

**Toshiba Personal Computer
Satellite A50/TECRA A2 Series
Maintenance Manual**

TOSHIBA CORPORATION

File Number 960-478

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Toshiba Satellite A50/TECRA A2 Series Maintenance Manual

First edition April 2004

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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 A50/TECRA A2 series 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.

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite A50/TECRA A2 series.

NOTE: *This Satellite A50/TECRA A2 series is a BTO-support personal computer. Each model 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 Satellite A50/TECRA A2 series 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 this computer that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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Hardware Overview

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1.1 Features

The Satellite A50/TECRA A2 is a high performance all-in-one PC running a Pentium M or Celeron M processor.

Features are listed below.

Microprocessor [CPU Easy Replaceable]

Microprocessor used is different from each model.

Mobile Intel® Pentium® -M model

A 1.50/1.60/1.70GHz Pentium M processor with a 1.50/1.60/1.70GHz internal clock, 400MHz bus and 1.48/0.88V core operation

Mobile Intel® Celeron® -M model

A 1.20/1.30/1.40GHz Celeron M processor with a 1.20/1.30/1.40GHz internal clock, 400MHz bus and 1.356V core operation

Cache memory

Mobile Intel® Pentium® -M model

64KB L1 cache (in CPU) and 1024KB L2 cache

Mobile Intel® Celeron® -M model

64KB L1 cache (in CPU) and 512KB L2 cache

Memory

Two SO-DIMM slots for DDR333 or DDR266. Memory modules can be installed to provide a maximum of 1GB or 2GB (It depend on a model.) Memory modules are available in 256MB, 512MB and 1,024MB sizes.

Montara-GML model can support 1GB in total as its maximum memory.

Montara-GM+ model can support 2GB in total as its maximum memory.

VRAM

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

HDD

Single 20GB, 30GB, 40GB, 60GB or 80GB internal drive. 2.5 inch x 9.5mm height.

USB FDD

The two-mode 3.5-inch USB FDD supports 720KB, 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, DVD-ROM & CD-R/RW, DVD-R/-RW or DVD Super Multi Drive is supported.

 Battery

The RTC battery is mounted inside the computer.

The main battery is a detachable lithium ion battery (2,200mAh: Li-Ion, 3 cell / 4,400mAh: Li-Ion, 6cell / 8,800mAh: Li-Ion, 12cell).

 USB (Universal Serial Bus)

Two or three USB ports are provided. The ports comply with the USB2.0 standard, which enables data transfer speeds 40 times faster than USB1.1 standard. USB1.1 is also supported.

 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, 802.11g or 802.11a/g) is equipped on the mini PCI slot.

 LAN/MODEM

Connectors for LAN and Modem are separately mounted.

 RGB

The port enables connection of an external monitor.

 IEEE1394

The computer comes with one IEEE1394 port. It enables high-speed transfer directly from external devices such as digital video cameras.

 Docking interface port

- RJ-45 LAN jack, RJ-11 Modem jack
- External monitor port
- PS/2 mouse and PS/2 keyboard ports
- Parallel port
- Serial port
- DC IN socket
- Audio line-in, line-out jack
- Four USB ports
- IEEE1394 port (The port is not supported by the computer.)
- DVI port (The port is not supported by the computer.)

Figure 1-1 shows the front of the computer.

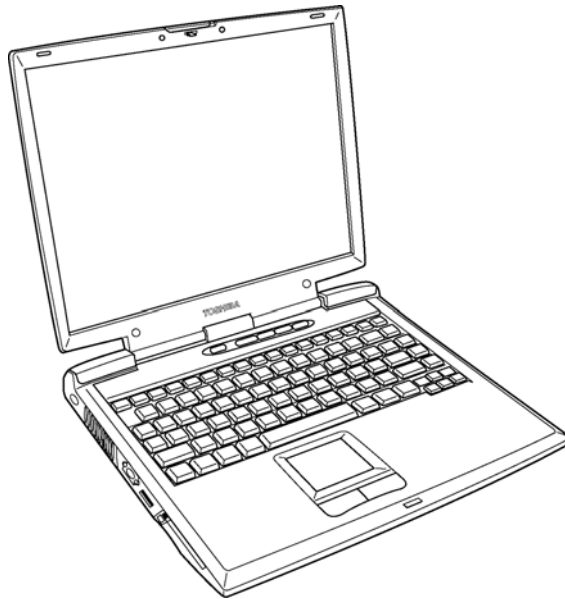


Figure 1-1 Front of the computer

Figure 1-2 shows the system units configuration.

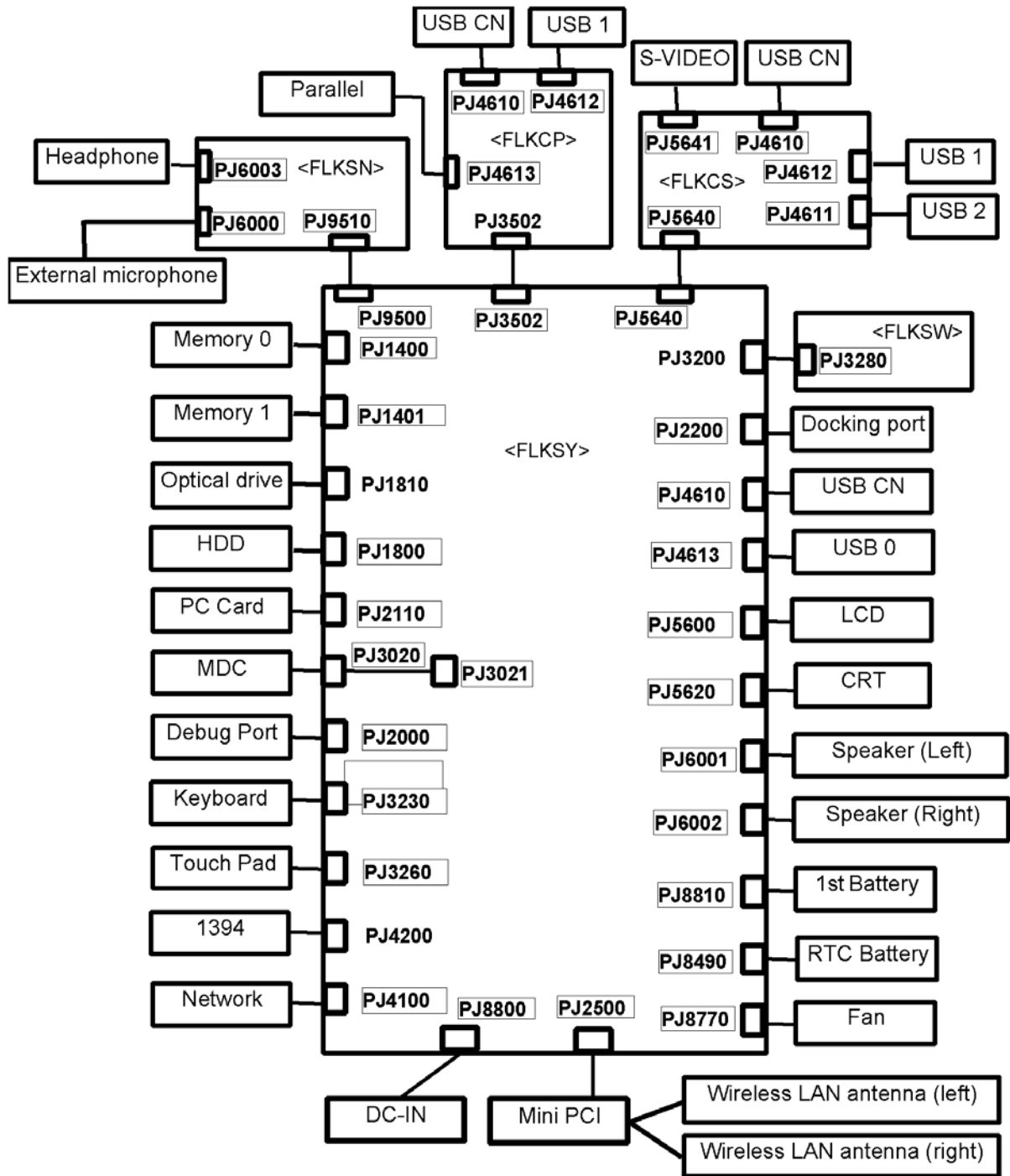


Figure 1-2 System units configuration

1.2 System Block Diagram

Figure 1-3 shows the system block diagram.

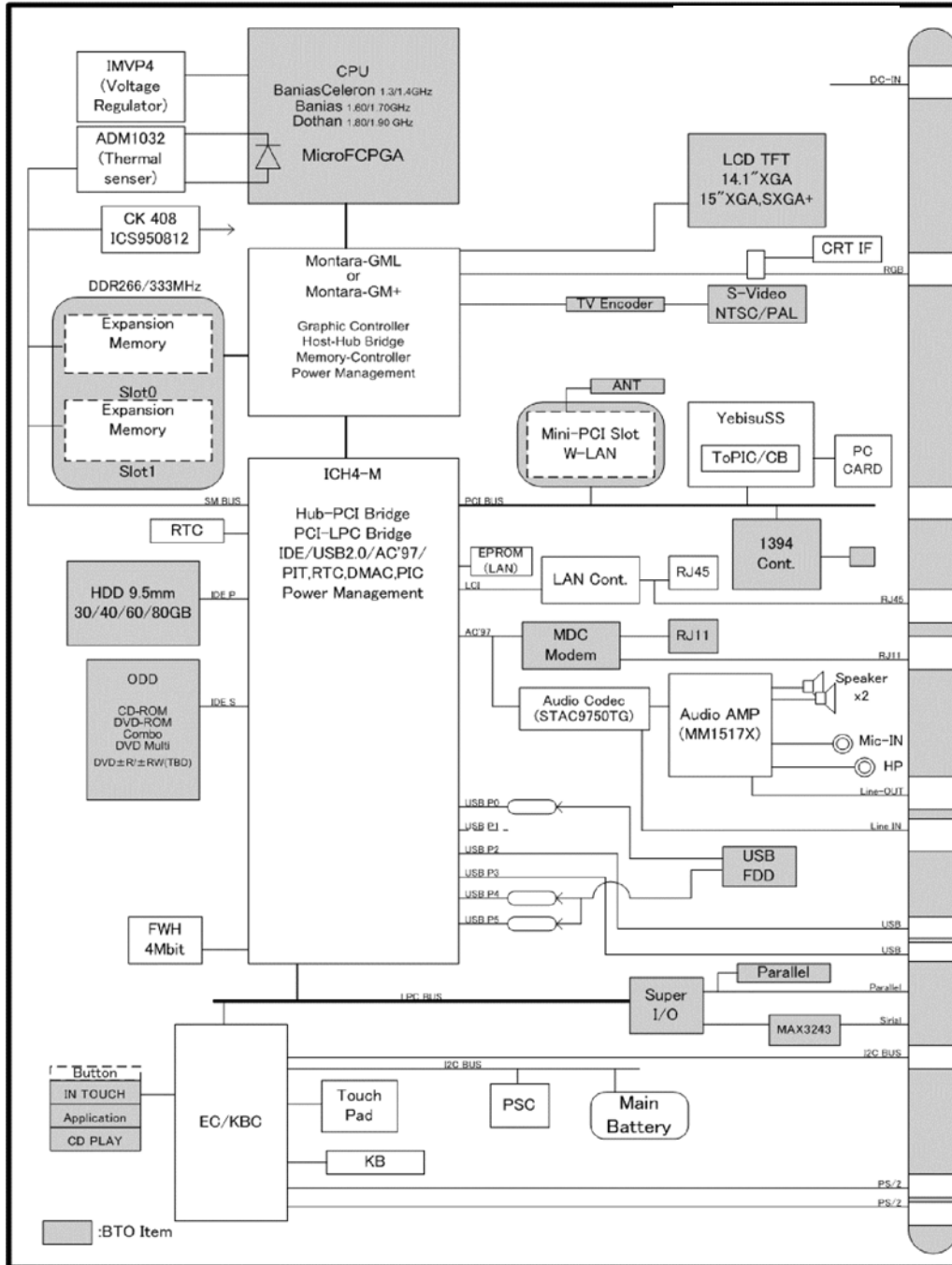


Figure 1-3 System Block Diagram

The PC contains the following components.

CPU

Intel® Mobile Pentium® -M model

- 1.50/1.60/1.70GHz (Internal clock: 1.50/1.60/1.70GHz, Bus: 400MHz, Core voltage: 1.48/0.88V, Built-in NDP)
- L1 cache memory: 64KB
- L2 cache memory: 1024KB

Intel® Mobile Celeron® -M model

- 1.20/1.30/1.40GHz (Internal clock: 1.20/1.30/1.40GHz, Bus: 400MHz, Core voltage: 1.356V, Built-in NDP)
- L1 cache memory: 64KB
- L2 cache memory: 256KB

Memory

Two memory slots capable of accepting 256MB, 512MB or 1024MB memory modules for a maximum of 1GB or 2GB.

- 200-pin DDR-SDRAM (PC2100/PC2700)
- Pipeline configuration
- 2.5V operation
- Support PC133

Firmware Hub

- 4Mbit (Flash memory)
- Vcc : 3.3V±0.3V
- Vpp : 3.3V/12V

❑ Chipset

This gate array has the following elements and functions.

- North Bridge (Intel Montara-GML or Intel Montara-GM+)
 - 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-47n277-MN)

- 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 (SigmaTel-made STAC9750TG x1)

 Mini PCI (802.11b: made by Intel, 802.11a/g: made by Askey or Intel, 802.11g: made by Intel x 1)

2.4 GHz DSSS wireless LAN card is equipped in the mini PCI card slot. Conformity with IEEE 802.11b (WiFi). 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 14.4Kbps. 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 and 1.44MB floppy disks.

Figure 1-4 shows the 3.5-inch FDD. Table 1-1 lists the specifications.

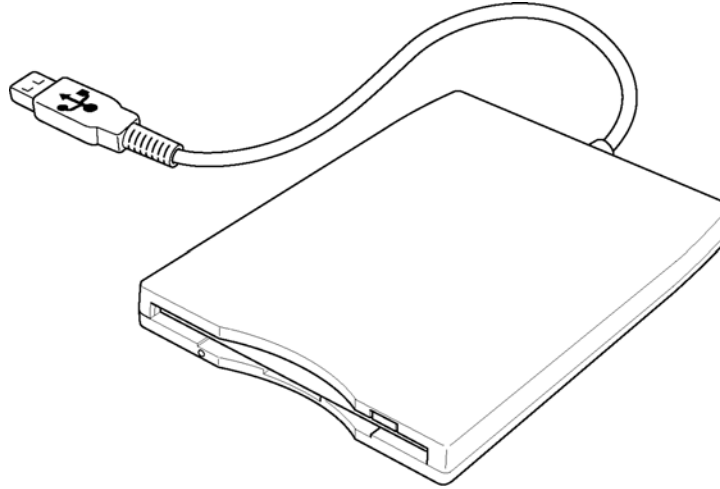


Figure 1-4 3.5-inch USB FDD

Table 1-1 3.5-inch USB FDD specifications

Item	Specifications	
Disk used	2DD	2HD
Unformatted capacity	1.0MB	2.0MB
Formatted capacity	720KB	1.44MB
Data transfer speed (Kb/s)	250	500
Rotation speed (rpm)	300	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 1-5 shows a view of the 2.5-inch HDD and Tables 1-2 and 1-3 list the dimensions and specifications.

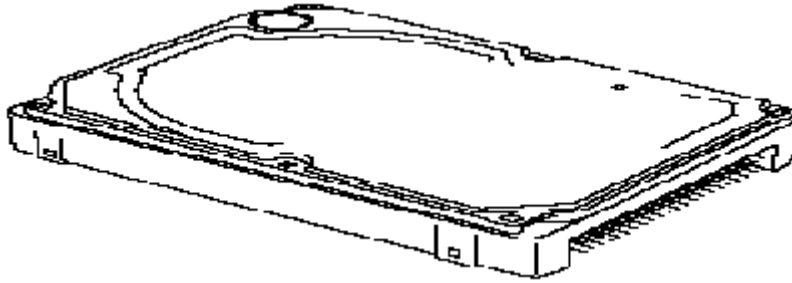


Figure 1-5 2.5-inch HDD

Table 1-2 2.5-inch HDD dimensions (1/5)

Item	Standard						
	TOSHIBA						
	HDD2187B	HDD2188B	HDD2189B	HDD2190B	HDD2191B	HDD2193B	HDD2194B
Width (mm)	69.85						
Height (mm)	9.5						
Depth (mm)	100.0						
Weight (g) (MAX)	95						

Table 1-2 2.5-inch HDD dimensions (2/5)

Item	Standard	
	FUJITSU	
	G8BC0001C410	G8BC0001C610
Width (mm)	70	
Height (mm)	9.5	
Depth (mm)	100.0	
Weight (g) (MAX)	99	

Table 1-2 2.5-inch HDD dimensions (3/5)

Item	Standard			
	HITACHI			
	G8BC0000Z310	G8BC0000Z311	G8BC0000Z411	G8BC0000Z611
Width (mm)	69.85			
Height (mm)	9.5			
Depth (mm)	100.0			
Weight (g)	99	95		99

Table 1-2 2.5-inch HDD dimensions (4/5)

Item	Standard		
	HITACHI		
	G8BC00014410	G8BC00014610	G8BC00014810
Width (mm)	69.85		
Height (mm)	9.5		
Depth (mm)	100.0		
Weight (g)	95		102 (max)

Table 1-2 2.5-inch HDD dimensions (5/5)

Item	Standard
	SEAGATE
	G8BC0001F410
Width (mm)	69.85
Height (mm)	9.5
Depth (mm)	100.2
Weight (g)	99

Table 1-3 2.5-inch HDD Specifications (1/5)

Item	Specifications						
	TOSHIBA						
	HDD2187B	HDD2190B	HDD2193	HDD2189B	HDD2194	HDD2188B	HDD2191
Storage size (formatted)	20GB	40GB		60GB		80GB	
Rotation speed (RPM)	4,200		5,400	4,200	5,400	4,200	5,400
Data transfer rate (MB/s)	164.6- 257.1	175.0- 341.7	154.3- 298.0	175.0- 341.7	258.0- 394.0	175.0- 341.7	233.0- 446.0
Interface transfer rate (MB/s)	100						
Storage density (Kbpi)	543	735	728		735		728
Track density (Ktpi)	72	88.1	78.9		88.8	88.1	88.8
Average random seek time (read) (ms)	12						
Average random seek time (write) (ms)	12						
Motor startup time (ms)	4						

Table 1-3 2.5-inch HDD Specifications (2/5)

Item	Specifications	
	FUJITSU	
	G8BC0001C410	G8BC0001C610
Storage size (formatted)	40GB	60GB
Rotation speed (RPM)	4,200	
Data transfer rate (MB/s)	443.2 (max)	
Interface transfer rate (MB/s)	100	
Storage density (Kbpi)	752	651
Track density (Ktpi)	92	79.8
Average random seek time (read) (ms)	12	
Average random seek time (write) (ms)	14	
Motor startup time (ms)	4.0	

Table 1-3 2.5-inch HDD Specifications (3/5)

Item	Specifications			
	HITACHI			
	G8BC0000Z310	G8BC0000Z311	G8BC0000Z411	G8BC0000Z611
Storage size (formatted)	30GB	30GB	40GB	60GB
Rotation speed (RPM)	4,200			
Data transfer rate (MB/s)	350 (max)			
Interface transfer rate (MB/s)	100			
Storage density (Kbpi)	712			
Track density (Ktpi)	63			
Average random seek time (read) (ms)	14			
Average random seek time (write) (ms)	12			
Motor startup time (ms)	5.0			

Table 1-3 2.5-inch HDD Specifications (4/5)

Item	Specifications		
	HITACHI		
	G8BC00014410	G8BC00014610	G8BC00014810
Storage size (formatted)	40GB	60GB	80GB
Rotation speed (RPM)	5,400		
Data transfer rate (MB/s)	450 (max)		
Interface transfer rate (MB/s)	100		
Storage density (Kbpi)	712		
Track density (Ktpi)	96		
Average random seek time (read) (ms)	14		
Average random seek time (write) (ms)	12		
Motor startup time (ms)	3.5		

Table 1-3 2.5-inch HDD Specifications (5/5)

Item	Specifications
	SEAGATE
	G8BC0001F410
Storage size (formatted)	40GB
Rotation speed (RPM)	4,200
Data transfer rate (MB/s)	386
Interface transfer rate (MB/s)	100
Storage density (Kbpi)	642
Track density (Ktpi)	100.7
Average random seek time (read) (ms)	12
Average random seek time (write) (ms)	14
Motor startup time (ms)	3.9

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 1-6. The specifications of the CD-ROM drive are described in Table 1-4.



Figure 1-6 CD-ROM drive

Table 1-4 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 (Form 1, Form 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 1-7. The specifications of the DVD-ROM drive are described in Table 1-5.



Figure 1-7 DVD-ROM drive

Table 1-5 DVD-ROM drive dimensions

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)		

1.7 DVD-ROM & CD-R/RW Drive

The DVD-ROM & CD-R/RW 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 & CD-R/RW drive is shown in Figure 1-8. The specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-6.

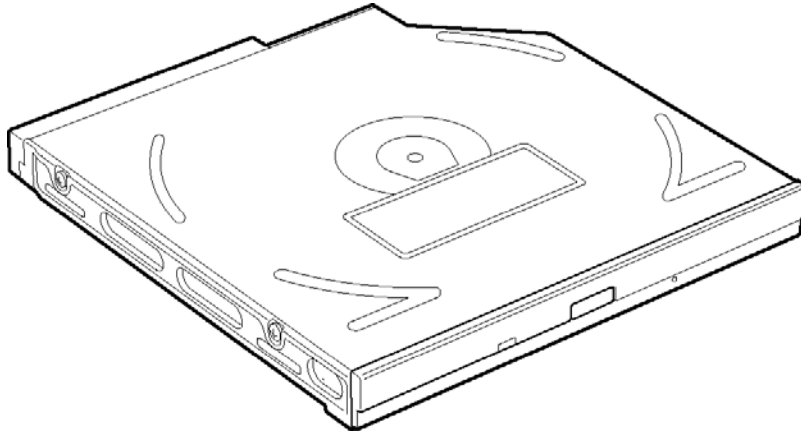


Figure 1-8 DVD-ROM & CD-R/RW drive

Table 1-6 DVD-ROM & CD-R/RW drive specifications (1/3)

Item		Specifications
		Toshiba SDR2512OAF
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 1-6 DVD-ROM & CD-R/RW drive specifications (2/3)

Item		Specifications
		HITACHI G8CC0001K210
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, Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Photo CD (single/multi-session), Enhanced CD, CD-TEXT
	DVD	DVD-ROM, DVD-Video, DVD-R, (General, Authoring), DVD-RAM(4.7GB, 2.6GB)

Table 1-6 DVD-ROM & CD-R/RW drive specifications (3/3)

Item		Specifications
		Panasonic G8CC0001C210
Transfer rate	For read (CD-ROM)	MAX 24 x CAV(MAX 3,600KB/s)
	For read (DVD-ROM)	MAX 8 x CAV(MAX 10,800KB/s)
Average access time (ms)	CD-ROM	90
	DVD-ROM	110
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 XA, DVD-R(3.9GB, 4.7GB), DVD-RW, DVD-RAM(4.7GB)

1.8 DVD-R/-RW drive

The DVD-R/-RW 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 at 2-speed, and reads CD at maximum 24-speed (3,600 KB per second).

The DVD-R/-RW drive is shown in Figure 1-9. The specifications of the DVD-R/-RW drive are described in Table 1-7.



Figure 1-9 DVD-R/-RW drive

Table 1-7 DVD-R/-RW drive specifications

Item		Specifications Toshiba G8CC0000ZH10(SDR61120AF)		
		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)		105	95	170
Average random seek time (ms)		95	90	120
Average full stroke access time (ms)		180	170	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		
	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 Super 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 CD at maximum 24-speed (3,600 KB per second) and writes DVD-RW at 2-speed, DVD-RAM at 2-speed, DVD-R at 4-speed, DVD+R at 2.4-speed and DVD+RW at 2.4-speed.

The DVD Super Multi drive is shown in Figure 1-10. The specifications of the DVD Super Multi drive are described in Table 1-8.



Figure 1-10 DVD Super Multi drive

Table 1-8 DVD Super Multi drive specifications (1/2)

Item	Specifications Panasonic G8CC0001S210		
	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	150	-
Data buffer capacity	2MB		
Supported formats	DVD	DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW (Ver.1.1), DVD-RAM (2.6GB, 4.7GB, 9.4GB), DVD+R, DVD+RW	
	CD	CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), Photo-CD, Video-CD, CD-EXTRA (CD+), CD-TEXT	

Table 1-8 DVD Multi drive specifications (2/2)

Item	Specification TEAC G8CC0001U210		
	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	150	-
Data buffer capacity	2MB		
Supported formats	DVD	DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW (Ver. 1.1), DVD-RAM (2.6GB, 4.7GB, 9.4GB), DVD+R, DVD+RW	
	CD	CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), Photo CD, 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 1-11 shows a view of the keyboard.

See Appendix E for details of the keyboard layout.



Figure 1-11 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 1-12 shows a view of the LCD module and Table 1-9 lists the specifications.

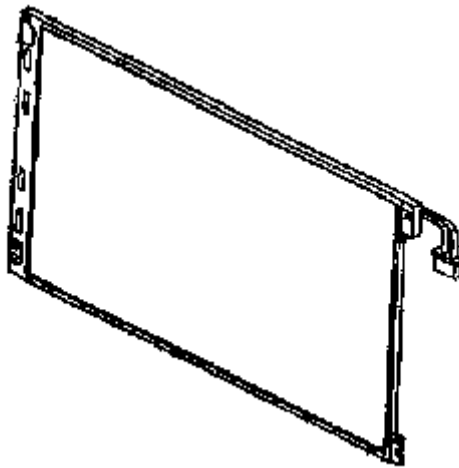


Figure 1-12 LCD module

Table 1-9 LCD module specifications (14.1-inch XGA TFT) (1/5)

Item	Specifications	
	G33C0001P110	G33C0001Z110
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 1-9 LCD module specifications (15.0-inch XGA (normal) TFT) (2/5)

Item	Specifications					
	G33C0000 L110	G33C0001 K110	G33C0001 7110	G33C0000 Q110	G33C0000 Q310	G33C0001 R110
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 1-9 LCD module specifications (15.0-inch XGA (SPWG) TFT) (3/5)

Item	Specifications		
	G33C0001Y110	G33C0001V110	G33C0001W110
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 1-9 LCD module specifications (15.0-inch SXGA+ TFT) (4/5)

Item	Specifications
	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)

Table 1-9 LCD module specifications (15.0-inch SXGA+ (SPWG) TFT) (5/5)

Item	Specifications
	G33C0001X110
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 1-10 lists the FL inverter board specifications.

Table 1-10 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 20 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 1-11 lists the power supply output specifications.

Table 1-11 Power supply output rating

Name	Power Supply (Yes / No)				Use
	Voltage [V]	S3	S3/S4	G3	
PPV	1.308 – 0.748	No	No	No	CPU, GMCH, ICH4-M
PTV	1.05	No	No	No	CPU, GMCH, ICH4-M
PMV	1.2/1.35	No	No	No	GMCH GM+:1.35V GM/GML:1.2V
1R25-B1V	1.25	No	No	No	DDR-SDRAM Termination
MR1R25-B1V	1.25	Yes	No	No	DDR-SDRAM, GMCH
1R5-P1V	1.5	No	No	No	TV, GMCH, ICH4-M
1R5-S1V	1.5	Yes	Yes	No	ICH4-M, LAN Power
2R5-B2V	2.5	Yes	No	No	GMCH, DDR-SDRAM
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, GMCH, SDRAM(SPD), TV, LCD, ICH4-M, Sound CODEC, Mini-PCI, EC/KBC,
E3V	3.3	Yes	Yes or No	No	YEBISUSS, PC Card Power, Mini-PCI, MDC, RS232C, LAN Power
LAN-E3V	3.3	Yes	Yes or No	No	ICH4-M, KINNERETH (Directly connected to E3V)
LAN1R5-E1V	1.5	Yes	Yes or No	No	ICH4-M, LAN Power
S3V	3.3	Yes	Yes	No	ICH4-M, EC/KBC, Flash Memory, PSC
P5V	5	No	No	No	CRT, ICH4-M, FL Inverter, LEDs, HDD, ODD, KB, PAD, Parallel,
SND-P5V	5	No	No	No	Speaker Amp
A4R7-P4V	4.7	No	No	No	Sound CODEC, Line IN, Headphone Amp
E5V	5	Yes	Yes or No	No	PC Card Power, USB Power
M5V	5	Yes	Yes	No	ICH4-M, Thermal sensor IC, LEDs
MCV	5	Yes	Yes	No	PSC
R3V	2.0 - 3.5	Yes	Yes	Yes	ICH4-M(RTC)

1.13 Batteries

The PC has the following two batteries.

- Main battery
- Real time clock (RTC) battery

Table 1-12 lists the specifications for these two batteries.

Table 1-12 Battery specifications

Battery Name		Material	Output Voltage	Capacity
Main battery	G71C0003U210	lithium ion (3-cell)	10.8V	2,200mAh
	G71C0003U110			
	G71C0003V210	lithium ion (6-cell)		4,400mAh
	G71C0003V110			
	G71C0003W210	lithium ion (12-cell)		8,800mAh
	G71C0003W110			
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 1-13 shows the time required for charges of main battery.

Table 1-13 Time required for charges of main battery

Condition		Charging Time
Normal charge	3cell	About 3.0 to 6.0 hours or longer
	6cell	About 5.0 to 11.0 hours or longer
	12cell	About 10.5 to 21.5 hours or longer
Quick charge	3cell	About 2.5 hours
	6cell	About 2.5 hours
	12cell	About 4.5 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

Battery preservation time

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

Table 1-14 Battery preservation time

Condition		Preservation Time
Normal charge	3cell	About 10 days
	6cell	About 25 days
	12cell	About 55 days
Quick charge	3cell	About 1 days
	6cell	About 3 days
	12cell	About 5 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 1-15 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 1-16 lists the AC adapter specifications.

Table 1-16 AC adapter specifications

Item	Specifications
	G71C0002S310
Input voltage	100V/240V
Input frequency	50Hz/60Hz
No load input power	0.5W or less
Output voltage	15.0V
Output current	4.0A

Chapter 2

Troubleshooting Procedures

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2.1 Troubleshooting

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

- | | |
|-----------------|------------------|
| 1. Power supply | 7. Touch pad |
| 2. 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. Debug port LED
7. Wraparound connector for PC card
8. Tester
9. External CRT
10. External USB FDD
11. External USB test module
12. External USB cable
13. External USB mouse
14. Headphone
15. Microphone
16. Toshiba CD-ROM test disk (ZA1217P01/P000204190)
17. Toshiba-EMI DVD-ROM test disk TSD-1
18. Music CD
19. CD-RW media (recommended :RICOH, Mitsubishi Kagaku supporting 4x media)
20. DVD-ROM media (normal media on the market)
21. RJ-11 connector checker LED
22. LAN wraparound connector
23. Speaker with an input terminal for S/PDIF
24. Personal computer that can communicate by wireless LAN for wireless LAN troubleshooting

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.

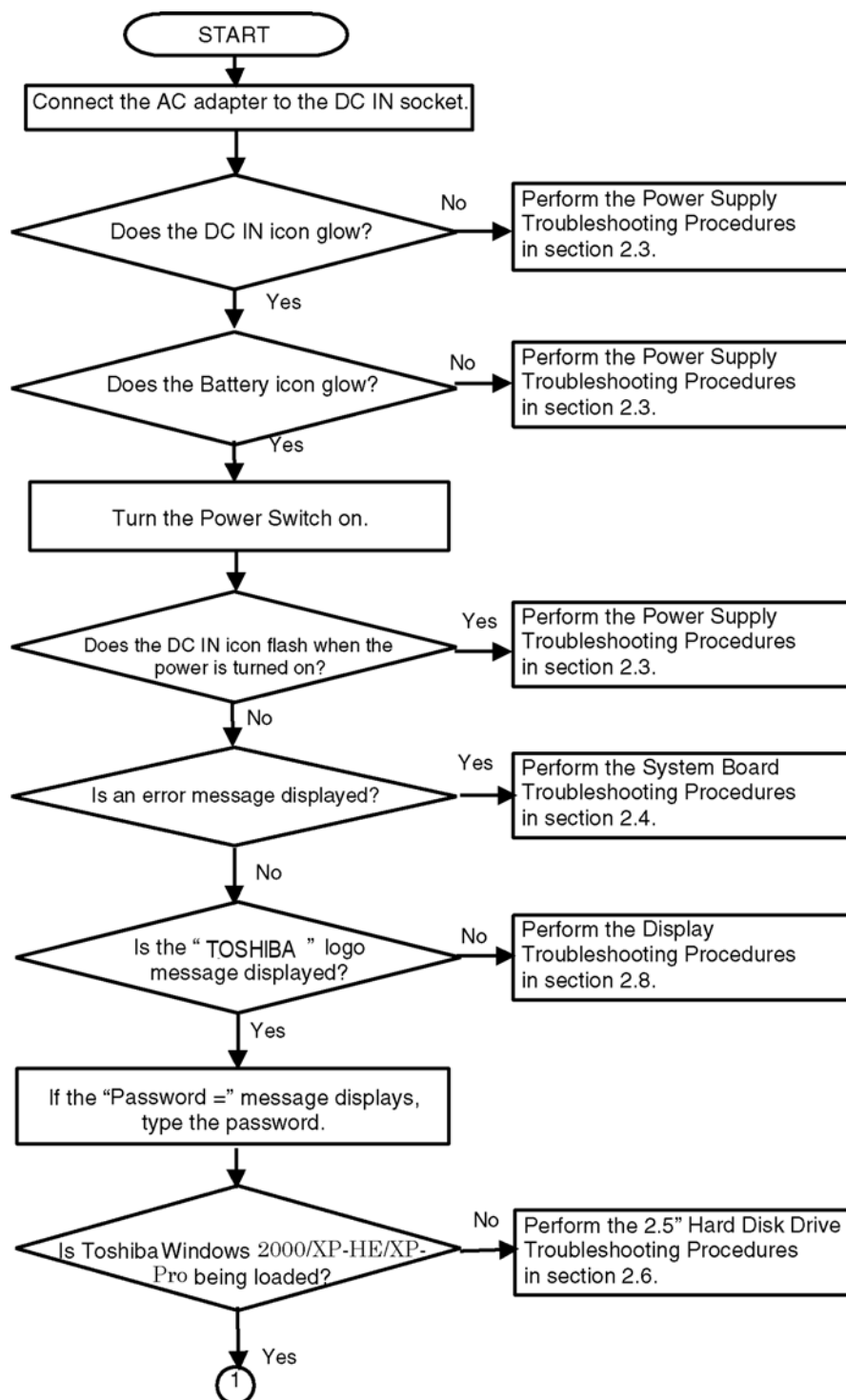


Figure 2-1 Troubleshooting flowchart (1/2)

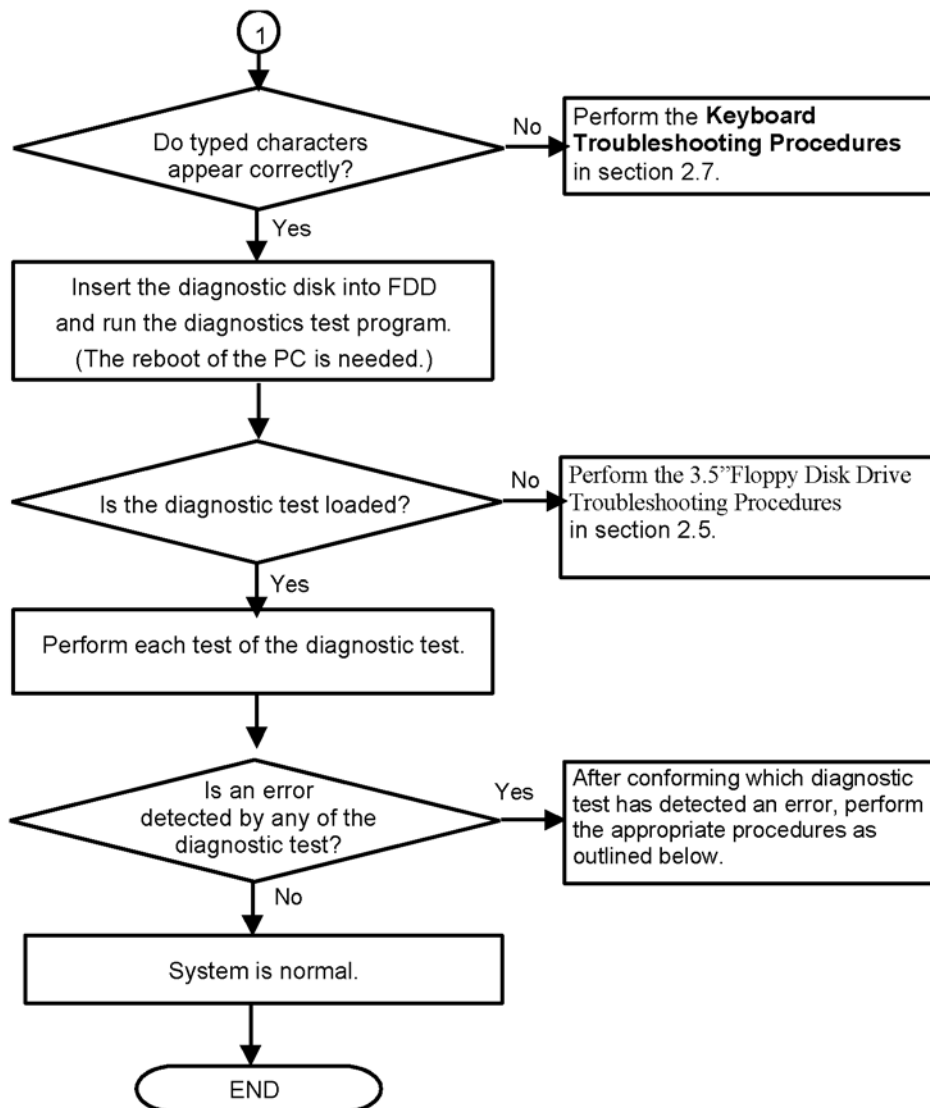


Figure 2-1 Troubleshooting flowchart (2/2)

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, printer test, Async test, expansion test, real timer test, NDP test or IEEE1394 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.
6. If an error is detected on the test for the touch pad function, perform the Touch Pad Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.14.

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 (G71C0002S310).

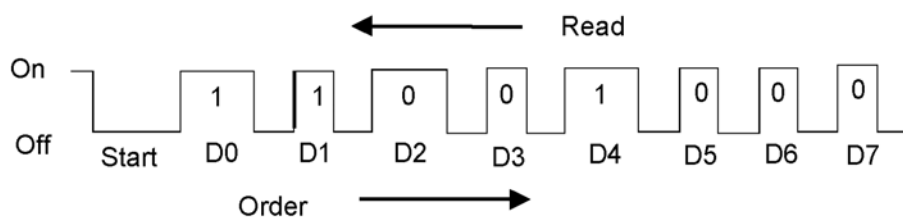
Procedure 2 Error Code Check

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

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

Error code	Where Error occurs
1*h	Adapter (AC Adapter, DS)
2*h	1st battery
3*h	2nd Battery
4*h	S3V output
5*h	1R5-C1V output
6*h	1R5-C1V output
7*h	PPV output
8*h	PTV output
9*h	E5V output
A*h	E3V output
B*h	PPV output
C*h	PMV output
D*h	1R25-B1V output
E*h	2R5-B2V output
F*h	-

❑ 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 7.00A.
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 7.00A.
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 7.00A.
32h	Second battery discharge current is over 0.5A when there is no load.
33h	Second battery charge current is over 3.1A. when AC adapter is not connected.
34h	Abnormal current has been sensed.
35h	Second battery charge current is over 0.3A.

❑ S3V output (P60)

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

❑ 1R5-C1V output (P61)

Error code	Meaning
50h	1R5-C1V voltage is over 1.80V when the computer is powered on/off.
51h	1R5-C1V voltage is 1.275V or less when the computer is powered on.
52h	1R5-C1V voltage is 1.275V or less when the computer is booting up.
53h	1R5-C1V voltage is 1.275V 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 1.50V 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 (P63)

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

❑ PTV output (P64)

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

❑ E5V output (P65)

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 (P66)

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 (P63)

Error code	Meaning
B0h	PPV voltage is over 1.80V when the computer is powered on/off.
B1h	PPV voltage is 0.56V or less when the computer is powered on.
B2h	PPV voltage is 0.56V or less when the computer is booting up.
B3h	PPV voltage is 0.56V or more when the computer is powered off.

❑ PMV output (P64)

Error code	Meaning
C0h	PMV voltage is over 1.62V when the computer is powered on/off.
C1h	PMV voltage is 1.02V or less when the computer is powered on.
C2h	PMV voltage is 1.02V or less when the computer is booting up.
C3h	PMV voltage is 1.02V or more when the computer is powered off.
C4h	PMV voltage is 1.02V or less when the computer is suspended.

❑ 1R25-B1V output (P65)

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 (P66)

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.

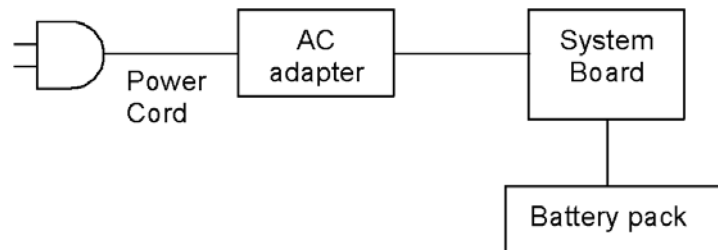
Check 3 In the case of error code 21h:

- 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: Debug Port Check

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

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

- If an error message is shown on the display, perform Check 1.
- If 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 4.

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 Debug Port Check

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

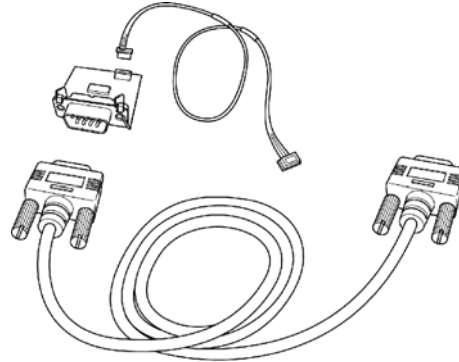
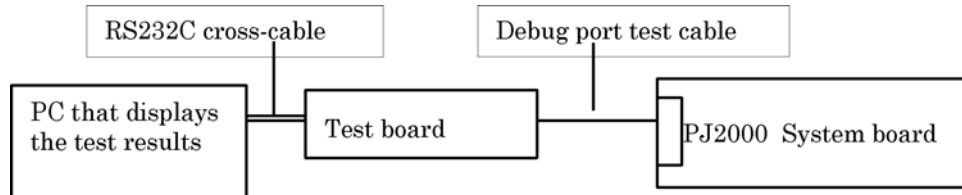


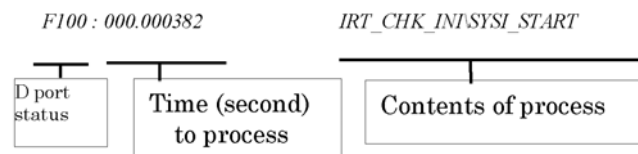
Figure 2-2 A set of tool for debug port test

The test procedures are follows;

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



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



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

Table 2-3 D port status (1/9)

D port status	Inspection items	Details
		Enabling address line A20 and Clearing a software reset bit
		Prohibition of APIC
		Initializing MCHM
		Initializing ICHM
		Initializing Super I/O
		Initializing debug port
		Dummy read of 3 rd Bus data
		Setting of printer port (Only for the model supporting PRT)
F000h	Start	Initializing the CH0 of a PIT (For HOLD_ON)
		Initializing flags determining whether BIOS is rewritten
		CHECK SUM CHECK
		Switching to protected mode
		Examining the checksum of Boot Block (Skip when returned to S3)
		Examining the checksum of other data in a flash memory (Skip when returned to S3)
F001h	Initializing a KBC (1)	EC/KBC rewrite check
		BIOS rewrite when "rewrite" is requested
		Transition of the process to System BIOS IRT when returned to S3
		Key input
		When inputting key, [←], [半角/全角 (漢字)], [TAB] key check
F002h	Checking whether BIOS rewrite is requested	Checking whether BIOS rewrite is requested
		Checksum error except Boot Block when rewrite is requested by user
		Transition to BIOS rewrite
F003h	BIOS rewrite	Transition to System BIOS IRT
		Initializing ICHM.D31
		DRAM Configuration
		Enabling L1 cache
		Clearing memory
		Transferring to real mode and copy BIOS to RAM

Table 2-3 D port status (2/9)

D port status	Inspection items	Details
F005h	Executing CHGBIOSA	Storing key scan code
		Setting up TASK_1ms_TSC
		Controlling Fan
		Initializing sound systems (For beep sound)
		Enabling system speaker
		Canceling mute
		Maximizing volume
		When BIOS,EC/KBC is requested to be rewritten (Green blinks in 2s cycle (ON:1s, Off: 1s))
		Abnormal BIOS ROM (Orange blinks in 2s cycle (ON:1s, Off: 1s))
		Key input
		Disabling USB first
		Sound beep
		Waiting for key input
		Loading CHGBIOSA.EXE/CHGFIRMA.EXE
		Reset FDC
		Setting up the parameter for 2HD (1.44MB)
		Loading first sector and Confirming the media if it is 2HD (1.44MB)
		Setting up the parameter for 2DD (720KB)
		Searching CHGBIOSA.EXE from route directory
		Calculate starting directory head, sector
		Loading route directory per sector
Searching entry of "CHGBIOSA.EXE/CHGFIRMA.EXE" from the loaded sector		
Loading EXE header of "CHGBIOSA.EXE /CHGFIRMA.EXE", Key input when an error occurred		
Executing "CHGBIOSA.EXE"/"CHGFIRMA.EXE"		

Table 2-3 D port status (3/9)

D port status	Inspection items	Details
F100h		Disabling cache
		Initializing H/W (before recognizing DRAM)
		Initializing MCHM
		Initializing ICH4M.D31.Func0
		Initializing ICH4M.D31.Func1
		Initializing USB.Func0,1,2,7
		Initializing ICH4M.D31.Func3
		Initializing ICH4M.D31.Func5
		Initializing FLUTE
		Initializing the channel 1 of a PIT (set 30 μ s for refresh interval)
F101h		Checking type and size of DRAM (at Cold boot only)
		HLT when DRAM size is 0
		Testing stack area of SM-RAM
		HLT when impossible to use as stack
F102h	CMOS check and initialization	Cache Configuration
		Enabling L1 and L2 cache
		Access test of CMOS (at Cold boot only) (HLT when an error occurred)
		Checking battery level of CMOS
		Checksum check of CMOS
		Initializing CMOS data (1)
		Setting up IRT status (Setting of Boot status and IRT Busy Flag, The bit left is 0)
		Storing DRAM size
F103h	Resume branch check (at Cold boot only)	Not resuming when a CMOS error occurred
		Not resuming when status code of resume is not set
		Checking resume error
		S3 Return error (ICH) Resume error F17AH
		Checking CheckSum of SM-RAM Resume error F173H

Table 2-3 D port status (4/9)

D port status	Inspection items	Details
(F103h)		Checking the change of memory configuration Resume error F173H
		Checking CheckSum of RAM area of system BIOS Resume error F179H
		Checking CheckSum of expanded memory (Montara) Resume error F176H
		Checking CheckSum of PnP RAM
		Processing resume (RESUME_MAIN)
	Processing resume error	Return the CPU clock to Low
		Disabling all SMI
		Clearing resume status
		Return to ROM
		Send the area from C0000h to EFFFFh to PCI (Disabling DRAM)
		Setting up Resume error request
		Copy ROM/RAM of the System BIOS (HLT when an error occurred)
	F104h	SMRAM initialization
Checking the factor of WakeUp		
Rewriting the SMRAM base and Storing CPU state map for BIOS		
Enabling SMI only by ASMI		
F105h	Initialization of the device Which needs initialization before PCI BUS Initialization	PCI test (at Cold boot only) and Initialization
		Setting test pattern in PIT#0 of Channel 0
		Checking whether test pattern set can be read
		Initializing the channel 0 of a PIT (set 55ms for the interval of interrupt timer)
		Initializing the channel 2 of a PIT (set 664Hz frequency for sound generator)
		Testing the channel 1 of a PIT (Checking whether refresh signal works properly with the cycle of refresh interval 30μs), HLT when timeout
		Testing the channel 2 of a PIT (Checking whether speaker gate works properly)

Table 2-3 D port status (5/9)

D port status	Inspection items	Details
(F105h)		Measuring the clock speed of a CPU
		Permission of SMI except auto-off function
		Control the excess of the rated input power
		Battery discharge current control (1CmA)
		AC adapter rated over current control
		Dividing procedures for time measuring of IRT
		Setting for clock generator
		Checking the parameter block A
		Initialization of CPU
		Micro code update
		Confirming CPU type
		Check the support of Geyserville
		Set the CPU clock to "High"
		Set Graphics Aperture Size (except VGA_BUS=0)
F106h	Initializing ACPI, KBC, VGA, sound function, and PIC	Storing the configuration of ROM in a buffer
		Reading EC version
		Updating the type of flash memory
		Determining what country the computer is designed to be used in by DMI data
		Checking the default settings of CMOS (When finding Bad Battery, Bad CheckSum (ROM, CMOS), set default)
		Initializing ACPI table (For executing option ROM)
		Initialization of the device needed initializing before PCI BUS Initialization
		AC'97 control
		Initializing information of thermal control
		Initializing a KBC
		Turning VGA display off and controlling reset
		Initializing sound function
		Acquiring the computer multiple box status
		HC initialization, Recognition of USB device connection and initialization
		Permission/ prohibition of Built-in LAN control
		Initializing a PCI
		Testing a PIC
		Initializing password

Table 2-3 D port status (6/9)

D port status	Inspection items	Details
F107h	Initializing PCI Initializing a LAN	Initializing PCI BUS (connecting DS Bus)
		Initializing information of LAN
		Checking the factor of WakeUp
F108h		Running a task of waiting for the end of INIT_PCI
		Initializing the data in CMOS (2)
		Initializing PnP
		Setting up the setup parameters
		Waiting for the end of multiple box state check
		Setting up the hardware parameters based on resources
F109h	Serial interrupt control	Running a task of waiting for the end of PnP resource creation
		Serial interrupt control (performed before interrupt)
	Initializing PnP hardware	Initializing PnP hardware
		Initializing PC Card Slots
	Configuration	Initializing SIO (for models supporting SIO)
		Initializing FIR (for models supporting FIR)
		PCI automatic configuration
		Making of work for automatic configuration
		Acquisition of PCI IRQ
		PCI Configuration
		Storing of VGA configuration result
F10Ah	Initializing drives	Task generation for waiting PCI_CONFIGURATION completion
		Initialization of H/W which is necessary after PCI configuration
		Printer port setting (for models supporting PRT)
		HDD initialization sequence start
		FDD initialization sequence start (For models supporting built-in FDD)
		Enabling power off
		Output code generation
F10Bh	Checking the first 64KB of memory	Checking the first 64KB of memory
F10Ch	Initializing interrupt vectors	Initializing interrupt vectors
F10Dh	Initializing a NDP	Initializing a NDP

Table 2-3 D port status (7/9)

D port status	Inspection items	Details
F10Eh	INIT_SYSTEM (Initialization of system)	Storing CMOS error information in IRT_ERR_STS_BUF
		Timer initialization start
		Initializing an EC, and reading battery information
		Updating system BIOS (Updating EDID of the LCD)
F10Fh	Initializing the display	Waiting for VGA chip initialization completion
F110h		Initializing VGA BIOS
F112h	Displaying a logo	Displaying a logo on the screen
F113h	SYS_MEM_CHK	Checking conventional memory (Boot)
F114h	EXT_MEM_CHK	Exception check in protect mode (Cold boot only)
F115h	INIT_SYS_MEM (DPORT=F114H if an error occurred during exception check in protected mode)	Initializing conventional memory (Reboot)
F117h	CHK_DMA_PAGE	Check of DMA page Register (Cold boot only)
F118h	Checking a DMAC	Checking a DMAC (Boot)
F119h	Initialization of DMA	Initializing DMA (Cold boot only)
F11Ah	CHECK_PRT	Checking a printer port existence (for models supporting PRT)
F11Bh	Checking SIO	Checking a SIO port (for models supporting SIO)
F11Ch	BOOT_PASSWORD	Check of password
		Waiting for the end of the FDD initialization process (for models supporting built-in FDD)
	(In the case of "Reboot")	Waiting for the end of the HDD initialization
		Checking key input during IRT (Waiting for KBC initialization completion)
		ATA priority Initialization
	(In the case of "Boot")	BM loading process (for models supporting fingerprint certification function)
		Initializing BM (for models supporting fingerprint certification function)
		Check of key input during IRT (waiting for KBC initialization completion)
		Input of password
		BM open (for models supporting fingerprint certification function)
F11Dh	Checking optional I/O ROM	Checking optional I/O ROM

Table 2-3 D port status (8/9)

D port status	Inspection items	Details
F11Eh	PRE_BOOT_SETUP	Storing the value in 40:00h (for SIO saving/restoring)
		Setting up the address of font data for resume password
		Setting up the parameters for character repeat on a USB keyboard
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource before boot
		Rewriting memory map data for INT15h E820h function
		Waiting for AC-Link initialization completion
		Updating of table for DMI
		Copying of ACPI table to the top of an expansion memory
		Waiting for the end of writing PSC version on BIOS
		Waiting for clock generator setting completion (Stops in "F11DH" when an error is detected)
		Waiting for the end of serial port initialization (for models supporting SIO)
		Canceling NMI mask
		Clearance of the checksum of TIT
		Clearing IRT running flag for runtime
		Update checksum for runtime
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (for models supporting Bluetooth)
		Check of existence of supported maintenance cards
		Prohibition unused PC cards
		Setting of WAKEUP status data for ACPI
		HW initialization before Boot, Waiting for initialization completion
		Notify the DVI connection status to VGA BIOS (for models supporting DVI)
		Setting up battery safe mode
		Setting up date
		Waiting for the end of Bluetooth initialization (for models supporting Bluetooth)
Updating DMI Wakeup factor and SM-BIOS structure table		
Closing configuration space of PCI devices		
Cache control		

Table 2-3 D port status (9/9)

D port status	Inspection items	Details
		Process for CPU (Make the CPU clock to be set by SETUP)
		Waiting for the motor off of a disabled HDD
		Final decision of USB FDD drive information
		Post processing of PRE_BOOT_SETUP
		Clearing PWRBTN_STS, Enabling the power button
F120h		Clearing IRT status
		Updating of checksum for Runtime
FFFFh	Completion	

Check 1 If the D port status error code F11Ah is displayed, go to the 3.5" USB FDD Troubleshooting Procedures in Section 2.5 or the 2.5" HDD Troubleshooting Procedures in Section 2.6.

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

D port error statuses are following:

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

Procedure 3 Diagnostic Test Program Execution Check

Execute the following tests from the Diagnostic Test Menu. These tests check the 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. IEEE1394 test
15. Wireless LAN test

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

Procedure 4 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 2-4. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-4 FDD error code and status

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

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

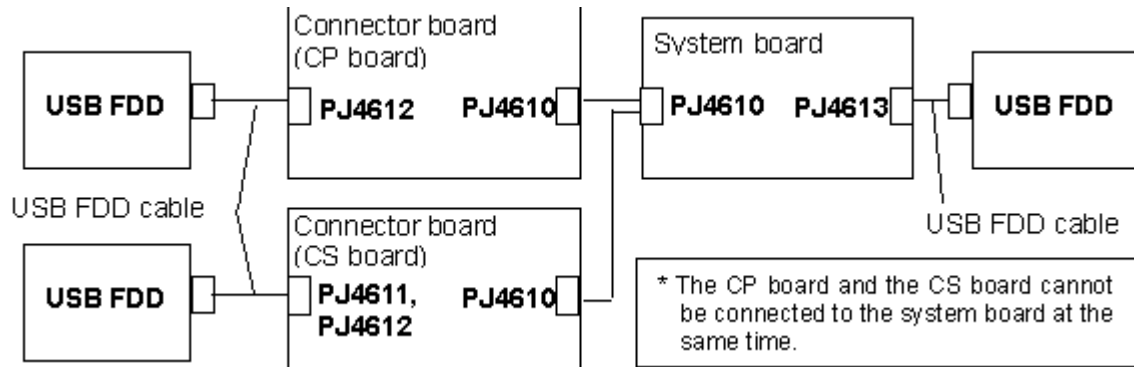
Write protected

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

Procedure 3 Connector Check and Replacement Check

The USB 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 The connector board connected to the system board may be defective or damaged. Replace it with a new one. If the FDD is still not functioning properly, perform Check 4.

Check 4 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 2-5. If an error code is not displayed but the problem still exists, go to Procedure 5.

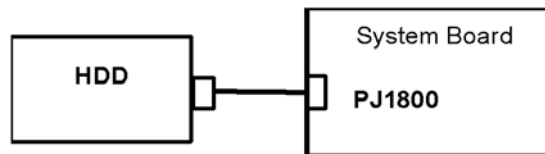
Table 2-5 2.5" Hard disk drive error code and status

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

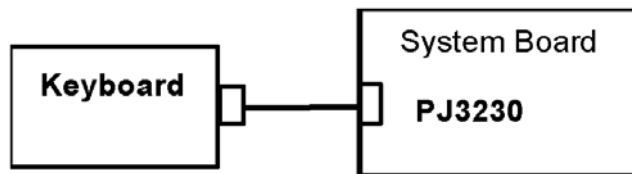
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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

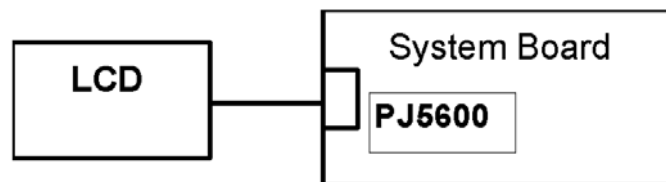
Procedure 1 Diagnostic Test Program Execution Check

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

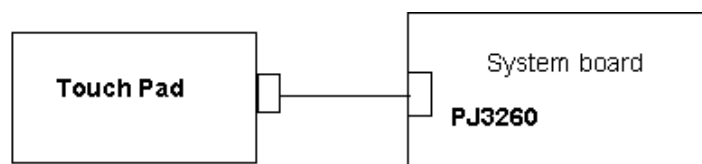
Execute the Touch Pad Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

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, DVD-ROM & CD-R/RW, DVD-R/-RW or DVD Super 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.

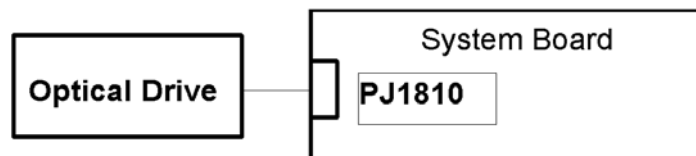
Prepare the tools before the test. (Refer to tools for implementing the Diagnostics procedures on page 2-1.)

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 optical 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 optical drive with a new one following the steps in Chapter 4. If the optical 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.

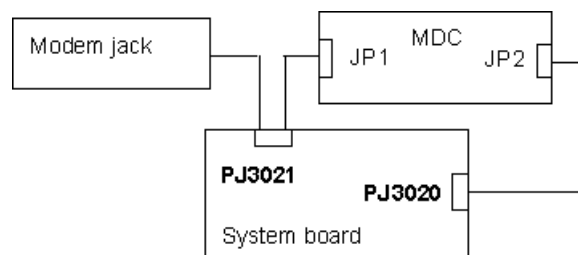
If any error is detected, perform Procedure 2.

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 PJ3020 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.

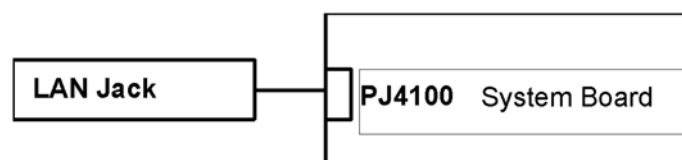
If any error is detected by the test, go to Procedure 2

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

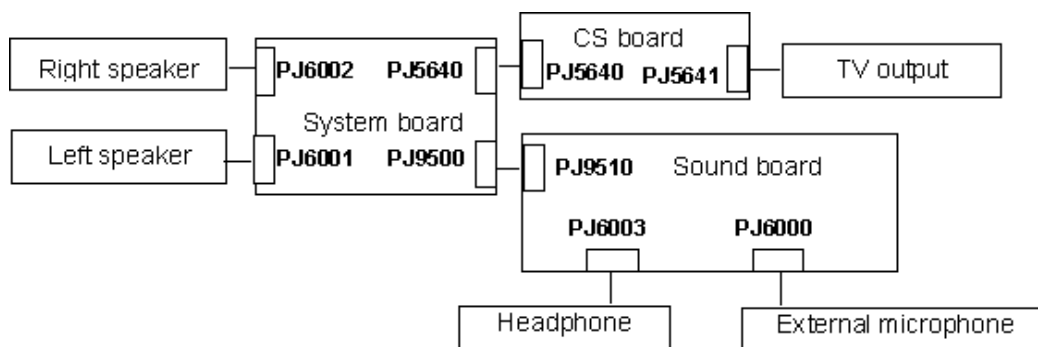
Procedure 1 Diagnostic Test Program Execution Check

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 speakers do not work properly, go to Check 1.

If the headphone or external microphone does not work properly, go to Check 2. If TV output function does not work properly, go to Check 3.

Check 1 Make sure the speaker cables are firmly connected to PJ6001 and PJ6002 on the system board. If the sound function does not still work properly, perform Procedure 3.

Check 2 Make sure the sound board is firmly connected to the system board. If each function does not still work properly, perform Check 2 of Procedure 3.

Check 3 Make sure the connector board is firmly connected to the system board. If the function does not still work properly, perform Check 3 of 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 4.
- Check 2 The sound board may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem persists, perform Check 4.
- Check 3 The connector board may be faulty. Replace it with a new one following the steps in Chapter 4. If the problem persists, perform Check 4.
- Check 4 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: 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.

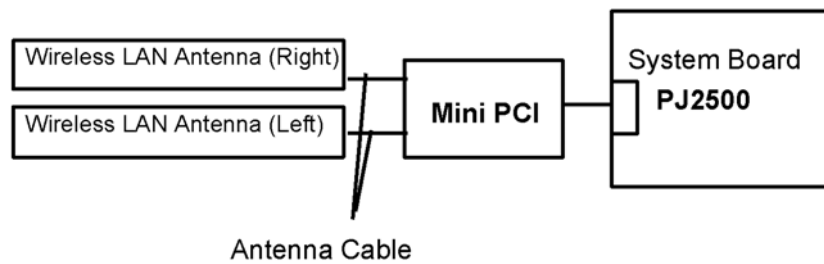
Check 1 Execute test program to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN. Perform the test following the instructions described in “Wireless LAN test” in Chapter 3.

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 PJ2500 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 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 2.
- 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

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3.1 The Diagnostic Test

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

The Hardware Initial information Setting Tool consists of some programs which writes the hardware information or displays the current information of the computer. It is also included in one of Diagnostic Disks.

NOTE: To start the diagnostics, follow these steps:

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

3.1.1 Diagnostics menu

The 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

Other tests are:

- Sound/LAN/MODEM/TV TEST (Sound/LAN/MODEM/TV TEST disk)
- Wireless LAN TEST (Wireless LAN TEST disk)
- IEEE1394 test (IEEE1394 TEST disk)

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

- USB FDD
- The Diagnostic Disks (Five disks for all tests (T&D for maintenance, Sound/LAN/Modem/TV for maintenance, two wireless LAN for maintenance and IEEE1394 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 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 USB test module (Keyboard test)
- A USB cable (Keyboard test)
- Headphones (Sound/LAN/Modem/TV test)
- A microphone (Sound/LAN/Modem/TV test)
- A FAT-MODE inspection device (Sound/LAN/Modem/TV test)
- An IBM compatible printer (Printer test)
- A PC for wraparound test

3.1.2 H/W (Hardware) initial information setting tool

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

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

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

- The Diagnostics Disk (all test (T&D))
- A LAN wraparound connector (E2PROM test)

3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

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

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

Enter a choice: 1

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

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

3.2.1 Diagnostics menu (T&D)

The following menu appears.

```
TOSHIBA personal computer 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.

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 -
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**.



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 : XXXXXX STATUS : XXX
```

SUB-TEST MENU :

```
01 - ROM checksum
02 - Dock/UnDock
03 -
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 - CPU Thermistor
10 -
11 - System LED
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.

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.

Table 3-1 in section 3.4 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.

### 3.2.2 H/W initial information setting tool

The following menu appears in the display.

```

#####
H/W initial information setting tool VX.XX
#####
#
* 1 Initial configuration *
* 2 Region write *
* 8 System configuration display *
* 9 E2PROM test (MAC/DMI) *

... Press test number[1,2,8,9] ?

```

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

### 3.3 Setting of the hardware configuration

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

#### Subtest 01 Initial configuration

This subtest executes the following items and shows their contents in the display. When an item ends normally, the program proceeds automatically to the next one. When an error is found, the program stops and waits for key input. (After solving the problem, the program executes the item again.) When the DMI information is displayed, the program waits for key input of DMI information. Then, input the DMI information. For more details on DMI information, refer to "Subtest 08, DMI write" in the System test.

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

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

#### Subtest 02 Region write

This subtest executes the setting of the region code for DVD drive.

The following message appears in the display. Press any key to return to the H/W initial information setting tool menu.

```
#####
It completed
#####
* *
```

Press any key to continue...

#### Subtest 08 System configuration display

This subtest displays the information of the system configuration.

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

Press [Enter] key

For details of the system configuration information, refer to "3.28 System configuration".

Subtest 09 E2PROM test (MAC/DMI)

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

This subtest checks whether the LAN function works correctly.

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

COMPLETED\_

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

### 3.4 Subtest 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          | Dock/UnDock                   |
|     |           | 04          | Fan ON/OFF                    |
|     |           | 05          | Geyserville                   |
|     |           | 06          | Quick charge                  |
|     |           | 07          | DMI read                      |
|     |           | 08          | DMI write                     |
|     |           | 09          | CPU Thirmistor                |
|     |           | 11          | System LED                    |
| 2   | MEMORY    | 01          | Conventional memory           |
|     |           | 02          | Protected Mode                |
|     |           | 04          | Cache memory                  |
|     |           | 05          | L2 Cache memory               |
|     |           | 06          | Stress                        |
|     |           |             |                               |
| 3   | KEYBOARD  | 01          | Pressed key display           |
|     |           | 02          | Pressed key code display      |
|     |           | 04          | Touch pad/IPS                 |
|     |           | 05          | USB test (Port 0/1/2)         |
|     |           | 07          | Button test                   |
| 4   | DISPLAY   | 01          | VRAM read/write for VGA       |
|     |           | 02          | Gradation for VGA             |
|     |           | 03          | Gradation for LCD             |
|     |           | 04          | Gradation & Mode test for VGA |
|     |           | 05          | All dot on/off for LCD        |
|     |           | 06          | "H" pattern display           |
|     |           | 07          | LCD Brightness                |
| 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/<br>DVD-ROM         | 01          | Sequential read                  |    |                 |
|     |                            | 02          | Read specified address           |    |                 |
|     |                            | 03          | Random address/data              |    |                 |
|     |                            | 05          | CDRW 1point W/R/C                |    |                 |
| -   | SOUND/LAN/<br>MODEM/TV     | 01          | Microphoned recording & play     |    |                 |
|     |                            | 02          | Sin wave                         |    |                 |
|     |                            | 03          | LAN                              |    |                 |
|     |                            | 04          | MODEM                            |    |                 |
|     |                            | 05          | TV Tuner slot                    |    |                 |
| -   | IEEE1394                   | 1           | IEEE1394 test                    |    |                 |
|     |                            | 2           | Responder tool                   |    |                 |
|     |                            | 3           | ID Check                         |    |                 |
| -   | Wireless LAN<br>(Atheros)  | 1           | Communication test               |    |                 |
| -   | Wireless LAN<br>(Calexico) | 1           | Communication test               |    |                 |
|     |                            | 2           | Mac Address check                |    |                 |

## 3.5 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 Dock/UnDock

**NOTE:** Attach Port Replicator III before the start of this test.

When this subtest displays message shown below, slide the corresponding switch and press **Enter**.

Slide Eject-SW, and press [Enter] key

Following message appears in the display, then press **Enter** without pressing eject button.

Release Eject-SW, and press [Enter] key

When the subtest end normally, return to SYSTEM test menu automatically.

After the display returns to the SYSTEM test menu, undock the computer from the Port Replicator III.

### 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** 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 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 :XXXXXX-XXXXX
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 09 CPU Thirmistor

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

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

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

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

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

0000h : The CPU is running full speed.

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

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

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

**Subtest 11     System LED**

This subtest checks the LED of Power, Battery and DC-IN.

The Following message appears in the display.

Confirm that the LED lights in the same color as the message changed in the certain interval. Then, press any key.

Check [PS-LED]= Orange & [Batt.LED]= Green!

The following message appears in the display. Check the LED in the same way as above. Then press any key.

Check [PW-LED]= Orange

Return to the SYSTEM TEST menu.

## 3.6 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.

### 3.7 Keyboard Test

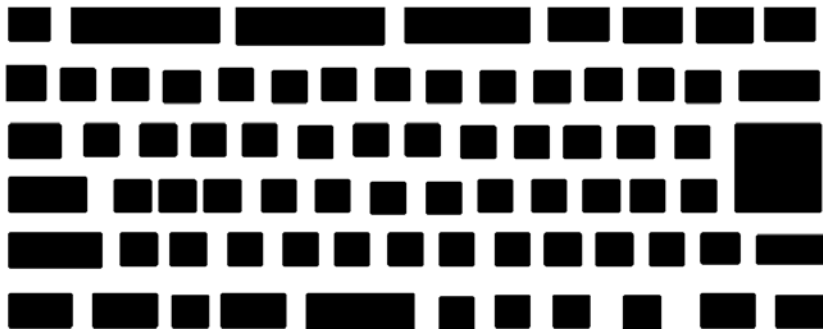
To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Keyboard test contains some subtests that test the computer's keyboard and Touch pad actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

#### 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

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.

Press **Enter** to return to SYSTEM TEST menu.

```

Scan code = SS
Character code = CC
Keytop = NNNNNN

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

```



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

```
Test Port number select (1:Port0, 2:Port1, 3:Port2) ?
```

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

#### Subtest 07 Button test

This subtest checks TOSHIBA Console button, Presentation button, Zoom in(+) button and Zoom out(-) button work properly.

The following message appears in the display.

```
Press [TOSHIBA Console] key
```

Then, press the TOSHIBA Console button of the computer. The message appears in the following order. Check the others buttons in the same way as the above.

```
Press [Presentation] key
```

```
Press [Smooth View(+)] key
```

```
Press [Smooth View(-)] key
```

After pressing the Zoom out(-) button, the display returns to the Keyboard TEST menu.

### 3.8 Display Test

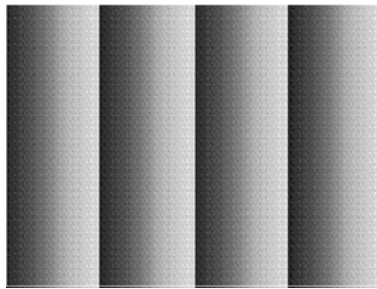
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

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]
```

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.



### 3.9 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.

## 3.10 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:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopq
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqr
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstu
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstu
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuv
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuv
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvw
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwx
!#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwx
```

## Subtest 02      Function

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

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

This subtest prints the various print types shown below:

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

## 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.)

### 3.11 Async Test

**NOTE:** This test cannot be performed without Advanced Port Replicator III. Before executing this test, make sure the computer is docked with the Advanced Port Replicator III.

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 in the Advanced Port Replicator III. 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.



## 3.12 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:XXXXXX ERRORCOUNT :XXXXXX
WRITE DATA:XX READ DATA :XX
ADDRESS :XXXXXXXXXX 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.

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

**Subtest 06** Write specified address

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

**Subtest 07** Read specified address

This subtest reads data 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.

### 3.13 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.

### 3.14 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.

### 3.15 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<br>00001 | nn<br>nn | xx<br>xx | Address line<br>REG#, CE#1, CE#2<br>nn=A0, 90, 80, 00 |
| 02   | 00002          | ww       | rr       | Data line<br>ww=write data, rr=read<br>data           |
| 03   | 00003          | —        | —        | Speaker line                                          |
| 04   | 00004          | 40,80    | xx       | Wait line (40<xx<80)                                  |
| 05   | 00005          | nn       | xx       | Other lines (BSY#, BVD1)<br>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.



### 3.16 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 05      CDRW 1point W/R/C
- This subtest writes, reads and compares data at one point on a CD-RW.

### 3.17 Sound/LAN/Modem /TV Test

To execute the Sound/LAN/Modem/TV Test, use the Sound/LAN/Modem/TV Test Diagnostics disk. Finish the tests of the main T&D Diagnostics disk 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 Sound/LAN/Modem/TV Test Diagnostics disk in the floppy disk drive and turn on the power while pressing **U**. The following message will appear:

```
#####
#####XXXXXX DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM/TV TEST)#####
#####
* 1 (Microphoned recording&play) *
* * *
* 2 (Sin wave) *
* * *
* 3 (LAN) *
* * *
* 4 (MODEM) *
* * *
* 5 (TV tuner slot) *
* * *

... Press test number[1-5] ?
```

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/TV test, remove the test program disk from 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[1-3] ? pause
Press any key to continue...
```

Press any key, and the following message appear.

```
Press test number[1-3] ? Call micrec
-
-
-
Copyright (c) Tenberry Software, Inc. XXXX
```

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.

```
STACWAVE Version X.XX
Build data: XXX XX XXXX at XX:XX:XX
Loading "mic.wav".
```

**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 paly 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

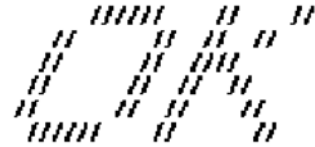
This subtest checks the operation of mini-PCI I/F by the loopback in the chip. Select **3** to execute and press **Enter**. The following message will appear:

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

LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
Destination Address = xxxxxxxxxxxx
Source Address = xxxxxxxxxxxx

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



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

Check that the message “OK” appears.

