# Toshiba Personal Computer

# Satellite & Satellite Pro

# Maintenance Manual

**TOSHIBA CORPORATION**

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Toshiba Personal Computer Satellite & SatellitePro Maintenance Manual

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# Preface

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

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

## SAFETY PRECAUTIONS

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

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

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

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

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

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

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

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

The manual is divided into the following parts:

Chapter 1    Hardware Overview describes the Satellite 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
```

# Table of Contents

**Chapter 1     Hardware Overview**

**Chapter 2    Troubleshooting Procedures**

**Figures**

## Chapter 3    Tests and Diagnostics

## Chapter 4    Replacement Procedures

**Figures**

## Appendices

# Chapter 1

# Hardware Overview

# Chapter 1      Contents

**Figures**

**Tables**

## 1.1      Features

The Toshiba Satellite L670D/Pro L670D is a full-size PC notebook equipped with a Dual Core Processor, providing high-speed processing capabilities and advanced features. The computer employs a lithium ion battery that allows it to be battery-operated for long periods of time. The display uses 17.3-inch WXGA LCD panel. Many features can be Built To Order (BTO) to customize the system for each user.

The computer has the following features:

❑  Processor (BTO)

The computer is equipped with one of the following AMD processors:

■  AMD Danube Processor

❑  Memory (BTO)

The computer has two SODIMM slots which come standard with 1GB/2GB/4GB, accepting BTO for your memory requirements. It can incorporate up to 8 GB of main memory and supports DDR3 at 1066MHz/800MHz.

❑  Battery Pack

The computer is powered by one rechargeable and removable lithium ion battery pack. The capacity can be 3-cell, 6-cell and 12-cell, depending on the model of the computer.

❑  RTC Battery

The internal RTC battery backs up the Real Time Clock and calendar.

❑  Hard Disk Drive (HDD) (BTO)

The computer accommodates a 9.5 mm HDD with the following storage capacities:

• 250/320/400/500/640 GB, S-ATA (5,400rpm)
• 500 GB, S-ATA (7,200rpm)

❑ ODD (BTO)

- 12.7mm height DVD Super Multi drive supporting ±R Double Layer

- 12.7mm height DVD Super Multi drive supporting ±R Double Layer w/ Labelflash

- 12.7mm height BD-Combo drive

- 12.7mm height BD Writer drive

❑ Display

The LCD display comes with the following:

- 17.3" W (16:9) HD+ (1600x900) LED CSV and Non-CSV Type.

❑ Graphics (BTO)

■   AMD M880G Chipset for integrated graphics display

■   ATI Mobility Radeon$^{TM}$ HD5470/HD5650 (DDR3, 1GB)for external graphics support
(depending on model)

❑ Keyboard

The computer is equipped with a Toshiba standard 360mm keyboard, which has A4 + 10key Genchaku Keyboard without stick-point. It is a Win7-compliant keyboard with optional Windows keys and application keys.

❑ Pointing Device

The integrated Wide Touch Pad and two control buttons in the palm rest allow control of the on-screen pointer and support functions such as the scrolling of windows.

❑ External Monitor Port

The analog VGA port provides support for VESA DDC2B compatible functions. A WDDM driver is ready for Win7.

❑ Universal Serial Bus (USB) Ports

The computer has two USB 2.0 ports along with one USB/eSATA combo port (see below). It is supported to daisy-chain a maximum of 127 USB devices. The serial data transfer rate is 480 Mbps or 12 Mbps and 1.5 Mbps. These ports support PnP installation and hot plugging.

❑  eSATA

The external SATA or eSATA port executes high-speed data transfer to external devices and supports shielded cable lengths of up to 2 meters outside the PC. The port also provides dual USB compatibility.

❑  Bridge Media Slot

This slot allows you to insert SD/SDHC/SDXC memory card, miniSD/microSD Card, Memory Stick (PRO), and MultiMediaCard. It supports high-speed SD, SDHC and SDXC. This model does not support CF, SmartMedia cards, xD or Memory Stick Duo cards.

❑  Sound system

The integrated sound system is composed of two Realtek Azalia internal speakers, an internal microphone (BTO with internal camera), and standard Microphone-IN and Headphone-OUT ports. Dolby® Advanced Audio function is also integrated in the system.

❑  Internal Camera (BTO)

It supports 0.3M and 1.3M pixels with Auto Macro and comes with a blue LED indicator. An internal microphone is BTO with the internal camera and includes echo cancellation. The camera is not a rotation type.

❑  Headphones/Line-out Jack

This jack connects digital speakers or stereo headphones (16 ohm minimum). When connected to digital speakers or headphones, the internal speaker is automatically disabled.

❑  Microphone/ Line-in Jack

A 3.5mm mini microphone jack enables connection of a three-conductor microphone for monaural input and also enables the connection of a stereo device for audio input.

❑  HDMI Out Port (BTO)

The HDMI out port can connect with a Type A connector HDMI cable. The HDMI out port can send SD and HD video/audio signals.

❑ LAN (BTO)

The computer has built-in support for 10M/100M Ethernet LAN (10/100 megabits per second, 10/100BASE-T). It employs a Realtek RTL8105E for 10M/100Mbit LAN. It is pre-installed as a standard device in some markets.

❑ Wireless LAN (BTO)

Some computers in this series are equipped with a Wireless LAN (WLAN) card. This WLAN module may come with the following types (depending on the model):

- Atheros 802.11 b/g (HB95 1x1n)
- Realtek 802.11 b/g/n (8191SE)

❑ Internal Modem (BTO)

Some models are equipped with an integrated modem. The integrated modem provides capability for data and fax communications that support the V.90 (V.92) standards and includes a modem jack for connection to the telephone line. Please note that both the V.90 and V.92 standards are only supported in the USA, Canada, United Kingdom, France, Germany and Australia - only the V.90 standard is supported in other regions. You should also be aware that the speed of data and fax transfer will depend on the analog telephone line conditions. The integrated model is only installed as a standard device in some markets. This internal modem comes with MDC 1.5 solution (Azalia interface).

❑ Bluetooth (BTO)

Some computers in this series offer Bluetooth wireless communication functionality which eliminates the need for cables between electronic devices such as computers and printers. When implemented, Bluetooth provides wireless communication in a small space. This module is Version 2.1 + EDR (BCM2070 Flash SLIM with Antenna), ie – Toshiba stack support.

❑ Figure 1-1A shows the computer and its system unit configuration.

CAMERA

Printing sub-brand

TOSHIBA

DC IN

THERMAL VAN HOLES

VGA

RJ45

eSATA/USB

HDMI

Bridge Media Slot

SPEAKER

POWER BTN

SATELLITE LOGO

SPEAKER

KENSINGTON LOCK

RJ11

ODD

USB

USB

MICROPHONE

HEADPHONE

TOUCH PAD ON/OFF BTN

TOUCH PAD

TP BTN

MAIN BATTERY

HDD/ODD/ESATA ACCESS

POWER

BRIDGE MEDIA ACCESS

DC IN

WIRELESS ACCESS

LED Lens

THERMAL VAN HOLES

BATTERY

HDD DOOR & RAM DOOR

*Figure 1-1A    ID Parts Description Placement Part A*

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Model Name : NALAE

File Name : LA-6053P

Thermal Sensor
ADM1032ARMZ   page 7

Fan Control
page 5

AMD S1G4 CPU
uFCPGA-638 Package
page 5,6,7,8

Memory BUS(DDRIII)
Dual Channel
1.5V DDRIII 1066/1333MHZ

200pin DDRIII-SO-DIMM X2
BANK 0, 1, 2, 3   page 9,10

Hyper Transport Link 2.6GHz
16X16

CRT   page 17

LCD Conn.   page 18

HDMI Conn.   page 19

AMD

RS880M

page 11,12,13,14,15

PCI-e Mini Card  WLAN
PCIe Port 2
USB Port 8   page 28

PCIe 4x
1.5V 2.5GHz(250MB/s)

RTL 8105E 10/100M
PCIe port 3
page 26

RJ45
page 26

A-Link Express II
4X PCI-E

USB/B
USB port 0,1   page 28

Card Reader
USB port 5   page 27

BT conn
USB port 6   page 28

Int. Camera
USB port 9   page 18

USB
5V 480MHz

AMD

SB820M

page 20,21,22,23,24

SATA port 0
5V 1.5GHz(150MB/s)   SATA HDD   page 25

SATA port 1
5V 1.5GHz(150MB/s)   SATA ODD   page 25

SATA port 3
5V 1.5GHz(150MB/s)
USB port 2
5V 480MHz   eSATA   page 25

HD Audio  3.3V 24.576MHz/48Mhz

Clock Generator
SLG8SP626   page 16

RTC CKT.
page 20

Power On/Off CKT.
page 33

DC/DC Interface CKT.
page 34

Power Circuit DC/DC
page 35,36,37.38,39
40,41

ODD/B
Page 25

Power/B
Page 33

Audio & USB/B
Page 33

LED/B
Page 33

Touch Pad/B
Page 33

LPC BUS
3.3V 33 MHz

Debug Port
page 32

ENE KB926 D3
page 31

MDC 1.5 Conn
page 32

HDA Codec
ALC259Q
page 29

Int.KBD
page 32

SPI ROM
page 32

Int.
MIC CONN.
page 18

MIC CONN.
page 30

HP CONN.
page 30

SPK CONN.
page 30

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| Issued Date | 2008/04/14 | Deciphered Date | 2009/04/14 | Title | Block Diagram | |
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| | | | | Date Wednesday, March 17, 2010 | Sheet 2 of 42 | |

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Model Name : NALAE

File Name : LA-6054P

| Thermal Sensor | Fan Control | AMD S1G4 CPU | Memory BUS(DDRIII) | 200pin DDRIII-SO-DIMM X2 |
|---|---|---|---|---|
| ADM1032ARMZ page 7 | page 5 | uFCPGA-638 Package | Dual Channel | BANK 0, 1, 2, 3 page 9,10 |

page 5,6,7,8

1.5V DDRIII 1066/1333MHZ

*Hyper Transport Link 2.6GHz*
16X16

CRT page 17

LCD Conn. page 18

HDMI Conn. page 19

**Madison & Park**

Page 35,36,37,38,39
40,41,42,43

**AMD**

**RS880M**

page 11,12,13,14,15

*A-Link Express II*
4X PCI-E

PCIeMini Card WLAN
PCIe Port 2
USB Port 8 page 28

*PCIe 4x*
1.5V 2.5GHz(250MB/s)

RTL 8105E 10/100
PCIe port 3
page 26

RJ45 page 26

| USB/B | Card Reader |
|---|---|
| USB port 0,1 page 28 | USB port 5 page 27 |
| BT conn | Int. Camera |
| USB port 6 page 28 | USB port 9 page 18 |

USB
5V 480MHz

**AMD**

**SB820M**

page 20,21,22,23,24

SATA port 0
5V 1.5GHz(150MB/s)

SATA HDD page 25

SATA port 1
5V 1.5GHz(150MB/s)

SATA ODD page 25

SATA port 3
5V 1.5GHz(150MB/s)

USB port 2
5V 480MHz

eSATA page 25

HD Audio 3.3V 24.576MHz/48Mhz

Clock Generator
SLG8SP626 page 16

| RTC CKT. page 20 | ODD/B page 25 |
|---|---|
| Power On/Off CKT. page 33 | Power/B page 33 |
| DC/DC Interface CKT. page 34 | Audio & USB/B page 33 |
| Power Circuit DC/DC page 44,45,46.47 48,49,50,51 | LED/B page 33 |
| | Touch Pad/B page 33 |

LPC BUS
3.3V 33 MHz

Debug Port page 32

ENE KB926 D3
page 31

MDC 1.5 Conn
page 32

HDA Codec
ALC259Q page 29

Int.KBD page 32

SPI ROM page 32

Int. MIC CONN page 18

MIC CONN page 30

HP CONN page 30

SPK CONN page 30

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| Issued Date | 2008-09-25 | Deciphered Date | 2009-09-25 | *Block Diagram* |

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| Size | Document Number | | Rev |
|---|---|---|---|
| Custom | | LA-6054P | 0.2 |
| Date | Wednesday, March 17, 2010 | Sheet 2 of 52 | |

The system unit of the computer consists of the following components:

❑ Processor (BTO)

The computer is equipped with one of the following AMD processors:

■ AMD Danube Processor

❑ Memory (BTO)

The computer has two SODIMM slots which come standard with 1GB/2GB/4GB, accepting BTO for your memory requirements. It can incorporate up to 8 GB of main memory. It supports DDR3 at 1066MHz/800MHz.

❑ BIOS ROM (EEPROM)

The system BIOS uses one 4096KB flash ROM and the keyboard BIOS uses another 256KB flash ROM. The flash utility can be used to program both system and keyboard BIOS at the same time.

❑ System Controllers

■ Advanced Power Management 1.2 support
■ ACPI 4.0b and Windows Logo Program 3.0 compliant
■ Support SMBIOS specification V2.4
■ Hot keys for system control
■ Audio volume output control
■ External LED control
■ Battery scope report and control
■ Sticky key support
■ Power switch control
■ Two host interface channels support
■ Supports three independent devices
■ Internal Keyboard country selection
■ Computrace

❑ Graphics Controller

   ■ AMD M880G Chipset for integrated graphics display

   ■ ATI Mobility Radeon<sup>TM</sup> HD5470/HD5650 (DDR3, 1GB)for external graphics support

❑ Audio Controller

   ■ Realtek Azalia ALC259

   ■ One Audio-in port: Mic-in/Line-in

   ■ One Audio-out port: Headphone-out/Line-out

   ■ Internal Microphone (with Internal Camera, MIC with echo cancellation)

   ■ Volume control: Digital control

   ■ Microsoft inbox audio driver support

   ■ Software EQ support

❑ Wireless LAN Controller

   ■ Atheros 802.11 b/g (HB95 1x1n)

   ■ Realtek 802.11 b/g/n (8191SE)

   ■ WPS supported

## 1.2    2.5-inch HDD

The computer contains an extremely low-profile and lightweight, high-performance HDD. The HDD incorporates a 9.5 mm magnetic disk and mini-Winchester type magnetic heads. The HDD interface conforms to Serial ATA. Storage capacities supported are 250, 320, 400, 500 and 640 GB.

The HDD is shown in Figure 1-2 and some of its specifications are listed in Table 1-1.
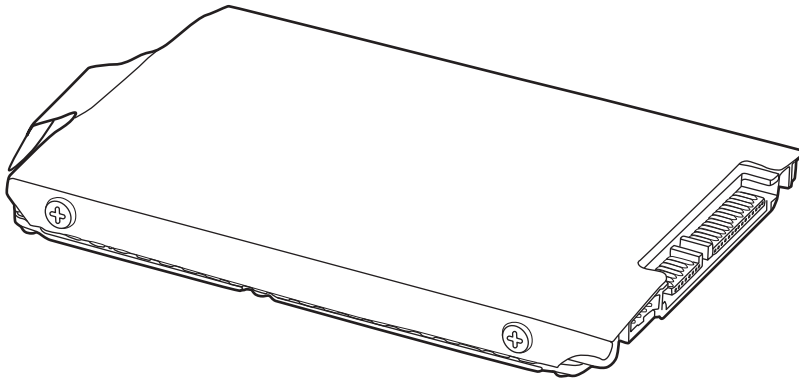


*Figure 1-2      SATA HDD*

*Table 1-1       HDD Specifications*

| Item | Specifications | | |
|------|------|------|------|
| Capacity (GB) | 250G | 320 GB | 400G |
| Rotational Speed (RPM) | 5400 RPM | 5400 RPM | 5400 RPM |
| Height | 9.5 mm | 9.5 mm | 9.5 mm |
| User Data Sectors | 488,397,168 | 625,142,448 | 781,422,768 |
| Bytes / Sector | 512 | 512 | 512 |

| Item | Specifications | |
|------|------|------|
| Capacity (GB) | 500G | 640 GB |
| Rotational Speed (RPM) | 5400 RPM | 5400 or 7200 RPM |
| Height | 9.5 mm | 9.5 mm |
| User Data Sectors | 976,773,168 | 1,250,263,728 |
| Bytes / Sector | 512 | 512 |

## 1.3     DVD Super Multi (+-R 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, CD-RW at 24x speed, DVD-R at 8x speed, DVD-R (Dual Layer) at 6x speed, DVD-RW at 6x speed, DVD+R at 8x speed, DVD+R (Double Layer) at 6x speed, DVD+RW at 8x speed and DVD-RAM at 5x speed.

The DVD Super Multi drive is shown in Figure 1-3 and its specifications are listed in Table 1-2.
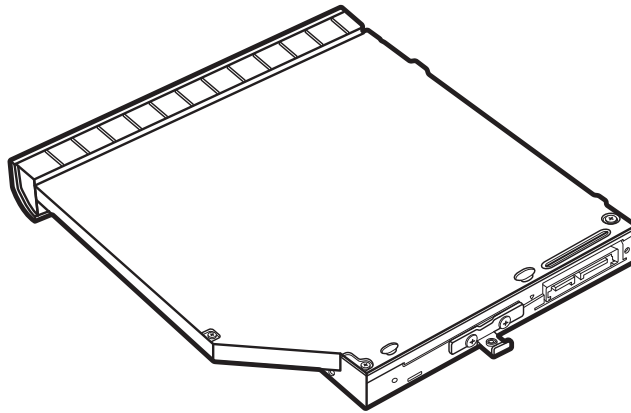


*Figure 1-3      DVD Super Multi Drive*

*Table 1-2       DVD Super Multi Drive Specifications*

| 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-R (Double Layer), DVD+R, DVD+RW, DVD+R (Double Layer), DVD-RAM.  CD:  CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, Photo CD (Multi-Session), Video CD, CD-Extra (CD+), CD-Text. | |

## 1.4 BD-Writer and BD-Combo drives

The BD-Writer and BD-Combo drives accept 12-cm (4.72-inch) and 8-cm (3.15-inch) discs and can play BDs, DVDs and CDs. At maximum the drives can playback BD at 6x speed, DVD at 8x speed, read CD-ROM at 24x speed, and write, CD-R at 24x speed, CD-RW at 16x speed, DVD-R at 8x speed, DVD-R (Dual Layer) at 4x speed, DVD-RW at 6x speed, DVD+R at 8x speed (BD-Combo drive at 4x speed), DVD+R (Double Layer) at 4x speed, DVD+RW at 8x speed and DVD-RAM at 5x speed.

In addition to being able to write to recordable CD/DVD discs, the BD-Writer drive can write to BD-R at 6x speed, BD-R (DL) at 4x speed, BD-RE at 2x speed and BD-RE (DL) at 2x speed.
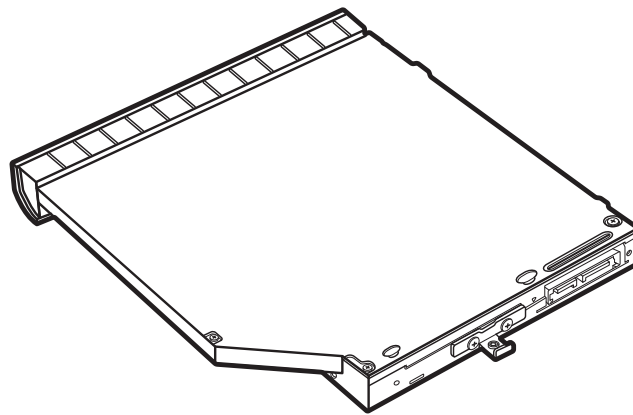


*Figure 1-4      BD-Writer or BD-Combo drive (depending on the model)*

*Table 1-3        Blu-ray Disc Drive specifications*

| Item | BD-ROM Mode | DVD-ROM Mode | CD-ROM Mode |
|---|---|---|---|
| Data Transfer Rate (Mbytes/s) | 33.3 (U-DMA transfer mode 2)<br><br>16.6 (PIO mode 4, Multiword DMA mode 2) | | |
| Access Time (ms)<br><br>Average Random Access | 130 | | |
| Data Buffer Size (Mbytes) | 2MB | | |
| Formats Supported | BD:<br><br>BD-ROM, BD-R, BD-R (DL), BD-RE, BD-RE (DL)<br><br>DVD:<br><br>DVD-VIDEO, DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+-R (Double Layer), DVD+RW.<br><br>CD:<br><br>CD-DA, CD-ROM, CD-R, CD-RW, CD-ROMXA, Photo CD (Multi-Session), Video CD, CD-Extra (CD+), CD-Text. | | |

## 1.5     Power Supply

The power supply unit provides constant voltage (19V) for the system board and performs the following functions:

1.  Power input monitor

    - Checks whether the AC adapter (DC power supply) is connected to the computer.
    - Checks whether the battery pack is connected to the computer.
    - Monitors the DC power supply input voltage (AC Adapter output voltage).

2.  Power supply's internal control

    - Turns on and off the battery pack charging power supply.
    - Issues a charging current instruction to the PWM control IC of the battery pack charging power supply.
    - Controls the supply of DC power supply input (AC Adapter output) to the power supply unit.
    - Controls the supply of power to the system block (load/logic circuit side).
    - Controls forced shutdown if the power supply malfunctions.

3.  Logic circuit control

    - Instructs the gate array to enable/disable tuning the power on.
    - Controls power-on/off operation.

4.  Status display

    - Turns on the Power LED (in White).
    - Battery indicator (in White or Amber).
    - DC-IN indicator (in White)

5.  External interface

    - Performs communication through the I2C bus (via the internal EC/KBC).
    - Transfers the power supply operation mode.

6. Output monitor

- Monitors the voltage output to the system block (load/logic circuit side).

- Monitors the voltage, over-voltage, input/output current of the battery pack.

- Monitors the internal temperature of the battery pack.

- Monitors the supply voltage from the AC adapter.

## 1.6     Batteries

The computer has the following two types of batteries:

❑  Main Battery Pack

❑  Real Time Clock (RTC) Battery

### 1.6.1      Main Battery

The main battery pack serves as the computer's main power source when the AC adapter is not attached. The main battery maintains the state of the computer when the AC adapter is detached.

### 1.6.2      Battery Charging Control

Battery charging is controlled by EC KB926. When the AC adapter and battery pack are attached to the computer, the EC KB926 controls the charge on/off state and detects a full charge.

❑  Battery Charge

When the AC adapter is attached, the battery is charged by off-state charge when the system is powered off or by on-state charge when it is powered on.

*Table 1-4      Quick/Normal Charging Time*

| State | Charge Time | |
|-------|-------------|--|
| Off-State Charge | 3/6/12 Cell | About 4 hours max |
| On-State Charge | 3/6/12 Cell | About 12 hours max |

---

*NOTE: The time required for normal charge depends on the power consumption by the system. Using a fluorescent lamp and frequently accessing the disk consumes more power and lengthens the charge time.*

---

Any of the following can stops battery charge:

1. The battery becomes fully charged.

2. The AC adapter or battery pack is removed.

3. The battery or AC adapter voltage is abnormal.

❑ Detection of full charge

A full charge is detected only when the battery is being charged by quick or normal charge. A full charge is detected when either of the following conditions is met:

1. The current in the battery charging circuit drops below the predetermined value.

2. The charging time exceeds the fixed limit.

### 1.6.3     RTC Battery

The RTC battery provides power to keep the current date, time and other system information in memory while the computer is turned off.

---

# Chapter 2
# Troubleshooting Procedures

# Chapter 2 Contents

**Figures**

**Tables**

## 2.1    Troubleshooting Introduction

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

| | | | |
|---|---|---|---|
| 1. Display | 5. Touch Pad | 9. Wireless LAN | 13. MIC |
| 2. USB Floppy Drive | 6. Speaker/Head | 10. Camera | 14. E-SATA |
| 3. Keyboard | 7. Optical Drive | 11. Bluetooth | 15. LAN |
| 4. USB ports | 8. Modem | 12. HDMI | |

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. Phillips screwdriver (3.5 mm)
2. 2DD or 2HD formatted work disk for floppy disk drive testing
3. Multimeter
4. External monitor
5. USB compatible keyboard
6. Multimedia sound system with line-in and line-out ports
7. Headphones
8. USB test module and USB cable
9. Music CD
10. MIC module and MIC line
11. E-SATA HDD
12. HDMI

## 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, if it is, ask him or her to enter the password.

● Verify with the customer that Toshiba Windows7 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 optical disk drive, if installed, is empty. If no ODD module is installed, you should use an external ODD to run the diagnostics tests

START

Connect the AC adapter to the DC-IN socket

Is the DC-IN LED on? —No→ Perform the Power Supply Troubleshooting procedures in section 2.3

Yes

Is the Battery LED on? —No→ Perform the Power Supply Troubleshooting procedures in section 2.3

Yes

Turn the Power switch on

Yes

Is the Power On LED on? —No→ Perform the Power Supply Troubleshooting procedures in section 2.3

Yes

Is the BIOS logo message display? —No→ Perform the Power Supply Troubleshooting procedures in section 2.3

Yes

If the "password" message displays, type the password, then press Enter.

Is Toshiba Windows7 being loaded? —No→ Perform diagnostics program. Run CM165.EXE and select the HARD DISK item.

Yes

A

*Figure 2-1 Troubleshooting flowchart (1/2)*

**A**

Does typed characters appear correctly? — No → Perform the Keyboard Troubleshooting procedures in section 2.4

Yes

Insert USB memory/CD disk, Then run the diagnostics test program.

Yes

Is the diagnostics test loaded? — No → Perform the USB memory/ CD disk Troubleshooting procedures in section 2.5

Yes

Allow each test to perform automatically

Is an error detected by any of the diagnostics tests? — Yes → After confirming which diagnostics test has detected an error, perform the appropriate procedure as outlined below.

No

System is normal

End

*Figure 2-1 Troubleshooting flowchart (2/2)*

If the diagnostics program cannot detect an error, the problem may be intermittent. The test program should be executed several times to isolate the problem. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

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

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

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

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

5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.8 and the Optical Drive Troubleshooting Procedures in Section 2.9

6. If an error is detected by the HDD test, perform the HDD Troubleshooting Procedures in Section 2.15

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 modem, perform the Modem Troubleshooting Procedures in Section 2.10

3.  If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting Procedures in Section 2.11

4.  If an error is detected when using the camera, perform the camera Troubleshooting Procedures in Section 2.12

5.  If an error is detected when using the Bluetooth, perform the Bluetooth Troubleshooting Procedures in Section 2.13

6.  If an error is detected when using the Bridge Media Slot, perform the Bridge Media Slot Troubleshooting Procedures in Section 2.14

7.  If an error is detected when using the CRT, perform the CRT Troubleshooting Procedures in Section 2.16

8.  If an error is detected when using the HDMI TV, perform the HDMI TV Troubleshooting Procedures in Section 2.17.

9.  If an error is detected when using the MIC, perform the MIC Troubleshooting Procedures in Section 2.18

10. If an error is detected when using the E-SATA, perform the E-SATA Troubleshooting Procedures in Section 2.19

11. If an error is detected when using the LAN, perform the LAN Troubleshooting Procedures in Section 2.20

### 2.3    Power Supply Troubleshooting

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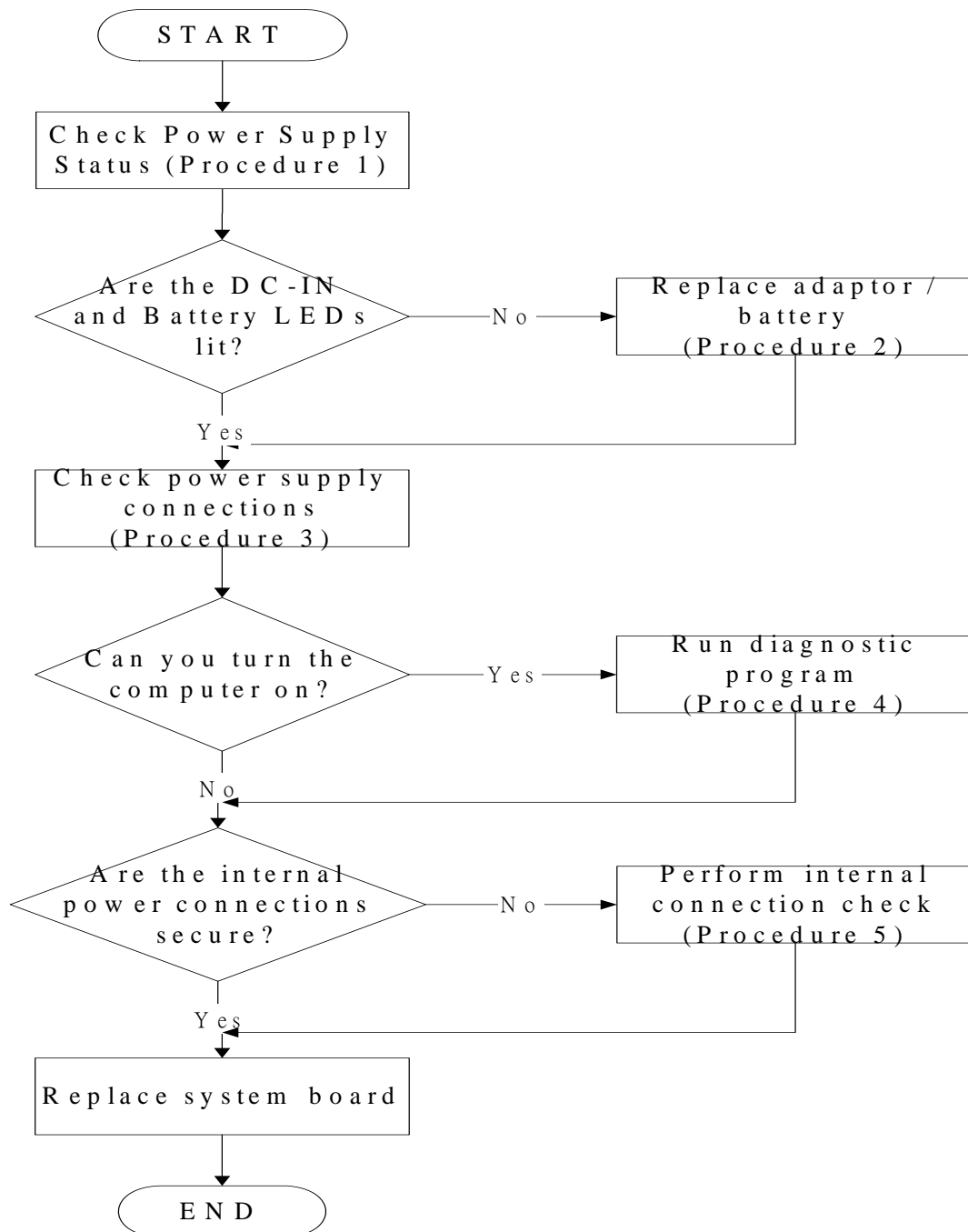
*Figure 2-2 Power Supply Troubleshooting Process*

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The flowchart in Figure 2-2 gives a summary of the process. The procedures described in this section are:

Procedure 1: Power Status Check

Procedure 2: Adaptor / battery replacement

Procedure 3: Power supply connection check

Procedure 4: Diagnostic check

Procedure 5: Internal connection check

**Procedure 1        Power Status Check**

The following LEDS indicate the power supply status:

    Battery LED

    DC-IN LED

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

*Table 2-1 Battery LED*

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

*Table 2-2 DC-IN LED*

| AC-IN LED | Power supply status |
|-----------|---------------------|
| Solid on  | AC power exists (LED is solid White). |
| 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:
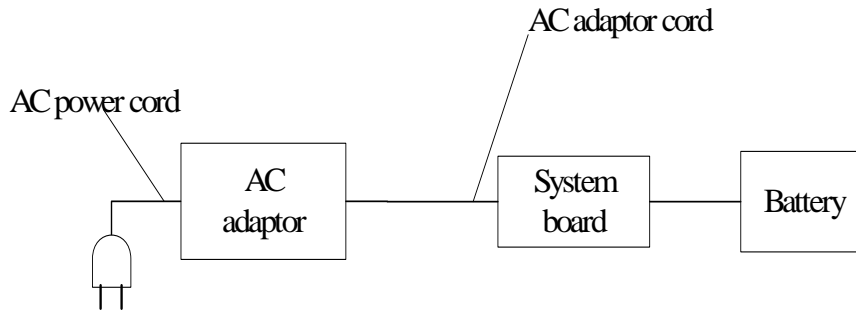


Any of the connectors may be disconnected.  Perform Check 1.

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 multimeter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2.  If a fuse is blown, go to Check 3.

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

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

## 2.4 Display Troubleshooting

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

*Figure 2-3 Display troubleshooting process*

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

Procedure 1:    External display check

Procedure 2:    Diagnostic check

Procedure 3:    Connector and replacement check

**Procedure 1        External display check**

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

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

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

**Procedure 2        Diagnostic check**

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

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

**Procedure 3      Connector and replacement check**

The 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 DDR3 RAM module is seated properly. Test display again. If the problem still exits, replace the DDR RAM module. If the problem still exists, perform Check 2.

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

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

Check 4      Replace the CPU with another of the same specifications.  If the problem still exists, perform Check 5.

Check 5      The system board may be damaged.  Replace it with a new one.

## 2.5    Keyboard Troubleshooting

```
                    ┌─────────────────┐
                    │     START       │
                    └─────────────────┘
                             │
                             ▼
          ┌──────────────────────────────┐
          │   Perform diagnostic         │
          │   check                      │
          │   (Procedure 2)              │
          └──────────────────────────────┘
                             │
                             ▼
              ◇ Was a keyboard              ┌──────────────────────┐
              ◇ problem detected?  ── No ──▶│  Keyboard is not     │
                                            │  faulty. Continue    │
                             │              │  troubleshooting-    │
                            Yes             │  refer to Figure 2-1 │
                             │              └──────────────────────┘
                             ▼
          ┌──────────────────────────────┐
          │   Perform connector and      │
          │   replacement check          │
          │   (Procedure 3)              │
          └──────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────┐
          │   Replace system board       │
          └──────────────────────────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │      END        │
                    └─────────────────┘
```

*Figure 2-4 Keyboard troubleshooting process*

To determine if the computer's internal keyboard is functioning properly, perform the following procedures. Figure 2-4 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1:   Diagnostic check

Procedure 2:   Connector and replacement check

## Procedure 1        Diagnostic check

Run the test and Diagnostics 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 2.  If an error does not occur, the keyboard is functioning ok.

## Procedure 2        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.
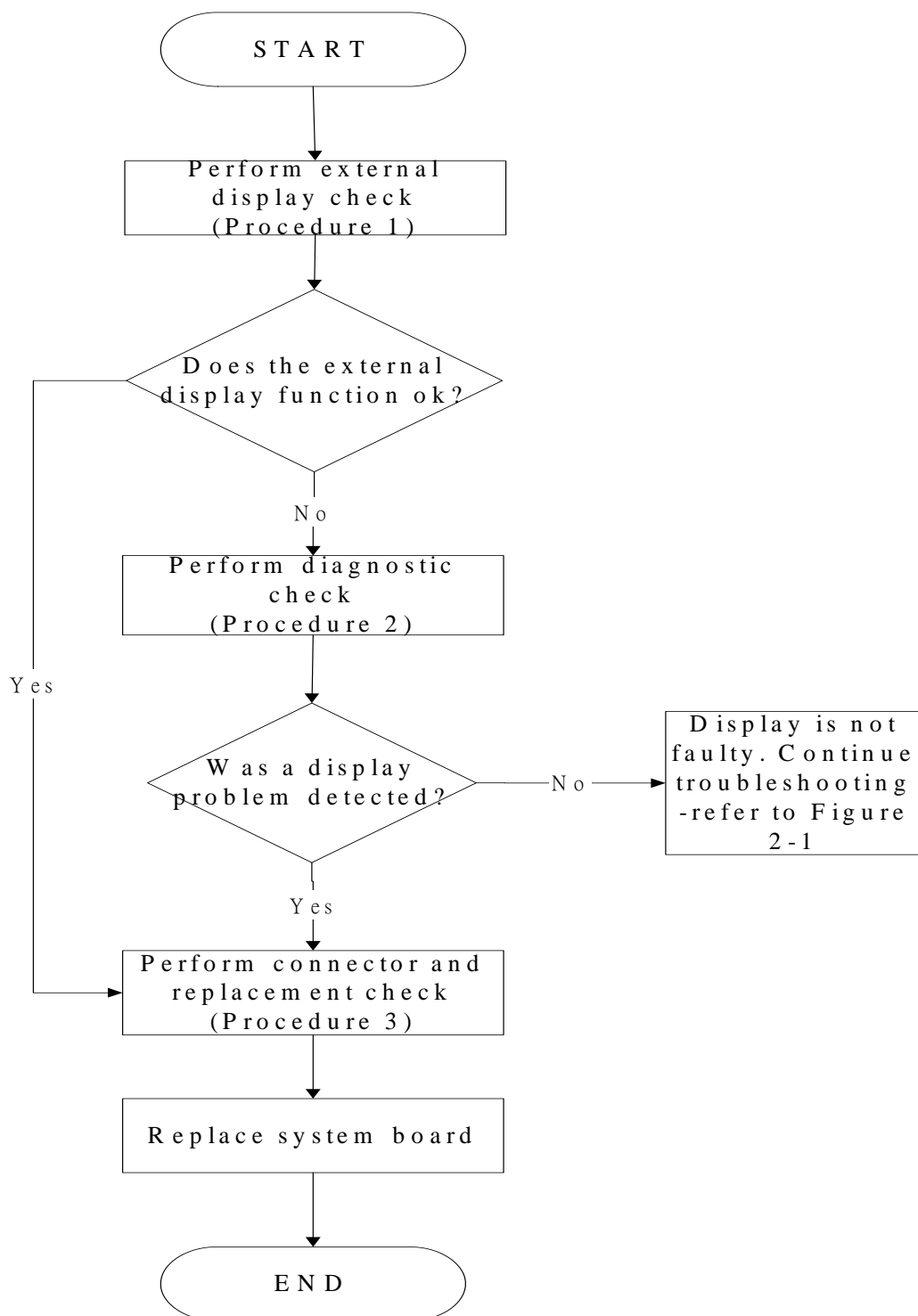
## 2.6    External USB Devices Troubleshooting

```
          ┌─────────────────┐
          │     S T A R T    │
          └─────────────────┘
                  │
                  ▼
       ┌─────────────────────────┐
       │ Perform external device │
       │  and connection check   │
       │     (Procedure 1)       │
       └─────────────────────────┘
                  │
                  ▼
            Does the device function
              correctly when
          connected to a different
                USB port?
                  │ No
                  ▼
            Does an alternative USB        Yes      ┌──────────────┐
            device function correctly?  ─────────▶  │ Original USB │
                  │ No                             │ device is    │
                  ▼                                 │ faulty       │
       ┌─────────────────────────┐                 └──────────────┘
       │ Replace system board    │
       │    (Procedure 2)        │
       └─────────────────────────┘
                  │
                  ▼
          ┌─────────────────┐
          │      E N D       │
          └─────────────────┘
```
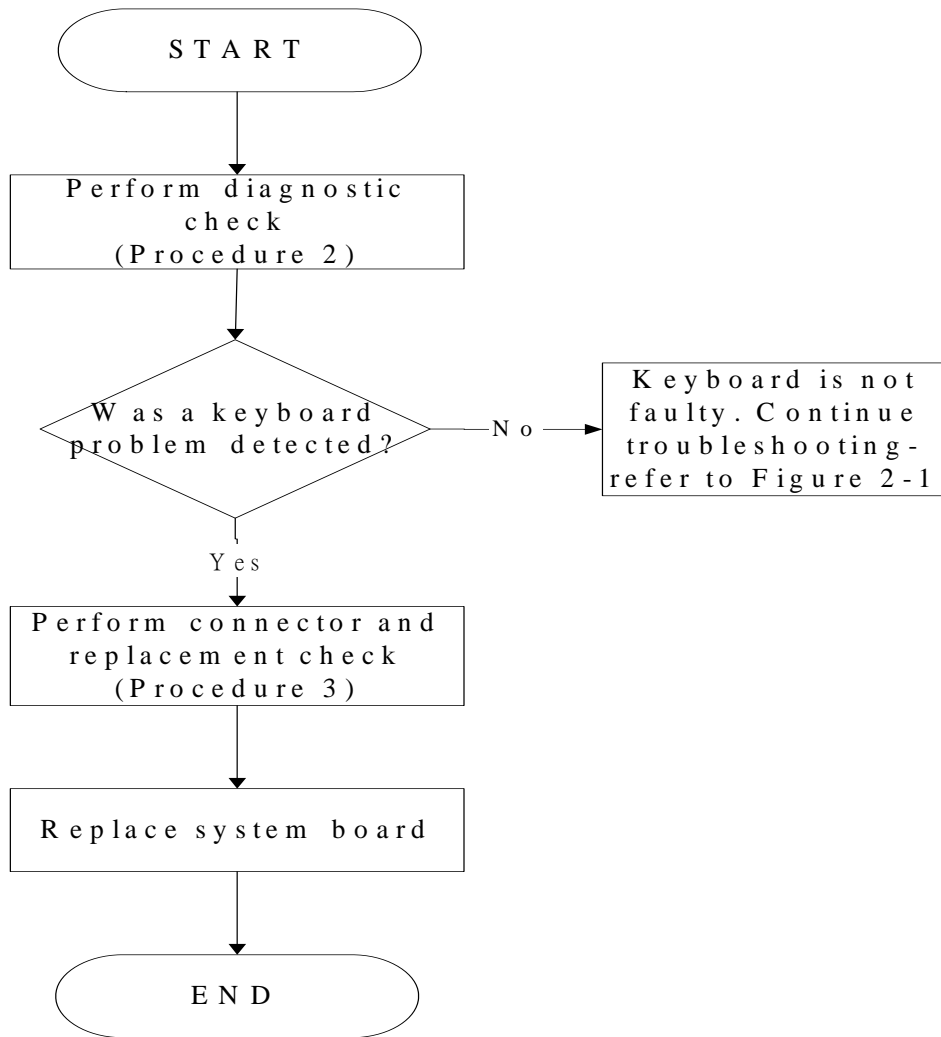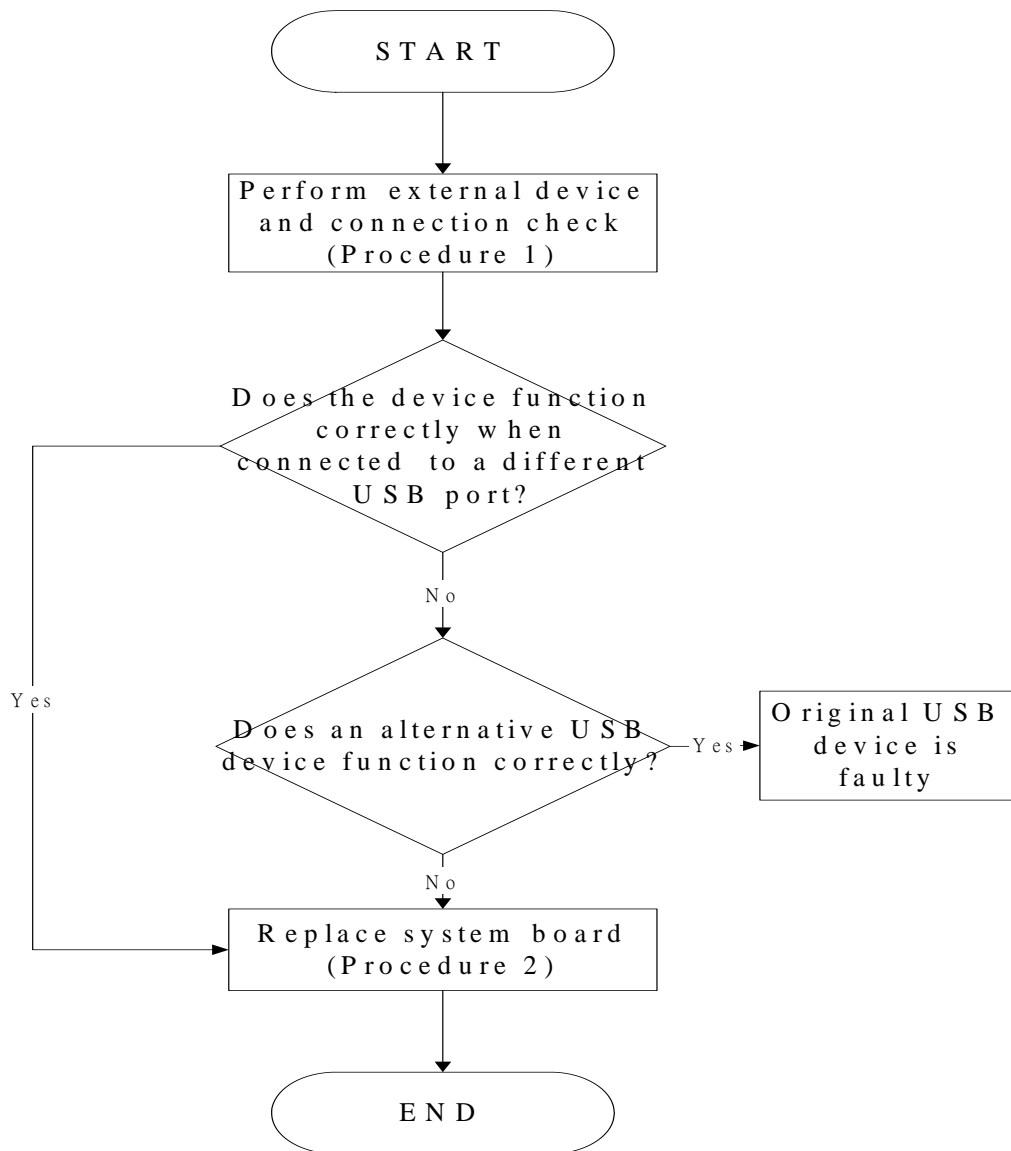
*Figure 2-5 External USB device troubleshooting process*

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 2-5 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. Use windows application to check device can work fine or not. If an error is located, go to Perform Check 1. If an error does not occur, the USB is functioning ok.

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 or USB small 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 or USB small board may be damaged. Go to Procedure 2.

## Procedure 2 Replace system board

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

## 2.7    Touch Pad Troubleshooting

