Toshiba Personal Computer

Satellite A20 Series

Maintenance Manual

TOSHIBA CORPORATION

File Number 960-444

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Toshiba Personal Computer Satellite A20 Series Maintenance Manual

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Disclaimer

This manual has been validated and reviewed for accuracy. The instructions and descriptions it contains are accurate for the TOSHIBA A20 Series Portable Personal Computer at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. TOSHIBA assumes no liability for damages incurred directly or indirectly from errors, omissions or discrepancies between the computer and the manual.

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite A20 Series, referred to as A20 Series in this manual.

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

SAFETY PRECAUTIONS

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

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

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

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

NOTE: "Note" contains general information that relates to your safe maintenance service.

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

❑ Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

Chapter 1   Hardware Overview describes the Satellite A20 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 assignments
- ❑ Keyboard scan/character codes
- ❑ Key layout
- ❑ Wiring diagrams
- ❑ BIOS Rewrite Procedures
- ❑ Reliability

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

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

```
Format complete
System transferred
```

Table of Contents

Chapter 1   Hardware Overview

Chapter 2   Troubleshooting Procedures

Chapter 3   Tests and Diagnostics

Chapter 4   Replacement Procedures

Appendices

Chapter 1

Hardware Overview

Chapter 1　　Contents

Figures

Tables

1.1　Features

The Toshiba Satellite A20 Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. The computer is built and configured to order, to best meet the customer's needs. This computer incorporates the following features:

❑ Processor

- Intel Desktop Pentium 4 Processor

   The processor runs at one of the following speeds:

  - 2.53GHz (1.525volts) / 533MHz
  - 2.66GHz (1.525volts) / 533MHz
  - 2.80GHz (1.525volts) / 533MHz
  - 3.06GHz (1.525volts) / 533MHz

     The processor incorporates a 12KB L1 cache memory and 512KB L2 cache memory.

❑ Memory

   The computer contains no on-board memory.

   Two PC2100 (266MHz) compatible DDR-SDRAM slots are available for installation of a 128MB, 256MB, 512MB or 1GB memory module, for a total of 2GB.

❑ HDD

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

❑ USB FDD

   A 3.5-inch USB FDD accommodates both 2HD (1.44MB) and 2DD (720KB) disks.

❑   CD-RW/DVD Drive

   A full-size, CD-RW/DVD-ROM drive module lets you run CD/DVDs without using
   an adaptor. It reads DVD-ROMs at maximum 8 speed and CD-ROMs at maximum
   24 speed. It writes CD-R at up to 24 speed and CD-RW at up to 10 speed. A Mode
   Control button turns power to the fixed CD-RW/DVD-ROM drive on and off so you
   can use the drive as a stand-alone audio CD player. This drive supports the following
   formats: Photo-CD, CD-EXTRA, CD-R, CD-RW, DVD-ROM, DVD-R, DVD-RW,
   DVD-Video, DVD-RAM.

❑   DVD-R/-RW Drive

   A full-size DVD-R/-RW drive module lets you record data to rewritable CD/DVDs as
   well as run either 12 cm (4.72") or 8 cm (3.15") CD/DVDs without using an adaptor.
   It reads DVD-ROMs at maximum 8 speed and CD-ROMs at maximum 24 speed. It
   writes CD-R at up to 16 speed, CD-RW at up to 10 speed, DVD-R and DVD-RW at
   single speed. This drive supports the following formats: Photo CD, CD-R, CD-ROM,
   CD-RW, CD-ROM XA, CD-DA, CD-TEXT, DVD-Video, DVD-ROM, DVD-R,
   DVD-RW, DVD-RAM.

❑   DVD-Multi Drive

   A full-size, DVD Multi drive module lets you run either 12 cm (4.72") or 8 cm
   (3.15") CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8
   speed and CD-ROMs at maximum 24 speed. It writes CD-R at up to 16 speed, CD-
   RW at up to 8 speed, DVD-R and DVD-RW at single speed, and DVD-RAM at 2
   speed. This drive supports the following formats: CD-ROM, CD-R, CD-RW, Photo
   CD, CD-EXTRA, DVD-Video, DVD-ROM, DVD-R.

❑   Keyboard

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

❑   Touch pad

   A touch pad and control buttons in the palm rest enable control of the on-screen
   pointer and scrolling of windows.

❑   Display

The following displays are available:

- 14.1-inch XGA TFT screen, 1,024×768 pixels, 16M colors
- 15.0-inch XGA TFT screen, 1,024×768 pixels, 16M colors
- 15.0-inch SXGA+ TFT screen, 1,400×1,050 pixels, 16M colors

A video controller contained on the north bridge and 4MB, 8MB, 16MB or 32MB of SMA VRAM enable an external monitor with an RGB cable to display 64k colors at a resolution of 1,600 x 1,200 pixels.

❑   Batteries

The computer has two batteries: a lithium-ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory).

❑   Slot for optional memory

Two DDR-SDRAM (PC2100) slots are available for 128MB, 256MB, 512MB and 1GB memory modules, consisting of SDRAM chips.

❑   Universal Serial Bus (USB)

The computer comes with three USB 2.0 ports that comply with Enhanced Host Controller Interface (EHCI) and Open Host Controller Interface (OHCI). The USB enables daisy-chain connection of up to 127 USB-equipped devices and 480Mbps serial data transfer. It is designed for easy configuration by a Plug-and-Play operating system and provides hot insertion/ejection capability.

❑   Infrared port

The infrared port is compatible with Fast InfraRed (FIR) standards enabling cableless 1.15 Mbps, 4 Mbps, 115.2 kbps, 57.6 kbps, 38.4 kbps, 19.2 kbps or 9.6 kbps data transfer with Infrared Data Association (IrDA) 1.1 compatible external devices.

❑   Internal LAN

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

❑ Wireless LAN (mini PCI Card slot)

In some models, a Mini PCI Card with wireless LAN functions is available as a dealer-installed option.

The mini PCI Card for wireless LAN is compatible with other LAN systems based on Direct Sequence Spread Spectrum radio technology that complies with the IEEE 802.11b or a/b. It supports data transfer up to 11 Mbit/s. It has Frequency Channel Selection (2.4GHz) and allows roaming over Multiple channels. Modem + 802.11b and modem mini PCI cards do not support wireless LAN.

❑ PC Card Slot

A PC Card Slot accommodates two 5mm cards (Type II) or one 10.5mm (Type III) card, which support the PC Card Standard Release 1997 cards and are ready for advanced cards, including PC Card 16's multifunction cards and CardBus 32-bit cards.

❑ SD Card Slot

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

❑ Sound system

This computer supports software sound (AC97 Audio). The sound system is equipped with AC97 Audio, a CODEC chip, stereo speakers and jacks for headphone and external microphone. The sound system is equipped with the following:

- Stereo speakers
- Volume control knob
- Headphone jack
- External microphone jack
- Line-in jack

❑ Video out

This video-out mini-jack enables transfer of NTSC or PAL data (video and right/left audio) to external devices such as a TV.

❑   Internal modem

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

The internal modem provides capability for data and fax communication and supports ITU-TV.90. In the U.S. and Canada, V.92 is supported. For data reception it operates at 56,000bps and for data transmission it operates at 33,600bps. For fax transmission it operates at 14,400bps. The speed of data transfer and fax depends on analog telephone line conditions. It has an RJ11 modem jack for connecting to a telephone line.

The computer is shown in figure 1-1. The system unit configuration is shown in figure 1-2.
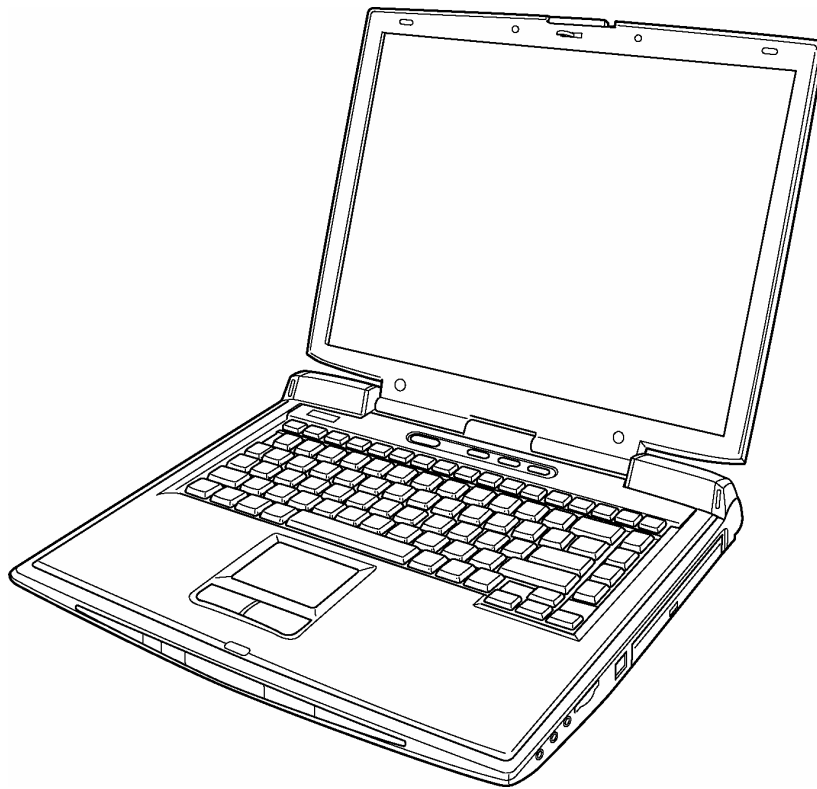
Figure 1-1 Front of the computer
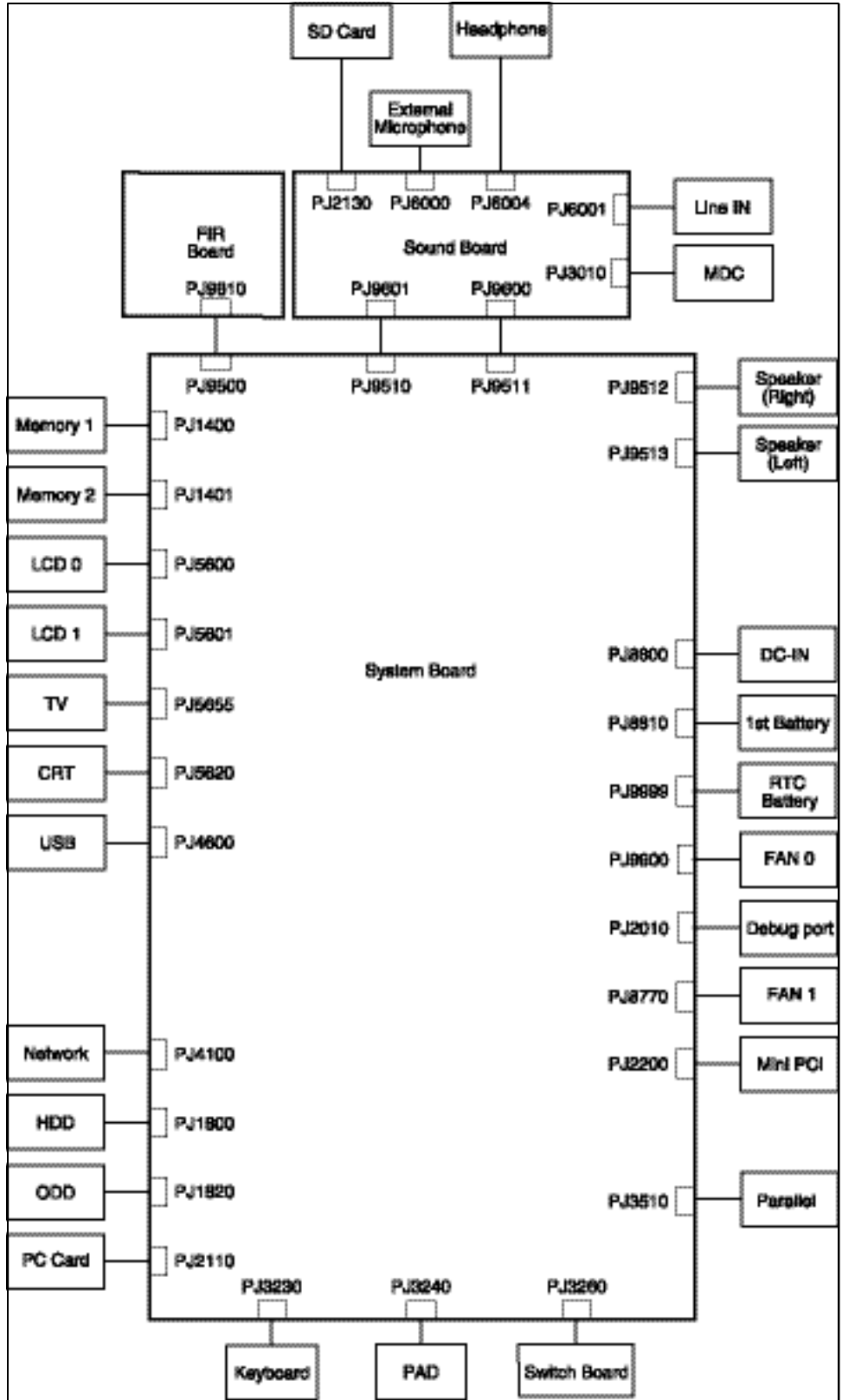
Figure 1-2 System unit configuration

1.2   System Unit Block Diagram

Figure 1-3 is the block diagram of the system unit.
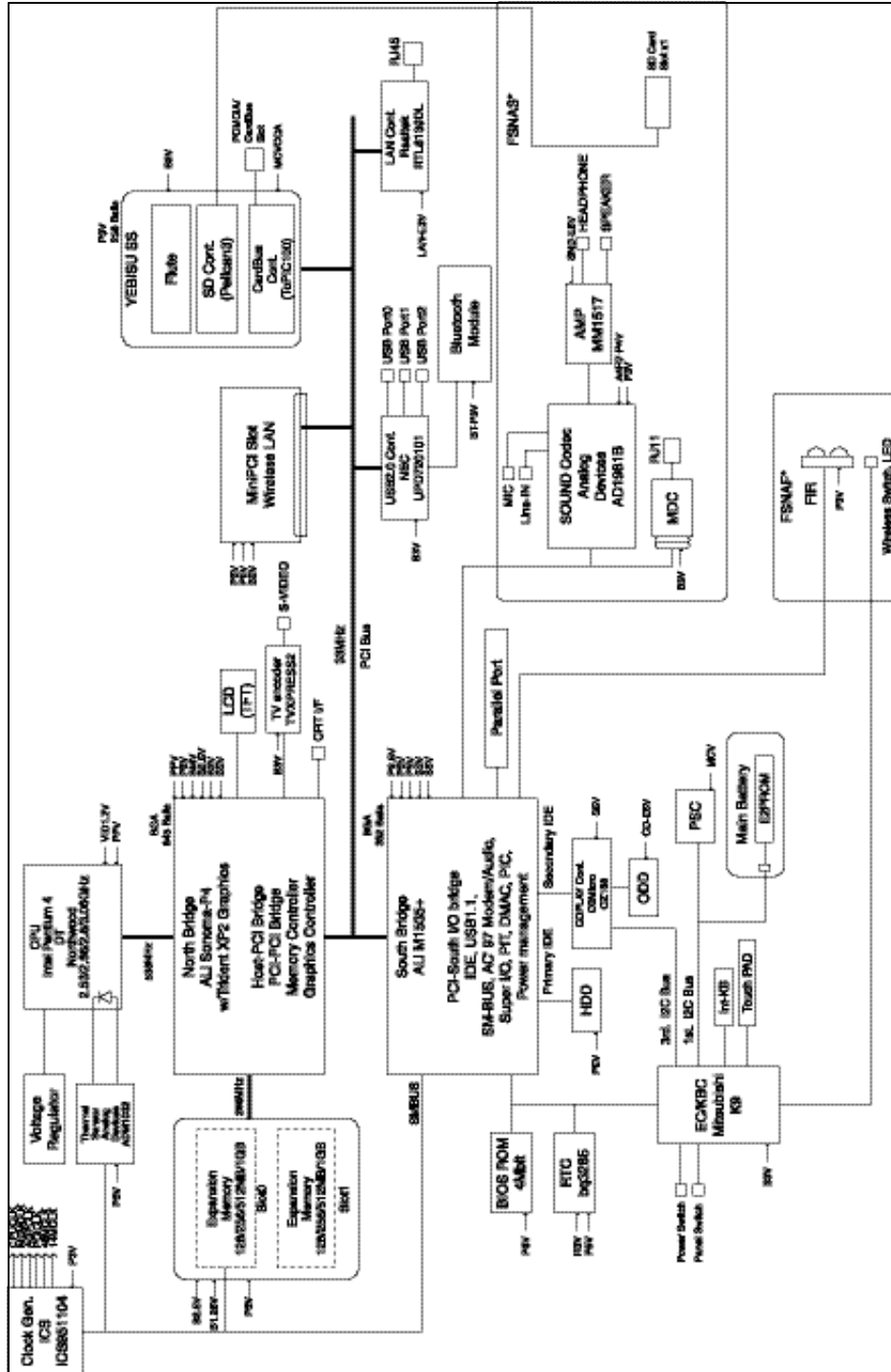
Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

Intel Desktop Pentium 4 Processor 2.53GHz

- – Processor core speed: 2.53GHz at 1.525V
- – Processor bus speed: 533MHz
- – Integrated L1 cache memory: 12KB instruction cache and 8KB write-back data cache, 4-way set associative
- – Integrated L2 cache memory: 512KB ECC protected cache data array, 8-way set associative
- – Integrated NDP

Intel Desktop Pentium 4 Processor 2.66GHz

- – Processor core speed: 2.66GHz at 1.525V
- – Processor bus speed: 533MHz
- – Integrated L1 cache memory: 12KB instruction cache and 8KB write-back data cache, 4-way set associative
- – Integrated L2 cache memory: 512KB ECC protected cache data array, 8-way set associative
- – Integrated NDP

Intel Desktop Pentium 4 Processor 2.8GHz

- – Processor core speed: 2.8GHz at 1.525V
- – Processor bus speed: 533MHz
- – Integrated L1 cache memory: 12KB instruction cache and 8KB write-back data cache, 4-way set associative
- – Integrated L2 cache memory: 512KB ECC protected cache data array, 8-way set associative
- – Integrated NDP

Intel Desktop Pentium 4 Processor 3.06GHz

- – Processor core speed: 3.06GHz at 1.525V
- – Processor bus speed: 533MHz
- – Integrated L1 cache memory: 12KB instruction cache and 8KB write-back data cache, 4-way set associative
- – Integrated L2 cache memory: 512KB ECC protected cache data array, 8-way set associative
- – Integrated NDP

❑ PCI Chip Set

     North Bridge

     ALi M1672 Northbridge with Integrated Graphic Chip

         ALi PCI Northbridge Core Logic Processor Support
            – Supports Intel Pentium 4 microprocessor family with host bus frequency can be up to 400MHz
            – 64-bit data bus and 32-bit addressing bus
            – Optimum buffering architecture design for CPU to memory, AGP and PCI read/write
            – Flexible configuration to support back-to-back read transfer in 1QW or 2QW
            – Supports back-to-back write transfer
            – Supports synchronous / pseudo asynchronous clock mode between processor and memory interface with optimized latency

         Memory Support

            – Supports SDR DRAM PC-100, PC-133
            – Supports DDR up to 200, 266MHz
            – Supports symmetrical and asymmetrical SDRAM / DDR addressing
            – Supports 64, 128, 256, 512Mbit SDRAM / DDR
            – Maximum memory size: 3GB
            – Supports 6 memory rows with per byte access on each row
            – Supports memory shadowing
            – x-1-1-1-1-1-1-1 back-to-back page hit
            – CAS before RAS and self refresh for SDRAM
            – Pipelined SDRAM / DDR cycle control with hidden pre-charge
            – Dynamic switching CKE algorithm
            – Supports LVTTL / SSTL2 signal level

         Advanced Mobile Power Management

            – Low power cell design
            – Suspend and standby modes
            – Internal clock gating on each functional block
            – PCIPM (H/W PCI initiated)
            – AGP Busy#/Stop# and PCI Clock Run#
            – ACPI and DPMS support

         High Performance DirectX 7.0 3D Engine

         DVD Playback

PCI Bus Support

–   Supports synchronous / asynchronous clock mode between the processor
    bus and the PCI bus
–   32-bit Address / Data PCI bus using PCI bus driver technology
–   Supports up to 5 PCI masters excluding the M1672 and PCI-to-ISA bridge
–   Parity protection on all PCI bus signals
–   Fully supports PCI Configuration Space Enable (CSE) protocol
–   Fully compliant with PCI Rev. 2.2
–   Supports delayed transaction
–   Dynamic memory prefetch algorithm and programmable post write flush
    algorithm
–   Data Collection/Write assembly of line bursts
–   Supports concurrent PCI bus burst transfer at zero wait-states

Trident CyberBlade XP Graphic Core Highly Integrated Graphics Engine

–   Advanced CyberBlade XP Dual-Pixel, Quad-Texture Single-Pass 3D
    rendering engine
–   128-bit internal bus interface to Core logic block
–   Supports Microsoft DirectX 7.0/8.0 with Cubic Mapping
–   Integrated Dual-channel LVDS transmitter
–   Digital interface to external TMDS transmitter
–   Digital interface to external TV encoder
–   DVD hardware assist with Motion Compensation (MC) and Inverse
    Discrete Cosine Transform (IDCT)
–   TrueVideo with Advanced Video De-interlacing
–   PC2001 Compliant

Packaging

–   645 balls in 37.5 x 37.5mm BGA package

South Bridge

ALi M1535+ Southbridge
- – Provides a high integration bridge between the PCI Bus and Peripheral Bus (PCI spec. 2.2 Compliant)
- – Provides Steerable PCI Interrupts for PCI Device Plug-and-Play
- – Enhanced DMA Controller
- – Interrupt Controller
- – Counter/Timers
- – Distributed DMA Supported
- – PC/PCI DMA Supported
- – Serialized IRQ Supported
- – Low Pin Count (LPC) Host Controller
- – Plug-and-Play Supported
- – Built-in Keyboard Controller
- – Supports up to 512 KB ROM Size Decoding PMU Features
- – Built-in PCI IDE Controller
- – USB Interface
- – SMBus Interface
- – Super I/O Interface
- – Audio System
- – Software Modem Interface
- – 352-pin (27mm x 27mm) BGA Package

❑ Card Controller:
- • YEBISU SS

  This gate array has the following functions and components.
  - – PCI Interface (PCI Rev. 2.2)
  - – Chipset Interface (Intel serial interrupt)
  - – CardBus/PC Card Controller (Yenta Ver. 2.2) : 1 slot
  - – SD memory Card Controller (SDHC Ver. 1.2 enhanced)
  - – SD I/O card controller (Ver. 1.1)
  - – SmartCard I/F / Debug port
  - – External device interface
  - – Deeper Sleep control interface

❑ Thermo Sensor

- • One ADM1032AR is used.

❑ LAN

- • One RTL8139DL chip is used

❑ KBC/EC (Keyboard Controller/Embedded Controller)

- One M306K9FCLRP chip functions as both KBC and EC.
- KBC has the following functions:
  – Scan controller to check status of keyboard matrix
  – Interface controller between the keyboard scan controller and the system
- EC has the following functions:
  – Power supply sequence control
  – System I/F
  – Thermal conditions control
  – Flash rewriting

❑ PSC (Power Supply Controller)

- One TMP87PM48V chip is used.
- This controller controls the power sources.

❑ Onboard memory: 0MB

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

- PC2100
- 3.3 volts operation
- No parity bit
- Data transfer width is 64-bit
- 128/256/512/1024 MB selectable
  – 128MB: eight 128Mbit (8M x 16bit) chips
  – 128MB: four 256Mbit (16M x 16bit) chips
  – 256MB: eight 256Mbit (16M x 16bit) chips
  – 512MB: eight 512Mbit (32M x 16bit) chips
  – 1GB: eight 1Gbit (64M x 16bit) chips

❑ Sound CODEC

- One AD1981B chip is used.
- Internal Audio Controller is integrated into the MM1535+ chip.
  Both chips are used as the CODEC chip.

❑ Battery E^2 PROM: ST24C04FM

- One ST24C04FM equivalent (128 words × 16-bit, I^2C-Interface) is used.
  This memory maintains records of battery use.

❑ Clock Generator

  • One ICS951104 is used.
  This device generates the system clock.

1.3   2.5-inch Hard Disk Drive

The removable HDD is a random-access, non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports a 30GB, 40GB, 60GB or 80GB HDD.

The HDD is shown in figure 1-4. The specifications are listed in table 1-1.
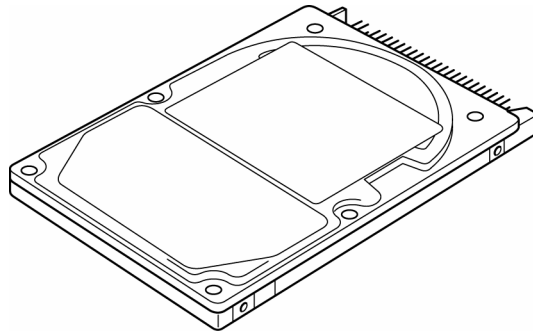
Figure 1-4   2.5-inch HDD

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

Parameter	Specifications				
	TOSHIBA HDD2181B	**TOSHIBA HDD2182B**	**TOSHIBA HDD2171B**	**TOSHIBA HDD2183B**	**TOSHIBA HDD2184B**
Storage size (formatted)	30	40		60	
Speed (RPM)	4.200		5.400	4.200	5.400
Data transfer speed (Mbits/s)	154.3 – 298.0		200.8 – 333.2	154.3 – 298.0	202.9 – 373.3
Interface transfer rate (MB/s)	100				
Storage density (Kbpi)	618		607	618	632
Track density (Ktpi)	78.9		57.1	78.9	
Average random seek time (read) (ms)	12				
Average random seek time (write) (ms)	-				
Motor start up time (ms)	4				

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

Parameter	Specifications			
	HITACHI G8BC0000F310	**HITACHI G8BC0000F410 G8BC0000Z410**	**HITACHI G8BC00009110**	**HITACHI G8BC0000F610**
Storage size (formatted)	30	40		60
Speed (RPM)	4.200		5.400	4.200
Data transfer speed (Mbits/s)	22.1 – 42.8	19.4 – 37.1	27.8 – 44.1	22.1 – 42.8
Interface transfer rate (MB/s)	100 (MAX Ultra DMA mode)			
Storage density (Kbpi)	716	644 (MAX)	612	716 (MAX)
Track density (Kbpi)	70.0		63.0	70.0
Average random seek time (read) (ms)	13			
Average random seek time (write) (ms)	-			
Motor start up time (ms)	5			

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

Parameter	Specifications	
	TOSHIBA HDD2188B	**HITACHI G8BC0000Z810**
Storage size (formatted)	80	80
Speed (RPM)	4200	4200
Data transfer speed (Mbits/s)	350	350
Interface transfer rate (MB/s)	100 (MAX Ultra DMA mode)	
Storage density (Kbpi)	712	712
Track density (Ktpi)	96	96
Average random seek time (read) (ms)	12	
Average random seek time (write) (ms)	-	
Motor start up time (ms)	4	

1.4   CD-RW/DVD Drive

A full-size, CD-RW/DVD-ROM drive module lets you run CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed and CD-ROMs at maximum 24 speed. It writes CD-R at up to 24 speed and CD-RW at up to 10 speed. A Mode Control button turns power to the fixed CD-RW/DVD-ROM drive on and off so you can use the drive as a stand-alone audio CD player.

The CD-RW/DVD drive is shown in figure 1-5. Specifications for the CD-RW/DVD drive are described in table 1-2.
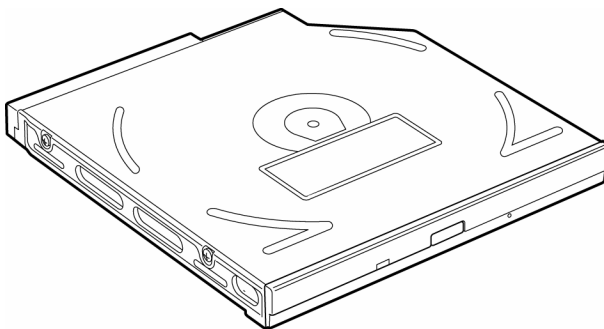
Figure 1-5 CD-RW/DVD drive

Table 1-2 CD-RW/DVD drive specifications (1/4)

Item		Specifications
		TEAC G8CC0000Q410
Transfer rate	Read (CD-ROM)	1,545 to 3,600 KB/sec.
	Read (DVD-ROM)	4,469 to 10,816 KB/sec.
	Write (CD-R)	-
	Write (CD-RW)	-
Average access time (msec.)	CD-ROM	90
	DVD-ROM	110
Data Buffer Capacity		2MB
Supported Formats		CD: CD-DA, CD-ROM Mode1, Mode2, CD-ROM XA Mode 2 (Form 1, Form 2), Photo CD (single/multi-session), Enhanced CD, CD-TEXT DVD: DVD-ROM, DVD-Video, DVD-R (General, Authoring) DVD-RAM (4.7GB, 2.6GB)

Table 1-2 CD-RW/DVD drive specifications (2/4)

Item		Specifications
		Panasonic G8CC00010410
Transfer rate	Read (CD-ROM)	MAX 8x CAV (MAX 10,800KB/sec.)
	Read (DVD-ROM)	MAX 24x CAV (MAX 3,600KB/sec.)
	Write (CD-R)	4x, 8x (CLV), MAX 16x, MAX 24x (ZCLV)
	Write (CD-RW)	4x (CLV)
Average access time (msec.)	CD-ROM	130
	DVD-ROM	180
Data Buffer Capacity		2MB
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, CD-R, CD-RW, Photo CD, Video CD, CD-EXTRA (CD+), CD-TEXT DVD: DVD-Video, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW, DVD-RAM (4.7GB)

Table 1-2 CD-RW/DVD drive specifications (3/4)

	TEAC G8CC0001D410		
Item	**DVD-ROM (Play mode)**	**CD-ROM (Play mode)**	**CD-R/CD-RW (Record mode)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.7 (PIO Mode 4, Multi word DMA mode 2)		
Access time (ms) Average 1/3 Stroke Access	180	130	-
Data Buffer Capacity (Mbytes)	2		
Supported Format	DVD: DVD-ROM, DVD-VIDEO, DVD-R (read) CD: CD-DA, CD-Text, Photo CD, CD-ROM Mode 1/Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2		CD-DA, CD-Text, Photo CD, CD-ROM Mode 1/ Mode 2, CD-ROM XA Mode 2 (Form 1, Form 2), Enhanced CD (CD-EXTRA), CD-G (Audio CD only), Addressing Method 2

Table 1-2 CD-RW/DVD drive specifications (4/4)

	TOSHIBA SD-R2212		
Item	**DVD-ROM mode**	**CD-ROM mode**	**CD-R/CD-RW (Write)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2) 16.6 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms) 1/3 Stroke Access (typ.)	140	120	-
Data Buffer Capacity (Mbytes)	2		
Supported Formats	CD: CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), CD-I Ready, Photo CD (Multi session), Video CD, CD-Extra (CD+), CD-text DVD: DVD-VIDEO, DVD-ROM, DVD-R		CD-R, CD-RW

1.5 DVD-R/-RW Drive

A full-size DVD-R/-RW drive module lets you record data to rewritable CD/DVDs as well as run either 12 cm (4.72") or 8 cm (3.15") CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed and CD-ROMs at maximum 24 speed. It writes CD-R at up to 16 speed, CD-RW at up to 10 speed, DVD-R and DVD-RW at single speed. The DVD-R/-RW drive is shown in figure 1-6. Specifications for the DVD-R/-RW drive are described in table 1-3.
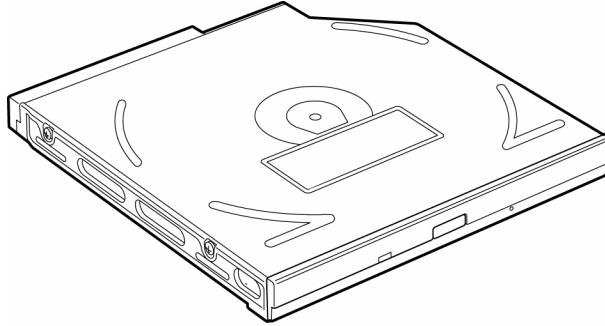
Figure 1-6 DVD-R/-RW drive

Table 1-3 DVD-R/-RW drive specifications

Item	Specifications		
	TOSHIBA G8CC0000ZD10		
	DVD-ROM	**CD-ROM**	**DVD-RAM (Write)**
Transfer rate (Kbytes/s)	33.3 (Ultra DMA) 16.7 (PIO mode 4, Multiple word DMA transfer mode 2)		

Access time (ms)
   Average Random Access
   Average Full Stroke Access
   Average Full Stroke Access
	100
	95
	160
		95
		90
		160
			170
			120
			350

Data Buffer Capacity (Mbytes)	2		
Supported Formats	DVD-ROM, DVD-R, DVD-RW, DVD-RAM	CD-DA, CD+ (E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, CD-I, CD-I Bridge, Multi session CD, CD-R, CD-RW	DVD-ROM DVD-RW (Ver.1.1)

1.6   DVD Multi Drive

A full-size, DVD Multi drive module lets you run either 12 cm (4.72") or 8 cm (3.15")
CD/DVDs without using an adaptor. It reads DVD-ROMs at maximum 8 speed and CD-
ROMs at maximum 24 speed. It writes CD-R at up to 16 speed, CD-RW at up to 8 speed,
DVD-R and DVD-RW at single speed, and DVD-RAM at 2 speed.

The DVD Multi drive is shown in figure 1-7. Specifications for the DVD-Multi drive are
listed in table 1-4.
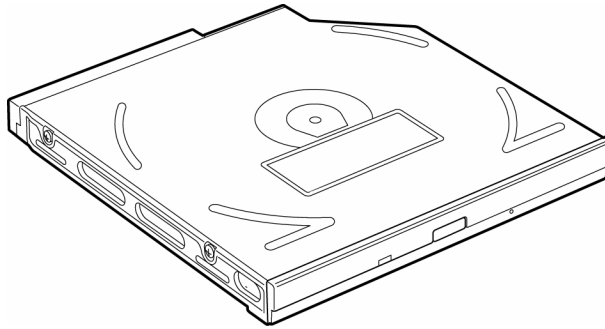
Figure 1-7 DVD Multi drive

Table 1-4 DVD Multi drive specifications (1/2)

Item	TEAC G8CC00013410		
	DVD-ROM mode	**CD-ROM mode**	**CD-R/CD-RW (Write)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2)		
	16.7 (PIO Mode 4, Multi word DMA mode 2)		
Access time (ms) 1/3 Stroke Access (typ.)	130	110	-
Data Buffer Capacity (Mbytes)	2		
Supported Formats	CD: CD-DA, CD-ROM Mode1, Mode2, CD-R/W, CD-R, CD-ROM XA Mode2 (Form1,Form2), Photo CD (Single/multi-session), CD-TEXT, Enhanced CD DVD: DVD-VIDEO, DVD-ROM, DVD-R (General, Authoring), DVD-RAM		CD-R, CD-RW

Table 1-4 DVD-Multi drive specifications (2/2)

Item	Panasonic G8CC00012410		
	DVD-ROM mode	**CD-ROM mode**	**CD-R/CD-RW (Write)**
ATAPI Burst (Mbytes/s)	33.3 (Ultra DMA mode 2)		
	16.6 (PIO Mode 4, Multi-word DMA mode 2)		
Access time (ms) 1/3 Stroke Access (typ.)	180	130	-
Data Buffer Capacity (Mbytes)	2		
Supported Formats	CD: CD-DA, CD-ROM, CD-R/W, CD-R, CD-ROM XA (except ADPCM), CD-I Ready, Photo CD (Multi session), Video CD, CD-EXTRA (CD+), CD-TEXT DVD:DVD-VIDEO, DVD-ROM, DVD-R (3.9GB, 4.7GB), DVD-RW (Ver.1.1), DVD-RAM		CD-R, CD-RW

1.7 Keyboard

The keyboard is mounted 85(US)/86(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.
Figure1-8 is a view of the keyboard.
See Appendix E about a layout of the keyboard.
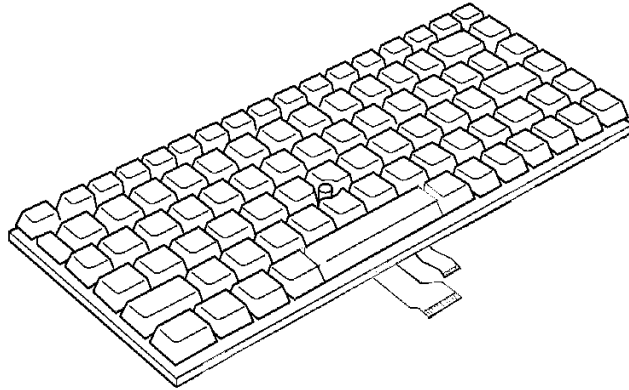
Figure 1-8 Keyboard

1.8   TFT Color Display

The TFT color display consists of 14.1/15.0-inch XGA/SXGA+ LCD module and FL inverter board.

1.8.1   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. The M1672 can control both internal and external XGA- or SXGA+- support displays simultaneously.
Figure 1-9 shows a view of the LCD module and Table 1-5 lists the specifications.
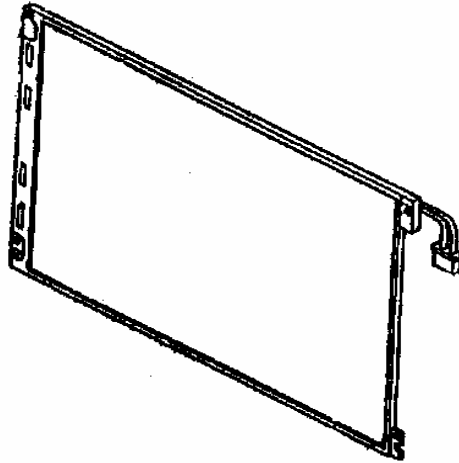
Figure 1-9 LCD module

Table 1-5 LCD module specifications (14.1-inch XGA TFT) (1/3)

Item	Specifications					
	G33C0000 L110	**G33C0000 G110**	**G33C0000 M110**	**G33C0000 Q110**	**VF2058 P01**	**VF2062 P01**
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 1-5 LCD module specifications (15.0-inch XGA TFT) (2/3)

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

Table 1-5 LCD module specifications (15.0-inch SXGA + TFT) (3/3)

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

1.8.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.
Table 1-6 lists the FL inverter board specifications.

Table 1-6 FL inverter board specifications

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

1.9   Power Supply

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

1. Input port management

    - AC adaptor connection
    - Battery pack installation
    - The voltage of AC adaptor (both IN and OUT)

2. Power supply internal control

    - Battery pack charging status (ON/OFF)
    - Controls DC voltage output by AC Adaptor
    - Regulates power supply to system components (load and logic circuits)
    - Controls circuit breakers in event of a power supply malfunction

3. Management of power to logic circuits

    - Controls power to the CPU
    - Regulates power supplied to gate arrays
    - Controls ON/OFF power

4. Status indicators

    - DC IN LED
    - Battery LED

5. External device interface

    - Monitors I^2C bus connections through EC/KBC on the system board.
    - Transmits the power supply mode.

6. Monitors power output

    - Power to systems components (load and logic circuits)
    - Battery pack voltage, overvoltage and I/O current
    - Battery pack internal temperature

The power supply output rating is specified in table 1-7.

Table 1-7 Power supply board output rating

Use	Name	Voltage (V)	Power supplied Yes/No		
			Stand by	Power off	No battery
CPU,M1672	PPV	1.55-1.25	NO	NO	NO
CPU	VID1R2-P1V	1.2	NO	NO	NO
M1672,Memory	2R5-B2V	2.5	YES	NO	NO
M1535+,Clock Generator	2R5-P2V	2.5	NO	NO	NO
Memory	1R25-B1V	1.25	YES	NO	NO
Memory	MR1R25-B1V	1.25	YES	NO	NO
M1672	BMV	3.3	YES	NO	NO
LAN	LAN-E3V	3.3	YES	YES	NO
LAN	LAN-E2R5V	2.5	YES	YES	NO
M1672,YEBISUSS-GA,Mini PCI,PC-Card(s),uPD720101,TVXPRESS2	B3V	3.3	YES	NO	NO
M1535+,Clock Generator,Memory,Mini PCI	P3V	3.3	NO	NO	NO
LCD	PNL-P3V	3.3	NO	NO	NO
USB Power	E5V	5.0	YES	NO	NO
M1672,PC-Card(s)	B5V	5.0	YES	NO	NO
M1535+,BIOS,HDD,Mini PCI,Keyboard,TouchPad,FAN,LEDs	P5V	5.0	NO	NO	NO
ODD	CD-E5V	5.0	YES	YES	NO
FL-inv	FL-P5V	5.0	NO	NO	NO
SD card	SD-B3V	3.3	YES	NO	NO
MDC	MDC-B3V	3.3	YES	NO	NO
CRT	DDC-P5V	5.0	NO	NO	NO
Sound	SND-E5V	5.0	YES	YES	NO
Sound	CDA4R7-E4V	4.7	YES	YES	NO
Sound	A4R7-P4V	4.7	NO	NO	NO
Pull-ups	15-EBV	9.0-11.5	YES	NO	NO
FAN	FANVCC	0-5.0	NO	NO	NO
EC/KBC,M1535+,OZ168	S3V	5.0	YES	YES	NO
M1535+,OZ168,LEDs,Battery	S5V	5.0	YES	YES	NO
PSC	MCV	5.0	YES	YES	NO
RTC(CLK 32kHz)	R3V	2.0-3.5	YES	YES	YES

1.10 Batteries

The computer has two types of batteries:

❏ Main battery pack

❏ RTC battery

The battery specifications are listed in table 1-8.

Table 1-8 Battery specifications

Battery name	Material	Output voltage	Capacity
Main battery	Lithium-Ion	10.8 V	8,400 mAh
RTC battery	NiMH	3.0 V	17mAh

1.10.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. When the main battery is fully charged, it can power the computer for the following duration:
Power ON   about 2.5 to 4 hours (Normal Mode)

1.10.2 Battery LED (Main Battery)

The battery LED displays the status of the battery pack. The battery LED on the computer displays the status of the main battery.

Orange	Main battery is charging. (with AC Adaptor)
Green	Main battery is fully charged. (with AC Adaptor)
Orange / Flashing	Power ON (without AC Adaptor)
	Main battery charge is low.
LED Off	Any other condition

1.10.3 Battery Charging Control

Battery charging is controlled by a power supply microprocessor mounted on the system board. The power supply microprocessor controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

❑ Battery Charge

When the AC adaptor is attached, battery charge starts.

The times required for quick charges are listed in table 1-9.

Table 1-9 Time required for quick charges

Status	Charging time
Power off	About 3.5 hours
Power on	3.5 to 12.5 hours or longer

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

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

1. The battery becomes fully charged.

2. The AC adaptor or battery is removed.

3. The AC adaptor or battery voltage is abnormal

4. The charging current is abnormal.

❑ Detection of full charge

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

1. The battery charging current drops under the predetermined limit.

2. The charging time exceeds the limit.

3. The battery's temperature exceeds 60°C.

1.10.4 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-10 lists the charging time and data preservation period of the RTC battery. The adapter or main battery charges the RTC battery, while the computer is powered on.

Table 1-10 RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	About 8 hours
Data preservation period (full charge)	1 month

Chapter 2

Troubleshooting Procedures

Chapter 2   Contents

Figures

Tables

2.1 Troubleshooting

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

1. System Board	5. Display	9. Wireless LAN
2. Floppy Disk Drive	6. CD/DVD/Multi Drive	10. Sound components
3. Hard Disk Drive	7. Modem	11. SD card
4. Keyboard	8. LAN	

The Diagnostics Disk operations are described in Chapter 3. Detailed replacement procedures are given in Chapter 4.

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk

2. Phillips screwdriver (2 mm)

3. Toshiba MS-DOS system disk(s)
   (You must install the following onto the disk: SYS.COM, FORMAT.COM, FDISK.COM and FDISK.EXE)

4. 2DD or 2HD formatted work disk for floppy disk drive testing

5. Cleaning kit for floppy disk drive troubleshooting

6. Cleaning kit for CD-RW/DVD, DVD-ROM, DVD-R/-RW and DVD Multi Drive troubleshooting

7. Printer port LED

8. Printer port wrap around connector

9. PC Card wrap around card

10. Multimeter

11. External monitor

12. PS/2 or compatible keyboard

13. PS/2 or compatible mouse

14. Multimedia sound system with line-in and line-out ports

15. Headphone

16. Microphone

17. USB test module and USB cable

18. TOSHIBA CD-ROM TEST DISK (ZA1217P01/P000204190)

19. DVD-ROM TSD-1 (TOSHIBA EMI DVD Test Media)

20. CD-RW media that supports four-speed writing and is formatted with DirectCD (media manufactured by RICOH or Mitsubishi Chemical are recommended).

21. RJ11 connector checker and modular cable or RJ11 connector checker LED

22. LAN wraparound connector

23. Music CD

24. DVD that isn't a test media

2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

❑ Ask the user if a password is registered and, if it is, ask him or her to enter the password. If the user has forgotten the system password, perform the following procedure at the appropriate step in the flowchart in Figure 2-1:

Connect the printer port wraparound board (F31PRT), and then turn the POWER switch on. The computer will override the password function by erasing the current password.

❑ Verify with the customer that Toshiba Windows XP Pro/Home is installed on the hard disk. Operating systems that were not preinstalled by Toshiba can cause the computer to malfunction.

❑ Make sure all optional equipment is removed from the computer.

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
             ┌──────────────────────────┐
             │   Connect the AC adaptor │
             │    to the DC IN socket.  │
             └──────────────────────────┘
                           │
                           ▼
                                            ┌────────────────────────────┐
                        No                  │ Perform the Power Supply   │
           ◇ Does the DC IN LED glow? ──────▶│ Troubleshooting Procedures │
                                            │ in section 2.3.            │
                           │                └────────────────────────────┘
                          Yes
                           │
                           ▼
                                            ┌────────────────────────────┐
                        No                  │ Perform the Power Supply   │
           ◇ Does the Battery LED glow? ────▶│ Troubleshooting Procedures │
                                            │ in section 2.3.            │
                           │                └────────────────────────────┘
                          Yes
                           │
                           ▼
             ┌──────────────────────────┐
             │  Turn the Power Switch on.│
             └──────────────────────────┘
                           │
                           ▼
                                            ┌────────────────────────────┐
                        Yes                 │ Perform the Power Supply   │
           ◇ Does the DC IN LED flash? ─────▶│ Troubleshooting Procedures │
                                            │ in section 2.3.            │
                           │                └────────────────────────────┘
                          No
                           │
                           ▼
                                            ┌────────────────────────────┐
                        Yes                 │ Perform the System Board   │
           ◇ Is an error message displayed? ▶│ Troubleshooting            │
                                            │ Procedures in section 2.4. │
                           │                └────────────────────────────┘
                          No
                           │
                           ▼
                                            ┌────────────────────────────┐
                  Is the        No          │ Perform the Display        │
           ◇  "TOSHIBA" logo    ───────────▶│ Troubleshooting Procedures │
              message displayed?            │ in section 2.8.            │
                           │                └────────────────────────────┘
                          Yes
                           │
                           ▼
             ┌────────────────────────────────────┐
             │ If the "Password=" message displays,│
             │ type the password, then press Enter.│
             └────────────────────────────────────┘
                           │
                           ▼
                                            ┌────────────────────────────┐
                  Is Toshiba   No           │ Perform the Hard Disk Drive│
           ◇  Windows XP       ────────────▶│ Troubleshooting Procedures │
              being loaded?                 │ in section 2.6.            │
                           │                └────────────────────────────┘
                           ▼
                         ( 1 )
```

Figure 2-1 Troubleshooting flowchart (1/2)

```
                            ( 1 )
                              │
                              ▼
              ╱───────────────────────╲          Perform the Keyboard
             ╱   Do typed characters    ╲   No    Troubleshooting Procedures
             ╲    appear correctly?      ╱───────▶ in section 2.7.
              ╲───────────────────────╱
                        │ Yes
                        ▼
        ┌───────────────────────────────────────┐
        │ Insert the diagnostics disk into the FDD, │
        │  then run the diagnostics test program.   │
        └───────────────────────────────────────┘
                        │
                        ▼
              ╱───────────────────────╲          Perform the Floppy Disk Drive
             ╱                          ╲   No    Troubleshooting Procedures
             ╲ Is the diagnostics test loaded? ╱──▶ in section 2.5.
              ╲───────────────────────╱
                        │ Yes
                        ▼
        ┌───────────────────────────────────────┐
        │ Perform each test.                        │
        └───────────────────────────────────────┘
                        │
                        ▼
              ╱───────────────────────╲          After confirming which
             ╱   Is an error            ╲   Yes   diagnostics test has detected an
             ╲  detected by any of the   ╱───────▶ error, perform the appropriate
             ╲   diagnostics tests?      ╱          procedures as outlined below.
              ╲───────────────────────╱
                        │ No
                        ▼
        ┌───────────────────────────────────────┐
        │ Perform/repeat running test               │
        └───────────────────────────────────────┘
                        │
                        ▼
              ╱───────────────────────╲          After confirming which
             ╱   Is an error            ╲   Yes   diagnostics test has detected an
             ╲  detected by any of the   ╱───────▶ error, perform the appropriate
             ╲   diagnostics tests?      ╱          procedures as outlined below.
              ╲───────────────────────╱
                        │ No
                        ▼
        ┌───────────────────────────────────────┐
        │ System is normal.                         │
        └───────────────────────────────────────┘
                        │
                        ▼
                   (   END   )
```
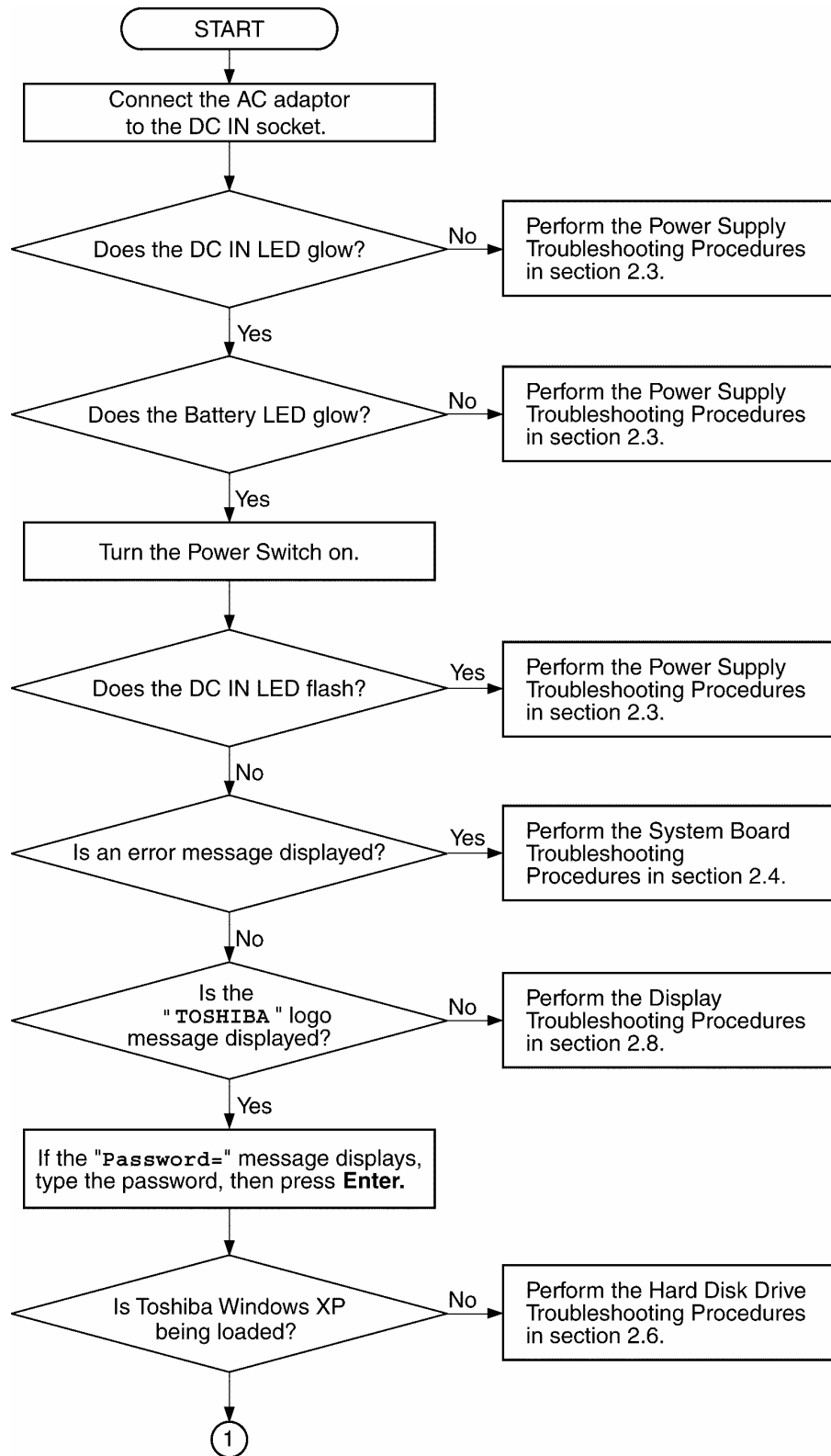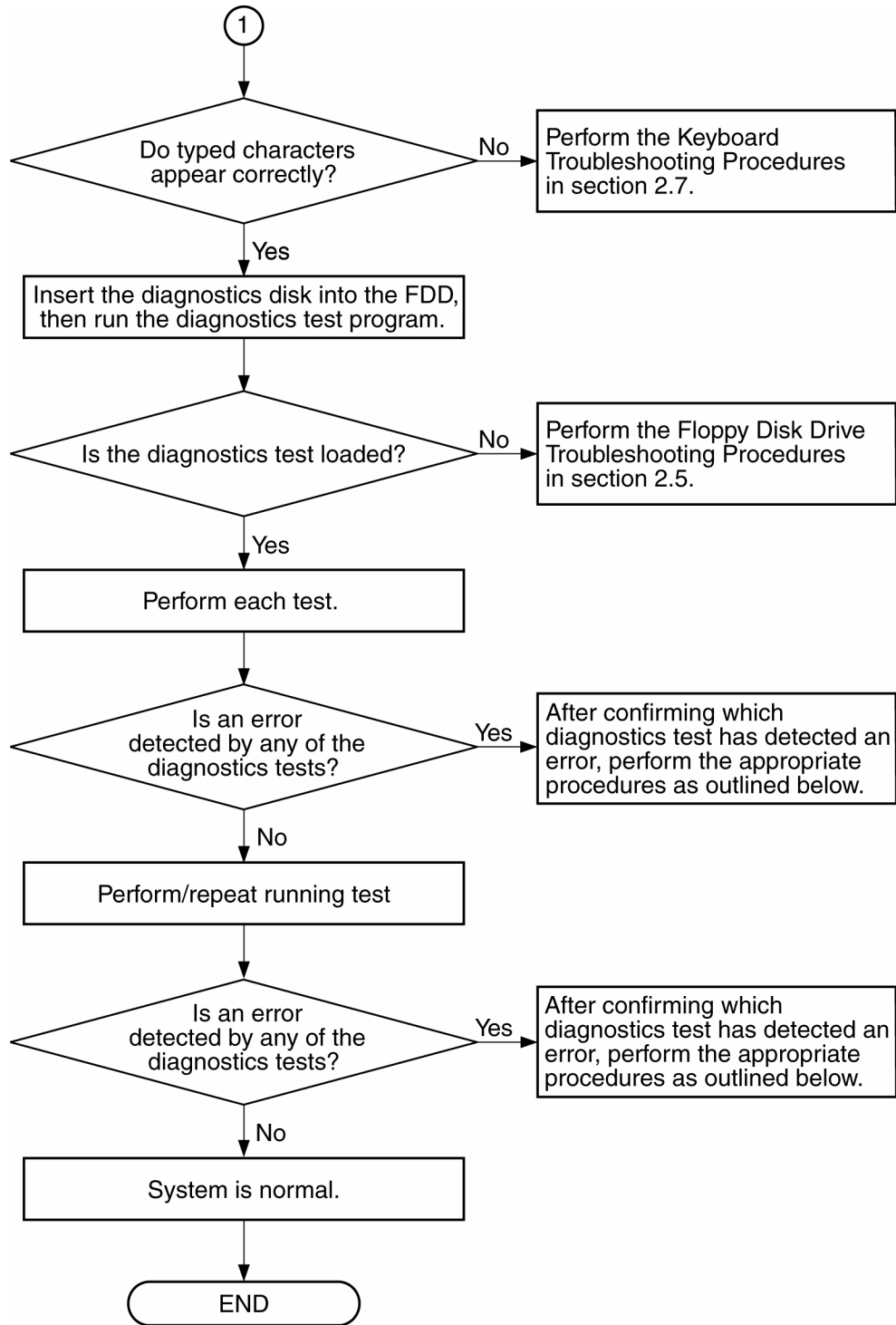
Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected by the system test, memory test, printer test, expansion test or real timer test, perform the System Board Troubleshooting Procedures in Section 2.4.

2. If an error is detected by the floppy disk test, perform the FDD Troubleshooting Procedures in Section 2.5.

3. If an error is detected by the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.

4. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.

5. If an error is detected by the display test, perform the Display Troubleshooting Procedures in Section 2.8.

6. If an error is detected by the CD-ROM/DVD-ROM test, perform the CD-RW/DVD, DVD-ROM, DVD-R/-RW and DVD Multi Drive Troubleshooting Procedures in Section 2.9.

7. If an error is detected by the Modem test, perform the Modem Troubleshooting Procedures in Section 2.10 or the LAN Troubleshooting Procedures in Section 2.11.

8. If an error is detected by the Sound test, perform the Sound Troubleshooting Procedures in Section 2.13.

2.3 Power Supply Troubleshooting

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

> Procedure 1:   Power Status Check
>
> Procedure 2:   Error Code Check
>
> Procedure 3:   Connection Check
>
> Procedure 4:   Quick Charge Check
>
> Procedure 5:   Replacement Check

Procedure 1   Power Status Check

The following LEDs indicate the power supply status:

❑ Battery LED

❑ DC IN LED

The power supply controller displays the power supply status through the Battery and the DC IN LEDs as listed in the tables below.

Table 2-1 Battery LED

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

> *1 Low Battery Hibernation will be executed soon.
>
> *2 Low Battery Hibernation has already been executed.

Table 2-2 DC IN LED

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

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

To check the power supply status, install a battery pack and connect an AC adaptor.

Check 1   If the DC IN LED blinks orange, go to Procedure 2.

Check 2   If the DC IN LED does not light, go to Procedure 3.

Check 3   If the battery LED does not light orange or green, go to Procedure 4.

Procedure 2   Error Code Check

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

❑ Start   Off for 2 seconds

❑ Error code (8 bit)

     "1"   On for one second

     "0"   On for a half second

     Interval between data bits   Off for a half second

The error code begins with the least significant digit.

Example: Error code 12h (Error codes are given in hexadecimal format.)
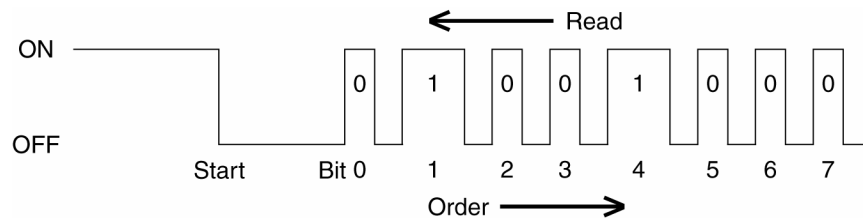
Check 1   Convert the DC IN LED blink pattern into the hexadecimal error code and compare it to the tables below.

The error code begins with the least significant digit.

Error code

Error code	Where Error occurs	
1*h	DC-IN (AC Adaptor, DS)	AC Adaptor is not connected. Error code begins with : 0x10 Error code ends with : 0x1F
2*h	The 1st Battery	The 1st Battery is not connected. Error code begins with : 0x20 Error code ends with : 0x2F
3*h	The 2nd Battery	The 2nd Battery is not connected. Error code begins with : 0x30 Error code ends with : 0x3F
4*h	S3V output (P60)	Operating Power ON
5*h	E5V output (P61)	Error code begins with : 0x40
6*h	E3V output (P62)	Error code ends with : 0xEF
7*h	PPV output (P63:CH0)	
8*h	EMV output (P64:CH0)	
9*h	2R5-E2V output (P65:CH0)	
A*h	1R25-B1V output (P66:CH0)	
B*h	PPV output (P63:CH1)	
C*h	EMV output (P64:CH1)	
D*h	2R5-E2V output (P65:CH1)	
E*h	1R25-B1V output (P66:CH1)	
F*h		

❑ DC IN

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	Common Dock output voltage is over 16.5V.
12h	Current from the DC power supply is over 13.2A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Current sensing IC is not normal.

❑ 1st Battery

Error code	Meaning
20h	Overvoltage is detected. (Not supported)
21h	Main battery charge current is over 13.2A.
22h	Main battery discharge current is over 0.5A when there is no load.
23h	Main battery charge current is more than 4.3A when the main battery isn't being quick charged.
24h	Current sensing IC is abnormal when there is no load.
25h	Main battery charge current is more than 0.3A when the main battery isn't being charged.

❑ 2nd Battery

Error code	Meaning
30h	Overvoltage is detected. (Not supported)
31h	Main battery charge current is over 13.2A.
32h	Main battery discharge current is over 0.5A when there is no load.
33h	Main battery charge current is over 4.3A when DC IN direct charge is off.
34h	Current sensing IC is not normal.
35h	Second battery charge current is over 0.3A.

❑ S3V output

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

❑ E5V output

Error code	Meaning
50h	E5V voltage is over 6.00V when the computer is powered on/off.
51h	E5V voltage is 4.50V or less when the computer is powered on.
52h	E5V voltage is 4.50V or less when the computer is booting up.
53h	E5V voltage is abnormal when the computer is suspended.
54h	E5V voltage is abnormal when the computer shuts down. (CV support)
55h	E5V voltage is 4.50V or less when the computer is booting up. (CV support)

❑ E3V output

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

❑ PPV output

Error code	Meaning
70h	PPV voltage is over 1.92V when the computer is powered on/off.
71h	PPV voltage is 1.04V or less when the computer is powered on.
72h	PPV voltage is 1.04V or less when the computer is booting up.
73h	PPV voltage is 1.04V or more when the computer is powered off.

❑ EMV output

Error code	Meaning
80h	EMV voltage is over 3.00V when the computer is powered on/off.
81h	EMV voltage is 1.53V or less when the computer is powered on.
82h	EMV voltage is 1.53V or less when the computer is booting up.
83h	EMV voltage is 1.53V or more when the computer is powered off.
84h	EMV voltage is 1.53V when the computer is suspended.

❑ 2R5-E2V output

Error code	Meaning
90h	2R5-E2V voltage is over 3.00V when the computer is powered on/off.
91h	2R5-E2V voltage is 2.125V or less when the computer is powered on.
92h	2R5-E2V voltage is 2.125V or less when the computer is booting up.
93h	2R5-E2V voltage is 2.125V or more when the computer is powered off.
94h	2R5-E2V voltage is 2.125V or less when the computer is suspended.

❑ 1R25-B1V output

Error code	Meaning
A0h	1R25-B1V voltage is over 1.50V when the computer is powered on/off.
A1h	1R25-B1V voltage is 1.063V or less when the computer is powered on.
A2h	1R25-B1V voltage is not more than 1.063V when the computer is booting up.
A3h	1R25-B1V voltage is 1.063V or less when the computer is powered off.
A4h	1R25-B1V voltage is 1.063V or less when the computer is suspended.

❑ PPV output

Error code	Meaning
B0h	PPV voltage is over 1.92V when the computer is powered on or off.
B1h	PPV voltage is 1.04V or less when the computer is powered on.
B2h	PPV voltage is 1.04V or less when the computer is booting up.
B3h	PPV voltage is 1.04V or more when the computer is powered off.

❑ EMV output

Error code	Meaning
C0h	EMV voltage is over 3.00V when the computer is powered on/off.
C1h	EMV voltage is 1.53V or less when the computer is powered on.
C2h	EMV voltage is 1.53V or less when the computer is booting up.
C3h	EMV voltage is 1.53V or more when the computer is powered off.
C4h	EMV voltage is 1.53V or less when the computer is suspended.

❑ 2R5-E2V output

Error code	Meaning
D0h	2R5-E2V voltage is over 3.00V when the computer is powered on/off.
D1h	2R5-E2V voltage is 2.125V or less when the computer is powered on.
D2h	2R5-E2V voltage is 2.125V or less when the computer is booting up.
D3h	2R5-E2V voltage is 2.125V or more when the computer is powered off.
D4h	2R5-E2V voltage is 2.125V or less when the computer is suspended.

❑ 1R25-B1V output

Error code	Meaning
E0h	1R25-B1V voltage is over 1.50V when the computer is powered on/off.
E1h	1R25-B1V voltage is 1.063V or less when the computer is powered on.
E2h	1R25-B1V voltage is 1.063V or less when the computer is booting up.
E3h	1R25-B1V voltage is 1.063V or more when the computer is powered off.
E4h	1R25-B1V voltage is 1.063V or less when the computer is suspended.

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

❑ Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:

❑ Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

Check 3   In the case of error code 2Xh:

❑ Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:

❑ Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

Check 4   Any other error is occurred, go to Procedure 5.

Procedure 3   Connection Check

The power supply wiring diagram is shown below:
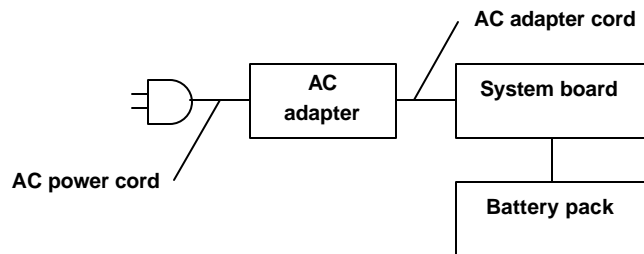
Any of the connectors may be disconnected. Perform Check 1.

Check 1   Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2   Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.

Check 3   Use a multimeter to make sure that the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 4. If the output is close to 15 V, go to Check 5.

Check 4   Connect a new AC adaptor or AC power cord.
- If the DC IN LED does not light, go to Procedure 5.
- If the battery LED does not light, go to Check 5.

Check 5   Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

Procedure 4   Quick Charge Check

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

1. Reinstall the battery pack.

2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.

3. Run the Diagnostic test, go to System test and execute subtest 06 (quick charge) described in Chapter 3.

4. When quick charge is complete, the diagnostics test displays the result code. Check the result code against the table below and perform any necessary check.

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

Check 1   Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).

Check 2   Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.

Check 3   The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.

Check 4   The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.

Check 5   Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

Procedure 5   Replacement Check

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

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

Check 2   Use a multimeter to make sure that F5602, F5603 and F8800 fuses on the system board are not blown. If a fuse(s) is not blown, go to Check 3. If a fuse(s) is blown, go to Check 4.

Check 3   Use a multimeter to make sure that F8810 fuse on the battery board are not blown. If the fuse is not blown, go to Check 4. If the fuse is blown, replace the battery board with a new one following the instructions in Chapter 4.

Check 4   The battery board or system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.4 System Board Troubleshooting

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

> Procedure 1: Message Check
>
> Procedure 2: Printer Port LED Check on Boot Mode
>
> Procedure 3: 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 Toshiba MS-DOS or Toshiba Windows XP Pro/Home is properly loaded, go to Procedure 3.

Check 1   If one of the following error messages appears on the screen, press **F1** 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 **F1** as the message instructs, the SETUP screen appears to set the system configuration. If the error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message displays, 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   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) appears, go to Procedure 4.

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

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

If the error message (21) appears, go to the DVD-ROM and CD-RW/DVD-ROM Troubleshooting Procedures in Section 2.9.

If the error message (22) or (23) appears, go to the FDD Troubleshooting Procedures in Section 2.5.

     (1)   PIT ERROR
     (2)   MEMORY REFRESH ERROR
     (3)   TIMER CH.2 OUT ERROR
     (4)   CMOS CHECKSUM ERROR
     (5)   CMOS BAD BATTERY ERROR
     (6)   FIRST 64KB MEMORY ERROR
     (7)   FIRST 64KB MEMORY PARITY ERROR
     (8)   VRAM ERROR
     (9)   SYSTEM MEMORY ERROR
     (10)   SYSTEM MEMORY PARITY ERROR
     (11)   EXTENDED MEMORY ERROR
     (12)   EXTENDED MEMORY PARITY ERROR
     (13)   DMA PAGE REGISTER ERROR
     (14)   DMAC #1 ERROR
     (15)   DMAC #2 ERROR
     (16)   PIC #1 ERROR
     (17)   PIC #2 ERROR
     (18)   KBC ERROR
     (19)   HDC ERROR
     (20)   IDE #0 ERROR
     (21)   IDE #1 ERROR
     (22)   NO FDD ERROR
     (23)   FDC ERROR
     (24)   TIMER INTERRUPT ERROR
     (25)   RTC UPDATE ERROR

Procedure 2   Printer Port LED Check on Boot Mode

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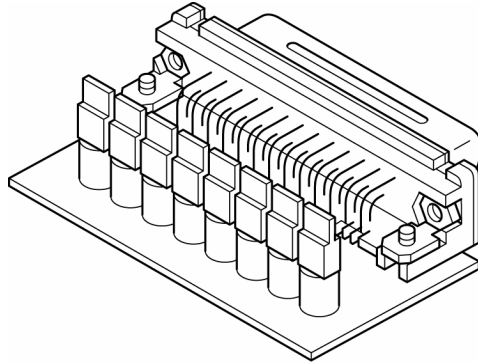
Figure 2-2 Printer port LED

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

1. Plug the printer port LED into the computer's parallel port.

2. Turn on the computer's power.

3. Read the LED status from left to right as you are facing the back of the computer.

4. Convert the status from binary to hexadecimal notation.

5. If the final LED status is FFh (normal status), go to Procedure 3.

6. If the final LED status matches any of the test status values in Table 2-3, perform Check 1.

NOTE: *If an error condition is detected by the IRT test, the printer port LED displays an error code after the IRT test ends. For example, when the printer port LED displays 19h and halts, the IRT test has already completed the Display initialization. In this instance, the IRT indicates an error has been detected during the Display logo.*

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

LED Status	Test item	Message
		Register initialization for boot block
FFh	Start	Clearing software reset bit
		Permitting A20 line
		Initialization of special register and Intel chip set
B0h	Flash ROM check	PIT CH0 initialization (for HOLD ON)
		BIOS rewrite flag initialization
		Checksum check
		Transition to protected mode
		Boot block checksum check (The system halts when a checksum error is detected.)
B1h	EC/KBC rewrite check	Transition to BIOS rewriting when rewrite is requested
		Executing KBC initialization sequence
		Enabling keyboard
		[Tilde], [TAB] key check
B2h	BIOS rewrite check	BIOS rewrite request check when check sum error except for Boot Block is detected, or rewrite is requested by user
		Transition to BIOS rewrite
B3h	System BIOS rewrite transition to IRT	System BIOS rewrite transition to IRT
	BIOS rewrite process	Hardware initialization
		Setting base for Power Management I/O Space
		Enabling BIOS write
		Special interrupt control
		Disabling BIOS write protect
		Enabling SMBus I/O space
		Enable SMBus access
		Opening work I/O for SDRAM initialization
		Setting FDC prohibition
		Hardware initialization for each model
		PIT CH1 initialization (setting refresh interval to 30 m/s)
		Initialization of PIT, DMAC, PIC

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

LED Status	Test item	Message
(B3h)		DRAM configuration
		Enable L1 cache
		Memory clear
		Transition to real mode, coping BIOS on RAM
B5h	Display initialization	Storing key scan code
		Setting TASK_1ms_TSC
		Display initialization
B6h	Second controller initialization	FAN control
		Sound controller initialization (for beep)
		Enabling system speaker
		Disabling mute
		Setting the volume to max
		Display of message (EC/KBC UPDATE/DAMAGED, BIOS UPDATE/DAMAGED)
		Key input
		Disabling USB
		Sound beep
		Waiting for key input
		Reading "CHGBIOSA.EXE"/"CHGFIRMA.EXE"
		FDC reset
		Setting parameters for 2DD (720KB), setting transmission rate
		Reading the first sector (For 2HD (1.44MB), the media is defined.)
		Setting parameters for 2SS (720KB), setting transmission rate
		Searching "CHGBIOSA.EXE" from route directory
		Working out the head and sector of directory start
		Reading the route directory by one sector
		Searching the entry of "CHGBIOSA.EXE"/"CHGFIRM.EXE" from the sector read.
		Key input when an error is detected while reading the EXE header of "CHGBIOSA.EXE"/ "CHGFIRM.EXE"
		Executing "CHGBIOSA.EXE"/ "CHGFIRM.EXE"

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

LED Status	Test item	Message
00h	IRT Check system	Initialization of special register
		PIT CH1 initialization size (Setting refresh interval to 30 m/s)
01h	Memory check	Check of the type and size of DRAM (at Cold Boot)
		The system halts when the DRAM size is zero.
		SM-RAM stack area test (The system halts when the stack area can not be used.)
02h	CMOS check and initialization	Cache configuration
		Enabling L1 cache
		CMOS access test (at Cold Boot) (the system halts when an error is detected.)
		Check of CMOS battery level
		Check of CMOS checksum
		CMOS data initialization (1)
		Setting of IRT status (setting boot status and IRT busy flag, the bit remained is zero)
		Storing DRAM size
03h	Resume branch	Resume branch (at Cold Boot)
		Not resume when a CMOS error is detected
		Not resume when resume status code is not set
		Resume error check
		ICH Power Failure error resume error 7Ah
		SM-RAM checksum check resume error 73h
		Check of change of memory configuration resume error 73h
		System BIOS RAM area checksum check resume error 79h
		PnP RAM checksum check resume error 77h
		Transition to resume process
		Resume error process
		Reset of the CPU clock to low
		Disabling all SMI
		Clearing resume status
		Return to ROM
		Setting the area of C0000h to EFFFFh to PCI (Disabling DRAM)

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

LED Status	Test item	Message
(03h)		Setting resume error request
		System BIOS ROM to RAM copy (The system halts when an error is detected.)
04h	SMRAM initialization	SMRAM initialization
		Check of Wake Up factor
		SMRAM base rewrite and BIOS CPU state map store
		Enabling SMI by ASMI
05h	CPU initialization	Initialization of devices that needs initialization before PCCI Bus initialization
		PIT test (at Cold Boot) and initialization of PIT
		Setting test pattern for PIT#0 CH0
		Check whether the test pattern set can be read
		PIT CH0 initialization (setting tim er interrupt internal to 55m/s)
		PIT CH2 initialization (setting the frequency for sound generator to 55 m/s)
		PIT CH1 test (Check whether the refresh signal is working properly when the refresh interval is 30m/s. The system halts when the time is out.)
		PIT CH2 test (Check whether the speaker gate is working properly.)
		Measuring of CPU clock
		Enabling SMI except for auto-off function
		Battery discharge current control (ICmA)
		Executing division proves for measuring IRT time
		Setting of clock generator
		Check of parameter block A
		CPU initialization
		Micro code update
		Check of Geyserville support
		Setting CPU clock to high
		Setting of Graphics Aperture Size

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

LED Status	Test item	Message
06h	PCI initialization	Storing memory configuration In buffer
		Reading EC version
		Update of flash ROM type
		Destination (home/abroad) reference by DMI data
		Default setting when CMOS default setting error (Bad Battery, Bad Checksum (ROM, CMOS) is detected)
		ACPI table initialization (for executing an optical ROM)
		Initialization of a device that needs initialization before PCI Bus initialization
		AC'97 control
		Initialization of temperature control information
		KBC initialization
		Setting VGA display to off and reset control
		Sound initialization
		Acquiring Multibox status of the computer
		HC initialization, connection recognition and initialization of a USB device
		Enable/Disable control of the internal LAN
		PIC initialization
		PIC test
		Check whether self test is necessary (at Cold Boot) (Check of space key and printer wraparound connector)
		Initialization of password
07h	PCI Bus initialization	PCI Bus initialization (Connecting DS Bus)
		Initialization of LAN information
		Check of WakeUp factor
08h	PnP initialization	Running a task for waiting the completion of INIT-PCI
		CMOS data initialization (2)
		PnP initialization
		Waiting for the completion of Multibox status check
		Hardware setting from PnP resource

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

LED Status	Test item	Message
09h	PnP Hardware initialization	Running a task for waiting the completion of PnP resource creating
		Serial interrupt control (before executing interrupt)
		PnP Hardware initialization
		PC card slot initialization
		FIR initialization
		PCI auto configuration
		Preparing work for auto configuration
		Acquiring PCI IRQ
		Configuration
		Storing the result of VGA configuration
0Ah	Output code generation	Running a task for waiting the completion of PCI configuration
		Initialization of hardware that is necessary after PCI configuration
		Setting of printer port
		Start of HDD initialization sequence
		SD initialization
		Output code generation
0Bh	First 64KB memory check	First 64KB memory check
0Ch	Interrupting vector initialization	Interrupting vector initialization
0Dh	NDP initialization	NDP initialization
0Eh	System initialization	Storing CMOS error status in IRT error status buffer
		Start of timer initialization
		Initialization of buffer for power save
		EC initialization and reading battery information
		System BIOS update (Update of model name, EDID information for LCD)
0Fh	Waiting for the completion of VGA chip, VGA BIOS initialization	Waiting for the completion of VGA chip, VGA BIOS initialization
10h	Logo Display	Logo Display
11h	System memory check	Conventional memory check (Boot)
12h	External memory check	Check of exceptional cases in protected mode (Boot)

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

LED Status	Test item	Message
13h	System memory initialization * LED=14h when an error is detected in check of exceptional cases in protected mode	Initialization of conventional memory (Reboot)
15h	DMA Page Register check	DMA Page Register check (Boot)
16h	DMAC check	DMAC check (Boot)
17h	DMAC initialization	DMAC initialization (Boot)
18h	Printer port check	Printer port check
19h	SIO check	SIO check
1Ah	Boot password	Password check
		(Reboot) Waiting for the completion of HDD initialization
		Key input check during IRT (Waiting for the completion of KBC initialization)
		Initialization of ATA priority
		(Boot)
		Loading BM
		BM initialization
		Key input check during IRT (Waiting for the completion of KBC initialization)
		Password input
		Releasing BM
1Bh	Extension I/O ROM check	Optional I/O ROM check
1Ch	Pre Boot Setup	Storing the value of 40:00h (for SIO save/restore)
		Setting of font address for resume password
		Setting repeat parameters for USB KB
		Storing T shadow RAW size
		Update of system resource for preboot
		Rewriting the memory map data for INT 15h E820h function
		Waiting for the completion of AC-Link initialization
		Update of DMI table
		Copying ACPI table to the top of expansion memory
		Waiting for the completion of writing PSC version on BIOS

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

LED Status	Test item	Message
(1Ch)		Waiting for the completion of the clock generator setting (The system halts in LED=1Dh when an error is detected.)
		Waiting for the completion of Serial Port initialization
		Releasing NMI mask
		TIT checksum
		Clearing runtime flag in IRT
		Update of runtime checksum
		Hibernation branch
		Bluetooth initialization
		Check the presence of a target maintenance card
		Disabling the PC card not used
		Hardware initialization Pre Boot
		Notifying the conditional of DVI connection to VGA BIOS
		Setting of the battery save mode
		Setting of date
		Waiting for the completion of Bluetooth initialization
		Update of DMI Wakeup factor and SM-BIOS structure table
		Closing the configuration space for PCI device
		Cache control
		Update of parameter block A
		Process related to CPU
		Setting CPU clock to setup specification
		Waiting for motor of f of the disabled HDD
		Final decision of the USB FDD drive information
		Process after Pre Boot Setup
		Clearing the power status button
		Enabling the power button
		Measure against the operation failure of USB at high temperature
FFh	End	

Check 1 If any of the following error codes display, go to Procedure 4.

    B0h, B1h, B2h, B3h, B7h, B8h, 00h, 01h, 02h, 03h, 04h, 06h, 07h, 05h, D0h, D1h, D2h, D3h, D4h, D5h, 70h, 74h, 75h, 71h, 72h, 73h, 76h, 77h, 81h, 82h, 83h, 78h, 79h, 08h, 09h, 0Ah, 0Dh, 18h, 19h, 1Fh, 20h, 25h, 30h, 40h, 41h, 22h, 42h, 80h, 83h, C0h, C1h, A6h

Check 2 If error codes 81h or 82h are displayed, go to the following sections:

    Section 2.5 FDD Troubleshooting

    Section 2.6 HDD Troubleshooting

Procedure 3 Diagnostic Test Program Execution Check

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

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

16. IEEE1394 test

17. Bluetooth test

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

Procedure 4   Replacement Check

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

Check 1   Visually check for the following conditions:

    a) Connector housing is cracked or broken.

    b) Connector pins are damaged.
- If there is damage, go to Check 2
- If there is no damage, but an error message still appears, go to Check 2.

Check 2   The system board may be damaged. Replace the system board with a new one.

2.5 FDD Troubleshooting

This section describes how to determine if the USB 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. The detailed operation is given in Chapter 3, *Tests and Diagnostics*.

Insert the Diagnostics Disk in the external floppy disk drive. Then turn on the computer and run the test. Clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 3.

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.

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

Table 2-4 FDD error code and status

Code	Status
01h	Bad command
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed on dual attach card
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 appears, disable the write protect tab on the floppy disk. 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 3.5-inch USB FDD is connected to the system board.

Check 1   Make sure the USB FDD cable is firmly connected to PJ4600 on system board.
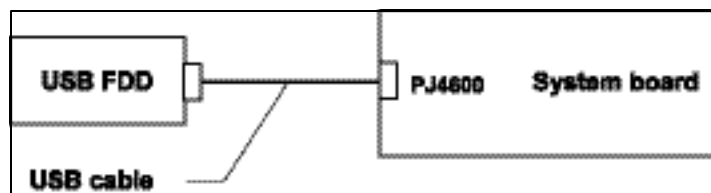
If any of the connections is loose, reconnect firmly and repeat Procedure 2. If any of the connections is damaged, or there is still an error, go to Check 2.

Check 2   The FDD or USB cable may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform Check 3.

Check 3   Replace the system board with a new one following the steps in Chapter 4.

2.6   HDD Troubleshooting

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

>   Procedure 1:   Message Check
>
>   Procedure 2:   Partition Check
>
>   Procedure 3:   Format Check
>
>   Procedure 4:   Diagnostic Test Program Execution Check
>
>   Procedure 5:   Connector Check and Replacement Check

> *CAUTION: The contents of the hard disk will be erased when the HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s).*

Procedure 1   Message Check

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

Check 1   If any of the following messages appear, go to Procedure 5. If the following messages do not appear, perform Check 2.

```
 HDC ERROR (After 5 seconds this message will disappear.)
                           or
   IDE #0 ERROR (After 5 seconds this message will disappear.)
```

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

```
        Insert system disk in drive
        Press any key when ready .....
                or
        Non-System disk or disk error
        Replace and press any key
```

Check 3   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 restart the computer. If the problem still exists, go to Procedure 2.

Procedure 2   Partition Check

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

Check 1   Type **C:** and press **Enter**. If you cannot change to the drive C, go to Check 2. If you can change to drive C, go to Check 3.

Check 2   Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If the drive C is listed, go to Check 3. If the drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on the drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.

Check 3   If the drive C is listed as active in the FDISK menu, go to Check 4. If the drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for the drive C. Restart the computer. If the problem still exists, go to Check 4.

Check 4   Type **DIR C:** and press **Enter**. If the following message appears, go to Procedure 3. If contents of drive C are listed on the display, go to Check 5.

```
Invalid media type reading drive C
Abort, Retry, Fail?
```

Check 5   Using the **SYS** command on the Toshiba MS-DOS system disk, install system files on the HDD.

If the following message appears on the display, the system files have been transferred to the HDD. Restart the computer. If the problem still exists, go to Procedure 3.

```
System transferred
```

Procedure 3   Format Check

The computer's HDD is formatted using the MS-DOS FORMAT program. To format the HDD, follow the steps below.

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

```
Format complete
```

If an error message appears on the display, 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 listed in Table 2-5. If an error code is not generated and the problem still exists, go to Procedure 5.

Table 2-5 Hard disk drive error code and status

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

Procedure 5   Connector Check and Replacement Check

The HDD or the 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 HDD is firmly connected to PJ1800 on the system board.
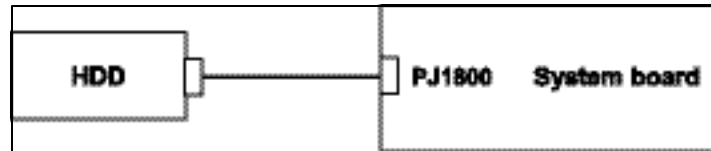
        If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2   The HDD may be damaged. Replace it with a new one following the instructions in Chapter 4. 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.

2.7   Keyboard Troubleshooting

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

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

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

Procedure 2   Connector and Replacement Check

The keyboard, touch pad 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. If the touch pad malfunctions, start with Check 3. If the keyboard malfunctions, start with Check 1.

Check 1   Make sure the keyboard cable is firmly connected to PJ3230 on the system board.
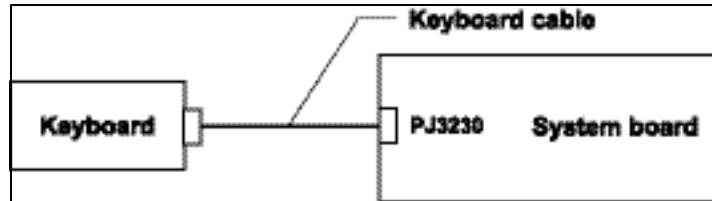
        If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2   The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4.

        If the problem still exists, perform Check 3.

Check 3   Make sure the touch pad cable is firmly connected to PJ3240 on the system board.
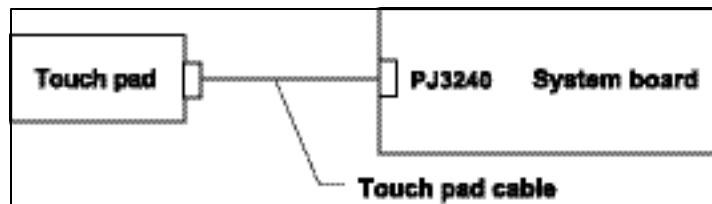
        If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 4.

Check 4   The touch pad may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 5.

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

2.8 Display Troubleshooting

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

> Procedure 1: External Monitor Check
>
> Procedure 2: Diagnostic Test Program Execution Check
>
> Procedure 3: Connector and Replacement Check

Procedure 1 External Monitor Check

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

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

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

Procedure 2 Diagnostic Test Program Execution Check

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

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

Procedure 3   Connector and Replacement Check

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

> If the FL does not light, perform Check 1.
>
> If characters or graphics are not displayed clearly, perform Check 2.
>
> If some screen functions do not operate properly, perform Check 3.
>
> If the FL remains lit when the display is closed, perform Check 4.

Check 1   Replace the FL inverter with a new one and test the display again. If the problem still exists, perform Check 2.
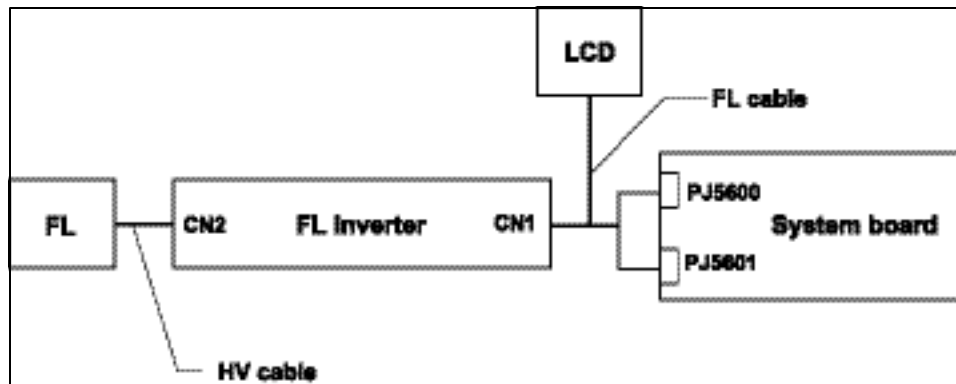
Check 2   The FL cable or HV cable may be defective or damaged. Replace the FL or HV cable with a new one and test the display again. If the problem still exists, perform Check3.

Check 3   The LCD module may be defective or damaged. Replace the LCD module with a new one and test the display again. If the problem still exists, perform Check 4.

Check 4   The FL cable may be defective or damaged. Replace the FL cable with a new one and test the display again. If the problem still exists, perform Check 5.

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

2.9 CD-RW/DVD, DVD-ROM, DVD-R/-RW, and DVD Multi Drive Troubleshooting

This section describes how to determine if the computer's internal CD-RW/DVD, DVD-ROM, DVD-R/-RW drive, or DVD Multi drive is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

> Procedure 1:   Drive Cleaning Check
>
> Procedure 2:   Diagnostic Test Program Execution Check
>
> Procedure 3:   Connector Check and Replacement Check

Procedure 1   Drive Cleaning Check

1. Turn off the power to the computer.

2. Open the CD/DVD drawer by inserting a slender object such as a straightened paper clip into the eject hole. The object must be long enough to activate the eject mechanism.

3. Clean the laser pickup lens with a lens cleaner. Apply the cleaner to a cloth and wipe the lens.

4. If the drive still does not function properly after cleaning, go to Procedure 2.

Procedure 2   Diagnostic Test Program Execution Check

The CD-ROM/DVD-ROM test program is stored in the Diagnostics Disk.

For the DVD-ROM test, prepare a test DVD (TOSHIBA-EMI DVD-ROM Test Media TSD-1).

For the CD-RW test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended).

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

If any errors occur while executing the CD-ROM/DVD-ROM test, go to Procedure 3.

Procedure 3   Connector Check and Replacement Check

The CD-RW/DVD, DVD-ROM, DVD-R/-RW or DVD Multi drive connects to PJ1820 on the system board. The drive may be disconnected, or the drive or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1   Make sure the drive is firmly connected to PJ1820 on the system board.
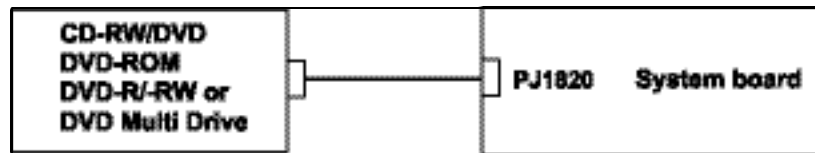
If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

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

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

2.10 Modem Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

If an error occurs while executing the modem diagnostics test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

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

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

Check 1   Make sure the MDC is firmly connected to PJ3010 on the sound board, and the RJ-11 Jack (modem jack) is firmly connected to MDC JP1.
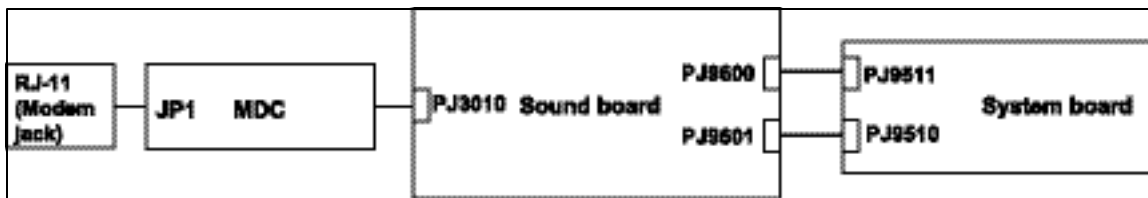
If a connector is disconnected, connect it firmly and repeat Procedure 1. If the Modem is still not functioning properly, perform Check 2.

Check 2   The RJ-11 jack may be defective or damaged. Replace the RJ-11 jack with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 3.

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

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

2.11 LAN Troubleshooting

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

> Procedure 1:   Diagnostic Test Program Execution Check
>
> Procedure 2:   Connector Check and Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

The LAN Diagnostic test program is stored on the computer's diagnostic disk. This program checks the LAN function. Insert the diagnostics disk in the computer's floppy disk drive, turn the computer on and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

If an error occurs while executing the LAN diagnostics test, go to Procedure 2.

Procedure 2   Connector Check and Replacement Check

If the LAN port malfunctions, there may be a bad connection between the RJ-45 jack and the system board. Or the system board may be damaged.

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

Check 1   Make sure the RJ-45 jack cable is firmly connected to PJ4100 on system board.
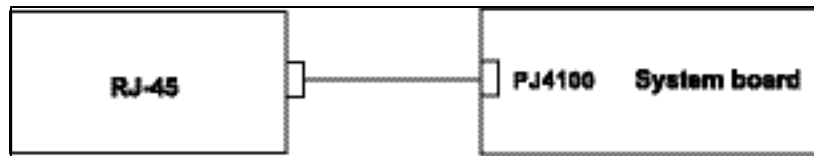
If a connector is disconnected, connect it firmly and repeat Procedure 1. If the LAN port is still not functioning properly, perform Check 2.

Check 2   The RJ-45 jack may be defective or damaged. Replace the RJ-45 jack with a new one following the steps in Chapter 4, *Replacement Procedures*. If the LAN port is still not functioning properly, perform Check 3.

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

2.12 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 other procedures as required.

Procedure 1:   Transmitting-Receiving Check

Procedure 2:   Antennas' Connection Check

Procedure 3:   Antennas' Capability Check

Procedure 4:   Replacement Check

Procedure 1   Transmitting-Receiving Check

Make sure the wireless communication switch on the computer is turned on. If it is not, turn the switch on.

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

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

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

Procedure 2   Antennas' Connection Check

The wireless LAN function wiring diagram is shown below:
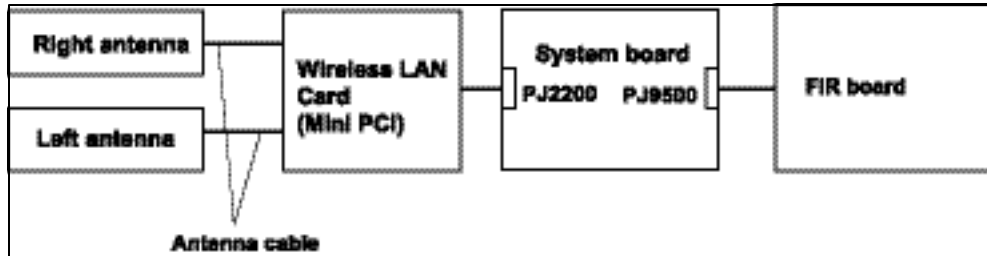
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, perform the following checks:

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

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

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

Procedure 3 Antenna Check

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

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

1. Disassemble the computer and disconnect the wireless LAN antenna cables (white and black) from the wireless LAN card. Refer to Chapter 4, *Replacement Procedures*, for detailed steps of disassembling

2. Connect the tester set up for impedance measurement to the antenna jig. Measure the white antenna's resistance.

3. Determine the resistance. The antenna passes the test when the resistance is less than 5 ohm. If it is more than 5 ohm, the antenna is faulty.

4. Measure the black antenna's resistance. Check if there is a faulty.
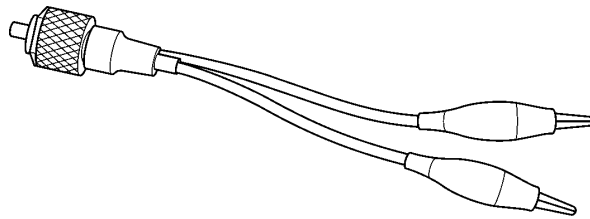
Figure 2-3   Antenna Test jig

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

NOTE: *1.*   *The resistances determined with the steps above may not be stable according to the length of the antenna. The impedance of the antenna itself is about 0.5 to 0.8 ohm.*

2.   *The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.*

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

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

Procedure 4   Replacement Check

Check if the wireless LAN card and the system board are connected properly. Any of these components may be damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

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

Check 2   The wireless LAN antenna or wireless LAN antenna cables may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace it with a new one. If there is still an error go to Check 3.

Check 3   The system board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

2.13 Sound Troubleshooting

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

        Procedure 1:   Diagnostic Test Program Execution Check

        Procedure 2:   Connector Check

        Procedure 3:   Replacement Check

Procedure 1   Diagnostic Test Program Execution Check

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

If an error is detected, go to Procedure 2.

Procedure 2   Connector Check

The sound function wiring diagram is shown below:
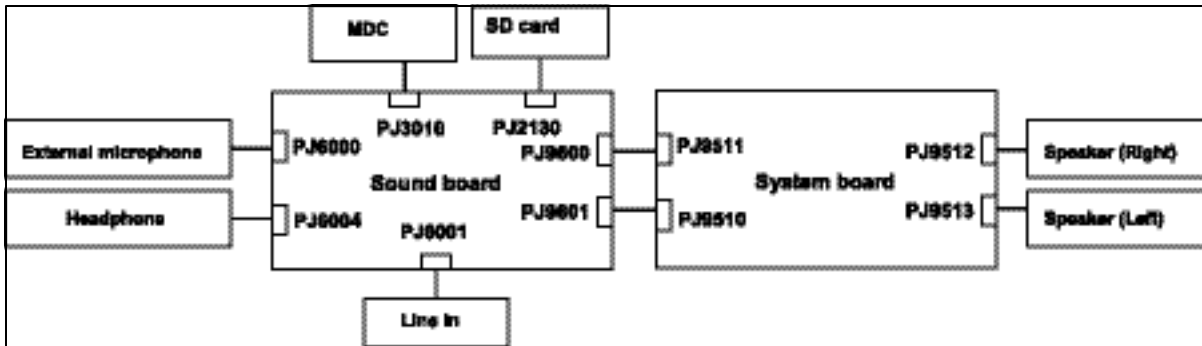
Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

   If the speakers don't work correctly, perform Check 1.

   If the external microphone or the headphone doesn't work correctly, perform Check 2.

Check 1   If the speakers don't sound properly, the speaker cable may be disconnected. Make sure the speaker cable is firmly connected to PJ9512 and PJ9513 on the system board. If the stereo speakers are still not functioning properly, go to Procedure 3.

Check 2   If the external microphone or the headphone does not work correctly, the cable may be disconnected. Make sure PJ9600 and PJ9601 on the sound board is firmly connected to PJ9511 and PJ9510 on the system board. If the external microphone or the headphone is still not functioning properly, go to Procedure 3.

Procedure 3   Replacement Check

Check 1   If the speakers don't sound properly, the left or right speaker may be defective or damaged. Replace it with a new one. If the stereo speakers still do not work properly, go to Check 3.

Check 2   If the external microphone or the headphone does not work correctly, the cable or the sound board may be defective or damaged. Replace it with a new one. If the external microphone or the headphone still does not work correctly, go to Check 3.

Check 3   The system board may be defective or damaged. Replace it with a new one.

2.14 SD Card Slot Troubleshooting

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

>Procedure 1 Check on Windows XP Pro/Home

>Procedure 2 Connector/Replacement Check

Procedure 1   Check on Windows XP Pro/Home

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

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

Procedure 2   Connector/Replacement Check

The SD card is connected to PJ2130 on the sound board.
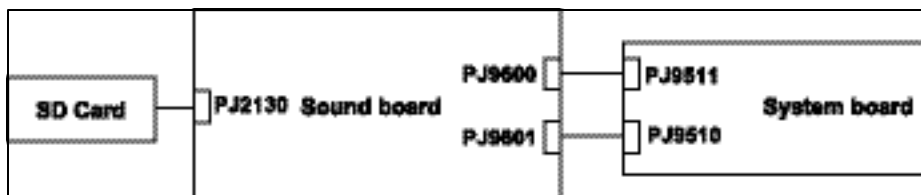
Check 1   The SD card and the sound board may be disconnected. Make sure the SD card is firmly inserted to PJ2130 on the sound board. If not, insert it firmly. Make sure PJ9600 and PJ9601 on the sound board is firmly connected to PJ9511 and PJ9511 on the system board. If the SD card is still not functioning properly, perform Check 2.

Check 2   The SD card may be faulty. Replace it with a new one following the step in Chapter 4. If the problem continues, perform Check 3.

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

Chapter 3

Tests and Diagnostics

Chapter 3   Contents

Tables

3.1   The Diagnostic Test

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

NOTE: To start the diagnostics, follow these steps:

1. Check all cables for loose connections.

2. Exit any application you may be using and close Windows.

The DIAGNOSTIC MENU consists of the following eight functions.

- ❑ DIAGNOSTIC TEST
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ EXIT TO MS-DOS
- ❑ SETUP

The DIAGNOSTIC TEST MENU contains the following twelve functional tests:

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

Other tests as follows

- ❑ WIRELESS LAN (Agere) TEST
- ❑ WIRELESS LAN (Atheros) TEST

❑ SOUND/LAN/MODEM TEST
❑ IEEE1394 TEST
❑ BLUETOOTH TEST

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

- ❑ The Diagnostics Disk (all tests)
- ❑ A formatted working disk for the floppy disk drive test
- ❑ An external FDD attachment
- ❑ A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- ❑ A cleaning kit to clean the DVD-ROM drive heads (Head Cleaning)
- ❑ A PC card wraparound connector for the I/O card test (Expansion test) (Rev.B or higher)
- ❑ A printer wraparound connector for the printer wraparound test (Printer test)
- ❑ A CD test media (TOSHIBA CD-ROM TEST DISK ZA1217P01/P000204190) (CD-ROM/DVD-ROM test)
- ❑ A DVD test media (Toshiba-EMI DVD-ROM TEST DISK TSD-1) (CD-ROM/DVD-ROM test)
- ❑ CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)
- ❑ External CRT (Display test)
- ❑ Headphone (Sound test)
- ❑ CD-ROM drive (CD-ROM test)
- ❑ A microphone
- ❑ A modular cable and RJ11 connector checker
- ❑ A modular cable and RJ11 connector checker (LED)
- ❑ USB test module and USB cable
- ❑ LAN wraparound connector
- ❑ Music CD (CD-ROM/DVD-ROM test)

The following sections detail the tests within the Diagnostic Test function of the DIAGNOSTIC TEST MENU. Refer to Sections 3.23 through 3.28 for detailed information on the remaining Service Program Module functions.

3.2   Executing the Diagnostic Test

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

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

---

*NOTE: To execute the CD-ROM or DVD-ROM test, make sure the CD-ROM and CD-
ROM drive or DVD-ROM and DVD-ROM drive is installed in the computer.*

The following menu will appear:

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

DIAGNOSTICS MENU :

  1 - DIAGNOSTIC TEST
  2 -
  3 -
  4 - HEAD CLEANING
  5 - LOG UTILITIES
  6 - RUNNNING TEST
  7 - FDD UTILITIES
  8 - SYSTEM CONFIGURATION
  9 - EXIT TO MS-DOS
  0 - SETUP




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

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

---

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

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

DIAGNOSTIC TEST MENU :

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



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

Refer to sections 3.4 through 3.15 for detailed descriptions of each Diagnostic Tests 1 through 13. Function 88 sets the floppy disk drive and hard disk drive error retry count. Function 99 exits the submenus of the Diagnostic Test and returns to the Diagnostic Menu.

3. Select the option you want to execute and press **Enter**. When "1-SYSTEM TEST" is selected, the following message will appear:

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


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

SUB-TEST MENU :

01 - ROM checksum
02 - Thermister Check
03 -
04 - CPU Fan ON/OFF
05 - 2nd Fan ON/OFF
06 - Quick charge
07 - DMI read
08 - DMI write
09 - CPU Temperature
99 - Exit to DIAGNOSTIC TEST MENU



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

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

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

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

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

Selecting **NO** returns the subtest menu to the main menu after the test is complete.

5. The following message will appear:

```
ERROR STOP : YES/NO
```

Then, use the left or right arrow keys to move the cursor to the desired option and press **Enter**.

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

```
ERROR STATUS NAME    [[ HALT OPERATION ]]

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

These three selections have the following functions respectively:

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

Selecting **NO** keeps the test running even if an error is found.