**Subtest 04 Modem 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**.

**Subtest 05 TV tuner slot (Japan-model only)**

This subtest is only for Japan-models.

### 3.18 IEEE1394 Test

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

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

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

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

The following menu will appear:

```

* -----*
* IEEE1394 [TSB!"LV28] test menu (For Repair) VX.XX*
* -----*
*
* ===== Select test No. and [Enter] =====*
*
* 1 : ... Ieee1394 test*
* 2 : ... Responder tool*
* 3 : ... ID Check*
*

Select [1-3]?

```

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

Subtest 01 IEEE1394 test

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

Subtest 02 Responder tool

This program initializes the machine responder.

Subtest 03 ID Check

This program checks the GUID.

### 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.  
It is recommended to conduct this test in the environment where any other wireless networks such as Bluetooth is not used nearby.

In this test, the following items are tested:

- (1) SKU (destination code) check
- (2) Mac Address check
- (3) Communication test (for 11a mode)
- (4) Communication test (for 11g mode)
- (5) Communication test (for 11b mode)

This program conducts the above test items 2) to 5) continuously and displays results for each item during the test. However, only the destination code and the last result for the other test items shall be checked. (The message "OK" or "NG" is displayed.)

**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 the first floppy disk containing the test program into the floppy disk drive of the responder machine and turn on the power. When the test starts, the following message will appear.

```

* Please inserts Media#2 in FDD. ! *
* After replacing FD, "S" + "Enter" *

```

Replace the first floppy disk with the second one. Then press **S** and **Enter**. The menu for selecting the test mode will appear.

```
#####
Askey/Atheros Wireless LAN Module Maintenance T&D
#####
*
* 1 DUT mode *
*
* 2 REF mode (Responder) *
*

....Press test number [1,2] ?
```

Press **2** and **Enter** of the responder machine.

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 the first floppy disk containing the test program into the floppy disk drive of the tester machine and turn on the power. When the test starts, the following message will appear.

```

* Please inserts Media#2 in FDD. ! *
* After replacing FD, "S" + "Enter" *

```

Replace the first floppy disk with the second one. Then press **S** and **Enter**. The menu for selecting the test mode will appear.



```
#####
Askey/Atheros Wireless LAN Module Maintenance T&D
#####
*
* 1 DUT mode *
*
* 2 REF mode (Responder) *
*
*

....Press test number [1,2] ?
```

Press **1** and **Enter** of the tester machine. The test program starts and shows the destination code of the installed wireless LAN card.

Check the "SKU" (destination code). When the code is correct (a proper card is installed), press any key to continue the test. If the code is not correct (an improper card is installed), end the test by pressing **Ctrl + C**.

Example) Message for G86C0000S210 (11a/g: MoW)

```

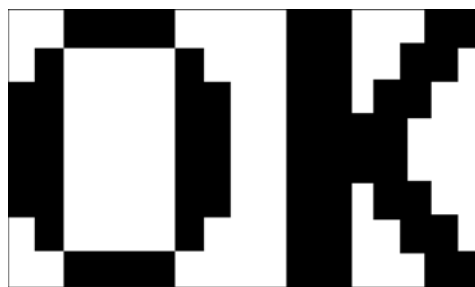
*
* Module : Askey/Atheros 802.11a/g *
*
* SKU : MoW *
*
* G code : G86C0000S210 *
*

```

When the test is continued, "Mac Address check" and "Communication test (confirmation of antenna connection)" are automatically conducted in order.

For the 11a/g card, the antenna connection confirmation test and the sending/receiving data test are conducted in 11a mode, and the sending /receiving data test is successively conducted in 11g mode and 11b mode. For the 11g card, the antenna connection confirmation test and the sending/receiving data test are conducted in 11g mode, and the sending/receiving data test is conducted in 11b mode.

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



Press **Enter** to return to the command prompt.

When the tester machine has not passed the test, it conducts automatically the test again. When the tester machine still cannot pass the test, the message "NG" will appear in the tester machine. Pressing **Enter** on the screen shows the message of the cause of error.

Example) Error in 11g mode test

```

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

```

Press **Enter** to return to the command prompt.

To finish the test, turn off the tester machine and responder machine, and set the Wireless Communication Switch to “off” position.

### 3.20 Wireless LAN Test (Calexico)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program. To execute the LAN Test, use the Diagnostics disk for wireless LAN test. Finish the tests of the main Diagnostics disk 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 for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U**.

The following menu appears in the display.

```
*****Intel Calexico2 11b/g Card Maintenance test Menu*****
*
* 1 : SKU check of Module
*
* 2 : MAC Address Check
*
* 3 : Antenna Check & communication test of 11b mode
*
* 4 : communication test of 11g mode
*
* 5 : All the tests of Calexico 11g Card
* (SKU & MAC Check, 11b/g communication test)
*

```

SELECT TEST No, (1-5) :

To execute the subtest, input the subtest number and press **Enter**.

Subtest 01     SKU check of module

This subtest displays SKU information.  
Confirm if there is no difference between the SKU information appeared on the display and the information of the label on the back of the wireless LAN Card.

Press any key and return to the test menu.

**Subtest 02    MAC Address Check**

This subtest displays the MAC address.

Press any key and return to the test menu.

**Subtest 03    11b mode of Calexico 11b/g Card**

This subtest checks if the wireless LAN antennas of Calexico 11b/g Card are connected and if the communication is operated properly.

**Caution:** *To execute subtest 03-05, use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform those tests. Access points are also required. (Access point for 11b and 11g)*

*Make sure that the wireless communication switch is moved to ON side before executing wireless LAN test. (The wireless communication LED lights orange.)*

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

**Setting the responder machine**

Connect the responder machine to the access points (for 11b and 11g) with a cross cable and turn on the access points.

Insert the floppy disk containing the wireless LAN test program into the FDD of the responder machine and turn on the responder machine.

**Setting the target machine**

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

Following message appears in the display.

Exchange the floppy disk of test program for that of responder.

After exchanging the floppy disk, input **S** and press **Enter**.

```

*
* Please exchange for Responder media *
*

Please input the "S" key and push the "Enter" key :
```

OK appears in the display when a problem is not found. Press any key and return to the test menu.

NG appears in the display when a problem is found.

Press any key, then the following message appears in the display.

```

*
* Main Antenna Test : NG !!
*

```

Press any key and return to the test menu.

#### Subtest 04 communication test of 11g mode

This subtest checks if the communication is operated properly in Calexico11g mode.

OK appears in the display when a problem is not found. Press any key and return to the test menu.

NG appears in the display when a problem is found.

Press any key, then the following message appears in the display.

```

*
* 11g Communication Test : NG !!
*

```

Press any key and return to the test menu.

#### Subtest 05 All the tests of Calexico 11b/g Card

This subtest checks SKU information, MAC address, connecting of the antennas and communication of Calexico 11b/g Card. The test stops at when an error occurs if a problem is found. To return to the test menu, follow the each subtest the test stops.

### 3.21 Thermal Radiation Control Test

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

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

[Status:pass]

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

[Status:CPU:FAIL GPU:FAIL]

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

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

### 3.22 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<br>02<br>03<br>04<br>FE<br>0A<br>0B<br>88                                                 | ROM Checksum Error<br>Location ID Error<br>Serial ID Write Error<br>Thermister Error<br>EC READ Error<br>LAN LOOPBACK Error<br>1394 data Error<br>FAN test Error                                                                                                                                                                                                                                                                                                              |
| Memory      | 01<br>02<br>0D                                                                               | RAM parity error<br>Protected mode not change<br>Cache memory error                                                                                                                                                                                                                                                                                                                                                                                                           |
| USB         | 00<br>01<br>02<br>03<br>04<br>05<br>06<br>07<br>08<br>09<br>10<br>11<br>12<br>13<br>14<br>15 | USB-NO DESCR. ERROR<br>USB-GET DESCR. ERROR(FIRST)<br>USB-SET ADDRESS. ERROR<br>HUB-GET DESCR. ERROR(Top8B)<br>HUB-GET DESCR. ERROR(Whole)<br>HUB-SET CONFIGURATION ERROR<br>HUB-GET DESCR. ERROR(DESCR.)<br>HUB-SET FEATURE ERROR(P ON)<br>HUB-GET STATES ERROR<br>HUB-SET FEATURE ERROR(RESET)<br>HUB-CLEAR FEATURE ERROR<br>HUB-CLEAR FEATURE1 ERROR<br>HUB-SET FEATURE ERROR(Enab.)<br>HUB-CLEAR FEATURE2 ERROR<br>USB-OVER CURRENT ERROR<br>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<br>02<br>03<br>04<br>06<br>08<br>09<br>10<br>20<br>40<br>60<br>80<br>EE                                     | Bad Command Error<br>Address Mark Not Found<br>Write Protected<br>Record Not Found<br>Media Removed<br>DMA Overrun Error<br>DMA Boundary Error<br>CRC Error<br>FDC Error<br>Seek Error<br>Not Drive Error<br>Time Out Error<br>Write Buffer Error                                                                                                                        |
| Printer     | 01<br>08<br>10<br>20<br>40<br>80                                                                               | Time Out<br>Fault<br>Select Line<br>Out Of Paper<br>Power Off<br>Busy Line                                                                                                                                                                                                                                                                                               |
| ASYNC       | 01<br>02<br>04<br>08<br>10<br>20<br>40<br>80<br>88                                                             | rs232c DSR off time out<br>CTS off time out<br>RX EMPTY time out<br>TX BUFFER FULL time out<br>parity error<br>framing error<br>overrun error<br>line status error<br>modem status error                                                                                                                                                                                 |
| HDD         | 01<br>02<br>04<br>05<br>07<br>08<br>09<br>0A<br>0B<br>10<br>11<br>20<br>40<br>80<br>AA<br>BB<br>CC<br>E0<br>EE | Bad Command Error<br>Address Mark Not Found<br>Record Not Found<br>HDC Not Reset Error<br>Drive Not Initialize<br>HDC overrun (DRQ)<br>DMA Boundary Error<br>Bad Sector<br>Bad Track Error<br>ECC Error<br>ECC recover enable<br>HDC Error<br>Seek Error<br>Time Out Error<br>Drive Not Ready<br>Undefined Error<br>Write Fault<br>Status Error<br>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        |

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

Table 3-4 Error register contents

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

## 3.24 FDD Cleaning

### 3.24.1 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.

### 3.24.2 Operations

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

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

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

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

```
Cleaning start
```

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

## 3.25 Log Utilities

### 3.25.1 Function Description

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

If the power switch is turned off, the error information will be lost. The error information is displayed in the following order:

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

### 3.25.2 Operations

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

```

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

```

FDD/HDD or  
memory address
HDC status

Error status
Read data
Error status name

Pass count
Write data

Subtest number

Test name

Error count

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

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

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

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

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

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

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

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

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

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

## 3.26 Running Test

### 3.26.1 Function Description

This function automatically executes the following tests in sequence:

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

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

### 3.26.2 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**.

## 3.27 Floppy Disk Drive Utilities

### 3.27.1 Function Description

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

#### 1. FORMAT

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

### 3.27.2 Operations

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

```
[FDD UTILITIES]

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

2. FORMAT program

- (a) Selecting FORMAT displays the following message:

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

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

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

- (c) Select a media/drive type number, 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. = YYYY...
Reserved (h) = XXXX
Double Word Capability = XXXXXXXX
```

Press [Enter] key

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

## 3.28 System Configuration

### 3.28.1 Function Description

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

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM version (1st ID, 2nd ID)
5. BOOT ROM version
6. KBC version
7. PS 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

### 3.28.2 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
* - X Printer Adapter LPT1 = XXXLPT2 = LPT3 =
* - X ASYNC Adapter COM1 = XXX COM2 = COM3 =
* -
* - X Math Co-Processor
* - X PCMCIA Slot
* - Modem = XXX
* - LAN = XXX
* - X Floppy Disk Drive(s) Track = , Head = , Sector =
* - X 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.



## 3.29 SETUP

### 3.29.1 Function Description

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

1. Memory
  - (a) Total
2. System Date/Time
3. Battery
4. Password
5. Boot Priority
  - (a) Boot Priority
  - (b) HDD Priority
  - (c) Network Boot Protocol
6. Display
  - (a) Power On Display
  - (b) LC Display Stretch
  - (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) Serial
  - (b) 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) External Keyboard “Fn” key
- (c) Parallel Port Mode
- (d) Hard Disk Mode

14. LEGACY Emulation

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

15. PCI LAN

### 3.29.2 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 |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------|------------------|-------------------------|--|-----------------|--------------|-----------------|------------|----------------|--|-------------------|--------------|-----------------|--|----------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|---------------|---------------------|--------------|-----------------------|-----------------------|-------|----------------|--|------------------|-----------------|---------------------|-----------|---------|-------------|---------------|--|---------------|--------|-----------|-----------|---------------|-----------|---------------------------------|--------------------------|---------------|------------|
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>MEMORY</b></td></tr> <tr><td>Total</td><td>= XXXXXX KB (*1)</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>SYSTEM DATE/TIME</b></td></tr> <tr><td>Date (MM-DD-YY)</td><td>= XX-XX-XXXX</td></tr> <tr><td>Time (HH:MM:SS)</td><td>= XX:XX:XX</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>BATTERY</b></td></tr> <tr><td>Battery Save Mode</td><td>= Full Power</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>PASSWORD</b></td></tr> <tr><td colspan="2">Not Registered</td></tr> </table> | <b>MEMORY</b>            |                          | Total | = XXXXXX KB (*1) | <b>SYSTEM DATE/TIME</b> |  | Date (MM-DD-YY) | = XX-XX-XXXX | Time (HH:MM:SS) | = XX:XX:XX | <b>BATTERY</b> |  | Battery Save Mode | = Full Power | <b>PASSWORD</b> |  | Not Registered |  | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>BOOT PRIORITY</b></td></tr> <tr><td>Boot Priority</td><td>=HDD→FDD→CD-ROM→LAN</td></tr> <tr><td>HDD Priority</td><td>=Built-in HDD→PC Card</td></tr> <tr><td>Network Boot Protocol</td><td>= PXE</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>DISPLAY</b></td></tr> <tr><td>Power On Display</td><td>= Auto-selected</td></tr> <tr><td>LCD Display Stretch</td><td>= Enabled</td></tr> <tr><td>TV Type</td><td>= NTSC (US)</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>Others</b></td></tr> <tr><td>Power-up mode</td><td>= Boot</td></tr> <tr><td>CPU Cache</td><td>= Enabled</td></tr> <tr><td>Level 2 Cache</td><td>= Enabled</td></tr> <tr><td>Dynamic CPU Frequency Mode (*2)</td><td>= Dynamically Switchable</td></tr> <tr><td>Auto Power On</td><td>= Disabled</td></tr> </table> | <b>BOOT PRIORITY</b> |  | Boot Priority | =HDD→FDD→CD-ROM→LAN | HDD Priority | =Built-in HDD→PC Card | Network Boot Protocol | = PXE | <b>DISPLAY</b> |  | Power On Display | = Auto-selected | LCD Display Stretch | = Enabled | TV Type | = NTSC (US) | <b>Others</b> |  | Power-up mode | = Boot | CPU Cache | = Enabled | Level 2 Cache | = Enabled | Dynamic CPU Frequency Mode (*2) | = Dynamically Switchable | Auto Power On | = Disabled |
| <b>MEMORY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | = XXXXXX KB (*1)         |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>SYSTEM DATE/TIME</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Date (MM-DD-YY)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | = XX-XX-XXXX             |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Time (HH:MM:SS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | = XX:XX:XX               |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>BATTERY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Battery Save Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | = Full Power             |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>PASSWORD</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Not Registered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>BOOT PRIORITY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Boot Priority                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | =HDD→FDD→CD-ROM→LAN      |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| HDD Priority                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | =Built-in HDD→PC Card    |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Network Boot Protocol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | = PXE                    |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>DISPLAY</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Power On Display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | = Auto-selected          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| LCD Display Stretch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | = Enabled                |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| TV Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | = NTSC (US)              |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| <b>Others</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                          |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Power-up mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | = Boot                   |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| CPU Cache                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | = Enabled                |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Level 2 Cache                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | = Enabled                |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Dynamic CPU Frequency Mode (*2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | = Dynamically Switchable |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |
| Auto Power On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | = Disabled               |                          |       |                  |                         |  |                 |              |                 |            |                |  |                   |              |                 |  |                |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |  |               |                     |              |                       |                       |       |                |  |                  |                 |                     |           |         |             |               |  |               |        |           |           |               |           |                                 |                          |               |            |

↑↓←→: 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 |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------|----------------|---------------|------------------|--|--------|--------------------|----------|------------------------|--------------------|--|--------------|----------------------------|--------|------------------------------|----------------|--|---------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--|-----------------|-----------------|-------------------|--|--------------------------|-----------|-------------------|------------|--------------------|-------|----------------|-------------------------|-------------------------|--|-------------------------------|-----------|--------------------------|-----------|----------------|--|--------------|-----------|
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>CONFIGURATION</b></td></tr> <tr><td>Device Config.</td><td>= Setup by OS</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>I/O PORTS</b></td></tr> <tr><td>Serial</td><td>= COM1 (3F8H/IRQ4)</td></tr> <tr><td>Parallel</td><td>= LPT1 (378H/IRQ7/CH3)</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>DRIVERS I/O</b></td></tr> <tr><td>Built-in HDD</td><td>= Primary IDE (1F0H/IRQ14)</td></tr> <tr><td>CD-ROM</td><td>= Secondary IDE (170H/IRQ15)</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>PCI BUS</b></td></tr> <tr><td>PCI BUS</td><td>= IRQ10, IRQ11</td></tr> </table> | <b>CONFIGURATION</b>         |                          | Device Config. | = Setup by OS | <b>I/O PORTS</b> |  | Serial | = COM1 (3F8H/IRQ4) | Parallel | = LPT1 (378H/IRQ7/CH3) | <b>DRIVERS I/O</b> |  | Built-in HDD | = Primary IDE (1F0H/IRQ14) | CD-ROM | = Secondary IDE (170H/IRQ15) | <b>PCI BUS</b> |  | PCI BUS | = IRQ10, IRQ11 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>PC CARD</b></td></tr> <tr><td>Controller Mode</td><td>= Auto-Selected</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>PERIPHERAL</b></td></tr> <tr><td>Internal Pointing Device</td><td>= Enabled</td></tr> <tr><td>Ext Keyboard "Fn"</td><td>= Disabled</td></tr> <tr><td>Parallel Port Mode</td><td>= ECP</td></tr> <tr><td>Hard Disk Mode</td><td>= Enhanced IDE (Normal)</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>LEGACY EMULATION</b></td></tr> <tr><td>USB KB/Mouse Legacy Emulation</td><td>= Enabled</td></tr> <tr><td>USB-FDD Legacy Emulation</td><td>= Enabled</td></tr> </table><br><table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;"><b>PCI LAN</b></td></tr> <tr><td>Built-in LAN</td><td>= Enabled</td></tr> </table> | <b>PC CARD</b> |  | Controller Mode | = Auto-Selected | <b>PERIPHERAL</b> |  | Internal Pointing Device | = Enabled | Ext Keyboard "Fn" | = Disabled | Parallel Port Mode | = ECP | Hard Disk Mode | = Enhanced IDE (Normal) | <b>LEGACY EMULATION</b> |  | USB KB/Mouse Legacy Emulation | = Enabled | USB-FDD Legacy Emulation | = Enabled | <b>PCI LAN</b> |  | Built-in LAN | = Enabled |
| <b>CONFIGURATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Device Config.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | = Setup by OS                |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>I/O PORTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Serial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | = COM1 (3F8H/IRQ4)           |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Parallel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | = LPT1 (378H/IRQ7/CH3)       |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>DRIVERS I/O</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Built-in HDD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | = Primary IDE (1F0H/IRQ14)   |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| CD-ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | = Secondary IDE (170H/IRQ15) |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>PCI BUS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| PCI BUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | = IRQ10, IRQ11               |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>PC CARD</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Controller Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | = Auto-Selected              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>PERIPHERAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Internal Pointing Device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | = Enabled                    |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Ext Keyboard "Fn"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | = Disabled                   |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Parallel Port Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | = ECP                        |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| Hard Disk Mode                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | = Enhanced IDE (Normal)      |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>LEGACY EMULATION</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| USB KB/Mouse Legacy Emulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | = Enabled                    |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| USB-FDD Legacy Emulation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | = Enabled                    |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| <b>PCI LAN</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                              |                          |                |               |                  |  |        |                    |          |                        |                    |  |              |                            |        |                              |                |  |         |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                |  |                 |                 |                   |  |                          |           |                   |            |                    |       |                |                         |                         |  |                               |           |                          |           |                |  |              |           |
| 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 Pentium-M processor model.

### 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.                           |
| LCD Brightness       | = Bright (*1)<br>Super-Bright (*2) |
| Cooling Method       | = Maximum Performance              |

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

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

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

(\*1) Operating the battery

(\*2) Using the AC adapter

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

(a) Battery Save Options

Processing Speed

This feature changes the CPU processing speed.

**High** CPU operates at 1.50/1.60/1.70GHz (Pentium M),  
1.20/1.30/1.40GHz (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.

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.

## 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, DVD-ROM & CD-R/RW, DVD-R/-RW, DVD-Multi drive or DVD Super 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:** 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

**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 M processor featuring Intel SpeedStep technology.

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

**Always Low** Disables Pentium M 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 |
| 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 **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.

## 8. Configuration

This option lets you set the device configuration.

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

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

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

## (b) Parallel

This option sets the interrupt request level 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).

|                |                     |
|----------------|---------------------|
| <b>OPTIONS</b> |                     |
| DMA            | = Channel (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.

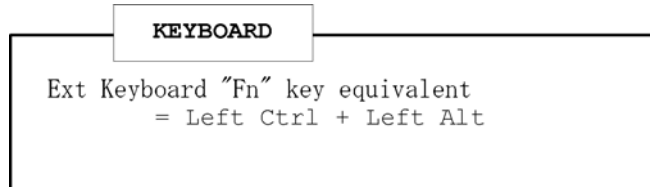
## (b) Ext Keyboard "Fn"

This option enables or disables Fn key function on the external keyboard.

**Enabled** Enables the feature.

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

When "Enabled" is selected, the following sub-window appears.



Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting a **Fn** key equivalent will enable you to use "Hotkeys" by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

= **Left Ctrl + Left Alt (\*1)**

= **Right Ctrl + Right Alt (\*2)**

= **Left Alt + Left Shift**

= **Right Alt + Right Shift**

= **Left Alt + Caps Lock**

**NOTE:** If these selections ((\*1) or (\*2)) are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.

## (c) Parallel Port Mode

Use this option to set information of Parallel Port Mode.

**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 using Windows, the setting of "Toshiba HW setup" is enabled and the setting of "Parallel Port Mode" is disabled.

(d) 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.

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## **Chapter 4**

# **Replacement Procedures**

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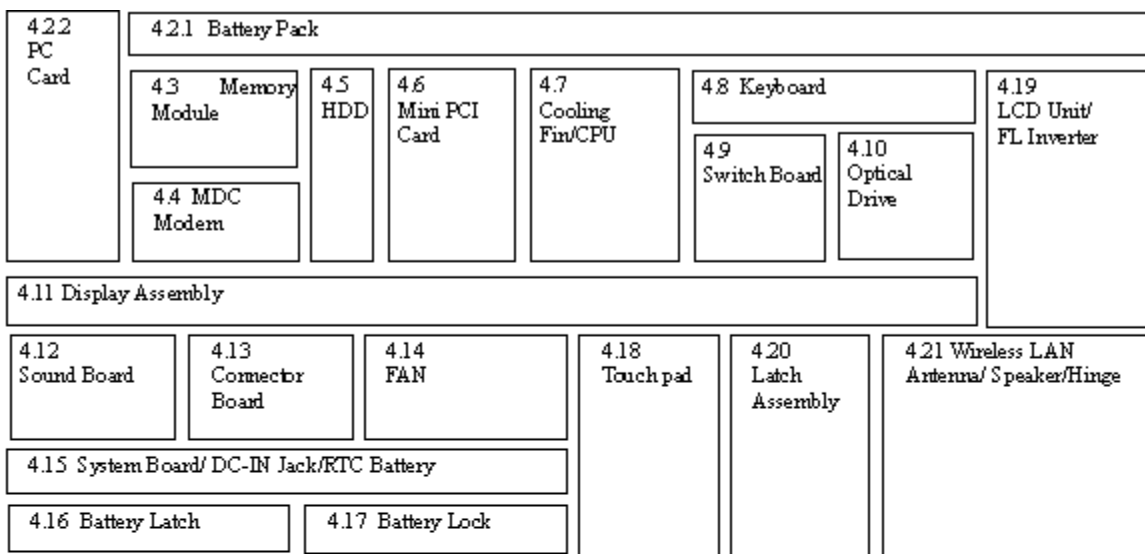




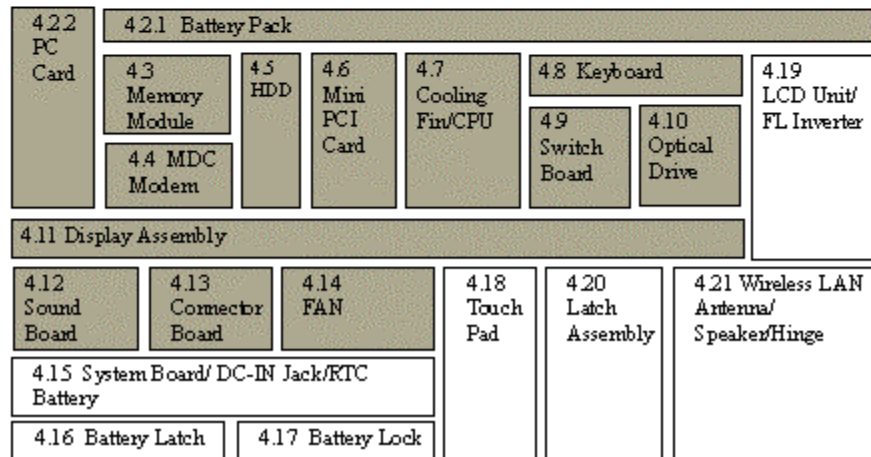
## 4.1 Overview

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

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



• Chart Notation  
The chart shows the case for the following example:  
• Removing System Board  
All FRUs down to the "4.2.1 Battery Pack" to "4.14 FAN" units must be 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

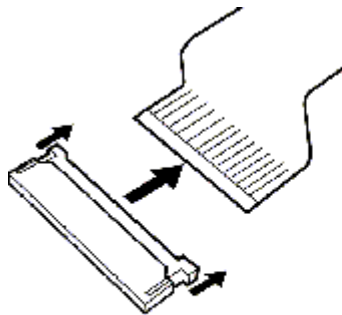
Three main types of cable connector are used.

- Pressure plate connector
- Spring connector
- Normal pin connector

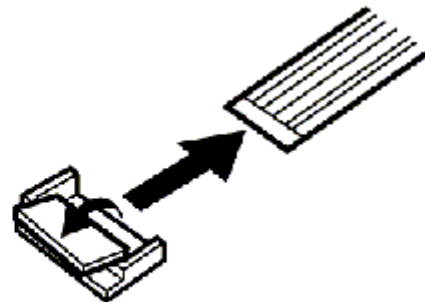
When disconnecting a pressure plate connector, lift up the tag on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, lift up the pressure plate to a suitable height and insert the cable into the connector.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

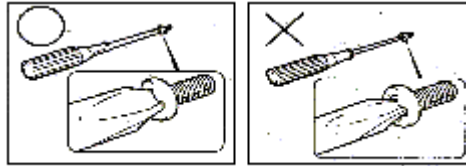
Use the following torque when tightening screws.

**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.

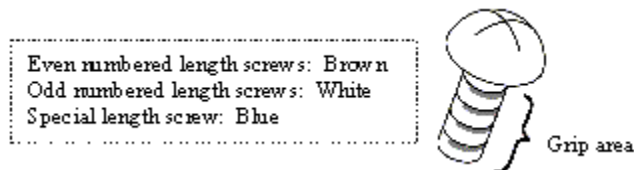
- M2 (2mm)      0.167 N·m (1.7 kgf·cm)
- M2.5 (2.5mm)    0.294 N·m (3.0 kgf·cm)
- M3 (3mm)      0.549 N·m (5.6 kgf·cm)

**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.



“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).

**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 to unlock.
5. While sliding the **battery latch** towards the direction indicated by the arrow, pull out the **battery pack** towards the direction indicated by corresponding arrow.

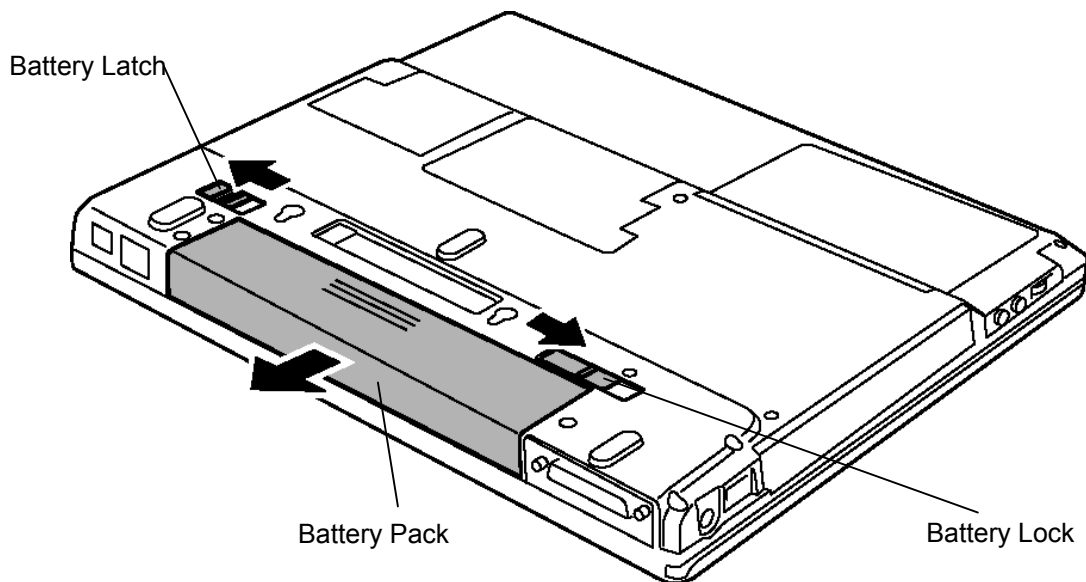


Figure 4-1 Removing Battery Pack

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

### Installing the battery pack

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

**CAUTION:** *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. 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. Fit the connector of the **battery pack** to the computer's connector and push it until click sounds.

### 4.2.2 PC Card

#### Removing the PC card

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

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

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

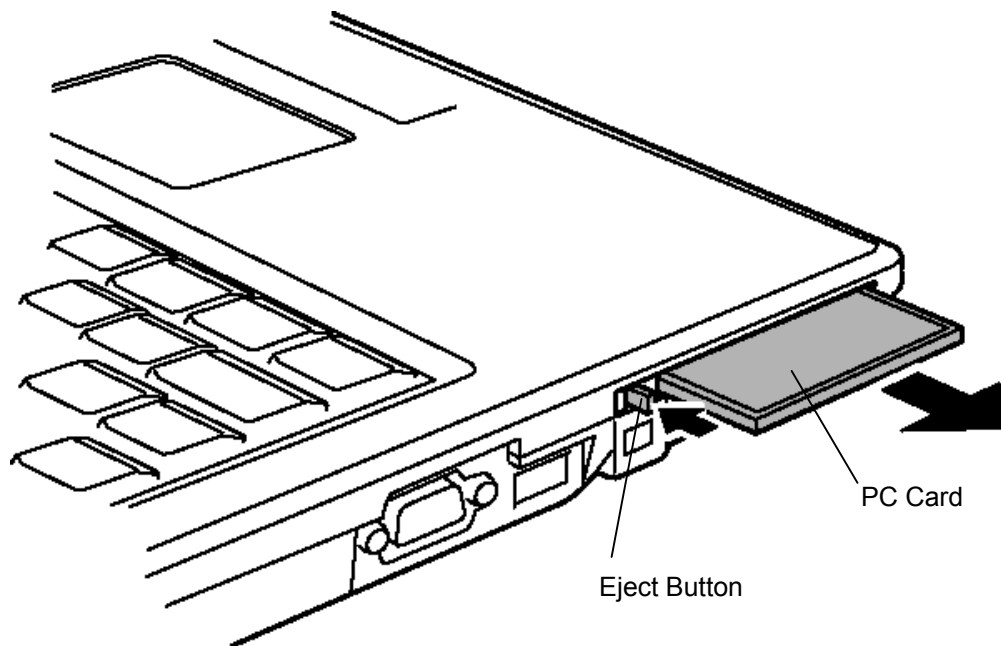


Figure 4-2 Removing PC Card

#### Installing the PC card

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

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

## 4.3 Memory Module

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

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

Never press hard or bend the memory module.

### Removing the memory module

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

1. Turn the computer upside down.
2. Loosen the **screw (with e-ring)** securing the **memory slot cover**.
3. Remove the memory slot cover from the edge near the screw.

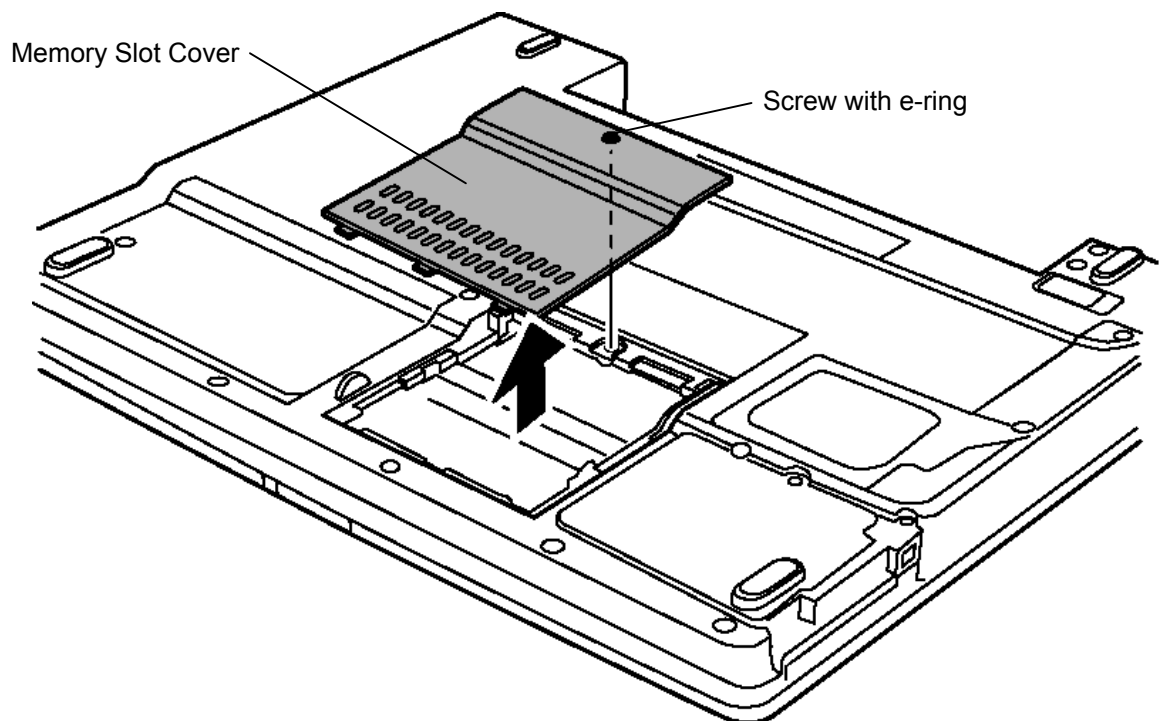


Figure 4-3 Removing Memory Slot Cover

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

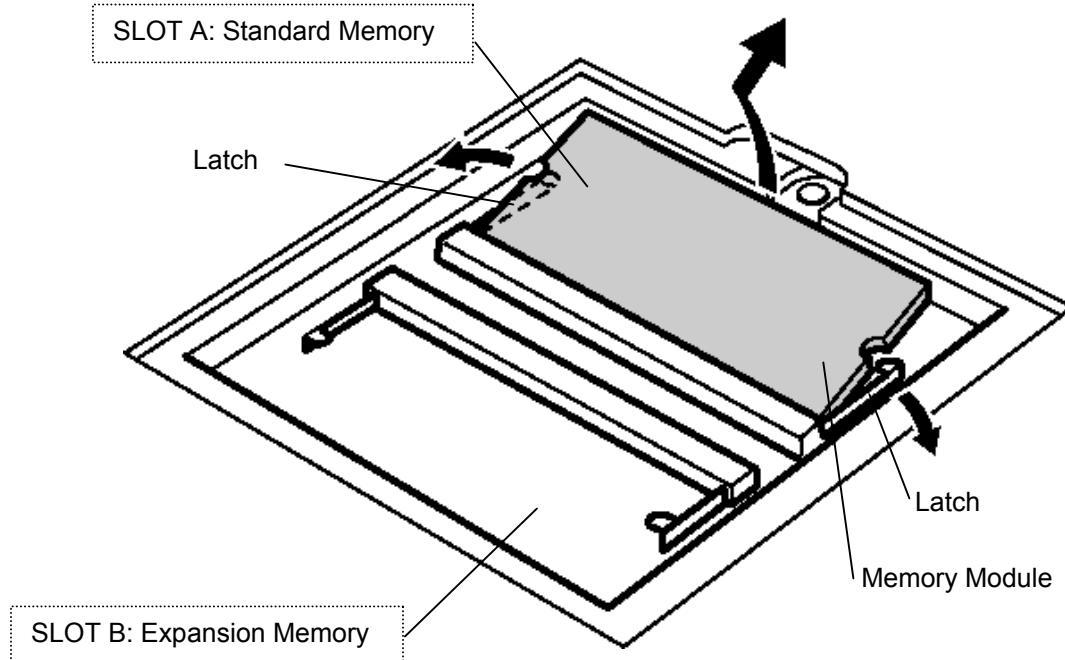


Figure 4-4 Removing Memory Module

### Installing the memory module

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

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 a memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

*When installing only one memory module, install it SLOT A. Otherwise, it might damage the module or the computer itself*

*Never press hard or bend the memory module.*

2. Install the **memory slot cover** from the front side edge 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 MDC Modem

### Removing the MDC Modem

The following describes the procedure for removing an MDC modem (See Figure 4-5).

**CAUTION:** Since the MDC slot cover is easily broken, remove the memory cover first before removing the MDC slot cover.

When replacing the MDC mode, 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. Loosen the **screw (with e-ring)** securing the **MDC slot cover** and remove the cover.
3. Remove the following **screws** fixing the **MDC modem**.
  - M2x4Z BIND screw x2
4. Lift up the MDC modem to remove it from the connector on the system board.
5. Remove the **MDC cable** from the connector on the MDC modem.

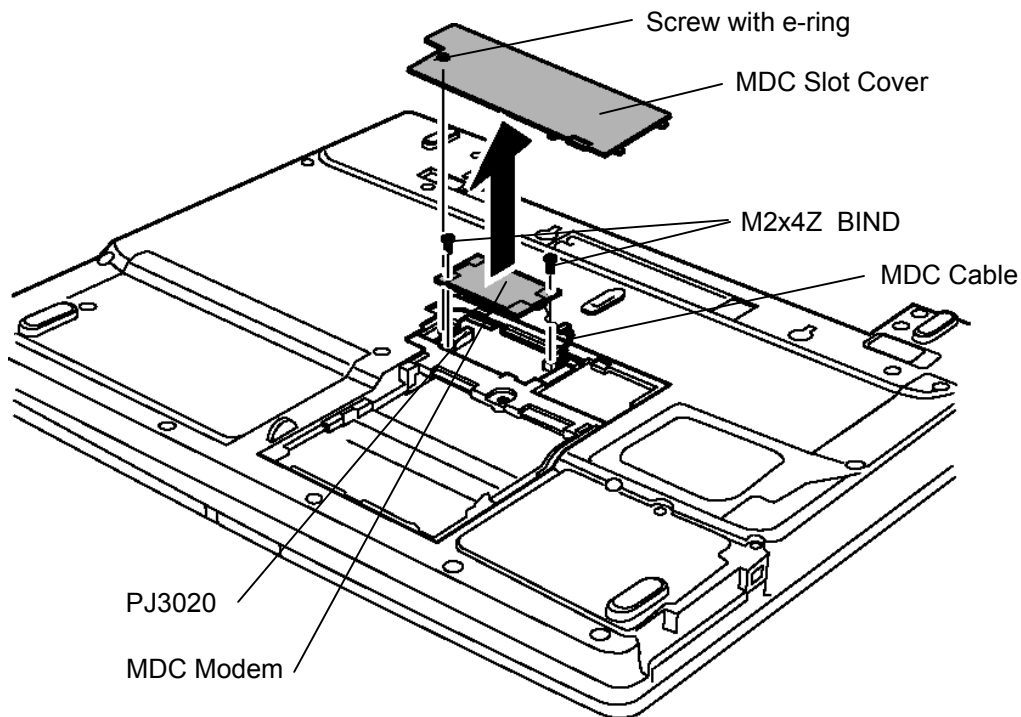


Figure 4-5 Removing MDC Modem

### Installing the MDC Modem

The following describes the procedure for installing an MDC modem (See Figure 4-5).

1. Connect the **MDC cable** to the connector **JP1** on the **MDC modem**.
2. Set the MDC modem on the slot and connect the MDC modem to the connector **PJ3020** on the system board by pressing it from the top.
3. Fix the MDC modem using the following **screws**.
  - M2x4Z BIND screw x2
4. Install the MDC slot cover and secure it with the supplied screw.

## 4.5 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 screw fixing the **HDD slot cover** and raise the cover to remove.

- M2.5x6B THIN BIND screw x1

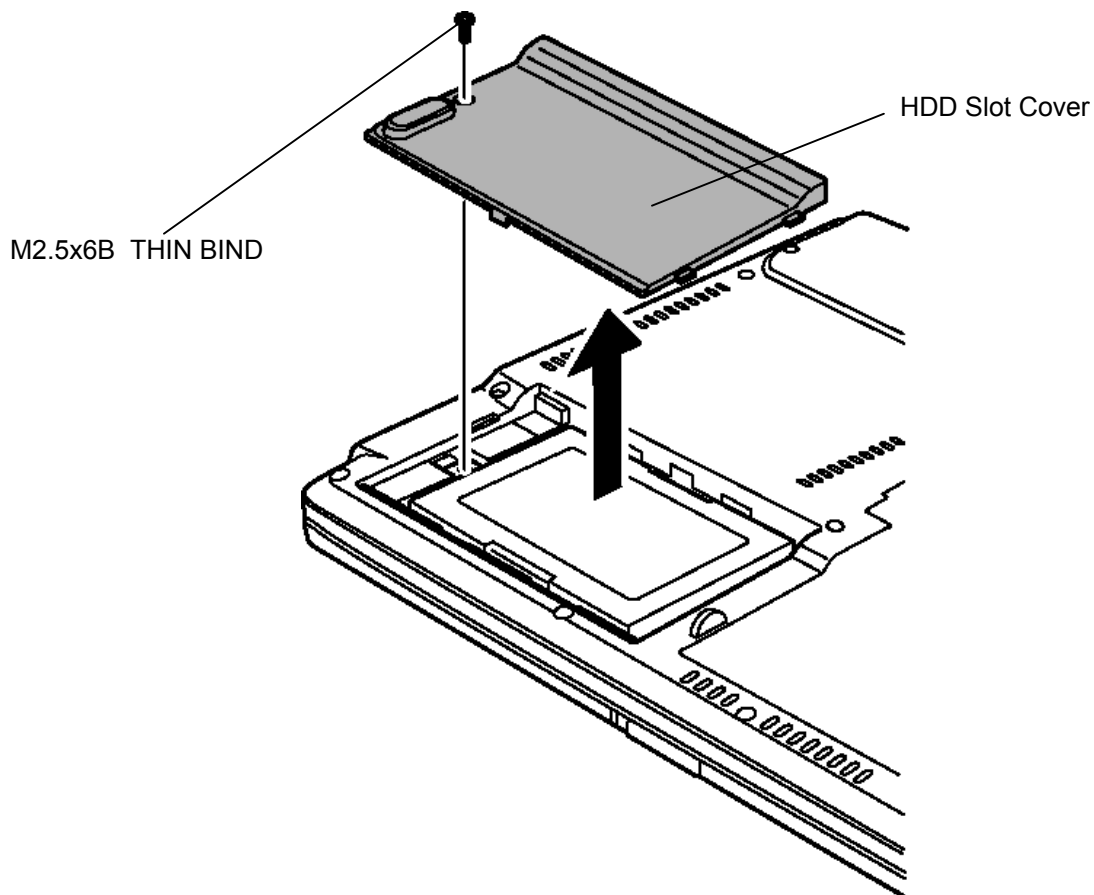


Figure 4-6 Removing HDD Slot Cover



3. Pull horizontally the **HDD ASSY** to disconnect it from the connector and lift up to remove.

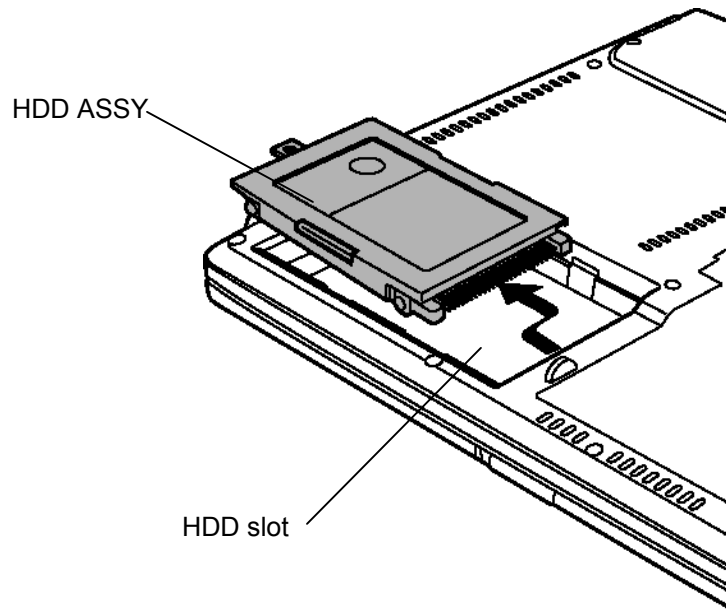


Figure 4-7 Removing HDD ASSY

4. Remove the following screws fixing the **HDD**.
  - M3x4S THIN BIND screw x4
5. Remove the **HDD holder** from the HDD.

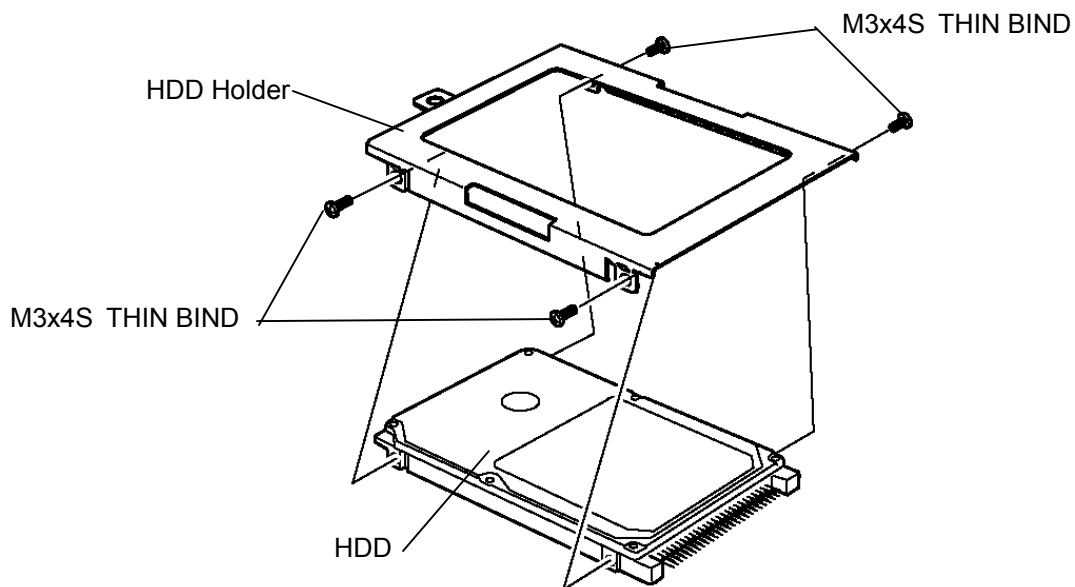


Figure 4-8 Removing HDD

### Installing the HDD

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

1. Install the **HDD holder** to the **HDD** with the following **screws**.
  - M3x4S THIN BIND screw x4
2. Put the **HDD ASSY** into the **HDD slot** and connect it to the connector.
3. Install the **HDD slot cover** and secure it by using the following **screws**.
  - M2.5x6B THIN BIND screw x1

## 4.6 Mini PCI Card

**CAUTION:** 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. 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 4-9, 4-10).

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

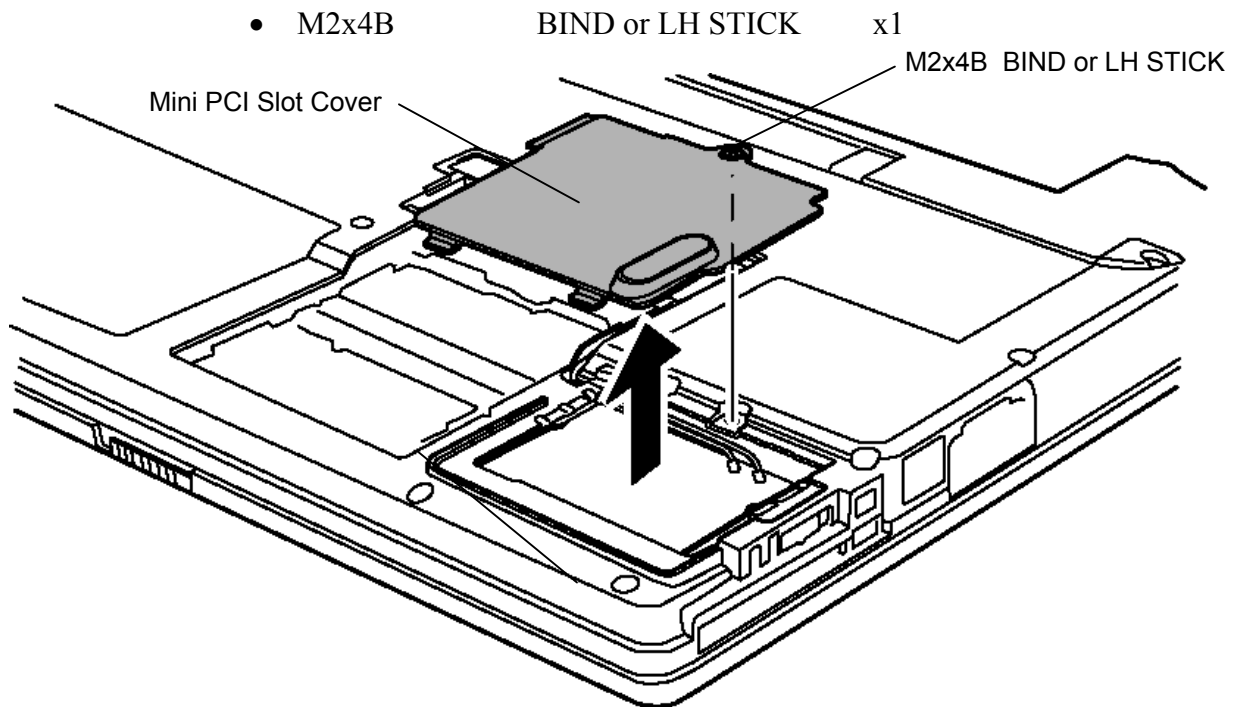


Figure 4-9 Removing Mini PCI Slot Cover

3. Disconnect two **wireless LAN cables** from JP1 and JP2 on the **mini PCI card**.
4. Remove two **glass tapes** and remove the cables from the guide.
5. Open the left and right latches holding the mini PCI card and remove the mini PCI card.

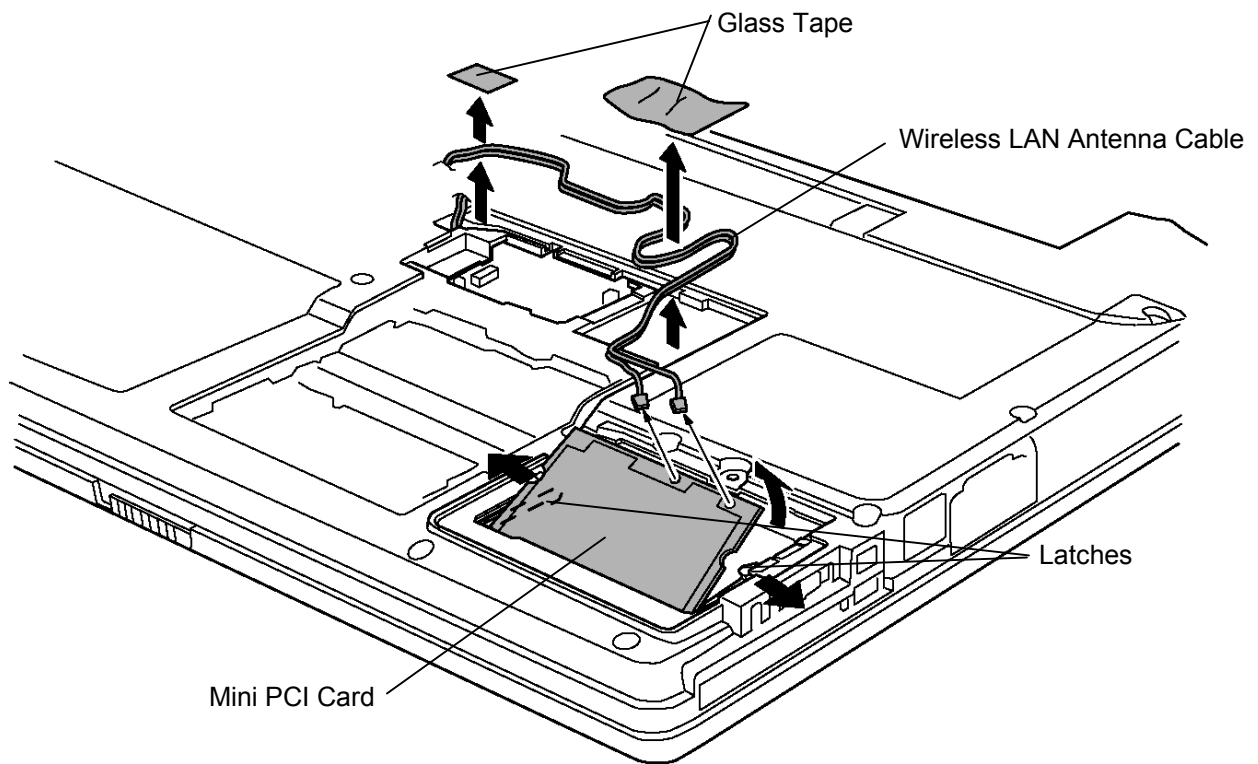


Figure 4-10 Removing Mini PCI Card

### Installing the Mini PCI card

The following describes the procedure for installing a mini PCI card (See Figure 4-9, 4-10).

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. Pass the black and white **wireless LAN cables** along the guide and secure them with two glass tapes. Connect the wireless LAN cables to the **J1** and **J2** terminals respectively on the mini PCI card.
3. Attach the **mini PCI slot cover** and secure it with the following screw.

- M2x4B BIND or LH STICK x1

## 4.7 Cooling Fin/CPU

### Removing the Cooling fin/CPU

The following describes the procedure for removing the cooling fin/CPU (See Figure 4-11 to 4-14).

1. Remove the following screws fixing the **CPU cover** and remove the CPU cover.

- M2.5x14B THIN BIND screw x1
- M2.5x18B THIN BIND screw x1

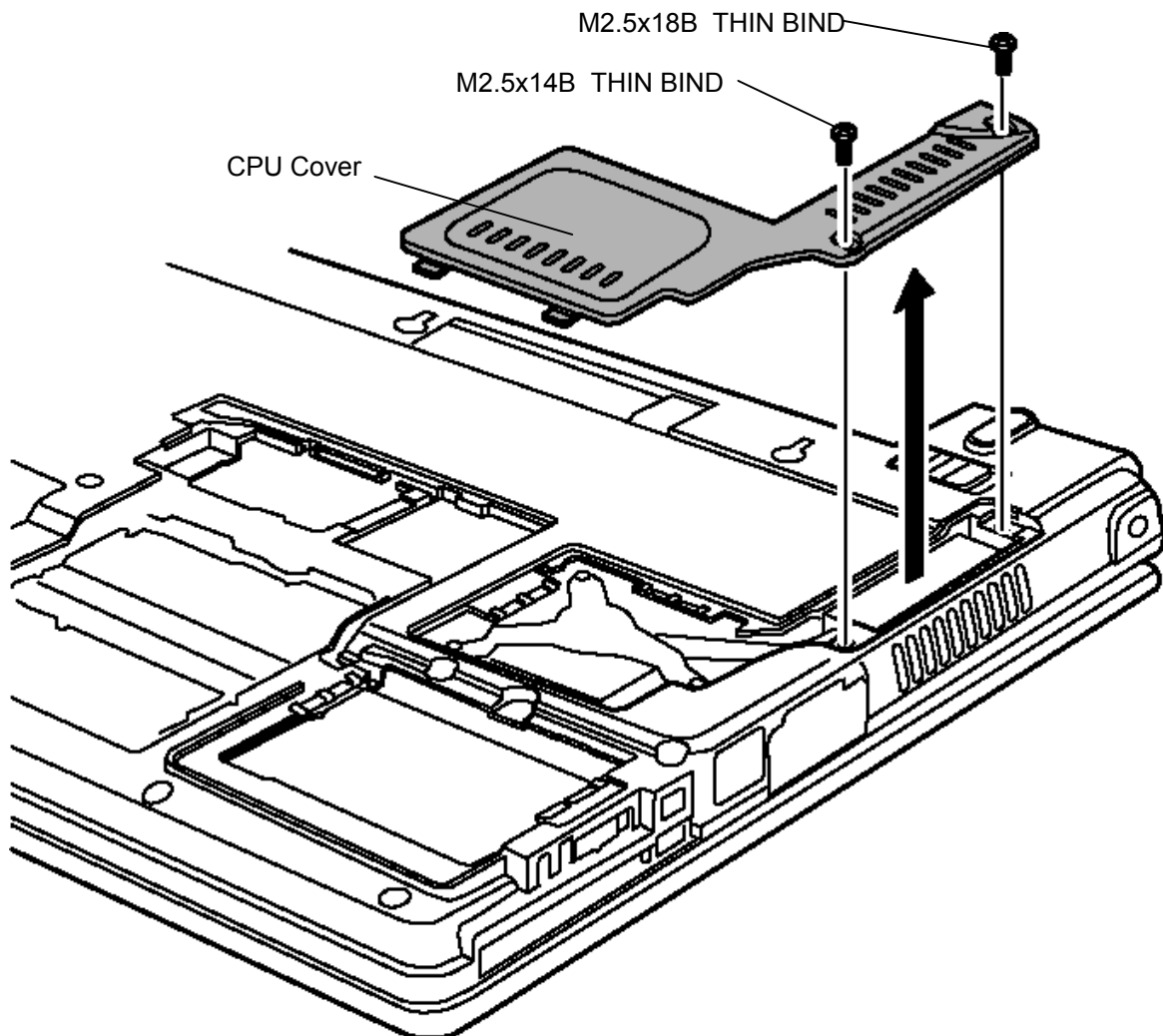


Figure 4-11 Removing CPU Cover

2. Remove the following screws securing the **CPU holder** on the CPU.

- M2x4B BIND screw x3

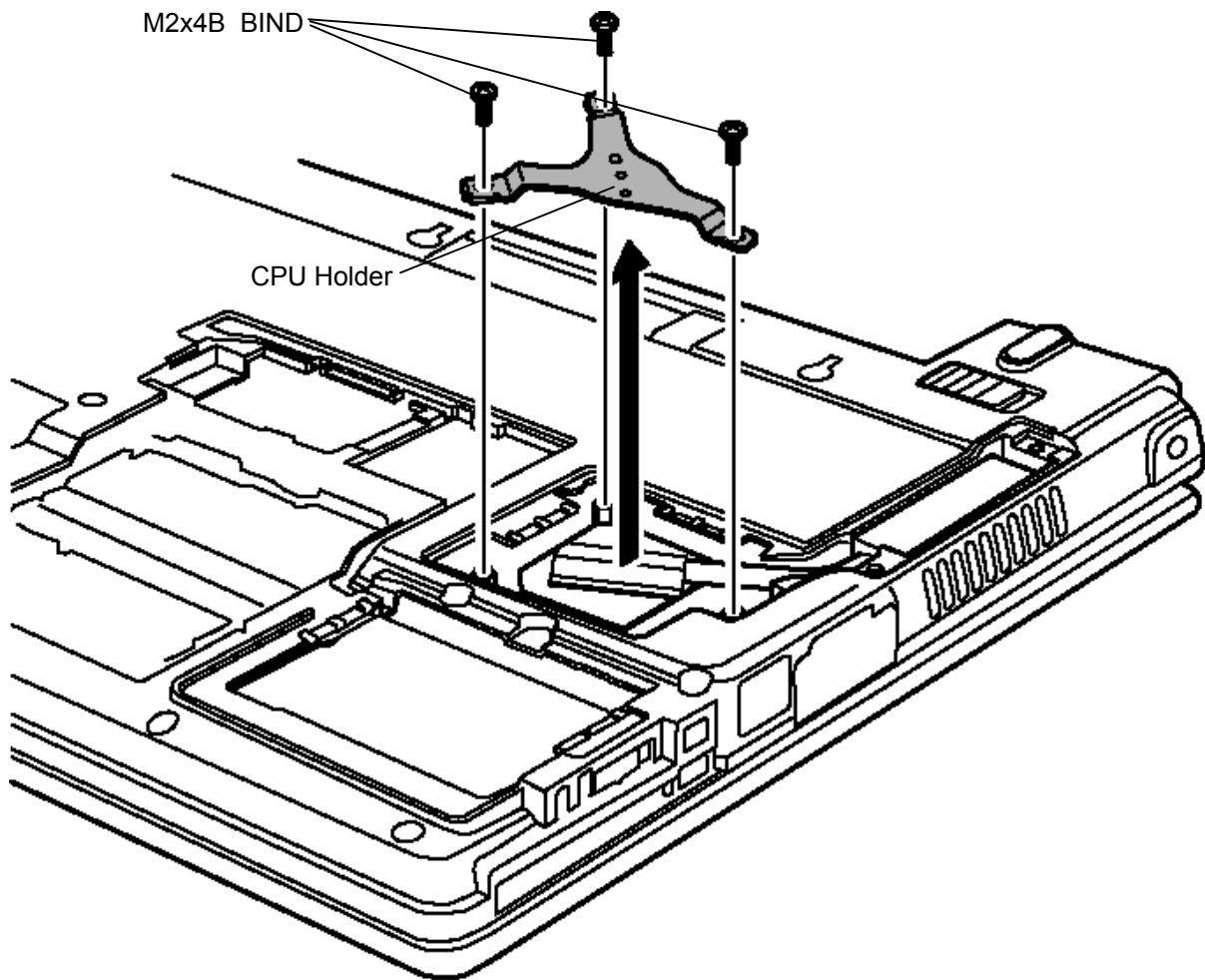


Figure 4-12 Removing CPU Holder

3. Lift up the **cooling fin** and remove it.

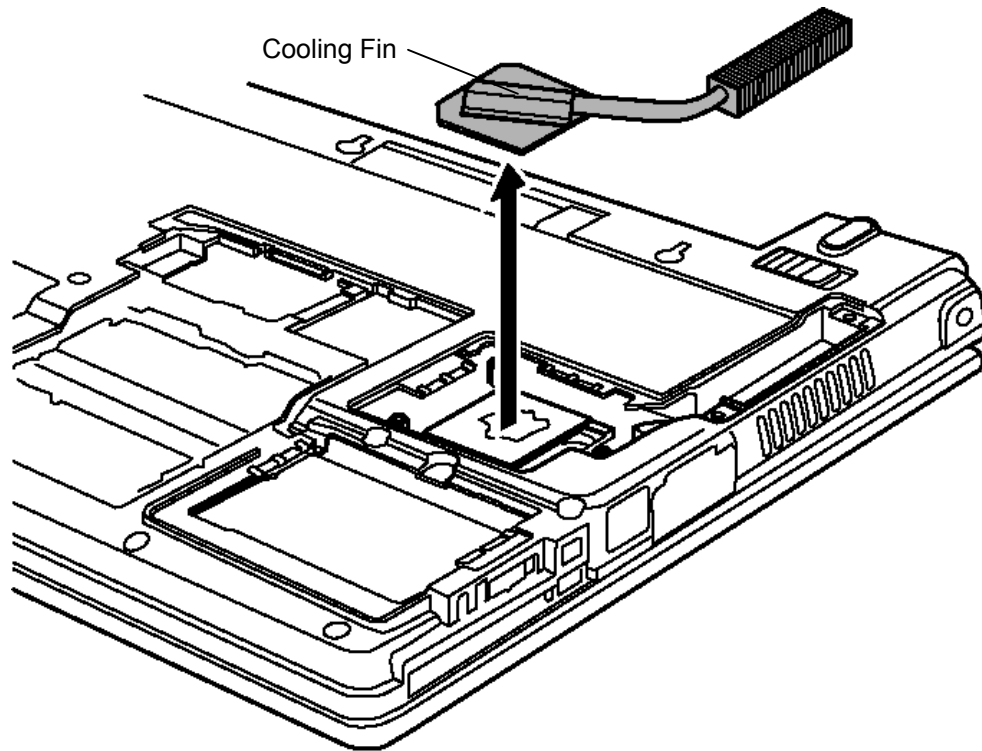


Figure 4-13 Removing Cooling Fin

4. 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).
5. Remove the **CPU**.

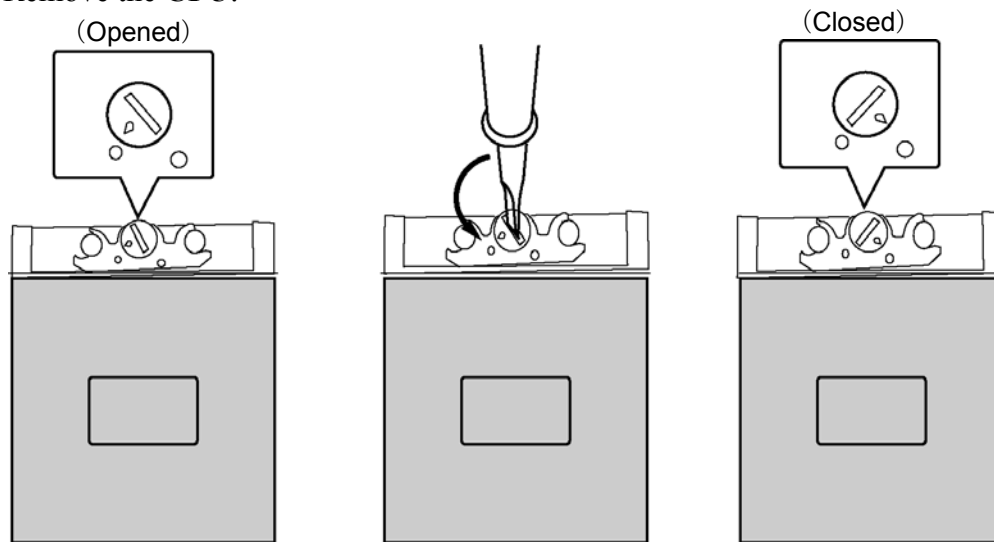


Figure 4-14 Removing CPU

### Installing the Cooling fin/CPU

The following describes the procedure for installing the cooling fin/CPU (See Figure 4-11 to 4-16).

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.)

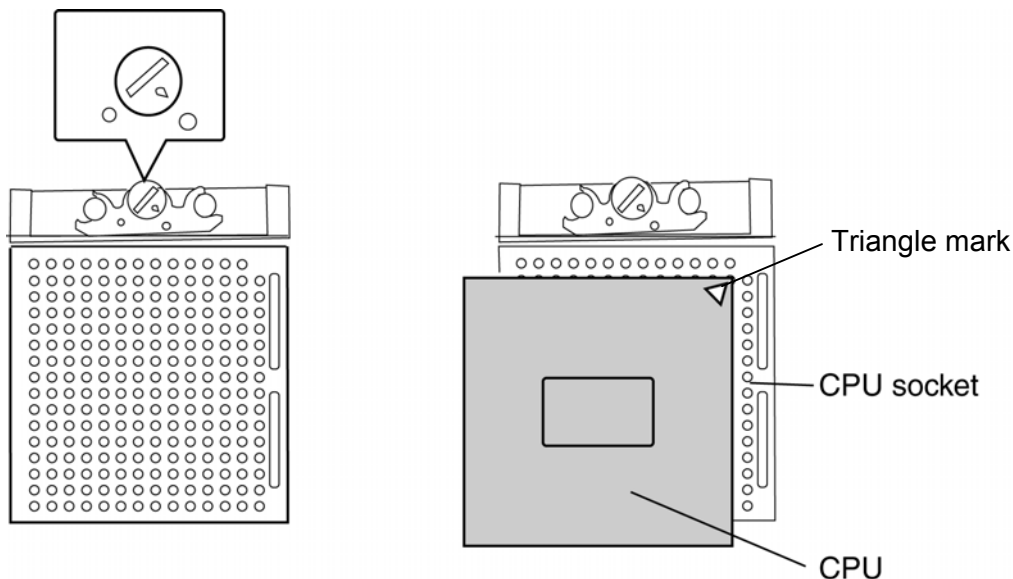


Figure 4-15 Installing CPU

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 cooling fin, clean it with a cloth. Using a special applicator, apply quarter of scale (0.25ml) of silicon grease evenly on the CPU chip.

**NOTE:** If silicon grease has already been applied to the CPU or cooling fin, 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 cooling fin.



**NOTE:** Apply the silicon grease enough to cover the chip surface using the special applicator. When installing the cooling fin, make sure the bottom of the fin covers the top of CPU.

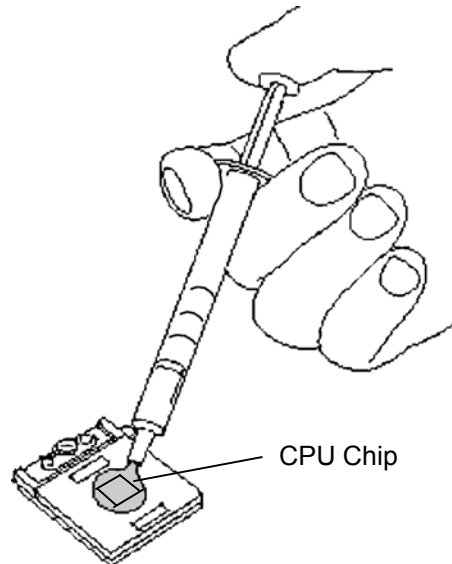


Figure 4-16 Applying Silicon Grease

5. Install the **cooling fin**.
6. Place the **CPU holder** on the cooling fin with its holes (small and large) fitted to the bosses of the cooling fin. Fix the CPU holder with following **screws** in the order of the marks (1 to 3) on the CPU holder.
  - M2x4B      BIND screw      x3
7. Install the **CPU cover** from the front side and secure it with the following screws.
  - M2.5x18B    THIN BIND screw      x1
  - M2.5x14B    THIN BIND screw      x1

## 4.8 Keyboard

### Removing the Keyboard

The following describes the procedure for removing the keyboard (See Figure 4-17 to 4-19).

**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.

**CAUTION:** When removing the keyboard holder, be careful not to touch the metal parts of the speakers under it.

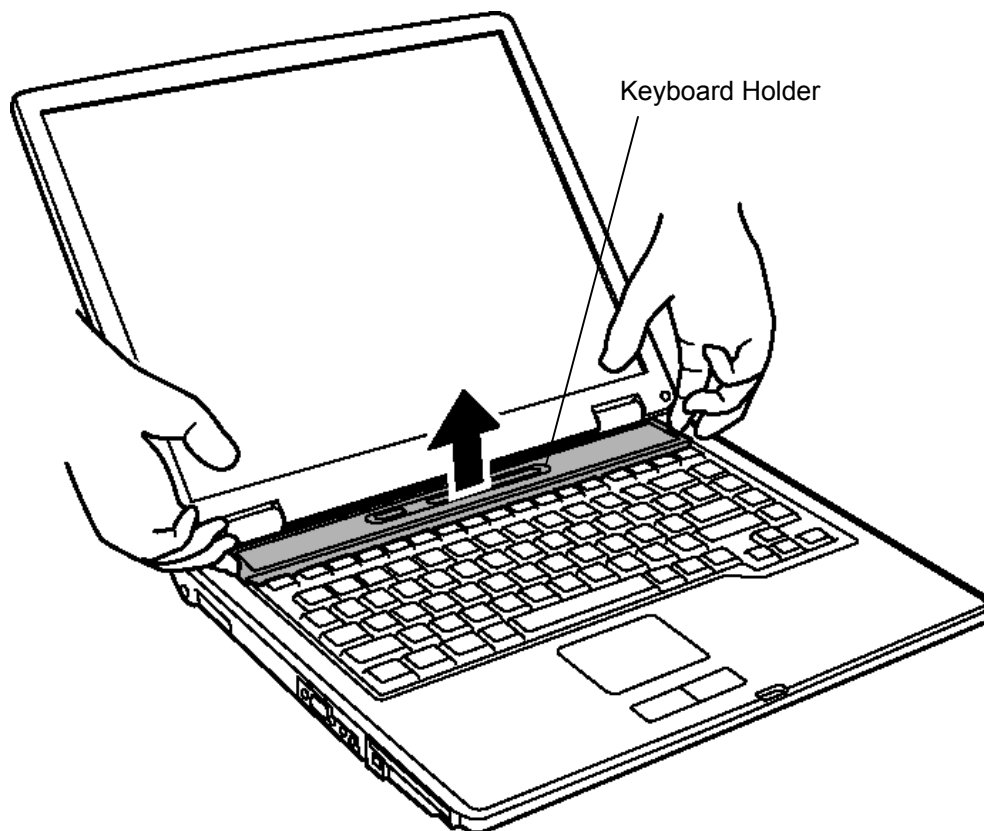


Figure 4-17 Removing Keyboard Holder

3. Remove the following **screws** holding the keyboard.
  - M2.5×2.8B THIN BIND screw x2
4. Remove the following **screw** fixing the **keyboard hold plate** and remove the keyboard hold plate by pulling it to the right side.
  - M2.5×2.8B THIN BIND screw x1
5. Lift the upper side of the **keyboard** out and bring it a little to the display. Then turn it face down on the palm rest.