```
                        ┌─────────────────┐
                        │     START       │
                        └─────────────────┘
                                 │
                 ┌───────────────────────────────┐
                 │   Perform diagnostic          │
                 │   check                       │
                 │   (Procedure 1)               │
                 └───────────────────────────────┘
                                 │
                           ◇ Does Touchpad
                             function ok? ◇
                                 │ No
                 ┌───────────────────────────────┐
                 │   Perform diagnostic          │
                 │   check                       │
                 │   (Procedure 2)               │
                 └───────────────────────────────┘
                                 │
        Yes                ◇ Was a Touchpad        No    ┌────────────────────┐
                             problem detected? ◇ ──────► │ Touchpad is not    │
                                 │ Yes                   │ faulty. Continue   │
                                                         │ troubleshooting    │
                 ┌───────────────────────────────┐       │ -refer to Figure   │
                 │   Perform connector and       │       │ 2-1                │
                 │   replacement check           │       └────────────────────┘
                 │   (Procedure 3)               │
                 └───────────────────────────────┘
                                 │
                 ┌───────────────────────────────┐
                 │   Replace system board        │
                 └───────────────────────────────┘
                                 │
                        ┌─────────────────┐
                        │      END        │
                        └─────────────────┘
```
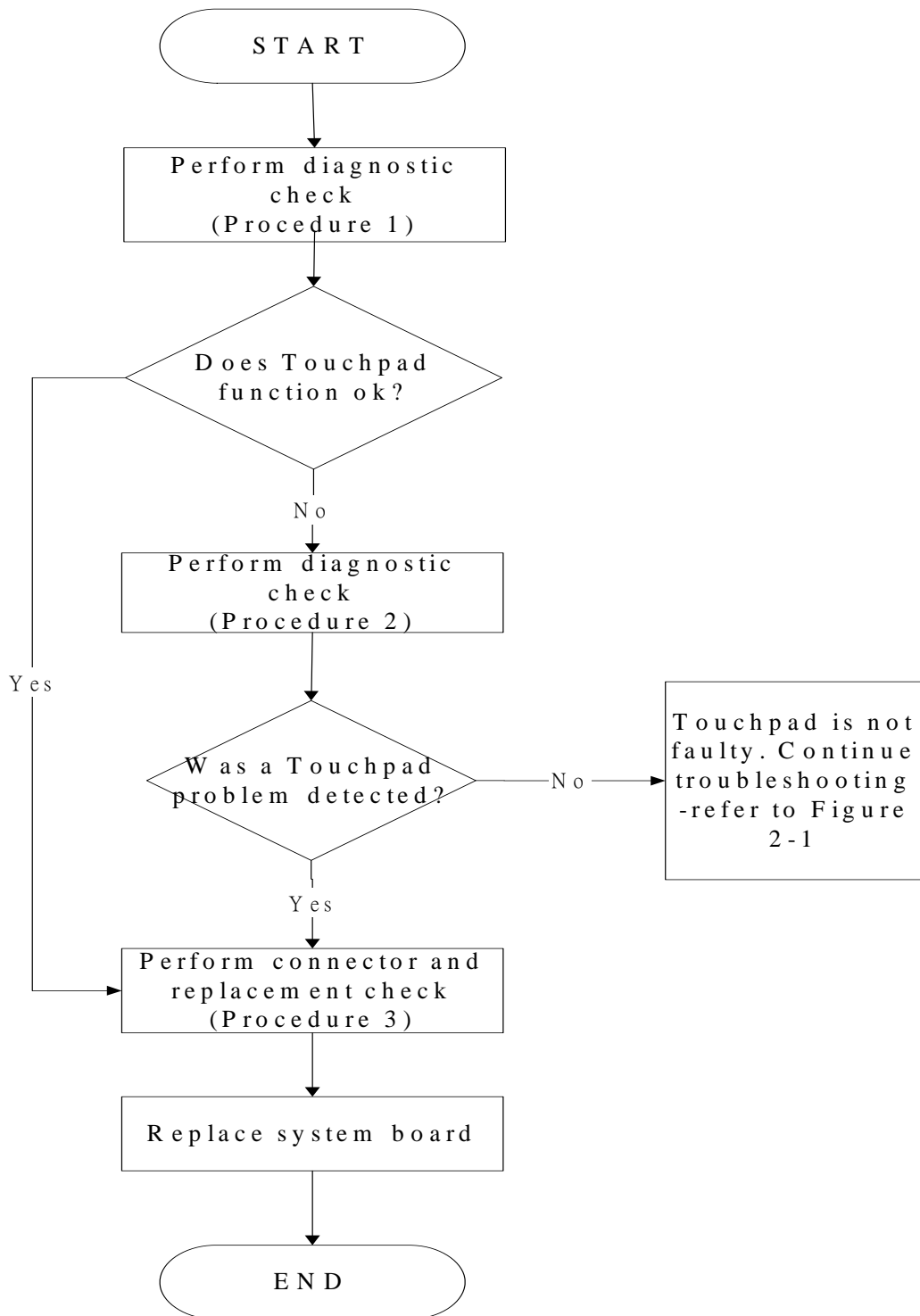
*Figure 2-6 Touchpad troubleshooting process*

To determine if the computer's built-in Touchpad is functioning properly, perform the following procedures. Figure 2-6 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1:   Diagnostic test

Procedure 2:   Touchpad connection check

Procedure 3:   Touchpad replacement check

**Procedure 1        Diagnostic test**

Run the Diagnostic Program, which will automatically execute the Touchpad test. (Refer to Chapter 3 system configuration check), 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 Touchpad function is functioning properly.

**Procedure 2        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 3.

**Procedure 3        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 free-Dos test is still not functioning properly, replace the system board with a new one following the steps in Chapter 4.
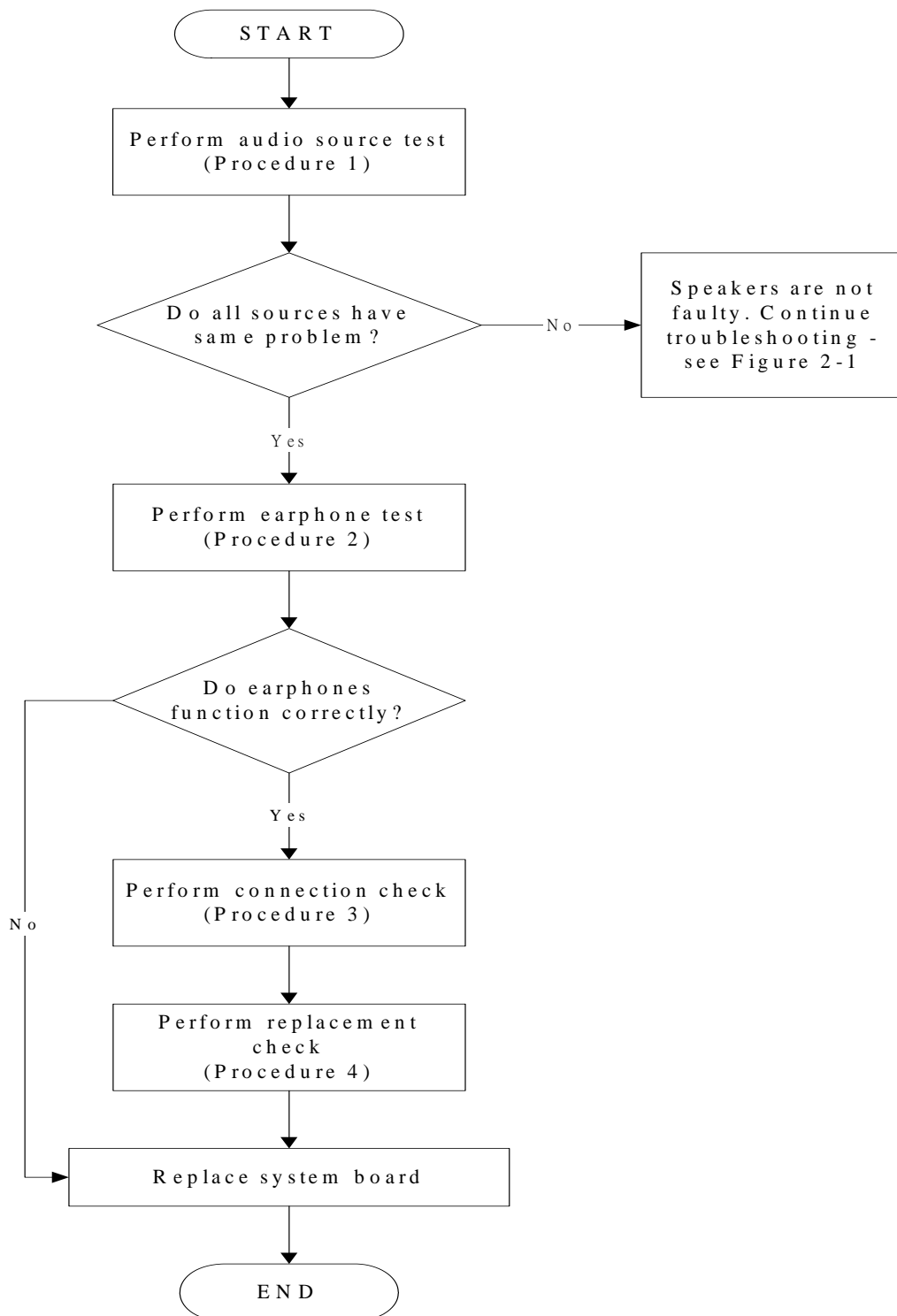
## 2.8     Speaker Troubleshooting



*Figure 2-7 Speaker troubleshooting process*

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 2-7 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

Procedure 1:   Audio source test

Procedure 2:   Earphone test

Procedure 3:   Connection check

Procedure 4:   Replacement check

**Procedure 1          Audio source test**

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

**Procedure 2          Earphone test**

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

**Procedure 3          Connection check**

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

**Procedure 4          Replacement check**

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

## 2.9    Optical Drive Troubleshooting

```
                    ┌─────────────┐
                    │   START     │
                    └──────┬──────┘
                           │
                           ▼
              ┌────────────────────────┐
              │  Perform audio CD check│
              │     (Procedure 1)      │
              └───────────┬────────────┘
                          │
                          ▼
                     ◇─────────◇              ┌────────────────────────┐
                    / Audio CD  \      No     │  Perform drive-        │
                   <  functions   >──────────▶│  cleaning check        │
                    \   ok?     /             │    (Procedure 2)       │
                     ◇─────────◇              └────────────────────────┘
                          │ Yes
                          ▼
              ┌────────────────────────┐
              │  Perform software check│
              │     (Procedure 3)      │
              └───────────┬────────────┘
                          │
                          ▼
              ┌────────────────────────┐
              │  Perform diagnostic test│
              │     (Procedure 4)      │
              └───────────┬────────────┘
                          │
                          ▼
              ┌────────────────────────┐
              │  Perform connection and│
              │   replacement check    │
              │     (Procedure 5)      │
              └───────────┬────────────┘
                          │
                          ▼
              ┌────────────────────────┐
              │  Replace system board  │
              └───────────┬────────────┘
                          │
                          ▼
                    ┌─────────────┐
                    │    END      │
                    └─────────────┘
```
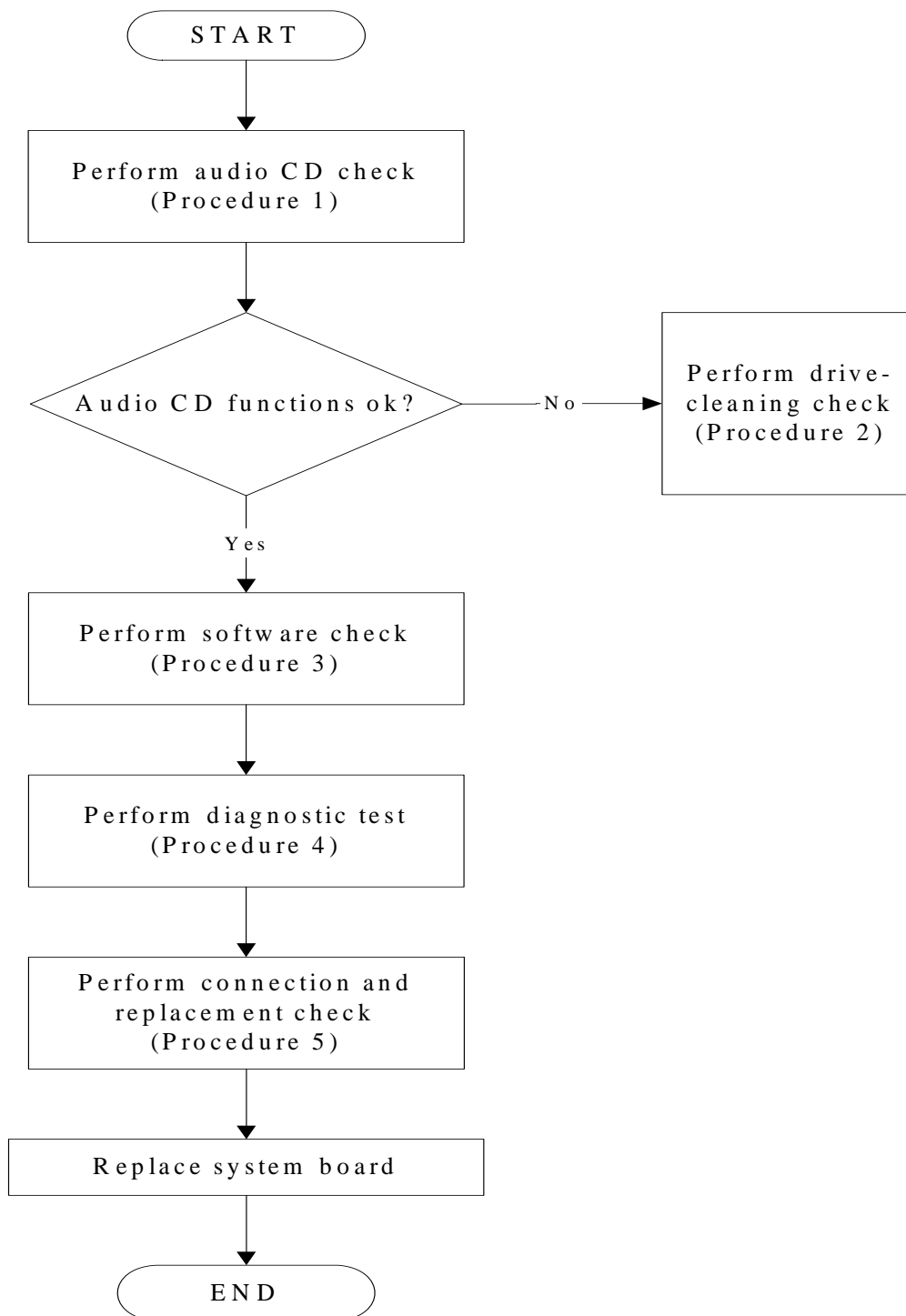
*Figure 2-8 Optical drive troubleshooting process*

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite L670D/ Satellite Pro L670D Series Maintenance Manual module bays can accommodate the following optical drives:

DVD SuperMulti supporting +-R Double Rayer

Blue-Ray DVD supporting

Figure 2-8 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:  Connection and replacement check

**Procedure 1       Audio CD check**

First, insert an audio CD into the CD/DVD drive. Use windows application to check device can work fine or not. 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        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.
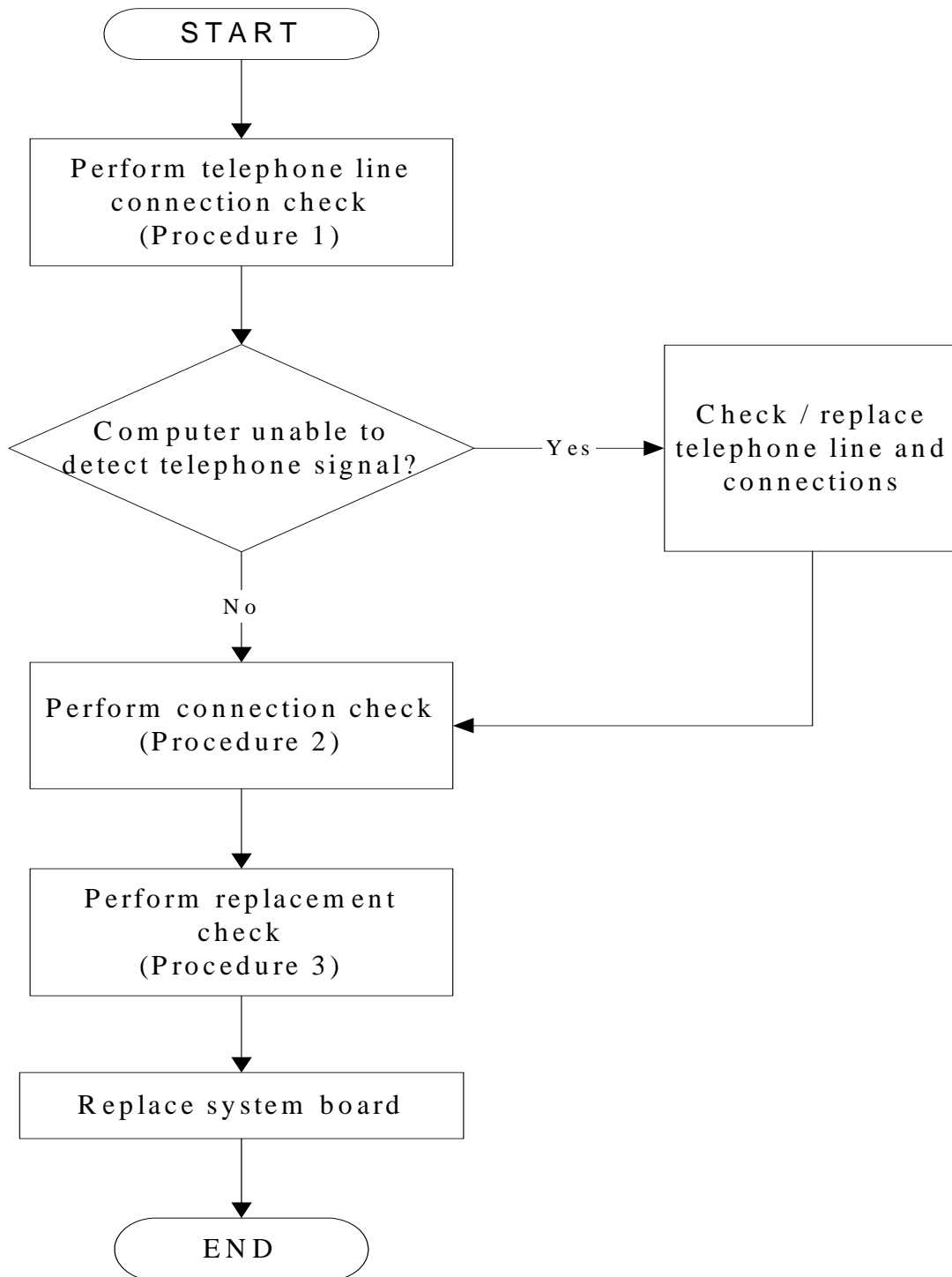
### 2.10 Modem Troubleshooting



*Figure 2-9 Modem troubleshooting process*

This section describes how to determine if the computer's modem is functioning properly. Figure 2-9 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. Use windows application to check device can work fine or not. 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*.
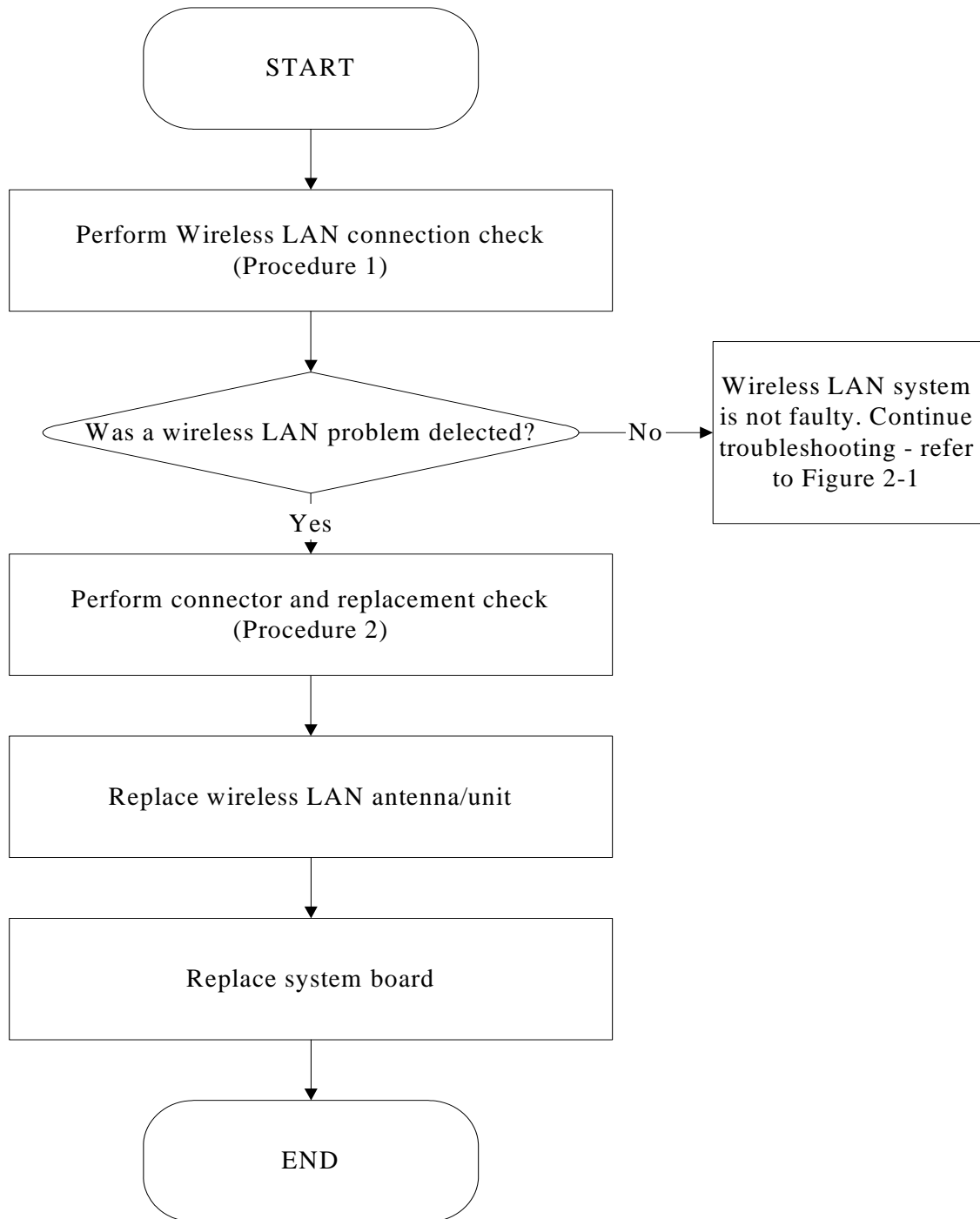
### 2.11    Wireless LAN Troubleshooting



START

Perform Wireless LAN connection check
(Procedure 1)

Was a wireless LAN problem delected? —No→ Wireless LAN system is not faulty. Continue troubleshooting - refer to Figure 2-1

Yes

Perform connector and replacement check
(Procedure 2)

Replace wireless LAN antenna/unit

Replace system board

END

*Figure 2-10 Wireless LAN troubleshooting process*

Notes: W/L Antenna assemble rule as below:

| color of antenna | Assemble location |
|---|---|
| White antenna | Main/1 |
| Black antenna | Aux/2 |

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 2-10 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1:     Wireless LAN connection test

Procedure 2:     Connector and replacement check

**Procedure 1       Wireless LAN connection check**

PLS use windows application. 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 module (refer to Chapter 4 for instructions) and that the wireless LAN module 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 light. If the LED is light 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 light 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.
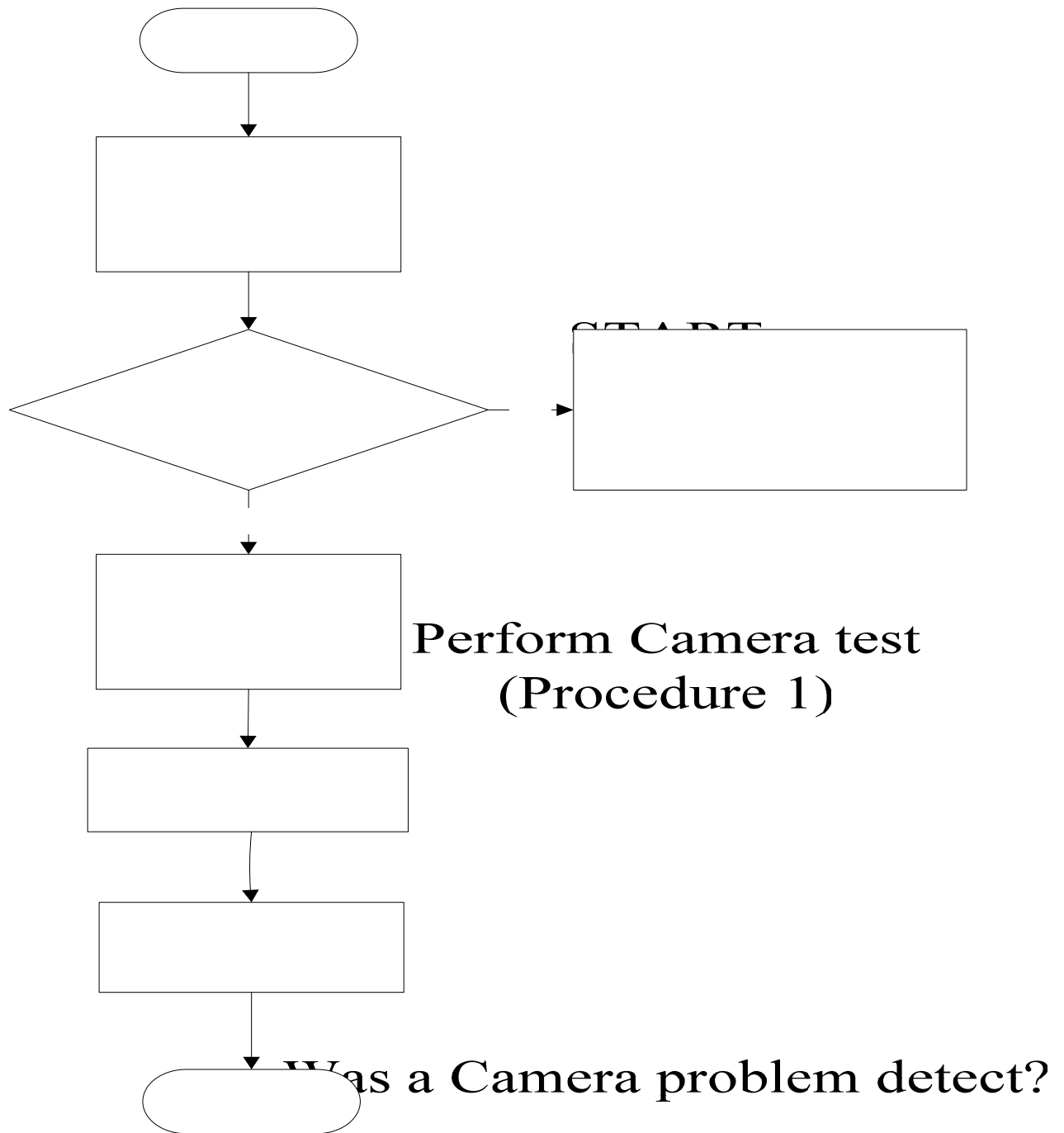
### 2.12    Camera Troubleshooting

START

Perform Camera test
(Procedure 1)

Was a Camera problem detect?

*Figure 2-11 Camera troubleshooting process*

Yes

Perform connector and
replacement check
(Procedure 2)

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 2-11 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Windows Application test

Procedure 2: Connector and replacement check

## Procedure 1      Windows Application 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 cable 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.

### 2.13    Bluetooth Troubleshooting

START

Perform Bluetooth test
(Procedure 1)

Was a Bluetooth problem
detect?

Yes
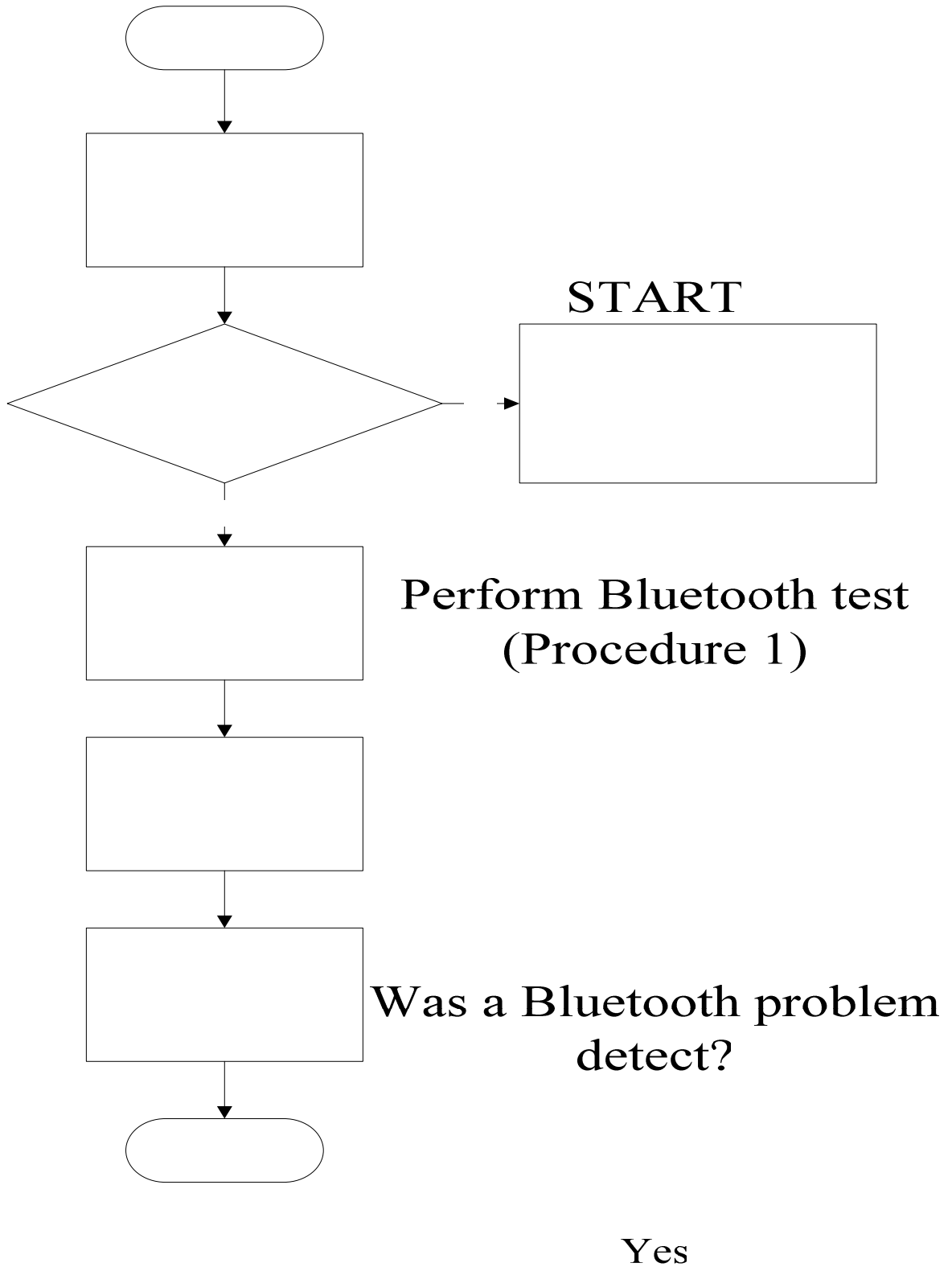
Perform connector and
replacement check
(Procedure 2)

*Figure 2-12 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 2-12 outlines the

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

Procedure 1: Windows Application test

Procedure 2: Connector and replacement check

## Procedure 1  Windows Application test

PLS use windows application to check device can work fine or not. 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.

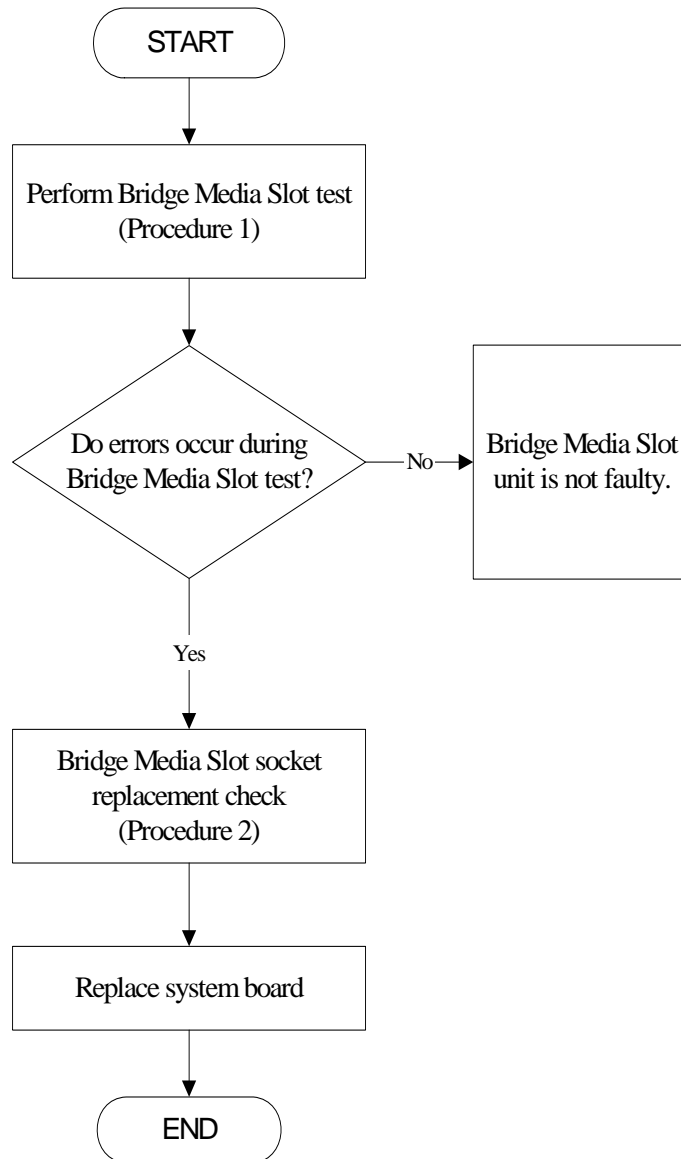## 2.14   Bridge Media Slot Troubleshooting

```
                        ╭──────────╮
                        │  START   │
                        ╰──────────╯
                              │
                              ▼
                ┌──────────────────────────┐
                │ Perform Bridge Media Slot │
                │  test                     │
                │  (Procedure 1)            │
                └──────────────────────────┘
                              │
                              ▼
                         ◇◇◇◇◇◇◇◇◇
                    ◇◇◇◇           ◇◇◇◇              ┌──────────────────┐
                ◇◇ Do errors occur during ◇◇   No → │ Bridge Media Slot│
                ◇◇ Bridge Media Slot test? ◇◇ ───── │ unit is not faulty.│
                    ◇◇◇◇           ◇◇◇◇              └──────────────────┘
                         ◇◇◇◇◇◇◇◇◇
                              │
                             Yes
                              │
                              ▼
                ┌──────────────────────────┐
                │ Bridge Media Slot socket  │
                │  replacement check        │
                │  (Procedure 2)            │
                └──────────────────────────┘
                              │
                              ▼
                ┌──────────────────────────┐
                │   Replace system board    │
                └──────────────────────────┘
                              │
                              ▼
                        ╭──────────╮
                        │   END    │
                        ╰──────────╯
```

*Figure 2-13 Bridge Media Slot troubleshooting process*

This section describes how to determine if the Bridge Media Slot 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:   Bridge Media Slot test

Procedure 2:   Bridge Media Slot replacement check

## Procedure 1      Bridge Media Slot test

The Bridge Media Slot test PLS Use windows application to check device can work fine or not. Ensure the card in fully inserted into the socket before running the program.

If an error occurs during the Bridge Media Slot test, perform Procedure 2. If no error occurs, it is likely that the original Bridge Media Slot was faulty.

## Procedure 2      Bridge Media Slot socket replacement check

The Bridge Media Slot 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.

### 2.15 HDD/SSD Troubleshooting
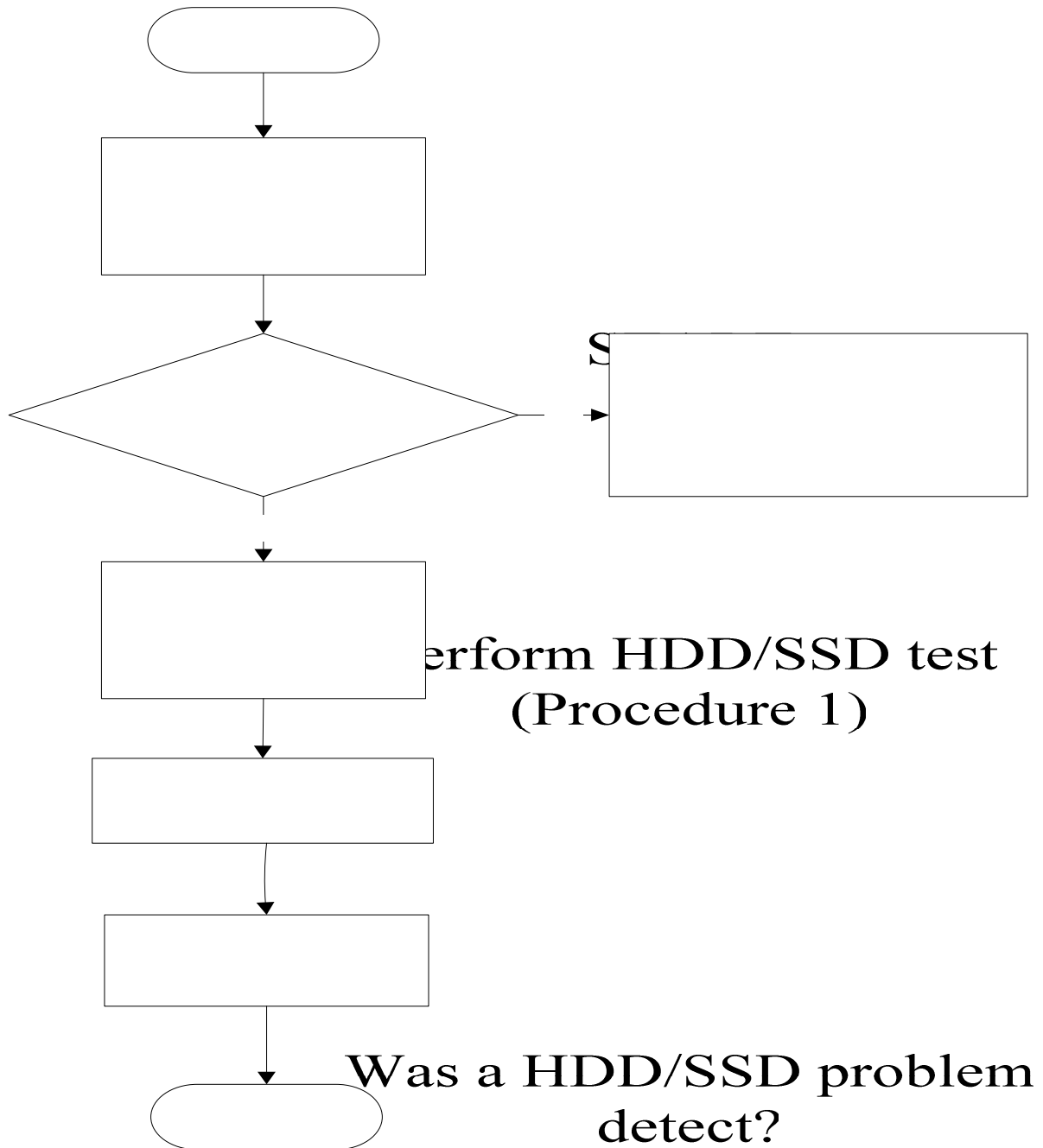
erform HDD/SSD test
(Procedure 1)

Was a HDD/SSD problem
detect?

*Figure 2-14 HDD/SDD troubleshooting process*

Yes

Perform connector and
replacement check
(Procedure 2)

The HDD/SSD or system board may be the reason of a HDD/SSD fault. Either of these two

components may be damaged. To determine if the computer's HDD/SDD is functioning

properly, perform the following procedures. Figure 2-14 outlines the process. Start with

Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

**Procedure 1        Diagnostic test**

Run the Diagnostic Program, which will automatically execute the HDD/SSD R/W test.
(Refer to Chapter 3 system configuration check), 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 HDD/SSD function is
functioning properly.

**Procedure 2        Connector and replacement check**

The 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 HDD module is securely slotted into the system board. If the
           problem persists, go to Check 2.

Check 2    The 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.

## 2.16    CRT Troubleshooting

