Toshiba Personal Computer

Satellite A130/ A135

Maintenance Manual

TOSHIBA CORPORATION

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Toshiba Personal Computer Satellite A130/ A135 Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite A130/ A135, referred to as the M100 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 M100 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
- ❑ Screw torque list
- ❑ 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 typeface below:

```
Format complete
System transferred
```

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Chapter 1

Hardware Overview

1

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1.1   Features

The Satellite A130 Series Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight and high reliability. This computer incorporates the following features and benefits:

❑ CPU

- Intel® Core™ 2 Duo Processor
- Intel® Core™ Duo Processor
- Intel® Core™ Solo Processor

❑ Chipset

- Mobile Intel® 945GM Express Chipset
- Mobile Intel® 945PM Express Chipset
- Mobile Intel® 943GML Express Chipset

❑ Memory

- Two DDRII 667 SO-DIMM, up to 4GB

❑ HDD

- 9.5mm/12.5mm, 2.5" HDD support
- Serial ATA-I interface support
- Dual HDD support
- Up to 200GB per drive

❑ VGA

- Intel 945GM/943GML for Integrated Graphics
- Intel 945PM with nVIDIA G72MV/NB7P-GS VGA Board support 128MB/256MB/512MB DDR2 VRAM

❑ Fixed Optical drive

- 12.7mm height, DVD-ROM & CD-RW combo device
- 12.7mm height, DVD Super-multi device

❑ Optional Devices

- Dual-band built-in antenna for wireless LAN communication
- Built-in antenna for BT
- WLAN module b/g and a/b/g
- Bluetooth 2.0+EDR
- MDC Modem 1.5

❑ Normal PAD/LUX PAD with Two Buttons

❑ I/O Ports

- Four USB (V2.0) ports
- One DDC2b compliant 15-pin VGA port (RGB)
- One S-Video port
- One microphone port
- One headphone-out jack
- Digital volume control by encoder
- Wireless communication switch
- One DC-in jack
- One RJ-11 jack for 56kbps V.92 modem
- One RJ-45 jack with LED indicator
- Kensington lock
- One IEEE 1394a port
- Fingerprint authentication
- One 6-in-1 push-push type flash card connector and card reader
- Internal Microphone
- One type II PCMCIA slot with shutter door

❑ PCMCIA Card Organization

- One type II card socket with shutter door
- TI 7412 controller
- PC card 95 supported
- No ZV-port support
- SRAM, OTPROM, FLASH ROM, mask ROM memory card up to 64MB
- Modem/LAN card
- Cardbus card

❑ ACPI 2.0 compliant

❑ Excellent Power Management Function

- Standby mode, Suspend to RAM or Suspend to disk mode, using time out or hot key
- HDD local standby mode by time out
- LCD local standby mode by time out
- Low battery alarm by beep
- Auto-backlight off when LCD cover closed
- Full ACPI 2.0 supported
- LCD auto-dim mode by time out

❑ Switch

- One wireless communication switch
- One power button switch
- Control buttons for Short-Cut key functions.

> 1 programmable launch button (IE button)
> 1 programmable launch button (CD/DVD start)

- Control buttons for CD/DVD play buttons (4 buttons)
  Play/Pause
  Stop/Eject
  Next
  Previous
- Magnetic Lid switch controlled by software.

❑ Security
  - Fingerprint authentication

❑ Memory Card & SO-DIMM Socket
  - SD/MMC/MS/MS Pro/XD/mini SD with adapter
    High speed SD support
    SDHC support for Vista
  - Support DDR-II 533/667MHz SO-DIMM
    Support Dual channel
    Two SODIMM with 256MB/ 512MB/ 1GB/ 2GB module
    Max. 4GB

❑ Display
  - 15.4" (16:10) TFT screen with a resolution of 1280 horizontal x 800 vertical pixels, CSV, high brightness approx 200nits, WXGA
  - 15.4" (16:10) TFT screen with a resolution of 1280 horizontal x 800 vertical pixels, CSV VA, brightness approx 150nits, WXGA
  - 15.4" (16:10) TFT screen with a resolution of 1280 horizontal x 800 vertical pixels, NON-CSV VA, brightness approx 150nits, WXGA

❑ Video RAM
  - NVidia G72MV Supported DDRII VRAM 350MHz with 128MB
  - NVidia NB7P-GS Support DDRII VRAM 400MHz with 128MB/256MB/512MB

❑ BIOS
  - Phoenix First BIOS
  - 1MB Flash ROM for system BIOS
  - Suspend to RAM/Disk
  - Password protection (Power on, supervisor, HDD)
  - Various hot keys for system control
  - Refreshable
  - Complete ACPI 2.0 function
  - APM, S4BIOS not supported

- USB memory boot support

❑ Power

- Universal AC adapter, 90~264VAC, 47~63Hz.
  - Offers constant voltage 19V output source with 65W, 75W or 90W max output power capacity
- 4 cells of Li-Ion 18650 size, smart battery pack with 2000mAH x 14.4V (28.8W)
- 6 cells of Li-Ion 18650 size, smart battery pack with 4000mAH x 10.8V (43.2W)
- 8 cells of Li-Ion 18650 size, smart battery pack with 4300mAH x 14.8V (63.6W)
- Approximately 12 hours or longer charging time to 100% battery capacity with system switched on.
- Approximately 4 hours charge time to 100% battery capacity with system switched off.
- Approximately 1.5 days discharging time in Standby Mode for the 8-cell battery, 1 day for 6-cell battery, and 0.75 day for 4-cell battery.
- Discharge time in shutdown mode is approximately 1 month

❑ Universal Serial Bus (USB)
The computer has four Universal Serial Bus (USB) ports that comply with the USB 2.0 standard, which enable data transfer speeds more than 40 times faster than USB 1.1 (which this computer also supports.) The USB drives may be used to transfer data at low, full, and high speeds.

❑ Bluetooth module
Some computers in this series are equipped with Bluetooth functionality (Version 2.0 + EDR) with antenna. Bluetooth is a short-range wireless technology used to create PANs (Personal Area Networks) among your devices, as well as with other nearby devices such as cell phones and digital cameras.

1.2   System Unit

The system unit is composed of the following major components:

❑ Processor
- Intel Core Duo processor, T2050/T2250
- Intel Core Solo processor, T1350
- Intel Core 2 Duo processor, T5500/ T5600/
- T7200/ T7400 / T7600
- Intel Core 2 Duo processor, T5200 (Tj85)
- Intel Core Duo processor, T2350 (Tj85)
- Intel Core Duo processor, T2060
- Intel Celeron M processor, 430
- XD bit support (Default is disable).

❑ System Logic
- Intel 945PM/945GM/943GML + ICH7M for Satellite A130 Series
  (This combination depends on which system you bought)

❑ Memory
- Support DDR-II 533/667MHz SO-DIMM
  Support Dual channel
  Two SODIMM with 256MB/ 512MB/ 1GB/ 2GB module
  Max. 4GB

❑ Video RAM
- NVidia G72MV Supported DDRII VRAM 350MHz with 128MB
- NVidia NB7P-GS Support DDRII VRAM 400MHz with 128MB/256MB/512MB

❑ Audio subsystem
- Realtek Azalia ALC861REV.D
- Mono Microphone-in and stereo headphone-out.
- Internal Microphone
- Sound effect by SRS software
- Volume control : Digital control, rotary type, no mute function
- Harman/Kardon w/box 8.5cc, 4ohm/1.5W, OdysseyII or Stereo w/box 8.5cc, 4ohm/1.5W (This combination depense on which system you bought)

1.3   2.5-inch Hard Disk Drive

The internal 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 up to 200G HDD.

The HDD is shown in Figure 1-1. Specifications are listed in Table 1-1.
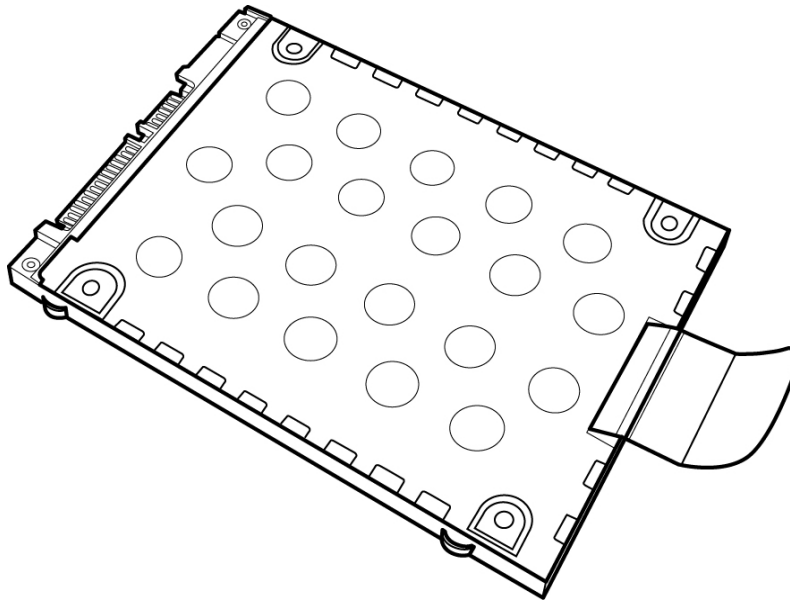
Figure 1-1   2.5-inch HDD

Items	40GB	60GB	80GB	100GB	120GB	160GB	200GB
Formatted capacity (GB)	37.26	55.89	74.52	93.15	111.8	149.05	186.31
Logical Blocks (LBA)	78,125,000	117,187,500	156,301,488	195,371,568	234,441,648	312,581,808	390,720,968
Rotational speed (rpm)	5400	5400	5400	5400	5400	5400/4200	5400/4200
Toshiba HDD Buffer (MB)	8	8	8	8	8	8	8

Hitachi HDD Buffer (MB)	8	8	8	8	8	8	N/A
Fujitsu HDD Buffer (MB)	8	8	8	8	8	8	8
Bytes per sector	512	512	512	512	512	512	512

Table 1-1   2.5-inch HDD specification

1.4   Optical Disc Device

1.4.1 DVD-ROM & CD-RW

The DVD-ROM and CD-RW drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and high speed CD-RW at 10x speed or Ultra speed CD-RW at 24X speed.

The specifications of the DVD-ROM & CD-RW drive are listed in Table 1-2.

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (single/multi-session), CD-EXTRA, CD-Text	

Table 1-2   DVD-ROM & CD-RW drive specifications

1.4.2 DVD Super Multi Double Layer

The DVD Super Multi drive accepts 12-cm (4.72-inch) and 8-cm (3.15-inch) discs. At maximum, the drive can play back a DVD at 8x speed, read CD-ROM at 24x speed, and write CD-R at 24x speed and CD-RW at 10x and DVD-R at 8x speed and DVD-RW at 4x speed and DVD+R at 8x speed and DVD+RW at 4x speed and DVD-RAM at 5x speed and DVD+R DL at 2.4x speed and DVD-R DL at 2x speed.

The specifications of the DVD Super Multi Double Layer drive are listed in Table 1-4

Item	DVD-ROM mode	CD-ROM mode
Data transfer rate (Mbytes/s)	33.3 (U-DMA transfer mode 2) 16.6 (PIO mode 4, Multiword DMA mode 2)	
Access time (ms) Average random access	180	150
Data buffer size (Mbytes)	2MB	
Formats supported	DVD: DVD-VIDEO, DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+RW, DVD+R DL, DVD-R DL CD: CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, PhotoCD (single/multi-session), CD-EXTRA, CD-Text	

Table 1-3   DVD Super Multi Double Layer drive specifications

1.5 Power Supply

This specification defines the performance and characteristics of the 65W/ 75W/ or 90W AC adapter power supply. It supplies a constant voltage 19V output source for the IAKAA Series Personal Computer.

❑ A/D conversion

- The EC uses 10-bit sampling for A/D conversion to determine the following values:
    - Battery and temperature

❑ AC adapter and battery check

- The EC checks the following by A/D converted values:
    - Battery installed
- The EC checks the following by GPIO values:
    - AC adapter connected

❑ Abnormal check

- The EC determines whether the condition is abnormal, and if so, stores an error code into the error register.

❑ Input port management

- The EC monitors the following input signal status:
    - System power ON/OFF status
    - Direct CD power ON/OFF status

❑ Beep and LED control

- Beep is caused by the low battery status.
- The EC controls the following two kinds of LED
    - DC IN LED (one color: blue)
- Blue: indicates AC adapter is connected
    - Battery LED (two colors: orange and blue)
- Blue solid: The battery is fully charged.
- Orange: The computer is quick-charging the battery / the battery is low.

❑ Power ON/OFF sequence

- When power is turned on or off, the EC starts the power on or off sequence.
    - SQ0-4: power ON sequence
    - SQ5-B: power OFF sequence

❑ Battery charging control

- The EC controls the following.
    - The quick charging ON/OFF
    - The detection of full charge

❑ Detection of the low battery

- The EC detects the low battery point by the gas gauge.
    - LB10M: The system will be driven by the battery for 12 more minutes.
    - LB0: The battery won't be able to drive the system after 3 minutes.
    - LB1: The battery can drive the system only during the suspend process.
    - LB2: The battery cannot drive the system.

❑ New battery installation

- When a new battery is installed, the EC communicates with the E^2PROM in the battery to read information of the newly installed battery.

❑ Battery capacity calculation

- The EC reads battery remaining and percentage capacity from the battery through SMBus.

1.6   Batteries

The computer has two types of battery:

❑ Main battery pack (18650 size)
❑ RTC battery

The removable main battery pack is the computer's main power source when the AC adapter is not attached.

The battery specifications are listed in the table below.

Battery name	Material	Output voltage	Capacity
Main battery (4 cells)	Lithium-Ion	14.4V	2000mAH
Main battery (6 cells)	Lithium-Ion	10.8V	4000mAH
Main battery (8 cells)	Lithium-Ion	14.8V	4300mAH
RTC battery (Maxell ML1220T10)	Lithium-Ion	3.0V	14 mAH
RTC battery (Maxell ML1220HT10)	Lithium-Ion	3.0V	18 mAH
RTC battery (Sanyo ML1220T28)	Lithium-Ion	3.0V	15 mAH
RTC battery (Panasonic ML1220/B)	Lithium-Ion	3.0V	17 mAh

Table 1-4   Battery specifications

1.6.1 Main Battery

Battery charging is controlled by a power supply microprocessor that is 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 adapter and battery are attached to the computer. The system charges the battery using quick charge or trickle charge.

❑ Quick Battery Charge

When the AC adapter is attached, there are two types of quick charges: quick charge when the system is powered off and normal charge when the system is powered on.

The times required for charges are listed in the table below.

Status	Charging time
Normal charge (power on)	12 hours or longer
Quick charge (power off)	About 4 hours

NOTES

1.   The time required for normal charge is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

2.   Using quick charge, the power supply microprocessor automatically stops the charge after eight hours regardless of the condition of the battery. Overcharging could cause the battery to explode.

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

1. The battery becomes fully charged.

2. The AC adapter or battery is removed.

3. The battery or output voltage is abnormal.

4. The battery temperature is abnormal.

5. The battery SMBus communication fails.

6. The battery cell is bad.

❑ Detection of full charge

A full charge is detected from the battery pack through SMBus when the battery is charging.

1.6.2 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. The table below lists the charging time and data preservation period of the RTC battery. The RTC battery is charged by the adapter or main battery, while the computer is powered on.

Status	Time
Charging Time (power on)	About 24 hours
Data preservation period (full charge)	1 month

Chapter 2
Troubleshooting Procedures

Chapter 2   Contents

Figures

Tables

2.1   Troubleshooting Introduction

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. Display	6. TouchPad	11. IEEE 1394 port
2. USB Floppy Drive	7. Speaker	12. Wireless LAN system
3. Keyboard	8. Optical drive	13. finger printer
4. USB ports	9. Modem	14. Bluetooth
5. TV-out port	10. PCMCIA unit	15. HDD(1st HDD&2nd HDD)

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 (Repair and Sound Repair)
2. Phillips screwdriver (2 mm)
3. 6mm nut driver (for the helix screw nuts on the rear ports for CPU door)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Sycard (PCMCIA test card)
6. Cleaning kit for floppy disk drive troubleshooting
7. Cleaning kit for optical drive troubleshooting
8. Multimeter
9. External monitor
10. USB compatible keyboard
11. Multimedia sound system with line-in and line-out ports
12. Headphones
13. USB test module and USB cable
14. Music CD

2.2   Troubleshooting Flowchart

If you know the location of the malfunction, turn directly to the appropriate section of this chapter. If the problem is unspecified, use the flowchart in Figure 2-1 as a guide for determining which troubleshooting procedures to execute. Before performing any troubleshooting procedures, verify the following:

● Ask the user if a password is registered and, if it is, ask him or her to enter the password.

● Verify with the customer that Toshiba Windows Vista 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.

● Make sure the floppy disk drive, if installed, is empty. If no FDD module is installed, you should use an external FDD to run the diagnostics tests

```
                          ┌──────────────┐
                          │    START     │
                          └──────┬───────┘
                                 │
         ┌───────────────────────────────────────────────┐
         │   Connect the AC adapter to the DC-IN socket   │
         └───────────────────────┬───────────────────────┘
                                 │
                            ◇ Is the DC-IN LED on? ◇ ──No──► Perform the Power Supply
                                 │Yes                        Troubleshooting procedures in
                                 │                           section 2.3
                            ◇ Is the Battery LED on? ◇ ──No──► Perform the Power Supply
                                 │Yes                        Troubleshooting procedures in
                                 │                           section 2.3
         ┌───────────────────────────────────────────────┐
         │           Turn the Power switch on             │
         └───────────────────────┬───────────────────────┘
                                 │Yes
                            ◇ Is the Power On LED on? ◇ ──No──► Perform the Power Supply
                                 │Yes                        Troubleshooting procedures in
                                 │                           section 2.3
                      ◇ Is the "Toshiba" logo message display? ◇ ──No──► Perform the Display
                                 │Yes                        Troubleshooting procedures in
                                 │                           section 2.4
         ┌───────────────────────────────────────────────┐
         │   If the "password" message displays, type     │
         │      the password, then press Enter.           │
         └───────────────────────┬───────────────────────┘
                                 │
                   ◇ Is Toshiba Windows being loaded? ◇ ──No──► Perform diagnostics program.
                                 │Yes                        Run CM165.EXE and select the
                                 │                           HARD DISK item.
                             ┌───────┐
                             │   A   │
                             └───────┘
```

Figure 2-1 Troubleshooting flowchart (1/2)

A

Does typed characters appear correctly? — No → Perform the Keyboard Troubleshooting procedures in section 2.6

Yes

Insert the diagnostics disk into the FDD. Then run the diagnostics test program.

Yes

Is the diagnostics test loaded? — No → Perform the FDD Troubleshooting procedures in section 2.5

Yes

Allow each test to perform automatically

Is an error detected by any of the diagnostics tests? — Yes → After confirming which diagnostics test has detected an error, perform the appropriate procedure 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 test program should be executed several times to isolate the problem. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.3.

2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.4.

3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.5.

4. If an error is detected by the TouchPad test, perform the TouchPad Troubleshooting procedures in Section 2.8.

5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.9 and the Optical Drive Troubleshooting Procedures in Section 2.10.

6. If an error is detected by the modem test, perform the Modem Troubleshooting Procedures in Section 2.11.

Other problems that are not covered by the diagnostics program may be discovered by a user.

1. If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 2.6.

2. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 2.7.

3. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 2.10.

4. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 2.11.

5. If an error is detected when using the PCMCIA unit, perform the PCMCIA Troubleshooting procedures in Section 2.12.

6. If an error is detected when using the IEEE1394 device, perform the IEEE1394 device Troubleshooting procedures in Section 2.13.

7. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.14.

8. If an error is detected when using the Finger printer, perform the Finger printer Troubleshooting procedures in Section 2.15.

9. If an error is detected when using the Bluetooth, perform the Bluetooth Troubleshooting procedures in Section 2.16.

10. If an error is detected when using the 4 in 1 card, perform the 4 in 1 card Troubleshooting procedures in Section 2.17.

11. If an error is detected when using the 1st HDD, perform the 1st HDD Troubleshooting procedures in Section 2.18.

12. If an error is detected when using the 2nd HDD, perform the 2nd HDD troubleshooting procedures in Section 2.19.

2.3   Power Supply Troubleshooting

```
                          ┌──────────┐
                          │  START   │
                          └────┬─────┘
                               │
                               ▼
                   ┌───────────────────────┐
                   │ Check Power Supply Status │
                   │      (Procedure 1)     │
                   └───────────┬───────────┘
                               │
                               ▼
                       ╱──────────────╲                  ┌──────────────────────┐
                      ╱  Are the DC-IN and ╲   No         │ Replace adaptor / battery │
                      ╲  Battery LEDs lit? ╱ ──────────▶  │     (Procedure 2)     │
                       ╲──────────────╱                   └───────────┬──────────┘
                               │                                       │
                             Yes                                       │
                               ◀───────────────────────────────────────┘
                               │
                               ▼
                   ┌───────────────────────┐
                   │  Check power supply    │
                   │     connections        │
                   │     (Procedure 3)      │
                   └───────────┬───────────┘
                               │
                               ▼
                       ╱──────────────╲                  ┌──────────────────────┐
                      ╱  Can you turn the ╲   Yes         │  Run diagnostic program  │
                      ╲   computer on?    ╱ ──────────▶  │     (Procedure 4)     │
                       ╲──────────────╱                   └───────────┬──────────┘
                               │                                       │
                              No                                       │
                               ◀───────────────────────────────────────┘
                               │
                               ▼
                       ╱──────────────╲                  ┌──────────────────────┐
                      ╱ Are the internal power ╲  No      │ Perform internal connection │
                      ╲ connections secure?  ╱ ───────▶  │        check          │
                       ╲──────────────╱                  │     (Procedure 5)     │
                               │                          └───────────┬──────────┘
                             Yes                                       │
                               ◀───────────────────────────────────────┘
                               │
                               ▼
                   ┌───────────────────────┐
                   │  Replace system board  │
                   └───────────┬───────────┘
                               │
                               ▼
                          ┌──────────┐
                          │   END    │
                          └──────────┘
```
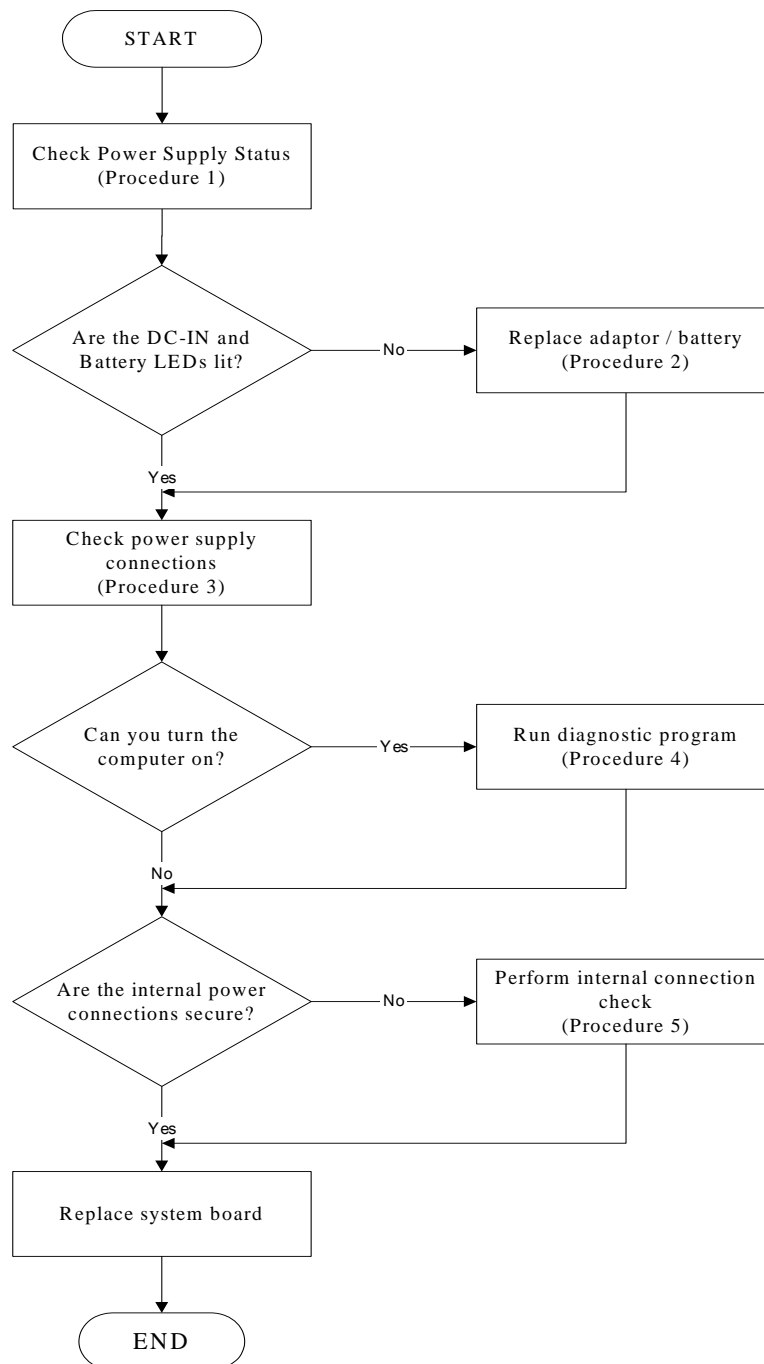
Figure 2-2 Power Supply Troubleshooting Process

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 flowchart in Figure 2-2 gives a summary of the process. The procedures described in this section are:

> Procedure 1:   Power status check
>
> Procedure 2:   Adaptor / battery replacement
>
> Procedure 3:   Power supply connection check
>
> Procedure 4:   Diagnostic check
>
> Procedure 5:   Internal connection 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 State	LED colors	Definition
Charging	Amber, solid on	Battery charging with AC.
	Blue, solid on	Battery fully charged by AC
	Blue color off	Battery abnormal stop charging with AC (Bad cell/ Overheated)
Discharging	Amber, blinking (LED on for 1 second every 4 seconds)	Battery within low state: 12 minutes remaining
	Amber, blinking (LED on for 1 second every 2 seconds)	Battery within critical low state: 3 minutes remaining. The system is protected and cannot be re-powered on without the AC power connected.
	Amber color off	Battery not in low or critical low state; It's in discharging state

Table 2-2 DC-IN LED

AC-IN LED	Power supply status
Solid on	AC power exists (LED is solid Blue).
Off	No AC power exists.

To check the power supply status, install a battery pack and connect an AC adaptor to the DC-IN port on the computer and to a power supply.

If the DC-IN LED or Battery LED is not lit, go to Procedure 2.

Procedure 2   Adaptor / battery replacement

A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

Check 1   Connect a new AC adaptor. If the problem is not resolved, go to Check 2.

Check 2   Insert a new battery. If the problem is still not resolved, go to Procedure 3.

Procedure 3   Power supply connection check

The power supply wiring diagram is shown below:

AC adaptor cord

AC power cord

| AC adaptor | | System board | | Battery |
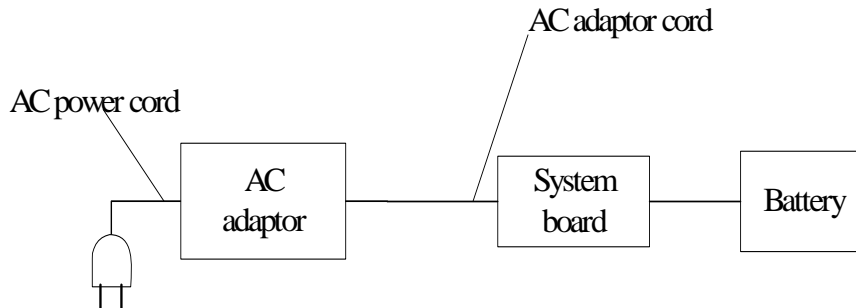
Any of the connectors may be disconnected. Perform Check 1.

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 socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.

Check 3   Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.
• If the DC-IN input socket is loose, go to Procedure 5.
• If it is not loose, go to Check 4.

Check 4   Use a multi-meter to make sure that the AC adaptor output voltage is close to 19 V. If the output is several percent lower than 19 V, go to Check 5. If the output is close to 19 V, go to Check 6.

Check 5   Connect a new AC adaptor or AC power cord.
• If the DC-IN LED does not light, go to Procedure 4.
• If the battery LED does not light, go to Check 6.

Check 6   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   Diagnostic 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 following the procedures described in Chapter 3, Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

Procedure 5   Replacement check

The system 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. After checking the connection, perform Check 1:

Check 1   Use a multi-meter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.

Check 2   Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.

