

**Toshiba Personal Computer  
Satellite A200  
Maintenance Manual**

**TOSHIBA CORPORATION**

*[CONFIDENTIAL]*

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Toshiba Personal Computer Satellite A200 Maintenance Manual

First edition March 2007

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## Preface

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite A200, 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

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## 1.1 Features

The Minnesota 10M/10MG 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® Pentium® Dual Core Processor
- Intel® Celeron® M Processor

### ❑ Chipset

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

### ❑ Memory

- Two DDRII SO-DIMM, up to 4GB with Intel 945PM/GM Chipset or up to 2GB with Intel 943GML Chipset

### ❑ BIOS

- 1024MB Flash ROM for system BIOS
- Suspend to RAM/Disk
- Password protection
  - Power on password
  - Supervisor password
  - HDD password for WW
  - No HDD password for JP
- Various hot key for system control
- Refreshable
- Complete ACPI 2.0 function
- SMBIOS V2.4
- Supports JSB memory Boot, USB Super Fetch, SD Super Fetch

### ❑ Power

- Universal AC adapter, 90~264VAC, 47~63Hz.
  - Offers constant voltage 19V output source with 65W max output power capacity for Minnesota 10M
  - Offers constant voltage 19V output source with 75W max output power capacity for Minnesota 10M
  - Offers constant voltage 19V output source with 90W max output power capacity for Minnesota 10MG

- 3 cells of Li-Ion 18650 size, smart battery pack with 2000mAH x 10.8V (21.6W)
  - 6 cells of Li-Ion 18650 size, smart battery pack with 4000mAH x 10.8V (43.2W)
  - 9 cells of Li-Ion 18650 size, smart battery pack with 6000mAH x 10.8V (64.8W)
  - 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.
  - Discharge time in shutdown mode is approximately 1 month
- ❑ HDD
- One/Dual 2.5", 9.5/12.5mm Hard Disk, up to 400GB (200GB+200GB)
  - SATA 1.5Gb/s
  - 9.5/12.5mmH, 2.5" SATA HDD Support
- ❑ VGA
- Intel® 945GM for Integrated Graphics
  - Intel® 943GML for Integrated Graphics
  - nVIDIA GeForce® Go 7300
- ❑ Fixed Optical drive
- 12.7mm height, DVD-ROM & CD-RW combo device
  - 12.7mm height, DVD Super-multi device
  - 12.7mm height, DVD Super-multi device with Label Flash
- ❑ Optional Devices
- Express Card
  - Build-in antenna for wireless LAN module
  - Build-in antenna for Bluetooth module
  - MDC Modem
- ❑ Keyboard
- 86/87 keys
  - Standard pitch 19.05mm, 2.5±0.3mm travel length
  - Windows key, Application key
  - Vista key supported
- ❑ Touch Pad with Two Buttons
- Left button
  - Right button
- ❑ 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/Rotary volume control
- 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 4-in-1 push-push type flash card connector and card reader
- Built-in camera with microphone
- One type II PCMCIA slot with shutter door
- One SIM card reader
- ❑ Express Card Slot
  - TI 8402 card bus controller for the model with Bridge media slot
  - PC Card 95 supported with one Type II Card socket
  - With Shutter door
  - No ZV-Port support
- ❑ Wireless LAN module
  - Dual-band built-in antenna for wireless LAN communication
  - WLAN module b/g, a/b/g, and a/b/g/n
- ❑ 5 in 1 Card Reader Organization
  - TI 8402 controller
  - SD, miniSD, MMC, Memory Stick/PRO, and xD card supported
  - 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

Switches

- Power button
- Two programmable launch buttons
- Four control buttons for CD playing
- Wireless communication switch

 Security

- Fingerprint authentication

 AC Adapter

- Universal AC adapter module
- Liteon & Delta 65W, 75W and 90W adapters
- Output voltage: 19Vdc
- Input Voltage/Frequency range: 90-264Vac, 47-63Hz

 Display

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

 Video RAM

- NVIDIA GeForce® Go 7300, up to 256MB VRAM (GDDR2)

 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.

 OS

- Windows Vista Home Basic/ Home Premium (32/64 bit support)
- Windows Vista Business (32/64 support)
- Vista Premium Logo

## 1.2 System Unit

The system unit is composed of the following major components:

### ❑ Processor

- Intel® Core™ 2 Duo Processor  
T7600/T7400/T7200/T5600/T5500/T5300/T5200
- Intel® Core™ Duo Processor T2450/T2350
- Intel® Pentium® Dual Core Processor T2080/T2060
- Intel® Celeron® M Processor 530/520

### ❑ System Logic

- Mobile Intel® 945PM with ICH7M Chipset
- Mobile Intel® 945PM with ICH7M Chipset
- Mobile Intel® 943GML with ICH7M Chipset

### ❑ Memory

- Two DDR-II 533/667MHz SO-DIMM
- Supports Dual channel
- Up to 2GB with 256MB/512MB/1GB module for Intel 945PM/945GM/943GML Chipset
- Up to 4GB with 2GB module for Intel 945PM/945GM Chipset

### ❑ Video RAM (Depending on the model you purchased)

- nVIDIA GeForce® Go 7300, up to 256MB VRAM (GDDR2)

### ❑ Audio subsystem

- Realtek High Definition Audio Codec ALC861
  - Microphone-in and headphone-out
  - Volume control: Digital control, rotary type, without mute function
  - Supports Microsoft Outlook Express audio

### 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 250G HDD.

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

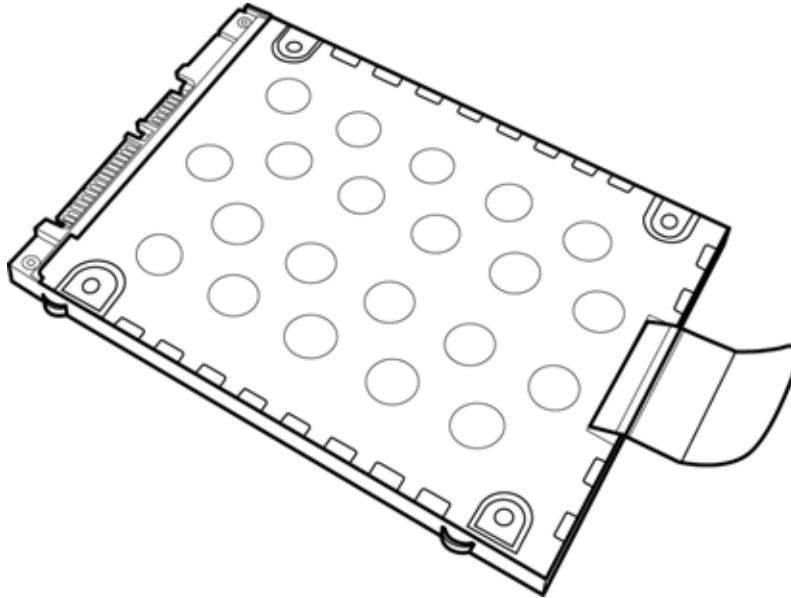


Figure 1-1 2.5-inch HDD

Items	40GB	60GB	80GB	100GB
Formatted capacity (GB)	37.26	55.89	74.52	93.15
Logical Blocks (LBA)	78,140,160	117,210,240	156,301,488	195,371,568
Rotational speed (rpm)	5400	5400	5400	5400
Toshiba HDD Buffer (MB)	8	8	8	8
Hitachi HDD Buffer (MB)	8	8	8	8
Fujitsu HDD Buffer (MB)	8	8	8	8
Bytes per sector	512	512	512	512

Table 1-1 2.5-inch HDD specifications

<b>Items</b>	<b>120GB</b>	<b>160GB</b>	<b>200GB</b>	<b>250GB</b>
Formatted capacity (GB)	111.8	149.05	186.31	232.89
Logical Blocks (LBA)	234,441,648	312,581,808	390,720,968	488,397,168
Rotational speed (rpm)	5400	5400/4200	5400/4200	4200
Toshiba HDD Buffer (MB)	8	8	8	N/A
Hitachi HDD Buffer (MB)	8	8	N/A	N/A
Fujitsu HDD Buffer (MB)	8	8	8	8
Bytes per sector	512	512	512	512

*Table 1-1 2.5-inch HDD specifications (Continued)*

## 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	150	130
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 1-3.

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	130	130
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, 90W, and 120W AC adapter power supply. It supplies a constant voltage 19V output source for the Minnesota 10M/10MG 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<sup>2</sup>PROM 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 (3 cells)	Lithium-Ion	10.8V	2000mAH
Main battery (6 cells)	Lithium-Ion	10.8V	4000mAH
Main battery (9 cells)	Lithium-Ion	10.8V	6000mAH
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

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## **Chapter 2**

# **Troubleshooting Procedures**

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## 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:

- |                            |                              |                                |
|----------------------------|------------------------------|--------------------------------|
| <u>1. Display</u>          | <u>6. TouchPad</u>           | <u>11. IEEE 1394 port</u>      |
| <u>2. USB Floppy Drive</u> | <u>7. Speaker</u>            | <u>12. Wireless LAN system</u> |
| <u>3. Keyboard</u>         | <u>8. Optical drive</u>      | <u>13. Camera</u>              |
| <u>4. USB ports</u>        | <u>9. Modem</u>              | <u>14. Bluetooth</u>           |
| <u>5. TV-out port</u>      | <u>10. EXPRESS CARD unit</u> |                                |

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 (EXPRESS CARD 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

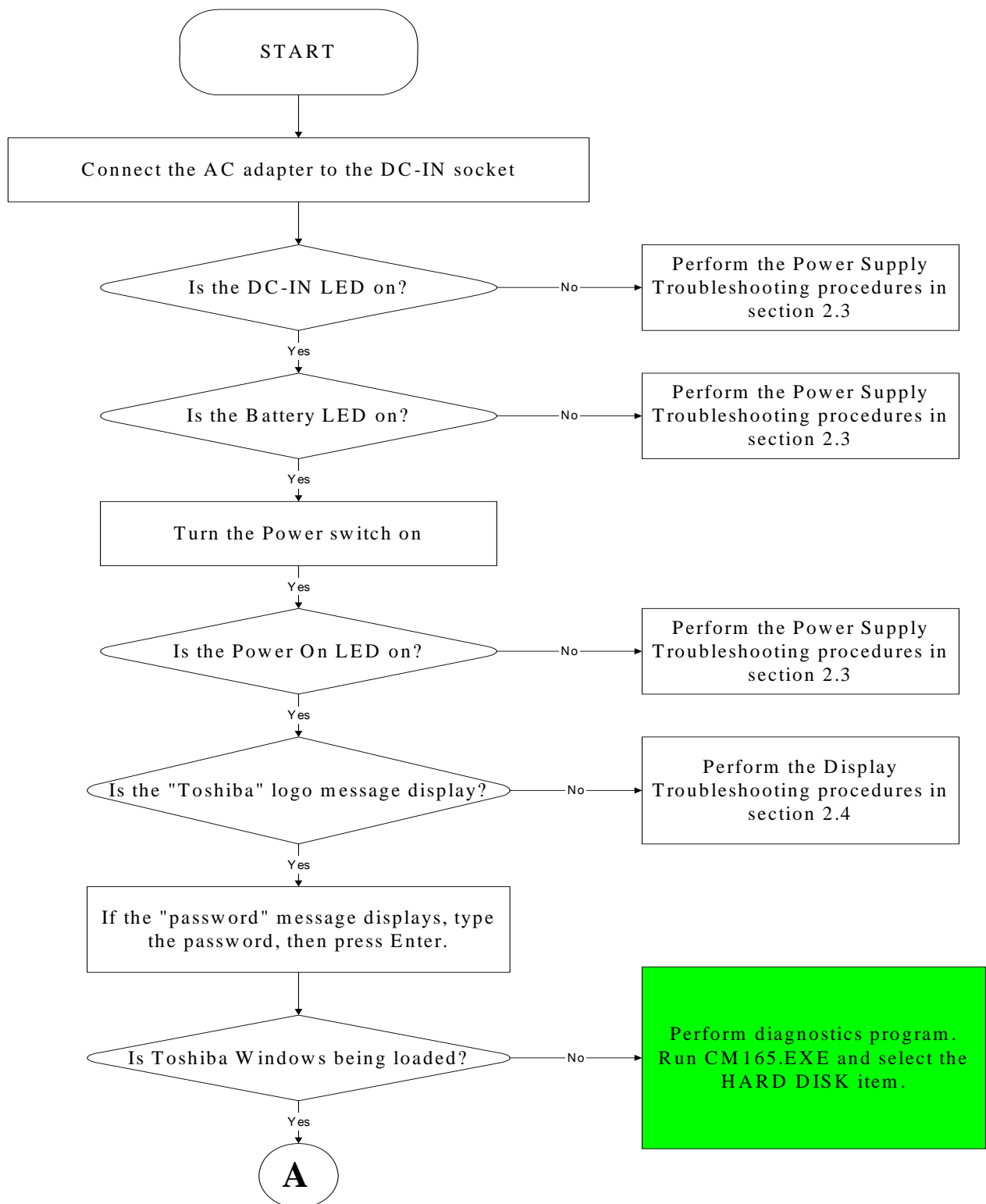


Figure 2-1 Troubleshooting flowchart (1/2)

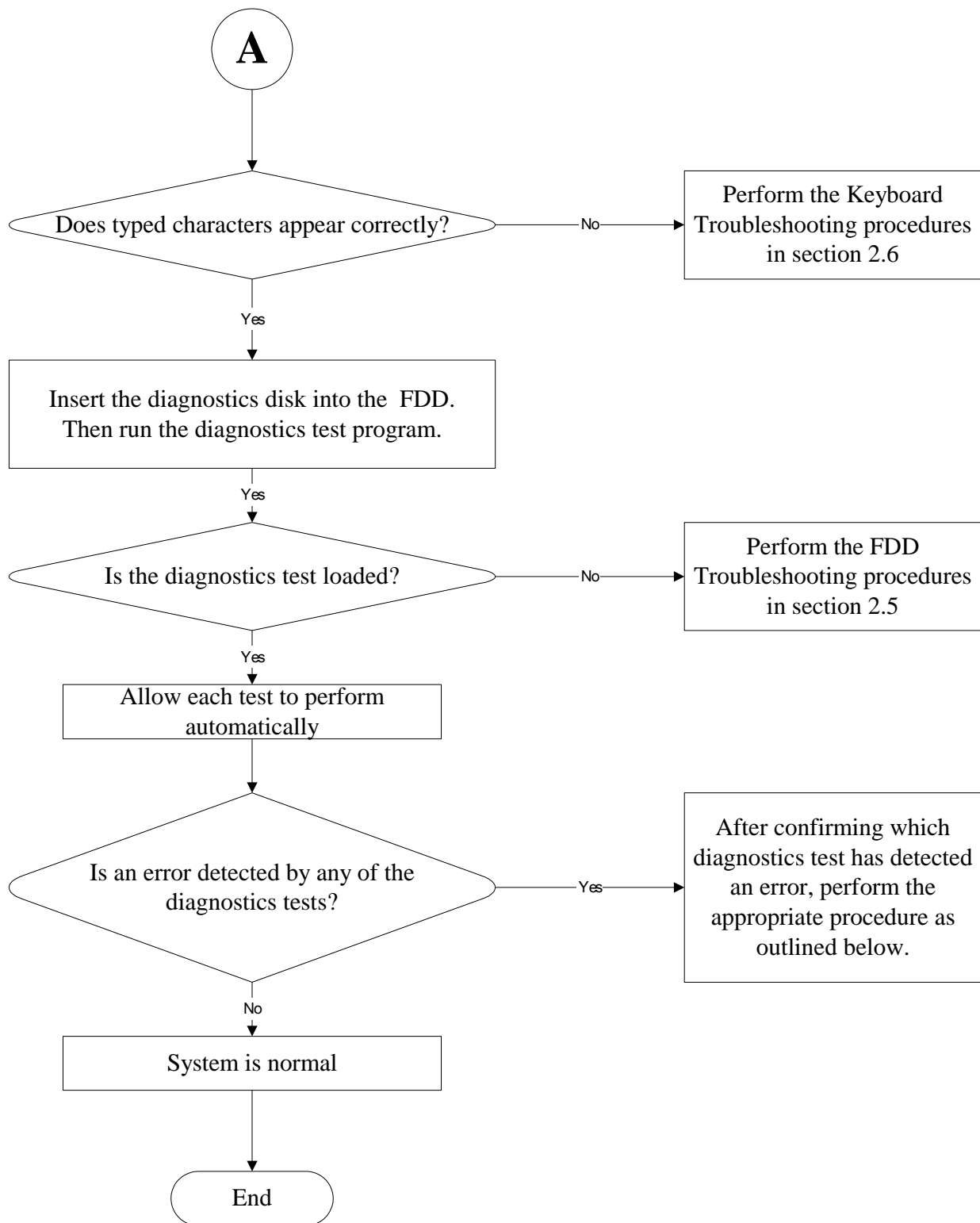


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The test program should be executed several times to isolate the problem. 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 EXPRESS CARD unit, perform the EXPRESS CARD 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.

## 2.3 Power Supply Troubleshooting

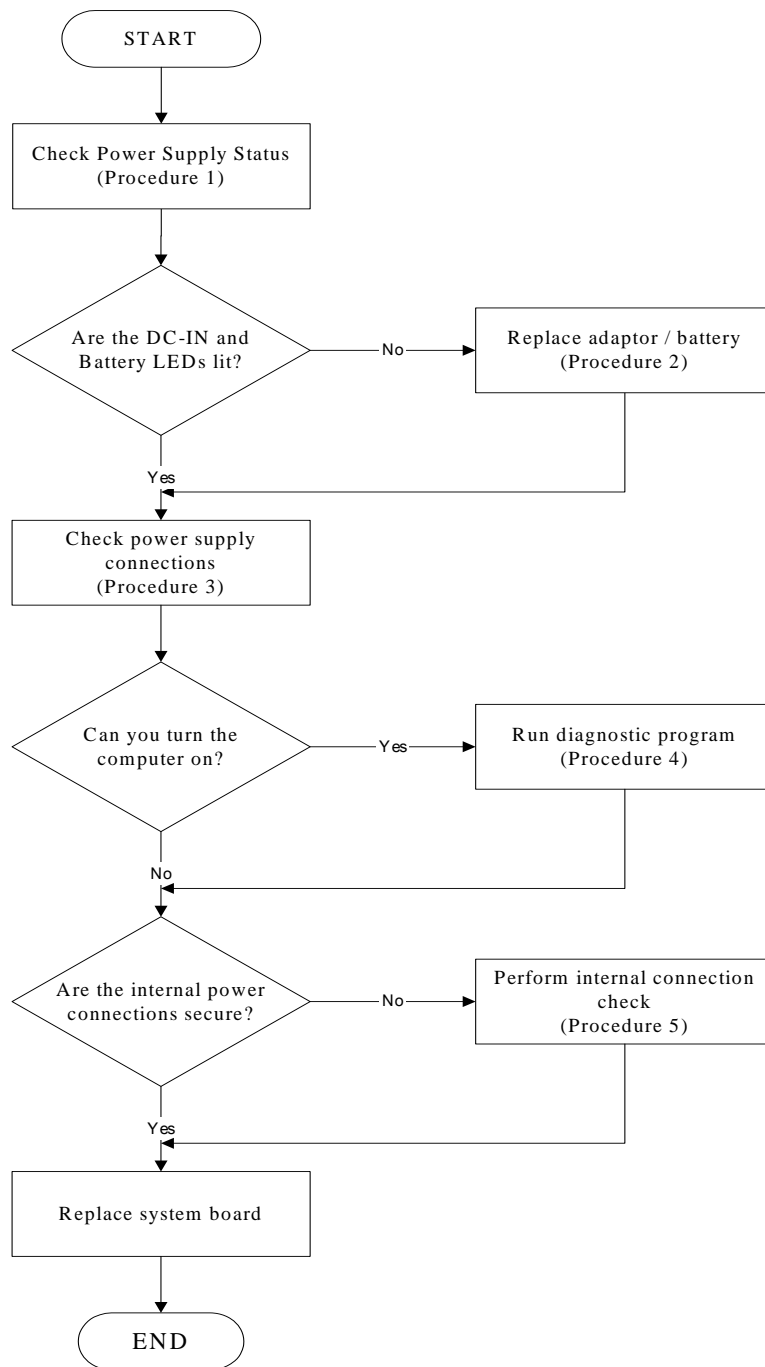


Figure 2-2 Power Supply Troubleshooting Process

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

<b>AC-IN LED</b>	<b>Power supply status</b>
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**

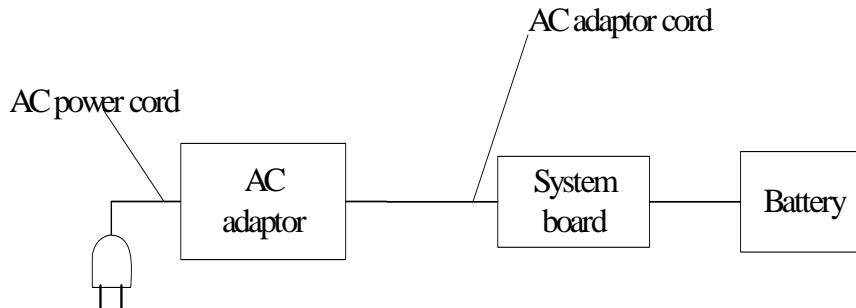
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

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:



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

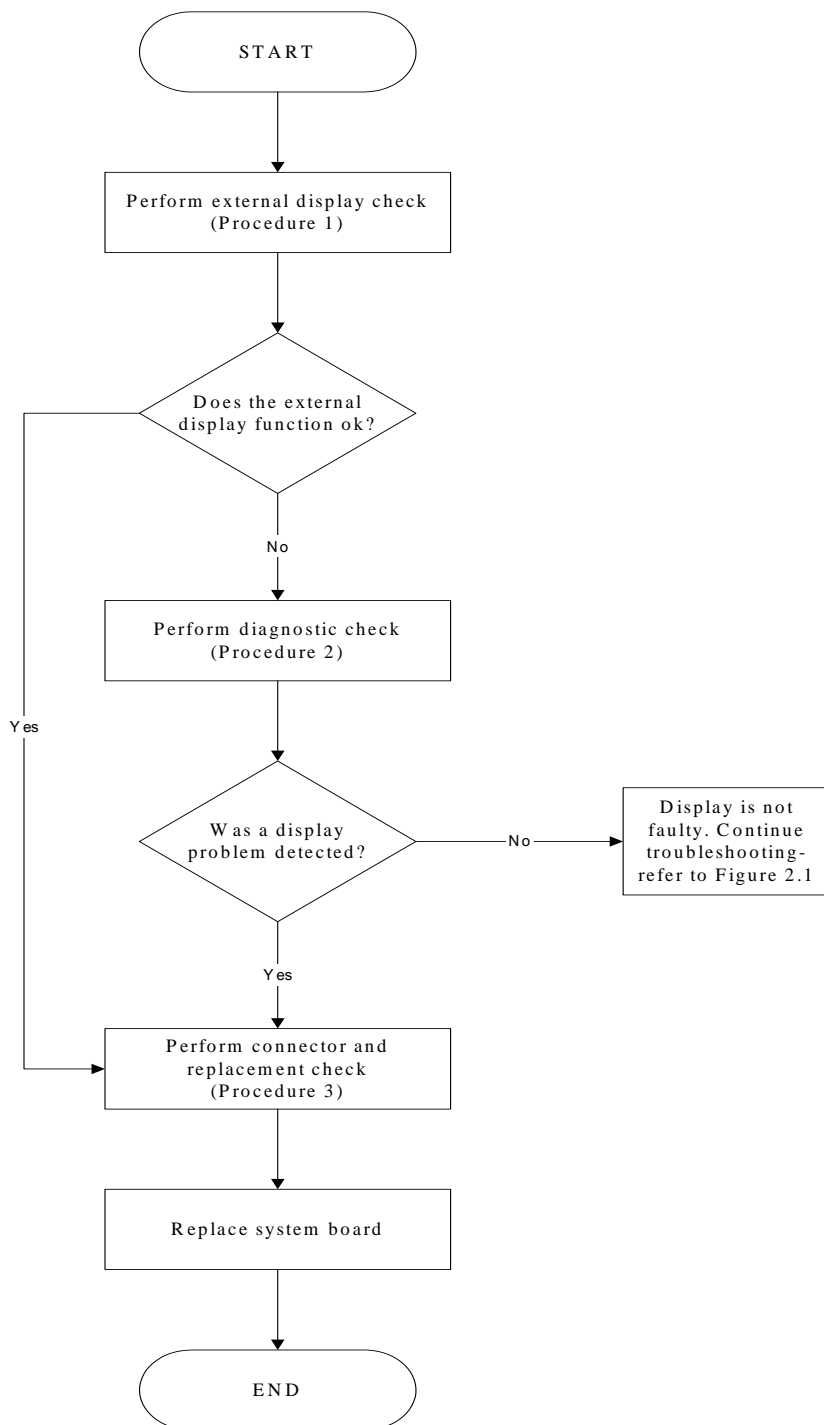


Figure 2-3 Display troubleshooting process

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 exists, 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