```
                        ┌─────────────────┐
                        │     START       │
                        └─────────────────┘
                                 │
                                 ▼
              ┌──────────────────────────────────┐
              │  Perform CRT connection check    │
              │         (Procedure 1)            │
              └──────────────────────────────────┘
                                 │
                                 ▼
                    ╱ Does replacement ╲
                   ╱     CRT cable       ╲ ── No ──▶  ┌──────────────┐
                   ╲  function properly? ╱            │ Replace CRT  │
                    ╲                   ╱             │    cable     │
                                 │                    └──────────────┘
                                Yes
                                 ▼
              ┌──────────────────────────────────┐
              │     Perform CRT set check        │
              │         (Procedure 2)            │
              └──────────────────────────────────┘
                                 │
                                 ▼
                    ╱                 ╲
                   ╱ CRT functioning   ╲ ── No ──▶  ┌──────────────┐
                   ╲      ok?          ╱            │ Use different│
                    ╲                 ╱             │   CRT set    │
                                 │                  └──────────────┘
                                Yes
                                 ▼
              ┌──────────────────────────────────┐        ┌──────────────┐
              │     Replace system board         │ ─────▶ │  Check CRT   │
              │                                  │        │    Port      │
              └──────────────────────────────────┘        │  connection  │
                                 │                         └──────────────┘
                                 ▼
                        ┌─────────────────┐
                        │      END        │
                        └─────────────────┘
```
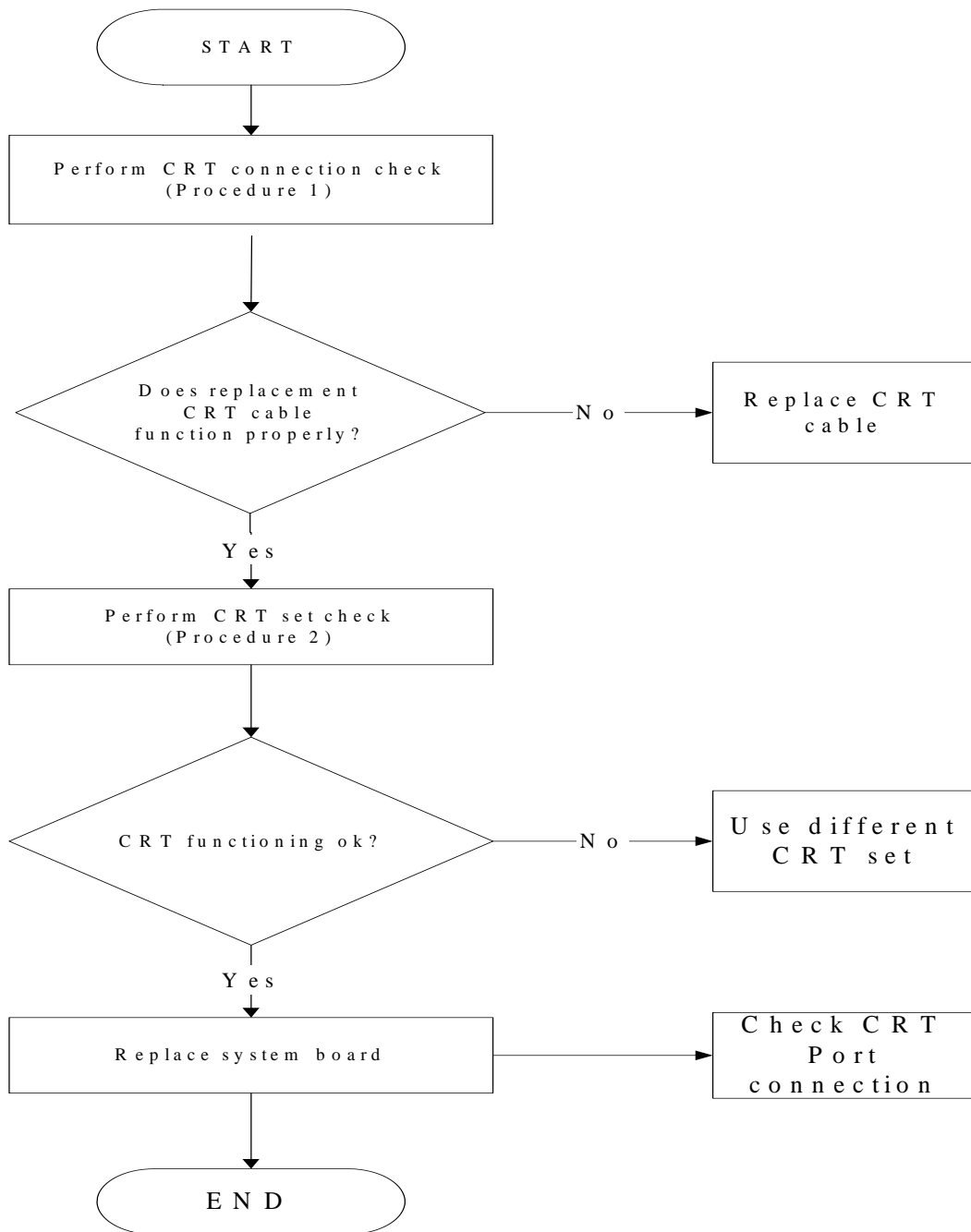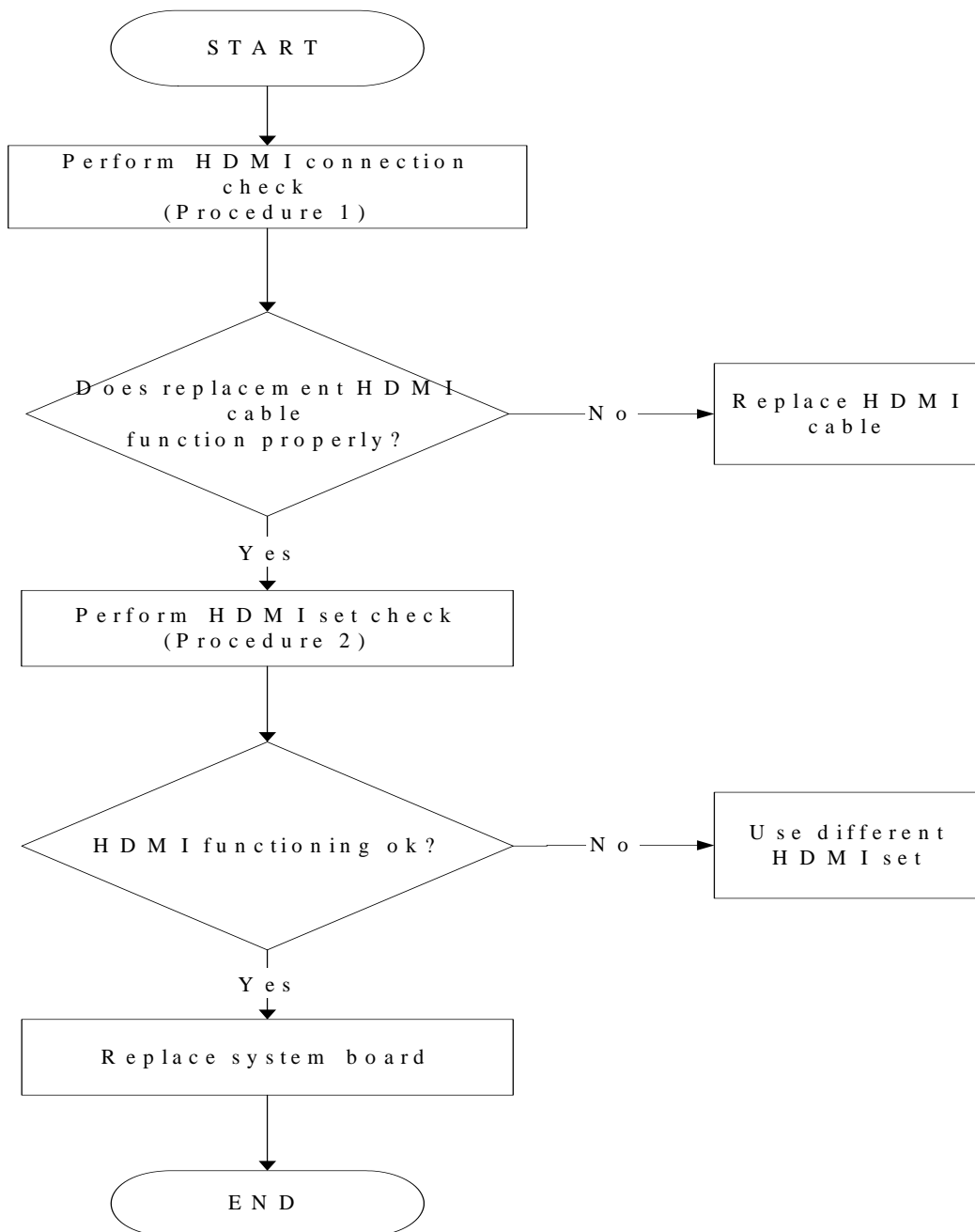
*Figure 2-15 CRT troubleshooting process*

To determine if the computer's CRT port is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue as instructed.

> Procedure 1: CRT connection check
>
> Procedure 2: CRT set check

**Procedure 1      CRT connection check**

The CRT cable may be damaged or the connections may be loose. Use windows application to check device can work fine or not. Perform Check 1:

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

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

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

**Procedure 2      CRT set check**

The CRT set may be faulty. Perform Check 1:

Check 1      Try using the set for CRT 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 CRT to the computer. If the replacement CRT 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.
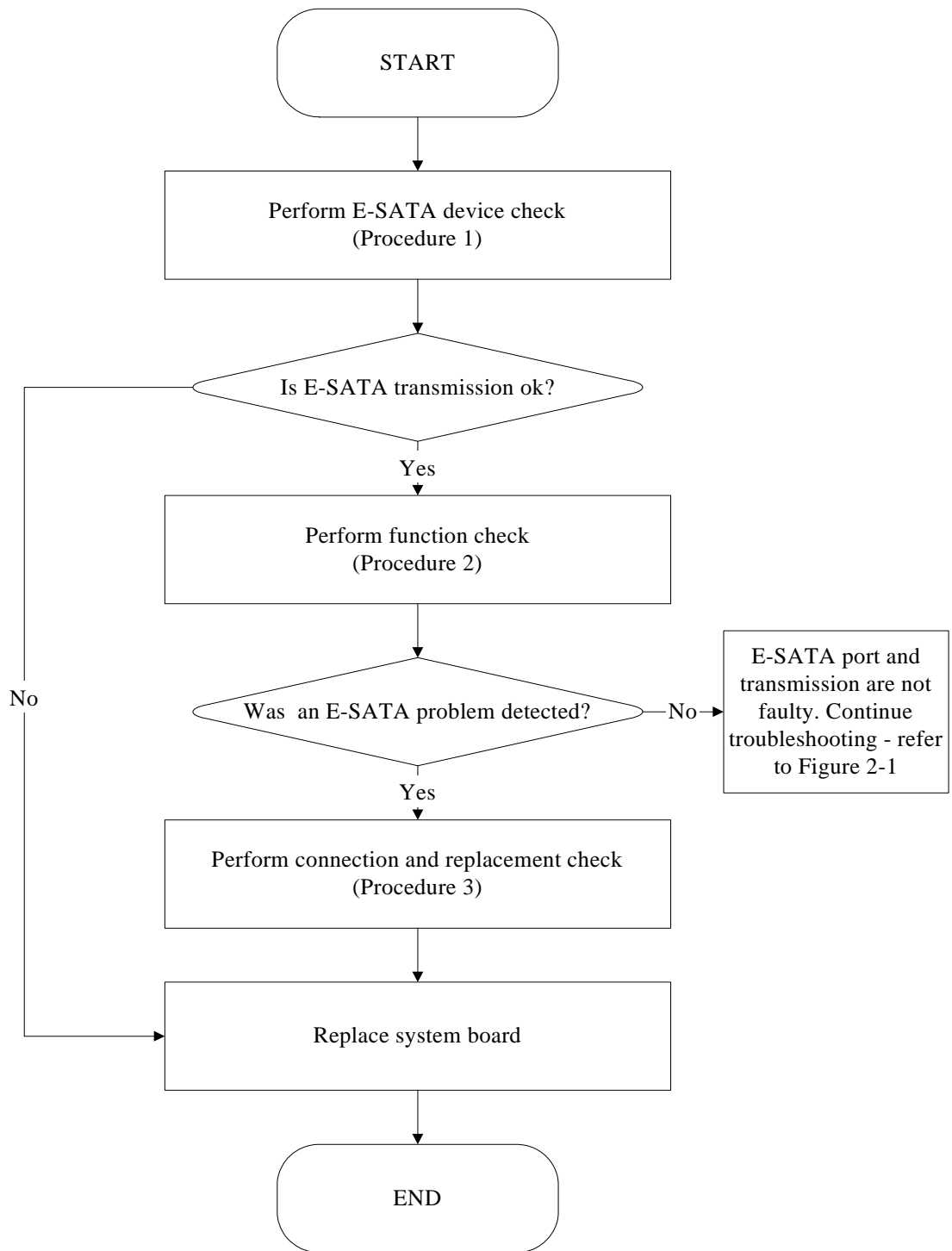
## 2.17 HDMI Troubleshooting



*Figure 2-16 HDMI troubleshooting process*

To determine if the computer's HDMI port is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1:    HDMI connection check

Procedure 2:    HDMI set check

**Procedure 1        HDMI connection check**

The HDMI cable may be damaged or the connections may be loose. Use windows application to check device can work fine or not. Perform Check 1:

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

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

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

**Procedure 2        HDMI set check**

The HDMI 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.

## 2.18    MIC Troubleshooting

START

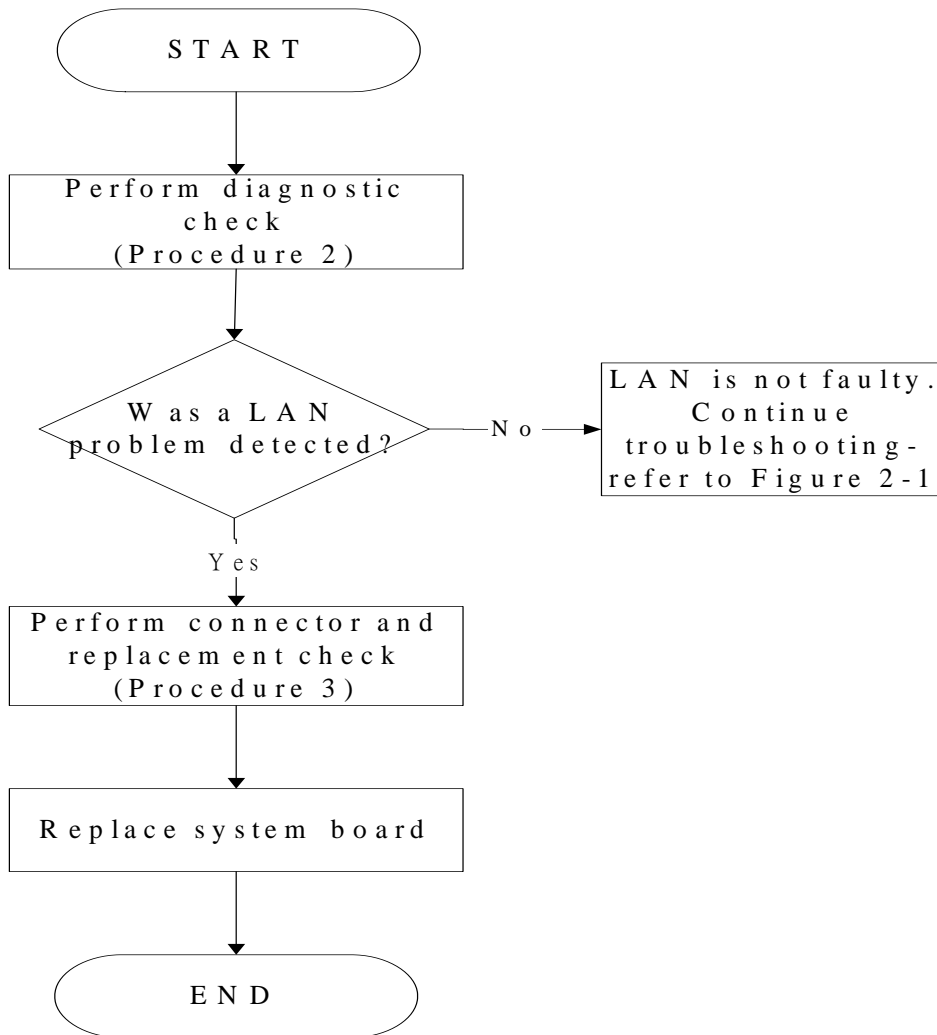Perform MIC test
(Procedure 1)

Was a MIC problem
detect?
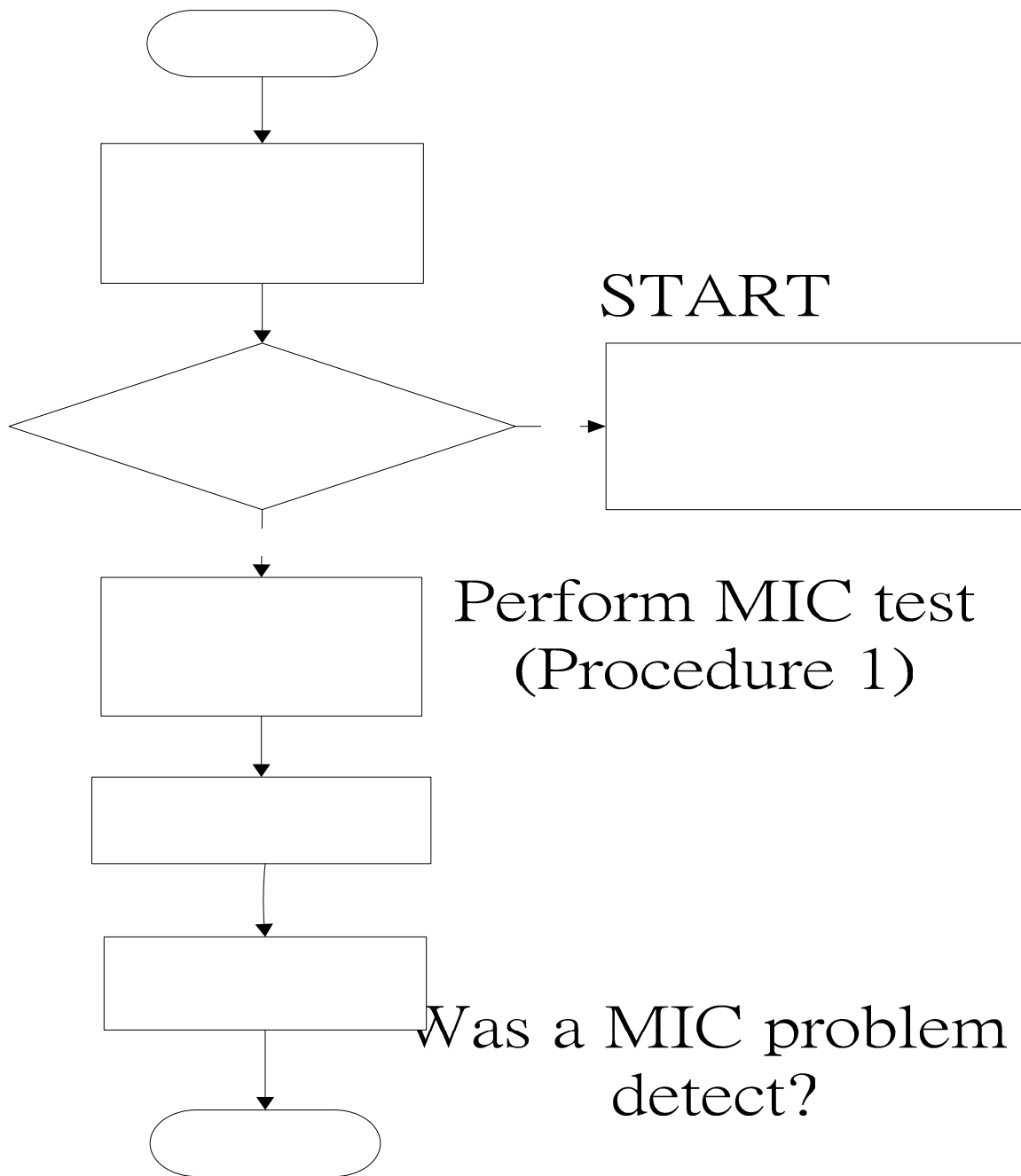
*Figure 2-17 MIC troubleshooting process*

Yes

Perform connector
and replacement
check
(Procedure 2)

The MIC line or system board may be the reason of a MIC fault. Either of these two components may be damaged. To determine if the computer's MIC is functioning properly, perform the following procedures. Figure 2-17 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

      Procedure 1:   Windows Application test

      Procedure 2:   Connector and replacement check

## Procedure 1      Windows Application test

Run the functioning Program (record.exe) on Windows model, which will display the MIC test result.

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

## Procedure 2      Connector and replacement check

The MIC line 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 MIC line is securely slotted into the system board. If the problem remains, go to Check 2.

Check 2    The MIC line 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   E-SATA Troubleshooting

```
                        ┌──────────────┐
                        │    START     │
                        └──────────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │ Perform E-SATA device│
                    │ check (Procedure 1)  │
                    └──────────────────────┘
                               │
                               ▼
                    ◇ Is E-SATA transmission ok? ◇ ──── No ──┐
                               │ Yes                          │
                               ▼                              │
                    ┌──────────────────────┐                 │
                    │ Perform function check│                │
                    │ (Procedure 2)        │                 │
                    └──────────────────────┘                 │
                               │                              │
                               ▼                    ┌───────────────────┐
                    ◇ Was an E-SATA problem  ◇─ No→ │ E-SATA port and   │
                      detected?                     │ transmission are  │
                               │ Yes                │ not faulty.       │
                               ▼                    │ Continue          │
                    ┌──────────────────────┐        │ troubleshooting - │
                    │ Perform connection   │        │ refer to Figure   │
                    │ and replacement check│        │ 2-1               │
                    │ (Procedure 3)        │        └───────────────────┘
                    └──────────────────────┘
                               │
                               ▼
                    ┌──────────────────────┐
                    │  Replace system board│
                    └──────────────────────┘
                               │
                               ▼
                        ┌──────────────┐
                        │     END      │
                        └──────────────┘
```

*Figure 2-18 E-SATA troubleshooting process*

To determine if the computer's E-SATA system is functioning properly, perform the following procedures. Figure 2-18 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: E-SATA device check

Procedure 2: Windows Application check

Procedure 3: Connection and replacement check

## Procedure 1      E-SATA device check

Connect an E-SATA device to the computer's LAN port, and then boot the computer for Windows7. The computer should automatically detect the LAN 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      Windows Application check

Run the Windows Application, which will automatically execute the LAN port test for transmission, 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 LAN 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 LAN - compatible device and the LAN port of the computer. If the cable is connected correctly, go to Check 2.

Check 2    Make sure the LAN 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.

## 2.20    LAN Troubleshooting

```
                        ┌─────────────────┐
                        │     START       │
                        └────────┬────────┘
                                 │
                                 ▼
                    ┌────────────────────────┐
                    │  Perform diagnostic    │
                    │        check           │
                    │     (Procedure 2)      │
                    └───────────┬────────────┘
                                │
                                ▼
                       ◇                ◇        ┌──────────────────────────┐
                    Was a LAN              No →  │ LAN is not faulty.       │
                 problem detected?              │ Continue                 │
                       ◇                ◇        │ troubleshooting-         │
                                │               │ refer to Figure 2-1      │
                              Yes               └──────────────────────────┘
                                │
                                ▼
                    ┌────────────────────────┐
                    │  Perform connector and │
                    │  replacement check     │
                    │     (Procedure 3)      │
                    └───────────┬────────────┘
                                │
                                ▼
                    ┌────────────────────────┐
                    │  Replace system board  │
                    └───────────┬────────────┘
                                │
                                ▼
                        ┌─────────────────┐
                        │      END        │
                        └─────────────────┘
```

*Figure 2-19 LAN troubleshooting process*

To determine if the computer's LAN port is functioning properly, perform the following procedures. Figure 2-19 outlines the process. Start with Procedure 1 and continue as instructed.

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

**Procedure 1      Diagnostic check**

Run the test and Diagnostics Program, which will automatically execute the LAN 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 2.  If an error does not occur, the LAN is functioning ok.

**Procedure 2      Connector and replacement check**

The LAN cable 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 LAN cable is firmly connected to the LAN port of 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 LAN cable may be damaged. Replace it with a new one and repeat Procedure 2. 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

## 3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Hamburg 10AD/10ADG T&D version 1.0)** hardware modules. 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
- ❑ AUDIO SOUND TEST
- ❑ FAN ON/OFF TEST
- ❑ MAIN BATTERY CHARGE TEST
- ❑ FDD TEST
- ❑ MEMORY CHECK
- ❑ KEYBOARD TEST
- ❑ MOUSE(PAD) TEST
- ❑ LCD PIXELS MODE TEST
- ❑ MAGNETIC SWITCH TEST
- ❑ LAN TEST
- ❑ RTC TEST
- ❑ 1$^{st}$ HDD TEST
- ❑ Read DMI TEST
- ❑ Write DMI TEST
- ❑ EE-PROM Setting
- ❑ TOSHIBA LOGO SET
- ❑ DYNABOOK LOGO SET

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

- ❑ The diagnostics CD disk
- ❑ A LAN loopback

## ❑ 3.2 Executing the Diagnostic Test

Free-Dos are required to run the DIAGNOSTICS PROGRAM.  To start the DIAGNOSTIC PROGRAM, follow these steps:

Turn on the computer and insert the diagnostics USB/CD disk.  (The diagnostics disk contains the Free-DOS boot files.) And then follow the instructions for T&D program installed in USB/CD disk.

The T&D Program can run single test by you press corresponsive English letter of test item, and it also asks you if you like to copy test log file to USB/CD disk as reference at the end of test(s).

The test list is as the following:

> A.  CONFIG CHECK TEST
> B.  AUDIO SOUND TEST
> C.  FAN ON/OFF TEST
> D.  MAIN BATTERY TEST
> E.  FDD TEST
> F.  MEMORY CHECK
> G.  KEYBOARD TEST
> H.  MOUSE (PAD) TEST
> I.  LCD PIXELS MODE TEST
> J.  MAGNETIC TEST
> K.  LAN TEST
> L.  RTC TEST
> M. 1st HDD TEST
> N.  RDMI TEST
> O.  WDMI TEST
> P.  EE-PROM Setting
> Q.  TOSHIBA LOGO SET
> R.  DYNABOOK LOGO SET

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

```
          Hamburg   10AG/10ADG Function T&D Menu
  A.CONFIG Check Test  J.Magnetic Switch
  B.Audio Sound Test   K.LAN Test
  C.FAN ON/OFF Test    L.RTC Test
  D.Main Battery Test  M.1ST HDD Test
  E.FDD Test           N.Read DMI
  F.Memory Check       O.Write DMI
  G.Keyboard Test      P.EEPROM Setting
  H.Mouse (Pad) Test   Q.TOSHIBA Log Set   Z.Save Log to Floppy
  I.LCD Pixels Test    R.DYNABOOK Logo Set  X.EXIT
         NALAE T&D Function Test --Ver:1.0(2010.04.14)
               Please select a test item
```

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

```



              P A S S



Press any key to continue . . .
```

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



Whether test result are "PASS" or "FAIL", Then press any key for next actions – Will go back main menu and copying test log file onto diskette is necessary.
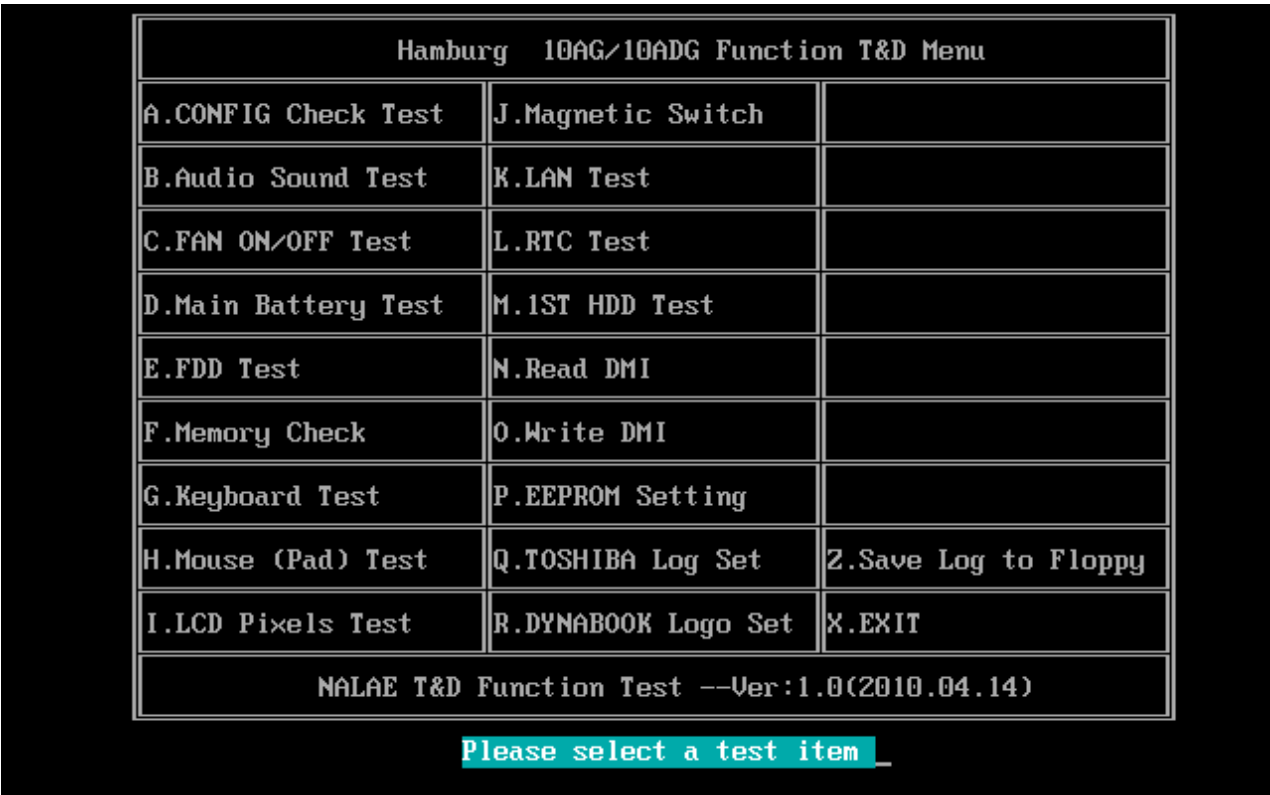
## 3.3 Display Configuration

This Item will show the unit configuration. It includes:

- ◆ CPU (CPU Type /Speed)

- ◆ DDRAM Size

- ◆ Panel ID

- ◆ HDD1 Type & capacity (Vendor ID. Model .Firmware)

- ◆ VGA Chip Type / VRAM Size

- ◆ Wireless Type

- ◆ Battery cell (3cell;6cell;12cell)

- ◆ LAN Type

- ◆ Bluetooth

- ◆ SKUID

The screen should display as below:

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

CPUTYPE=PHENOM(TM)IIN830TRIPLE-COREPROCESSOR
DDRAMSIZE=2048MB+2048MB
PanelID=LP173WD1-TLA1
HDD2=TOSHIBAMK5065GSX
VRAMSIZE&VGATYPE=512MBPark
BATT=6cell
WirelessTYPE= RealtekCC00
LANTYPE=8105E
Bluetooth=YES
SKUID=11

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

## 3.4 Audio Sound Test

The beep sound test program need the user confirm the speaker function by hearing the sound. And the speaker will send out music during test.

---

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

      *Buffalo only have one speaker, no need test Left/Right Speaker*

---

Before Memory test start, you should choice the below item:

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


Please listen to both of speaker will send out sound



Press any key to continue . . .
_
```

Press any key, then the program will test below item:

1. Line out Left channel test
2. Line out Right channel test
3. Playing 44K wave file
4. Playing 48K wave file

The screen should display as below, and you can press "Y" to stop playing (If the function is passed);

```
HD Codec DOS Test Program Version:3.47

   Play a wave file (48k sampling rate/16-bits stereo file)
        You must hear some music. Yes/No ?
        Press 'Y ' to stop playing(If the function is passed)
        Press 'N' key (If the function is failed)
    1.Line_Out Left Channel Test
    2.Line_Out Right Channel Test
    Playing 44K wave file
    Playing 48K wave file




                              Copyright(C) 2008, Realtek Semiconductor CO. Ltd
```
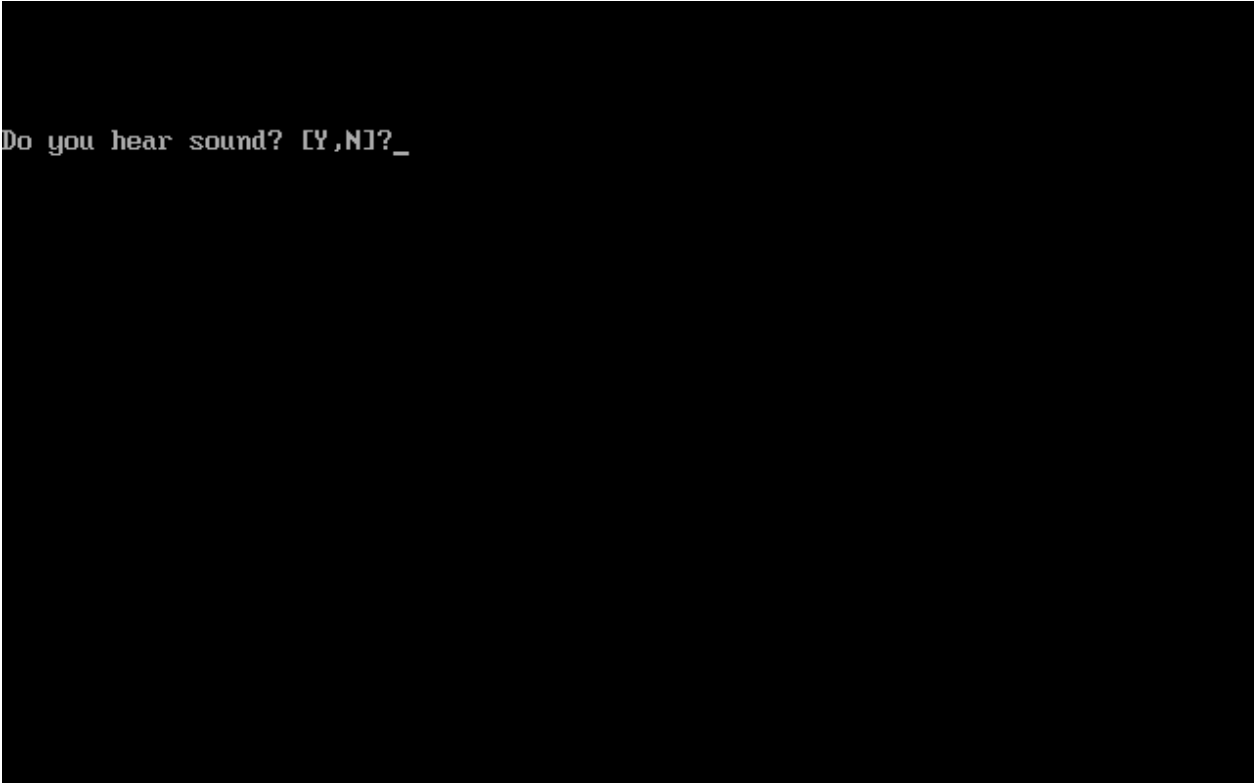
If the function test fail, you can press "N" to stop test, and then it will display as below;

```
   HD Codec DOS Test Program Version:3.47
  ********************************
    1. Fail Playback Test
  **********************************
  **********************************
  Please send the autest.cfg and *.log files(autest.log and I*_O*.log)
  to Realtek.
```

Press any key, the program will return to the below display, and you can press "Y" or "N" to judge the result.

```
Do you hear sound? [Y,N]?_
```

## 3.5 Fan ON/OFF/Speed Test

The FAN test need the user sense the wind to judge 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 left 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 ON/OFF Test   ,Please Listen To The FAN Sound !! ****
Press Any Key To Fan On Test ..

Fan On Test   :rotating.. ( Press Any Key To Fan Off Test )

Fan Off Test :stoping..


 Do you feel FAN rotating wind?


[Y,N]?_
```

◆ After Press "Y", computer will auto test FAN RPM (2000-6000), and it will auto check.

The screen will show below picture, if FAN RPM check is OK;

```
================================================================
COMPAL Electronic Inc.        [DOS] FanSpd.EXE   V2.0.0.1 0004
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
================================================================
Fan Speed Test :     4300    RPM    [PASS]


Press any key to continue . . ._
```

If FAN RPM check is NG, it will show as below:

```
================================================================
COMPAL Electronic Inc.        [DOS] FanSpd.EXE   V2.0.0.1 0004
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
================================================================
Fan Speed Test :     1900 RPM        [FAIL]
```

```
================================================================
COMPAL Electronic Inc.        [DOS] FanSpd.EXE   V2.0.0.1 0004
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
================================================================
Fan Speed Test :     6200 RPM        [FAIL]
```

## 3.6 Main Battery Charge Test

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

> **. 65W with 19V DC for UMA 25W CPU model**
>
> **. 75W with 19V DC for 25W CPU discrete graphics (ParkXT, M92XTX, MadisonLP) and UMA 35W CPU model**
>
> **. 90W with 19V DC for 35W CPU discrete graphics (ParkXT, M92XTX, MadisonLP)**

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: Sanyo
Remain charge capacity : 52.8%

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: Sanyo
Remain charge capacity : 52.8%

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).  Need to insert FDD when power on machine. Otherwise the Floppy can not be detected.*

---

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 =====




1.Only can test external FDD.
2.Please insert a diskette with no data into the external FDD.
3.Please check the result after test.
4.Please press "ESC" button to skip test.

Press any key to continue . . ._
```

## 3. 8 Memory Check

This test will check if the computer's Memory Frequency and Size is correct in every slot.

Before Memory test start, you should choice the below item:

   1. Memory Read test

   2. Memory Write test

   3. Memory Read & Write test

   4. Memory INFO test

   5. Back to MENU

```
=======MEMORY R&W Test=======


Please check the Memory read or write Test
Notice:Can not test Memory Read&Write with over 4GB memory
       due to DOS condition

1: Memory Read Test
2: Memory Write Test
3: Memory Read&Write Test
4: Memory INFO Test
5: Back to MENU

Please choose test item(1,2,3,4,5) _
```
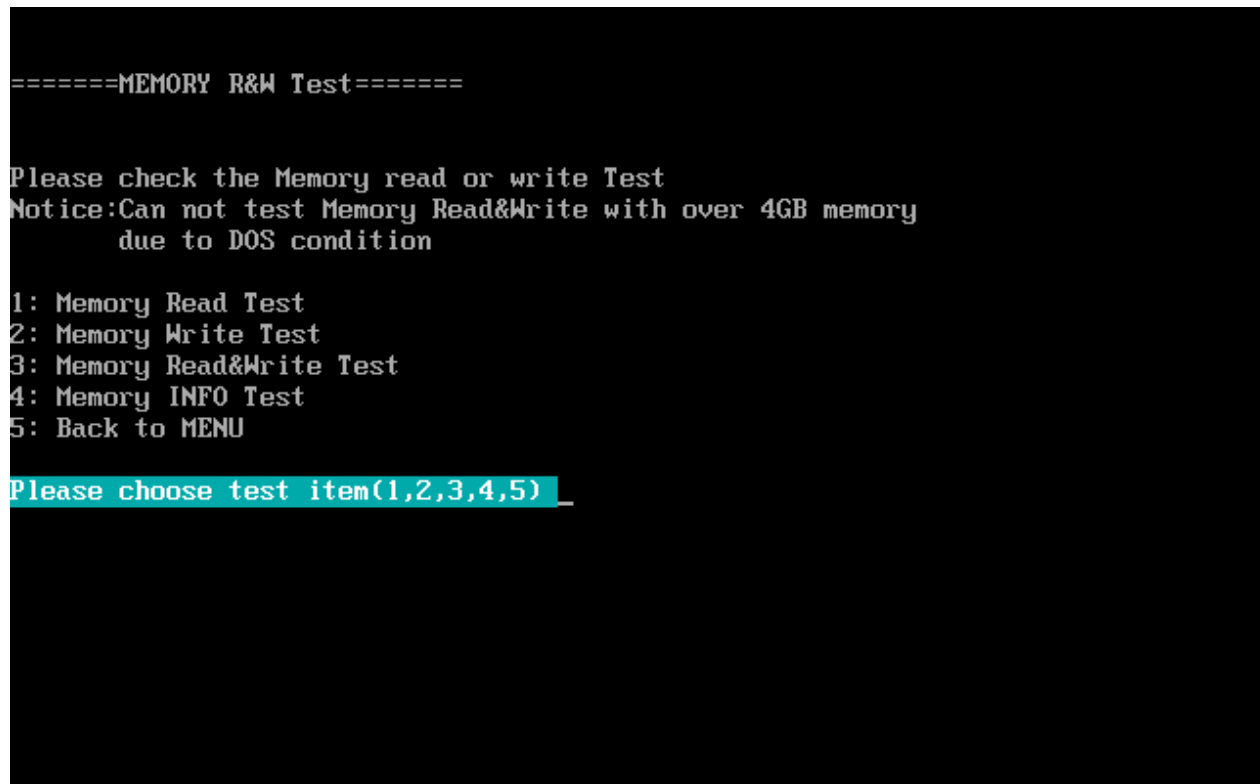
When you execute this test, after you press the related number, the test picture will show as below:

Memory Read Test

```
= Read Test  === block  2 ============================
Address: 00000001 : 37FF8000
                        Read Test fails at: 137FF8000 : 2
are the RAM read data is ok? [Y,N]?_
```

Memory Write Test

```
= Write Test === block  2 ============================
Address: 00000001 : 37FF8000
                        Write Test fails at: 137FF8000 : 2
are the RAM write data is ok? [Y,N]?_
```

Memory Read & Write Test

```
= Write Test === block  2 =============================
Address: 00000001 : 37FF8000
                            Write Test fails at: 137FF8000 : 2

Read test:
Write test:
are the RAM R&W is ok? [Y,N]?_
```

Memory Info Test

```
==================================================================
 COMPAL Electronic Inc.                              V1.0.0.1
 Author : STD.SID TEAM.
 WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
 Copyright (c) 2008 COMPAL Electronic Inc. All rights reserved.
==================================================================
DIM: 0
        Size0: 1024 MB
        Speed0: 800
        Manufacturer0: 3GA1801

DIM: 1
        Size1: 1024 MB
        Speed1: 800
        Manufacturer1: 2F

are the RAM type is ok? [Y,N]?
```

## 3. 9 Keyboard Test

The keyboard test checks the all keys function.

---

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

---

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

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

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

3.  **J** (Japan, for Japan)

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 sub test is passed or failed after the question.

US Keyboard



UK keyboard

---

Japan keyboard



---

**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:
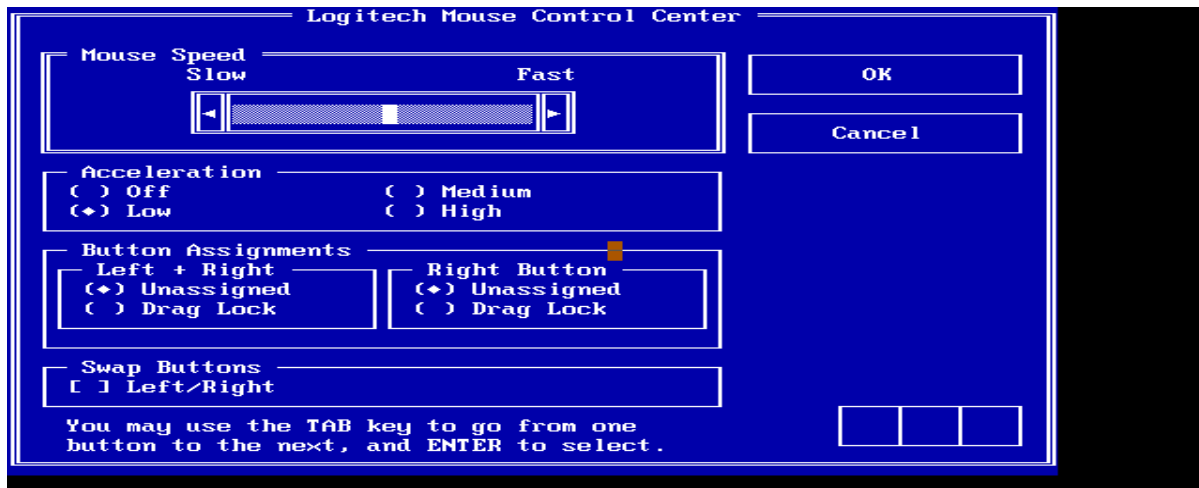


After checking T/Pad buttons and cursor's function, use "Tab" key or use T/Pad cursor to click the "OK" column will end this test.

