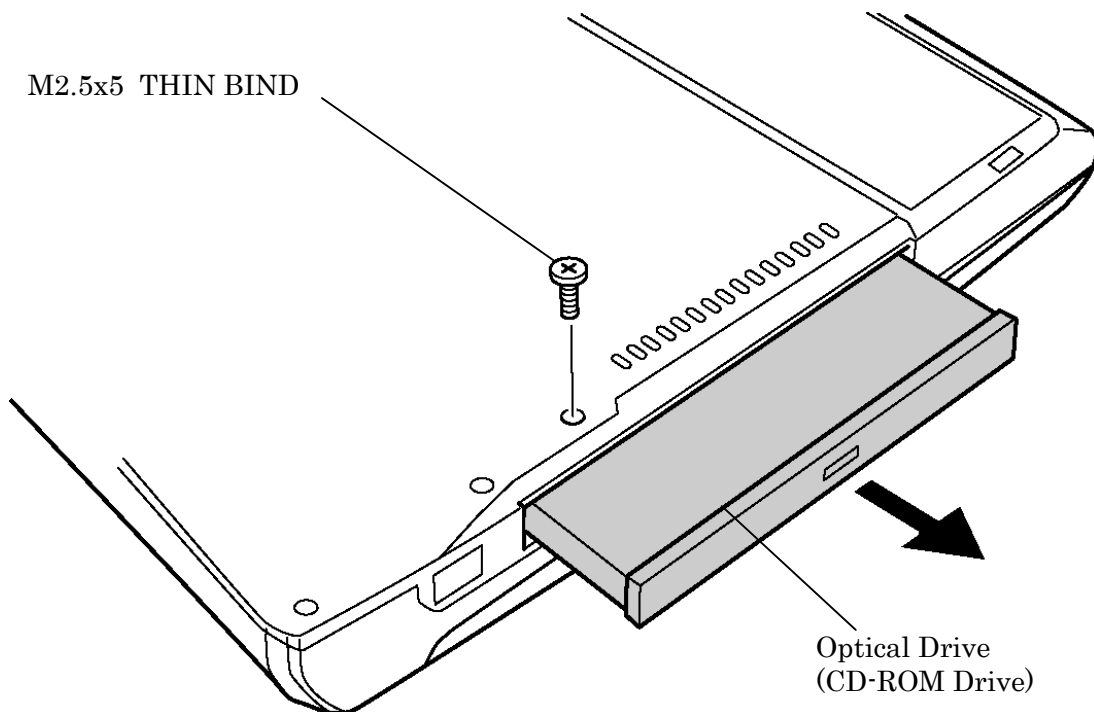


Figure 4-22 Removing CD-ROM Drive (1)

1. Remove the following screws fixing the CD-ROM holder from the CD-ROM drive assembly.
 - M2x1.7 STEP screw x2
2. Remove the following screw fixing the side bracket and remove the side bracket.
 - M2x3 SUPER THIN BIND screw x1

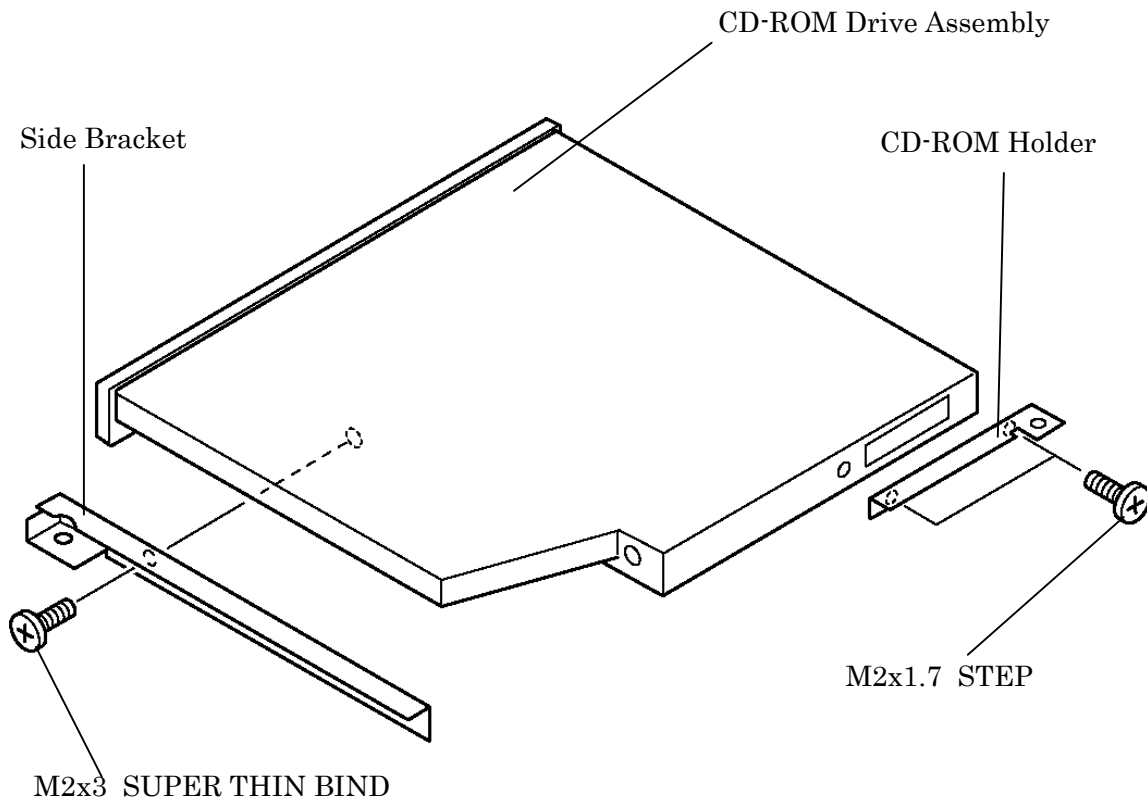


Figure 4-23 Removing CD-ROM Drive (2)

Installing the Optical Drive

The following describes the procedure for installing the optical drive (See Figure 4-22, 4-23).

1. Install the side bracket on the CD-ROM drive and fix it with the following screw.
 - M2x3 SUPER THIN BIND screw x1
2. Place the CD-ROM holder on the CD-ROM drive and fix it with the following screws.
 - M2x17 STEP screw x2
3. Insert the CD-ROM drive assembly into the slot to connect it to PJ1800 on the system board.
4. Turn the computer face down and fix the CD-ROM drive assembly with the following screw.
 - M2.5x5 THIN BIND screw x1

4.10 Display Assembly

Removing the Display Assembly

The following describes the procedure for removing the display assembly (See Figure 4-24 to 4-26).

1. Open the display and disconnect the LCD cable from PJ5600 on the system board.
2. Pull out the insulator covering the speaker connectors from the chassis and turn up the insulator. Disconnect the speaker cables (Blue, Red) from PJ6000 and PJ6001 respectively.

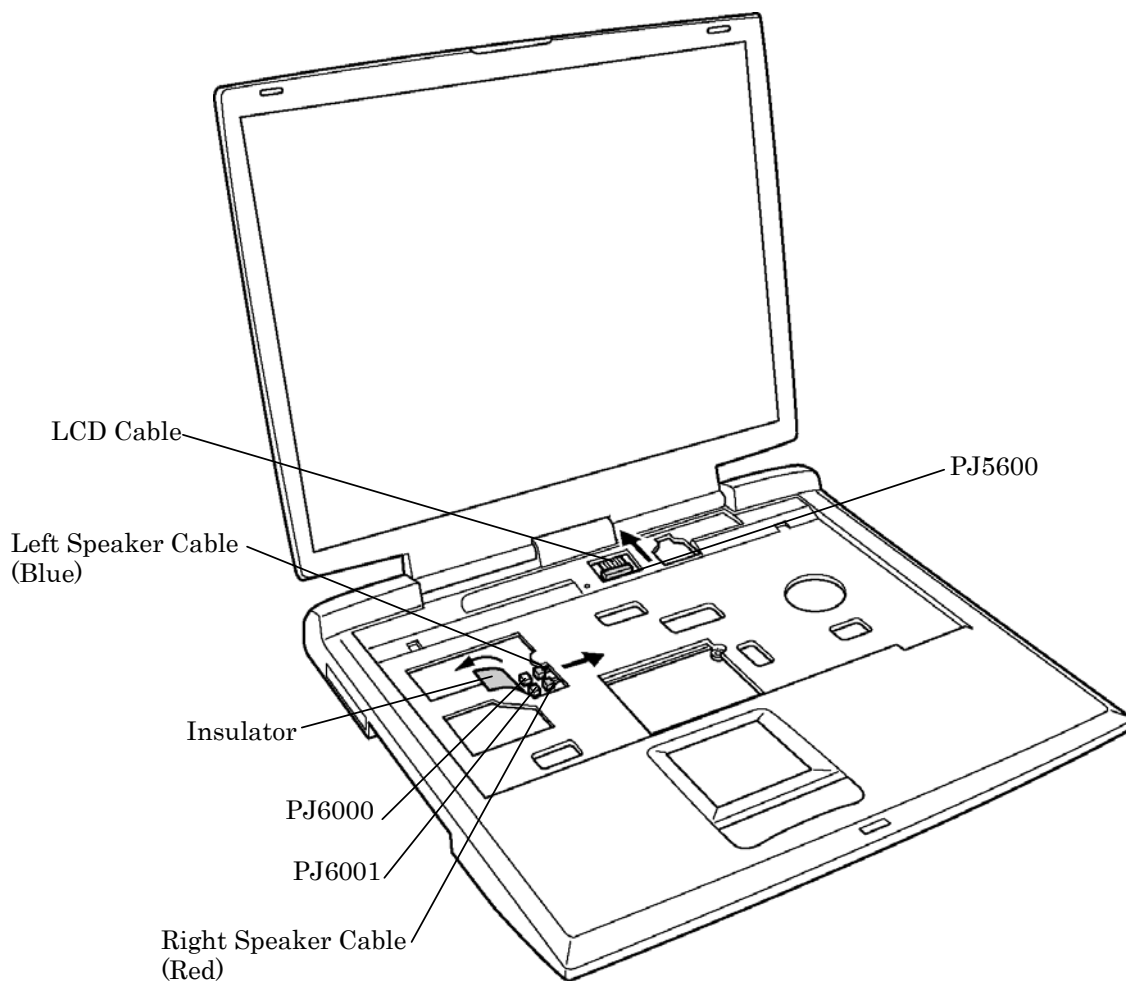


Figure 4-24 Removing Display Assembly (1)

3. Close the display and turn the computer face down.
4. Remove the following screws from the bottom and rear of the computer.

- M2.5x5 THIN BIND screw x7 (“5” in the figure)
- M2.5x16 THIN BIND screw x13 (“16” in the figure)

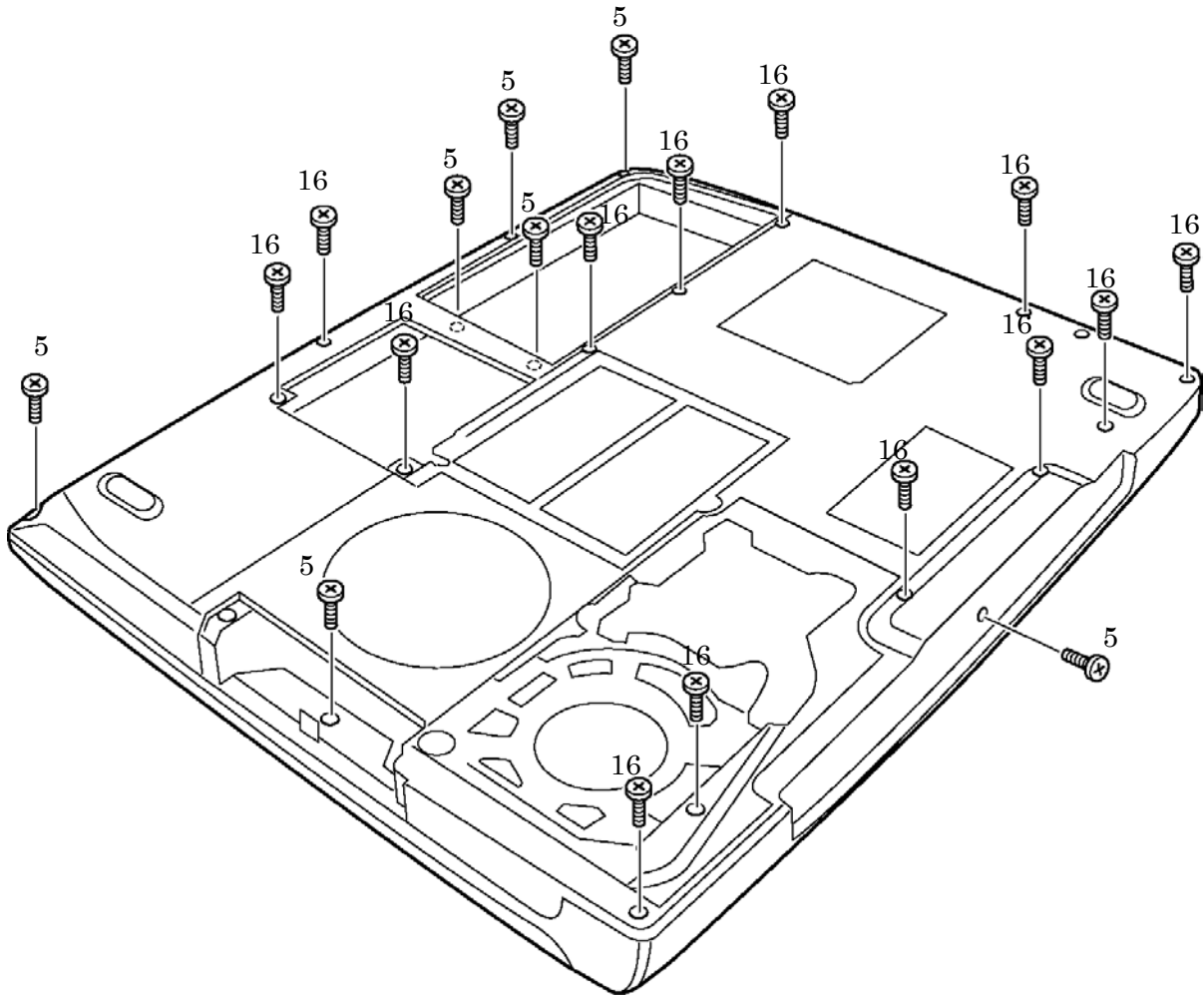


Figure 4-25 Removing Display Assembly (2)

5. Lift the display assembly up and remove it from the base assembly.

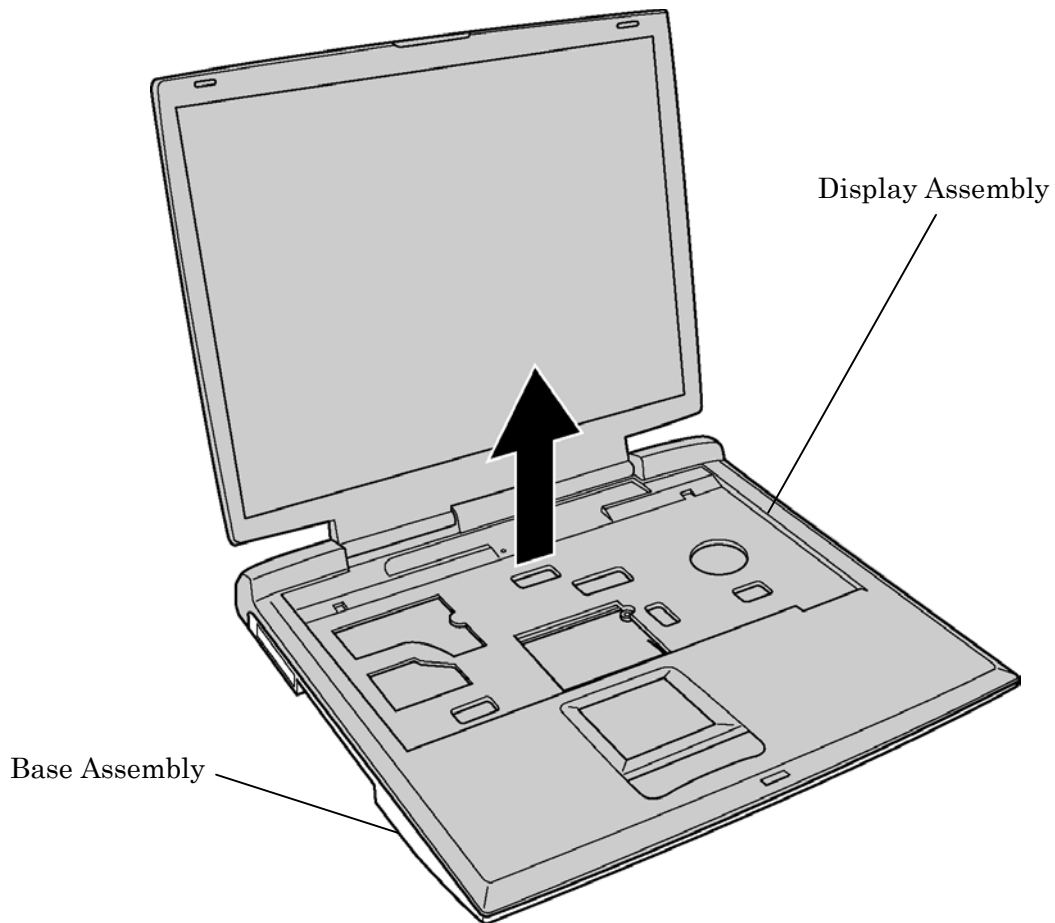


Figure 4-26 Removing Display Assembly (3)

6. (For wireless LAN models only)
Pull the wireless LAN cables from the slot of the base assembly.

NOTE: (For wireless LAN models only)

When removing the display assembly, be careful not to cut the wireless LAN cables.

Installing the Display Assembly

The following describes the procedure for installing the display assembly (See Figure 4-24 to 4-26).

1. Close the display and install the display assembly on the base assembly from the rear of the computer.
2. (For wireless LAN models only)
Pass the wireless LAN cables through the slot and hook the cables on the guides.
3. Secure the following screws to fix the bottom and rear of the computer.
 - M2.5x5 THIN BIND screw x7
 - M2.5x16 THIN BIND screw x13
4. Turn the computer face up and open the display.
5. Turn up the insulator covering the speaker connectors and connect the speaker cables (Blue, Red) to PJ6000 and PJ6001 on the system board respectively. Insert the insulator inside the chassis.
6. Connect the LCD cable to PJ5600 on the system board.

4.11 Touch Pad

Removing the Touch Pad

The following describes the procedure for removing the touch pad (See Figure 4-27).

1. Disconnect the touch pad flexible cable from PJ3201 on the system board.
2. Remove the following screw securing the touch pad.
 - M2.5x5 THIN BIND screw x1
3. Remove the touch pad.

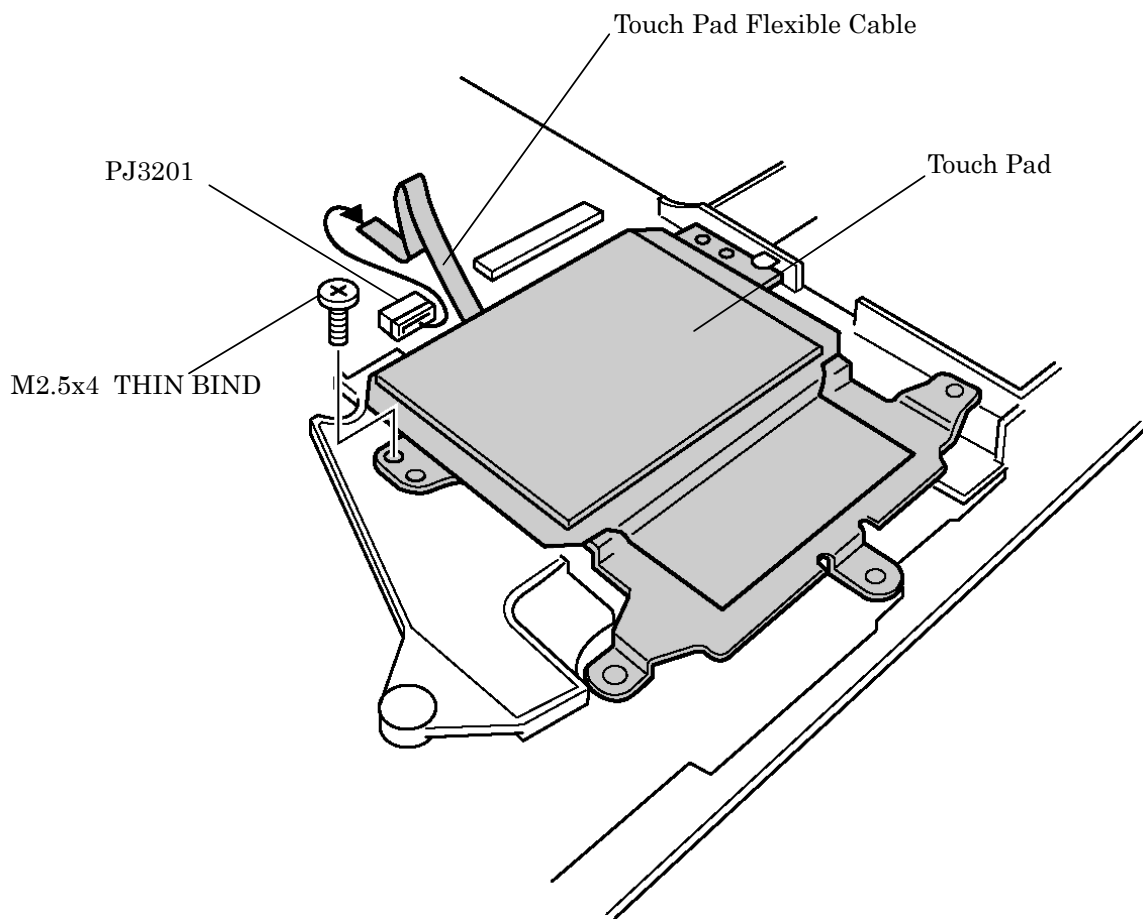


Figure 4-27 Removing Touch Pad

Installing the Touch Pad

The following describes the procedure for installing the touch pad (See Figure 4-27).

1. Place the touch pad from the right side according to the guide pins.
2. Connect the touch pad flexible cable to PJ3201 on the system board.
3. Secure the touch pad with the following screw.
 - M2.5x5 THIN BIND screw x1

4.12 BAT CON Holder

Removing the BAT CON Holder

The following describes the procedure for removing the BAT CON holder (See Figure 4-28).

1. Remove the following screws fixing the BAT CON holder.

- M2.5x8 THIN BIND screw x2

2. Remove the BAT CON holder from the system board.

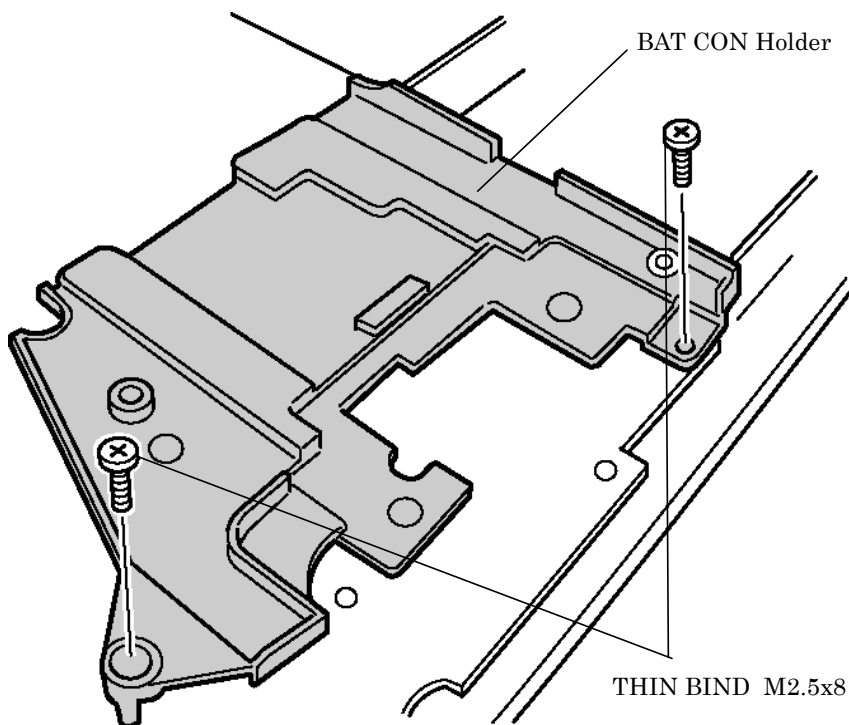


Figure 4-28 Removing BAT CON Holder

Installing the BAT CON Holder

The following describes the procedure for installing the BAT CON holder (See Figure 4-28).

1. Install the CON holder on the system board.
2. Secure the BAT CON holder with the following screws.

- M2.5x8 THIN BIND screw x2

4.13 System Board/DC-IN Jack/RTC Battery

- CAUTION:** 1. When handling the system board, always hold by the edges. Do not touch the printed circuit face.
2. After replacing the system board with a new one, set the DMI information as described in section 3.4 "System test". Also update with the latest BIOS as described in Appendix G "BIOS/KBC/EC Update".
3. After replacing the system board, the DMI information must be updated.

Removing the System Board/DC-IN Jack/RTC Battery

The following describes the procedure for removing the system board/DC-IN jack/RTC battery (See Figure 4-29, 4-30).

1. Remove the following screws fixing the system board to the base assembly.
 - M2.5x5 THIN BIND screw x2
2. Peel off the glass tape fixing the RTC battery cable.
3. Remove the DC-IN jack from the base assembly.
4. Remove the system board from the base assembly by lifting it up from the RTC battery side.
5. Turn up the insulator and disconnect the RTC battery cable from PJ8790 on the system board.
6. Disconnect the DC-IN jack cable from PJ8800 on the system board.
7. Lift up the modem jack and remove it from the base assembly.

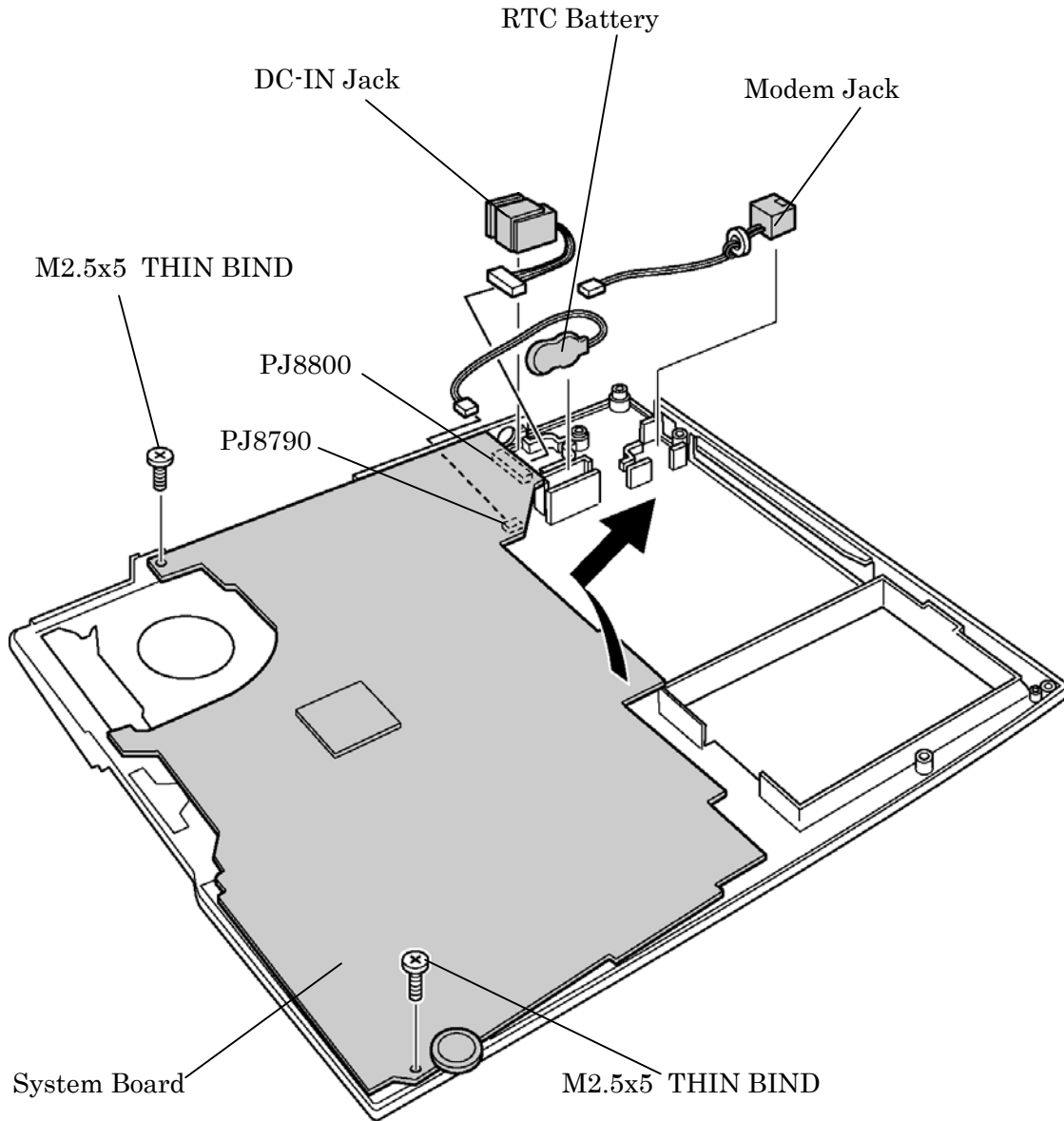


Figure 4-29 Removing System Board

8. Remove the FIR dummy cover from the base assembly by pressing it outward while holding the base assembly. Be careful not to damage the FIR dummy cover or the base assembly.

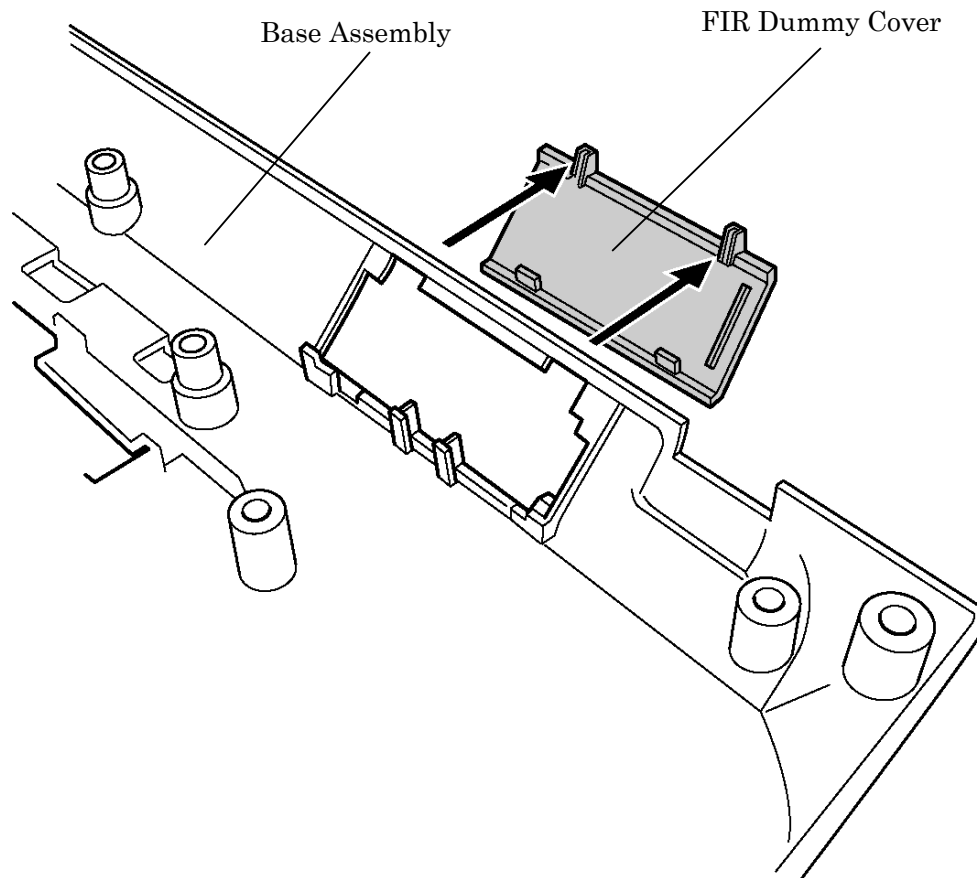


Figure 4-30 Removing FIR Dummy Cover

Installing the System Board/DC-IN Jack/RTC Battery

The following describes the procedure for installing the system board/DC-IN Jack/RTC Battery (See Figure 4-29, 4-30).

1. Attach the FIR dummy cover on the base assembly. Make sure the latches are setured.
2. Install the modem jack on the base assembly.
3. Connect the DC-IN jack cable to PJ8800 on the system board.
4. Connect the RTC battery cable to PJ8790 on the system board.
5. Insert the system board into the base assembly from the microphone and headphone jack side first.
6. Install the DC-IN jack to the base assembly.
7. Insert the RTC battery into the slot on the base assembly.
8. Secure the system board with the following screws.
 - M2.5x5 THIN BIND screw x2

4.14 BAT LOCK ASSY/HDD UPPER ASSY

Removing the BAT LOCK ASSY/HDD UPPER ASSY

The following describes the procedure for removing the BAT LOCK ASSY/HDD UPPER ASSY (See Figure 4-31, 4-32).

1. Remove the following screws fixing the BAT LOCK ASSY.
 - M2.5x6 PSP TIGHT screw x2
2. Remove the BAT LOCK ASSY from the base assembly.

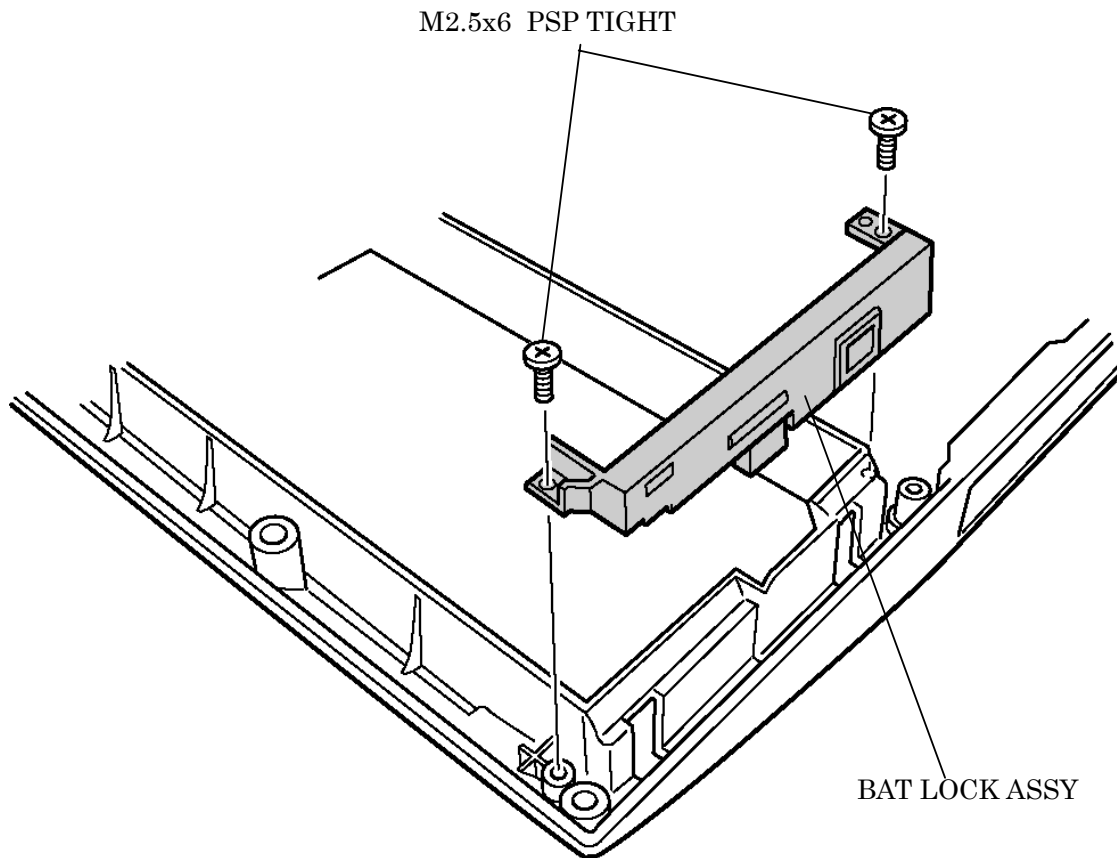


Figure 4-31 Removing BAT LOCK ASSY

3. Remove the HDD UPPER ASSY from the base assembly by lifting it up.

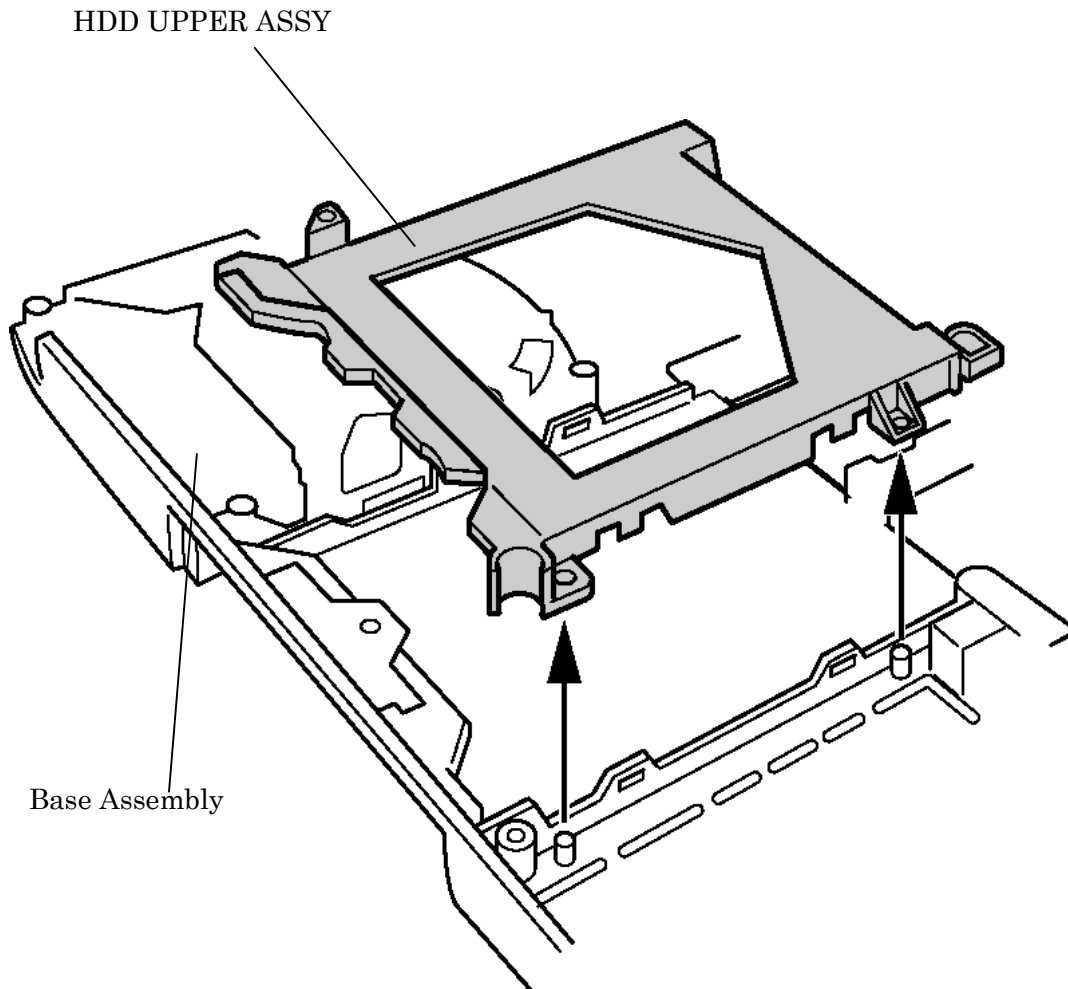


Figure 4-32 Removing HDD UPPER ASSY

Installing the BAT LOCK ASSY/HDD UPPER ASSY

The following describes the procedure for installing the BAT LOCK ASSY/HDD UPPER ASSY (See Figure 4-31, 4-32).

1. Install the HDD UPPER ASSY on the base assembly.
2. Install the BAT LOCK ASSY on the base assembly.
3. Secure the BAT LOCK ASSY on the base assembly with the following screws.
 - M2.5x6 PSP TIGHT screw x2

4.15 Touch Pad Switch

Removing the Touch Pad Switch

The following describes the procedure for removing the touch pad switch (See Figure 4-33).

1. Remove the following screws fixing the touch pad switch.
 - M2.5x4 PSP TIGHT screw x2
2. Remove the touch pad switch.

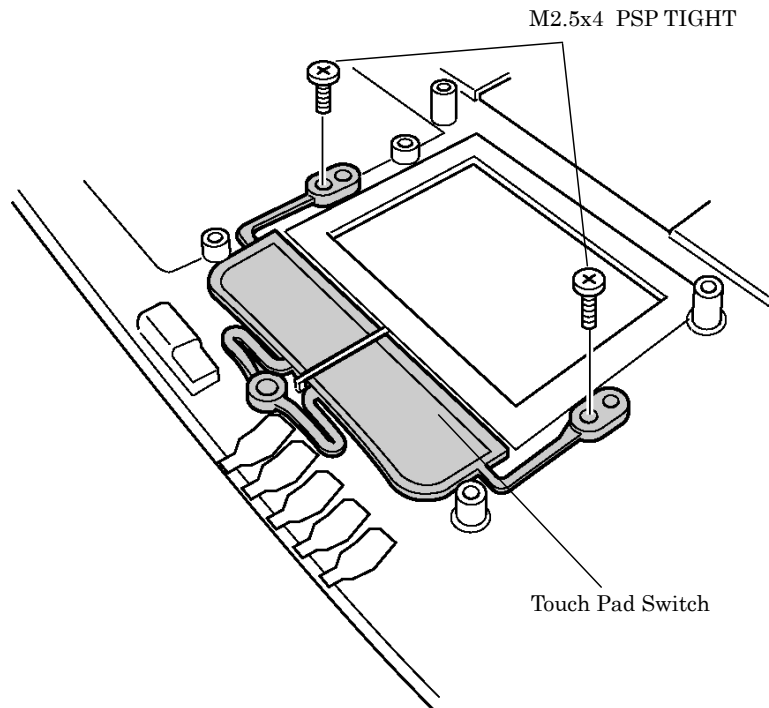


Figure 4-33 Removing Touch Pad Switch

Installing the Touch Pad Switch

The following describes the procedure for installing the touch pad switch (See Figure 4-33).

1. Set the touch pad switch with its holes attached to the guide pins.
2. Fix the touch pad switch with the following screws.
 - M2.5x4 PSP TIGHT screw x2

4.16 LCD Unit/FL Inverter

NOTE: The same part is used for the display hinge that holds the LCD unit, regardless of the LCD size.

Removing the LCD Unit/FL Inverter

The following describes the procedure for removing the LCD unit and FL inverter (See Figure 4-34 to 4-36).

1. Peel off two mask tapes from the front and remove the following screws.
 - M2.5x8 THIN BIND screw x2
2. Insert your fingers between the upper edge of the display mask and the LCD and remove the display mask while unlatching the display mask.

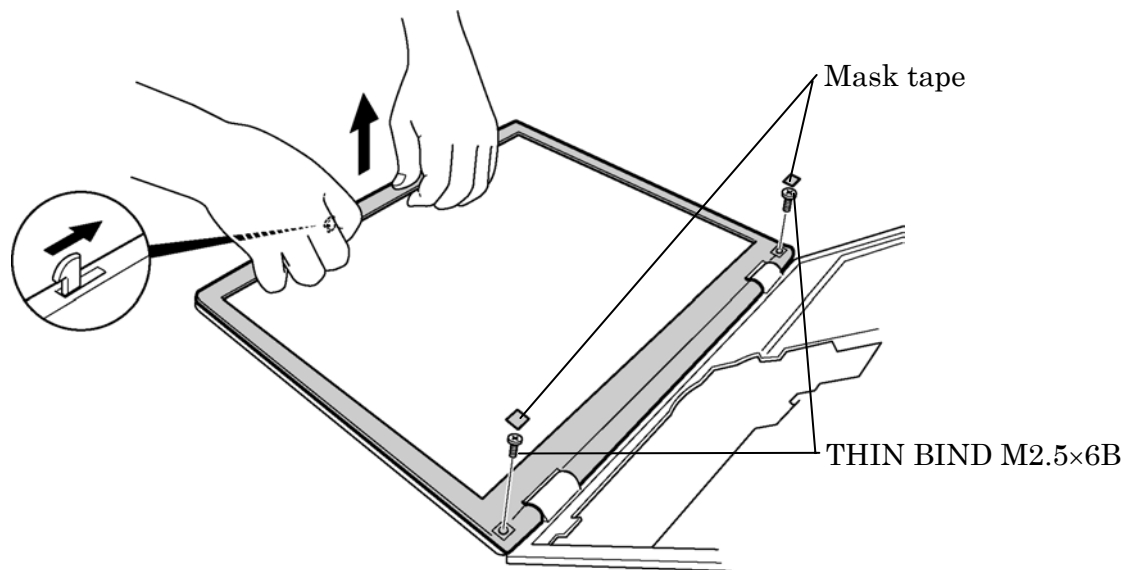


Figure 4-34 Removing Display Mask

3. Peel off the mask tapes from the sides of the display and remove the following screws fixing the LCD unit.
 - M2x4 SUPER THIN BIND screw x4
4. With the bottom edge of the LCD unit resting on the display cover, lift the top edge of the LCD unit. Peel off the glass tape and disconnect the LCD cable from the connector on the back of the LCD.
5. Remove the following screw fixing the FL inverter.
 - M2x4 SUPER THIN BIND screw x1
6. Remove the insulator and disconnect the two cables from the connectors CN1 and CN2 on the FL inverter and remove the FL inverter.
7. Remove the LCD unit from the display cover.

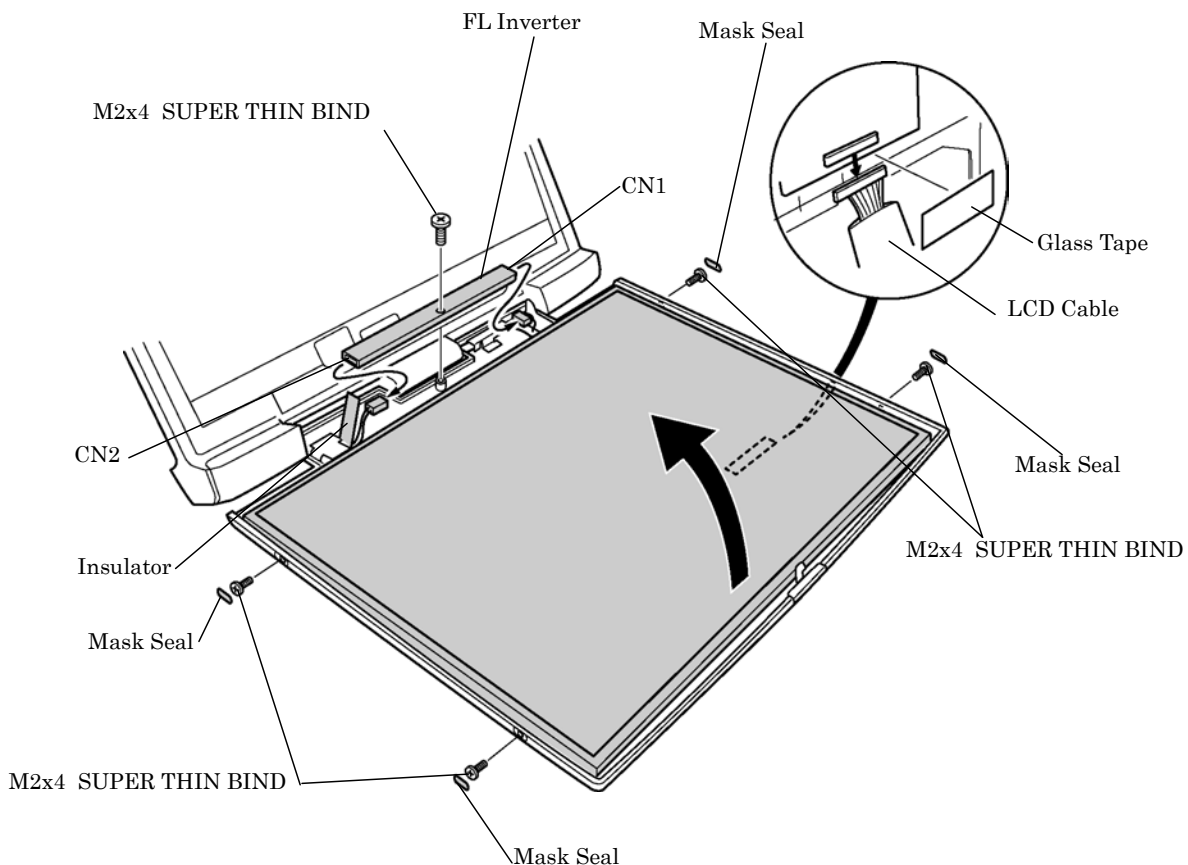


Figure 4-35 Removing FL Inverter and LCD Unit

8. Remove the following screws securing the LCD brackets. Remove the LCD brackets from the LCD module.

- M2x3 SUPER THIN BIND screw x4

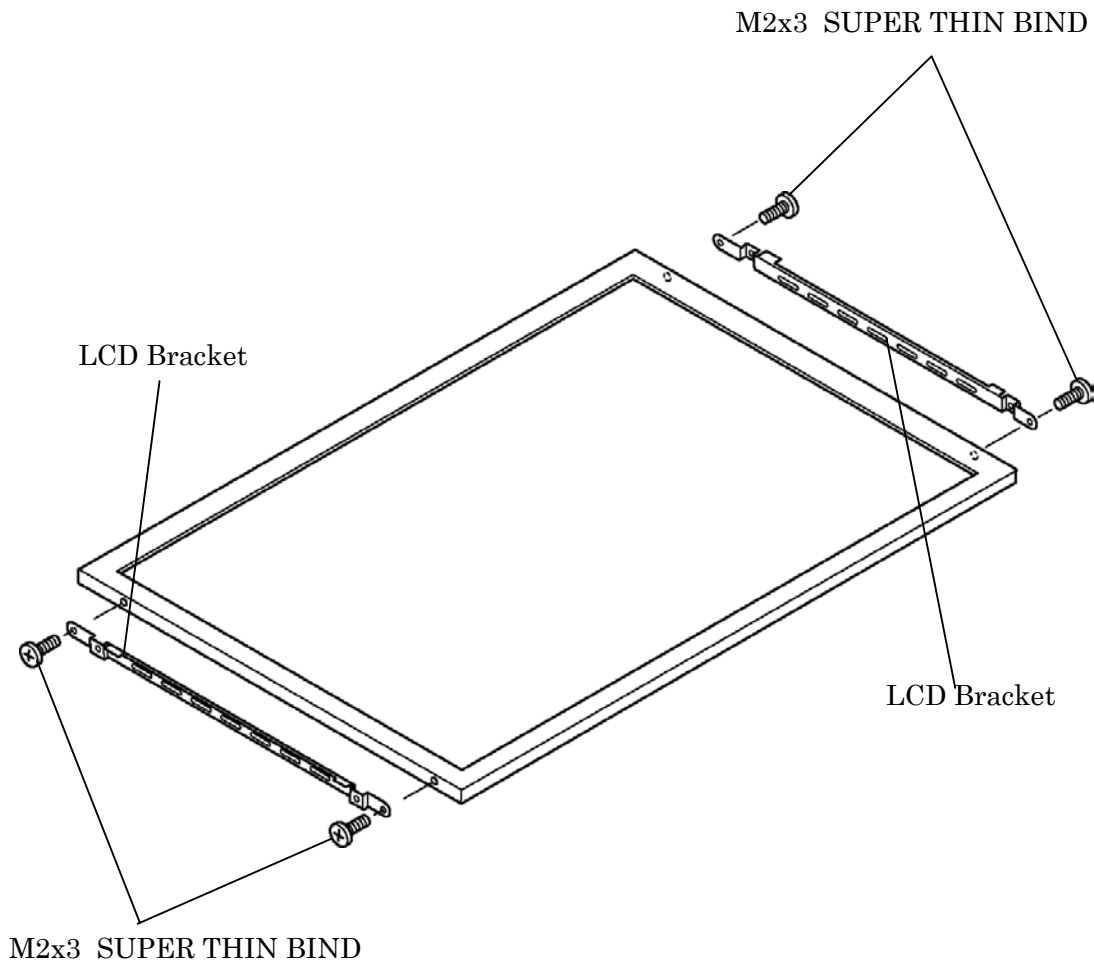


Figure 4-36 Removing LCD Bracket

Installing the FL Inverter/LCD Unit

The following describes the procedure for installing the LCD unit/FL inverter (See Figure 4-34 to 4-36).