6. Use the arrow keys to move the cursor to the desired option and press **Enter**.

Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-4 in section 3.21 describes the error codes and error status for each error.

3.3   Subtest Names

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

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Thermister Check
		04	CPU Fan ON/OFF
		05	2nd Fan ON/OFF
		06	Quick charge
		07	DMI read
		08	DMI write
		09	CPU Temperature
2	MEMORY	01	Conventional memory
		02	Protected mode
		04	Cache memory
		05	L2 cache memory
		06	Stress
3	KEYBOARD	01	Pressed key display
		02	Pressed key code display
		04	Touch Pad
		05	USB test
		08	CD-function key 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	FLOPPY DISK	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	06	FIR/SIR Point to point (send)
		07	FIR/SIR Point to point (receive)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		06	Write specified address
		07	Read specified address
		09	Sequential write
		10	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP test
11	EXPANSION	01	PCMCIA Wrap around
		03	RGB monitor ID
13	CD-ROM/DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	Playback music
		07	RW 1point W/R/C
-	Wireless LAN (Agere)	1	Transmit & Receive test [Responder]
		2	MAC Address test [Mini-PCI Wireless LAN]
		3	Wireless LAN (WEP64/128) test
		0	Transmit & Receive test [Initiator]
-	Wireless LAN (Atheros)	1	Test PC [Initiator]
		0	[Responder]
-	SOUND/ LAN/ MODEM	1	Microphone recording & play
		2	Sin wave
		3	LAN
		4	Modem
-	IEEE1394	1	IEEE1394 test
		2	Responder test
		3	ID check
-	Bluetooth	1	BD_ADDR check
		2	Communication test

3.4   System Test

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

Subtest 01   ROM Checksum

This subtest executes a checksum test of the BIOS ROM on the System Board.

Subtest 02   Thermister Check

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

Subtest 04   CPU Fan On/Off

This subtest checks CPU fan operation using the on/off command. The following message will appear when this subtest is executed. Make sure the fan does not rotate and press **Enter.**

```
Test CPU Fan Revolution 0000RPM Start
```

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

```
Test CPU Fan Revolution LEVEL 5 speed start
```

Subtest 05   2nd Fan On/Off

This subtest checks 2nd fan operation using the on/off command. The following message will appear when this subtest is executed. Make sure the fan does not rotate and press **Enter.**

```
Test 2nd Fan Revolution 0000RPM Start
```

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

```
Test 2nd Fan Revolution LEVEL 5 speed start
```

Subtest 06   Quick charge

This subtest checks the status for the quick charge.

Subtest 07   DMI read

Reads the factory setting for the serial and DMI numbers.

```
Model Name          :  XXXXXX
Version Number      :  XXXXXX-XXXXX
Serial Number       :  XXXXXXXXXX
Model Number        :  XXXXXX-XXXXX
PCN/BND Number      :  XXXXXXXXXXXXXXXXXX
UUID Number         :  XXXXXXXXXXXXXXXXXXXXXXXX
```
To exit this subtest and return to the SYSTEM TEST menu, press Enter.

Subtest 08   DMI write

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

1. "`Enter Model Name ?`" is displayed.

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

2. "`Enter Version Number ?`"

Input the computer's version number and press **Enter.** (e.g. PS245U-AAA13)

3. "`Enter Serial Number ?`"

    Input the computer's serial number and press **Enter**. (e.g. Z2020855JU)

4. "`Enter Model Number ?`"

    Input the computer's sales model number and press **Enter.** (e.g. PS245U-AAA13)

5. "`Enter Bundle Number ?`"

    Input the computer's PCN/Bundle number and press **Enter**. (e.g. PCN1190CCZ01/S3A1320D990)

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

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

Subtest 09   CPU Temperature

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.

3.5   Memory Test

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

Subtest 01   Conventional memory

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

Subtest 02   Protected Mode

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

This subtest writes constant data and address data to extended memory (maximum address 100000h) then reads the new data and compares the result with the original data.

The constant data is FFh, AAh, 55h, and 00h.

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' (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory. One test takes 3 seconds.

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

Subtest 05   L2 Cache Memory

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

Subtest 06   Stress

The conventional memory is provided with a write/read buffer (size 1b30 h) and creates write data in the write buffer. Subsequent to 1 MB, the data is written in the write buffer and is read into the read buffer, followed by a data comparison up to the maximum memory size.

3.6   Keyboard Test

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

Subtest 01   Pressed Key Display

> *NOTE: The Num **Lock** and the **Overlay** mode must be off to execute this subtest.*

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 that was pressed. Holding a key down enables the auto-repeat function, which causes the key's display character to blink.

To exit this subtest, press **Del + Enter**
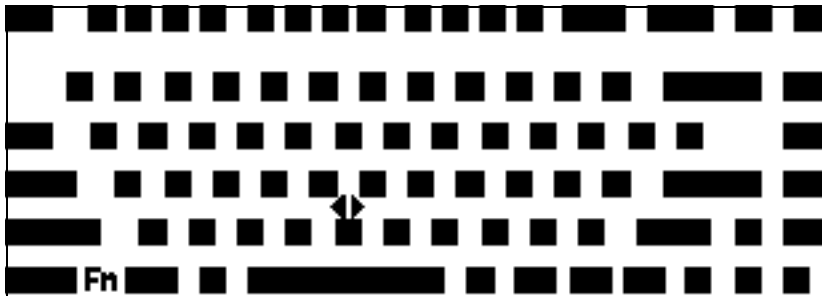
Subtest 02   Pressed Key Code Display

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

```
KEYBOARD TEST   IN PROGRESS   302000

        Scan code       =
        Character code  =
        Keytop          =

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

PRESS [Enter] KEY
```

Subtest 04   Touch Pad

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

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

This test reports the pointing stick motion response from the touch pad and touch pad switch. When the touch pad is pressed towards the upper left, the `<POINTING>` display changes according to the following illustration. If a touch pad switch is pressed, the `<BUTTON>` (1) or (2) highlights. The parameters appear on the upper right of the display. To exit this subtest, press the two touch pad switches.
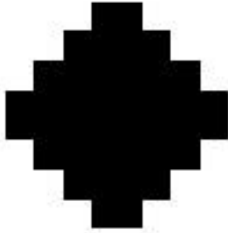
```
       *** IPS (PAD) TEST (Vx.xx) ***

   <POINTING>                      <PARAMETER>
                                   STATUS:0000h
                                   X-RATE:0000h
                                   Y-RATE:0000H

                                      <BUTTON>
                                    (1)     (2)



        << PRESS BUTTON1+BUTTON2 THEN END >>


       *** IPS (4-Btton) TEST (Vx.xx) ***

    < POINTING >                    <PARAMETER>
                                   STATUS:0018h
                                   X-RATE:00FFh
                                   Y-RATE:0001H



                                      <BUTTON>
                                    (1)     (2)



        << PRESS BUTTON1+BUTTON2 THEN END >>
```
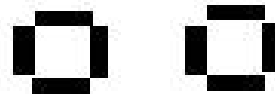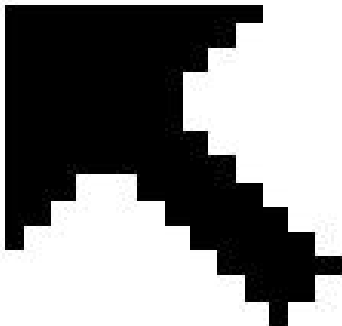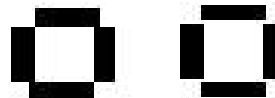
Subtest 05   USB Test

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

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

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

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

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

Connect the USB mouse to the computer's USB connector.

Next, set up the computer's hardware as follows:

```
  PERIPHERAL

     Pointing Devices = Simultaneous
     USB Legacy Emulation = Enabled
```

Then, perform the Pointing Stick Diagnostic Test and make sure:

- The cursor moves in the direction that you move the USB mouse.
- The display reverses when you click the right button or left button

To stop this test, press the two IPS buttons on the computer (connected to PJ10) at the same time. (You cannot use the USB mouse to stop the test.)

Subtest 08   CD-function key test

When this subtest displays a message shown below, press [MODE] button for 3 seconds to release the key lock.

```
     Press [MODE Control] Button
```

> *CAUTION: You cannot continue the test if the key lock is not released.*

When this subtest displays messages shown below, press the corresponding CD-function key.

> *NOTE: This subtest must be completed within 10 seconds.*

```
     Press [play/pause] Button
     Press [stop] Button
     Press [rewind] Button
     Press [forward] Button
```

3.7   Display Test

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

Subtest 01   VRAM Read/Write for VGA

                 This subtest writes constant data AAh and 55h and address data to video RAM 8MB. This data is then read from the video RAM 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.
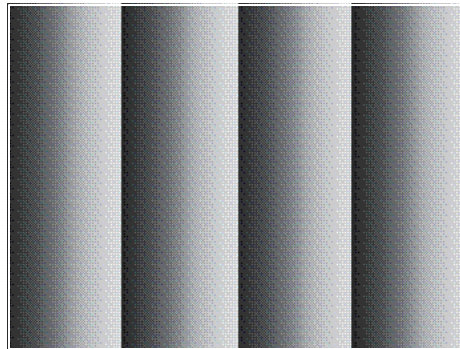
                 To exit this subtest and return to the DISPLAY TEST menu, press **Enter.**

Subtest 03   Gradation for LCD

                 This subtest displays several horizontal bands of multiple color, followed by red, green and blue bars. Each bar displays black on the top and the brightest color at the bottom.

                 Next, this subtest displays full screen of eight colors: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white.

                 Each color displays for three seconds.

Subtest 04   Gradation & Mode test for VGA

This subtest displays gradations for each mode. Execute the test, then press **Enter** to change the mode.

The display below appears on the screen when this subtest is executed.
Pressing **Enter** changes the size of the displayed image.
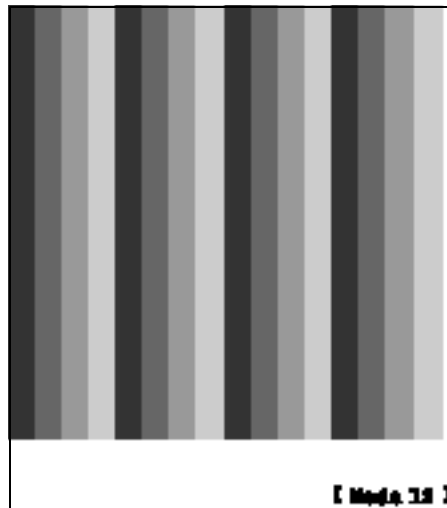
Pressing **Enter** changes the size of the displayed image.
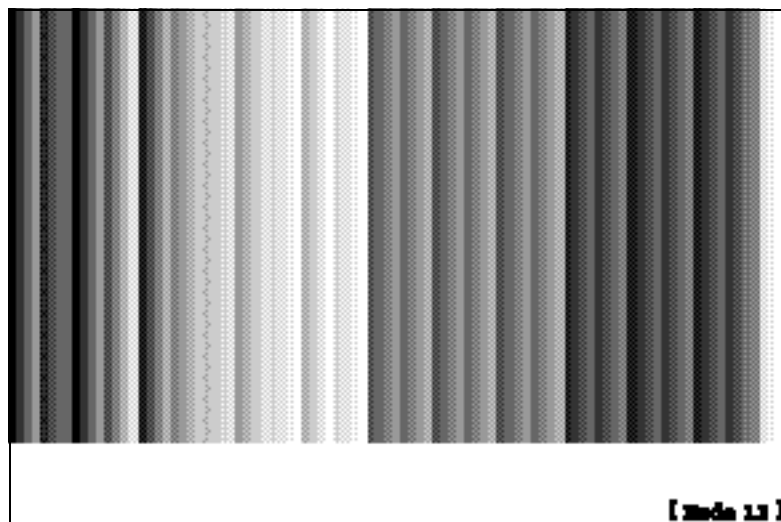
Pressing **Enter** changes the size of the displayed image.
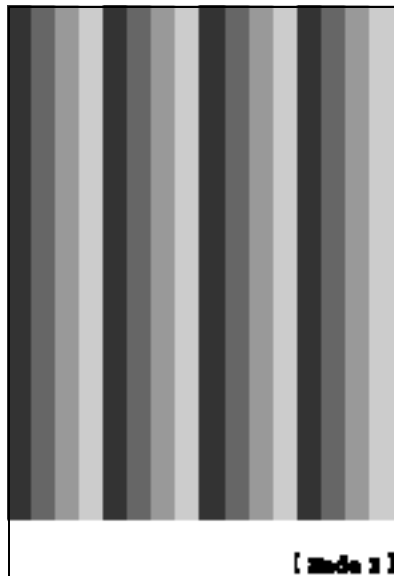
[Mode 1]

Pressing **Enter** changes the size of the displayed image in the following order:

Mode 111	640*480	64K
Mode 112	640*480	16M
Mode 114	800*600	64K
Mode 115	800*600	16M
Mode 117	1024*768	64K

[Mode 111 640x480 64K]
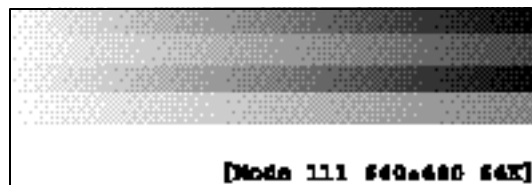
To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break.**

Subtest 05   All Dot On /Off for LCD

This subtest displays an all-white screen (all dots on) for three seconds then an all-black screen (all dots off) for three seconds.

To exit this subtest and return to the DISPLAY TEST menu, press **Ctrl + Break.**

Subtest 06   "H" Pattern Display

This subtest displays a full screen of "H" patterns.

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

To exit this subtest and return to the DISPLAY TEST menu, **Ctrl + Break**.

NOTE: The last row may not be completely filled. This condition does not indicate a error.

Subtest 07   LCD Brightness

The LCD brightness changes in the following order:

Super-Bright —> Bright —> Semi-Bright —> Bright —> Super-Bright

The display switches automatically every three seconds and returns to the
DISPLAY TEST menu.

3.8   Floppy Disk Test

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

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

1. The following messages will appear. Specify the start track of the floppy disk drive to be tested.

```
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    XXXXXXX


 SUB-TEST  :XX

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

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

Subtest 01   Sequential read

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

The start track is specified at the start of the FDD test. Refer to 1. in this section.

Subtest 02   Sequential read/write

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

Subtest 03   Random address/data

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

Subtest 04   Write specified address

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

Subtest 05   Read specified address

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

3.9   Printer Test

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

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

The following message will appear when the printer 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[\]^_`abcdefghijklmno
!"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
£'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
```

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:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmn
opqrstuvwxyz{|}~
```

Subtest 03   Wrap around

> **NOTE***: To execute this subtest, a printer wraparound connector must be connected to the printer port in the Port Replicator. The printer wraparound connector (34M741986G01) wiring diagram is described in Appendix F.*

This subtest checks the output and bi-directional modes of the data control and status lines through the parallel port wraparound connector.

3.10   Async Test

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

Subtests require the following data format:

Method:	Asynchronous
Speed:	38400BPS (Subtests 06, 07)
Data:	8 bits and one parity bit (EVEN)
Data pattern:	20h to 7Eh

Subtest 06   FIR/SIR Point to Point (send)

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

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

Subtest 07   FIR/SIR Point to Point (receive)

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

3.11   Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter,** and follow the directions on the screen. The hard disk test contains ten subtests that test the hard disk drive functions.

NOTE: *To execute the subtest 02,03,04,06,09 or 10, the system requires you to enter password.*
The contents of the hard disk will be erased when the subtest 02, 03, 04, 06,09, or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk. If the customer has not or cannot perform the back-up, create back-up disks as described below.

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

Refer to the operating system instructions.

After selecting the hard disk test from the DIAGNOSTIC TEST MENU, answer each of the questions with an appropriate response to execute the test.

1. Select the hard disk drive number to be tested.

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

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

    ```
     HDC F/W error retry (1:yes, 2:no) ?
    ```

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

    ```
    Data compare error dump (1:yes, 2:no) ?
    ```

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

    ```
    Detail status display (1:yes, 2:no) ?
    ```

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

    ```
    HARD DISK TEST      XXXXXXX

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

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

    The first digit of the STATUS number indicates the drive being tested and the last two digits indicate the error status code as explained in Table 3-4.

Subtest 01   Sequential Read

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

Subtest 02   Address Uniqueness

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

               - Forward sequential
               - Reverse sequential
               - Random

Subtest 03   Random Address/Data

               This subtest writes random data to random addresses on the HDD cylinder, head and sector. 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.

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

Subtest 06   Write Specified Address

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

Subtest 07   Read Specified Address

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

Subtest 09   Sequential Write

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

Subtest 10   W-R-C Specified Address

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

3.12   Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The real timer test contains three 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:

1.   Select the subtest 01 and the following message will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX

Enter new date:

PRESS [ENTER] KEY TO EXIT TEST
```

2.   If the current date is not correct, input the correct date at the "Enter new date" prompt and press **Enter**. To enter ":", press **Shift + ;**. The date is updated and the following prompt will appear:

```
Enter new time :
```

3.   If the current time is not correct, input the correct time in 24-hour format and press **Enter**. The time is updated.

Subtest 02   Backup Memory

This Subtest performs the following backup memory check:

Writes 1-bit of "on" data to address 01h through 80h
Writes 1-bit of "off" data to address 0Eh through 80h
Writes the data pattern AAh and 55h to the RTC 114-byte memory
(address 0Eh to 7Fh)

The Subtest reads and compares this data with the original data.

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

Subtest 03   Real Time Carry

CAUTION: When you execute this Subtest, the current date and time are erased.

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

```
Current date  :  12-31-2001
Current time  :  23:59:58

PRESS [Enter] KEY TO EXIT TEST
```

Press **Enter** to exit.

3.13   NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and
follow the directions on the screen. The NDP test contains one Subtest that tests the computer's
NDP functions.

Subtest 01   NDP

This test checks the following functions of the coprocessor:

❑ Control word

❑ Status word

❑ Bus

❑ Addition

❑ Multiplication

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

3.14 Expansion Test

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

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

Subtest 01   PCMCIA Wraparound

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

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

This subtest is executed in the following order:

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

NOTE: *When the subtest 01 is executed, the following message will appear: Test slot number select (1:slot, 2:slot, 0:slot0&1)?*

Select the slot to test.

Subtest 03   RGB monitor ID

For this test, the computer must be in CRT mode. Connect the CRT (an RGB monitor) with the external monitor port.

3.15 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **13** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The CD-ROM/DVD-ROM test contains six Subtests that test the computer's CD-ROM/DVD-ROM functions.

Subtest 01   Sequential Read

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

Subtest 02   Read Specified Address

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

Subtest 03   Random Address/Data

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

Subtest 04   Playback Music (CD only)

NOTE : You cannot use the Toshiba-EMI DVD-ROM TEST DISK TSD-1 for Subtest 04. For this test, use an ordinary music CD.

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

Subtest 05   RW 1 point W/R/C

This subtest performs the CD-RW drive test.

NOTE : For the CD-RW drive test, use CD-RW media that supports four-speed writing (media manufactured by RICOH or Mitsubishi Chemical are recommended.)

3.16 Wireless LAN Test (Agere)

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

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

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

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

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

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

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

Subtest 01   Transmit & Receive test

          This sub test checks transmit and receive functions.

Transmit test

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

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

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

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

[[[ Responder Mode ]]]

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

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

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

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

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

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

[[[ Responder Mode ]]]

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

When the machine has passed the test, "OK" message will appear in the test machine.
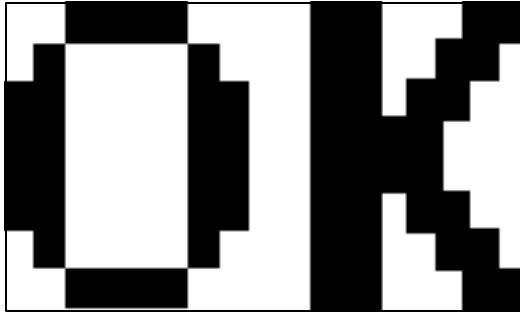
Then press **Enter** in the target machine; the "OK" message will appear also in the target machine.

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

Receive test

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

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

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

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

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

[[[ Responder Mode ]]]

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

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

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

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

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

[[[ Responder Mode ]]]

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

When the machine has passed the test, "OK" message will appear in the target machine.
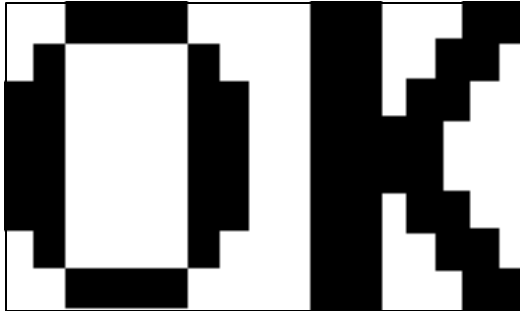
Then press **Enter** in the test machine; the "OK" message will appear also in the test machine.

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

Subtest 02   Mac Address test

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

Subtest 03   Wireless LAN (WEP64/128) test

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

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

3.17 Wireless LAN Test (Atheros)

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

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

In this test, the following items are tested:

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

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

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

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

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

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

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

Setting the responder machine

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

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

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

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

```
Waiting for transmitter to ring the bell in 11a mode.

Input or output error (EIO) : rxDatBegin : nothing receive within
3000millisecs(waitTime)
```

The responder machine is ready for the test.

Setting the tester machine

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

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

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

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

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

To proceed the test, press any key.

When the tester machine has passed the test, "OK" message will appear in the tester machine.
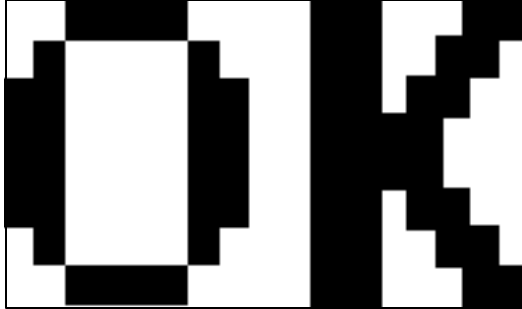
Press **Enter** to return to the main menu.

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

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

Then the test returns to the main menu automatically.

3.18 Sound/LAN/Modem Test

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

CAUTION: The system is capable of producing high volume sound. When you use a headphone, be careful to set the volume low and adjust it as necessary. Using a headphone at full volume might damage your ears.

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

(a) Insert the test program 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:

```
    ######################################################################
    ####     Satellite 2450 DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)    ####
    ######################################################################
    *                                                                    *
    *          1       ( Microphoned Recording & play )                  *
    *          2       ( DOREMI )                                        *
    *          3       ( LAN )                                           *
    *          4       ( MODEM )                                         *
    *          5       ( USB 2.0)                                        *
    *                                                                    *
    **********************************************************************
    ....Press test number [1-5]  ? _
```

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

   .

Subtest 01   Microphoned recording & play

This subtest checks the function of the CODEC A/D D/A converter. Both the
microphone and headphone terminal 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.

```
Copyright (C) 2000 Acer Laboratories Inc. All Rights
Reserved.

Record Parameters :
        Wave Channel Index = 31 (d)
        Wave File Name     = Record.wav
        Recording Length   = 3 (d) sec
        PCM Sample Rate    = 11000 (d)
        PCM Sample Size    = 8 (d)
        PCM Tone Type      = 2 (d)
        Record Input       = Mic-In
        SPDIF In Option    = 0 (d)
        Play Volume Gain   = 11 (d)
        Record Volume Gain = 15 (d)

When "SPDIF" is "On", Options Listed Below Will Be Ignored:
        "Play Volume Gain"
        "Record Volume Gain"

Recording... (Press "s" to Stop)
ALi Audio Device Record Wave File Done !!!
```

The sound is recorded for five seconds automatically from the microphone. After the
recording is completed, the computer immediately plays back the sound recorded.
When the playing is finished, a message similar to the one below appears.

```
Copyright (C) 2000 Acer Laboratories Inc. All Rights
Reserved.
Playback Parameters :
        Wave File Name = record.wav
        Wave Channel Index    = 1 (d)
        SPDIF On-Off Option   = 0 (d)
        Play Wave Volume Gain = 15 (d)

When "SPDIF" is "On", Options Listed Below Will Be Ignored:
        Sound Track Option
        Play Wave Volume Gain

Playing... (Press "s" to Stop)
ALi Audio Device Playback Wave File Done !!!
Press any key to continue...
```

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

Subtest 02   DOREMI

The subtest is executed, the following message appears.

```
Copyright (C) 2000 Acer Laboratories Inc. All Rights
Reserved.

Playback Parameters :
        Wave File Name        = doremi.wav
        Wave Channel Index    = 1 (d)
        SPDIF On-Off Option   = 0 (d)
        Play Wave Volume Gain = 11 (d)

When "SPDIF" is "On", Options Listed Below Will Be Ignored:
        Sound Track Option
        Play Wave Volume Gain

Playing... (Press "s" to Stop)
```

When the sound finished, the following massage appears.

```
ALi Audio Device Playback Wave File Done !!!
Press any key to continue...


Press any key to continue...
```

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

Subtest 03   LAN Test

(a) Select **3** to execute and press **Enter**. The following message will appear:

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

XXXX (XXXXX) LAN TEST Vol.X.XX

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

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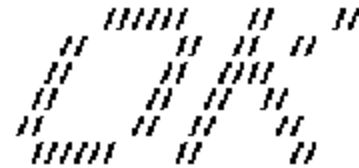
OK

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

(b) Check that the message "OK" appears.

(c) Press **Enter** to return to Main Menu.

Subtest 04   Modem Test

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

```
MDC Test Program [PCB (MDC I/F) Test] for M1535 plus
Version X.X

* Scorpio Modem Initialize          :OK

* Digital Loopback                  :OK

* Modem Sound Test                  :( Operator's Check!! )
```

(b) 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.*

(c) After you press Y or N, the RJ11 Connection Check (LED) ((Operator's Check LED)) test will execute, 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**.

Press **Enter** to return to Main Menu.

Subtest 05   USB 2.0

The subtest is executed, the following message appears.

```
((( USB Test Program for UPD720100GM-8ED System [Ver.2.00] )))
(C) Copyright TOSHIBA Corporation, 2001-2002. All rights reserved.

* Read PCI Configuration      :OK
* HC Initialize               :OK
* Work Area (Memory) Initialize :OK
* OHCI0 Interrupt test        :OK
* EHCI Interrupt test         :OK
* PME status check            :OK
```

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

3.19 Error Code and Error Status Names

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

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

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01	ROM Checksum Error
	03	Serial ID Write Error
	04	Not supported PS-System
	05	Sending Error For AC-Adopter
	06	Sending Error For 1st Battery
	07	Sending Error For 2nd Battery
	08	Thormistor error (1)
	09	Thormistor error (2)
	10	Thormistor error (3)
Memory	01	RAM Parity Error
	02	Protected Mode Not Changed
	0D	Cache Memory Error
USB	EE	USB-NO DESCR. ERROR
	FE	USB-GET DESCR. ERROR (FIRST)
	FD	USB-SET ADDRESS ERROR
	F0	HUB-GET DESCR. ERROR (Top 8B)
	F1	HUB-GET DESCR. ERROR (Whole)
	F2	HUB-SET CONFIGURATION ERROR
	F3	HUB-GET DESCR. ERROR (DESCR.)
	F4	HUB-SET FEATURE ERROR (P ON)
	F5	HUB-GET STATUS ERROR
	F6	HUB-SET FEATURE ERROR (RESET)
	F7	HUB-CLEAR FEATURE ERROR
	F8	HUB-CLEAR FEATURE1 ERROR
	F9	HUB-SET FEATURE ERROR (Eanab.)
	FA	HUB-CLEAR FEATURE2 ERROR
	EF	USB-OVER COUNT ERROR
	ED	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	Bad Command Error
	02	Address Mark Not Found
	03	Write Protected
	04	Record Not Found
	06	Media Removed
	08	DMA Overrun Error
	09	DMA Boundary Error
	10	CRC Error
	20	FDC Error
	40	Seek Error
	60	Not Drive Error
	80	Time Out Error
	EE	Write Buffer Error
Printer	01	Time Out
	08	Fault
	10	Select Line
	20	Out Of Paper
	40	Power Off
	80	Busy Line
ASYNC	01	DSR Off Time Out
	02	CTS Off Time Out
	04	RX-Empty Time Out
	08	TX-BUFFER Full Time Out
	10	Parity Error
	20	Framing Error
	40	Overrun Error
	80	Line Status Error
	88	Modem Status Error
HDD	01	Bad Command Error
	02	Address Mark Not Found
	04	Record Not Found
	05	HDC Not Reset Error
	07	Drive Not Initialized
	08	HDC Overrun (DRQ)
	09	DMA Boundary Error
	0A	Bad Sector
	0B	Bad Track Error
	10	ECC Error
	11	ECC Recover Enable
	20	HDC Error
	40	Seek Error
	80	Time Out Error
	AA	Drive Not Ready
	BB	Undefined Error
	CC	Write Fault
	E0	Status Error
	EE	Access Time Out Error
	DA	No HDD

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

Device name	Error code	Error status name
NDP	01 02 03 04 05 06	No Co-Processor Control Word Error Status Word Error Bus Error Addition Error Multiply Error
Expansion	C1 C4 C5 C6 C7 C8 CB CD CE	Address Line Error CE#2 Line Error DATA Line Error WAIT Line Error BSY# Line Error BVD1 Line Error ZV Port Error No PCMCIA Card Type Error ZV_CONT Error
CD/DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 BO	Bad Command Illegal Length Unit Attention Media Change Request Media Detected Additional Sense Boundary Error Corrected Data Error Drive Not Ready Seek Error Time Out Reset Error Address Error
Keyboard	01 02 03 04 05 06	Mouse Interface Error IPS Interface Error Interface Error Retransmit Error Mouse Handler Not Support PS/2 Mouse & IPS Not Support

3.20 Hard Disk Test Detail Status

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

```
HDC status = XXXXXXXX
```

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

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

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

Table 3-3 Hard disk controller status register contents

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

Table 3-4 Error register contents

Bit	Name	Description
7	BBK1 (Bad block mark)	"0" … Not used "1" … A bad block mark is detected.
6	UNC (Uncorrectable)	"0" … There is no uncorrectable data error. "1" … Uncorrectable data error has been detected.
5	——	Not used
4	IDNF (Identification)	"0" … Not used "1" … There was no ID field in the requested sector.
3	——	Not used
2	ABRT (Abort)	"0" … Not used "1" … Illegal command error or a drive status error occurred.
1	TK00 (Track 0)	"0" … The hard disk found track 0 during a recalibrate command. "1" … The hard disk could not find track 0 during a recalibrate command.
0	——	Not used.

3.21 Head Cleaning

3.21.1 Function Description

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

3.21.2 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.

3.22 Log Utilities

3.22.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can store data on a floppy disk or output the data to 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 (TS-NAME)
3. Subtest number (TS-NAME)
4. Pass count (PASS)
5. Error status (STS)
6. FDD/HDD or memory address (ADDR)
7. Write data (WD)
8. Read data (RD)
9. HDC status (HSTS)
10. Error status name (ERROR STATUS NAME)

3.22.2 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:

```
      XXXXX ERRORS
CNT   TS-NO   PASS STS   ADDR    WD RD HSTS [ERROR  STATUS  NAME]

001   FDD 02  0000 103   00001   00 00 0000 FDD-WRITE PROTECTED
001   FDD 01  0000 180   00001   00 00 0000 FDD-TIME OUT ERROR
                                    Address
                         Error status
                                          HDC status
                    Pass count        Read data
                Subtest number                      Error status name
           Test name                  Write data

  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:

    1 scrolls the display to the next page.
    2 scrolls the display to the previous page.
    3 returns to the Diagnostic Menu.
    4 erases all error log information in RAM.
    5 outputs the error log information to a printer.
    6 reads the log information from a floppy disk.
    7 writes the log information to a floppy disk.

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

3.23 Running Test

3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 04, and 06)
3. Real timer test (subtest 02)
4. Display test (subtest 01)
5. FDD test (subtest 02)
6. HDD test (subtests 01 and 05)
7. Printer test (subtest 03) if selected
8. Async test (subtest 01) (not supported in this model)

3.23.2 Operations

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

1. Remove the diagnostics disk from the floppy disk drive and insert the work disk.

2. Select **6** from the Diagnostic Menu and press **Enter,** the following message displays:

        Printer wrap around test (Y/N) ?

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

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

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

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

4. Select **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**.

3.24 Floppy Disk Drive Utilities

3.24.1 Function Description

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

1. FORMAT

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

This program can format a 5.25-inch or 3.5-inch 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 on the display.

4. HDD ID

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

3.24.2 Operations

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

   ```
   [ FDD UTILITIES ]

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

2. FORMAT program

   (a) Selecting FORMAT displays the following message:

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

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

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

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

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

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

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

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

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

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

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

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

3. COPY program

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

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

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

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

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

    ```
    [ 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 [[track, head = XXX X]] message will appear and start copying to the target disk. When the amount of data is too large to be copied in one operation, the message from step (b) displays again. After the floppy disk has been copied, the following message will appear:

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

    (e) To copy another disk, type **1** and the message from step (a) displays 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) When FDD is selected, the following message appears. Select a format type number.
        When HDD is selected, the display will go to step (g).

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

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

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

   (d) Select a media type number and the following message will appear:

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

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

   ```
   --- Max. address ---
   [ Track  ] = XXXX
   [ Head   ] = XX
   [ Sector ] = XX

   Track number ??
   ```

   (f) Set the track number, head number and sector number you want to dump. The system
        will access the disk and dump a list and the following message appears. Select **3** to end
        the list display.

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

   (g) When HDD is selected in step (a), the following message appears.

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

   (h) Select a drive number. Then the following message appears.

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

   (i) Enter a LBA number, Then the system accesses the disk and dumps a list.

   (j) The following message appears. Select 3 to end the list display.

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

   (k) The following message appears. Select 2 to return to the FDD UTILITIES menu.

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

5. HDD-ID READ

Selecting HDD ID READ displays the following HDD ID configuration:

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

   Press [Enter] key
```

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

3.25 System Configuration

3.25.1 Function Description

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

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

3.25.2   Operations

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

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

* - Processor Type        = XXXX
**- VGA Controller        = XXXX
* - 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 = XXXXX KB )
* - Battery Code          = XXXXXMB
**- Sound System          = XXXXX
* - X Printer Adapter          LPT1  = XXXX  LPT2 = XXXX  LPT3 = XXXX
* - X ASYNC Adapter            COM1  = XXXX  COM2 = XXXX  COM3 = XXXX
* -
* - X Math Co-Processor
* - X PCMCIA Slot
* -    Modem             = XX
* -    LAN               = XX
* -     X Floppy Disk Drive(s) Track = XX, Head = XX, Sector = XX
* -     X Hard Disk Drive(s)     #1 Sectors  = XXXXX (XX GB)
                                 #2 Sectors  = XXXXX (XX GB)

* -

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

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

3.26 SETUP

3.26.1 Function Description

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

1. Memory
    (a) Total

2. Password

3. Battery

    (a) Battery Save Mode

4. Peripheral
    (a) Internal Pointing Device
    (b) Parallel Port Mode
    (c) Hard Disk Mode

5. Display

    (a) Power On Display
    (b) LCD Display Stretch
    (c) TV Type

6. Boot Priority

    (a) Boot Priority
    (b) HDD Priority
    (c) Network Boot Protocol

7. Others

    (a) Power-up Mode
    (b) CPU Cache
    (c) Level 2 Cache
    (d) Auto Power On
    (e) Panel Power On/Off

8. Configuration

    (a) Device Config.

9. I/O Ports

    (a) Parallel

10. PCI Bus

(a) PCI Bus

11. Legacy Emulation

    (a)   USB keyboard/Mouse Legacy Emulation

    (b)   USB-FDD Legacy Emulation

12. PC Card

    (a)   Controller Mode

13. Drives I/O

    (a)   Built-in HDD

    (b)   Select Bay

14. PCI LAN

    (a)   Built-in LAN

3.26.2 Accessing the SETUP Program

Selecting **0** from the DIAGNOSTICS MENU and pressing **Enter** displays the TSETUP screen. The TSETUP screen is divided into two pages: SYSTEM SETUP (1/2) and SYSTEM SETUP (2/2).

```
                        SYSTEM SETUP (1/2)      ACPI BIOS version = x.xx
┌─────────── MEMORY ───────────┐  ┌──────── BOOT PRIORITY ─────────┐
│Total              = xxxxxxKB │  │Boot Priority = HDD→FDD→CD-ROM→LAN│
│                              │  │HDD Priority  = Built-in HDD→PC Card│
┌──────── SYSTEM DATE/TIME ────┐  │Network Boot Protocol = PXE      │
│Date (MM-DD-YYYY)  = xx-xx-xxxx│  └──────────────────────────────────┘
│Time (HH:MM:SS)    = xx:xx:xx  │  ┌─────────── DISPLAY ──────────┐
│                              │  │Power On Display   = Auto-Selected│
┌─────────── BATTERY ──────────┐  │LCD Display Stretch = Disabled │
│Battery Save Mode   = Full Power│  │TV Type            = NTSC      │
│                              │  └──────────────────────────────────┘
┌─────────── PASSWORD──────────┐  ┌─────────── OTHERS ───────────┐
│Not Registered                │  │Power-up Mode      = Boot      │
│                              │  │CPU Cache          = Enabled   │
│                              │  │Level 2 Cache      = Enabled   │
│                              │  │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
┌─────────── CONFIGURATION ────┐  ┌─────────── PC CARD ──────────┐
│Device Config. = Setup by OS  │  │Controller Mode = Auto-Selected│
│                              │  └──────────────────────────────────┘
┌─────────── I/O PORTS ────────┐  ┌─────────── PERIPHERAL ───────┐
│Parallel     = LPT1(378H/IRQ7/CH3)│  │Internal Pointing Device = Enabled│
│                              │  │Parallel Port Mode  = ECP     │
┌─────────── DRIVES I/O ───────┐  │Hard Disk Mode = Enhanced IDE(Normal)│
│Built-in HDD                  │  └──────────────────────────────────┘
│       = Primary IDE(1F0H/IRQ14)│  ┌──────── LEGACY EMULATION ────┐
│CD-ROM      = Secondary IDE(170H/IRQ15)│  │USB KB/Mouse Legacy Emulation │
│                              │  │                    = Enabled  │
│                              │  │USB-FDD Legacy Emulation = Enabled│
┌─────────── PCI BUS ──────────┐  └──────────────────────────────────┘
│PCI BUS       = IRQ11         │  ┌─────────── PCI LAN ──────────┐
│                              │  │Built-in LAN    = Enabled      │
│                              │  └──────────────────────────────────┘



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

NOTE:

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

2. *The USB FDD Legacy Emulation item appears under the LEGACY EMULATION item only when Floppy Disk I/O is set to Disabled.*

3. *The LCD Display Stretch item appears under the Display item only when the LCD screen resolution is XGA (1024 ´768 LCD).*

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press **PgDn** and **PgUp** to move between the two pages. Press ↑ and ↓ to move between items in a column.

2. Press either the **space bar** to change the value.

Accepting Changes and Exiting the SETUP Window

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

    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 toward User.*

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.

2. Press **End** and then press **Y** to accept the factory preset settings.

NOTE: When you execute the default setting, the following settings are not changed:
       HDD Mode
       Password
       Write Policy in the CPU Cache

SETUP Options

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

1. Memory

   This group of options displays the computer's memory.

   (a) Total

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

2. Password

   This option allows you to set or reset the user password for power on.

   Not Registered   Change or remove the password. (Default)

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

3. Battery

   This option is used to select the battery setting.

   (a) Battery Save Options

   The following set of options can be selected in the submenu.

   Processing Speed

   This feature changes the CPU processing speed.

   High   CPU operates at high speed. (Default)

   Low   CPU operates at low speed.

   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 for the set period of time.

Disabled   Disables display automatic power off.

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

HDD Auto Off

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

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

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright   Full brightness for maximum visibility.

Bright   Full brightness for high visibility.

Semi-Bright   Less than full brightness for saving power.

Cooling Method

If the CPU becomes too hot, the fan turns on or the processing speed is lowered
automatically. When the CPU temperature falls to a normal range, the fan turns off.

Maximum performance   Turns on fan first, then if necessary lowers CPU
                                processing speed.

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

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

4. Peripheral

Use this option to select the parallel port mode and hard disk mode.

    (a) Internal Pointing Device

        This option enables and disables the Touch Pad.

        Enabled   Enables the Touch Pad. (Default)

        Disabled   Disables the Touch Pad.

    (b) Parallel Port Mode

        The options in this tab are ECP and Standard Bi-directional.

        ECP   Sets the port mode to Extended Capabilities Port (ECP). For most printers, the port should be set to ECP. (Default)

        Std. Bi-Direct.

                This setting should be used with some other parallel devices.

    (c) Hard Disk Mode

        Use this item to select the hard disk mode.

        Enhanced IDE (Normal)   Select this mode when using an operating system that supports Enhanced IDE. (Default)

        Standard IDE Select this mode when using an operating system that does not support Enhanced IDE.

> *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.*

5. Display

This group of options configures the computer's display.

    (a) Power On Display

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

Auto-Selected	Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)
LCD+**AnalogRGB**	Selects both the internal LCD and the external monitor for simultaneous display.

> *NOTE : When starting the computer in Resume mode, the last configuration is remembered. If data does not appear on the display you are using after starting in Resume mode, pressing* **Fn+F5***.*
>
> *Pressing* **Fn+F5** *changes the display setting in the order of internal LCD to simultaneous to external monitor.*

    (b) LCD Display Stretch

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

Enabled	Enables the LCD display stretch feature. (Default)
Disabled	Disables the LCD display stretch feature.

    (c) TV Type

        This option lets you make settings for television display.

        NTSC(US)   (Default)

        NTSC(JAPAN)

        PAL

6. Boot Priority

This tab sets the priority for booting the computer and the priority for the built-in HDD or optional secondary HDD.

(a) Boot Priority

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

NOTE : CD-ROM refers to a DVD-ROM, CD-RW/DVD, DVD-R/RW or DVD-Multi drive.

(b) HDD Priority

This option enables to select the priority for the Built-in HDD or PC card.

Built-in HDD -> PC Card (Default)
PC Card -> Built-in HDD

    (c)   Network Boot Protocol

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

PXE   Sets to PXE protocol   (Default)

RPL   Sets to PRL protocol

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 Modes

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

Boot   Turns on boot mode. (Default)

Resume   Turns on resume mode.

    (b) CPU Cache

Use this option to enable or disable the CPU cache.

Enabled   Enables the CPU cache. (Default)

Disabled   Disables the CPU cache.

When enabled is selected, a subwindow similar to the one below is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

```
┌──────── OPTION ─────────┐
│                         │
│ Write policy   =  Write-back │
│                         │
└─────────────────────────┘
```

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

    (c)   Level 2 Cache

Use this option to enable or disable the level 2 cache.

Enabled   Enables the level 2 cache. (Default)

Disabled   Disables the level 2 cache.

(d) Auto Power On

Use this option to set a time and date for automatic power on and enable or disable the ring indicator feature. **Ring Indicator** displays only when the computer is in Resume mode and the **Alarm Date Option** displays when **Alarm Time** is enabled.

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

* only for Modem Model ******only for LAN Model

Alarm Time is set in the sequence of hours and minutes. Seconds cannot be changed. **Alarm Date Option** is set in the sequence of month and day. If Alarm Date is set to Disabled, the computer will be powered on at the same time every day. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

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.*

(e) Panel Power On/Off

This option lets you set the Panel Power On/Off function. It is effective only in Resume mode.

Enabled   Enables the Panel Power On/Off.

Disabled   Disables the Panel Power On/Off (Default)

8. System Date/Time

Use this option to set the computer's system date/time. Press ¯ to move the cursor to the right and press - to move the cursor to the left. Press the **space bar** to increase the number and press **BkSp** to decrease the number.

(a) System Date

Use this option to set the system date of the computer.

(b) System Time

Use this option to set the system time of the computer.

9. Configuration

This field displays the configuration method.

The devices are initialized when the PNP OS loads.

Setup by OS	First, devices necessary for loading the OS will be initialized. After the PNP OS loads, other devices will be initialized by the OS. In this case, setup of PC Cards will be fixed to "Auto-Selected," and cannot be changed. (Default)
All Devices	All devices will be initialized.

If you are using an OS that does not have PNP capacity, select "All Devices."

The Display shows the following message:

Device Config. = All Devices

10. I/O ports

This option controls settings for the parallel port.

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

(a) Parallel

This option sets the interrupt request level (IRQ) and I/O port base address for the parallel port. When the Printer Port Mode is set to **Std. Bi-direct**, the options are:

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

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

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

```
            ┌──────── OPTIONS ────────┐
            │ DMA          = Channel 3 (Default) │
            └─────────────────────────┘
```

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

11. PCI Bus

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

        PCI BUS = IRQ11

12. Legacy Emulation.

    (a) USB keyboard/Mouse Legacy Emulation.

         Use this option to enable or disable USB KB/Mouse Legacy Emulation. If your
         operating system does not support USB, you can still use a USB mouse and
         keyboard by setting the **USB KB/Mouse Legacy Emulation** item to **Enabled**.

         Enabled   USB Legacy Support can be used. (Default)

         Disabled   USB Legacy Support cannot be used.

    (b) USB-FDD Legacy Emulation.

         Use this option to enable or disable USB-FDD Legacy Emulation.

         Enabled   USB Legacy Support can be used. (Default)

         Disabled   USB Legacy Support cannot be used.

13. PC Card

    This option sets the PC Card Controller mode. This option can be changed when "Device
    Config." is set to "All Devices".

                 Auto-Selected   Use this setting for all PC Cards when OS supports Plug&Play.
                                     (Default)

                 PCI Compatible Use this setting for PCIC compatible PC card.

                 CardBus/16-bit Use this setting when CardBus does not work properly in
                                     Auto-Selected", or PC card supports 16-bit.

14. Drives I/O

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

    (a) Built-in HDD

         Primary IDE (1F0H/IRQ14) The Built-in HDD is ready for use.

         No Drive   The Built-in HDD is not installed.

(b) CD-ROM

Secondary IDE (170H/IRQ15)

(c) PC Card

When an ATA card is installed in IN13h, the sub window below is displayed.

```
                    DRIVES I/O
Built-in HDD        = Primary IDE (1F0H/IRQ14)


ATA Card            = Others (190H/IRQ)
```

15. PCI LAN (Not used)

This option enables/disables the Built-in LAN functions.

(a) Built-in LAN

Enabled   Enables Built-in LAN functions. (Default)

Disabled   Disables Built-in LAN functions.

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1   General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card and optional SD card, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.
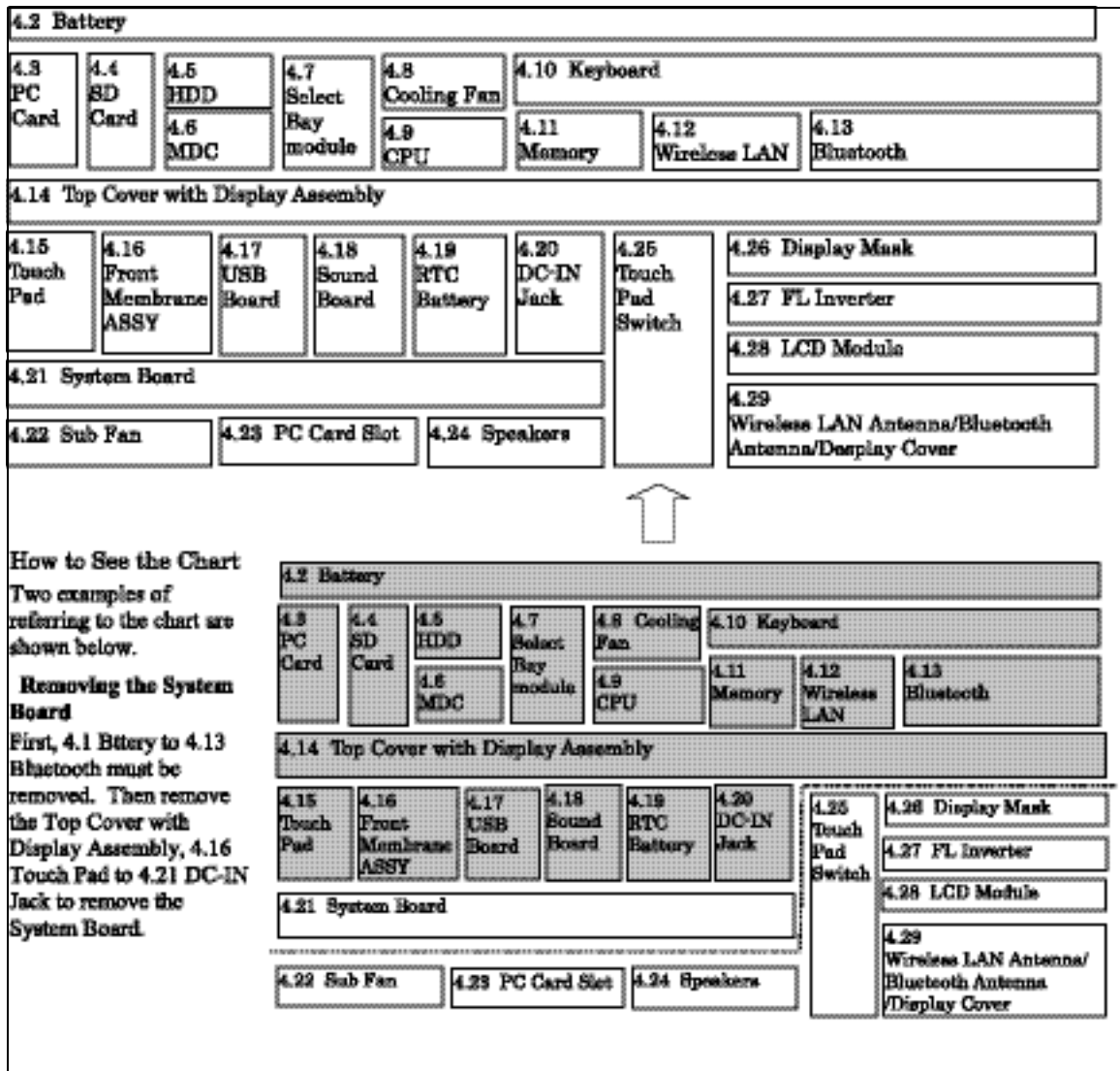
Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

DANGER: 1. *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.*
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.

2. *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock.*
Also, do not disassemble individual components in first-level maintenance.

WARNING: 1. *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*

2. *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*

3. *Be careful of edges and corners as these may cut.*

CAUTION: 1. *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*

2. *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*

3. *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*

4. *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*

5. *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*

6. *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.

2. Use only the correct and approved tools.

3. Make sure the working environment is free from the following elements whether you are using or storing the computer.

    - Dust and contaminates
    - Static electricity
    - Extreme heat, cold and humidity

4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.

5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.

6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.

7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.

8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.

9. The computer contains many sharp edges and corners, so be careful not to injure yourself.

10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnector.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.

- Make sure all cables and connectors are securely fastened.

- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.

- Check that all latches are closed securely in place.

- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 point size 0 Phillips screwdriver to remove and replace screws.

- One 4 mm flat-blade screwdriver.

- Tweezers, to lift out screws that you cannot grasp with your fingers.

- ESD mats for the floor and the table you are working on.

- An ESD wrist strap or heel grounder.

- Anti-static carpeting or flooring.

- Air ionizers in highly static sensitive areas.

- Plastic card of the size of credit card.

- Antenna coaxial cable disconnector

Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

CAUTION: Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.

NOTE: Toshiba recommends that you use an electric screw driver for quick and easy operations.

- M2   0.17 N·m   (1.7 kgf·cm)

- M2.5   0.30 N·m   (3.0 kgf·cm)

- M3   0.57 N·m   (5.6 kgf·cm)

- M2×4 LH STICK   0.167 N·m (1.7 kgf·cm)

NOTE: The computer contains several flat head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.

Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

   ❑ Even number length screw: brown

   ❑ Odd number length screw: white

   ❑ Special length screw: blue

Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.

Marking of Screws on the Computer Body

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

Kind of screws	Symbol
❑ BIND screw	B
❑ FLAT HEAD screw	F
❑ SUPER FLAT HEAD screw	S
❑ TAPPING screw	T
❑ Other screws (Unique screws, STUD, etc.)	U

Examples:

   ❑ 6 mm BIND screw   B6

   ❑ 12 mm BIND screw   B12

   ❑ 5 mm FLAT HEAD screw   F5

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

4.2   Battery Pack

Removing the Battery Pack

To remove the battery pack, follow the steps below and refer to figure 4-1.

> *CAUTION: When handling battery packs, be careful not to short circuit the terminals. Also do not drop, hit or apply impact; do not scratch or break the casing and do not twist or bend the battery pack.*

1. Turn off the computer.

2. Disconnect the AC cable and other external devices from the computer.

3. Turn the computer face down.

4. Unlock the battery lock.

5. While sliding the battery latch, insert your finger into the slot, then pull the battery pack to the back side of the computer and lift it out.

   > *NOTE: For environmental reasons, do not throw away a spent battery pack. Please return the spent battery packs to Toshiba.*
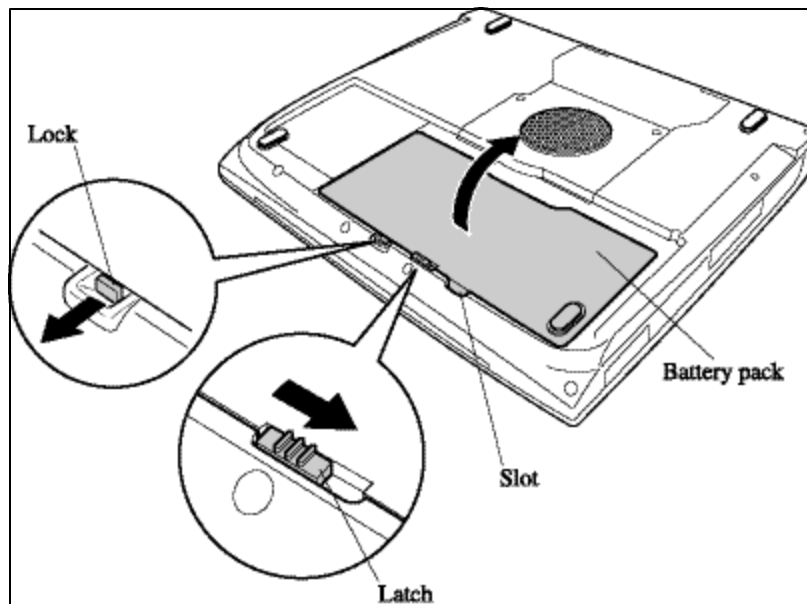
Figure 4-1   Removing the Battery cover

Installing the Battery Pack

To install the battery pack, follow the steps below and refer to figures 4-1.

CAUTION: The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. Dispose of the battery as required by local ordinances or regulations. Use only batteries recommended by Toshiba as replacements.

NOTE: Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.

1. Seat the battery pack in the computer and carefully push it toward the connectors.

2. Make sure the battery pack is installed securely.

3. Lock the battery lock.

4.3   Optional PC Card

Removing an Optional PC Card

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

CAUTION: Before you remove a PC card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Turn the computer face up.

2. Press the eject button for the PC card you want to remove to extend the button.

3. Press the extended eject button to pop the PC card out slightly.

4. Grasp the PC card and pull it out.
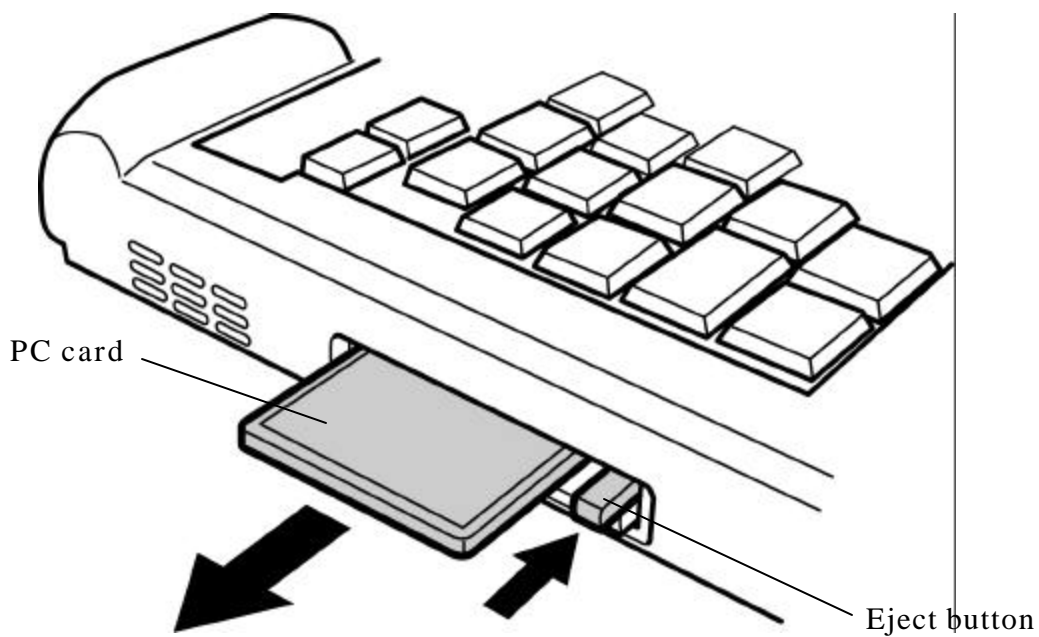
Figure 4-2   Removing a PC card

Installing an Optional PC Card

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

1. Insert a PC card.

2. Push it carefully to ensure a firm connection.

4.4   Optional SD Card

Removing an Optional SD Card

To remove an SD card (option), follow the steps below and refer to figure 4-3.

> *CAUTION:* *Before you remove an SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.*

    1. Turn the computer face up.

    2. Push the SD card in (indicated as "1" in the figure below) and release it to pop the card out slightly.

    3. Grasp the SD card and pull it out (indicated as "2" in the figure below).
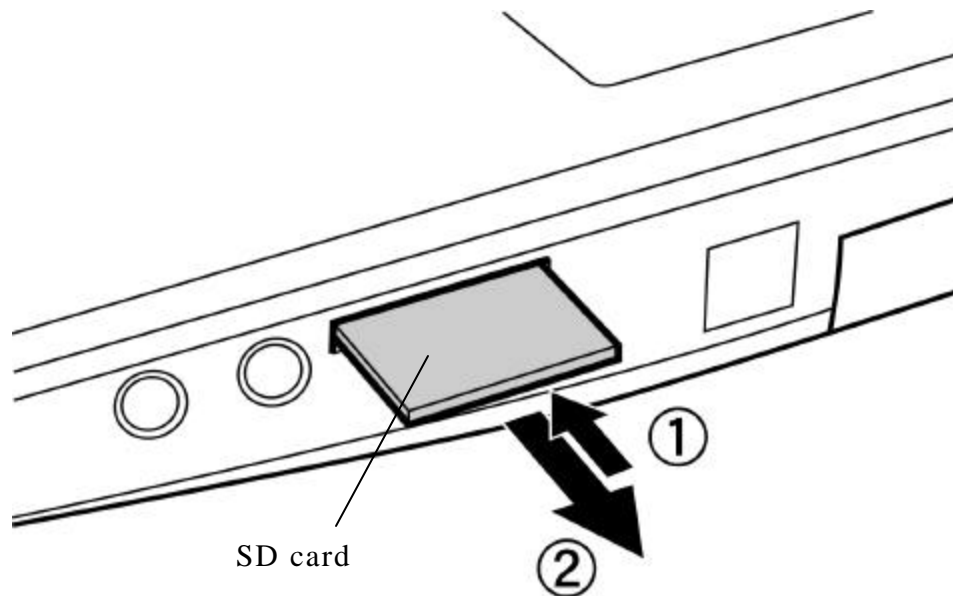
Figure 4-3   Removing an SD card

Installing an Optional SD Card

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

    1. Insert an SD card.

2.   Push it carefully to ensure a firm connection.

4.5 HDD

CAUTION: When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.
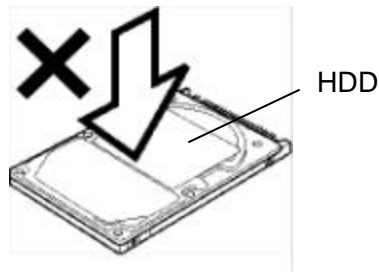
Removing the HDD

To remove the HDD, follow the steps below and refer to figures 4-4 to 4-6.

1. Turn the computer upside down.

2. Remove the following screw securing the HDD cover.

    - M2.5×4   FLAT HEAD screw   ×1
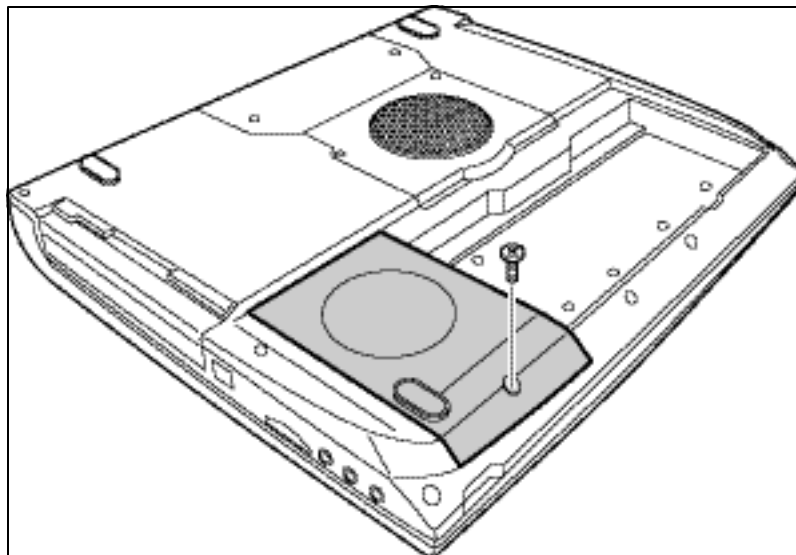
Figure 4-4   Removing the HDD cover

3. Lift up the HDD cover.
4. Pull the guide of the HDD and remove the HDD. Be careful not to damage the connector.
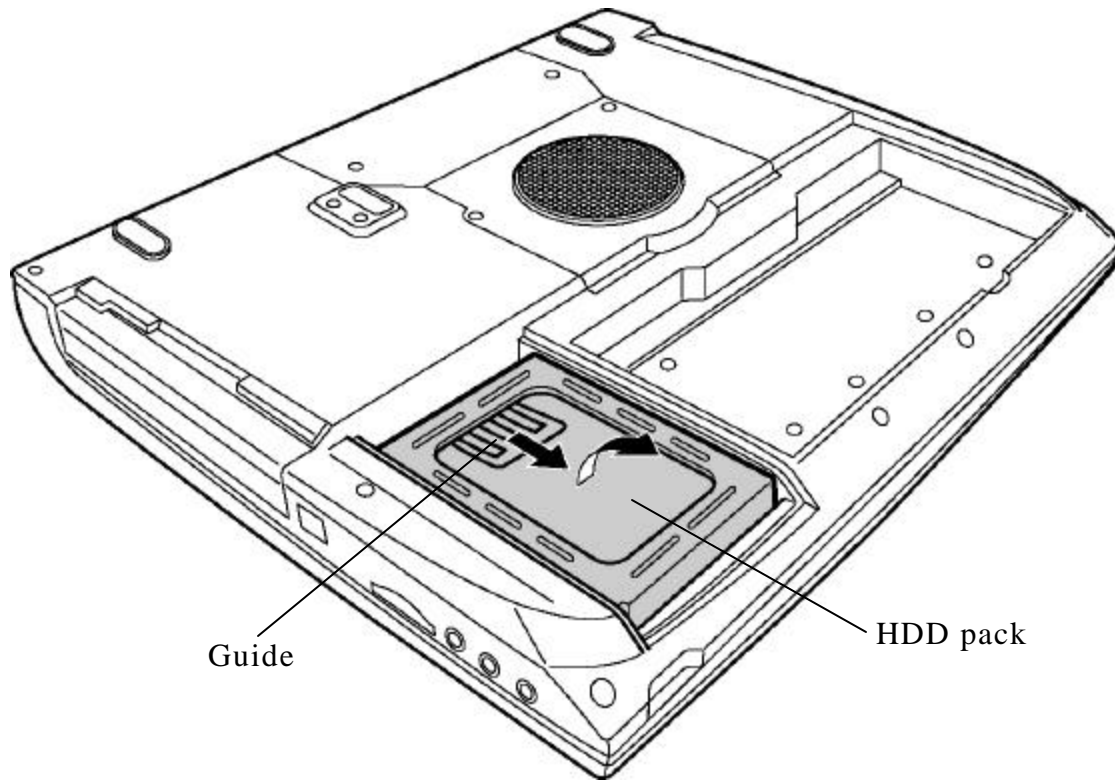
Figure 4-5   Removing the HDD pack

NOTE: The following steps describe how to disassemble the HDD pack; however, do not disassemble if the HDD is working properly.

5. Place the HDD pack on a flat surface, and remove the following screws.

    *   M3×4 FLAT screw   ×4

6. Remove the HDD bracket.

7. Remove the aluminum cover.

CAUTION: Do not apply pressure to the top or bottom of the HDD.
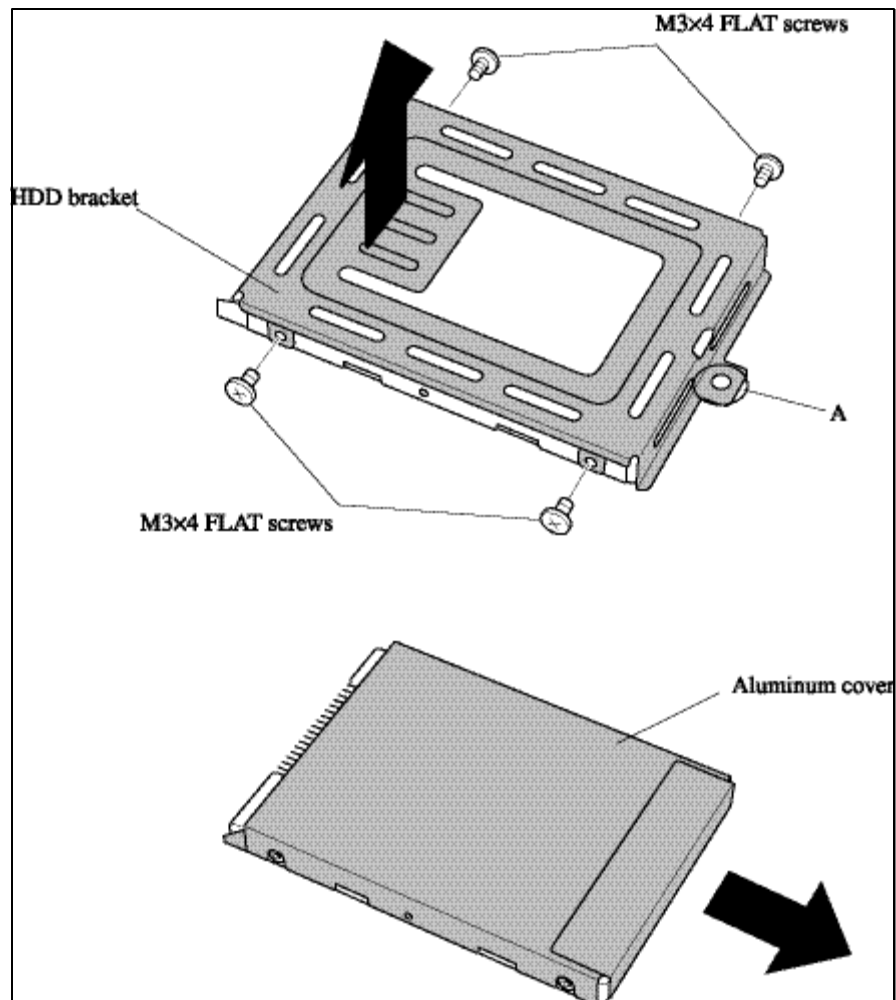
Figure 4-6   Removing the HDD bracket

Installing the HDD

To install the HDD, follow the steps below and refer to figures 4-4 to 4-6.

CAUTION: Do not hold the HDD by its top and bottom flat surfaces. It may damage the HDD.

---

1. Fit the aluminum cover to the HDD.

2. Seat the HDD in the bracket.

3. Secure the HDD to the HDD bracket with the following screws.

    *   M3×4 FLAT screw   ×4

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

    ---

4. Hold the HDD pack by its corners and insert the "A" side of the HDD bracket into the hole of the dent on the back of the computer first. Then lay the HDD pack in the dent and slide it to the connector of the computer to connect. Press to ensure a firm connection.

5. Seat the HDD cover and secure it with the following screw.

    *   M2.5×6   FLAT HEAD screw   ×1

4.6   Modem Daughter Card

Removing the Modem Daughter Card

To remove the modem daughter card, follow the steps below and refer to figure 4-7.

1. Remove the following screws securing the modem daughter card.

    *   M2×3 SUPER FLAT screw   ×2

2. Turn over the insulator covering the modem daughter card.

3. Carefully lift up the modem daughter card to disconnect it from PJ3010 on the sound board.

4. Carefully disconnect the modem cable from JP1 on the modem daughter card.
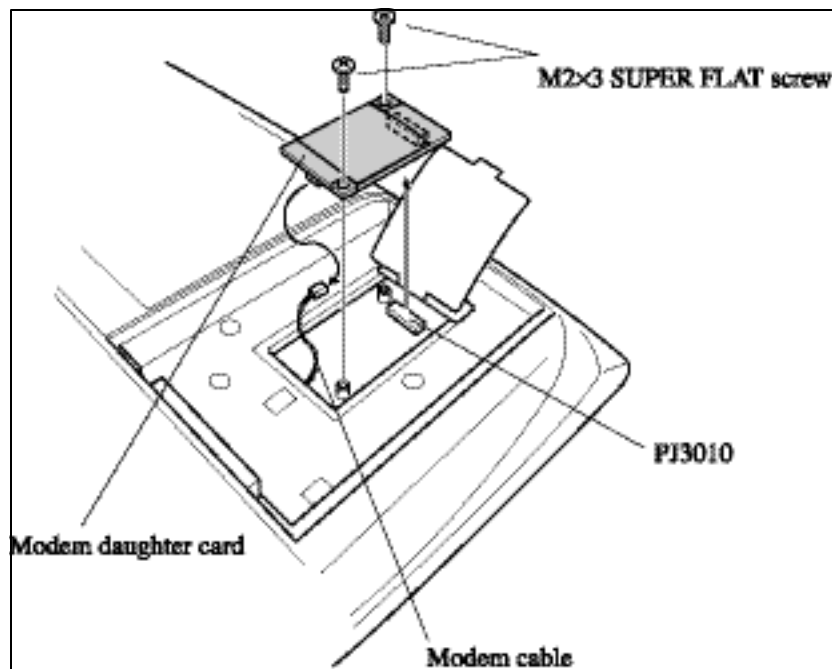
Figure 4-7   Removing the Modem daughter card

Installing the Modem Daughter Card

To install the modem daughter card, follow the steps below and refer to figure 4-7.

1. Carefully connect the modem cable to JP1 on the modem daughter card.

2. Turn over the insulator on the modem daughter card slot.

3. Seat the modem daughter card and press carefully on the right end of the card to connect it to PJ3010 on the sound board. Be careful not to damage the card or connector.

4. Secure the modem daughter card with the following screws.

    - M2×3 SUPER FLAT screw   ×2

4.7   ODD

Removing the ODD

To remove the ODD, follow the steps below and refer to figures 4-8 and 4-9.

CAUTION: The ODD can become hot with use. Be careful when removing the module.

1. Remove the following screw securing the ODD cover.

    *   M2.5×6   FLAT HEAD screw   ×2

2. While sliding the latch to the back side of the computer, disconnect the ODD from PJ1820 on the system board.

3. Carefully slide the ODD to the side of the computer.
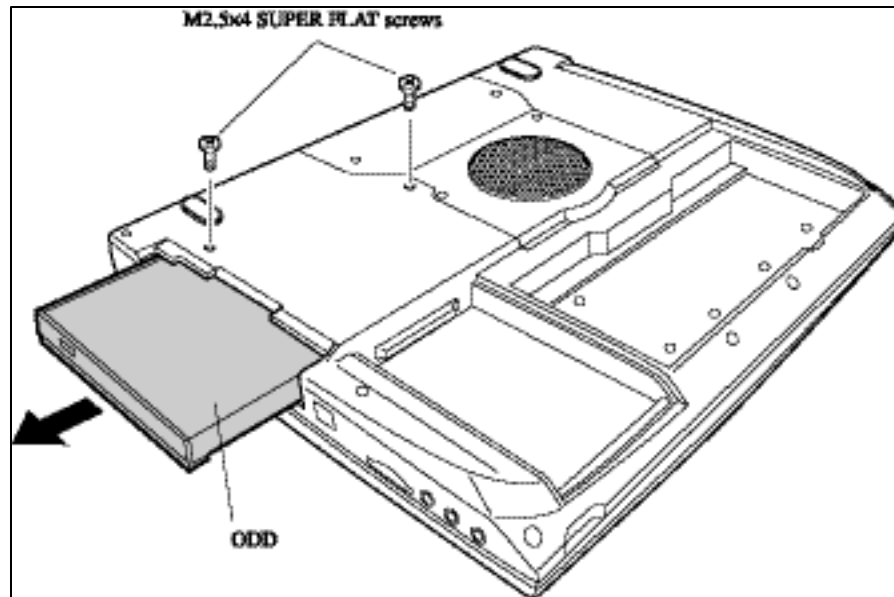
Figure 4-8   Removing the ODD

4. Remove the following screws and the plastic frame.

- M2×3 SUPER FLAT screw   ×4
- M2×5 SUPER FLAT screw   ×1
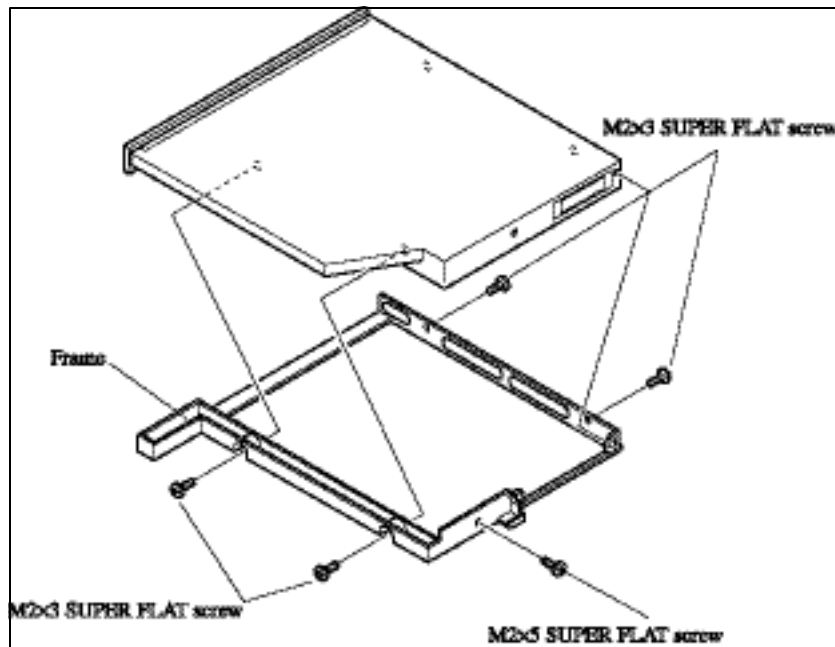
Figure 4-9   Disassembling the ODD

Installing the ODD

To install the ODD, follow the steps below and refer to figures 4-8 and 4-9.

1. Seat the plastic frame on the side of the ODD, and secure it with the following screws.

    *   M2×3 SUPER FLAT screw   ×4
    *   M2×5 SUPER FLAT screw   ×1

2. Slide the ODD and connect the drive to PJ1820 on the system board.

3. Secure the ODD with the following screws.

    *   M2.5×4   FLAT HEAD screw   ×2

4.8   Cooling Fan

Removing the Cooling Fan

To remove the cooling fan, follow the steps below and refer to figure 4-10.

NOTE: A filter is attached to the back of the fan cover to prevent dust or dirt from entering inside of the computer. When you removed the fan cover, make sure there is no dust or dirt on the filter. If there is, vacuum off dust or dirt. The filter can not be removed.

CAUTION: The cooling fan can become very hot during operation. Wait for the fan to cool before removing it. Do not touch the fan rotor or fan blades or apply impact to the cooling fan module.

1. Remove the following screws securing the fin cover and remove the fin cover.

    - M2.5×6   FLAT HEAD screw   ×2

2. Remove the following screws securing the fan cover and remove the fan cover.

    - M2.5×4   FLAT HEAD screw   ×2

3. Remove the following screws securing the cooling fan module.

    - M2.5×6   FLAT HEAD screw   ×2

4. Remove the cooling fan module.

5. Disconnect the fan cable from PJ9900 on the system board.

M2.5×4 FLAT HEAD screw

PJ9900   Fin cover

Fan cover

M2.5×6 FLAT HEAD screw

Fan

M2.5×6 FLAT HEAD screw
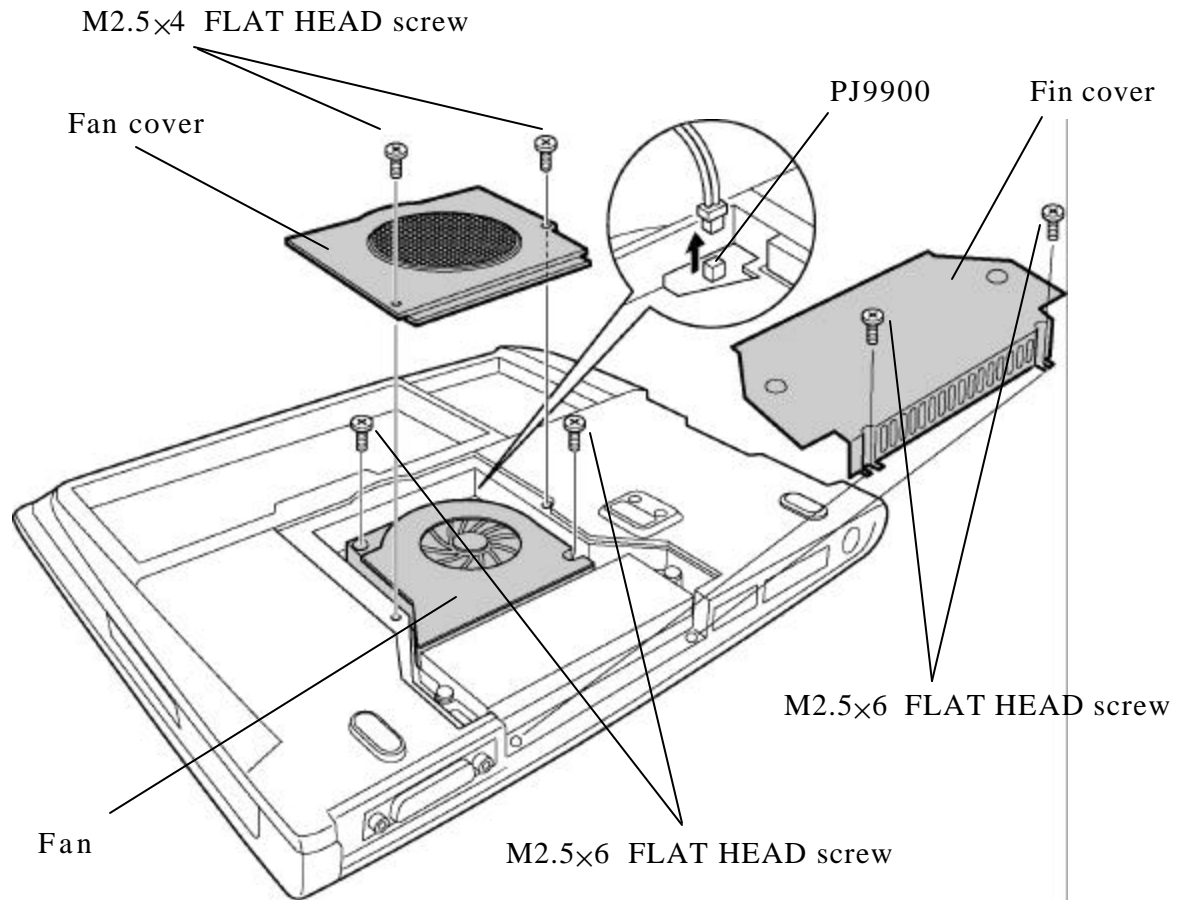
Figure 4-10 Removing the Cooling fan module

Installing the Cooling Fan

To install the cooling fan, follow the steps below and refer to figures 4-10.

CAUTION: *Before installing the fan cover, vacuum off dust or dirt on the indentation of the filter attached to the fan cover.*

---

1. Seat the cooling fan.

2. Secure the cooling fan with the following screws.

    *   M2.5×6   FLAT HEAD screw   ×2

3. Connect the fan cable to PJ9900 on the system board.

4. Place the fan cover and secure it with the following screws.

    *   M2.5×4   FLAT HEAD screw   ×2

5. Place the fin cover and secure it with the following screws.

    *   M2.5×6   FLAT HEAD screw   ×2

4.9 CPU

Removing the CPU

To remove the CPU, follow the steps below and refer to figures 4-11 to 4-14.

CAUTION: When you remove the CPU, wipe the grease off of the bottom of the heat sink, bottom of the cooling fan and top of the CPU. Apply new grease when installing.

1. Remove the following screw securing the fin cover and remove the fin cover.

   • M2.5×6 FLAT HEAD screw   ×2
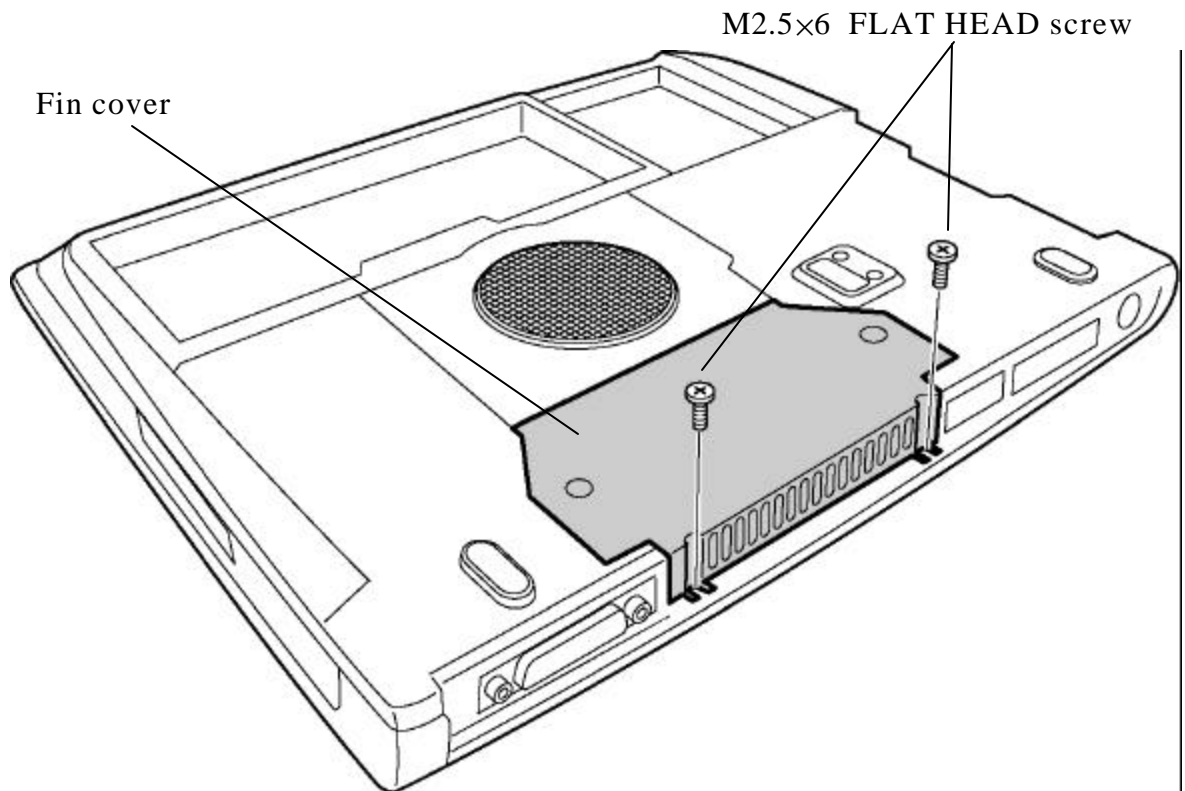
Figure 4-11 Removing the Fin cover

2. Remove the fan cover and fan.

> **NOTE:** *To remove the fin, the fan cover and fan must be removed. For removing the fan cover and fan, refer to **4.8 Cooling Fan**.*

3. Remove the following screws securing the fin and remove the fin by lifting it up directly above.

- M2×18   BIND screw   ×2

> **CAUTION:** *Silicon grease is applied between the fin and the CPU. When removing the fin, be careful not to damage the CPU under the fin.*

M2×18 BIND screw

Fin

Fan cover
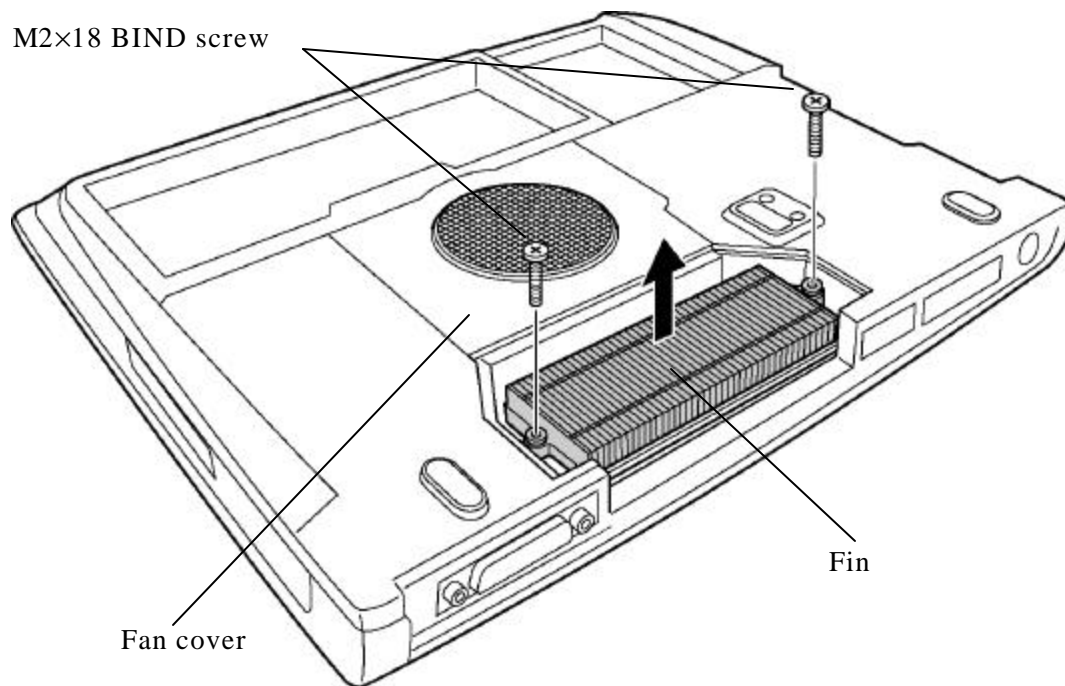
Figure4-12 Removing the Fin

4. Turn the cam to the unlock position with a flat-blade screwdriver to unlock the CPU.
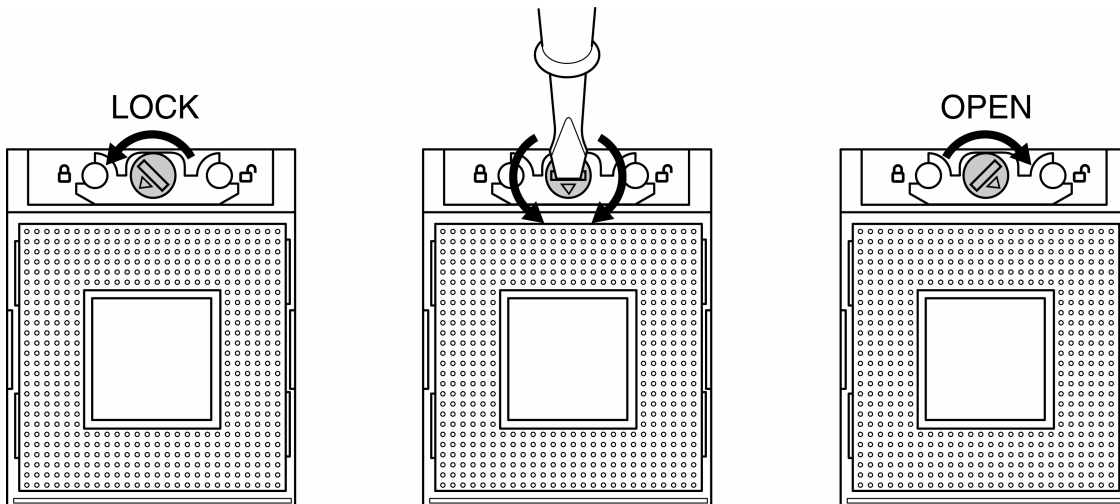
Figure 4-13   Unlocking the CPU

4. Lift up the CPU.

Installing the CPU

To install the CPU, follow the steps below and refer to figures 4-11 to 4-14.