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) and 320*200(4/16 colors) and 640*200(2/16 colors) and 640*480(2/16 colors) and 640*350(4 colors)

      2.      VGA Mode

- including   320*200 (256 colors) and 640*480 (256 colors).800*600(256 colors).1024*768(256 colors)

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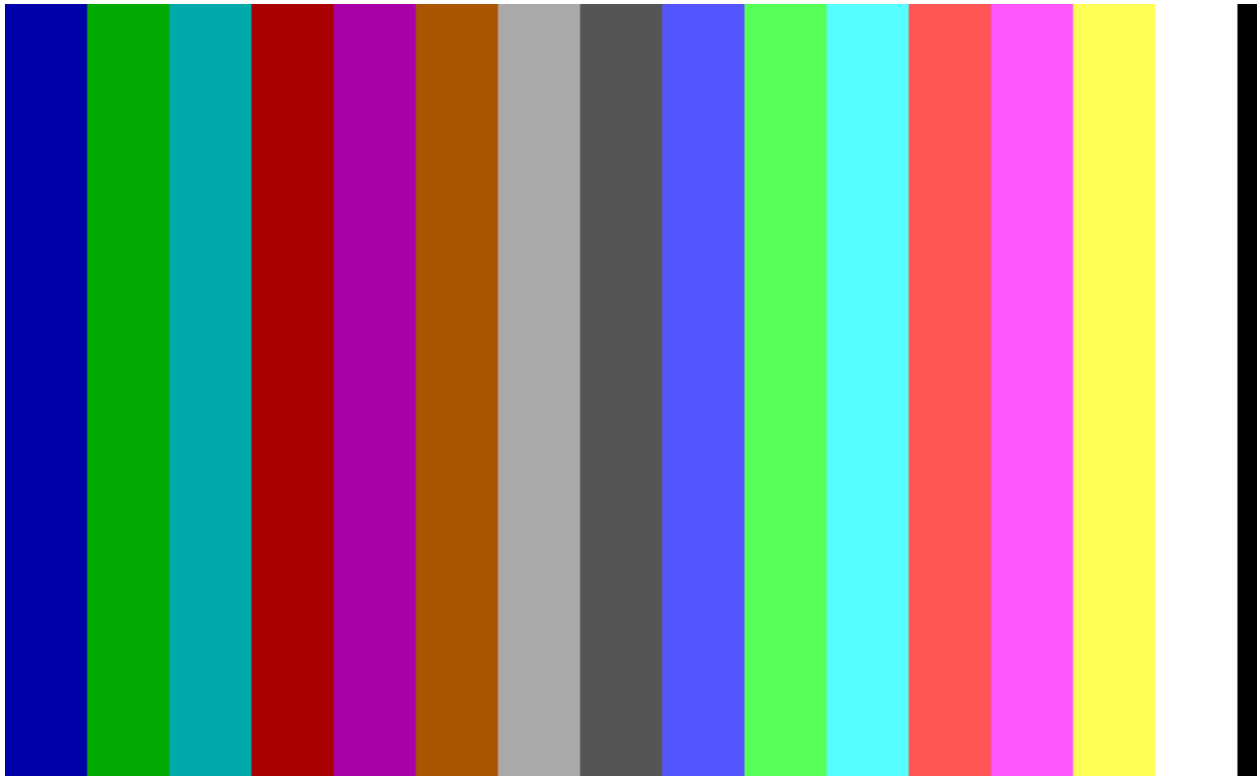
## 3.12 Magnetic Switch Test

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

Follow below steps to run this test:

1. Close the LCD cover.

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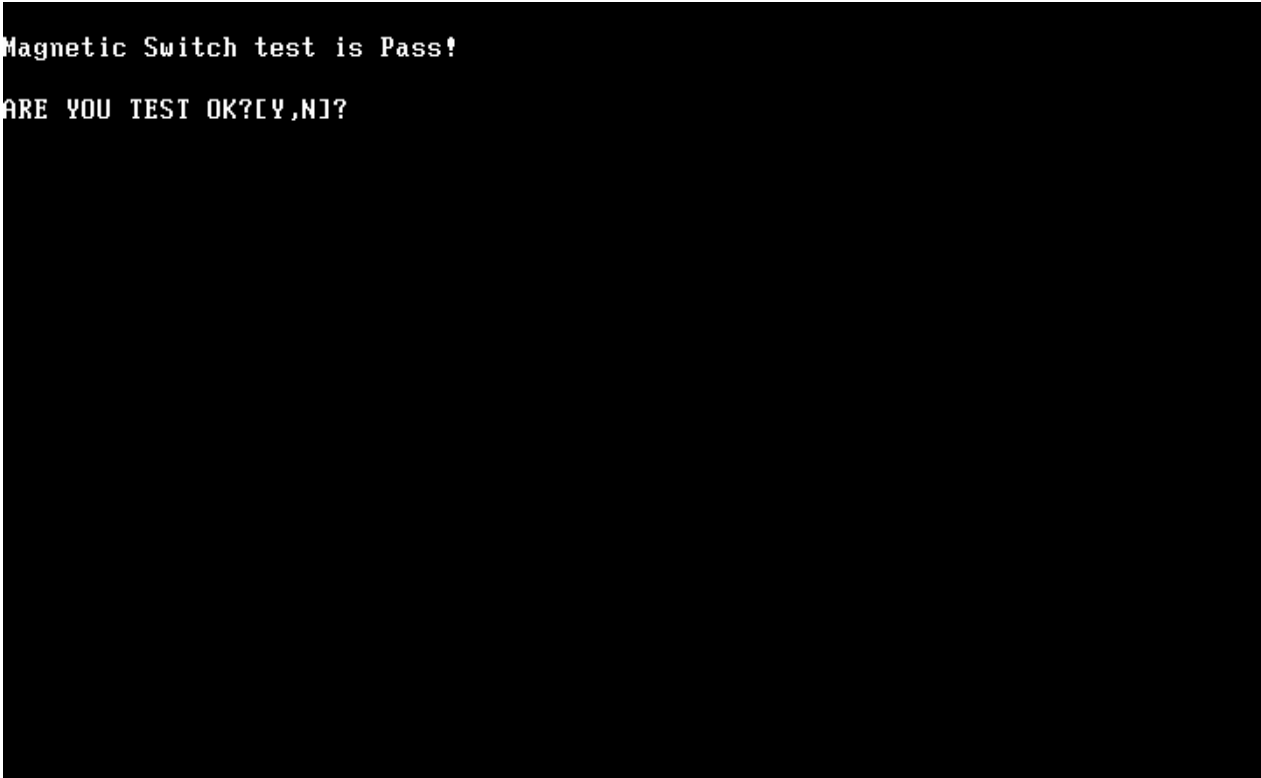
Then it will indicate whether the test is passed or failed.

1>. If the Magnetic switch test as fail, it will show below display:

2>.If the Magnetic switch tests pass, it will show below display:

```
Magnetic Switch test is Pass!

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

## 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  B".

- ◆ Node – it is "MAC Address".

- ◆ Line Speed – 1000Mbps or 100Mbps or 10 Mbps.

- ◆ Bus ID – it's "14".

The LAN test includes three subtests of the:

1. Speed1000

2. Speed100

3. Speed10

The subtests run automatically.

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

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

Press any key to continue . . .
```

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

```
Realtek Giga Family LAN MP Program /Client v1.32 03-08-2010
IOBASE = D000H IRQ =  A H Node:705AB67B52CC 1000M:   5K 100M:   3K  10M:     1K
   VID =10ECH DID =8136H SVID =1179H SSID =FD00H         Lan Adapters:  1
                              PASS=   0 FAIL=   0          Now is:  1
 Open Your MPLAN.CFG in this machine!                100M Link Fail
   Test Item                 Result(Pass/Fail)
1.PG_LAN=false               none
2.Reg_R/W=true               Pass
3.Speed1000=true             none        Rxtimeout    677
4.Speed100=true              testing     ROK=          1 TOK=          677
5.Speed10=true               testing     Error=        0
6.Debug=true                             Txtimeout = 50
7.AutoRun=true



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

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



```
Press any key to continue . . .
```

## 3.14 RTC Test

Check the computer's RTC (Real Time Clock) and calendar functions by comparing the Free-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 = 10:34:27.04(3806704), CMOS TIME = 10:34:27(3806700)
DOS DATE: 01/29/2010, CMOS DATE: 01/29/2010
DATE & TIME test [ PASS ]




Press any key to continue . . .
_
```

## 3.15 1st HDD Test

> *NOTE:* You can press "Ctrl + Fn + Break" key to stop HDD test if you want.

The HDD test allows the user to verify the 1st HDD ok or not. First, please select HDD test method, Screen would display as below:

```
===== HDD TEST =====

1.Partial W/R + Random W/R
2.HDD W/R test(all surface)
Note: if you want to break this test, please press CTRL+C keys to break
[1,2]?_
```

After you select the method, then input password: "hard disk", 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 . . .
```

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

```
*** Hard disk test tools V1.72 Compal STD/TTF ***

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

LBA Mode Sectors=625142448
LBA Mode Sizes  =320073 MB

HDD Random R/W 100 sectors ....... PASS !
HDD Sequential R/W ... Testing !_
```

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

```
*** Hard disk test tools V1.72 Compal STD/TTF ***

Reset DISK1 ...............Pass !
 Error ! Can't use Enhanced Disk Drive Support Function

ARE YOU TEST OK?[Y,N]?
```
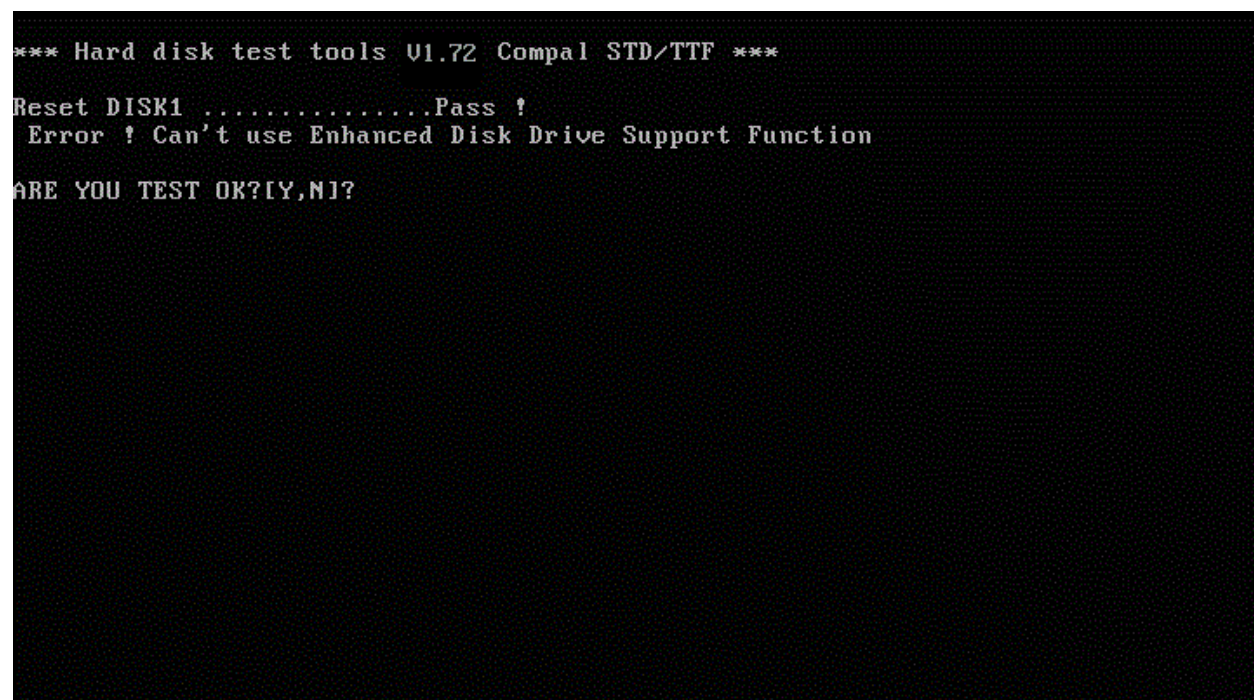
## 3.16 Read DMI

Compal write Toshiba Part No (version), Toshiba Serial No (Serial No), Product Name, OEM string and UUID, If you want to double check the DMI data, please select Read DMI item, the figure below will be displayed:

```
Manufacturer : TOSHIBA

Product_Name : *

Serial_Number: *

Version      : *

Asset_Number : *

UUID : 966FBD94200C11DF8BE5705AB67B52CC

OEM_Strings : toshiba
Are the DMI data OK? [Y,N]?_
```

## 3.17 Write DMI

When you want to write DMI data, please select which data you want to write, the figure below will be displayed:

1. Write Product (32)

2. Write Serial (32)

3. Write Version (32)

4. Write OME string (64)

5. Back to test title

```
please choice the item
 1: Write Product
 2: Write Serial
 3: Write Version
 4: Write OEM String
 5: Back to test title
please enter the num you choose: ^C
Control-Break pressed.
Terminate batch file 'C:\DMI.BAT' (Yes/No/All) ? _
```

After write OK, you should reboot the system that can make the setting effective, or you can write next data before reboot system, the figure below will displayed:

```
please choice the item
 1: Write Product
 2: Write Serial
 3: Write Version
 4: Write OEM String
 5: Back to test title
please enter the num you choose: 1
please enter the product gfhd

Modify Product String to gfhd

Jump to EEPROM Bank : 0

Erase EEPROM Start Offset : 80 End Offset:9f Size:32
...............................
Jump to EEPROM Bank : 0

Flash EEPROM Start Offset : 80
...._
```

> *NOTE*:  *should input correct DMI data, and should reboot the system that can make the setting effective.*

## 3.18 EE--PROM Setting

This EE-PROM SETTING will set the computer's function status into EEPROM, included supported function and no support function.

---

*NOTE: Should perform EE-PROM SETTING once change M/B. It defined as normal rule.*

---

The screen should display as below:

---

*NOTE: when you select related program to setting the EEP-ROM, Before show below screen, the D3E function will auto enable.*

---

1. Set MIC Function Status in EEPROM (Disable/Enable)

2. Set HDMI Function Status in EEPROM (Disable/Enable)

3. Check Touch Pad Status in EE-PROM

4. Set and Check Speaker EQ Status in EE-PROM

5. Set BIOS Language in EE-PROM (English/Japanese/French)

6. Set and Check SKUID Status(Set/Check)

7. Set NON_OS function flag in EE-PROM (NONEOS/ HAVEOS)

8. Set NO Support Function Disable

9. Back To Test Title

```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set HDMI Function Status in EE-PROM (Disable/Enable)
3. Check Touch Pad Status in EE-PROM
4. Set and Check Speaker EQ Status in EE-PROM
5. Set BIOS Language in EE-PROM (English/Janpanese/French)
6. Set and Check SKUID Status(Set/Check)
7. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
8. Set No Support Function Disable
9. Back To Test Title


Please select the setting item [1,2,3,4,5,6,7,8,9]?_
```

When you execute these set, you can press the related number to do.

**For example:** If you want to set MIC function, please press "1", the screen will display as below:

```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set HDMI Function Status in EE-PROM (Disable/Enable)
3. Check Touch Pad Status in EE-PROM
4. Set and Check Speaker EQ Status in EE-PROM
5. Set BIOS Language in EE-PROM (English/Janpanese/French)
6. Set and Check SKUID Status(Set/Check)
7. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
8. Set No Support Function Disable
9. Back To Test Title


Please select the setting item [1,2,3,4,5,6,7,8,9]?1


1. Please check SPEC of this unit whether has MIC? (Y=MIC, N=NOMIC)


[Y,N]?_
```

Please check related information to judge this unit whether has MIC function.

If this unit has MIC function, press "Y" then program will set MIC enable automatically as below:

```
        A51 I-MIC SET/CHECK PROGRAM ---Ver 1.0 [A51 SWDL]
        Read(f5)-> [bf]
        SET I-MIC TO SUPPORT!
        Write(f5)-> [ff]
        Successful!
Press any key to continue . . ._
```

If this unit has no MIC function, press "N" then program will set MIC disable automatically as below:

```
        A51 I-MIC SET/CHECK PROGRAM ---Ver 1.0 [A51 SWDL]
        Read(f5)-> [ff]
        SET NO I-MIC TO SUPPORT!
        Write(f5)-> [bf]
        Successful!
Press any key to continue . . ._
```

When you "Enable" or "Disable" EE-PROM function are OK, press any key will go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set HDMI Function Status in EE-PROM (Disable/Enable)
3. Check Touch Pad Status in EE-PROM
4. Set and Check Speaker EQ Status in EE-PROM
5. Set BIOS Language in EE-PROM (English/Janpanese/French)
6. Set and Check SKUID Status(Set/Check)
7. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
8. Set No Support Function Disable
9. Back To Test Title


Please select the setting item [1,2,3,4,5,6,7,8,9]?_
```

## 3.19 Toshiba Logo setting

Set the computer's Toshiba Logo for other region except Japan SKU.

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

```
======Toshiba Logo set======


Please Check the result after set.


Press any key to continue . . ._
```

Press any key continue to auto set, if write OK, the following message displays:

```
PASS


Press any key to continue . . .
```
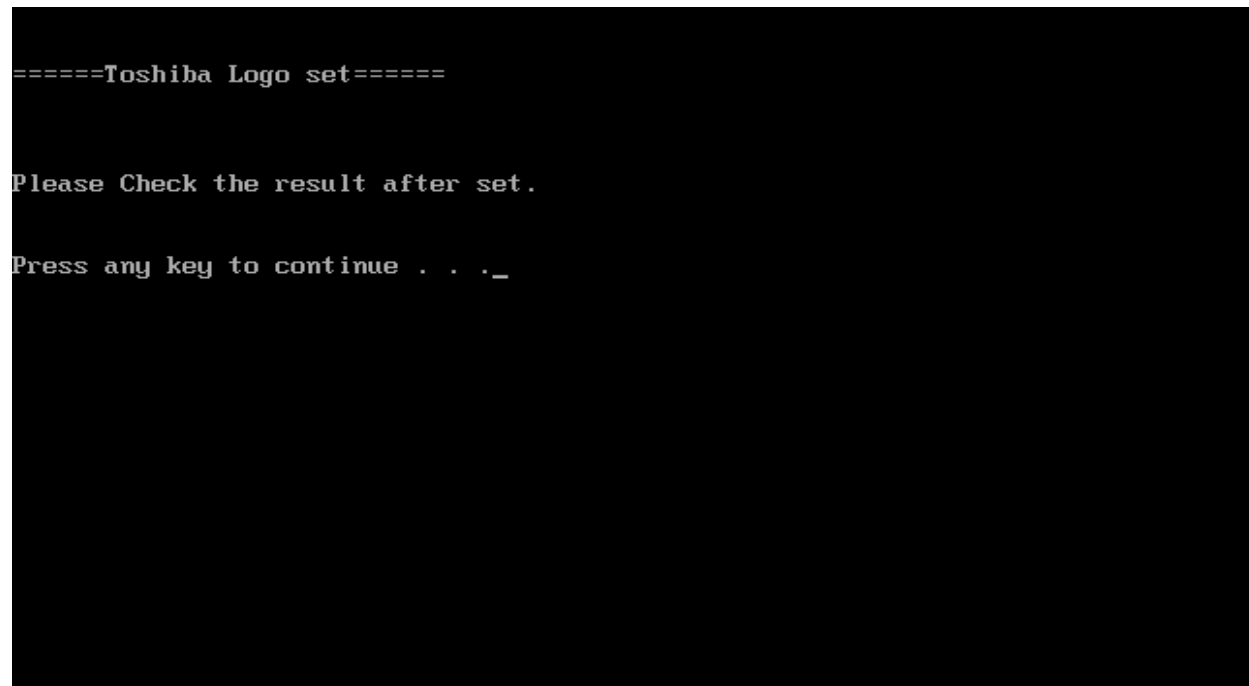
When Toshiba Logo set finish, please restart machine, when show below Logo:

## 3.20 Dynabook Logo Setting

Set the computer's Dynabook Logo for Japan SKU.

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

```
======Dynabook Logo set======


Please Check the result after set.


Press any key to continue . . ._
```

Press any key continue to auto set, if write OK, the following message displays:

```
PASS




Press any key to continue . . .
```

When Dynabook Logo set finish, please restart machine, when show below Logo:
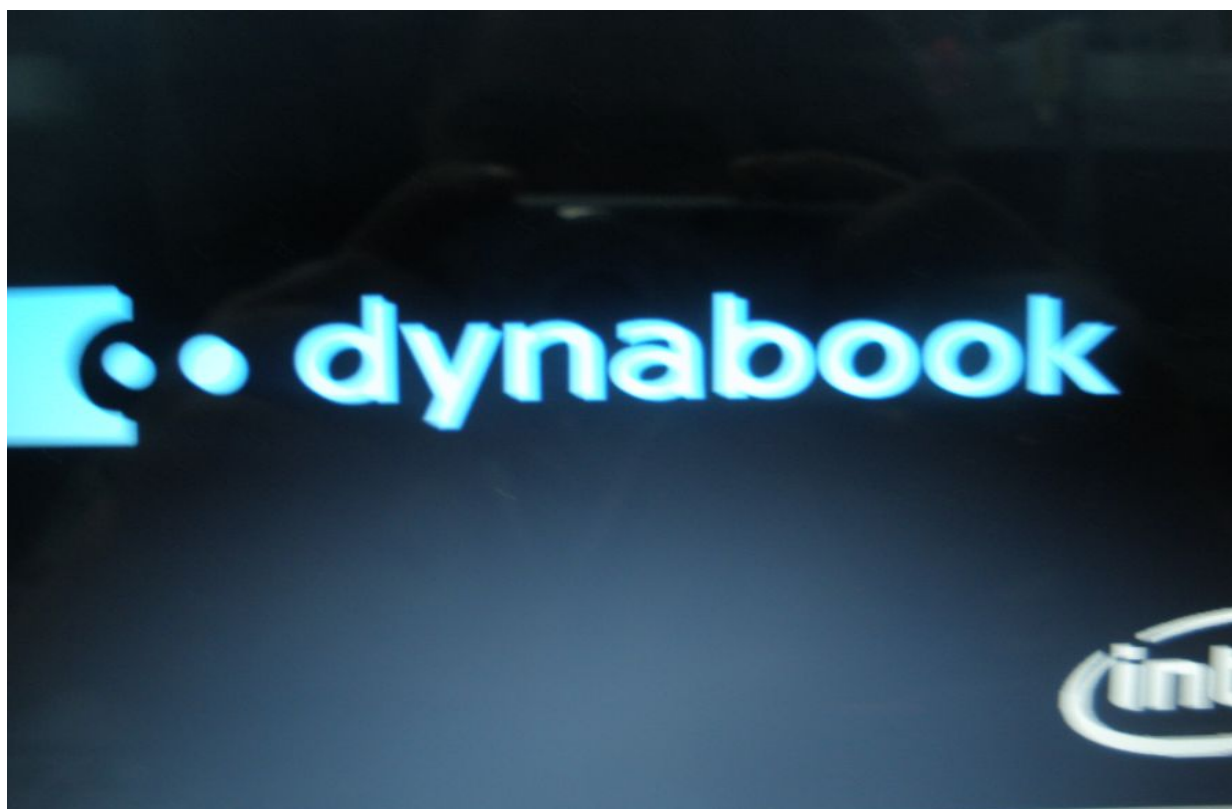
# Chapter 4

# Replacement Procedures

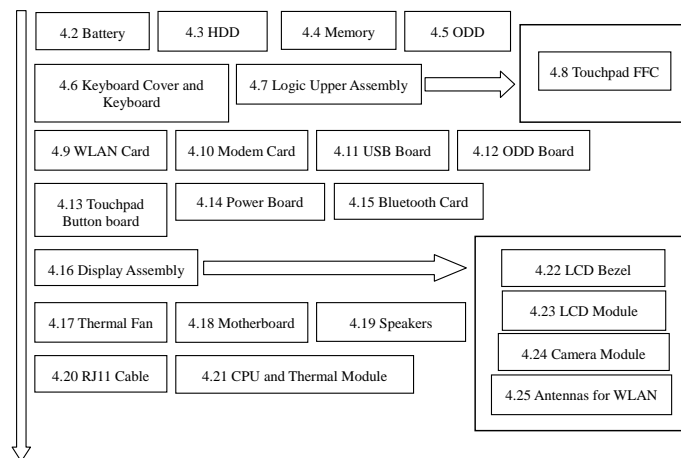# Chapter 4      Contents

**Figures**

# 4.1    General

This chapter explains how to disassemble the laptop and replace Field Replaceable Units (FRUs). Some replacement procedures may not require you to remove all the surrounding FRUs to replace only one FRU. The chart below shows the FRUs in the order in which they should be removed in a top-down manner, irrespective of their physical locations. The FRUs shown in the top area of the chart should normally be removed before removing the FRUs shown in the bottom area. To replace the FRUs, first identify the suspect FRU for the system failure. Next, according to this chart, determine the FRUs that need to be removed before removing the suspect FRU. After you determine those FRUs, go to the appropriate sections according to the section numbers shown in the boxes. Then start removal and replacement.

| 4.2 Battery | 4.3 HDD | 4.4 Memory | 4.5 ODD | |
|---|---|---|---|---|
| 4.6 Keyboard Cover and Keyboard | 4.7 Logic Upper Assembly | → | 4.8 Touchpad FFC | |
| 4.9 WLAN Card | 4.10 Modem Card | 4.11 USB Board | 4.12 ODD Board | |
| 4.13 Touchpad Button board | 4.14 Power Board | 4.15 Bluetooth Card | | |
| 4.16 Display Assembly | → | 4.22 LCD Bezel | | |
| 4.17 Thermal Fan | 4.18 Motherboard | 4.19 Speakers | 4.23 LCD Module | |
| 4.20 RJ11 Cable | 4.21 CPU and Thermal Module | 4.24 Camera Module | | |
| | | 4.25 Antennas for WLAN | | |

How to use the chart (two examples):

- For removing the Motheroard:
  First, remove parts from 4.6 Keyboard Cover & Keyboard, 4.7 Logic Upper Assembly, 4.16 WLAN card, 4.15 Thermal Fan.

- For removing the LCD Module:
  First, remove 4.22 LCD Bezel, then remove 4.22 the LCD module.

| 4.2 Battery | 4.3 HDD | 4.4 Memory | 4.5 ODD | |
|---|---|---|---|---|
| 4.6 Keyboard Cover and Keyboard | 4.7 Logic Upper Assembly | → | 4.8 Touchpad FFC | |
| 4.9 WLAN Card | 4.10 Modem Card | 4.11 USB Board | 4.12 ODD Board | |
| 4.13 Touchpad Button board | 4.14 Power Board | 4.15 Bluetooth Card | | |
| 4.16 Display Assembly | → | 4.22 LCD Bezel | | |
| 4.17 Thermal Fan | 4.18 Motherboard | 4.19 Speakers | 4.23 LCD Module | |
| 4.20 RJ11 Cable | 4.21 CPU and Thermal Module | 4.24 Camera Module | | |
| | | 4.25 Antennas for WLAN | | |

**Safety Precautions**

Before you begin disassembly read the following safety precautions carefully. Be sure to follow them while you are working.

---

*DANGER:*

1.  *Always use the original batteries or replacement batteries authorized by Toshiba. Batteries other than those differ in specifications and are incompatible with the laptop. They may burst or explode. To avoid leakage of alkaline solutions, never heat or disassemble the battery packs. Never throw the battery packs into a fire. If this is violated, they will explode.*

2.  *The components such as the power supply and inverter carry high voltages. When you partially disassemble the laptop and turn on the components, use extreme care not to touch the connectors and components to avoid the risk of electrical shock. Do not disassemble individual components during first-level maintenance.*

---

*WARNING:*

1.  *To avoid the risk of electrical shock, turn the laptop off and remove the AC adapter from the electrical outlet.*

2.  *Because the battery in the laptop is left charged, the risk of electrical shock remains even after the AC adapter is removed from the electrical outlet. To avoid the risk of electrical shock, be sure to remove any metal jewelry or accessories such as necklaces, bracelets and rings before starting work. Never work with damp or wet hands.*

3.  *To avoid personal injury, use care to avoid the sharp edges or corners of the components.*

---

*CAUTION:*

1. *Before replacing a component, make sure that the replacement component meets the required specifications. To avoid laptop failures, never use components that do not meet the specifications.*

2. *To avoid internal damage such as short circuits and fire, never drop metal objects such as screws, pins, paper clips, etc. into the components. When a screw is removed, be sure to replace a screw that is the same size as the original screw. Make sure that all the screws are fastened securely. Loose screws can cause short circuits, overheating, smoke or fire.*

3. *Before removing a FRU or other component, make sure that all the component cables have been disconnected to avoid the risk of electrical shock caused by accidental contact with the energized components.*

4. *For AC input, be sure to use the AC adapter and AC power cable that come with your laptop or Toshiba-recommended equivalents.*

5. *To avoid the risk of electrical shock, make sure that all the replacement components meet the specifications of the laptop and that all the cables and connectors are fastened securely.*

6. *Inside the PC are components that become hot during operation (such as the CPU and cooling module). To avoid burns, let the hot components cool down before starting inspection or repair task.*

**Before You Begin**

Before you begin to disassemble the laptop, keep in mind the precautions and advice in this section. Always begin disassembly by removing the AC adapter and battery pack. Remove the optional parts and accessories as well. The procedures for removing the batteries will be explained later.

Disassemble the laptop only when an abnormality has occurred.

Use only the recommended tools.

To run and store the laptop, be sure to prepare a working environment that is free from:

- ❑ Dust and contaminants
- ❑ Static electricity
- ❑ Extremely high or low temperatures and extremely high humidity

Run the diagnostic tests explained in Chapter 2 of this manual to identify the FRU that has probably caused the system failure.

Perform only the required machine operations. Use only the disassembly and reinstallation procedures described in this manual.

Place the removed components in a safe place away from the laptop so that they are not damaged or get in the way of you doing your work.

Normally, a number of screws need to be removed or replaced during disassembling. Place the removed screws in a safe place so that you can easily find the right screws for the right components.

When assembling the laptop, use the specified screws to fasten the parts to the specified locations. See the appropriate explanations and figures for screw sizes.

To avoid personal injury, use care when handling components that have sharp edges or corners.

After you have replaced a FRU, check that the FRU works correctly to ensure normal laptop operation.

**Disassembly Procedures**

The cable connectors come in these two basic types:

❑  Pressure plate connectors
❑  Normal pin connectors

To remove a pressure plate connector, pull up the tabs on either side of the connector's plastic pressure plate and gently pull the cable out of the connector. To reconnect the cable to the pressure plate's connector, raise the pressure plate up to a satisfactory height and slide the cable into the connector. Secure the cable in the correct position by pressing down the sides of the pressure plate so that the plate is flush with the sides of the connector. Grasp and pull the cable gently to check that the cable is connected firmly. If the cable has come off the connector, reinsert the cable by raising the pressure plate up to a satisfactory height.

Normal pin connectors are used for all the other types of cables. These connectors can be installed or removed by simply inserting them or pulling them out.

**Assembly Procedures**

You have to reassemble the laptop after you have disassembled the laptop and fixed the component that caused the problem.

When reassembling the laptop, keep the following general guidelines in mind:

❑  Take your time to carry out the suggested instructions completely. Hurried reassembly can often cause problems.
❑  Check that all the cable and connectors are fastened securely.
❑  Before securing the FRUs or other parts, check that the cables are not caught by the screws or FRUs.
❑  Check that all the latches are closed securely.
❑  Check that all the required screws are used to secure the FRUs. Using wrong screws can damage the threads or heads of the screws or does not ensure that the FRUs are secure.

After installing a FRU, make sure that the FRU and laptop work normally.

**Tools and Equipment**

For your safety and that of other people in the working environment, it is strongly recommended that you use electrostatic discharge (ESD) equipment. The proper use of this equipment will ensure successful repair work and reduce the costs for repairing damaged components. The equipment and tools required for disassembly and reassembly are:

❑  One 2 mm Phillips screwdriver
❑  One 4 mm flat-blade screwdriver
❑  Torx screwdriver
❑  Tweezers (for pulling out screws)
❑  ESD mats (for the floor and work desks)
❑  An ESD wrist strap or heel grounder
❑  Anti-static carpets or flooring
❑  Air ionizers (for highly electrostatic sensitive areas)
❑  A plastic card (in credit card size)

**Screw Tightening Torque**

To secure screws, follow the torque values listed below. Over-tightening can damage components and screws. Under-tightening can loosen the screw or cause screws to come off, which may result in short circuits or other damage.

❑  M2 (2 mm)                    0.22 N·m (2.2 kgf·cm)
❑  M2.5 (2.5 mm)               0.36 N·m (3.5 kgf·cm)
❑  M3 (3 mm)                    0.51 N·m (5.0 kgf·cm)
❑  M2.5x4 PSP TITE screws      0.204 N·m (2.0 kgf·cm)
❑  M2.5x6 GIZA TITE screws     0.36 N·m (3.5 kgf·cm)

**Colors of Screw Shanks**

For easy identification of the correct screws, the screw shanks are colored according to their lengths, as follows:

❑ Screws of an odd-numbered length    Blue
❑ Screws of a special length        Black
   Screws of a special length are those of a length having decimal places (i.e. 16mm).

**Symbols of Screws on the Laptop Body**

For easy maintenance, the screw types are shown on the laptop body as symbols. A symbol consists of a letter representing the screw type and a numeral representing the screw length.

❑ Screw type                  Letter
❑ Bind screw                  B    (stands for bind)
❑ Flat-head screw             F    (stands for flat-head)
❑ Super flat-head screw       S    (stands for super flat-head)
❑ Tapping screw               T    (stands for tapping)
❑ Other screws                U    (stands for unique-pan head screws, studs, etc.)

**Symbol examples**

❑ 6 mm bind screw             B6
❑ 12 mm bind screw            B12
❑ 5 mm stud                   U5
   (The numeral represents the rounded length of the threaded portion regardless of the entire stud length.)

## 4.2 Battery

**Removing the Battery Pack**

Remove the battery pack according to the following procedures and Figure 4.1.

*CAUTION: When handling the battery packs, use care not to short circuit the terminals. Do not drop, hit, twist, or bend the battery packs. Do not scratch or break up their casing.*

1. Turn the laptop upside down.

2. Slide the battery outward.

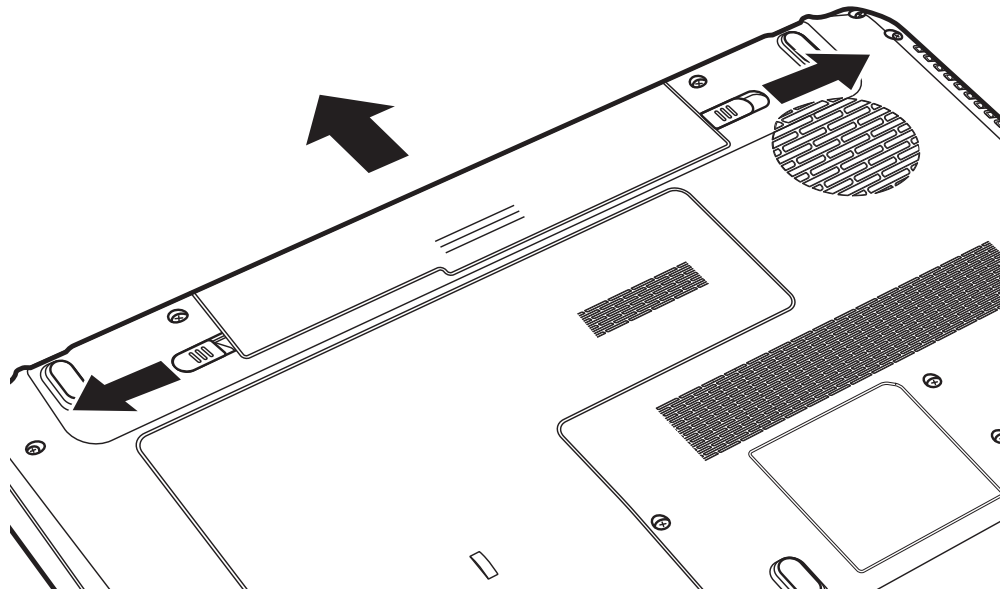3. Slide the battery release latch outward, and remove the battery pack from the laptop.

*Figure 4.1 Removing the Battery Pack*

*NOTE: Dispose of the used battery packs as required by local ordinances or regulations.*

**Installing the Battery Pack**

Install the battery pack according to the following procedures.

*CAUTION: The battery packs contain a lithium ion battery, which can explode due to improper replacement, use, handling or disposal. Always dispose of the battery packs as required by local ordinances or regulations. Use only replacement batteries recommended by Toshiba.*

*NOTE: Visually check the battery's terminals. If they are dirty, clean them with a dry cloth.*

1. Gently insert a new or recharged battery pack into the battery bay. Check that the battery release latch slides inward and stops with a click.

2. Slide in the battery lock.

## 4.3     HDD

**Removing the HDD**

Remove the HDD (hard disk drive) according to the following procedures and Figures 4.2, 4.3 and 4.4.

> *CAUTION: Do not press on the top or bottom of the drive. Applying such pressure can either corrupt the data in the drive or damage the drive.*
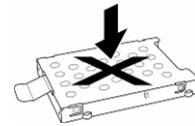
1. Loosen the screw securing the logic lower door.

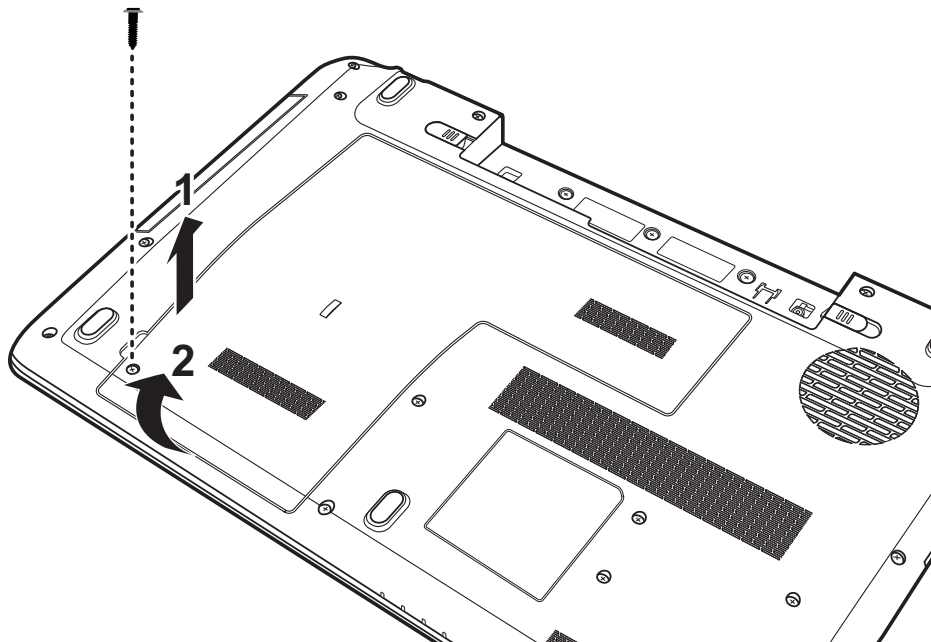2. Pry up the logic lower door and remove it.



*Figure 4.2 Removing the logic lower door*

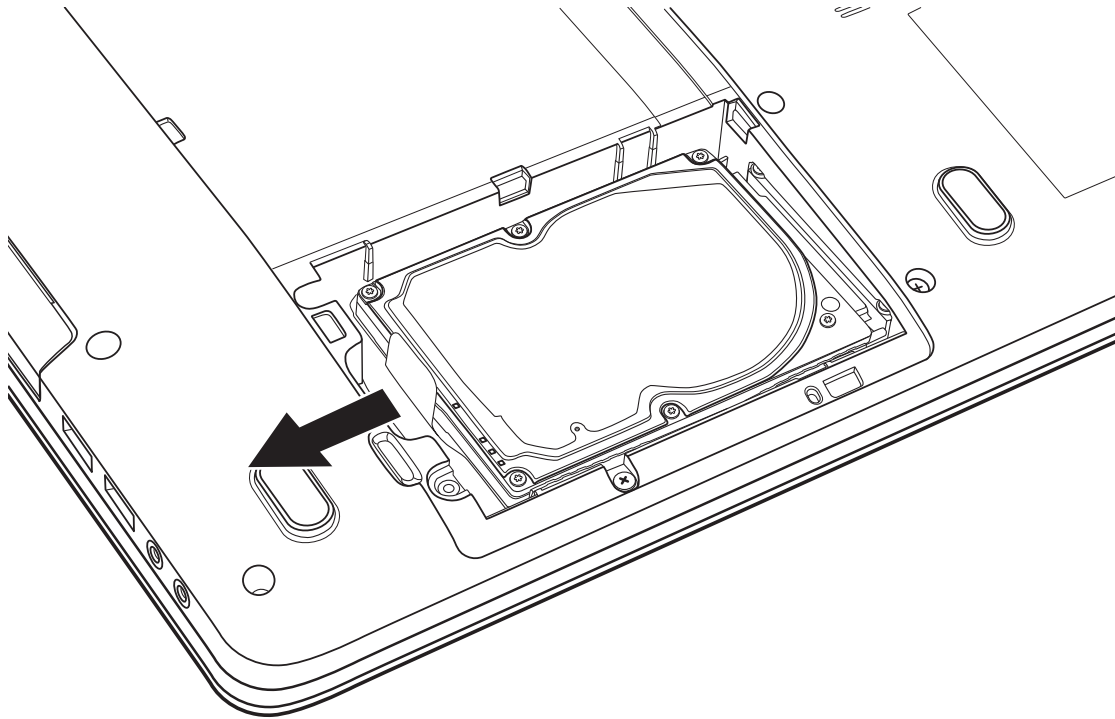3. Remove the HDD by pulling the tab attached to the HDD.



*Figure 4.3 Removing the HDD from the HDD bay*

---

**NOTE:** *Do not disassemble the HDD pack when it is working normally. Disassemble or replace the HDD pack only if it fails.*

---

4. Place the HDD on a flat surface such as a desk.

5. Remove the four M3x3 screws securing the HDD aluminum foil.
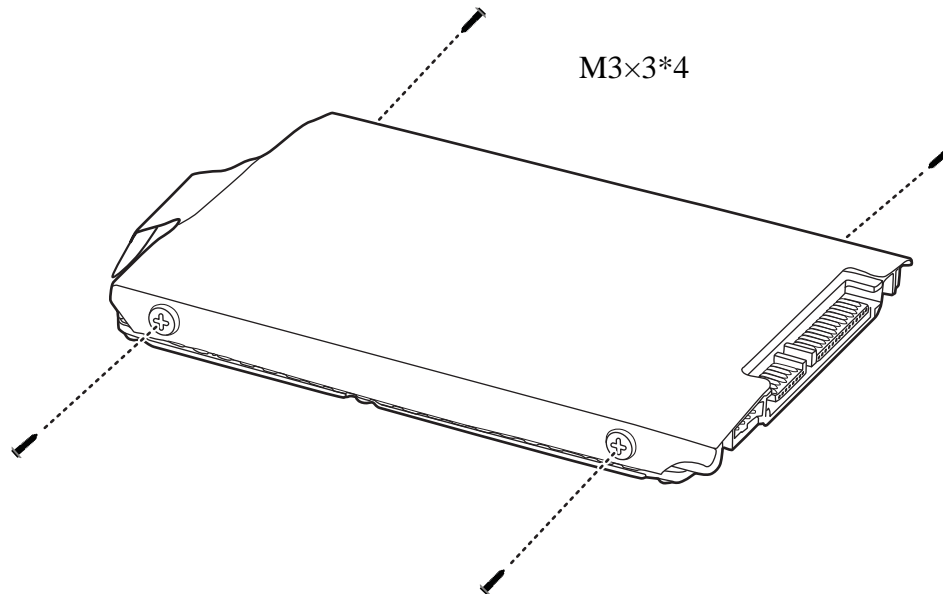
6.  Remove the HDD aluminum foil.

M3×3*4

*Figure 4.4 Removing the HDD aluminum*

---

*CAUTION: Do not apply pressure to the top or bottom of the drive.*

---

**Installing the HDD**

Install the HDD according to the following procedures.