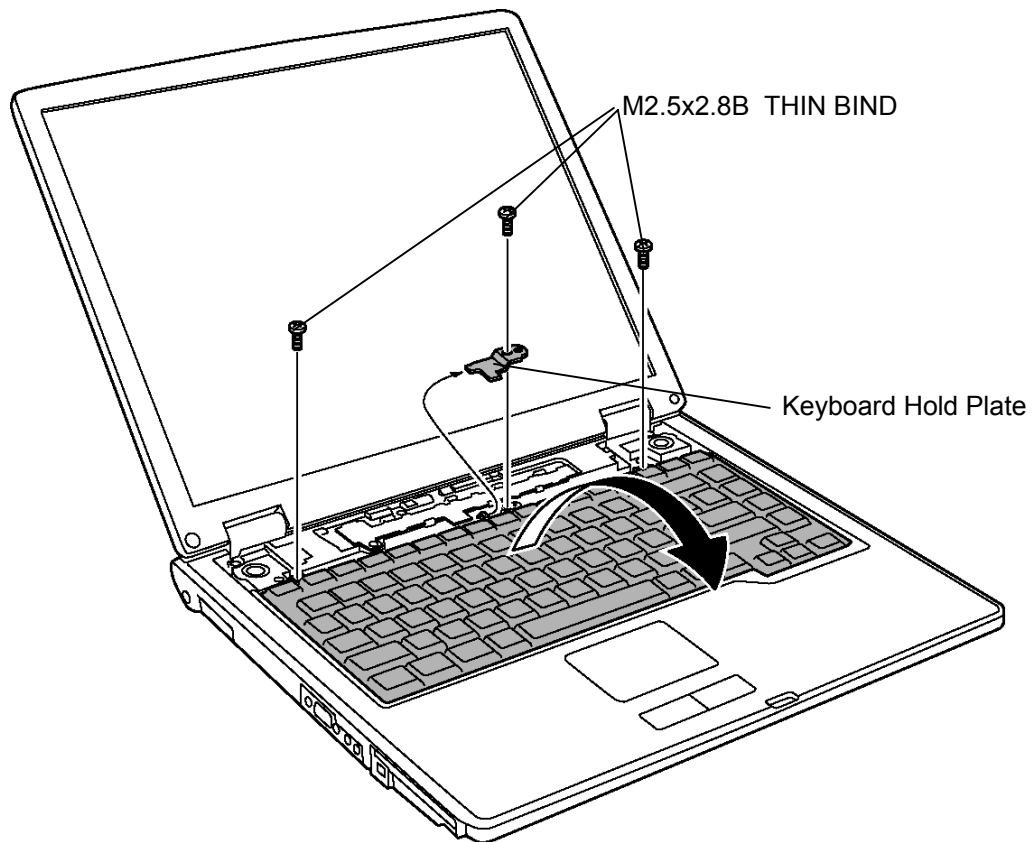
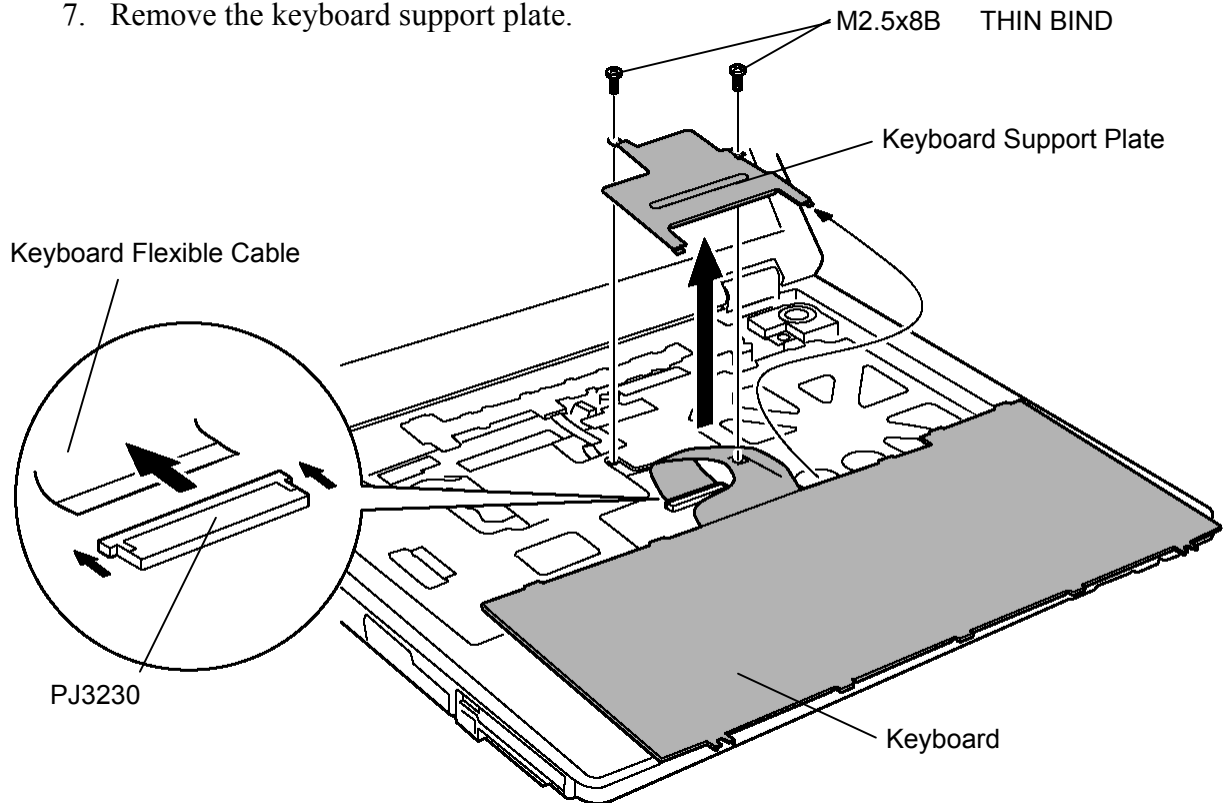


Figure 4-18 Removing Keyboard

6. Remove the following **screw** fixing the **keyboard support plate** underneath the keyboard.

- M2.5x8B THIN BIND screw x2

7. Remove the keyboard support plate.



*Figure 4-19 Removing Keyboard Support Plate*

8. Unlock the connector and remove the **keyboard flexible cable** from the connector of the system board.

### Installing the Keyboard

The following describes the procedure for installing the keyboard (See Figure 4-17 to 4-19).

1. Place the keyboard on the palm rest as its face is down. Connect the keyboard flexible cable to the connector PJ3230 on the system board.
2. Install the keyboard support plate on the keyboard flexible cable from the front side part and secure it with the following screws.
  - M2.5x8B THIN BIND screw x2
3. Turn the keyboard face up while inserting the bottom edge of the keyboard under the chassis. Then put it on the computer. Make sure that there is no gap between the keyboard and the computer chassis.
4. Insert the left side of the keyboard hold plate into the slot of the chassis. Set the plate with its hole fitted to the guide pin on the chassis. Secure the keyboard hold plate with the following screw. When installing, make sure the keyboard hold plate holds the center tab of the keyboard.
  - M2.5x2.8B THIN BIND screw x1
5. Secure the keyboard with the following screws.
  - M2.5x2.8B THIN BIND screw x2
6. Install the keyboard holder by pressing it from the top side.

## 4.9 Switch Board

### Removing the Switch board

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

1. Open the display and unlock the connector. Disconnect the **switch board cable** from the connector on the system board.
2. Remove the following **screw** securing the **switch board**.
  - M2.5x2.8B THIN BIND screw x1
3. Slide the switch board to the left and remove it.

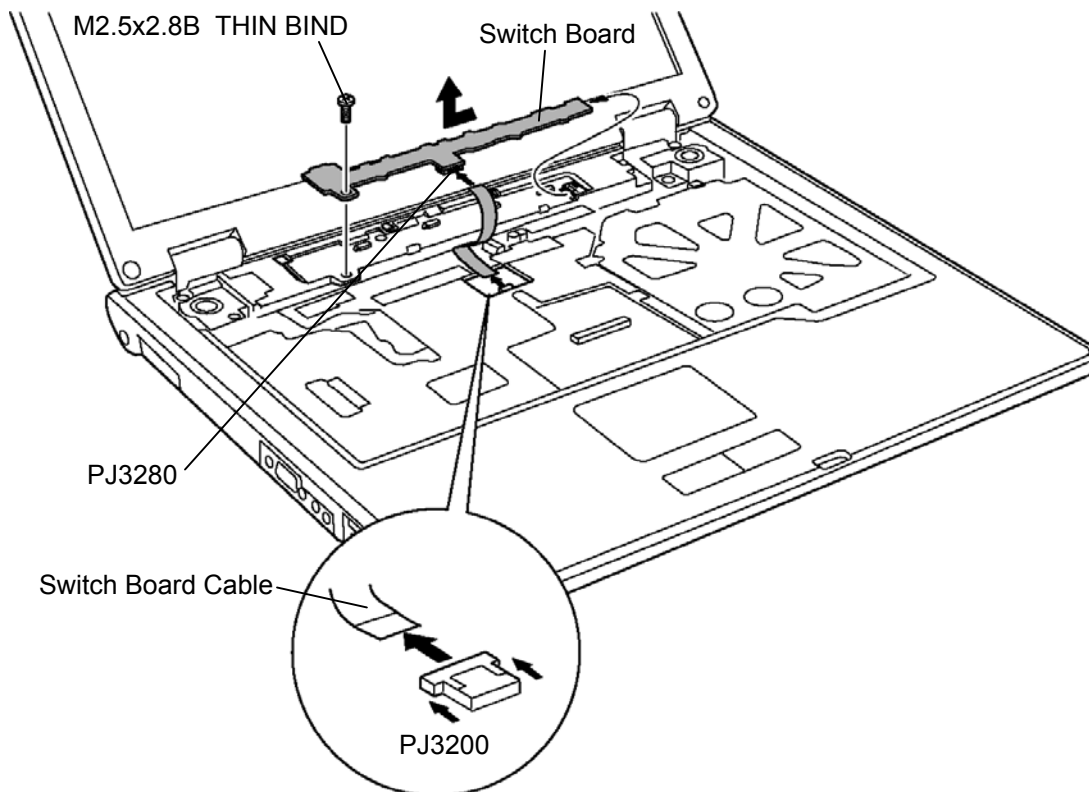


Figure 4-20 Removing Switch Board

4. Unlock the connector and disconnect the switch board cable from the switch board.

### **Installing the Switch board**

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

1. Connect the **switch board cable** to the connector **PJ3280** on the switch board.
2. Place the **switch board** to the left side of the installation position and slide it to the right to install. Then fix it with the following **screw**.
  - M2.5x2.8B THIN BIND screwx1
3. Connect the switch board cable to the connector **PJ3200** on the system board.

## 4.10 Optical Drive

This section describes how to remove and install a DVD-ROM drive as an example. The procedure for a CD-ROM, DVD-ROM & CD-R/RW, DVD-R/-RW or DVD Super 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 4-21, 4-22).

1. Turn the computer face down and remove the following **screw securing the DVD-ROM drive assembly**.
  - M2.5x6B THIN BIND screw x1
2. Pull out the DVD-ROM drive assembly in the direction indicated by arrow to remove.

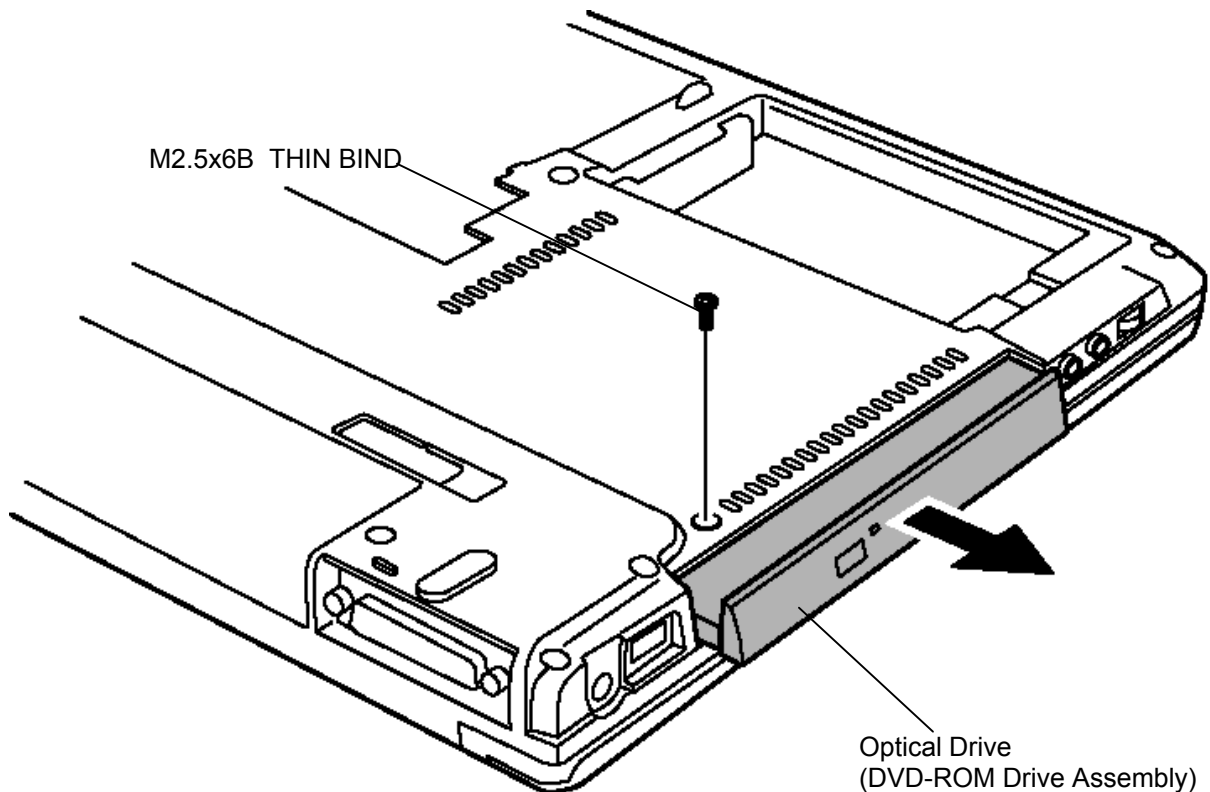


Figure 4-21 Removing DVD-ROM Drive (1)



3. Remove the following screws fixing the rear bracket from the DVD-ROM drive assembly.
  - M2x2.7 STEP screw x2
4. Remove the following screw fixing the side bracket and remove the side bracket.
  - M2x3S SUPER THIN BIND screw x1

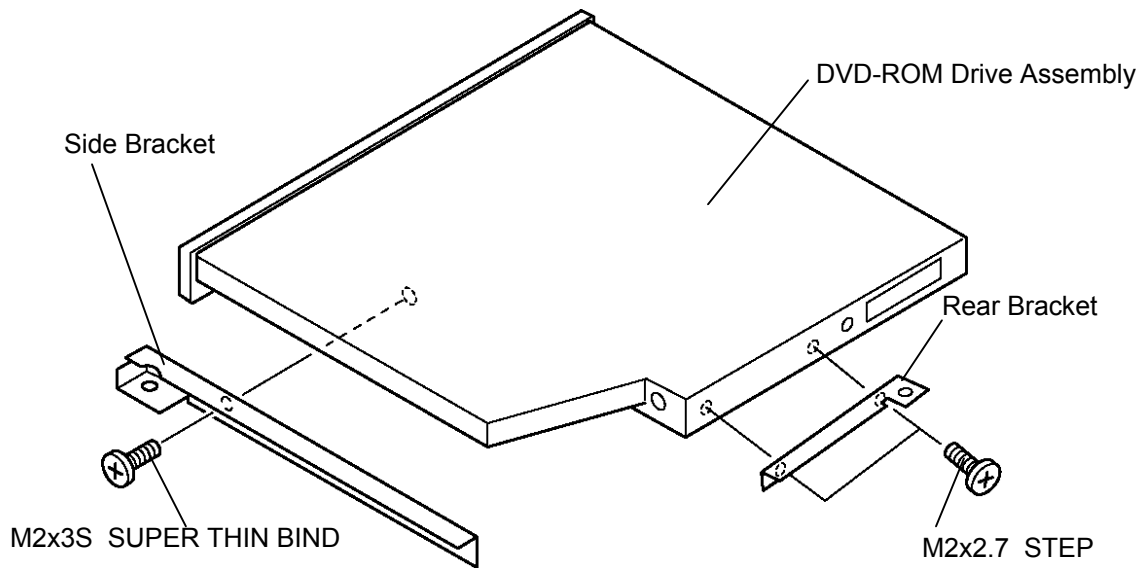


Figure 4-22 Removing DVD-ROM Drive (2)

### Installing the Optical drive

The following describes the procedure for installing the optical drive (See Figure 4-21, 4-22).

1. Install the **side bracket** on the DVD-ROM drive and fix it with the following **screw**.
  - M2x3S SUPER THIN BIND screw x1
2. Place the **rear bracket** on the DVD-ROM drive and fix it with the following **screws**.
  - M2x2.7 STEP screw x2
3. Insert the **DVD-ROM drive assembly** into the slot to connect it to the connector **PJ1810** on the system board.
4. Secure the DVD-ROM drive assembly with the following **screw** from the bottom of the computer.
  - M2.5x6B THIN BIND screw x1

## 4.11 Display Assembly

### Removing the Display assembly

The following describes the procedure for removing the display assembly (See Figure 4-23 to 4-25).

1. Close the display and turn the computer face down.
2. Remove the following screws from the bottom of the computer.
  - M2.5x6B THIN BIND screw x9 (“6” in the figure)
  - M2.5x14B THIN BIND screw x5 (“14” in the figure)
  - M2.5x18B THIN BIND screw x1 (“18” in the figure)

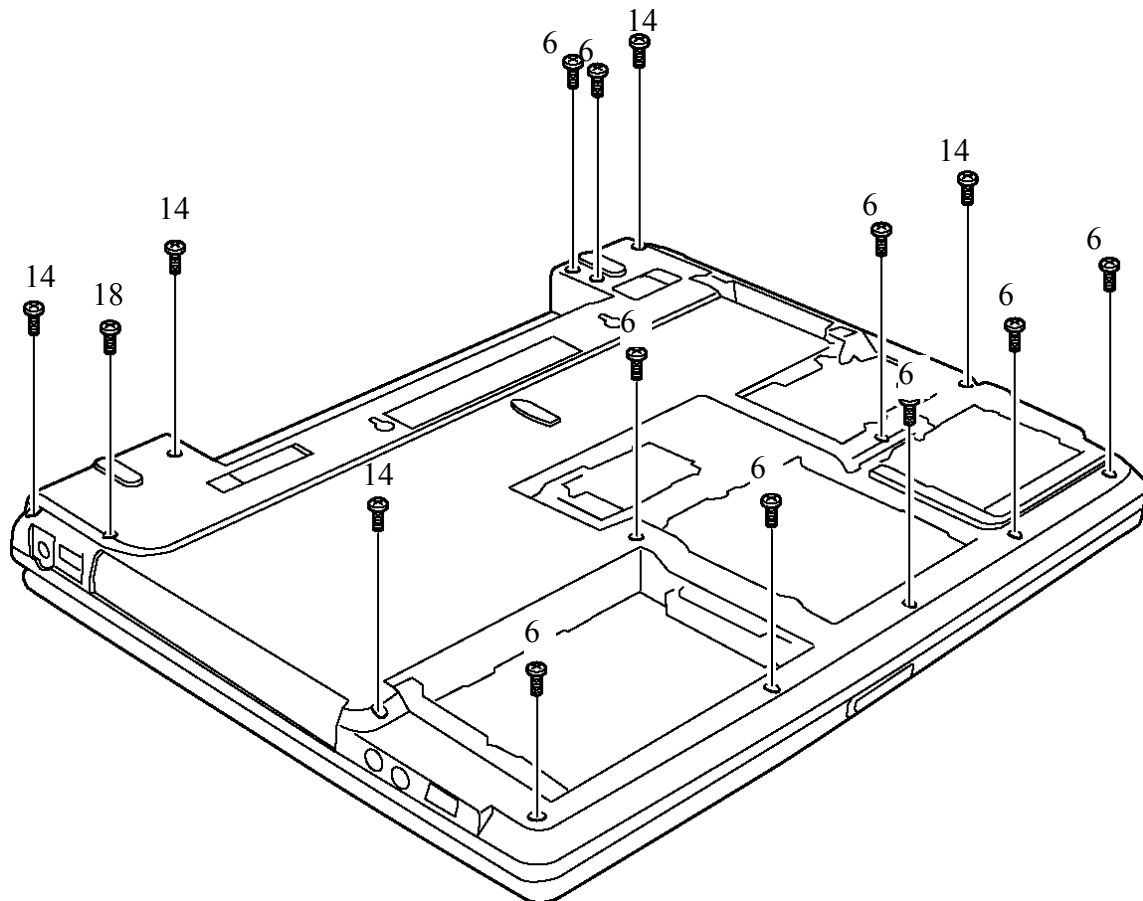


Figure 4-23 Removing Display Assembly (1)

3. Turn the computer face up. Open the display and disconnect the **LCD cable** and the **speaker cables (Blue, Red)** from the connectors on the system board. Unlock the connector and disconnect the **touch pad cable** from the system board.

4. Remove the following **screws** securing the display assembly.

- M2x8B BIND screw x1
- M2.5x8B THIN BIND screw x1

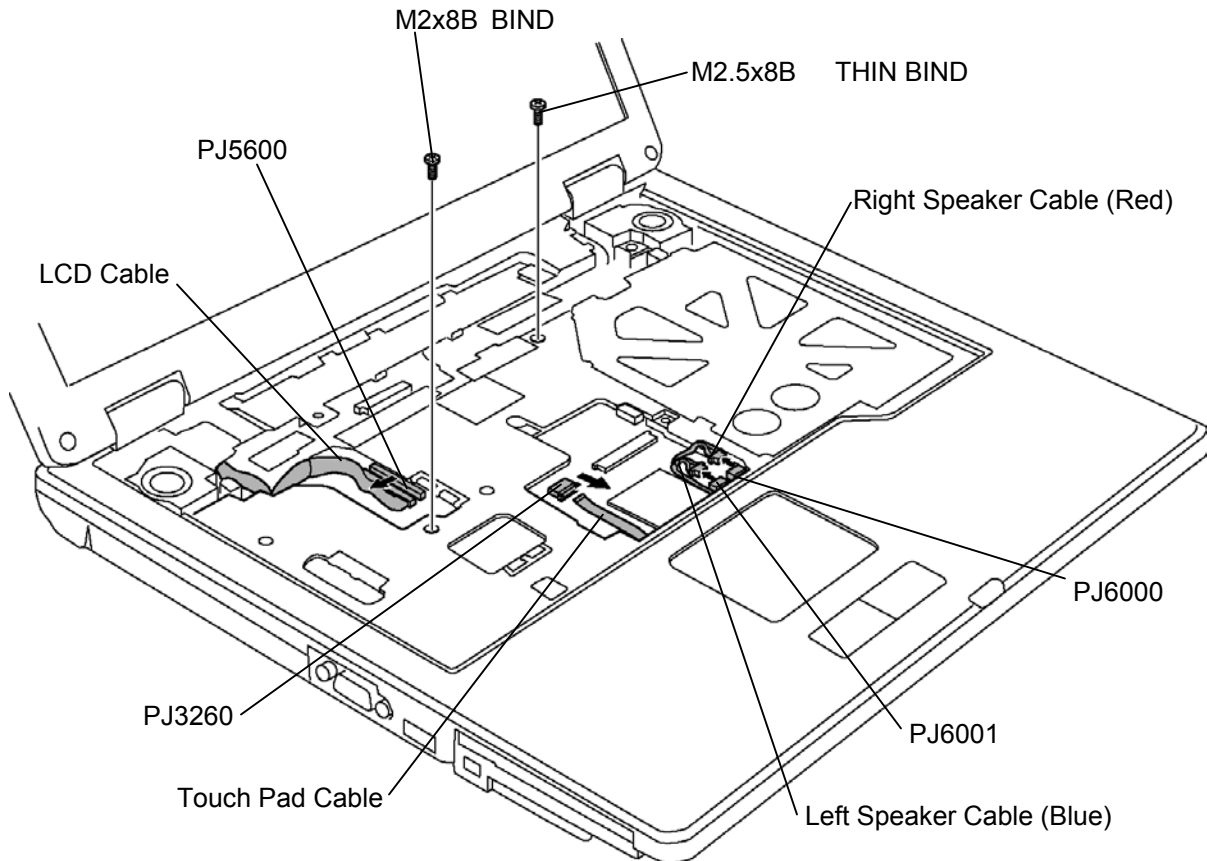


Figure 4-24 Removing Display Assembly (2)

5. (For wireless LAN models only)  
Pull out the wireless LAN cables from the slot near the center of the base assembly.

**NOTE:** (For wireless LAN models only) When removing the display assembly, be careful not to cut or scratch the wireless LAN cables.

6. Unhook the latches between the **display assembly** and the **base assembly**. Lift the display assembly up and remove it from the base assembly.

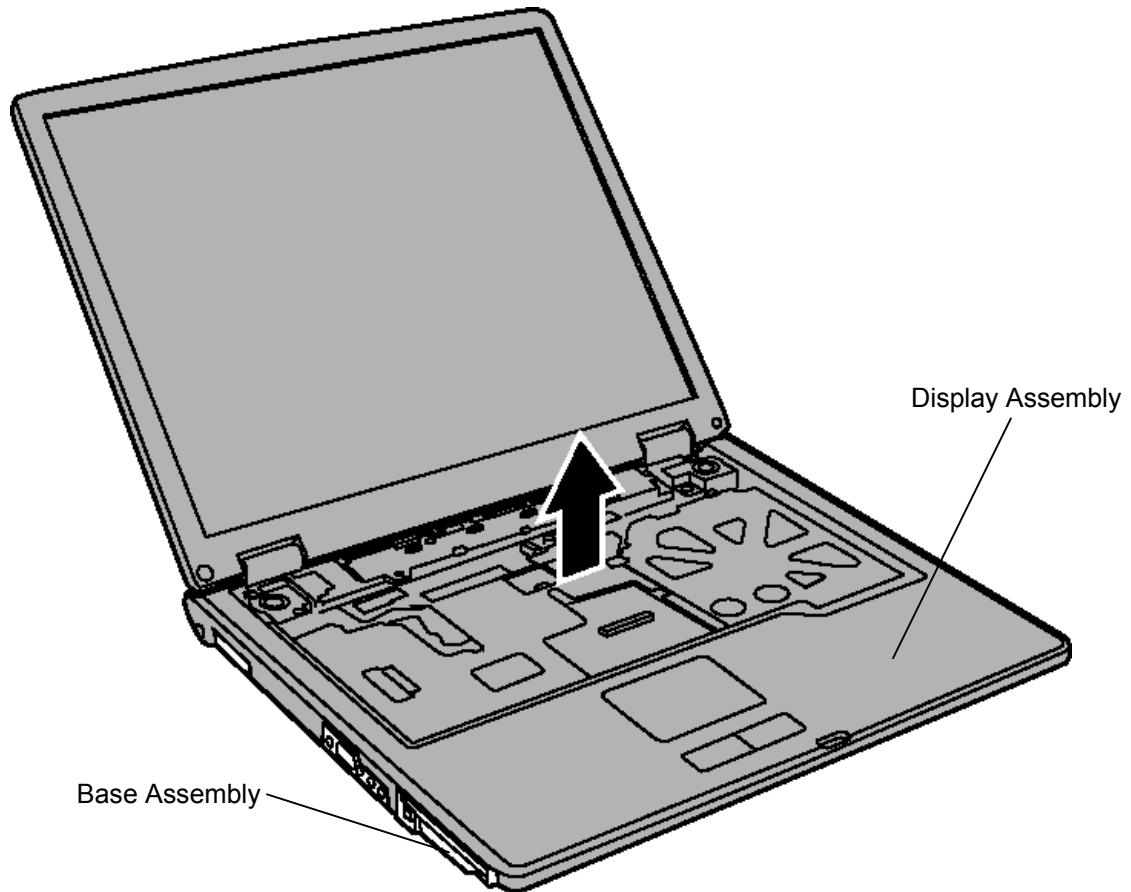


Figure 4-25 Removing Display Assembly (3)

### Installing the Display assembly

The following describes the procedure for installing the display assembly (See Figure 4-23 to 4-25).

1. (For wireless LAN models only)  
Pass the wireless LAN cables through the slot near the center of the base assembly.
2. Install the **display assembly** on the base assembly from the rear of the computer and secure them with the following **screws**.
  - M2x8B      BIND screw      x1
  - M2.5x8B    THIN BIND screw    x1
3. Close the display and turn the computer face down. Secure the **base assembly** with the following **screws** from the bottom.
  - M2.5x6B      THIN BIND screw    x9 (“6” in the figure)
  - M2.5x14B    THIN BIND screw    x5 (“14” in the figure)
  - M2.5x18B    THIN BIND screw    x1 (“18” in the figure)
4. Turn the computer face up and open the display.
5. Connect the **LCD cable**, **speaker cables (blue, red)**, **touch pad cable** to connectors **PJ5600**, **PJ6001**, **PJ6000**, **PJ3260** on the system board respectively.

## 4.12 Sound Board

### Removing the Sound Board

The following describes the procedure for removing the sound board (See Figure 4-26).

1. Unlock the connector and disconnect the **sound board cable** from the connector of the system board.
2. Remove the following **screw** to remove the **sound board**.

- M2.5x4B THIN BIND screw x1

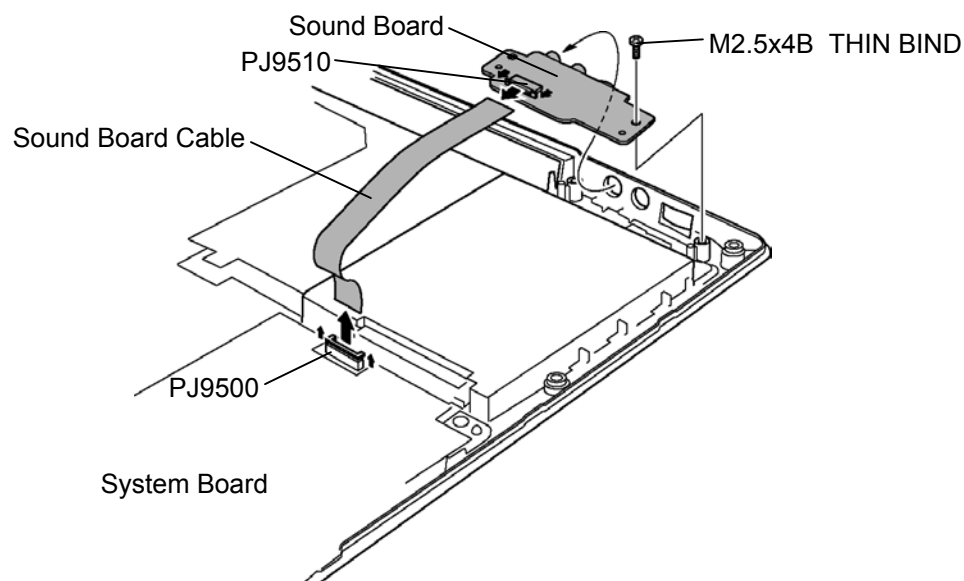


Figure 4-26 Removing Sound Board

3. Unlock the connector and disconnect the sound board cable from the connector on the sound board.

### Installing the Sound Board

The following describes the procedure for installing the sound board (See Figure 4-26).

1. Connect the **sound board cable** to the connector **PJ9510** on the **sound board**.
2. Install the sound board from the side with the volume on the base assembly and secure with the following **screw**.

- M2.5x4B THIN BIND screw x1

3. Connect the sound board cable to the connector **PJ9500** on the system board.

## 4.13 Connector Board

This section describes how to remove and install a connector board with drawings of the board with parallel port (parallel port type) as an example. The procedure for a connector board with TV jack is the same.

### Removing the Connector Board

The following describes the procedure for removing the Connector Board (See Figure 4-27, 4-28).

1. Remove the **DC-IN jack** from the slot of the base assembly.
2. Remove the following **screws** to remove the **harness holder**.

- M2.5x4B THIN BIND screw x2

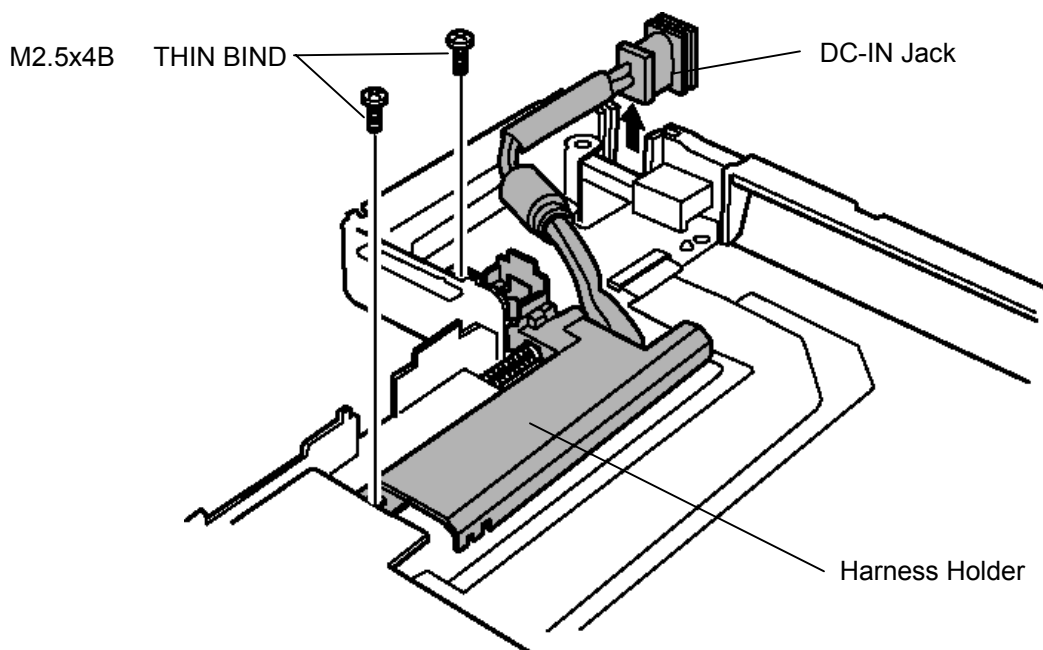


Figure 4-27 Removing Harness Holder

3. Disconnect the **USB I/F cable** and **connector board cable** after unlock from the connector on the system board.
4. Remove the following **screws** to remove the **connector board**.
  - M2x2.8S THIN BIND screw x1
5. Remove the connector board by lifting it.



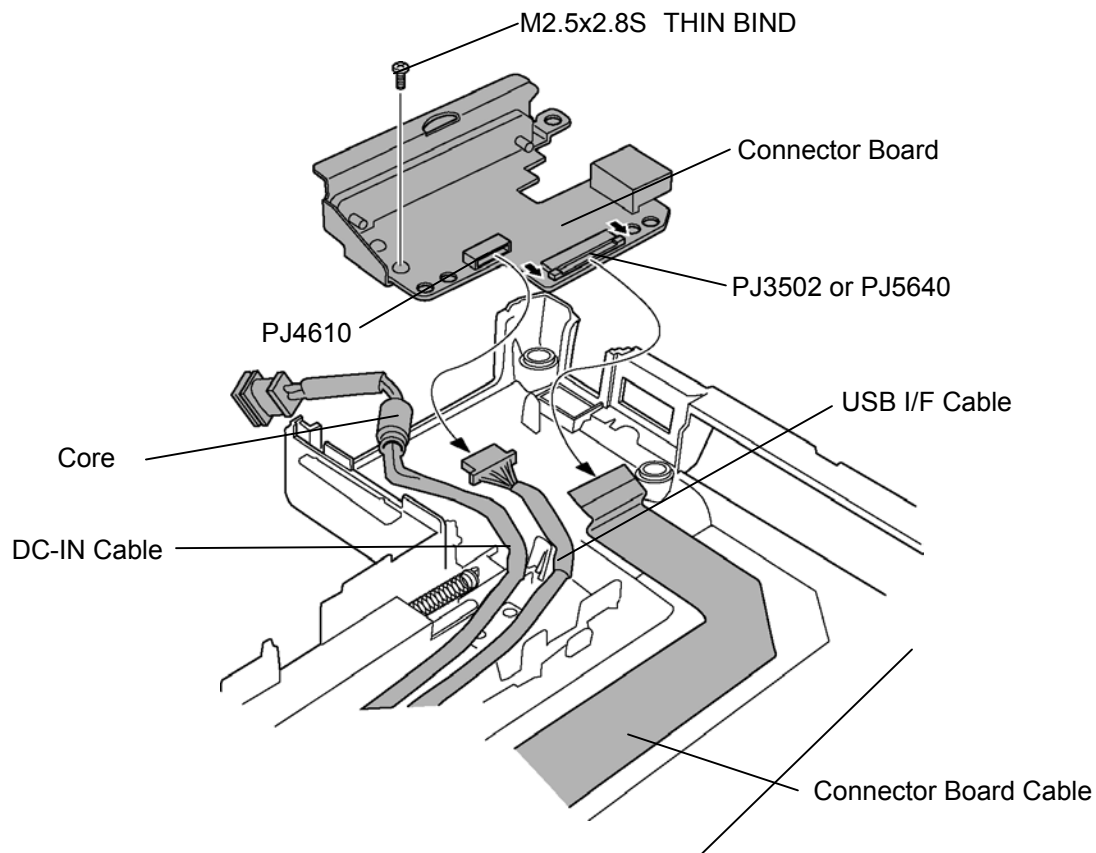


Figure 4-28 Removing Connector Board

### Installing the Connector Board

The following describes the procedure for installing the connector board (See Figure 4-27, 4-28).

1. Install the **connector board** from the side with I/O port on the base assembly and secure it with the following **screws**.
  - M2x2.8S THIN BIND screw           x1
2. Connect the **connector board cable** to the connector **PJ3502 (parallel port type)** or **PJ5640 (TV jack type)** of the connector board.
3. Pass the **DC-IN cable** along the bosses near rear and **USB I/F cable** along the bosses of the front side. Connector the USB I/F cable to the **connector PJ4610 (Parallel port type, TV jack type)** on the connector on the connector board.
4. Install the **harness holder** and secure it with the following **screws**.
  - M2.5x4B THIN BIND screw           x2
5. Set the core of the DC-IN cable on the harness holder and install the **DC-IN jack** in the slot of the base assembly.

## 4.14 Fan

### Removing the Fan

The following describes the procedure for removing the fan (See Figure 4-29).

1. Disconnect the **fan cable** from the connector on the system board.
2. Remove the following **screws** and remove the **fan module** by raising it up.

- M2.5x4B THIN BIND screw x2

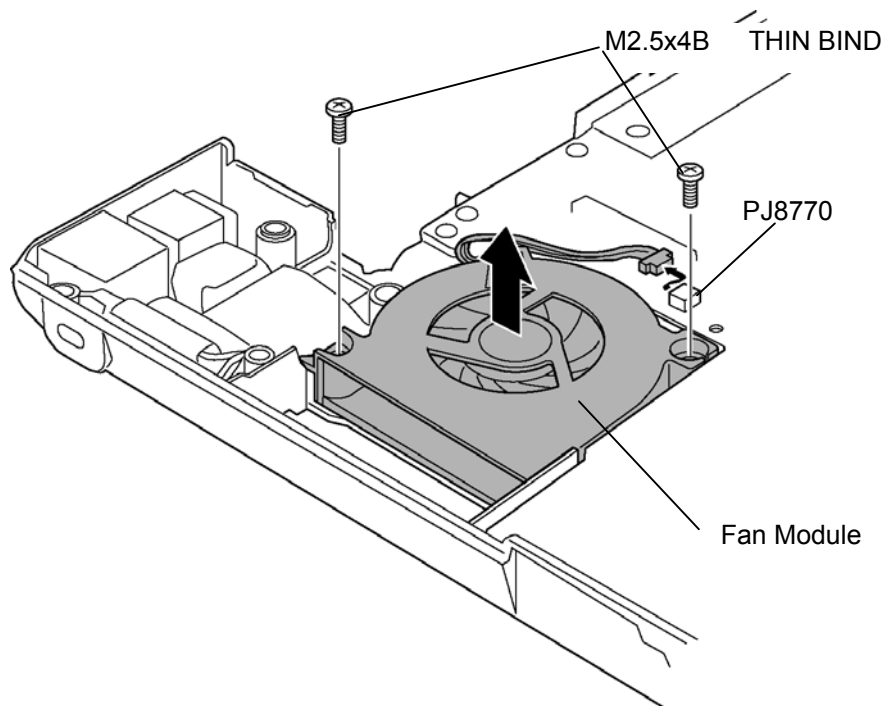


Figure 4-29 Removing Fan Module

### Installing the Fan

The following describes the procedure for installing the fan (See Figure 4-29).

1. Connect the **fan cable** to the connector **PJ8770** on the system board.
2. Install the **fan** on the base assembly and secure it with the following **screws**.

- M2.5x4B THIN BIND screw x2

## 4.15 System Board/DC-IN Jack/RTC Battery

**CAUTION:** When handling the system board, always hold by the edges. Do not touch the printed circuit face.

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".

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 4-30, 4-31).

1. Open **insulators** bundle the **LAN cable**, **MODEM cable** and **RTC battery cable**.

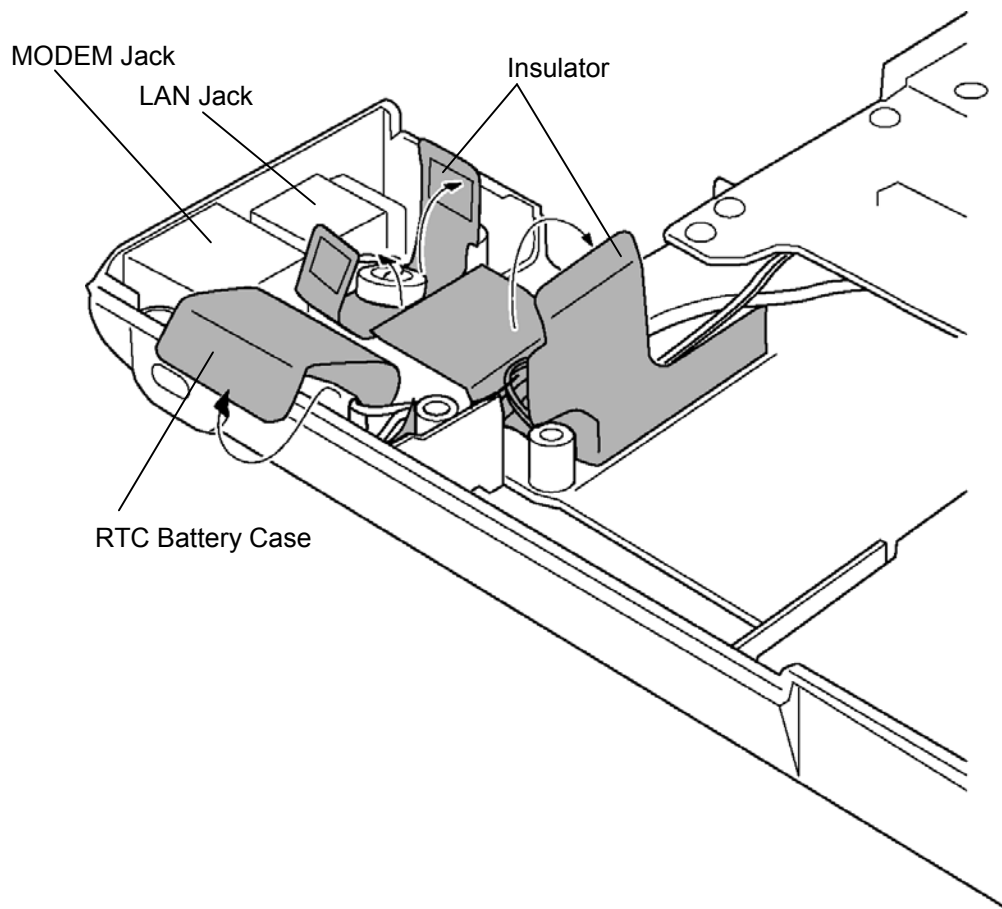


Figure 4-30 Removing System Board (1)

2. Take out the **RTC battery** from the **RTC battery case**.
3. Push a little the **LAN jack** and **MODEM jack** from the outside and raise them to remove from the base assembly.
4. Remove the following **screws** securing the **system board** to the base assembly.
  - M2.5x4B THIN BIND screw      x2
5. Unlock the connector and disconnect the **connector board cable** from the system board.
6. Remove the system board from the edge next to the optical drive position from the base assembly.
7. Disconnect the **DC-IN jack cable** and **USB I/F cable** from the back of the system board.
8. Disconnect the RTC battery cable from the connector on the system board. Peel off two glass tapes and disconnect the MODEM cable and the LAN cable.

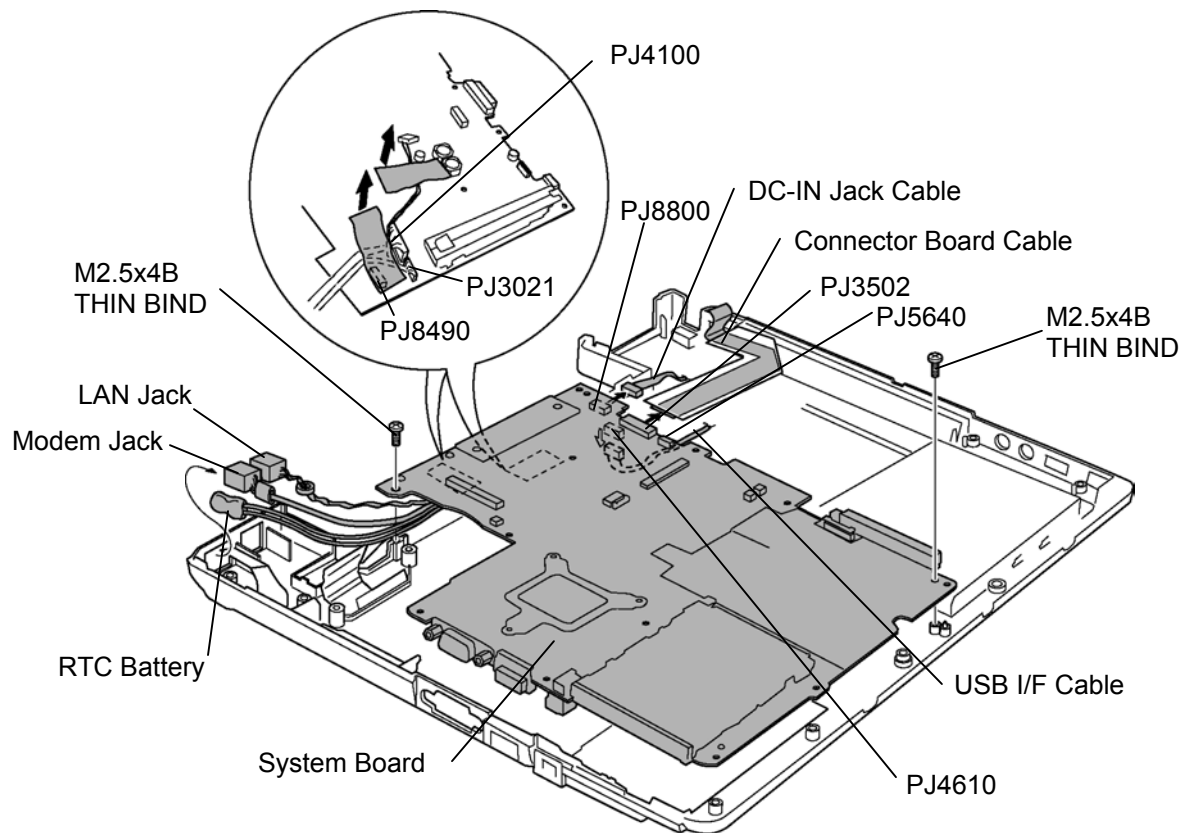


Figure 4-31 Removing System Board (2)

**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 4-30, 4-31).

1. Connect the **MODEM cable** to the connector **PJ3021** and the **LAN cable** to **PJ4100** on the back of the **system board** and secure them with two **glass tapes**.
2. Connect the **RTC battery cable** to the connector **PJ8490** on the system board.
3. Connect the **connector board cable** to the connector **PJ3502 (parallel port type)** or **PJ5640 (TV jack type)** on the system board.
4. Connect the **DC-IN jack cable** to the connector **PJ8800** and the **USB I/F cable** to **PJ4610** on the back of the system board.
5. Set the system board on the base assembly from the side with CRT connector.
6. Wrap the **RTC battery** with the **RTC battery case** and set it in the slot on the base assembly.
7. Install the **MODEM jack** and **LAN jack** on the base assembly and secure the **core** of the **LAN cable** with the **insulator**. Bundle the **MODEM cable**, LAN cable and **RTC battery cable** with the **insulator** attached on the base assembly.
8. Secure the system board with the following **screws**.
  - M2.5x4B THIN BIND screw x2

## 4.16 Battery Latch

### Removing the Battery latch

The following describes the procedure for removing the battery latch (See Figure 4-32, 4-33).

1. While pressing **projections** of the **SB latch button** inside each other, push the SB latch button to the bottom of the base assembly to remove.

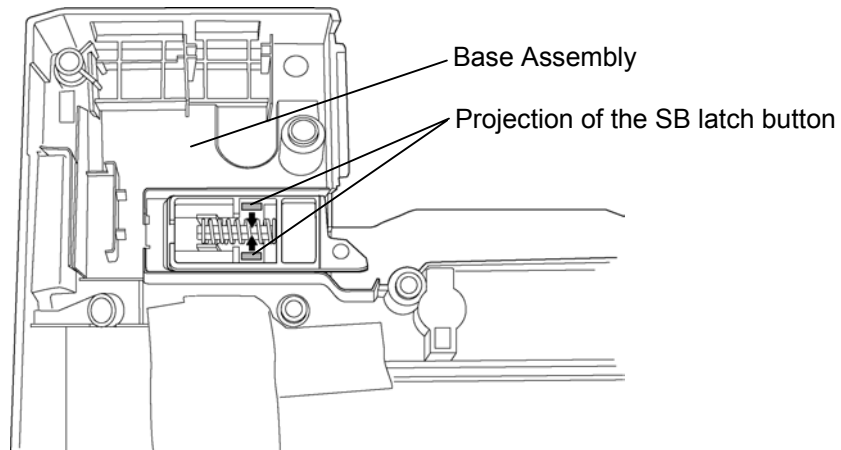


Figure 4-32 Removing SB Latch Button

2. Remove the **battery lock L** from the base assembly and remove the **spring** from the battery lock L.

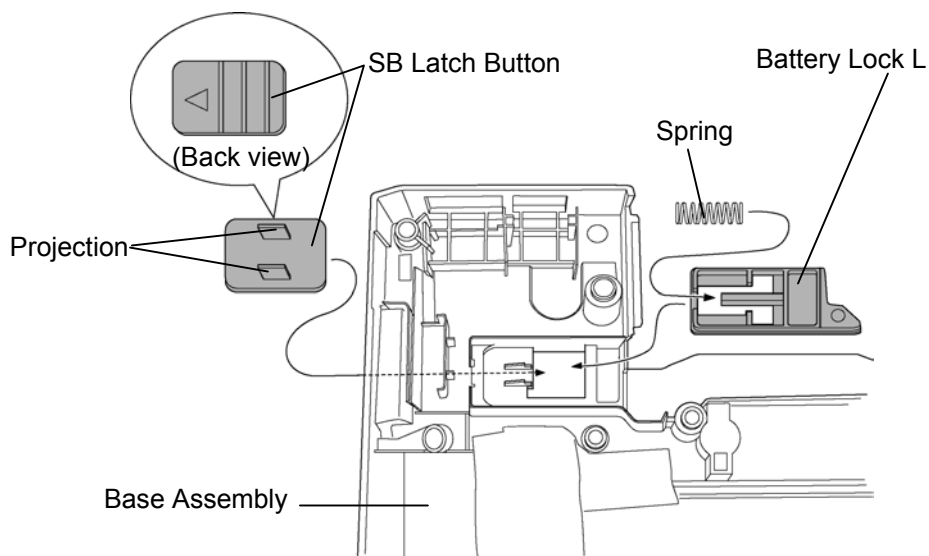


Figure 4-33 Removing Battery Lock L

**Installing the Battery latch**

The following describes the procedure for installing the battery latch (See Figure 4-32, 4-33).

1. Set the **spring** to the **battery lock L** and install it on the base assembly.
2. Install the **SB latch button** from the bottom of the base assembly and snap their **projections** to the **battery lock L**. When installing the button, make sure the triangle mark on the back side is located in the indicated position. After installation, slide the latch on the bottom of the base assembly to make sure it works properly.

## 4.17 Battery Lock

### Removing the Battery lock

The following describes the procedure for removing the battery lock (See Figure 4-34, 4-35).

1. While pressing **projections** of the **battery lock button** inside each other, push the button to the bottom of the base assembly to remove.

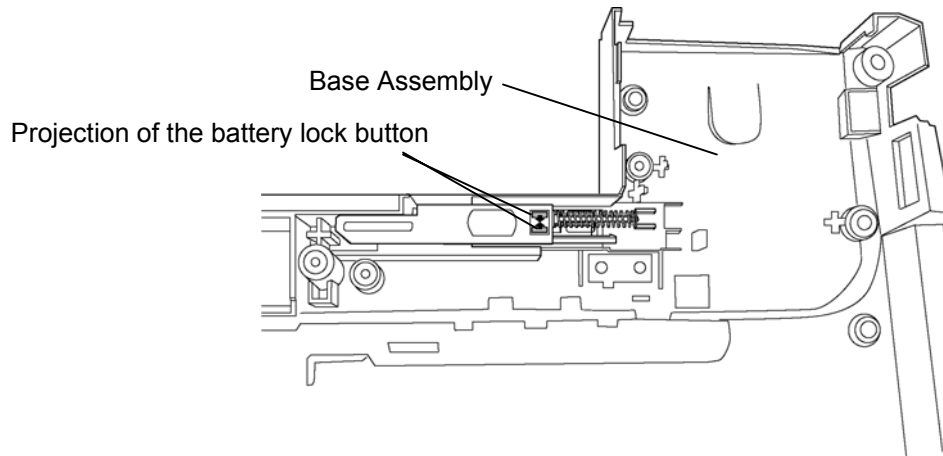


Figure 4-34 Removing Battery Lock Button

2. Remove the **battery lock R** from the base assembly and remove the **spring** from the battery lock R.

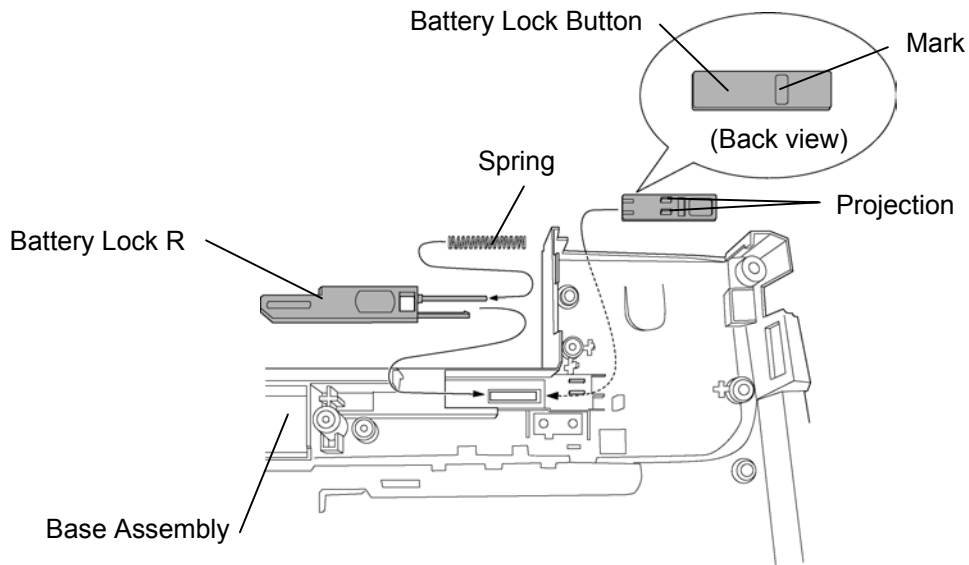


Figure 4-35 Removing Battery Lock R



**Installing the Battery lock**

The following describes the procedure for installing the battery latch (See Figure 4-34, 4-35).

1. Set the **spring** to the **battery lock R** and install it on the base assembly.
2. Install the **battery lock button** from the bottom of the base assembly and snap their **projections** to the **battery lock R**. When installing the button, make sure the **mark** on the back side is located in the indicated position. After installation, slide the latch on the bottom of the base assembly to make sure it works properly.

## 4.18 Touch Pad

### Removing the Touch pad

The following describes the procedure for removing the touch pad (See Figure 4-36).

1. Remove the following **screws** securing the **touch pad**.
  - M2.5x4B THIN BIND screw x6
2. Remove the touch pad and **touch pad switch** by raising.

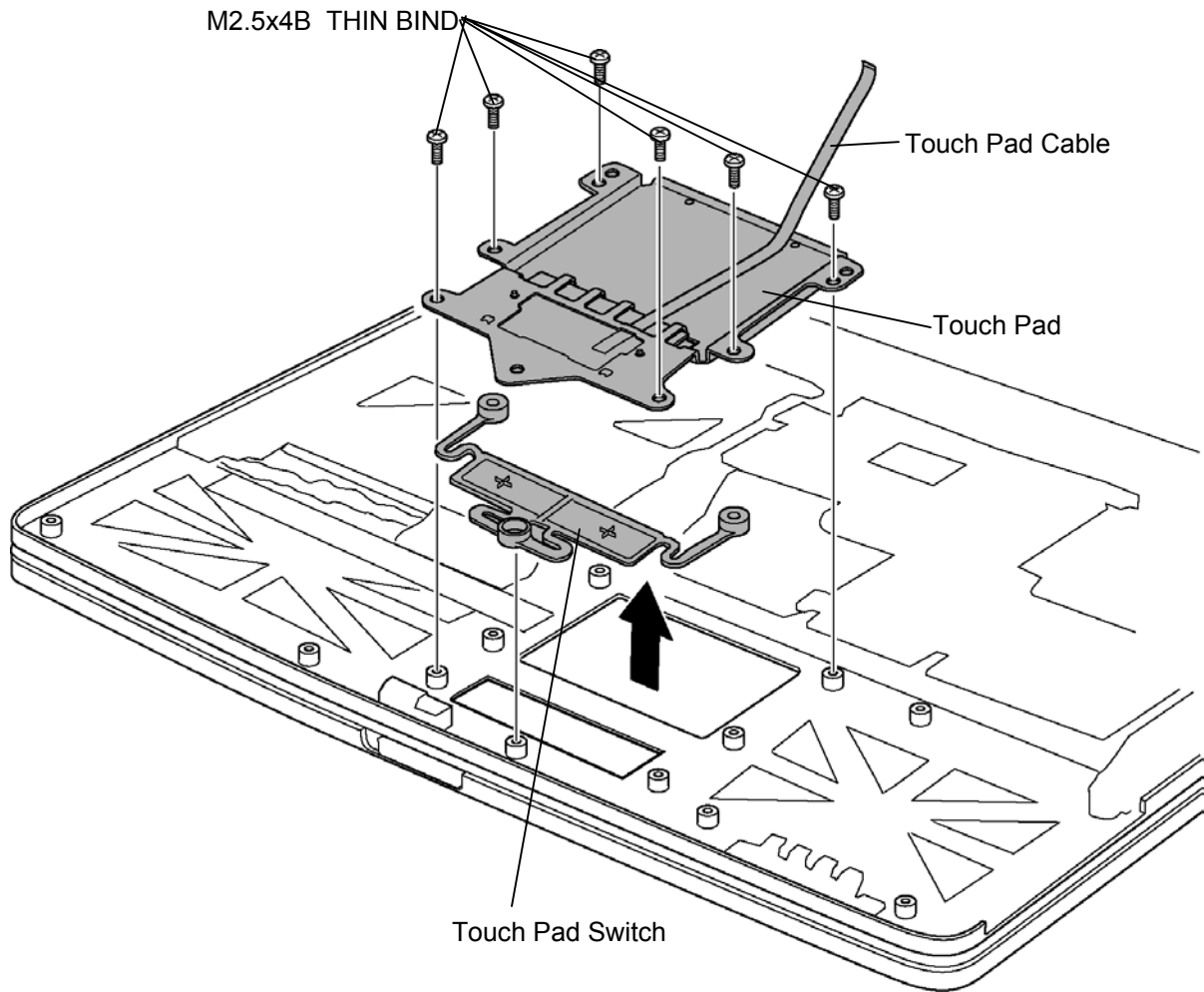


Figure 4-36 Removing Touch Pad

### Installing the Touch pad

The following describes the procedure for installing the touch pad (See Figure 4-36).

1. Place the **touch pad switch** fitting to bosses.
2. Place the **touch pad** according to the guide pins.
3. Secure the touch pad with the following **screws**.
  - M2.5x4B THIN BIND screw      x6

## 4.19 LCD Unit/FL Inverter

### Removing the LCD unit/FL inverter

The following describes the procedure for removing the LCD unit and FL inverter (See Figure 4-37 to 4-40).

1. Peel off two **mask seals** from the front of the **display mask** and remove the following screws.
  - M2.5x6B THIN BIND screw x2
2. Insert your fingers between the display mask and the **LCD** and remove the display mask after unlatching the display mask.

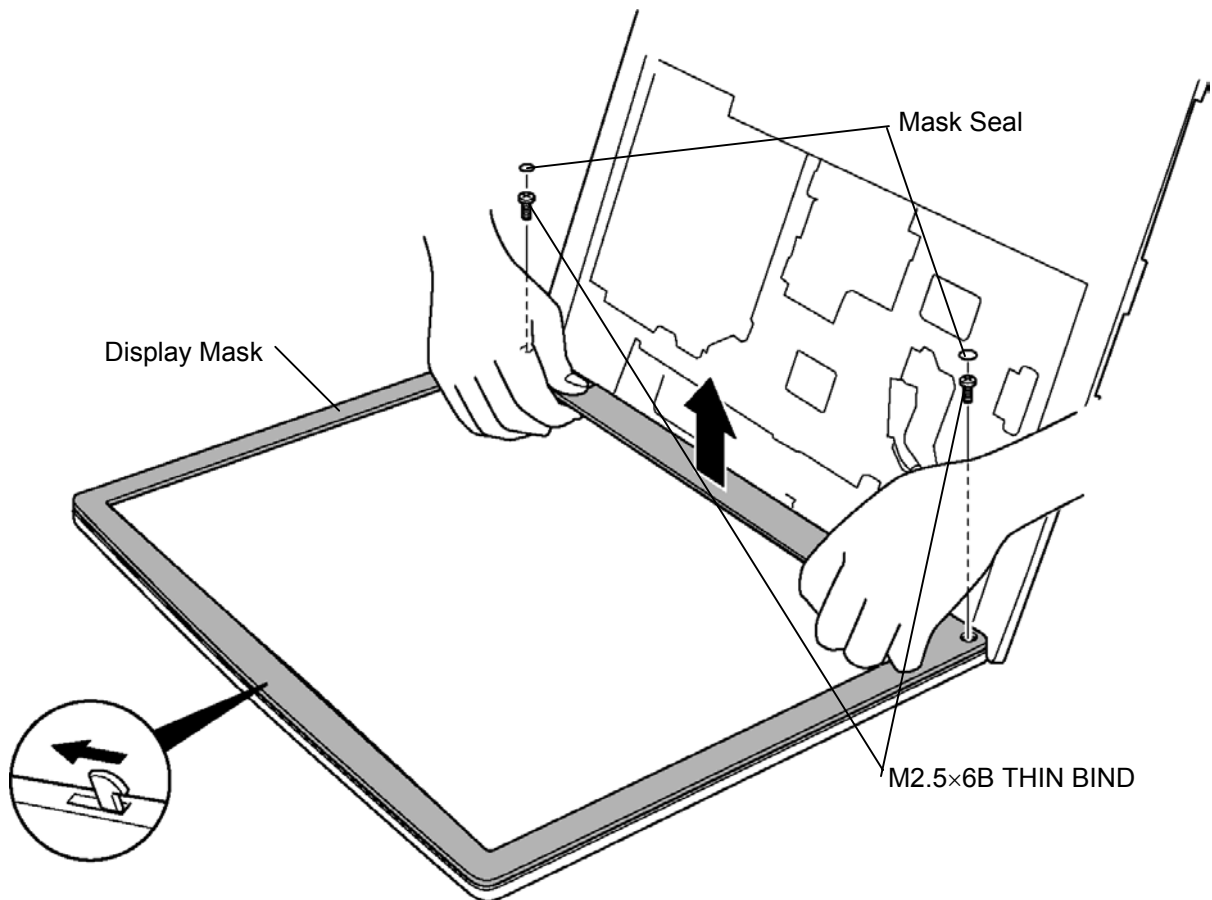


Figure 4-37 Removing Display Mask

3. Remove the following **screw** fixing the **FL inverter**.
  - M2x4Z SUPER THIN BIND screw x1
4. Peel off the **insulator** and disconnect two **cables** from the FL inverter. Remove the FL inverter.
5. Remove the following **screws** fixing the **LCD unit**.
  - M2x4Z SUPER THIN BIND screw x4
6. With the bottom edge of the LCD unit resting on the display cover, raise 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.
7. Remove the LCD unit from the display cover.

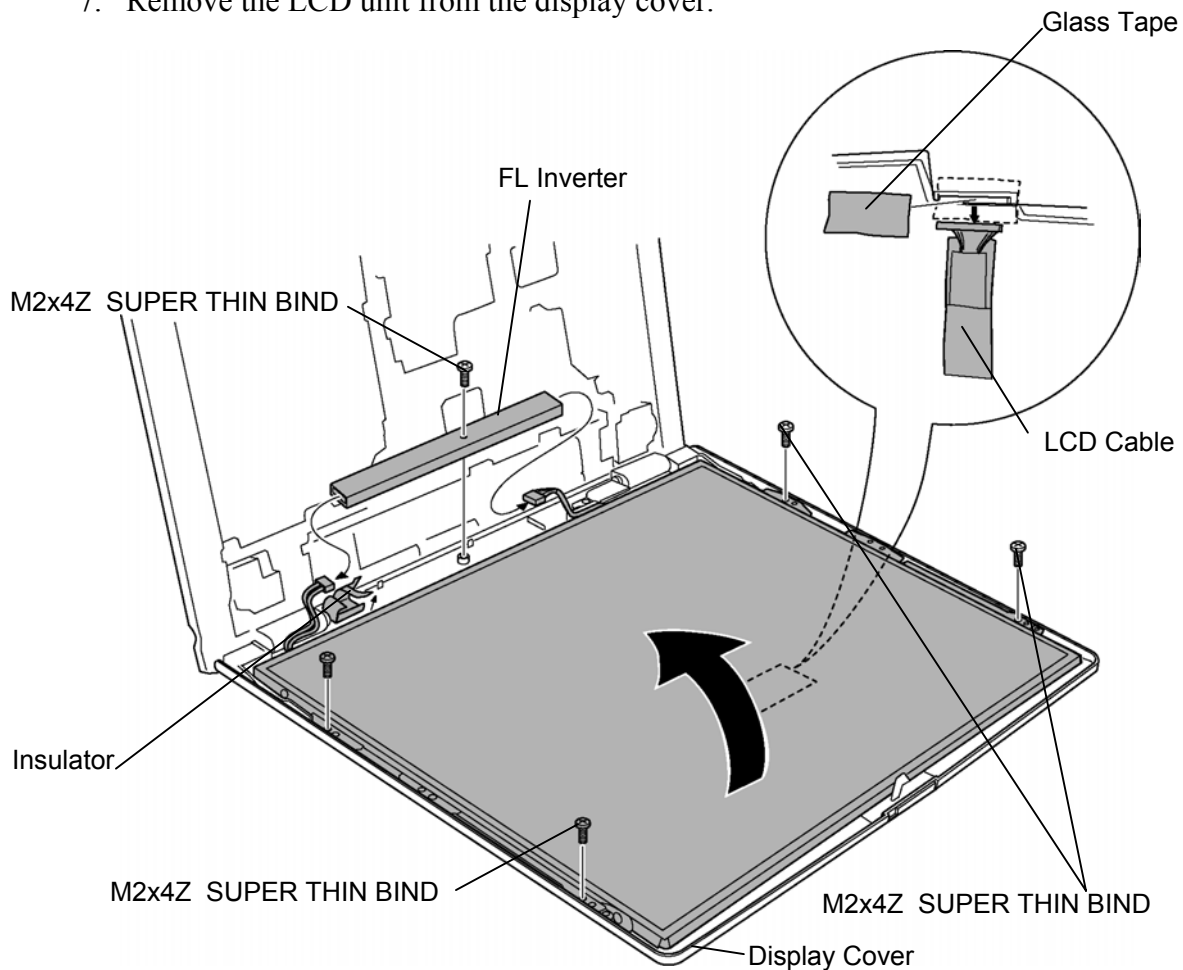


Figure 4-38 Removing FL Inverter and LCD Unit

8. Remove the following **screws** securing the **LCD brackets**. Remove the LCD brackets from the **LCD module**.

- M2x3 SUPER THIN BIND screw x4

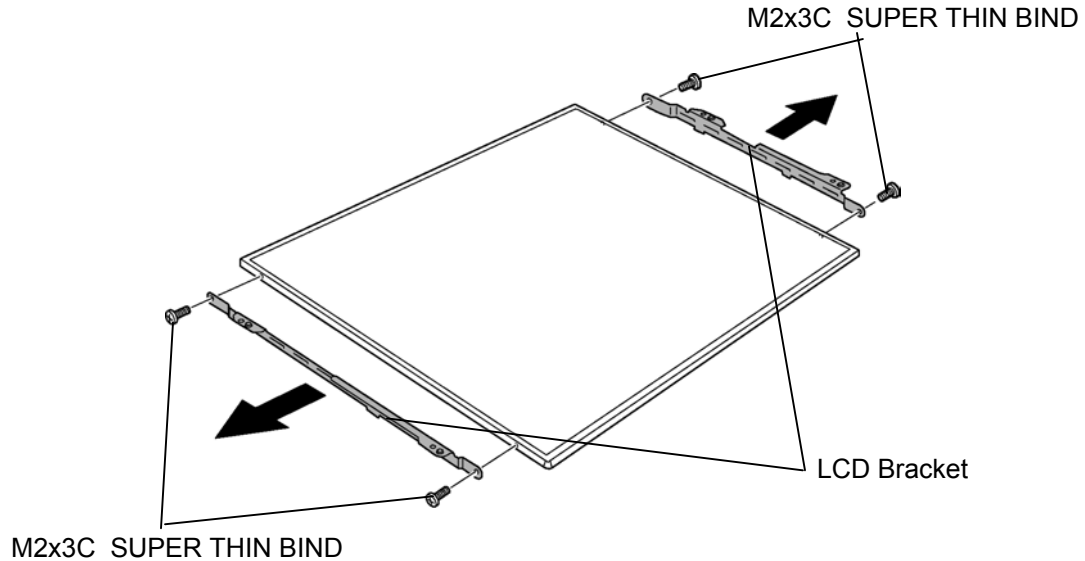


Figure 4-39 Removing LCD Bracket

9. (For 14.1-inch LCD made by Samsung only)  
Remove the **aluminum tape** from the LCD module.

**NOTE:** Do not apply power on ICs under aluminum tape because they are easily broken.

When discarding broken ICs or FL tube, follow regulations of the local area.

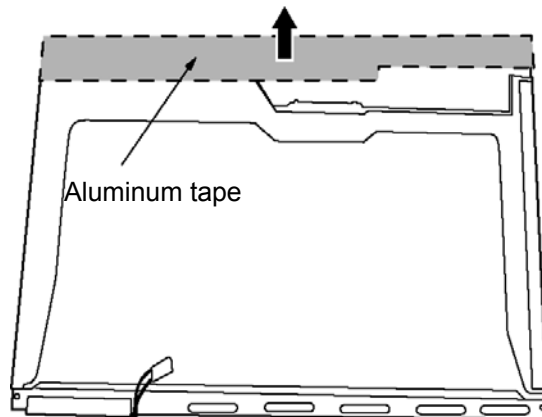


Figure 4-40 Removing Aluminum Tape

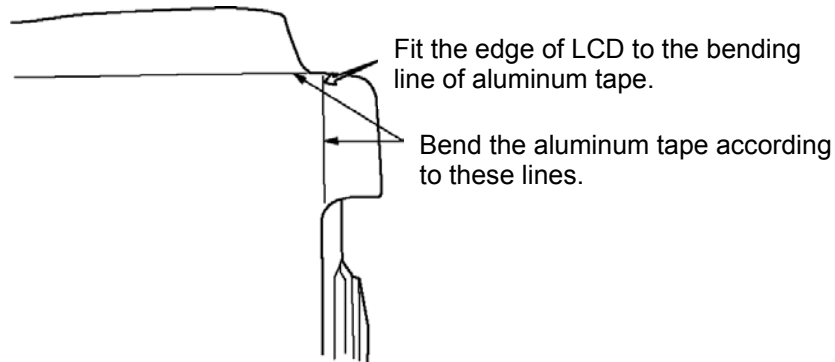
### Installing the FL inverter/LCD unit

The following describes the procedure for installing the LCD unit/FL inverter (See Figure 4-37 to 4-40).