1. Secure the LCD brackets to the LCD module with the following screws.
 - M2x3 SUPER THIN BIND screw x4
2. Set the LCD module on the display cover.
3. Connect two cables to the connectors CN1 and CN2 on the FL inverter. Stick the insulator on the FL inverter and secure the FL inverter with the following screw.
 - M2x4 SUUPER THIN BIND screw x1
4. Stand the LCD unit on the display cover and connect the LCD cable to the back of the LCD. Fix it with the glass tape.
5. Fix the LCD unit to the display cover with the following screws.
 - M2x4 SUPER THIN BIND screw x4
6. Install the display mask and engage the latches.

NOTE: When installing the display mask, make sure there is no gap between the display mask and the display cover.

7. Secure the display mask with the following screws and stick two mask tapes on the front of the display mask.
 - M2.5x8 THIN BIND screw x2

4.17 Wireless LAN Antenna/Display Cover/Speaker

Removing the Wireless LAN Antenna/Display Cover/Speaker

The following describes the procedure for removing the wireless LAN antenna, display cover, and speaker (See Figure 4-37 to 4-44).

1. Remove the latch assembly from the display cover by pressing it outward.

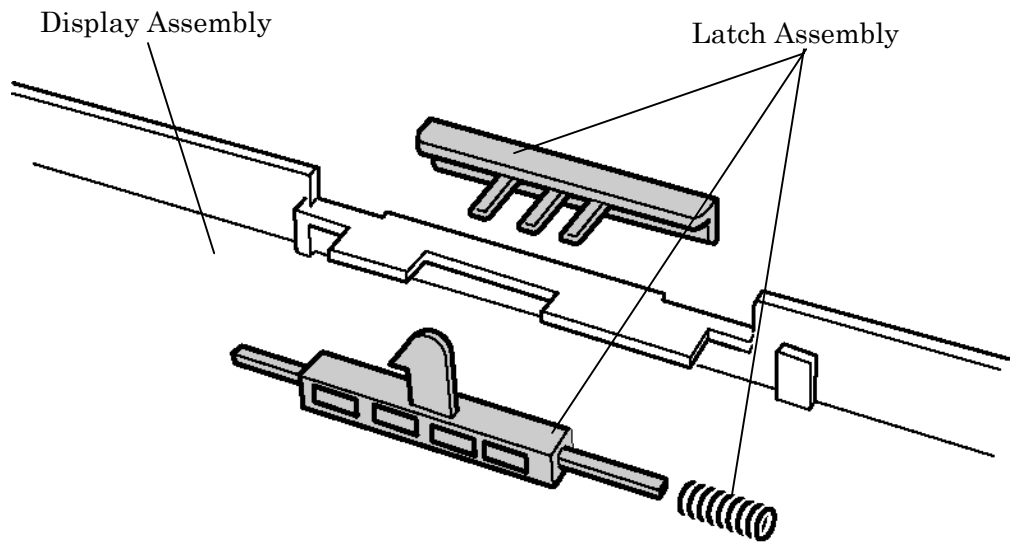


Figure 4-37 Removing Latch Assembly

2. Close the display and turn the display assembly face down. Peel off the glass tape securing the speaker cables. Unhook the speaker cables (Blue, Red) from the guides respectively.

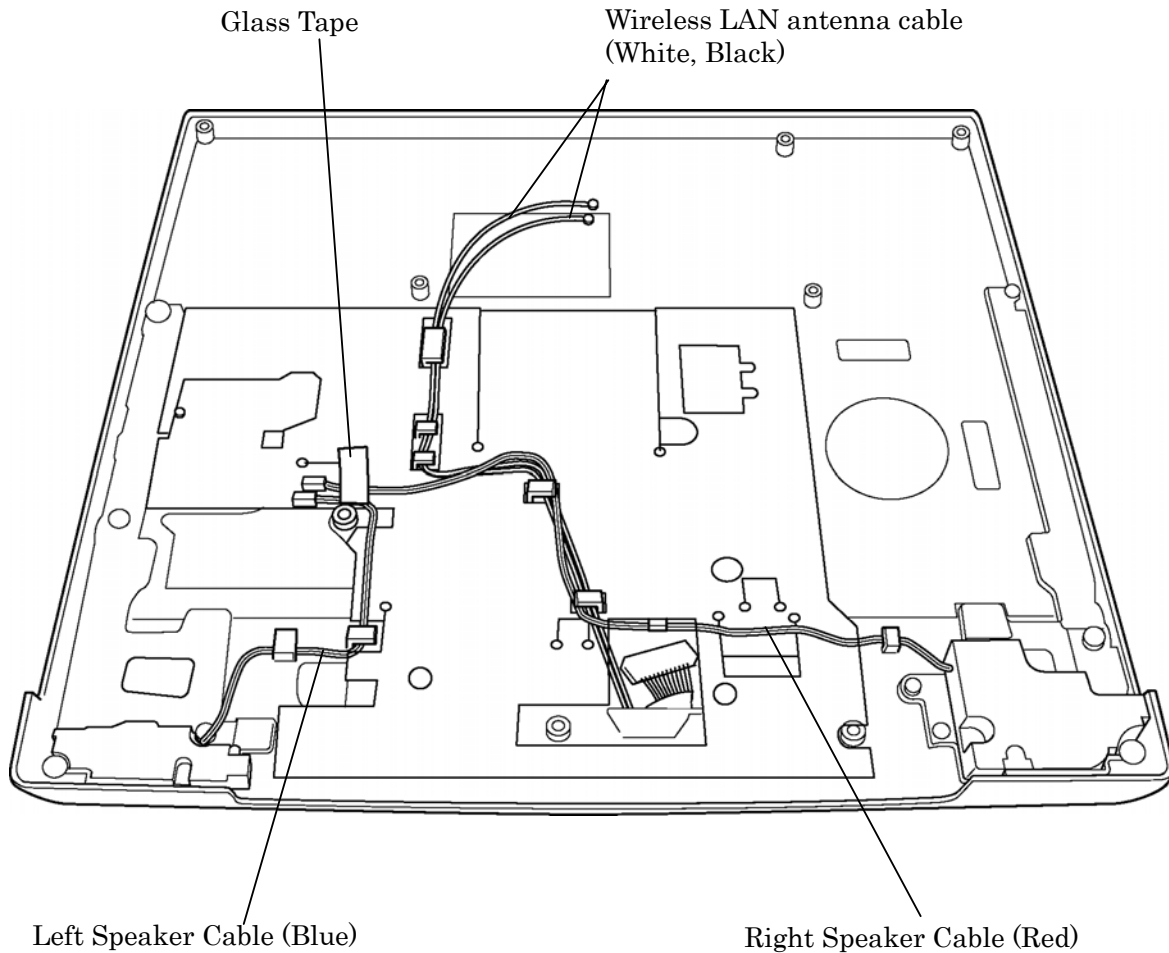


Figure 4-38 Removing Speaker Cables

3. (Wireless LAN models only)
Open the display and peel off four acetate tapes securing the wireless LAN antenna cables. Remove the wireless LAN antennas. Then unhook the wireless LAN antenna cables from the guides on the chassis. Turn the display assembly face down and unhook the wireless LAN antenna cable from the guides.

- M2.5x8 THIN BIND screw x2

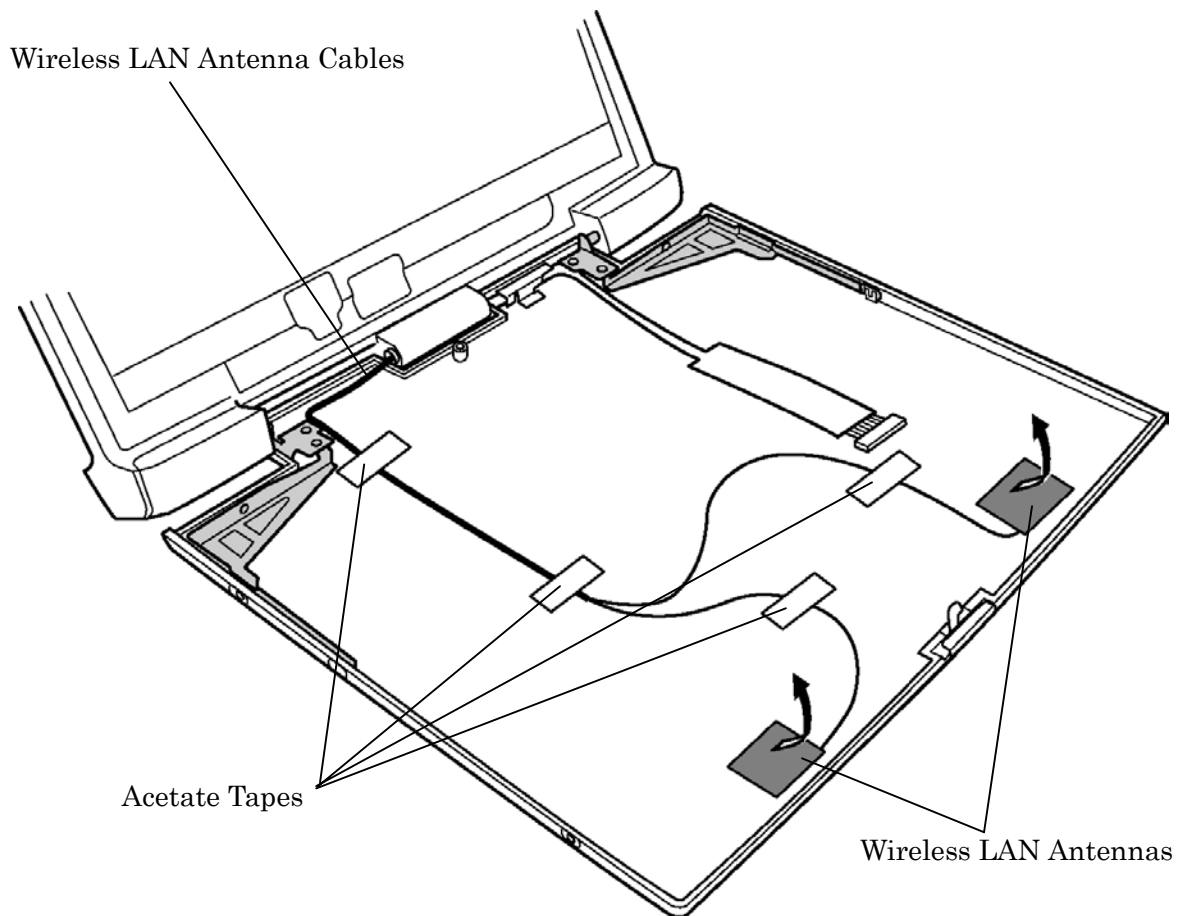


Figure 4-39 Removing Wireless LAN Antennas

4. Peel off the insulator covering the back side of the display assembly and remove the following screws securing the hinge cover. Then open the display, release two latches of the hinge cover and remove the hinge cover.

- M2.5x4 PSP TIGHT screw x1

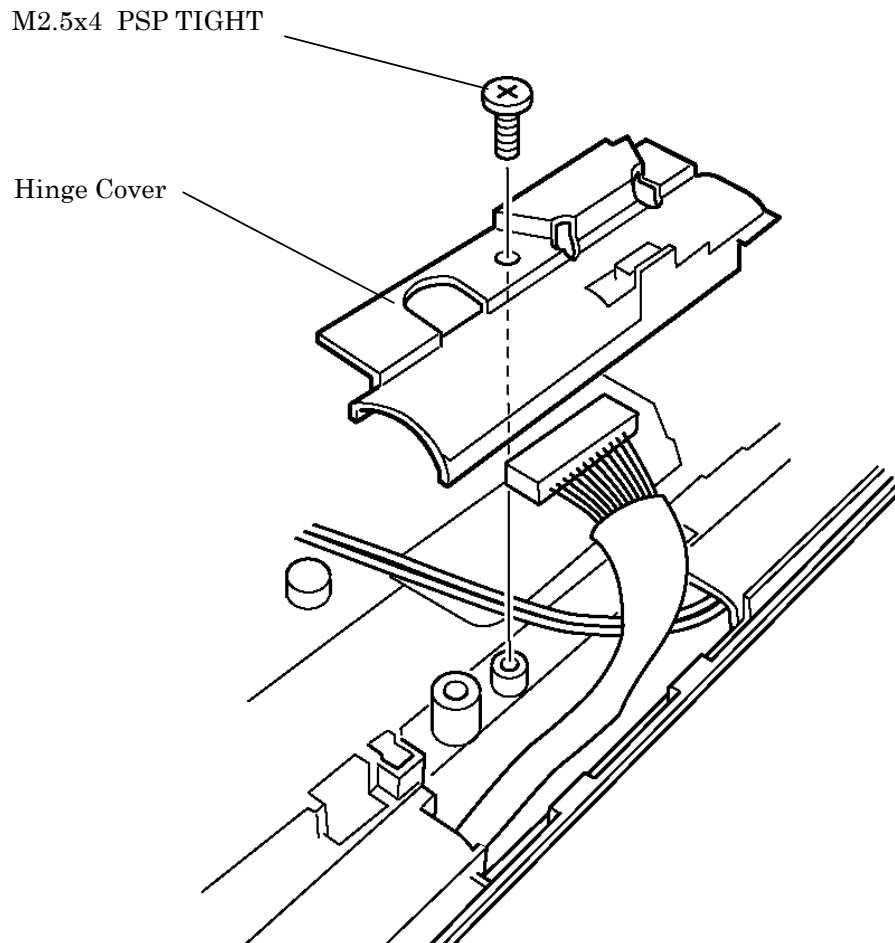


Figure 4-40 Removing Hinge Cover

5. Remove the following screws securing the speakers (Left, Right) and remove the speakers.

- M2.5x5 THIN BIND screw x5 (Left: 2, Right: 3)

CAUTION: When removing the speakers, be careful not to touch the metal part of the speakers. It might damage the speakers.

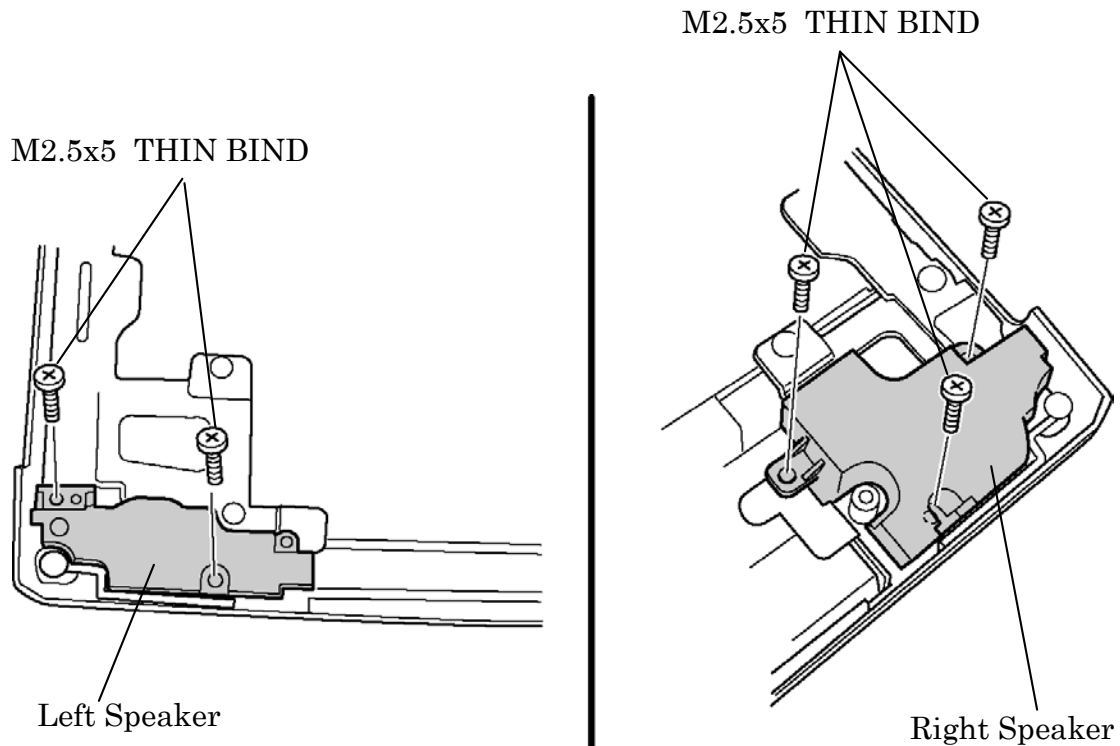


Figure 4-41 Removing Speakers

6. Remove the following screw securing the LCD cable holder and remove the LCD cable holder. Then pull out the LCD cable from the bottom side of the display cover.
 - M2.5x4 PSP TIGHT screw x1

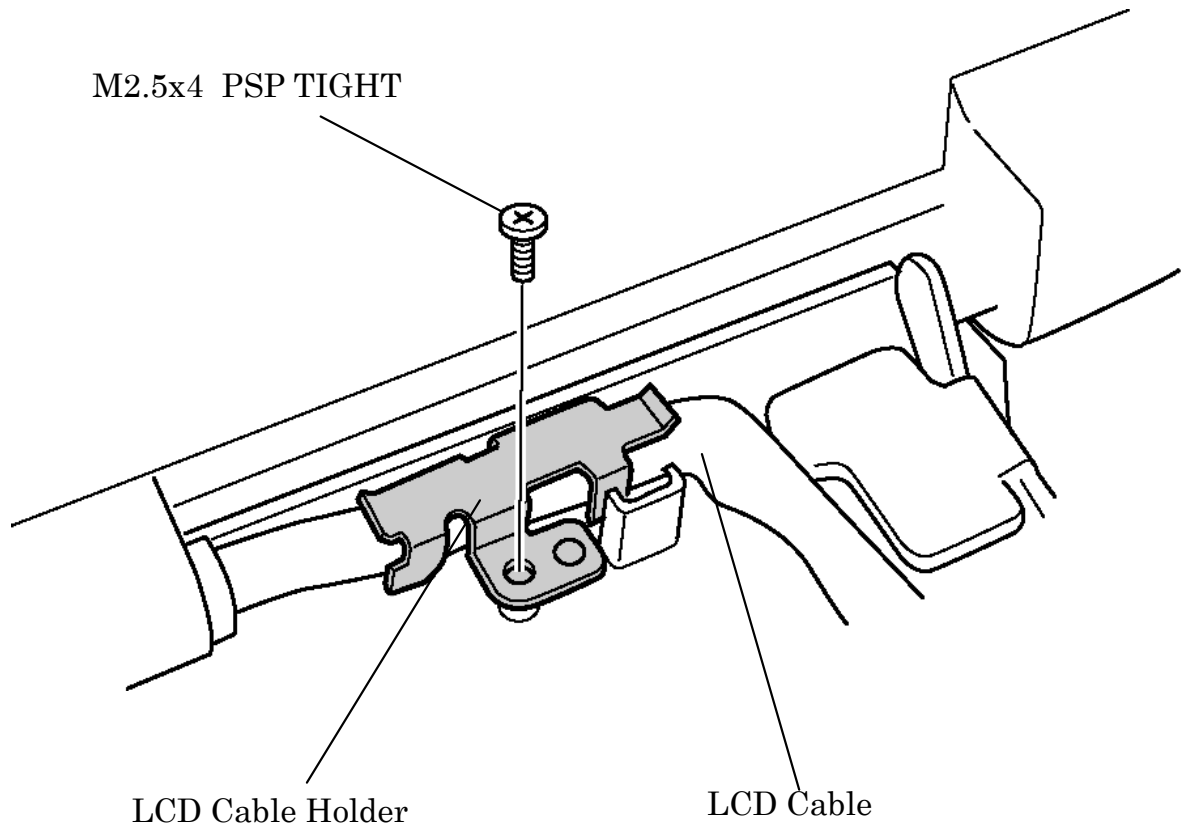


Figure 4-42 Removing LCD Cable Holder

7. Peel off four mask seals from the both sides of the display cover and remove the following screws securing the hinges to the display cover.
 - M2.5x2.8 THIN BIND screw x2
8. Open the display and remove the following screws securing the hinges to the display cover.
 - M2.5x6 THIN BIND screw x2
9. Open the display at 45-degree slant and remove the following screws securing the hinges to the display cover.
 - M2.5x2.8 THIN BIND screw x2
10. Remove the display cover from the display assembly.

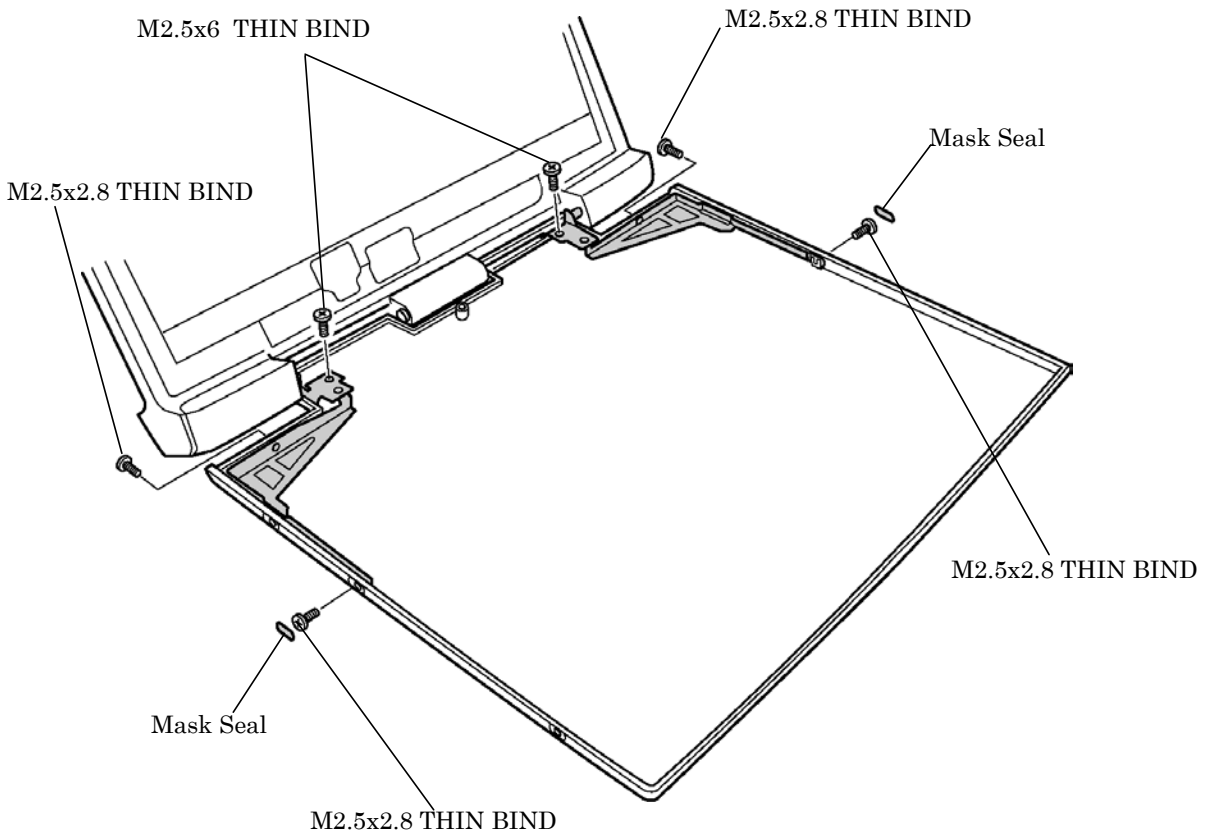


Figure 4-43 Removing Display Cover

11. Straighten the edges of the left and right speaker nets (at four point each) using a device such as a flatblade driver and remove the speaker nets.
12. Remove the following screws securing the hinges to the display assembly. Pull the hinge outward slightly, then remove it by rotating.

- M2.5x6 PSP TIGHT screw x3 (Left: 2, Right: 1)
- M2.5x6 THIN BIND screw x1 (Right)

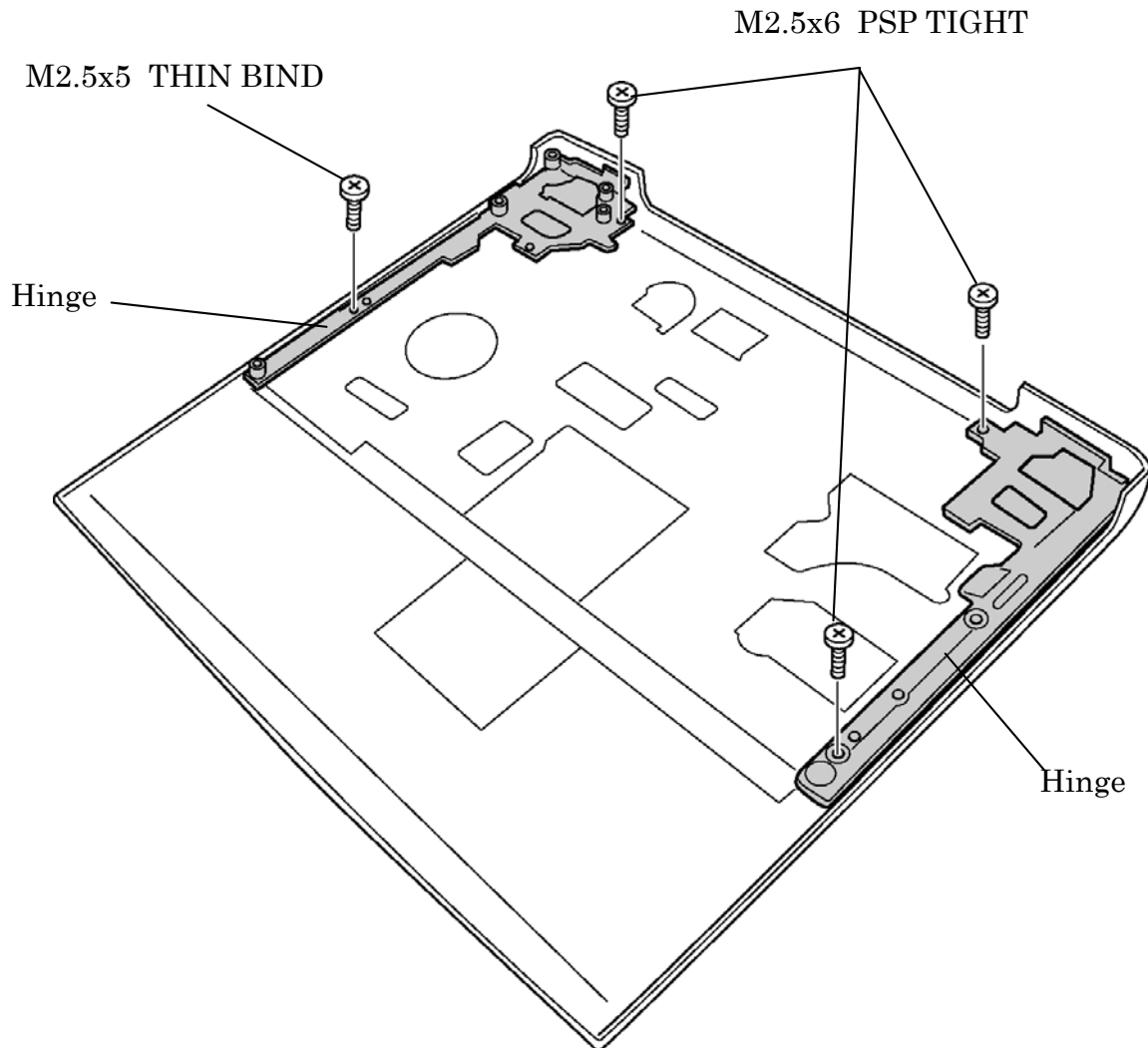


Figure 4-44 Removing Hinges

Installing the Wireless LAN Antenna/Display Cover/Speaker

The following describes the procedure for installing the wireless LAN antenna, display cover, and display cable (See Figure 4-37 to 4-44).

1. Install the hinges to the display assembly and secure them with the following screws.
 - M2.5x6 PSP TIGHT screw x3 (Left: 2, Right:1)
 - M2.5x5 THIN BIND screw x1 (Right)
2. Install the left and right speaker nets and bend the edges (at four points each) using a device such as a flatblade driver and secure them.
3. Install the display cover to the display assembly.
4. Open the display at 45-degree slant and secure the hinges to the display cover with the following screws.
 - M2.5x2.8 THIN BIND screw x2
5. Secure the hinges to the display cover with the following screws. Stick two mask seals on each side of the display cover.
 - M2.5x2.8 THIN BIND screw x4 (Display cover side)
 - M2.5x6 THIN BIND screw x2 (FL inverter side)
6. (For wireless LAN models only)
Fit the wireless LAN antennas to the grooves at the rear of the display cover with double-sided adhesive tapes. Set the wireless LAN antenna cables and stick four acetate tapes on the cables.
7. (For wireless LAN models only)
Pass the wireless LAN antenna cables through the bottom of the display cover toward the back side of the display assembly.
8. Pass the LCD cable from the bottom of the display cover toward the back side of the display assembly. Then install the LCD cable holder and secure the holder with the following screw.
 - M2.5x4 PSP TIGHT screw x1
9. Turn the display assembly face down. Close the display and attach the hinge cover. Then open the display and secure two latches of the hinge cover. Turn the display assembly face down and secure the hinge cover with the following screw.
 - M2.5x4 PSP TIGHT screw x1

10. Set the left and right speakers on the back of the display assembly and secure the speakers with the following screws.

- M2.5x5 THIN BIND screw x5 (Left: 2, Right: 3)

CAUTION: When installing the speakers, be careful not to touch the metal part of the speakers. It might damage the speakers.

11. Hook the right speaker cable (Red) on two guides and pass it around the hinge cover. Stick the insulator on the back of the display assembly.
12. Hook each speaker cable (Red, Blue) on the guides respectively. Pass the connector part of the cables under the insulator and stick the glass tape on the cables.
13. Hook the wireless LAN antenna cables on the guides. Pass the cables toward the front of the display assembly and stick the acetate tape to secure the cables. Then pass the cables toward back side again and hook on the guide. Pass the cables over the wireless LAN slot.
14. Install the latch assembly on the display cover.

4.18 Fluorescent Lamp

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

Type	Part No.	Supplier	Section
14.1 inch (XGA)	G33C00012110	TMD	4.18.1
	G33C00013110	TMD	4.18.1
	VF2093P01	CHIMEI	4.18.2
	VF2058P01	Samsung	4.18.3
	VF2048P01	Samsung	4.18.4
	VF2062P01	LG.Philips	4.18.5
15.0 inch (XGA)	G33C0000G110	LG.Philips	4.18.6
	G33C0000L110	Samsung	4.18.7
	G33C0000Q110	Sharp	4.18.8
	G33C0000M110	CHIMEI	4.18.9
15.0 inch (SXGA+)	G33C0000R110	LG.Philips	4.18.10
	G33C0000N110	Samsung	4.18.11
	G33C0000P110	Sharp	4.18.12

NOTE: - When working with a LCD module, always use a flat, grounded table.

- (1) 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.
- (2) Use an anti-static or protective sheet.
- (3) When replacing the FL unit, cover with a finger protector or similar to prevent dirtying or scratching the LCD panel.
- (4) Take care when handling the lamp. Excessive force may break the lamp.
- (5) Take care not to dirty or deform the lamp reflector.
- (6) Ensure always that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.

4.18.1 Replacing the TMD 14.1 Inch XGA Fluorescent Lamp

Replace the Toshiba 14.1-inch XGA fluorescent lamp according to the following procedures and Figures 4-45 to 4-56.

4.18.1.1 Disassembling Fluorescent Lamp

Peeling off the tapes and insulation sheets

1. Flip the module over and place it on a flat surface that is free of foreign objects.
2. In the order (1), (2), and (3) shown in Figure 4-45, remove the tape for fixing the FL tube cable, two pieces of tape on the bezel that are close to the FL tube, and the X-PCB insulation sheet.

CAUTION: (1) Be careful not to damage the TAB.

(2) Leave the insulation sheet on the bezel to allow the reuse of the sheet.

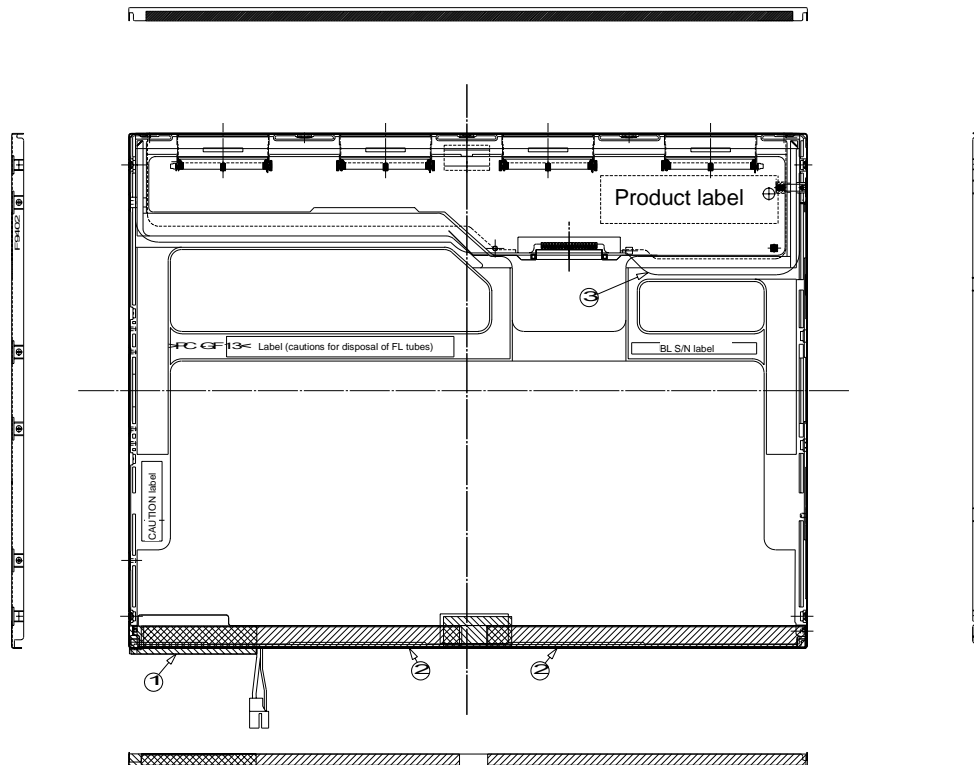


Figure 4-45 Replacing 14 Inch TMD fluorescent lamp (1)

Removing the screws

1. Spread out the insulation sheet without detaching it from the side of the bezel, as shown in Figure 4-46.
2. In the order (1) and (2) shown in Figure 4-46, remove the screws from the left- and right-hand sides of the module.

CAUTION: To unfasten the screws, use an insert bit of point size 0 for Philips screwdrivers.

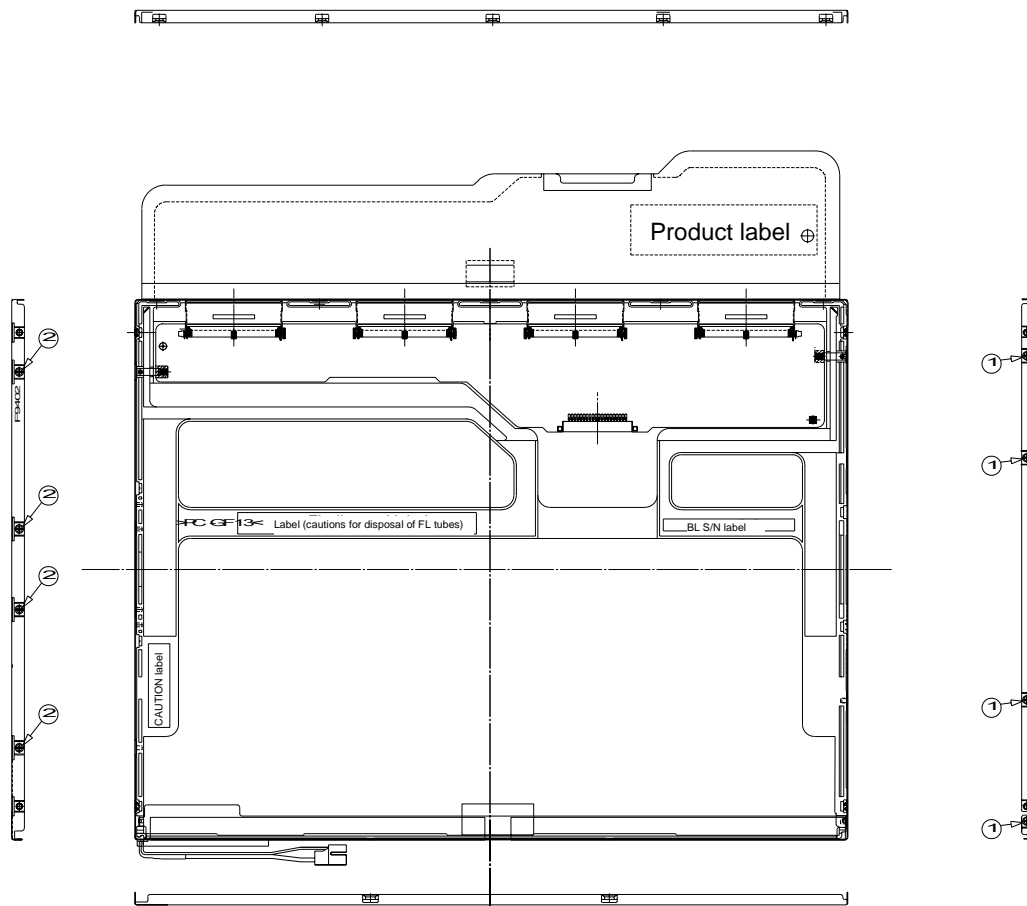


Figure 4-46 Replacing 14 Inch TMD fluorescent lamp (2)

Removing the bezel

1. Without removing the insulation tape, flip the module over again so that the display screen can face up.
2. Release the latches of the bezel and frame. (On the sides, there are five latches in the upper area and two latches in the lower area.)
3. Gently remove the double-sided tape from the cell at the reverse side of the bottom of the bezel and remove the bezel.
4. Remove the double-sided tape remaining at the bottom of the cell and on the reverse side of the bezel.

CAUTION: Do not damage the TAB when releasing the latches on the upper area. When removing the bezel, gently remove the top double-sided tape at the bottom of the surface of the bezel to prevent cell damage. Be careful not to deform the bezel.

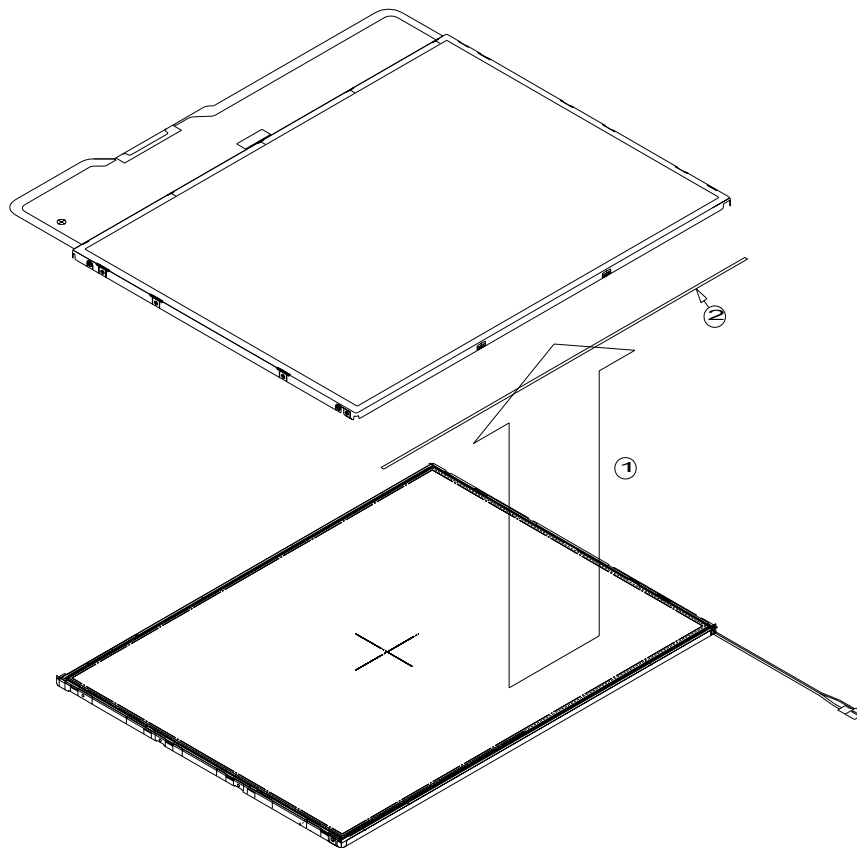


Figure 4-47 Replacing 14 Inch TMD fluorescent lamp (3)

Opening the PCB

1. Spread out the PCB horizontally, as shown in Figure 4-48.

CAUTION: Be careful not to damage the TAB.

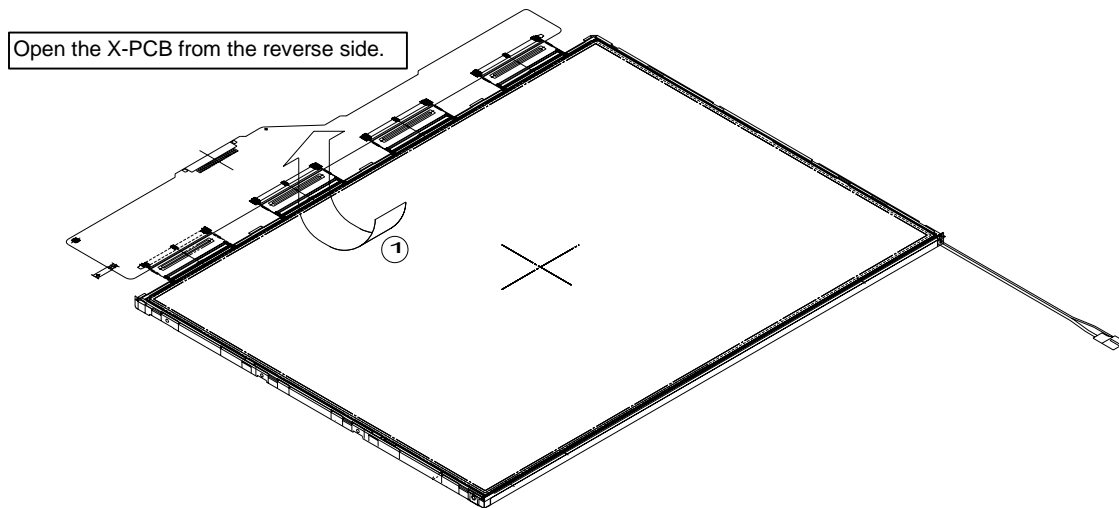


Figure 4-48 Replacing 14 Inch TMD fluorescent lamp (4)

Removing the PCB-assembly cell

1. Remove the cell of the PCB assembly from the backlight assembly, as indicated by (1) in Figure 4-49. Completely remove the double-sided tape remaining on the reverse side of the cell.

CAUTION: On the cell, three areas are bonded to the frame with the double-sided tape (as shown in Figure 4-49, one area is at the top, and two areas are at the bottom of both sides). Remove the cell gently, taking care not to damage it. Be careful not to peel off the masking tape in the three areas on the cell.

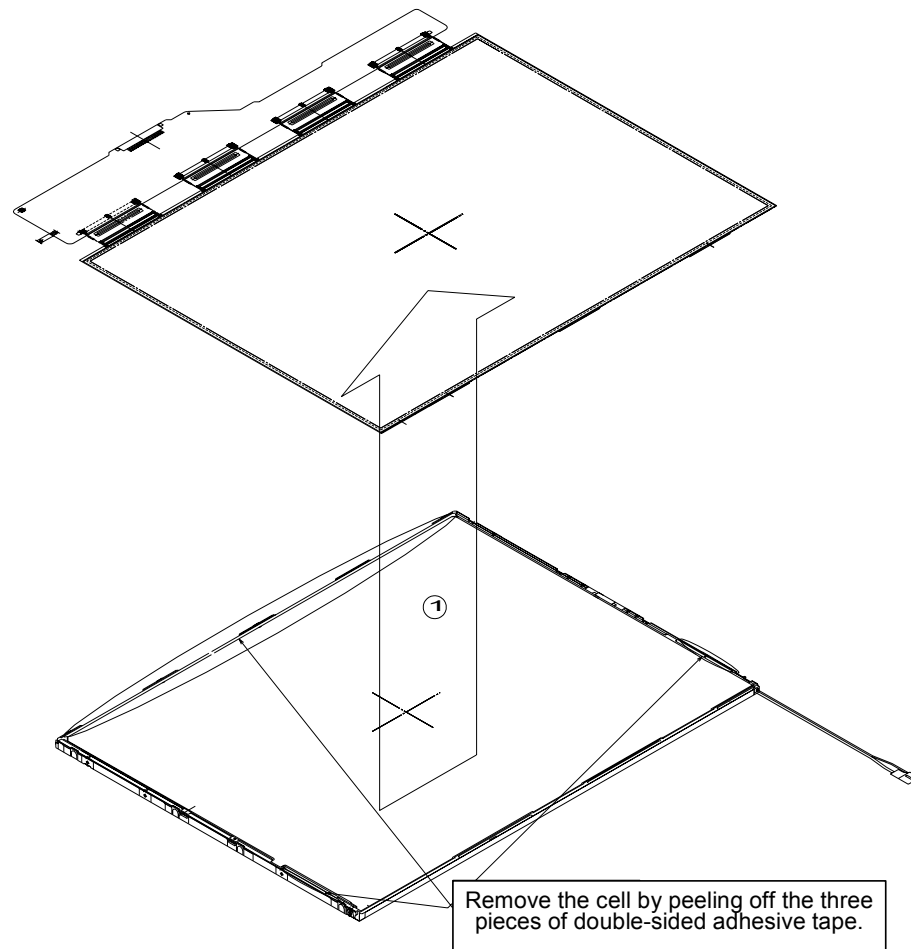


Figure 4-49 Replacing 14 Inch TMD fluorescent lamp (5)

4.18.1.2 Assembling Fluorescent Lamp

Putting the double-sided tapes on the bezel

1. Attach the double-sided tape to the reverse side of the bezel, as shown in Figure 4-50.

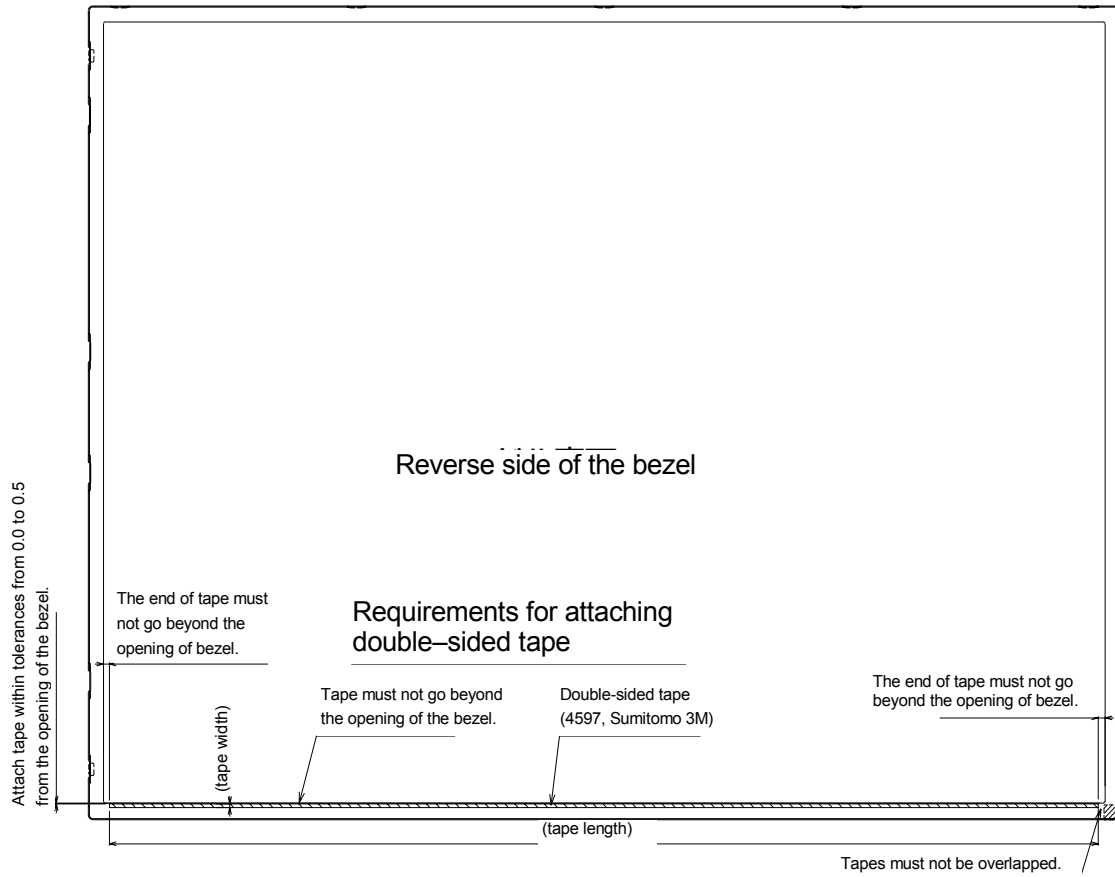


Figure 4-50 Replacing 14 Inch TMD fluorescent lamp (6)

Checking the backlight

1. Inspect the replacement backlight according to Figure 4-51.

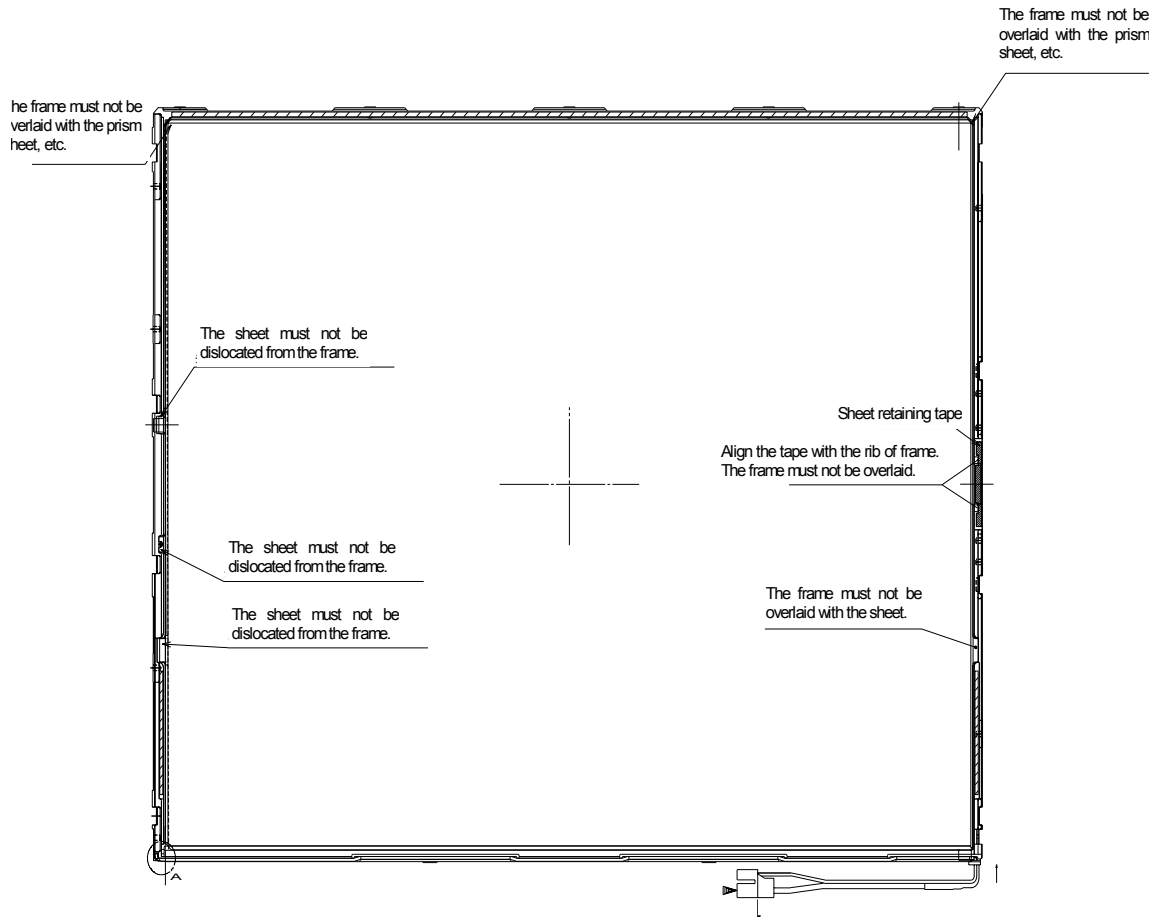


Figure 4- 51 Replacing 14 Inch TMD fluorescent lamp (7)

Assembling PCB-assembly cell

1. Remove the paper (coated with a mold release) from the double-sided tape in the three areas on the replacement backlight unit. The areas are at the top and on both sides. See Figure 4-52.
2. Turn the backlight on.
3. Check that the backlight is free of dust, foreign objects, or damage. Perform this check also for the reverse side of the cell. Then install the cell of the PCB assembly in the backlight unit.