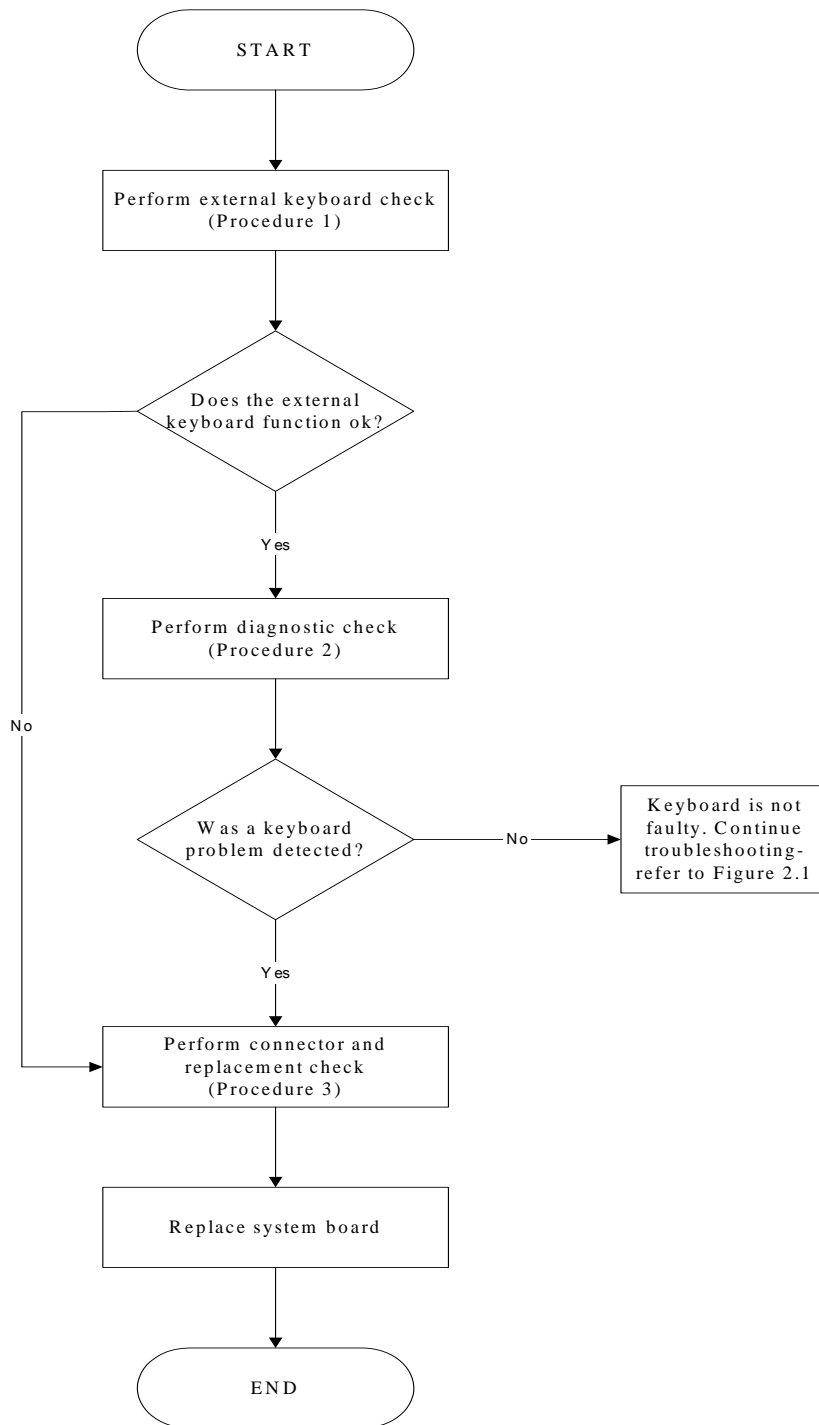


Figure 2-4 Keyboard troubleshooting process

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

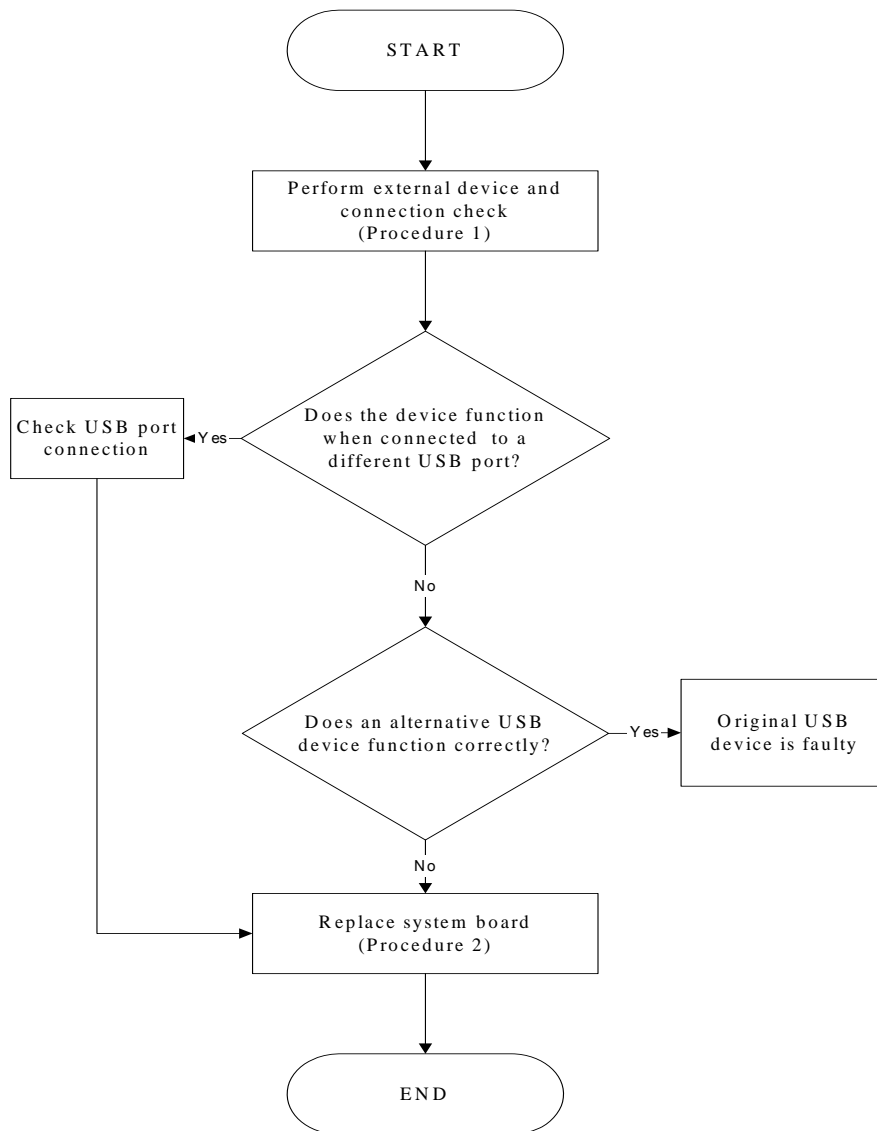


Figure 2-5 External USB device troubleshooting process

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

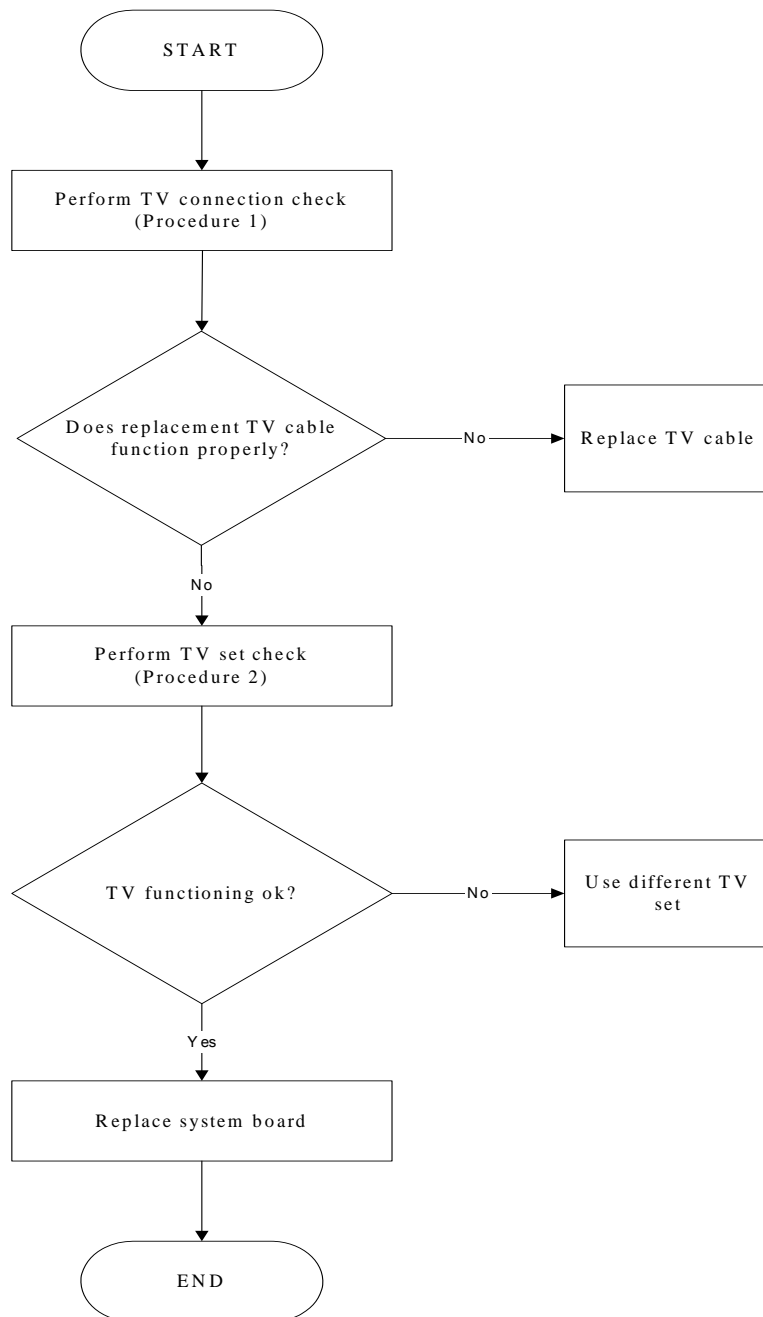


Figure 2-6 TV-out troubleshooting process

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:

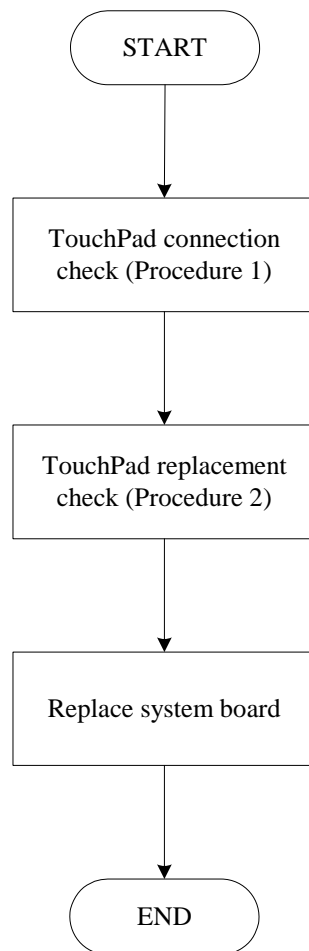
- Check 1 Make sure TV cable is firmly plugged into both the TV set and the TV-out port of the computer. If the cable is connected correctly, go to Check 2.
- Check 2 Make sure the TV-out port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.
- Check 3 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



*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

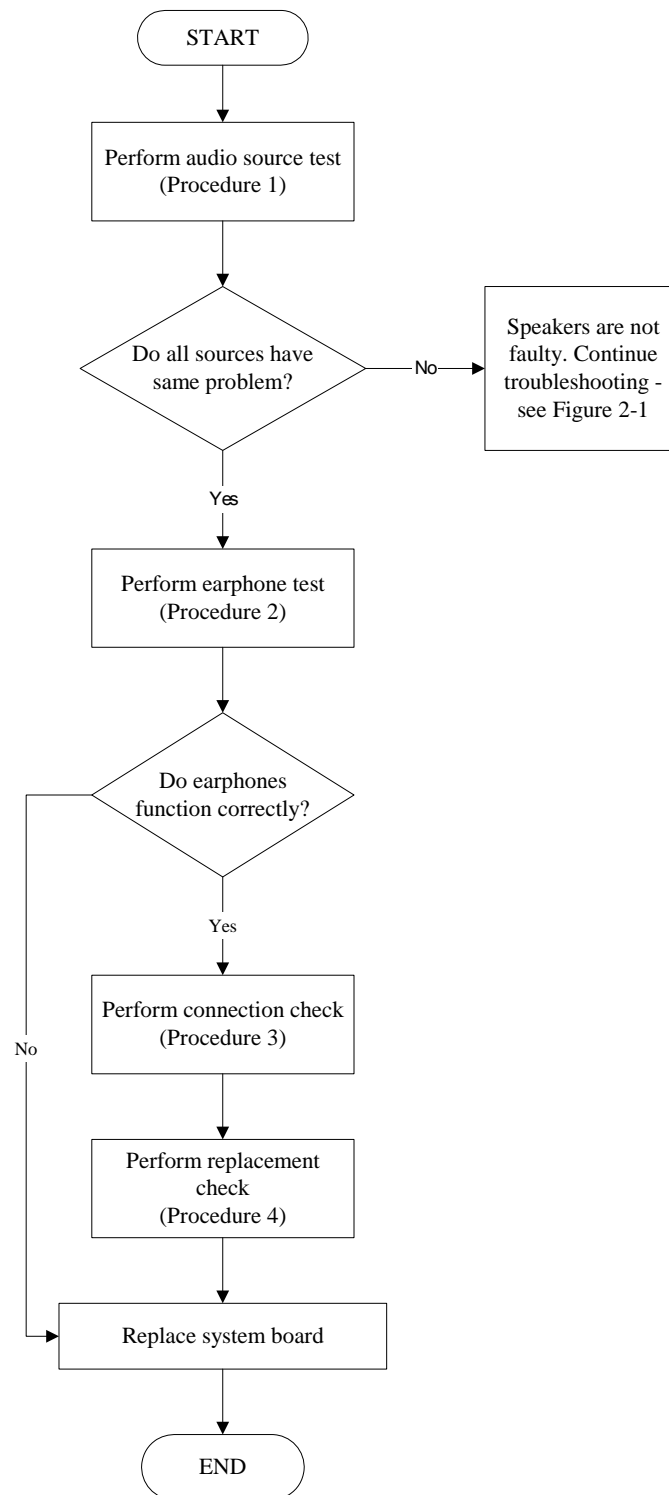


Figure 2-8 Speaker troubleshooting process

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 of 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

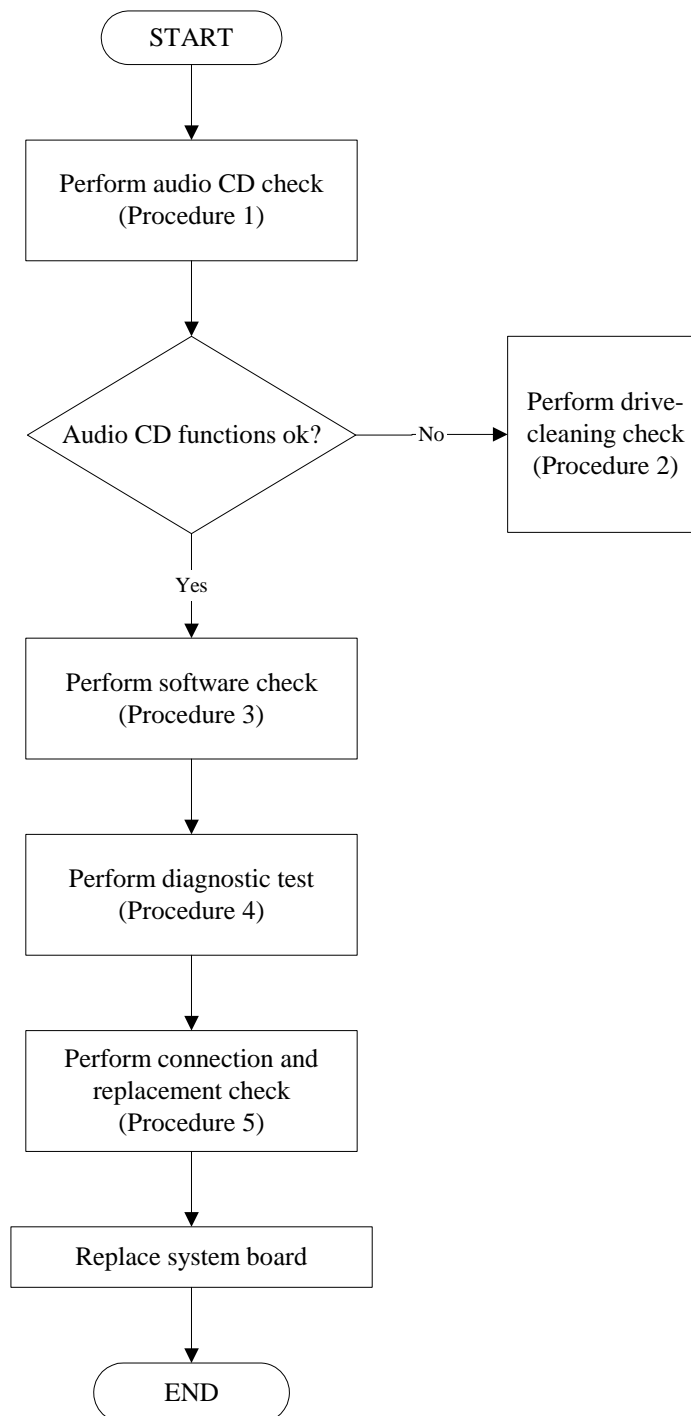


Figure 2-9 Optical drive troubleshooting process

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite A200/Satellite A205/Satellite Pro A200/EQUIUM A200/SATEGO A200 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

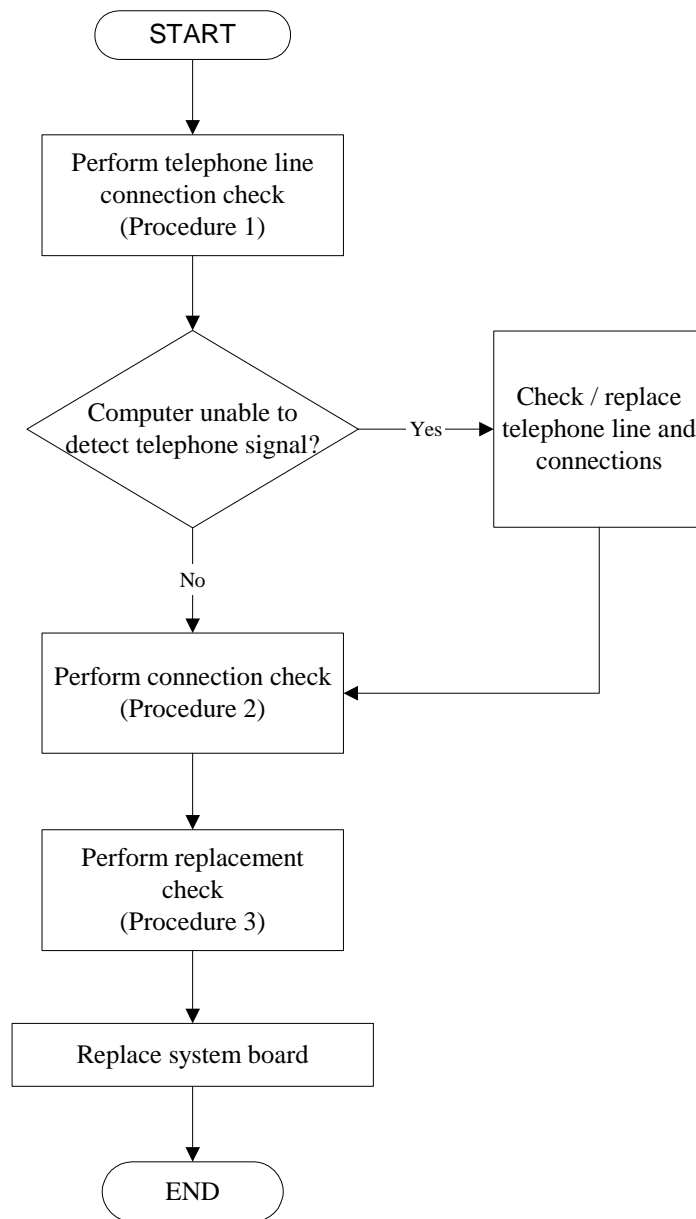


Figure 2-10 Modem troubleshooting process

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 Express card Troubleshooting

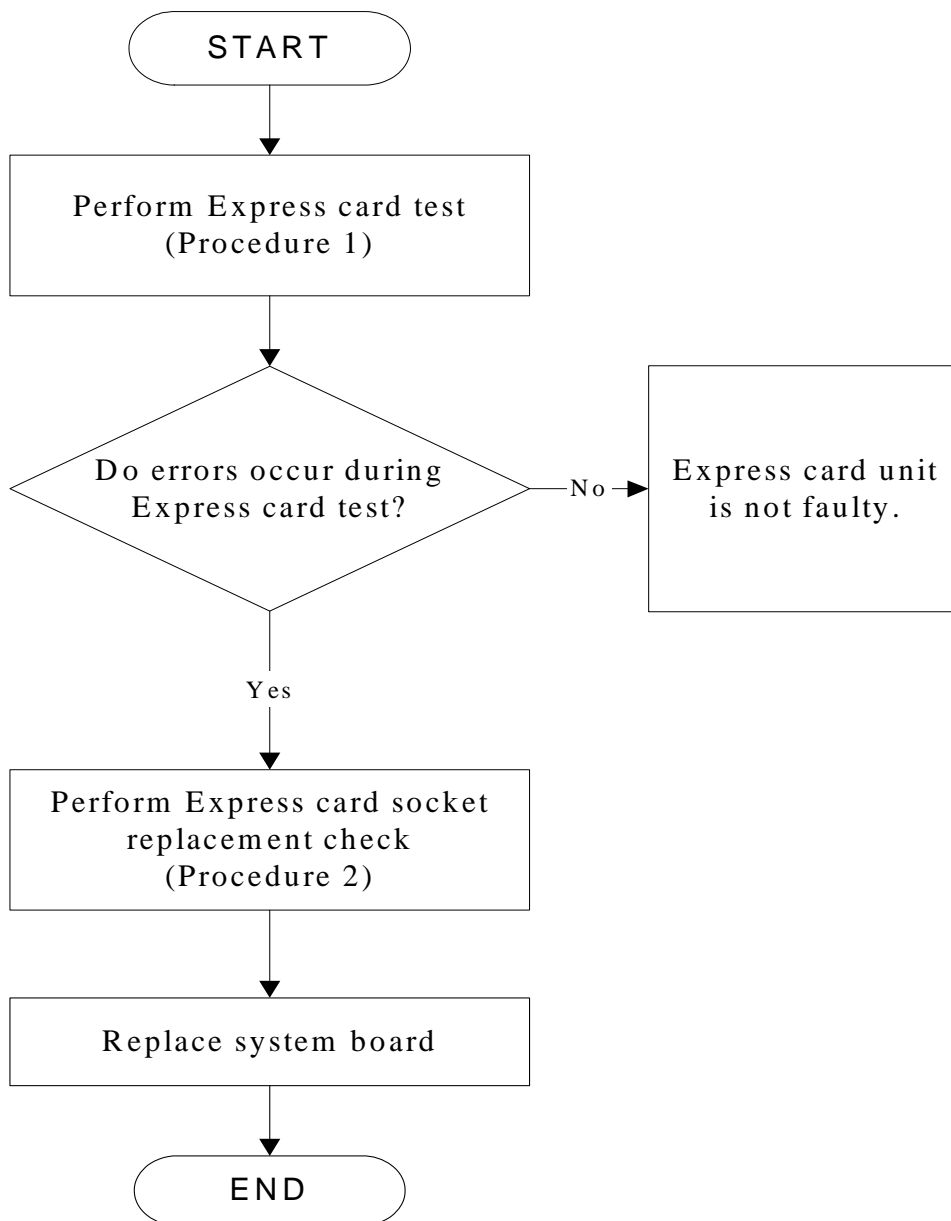


Figure 2-11 Express card troubleshooting process

This section describes how to determine if the Express 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: Express card test

Procedure 2: Express card socket replacement check

### **Procedure 1 Express card test**

The Express test card contains a Express test program. Ensure the card is fully inserted into the socket before running the program.