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

2.4 Display Troubleshooting

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
              ┌────────────────────────┐
              │ Perform external display│
              │ check (Procedure 1)     │
              └────────────────────────┘
                           │
                           ▼
                   ╱ Does the external ╲
        ┌─────────◁  display function  ▷
        │          ╲     ok?          ╱
        │                  │ No
        │                  ▼
        │         ┌────────────────────┐
        │         │ Perform diagnostic │
        │         │ check (Procedure 2)│
        │         └────────────────────┘
        │                  │
     Yes│                  ▼
        │          ╱ Was a display ╲        ┌──────────────────┐
        │         ◁  problem       ▷── No ─▶│ Display is not    │
        │          ╲ detected?    ╱         │ faulty. Continue  │
        │                  │ Yes            │ troubleshooting-  │
        │                  ▼                │ refer to Figure2.1│
        │         ┌────────────────────┐    └──────────────────┘
        └────────▶│ Perform connector  │
                  │ and replacement    │
                  │ check (Procedure 3)│
                  └────────────────────┘
                           │
                           ▼
                  ┌────────────────────┐
                  │ Replace system board│
                  └────────────────────┘
                           │
                           ▼
                    ┌─────────────┐
                    │     END     │
                    └─────────────┘
```
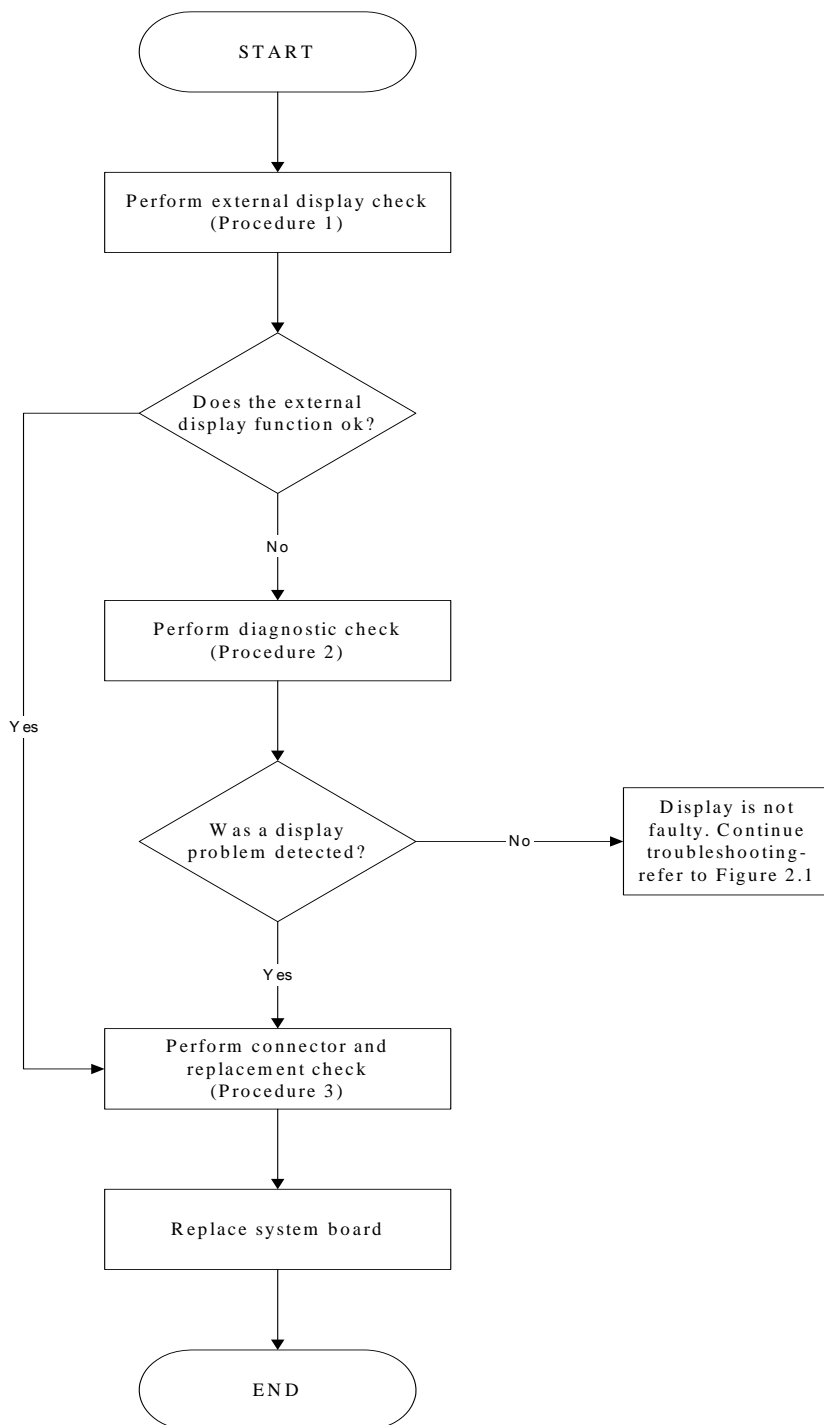
Figure 2-3 Display troubleshooting process

This section describes how to determine if the computer's display is functioning properly. The process is outlined in Figure 2-3. Start with Procedure 1 and continue with the other procedures as instructed.

> Procedure 1: External display check
>
> Procedure 2: Diagnostic check
>
> Procedure 3: Connector and replacement check

Procedure 1   External display check

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

If the external display 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 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 inverter board, 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:

Check 1   Make sure the DDR RAM module is seated properly. Test display again. If the problem still exits, replace the DDR RAM module. If the problem still exists, perform Check 2.

Check 2   Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 3.

Check 3   Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.

Check 4   Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.

Check 5   Replace the CPU with another of the same specifications. If the problem still exists, perform Check 6.

Check 6   The system board may be damaged. Replace it with a new one.
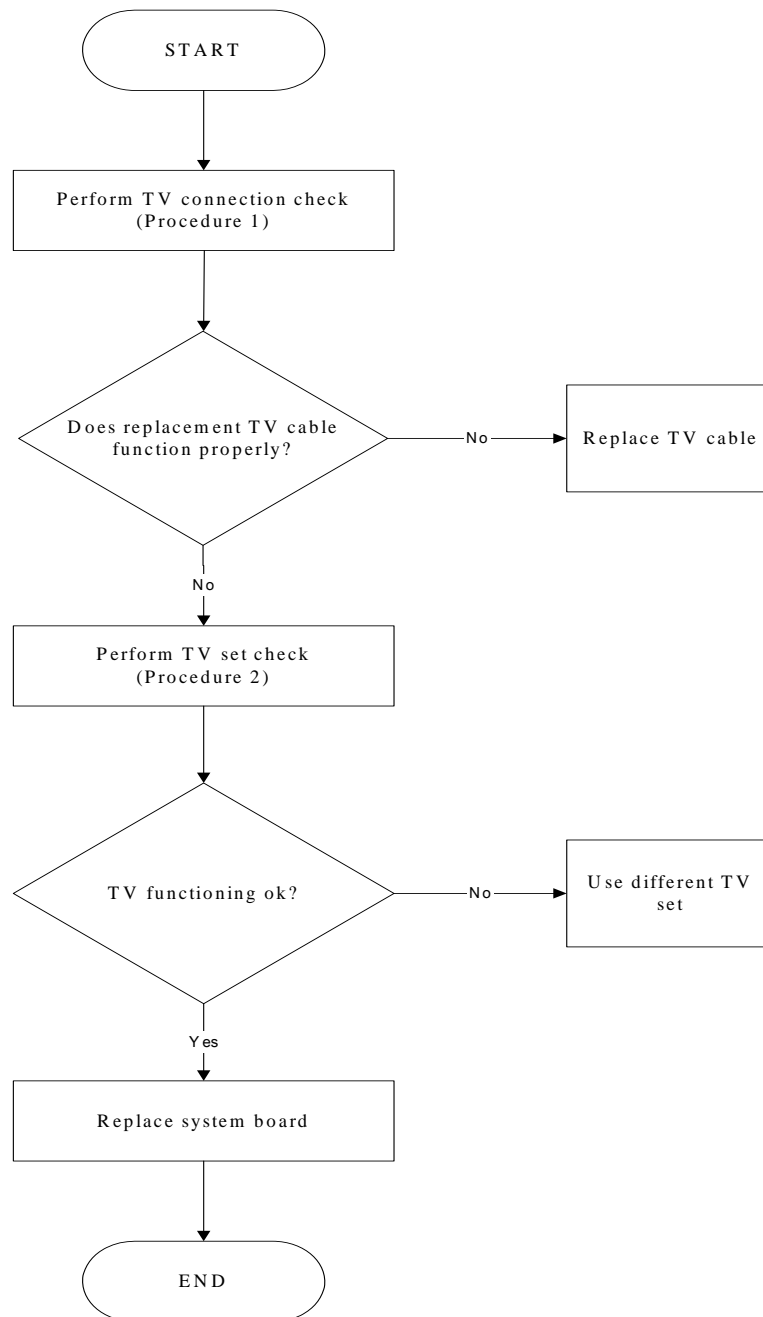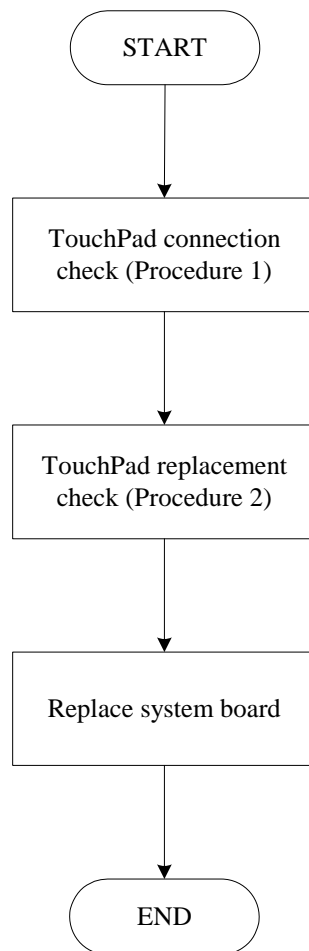
2.5 Keyboard Troubleshooting
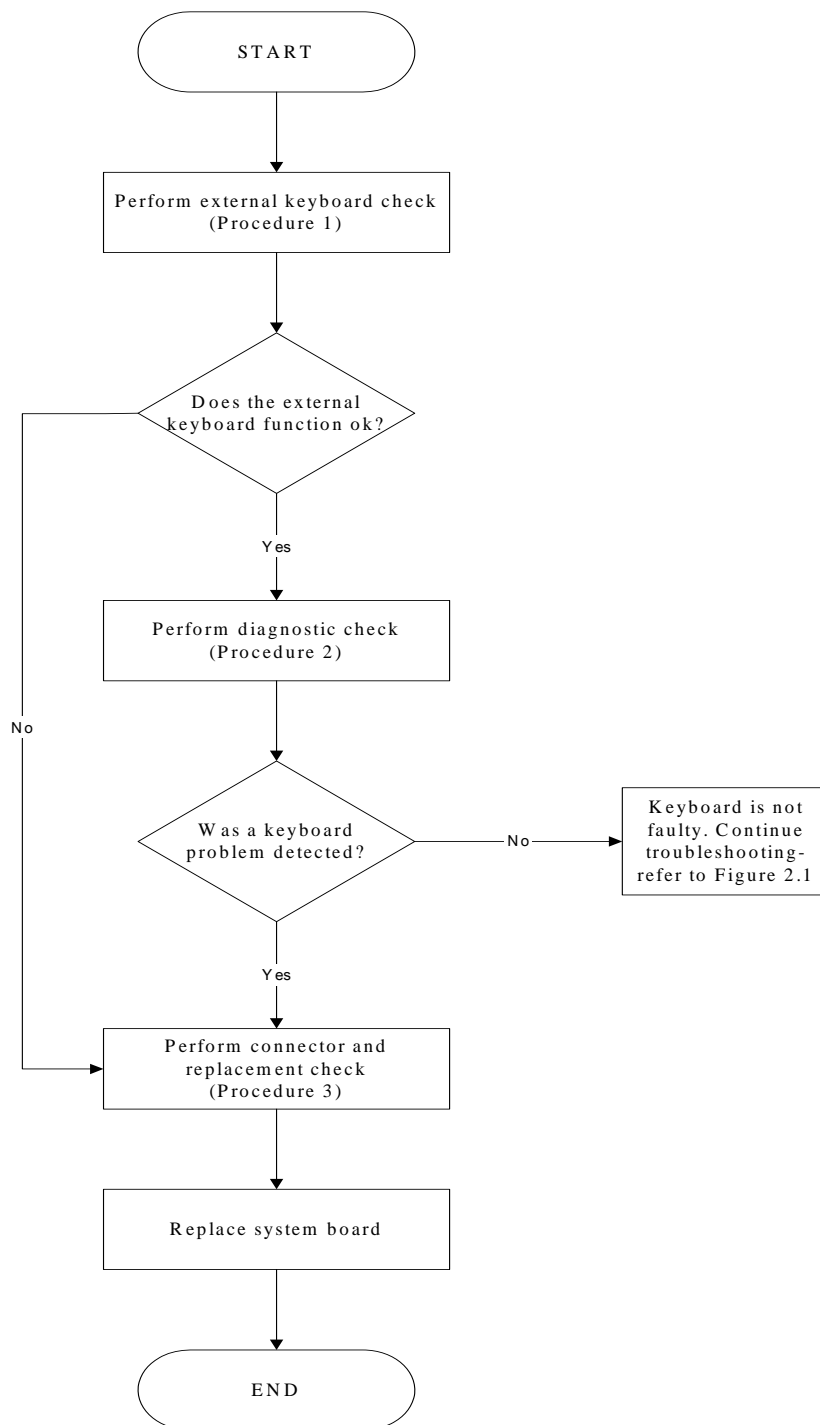
Figure 2-4 Keyboard troubleshooting process

To determine if the computer's keyboard is functioning properly, perform the following procedures. Figure 2-5 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

> Procedure 1: External keyboard check
>
> Procedure 2: Diagnostic check
>
> Procedure 3: Connector and replacement check

Procedure 1   External keyboard check

Connect a USB keyboard to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard or its connections may be faulty. Go to Procedure 2.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Procedure 2   Diagnostic check

Run the Diagnostic Program, which will automatically execute the Keyboard Test. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

Procedure 3   Connector and replacement check

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

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

        If the connection is loose, reconnect firmly and repeat Procedure 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   The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.6 External USB Devices Troubleshooting
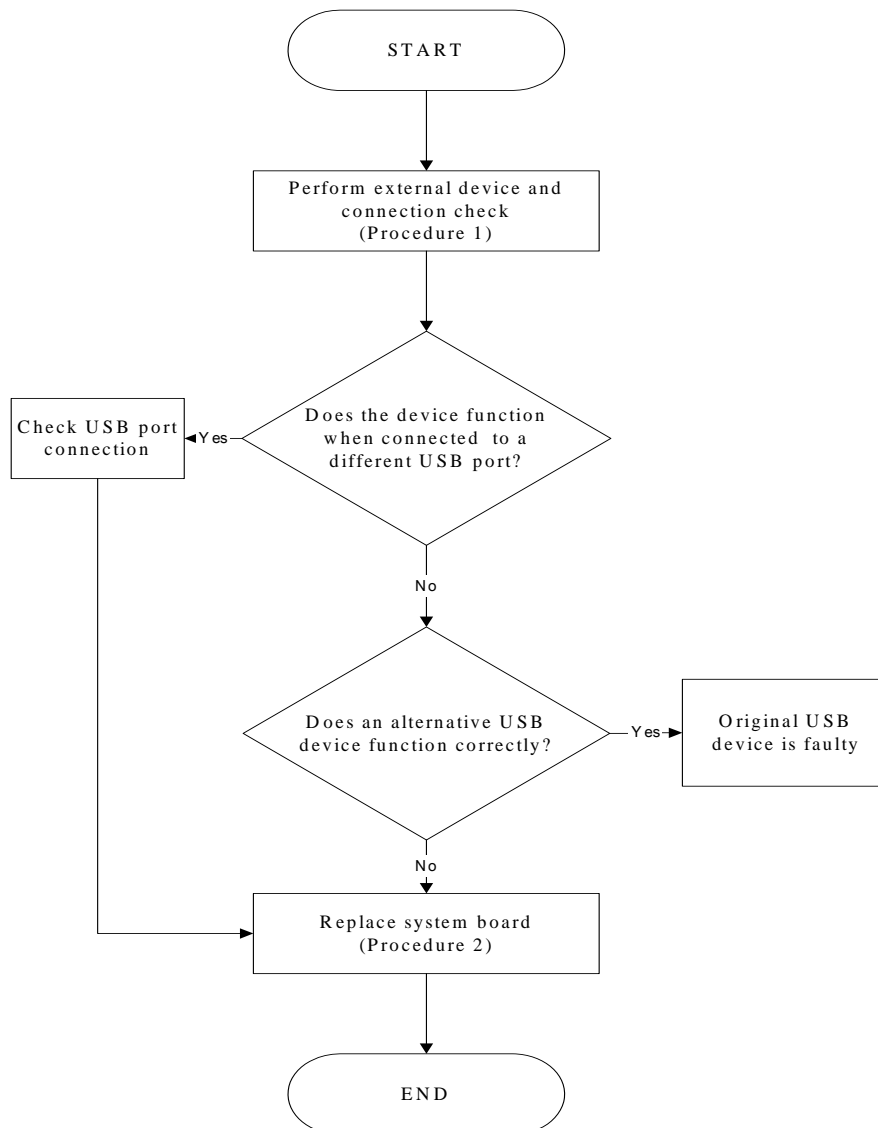
Figure 2-5 External USB device troubleshooting process

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 2-6 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1:   External device and connection check

Procedure 2:   Replace system board

Procedure 1   External device and connection check

The USB device may be damaged or the connection may be faulty. Perform Check 1.

Check 1   Make sure USB device cable is firmly plugged into one of the USB sockets. If the cable is connected correctly, go to Check 2.

Check 2   Plug the USB device into another USB socket (there are three in all). If the USB device still does not work, go to Check 4.

If the device functions correctly when connected to another USB port, go to Check 3.

Check 3   Make sure that the USB socket is firmly secured to the system board of the computer. If the malfunction remains, the system board may be damaged. Go to Procedure 2.

Check 4   Connect an alternative USB device to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external device.

If the alternative USB device works correctly, the original device may be damaged and should be replaced.

If the alternative USB device appears to have the same problem as the original device, the system board may be damaged. Go to Procedure 2.

Procedure 2   Replace system board

If the error persists, the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.7   TV-Out Failure Troubleshooting

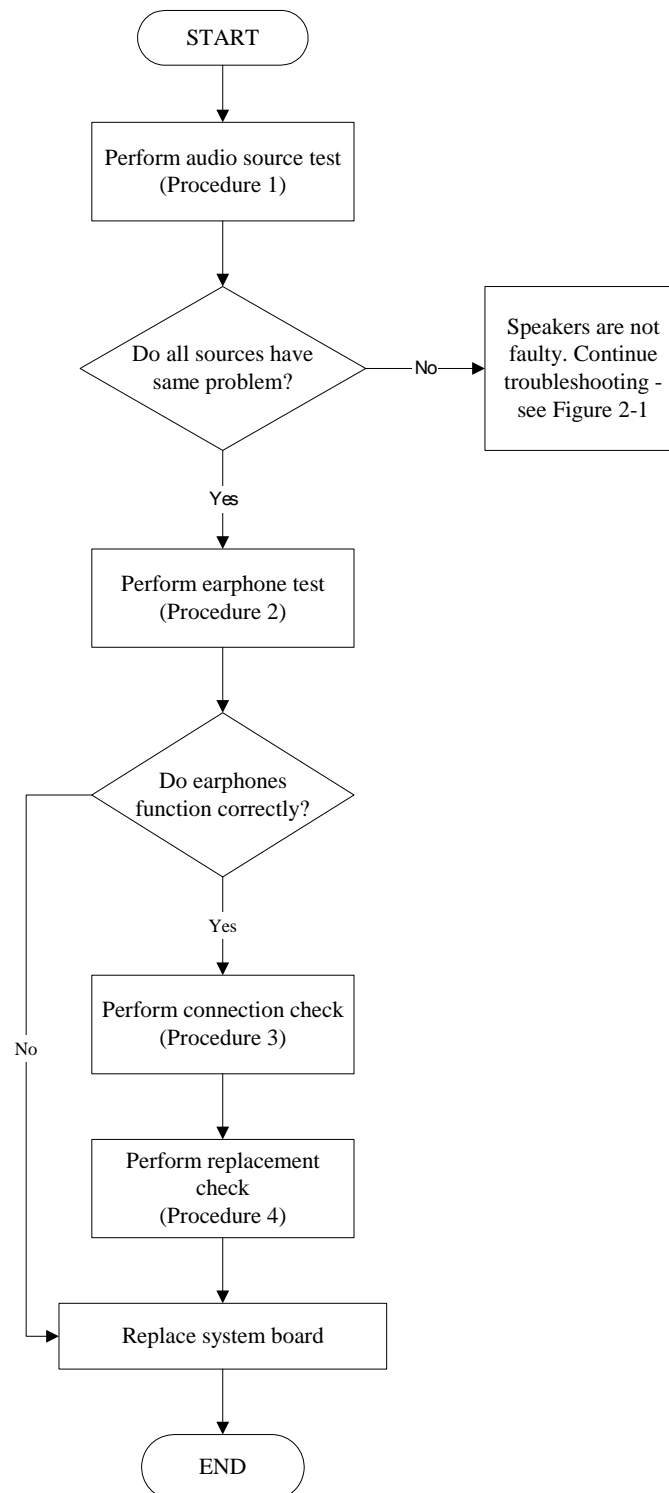*Figure 2-6 TV-out troubleshooting process*

To determine if the computer's TV-out port is functioning properly, perform the following procedures. Figure 2-7 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1:   TV connection check

Procedure 2:   TV set check

Procedure 1   TV connection check

The TV cable may be damaged or the connections may be loose. Perform Check 1:

Check 1   Make sure TV cable is firmly plugged into both the TV set and the TV-out port of the computer. If the cable is connected correctly, go to Check 2.

Check 2   Make sure the TV-out port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3   The TV cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

Procedure 2   TV set check

The TV set may be faulty. Perform Check 1:

Check 1   Try using the set for television reception. If it does not work, the set may be damaged. If the set does work, perform Check 2.

Check 2   Try connecting a different television to the computer. If the replacement television works, the original set may be damaged. If the replacement set does not work the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.8   TouchPad Troubleshooting

```
                    ┌──────────────┐
                    │    START     │
                    └──────┬───────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  TouchPad connection    │
              │  check (Procedure 1)    │
              └────────────┬───────────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  TouchPad replacement   │
              │  check (Procedure 2)    │
              └────────────┬───────────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  Replace system board   │
              │                         │
              └────────────┬───────────┘
                           │
                           ▼
                    ┌──────────────┐
                    │     END      │
                    └──────────────┘
```

Figure 2-7 Touchpad troubleshooting process

To determine if the computer's built-in TouchPad is functioning properly, perform the following procedures. Figure 2-9 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TouchPad connection check

Procedure 2: TouchPad replacement check

Procedure 1   TouchPad connection check

The TouchPad is connected via the TouchPad FPC to the system board. Make sure the TouchPad FPC cable is firmly connected to the TouchPad and system board. Refer to Chapter 4, *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks.

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

Procedure 2   TouchPad replacement check

The TouchPad unit or FPC may be defective or damaged. Replace each with a new one following the steps in Chapter 4. If the FDD is still not functioning properly, replace the system board with a new one following the steps in Chapter 4.

2.9 Speaker Troubleshooting

Figure 2-8 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 2-10 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

> Procedure 1: Audio source test
>
> Procedure 2: Earphone test
>
> Procedure 3: Connection check
>
> Procedure 4: Replacement check

Procedure 1   Audio source test

Try different audio sources (e.g. an audio CD and digital music file) to determine whether the fault is in the speaker system or not. If not all sources have sound problem, the problem is in the source devices. If all have the same problem, continue with Procedure 2.

Procedure 2   Earphone test

Connect a set if earphones or external speakers. If these function correctly, go to Procedure 3. If they do not function correctly, the system board may be defective or damaged. Replace it with a new one.

Procedure 3   Connection check

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and make sure the speaker cable is firmly connected to the audio board. If the stereo speakers are still not functioning properly, go to Procedure 4.

Procedure 4   Replacement check

If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly, try replacing in turn the audio board and system board.

2.10 Optical Drive Troubleshooting

```
                          ┌─────────────┐
                          │    START    │
                          └─────────────┘
                                 │
                                 ▼
                   ┌───────────────────────────┐
                   │  Perform audio CD check   │
                   │      (Procedure 1)        │
                   └───────────────────────────┘
                                 │
                                 ▼
                           ╱─────────────╲                 ┌──────────────────┐
                          ╱               ╲      No         │  Perform drive-  │
                         ╱  Audio CD       ╲──────────────▶ │  cleaning check  │
                         ╲  functions ok?  ╱                │  (Procedure 2)   │
                          ╲               ╱                 └──────────────────┘
                           ╲─────────────╱
                                 │
                                Yes
                                 │
                                 ▼
                   ┌───────────────────────────┐
                   │  Perform software check   │
                   │      (Procedure 3)        │
                   └───────────────────────────┘
                                 │
                                 ▼
                   ┌───────────────────────────┐
                   │  Perform diagnostic test  │
                   │      (Procedure 4)        │
                   └───────────────────────────┘
                                 │
                                 ▼
                   ┌───────────────────────────┐
                   │  Perform connection and   │
                   │    replacement check      │
                   │      (Procedure 5)        │
                   └───────────────────────────┘
                                 │
                                 ▼
                   ┌───────────────────────────┐
                   │    Replace system board   │
                   └───────────────────────────┘
                                 │
                                 ▼
                          ┌─────────────┐
                          │     END     │
                          └─────────────┘
```
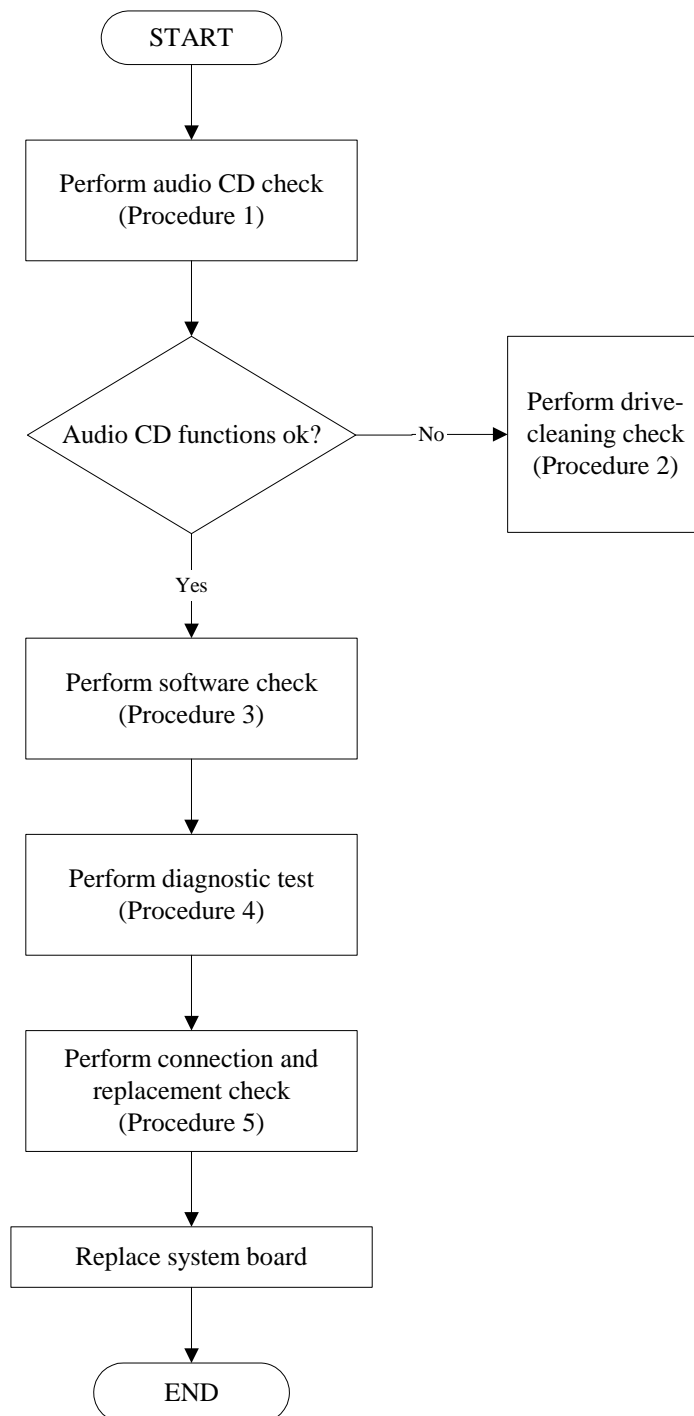
Figure 2-9 Optical drive troubleshooting process

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite A130/A135 /Satellite Pro A130 module bays can accommodate the following optical drives:

DVD SuperMulti supporting +-R Double Rayer
COMBO device

Figure 2-11 outlines the process. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1:   Audio CD test

Procedure 2:   Drive cleaning check

Procedure 3:   Software check

Procedure 4:   Diagnostic test

Procedure 5:   Connection and replacement check

Procedure 1   Audio CD check

First, insert an audio CD into the CD/DVD drive. If it works, the problem is not with the drive. Go to Procedure 3. If the audio CD does not work, go to Procedure 2. If the CD/DVD LED on the front panel does not light when the disc is played and the drive gives no response, go straight to Procedure 3.

Procedure 2   Drive cleaning check

Insert a CD/DVD drive-cleaning disk into the drive clean according to the drive-cleaning product instructions. If the problem persists, go to Procedure 3.

Procedure 3   Software check

Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

Procedure 4   Diagnostic test

The audio test program stored in the Diagnostics Disk will test the drive's ability to play an audio CD. See Chapter 3 for details.

If any errors occur while executing the diagnostic program, go to Procedure 5.

Procedure 5   Connection check and replacement check

The optical drive connects to 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 the system board. If the connection is good and there is still an error, go to Check 2.

Check 2   The drive or drive cable may be defective or damaged. Replace each 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 damaged. Replace it with new one following the instructions in Chapter 4, Replacement Procedures.

2.11 Modem Troubleshooting
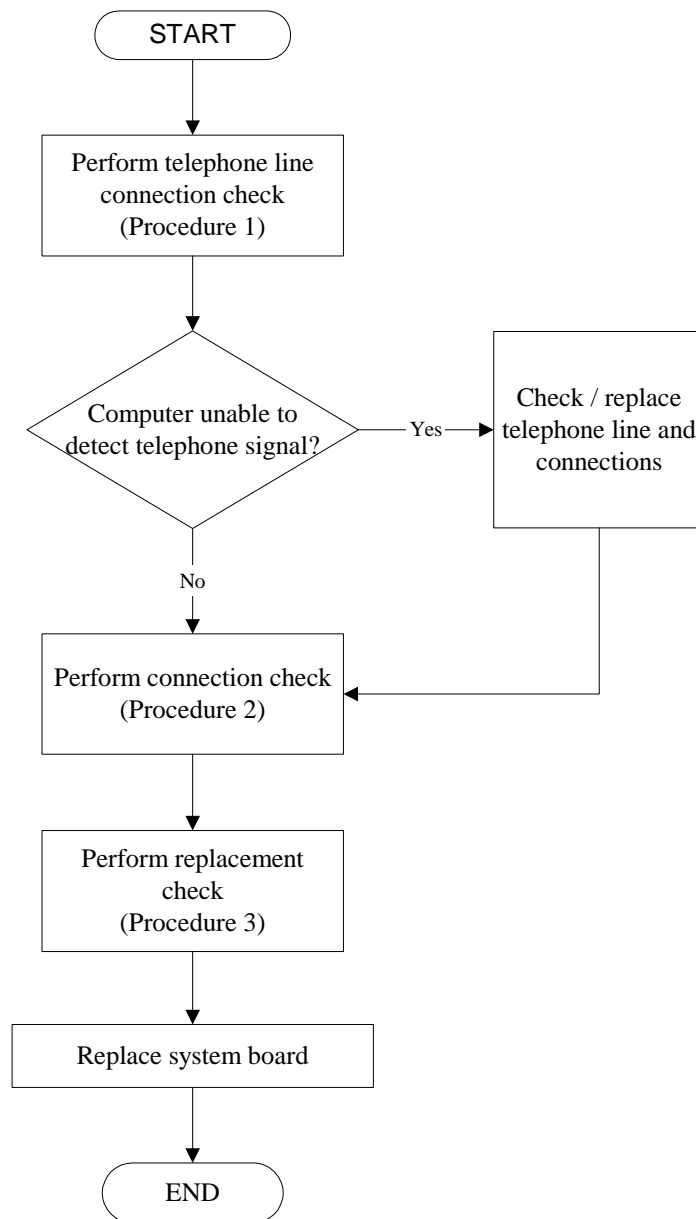
Figure 2-10 Modem troubleshooting process

This section describes how to determine if the computer's modem is functioning properly. Figure 2-12 outlines the process. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1:   Telephone line connection check

Procedure 2:   Modem card connection check

Procedure 3:   Modem card replacement check

Procedure 1   Telephone line connection check

The telephone cable may be damaged or the connections may be loose. Attempt to connect the computer to a network through using the modem. If the modem does not function at all, go to Procedure 3. If the attempt fails because the computer detects no telephone signal, the fault may be in the telephone cable, the wall socket or the modem port. Perform Check 1:

Check 1   Make sure telephone cable is firmly plugged into both the telephone wall socket and the modem port of the computer. If the cable is connected correctly, go to Check 2.

Check 2   Make sure the modem port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3   The telephone cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

Procedure 2   Modem card connection check

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and ensure that the modem card is well connected to the system board. If the problem persists, perform Procedure 3.

Procedure 3   Modem replacement check

The modem card or RJ-11 jack may be faulty. Try replacing them. If the problem persists, 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 PCMCIA Troubleshooting

```
                        ┌──────────┐
                        │  START   │
                        └──────────┘
                             │
                             ▼
                  ┌────────────────────┐
                  │  Perform SYCARD test│
                  │    (Procedure 1)    │
                  └────────────────────┘
                             │
                             ▼
                       ◇◇◇◇◇◇◇◇◇
                   Do errors occur during        ┌──────────────┐
                       SYCARD test?     ──No──▶  │ PCMCIA unit is│
                       ◇◇◇◇◇◇◇◇◇                 │  not faulty.  │
                             │                   └──────────────┘
                            Yes
                             │
                             ▼
                  ┌────────────────────┐
                  │ Perform PCMCIA socket│
                  │  replacement check  │
                  │    (Procedure 2)    │
                  └────────────────────┘
                             │
                             ▼
                  ┌────────────────────┐
                  │ Replace system board│
                  └────────────────────┘
                             │
                             ▼
                        ┌──────────┐
                        │   END    │
                        └──────────┘
```
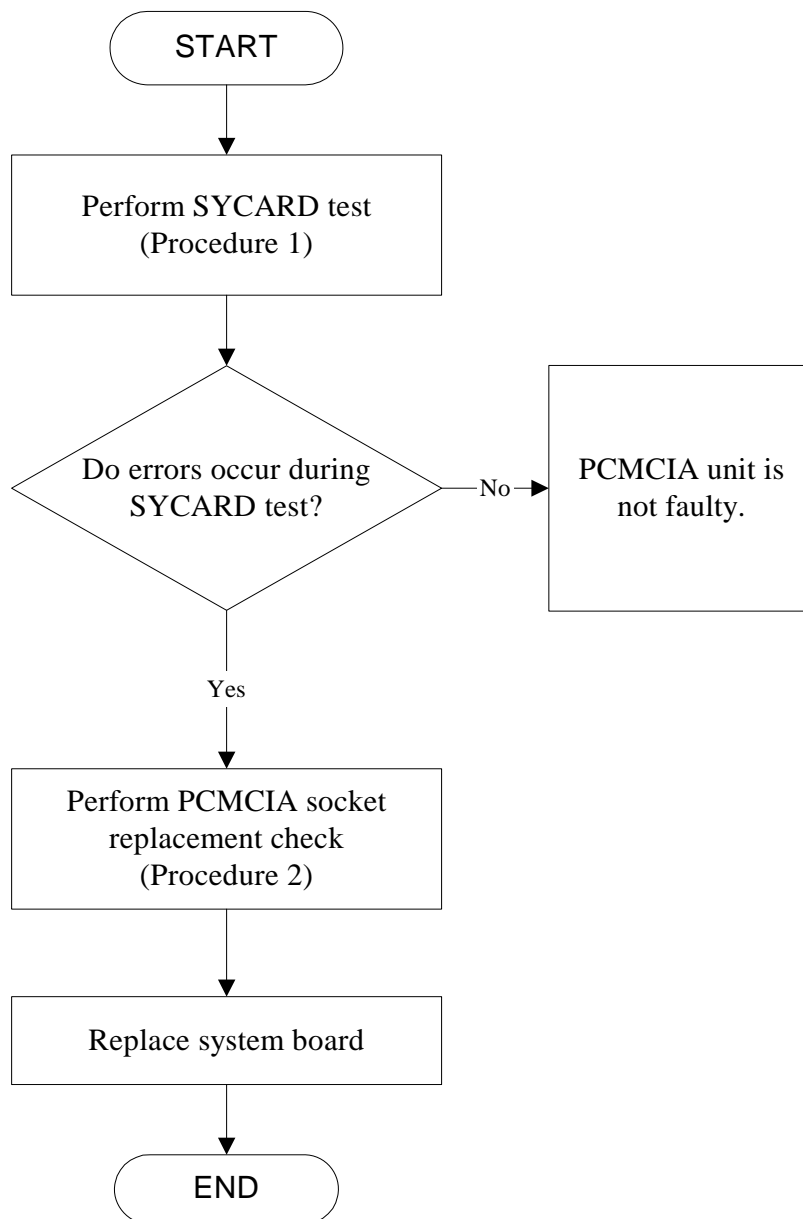
Figure 2-11 PCMCIA troubleshooting process

This section describes how to determine if the PCMCIA card player is functioning properly. The process is summarized in Figure 2-13. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1:   Sycard test

Procedure 2:   PCMCIA socket replacement check

Procedure 1   SYCARD test

The SYCARD test card contains a PCMCIA test program. Ensure the card in fully inserted into the socket before running the program.

If an error occurs during the SYCARD test, perform Procedure 2. If no error occurs, it is likely that the original PC card was faulty.

Procedure 2   PCMCIA socket replacement check

The PCMCIA socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

2.13 IEEE 1394 Troubleshooting

```
                    ┌──────────────┐
                   (    START       )
                    └──────┬───────┘
                           │
                           ▼
              ┌────────────────────────────┐
              │ Perform IEEE 1394 device check│
              │        (Procedure 1)          │
              └──────────────┬───────────────┘
                             │
                             ▼
                    ◇ Is IEEE 1394 transmission ok? ◇───No──┐
                             │                               │
                            Yes                              │
                             ▼                               │
              ┌────────────────────────────┐                │
              │   Perform diagnostic check  │                │
              │        (Procedure 2)        │                │
              └──────────────┬─────────────┘                │
                             │                               │
                             ▼                               │
                    ◇ Was an IEEE 1394 problem detected? ◇─No→ ┌──────────────────┐
                             │                                 │ IEEE 1394 port and│
                            Yes                                │ transmission are not│
                             ▼                                 │ faulty. Continue   │
              ┌────────────────────────────┐                  │ troubleshooting -  │
              │Perform connection and replace- │               │ refer to Figure 2.1│
              │ment check (Procedure 3)      │                 └──────────────────┘
              └──────────────┬─────────────┘                │
                             │                               │
                             ▼                               │
              ┌────────────────────────────┐                │
              │    Replace system board     │◄───────────────┘
              └──────────────┬─────────────┘
                             │
                             ▼
                    ┌──────────────┐
                   (     END        )
                    └──────────────┘
```
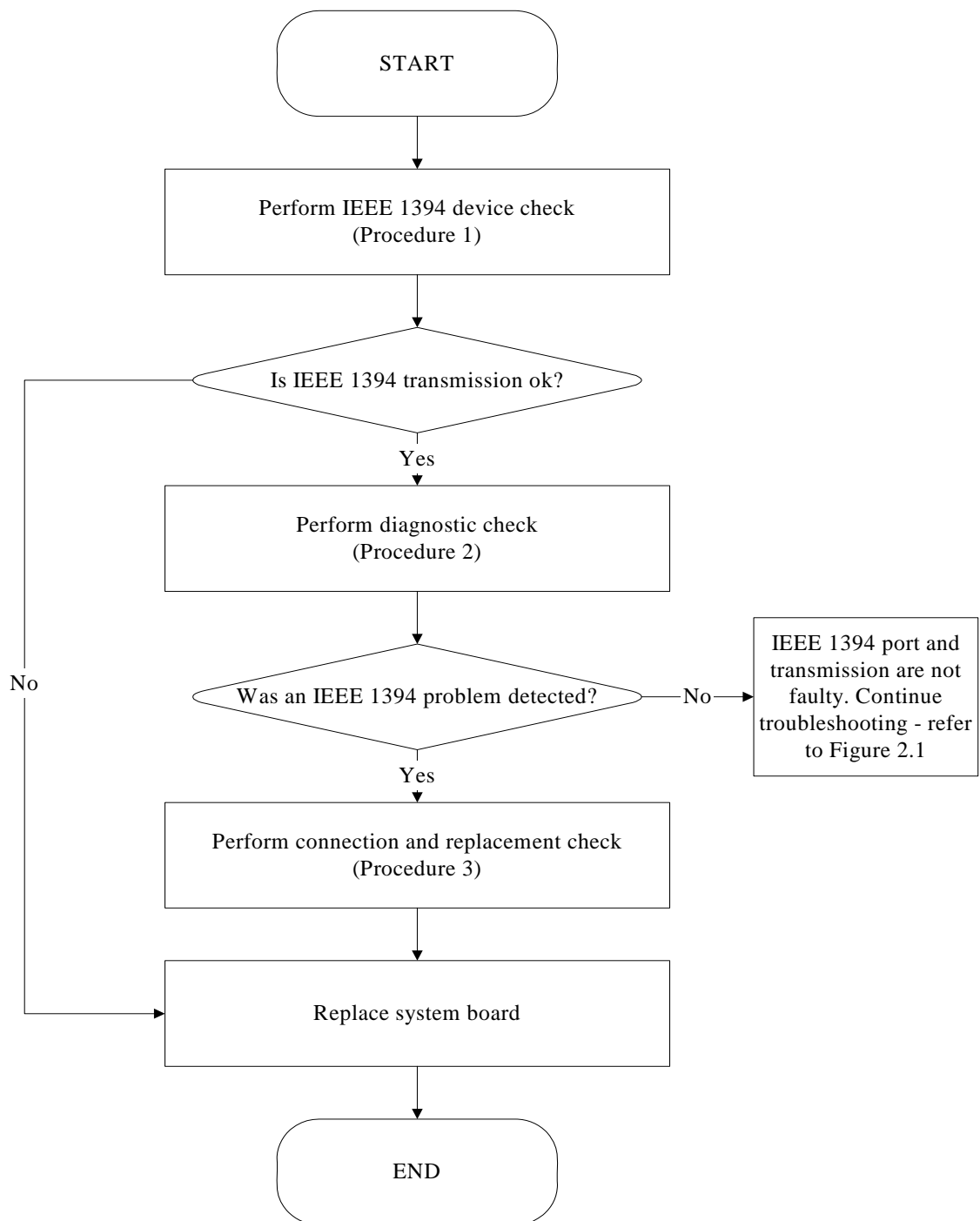
Figure 2-12 IEEE 1394 troubleshooting process

To determine if the computer's IEEE 1394 system is functioning properly, perform the following procedures. Figure 2-14 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1:   IEEE 1394 device check

Procedure 2:   Diagnostic check

Procedure 3:   Connection and replacement check

Procedure 1   IEEE 1394 device check

Connect an IEEE 1394 device to the computer's IEEE 1394 port, then boot the computer for Windows Vista. The computer should automatically detect the 1394 device. Check whether the device can transmit data to the computer.

If the device is able to communicate with the computer, the problem may be intermittent or connections may be faulty. Go to Procedure 2.

If communication is impaired, there may be a faulty connection. Go to Procedure 3.

Procedure 2   Diagnostic check

Run the Diagnostic Program, which will automatically execute the IEEE 1394 port test for transmission. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the 1394 port is functioning properly.

Procedure 3   Connection and replacement check

The transmission cable may be damaged or the connections may be loose. Perform Check 1:

Check 1   Make sure the transmission cable is firmly plugged into both the IEEE 1394-compatible device and the IEEE 1394 port of the computer. If the cable is connected correctly, go to Check 2.

Check 2   Make sure the IEEE 1394 port is firmly secured to the system board of the computer. If the malfunction persists, go to Check 3.

Check 3   The transmission cable may be damaged. Replace with a good cable. If the malfunction persists, go to Check 4

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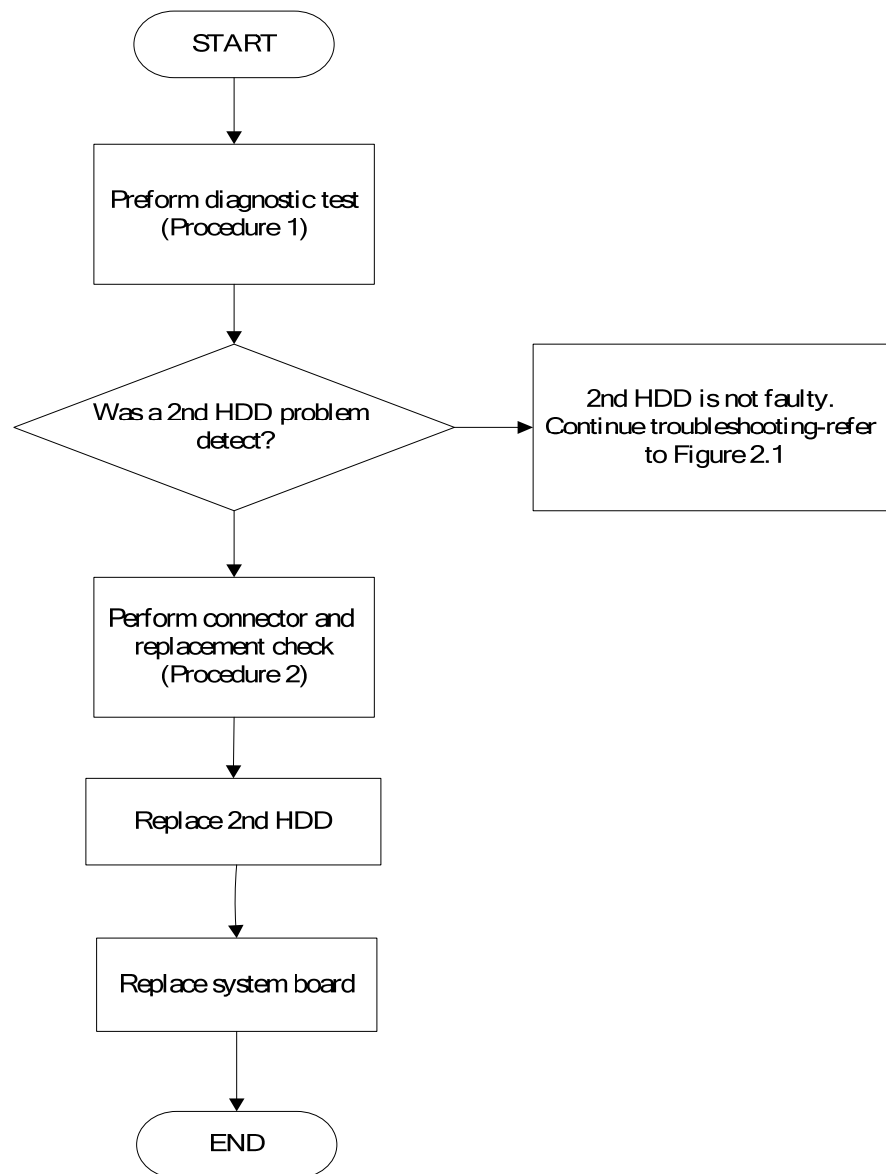
2.14 Wireless LAN Troubleshooting