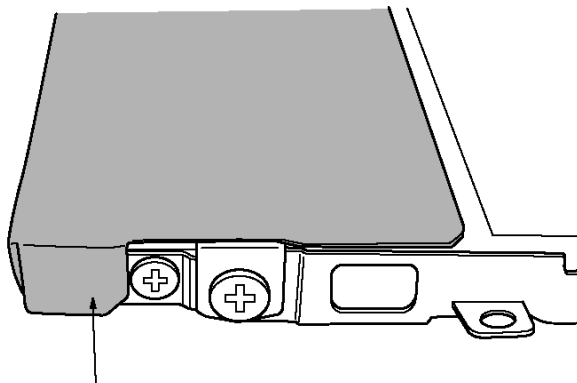
1. (For 14.1-inch LCD made by Samsung only)  
Attach the **aluminum tape** on the **LCD unit**.

**CAUTION:** When attaching the aluminum tape, be careful with the followings:

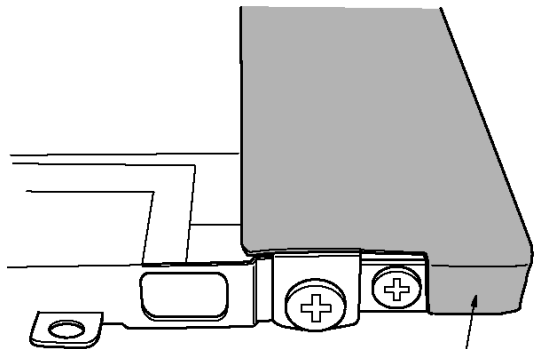
\* *Right of back of the LCD (enlarged view)*

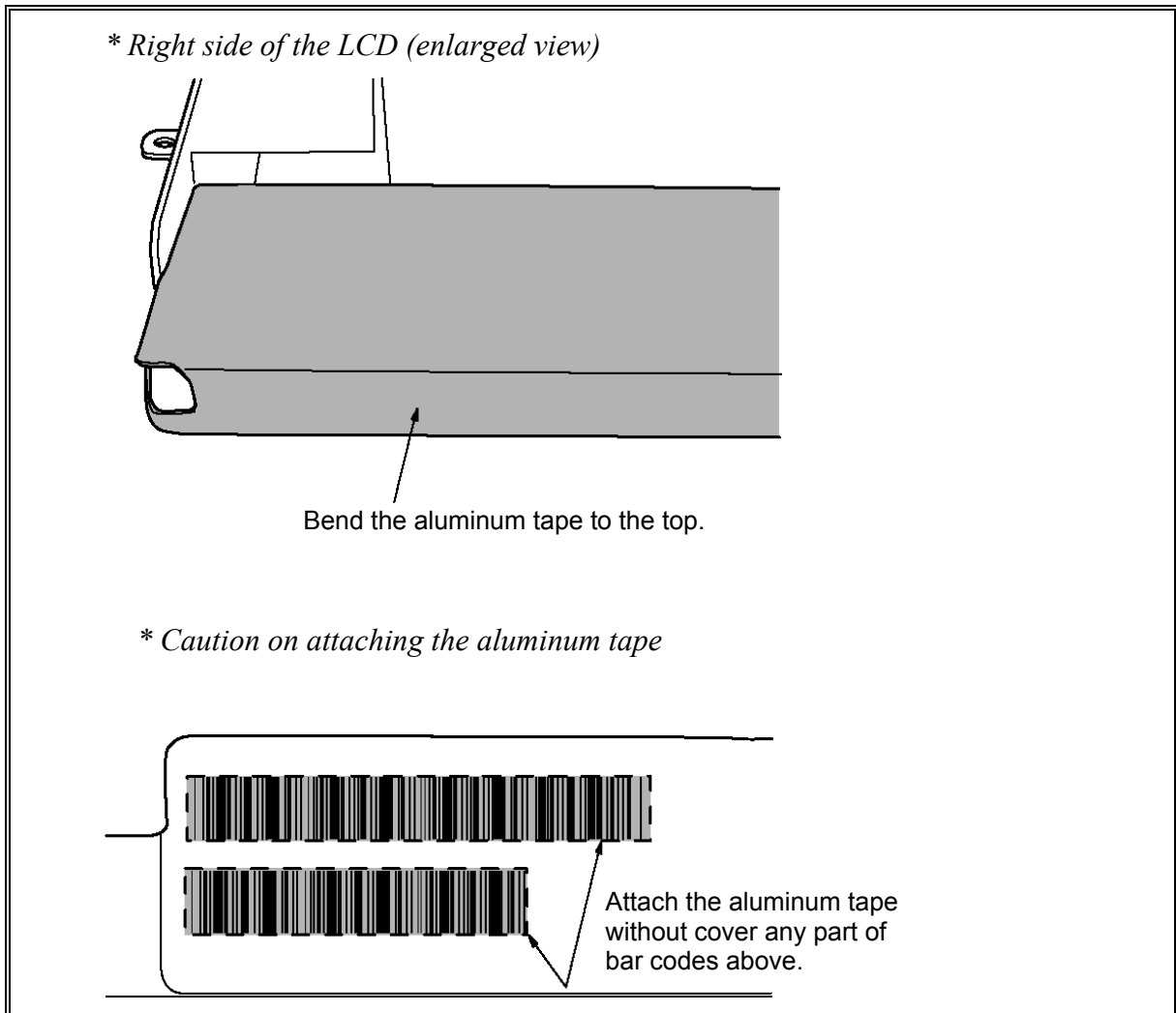


\* *Right of side of the LCD (enlarged view)*



\* *Left side of side of the LCD (enlarged view)*



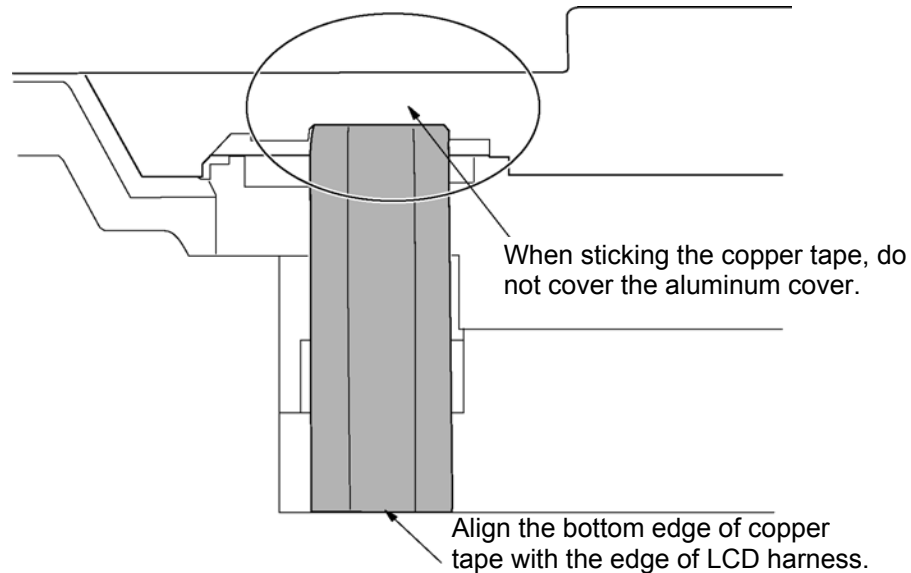


2. Secure the **LCD brackets** to the LCD module with the following **screws**.
  - M2x3C SUPER THIN BIND screw x4



3. 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**.

**CAUTION:** (For 14.1-inch LCD made by Samsung only) For fixing the LCD cable, use the copper tape instead of the glass tape.



4. Put the LCD unit on the display cover and secure the LCD with the following **screws**.
  - M2x4Z SUPER THIN BIND screw x4
5. 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**. Insert the end of the insulator under the LCD unit.
  - M2x4Z SUUPER THIN BIND screw x1
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.

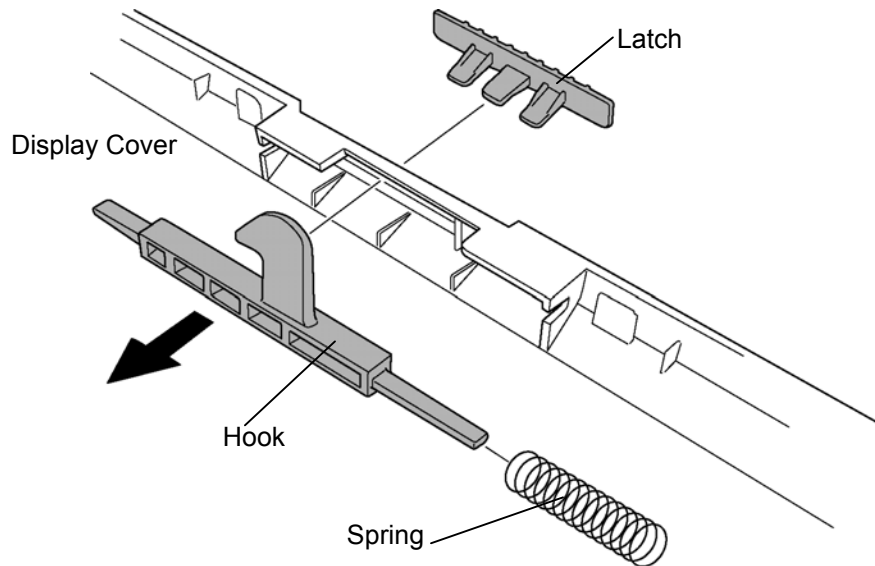
7. Secure the display mask with the following **screws** and stick two **mask seals** on the front of the display mask.
  - M2.5x6B THIN BIND screw x2

## 4.20 Latch Assembly

### Removing the Latch assembly

The following describes the procedure for removing latch assembly (See Figure 4-41).

1. Press the **latch assembly** in the direction indicated by arrow to remove it from the display cover.



*Figure 4-41 Removing Latch Assembly*

### Installing the Latch Assembly

The following describes the procedure for installing the Latch Assembly (See Figure 4-41).

1. Set the **spring** on the **hook** and fit the hook on the slot of display cover.
2. Install the hook and **latch** by fitting projections on the latch to the holes of the hook.

## 4.21 Wireless LAN Antenna/Speaker/Hinge

### Removing the Wireless LAN antenna/Speaker/Hinge

The following describes the procedure for removing the wireless LAN antenna, speaker and hinge (See Figure 4-42 to 4-49).

1. (Wireless LAN models only)  
Peel off five **acetate tapes** securing the white and the black **wireless LAN antenna cables**. Remove the **wireless LAN antennas**. Turn the display assembly face down and unhook the wireless LAN antenna cable from the guides.

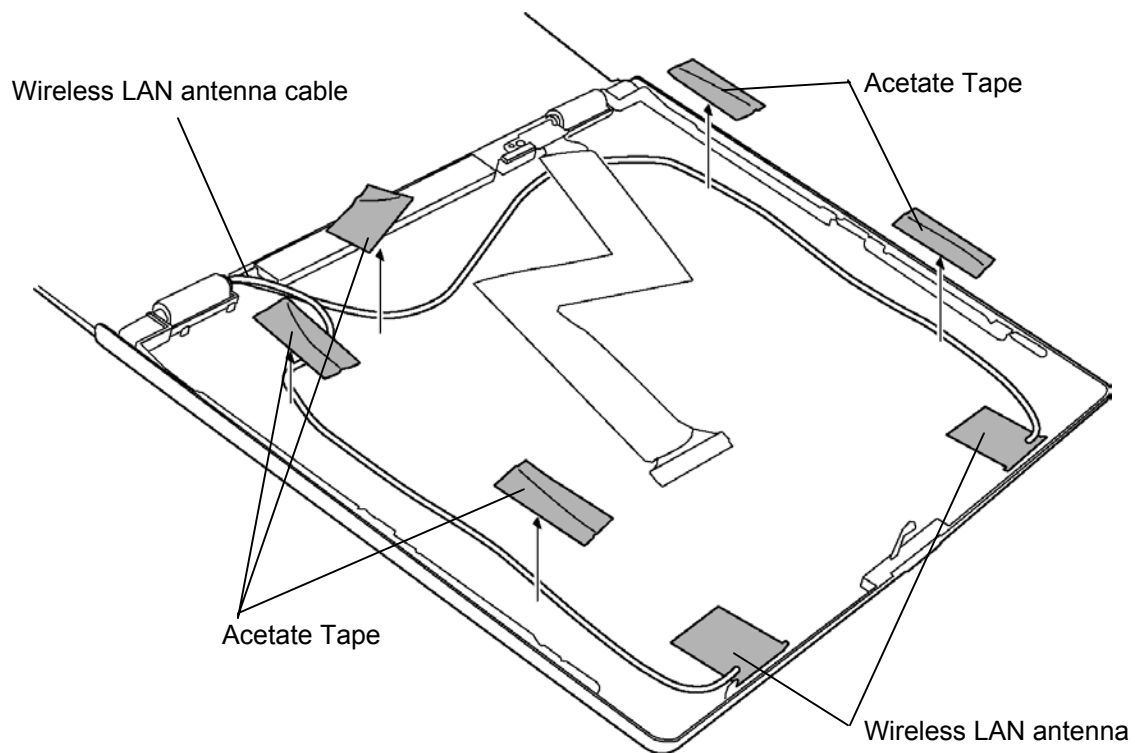


Figure 4-42 Removing Speaker Cables

2. Remove the following **screw** securing the **LCD cable holder** to remove it.

- M2x4Z SUPER THIN screw x1

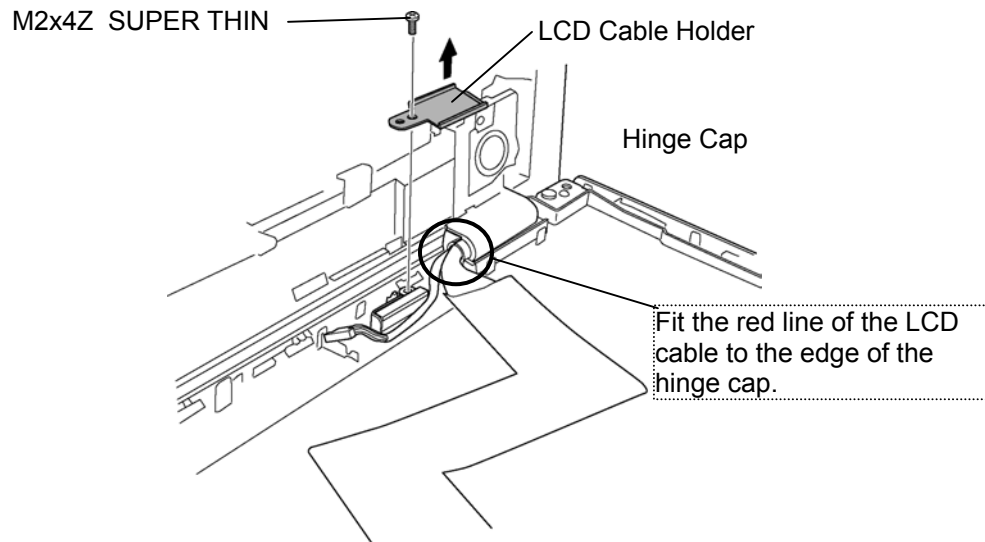


Figure 4-43 Removing LCD Cable Holder

3. Remove the following **screws** securing the **display cover** to the **hinges**.

- M2x6C PSP TIGHT screw x4
- M1.5x5C SUPER THIN screw x2

4. Remove the display cover from the hinges.

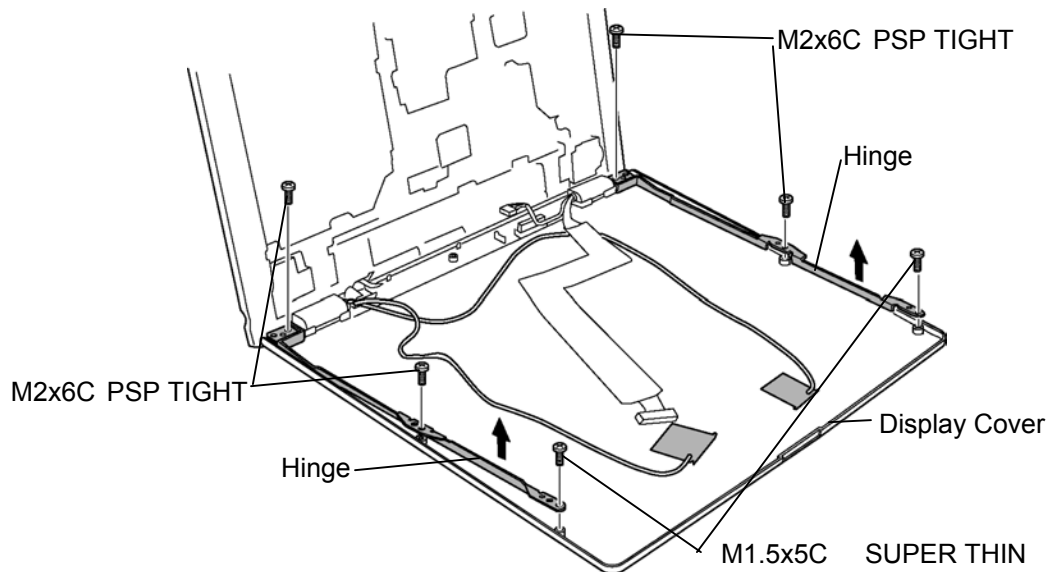


Figure 4-44 Removing Wireless LAN Antennas

5. Remove the following **screws** securing the **hinge caps**.
  - M2.5x6B THIN BIND screw x2
6. Take out the **LCD cable** under the **insulator**.
7. (Wireless LAN models only)  
Remove the **wireless LAN antenna cable**.

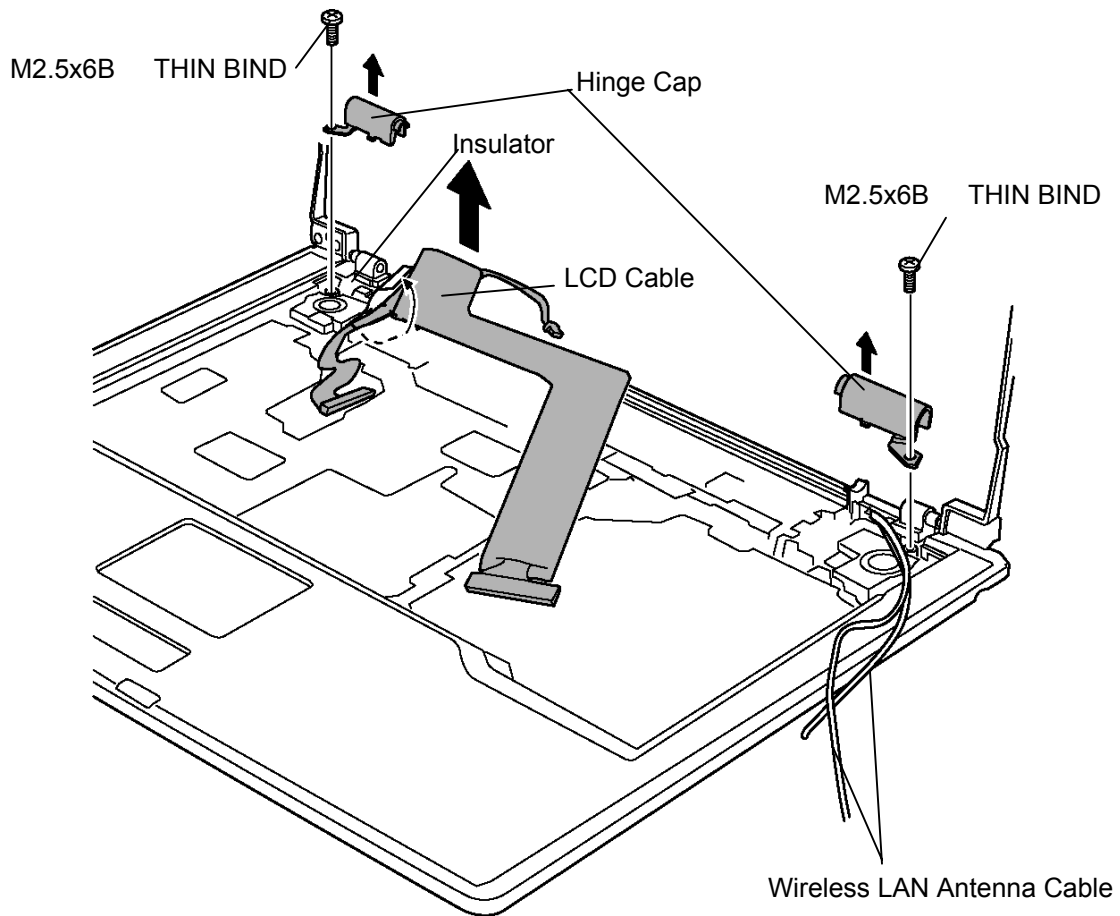


Figure 4-45 Removing Hinge Cap

8. Remove the following **screws** securing the **optical drive cover** from the back of the display assembly. To remove the optical drive cover, pull it out to the right hinge first.

- M2x2.8B THIN BIND screw x3
- M2x4B THIN BIND screw x2

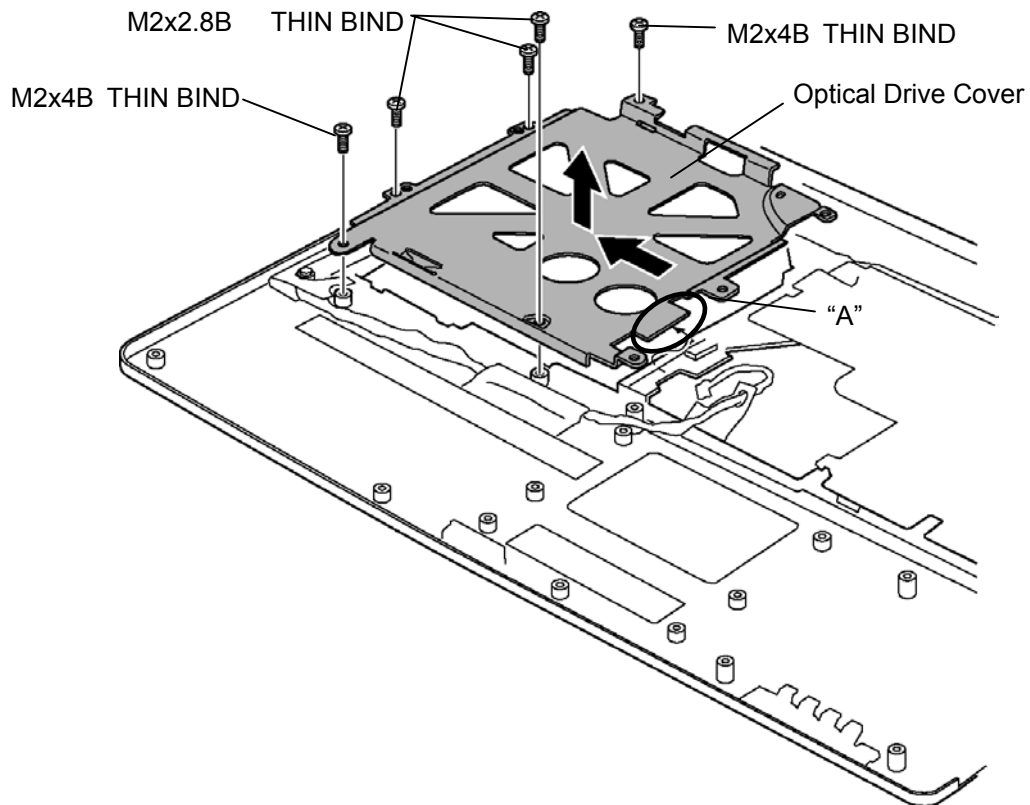


Figure 4-46 Removing Optical Drive Cover

9. Remove the following **screws** securing the **hinges** to the **display assembly**.

- M2x4B THIN BIND screw x3 (Right:2, Left: 1)

10. Peel off the **glass tapes** securing the **speaker cables** and take out the cable under the **insulator**.

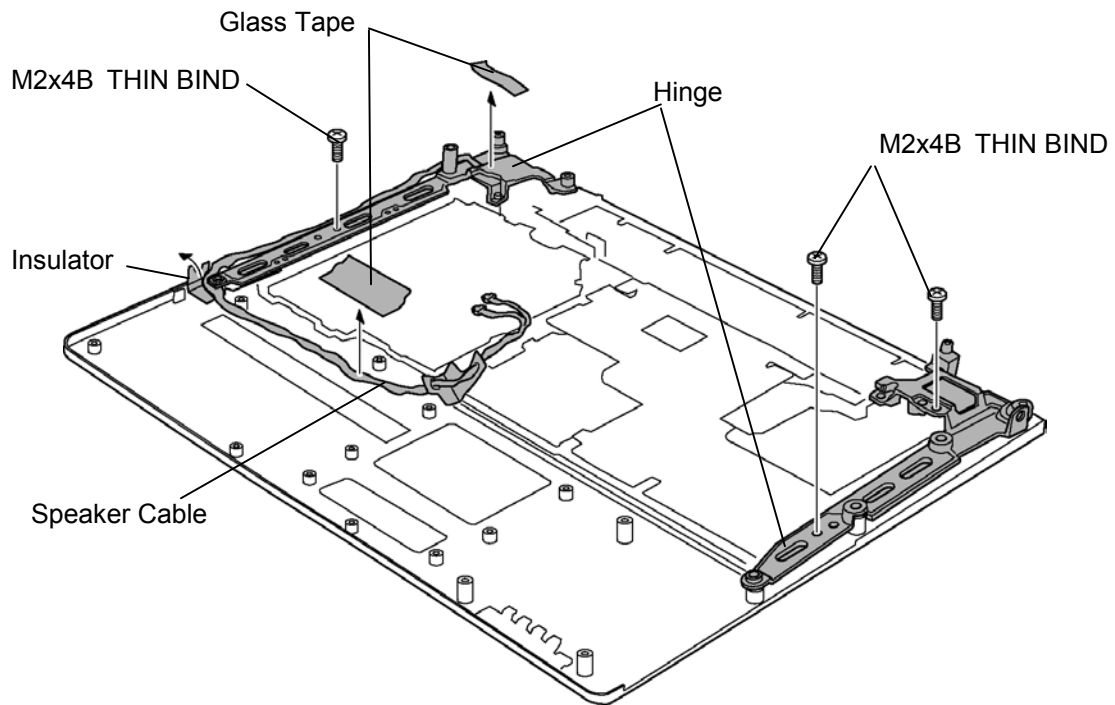


Figure 4-47 Removing Hinges (1)

11. Remove the following **screws** securing the speakers.

- M2. 5x6B THIN BIND screw      x1

**CAUTION:** When removing the speakers, be careful not to touch the metal part of the speakers. It might damage the speakers.

12. Peel off four **glass tapes** and pull out the **speaker cable (blue)** to the surface. Remove the cable from the guide and remove the **left speaker**. Pull out the **right speaker** to remove.

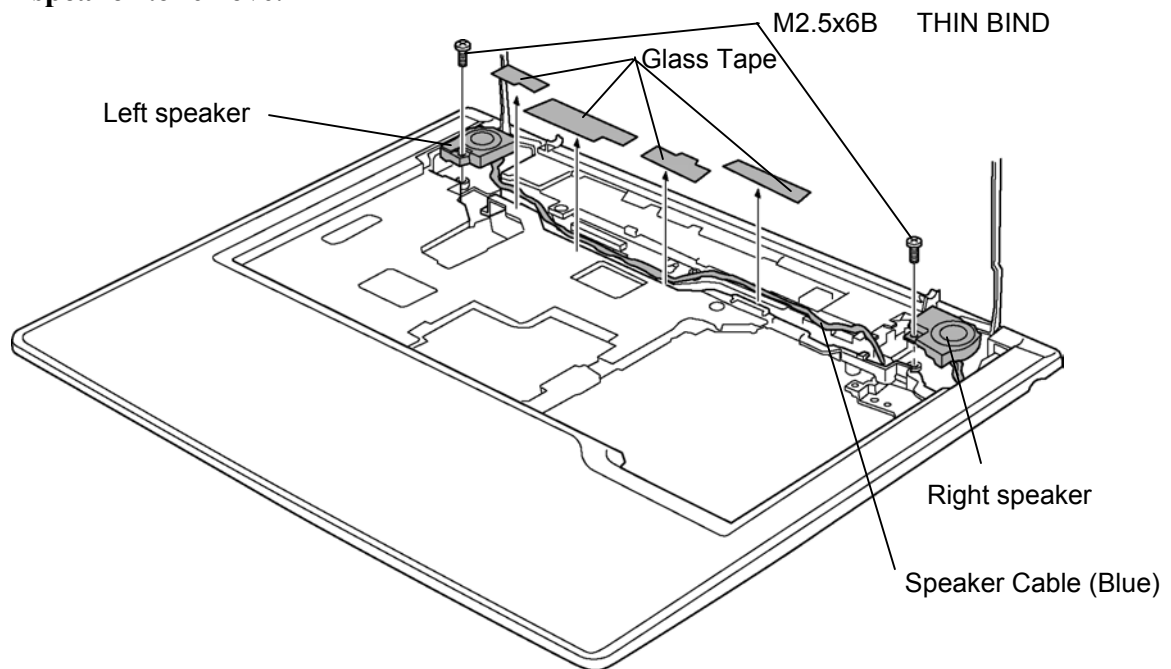


Figure 4-48 Removing Speakers



13. Shift the hinges inside and pull out them to remove.

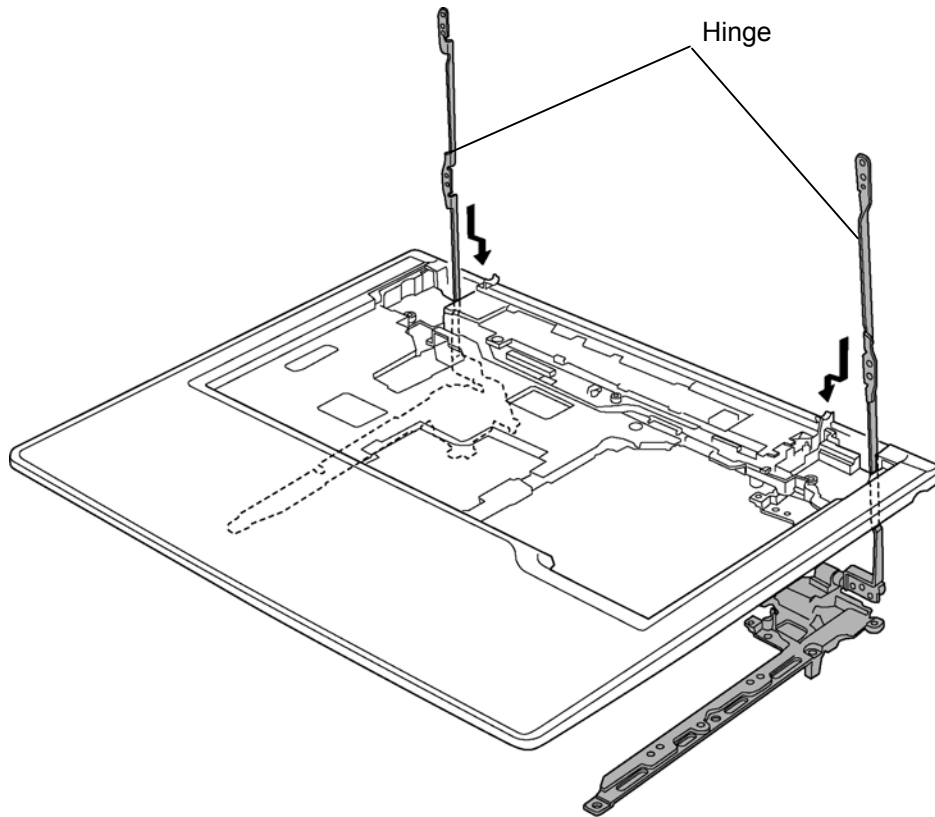


Figure 4-49 Removing Hinges (2)

### Installing the Wireless LAN antenna/Speaker/Hinge

The following describes the procedure for installing the wireless LAN antenna, speaker and hinge (See Figure 4-42 to 4-50).

**CAUTION:** When installing the speakers, be careful not to touch the metal part of the speakers. It might damage the speakers.

1. Install the **hinges** to the **display assembly** and secure them with the following **screws**.

- M2x4B THIN BIND screw x3 (Right:2, Left: 1)

2. Attach sponges on both the side of each speaker.

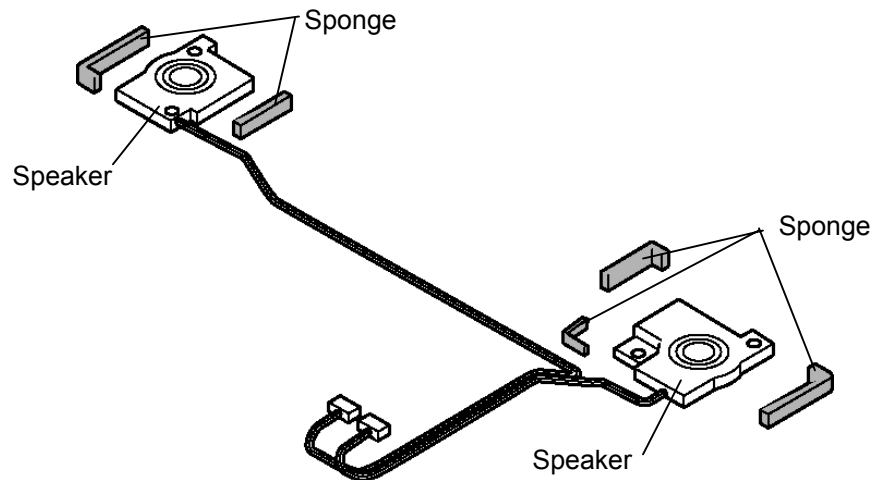


Figure 4-50 Attaching Sponges

3. Set the **left speaker** on the base assembly. Pass the **left speaker's cable (blue)** along the guide on the surface of the display assembly and toward the back side. Secure the cable with four insulators.
4. Set the **right speaker** on the base assembly and pass the **speaker cable (red)** toward the back side of the base assembly.
5. Hook the speaker cables (blue and red) to guides. Pass the cables under the **insulator** and secure them with two **glass tapes**. Insert the insulator end under the **hinge**.
6. Install the **optical drive cover** and secure it with the following **screws**. When installing, insert the part "A"

- M2x2.8B THIN BIND screw x3
- M2x4B THIN BIND screw x2

7. Install the **display cover** on the display assembly and secure the **hinges** and the display cover with the following **screws**.
  - M2.5x6C      PSP TIGHT screw      x4
  - M1.5x5C      SUPER THIN screw      x2
  
8. (For wireless LAN models only)  
Fit the **wireless LAN antennas** to the lines on the back side of the display cover with double-sided adhesive tapes. Pass the **wireless LAN antenna cables** along the lines and secure them with five **acetate tapes**.
  
9. (For wireless LAN models only)  
Pass the wireless LAN antenna cables toward the back side of the display assembly.
  
10. Install the **LCD cable** and put the **LCD cable hold plate** on it. Secure the plate with the following **screw**. When installing, hook the right projection to the edge of the chassis. Make sure the red line on the cable comes to the end of the hinge cover. Secure the cable with the insulator.
  - M2x4Z      SUPER THIN screw      x1
  
11. Install the **right and left hinge caps** and secure them with the following **screws**.
  - M2.5x6B      THIN BIND screw      x1
  
12. Pass the wireless LAN antenna toward back side of the base assembly and hook them on the guides. Pass the cables to the center of the base assembly.

## 4.22 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<br>(XGA)   | G33C0001Z110 | CHIMEI     | 4.22.1  |
|                      | G33C0001P110 | Samsung    | 4.22.2  |
| 15.0 inch<br>(XGA)   | G33C0000L110 | Samsung    | 4.22.3  |
|                      | G33C0001Q110 |            |         |
|                      | G33C0001K110 | LG.Philips | 4.22.4  |
|                      | G33C0000Q310 | Sharp      | 4.22.5  |
|                      | G33C0001Y110 | CHIMEI     | 4.22.6  |
|                      | G33C0001W110 | LG.Philips | 4.22.7  |
|                      | G33C00017110 | Sharp      | 4.22.8  |
|                      | G33C0001R110 | Sharp      | 4.22.9  |
| 15.0 inch<br>(SXGA+) | G33C0000R110 | LG.Philips | 4.22.10 |
|                      | G33C0001X110 |            |         |

**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.

### 4.22.1 Replacing the CHIMEI 14.1 Inch XGA Fluorescent Lamp

Replace the Toshiba 14.1-inch XGA fluorescent lamp according to the following procedures and Figures 4-51 to 4-56.

#### Disassembling the 14.1 Inch XGA CHIMEI Fluorescent lamp

To disassemble the 14.1-inch XGA CHIMEI fluorescent lamp, follow the steps below and refer to Figures 4-51 to 4-56.

1. Peel off the tapes (CU tapes, protector film).

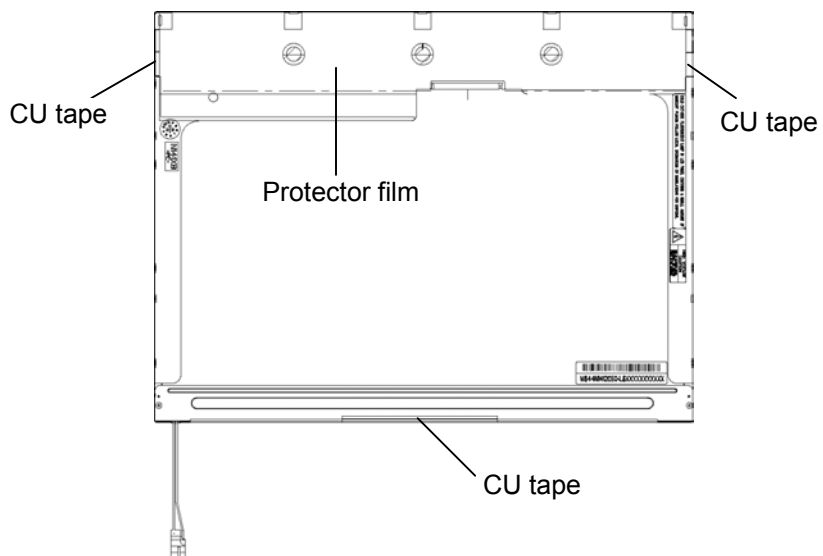


Figure 4-51 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (1)

2. Remove the twelve hooks from the metal frame.

**NOTE:** When removing the hooks, be careful not to bend the metal frame.

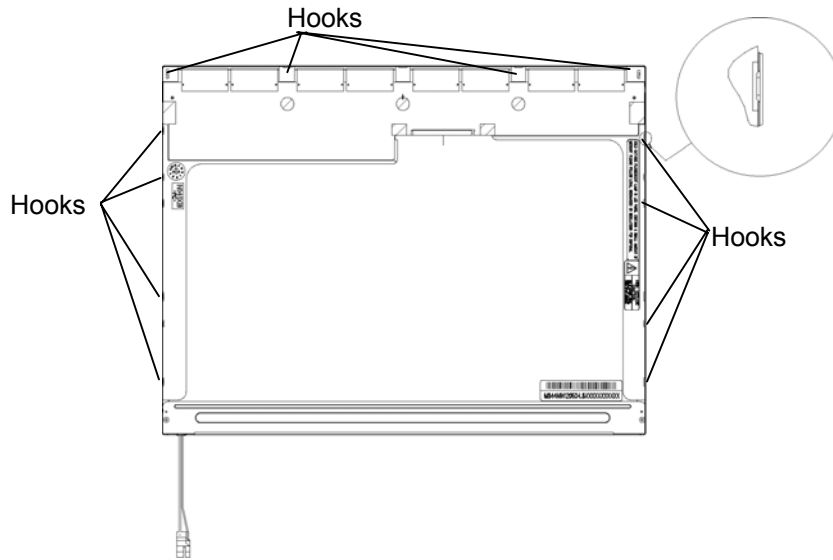


Figure 4-52 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (1)

3. Open the metal frame from the top. Pushing the bottom of the metal frame, pull up the metal frame with parallel

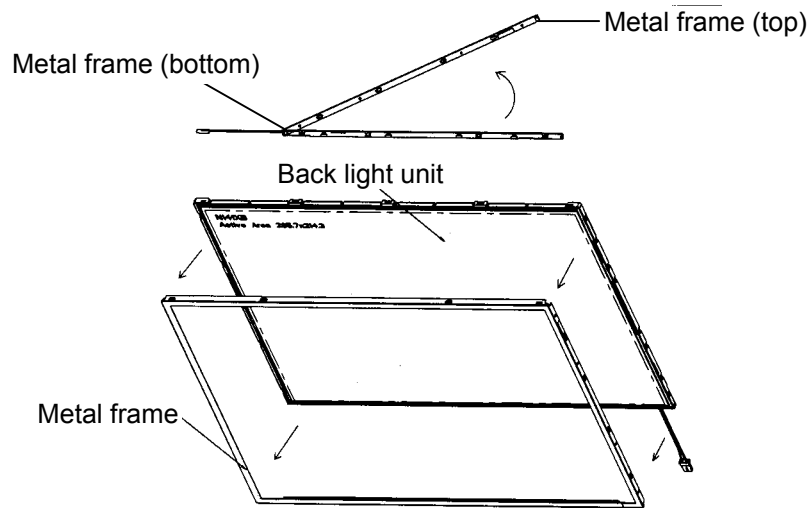


Figure 4-53 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (2)

4. Open the panel PCB.

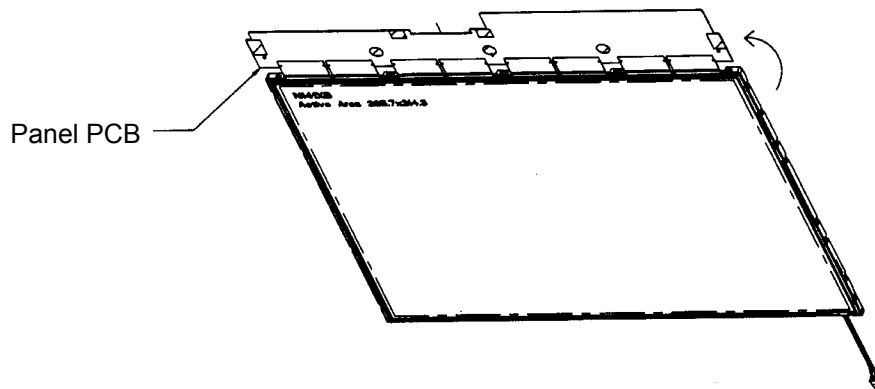


Figure 4-54 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (3)

5. Remove the panel from the back light unit.

**NOTE:** When removing the panel, be careful not to damage the top lens of back light unit.

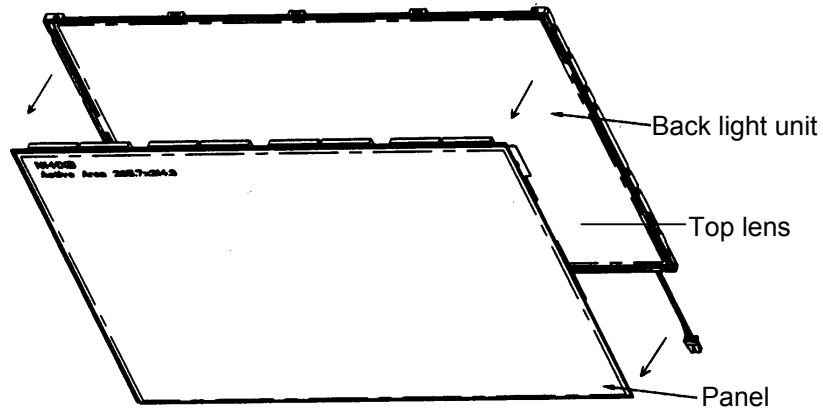


Figure 4-55 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (4)



6. Remove the two silicon spacers. Remove all the sheets and tapes.  
Remove the two screws fixing lamp assembly and remove the lamp assembly.

**NOTE:** When removing the sheets, be careful not to damage them.

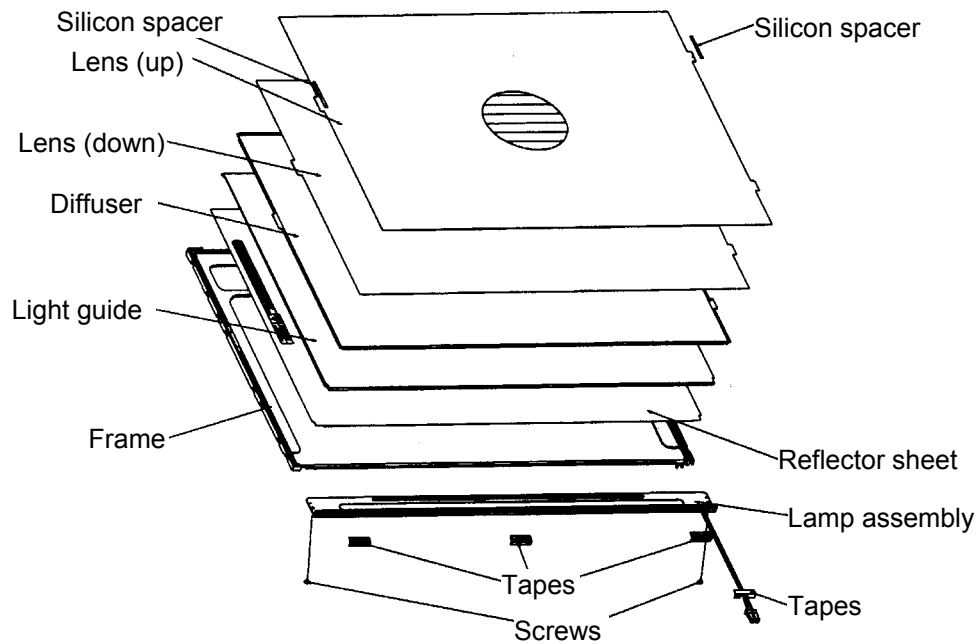


Figure 4-56 Replacing 14.1 Inch CHIMEI fluorescent lamp (XGA) (5)

**Assembling the 14.1-inch XGA CHIMEI Fluorescent lamp**

The assembly procedure of the 14.1-inch XGA CHIMEI fluorescent lamp is the reverse of the above disassembly procedure.

### 4.22.2 Replacing the Samsung 14.1 Inch XGA Fluorescent Lamp

Replace the Toshiba 14.1-inch XGA fluorescent lamp according to the following procedures and Figures 4-57 to 4-65.

#### Disassembling the 14.1 Inch XGA Samsung Fluorescent lamp

To disassemble the 14.1-inch XGA Samsung fluorescent lamp, follow the steps below and refer to Figures 4-57 to 4-65.

1. Remove the PCB cover.

**NOTE:** When removing the PCB cover, be careful not to damage the COF.

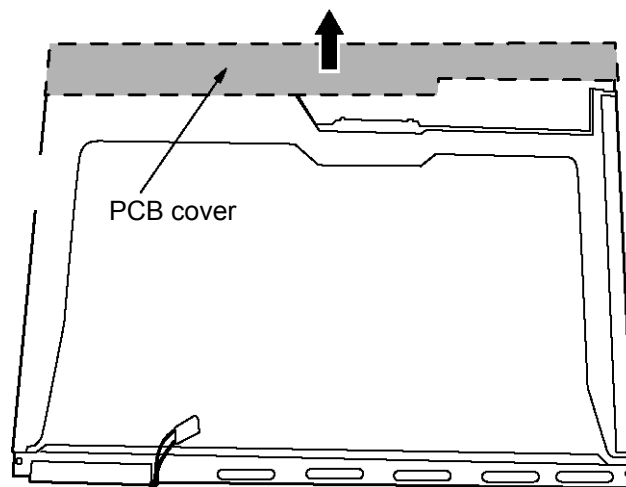


Figure 4-57 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (1)

2. Peel off the Lamp-wire tape and aluminum tape.

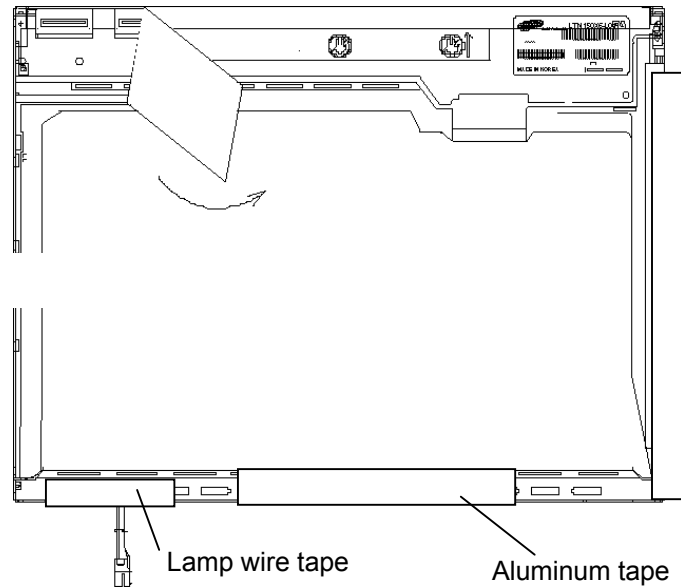


Figure 4-58 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (2)

3. Remove the two screws.

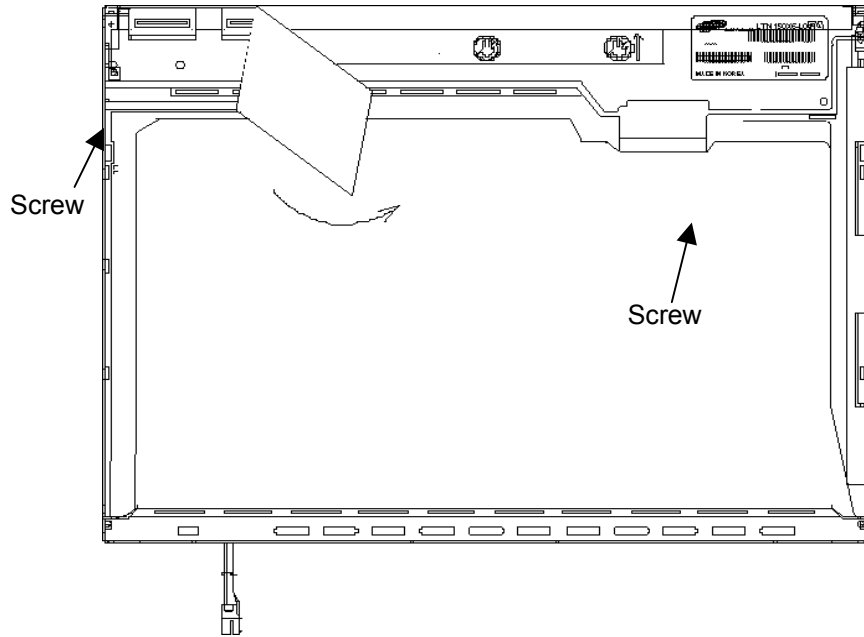


Figure 4-59 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (3)

4. Remove the four screws from the top chassis.

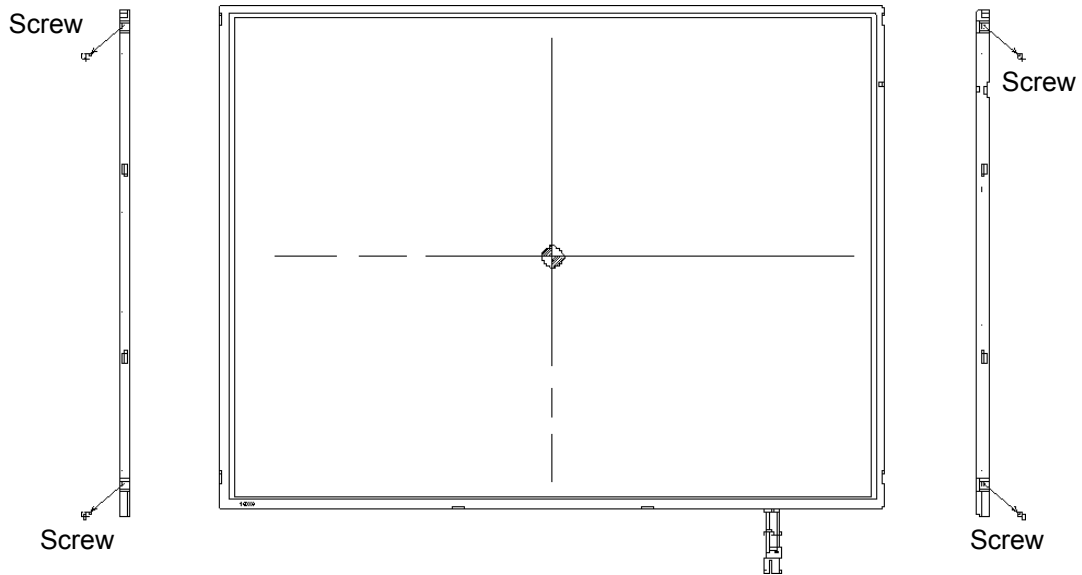


Figure 4-60 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (4)

5. Remove the panel assembly from the mold frame.

**NOTE:** When removing the panel assembly, be careful not to damage the COF.

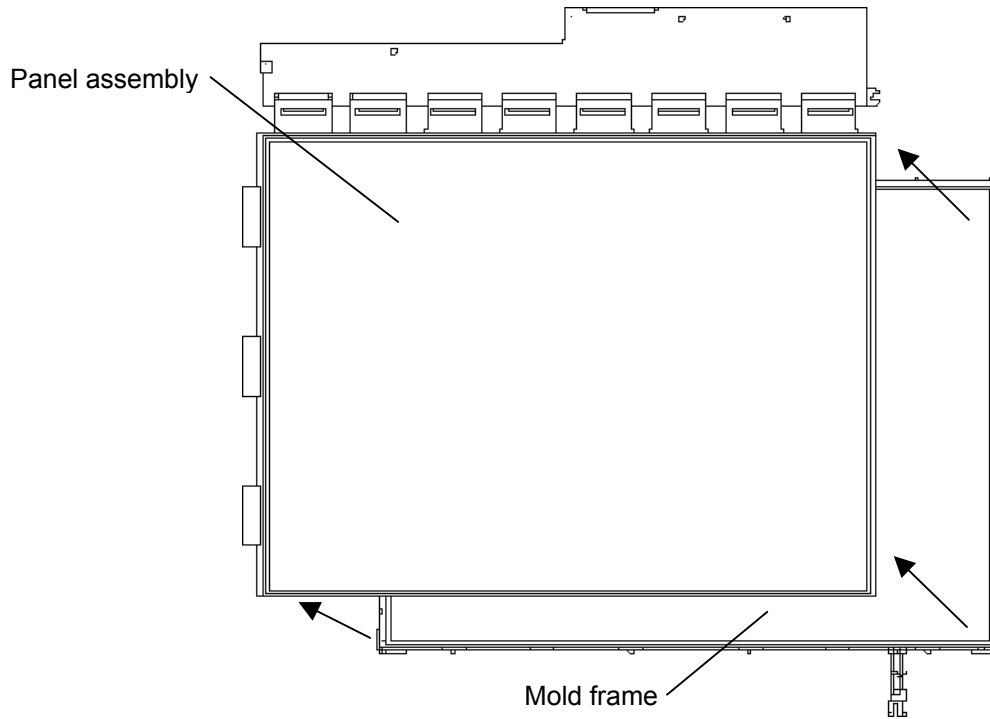


Figure 4-61 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (5)

6. Remove the sheets and clips.
  - 1) Remove the two clips fixing the sheets.
  - 2) Remove the sheets.

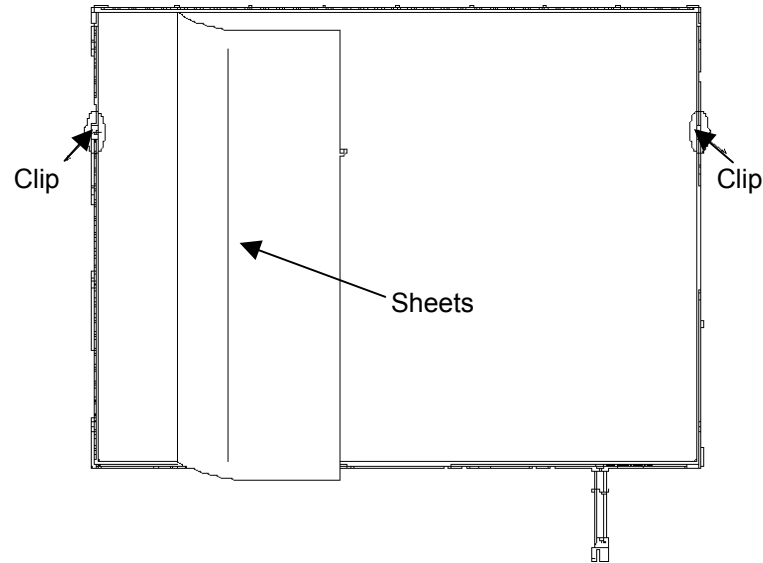


Figure 4-62 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (6)

7. Remove the lamp back cover.
  - 1) Remove the two screws from the lamp back cover.
  - 2) Remove the lamp back cover.

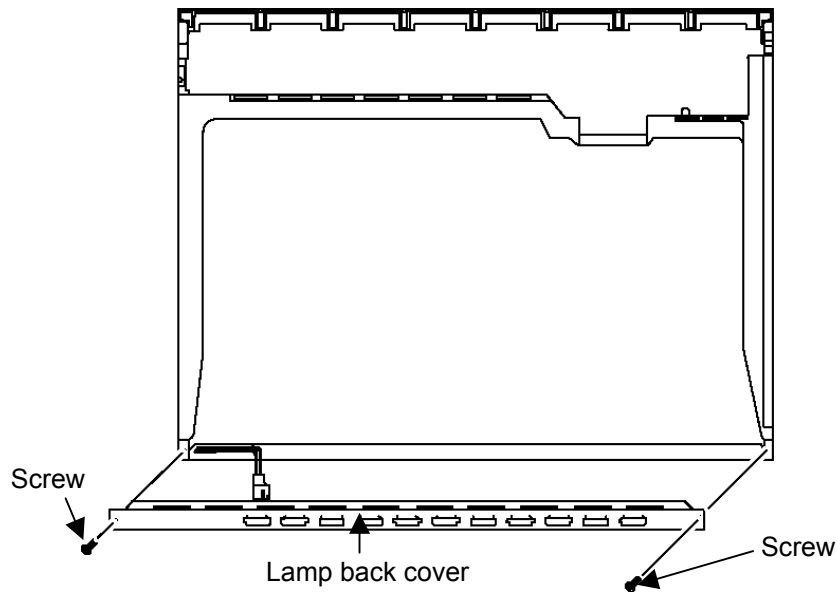


Figure 4-63 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (7)

8. Remove the lamp wire from the wire guide of the mold frame.

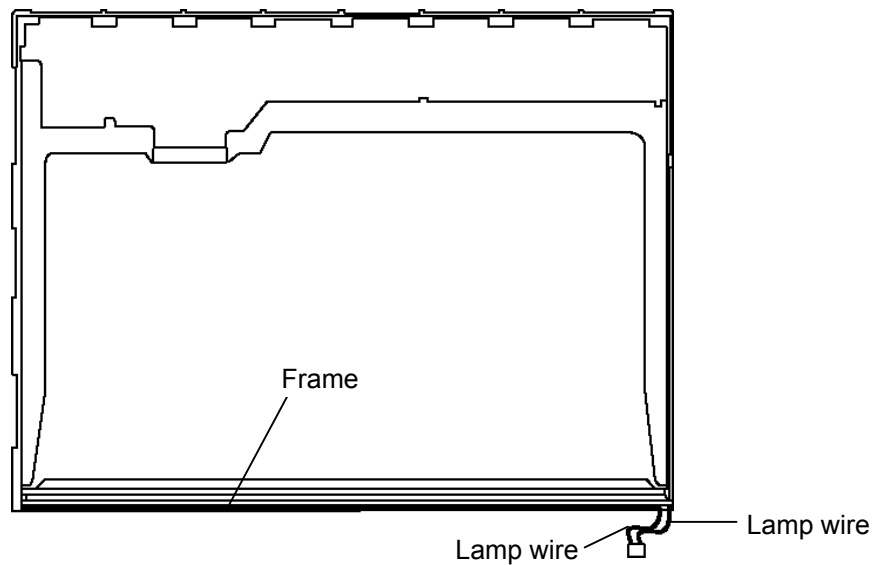


Figure 4-64 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (8)

9. Remove the lamp assembly from the mold frame.

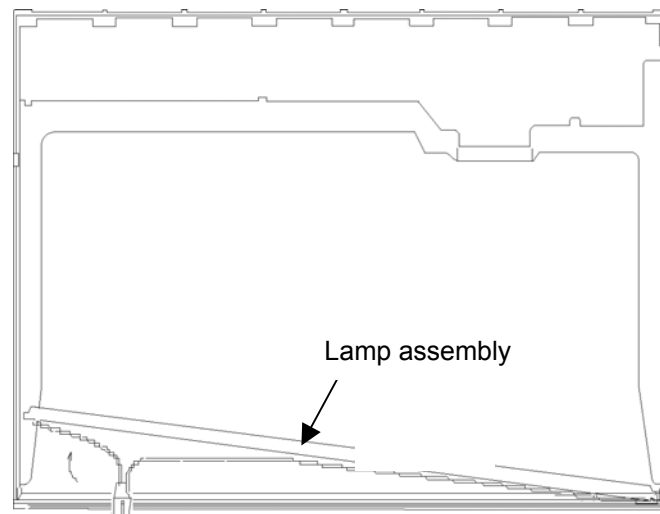


Figure 4-65 Replacing 14.1 Inch Samsung fluorescent lamp (XGA) (9)



**Assembling the 14.1-inch XGA Samsung Fluorescent lamp**

The assembly procedure of the 14.1-inch XGA Samsung fluorescent lamp is the reverse of the above disassembly procedure.

### 4.22.3 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 4-66 to 4-74.

1. Remove the PCB cover.

**NOTE:** When removing the PCB cover, be careful not to damage the COF.

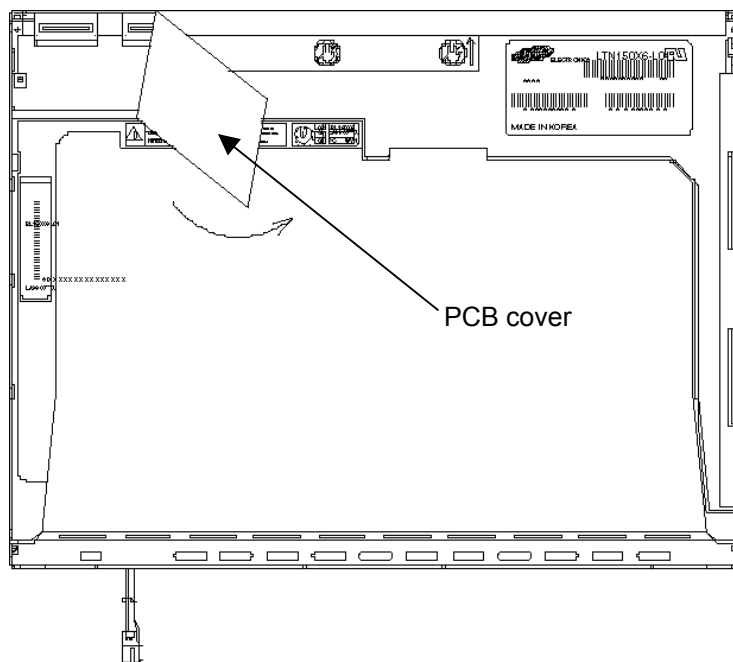


Figure 4-66 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (1)

- Remove the two screws.

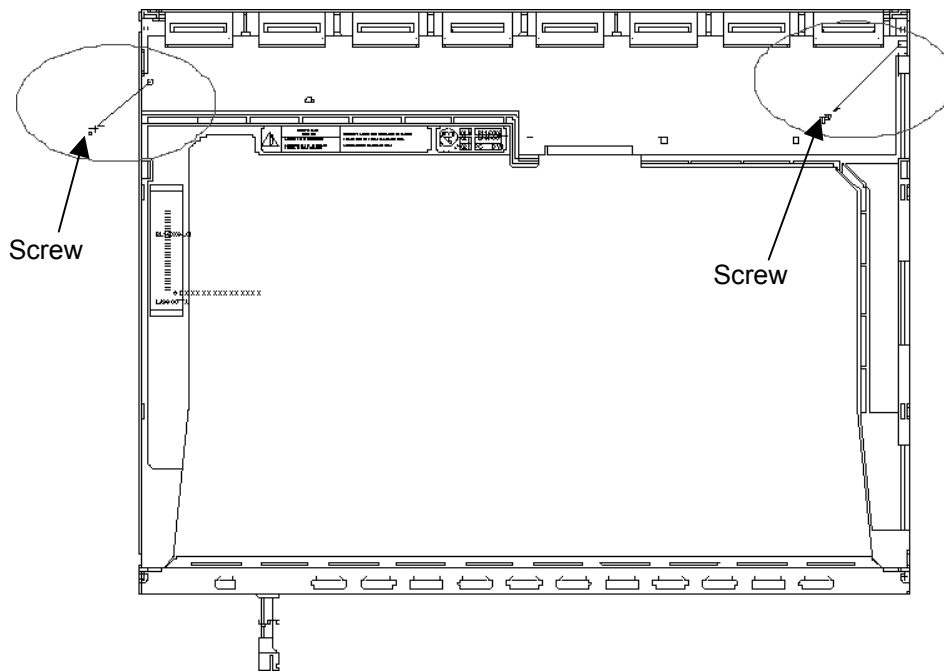


Figure 4-67 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (2)

- Remove the four screws from the top chassis.

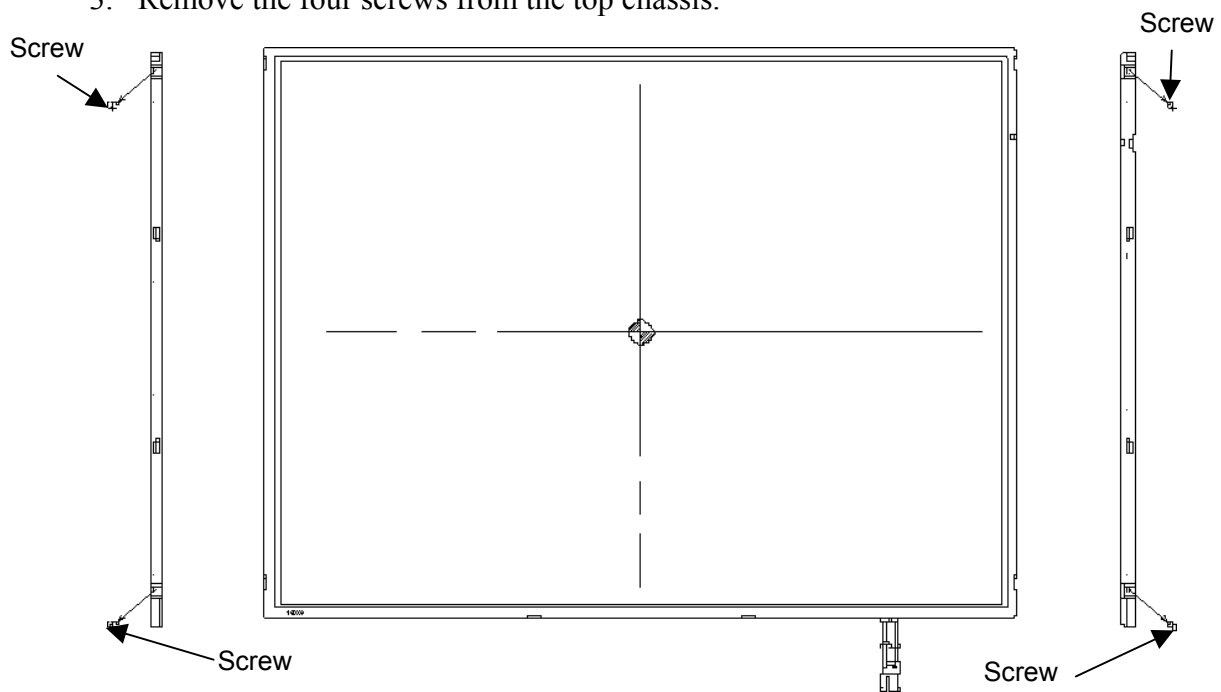


Figure 4-68 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (3)

4. Remove the four bottom hooks and four side hooks (left and right). Then remove the top chassis from the mold frame.

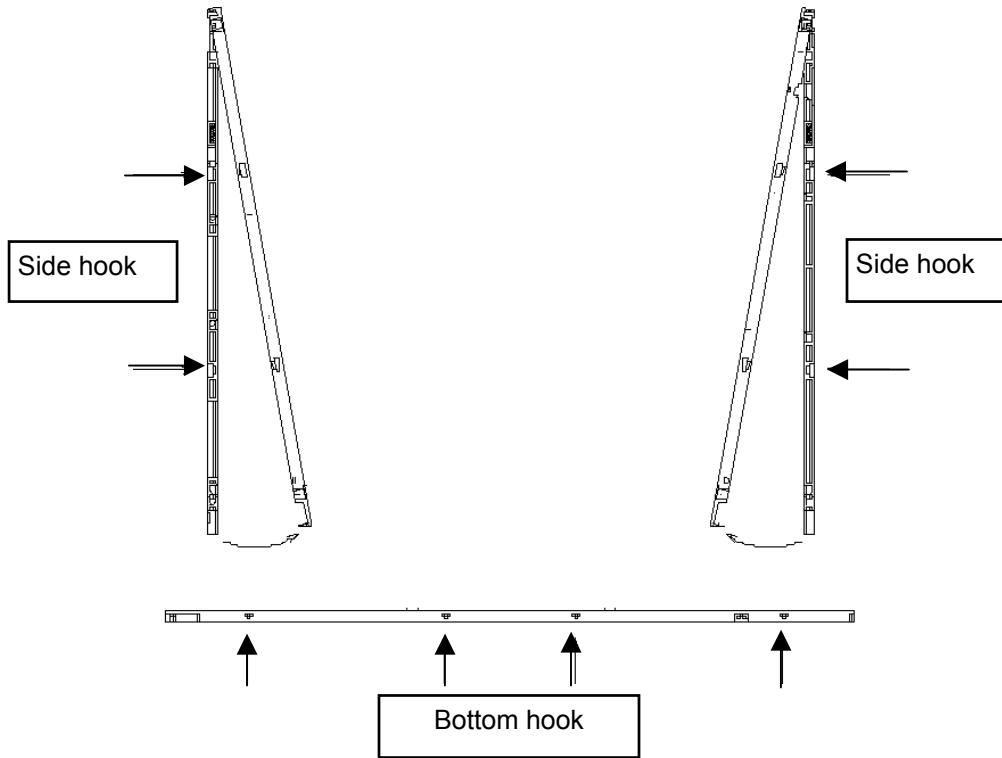


Figure 4-69 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (4)

5. Remove the panel assembly from the mold frame.

**NOTE:** When removing the panel assembly, be careful not to damage the COF.

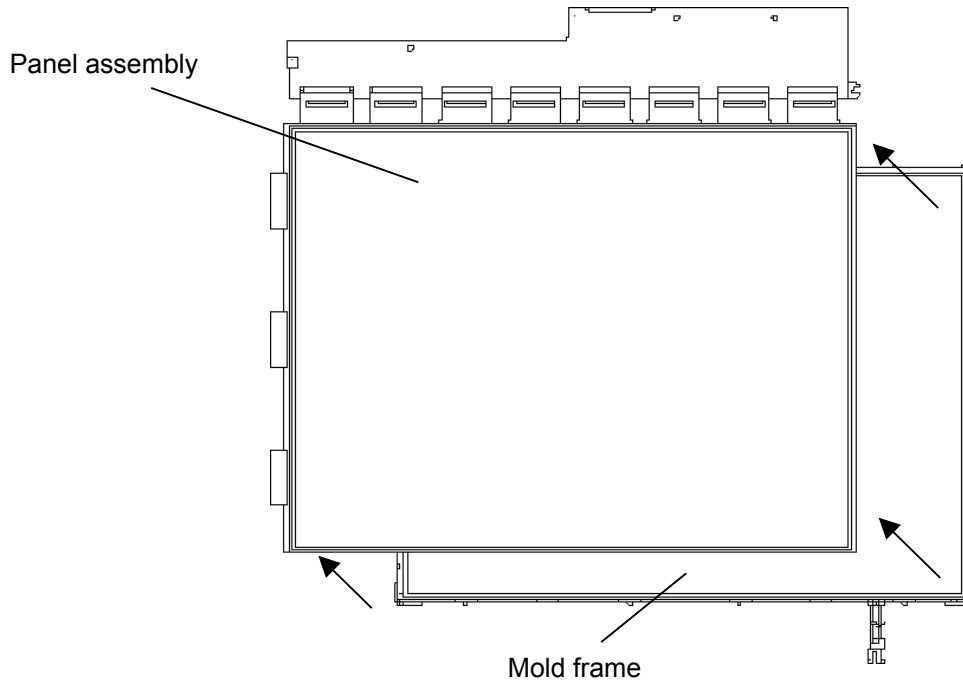
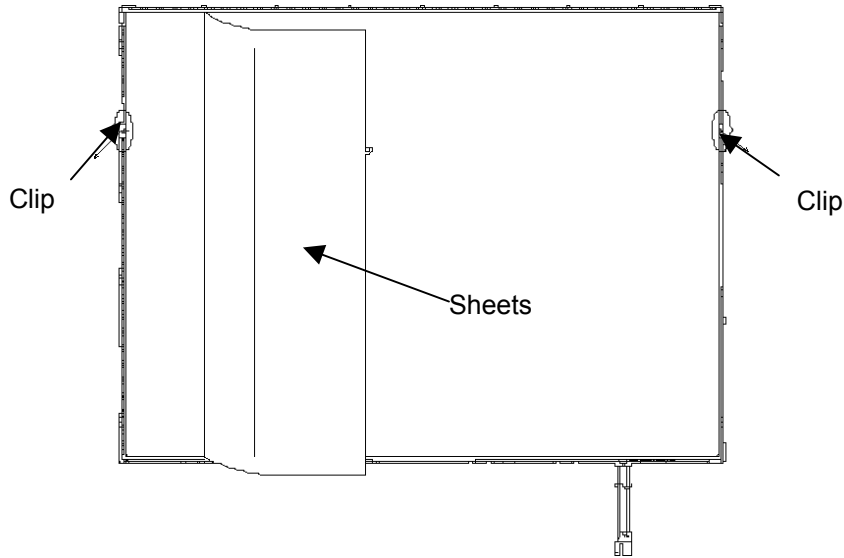


Figure 4-70 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (5)

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 4-71 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.