1. Make sure the cam is in the open position.

2. Seat the CPU in the CPU socket. Make sure the alignment is exact to avoid damaging pins on the CPU.

3. Press the interposer gently with your fingers and turn the cam on the CPU socket to the lock position with a flat-blade screwdriver to secure the CPU.

4. Apply new grease on the CPU using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip. When silicon grease is already applied to the CPU, wipe them off with a close in advance.

> *CAUTION: When installing the CPU, apply new grease on the top of the CPU chip. When installing the fin, make sure the bottom of the fin covers the top of the CPU.*

CPU chip
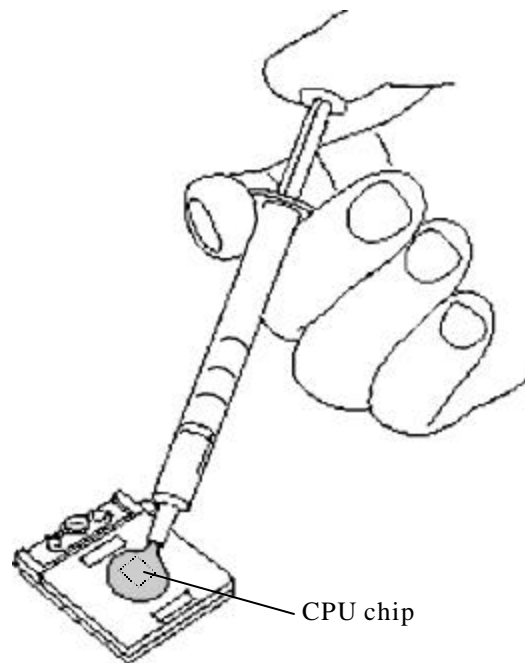
*Figure 4-*14 *Applying new grease*

5. Place the fin and secure it with the following screws.

   - M2×18   BIND screw   ×2

6. Install the fan and fan cover.

   > ***NOTE:*** *To remove the fin, the fan cover and fan must be removed. For installing the fan and fan cover, refer to* ***4.8 Cooling Fan***.

7. Place the fin cover and secure it with the following screws.

   - M2.5×6   FLAT HEAD screw   ×2

4.10 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to figures 4-15 to 4-17.

1. Turn the computer face up and open the display panel.

2. Insert your fingernails into latches between the keyboard brace and the computer, and lift up the keyboard brace to unlatch and remove it.
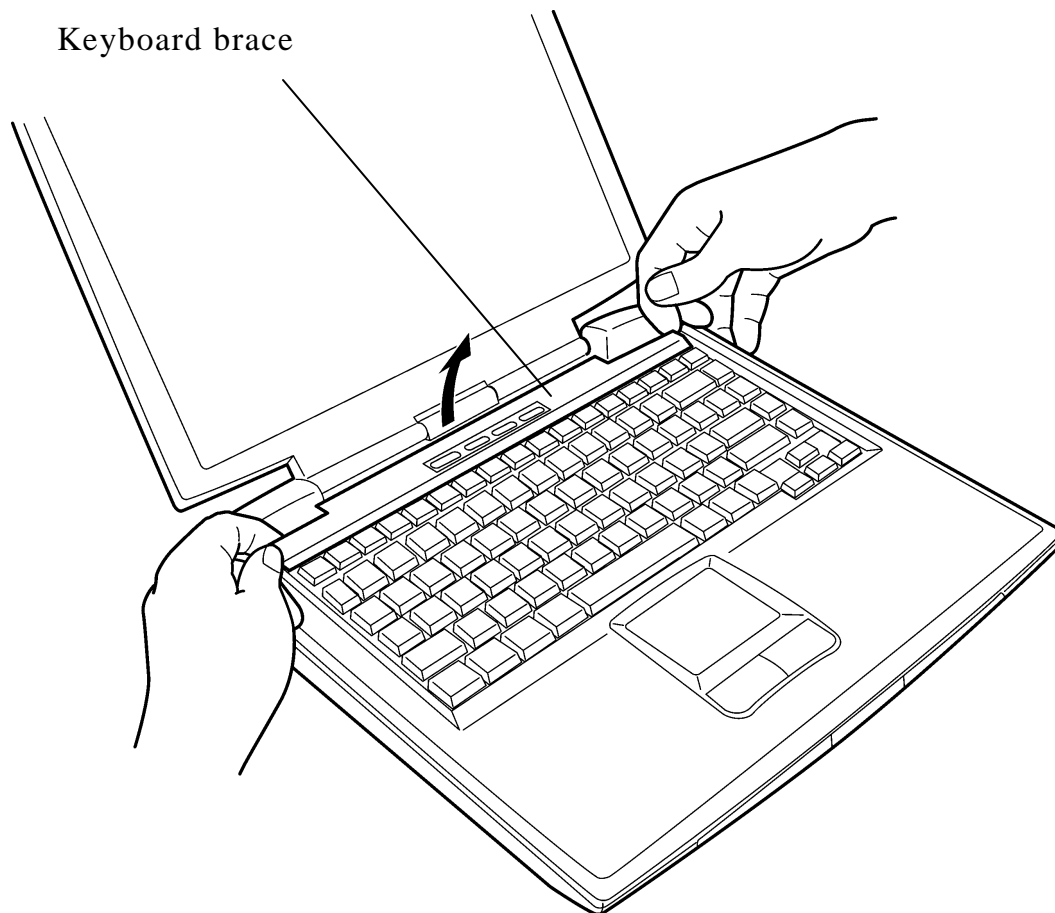
Keyboard brace

Figure 4-15   Removing the Keyboard brace

3. Remove the following screws securing the keyboard.

   - M2.5×4   FLAT HEAD screw   ×2

4. Remove the following screw securing the keyboard hold plate and remove the keyboard hold plate.

   - M2.5×4   FLAT HEAD screw   ×1
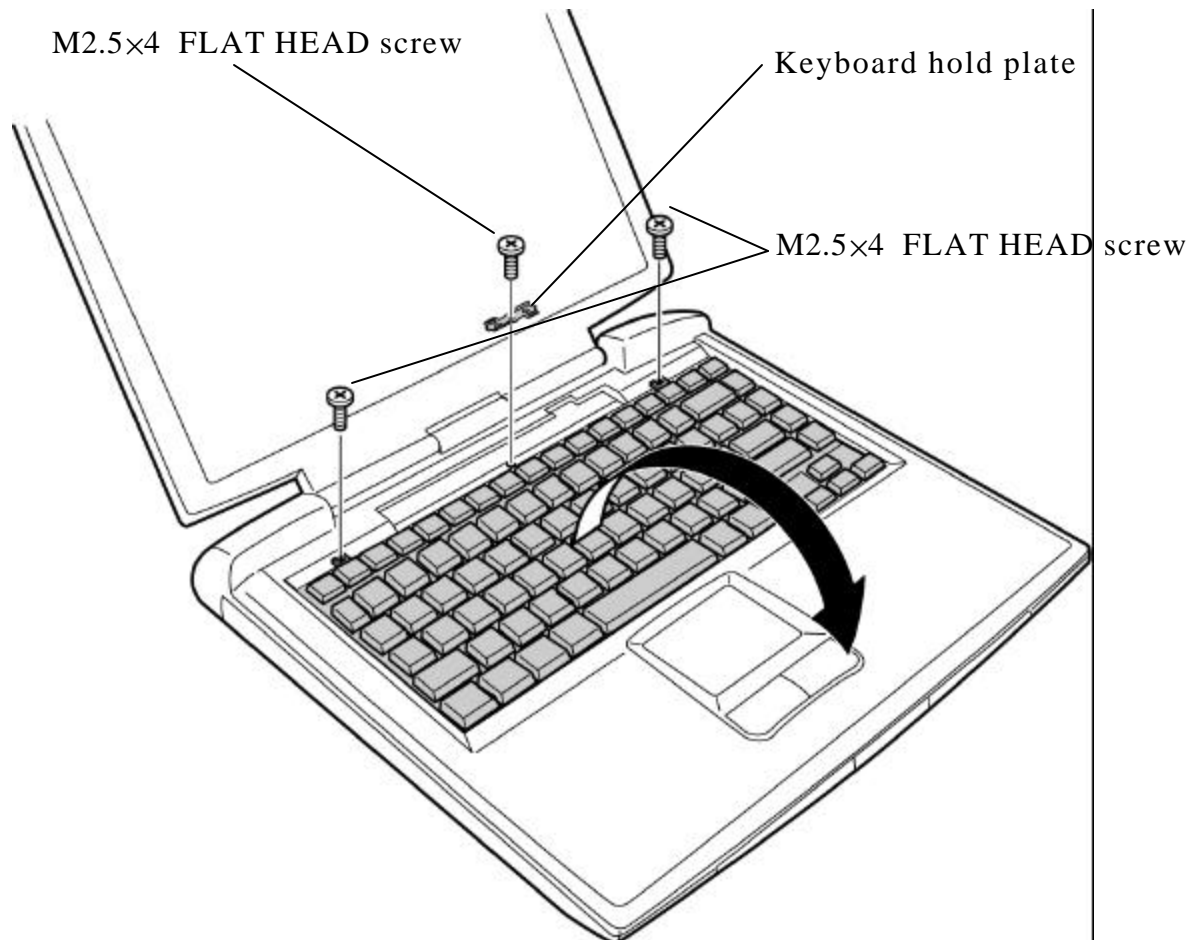
Figure 4-16   Removing the Keyboard

5. Rotate out the keyboard and lay it on top of the palm rest.

6. Remove the following screw securing the keyboard support plate and remove the keyboard support plate.

    • M2.5×6   FLAT HEAD screw   ×1
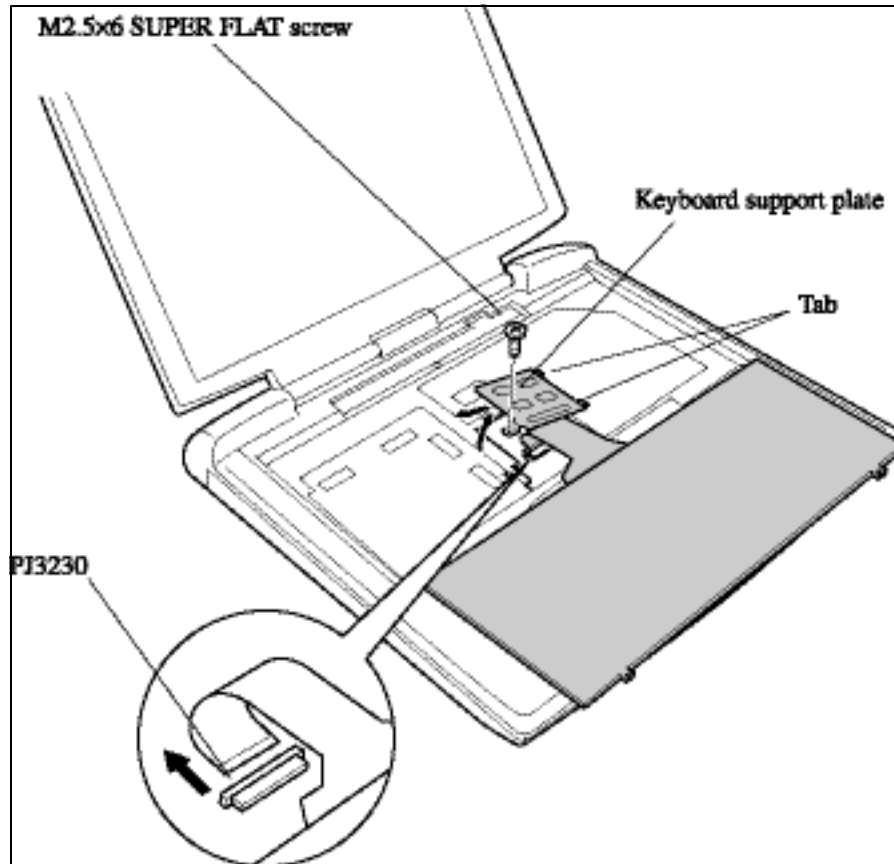
Figure 4-17   Removing the Keyboard support plate

7. Disconnect the keyboard cable from PJ3230 on the system board, and remove the keyboard.

Installing the Keyboard

To install the keyboard, follow the steps below and refer to figures 4-15 to 4-17.

1. Seat the keyboard face down on the palm rest.

2. Connect the keyboard cable to PJ3230 on the system board.

3. Insert the tabs on the keyboard support plate first, then place the keyboard support plate on the keyboard cable and secure the keyboard support plate with the following screw.

   • M2.5×6   FLAT HEAD screw   ×1

4. Align the tabs on the bottom of the keyboard with the holes on the top cover and rotate the keyboard down.

5. Secure the keyboard with the following screws.

   • M2.5×4   FLAT HEAD screw   ×2

6. Place the keyboard hold plate on the keyboard and the switch board. Then secure the keyboard hold plate with the following screw.

   • M2.5×4   FLAT HEAD screw   ×1

7. Seat the keyboard brace and press to secure the latches.

4.11 Memory Module

Removing a Memory Module

To remove a memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to figures 4-18.

CAUTION: Do not try to remove a memory module with the computer turned on. The computer or the memory might be damaged.

CAUTION: Do not touch the connectors on the memory module(s) or on the computer. Debris on the connectors may cause memory access problems.

1. Turn up the insulator covering the memory slots.

2. Press out on two latches. One end of the memory module will pop up.

3. Grasp the memory module and pull it out to remove the memory module from PJ1400 (Slot A) or PJ1401 (Slot B) on the system board.

Insulator

Two latches

Memory slot B

Memory slot A
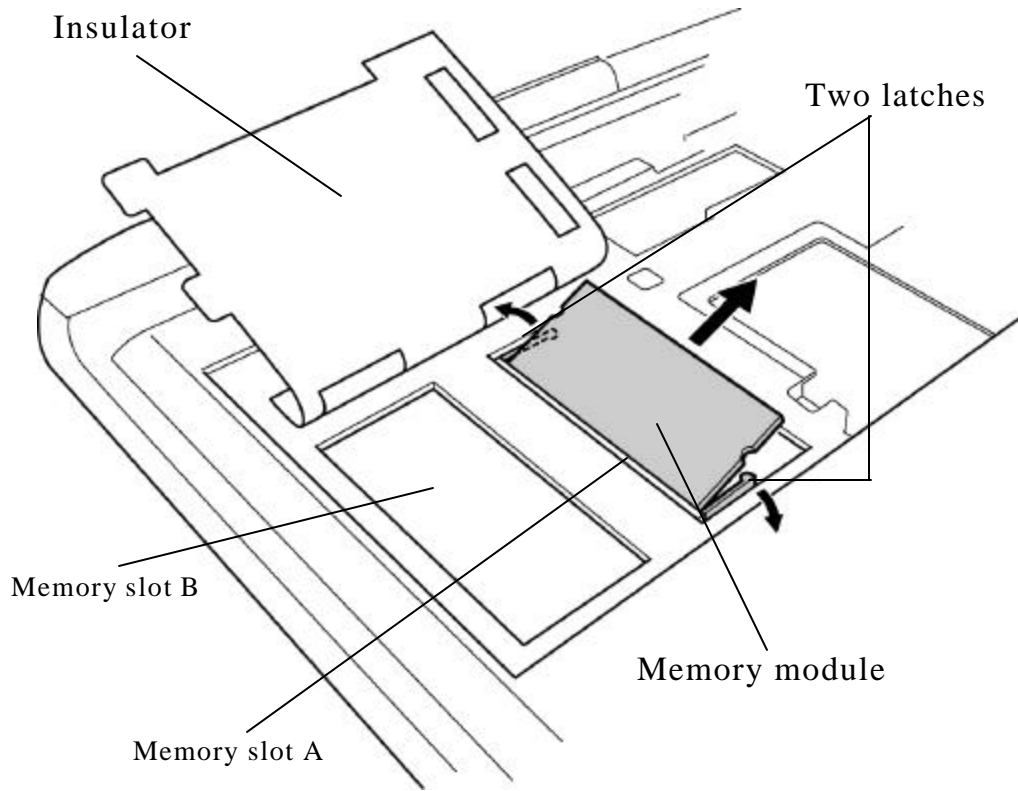
Memory module

Figure 4-18   Removing the Memory module

Installing a Memory Module

To install a memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figure 4-18.

CAUTION: *1) Do not install a memory module in slot B only. Use slot A prior to slot B.*
Otherwise, the computer or the memory may be damaged.

2) Do not touch the connectors on the memory module or on the computer.

Debris on the connectors may cause memory access problems.

---

1. Turn up the insulator and insert a memory module into PJ1400 (Slot A) or PJ1401 (Slot B) on the system board at an angle of 45 degrees and press carefully to ensure firm connection.

2. Push the memory module down until notches on either side engage the memory module to hold it in place.

3. Seat the insulator.

4.12 Wireless LAN Card

Removing the Wireless LAN Card

To remove the wireless LAN card, make sure the computer is in boot mode and powered off, follow the steps below and refer to figures 4-19 and 4-20.

NOTE: The wireless LAN card is an option in some models. This computer supports two types of wireless LAN (802.11/b or 802.11a/b combo). In this section, removing/installing a wireless LAN card for a/b combo model is described for example.

CAUTION: Do not try to remove the wireless LAN card with the computer turned on. You can damage the computer or the wireless LAN card. Do not touch the connectors on the wireless LAN card module on the computer. Debris on the connectors may cause wireless LAN card access problems.

---

1. Turn up the keyboard insulator.

2. (For a/b combo models)
    Remove the following screw securing the wireless LAN card cover.

    • M2×4 LH STICK screw   ×1

M2×4 LH STICK screw   Keyboard insulator

Wireless LAN card cover
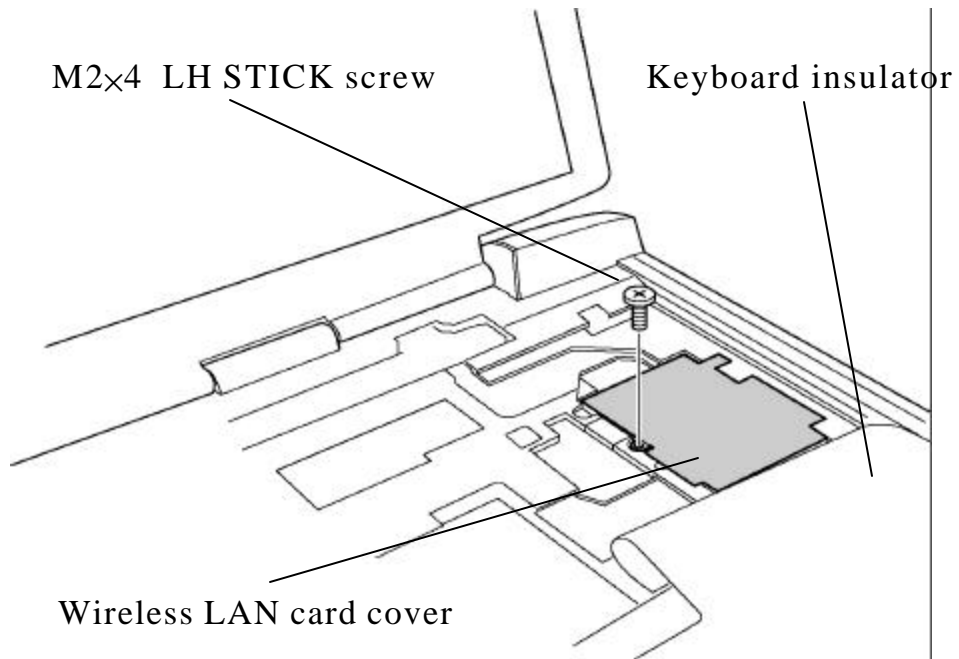
Figure 4-19   Removing the Wireless LAN card cover

3. Disconnect the wireless LAN antenna cables (black and white) from the wireless LAN card using an antenna coaxial cable disconnector.
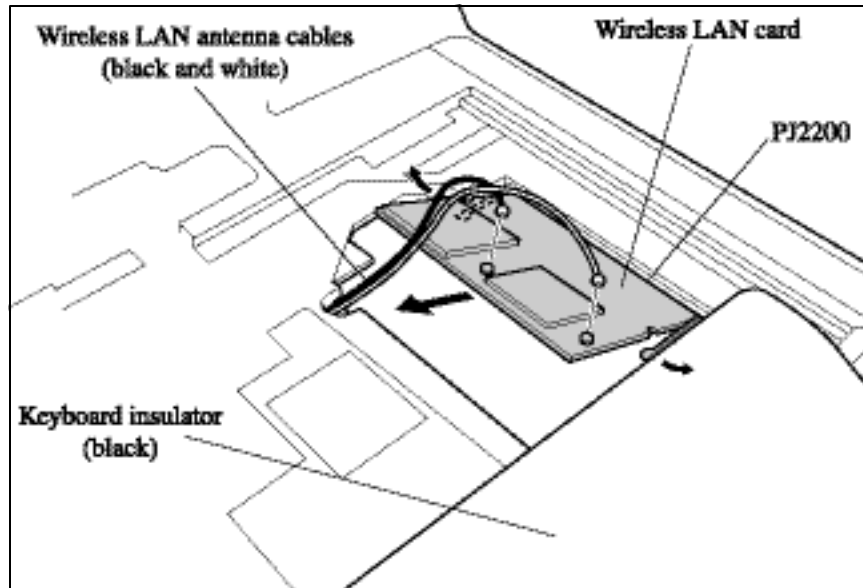
Figure 4-20 Removing the Wireless LAN card

4. Push the wireless LAN card lock latches outward to release the wireless LAN card. It will pop up to about a 45-degree angle.

5. Disconnect the wireless LAN card from PJ2200 on the system board. Be careful not to damage the connector.

Installing the Wireless LAN Card

To install the wireless LAN card, make sure that the computer is in boot mode and powered off, follow the steps below and refer to figure 4-21.

CAUTION: Be sure to switch the computer off before removing the wireless LAN card. Otherwise, the computer or the wireless LAN card may be damaged.

---

1. Turn up the keyboard insulator and insert the wireless LAN card into the connector at an angle of 45 degrees.

2. Gently push the wireless LAN card down until latches on both sides engage the wireless LAN card to hold it in place.

3. Connect the wireless LAN antenna cables (black and white) to the connectors on the wireless LAN card.

   CAUTION: Put the excess portion of wireless LAN cables in empty space. Be careful not to place the cables on the wireless LAN card. Be careful not to damage or pinch the cables when installing the wireless LAN card.

   ---

4. (For a/b combo models)
   Secure the wireless LAN card cover with the following screw.

   • M2×4 LH STICK screw   ×1

5. Seat the keyboard insulator.

   CAUTION: There are two MAC address barcode labels in the package containing the new wireless LAN card. Apply one label next to the wireless LAN socket and one on the box the computer was shipped in. Before you apply the new labels, remove the old ones from the computer and the box. The computer may have MAC address barcode labels for both wired and wireless LANs. Be sure to replace the correct label.

4.13 Bluetooth

Removing the Bluetooth

To remove the Bluetooth, follow the steps below and refer to figure 4-21.

CAUTION: Do not try to remove the Bluetooth module with the computer turned on. You can damage the computer or Bluetooth module. Do not touch the connectors on the Bluetooth module on the computer. Debris on the connectors may cause Bluetooth access problems.

---

1. Remove the Bluetooth coaxial cable (brown) from the Bluetooth module using an antenna coaxial cable disconnector.

2. Remove the following screw securing the Bluetooth module.

    - M2×3 SUPER FLAT screw   ×1

3. Lift up the Bluetooth module and disconnect the Bluetooth SUMI card from PJ4900 on the system board.

4. Remove the Bluetooth SUMI card from the connector on the Bluetooth module.
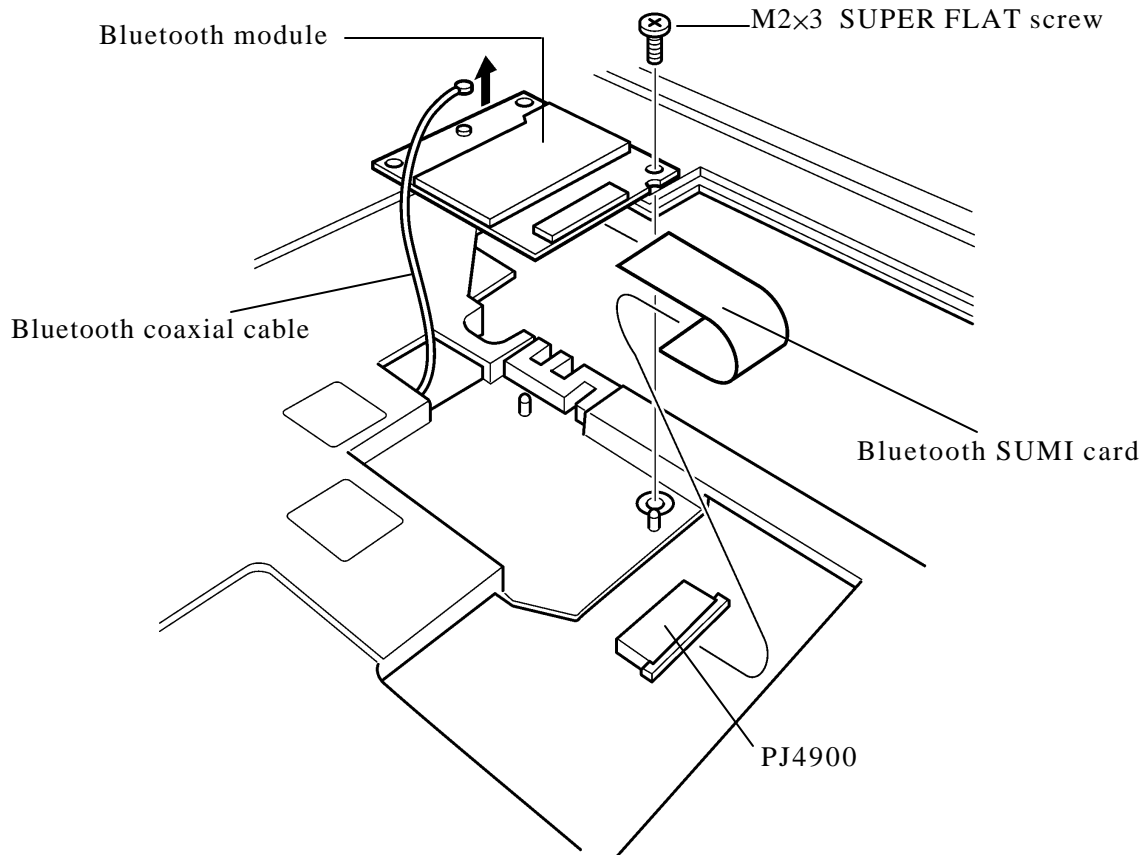
Figure4-21 Removing the Bluetooth module

Installing the Bluetooth

To install the Bluetooth, follow the steps below and refer to figure 4-21.

1. Connect the Bluetooth SUMI card to the connector on the Bluetooth module.

2. Connect the Bluetooth SUMI card to PJ4900 on the system board.

3. Place the Bluetooth module.

4. Secure the Bluetooth module with the following screw.

   • M2×3 SUPER FLAT screw   ×1

5. Connect the Bluetooth coaxial cable (brown) to the Bluetooth module.

4.14 Top Cover with Display Assembly

Removing the Top Cover with Display Assembly

To remove the top cover with display assembly, follow the steps below and refer to figures
4-23 and 4-24.

1. Turn the computer face down, and remove the following 24 screws:

    - M2.5×6   FLAT HEAD screw   ×11
    - M2.5×20   BIND screw   ×8
    - M2.5×4   FLAT HEAD screw   ×5
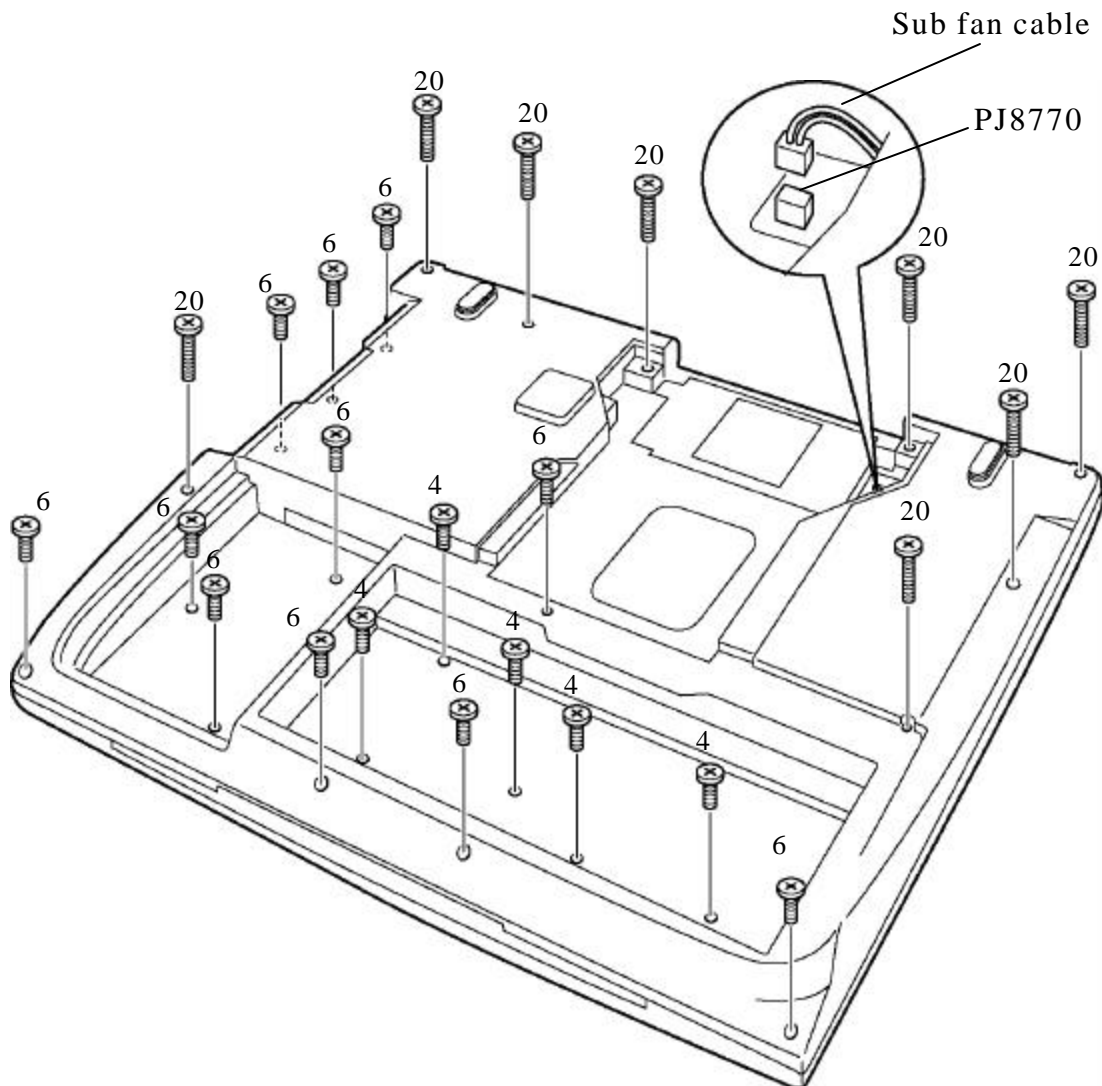
Figure 4-23   Removing the Display assembly

2. Disconnect the sub fan cable from PJ8770 on the system board.

3. Turn the computer face up and open the display panel.

4. Remove the following screws securing the top cover.

   - M2.5×6   FLAT HEAD screw   ×4

5. Turn up the keyboard insulator an d disconnect the two LCD cables from PJ5600 and PJ5601 and the speaker cables from PJ9512 (red) and PJ9513 (blue) on the system board.
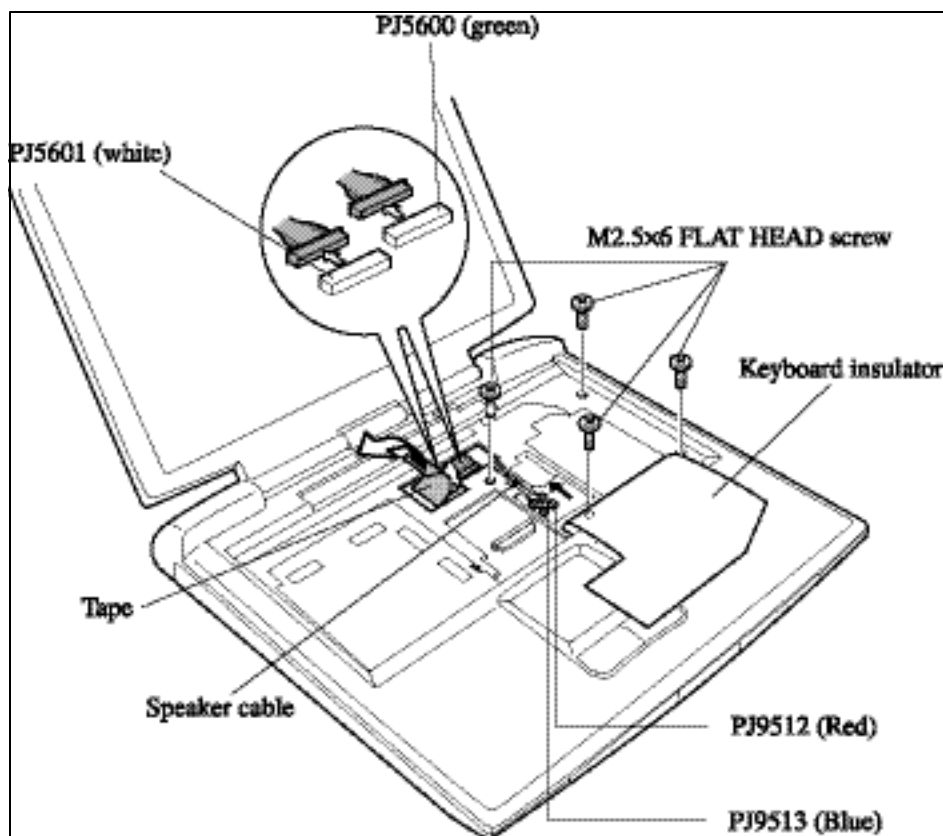
Figure 4-24   Removing the Top cover

6. Remove the top cover with display assembly starting from the front side of the computer. Be careful not to damage the wireless LAN or Bluetooth antenna coaxial cables.

Installing the Top Cover with Display Assembly

To install the top cover with display assembly, follow the steps below and refer to figures
4-23 and 4-24.

1. Install the top cover on the display assembly.

   > *NOTE: When installing the top cover on display assembly, be careful to pinch the wireless LAN or Bluetooth antenna coaxial cables.*

2. Press along the edges of the top cover with display assembly to secure latches.

3. Turn up the keyboard insulator and connect the two LCD cables to PJ5600 (green) and PJ5601 (white) on the system board.

4. Connect the speaker cables to PJ9512 (red) and PJ9513 (blue).

5. Secure the top cover to the display assembly with the following screws.

   - M2.5×6   FLAT HEAD screw   ×4

6. Turn the computer face down and connect the sub fan cable to PJ8770 on the system board.

7. Turn the computer face down and secure the following 24 screws:
   - M2.5×6   FLAT HEAD screw   ×11
   - M2.5×20   BIND screw   ×8
   - M2.5×4   FLAT HEAD screw   ×5

4.15 Touch Pad

Removing the Touch Pad

To remove the touch pad, follow the steps below and refer to figure 4-25.

1. Disconnect the touch pad SUMI card from PJ3240 on the system board.

2. Remove the following screw securing the touch pad.

    *   M2.5×4   FLAT HEAD screw   ×1

3. Lift out the touch pad.
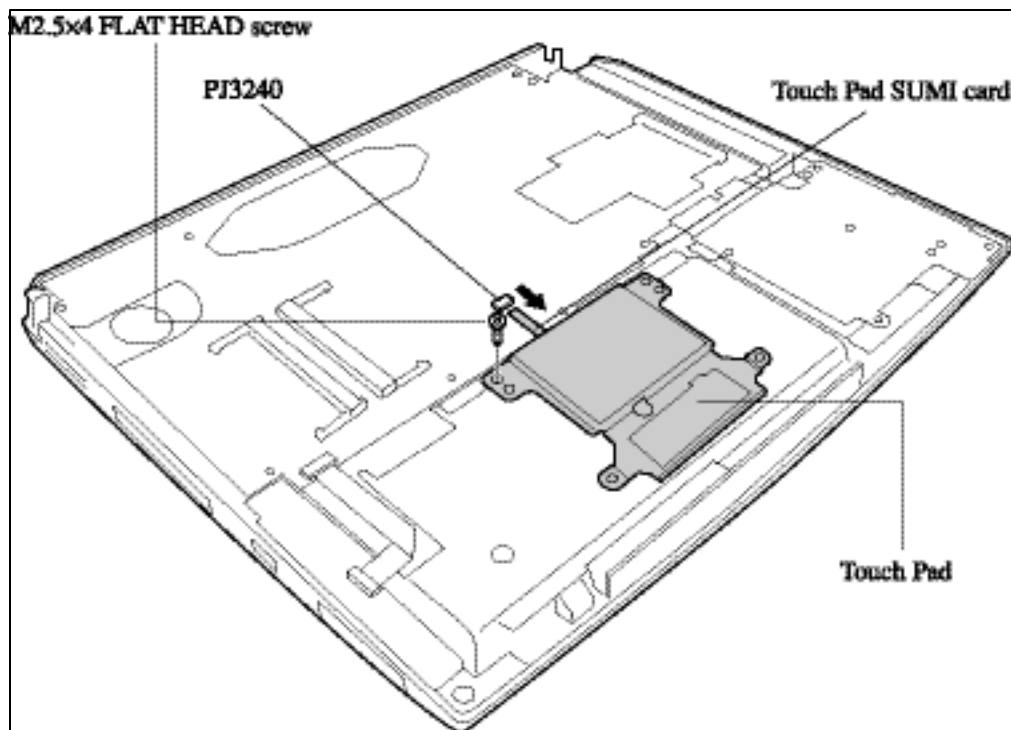
Figure 4-25   Removing the Touch Pad

4. Disconnect the touch pad SUMI card from J1 on the touch pad, if necessary.

Installing the Touch Pad

To install the touch pad, follow the steps below and refer to figure 4-25.

1. Connect the touch pad SUMI card to J1 on the touch pad, if necessary.

2. Seat the touch pad.

3. Secure the touch pad with the following screw.

   - M2.5×4   FLAT HEAD screw   ×1

4. Connect the touch pad SUMI card to PJ3240 on the system board.

4.16 Front Membrane ASSY

Removing the Front Membrane ASSY

To remove the front membrane ASSY, follow the steps below and refer to figure 4-26.

1. Disconnect the front membrane cable from PJ3260 on the system board.

2. Remove the following screws securing the front membrane holder.

   - M2.5×4   FLAT HEAD screw   ×2

3. Remove the front membrane holder and the front membrane ASSY.
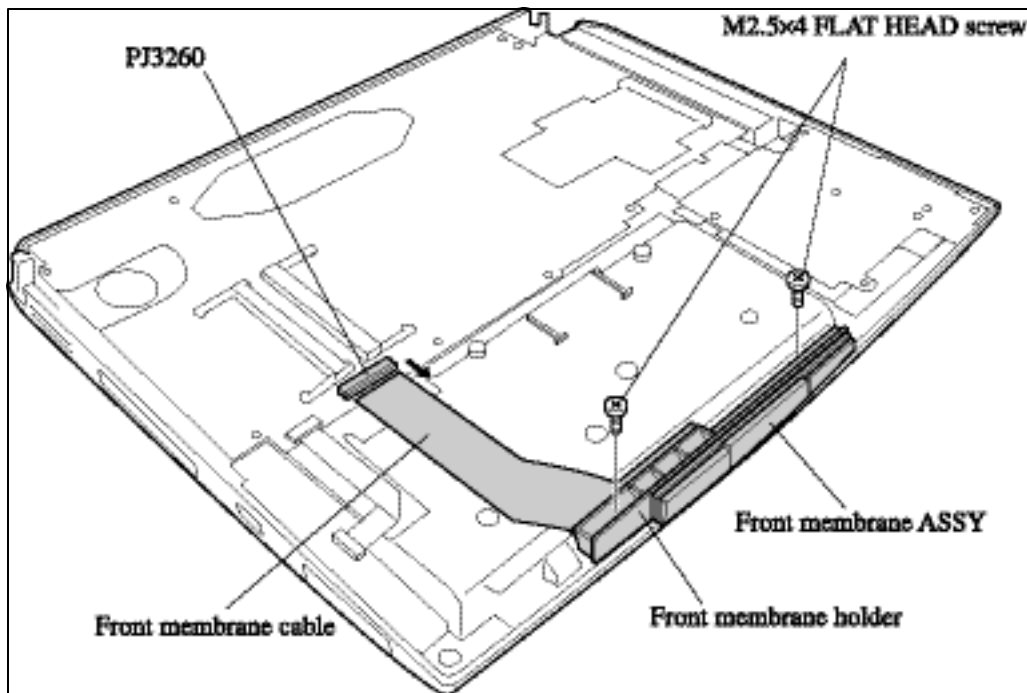
Figure 4-26 Removing the Front membrane ASSY

Installing the Front Membrane ASSY

To install the front membrane ASSY, follow the steps below and refer to figures 4-26.

1. Place the front membrane ASSY and front membrane holder on it, and secure them with the following screws.

   - M2.5×4   FLAT HEAD screws   ×2

2. Connect the front membrane cable to PJ3260 on the system board.

4.17 FIR Board

Removing the FIR Board

To remove the FIR board, follow the steps below and refer to figure 4-27.

1. Remove the following screws securing the FIR board.

    *   M2.5×6   FLAT HEAD screws   ×2

2. Disconnect the FIR board from PJ9500 on the system board.
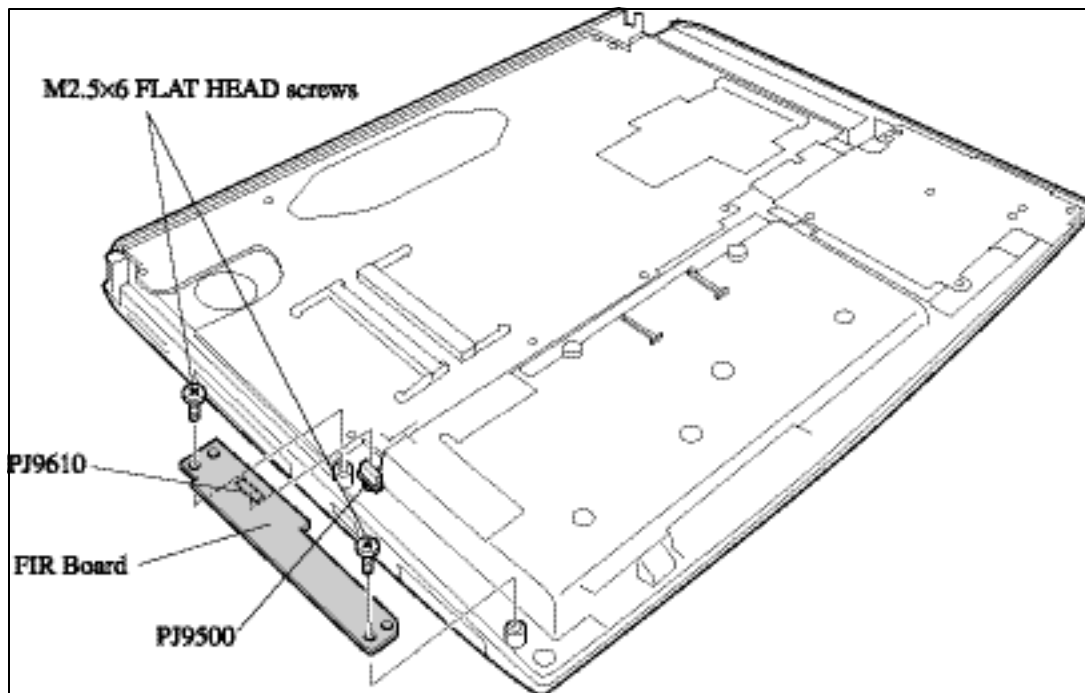
Figure 4-27   Removing the FIR board

Installing the FIR Board

To install the FIR board, follow the steps below and refer to the figure 4-27.

1. Connect the FIR board to PJ9500 on the system board.

2. Check the position of the wireless communication switch on the FIR board and the switch on the system chassis. Fit their positions and place the FIR board. Make sure they are correctly interlocked by sliding the switch on the system chassis several times.

3. Secure the FIR board with the following screws.

    *   M2.5×6   FLAT HEAD screws   ×2

4.18 Sound Board

Removing the Sound Board

To remove the sound board, follow the steps below and refer to figure 4-28.

1. Disconnect the sound board SUMI card from PJ9510 and PJ9511 on the system board.

2. Remove the following screw securing the sound board.

    *   M2.5×6   FLAT HEAD screw   ×1

3. Lift up the sound board and remove it by pulling toward the arrow direction in the figure.

4. Disconnect the sound board SUMI card from PJ9600 and PJ9601 on the sound board.
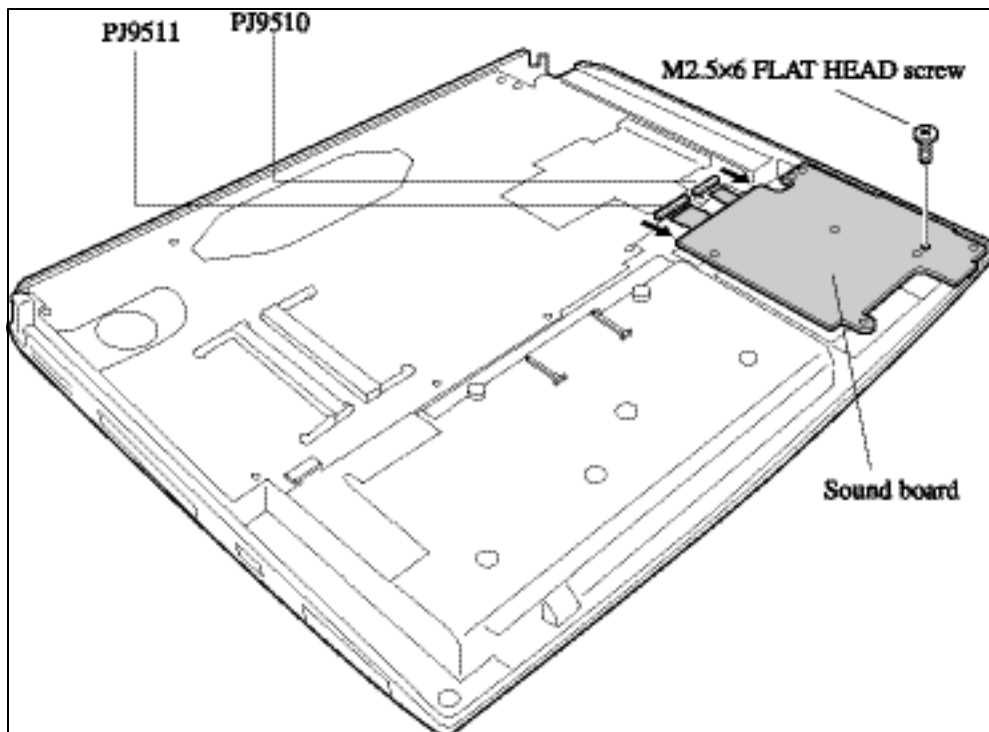
Figure 4-28   Removing the Sound board

Installing the Sound Board

To install the sound board, follow the steps below and refer to figure 4-28.

1. Connect the sound board SUMI card to PJ9600 and PJ9601 on the sound board.

2. Seat the sound board. When seating, insert three jacks on the sound board into the holes of the chassis first.

3. Connect the sound board SUMI card to PJ9510 and PJ9511 on the system board.

4. Secure the sound board with the following screw.

    - M2.5×6   FLAT HEAD screw   ×1

4.19 RTC Battery

WARNING: When replacing the RTC battery, be sure to use genuine batteries or replacement batteries authorized by Toshiba. Installing the wrong battery could cause a battery explosion or other damage.

If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.

Check for any of the following signs of damage:

1)   Electrolyte leakage

   • *Corrosion (greenish color) on the battery connector or cable*

   • *Corrosion on the computer's battery connector*

   • *White powder on any part of the battery*

   • *White powder in the battery tray*

   • *Clear liquid on the battery*

   • *Clear liquid in the battery tray*

   • *Clear liquid on any board near the battery*

2)   Damage to the connection cable

3)   Damage to the connector housing

If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC Battery

To remove the RTC battery, follow the steps below and refer to figure 4-29.

1. Disconnect the RTC battery cable from PJ9999 on the system board.

2. Pull the hook on each side fixing the RTC battery outward and lift out the RTC battery.
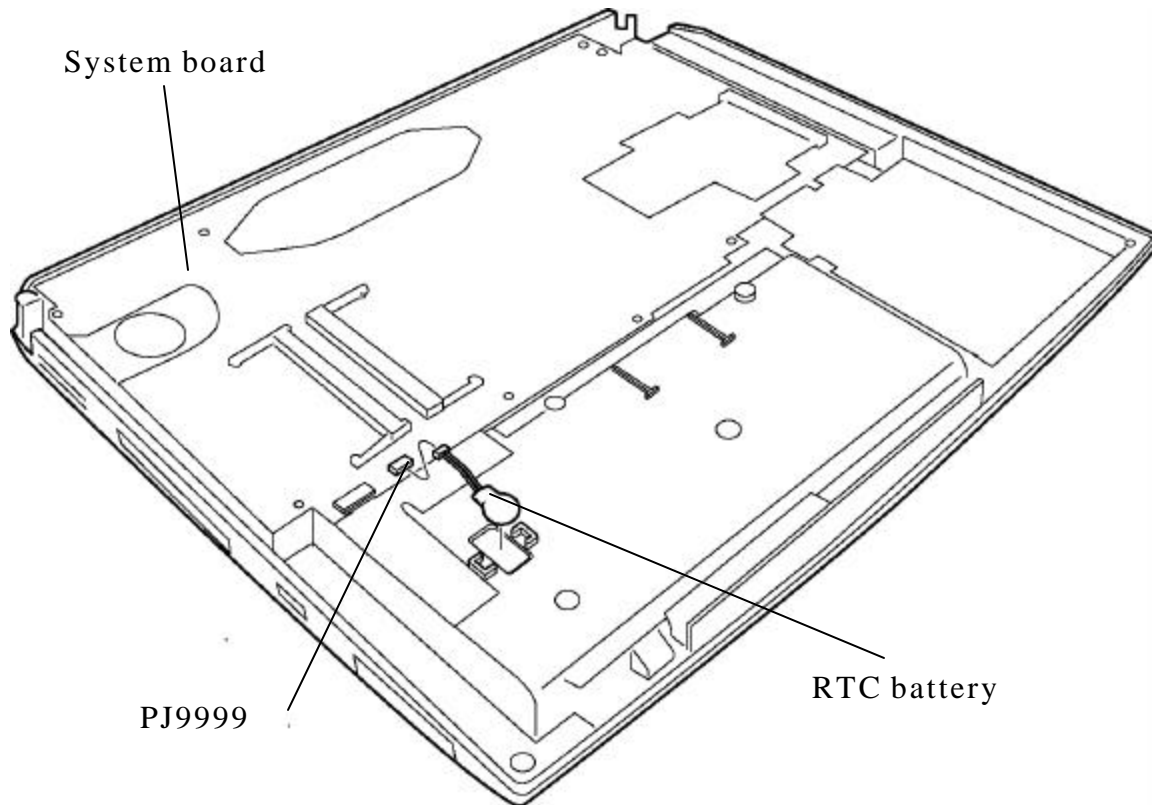
Figure 4-29 Removing the RTC battery

Installing the RTC Battery

To install the RTC battery, follow the steps below and refer to figure 4-29.

1. Seat the RTC battery.

2. Connect the RTC battery cable to PJ9999 on the system board.

4.20 DC-IN Jack

Removing the DC-IN Jack

To remove the DC-IN jack, follow the steps below and refer to figure 4-30.

1. Disconnect the DC-IN cable from PJ8800 on the system board.

2. Remove the DC-IN jack.
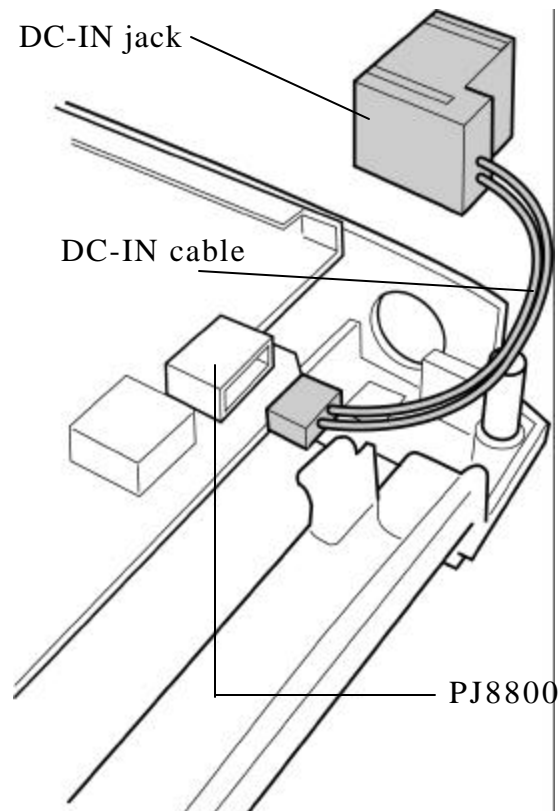
Figure 4-30   Removing the DC-IN jack

Installing the DC-IN Jack

To install the DC-IN jack, follow the steps below and refer to figure 4-30.

1. Seat the DC-IN jack.

2. Connect the DC-IN cable to PJ8800 on the system board.

4.21 System Board

Removing the System Board

To remove the system board, follow the steps below and refer to figure 4-31.

1. Remove the following screws securing the plastic holder and the system board.

    *   M2.5×6   FLAT HEAD screw   ×3
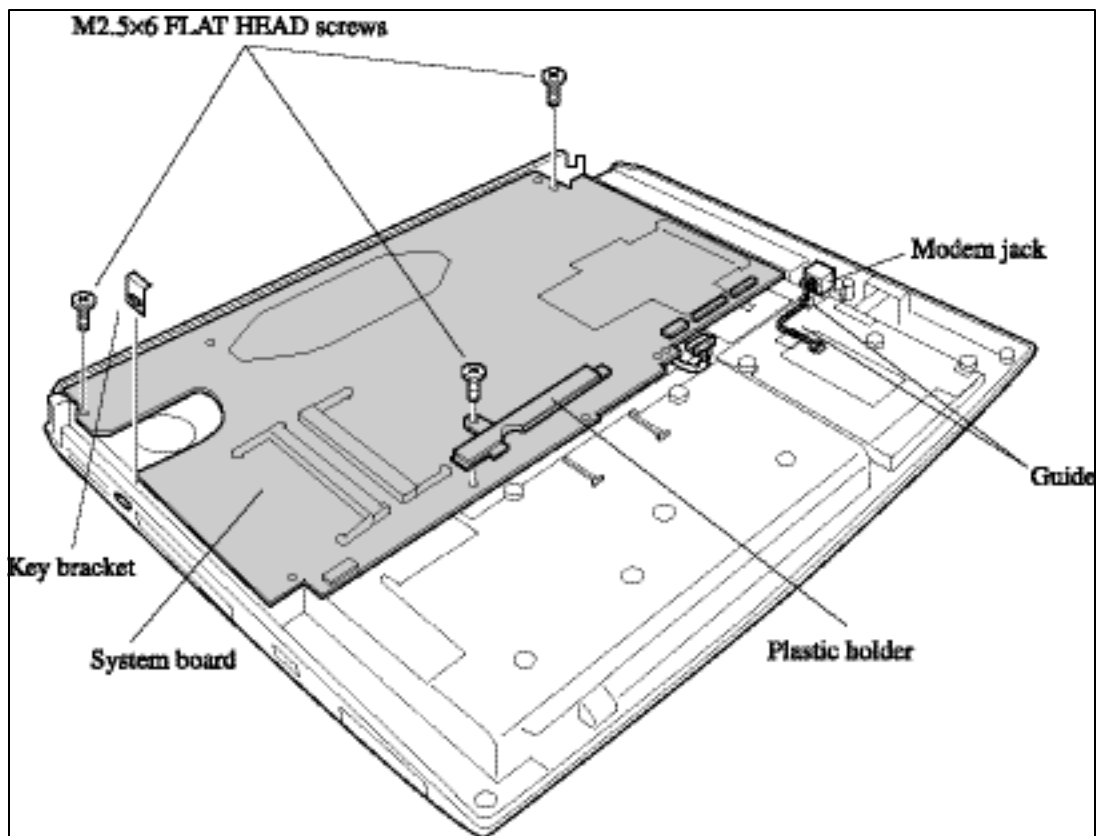
Figure 4-31 Removing the System board

2. Lift up the system board from the DC-IN cable side and remove it. When removing, press slightly the left part of the rear frame ("A" in the figure) of the chassis outside.

3. Remove the modem jack.

4. Remove the key bracket on the left side of the chassis outside.

Installing the System Board

To install the system board, follow the steps below and refer to figures 4-31.

1. Install the key bracket on the left side of the chassis.

2. Set the modem jack and hook the cable under the guides.

3. Seat the system board and plastic holder. When seating the system board, insert the PC card slot into the chassis first.

4. Secure the plastic board and the system board with the following screws.

    - M2.5×6   FLAT HEAD screw   ×3

4.22 Sub Fan

Removing the Sub Fan

To remove the sub fan board, follow the steps below and refer to figure 4-32.

1. Remove the following screws securing the sub fan.

   • M2.5×6   FLAT HEAD screw   ×2

2. Remove the sub fan.
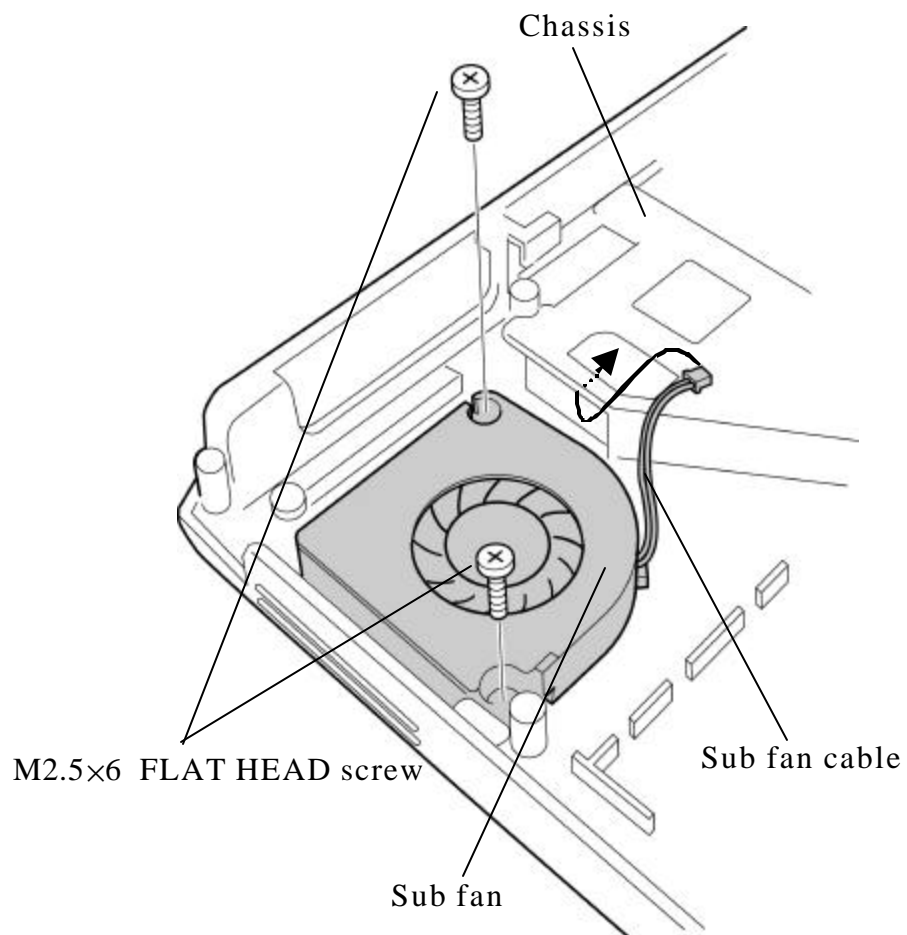
Figure4-32   Removing the Sub Fan

Installing the Sub Fan

To install the sub fan board, follow the steps below and refer to figures 4-32.

1. Place the sub fan.

2. Pass the sub fan cable in the hole of the chassis.

3. Secure the sub fan with the following screws.

    • M2.5×6   FLAT HEAD screw   ×2

4.23 PC Card Slot

Removing the PC Card Slot

To remove the PC card slot, follow the steps below and refer to figure 4-33.

1. Lay the system board face up.

2. Remove the following screws securing the PC card slot.

    *   M2×12 BIND screw   ×4
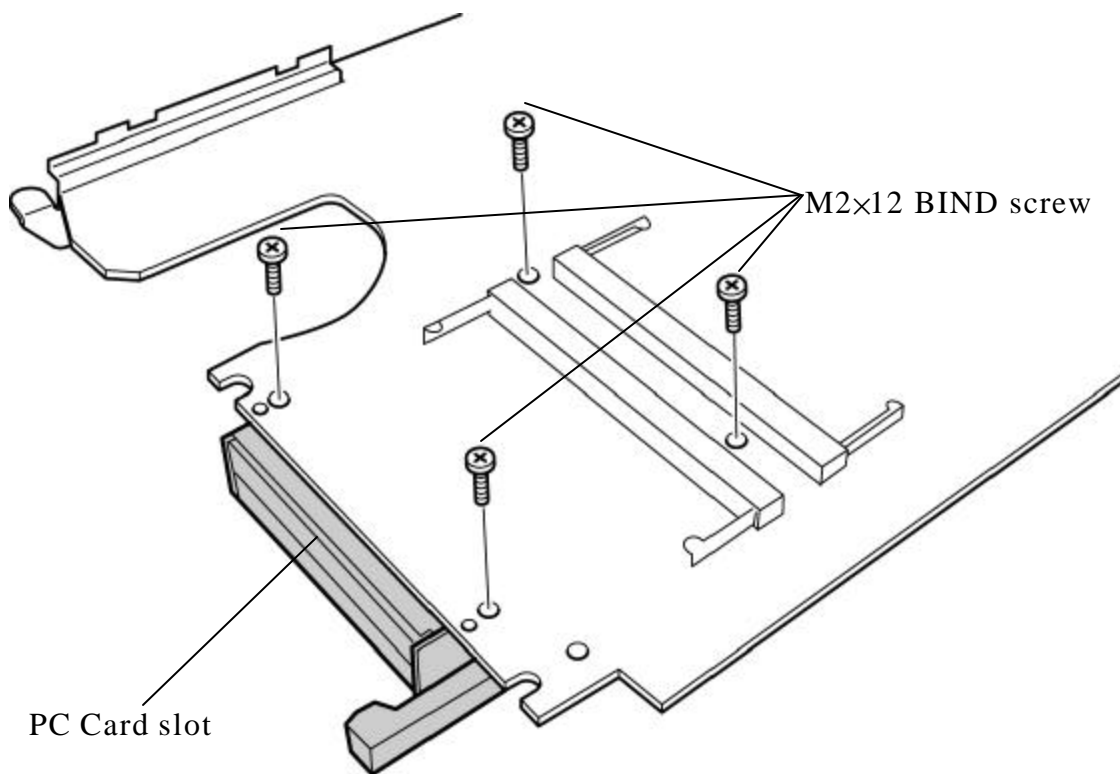
Figure 4-33   Removing the PC card slot

3. Lay the system board face up.

4. Disconnect the PC card slot from PJ2110 on the system board.

Installing the PC card slot

To install the PC card slot, follow the steps below and refer to figure 4-33.

1. Lay the system board face down and seat the PC card slot.

2. Press the PC card slot to connect it to PJ2110. Make sure the connection is secure.

3. Lay the system board face up.

4. Secure the PC card slot with the following screws.

    - M2×12   BIND screw   ×4

    > *CAUTION: If you do not seat the PC card slot completely, you might not be able to connect the system board properly. Make sure the PC card slot is connected to the connector on the system board.*

4.24 Speakers

Removing the Speakers

To remove the speakers, follow the steps below and refer to figures 4-34 and 4-35.

1. Lay the top cover and display assembly face down and remove the insulator.

2. Remove the following screws securing the side covers.

   - M2.5×6   FLAT HEAD screw   ×4
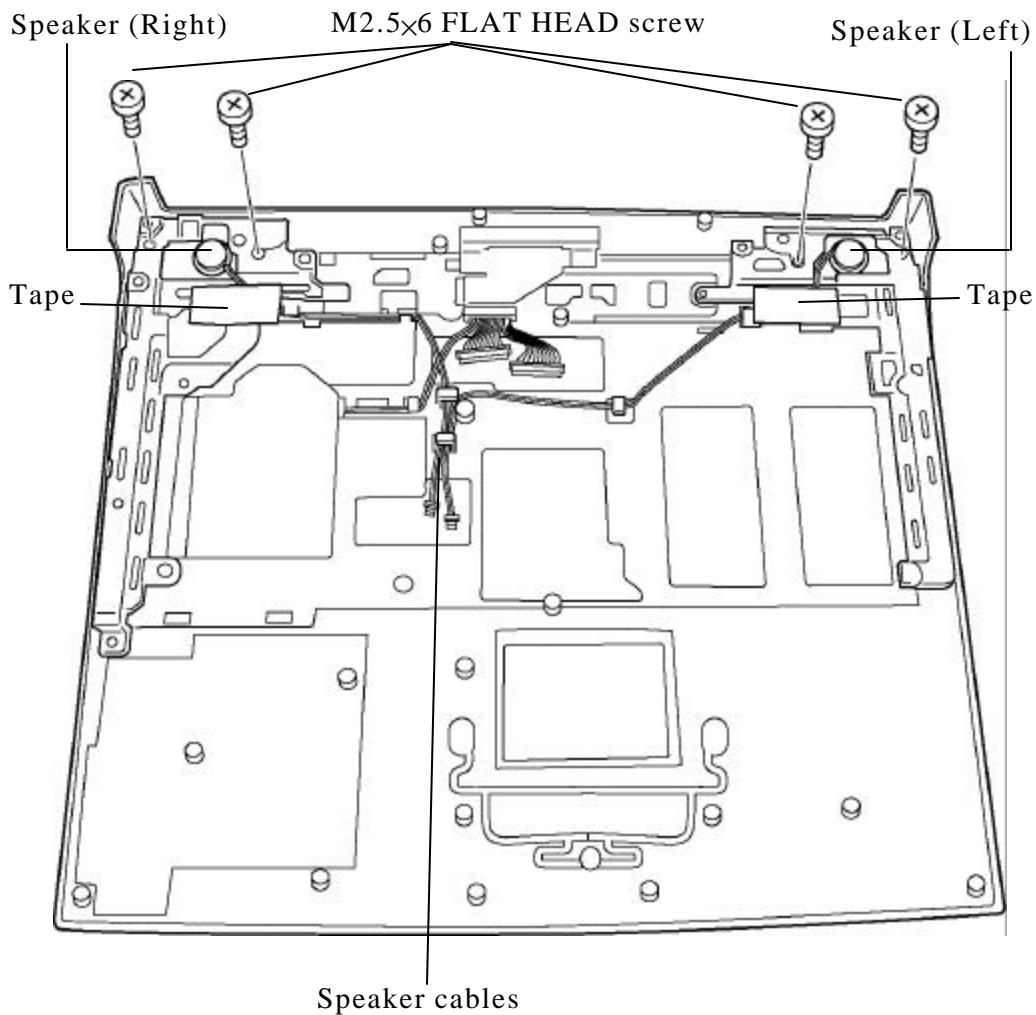
Figure 4-34   Removing the Speakers

3. Remove the two tapes securing the speaker cables.

4. Remove the speakers and speaker cables from their guides.

5. Remove the side speaker (right and left) from the front of the computer.
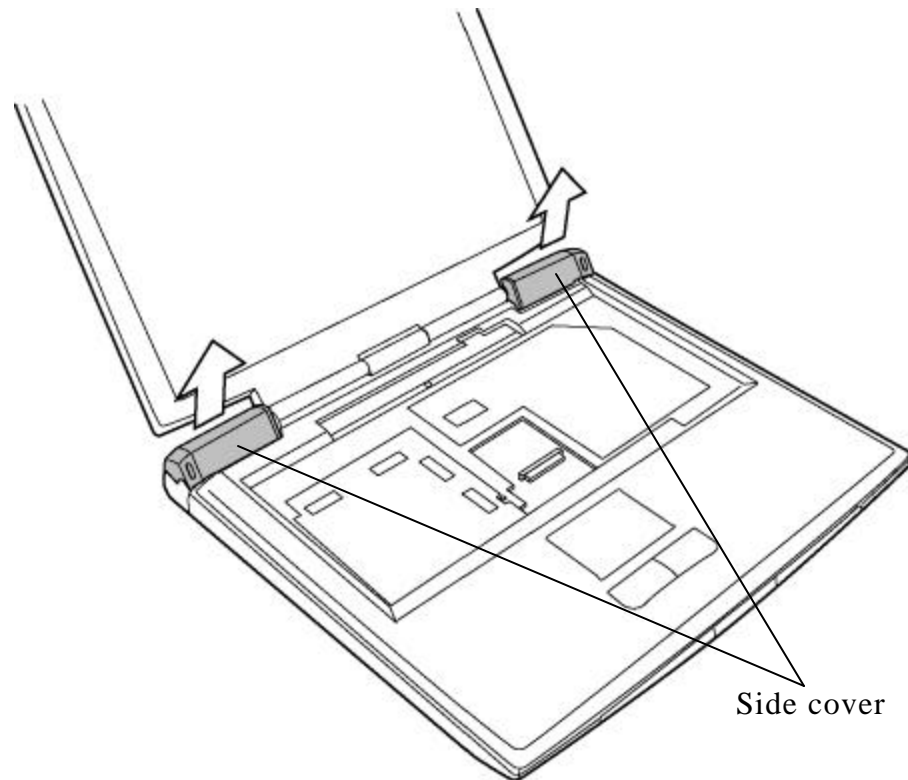
Figure 4-35   Removing the Side cover

Installing the Speakers

To install the speakers, follow the steps below and refer to figures 4-34 and 4-35.

1. Install the side cover (right and left) on the front of the computer.

2. Place each speaker from the back and secure the side covers with the following screws.

   • M2.5×6   FLAT HEAD screw   ×4

3. Route the speaker cables through guides.

4. Secure the speaker cables with tape.

5. Seat the insulator.

4.25 Touch Pad Switch

Removing the Touch Pad Switch

To remove the touch pad switch, follow the steps below and refer to figure 4-36.

1. Remove the following screws securing the touch pad switch.

   • M2.5×4   TAPPING screw   ×3

2. Removing the touch pad switches.

Touch pad switch

M2.5×4 TAPPING screw
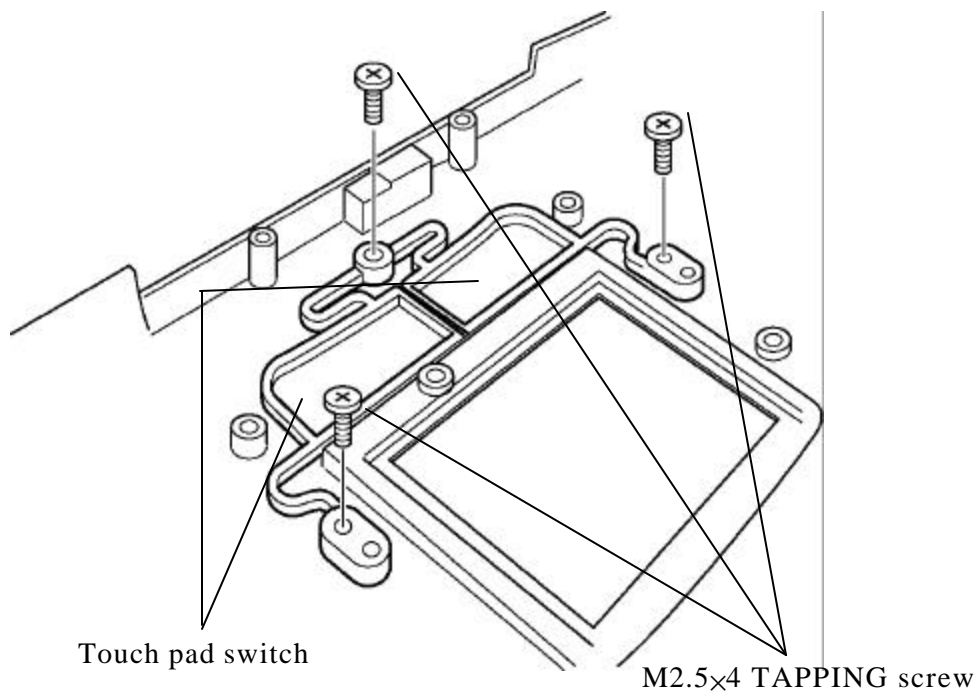
Figure 4-36   Removing the Touch pad switch

Installing the Touch Pad Switch

To install the touch pad switch, follow the steps below and refer to figure 4-36.

1. Place the touch pad switches on the back of the palm rest.

2. Secure the touch pad switch with the following screws.

- M2.5×4   TAPPING screw   ×3

4.26 Display Mask

Removing the Display Mask

To remove the display mask, follow the steps below and refer to figures 4-37 and 4-38.

1. Remove the two mask seals at the lower part of the display mask.

2. Remove the following screws securing the display mask.

    *   M2.5×6   FLAT HEAD screw   ×2
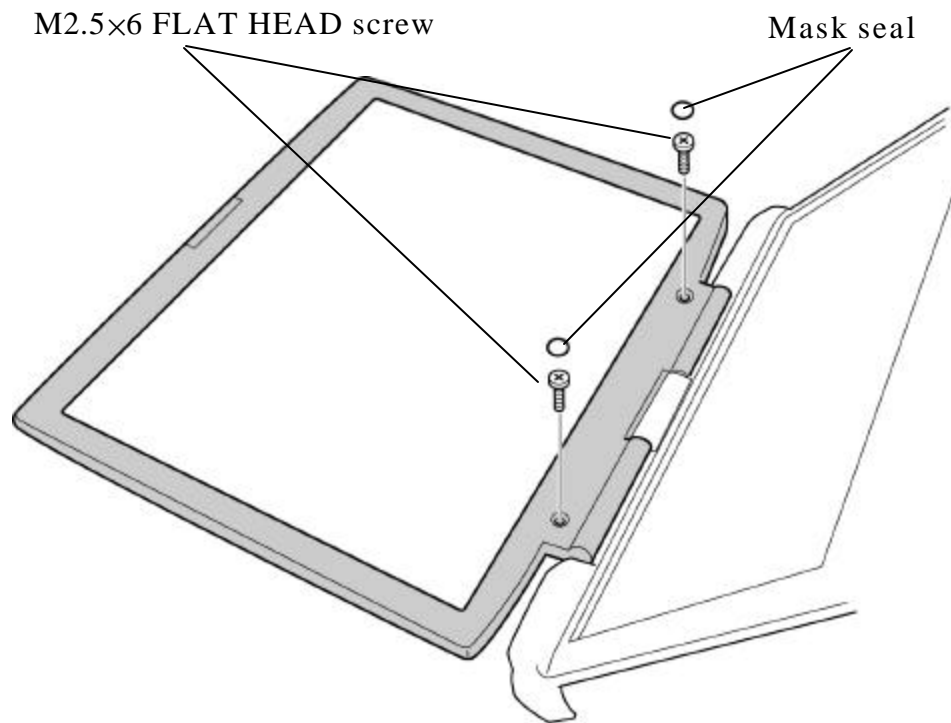
Figure 4-37   Removing the Display mask (1)

3. Release the latches on the display mask from the upper side of the display.

4. Remove the display mask.
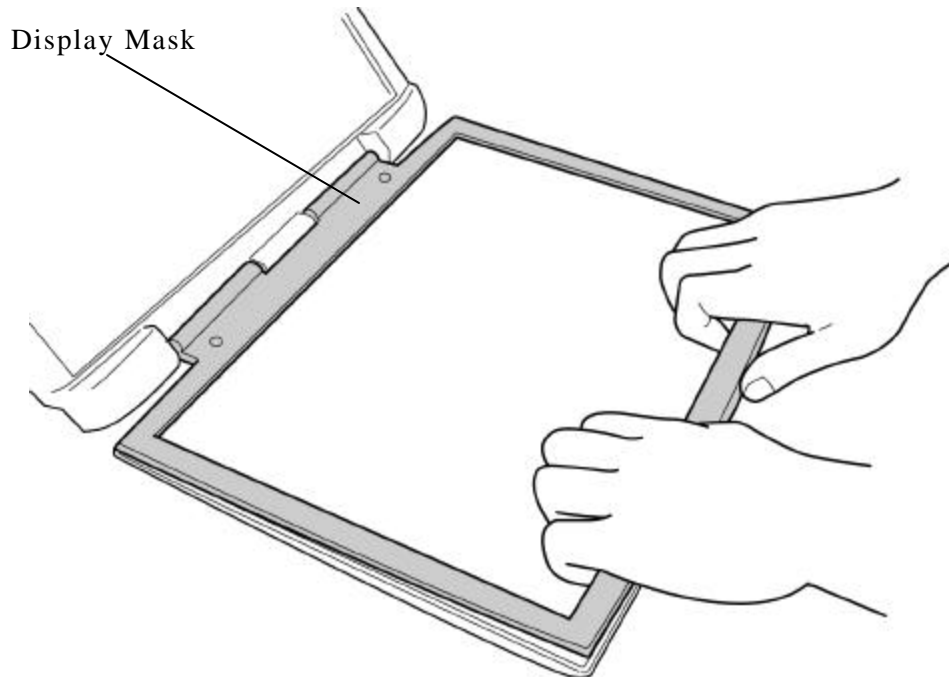
Figure 4-38   Removing the Display mask (2)

Installing the Display Mask

To install the display mask, follow the steps below and refer to figures 4-37 and 4-38.

1. Place the display mask in its position.

2. Fasten the latches of the display mask.

3. Secure the display mask with the following screw.

   - M2.5×6   FLAT HEAD screw   ×2

4. Stick the two mask seals on the top of screws.

4.27 FL Inverter

Removing the FL Inverter

To remove the FL inverter, follow the steps below and refer to figure 4-39.

1. Remove the following screw securing the FL inverter.

    - M2×6 SUPER FLAT screw   ×1

2. Remove the insulator and disconnect the FL cable from the FL inverter.

3. Disconnect the HV cable from the FL inverter.

4. Remove the FL inverter.
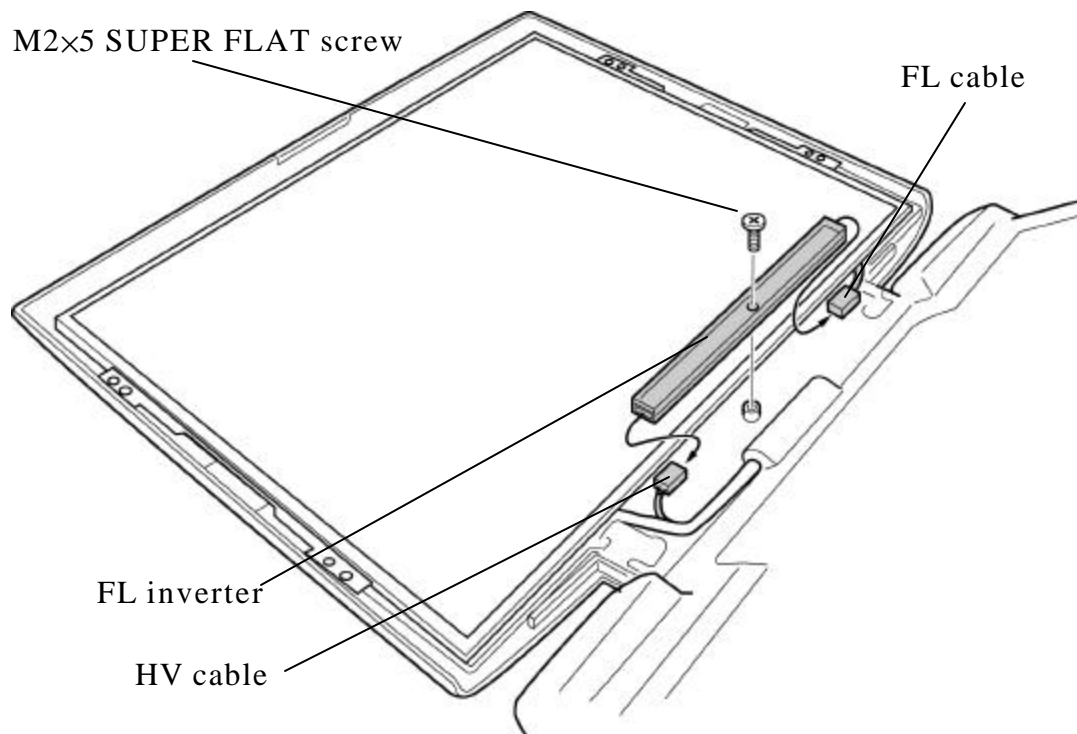
Figure 4-39   Removing the FL inverter

Installing the FL Inverter

To install the FL inverter, follow the steps below and refer to figure 4-39.

1. Connect the FL cable and the HV cable to the FL inverter.

2. Seat the FL inverter board and stick the insulator on the FL inverter of the FL cable side.

3. Secure the FL inverter with the following screw.

    - M2×5 SUPER FLAT screw   ×1

4.28 LCD Module

NOTE: *Be careful not to apply pressure to the ICs along the edge of LCD module. The ICs are easily damaged.*

NOTE: *For environmental reasons, do not throw away a malfunctioning LCD module (or FL). Please follow local ordinances or regulations for its disposal.*

Removing the LCD Module

To remove the LCD Module, follow the steps below and refer to figures 4-40 and 4-41.

1. Remove the following screws securing the LCD module.

   - M2×5 SUPER FLAT screw   ×4

2. Carefully rotate out the top of the LCD module to access the LCD cable.

   NOTE: *When rotating the top of the LCD module, hold the corners of the LCD module. The top edge of LCD module is sensitive area.*

   ---

3. (For SXGA+ models only) Remove the copper tape securing the LCD cable and glass tape.

4. Remove the grass tape securing the LCD cable.

5. Disconnect the LCD cable and remove the LCD module.

Connector

Glass tape

Copper tape
(SXGA+ models only)

M2×5 SUPER FLAT screw
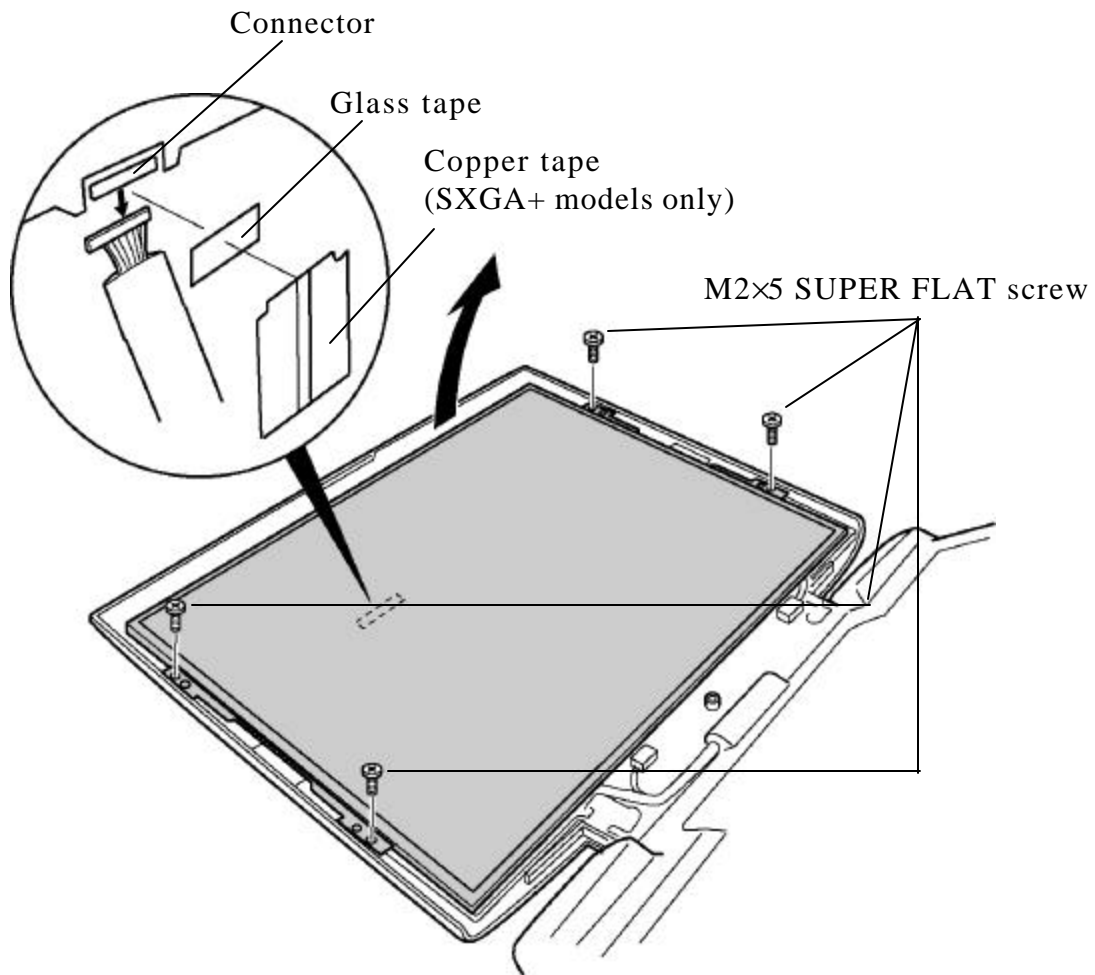
Figure 4-40   Removing the LCD module (1)

6. Remove the following screw securing the two metal braces to the LCD module.

- M2×3 SUPER FLAT screw   ×4

M2×3 SUPER FLAT screw

LCD module

Metal brace

M2×3 SUPER FLAT screw
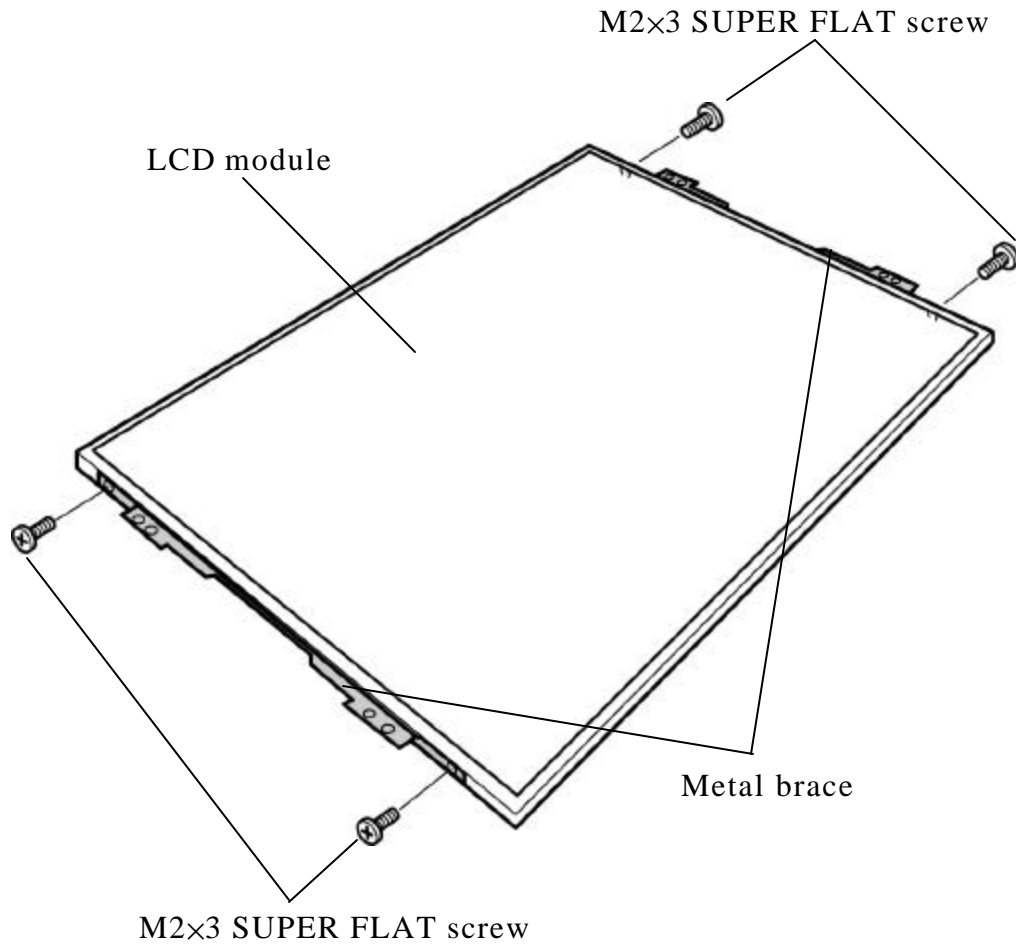
Figure 4-41   Removing the LCD module (2)

Installing the LCD Module

To install the LCD module, follow the steps below and refer to figures 4-40 and 4-41.

1. Secure the two metal braces to the LCD module with the following screws.

    - M2×3 SUPER FLAT screw   ×4

2. Lean the LCD module against the lower side of the display cover.

3. Connect the LCD cable to the LCD module.

4. Stick the grass tape on the LCD cable.

5. (For SXGA+ models only)
    Stick the copper tape on the LCD cable.

    > *NOTE: When sticking the copper tape, make sure the copper part of the copper tape is in the center position of the LCD cable.*

6. Seat the LCD module and secure it with the following screws.

    - M2×5 SUPER FLAT screw   ×4

    > *CAUTION: Make sure the cables lie inside the guide. Be careful not to damage or pinch any cables when you seat the LCD module.*

4.29 Wireless LAN Antenna/Bluetooth Antenna/Display Cover

Removing the Wireless LAN Antenna/Bluetooth Antenna/Display Cover

To remove the wireless LAN antenna/Bluetooth antenna/display cover, follow the steps below and refer to figures 4-42 to 4-48.

NOTE: When you open or close the top cover, hold it by the sides close to the hinges to prevent damage.

1. Remove the latch assembly on the display cover. First, press the inside switch (dark blue) outward and remove it. Then remove the switch (light blue) by lifting it up.
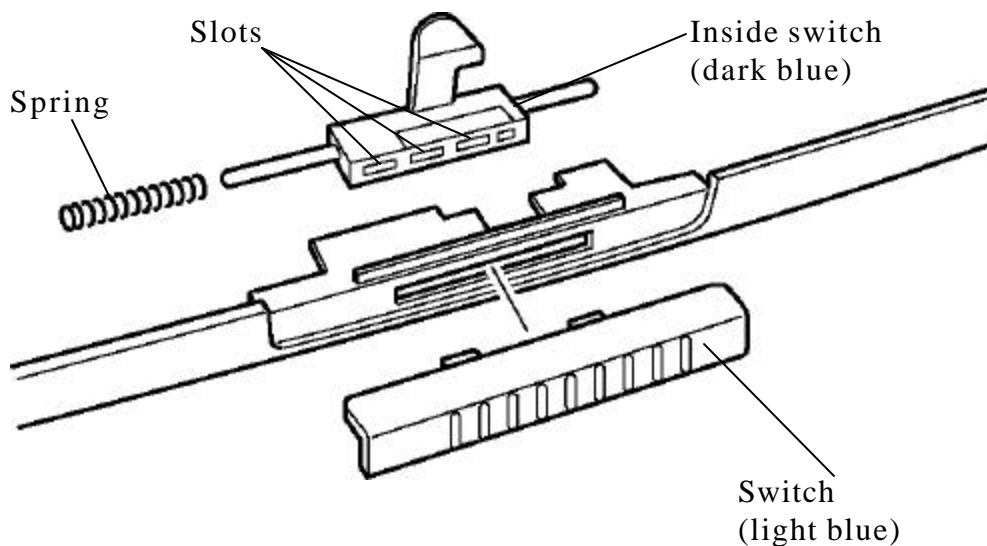
Figure 4-42 Removing the Latch assembly

2. (For Wireless LAN/Bluetooth models only)
    Peel off the three acetate tapes securing the wireless LAN antenna cables and Bluetooth
    antenna cable and remove the wireless LAN antennas and Bluetooth antenna from the
    display cover.