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

### **Procedure 2 Express card socket replacement check**

The Express 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.

### 2.13 IEEE 1394 Troubleshooting

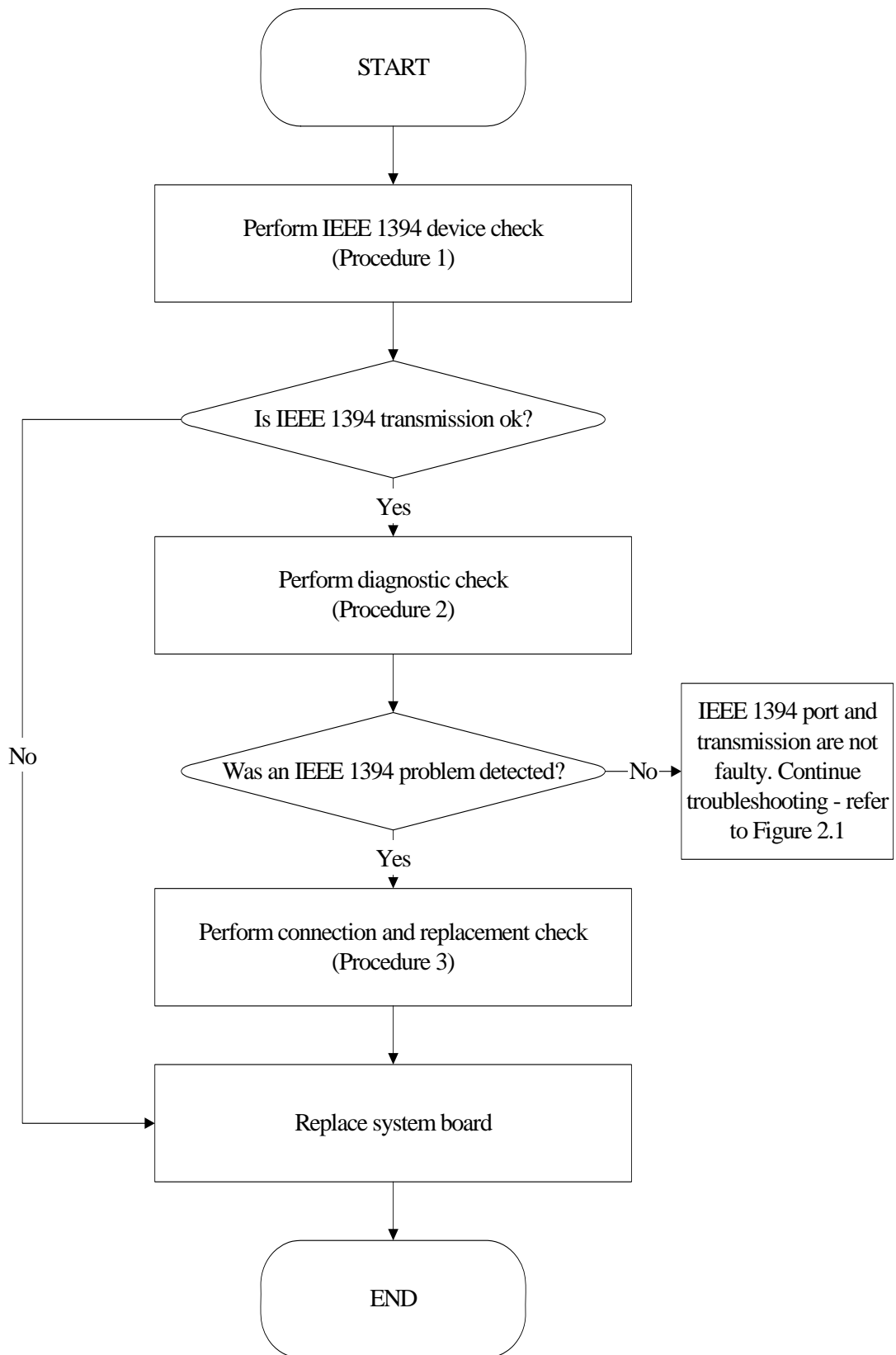


Figure 2-12 IEEE 1394 troubleshooting process



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

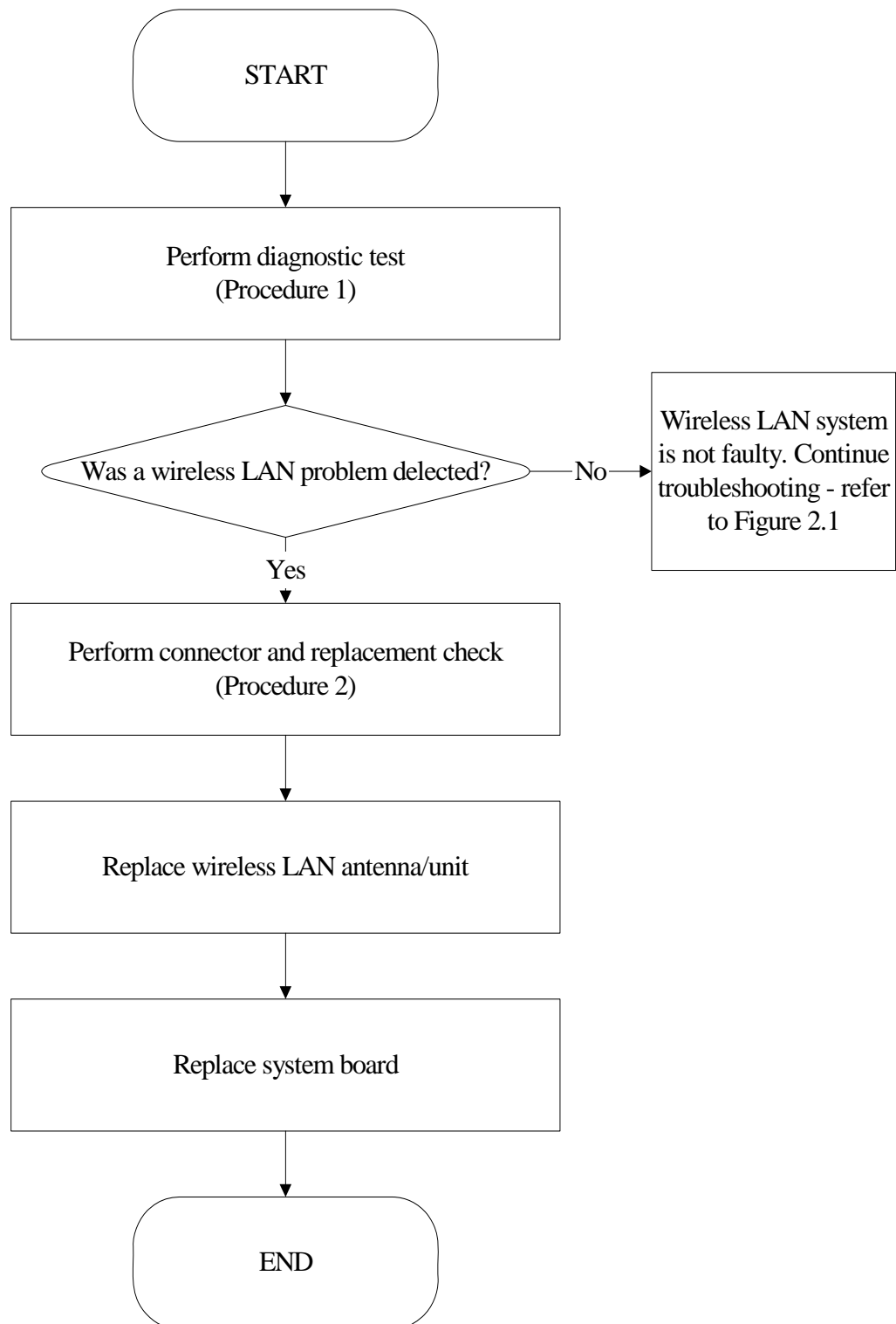


Figure 2-13 Wireless LAN troubleshooting process

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 Camera Troubleshooting

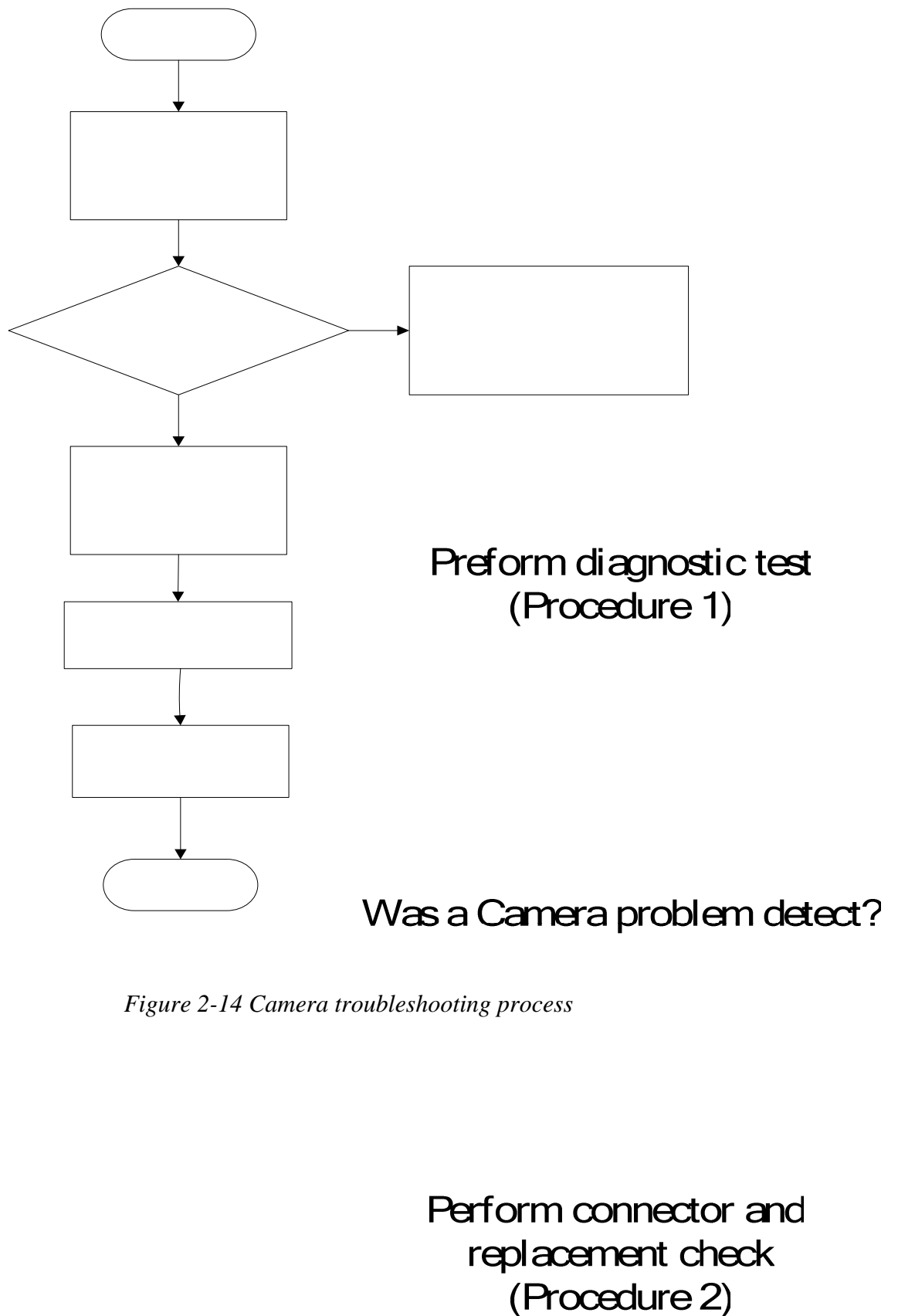


Figure 2-14 Camera troubleshooting process

The Camera board or system board may be the reason of a Camera fault. Either of these two components may be damaged. To determine if the computer's Camera 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 functioning Program in windows, which will display the Camera test result.

If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the Camera system is functioning properly.

### **Procedure 2 Connector and replacement check**

The Camera 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 Camera board FFC is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 The Camera 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

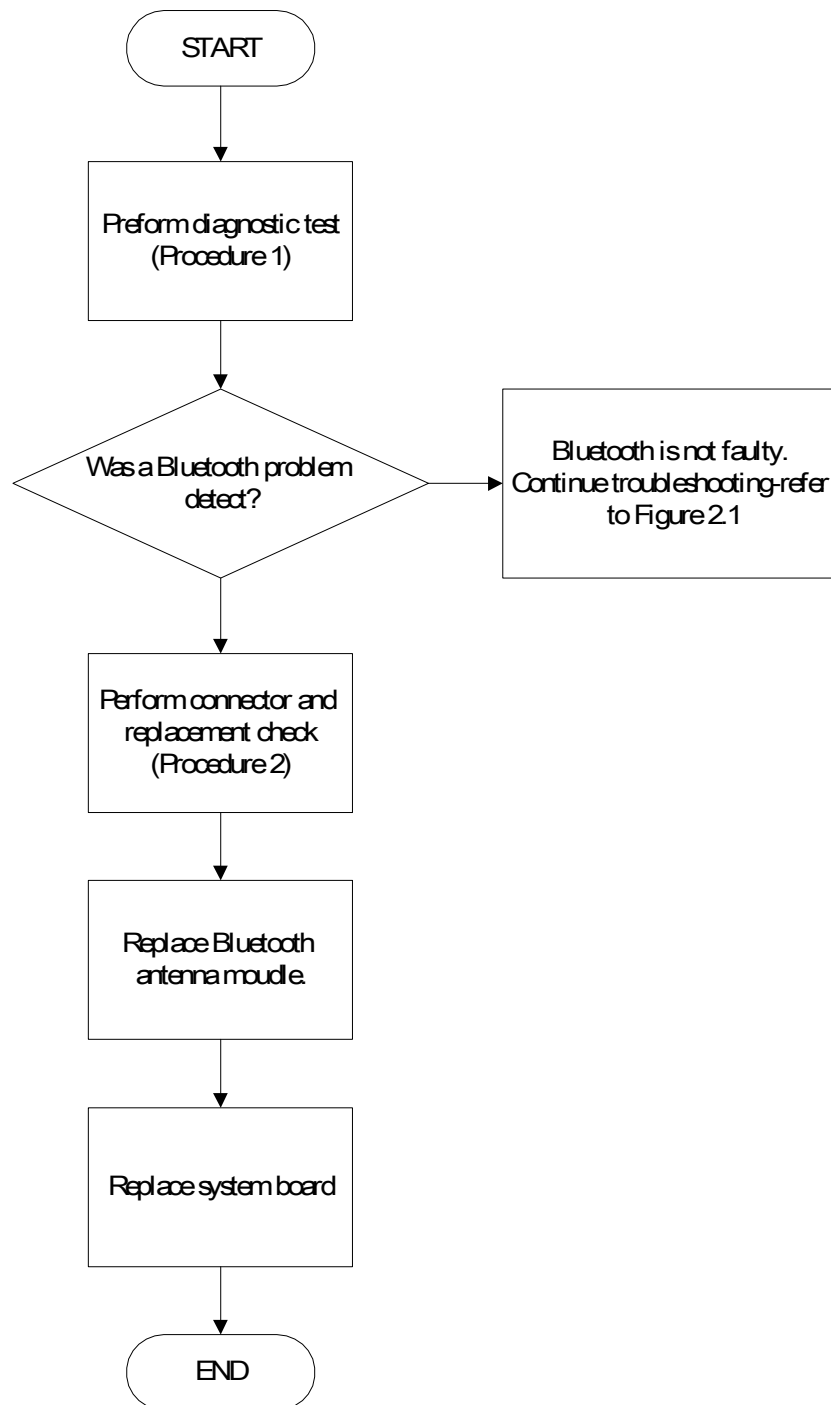


Figure 2-15 Bluetooth troubleshooting process

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

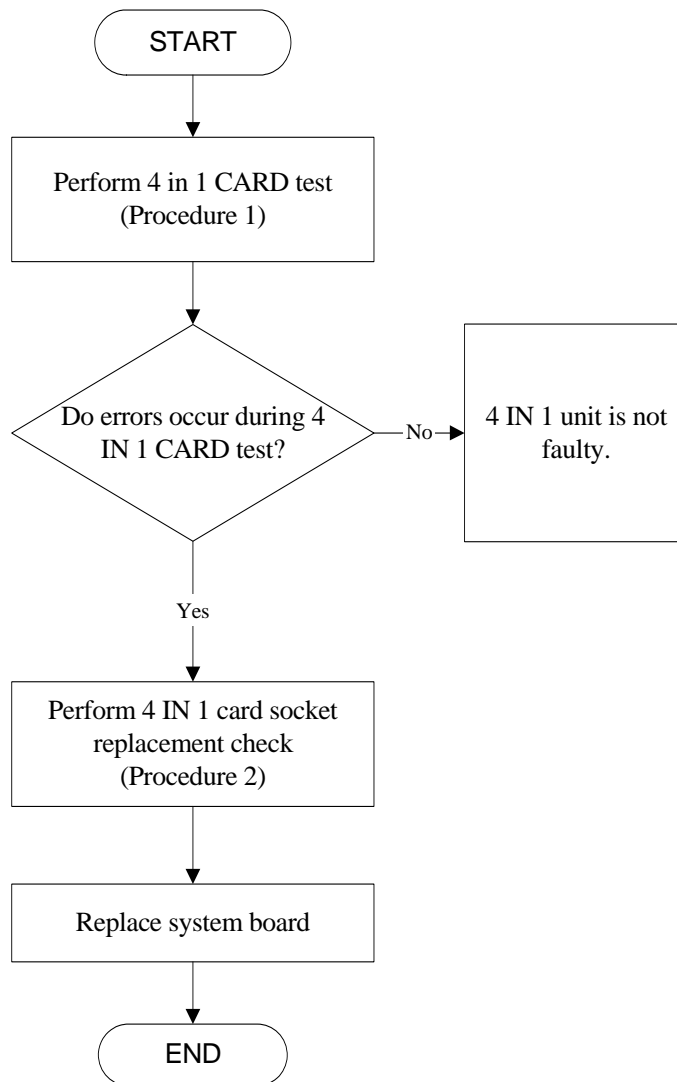


Figure 2-16 4 in 1 card troubleshooting process



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 is 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 1<sup>st</sup> HDD Troubleshooting

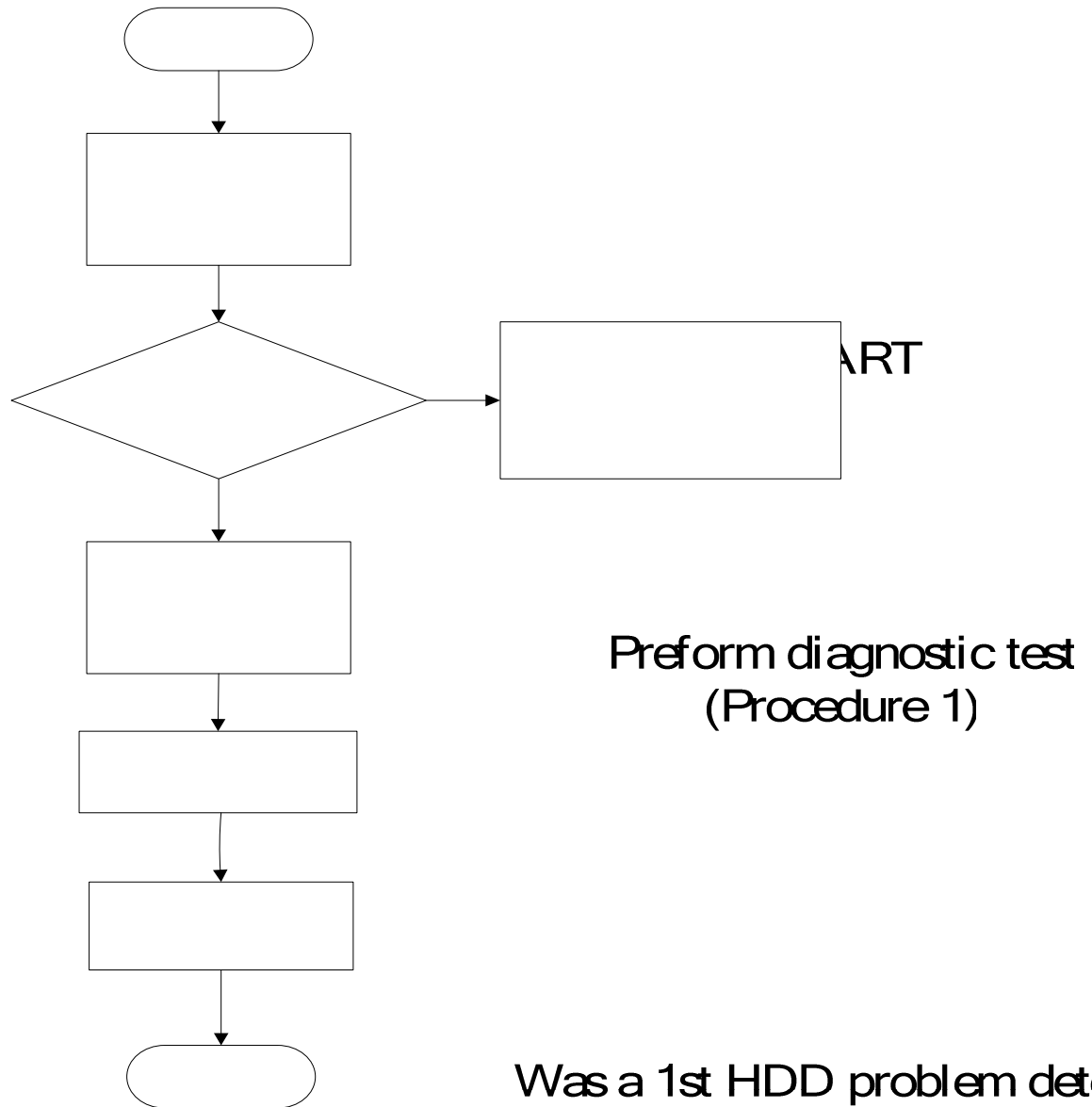


Figure 2-17 HDD troubleshooting process

Perform connector and  
replacement check  
(Procedure 2)

The 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> HDD function is functioning properly.