CAUTION: Align the top left corner of the cell with the corresponding corner of the backlight unit, as indicated by ② in Figure 4-52. Be careful not to damage the TAB.

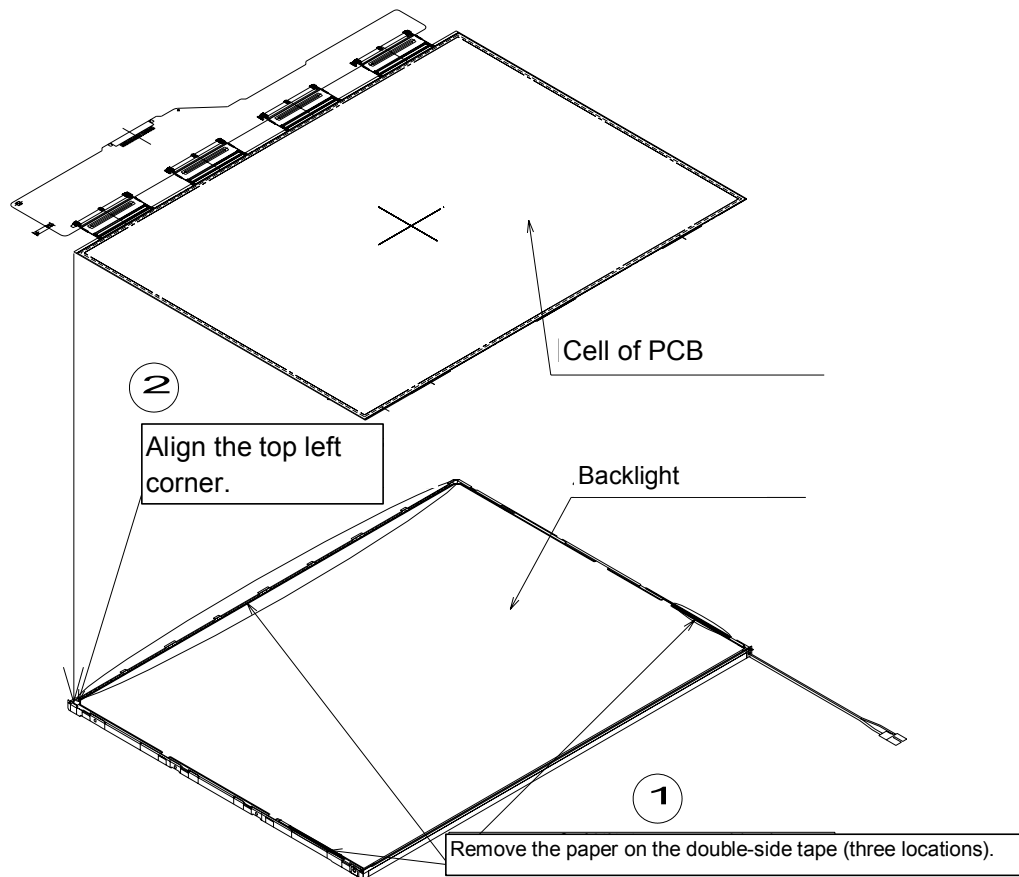


Figure 4- 52 Replacing 14 Inch TMD fluorescent lamp (8)

Folding down and temporary fixing of the TAB/PCB

1. Fold down the TAB (PCB) toward the reverse side of the backlight unit, as shown in Figure 4-53.

CAUTION: Be careful not to damage the TAB.

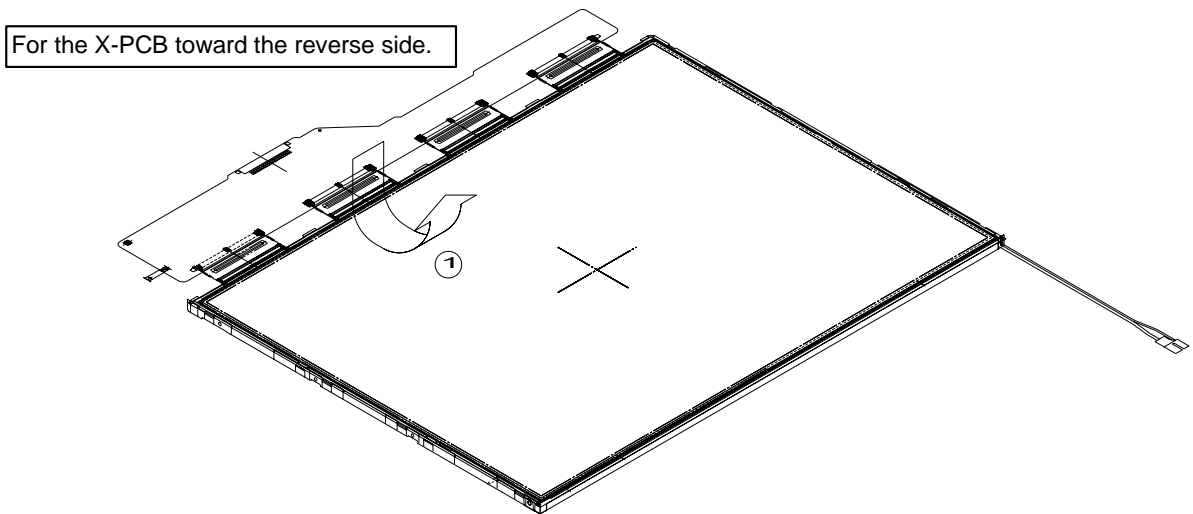


Figure 4-53 Replacing 14 Inch TMD fluorescent lamp (9)

Setting the bezel

1. Start installing the bezel in the upward direction until it stops at the top left corner.

NOTE: The GND-CU and lamp reflector on the left-hand side must not go beyond the edges of the bezel.
 Be careful not to damage the cables and TAB.
 The bezel latches must be engaged (there are five latches on the top edge, and two latches on the bottom edge).

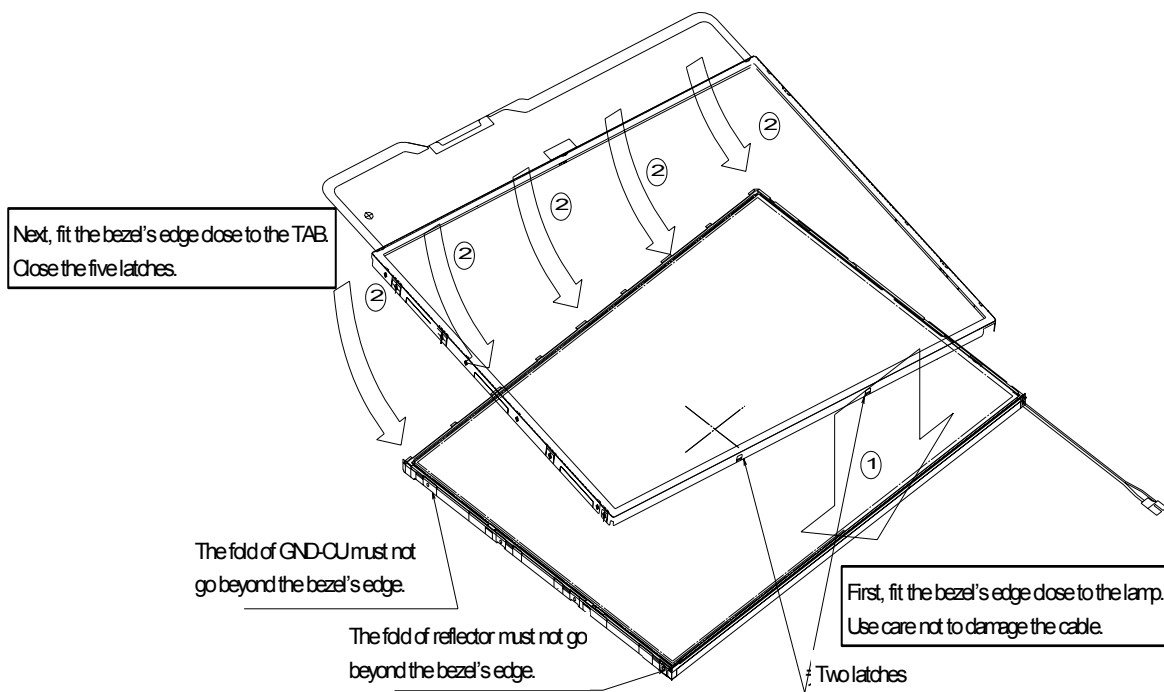


Figure 4-54 Replacing 14 Inch TMD fluorescent lamp (10)

Fasten screws of the PCB and bezel

1. Fasten four screws on the left edge in the order (5), (6), (7), and (8) shown in Figure 4-55.
2. Fasten four screws on the right edge in the order (1), (2), (3), and (4) shown in Figure 4-55.

CAUTION: Fasten the screws in the orders shown in Figure 4-55. No loose fastening is allowed.
The tightening torque must not exceed $0.147\text{ N}\cdot\text{m}$ ($1.5\text{kgf}\cdot\text{cm}$) for all the eight screws.
For the Philips screwdrivers, use an insert bit of point size 0.

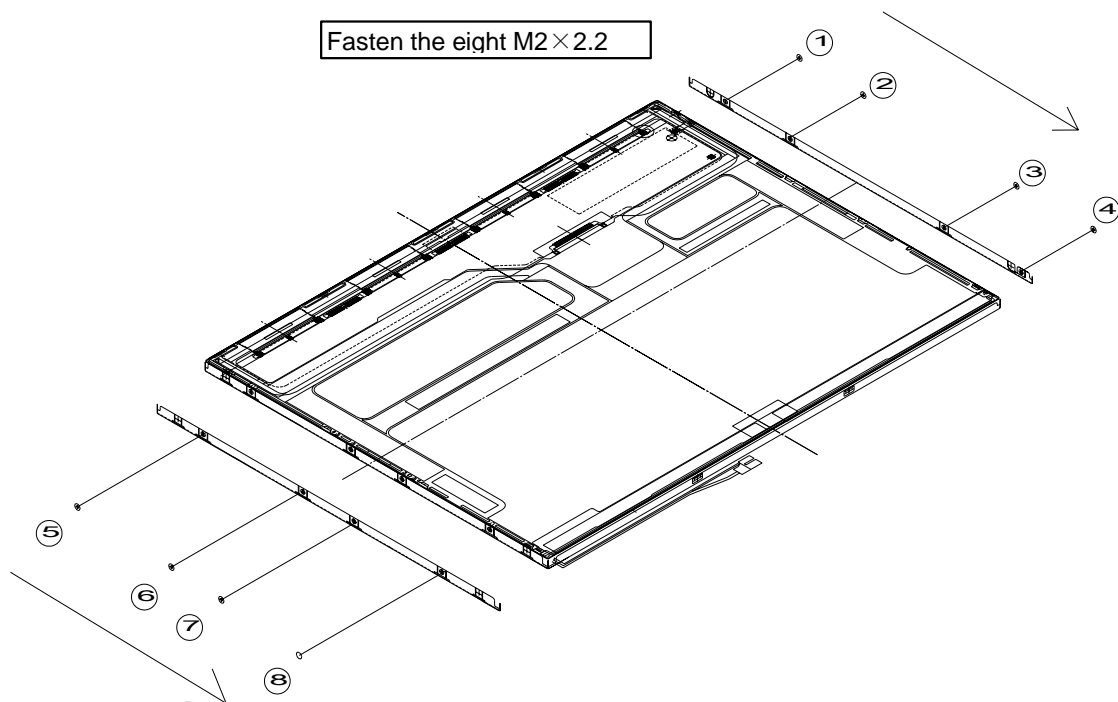


Figure 4-55 Replacing 14 Inch TMD fluorescent lamp (11)

Attaching the tapes and insulation sheet

1. Attach the PCB insulation sheet (one point).
2. Attach the tape for the bezel to the bottom area close to the lamp (two points).
3. Attach the tape for fixing the FL tube cable (one point).

CAUTION: When attaching tape and insulation sheet, be careful not to damage the TAB and lamp cable connections.

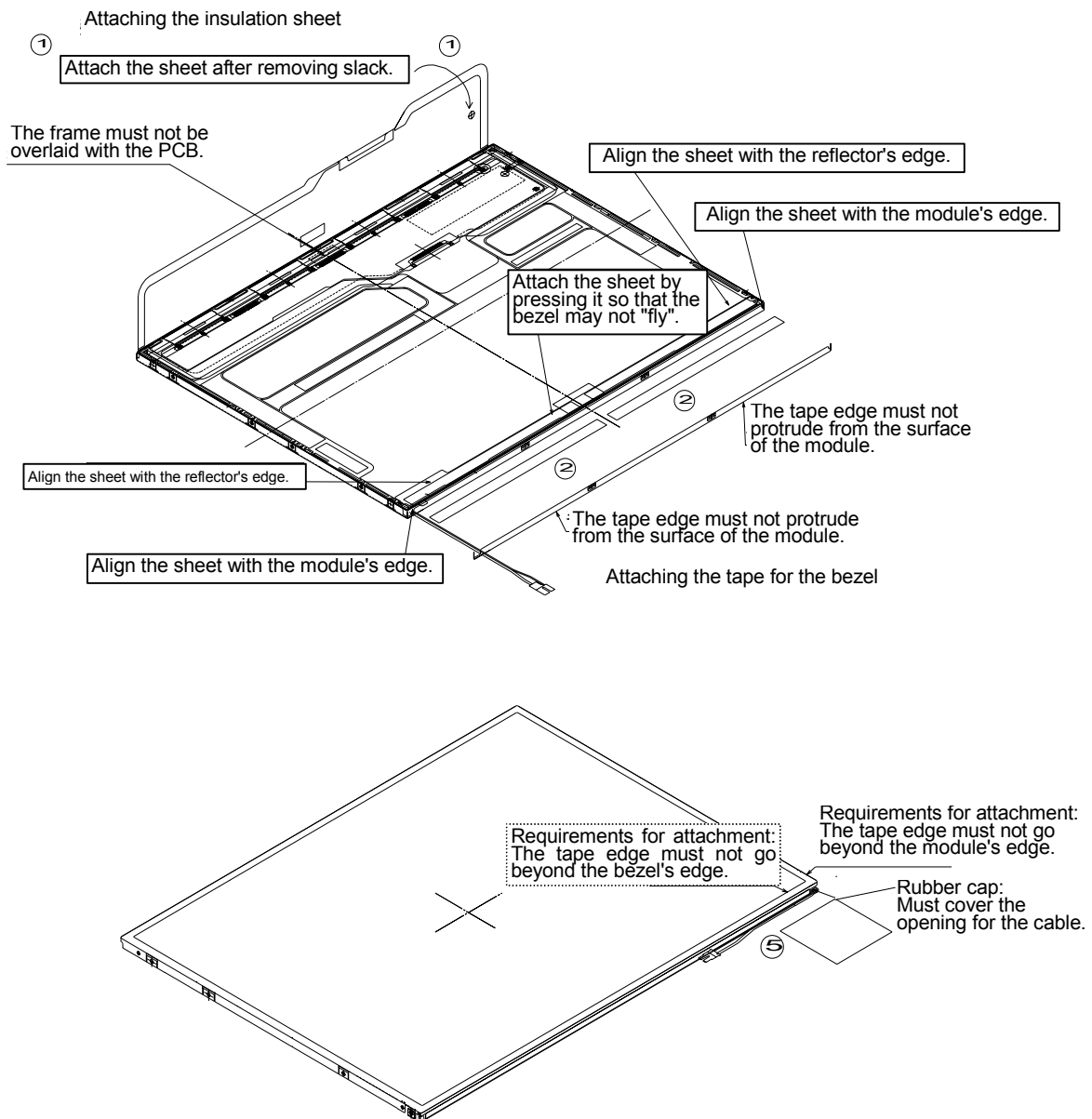


Figure 4-56 Replacing 14 Inch TMD fluorescent lamp (12)

4.18.2 Replacing the 14.1 Inch XGA CHIMEI Fluorescent Lamp

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-57 to Figure 4-63).

1. Remove the tapes, labels and films (1 to 8).

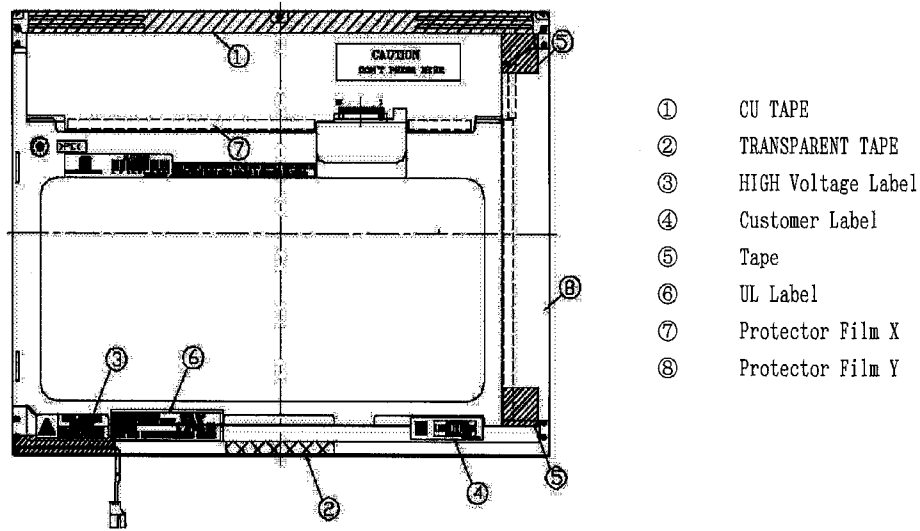


Figure 4-57 Replacing 14.1 Inch CHIMEI fluorescent lamp (1)

2. Remove the latch.

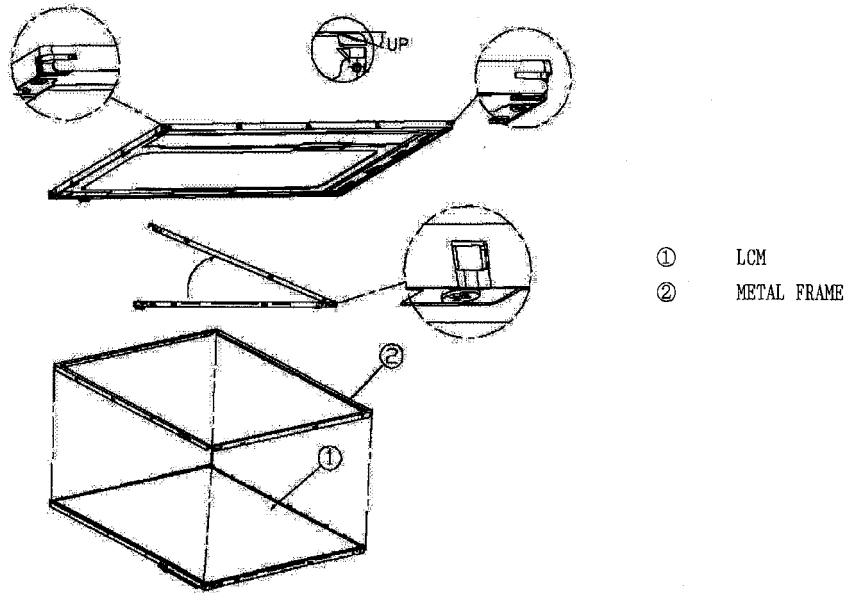


Figure 4-58 Replacing 14.1 Inch CHIMEI fluorescent lamp (2)

3. Remove the screw and PCB cover.

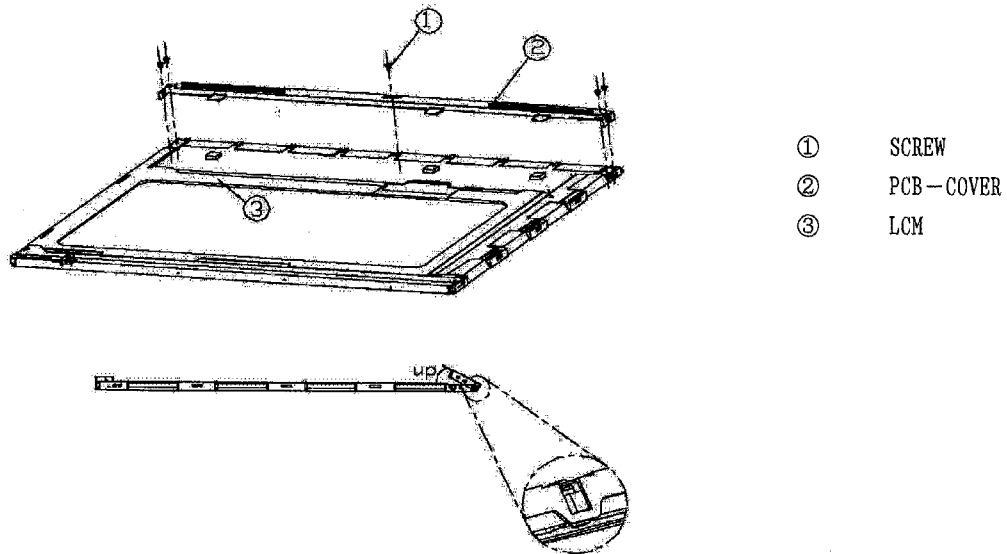


Figure 4-59 Replacing 14.1 Inch CHIMEI fluorescent lamp (3)

4. Loosen the X-PCB connector and disconnect the FPC from the Y-PCB.
5. Remove the X-PCB and Y-PCB.

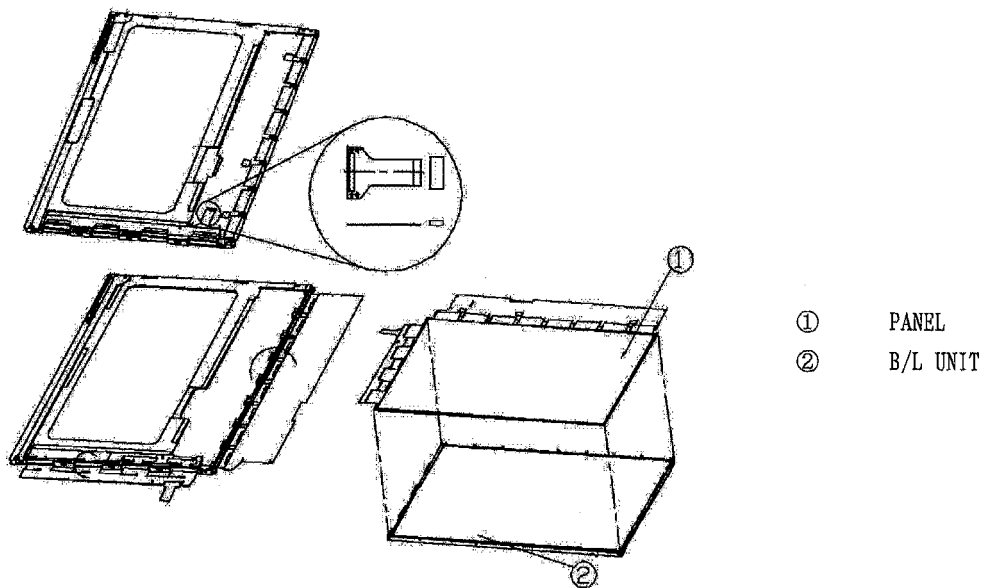


Figure 4-60 Replacing 14.1 Inch CHIMEI fluorescent lamp (4)

6. Remove the spacer from the protector sheet.
7. Remove the sheets (2) to (5).

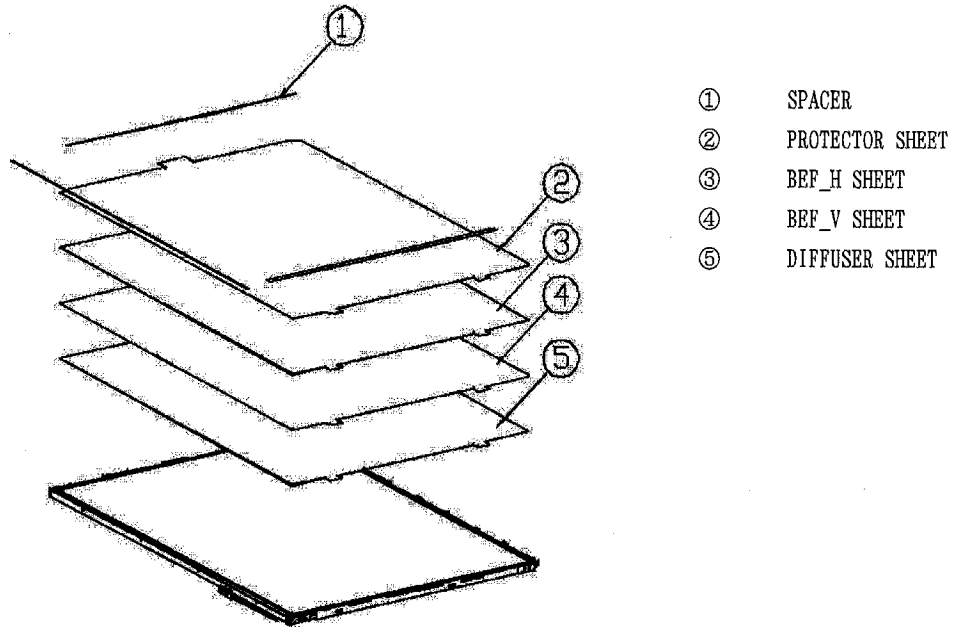


Figure 4-61 Replacing 14.1 Inch CHIMEI fluorescent lamp (5)

8. Remove the LGP and reflection sheet.

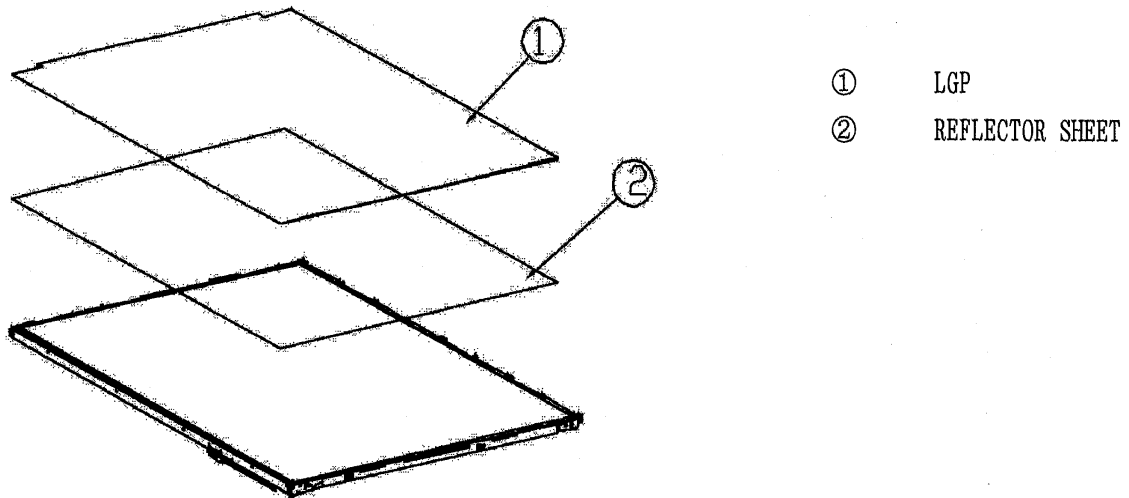


Figure 4-62 Replacing 14.1 Inch CHIMEI fluorescent lamp (6)

9. Remove the screw.

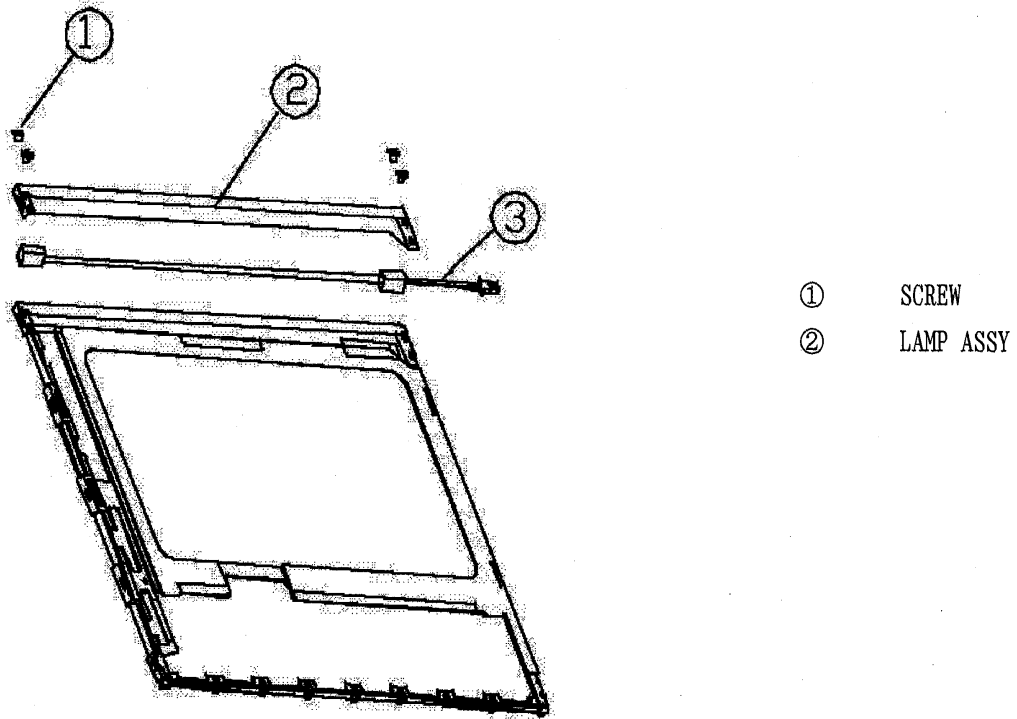


Figure 4-63 Replacing 14.1 Inch CHIMEI fluorescent lamp (7)

10. The assembly procedure is the reverse of the above disassembly procedure.

4.18.3 Replacing the 14.1 Inch XGA Samsung Fluorescent Lamp (VF2058P01)

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-64 to Figure 4-71)

1. Remove the PCB cover and tapes from the LCD module. Be careful not to damage the PCB.

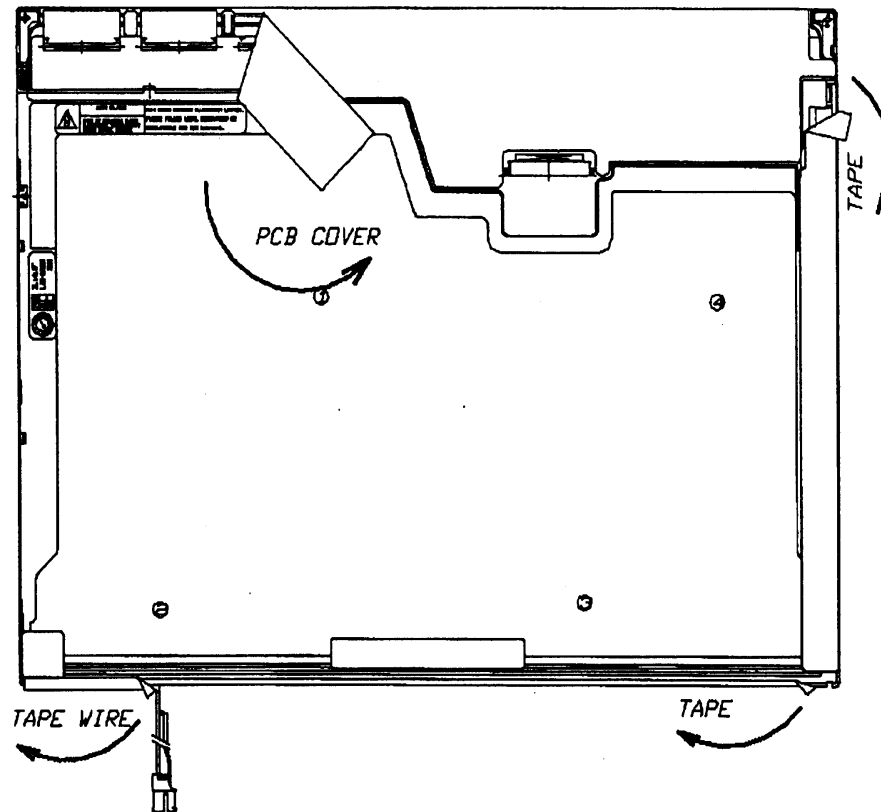


Figure 4-64 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (1)

2. Remove two screws fixing the PCB. Be careful not to damage the PCB.

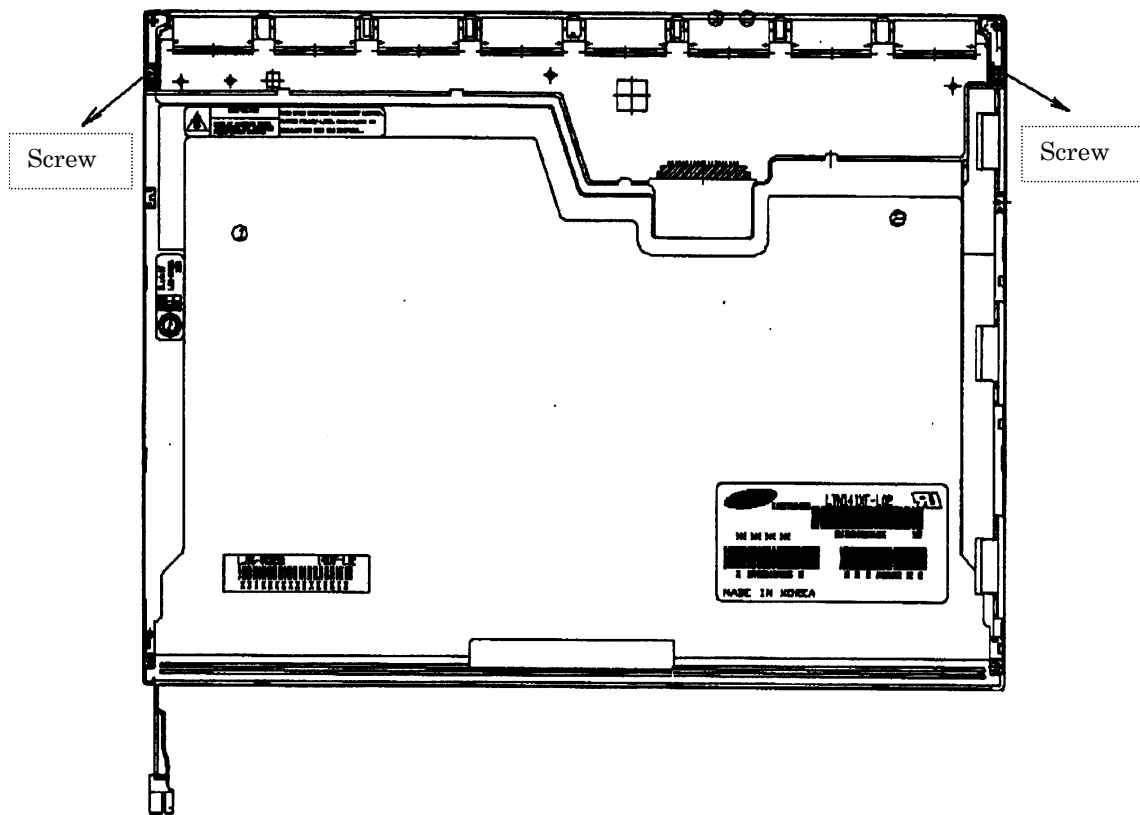


Figure 4-65 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (2)

- Remove the metal bezel from the plastic chassis by detaching the top hooks, side hooks and bottom hooks.

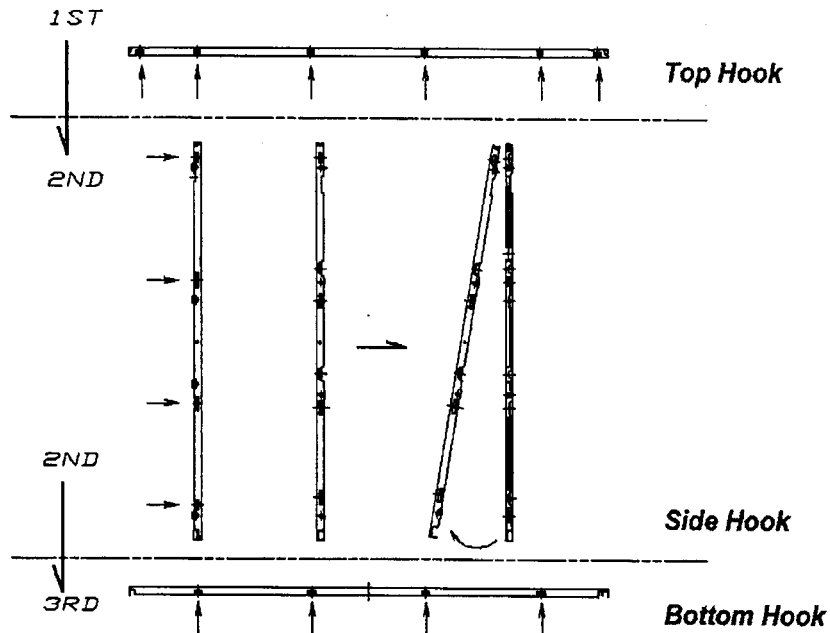


Figure 4-66 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (3)

- Remove the panel from the backlight unit. Be careful not to damage the TCP.

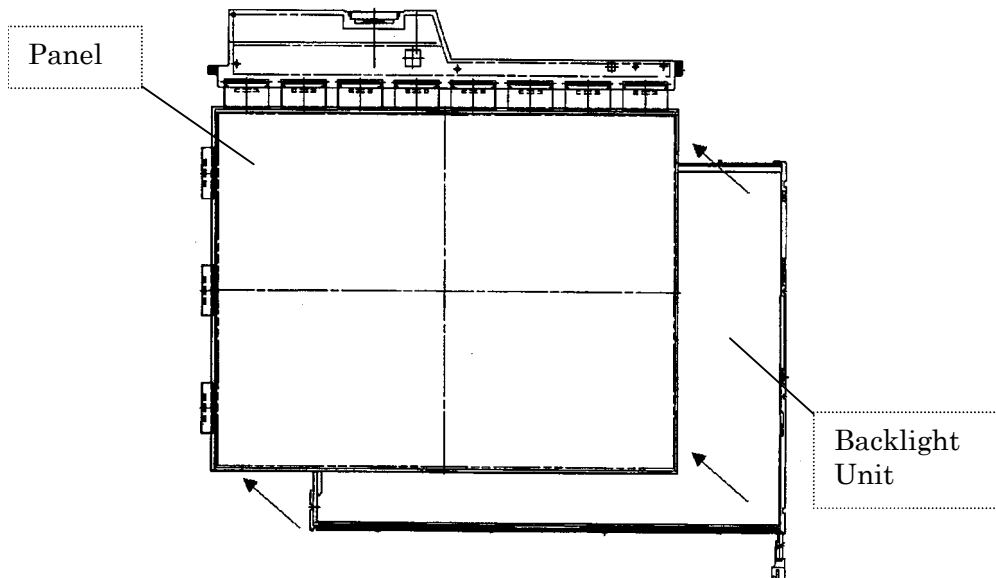


Figure 4-67 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (4)

5. Remove two clips. Remove the sheets (lens sheet, diffusion sheet, light guide and reflection sheet).

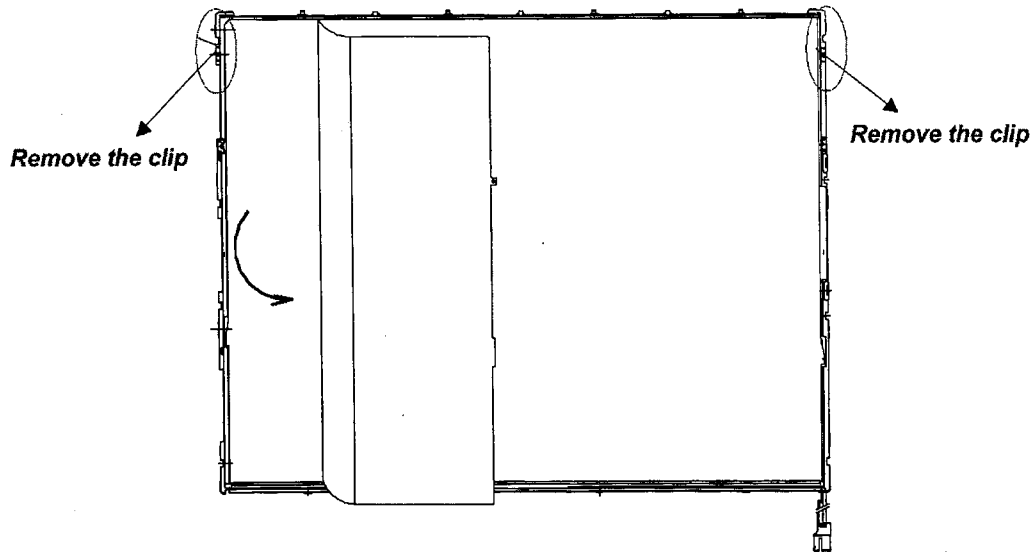


Figure 4-68 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (5)

6. Remove two screws fixing the lamp cover and remove the lamp cover.

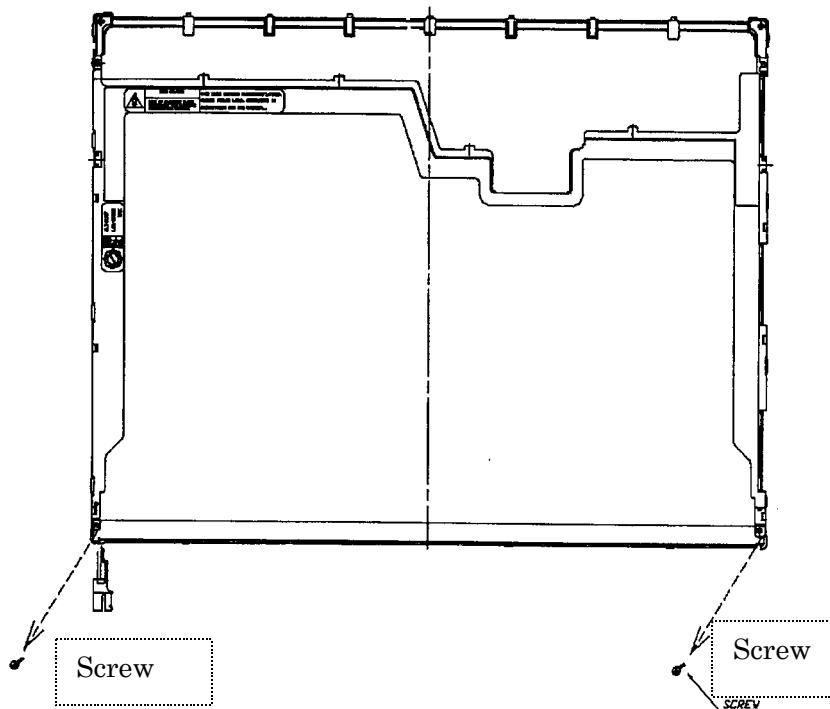


Figure 4-69 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (6)

7. Remove the GND cable of the FL lamp from the plastic chassis.

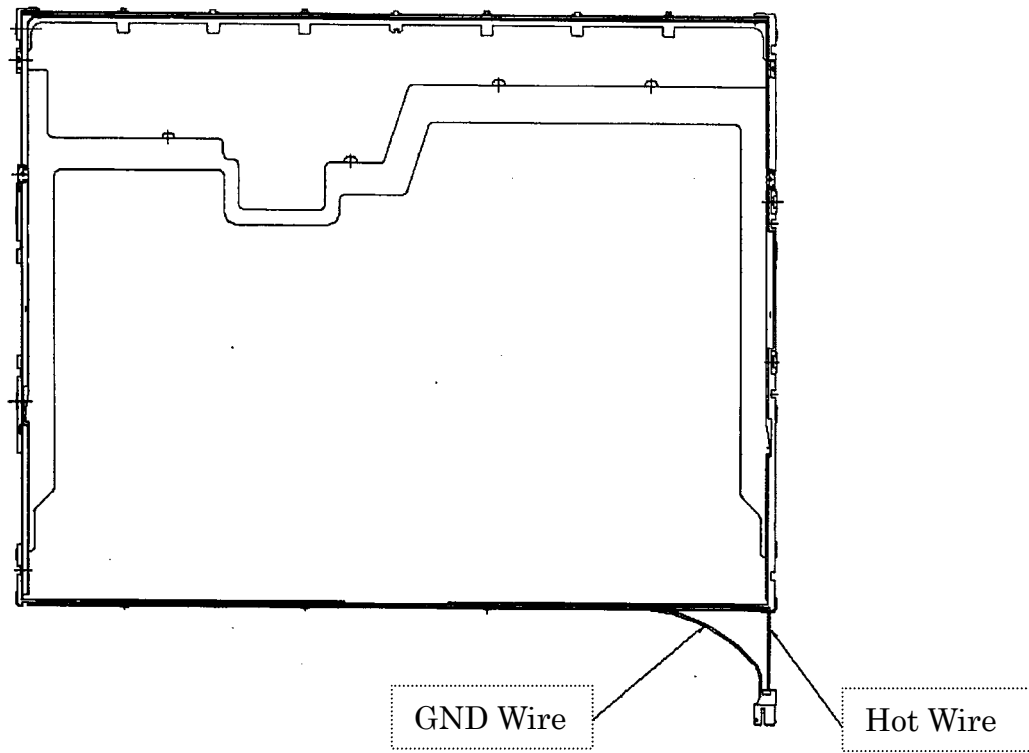


Figure 4-70 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (7)

8. Remove the lamp unit from the plastic chassis and replace the lamp with a new one.

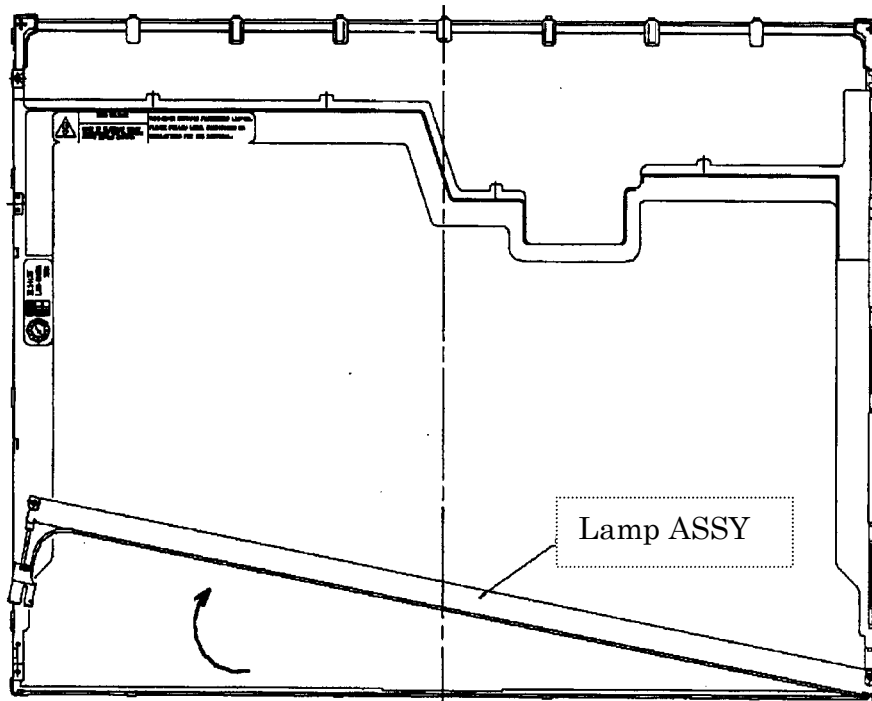


Figure 4-71 Replacing 14.1 Inch Samsung fluorescent lamp (VF2058P01) (8)

9. The assembly procedure is the reverse of the above disassembly procedure.

4.18.4 Replacing the 14.1 Inch XGA Samsung Fluorescent Lamp (VF2048P01)

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-72 to Figure 4-81).

1. Remove the PCB cover (Cover-PCB), tape fixing the FL cable (Tape-Wire) and the aluminum tape (Tape-Al).
 - 1) When removing the PCB cover, be careful not to damage the driver IC on the PCB.
 - 2) Remove the aluminum tape.
 - 3) Remove the tape fixing the FL cable.

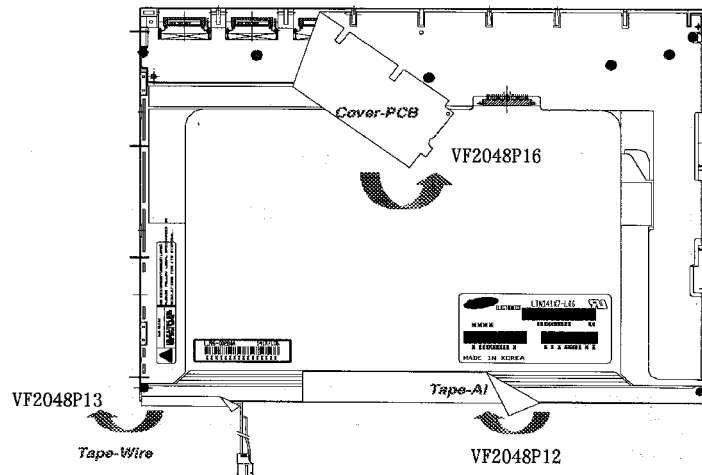


Figure 4-72 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (1)

10. Remove the five screws from the top chassis (VF2048P15:M2x2.5).

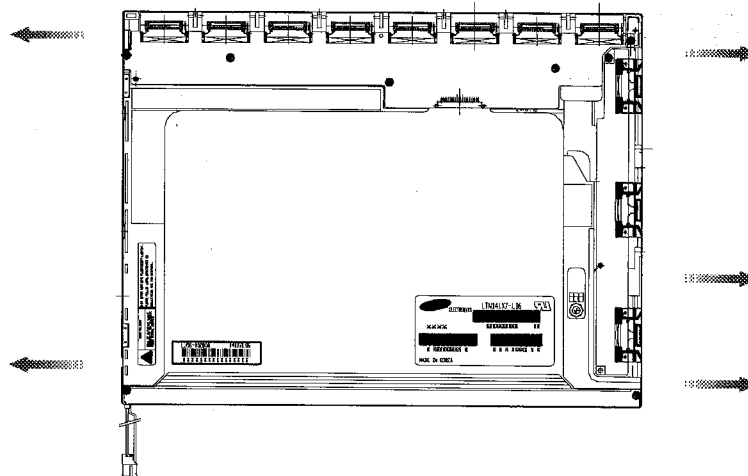


Figure 4-73 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (2)

11. Remove the top chassis

- 1) Release four hooks on the bottom side.

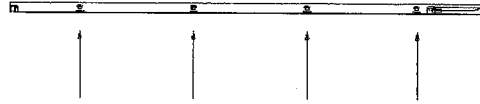


Figure 4-74 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (3)

- 2) Release the four hooks on the side.

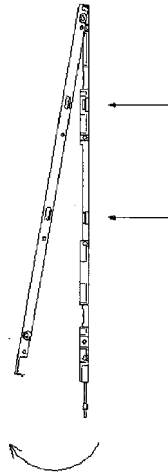


Figure 4-75 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (4)

12. Remove the following five screws (VF2048P14:M2x1.7) from the source circuit board and one screw (VF2048P15:M2x2.5) from the gate circuit board.