```
                          ┌─────────────┐
                          │    START    │
                          └──────┬──────┘
                                 │
                                 ▼
                  ┌────────────────────────────┐
                  │   Perform diagnostic test   │
                  │       (Procedure 1)         │
                  └──────────────┬──────────────┘
                                 │
                                 ▼
```

Was a wireless LAN problem delected? ──No──► Wireless LAN system is not faulty. Continue troubleshooting - refer to Figure 2.1

Yes

Perform connector and replacement check (Procedure 2)

Replace wireless LAN antenna/unit

Replace system board

END
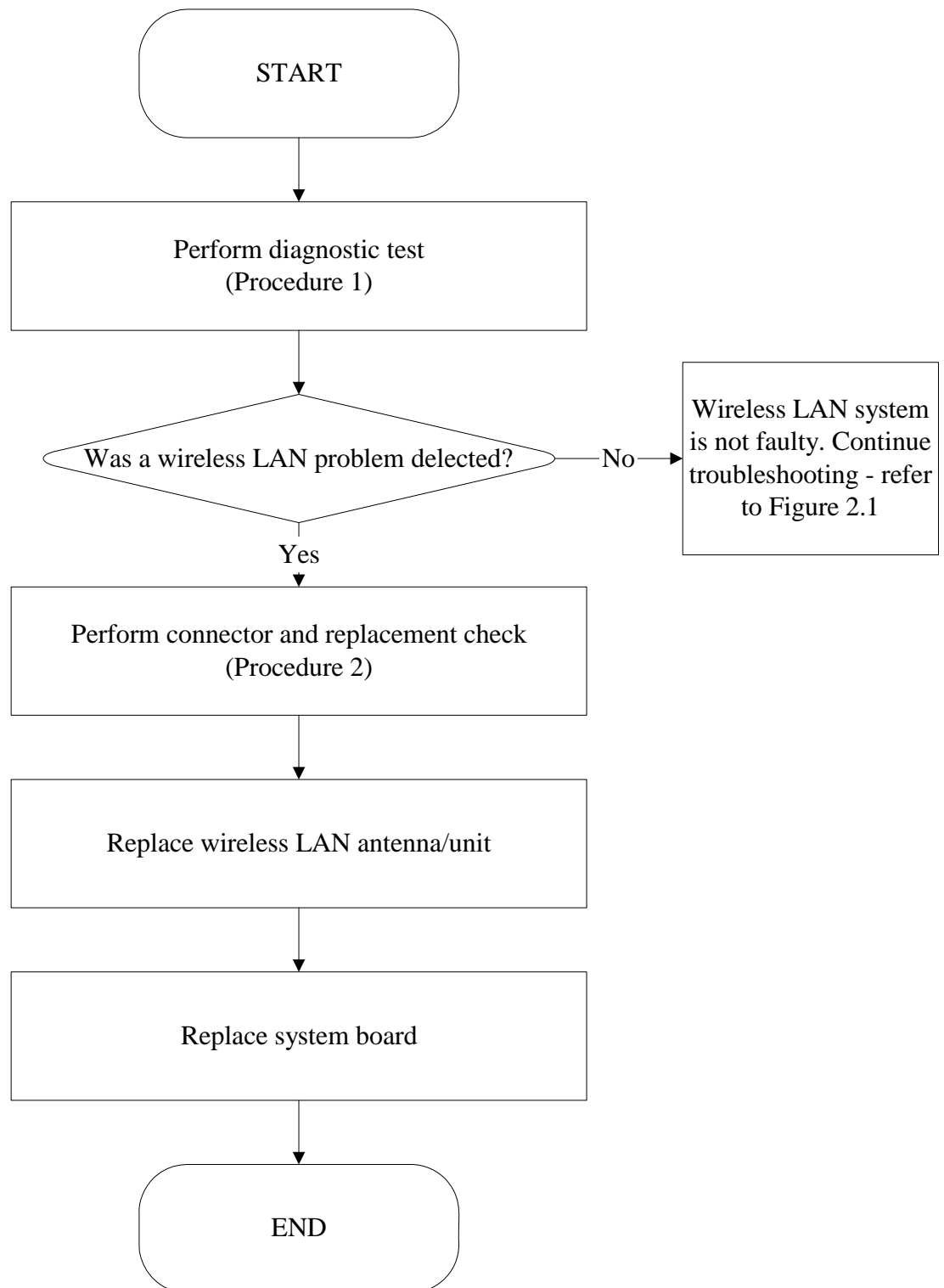
Figure 2-13 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source

of a wireless LAN fault. Any of these components may be damaged. To determine if the

computer's wireless LAN system is functioning properly, perform the following procedures.

Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other

procedures as instructed.

> Procedure 1: Diagnostic test
> Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Refer
to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the wireless LAN system is
functioning properly.

Procedure 2 Connector and replacement check

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

Check 1   Make sure that the wireless LAN antenna is firmly connected to the wireless LAN
          unit (refer to Chapter 4 for instructions) and that the wireless LAN unit is securely
          slotted into the system board. If the problem persists, go to Check 2.

Check 2   Check that the wireless communication switch is turned to "On", and then make
          sure that the wireless communication LED on the front panel is lit. If the LED is
          lit but the wireless LAN function is still faulty, the antenna may be damaged.
          Replace with a new antenna following the steps in Chapter 4, *Replacement
          Procedures*. If the problem persists, or if the wireless LAN LED is not lit when
          the wireless communication switch is turned to "On", go to Check 3.

Check 3   The wireless LAN unit may be damaged. Replace it with a new one following the
          instructions in Chapter 4. If the problem still exists, perform Check 4.

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

2.15 Finger printer Troubleshooting
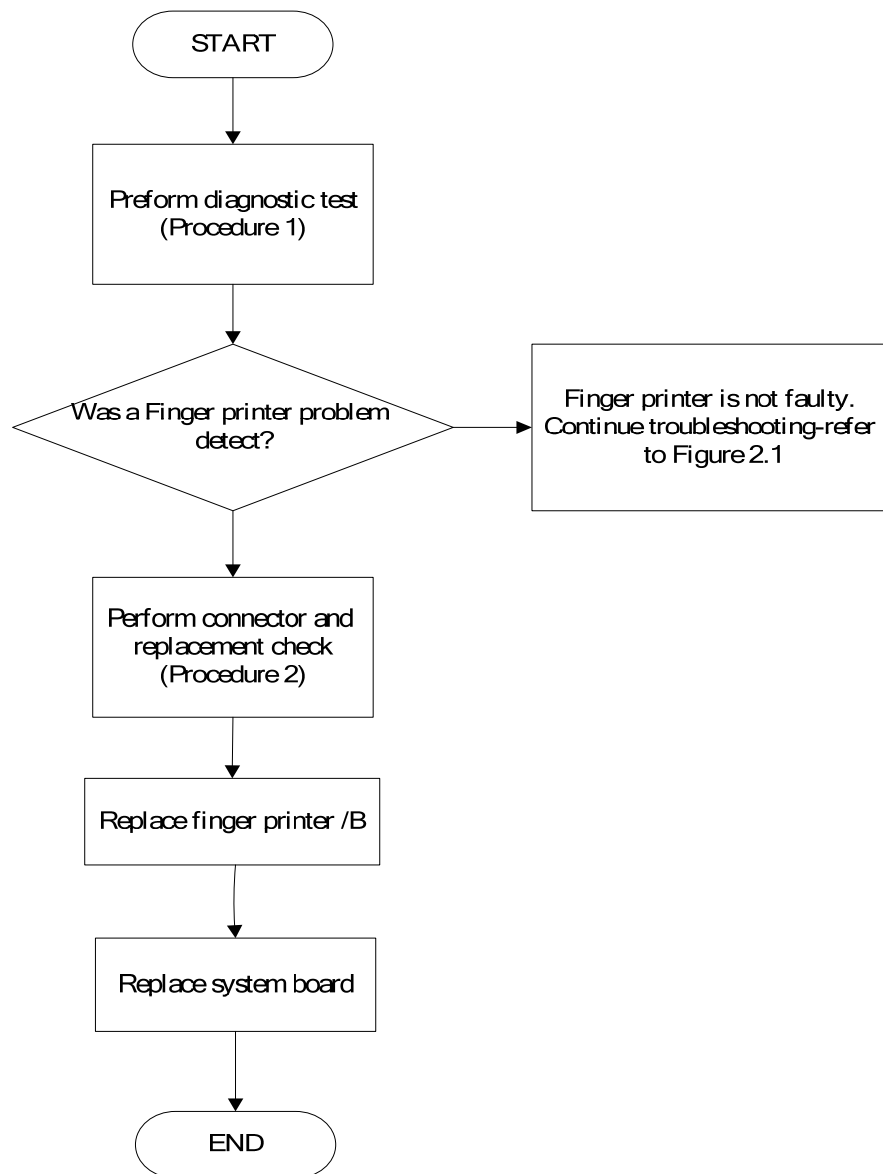
Figure 2-14 Finger printer troubleshooting process

The Finger printer board or system board may be the reason of a finger printer fault. Either of these two components may be damaged. To determine if the computer's Finger printer is functioning properly, perform the following procedures. Figure 2-14 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1   Diagnostic test

Run the Diagnostic Program, which will automatically execute the Finger printer test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the Finger printer system is functioning properly.

Procedure 2   Connector and replacement check

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

Check 1   Make sure that the Finger printer board FFC is securely slotted into the system board. If the problem persists, go to Check 2.

Check 2   The Finger printer board 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.

2.16 Bluetooth Troubleshooting
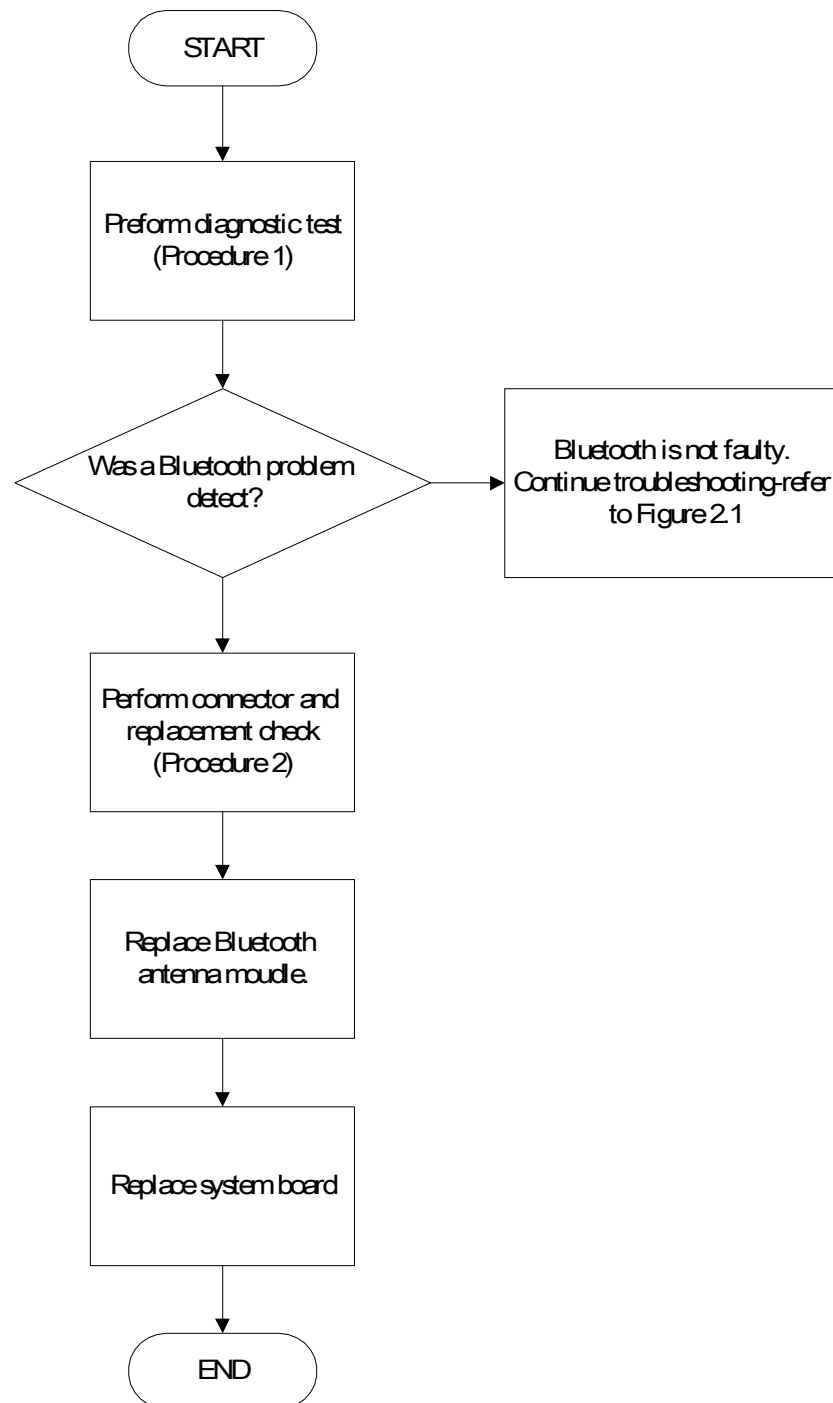
Figure 2-15 Bluetooth troubleshooting process

The Bluetooth antenna wire, Bluetooth module or system board may be the reason of a

Bluetooth fault. Any of these components may be damaged. To determine if the computer's

Bluetooth is functioning properly, perform the following procedures. Figure 2-16 outlines the

process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1:   Diagnostic test

Procedure 2:   Connector and replacement check

Procedure 1   Diagnostic test

Run the Diagnostic Program, which will automatically execute the Bluetooth test. Refer to
Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the Bluetooth system is
functioning properly.

Procedure 2   Connector and replacement check

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

Check 1   Make sure that the Bluetooth antenna is firmly connected to the Bluetooth module
(refer to Chapter 4 for instructions) and that the Bluetooth FFC is securely slotted
into the system board. If the problem persists, go to Check 2.

Check 2   Check that the Bluetooth communication switch is turned to "On", then make sure
that the communication LED on the left panel is lit. If the LED is lit but the
Bluetooth function is still faulty, the antenna module may be damaged. Replace
with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If
the problem persists, or if the Bluetooth communication LED is not lit when the
Bluetooth communication switch is turned to "On", go to Check 3.

Check 3   The Bluetooth module may be damaged. Replace it with a new one following the
instructions in Chapter 4. If the problem still exists, perform Check 4.

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

2.17 **4 in 1 card Troubleshooting**

```
                        ┌─────────────┐
                        │    START    │
                        └─────────────┘
                               │
                               ▼
                   ┌───────────────────────┐
                   │  Perform 4 in 1 CARD test │
                   │      (Procedure 1)     │
                   └───────────────────────┘
                               │
                               ▼
                          ╱─────────╲              ┌──────────────┐
                        ╱  Do errors   ╲    No      │ 4 IN 1 unit is not │
                       ╱ occur during 4  ╲─────────▶│    faulty.   │
                        ╲ IN 1 CARD test? ╱          └──────────────┘
                          ╲─────────╱
                               │
                              Yes
                               ▼
                   ┌───────────────────────┐
                   │ Perform 4 IN 1 card socket │
                   │   replacement check    │
                   │      (Procedure 2)     │
                   └───────────────────────┘
                               │
                               ▼
                   ┌───────────────────────┐
                   │   Replace system board  │
                   └───────────────────────┘
                               │
                               ▼
                        ┌─────────────┐
                        │     END     │
                        └─────────────┘
```
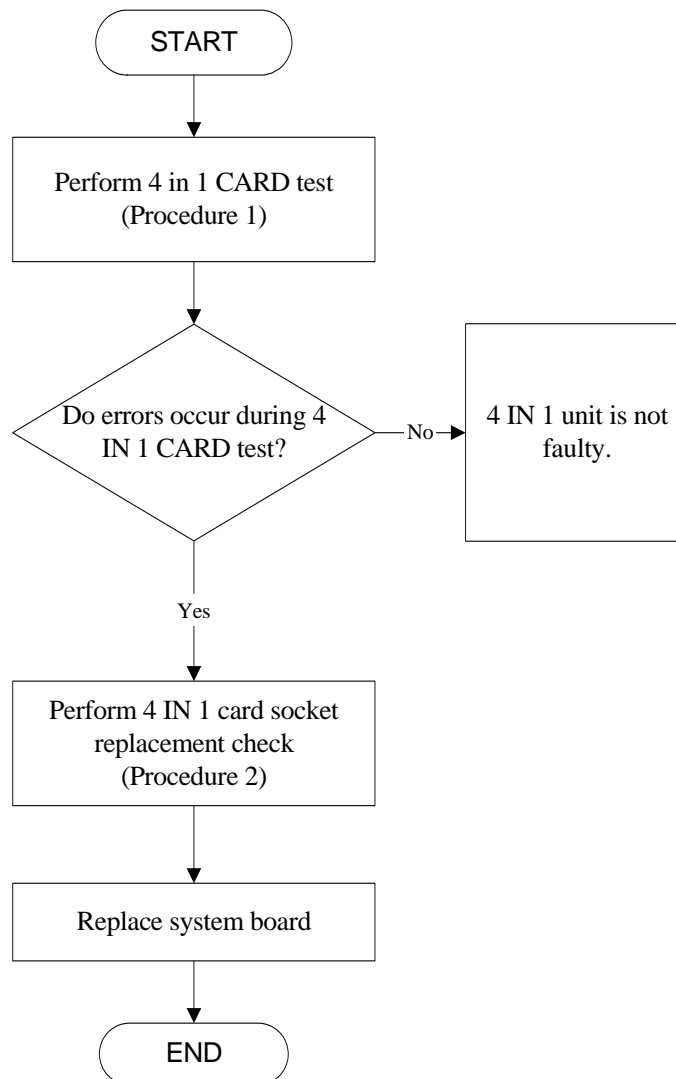
Figure 2-16 4 in 1 card troubleshooting process

This section describes how to determine if the 4 IN 1 Card player is functioning properly. The process is summarized in Figure 2-16. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1:   5 in 1 card test

Procedure 2:   Express socket replacement check

Procedure 1   4 in 1 card test

The 4 in 1 Card test card contains a 4 in 1 card test program. Ensure the card in fully inserted into the socket before running the program.

If an error occurs during the 4 in 1 card test, perform Procedure 2. If no error occurs, it is likely that the original 4 in 1 card was faulty.

Procedure 2   4 in 1 Card socket replacement check

The 4 in 1 Card socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

2.18 1st HDD Troubleshooting
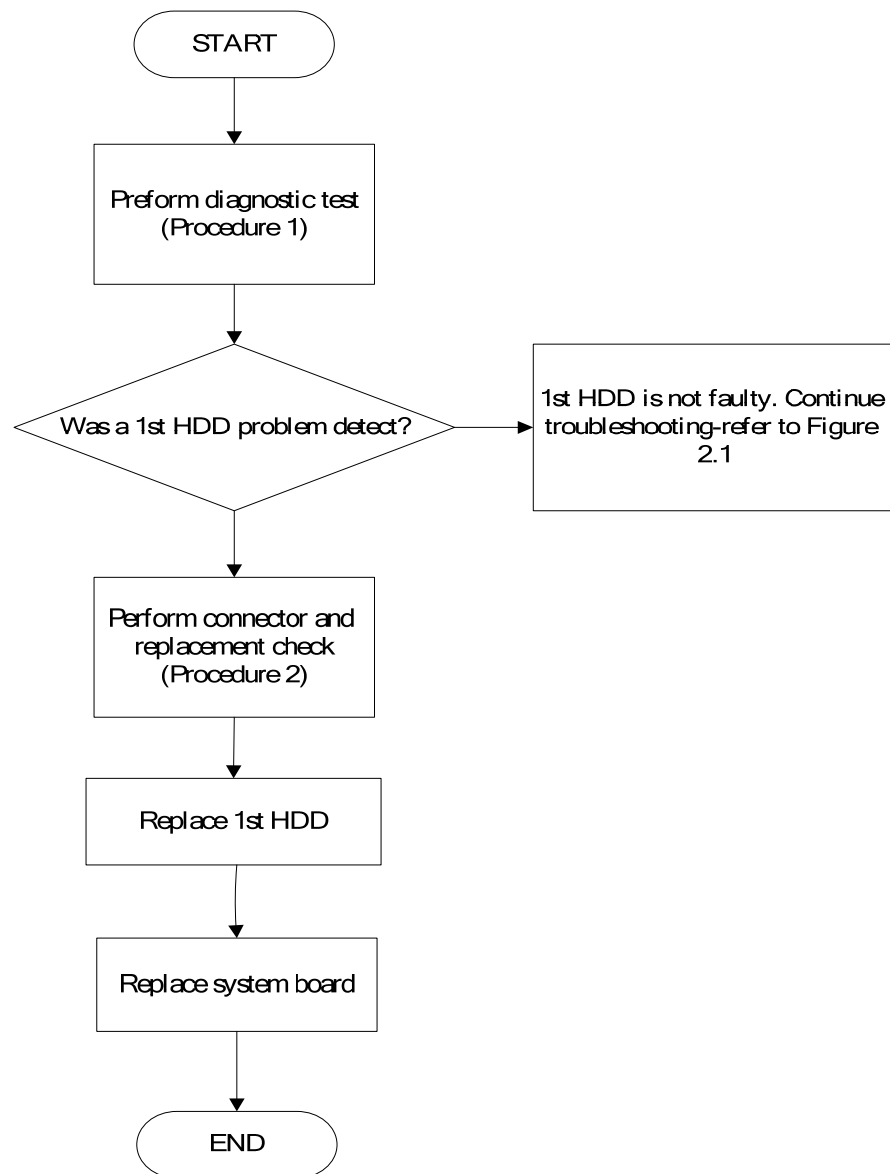
Figure 2-17 HDD troubleshooting process

The 1st HDD or system board may be the reason of a HDD fault. Either of these two components may be damaged. To determine if the computer's 1st HDD is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1:   Diagnostic test

Procedure 2:   Connector and replacement check

Procedure 1   Diagnostic test

Run the Diagnostic Program, which will automatically execute the 1st HDD R/W test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the 1st HDD function is functioning properly.

Procedure 2   Connector and replacement check

The 1st HDD module or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1   Make sure that the 1st HDD module is securely slotted into the system board. If the problem persists, go to Check 2.

Check 2   The 1st HDD module 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.

2.19 2nd HDD Troubleshooting

START

Preform diagnostic test
(Procedure 1)

Was a 2nd HDD problem detect?

2nd HDD is not faulty.
Continue troubleshooting-refer
to Figure 2.1

Perform connector and
replacement check
(Procedure 2)

Replace 2nd HDD

Replace system board

END

Figure 2-18 2nd HDD troubleshooting process

The 2nd HDD or system board may be the reason of a HDD fault. Either of these two components may be damaged. To determine if the computer's 2nd HDD is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

> Procedure 1: Diagnostic test
> Procedure 2: Connector and replacement check

Procedure 1   Diagnostic test

Run the Diagnostic Program, which will automatically execute the 2nd HDD R/W test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the 2nd HDD function is functioning properly.

Procedure 2   Connector and replacement check

The 2nd HDD module or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1   Make sure that the 2nd HDD module is securely slotted into the system board. If the problem persists, go to Check 2.

Check 2   The 2nd HDD module 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.

Chapter 3

Tests and Diagnostics

Contents

3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Dallas10&10G T&D version 1.0)** hardware modules. The Test & Diagnostic Program is stored on the T&D diskettes. The program consists of a series of tests that run automatically when the Diagnostics Program items are selected and executed.

> *NOTES: To start the diagnostics, follow these steps*
>
> *1. Check all cables for loose connections.*
>
> *2. Exit this program when you are at Main Menu.*

The TEST & DIAGNOSTIC PROGRAM contains the following functional tests:

- ❑ CONFIG CHECK TEST
- ❑ SPEAKER AUDIO TEST
- ❑ FAN ON/OFF TEST
- ❑ MAIN BATTERY CHARGE TEST
- ❑ FDD TEST
- ❑ ODD TEST
- ❑ KEYBOARD TEST
- ❑ MOUSE(PAD) TEST
- ❑ LCD PIXELS MODE TEST
- ❑ MAGNETIC SWITCH TEST
- ❑ HDD R/W TEST
- ❑ LAN TEST
- ❑ RTC TEST
- ❑ IEEE1394 CODE TEST
- ❑ Speaker EQ Check&Rewrite
- ❑ Button Test
- ❑ Fingerprint DOS Test
- ❑ Clear FP(Fingerprint) Registered

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

- ❑ The diagnostics diskette (2 pcs)
- ❑ A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- ❑ A data CD disc (ODD Test)
- ❑ A LAN loopback

The following sections explain how to execute the Test & Diagnostic Program and detail the tests within the program.

3.2 Executing the Diagnostic Test

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

1. Insert the diagnostics diskette #1 in the floppy disk drive and turn on the computer. (The diagnostics diskette contains the DOS boot files.) And then follow the instructions to swap with the diagnostics diskette #2 for T&D program installed in RAM driver.

> *NOTE: To execute the CD test, make sure the CD is installed in the ODD drive.*

The T&D Program can run by single test item when you press corresponsive English letter of test item, or run two or more test items what you like if you choose them by "Arrow cursors" and "Space Bar" – the wonderful thing is you can setup test loop by "Enter" button. And it also asks you if you like to copy test log file to diskette as reference at the end of test(s).

The test list is as the following:

A. CONFIG CHECK TEST
B. SPEAKER AUDIO TEST
C. FAN ON/OFF TEST
D. MAIN BATTERY TEST
E. FDD TEST
F. ODD TEST
G. KEYBOARD TEST
H. MOUSE (PAD) TEST
I. LCD PIXELS MODE TEST
J. MAGNETIC TEST
K. LAN TEST
L. RTC TEST
M. IEEE1394 CODE TEST
N. SPEAKER EQ CHECK TEST
O. BUTTON TEST
P. FINGERPRINT TEST
Q. CLEAR FP REGISTERED
R. 1st HDD TEST
S. 2nd HDD TEST

The below display will show up at the beginning of T&D program

```
┌──────────────────────────────────────────────────────────────────┐
│        Dallas10&10G (IAKAA) DOS MODE Function T&D DISKETTE MENU     │
├─────────────────────┬──────────────────────┬─────────────────────┤
│ A.CONFIG CHECK TEST │ J.Magnetic Switch    │ S.2nd HDD TEST      │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ B.SPEAKER AUDIO TEST│ K.LAN TEST           │ T.N/A               │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ C.FAN ON/OFF TEST   │ L.RTC TEST           │ U.N/A               │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ D.MAIN BATTERY TEST │ M.IEEE1394 CODE CHECK│ V.N/A               │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ E.FDD TEST          │ N.Speaker EQ Check   │ W.N/A               │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ F.ODD TEST          │ O.BUTTON TEST        │                     │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ G.KEYBOARD TEST     │ P.Fingerprint TEST   │                     │
├─────────────────────┼──────────────────────┼─────────────────────┤
│ H.MOUSE (PAD) TEST  │ Q.Clear FP Redistered│ Z.Save LOG to Floppy│
├─────────────────────┼──────────────────────┼─────────────────────┤
│ I.LCD PIXELS TEST   │ R.1st HDD TEST       │ X.EXIT              │
├─────────────────────┴──────────────────────┴─────────────────────┤
│        Dallas T&D Function test --Ver:1.0(2006.11.27)             │
└──────────────────────────────────────────────────────────────────┘
              Please select a test item
```

If the test result passes, the following display will show up:

Press any key to continue . . .

If an error is detected and a test fails, the following message displays:

Then press any key for next actions – the below display presented if copying test log file onto diskette is necessary. This action will be executed when "**Y**" key pressed.

It will skip this process if "N" key pressed.

And then it will check if it's necessary to leave this program. Program will quit when "**Y**" key pressed and it will go back main menu for next test if "**N**" key pressed.

```
┌──────────────────────────────────────────────────────────────────┐
│      Dallas10&10G (IAKAA) DOS MODE Function T&D DISKETTE MENU       │
├──────────────────────┬──────────────────────┬──────────────────────┤
│ A.CONFIG CHECK TEST  │ J.Magnetic Switch    │ S.2nd HDD TEST       │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ B.SPEAKER AUDIO TEST │ K.LAN TEST           │ T.N/A                │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ C.FAN ON/OFF TEST    │ L.RTC TEST           │ U.N/A                │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ D.MAIN BATTERY TEST  │ M.IEEE1394 CODE CHECK│ V.N/A                │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ E.FDD TEST           │ N.Speaker EQ Check   │ W.N/A                │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ F.ODD TEST           │ O.BUTTON TEST        │                      │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ G.KEYBOARD TEST      │ P.Fingerprint TEST   │                      │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ H.MOUSE (PAD) TEST   │ Q.Clear FP Redistered│ Z.Save LOG to Floppy │
├──────────────────────┼──────────────────────┼──────────────────────┤
│ I.LCD PIXELS TEST    │ R.1st HDD TEST       │ X.EXIT               │
├──────────────────────┴──────────────────────┴──────────────────────┤
│         Dallas T&D Function test --Ver:1.0(2006.11.27)             │
└──────────────────────────────────────────────────────────────────┘
              Please select a test item
```

3.3 Display Configuration

This Item will show the unit configuration. It includes:

- ◆ CPU type (Single/Dual Yunah; Cache ; CPU speed ;CPU FSB)

- ◆ DDRAM SIZE

- ◆ ODD TYPE ((DVD-SuperMulti; COMBO; …)

- ◆ Panel ID

- ◆ HDD type & capacity (Vendor ID. Model .Firmware)

- ◆ VRAM size / VGA CHIP TYPE

- ◆ Battery cell (6cell;9cell;12cell)

- ◆ Wireless type

- ◆ LAN Type

- ◆ 1394

- ◆ Bluetooth

- ◆ SKU ID

The screen should display as below:

```
=================================================================
========          Configuration as Below          ========
=================================================================

CPUTYPE=Yonah-T2250
CPUCatche=2048
CPUSpeed=1.73GHZ
CPUFSB=533MHZ
DDRAMSIZE=512MBRAM
ODDTYPE=SuperMulti
PanelID=SAMSUNG15.4WXGA
HDDTYPE=40G54
VRAMSIZE&VGATYPE=MBG72MV
BATT=6cell
WirelessTYPE= INTEL03W10_0610_4V10
LANTYPE=8111B
1394=YES
Bluetooth=NO
SKUID=08

ARE YOU TEST OK?[Y,N]?
```

3.4 Speaker Audio Test

The speaker audio test allows the user to aurally confirm the speaker functions. And check both speakers if they are OK within 3 times "Beep" sound generated.

*NOTE: Remember to tune up the volume as "**Maximum**" before this test starts.*

The screen should display as below, indicating whether the test is passed or failed after the question.

```
======Speaker audio Test======


1.Please adjust volume to max level.
2.Please listen to both of speaker will send out Beep sound
 (3 times).


Press any key to continue . . .
```

3.5 Fan ON/OFF Test

The fan test allows the user to test aurally whether the fan is working. And follow the below procedures for this test:

- ◆ The computer will let the fan be "ON" after any key pressed. Feel the wind or listen the rotating sound to check whether the fan is working or not.

NOTE: Remember to approach fan outlet that is near right side of unit whether fan is "ON".

- ◆ The computer will stop the fan working after any key pressed. Feel the wind or listen the sound to check if the fan is "OFF".

The screen should display as below, indicating whether the test is passed or failed after the question.

```
====== FAN TEST ======

  Please approach FAN outlet to listen to FAN rotating sound.


Press any key to continue . . .
```

3.6 Main Battery Charge Test

> ***NOTE****: The AC adaptor (**90W, 19V**) should be connected to successfully run this test.*

This test shows and measures the main battery:

- ◆ Battery type (Lion)

- ◆ Manufacturer (Sanyo/Panasonic/Sony)

- ◆ Remain charge capacity (0 ~ 100%)

- ◆ Charge function (PASS/FAIL)

    - "Battery Is Full" showed when "remain charge capacities" is 100%

The screen should display as below, if the charge function is OK, will show:.

```
ONLY FOR 87591 T&D Series Battery Test Program.[591] V1.0 2002/07/23
MAIN Battery

Battery Type: Lion
Manufacturer: Sony
Remain charge capacity : 80.0%

Charge Test-> [ PASS ]


Press any key to continue . . .
```

If the charge function is NG, the screen will display as:

```
ONLY FOR 87591 T&D Series Battery Test Program.[591] V1.0 2002/07/23
MAIN Battery

Battery Type: Lion
Manufacturer: Sony
Remain charge capacity : 86.5%

Charge Test-> [ FAIL ]


Press any key to continue . . .
```

3. 7 FDD Test

NOTE: Before running the FDD test, prepare a formatted work diskette (1.44 MB).
Remove the diagnostics diskette and insert the work diskette into the FDD. The contents of
the floppy diskette maybe erased.

The Floppy Disk Test includes three subtests of the:

1. Sequential seek/verify function (Range: Track 0 ~ 79)

2. Funnel code seek/verify function (Range: Track 0 ~ 79)

3. Write/Read/Compare pattern function (Range: Track 75 ~ 79)

NOTE: The write-protected device of this formatted diskette should be "Disable".

The subtests run automatically.

NOTE: Press "Esc" key can skip the current subtest.

The screen should display as below, indicating whether the subtests pass or fail when finished.