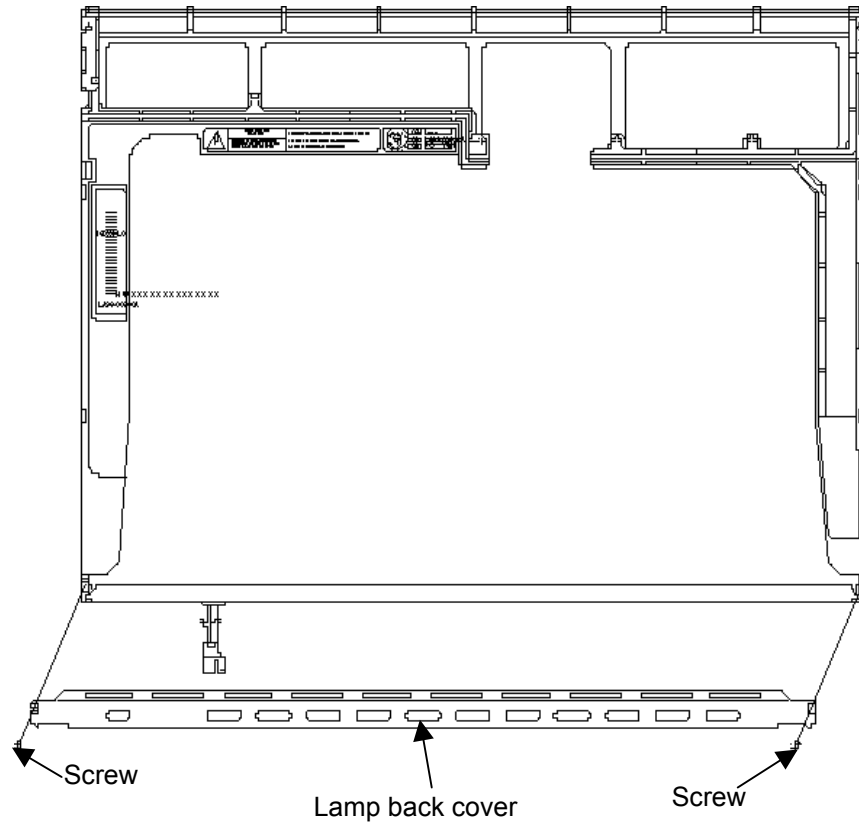


Figure 4-72 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (7)

8. Remove the lamp wire from the wire guide of the mold frame.

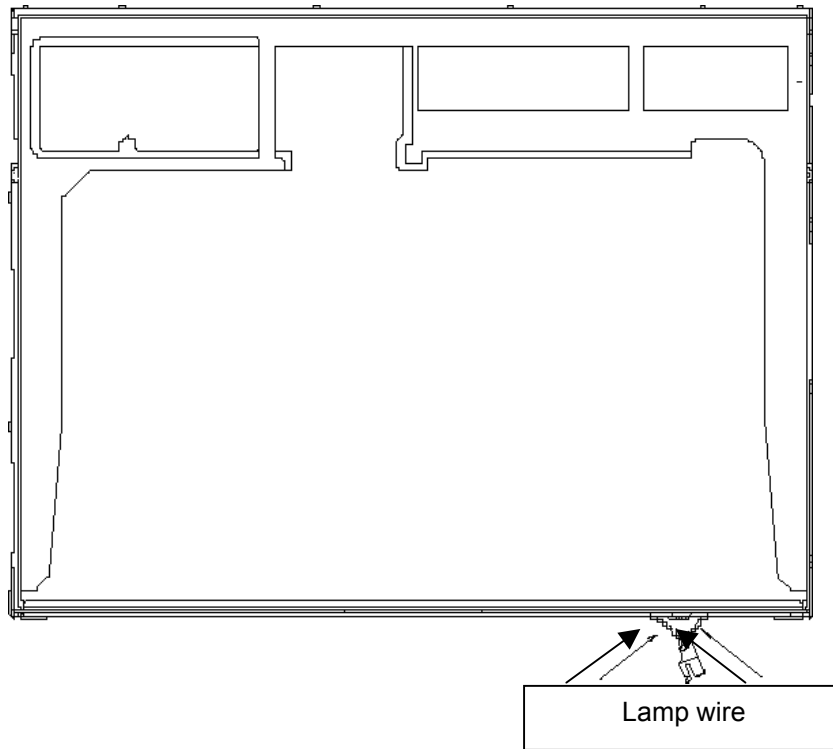


Figure 4-73 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (8)



9. Remove the lamp assembly from the mold frame.

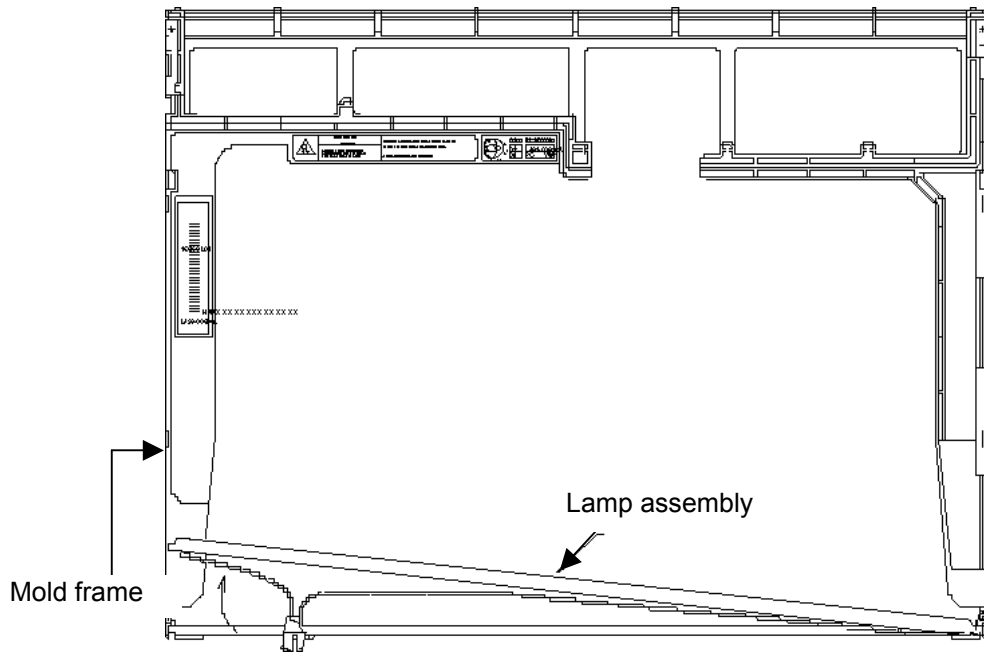


Figure 4-74 Replacing 15.0 Inch Samsung fluorescent lamp (XGA) (9)

**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.

#### 4.22.4 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 4-75 to 4-78.

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.

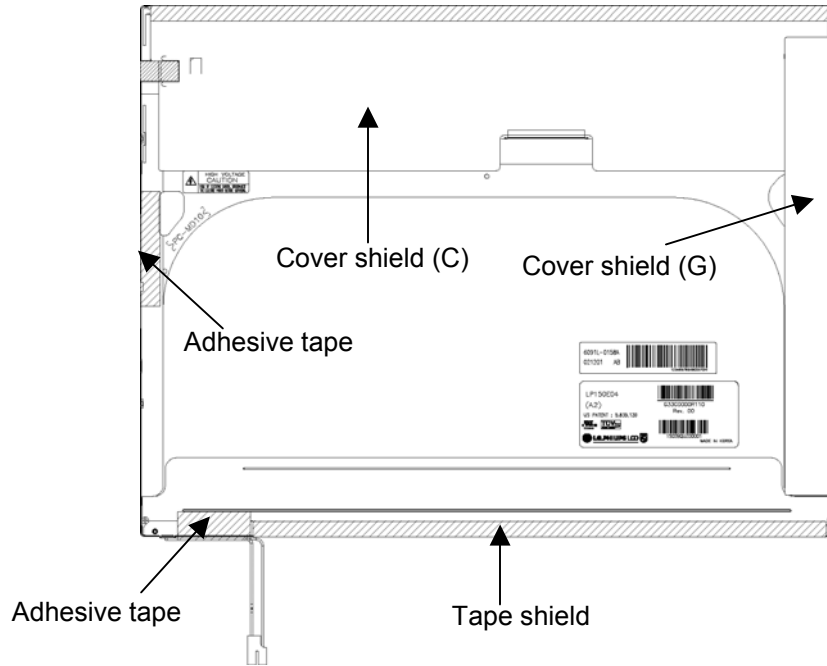


Figure 4-75 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (1)

2. Remove the top case. Be careful not to apply excessive force to the top case and gate TCP.

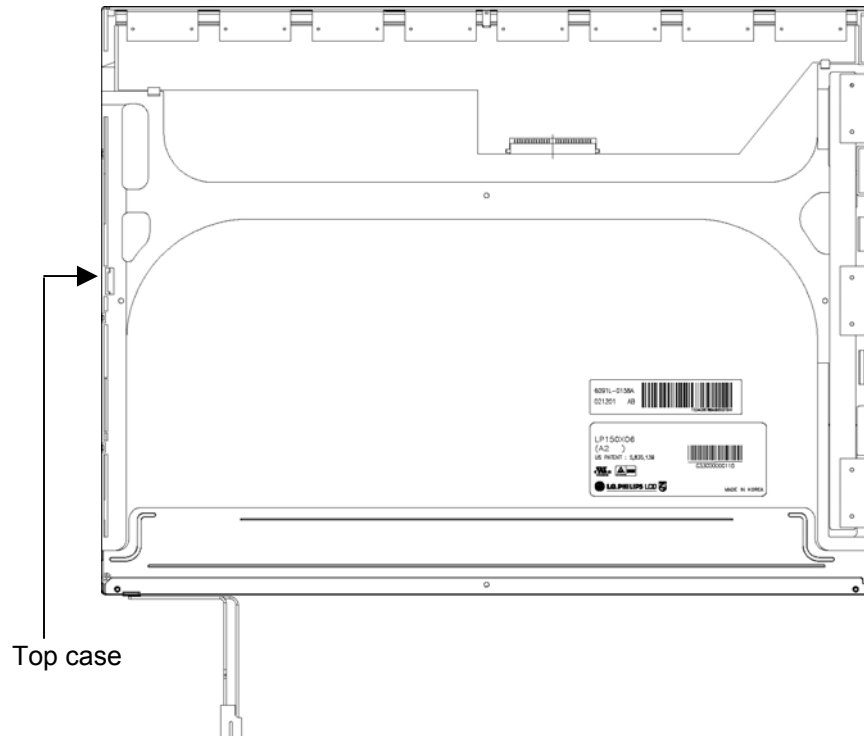


Figure 4-76 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (2)

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.

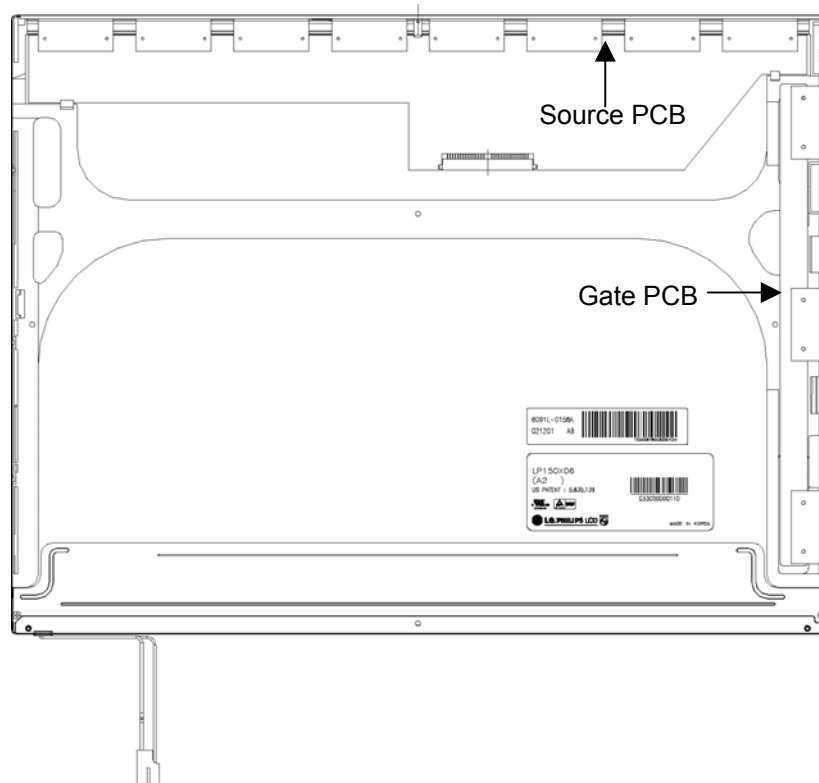


Figure 4-77 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (3)

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).

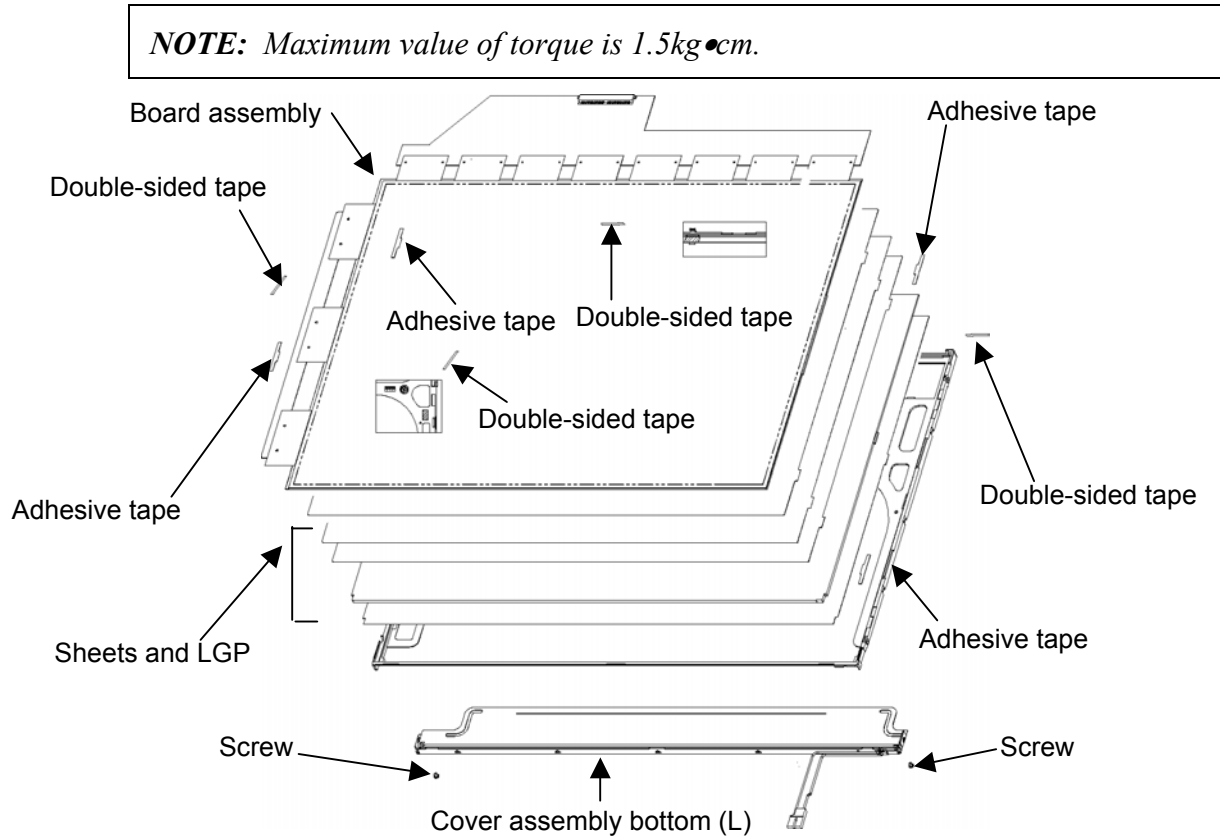


Figure 4-78 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (4)

### 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 4-79 to 4-82.

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.

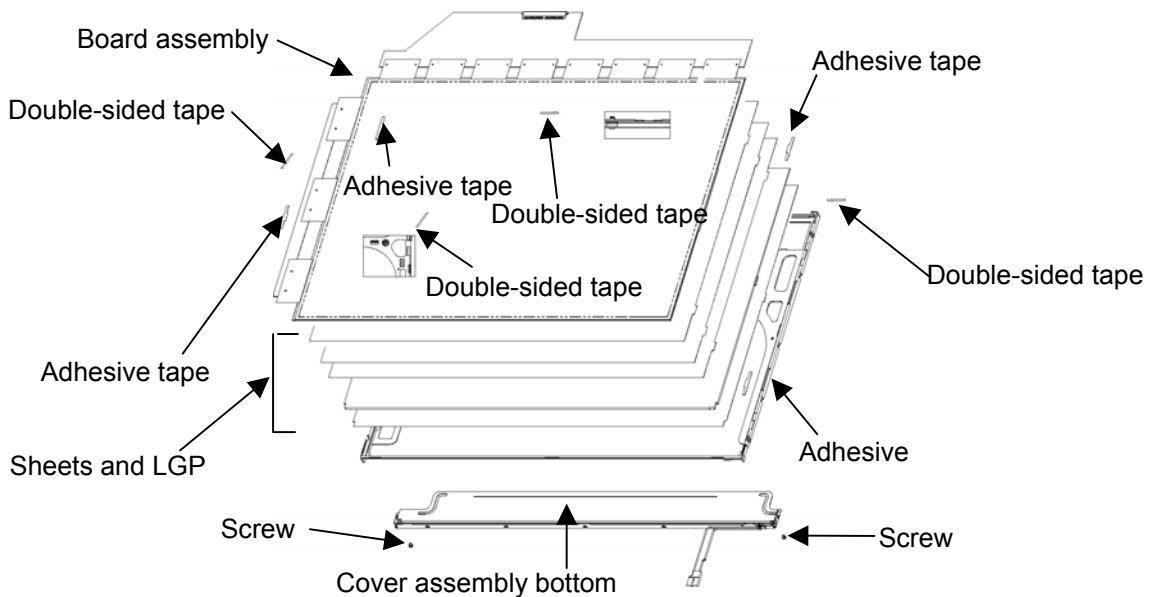


Figure 4-79 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (5)

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.

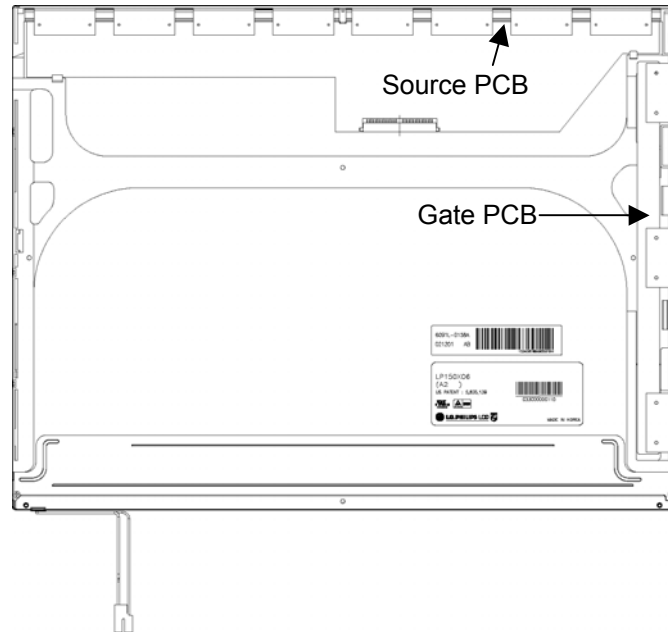


Figure 4-80 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (6)

3. Install the top case. Be careful not to apply excessive force to the gate TCP.

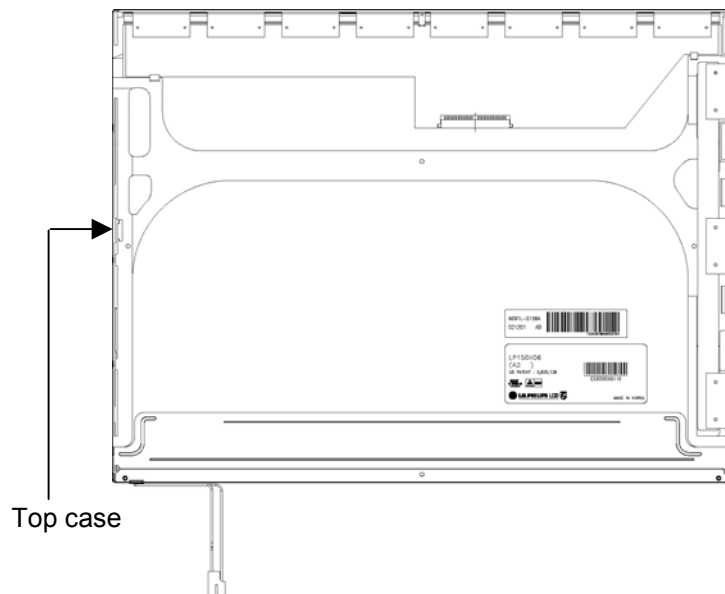


Figure 4-81 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (7)



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.

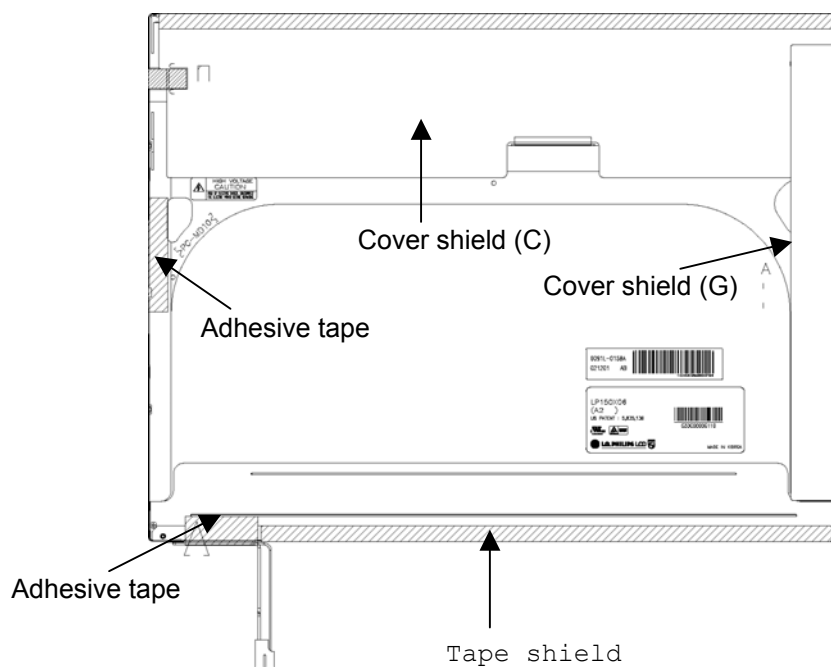


Figure 4-82 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (8)

### 4.22.5 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 4-83 to 4-92.

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 (D).

**NOTE:** 1) Be careful not to damage the TCP or chips.

2) The protection cover G is reused. Discard the other tapes removed.

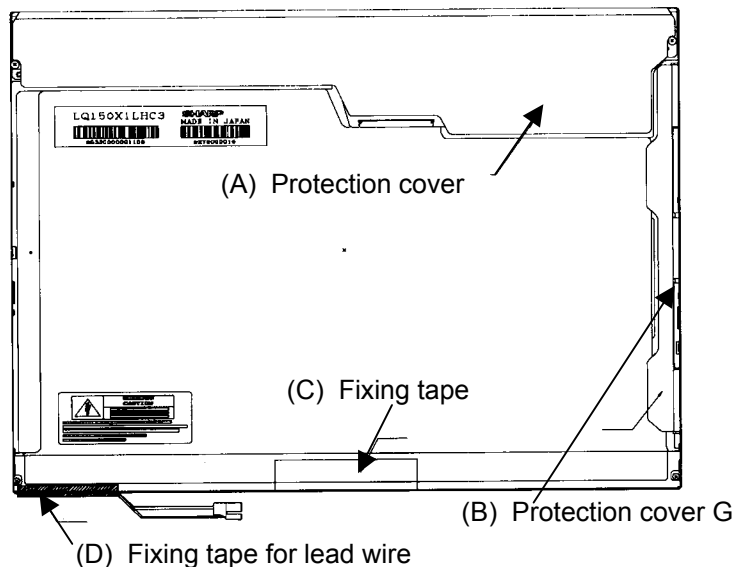


Figure 4-83 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (1)

- Remove the four screws on the sides.

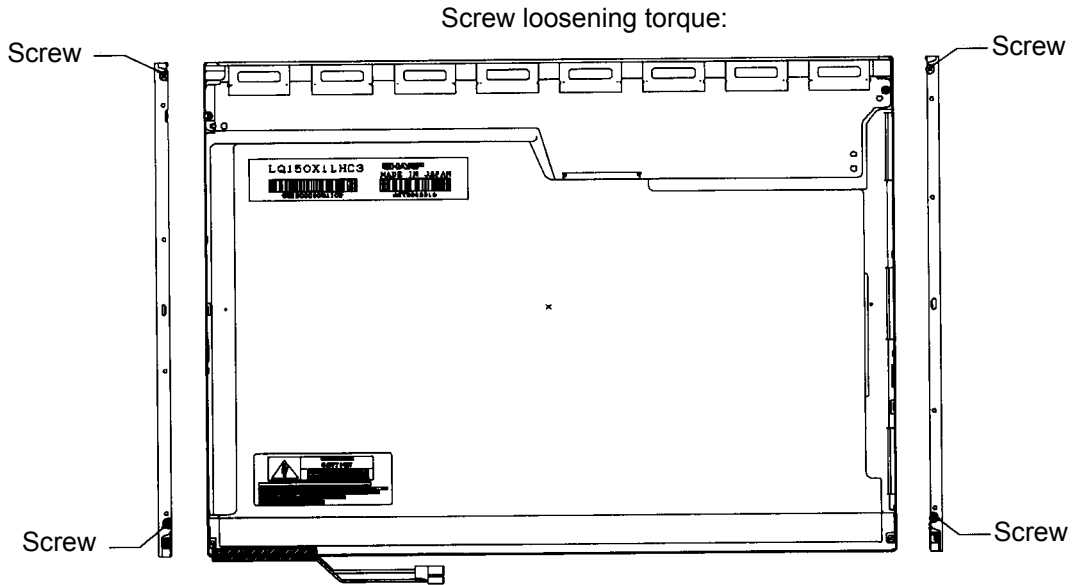


Figure 4-84 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (2)

- Turn the LCD module face up and remove the bezel (E).

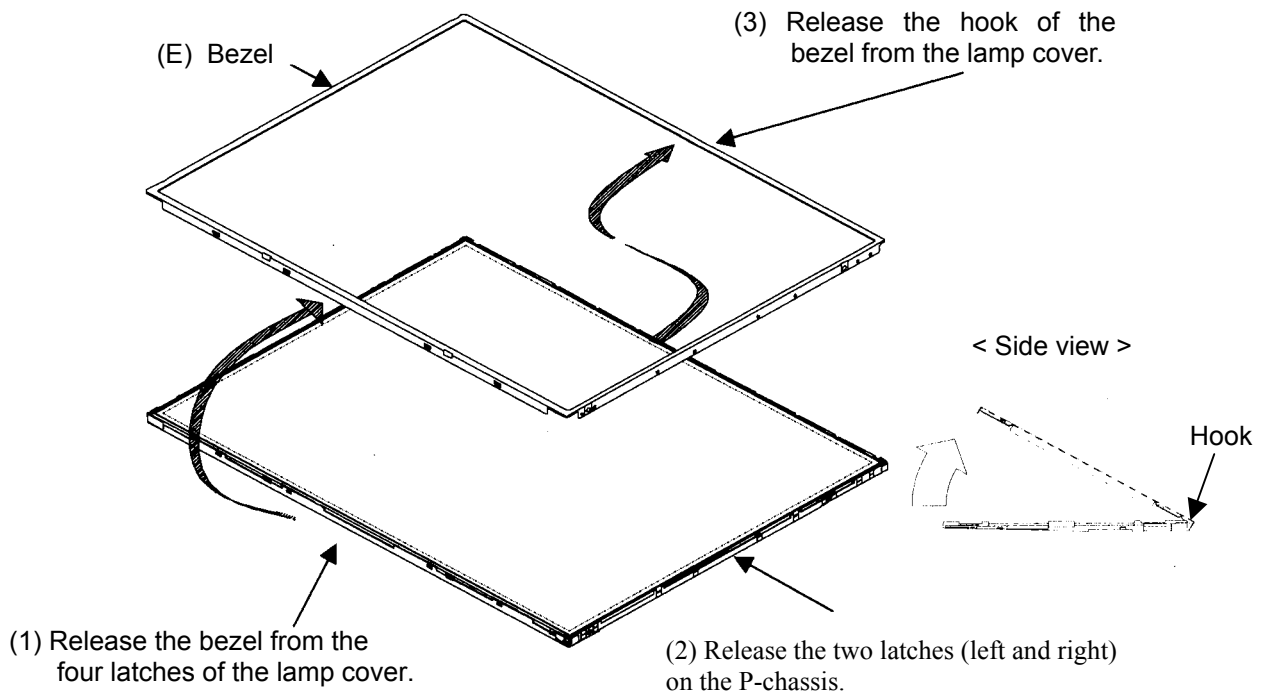


Figure 4-85 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (3)

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.

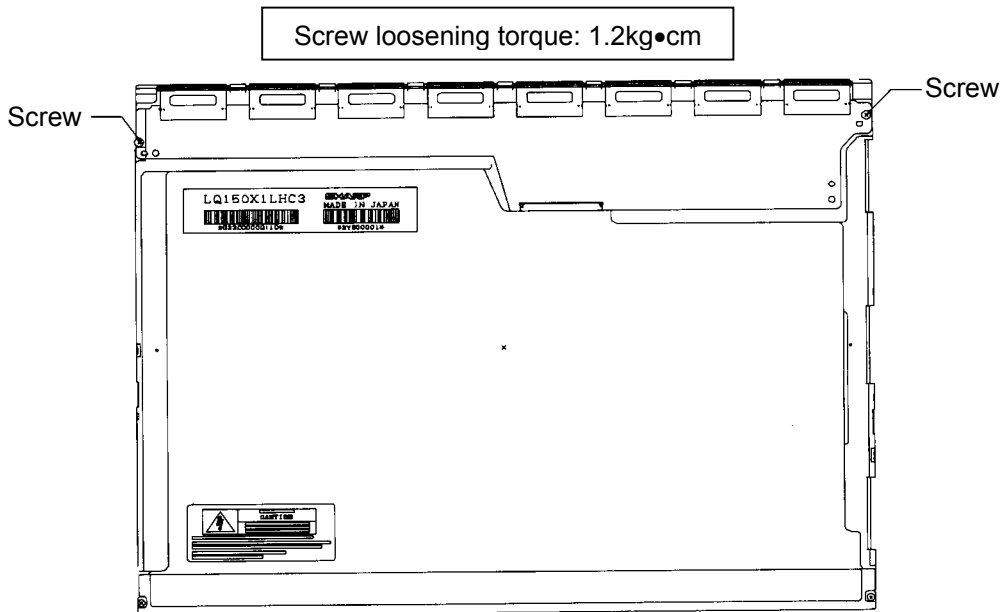


Figure 4-86 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (4)

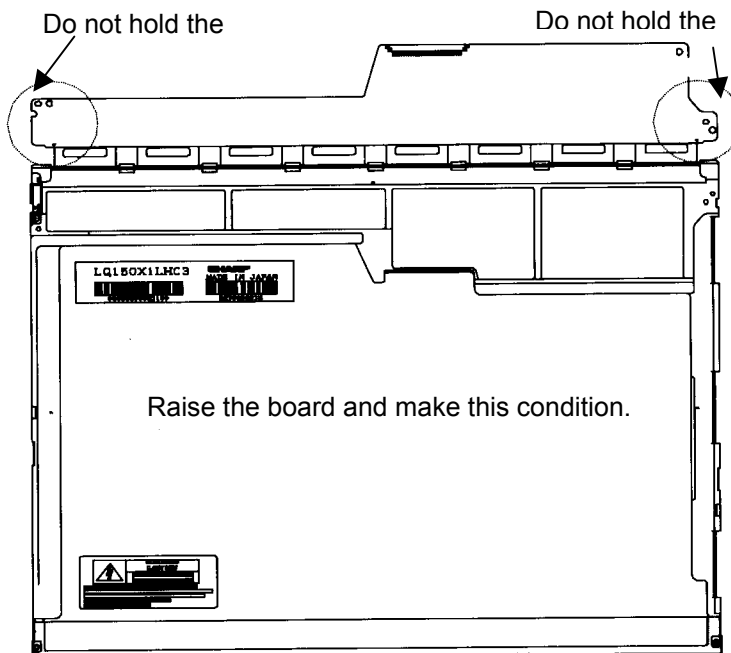


Figure 4-87 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (5)

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.*

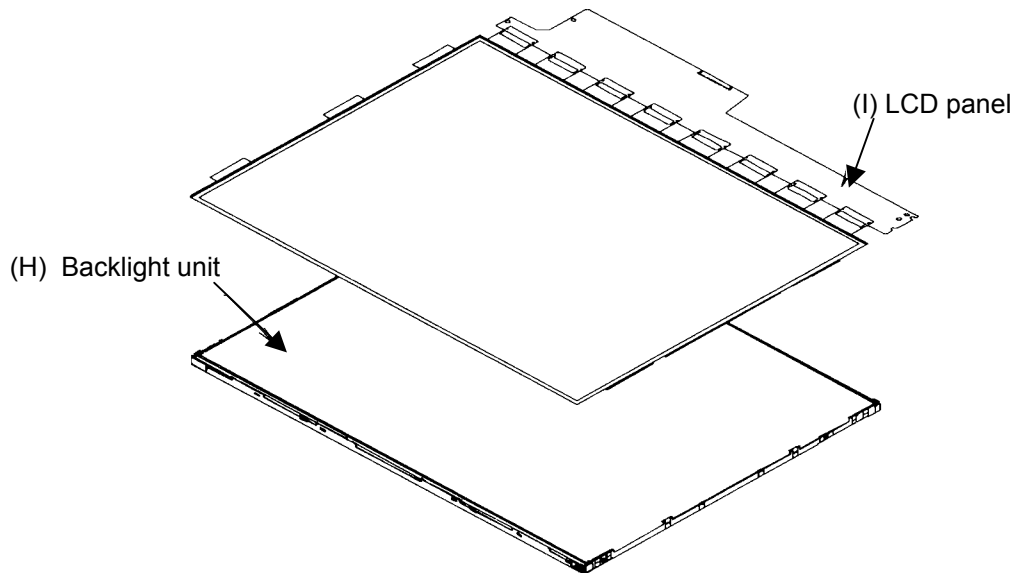


Figure 4-88 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (6)

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.

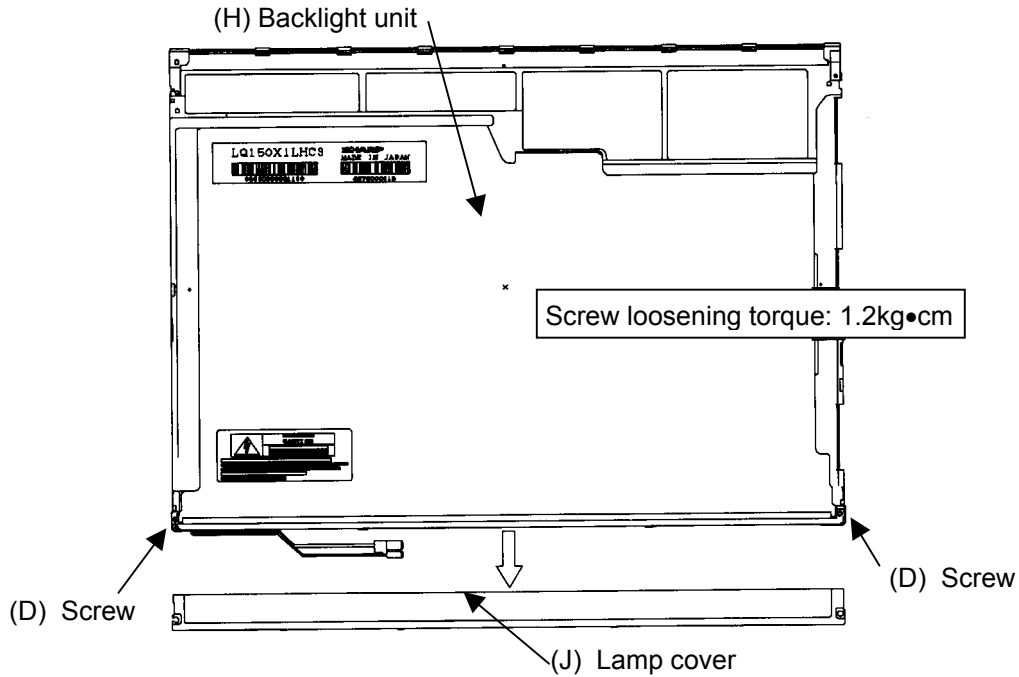


Figure 4-89 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (7)

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.

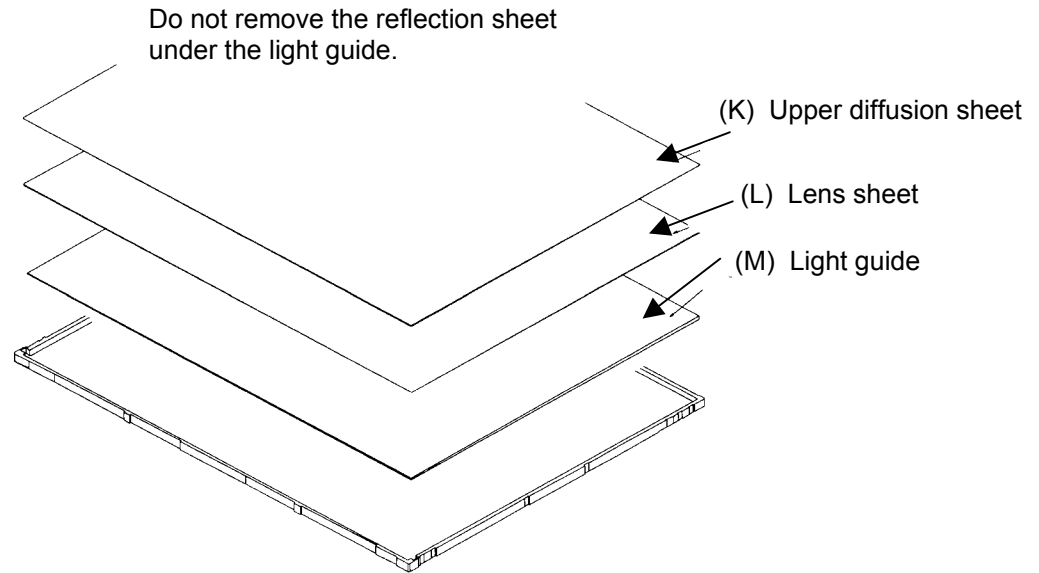


Figure 4-90 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (8)

8. Remove the four double-sided tapes (N, O, P, Q).

**NOTE:** Discard the removed tapes. Do not reuse them.

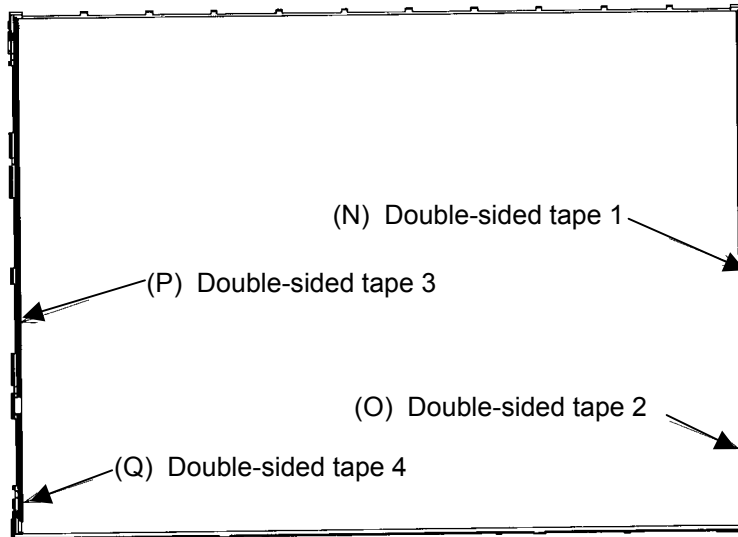


Figure 4-91 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (9)



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.

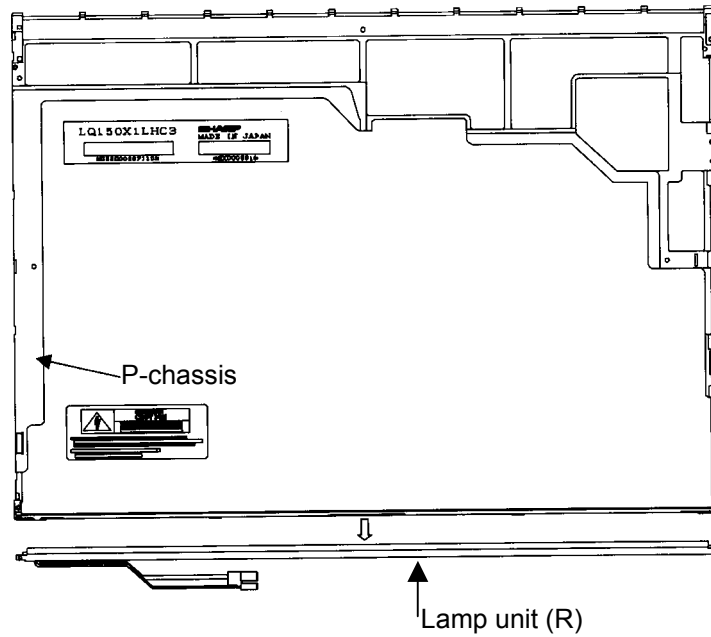


Figure 4-92 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (10)

**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 4-93 to 4-105.

1. Stick the four double-sided tapes (N, O, P, Q) on the P-chassis.

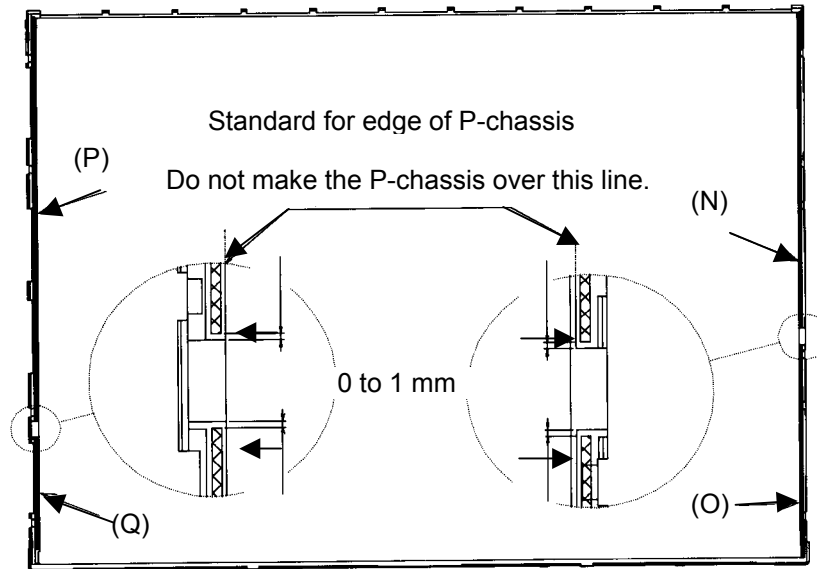


Figure 4-93 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (11)

- 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.

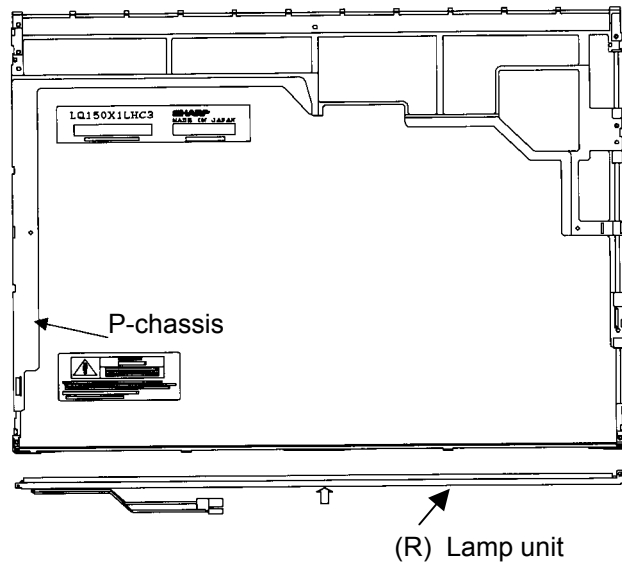
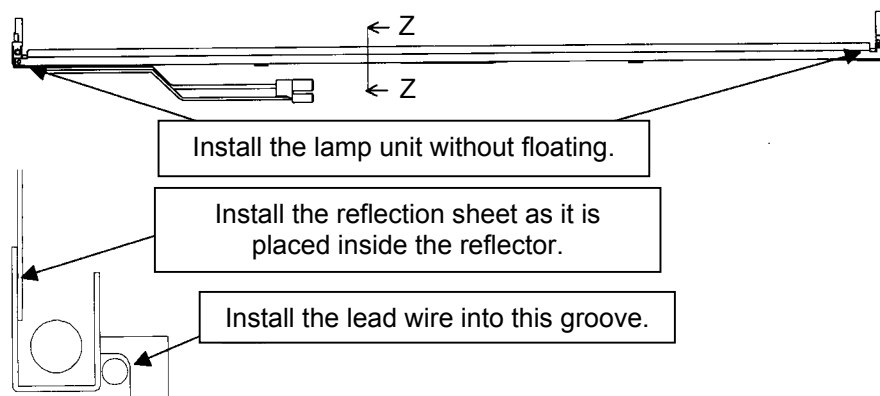


Figure 4-94 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (12)



Cross-section drawing of Z-Z

Figure 4-95 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).

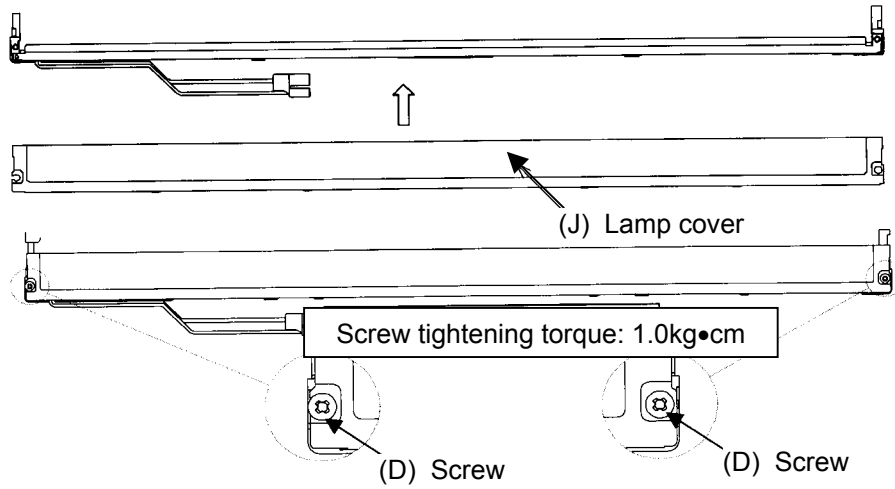


Figure 4-96 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (14)

4. Install the light guide (M) on the backlight unit.

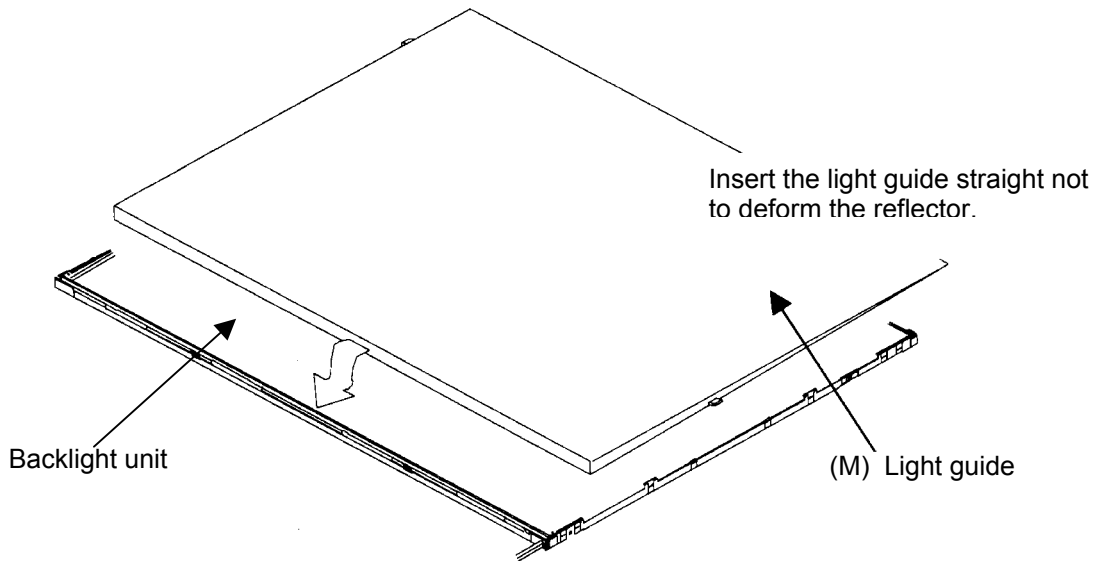
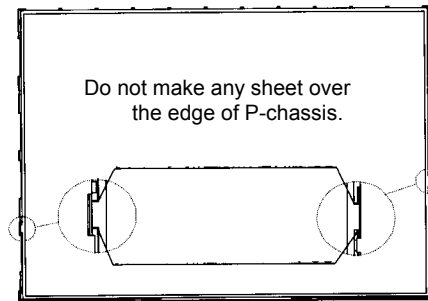
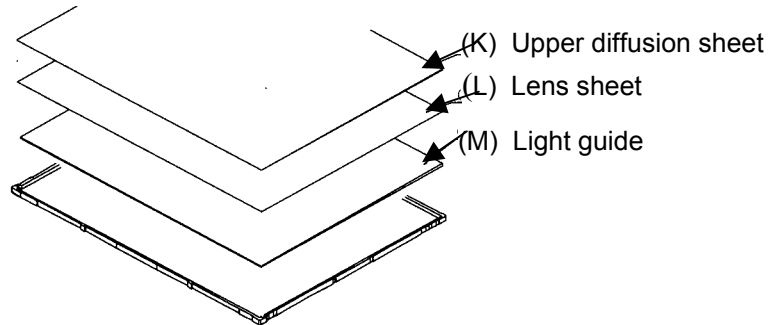


Figure 4-97 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (15)

5. Place the lens sheet (L) and upper diffusion sheet (K) on the backlight unit with light guide(M).



*Figure 4-98 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (16)*

6. 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.

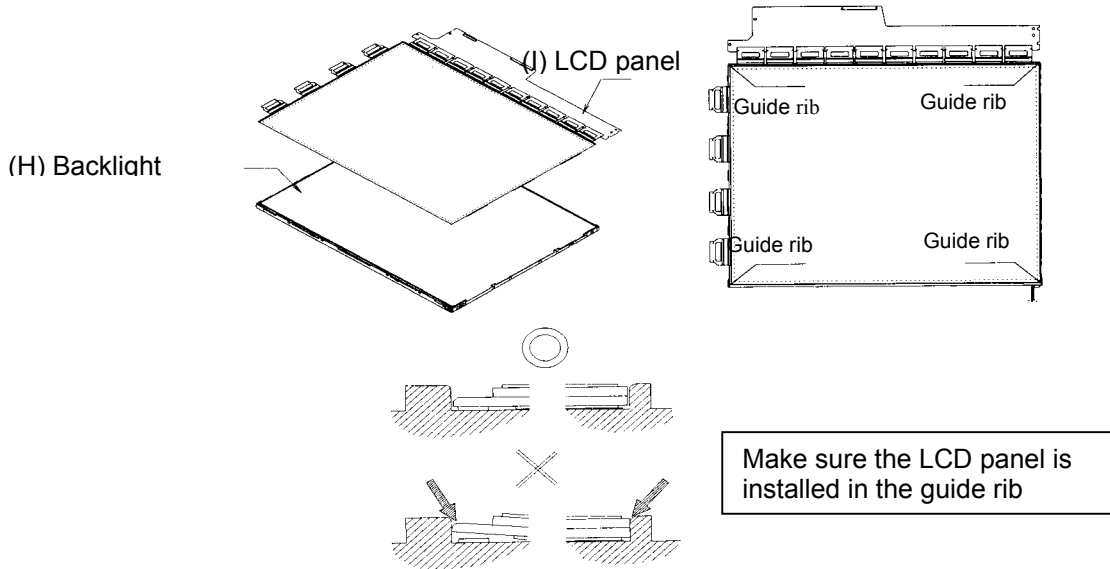


Figure 4-99 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (17)

7. Bend the TCP attaching to the source board and secure it with the two screws.

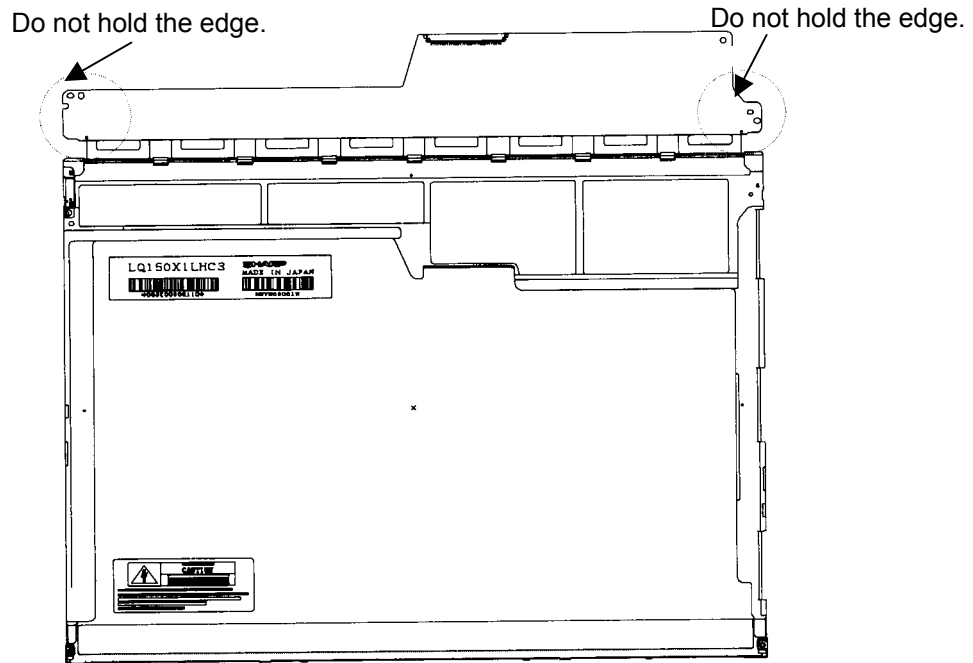


Figure 4-100 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (18)

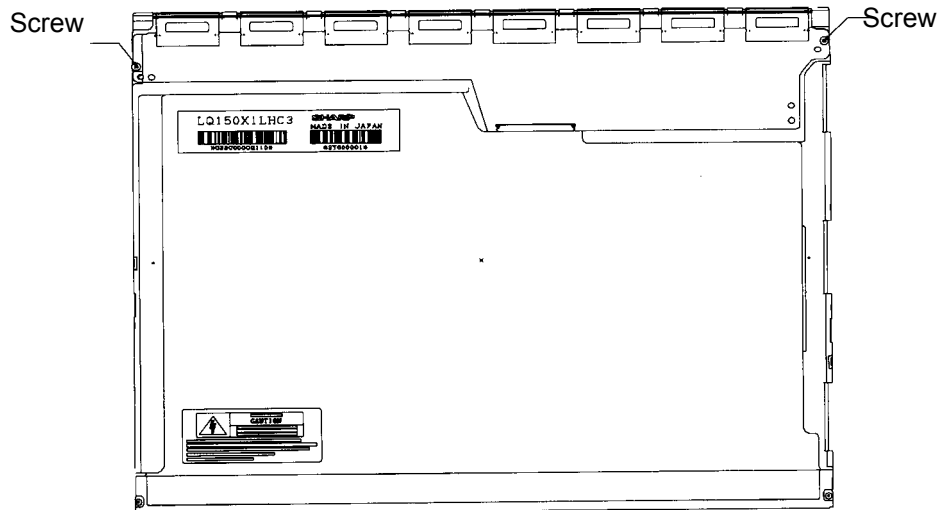
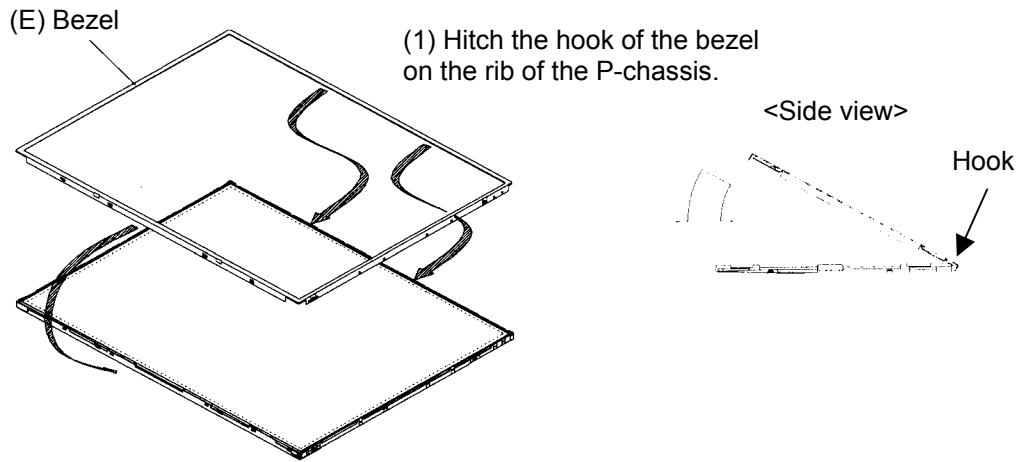


Figure 4-101 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (19)

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 4-102 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (20)

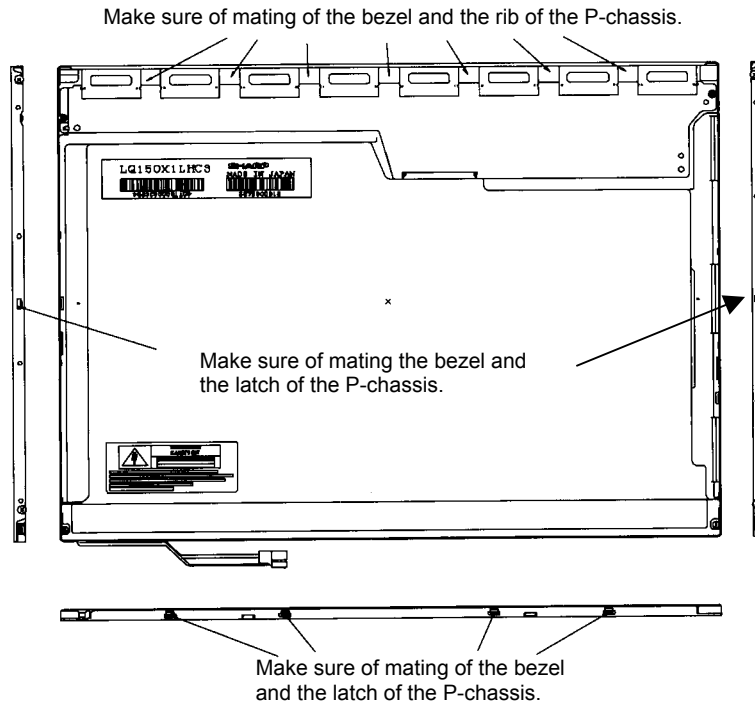


Figure 4-103 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (21)



- Secure the sides of the unit with the four screws.

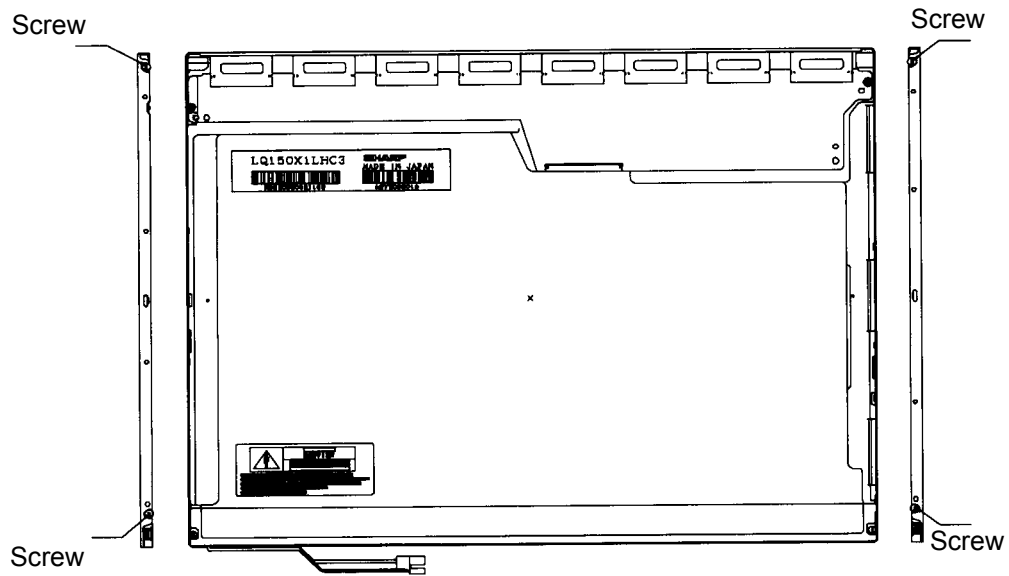


Figure 4-104 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (22)

10. Stick the protection cover G (B), protection cover S (A), fixing tape (C) and fixing tape for lead wire (D).

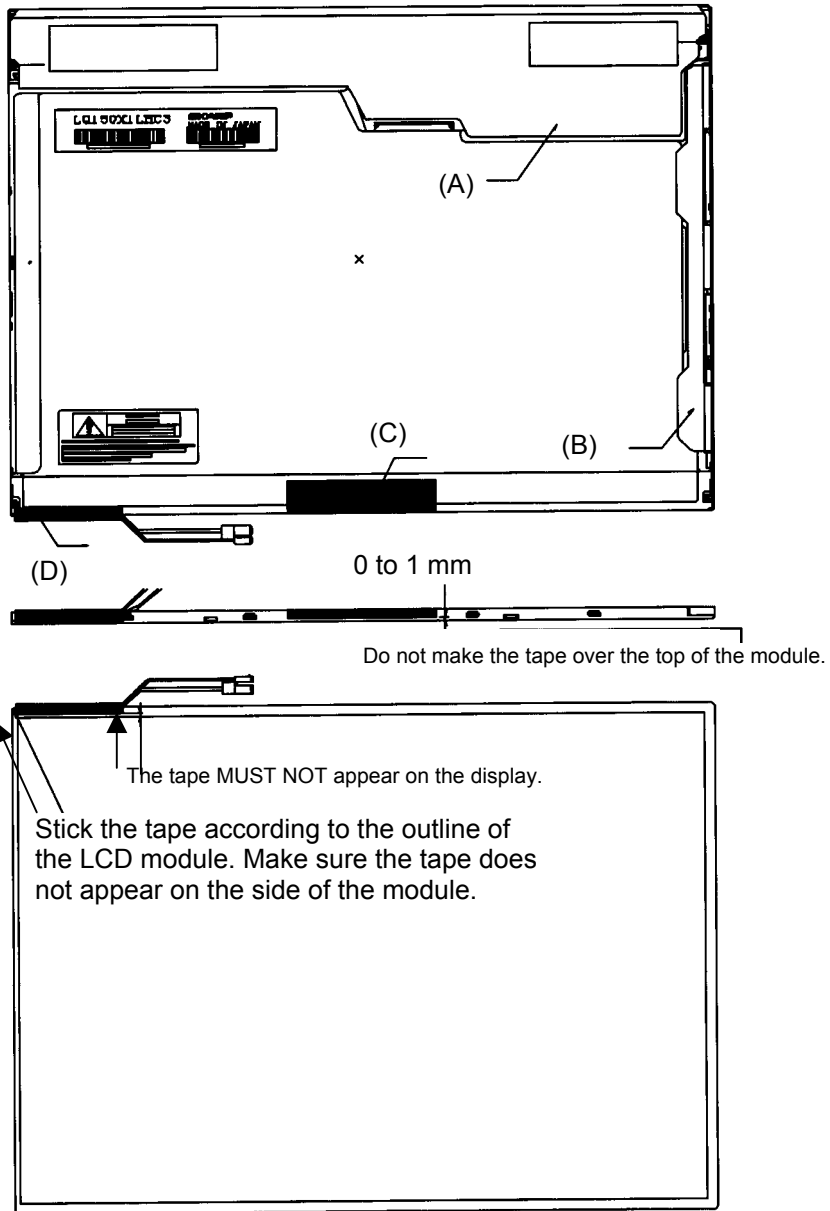


Figure 4-105 Replacing 15.0 Inch Sharp fluorescent lamp (XGA) (23)

### 4.22.6 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 4-106 to 4-112.

1. Peel off the CU tape, Kapton tape and protector film.

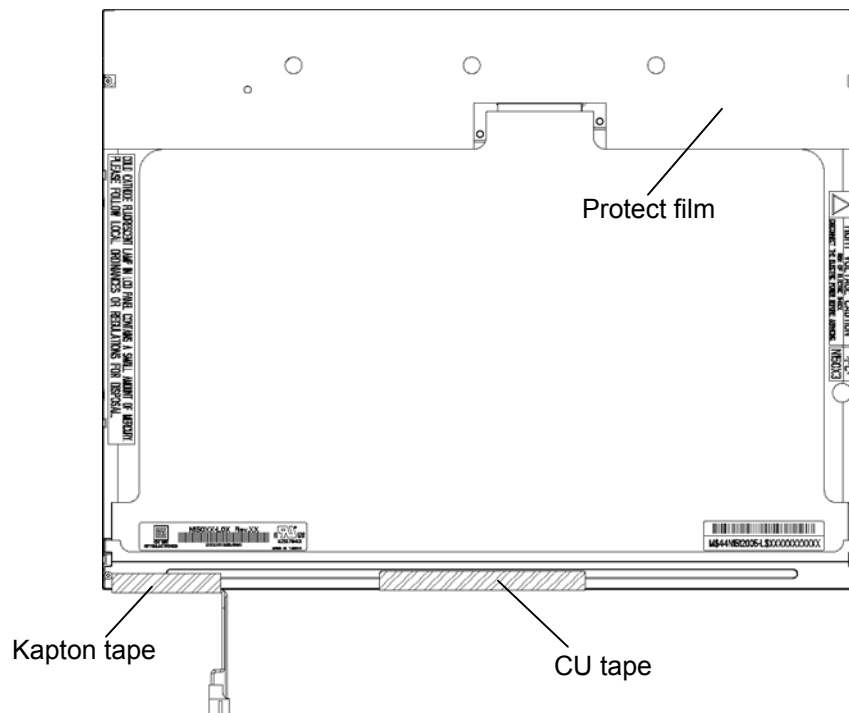


Figure 4-106 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (1)

2. Remove the two screws fixing the panel PCB.

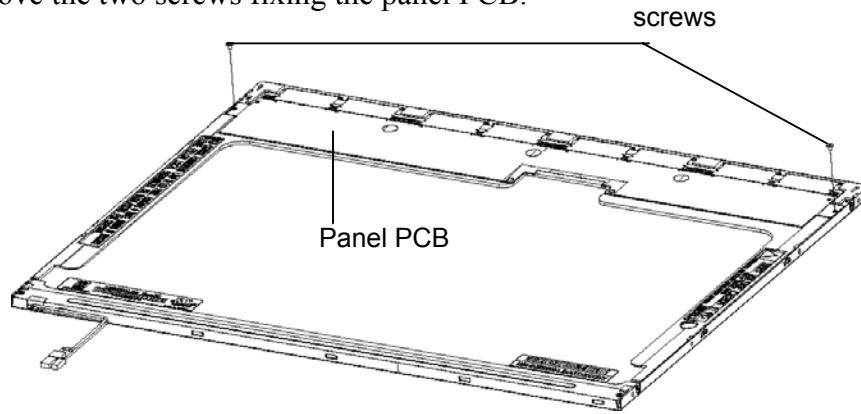


Figure 4-107 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (2)

3. Remove the four screws fixing the metal frame.

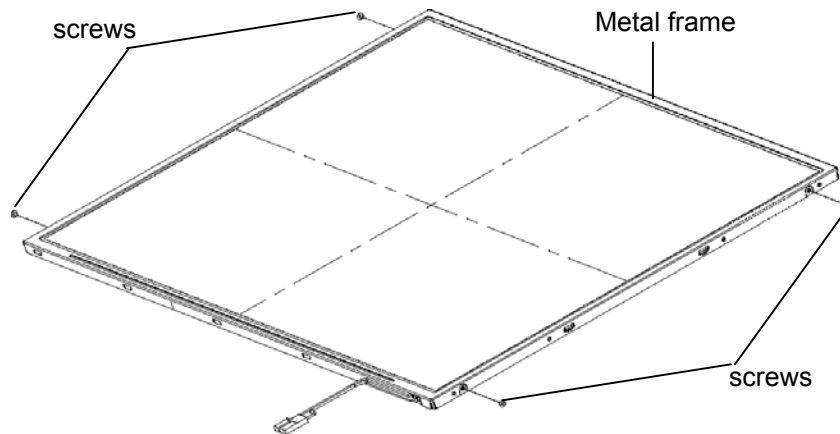


Figure 4-108 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (3)

4. Remove the hooks from the top and from the both sides in order. Then, remove the metal frame from the back light unit.

**NOTE:** When removing the metal frame, be sure to pull it up with parallel.

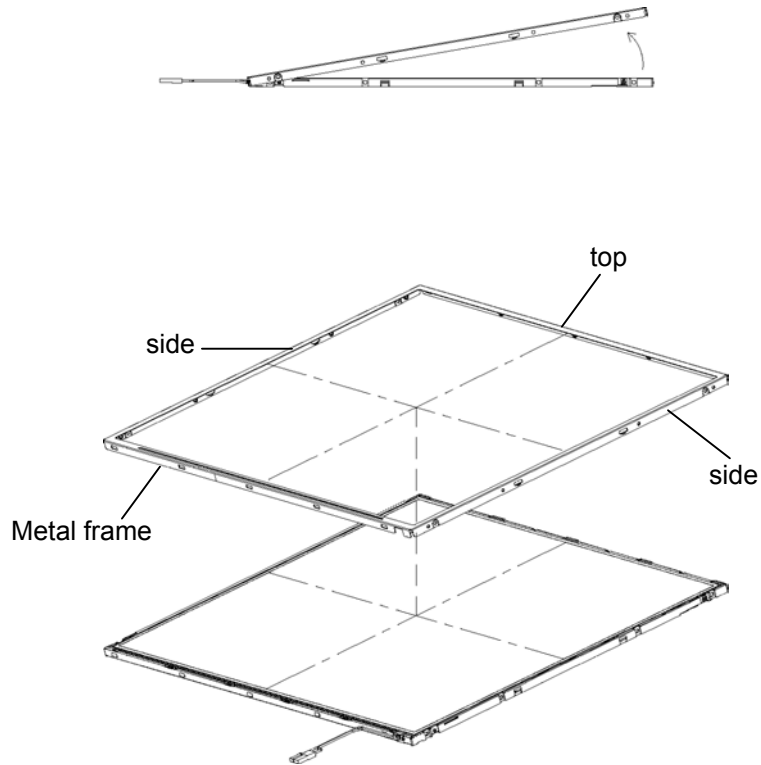


Figure 4-109 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (4)

5. Open the panel PCB and remove it from the back light unit.

**NOTE:** When removing the panel PCB, be careful not to damage and deform it.

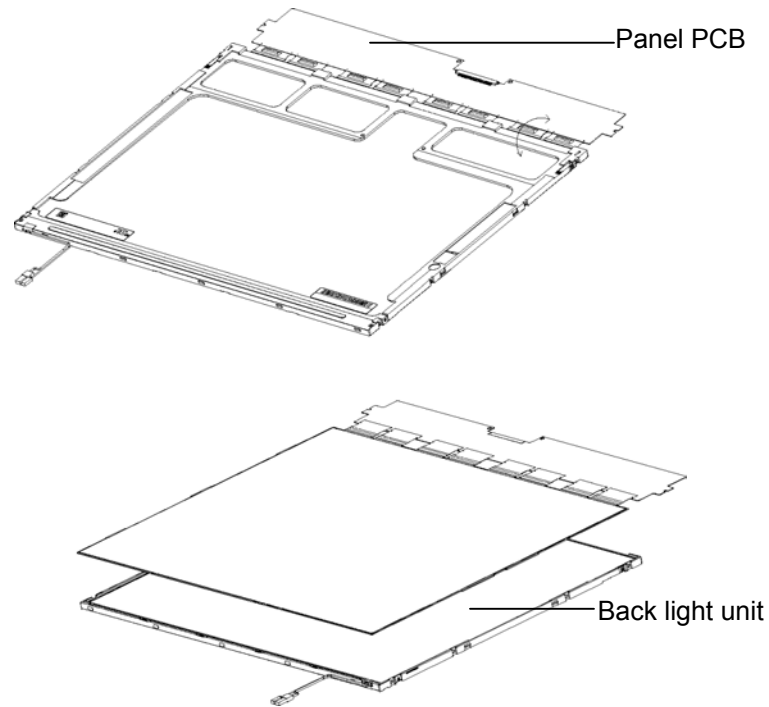


Figure 4-110 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (5)

6. Remove the spacer from the diffuser sheet.  
Remove the diffuser sheet, BEF III (M), BEF III (T), LGP and reflector sheet from the back light unit in order.