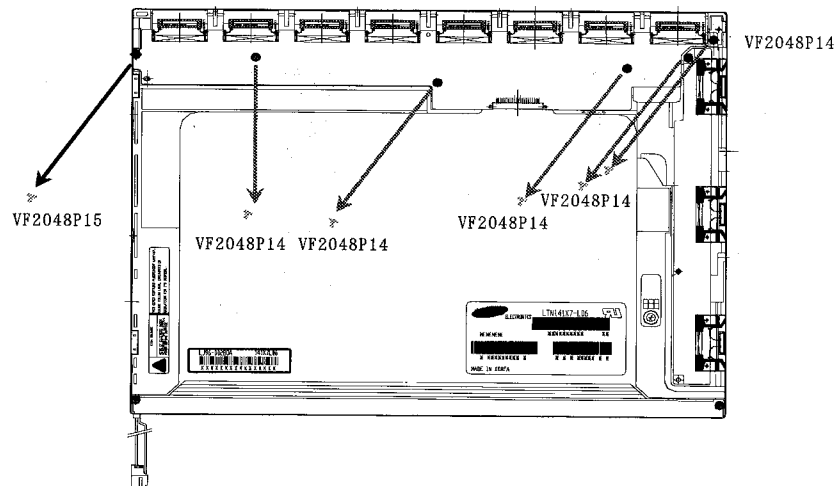


Figure 4-76 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (5)

13. Remove the panel assembly from the backlight assembly. Be careful not to scratch the TAB (TCP) and other parts.

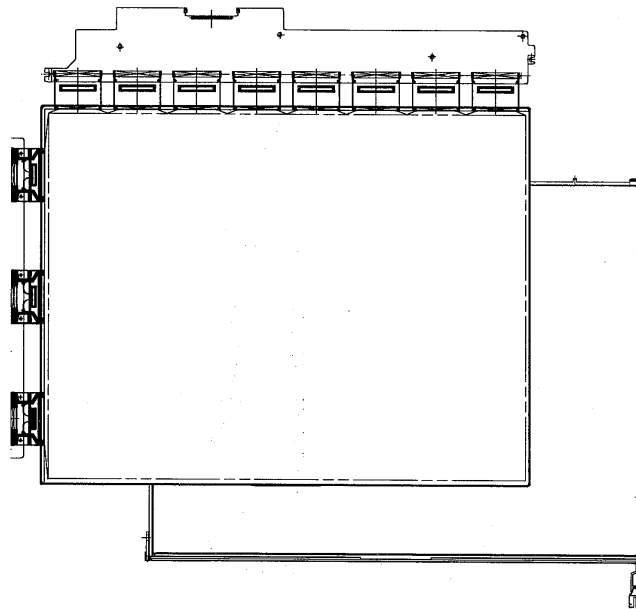


Figure 4-77 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (6)

14. Remove the sheets and clips fixing the sheet.
 - 1) Remove the two clips fixing the sheet.
 - 2) Remove the sheets (diffusion sheet, two lens sheets, diffusion sheet, light guide, and reflective sheet).

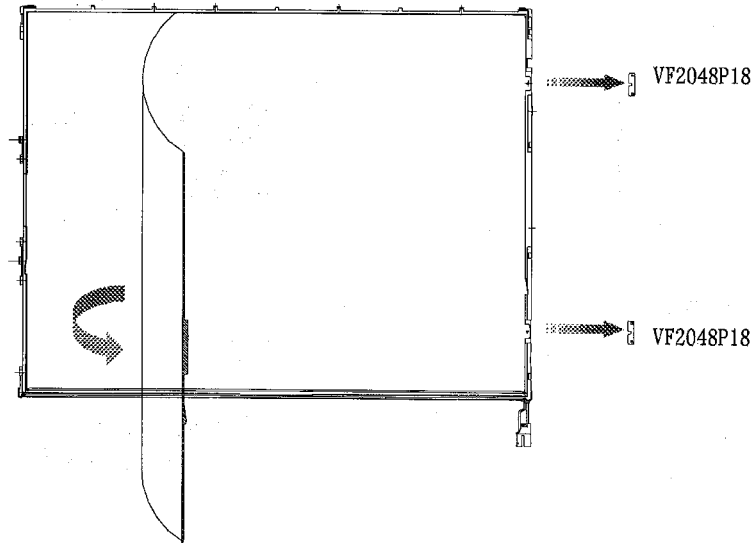


Figure 4-78 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (7)

15. Remove the lamp cover.

- 1) Remove the two screws (VF2048P15:M2x2.5) from the lamp cover.
- 2) Remove the lamp cover from the mold frame.

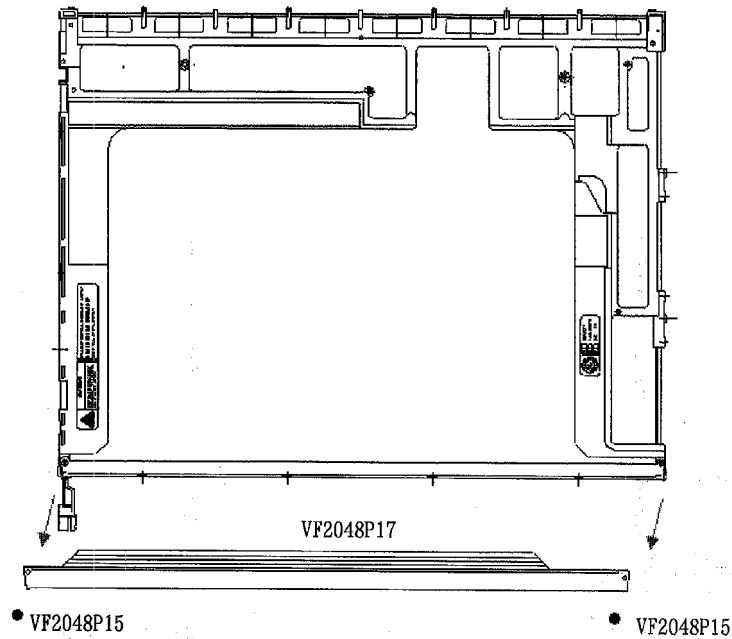


Figure 4-79 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (8)

16. Remove the FL cable GND wire (white) from the mold frame.

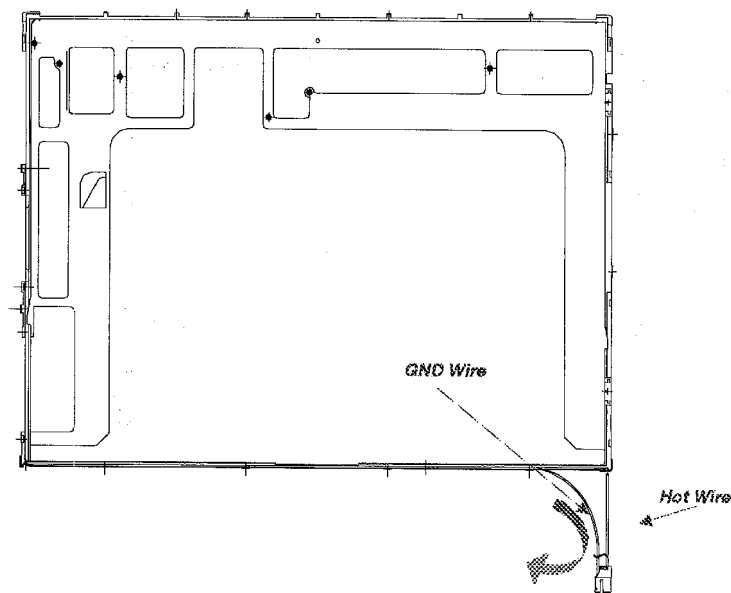


Figure 4-80 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (9)

17. Remove the lamp assembly (Lamp-Ass'y) fixed by the double-sided tape from the mold frame.

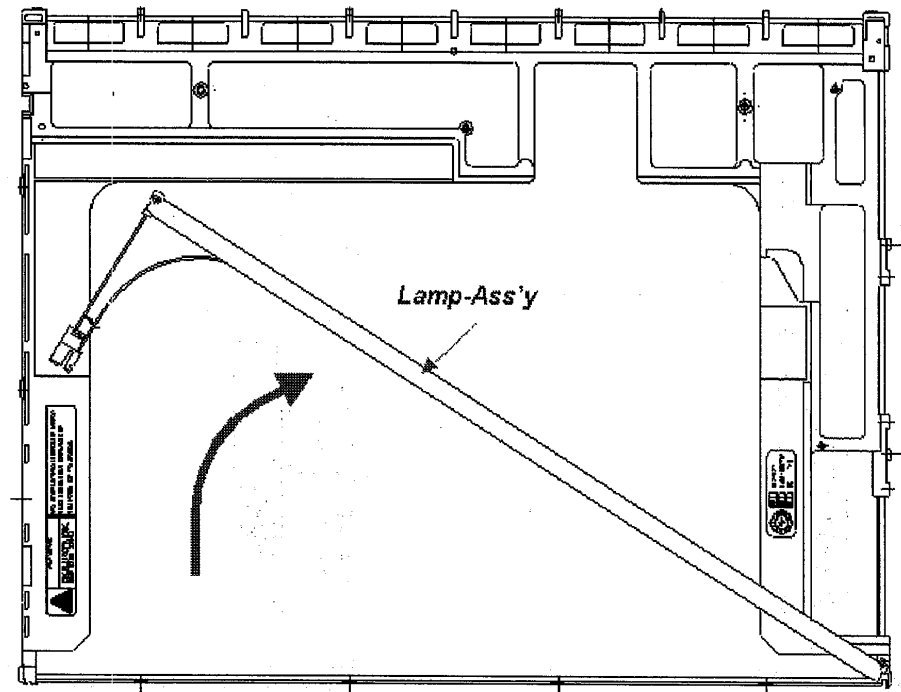


Figure 4-81 Replacing 14.1 Inch Samsung fluorescent lamp (VF2048P01) (10)

18. The assembly procedure is the reverse of the above disassembly procedure.

4.18.5 Replacing the 14.1 Inch XGA LG.Philips Fluorescent Lamp

The following describes the procedure for replacing the fluorescent lamp (See Figure 4-82 to Figure 4-89).

Removing the tape and cover shield

1. Remove the adhesive tape fixing the B/L cable (1). Be careful not to apply excessive force to the B/L cable.
2. Remove the adhesive tape (Yupo paper) fixing the top case (2).
3. Remove the cover shield (C) (3). Be careful not to apply excessive force to the LCD controller. Wear anti-static gloves as much as possible to prevent circuit damage caused by ESC.
4. Remove the cover shield (G) (4). Be careful not to apply excessive force to the TCP.
5. Remove the adhesive tape fixing the top case (5, 6). During this step, be careful not to apply excessive force to the top case.

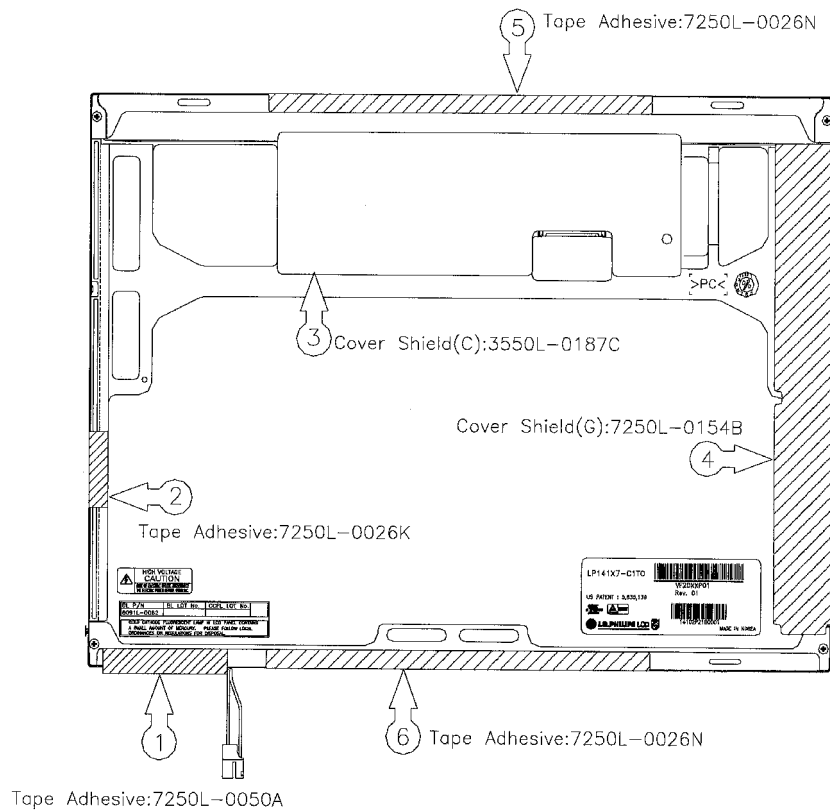


Figure 4-82 Replacing 14.1 Inch LG.Philips fluorescent lamp (1)

Removing the LCD controller, top case, and cover assembly

1. Disconnect the FPC cable from the LCD controller (Control PCB) (1). Be careful not to apply excessive force to the FPC cable.
2. Remove the LCD controller (2). Move the LCD controller to the left first.
3. Remove the top case (3). Be careful not to apply excessive force to the top case or gate TCP.
4. Remove the screws and cover assembly (Cover Ass'y) (4). Be careful not to apply excessive force to the source TCP. The screw tightening torque is 2.0kgf.cm maximum.

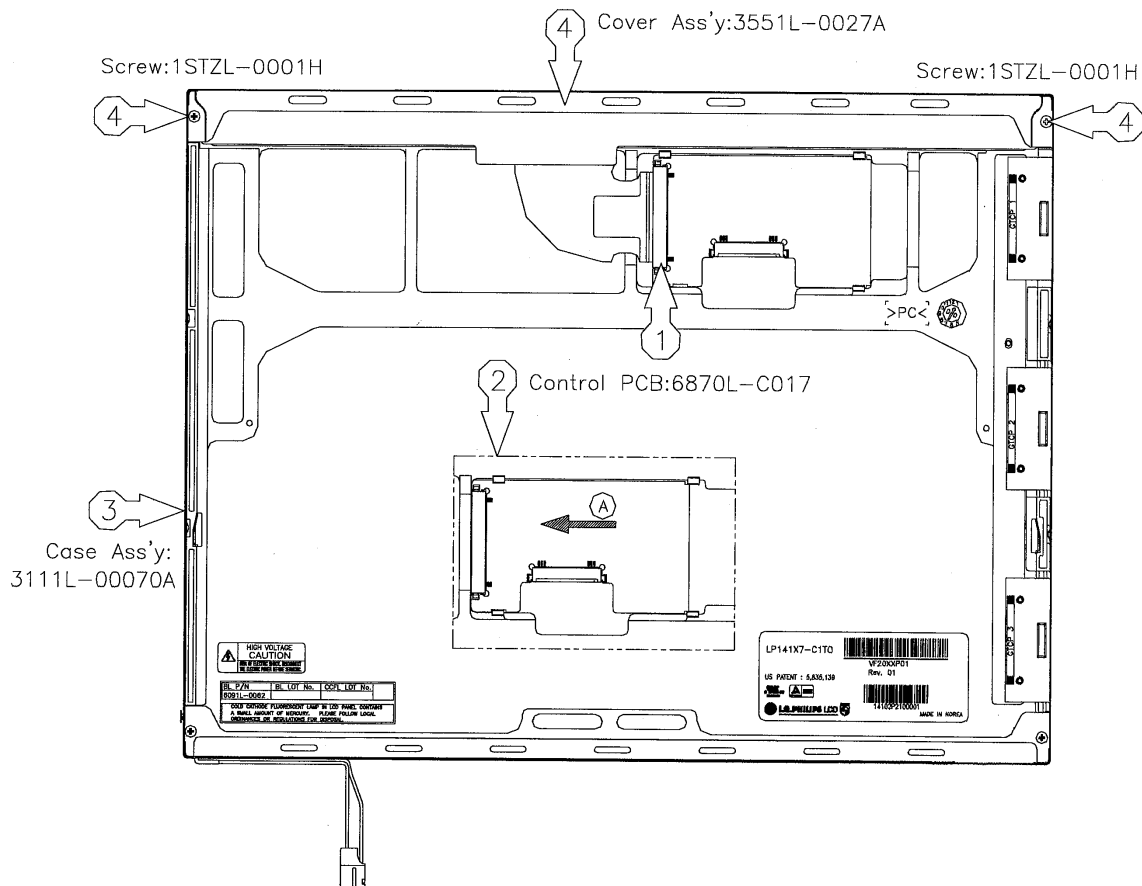


Figure 4-83 Replacing 14.1 Inch LG.Philips fluorescent lamp (2)

Removing the source PCB and the gate PCB

1. Remove the source PCB (1). Be careful not to apply excessive force to the TCP or PCB when removing the adhesive tape.
2. Remove the gate PCB (2). Be careful not to apply excessive force to the TCP or PCB when removing the adhesive tape.

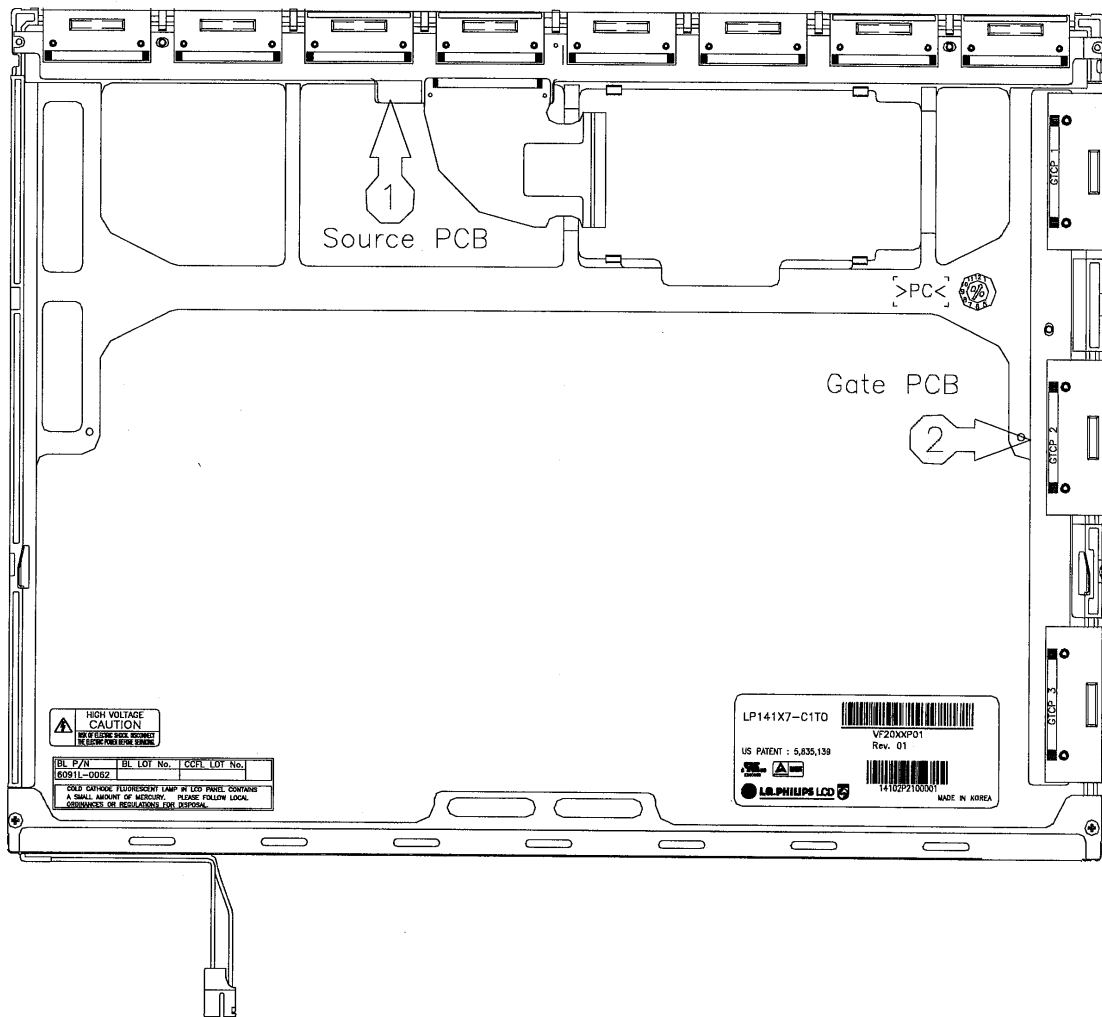


Figure 4-84 Replacing 14.1 Inch LG.Philips fluorescent lamp (3)

Removing the board assembly, tape pad, sheets, light guide, bottom cover (B), and lamp assembly

1. Remove the board assembly (Board Ass'y) (1). Perform this work in a clean room and be careful not to scratch or get dirt on the polarized plate and B/L assembly.
2. Remove the tape pad (Tape Pad) fixing the sheets (2).
3. Remove the sheets and light guide (Sheets&LGP) (3). Be careful not to scratch or get dirt on the sheets.
4. Remove the screws and bottom cover (B) (4). The screw tightening torque is 2.0kgf.cm maximum.
5. Remove the low voltage cable from the mold frame, then remove the lamp assembly from the mold frame (5). Be careful not to apply excessive force. Do not leave any dirt or double-sided tape glue on the mold frame.

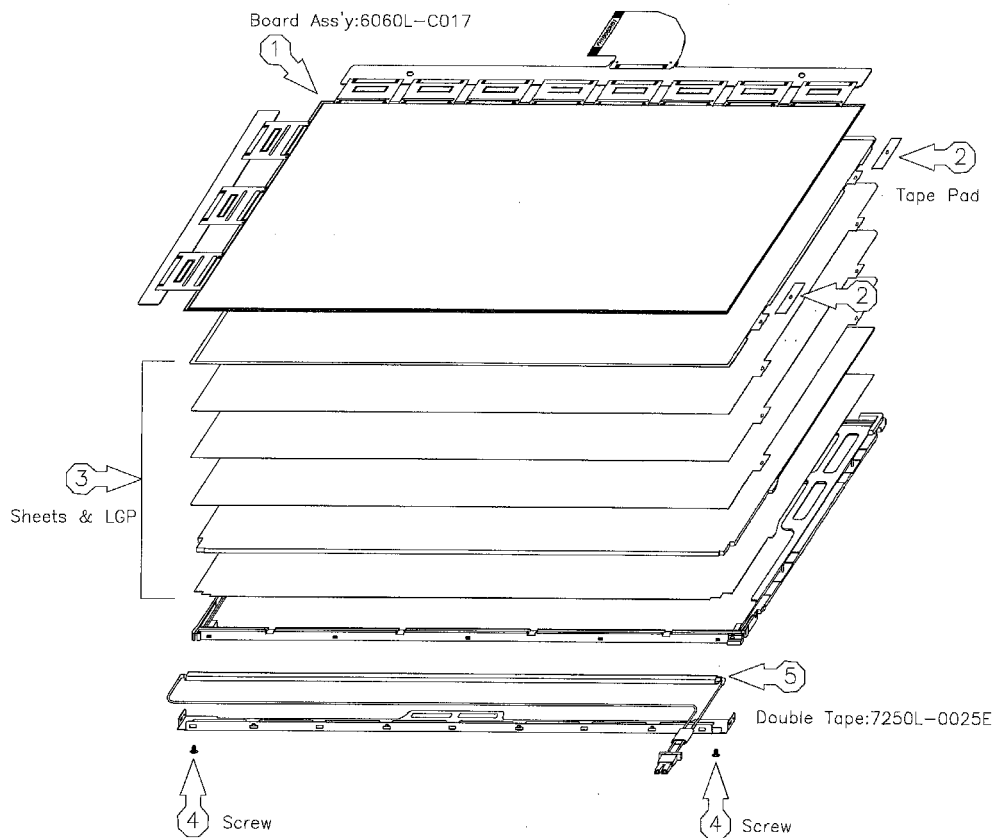


Figure 4-85 Replacing 14.1 Inch LG.Philips fluorescent lamp (4)

Installing the double-sided tape, lamp assembly, bottom cover (B), sheets, light guide, adhesive tape, and board assembly

1. Install the lamp assembly using the double-sided tape (install the lamp housing) (1).
2. Install the lamp assembly to the mold frame and connect the low voltage cable to the mold frame (2). Be careful not to apply excessive force to the cable.
3. Install the bottom cover (B) using the double-sided tape (for grounding) (3).
4. Install the Kapton tape to the main supporter (to protect the cable (G)) (4).
5. Install the bottom cover (B) and screws (5). The screw tightening torque is 2.0kgf.cm maximum.
6. Install the sheets and light guide (6). Be careful not to scratch or get dirt on the sheets.
7. Fix the sheets with the adhesive tape (7).
8. Install the board assembly (8). Be careful not to apply excessive force to the TCP or PCB.

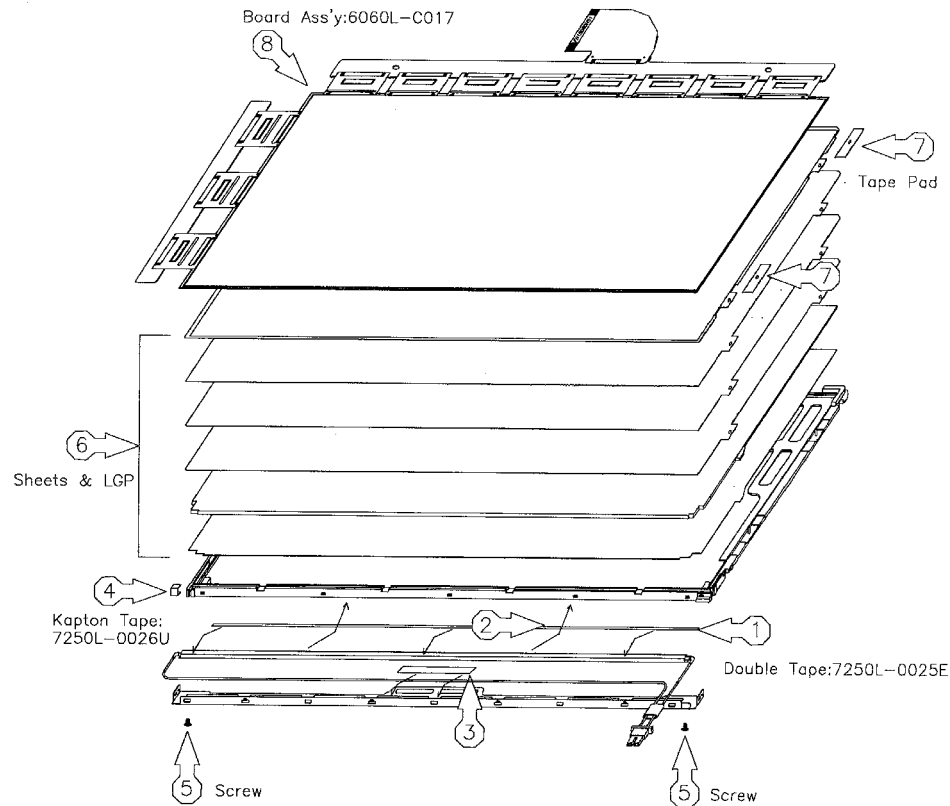


Figure 4-86 Replacing 14.1 Inch LG.Philips fluorescent lamp (5)

Installing the source PCB and the gate PCB

1. Install the source PCB (1). Be careful not to apply excessive force to the TCP.
2. Install the gate PCB (2). Be careful not to apply excessive force to the TCP.

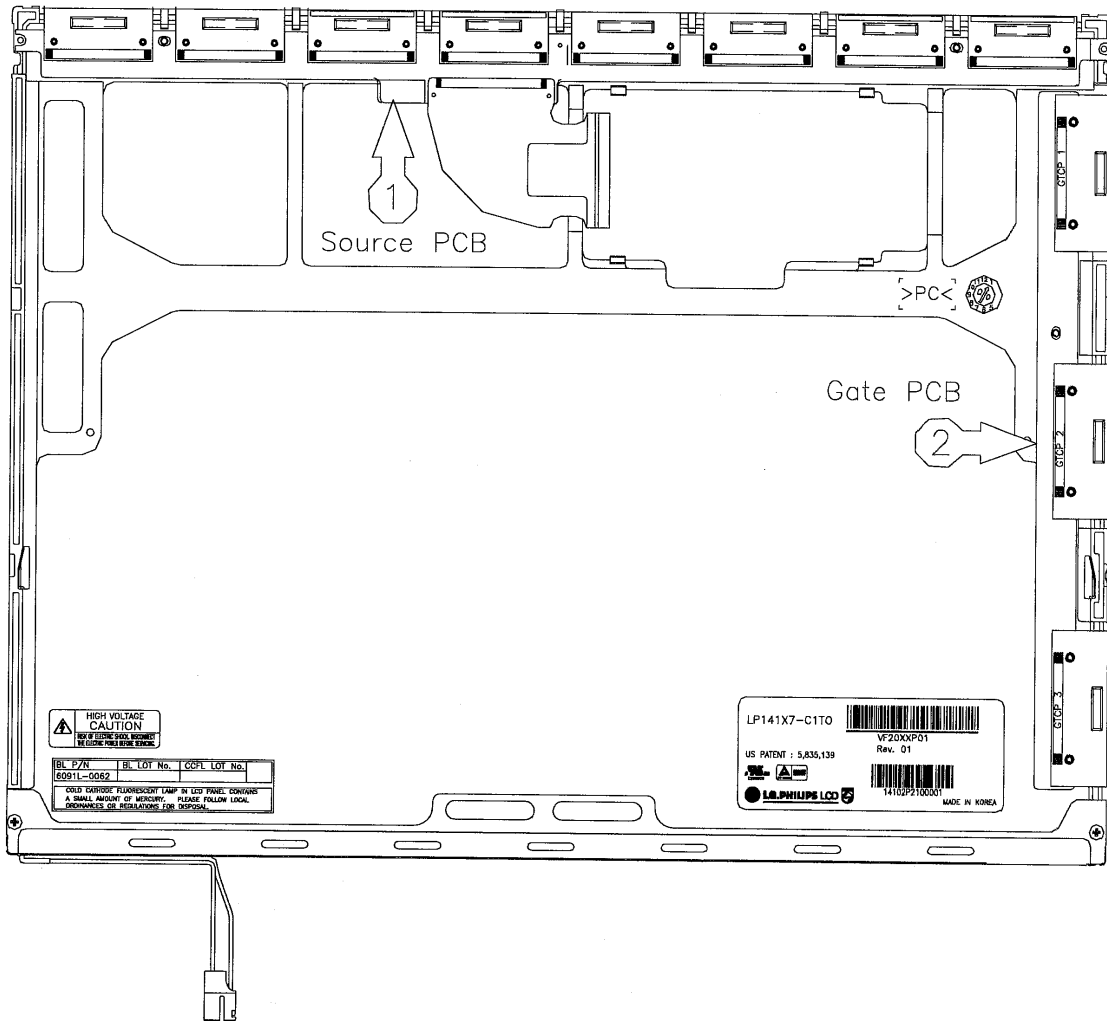


Figure 4-87 Replacing 14.1 Inch LG.Philips fluorescent lamp (6)

Installing the bottom cover (A), screws, top case, LCD controller, and FPC

1. Install the bottom cover (A) and screws (1). Be careful not to apply excessive force to the source TCP.
2. Install the top case (3). Be careful not to apply excessive force to the gate TCP (2).
3. Install the LCD controller. When installing, slide the LCD controller to the right.
4. Connect the FPC cable to the LCD controller (4). Be careful not to apply excessive force to the FPC cable.

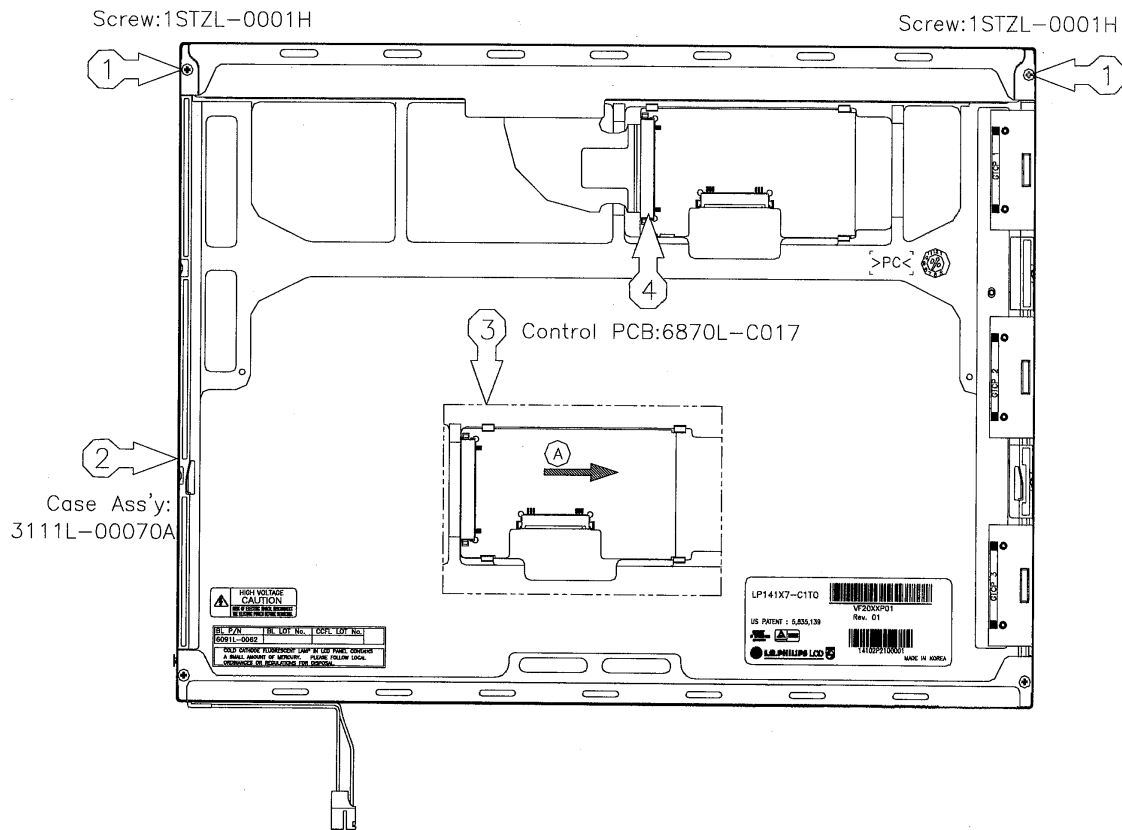


Figure 4-88 Replacing 14.1 Inch LG.Philips fluorescent lamp (7)

Installing the tape and the cover shield

1. Stick the adhesive tape for fixing the B/L cable (1). Be careful not to apply excessive force to the B/L cable.
2. Stick the adhesive tape (Yupo paper) for fixing the top case (2).
3. Remove the cover shield (C) (3). Be careful not to apply excessive force to the LCD controller. Wear anti-static gloves as much as possible to prevent circuit damage caused by ESC.
4. Install the cover shield (G) (4). Be careful not to apply excessive force to the gate TCP.
5. Stick the adhesive tape for fixing the top case (5, 6). Be careful not to apply excessive force to the top case.

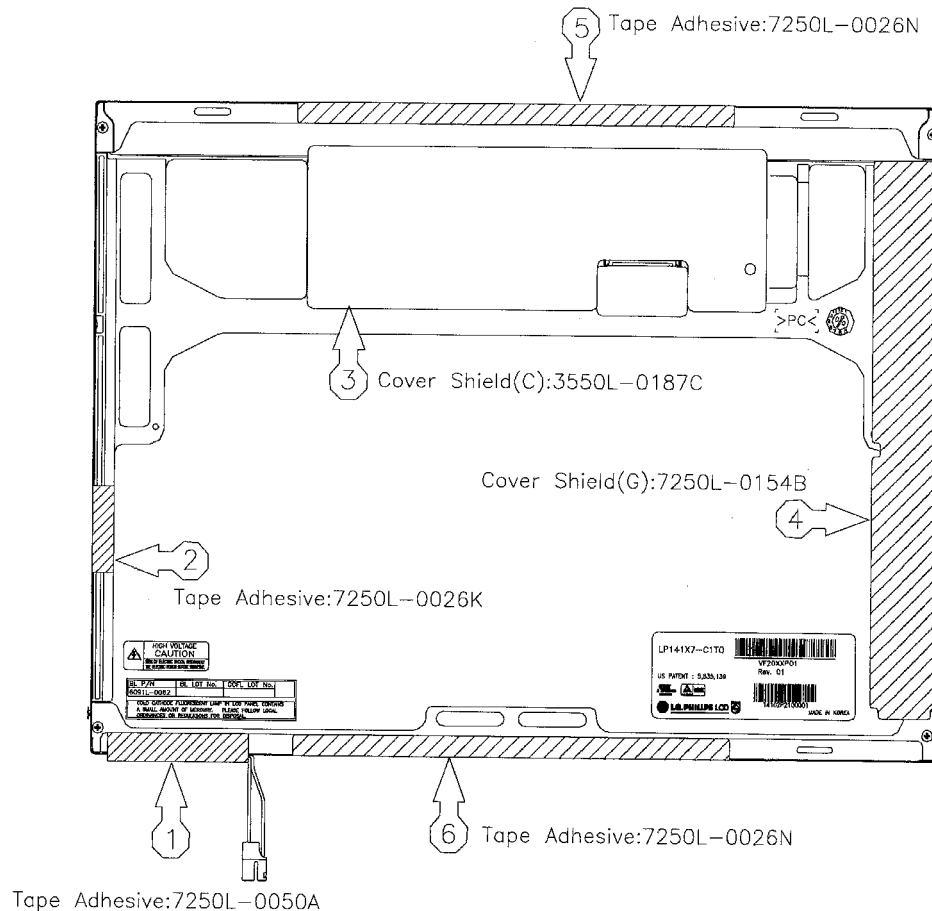


Figure 4-89 Replacing 14.1 Inch LG.Philips fluorescent lamp (8)

4.18.6 Replacing the 15.0 Inch XGA LG.Philips Fluorescent Lamp

CAUTION: When replacing the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign substance into the module.

Disassembling the 15.0 Inch XGA LG.Philips Fluorescent Lamp

To disassemble the 15.0 inch XGA LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-90 to 4-93.

1. Remove the outside tape and cover shield.
 - 1) Remove the adhesive tape fixing the B/L wire. Be careful not to apply to the B/L wire.
 - 2) Remove the cover shield (G). Be careful not to apply excessive force to the gate TCP.
 - 3) Remove the cover shield (C). Be careful not to apply excessive force to the source PCB.

CUATION: Wear anti-static gloves to prevent circuit damage caused by ESC.

- 4) Remove the tape shield and adhesive tape fixing the top tape. Be careful not to apply excessive force to the top case.

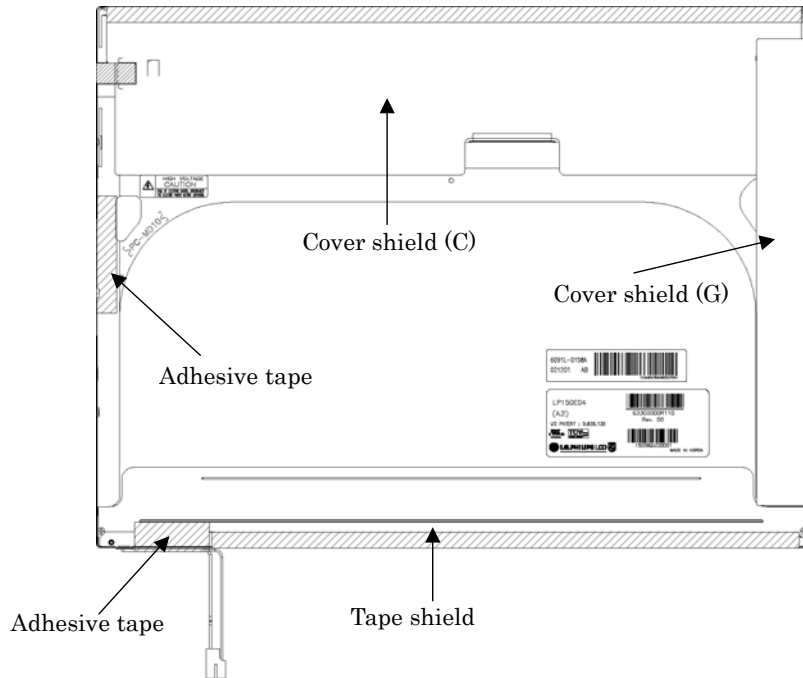


Figure 4-90 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (1)

2. Remove the top case. Be careful not to apply excessive force to the top case and gate TCP.

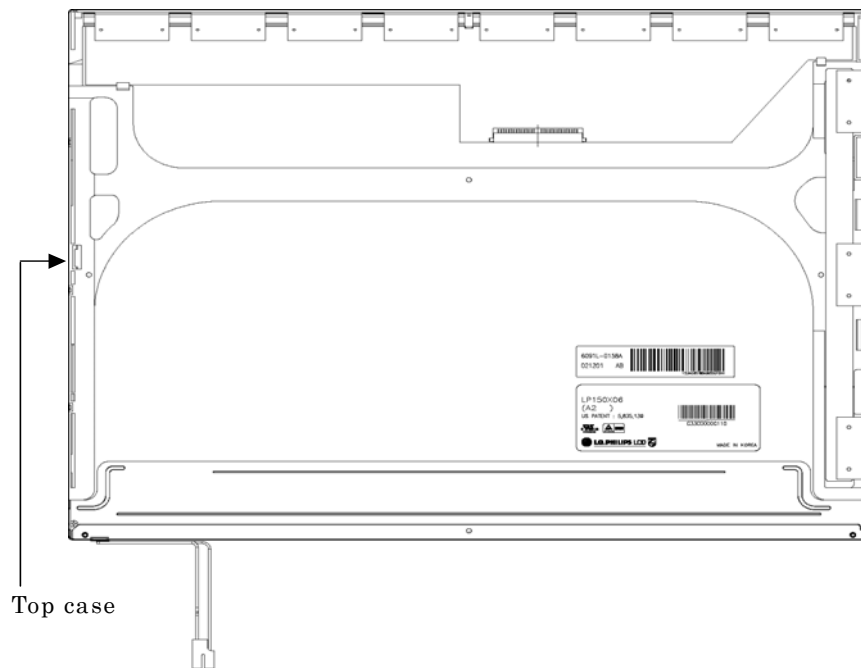


Figure 4-91 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (2)

3. Remove the source PCB and gate PCB.
 - 1) Remove the source PCB. Be careful not to apply excessive force to the PCB or TCP when removing the double-sided tape.
 - 2) Remove the gate PCB. Be careful not to apply excessive force to the PCB or TCP when removing the double-sided tape.

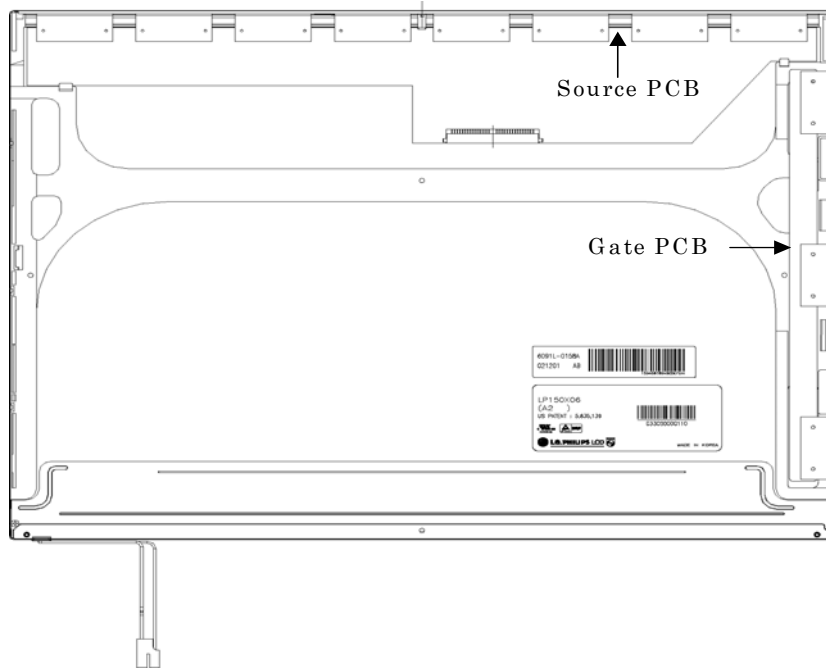


Figure 4-92 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (3)

4. Remove the board assembly, adhesive tape, light guide and cover assembly bottom (L).
 - 1) Remove the board assembly.
 - 2) Remove the adhesive tape securing the sheets (four points).
 - 3) Remove the sheets and light guide.

NOTE: No penetration of foreign object is indispensable not to scratch the sheets.

- 4) Remove the screw and cover assembly bottom (L).

NOTE: Maximum value of torque is 1.5kg•cm.

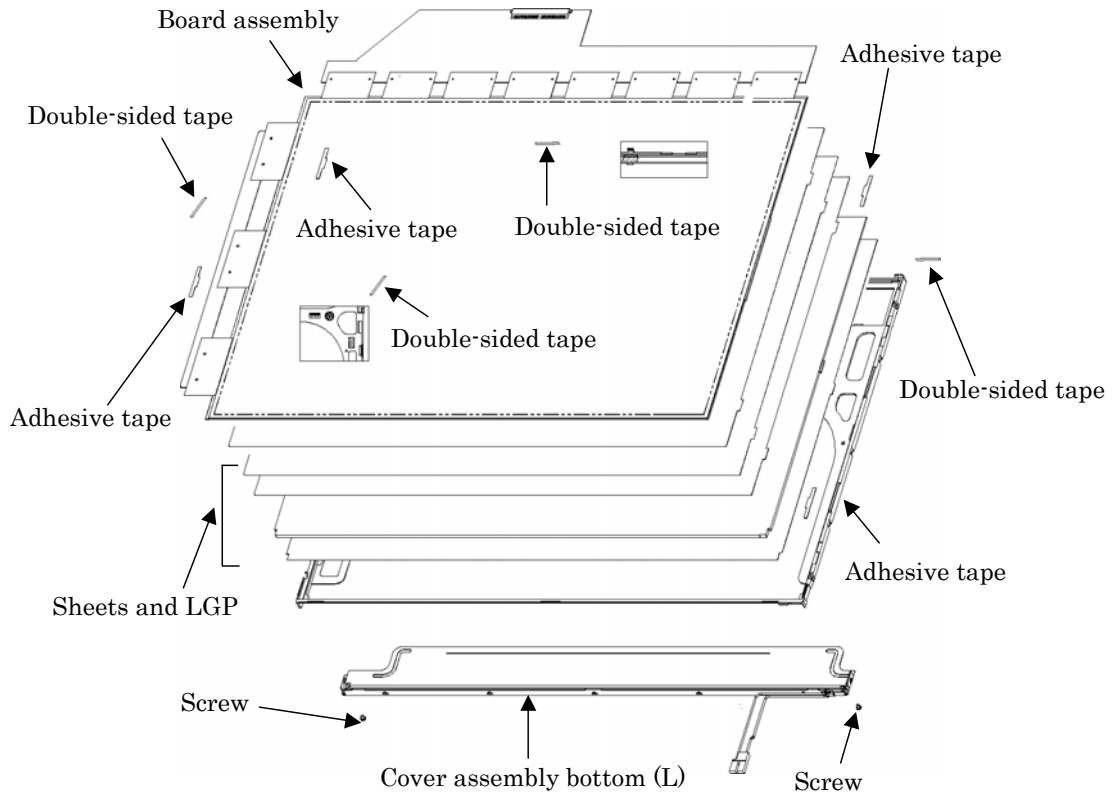


Figure 4-93 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (4)

Assembling the 15.0-inch XGA LG.Philips Fluorescent Lamp

To assemble the 15.0-inch XGA LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-94 to 4-97.

1. Install the cover assembly bottom (L), sheets, light guide, adhesive tape and board assembly.
 - 1) Remove the protect film from the cover assembly bottom (L).
 - 2) Secure the cover assembly bottom (L) with the two screws.

NOTE: Maximum value of torque is 2.0kg•cm.

- 3) Install the light guide and sheets. (Secure the reflection sheets with double-sided tape.)

NOTE: No penetration of foreign object is indispensable not to scratch the surface of the sheets.

- 4) Stick the adhesive tape to fix the sheets.
- 5) Install the board assembly. (Secure the gate PCB with double-sided tape.)

NOTE: Do not apply excessive force to the PCB and TCP.

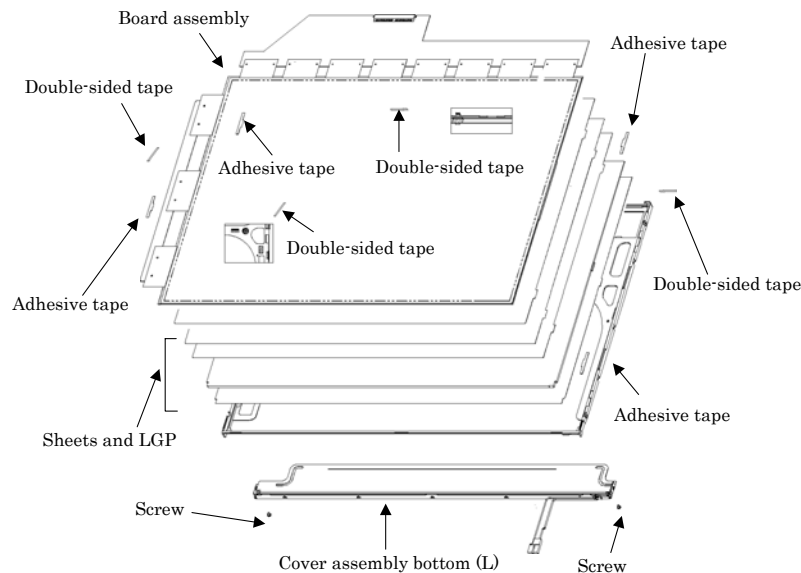


Figure 4-94 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (5)

4. Stick the outside tape and install the cover shield.

- 1) Stick the tape shield and adhesive tape to fix the top case.

NOTE: Be careful not to apply excessive force to the top case.

- 2) Install the cover shield (C).

NOTE: Be careful not to apply excessive force to the control PCB.

CAUTION: Wear anti-static gloves to prevent circuit damage to the source PCB.

- 3) Install the cover shield (G).

NOTE: Be careful not to apply excessive force to the gate TCP.

- 4) Stick the adhesive tape to fix the B/L wire.

NOTE: Be careful not to apply excessive force to the B/L wire.

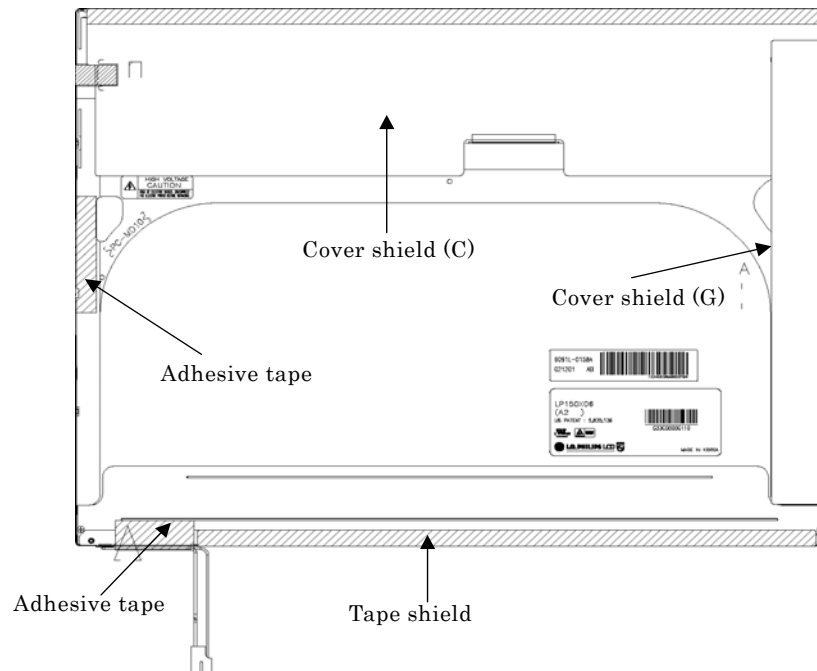


Figure 4-97 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (8)

4.18.7 Replacing the 15.0 Inch XGA Samsung Fluorescent Lamp

Disassembling the 15.0 Inch XGA Samsung Fluorescent Lamp

To disassemble the 15.0 inch XGA Samsung fluorescent lamp, follow the steps below and refer to figures 4-98 to 4-106.

1. Remove the PCB cover.

NOTE: When removing the PCB cover, be careful not to damage the COF.