```
***** Fdd Test Program V1.3  *****
Testing Driver A: [1.44 MByte (Cyl:80, Head:2, Sec:18)]...
Testing Seq. seek/verify... Head: 01, Track: 79...  [ PASS ]
Testing Fun. seek/verify... Head: 01, Track: 06...
```

---

3. 8 ODD Test

The ODD test allows a user to aurally confirm the ODD functions.

*NOTE: **A CD disc (including data file) must be inserted into the ODD drive then must wait ODD drive initial OK (ODD LED stop flashing) before this test starts**.*

The ODD test includes two subtests of the:

1. Random read/partial sequential read function

2. Eject ODD door

The screen should display as below, indicating whether the subtests pass or fail when finished.
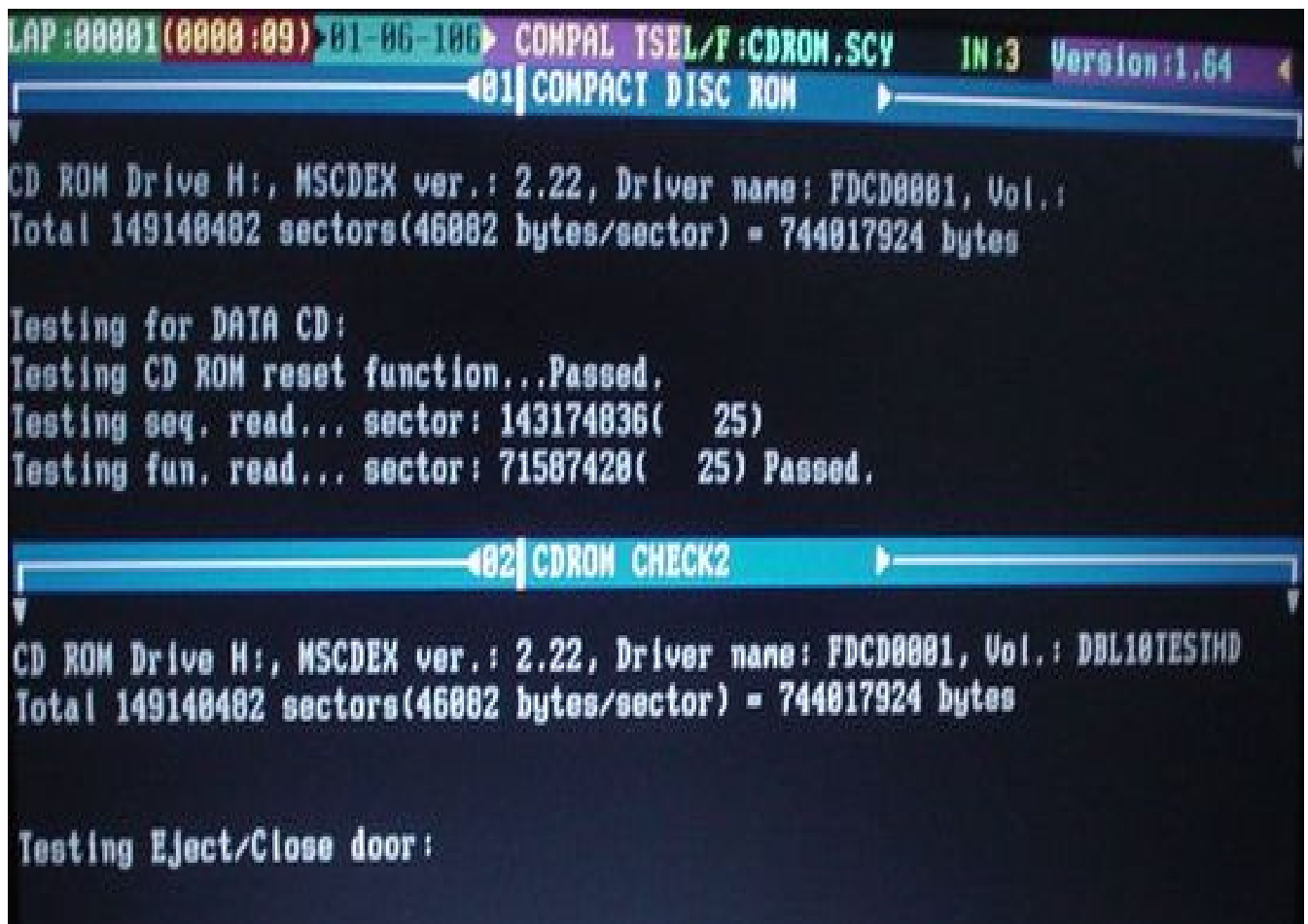
3. 9 Keyboard Test

The keyboard test checks the all keys function.

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

Before keyboard test starts, the keyboard matrix code should be chosen as below display:

1. **K** (UK, for Europe)

2. **S** (US, for America)

When you execute this test, the keyboard layout is drawn on the display. When any key is pressed, the corresponding key on the screen changes to black as shown below.

It will indicate whether the subtest is passed or failed after the question.

> *NOTE: The "**Fn**" key cannot be tested in the keyboard test. To determine whether the "**Fn**" key is working correctly, press "**Fn**+**F6**   " or "**Fn**+**F7**   " keys to check if LCD display brightness change gradually.*
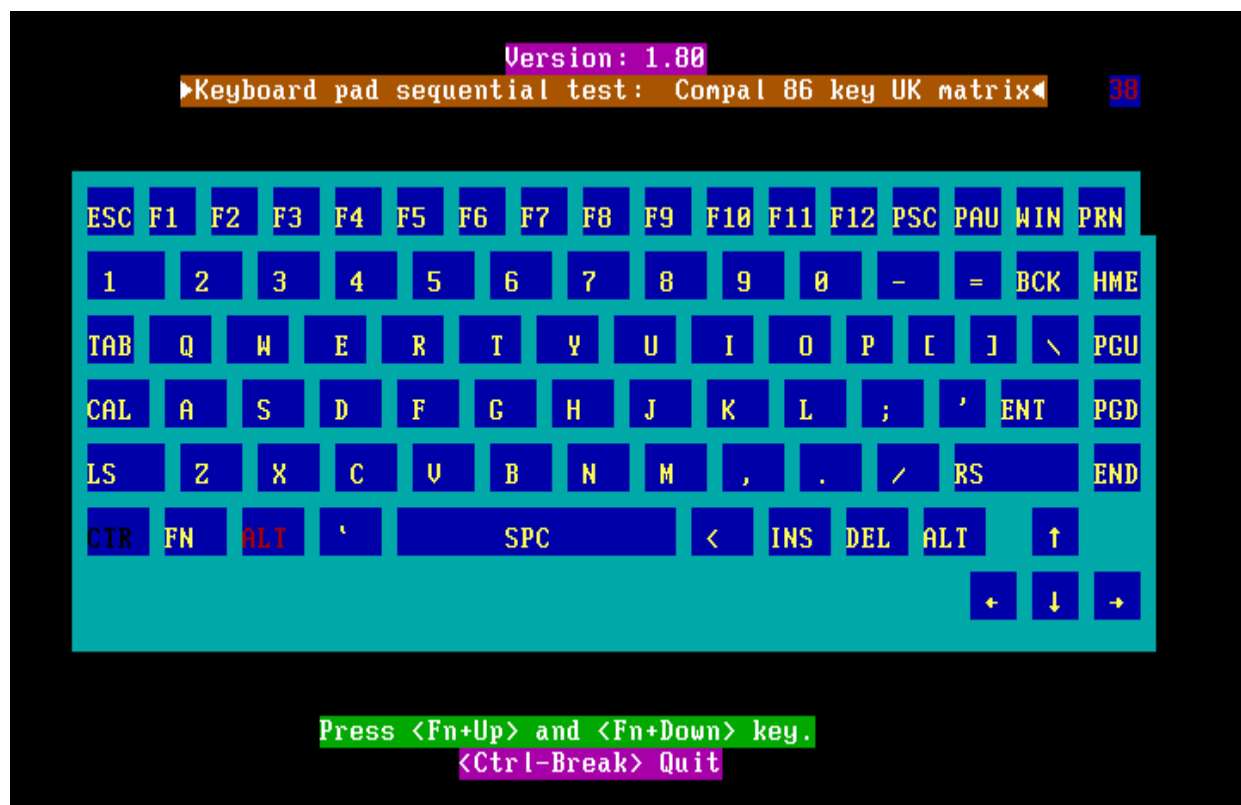
3.10 Mouse (Pad) Test

The Mouse test allows the user to select and assign values to the following, using the Touch Pad or "***Tab***" key to move between selections:

1. Mouse Speed (on a scale from slow to fast)

2. Acceleration (Off, Low, Medium, High)

3. Button Assignments (Left + Right / Right button, either Unassigned or Drag Lock)

4. Swap Buttons (Left /Right)

NOTE: *The Touch Pad test cannot be used to test an external USB mouse.*

The Touch Pad button subtest allows users to test their Touch Pad buttons. If the buttons are clicked, the cursors should appear in the corresponding box of the button figure that is displayed on the screen as below.
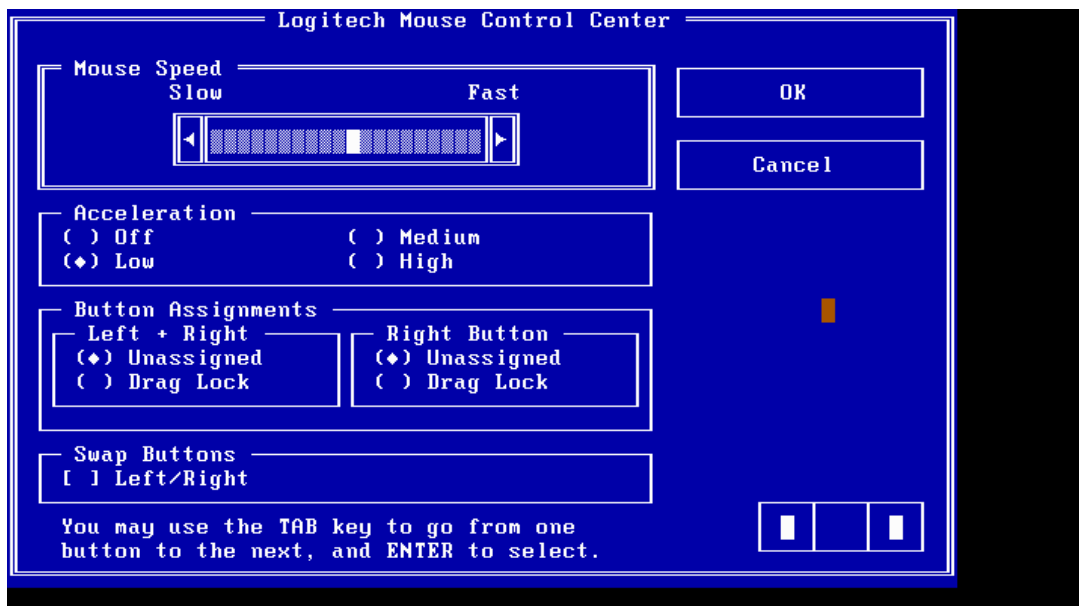
After checking T/Pad buttons and cursor's function, use "Tab" key or use T/Pad cursor to click the "OK" column will end this test.

It will indicate whether the subtests pass or fail after three questions.

NOTE: *The above figure has three compartments although the Touch Pad installed may only have two buttons. In this case, the central compartment in the figure does not correspond to any button.*

3. 11 LCD Pixels Mode Test

This LCD pixels mode test checks whether video display is fine.

This test includes two modes of the test:

1.   Text Mode

     - including 40*25 (16 colors) and 80*25 (2/16colors).

2.   VGA Mode

     - including 320*200 (4/16/256 colors), 640*200 (2/16 colors), 640*350 (2/16 colors), 640*480 (2/16/256 colors), 800*600 (256 colors) and 1024*768 (256 colors).

The screen should display as below, indicating whether the test is passed or failed after the question.
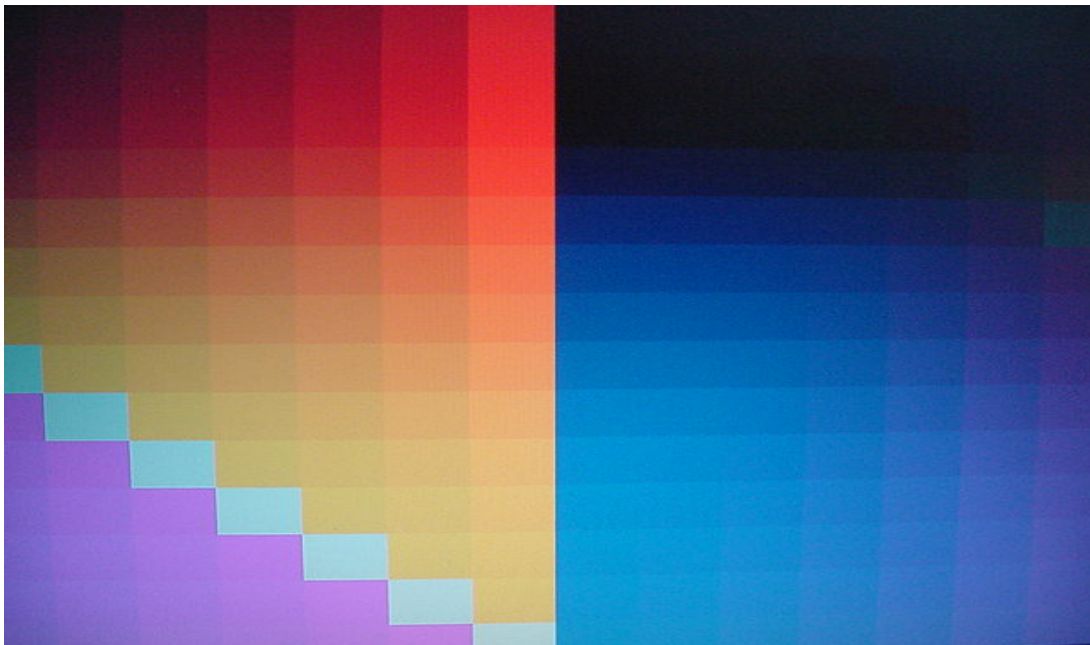
3.12 Magnetic Switch Test

The lid switch test checks the lid function of the unit. When LCD cover closed, the lid should enable to turn off the display.

NOTE: *Remember to tune up the volume as "**Maximum**" before this test starts.*

Follow below steps to run this test:

1. Close the LCD cover.

2. Heard 3 "Beep" sound happened during LCD closed.

3. Open the LCD.

Then it will indicate whether the test is passed or failed.

```
Compal Lid switch test program Ver 1.01
    Please Close LCD Panel to Test Magnetic OR Press Ctrl+Q to quit the test!
```

3.13 LAN Test

The LAN test checks the LAN full-duplex environment.

> *NOTE: LAN loopback needs to plug in before test begins.*

And LAN information will show on the test screen:

- ◆ IO Base – Port: A000H

- ◆ IRQ – BH, it's "IRQ 10".

- ◆ Node – it is "MAC Address".

- ◆ Line Frame – 1514 Bytes.

- ◆ Line Speed – 100Mbps or 10 Mbps.

- ◆ Bus ID – it's "4".

The LAN test includes three subtests of the:

1. Speed1000

2. Speed100

3. Speed10

The subtests run automatically.

```
===== LAN TEST =====


1.Please plug-in the Loopback into LAN port.
2.Please see test result in middle of display.
  (Pass: ooo , Fail: xxx )

Press any key to continue . . .
```

The screen should display as below, indicating whether the subtests pass or fail when finished.

```
        Test PCI-E Family LAN product Tools / Client 1.00 Test Version
IOBASE = 4000H IRQ =  B H Node:0016D4123456          100M:   3K  10M:     1K
   VID =10ECH SID =8136H      SVID =1179H SSID =FF00H

 Open Your PCIE.CFG in this machine!
   Test Item              Result(Pass/Fail)      Return code


1.PG8136=false          none
2.Reg_R/W=true          Pass
3.Speed1000=true        none
4.Speed100=true         testing
5.Speed10=true          testing
6.Debug=false
7.LoopCount= 1




                                         Press 'ESC' key to exit .......
```

If an error is detected and a test fails, the following message displays:
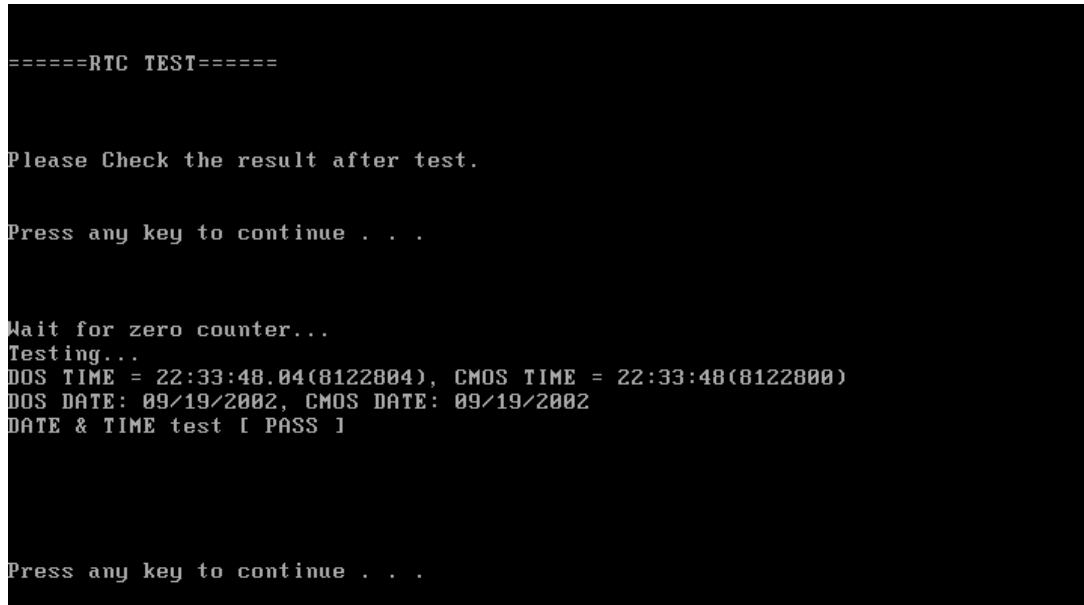
3.14 RTC Test

Checks the computer's RTC (Real Time Clock) and calendar functions by comparing the DOS and CMOS values.

The test runs automatically.

The screen should display as below, indicating whether the test is passed or failed when finished.

```
======RTC TEST======


Please Check the result after test.


Press any key to continue . . .



Wait for zero counter...
Testing...
DOS TIME = 22:33:48.04(8122804), CMOS TIME = 22:33:48(8122800)
DOS DATE: 09/19/2002, CMOS DATE: 09/19/2002
DATE & TIME test [ PASS ]



Press any key to continue . . .
```
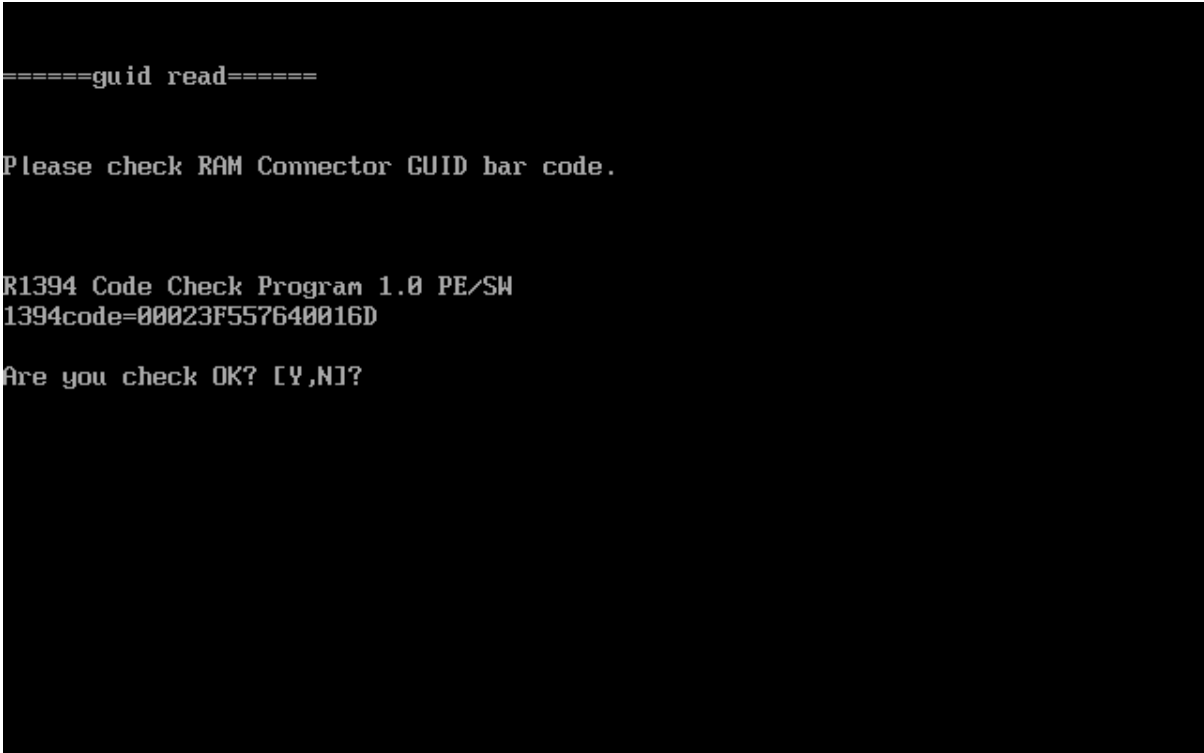
3.15 Read 1394 GUID

This test will check if the computer's EEPROM 1394GUID code is correct.

NOTE: Must open the RAM Door to see RAM connector GUID bar code before test item begins.

The figure below will be displayed:

```
======guid read======


Please check RAM Connector GUID bar code.



R1394 Code Check Program 1.0 PE/SW
1394code=00023F557640016D

Are you check OK? [Y,N]?
```

3.16 Speaker EQ Type Check&Re-Write
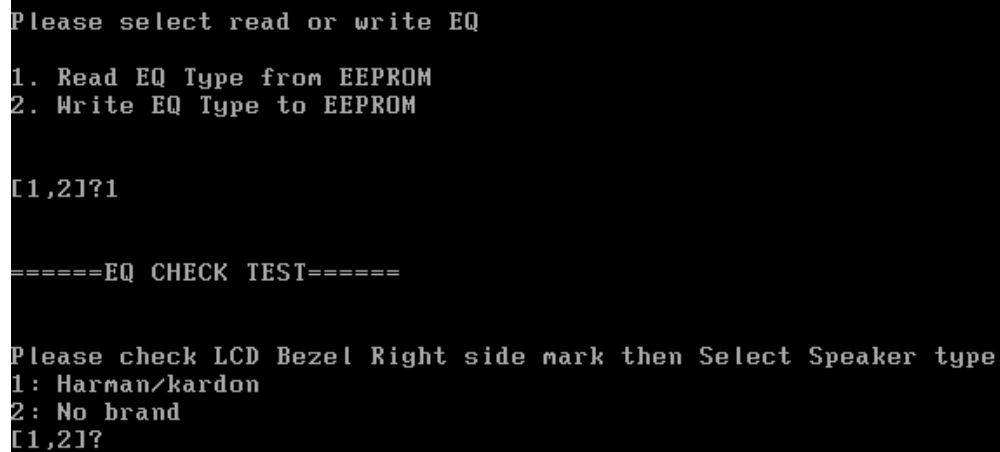
This test will check if the computer's EEPROM EQ type is correct.

The EQ Type test includes two subtests of the:

      1.   Read EQ Type from EEPROM

      2.   Re-Write EQ Type to EEPROM

NOTE: To execute this test, you must select speaker type (Harman or No brand).

The figure below will be displayed:

```
Please select read or write EQ

1. Read EQ Type from EEPROM
2. Write EQ Type to EEPROM


[1,2]?1


======EQ CHECK TEST======


Please check LCD Bezel Right side mark then Select Speaker type
1: Harman/kardon
2: No brand
[1,2]?
```

3.17 Button Test

The control button test allows the user to manually test each of the five CD control buttons.

Key "WWW" need to press first. One will hear one "bi" sound when press"WWW" or "Audio" Sound and continuously "bi" sound for another key test.

The figure below will be displayed:

Press each of the buttons on the front panel in turn. A yellow bar will appear on the relevant section of the figure if the button passes the test.

Press **Ctrl +C** to quit the test.

3.18 Fingerprint DOS Test

This test will check if the computer's Fingerprint function is OK.

NOTE: Execution of this test destroys fingerprint data

The subtests run step by step: (As below)

Step1. Need you swipe your finger to enroll

Step2. Need you swipe your finger 2nd time to enroll.

Step3. Need you swipe your finger 3rd time to enroll.
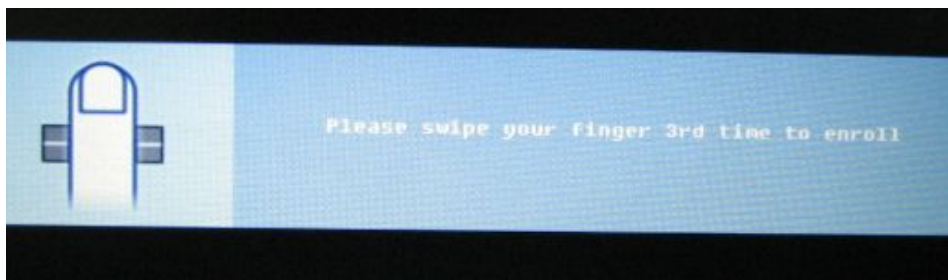
Step4. The test program auto compare 1st, 2nd and 3rd finger then to enroll.
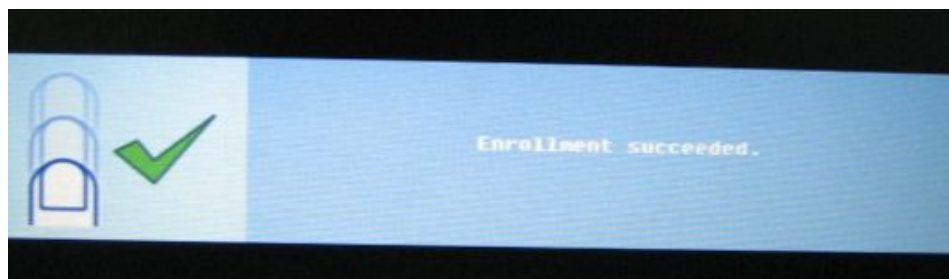
Step5. Need you swipe your finger then test program will verify it.

Step6. Verify pass,
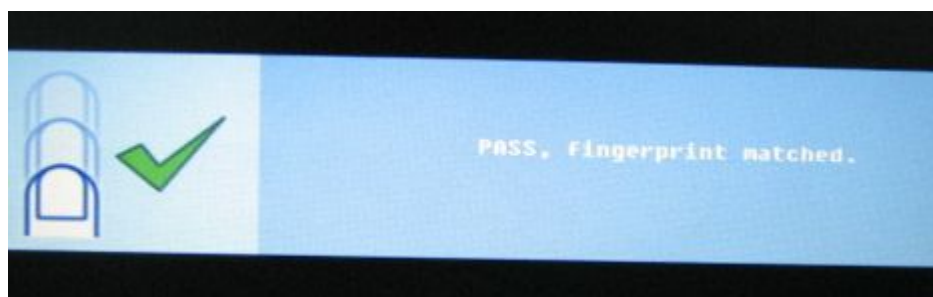
Step7. Need you select your test result to show "PASS" or "Fail".
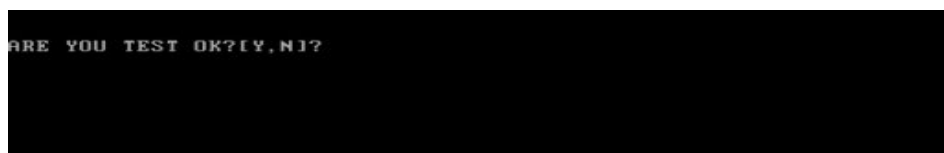
3.19 Clear Fingerprint Registered

NOTE: Execution of this test destroys fingerprint data

Working Instruction:

Run command - " HWTEST 0 29 3 1 -C " to clear all information in TBX module

The subtests run step by step: (As below)

Step1:

```
======Clear Fingerprint Registered ======


Are YOU Clear Fingerprint Registered?[Y,N]?
```

Step2: Display **Notice** for clear registered.

```
1. RUN This tools at first.
2. Reboot system to enter Windowns mode.
3. Remove "Protector Suite QL"(include user data), If you had installed.
4. Clear Fingerprint Registered completely.

Press any key to continue . . .
```

Step3: below information was the utility auto run.

```
C:\>hwtest 0 29 3 1
Bus 0 Device 29 function 3 port 1
Sensor Info:
    FwVersion:              0x04020016.
    FwMinNextVersion:       0x04020016.
    FwVariant:              0x20000003.
    FwFunctionality:        0x0003006F.
    FwConfig:               0x00030018.
    Id:                     0x00000000.
    AuthentifyID:           0x00000005.
    CompanionVendorCode:    0x00020001.
    SystemID:               0x00030003.
    SystemName:             Toshiba  C&D.

main return: 0
```

Step4: Must to reboot system to make the setting effective.

```
**** You must reboot system to make the setting effective ****
**** You must remove FDD before the system reboot        ****

ARE YOU reboot system?[Y,N]?
```

Step5: If you choice "Y", the system will reboot.

If you choice "N", the system will show Notice again (see be photo). You can press any key to go back test MEMU list.

```
**** You must reboot system to make the setting effective ****
**** You must inset T&D disk1 to FDD before the system reboot ****

Press any key to continue . . .
```

3.20 1st HDD Test

The HDD test allows the user to verify the 1st HDD ok or not. For data security concern, it is necessary to input password - "**hard disk**" before HDD test starts.

After the choice HDD test, Screen would display as below:

```
*****************************************************
**************** Password verify ****************
*****************************************************
Please input password :
```

If input password is Right, the screen would display as below:

```
 Input password is Right
 Press any key to Test HDD function

Press any key to continue . . .
```

Press any key to test HDD function, the screen would display as below:

```
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=156301488
LBA Mode Sizes   =80026 MB
LBA Verify Sectors:
 H:252
 S:62
 C:9722
 LBA Sec. Verify:156199867
ARE YOU TEST OK?[Y,N]?
```

If input password is wrong, the screen would display as below:

```
  Input Password is wrong

ARE YOU INPUT PASSWORD AGAIN?[Y,N]?
```

The screen will display as below picture to show the subtest is passed or failed when finished:

 If it is show the picture as below, it means HDD function is OK

```
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=156301488
LBA Mode Sizes  =80026 MB
LBA Verify Sectors:
 H:252
 S:62
 C:9722
 LBA Sec. Verify:156199867
ARE YOU TEST OK?[Y,N]?
```

If the picture shows as below, it means he HDD function is NG

```
 Error ! Can't use Enhanced Disk Drive Support Function

ARE YOU TEST OK?[Y,N]?
```

3.21 2nd HDD Test

The HDD test allows the user to verify the 2nd HDD ok or not. For data security concern, it is necessary to input password - "**hard disk**" before HDD test starts.

After the choice HDD test, Screen would display as below:

```
****************************************************
**************** Password verify ****************
****************************************************
Please input password :
```

If input password is Right, the screen would display as below:

```
 Input password is Right
 Press any key to Test HDD function


Press any key to continue . . .
```

Press any key to test HDD function, the screen would display as below:

```
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=156301488
LBA Mode Sizes  =80026 MB
LBA Verify Sectors:
 H:252
 S:62
 C:9722
 LBA Sec. Verify:156199867
ARE YOU TEST OK?[Y,N]?
```

If input password is wrong, the screen would display as below:

```
  Input Password is wrong

ARE YOU INPUT PASSWORD AGAIN?[Y,N]?
```

The screen will display as below picture to show the subtest is passed or failed when finished:

 If it is show the picture as below, it means HDD function is OK

```
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=156301488
LBA Mode Sizes   =80026 MB
LBA Verify Sectors:
 H:252
 S:62
 C:9722
 LBA Sec. Verify:156199867
ARE YOU TEST OK?[Y,N]?
```

If the picture shows as below, it means he HDD function is NG