### **Procedure 2 Connector and replacement check**

The 1<sup>st</sup> 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 1<sup>st</sup> HDD module is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 The 1<sup>st</sup> 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 2<sup>nd</sup> HDD Troubleshooting

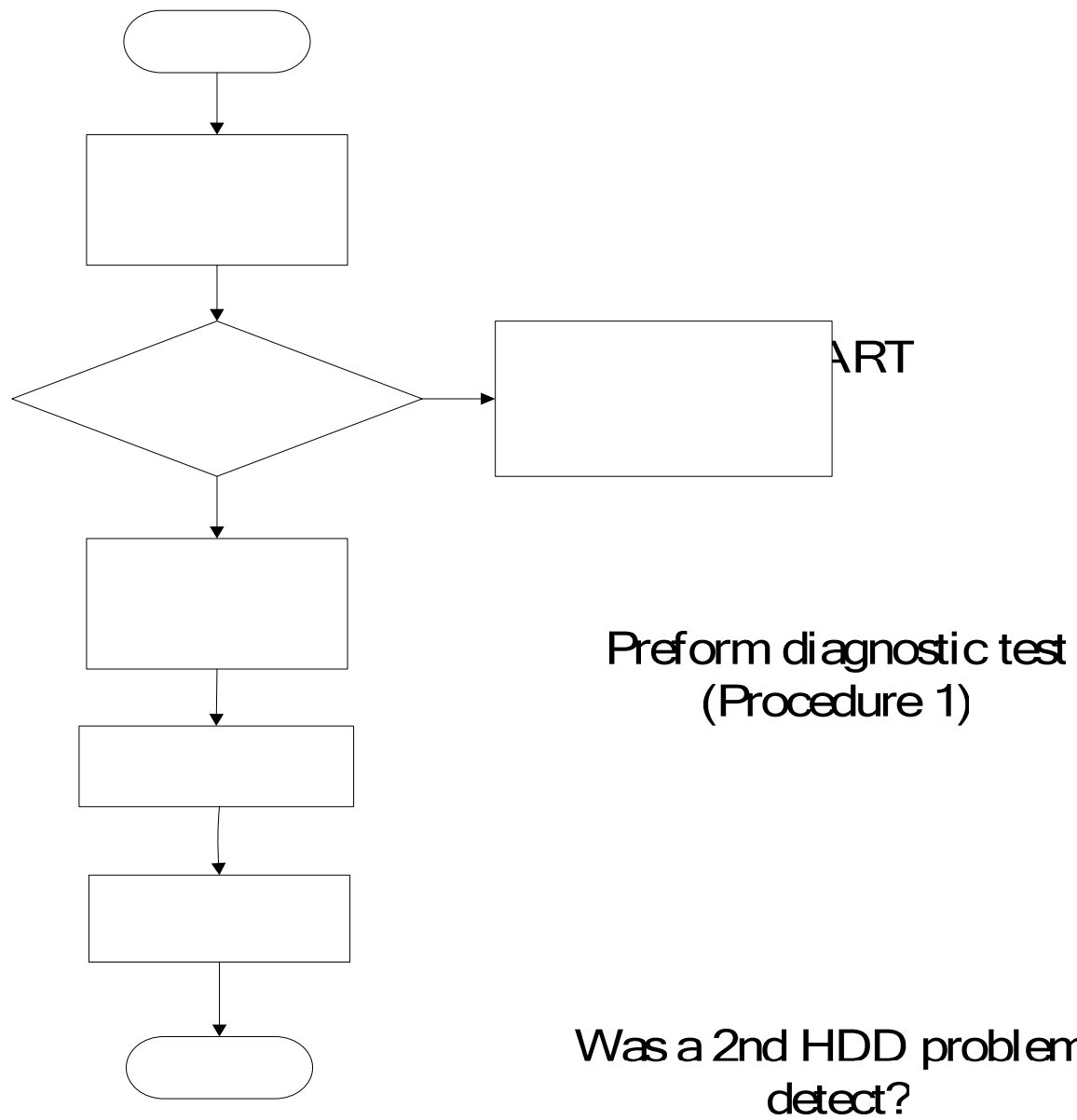


Figure 2-18 2<sup>nd</sup> HDD troubleshooting process

Perform connector and replacement check (Procedure 2)

The 2<sup>nd</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> HDD function is functioning properly.

### **Procedure 2 Connector and replacement check**

The 2<sup>nd</sup> 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 2<sup>nd</sup> HDD module is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 The 2<sup>nd</sup> 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**

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### 3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Minnesota 10M&10MG 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
- LAN TEST
- RTC TEST
- IEEE1394 CODE TEST
- Speaker EQ Check & Rewrite
- Button Test
- 1st HDD TEST
- 2<sup>nd</sup> HDD Test
- Satellite LED Test

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.

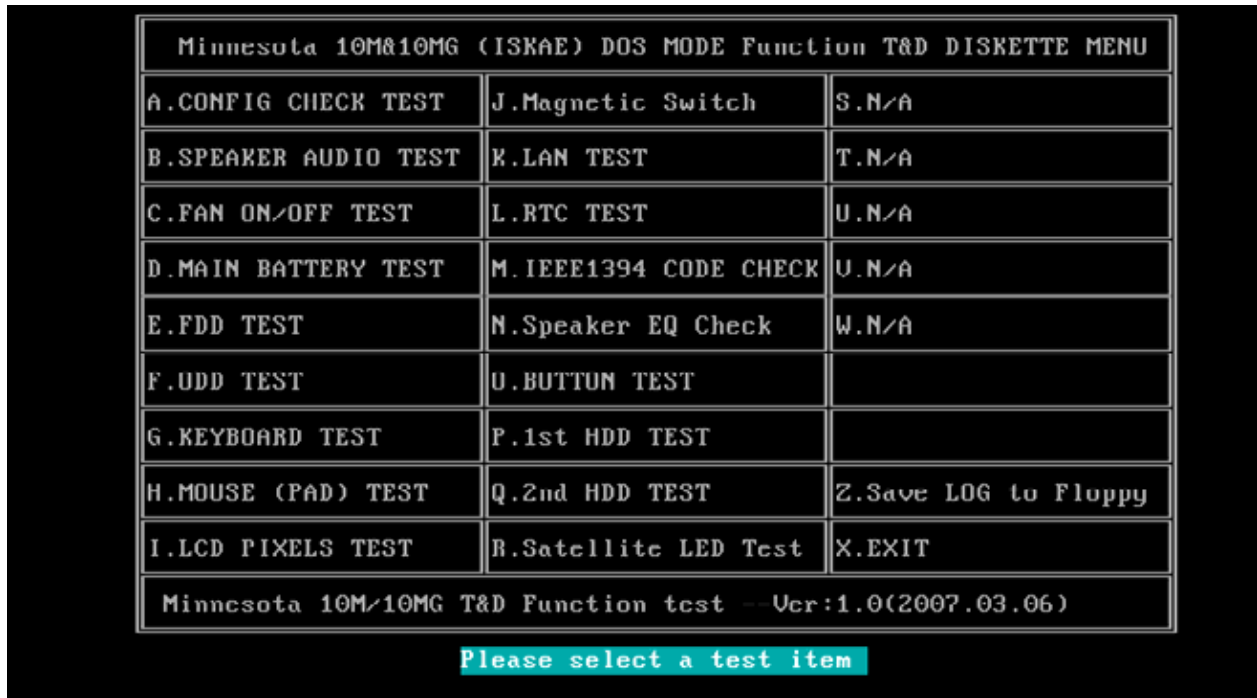
The T&D Program can run by single test item when you press corresponsive English letter of test item, or run two or more test items what you like if you choose them by “Arrow cursors” and “Space Bar” – the wonderful thing is you can setup test loop by “Enter” button. And it also asks you if you like 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. 1<sup>st</sup> HDD TEST
- Q. 2<sup>nd</sup> HDD TEST
- R. Satellite LED Test

### 3. Tests and Diagnostics

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



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



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.

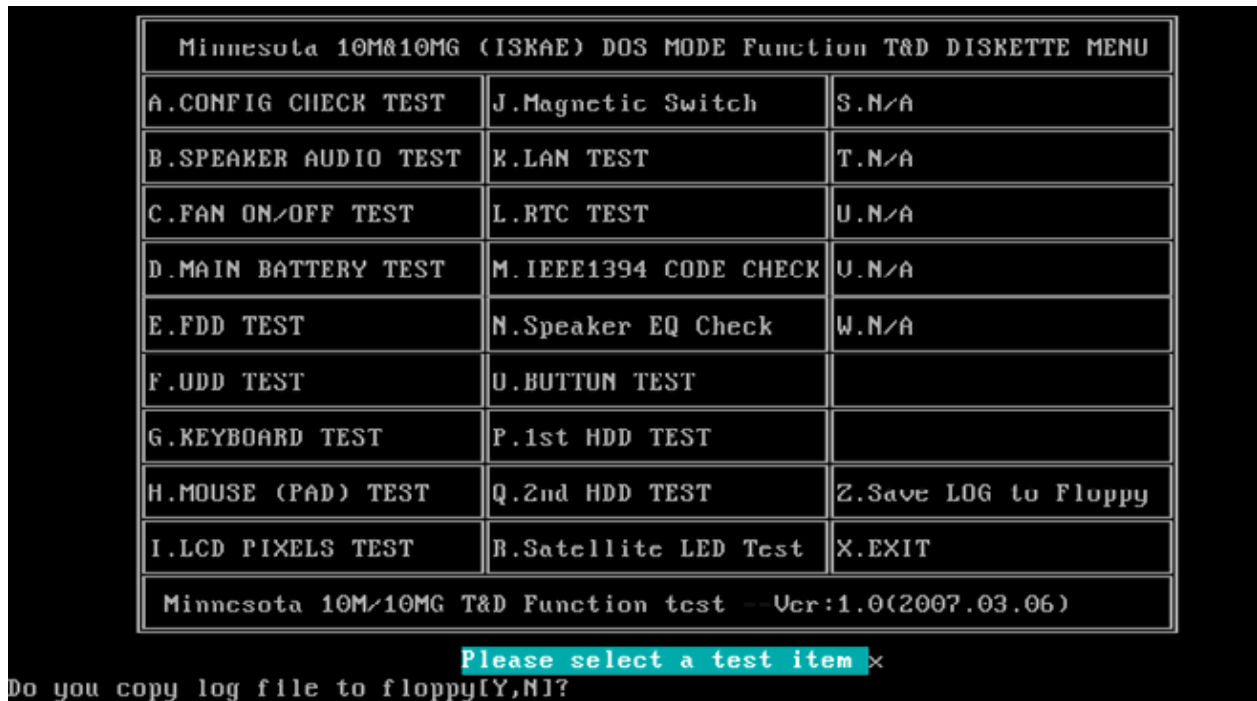
Minnesota 10Mx10MG (ISKAE) DIS MODE Function T&D DISKETTE MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.N/A
B.SPEAKER AUDIO TEST	K.LAN TEST	T.N/A
C.FAN ON/OFF TEST	L.RTC TEST	U.N/A
D.MAIN BATTERY TEST	M.IEEE1394 CODE CHECK	V.N/A
E.FDD TEST	N.Speaker EQ Check	W.N/A
F.ODD TEST	O.BUTTON TEST	
G.KEYBOARD TEST	P.1st HDD TEST	
H.MOUSE (PAD) TEST	Q.2nd HDD TEST	Z.Save LOG to Floppy
I.LCD PIXELS TEST	R.Satellite LED Test	X.EXIT
Minnesota 10M/10MG T&D Function test --Ver:1.0(2007.03.06)		
Please select a test item z		
Do you copy log file to floppy[Y,N]?		

### 3. Tests and Diagnostics

---

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.



### 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=Merom-T7200
CPUCatche=4096
CPUSpeed=2.00GHZ
CPUFSB=667MHZ
DDRAMSIZE=1024MBRAM
ODDTYPE=DVD-RW+2RJ0
PanelID=AU15.4WXGA
HDD1=TOSHIBA_MK1637GSXDL030M
HDD2=NONE
VRAMSIZE&UGATYPE=256MBG72MU
BATT=6cell
WirelessTYPE=NOWEP
LANTYPE=8101E
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 : 88.0%

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 U1.3 *****  
Testing Driver A: [1.44 MByte (Cyl:08, Head:2, Sec:10)]...  
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.

```
LAP:00001(0000:00) 11-07-106 COMPAL TSEL/F:ODD.SCY IN:2 Version:1.64
<01| COMPACT DISC ROM |>
CD ROM Drive G:, MSCDEX ver.: 2.22, Driver name: FDCD0001, Vol.: COMPAL_TEST
Total 149402626 sectors(46082 bytes/sector) = 4234203140 bytes
Testing for DATA CD:
Testing CD ROM reset function...Passed.
Testing seq. read... sector: 143426501( 25)
Testing fun. read... sector: 71713253( 25) Passed.
<02| CDROM CHECK2 |>
CD ROM Drive G:, MSCDEX ver.: 2.22, Driver name: FDCD0001, Vol.: COMPAL_TEST
Total 149402626 sectors(46082 bytes/sector) = 4234203140 bytes
Testing Eject/Close door:
```

### 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.

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.*

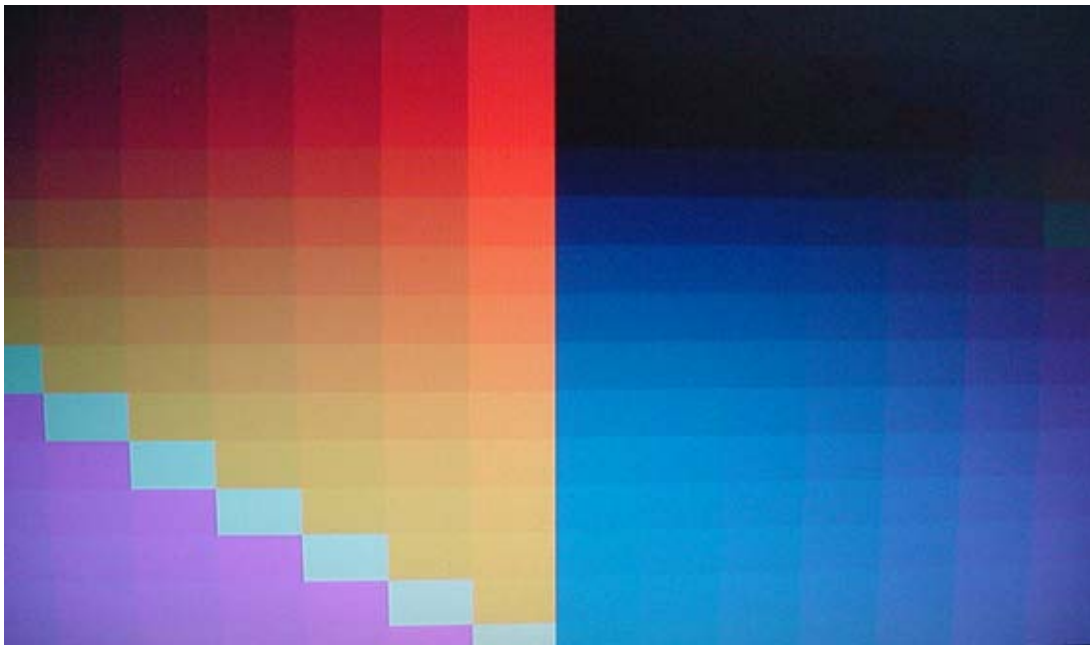
### 3. 11 LCD Pixels Mode Test

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: 000 , 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 Mode: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.PG013G=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 ]

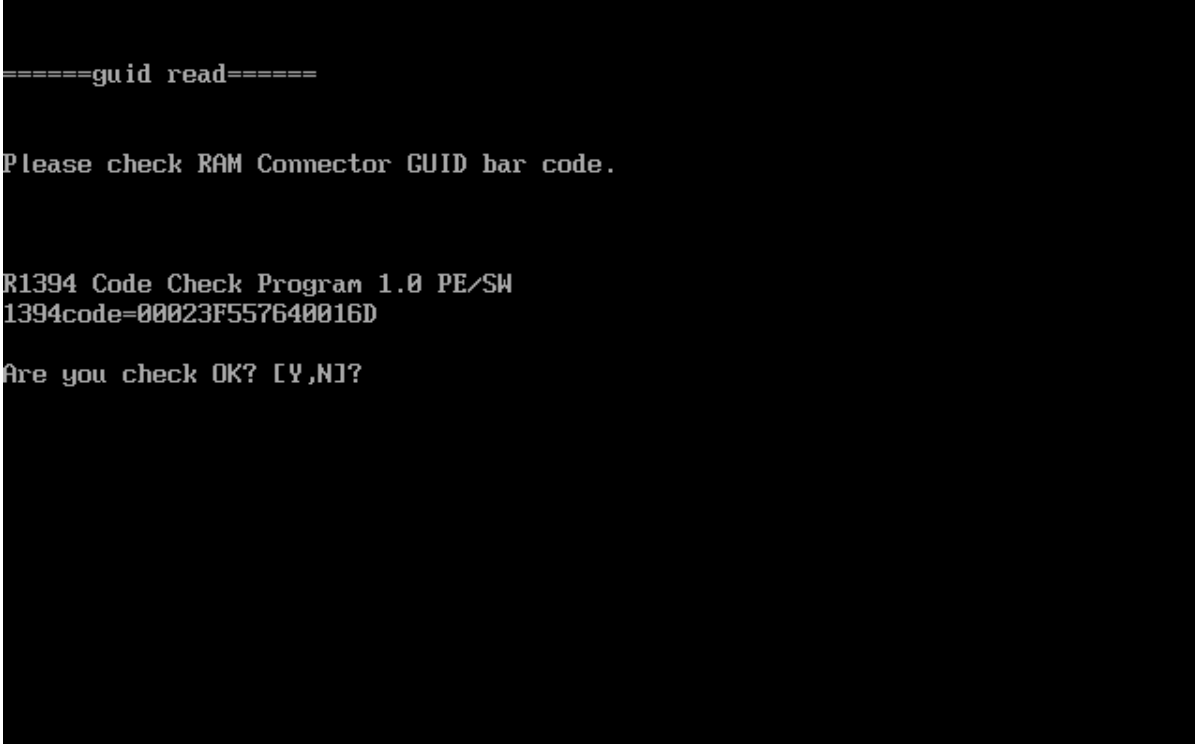
Press any key to continue . . .
```

### 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. Tests and Diagnostics

---

```
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 the HDD function is NG

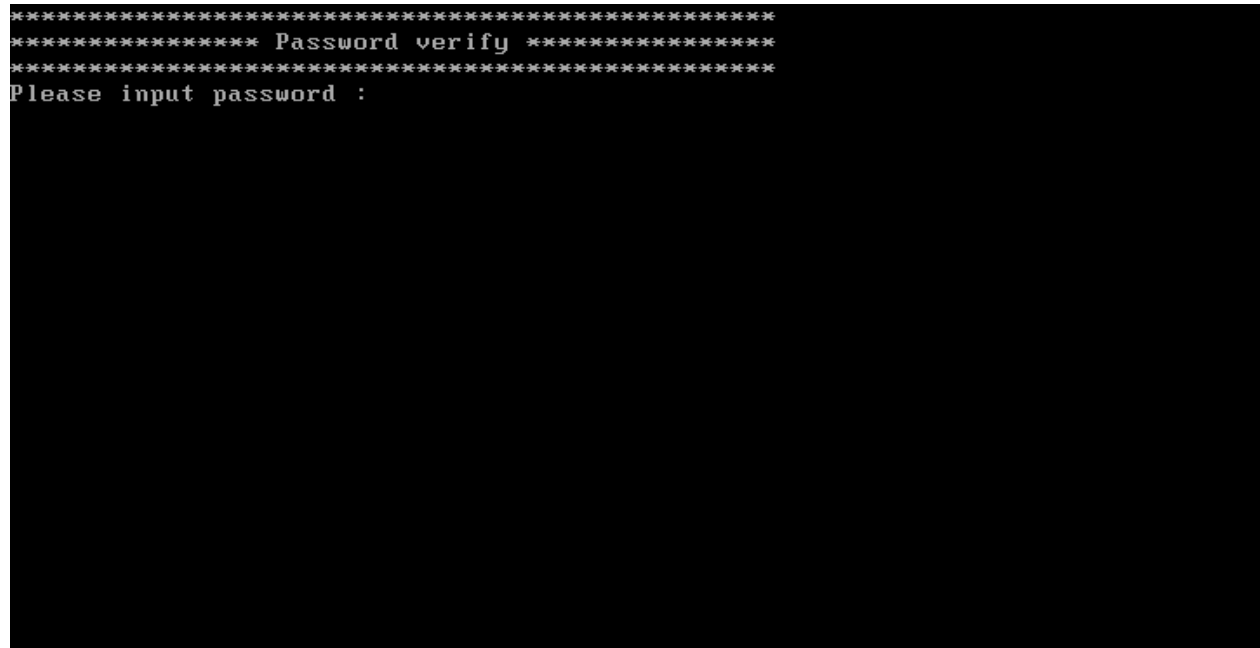
```
Error ! Can't use Enhanced Disk Drive Support Function
ARE YOU TEST OK?[Y,N]?
```