---

*CAUTION: To avoid damage, always hold the HDD only by its sides.*

---

1.  Place the HDD aluminum foil onto the HDD.

2. Secure the HDD aluminum foil to the HDD with four M3x3 screws according to the sequence indicated in Figure 4.5.
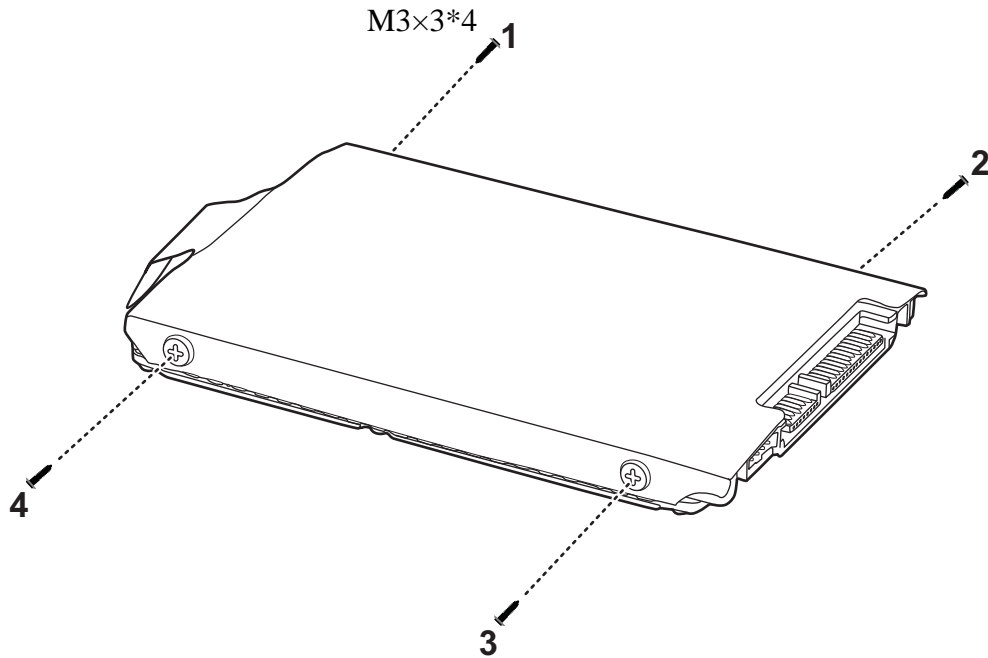
M3×3*4

*Figure 4.5 Installing the HDD aluminum*

---

**CAUTION:** *To prevent the HDD al foil from being distorted when installing the HDD pack into the laptop, do not press the center of the HDD pack. Always hold the HDD pack by its sides.*

---

3. Insert the HDD into the HDD bay, and slide the HDD inward to connect to the motherboard.

4. Replace the logic lower door. Press down the logic lower door according to the sequence indicated in Figure 4.6.
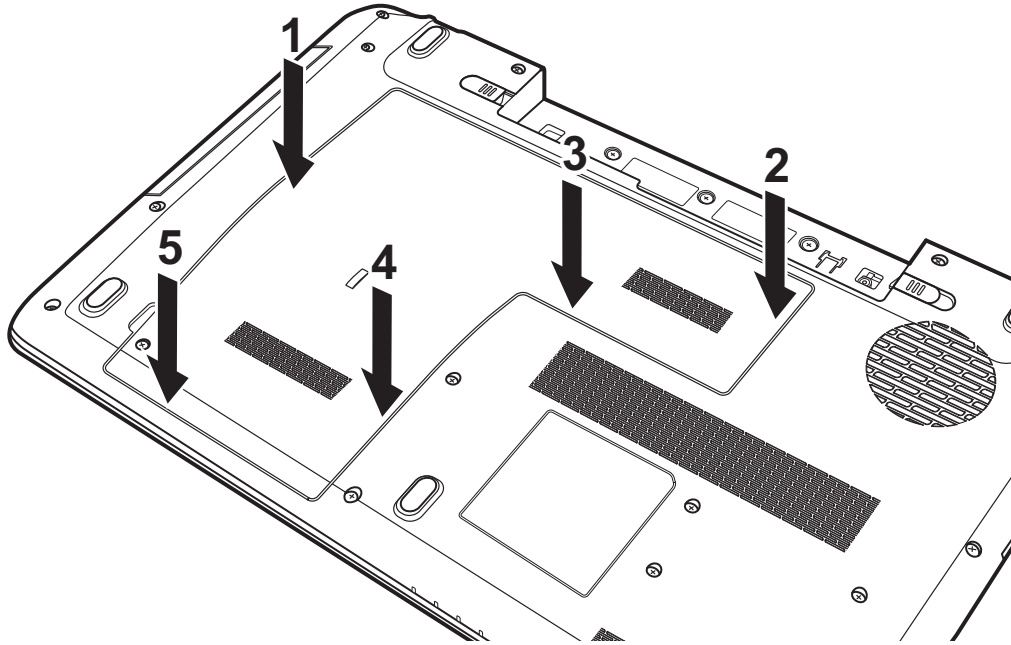
*Figure 4.6 Installing the logic lower door*

5. Tighten the screw on the logic lower door.

## 4.4      Memory

**Removing the Optional Memory**

Remove the optional memory according to the following procedures and Figure 4.7 after checking that the laptop is turned off.

---

*CAUTION: Remove the optional memory after turning off the laptop. If this is violated, the laptop or memory can be damaged.*

---

1. Turn the laptop upside down.

2. Pull the two memory lock latches outward so that the memory pops up.

---

*CAUTION: Do not touch the connectors on the memory or in the laptop. Contaminated connectors can cause memory access problems.*
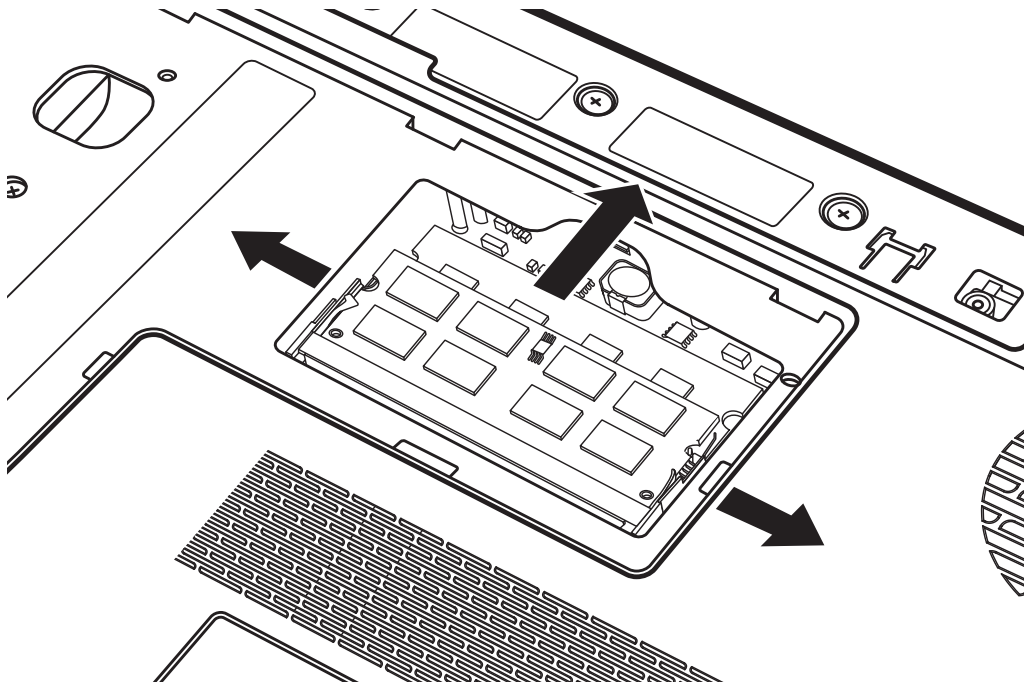
---



*Figure 4.7 Removing the RAM from the connectors*

3. Pull the memory up and out at an angle of 45 degrees, using care to avoid touching the connectors.

---

**Installing the Optional Memory**

Install the optional memory according to the following procedures after checking that the laptop is turned off.

---

*CAUTION: Install the optional memory after turning off the laptop. If this is violated, the laptop or memory can be damaged.*

---

1. Insert the memory into the connector at an angle of 45 degrees.

2. Press down on the memory module until it is secured in place by the two memory lock latches.

Once the laptop is turned on, check the hardware configuration in the Hardware Setup or TESTUP program to make sure that the installed memory has been recognized by the system. If it has not been recognized yet, check the connections.

## 4.5 ODD

**Removing the ODD**

> *NOTE: The installation and removal procedures are the same for all the modules that can be installed in the ODD bay. See the appropriate sections for the disassembly procedures of specific modules.*

Remove the ODD (optical disc drive) according to the following procedures and Figure 4.8.
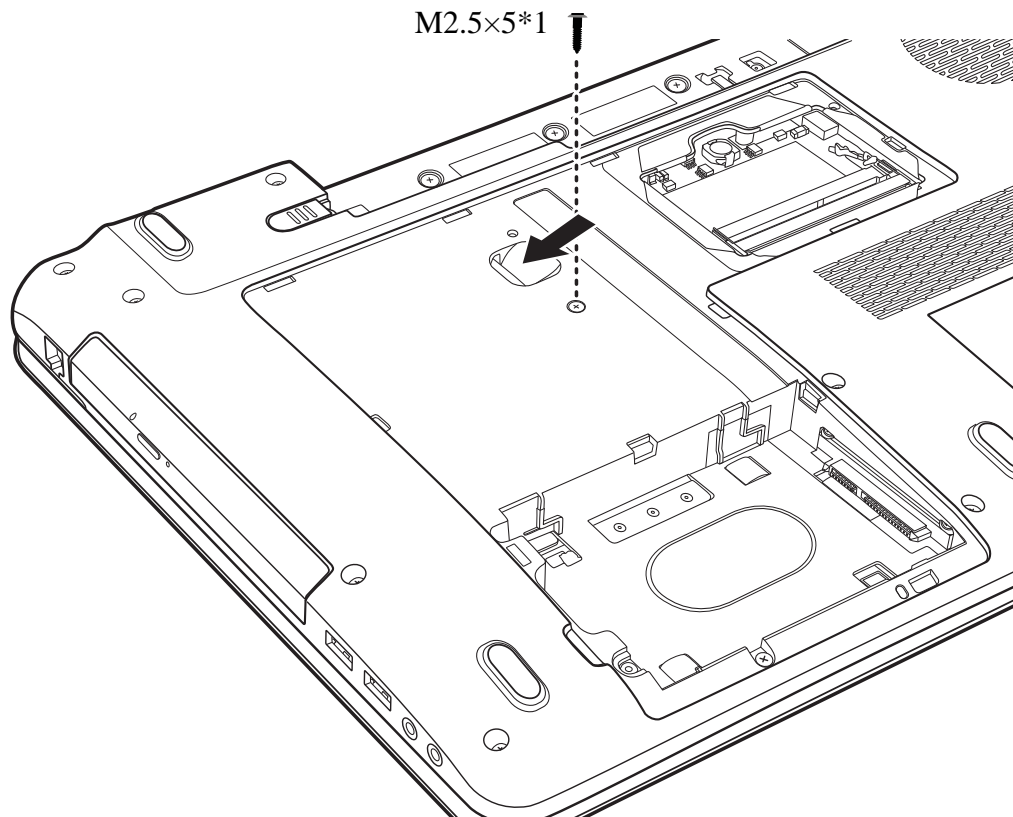
M2.5×5*1



*Figure 4.8 Removing the ODD*

1. Turn the laptop upside down.

2. Remove the M2.5x5 screw securing the ODD.

3. Push the ODD outward as indicated in Figure 4.8 and then remove the ODD.

> *CAUTION: Handle the ODD carefully. It can become hot during operation.*

**Installing the ODD**

Install the ODD according to the following procedures.

1. Insert the ODD into the ODD bay.
2. Slide the ODD bay inward until it meets the end.
3. Secure the ODD with one M2.5x5 screw.

**Disassembling the ODD**

> *NOTE: Do not disassemble the ODD when it is working normally. Disassemble or replace the ODD only if it fails.*

Disassemble the ODD according to the following procedures and Figure 4.9.

1. Remove two M2x3 screws securing the ODD bracket to the ODD.

2. Remove the ODD bracket from the ODD.

M2×3*2
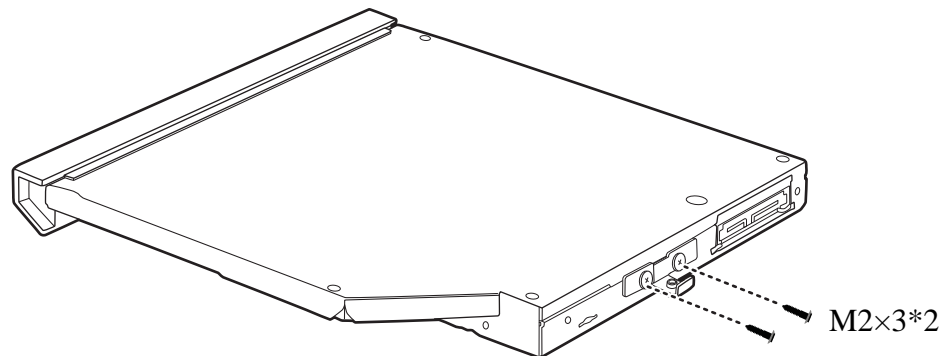
*Figure 4.9 Removing the ODD bracket from the ODD*

**Assembling the ODD Drive**

Assemble the ODD drive according to the following procedures.

1. Seat the ODD bracket in the correct position on the ODD.

2. Secure the ODD bracket to the ODD with two M2×3 screws.

## 4.6     Keyboard Cover and Keyboard

**Removing the Keyboard Cover and Keyboard**

Remove the Keyboard Cover and Keyboard according to the following procedures and Figures 4.10, 4.11, and 4.12.

1. Open the display panel.

2. Gently insert a flat blade screwdriver above the HOME/SYSRQ key and pry up the keyboard cover.

3. Remove the keyboard cover.
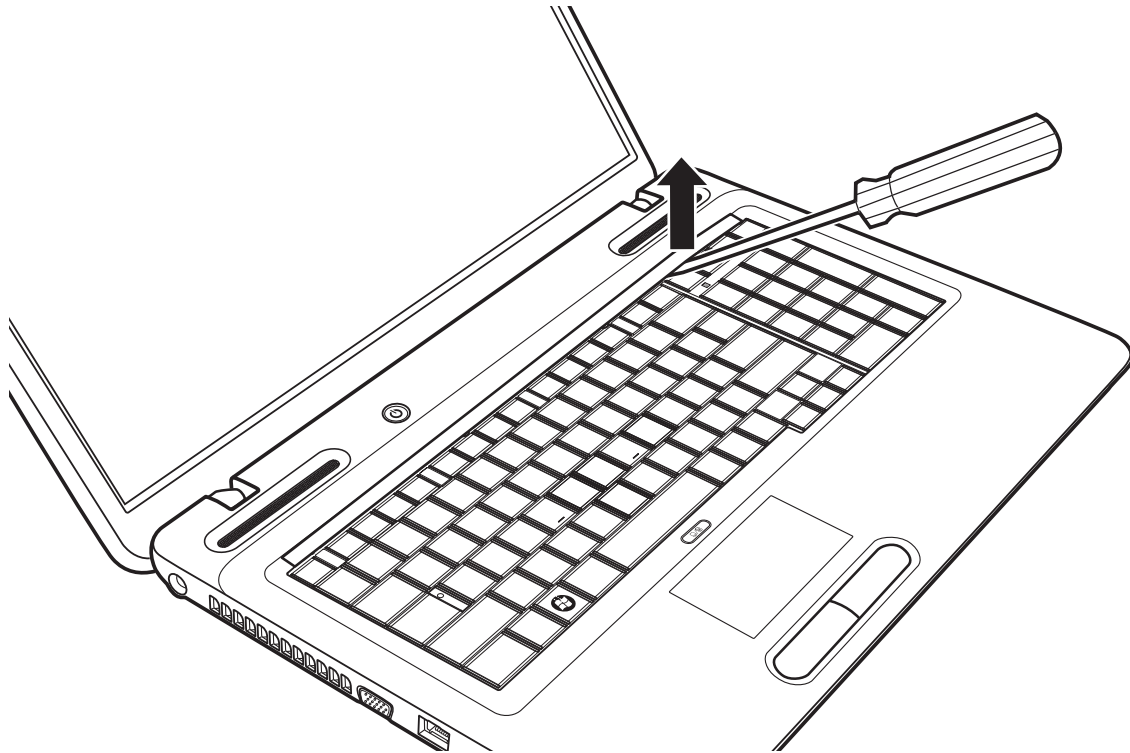


*Figure 4.10 Removing the keyboard cover*

4. Remove the four M2.5x3 screws securing the keyboard.

M2.5×3*4
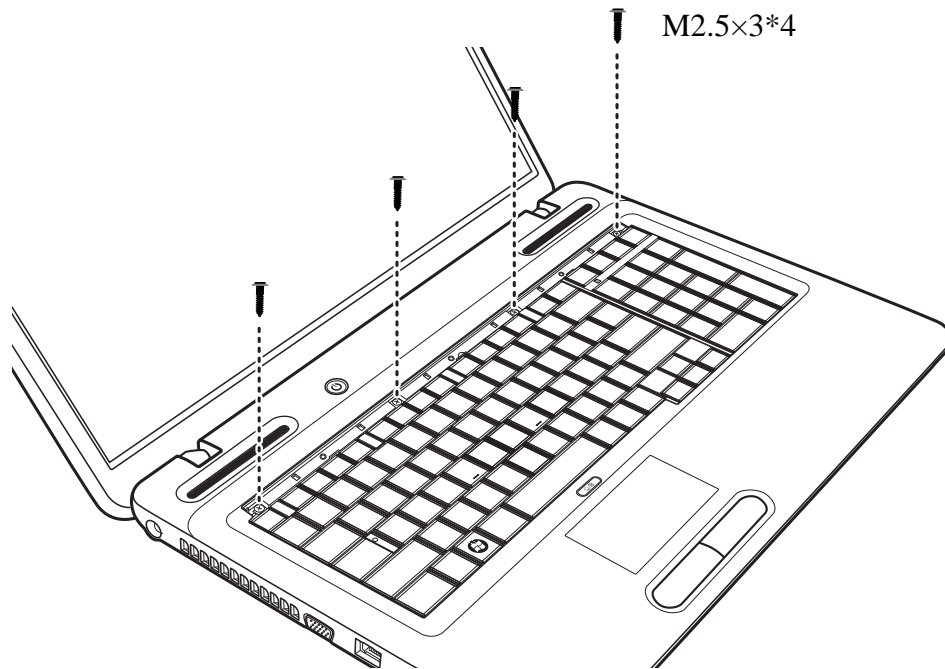
*Figure 4.11 Removing screws securing the keyboard*

5. Lift up the keyboard and disconnect the FPC from the motherboard.
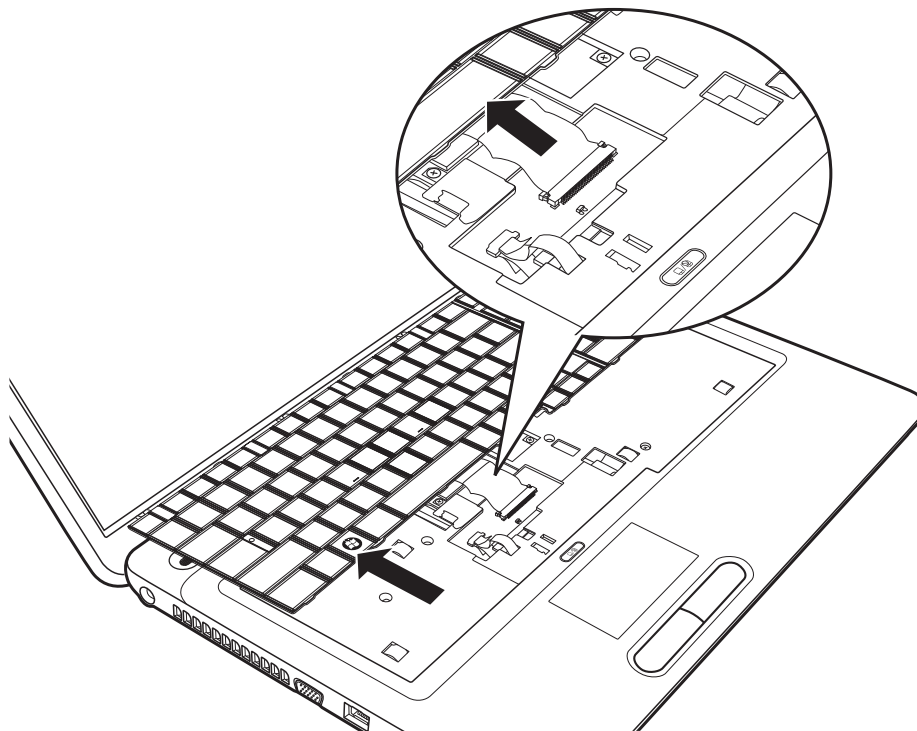
*Figure 4.12 Removing the keyboard*

**Installing the Keyboard Cover and Keyboard**

Install the keyboard cover and keyboard according to the following procedures.

1. Connect the FPC to the motherboard.

2. Place the keyboard in the correct position and secure it with four M2.5x3 screws.

3. Place the keyboard cover in the correct position.

4. Press down the keyboard cover starting from the center and toward the left. Make sure the hooks on the back of the cover are securely in place.

5. Press down the right of the keyboard cover. Make sure the hooks on the back of the cover are securely in place.

6. Press down the keyboard cover in the position around the key F9 and slide to the left to make sure the last hook on the back of the cover is securely in place.

## 4.7     Logic Upper Assembly

**Removing the Logic Upper Assembly**

Remove the logic upper assembly according to the following procedures and Figures 4.13, 4.14 and 4.15.

1. Turn the laptop upside down.

2. Remove the following twenty-one screws:

   − Eighteen M2.5x5 screws
   − Three M2x2 screws
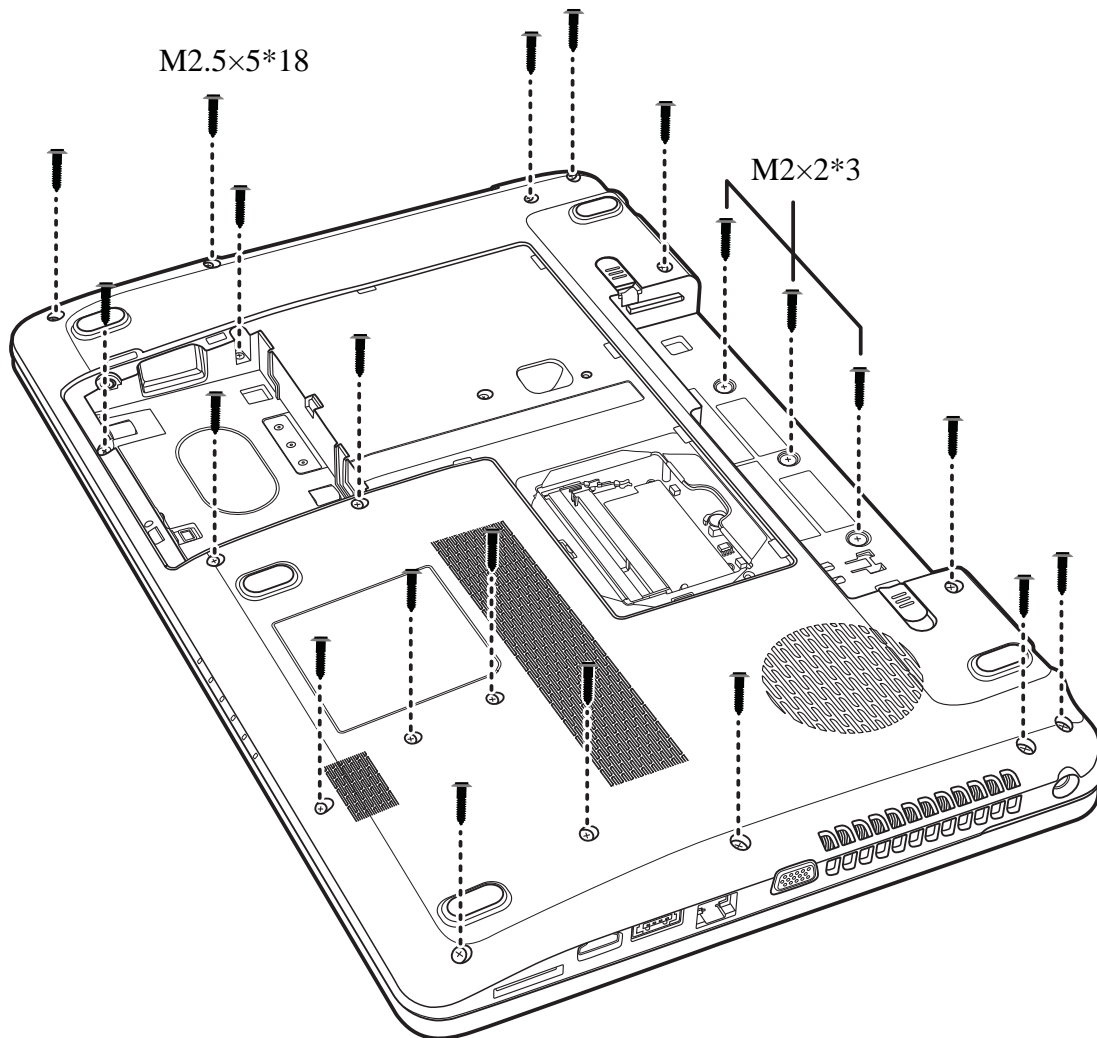


*Figure 4.13 Removing twenty-one screws from the bottom of the laptop*

3. Turn to the front and remove the five M2.5x5 screws securing the logic upper assembly.

4. Disconnect the touchpad FFC from the motherboard.

M2.5×5*5
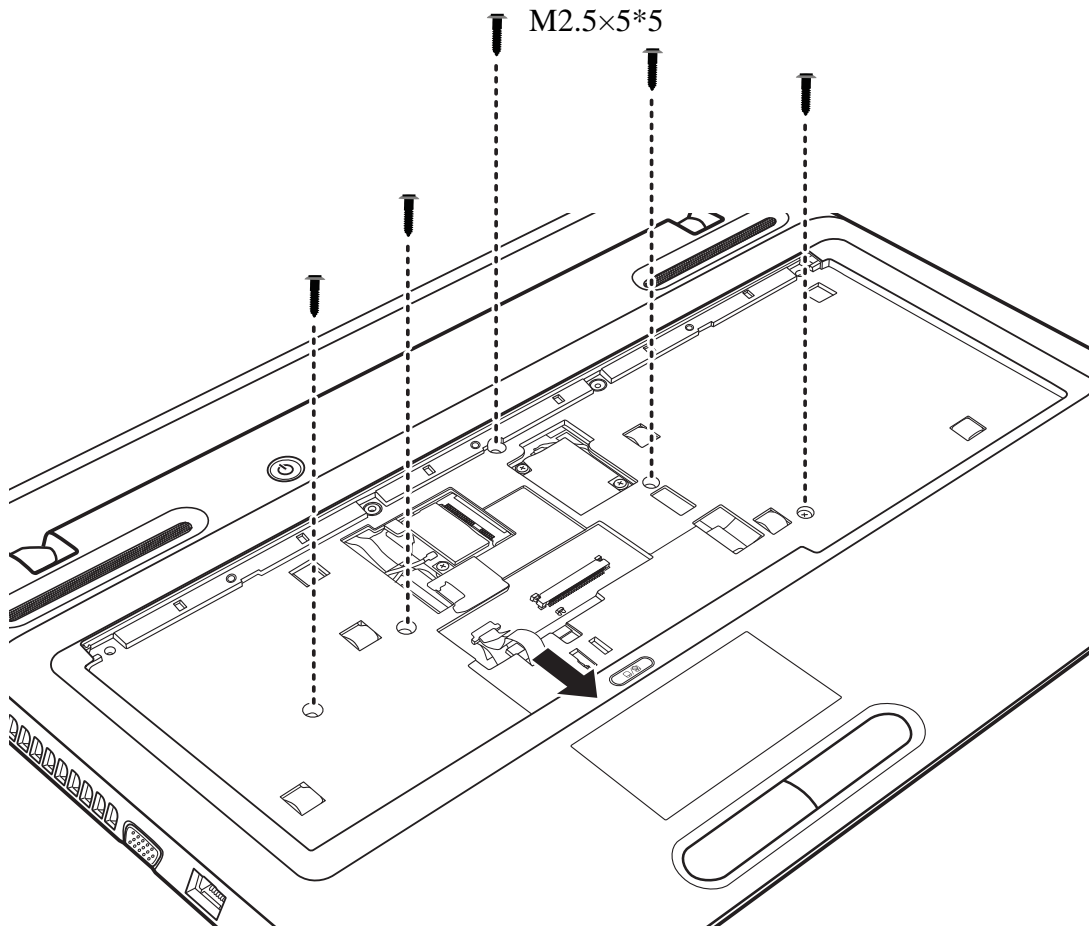
*Figure 4.14 Removing five screws and disconnecting one FFC from the motherboard*

5. Grab the edge of the opening in the middle of the logic upper assembly and pull up to remove it from the laptop as shown in Figure 4.15.
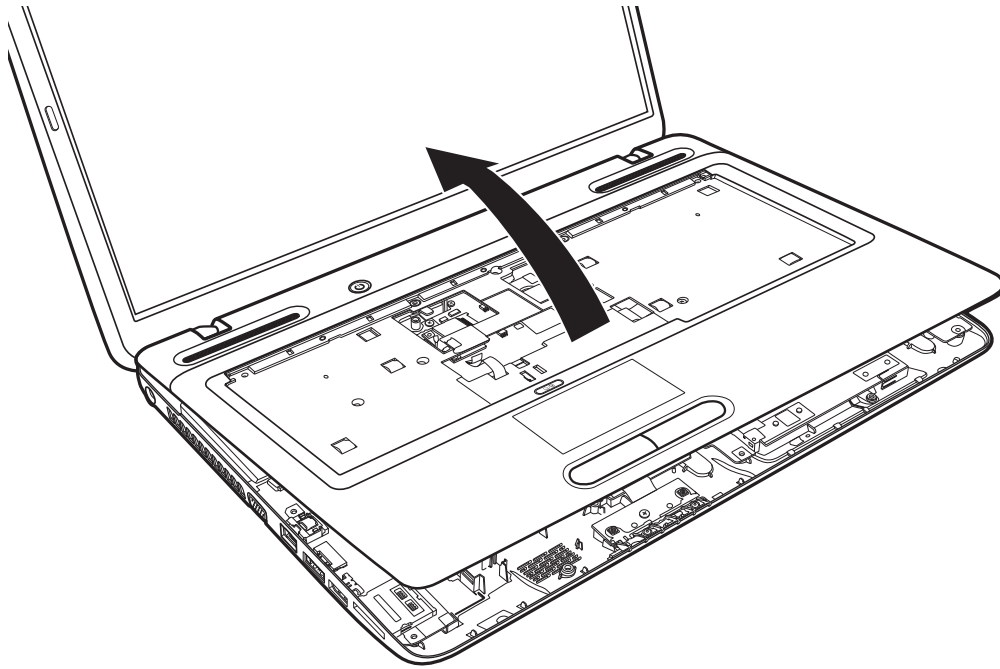


*Figure 4.15 Removing the logic upper assembly from the laptop*

**Installing the Logic Upper Assembly**

Install the logic upper assembly according to the following procedures.

1. Seat the logic upper assembly to the front of the laptop, and adjust to the correct position.

2. Press down the logic upper assembly, starting from the top and toward the bottom. Make sure that the hooks on the back of the assembly are securely in place.

3. Connect the touchpad FFC to the motherboard.

4. Secure five M2.5x5 screws.

5. Turn the laptop upside down.

6. Secure the logic upper assembly with twenty-one screws as indicated in Figure 4.13:

   − Eighteen M2.5x5 screws
   − Three M2x2 screws

## 4.8     Touchpad FFC

**Removing the Touchpad FFC**

Remove the touchpad FFC according to the following procedures and Figure 4.16.

1. Turn the logic upper assembly upside down.

2. Disconnect the touchpad FFC from the touchpad board.

3. Remove the touchpad FFC.
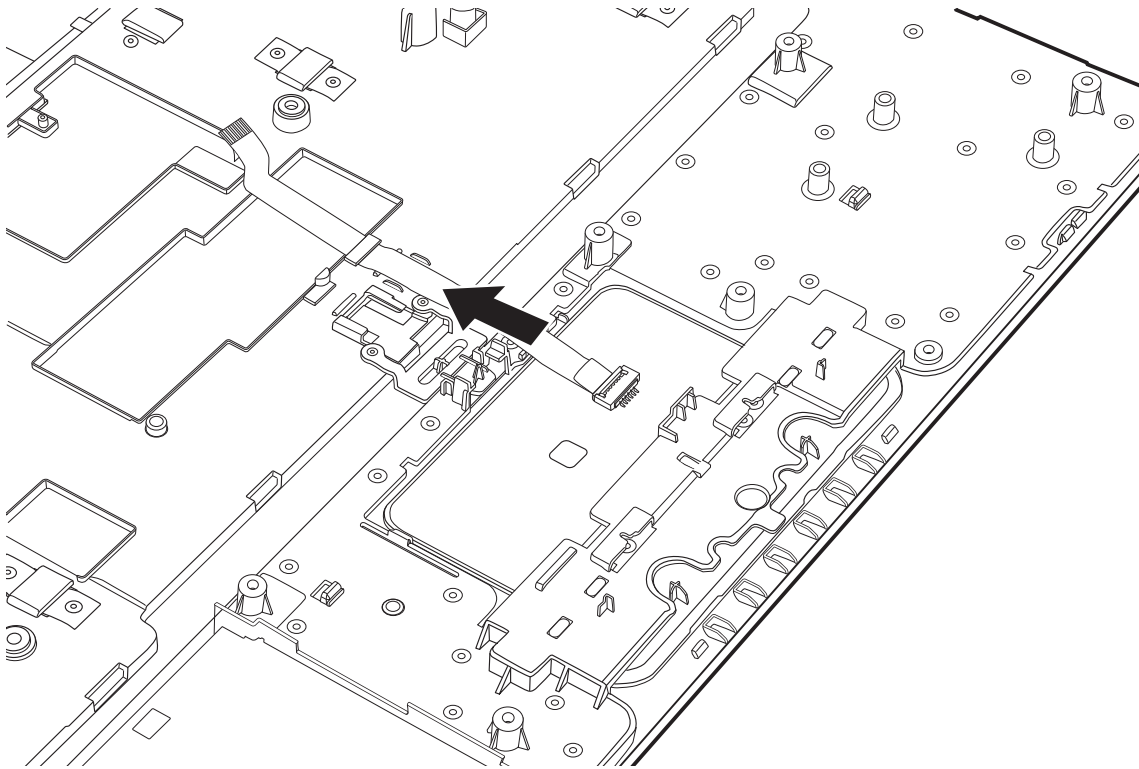


*Figure 4.16 Removing the touchpad FFC*

**Installing the Touchpad FFC**

Install the touchpad FFC according to the following procedures.

1. Connect the touchpad FFC to the touchpad board.

## 4.9     WLAN Card

**Removing the WLAN Card**

Remove the WLAN card according to the following procedures and Figure 4.17.

1. Disconnect the two antenna cables from the WLAN card.

2. Remove the M2x3 screw securing the WLAN card. The card pops up automatically.

3. Remove the WLAN card at an angle of 45 degrees.

M2×3*1
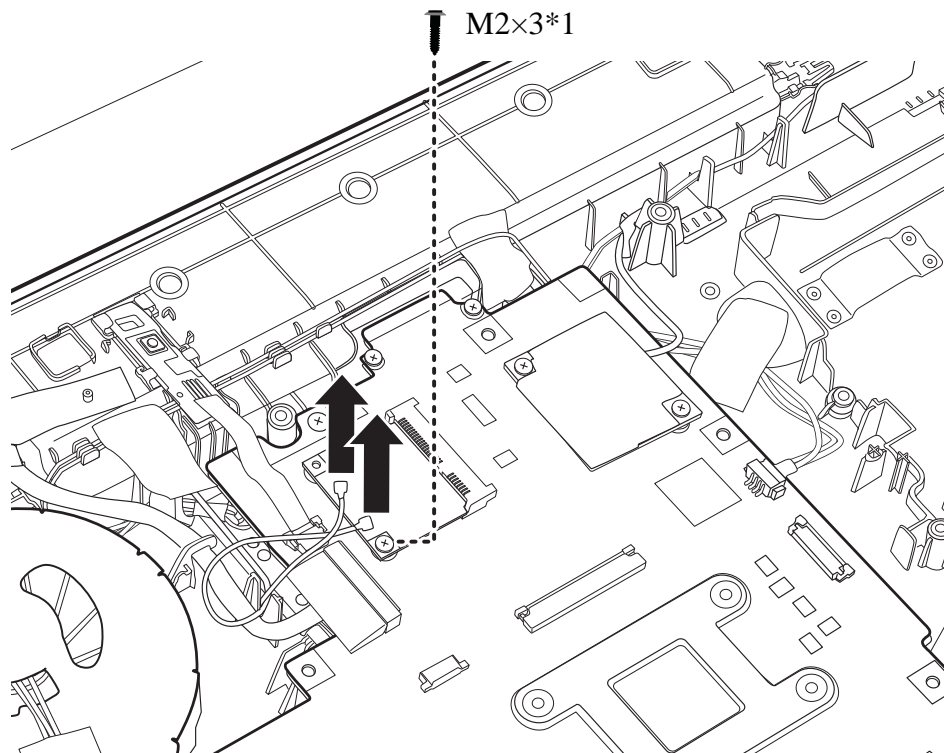
*Figure 4.17 Removing the WLAN Card*

**Installing the WLAN card**

Install the WLAN card according to the following procedures.

1.  Insert the WLAN card into the connector on the motherboard at an angle of 45 degrees.

2.  Press the WLAN card down and secure it with one M2x3 screw.

3.  Connect the two antenna cables to the WLAN card. Connect the white WLAN antenna (main) to the #1 connector, and the black WLAN antenna (auxiliary) to the #2 connector.

## 4.10    Modem Card

**Removing the Modem Card**

Remove the modem card according to the following procedures and Figures 4.18 and 4.19.

1.  Remove the two M2x3 screws securing the modem card.

M2×3*2
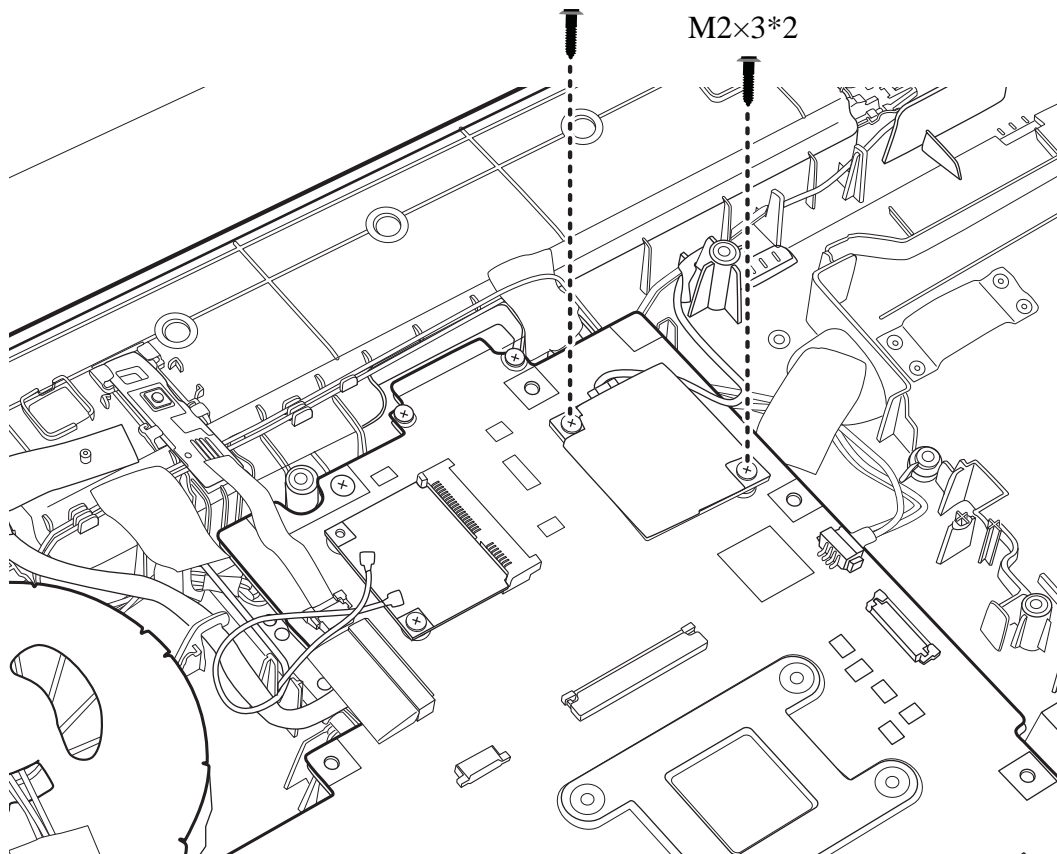
*Figure 4.18 Removing two screws securing the modem card*

2. Disconnect the RJ11 cable connected to the back of the modem card.

3. Remove the modem card from the motherboard.
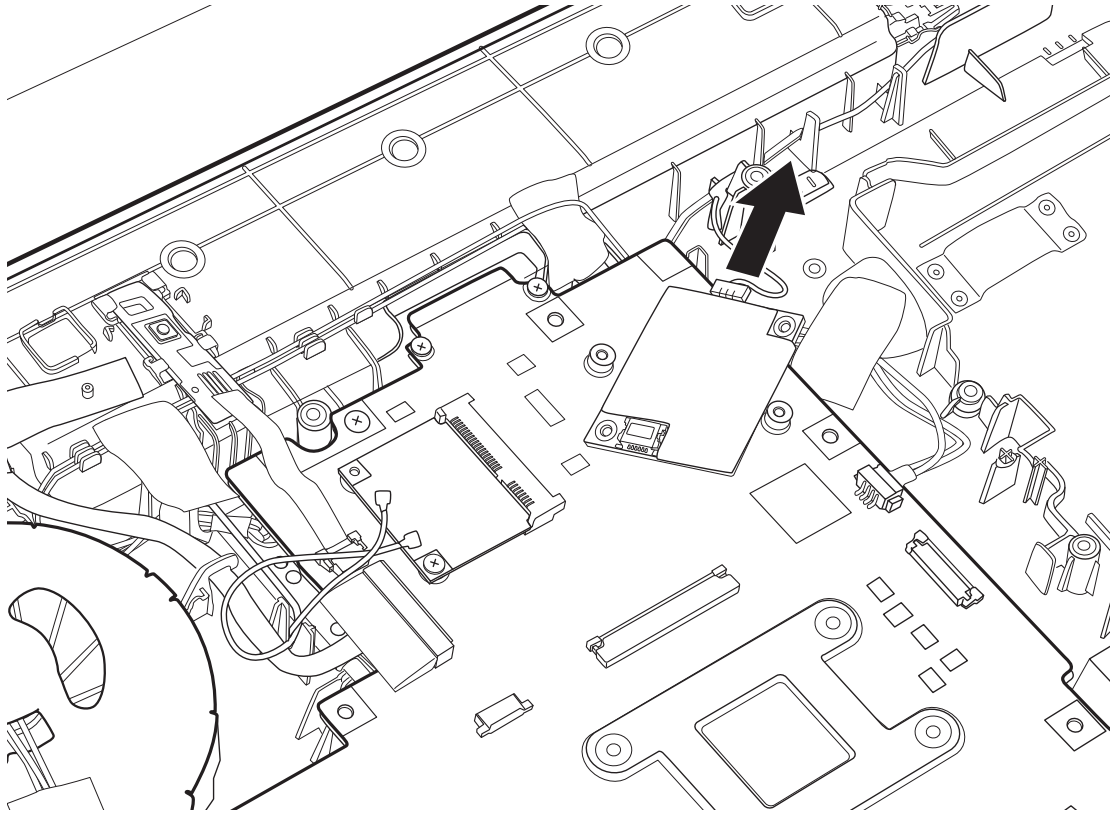


*Figure 4.19 Disconnecting the cable from the modem card*

**Installing the Modem Card**

Install the modem card according to the following procedures.

1. Connect the RJ11 cable to the back of the modem card.

2. Place the modem card on the motherboard and secure it with two M2x3 screws.

## 4.11     USB Board

**Removing the Right USB Board on the Right Side**

Remove the Right USB board according to the following procedures and Figure 4.20.