Wireless LAN/Bluetooth antenna cables

Bluetooth antenna

Acetate tape

Wireless LAN antenna
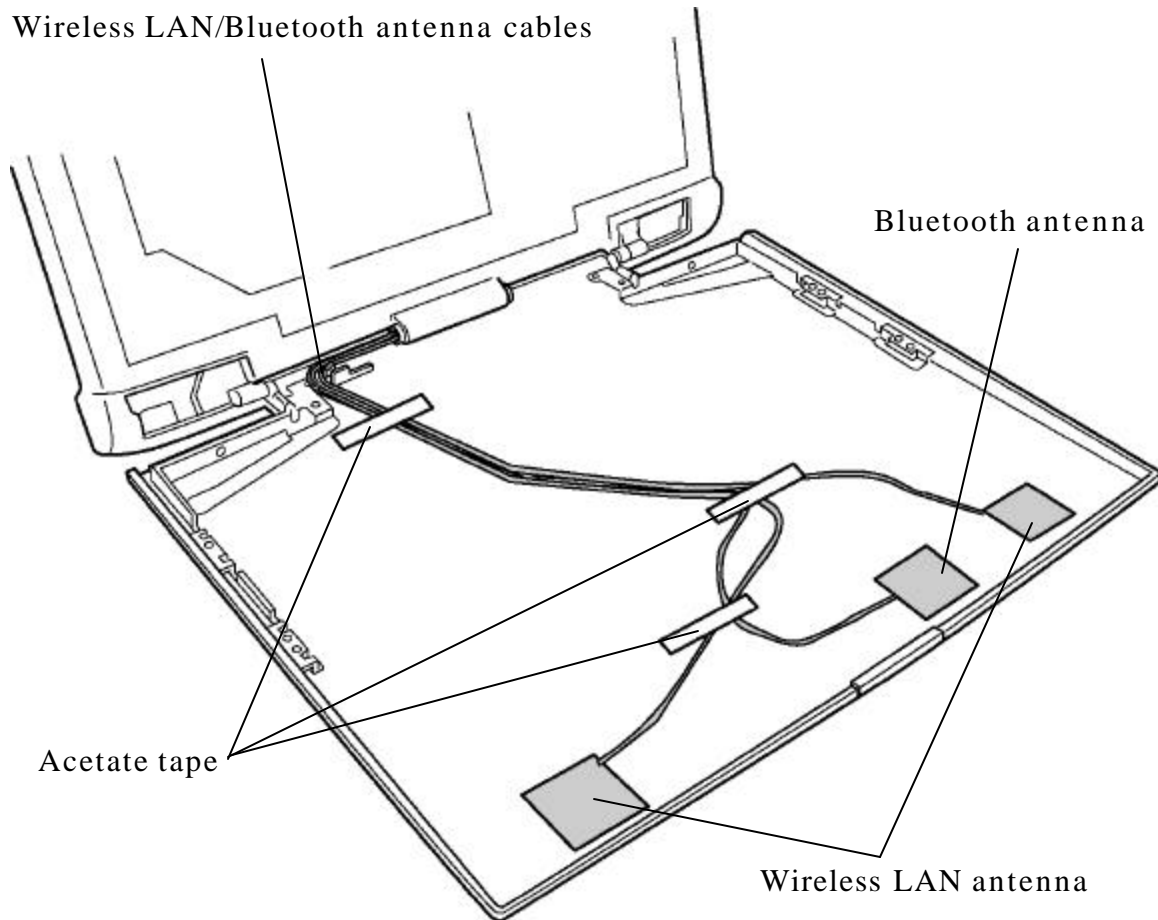
Figure 4-43   Removing the Wireless LAN/Bluetooth antenna

3. Remove the following screw securing the metal plate on the LCD cable and remove the metal plate.

   • M2.5×4   TAPPING screw   ×1

M2.5×4 TAPPING screw

Metal plate
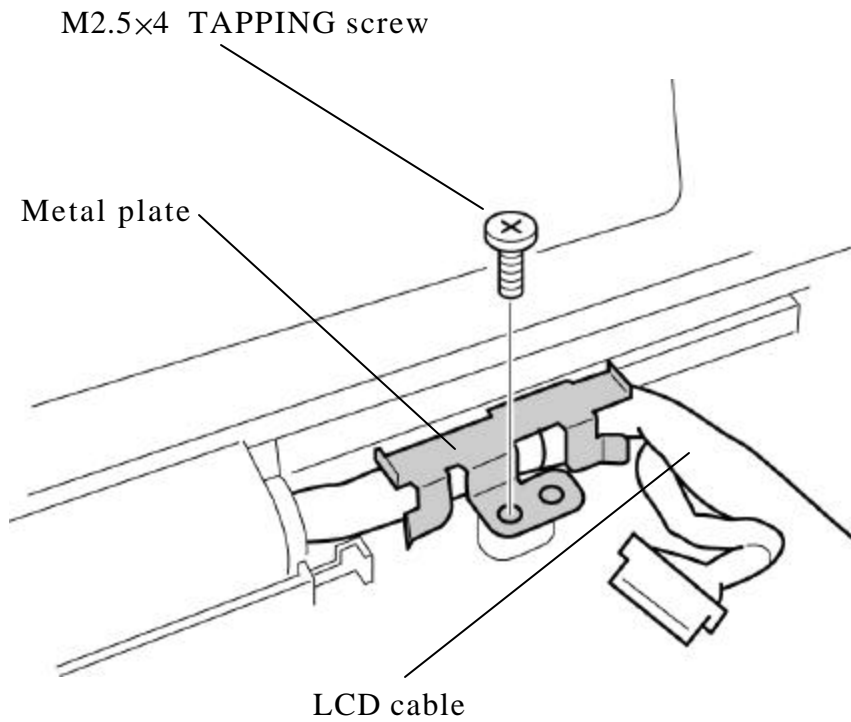
LCD cable

Figure 4-44   Removing the LCD cable (1)

4. Turn the display cover face down and remove the insulator.

5. Remove the following screws securing the cable hold plate and cable earth plate.

   - M2.5×6   TAPPING screw   ×2

   M2.5×6 TAPPING screw
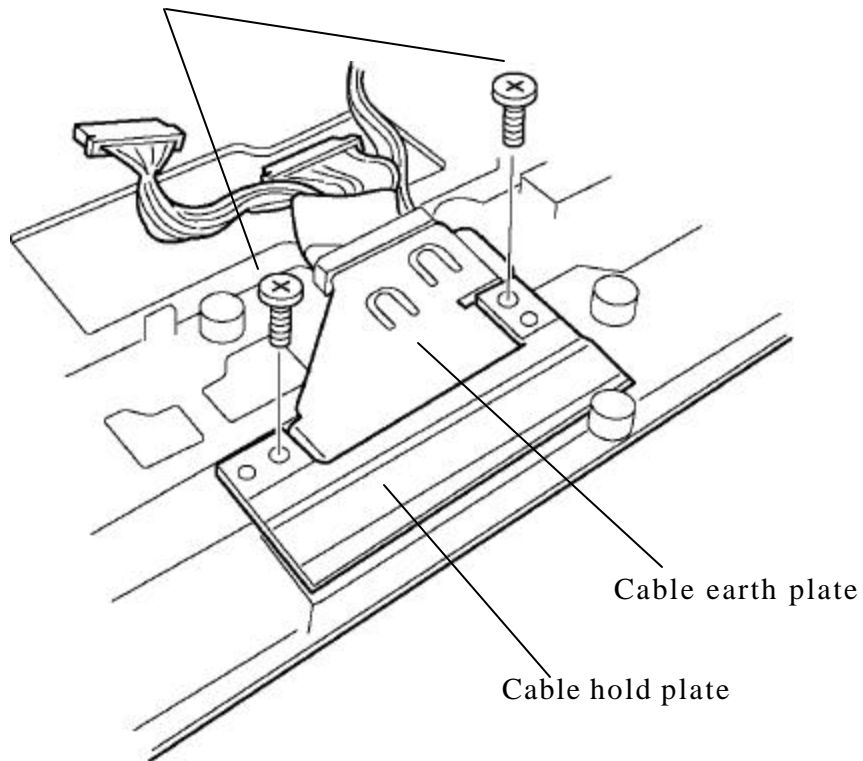
Figure 4-45   Removing the Cable hold plate/Cable earth plate

6. Remove the cable hold plate first. Then remove the cable earth plate.

7.   Remove the LCD cable from the display assembly.
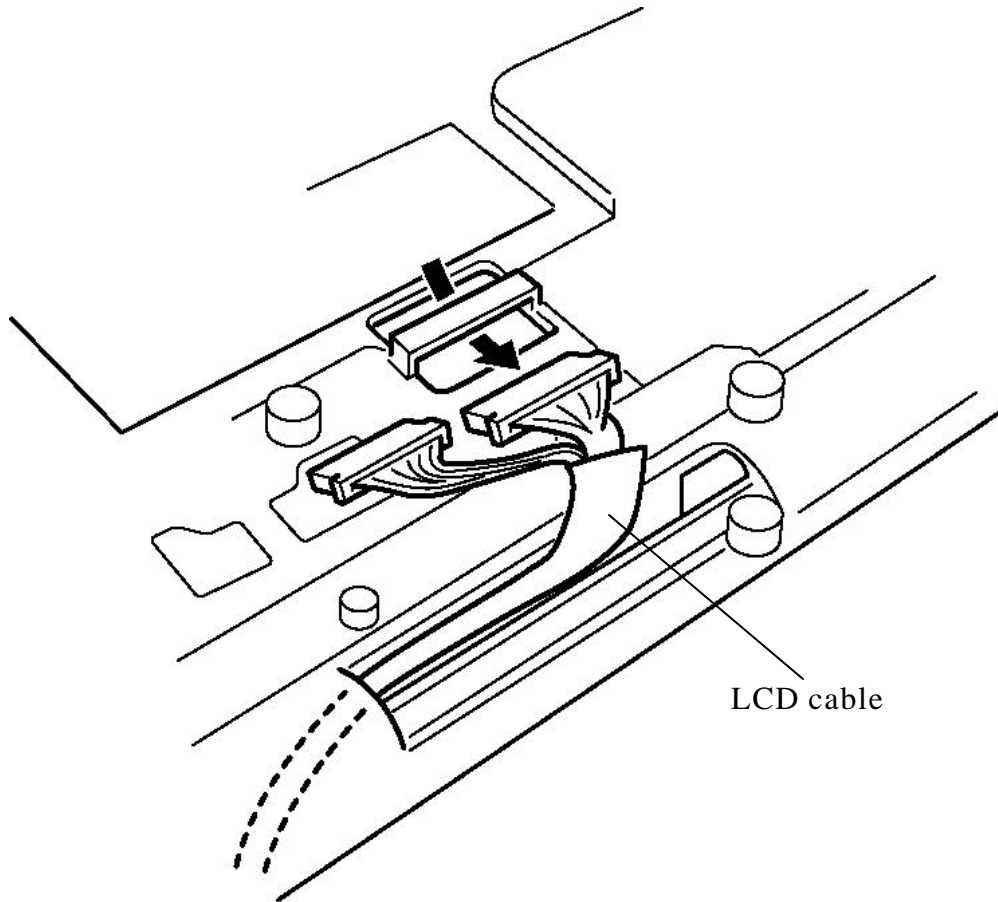
LCD cable

Figure 4-46   Removing the LCD cable (2)

8. Remove the following screws securing the two hinges to the display cover.

    - M2.5×4   FLAT HEAD screw   ×2

    - M2.5×5   FLAT HEAD screw   ×4

M2.5×4 FLAT BIND screw

M2.5×5 FLAT HEAD screw

M2.5×5 FLAT HEAD screw
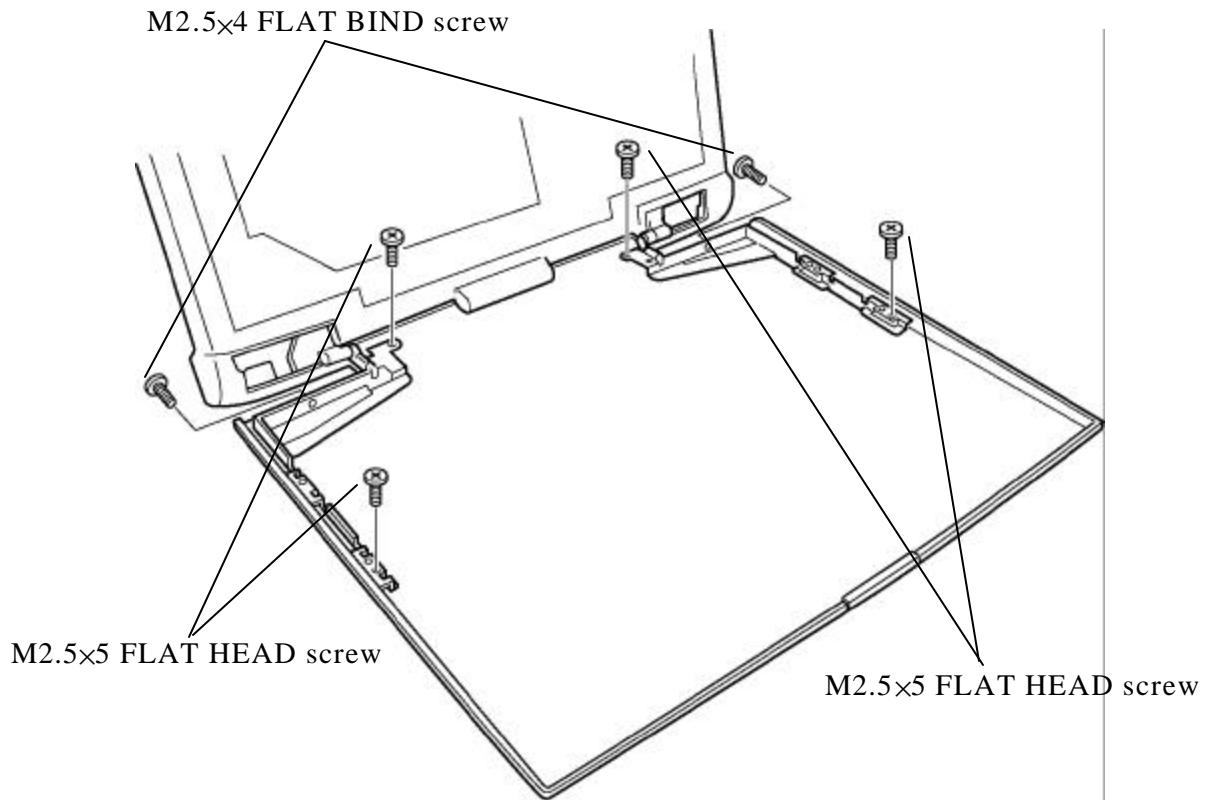
Figure 4-47   Removing the Hinge (1)

9. Remove the display cover from the display assembly.

10. Remove the following screws securing the two hinges to the display cover.

    - M2.5×6   FLAT HEAD screw   ×4

M2.5×6 FLAT HEAD screw

M2.5×6 FLAT HEAD screw
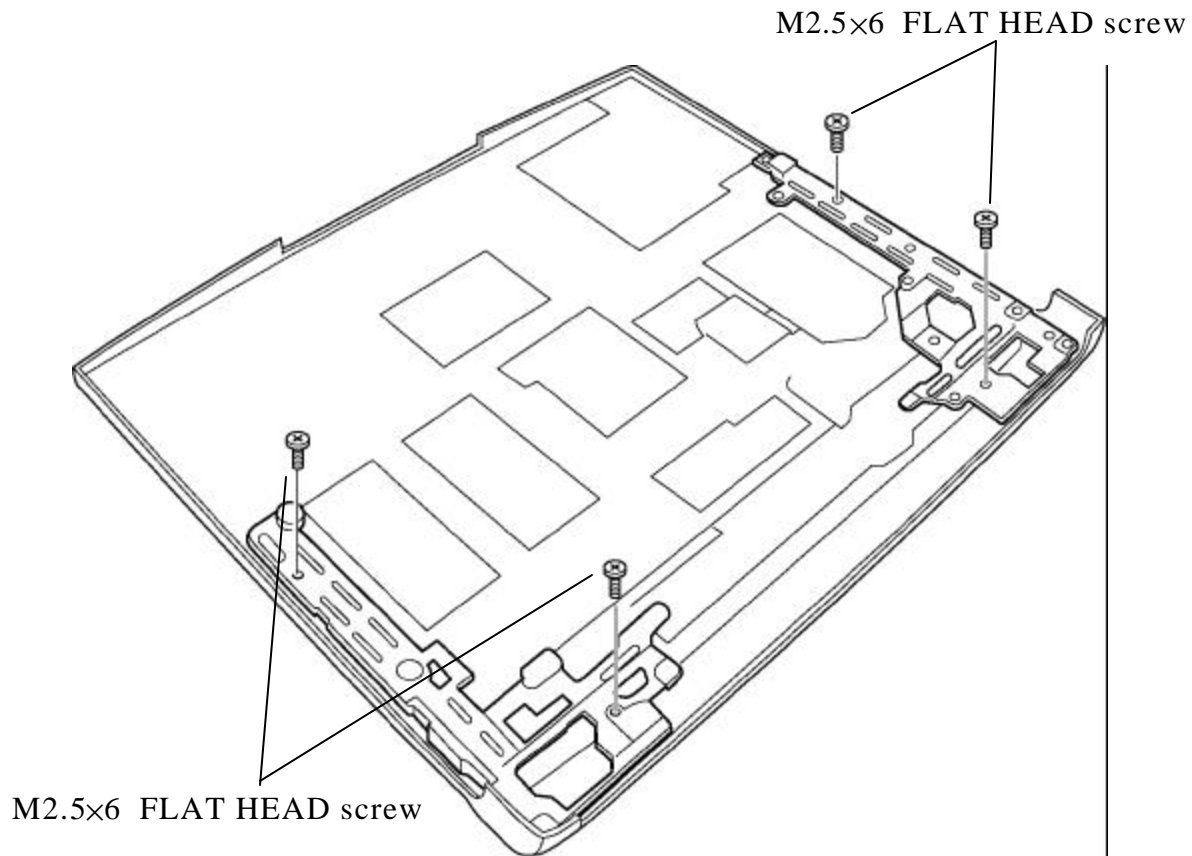
Figure 4-48 Removing the Hinge (2)

Installing the Wireless LAN Antenna/Bluetooth Antenna/Display Cover

To install the wireless LAN antenna/Bluetooth antenna/display cover, follow the steps below and refer to figures 4-42 to 4-49.

1. Install the two hinges on the hole of the display assembly and secure the hinges with the following screws.

   - M2.5×6 FLAT HEAD screw   ×4

2. (For wireless LAN/Bluetooth models only)
   Fit the wireless LAN antennas and Bluetooth antenna to the groove on the rear of the display cover and secure it with the three acetate tapes. Then pass the wireless LAN cables (black and white) and Bluetooth cable (brown) through the guides on the back of the display cover.
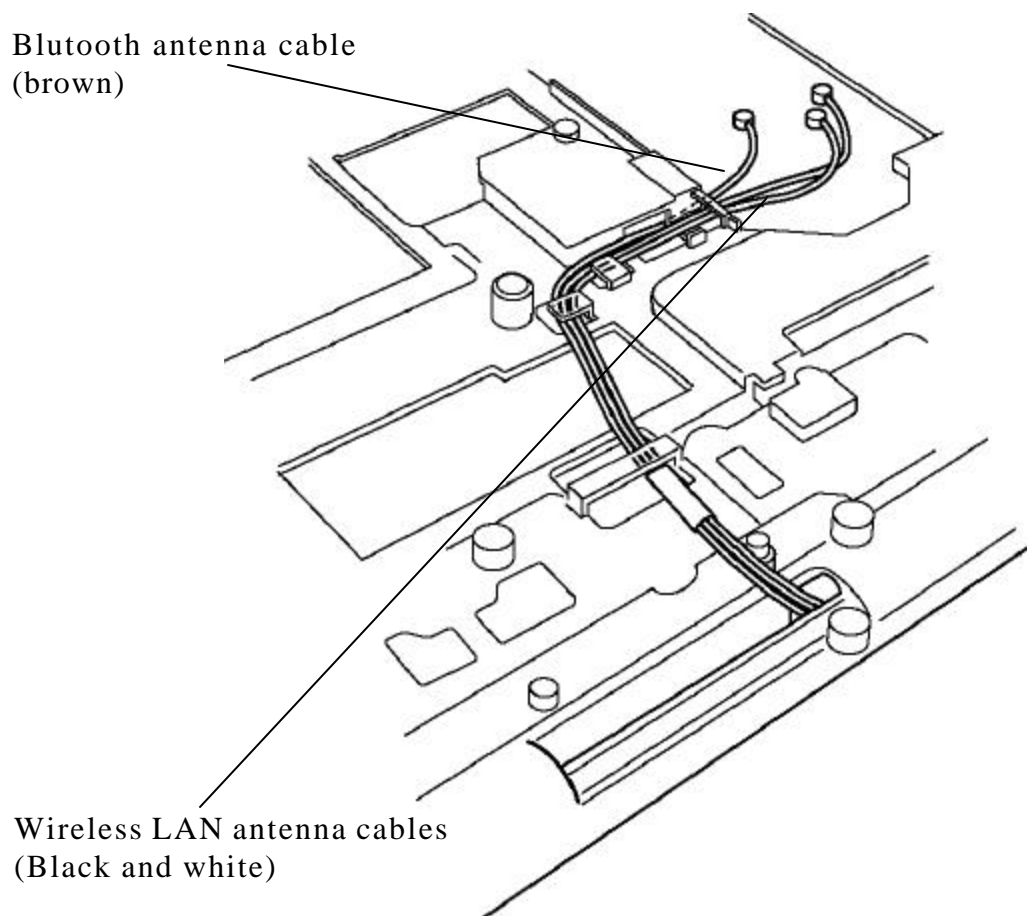
Figure 4-49 Installing the Wireless LAN/Bluetooth antenna cable

3. Pass the LCD cable through the hole from the top of the display assembly toward its bottom.

4. Close the display cover and turn the display assembly face down.

5. Place the cable earth plate first and then place the cable hold plate on the display cable and secure them with the following screws.

> *NOTE: Before securing, make sure the cable hold plate is securely fit to the guide on the chassis.*

   - M2.5×6 TAPPING screw   ×2

6. Install the display cover to the two hinges of the display assembly and secure it with the following screws.

   - M2.5×4 FLAT HEAD screw   ×2

   - M2.5×5 FLAT HEAD screw   ×4

7. Place the metal plate on the LCD cable and secure it with the following screw.

   - M2.5×4   TAPPING screw   ×1

8. Install the latch assembly on the display cover. First, install the switch (light blue) on the front side of the computer. Then, install the inside switch (dark blue) with spring so that three slots of the inside switch are attach to the switch.

> *NOTE: When installing the latch assembly, move the switch several times to check it is working properly. Make sure the switch interlocks the inside switch.*

4.30 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
15.0 inch (XGA)	G33C0000G110	LG.Philips	4.30.1
	G33C0000L110	Samsung	4.30.2
	G33C0000Q110	Sharp	4.30.3
	G33C0000M110	CHIMEI	4.30.4
15.0 inch (SXGA+)	G33C0000R110	LG.Philips	4.30.5
	G33C0000N110	Samsung	4.30.6
	G33C0000P110	Sharp	4.30.7
14.1 inch (XGA)	VF2091P01	TOSHIBA	4.30.8
	VF2057P01	Sharp	4.30.9
	VF2058P01	Samsung	4.30.10
	VF2062P01	L.G. Philips	4.30.11

> *NOTE:* - *When working with an LCD module, always use a flat, grounded table.*
>
>   - *Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.*
>
>   - *Use an anti-static or protective sheet.*
>
>   - *When replacing the FL unit, cover with a finger protector or similar to prevent soiling or scratching the LCD panel.*
>
>   - *Be careful when handling the lamp. Excessive force may break the lamp.*
>
>   - *Be careful not to soil or deform the lamp reflector.*
>
>   - *Make sure that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.*

4.30.1 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 4-50 to 4-53.

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.
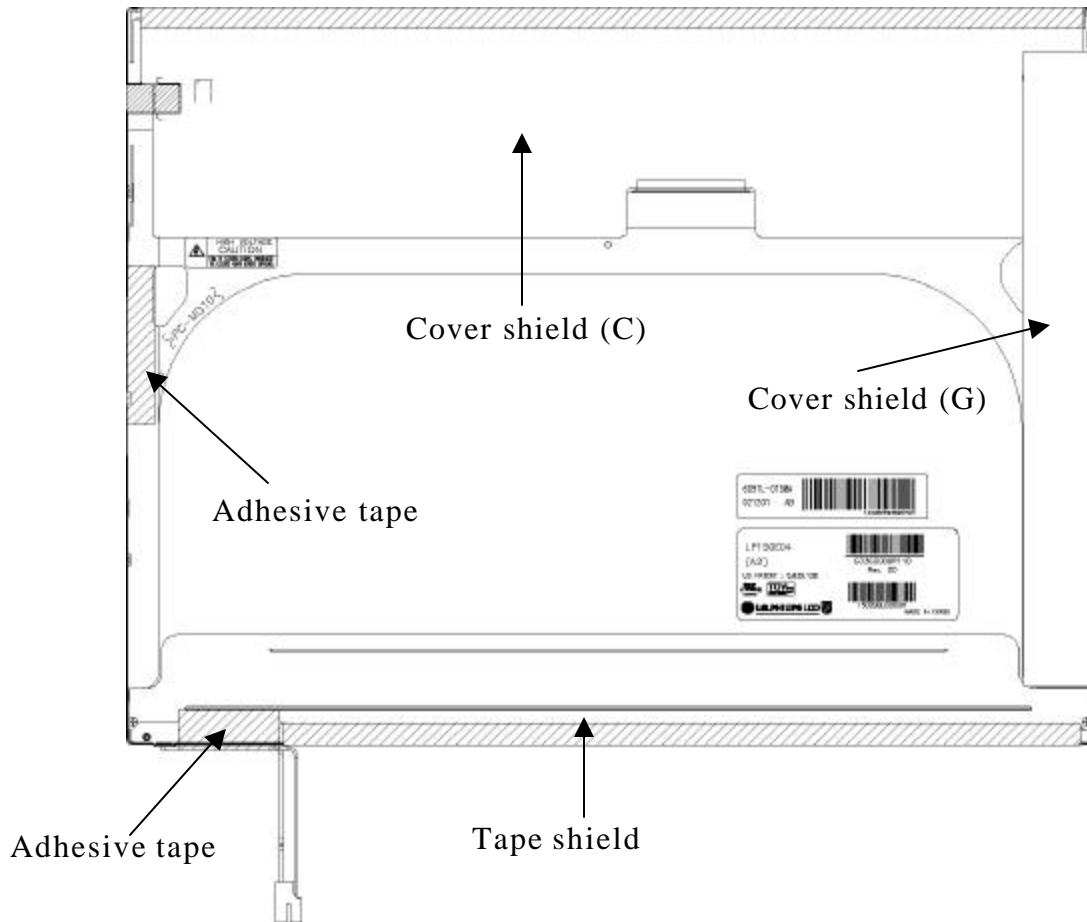
Figure 4-50 Replacing LG.Philips fluorescent lamp (XGA) (1)

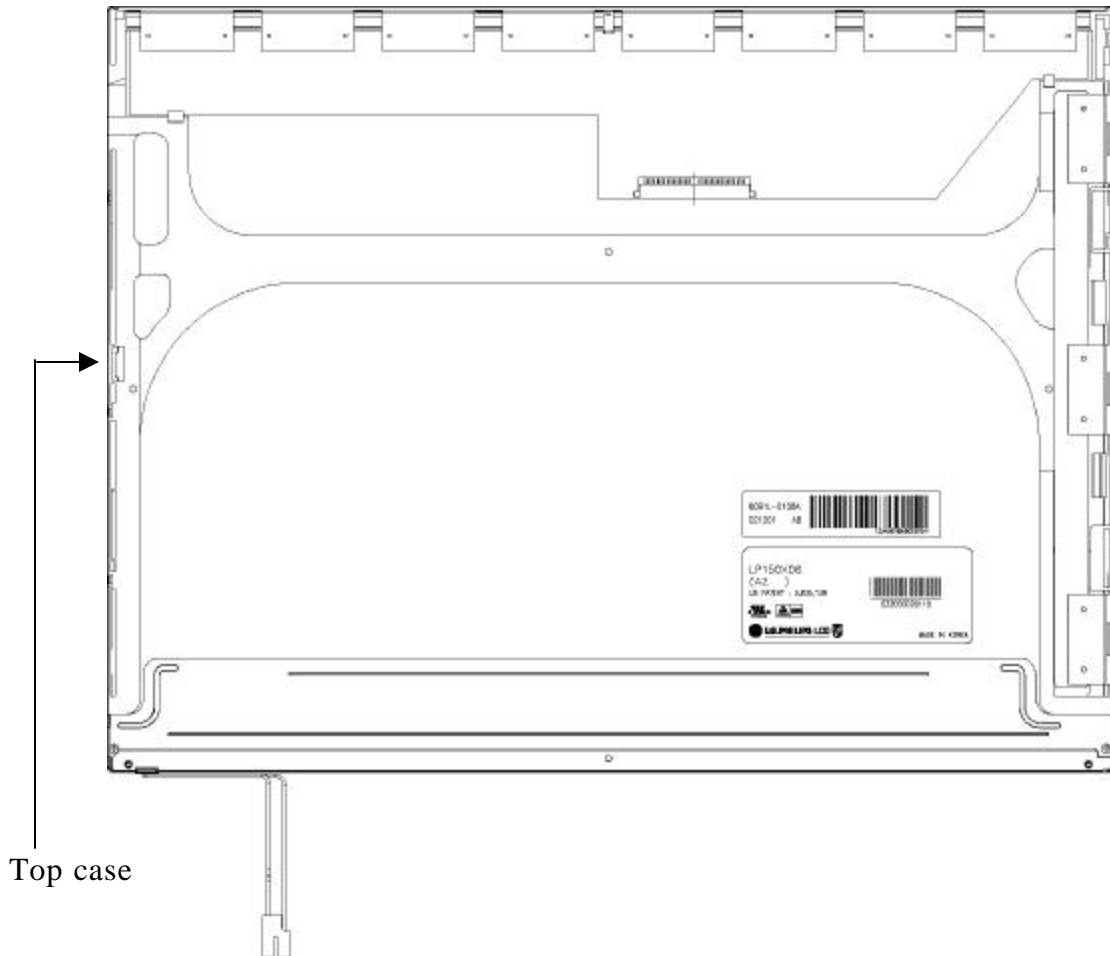2. Remove the top case. Be careful not to apply excessive force to the top case and gate TCP.

Top case
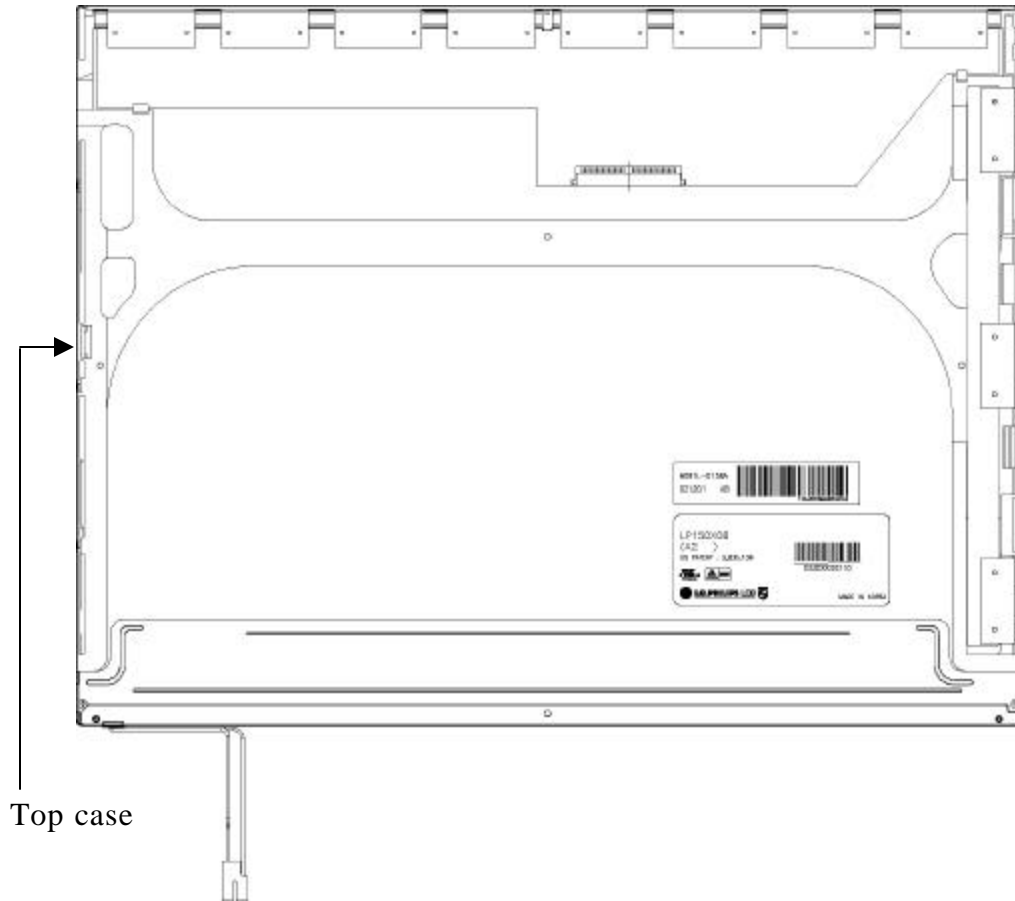
Figure 4-51   Replacing LG.Philips fluorescent lamp (XGA) (2)

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.
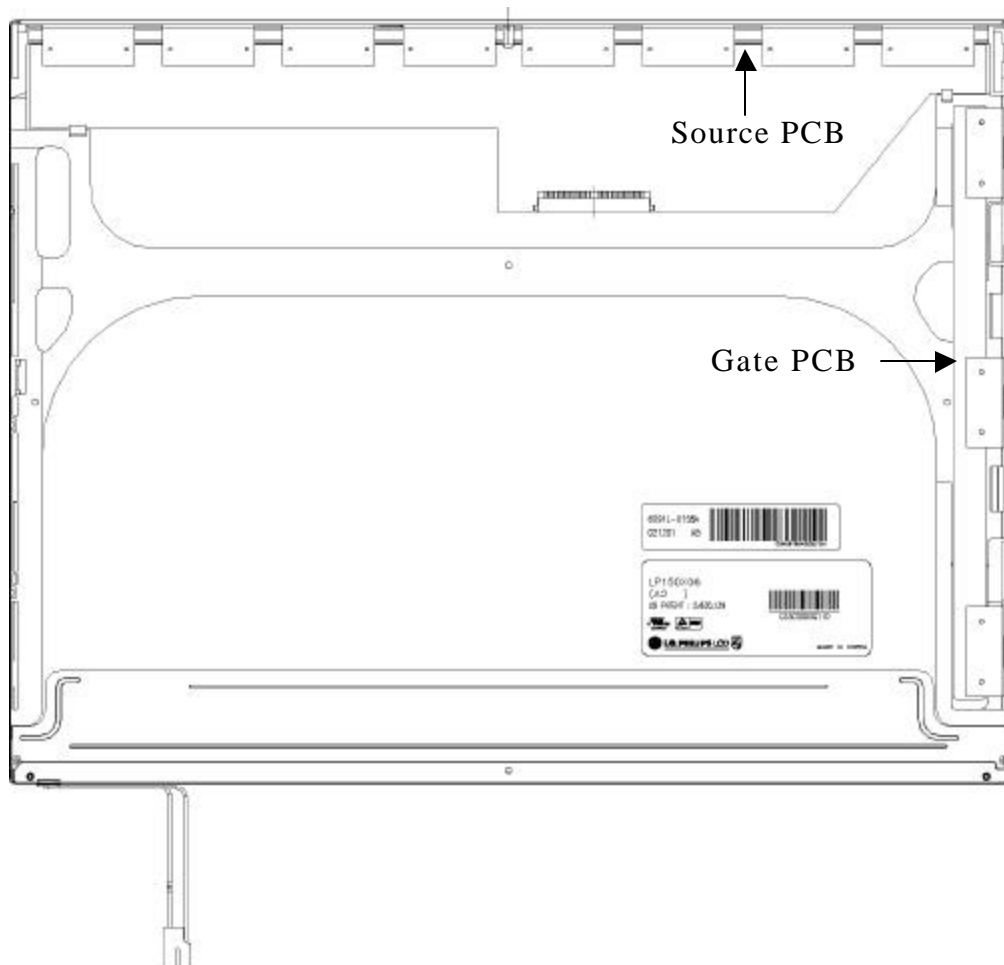
Figure 4-52   Replacing LG.Philips fluorescent lamp (XGA) (3)

4. Remove the board assembly, adhesive tape, light guide and cover assembly bottom (L).

     1) Remove the board assembly.

     2) Remove the adhesive tape securing the sheets (four points).

     3) Remove the sheets and light guide.

NOTE: No penetration of foreign object is indispensable not to scratch the sheets.

     4) Remove the screw and cover assembly bottom (L).

NOTE: Maximum value of torque is 1.5kg·cm.
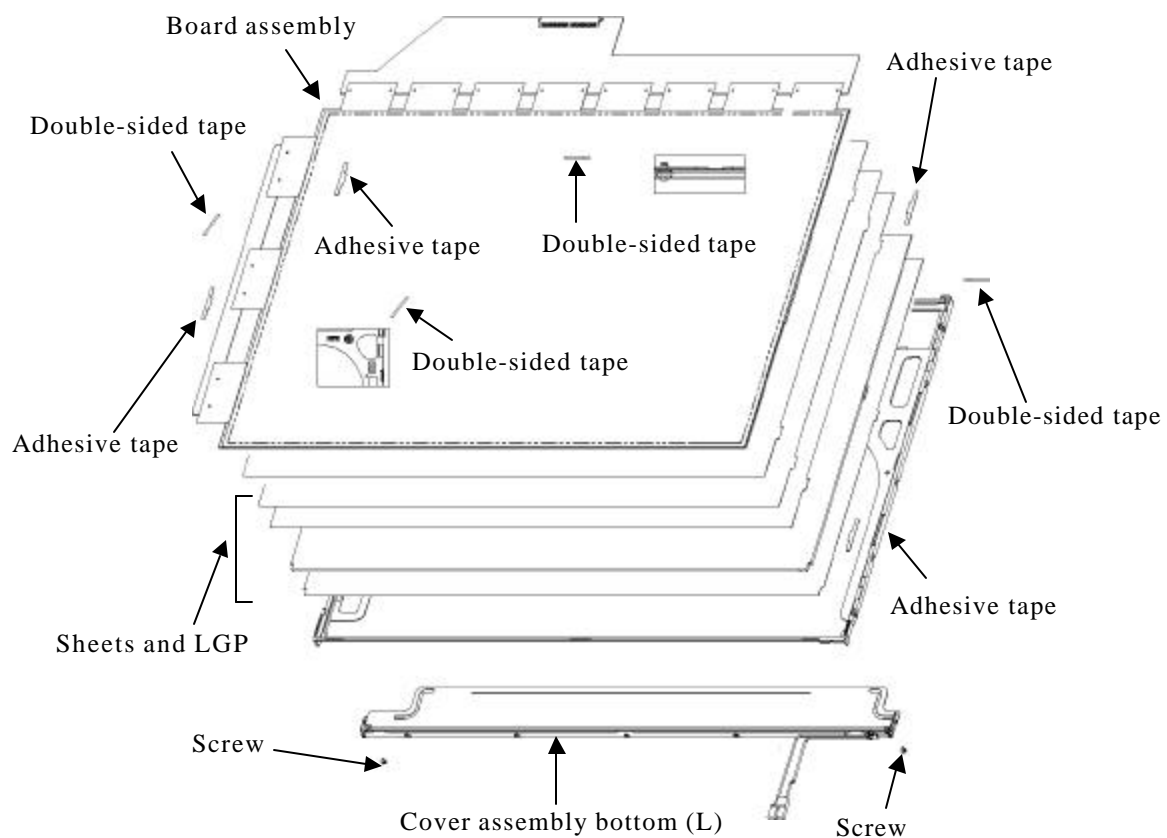
Figure 4-53 Replacing LG.Philips fluorescent lamp (XGA) (4)

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 4-54 to 4-57.

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.*
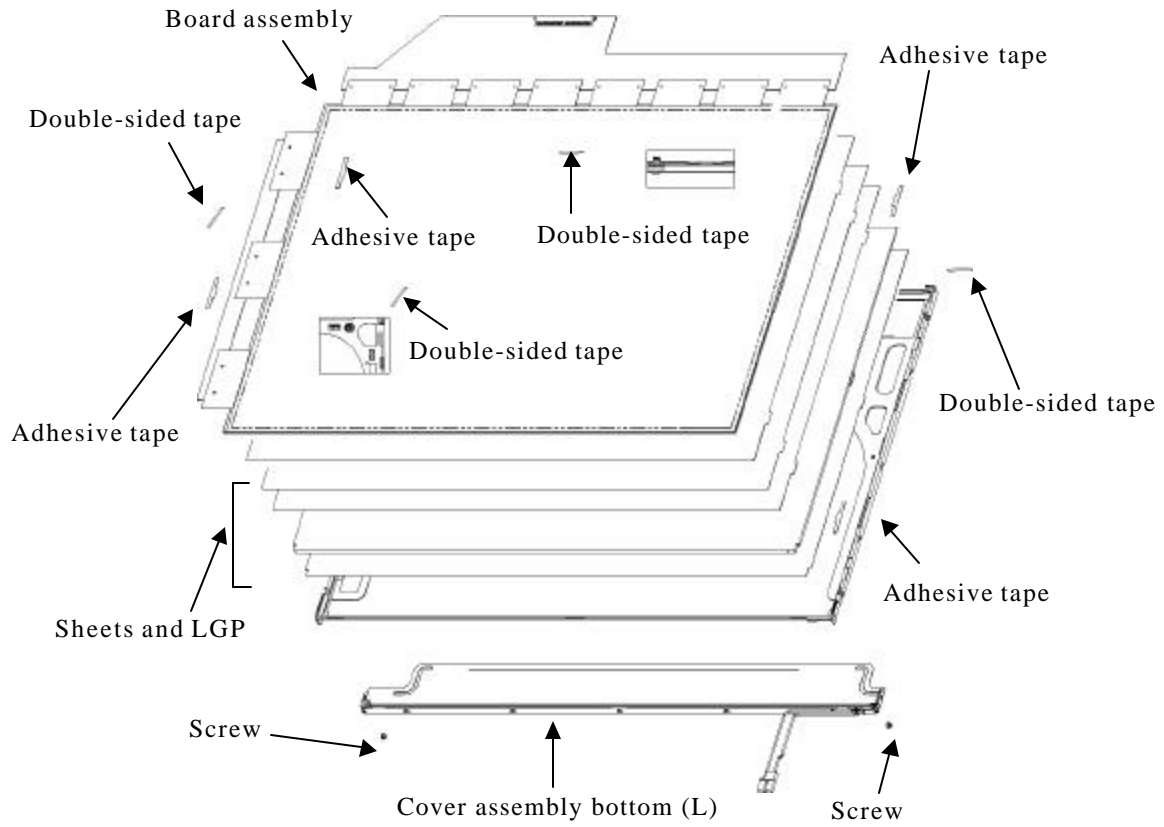
Figure 4-54 Replacing LG.Philips fluorescent lamp (XGA) (5)

2.   Install the source PCB and gate PCB.

   1)   Install the source PCB.

NOTE: Be careful not to apply excessive force to the TCP.

---

   2)   Install the gate PCB.

NOTE: Be careful not to apply excessive force to the TCP.

Source PCB

Gate PCB
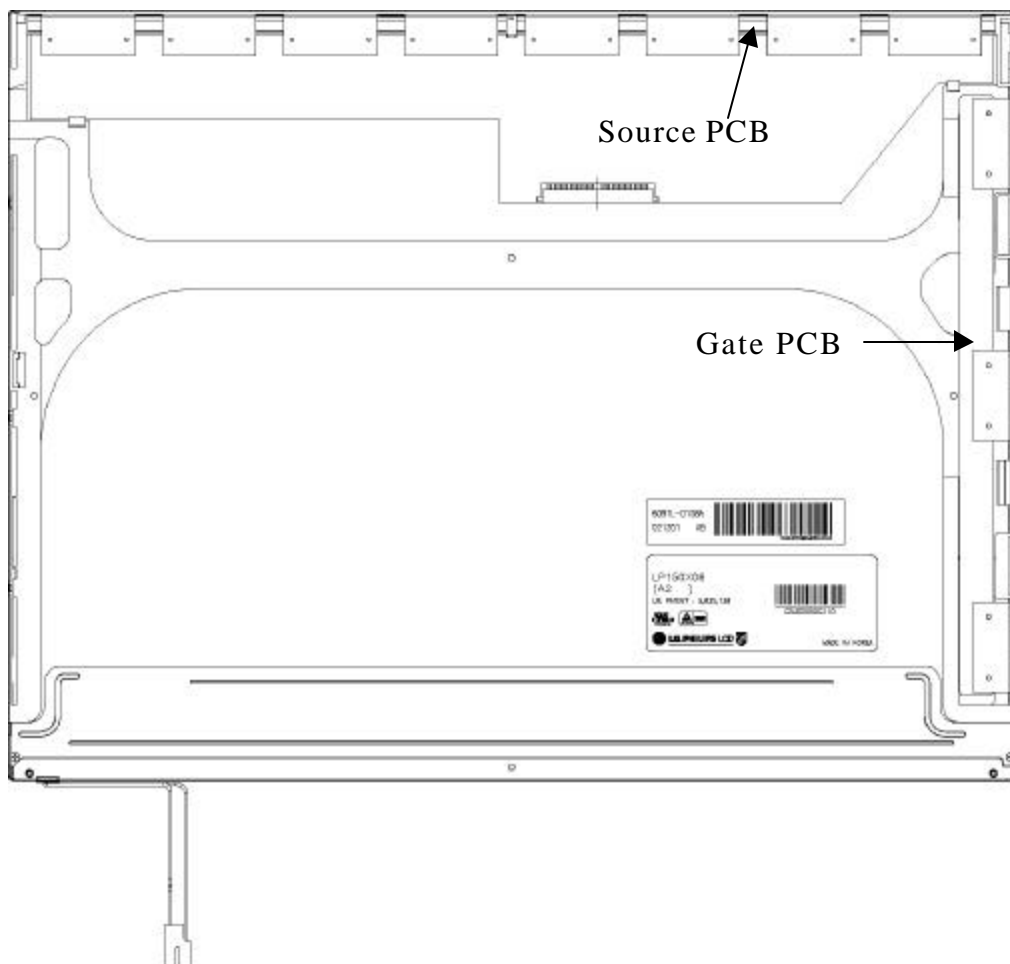
Figure 4-55 Replacing LG.Philips fluorescent lamp (XGA) (6)

3. Install the top case.

NOTE: Be careful not to apply excessive force to the gate TCP.

Top case

Figure 4-56 Replacing 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.*
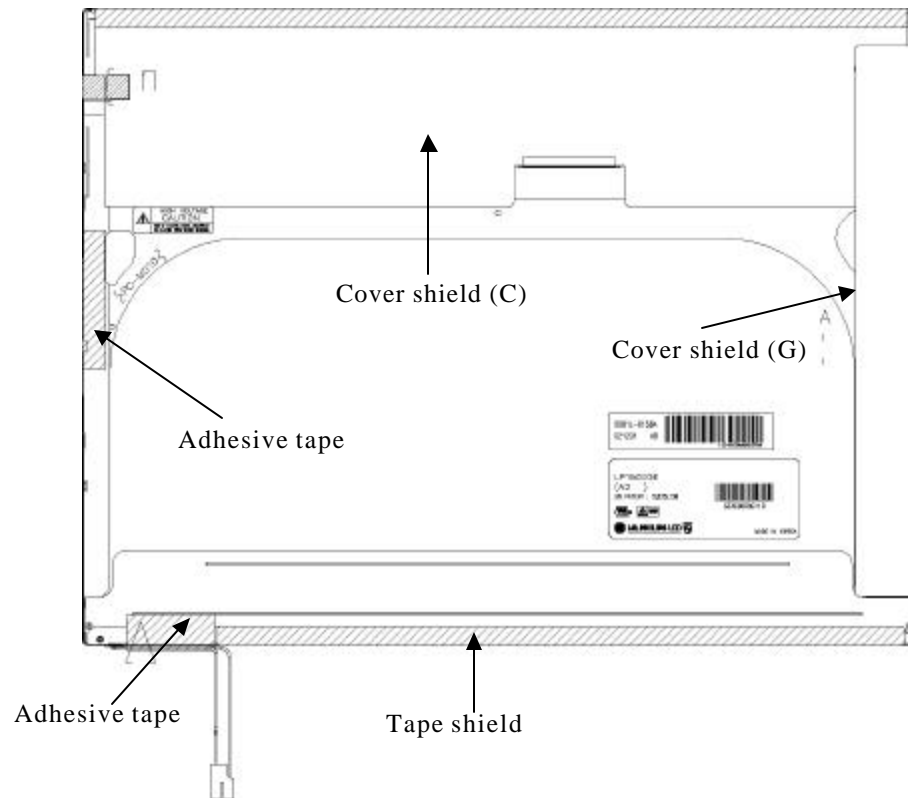
Figure 4-57 Replacing LG.Philips fluorescent lamp (XGA) (8)

4.30.2 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 4-58 to 4-65.

1. Remove the PCB cover.

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

PCB cover
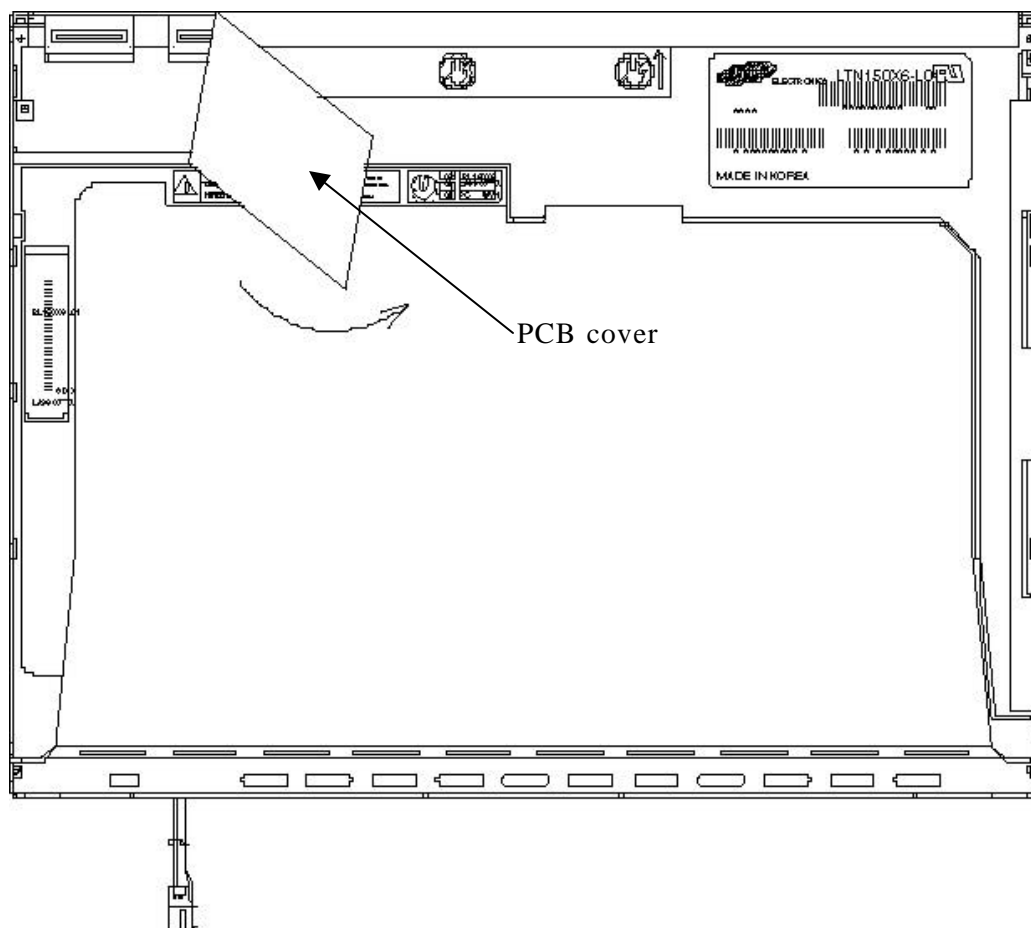
Figure 4-58 Replacing Samsung fluorescent lamp (XGA) (1)

2. Remove the two screws.
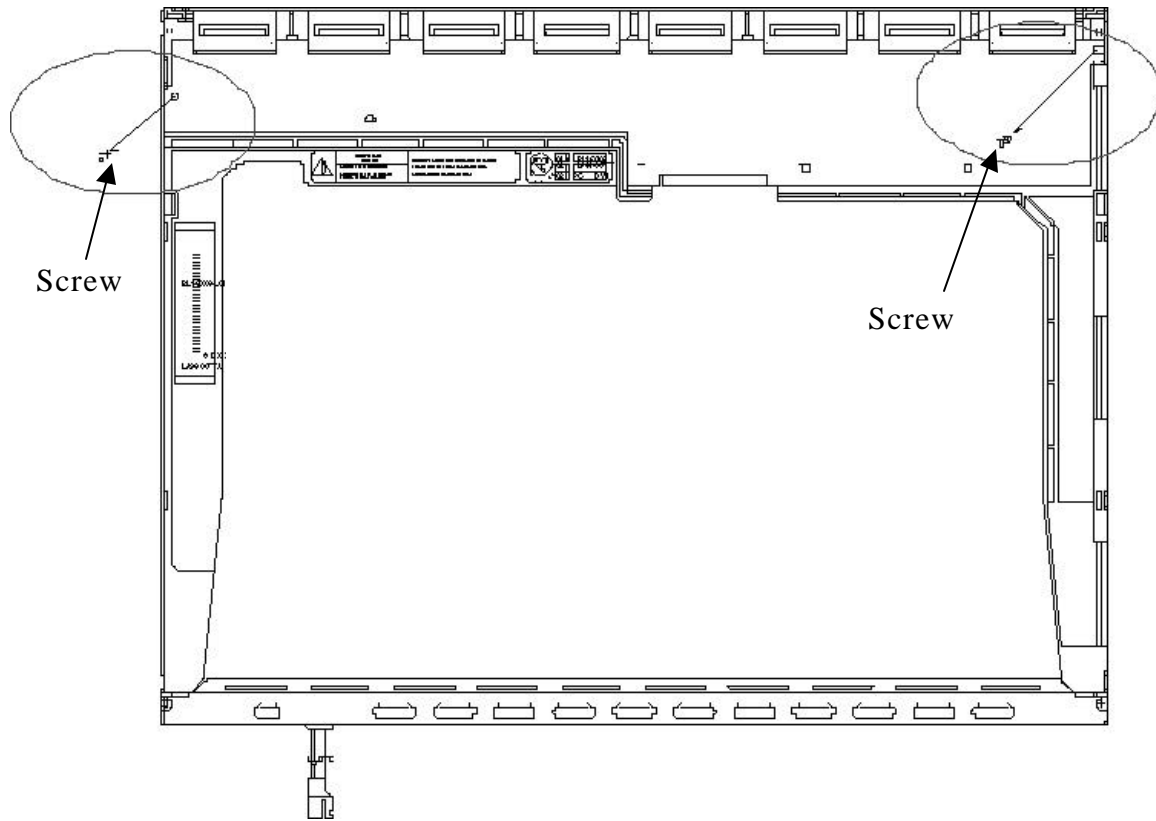
Figure 4-59 Replacing Samsung fluorescent lamp (XGA) (2)

3.   Remove the four screws from the top chassis.
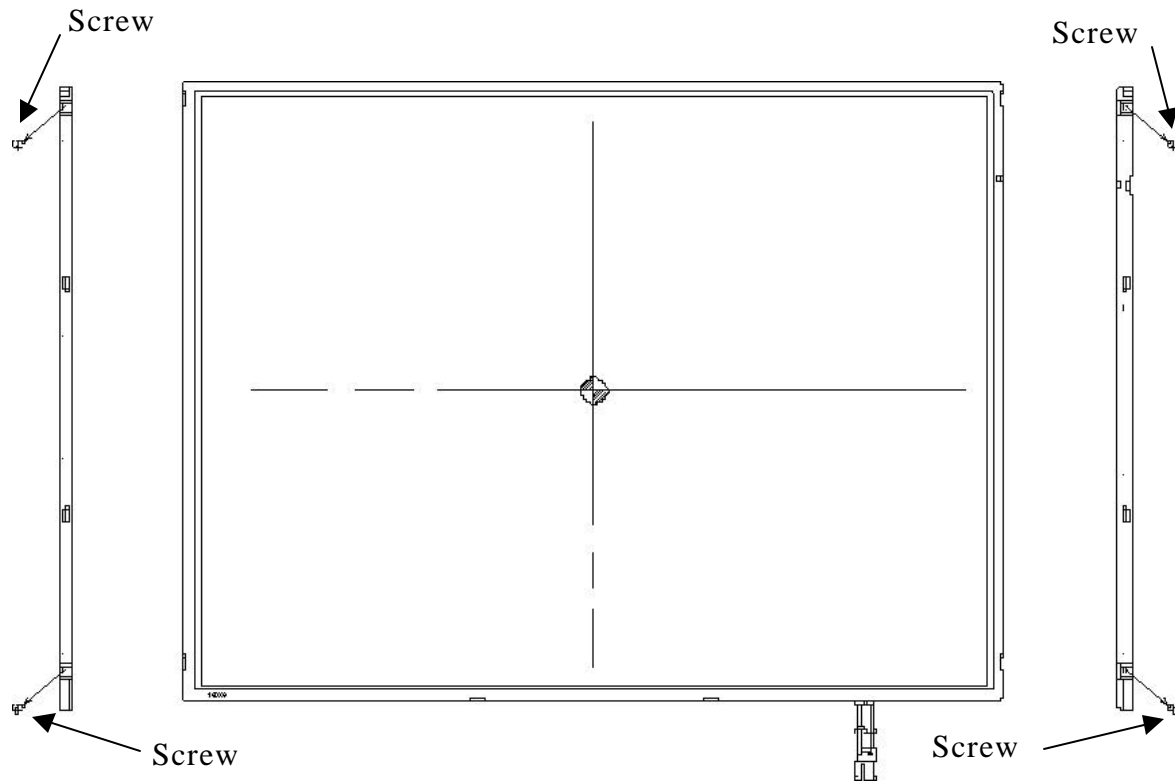
Figure 4-60 Replacing Samsung fluorescent lamp (XGA) (3)

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

Side hook

Side hook

Bottom hook
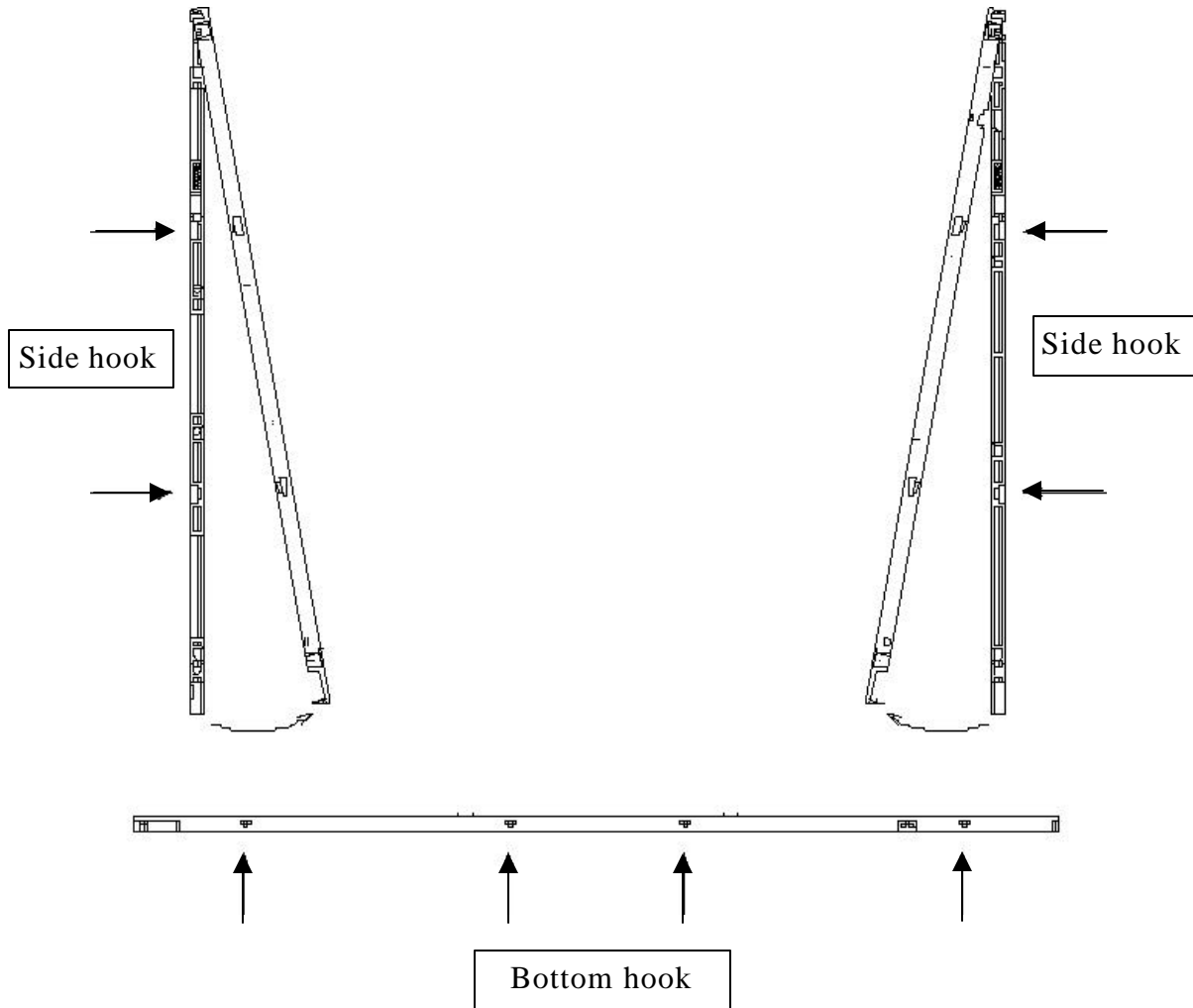
Figure 4-61 Replacing Samsung fluorescent lamp (XGA) (4)

5. Remove the panel assembly from the mold frame.

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

Panel assembly

Mold frame
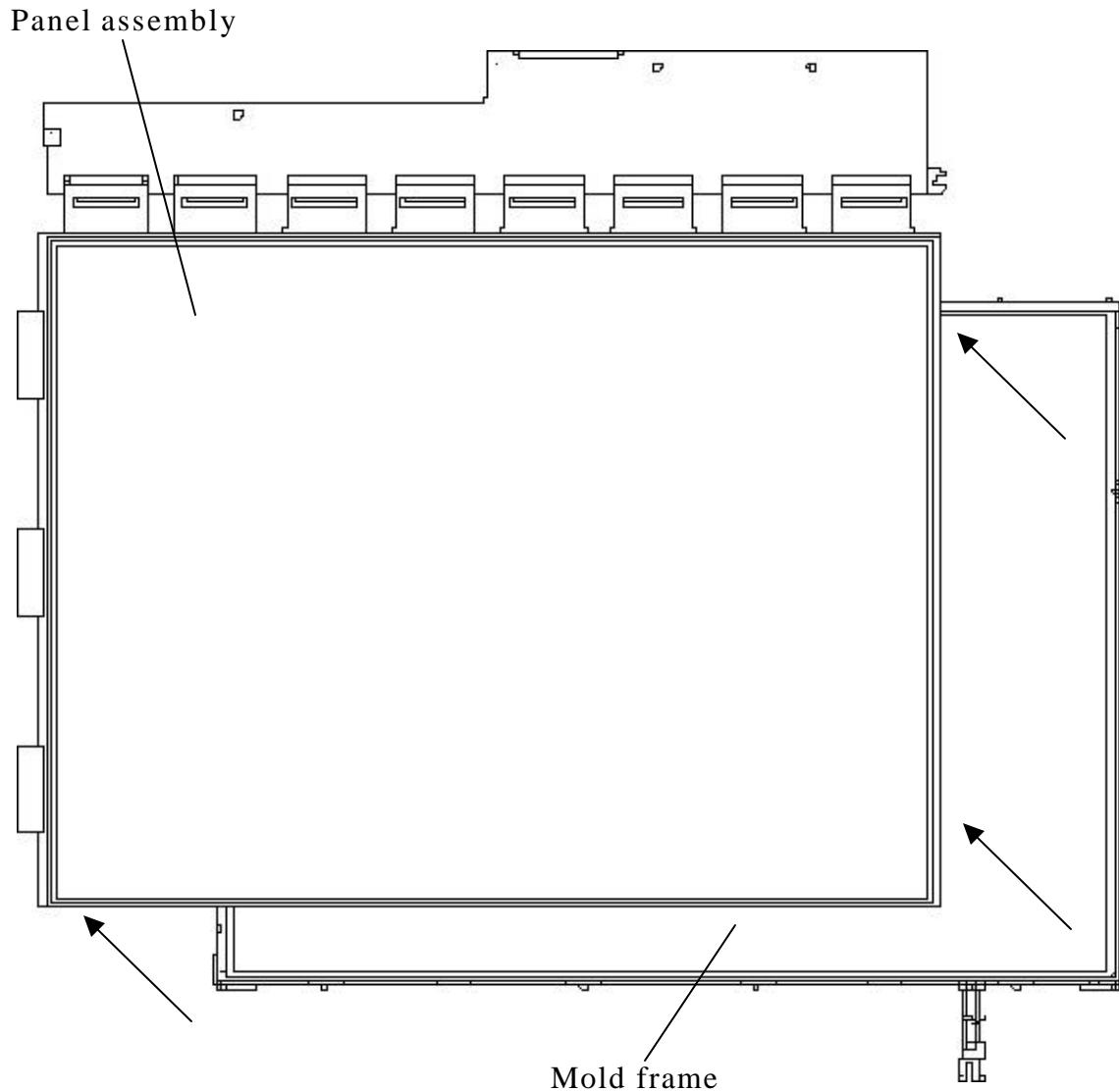
Figure 4-62 Replacing Samsung fluorescent lamp (XGA) (5)

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).
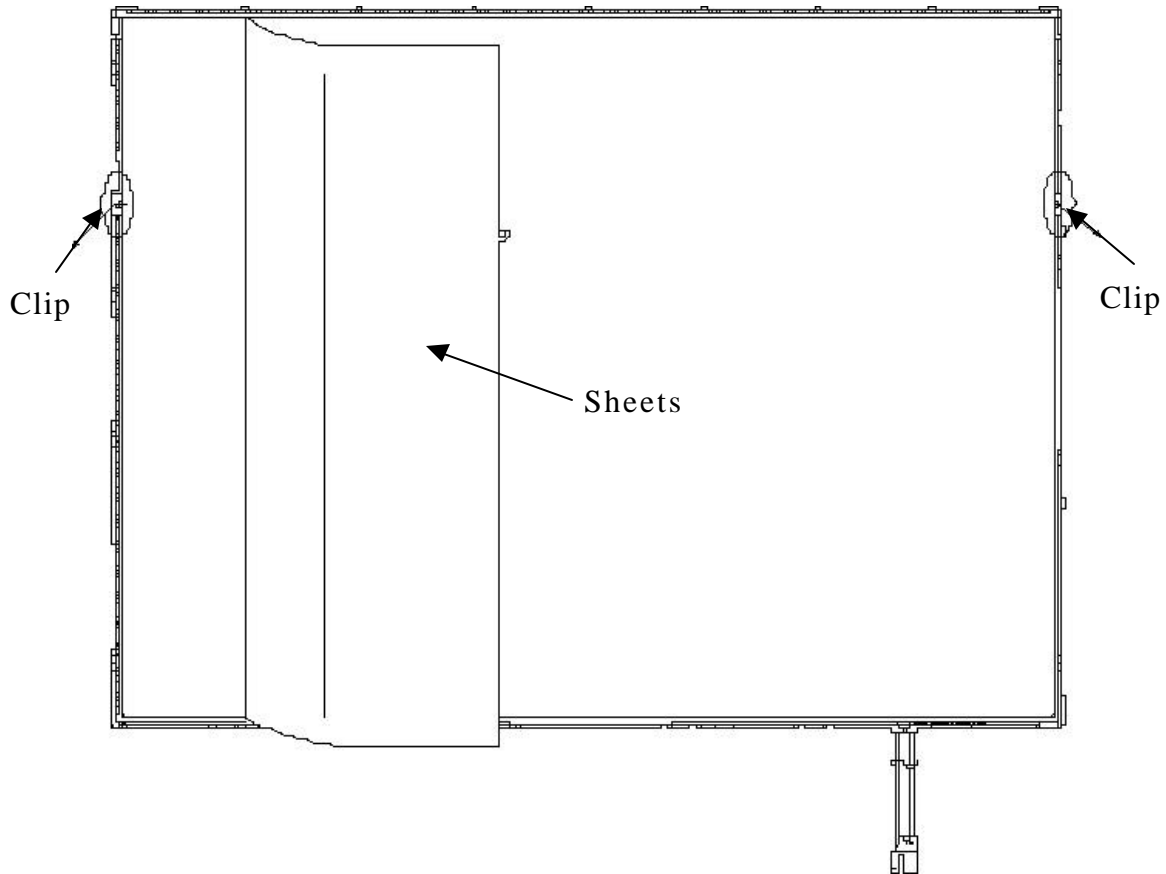
Figure 4-63 Replacing Samsung fluorescent lamp (XGA) (6)

7. Remove the lamp back cover.

    1) Remove the two screws from the lamp back cover.

    2) Remove the lamp back cover.
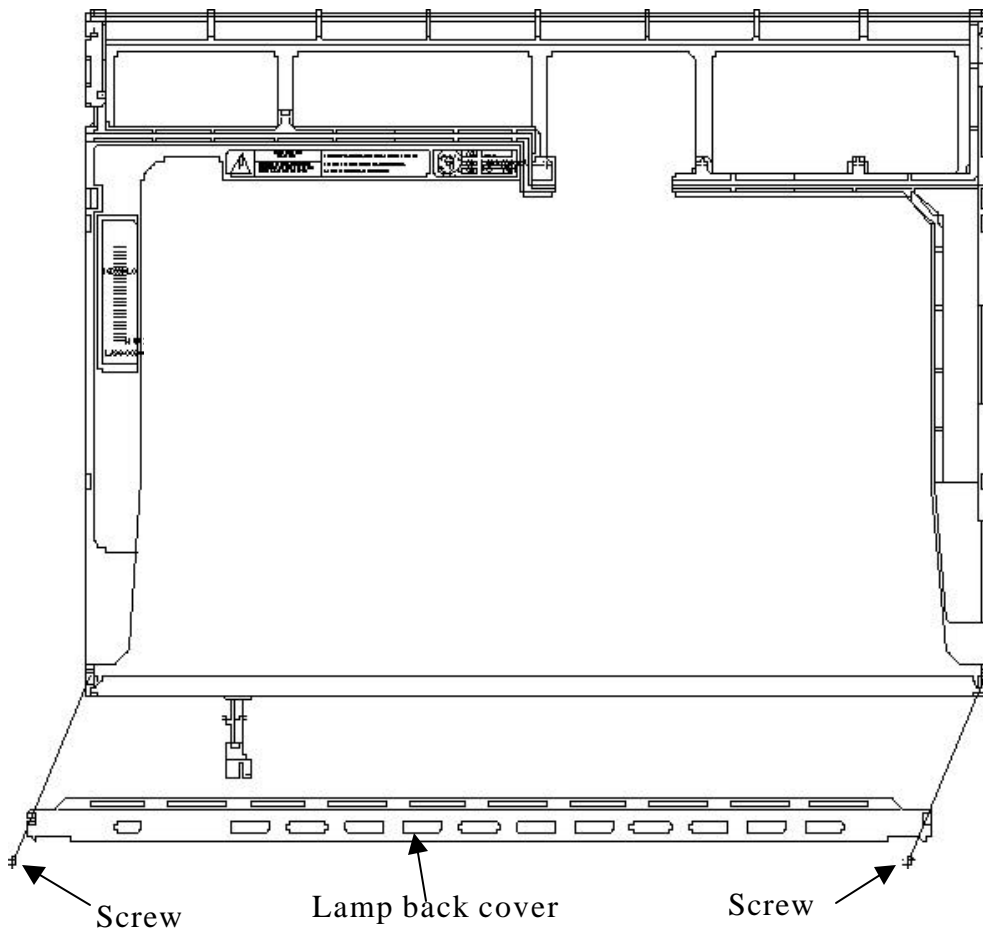
Figure 4-64 Replacing Samsung fluorescent lamp (XGA) (7)

8.   Remove the lamp wire from the wire guide of the mold frame.
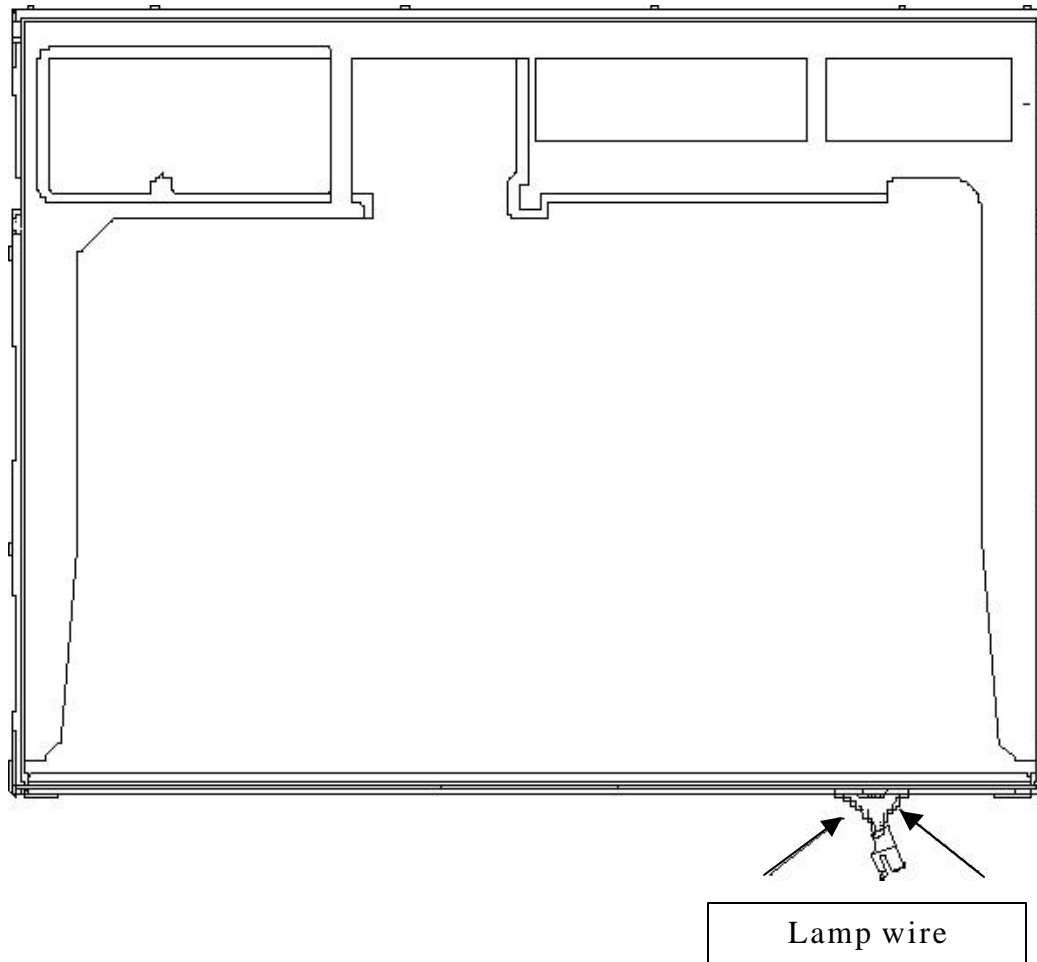
Figure 4-65 Replacing Samsung fluorescent lamp (XGA) (8)

9. Remove the lamp assembly from the mold frame.

Lamp assembly

Mold frame

Figure 4-66 Replacing Samsung fluorescent lamp (XGA) (9)

Assembling the 15.0-inch XGA Samsumg Fluorescent Lamp

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

4.30.3 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 figures4-67 to 4-76.

1. Turn the LCD module face down, and remove the protection cover S (A), protection cover G (B), fixing tape (C) and fixing tape for lead wire (C).

> *NOTE:*   *1)* *Be careful not to damage the TCP or chips.*
>
>   *2)* *The protection cover G is reused. Discard the other tapes removed.*
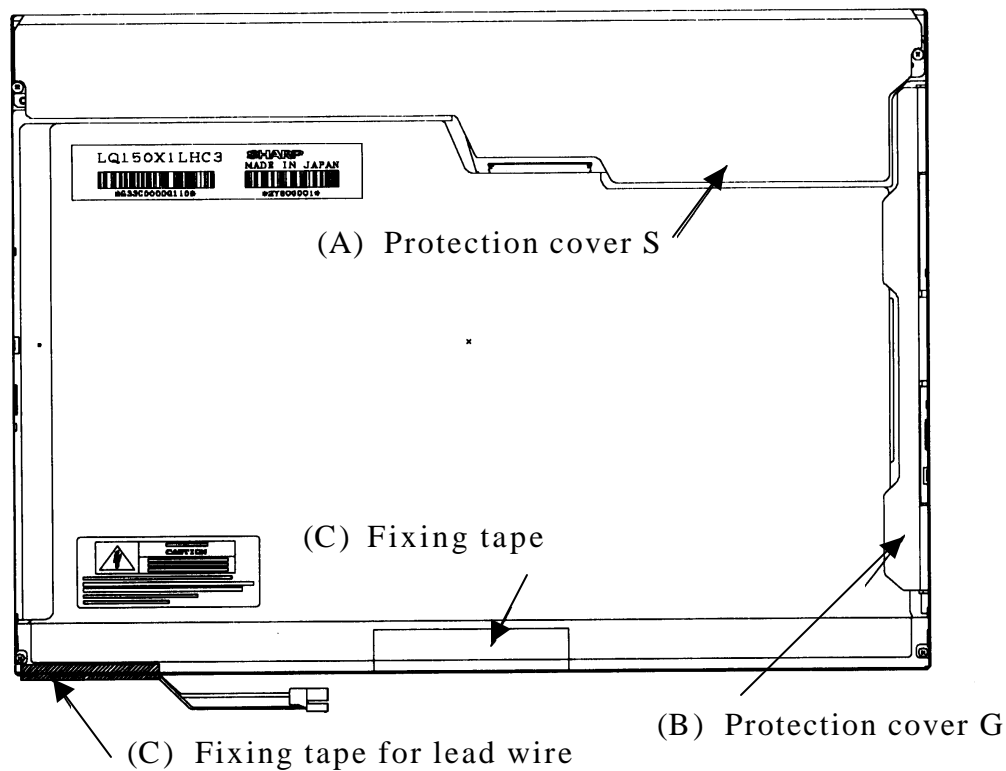
Figure 4-67 Replacing Sharp fluorescent lamp (XGA) (1)

2.   Remove the four screws on the sides.
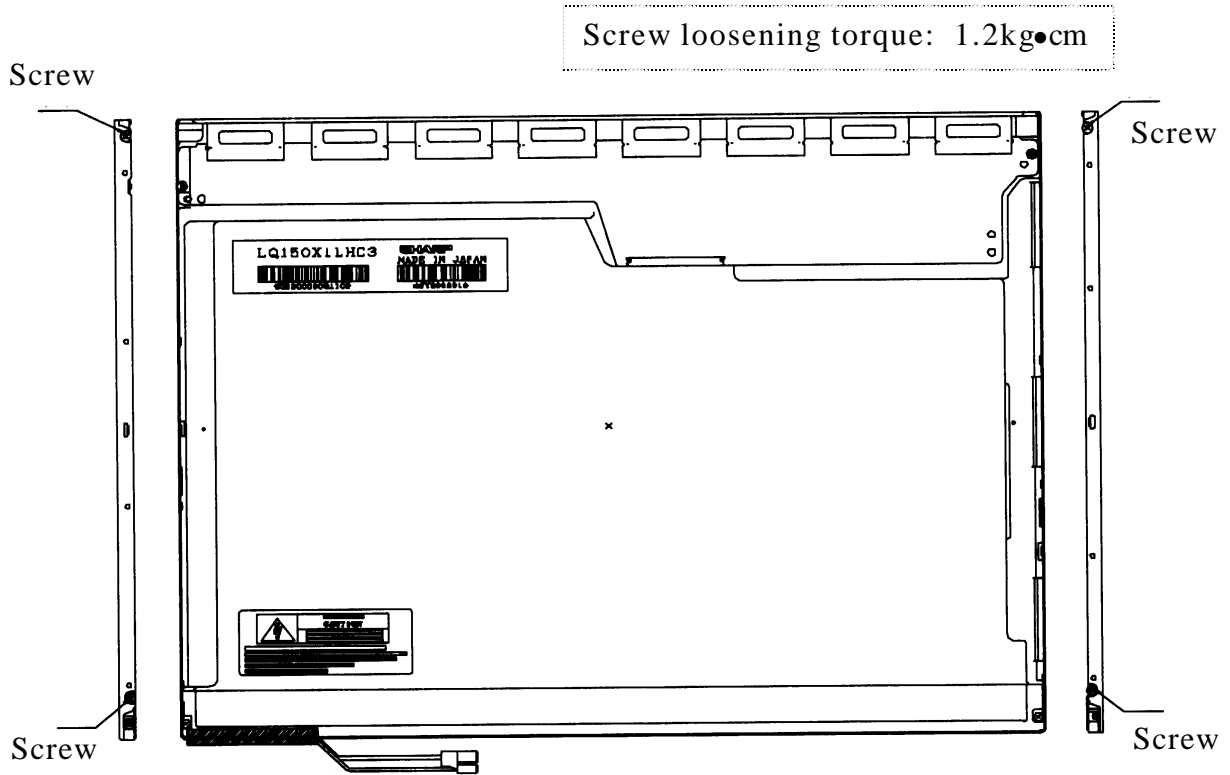
Figure 4-68 Replacing Sharp fluorescent lamp (XGA) (2)

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

(E) Bezel

(3) Release the hook of the bezel from the lamp cover.

< Side view >

Hook

(1) Release the bezel from the four latches of the lamp cover.

(2) Release the two latches (left and right) on the P-chassis.
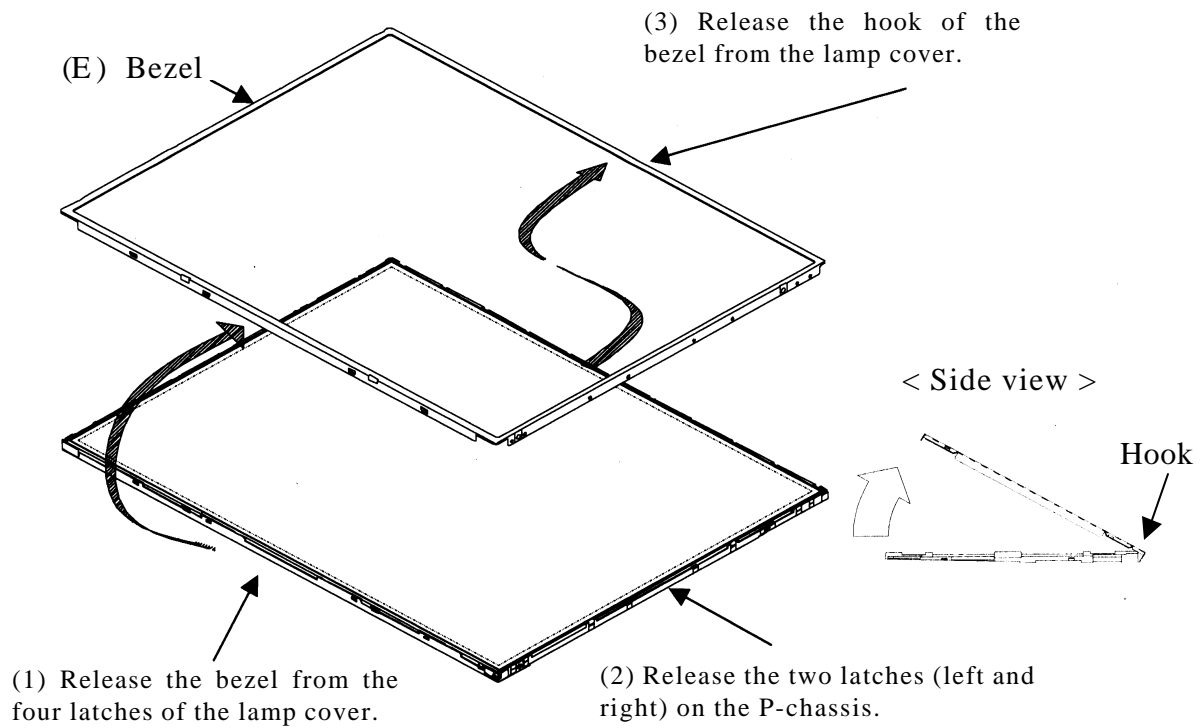
Figure 4-69 Replacing Sharp fluorescent lamp (XGA) (3)

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.
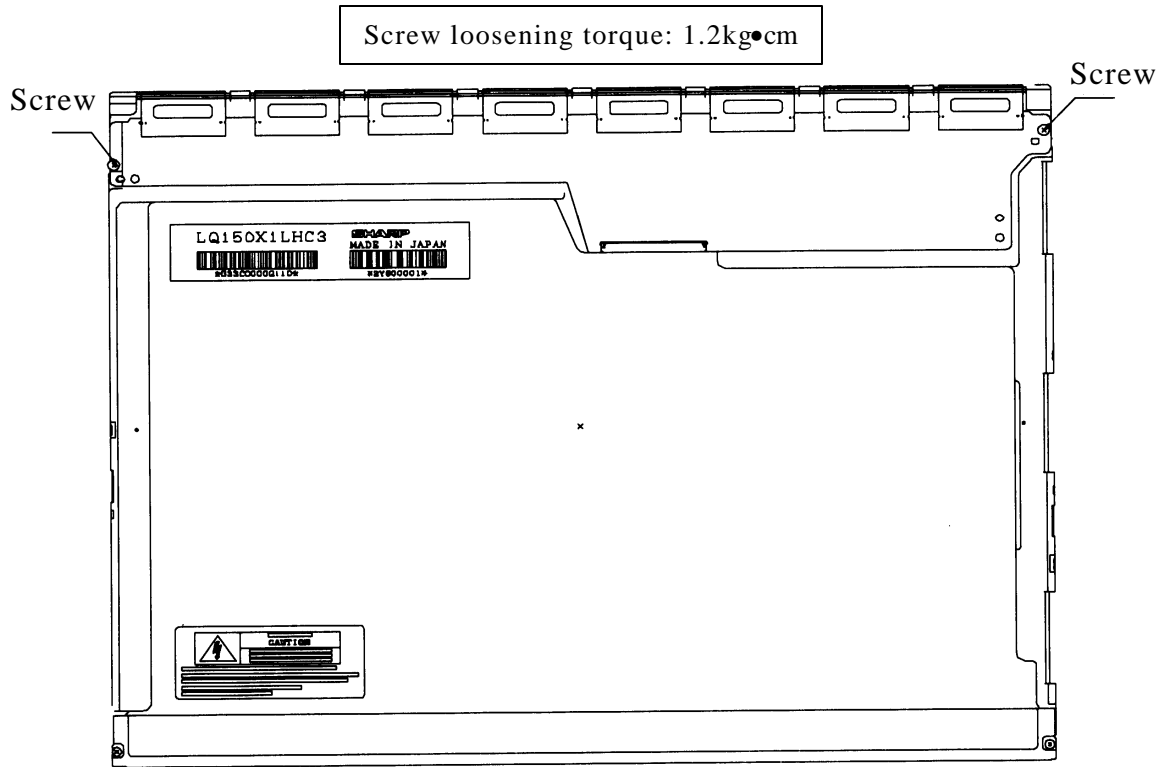
Figure 4-70 Replacing Sharp fluorescent lamp (XGA) (4)

Figure 4-71 Replacing 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.*

(I) LCD panel
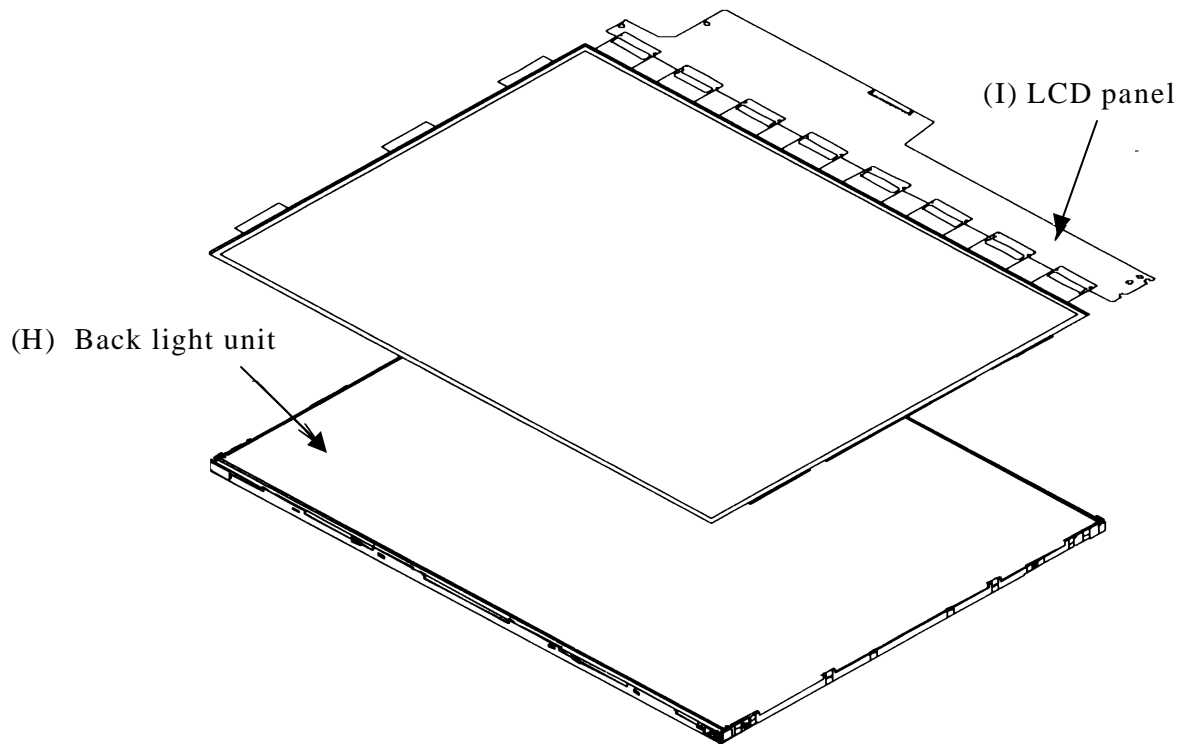
(H) Back light unit

Figure 4-72 Replacing 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.*

(H) Backlight unit

Screw loosening torque: 1.2kg•cm

(D) Screw

(D) Screw

(J) Lamp cover
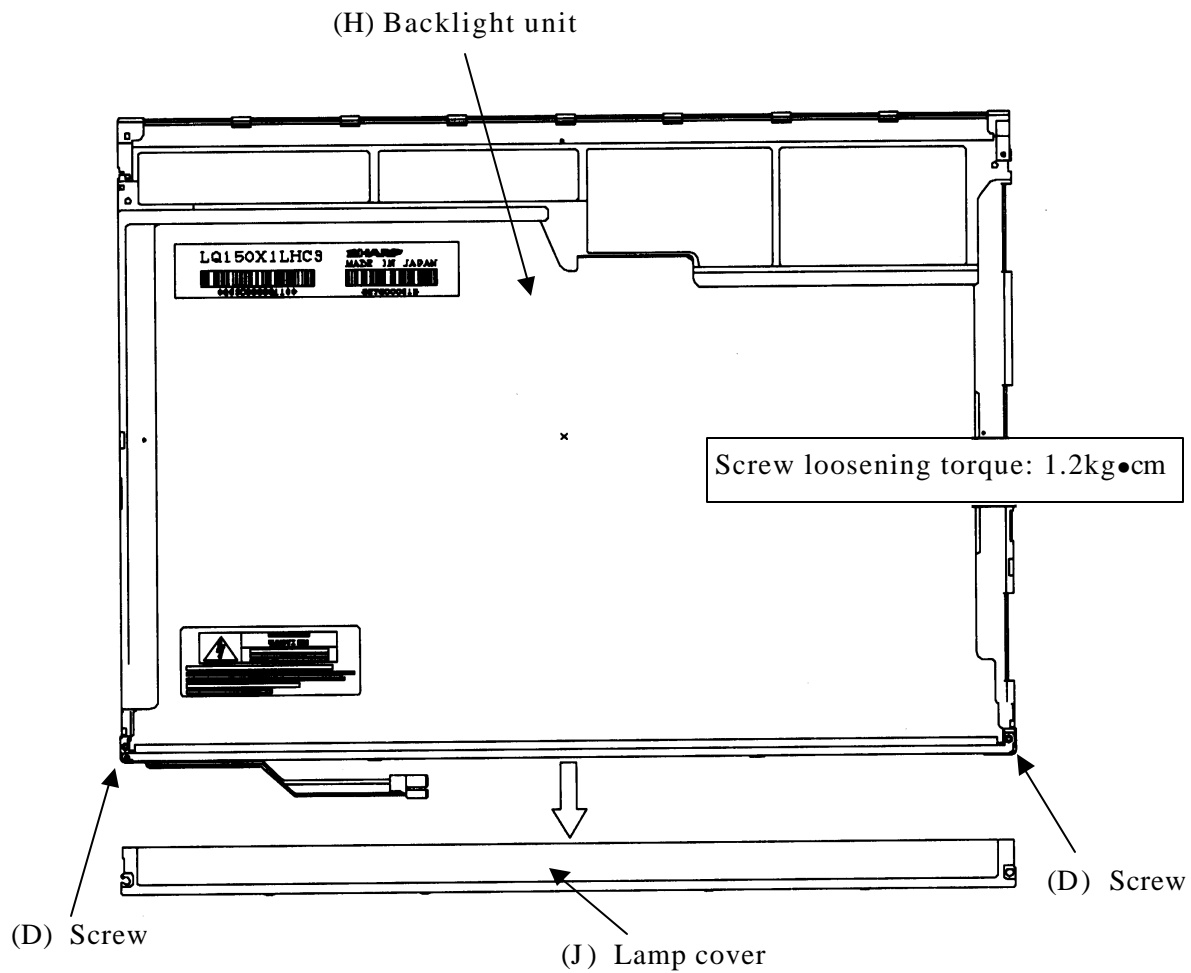
Figure 4-73 Replacing Sharp fluorescent lamp (XGA) (7)

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.*

Do not remove the reflection sheet under the light guide.