### 3.19 2<sup>nd</sup> HDD Test

The HDD test allows the user to verify the 2<sup>nd</sup> 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

### 3. Tests and Diagnostics

---

```
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 the 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.

### 3.20 Satellite LED Test

Because this Model has Front Edge Logo, must set the EEPROM to enable/disable Front Edge Logo function, if select this test, the picture will show as below:

```
====ISKAE Front Edge Logo led enable/disable TEST====

please check Front Edge Logo led:

if have,please select enable(1)
if not have,please select disable(2)

1.Enable Front Edge Logo LED
2.Disable Front Edge Logo LED

[1,2]?
```

Please check the units whether have the Front Edge Logo:

If have the logo, please key 1 to set the Front Edge Logo.

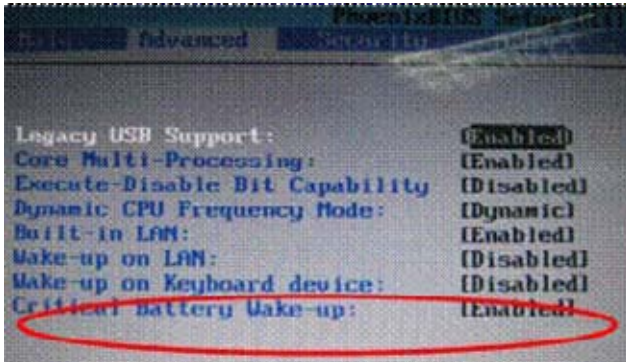
If not have the logo, please key 2 to disable the Front Edge Logo.

Please read the notice to check the function be enable or be disable in BIOS setup menu.

Restart the computer after you change BIOS setting of this function every time.

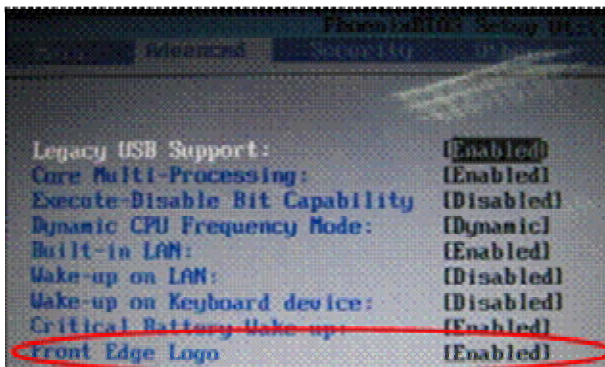
**Notice: Check logo LED on/off function.**

1. If we select “2” to disable the Front Edge logo function by program, there haven’t the item of Front Edge Logo in BIOS Menu, the picture likes below.

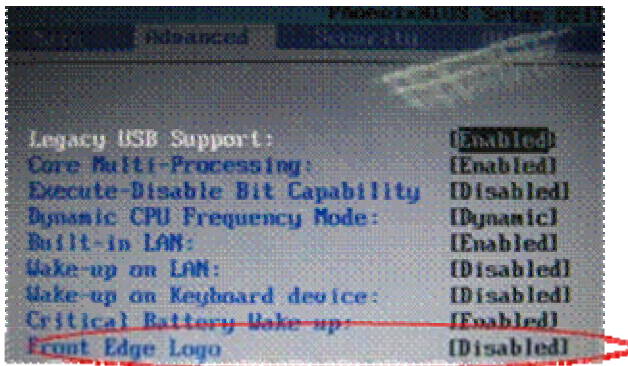


2. If we select “1” to enable the Front Edge logo function by program, There have the item of Front Edge Logo in BIOS Menu.

- 2.1 Select enable to let the Front Edge logo item in enable mode (show as below picture), and then restart the machine, the Front Edge Logo Led will be light.



- 2.2 Press disable to let the Front Edge logo item in disable mode (show as below picture), then restart the machine; the Front Edge Logo Led will not be light.





---

## **Chapter 4**

# **Replacement Procedures**

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## 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.

Battery Pack									
HDD		Expansion Memory		PC Card		ODD		Keyboard	
Top Cover									
Bluetooth Module	Touch Pad	Finger print Module	Speakers	Function Button Board	USB Board	MDC Card	Wireless Module	System Fan	Display Assembly
System Board									FL Inverter
VGA Board				Heat Sink					LCD Module
CPU									Camera and Microphone

#### 4 Replacement Procedures

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The example below shows FRUs to be removed before the CPU can be removed. The CPU is located on the system board. The USB board and the system fan are attached to the system board. The system board itself is located under the top cover. The keyboard must be removed before the display assembly can be removed. The HDD, expansion memory module, PC card module and ODD 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.

Battery Pack									
HDD		Expansion Memory		PC Card		ODD		Keyboard	
Top Cover									
Bluetooth Module	Touch Pad	Finger print Module	Speakers	Function Button Board	USB Board	MDC Card	Wireless Module	System Fan	Display Assembly
System Board									FL Inverter
VGA Board				Heat Sink					LCD Module
CPU									Camera and Microphone



## 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.

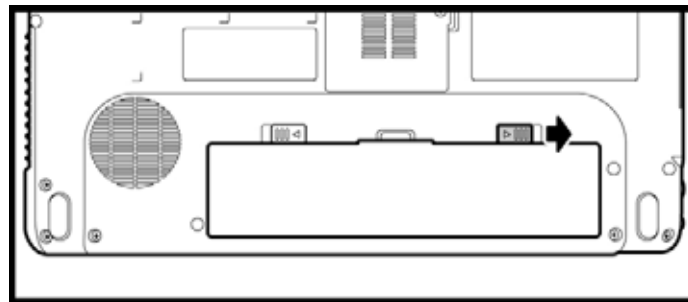


Figure 4-1 Unlocking the battery lock

3. Slide the battery bay latch to release the battery pack and then remove the battery pack from the bay.

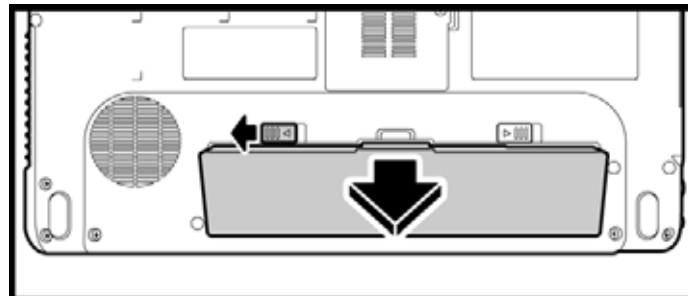


Figure 4-2 Removing the battery pack

**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.*

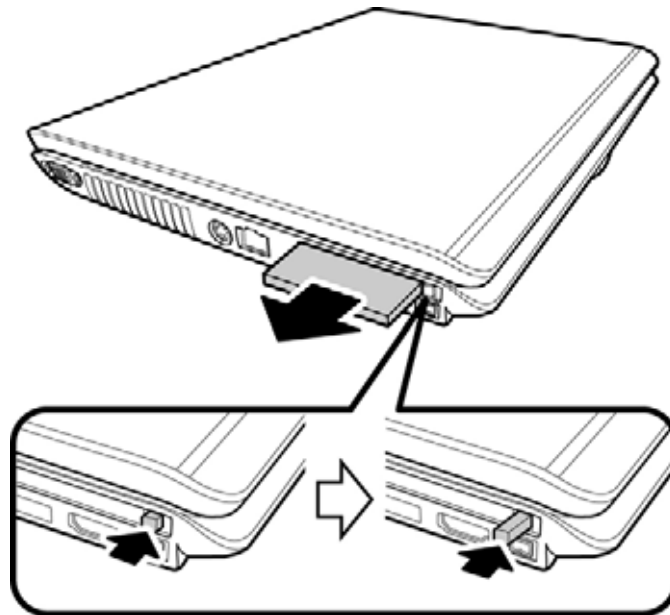
1. Slide the battery pack into the battery bay. The battery bay latch will click automatically.
2. Lock the battery double lock to secure the battery pack in position.

### 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.



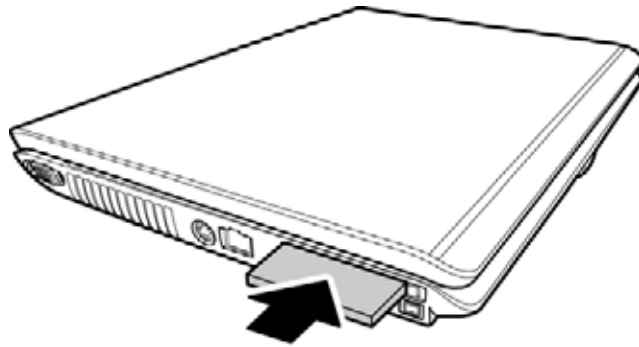
*Figure 4-3 Removing the PC card*

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*

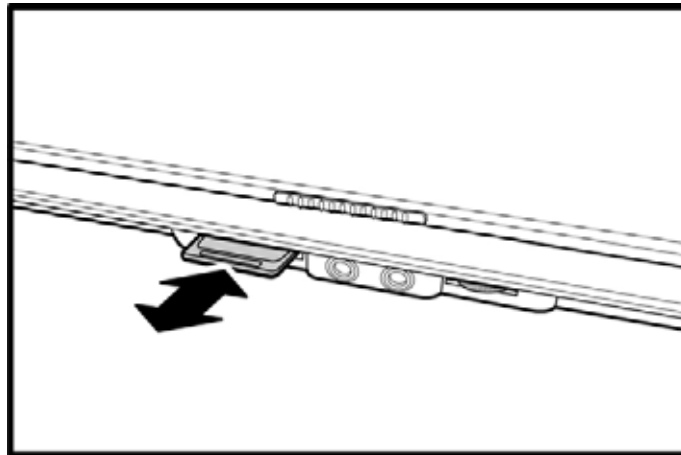


## 4.4 Memory Card

### Removing a Memory Card

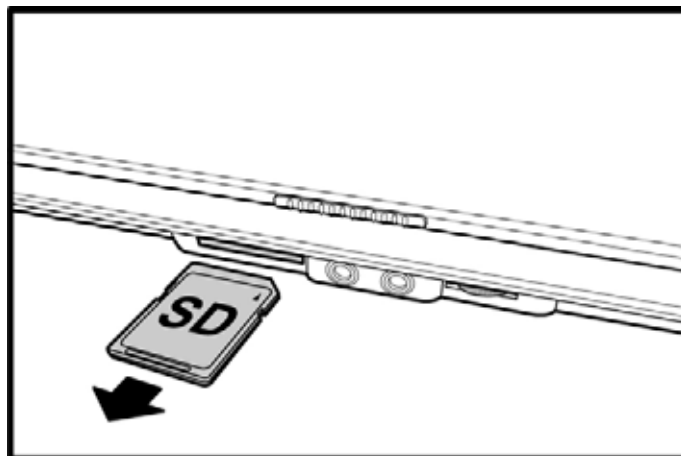
To remove a memory card, follow the steps below:

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.

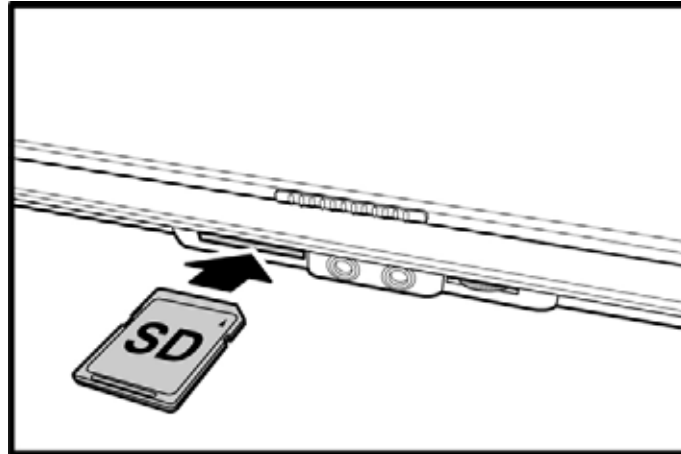


*Figure 4-6 Removing the memory card*

### 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.

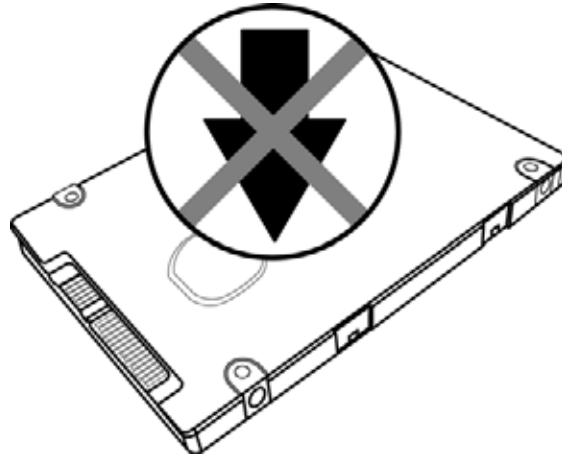


Figure 4-8 HDD

### 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 M2.5x4 screws to release the main HDD door.

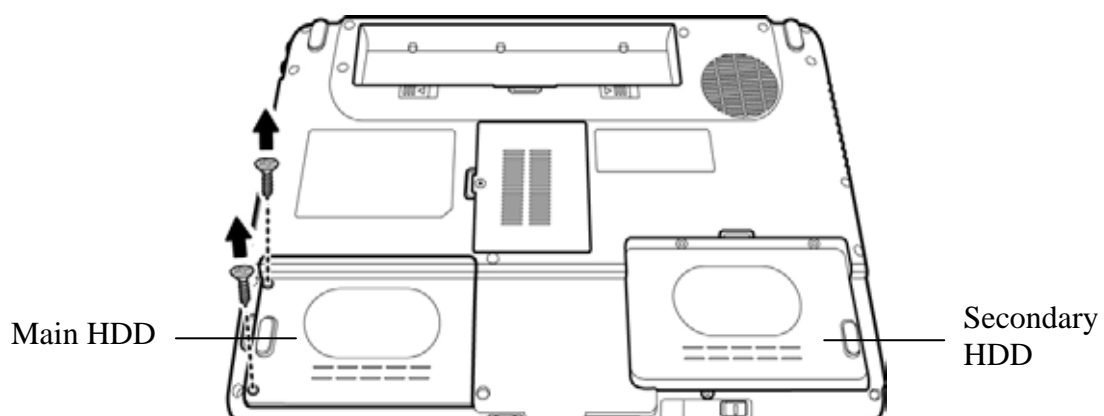


Figure 4-9 Releasing the main HDD door screw

3. Pull up and lift the HDD door to remove it.

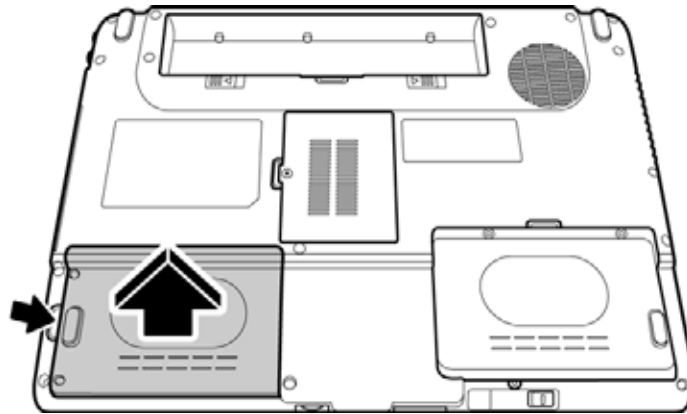


Figure 4-10 Removing the main HDD door

4. Pull out the black Mylar tab to remove the HDD unit.

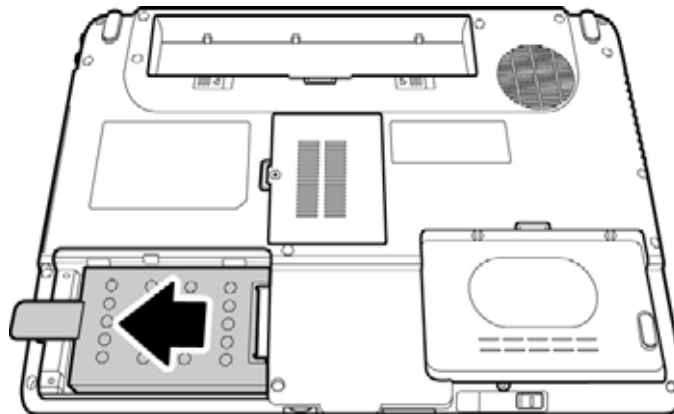
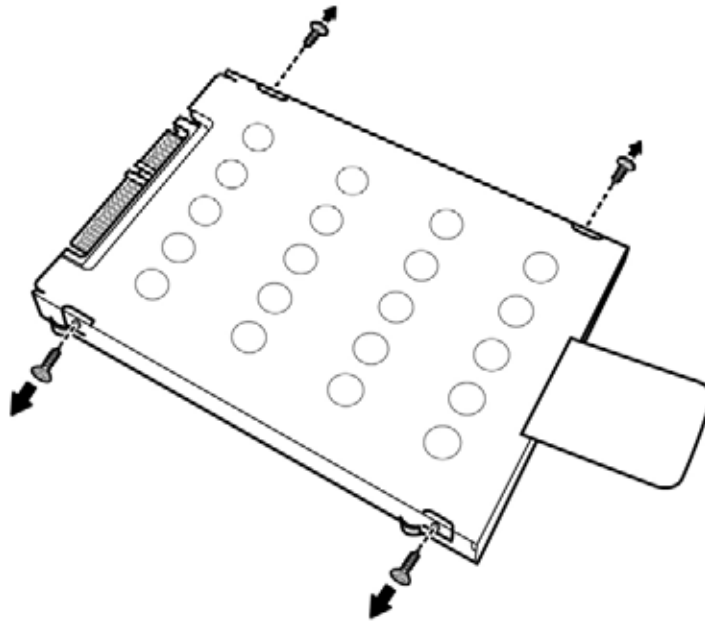


Figure 4-11 Removing the main HDD

5. Remove the HDD from the HDD case.

6. Pull the HDD outwards and remove the four M3x3 black 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 M2.5x4 screws to release the secondary HDD door.

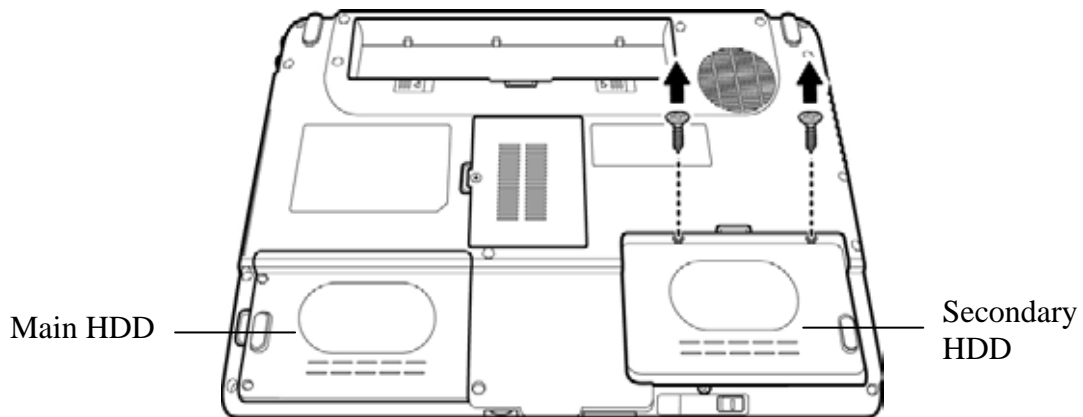


Figure 4-13 Releasing the secondary HDD door screw

3. Pull up and lift the HDD door to remove it.

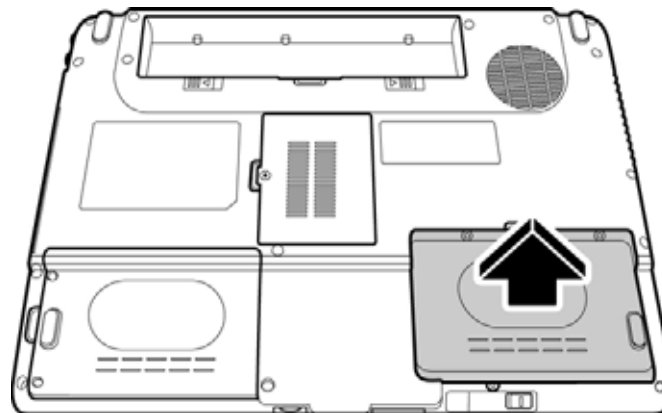
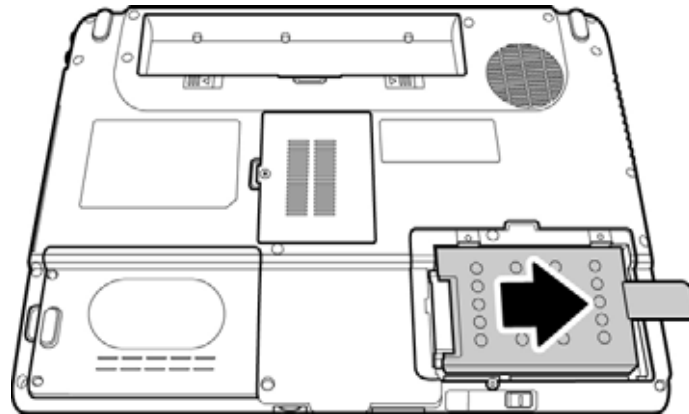


Figure 4-14 Removing the secondary HDD door

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 black screws.
2. Insert the HDD unit into the HDD slot.
3. Secure the HDD door with two black M2.5x4 screws.

### **Installing the Secondary HDD**

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

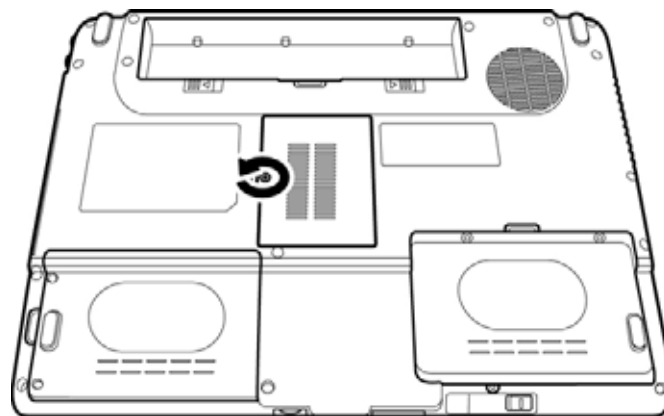
1. Seat the secondary HDD in the HDD case and bracket, and secure it with four M3×3 black screws.
2. Insert the secondary HDD unit into the HDD slot on the right.
3. Secure the HDD door with two black M2.5x4 screws.

## 4.6 Expansion Memory

### Removing the Expansion Memory Modules

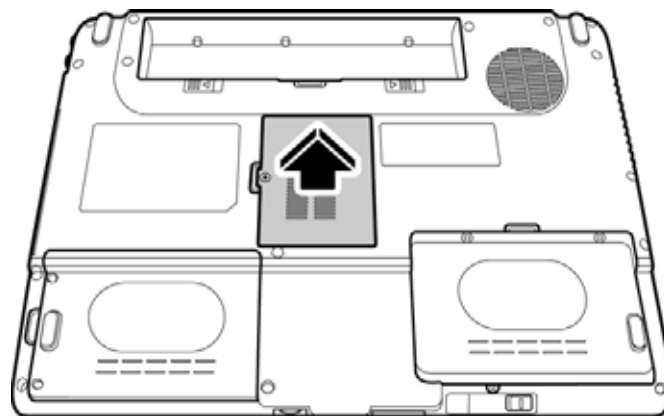
To remove the memory module, make sure the computer is in boot mode before removing the memory module. Remove the battery pack, cables and any optional devices before you start and then follow these steps:

1. Release the black non-separate screw M2.5x2 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.

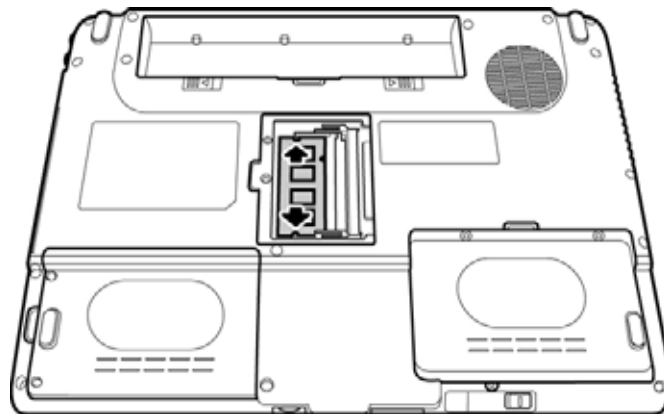


Figure 4-18 Releasing the memory module

4. Grasp the module and pull it out.