1. Disconnect the USB board FFC from the motherboard.

2. Gently pry up the USB board FFC.
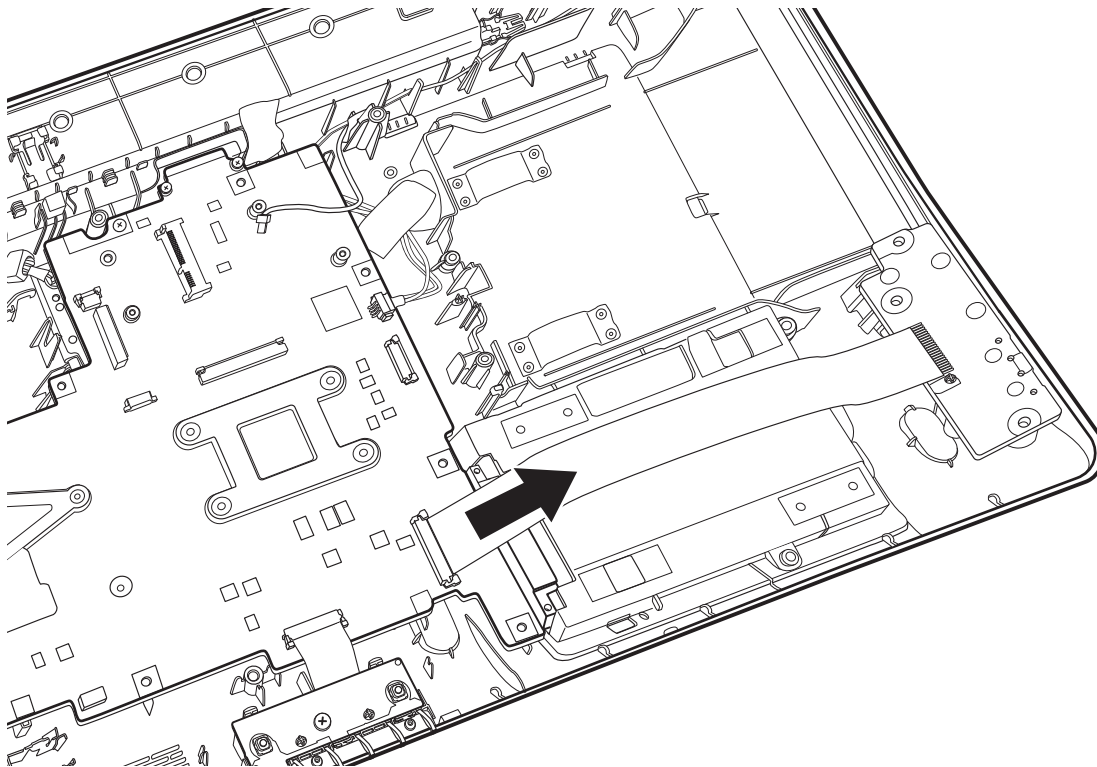


*Figure 4.20 Disconnecting the FFC from the motherboard*

3. Remove the USB Board from the logic lower assembly.

**Installing the Right USB Board**

Install the Right USB board according to the following procedures.

1. Seat the USB board in the logic lower assembly.

2. Connect the USB board FFC to the motherboard.

## 4.12    ODD Board

**Removing the ODD Board**

Remove the ODD board according to the following procedures and Figure 4.21.

1.  Disconnect the ODD board FFC from the motherboard.
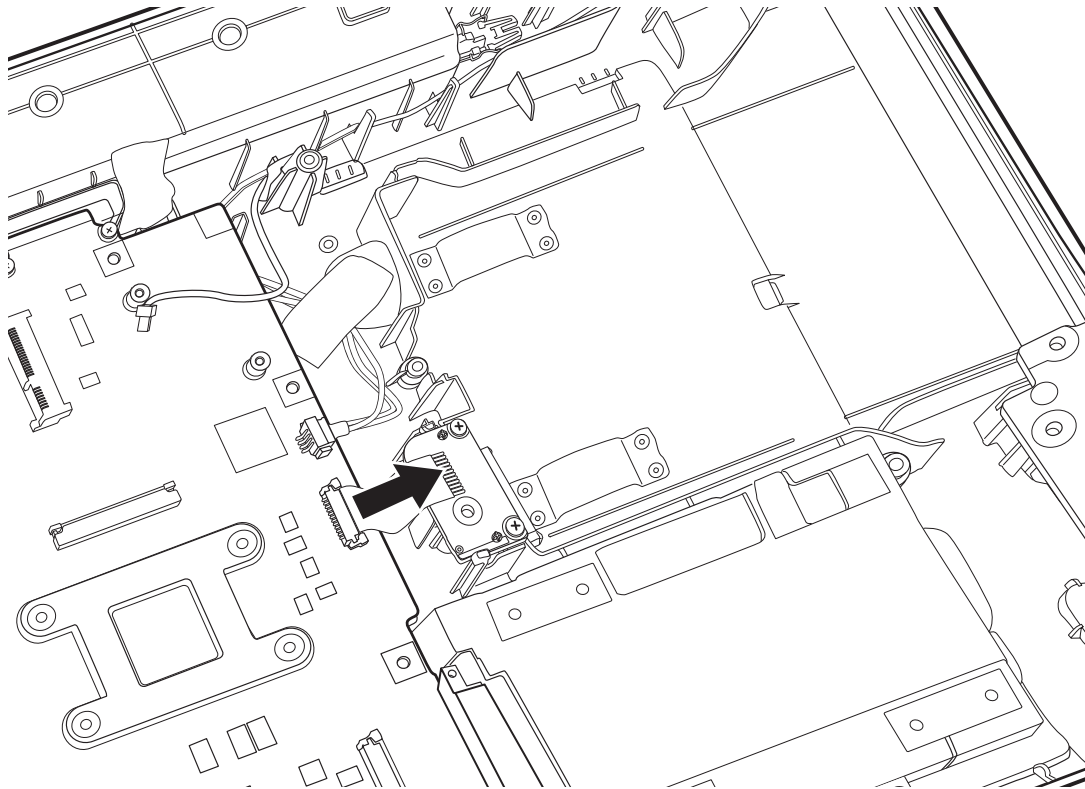


*Figure 4.21 Disconnecting the ODD board FFC*

2.  Remove the ODD board from the logic lower assembly.


**Installing the ODD switch board**

Install the power switch according to the following procedures.

1.  Seat the ODD board in the logic lower assembly.

2.  Connect the ODD board FFC to the motherboard assembly.

## 4.13    Touchpad Button Board

**Removing the Touchpad Button Board**

Remove the touchpad button board according to the following procedures and Figure 4.22.

1.  Remove the M2.5x5 screw securing the touchpad button board.

2.  Disconnect the touchpad button board from the motherboard.
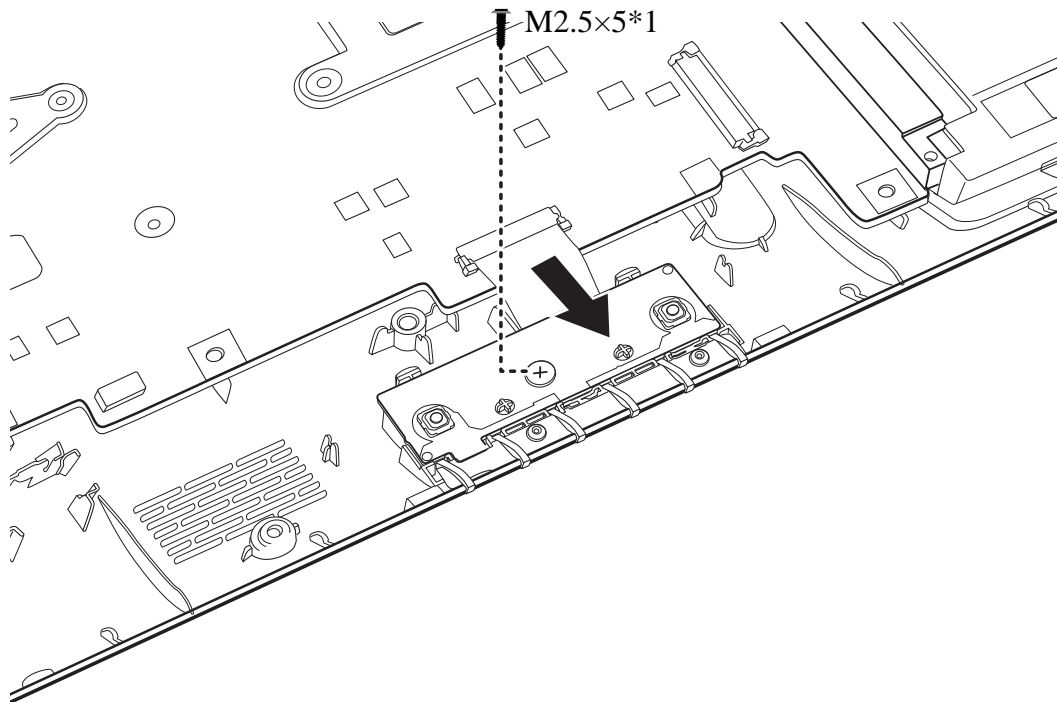


*Figure 4.22 Removing the touchpad button board*

3.  Remove the touchpad button board from the logic lower assembly.


**Installing the touchpad button switch board**

Install the touchpad button board according to the following procedures.

1.  Seat the touchpad button board in the logic lower assembly.

2.  Secure the touchpad button board with one M2.5x5 screw.

3.  Connect the touchpad button board FFC to the motherboard.

## 4.14 Power Board

**Removing the Power Board**

Remove the power board according to the following procedures and Figures 4.23 and 4.24.

1. Disconnect the power board FFC from the motherboard.
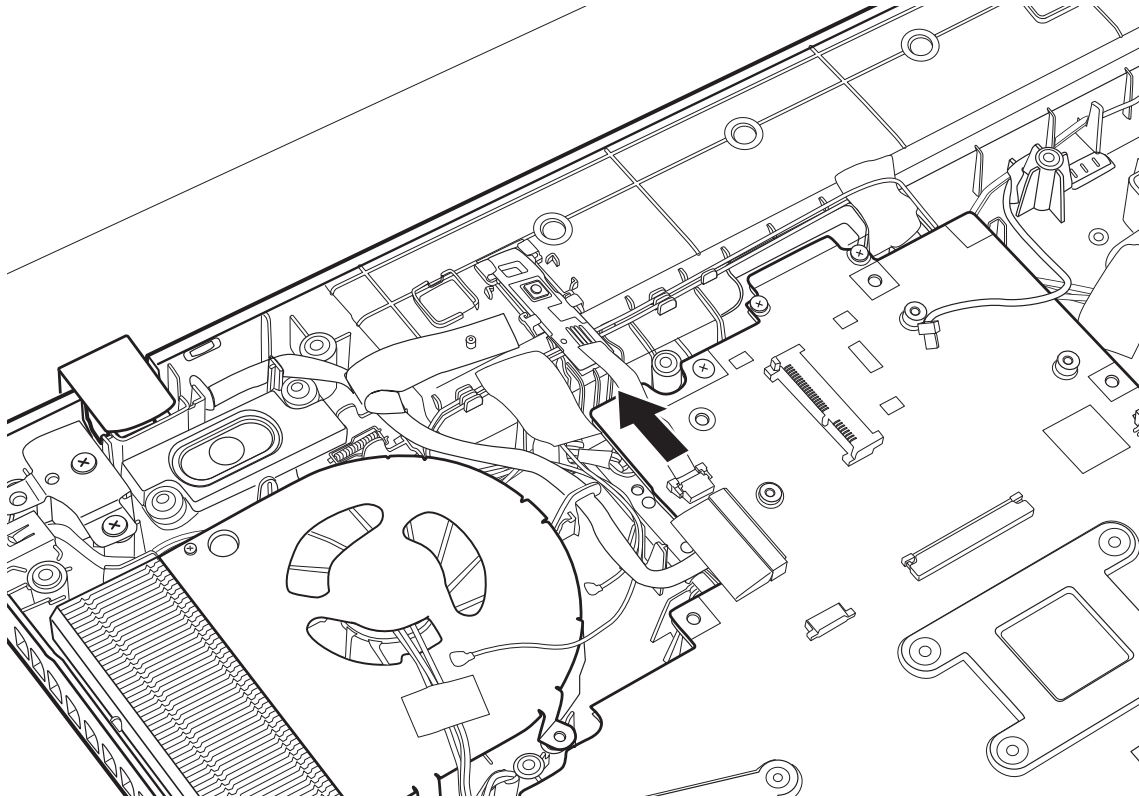


*Figure 4.23 Disconnecting the FFC from the motherboard*

2. Press down the catch with a small screwdriver as indicated in Figure 4.24, and slide the power board out of the socket.
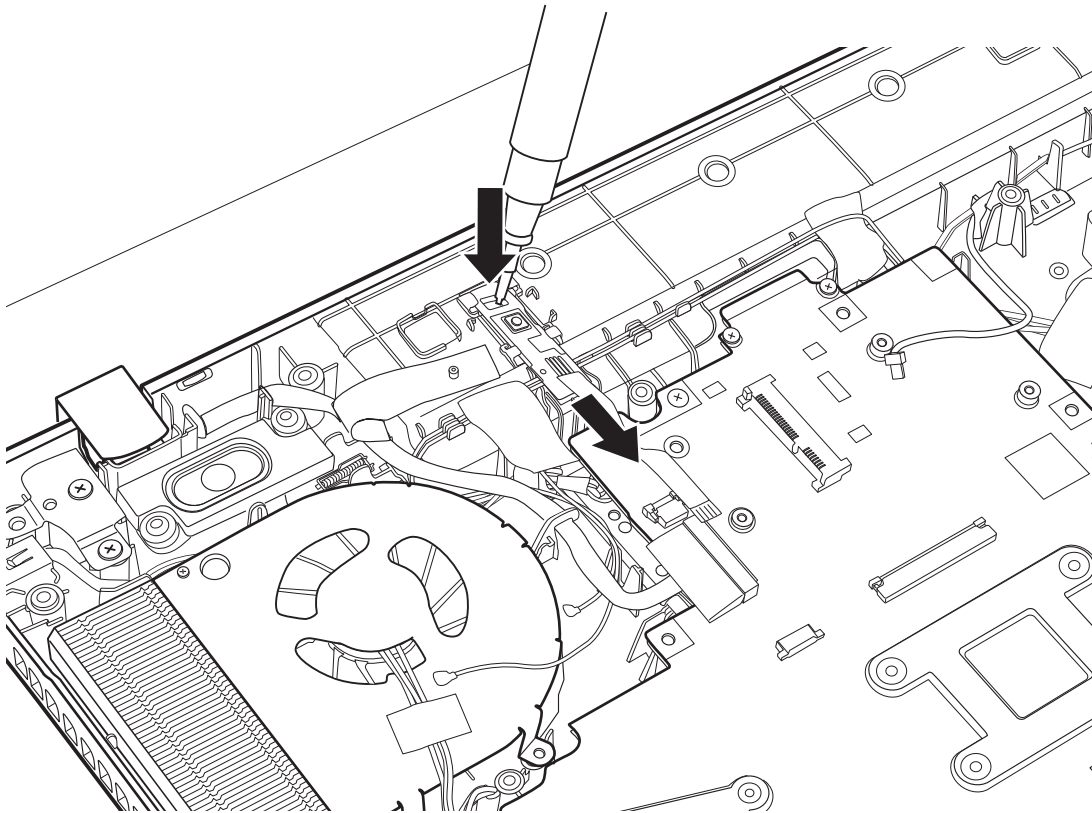
*Figure 4.24 Removing the power board*

**Installing the Power Board**

Install the power board according to the following procedures.

1. Slide the power board into the socket on the logic lower assembly. Make sure that the power board clicks into place.

2. Connect the power board FFC to the motherboard.

## 4.15    Bluetooth Card

**Removing the Bluetooth card**

Remove the Bluetooth card according to the following procedures and Figures 4.25 and 4.26.

1.  Disconnect the Bluetooth cable from the motherboard

2.  Remove the Bluetooth card from the trough on the logic lower assembly.
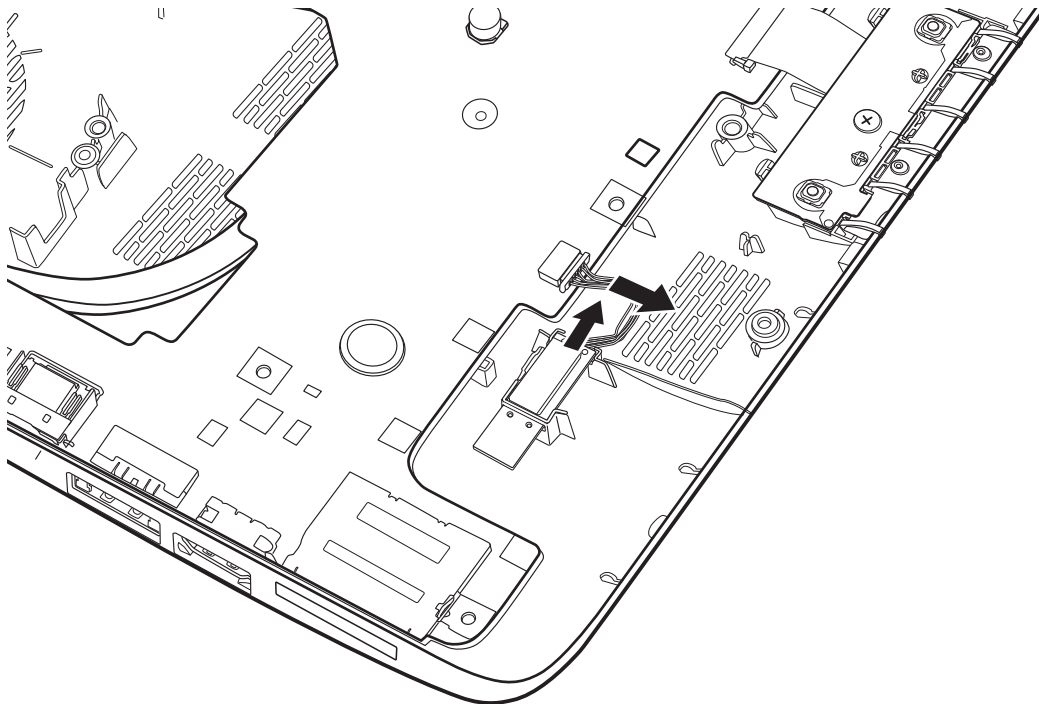


*Figure 4.25 Removing the Bluetooth card*

3.  Disconnect the Bluetooth cable from the Bluetooth card.
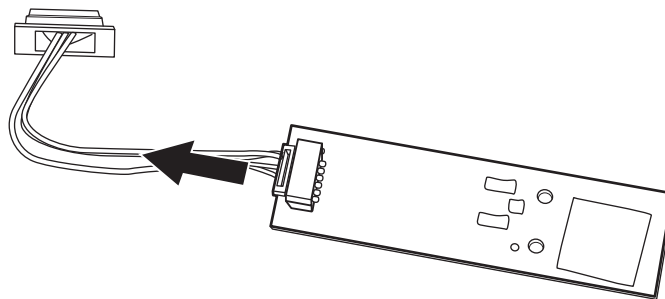


*Figure 4.26 Disconnecting the Bluetooth cable*

**Installing the Bluetooth card**

Install the Bluetooth card according to the following procedures.

1. Connect the Bluetooth cable to the Bluetooth card.

2. Seat the Bluetooth card in the trough on the logic lower assembly.

3. Connect the Bluetooth cable to the motherboard.

## 4.16    Display Assembly

**Removing the Display Assembly**

---

*CAUTION:*

*Use care to avoid the antenna cable being caught between the display assembly and the laptop.*

---

Remove the display assembly according to the following procedures and Figure 4.27.

1.  Peel away the clear tape securing the LVDS cable connector in place, and disconnect the LVDS cable from the motherboard.

2.  Peel away the tape securing the two antenna cables (black and white) and the LVDS cable, and pull the cables from the routing channels on the logic lower assembly.

3.  Remove the  LVDS cable from the logic lower assembly's rib.

4.  Remove the tapes from the logic lower assembly.

5.  Remove the four M2.5x5 screws securing the display assembly.

6.  Remove the display assembly from the logic lower assembly.

M2.5×5*4
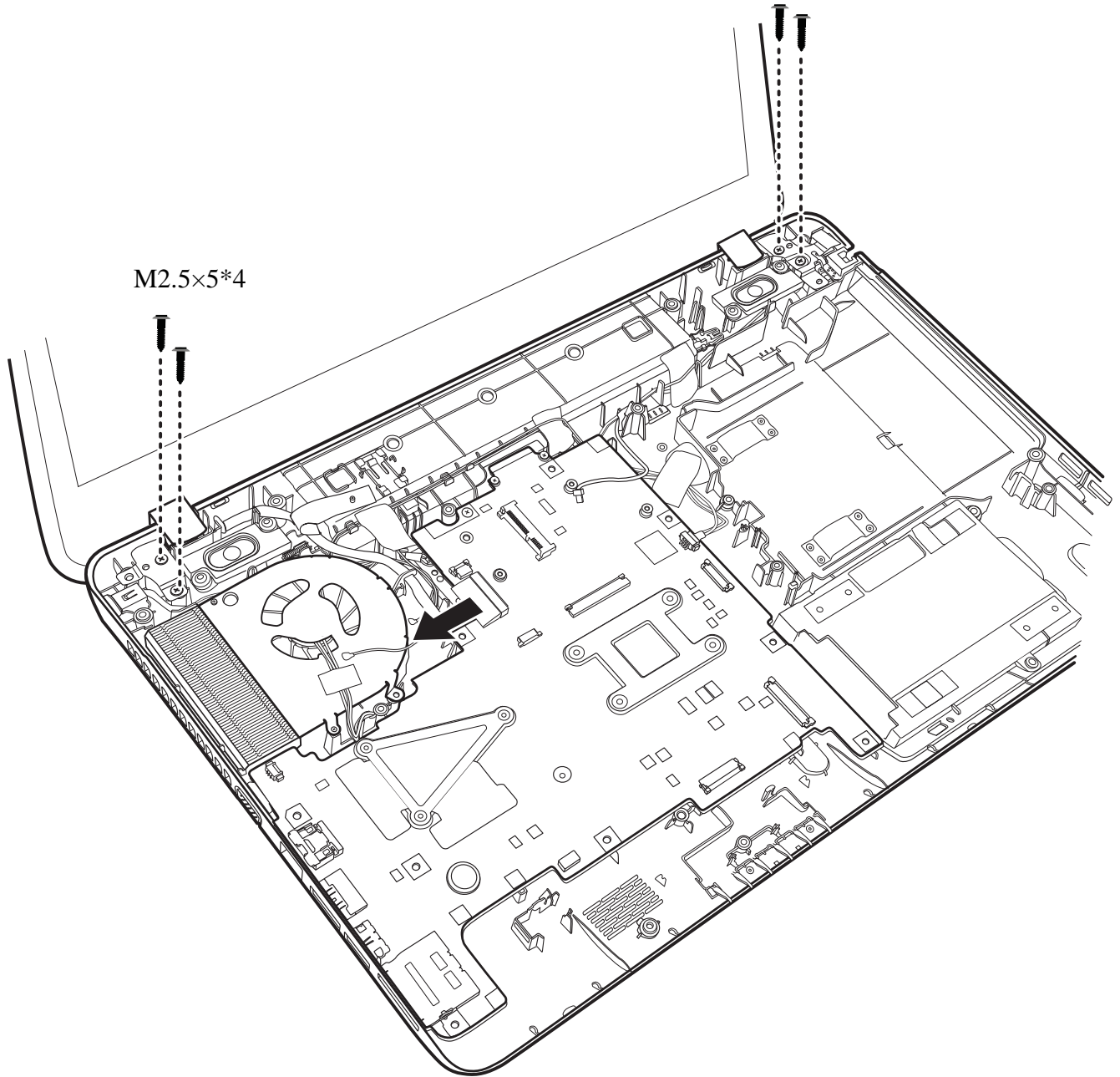
*Figure 4.27 Removing the display assembly*

**Installing the Display Assembly**

Install the display assembly according to the following procedures and Figure 4.28.

1.  Seat the display hinge brackets in the correct position on the logic lower assembly and secure it with four M2.5x5 screws.

2.  Connect the LVDS cable to the motherboard and adhere the clear tape over the connector to secure it in place.

3.  Route the two antenna cables and the LVDS cable into the routing channel on the logic lower assembly, and attach the tape over the cables to secure them in place.
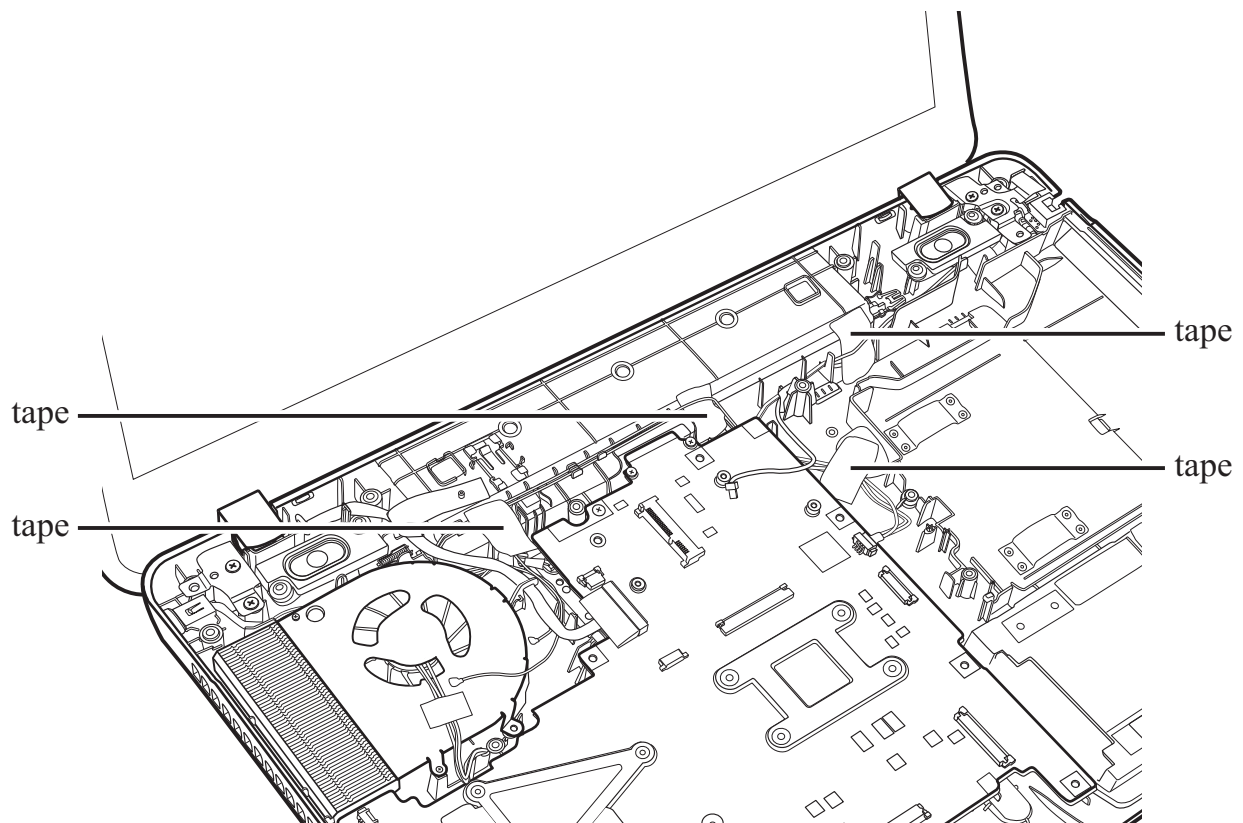
*Figure 4.28 Installing the display assembly*

## 4.17    Thermal Fan

**Removing the Thermal Fan**

Remove the thermal fan according to the following procedures and Figure 4.29.

1.  Disconnect the thermal fan cable from the motherboard and remove the two M2x5 screws.

2.  Remove the thermal fan from the logic lower assembly.

M2×5*2
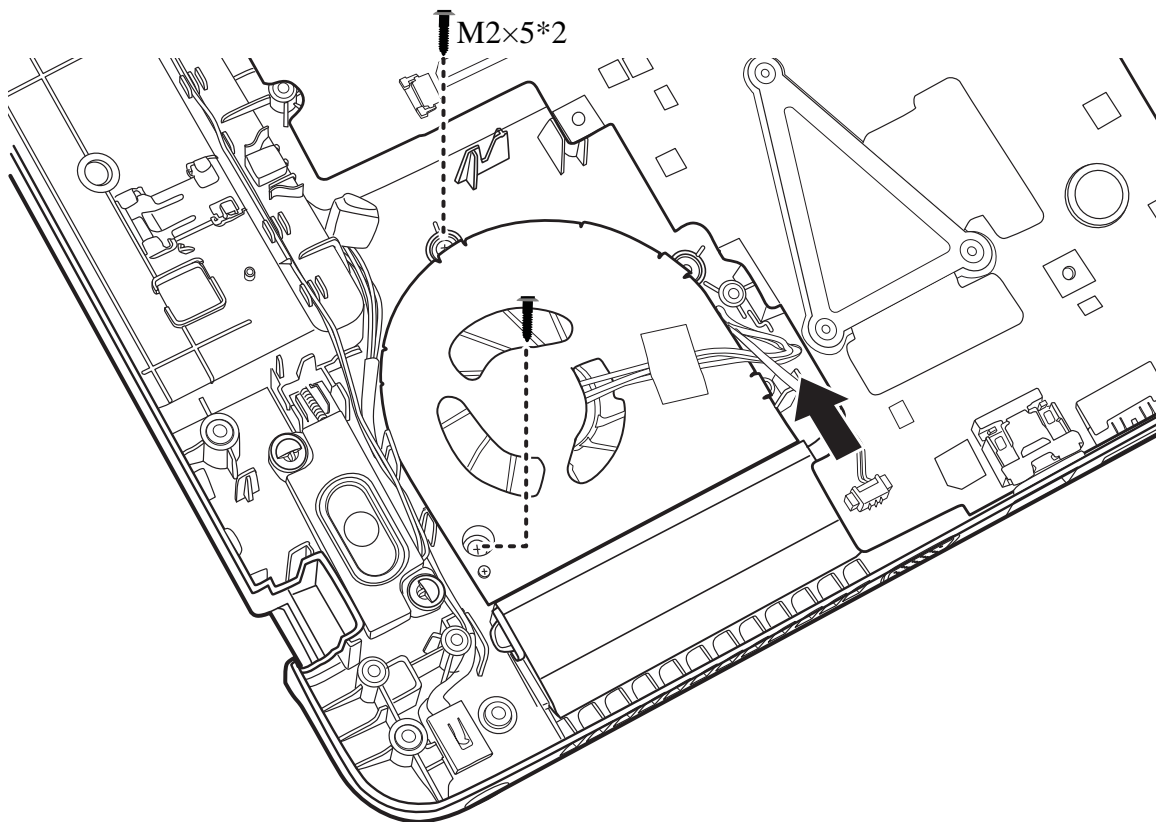
*Figure 4.29 Removing the thermal fan from the logic lower assembly*

**Installing the Thermal Fan**

Install the thermal fan according to the following procedures.

1.  Seat the thermal fan in the logic lower assembly.

2.  Secure the thermal fan with two M2x5 screws.

3.  Connect the thermal fan cable to the motherboard.

## 4.18    Motherboard

**Removing the Motherboard**

Remove the motherboard according to the following procedures and Figure 4.30.

1. Pull out the DC-IN connector from the routing channel.

2. Disconnect the speaker cable from the motherboard.

3. Remove the M2.5x5 screw securing the motherboard.

4. Gently lift the right edge of the motherboard to free the port connectors, and remove the motherboard from the logic lower assembly.
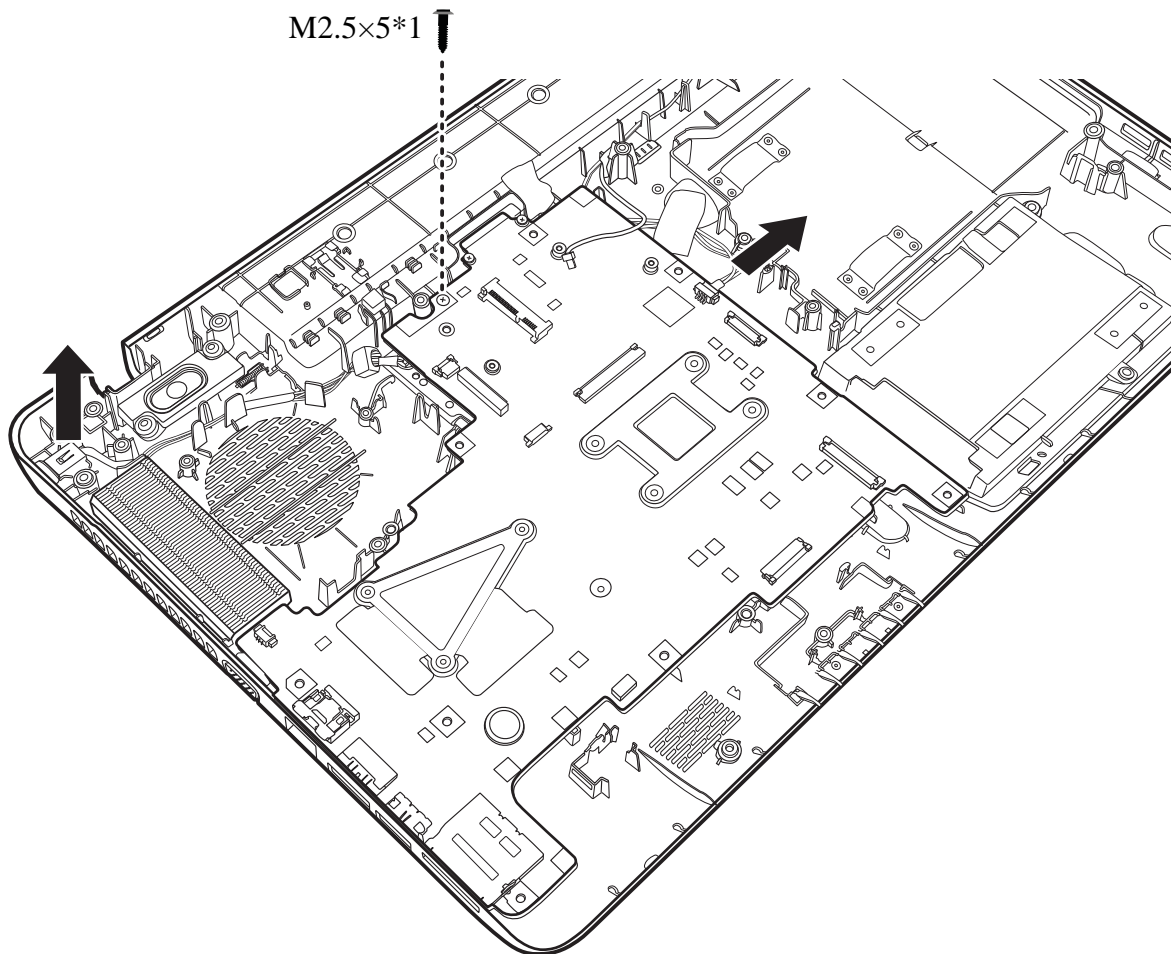


*Figure 4.30 Removing the motherboard from the logic lower assembly*

**Installing the Motherboard**

Install the motherboard according to the following procedures.

1. Align the ports on the left side of the motherboard to the corresponding openings in the logic lower assembly, and seat the motherboard in the logic lower assembly.

2. Seat the DC-IN connector in the DC_IN trough and route the cable from right to left in the routing channel.

3. Secure the motherboard with one M2.5x5 screw.

4. Connect the speaker cable to the motherboard.

## 4.19     Speakers

**Removing the Speakers**

Remove the Speakers according to the following procedures and Figure 4.31.

1. Remove the tape securing the speaker cable and pull out the speaker cable from the routing channel.

2. Remove the left and right speakers from the logic upper assembly.
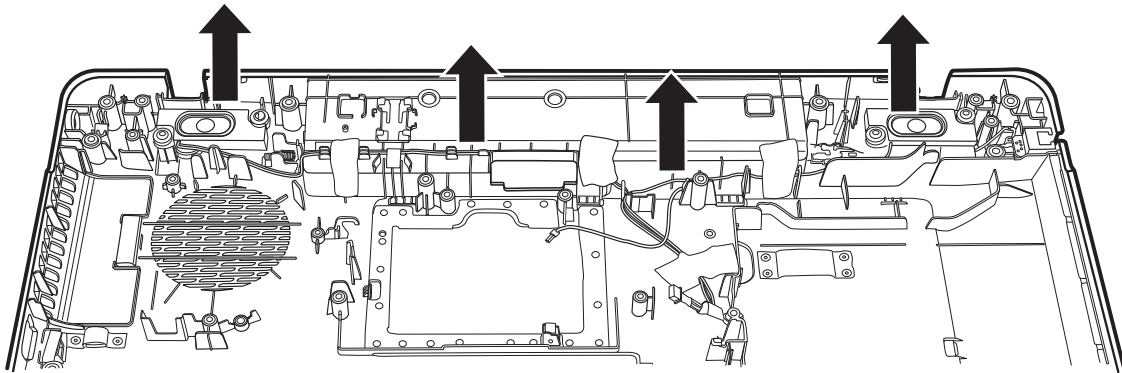


*Figure 4.31 Removing the speakers*

**Installing the Speakers**

Install the speakers according to the following procedures.

1. Seat the left and right speakers in the logic lower assembly.

2. Route the speaker cable in the routing channel on the logic lower assembly and secure it in place with tape.

## 4.20 RJ11 Cable

**Removing the RJ11 Cable**

Remove the RJ11 cable according to the following procedures and Figures 4.32 and 4.33.

1. Remove one tape from the logic lower assembly.

2. Pull out the RJ11 cable from the routing channel on the logic lower assembly.



Tape
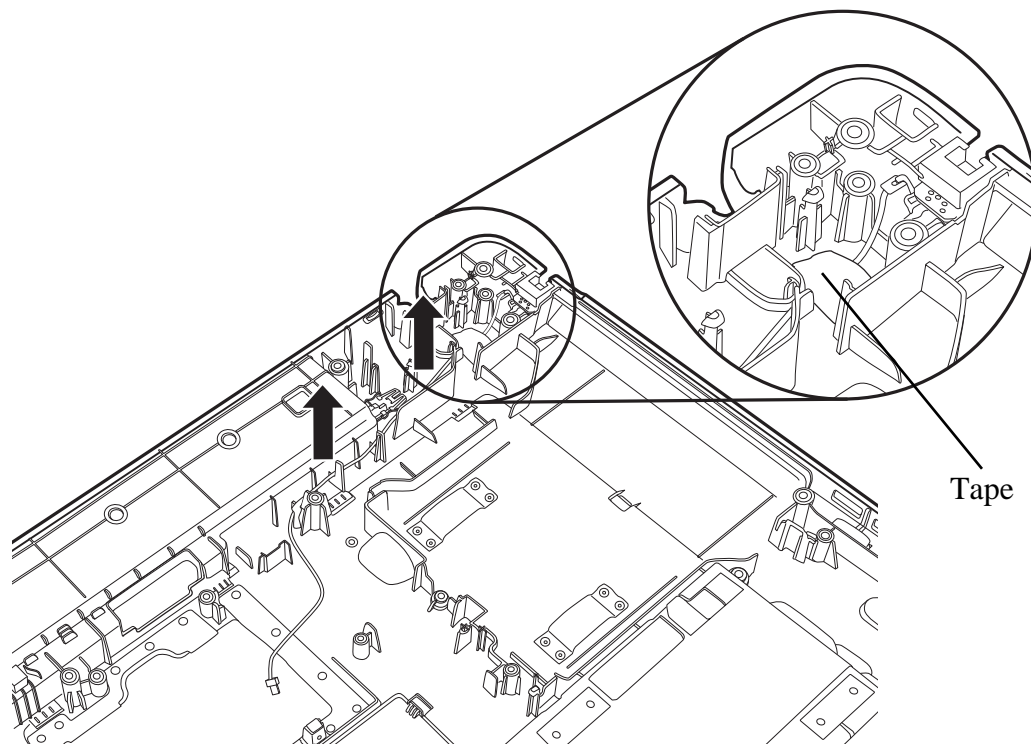
*Figure 4.32 Pulling out the cable from the routing channel*

3.  Pry up the RJ11 connector with a flat blade screwdriver and remove it from the trough on the logic lower assembly.
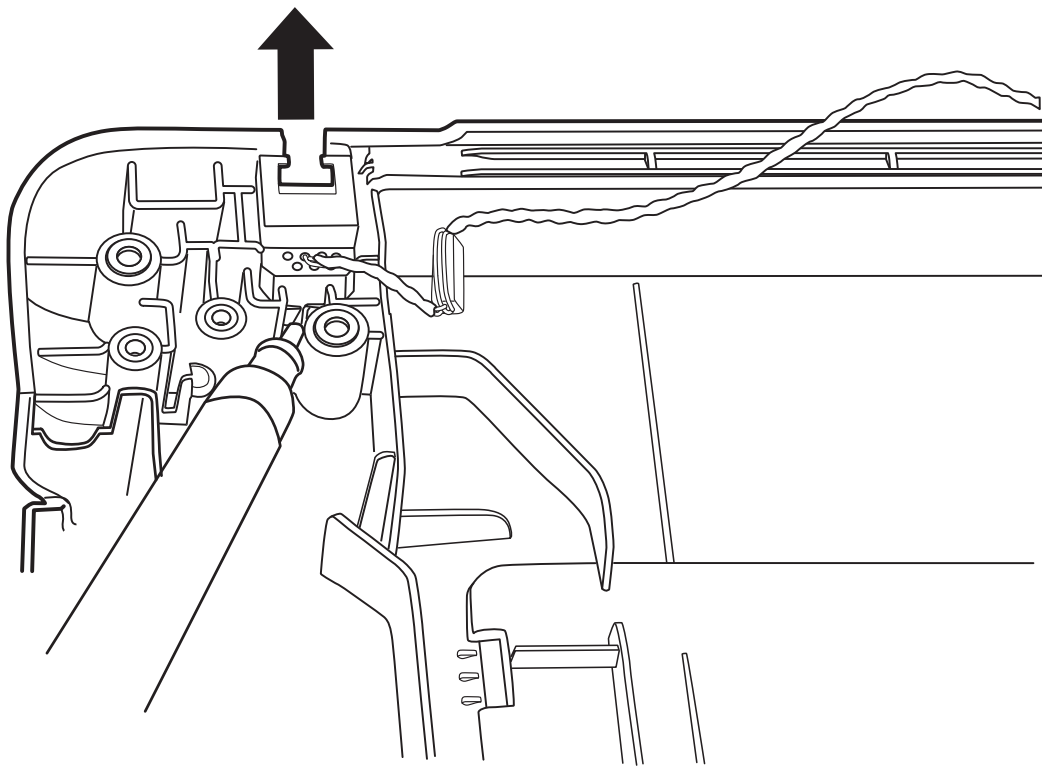
*Figure 4.33 Removing the RJ11 connector*

**Installing the RJ11 Cable**

Install the RJ11 cable according to the following procedures.

1.  Seat the RJ11 connector in the trough on the logic lower assembly.

2.  Route the cable in the routing channel on the logic lower assembly.

3.  Attach the tape on the logic lower assembly.

## 4.21 CPU and Thermal Module

**Removing the CPU and Thermal Module**

Remove the CPU thermal module according to the following procedures and Figures 4.34 and 4.35.