(K) Upper diffusion sheet

(L) Lens sheet

(M) Light guide
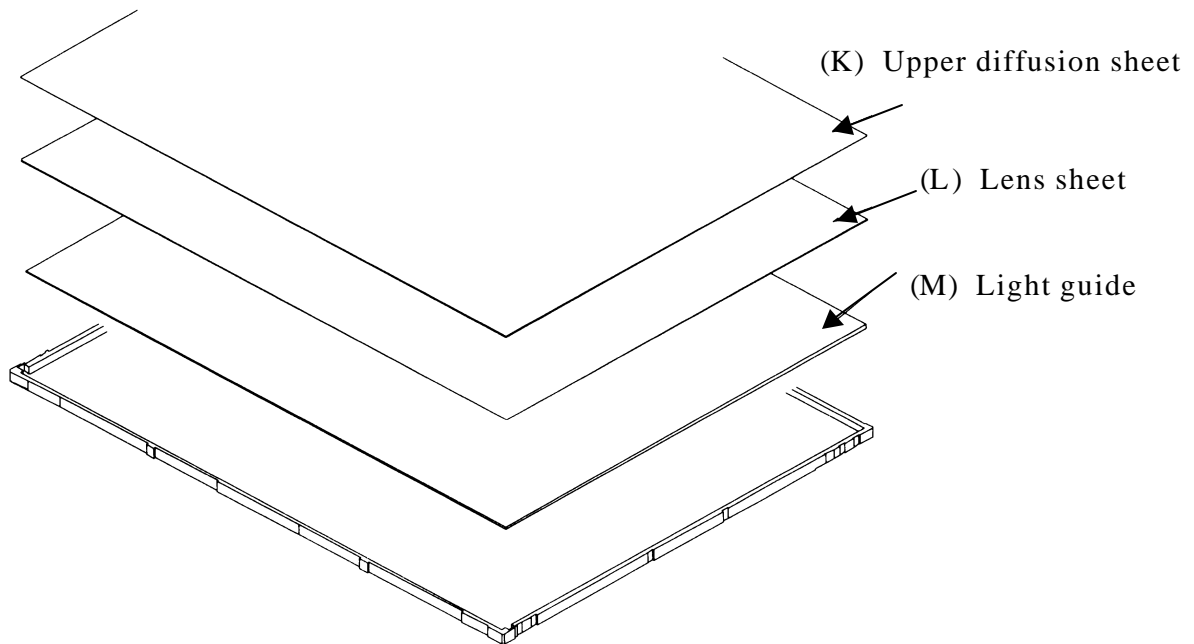
Figure 4-74 Replacing Sharp fluorescent lamp (XGA) (8)

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

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

(N) Double-sided tape 1

(P) Double-sided tape 3

(O) Double-sided tape 2

(Q) Double-sided tape 4
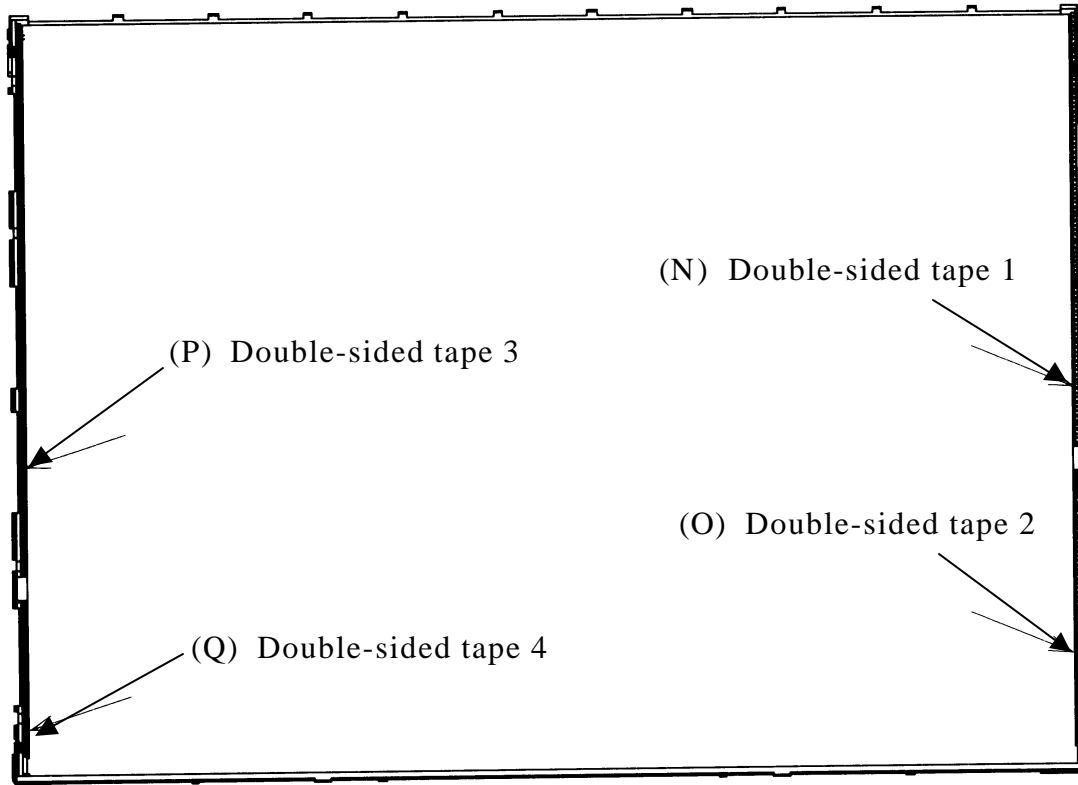
Figure 4-75 Replacing Sharp fluorescent lamp (XGA) (9)

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.*
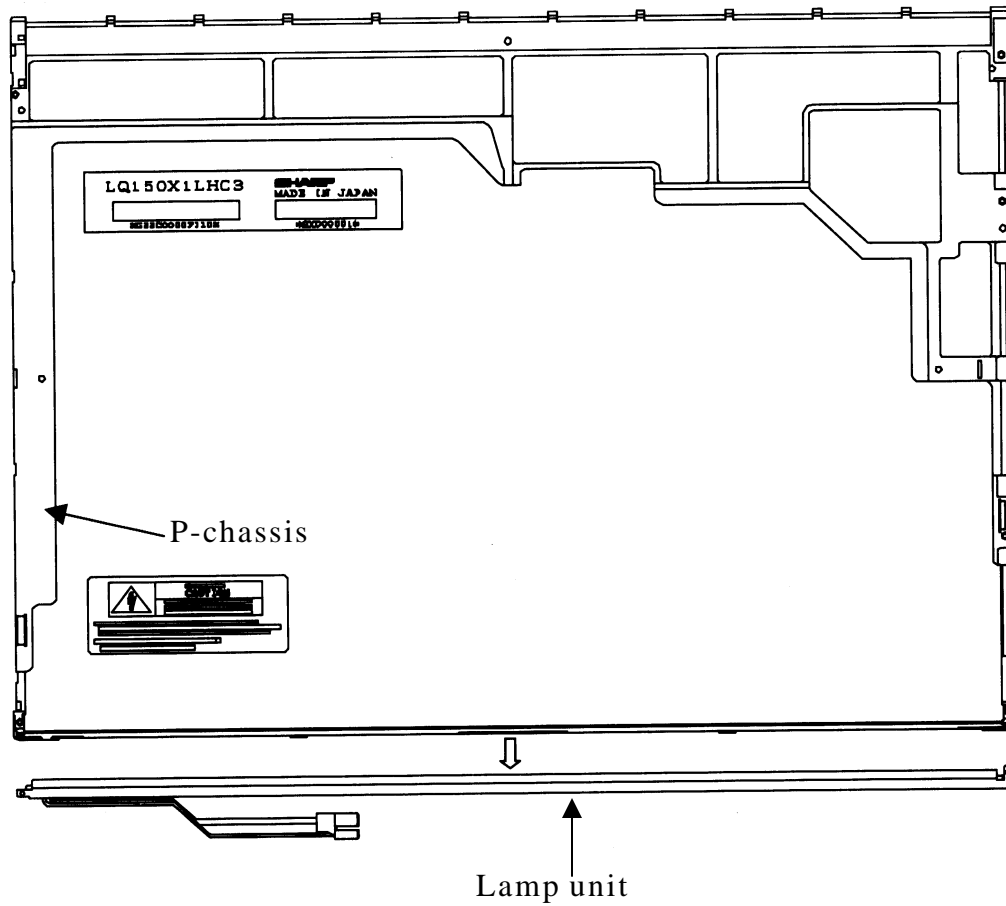
Figure 4-76 Replacing Sharp fluorescent lamp (XGA) (10)

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 4-77 to 4-89.

1. Stick the four double-sided tapes (N, O, P, Q) on the P-chassis.
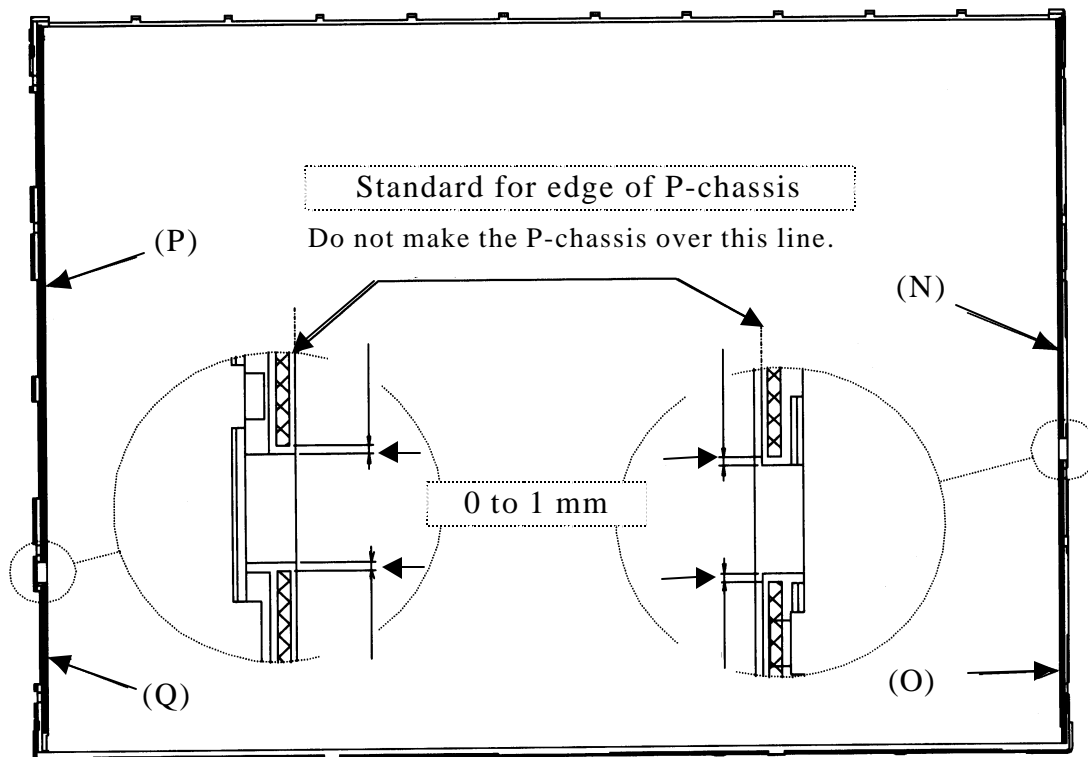
Figure 4-77 Replacing Sharp fluorescent lamp (XGA) (11)

2. 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.*

LQ150X1LHC3 SHARP
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P-chassis

(R) Lamp unit
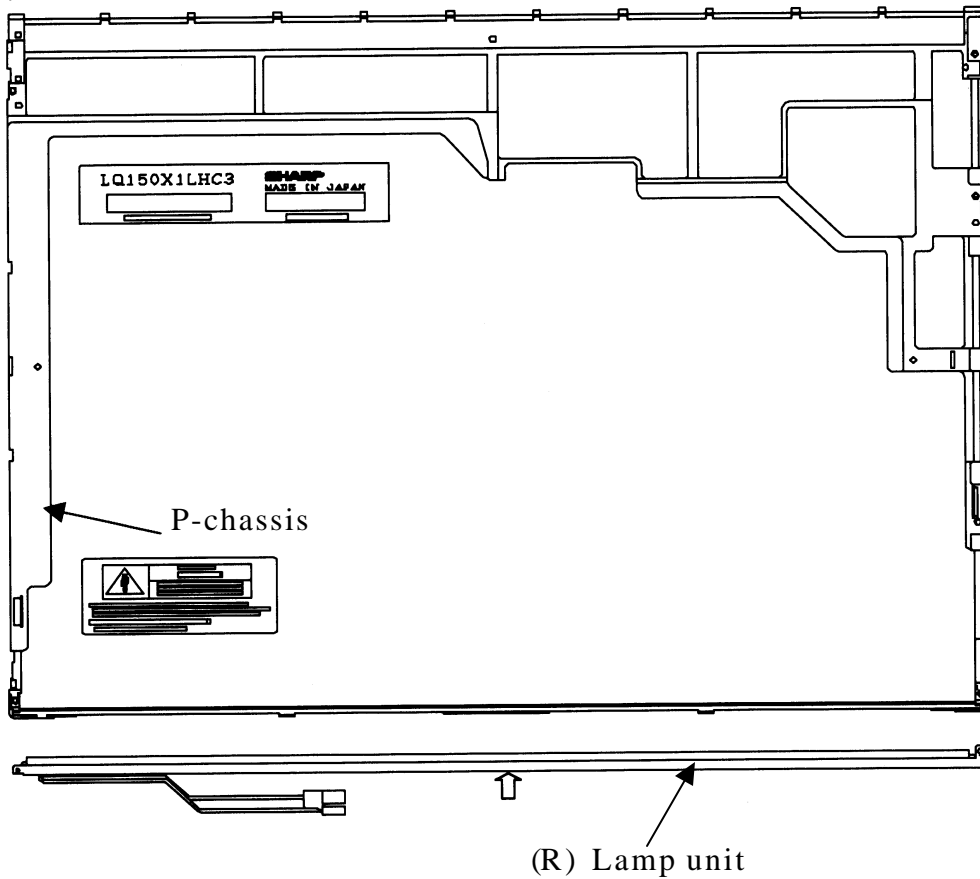
Figure 4-78 Replacing Sharp fluorescent lamp (XGA) (12)

Install the lamp unit without floating.

Install the reflection sheet as it is placed inside the reflector.

Install the lead wire into this groove.
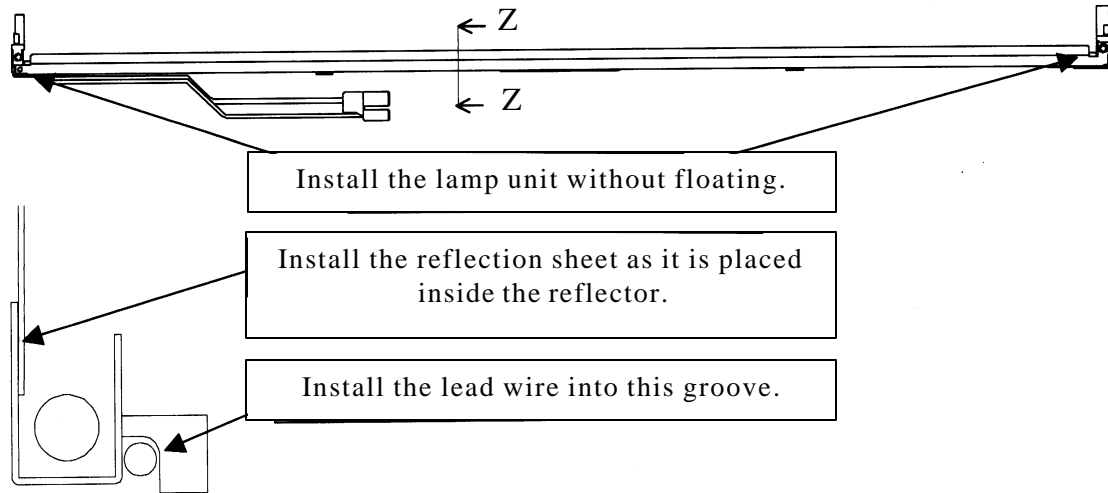
Cross-section drawing of Z-Z

Figure 4-79 Replacing Sharp fluorescent lamp (XGA) (13)

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

(J) Lamp cover

Screw tightening torque: 1.0kg•cm

(D) Screw

(D) Screw
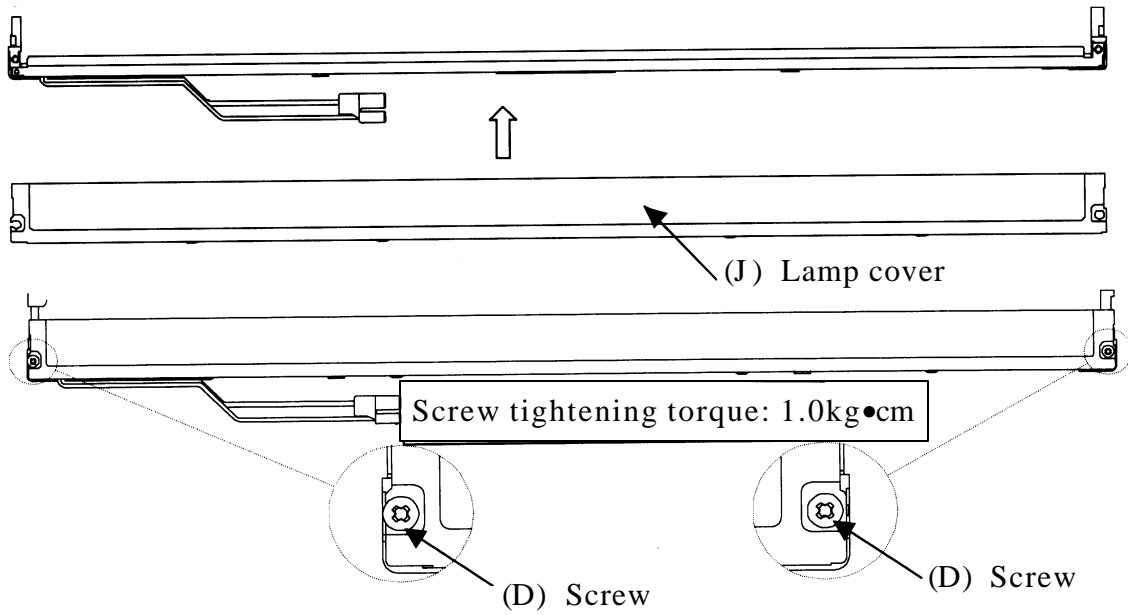
Figure 4-80 Replacing Sharp fluorescent lamp (XGA) (14)

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

Insert the light guide straight not to deform the reflector.

Backlight unit
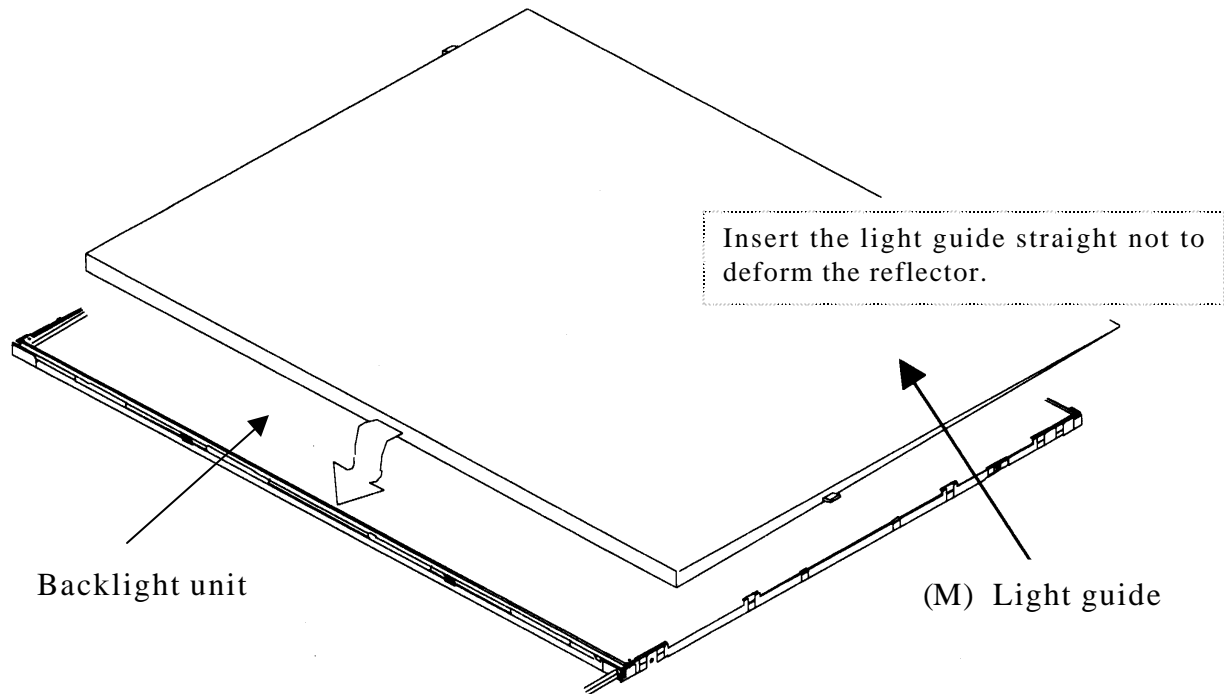
(M) Light guide

Figure 4-81 Replacing Sharp fluorescent lamp (XGA) (15)

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

(K) Upper diffusion sheet

(L) Lens sheet

(M) Light guide

Make sure there is no
dust or scratch.

Do not make any sheet over
the edge of P-chassis.
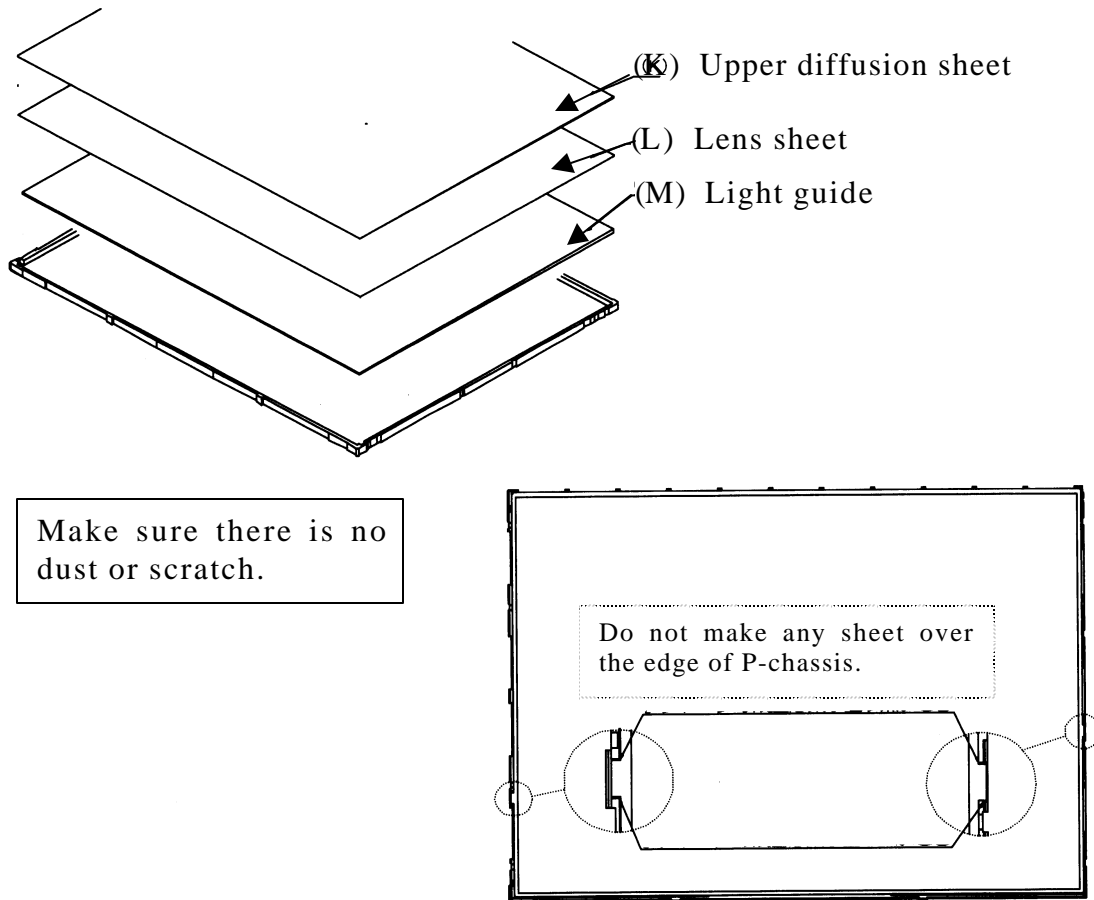
Figure 4-82 Replacing Sharp fluorescent lamp (XGA) (16)

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.

(I) LCD panel

(H) Backlight unit

Guide rib   Guide rib

Guide rib   Guide rib

Make sure the LCD panel is installed in the guide rib surely.
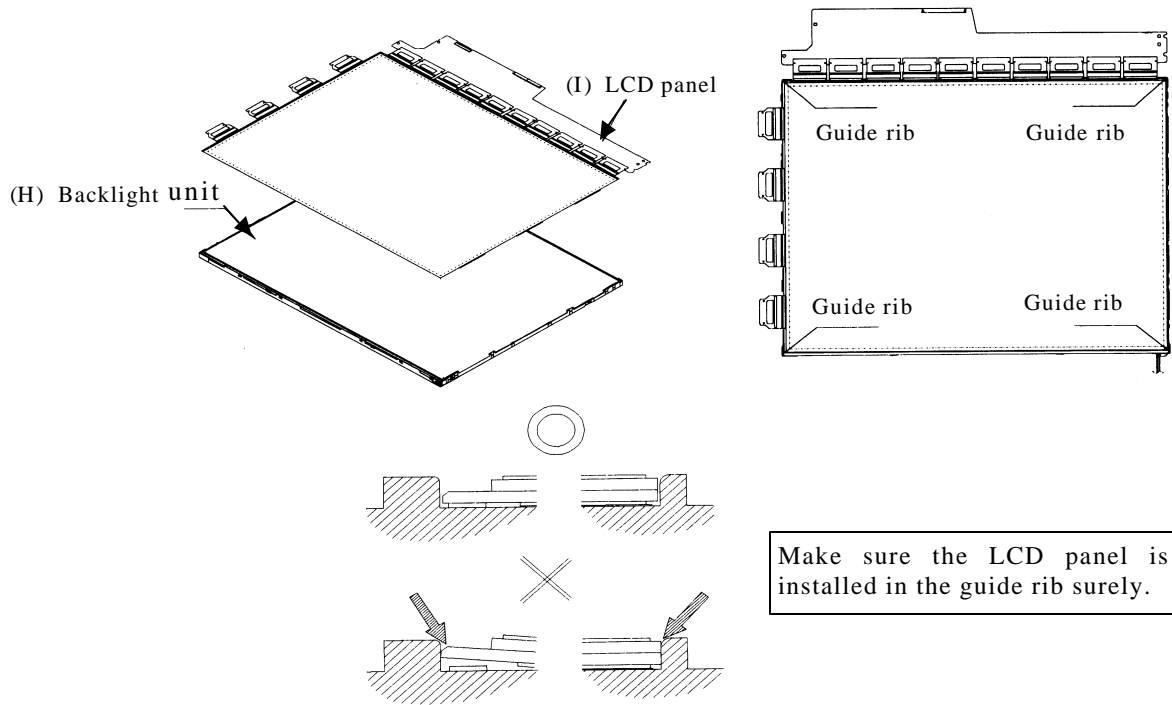
Figure 4-83 Replacing Sharp fluorescent lamp (XGA) (17)

7. Bend the TCP attaching to the source board and secure it with the two screws.
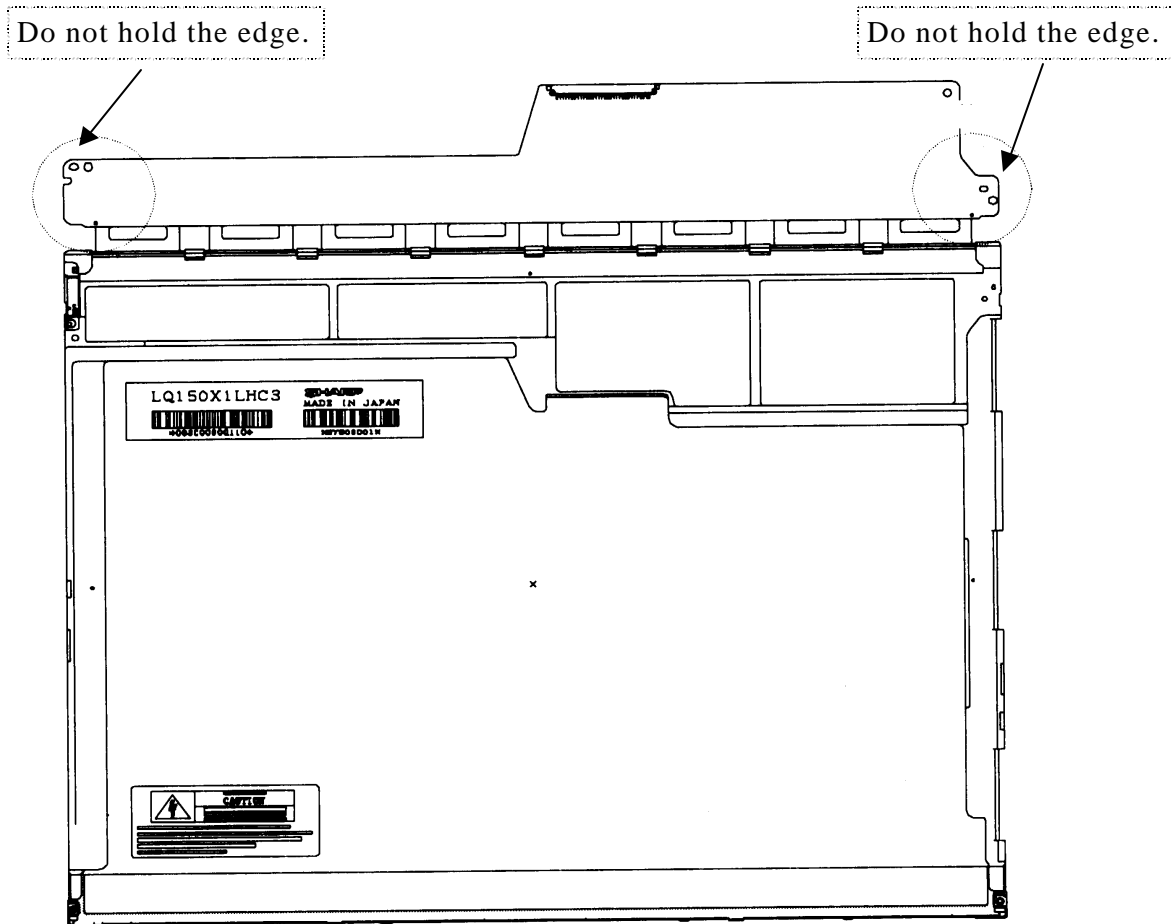
Figure 4-84 Replacing Sharp fluorescent lamp (XGA) (18)

Screw

Screw

LQ150X1LHC3   SHARP
              MADE IN JAPAN
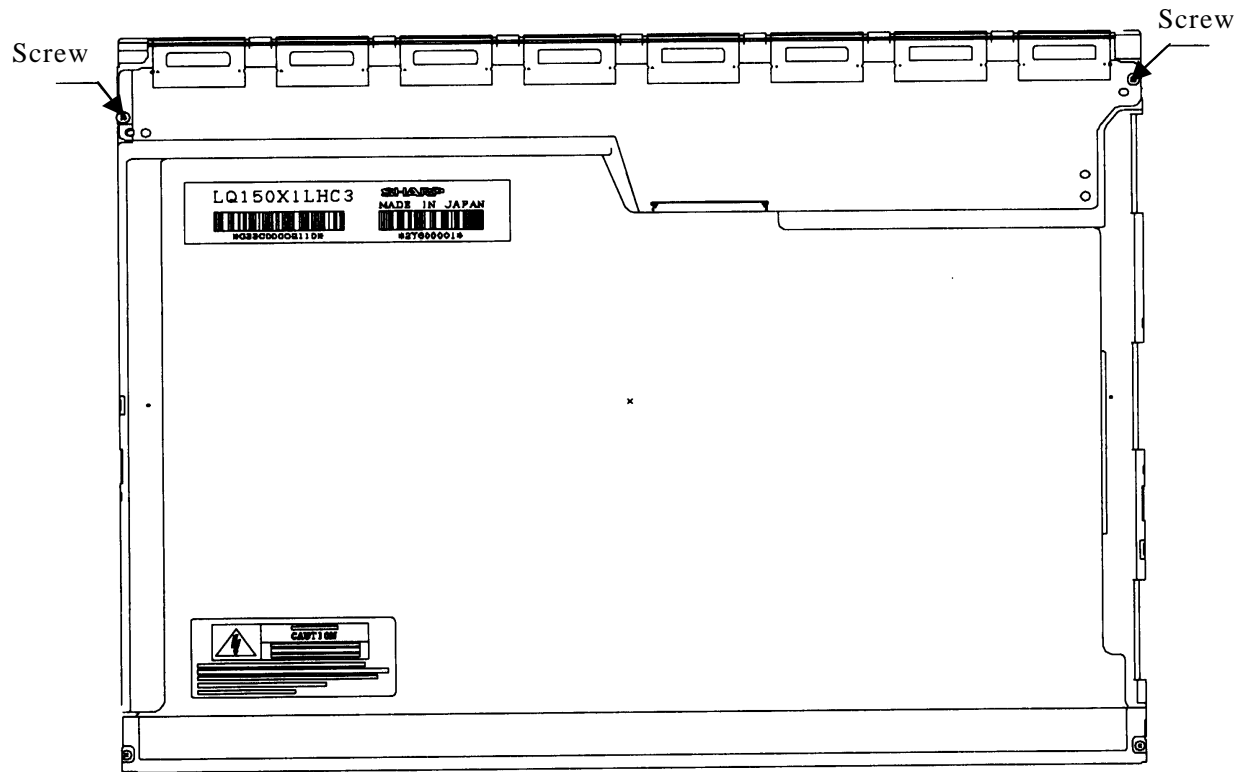
Figure 4-85 Replacing Sharp fluorescent lamp (XGA) (19)

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.

(E) Bezel

(1) Hitch the hook of the bezel on the rib of the P-chassis.

< Side view >

Hook
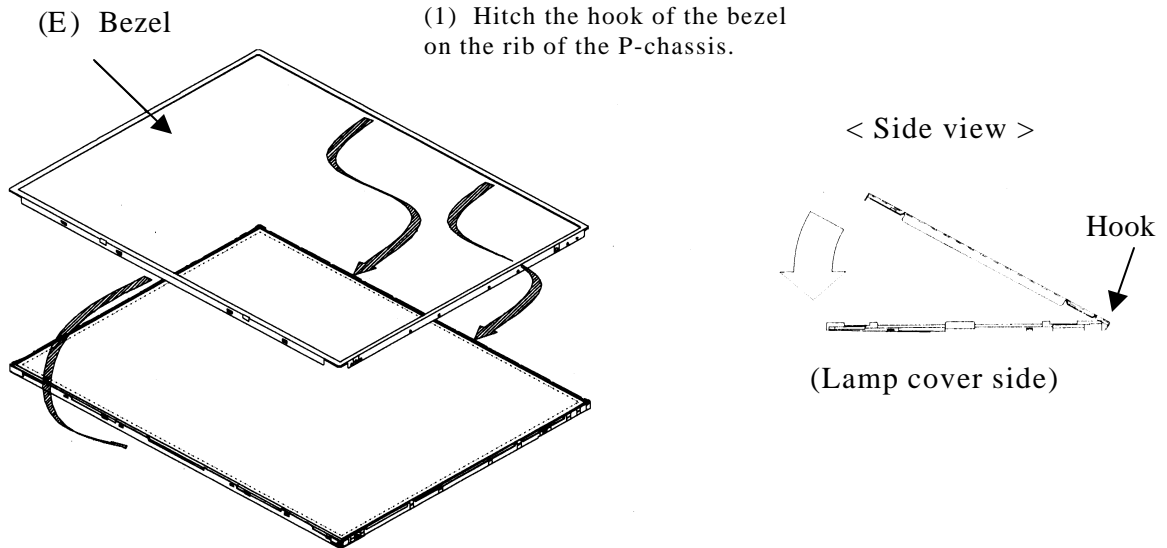
(Lamp cover side)

(2) Lean the bezel on the lamp cover without interference with the TCP.

Figure 4-86 Replacing Sharp fluorescent lamp (XGA) (20)

Make sure of mating of the bezel and the rib of the P-chassis.

LQ150X1LHC3 SHARP
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Make sure of mating of the bezel and the latch of the P-chassis.

Make sure of mating of the bezel and the latch of the P-chassis.
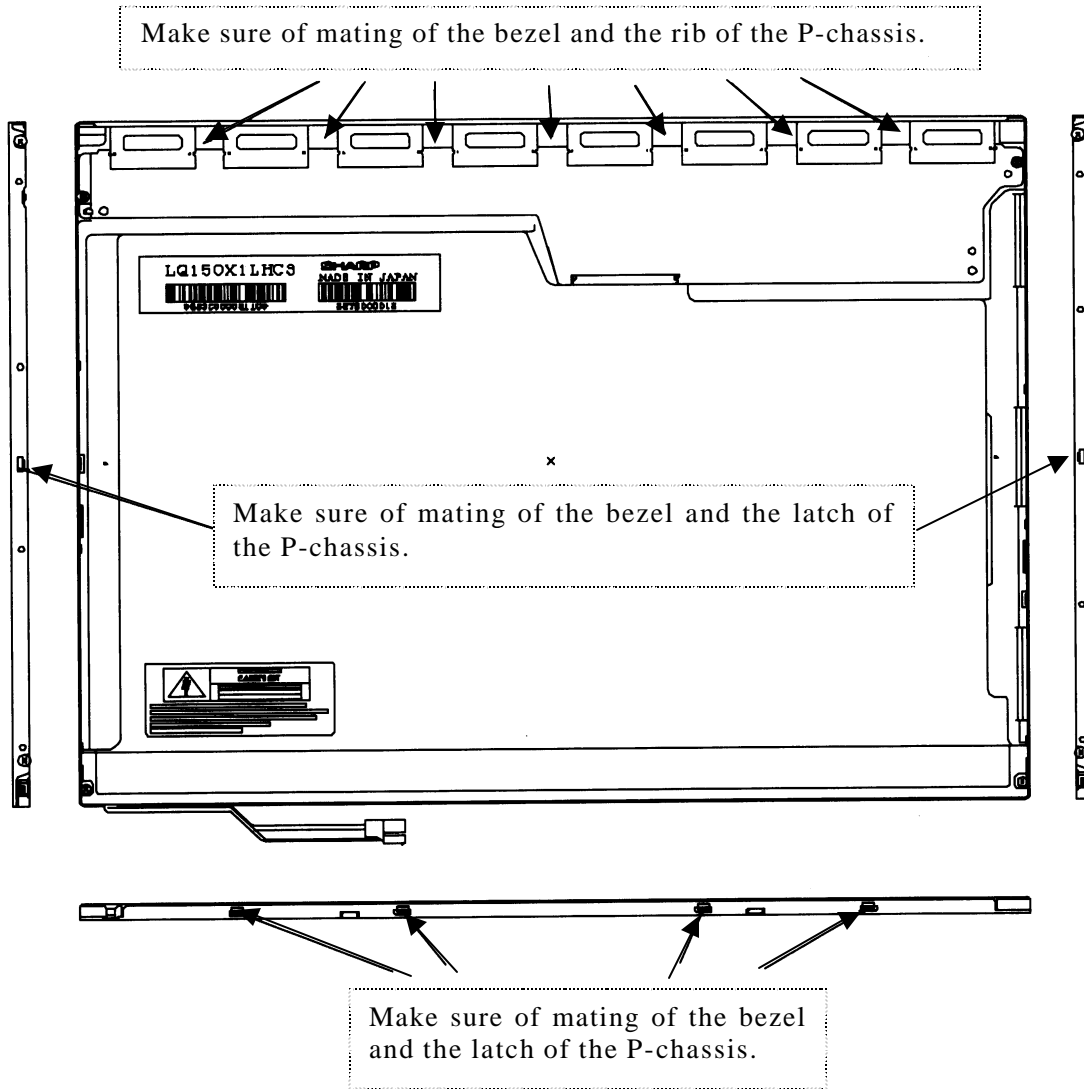
Figure 4-87 Replacing Sharp fluorescent lamp (XGA) (21)

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

Screw   Screw

Screw   Screw
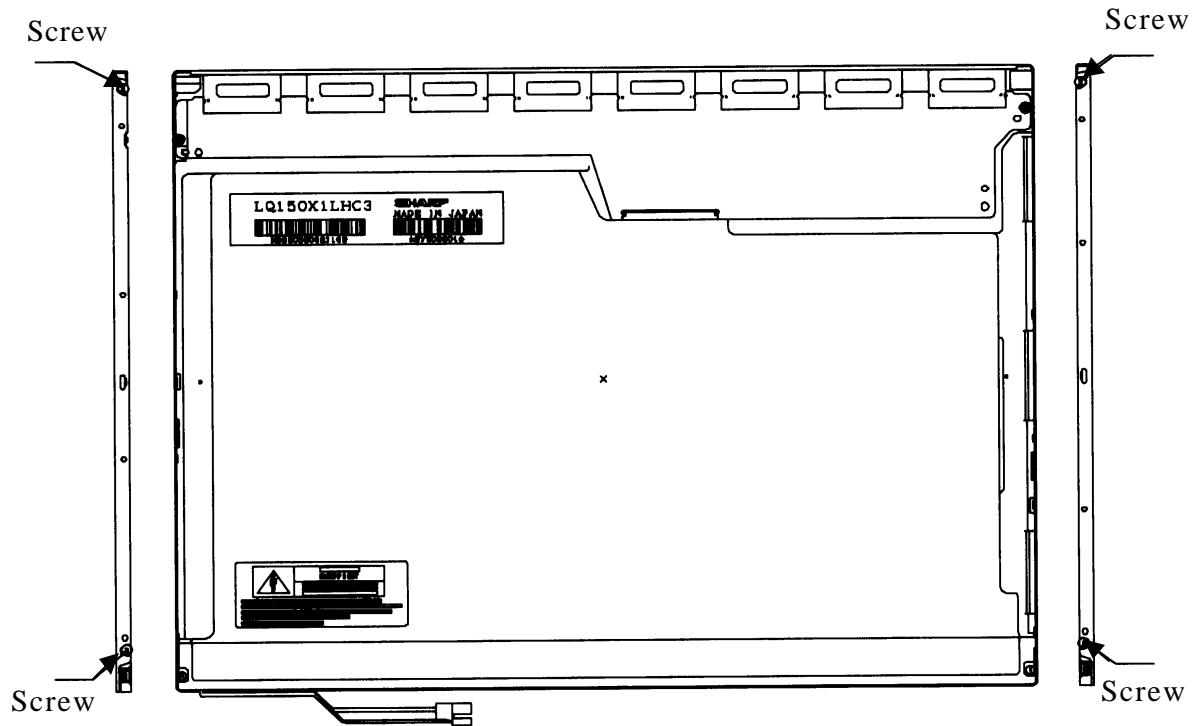
Figure 4-88 Replacing Sharp fluorescent lamp (XGA) (22)

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

Fit the cover according to the outline of the screw.

(A)

(C)

(B)

(C)

0 to 1 mm

0 to 0.5 mm

Do not make the tape over the top of the module.

The tape MUST NOT appear on the display.

Stick the tape according to the outline of the LCD module. Make sure the tape does not appear on the side of the module.
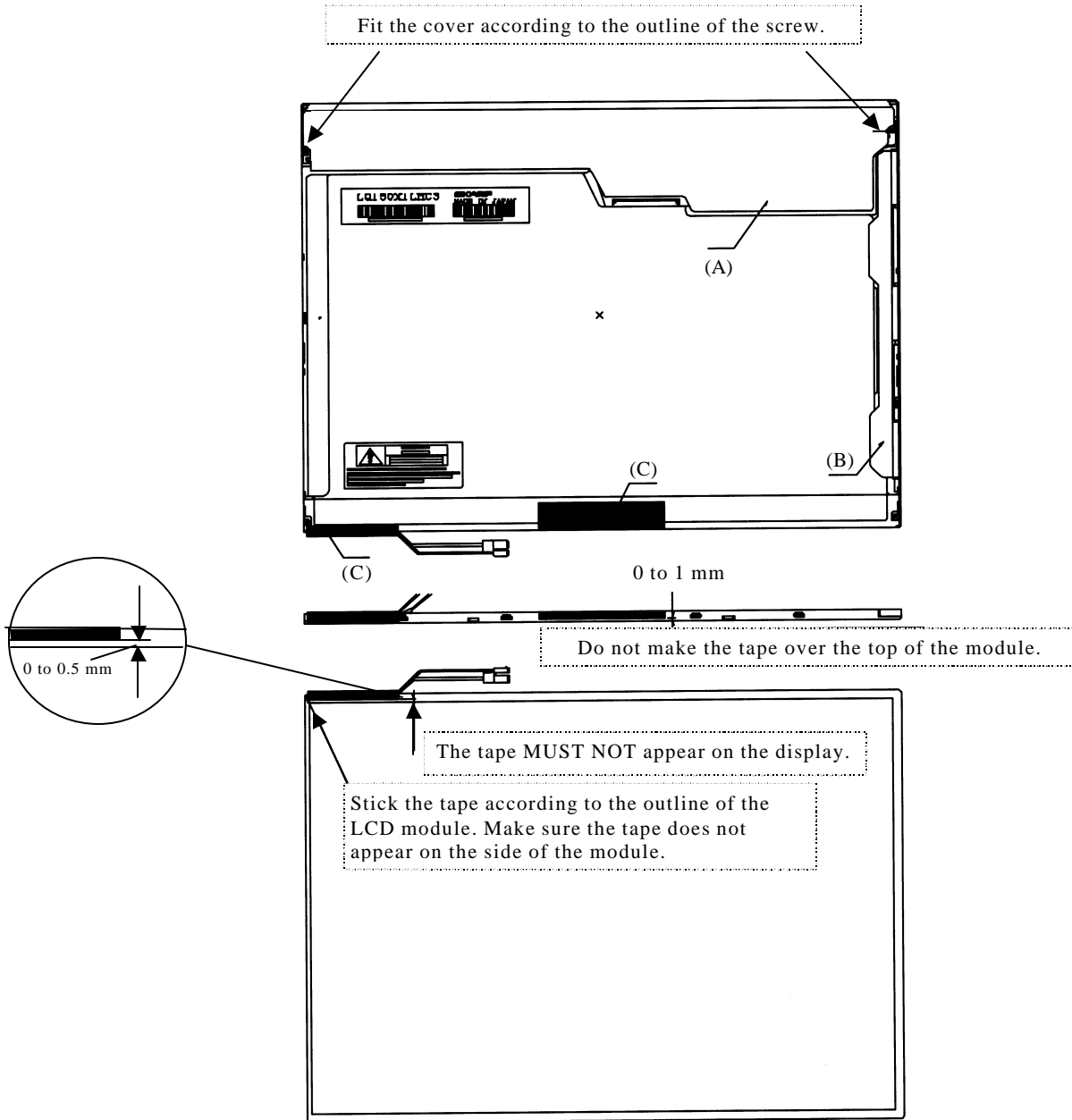
Figure 4-89 Replacing Sharp fluorescent lamp (XGA) (23)

4.30.4 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 figures4-90 to 4-95.

1. Remove the CU tape, yellow tape and protector film X.
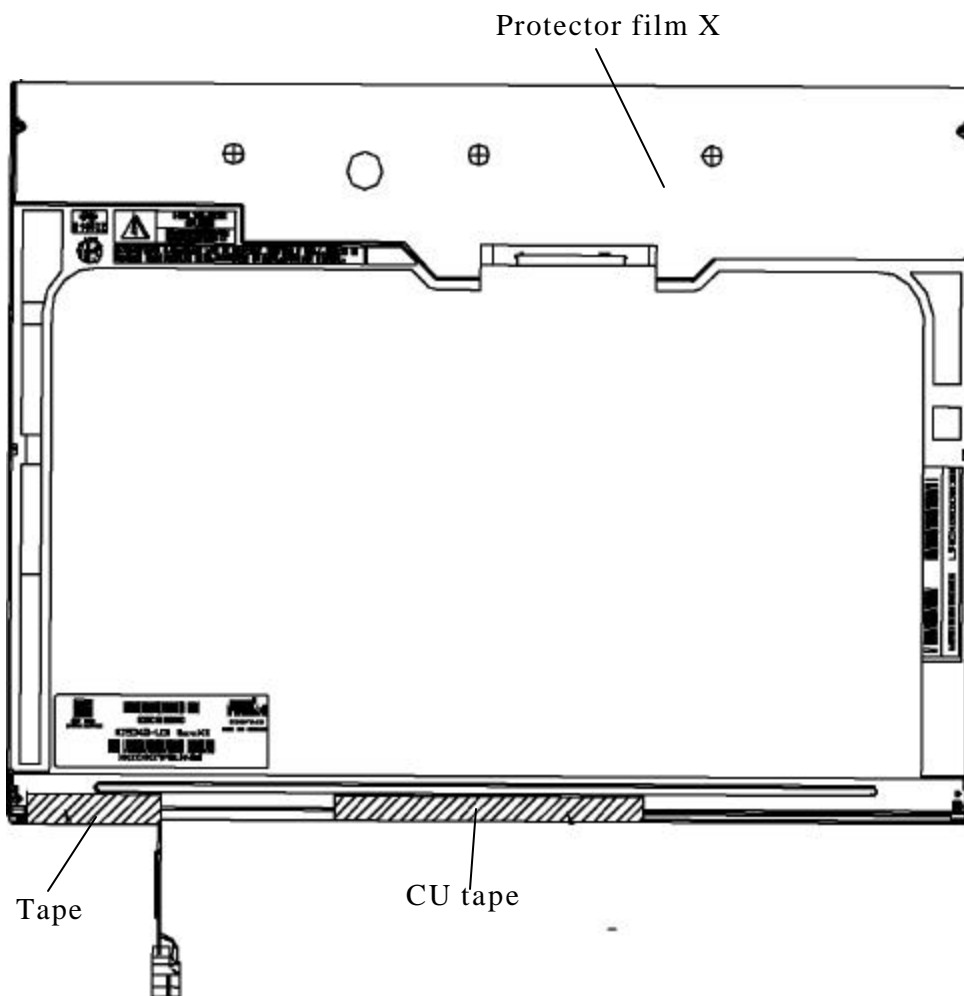
Figure 4-90 Replacing CHIMEI fluorescent lamp (XGA) (1)

2. Remove the two screws (B) fixing the X-PCB. Then remove the eight screws (C) fixing the metal frame. Release the two hooks (A).
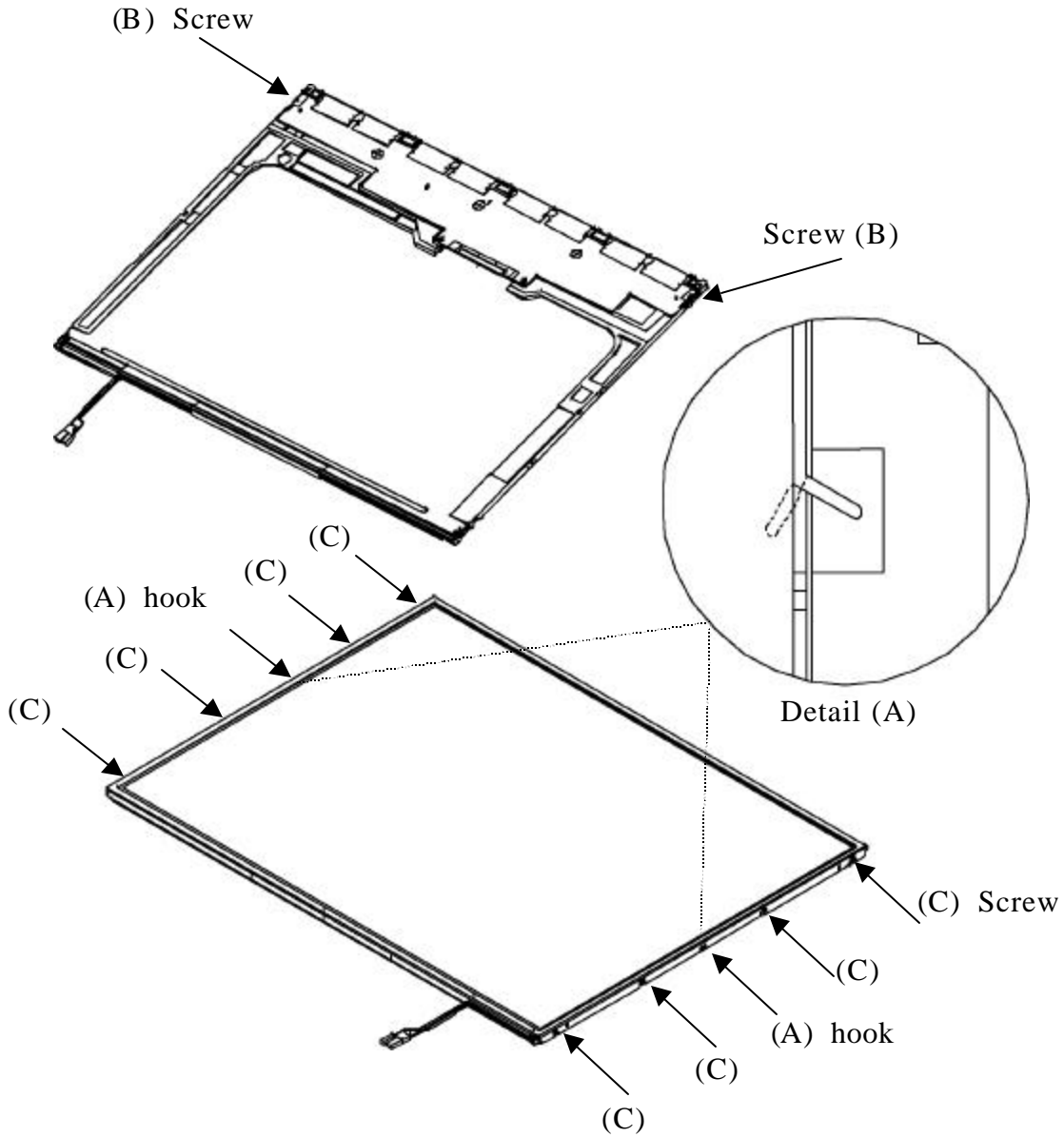
Figure 4-91 Replacing CHIMEI fluorescent lamp (XGA) (2)

3. Release the latch.

NOTE: *Remove the metal frame parallel no to damage it.*

Latch

Metal frame

Backlight
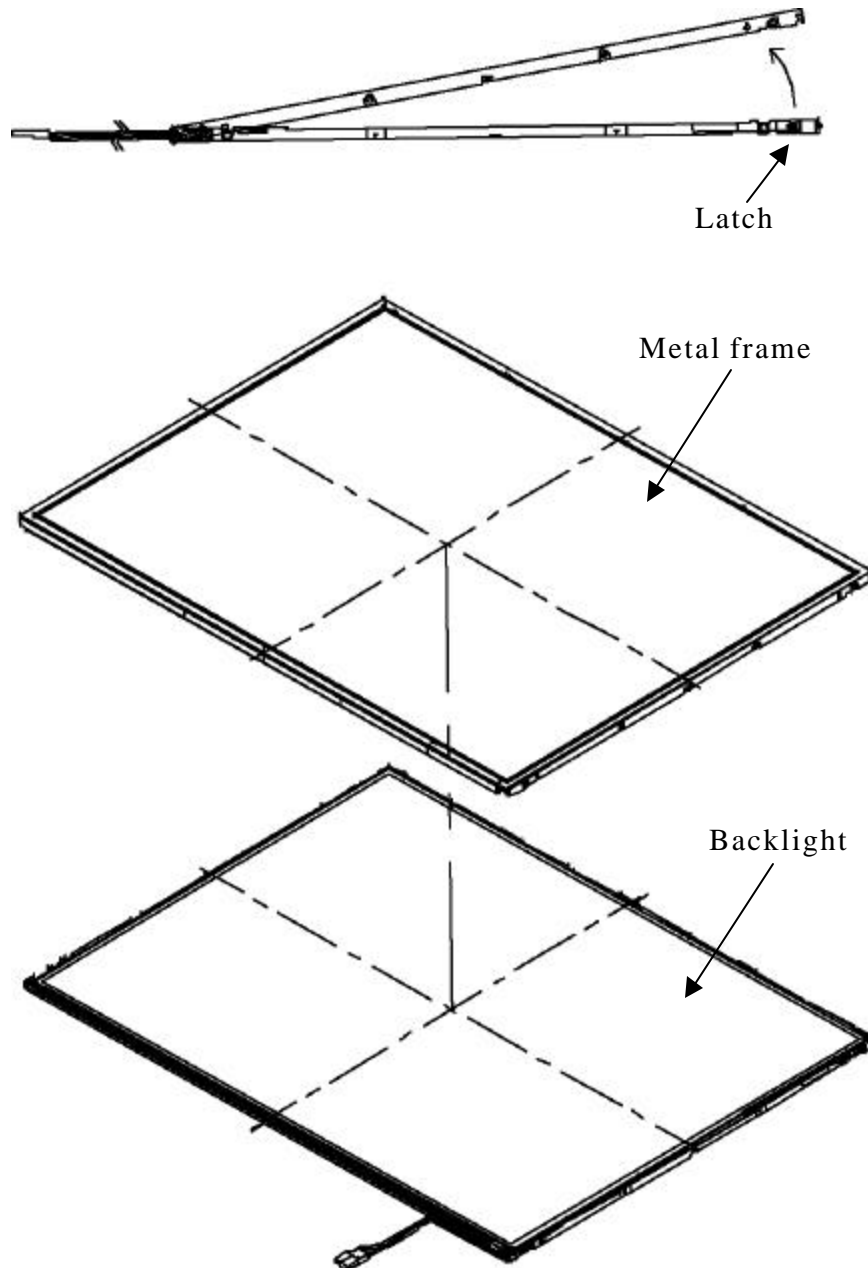
Figure 4-92 Replacing CHIMEI fluorescent lamp (XGA) (3)

4. Remove the X-PCB.

NOTE: When removing the X-PCB, be careful not to damage the TCP.

X-PCB

Panel
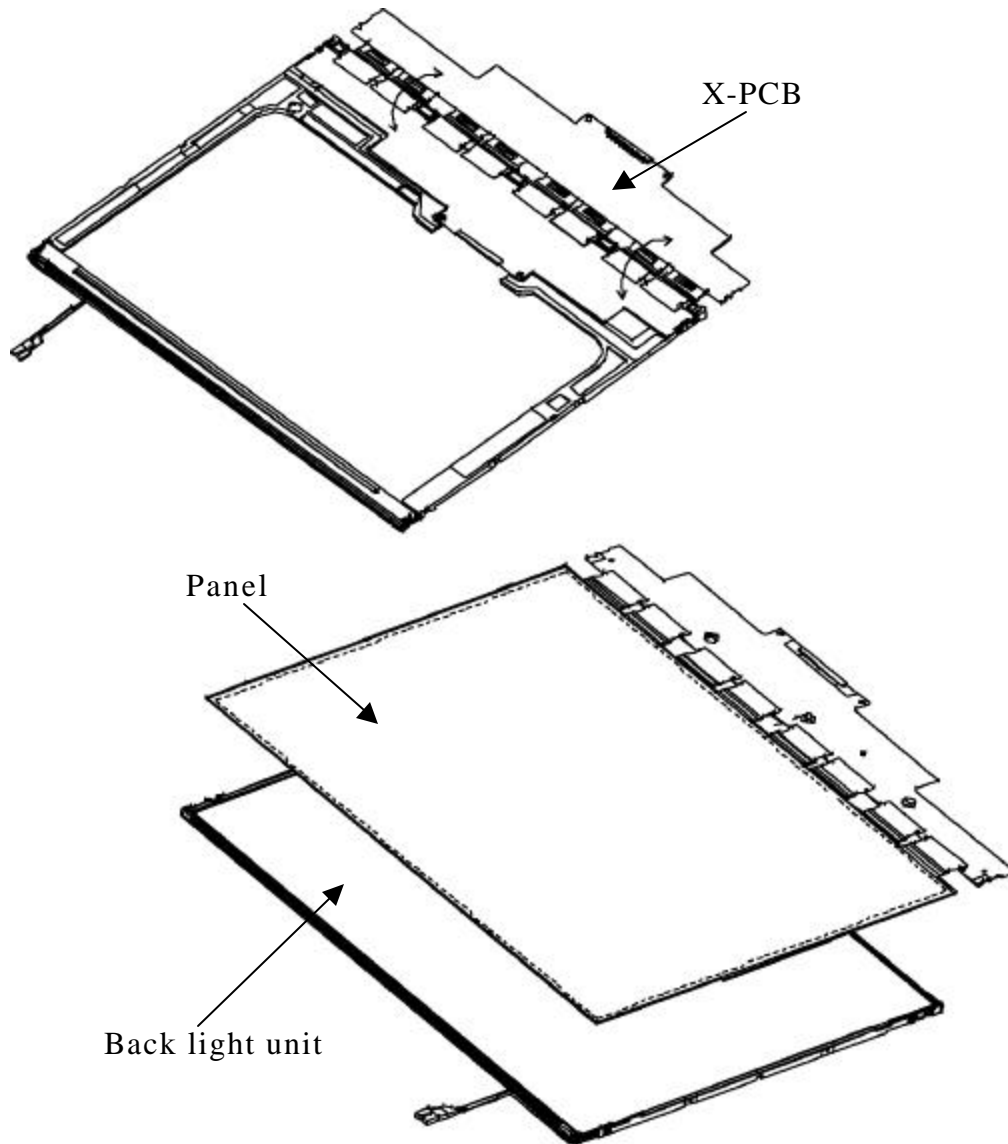
Back light unit

Figure 4-93 Replacing CHIMEI fluorescent lamp (XGA) (4)

5. Remove the three spacers from the BEFIII-M diffuser sheet. Remove the DEFIII-M diffuser sheet, BEFIII-T diffuser sheet and two tapes from the backlight unit in order.

NOTE: When removing the sheets, be careful not to damage them.
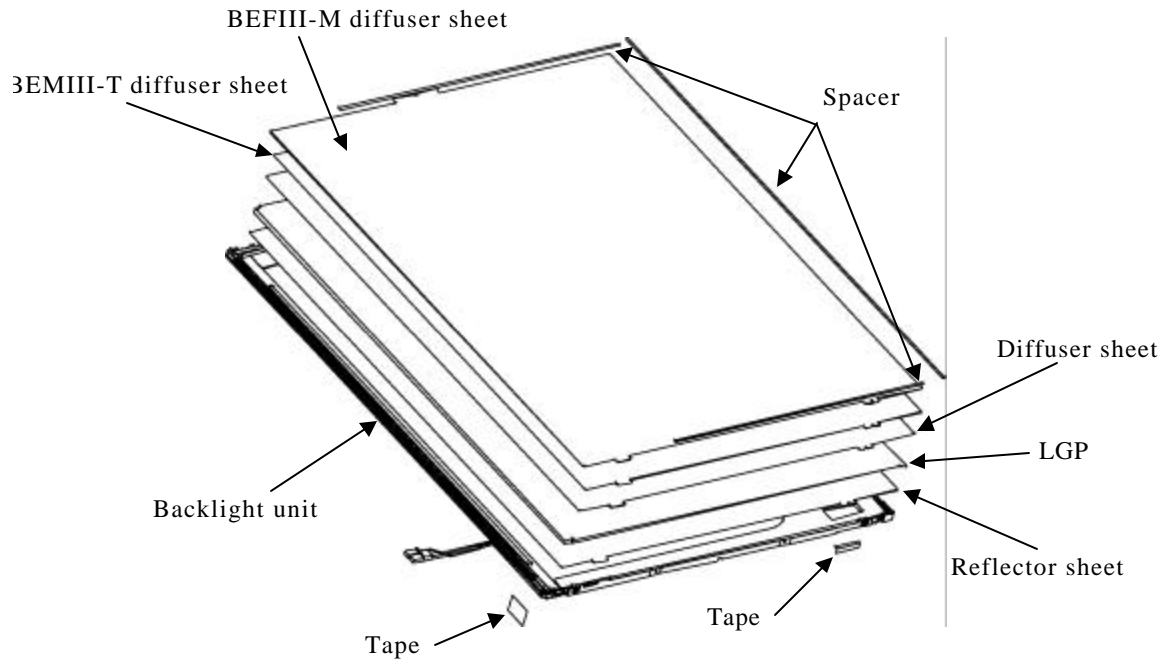
Figure 4-94 Replacing CHIMEI fluorescent lamp (XGA) (5)

6. Remove the two screws.

Screw

Screw

Housing

Lamp assembly
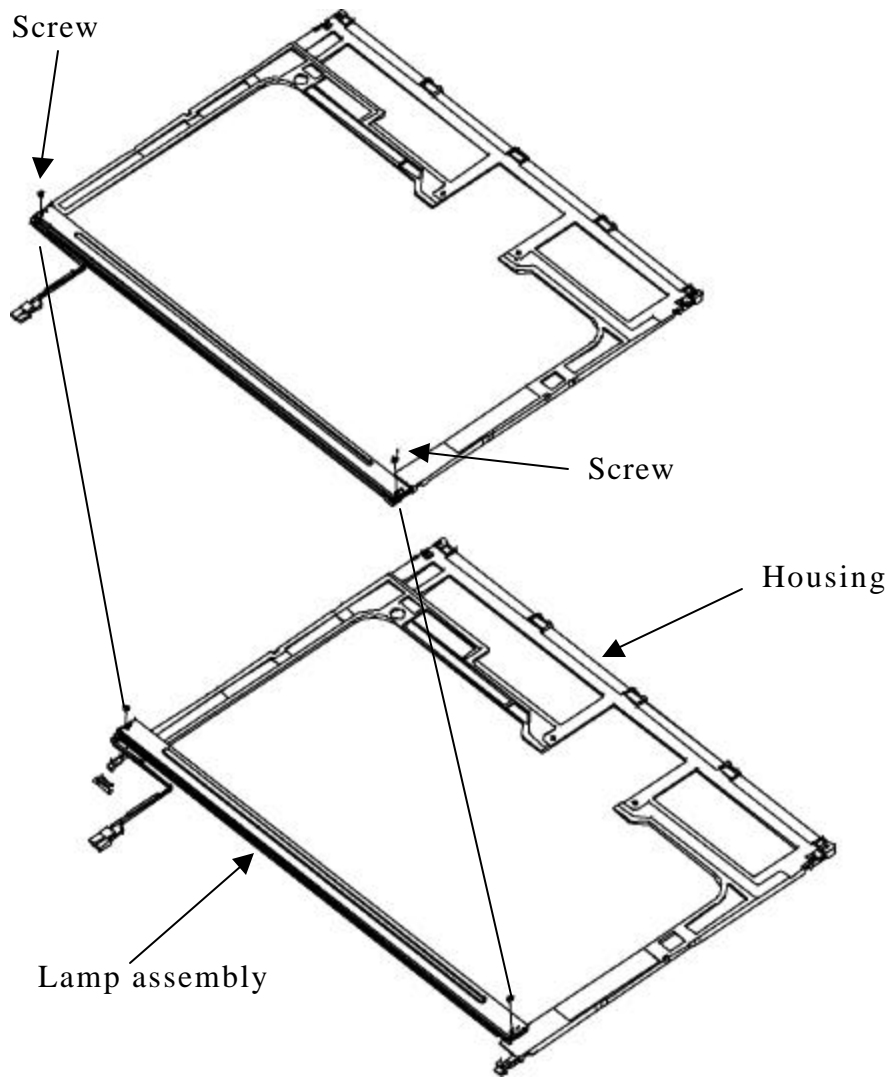
Figure 4-95 Replacing CHIMEI fluorescent lamp (XGA) (6)

Assembling the 15.0-inch XGA CHIMEI fluorescent lamp

To assemble procedure of the 15.0-inch XGA CHIMEI fluorescent lamp, follow the reverse steps of the disassembling steps above.

4.30.5 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 4-96 to 4-99.

    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.
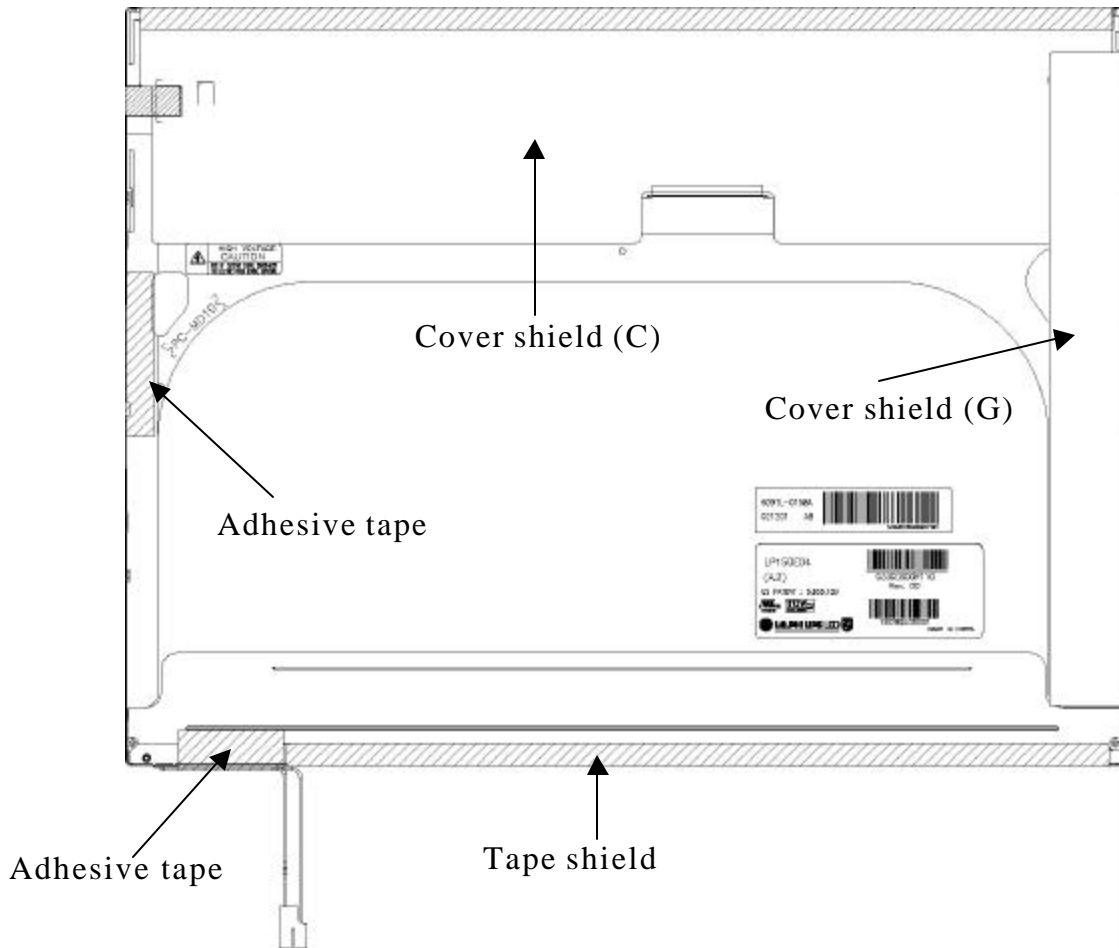
Figure 4-96 Replacing LG.Philips fluorescent lamp (SXGA+) (1)

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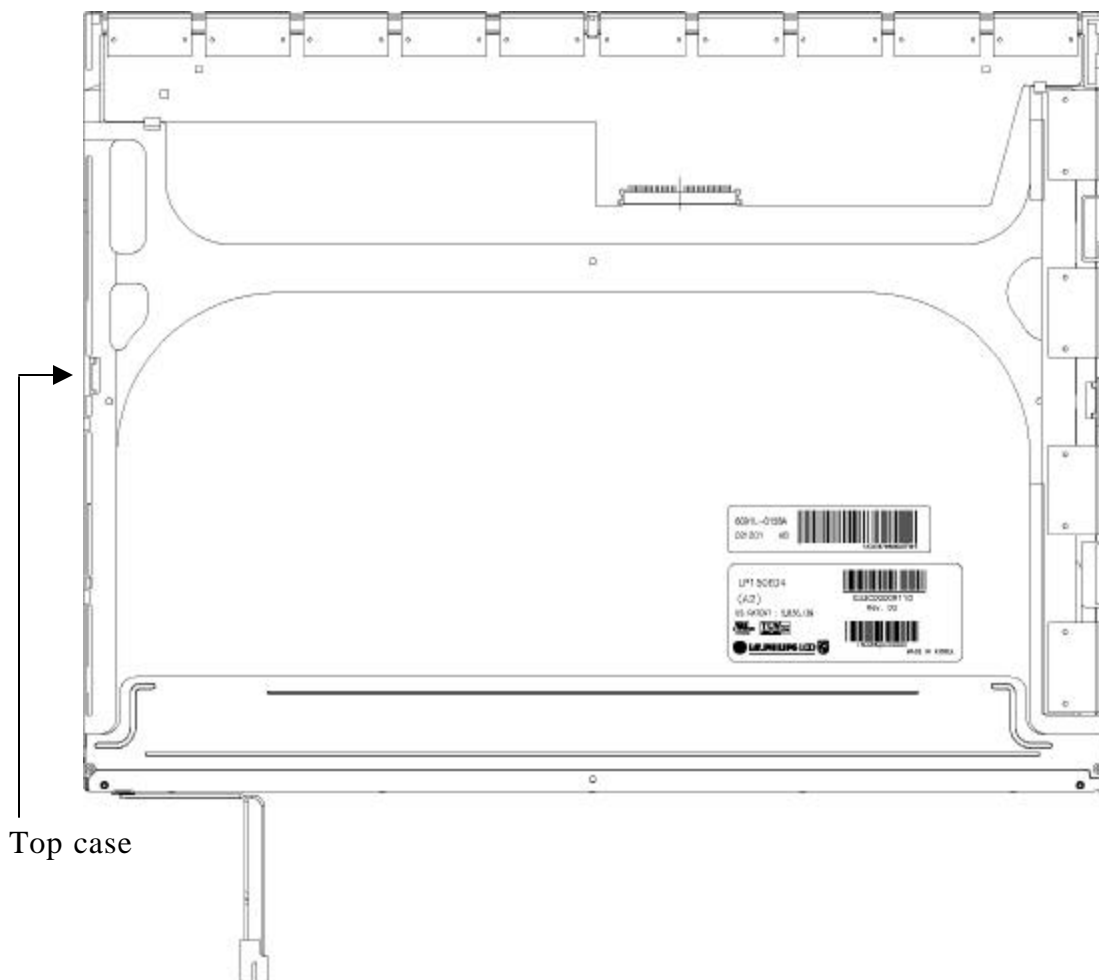

Top case

Figure 4-97   Replacing 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.
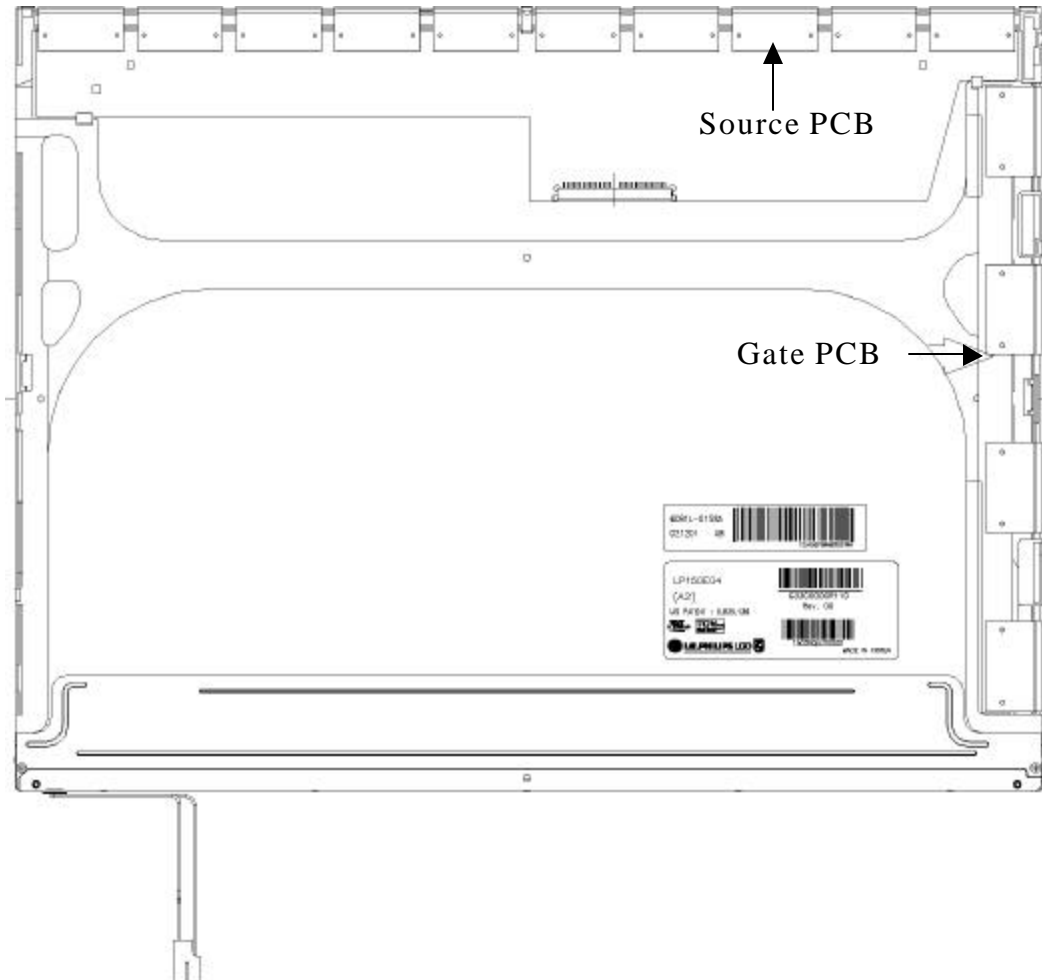
Figure 4-98   Replacing LG.Philips fluorescent lamp (SXGA+) (3)

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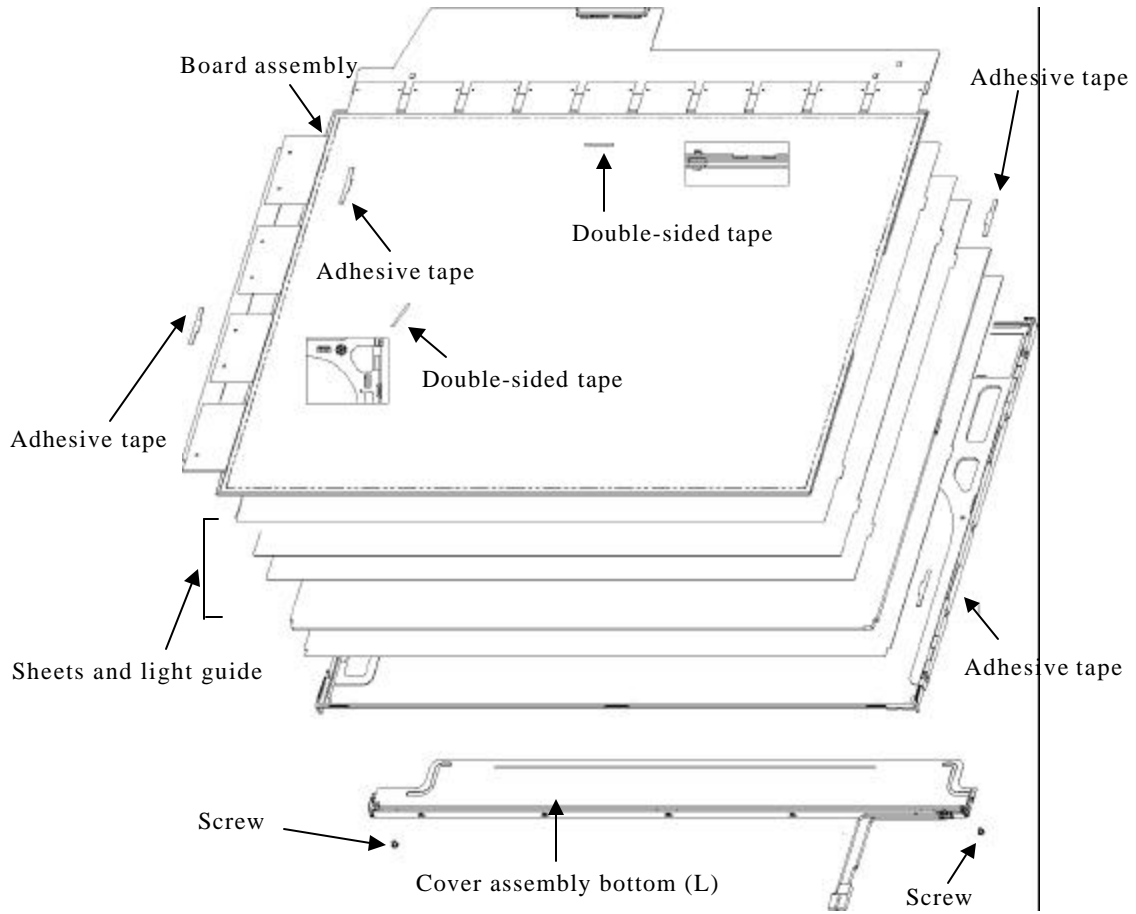
NOTE: *Maximum value of torque is 1.5kg·cm.*

Figure 4-99   Replacing LG.Philips fluorescent lamp (SXGA+) (4)

Assembling the 15.0-inch SXGA+ LG.Philips Fluorescent Lamp

To assembling the 15.0-inch SXGA+ LG.Philips fluorescent lamp, follow the steps below and refer to figures 4-100 to 4-103.

1. Install the cover assembly bottom (L), sheets, light guide, adhesive tape and board assembly.

    1) Remove the protect sheet from the cover assembly bottom (L).

    2) Secure the cover assembly bottom (L) with the two screws.

    > *NOTE: Maximum value of torque is 2.0kg·cm.*

    3) Install the light guide and sheets. (Secure the reflection sheet with double-sided tape.)

    > *NOTE: No penetration of foreign object is indispensable not to scratch on the surface of the sheets and light guide.*

    4) Stick the adhesive tape to fix the sheets.

    5) Install the board assembly. (Secure the gate PCB with double-sided tape.)

    > *NOTE: Be careful not to apply excessive force to the PCB and TCP.*

Board assembly

Double-sided tape

Adhesive tape

Adhesive tape

Double-sided tape

Adhesive tape

Double-sided tape

Double-sided tape

Sheets and light guide

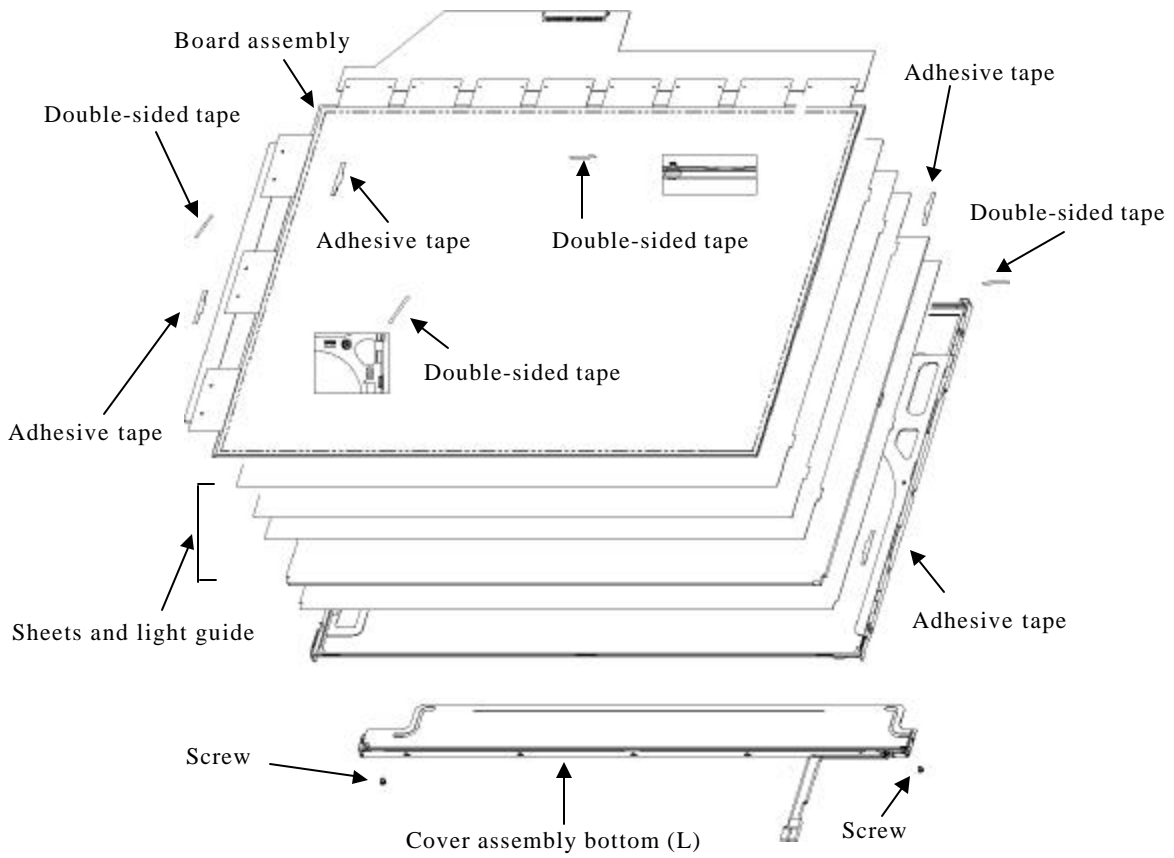Adhesive tape

Screw

Screw

Cover assembly bottom (L)

Figure 4-100   Replacing LG.Philips fluorescent lamp (SXGA+) (5)

2. Install the source PCB and gate PCB.

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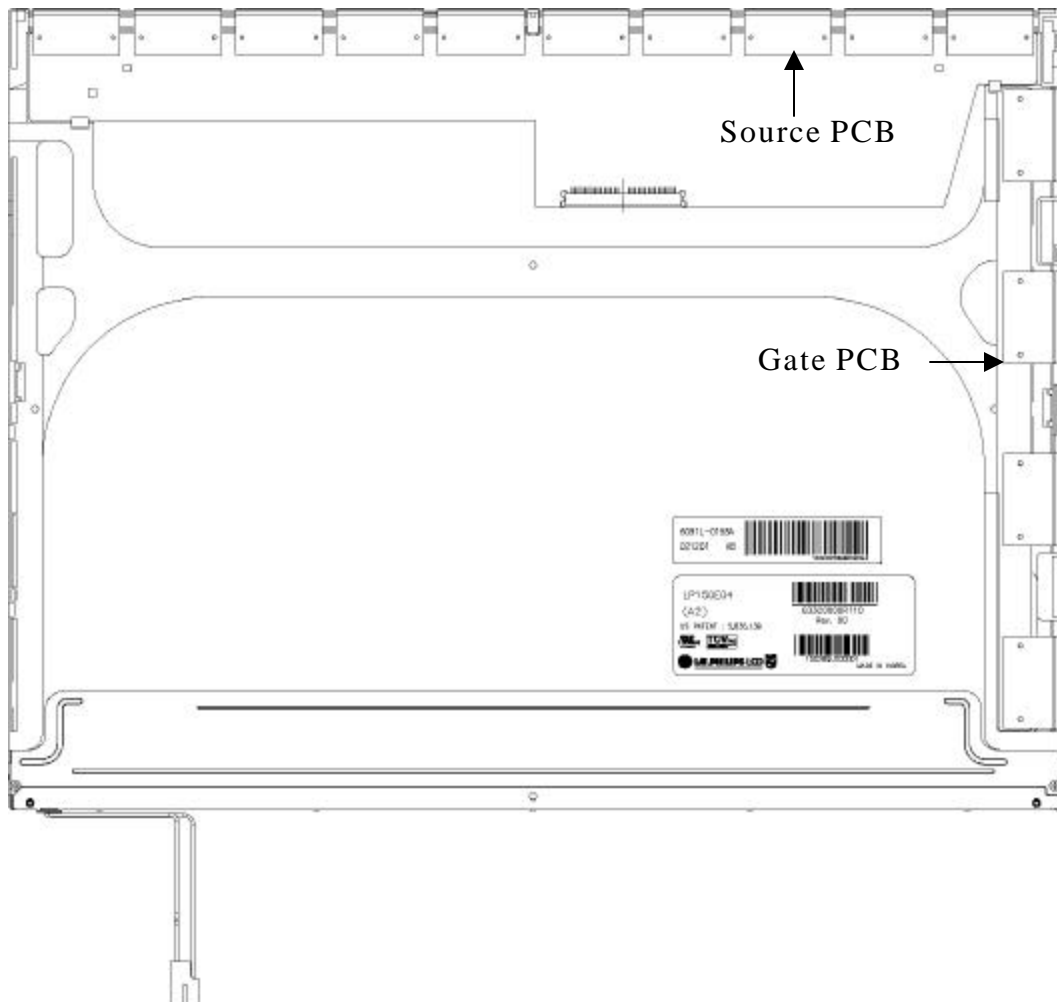> 2) Install the gate PCB. Be careful not to apply excessive force to the TCP.

Source PCB

Gate PCB

Figure 4-101   Replacing LG.Philips fluorescent lamp (SXGA+) (6)

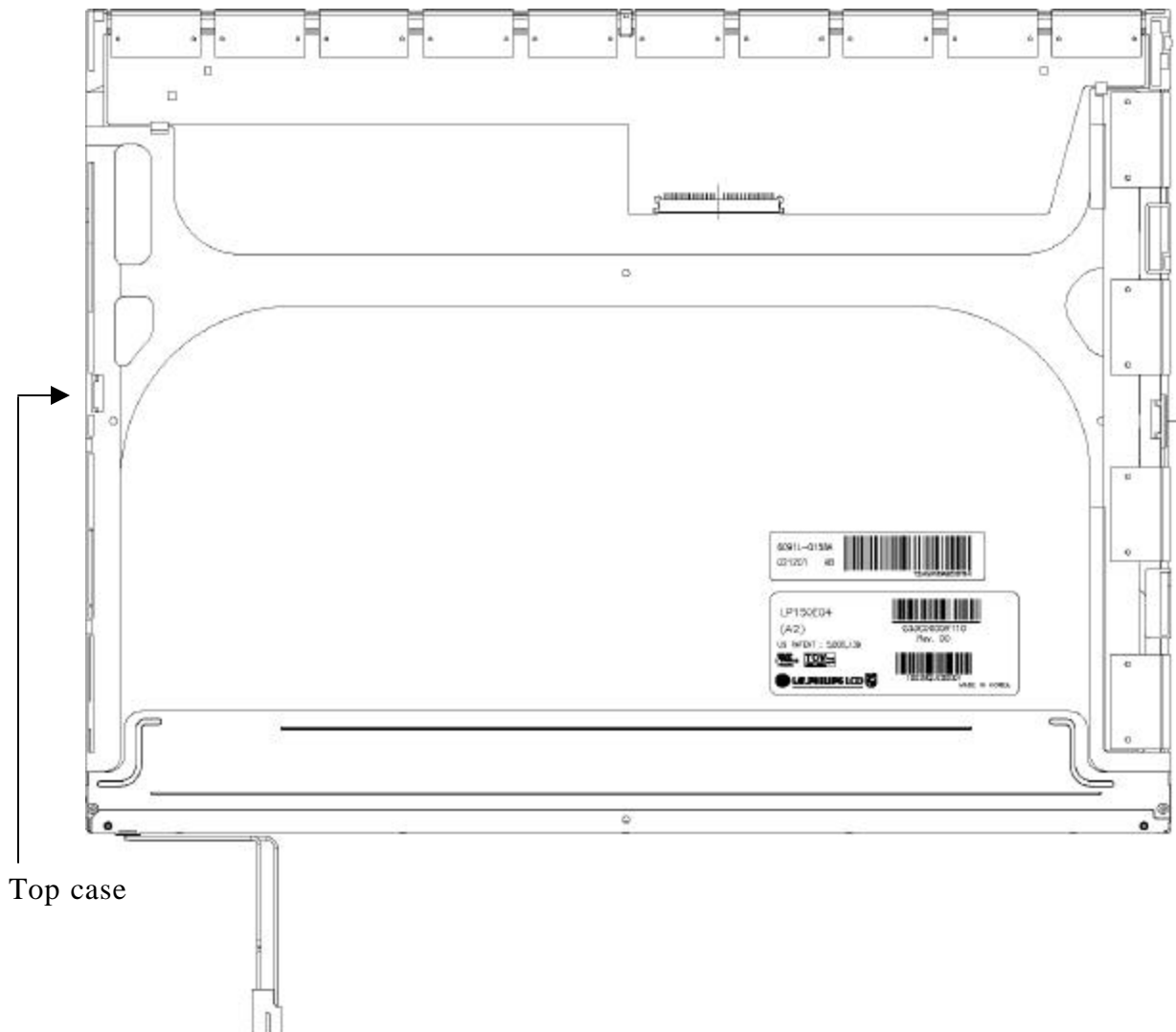3. Install the top case. Be careful not to apply excessive force to the gate TCP.

Top case

Figure 4-102   Replacing 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.

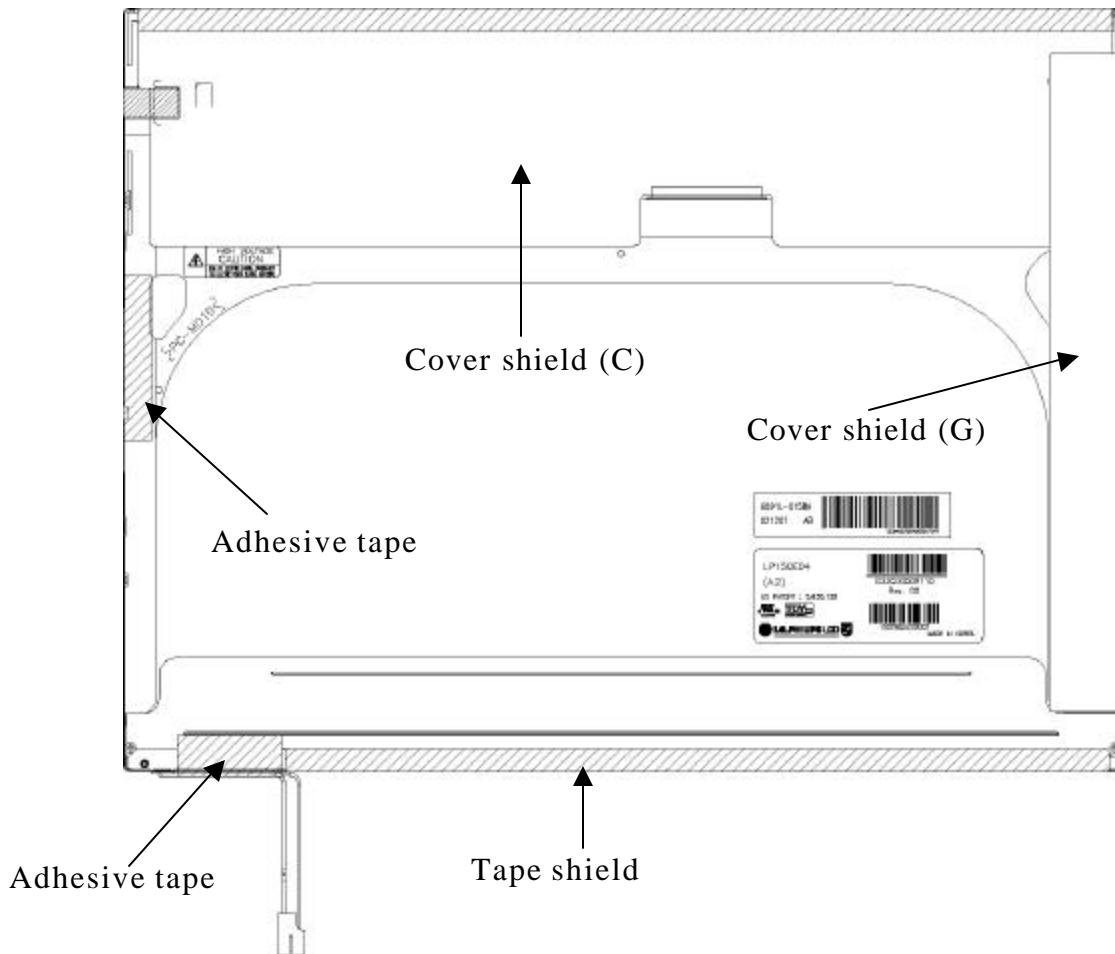   4) Stick the adhesive tape to fix the B/L wire. Be careful not to apply excessive force to the B/L wire.