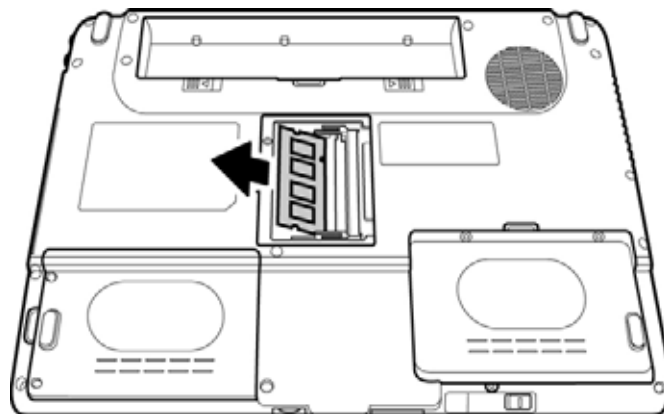


Figure 4-19 Removing the expansion memory module

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 M2.5x2 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 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 M2x3 screw securing the optical drive module.

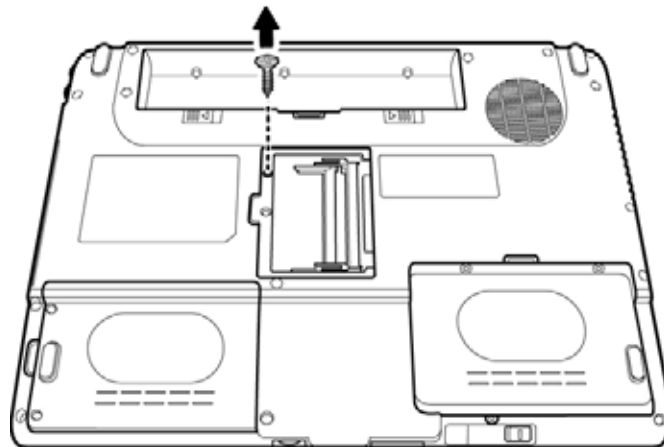


Figure 4-20 Removing the optical drive screw

4. Use your hand to push the module bracket and then slide the module from the bay.

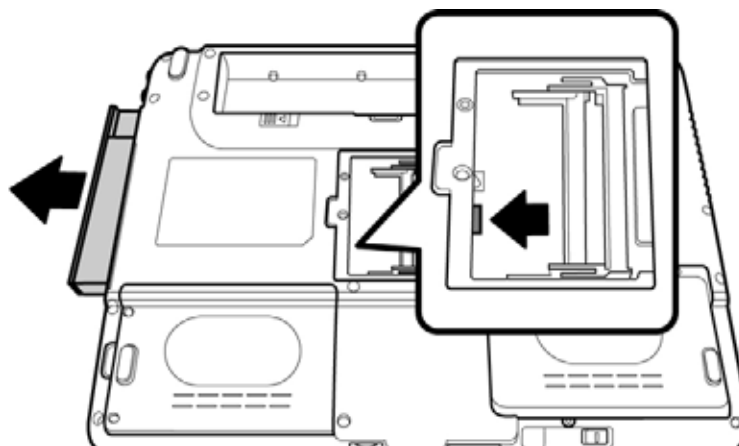


Figure 4-21 Removing the optical drive module

### **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 (M2x3, black) is removed.
2. Slide the device into the optical drive module bay.
3. Use the black M2x3 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.

## 4.8 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 4-22 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.

## 4.9 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.

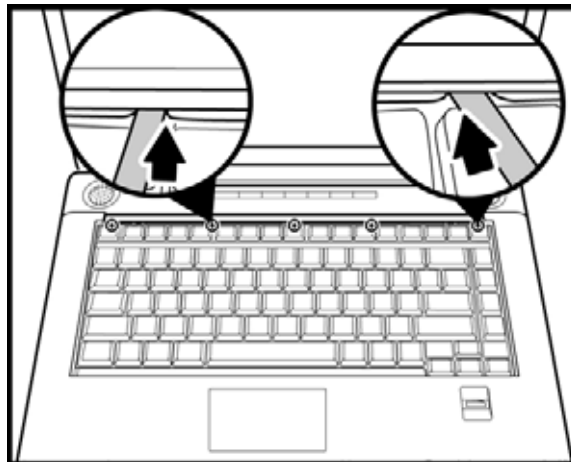


Figure 4-23 Removing the strip cover

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

3. Remove the strip cover.

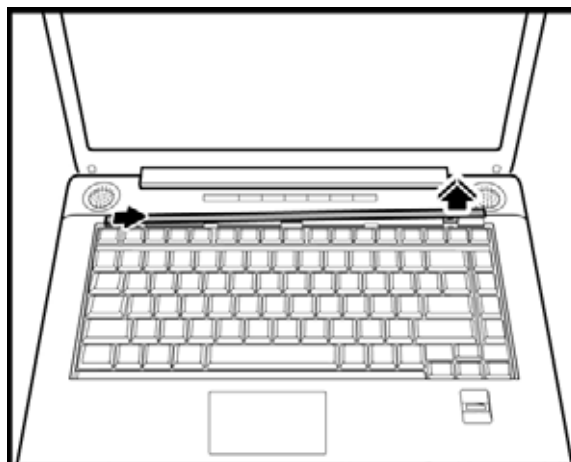


Figure 4-24 Removing the strip cover

4. Remove the two black M2.5x2.5 black screws securing the keyboard.

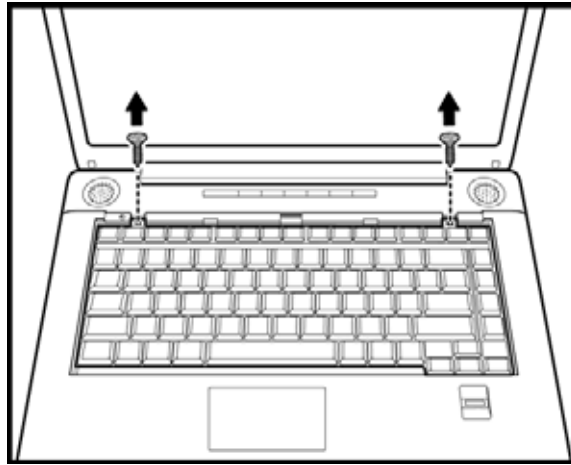


Figure 4-25 Removing the keyboard screws

5. Unclip the keyboard from its fitting.
6. 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.

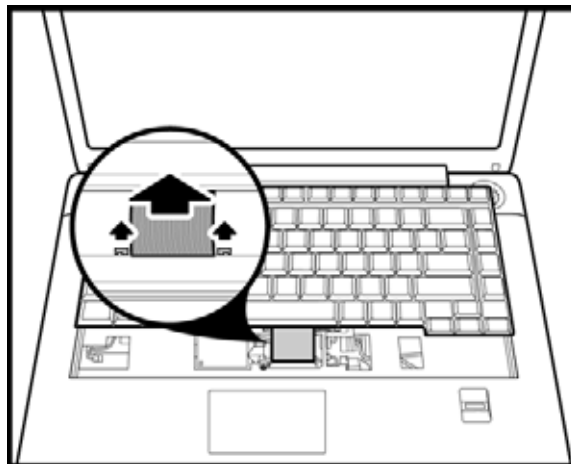


Figure 4-26 Disconnecting the keyboard cable



7. Lift and remove the keyboard.

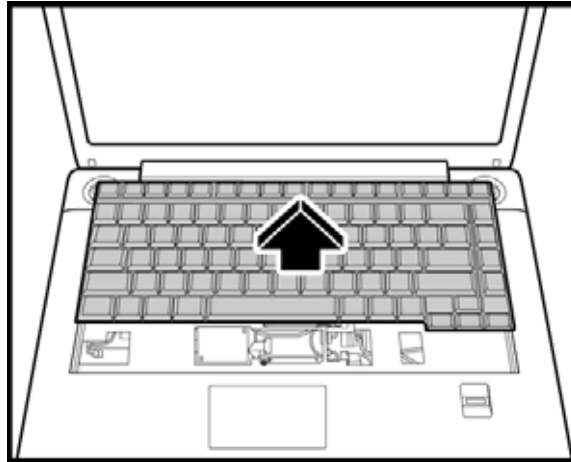


Figure 4-27 Removing the keyboard

### 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. Clip the keyboard back into its fitting.
3. Place the keyboard on the top cover, insert under the center tab, and secure it with two black M2.5x2.5 screws.
4. Set the strip cover and press down to secure the strip cover until the latches engage.

## 4.10 Display Assembly

### Removing the Display Assembly

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

1. Turn over the laptop. Remove seventeen (17) M2.5x8 screws securing the bottom cover, and three M2x3 screws from inside the battery compartment.

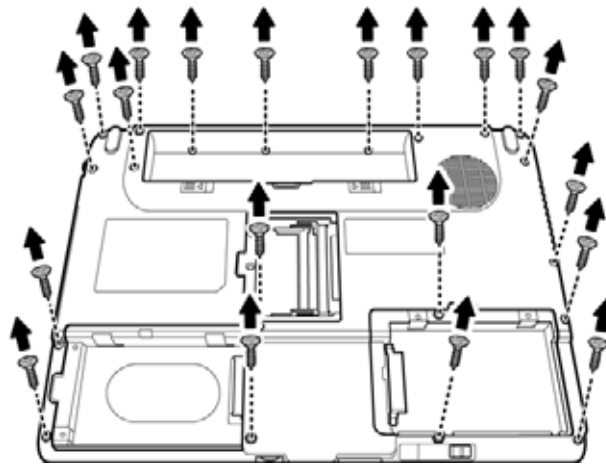


Figure 4-28 Removing screws from the bottom cover

2. Turn over the laptop. Remove four M2.5x8 screws from the top cover.

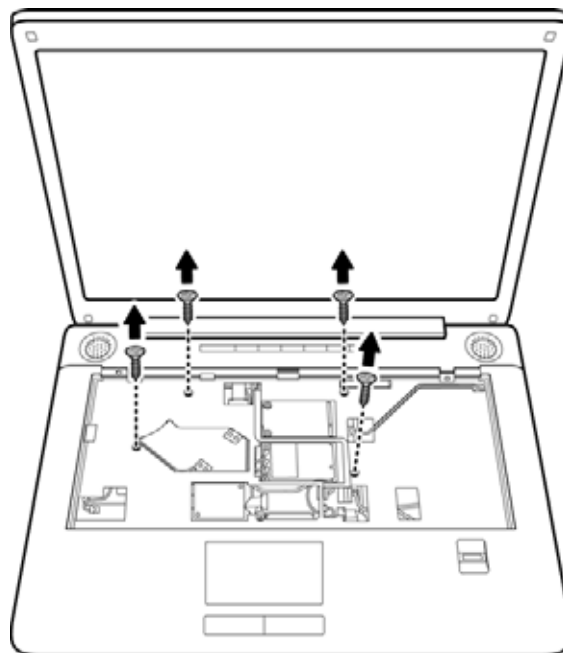


Figure 4-29 Removing screws from the top cover

3. Disconnect the camera cable (CMOS), right and left speaker cables, Bluetooth cable, FPC cable, touch pad cable, and function button cable from the system board.

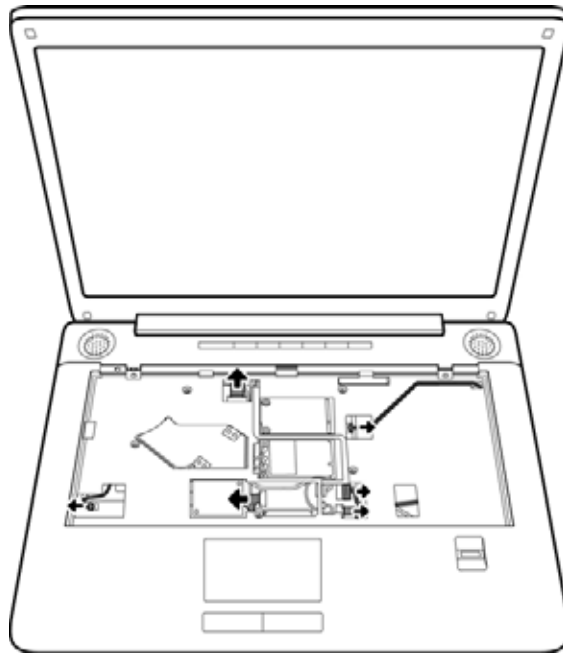


Figure 4-30 Disconnecting cables

4. Remove the top cover.

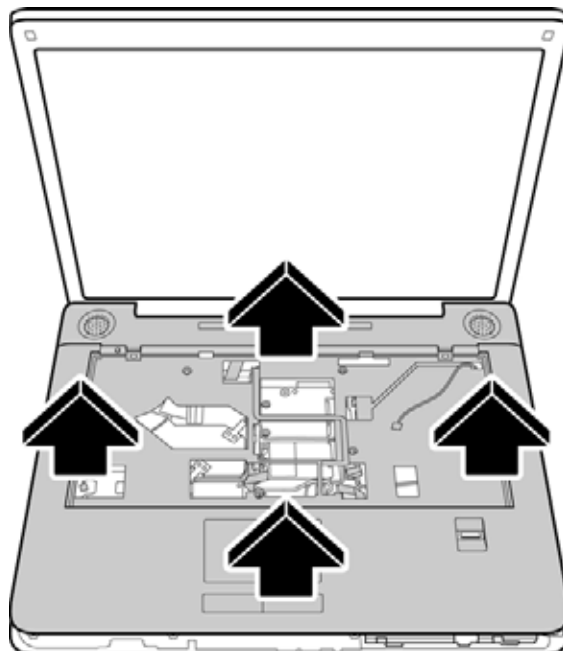


Figure 4-31 Removing the top cover

5. Disconnect the microphone cable, WLAN cable, and LVDS cable from the system board. Carefully unhook all cables and place them to the side of the laptop.

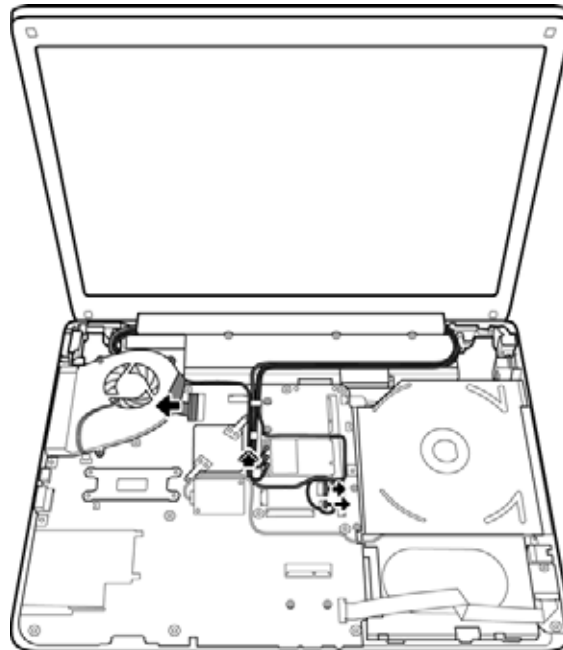


Figure 4-32 Disconnecting cables

6. Remove two hexagonal VGA screws from the CRT module on the left side of the laptop. Remove three M2.5x6 screws securing the LCD assembly to the bottom cover.

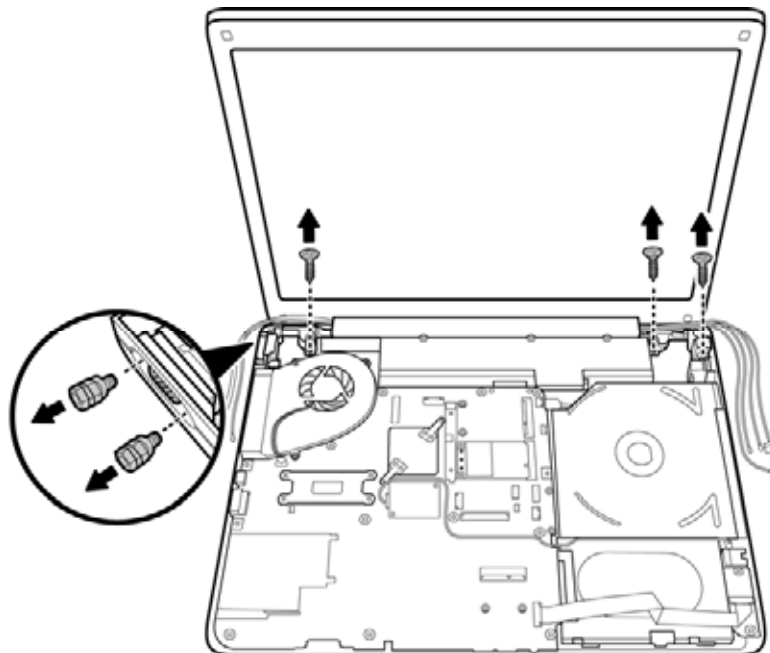
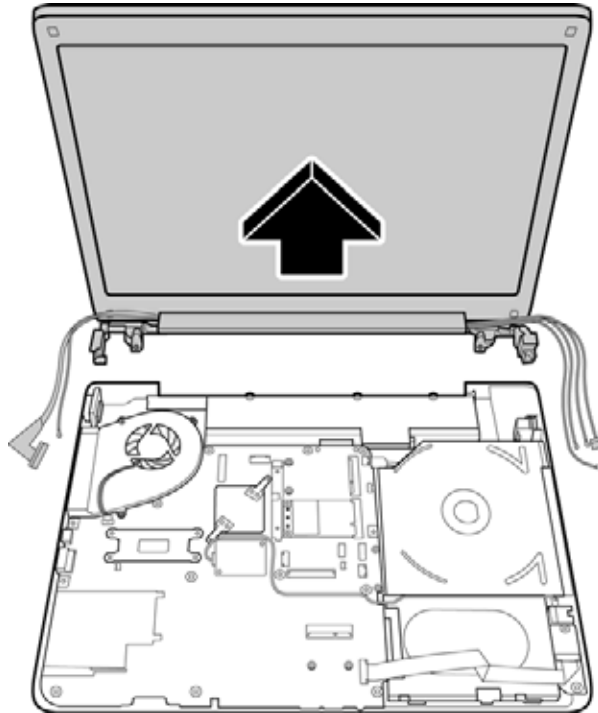


Figure 4-33 Removing CRT module screws and display assembly

7. Lift and remove the LCD assembly.



*Figure 4-34 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 CMOS cable, the WLAN cables, the Bluetooth connector, and the microphone cable.
2. Secure three M2.5x6 screws to each hinge to connect the assembly to the bottom cover.
3. Feed the CMOS cable, WLAN cables, microphone cable, Bluetooth cable, and LVDS cable through the indented track on the system board.
4. Connect the microphone cable, WLAN cable, and LVDS cable to the system board.
5. Replace the top cover.
6. Connect the camera cable (CMOS), right and left speaker cables, Bluetooth cable, FPC cable, touch pad cable, and function button cable to the system board.
7. Secure the top cover with four M2.5x8 screws.
8. Turn over the laptop and secure seventeen M2.5x8 screws and three M2x3 screws to the bottom cover.
9. Reinstall the keyboard.

## 4.11 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 four rubber pads to reveal the four M2.5x6 screws securing the display mask to the LCD module.

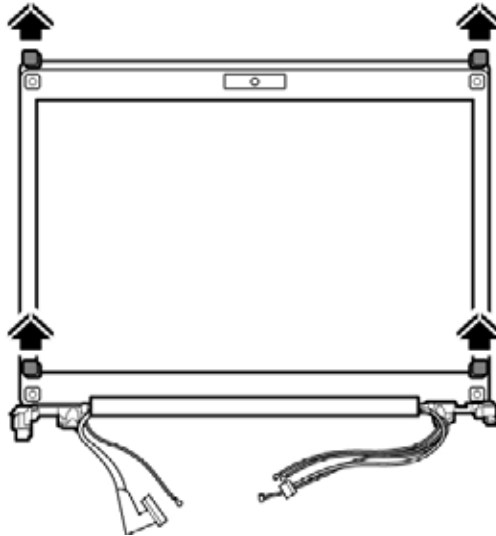


Figure 4-35 Removing the rubber pads

2. Remove the four M2.5x6 black screws securing the display mask.

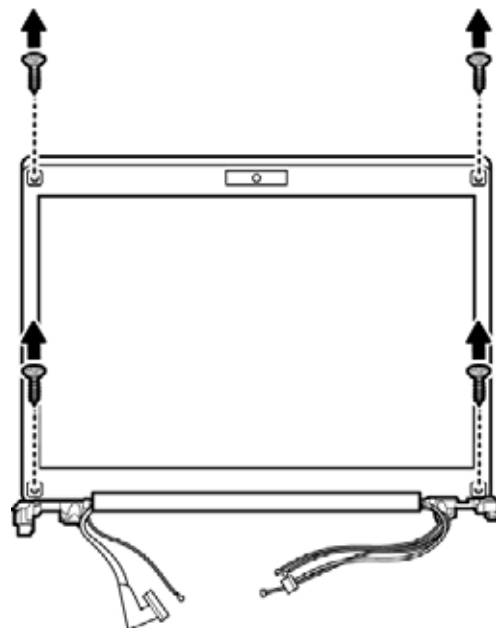


Figure 4-36 Removing the display mask screws

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.

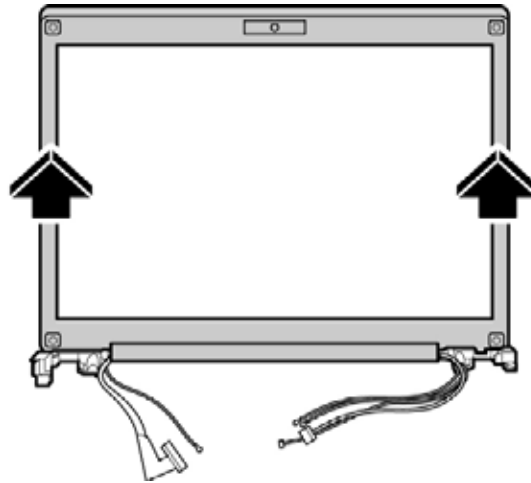


Figure 4-37 Removing the display mask

### 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 four M2.5x6 screws and then replace the rubber pads on top.



## 4.12 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.

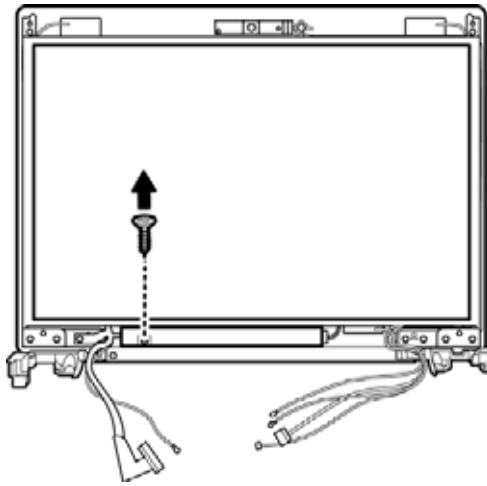


Figure 4-38 Removing the screw

**NOTE:** If a dual inverter board is installed, you must remove two additional M2.5x4 screws.

2. Disconnect the two connectors on either side of the board.

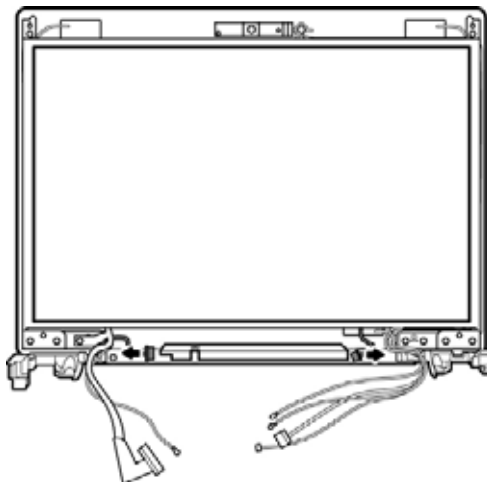


Figure 4-39 Removing the connectors

3. Remove the FL inverter board.

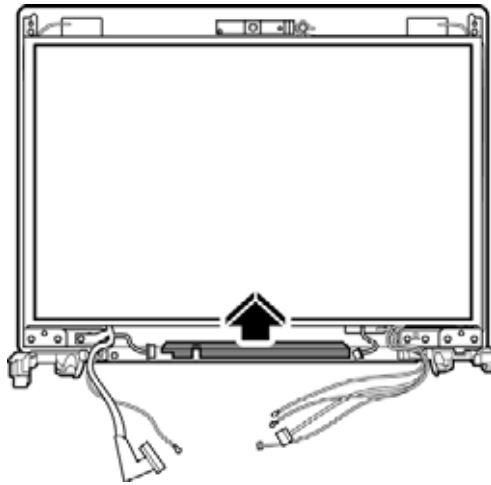


Figure 4-40 Removing the FL inverter board

### 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.

**NOTE:** If a dual inverter board is installed, you must secure it with two additional M2.5x4 screws.

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

## 4.13 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. Unhook all cables from the fasteners around the edge of the top chassis.

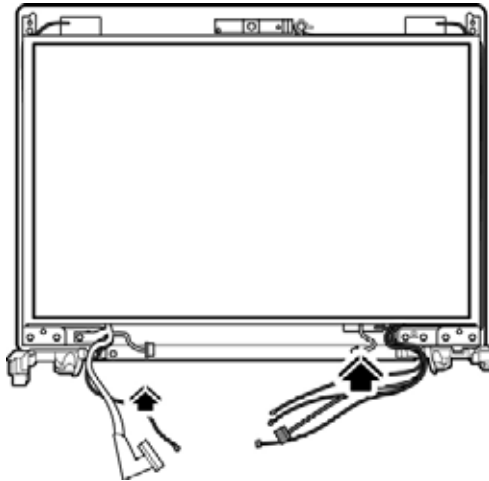


Figure 4-41 Removing the LCD Module

2. Remove four M2.5x4 screws securing the top chassis to the LCD module, and two M2.5x5 screws securing the hinges to the LCD module.

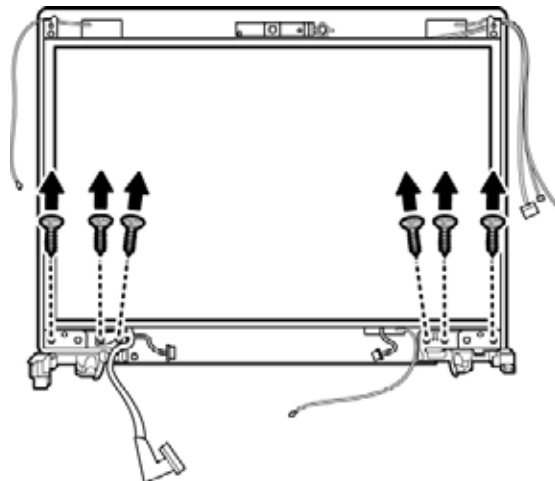


Figure 4-42 Removing the LCD Module

3. Lift the LCD module from the top chassis.

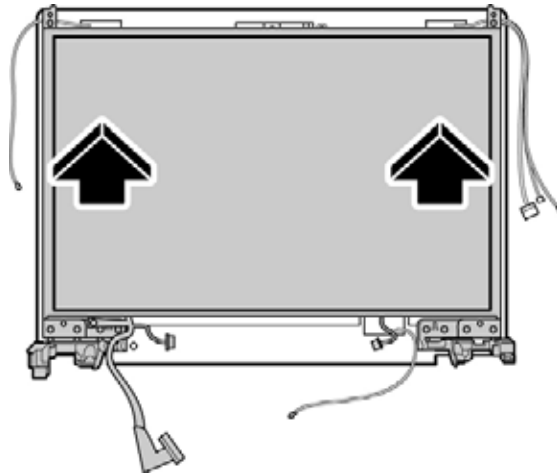


Figure 4-43 Removing the LCD Module

4. Remove six M2x3 screws securing the LCD module bracket to the LCD module.

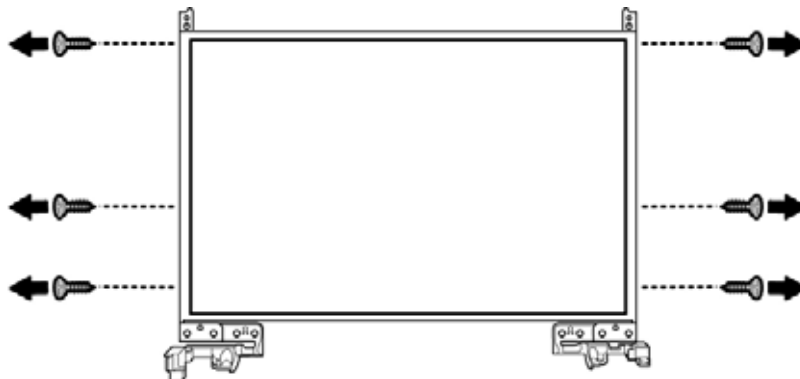


Figure 4-44 Removing the bracket screws

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