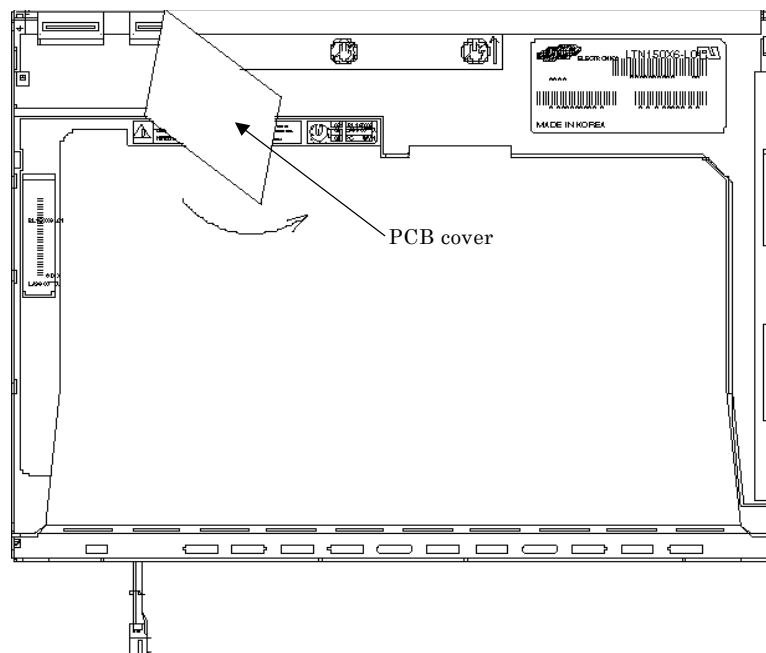


Figure 4-98 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (1)

2. Remove the two screws.

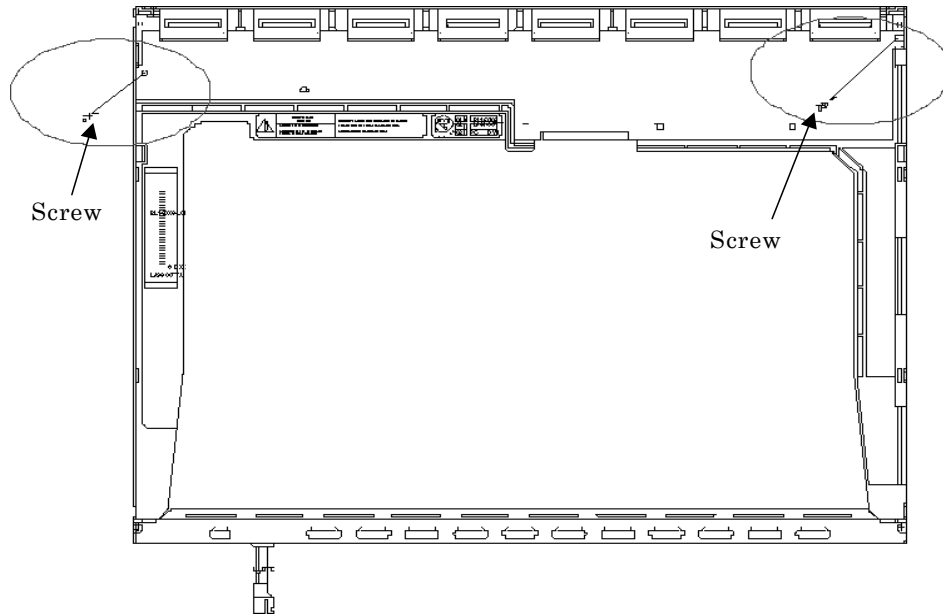


Figure 4-99 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (2)

3. Remove the four screws from the top chassis.

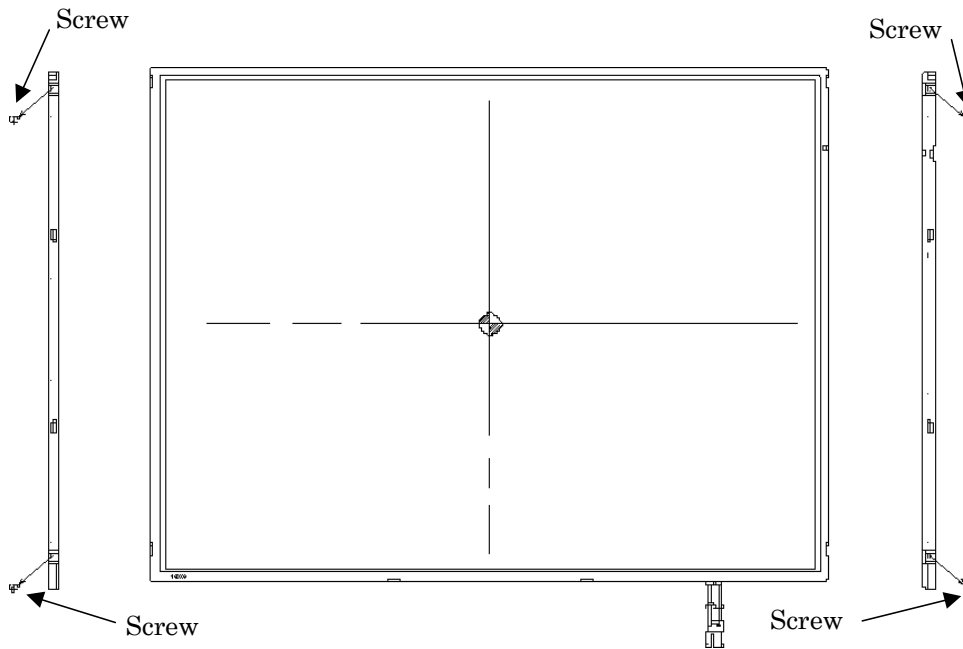


Figure 4-100 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (3)

- Remove the four bottom hooks and four side hooks (left and right). Then remove the top chassis from the mold frame.

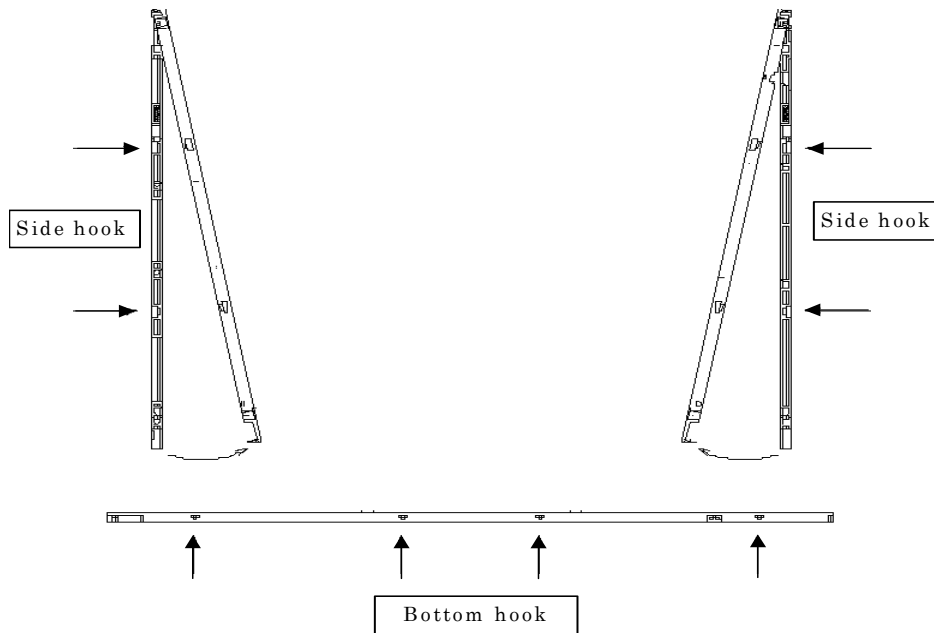


Figure 4-101 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (4)

- Remove the panel assembly from the mold frame.

NOTE: When removing the panel assembly, be careful not to damage the COF.

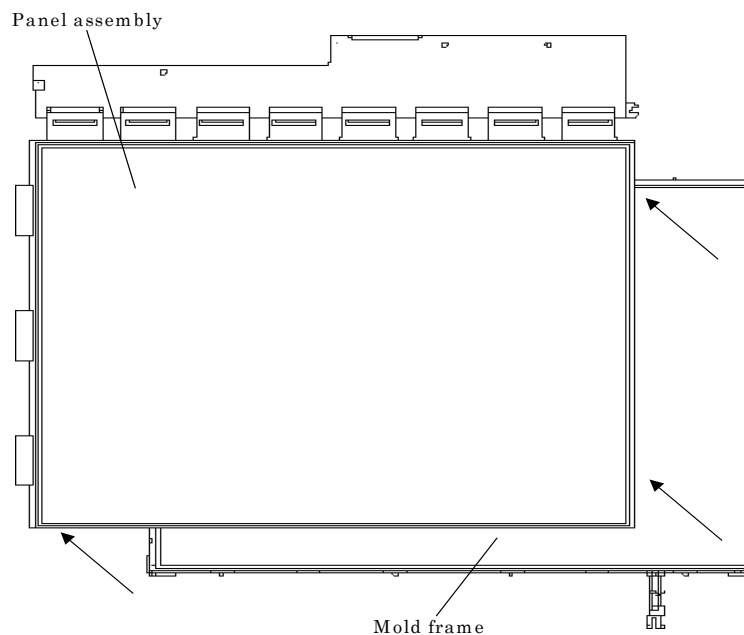


Figure 4-102 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (5)

6. Remove the sheets and clips.
 - 1) Remove the two clips fixing the sheets.
 - 2) Remove the sheets (protection sheet, prism sheet (L, U), diffusion sheet, LGP and reflection sheet).

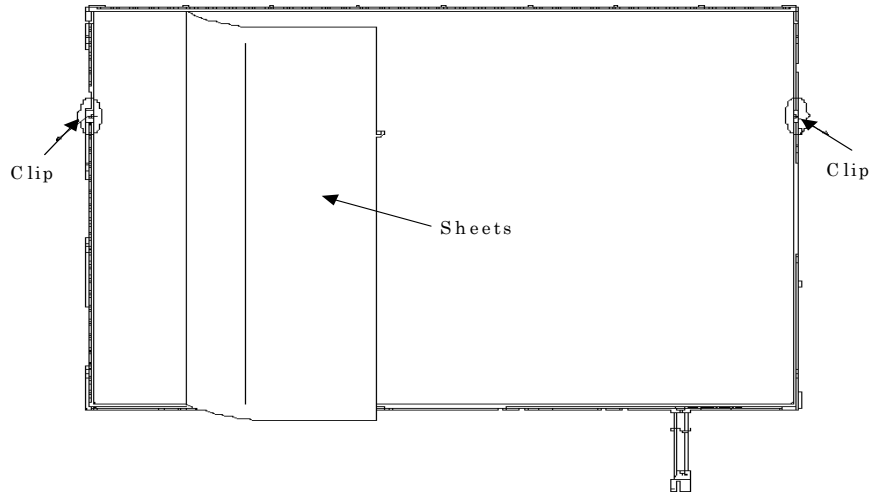


Figure 4-103 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (6)

7. Remove the lamp back cover.
 - 1) Remove the two screws from the lamp back cover.
 - 2) Remove the lamp back cover.

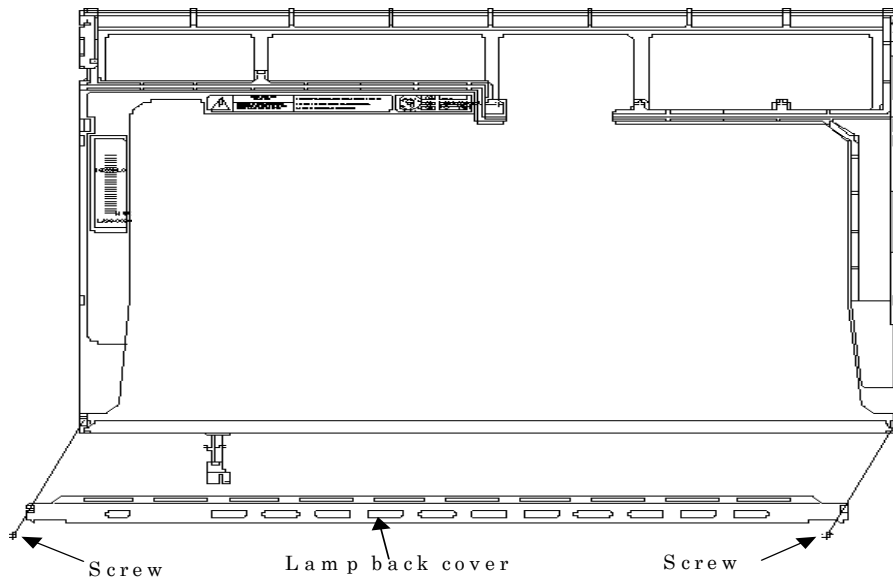


Figure 4-104 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (7)

8. Remove the lamp wire from the wire guide of the mold frame.

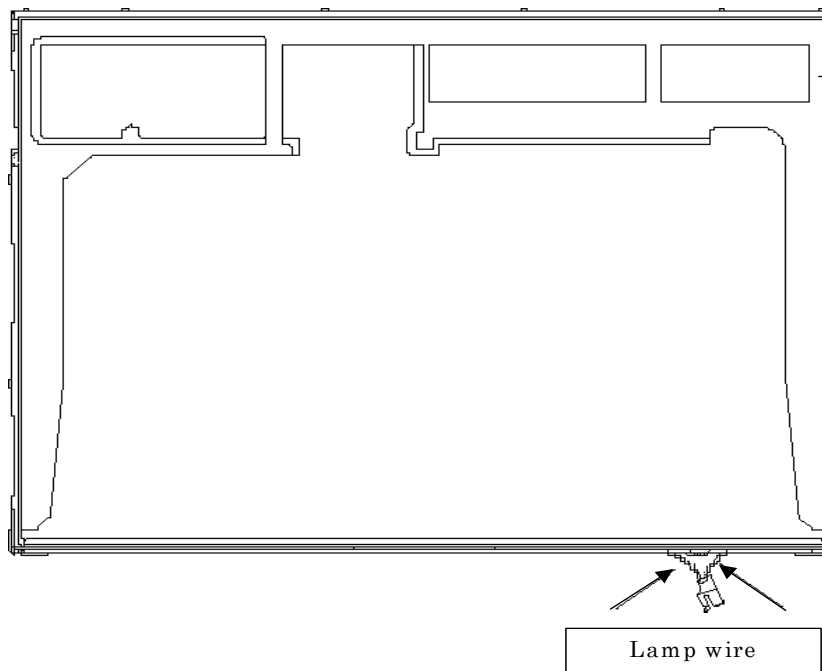


Figure 4-105 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (8)

9. Remove the lamp assembly from the mold frame.

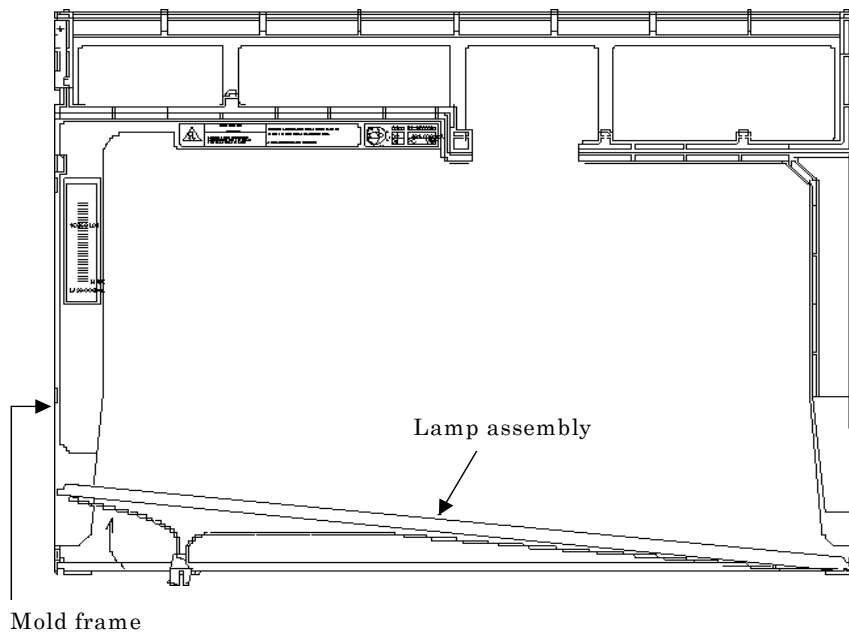


Figure 4-106 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (9)

Assembling the 15.0-inch XGA Samsung Fluorescent Lamp

The assembly procedure of the 15.0-inch XGA Samsung fluorescent lamp is the reverse of the above disassembly procedure.

4.18.8 Replacing the 15.0 Inch XGA Sharp Fluorescent Lamp

Disassembling the 15.0 Inch XGA Sharp Fluorescent Lamp

To disassemble the 15.0-inch XGA Sharp fluorescent lamp, follow the steps below and refer to figures 4-107 to 4-116.

1. Turn the LCD module face down, and remove the protection cover S (A), protection cover G (B), fixing tape (C) and fixing tape for lead wire (C).

NOTE: 1) Be careful not to damage the TCP or chips.

2) The protection cover G is reused. Discard the other tapes removed.

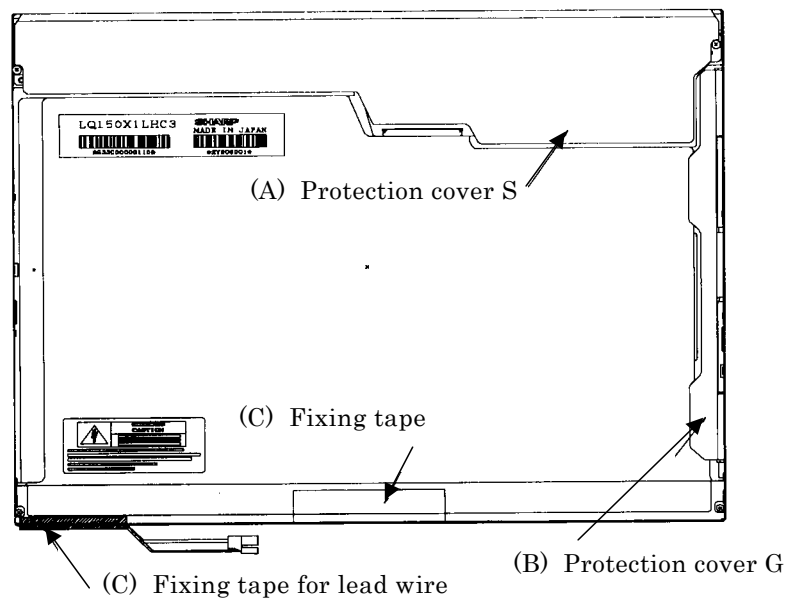


Figure 4-107 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (1)

- Remove the four screws on the sides.

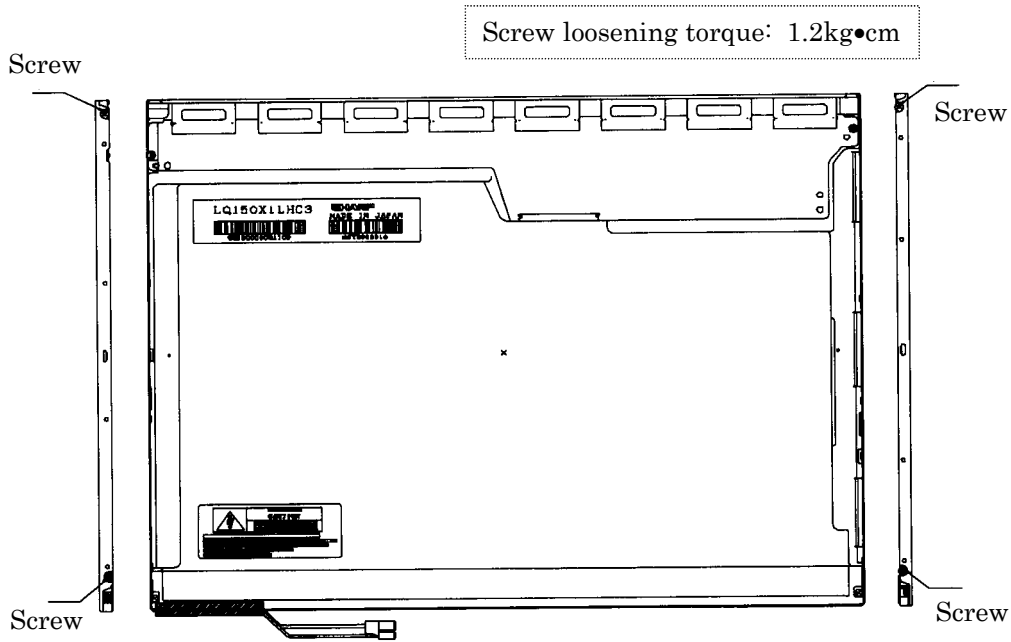


Figure 4-108 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (2)

- Turn the LCD module face up and remove the bezel (E).

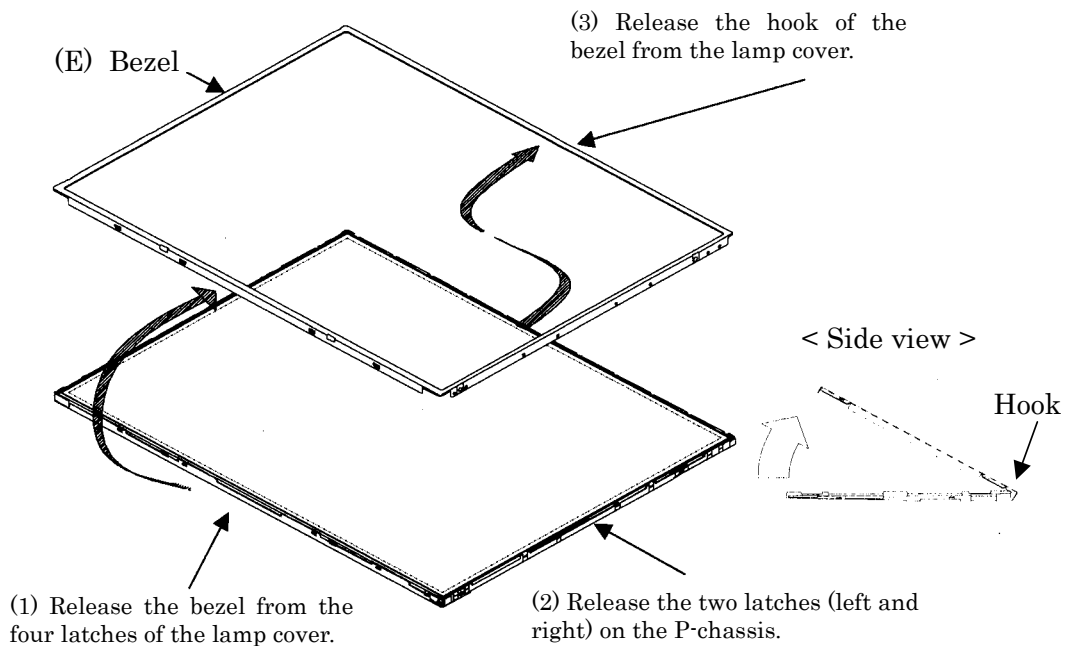


Figure 4-109 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (3)

4. Turn the LCD module face down and remove the two screws fixing the board. Then open the bent portion of the TCP of the board and remove the backlight.

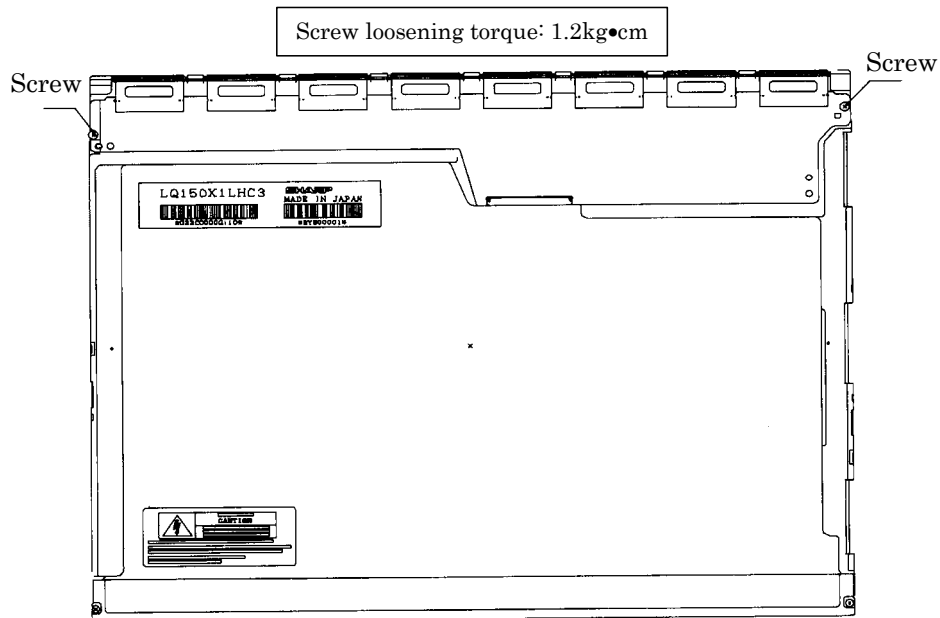


Figure 4-110 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (4)

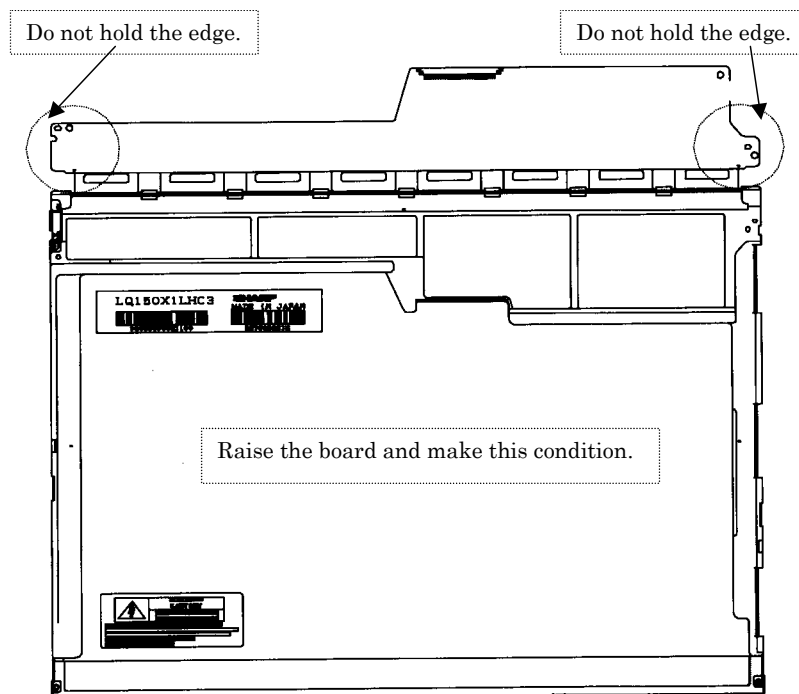


Figure 4-111 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (5)

5. Turn the LCD module face up and remove the LCD panel (I) from the backlight unit (H).

CAUTION: Wear finger sacks or gloves during the work not to soil or scratch the LCD panel or backlight unit.

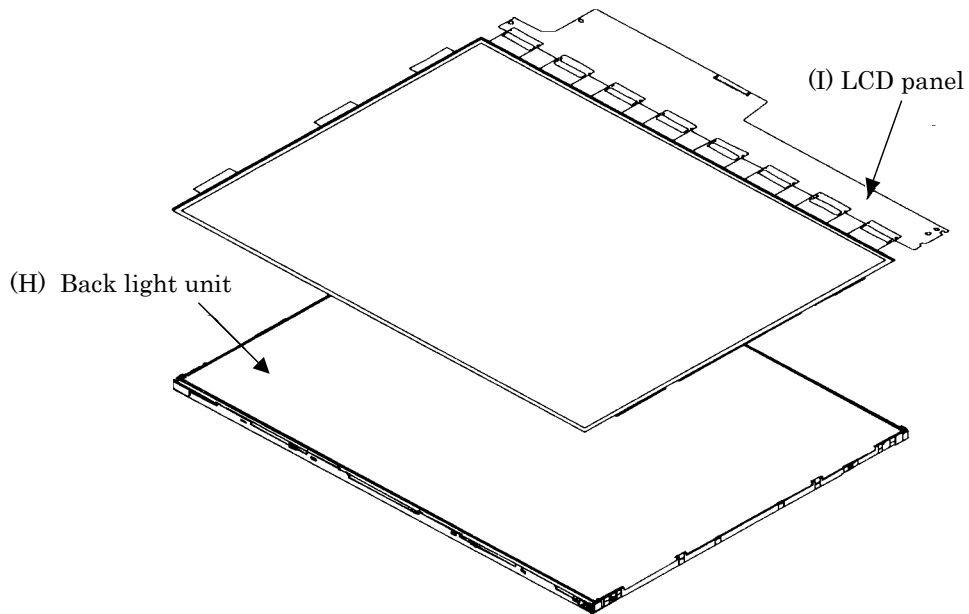


Figure 4-112 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (6)

- Turn the backlight unit (H) removed face down and remove the two screws (D) and lamp cover (J).

NOTE: Be careful not to scratch or soil the sheets.

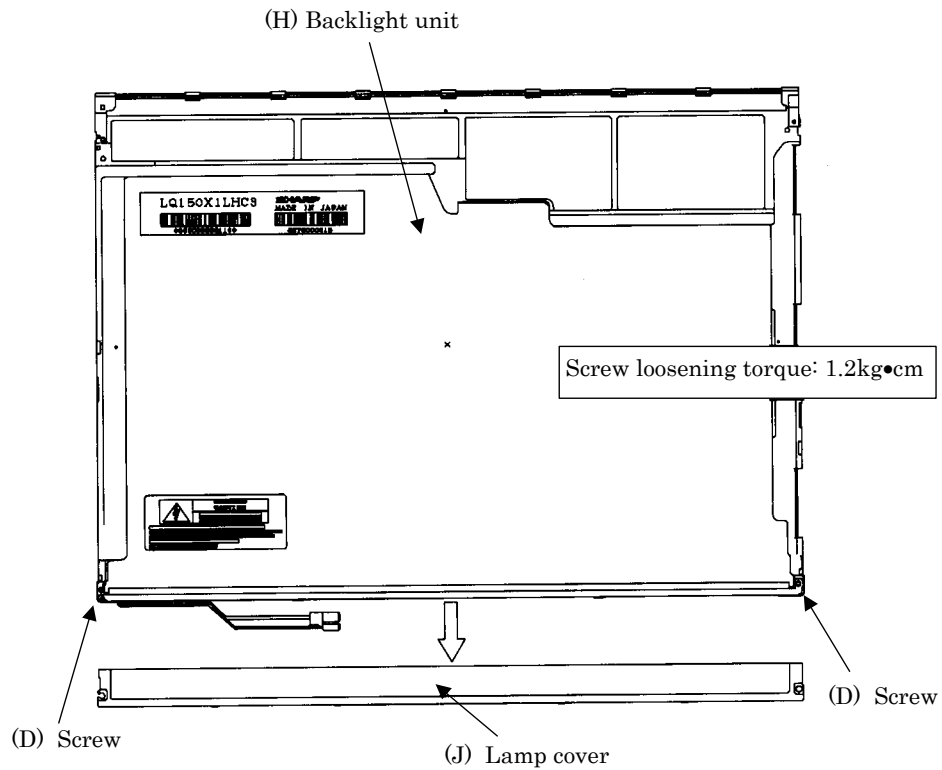


Figure 4-113 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (7)

- Turn the backlight unit face up and remove the upper diffusion sheet (K), lens sheet (L) and light guide (M).

NOTE: Be careful not to scratch or soil the removed sheets or light guide to reuse them.

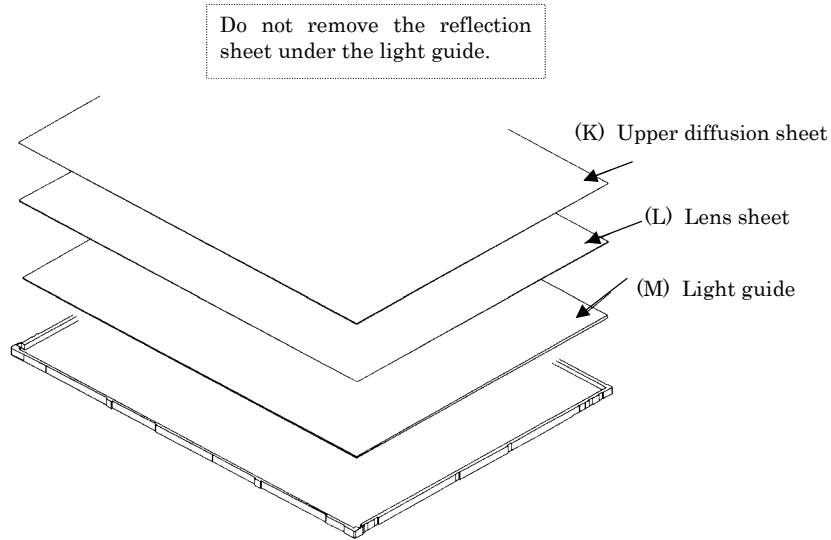


Figure 4-114 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (8)

- Remove the four double-sided tapes (N, O, P, Q).

NOTE: Discard the removed tapes. Do not reuse them.

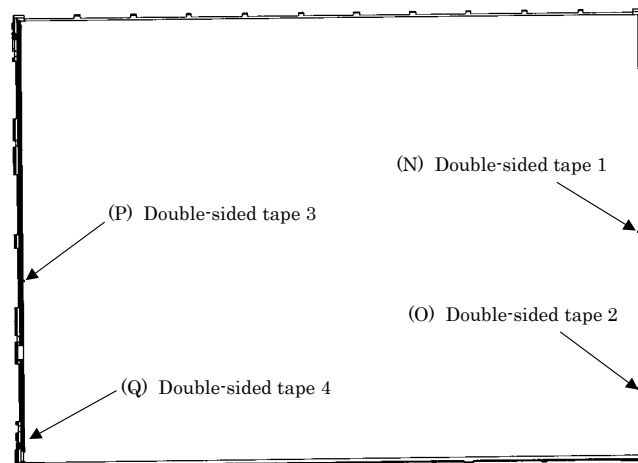


Figure 4-115 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (9)

9. Turn the backlight unit face down and remove the lamp unit (R) from the P-chassis.

CAUTION: When removing the lamp unit, be careful not to break the lamp, or bend the reflection sheet.

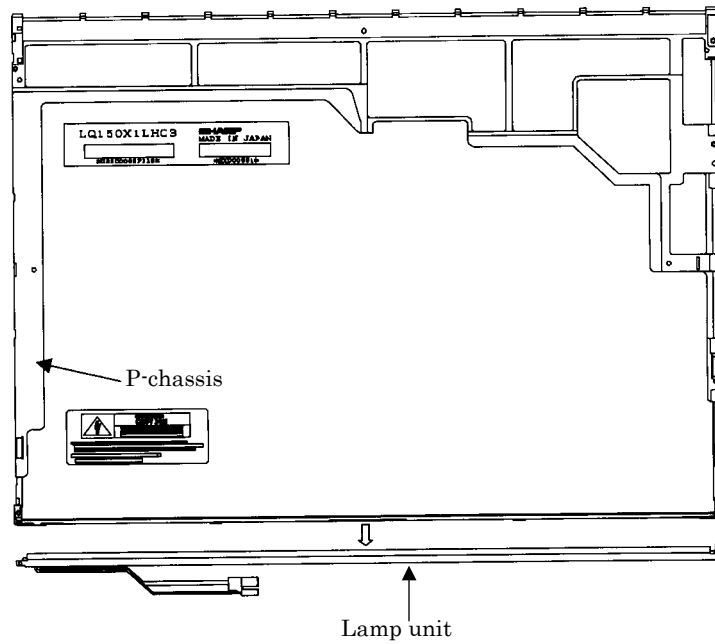


Figure 4-116 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (10)

Assembling the 15.0 Inch XGA Sharp Fluorescent Lamp

To assemble the 15.0 Inch Sharp XGA fluorescent lamp, follow the steps below and refer to figures 4-117 to 4-129.

1. Stick the four double-sided tapes (N, O, P, Q) on the P-chassis.

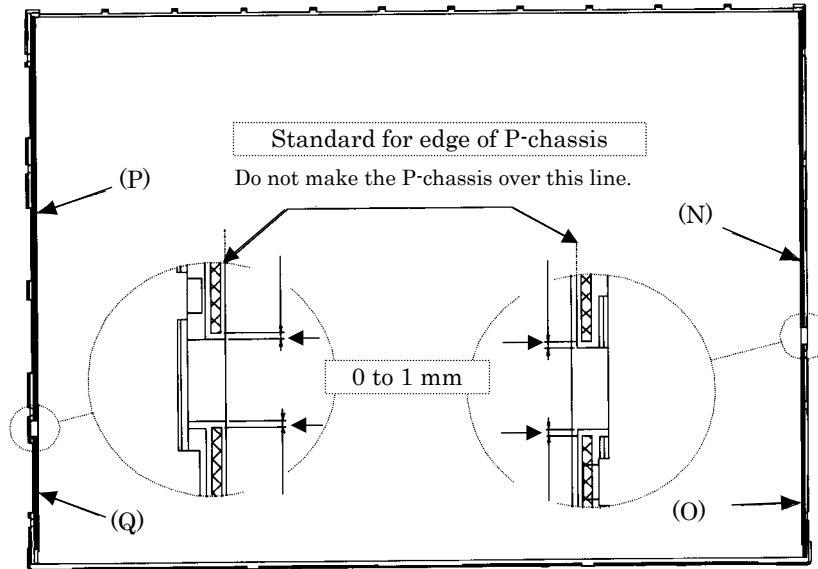


Figure 4-117 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (11)

- Turn the backlight unit face down and install a new lamp unit (R) on the P-chassis.

NOTE: When install the lamp unit (R), be careful not to bend or damage the reflection sheet.

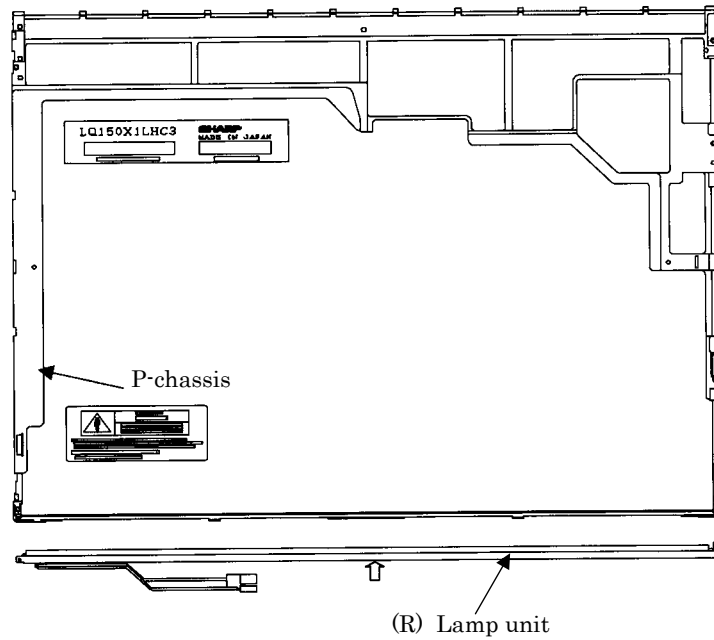
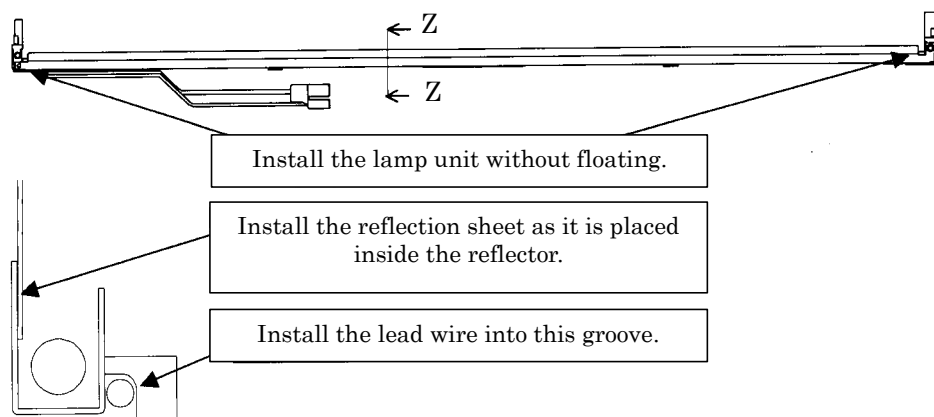


Figure 4-118 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (12)



Cross-section drawing of Z-Z

Figure 4-119 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (13)

3. Install the lamp cover (J) on the backlight unit and secure it with the two screws (D).

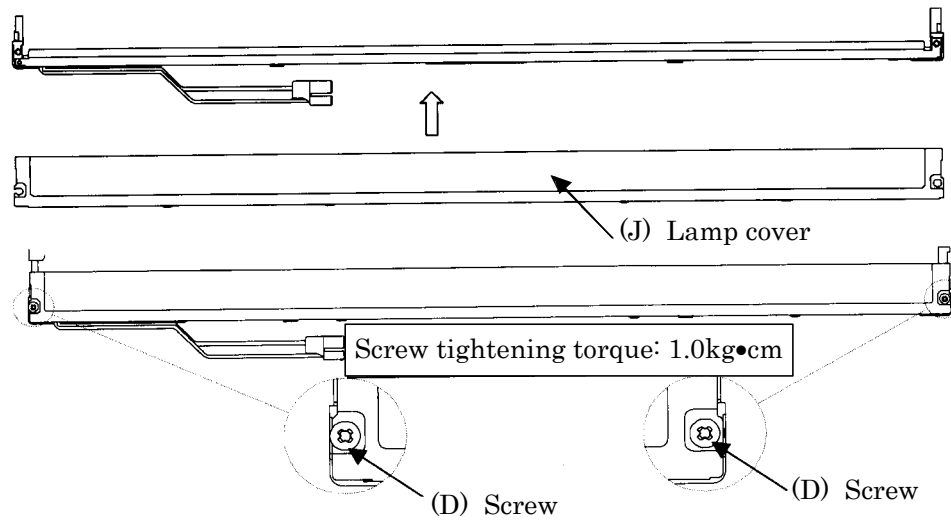


Figure 4-120 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (14)

4. Install the light guide (M) on the backlight unit.

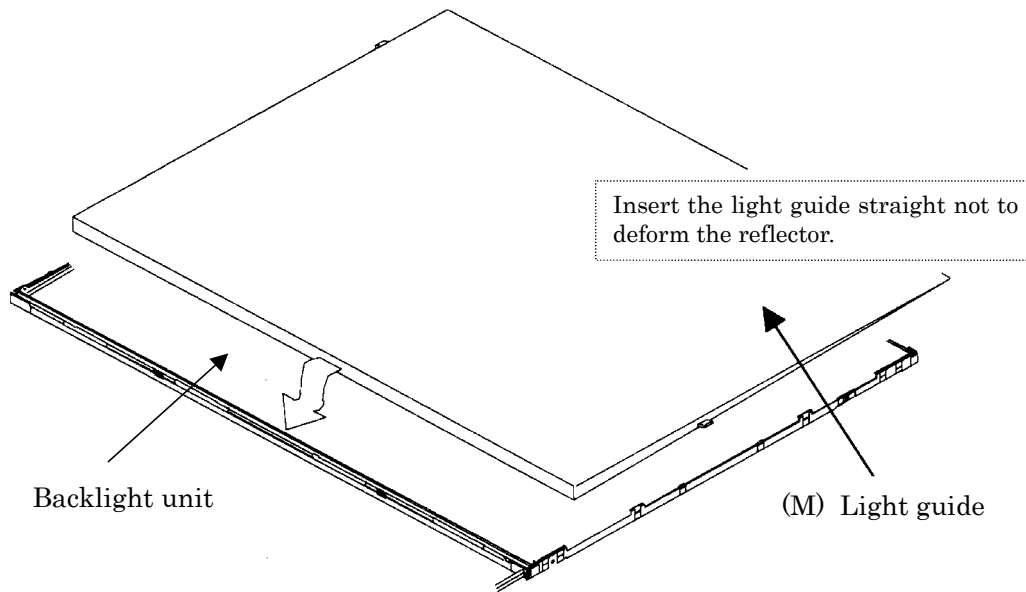


Figure 4-121 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (15)

- Place the lens sheet (L) and upper diffusion sheet (K) on the backlight unit with light guide.

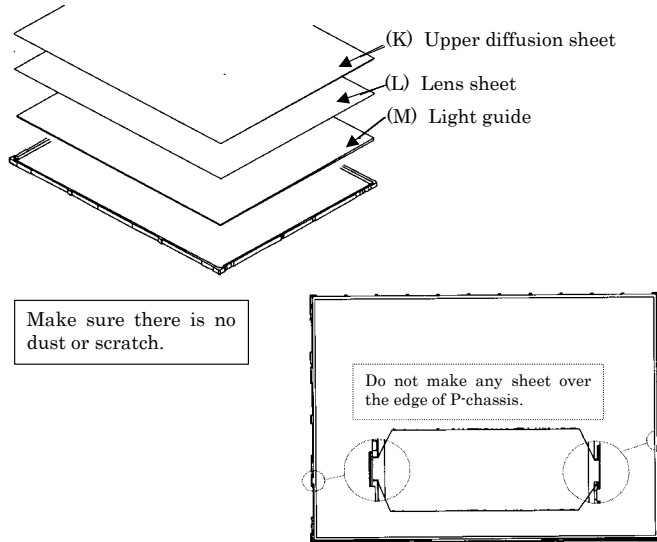


Figure 4-122 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (16)

- Place the LCD panel (I) on the backlight unit (H).

NOTE: Make sure there is no dust between the LCD panel and backlight unit. If any dust is found, remove it with crepe tape or others which has no remaining of paste.

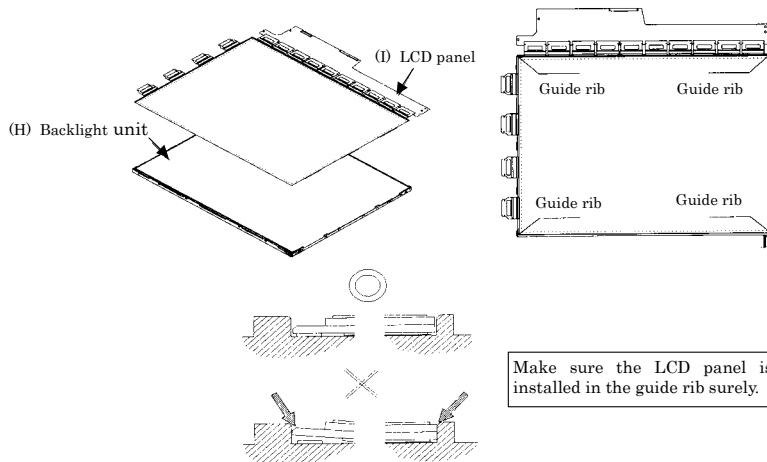


Figure 4-123 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (17)

7. Bend the TCP attaching to the source board and secure it with the two screws.

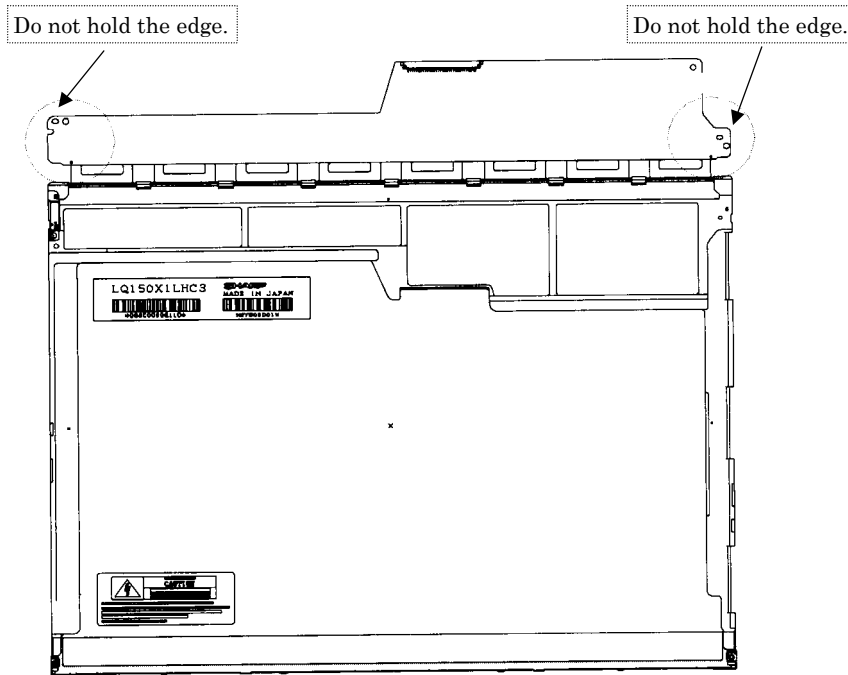


Figure 4-124 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (18)

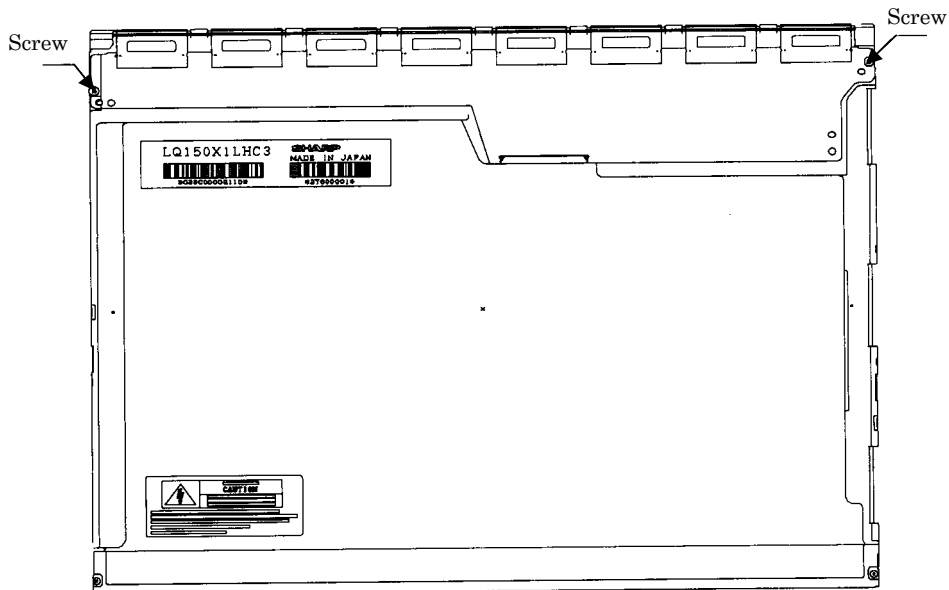
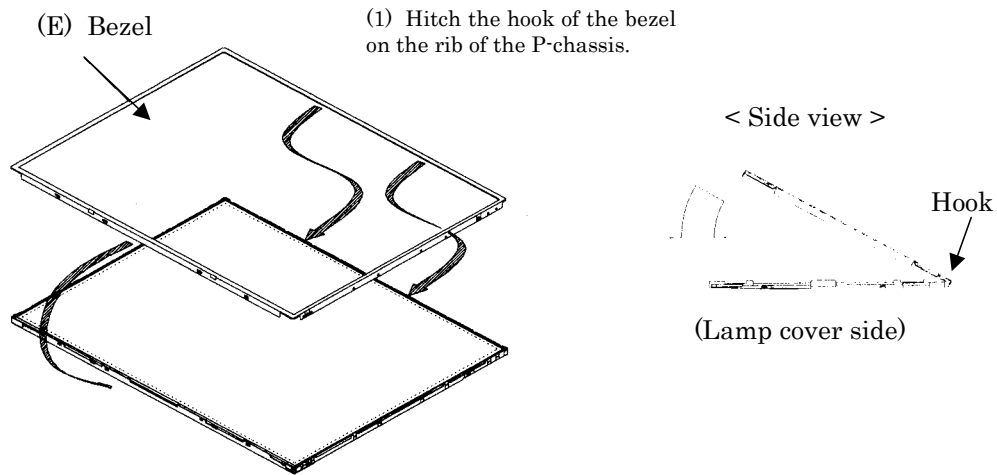


Figure 4-125 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (19)

8. Install the bezel (E) on the lamp cover and hook the four latches on the lamp cover and two latches on the P-chassis.



- (2) Lean the bezel on the lamp cover without interference with the TCP.