```
 Error ! Can't use Enhanced Disk Drive Support Function

ARE YOU TEST OK?[Y,N]?
```

NOTE: *The AC adaptor should be connected to successfully run this test.*

Chapter 4

Replacement Procedures

Chapter 4 Contents

Figures

4.1   General

This chapter 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 or memory card, and then follow the chart downward removing only those FRUs necessary to reach the one you think is causing the computer to operate abnormally. Refer to the example on the following page.

PC card							
Battery							
HDD	Expension Memory Module	ODD	Wireless LAN			Keyboard	
			Modem Card			Display assembly	
Top Cover						Display Mask	
Finger Print Module	Touch Pad	Bluetooth Module	Speakers	USB Board	Direct Play Button Module	System Board	
						Fan and Heat sink	VGA Module	FL Inverter Board
						CPU	LCD Module

The example below shows FRUs to be removed before the CPU can be removed. The CPU is located on the system board, under the VGA module. The system board itself is located under the top cover. The keyboard is on top of the top cover, along with the Bluetooth module, Memory module, and the Direct Play Button Module and must be removed. The HDD, wireless LAN card, expansion memory module, ODD, modem, and display assembly in turn need to be removed. Always start the disassembly process by removing the battery pack and optional devices and then move downwards through the table to access the required component.

PC card							
Battery							
HDD	Expension Memory Module	ODD	Wireless LAN			Keyboard	
			Modem Card			Display assembly	
Top Cover						Display Mask	
Finger Print Module	Touch Pad	Bluetooth Module	Speakers	USB Board	Direct Play Button Module	System Board	
						Fan and Heat sink	VGA Module	FL Inverter Board
						CPU	LCD Module

Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

DANGER:

1.   Always use the lithium ion battery pack or a backup battery that is authorized by Toshiba or is compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode. Heating or disassembling the battery pack could cause leakage of alkaline solution. Throwing the battery pack into a fire could cause the battery pack to explode.

2.   The power supply, FL inverter and other components carry high voltages. To avoid the risk of electric shock when 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. Also, do not disassemble individual components for first-level maintenance.

WARNING: To avoid the risk of electric shock or other injury:

1.   Always turn the power off and disconnect the AC adapter from the power source.

2.   Remove any metal jewelry or accessories such as watches, necklaces, bracelets, or rings. Batteries in the computer retain an electrical charge so there is a danger of electrical shock even when the computer is disconnected from an AC power source.

3.   Never work with wet or damp hands.

4.   The computer contains sharp edges and corners. Be careful not to injure yourself.

5.   Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened.

CAUTION: To avoid damage to the computer:

1.   When you change a component, make sure that the replacement component meets the required specifications. Never use foreign or incompatible parts.

2.   Metal objects such as screws or paper clips which fall into the unit can cause a short-circuit, fire, or other internal damage.

3.   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 figure. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke, or fire.

4.   Before removing an FRU or other component, make sure all connected cables to the component have been disconnected.

5.   If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.

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 adaptor and the battery pack as instructed in section 4.2.

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 contaminants

   ❑   Static electricity

   ❑   Extreme heat, cold and humidity

4.   Make sure the FRU you are replacing is causing the fault by performing the necessary troubleshooting and diagnostics tests described in chapters 2 and 3 of this manual.

5.   Do not perform any operations that are unnecessary 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. 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 a 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

❑   Standard 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.

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 assemble the computer in a hurry.

❑   Make sure all cables and connectors are securely fastened.

❑   Before securing the FRU or other parts, make sure that no cables are pinched by screws or the FRUs.

❑   Check that all latches are closed securely.

❑   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 Phillips screwdriver to remove and replace screws.

❑   One T5 security 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.

❑   ESD wrist strap or heel grounder.

❑   Anti-static carpeting or flooring.

❑   Air-ionizers in highly static sensitive areas.

4.2 Battery

Removing the Battery Pack

To remove the battery pack from the battery bay, follow these steps:

1. Turn the computer upside down.

2. Unlock the battery compartment lock.
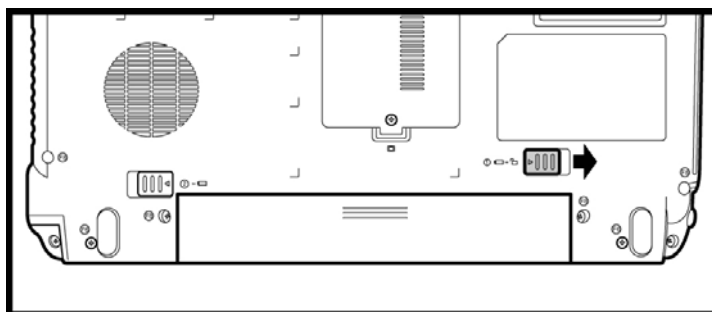
Figure 4-1   Unlocking the battery lock

3. Slide the battery bay latch to release the battery pack and then remove the battery pack from the bay.
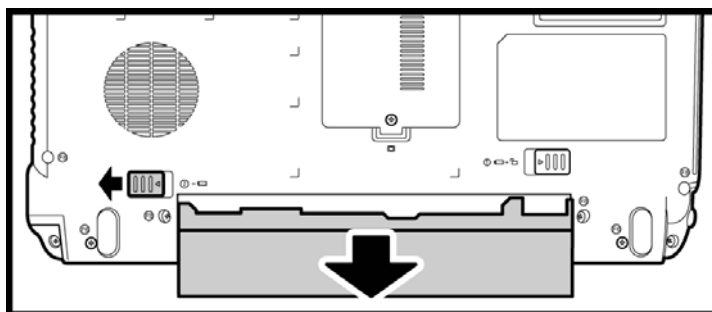
Figure 4-2   Removing the battery pack

NOTE: For environmental reasons, do not throw away a spent battery pack. Please return spent battery packs to Toshiba.

Installing the Battery Pack

To install the battery pack in the battery bay, follow these steps and refer to the figures in the preceding section.

> *WARNING:* *The battery is a lithium ion battery and can explode if not properly replaced, used, handled or disposed of. Use only batteries recommended by Toshiba as replacements.*

1.   Slide the battery pack into the battery bay. The battery bay latch will click automatically.

2.   Lock the battery double lock to secure the battery pack in position.

4.3   PC Card

Removing a PC Card

To remove a PC card, follow the steps below:

1. Push the PC card's eject button. The button pops out when you release it.

2. Push the eject button again to pop the PC card out slightly.

3. Grasp the PC card and pull it out from the slot.
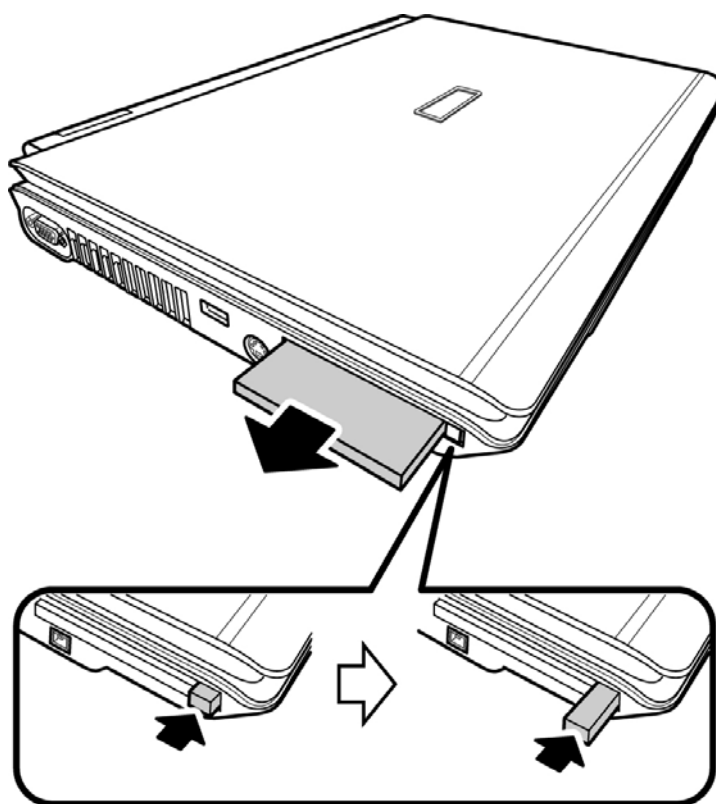
Figure 4-3   Removing the PC card

4. Press the eject button back into place, if necessary.

Inserting the PC Card

To insert a PC card, follow the steps below:

1. Make sure the eject button does not stick out. Push it back into place if required.

2. Insert the PC card in the slot and gently press to ensure a firm connection.
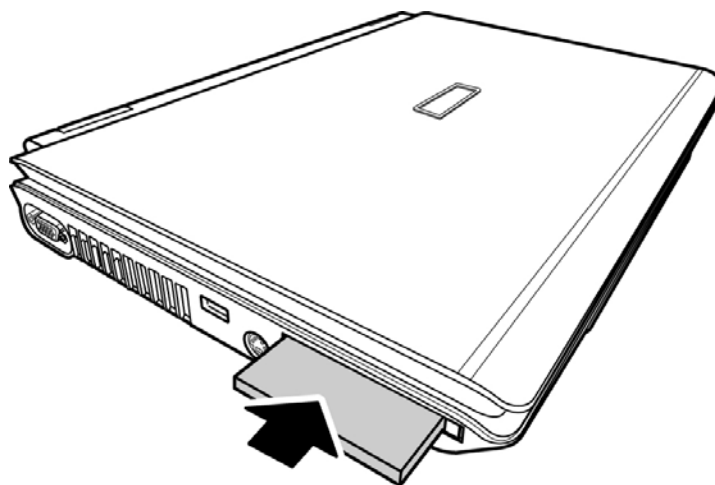
Figure 4-4   Installing the PC card

4.4   Memory Card

Removing a Memory Card

To remove a memory card, follow the steps below:

1. Press the memory card gently into the socket until it pops out.
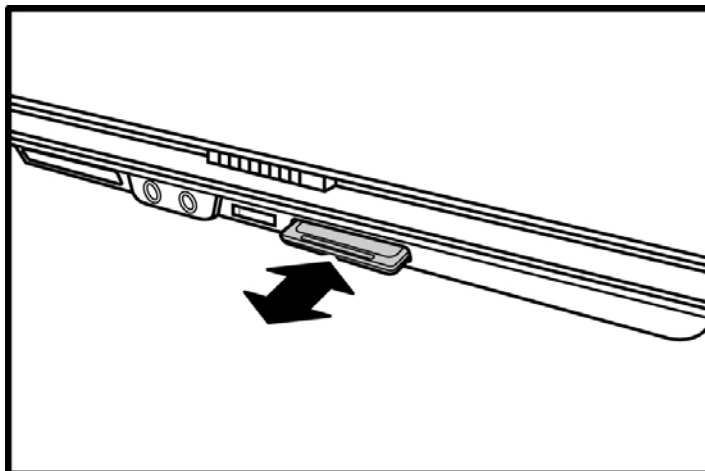
Figure 4-5   Pressing the memory card

2. Grasp the memory and remove it.
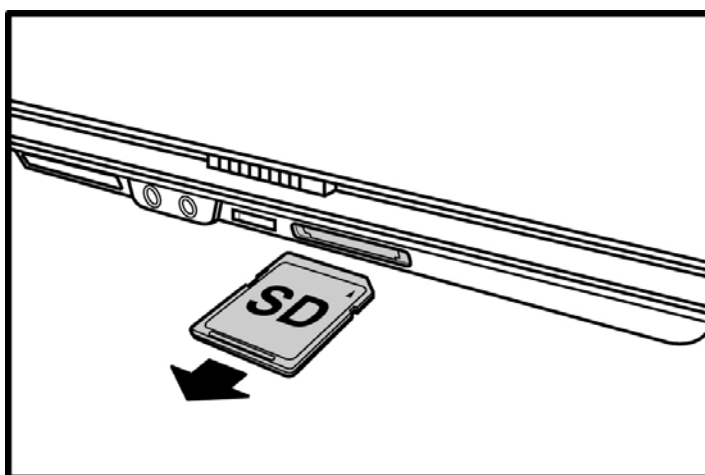
Figure 4-6   Removing the memory card

Inserting the Memory Card

To insert a memory card, follow the steps below:

1. Insert the memory card in the slot and gently press to ensure a firm connection.
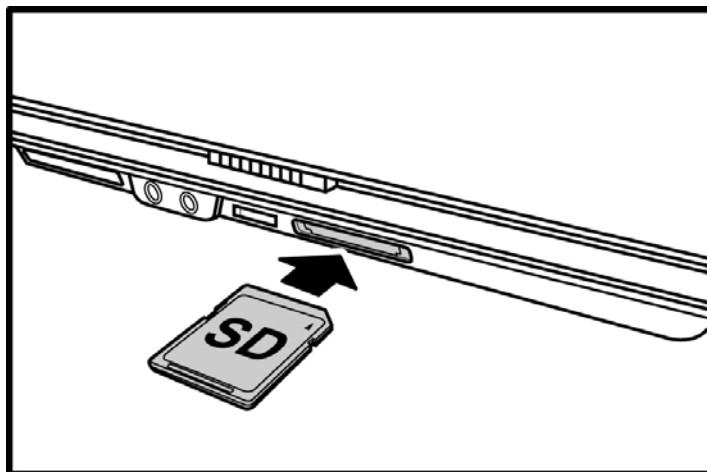
Figure 4-7   Installing the memory card

4.5   HDD

CAUTION: When handling the HDD, do not press the top surface. Hold the disk by the sides to prevent damage and loss of data.
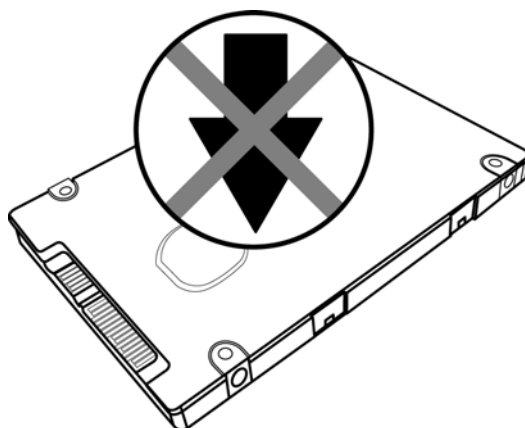
Figure 4-8   HDD

Removing the Main HDD Modules

The Dual HDD feature make it easy to handle demanding applications while running background applications such as system backup and virus scans.

Follow the steps below to remove Main HDD module:

1.   Turn the computer upside down.

2.   Release the two black M2.5x3 screws to release the main HDD door.
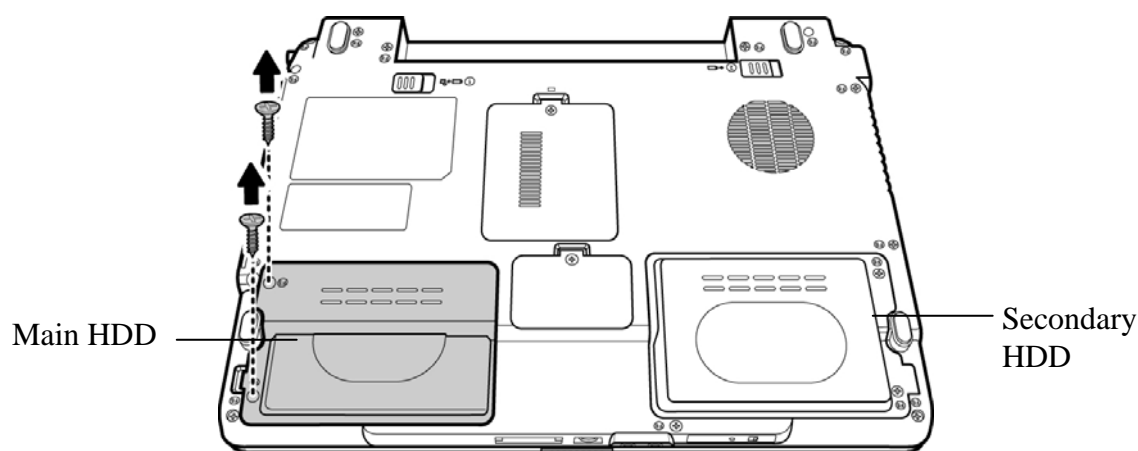
Figure 4-9   Releasing the main HDD door screw

3. Pull up and lift the HDD door to remove it.
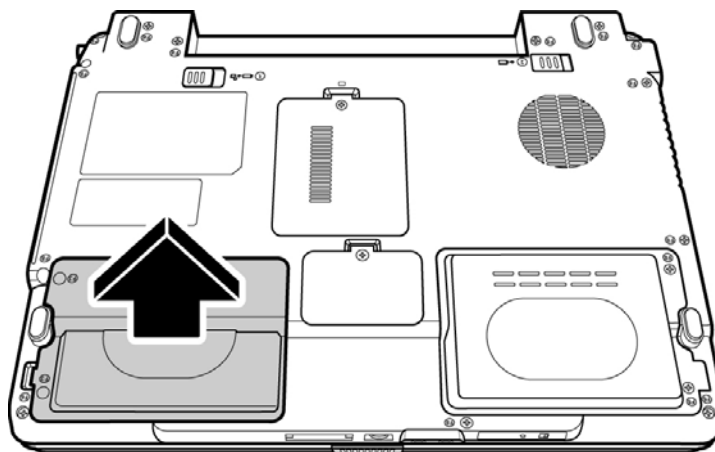
Figure 4-10   Removing the main HDD door

4. Pull out the black Mylar tab to remove the HDD unit.
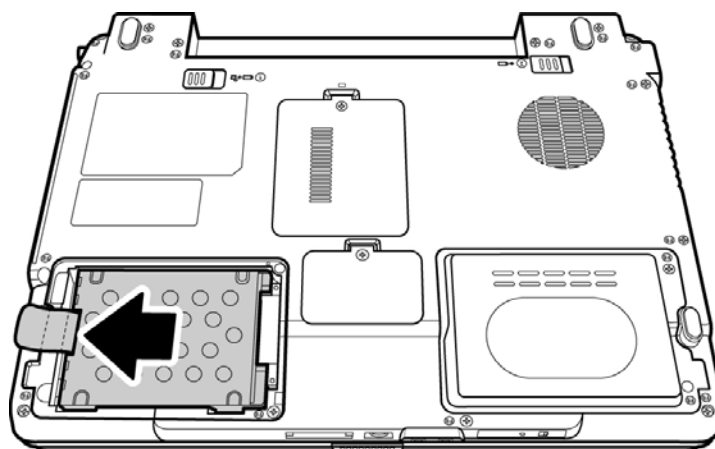
Figure 4-11   Removing the main HDD

5. Remove the HDD from the HDD case.

6. Pull the HDD outwards and remove the four M3x3 silver screws that secure the HDD case and bracket to the HDD.
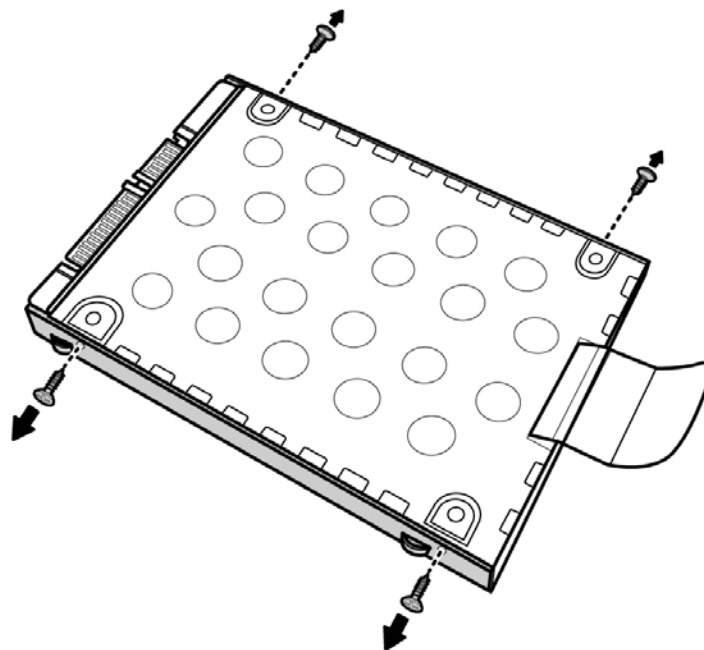
Figure 4-12   Removing the HDD screws from bracket

Removing the Second HDD

Follow the steps below to remove Main HDD module:

1. Turn the computer upside down.

2. Release the two black M2.5x3 screws to release the secondary HDD door.
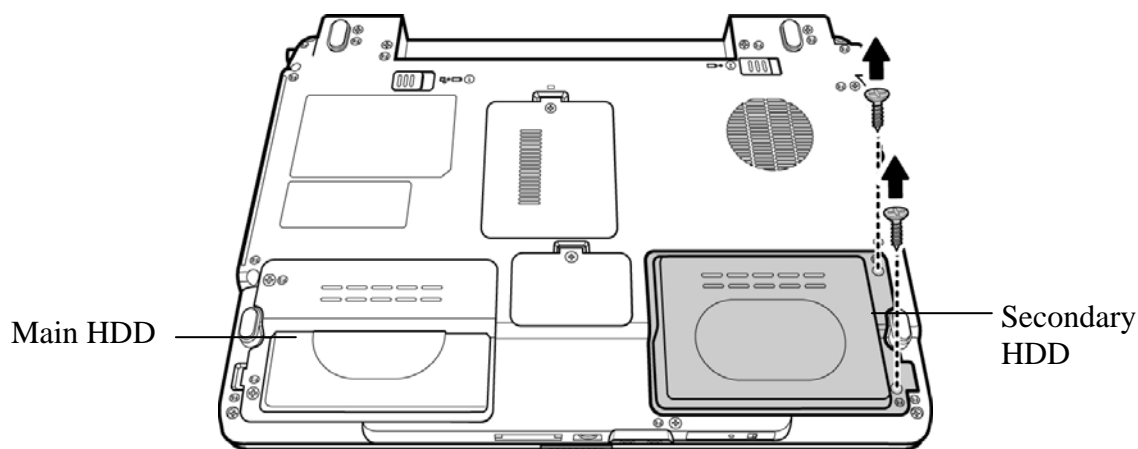
Figure 4-13   Releasing the secondary HDD door screw

3. Pull up and lift the HDD door to remove it.
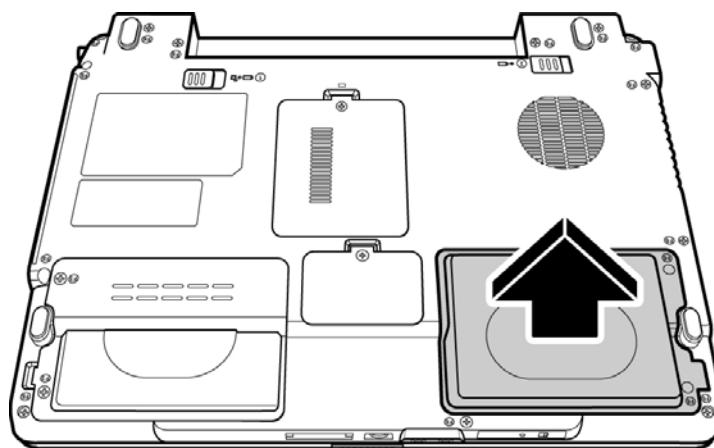
Figure 4-14   Removing the secondary HDD door

4. Pull out the black Mylar tab to remove the HDD unit.
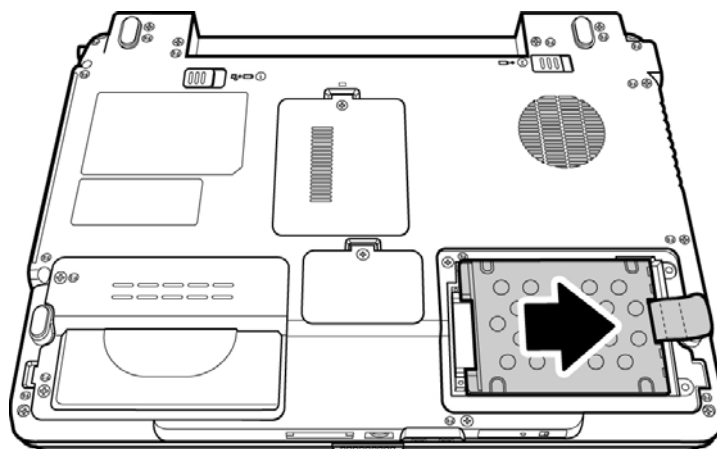
Figure 4-15   Removing the secondary HDD

5. Remove the HDD from the HDD case.

Installing the Main HDD

To install the main HDD, follow these steps and refer to the figures in the preceding section.

1. Seat the HDD in the HDD case and bracket, and secure it with four M3×3 silver screws.

2. Insert the HDD unit into the HDD slot.

3. Secure the HDD door with two black M2.5x3 screws.

Installing the Secondary HDD

To install the secondary HDD, follow these steps and refer to the figures in the preceding section.

1. Seat the secondary HDD in the HDD case and bracket, and secure it with four M3×3 silver screws.

2. Insert the secondary HDD unit into the HDD slot on the right.

3. Secure the HDD door with two black M2.5x3 screws.

4.6   Expansion Memory

Removing the Expansion Memory Modules

To remove the memory module, make sure the computer is in boot mode before removing the memory module. Remove the battery pack, cables and any optional devices before you start and then follow these steps:

1.   Release the black non-separate screw M2.5x5.4 screws securing the memory module socket cover.
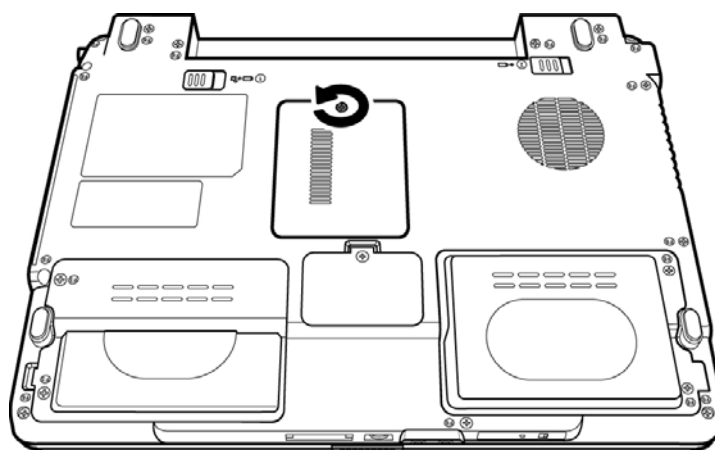
Figure 4-16   Releasing the cover screw

2.   Slide your fingernail or a thin object under the cover and lift it off.
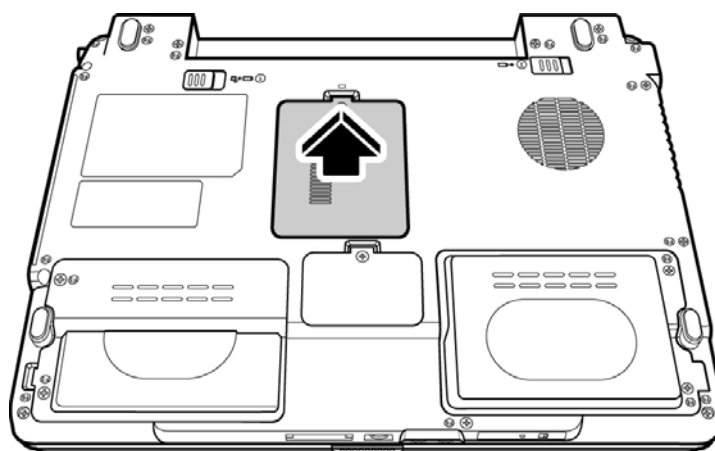
Figure 4-17   Removing the expansion memory module cover

3.   Push the latches to release the memory module. A spring will force one end of the module up.
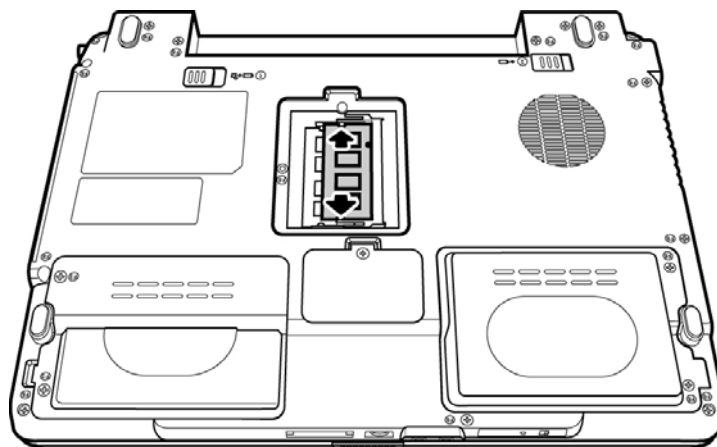
Figure 4-18   Releasing the memory module

4.   Grasp the module and pull it out.
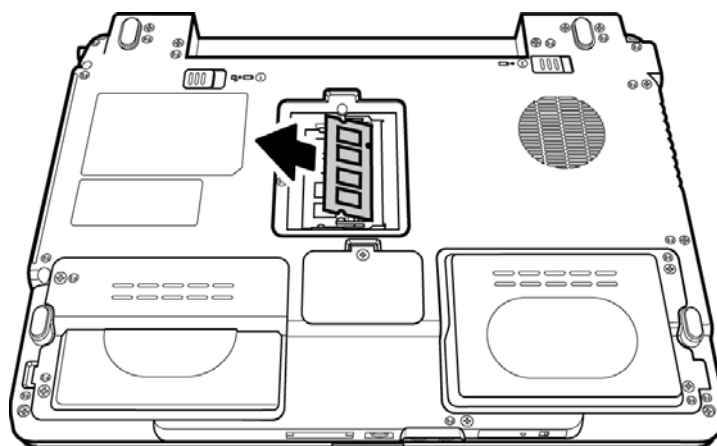
Figure 4-19   Removing the expansion memory module

5.   Repeat steps 3 and 4 to remove the second memory expansion module in the same way.

CAUTION: Do not touch the connectors on the expansion memory module or on the computer. Debris on the connectors may cause memory access problems.

Installing the Expansion Memory Module

CAUTION: Do not touch the connectors on the expansion memory module or on the computer. Debris on the connectors may cause memory access problems.

Follow these steps to install a memory module:

1.   Set the computer to boot mode and turn off the power.

2.   Remove the black non-separate screw with RAM door M2.5x5.4 screw securing the memory module socket cover.

3.   Slide your fingernail or a thin object under the cover and lift it off.

4.   Fit the module's connectors into the computer's connectors at about a 45-degree angle and press the module carefully to ensure a firm connection.

5.   Push the module down so it lies flat. The latches on either side will click into place to secure the module.

4.7   Wireless LAN Unit

Removing the Wireless LAN Unit

Remove the battery and any optional devices before removing the wireless LAN unit as described in the following instructions.

1. Remove the black non-separate M2.5x5.4 screw securing the wireless LAN door.
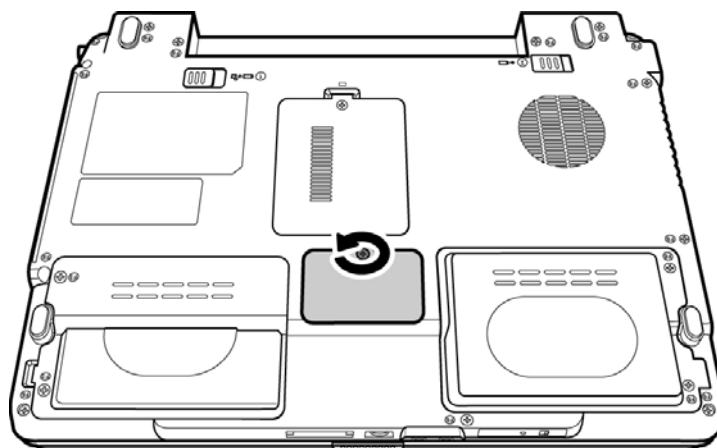
Figure 4-20   Removing the wireless LAN unit screw

2. Remove the wireless LAN door.
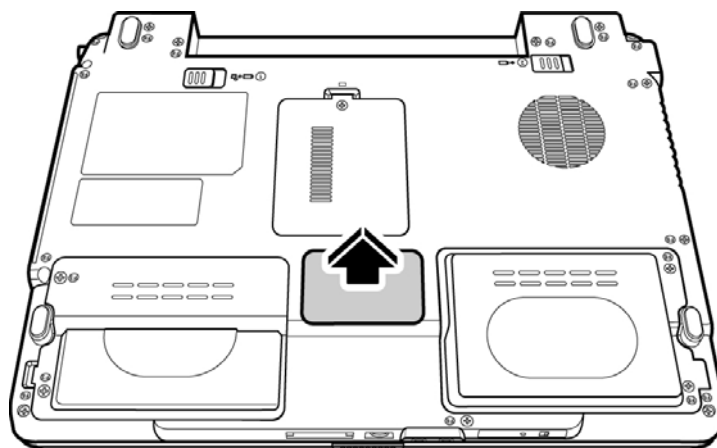
Figure 4-21   Removing the wireless LAN door

3. Remove the wireless LAN module by removing the two M2.5x3 screws connecting it to the system board.
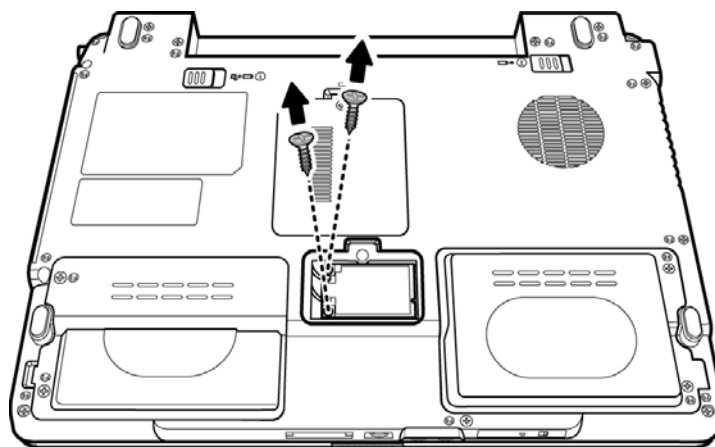
Figure 4-22   Removing the wireless LAN module screws

4. Detach the two ends of the wireless LAN antenna (black and white).
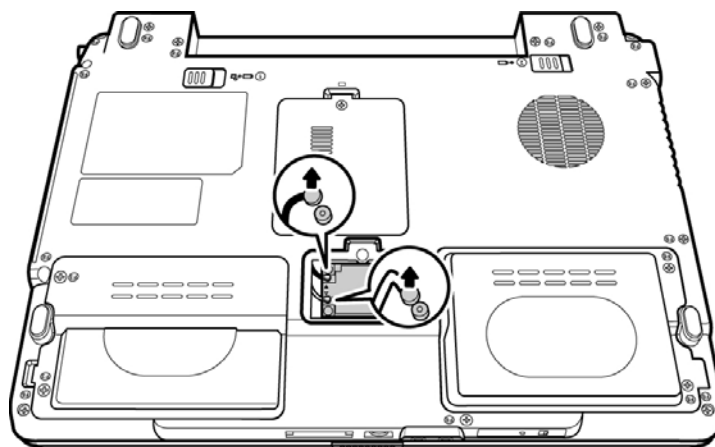
Figure 4-23   Removing the wireless LAN antenna connectors

***NOTE**: The W, B, G markings on logic low indicate white, black, and gray respectively.*

5. Remove the wireless LAN unit.
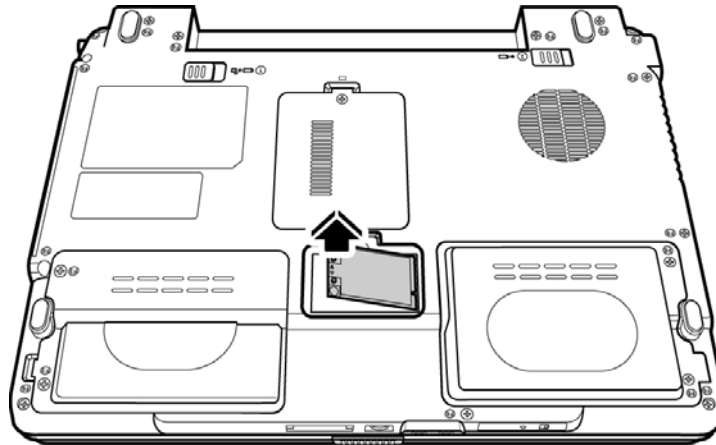
Figure 4-24   Releasing the wireless LAN unit

CAUTION: *Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.*

Installing the Wireless LAN Unit

To install the wireless LAN unit, follow the steps below and refer to the figures in the preceding section.

1. Remove the black non-separate M2.5x5.4 screw securing the wireless LAN door, and then remove the wireless LAN door as described previously.

> *CAUTION: Do not touch the connectors on the wireless LAN unit or on the computer. Debris on the connectors may cause malfunction.*

2. Place the wireless LAN unit in the wireless LAN holder and gently press down.

3. Secure the wireless LAN module to the system board with two M2.5x3 screws.

4. Attach the white antenna to the main connector, and the black antenna to the Aux connector.