5. Turn over the LCD screen and remove the tape securing the LVDS cable. Detach the LVDS cable.

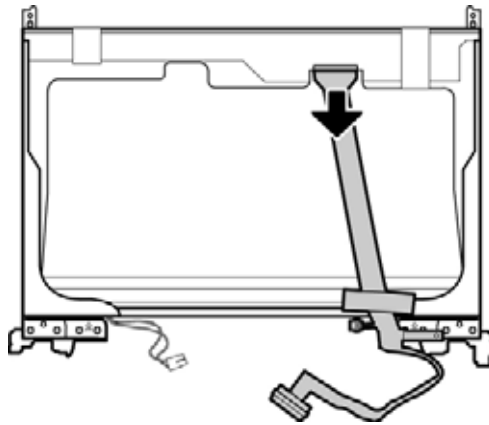


Figure 4-45 Removing the LVDS cable

### 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. Ensure all cables are outside of the LCD display casing
3. 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.
4. Secure the hinges to the LCD module with two M2.5x5 screws.
5. Place the FL inverter board on the LCD module.
6. Secure one M2x3 black screw connecting the FL inverter board to the LCD display assembly.
7. Connect the two connectors on either side of the board.
8. Secure the top chassis to the LCD module with four M2.5x4 screws.
9. Hook all the cables in the fasteners around the edge of the top chassis. Thread the thinner cables first, followed by the thicker ones.

## 4.14 WLAN antennas

To remove the 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 three square tabs securing the WLAN antennas.

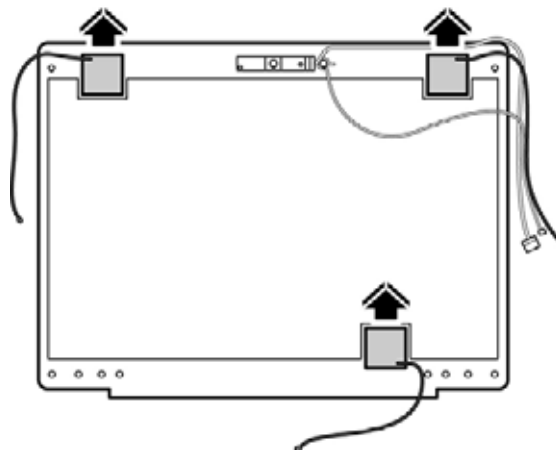


Figure 4-46 Removing the WLAN antennas

### Installing the WLAN antennas

To install the 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 right, the white WLAN cable to the left, and the gray WLAN cable to the lower right corner.
2. Make sure all cables are arranged properly in the clamps and use scotch tape to fix the antennas in the four corners.

## 4.15 Camera and Microphone

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

1. Remove the CMOS cable from the camera module. Remove the camera module by gently peeling it away from its adhesive backing.

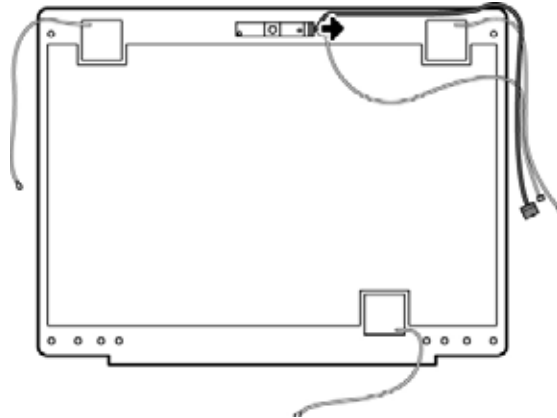


Figure 4-47 Removing the CMOS cable & camera

2. Use a flat screwdriver to lever the microphone module from its bracket and gently lift out.

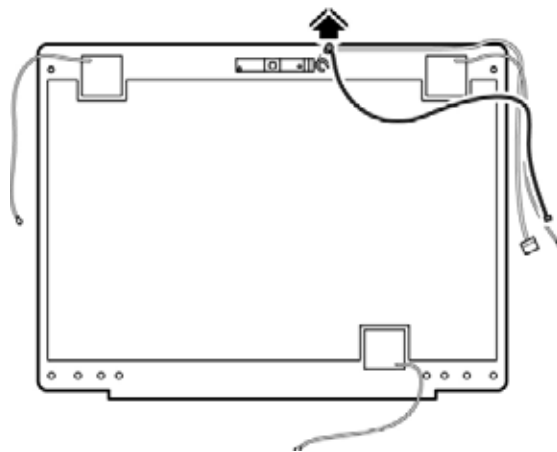


Figure 4-48 Removing the microphone

### **Installing the Camera and Microphone**

To install the camera and microphone, follow the steps below and refer to the figures in the preceding sections.

1. Fix the camera module to the adhesive backing at the top of the display mask.
2. Connect the CMOS cable to the camera module.
3. Push the microphone into place in its respective bracket.

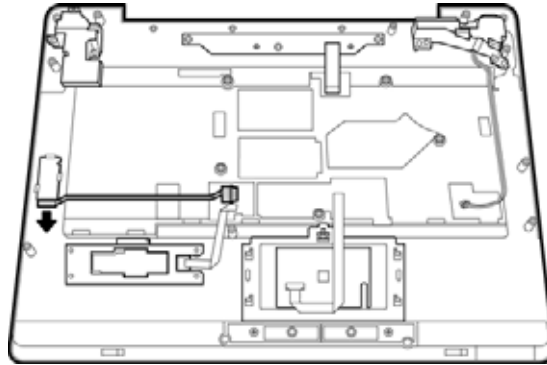


## 4.16 Bluetooth module

To remove the Bluetooth module, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

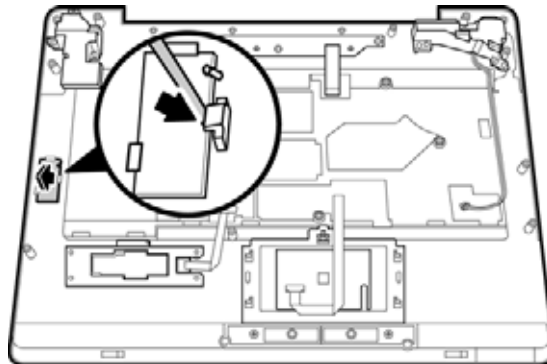
### Removing the Bluetooth Module

1. Turn over the top cover. Remove the Bluetooth cable from the Bluetooth module.



*Figure 4-49 Disconnecting the Bluetooth cable*

2. Use a flat screwdriver to lever the Bluetooth module from the snaps and gently lift out.



*Figure 4-50 Removing the Bluetooth module*

### **Installing the Bluetooth Module**

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

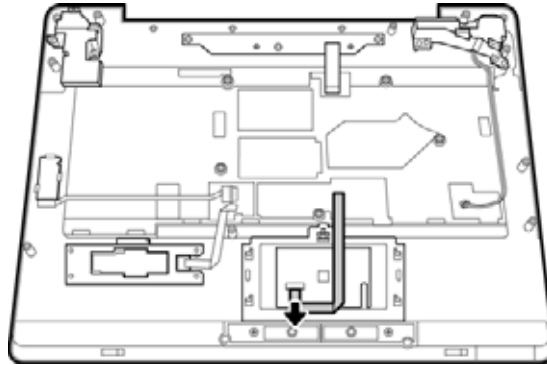
1. Insert the Bluetooth module into the module holder on the rear of the top cover at a 45-degree angle. Push down and snap into place.
2. Connect the Bluetooth cable to the module to connect to the system board.

## 4.17 Touch Pad

To remove the Touch Pad, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

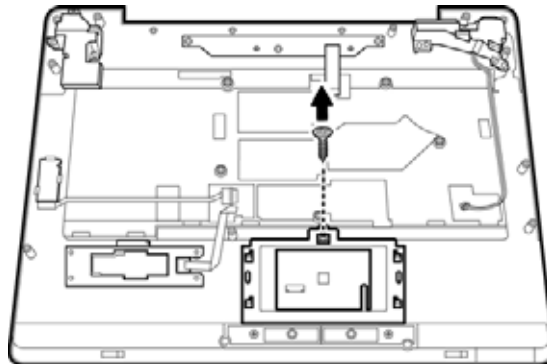
### Removing the Touch Pad

1. Turn over the top cover. Remove the Touch Pad cable from the Touch Pad module.



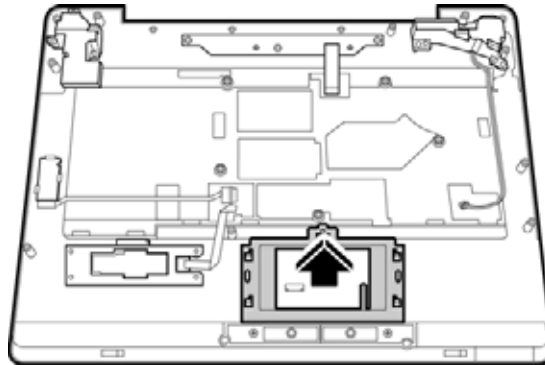
*Figure 4-51 Removing the touch pad cable*

2. Remove one M2.5x4 screw securing the Touch Pad Bracket to the top cover.



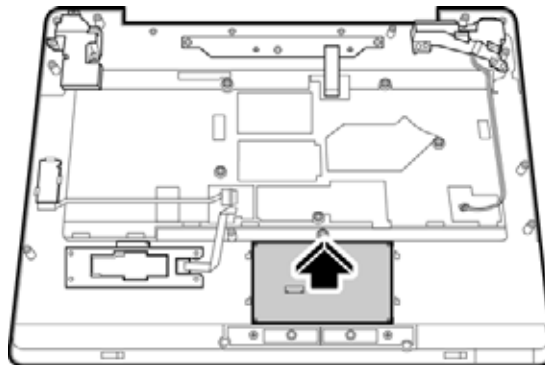
*Figure 4-52 Removing the touch pad bracket screw*

3. Remove the Touch Pad bracket by sliding it away from you and lifting it gently.



*Figure 4-53 Removing the touch pad bracket*

4. Remove the Touch Pad by lifting it gently.



*Figure 4-54 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 in position.
2. Place the Touch Pad Bracket in position on top, sliding it down into place.
3. Secure the Touch Pad bracket with one M2.5x4 screw.

## 4.18 Fingerprint Module

To remove the Fingerprint module, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

### Removing the Fingerprint Module

1. Turn over the top cover. Remove four M2.0x2.5 screws securing the Fingerprint Module Bracket to the rear side of the top cover. Follow the numbering indicated on the bracket in the correct sequence.

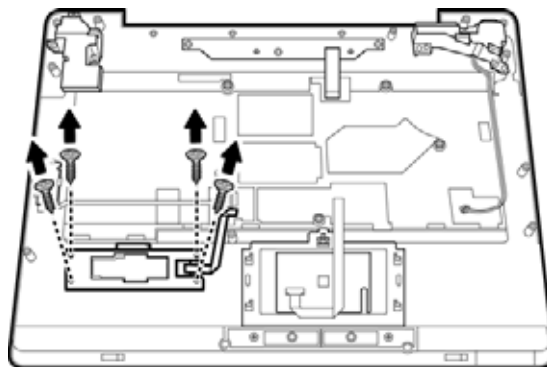


Figure 4-55 Removing the fingerprint module bracket screws

2. Remove the bracket.

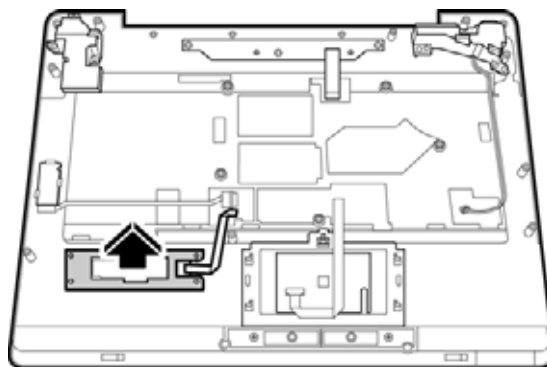
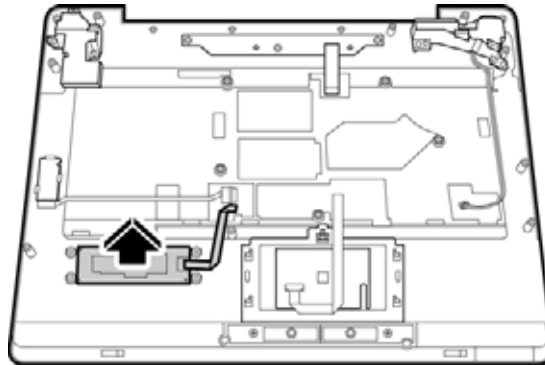


Figure 4-56 Removing the fingerprint module bracket

3. Remove the Fingerprint module by lifting it gently.



*Figure 4-57 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 M2.0x2.5 screws. Follow the numbering indicated on the bracket in the correct sequence.

## 4.19 Speakers

To remove the speakers, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

### Removing the Speakers

1. Turn over the top cover. Remove three M2.5x4 screws securing the right speaker to the top cover. Remove three M2.5x4 screws securing the left speaker to the top cover.

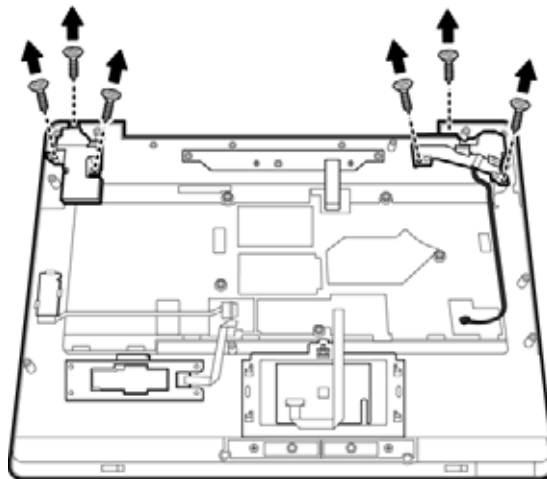


Figure 4-58 Removing the speaker screws

2. Unfasten the speaker cables.

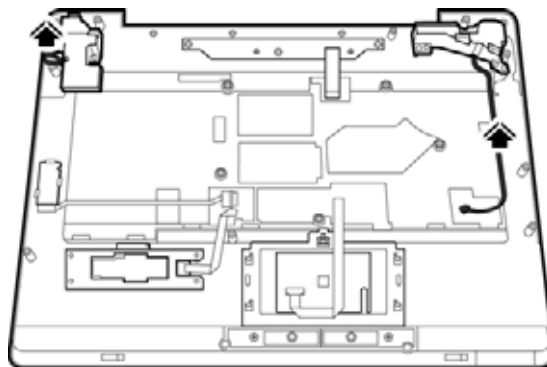
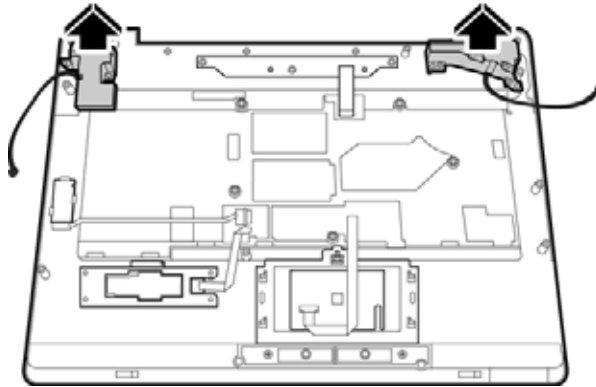


Figure 4-59 Unfastening the speaker cables

3. Remove the speakers.



*Figure 4-60 Removing the speakers*

### **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 three M2.5x4 screws on each side.
3. Thread the right speaker cable through the top cover.
4. Turn over and install the top cover onto the system board.
5. Connect the speaker cables (black and red) to the system board.

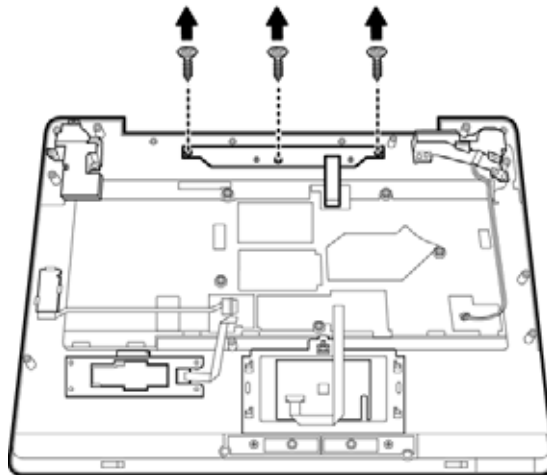


## 4.20 Function Button Board

To remove the function button board, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

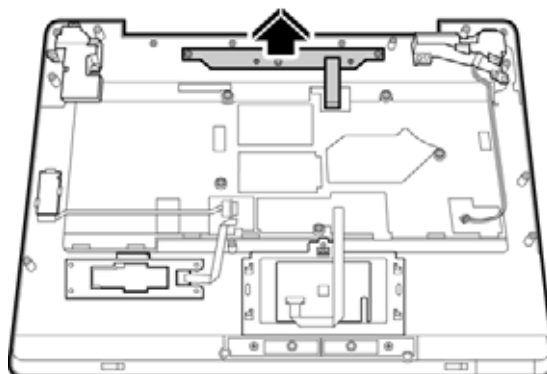
### Removing the Function Button Board

1. Turn the top cover. Remove three M2.0x2.5 screws securing the function button board to the top cover.



*Figure 4-61 Removing the Function Button Board screws*

2. Insert a thin tool such as a flat screwdriver into the gap between the frame and the function button board to lever it up from the snaps.



*Figure 4-62 Removing the Function Button Board*

3. Remove the function button board cable attached to the system 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.

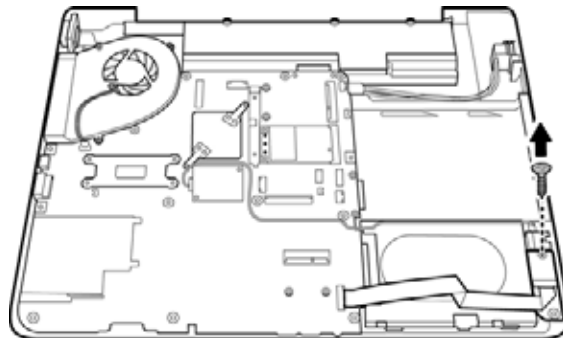