---

*CAUTION:*

*When removing the thermal module, keep the following in mind:*

*1.      The thermal module can become very hot during operation. Be sure to let it cool down before starting the repair work.*

*2.      If you remove the CPU thermal module, please use soft cloth with alcohol to clean the CPU and CPU thermal module. Reapply Shinetsu 7762 grease before installing the CPU thermal module.*

---

For UMA module

     1. Remove the four spring screws securing the thermal module in the sequence indicated in Figure 4.34.
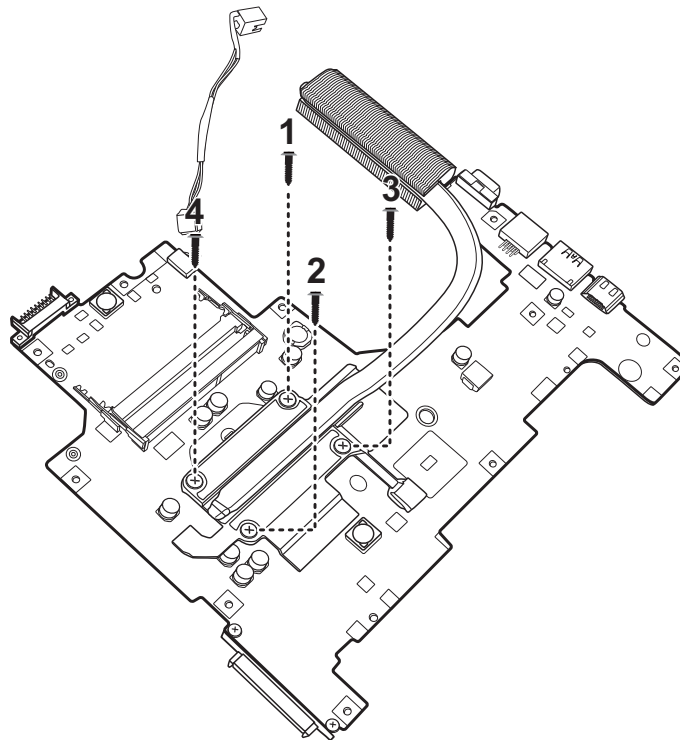


*Figure 4.34 Removing the Thermal Module spring screws*

2. Remove the thermal module from the motherboard.

For Discrete module

1. Remove the seven spring screws securing the thermal module in the sequence indicated in Figure 4.35.
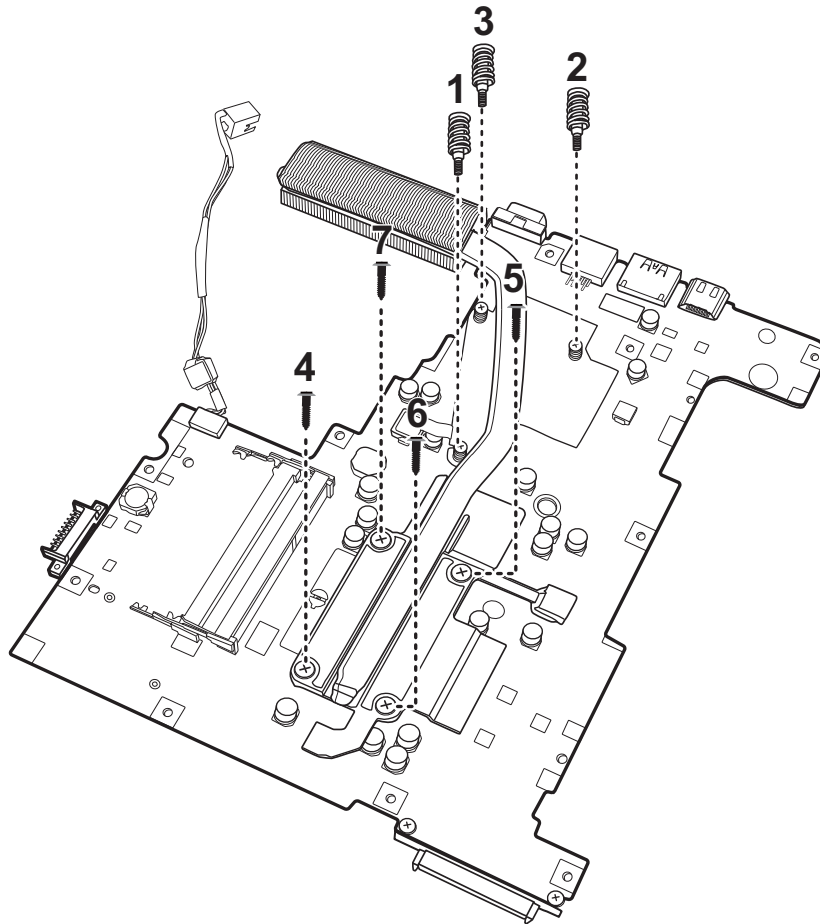


*Figure 4.35 Removing the Thermal Module spring screws*

2. Remove the thermal module from the motherboard.

Remove the CPU according to the following procedures and Figures 4.36.

---

*CAUTION:*

*When removing the CPU, keep the following in mind:*

*The CPU can become very hot during operation. Be sure to let it cool down before starting repair work.*

---

1. Rotate the cam on the CPU socket counterclockwise to the unlock position with a flat blade screwdriver.

2. Remove the CPU.
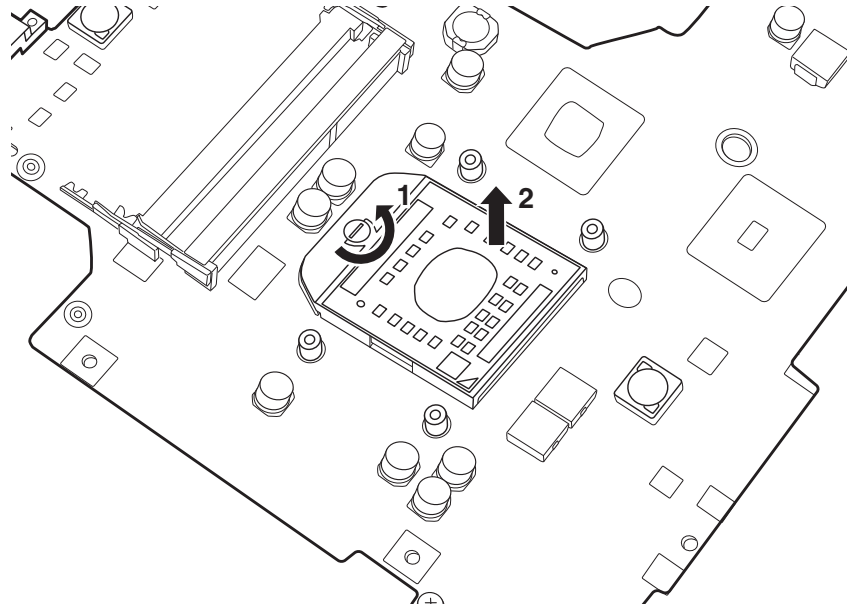


*Figure 4.36 Removing the CPU*

**Installing the CPU and Thermal Module**

Install the CPU and Thermal Module according to the following procedures.

1. Make sure the cam is in the unlock position.

2. Seat the CPU on the socket, using care not to damage the pins. Align the CPU with the CPU socket by using the triangle as a guide.

3. Rotate the cam clockwise to the lock position with a flat blade screwdriver.

---

*CAUTION:*

*When installing the thermal module, keep the following in mind:*

*1. Be sure to confirm the correct position for the module.*

*2. Secure the relevant screws on the thermal module to the motherboard according to the number sequence sealed on the thermal module.*

---

4.  Reapply Shinetsu 7762 grease on the CPU thermal module as shown in Figure 4.37. If you use a new CPU thermal module, remove the release papers on the thermal pads first.



Discrete thermal module
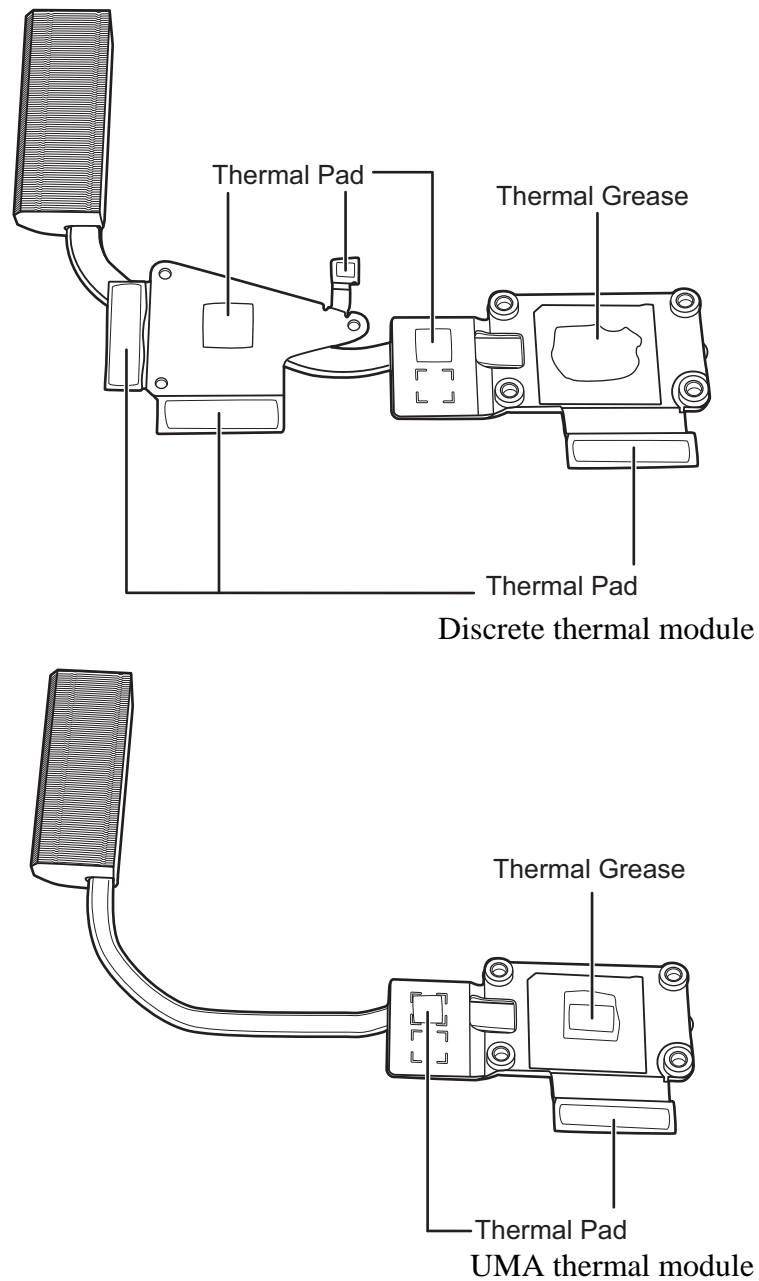


UMA thermal module

*Figure 4.37 Reapply the Shinetsu 7762 grease on the thermal module*

5.  Place the thermal module in the correct position on the motherboard.

6.  Secure the thermal module with four spring screws (UMA) or seven spring screws (discreet), according to the number sequence sealed on the thermal module.

## 4.22    LCD Bezel

**Removing the LCD Bezel**

Remove the LCD bezel according to the following procedures and Figures 4.38, 4.39 and 4.40.

1.  Remove the six screw rubbers on the LCD bezel.

2.  Remove the six M2.5x6 screws as shown in Figure 4.38.

M2.5×6*6
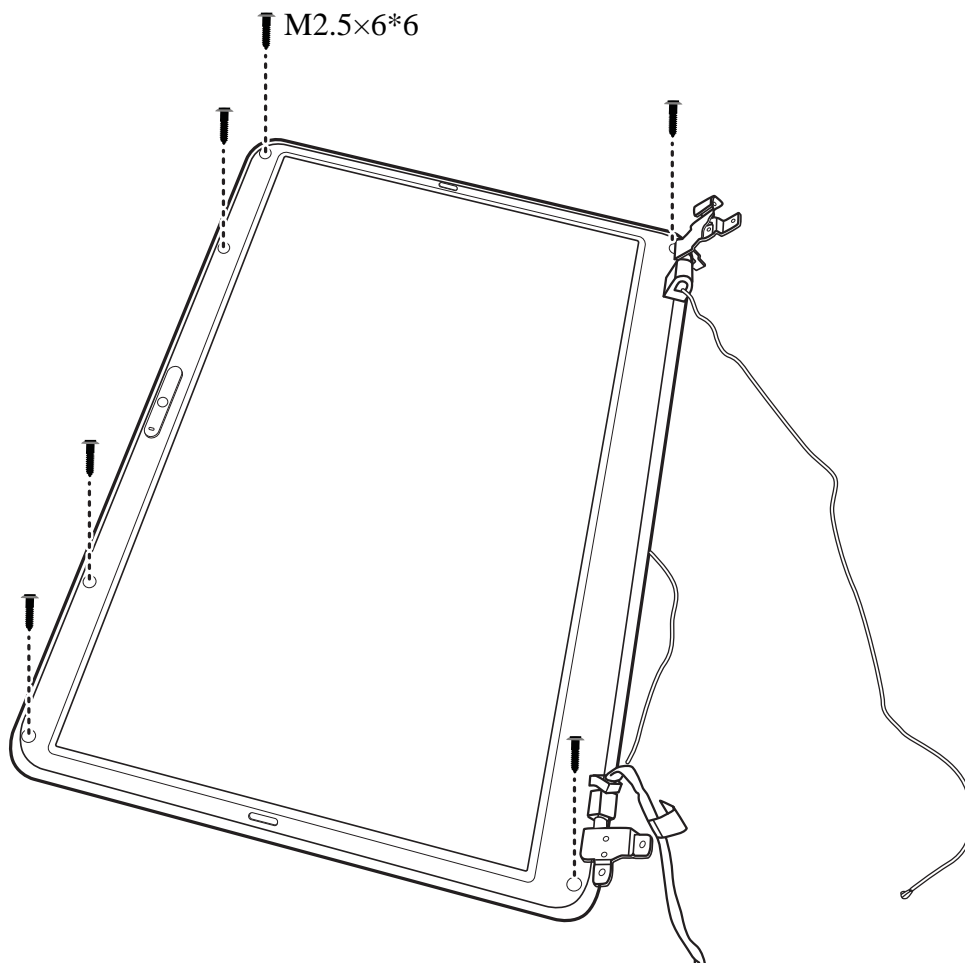
*Figure 4.38 Removing the LCD Bezel*

3.  Pry up the left and right sides of the LCD bezel from the inner edges.

4. Pry up the LCD bezel, starting from the bottom edge and toward the top edge.
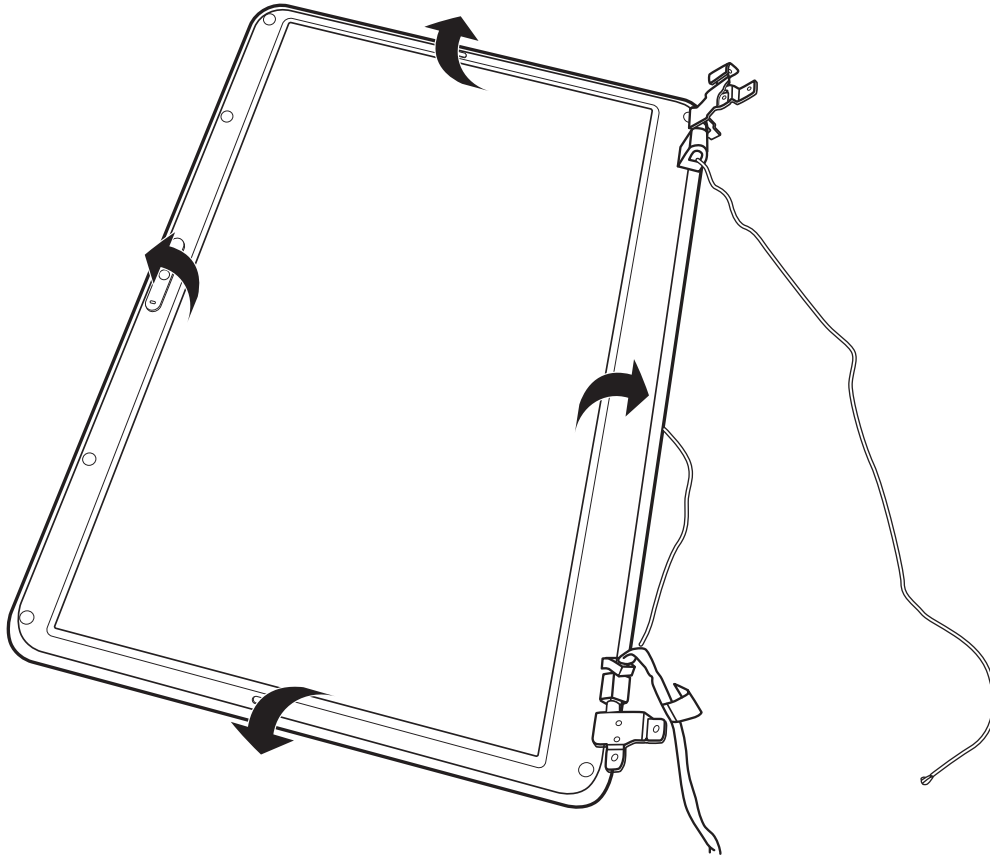
*Figure 4.39 Prying up the LCD Bezel*

5. Push up the hinge caps to free it from the LCD hinges and remove the LCD bezel.
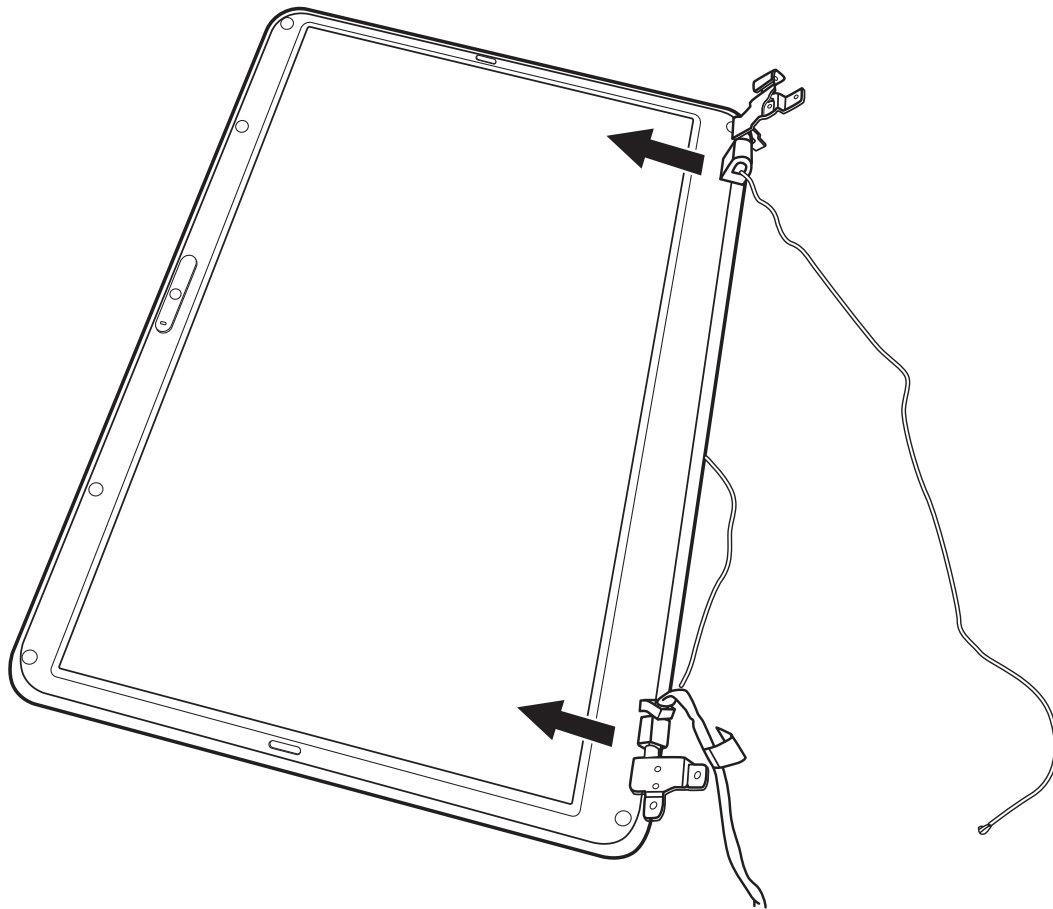


*Figure 4.40 Removing the LCD Bezel*

**Install the LCD bezel assembly according to the following procedures.**

> *NOTE:*
>
> *Take care not to pinch the antenna cables. Make sure the routing positions of the antennas are correct and do not block any components, such as screw holes.*

1. Place the LCD bezel assembly on the LCD cover assembly. Make sure the hinge caps fit over the LCD hinges and the tabs on the back of the LCD bezel align with the slots in the LCD cover assembly.

2. Press down on the LCD bezel, starting from the bottom edge and toward the sides and top edge. Make sure the bezel clicks into place.

3. Secure the LCD bezel to the LCD cover assembly with six M2.5x6 screws.

4. Adhere the six screw rubbers to the screws.

## 4.23 LCD Module

**Removing the LCD Module**

Remove the LCD module according to the following procedures and Figures 4.41, 4.42, 4.43, and 4.44.

1. Remove the two M2.5x6 screws securing the LCD module to the LCD cover assembly.

M2.5×6*2
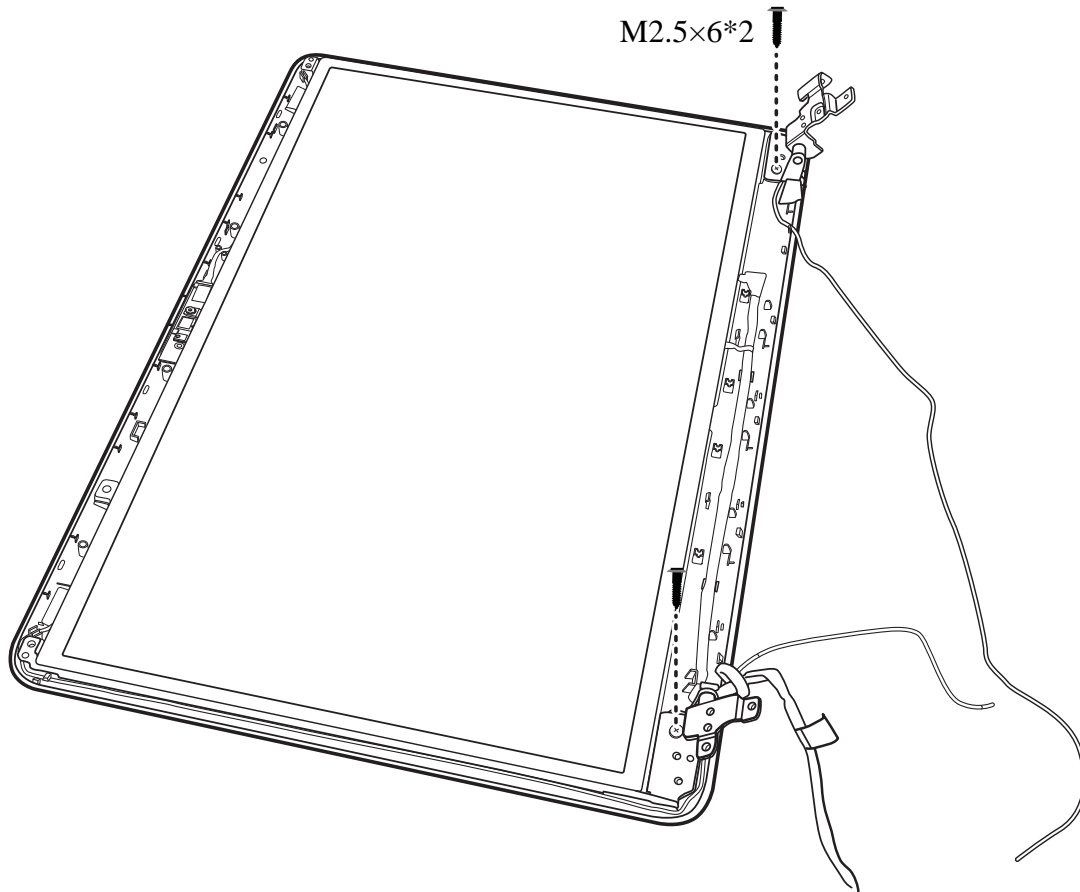
*Figure 4.41 Removing the LCD Module from the LCD cover assembly*

2. Disconnect the camera module cable.
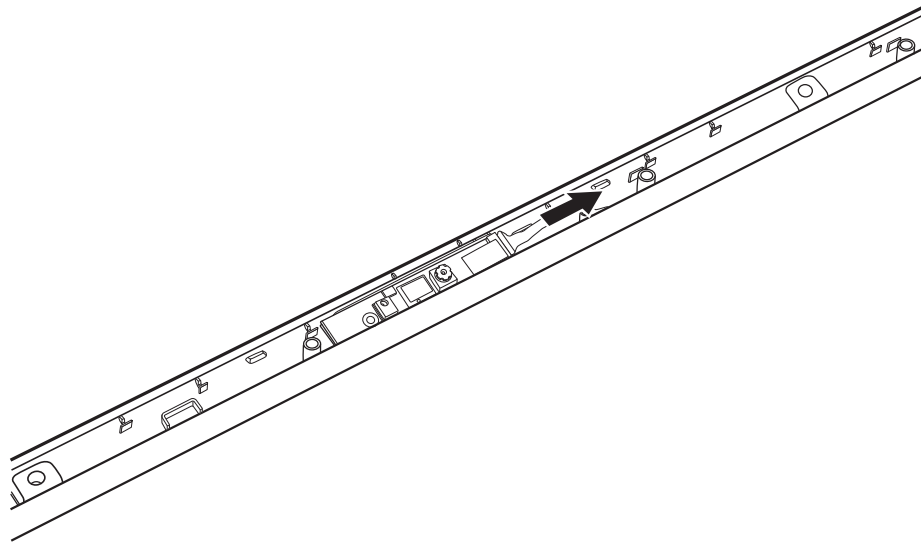


*Figure 4.42 Disconnect the camera module cable*

3. Lift the LCD panel out of the LCD cover assembly.

4. Remove the four M2x2.5 screws securing the LCD hinges.

5. Remove the LCD hinges.

M2×2.5*4
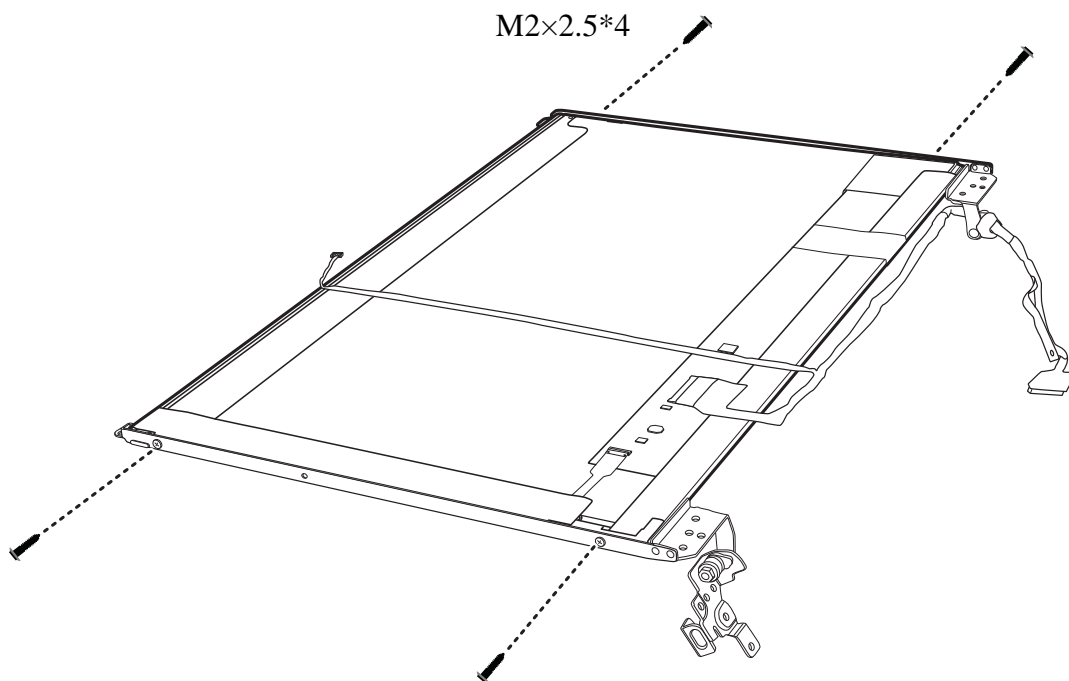


*Figure 4.43 Removing the LCD hinges*

6.  Turn the LCD panel over and place it face down on a protective surface, such as a foam pad.

7.  Gently peel the clear connector tape from the back of the LCD panel and disconnect the LVDS cable connector.

8.  Remove the tape and carefully peel the LVDS cable from the back of the LCD panel.
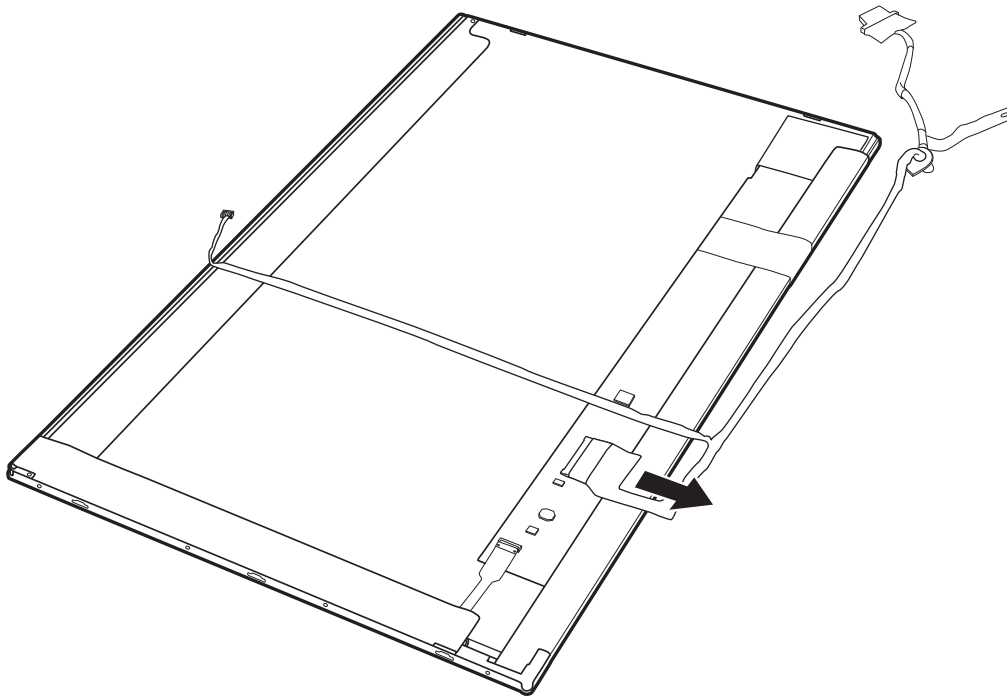


*Figure 4.44 Removing the LVDS cable from the LCD panel*

---

***NOTE:***

*Integrated Circuits (ICs) are fragile. Use extreme care not to apply pressure to the ICs along the edges of the LCD panel.*

*Dispose of used LCD panels (fluorescent (FL) tubes) as required by local ordinances or regulations.*

---

**Installing the LCD Panel**

Install the LCD panel according to the following procedures and Figure 4.45.

1. Connect the LVDS cable to the LCD panel connector, and adhere the clear tape to the back of the LCD panel.

2. Align the LCD hinges with the LCD panel and secure them with four M2x2.5 screws, according to the sequence indicated in Figure 4.45.

M2×2.5*4
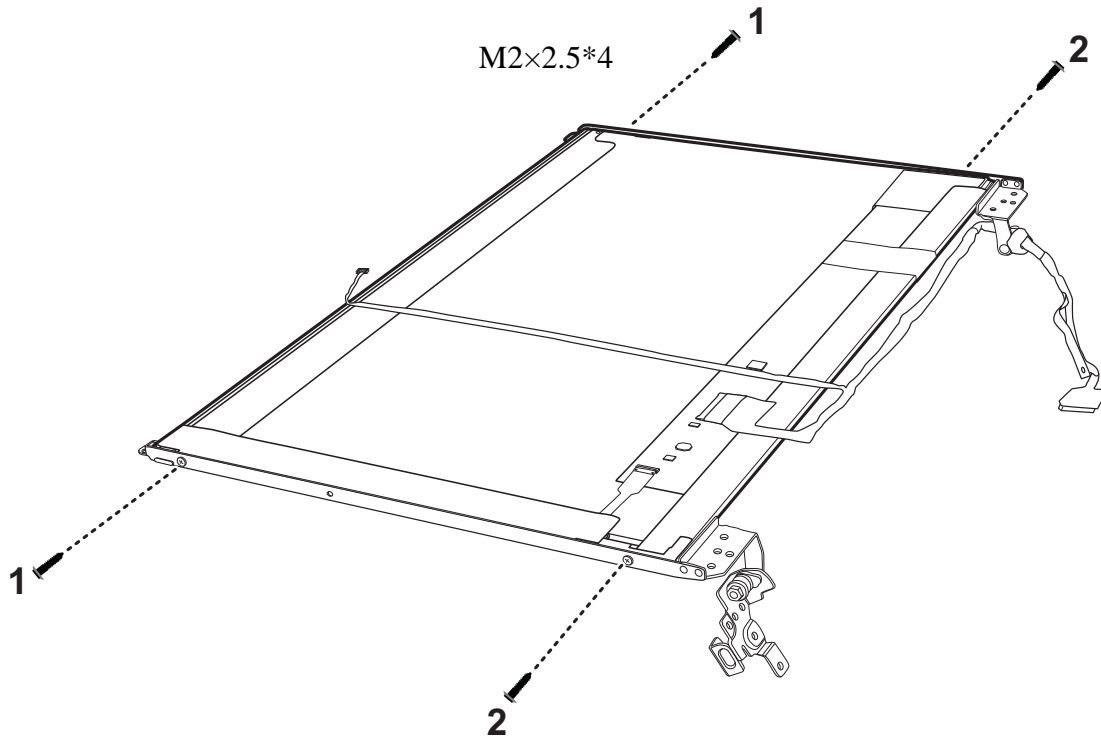
*Figure 4.45 Installing the LCD hinges*

3. Place the LCD module in the LCD cover assembly.

4. Secure the LCD panel to the LCD cover assembly with two M2.5x6 screws.

5. Connect the camera module cable to the camera module.

## 4.24    Camera Module

**Removing the Camera Module**

Remove the Camera Module according to the following procedures and Figure 4.46.

1.  Peel the camera module off the LCD cover assembly.
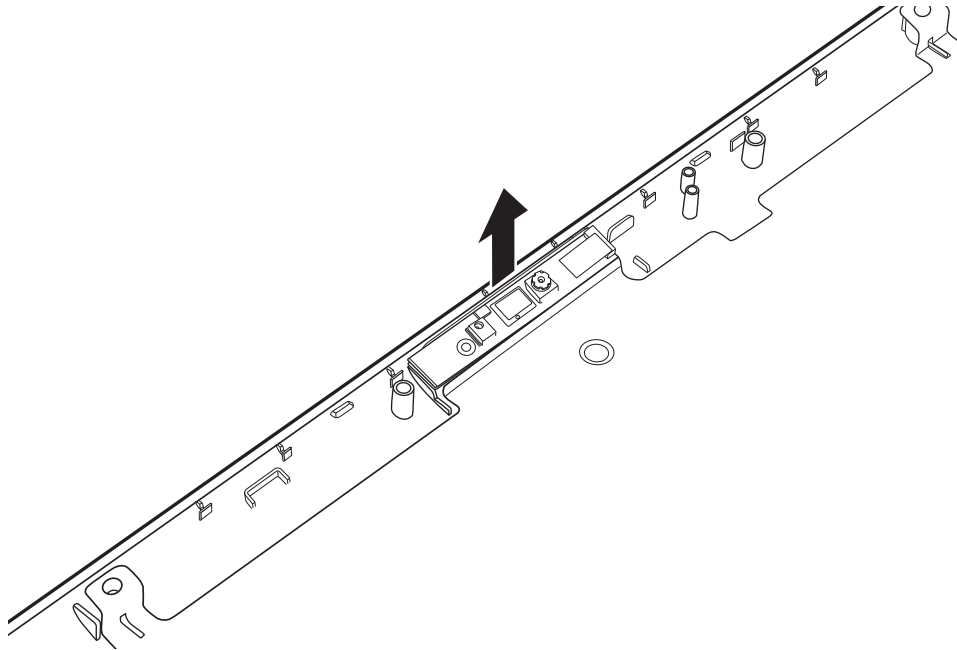


*Figure 4.46 Removing the Camera Module*

**Installing the Camera Module**

Install the Camera Module according to the following procedures.

1.  Seat the camera module on the LCD cover assembly and press down to make sure it is adhered to the LCD cover assembly.

## 4.25 Antennas for WLAN

**Removing the Antennas for WLAN**

Remove the antennas for WLAN according to the following procedures and Figure 4.47.

1. Pull the antennas out from the routing channel on the LCD cover assembly.

2. Carefully peel the antennas from the LCD cover assembly.
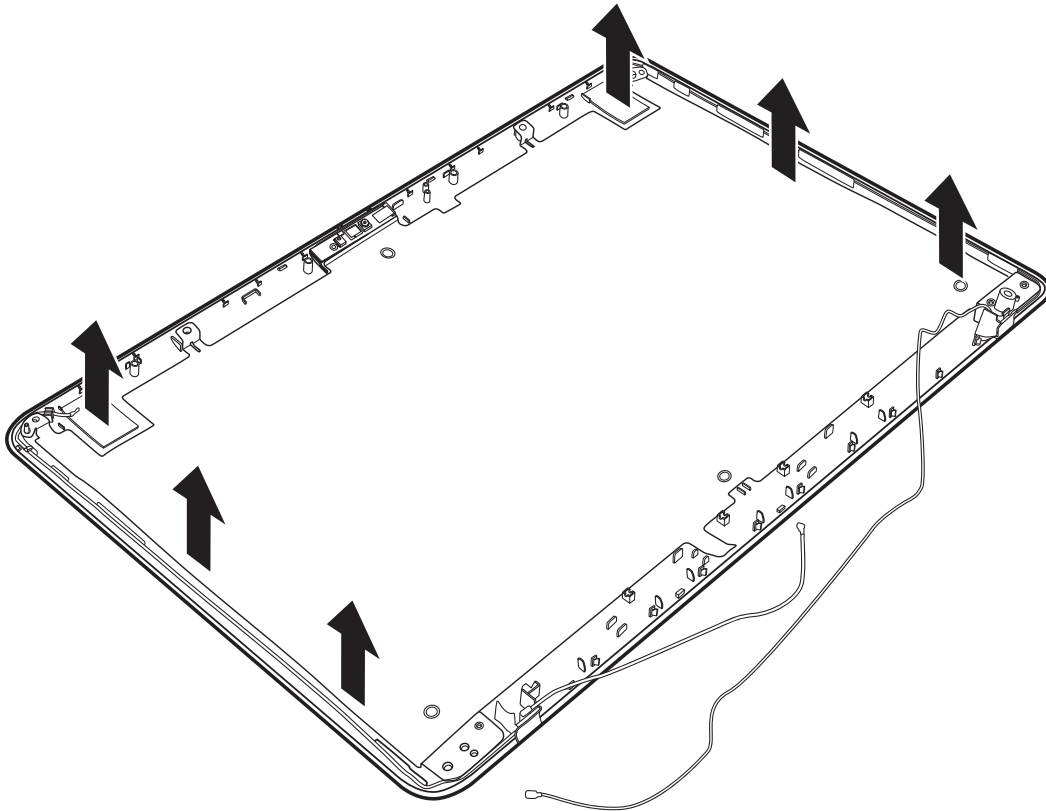


*Figure 4.47 Removing the antennas from the LCD cover assembly*

**Installing the Antennas for WLAN**

---

*NOTE:*

*Take care not to pinch the antenna cables. Make sure the routing positions of the antennas are correct and do not block any components, such as screw holes.*

---

Install the antennas for WLAN according to the following procedures.

1. Adhere the antennas to the LCD cover assembly. Note that the white antenna is placed in the top left corner and the black antenna is placed in the top right corner of the LCD cover assembly.

2. Route the antennas in the routing channel on the LCD cover assembly.

# Appendix A  Handling the LCD Module

## Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling it to prevent damaging it.