Figure 4-126 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (20)

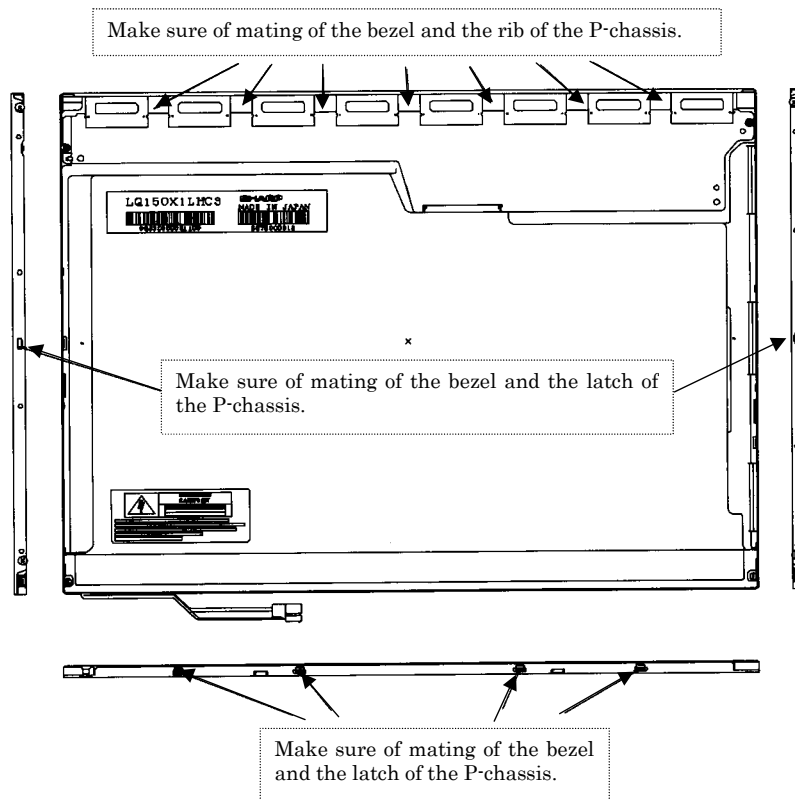


Figure 4-127 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (21)

9. Secure the sides of the unit with the four screws.

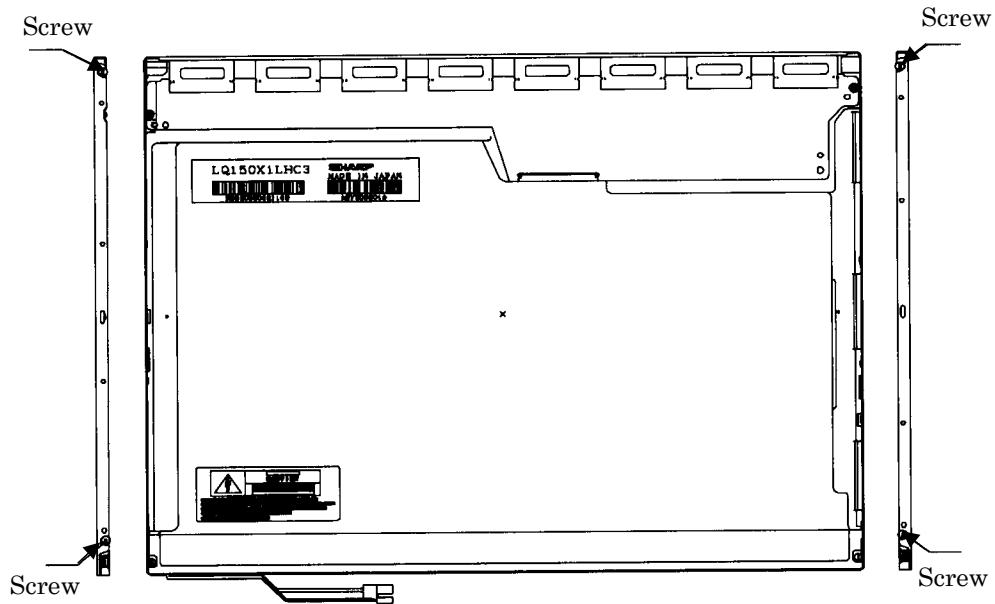


Figure 4-128 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (22)

10. Stick the protection cover G (B), protection cover S (A), fixing tape (C) and fixing tape for lead wire (C).

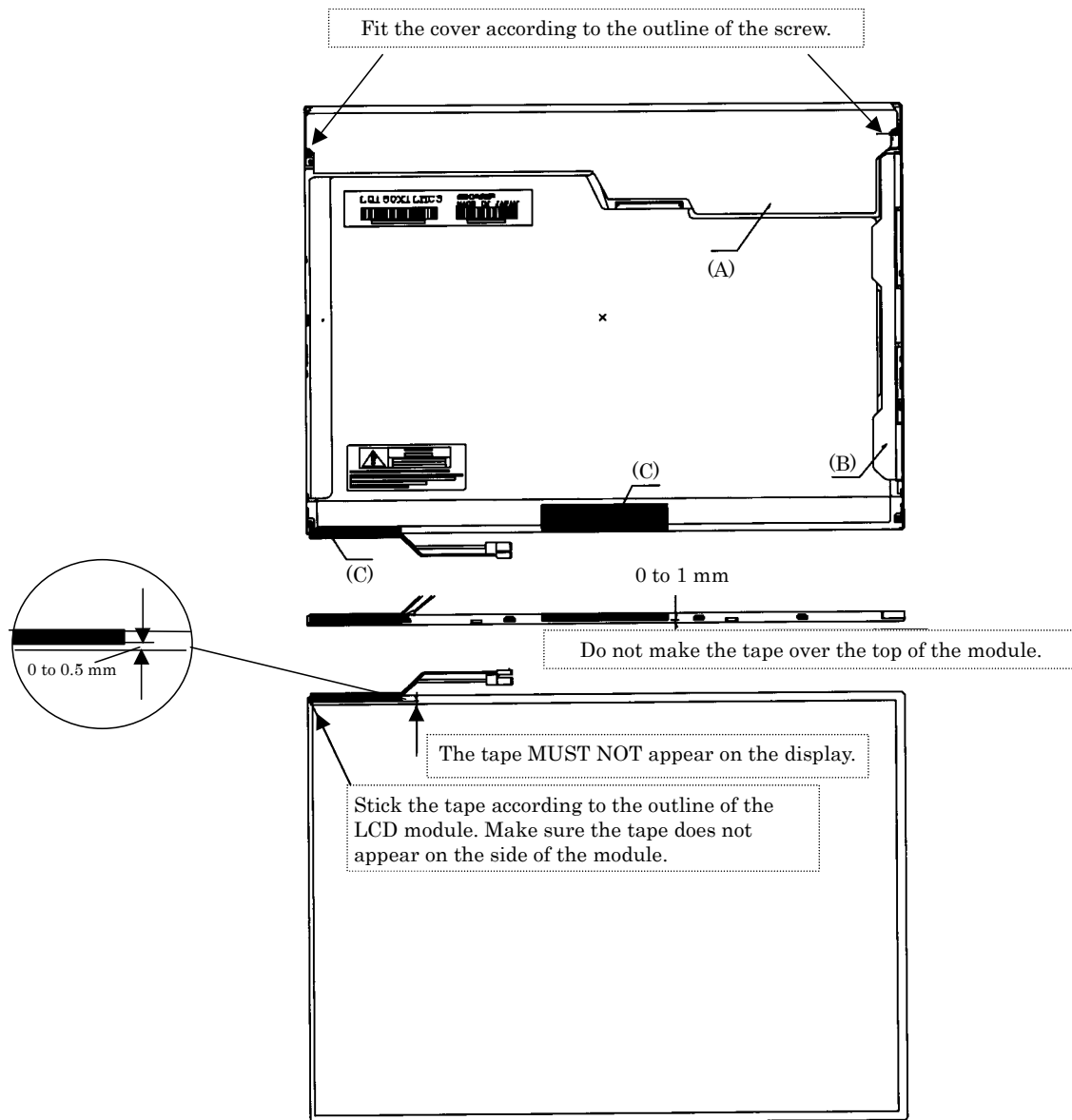


Figure 4-129 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (23)

4.18.9 Replacing the 15.0 Inch XGA CHIMEI Fluorescent Lamp

Disassembling the 15.0 Inch XGA CHIMEI Fluorescent Lamp

To disassemble the 15.0 inch XGA CHIMEI fluorescent lamp, follow the steps below and refer to figures 4-130 to 4-135.

1. Remove the CU tape, yellow tape and protector film X.

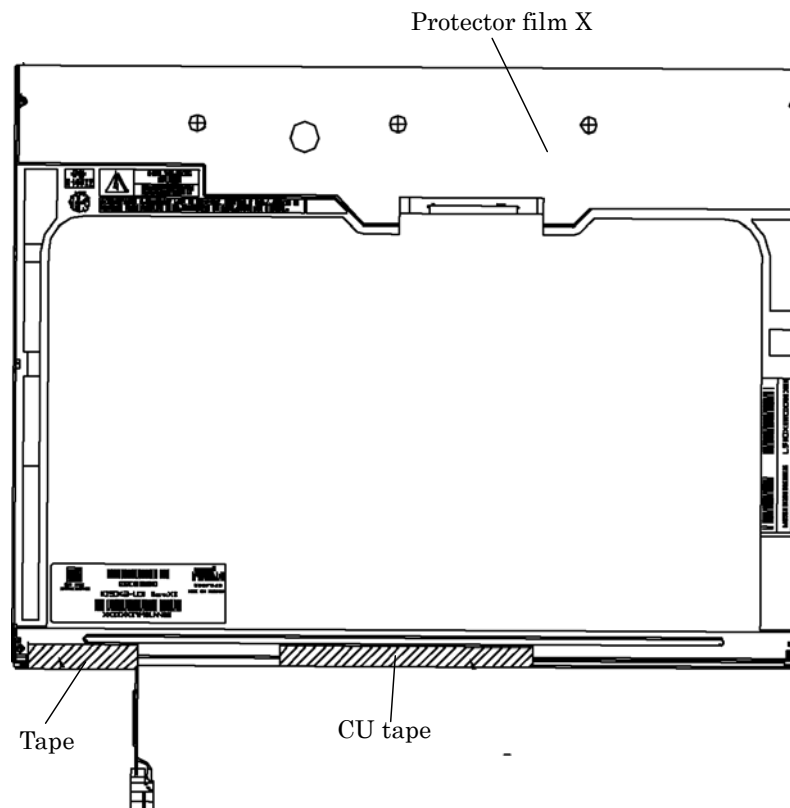


Figure 4-130 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (1)

2. Remove the two screws (B) fixing the X-PCB. Then remove the eight screws (C) fixing the metal frame. Release the two hooks (A).

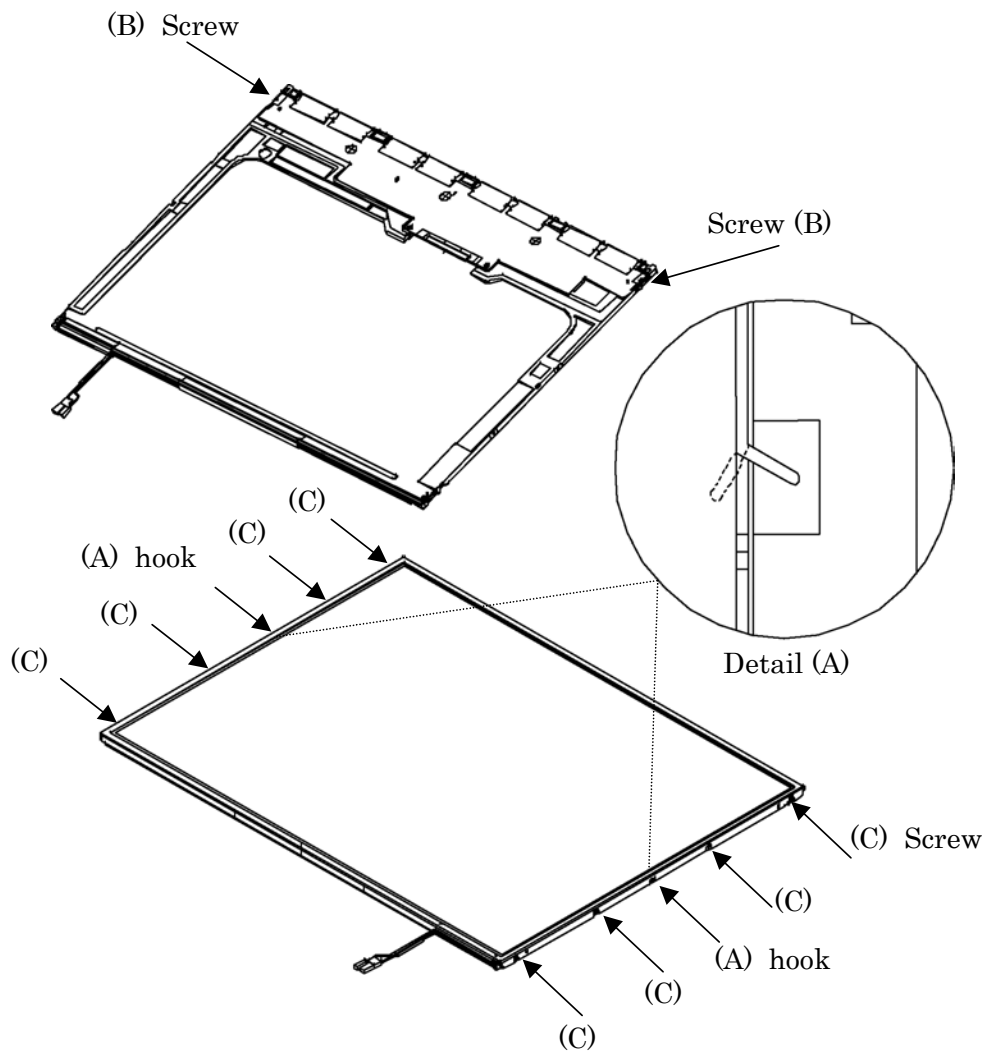


Figure 4-131 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (2)

3. Release the latch.

NOTE: Remove the metal frame parallel no to damage it.

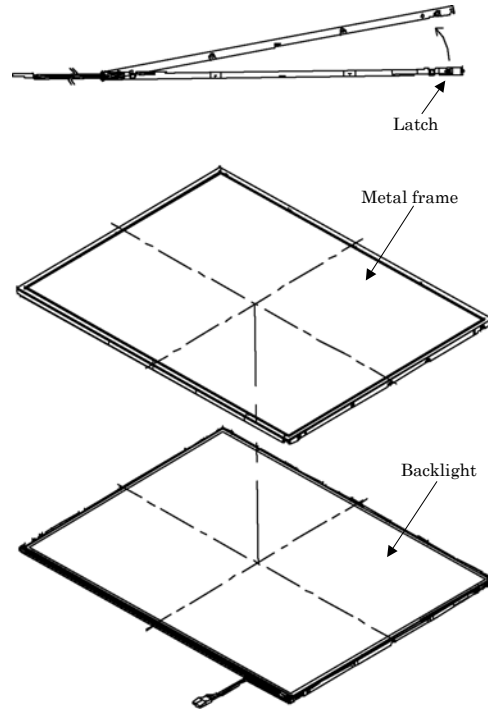


Figure 4-132 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (3)

4. Remove the X-PCB. When removing the X-PCB, be careful not to damage the TCP.

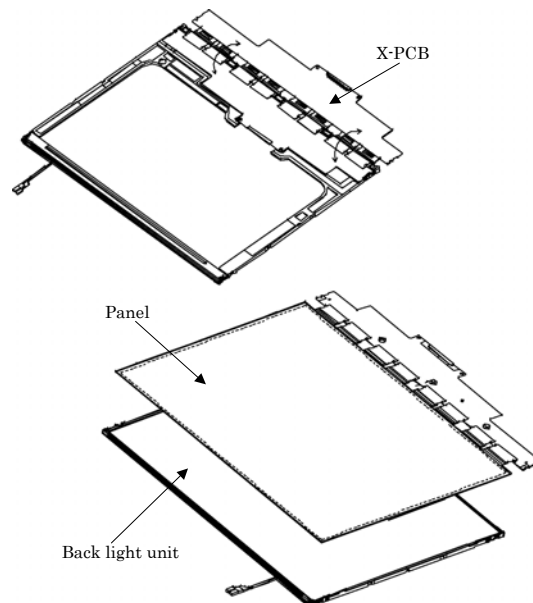


Figure 4-133 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (4)

- Remove the three spacers from the BEFIII-M diffuser sheet. Remove the DEFIII-M diffuser sheet, BEFIII-T diffuser sheet and two tapes from the backlight unit in order. When removing the sheets, be careful not to damage them.

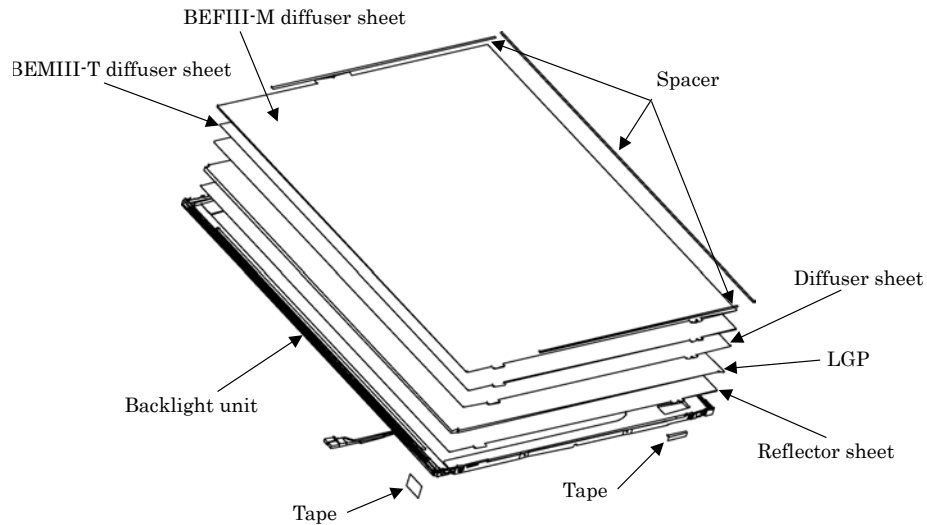


Figure 4-134 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (5)

- Remove the two screws.

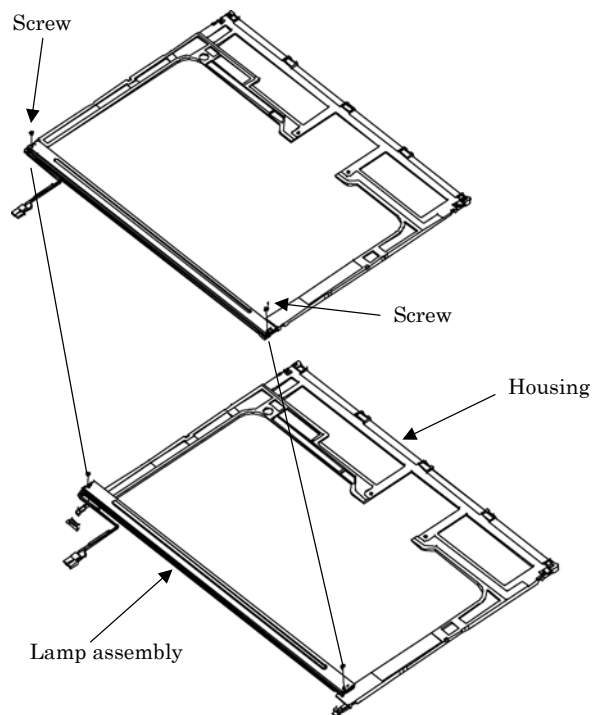


Figure 4-135 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (6)

Assembling the 15.0 Inch XGA CHIMEI fluorescent lamp

To assemble procedure of the 15.0 inch XGA CHIMEI fluorescent lamp, follow the reverse steps of the disassembling steps above.

4.18.10 Replacing the 15.0 Inch SXGA+ LG.Philips Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

Disassembling the 15.0 Inch SXGA+ LG.Philips Fluorescent Lamp

To disassemble the 15.0 inch SXGA+ LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-136 to 4-139.

1. Remove the outside tape and cover shield.
 - 1) Remove the adhesive tape fixing the B/L wire. Be careful not to apply excessive force to the B/L wire.
 - 2) Remove the cover shield (G). Be careful not to apply excessive force to the gate TCP.
 - 3) Remove the cover shield (C). Be careful not to apply excessive force to the source PCB.

CAUTION: Wear anti-static gloves to prevent circuit damage caused by ESC.

- 4) Remove the tape shield and adhesive tape fixing the top case. Be careful not to apply excessive force to the top case.

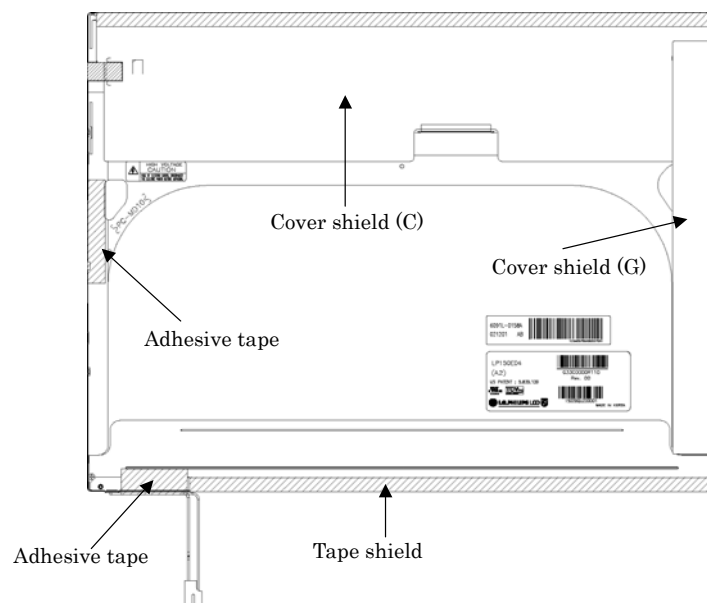


Figure 4-136 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (1)

2. Remove the top case. Be careful not to apply excessive force to the top case or gate TCP.

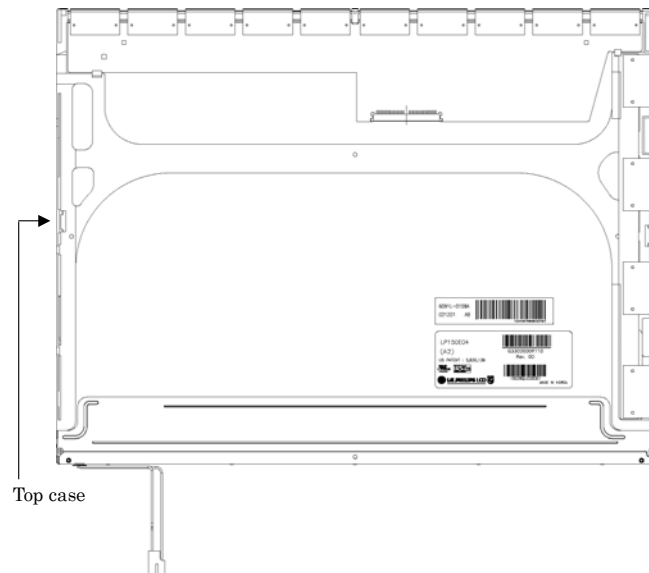


Figure 4-137 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (2)

3. Remove the source PCB and gate PCB.
 - 1) Remove the source PCB. Be careful not to apply excessive force to the PCB or TCP when removing double-sided tape.
 - 2) Remove the gate PCB. Be careful not to apply excessive force to the PCB or TCP when removing double-sided tape.

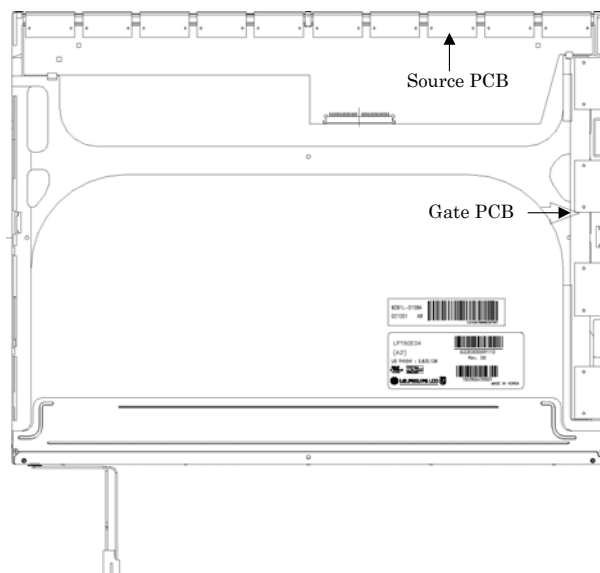


Figure 4-138 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (3)

4. Remove the board assembly, adhesive tape, light guide and cover assembly bottom (L).
 - 1) Remove the board assembly.

NOTE: This process should be made in a clean room to prevent scratch or particle on polarizer or B/L assembly.

- 2) Remove the adhesive tape fixing the sheets (four points).
- 3) Remove the sheets and light guide.

NOTE: No penetration of foreign object is indispensable not to scratch on the surface of each sheet.

- 4) Remove the two screws fixing the cover assembly bottom (L).

NOTE: Maximum value of torque is 1.5kg•cm.

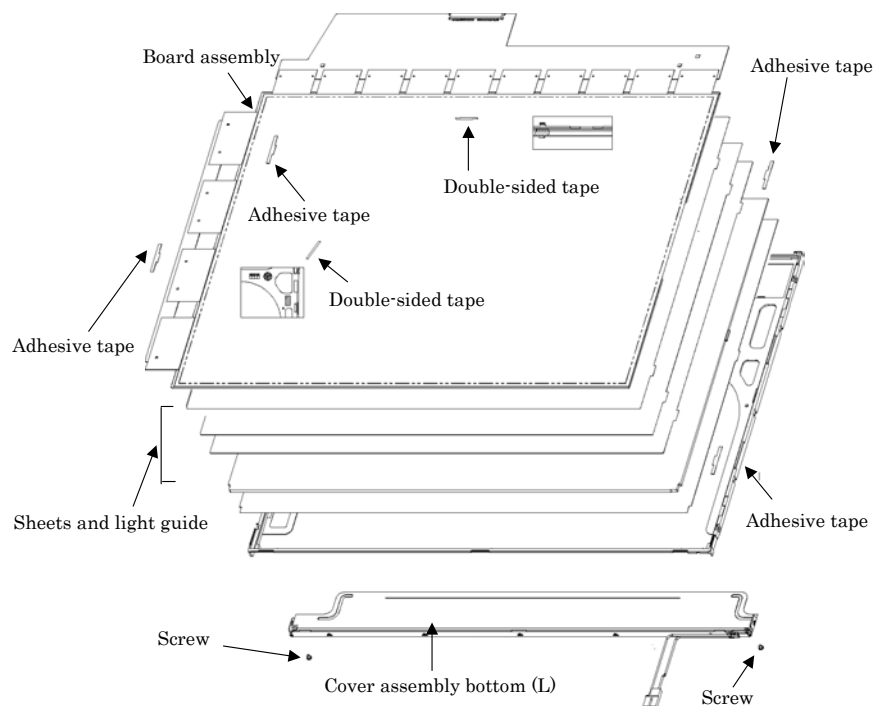


Figure 4-139 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (4)

Assembling the 15.0 Inch SXGA+ LG.Philips Fluorescent Lamp

To assembling the 15.0 inch SXGA+ LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-100 to 4-103.

1. Install the cover assembly bottom (L), sheets, light guide, adhesive tape and board assembly.
 - 1) Remove the protect sheet from the cover assembly bottom (L).
 - 2) Secure the cover assembly bottom (L) with the two screws.

NOTE: Maximum value of torque is 2.0kg•cm.

- 3) Install the light guide and sheets. (Secure the reflection sheet with double-sided tape.)

NOTE: No penetration of foreign object is indispensable not to scratch on the surface of the sheets and light guide.

- 4) Stick the adhesive tape to fix the sheets.
- 5) Install the board assembly. (Secure the gate PCB with double-sided tape.)

NOTE: Be careful not to apply excessive force to the PCB and TCP.

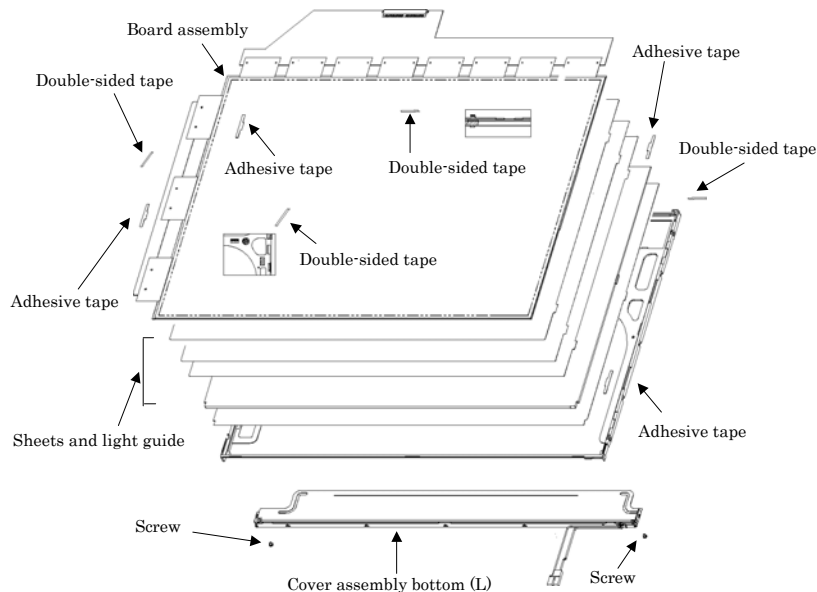


Figure 4-140 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (5)

2. Install the source PCB and gate PCB.
 - 1) Install the source PCB. Be careful not to apply excessive force to the TCP.
 - 2) Install the gate PCB. Be careful not to apply excessive force to the TCP.

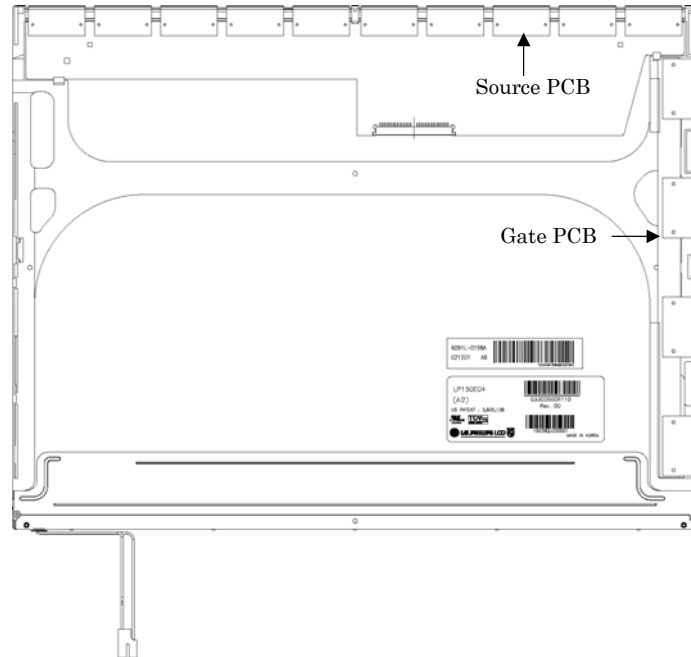


Figure 4-141 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (6)

3. Install the top case. Be careful not to apply excessive force to the gate TCP.

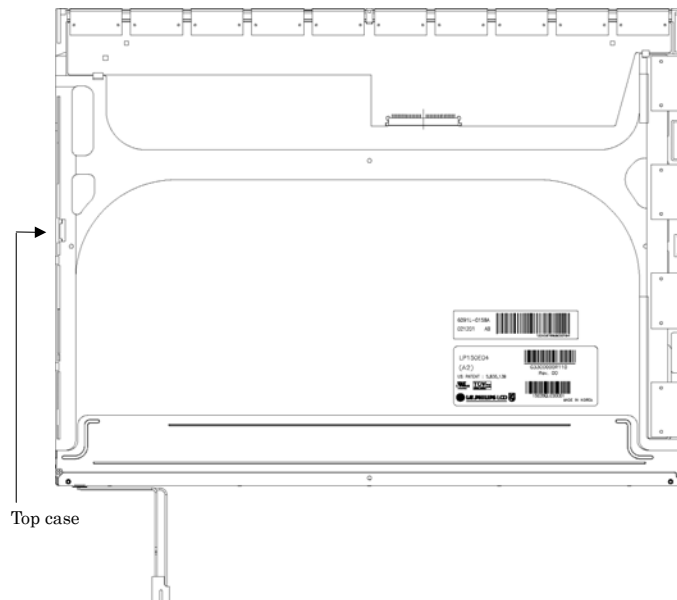


Figure 4-142 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (7)

4. Stick the out side tape and cover shield.
 - 1) Install the tape shield and adhesive tape to fix the top case. Be careful not to apply excessive force to the top case.
 - 2) Install the cover shield (C). Be careful not to apply excessive force to the control PCB.

CAUTION: Wear anti-static gloves to prevent circuit damage caused by ESC.

- 3) Install the cover shield (G). Be careful not to apply excessive force to the gate TCP.
- 4) Stick the adhesive tape to fix the B/L wire. Be careful not to apply excessive force to the B/L wire.

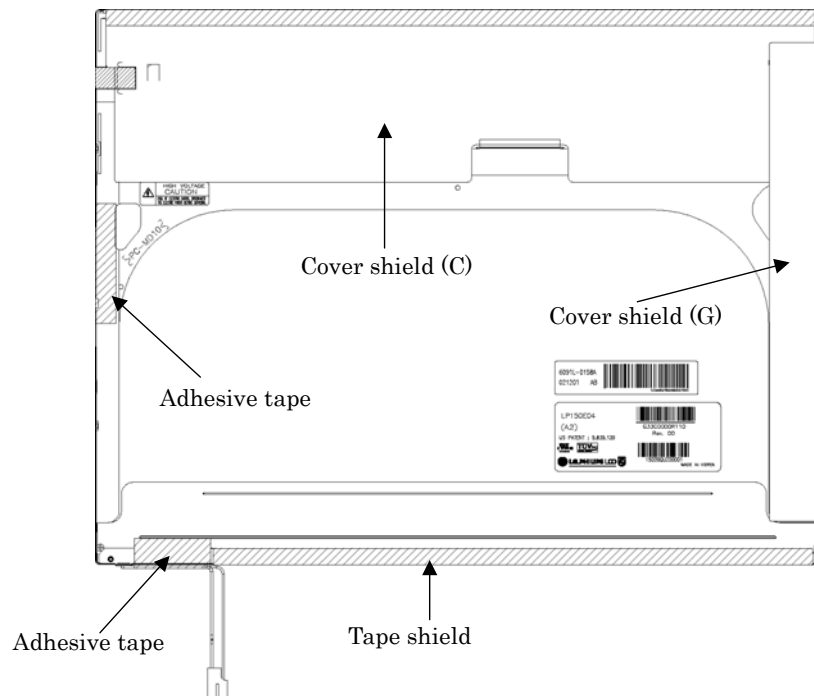


Figure 4-143 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (8)

4.18.11 Replacing the 15.0 Inch SXGA+ Samsung Fluorescent Lamp

Disassembling the 15.0 Inch SXGA+ Samsung Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

To disassemble the 15.0 inch SXGA+ Samsung fluorescent lamp, follow the steps below and refer to Figures 4-144 to 4-152.

1. Remove the PCB cover (source and gate parts) and aluminum tape.

NOTE: Be careful not to damage the COF.

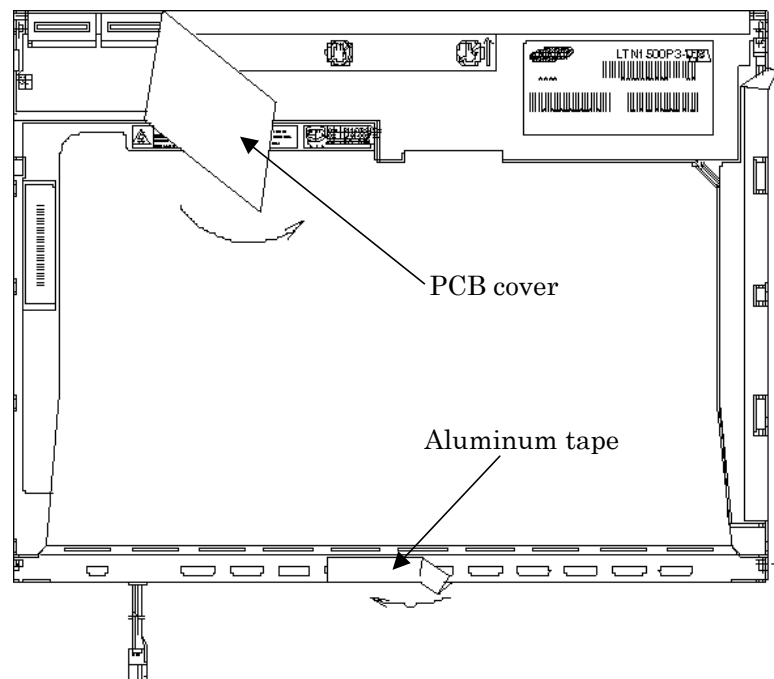


Figure 4-144 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (1)

- Remove the two screws securing the PCB.

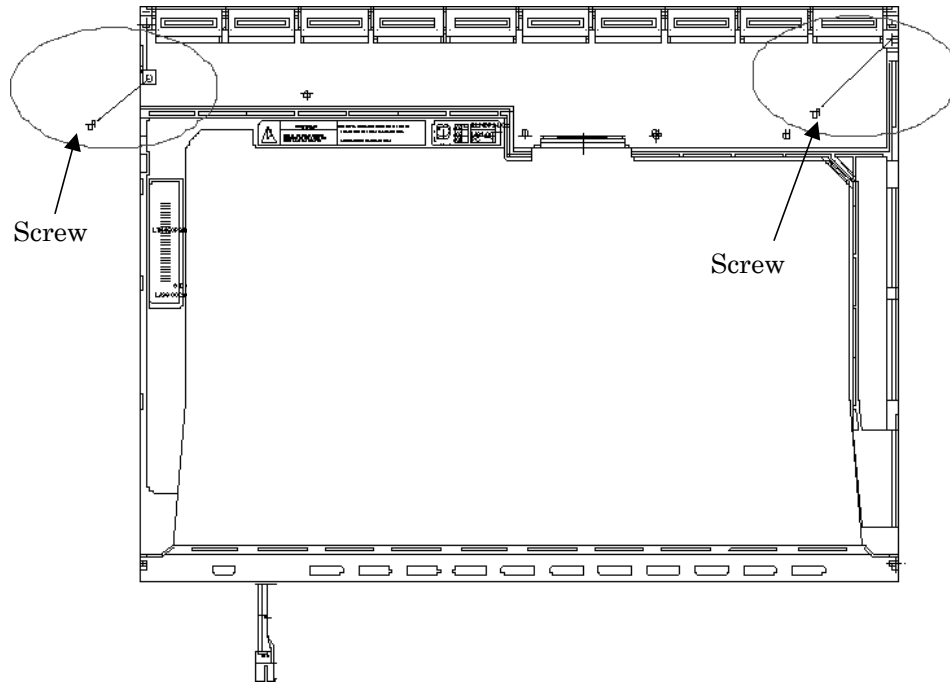


Figure 4-145 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (2)

- Remove the four screws from the top side of the chassis.

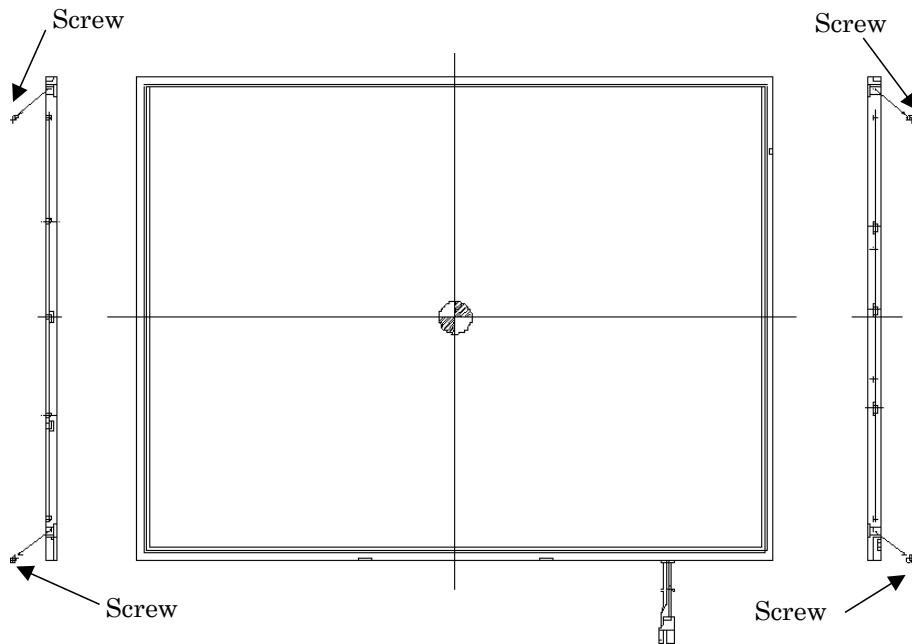


Figure 4-146 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (3)

- Remove the four bottom hooks and five hooks (left and right). Then remove the top chassis from the mold frame.

CAUTION: When you release hooks on the top chassis, be careful not to apply excessive force to the FL. The FL can be damaged easily.

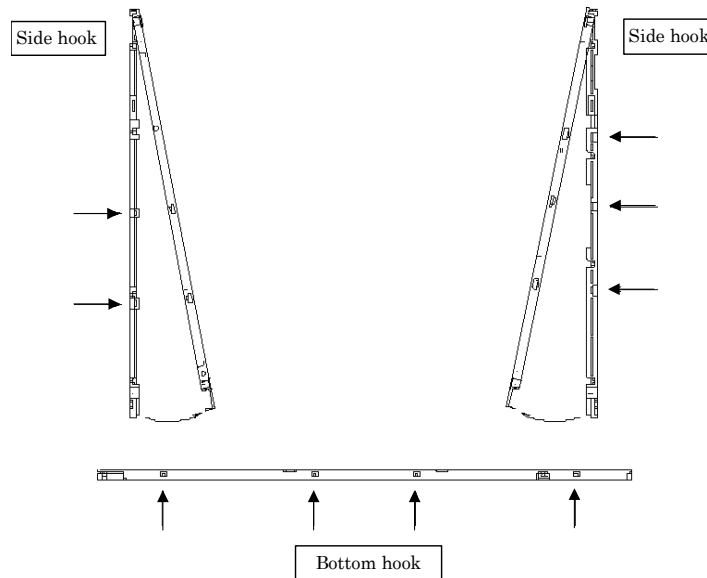


Figure 4-147 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (4)

- Remove the panel assembly from the mold frame.

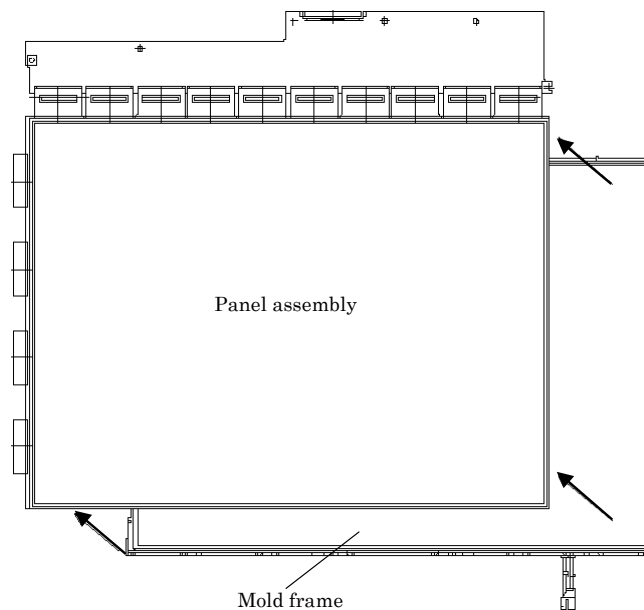


Figure 4-148 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (5)

- Remove the two clips. Then remove the five sheets (prism sheet (L, U), diffusion sheet, LGP and reflection sheet).

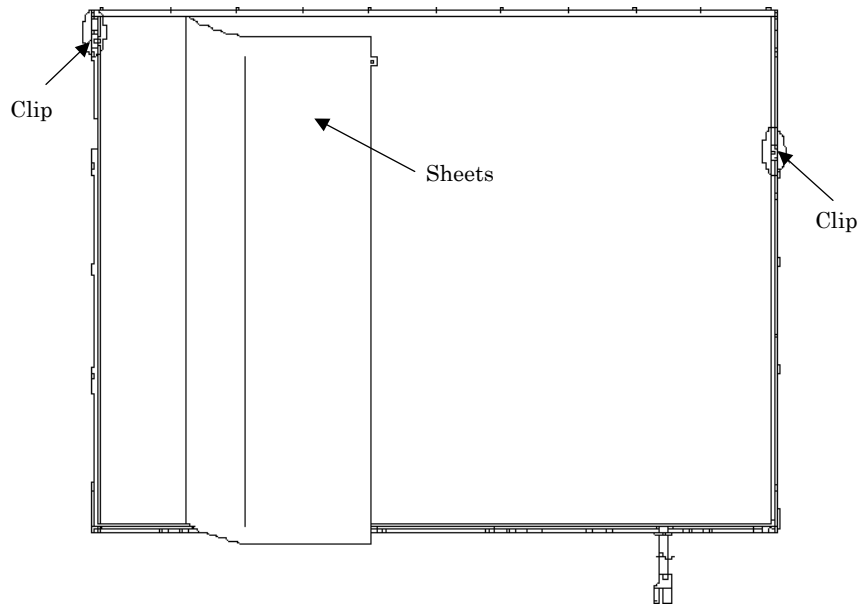


Figure 4-149 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (6)

- Remove the two screws securing the lamp back cover. Then remove the lamp back cover.

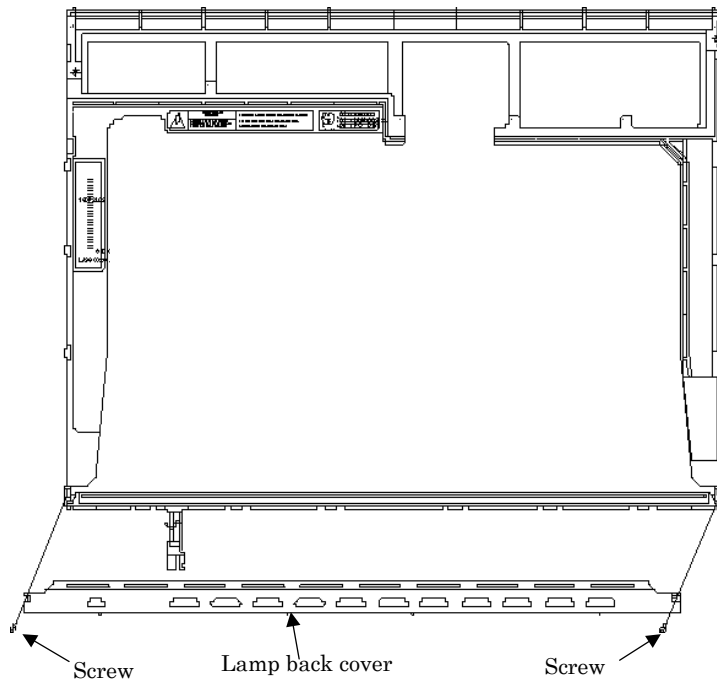


Figure 4-150 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (7)

8. Remove the lamp wire from the wire guide of the mold frame.

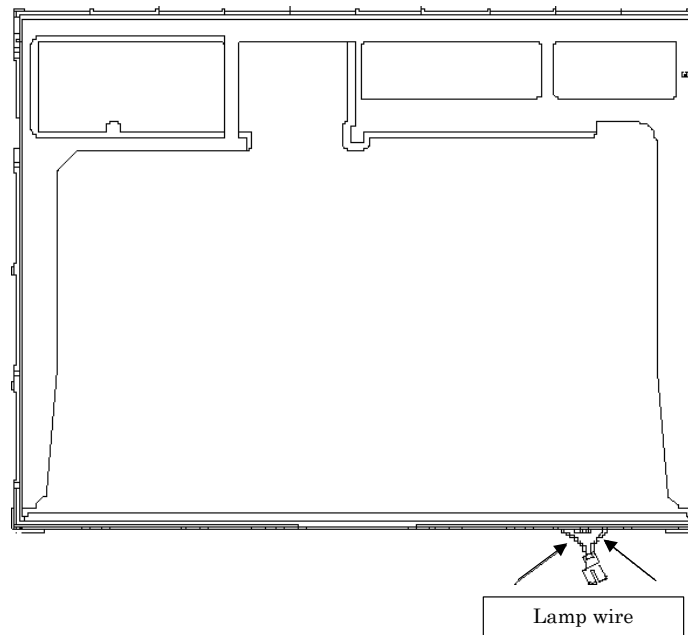


Figure 4-151 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (8)

9. Remove the lamp assembly from the mold frame.

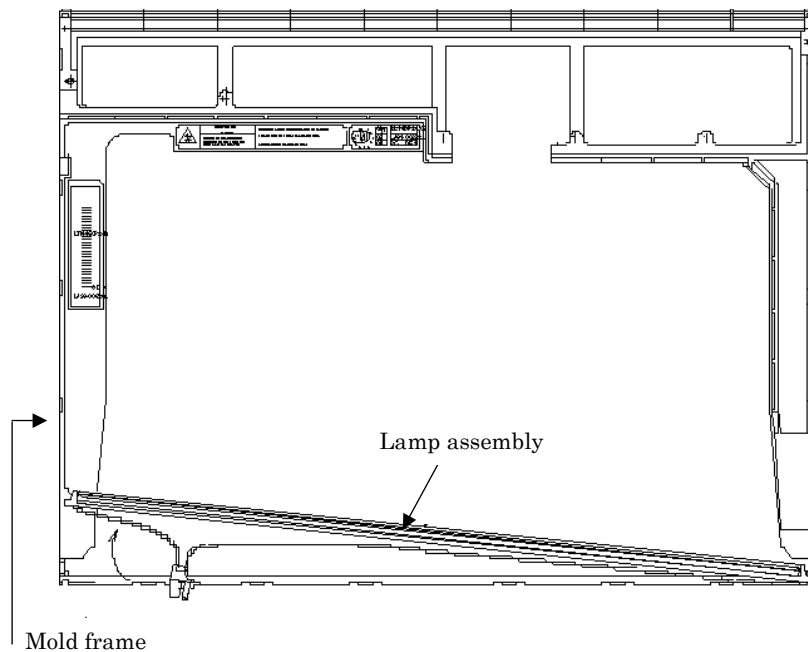


Figure 4-152 Replacing 15.0 Inch Samsung fluorescent lamp (SXGA+) (9)

Assembling the 15.0 Inch SXGA+Samsung Fluorescent Lamp

The assembly procedure is the reverse of the above disassembly procedure.

4.18.12 Replacing the 15.0 Inch SXGA+ Sharp Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

Disassembling the 15.0-inch SXGA+ Sharp Fluorescent Lamp

To disassemble the 15.0 inch SXGA+ Sharp fluorescent lamp, follow the steps below and refer to Figures 4-153 to 4-162.

1. Turn the LCD module face down, and remove the protection cover S (A), protection cover G (B), fixing tape (C) and fixing tape for lead wire (C).

NOTE: 1) Be careful not to damage the TCP or chips.
2) Discard the tapes removed. Do not reuse them.