5. Use the black non-separate M2.5x5.4 screw to secure the wireless LAN door.

4.8 Modem

Removing the Modem

Remove the battery and any optional devices before removing the modem as described in the following instructions:

1. After removing the WLAN card as described in the previous section, release the two M2.5x3 screws securing the modem module.
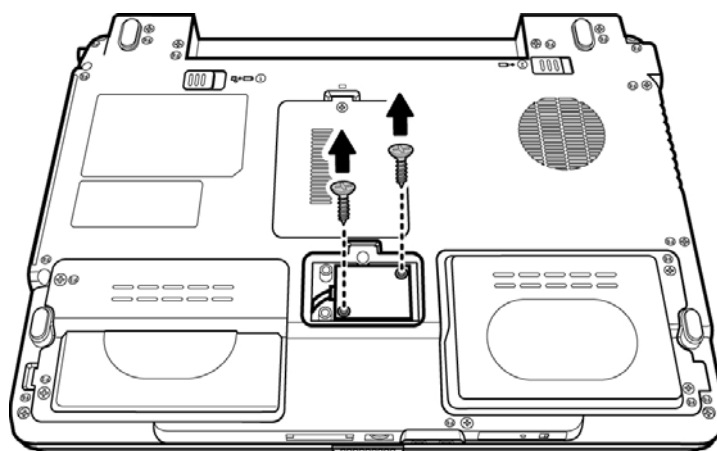
Figure 4-25   Removing the modem module screws

2. Disconnect the modem connector from the modem module.
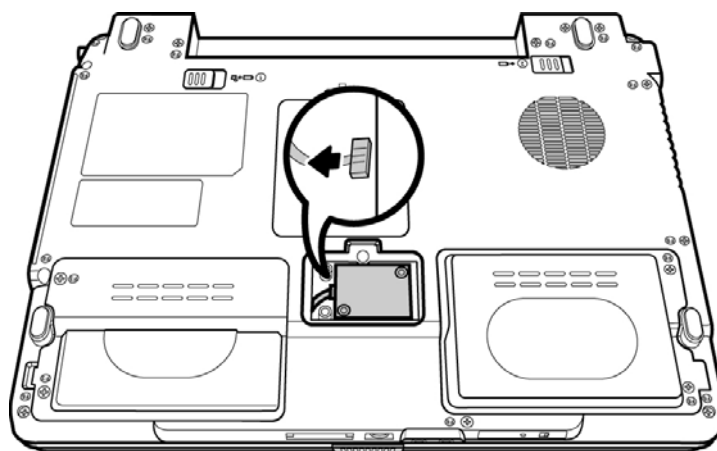
Figure 4-26   Removing the modem connector

3. Carefully lift the unit from its connector.
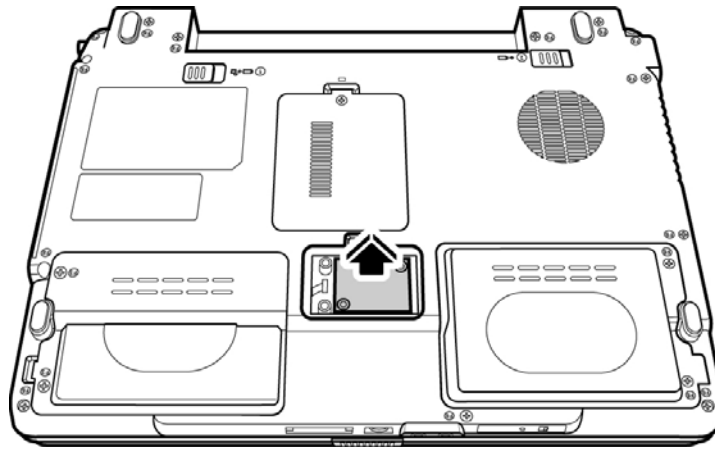
Figure 4-27   Removing the modem module

Installing the Modem

To install a modem, follow the steps below and refer to the figures in the preceding section.

1. Connect the modem connector on the system board to the modem module.

2. Fit the modem onto its connector and secure it with two black M2.5x3 screws.

3. Install the wireless LAN card on top of modem and then replace the M2.5x5.4 screw to fix the WLAN cover.

4.9   Optical Drive Module

Removing the Optical Drive Module

To remove the optical drive module, you need to remove the expansion memory module cover first as described in the previous section. Follow the steps below:

1.   Turn the computer upside down.

2.   Remove the battery and the expansion memory module cover.

3.   Remove the black M2.5x8 screw securing the optical drive module.
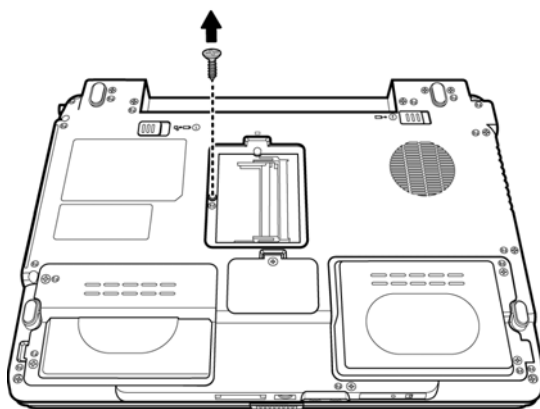
Figure 4-28   Removing the optical drive screw

4.   Use your hand to push the module bracket and then slide the module from the bay.
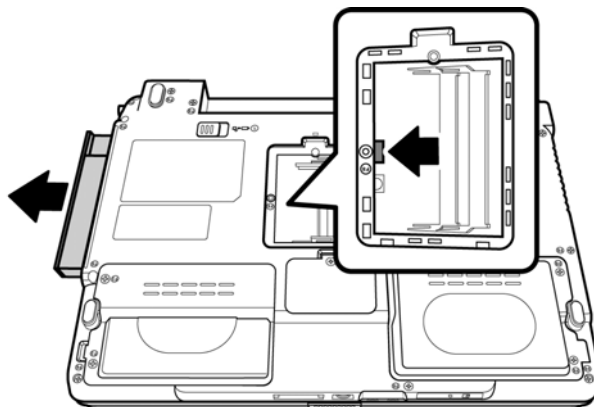
Figure 4-29   Removing the optical drive module

Installing the Optical Drive Module

To install a device in the optical drive module bay, follow the steps below and refer to the figure in the preceding section.

1. Make sure that the expansion memory door is opened and the ODD screw (M2.5x8, black) is removed.

2. Slide the device into the optical drive module bay.

3. Use the black M2.5x8 screw to secure the optical drive module.

4. Install the expansion memory modules as described in the preceding section.

5. Replace the expansion memory module cover.

4.10 Optical Drive

This computer may be fitted with a: DVD-ROM device
                                          CD-RW/DVD-ROM combo device
                                          DVD Super Multi device

Disassembling the Optical Drive

To disassemble the optical drive, first remove the drive from its module bay as described in the previous section.

Next, release the two M2x3 screws from the bracket plate and remove the bracket plate.
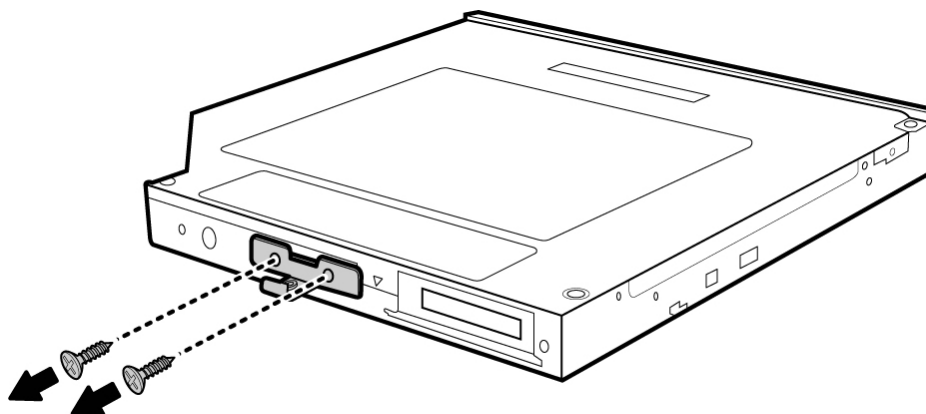
Figure 4-30   Removing the optical drive bracket

NOTE: The small arrow shown on the metal bracket indicates the top side of the optical bracket. Keep this in mind when removing or installing the drive.

Reassembling the Optical Drive

NOTE: *The small arrow shown on the metal bracket indicates the top side of the optical bracket. Keep this in mind when removing or installing the drive.*

To reassemble an optical drive, follow the steps below and refer to the figure in the preceding section.

1. Position the optical drive bracket plate so that it is aligned with the rear panel of optical drive.

2. Secure the optical drive bracket plate with two M2x3 screws.

3. Install the optical drive module into the bay as described in the preceding section.

4.11 Keyboard

Removing the Keyboard

Before removing the keyboard, remove the battery and any optional devices. Follow the steps below to remove the keyboard:

1. Open the display panel.

2. Insert a thin tool such as a flat screwdriver into the gap between the strip cover and keyboard to lever the strip cover up.
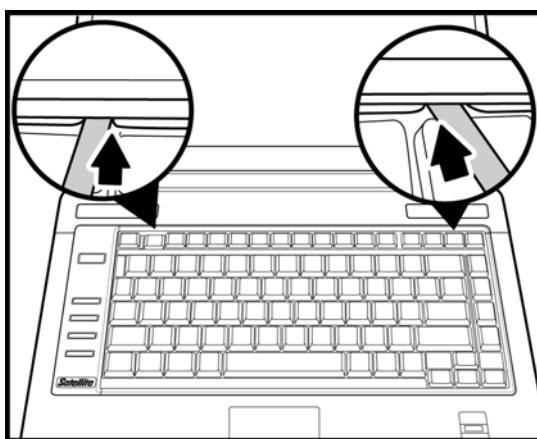
Figure 4-31   Removing the strip cover

NOTE: *The display panel must be fully open in order to remove the strip cover.*

3. Remove the strip cover.
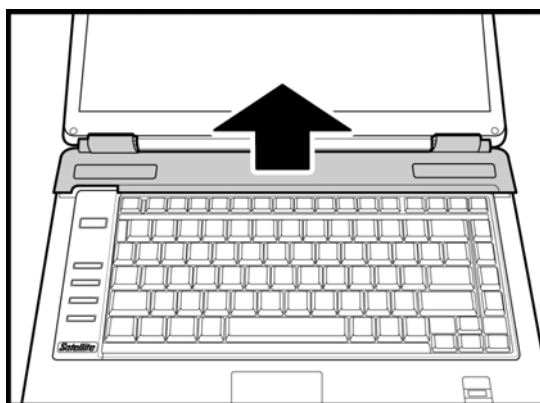
Figure 4-32   Removing the strip cover

4. Remove the two black M2.5x3 black screws securing the keyboard.
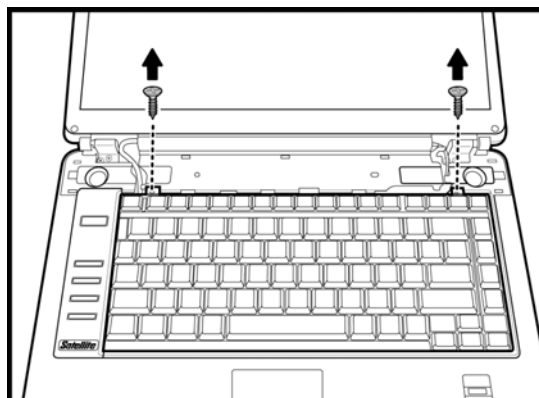
Figure 4-33   Removing the keyboard screws

5. Push the center of the keyboard, press the center tab, and lift the keyboard out, revealing the keyboard cable underneath. Disconnect the keyboard cable from the system board.
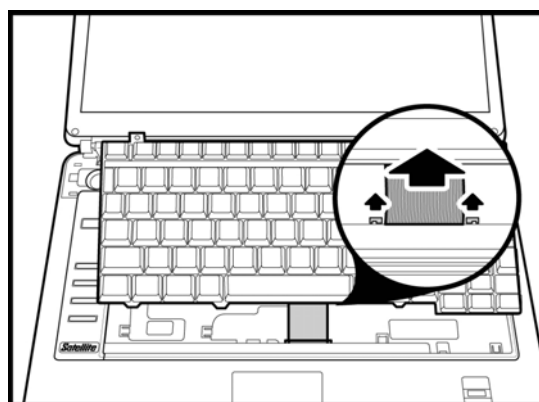
Figure 4-34   Disconnecting the keyboard cable

6. Lift and remove the keyboard.
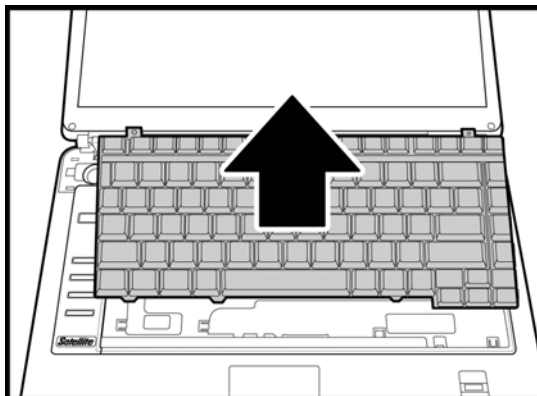
Figure 4-35   Removing the keyboard

Installing the Keyboard

To install the keyboard, follow the steps below and refer to the figures in the preceding section.

1. Connect the keyboard cable to the system board.

2. Place the keyboard on the top cover, insert under the center tab, and secure it with two black M2.5x3 screws.

3. Set the strip cover and press down to secure the strip cover until the latches engage.

4.12 Display Assembly

Removing the Display Assembly

To remove the display assembly, first remove the battery and any optional devices. Also remove the keyboard, and the wireless LAN unit as described in the previous sections. Then follow the steps below:

1. Separate the wireless LAN antenna connectors (black and white) from the top cover and place them on a side out of the way. Also remove the Bluetooth antenna connector (peach) from the module.

2. Disconnect the black LCD power (LVDS) cable, Bluetooth cable, and wireless LAN cable from the system board.
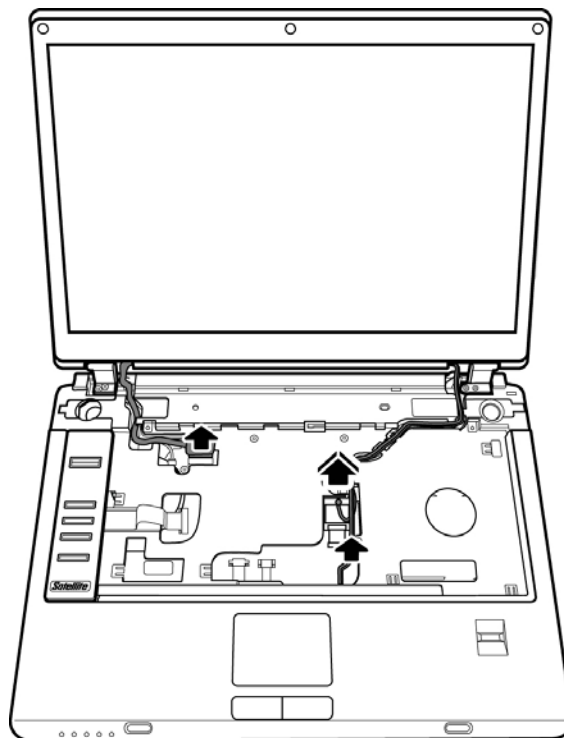
Figure 4-36   Disconnecting cables

3. Remove four M2.5x8 screws securing the LCD assembly to the top cover
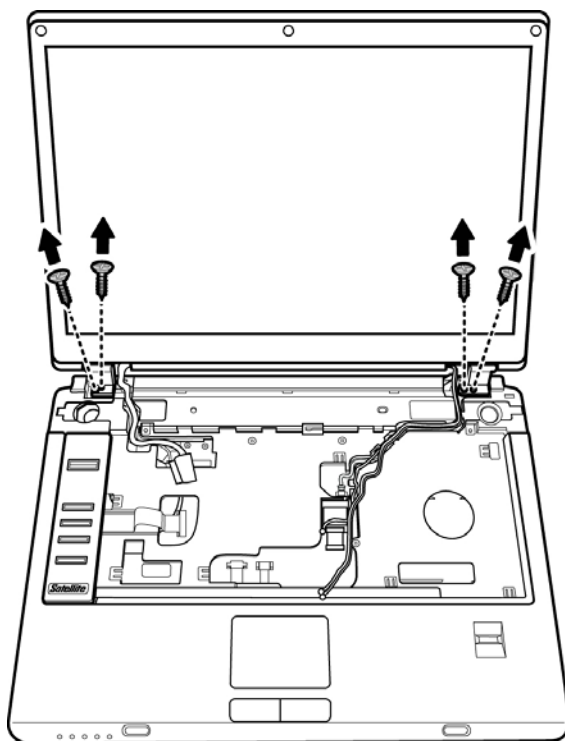
Figure 4-37   Removing the front screws

4. Remove two M2.5x8 black screws securing the LCD assembly from the rear side.
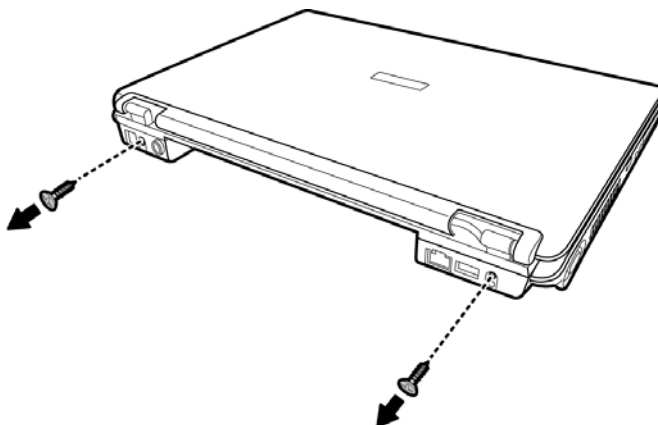
Figure 4-38   Disconnecting the rear screws

5. Remove the LCD assembly.
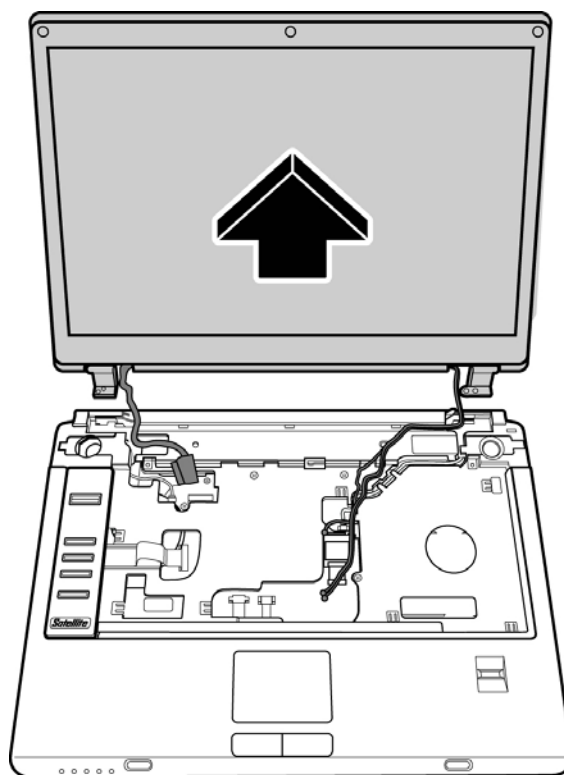
Figure 4-39   Removing the display assembly

Installing the Display Assembly

To install the display assembly, follow the steps below and refer to the figures in the preceding section.

1. Seat the display assembly, taking care not to crush to the LCD display cable, the LCD power cable, the wireless LAN antenna connectors, or the Bluetooth connector.

2. Secure four M2.5x8 black screws to each hinge to connect the assembly to the top cover.

3. Secure two black M2.5x8 black screws to the computer's rear side. They hold the display assembly in place.

4. Feed the wireless LAN module's antenna wires through the indented track on the system board towards the rear side.

5. Connect the Bluetooth connector to the Bluetooth module.

6. Connect the LCD power cable to the top chassis.

7. Reinstall the keyboard and wireless LAN module.

4.13 Display Mask

Removing the Display Mask

To remove the display mask, first remove the display assembly as described earlier, and then follow the steps below:

1. Remove five rubber pads to reveal the five M2.5x6 black screws securing the display mask to the LCD module.
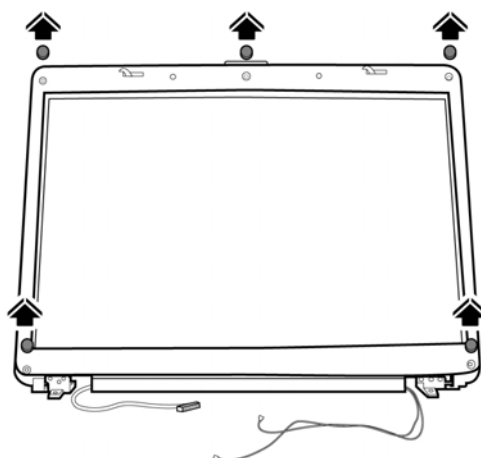
Figure 4-40   Removing the rubber pads

2. Remove the five M2.5x6 black screws securing the display mask.
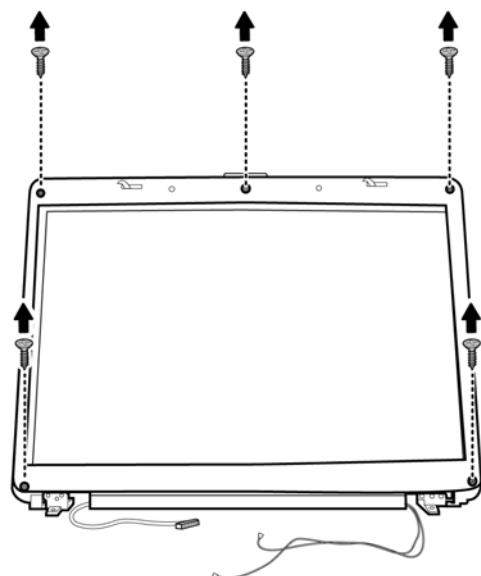
Figure 4-41   Removing the display mask screws

3.   Carefully insert your fingers between the display mask and the LCD panel, and pry open the snaps. Start with the four snaps at the top of the display mask. Continue unsnapping the display mask along the two sides and the bottom edge to remove the display mask.
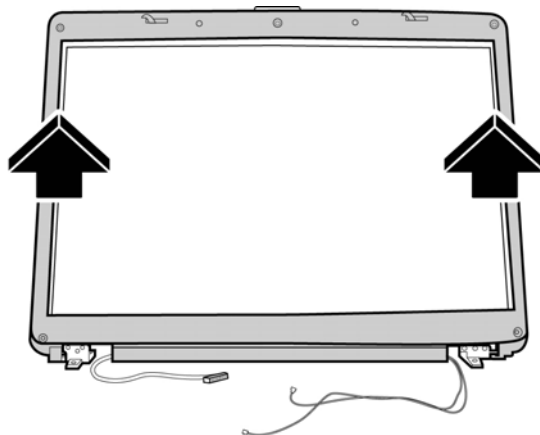
Figure 4-42   Removing the display mask

Installing the Display Mask

To install the display mask, follow the steps below and refer to the figures in the preceding section.

1.   Seat the display mask and secure the snaps on each side.

2.   Secure the display mask with five M2.5x6 screws and then replace the rubber pads on top.

4.14 FL Inverter Board

Removing the FL Inverter Board

To remove the FL inverter board, first remove the battery pack, display assembly, and display mask; then follow the steps below.

1.   Remove the M2x3 black screw securing the FL inverter board to the LCD display assembly.
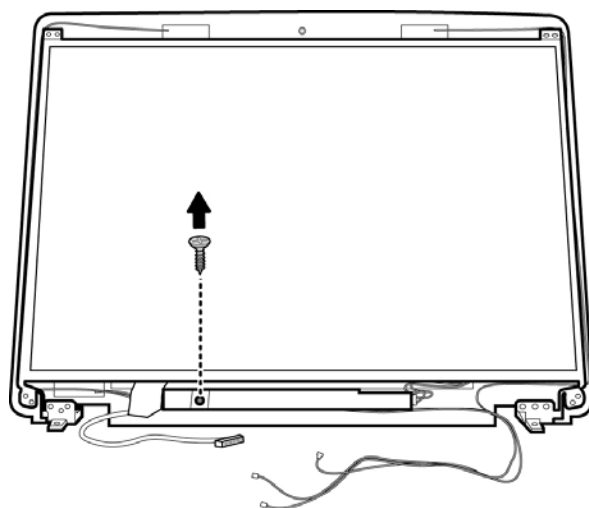
Figure 4-43   Removing the screws

2.   Disconnect the two connectors on either side of the board.
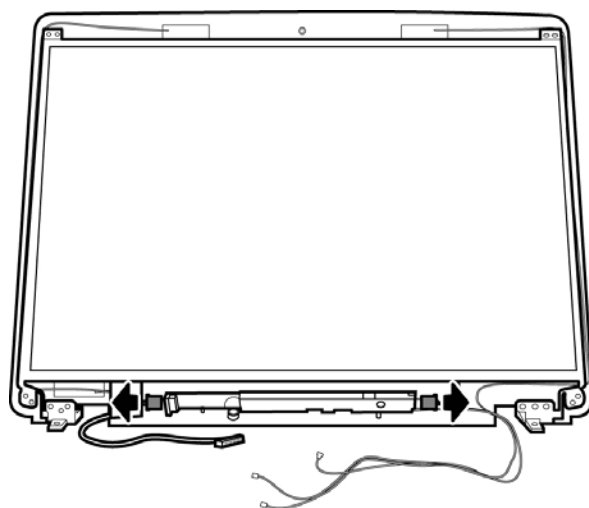
Figure 4-44   Removing the connectors

3.   Remove the FL inverter board.
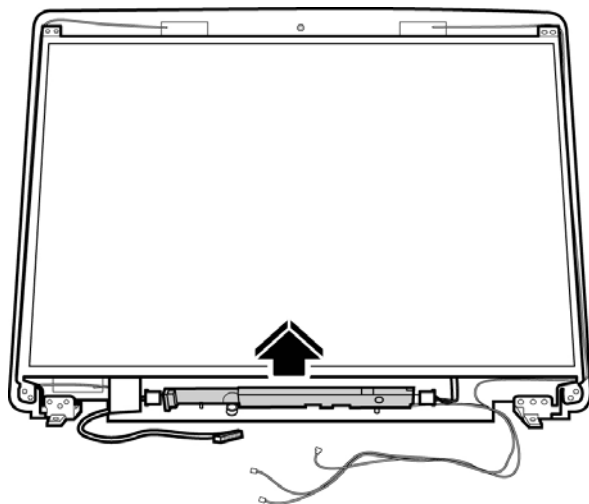
Figure 4-45   Removing the FL inverter board

Installing the FL Inverter Board

To install the FL inverter board, follow the steps below and refer to the figure in the preceding section.

1.   Place the FL inverter board on the LCD module.

2.   Secure one M2x3 black screw connecting the FL inverter board to the LCD display assembly.

3.   Connect the two connectors on either side of the board.

4.15 LCD Module

Removing the LCD Module

To remove the LCD module, first remove the display assembly, display mask, and FL inverter board and then follow the steps below.

1. Lift the LCD module from the top chassis.
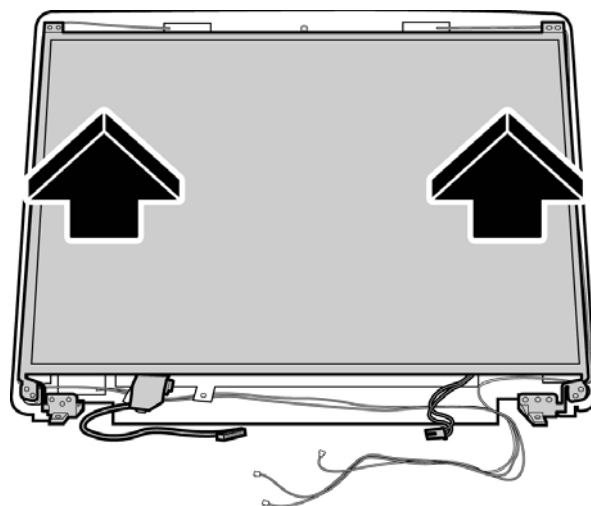
Figure 4-46   Removing the LCD Module

2. Remove six M2x3 screws securing the LCD module bracket to the LCD module.
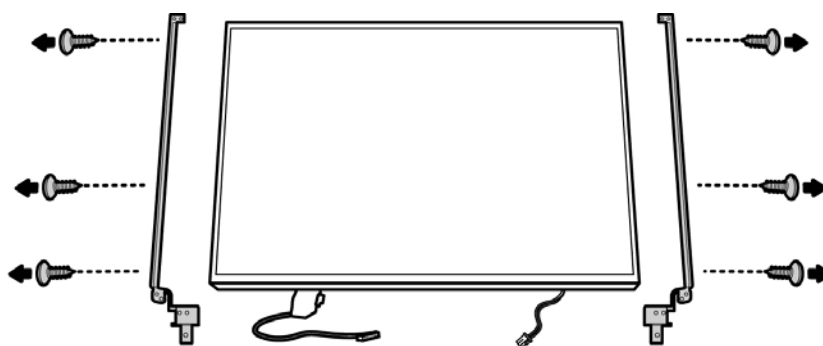
Figure 4-47   Removing the bracket screws

NOTE: If the LCD module malfunctions, remove the LCD cable and LCD bracket. Then replace the whole LCD module unit.

3. Turn over the LCD screen and remove the tape securing the LVDS cable. Detach the LVDS cable.
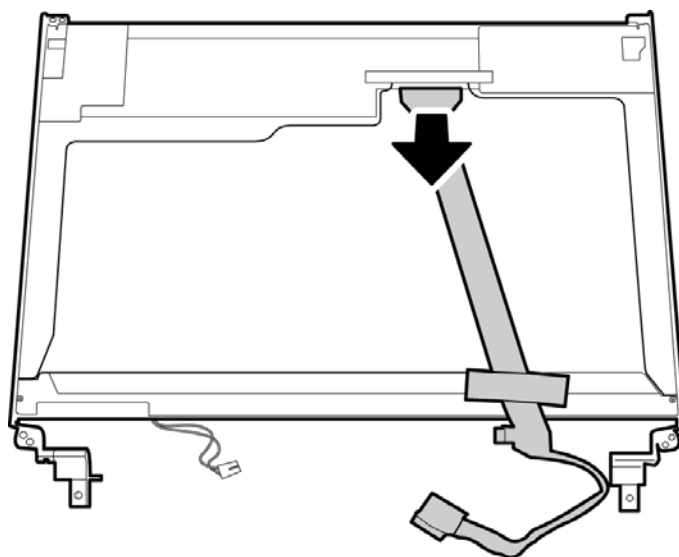
Figure 4-48   Removing the LVDS cable

Installing the LCD Module

To install the LCD module, follow the steps below and refer to the figures in the preceding section.

1. Secure the LVDS cable to the LCD module.

2. Seat the LCD module in the display assembly with the LCD module bracket and secure it with six M2x3 black screws. Note the L and R markings to make sure that the bracket arms are secured on the correct side.

3. Seat the LCD module with bracket on the chassis.

4. Arrange the LVDS cable in the chassis.

4.16 Bluetooth and WLAN antennas

To remove the Bluetooth and WLAN antennas, first remove the display assembly, display mask, FL inverter board and the LCD display module. Then follow the steps below.

1.   Remove the four square tabs securing the Bluetooth and WLAN antennas.
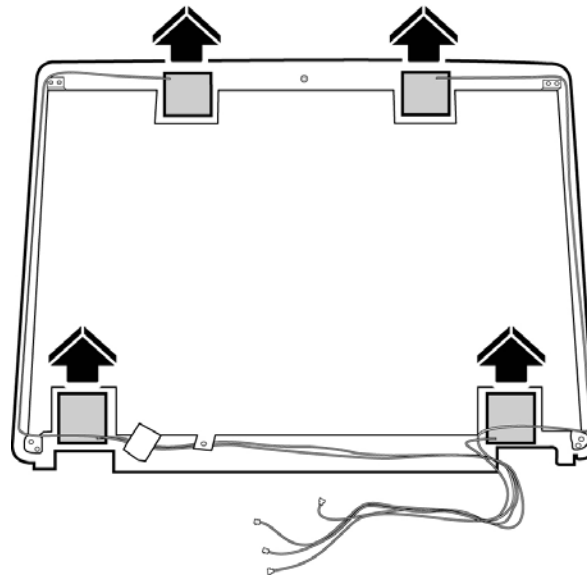
Figure 4-49   Removing the Bluetooth and WLAN antennas

Installing the Bluetooth and WLAN antennas

To install the Bluetooth and WLAN antennas, follow the steps below and refer to the figures in the preceding sections.

1.   Replace the tabs noting the markings on the LCD cover. The black WLAN cable is arranged to the left while the white WLAN cable to the right.

2.   Secure the Bluetooth antenna with the tab on the lower right corner. Make sure all cables are arranged properly in the clamps and use scotch tape to fix the antennas in the four corners.

4.17 Top Cover

Removing the Cover

To remove the top cover, first remove the battery pack, HDD, expansion memory module, ODD, modem, wireless LAN unit, keyboard, and display assembly, and then disconnect the black LCD power (LVDS) cable, Bluetooth cable, and wireless LAN cable from the system board, as described in the preceding sections. Follow the steps below to remove the top cover.

1. Turn the computer upside down and remove the following 16 screws from the rear panel:

   - M2.5X6: four screws (denoted by white arrows)

   - M2.5X8: twelve screws (denoted by black arrows)
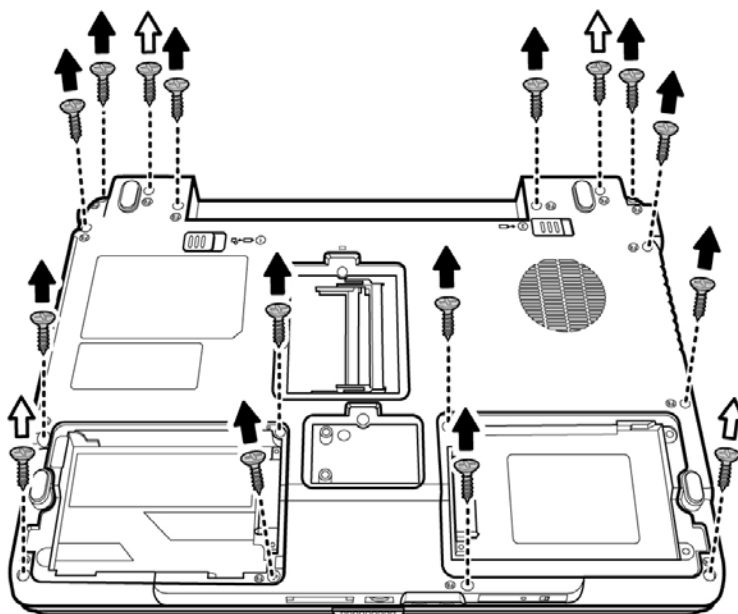
Figure 4-50   Removing the top cover (back panel screws)

2. Turn the computer over again and detach the two speaker cables, touch pad FFC cable, finger print unit FFC cable, and the Function Button cable from the top cover.
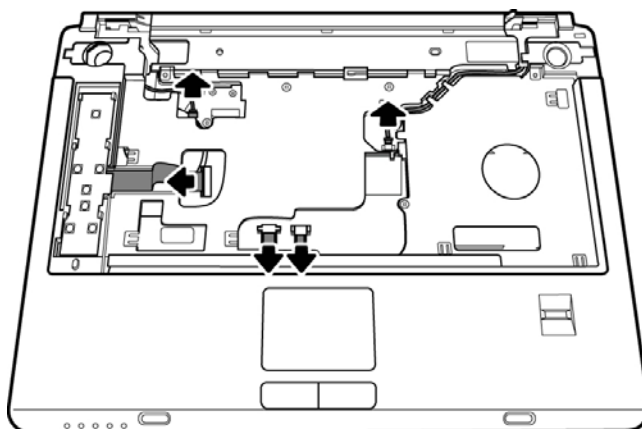
Figure 4-51   Removing the cables

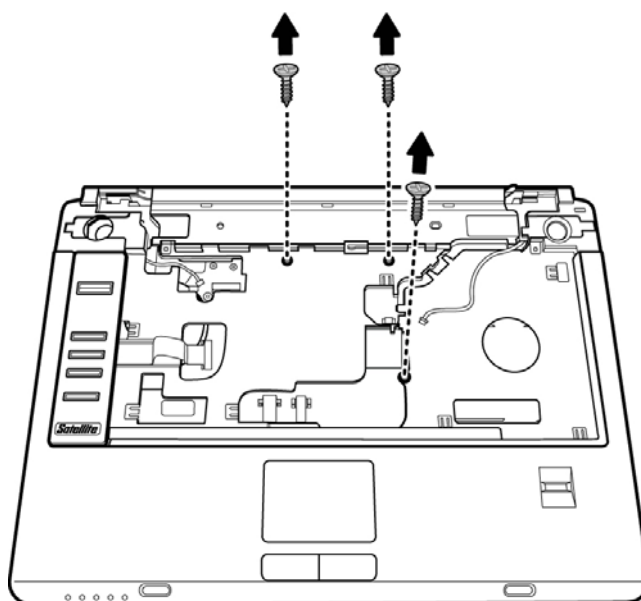3. Remove the three M2.5x6 black screws securing the top cover.

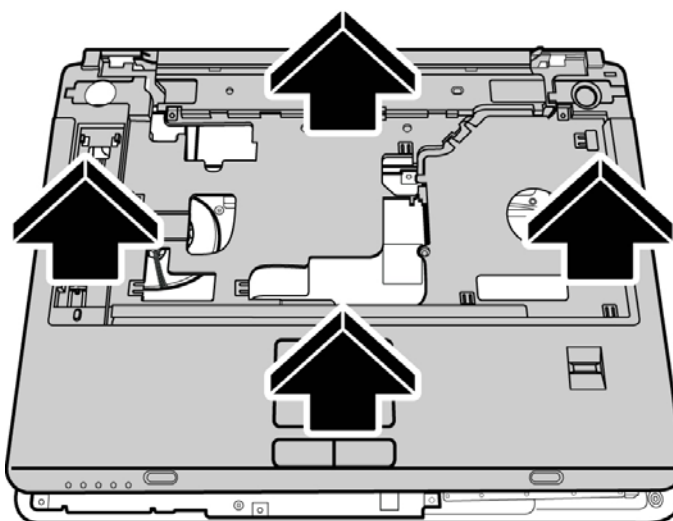*Figure 4-52   Removing the top cover (front panel screws)*

4. Lift off the top cover.

Figure 4-53   Removing the top cover

Installing the Top Cover

To install the top cover, follow the steps below and refer to the figures in the preceding section.

1. Seat the top cover, and secure the speaker cables, finger print unit FFC cable, touch pad unit FFC cable, and the Function Button cable to the system board.

2. Secure the top cover with three M2.5x6 black screws.

3. Turn the computer upside down and secure the 16 screws to the rear panel.

4.18 Function Button Board

Removing the Function Button Board

To disassemble the function button board, first remove the battery, optional devices, and the keyboard strip cover. Then follow the steps below.

1. Insert a thin tool such as a flat screwdriver into the gap between the frame and the Function Button Board to lever the strip cover up.
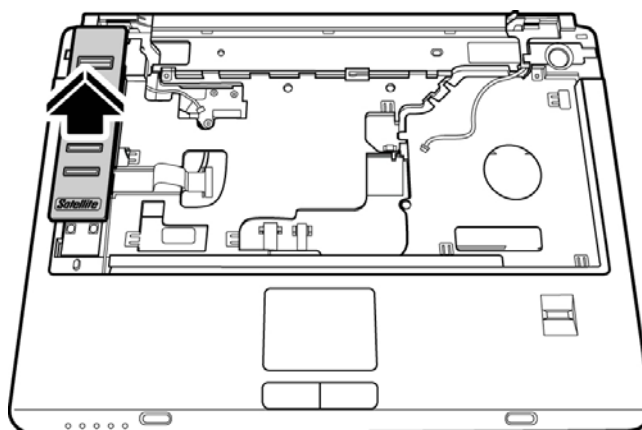

Figure 4-54   Removing the Function Button Board

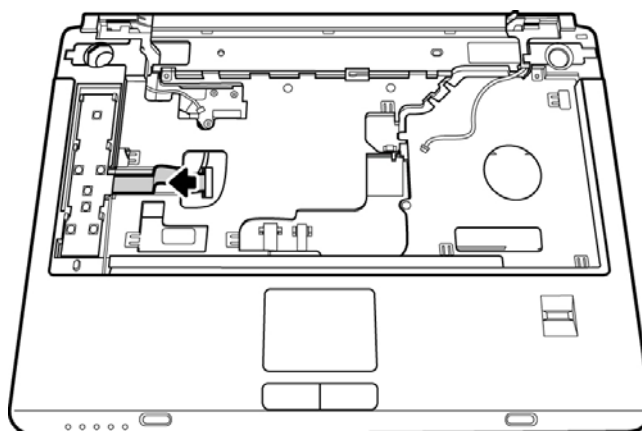2. Remove the Function Button Board Cable attached to the system board.

Figure 4-55   Removing the Direct Play Button Board cable

3. Use a thin object such as a screwdriver to press the release button on the Function Button Board and lift it up