**NOTE:** When removing the sheets, be careful not to damage them.

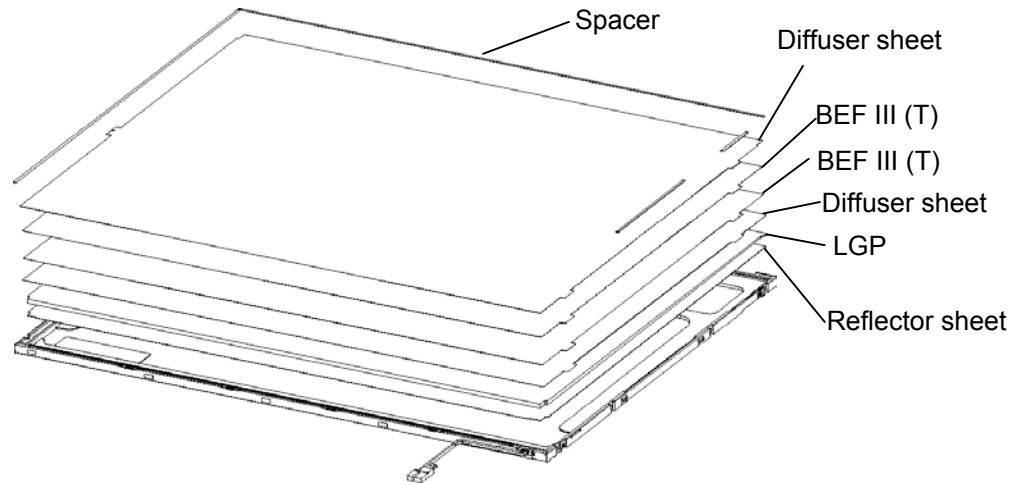
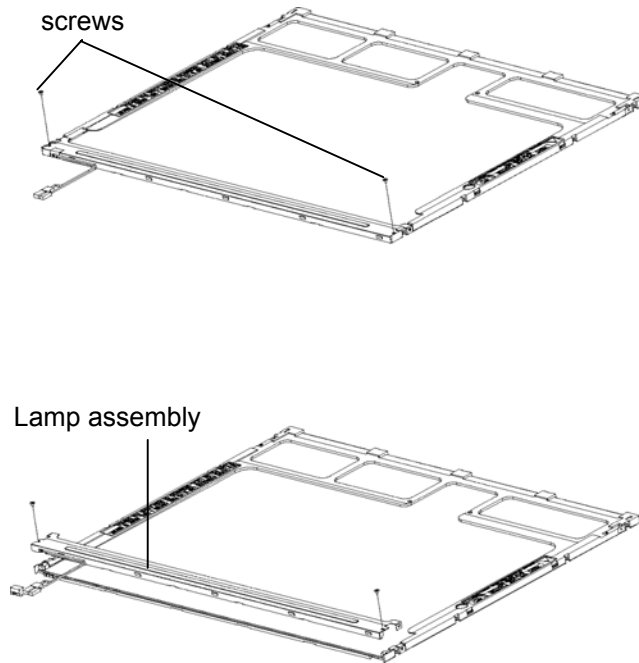


Figure 4-111 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (6)

7. Remove the two screws fixing the lamp assembly.



*Figure 4-112 Replacing 15.0 Inch CHIMEI fluorescent lamp (XGA) (7)*



**Assembling the 15.0-inch XGA CHIMEI Fluorescent Lamp**

The assembly procedure of the 15.0-inch XGA CHIMEI fluorescent lamp is the reverse of the above disassembly procedure.

### 4.22.7 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 4-113 to 4-116.

1. Remove the outside tape and cover shield.
  - 1) Remove the adhesive tape fixing the B/L wire and Top case. 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 COF and source PCB.

**CAUTION:** Wear anti-static gloves to prevent circuit damage caused by ESC.

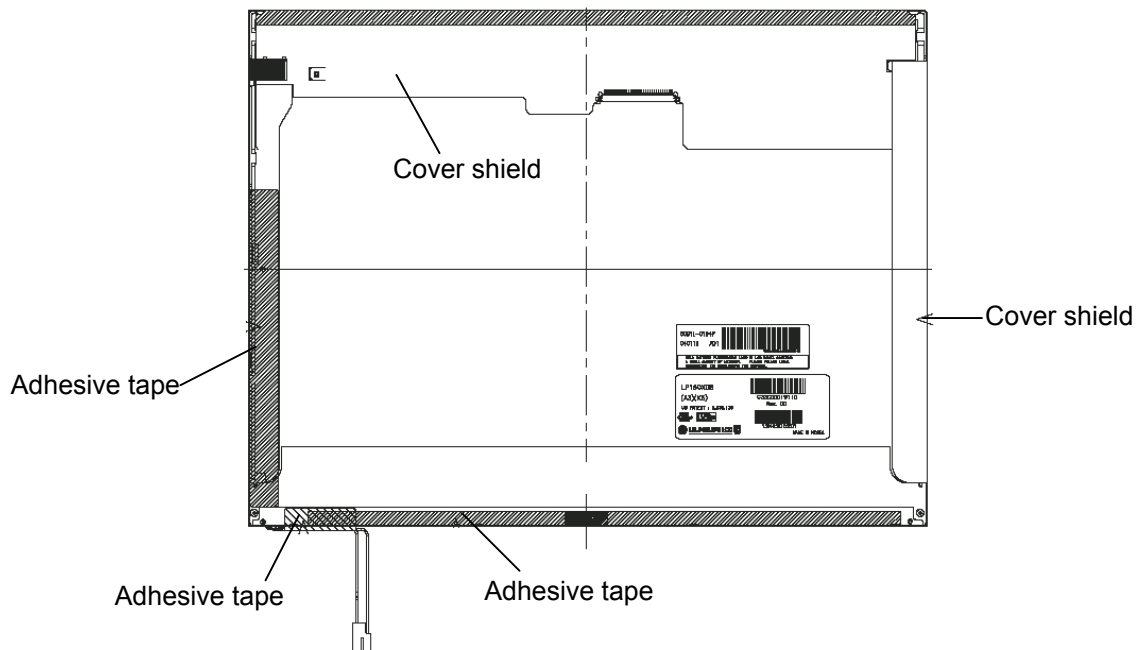


Figure 4-113 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (1)



3. Remove the source PCB.
  - 1) Remove the source PCB. Be careful not to apply excessive force to the PCB and TCP.

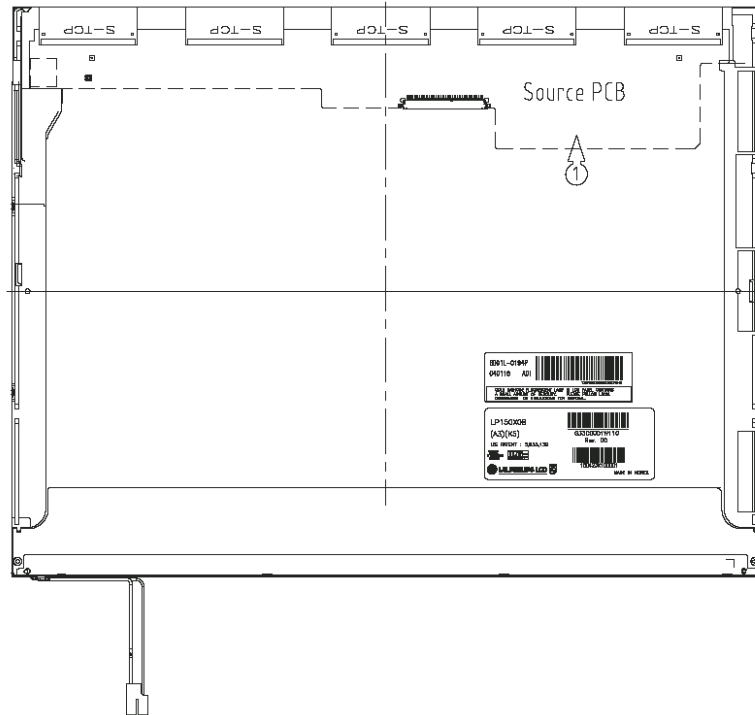


Figure 4-115 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (3)

4. Remove the board assembly, adhesive tape, light guide and cover assembly bottom.
  - 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.

**NOTE:** Maximum value of torque is 1.5kg•cm.

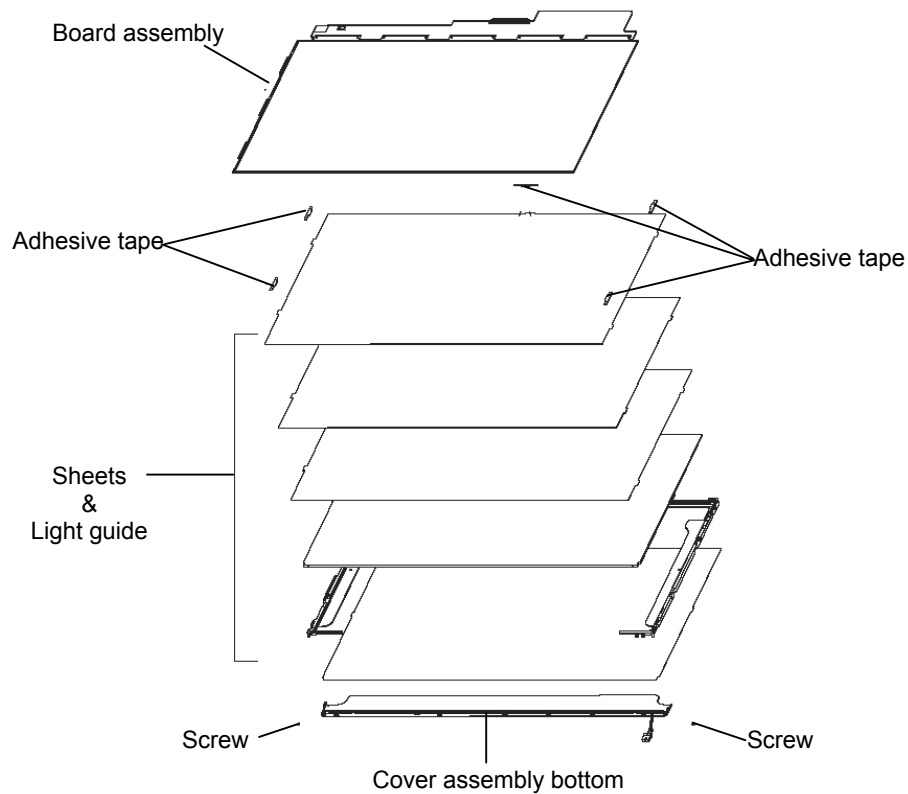


Figure 4-116 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (4)

### 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 4-117 to 4-120.

1. Install the cover assembly bottom, sheets, light guide, adhesive tape and board assembly.
  - 1) Secure the cover assembly bottom with the two screws.
  - 2) 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.

- 3) Stick the adhesive tape to fix the sheets.
- 4) Install the board assembly.

**NOTE:** Do not apply excessive force to the PCB and TCP.

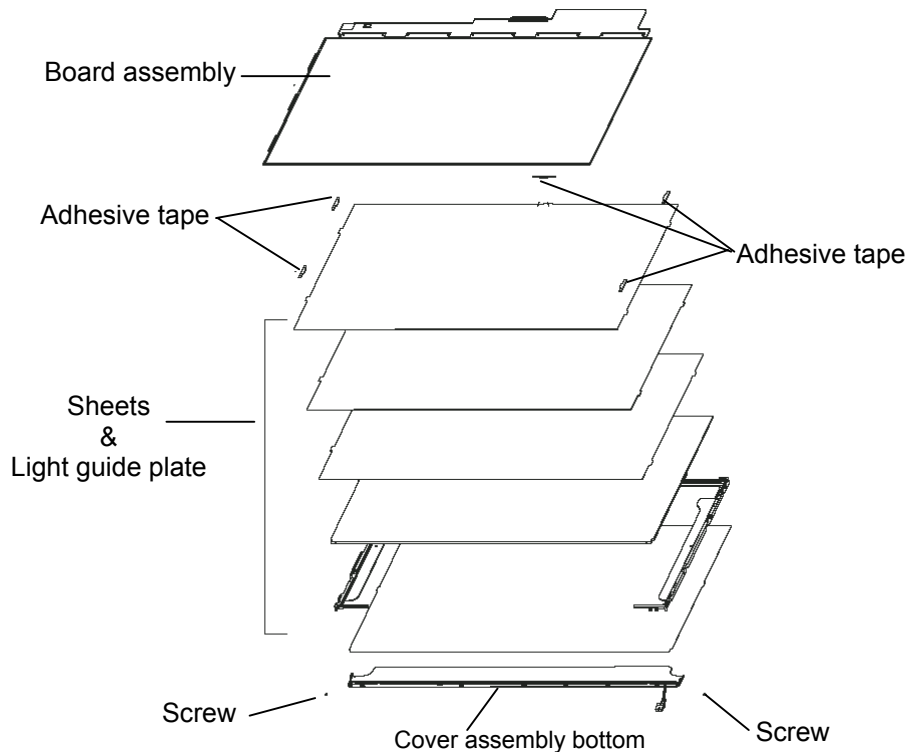


Figure 4-117 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (5)

2. Install the source PCB.
  - 1) Install the source PCB. Be careful not to apply excessive force to the TCP.

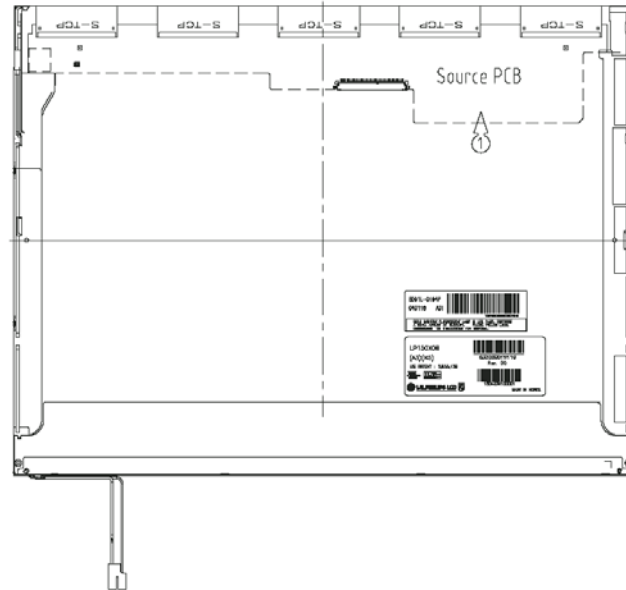


Figure 4-118 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (6)

3. Install the top case.

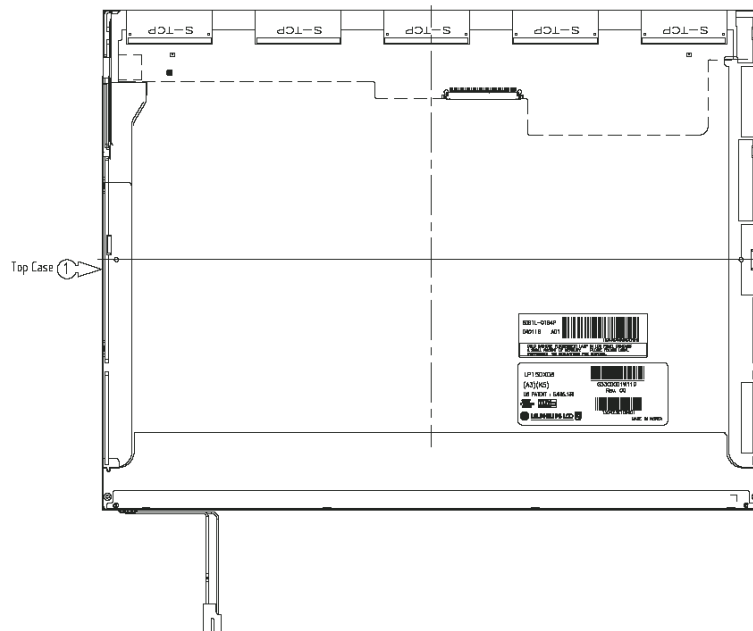


Figure 4-119 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (7)

4. Stick the outside tape and install the cover shield.

1) Install the cover shield.

**CAUTION:** Wear anti-static gloves to prevent circuit damage to the source PCB.

2) Stick the adhesive tape to fix the top case and B/L wire.

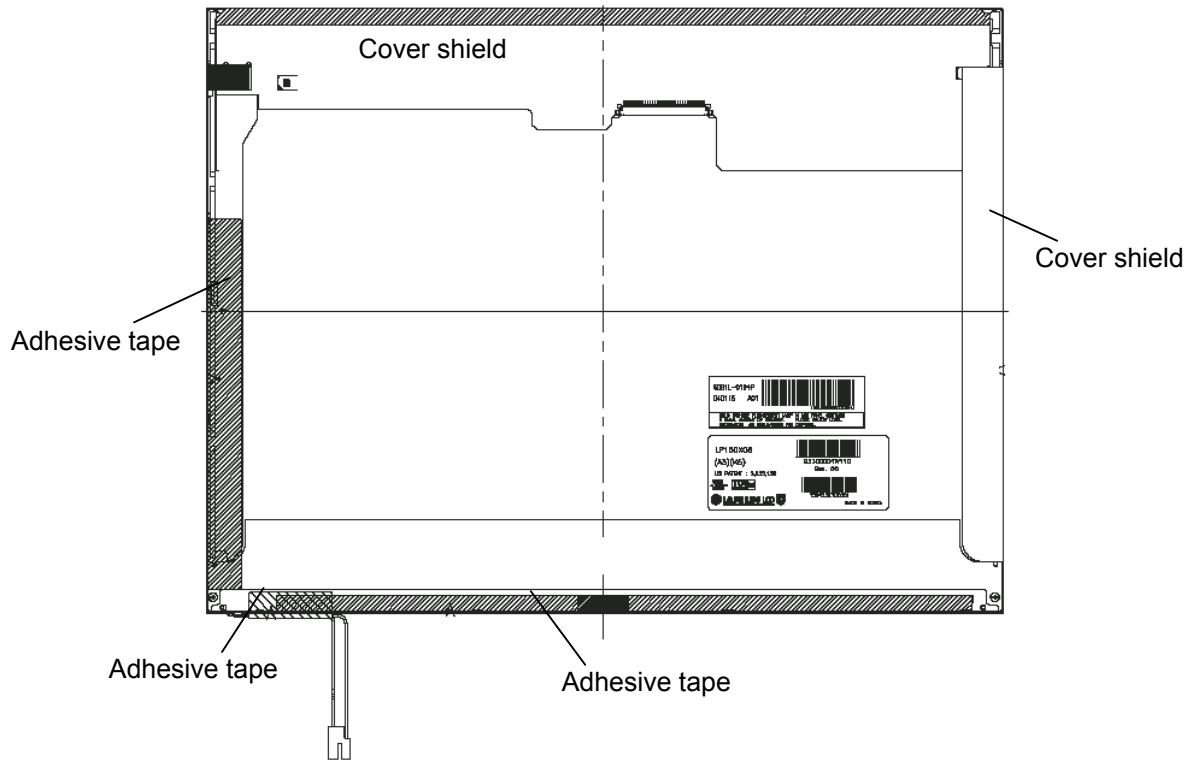


Figure 4-120 Replacing 15.0 Inch LG.Philips fluorescent lamp (XGA) (8)



### 4.22.8 Replacing the 15.0 Inch XGA (CSV) Sharp Fluorescent Lamp

#### Removing the 15.0-inch XGA (CSV) Sharp fluorescent lamp

To remove the 15.0-inch XGA Sharp Fluorescent Lamp, follow the steps below and refer to Figures 4-121 to 4-130.

1. Turn the LCD module face down, and remove the protection cover SC (A), protection cover G (B) and two fixing tapes (C).

**CAUTION:** 1) Be careful not to damage the TCP and chip.  
2) Discard the tapes removed.  
3) The protection cover G (B) is reused. Do not peel off the place stuck to the bezel.

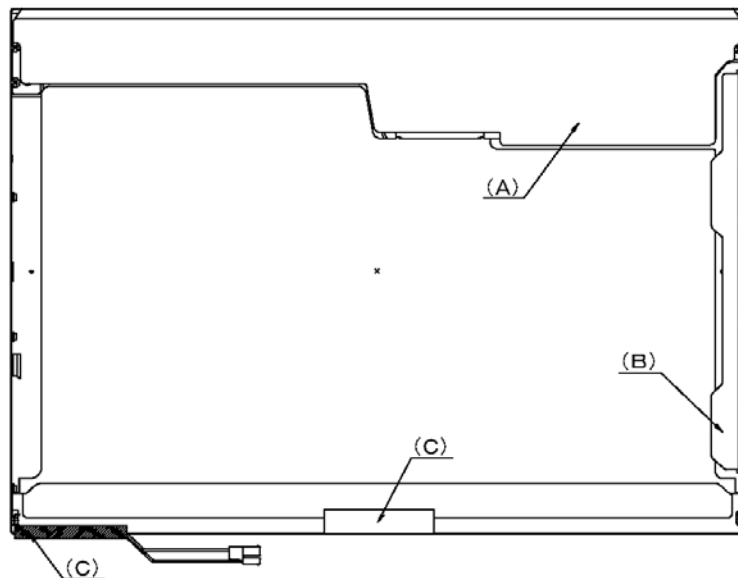


Figure 4-121 Replacing Sharp fluorescent lamp (XGA-CSV)) (1)

- Remove the five screws on the sides.

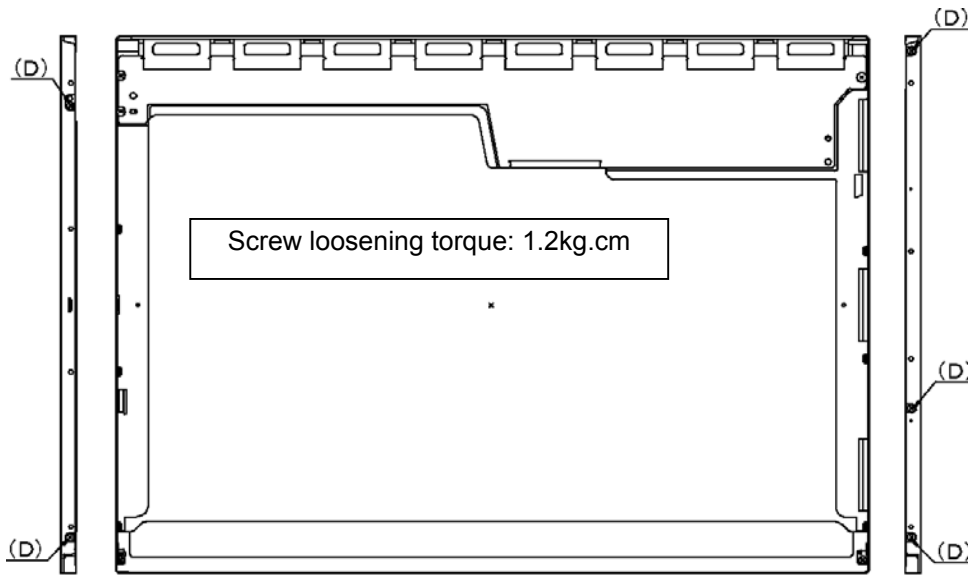


Figure 4-122 Replacing Sharp fluorescent lamp (XGA-CSV) (2)

- Turn the LCD module face up and remove the bezel (E).

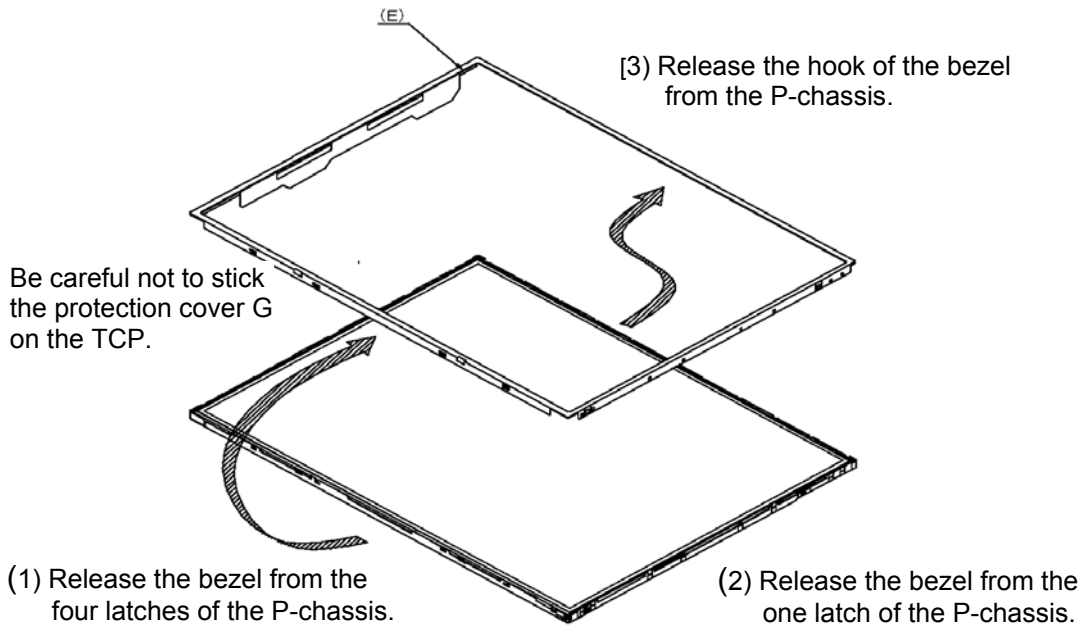


Figure 4-123 Replacing Sharp fluorescent lamp (XGA-CSV) (3)

- Turn the LCD module face down and remove the three screws (D) fixing the board. Then open the bent portion of the TCP of the board and remove the backlight.

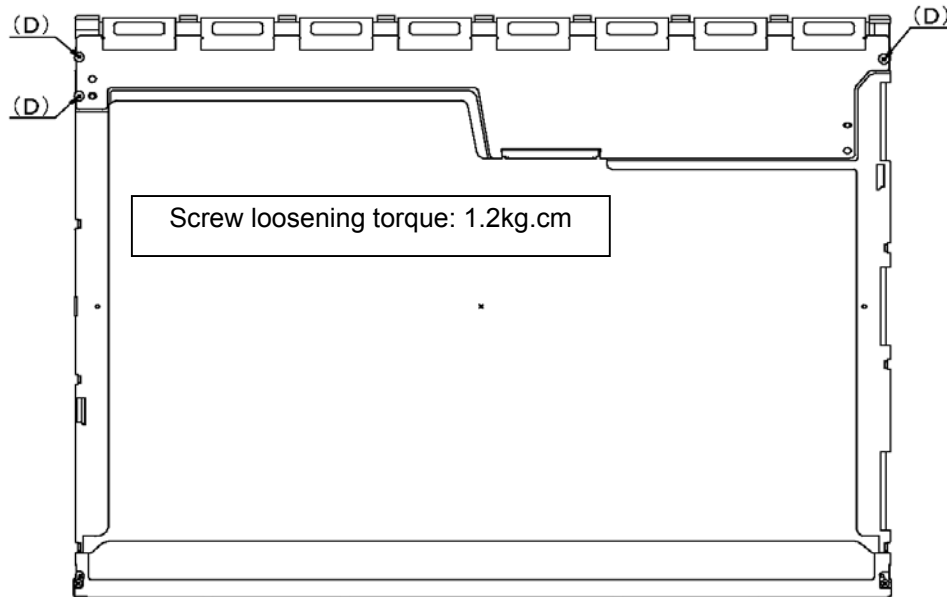


Figure 4-124 Replacing Sharp fluorescent lamp (XGA-CSV) (4)

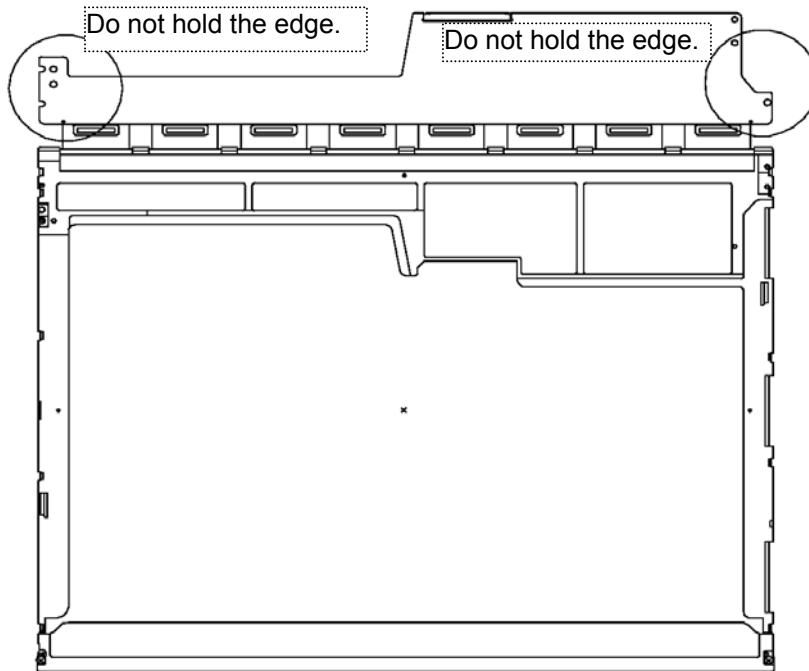


Figure 4-125 Replacing Sharp fluorescent lamp (XGA-CSV) (5)

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.*

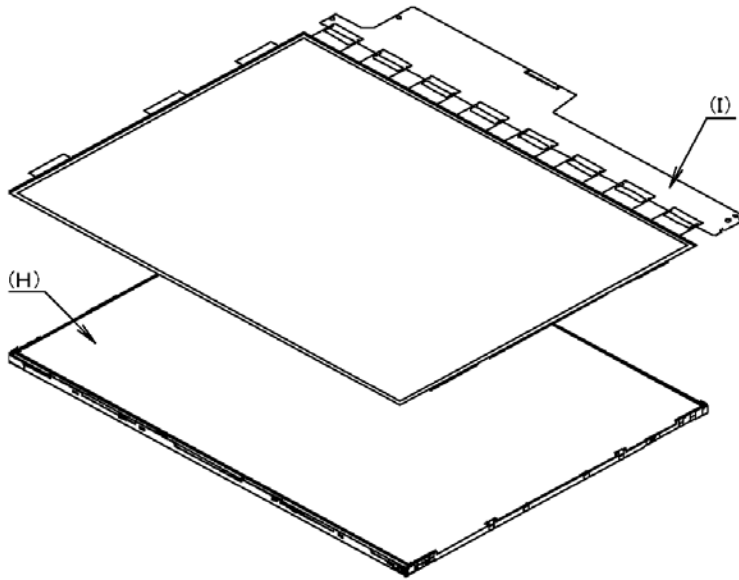


Figure 4-126 Replacing Sharp fluorescent lamp (XGA-CSV) (6)

6. Turn the backlight unit (H) removed face down and remove the two screws (F) and lamp cover (J).

**CAUTION:** Be careful not to scratch or soil the sheets.

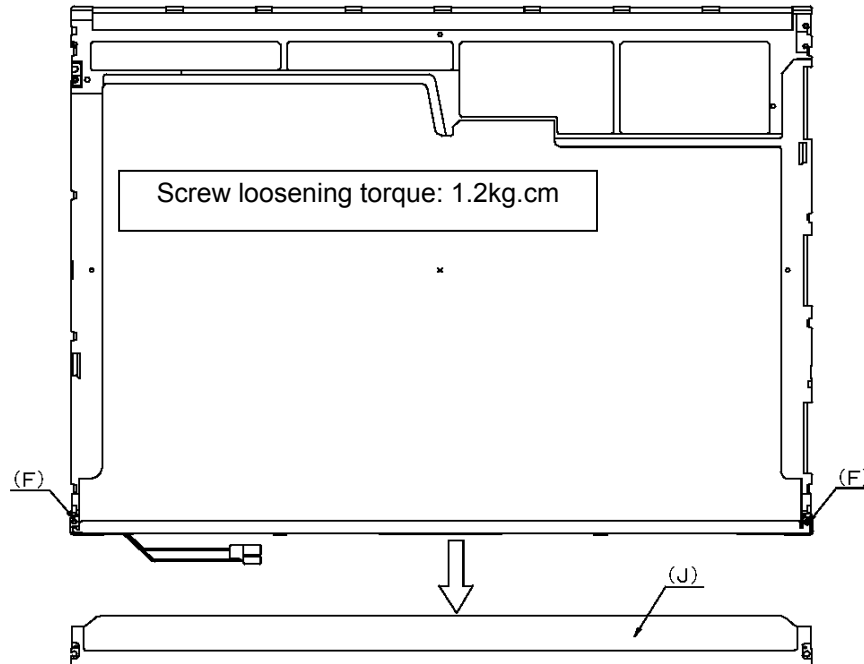


Figure 4-127 Replacing Sharp fluorescent lamp (XGA-CSV) (7)

7. Turn the backlight unit face up and remove the upper diffusion sheet (K), upper lens sheet (L), lower lens sheet (M), lower diffusion sheet (O) and light guide plate (P).

**CAUTION:** Be careful not to scratch or soil the removed sheets and light guide to reuse them.

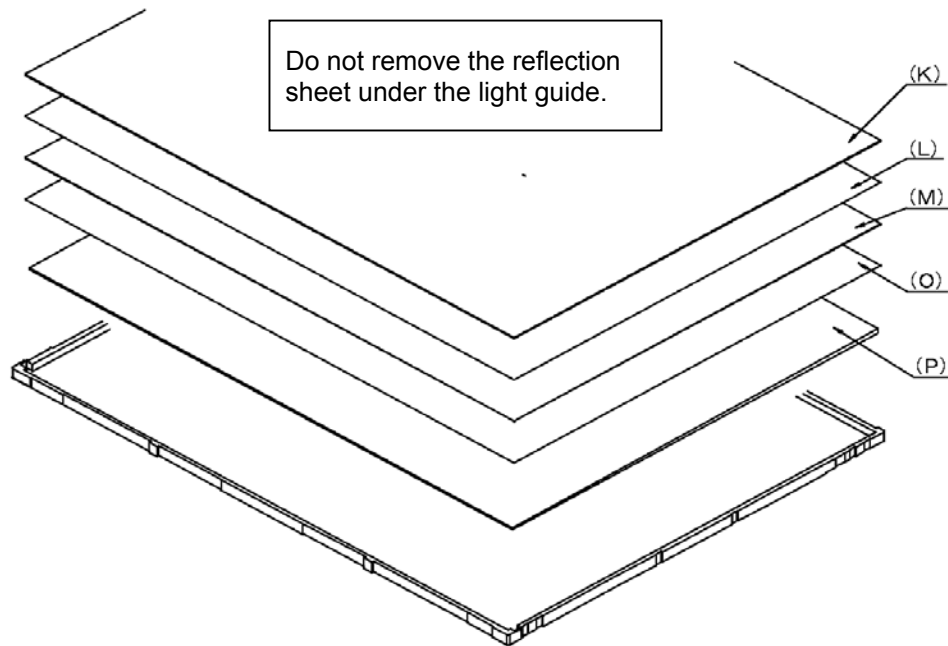


Figure 4-128 Replacing Sharp fluorescent lamp (XGA-CSV) (8)

8. Remove the five double-sided tapes (Q, R, S, T, and U).

**CAUTION:** Discard the removed tapes. Do not reuse them.

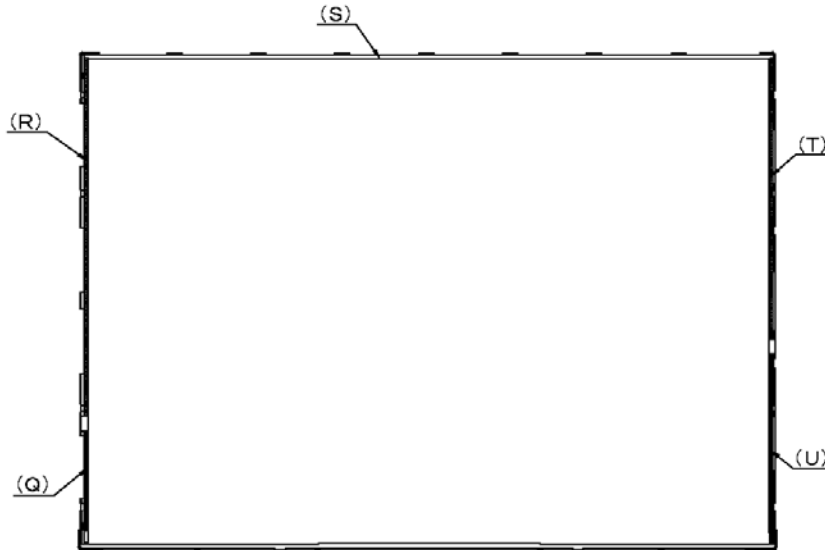


Figure 4-129 Replacing Sharp fluorescent lamp (XGA-CSV) (9)

9. Turn the backlight unit face down and remove the lamp unit (V) from the P-chassis.

**CAUTION:** When removing the lamp unit, be careful not to break the lamp, or bend the reflection sheet.

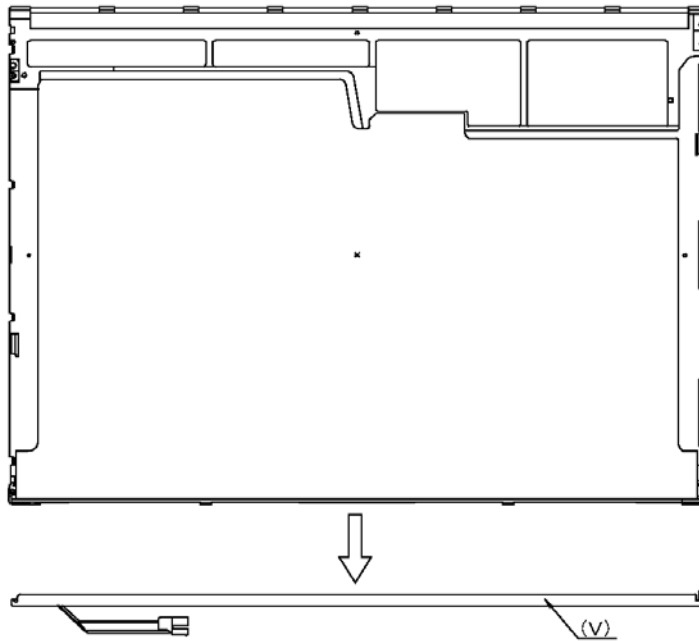


Figure 4-130 Replacing Sharp fluorescent lamp (XGA-CSV) (10)



**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 4-131 to 4-143.

1. Stick the five double-sided tapes (Q, R, S, T, and U).

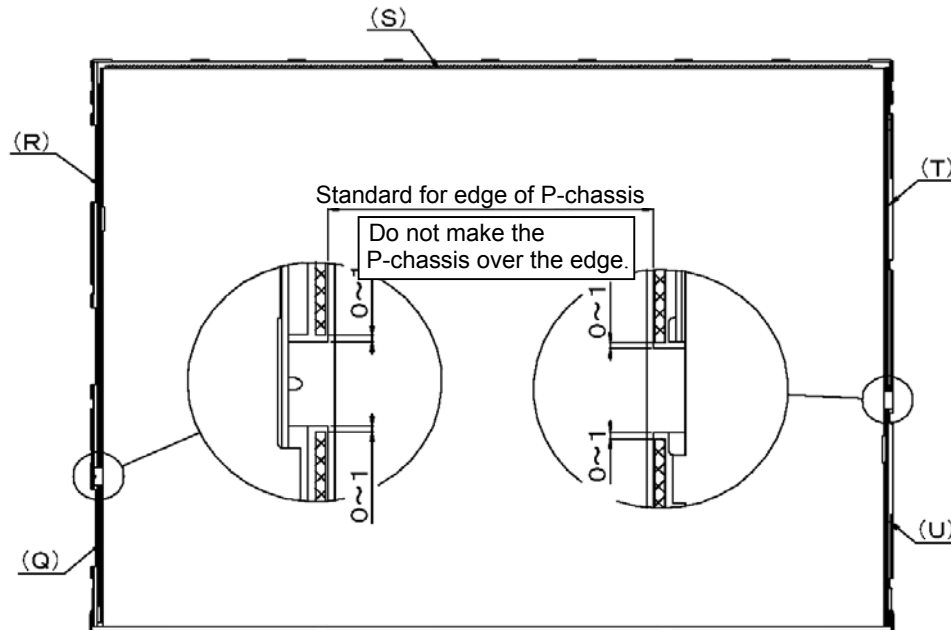


Figure 4-131 Replacing Sharp fluorescent lamp (XGA-CSV) (11)

2. Turn the backlight unit face down and install a new lamp unit (V) on the P-chassis.

**CAUTION:** When install the lamp unit (V), be careful not to bend or damage the reflection sheet.

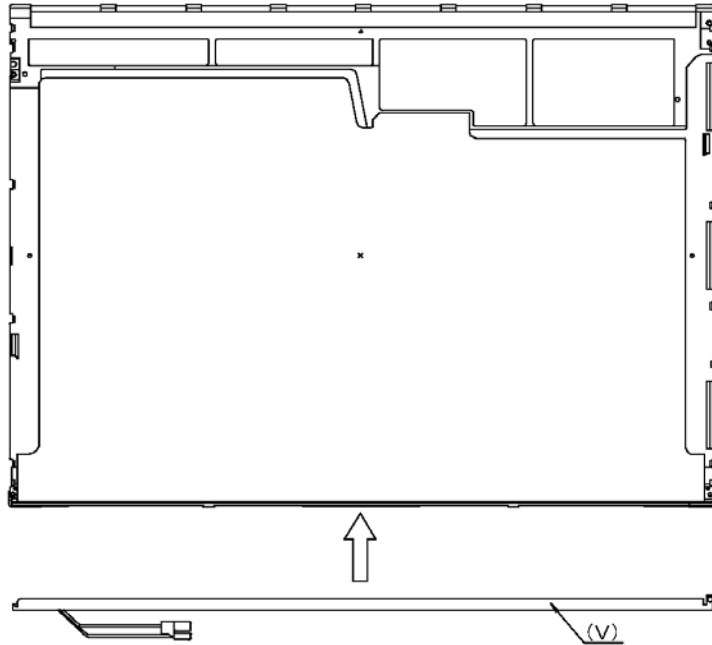
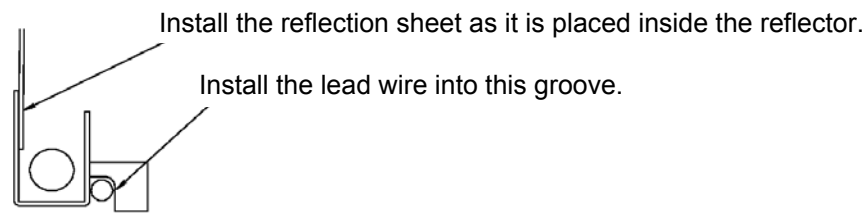
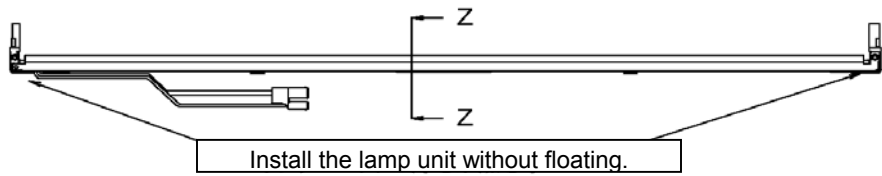


Figure 4-132 Replacing Sharp fluorescent lamp (XGA-CSV) (12)



Cross-section drawing of Z-Z

Figure 4-133 Replacing Sharp fluorescent lamp (XGA-CSV) (13)

3. Install the lamp cover (J) on the backlight unit and secure it with the two screws (F).

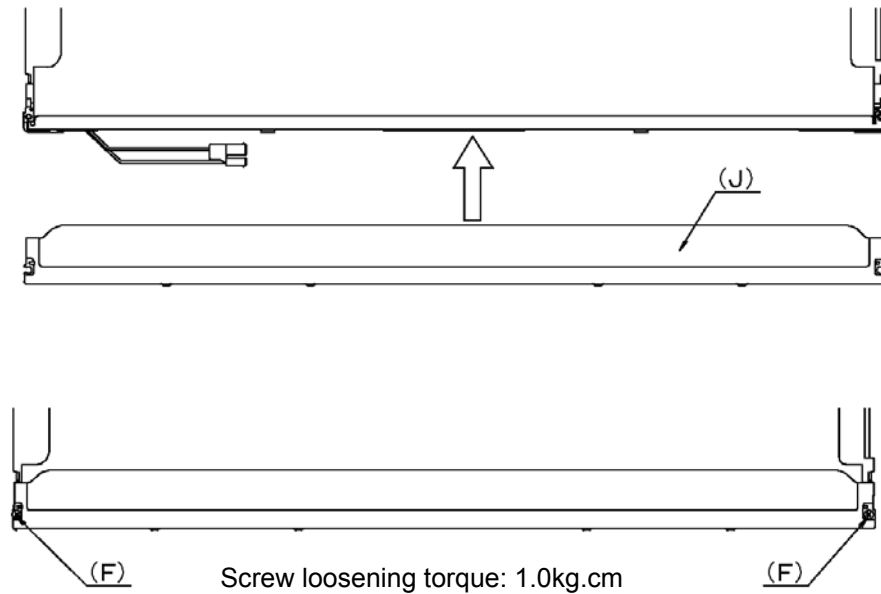


Figure 4-134 Replacing Sharp fluorescent lamp (XGA-CSV) (14)

4. Install the light guide plate (P) on the backlight unit.

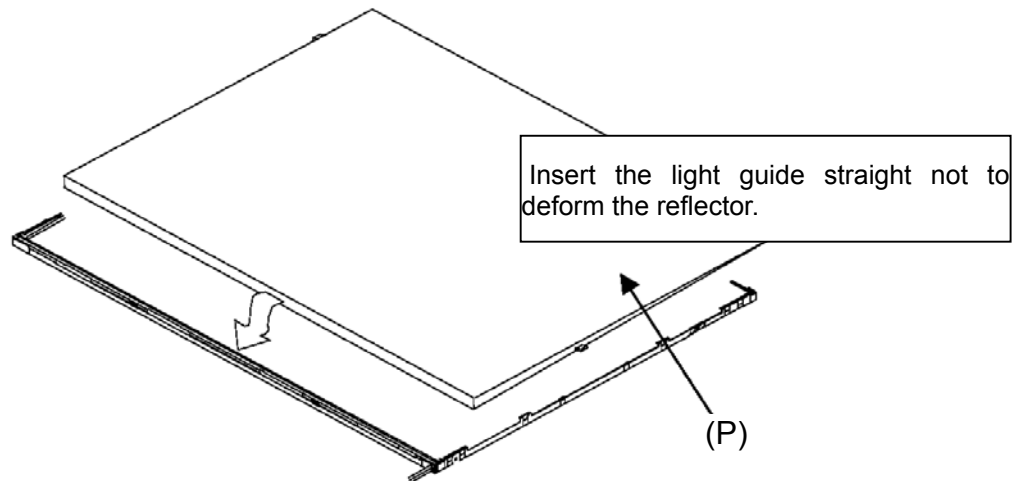


Figure 4-135 Replacing Sharp fluorescent lamp (XGA-CSV) (15)

5. Place the lower diffusion sheet (O), lower lens sheet (M), upper lens sheet (L) and upper diffusion sheet (K) on the backlight unit with light guide plate (P).

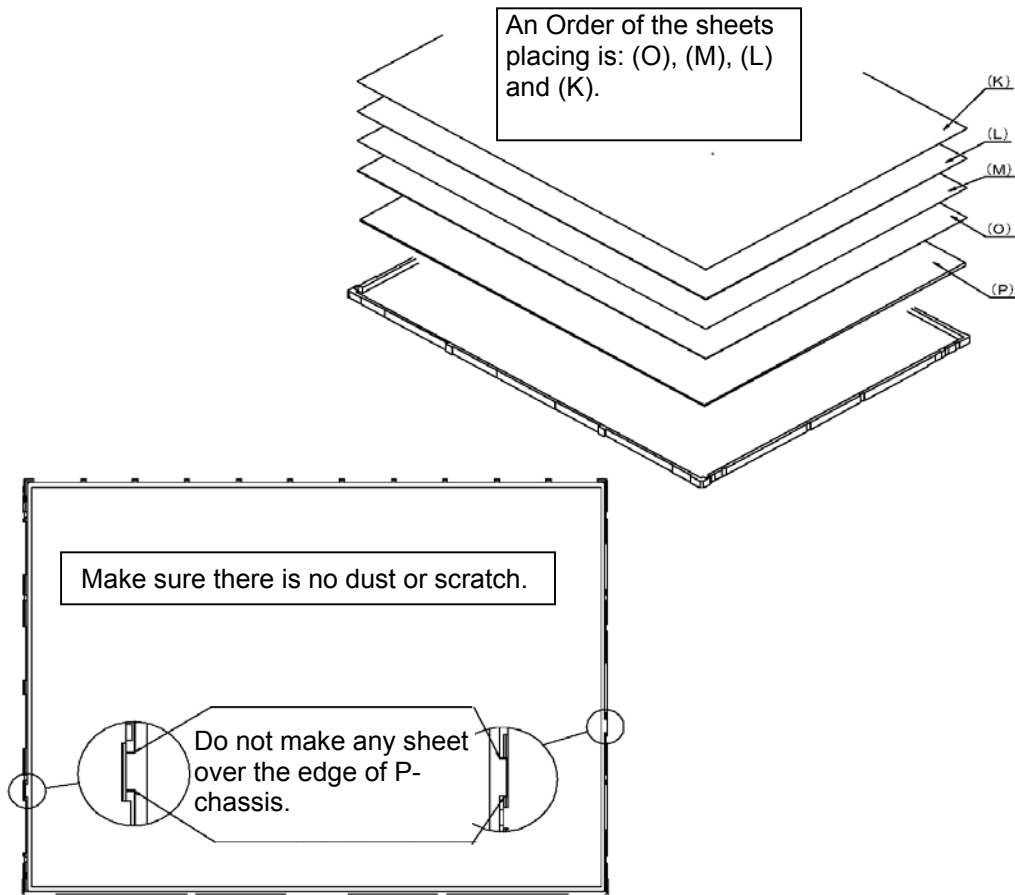


Figure 4-136 Replacing Sharp fluorescent lamp (XGA-CSV) (16)

- Place the LCD panel (I) on the backlight unit (H).

**CAUTION:** 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.

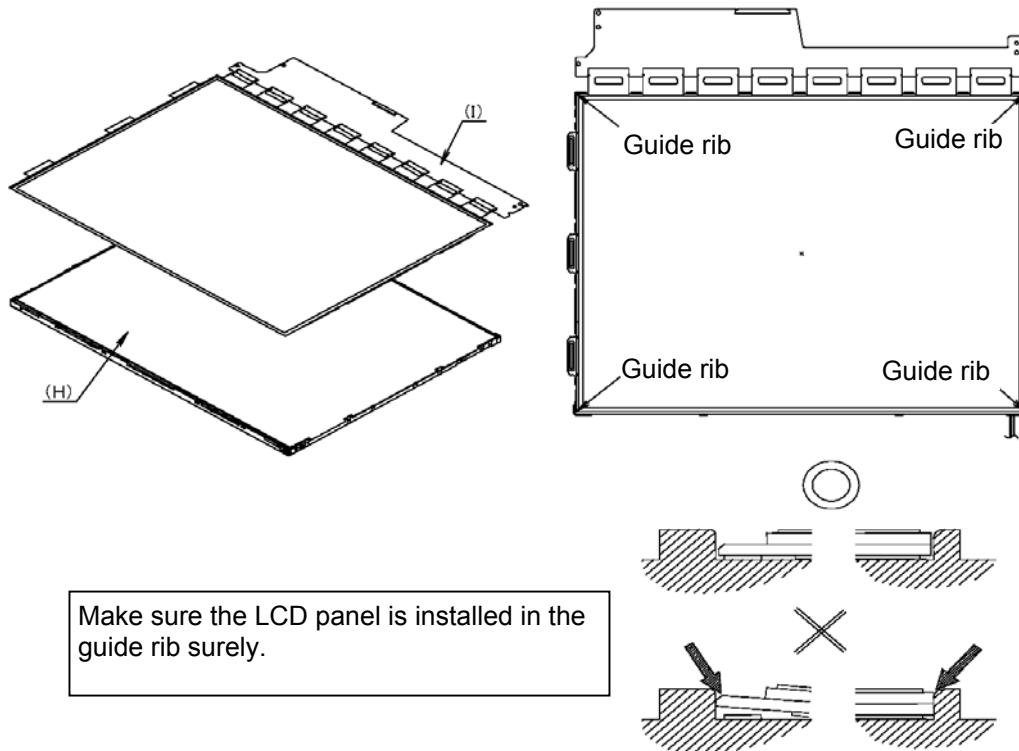


Figure 4-137 Replacing Sharp fluorescent lamp (XGA-CSV) (17)

7. Bend the TCP attaching to the source board and secure it with the three screws (D).

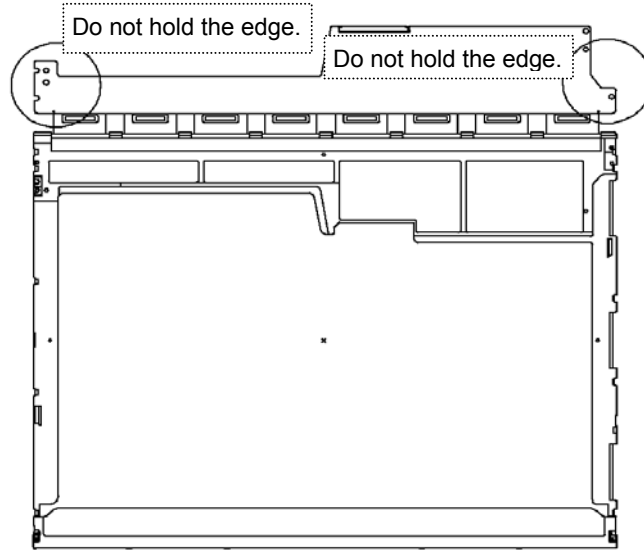


Figure 4-138 Replacing Sharp fluorescent lamp (XGA-CSV) (18)

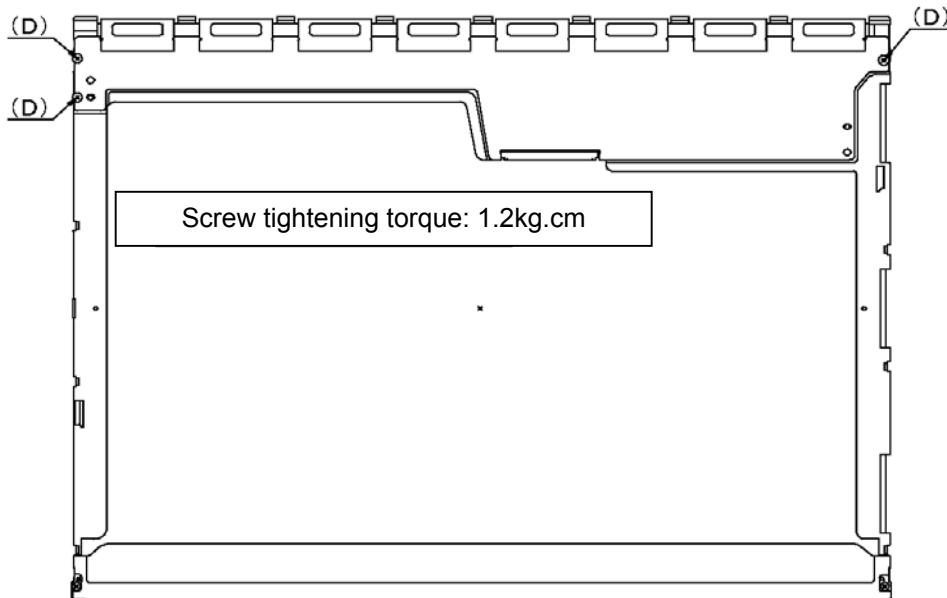


Figure 4-139 Replacing Sharp fluorescent lamp (XGA-CSV) (19)

8. Install the bezel (E) on the lamp cover and hook the one latch on the lamp cover and one latch on the P-chassis.

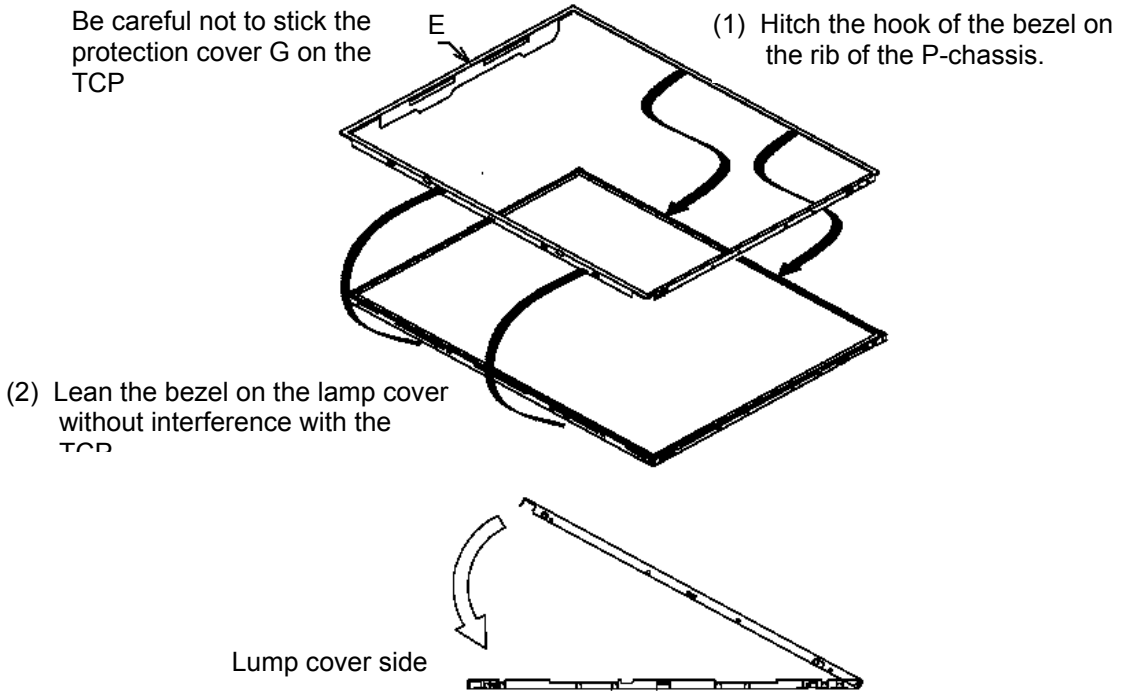


Figure 4-140 Replacing Sharp fluorescent lamp (XGA-CSV) (20)

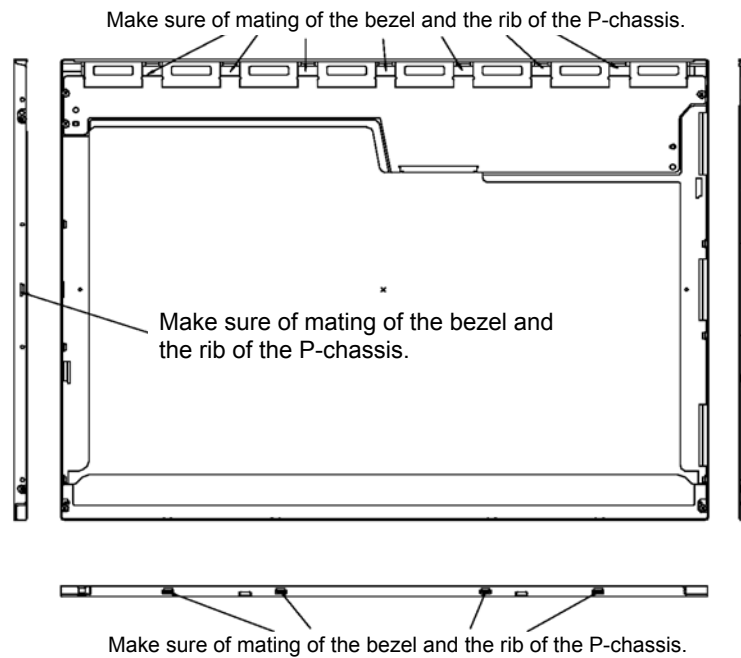


Figure 4-141 Replacing Sharp fluorescent lamp (XGA-CSV) (21)

- Secure the five screws (D) of the side.

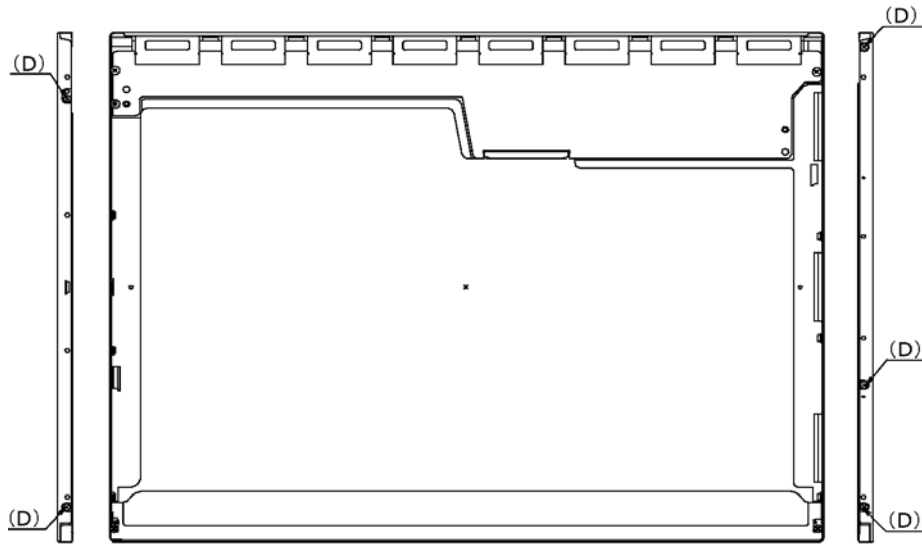


Figure 4-142 Replacing Sharp fluorescent lamp (XGA-CSV) (22)



10. Stick the protection cover G (B), protection cover SC (A) and two fixing tapes (C).

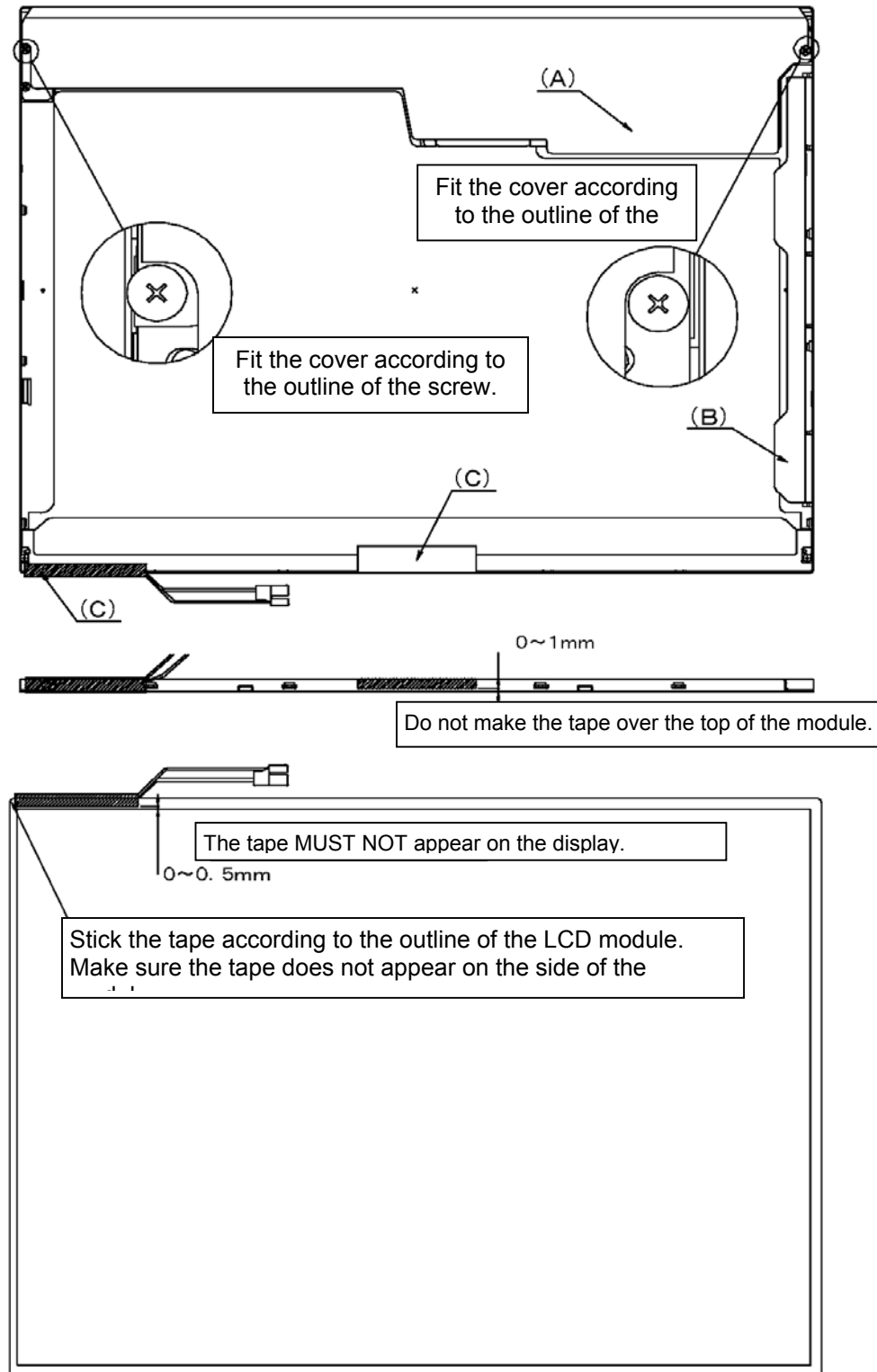


Figure 4-143 Replacing Sharp fluorescent lamp (XGA-CSV) (23)

### 4.22.9 Replacing the 15.0 Inch XGA Sharp (HCSV) Fluorescent Lamp

#### Removing the 15.0-inch XGA Sharp (HCSV) fluorescent lamp

To remove the 15.0-inch XGA Sharp (HCSV) Fluorescent Lamp, follow the steps below and refer to Figures 4-144 to 4-153.

1. Turn the LCD module face down, and remove the protection cover SC (A), protection cover G (B), fixing tapes 1 (C) and fixing tape 2 (D).

**CAUTION:** 1) Be careful not to damage the TCP and chip.  
2) Discard the tapes removed.  
3) The protection cover G (B) is reused. Do not peel off the place stuck to the bezel.

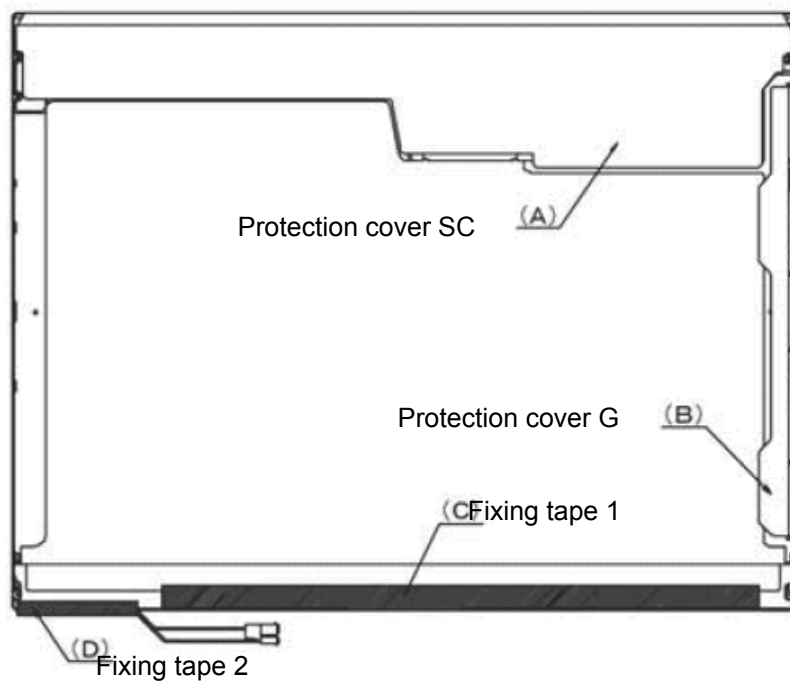


Figure 4-144 Replacing Sharp fluorescent lamp (XGA-HCSV) (1)

2. Remove the four screws (E) on the sides.

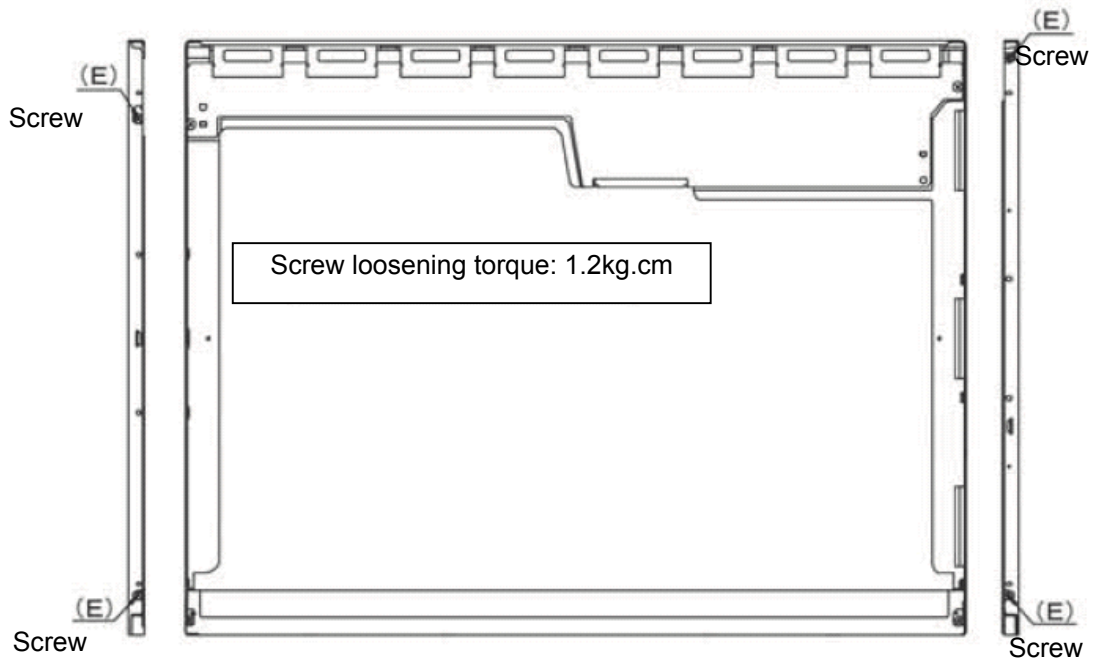


Figure 4-145 Replacing Sharp fluorescent lamp (XGA-HCSV) (2)

3. Turn the LCD module face up and remove the bezel (F).

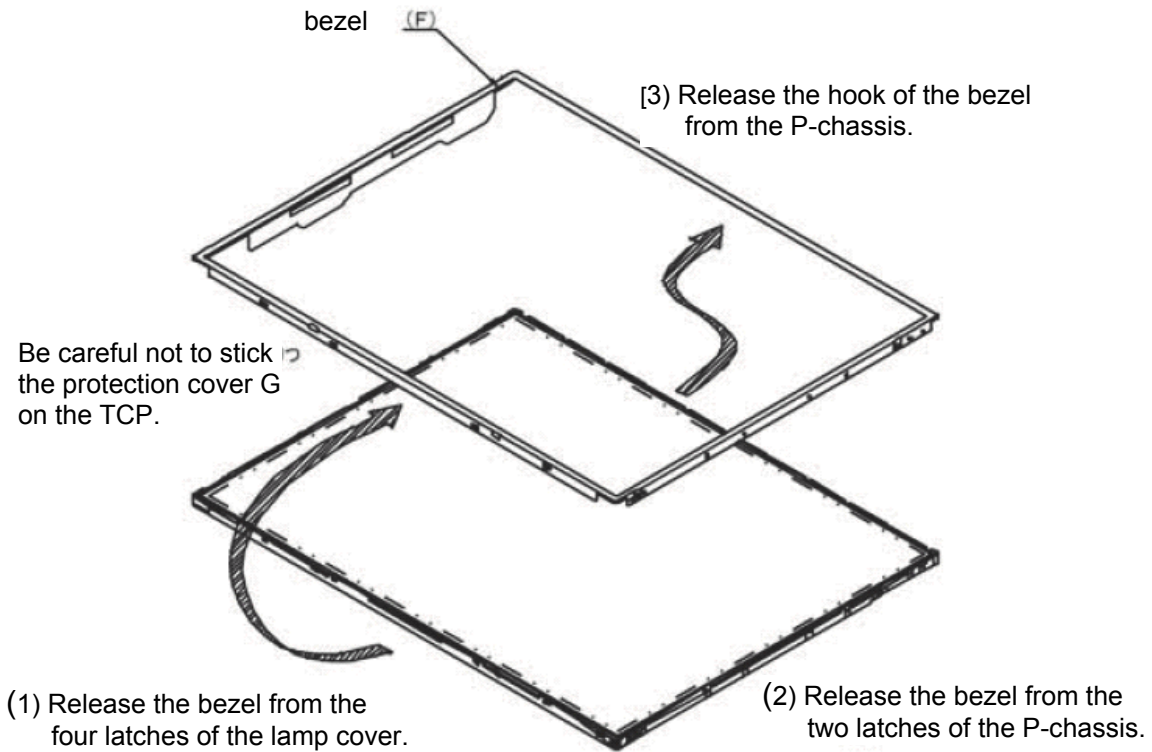


Figure 4-146 Replacing Sharp fluorescent lamp (XGA-HCSV) (3)

- Turn the LCD module face down and remove the two screws (E) fixing the board. Then open the bent portion of the TCP of the board and remove the backlight.