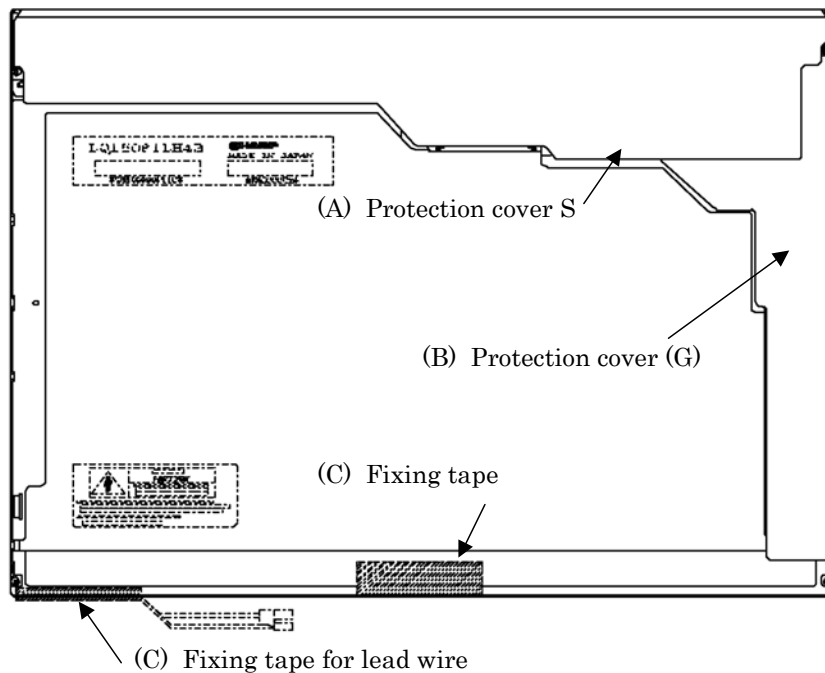


Figure 4-153 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (1)

- Remove the four screws on the sides.

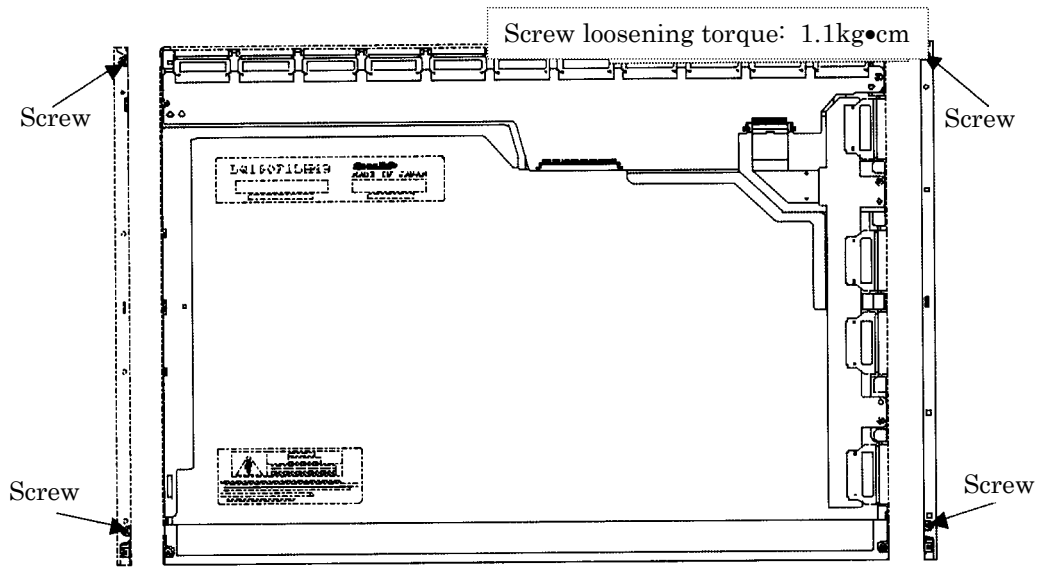


Figure 4-154 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (2)

- Turn the LCD module face up and remove the bezel (E).

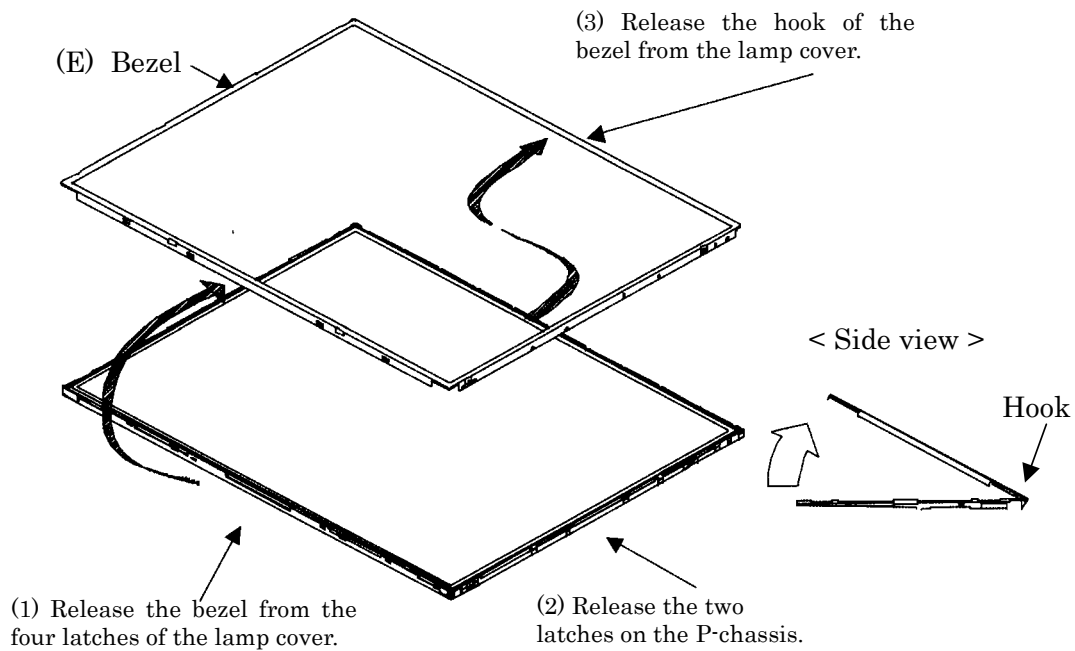


Figure 4-155 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (3)

- Turn the LCD module face down. Remove four screws fixing the board and remove the FPC (G). Open the bent portion of the TCP of the board and remove the backlight.

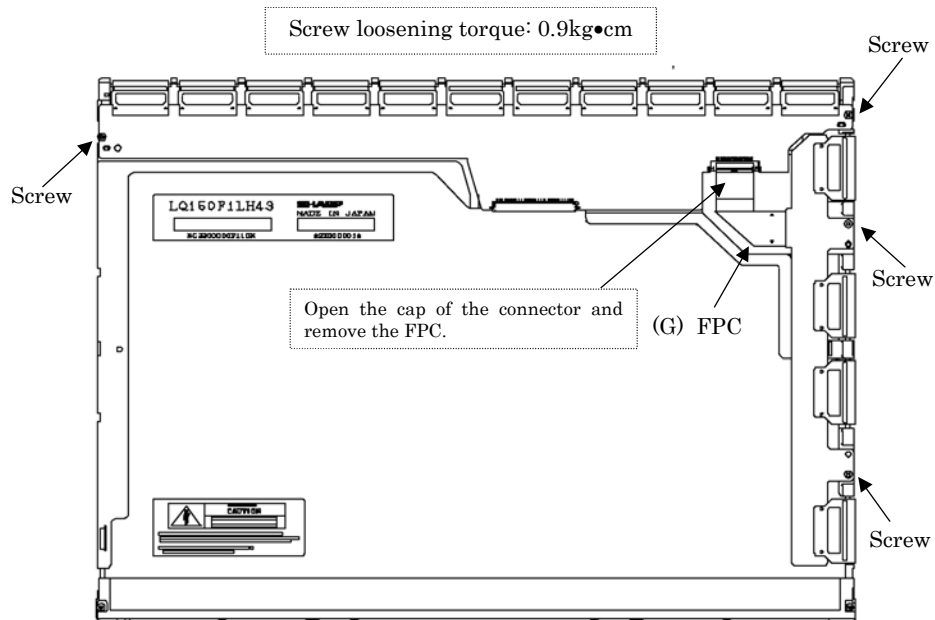


Figure 4-156 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (4)

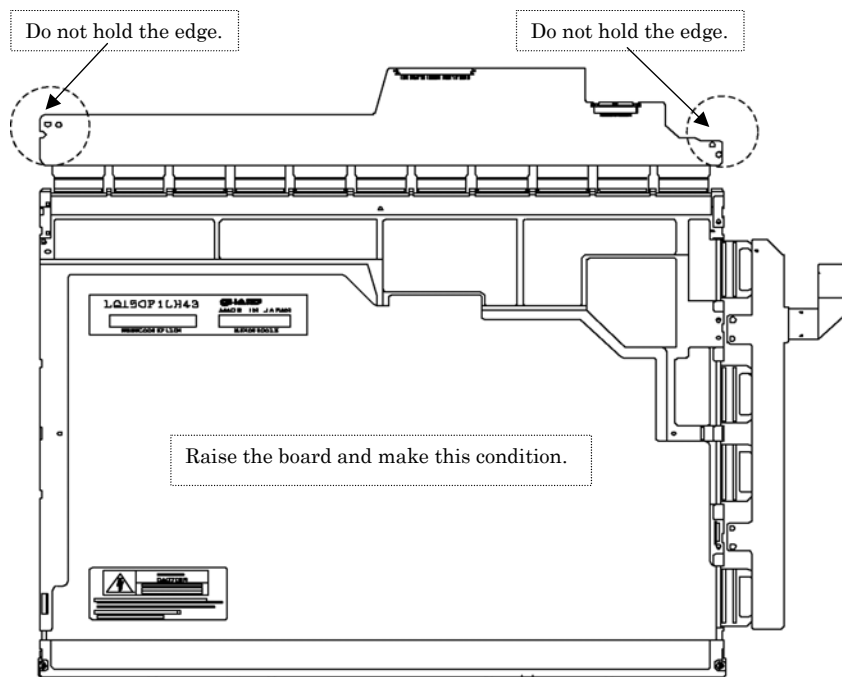


Figure 4-157 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (5)

- Turn the LCD module face up and remove the LCD panel (I) from the backlight unit (H).

NOTE: Wear finger sacks or gloves during the work not to soil or scratch the LCD panel or backlight unit.

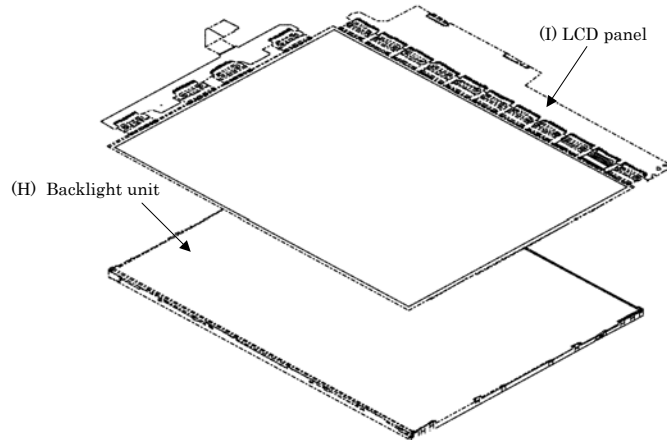


Figure 4-158 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (6)

- Turn the backlight unit (H) removed face down and remove two screws (D) and lamp cover (J).

NOTE: Be careful not to scratch or soil the sheets.

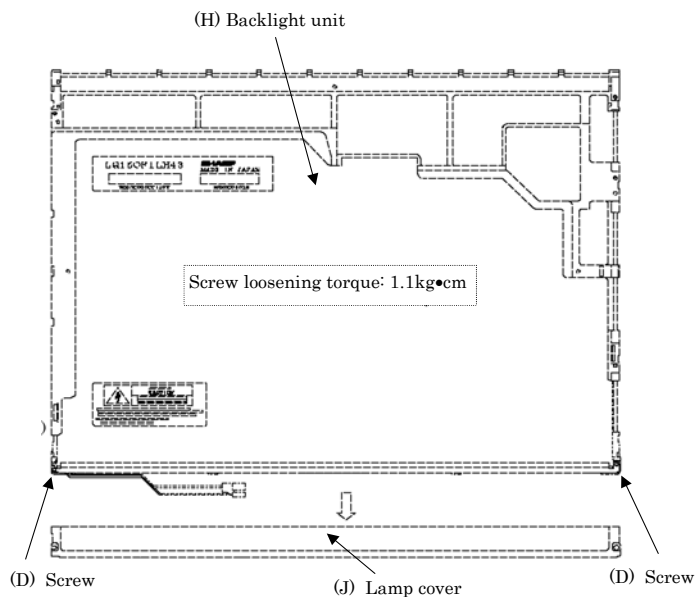


Figure 4-159 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (7)

- Turn the backlight unit face up and remove the upper diffusion sheet (K), lens sheet (L) and light guide (M).

NOTE: The light guide and sheets are reused. Be careful not to scratch or soil them.

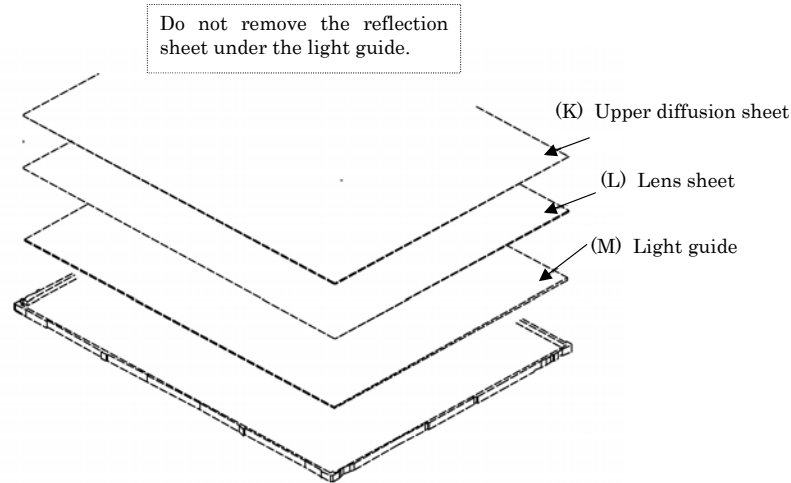


Figure 4-160 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (8)

- Remove the four double-sided tapes (N, O, P, Q).

NOTE: Discard the removed tapes. Do not reuse them.

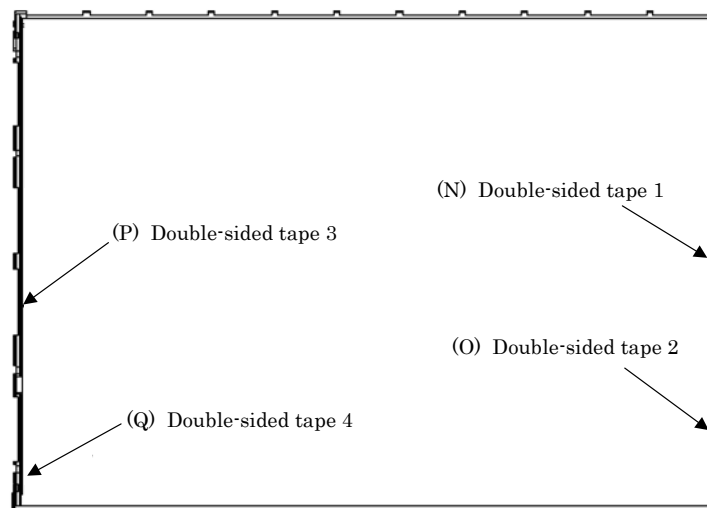


Figure 4-161 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (9)

9. Turn the backlight unit face down and remove the lamp unit (R) from the P-chassis.

CAUTION: When removing the lamp unit, be careful not to break the lamp, or bend the reflection sheet.

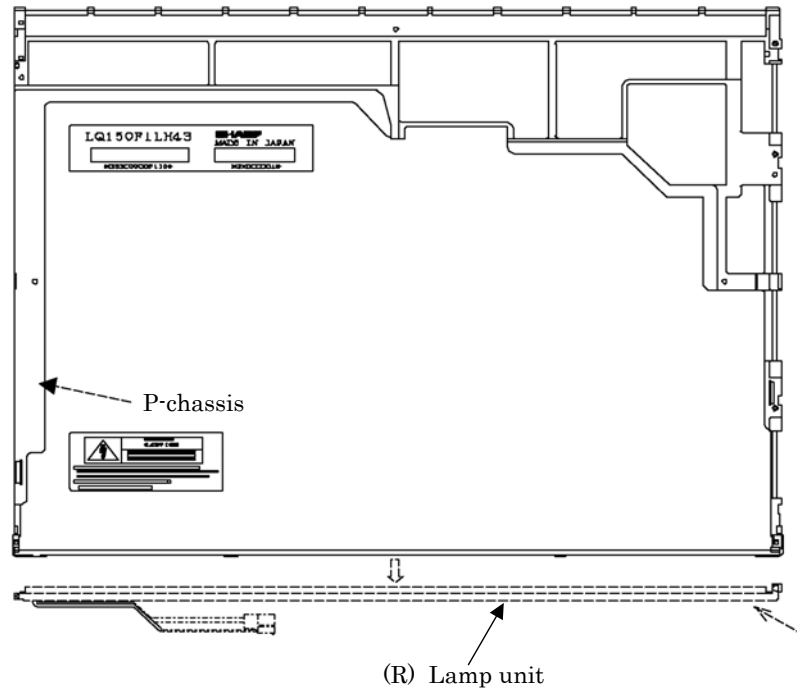


Figure 4-162 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (10)

Assembling the 15.0 Inch SXGA+ Sharp Fluorescent Lamp

To assemble the 15.0 inch SXGA+ Sharp fluorescent lamp, follow the steps below and refer to Figures 4-163 to 4-177.

1. Stick four double-sided tapes (N, O, P, Q) on the P-chassis.

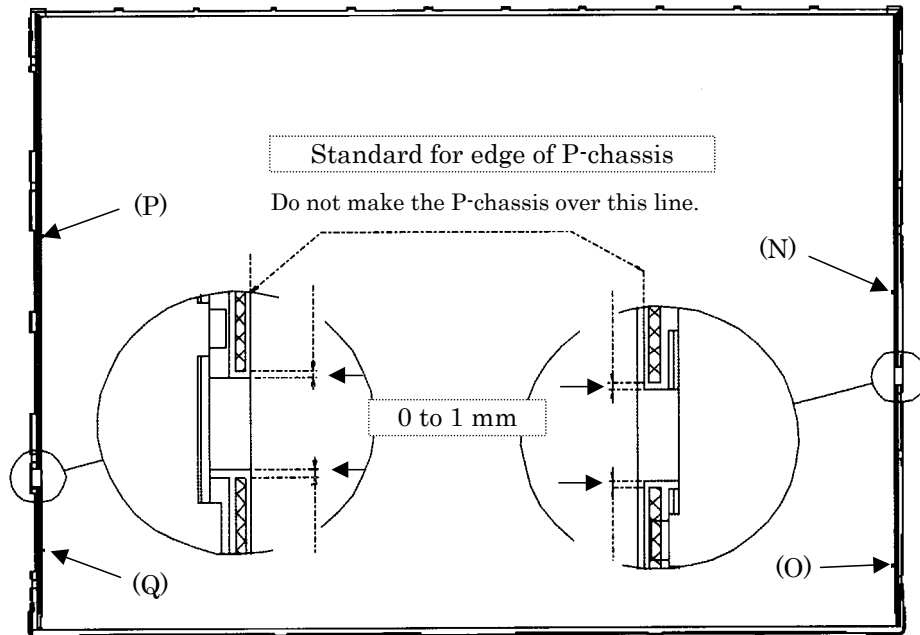


Figure 4-163 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (11)

2. Turn the backlight unit face down and install a new lamp unit (R) on the P-chassis.

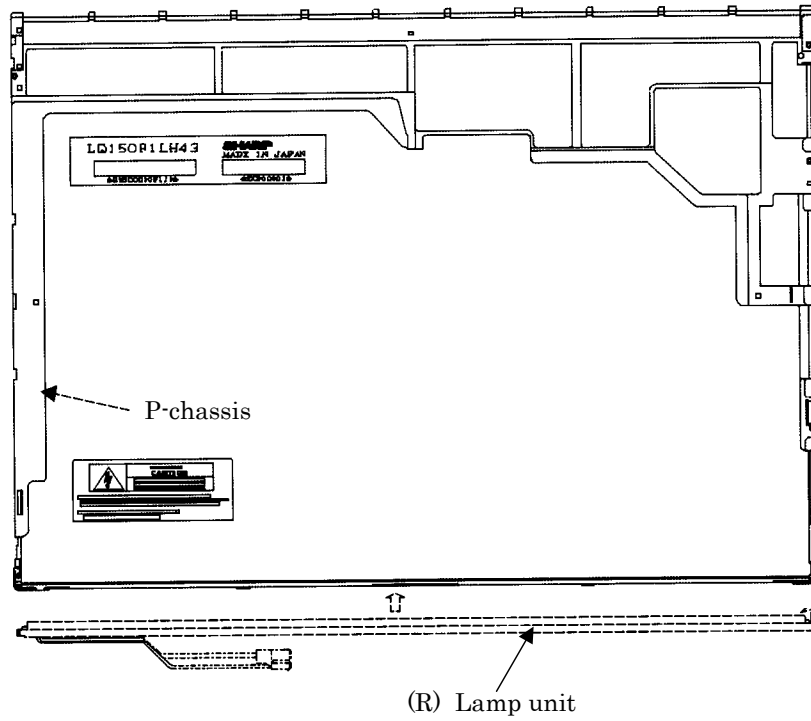
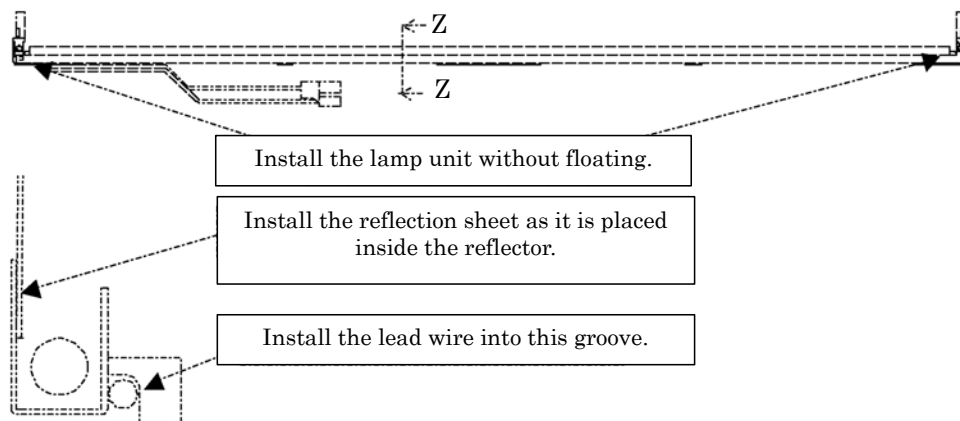


Figure 4-164 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (12)

NOTE: When install the lamp unit, be careful not to bend or damage the reflection sheet.



Cross-section drawing of Z-Z

Figure 4-165 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (13)

3. Install the lamp cover (J) on the backlight unit and secure it with the two screws.

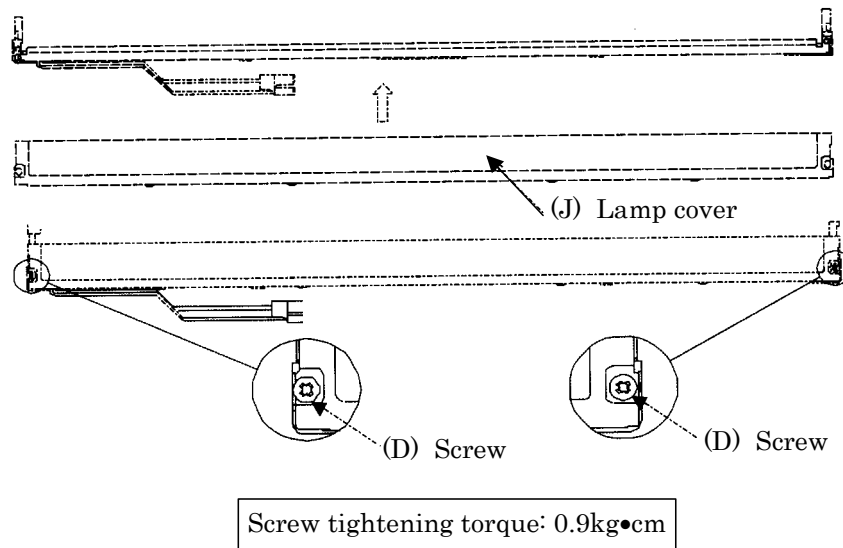


Figure 4-166 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (14)

4. Install the light guide (M) on the backlight unit.

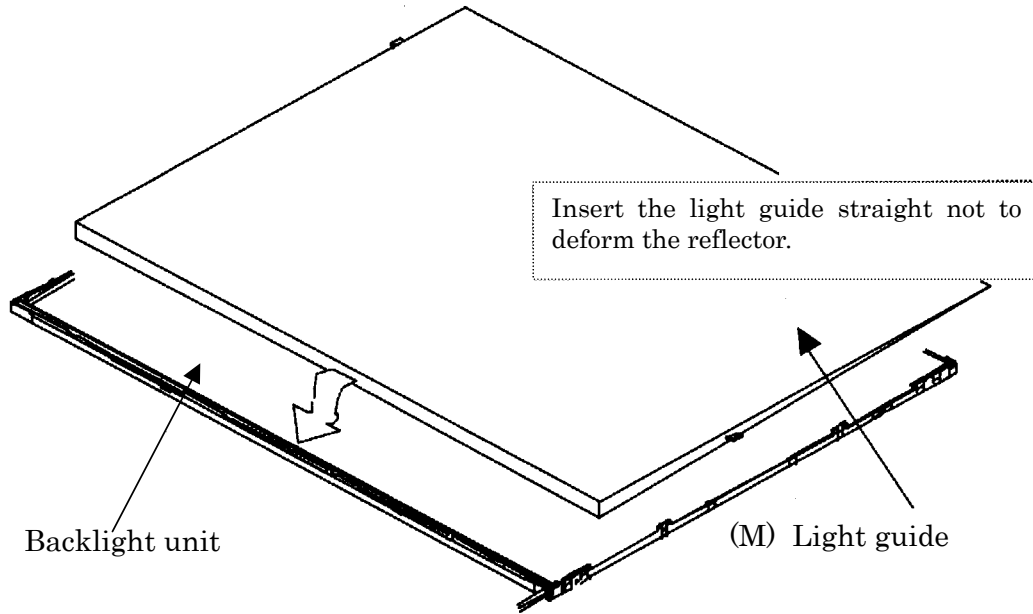


Figure 4-167 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (15)

5. Place the lens sheet (L) and upper diffusion sheet (K) on the backlight unit with light guide.

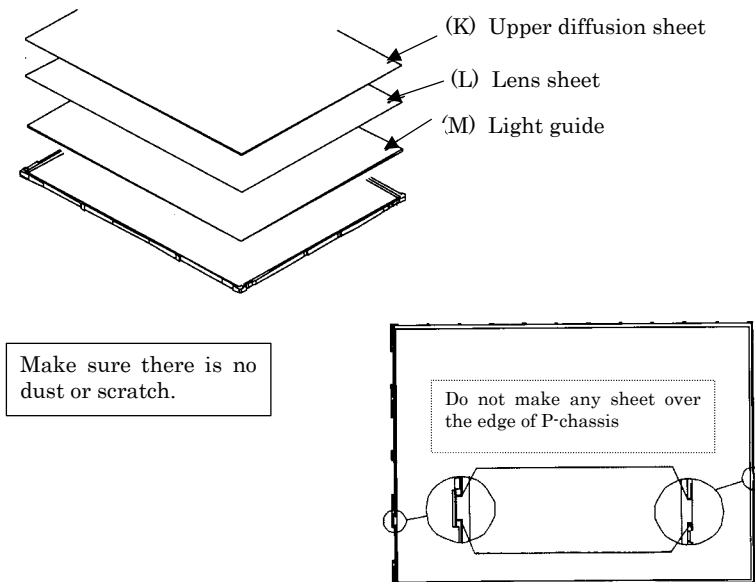


Figure 4-168 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (16)

- Place the LCD panel (I) on the backlight unit (H).

NOTE: Make sure there is no dust between the LCD panel and backlight unit. If any dust is found, remove it with crepe tape or others which has no remaining of paste.

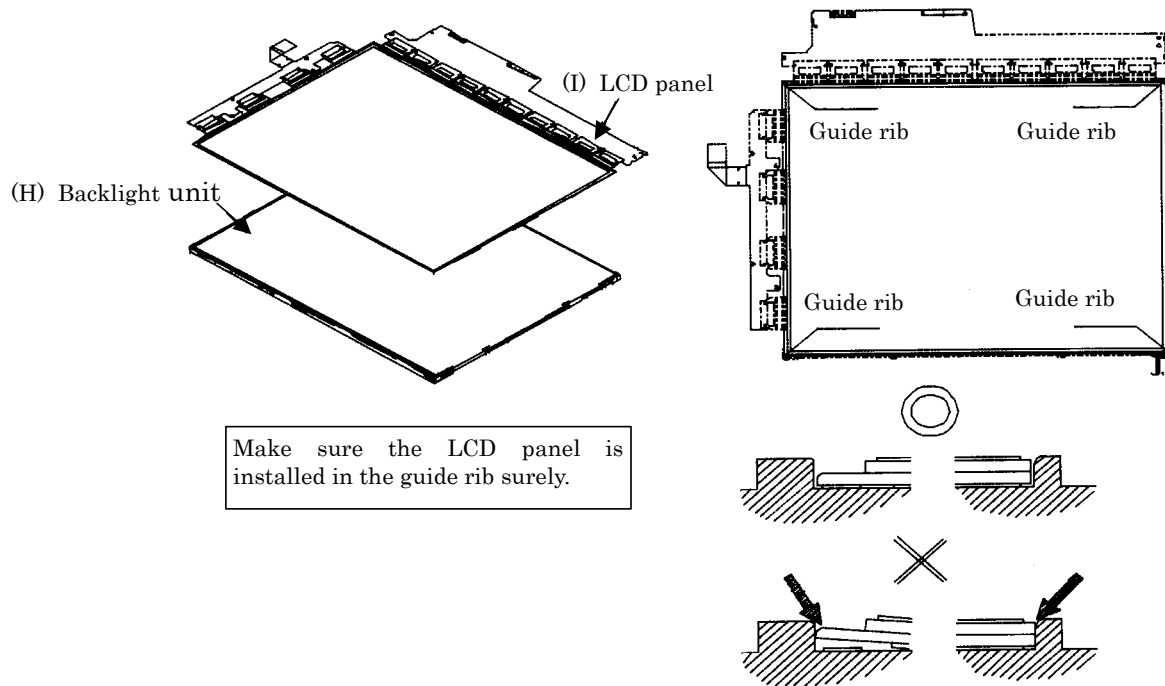


Figure 4-169 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (17)

7. Bend the TCP attaching to the source board and secure it with two screws. Then bend the TCP attaching to the gate board with two screws and insert the FPC (G) into the connector of the source board.

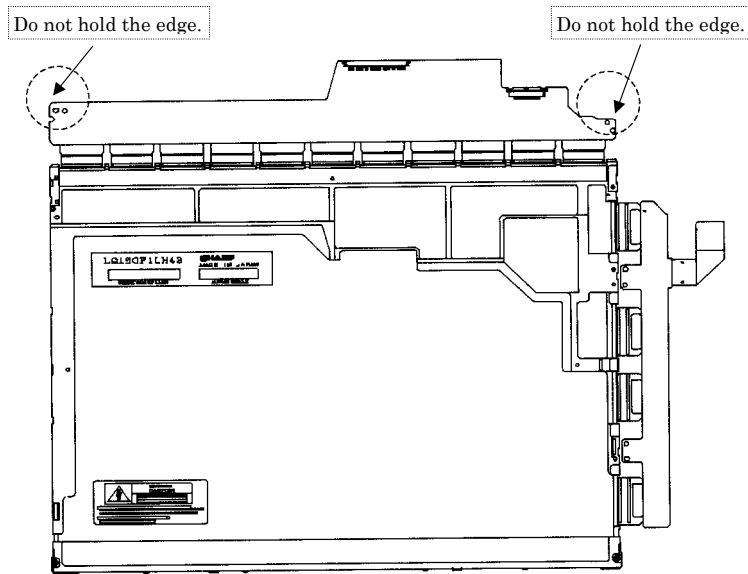


Figure 4-170 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (18)

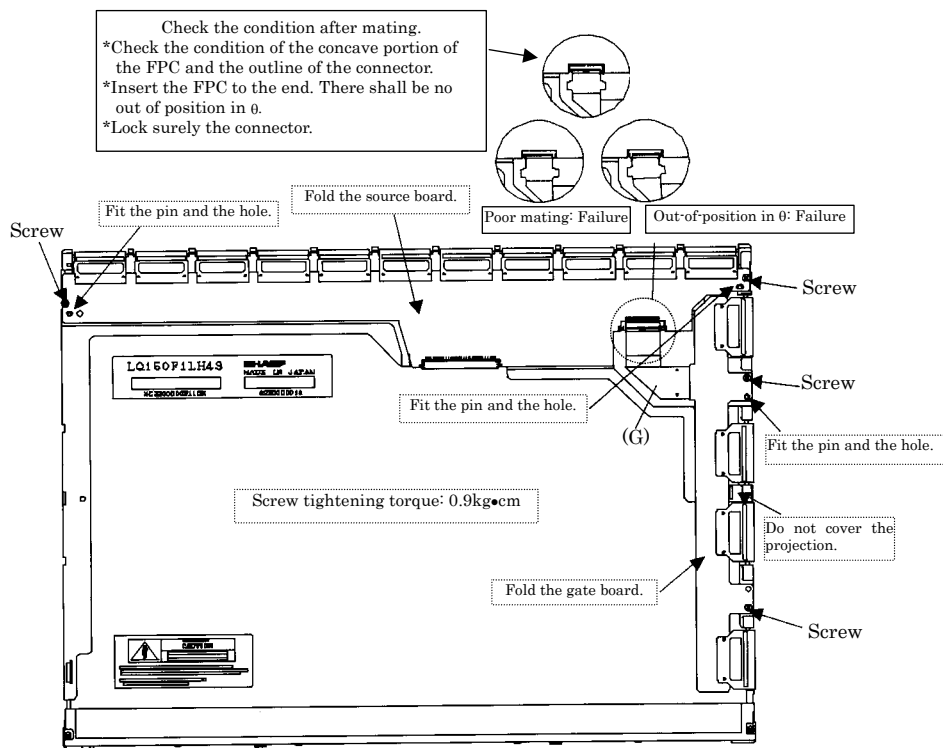
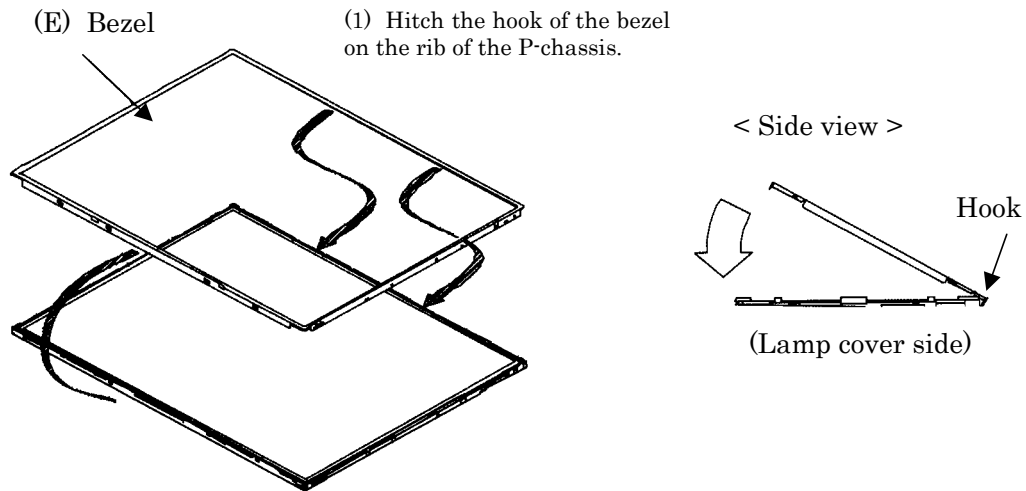


Figure 4-171 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (19)

8. Install the bezel (E) on the lamp cover. Attach four latches on the lamp cover and two latches on the P-chassis.



- (2) Lean the bezel on the lamp cover without interference with the TCP.

Figure 4-172 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (20)

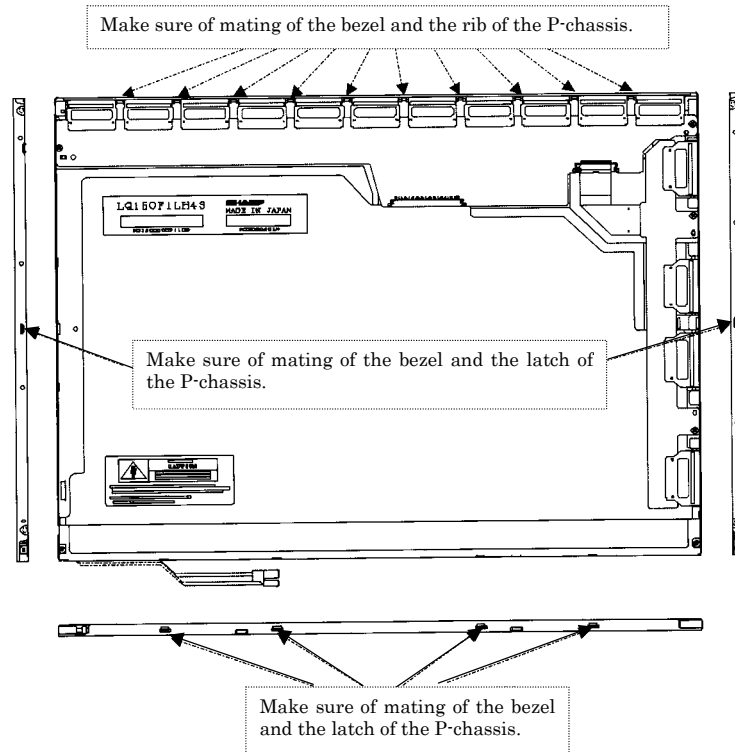


Figure 4-173 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (21)

9. Secure the sides of the unit with the four screws.

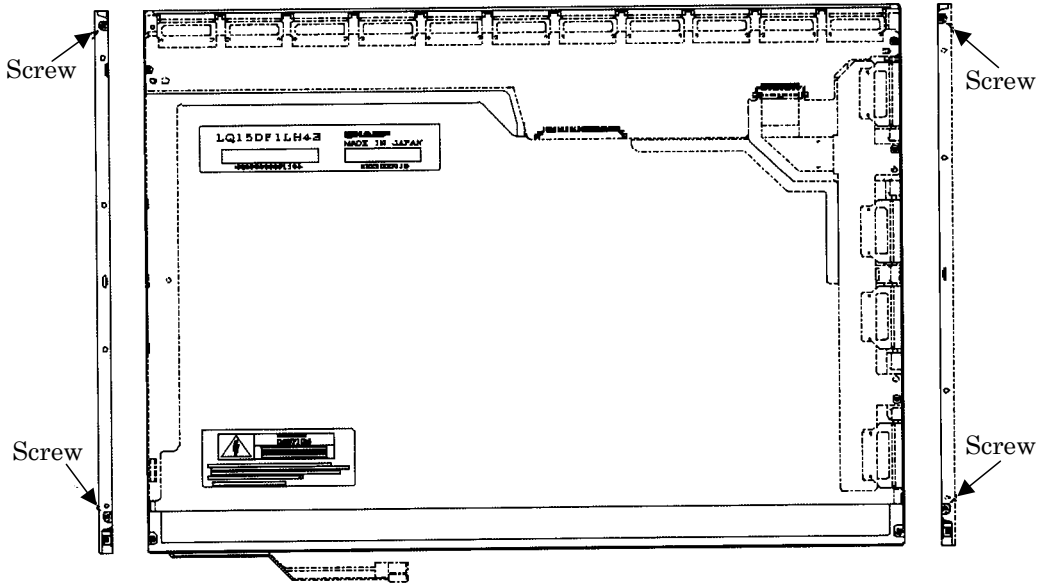


Figure 4-174 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (22)

10. Stick the protection cover G (B).

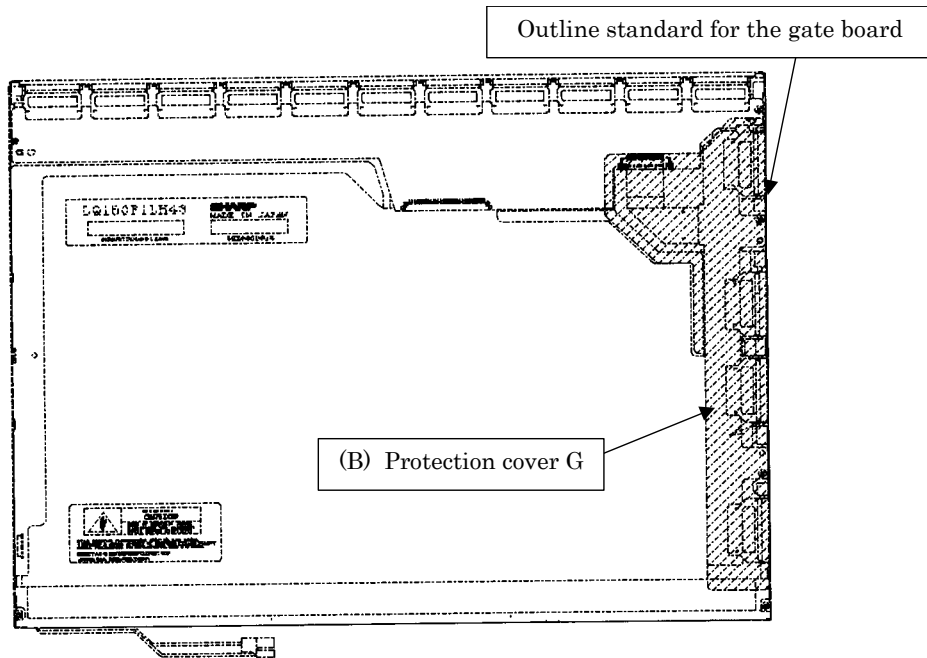


Figure 4-175 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (23)

11. Stick the protection cover S (A), fixing tape (C), fixing tape for lead wire (D).

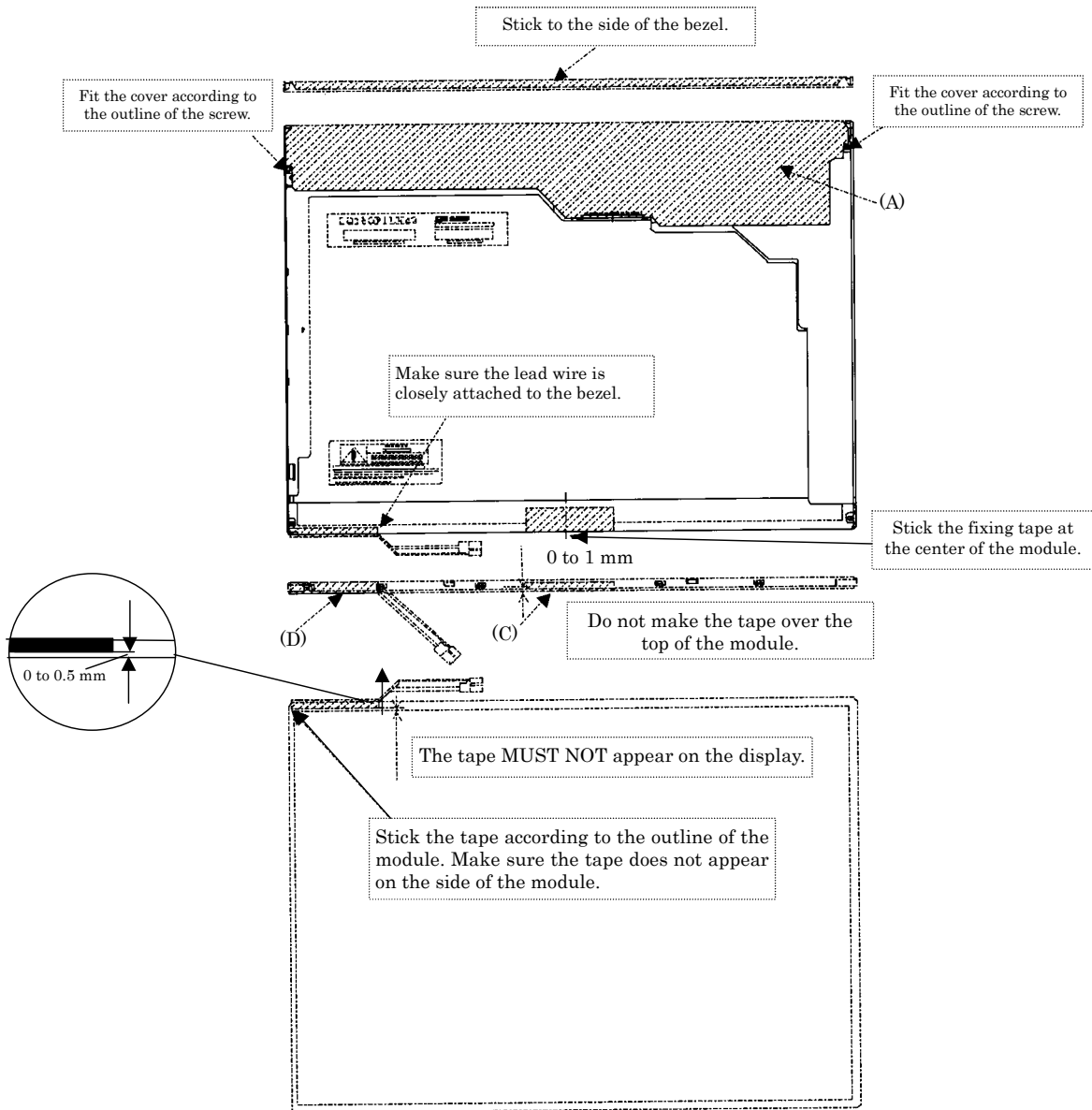


Figure 4-176 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (24)

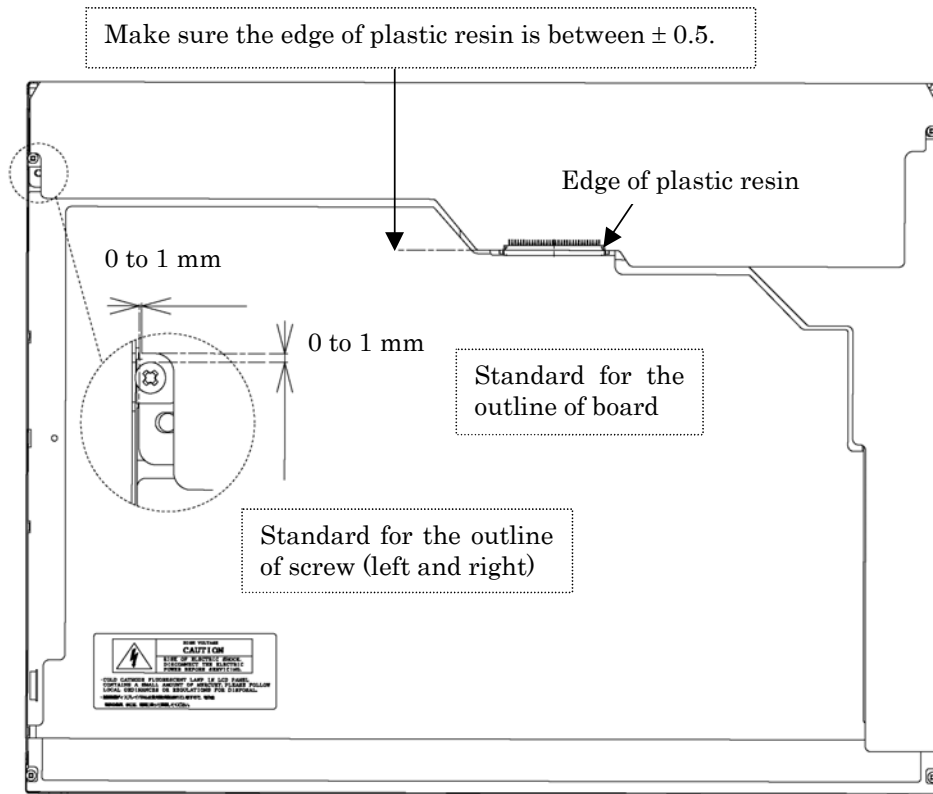


Figure 4-177 Replacing 15.0 Inch Sharp fluorescent lamp (SXGA+) (25)

Appendices

Appendix Contents

Appendix A Handling the LCD Module..... A-1

Appendix B Board Layout.....B-1

B.1 System Board Front View.....B-1

B.2 System Board Back ViewB-3

Appendix C Pin Assignment..... C-1

System Board

C.1 PJ1420 Memory 0 Connector (200-pin) C-1

C.2 PJ1440 Memory 1 Connector (200-pin) C-5

C.3 PJ1800 Optical Drive I/F Connector (50-pin) C-9

C.4 PJ1801 HDD I/F Connector (44-pin)..... C-10

C.5 PJ2001 PC Card I/F Connector (68-pin)..... C-11

C.6 PJ2200 Mini PCI I/F Connector (124-pin) C-13

C.7 PJ3000 MDC I/F Connector (30-pin) C-15

C.8 PJ3203 Debug Port Connector (4-pin)..... C-15

C.9 PJ3333 Keyboard Connector (34-pin) C-16

C.10 PJ3201 Touch Pad I/F Connector (4-pin) C-16

C.11 PJ3202 Parallel I/F Connector (25-pin) C-17

C.12 PJ4100 Network I/F Connector (12-pin) C-17

C.13 PJ4600 USB I/F Connector (8-pin)..... C-18

C.14 PJ5600 LCD I/F Connector (40-pin) C-18

C.15 PJ5620 CRT I/F Connector (15-pin)..... C-19

C.16 PJ5640 TV Connector (4-pin)..... C-19

C.17 PJ6002 External Microphone Connector (6-pin)..... C-19

C.18 PJ6000 Speaker Connector (Left) (3-pin)..... C-20

C.19 PJ6001 Speaker Connector (Right) (2-pin)..... C-20

C.20 PJ6004 Headphone Connector (6-pin)..... C-20

C.21 PJ8810 1st Battery Connector (10-pin)..... C-20

C.22	PJ8790 RTC Battery Connector (3-pin)	C-21
C.23	PJ8770 FAN I/F Connector (3-pin)	C-21
C.24	PJ8800 DC-IN Connector (4-pin).....	C-21
Appendix D	Display Codes	D-1
D.1	Display Codes	D-1
Appendix E	Key Layout	E-1
E.1	Keyboard Layout	E-1
Appendix F	Wiring Diagrams.....	F-1
F.1	Parallel Port Wraparound Connector	F-1
F.2	RGB monitor ID Wraparound Connector (15-Pin to 15-Pin).....	F-2
Appendix G	BIOS/KBC/EC Update	G-1
Appendix H	Reliability.....	H-1

Figures

Figure B-1	System board layout (front)	B-1
Figure B-2	System board layout (back)	B-3
Figure E-1	Keyboard layout.....	E-1
Figure F-1	Parallel port wraparound connector	F-1
Figure F-2	RGB monitor ID wraparound connector (15-pin to 15-pin).....	F-2

Tables

Table B-1	System board ICs and connectors (front).....	B-2
Table B-2	System board ICs and connectors (back).....	B-4
Table C-1	Memory 0 connector pin assignment (200-pin).....	C-1
Table C-2	Memory 1 connector pin assignment (200-pin).....	C-5
Table C-3	Optical Drive connector pin assignment (50-pin).....	C-9
Table C-4	HDD I/F connector pin assignment (44-pin)	C-10
Table C-5	PC Card I/F connector pin assignment (68-pin)	C-11
Table C-6	Mini PCI I/F connector connector pin assignment (124-pin).....	C-13
Table C-7	MDC I/F connector pin assignment (30-pin).....	C-15
Table C-8	Debug port connector pin assignment (4-pin)	C-15
Table C-9	Keyboard connector pin assignment (34-pin).....	C-16
Table C-10	Touch pad I/F connector pin assignment (4-pin).....	C-16
Table C-11	Parallel I/F connector pin assignment (25-pin).....	C-17
Table C-12	Network I/F connector pin assignment (12-pin).....	C-17
Table C-13	USB I/F connector pin assignment (8-pin)	C-18
Table C-14	LCD I/F connector pin assignment (40-pin).....	C-18
Table C-15	CRT I/F connector pin assignment (15-pin).....	C-19
Table C-16	TV connector pin assignment (4-pin)	C-19
Table C-17	External microphone connector pin assignment (6-pin).....	C-19
Table C-18	Speaker connector pin assignment (Left) (3-pin)	C-20

Appendices

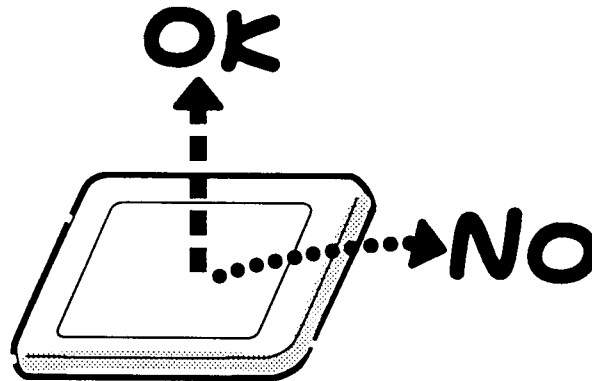
Table C-19	Speaker connector pin assignment (Right) (2-pin).....	C-20
Table C-20	Headphone connector pin assignment (6-pin)	C-20
Table C-21	1st Battery connector pin assignment (10-pin).....	C-20
Table C-22	RTC Battery connector pin assignment (3-pin).....	C-21
Table C-23	FAN I/F connector pin assignment (3-pin).....	C-21
Table C-24	DC IN connector pin assignment (4-pin).....	C-21
Table D-1	Display codes	D-1
Table H-1	MTBF.....	H-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.