1. Place the function button board into the holder on the rear of the top cover at a 45-degree angle. Push down and snap into place.
2. Connect the cable to the connector on the system board.
3. Secure the function button board with one M2.0x2.5 screw.

## 4.21 USB Board

To remove the USB board, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

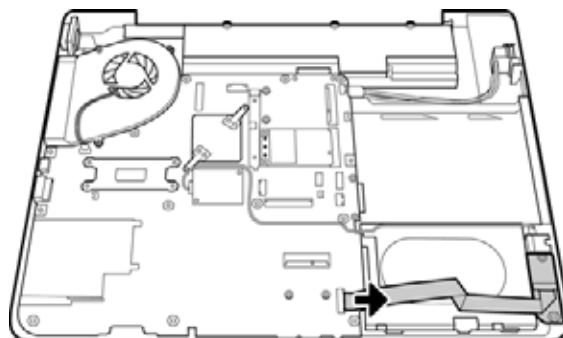
### Removing the USB Board

1. Remove one M2.5x4 screw securing the USB board to the bottom cover.



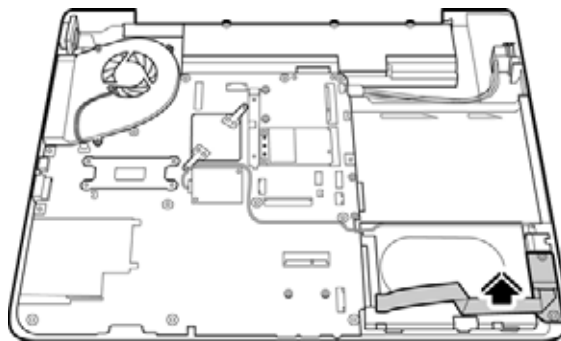
*Figure 4-63 Removing the USB board screw*

2. Remove the USB board cable.



*Figure 4-64 Removing the USB board cable*

3. Remove the USB board.



*Figure 4-65 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.
2. Connect the USB board cable to the system board.
3. Secure the USB board with one M2.5x4 screw.

## 4.22 MDC Card

### Removing the MDC Card

To remove the MDC card, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

1. Remove the two M2.5x2.5 screws securing the MDC card.

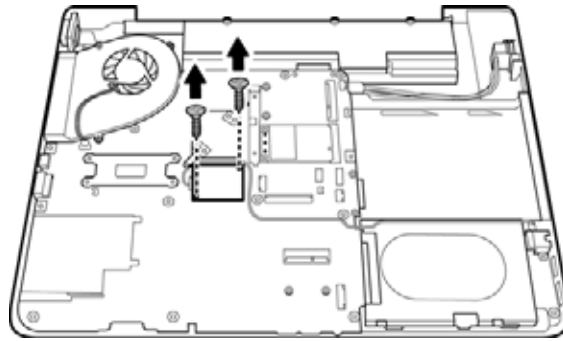


Figure 4-66 Removing the MDC card screws

2. Remove the RJ-11 cable.

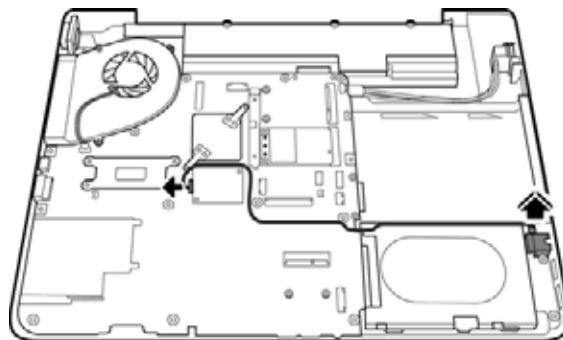


Figure 4-67 Removing the RJ-11 cable

3. Remove the MDC Card.

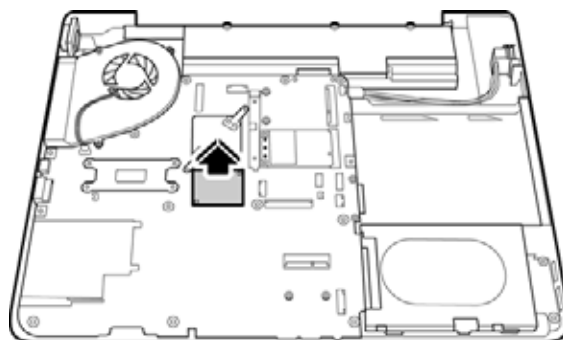


Figure 4-68 Removing the MDC card

### **Installing the MDC Card**

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

1. Seat the MDC card in the system board.
2. Install the RJ-11 connector and attach the RJ-11 cable to the MDC card.
3. Secure the MDC card with two M2.5x2.5 screws.

## 4.23 Wireless Module

### Removing the Wireless Module

To remove the wireless module, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

1. Remove the two M2x3 screws securing the wireless module to the system board.

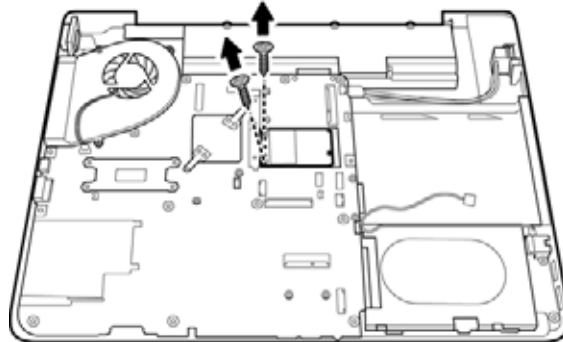


Figure 4-69 Removing the wireless module screws

2. Remove the wireless module.

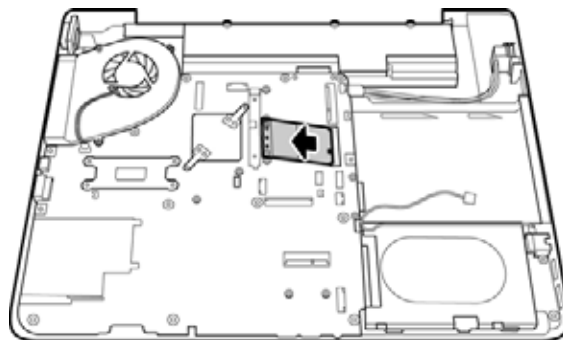


Figure 4-70 Removing the wireless module

### Installing the Wireless Module

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

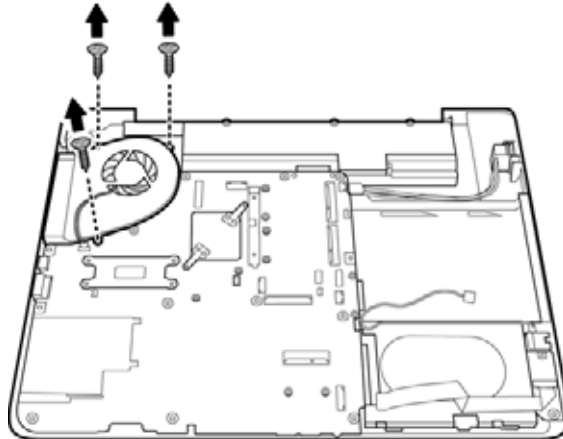
1. Seat the wireless module in the slot on the system board.
2. Replace the two M2x3 screws securing the wireless module to the system board.

## 4.24 System Fan

### Removing the System Fan

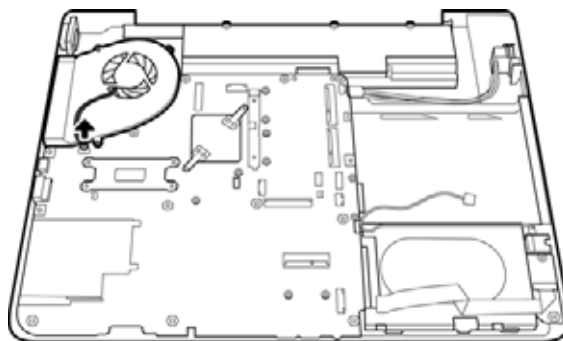
To remove the system fan, first remove the display assembly, keyboard, and top cover. Then follow the steps below:

1. Remove the three M2.5x2.5 screws securing the system fan to the system board.



*Figure 4-71 Removing the system fan screws*

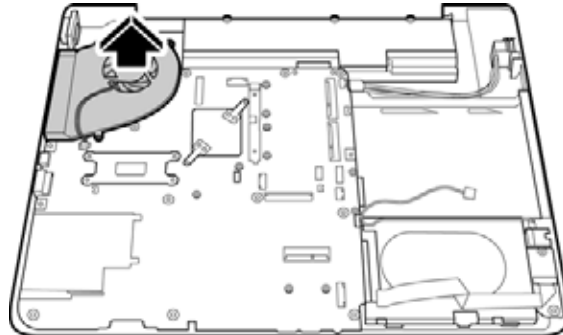
2. Disconnect the system fan cable from the system fan board.



*Figure 4-72 Removing the system fan cable*



3. Remove the system fan.



*Figure 4-73 Removing the system fan*

### **Installing the System Fan**

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

1. Seat the system fan in the chassis.
2. Connect the system fan cable to the system board.
3. Replace the three M2.5x2.5 screws securing the system fan to the system board.

## 4.25 System Board

### Removing the System Board

To remove the system board, first remove the display assembly, keyboard, top cover, MDC card, USB board, wireless module, and system fan. Then follow the steps below:

1. Unhook and remove the VGA cable.

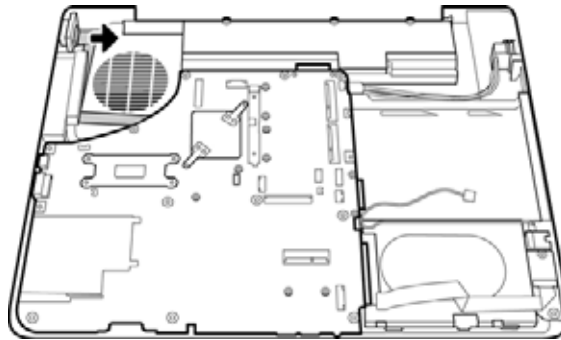


Figure 4-74 Removing the VGA cable

2. Unhook the DC-IN connector from its socket.

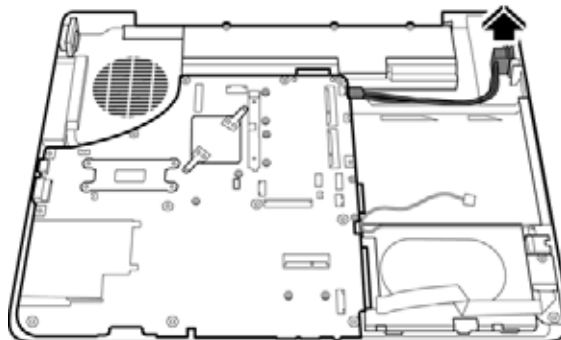


Figure 4-75 Removing the DC-IN connector

3. Remove one M2.5x4 screw securing the system board to the bottom cover.

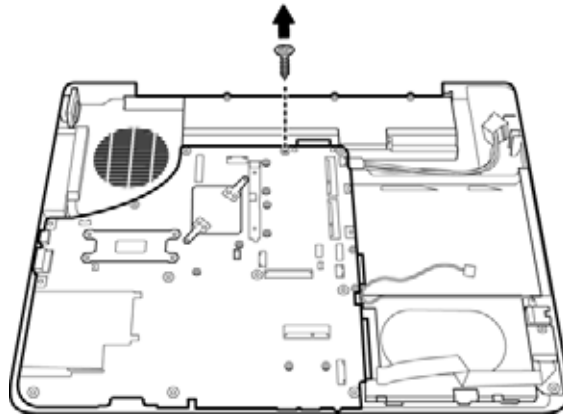


Figure 4-76 Removing system board screw

4. Remove the system board.

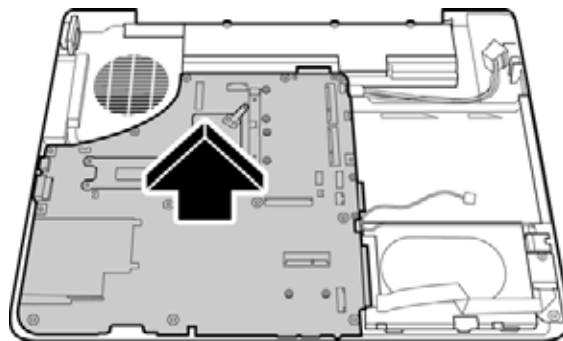


Figure 4-77 Removing the system board

### **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.
2. Replace one M2.5x4 screw securing the system board to the bottom cover.
3. Replace the DC-IN connector into its socket.
4. Replace the VGA cable.

## 4.26 VGA Board

### Removing the VGA Board

To remove the VGA board, first remove the display assembly, keyboard, top cover, MDC card, USB board, wireless module, system fan, and system board. Then follow the steps below:

1. Turn the system board over and unscrew the four spring screws securing the VGA heat sink to the VGA board. Follow the order indicated by the numbers on the heat sink to remove the screws.

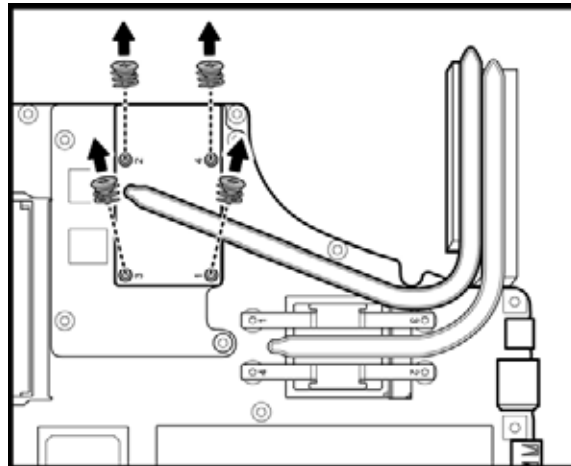


Figure 4-78 Removing the VGA heat sink screws

2. Remove the VGA heat sink from the VGA board.

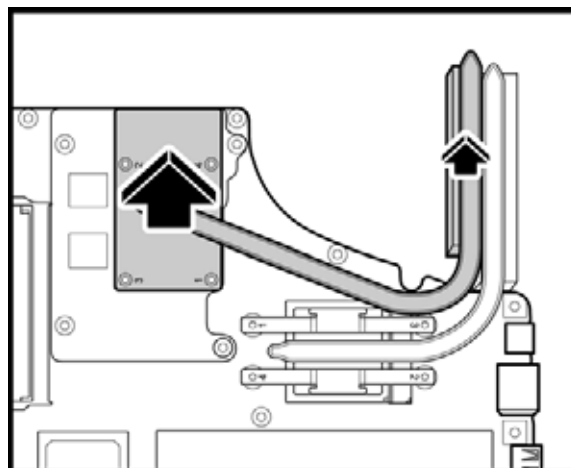


Figure 4-79 Removing the VGA heat sink

3. Remove the four M2.5x4 screw securing the VGA board to the system board.

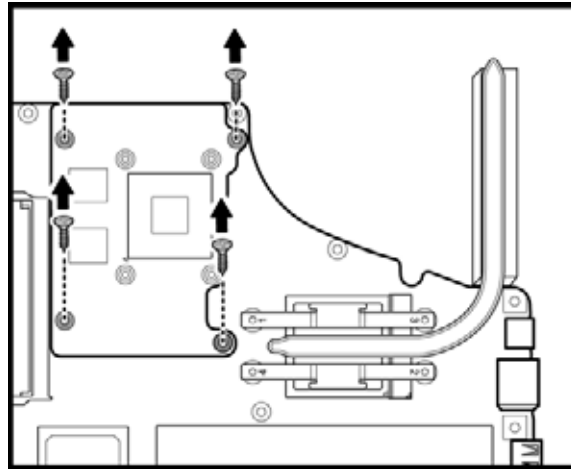


Figure 4-80 Removing the VGA board screw

4. Remove the VGA board.

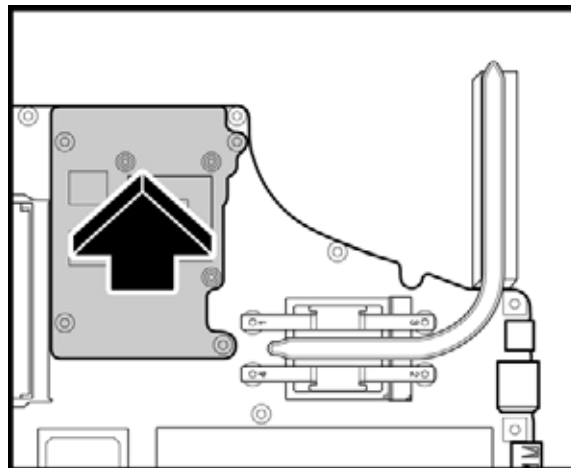


Figure 4-81 Removing the VGA board

### Installing the VGA Board

To install the VGA board, 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. Place the VGA board in the chassis and secure with four M2.5x4 screws.
2. Place the VGA heat sink on top of the VGA board.
3. Screw the four spring screws to secure the VGA heat sink to the VGA board. Follow the order indicated by the numbers on the heat sink to remove the screws.

## 4.27 CPU

### Removing the Fan & CPU

To remove the heat sink, and CPU, first remove the display assembly, keyboard, top cover, MDC card, USB board, wireless module, system fan, and VGA board. Then follow the steps below:

1. Turn the system board over and remove the four M2.5x4 screws from the heat sink. Follow the order indicated by the numbers on the heat sink to remove the screws.

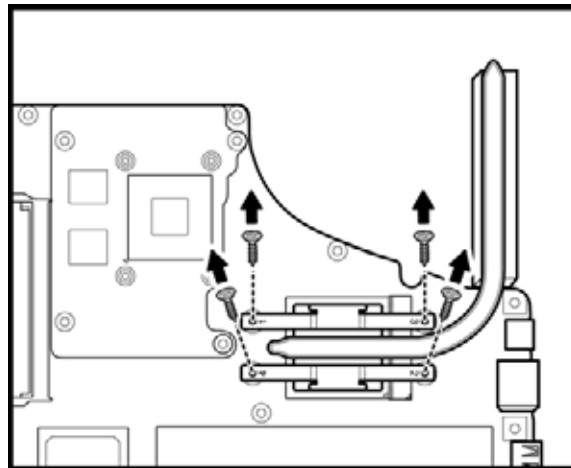


Figure 4-82 Removing the heat sink screws

2. Lift and remove the heat sink from the system board.

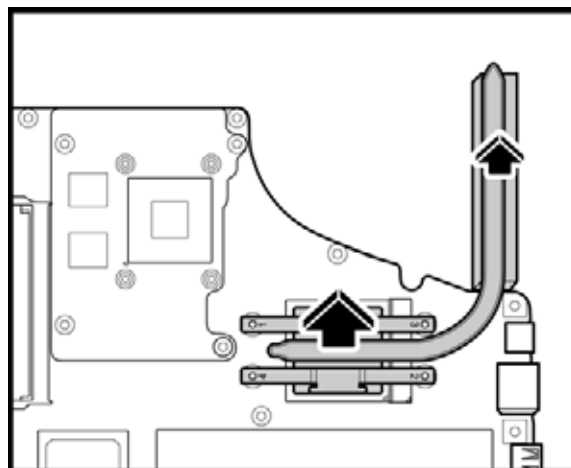


Figure 4-83 Removing the heat sink



3. 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

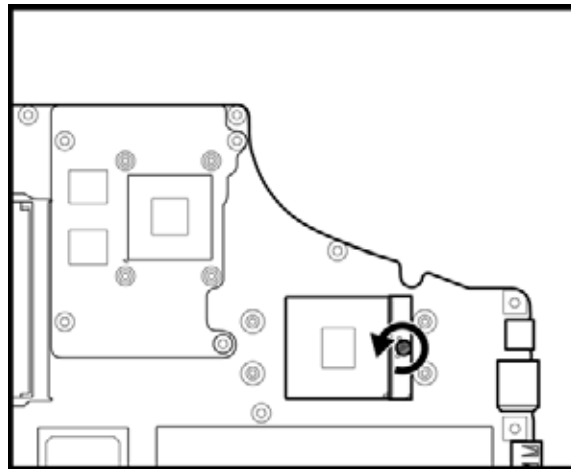


Figure 4-84 Turning the CPU cam

4. Gently lift out the CPU.

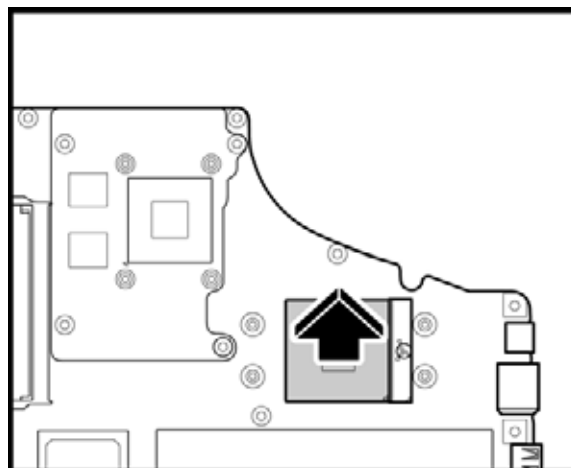


Figure 4-85 Removing the CPU

## 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.*

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 heat sink on top of the CPU.
5. Seat the heat sink over the CPU and secure with four M2.5x4 screws. Follow the order indicated by the numbers on the heat sink.