Figure 4-103   Replacing LG.Philips fluorescent lamp (SXGA+) (8)

4.30.6 Replacing the 15.0-inch SXGA+ Samsung Fluorescent Lamp

Disassembling the 15.0-inch SXGA+ Samsung Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

To disassemble the 15.0-inch SXGA+ Samsung fluorescent lamp, follow the steps below and refer to Figures 4-104 to 4-112.

1. Remove the PCB cover (source and gate parts) and aluminum tape.
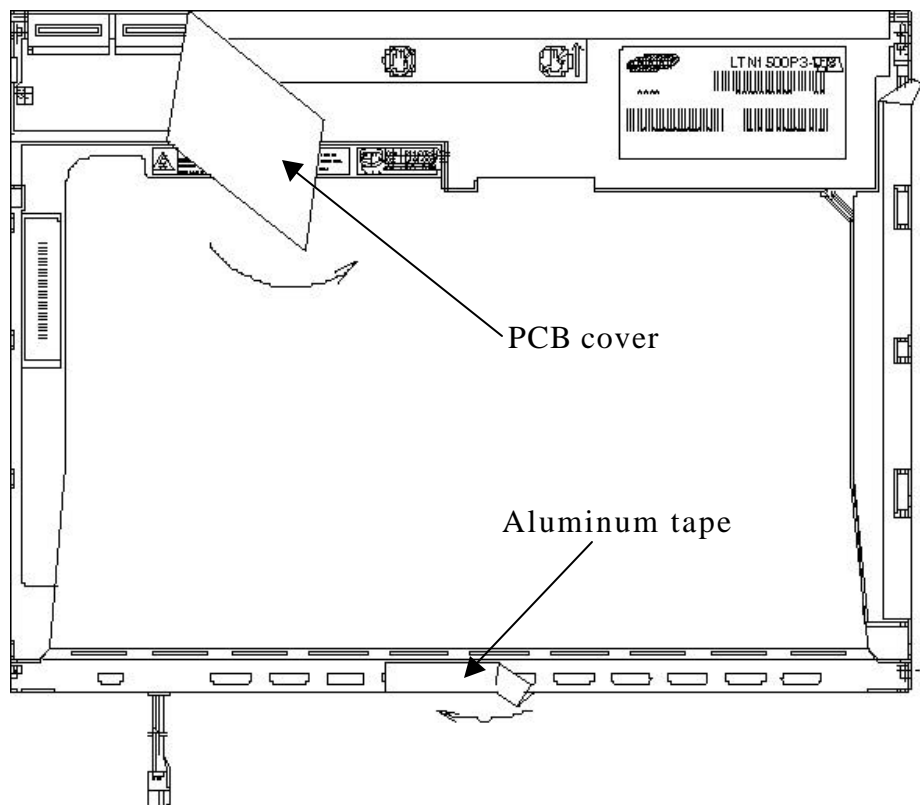
NOTE: Be careful not to damage the COF.

PCB cover

Aluminum tape

Figure 4-104   Replacing Samsung fluorescent lamp (SXGA+) (1)

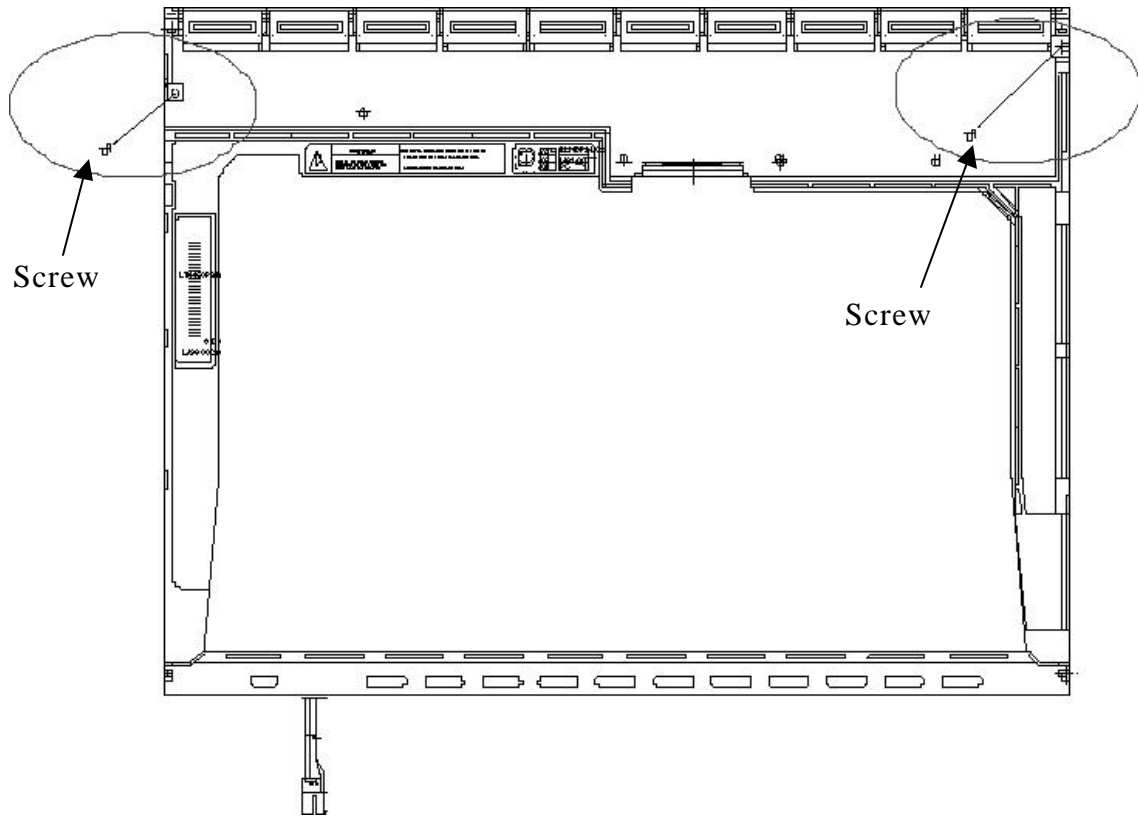2. Remove the two screws securing the PCB.

Screw

Screw

Figure 4-105   Replacing Samsung fluorescent lamp (SXGA+) (2)

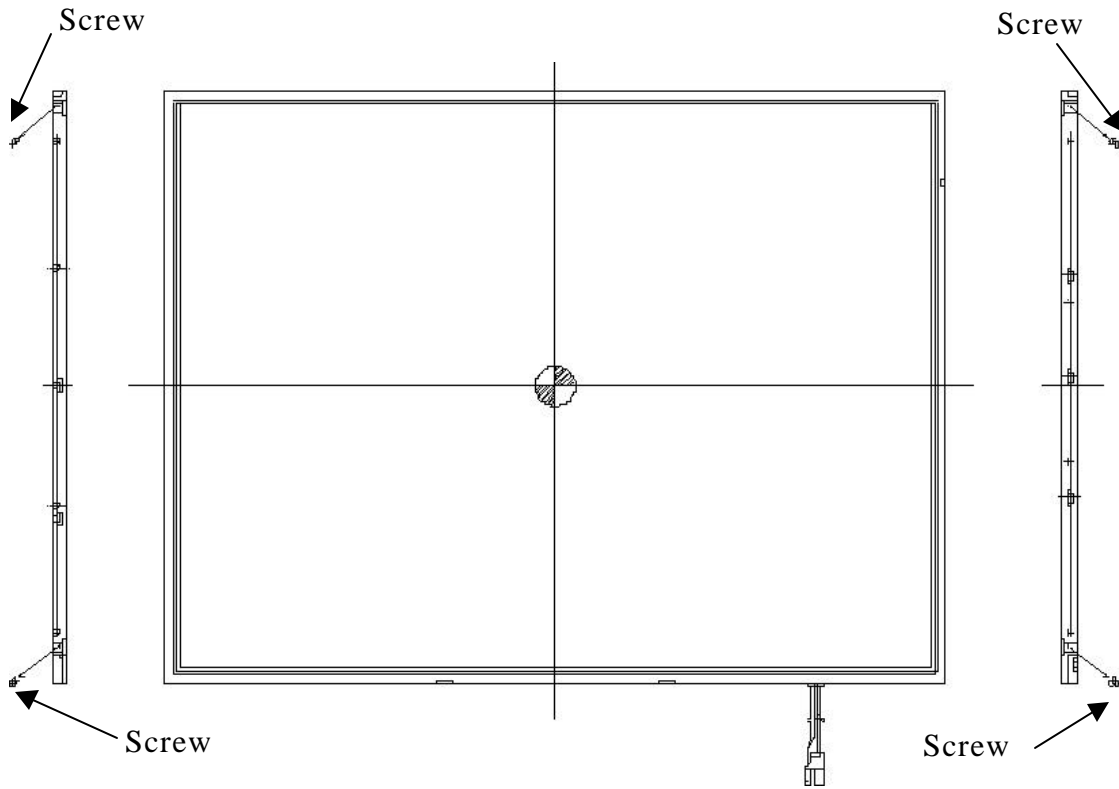3. Remove the four screws from the top side of the chassis.

Figure 4-106   Replacing Samsung fluorescent lamp (SXGA+) (3)

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

> *CAUTION:* *When you release hooks on the top chassis, be careful not to apply excessive force to the FL. The FL can be damaged easily.*

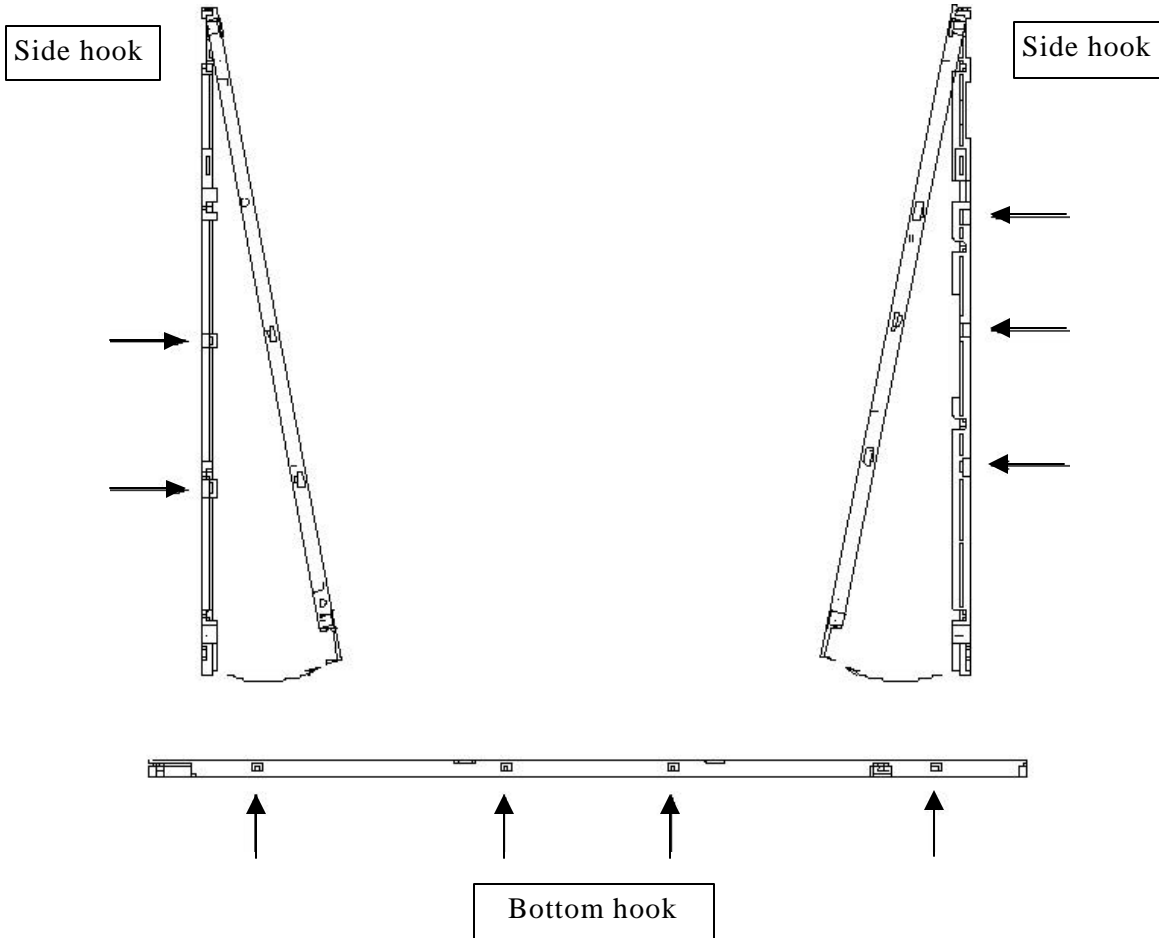Side hook   Side hook

Bottom hook

Figure 4-107   Replacing Samsung fluorescent lamp (SXGA+) (4)

5.   Remove the panel assembly from the mold frame.
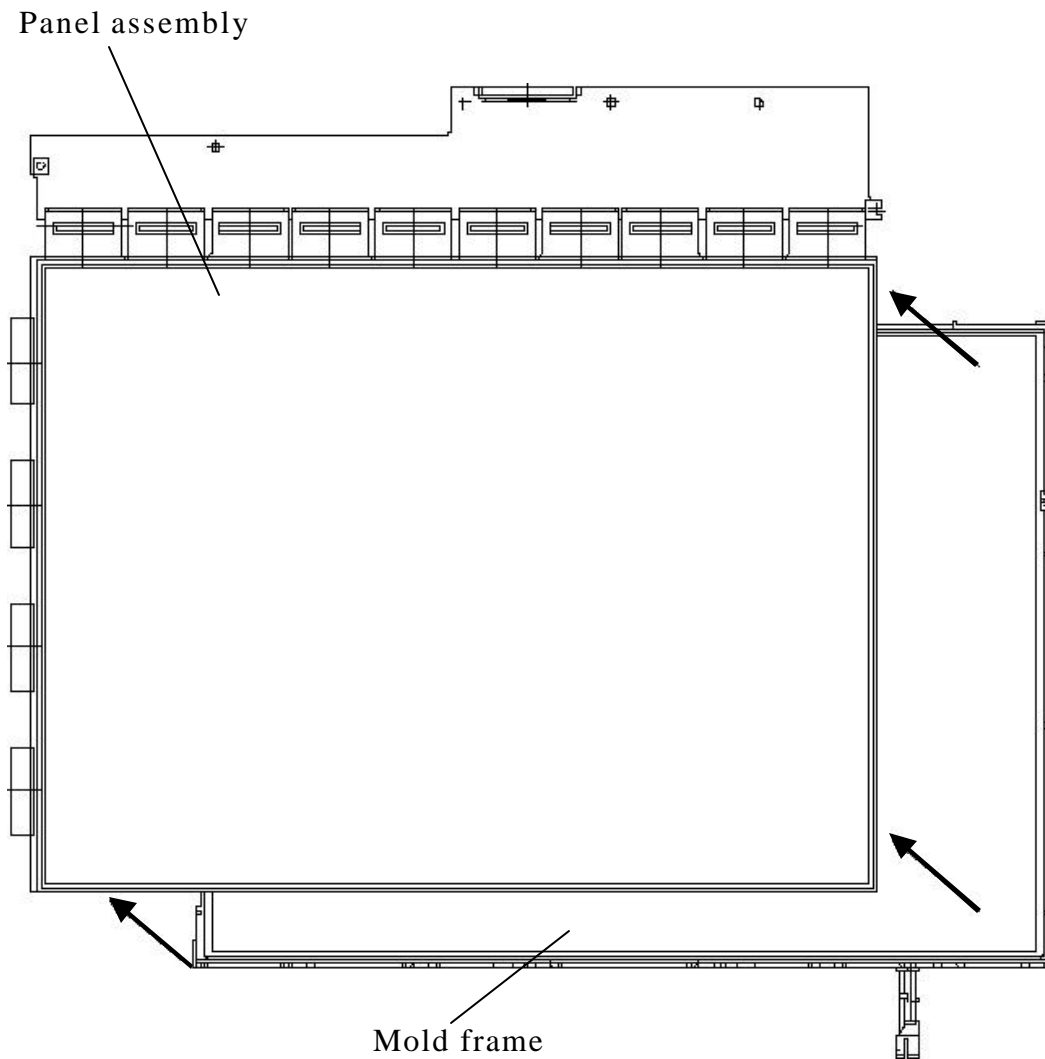
Panel assembly

Mold frame

Figure 4-108   Replacing Samsung fluorescent lamp (SXGA+) (5)

6. Remove the two clips. Then remove the five sheets (prism sheet (L, U), diffusion sheet, LGP and reflection sheet).

Clip

Sheets

Clip

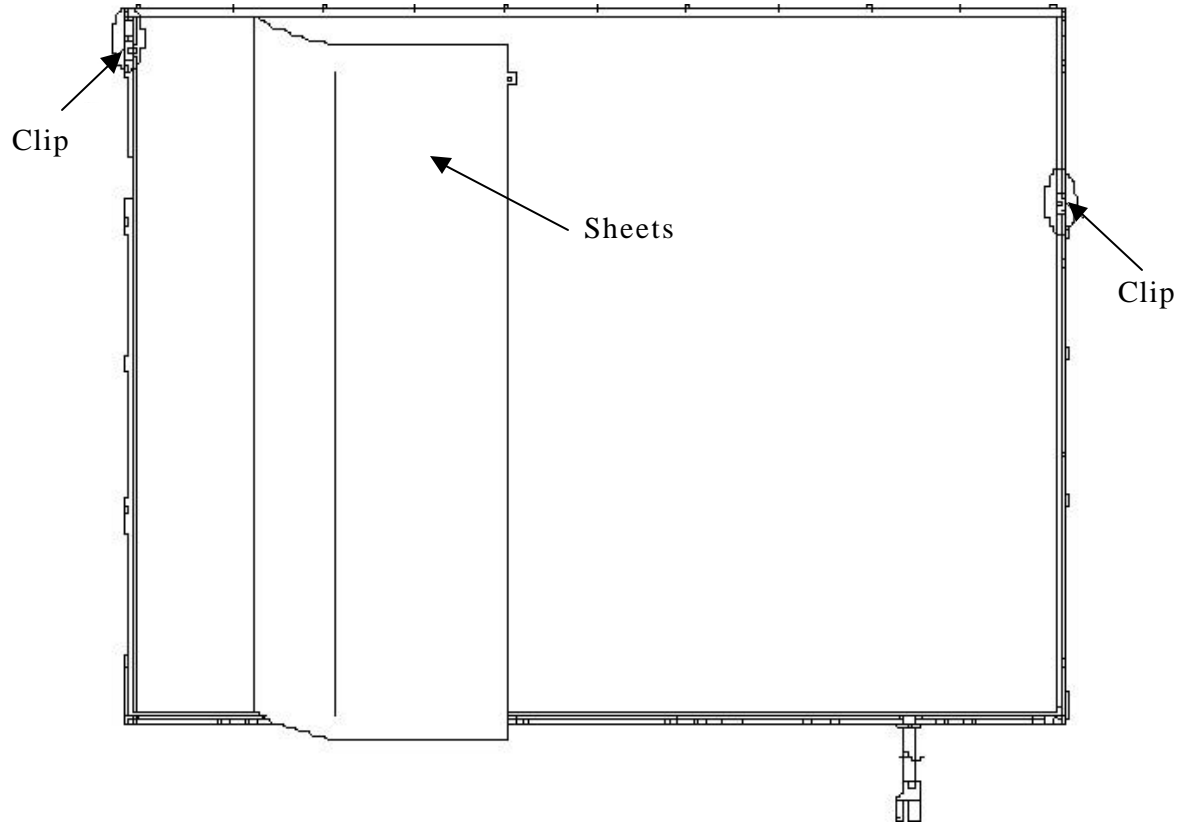*Figure 4-109   Replacing Samsung fluorescent lamp (SXGA+) (6)*

7.   Remove the two screws securing the lamp back cover. Then remove the lamp back cover.

Screw   Lamp back cover   Screw
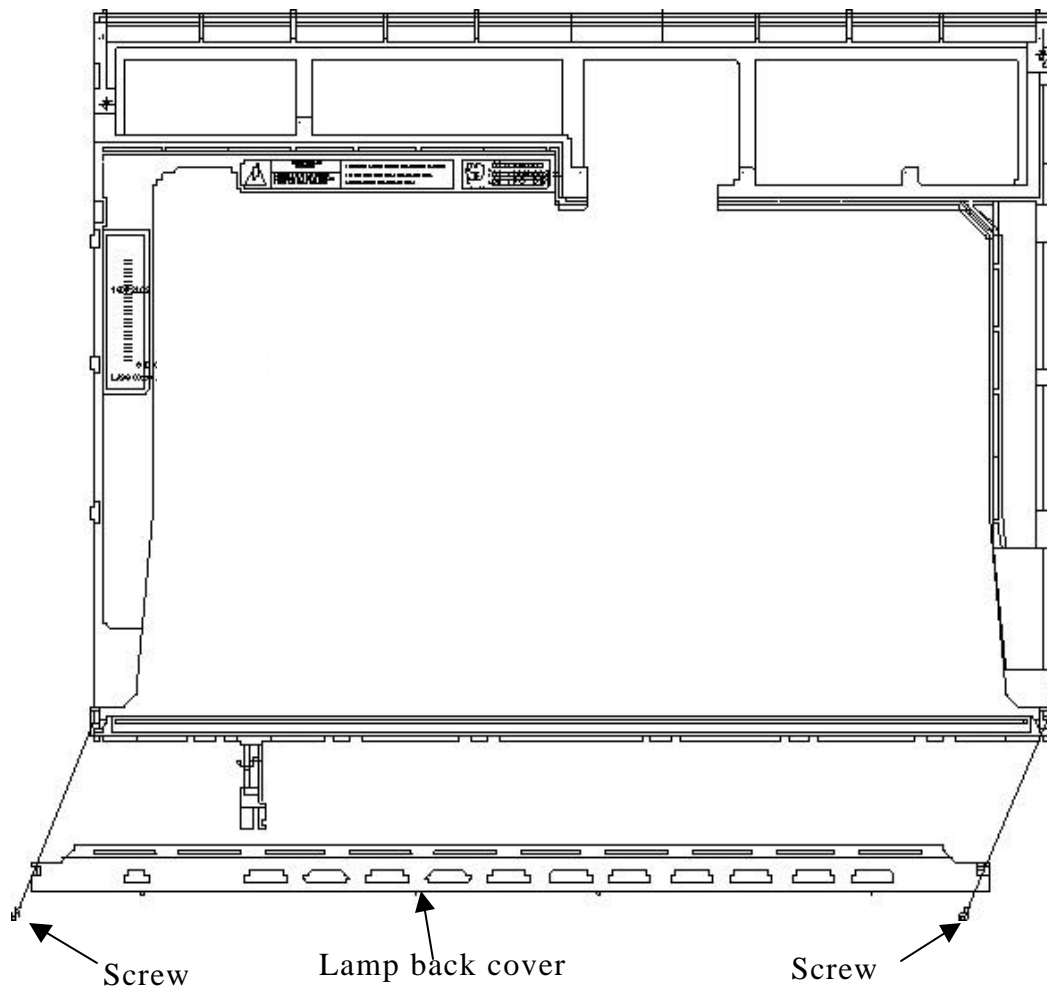
Figure 4-110   Replacing Samsung fluorescent lamp (SXGA+) (7)

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

Lamp wire

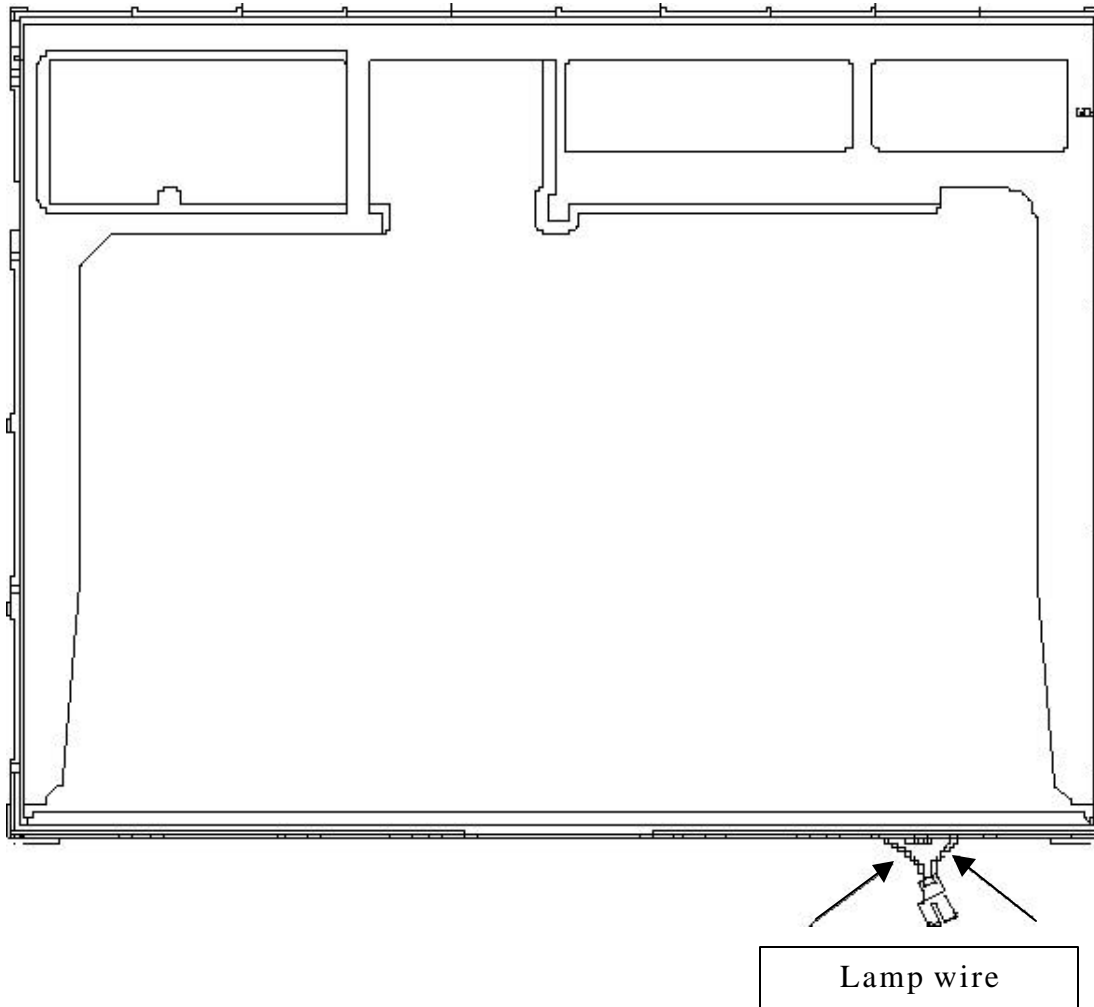*Figure 4-111   Replacing Samsung fluorescent lamp (SXGA+) (8)*

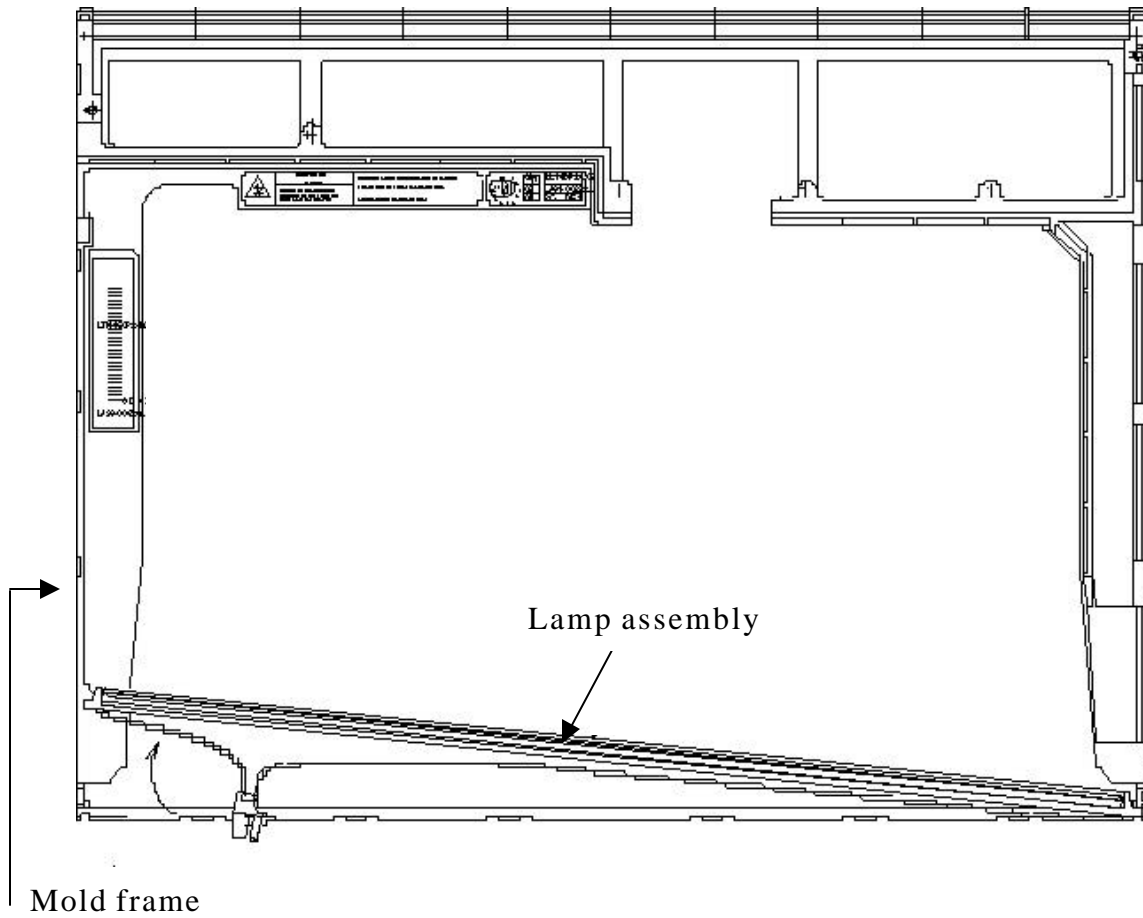9.   Remove the lamp assembly from the mold frame.

Lamp assembly

Mold frame

Figure 4-112   Replacing Samsung fluorescent lamp (SXGA+) (9)

Assembling the 15.0-inch SXGA+Samsung Fluorescent Lamp

The assembly procedure is the reverse of the above disassembly procedure.

4.30.7 Replacing the 15.0-inch SXGA+ Sharp Fluorescent Lamp

To disassemble the 15.0-inch SXGA+ Sharp fluorescent lamp, follow the steps below and refer to Figures 4-113 to 4-122.

> *CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.*

Disassembling the 15.0-inch SXGA+ Sharp Fluorescent Lamp

1. Turn the LCD module face down, and remove the protection cover S (A), protection cover G (B), fixing tape (C) and fixing tape for lead wire (C).

> *NOTE: 1) Be careful not to damage the TCP or chips.*
>
> *2) Discard the tapes removed. Do not reuse them.*
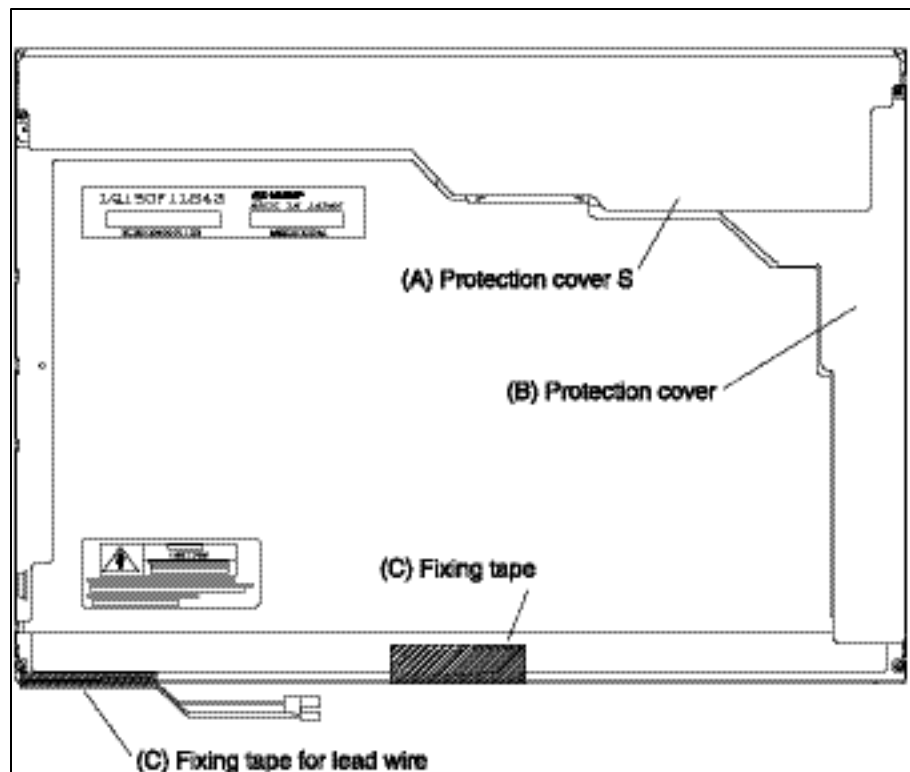
Figure 4-113 Replacing Sharp fluorescent lamp (SXGA+) (1)

2.   Remove the four screws on the sides.
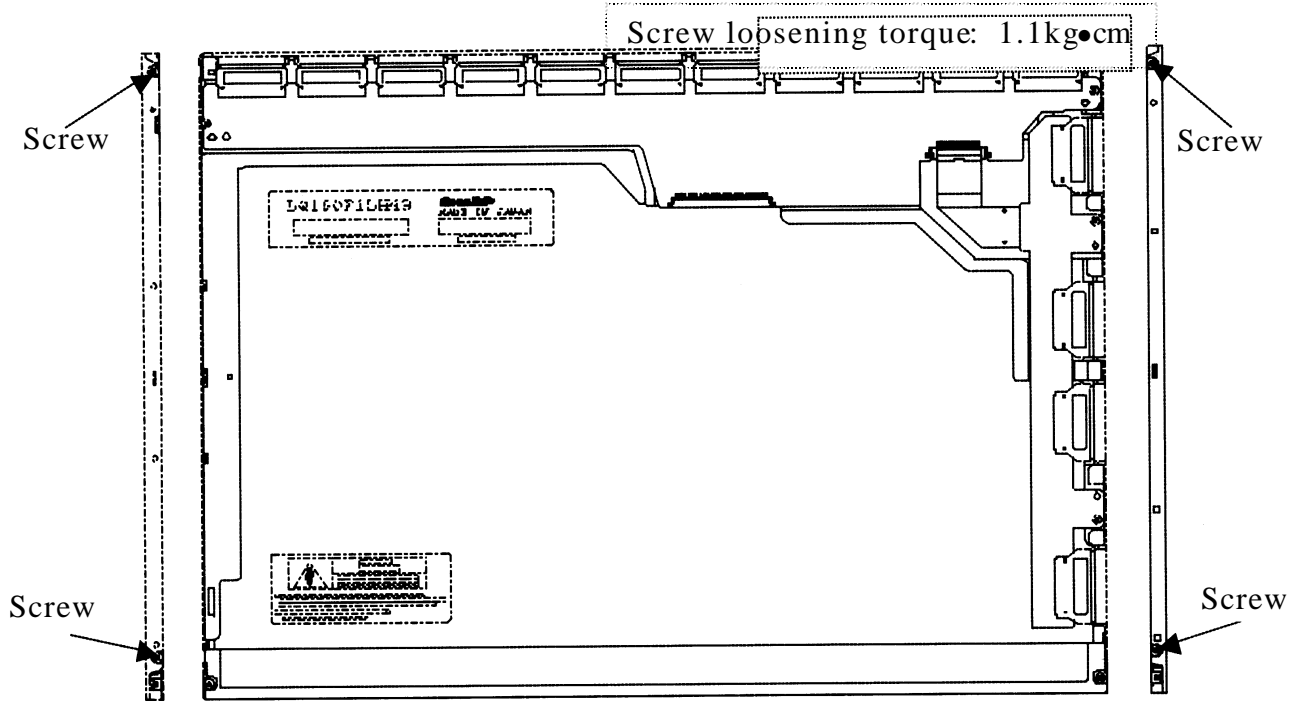
Figure 4-114 Replacing Sharp fluorescent lamp (SXGA+) (2)

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

(3) Release the hook of the
bezel from the lamp cover.

(E) Bezel

< Side view >

Hook

(1) Release the bezel from the
four latches of the lamp cover.

(2) Release the two
latches on the P-chassis.
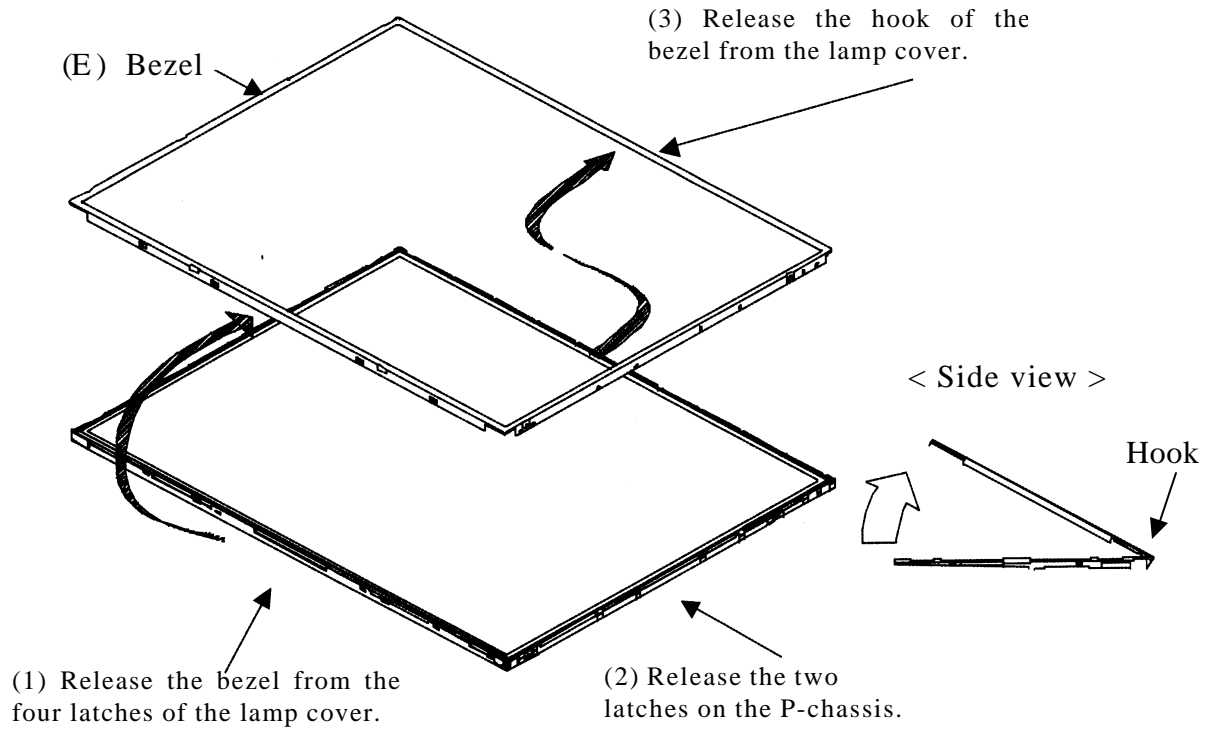
Figure 4-115 Replacing Sharp fluorescent lamp (SXGA+) (3)

4. Turn the LCD module face down. Remove the four screws fixing the board and remove the FPC (G). Open the bent portion of the TCP of the board and remove the backlight.

Screw loosening torque: 0.9kg•cm

Screw

Screw

LQ150P1LH43

Open the cap of the connector and remove the FPC.

Screw

(G) FPC

Screw

Screw
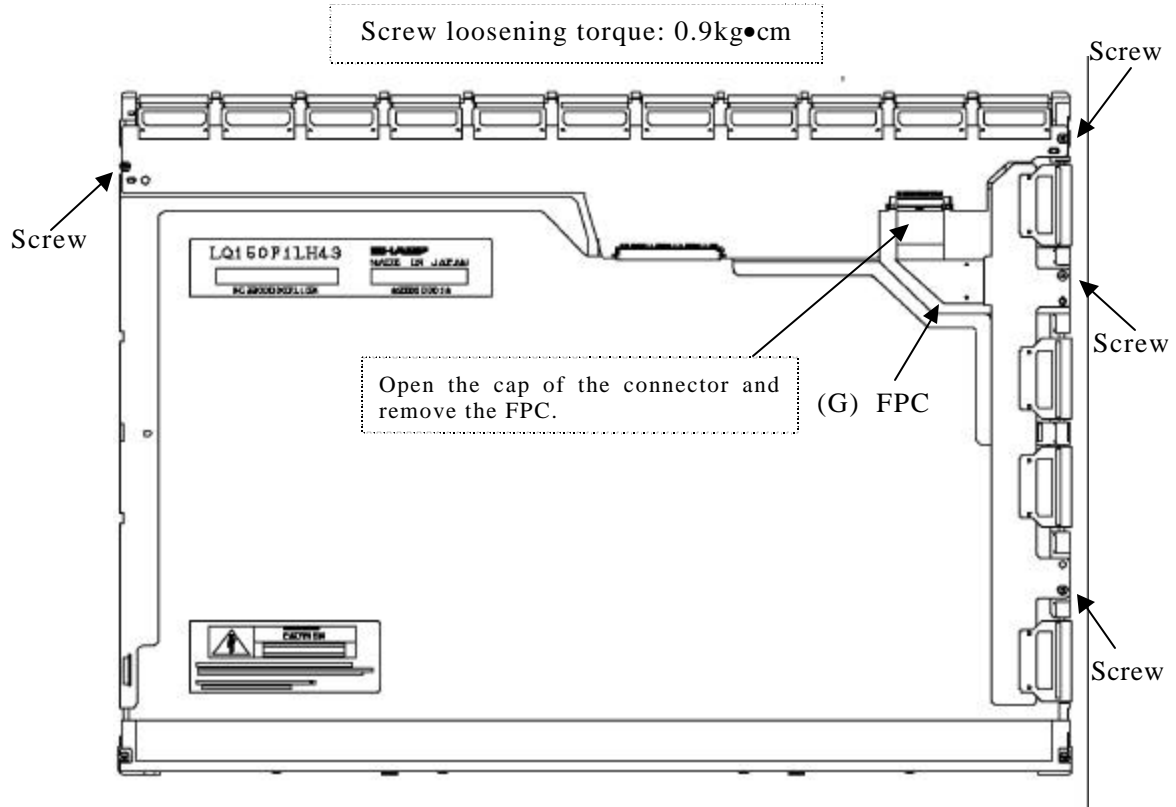
Figure 4-116 Replacing Sharp fluorescent lamp (SXGA+) (4)
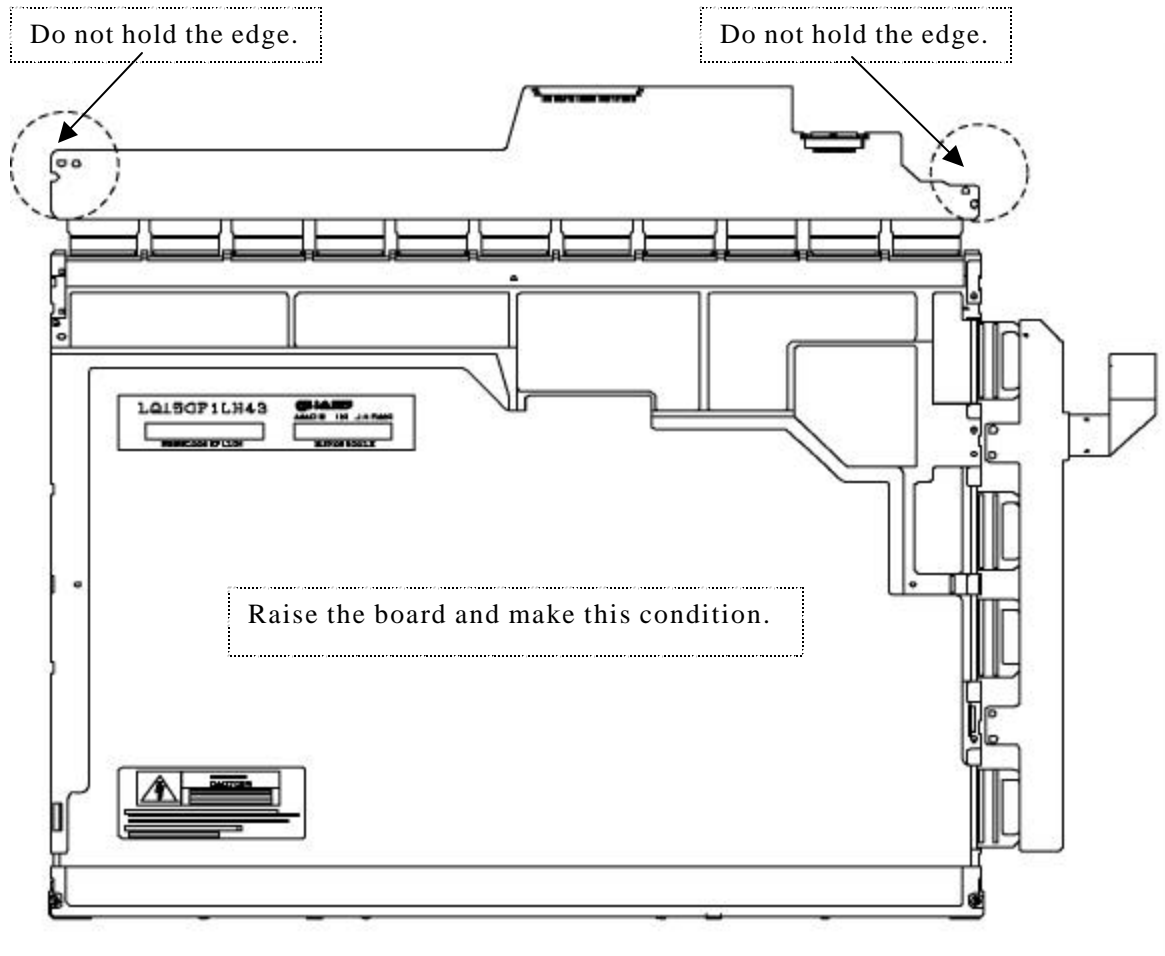
Figure 4-117 Replacing Sharp fluorescent lamp (SXGA+) (5)

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

> **NOTE:** *Wear finger sacks or gloves during the work not to soil or scratch the LCD panel or backlight unit.*
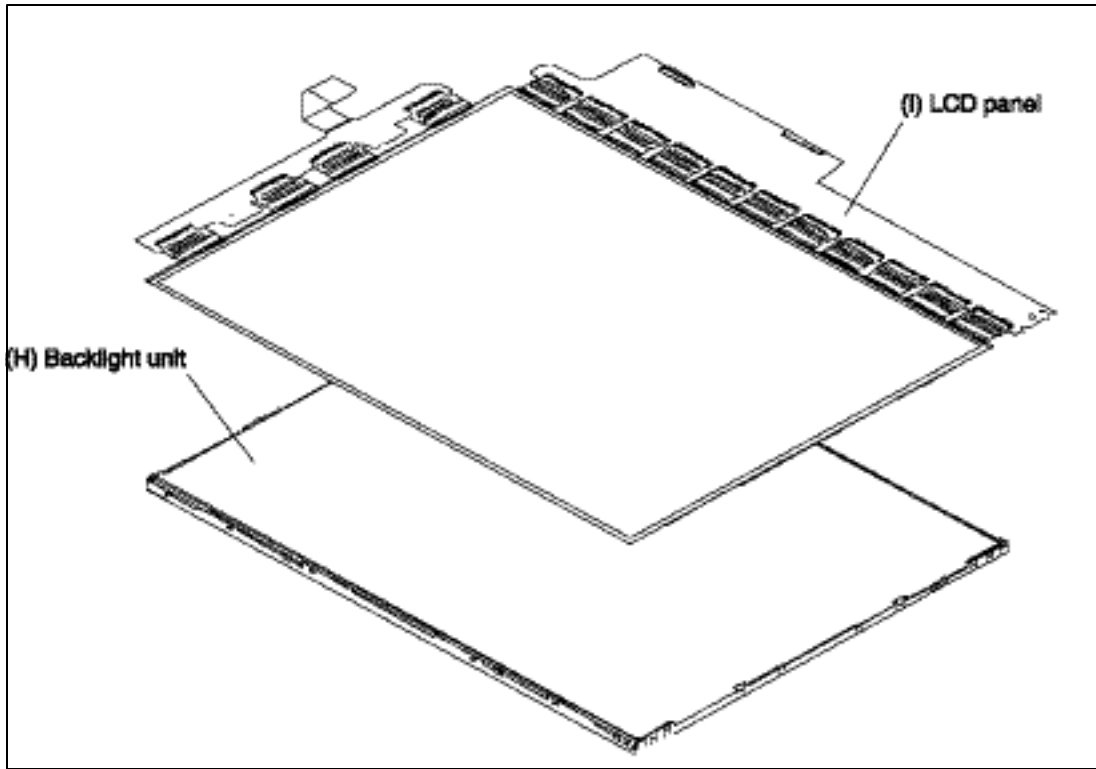
Figure 4-118 Replacing Sharp fluorescent lamp (SXGA+) (6)

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.*
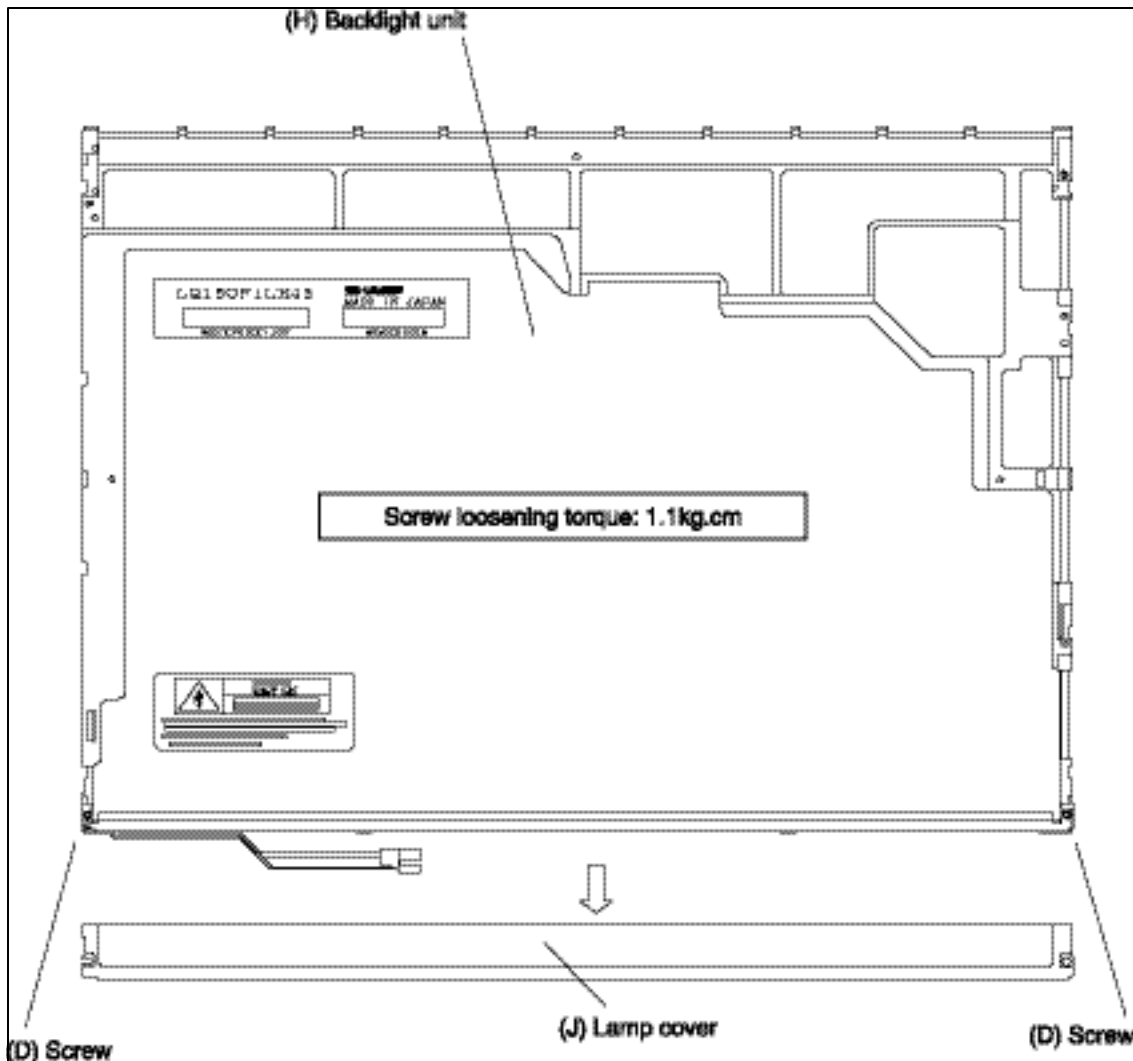
Figure 4-119 Replacing Sharp fluorescent lamp (SXGA+) (7)

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

NOTE: The light guide and sheets are reused. Be careful not to scratch or soil them.
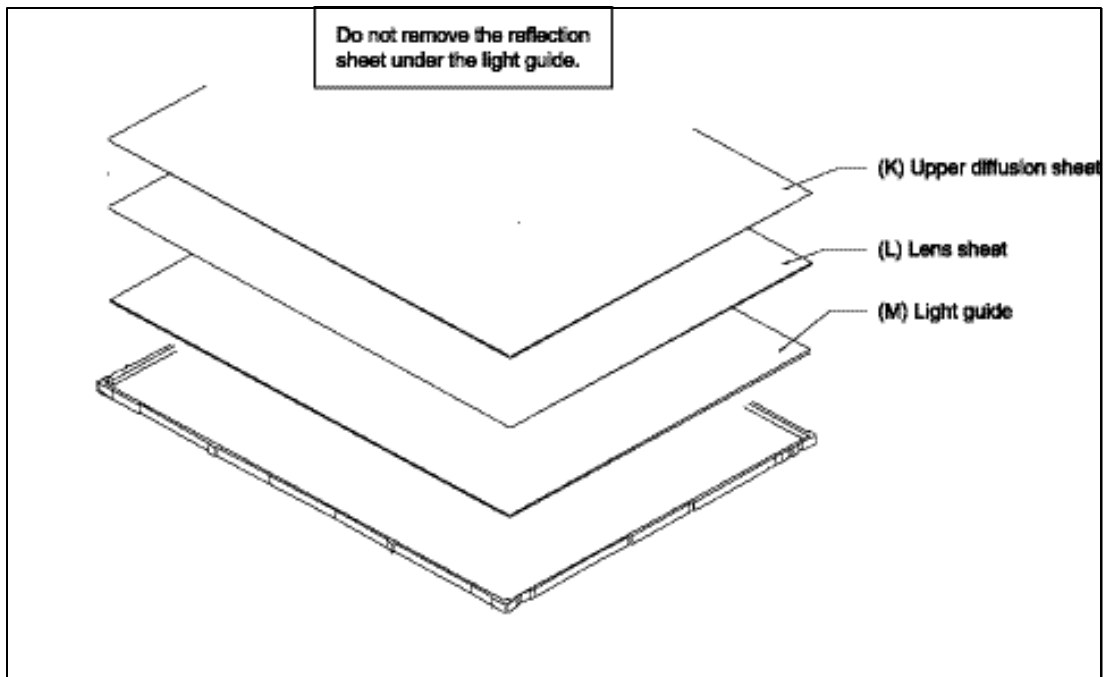
Figure 4-120 Replacing Sharp fluorescent lamp (SXGA+) (8)

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

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

(N) Double-sided tape 1

(P) Double-sided tape 3

(O) Double-sided tape 2

(Q) Double-sided tape 4
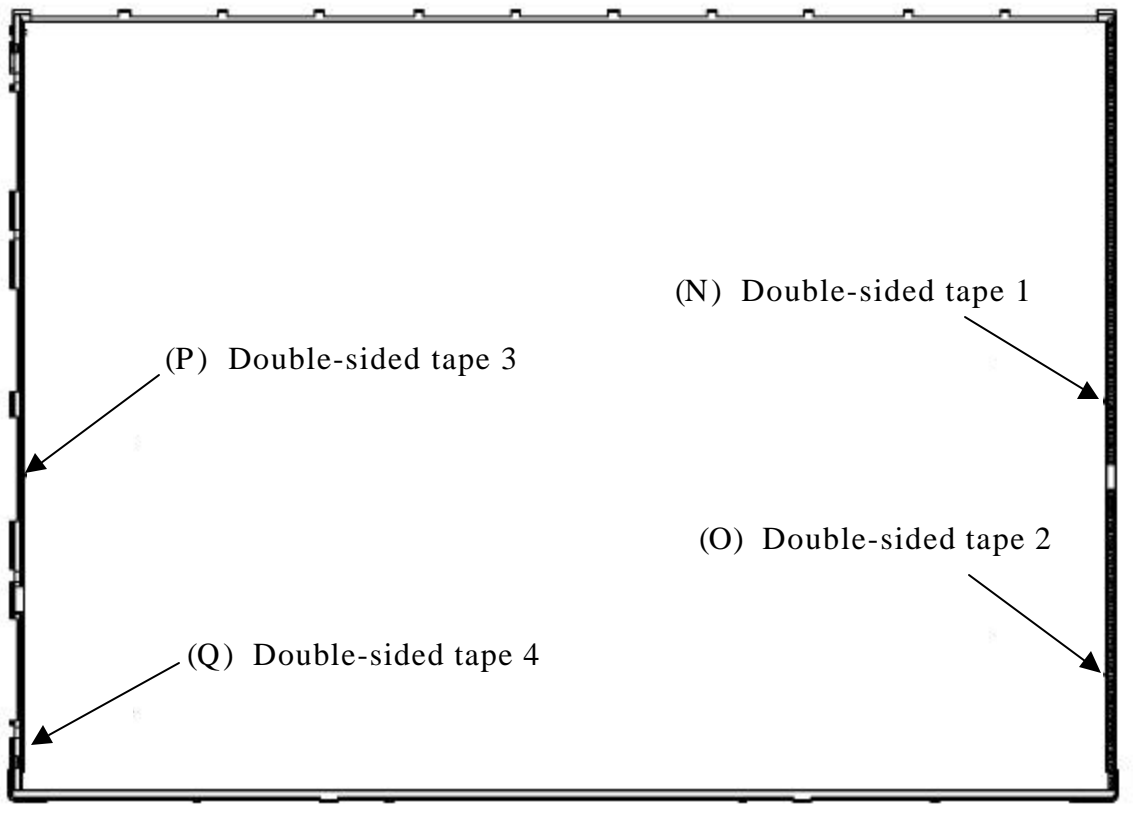
Figure 4-121 Replacing Sharp fluorescent lamp (SXGA+) (9)

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

CAUTION: *When removing the lamp unit, be careful not to break the lamp, or bend the reflection sheet.*
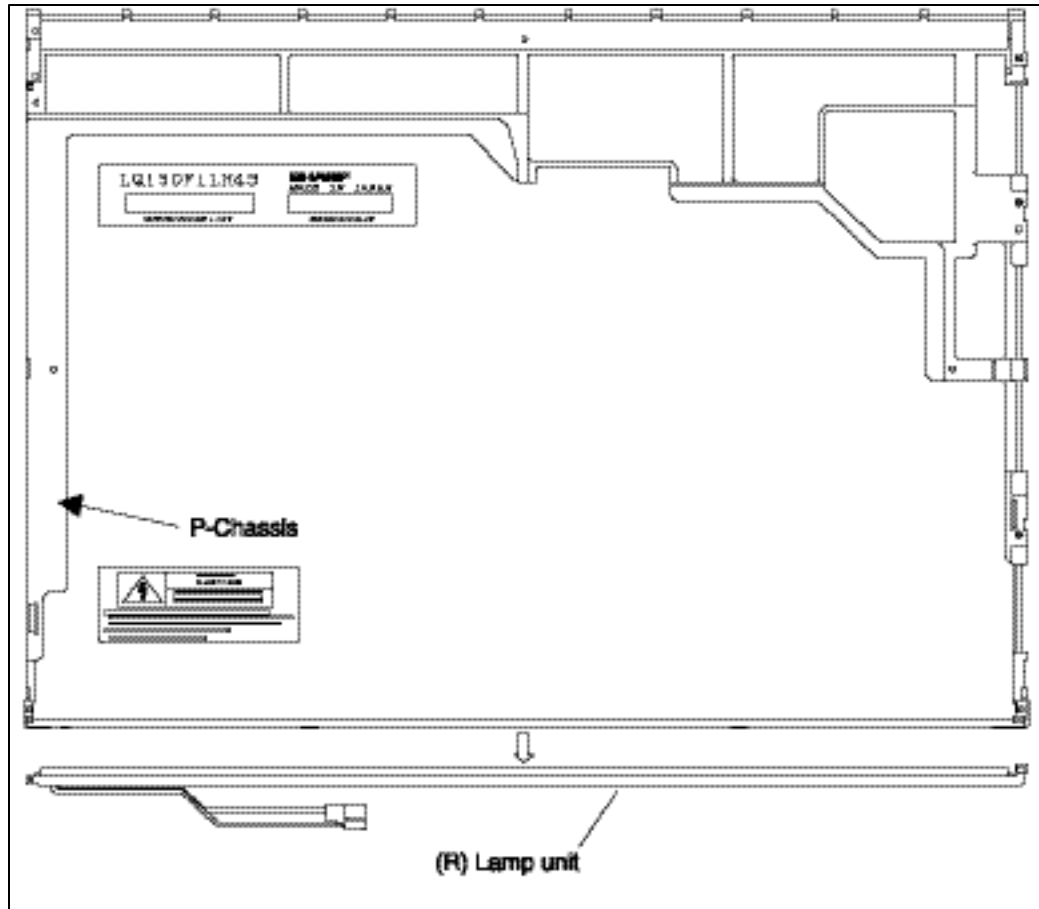
Figure 4-122 Replacing Sharp fluorescent lamp (SXGA+) (10)

Assembling the 15.0-inch SXGA+ Sharp Fluorescent Lamp

To assemble the 15.0-inch SXGA+ Sharp fluorescent lamp, follow the steps below and refer to Figures 4-123 to 4-137.

1. Stick the four double-sided tapes (N, O, P, Q) on the P-chassis.
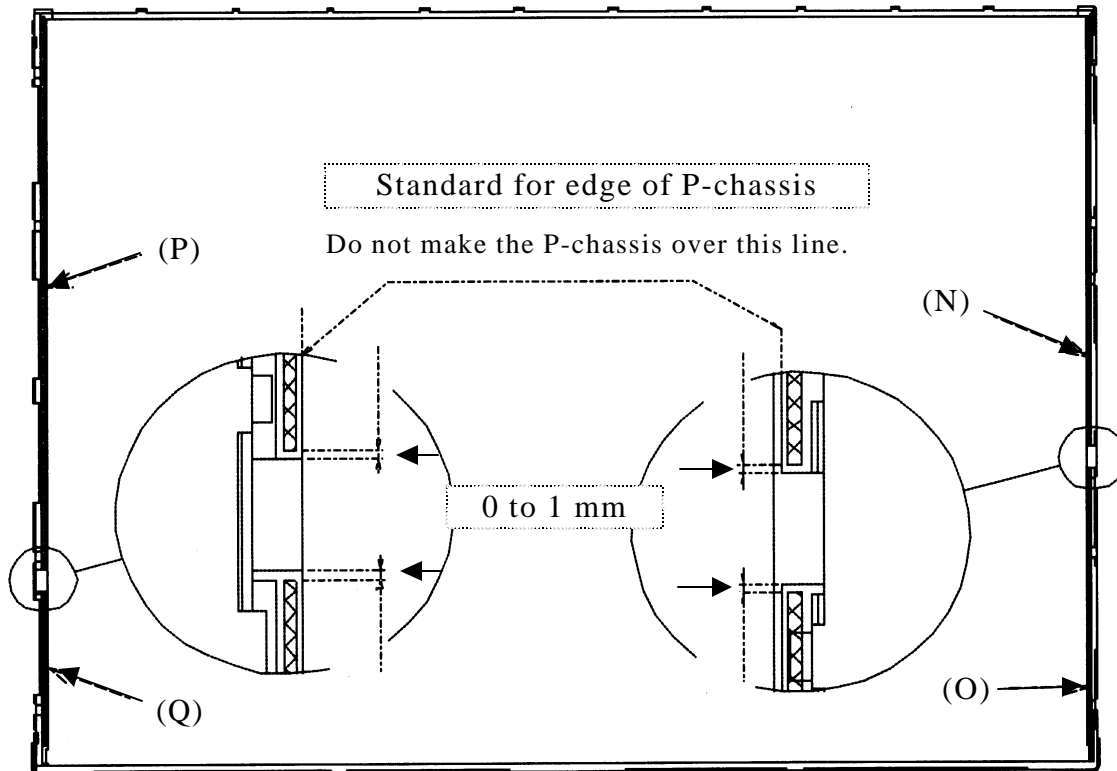
Figure 4-123 Replacing Sharp fluorescent lamp (SXGA+) (11)

2. Turn the backlight unit face down and install a new lamp unit (R) on the P-chassis.
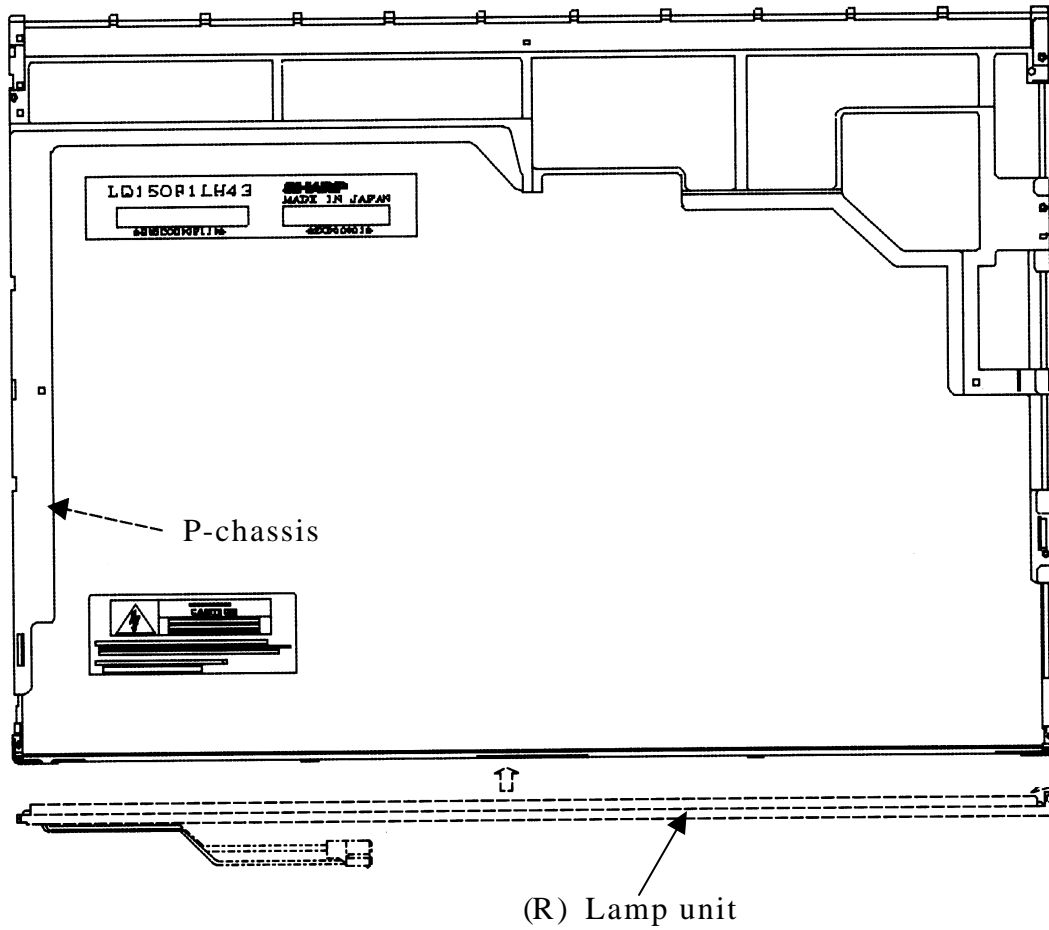
Figure 4-124 Replacing Sharp fluorescent lamp (SXGA+) (12)

NOTE: *When install the lamp unit, be careful not to bend or damage the reflection sheet.*
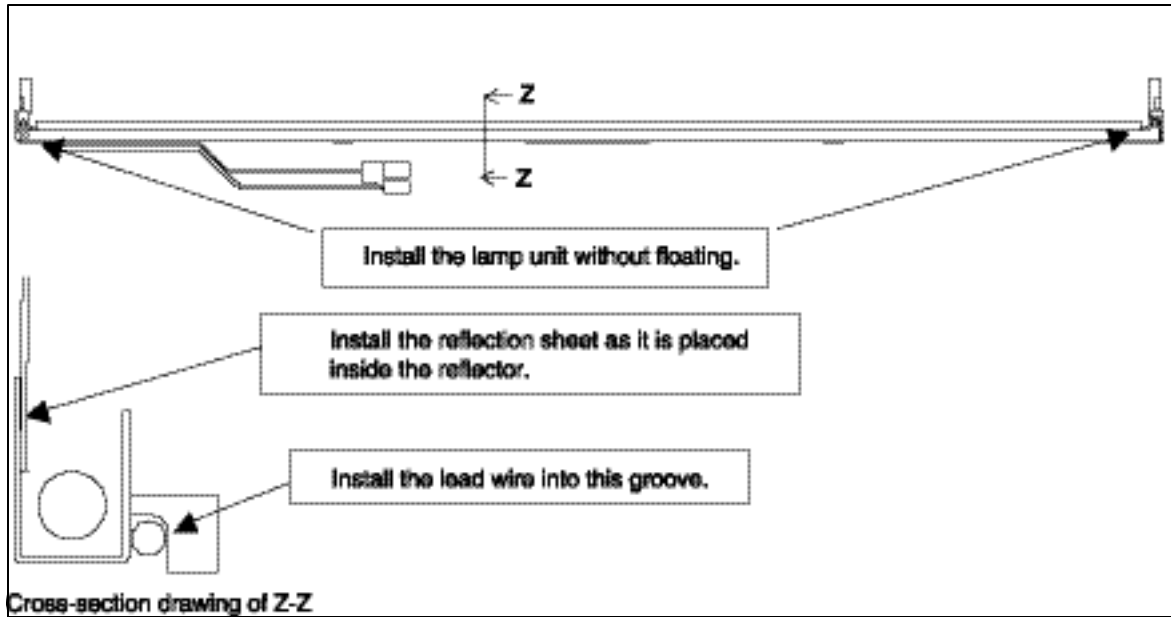
Figure 4-125 Replacing Sharp fluorescent lamp (SXGA+) (13)

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

(J) Lamp cover

(D) Screw   (D) Screw

Screw tightening torque: 0.9kg•cm
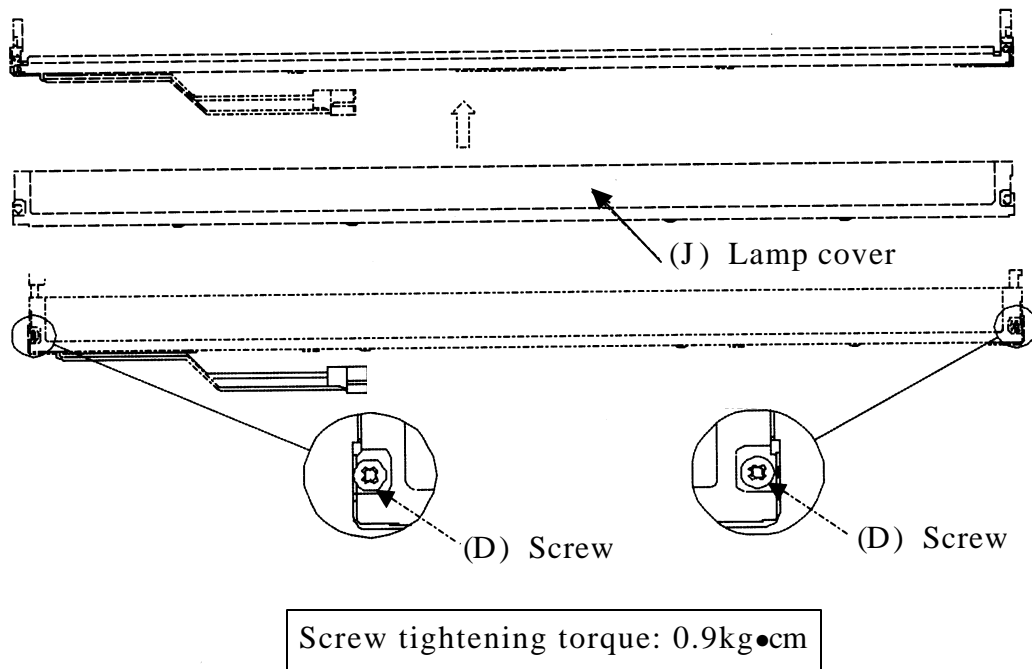
Figure 4-126 Replacing Sharp fluorescent lamp (SXGA+) (14)

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

Insert the light guide straight not to deform the reflector.

Backlight unit
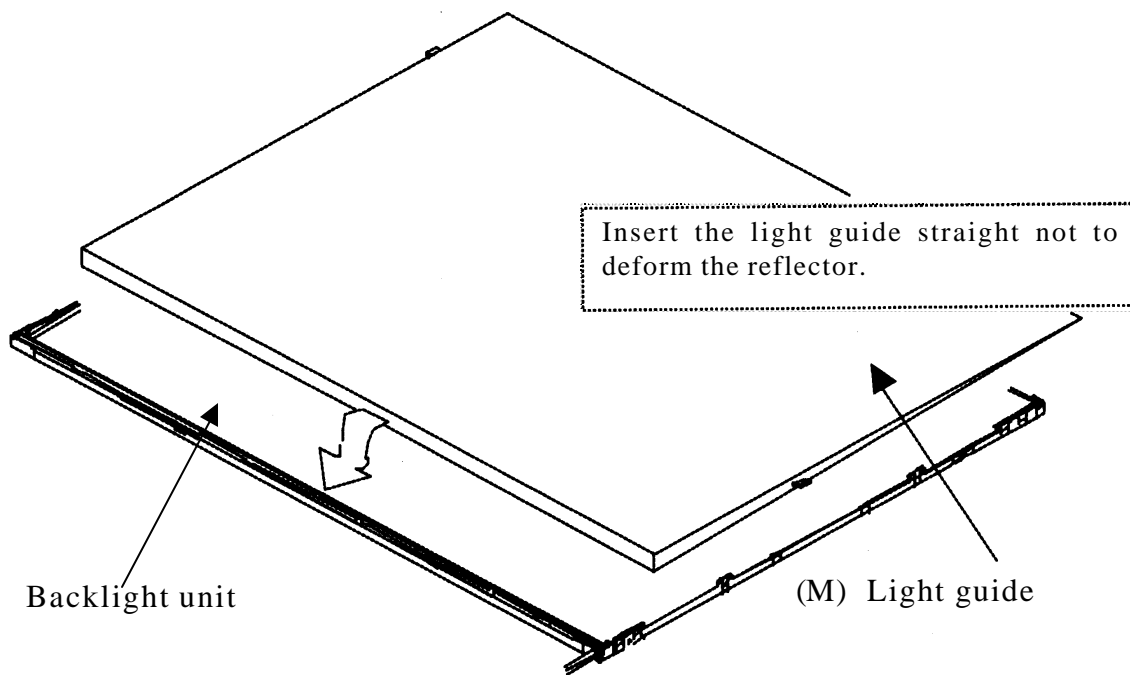
(M) Light guide

Figure 4-127 Replacing Sharp fluorescent lamp (SXGA+) (15)

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

(K) Upper diffusion sheet

(L) Lens sheet

(M) Light guide

Make sure there is no dust or scratch.

Do not make any sheet over the edge of P-chassis
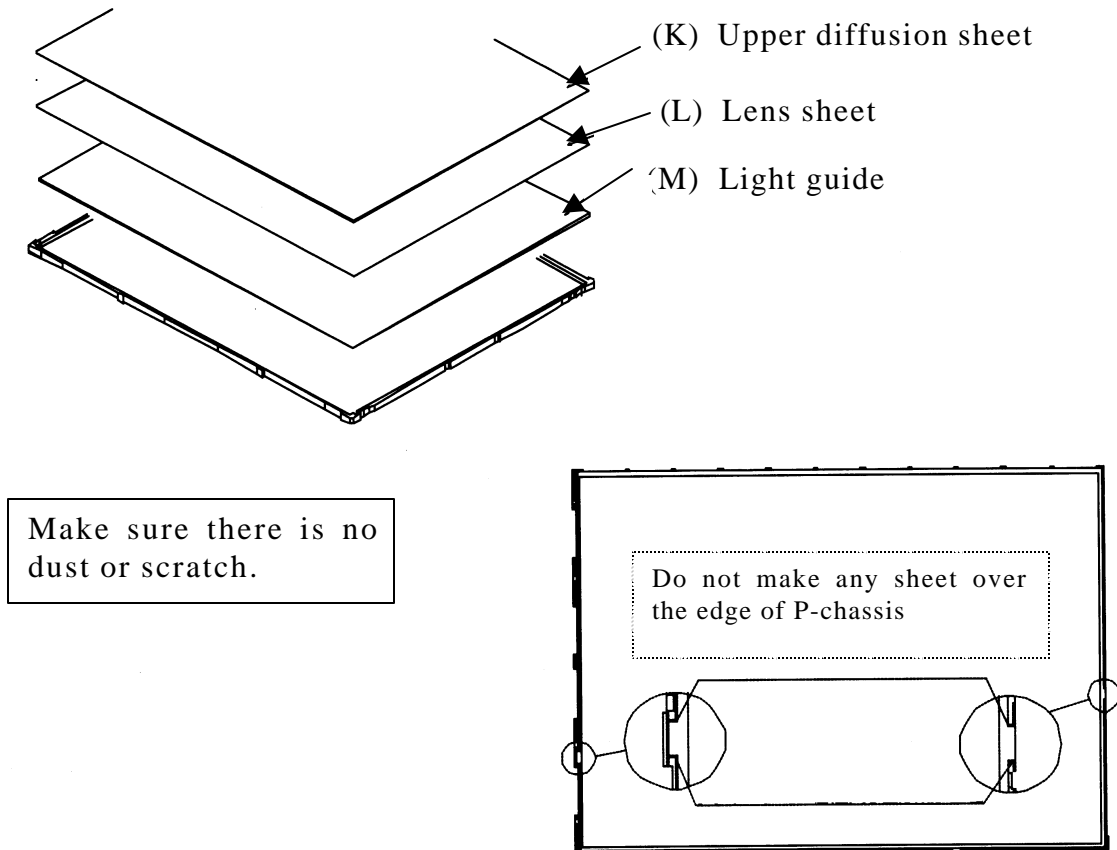
Figure 4-128 Replacing Sharp fluorescent lamp (SXGA+) (16)

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.
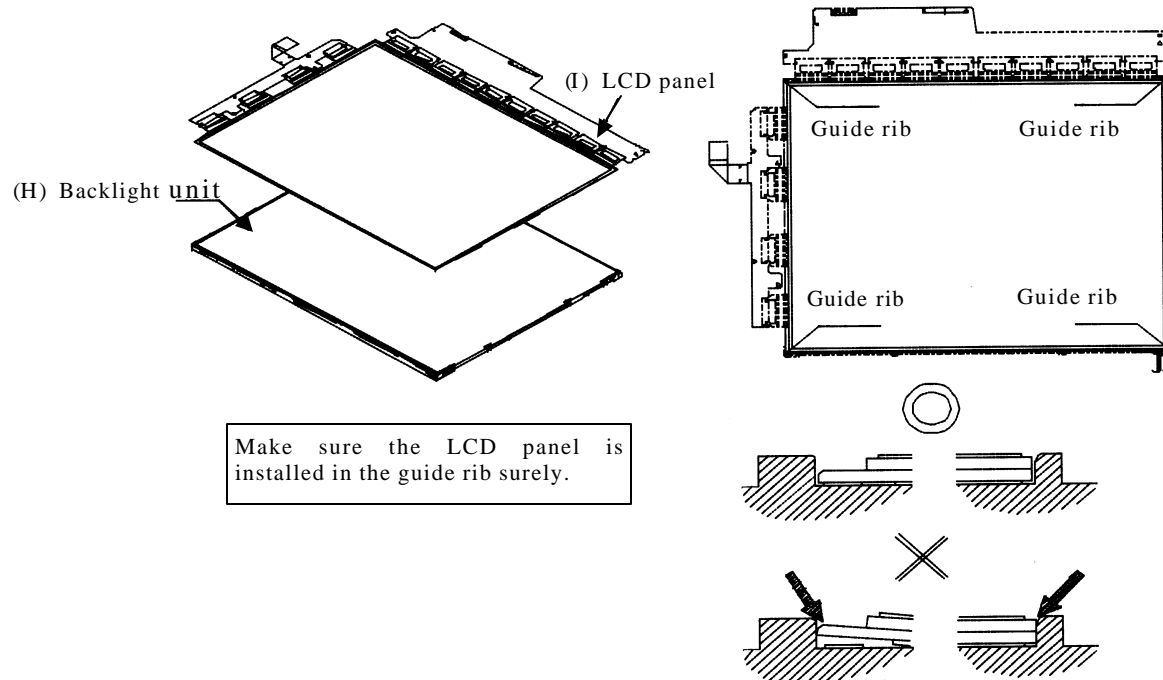
Figure 4-129 Replacing Sharp fluorescent lamp (SXGA+) (17)

7. Bend the TCP attaching to the source board and secure it with the two screws. Then bend the TCP attaching to the gate board with the two screws and insert the FPC (G) into the connector of the source board.

Do not hold the edge.   Do not hold the edge.
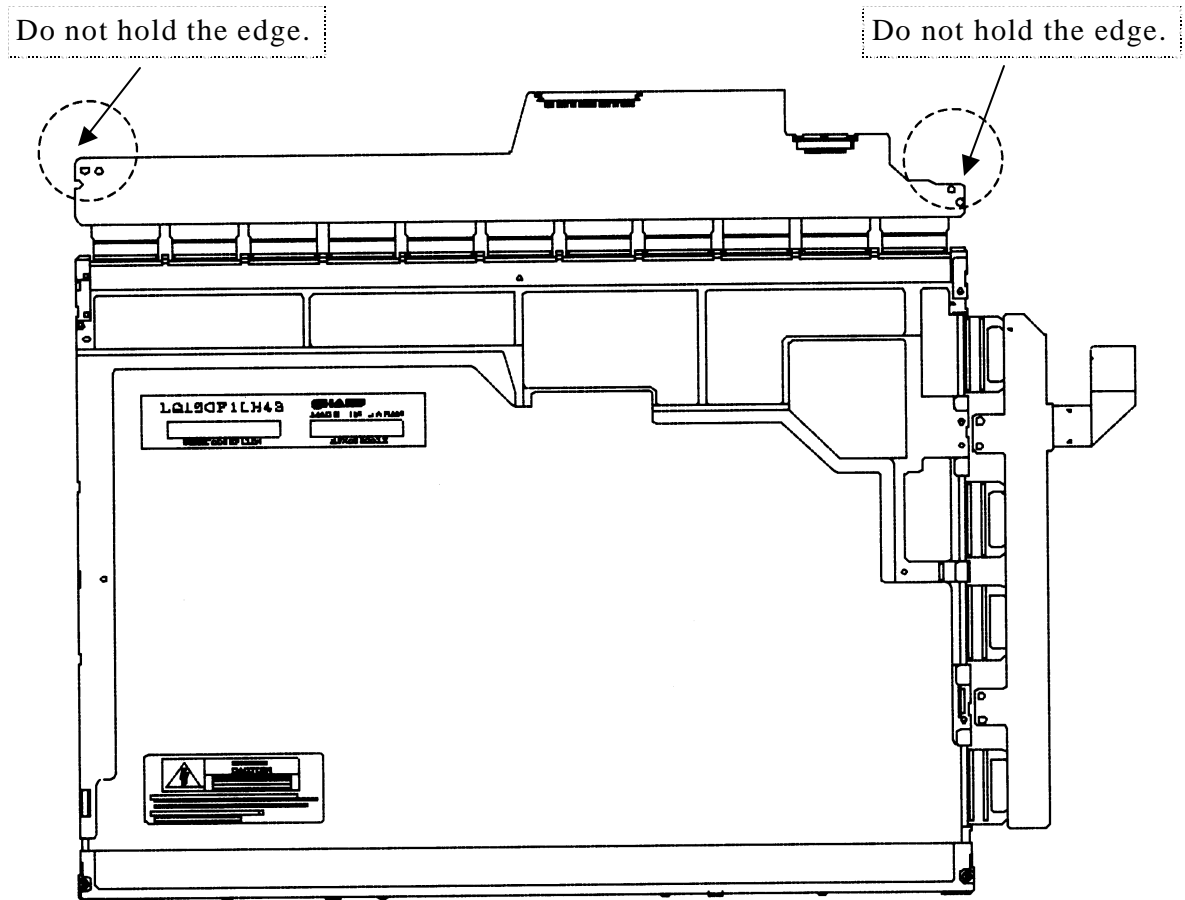
Figure 4-130 Replacing Sharp fluorescent lamp (SXGA+) (18)

Check the condition after mating.
*Check the condition of the concave portion of
 the FPC and the outline of the connector.
*Insert the FPC to the end. There shall be no
 out of position in θ.
*Lock surely the connector.

Poor mating: Failure

Out-of-position in θ: Failure

Fold the source board.

Fit the pin and the hole.

Screw

Screw

Screw

LQ150F1LH43

Fit the pin and the hole.

(G)

Fit the pin and the hole.

Screw tightening torque: 0.9kg•cm

Do not cover the projection.

Fold the gate board.

Screw

Figure 4-131 Replacing Sharp fluorescent lamp (SXGA+) (19)

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

(E) Bezel   (1) Hitch the hook of the bezel
                                   on the rib of the P-chassis.

< Side view >

Hook
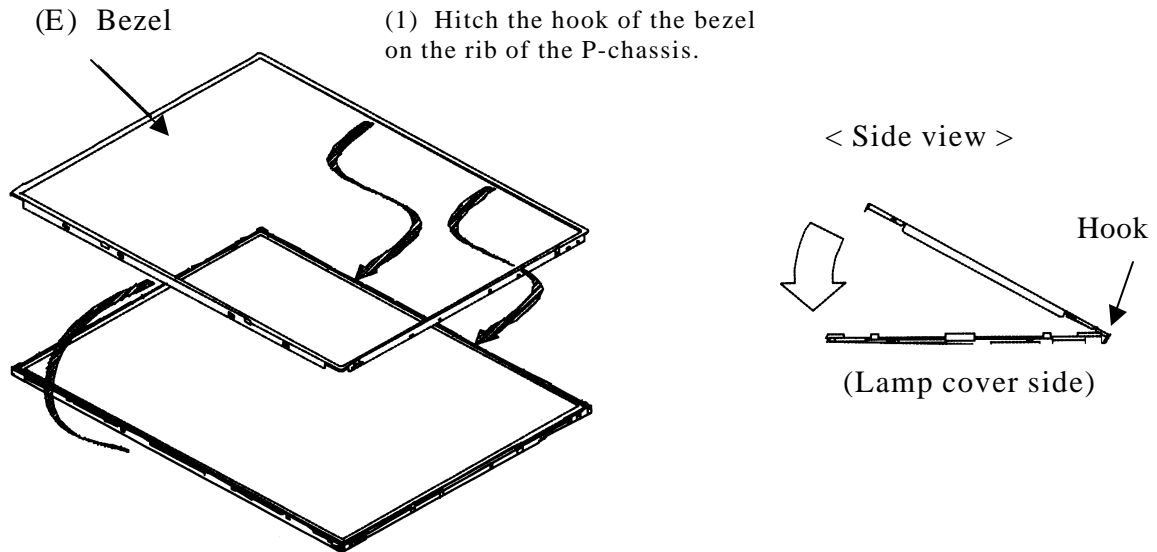
(Lamp cover side)

(2) Lean the bezel on the lamp cover
without interference with the TCP.

Figure 4-132 Replacing Sharp fluorescent lamp (SXGA+) (20)

Make sure of mating of the bezel and the rib of the P-chassis.

Make sure of mating of the bezel and the latch of the P-chassis.

Make sure of mating of the bezel and the latch of the P-chassis.
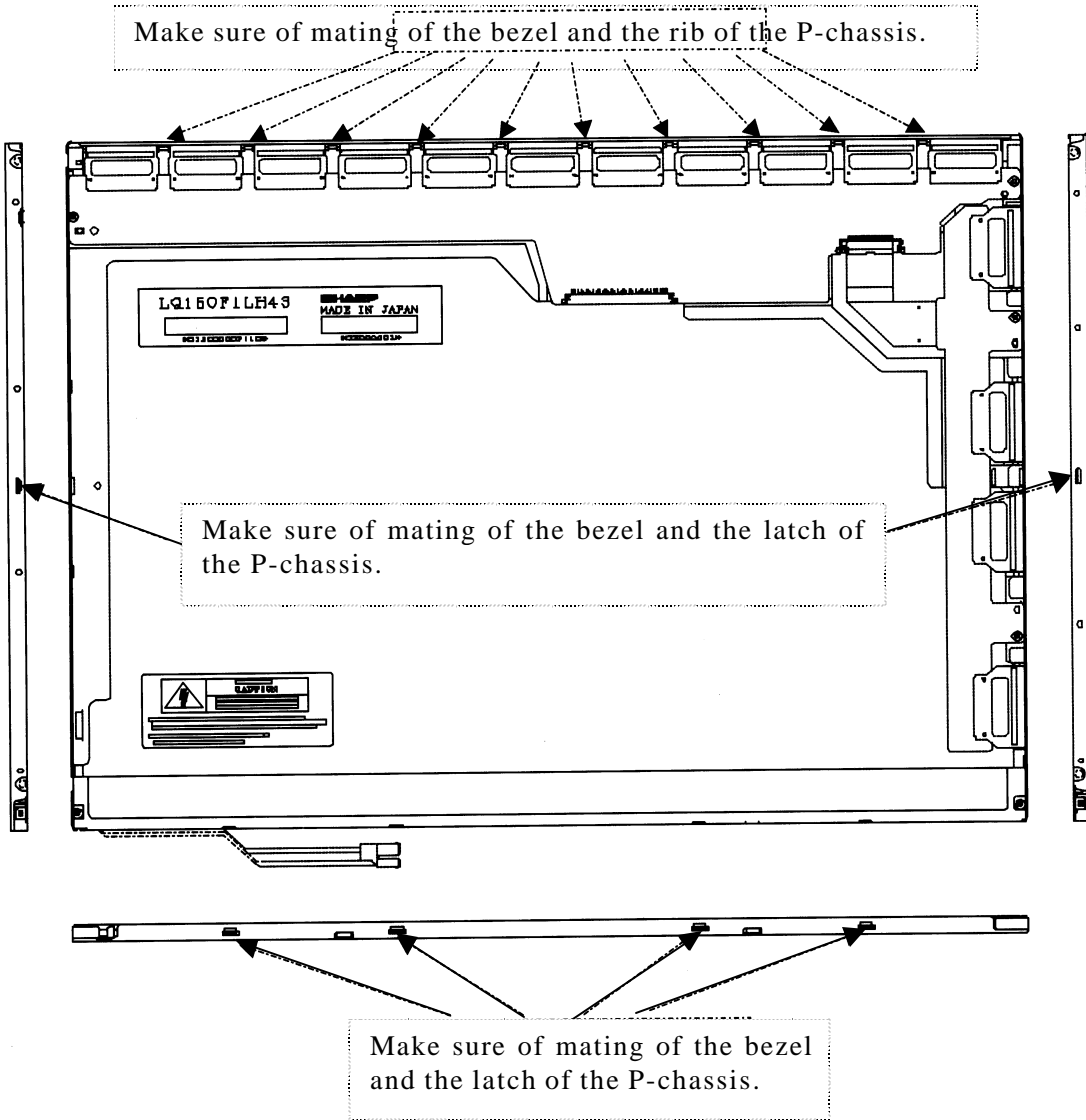
Figure 4-133 Replacing Sharp fluorescent lamp (SXGA+) (21)

9. Secure the sides of the unit with the four screws.
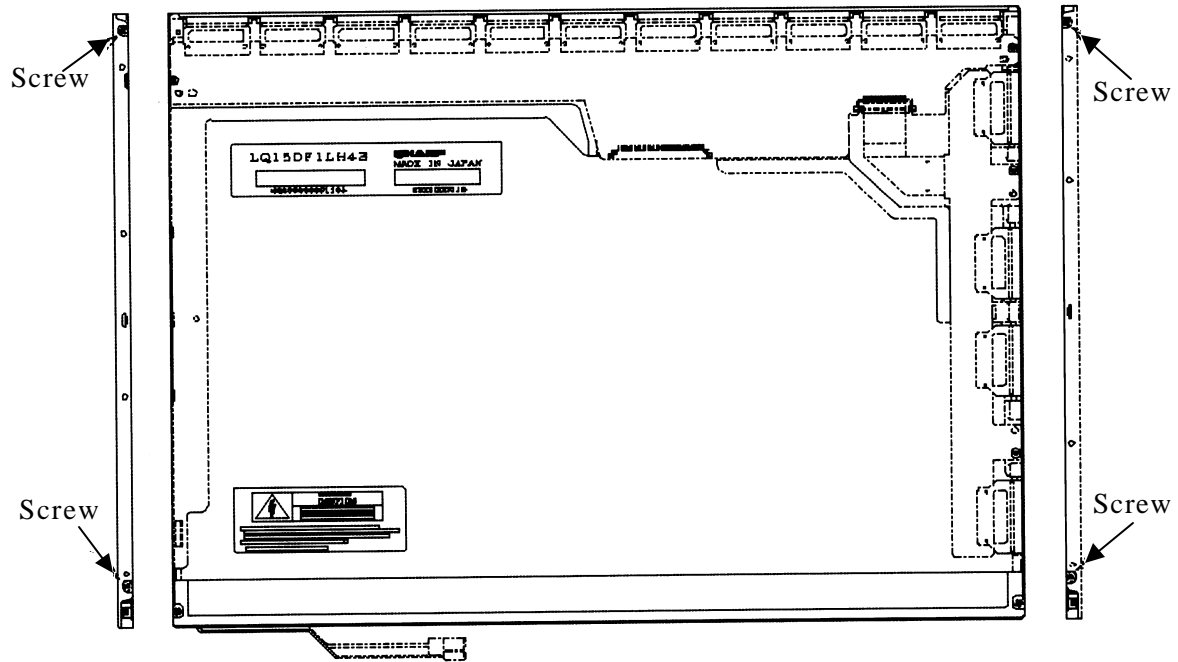
Figure 4-134 Replacing Sharp fluorescent lamp (SXGA+) (22)

10. Stick the protection cover G (B).

Outline standard for the gate board

(B) Protection cover G
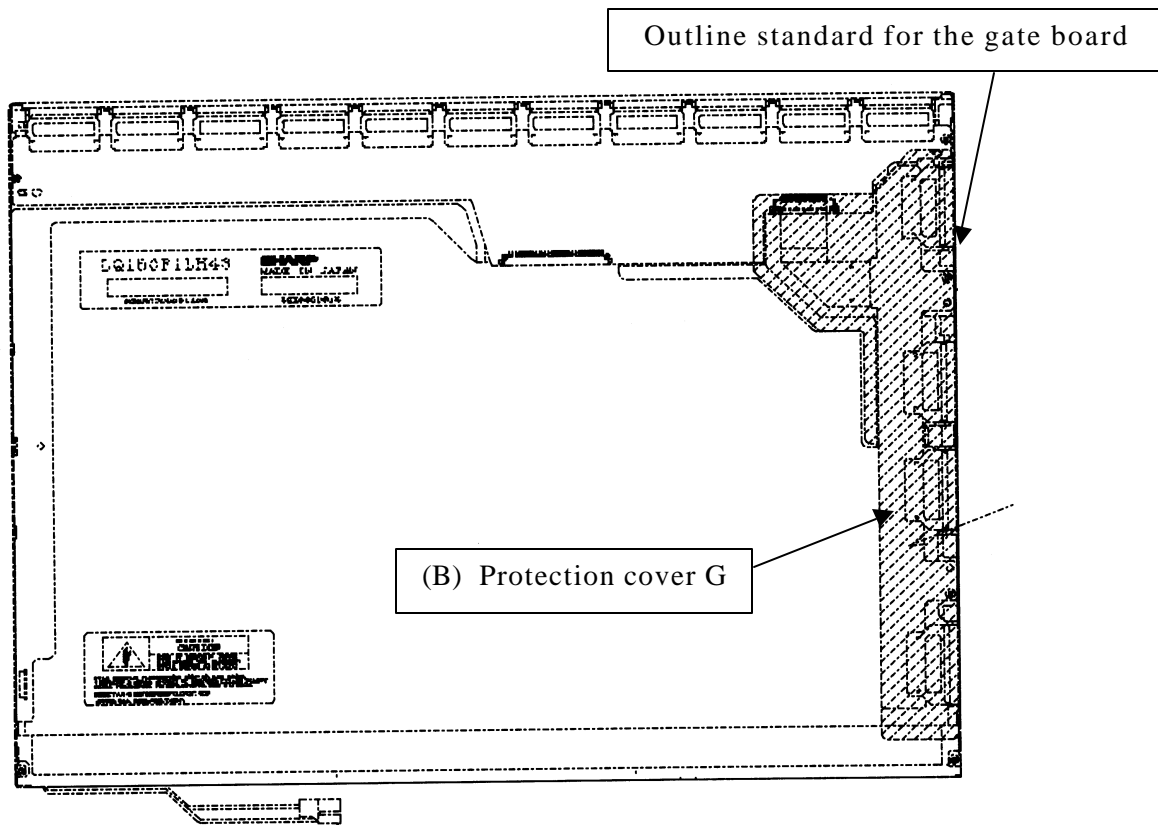
Figure 4-135 Replacing Sharp fluorescent lamp (SXGA+) (23)

11. Stick the protection cover S (A), fixing tape (C), fixing tape for lead wire (D).

Stick to the side of the bezel.