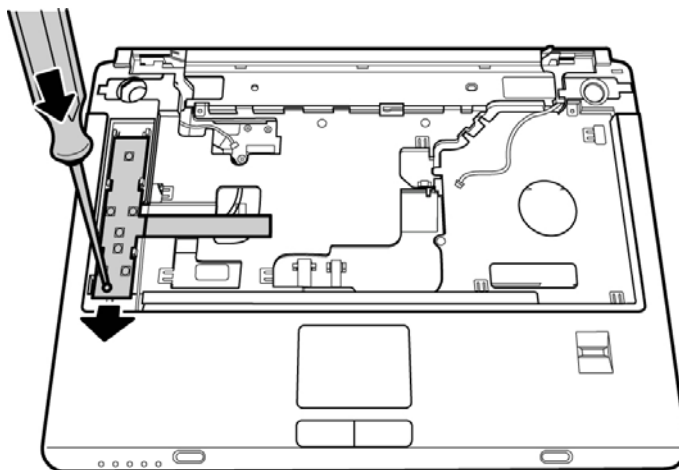

Figure 4-56   Removing the Direct Play Button Board

Installing the Function Button Board

To install the Function Button Board, follow the steps below and refer to the figures in the preceding section.

1. Snap the Function Button Board in place.

2. Connect the cable to the connector on the system board.

3. Replace the cover of the Function Button Board.

4.19 Fingerprint Module

Removing the Fingerprint Module

To remove the Fingerprint Module, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove four M2.0x2.3 black screws securing the Fingerprint Module Bracket to the rear side of the top cover.
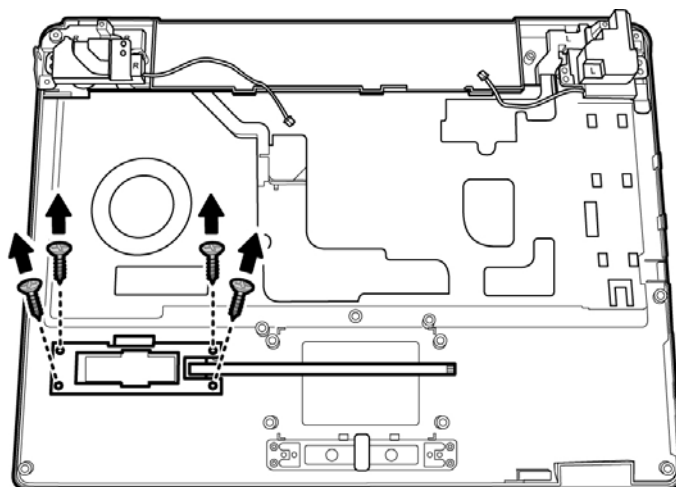

Figure 4-57   Removing the fingerprint module bracket screws
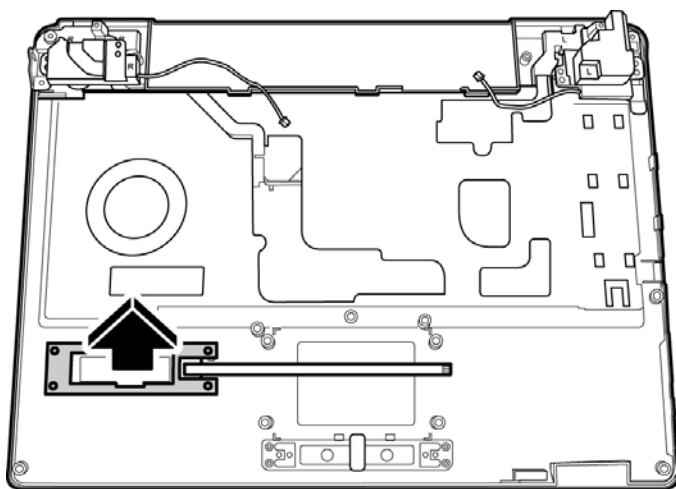
2. Remove the bracket.

Figure 4-58   Removing the fingerprint module bracket

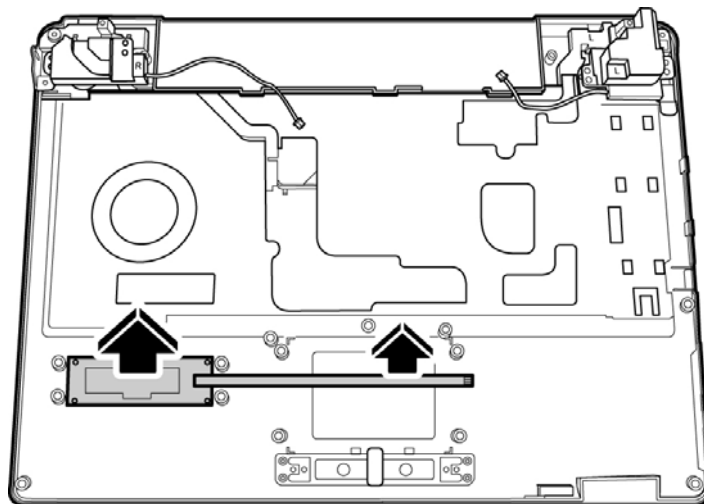3. Remove the Fingerprint module by lifting it gently.

Figure 4-59   Removing the fingerprint module

Installing the Fingerprint Module

To install the Fingerprint Module, follow the steps below and refer to the figures in the preceding section:

1. Turn the top cover upside down and place the Fingerprint Module and the Fingerprint Module Bracket in position on top.

2. Secure the Fingerprint Module bracket with four M2.0x2.3 black screws.

4.20 Touch Pad

Removing the Touch Pad

To remove the Touch Pad, first remove the battery pack, keyboard, top cover, and Fingerprint module, and then follow the steps below:

1. Remove five M2.5x3 screws securing the Touch Pad Bracket to the rear side of the top cover.
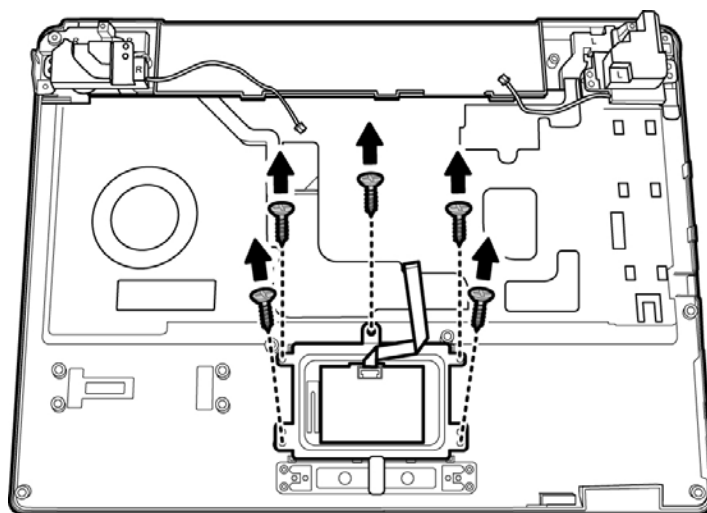

Figure 4-60   Removing the touch pad screw

2. Remove the Touch Pad by lifting it gently.

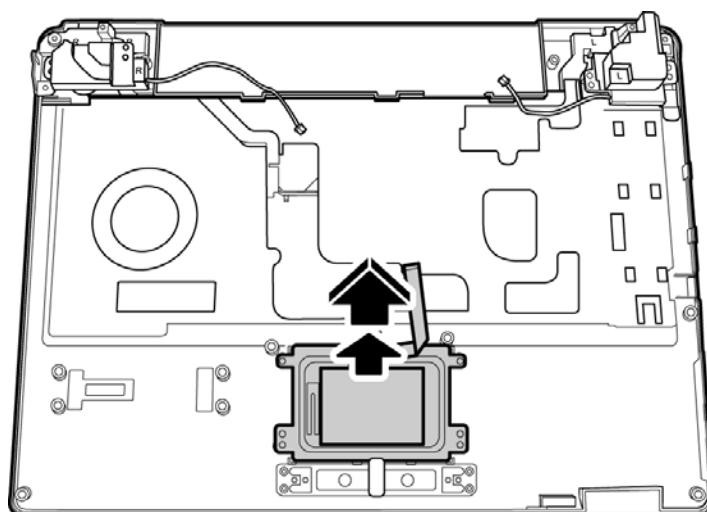*Figure 4-61   Removing the touch pad*

Installing the Touch Pad

To install the Touch Pad, follow the steps below and refer to the figures in the preceding section:

1. Turn the top cover upside down and place the Touch Pad and the Touch Pad Bracket in position on top.

2. Secure the Touch Pad bracket with five M2.5x3 screws.

3. Replace the Fingerprint module as described in the previous sections.

4.21 Bluetooth module

Removing the Bluetooth Module

Remove the battery and any optional devices before removing the Bluetooth module. In addition, you have to remove the keyboard as described in the previous section to access the Bluetooth module. Follow these instructions:

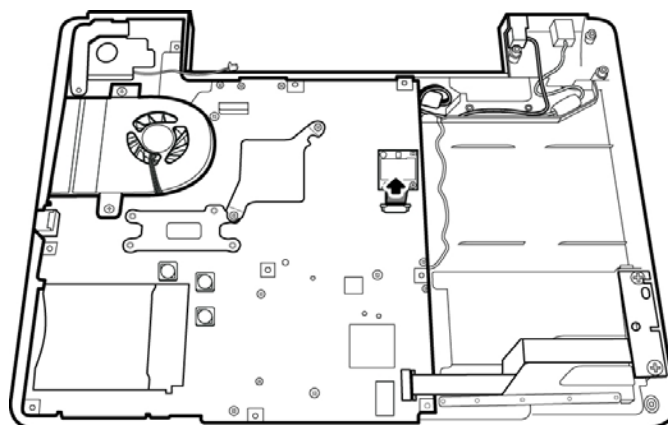1. Disconnect the Bluetooth FFC cable from the system board.

Figure 4-62   Disconnecting the FFC cable

2. Remove the M2x3 black screw securing the Bluetooth module to the system board.
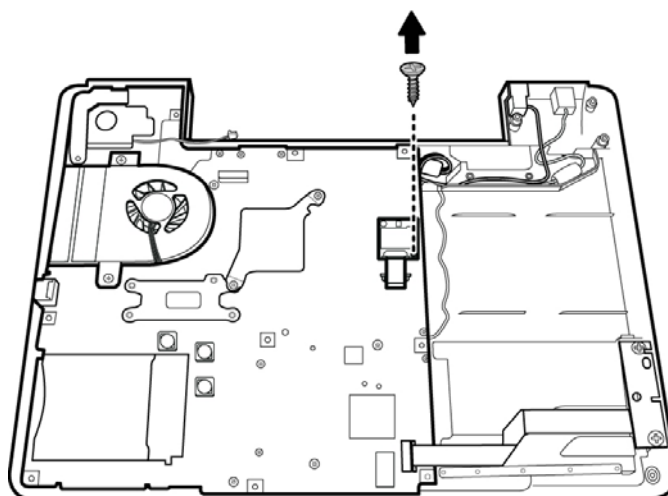
Figure 4-63   Removing the Bluetooth module screw

3. Gently lift the Bluetooth module.
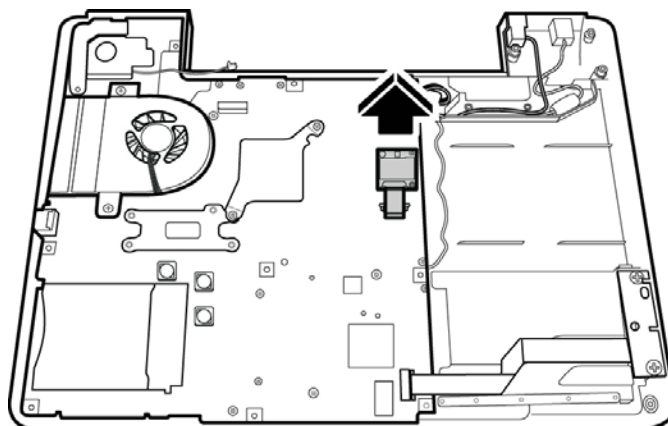
Figure 4-64   Removing the Bluetooth module

4. Separate the FFC cable from the Bluetooth module.
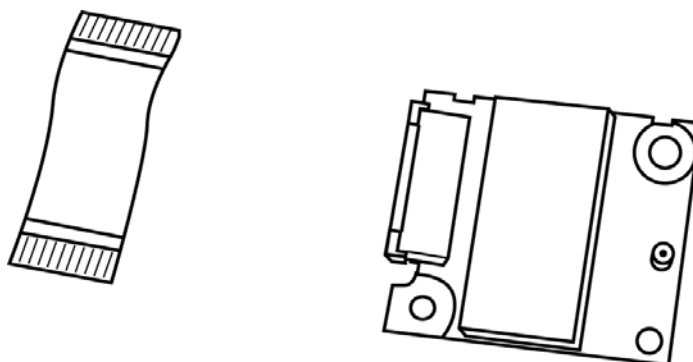
Figure 4-65   Removing the Bluetooth module cable

Installing the Bluetooth Module

To install the Bluetooth module, follow the steps below and refer to the figures in the preceding section.

1. Secure the module to the system board using one black M2x3 screw.

2. Connect the FFC cable to the module to connect to the system board.

3. Connect the Bluetooth connector (brown) to the module after replacing the top cover.

4.22 Speakers

Removing the Speakers

Remove the battery pack, cables and any optional devices before you start. In addition, remove the keyboard and the top cover and then follow these steps:

1. Remove the two M2.5x5 screws securing the left speaker to the rear side of the top cover. Remove the two M2.5x5 screws securing the right speaker to the rear side of the top cover.
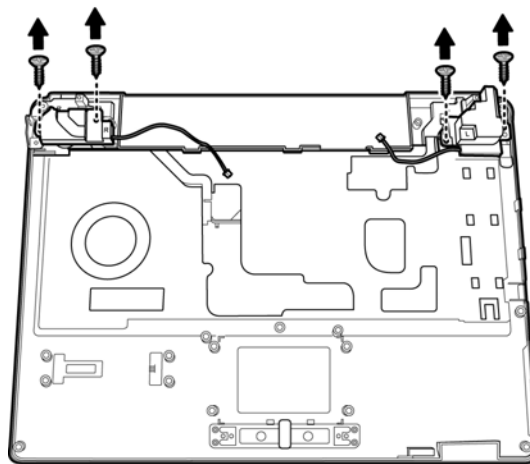
Figure 4-66   Removing the speaker screws

2. Remove the speakers.
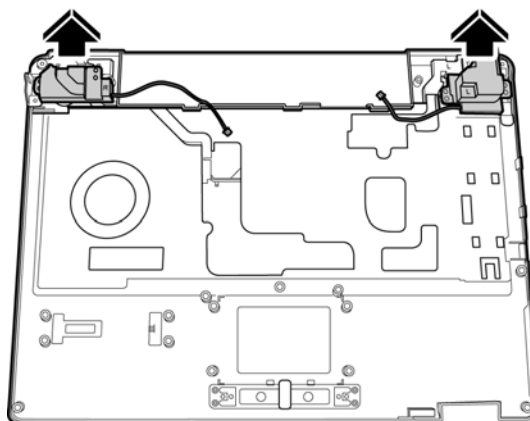
Figure 4-67   Removing the speakers

3. Remove the speaker brackets.
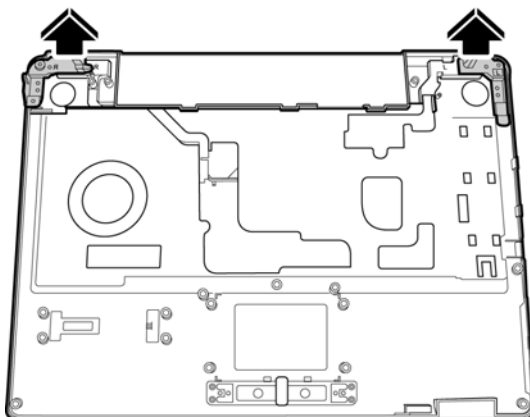
Figure 4-68   Removing the speaker brackets

Installing the Speakers

To install the speakers, follow the steps below and refer to the figures in the preceding section.

1. Seat the speaker brackets in the top cover paying attention to the direction markings.

2. Replace the speakers and secure with two M2.5x5 screws on each side.

3. Turn over and install the top cover onto the system board.

4. Connect the speaker cables (black and red) to the system board.

4.23   USB Board

Removing the USB Board

To remove the USB board, first remove the battery pack, keyboard, and top cover, and then follow the steps below:

1. Remove the M2.5x3 screw securing the USB board to the system board.
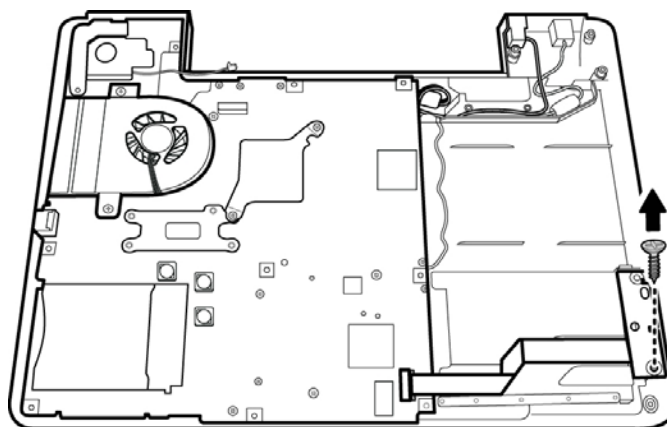
Figure 4-69   Removing the USB Board screws

2. Remove the USB board cable.
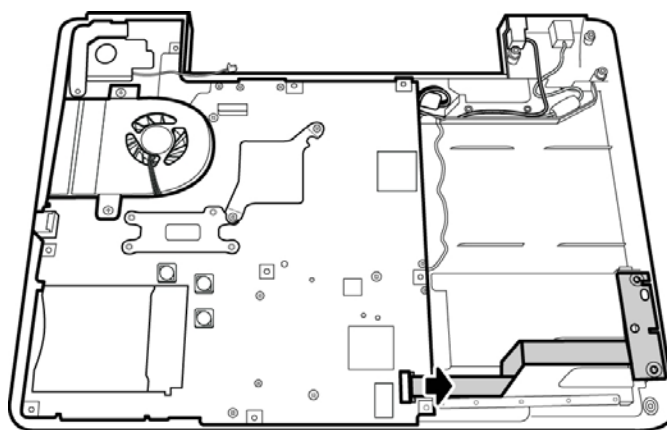
Figure 4-70   Removing the USB Board cable

3. Remove the USB board.
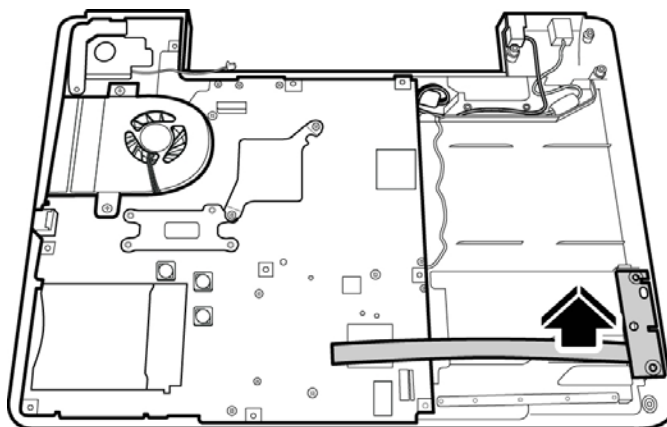
Figure 4-71   Removing the USB Board

Installing the USB Board

To install the USB board, follow the steps below and refer to the figures in the preceding section:

1. Place the USB board in position next to the system board.

2. Connect the USB board cable to the system board.

3. Secure the USB board with one M2.5x3 screw.

4.24 System Board

Removing the System Board

To remove the system board, first remove the display assembly, keyboard, and top cover, and then follow the steps below:

1. Remove the two M2.5x6 screws and two M2.5x3 screws securing the system board. Then remove the two hexagonal VGA screws from the system board.
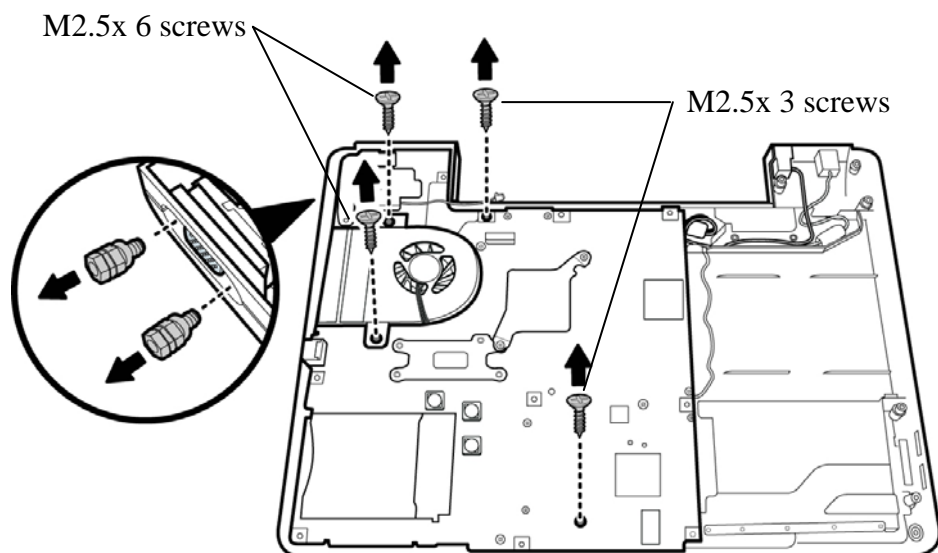
Figure 4-72   Removing the system board screws and the hexagonal screw

2. Remove the DC connector from its socket.
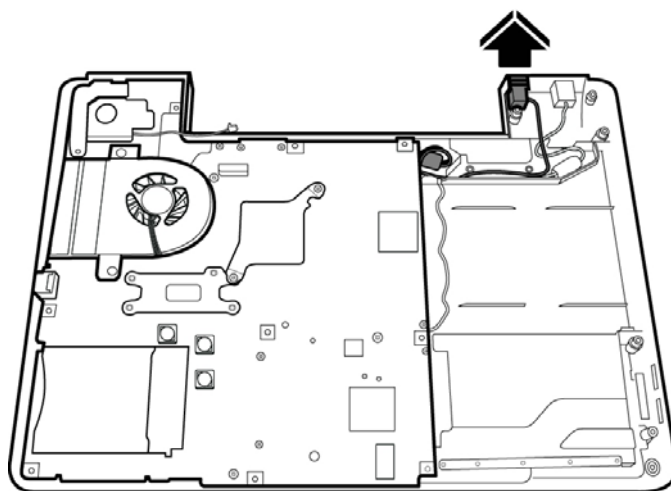
Figure 4-73   Removing the DC cable

3. Remove the system board after making sure that all connectors are removed from their respective sockets.
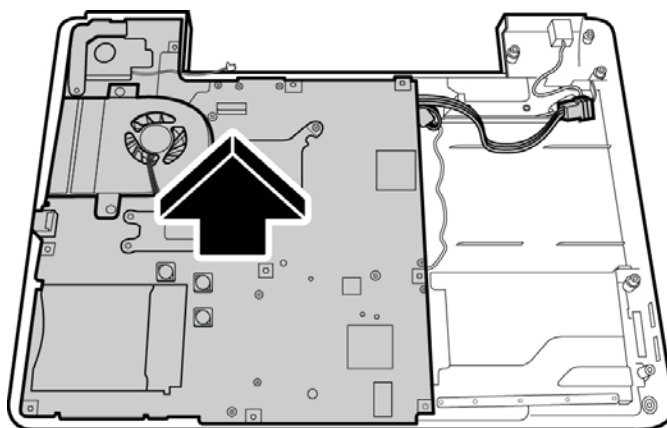
Figure 4-74   Removing the system board

Installing the System Board

To install the system board, follow the steps below and refer to the figures in the preceding section.

1. Seat the system board in the chassis. Take care to align all the ports and connectors in their respective openings on the chassis.

2. Replace the two M2.5x6 screws and two M2.5x3 screws securing the system board.

3. Replace the two hexagonal screws to secure the VGA port.

4. Connect the power connector in its socket.

4.25 VGA Module

Removing the VGA Module

To remove the VGA module, you have to first remove the keyboard, top cover, and system board. Then follow the steps below:

1. Turn the system board over and remove the three M2.5x3 screws securing the VGA bracket.
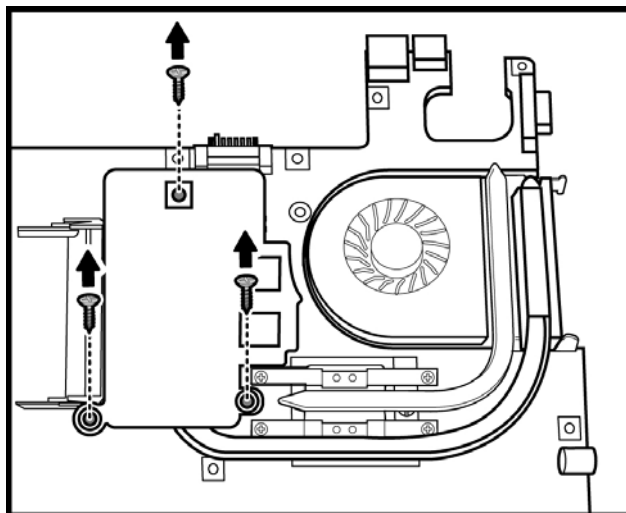
Figure 4-75   Removing the VGA module screws

2. Remove the VGA module from the system board.
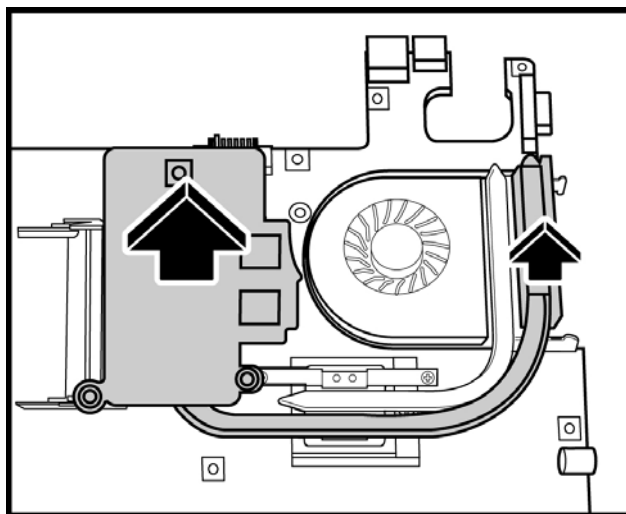
Figure 4-76   Removing the VGA module

3. Remove the heat sink from the VGA module by removing the four M2.5x3 screws. Follow the order indicated by the numbers on the heat sink to remove the screws.
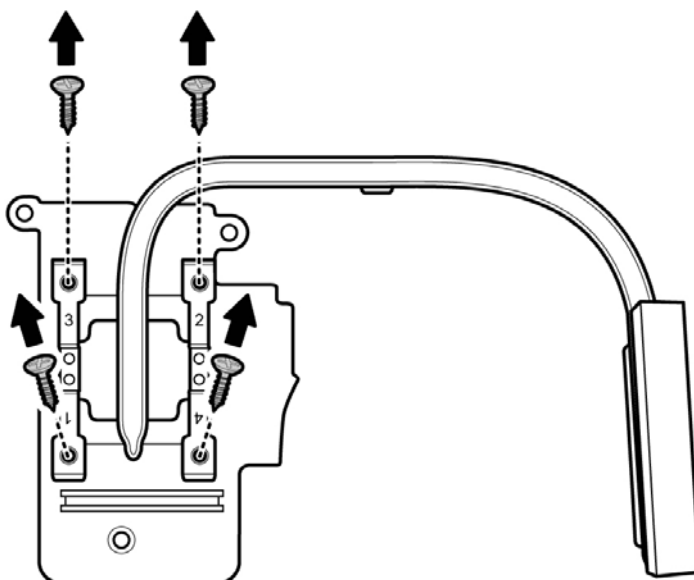
Figure 4-77   Removing the VGA module heat sink

Installing the VGA Module

To install the VGA module, follow the steps below and refer to the figure in the preceding section:

> *CAUTION: If you remove the heat sink, use the grease tool to remove the grease on the VGA board and heat sink. Reapply fresh grease before installing the heat sink.*

1. Connect the heat sink to the VGA module by securing it with four M2.5x3 screws. Follow the order indicated by the numbers on the heat sink to tighten the screws.

2. Seat the VGA module and secure the module by placing the three M2.5x3 screws and tightening them.

4.26 Fan & CPU

Removing the Fan & CPU

To remove the fan, heat sink, and CPU, you must first remove the display assembly, keyboard, top cover and system board, and then follow the steps below:

1. Turn the system board upside down. Remove the four M2.5x6 screws from the heat sink.
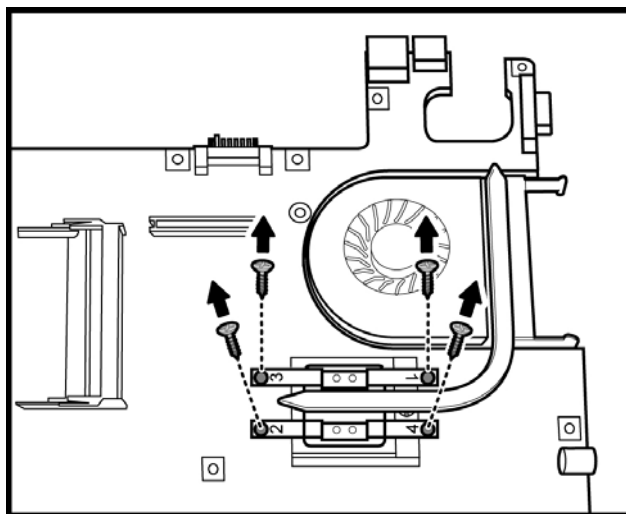
Figure 4-78   Removing the heat sink screws

2. Lift and remove the heat sink from the system board.
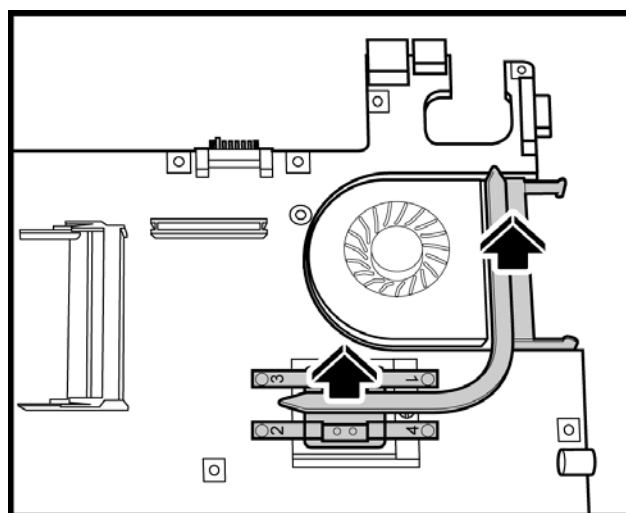
Figure 4-79   Removing the heat sink

3.   Turn over and remove the fan connector from the system board.
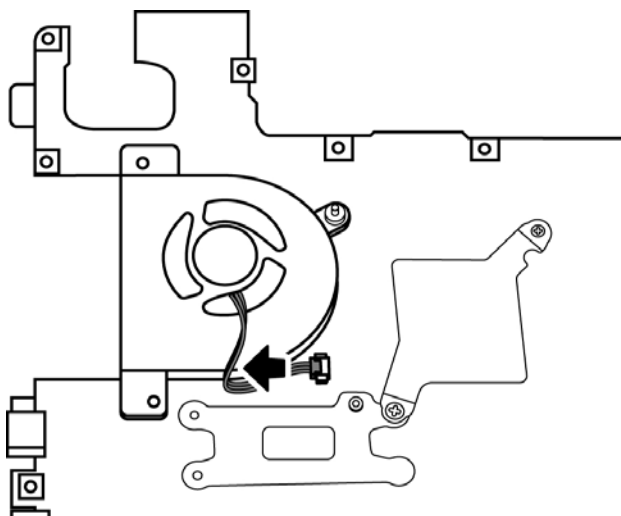
Figure 4-80   Removing the fan connector

4.   Remove the M2.5x3 screw securing the fan from the top side of the system board.
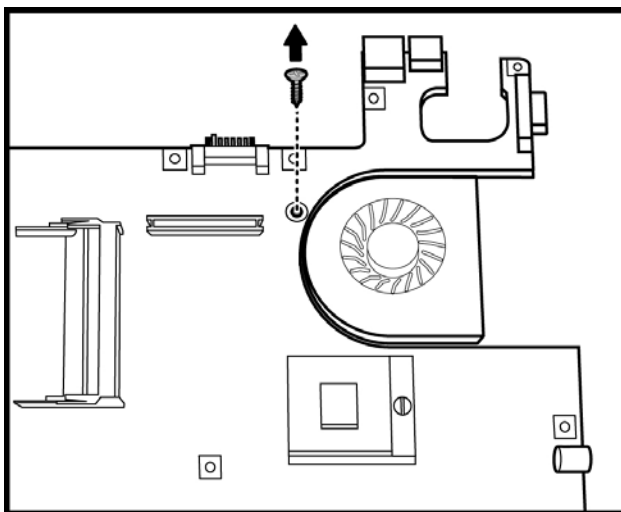
Figure 4-81   Removing the fan screw from the top side of the system board

5. Remove the fan module.
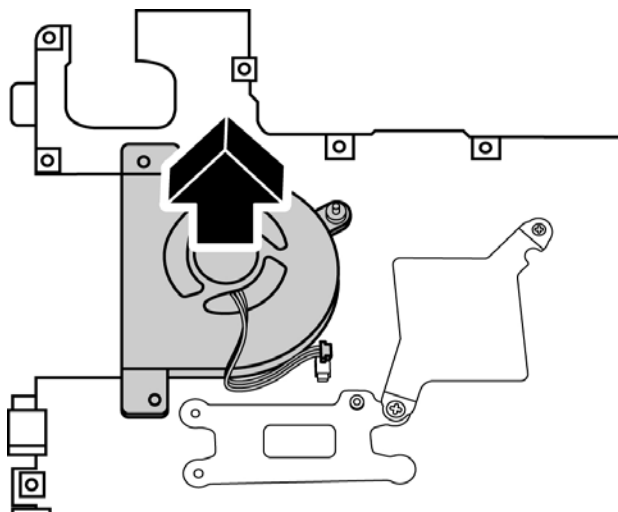
Figure 4-82   Removing the fan

6. Turn the cam on the CPU socket with a flat-blade screwdriver so that the notch on the cam is aligned with the *open* side of the CPU socket to unlock the CPU.
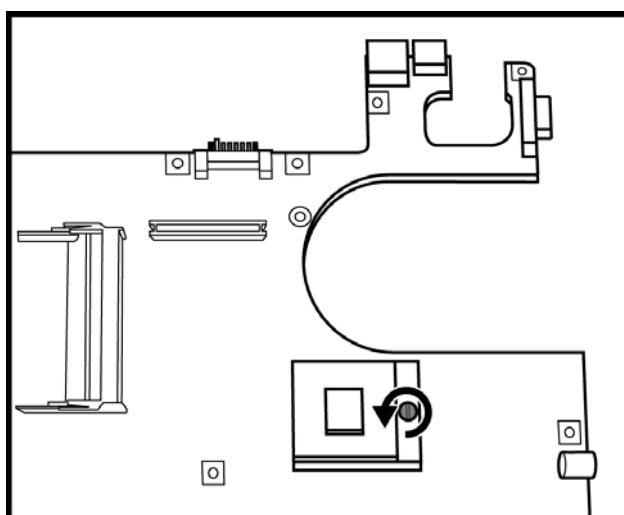
Figure 4-83   Turning the CPU cam

7.   Gently lift out the CPU.
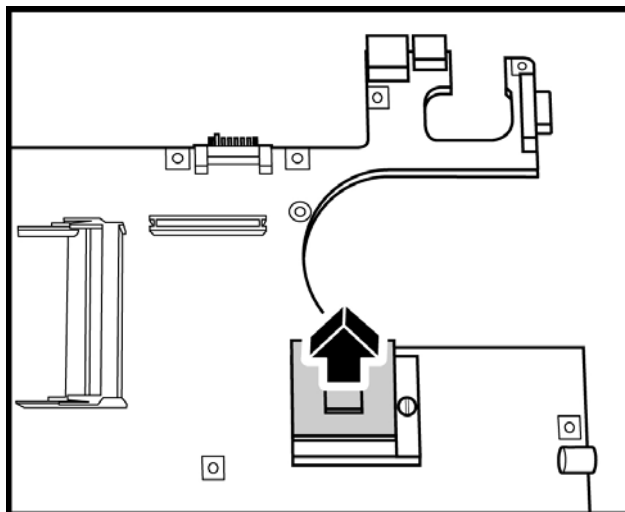
Figure 4-84   Removing the CPU

Installing the CPU

To install the CPU, follow the steps below and refer to the figures in the preceding section.

CAUTION: If you remove the heat sink, use the CPU grease tool to remove the grease on the CPU and heat sink. Reapply fresh grease before installing the heat sink.

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1. Make sure that the notch on the cam is aligned with the *open* position of the CPU slot.

2. Seat the CPU aligning the triangle mark on the CPU with the one on the CPU socket. Make sure the alignment is exact to avoid damaging pins on the CPU.

3. Press the CPU softly with your fingers to insert into the socket and turn the cam on the CPU socket to the *closed* position with a flat-blade screwdriver to secure the CPU.

4. Seat the fan module and secure with the M2.5x3 screw on the front side of the system board.

5. Attach the fan connector.

6. Seat the heat sink over the CPU and secure with four screws in the order indicated on the heat sink.

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 it to prevent damaging it.

1. When installing the LCD module in the display assembly, make sure that you seat it so that it is properly aligned and maximum visibility of the display is maintained.
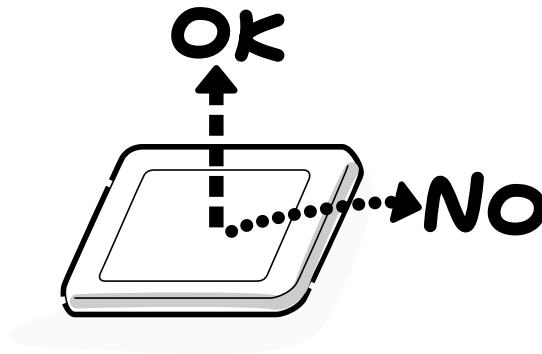
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

    Note: The panel's polarized surface is easily scratched and damaged, so handle it carefully.

3. If the panel's surface gets dirty or moist, 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 soft 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.
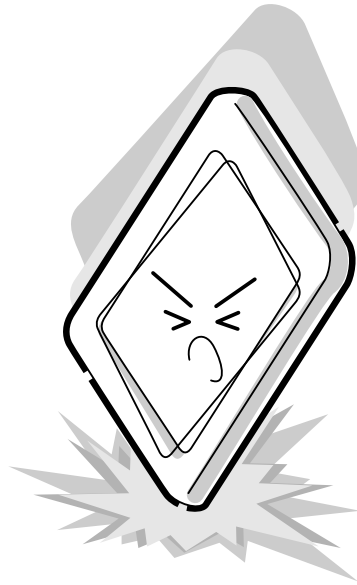
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.
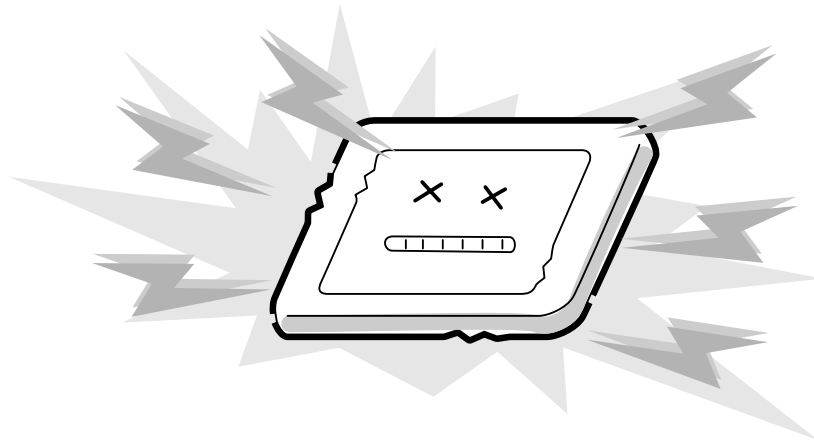
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.

8. Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
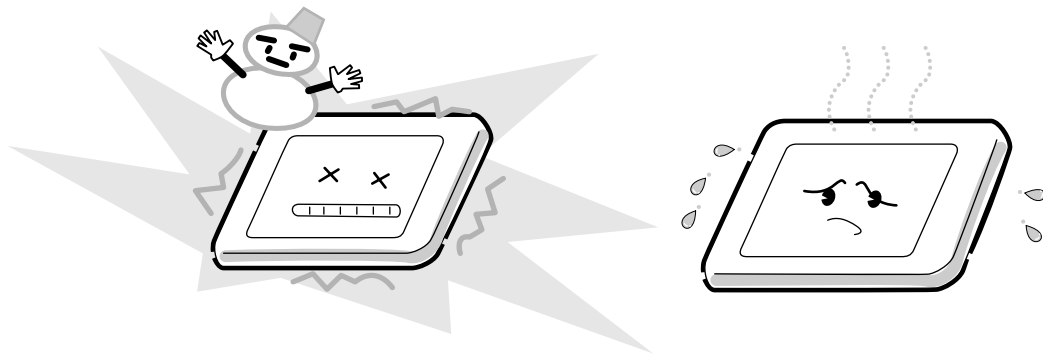
9. Do not disassemble the LCD module. Disassembly can cause malfunctions.
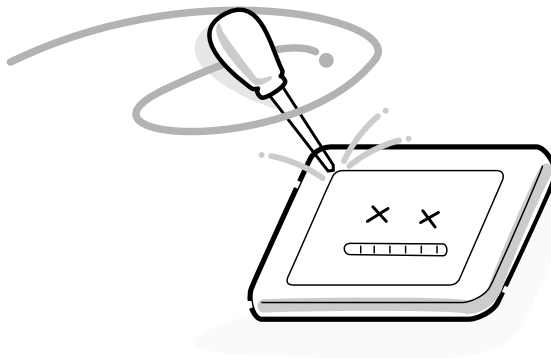
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.

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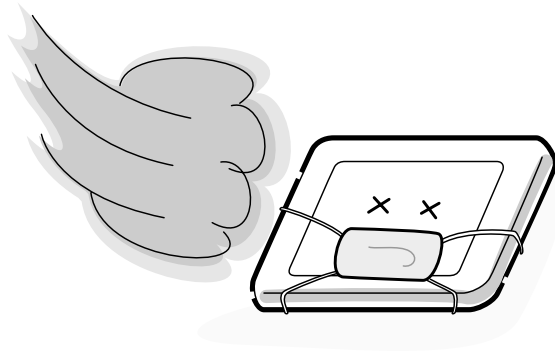
Appendix B   Board Layout

B.1 System Board (FRDSY*) Top View
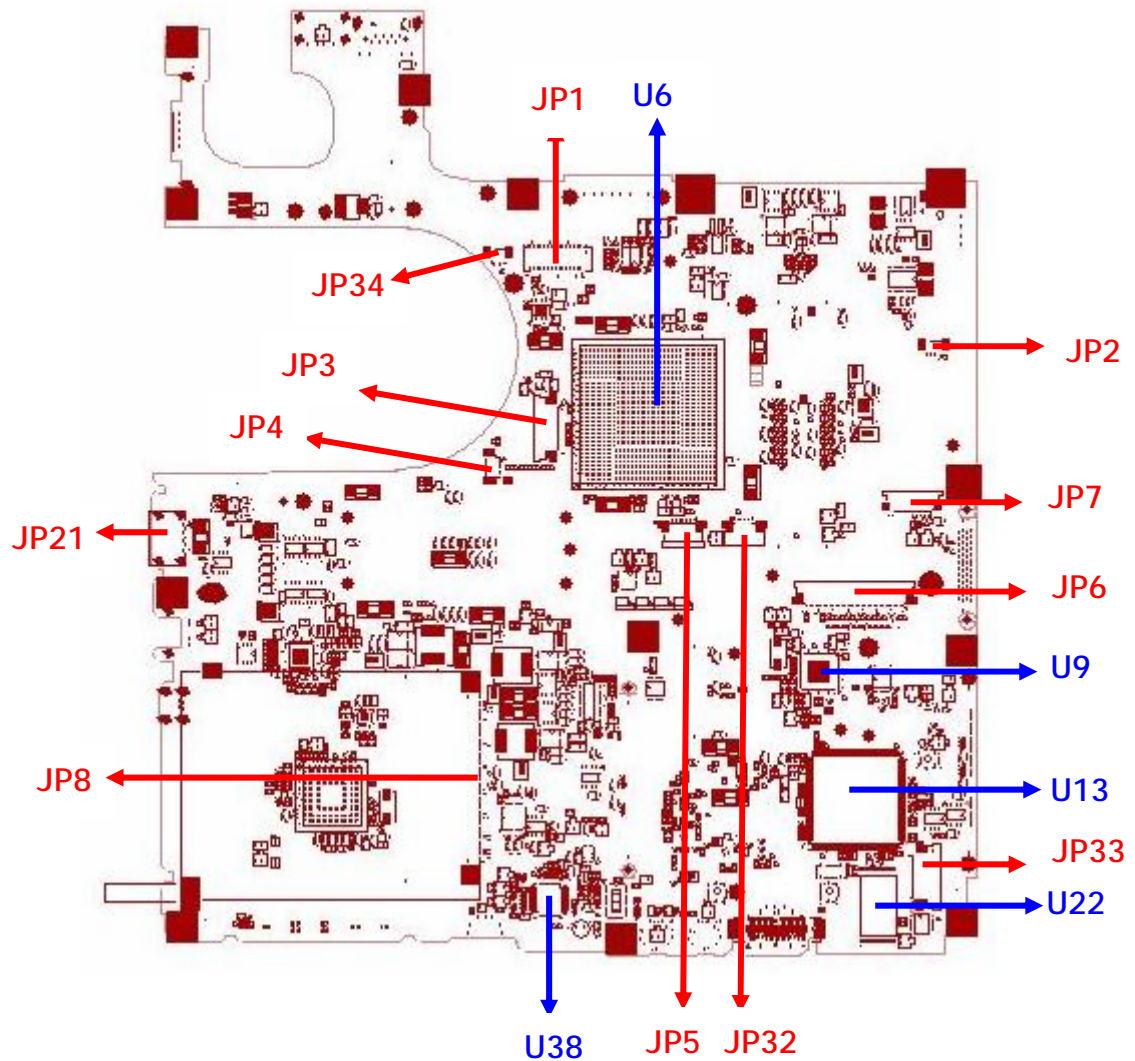
B.2 System Board (FRDSY*) Button View

JP11　JP12

JP13

U30

PJP2　JP14

PJP1

U5

JP15

JP16

JP18

JP19

JP17

JP24

JP20

JP25

JP9

JP31

U16

JP29　JP28
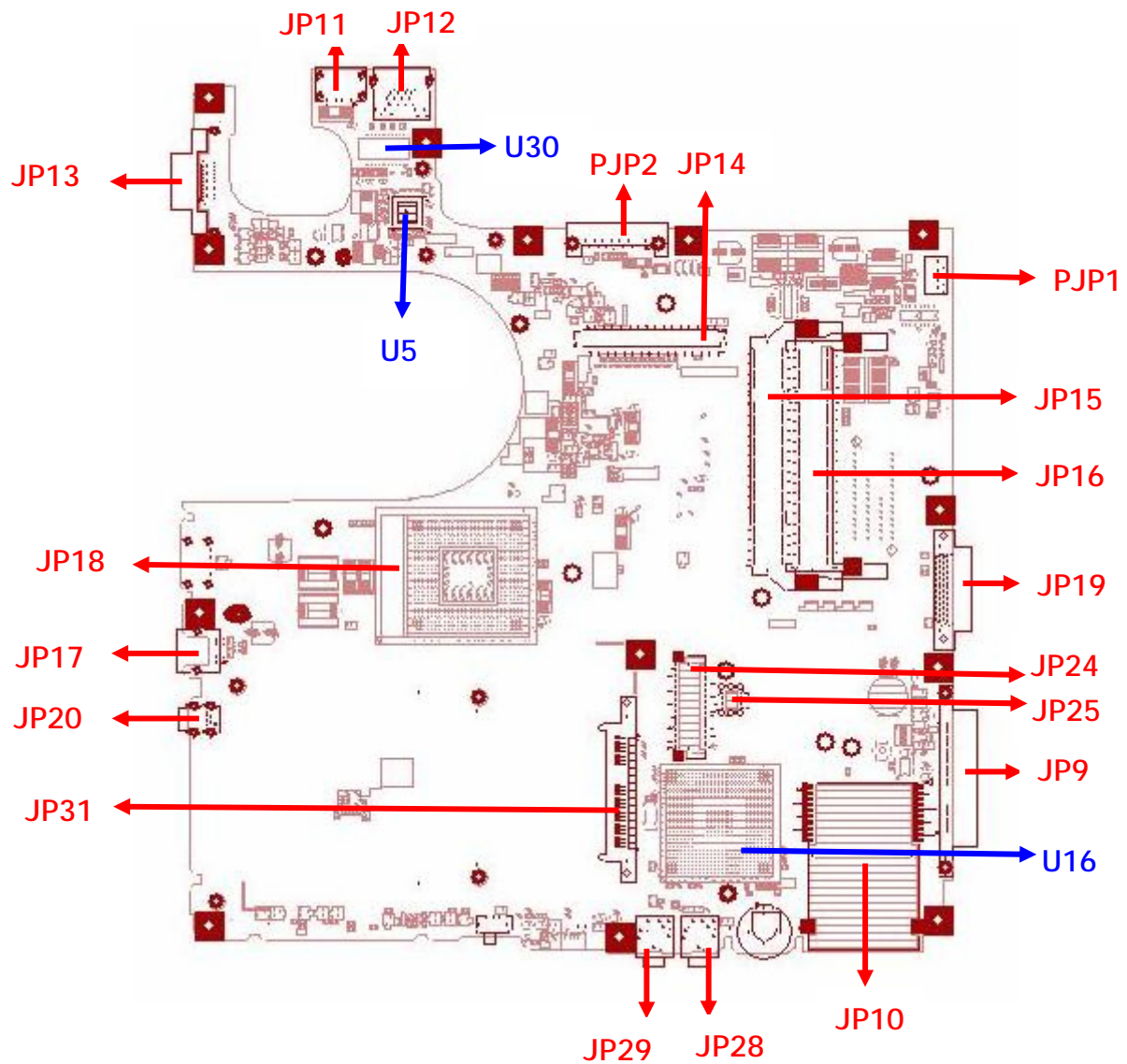
JP10

Table B-1　System board connectors (top and bottom)

Number	Name
JP1	LCD conn
JP2	Speaker conn (Right)
JP3	SW/LED conn
JP4	FAN conn
JP5	TP conn
JP6	Keyboard conn
JP7	Bluetooth conn
JP8	PCMCIA Socket
JP9	1st SATA HDD conn
JP10	6 in 1 CardReader conn
JP11	LAN conn
JP12	USB conn1 (Back Side)
JP13	CRT conn
JP14	VGA/B conn
JP15,16	DDR2 conn
JP17	TV-OUT conn
JP18	CPU conn
JP19	ODD conn
JP20	1394 conn
JP21	USN conn2 (Left Side)
JP23	For EC tools
JP24	Mini-Express card conn
JP25	MDC conn
JP28	Headphone out jack
JP29	Microphone in jack
JP30	ROM Socket
JP31	2nd SATA HDD conn
JP32	Finger Printer conn
JP33	USB/B conn
JP34	Speaker conn (Left)
PJP1	Power core conn
PJP2	Battery conn

Table B-2   System board ICs (top and bottom)

Number	Name
U5	LAN RTL8101E/ RTL8111B
U6	North bridge 945GM/945PM
U9	Clock Generator ICS9LPRS325CKLFT
U13	EC KB910
U16	South bridge ICH7
U22	BIOS ROM
U30	LAN transformer
U31	Card bus controller TI PCI7412
U38	HD codec AC861-VD-GR

Appendix C   Pin Assignments

System Board

C.1   JP15,JP16

Table C-1 SODIMM I/F pin assignments (200-PIN) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	VREF	O	2	VSS	O
3	VSS	O	4	DQ4	I/O
5	DQ0	I/O	6	DQ5	I/O
7	DQ1	I/O	8	VSS	O
9	VSS	O	10	DM0	I/O
11	DQS0#	I/O	12	VSS	O
13	DQS0	I/O	14	DQ6	I/O
15	VSS	O	16	DQ7	I/O
17	DQ2	I/O	18	VSS	O
19	DQ3	I/O	20	DQ12	I/O
21	VSS	O	22	DQ13	I/O
23	DQ8	I/O	24	VSS	I/O
25	DQ9	I/O	26	DM1	O
27	VSS	O	28	VSS	O
29	DQS1#	I/O	30	CK0	I/O
31	DQS1	I/O	32	CK0#	I/O
33	VSS	O	34	VSS	O
35	DQ10	I/O	36	DQ14	I/O
37	DQ11	I/O	38	DQ15	I/O
39	VSS	O	40	VSS	O
41	VSS	O	42	VSS	O
43	DQ16	I/O	44	DQ20	I/O
45	DQ17	I/O	46	DQ21	I/O
47	VSS	O	48	VSS	O
49	DQS2#	I/O	50v	NC	-

Table C-1 SODIMM I/F pin assignments (200-PIN) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
51	DQS2	I/O	52	DM2	I/O
53	VSS	O	54	VSS	O
55	DQ18	I/O	56	DQ22	I/O
57	DQ19	I/O	58	DQ23	I/O
59	VSS	O	60	VSS	O
61	DQ24	I/O	62	DQ28	I/O
63	DQ25	I/O	64	DQ29	I/O