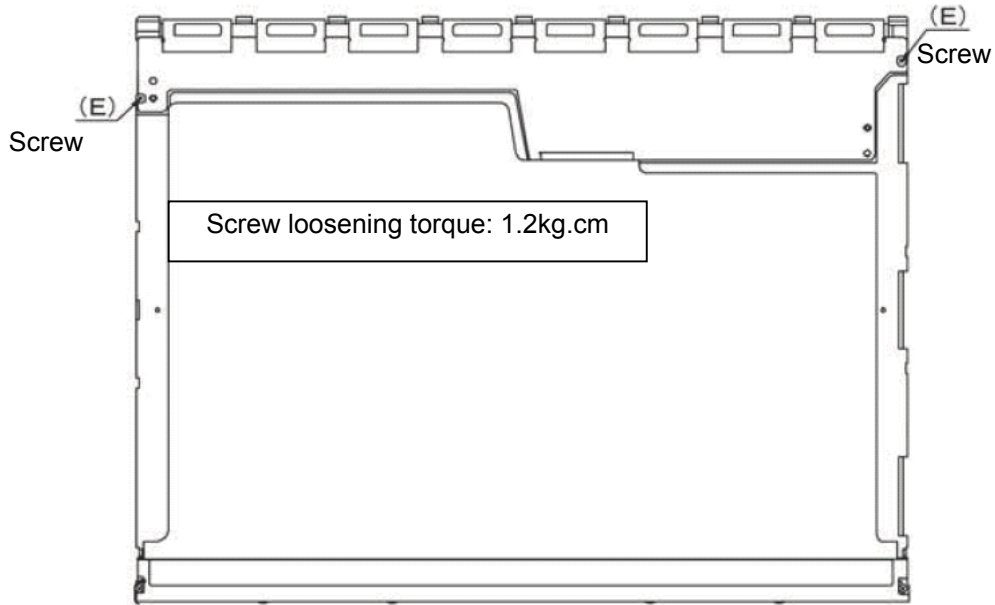


Figure 4-147 Replacing Sharp fluorescent lamp (XGA-HCSV) (4)

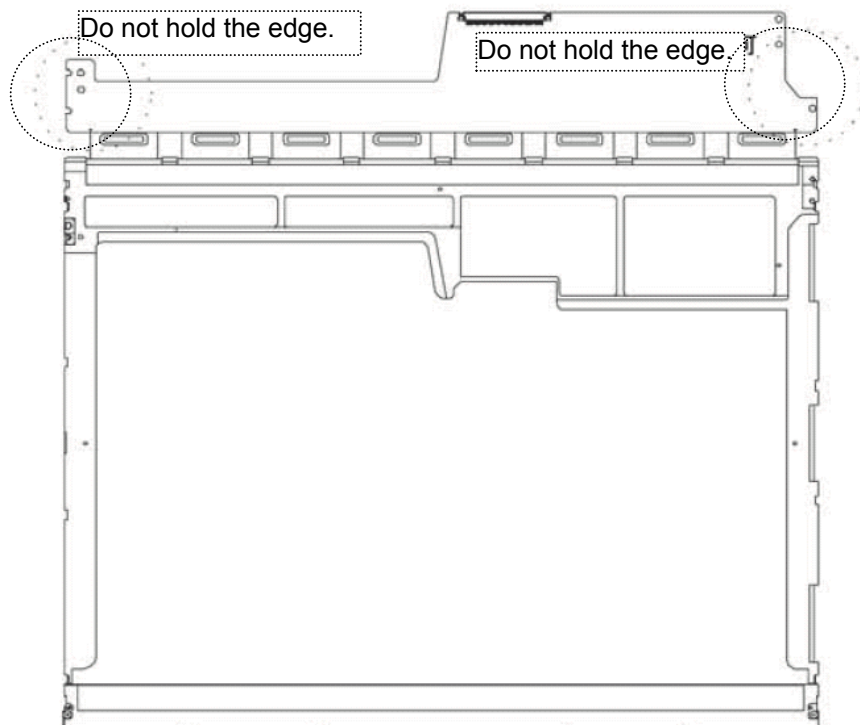


Figure 4-148 Replacing Sharp fluorescent lamp (XGA-HCSV) (5)

5. Turn the LCD module face up and remove the LCD panel (H) from the backlight unit (G).

**CAUTION:** *Wear finger sacks or gloves during the work not to soil or scratch the LCD panel or backlight unit.*

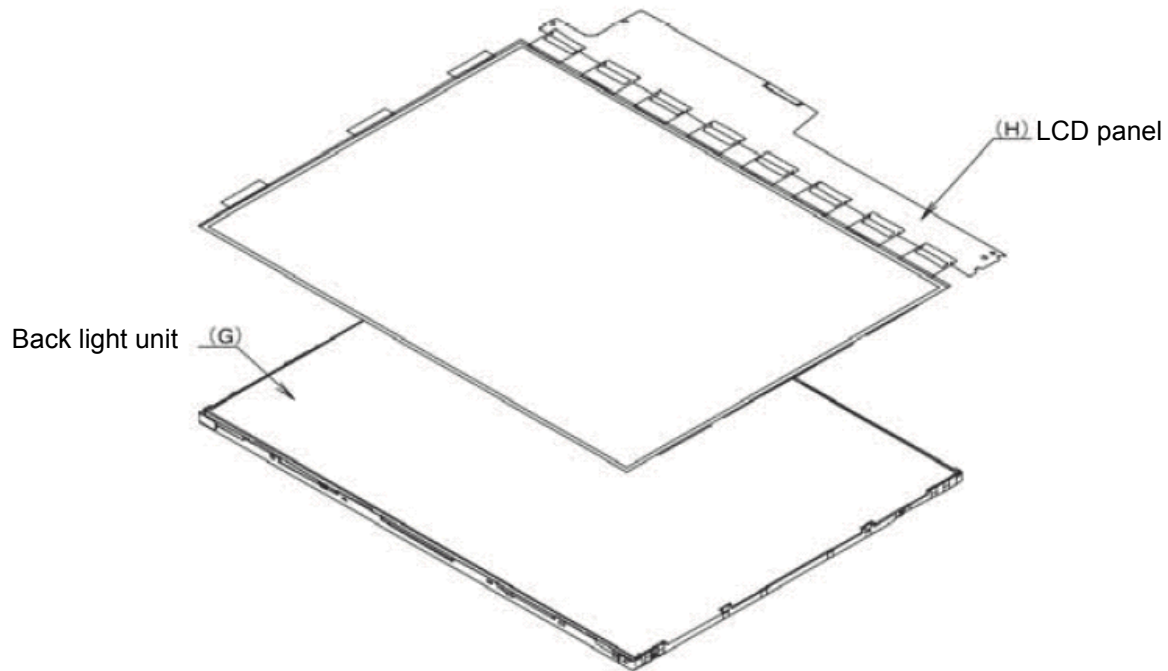


Figure 4-149 Replacing Sharp fluorecent lamp (XGA-HCSV) (6)

- Turn the backlight unit (G) removed face down and remove the two screws (I) and lamp cover (J).

**CAUTION:** Be careful not to scratch or soil the sheets.

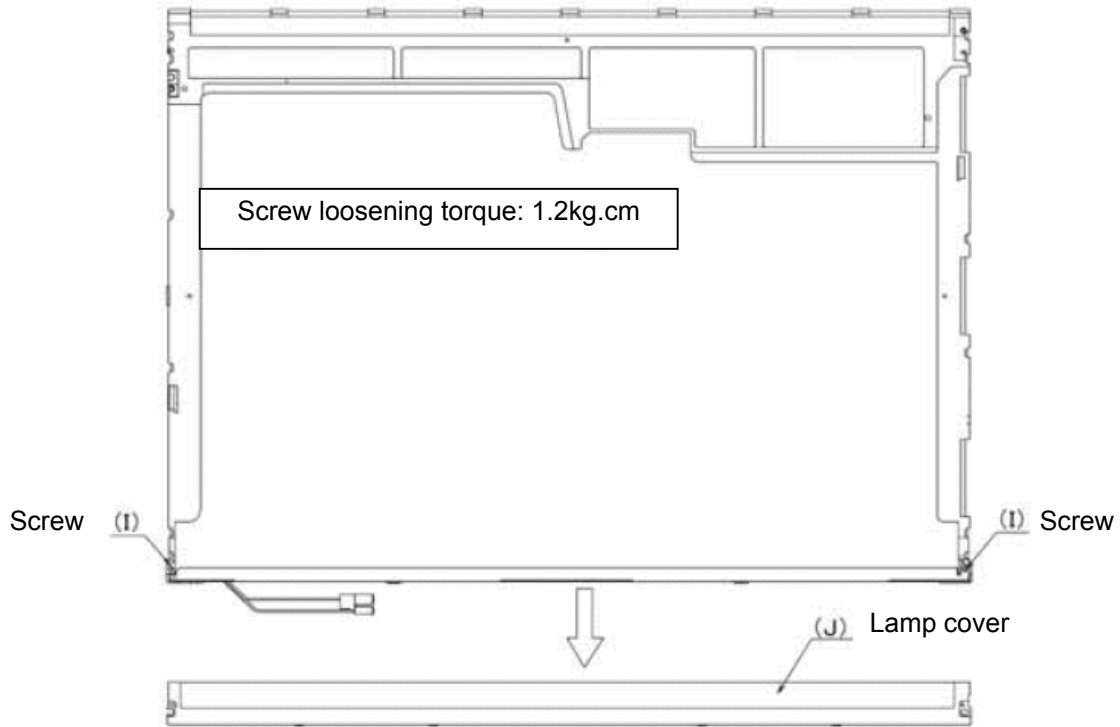


Figure 4-150 Replacing Sharp fluorescent lamp (XGA-HCSV) (7)

7. Turn the backlight unit face up and remove the upper diffusion sheet (M), lens sheet (N) and light guide plate (O).

**CAUTION:** Be careful not to scratch or soil the removed sheets and light guide to reuse them.

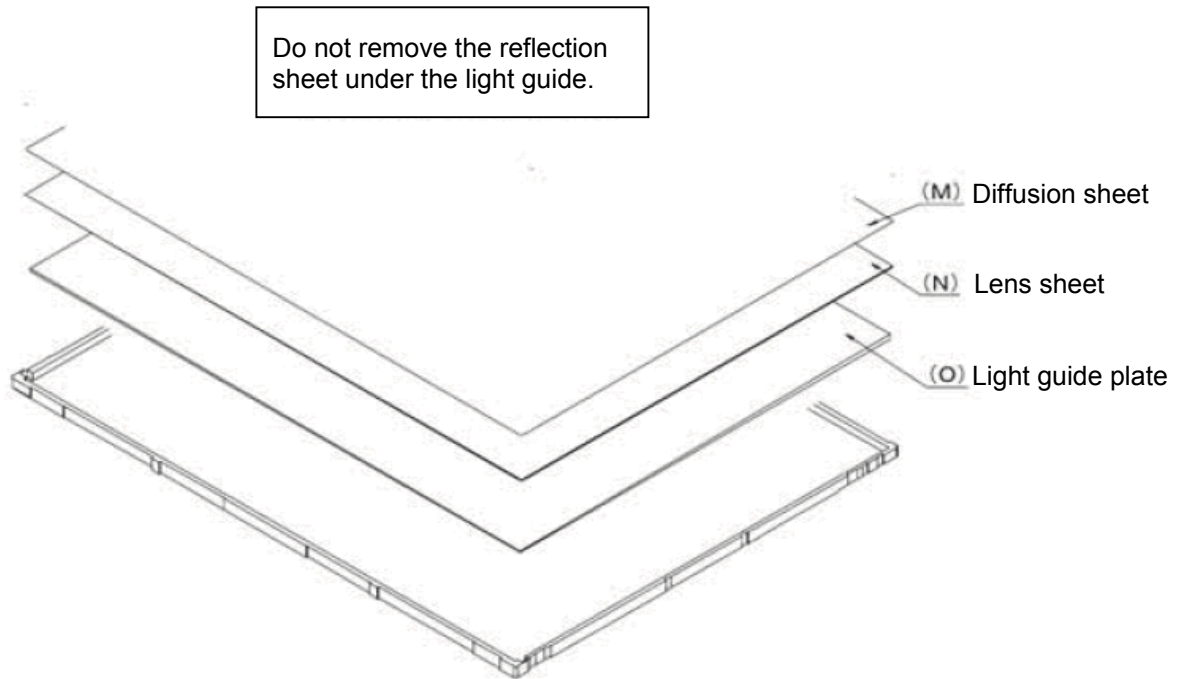


Figure 4-151 Replacing Sharp fluorescent lamp (XGA-HCSV) (8)



8. Remove the five double-sided tapes (P,Q, R, S and T).

**CAUTION:** Discard the removed tapes. Do not reuse them.

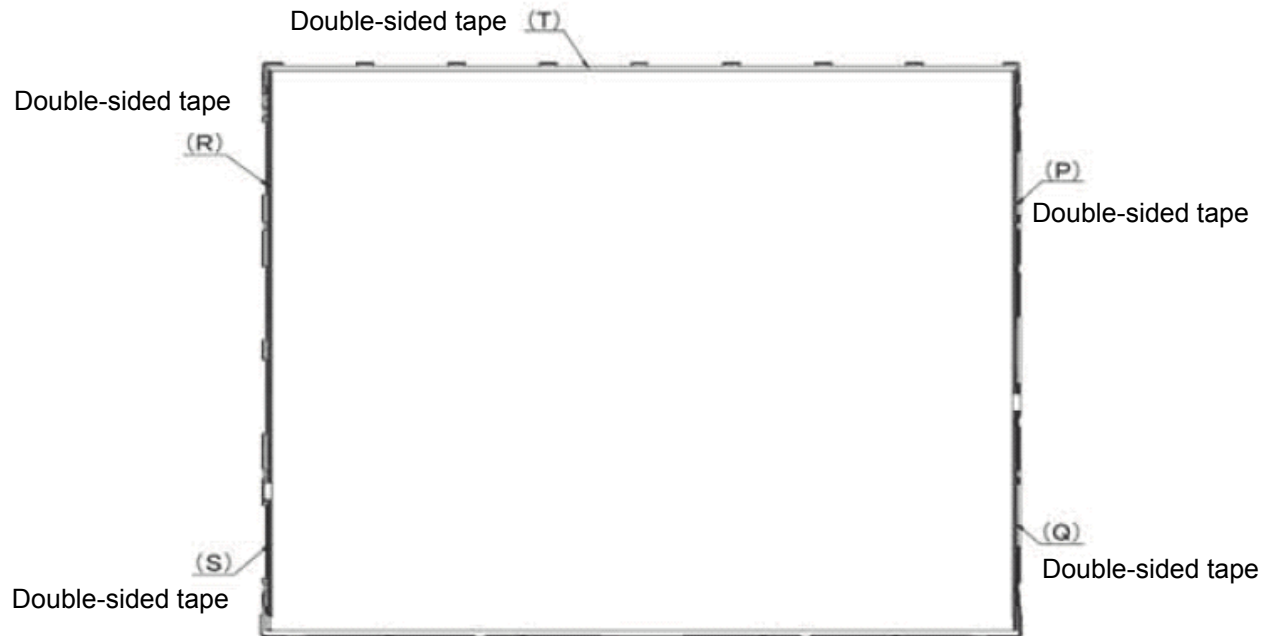


Figure 4-152 Replacing Sharp fluorescent lamp (XGA-HCSV) (9)

9. Turn the backlight unit face down and remove the lamp unit (U) from the P-chassis.

**CAUTION:** When removing the lamp unit, be careful not to break the lamp, or bend the reflection sheet.

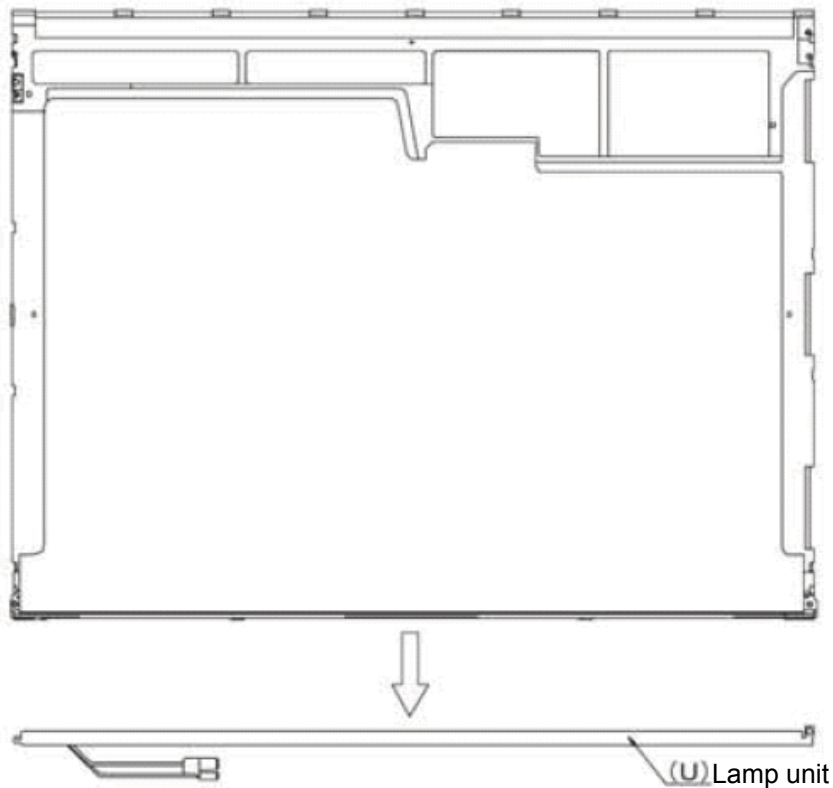


Figure 4-153 Replacing Sharp fluorescent lamp (XGA-HCSV) (10)

**Assembling the 15.0-inch XGA (HCSV) Sharp fluorescent lamp**

To assemble the 15.0-inch Sharp XGA (HCSV) fluorescent lamp, follow the steps below and refer to figures 4-154 to 4-166.

1. Stick the five double-sided tapes (P, Q, R, S and T).

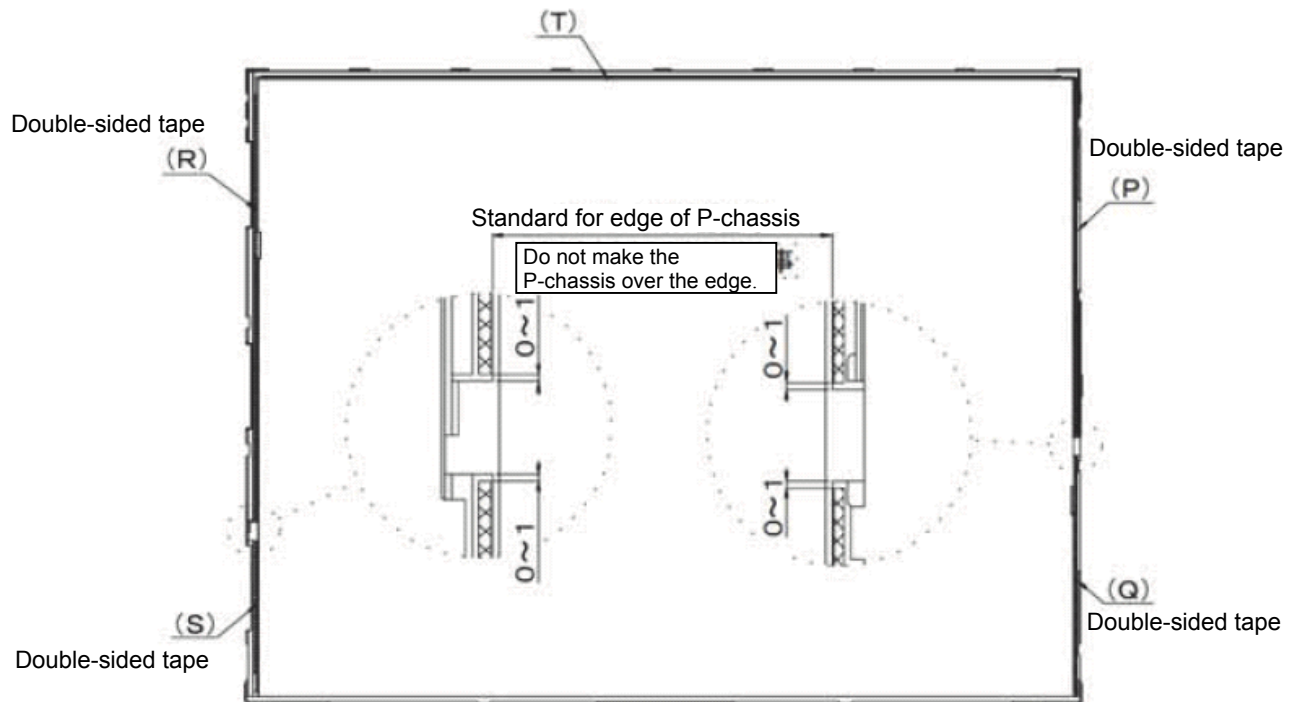


Figure 4-154 Replacing Sharp fluorescent lamp (XGA-HCSV) (11)

2. Turn the backlight unit face down and install a new lamp unit (U) on the P-chassis.

**CAUTION:** When install the lamp unit (U), be careful not to bend or damage the reflection sheet.

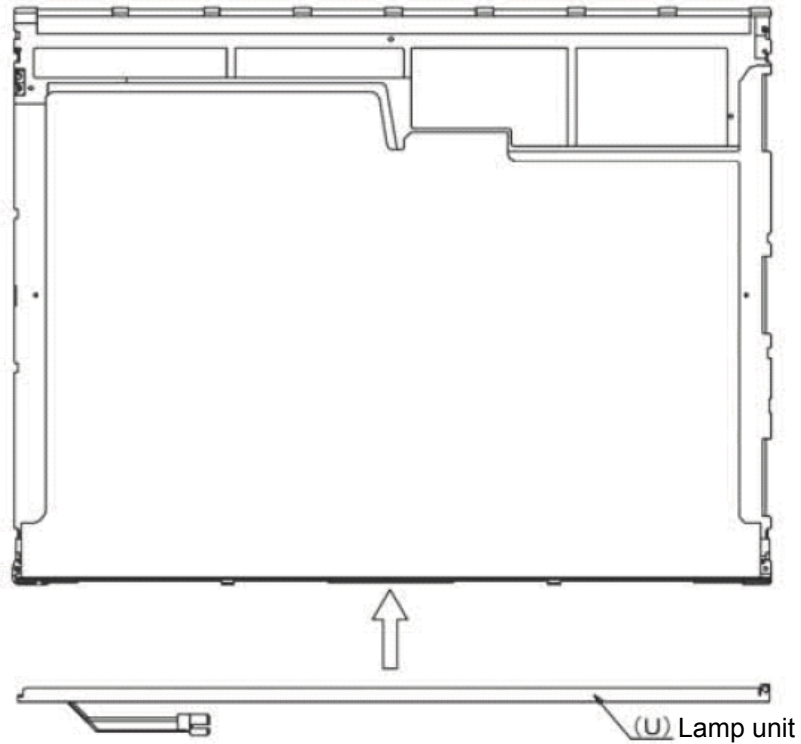


Figure 4-155 Replacing Sharp fluorescent lamp (XGA-HCSV) (12)

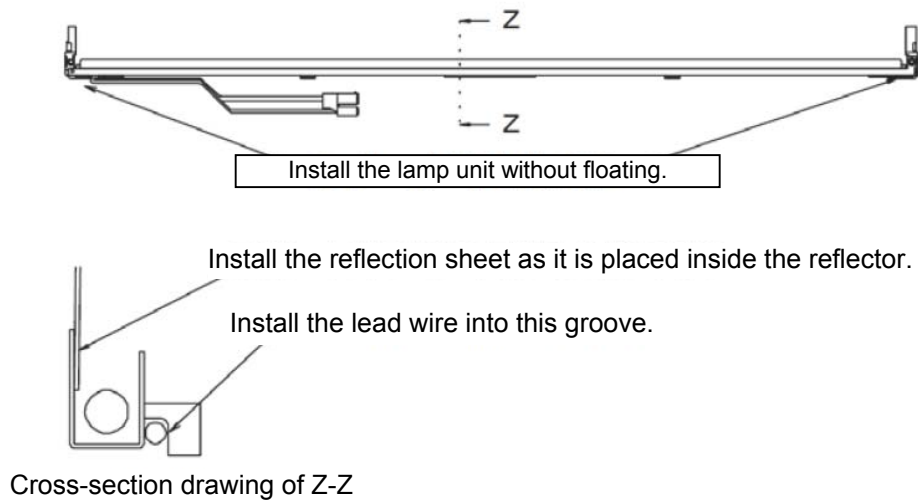


Figure 4-156 Replacing Sharp fluorescent lamp (XGA-HCSV) (13)

3. Install the lamp cover (J) on the backlight unit and secure it with the two screws (I).

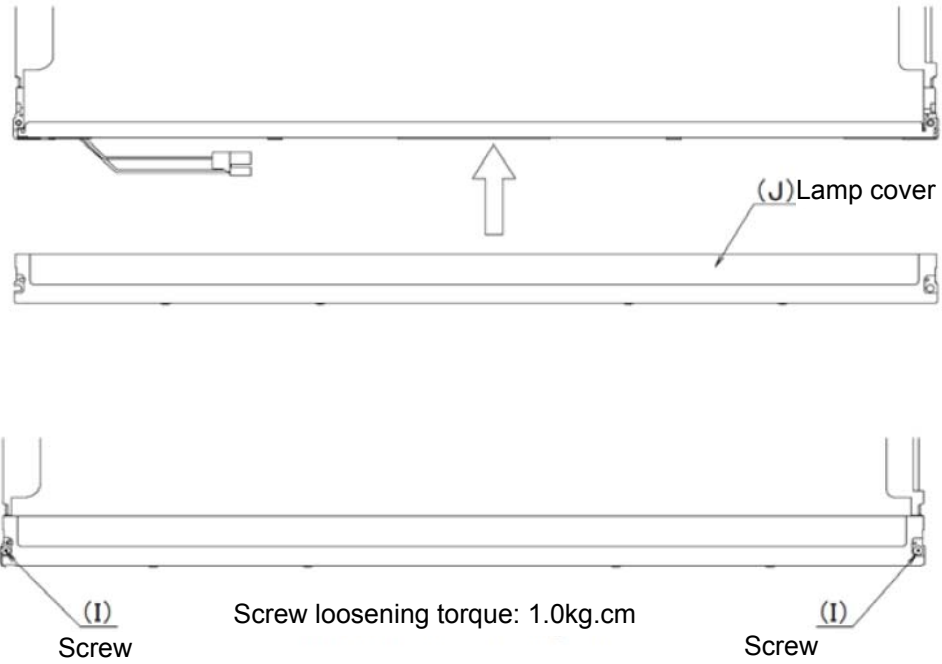


Figure 4-157 Replacing Sharp fluorescent lamp (XGA) (14)

4. Install the light guide plate (O) on the backlight unit. (Fit the thick side of the light guide plate to the lamp unit side.)

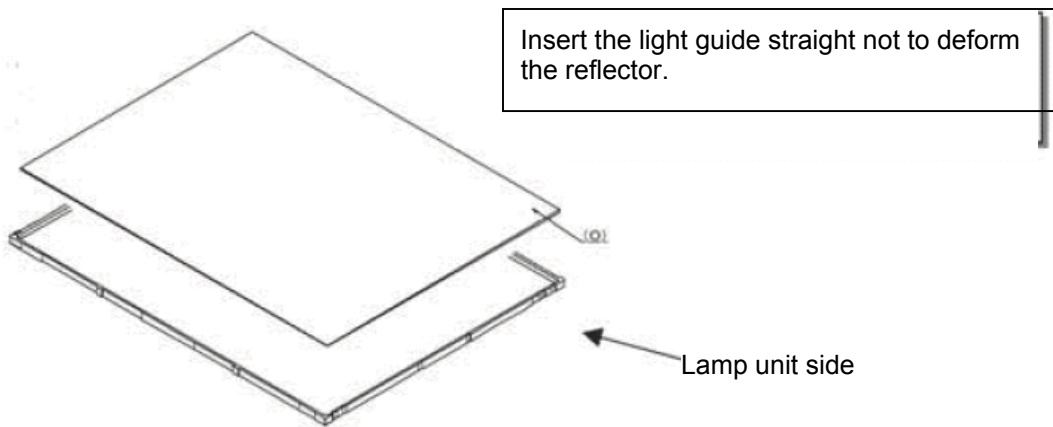


Figure 4-158 Replacing Sharp fluorescent lamp (XGA-HCSV) (15)

5. Place the lens sheet (N) and diffusion sheet (M) on the backlight unit with light guide plate (O).

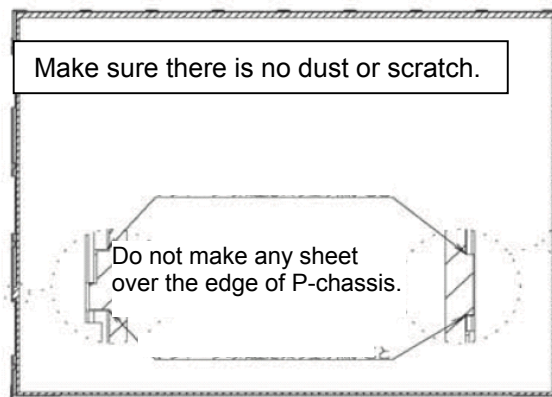
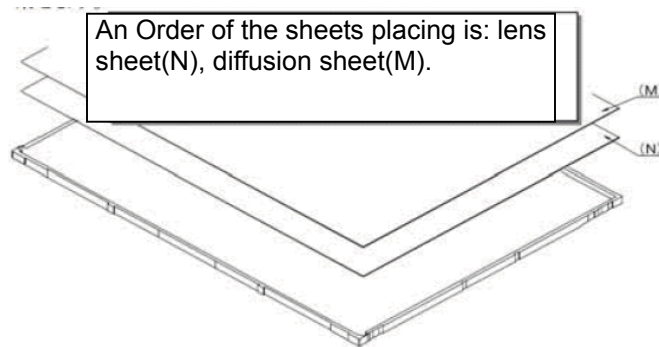
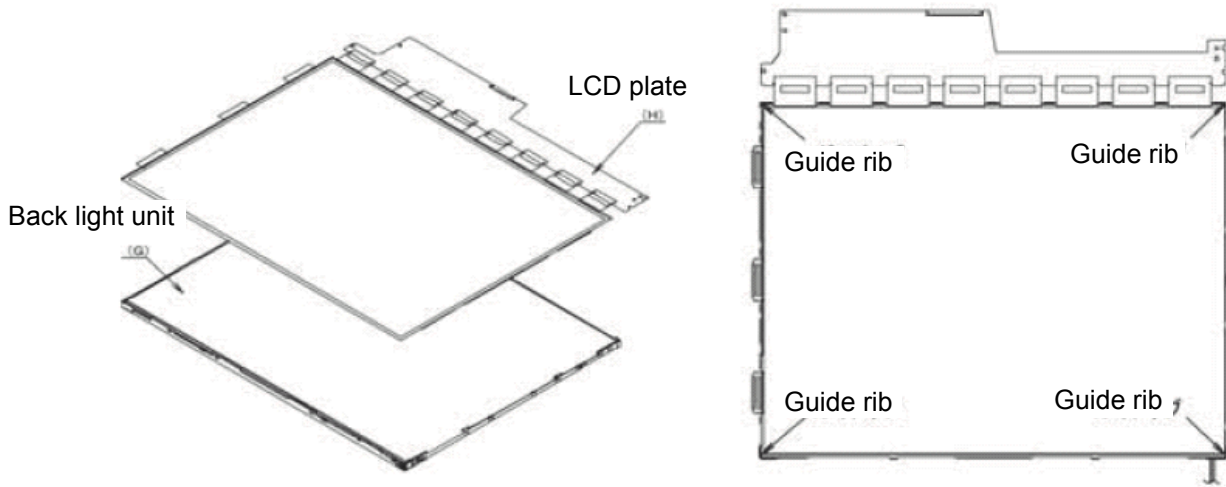


Figure 4-159 Replacing Sharp fluorescent lamp (XGA-HCSV) (16)

6. Place the LCD panel (H) on the backlight unit (G).

**CAUTION:** 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.



Make sure the LCD panel is installed in the guide rib surely.

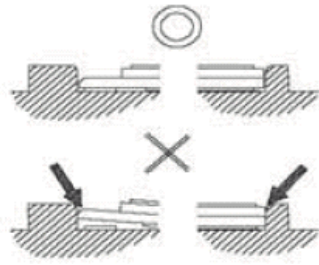


Figure 4-160 Replacing Sharp fluorescent lamp (XGA-HCSV) (17)



7. Bend the TCP attaching to the source board and secure it with the three screws (E).

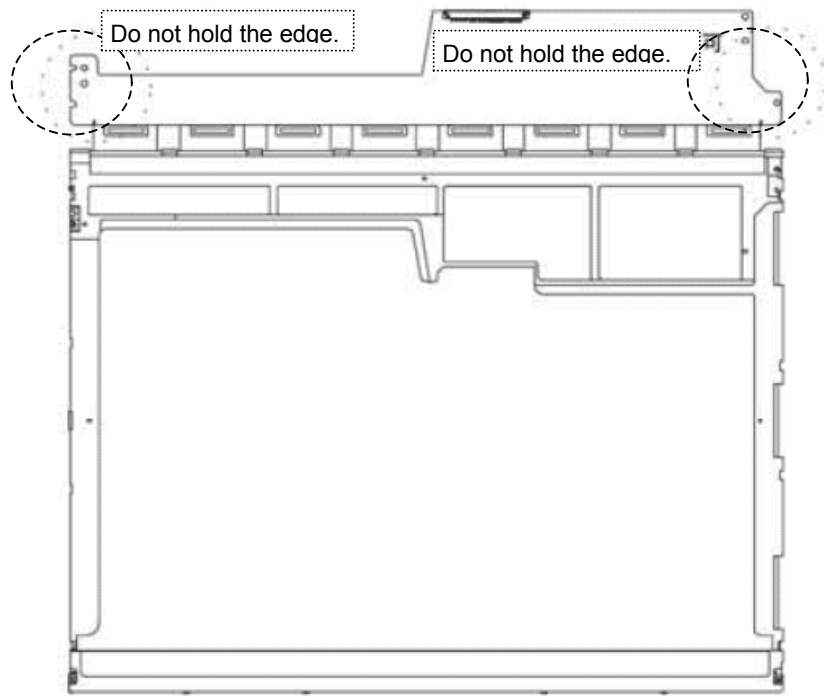


Figure 4-161 Replacing Sharp fluorescent lamp (XGA-HCSV) (18)

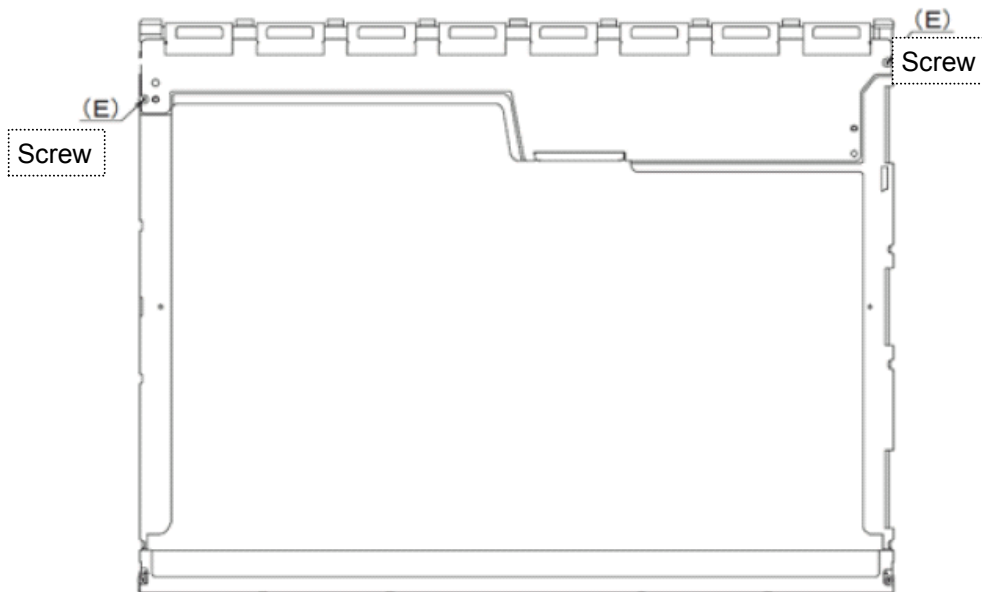


Figure 4-162 Replacing Sharp fluorescent lamp (XGA-HCSV) (19)

8. Install the bezel (F) on the lamp cover and hook the four latches on the lamp cover and two latches on the P-chassis.

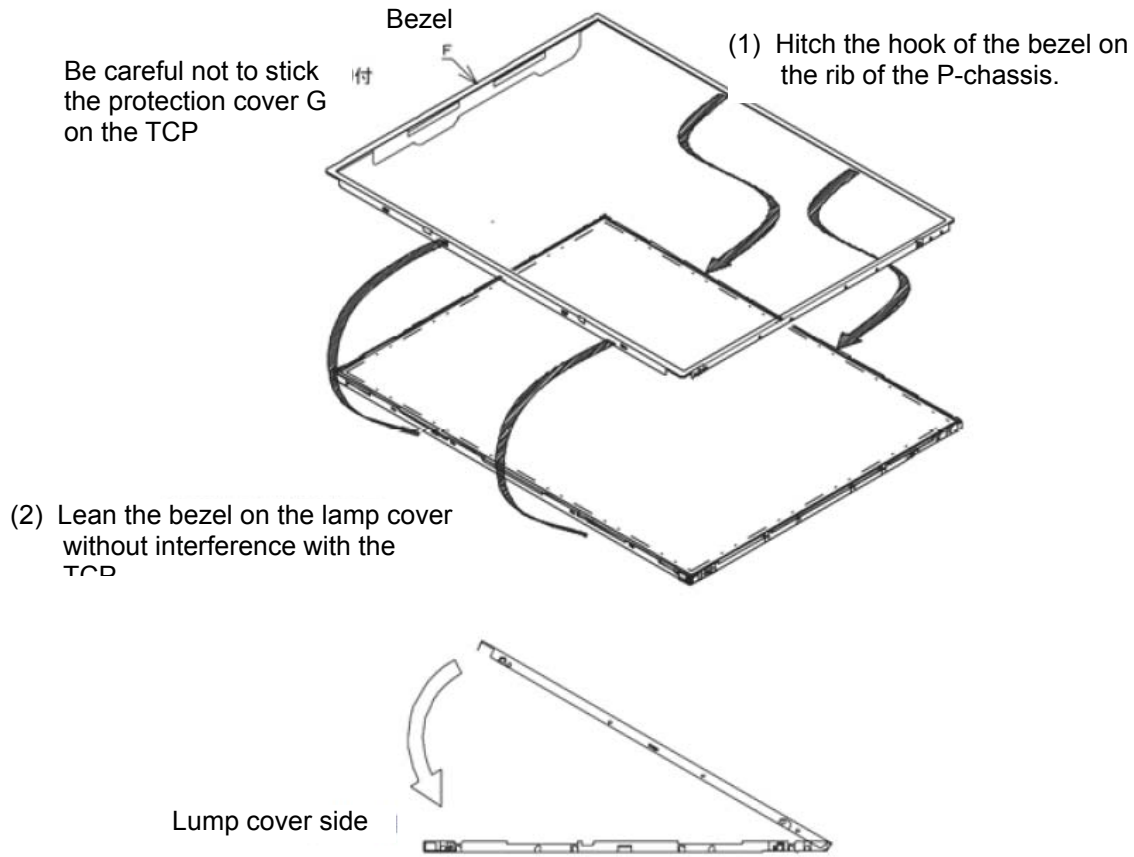


Figure 4-163 Replacing Sharp fluorescent lamp (XGA-HCSV) (20)

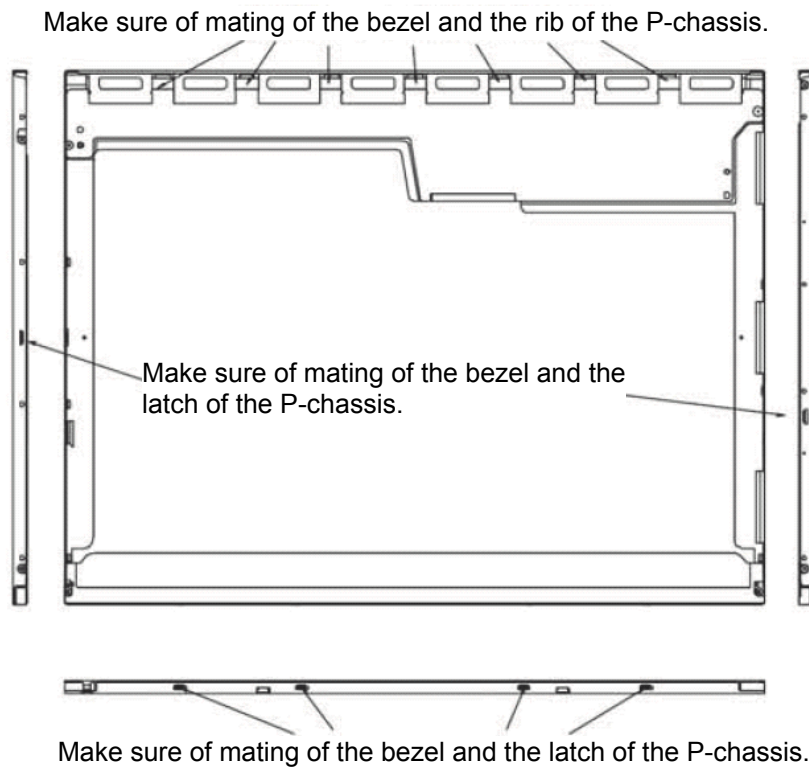


Figure 4-164 Replacing Sharp fluorescent lamp (XGA-HCSV) (21)

9. Secure the four screws (E) of the side.

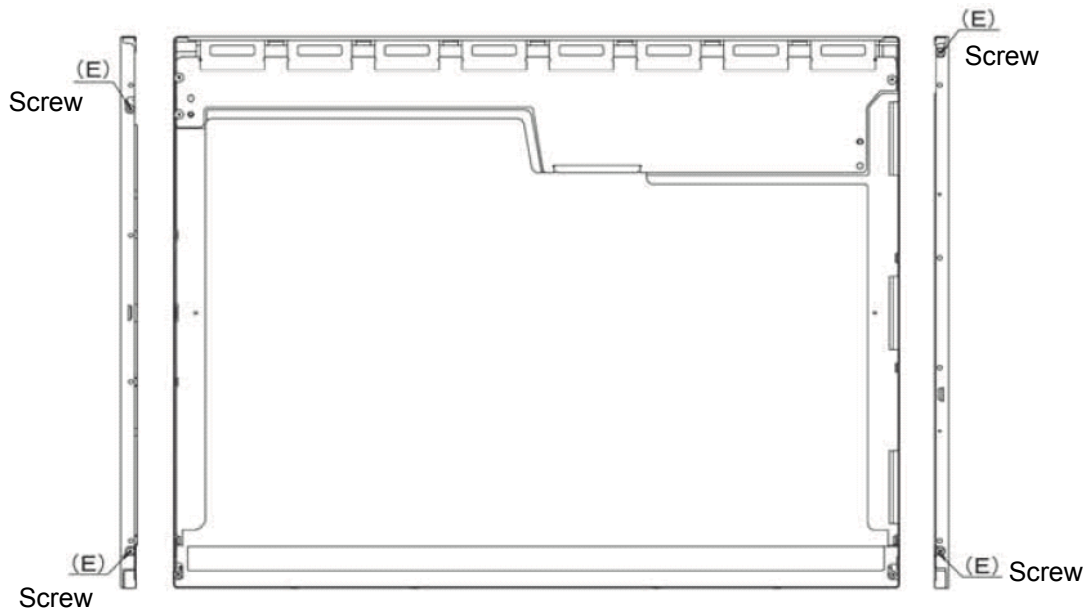


Figure 4-165 Replacing Sharp fluorescent lamp (XGA-HCSV) (22)

- Stick the protection cover G (B), protection cover SC (A), fixing tape 1 (C) and fixing tape 2 (D).

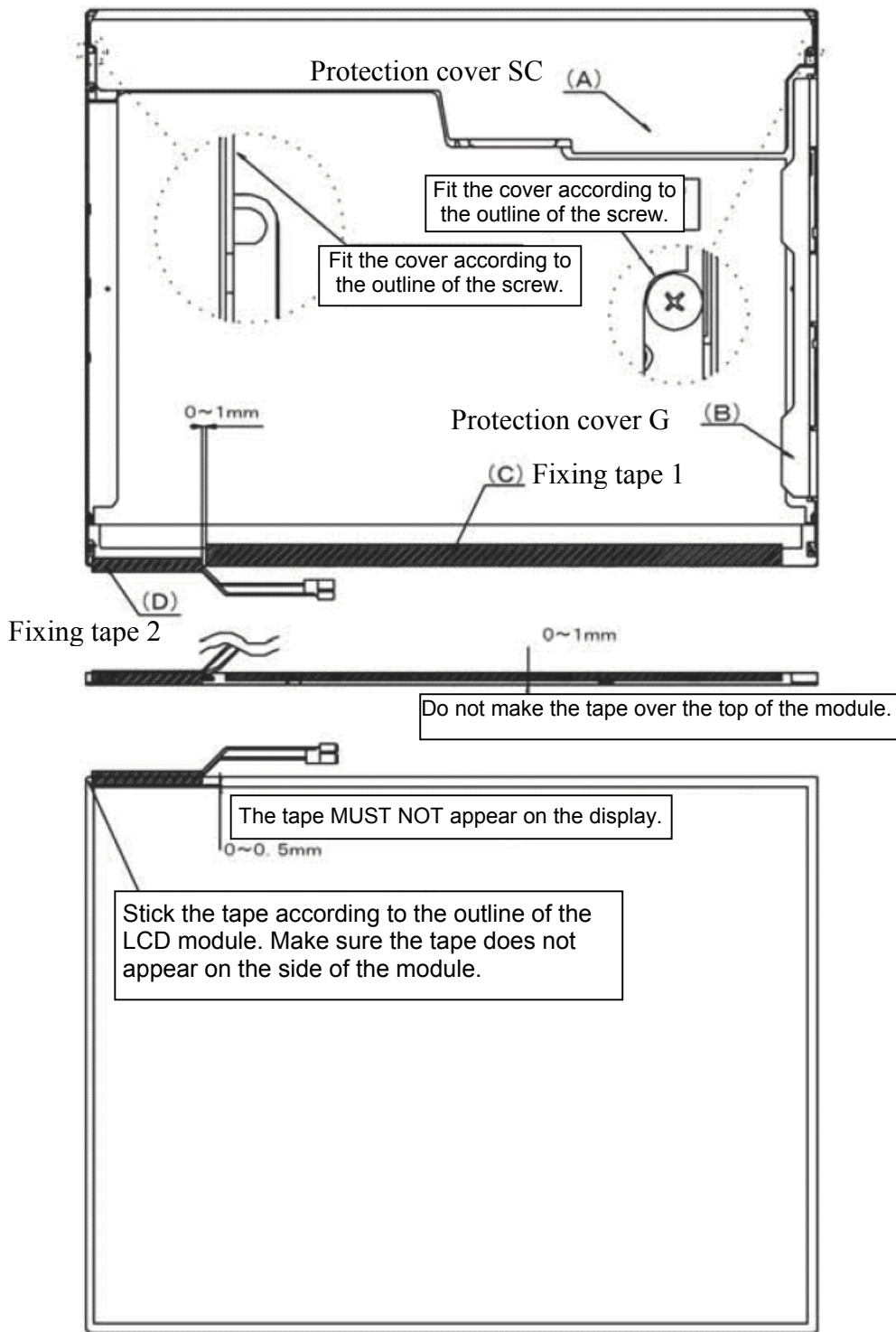


Figure 4-166 Replacing Sharp fluorescent lamp (XGA-HCSV) (23)

#### 4.22.10 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 4-167 to 4-170.

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.

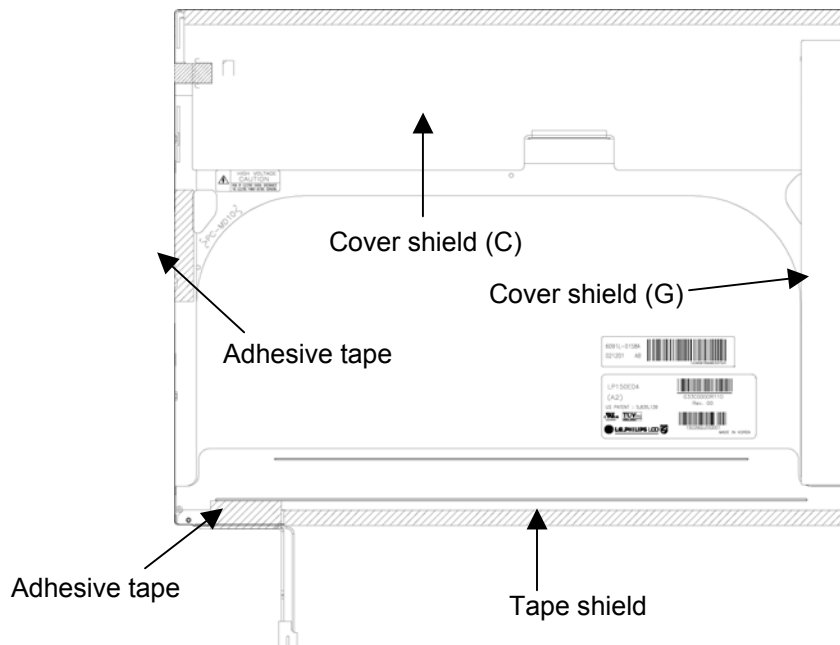


Figure 4-167 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (1)

2. Remove the top case. Be careful not to apply excessive force to the top case or gate TCP.

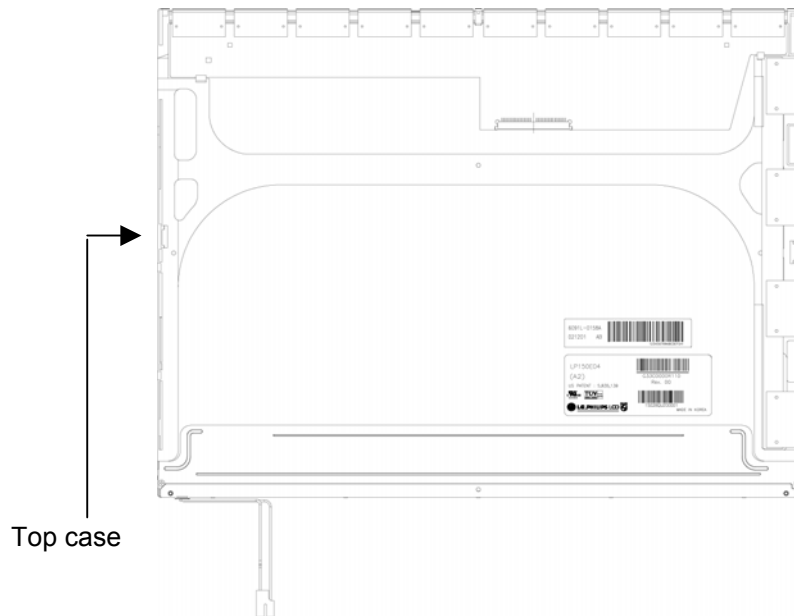


Figure 4-168 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (2)

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.

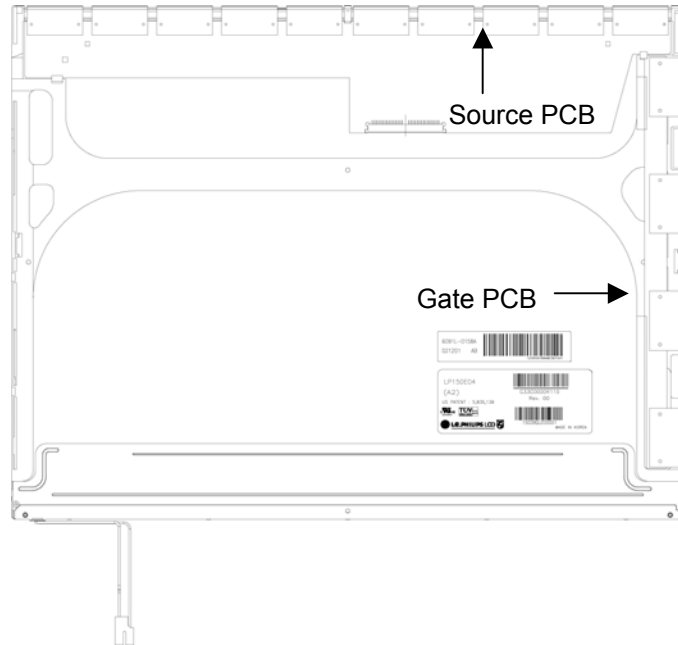


Figure 4-169 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (3)

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.

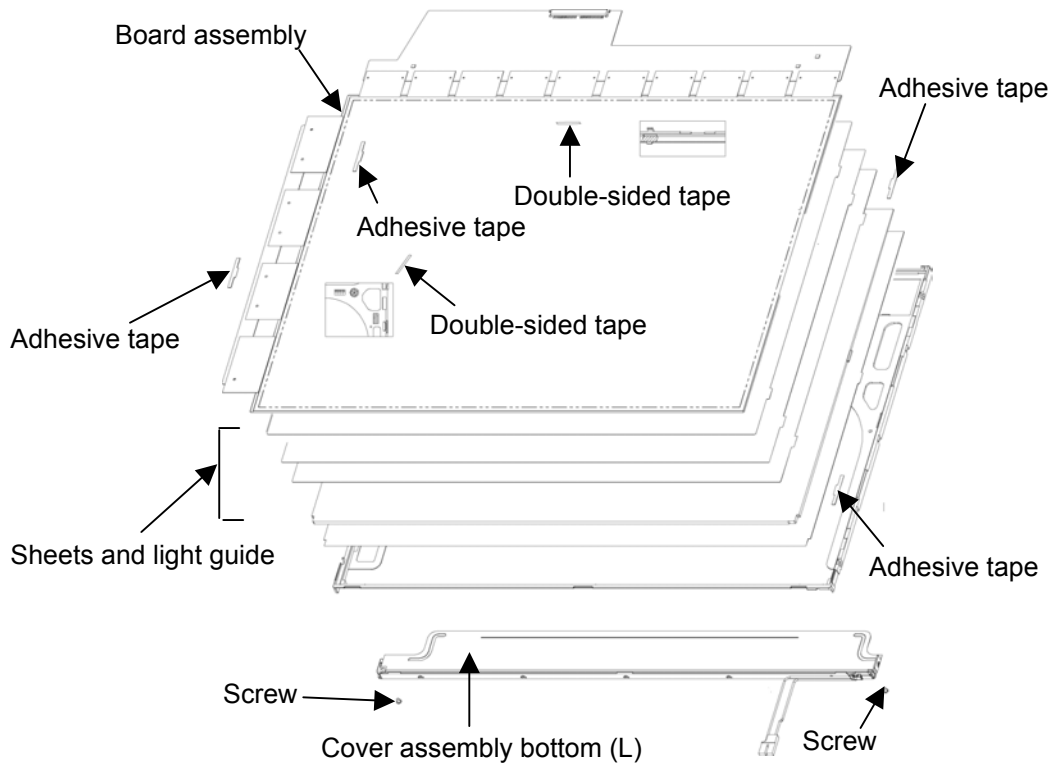


Figure 4-170 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (4)



**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 4-171 to 4-174.

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.

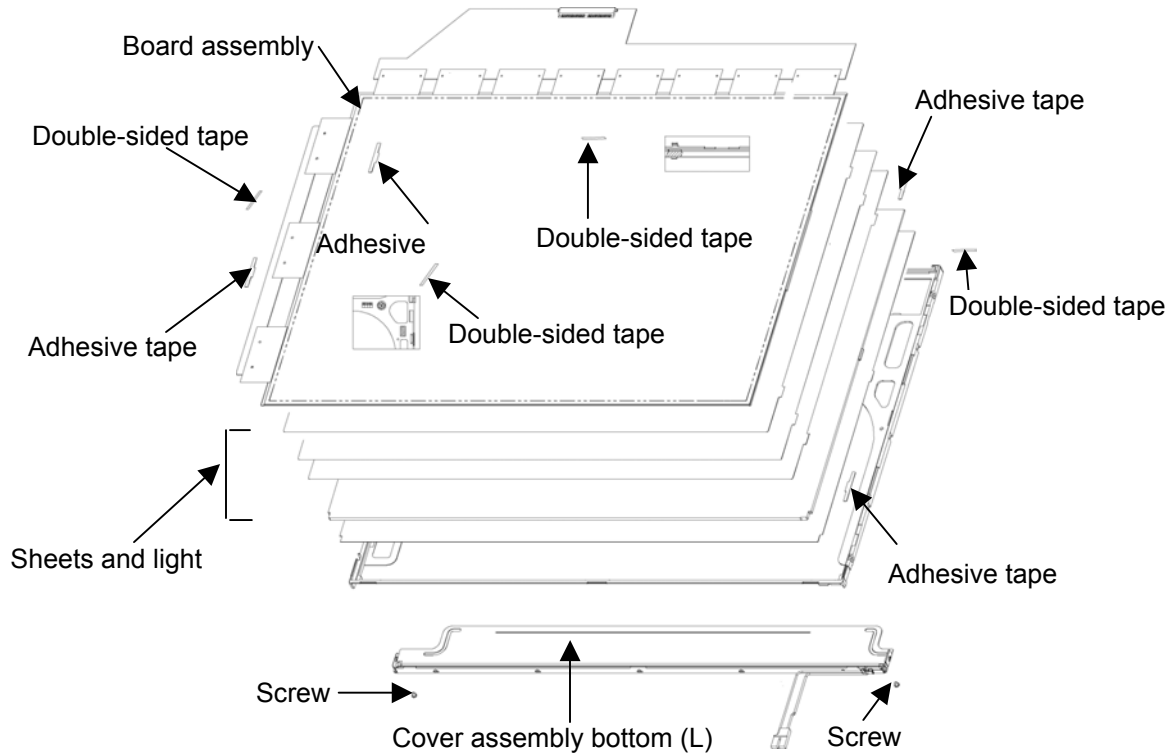


Figure 4-171 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (5)





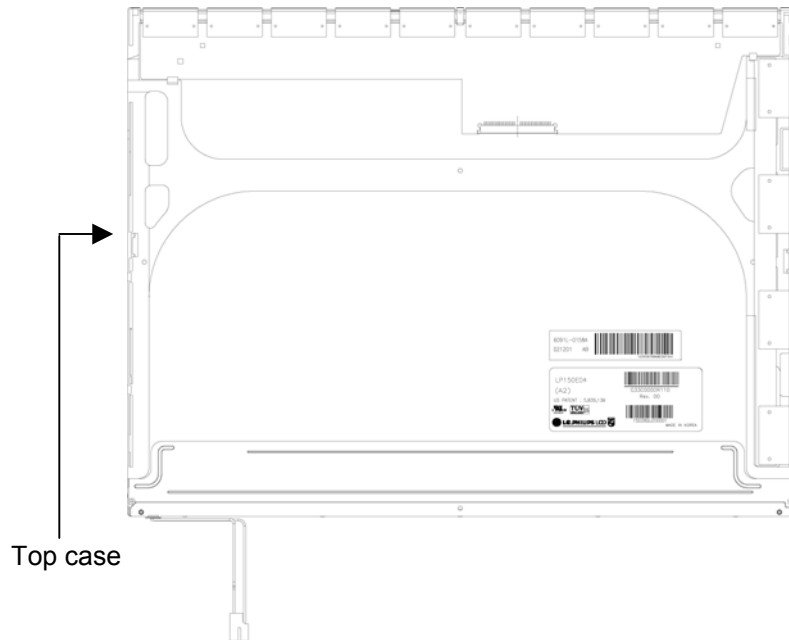


Figure 4-173 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (7)

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.

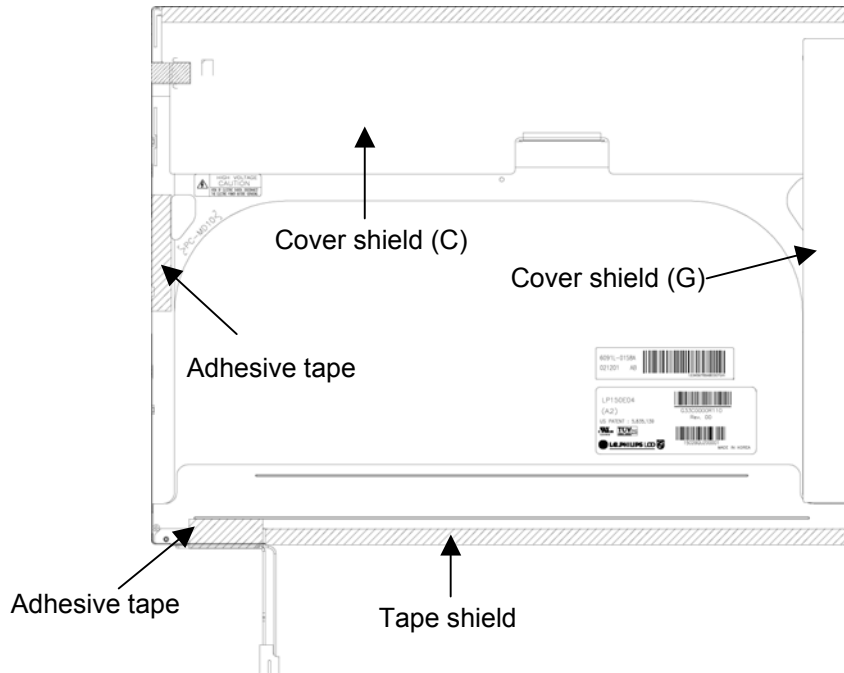


Figure 4-174 Replacing 15.0 Inch LG.Philips fluorescent lamp (SXGA+) (8)



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# **Appendices**

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## Appendix Contents

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**Appendix A Handling the LCD Module..... A-1**

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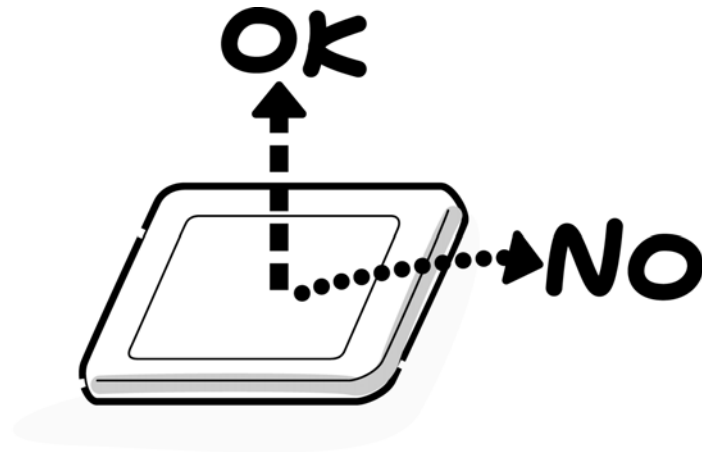
## **Appendix A Handling the LCD Module**

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### **Precautions for handling the LCD module**

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

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



2. 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.

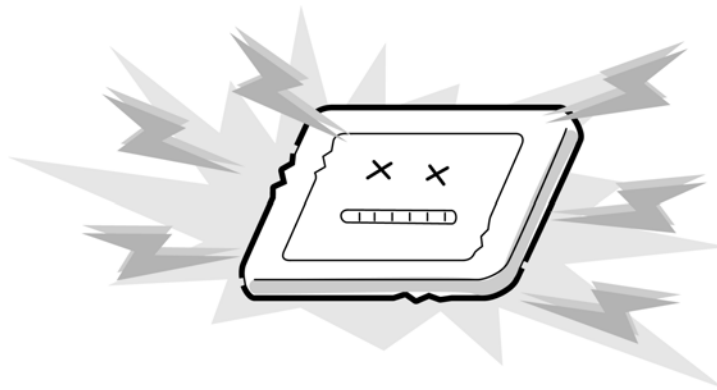




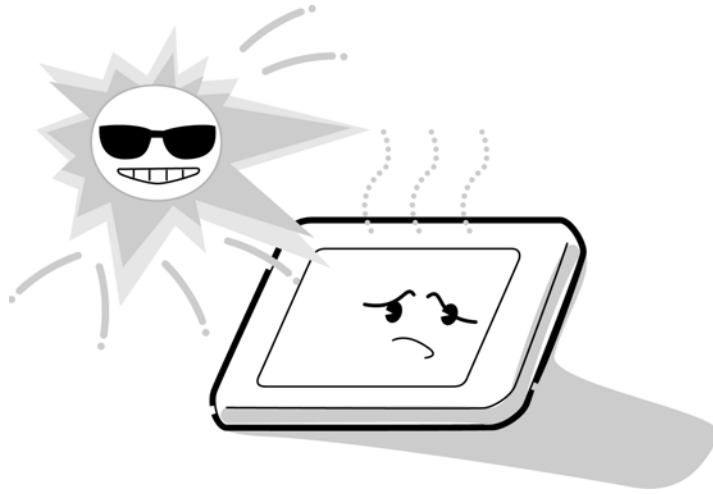
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



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.



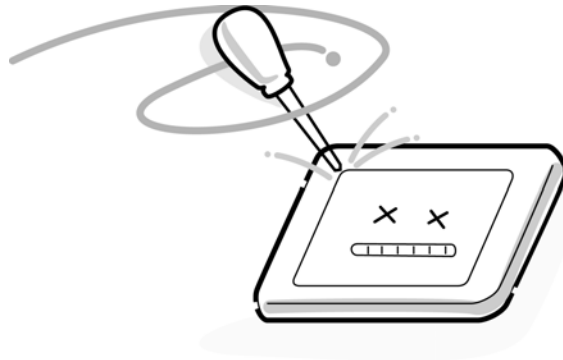
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



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.