Fit the cover according to
the outline of the screw.

Fit the cover according to
the outline of the screw.

(A)

Make sure the lead wire is
closely attached to the bezel.

Stick the fixing tape at
the center of the module.

0 to 1 mm

0 to 0.5 mm

(D)   (C)

Do not make the tape over the
top of the module.

The tape MUST NOT appear on the display.

Stick the tape according to the outline of the
module. Make sure the tape does not appear
on the side of the module.

Figure 4-136 Replacing Sharp fluorescent lamp (SXGA+) (24)

Make sure the edge of plastic resin is between ± 0.5.

Edge of plastic resin

0 to 1 mm

0 to 1 mm

Standard for the outline of board

Standard for the outline of screw (left and right)
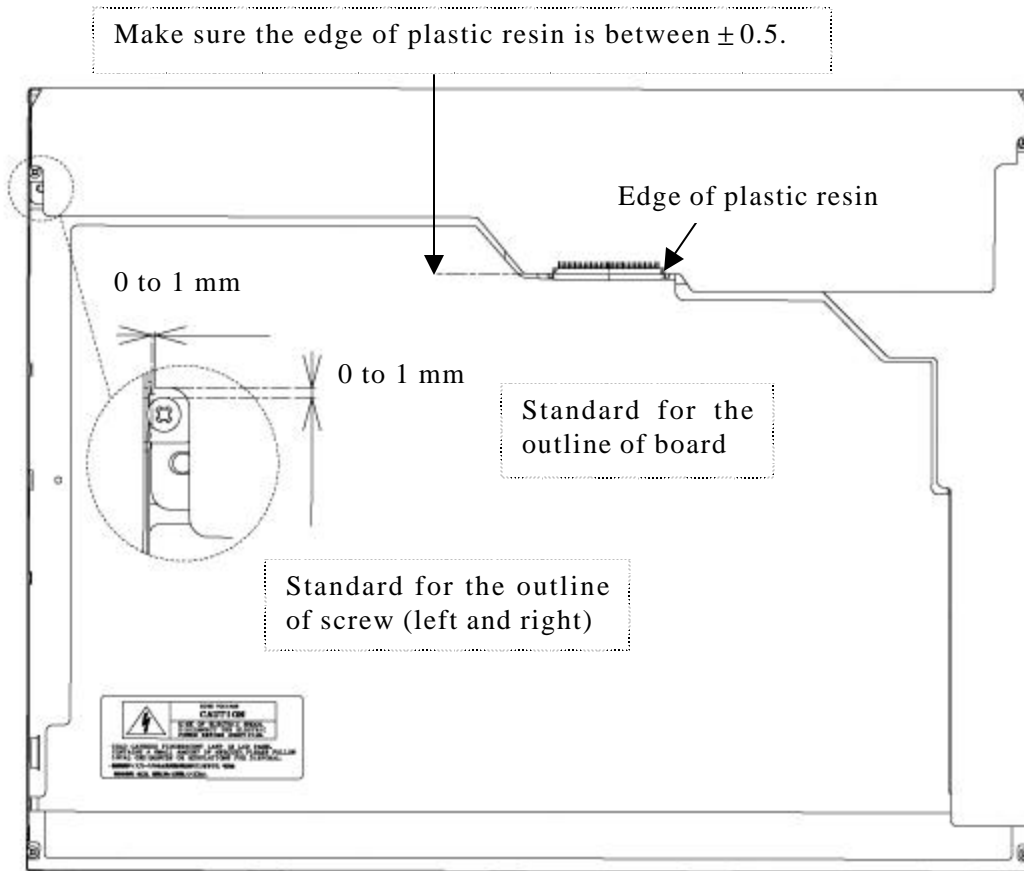
Figure 4-137 Replacing Sharp fluorescent lamp (SXGA+) (25)

4.30.8 Replacing the 14.1-inch XGA TOSHIBA 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 14.1-inch XGA TOSHIBA Fluorescent Lamp

To disassemble the 14.1-inch XGA TOSHIBA fluorescent lamp, follow the steps below and refer to figures 4-138 to 4-142.

Peeling off the tapes and insulation sheets

1. Flip the module over and place it on a flat surface that is free of foreign objects.

2. In the order (1), (2), and (3) shown in Figure 4-138, remove the tape for fixing the FL tube cable, two pieces of tape on the bezel that are close to the FL tube, and the X-PCB insulation sheet.

> *CAUTION: 1) Use care not to damage the TAB.*
>
> *2) Leave the insulation sheet on the bezel to allow the reuse of the sheet.*
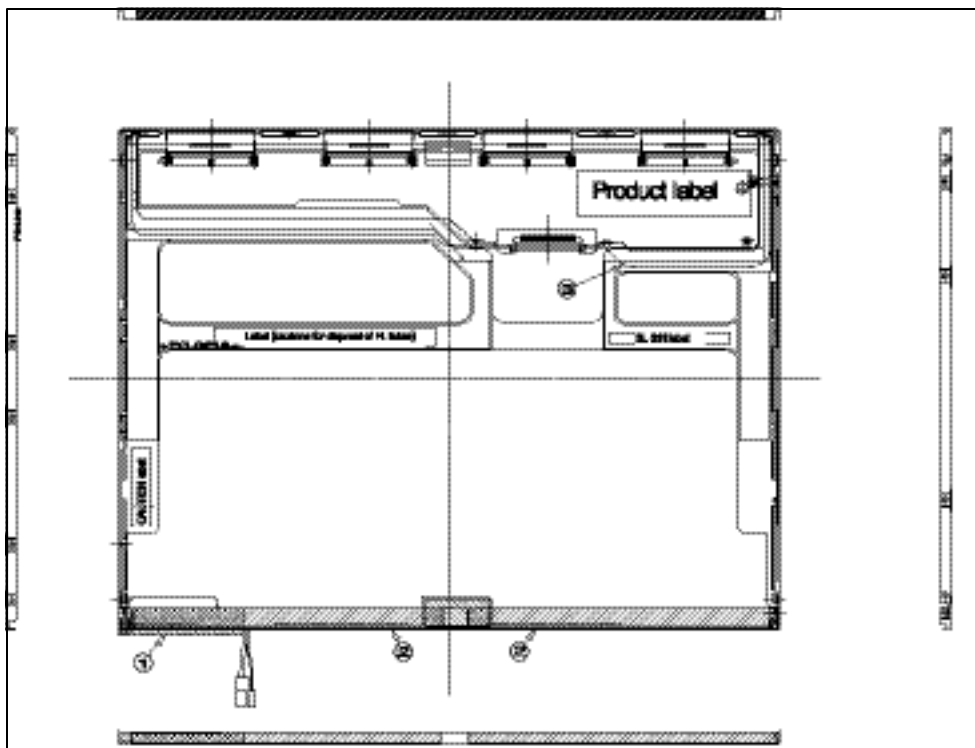
Figure 4-138 Removing the tape and insulation sheet

Removing the screws

1. Spread out the insulation sheet without detaching it from the side of the bezel, as shown in Figure 4-139.

2. In the order (1) and (2) shown in Figure 4-139, remove the screws from the left- and right-hand sides of the module.

CAUTION: *To unfasten the screws, use an insert bit of point size 0 for Philips*

screwdrivers.
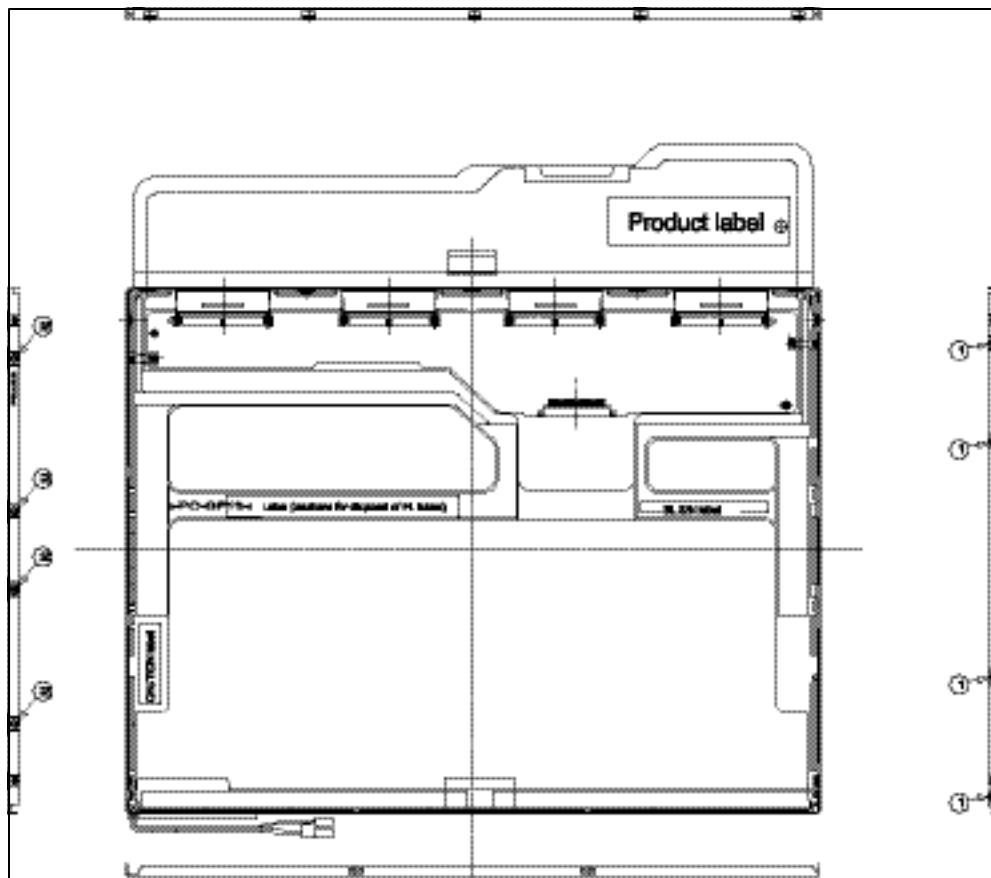
Figure 4-139 Removing the screws

Removing the bezel

1. Without removing the insulation tape, flip the module over again so that the display screen can face up.

2. Release the latches of the bezel and frame. (On the sides, there are five latches in the upper area and two latches in the lower area.)

3. Gently remove the double-sided tape from the cell at the reverse side of the bottom of the bezel and remove the bezel.

4. Remove the double-sided tape remaining at the bottom of the cell and on the reverse side of the bezel.

CAUTION: Do not damage the TAB when releasing the latches on the upper area. When removing the bezel, gently remove the top double-sided tape at the bottom of the surface of the bezel to prevent cell damage. Use care not to deform the bezel.
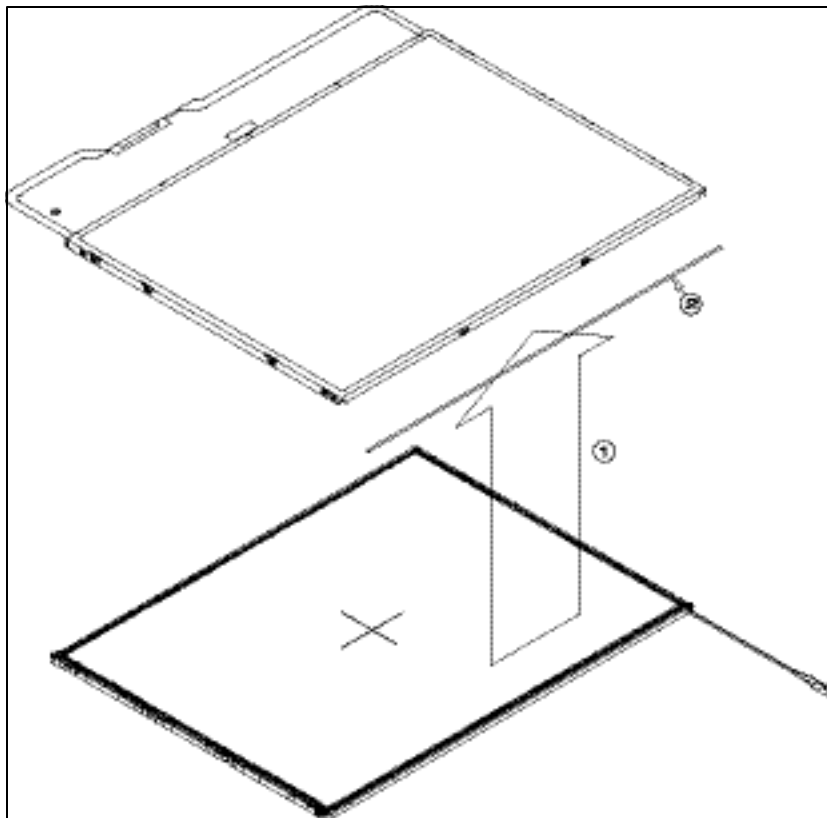
Figure 4-140 Removing the double-sided tape

Opening the PCB

1. Spread out the PCB horizontally, as shown in Figure 4-141.

CAUTION: *Use care not to damage the TAB.*
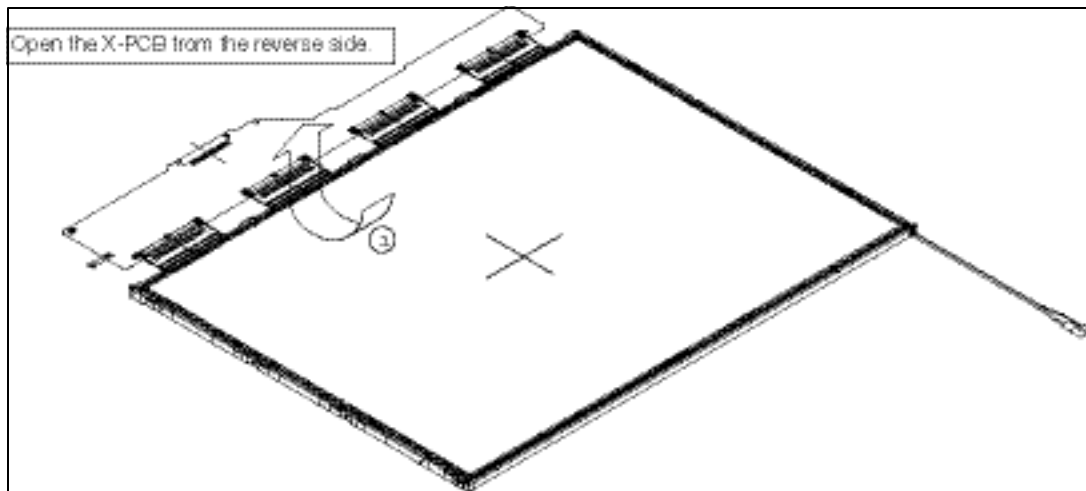
Figure 4-141 Spreading out the PCB horizontally

Removing the PCB-assembly cell

1. Remove the cell of the PCB assembly from the backlight assembly, as indicated by (1) in
    Figure 4-142. Completely remove the double-sided tape remaining on the reverse side of
    the cell.

CAUTION: On the cell, three areas are bonded to the frame with the double-sided tape
(as shown in Figure 4-142, one area is at the top, and two areas are at the bottom of both
sides). Remove the cell gently, taking care not to damage it.
Use care not to peel off the masking tape in the three areas on the cell.

Remove the cell by peeling off the three
pieces of double-sided tape.
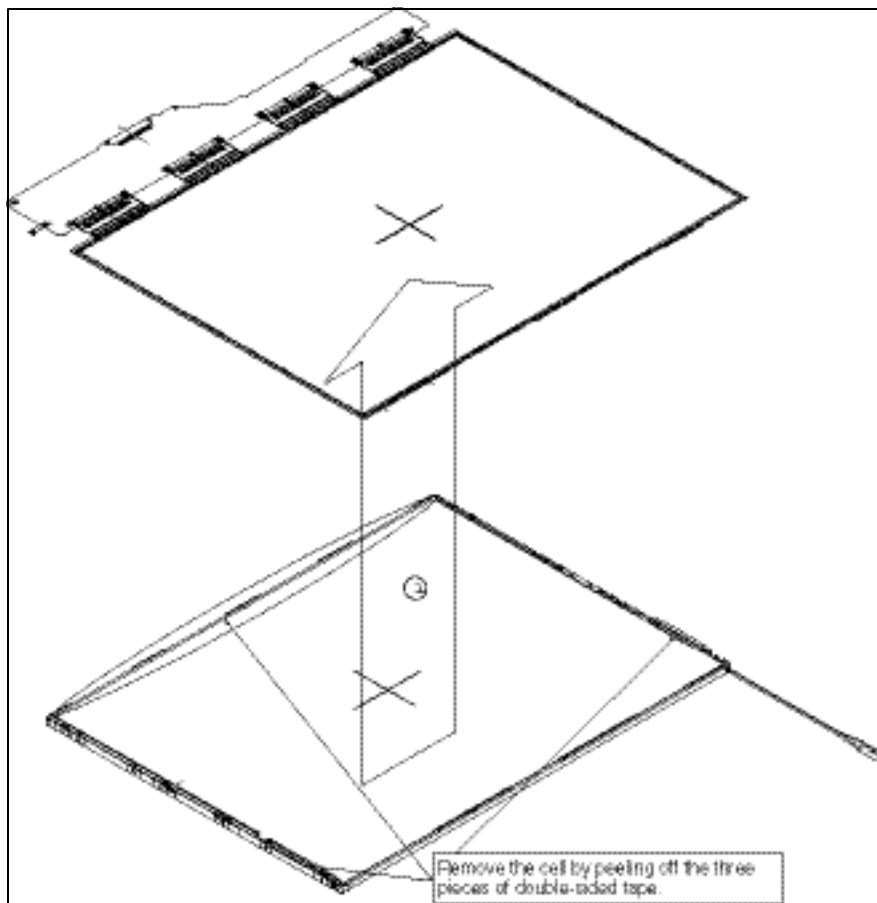
Figure 4-142 Removing the cell of the PCB assembly

Assembling the 14.1-inch XGA TOSHIBA Fluorescent Lamp

To assembling the 14.1-inch XGA TOSHIBA fluorescent lamp, follow the steps below and refer to figures 4-143 to 4-149.

  Putting the double-sided tapes on the bezel

1. Attach the double-sided tape to the reverse side of the bezel, as shown in Figure 4-143.
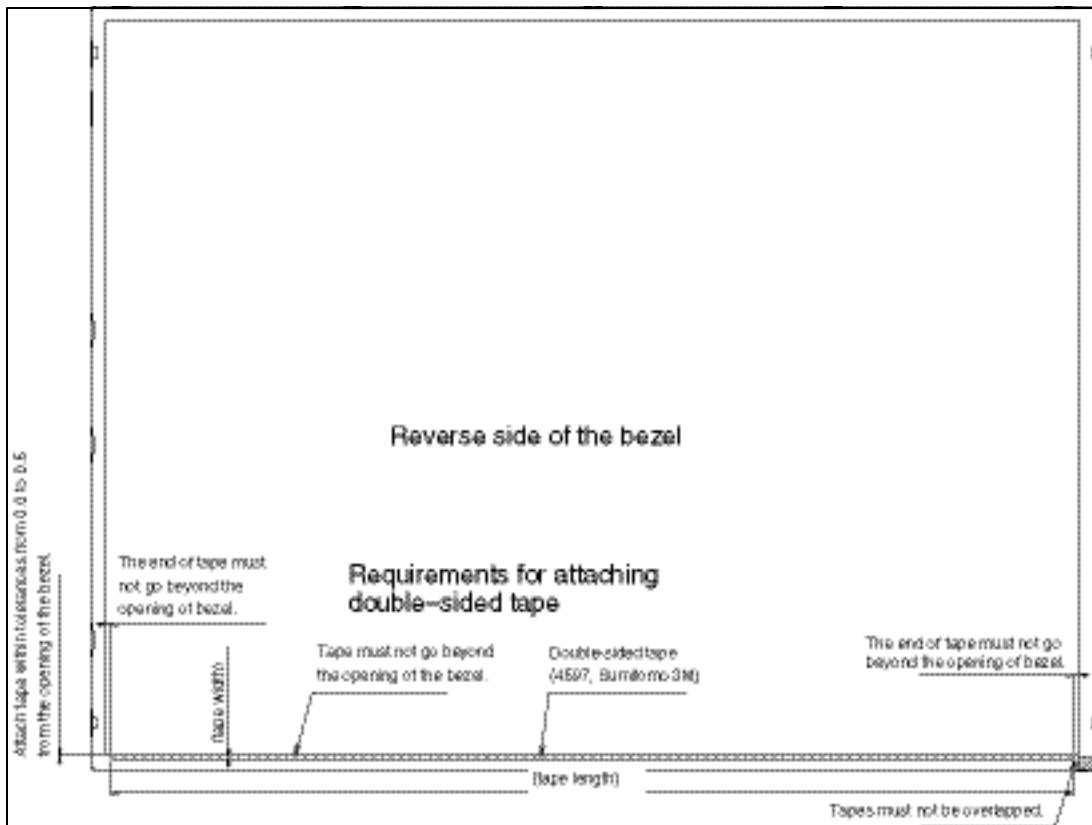
Figure 4-143 Attaching double-sided tape to the bezel's reverse side

Checking the backlight

1. Inspect the replacement backlight according to Figure 4-144.
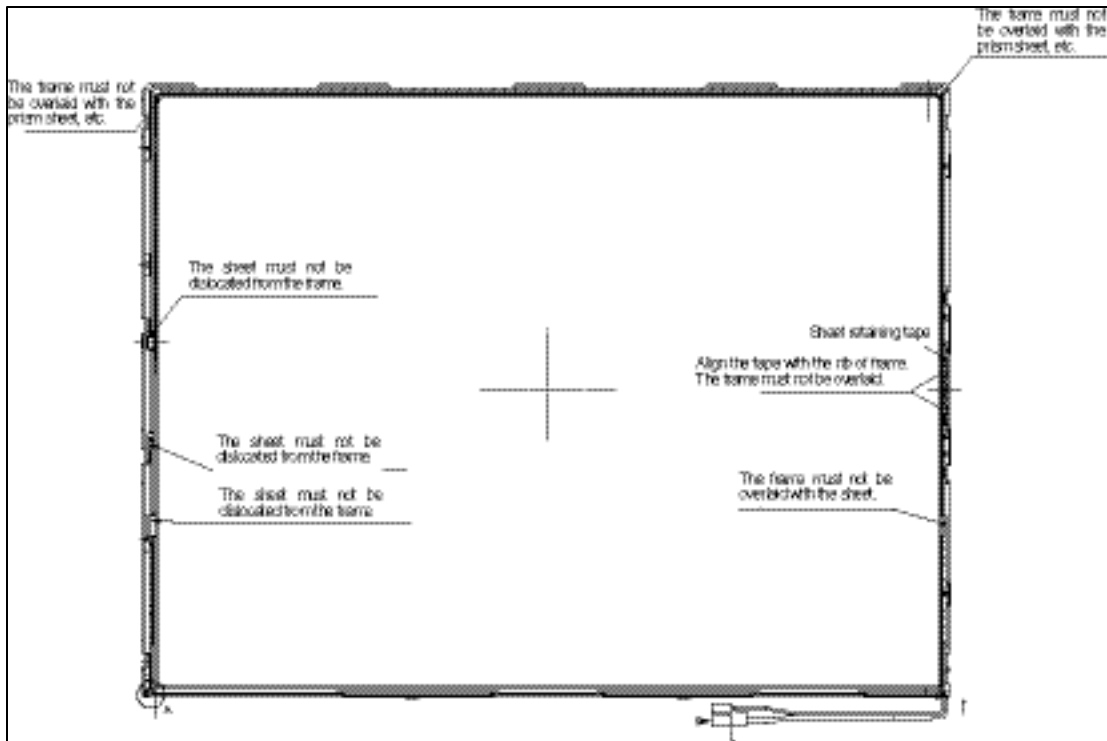
Figure 4-144 Inspecting the replacement backlight

Assembling PCB-assembly cell

1. Remove the paper (coated with a mold release) from the double-sided tape in the three areas on the replacement backlight unit. The areas are at the top and on both sides. See Figure 4-145.

2. Turn the backlight on.

3. Check that the backlight is free of dust, foreign objects, or damage. Perform this check also for the reverse side of the cell. Then install the cell of the PCB assembly in the backlight unit.

CAUTION: Align the top left corner of the cell with the corresponding corner of the backlight unit, as indicated by - in Figure 4-145.
Use care not to damage the TAB.
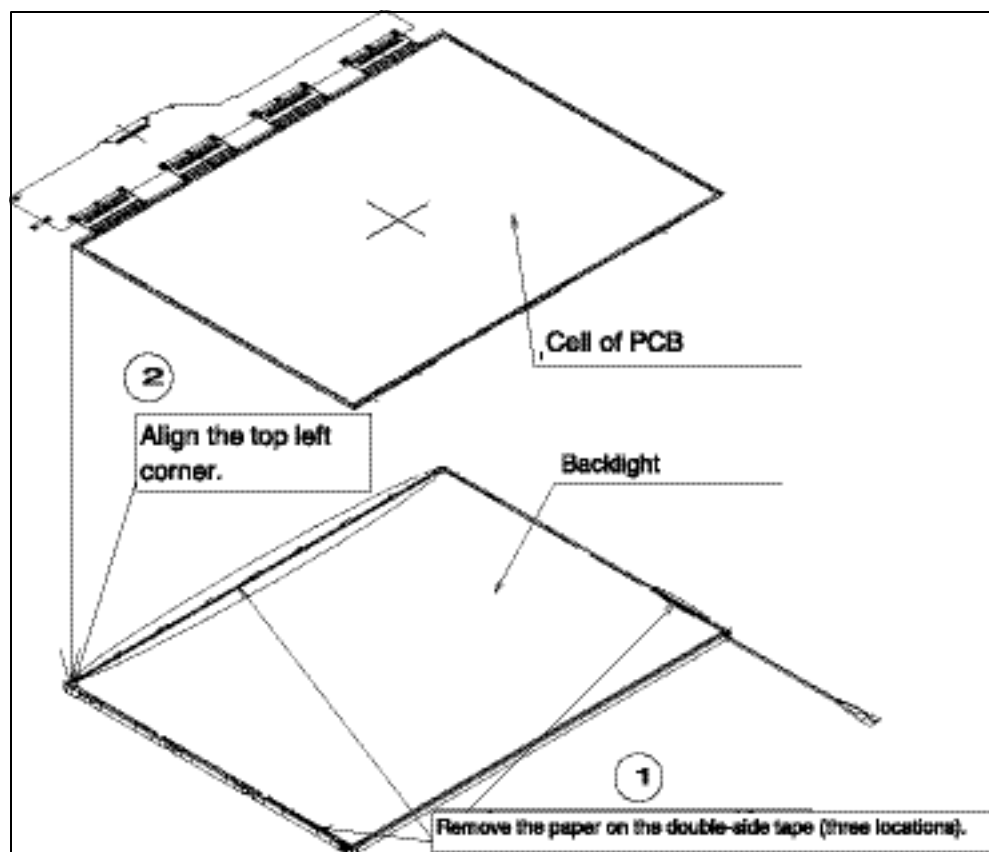
Figure 4-145 Removing the paper coated with a mold release

Folding down and temporary fixing of the TAB/PCB

1. Fold down the TAB (PCB) toward the reverse side of the backlight unit, as shown in Figure 4-146.

CAUTION: *Use care not to damage the TAB.*
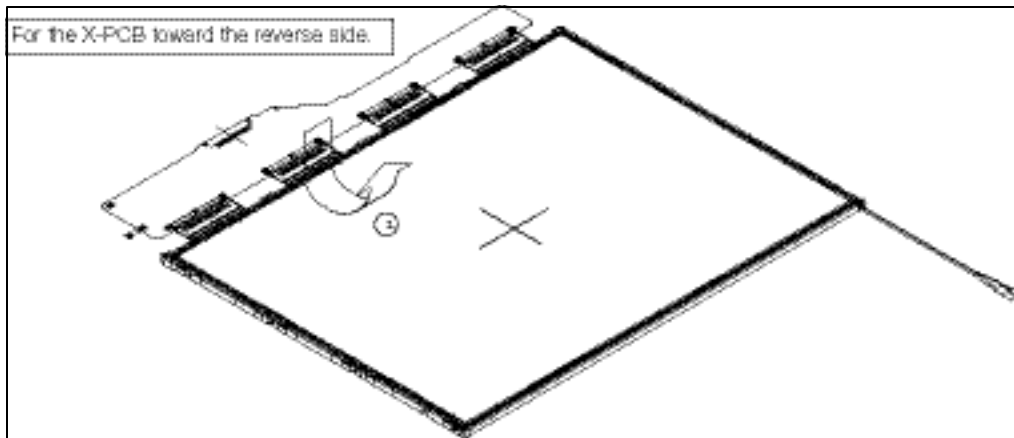
Figure 4-146 Folding down the TAB

Setting the bezel

1. Start installing the bezel in the upward direction until it stops at the top left corner.

NOTE: The GND-CU and lamp reflector on the left-hand side must not go beyond the edges of the bezel.
Use care not to damage the cables and TAB.
The bezel latches must be engaged (there are five latches on the top edge, and two latches on the bottom edge).
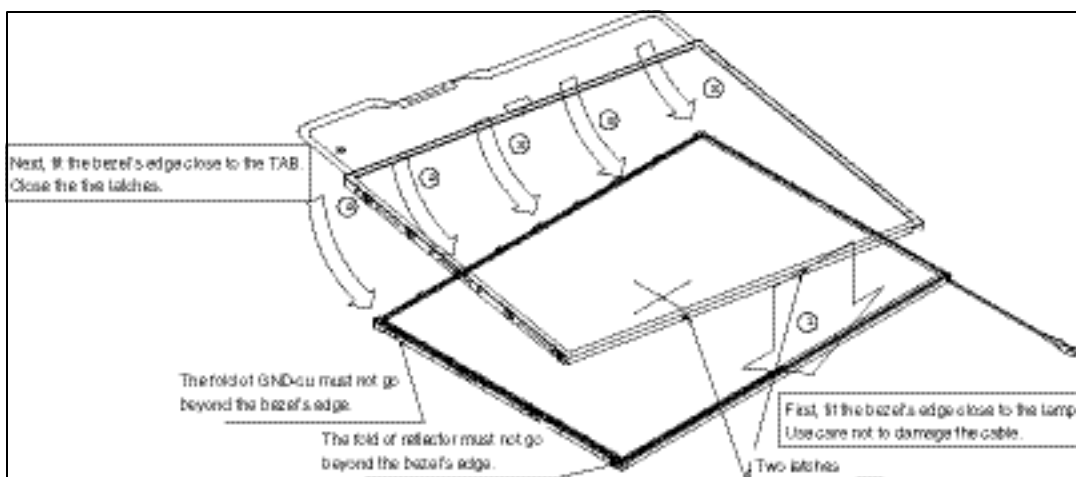
Figure 4-147 Setting the bezel

Fasten screws of the PCB and bezel

1. Fasten the four screws on the left edge in the order (5), (6), (7), and (8) shown in Figure 4-148.

2. Fasten the four screws on the right edge in the order (1), (2), (3), and (4) shown in Figure 4-148.

CAUTION: *Fasten the screws in the orders shown in Figure 4-148. No loose fastening is allowed.*
The tightening torque must not exceed 0.147N·m (1.5kgf·cm) for all the eight screws.
For the Philips screwdrivers, use an insert bit of point size 0.
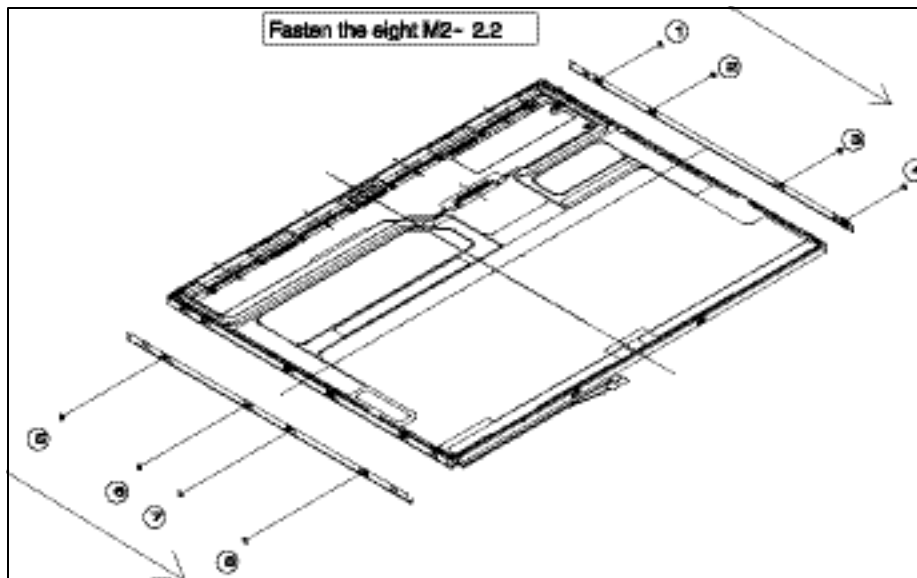
Figure 4-148 Fixing the PCB and the bezel

Attaching the tapes and insulation sheet

1. Attach the PCB insulation sheet (one location).

2. Attach the tape for the bezel to the bottom area close to the lamp (two locations).

3. Attach the tape for fixing the FL tube cable (one location).

CAUTION: When attaching tape and insulation sheet, use care not to damage the TAB and lamp cable connections.
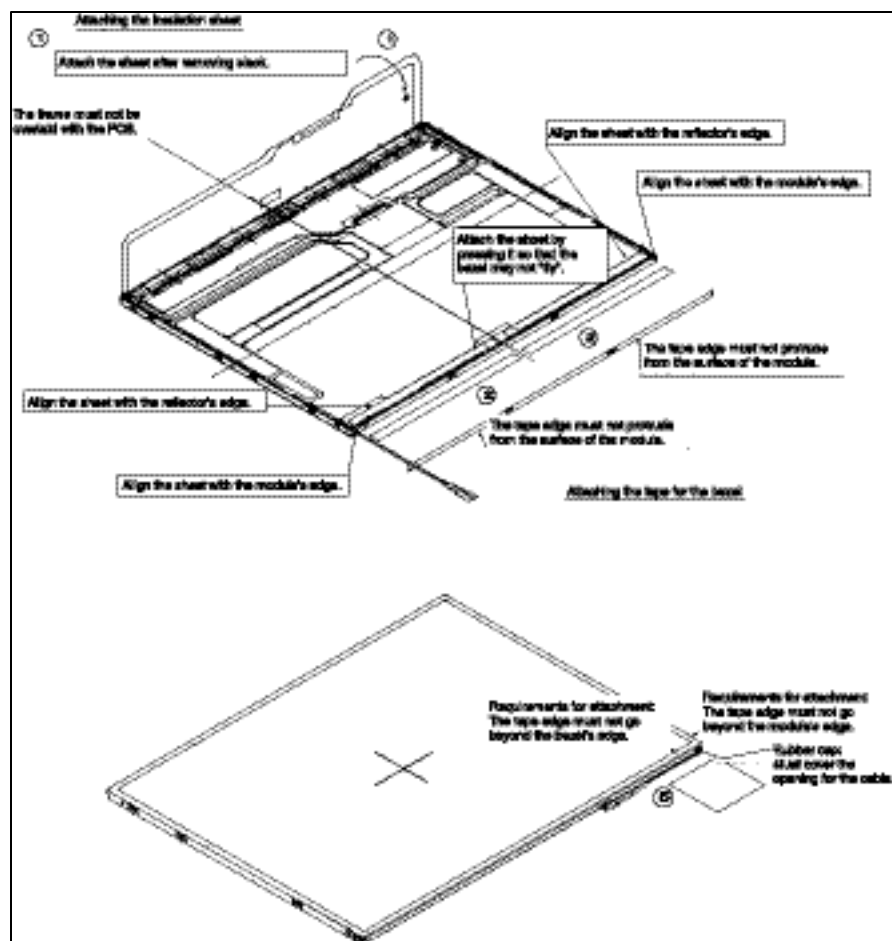
Figure 4-149 Attaching the insulation sheet and tape

4.30.9 Replacing the 14.1-inch XGA Sharp Fluorescent Lamp

Disassembling the 14.1-inch XGA Sharp Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

To disassemble the 14.1-inch XGA Sharp fluorescent lamp, follow the steps below and refer to Figures 4-150 to 4-154.

1. Flip the module over and remove the protection cover S (A), protection cover G (B), aluminum tape (C), tape for lead fixing (D), retention tape (H), and aluminum shield (K). Loose shield tape (I) without removing.
    Use care not to damage the TCP and chips. Discard the removed tapes.
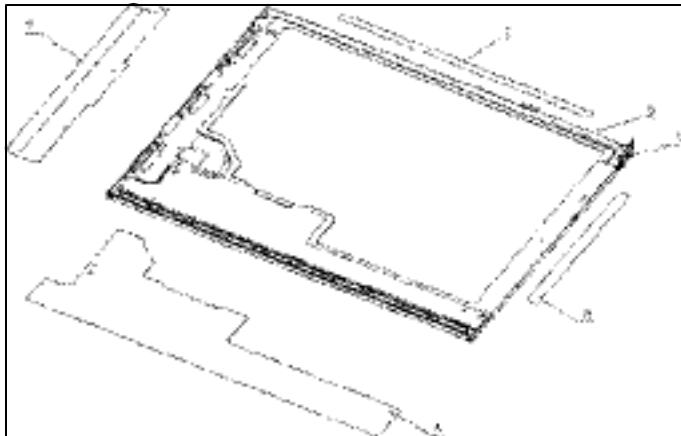
Figure 4-150 Removing the protective cover and tape

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

The maximum allowed releasing torque is
0.1078N·m (1.1kgf·cm).
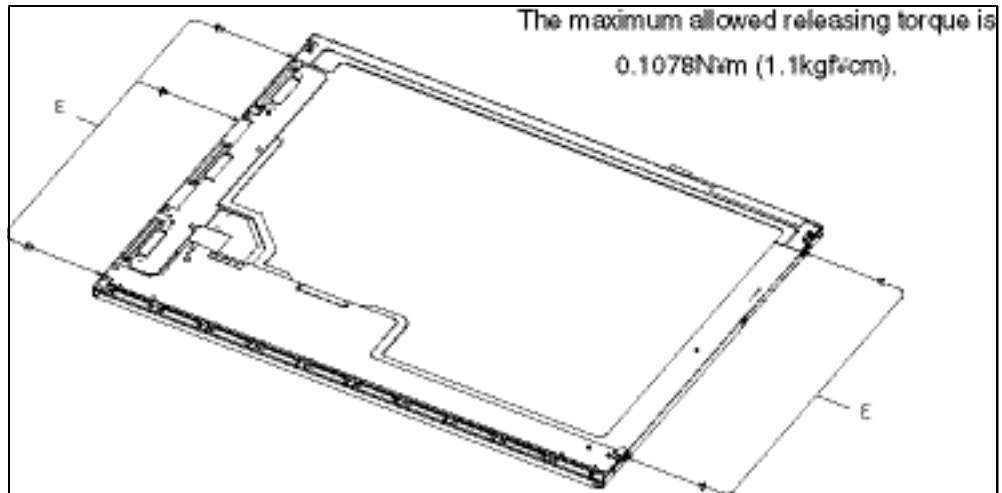
Figure 4-151 Removing the screws from the sides

3. Flip the module over again (with the top of the module facing up) and remove the two latches that are close to the lamp.
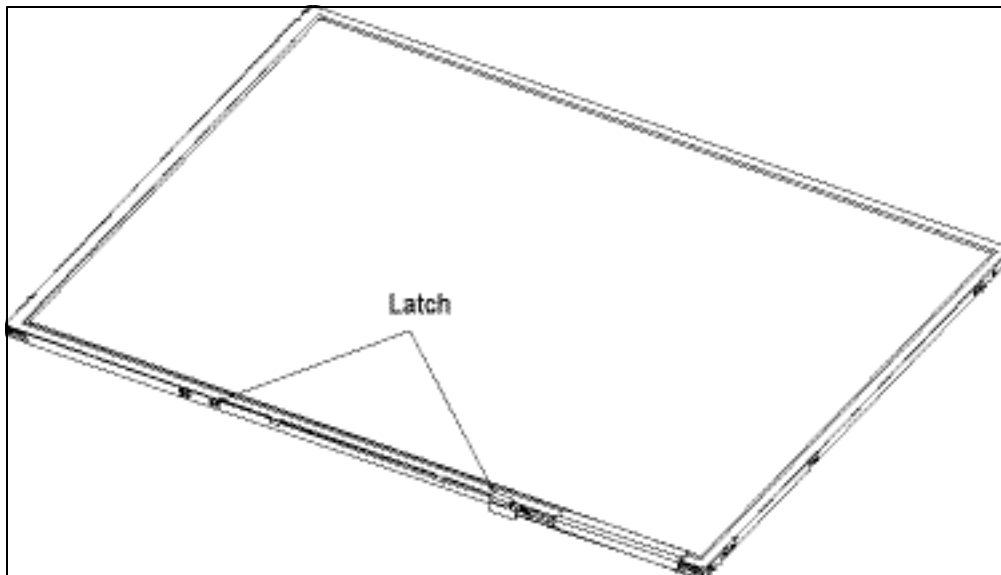
Latch

Figure 4-152 Removing the latches close to the lamp

4. Using the U-shaped edge of the bezel as a "hinge," raise the edge of the bezel from which the latches have been removed. Then remove the bezel. Peel off the tape for GND wire fixing (J).
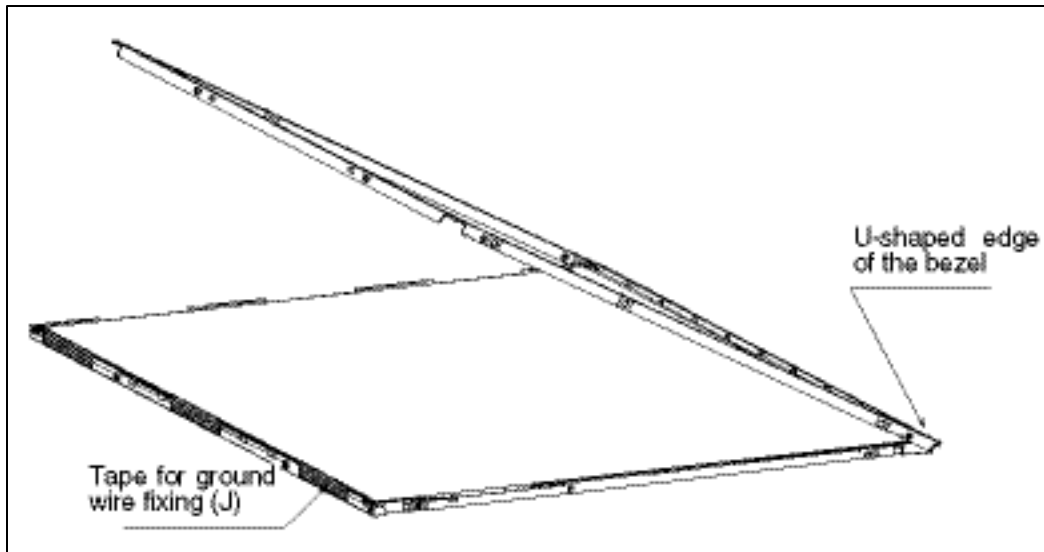
Figure 4-153 Removing the bezel

5. Flip the bezel over and remove the two screws (E) and lamp cover (F). Then replace the lamp unit (G) with a new one.
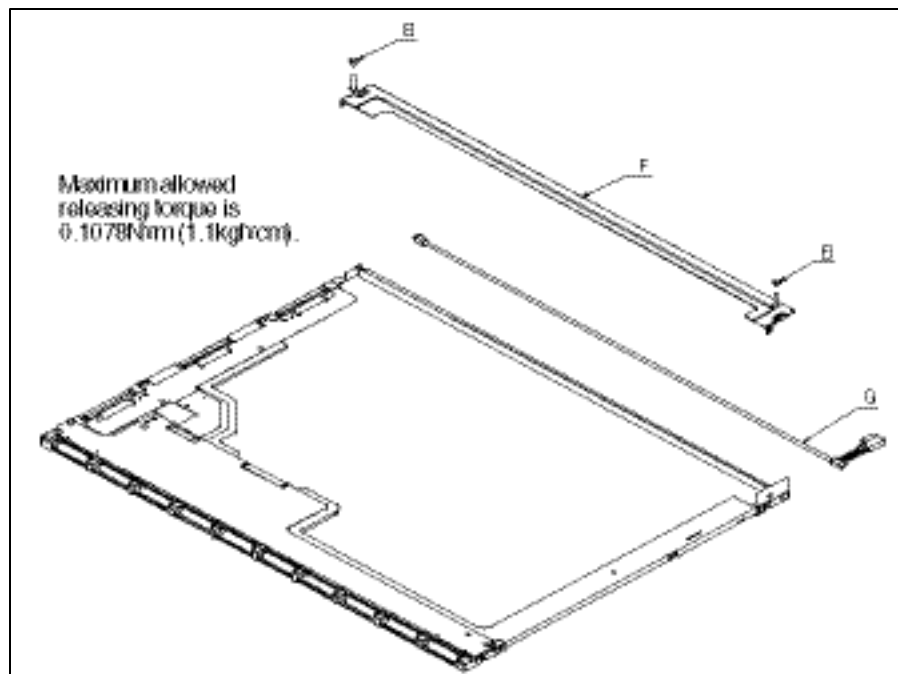
Figure 4-154 Removing the lamp cover

Assembling the 14.1-inch XGA Sharp Fluorescent Lamp

To assembling the 14.1-inch XGA Sharp fluorescent lamp, follow the steps below and refer to figures 4-155 to 4-159.

1. Attach the lamp cover (F) and attach the shield tape to the lamp cover after folding it. Then fix the lamp cover with the two screws (E).
    The attached lamp cover must not cover the heads of the engaging pins.
    Around the opening for extracting the lead, the edge of the P chassis should go beyond the edge of lamp cover.
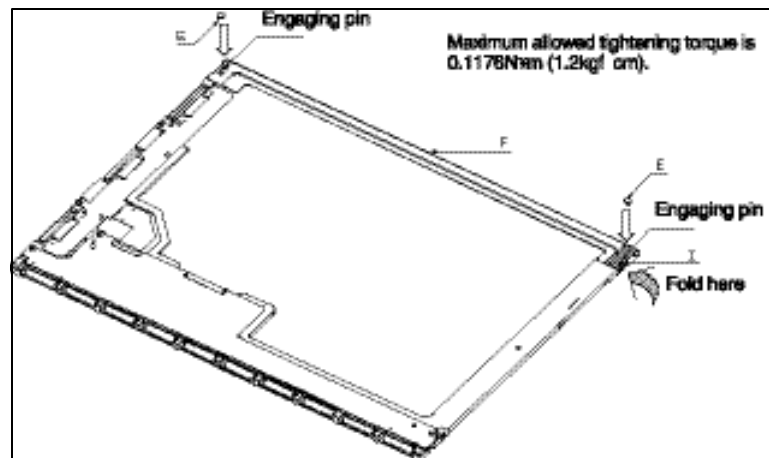
Figure 4-155 Replacing the lamp unit

2. Fix the GND lead wire with the fixing tape. Check that the guide rib is not overlaid with the panel. After fitting the U-shaped side of the bezel to the P chassis, attach the bezel by pressing the two latches close to the lamp into place.
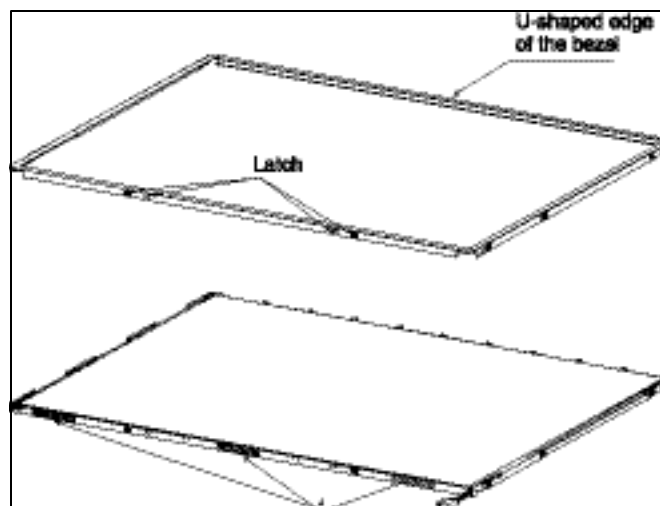
Figure 4-156 Attaching the bezel

3. Fasten the five screws (E) on both sides. Make sure that the two latches are fitting surely.
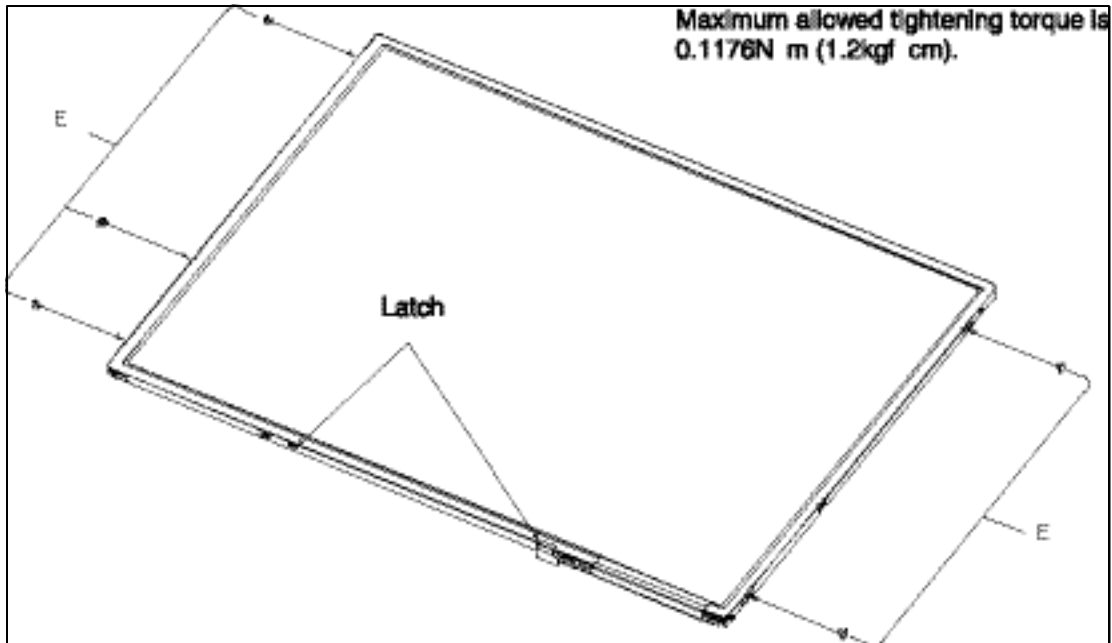
Figure 4-157 Fastening the screws on both sides

4. Attach the protection cover S (A), protection cover G (B), aluminum tape (C), tape for lead fixing (D), and aluminum shield (K). All of which must be new ones.
Attach the protection cover (A) then cover (B), using the engaging pins as the guide. Fold the ends of the covers toward the side of the bezel.

- When attaching the aluminum tape (C)

    − Align a longer side with the marking on the lamp cover on the reverse side of the bezel.
    − Align a shorter side with the edge of the lamp cover.

When attaching the tape for lead fixing (D)

Align a longer side with the marking on the lamp cover on the reverse side of the bezel.
    − Align a shorter side with the location where the head of the screw is covered.

When attaching the retention tape (H)

    − Align both a longer and a shorter sides with the rectangular hole.

- When attaching the aluminum shield (K)

Align the corner of shield with the module corner.
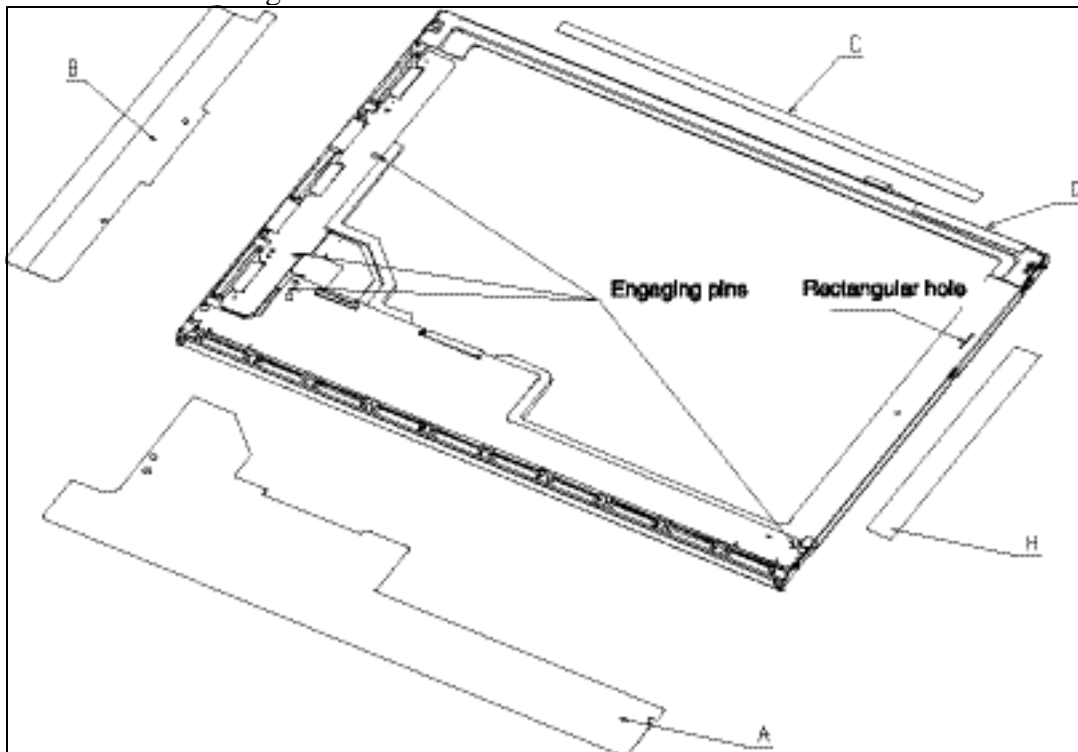
Figure 4-158 Attaching the protection cover and tapes

5. Upon completion of the assembly, perform visual inspections, as shown in Figure 4-159.
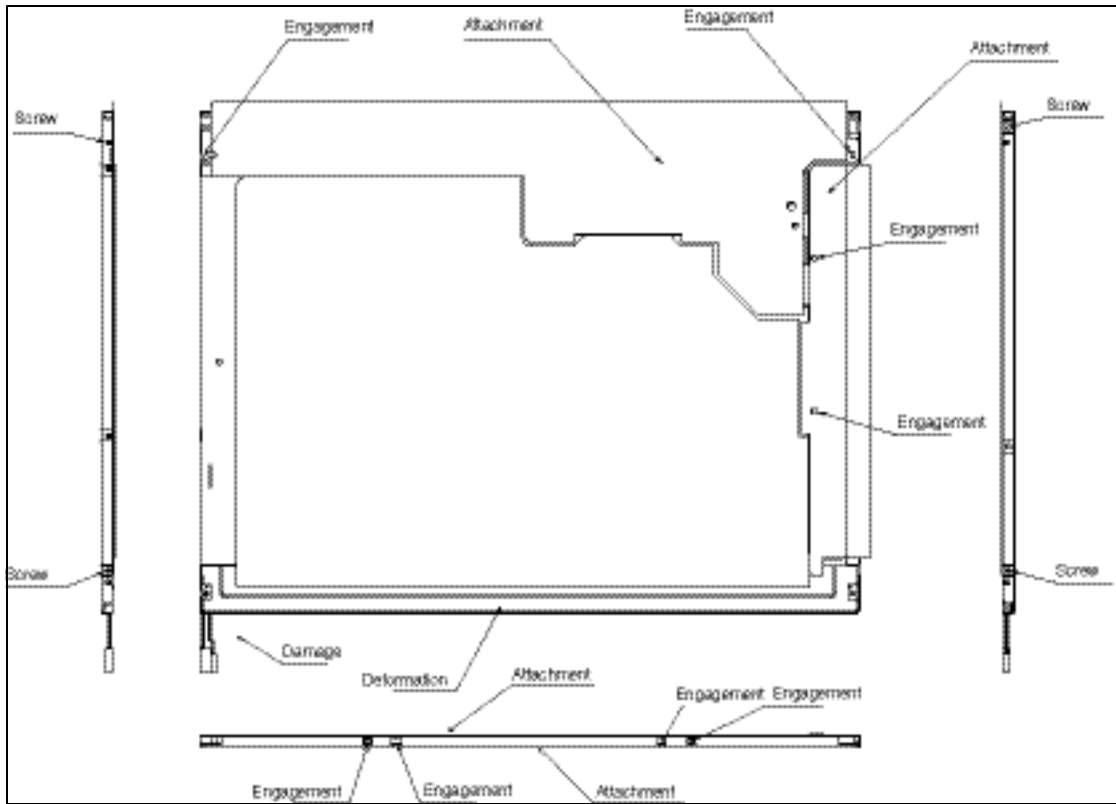
Figure 4-159 Visual inspections

4.30.10   Replacing the 14.1-inch XGA Samsung Fluorescent Lamp

CAUTION: When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.

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 4-160 to 4-167.

1. Flip the LCD module over and remove the PCB cover and three pieces of tape.

CAUTION: Use care not to damage the PCB.
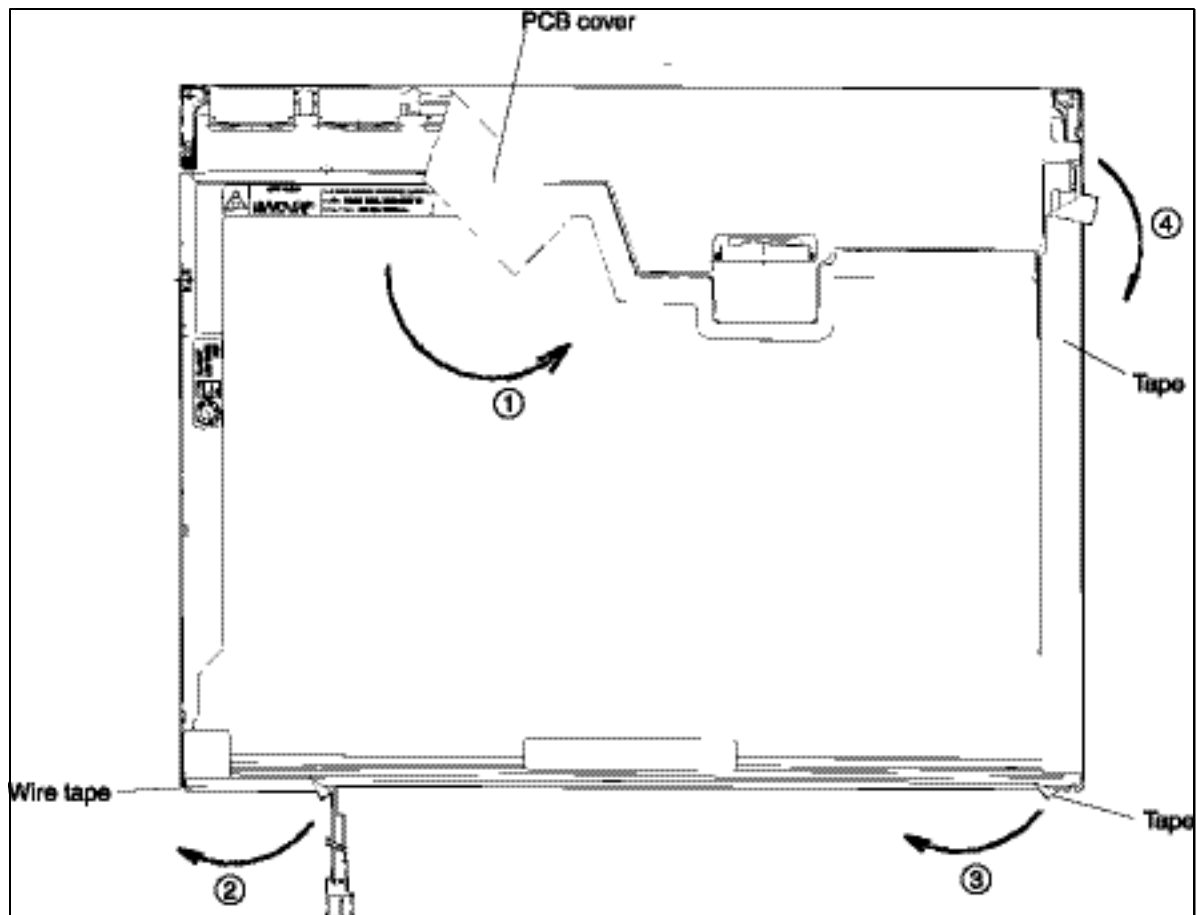
Figure 4-160   Removing the PCB cover and tape

2. Remove the two screws for fixing the power supply board.

CAUTION: *Use care not to damage the PCB.*
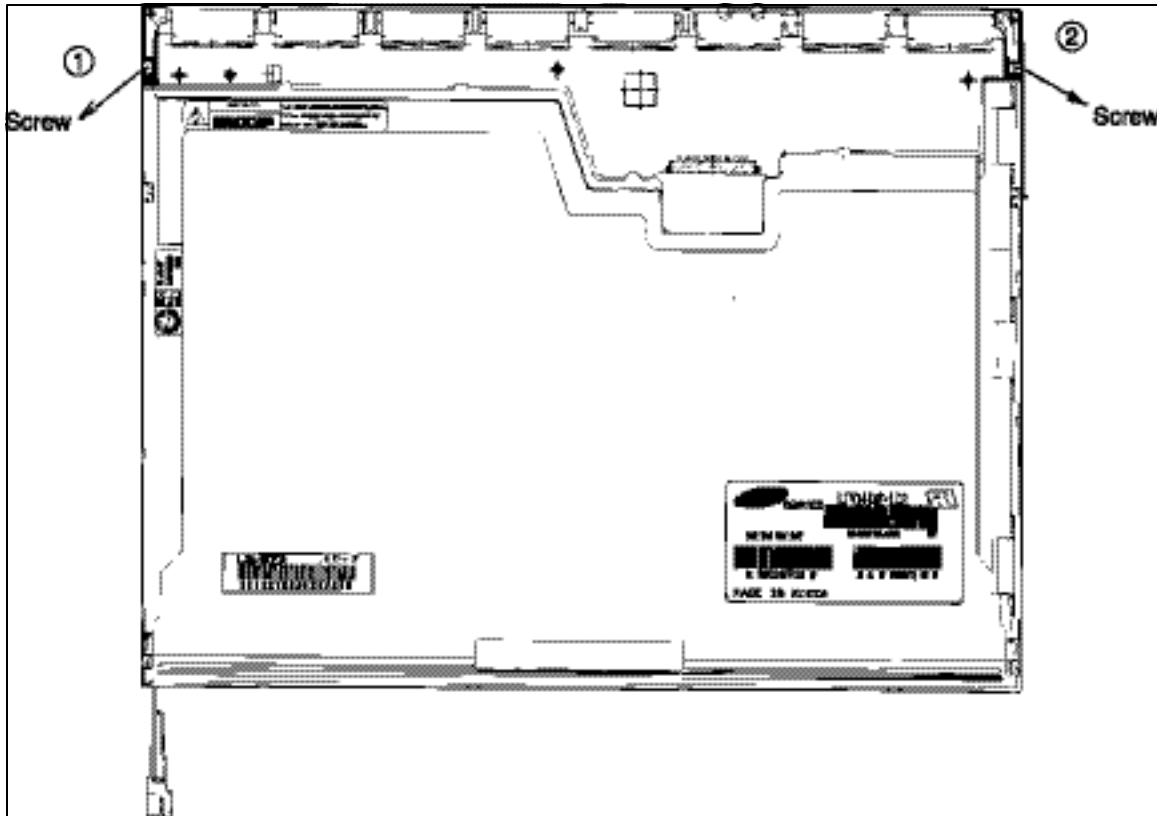
Figure 4-161   Removing the two screws for fixing the power supply board

3. Release the 18 hooks and remove the upper chassis from the frame. There are six hooks at the top, four hooks on each of the left- and right-hand sides, and four hooks at the bottom.
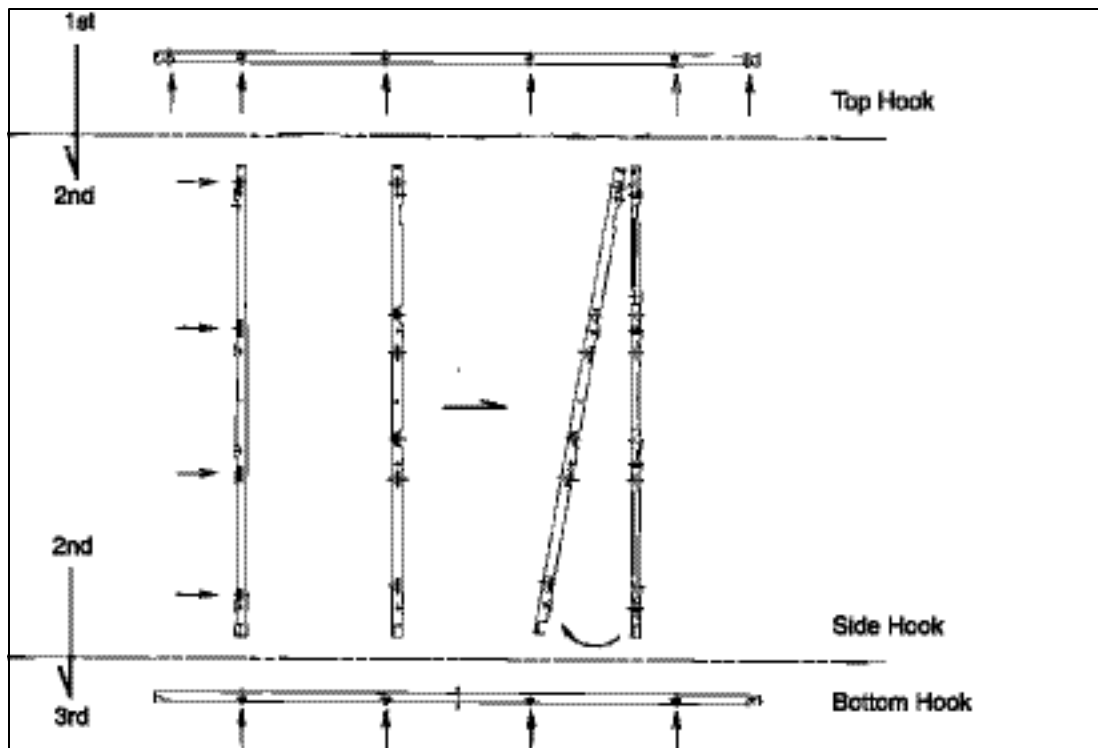
Figure 4-162   Releasing the 18 hooks

4. Remove the panel assembly from the backlight assembly.

CAUTION: *Use care not to damage the TCP during working.*
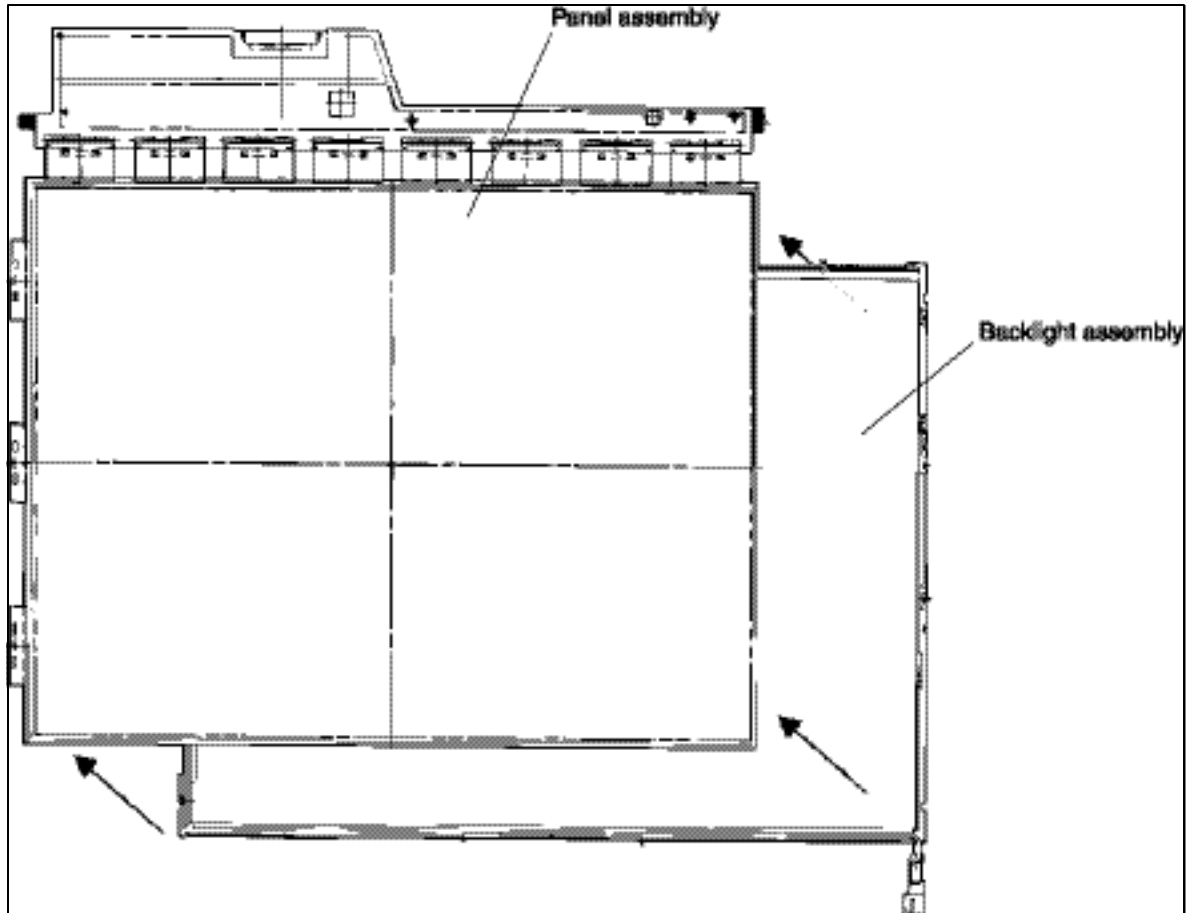
Figure 4-163   Removing the panel assembly

5. Remove the two clips.

6. Remove these:
   - Prism sheet
   - Diffuser sheet
   - Light guide plate (LGP)
   - Reflective sheet
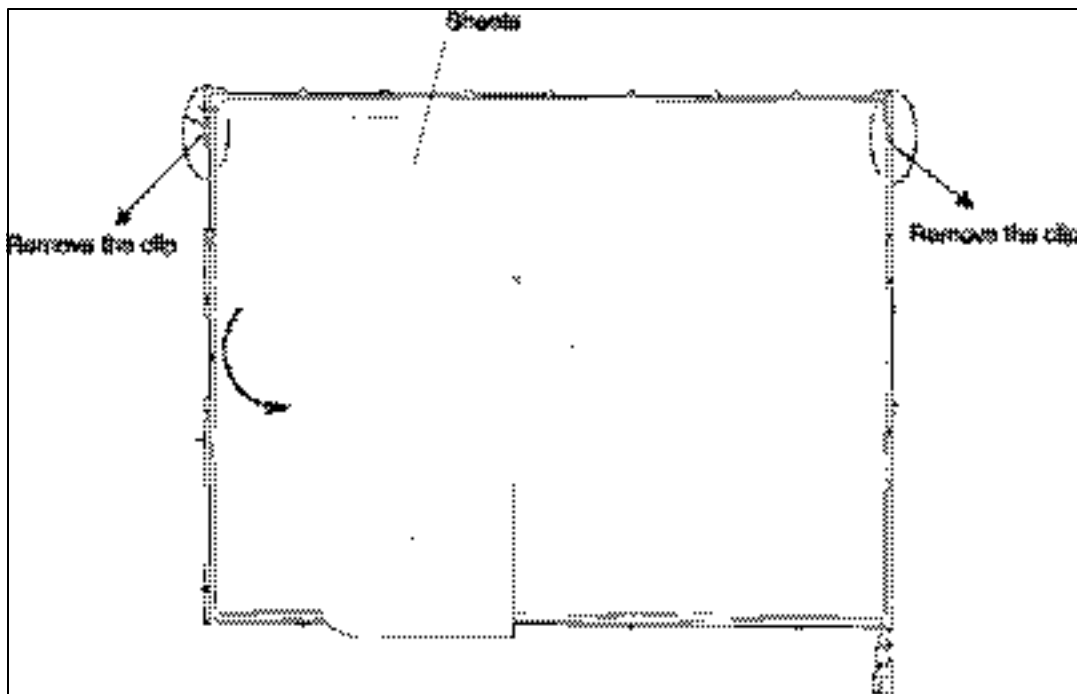
Figure 4-164   Removing the panel assembly

7. Remove the two screws for fixing the back cover of the FL tube.
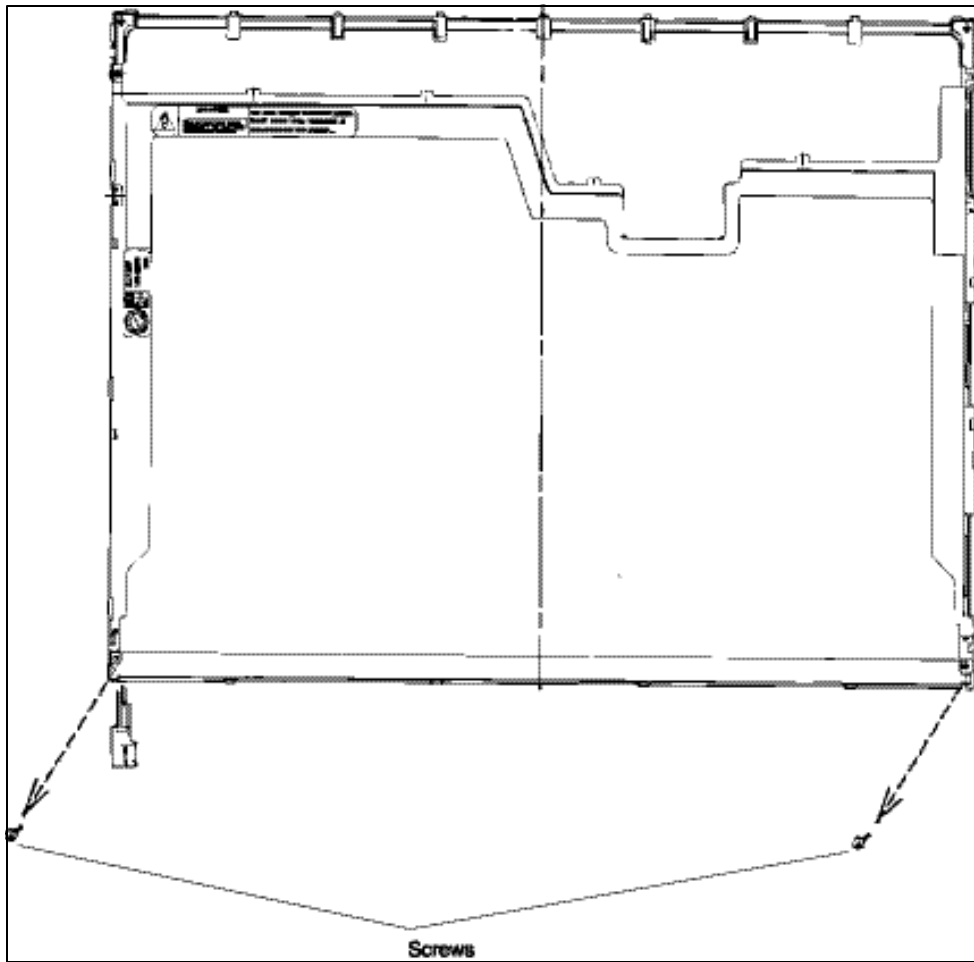
Figure 4-165   Removing the screws for fixing the FL tube back cover

8. Disconnect the ground wire of the FL tube from the frame.
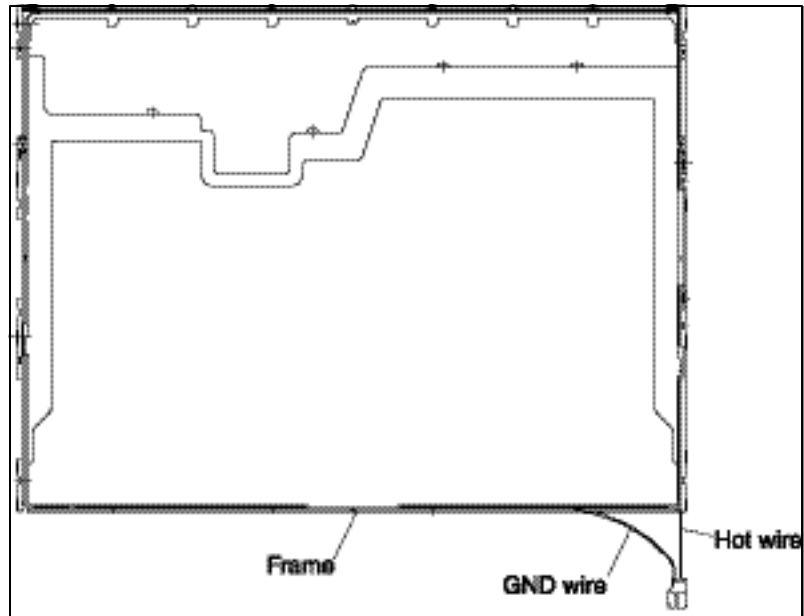
Figure 4-166   Disconnecting the FL tube ground wire

9. Remove the FL tube from the frame.
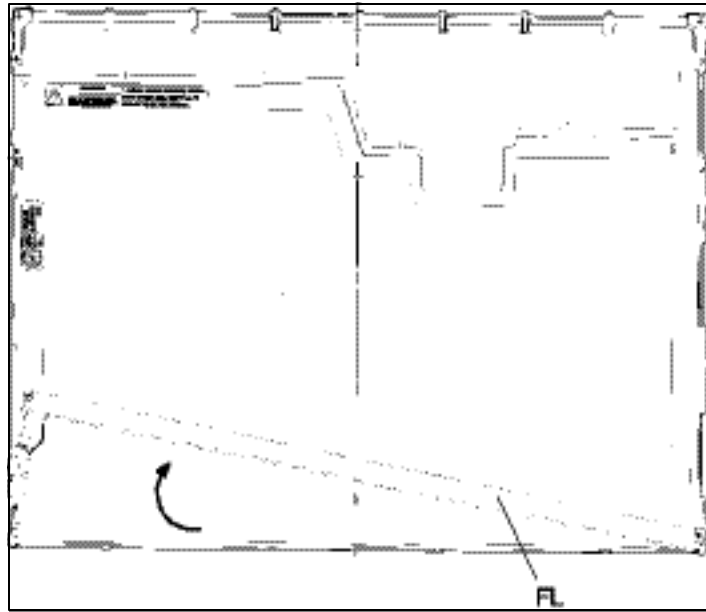
Figure 4-167   Removing the FL tube

Assembling the 14.1-inch XGA Samsung Fluorescent Lamp

To assembling the 14.1-inch XGA Samsung fluorescent lamp, follow the steps below and refer to figures 4-160 to 4-167.

1. Place the FL tube on the correct location in the frame.

2. Connect the ground wire to the frame.

3. Fix the back cover of the FL tube with the two screws.

4. Attach these:
    - Reflective sheet
    - Light guide plate (LGP)
    - Diffuser sheet
    - Prism sheet

5. Fasten the two clips.

6. Place the panel assembly on the correct location in the backlight assembly.

7. Place the upper chassis on the frame. Fit the hooks into the holes. There are four hooks at the bottom, four hooks on each of the left- and right-hand sides, and six hooks at the top.

8. Fix the power supply board with the two screws.

9. Attach the PCB cover and three pieces of tape.

4.30.11   Replacing the 14.1-inch XGA L.G. Philips Fluorescent Lamp

Disassembling the 14.1-inch XGA L.G. Philips Fluorescent Lamp

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CAUTION: *When you replace the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD module. Be careful not to let dust or other foreign substances into the LCD module.*

To disassemble the 14.1-inch XGA L.G. Philips fluorescent lamp, follow the steps below and refer to Figures 4-168 to 4-171.

Removing the outside tape/cover tape

1. Remove the tape adhesive (1) used for the B/L wire fixing.

CAUTION: *Pressure or stress should not be given on the B/L wire*

---

2. Remove the tape adhesive (2) used for the top case fixing

3. Remove the cover shield (C) (3)

CAUTION: *Pressure or stress should not be given on control the PCB*

                      Usage of gloves with the anti-electric discharge coating is recommended.

                      To eliminate possible damage on circuits occurred by the ESC.

---

4. Remove the cover shield (G) (4)

CAUTION: *Pressure or stress should not be given on the gate TCP*

---

5. Remove the tape adhesive (5), (6) used for the top case fixing.

CAUTION: *Pressure or stress should not be given on the top case during this process.*
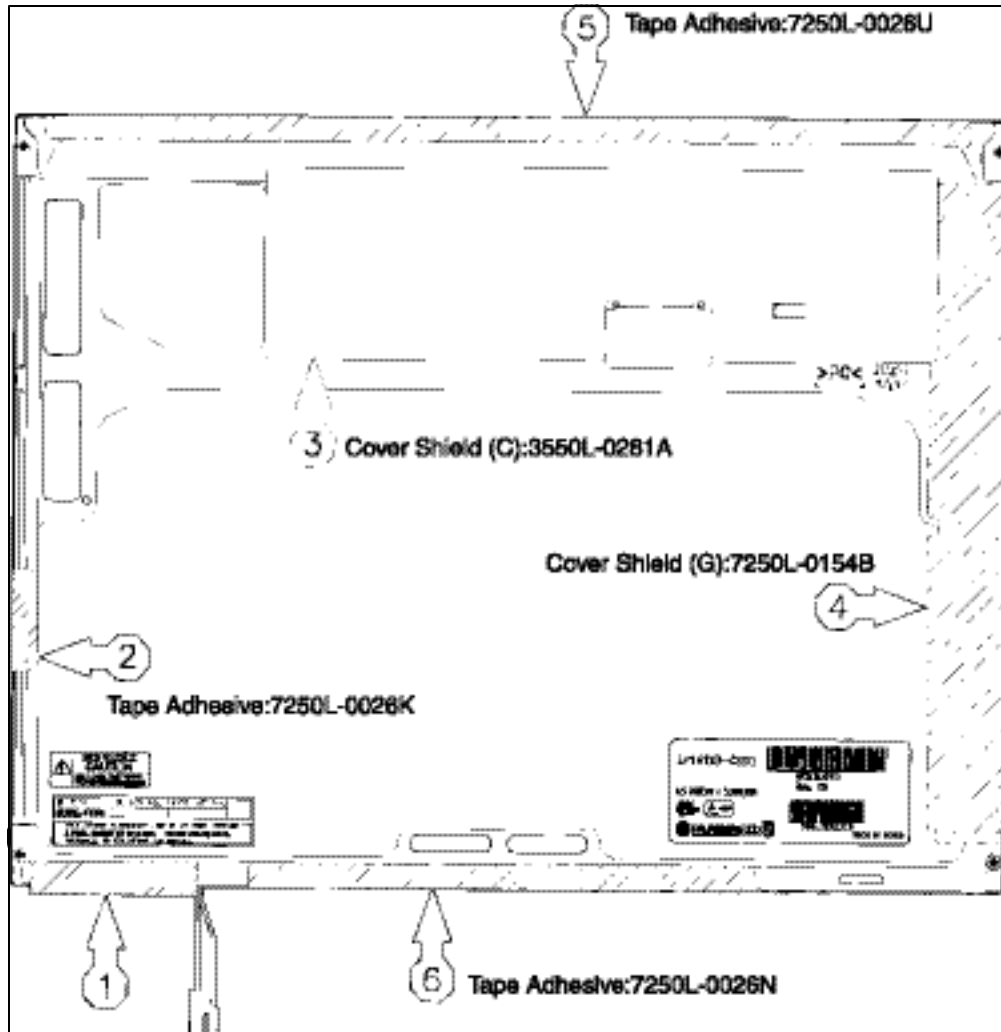
Figure 4-168   Removing the outside tape/cover tape

Removing the control PCB, top case and cover assembly

6. Remove the FPC cable (1) used for the control PCB connecting.

CAUTION: *Pressure or stress should not be given on the FPC cable.*

---

7. Remove the control PCB (2).

CAUTION: *At first, move the control PCB to the left*

---

8. Remove the top case (3)

CAUTION: *Pressure or stress should not be given on the top case and gate TCP*

---

9. Remove the screw and cover assembly (4).

CAUTION: *Pressure or stress should not be given on the source TCP*

Maximum value of torque with screw should be below 2.0kgf.cm
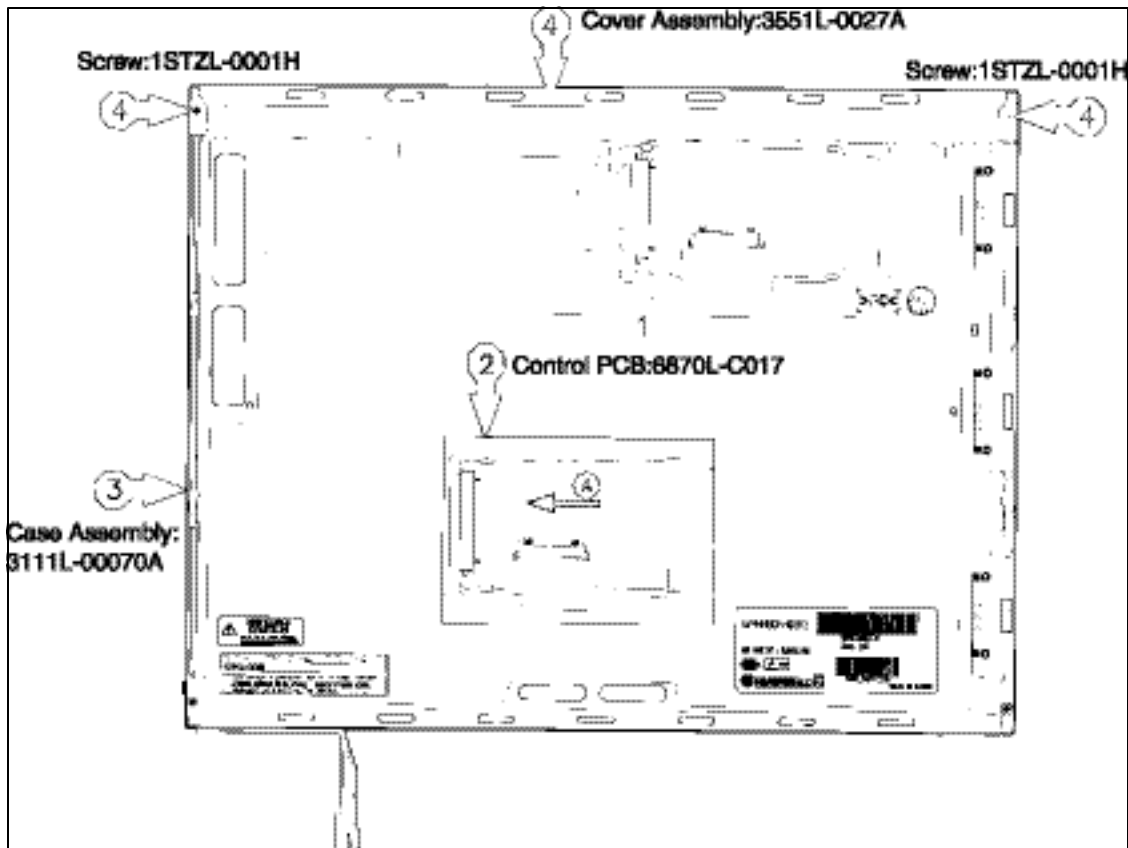
Figure 4-169   Removing the control PCB, top case and cover assembly

Removing the source PCB and gate PCB

    10. Remove the source PCB (1).

CAUTION: Pressure or stress should not be given on the PCB and TCP during removing

                  double tape.