65	VSS	O	66	VSS	O
67	DM3	I/O	68	DQS3#	I/O
69	NC	-	70	DQS3	I/O
71	VSS	O	72	VSS	O
73	DQ26	I/O	74	DQ30	I/O
75	DQ27	I/O	76	DQ31	I/O
77	VSS	O	78	VSS	O
79	CKE0	I/O	80	NC/CKE1	I/O
81	VDD	O	82	VDD	O
83	NC	-	84	NC/A15	-
85	BA2	I/O	86	NC/A14	-
87	VDD	O	88	VDD	O
89	A12	I/O	90	A11	I/O
91	A9	I/O	92	A7	I/O
93	A8	I/O	94	A6	I/O
95	VDD	O	96	VDD	O
97	A5	I/O	98	A4	I/O
99	A3	I/O	100	A2	I/O
101	A1	I/O	102	A0	I/O
103	VDD	O	104	VDD	O
105	A10/AP	I/O	106	BA1	I/O
107	BAD	I/O	108	RAS#	I/O
109	WE#	I/O	110	S0#	I/O
111	VDD	O	112	VDD	O
113	CAS#	I/O	114	ODT0	I/O

Table C-1 SODIMM I/F pin assignments (200-PIN) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
115	NC/S1#	I/O	116	NC/A13	I/O
117	VDD	O	118	VDD	O
119	NC/ODT1	I/O	120	NC	-
121	VSS	O	122	VSS	O
123	DQ32	I/O	124	DQ36	I/O
125	DQ33	I/O	126	DQ37	I/O
127	VSS	O	128	VSS	O
129	DQS4#	I/O	130	DM4	I/O
131	DQS4	I/O	132	VSS	O
133	VSS	O	134	DQ38	I/O
135	DQ34	I/O	136	DQ39	I/O
137	DQ35	I/O	138	VSS	O
139	VSS	O	140	DQ44	I/O
141	DQ40	I/O	142	DQ45	I/O
143	DQ41	I/O	144	VSS	O
145	VSS	O	146	DQS5#	I/O
147	DM5	I/O	148	DQS5	I/O
149	VSS	O	150	VSS	O
151	DQ42	I/O	152	DQ46	I/O
153	DQ43	I/O	154	DQ47	I/O
155	VSS	O	156	VSS	O
157	DQ48	I/O	158	DQ52	I/O
159	DQ49	I/O	160	DQ53	I/O
161	VSS	O	162	VSS	O
163	NC,TEST	-	164	CK1	I/O
165	VSS	O	166	CK1#	I/O
167	DQS6#	I/O	168	VSS	O
169	DQS6	I/O	170	DM6	I/O
171	VSS	O	172	VSS	O
173	DQ50	I/O	174	DQ54	I/O
175	DQ51	I/O	176	DQ55	I/O
177	VSS	O	178	VSS	O
179	DQ56	I/O	180	DQ60	I/O

Table C-1 SODIMM I/F pin assignments (200-PIN) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
181	DQ57	I/O	182	DQ61	I/O
183	VSS	O	184	VSS	O
185	DM7	I/O	186	DQS7#	I/O
187	VSS	O	188	DQS7	I/O
189	DQ58	I/O	190	VSS	O
191	DQ59	I/O	192	DQ62	I/O
193	VSS	O	194	DQ63	I/O
195	SDA	I/O	196	VSS	O
197	SLC	I/O	198	SA0	O
199	VDDSPD	O	200	SA1	O

C.2 JP13

Table C-2 RGB I/F pin assignments (15-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	CRT_R_L	O	2	CRT_G_L	O
3	CRT_B_L	O	4	GND	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	+CRT_VCC	-	10	GND	-
11	NC	-	12	DSUB_12	I/O
13	CRT_HSYNC_L	O	14	CRT_VSYNC_L	O
15	DSUB_15	I/O			

C.3 JP22

Table C-3 1st HDD I/F pin assignments (22-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	A+	
3	A-		4	GND	
5	B-		6	B+	
7	GND		8	VCC3.3	
9	VCC3.3		10	VCC3.3	
11	GND		12	GND	
13	GND		14	VCC5	
15	VCC5		16	VCC5	
17	GND		18	NC	
19	GND		20	NC	
21	NC		22	NC	-

C.4 JP31

Table C-4 2nd HDD I/F pin assignments (22-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	A+	
3	A-		4	GND	
5	B-		6	B+	
7	GND		8	VCC3.3	
9	VCC3.3		10	VCC3.3	
11	GND		12	GND	
13	GND		14	VCC5	
15	VCC5		16	VCC5	
17	GND		18	NC	
19	GND		20	NC	
21	NC		22	NC	-

C.5   JP19

Table C-5 ODD I/F pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	INT_CD_L	I	2	INT_CD_R	I
3	CD_AGND	-	4	NC	-
5	IDE_ODDRST#	O	6	IDE_DD8	I/O
7	IDE_DD7	I/O	8	IDE_DD9	I/O
9	IDE_DD6	I/O	10	IDE_DD10	I/O
11	IDE_DD5	I/O	12	IDE_DD11	I/O
13	IDE_DD4	I/O	14	IDE_DD12	I/O
15	IDE_DD3	I/O	16	IDE_DD13	I/O
17	IDE_DD2	I/O	18	IDE_DD14	I/O
19	IDE_DD1	I/O	20	IDE_DD15	I/O
21	IDE_DD0	I/O	22	IDE_DDREQ	I
23	GND	-	24	IDE_DIOR#	O
25	IDE_DIOW#	O	26	GND	O
27	IDE_DIORDY	I	28	IDE_DDACK#	O
29	IDE_IRQ	I	30	NC	O
31	IDE_DA1	O	32	+5VCD	I
33	IDE_DA0	O	34	IDE_DA2	I
35	IDE_DCS1#	O	36	IDE_DCS3#	-
37	SHDD_LED#	I	38	+5VCD	O
39	+5VS	-	40	+5VCD	-
41	+5VS	-	42	+5VCD	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	SD_CSEL	-	48	GND	-
49	NC	-	50	NC	-
51	NC		52	NC	

C.6 JP8

Table C-6 PC Card I/F pin assignments (68-pin) (1/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	35	GND	-
2	DATA3	I/O	36	CD1#	O
3	DATA4	I/O	37	DATA11	I/O
4	DATA5	I/O	38	DATA12	I/O
5	DATA6	I/O	39	DATA13	I/O
6	DATA7	I/O	40	DATA14	I/O
7	CE1#	I/O	41	DATA15	I/O
8	ADD10	I	42	CE2#	I/O
9	OE#	I/O	43	VS1#	I
10	ADD11	I	44	IORD#	I/O
11	ADD9	I	45	IOWR#	I
12	ADD8	I	46	ADD17	I
13	ADD13	I	47	ADD18	I
14	ADD14	I	48	ADD19	I
15	WE#	I	49	ADD20	I
16	READY	O	50	ADD21	I
17	VCC	-	51	VCC	-
18	VPP	-	52	VPP	-
19	ADD16	I	53	ADD22	I
20	ADD15	I	54	ADD23	I
21	ADD12	I	55	ADD24	I
22	ADD7	I	56	ADD25	I
23	ADD6	I	57	VS2#	I
24	ADD5	I	58	RESET	I
25	ADD4	I	59	WAIT#	I
26	ADD3	I	60	INPACK#	O
27	ADD2	I	61	REG#	I
28	ADD1	I	62	BVD2	O
29	ADD0	I	63	BVD1	I
30	DATA0	I	64	DATA8	I/O

Table C-6 PC Card I/F pin assignments (68-pin) (2/2)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
31	DATA1	I/O	65	DATA9	I/O
32	DATA2	I/O	66	DATA10	I/O
33	WP	I/O	67	CD2#	I
34	GND	-	68	GND	-

C.6 JP24

Table C-6 Mini-Express I I/F pin assignments (54-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	PCI_WAKE	I/O	2	+3VS	O
3	WLAN_DATA	I/O	4	VSS	
5	WLAN_CLK	I/O	6	+1.5VS	O
7	MINI_CLKREQ	I/O	8	NC	-
9	VSS	-	10	NC	-
11	CLK_PCIE#	I/O	12	NC	-
13	CLK_PCIE	I/O	14	NC	-
15	VSS	-	16	NC	-
17	NC	-	18	VSS	-
19	NC	-	20	XMIT_OFF#	I/O
21	VSS	-	22	PLT_RST#	I/O
23	PCIE_RXN2	I/O	24	+3VALW	O
25	PCIE_RXP2	I/O	26	VSS	-
27	VSS	-	28	+1.5VS	O
29	VSS	-	30	SMBCLK	I/O
31	PCIE_TXN2	I/O	32	SMBDATA	I/O
33	PCIE_TXP2	I/O	34	VSS	-
35	VSS	-	36	USB_N	I/O
37	NC	-	38	USB_P	I/O
39	NC	-	40	VSS	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	+1.5VS	O
49	NC	-	50	VSS	-
51	NC	-	52	+3VS	O
53	VSS	-	54	VSS	-

C.7 JP1

Table C-7 LCDS I/F (30-pin)

Pin No.	Signal name	Function
1	GND	GND
2	GND	GND
3	TXCLK-	Panel Clock Signals
4	GND	GND
5	TXCLK+	Panel Clock Signals
6	NC	Non-Connection
7	GND	GND
8	+LCDVDD_LCD	Power for Panel
9	TXOUT0-	Panel Data Signals
10	+VCDVDD_LCD	Power for Panel
11	TXOUT0+	Panel Data Signals
12	+3VS_LCD	Power for Panel
13	GND	GND
14	+3VS_LCD	Power for Panel
15	TXOUT2-	Panel Data Signals
16	LCD_CLK	LCD Clock
17	TXOUT2+	Panel Data Signals
18	LCD_DATA	LCD DATA
19	GND	GND
20	DAC_BRIG	Inverter Control signal
21	TXOUT1-	Panel Data Signals
22	INVT_PWM	Inverter Control signal
23	TXOUT1+	Panel Data Signals
24	DISPOFF#	LCD back light
25	GND	GND
26	NC	Non-Connection
27	GND	GND
28	INVPWR+B	Inverter Control signal
29	GND	GND
30	INVPWR+B	Inverter Control signal

C.8　JP4

Table C-8 JP8 Fan I/F pin assignments (3-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+FAN1_VOUT	I	2	FANSPEED1	O
3	GND	-			

C9　JP6

Table C-9 K/B connector pin assignments (38-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+3VS	I	2	NC	-
3	NC	-	4	NC	-
5	NC	-	6	+3VS	I
7	KSO4	O	8	KSO2	O
9	KSI2	O	10	KSI1	O
11	KSO1	O	12	KSO0	O
13	KSI0	O	14	KSI3	O
15	KSO5	O	16	KSO6	O
17	KSI5	O	18	KSI6	O
19	KSI4	O	20	KSO12	O
21	KSO7	O	22	KSO3	O
23	KSI7	O	24	KSO13	O
25	KSO9	O	26	KSO8	O
27	KSO11	O	28	KSO10	O
29	KSO14	O	30	KSO15	O
31	+3VS	I	32	CAPS_LED#	I
33	PADS_LED#	I	34	NUM_LED#	I
35	NC	-	36	NC	-
37	NC	-	38	NC	-

C.10 JP25

Table C-10 MDC Connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	REV	-
3	ACZ_SDOUT	O	4	REV	-
5	GND	-	6	3.3V	O
7	ACZ_SYNC	I/O	8	GND	-
9	ACZ_SDIN1	I/O	10	GND	-
11	REEST	I/O	12	ACZ_BITCLK	I/O

C.11 PJP1

Table C-119 AC Adaptor Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	DC_IN_S2	I	2	DC_IN_S2	-
3	GND	-	4	GND	-

C.12 JP29

Table C-12 Microphone I/F pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	MIC-1	I
3	+AUD_VREF_J	I	4	NC	-
5	NC	-	6	NC	-

C.13 JP28

Table C-13 Head phone Connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	INTSPK_L1	O
3	INTSPK_R1	O	4	NBA_PLUG	I
5	GND	-	6	NC	-

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	18	98	44	F0	44	*2
26	P	19	99	4D	F0	4D	*2
27	[{	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

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 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break			Note
58	Ctrl(L)		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	
64	Ctrl(R)	E0	1D	E0	9D	E0	14	E0	F0	14	
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

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
X	Fn	—		—		—		—			*4
X	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F	
x	App	E0	5D	E0	DD	E0	2F	E0	F0	2F	

Notes:

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combination with the **Fn** key gives different codes.
4. * The **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1								Code set 2							
		Make				Break				Make				Break			
55	/	E0	AA	E0	35	E0	B5	E0	2A	E0	F0	12	E0	4A	E0	F0	4A	E0	12
75	INS	E0	AA	E0	52	E0	D2	E0	2A	E0	F0	12	E0	70	E0	F0	70	E0	12
76	DEL	E0	AA	E0	53	E0	D3	E0	2A	E0	F0	12	E0	71	E0	F0	71	E0	12
79	←	E0	AA	E0	4B	E0	CB	E0	2A	E0	F0	12	E0	6B	E0	F0	6B	E0	12
80	Home	E0	AA	E0	47	E0	C7	E0	2A	E0	F0	12	E0	6C	E0	F0	6C	E0	12
81	End	E0	AA	E0	4F	E0	CF	E0	2A	E0	F0	12	E0	69	E0	F0	69	E0	12
83	↑	E0	AA	E0	48	E0	C8	E0	2A	E0	F0	12	E0	75	E0	F0	75	E0	12
84	↓	E0	AA	E0	50	E0	D0	E0	2A	E0	F0	12	E0	72	E0	F0	72	E0	12
85	PgUp	E0	AA	E0	49	E0	C9	E0	2A	E0	F0	12	E0	7D	E0	F0	7D	E0	12
86	PgDn	E0	AA	E0	51	E0	D1	E0	2A	E0	F0	12	E0	7A	E0	F0	7A	E0	12
89	→	E0	AA	E0	4D	E0	CD	E0	2A	E0	F0	12	E0	74	E0	F0	74	E0	12
X	Win	E0	AA	E0	5B	E0	DB	E0	2A	E0	F0	12	E0	1F	E0	F0	1F	E0	12
X	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 Make				Code set 1 Break				Code set 2 Make				Code set 2 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
X	Win	E0	2A	E0	5B	E0	DB	E0	AA	E0	12	E0	1F	E0	F0	1F	E0	F0	12
X	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 keyiI

Cap No.	Keytop	Code set 1 Make		Code set 1 Break		Code set 2 Make		Code set 2 Break		
43	ENT	E0	1C	E0	9C	E0	5A	E0	F0	5A
58	L-CTRL	E0	1D	E0	9D	E0	14	E0	F0	14
60	L-ALT	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		C6		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	E0 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	84	

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 (GS)

United Kingdom (UK) Keyboard

Figure UK keyboard

Spanish (SP) Keyboard

Figure SP keyboard

Portuguese (PO) Keyboard

Figure PO keyboardE.8

US-INTE (UI/INTE) Keyboard

Figure US-INTE Keyboard

Germanic (GR) Keyboard

Figure GR keyboard

France (FR) Keyboard

Figure FR keyboard

Italian (IT) Keyboard

Figure IT keyboard

Belgium (BE) Keyboard

Figure BE keyboard

Czech (CZ) Keyboard

Figure CZ keyboard

Greek (GK) Keyboard

Figure GK keyboard

Hebrew (HB) Keyboard

Figure HB keyboard

Hungary (HG) Keyboard

Figure HG Keyboard

Norwegian (NW) Keyboard

Figure NW keyboard

Russian (RU) Keyboard

Figure RU keyboard

Turkish (TR) Keyboard

Figure TR keyboard

Yugoslavian (YU) Keyboard

Figure YU keyboard

Danish (DM) Keyboard

Figure DM keyboard

Swedish (SD) Keyboard

Figure SD keyboard

Swiss (SW) Keyboard

Figure SW keyboard

Arabic (ARE) Keyboard

Figure ARE keyboard

Slovakian (SV) Keyboard

Figure SV keyboard

Turkish-F (TR) Keyboard
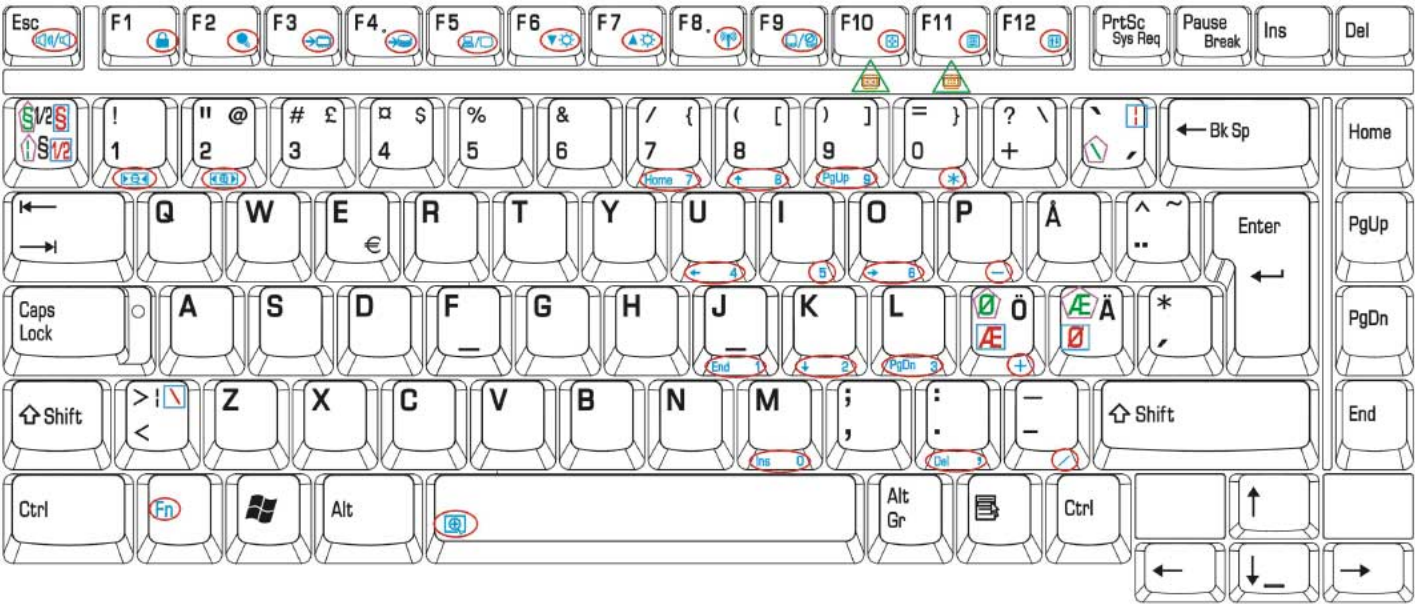

Figure TR –F keyboard

Scandinavian (ND) Keyboard

Figure ND keyboard

Appendix F   Series Screw Torque List

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
MA0000060G0	M2.0*3	8	LCD HINGE BRK ASSY L&R TO LCD 15.4w"	1.2~1.5Kgf.cm
		1	INVERTER TO COVER SUB ASSY	1.5~2.0Kgf.cm
MA0000062G0	M2.5*6	5	LCD BEZEL TO COVER	2.5~3.0Kgf.cm
MA000005WG0	M2.5*3	1	THERMAL FAN TO MB	2.0~2.5Kgf.cm
		2	MINICARD TO MB(STANDOFF)	2.0~2.5Kgf.cm
		2	MDC CRD TO MB(STANDOFF)	2.0~2.5Kgf.cm
		1	NB_SINK TO MB STANDOFF(10/10G)	2.0~2.5Kgf.cm
		3	VGA Board to MB STANDOFF(10/10G)	2.0~2.5Kgf.cm
MA0000062G0	M2.5*6	4	CPU THERMAL SINK TO CPU BRK	2.5~3.0Kgf.cm
MA0000060G0	M2.0*3	1	BLUETOOTH TO MB (STANDOFF)(10/10G)	1.5~2.0Kgf.cm
		3	MB BRK TO MB	1.5~2.0Kgf.cm
MMCK20060Z0	M2.0*6	2	HDD CONN (H=4.3mm)TO MB	1.5~2.0Kgf.cm
		2	ODD CONN TO MB	1.5~2.0Kgf.cm
MMCK20080G0	M2.0*8	2	PCMCIA CONN TO MB	1.5~2.0Kgf.cm
		2	HDD CONN (H=11mm)TO MB	1.5~2.0Kgf.cm
MACA25001G0	M2.0*4	2	PCMCIA TO MB	1.5~2.0Kgf.cm
		2	BATT CONN TO MB	1.5~2.0Kgf.cm
		1	NB_SINK TO MB STANDOFF(10/10G)	1.5~2.0Kgf.cm
MA000005WG0	M2.5*3	4	VGA_THERM_SPRING_PL TO PCB	2.0~2.5Kgf.cm
MA000008AG0	M2.5*2.5	4	FINGERPRINT BRK TO LOG UP	2.5~3.0Kgf.cm
		4	VGA Board to STANDOFF	2.5~3.0Kgf.cm
MA000005WG0	M2.5*3	5	TP BRK TO LOG UP	2.5~3.0Kgf.cm
MA000006WG0	M2.5*5	1	SPEAKER(R) TO SADDLE(R) TO LOG UP	2.5~3.0Kgf.cm
		1	SPEAKER(L) TO SADDLE(L) TO LOG UP SHIELD TO LOG UP	2.5~3.0Kgf.cm
		1	SPEAKER(R) TO TO LOG UP	2.5~3.0Kgf.cm
		1	SPEAKER(L) TO TO LOG UP	2.5~3.0Kgf.cm
MA000005WG0	M2.5*3	2	BATT LATCH TO LATCH KNOB	2.0~2.5Kgf.cm
MA000005WG0	M2.5*3	2	MB TO LOG LOW	2.5~3.0Kgf.cm
		2	KB TO LOG UP	2.5~3.0Kgf.cm
		2	HDD DOOR-LOG LOW(Main HDD)	2.5~3.0Kgf.cm
		2	HDD DOOR-LOG LOW(Second HDD)	2.5~3.0Kgf.cm
		1	USB PCB TO LOW	2.5~3.0Kgf.cm
MA0000062G0	M2.5*6	1	LOG LOW-LOG UP/R	2.5~3.0Kgf.cm
		3	LOG UP-MB-LOG LOW	2.5~3.0Kgf.cm

		1	LOG LOW TO LOG UP/L (FRONT)	2.5~3.0Kgf.cm
		2	LCD HINGE BRK R-LOG UP-HINGE SADDLE R	4.0~4.5Kgf.cm
		2	LCD HINGE BRK L-LOG UP-HINGE SADDLE L	4.0~4.5Kgf.cm
		2	THERMAL FAN-LOG LOW	2.5~3.0Kgf.cm
		2	LOG LOW TO SADDLE (R/L)	2.5~3.0Kgf.cm
MA000005YG0	M2.5*8	1	LOG LOW-USB PCB TO LOG UP	2.5~3.0Kgf.cm
		2	LOG LOW TO SADDLE TO LOG UP	2.5~3.0Kgf.cm
		2	LOG LOW TO MB TO LOG UP (M)-NEAR MAIN HDD)	2.5~3.0Kgf.cm
		2	LOG LOW TO MB TO LOG UP (M) - NEAR 2ND HDD)	2.5~3.0Kgf.cm
		1	LOG LOW TO MB TO LOG UP (BATT-R)-REAR	2.5~3.0Kgf.cm
		1	LOG LOW TO MB TO LOG UP (BATT-L)-REAR	2.5~3.0Kgf.cm
		1	LOG LOW TO LOG UP/L MID)	2.5~3.0Kgf.cm
		2	LOG LOW TO SADDLE (L) TO LOG UP	2.5~3.0Kgf.cm
		1	LOG LOW-LCD HINGE BRK L-SADDLE/L(BACK)	2.5~3.0Kgf.cm
		1	LOG LOW-LCD HINGE BRK R-SADDLE/R(BACK)	2.5~3.0Kgf.cm
		1	LOG LOW-ODD LOCK	2.5~3.0Kgf.cm
MA0000035G0	M2.5*5	1	RAM DOOR-LOG LOW(FIX ON DOOR)	2.5~3.0Kgf.cm
		1	WLAN DOOR-LOG LOW(FIX ON DOOR)	2.5~3.0Kgf.cm
MAFA94001G0	M 2.82D 5.05L 6 5.0D NI *	2	LOG LOW TO D SUB CONN(MB)	2.5~3.0Kgf.cm
MAAA43030G0	M3.0*3	2	HDD BRK L TO HDD	2.0~2.5Kgf.cm
		2	HDD BRK R TO HDD	2.0~2.5Kgf.cm
MA0000060G0	M2.0*3	2	ODD Module-ODD Lock	1.5~2.0Kgf.cm

Appendix G   Reliability

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

Table G-1 MTBF

Component	Time (hours)
LCD	10,000
Keyboard	60,000
HDD	300,000
Removable FDD	30,000
Optical (DVD/CD) drive	60,000
AC adaptor	60,000