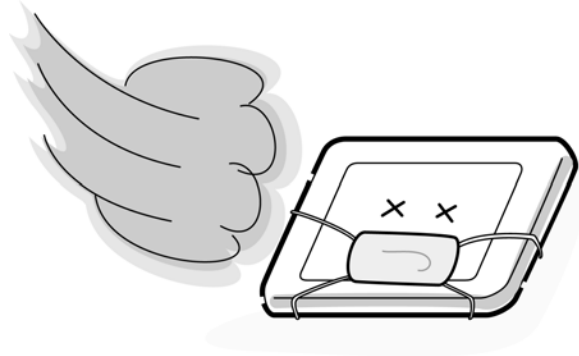






Table B-1 System board ICs and connectors (front)

| Mark | Number | Name                               |
|------|--------|------------------------------------|
| (A)  | PJ3502 | Parallel I/F connector             |
| (B)  | PJ5640 | Connector board (FLKCS*) connector |
| (C)  | PJ3230 | Keyboard I/F connector             |
| (D)  | PJ6001 | Left Speaker I/F connector         |
| (E)  | PJ6002 | Right Speaker I/F connector        |
| (F)  | PJ9500 | Sound board (FLKSN*) connector     |
| (G)  | PJ1800 | HDD I/F connector                  |
| (H)  | PJ2110 | PC card I/F connector              |
| (I)  | PJ2000 | Debug Port connector               |
| (J)  | PJ3260 | Touch Pad I/F connector            |
| (K)  | PJ8770 | FAN I/F connector                  |
| (L)  | PJ5600 | LCD I/F connector                  |
| (M)  | PJ8810 | 1st Battery connector              |
| (N)  | PJ3200 | Switch board (FLKSW*) connector    |

### B.2 System Board Back View

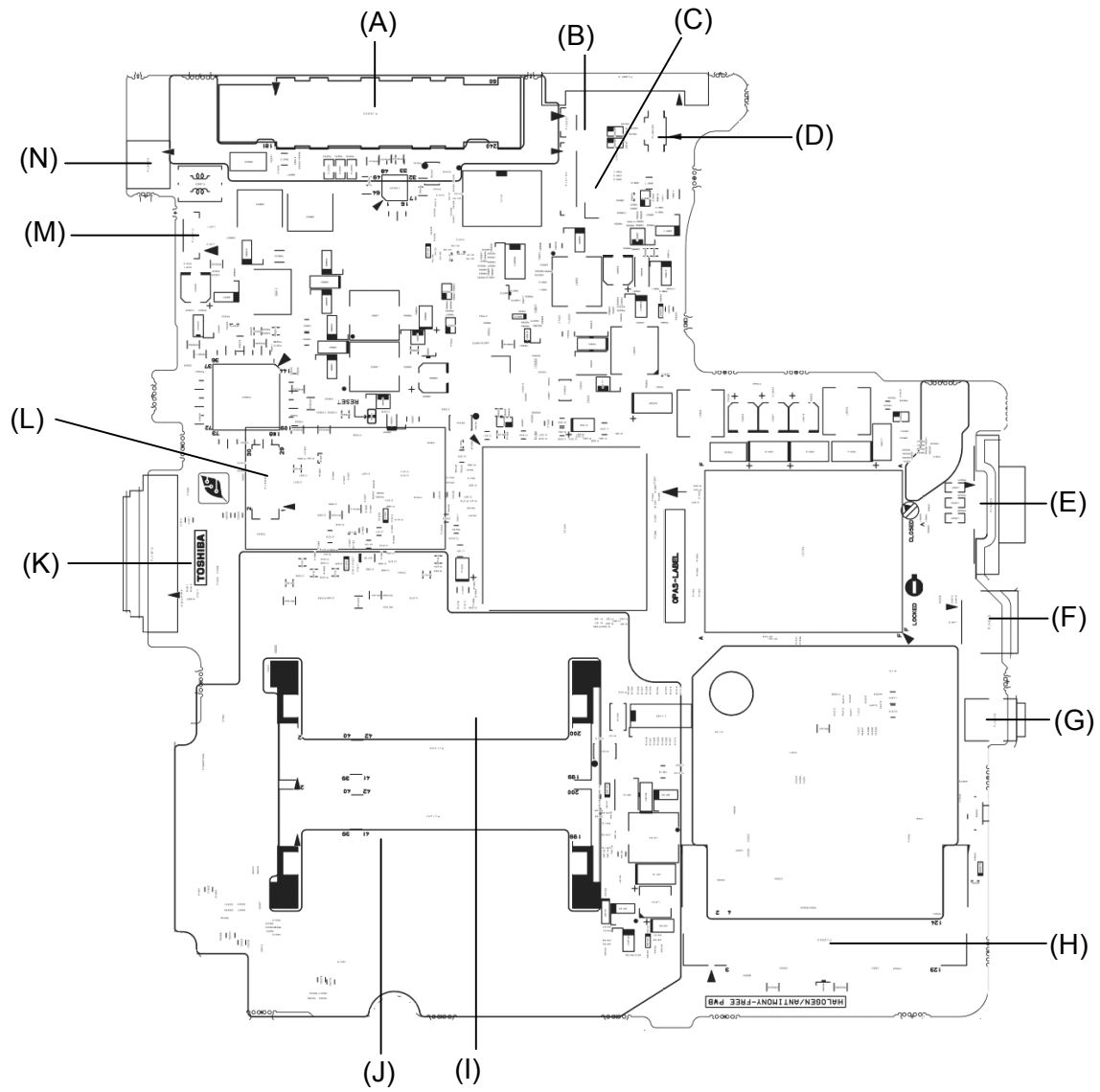


Figure B-2 System board layout (back)

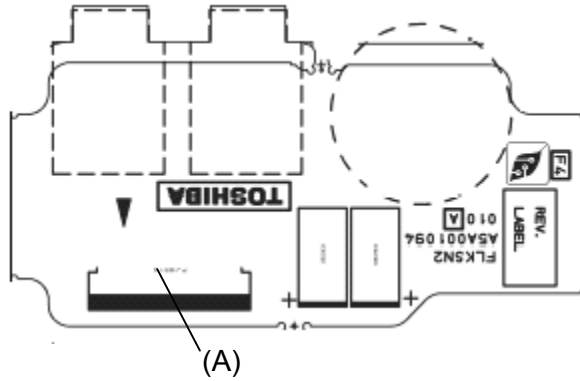
Table B-2 System board ICs and connectors (back)

| Mark | Number | Name                     |
|------|--------|--------------------------|
| (A)  | PJ2200 | Docking I/F connector    |
| (B)  | PJ3021 | MDC relay connector      |
| (C)  | PJ4100 | Network I/F connector    |
| (D)  | PJ8490 | RTC connector            |
| (E)  | PJ5620 | CRT I/F connector        |
| (F)  | PJ4613 | USB I/F connector        |
| (G)  | PJ4200 | 1394 I/F connector       |
| (H)  | PJ2500 | Mini PCI I/F connector   |
| (I)  | PJ1400 | Memory I/F connector (1) |
| (J)  | PJ1401 | Memory I/F connector (2) |
| (K)  | PJ1810 | ODD I/F connector        |
| (L)  | PJ3020 | MDC I/F connector        |
| (M)  | PJ4610 | USB I/F connector        |
| (N)  | PJ8800 | DC-IN I/F connector      |

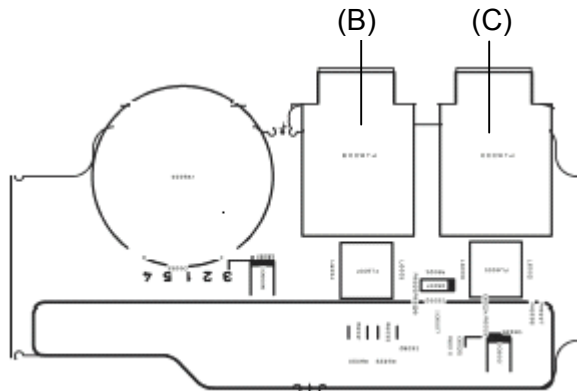


**B.3 Sound Board (FLKSN\*)**

(Front)



(Back)



*Figure B-3 Sound Board (FLKSN\*) layout (front & back)*

*Table B-3 Sound Board (FLKSN\*) connectors*

| Mark | Number | Name                          |
|------|--------|-------------------------------|
| (A)  | PJ9510 | System I/F connector          |
| (B)  | PJ6003 | Headphone connector           |
| (C)  | PJ6000 | External microphone connector |



## Appendix C Pin Assignment

### System Board (FLKSY\*)

#### C.1 PJ1400 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-B1V  | I   | 2       | MR1R25-B1V  | I   |
| 3       | GND         | -   | 4       | GND         | -   |
| 5       | SDQ05R-B2P  | I/O | 6       | SDQ02R-B2P  | I/O |
| 7       | SDQ04R-B2P  | I/O | 8       | SDQ03R-B2P  | I/O |
| 9       | 2R5-B2V     | I   | 10      | 2R5-B2V     | I   |
| 11      | SDQS0R-B2P  | I/O | 12      | SDM00R-B2P  | I   |
| 13      | SDQ00R-B2P  | I/O | 14      | SDQ07R-B2P  | I/O |
| 15      | GND         | -   | 16      | GND         | -   |
| 17      | SDQ01R-B2P  | I/O | 18      | SDQ06R-B2P  | I/O |
| 19      | SDQ12R-B2P  | I/O | 20      | SDQ11R-B2P  | I/O |
| 21      | 2R5-B2V     | I   | 22      | 2R5-B2V     | I   |
| 23      | SDQ13R-B2P  | I/O | 24      | SDQ10R-B2P  | I/O |
| 25      | SDQS1R-B2P  | I/O | 26      | SDM01R-B2P  | I   |
| 27      | GND         | -   | 28      | GND         | -   |
| 29      | SDQ08R-B2P  | I/O | 30      | SDQ14R-B2P  | I/O |
| 31      | SDQ09R-B2P  | I/O | 32      | SDQ15R-B2P  | I/O |
| 33      | 2R5-B2V     | I   | 34      | 2R5-B2V     | I   |
| 35      | SCK0-B2P    | I   | 36      | 2R5-B2V     | I   |
| 37      | SCK0-B2N    | I   | 38      | GND         | -   |
| 39      | GND         | -   | 40      | GND         | -   |
| 41      | SDQ20R-B2P  | I/O | 42      | SDQ21R-B2P  | I/O |
| 43      | SDQ17R-B2P  | I/O | 44      | SDQ22R-B2P  | I/O |
| 45      | 2R5-B2V     | I   | 46      | 2R5-B2V     | I   |
| 47      | SDQS2R-B2P  | I/O | 48      | SDM02R-B2P  | I   |
| 49      | SDQ16R-B2P  | I/O | 50      | SDQ19R-B2P  | I/O |
| 51      | GND         | -   | 52      | GND         | -   |
| 53      | SDQ18R-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      | SDQ30R-B2P  | I/O |
| 57      | 2R5-B2V     | I   | 58      | 2R5-B2V     | I   |
| 59      | SDQ24R-B2P  | I/O | 60      | SDQ26R-B2P  | I/O |
| 61      | SDQS3R-B2P  | I/O | 62      | SDM03R-B2P  | I   |
| 63      | GND         | -   | 64      | GND         | -   |
| 65      | SDQ28R-B2P  | I/O | 66      | SDQ27R-B2P  | I/O |
| 67      | SDQ29R-B2P  | I/O | 68      | SDQ31R-B2P  | I/O |
| 69      | 2R5-B2V     | I   | 70      | 2R5-B2V     | I   |
| 71      | SCB5A-B2P   | I/O | 72      | SCB0A-B2P   | I/O |
| 73      | SCB4A-B2P   | I/O | 74      | SCB1A-B2P   | I/O |
| 75      | GND         | -   | 76      | GND         | -   |
| 77      | SDQS8A-B2P  | I/O | 78      | GND         | -   |
| 79      | SCB2A-B2P   | I/O | 80      | SCB3A-B2P   | I/O |
| 81      | 2R5-B2V     | I   | 82      | 2R5-B2V     | I   |
| 83      | SCB6A-B2P   | I/O | 84      | SCB7A-B2P   | I/O |
| 85      | N.C.        | -   | 86      | N.C.        | -   |
| 87      | GND         | -   | 88      | GND         | -   |
| 89      | 2R5-B2V     | I   | 90      | GND         | -   |
| 91      | GND         | -   | 92      | 2R5-B2V     | I   |
| 93      | 2R5-B2V     | I   | 94      | 2R5-B2V     | I   |
| 95      | SCKE1-B2P   | I   | 96      | SCKE0-B2P   | I   |
| 97      | N.C.        | -   | 98      | N.C.        | -   |
| 99      | SMA12R-B2P  | I   | 100     | SMA11R-B2P  | I   |
| 101     | SMA09R-B2P  | I   | 102     | SMA08R-B2P  | I   |
| 103     | GND         | -   | 104     | GND         | -   |
| 105     | SMA07R-B2P  | I   | 106     | SMA06R-B2P  | I   |
| 107     | SMA05-B2P   | I   | 108     | SMA04-B2P   | I   |
| 109     | SMA03R-B2P  | I   | 110     | SMA02R-B2P  | I   |
| 111     | SMA01-B2P   | I   | 112     | SMA00R-B2P  | I   |
| 113     | 2R5-B2V     | I   | 114     | 2R5-B2V     | I   |
| 115     | SMA10R-B2P  | I   | 116     | SBS1R-B2P   | I   |
| 117     | SBS0R-B2P   | I   | 118     | SRASR-B2N   | I   |
| 119     | SWER-B2N    | I   | 120     | SCASR-B2N   | I   |

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     | SDQ34R-B2P  | I/O |
| 129     | SDQ36R-B2P  | I/O | 130     | SDQ38R-B2P  | I/O |
| 131     | 2R5-B2V     | I   | 132     | 2R5-B2V     | I   |
| 133     | SDQS4R-B2P  | I/O | 134     | SDM04R-B2P  | I   |
| 135     | SDQ32R-B2P  | I/O | 136     | SDQ39R-B2P  | I/O |
| 137     | GND         | -   | 138     | GND         | -   |
| 139     | SDQ33R-B2P  | I/O | 140     | SDQ35R-B2P  | I/O |
| 141     | SDQ40R-B2P  | I/O | 142     | SDQ42R-B2P  | I/O |
| 143     | 2R5-B2V     | I   | 144     | 2R5-B2V     | I   |
| 145     | SDQ41R-B2P  | I/O | 146     | SDQ47R-B2P  | I/O |
| 147     | SDQS5R-B2P  | I/O | 148     | SDM05R-B2P  | I   |
| 149     | GND         | -   | 150     | GND         | -   |
| 151     | SDQ44R-B2P  | I/O | 152     | SDQ46R-B2P  | I/O |
| 153     | SDQ45R-B2P  | I/O | 154     | SDQ43R-B2P  | I/O |
| 155     | 2R5-B2V     | I   | 156     | 2R5-B2V     | I   |
| 157     | 2R5-B2V     | I   | 158     | SCK1-B2N    | I   |
| 159     | GND         | -   | 160     | SCK1-B2P    | I   |
| 161     | GND         | -   | 162     | GND         | -   |
| 163     | SDQ53R-B2P  | I/O | 164     | SDQ55R-B2P  | I/O |
| 165     | SDQ48R-B2P  | I/O | 166     | SDQ50R-B2P  | I/O |
| 167     | 2R5-B2V     | I   | 168     | 2R5-B2V     | I   |
| 169     | SDQS6R-B2P  | I/O | 170     | SDM06R-B2P  | I   |
| 171     | SDQ49R-B2P  | I/O | 172     | SDQ54R-B2P  | I/O |
| 173     | GND         | -   | 174     | GND         | -   |
| 175     | SDQ52R-B2P  | I/O | 176     | SDQ51R-B2P  | I/O |
| 177     | SDQ60R-B2P  | I/O | 178     | SDQ62R-B2P  | I/O |
| 179     | 2R5-B2V     | I   | 180     | 2R5-B2V     | I   |
| 181     | SDQ56R-B2P  | I/O | 182     | SDQ58R-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     | SDQ57R-B2P  | I/O | 188     | SDQ59R-B2P  | I/O |
| 189     | SDQ61R-B2P  | I/O | 190     | SDQ63R-B2P  | I/O |
| 191     | 2R5-B2V     | I   | 192     | 2R5-B2V     | I   |
| 193     | SMBDAT-P3P  | I/O | 194     | GND         | -   |
| 195     | SMBCLK-P3P  | I   | 196     | GND         | -   |
| 197     | P3V         | I   | 198     | GND         | -   |
| 199     | N.C.        | -   | 200     | N.C.        | -   |

## C.2 PJ1401 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       | MRVREF-B1V  | I   | 2       | MRVREF-B1V  | I   |
| 3       | GND         | -   | 4       | GND         | -   |
| 5       | SDQ05R-B2P  | I/O | 6       | SDQ02R-B2P  | I/O |
| 7       | SDQ04R-B2P  | I/O | 8       | SDQ03R-B2P  | I/O |
| 9       | 2R5-B2V     | I   | 10      | 2R5-B2V     | I   |
| 11      | SDQS0R-B2P  | I/O | 12      | SDM00R-B2P  | I   |
| 13      | SDQ00R-B2P  | I/O | 14      | SDQ07R-B2P  | I/O |
| 15      | GND         | -   | 16      | GND         | -   |
| 17      | SDQ01R-B2P  | I/O | 18      | SDQ06R-B2P  | I/O |
| 19      | SDQ12R-B2P  | I/O | 20      | SDQ11R-B2P  | I/O |
| 21      | 2R5-B2V     | I   | 22      | 2R5-B2V     | I   |
| 23      | SDQ13R-B2P  | I/O | 24      | SDQ10R-B2P  | I/O |
| 25      | SDQS1R-B2P  | I/O | 26      | SDM01R-B2P  | I   |
| 27      | GND         | -   | 28      | GND         | -   |
| 29      | SDQ08R-B2P  | I/O | 30      | SDQ14R-B2P  | I/O |
| 31      | SDQ09R-B2P  | I/O | 32      | SDQ15R-B2P  | I/O |
| 33      | 2R5-B2V     | I   | 34      | 2R5-B2V     | I   |
| 35      | SCK3-B2P    | I   | 36      | 2R5-B2V     | I   |
| 37      | SCK3-B2N    | I   | 38      | GND         | -   |
| 39      | GND         | -   | 40      | GND         | -   |
| 41      | SDQ20R-B2P  | I/O | 42      | SDQ21R-B2P  | I/O |
| 43      | SDQ17R-B2P  | I/O | 44      | SDQ22R-B2P  | I/O |
| 45      | 2R5-B2V     | I   | 46      | 2R5-B2V     | I   |
| 47      | SDQS2R-B2P  | I/O | 48      | SDM02R-B2P  | I   |
| 49      | SDQ16R-B2P  | I/O | 50      | SDQ19R-B2P  | I/O |
| 51      | GND         | -   | 52      | GND         | -   |
| 53      | SDQ18R-B2P  | I/O | 54      | SDQ23R-B2P  | I/O |

Table C-2 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      | SDQ30R-B2P  | I/O |
| 57      | 2R5-B2V     | I   | 58      | 2R5-B2V     | I   |
| 59      | SDQ24R-B2P  | I/O | 60      | SDQ26R-B2P  | I/O |
| 61      | SDQS3R-B2P  | I/O | 62      | SDM03R-B2P  | I   |
| 63      | GND         | -   | 64      | GND         | -   |
| 65      | SDQ28R-B2P  | I/O | 66      | SDQ27R-B2P  | I/O |
| 67      | SDQ29R-B2P  | I/O | 68      | SDQ31R-B2P  | I/O |
| 69      | 2R5-B2V     | I   | 70      | 2R5-B2V     | I   |
| 71      | SCB5B-B2P   | I/O | 72      | SCB0B-B2P   | I/O |
| 73      | SCB4B-B2P   | I/O | 74      | SCB1B-B2P   | I/O |
| 75      | GND         | -   | 76      | GND         | -   |
| 77      | SDQS8B-B2P  | I/O | 78      | GND         | -   |
| 79      | SCB2B-B2P   | I/O | 80      | SCB3B-B2P   | I/O |
| 81      | 2R5-B2V     | I   | 82      | 2R5-B2V     | I   |
| 83      | SCB6B-B2P   | I/O | 84      | SCB7B-B2P   | I/O |
| 85      | N.C.        | -   | 86      | N.C.        | -   |
| 87      | GND         | -   | 88      | GND         | -   |
| 89      | 2R5-B2V     | I   | 90      | GND         | -   |
| 91      | GND         | -   | 92      | 2R5-B2V     | I   |
| 93      | 2R5-B2V     | I   | 94      | 2R5-B2V     | I   |
| 95      | SCKE3-B2P   | I   | 96      | SCKE2-B2P   | I   |
| 97      | N.C.        | -   | 98      | N.C.        | -   |
| 99      | SMA12-B2P   | I   | 100     | SMA11-B2P   | I   |
| 101     | SMA09-B2P   | I   | 102     | SMA08-B2P   | I   |
| 103     | GND         | -   | 104     | GND         | -   |
| 105     | SMA07-B2P   | I   | 106     | SMA06-B2P   | I   |
| 107     | SMAB05-B2P  | I   | 108     | SMAB04-B2P  | I   |
| 109     | SMA03-B2P   | I   | 110     | SMAB02-B2P  | I   |
| 111     | SMAB01-B2P  | I   | 112     | SMA00-B2P   | I   |
| 113     | 2R5-B2V     | I   | 114     | 2R5-B2V     | I   |
| 115     | SMA10-B2P   | I   | 116     | SBS1-B2P    | I   |
| 117     | SBS0-B2P    | I   | 118     | SRAS-B2N    | I   |
| 119     | SWE-B2N     | I   | 120     | SCAS-B2N    | I   |



*Table C-2 Memory 1 connector pin assignment (200-pin) (3/4)*

| <b>Pin No.</b> | <b>Signal name</b> | <b>I/O</b> | <b>Pin No.</b> | <b>Signal Name</b> | <b>I/O</b> |
|----------------|--------------------|------------|----------------|--------------------|------------|
| 121            | SCS2-B2N           | I          | 122            | SCS3-B2N           | I          |
| 123            | N.C.               | -          | 124            | N.C.               | -          |
| 125            | GND                | -          | 126            | GND                | -          |
| 127            | SDQ37R-B2P         | I/O        | 128            | SDQ34R-B2P         | I/O        |
| 129            | SDQ36R-B2P         | I/O        | 130            | SDQ38R-B2P         | I/O        |
| 131            | 2R5-B2V            | I          | 132            | 2R5-B2V            | I          |
| 133            | SDQS4R-B2P         | I/O        | 134            | SDM04R-B2P         | I          |
| 135            | SDQ32R-B2P         | I/O        | 136            | SDQ39R-B2P         | I/O        |
| 137            | GND                | -          | 138            | GND                | -          |
| 139            | SDQ33R-B2P         | I/O        | 140            | SDQ35R-B2P         | I/O        |
| 141            | SDQ40R-B2P         | I/O        | 142            | SDQ42R-B2P         | I/O        |
| 143            | 2R5-B2V            | I          | 144            | 2R5-B2V            | -          |
| 145            | SDQ41R-B2P         | I/O        | 146            | SDQ47R-B2P         | I/O        |
| 147            | SDQS5R-B2P         | I/O        | 148            | SDM05R-B2P         | I          |
| 149            | GND                | -          | 150            | GND                | -          |
| 151            | SDQ44R-B2P         | I/O        | 152            | SDQ46R-B2P         | I/O        |
| 153            | SDQ45R-B2P         | I/O        | 154            | SDQ43R-B2P         | I/O        |
| 155            | 2R5-B2V            | I          | 156            | 2R5-B2V            | I          |
| 157            | 2R5-B2V            | I          | 158            | SCK4-B2N           | I          |
| 159            | GND                | -          | 160            | SCK4-B2P           | I          |
| 161            | GND                | -          | 162            | GND                | -          |
| 163            | SDQ53R-B2P         | I/O        | 164            | SDQ55R-B2P         | I/O        |
| 165            | SDQ48R-B2P         | I/O        | 166            | SDQ50R-B2P         | I/O        |
| 167            | 2R5-B2V            | I          | 168            | 2R5-B2V            | I          |
| 169            | SDQS6R-B2P         | I/O        | 170            | SDM06R-B2P         | I          |
| 171            | SDQ49R-B2P         | I/O        | 172            | SDQ54R-B2P         | I/O        |
| 173            | GND                | -          | 174            | GND                | -          |
| 175            | SDQ52R-B2P         | I/O        | 176            | SDQ51R-B2P         | I/O        |
| 177            | SDQ60R-B2P         | I/O        | 178            | SDQ62R-B2P         | I/O        |
| 179            | 2R5-B2V            | I          | 180            | 2R5-B2V            | I          |
| 181            | SDQ56R-B2P         | I/O        | 182            | SDQ58R-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     | SDQ57R-B2P  | I/O | 188     | SDQ59R-B2P  | I/O |
| 189     | SDQ61R-B2P  | I/O | 190     | SDQ63R-B2P  | I/O |
| 191     | 2R5-B2V     | I   | 192     | 2R5-B2V     | I   |
| 193     | SMBDAT-P3P  | I/O | 194     | P3V         | I   |
| 195     | SMBCLK-P3P  | I   | 196     | GND         | -   |
| 197     | P3V         | I   | 198     | GND         | -   |
| 199     | N.C.        | -   | 200     | N.C.        | -   |

**C.3 PJ1800 HDD I/F Connector (44-pin)***Table C-3 HDD I/F connector pin assignment (44-pin)*

| Pin No. | Signal Name | I/O | Pin No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | N.C.        | -   | 2       | GND         | -   |
| 3       | P5V         | I   | 4       | P5V         | I   |
| 5       | GND         | -   | 6       | HDDLED-P5N  | I/O |
| 7       | PDCS3-P3N   | O   | 8       | PDCS1-P3N   | O   |
| 9       | PDA2-P3P    | O   | 10      | PDA0-P3P    | O   |
| 11      | N.C.        | -   | 12      | PDA1-P3P    | O   |
| 13      | N.C.        | -   | 14      | IRQ14-P3P   | I   |
| 15      | GND         | -   | 16      | PDDACK-P3N  | O   |
| 17      | GND         | -   | 18      | PIORDY-P3P  | I   |
| 19      | GND         | -   | 20      | PDIOR-P3N   | O   |
| 21      | GND         | -   | 22      | PDIOW-P3N   | O   |
| 23      | GND         | -   | 24      | PDDREQ-P3P  | I   |
| 25      | N.C.        | -   | 26      | GND         | -   |
| 27      | PDD15-P3P   | I/O | 28      | PDD00-P3P   | I/O |
| 29      | PDD14-P3P   | I/O | 30      | PDD01-P3P   | I/O |
| 31      | PDD13-P3P   | I/O | 32      | PDD02-P3P   | I/O |
| 33      | PDD12-P3P   | I/O | 34      | PDD03-P3P   | I/O |
| 35      | PDD11-P3P   | I/O | 36      | PDD04-P3P   | I/O |
| 37      | PDD10-P3P   | I/O | 38      | PDD05-P3P   | I/O |
| 39      | PDD09-P3P   | I/O | 40      | PDD06-P3P   | I/O |
| 41      | PDD08-P3P   | I/O | 42      | PDD07-P3P   | I/O |
| 43      | GND         | -   | 44      | IDRSTA-P5N  | I   |

## C.4 PJ1810 Optical Drive I/F Connector (50-pin)

Table C-4 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-P3P   | I/O |
| 7       | SDD07-P3P   | I/O | 8       | SDD09-P3P   | I/O |
| 9       | SDD06-P3P   | I/O | 10      | SDD10-P3P   | I/O |
| 11      | SDD05-P3P   | I/O | 12      | SDD11-P3P   | I/O |
| 13      | SDD04-P3P   | I/O | 14      | SDD12-P3P   | I/O |
| 15      | SDD03-P3P   | I/O | 16      | SDD13-P3P   | I/O |
| 17      | SDD02-P3P   | I/O | 18      | SDD14-P3P   | I/O |
| 19      | SDD01-P3P   | I/O | 20      | SDD15-P3P   | I/O |
| 21      | SDD00-P3P   | I/O | 22      | SDDREQ-P3P  | I   |
| 23      | GND         | -   | 24      | SDIOR-P3N   | O   |
| 25      | SDIOW-P3N   | O   | 26      | GND         | -   |
| 27      | SIORDY-P3P  | 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      | N.C.        | -   | 38      | P5V         | O   |
| 39      | P5V         | O   | 40      | P5V         | O   |
| 41      | P5V         | O   | 42      | P5V         | O   |
| 43      | GND         | -   | 44      | GND         | -   |
| 45      | GND         | -   | 46      | N.C.        | -   |
| 47      | N.C.        | -   | 48      | GND         | -   |
| 49      | N.C.        | -   | 50      | N.C.        | -   |

**C.5 PJ2110 PC Card I/F Connector (70-pin)***Table C-5 PC card I/F connector pin assignment (70-pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | ACAD00-EYP  | I/O |
| 3       | ACAD01-EYP  | I/O | 4       | ACAD03-EYP  | I/O |
| 5       | ACAD05-EYP  | I/O | 6       | ACAD07-EYP  | I/O |
| 7       | ACCBEO-EYN  | I/O | 8       | ACAD09-EYP  | I/O |
| 9       | ACAD11-EYP  | I/O | 10      | ACAD12-EYP  | I/O |
| 11      | ACAD14-EYP  | I/O | 12      | ACCBE1-EYN  | I/O |
| 13      | ACPAR-EYP   | I/O | 14      | ACPERR-EYN  | I/O |
| 15      | ACGNT-EYN   | I   | 16      | ACINT-EYN   | O   |
| 17      | MCVCCA-EYV  | I   | 18      | MCVPPA-EYV  | I   |
| 19      | ACCLK-EYP   | I/O | 20      | ACIRDY-EYN  | I/O |
| 21      | ACCBE2-EYN  | I/O | 22      | ACAD18-EYP  | I/O |
| 23      | ACAD20-EYP  | I/O | 24      | ACAD21-EYP  | I/O |
| 25      | ACAD22-EYP  | I/O | 26      | ACAD23-EYP  | I/O |
| 27      | ACAD24-EYP  | I/O | 28      | ACAD25-EYP  | I/O |
| 29      | ACAD26-EYP  | I/O | 30      | ACAD27-EYP  | I/O |
| 31      | ACAD29-EYP  | I/O | 32      | ACD02-EYP   | I/O |
| 33      | ACCLKR-EYN  | I/O | 34      | GND         | -   |
| 35      | GND         | -   | 36      | ACCD1-E3N   | O   |
| 37      | ACAD02-EYP  | I/O | 38      | ACAD04-EYP  | I/O |
| 39      | ACAD06-EYP  | I/O | 40      | ACD14-EYP   | I/O |
| 41      | ACAD08-EYP  | I/O | 42      | ACAD10-EYP  | I/O |
| 43      | ACVS1-E3P   | I/O | 44      | ACAD13-EYP  | I/O |
| 45      | ACAD15-EYP  | I/O | 46      | ACAD16-EYP  | I/O |
| 47      | ACA18-EYP   | I/O | 48      | ACLOCK-EYN  | I/O |
| 49      | ACSTOP-EYN  | I/O | 50      | ACDEVS-EYN  | I/O |
| 51      | MCVCCA-EYV  | I   | 52      | MCVPPA-EYV  | I   |
| 53      | ACTRDY-EYN  | I/O | 54      | ACFRAM-EYN  | I/O |
| 55      | ACAD17-EYP  | I/O | 56      | ACAD19-EYP  | I/O |
| 57      | ACVS2-E3P   | I/O | 58      | ACRST-EYN   | I/O |
| 59      | ACSERR-EYN  | I/O | 60      | ACREQ-EYN   | O   |

Table C-5 PC Card slot connector pin assignment (70-pin)(2/2)

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 61      | ACCBE3-EYN  | I/O | 62      | ACAUDI-EYP  | O   |
| 63      | ACSTSC-EYP  | O   | 64      | ACAD28-EYP  | I/O |
| 65      | ACAD30-EYP  | I/O | 66      | ACAD31-EYP  | I/O |
| 67      | ACCD2-E3N   | O   | 68      | GND         | -   |
| 69      | GND         | -   | 70      | GND         | -   |

## C.6 PJ2200 Docking I/F connector (240-pin)

Table C-6 Docking I/F connector (240-pin)(1/4)

| Pin No. | Signal name  | I/O | Pin No. | Signal name  | I/O |
|---------|--------------|-----|---------|--------------|-----|
| A1      | DSKDC        | I   | A2      | GND          | -   |
| 1       | DCOUT        | I   | 2       | DCOUT        | I   |
| 3       | DOCDT1-S3N   | O   | 4       | P5V          | I   |
| 5       | EXMSCK-P5P   | I/O | 6       | EXKBCK-P5P   | I/O |
| 7       | GND          | -   | 8       | N.C.         | -   |
| 9       | DPCONF-S5P   | O   | 10      | GND          | -   |
| 11      | GND          | -   | 12      | DDCACK-P3P   | I/O |
| 13      | DRED-PXP     | I   | 14      | DGREEN-PXP   | I   |
| 15      | DBLUE-PXP    | I   | 16      | DVSYNC-P3P   | I   |
| 17      | (DVISC-P3P)  | -   | 18      | Reserved     | -   |
| 19      | GND          | -   | 20      | (DVI-PRTCT2) | -   |
| 21      | (DVI-PRTCT1) | -   | 22      | (DVITX2-P3P) | -   |
| 23      | (DVITX2-P3N) | -   | 24      | (DVITX1-P3P) | -   |
| 25      | (DVITX1-P3N) | -   | 26      | (DVITX0-P3P) | -   |
| 27      | (DVITX0-P3N) | -   | 28      | GND          | -   |
| 29      | GND          | -   | 30      | (DVITXC-P3P) | -   |
| 31      | (DVITXC-P3N) | -   | 32      | (DVIDET-S3N) | -   |
| 33      | (DVIPD1-P3N) | -   | 34      | Reserved     | -   |
| 35      | (QSWON-B3P)  | -   | 36      | (DIRQD-S3N)  | -   |
| 37      | GND          | -   | 38      | (PCM2SP-B3P) | -   |
| 39      | (DPMRST-S3N) | -   | 40      | (DAD00-P3P)  | -   |
| 41      | GND          | -   | 42      | (DAD00-P3P)  | -   |
| 43      | (DADO2-P3P)  | -   | 44      | (DAD06-P3P)  | -   |
| 45      | GND          | -   | 46      | (XDPCI-P3P)  | -   |
| 47      | (DAD09-P3P)  | -   | 48      | (DAD11-P3P)  | -   |
| 49      | GND          | -   | 50      | (DAD11-P3P)  | -   |
| 51      | (DAD15-P3P)  | -   | 52      | (DINTA-P3N)  | -   |
| 53      | VOID         | -   | 54      | VOID         | -   |
| 55      | BIDDP-EXP    | I/O | 56      | BIDDN-EXN    | I/O |
| 57      | VOID         | -   | 58      | VOID         | -   |

Table C-6 Docking I/F connector (240-pin)(2/4)

| Pin No. | Signal name  | I/O | Pin No. | Signal name   | I/O |
|---------|--------------|-----|---------|---------------|-----|
| 59      | MDMRNG-E3P   | I/O | 60      | MDMTIP-E3P    | I/O |
| 61      | DCOUT        | I   | 62      | DCOUT         | I   |
| 63      | EJCTRQ-S3N   | I/O | 64      | IF-P5V        | I   |
| 65      | EXMSDT-P5P   | I/O | 66      | EXKBDT-P5P    | I/O |
| 67      | GND          | -   | 68      | (DNVSON-S3P)  | -   |
| 69      | GND          | -   | 70      | (NVPCNF-S3P)  | -   |
| 71      | GND          | -   | 72      | DDCADA-P3P    | I/O |
| 73      | GND          | -   | 74      | GND           | -   |
| 75      | GND          | -   | 76      | DHSYNC-P3P    | I   |
| 77      | (DVISD-P3P)  | -   | 78      | (DVI_PRTCT3)  | -   |
| 79      | GND          | -   | 80      | (DVITX5-P3P)  | -   |
| 81      | (DVITX5-P3N) | -   | 82      | (DVITX4-P3P)  | -   |
| 83      | (DVITX4-P3N) | -   | 84      | (DVITX3-P3P)  | -   |
| 85      | (DVITX3-P3N) | -   | 86      | (DVI16)       | -   |
| 87      | (DVI17)      | -   | 88      | GND           | -   |
| 89      | GND          | -   | 90      | (DOC_ON_LED1) | -   |
| 91      | Reserved     | -   | 92      | (DOC_ON_LED2) | -   |
| 93      | (DVIPD0-P3N) | -   | 94      | (DVI_PRTCT4)  | -   |
| 95      | (DCADIO-S3P) | -   | 96      | (DSMI-B3P)    | -   |
| 97      | GND          | -   | 98      | (DCKRUN-P3N)  | -   |
| 99      | (PME-S3P)    | -   | 100     | (DAD01-P3P)   | -   |
| 101     | GND          | -   | 102     | (DAD03-P3P)   | -   |
| 103     | (DAD05-P3P)  | -   | 104     | (DAD07-P3P)   | -   |
| 105     | GND          | -   | 106     | (DAD08-P3P)   | -   |
| 107     | (DAD10-P3P)  | -   | 108     | (DAD10-P3P)   | -   |
| 109     | GND          | -   | 110     | (DAD14-P3P)   | -   |
| 111     | (DCBE1-P3N)  | -   | 112     | (DPAR-P3P)    | -   |
| 113     | VOID         | -   | 114     | VOID          | -   |
| 115     | BIDCN-EXN    | I/O | 116     | VOID          | -   |
| 117     | BIDCP-EXP    | I/O | 118     | VOID          | -   |
| 119     | VOID         | -   | 120     | VOID          | -   |



Table C-6 Docking I/F connector (240-pin)(3/4)

| Pin No. | Signal name  | I/O | Pin No. | Signal name | I/O |
|---------|--------------|-----|---------|-------------|-----|
| 121     | DCOUT        | I   | 122     | DCOUT       | I   |
| 123     | DSSCL-S5P    | I/O | 124     | IF-P5V      | I   |
| 125     | M5V          | I   | 126     | N.C.        | -   |
| 127     | GND          | -   | 128     | N.C.        | -   |
| 129     | N.C.         | -   | 130     | N.C.        | -   |
| 131     | GND          | -   | 132     | N.C.        | -   |
| 133     | N.C.         | -   | 134     | SNDMUT-S3N  | I   |
| 135     | (SNDVCC-OFF) | -   | 136     | DOUTL-PXP   | I/O |
| 137     | DINL-PXP     | I/O | 138     | DINR-PXN    | I/O |
| 139     | GND          | -   | 140     | PWRSW-S3N   | O   |
| 141     | DCD-PYP      | O   | 142     | DSR-PYP     | O   |
| 143     | TXD-PYN      | I   | 144     | RING-BYP    | O   |
| 145     | PE-P5P       | O   | 146     | PDB07-P5P   | I/O |
| 147     | PDB06-P5P    | I/O | 148     | GND         | -   |
| 149     | GND          | -   | 150     | PDB04-P5P   | I/O |
| 151     | PDB01-P5P    | I/O | 152     | PDB02-P5P   | I/O |
| 153     | PDB00-P5P    | I/O | 154     | STROB-P5N   | I   |
| 155     | (DPGNT-P3N)  | I   | 156     | (DAD30-P3P) | -   |
| 157     | GND          | -   | 158     | (DAD28-P3P) | -   |
| 159     | (DAD26-P3P)  | -   | 160     | (DAD24-P3P) | -   |
| 161     | GND          | -   | 162     | (DIDSL-P3P) | -   |
| 163     | (DAD22-P3P)  | -   | 164     | (DAD20-P3P) | -   |
| 165     | GND          | -   | 166     | (DCBE0-P3N) | -   |
| 167     | (DAD18-P3P)  | -   | 168     | (DAD16-P3P) | -   |
| 169     | GND          | -   | 170     | (DCBE2-P3N) | -   |
| 171     | (DTRDY-P3N)  | -   | 172     | (DSTOP-P3N) | -   |
| 173     | GND          | -   | 174     | VOID        | -   |
| 175     | LAN-E3V      | I   | 176     | VOID        | -   |
| 177     | VOID         | -   | 178     | N.C.        | -   |
| 179     | BIDAP-EXP    | O   | 180     | BIDAN-EXN   | O   |

Table C-6 Docking I/F connector (240-pin)(4/4)

| Pin No. | Signal name | I/O | Pin No. | Signal name  | I/O |
|---------|-------------|-----|---------|--------------|-----|
| 181     | DCOUT       | I   | 182     | DCOUT        | I   |
| 183     | DSSDA-S5P   | I/O | 184     | IF-P5V       | I   |
| 185     | Reserved    | -   | 186     | N.C.         | -   |
| 187     | GND         | -   | 188     | N.C.         | -   |
| 189     | USBP2-S3P   | I/O | 190     | USBP2-S3N    | I/O |
| 191     | GND         | -   | 192     | N.C.         | -   |
| 193     | N.C.        | -   | 194     | DOU-TR-PXP   | I/O |
| 195     | DOU-TR-PXN  | I/O | 196     | DOU-TL-PXN   | I/O |
| 197     | DINL-PXN    | I/O | 198     | DINR-PXP     | I/O |
| 199     | GND         | -   | 200     | RXD-PYN      | O   |
| 201     | RTS-PYP     | I   | 202     | CTS-PYP      | O   |
| 203     | DTR-PYP     | I   | 204     | SELCT-P5P    | O   |
| 205     | BUSY-P5P    | O   | 206     | ACK-P5N      | O   |
| 207     | PDB05-P5P   | I/O | 208     | GND          | -   |
| 209     | GND         | -   | 210     | PDB03-P5P    | I/O |
| 211     | SLIN-P5N    | I   | 212     | PINIT-P5N    | I   |
| 213     | ERROR-P5N   | O   | 214     | AUTFD-P5N    | I   |
| 215     | (DPREQ-P3N) | -   | 216     | (DAD31-P3P)  | -   |
| 217     | GND         | -   | 218     | (DAD29-P3P)  | -   |
| 219     | (DAD27-P3P) | -   | 220     | (DAD25-P3P)  | -   |
| 221     | GND         | -   | 222     | (DCBE23-P3N) | -   |
| 223     | (DAD23-P3P) | -   | 224     | (DAD21-P3P)  | -   |
| 225     | GND         | -   | 226     | (DCPCLR-P3P) | -   |
| 227     | (DAD19-P3P) | -   | 228     | (DAD17-P3P)  | -   |
| 229     | GND         | -   | 230     | (DFRAME-P3N) | -   |
| 231     | (DIRDY-P3N) | -   | 232     | (DDEVSL-P3N) | -   |
| 233     | GND         | -   | 234     | ACT-E3N      | O   |
| 235     | LINK-E3N    | O   | 236     | DOCDT2-S3N   | O   |
| 237     | VOID        | -   | 238     | VOID         | -   |
| 239     | BIDBP-EXP   | I   | 240     | BIDBN-EXN    | I   |

**C.7 PJ2500 Mini PCI I/F Connector (124-pin)***Table C-7 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      | PIRQD-P3N   | I/O | 18      | P5V         | I   |
| 19      | P3V         | I   | 20      | PIRQG-P3N   | I/O |
| 21      | N.C.        | -   | 22      | N.C.        | -   |
| 23      | GND         | -   | 24      | E3V         | I   |
| 25      | X33MPC-P3P  | O   | 26      | PCIRS0-S3N  | O   |
| 27      | GND         | -   | 28      | P3V         | I   |
| 29      | PREQ2-P3N   | I   | 30      | PGNT2-P3N   | O   |
| 31      | P3V         | I   | 32      | GND         | -   |
| 33      | AD31-P3P    | I/O | 34      | PME-S3N     | I   |
| 35      | AD29-P3P    | I/O | 36      | N.C.        | -   |
| 37      | GND         | -   | 38      | AD30-P3P    | I/O |
| 39      | AD27-P3P    | I/O | 40      | P3V         | I   |
| 41      | AD25-P3P    | I/O | 42      | AD28-P3P    | I/O |
| 43      | N.C.        | -   | 44      | AD26-P3P    | I/O |
| 45      | CBE3-P3N    | I/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-7 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         | I   | 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         | I   |
| 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         | i   |
| 89      | P3V         | i   | 90      | AD06-P3P    | I/O |
| 91      | AD05-P3P    | I/O | 92      | AD04-P3P    | I/O |
| 93      | N.C.        | -   | 94      | AD02-P3P    | I/O |
| 95      | AD03-P3P    | I/O | 96      | AD00-P3P    | I/O |
| 97      | P5V         | -   | 98      | N.C.        | -   |
| 99      | AD01-P3P    | I/O | 100     | N.C.        | -   |
| 101     | GND         | -   | 102     | GND         | -   |
| 103     | N.C.        | -   | 104     | GND         | -   |
| 105     | N.C.        | -   | 106     | N.C.        | -   |
| 107     | N.C.        | -   | 108     | N.C.        | -   |
| 109     | N.C.        | -   | 110     | N.C.        | -   |
| 111     | N.C.        | -   | 112     | N.C.        | -   |
| 113     | GND         | -   | 114     | GND         | -   |
| 115     | N.C.        | -   | 116     | N.C.        | -   |
| 117     | GND         | -   | 118     | N.C.        | -   |
| 119     | GND         | -   | 120     | GND         | -   |
| 121     | N.C.        | -   | 122     | N.C.        | -   |
| 123     | N.C.        | -   | 124     | E3V         | I   |

**C.8 PJ3020 MDC I/F Connector (30-pin)**

*Table C-8 MDC I/F connector pin assignment (30-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | N.C.        | -   | 2       | GND         | -   |
| 3       | GND         | -   | 4       | N.C.        | -   |
| 5       | N.C.        | -   | 6       | N.C.        | -   |
| 7       | N.C.        | -   | 8       | GND         | -   |
| 9       | N.C.        | -   | 10      | N.C.        | -   |
| 11      | N.C.        | -   | 12      | N.C.        | -   |
| 13      | N.C.        | -   | 14      | N.C.        | -   |
| 15      | GND         | -   | 16      | MDC-E3V     | I   |
| 17      | E3V         | I   | 18      | N.C.        | -   |
| 19      | GND         | -   | 20      | GND         | -   |
| 21      | N.C.        | -   | 22      | M97SY2-P3P  | I   |
| 23      | M97OT2-P3P  | I   | 24      | N.C.        | -   |
| 25      | M97RS2-S3N  | I   | 26      | M97IN2-E3P  | O   |
| 27      | GND         | -   | 28      | GND         | -   |
| 29      | GND         | -   | 30      | X97BC2-P3P  | I/O |

**C.9 PJ3021 Modem Relay Connector (4-pin)**

*Table C-9 Modem relay connector pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | MDMTIP-E3P  | I/O | 2       | MDMTIP-E3P  | I/O |
| 3       | MDMRNG-E3P  | I/O | 4       | MDMRNG-E3P  | I/O |

**C.10 PJ2000 Debug Port Connector (4-pin)**

*Table C-10 Debug port connector pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | P3V         | I   | 2       | DBGRX       | O   |
| 3       | DBGTX       | I   | 4       | GND         | -   |

**C.11 PJ3230 Keyboard I/F Connector (34-pin)***Table C-11 Keyboard I/F 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         | I   |
| 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         | I   | 30      | N.C.        | -   |
| 31      | N.C.        | -   | 32      | N.C.        | -   |
| 33      | N.C.        | -   | 34      | P5V         | I   |

**C.12 PJ3260 Touch Pad I/F Connector (4-pin)***Table C-12 Touch pad I/F connector pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | P5V         | I   | 2       | IPDDAT-P5P  | I/O |
| 3       | IPDCLK-P5P  | I/O | 4       | GND         | -   |

**C.13 PJ3200 Switch Board I/F Connector (10-pin)***Table C-13 Switch board I/F connector pin assignment (10-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | GND         | -   | 4       | GPBTND-S3N  | O   |
| 5       | GPBTNC-S3N  | O   | 6       | GPBTNB-S3N  | O   |
| 7       | GPBTNA-S3N  | O   | 8       | PWRSW-S3N   | O   |
| 9       | GND         | -   | 10      | PNLOFF-S3N  | O   |

**C.14 PJ3502 Parallel Board I/F Connector (25-pin)***Table C-14 Parallel board I/F connector pin assignment (25-pin)*

| Pin No. | Signal Name | I/O | Pin No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | GND         | -   | 4       | GND         | -   |
| 5       | GND         | -   | 6       | STROB-P5N   | I   |
| 7       | PDB00-P5P   | I/O | 8       | PDB01-P5P   | I/O |
| 9       | PDB02-P5P   | I/O | 10      | PDB03-P5P   | I/O |
| 11      | PDB04-P5P   | I/O | 12      | PDB05-P5P   | I/O |
| 13      | PDB06-P5P   | I/O | 14      | PDB07-P5P   | I/O |
| 15      | GND         | -   | 16      | GND         | -   |
| 17      | ACK-P5N     | I   | 18      | BUSY-P5P    | I   |
| 19      | PE-P5P      | I   | 20      | SELCT-P5P   | I   |
| 21      | AUTFD-P5N   | O   | 22      | ERROR-P5N   | I   |
| 23      | PINIT-P5N   | O   | 24      | SLIN-P5N    | O   |
| 25      | PRTDET-P3N  | I/O | 26      | GND         | -   |
| 27      | GND         | -   | 28      | GND         | -   |
| 29      | GND         | -   | 30      | GND         | -   |

**C.15 PJ4100 Network I/F Connector (14-pin)**

*Table C-15 Network I/F connector pin assignment (14-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | ACT-E3N     | I   | 2       | LINK-E3N    | I   |
| 3       | LAN-E3V     | I   | 4       | LAN-E3V     | I   |
| 5       | N.C.        | -   | 6       | N.C.        | -   |
| 7       | BIDDN-EXN   | I/O | 8       | BIDDP-EXP   | I/O |
| 9       | BIDCN-EXN   | I/O | 10      | BIDCP-EXP   | I/O |
| 11      | BIDAP-EXP   | I   | 12      | BIDAN-EXN   | I   |
| 13      | BIDBP-EXP   | O   | 14      | BIDBN-EXN   | O   |

**C.16 PJ4200 1394 I/F Connector (4-pin)**

*Table C-16 1394 I/F connector pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | TPBO-P3N    | I/O | 2       | TPBO-P3P    | I/O |
| 3       | TPAO-P3N    | I/O | 4       | TPAO-P3P    | I/O |

**C.17 PJ4610 USB on Connector Board Connector (8-pin)**

*Table C-17 USB on connector board connector pin assignment (8-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | USBP0-S3N   | I/O |
| 3       | USBP0-S3P   | I/O | 4       | USBOPS-E5V  | I   |
| 5       | USBOPS-E5V  | I   | 6       | USBP3-S3N   | I/O |
| 7       | USBP3-S3P   | I/O | 8       | GND         | -   |



**C.18 PJ4613 USB I/F Connector 0 (4-pin)***Table C-18 USB I/F connector 0 pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | USB1PS-E5V  | I   | 2       | USBP5-S3N   | I/O |
| 3       | USBP5-S3P   | I/O | 4       | GND         | -   |

**C.19 PJ5600 LCD I/F Connector (41-pin)***Table C-19 LCD I/F connector pin assignment (41-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | TXDTA0-PYP  | I   | 4       | TXDTA0-PYN  | O   |
| 5       | TXDTA1-PYP  | I   | 6       | TXDTA1-PYN  | O   |
| 7       | GND         | -   | 8       | TXDTA2-PYP  | I   |
| 9       | TXDTA2-PYN  | O   | 10      | TXCLKA-PYP  | I   |
| 11      | TXCLKA-PYN  | O   | 12      | GND         | -   |
| 13      | TXDTB0-PYP  | I   | 14      | TXDTB0-PYN  | O   |
| 15      | TXDTB1-PYP  | I   | 16      | TXDTB1-PYN  | O   |
| 17      | GND         | -   | 18      | TXDTB2-PYP  | I   |
| 19      | TXDTB2-PYN  | O   | 20      | TXCLKB-PYP  | I   |
| 21      | TXCLKB-PYN  | O   | 22      | GND         | -   |
| 23      | GND         | -   | 24      | N.C.        | -   |
| 25      | PNL-P3V     | I   | 26      | PNL-P3V     | I   |
| 27      | N.C.        | -   | 28      | GND         | -   |
| 29      | GND         | -   | 30      | GND         | -   |
| 31      | N.C.        | -   | 32      | FL-P5V      | I   |
| 33      | FL-P5V      | I   | 34      | FL-P5V      | I   |
| 35      | PNL2-P3P    | O   | 36      | PNL1-P3P    | O   |
| 37      | PNL0-P3P    | O   | 38      | BRT2DA-S3P  | I   |
| 39      | BRT1-P5P    | I   | 40      | BRT0-P5P    | I   |
| 41      | GND         | -   |         |             |     |

**C.20 PJ5620 CRT I/F Connector (15-pin)***Table C-20 CRT I/F connector pin assignment (15-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | MRED-PXP    | I   | 2       | MGREEN-PXP  | I   |
| 3       | MBLUE-PXP   | I   | 4       | N.C.        | -   |
| 5       | GND         | -   | 6       | GND         | -   |
| 7       | GND         | -   | 8       | GND         | -   |
| 9       | DDC-P5V     | I   | 10      | GND         | -   |
| 11      | N.C.        | -   | 12      | CRTSDA-P5P  | I/O |
| 13      | MHSYNC-P3P  | I/O | 14      | MVSYNC-P3P  | I/O |
| 15      | CRTSCL-P5P  | I/O |         |             |     |

**C.21 PJ5640 TV Board I/F Connector (5-pin)***Table C-21 TV board I/F connector pin assignment (5-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | CHROMA-PYP  | I   |
| 3       | GND         | -   | 4       | LUMINA-PYP  | I   |
| 5       | GND         | -   |         |             |     |

**C.22 PJ6001 Speaker Connector (Left) (3-pin)***Table C-22 Speaker connector (left) pin assignment (3-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | SPOUT (L-)  | I   | 2       | N.C.        | -   |
| 3       | SPOUT (L+)  | I   |         |             |     |

**C.23 PJ6002 Speaker Connector (Right) (2-pin)***Table C-23 Speaker connector (right) pin assignment (2-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | SPOUT(R+)   | I   | 2       | SPOUT (R-)  | I   |

**C.24 PJ9500 Sound Board I/F Connector (18-pin)***Table C-24 Sound Board I/F connector pin assignment (18-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | A-GND       | -   | 2       | A-GND       | -   |
| 3       | A-GND       | -   | 4       | LOUTL-PXP   | I   |
| 5       | VROUTL-PXP  | O   | 6       | A4R7-P4V    | I   |
| 7       | A4R7-P4V    | I   | 8       | VROUTR-PXP  | O   |
| 9       | LOUTR-PXP   | I   | 10      | A-GND       | -   |
| 11      | HEADR-PXP   | I   | 12      | HEADL-PXP   | I   |
| 13      | SPKEN-P5P   | O   | 14      | MMREFV-P2V  | O   |
| 15      | MICIN-PXP   | O   | 16      | A-GND       | -   |
| 17      | A-GND       | -   | 18      | A-GND       | -   |

**C.25 PJ8800 DC-IN Connector (4-pin)***Table C-25 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         | O   | 4       | PVL         | O   |

**C.26 PJ8810 1st Battery Connector (10-pin)***Table C-26 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       | DCHG        | I   | 4       | M5V         | I   |
| 5       | PSCL-S5P    | O   | 6       | PSDA-S5P    | O   |
| 7       | GND         | -   | 8       | DBT10V-S5N  | O   |
| 9       | GND         | -   | 10      | GND         | -   |

**C.27 PJ8490 RTC Battery Connector (3-pin)***Table C-27 RTC Battery connector pin assignment (3-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | R3V         | O   | 2       | N.C.        | -   |
| 3       | GND         | -   |         |             |     |

**C.28 PJ8770 FAN I/F Connector (3-pin)***Table C-28 FAN I/F connector pin assignment (3-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | P5V         | I   | 2       | GND         | -   |
| 3       | FANG-P3P    | O   |         |             |     |

## Sound Board (FLKSN\*)

### C.29 PJ6000 External Microphone Connector (6-pin)

Table C-29 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      | O   | 4       | A-GND       | -   |
| 5       | N.C.        | -   | 6       | MMREFV      | O   |

### C.30 PJ6003 Headphone Connector (6-pin)

Table C-30 Headphone Connector pin assignment (6-pin)

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | A-GND       | -   | 2       | HEADL-PXP   | O   |
| 3       | HEADR-PXP   | O   | 4       | A-GND       | -   |
| 5       | SPKEN-P5N   | O   | 6       | N.C.        | -   |

### C.31 PJ9510 System Board I/F Connector (18-pin)

Table C-31 System board I/F Connector pin assignment (18-pin)

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | A-GND       | -   | 2       | A-GND       | -   |
| 3       | A-GND       | -   | 4       | MICIN-PXP   | I   |
| 5       | MMREFV-P2V  | I   | 6       | SPKEN-P5N   | I   |
| 7       | HEADL-PXP   | O   | 8       | HEADR-PXP   | O   |
| 9       | A-GND       | -   | 10      | LOUTR-PXP   | O   |
| 11      | VROUT-PXP   | I   | 12      | A4R7-P4V    | O   |
| 13      | A4R7-P4V    | O   | 14      | VROUTL-PXP  | I   |
| 15      | LOUTL-PXP   | O   | 16      | A-GND       | -   |
| 17      | A-GND       | -   | 18      | A-GND       | -   |

**Switch Board (FLKSW\*)****C.32 PJ3280 System Board I/F Connector (10-pin)***Table C-32 System board I/F Connector pin assignment (10-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | GND         | -   | 4       | GPBTND-S3N  | I   |
| 5       | GPBTNC-S3N  | I   | 6       | GPBTNB-S3N  | I   |
| 7       | GPBTNA-S3N  | I   | 8       | PWRSW-S3N   | I   |
| 9       | GND         | -   | 10      | PNLOFF-S3N  | I   |

**Connector Board (Parallel Board) (FLKCP\*)****C.33 PJ3502 System Board I/F Connector (30-pin)***Table C-33 System board I/F Connector pin assignment (30-pin)*

| Pin No. | Signal Name | I/O | Pin No. | Signal name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | GND         | -   | 4       | GND         | -   |
| 5       | GND         | -   | 6       | STROB-P5N   | O   |
| 7       | PDB00-P5P   | I/O | 8       | PDB01-P5P   | I/O |
| 9       | PDB02-P5P   | I/O | 10      | PDB03-P5P   | I/O |
| 11      | PDB04-P5P   | I/O | 12      | PDB05-P5P   | I/O |
| 13      | PDB06-P5P   | I/O | 14      | PDB07-P5P   | I/O |
| 15      | GND         | -   | 16      | GND         | -   |
| 17      | ACK-P5N     | I   | 18      | BUSY-P5P    | I   |
| 19      | PE-P5P      | I   | 20      | SELCT-P5P   | I   |
| 21      | AUTFD-P5N   | O   | 22      | ERROR-P5N   | I   |
| 23      | PINIT-P5N   | O   | 24      | SLIN-P5N    | O   |
| 25      | (PRTDET#)   | -   | 26      | GND         | -   |
| 27      | GND         | -   | 28      | GND         | -   |
| 29      | GND         | -   | 30      | GND         | -   |

**C.34 PJ4613 Parallel I/F Connector (25-pin)***Table C-34 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.35 PJ4610 USB on System Board Connector (8-pin)***Table C-35 USB on system board connector pin assignment (8-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | USBP0-S3N   | I/O |
| 3       | USBP0-S3P   | I/O | 4       | USBP0-4     | I/O |
| 5       | USBP0-5     | I/O | 6       | N.C.        | -   |
| 7       | N.C.        | -   | 8       | GND         | -   |

**C.36 PJ4612 USB I/F Connector 1 (4-pin)***Table C-36 USB I/F Connector 1 pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | USBP0-4&5   | I/O | 2       | USBP0-S3N   | I/O |
| 3       | N.C.        | -   | 4       | USBP0-1     | I/O |



**Connector Board (TV Board) (FLKCS\*)****C.37 PJ4610 USB on System Board Connector (8-pin)***Table C-37 USB on system board connector pin assignment (8-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | USBP0-S3N   | I/O |
| 3       | USBP0-S3P   | I/O | 4       | USBP0-4     | I/O |
| 5       | USBP0-5     | I/O | 6       | USBP3-S3N   | I/O |
| 7       | USBP3-S3P   | I/O | 8       | USBP3-8     | I/O |

**C.38 PJ4612 USB I/F Connector 1 (4-pin)***Table C-38 USB I/F Connector 1 pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | USBP0-4&5   | I/O | 2       | USBP0-S3N   | I/O |
| 3       | USBP0-S3P   | I/O | 4       | USBP0-1     | I/O |

**C.39 PJ4611 USB I/F Connector 2 (4-pin)***Table C-39 USB I/F Connector 2 pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | USBP0-4&5   | I/O | 2       | USBP3-S3N   | I/O |
| 3       | USBP3-S3P   | I/O | 4       | USBP3-8     | I/O |

**C.40 PJ5640 System Board I/F Connector (5-pin)***Table C-40 System board I/F Connector pin assignment (5-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | CHROMA      | O   |
| 3       | GND         | -   | 4       | LUMINANCE   | O   |
| 5       | GND         | -   |         |             |     |

**C.41 PJ5641 TV Connector (4-pin)***Table C-41 TV Connector pin assignment (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1       | GND         | -   | 2       | GND         | -   |
| 3       | LUMINANCE   | I   | 4       | CHROMA      | I   |

## Appendix D Keyboard Scan/Character Codes

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

| Cap No. | Keytop | Code set 1 |       | Code set 2 |       |    | Note |
|---------|--------|------------|-------|------------|-------|----|------|
|         |        | Make       | Break | Make       | Break |    |      |
| 01      | ' ~    | 29         | A9    | 0E         | F0    | 0E |      |
| 02      | 1 !    | 02         | 82    | 16         | F0    | 16 |      |
| 03      | 2 @    | 03         | 83    | 1E         | F0    | 1E |      |
| 04      | 3 #    | 04         | 84    | 26         | F0    | 26 |      |
| 05      | 4 \$   | 05         | 85    | 25         | F0    | 25 |      |
| 06      | 5 %    | 06         | 86    | 2E         | F0    | 2E |      |
| 07      | 6 ^    | 07         | 87    | 36         | F0    | 36 |      |
| 08      | 7 &    | 08         | 88    | 3D         | F0    | 3D | *2   |
| 09      | 8 *    | 09         | 89    | 3E         | F0    | 3E | *2   |
| 10      | 9 (    | 0A         | 8A    | 46         | F0    | 46 | *2   |
| 11      | 0 )    | 0B         | 8B    | 45         | F0    | 45 |      |
| 12      | - _    | 0C         | 8C    | 4E         | F0    | 4E |      |
| 13      | = +    | 0D         | 8D    | 55         | F0    | 55 |      |
| 15      | BkSp   | 0E         | 8E    | 66         | F0    | 66 |      |
| 16      | Tab    | 0F         | 8F    | 0D         | F0    | 0D |      |
| 17      | Q      | 10         | 90    | 15         | F0    | 15 |      |
| 18      | W      | 11         | 91    | 1D         | F0    | 1D |      |
| 19      | E      | 12         | 92    | 24         | F0    | 24 |      |
| 20      | R      | 13         | 93    | 2D         | F0    | 2D |      |
| 21      | T      | 14         | 94    | 2C         | F0    | 2C |      |
| 22      | Y      | 15         | 95    | 35         | F0    | 35 |      |
| 23      | U      | 16         | 96    | 3C         | F0    | 3C | *2   |
| 24      | I      | 17         | 97    | 43         | F0    | 43 | *2   |
| 25      | O      | 13         | 98    | 44         | F0    | 44 | *2   |
| 26      | P      | 19         | 99    | 4D         | F0    | 4D | *2   |
| 27      | [ {    | 1A         | 9A    | 54         | F0    | 54 |      |
| 28      | ] }    | 1B         | 9B    | 5B         | F0    | 5B |      |

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

| Cap No. | Keytop     | Code set 1 |       | Code set 2 |       |    | Note |
|---------|------------|------------|-------|------------|-------|----|------|
|         |            | Make       | Break | Make       | Break |    |      |
| 29      | \          | 2B         | AB    | 5D         | F0    | 5D | *5   |
| 30      | Caps Lock  | 3A         | BA    | 58         | F0    | 58 |      |
| 31      | A          | 1E         | 9E    | 1C         | F0    | 1C |      |
| 32      | S          | 1F         | 9F    | 1B         | F0    | 1B |      |
| 33      | D          | 20         | A0    | 23         | F0    | 23 |      |
| 34      | F          | 21         | A1    | 2B         | F0    | 2B |      |
| 35      | G          | 22         | A2    | 34         | F0    | 34 |      |
| 36      | H          | 23         | A3    | 33         | F0    | 33 |      |
| 37      | J          | 24         | A4    | 3B         | F0    | 3B | *2   |
| 38      | K          | 25         | A5    | 42         | F0    | 42 | *2   |
| 39      | L          | 26         | A6    | 4B         | F0    | 4B | *2   |
| 40      | ; :        | 27         | A7    | 4C         | F0    | 4C | *2   |
| 41      | ' "        | 28         | A8    | 52         | F0    | 52 |      |
| 43      | Enter      | 1C         | 9C    | 5A         | F0    | 5A | *3   |
| 44      | Shift (L)  | 2A         | AA    | 12         | F0    | 12 |      |
| 45      | No.102 key | 56         | D6    | 61         | F0    | 61 |      |
| 46      | Z          | 2C         | AC    | 1A         | F0    | 1A |      |
| 47      | X          | 2D         | AD    | 22         | F0    | 22 |      |
| 48      | C          | 2E         | AE    | 21         | F0    | 21 |      |
| 49      | V          | 2F         | AF    | 2A         | F0    | 2A |      |
| 50      | B          | 30         | B0    | 32         | F0    | 32 |      |
| 51      | N          | 31         | B1    | 31         | F0    | 31 |      |
| 52      | M          | 32         | B2    | 3A         | F0    | 3A | *2   |
| 53      | , <        | 33         | B3    | 41         | F0    | 41 | *2   |
| 54      | . >        | 34         | B4    | 49         | F0    | 49 | *2   |
| 55      | / ?        | 35         | B5    | 4A         | F0    | 4A | *2   |
| 57      | Shift (R)  | 36         | B6    | 59         | F0    | 59 |      |

Table D-1 Scan codes (set 1 and set 2) (3/4)

| Cap No. | Keytop  | Code set 1 |  |       |  | Code set 2 |  |       |    | Note |
|---------|---------|------------|--|-------|--|------------|--|-------|----|------|
|         |         | Make       |  | Break |  | Make       |  | Break |    |      |
| 58      | Ctrl    | 1D         |  | 9D    |  | 14         |  | F0    | 14 | *3   |
| 60      | Alt (L) | 38         |  | B8    |  | 11         |  | F0    | 11 | *3   |
| 61      | Space   | 39         |  | B9    |  | 29         |  | F0    | 29 |      |
| 62      | ALT (R) | E0 38      |  | E0 B8 |  | E0 11      |  | E0 F0 | 11 |      |
| 75      | Ins     | E0 52      |  | E0 D2 |  | E0 70      |  | E0 F0 | 70 | *1   |
| 76      | Del     | E0 53      |  | E0 D3 |  | E0 71      |  | E0 F0 | 71 | *1   |
| 79      | ←       | E0 4B      |  | E0 CB |  | E0 6B      |  | E0 F0 | 6B | *1   |
| 80      | Home    | E0 47      |  | E0 C7 |  | E0 6C      |  | E0 F0 | 6C | *1   |
| 81      | End     | E0 4F      |  | E0 CF |  | E0 69      |  | E0 F0 | 69 | *1   |
| 83      | ↑       | E0 48      |  | E0 C8 |  | E0 75      |  | E0 F0 | 75 | *1   |
| 84      | ↓       | E0 50      |  | E0 D0 |  | E0 72      |  | E0 F0 | 72 | *1   |
| 85      | PgUp    | E0 49      |  | E0 C9 |  | E0 7D      |  | E0 F0 | 7D | *1   |
| 86      | PgDn    | E0 51      |  | E0 D1 |  | E0 7A      |  | E0 F0 | 7A | *1   |
| 89      | →       | E0 4D      |  | E0 CD |  | E0 74      |  | E0 F0 | 74 | *1   |
| 110     | Esc     | 01         |  | 81    |  | 76         |  | F0    | 76 |      |
| 112     | F1      | 3B         |  | BB    |  | 05         |  | F0    | 05 |      |
| 113     | F2      | 3C         |  | BC    |  | 06         |  | F0    | 06 |      |
| 114     | F3      | 3D         |  | BD    |  | 04         |  | F0    | 04 |      |
| 115     | F4      | 3E         |  | BE    |  | 0C         |  | F0    | 0C |      |
| 116     | F5      | 3F         |  | BF    |  | 03         |  | F0    | 03 |      |
| 117     | F6      | 40         |  | C0    |  | 0B         |  | F0    | 0B |      |
| 118     | F7      | 41         |  | C1    |  | 83         |  | F0    | 83 |      |
| 119     | F8      | 42         |  | C2    |  | 0A         |  | F0    | 0A |      |
| 120     | F9      | 43         |  | C3    |  | 01         |  | F0    | 01 |      |
| 121     | F10     | 44         |  | C4    |  | 09         |  | F0    | 09 | *3   |

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

| Cap No. | Keytop  | Code set 1 |    |       |    | Code set 2 |    |       |    | Note |
|---------|---------|------------|----|-------|----|------------|----|-------|----|------|
|         |         | Make       |    | Break |    | Make       |    | Break |    |      |
| 122     | F11     | 57         | D7 | 78    | F0 | 78         |    |       | *3 |      |
| 123     | F12     | 58         | D8 | 07    | F0 | 07         |    |       | *3 |      |
| 124     | PrintSc | *6         | *6 | *6    | *6 |            |    |       | *6 |      |
| 126     | Pause   | *7         | *7 | *7    | *7 |            |    |       | *7 |      |
| 202     | Fn      | —          | —  | —     | —  |            |    |       | *4 |      |
| 203     | Win     | E0         | 5B | E0    | DB | E0         | 1F | E0    | F0 | 1F   |
| 204     | App     | E0         | 5D | E0    | DD | E0         | 2F | E0    | F0 | 2F   |

**Notes:**

1. \* Scan codes differ by mode.
2. \* Scan codes differ by overlay function.
3. \* Combined with the **Fn** key makes different codes.
4. \* **Fn** key does not generate a code by itself.
5. \* This key corresponds to key No. 42 in a 102-key model.
6. \* Refer to Table D-6, No. 124 key scan code.
7. \* Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

| Cap No. | Key top | Code set 1  |             |                |                | Code set 2 |  |       |  |
|---------|---------|-------------|-------------|----------------|----------------|------------|--|-------|--|
|         |         | Make        |             | Break          |                | Make       |  | Break |  |
| 55      | /       | E0 AA E0 35 | E0 B5 E0 2A | E0 F0 12 E0 4A | E0 F0 4A E0 12 |            |  |       |  |
| 75      | INS     | E0 AA E0 52 | E0 D2 E0 2A | E0 F0 12 E0 70 | E0 F0 70 E0 12 |            |  |       |  |
| 76      | DEL     | E0 AA E0 53 | E0 D3 E0 2A | E0 F0 12 E0 71 | E0 F0 71 E0 12 |            |  |       |  |
| 79      | ←       | E0 AA E0 4B | E0 CB E0 2A | E0 F0 12 E0 6B | E0 F0 6B E0 12 |            |  |       |  |
| 80      | Home    | E0 AA E0 47 | E0 C7 E0 2A | E0 F0 12 E0 6C | E0 F0 6C E0 12 |            |  |       |  |
| 81      | End     | E0 AA E0 4F | E0 CF E0 2A | E0 F0 12 E0 69 | E0 F0 69 E0 12 |            |  |       |  |
| 83      | ↑       | E0 AA E0 48 | E0 C8 E0 2A | E0 F0 12 E0 75 | E0 F0 75 E0 12 |            |  |       |  |
| 84      | ↓       | E0 AA E0 50 | E0 D0 E0 2A | E0 F0 12 E0 72 | E0 F0 72 E0 12 |            |  |       |  |
| 85      | PgUp    | E0 AA E0 49 | E0 C9 E0 2A | E0 F0 12 E0 7D | E0 F0 7D E0 12 |            |  |       |  |
| 86      | PgDn    | E0 AA E0 51 | E0 D1 E0 2A | E0 F0 12 E0 7A | E0 F0 7A E0 12 |            |  |       |  |
| 89      | →       | E0 AA E0 4D | E0 CD E0 2A | E0 F0 12 E0 74 | E0 F0 74 E0 12 |            |  |       |  |
| 203     | Win     | E0 AA E0 5B | E0 DB E0 2A | E0 F0 12 E0 1F | E0 F0 1F E0 12 |            |  |       |  |
| 204     | App     | E0 AA E0 5D | E0 DD E0 2A | E0 F0 12 E0 2F | E0 F0 2F E0 12 |            |  |       |  |

**Note :** The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

|       | With left <b>Shift</b> | With right <b>Shift</b> |
|-------|------------------------|-------------------------|
| Set 1 | E0 AA _____            | E0 B6                   |
|       | E0 2A _____            | E0 36                   |
| Set 2 | E0 F0 12 _____         | E0 F0 59                |
|       | E0 12 _____            | E0 59                   |

Table D-3 Scan codes in Numlock mode

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

Table D-4 Scan codes with Fn key

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



Table D-5 Scan codes in overlay mode

| Cap No. | Keytop |     | Code set 1 |       | Code set 2 |       |    |
|---------|--------|-----|------------|-------|------------|-------|----|
|         |        |     | Make       | Break | Make       | Break |    |
| 09      | 8      | (8) | 48         | C8    | 75         | F0    | 75 |
| 10      | 9      | (9) | 49         | C9    | 7D         | F0    | 7D |
| 11      | 0      | (*) | 37         | B7    | 7C         | F0    | 7C |
| 23      | U      | (4) | 4B         | CB    | 6B         | F0    | 6B |
| 24      | I      | (5) | 4C         | CC    | 73         | F0    | 73 |
| 25      | O      | (6) | 4D         | CD    | 74         | F0    | 74 |
| 26      | P      | (-) | 4A         | CA    | 7B         | F0    | 7B |
| 37      | J      | (1) | 4F         | CF    | 69         | F0    | 69 |
| 38      | K      | (2) | 50         | D0    | 72         | F0    | 72 |
| 39      | L      | (3) | 51         | D1    | 7A         | F0    | 7A |
| 40      | ;      | (+) | 4E         | CE    | 79         | F0    | 79 |
| 52      | M      | (0) | 52         | D2    | 70         | F0    | 70 |
| 54      | .      | (.) | 53         | D3    | 71         | F0    | 71 |
| 55      | /      | (/) | E0 35      | E0 B5 | 40 4A      | E0 F0 | 4A |

Table D-6 No.124 key scan code

| Key top | Shift   | Code set 1 |       |       |       | Code set 2 |       |          |          |
|---------|---------|------------|-------|-------|-------|------------|-------|----------|----------|
|         |         | Make       |       | Break |       | Make       |       | Break    |          |
| Prt Sc  | Common  | E0 2A      | E0 37 | E0 B7 | E0 AA | E0 12      | E0 7C | E0 F0 7C | E0 F0 12 |
|         | Ctrl +  | E0 37      |       | E0 B7 |       | E0 7C      |       | E0 F0 7C |          |
|         | Shift + | E0 37      |       | E0 B7 |       | E0 7C      |       | E0 F0 7C |          |
|         | Alt +   |            | 54    | D4    |       | 84         |       | F0 B4    |          |

Table D-7 No.126 key scan code

| Key top | Shift    | Code set 1 |    |    |    |    |    | Code set 2 |    |    |    |    |    |    |    |
|---------|----------|------------|----|----|----|----|----|------------|----|----|----|----|----|----|----|
|         |          | Make       |    |    |    |    |    | Make       |    |    |    |    |    |    |    |
| Pause   | Common * | E1         | 1D | 45 | E1 | 9D | C5 | E1         | 14 | 77 | E1 | F0 | 14 | F0 | 77 |
|         | Ctrl*    | E0         | 46 | E0 | C6 |    |    | E0         | 7E | E0 | F0 | 7E |    |    |    |

\*: This key generates only make codes.

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## Appendix E Key Layout

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### E.1 Keyboard Layout

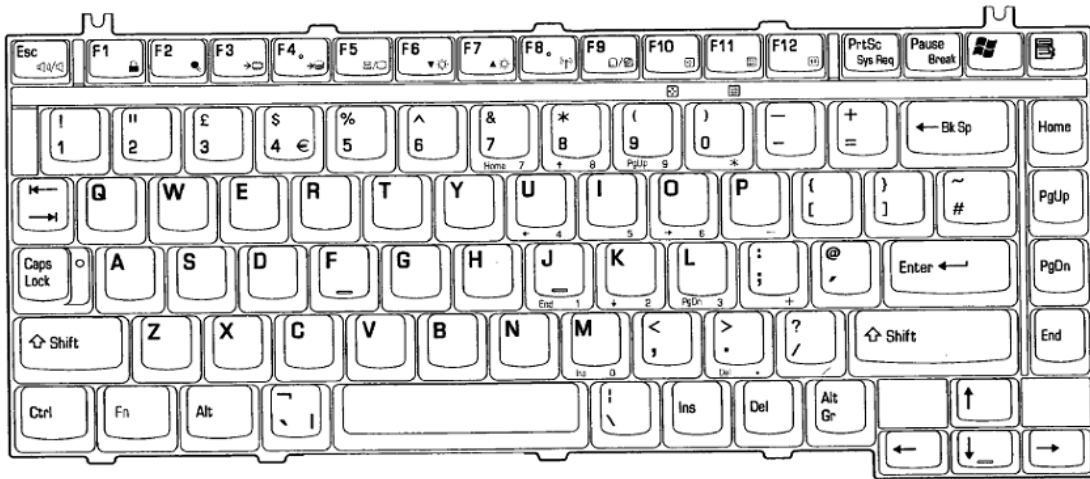


Figure E-1 Keyboard layout (for UK)

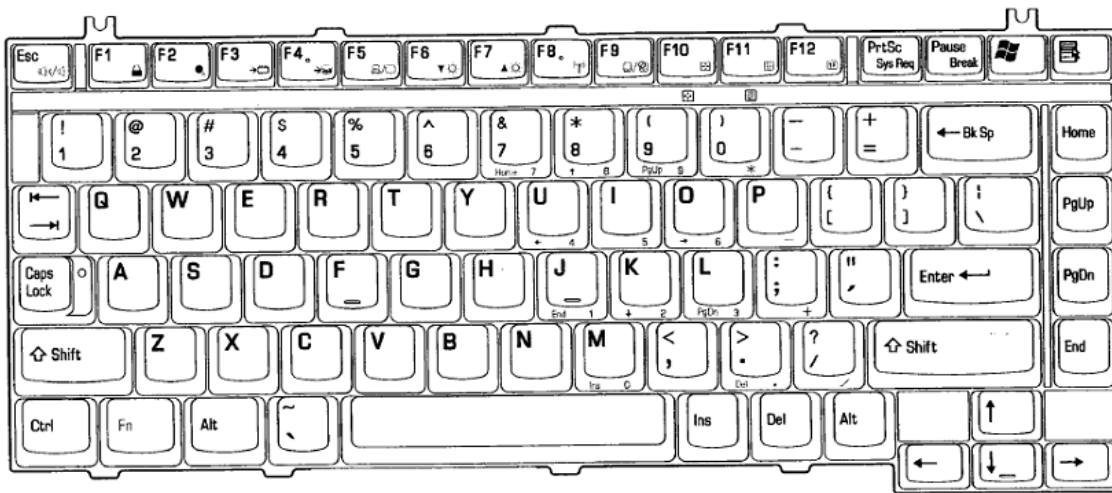


Figure E-2 Keyboard layout (for US)

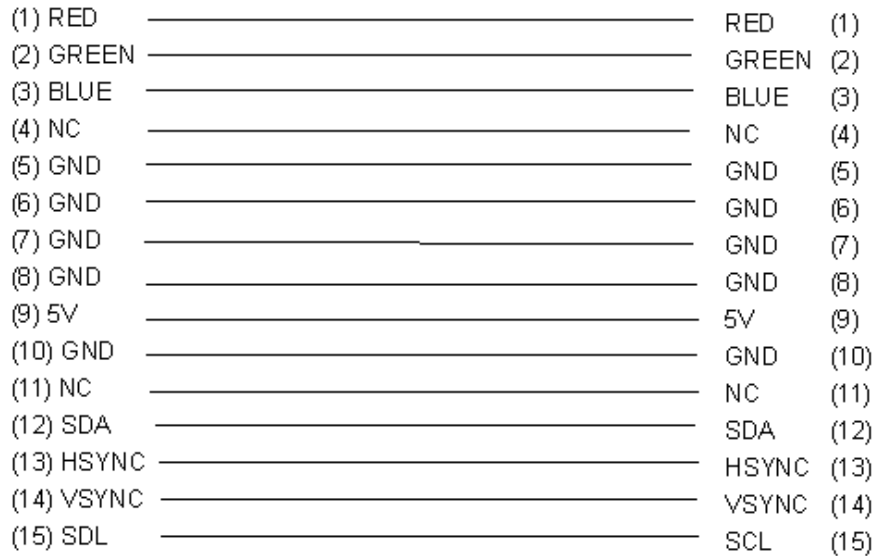


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## Appendix F Wiring Diagrams

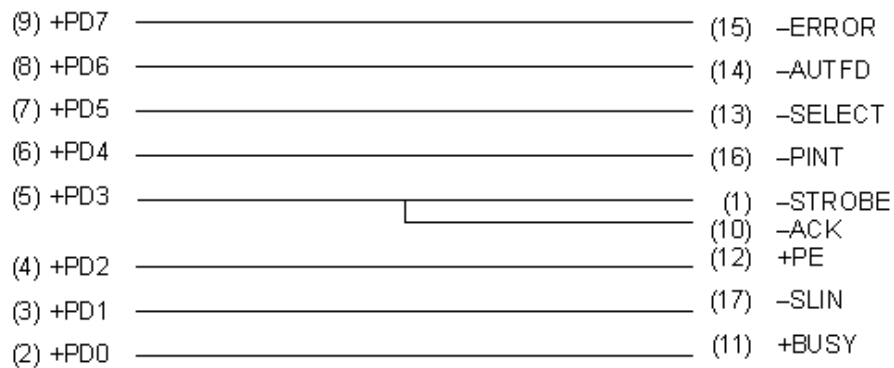
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### F.1 RGB Monitor ID Wraparound Connector (15-pin to 15-pin)



*Figure F-1 RGB monitor ID wraparound connector*

### F.2 Parallel Port Wraparound Connector



*Figure F-2 Parallel port wraparound connector*



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## Appendix G BIOS/KBC/EC Update

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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 ; See the following pictures.)



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.

**NOTE:** *Do not turn off the power of the computer during update. Otherwise the computer may not start again.*





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**Appendix H Reliability**

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The following table shows the MTBF (Mean Time Between Failures) of system.

*Table H-1 MTBF*

| <b>Component</b>                           | <b>Time (hours)</b> |
|--------------------------------------------|---------------------|
| System<br>(Docking port is not supported.) | 6,822               |
| System<br>(Docking port is supported.)     | 6,873               |