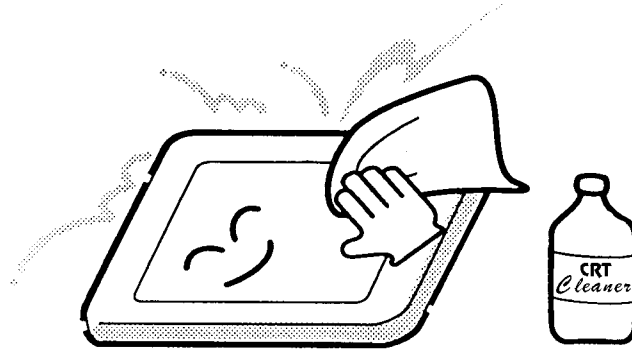
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

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

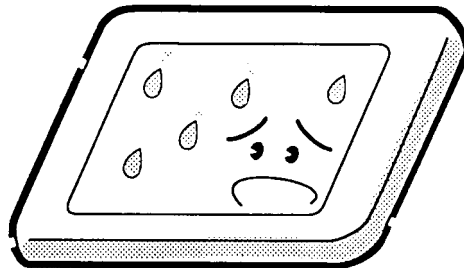


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

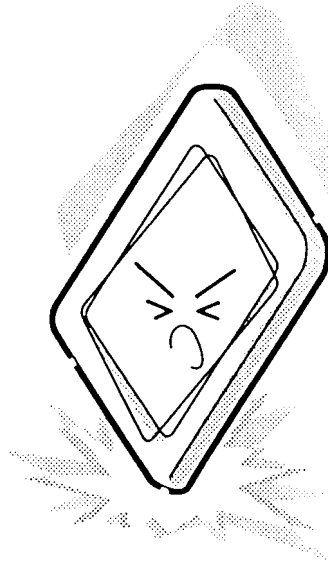
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



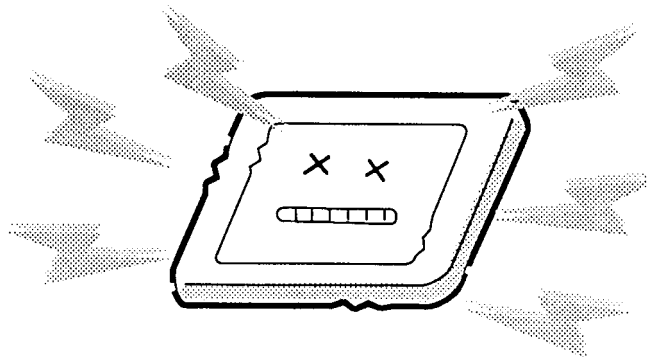
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



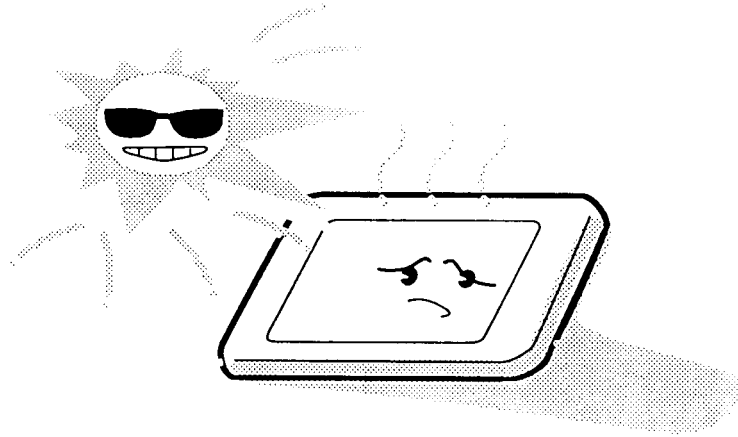
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



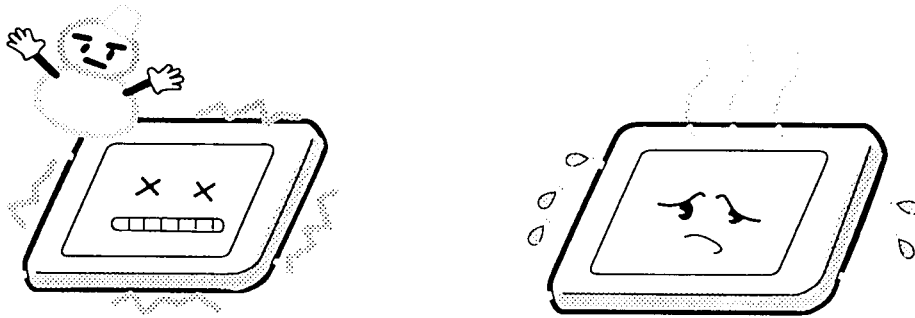
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



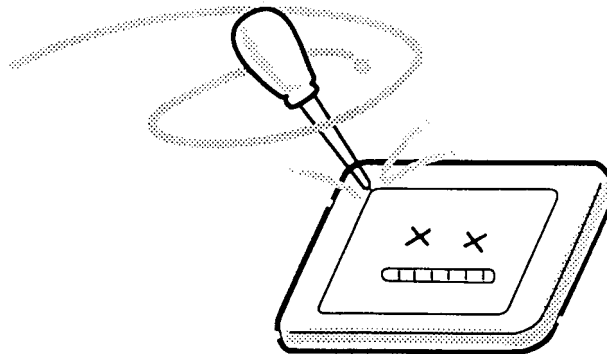
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



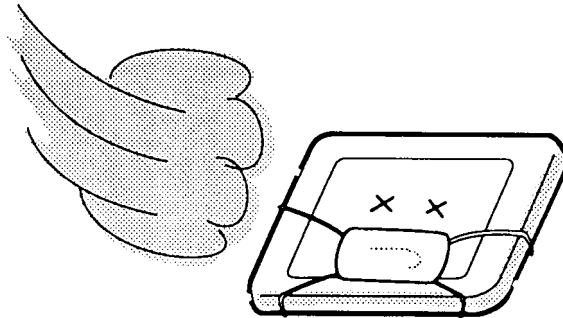
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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 System Board Front View

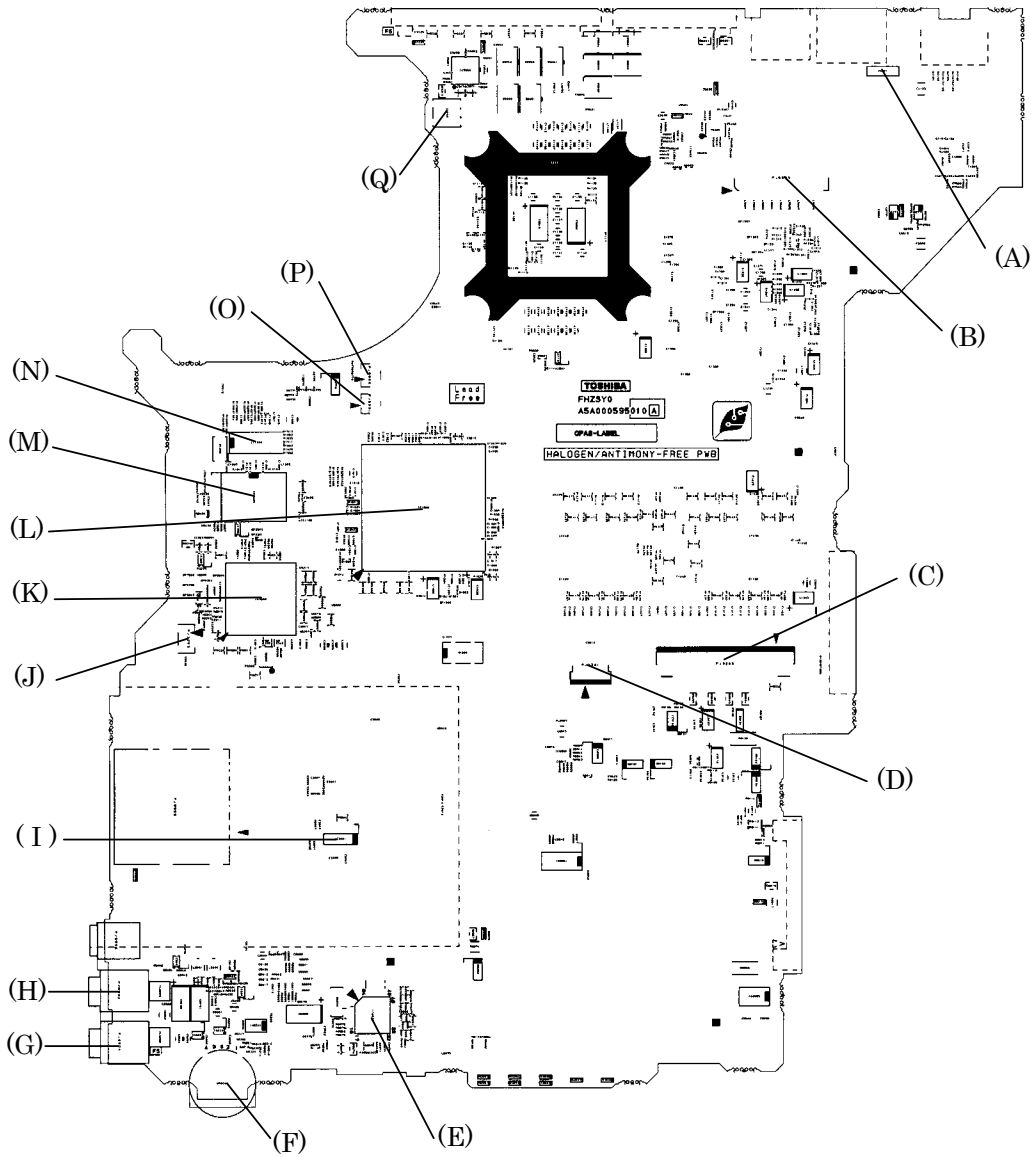


Figure B-1 System board layout (front)

Table B-1 System board ICs and connectors (front)

Mark	Number	Name
(A)	S3201	Sensor Switch
(B)	PJ5600	LCD I/F connector
(C)	PJ3200	Keyboard I/F connector
(D)	PJ3201	Touch pad I/F connector
(E)	IC8972	PSC
(F)	VR6000	Volume
(G)	PJ6004	Headphone connector
(H)	PJ6002	External microphone connector
(I)	IC2001	PC-Card Power
(J)	PJ3203	Debug Port connector
(K)	IC3200	SMSC EC/KBC
(L)	IC1600	ICH4-M
(M)	IC3403	BIOS for SMSC
(N)	IC1000	CK408
(O)	PJ6001	Right speaker connector
(P)	PJ6000	Left speaker connector
(Q)	S3200	Power Switch

B.2 System Board Back View

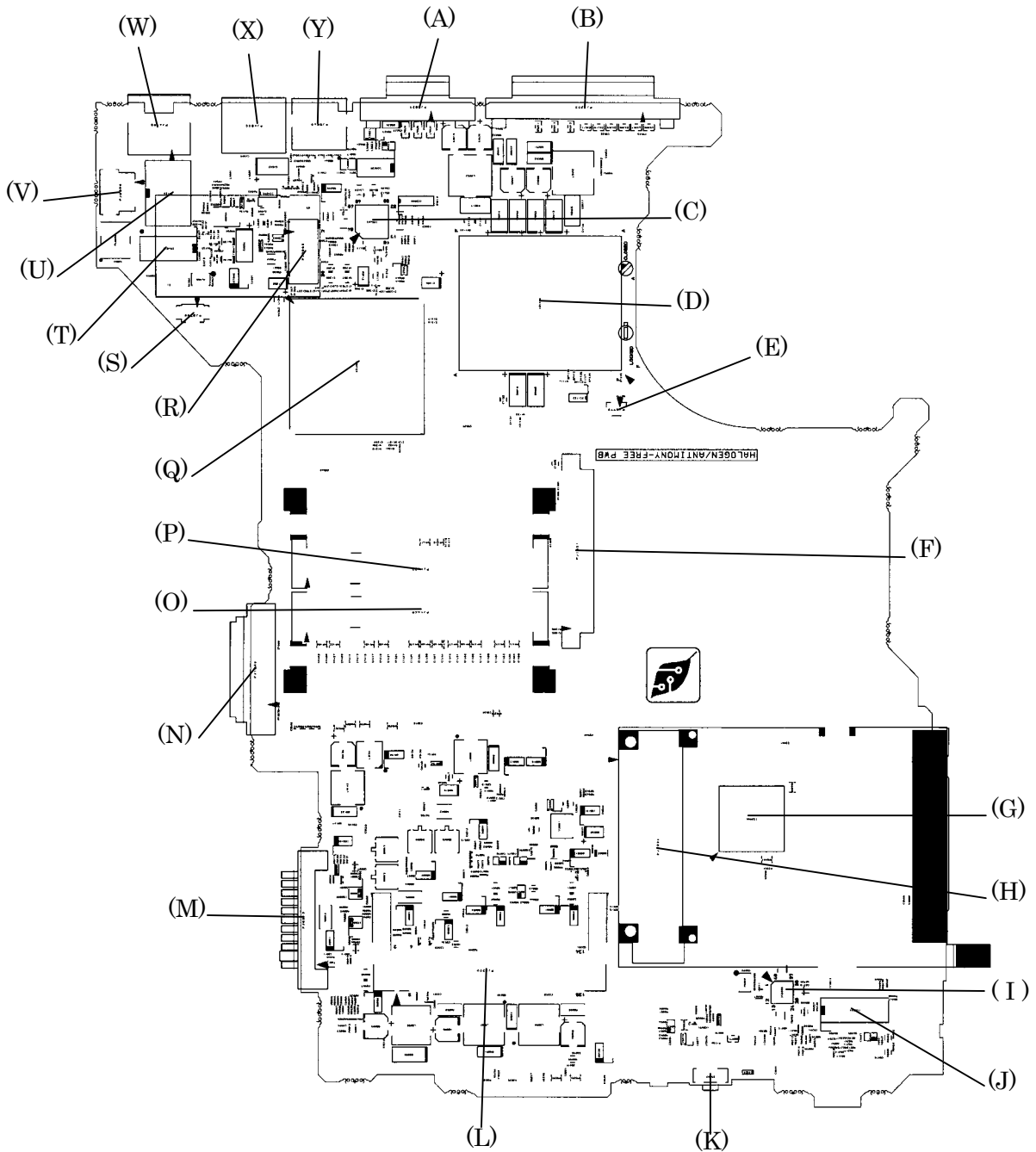


Figure B-2 System board layout (back)

Table B-2 System board ICs and connectors (back)

Mark	Number	Name
(A)	PJ5620	CRT I/F connector
(B)	PJ3202	Parallel I/F connector
(C)	IC5400	TV encoder
(D)	IS1100	MPGA479M
(E)	PJ8770	FAN I/F connector
(F)	PJ1801	HDD I/F connector
(G)	IC2000	YEBISUSS
(H)	PJ2001	PC-Card I/F connector
(I)	IC6000	AD1981B
(J)	IC6004	AMP MM1517A
(K)	S3202	Wireless Switch/LED
(L)	PJ2200	Mini PCI I/F connector
(M)	PJ8810	1st Battery connector
(N)	PJ1800	CD-ROM I/F connector
(O)	PJ1440	Memory 1 connector
(P)	PJ1420	Memory 0 connector
(Q)	IC1200	Montara-GML
(R)	PJ3000	MDC I/F connector
(S)	PJ8790	RTC Battery connector
(T)	IC4010	KINNERETH
(U)	T4100	NETWORK
(V)	PJ8800	DC-IN connector
(W)	PJ4100	Network I/F connector
(X)	PJ4600	USB I/F connector
(Y)	PJ5640	TV connector

Appendix C Pin Assignment

System Board

C.1 PJ1420 Memory 0 Connector (200-pin)

Table C-1 Memory 0 connector pin assignment (200-pin) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-P1V	-	2	MR1R25-P1V	-
3	GND	-	4	GND	-
5	SDQ05R-B2P	I/O	6	SDQ01R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ00R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	SDM00R-B2P	I
13	SDQ06R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ07R-B2P	I/O	18	SDQ03R-B2P	I/O
19	SDQ09R-B2P	I/O	20	SDQ13R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ12R-B2P	I/O
25	SDQS1R-B2P	I/O	26	SDM01R-B2P	I
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ10R-B2P	I/O
31	SDQ11R-B2P	I/O	32	SDQ15R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK0-B2P	I	36	2R5-B2V	-
37	SCK0-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ21R-B2P	I/O
43	SDQ17R-B2P	I/O	44	SDQ16R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	SDM02R-B2P	I
49	SDQ18R-B2P	I/O	50	SDQ23R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ22R-B2P	I/O	54	SDQ19R-B2P	I/O

Table C-1 Memory 0 connector pin assignment (200-pin) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
55	SDQ25R-B2P	I/O	56	SDQ31R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	SDM03R-B2P	I
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ29R-B2P	I/O
67	SDQ30R-B2P	I/O	68	SDQ27R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5A-B2P	I/O	72	SCB0A-B2P	I/O
73	SCB4A-B2P	I/O	74	SCB1A-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8A-B2P	I/O	78	GND	-
79	SCB2A-B2P	I/O	80	SCB3A-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6A-B2P	I/O	84	SCB7A-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE1-B2P	I	96	SCKE0-B2P	I
97	N.C.	-	98	N.C.	-
99	SMA12R-B2P	I	100	SMA11R-B2P	I
101	SMA09R-B2P	I	102	SMA08R-B2P	I
103	GND	-	104	GND	-
105	SMA07R-B2P	I	106	SMA06R-B2P	I
107	SMA05R-B2P	I	108	SMA04R-B2P	I
109	SMA03R-B2P	I	110	SMA02R-B2P	I
111	SMA01R-B2P	I	112	SMA00R-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10R-B2P	I	116	SBS1R-B2P	I
117	SBS0R-B2P	I	118	SRASR-B2N	I
119	SWER-B2N	I	120	SCASR-B2N	I

Table C-1 Memory 0 connector pin assignment (200-pin) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
121	SCS0-B2N	I	122	SCS1-B2N	I
123	N.C.	-	124	N.C.	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ32R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ33R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	SDM04R-B2P	I
135	SDQ35R-B2P	I/O	136	SDQ34R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ39R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ45R-B2P	I/O	146	SDQ41R-B2P	I/O
147	SDQS5R-B2P	I/O	148	SDM05R-B2P	I
149	GND	-	150	GND	-
151	SDQ43R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ40R-B2P	I/O	154	SDQ42R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK1-B2N	I
159	GND	-	160	SCK1-B2P	I
161	GND	-	162	GND	-
163	SDQ53R-B2P	I/O	164	SDQ52R-B2P	I/O
165	SDQ48R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	SDM06R-B2P	I
171	SDQ50R-B2P	I/O	172	SDQ51R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55R-B2P	I/O	176	SDQ54R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SD56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	SDM07R-B2P	I
185	GND	-	186	GND	-

Table C-1 Memory 0 connector pin assignment (200-pin) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
187	SDQ59R-B2P	I/O	188	SDQ58R-B2P	I/O
189	SDQ63R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	N.C.	-	200	N.C.	-

C.2 PJ1440 Memory 1 Connector (200-pin)

Table C-2 Memory 1 connector pin assignment (200-pin) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	MR1R25-P1V	-	2	MR1R25-P1V	-
3	GND	-	4	GND	-
5	SDQ05R-B2P	I/O	6	SDQ01R-B2P	I/O
7	SDQ04R-B2P	I/O	8	SDQ00R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	SDM00R-B2P	I
13	SDQ06R-B2P	I/O	14	SDQ02R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ07R-B2P	I/O	18	SDQ03R-B2P	I/O
19	SDQ09R-B2P	I/O	20	SDQ13R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ12R-B2P	I/O
25	SDQS1R-B2P	I/O	26	SDM01R-B2P	I
27	GND	-	28	GND	-
29	SDQ14R-B2P	I/O	30	SDQ10R-B2P	I/O
31	SDQ11R-B2P	I/O	32	SDQ15R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK3-B2P	I	36	2R5-B2V	-
37	SCK3-B2N	I	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ21R-B2P	I/O
43	SDQ17R-B2P	I/O	44	SDQ16R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	SDM02R-B2P	I
49	SDQ18R-B2P	I/O	50	SDQ23R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ22R-B2P	I/O	54	SDQ19R-B2P	I/O

Table C-2 Memory 1 connector pin assignment (200-pin) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
55	SDQ25R-B2P	I/O	56	SDQ31R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ24R-B2P	I/O	60	SDQ28R-B2P	I/O
61	SDQS3R-B2P	I/O	62	SDM03R-B2P	I
63	GND	-	64	GND	-
65	SDQ26R-B2P	I/O	66	SDQ29R-B2P	I/O
67	SDQ30R-B2P	I/O	68	SDQ27R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB5B-B2P	I/O	72	SCB0B-B2P	I/O
73	SCB4B-B2P	I/O	74	SCB1B-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8B-B2P	I/O	78	GND	-
79	SCB2B-B2P	I/O	80	SCB3B-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB6B-B2P	I/O	84	SCB7B-B2P	I/O
85	N.C.	-	86	N.C.	-
87	GND	-	88	GND	-
89	2R5-B2V	-	90	GND	-
91	GND	-	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE3-B2P	I	96	SCKE2-B2P	I
97	N.C.	-	98	N.C.	-
99	SMA12-B2P	I	100	SMA11-B2P	I
101	SMA09-B2P	I	102	SMA08-B2P	I
103	GND	-	104	GND	-
105	SMA07-B2P	I	106	SMA06-B2P	I
107	SMAB5R-B2P	I	108	SMAB4R-B2P	I
109	SMA03-B2P	I	110	SMAB2R-B2P	I
111	SMAB1R-B2P	I	112	SMA00-B2P	I
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10-B2P	I	116	SBS1-B2P	I
117	SBS0-B2P	I	118	SRAS-B2N	I
119	SWE-B2N	I	120	SCAS-B2N	I

Table C-2 Memory 1 connector pin assignment (200-pin) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
121	SCS2-B2N	I	122	SCS3-B2N	I
123	N.C.	-	124	N.C.	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ32R-B2P	I/O
129	SDQ36R-B2P	I/O	130	SDQ33R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	SDM04R-B2P	I
135	SDQ35R-B2P	I/O	136	SDQ34R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ38R-B2P	I/O	140	SDQ39R-B2P	I/O
141	SDQ44R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ45R-B2P	I/O	146	SDQ41R-B2P	I/O
147	SDQS5R-B2P	I/O	148	SDM05R-B2P	I
149	GND	-	150	GND	-
151	SDQ43R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ40R-B2P	I/O	154	SDQ42R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK4-B2N	I
159	GND	-	160	SCK4-B2P	I
161	GND	-	162	GND	-
163	SDQ53R-B2P	I/O	164	SDQ52R-B2P	I/O
165	SDQ48R-B2P	I/O	166	SDQ49R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	SDM06R-B2P	I
171	SDQ50R-B2P	I/O	172	SDQ51R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ55R-B2P	I/O	176	SDQ54R-B2P	I/O
177	SDQ60R-B2P	I/O	178	SDQ57R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ61R-B2P	I/O
183	SDQS7R-B2P	I/O	184	SDM07R-B2P	I
185	GND	-	186	GND	-

Table C-2 Memory 1 connector pin assignment (200-pin) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
187	SDQ59R-B2P	I/O	188	SDQ58R-B2P	I/O
189	SDQ63R-B2P	I/O	190	SDQ62R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	P3V	-
195	SMBCLK-P3P	I	196	GND	-
197	P3V	-	198	GND	-
199	N.C.	-	200	N.C.	-

C.3 PJ1800 Optical Drive I/F Connector (50-pin)

Table C-3 Optical drive I/F connector pin assignment (50-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	CDAUDL-PXP	I	2	CDAUDR-PXP	I
3	CD-GND	-	4	N.C.	-
5	IDRSTB-P5N	O	6	SDD08-P5P	I/O
7	SDD07-P5P	I/O	8	SDD09-P5P	I/O
9	SDD06-P5P	I/O	10	SDD10-P5P	I/O
11	SDD05-P5P	I/O	12	SDD11-P5P	I/O
13	SDD04-P5P	I/O	14	SDD12-P5P	I/O
15	SDD03-P5P	I/O	16	SDD13-P5P	I/O
17	SDD02-P5P	I/O	18	SDD14-P5P	I/O
19	SDD01-P5P	I/O	20	SDD15-P5P	I/O
21	SDD00-P5P	I/O	22	SDDREQ-P5P	I
23	GND	-	24	SDIOR-P3N	O
25	SDIOW-P3N	O	26	GND	-
27	SIORDY-P5P	I	28	SDDACK-P3N	O
29	IRQ15-P3P	I	30	N.C.	-
31	SDA1-P3P	O	32	N.C.	-
33	SDA0-P3P	O	34	SDA2-P3P	O
35	SDCS1-P3N	O	36	SDCS3-P3N	O
37	CDRLED-P5N	I/O	38	P5V	-
39	P5V	-	40	P5V	-
41	P5V	-	42	P5V	-
43	GND	-	44	GND	-
45	GND	-	46	N.C.	-
47	N.C.	-	48	GND	-
49	N.C.	-	50	N.C.	-

C.4 PJ1801 HDD I/F Connector (44-pin)

Table C-4 HDD I/F connector pin assignment (44-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	IDRSTA-P5N	O	2	GND	-
3	PDD07-P3P	I/O	4	PDD08-P3P	I/O
5	PDD06-P3P	I/O	6	PDD09-P3P	I/O
7	PDD05-P3P	I/O	8	PDD10-P3P	I/O
9	PDD04-P3P	I/O	10	PDD11-P3P	I/O
11	PDD03-P3P	I/O	12	PDD12-P3P	I/O
13	PDD02-P3P	I/O	14	PDD13-P3P	I/O
15	PDD01-P3P	I/O	16	PDD14-P3P	I/O
17	PDD00-P3P	I/O	18	PDD15-P3P	I/O
19	GND	-	20	N.C.	-
21	PDDREQ-P3P	I	22	GND	-
23	PDIOW-P3N	O	24	GND	-
25	PDIOR-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	GND	-
29	PDDACK-P3N	O	30	GND	-
31	IRQ14-P3P	I	32	N.C.	-
33	PDA1-P3P	O	34	N.C.	-
35	PDA0-P3P	O	36	PDA2-P3P	O
37	PDCS1-P3N	O	38	PDCS3-P3N	O
39	HDDLED-P5N	I/O	40	GND	-
41	P5V	-	42	P5V	-
43	GND	-	44	N.C.	-

C.5 PJ2001 PC Card I/F Connector (68-pin)*Table C-5 PC card I/F connector pin assignment (68-pin) (1/2)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ACAD00-BYP	I/O
3	ACAD01-BYP	I/O	4	ACAD03-BYP	I/O
5	ACAD05-BYP	I/O	6	ACAD07-BYP	I/O
7	ACCBE0-BYN	I/O	8	ACAD09-BYP	I/O
9	ACAD11-BYP	I/O	10	ACAD12-BYP	I/O
11	ACAD14-BYP	I/O	12	ACCBE1-BYN	I/O
13	ACPAR-BYP	I/O	14	ACPER-BYN	I/O
15	ACGNT-BYN	I	16	ACINT-BYN	O
17	MCVCCA-BYV	-	18	MCVPPA-BYV	-
19	ACCLK-BYP	I/O	20	ACIRDY-BYN	I/O
21	ACCBE2-BYN	I/O	22	ACAD18-BYP	I/O
23	ACAD20-BYP	I/O	24	ACAD21-BYP	I/O
25	ACAD22-BYP	I/O	26	ACAD23-BYP	I/O
27	ACAD24-BYP	I/O	28	ACAD25-BYP	I/O
29	ACAD26-BYP	I/O	30	ACAD27-BYP	I/O
31	ACAD29-BYP	I/O	32	ACD02-BYP	I/O
33	ACCLKR-BYN	I/O	34	GND	-
35	GND	-	36	ACCD1-B3N	O
37	ACAD02-BYP	I/O	38	ACAD04-BYP	I/O
39	ACAD06-BYP	I/O	40	ACD14-BYP	I/O
41	ACAD08-BYP	I/O	42	ACAD10-BYP	I/O
43	ACVS1-B3P	I/O	44	ACAD13-BYP	I/O
45	ACAD15-BYP	I/O	46	ACAD16-BYP	I/O
47	ACA18-BYP	I/O	48	ACLOCK-BYN	I/O
49	ACSTOP-BYN	I/O	50	ACDEVS-BYN	I/O
51	MCVCCA-BYV	-	52	MCVPPA-BYV	-
53	ACTRDY-BYN	I/O	54	ACFRAM-BYN	I/O
55	ACAD17-BYP	I/O	56	ACAD19-BYP	I/O
57	ACVS2-B3P	I/O	58	ACRST-BYN	I/O
59	ACSERR-BYN	I/O	60	ACREQ-BYN	O

Table C-5 PC Card slot connector pin assignment (68-pin)(2/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
61	ACCBE3-BYN	I/O	62	ACAUDI-BYP	O
63	ACSTSC-BYP	O	64	ACAD28-BYP	I/O
65	ACAD30-BYP	I/O	66	ACAD31-BYP	I/O
67	ACCD2-B3N	O	68	GND	-

C.6 PJ2200 Mini PCI I/F Connector (124-pin)

Table C-6 Mini PCI I/F connector pin assignment (124-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	N.C..	-	2	N.C.	-
3	N.C.	-	4	N.C.	-
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	N.C.	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	WLON-S3N	I	14	N.C.	-
15	GND	-	16	N.C.	-
17	PIROG-P3N	I/O	18	P5V	-
19	P3V	-	20	PIRQD-P3N	I/O
21	N.C.	-	22	N.C.	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	O	26	PCIRST-S3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	I	30	PGNT2-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	I
35	AD29-P3P	I/O	36	N.C.	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	-
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	N.C.	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD26-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-

Table C-5 Mini PCI I/F connector pin assignment (124-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	O	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O
69	GND	-	70	P3V	-
71	PERR-P3N	I/O	72	DEVSEL-P3N	I/O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	N.C.	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	N.C.	-
99	AD01-P3P	I/O	100	N.C.	-
101	GND	-	102	GND	-
103	N.C.	-	104	GND	-
105	N.C.	-	106	N.C.	-
107	N.C.	-	108	N.C.	-
109	N.C.	-	110	N.C.	-
111	N.C.	I	112	N.C.	-
113	GND	-	114	GND	-
115	N.C.	-	116	N.C.	-
117	GND	-	118	N.C.	-
119	GND	-	120	GND	-
121	N.C.	-	122	N.C.	-
123	N.C.	-	124	B3V	-

C.7 PJ3000 MDC I/F Connector (30-pin)*Table C-7 MDC I/F connector pin assignment (30-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	N.C.	-	2	MDC-GND	-
3	MDC-GND	-	4	PHONE-BXN	O
5	N.C.	-	6	N.C.	-
7	N.C.	-	8	MDC-GND	-
9	N.C.	-	10	N.C.	-
11	N.C.	-	12	N.C.	-
13	N.C.	-	14	N.C.	-
15	MDC-GND	-	16	MDC-B3V	I
17	B3V	-	18	N.C.	-
19	MDC-GND	-	20	MDC-GND	-
21	N.C.	-	22	M97SY1-P3P	I
23	M97OT1-P3P	I	24	N.C.	-
25	M97RS1-S3N	I	26	M97DI1-B3P	O
27	MDC-GND	-	28	MDC-GND	-
29	MDC-GND	-	30	X97BC1-P3P	I/O

C.8 PJ3203 Debug Port Connector (4-pin)*Table C-8 Debug port connector pin assignment (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	B3V	-	2	DBGRX-P3P	O
3	DBGTX-P3P	I	4	GND	-

C.9 PJ3333 Keyboard Connector (34-pin)*Table C-9 Keyboard connector pin assignment (34-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	O
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	O
17	KBRT02-S3N	O	18	KBRT03-S3N	O
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	O	22	KBRT05-S3N	O
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	O	26	KBRT07-S3N	O
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	P5V	-	30	N.C.	-
31	N.C.	-	32	N.C.	-
33	N.C.	-	34	P5V	-

C.10 PJ3201 Touch Pad I/F Connector (4-pin)*Table C-10 Touch pad I/F connector pin assignment (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	IPSDAT-P5P	I/O
3	IPSCCLK-P5P	I/O	4	GND	-

C.11 PJ3202 Parallel I/F Connector (25-pin)*Table C-11 Parallel I/F connector pin assignment (25-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	STROB-P5N	I	2	PDB00-P5P	I/O
3	PDB01-P5P	I/O	4	PDB02-P5P	I/O
5	PDB03-P5P	I/O	6	PDB04-P5P	I/O
7	PDB05-P5P	I/O	8	PDB06-P5P	I/O
9	PDB07-P5P	I/O	10	ACK-P5N	I
11	BUSY-P5P	I	12	PE-P5P	I
13	SELCT-P5P	I	14	AUTFD-P5N	O
15	ERROR-P5N	I	16	PINIT-P5N	O
17	SLIN-P5N	O	18	GND	-
19	GND	-	20	GND	-
21	GND	-	22	GND	-
23	GND	-	24	GND	-
25	GND	-			

C.12 PJ4100 Network I/F Connector (12-pin)*Table C-12 Network I/F connector pin assignment (12-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	TDP-E3P	I	2	TDN-E3N	I
3	RDP-E3P	O	4	Not Mount	-
5	Not Mount	-	6	RDN-E3N	O
7	Not Mount	-	8	Not Mount	-
9	LAN-E3V	-	10	LNK-E3N	I
11	LAN-E3V	-	12	ACT-E3N	I

C.13 PJ4600 USB I/F Connector (8-pin)*Table C-13 USB I/F connector pin assignment (8-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	USBOPS-E5V	-	2	USBP0-S3N	I/O
3	USBP0-S3P	I/O	4	GND	-
5	USBOPS-E5V	-	6	USBP1-S3N	I/O
7	USBP1-S3P	I/O	8	GND	-

C.14 PJ5600 LCD I/F Connector (40-pin)*Table C-14 LCD I/F connector pin assignment (40-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	BRT0-P5P	I
3	TXDTA1-PYP	I	4	BRT1-P5P	I
5	TXDTA1-PYN	O	6	BRT2-P5P	I
7	TXDTA0-PYP	I	8	FL-P5V	-
9	TXDTA0-PYN	O	10	FL-P5V	-
11	TXCLKA-PYP	I	12	GND	-
13	TXCLKA-PYN	O	14	BRT2DA-S3P	I
15	TXDTA2-PYP	I	16	GND	-
17	TXDTA2-PYN	O	18	GND	-
19	GND	-	20	GND	-
21	TXDTB0-PYP	I	22	GND	-
23	TXDTB0-PYN	O	24	GND	-
25	TXDTB2-PYP	I	26	GND	-
27	TXDTB2-PYN	O	28	PNL0-P3P	O
29	TXCLKB-PYP	I	30	PNL1-P3P	O
31	TXCLKB-PYN	O	32	PNL2-P3P	O
33	TXDTB1-PYP	I	34	GND	-
35	TXDTB1-PYN	O	36	GND	-
37	PNL-P3V	-	38	GND	-
39	GND	-	40	GND	-

C.15 PJ5620 CRT I/F Connector (15-pin)*Table C-15 CRT I/F connector pin assignment (15-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	RED-PXP	I	2	GREEN-PXP	I
3	BLUE-PXP	I	4	N.C.	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	-	10	GND	-
11	N.C.	-	12	DDCADA-P3P	I/O
13	CRTEN-B3N	O	14	VSYNC-P3P	I/O
15	DDCACK-P3P	I/O			

C.16 PJ5640 TV Connector (4-pin)*Table C-16 TV connector pin assignment (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	LUMINA-PYP	I	2	CHROMA-PYP	I
3	GND	-	4	GND	-

C.17 PJ6002 External Microphone Connector (6-pin)*Table C-17 External microphone connector pin assignment (6-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	MICIN-PXP	O
3	MMREFV-P2V	-	4	GND	-
5	N.C.	-	6	MMRFEV	I

C.18 PJ6000 Speaker Connector (Left) (3-pin)*Table C-18 Speaker connector (left) pin assignment (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	SPOLP-PXP	I	2	N.C.	-
3	SPOLM-PXN	I			

C.19 PJ6001 Speaker Connector (Right) (2-pin)*Table C-19 Speaker connector (right) pin assignment (2-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	SPORP-PXP	I	2	SPORM-PXN	I

C.20 PJ6004 Headphone Connector (6-pin)*Table C-20 Headphone connector pin assignment (6-pin))*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEDL-PXP	I
3	HEDR-PXP	I	4	GND	-
5	SPKEN-P5P	O	6	N.C.	-

C.21 PJ8810 1st Battery Connector (10-pin)*Table C-21 1st Battery connector pin assignment (10-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	CHGVL	O	2	BTMP1	O
3	CB1CHG-S5P	I	4	M5V	-
5	PSCL-S5P	O	6	PSDA-S5P	O
7	GND	-	8	DBT10V-S5N	O
9	GND	-	10	GND	-

C.22 PJ8790 RTC Battery Connector (3-pin)*Table C-22 RTC Battery connector pin assignment (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	S3V	-	2	N.C.	-
3	GND	-			

C.23 PJ8770 FAN I/F Connector (3-pin)*Table C-23 FAN I/F connector pin assignment (3-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	GND	-
3	FANG-P3P	O			

C.24 PJ8800 DC-IN Connector (4-pin)*Table C-24 DC-IN connector pin assignment (4-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	ADPDC	O	2	PVDC	O
3	PVH	I	4	PVL	I

Appendix D Display Codes

D.1 Display Codes

Table D-1 Display Codes

HEXA DECIMAL VALUE	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	BLANK (NULL)	▶	BLANK (SPACE)	0	@	P	'	p	Ç	É	ó	▤	▥	▦	α	≡
1	☺	◀	!	1	A	Q	a	q	ü	æ	í	▧	▨	▩	β	±
2	☹	↑	"	2	B	R	b	r	é	Æ	ó	▪	▫	▬	Γ	∞
3	♥	!!	#	3	C	S	c	s	â	ô	ú	▭	▮	▯	π	∞
4	♠	¶	\$	4	D	T	d	t	ä	ö	ñ	▰	▱	▲	Σ	∫
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	△	▴	▵	σ	∫
6	♠	▬	&	6	F	V	f	v	ã	û	ã	▴	▵	▶	μ	÷
7	•	↓	'	7	G	W	g	w	ç	ù	o	▷	▸	▹	τ	≈
8	●	↑	(	8	H	X	h	x	ê	ÿ	ï	▸	▹	►	θ	°
9	○	↓	)	9	I	Y	i	y	ë	Ö	∟	▹	►	▻	θ	•
A	●	→	*	:	J	Z	j	z	è	Ü	∟	▹	►	▻	Ω	•
B	♂	←	+	;	K	[	k	{	ï	ç	½	▹	►	▻	δ	√
C	♀	└	,	<	L	\	l	|	î	£	¼	▹	►	▻	∞	∞
D	♪	↔	-	=	M	]	m	}	î	¥	ı	▹	►	▻	φ	2
E	♪	▲	.	>	N	^	n	~	Ä	¶	©	▹	►	▻	€	■
F	☼	▼	/	?	O	_	o	Δ	Å	ƒ	»	▹	►	▻	∩	BLANK (FF)

Appendix E Key Layout

E.1 Keyboard Layout

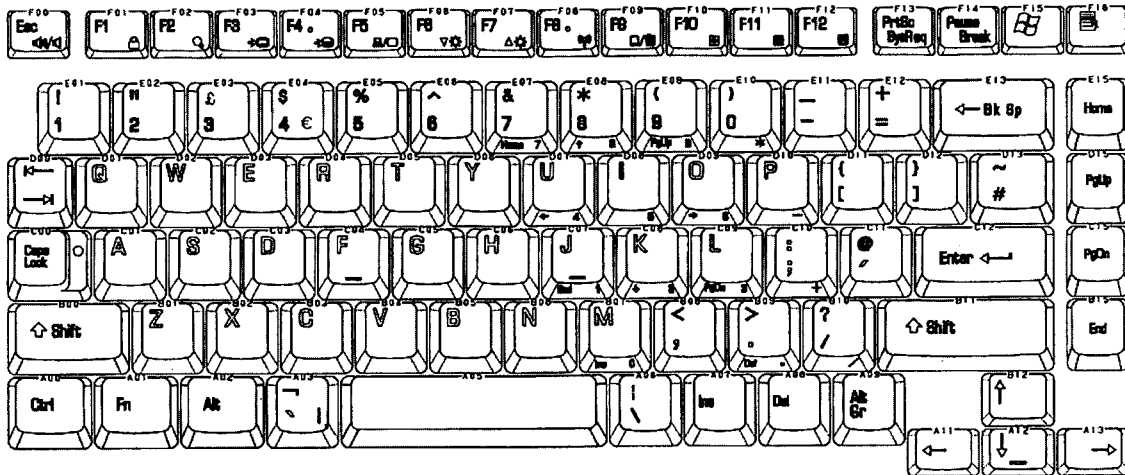


Figure E-1 Keyboard layout (for UK, made by Fujitsu, G83C0001K110) (1/5)

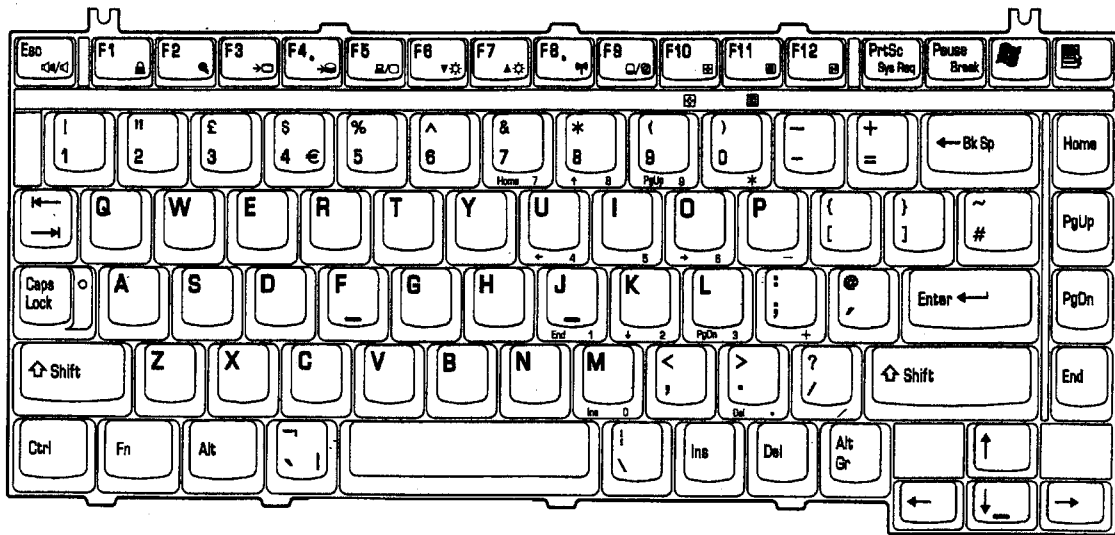


Figure E-1 Keyboard layout (for UK, made by ALPS, UE2024P136) (2/5)

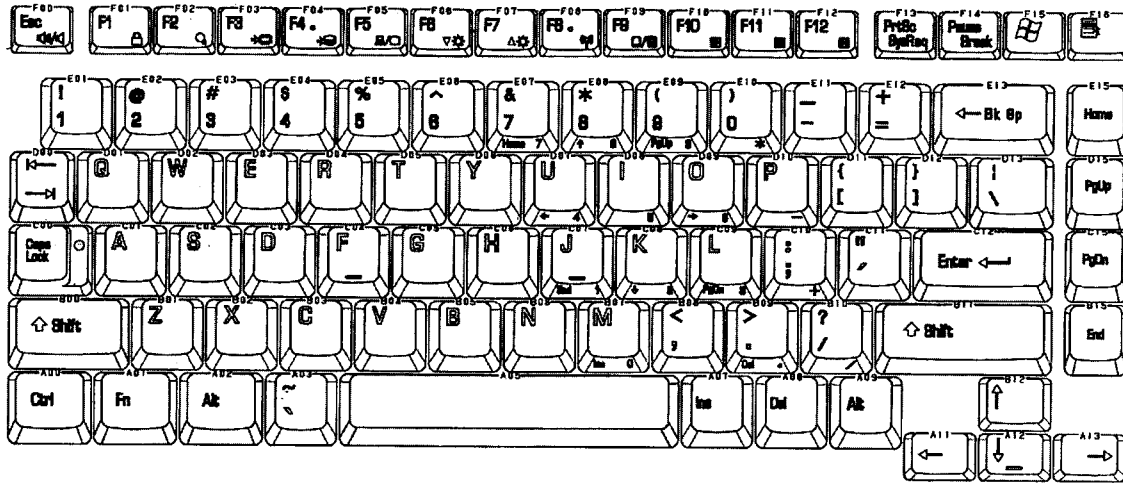


Figure E-1 Keyboard layout (for US, made by Fujitsu, G83C0001K210) (3/5)

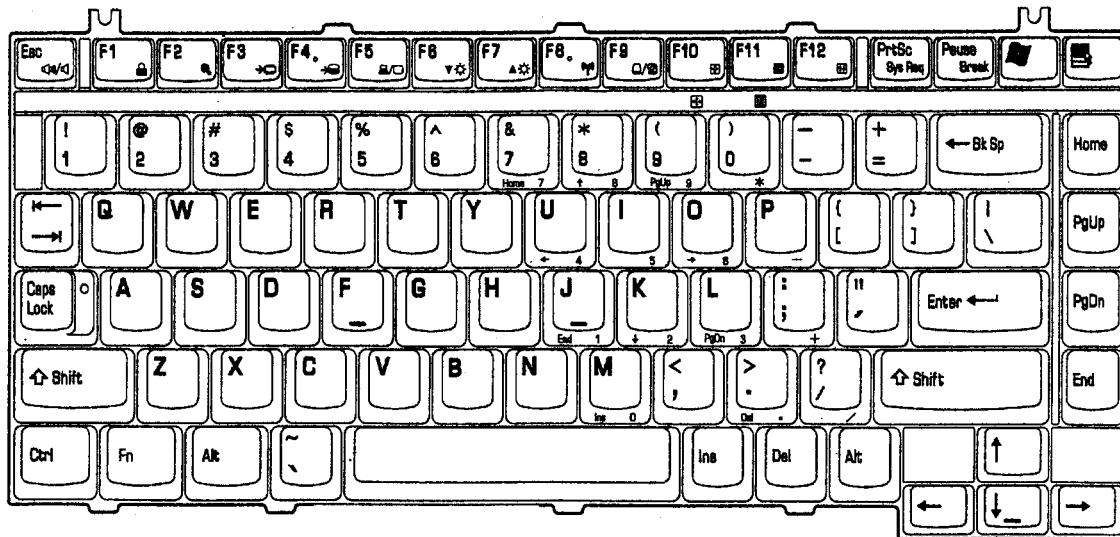


Figure E-1 Keyboard layout (for US, made by ALPS, UE2024P137) (4/5)

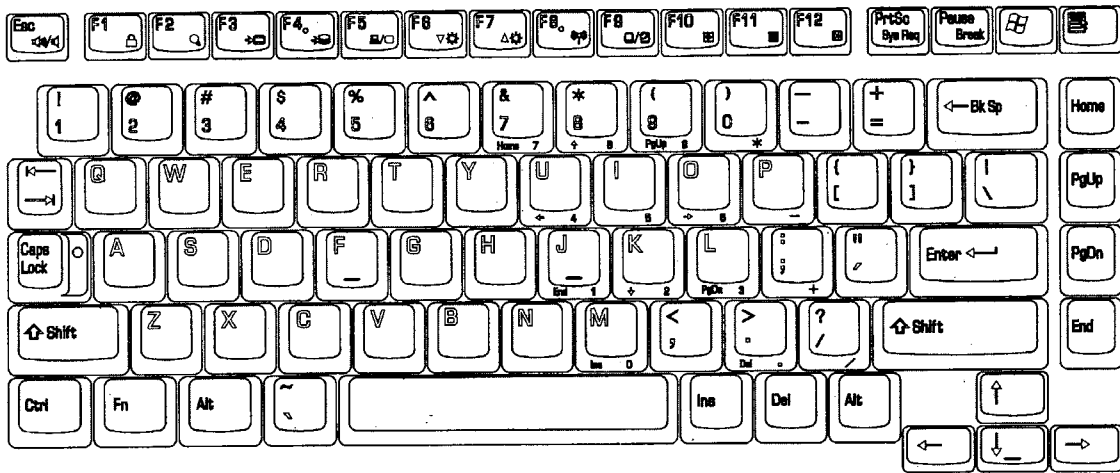


Figure E-1 Keyboard layout (for US, made by NMB, G83C0000E510) (5/5)

Appendix F Wiring Diagrams

F.1 Parallel Port Wraparound Connector

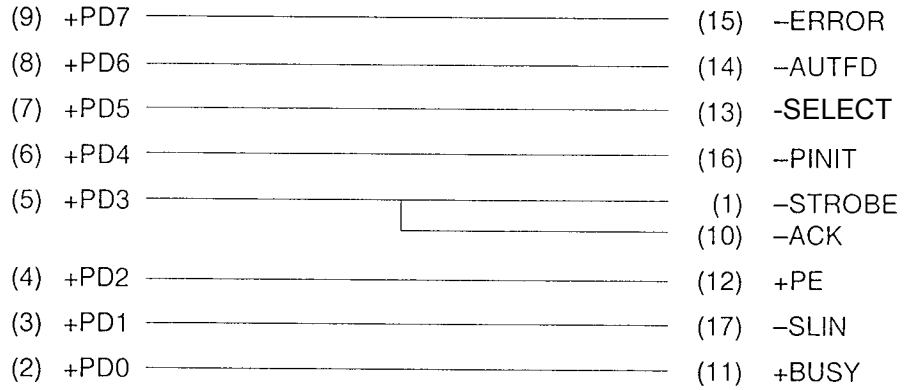


Figure F-1 Parallel port wraparound connector

F.2 RGB Monitor ID Wraparound Connector (15-Pin to 15-Pin)

(1) RED	_____	RED	(1)
(2) GREEN	_____	GREEN	(2)
(3) BLUE	_____	BLUE	(3)
(4) NC	_____	NC	(4)
(5) GND	_____	GND	(5)
(6) GND	_____	GND	(6)
(7) GND	_____	GND	(7)
(8) GND	_____	GND	(8)
(9) 5V	_____	5V	(9)
(10) GND	_____	GND	(10)
(11) NC	_____	NC	(11)
(12) SDA	_____	SDA	(12)
(13) HSYNC	_____	HSYNC	(13)
(14) VSYNC	_____	VSYNC	(14)
(15) SDL	_____	SCL	(15)

Figure F-2 RGB monitor ID wraparound connector (15-Pin to 15-Pin)

Appendix G BIOS/KBC/EC Update

To update the BIOS, KBC or EC, insert the FD for update into the FDD. Then turn on the power of the computer while pressing the following key until the power LED blinks.

For BIOS update: ~ (tilde key)

For KBC or EC update: **Tab**

When the update is completed, the message will appear and the beep will sound. Then the power of the computer is turned off.

Make sure of the update using the T&D.

<p>NOTE: <i>Do not turn off the power of the computer during update. Otherwise the computer may not start again.</i></p>

Appendix H Reliability

The following table shows the MTBF (Mean Time Between Failures) of system.

Table H-1 MTBF

Component	Time (hours)
System	6,422