---

    11. Remove the gate PCB (2).

CAUTION: Pressure or stress should not be given on the PCB and TCP during removing

                  double tape.
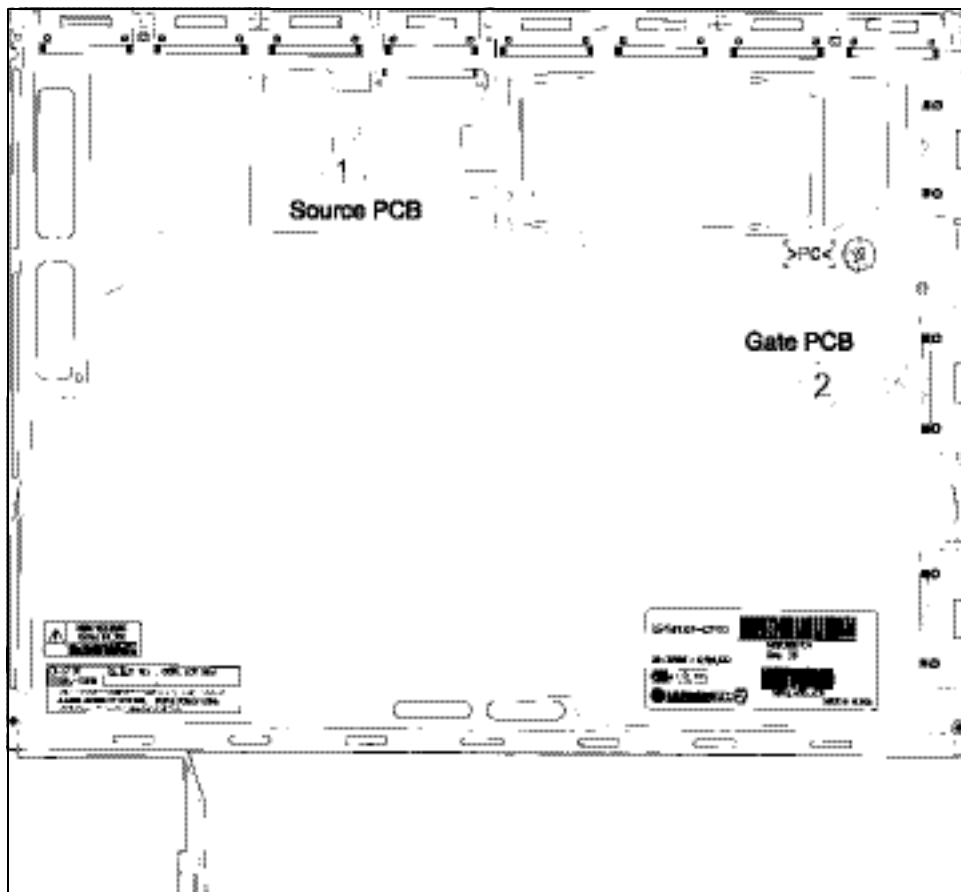
Figure 4-170   Removing the source PCB and gate PCB

Removing the board assembly, tape pad sheet, light guide, cover bottom and lamp assembly

 12. Remove the board assembly (1).

CAUTION: *This process should be made in the clean room with no scratch nor particle on the Polarize and B/L assembly .*

---

 13. Remove the tape pad (2) used for sheets fixing.

 14. Remove the sheets and light guide (3).

CAUTION: *No penetration of foreign body is indispensable with no scratch on the surface of each sheet.*

---

 15. Remove the screw and cover bottom (4).

CAUTION: *Maximum value of torque with screw should be below 2.0kgf.cm*

---

 16. Disconnect the low voltage wire from mold frame and disassembly of the lamp assembly from mold frame (5).

CAUTION: *Pressure or stress should not be given on this wire.*

Glue or foreign body of the double tape should not be attached in the mold frame.
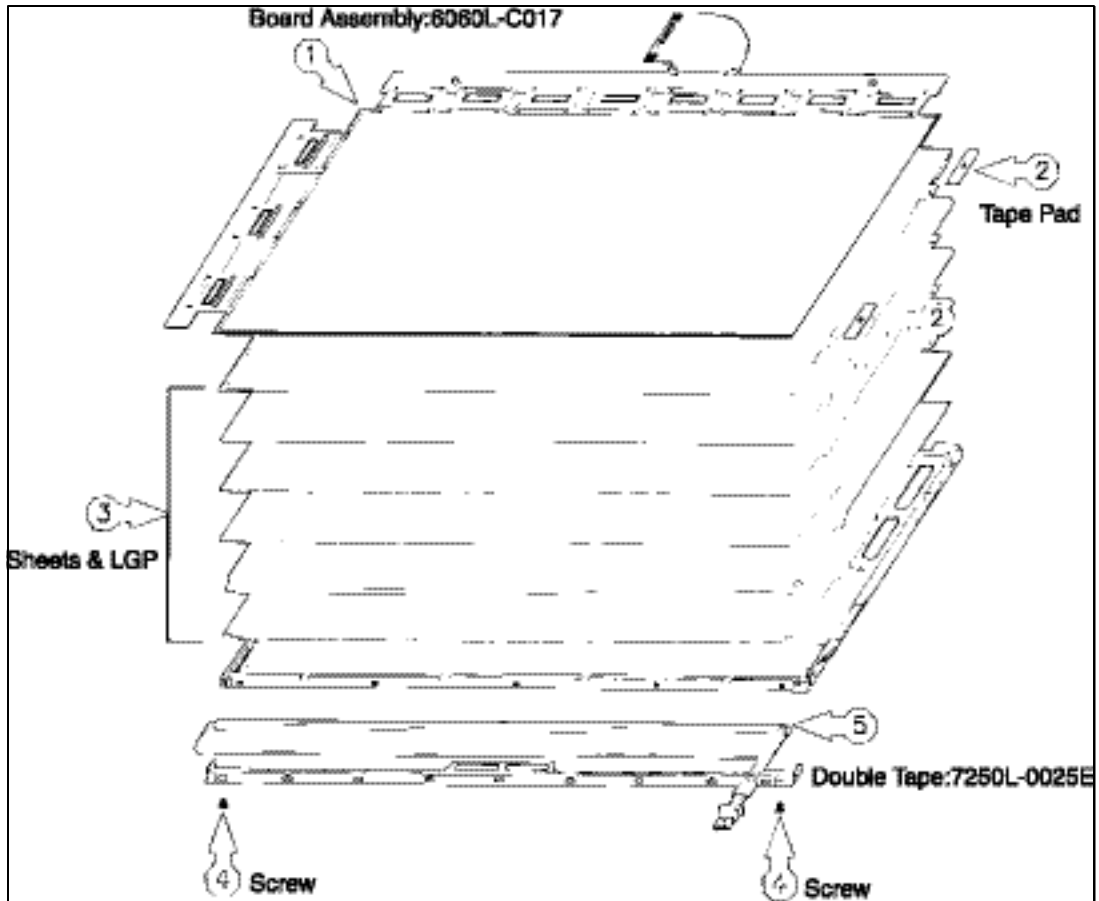
Figure 4-171 Removing the board assembly, tape pad sheet, light guide, cover bottom and lamp assembly

Assembling the 14.1-inch XGA L.G. Philips Fluorescent Lamp

To assembling the 14.1-inch XGA L.G. Philips fluorescent lamp, follow the steps below and refer to figures 4-172 to 4-175.

Attaching the double tape, lamp assembly, cover bottom, sheets, light guide, tape adhesive and board assembly

1. Attach the lamp assembly with the double tape (1). (Lamp housing fixing)

2. Attach the lamp assembly with the mold frame and connecting the low voltage wire with the mold frame (2).

CAUTION: Pressure or stress should not be given on the wire during this process.

3. Connect the cover bottom with the double tape (3). (grounding)

4. Connect the kapton tape with supporter main (4). (protection of wire (G))

5. Fix the cover bottom and screw (5).

CAUTION: Maximum value of torque with screw should be below 2.0kgf.cm.

6. Attach the sheets and light guide (6).

CAUTION: No penetration of foreign body is indispensable with no scratch on the
                 surface of each sheet and light guide.

7. Attach the tape adhesive (7) used for sheets fixing.

8. Attach the board assembly (8).

CAUTION: Pressure or stress should not be given on the PCB and TCP.
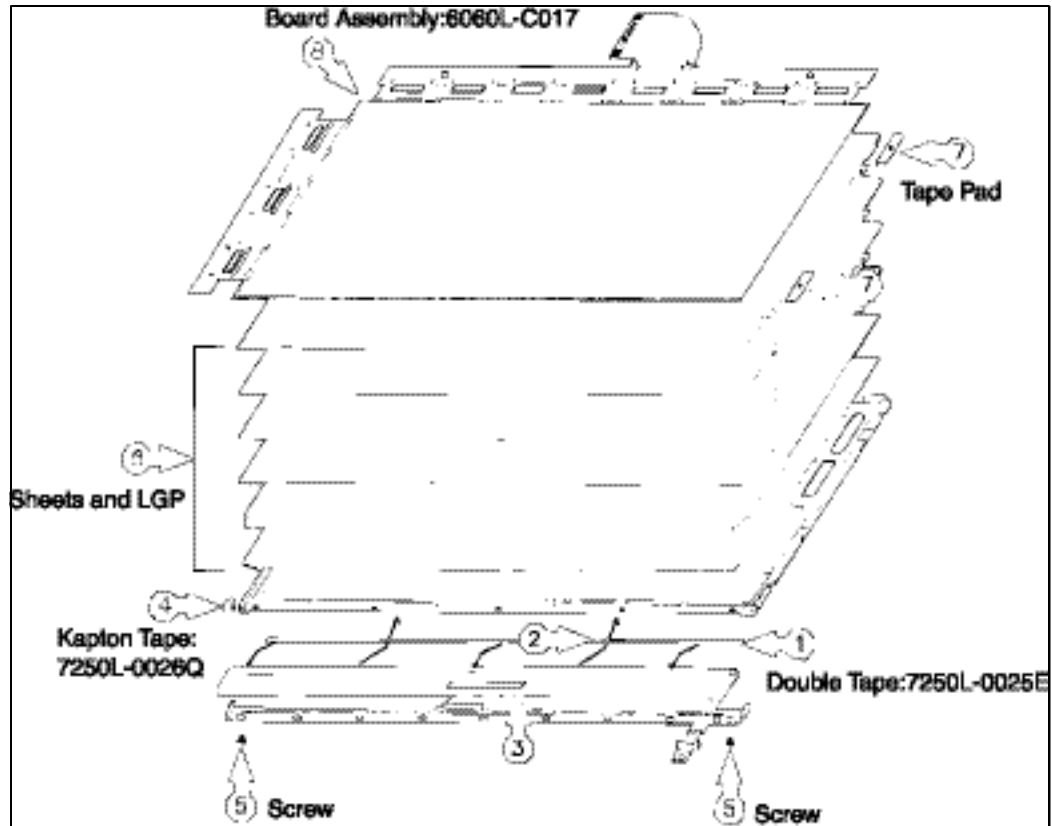
*Figure 4-172   Attaching the double tape, lamp assembly , cover bottom, sheets, light guide,
tape adhesive and board assembly*

Attaching the source PCB and gate PCB

9.   Attach the source PCB (1).

CAUTION: Stress should not be given on the TCP.

10. Attach the gate PCB (2).

CAUTION: Stress should not be given on the TCP.
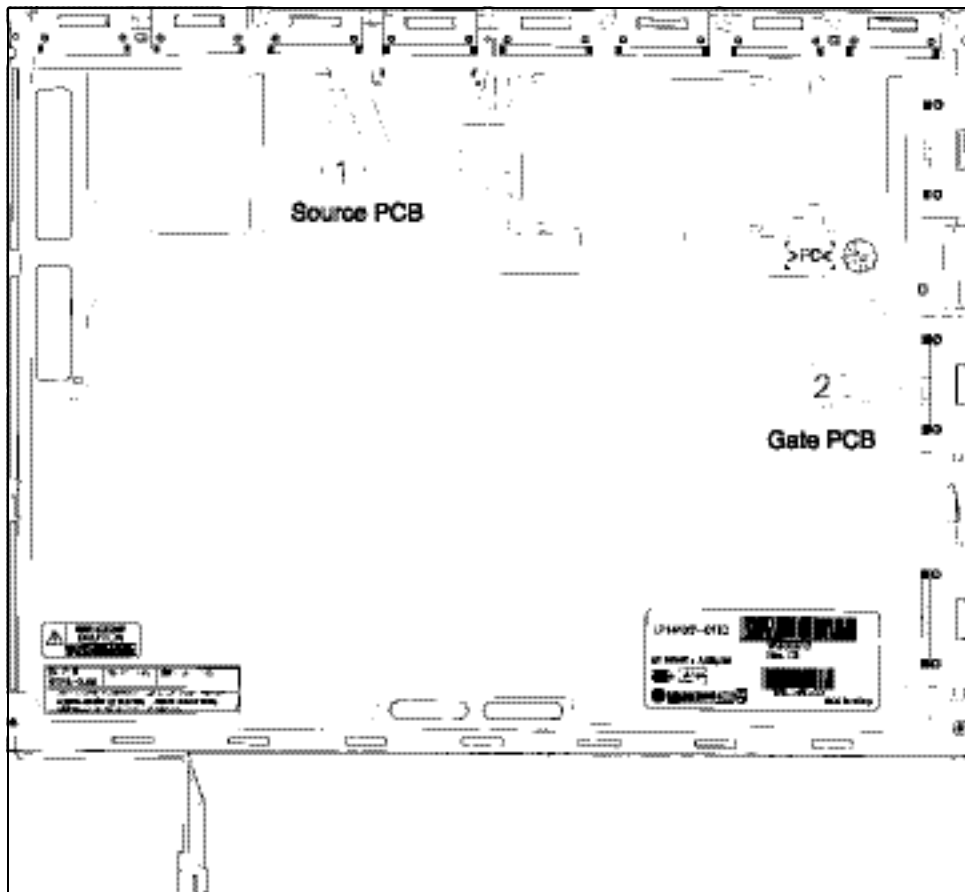
Figure 4-173   Attaching the source PCB and gate PCB

Attaching the cover bottom, screw, top case, control PCB and FPC

11. Attach the bottom cover and screw (1).

CAUTION: Pressure should not be given on the source TCP.

---

12. Attach the top case (2).

CAUTION: Pressure should not be given on the gate TCP.

---

13. Attach the control PCB (3).

CAUTION: Move the control PCB to the right.

---

14. Attach the FPC cable (4) used for the control PCB connecting.

CAUTION: Pressure or stress should not be given on the FPC cable.
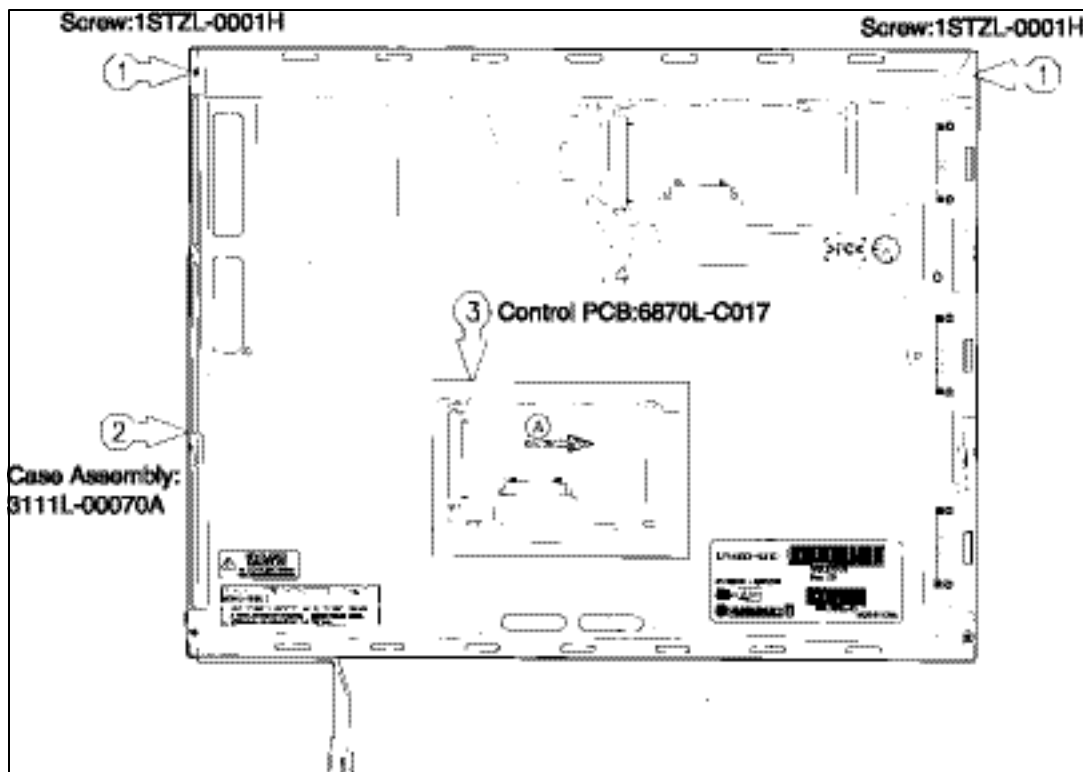
Figure 4-174   Attaching the cover bottom, screw, top case, control PCB and FPC

Attaching the outside tape and cover shield

    15. Attach the tape adhesive (1) used for B/L wire fixing.

CAUTION: Pressure or stress should not be given on the B/L wire fixing.

---

    16. Attach the tape adhesive (2) used for top case fixing.

    17. Attach the cover shield (3).

CAUTION: Pressure or stress should not be given on the control PCB.

                  Usage of the gloves with anti-electric discharge coating is recommended to eliminate possible damage on the circuits occurred by the ESC

---

    18. Attach the cover shield (4).

CAUTION: Pressure or stress should not be given on the gate PCB.

---

    19. Attach the tape adhesive (5), (6) used for the top case fixing.

CAUTION: Pressure or stress should not be given on the top case during this process.

Figure 4-175   Attaching the outside tape and cover shield

Appendices

Appendix   Contents

Figures

Tables

Appendix A   Handling the LCD Module

Precautions for handling the LCD module

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

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.
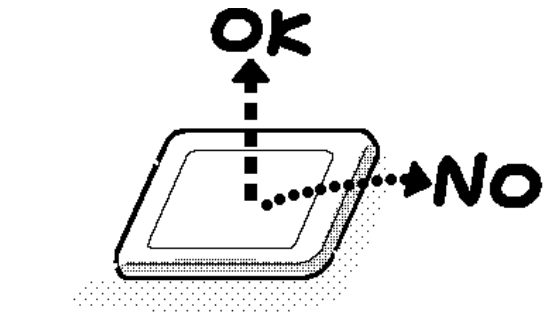
2. For the LCD module, do not force the module into place, because stress can affect its performance.

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

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

    If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.
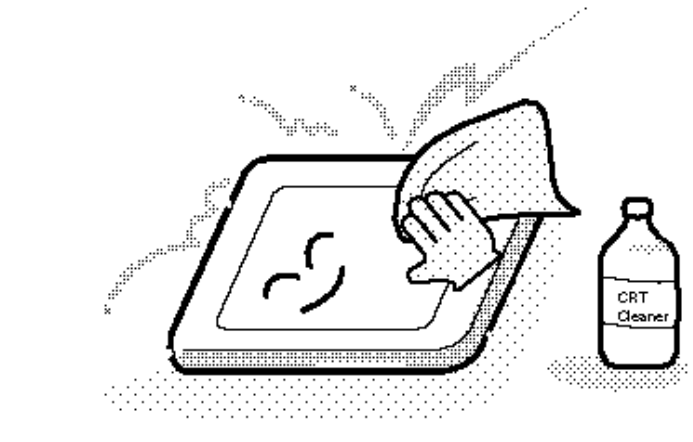
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.
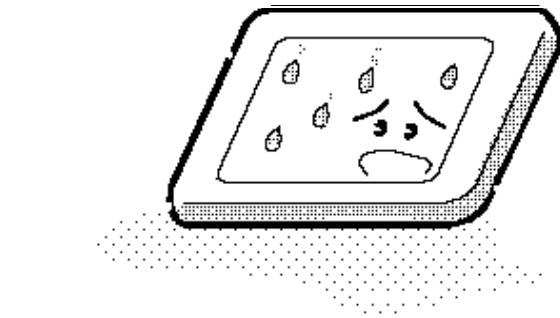
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which
   could cause breakage or cracks.
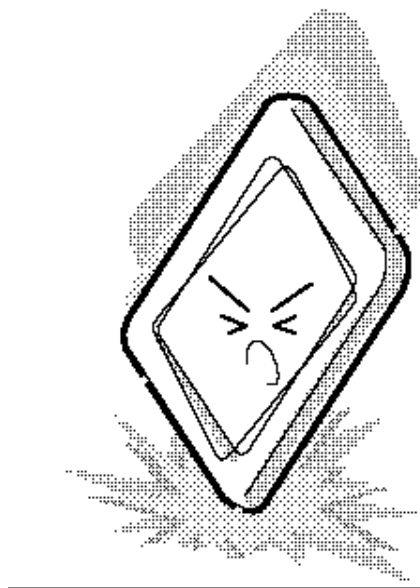
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic
   discharge. Be sure to wear a wrist or ankle ground when handling the module.
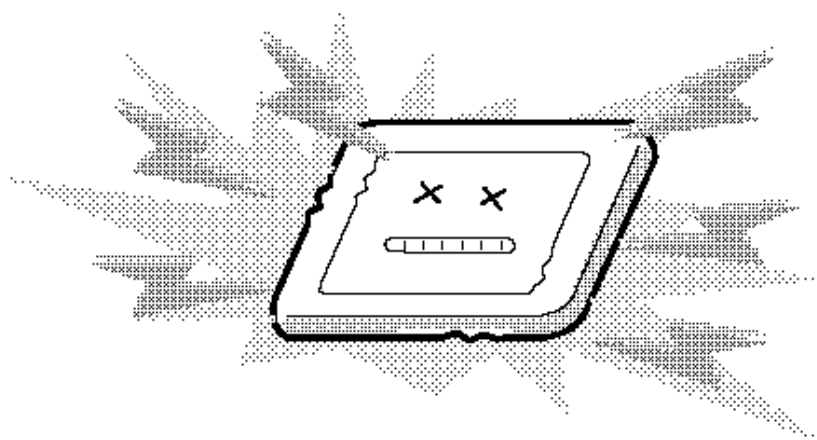
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.
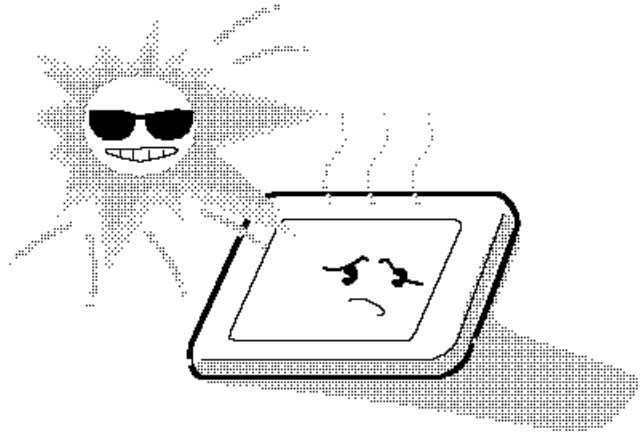
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
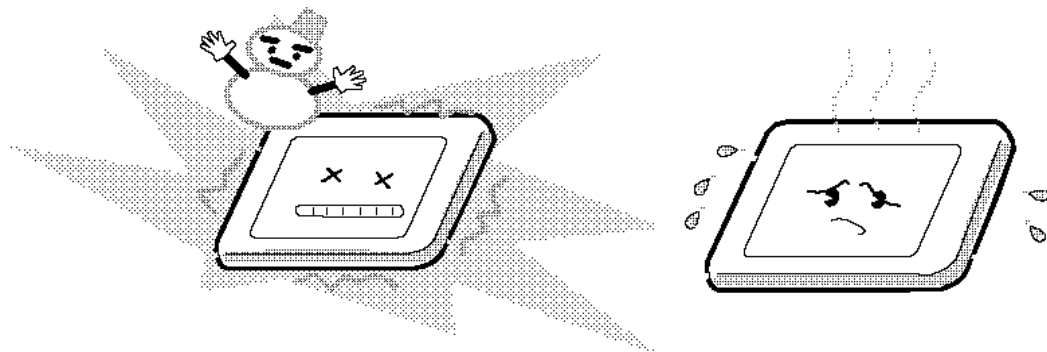
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
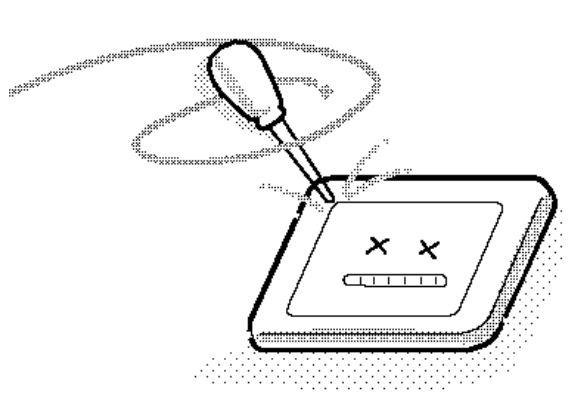
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
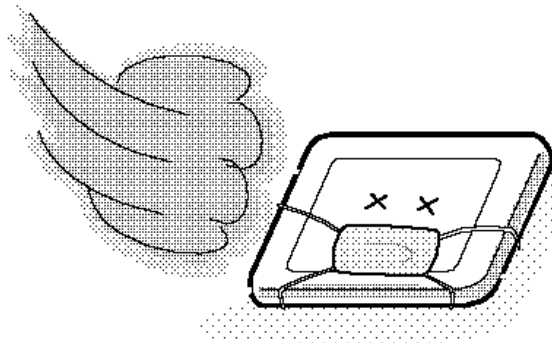
Appendix B   Board Layout

B.1   System Board Front View
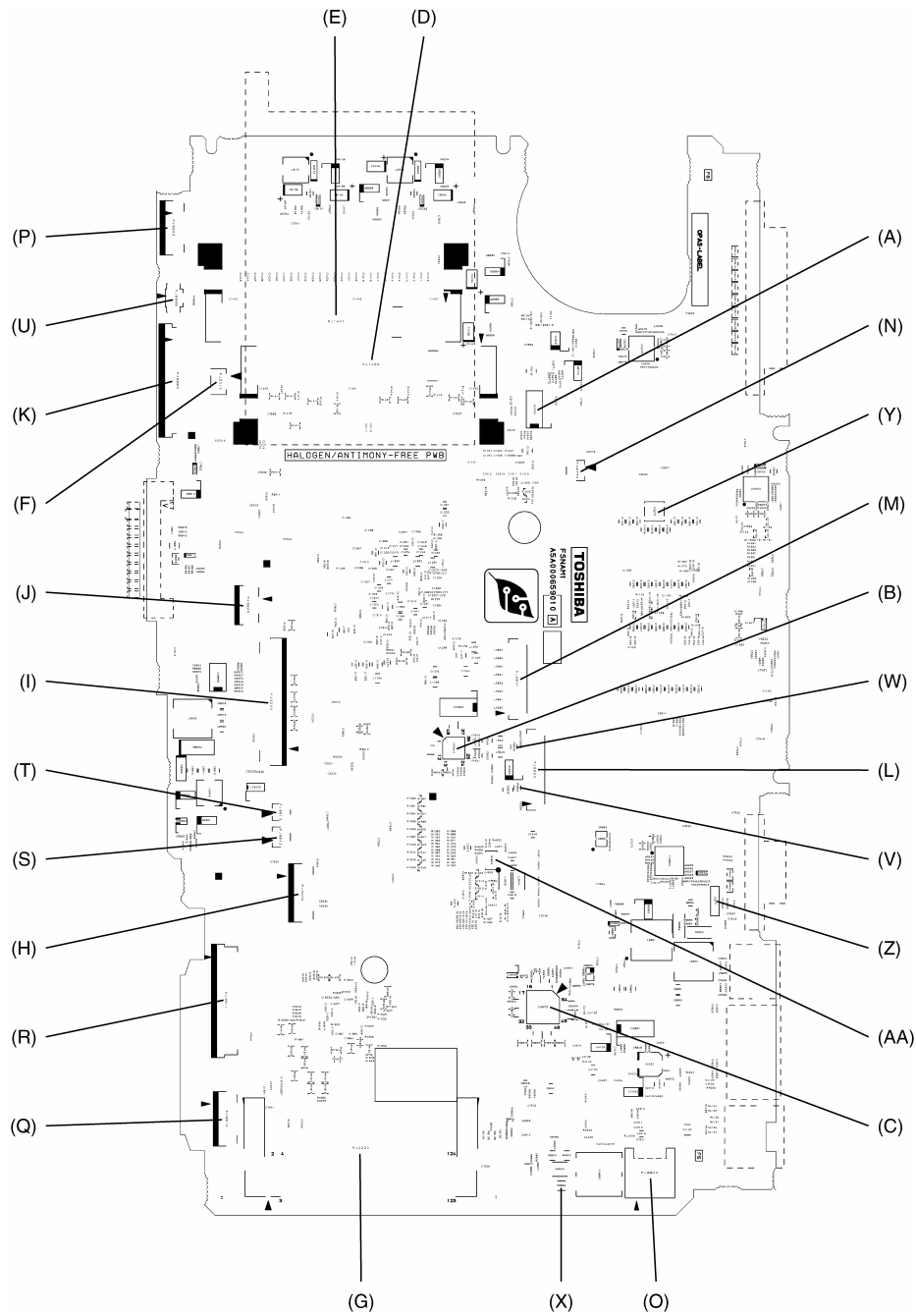
Figure B-1   System board layout (front)

Table B-1   System board layout (front)

Mark	Number	Name
(A)	IC2100	PC Card Power Switch MIC2563A
(B)	IC5640	TV encoder TVxpress2
(C)	IC8972	PSC TMP87PM48V
(D)	PJ1400	SO-DIMM slot 0
(E)	PJ1401	SO-DIMM slot 1
(F)	PJ2010	Debug port
(G)	PJ2200	Mini PCI slot
(H)	PJ3030	Bluetooth I/F connector
(I)	PJ3230	Keyboard I/F connector
(J)	PJ3240	PAD I/F connector
(K)	PJ3260	Mode panel I/F connector
(L)	PJ5600	LCD I/F connector (green)
(M)	PJ5601	LCD I/F connector (white)
(N)	PJ8770	Sub FAN I/F connector
(O)	PJ8800	DC-IN connector
(P)	PJ9500	FIR board (FSNAS*) I/F connector
(Q)	PJ9510	Sound board (FSNAS*) I/F connector
(R)	PJ9511	Sound board (FSNAS*) I/F connector
(S)	PJ9512	Right Speaker I/F connector
(T)	PJ9513	Left Speaker I/F connector
(U)	PJ9999	RTC battery I/F connector
(V)	F5602	3.15A fuse (for FL)
(W)	F5603	2A fuse (for LCD)
(X)	F8800	12A fuse (for DC-IN)
(Y)	S3270	Power switch
(Z)	S3271	LCD panel switch
(AA)	X4600	48.0000MHz clock (for USB 2.0 controller)

B.2   System Board Back View
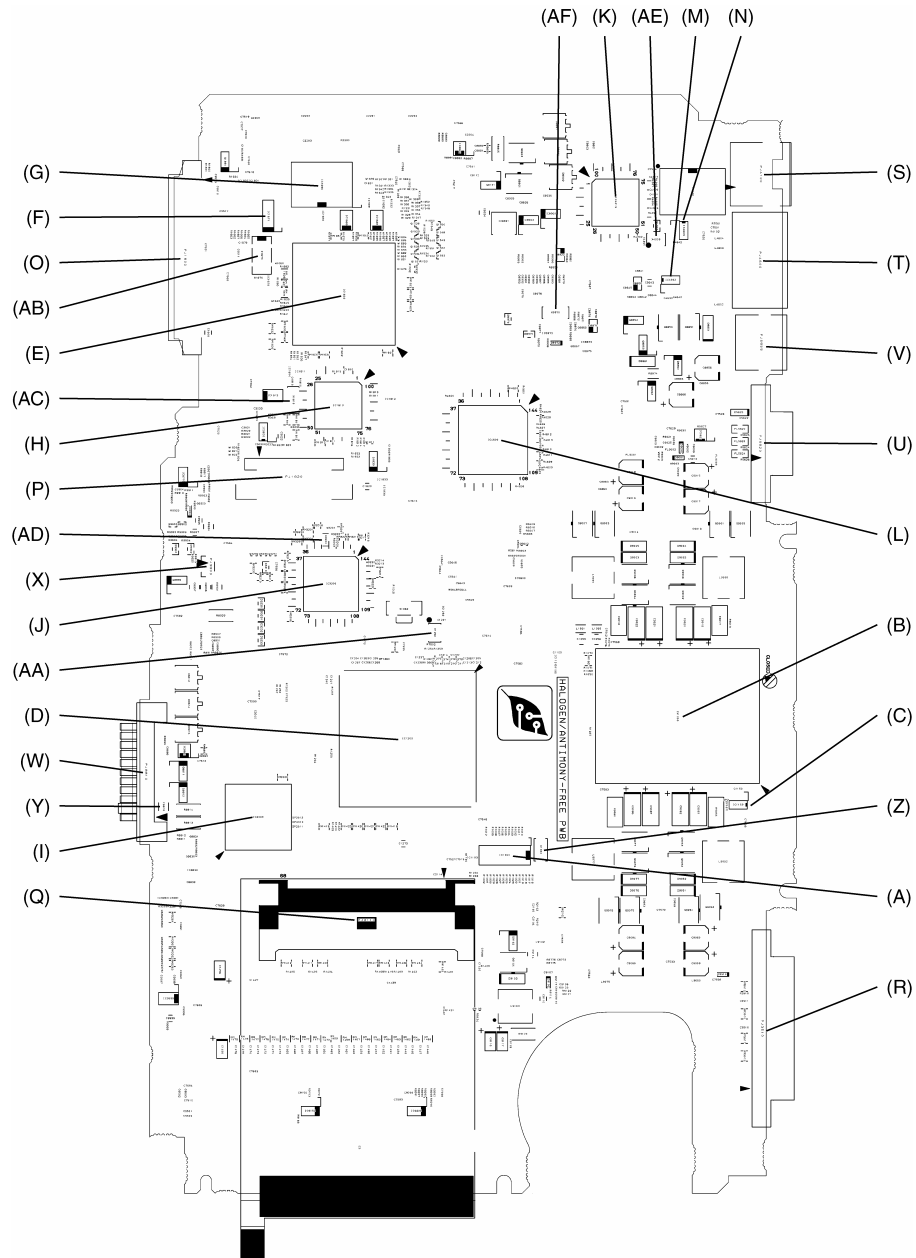
Figure B-2   System board layout (back)

Table B-2   System board layout (back)

Mark	Number	Name
(A)	IC1000	Clock Generator ICS951104
(B)	IS1050	CPU Socket
(C)	IC1150	Thermal Sensor ADM1032AR
(D)	IC1200	North Bridge M1672
(E)	IC1600	South Bridge M1535+
(F)	IC1671	RTC bq3285LDSS
(G)	IC1690	BIOS ROM MF400A
(H)	IC1810	CD Play Controller OZ168
(I)	IC2000	YEBISU SS
(J)	IC3200	EC/KBC M306K9FCLRP
(K)	IC4013	LAN Controller RTL8139DL
(L)	IC4600	USB 2.0 controller µPD720101
(M)	IC4602	USB Power Switch MAX1922ESA
(N)	IC4603	USB Power Switch MAX1922ESA
(O)	PJ1800	HDD I/F connector
(P)	PJ1820	ODD I/F connector
(Q)	PJ2110	PC Card Slot
(R)	PJ3510	Parallel Port
(S)	PJ4100	RJ-45 LAN Jack
(T)	PJ4600	USB connector
(U)	PJ5620	CRT I/F connector
(V)	PJ5655	TV connector
(W)	PJ8810	Battery I/F connector
(X)	PJ9900	FAN connector
(Y)	F8810	15A fuse (for battery)
(Z)	X1000	14.31818MHz clock (for clock generator)
(AA)	X1260	14.31818MHz clock (for north bridge)
(AB)	X1670	32.768KHz clock (for RTC)
(AC)	X1810	8MHz clock (for OZ168)
(AD)	X3200	8MHz clock (for EC/KBC)
(AE)	X4000	25MHz clock (for LAN controller)

(AF)	X8970	4MHz clock (for PSC)

B.3   Sound Board Front View
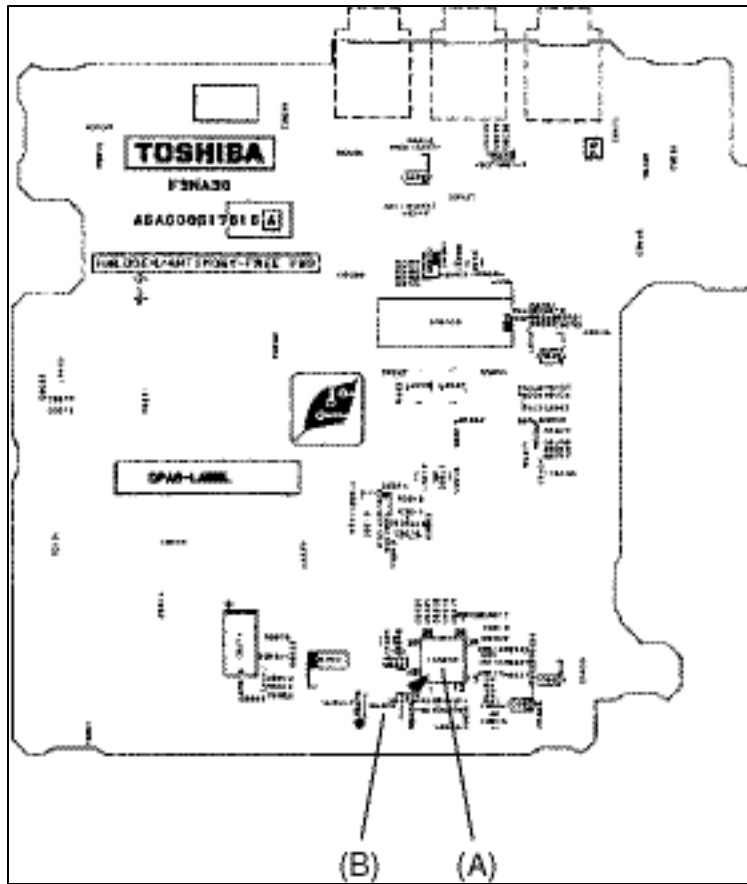
Figure B-3   Sound board layout (front)

Table B-3   Sound board layout (front)

Mark	Number	Name
(A)	IC6000	Sound CODEC AD1981B
(B)	X6000	24.576MHz clock (for AD1981B)

B.4   Sound Board Back View
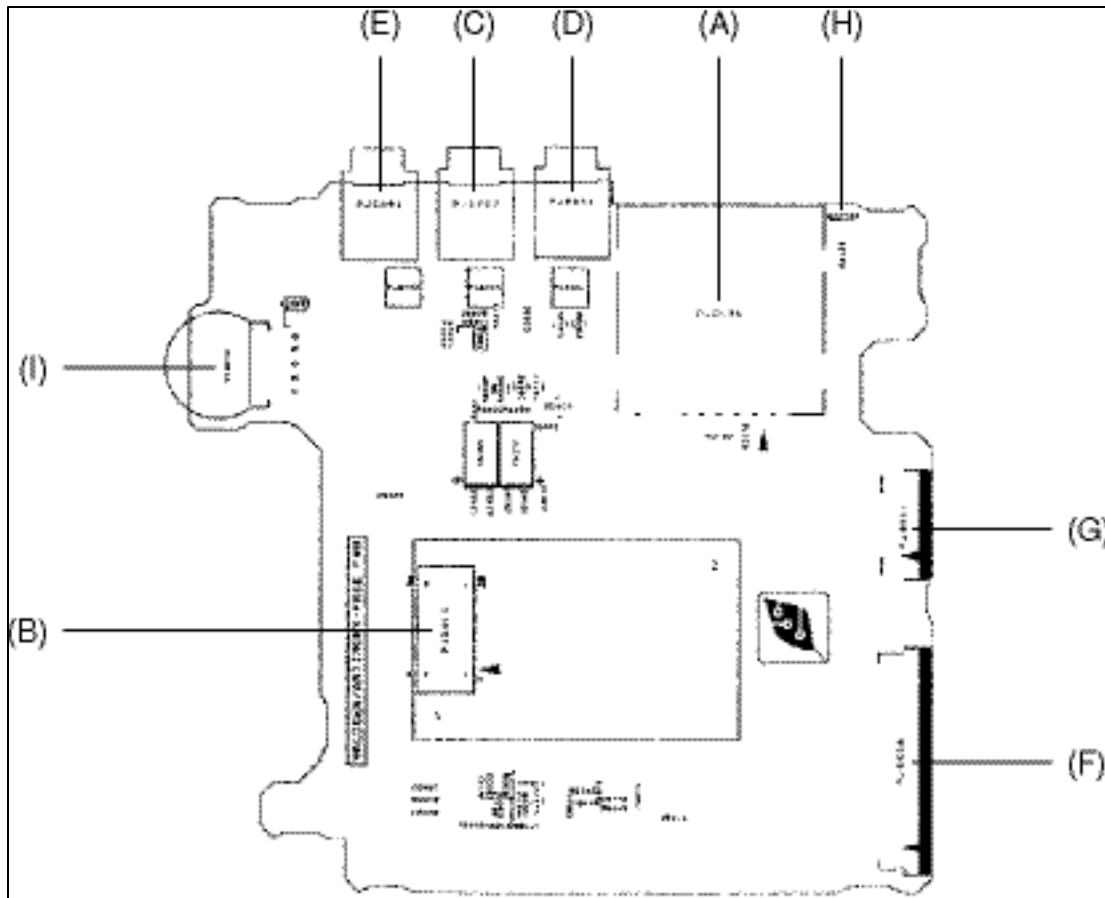
Figure B-4   Sound board layout (back)

Table B-4   Sound board layout (back)

Mark	Number	Name
(A)	PJ2130	SD Card Slot
(B)	PJ3010	MDC I/F connector
(C)	PJ6000	External Microphone jack
(D)	PJ6001	Line In jack
(E)	PJ6004	Headphone jack
(F)	PJ9600	System board (FSNAM*) I/F connector
(G)	PJ9601	System board (FSNAM*) I/F connector
(H)	DS2120	SD Card LED
(I)	VR6000	Volume dial

B.5   USB Board Front and Back View
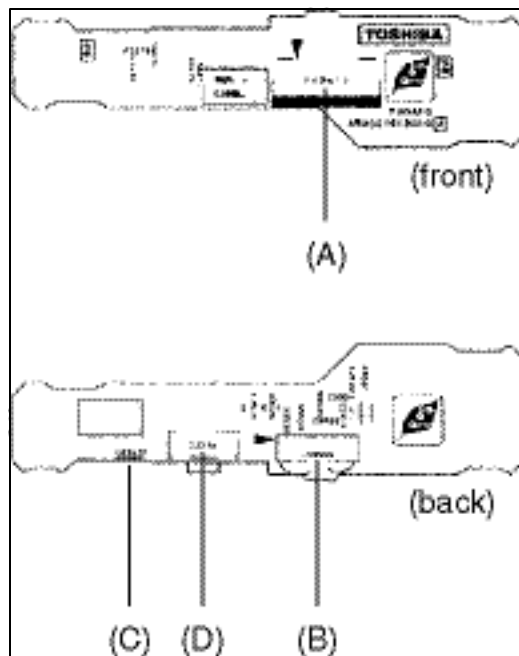
Figure B-5   USB board layout (front/back)

Table B-5   USB board ICs and connectors (front/back)

Mark	Number	Name
(A)	PJ9610	System board (FSNAM*) I/F connector
(B)	IC3520	FIR module
(C)	DS3270	Wireless communication LED
(D)	S3270	Wireless communication switch

Appendix C   Pin Assignments

System Board FSNAM*

C.1   PJ1400   Memory 1 Connector (200-pin)

Table C-1   PJ1400   Memory 1 connector pin assignments (200-pin) (1/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-B1V	-	2	MR1R25-B1V	-
3	GND	-	4	GND	-
5	SDQ01R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ00R-B2P	I/O	8	SDQ02R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	SDQM0R-B2P	O
13	SDQ05R-B2P	I/O	14	SDQ07R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ04R-B2P	I/O	18	SDQ03R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ14R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ10R-B2P	I/O
25	SDQS1R-B2P	I/O	26	SDQM1R-B2P	O
27	GND	-	28	GND	-
29	SDQ09R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ12R-B2P	I/O	32	SDQ15R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK1-P2P	O	36	2R5-B2V	-
37	SCK1-P2N	O	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ18R-B2P	I/O
43	SDQ21R-B2P	I/O	44	SDQ19R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	SDQM2R-B2P	O
49	SDQ16R-B2P	I/O	50	SDQ23R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ17R-B2P	I/O	54	SDQ22R-B2P	I/O
55	SDQ29R-B2P	I/O	56	SDQ31R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ25R-B2P	I/O	60	SDQ30R-B2P`	I/O
61	SDQS3R-B2P	I/O	62	SDQM3R-B2P	O

Table C-1   PJ1400   Memory 1 connector pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
63	GND	-	64	GND	-
65	SDQ28R-B2P	I/O	66	SDQ26R-B2P	I/O
67	SDQ24R-B2P	I/O	68	SDQ27R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB0R-B2P	I/O	72	SCB4R-B2P	I/O
73	SCB1R-B2P	I/O	74	SCB5R-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8R-B2P	I/O	78	SDQM8R-B2P	-
79	SCB2R-B2P	I/O	80	SCB6R-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB3R-B2P	I/O	84	SCB7R-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	SCK0-P2P	O	90	GND	-
91	SCK0-P2N	O	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE3R-B2P	O	96	SCKE2R-B2P	O
97	NC	-	98	NC	-
99	SMA12R-B2P	O	100	SMA11R-B2P	O
101	SMA09R-B2P	O	102	SMA08R-B2P	O
103	GND	-	104	GND	-
105	SMA07R-B2P	O	106	SMA06R-B2P	O
107	SMA05R-B2P	O	108	SMA04R-B2P	O
109	SMA03R-B2P	O	110	SMA02R-B2P	O
111	SMA01R-B2P	O	112	SMA00R-B2P	O
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10R-B2P	O	116	SBS1R-B2P	O
117	SBS0R-B2P	O	118	SRASR-B2N	O
119	SWER-B2N	O	120	SCASR-B2N	O
121	SCS2R-B2N	O	122	SCS3R-B2N	O
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ35R-B2P	I/O
129	SDQ32R-B2P	I/O	130	SDQ38R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	SDQM4R-B2P	O
135	SDQ36R-B2P	I/O	136	SDQ34R-B2P	I/O

Table C-1   PJ1400   Memory 1 connector pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
137	GND	-	138	GND	-
139	SDQ33R-B2P	I/O	140	SDQ39R-B2P	I/O
141	SDQ41R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ42R-B2P	I/O	146	SDQ40R-B2P	I/O
147	SDQS5R-B2P	I/O	148	SDQM5R-B2P	O
149	GND	-	150	GND	-
151	SDQ44R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ45R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK2-P2N	O
159	GND	-	160	SCK2-P2P	O
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ50R-B2P	I/O
165	SDQ52R-B2P	I/O	166	SDQ54R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	SDQM6R-B2P	O
171	SDQ53R-B2P	I/O	172	SDQ51R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ49R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ61R-B2P	I/O	178	SDQ62R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ59R-B2P	I/O
183	SDQS7R-B2P	I/O	184	SDQM7R-B2P	O
185	GND	-	186	GND	-
187	SDQ57R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ60R-B2P	I/O	190	SDQ58R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	GND	-
195	SMBCLK-P3P	O	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.2   PJ1401   Memory 2 Connector (200-pin)

Table C-2   PJ1401   Memory 2 connector pin assignments (200-pin) (1/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	MR1R25-B1V	-	2	MR1R25-B1V	-
3	GND	-	4	GND	-
5	SDQ01R-B2P	I/O	6	SDQ06R-B2P	I/O
7	SDQ00R-B2P	I/O	8	SDQ02R-B2P	I/O
9	2R5-B2V	-	10	2R5-B2V	-
11	SDQS0R-B2P	I/O	12	SDQM0R-B2P	O
13	SDQ05R-B2P	I/O	14	SDQ07R-B2P	I/O
15	GND	-	16	GND	-
17	SDQ04R-B2P	I/O	18	SDQ03R-B2P	I/O
19	SDQ13R-B2P	I/O	20	SDQ14R-B2P	I/O
21	2R5-B2V	-	22	2R5-B2V	-
23	SDQ08R-B2P	I/O	24	SDQ10R-B2P	I/O
25	SDQS1R-B2P	I/O	26	SDQM1R-B2P	O
27	GND	-	28	GND	-
29	SDQ09R-B2P	I/O	30	SDQ11R-B2P	I/O
31	SDQ12R-B2P	I/O	32	SDQ15R-B2P	I/O
33	2R5-B2V	-	34	2R5-B2V	-
35	SCK4-P2P	O	36	2R5-B2V	-
37	SCK4-P2N	O	38	GND	-
39	GND	-	40	GND	-
41	SDQ20R-B2P	I/O	42	SDQ18R-B2P	I/O
43	SDQ21R-B2P	I/O	44	SDQ19R-B2P	I/O
45	2R5-B2V	-	46	2R5-B2V	-
47	SDQS2R-B2P	I/O	48	SDQM2R-B2P	O
49	SDQ16R-B2P	I/O	50	SDQ23R-B2P	I/O
51	GND	-	52	GND	-
53	SDQ17R-B2P	I/O	54	SDQ22R-B2P	I/O
55	SDQ29R-B2P	I/O	56	SDQ31R-B2P	I/O
57	2R5-B2V	-	58	2R5-B2V	-
59	SDQ25R-B2P	I/O	60	SDQ30R-B2P	I/O
61	SDQS3R-B2P	I/O	62	SDQM3R-B2P	O
63	GND	-	64	GND	-
65	SDQ28R-B2P	I/O	66	SDQ26R-B2P	I/O
67	SDQ24R-B2P	I/O	68	SDQ27R-B2P	I/O
69	2R5-B2V	-	70	2R5-B2V	-
71	SCB0R-B2P	I/O	72	SCB4R-B2P	I/O

Table C-2   PJ1401   Memory 2 connector pin assignments (200-pin) (2/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
73	SCB1R-B2P	I/O	74	SCB5R-B2P	I/O
75	GND	-	76	GND	-
77	SDQS8R-B2P	I/O	78	SDQM8R-B2P	O
79	SCB2R-B2P	I/O	80	SCB6R-B2P	I/O
81	2R5-B2V	-	82	2R5-B2V	-
83	SCB3R-B2P	I/O	84	SCB7R-B2P	I/O
85	NC	-	86	NC	-
87	GND	-	88	GND	-
89	SCK3-P2P	O	90	GND	-
91	SCK3-P2N	O	92	2R5-B2V	-
93	2R5-B2V	-	94	2R5-B2V	-
95	SCKE1R-B2P	O	96	SCKE0R-B2P	O
97	NC	-	98	NC	-
99	SMA12R-B2P	O	100	SMA11R-B2P	O
101	SMA09R-B2P	O	102	SMA08R-B2P	O
103	GND	-	104	GND	-
105	SMA07R-B2P	O	106	SMA06R-B2P	O
107	SMA05R-B2P	O	108	SMA04R-B2P	O
109	SMA03R-B2P	O	110	SMA02R-B2P	O
111	SMA01R-B2P	O	112	SMA00R-B2P	O
113	2R5-B2V	-	114	2R5-B2V	-
115	SMA10R-B2P	O	116	SBS1R-B2P	O
117	SBS0R-B2P	O	118	SRASR-B2N	O
119	SWER-B2N	O	120	SCASR-B2N	O
121	SCS0R-B2N	O	122	SCS1R-B2N	O
123	NC	-	124	NC	-
125	GND	-	126	GND	-
127	SDQ37R-B2P	I/O	128	SDQ35R-B2P	I/O
129	SDQ32R-B2P	I/O	130	SDQ38R-B2P	I/O
131	2R5-B2V	-	132	2R5-B2V	-
133	SDQS4R-B2P	I/O	134	SDQM4R-B2P	O
135	SDQ36R-B2P	I/O	136	SDQ34R-B2P	I/O
137	GND	-	138	GND	-
139	SDQ33R-B2P	I/O	140	SDQ39R-B2P	I/O
141	SDQ41R-B2P	I/O	142	SDQ46R-B2P	I/O
143	2R5-B2V	-	144	2R5-B2V	-
145	SDQ42R-B2P	I/O	146	SDQ40R-B2P	I/O

| 147 | SDQS5R-B2P | I/O | 148 | SDQM5R-B2P | O |

Table C-2   PJ1401   Memory 2 connector pin assignments (200-pin) (3/3)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
149	GND	-	150	GND	-
151	SDQ44R-B2P	I/O	152	SDQ47R-B2P	I/O
153	SDQ45R-B2P	I/O	154	SDQ43R-B2P	I/O
155	2R5-B2V	-	156	2R5-B2V	-
157	2R5-B2V	-	158	SCK5-P2N	O
159	GND	-	160	SCK5-P2P	O
161	GND	-	162	GND	-
163	SDQ48R-B2P	I/O	164	SDQ50R-B2P	I/O
165	SDQ52R-B2P	I/O	166	SDQ54R-B2P	I/O
167	2R5-B2V	-	168	2R5-B2V	-
169	SDQS6R-B2P	I/O	170	SDQM6R-B2P	O
171	SDQ53R-B2P	I/O	172	SDQ51R-B2P	I/O
173	GND	-	174	GND	-
175	SDQ49R-B2P	I/O	176	SDQ55R-B2P	I/O
177	SDQ61R-B2P	I/O	178	SDQ62R-B2P	I/O
179	2R5-B2V	-	180	2R5-B2V	-
181	SDQ56R-B2P	I/O	182	SDQ59R-B2P	I/O
183	SDQS7R-B2P	I/O	184	SDQM7R-B2P	O
185	GND	-	186	GND	-
187	SDQ57R-B2P	I/O	188	SDQ63R-B2P	I/O
189	SDQ60R-B2P	I/O	190	SDQ58R-B2P	I/O
191	2R5-B2V	-	192	2R5-B2V	-
193	SMBDAT-P3P	I/O	194	P3V	-
195	SMBCLK-P3P	O	196	GND	-
197	P3V	-	198	GND	-
199	NC	-	200	NC	-

C.3 PJ1800 HDD Interface Connector (44-pin)

Table C-3   HDD interface connector pin assignments (44-pin)

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

C.4 PJ1820 ODD Interface Connector (50-pin)

Table C-4 ODD interface connector pin assignments (50-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CDAUDL-EXP	I	2	CDAUDR-EXP	I
3	CD-GND	-	4	NC	-
5	IDRSTB-E5N	O	6	SDD08-E5P	I/O
7	SDD07-E5P	I/O	8	SDD09-E5P	I/O
9	SDD06-E5P	I/O	10	SDD10-E5P	I/O
11	SDD05-E5P	I/O	12	SDD11-E5P	I/O
13	SDD04-E5P	I/O	14	SDD12-E5P	I/O
15	SDD03-E5P	I/O	16	SDD13-E5P	I/O
17	SDD02-E5P	I/O	18	SDD14-E5P	I/O
19	SDD01-E5P	I/O	20	SDD15-E5P	I/O
21	SDD00-E5P	I/O	22	SDDREQ-E5P	I
23	GND	-	24	SDIOR-E3N	O
25	SDIOW-E3N	O	26	GND	-
27	SIORDY-E5P	I	28	SDDACK-E3N	O
29	IRQ15-E5P	I	30	NC	-
31	SDA1-E3P	O	32	NC	-
33	SDA0-E3P	O	34	SDA2-E3P	O
35	SDCS1-E3N	O	36	SDCS3-E3N	O
37	SDASP-E5N	I/O	38	CD-E5V	-
39	CD-E5V	-	40	CD-E5V	-
41	CD-E5V	-	42	CD-E5V	-
43	GND	-	44	GND	-
45	GND	-	46	NC	-
47	NC	-	48	GND	-
49	NC	-	50	NC	-

C.5 PJ2010 Debug port Connector (4-pin)

Table C-5 Debug port connector pin assignments (4-pin)

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

C.6 PJ2110 PC Card Interface Connector (68-pin)

Table C-6 PC-Card interface connector pin assignments (68-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	ACAD00-BYP	I/O
3	ACAD01-BYP	I/O	4	ACAD03-BYP	I/O
5	ACAD05-BYP	I/O	6	ACAD07-BYP	I/O
7	ACCBE0-BYN	I/O	8	ACAD09-BYP	I/O
9	ACAD11-BYP	I/O	10	ACAD12-BYP	I/O
11	ACAD14-BYP	I/O	12	ACCBE1-BYN	I/O
13	ACPAR-BYP	I/O	14	ACPERR-BYN	I/O
15	ACGNT-BYN	I	16	ACINT-BYN	O
17	MCVCCA-BYV	-	18	MCVPPA-BYV	-
19	ACCLK-BYP	I/O	20	ACIRDY-BYN	I/O
21	ACCBE2-BYN	I/O	22	ACAD18-BYP	I/O
23	ACAD20-BYP	I/O	24	ACAD21-BYP	I/O
25	ACAD22-BYP	I/O	26	ACAD23-BYP	I/O
27	ACAD24-BYP	I/O	28	ACAD25-BYP	I/O
29	ACAD26-BYP	I/O	30	ACAD27-BYP	I/O
31	ACAD29-BYP	I/O	32	ACD02-BYP	I/O
33	ACCLKR-BYN	I/O	34	GND	-
35	GND	-	36	ACCD1-B3N	O
37	ACAD02-BYP	I/O	38	ACAD04-BYP	I/O
39	ACAD06-BYP	I/O	40	ACD14-BYP	I/O
41	ACAD08-BYP	I/O	42	ACAD10-BYP	I/O
43	ACVS1-B3P	I/O	44	ACAD13-BYP	I/O
45	ACAD15-BYP	I/O	46	ACAD16-BYP	I/O
47	ACA18-BYP	I/O	48	ACLOCK-BYN	I/O
49	ACSTOP-BYN	I/O	50	ACDEVS-BYN	I/O
51	MCVCCA-BYV	-	52	MCVPPA-BYV	-
53	ACTRDY-BYN	I/O	54	ACFRAM-BYN	I/O
55	ACAD17-BYP	I/O	56	ACAD19-BYP	I/O
57	ACVS2-B3P	I/O	58	ACRST-BYN	I/O
59	ACSERR-BYN	I/O	60	ACREQ-BYN	O
61	ACCBE3-BYN	I/O	62	ACAUDI-BYP	O
63	ACSTSC-BYP	O	64	ACAD28-BYP	I/O
65	ACAD30-BYP	I/O	66	ACAD31-BYP	I/O
67	ACCD2-B3N	O	68	GND	-

C.7   PJ2200   Mini PCI Card Interface Connector (124-pin)

Table C-7   Mini PCI card interface connector pin assignments (124-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NC	-	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	NC	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	WLON-S3N	O	14	NC	-
15	GND	-	16	NC	-
17	PINTD-P3N	O	18	P5V	-
19	P3V	-	20	PINTA-P3N	I/O
21	NC	-	22	NC	-
23	GND	-	24	B3V	-
25	X33MPC-P3P	I	26	PCIRST-S3N	O
27	GND	-	28	P3V	-
29	PREQ2-P3N	O	30	PGNT2-P3N	O
31	P3V	-	32	GND	-
33	AD31-P3P	I/O	34	PME-S3N	O
35	AD29-P3P	I/O	36	NC	-
37	GND	-	38	AD30-P3P	I/O
39	AD27-P3P	I/O	40	P3V	-
41	AD25-P3P	I/O	42	AD28-P3P	I/O
43	NC	-	44	AD26-P3P	I/O
45	CBE3-P3N	I/O	46	AD24-P3P	I/O
47	AD23-P3P	I/O	48	AD27-P3P	I/O
49	GND	-	50	GND	-
51	AD21-P3P	I/O	52	AD22-P3P	I/O
53	AD19-P3P	I/O	54	AD20-P3P	I/O
55	GND	-	56	PAR-P3P	I/O
57	AD17-P3P	I/O	58	AD18-P3P	I/O
59	CBE2-P3N	I	60	AD16-P3P	I/O
61	IRDY-P3N	I/O	62	GND	-
63	P3V	-	64	FRAME-P3N	I/O
65	CLKRUN-P3N	I	66	TRDY-P3N	I/O
67	SERR-P3N	I	68	STOP-P3N	I/O

| 69 | GND | - | 70 | P3V | - |

Table C-7 Mini PCI interface connector pin assignments (124-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
71	PERR-P3N	O	72	DEVSEL-P3N	O
73	CBE1-P3N	I	74	GND	-
75	AD14-P3P	I/O	76	AD15-P3P	I/O
77	GND	-	78	AD13-P3P	I/O
79	AD12-P3P	I/O	80	AD11-P3P	I/O
81	AD10-P3P	I/O	82	GND	-
83	GND	-	84	AD09-P3P	I/O
85	AD08-P3P	I/O	86	CBE0-P3N	O
87	AD07-P3P	I/O	88	P3V	-
89	P3V	-	90	AD06-P3P	I/O
91	AD05-P3P	I/O	92	AD04-P3P	I/O
93	NC	-	94	AD02-P3P	I/O
95	AD03-P3P	I/O	96	AD00-P3P	I/O
97	P5V	-	98	NC	-
99	AD01-P3P	I/O	100	NC	-
101	GND	-	102	GND	-
103	NC	-	104	GND	-
105	NC	-	106	NC	-
107	NC	-	108	NC	-
109	NC	-	110	NC	-
111	NC	-	112	NC	-
113	GND	-	114	GND	-
115	NC	-	116	NC	-
117	GND	-	118	NC	-
119	GND	-	120	GND	-
121	NC	-	122	NC	-
123	NC	-	124	B3V	-

C.8   PJ4900   Bluetooth Interface Connector (20-pin)

Table C-8   Bluetooth interface connector pin assignments (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	NC	-
3	BTMDL-P3N	O	4	NC	-
5	NC	-	6	NC	-
7	NC	-	8	BTRST-S3N	I
9	NC	-	10	NC	-
11	GND	-	12	NC	-
13	BTIFIOF-S3N	I	14	NC	-
15	NC	-	16	USBDP2-B3P	I/O
17	USBDM2-B3N	I/O	18	NC	-
19	NC	-	20	BT-P3V	-

C.9   PJ3230   Keyboard Interface Connector (34-pin)

Table C-9   Keyboard interface connector pin assignments (34-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NUMLED-P5N	O	2	ARWLED-P5N	O
3	CAPLED-P5N	O	4	P5V	-
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	I
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	I
17	KBRT02-S3N	I	18	KBRT03-S3N	I
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	I	22	KBRT05-S3N	I
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	I	26	KBRT07-S3N	I
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	P5V	-	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	P5V	-

C.10 PJ3240 Touch Pad Interface Connector (8-pin)

Table C-10 Touch Pad interface connector pin assignments (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	GND	-	4	NC	-
5	IPDCLK-P5P	I/O	6	IPDDAT-P5P	I/O
7	P5V	-	8	P5V	-

C.11 PJ3260 Membrane interface Connector (24-pin)

Table C-11 Membrane interface connector pin assignments (24-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	MODBTN-S3N	O
3	CDPREV-S5N	I	4	CDNEXT-S5N	I
5	S5V	-	6	CDMODE-S3P	I
7	MP3MOD-S3P	I	8	S5V	-
9	DCINOR-S5N	I	10	DCINGR-S5N	I
11	S5V	-	12	PWLEOR-S3P	I
13	PWLEGR-S3P	I	14	BAT1OR-S5N	I
15	BAT1GR-S5N	I	16	S5V	-
17	NC	-	18	P5V	-
19	HDDLED	O	20	S5V	-
21	OZPVEN-S3N	O	22	CDPLAY-S5N	I
23	CDSTOP-S5N	I	24	GND	-

C.12   PJ3510   Parallel Interface Connector (25-pin)

Table C-12   Parallel interface connector pin assignments (25-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	STROB-P5N	O	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	O
11	BUSY-P5P	O	12	PE-P5P	O
13	SELCT-P5P	O	14	AUTFD-P5N	O
15	ERROR-P5N	O	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.13   PJ4100   Network Interface Connector (8-pin)

Table C-13   Network interface connector pin assignments (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TDP-E3P	I	2	TDN-E3N	I
3	RDP-E3P	O	4	GND	-
5	GND	-	6	RDN-E3N	O
7	GND	-	8	GND	-

C.14   PJ4600   USB Connector (12-pin)

Table C-14   USB connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
A1	USBP0V-E5V	I	A2	USBDM1-B3N	O
A3	USBDP1-B3P	I/O	A4	GND	-
B1	USBP0V-E5V	I	B2	USBDM3-B3N	O
B3	USBDP3-B3P	I/O	B4	GND	-
C1	USBP1V-E5V	I	C2	USBDM5-B3N	O
C3	USBDP5-B3P	I/O	C4	GND	-

C.15   PJ5600   LCD 0 Interface Connector (20-pin)

Table C-15   LCD 0 interface connector pin assignments (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FL-P5V	-	2	FL- P5V	-
3	FL-P5V	-	4	BRT0-P5P	O
5	BRT1-P5P	O	6	BRT2DA-S3P	O
7	GND	-	8	GND	-
9	GND	-	10	GND	-
11	GND	-	12	GND	-
13	GND	-	14	GND	-
15	GND	-	16	PNL0-P3P	O
17	PNL1-P3P	O	18	PNL2-P3P	O
19	PNL-P3V	-	20	PNL-P3V	-

C.16   PJ5601   LCD 1 Interface Connector (20-pin)

Table C-16   LCD 1 interface connector pin assignments (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	TXCK0-B3N	O	4	TXCK0-B3P	O
5	TXDT0-B3N	O	6	TXDT0-B3P	O
7	TXDT1-B3N	O	8	TXDT1-B3P	O
9	TXDT2-B3N	O	10	TXDT2-B3P	O
11	TXCK1-B3N	O	12	TXCK1-B3P	O
13	TXDT4-B3N	O	14	TXDT4-B3P	O
15	TXDT5-B3N	O	16	TXDT5-B3P	O
17	TXDT6-B3N	O	18	TXDT6-B3P	O
19	GND	-	20	GND	-

C.17   PJ5620   CRT Interface Connector (15-pin)

Table C-17   CRT interface connector pin assignments (15-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	CRTRED-BXP	O	2	CRTGRN-BXP	O
3	CRTBLU-BXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	DDC-P5V	-	10	GND	-
11	NC	-	12	DDCSDA-B3P	I/O
13	HSYNC-B3P	I/O	14	VSYNC-B3P	I/O
15	DDCSCL-B3P	I/O			

C.18   PJ5655   TV Interface Connector (4-pin)

Table C-18   TV interface connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	TVLUMA-BXP	O	2	TVCHR0-BXP	O
3	GND	-	4	GND	-

C.19   PJ8770   Fan 0 Interface Connector (3-pin)

Table C-19   Fan 0 interface connector pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	FANVCC	O	2	GND	-
3	FANG1-P3P	I			

C.20   PJ8800   DC-IN Connector (4-pin)

Table C-20   DC-IN connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	GND	-
3	ADPDC	-	4	ADPDC	-

C.21   PJ8810   1st Battery Connector (10-pin)

Table C-21   1st Battery connector pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	PVBL1	-	2	BTMP1	I
3	PVBL1	-	4	S5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT10V-S5N	I
9	GND	-	10	GND	-

C.22   PJ9500   FSNAF* Board Interface Connector (18-pin)

Table C-22   FSNAF board interface connector pin assignments (18-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	S3V	-	2	BTSWON-S3P	I
3	P5V	-	4	BTLED-S3P	I
5	GND	-	6	GND	-
7	FIRMDL-P5N	I/O	8	FIR-GND	-
9	FIR-GND	-	10	FIR-GND	-
11	FIR-GND	-	12	IRTX-P3P	I
13	IRMODE-P3P	I/O	14	IRRX-P3N	I
15	P3V	-	16	P3V	-
17	P3V	-	18	P3V	-

C.23   PJ9510   FSNAS* Board Interface Connector (18-pin)

Table C-23   FSNAS board interface connector pin assignments (18-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P3V	-	2	P3V	-
3	P3V	-	4	NC	-
5	B3V	-	6	B3V	-
7	SNDON-S5N	O	8	GND	-
9	NC	-	10	SND-GND	-
11	SND-GND	-	12	SND-GND	-
13	SND-GND	-	14	PVON-S5P	O
15	SND-E5V	-	16	SND-E5V	-
17	SND-E5V	-	18	SND-E5V	-

C.24   PJ9511   Sound Board 1 Interface Connector (50-pin)

Table C-24   Sound board 1 interface connector pin assignments (50-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	SPKOTR-EXN	I
3	SPKOTR-EXN	I	4	SPKOTR-EXP	I
5	SPKOTR-EXP	I	6	GND	-
7	SPKOTL-EXP	I	8	SPKOTL-EXP	I
9	SPKOTL-EXN	I	10	SPKOTL-EXN	I
11	CD-GND	-	12	CDAUDR-EXP	O
13	CD-GND	-	14	CDAUDL -EXP	O
15	CD-GND	-	16	GND	-
17	X14SND-P3P	I	18	GND	-
19	M97SY1-P3P	I	20	M97OT1-P3P	I
21	M97RS1-S3N	O	22	GND	-
23	X97BC2-P3P	I	24	GND	-
25	M97IN1-P3P	I	26	M97IN2-B3P	I
27	M97OT2-P3P	I	28	M97SY2-P3P	I
29	M97RS2-S3N	O	30	GND	-
31	SNDMUT-S3N	O	32	AMPSD-S3N	O
33	OZPVEN-S5P	O	34	CAUDIO-B3P	I
35	ATBEEP-B3P	I	36	GND	-
37	SDAT0-B3P	I/O	38	SDAT1-B3P	I/O
39	SDAT2-B3P	I/O	40	SDAT3-B3P	I/O
41	GND	-	42	SDCMD-B3P	I/O
43	SDWP-B3P	I	44	SDCD-B3N	O
45	SDCLK-B3P	I	46	GND	-
47	GND	-	48	SDLED-P3P	I
49	SD-B3V	-	50	SD-B3V	-

C.25   PJ9512   Speaker (Right) Connector (3-pin)

Table C-25   Speaker (Right) Connector pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPKOTR-EXP	O	2	NC	-
3	SPKOTR-EXN	O			

C.26   PJ9513   Speaker (Left) Connector (2-pin)

Table C-26   Speaker (Left) Connector pin assignments (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	SPKOTL-EXP	O	2	SPKOTL-EXN	O

C.27   PJ9900   Fan 1 Interface Connector (3-pin)

Table C-27   Fan 1 interface connector pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P5V	I	2	GND	-
3	FANG0-P3P	O			

C.28   PJ9999   RTC Battery Connector (2-pin)

Table C-28   RTC Battery connector pin assignments (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	R3V	-	2	GND	-

Sound Board FSNAS*

C.29   PJ2130   SD Card Interface Connector (12-pin)

Table C-29   SD card interface connector pin assignments (12-pin)

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

C.30   PJ3010   MDC Interface Connector (30-pin)

Table C-30   MDC interface connector pin assignments (30-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	NC	-	2	GND	-
3	GND	-	4	PHONE-BXN	I
5	NC	-	6	NC	-
7	NC	-	8	GND	-
9	NC	-	10	NC	-
11	NC	-	12	NC	-
13	NC	-	14	NC	-
15	GND	-	16	MDC-B3V	-
17	B3V	-	18	NC	-
19	GND	-	20	GND	-
21	NC	-	22	M97SY2-P3P	I
23	M97OT2-P3P	I	24	NC	-
25	-M97RS2-S3N	I	26	M97IN2-B3P	O
27	GND	-	28	GND	-
29	GND	-	30	X97BMD-P3P	I/O

C.31   PJ6000   External Microphone Connector (6-pin)

Table C-31   External microphone connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	MICIN-PXP	O
3	REFV-P2V	-	4	A-GND	-
5	NC	-	6	A-GND	-

C.32   PJ6001   Line IN Connector (6-pin)

Table C-32   Line IN connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	LININL-PXP	O
3	LININR-PXP	O	4	NC	-
5	NC	-	6	NC	-

C.33   PJ6004   Headphone Connector (6-pin)

Table C-33   Headphone connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	A-GND	-	2	HEDL-EXP	O
3	HEDR-EXP	O	4	GND	-
5	SPKEN-E5P	I	6	NC	-

C.34   PJ9600   System Board 1 Interface Connector (50-pin)

Table C-34   System Board 1 interface connector pin assignments (50-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	GND	-	2	SPKOTR-EXN	O
3	SPKOTR-EXN	O	4	SPKOTR-EXP	O
5	SPKOTR-EXP	O	6	GND	-
7	SPKOTL-EXP	O	8	SPKOTL-EXP	O
9	SPKOTL-EXN	O	10	SPKOTL-EXN	O
11	CD-GND	-	12	CDAUDR-EXP	I
13	CD-GND	-	14	CDAUDL-EXP	I
15	CD-GND	-	16	GND	-
17	X14SND-P3P	O	18	GND	-
19	M97SY1-P3P	O	20	M97OT1-P3P	O
21	M97RS1-S3N	O	22	GND	-
23	X97BIC-P3P	I/O	24	GND	-
25	M97IN1-P3P	I	26	M97IN2-B3P	I
27	M97OT2-P3P	O	28	M97SY2-P3P	O
29	M97RS2-S3N	O	30	GND	-
31	SNDMUT-S3N	O	32	AMPSD-S3N	O
33	OZPVEN-S3N	I	34	CAUDIO-B3P	O
35	ATBEEP-B3P	I	36	GND	-
37	SDAT0-P3P	I/O	38	SDAT1-P3P	I/O
39	SDAT2-P3P	I/O	40	SDAT3-P3P	I/O
41	GND	-	42	SDCMD-P3P	I
43	SDWP-P3P	O	44	SDCD-P3N	O
45	SDCLK-P3P	I	46	GND	-
47	GND	-	48	SDLED-P3P	I
49	SD-B3V	-	50	SD-B3V	-

C.35   PJ9601   Sound Board 2 Interface Connector (18-pin)

Table C-35   Sound board 2 interface connector pin assignments (18-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	P3V	-	2	P3V	-
3	P3V	-	4	NC	-
5	B3V	-	6	B3V	-
7	SNDON-S5N	O	8	GND	-
9	NC	-	10	SND-GND	-
11	SND-GND	-	12	SND-GND	-
13	SND-GND	-	14	PVON-S5P	O
15	SND-E5V	-	16	SND-E5V	-
17	SND-E5V	-	18	SND-E5V	-

FIR Board FSNAF*

C.36   PJ2902   System Board 2 Interface Connector (18-pin)

Table C-36   System Board 2 interface connector pin assignments (18-pin)

Pin No.	Signal name	I/O	Pin No.	Signal name	I/O
1	S3V	-	2	BTSWON-S3P	-
3	P5V	-	4	BTLED-S3P	-
5	GND	-	6	GND	-
7	FIRMDL-P3N	I	8	FIR-GND	-
9	FIR-GND	-	10	FIR-GND	-
11	FIR-GND	-	12	IRTX-P3P	I
13	IRMODE-P3P	-	14	IRRX-P3N	-
15	P3V	-	16	P3V	-
17	P3V	-	18	P3V	-

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	Key	Code set 1								Code set 2							
No.	top	Make				Break				Make					Break			
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
203	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
204	App	E0	AA	E0	5D	E0	DD	E0	2A	E0	F0	12	E0	2F	E0	F0	2F	E0	12

Note : The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

	With left **Shift**	With right **Shift**
Set 1	E0 AA_____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

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

Table D-4 Scan codes with Fn key

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

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2	
			Make	**Break**	**Make**	**Break**
09	8	(8)	48	C8	75	F0 75
10	9	(9)	49	C9	7D	F0 7D
11	0	(*)	37	B7	7C	F0 7C
23	U	(4)	4B	CB	6B	F0 6B
24	I	(5)	4C	CC	73	F0 73
25	O	(6)	4D	CD	74	F0 74
26	P	(−)	4A	CA	7B	F0 7B
37	J	(1)	4F	CF	69	F0 69
38	K	(2)	50	D0	72	F0 72
39	L	(3)	51	D1	7A	F0 7A
40	;	(+)	4E	CE	79	F0 79
52	M	(0)	52	D2	70	F0 70
54	.	(.)	53	D3	71	F0 71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0 4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		**Break**		**Make**		**Break**	
Prt Sc	Common	E0 2A E0 37		E0 B7 E0 AA		E0 12 E0 7C		E0 F0 7C E0 F0 12	
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Shift +	E0 37		E0 B7		E0 7C		E0 F0 7C	
	Alt +	54		D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2						
		Make						**Make**						
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E		

*: This key generates only make codes.

Appendix E   Key Layout

E.1   United States (US) Keyboard
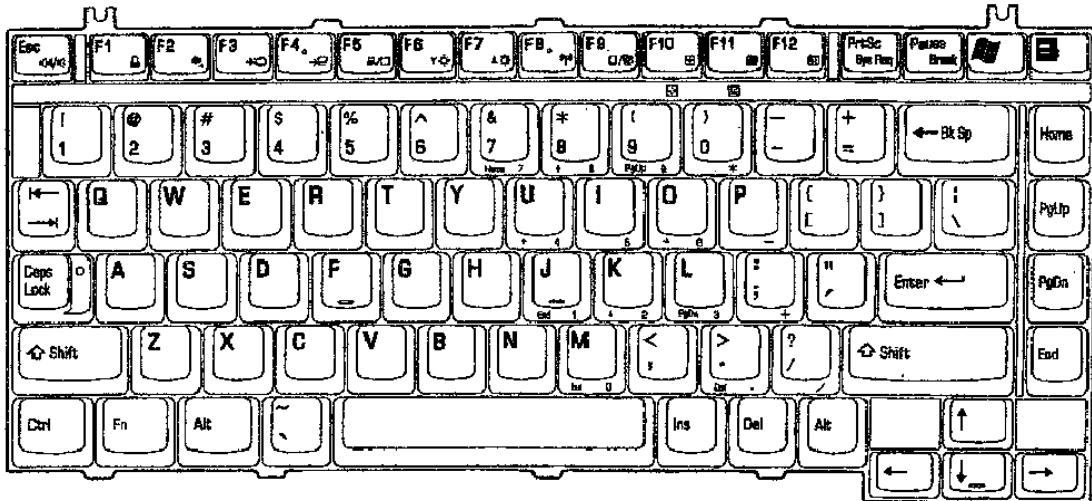
Figure E-1 US keyboard

E.2   United Kingdom (UK) Keyboard
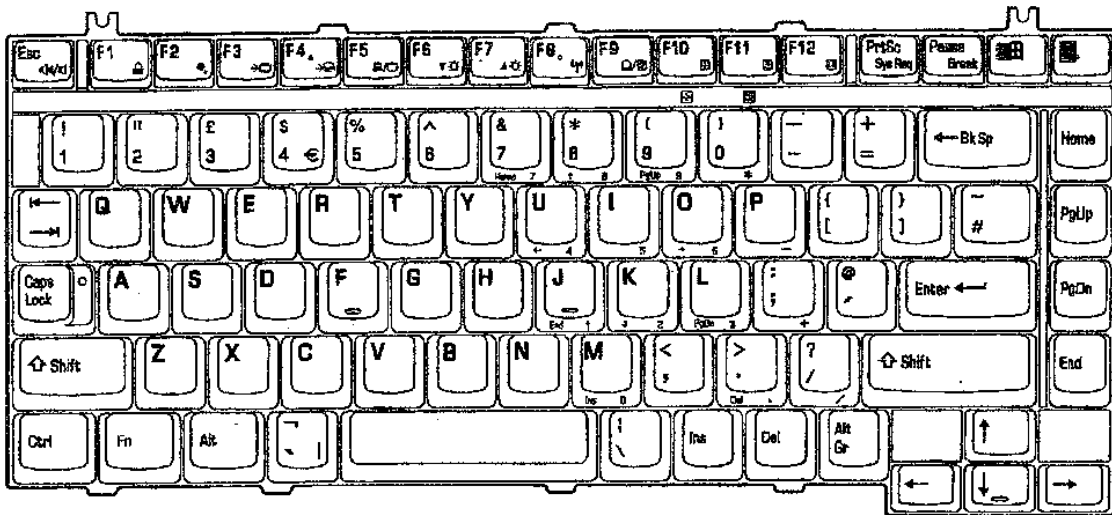
Figure E-2 UK keyboard

E.3   German (GR) Keyboard
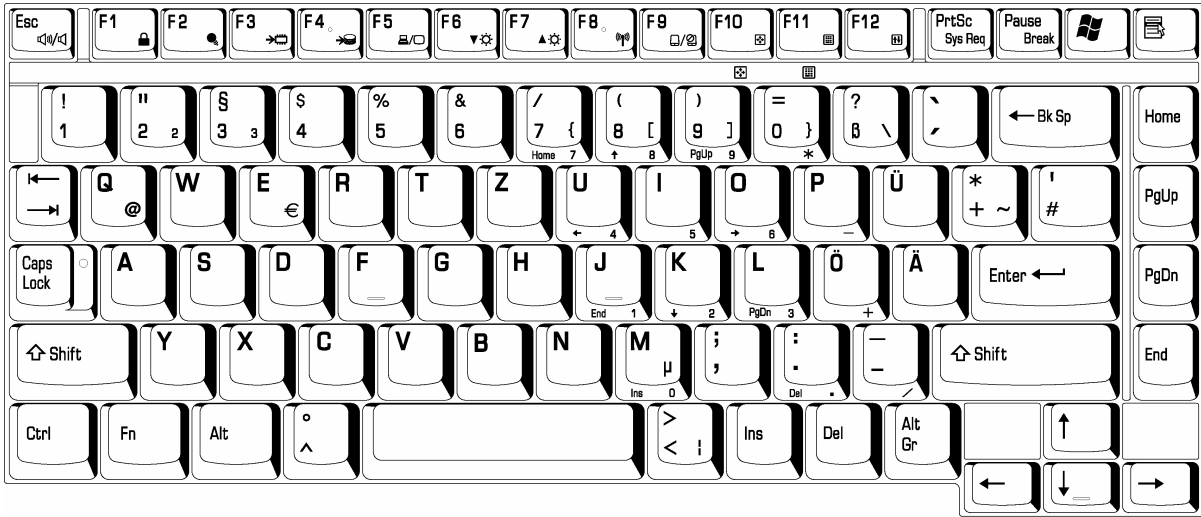
Figure E-3 GR keyboard

E.4   French (FR) Keyboard
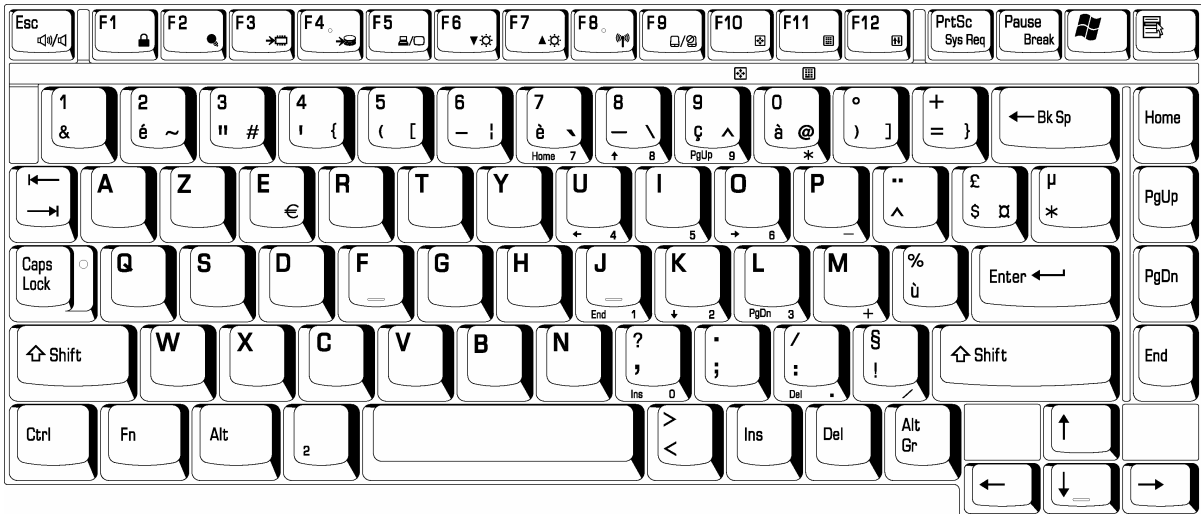
Figure E-4 FR keyboard
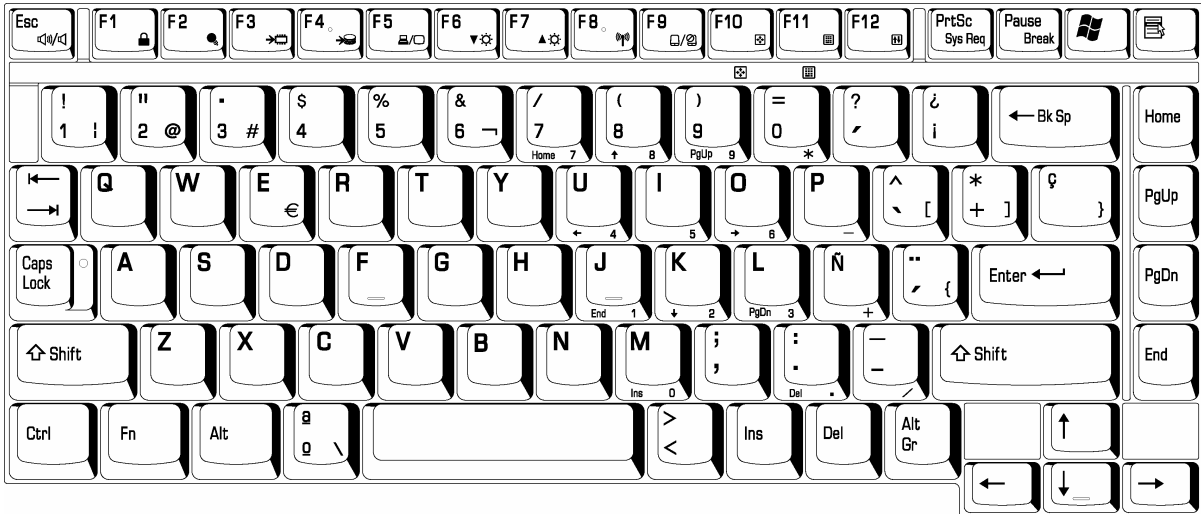
E.5   Spanish (SP) Keyboard

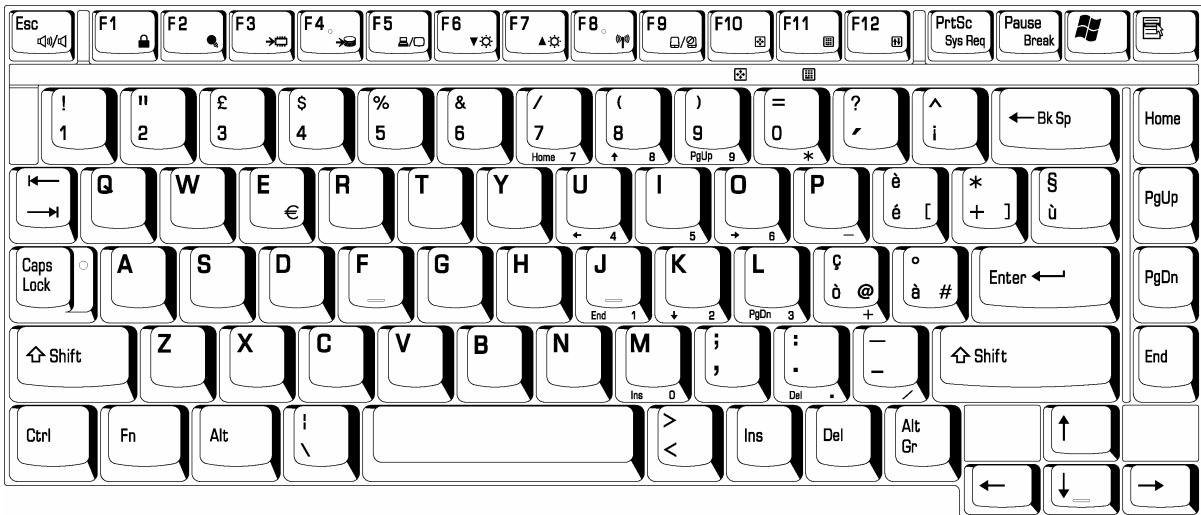

Figure E-5 SP keyboard

E.6   Italian (IT) Keyboard

Figure E-6 IT keyboard

E.7   Scandinavian (SC) Keyboard
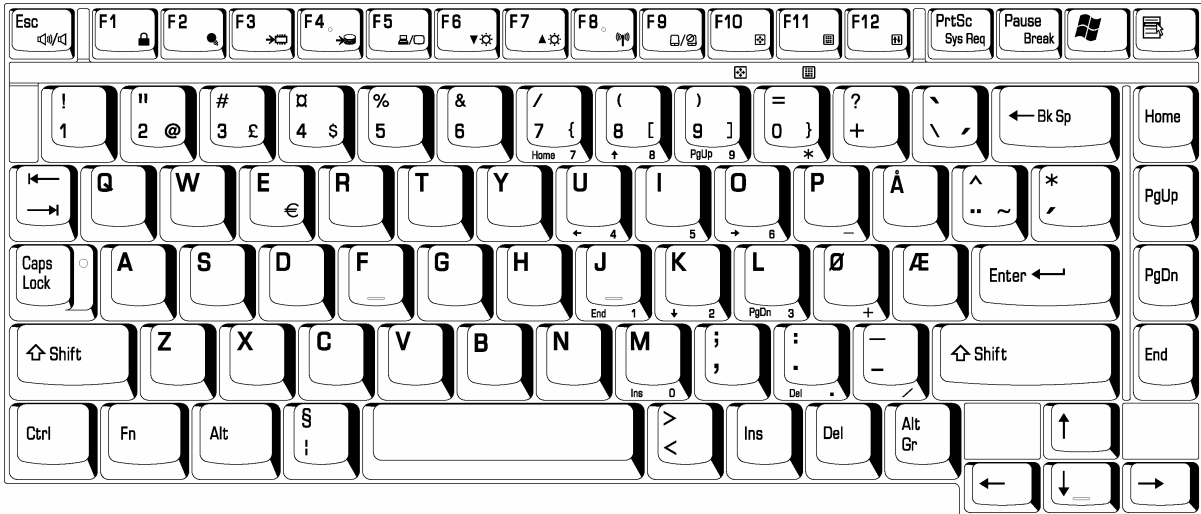

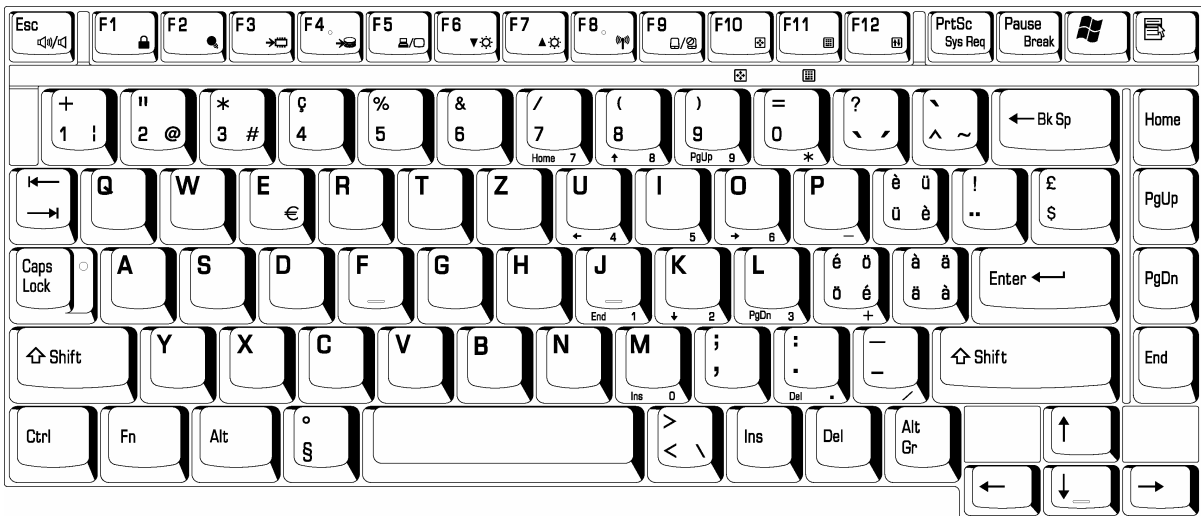*Figure E-7 SC keyboard*

E.8   Swiss-German (SL) Keyboard

Figure E-8 SL keyboard
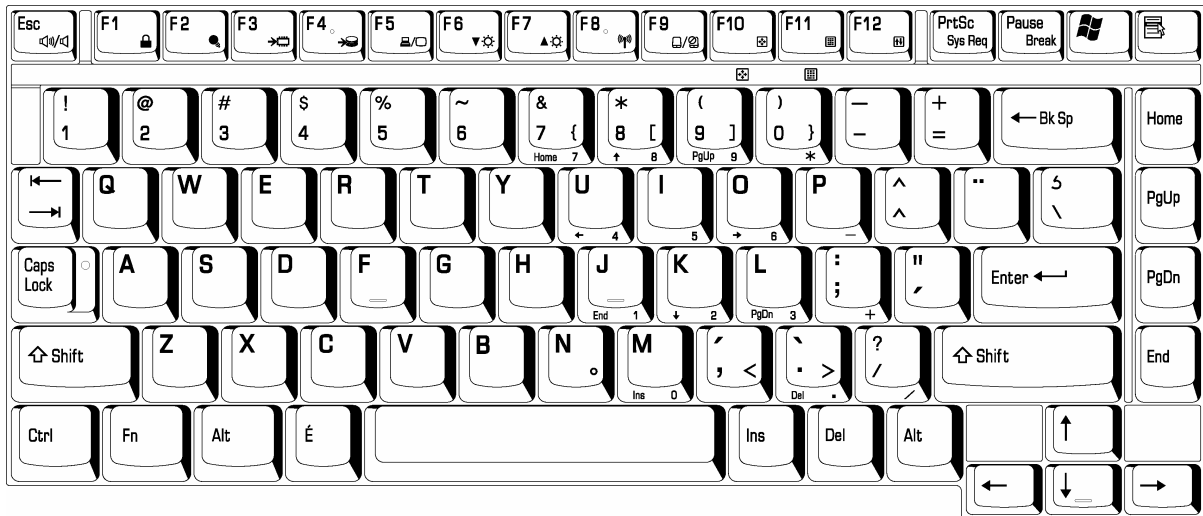
E.9   Canadian (CS) Keyboard

Figure E-9 CS keyboard
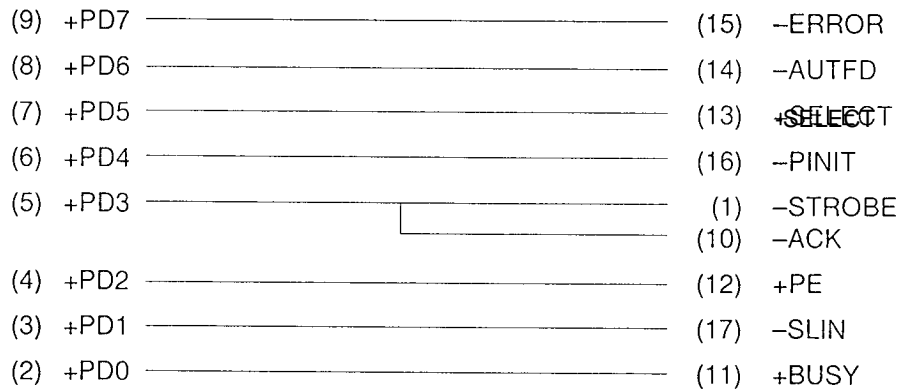
Appendix F   Wiring Diagrams

F.1   Parallel Port Wraparound Connector

(9)	+PD7	(15)	–ERROR
(8)	+PD6	(14)	–AUTFD
(7)	+PD5	(13)	+SELECT
(6)	+PD4	(16)	–PINIT
(5)	+PD3	(1)	–STROBE
		(10)	–ACK
(4)	+PD2	(12)	+PE
(3)	+PD1	(17)	–SLIN
(2)	+PD0	(11)	+BUSY

Figure F-1 Parallel port wraparound connector

F.2   RJ45 Wraparound Connector

(1)	TDP	(3)	RDP
(2)	TDN	(6)	RDN
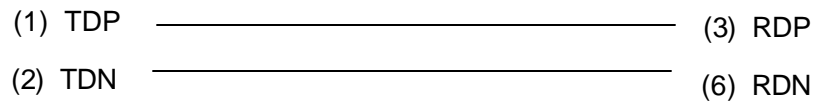
Figure F-2 RJ45 wraparound connector

Appendix G   BIOS Rewrite Procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

❑   BIOS/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

1. Set the system to boot mode.

2. Turn off the power to the computer.

3. Remove the external cable and PC card.

4. Insert the BIOS/EC/KBC rewriting disk into the USB FDD.

5. Turn on the power while holding down the **Tilde** key.
        (Keep holding down the key until a message appears on the screen.)
        The BIOS rewriting starts.

6. When the process is completed, eject the BIOS/EC/KBC rewriting disk and the system is automatically reset.

Appendix H   EC/KBC Rewrite Procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

❑ BIOS/EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

NOTE: 1.   *Rewrite the EC/KBS only when instructed by a diagnostic disk release notice.*

2.   *Connect the AC adaptor to the computer when you rewrite the EC/KBC.*

3.   *Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.*

4.   *If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC has been erased. In this case, insert the BIOS/EC/KBC rewriting disk, and the EC/KBC will be rewritten.*

5.   *Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.*

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1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC Card.
4. Insert the BIOS/EC/KBC rewriting disk into the built-in FDD.
5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a message appears on the screen.) The BIOS/EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I   Reliability

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

Table I-1 MTBF

Component	Time (hours)
LCD	50,000
Keyboard	40,000
HDD	300,000
USB FDD	43,800
DVD-RAM drive	60,000
CD-RW/DVD-ROM drive	60,000
AC adaptor	20,000