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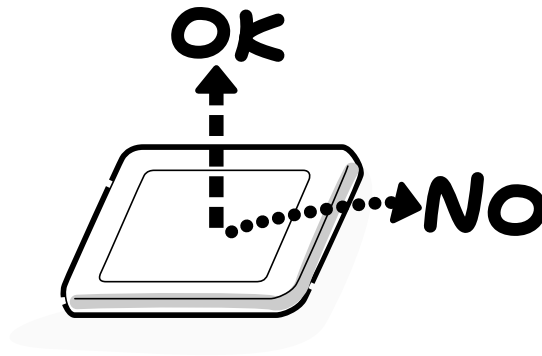
2.  Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

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

3.  If the panel's surface gets dirty or moist, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

    If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a soft cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



4.  If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it.  Be sure to quickly wipe off any liquid.

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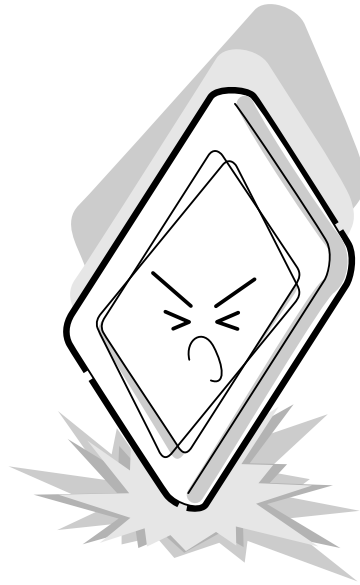


6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.
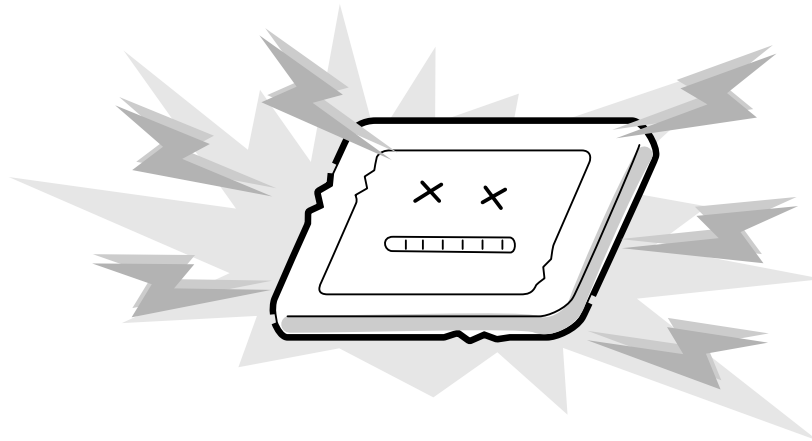
7.  Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.
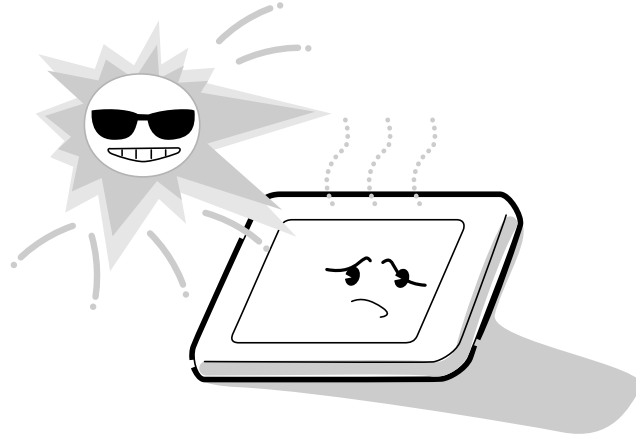
8.  Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.
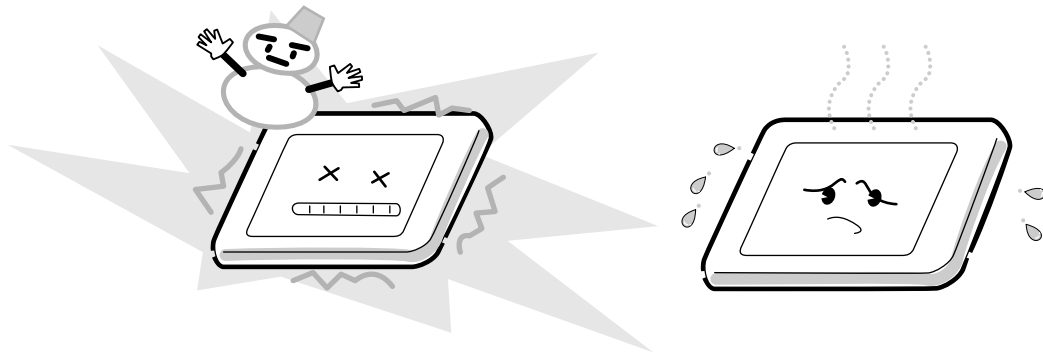
9.  Do not disassemble the LCD module. Disassembly can cause malfunctions.
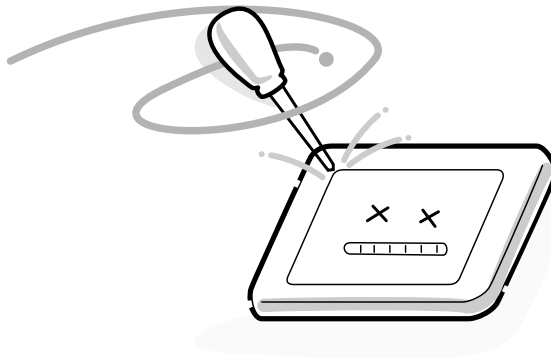
10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.
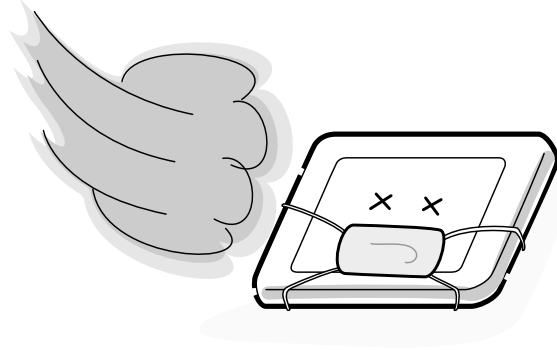
# Appendix B    Board Layout

## B.1    System Board Top View
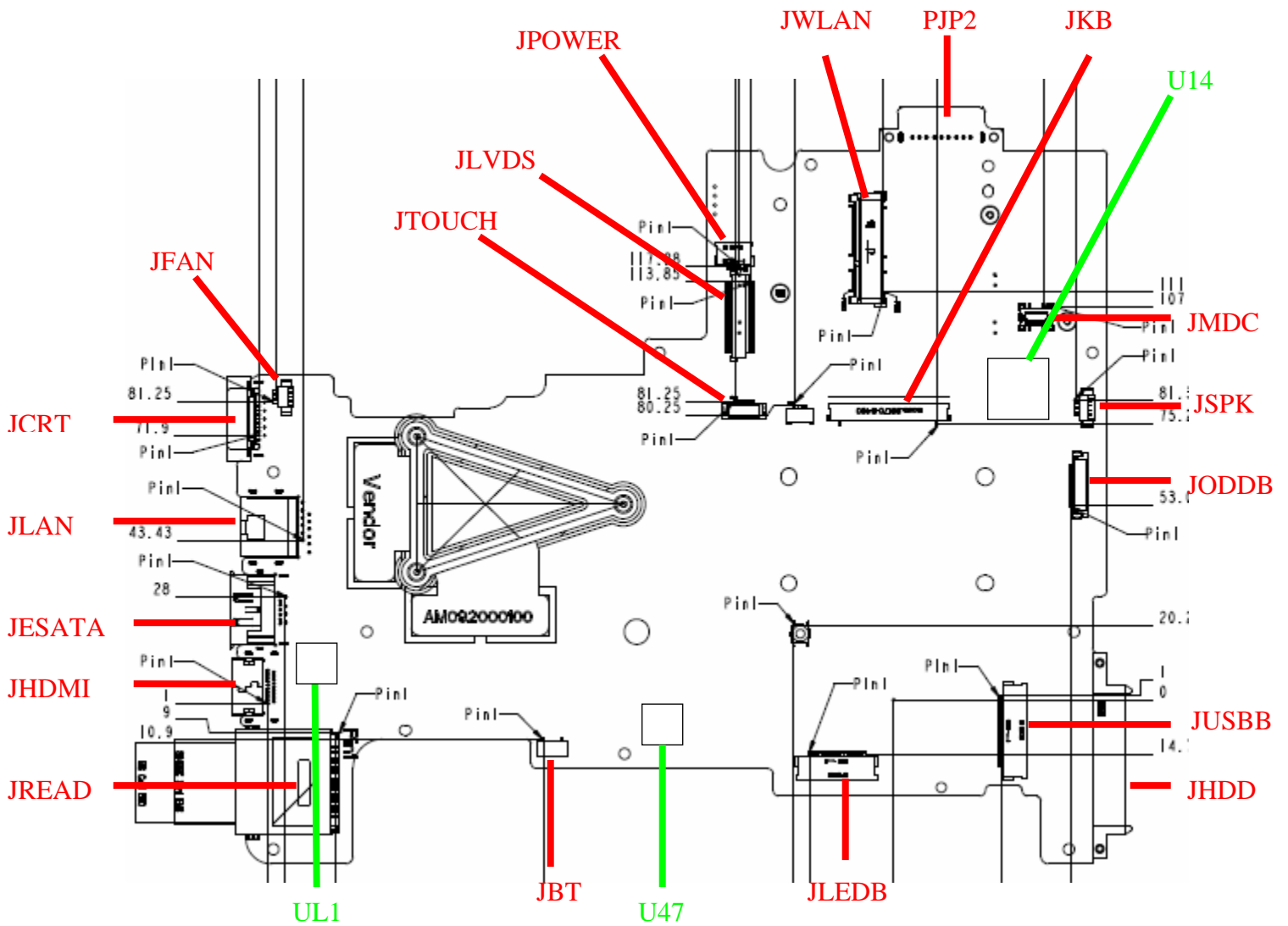


*Figure B-1 System Board Layout (Top)*

## B.2    System Board Bottom View
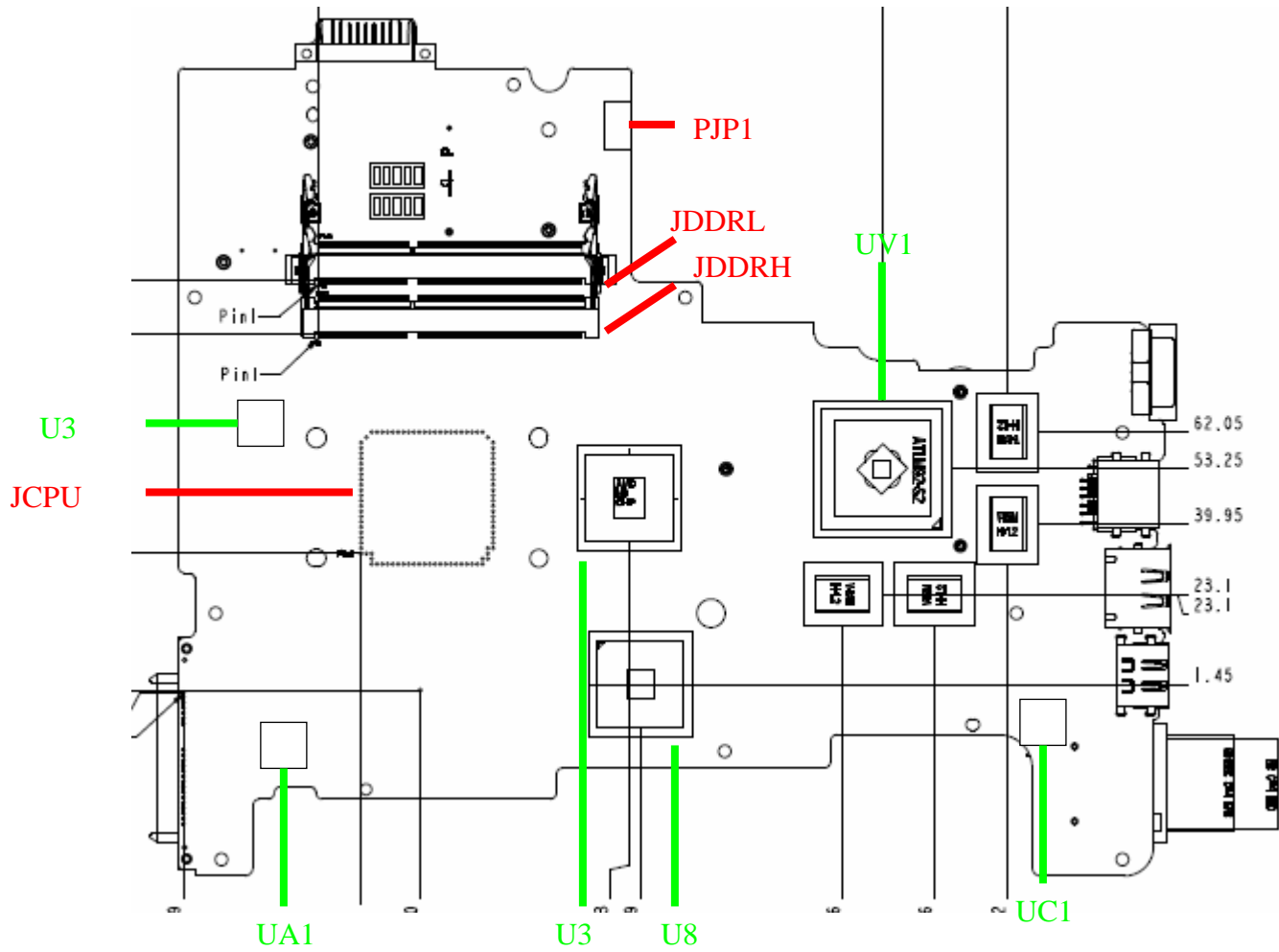


*Figure B-2 System Board Layout (Bottom)*

*Table B-1 System Board ICs (top and bottom)*

| Number | Name |
|--------|------|
| U3 | North bridge AMD RS880 |
| U8 | South bridge AMD SB820 |
| U14 | KB926QFE0(EC) |
| U46 | EC ROM |
| U47 | Bios ROM |
| UA1 | ALC259-VB5-GR (CODEC) |
| UC1 | RTS5138-GR (CARD READ) |
| UL1 | RTL8105E-VB-GR (LAN Conroller) |
| UV1 | VGA |

*Table B-2 System Board Connectors (top and bottom)*

| Number | Name |
|--------|------|
| JCPU | CPU Socket |
| JFAN | Fan conn. |
| JLVDS | LVDS conn. |
| JCRT | CRT conn. |
| JHDMI | HDMI conn. |
| JTOUCH | Touch Module conn. |
| JHDD | SATA HDD conn. |
| JODDB | ODD/B conn. |
| JESATA | ESATA/USB Combo conn. |
| JBT | Bluetooth conn. |
| JWLAN | WLAN conn. |
| JLAN | LAN conn. |
| JUSBB | Audio Jack & USB/B conn. |
| JDDRH, JDDRL | DDRIII conn. |
| JKB | Keyboard conn. |
| JREAD | 3 in 1 Card Reader conn. |
| JSPK | Speaker conn. |
| JPOWER | Power/B conn. |
| JMDC | MDC conn. |
| JLEDB | LED & Touch Button/B conn. |
| PJP1 | AC Adaptor conn. |

| PJP2 | Battery conn. |
|------|---------------|

# Appendix C    Pin Assignments

## System Board

### C.1    JFAN

*Table C-1 FAN I/F pin assignments (3-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +FAN1 | | 2 | FAN_SPEED1 | |
| 3 | GND | | | | |

### C.2    JLVDS

*Table C-2 LVDS I/F pin assignments (40-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | - | 2 | +3VS_LVDS_CAM | - |
| 3 | LCD_TXCLK+ | O | 4 | USB20_P9_L | O |
| 5 | LCD_TXCLK- | O | 6 | USB20_N9_L | O |
| 7 | GND | - | 8 | GND | - |
| 9 | LCD_TZCLK+ | O | 10 | LCD_TXOUT0+ | O |
| 11 | LCD_TZCLK- | O | 12 | LCD_TXOUT0- | O |
| 13 | GND | - | 14 | LCD_TXOUT1+ | O |
| 15 | LCD_EDID_CLK | O | 16 | LCD_TXOUT1- | O |
| 17 | LCD_EDID_DATA | O | 18 | LCD_TXOUT2+ | O |
| 19 | INT_MIC_CLK | I | 20 | LCD_TXOUT2- | O |
| 21 | INT_MIC_DATA | I | 22 | GND | - |
| 23 | NC | - | 24 | LCD_TZOUT0+ | O |
| 25 | INVT_PWM | O | 26 | LCD_TZOUT0- | O |
| 27 | +3VS | - | 28 | LCD_TZOUT1+ | O |
| 29 | +LCDVDD_R | - | 30 | LCD_TZOUT1- | O |
| 31 | +LCDVDD_R | - | 32 | LCD_TZOUT2+ | O |
| 33 | BKOFF#_R | O | 34 | LCD_TZOUT2- | O |
| 35 | NC | - | 36 | GND | - |
| 37 | +LCD_INV | - | 38 | NC | - |

| 39 | +LCD_INV | - | 40 | +LCD_INV | - |

## C.3    JCRT

*Table C-3 CRT pin assignments (15-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | RED_L | O | 2 | GREEN_L | O |
| 3 | BLUE_L | O | 4 | NC | - |
| 5 | GND | - | 6 | GND | - |
| 7 | GND | - | 8 | GND | - |
| 9 | +CRT_VCC | O | 10 | GND | - |
| 11 | NC | - | 12 | D_DDCDATA | I |
| 13 | HSYNC | O | 14 | VSYNC | O |
| 15 | D_DDCCLK | I | | | |

## C.4    JHDMI

*Table C-4 HDMI I/F pin assignments (19-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | HDMI_R_D2+ | O | 2 | GND | |
| 3 | HDMI_R_D2- | O | 4 | HDMI_R_D1+ | O |
| 5 | GND | | 6 | HDMI_R_D1- | O |
| 7 | HDMI_R_D0+ | O | 8 | GND | |
| 9 | HDMI_R_D0- | O | 10 | HDMI_R_CK+ | O |
| 11 | GND | | 12 | HDMI_R_CK | O |
| 13 | NC | | 14 | NC | |
| 15 | HDMI_SCLK | O | 16 | HDMI_SDATA | O |
| 17 | GND | | 18 | +HDMI_5V_OUT | O |
| 19 | HDMI_HPD | O | | | |

## C.5   JTOUCH

*Table C-5 Touch Module Connector pin assignments (6-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +5VS | - | 2 | TP_CLK | I |
| 3 | TP_DATA | I | 4 | SW_L | O |
| 5 | SW_R | O | 6 | GND | - |

## C.6   JHDD

*Table C-6 HDD I/F pin assignments (22-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | - | 2 | SATA_PTX_C_DRX_P1 | O |
| 3 | SATA_PTX_C_DRX_N1 | O | 4 | GND | - |
| 5 | SATA_PRX_DTX_N1 | I | 6 | SATA_PRX_DTX_P1 | I |
| 7 | GND | - | 8 | +3VS | - |
| 9 | +3VS | - | 10 | +3VS | - |
| 11 | GND | - | 12 | GND | - |
| 13 | GND | - | 14 | +5VS | - |
| 15 | +5VS | - | 16 | +5VS | - |
| 17 | GND | - | 18 | NC | - |
| 19 | GND | - | 20 | NC | - |
| 21 | NC | | 22 | NC | - |

## C.7   JODDB

*Table C-7 SATA ODD I/F pin assignments (12-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | | 2 | SATA_TXP1 | |
| 3 | SATA_TXN1 | | 4 | GND | |

| 5 | SATA_IRX_DTX_N1 | | 6 | SATA_IRX_DTX_P1 | |
| 7 | GND | | 8 | NC | |
| 9 | +5VS | | 10 | +5VS | |
| 11 | +5VS | | 12 | +5VS | |

## C.8    JESATA

*Table C-8 eSATA/USB I/F pin assignments (11-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +USB_VCCB | - | 2 | USB20_N2_R_S | I/O |
| 3 | USB20_P2_R_S | I/O | 4 | GND | - |
| 5 | GND | - | 6 | SATA_TXP3 | O |
| 7 | SATA_TXN3 | O | 8 | GND | - |
| 9 | SATA_RXN3 | I | 10 | SATA_RXP3 | I |
| 11 | GND | - | | | |

## C.9    JBT

*Table C-9 Bluetooth Connector pin assignments (6-pin)*

| Pin No. | Signal name | | Pin No. | Signal Name | I/O |
|---------|-------------|---|---------|-------------|-----|
| 1 | +BT_VCC | - | 2 | GND | - |
| 3 | USB20_P6 | I/O | 4 | USB20_N6 | I/O |
| 5 | BT_RST# | O | 6 | BT_DET# | I |

## C.10   JWLAN

*Table C-10 WLAN Connector pin assignments (52-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | NC | | 2 | +3VS | |
| 3 | NC | | 4 | GND | |
| 5 | BT_CTRL | | 6 | +1.5VS | |
| 7 | CLKREQ_MCARD2# | | 8 | NC | |

| 9 | GND | | | 10 | NC | |
| 11 | CLK_PCIE_MCARD2# | | | 12 | NC | |
| 13 | CLK_PCIE_MCARD2 | | | 14 | NC | |
| 15 | GND | | | 16 | NC | |
| 17 | NC | | | 18 | GND | |
| 19 | NC | | | 20 | WL_OFF# | |
| 21 | GND | | | 22 | PLT_RST# | |
| 23 | PCIE_PTX_C_IRX_N2 | | | 24 | +3VS | |
| 25 | PCIE_PTX_C_IRX_P2 | | | 26 | GND | |
| 27 | GND | | | 28 | +1.5VS | |
| 29 | GND | | | 30 | SMB_CK_CLK1 | |
| 31 | PCIE_ITX_C_PRX_N2 | | | 32 | SMB_CK_DAT1 | |
| 33 | PCIE_ITX_C_PRX_P2 | | | 34 | GND | |
| 35 | GND | | | 36 | USB20_N8 | |
| 37 | GND | | | 38 | USB20_P8 | |
| 39 | +3VS | | | 40 | GND | |
| 41 | +3VS | | | 42 | NC | |
| 43 | GND | | | 44 | NC | |
| 45 | NC | | | 46 | NC | |
| 47 | NC | | | 48 | +1.5VS | |
| 49 | E51_TXD_R | | | 50 | GND | |
| 51 | E51_RXD_R | | | 52 | +3VS | |

## C.11   JLAN

*Table C-11 LAN Connector pin assignments (16-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
| --- | --- | --- | --- | --- | --- |
| 1 | RJ45_MIDI0+ | I/O | 2 | RJ45_MIDI0- | I/O |
| 3 | RJ45_MIDI1+ | I/O | 4 | NC | - |
| 5 | NC | - | 6 | RJ45_MIDI1- | I/O |
| 7 | NC | - | 8 | NC | - |
| 9 | +3V_LAN | - | 10 | LAN_SK_LINK#_R | O |
| 11 | +3V_LAN | - | 12 | LAN_ACTIVITY#_R | O |
| 13 | LANGND | - | 14 | LANGND | - |
| 15 | LANGND | - | 16 | LANGND | - |

## C.12 JUSBB

*Table C-12 Audio & USB/B Connector pin assignments (20-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +USB_VCCA | - | 2 | +USB_VCCA | - |
| 3 | +USB_VCCA | - | 4 | +USB_VCCA | - |
| 5 | NC | - | 6 | USB20_N0_R | I/O |
| 7 | USB20_P0_R | I/O | 8 | GND | - |
| 9 | GND | - | 10 | USB20_N1_R | I/O |
| 11 | USB20_P1_R | I/O | 12 | GND | - |
| 13 | GND | - | 14 | HP_R | O |
| 15 | HP_L | O | 16 | AGND | - |
| 17 | MIC1_L | I | 18 | MIC1_R | I |
| 19 | NBA_PLUG | I | 20 | MIC_SENSE | I |

## C.13 JDDRL

*Table C-13  SODIMM I/F pin assignments (204-PIN)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +VREF_DQ | - | 2 | GND | - |
| 3 | GND | - | 4 | DDR_A_D4 | I/O |
| 5 | DDR_A_D0 | I/O | 6 | DDR_A_D5 | I/O |
| 7 | DDR_A_D1 | I/O | 8 | GND | - |
| 9 | GND | - | 10 | DDR_A_DQS#0 | O |
| 11 | DDR_A_DM0 | O | 12 | DDR_A_DQS0 | O |
| 13 | GND | - | 14 | GND | - |
| 15 | DDR_A_D2 | I/O | 16 | DDR_A_D6 | I/O |
| 17 | DDR_A_D3 | I/O | 18 | DDR_A_D7 | I/O |
| 19 | GND | - | 20 | GND | - |
| 21 | DDR_A_D8 | I/O | 22 | DDR_A_D12 | I/O |
| 23 | DDR_A_D9 | I/O | 24 | DDR_A_D13 | I/O |
| 25 | GND | - | 26 | GND | - |

| 27 | DDR_A_DQS#1 | O | 28 | DDR_A_DM1 | O |
|----|-------------|---|----|-----------|---|
| 29 | DDR_A_DQS1 | O | 30 | SM_DRAMRST# | O |
| 31 | GND | - | 32 | GND | - |
| 33 | DDR_A_D10 | I/O | 34 | DDR_A_D14 | I/O |
| 35 | DDR_A_D11 | I/O | 36 | DDR_A_D15 | I/O |
| 37 | GND | - | 38 | GND | - |
| 39 | DDR_A_D16 | I/O | 40 | DDR_A_D20 | I/O |
| 41 | DDR_A_D17 | I/O | 42 | DDR_A_D21 | I/O |
| 43 | GND | - | 44 | GND | - |
| 45 | DDR_A_DQS#2 | O | 46 | DDR_A_DM2 | O |
| 47 | DDR_A_DQS2 | O | 48 | GND | - |
| 49 | GND | - | 50 | DDR_A_D22 | I/O |
| 51 | DDR_A_D18 | I/O | 52 | DDR_A_D23 | I/O |
| 53 | DDR_A_D19 | I/O | 54 | GND | - |
| 55 | GND | - | 56 | DDR_A_D28 | I/O |
| 57 | DDR_A_D24 | I/O | 58 | DDR_A_D29 | I/O |
| 59 | DDR_A_D25 | I/O | 60 | GND | - |
| 61 | GND | - | 62 | DDR_A_DQS#3 | O |
| 63 | DDR_A_DM3 | O | 64 | DDR_A_DQS3 | O |
| 65 | GND | - | 66 | GND | - |
| 67 | DDR_A_D26 | I/O | 68 | DDR_A_D30 | I/O |
| 69 | DDR_A_D27 | I/O | 70 | DDR_A_D31 | I/O |
| 71 | GND | - | 72 | GND | - |
| 73 | DDR_CKE0_DIMM A | O | 74 | DDR_CKE1_DIMMA | I/O |
| 75 | +1.5V | - | 76 | +1.5V | - |
| 77 | NC | - | 78 | DDR_A_MA15 | O |
| 79 | DDR_A_BS2 | O | 80 | DDR_A_MA14 | O |
| 81 | +1.5V | - | 82 | +1.5V | - |
| 83 | DDR_A_MA12 | O | 84 | DDR_A_MA11 | O |
| 85 | DDR_A_MA9 | O | 86 | DDR_A_MA7 | O |
| 87 | +1.5V | - | 88 | +1.5V | - |
| 89 | DDR_A_MA8 | O | 90 | DDR_A_MA6 | O |
| 91 | DDR_A_MA5 | O | 92 | DDR_A_MA4 | O |
| 93 | +1.5V | - | 94 | +1.5V | - |
| 95 | DDR_A_MA3 | O | 96 | DDR_A_MA2 | O |
| 97 | DDR_A_MA1 | O | 98 | DDR_A_MA0 | O |
| 99 | +1.5V | - | 100 | +1.5V | - |

| | | | | | |
|---|---|---|---|---|---|
| 101 | DDRA_CLK0 | O | 102 | DDRA_CLK1 | O |
| 103 | DDRA_CLK0# | O | 104 | DDRA_CLK1# | O |
| 105 | +1.5V | - | 106 | +1.5V | - |
| 107 | DDR_A_MA10 | O | 108 | DDR_A_BS1 | O |
| 109 | DDR_A_BS#0 | O | 110 | DDR_A_RAS# | O |
| 111 | +1.5V | - | 112 | +1.5V | - |
| 113 | DDR_A_WE# | O | 114 | DDR_CS0_DIMMA# | O |
| 115 | DDR_A_CAS# | O | 116 | DDRA_ODT0 | O |
| 117 | +1.5V | - | 118 | +1.5V | - |
| 119 | DDR_A_MA13 | O | 120 | DDRA_ODT1 | O |
| 121 | DDR_CS1_DIMMA# | O | 122 | NC | - |
| 123 | +1.5V | - | 124 | +1.5V | - |
| 125 | NC | - | 126 | +VREF_CA | - |
| 127 | GND | - | 128 | GND | - |
| 129 | DDR_A_D32 | I/O | 130 | DDR_A_D36 | I/O |
| 131 | DDR_A_D33 | I/O | 132 | DDR_A_D37 | I/O |
| 133 | GND | - | 134 | GND | - |
| 135 | DDR_A_DQS#4 | O | 136 | DDR_A_DM4 | O |
| 137 | DDR_A_DQS4 | O | 138 | GND | - |
| 139 | GND | - | 140 | DDR_A_D38 | |
| 141 | DDR_A_D34 | I/O | 142 | DDR_A_D39 | I/O |
| 143 | DDR_A_D35 | I/O | 144 | GND | - |
| 145 | GND | - | 146 | DDR_A_D44 | I/O |
| 147 | DDR_A_D40 | I/O | 148 | DDR_A_D45 | I/O |
| 149 | DDR_A_D41 | I/O | 150 | GND | - |
| 151 | GND | - | 152 | DDR_A_DQS#5 | O |
| 153 | DDR_A_DM5 | O | 154 | DDR_A_DQS5 | O |
| 155 | GND | - | 156 | GND | - |
| 157 | DDR_A_D42 | I/O | 158 | DDR_A_D46 | I/O |
| 159 | DDR_A_D43 | I/O | 160 | DDR_A_D47 | I/O |
| 161 | GND | - | 162 | GND | - |
| 163 | DDR_A_D48 | I/O | 164 | DDR_A_D52 | I/O |
| 165 | DDR_A_D49 | I/O | 166 | DDR_A_D53 | I/O |
| 167 | GND | - | 168 | GND | - |
| 169 | DDR_A_DQS#6 | O | 170 | DDR_A_DM6 | I/O |
| 171 | DDR_A_DQS6 | O | 172 | GND | - |
| 173 | GND | - | 174 | DDR_A_D54 | I/O |
| 175 | DDR_A_D50 | I/O | 176 | DDR_A_D55 | I/O |

| 177 | DDR_A_D51 | I/O | 178 | GND | - |
|-----|-----------|-----|-----|-----|---|
| 179 | GND | - | 180 | DDR_A_D60 | I/O |
| 181 | DDR_A_D56 | I/O | 182 | DDR_A_D61 | I/O |
| 183 | DDR_A_D57 | I/O | 184 | GND | - |
| 185 | GND | - | 186 | DDR_A_DQS#7 | O |
| 187 | DDR_A_DM7 | O | 188 | DDR_A_DQS7 | O |
| 189 | GND | - | 190 | GND | - |
| 191 | DDR_A_D58 | I/O | 192 | DDR_A_D62 | I/O |
| 193 | DDR_A_D59 | I/O | 194 | DDR_A_D63 | I/O |
| 195 | GND | - | 196 | GND | - |
| 197 | GND | - | 198 | NC | |
| 199 | +3VS | - | 200 | SMB_CK_DAT0 | I/O |
| 201 | GND | - | 202 | SMB_CK_CLK0 | I/O |
| 203 | +0.75VS | - | 204 | +0.75VS | - |

## C.14   JDDRH

*Table C-14  SODIMM I/F pin assignments (204-PIN)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | +VREF_DQ | - | 2 | GND | - |
| 3 | GND | - | 4 | DDR_B_D4 | I/O |
| 5 | DDR_B_D0 | I/O | 6 | DDR_B_D5 | I/O |
| 7 | DDR_B_D1 | I/O | 8 | GND | - |
| 9 | GND | - | 10 | DDR_B_DQS#0 | O |
| 11 | DDR_B_DM0 | O | 12 | DDR_B_DQS0 | O |
| 13 | GND | - | 14 | GND | - |
| 15 | DDR_B_D2 | I/O | 16 | DDR_B_D6 | I/O |
| 17 | DDR_B_D3 | I/O | 18 | DDR_B_D7 | I/O |
| 19 | GND | - | 20 | GND | - |
| 21 | DDR_B_D8 | I/O | 22 | DDR_B_D12 | I/O |
| 23 | DDR_B_D9 | I/O | 24 | DDR_B_D13 | I/O |
| 25 | GND | - | 26 | GND | - |
| 27 | DDR_B_DQS#1 | O | 28 | DDR_B_DM1 | O |
| 29 | DDR_B_DQS1 | O | 30 | MEM_MB_RST# | O |
| 31 | GND | - | 32 | GND | - |
| 33 | DDR_B_D10 | I/O | 34 | DDR_B_D14 | I/O |

| 35 | DDR_B_D11 | I/O | 36 | DDR_B_D15 | I/O |
|---|---|---|---|---|---|
| 37 | GND | - | 38 | GND | - |
| 39 | DDR_B_D16 | I/O | 40 | DDR_B_D20 | I/O |
| 41 | DDR_B_D17 | I/O | 42 | DDR_B_D21 | I/O |
| 43 | GND | - | 44 | GND | - |
| 45 | DDR_B_DQS#2 | O | 46 | DDR_B_DM2 | O |
| 47 | DDR_B_DQS2 | O | 48 | GND | - |
| 49 | GND | - | 50 | DDR_B_D22 | I/O |
| 51 | DDR_B_D18 | I/O | 52 | DDR_B_D23 | I/O |
| 53 | DDR_B_D19 | I/O | 54 | GND | - |
| 55 | GND | - | 56 | DDR_B_D28 | I/O |
| 57 | DDR_B_D24 | I/O | 58 | DDR_B_D29 | I/O |
| 59 | DDR_B_D25 | I/O | 60 | GND | - |
| 61 | GND | - | 62 | DDR_B_DQS#3 | O |
| 63 | DDR_B_DM3 | O | 64 | DDR_B_DQS3 | O |
| 65 | GND | - | 66 | GND | - |
| 67 | DDR_B_D26 | I/O | 68 | DDR_B_D30 | I/O |
| 69 | DDR_B_D27 | I/O | 70 | DDR_B_D31 | I/O |
| 71 | GND | - | 72 | GND | - |
| 73 | DDR_CKE0_DIMMB | O | 74 | DDR_CKE1_DIMMB | I/O |
| 75 | +1.5V | - | 76 | +1.5V | - |
| 77 | NC | - | 78 | DDR_B_MA15 | O |
| 79 | DDR_B_BS2 | O | 80 | DDR_B_MA14 | O |
| 81 | +1.5V | - | 82 | +1.5V | - |
| 83 | DDR_B_MA12 | O | 84 | DDR_B_MA11 | O |
| 85 | DDR_B_MA9 | O | 86 | DDR_B_MA7 | O |
| 87 | +1.5V | - | 88 | +1.5V | - |
| 89 | DDR_B_MA8 | O | 90 | DDR_B_MA6 | O |
| 91 | DDR_B_MA5 | O | 92 | DDR_B_MA4 | O |
| 93 | +1.5V | - | 94 | +1.5V | - |
| 95 | DDR_B_MA3 | O | 96 | DDR_B_MA2 | O |
| 97 | DDR_B_MA1 | O | 98 | DDR_B_MA0 | O |
| 99 | +1.5V | - | 100 | +1.5V | - |
| 101 | DDRB_CLK0 | O | 102 | DDRB_CLK1 | O |
| 103 | DDR_B_CLK#0 | O | 104 | DDRB_CLK1# | O |
| 105 | +1.5V | - | 106 | +1.5V | - |
| 107 | DDR_B_MA10 | O | 108 | DDR_B_BS1 | O |

| 109 | DDR_B_BS#0 | O | 110 | DDR_B_RAS# | O |
|-----|------------|---|-----|------------|---|
| 111 | +1.5V | - | 112 | +1.5V | - |
| 113 | DDR_B_WE# | O | 114 | DDR_CS0_DIMMB# | O |
| 115 | DDR_B_CAS# | O | 116 | DDRB_ODT0 | O |
| 117 | +1.5V | - | 118 | +1.5V | - |
| 119 | DDR_B_MA13 | O | 120 | DDRB_ODT1 | O |
| 121 | DDR_CS1_DIMMB# | O | 122 | NC | - |
| 123 | +1.5V | - | 124 | +1.5V | - |
| 125 | NC | - | 126 | +VREF_CA | - |
| 127 | GND | - | 128 | GND | - |
| 129 | DDR_B_D32 | I/O | 130 | DDR_B_D36 | I/O |
| 131 | DDR_B_D33 | I/O | 132 | DDR_B_D37 | I/O |
| 133 | GND | - | 134 | GND | - |
| 135 | DDR_B_DQS#4 | O | 136 | DDR_B_DM4 | O |
| 137 | DDR_B_DQS4 | O | 138 | GND | - |
| 139 | GND | - | 140 | DDR_B_D38 | |
| 141 | DDR_B_D34 | I/O | 142 | DDR_B_D39 | I/O |
| 143 | DDR_B_D35 | I/O | 144 | GND | - |
| 145 | GND | - | 146 | DDR_B_D44 | I/O |
| 147 | DDR_B_D40 | I/O | 148 | DDR_B_D45 | I/O |
| 149 | DDR_B_D41 | I/O | 150 | GND | - |
| 151 | GND | - | 152 | DDR_B_DQS#5 | O |
| 153 | DDR_B_DM5 | O | 154 | DDR_B_DQS5 | O |
| 155 | GND | - | 156 | GND | - |
| 157 | DDR_B_D42 | I/O | 158 | DDR_B_D46 | I/O |
| 159 | DDR_B_D43 | I/O | 160 | DDR_B_D47 | I/O |
| 161 | GND | - | 162 | GND | - |
| 163 | DDR_B_D48 | I/O | 164 | DDR_B_D52 | I/O |
| 165 | DDR_B_D49 | I/O | 166 | DDR_B_D53 | I/O |
| 167 | GND | - | 168 | GND | - |
| 169 | DDR_B_DQS#6 | O | 170 | DDR_B_DM6 | I/O |
| 171 | DDR_B_DQS6 | O | 172 | GND | - |
| 173 | GND | - | 174 | DDR_B_D54 | I/O |
| 175 | DDR_B_D50 | I/O | 176 | DDR_B_D55 | I/O |
| 177 | DDR_B_D51 | I/O | 178 | GND | - |
| 179 | GND | - | 180 | DDR_B_D60 | I/O |
| 181 | DDR_B_D56 | I/O | 182 | DDR_B_D61 | I/O |
| 183 | DDR_B_D57 | I/O | 184 | GND | - |

| 185 | GND | - | 186 | DDR_B_DQS#7 | O |
| 187 | DDR_B_DM7 | O | 188 | DDR_B_DQS7 | O |
| 189 | GND | - | 190 | GND | - |
| 191 | DDR_B_D58 | I/O | 192 | DDR_B_D62 | I/O |
| 193 | DDR_B_D59 | I/O | 194 | DDR_B_D63 | I/O |
| 195 | GND | - | 196 | GND | - |
| 197 | +3VS | - | 198 | NC | O |
| 199 | +3VS | - | 200 | SMB_CK_DAT0 | I/O |
| 201 | GND | - | 202 | SMB_CK_CLK0 | I/O |
| 203 | +0.75VS | - | 204 | +0.75VS | - |

## C.15  JKB

*Table C-15 Keyboard Connector pin assignments (34-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | NUM_LED# | | 2 | NC | |
| 3 | CAPS_LED# | | 4 | +3VS | |
| 5 | KSI1 | | 6 | KSI6 | |
| 7 | KSI5 | | 8 | KSI0 | |
| 9 | KSI4 | | 10 | KSI3 | |
| 11 | KSI2 | | 12 | KSI7 | |
| 13 | KSO15 | | 14 | KSO12 | |
| 15 | KSO11 | | 16 | KSO10 | |
| 17 | KSO9 | | 18 | KSO8 | |
| 19 | KSO13 | | 20 | KSO7 | |
| 21 | KSO6 | | 22 | KSO14 | |
| 23 | KSO5 | | 24 | KSO3 | |
| 25 | KSO4 | | 26 | KSO0 | |
| 27 | KSO1 | | 28 | KSO2 | |
| 29 | NC | | 30 | NC | |
| 31 | KSO17 | | 32 | NC | |
| 33 | KSO16 | | 34 | +3VS | |

## C.16 JREAD

*Table C-16CARD READER  connector pin assignments (21-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | SDWP_MSCLK | O | 2 | SD_DATA1 | I/O |
| 3 | SD_DATA0 | I/O | 4 | GND | - |
| 5 | GND | - | 6 | MSBS | O |
| 7 | MS_DATA2_SDCLK | I/O | 8 | MS_DATA1_SD_DATA3 | I/O |
| 9 | MS_DATA0_SD_DATA5 | I/O | 10 | +VCC_3IN1 | - |
| 11 | MS_DATA2_SDCLK | I/O | 12 | GND | - |
| 13 | MSCD# | I | 14 | MS_DATA3_SD_DATA7 | I/O |
| 15 | SDCMD | O | 16 | SDWP_MSCLK | O |
| 17 | +VCC_3IN1 | - | 18 | MS_DATA1_SD_DATA3 | I/O |
| 19 | GND | - | 20 | SD_DATA2_MS_DATA5 | I/O |
| 21 | SDCD# | I | | | |

## C.17 JSPK

*Table C-17 SPK  connector pin assignments (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | SPK_R1 | O | 2 | SPK_R2 | O |
| 3 | SPK_L1 | O | 4 | SPK_L2 | O |

## C.18 JPOWER

*Table C-18 Power/B  connector pin assignments (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | ON/OFFBTN# | I | 2 | NC | - |
| 3 | GND | - | 4 | GND | - |

## C.19  JMDC

*Table C-19 MDC  connector pin assignments (12-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | - | 2 | +MDC_VCC | - |
| 3 | HDA_SDOUT_MDC | O | 4 | NC | - |
| 5 | GND | - | 6 | +3VALW | - |
| 7 | HDA_SYNC_MDC | O | 8 | GND | - |
| 9 | HDA_SDIN1_MDC | I | 10 | GND | - |
| 11 | HDA_RST#_MDC | O | 12 | HDA_BITCLK_MDC | O |

## C.20  JLEDB

*Table C-20 LED & Touch Button/B  connector pin assignments (16-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | GND | - | 2 | GND | - |
| 3 | LID_SW#_R | I | 4 | ACIN_LED# | O |
| 5 | PWR_ON_LED# | O | 6 | PWR_SUSP_LED# | O |
| 7 | HDD_LED# | O | 8 | CR_LED# | O |
| 9 | BATT_FULL_LED# | O | 10 | BATT_CHG_LOW_ LED# | O |
| 11 | SW_L | I | 12 | SW_R | I |
| 13 | WL_BT_LED# | O | 14 | +3VALW | - |
| 15 | +5VS | - | 16 | +5VALW | - |

## C.21  PJP1

*Table C-21 AC Adaptor  connector pin assignments (4-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | DC_IN_S1 | - | 2 | DC_IN_S1 | - |
| 3 | GND | - | 4 | GND | - |

## C.22 PJP2

*Table C-22 Battery connector pin assignments (9-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---------|-------------|-----|---------|-------------|-----|
| 1 | BATT_S1 | - | 2 | BATT_S1 | - |
| 3 | BATT_P3 | - | 4 | BATT_P4 | - |
| 5 | BATT_P5 | - | 6 | EC_SMDA | I/O |
| 7 | EC_SMCA | I/O | 8 | GND | - |
| 9 | GND | - | | | |

# Appendix D    Keyboard Scan/Character Codes

*Table D-1  Scan codes (set 1 and set 2) (1/4)*

| Cap No. | Keytop | Code set 1 | | Code set 2 | | | Note |
|---|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | | |
| 01 | ' ~ | 29 | A9 | 0E | F0 | 0E | |
| 02 | 1 ! | 02 | 82 | 16 | F0 | 16 | |
| 03 | 2 @ | 03 | 83 | 1E | F0 | 1E | |
| 04 | 3 # | 04 | 84 | 26 | F0 | 26 | |
| 05 | 4 $ | 05 | 85 | 25 | F0 | 25 | |
| 06 | 5 % | 06 | 86 | 2E | F0 | 2E | |
| 07 | 6 ^ | 07 | 87 | 36 | F0 | 36 | |
| 08 | 7 & | 08 | 88 | 3D | F0 | 3D | *2 |
| 09 | 8 * | 09 | 89 | 3E | F0 | 3E | *2 |
| 10 | 9 ( | 0A | 8A | 46 | F0 | 46 | *2 |
| 11 | 0 ) | 0B | 8B | 45 | F0 | 45 | |
| 12 | - _ | 0C | 8C | 4E | F0 | 4E | |
| 13 | = + | 0D | 8D | 55 | F0 | 55 | |
| 15 | BkSp | 0E | 8E | 66 | F0 | 66 | |
| 16 | Tab | 0F | 8F | 0D | F0 | 0D | |
| 17 | Q | 10 | 90 | 15 | F0 | 15 | |
| 18 | W | 11 | 91 | 1D | F0 | 1D | |
| 19 | E | 12 | 92 | 24 | F0 | 24 | |
| 20 | R | 13 | 93 | 2D | F0 | 2D | |
| 21 | T | 14 | 94 | 2C | F0 | 2C | |
| 22 | Y | 15 | 95 | 35 | F0 | 35 | |
| 23 | U | 16 | 96 | 3C | F0 | 3C | *2 |
| 24 | I | 17 | 97 | 43 | F0 | 43 | *2 |
| 25 | O | 18 | 98 | 44 | F0 | 44 | *2 |
| 26 | P | 19 | 99 | 4D | F0 | 4D | *2 |
| 27 | [ { | 1A | 9A | 54 | F0 | 54 | |
| 28 | ] } | 1B | 9B | 5B | F0 | 5B | |

*Table D-1  Scan codes (set 1 and set 2) (2/4)*

| Cap No. | Keytop | Code set 1 | | Code set 2 | | | Note |
|---|---|---|---|---|---|---|---|
| | | **Make** | **Break** | **Make** | **Break** | | |
| 29 | \ \| | 2B | AB | 5D | F0 | 5D | *5 |
| 30 | Caps Lock | 3A | BA | 58 | F0 | 58 | |
| 31 | A | 1E | 9E | 1C | F0 | 1C | |
| 32 | S | 1F | 9F | 1B | F0 | 1B | |
| 33 | D | 20 | A0 | 23 | F0 | 23 | |
| 34 | F | 21 | A1 | 2B | F0 | 2B | |
| 35 | G | 22 | A2 | 34 | F0 | 34 | |
| 36 | H | 23 | A3 | 33 | F0 | 33 | |
| 37 | J | 24 | A4 | 3B | F0 | 3B | *2 |
| 38 | K | 25 | A5 | 42 | F0 | 42 | *2 |
| 39 | L | 26 | A6 | 4B | F0 | 4B | *2 |
| 40 | ; : | 27 | A7 | 4C | F0 | 4C | *2 |
| 41 | ' " | 28 | A8 | 52 | F0 | 52 | |
| 43 | Enter | 1C | 9C | 5A | F0 | 5A | *3 |
| 44 | Shift (L) | 2A | AA | 12 | F0 | 12 | |
| 45 | No.102 key | 56 | D6 | 61 | F0 | 61 | |
| 46 | Z | 2C | AC | 1A | F0 | 1A | |
| 47 | X | 2D | AD | 22 | F0 | 22 | |
| 48 | C | 2E | AE | 21 | F0 | 21 | |
| 49 | V | 2F | AF | 2A | F0 | 2A | |
| 50 | B | 30 | B0 | 32 | F0 | 32 | |
| 51 | N | 31 | B1 | 31 | F0 | 31 | |
| 52 | M | 32 | B2 | 3A | F0 | 3A | *2 |
| 53 | , < | 33 | B3 | 41 | F0 | 41 | *2 |
| 54 | . > | 34 | B4 | 49 | F0 | 49 | *2 |
| 55 | / ? | 35 | B5 | 4A | F0 | 4A | *2 |
| 57 | Shift (R) | 36 | B6 | 59 | F0 | 59 | |

| Cap No. | Keytop | Code set 1 | | | | Code set 2 | | | | | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Make | | Break | | Make | | Break | | | |
| 58 | Ctrl(L) | 1D | | 9D | | 14 | | F0 | | 14 | *3 |
| 60 | Alt (L) | 38 | | B8 | | 11 | | F0 | | 11 | *3 |
| 61 | Space | 39 | | B9 | | 29 | | F0 | | 29 | |
| 62 | ALT (R) | E0 | 38 | E0 | B8 | E0 | 11 | E0 | F0 | 11 | |
| 64 | Ctrl(R) | E0 | 1D | E0 | 9D | E0 | 14 | E0 | F0 | 14 | |
| 75 | Ins | E0 | 52 | E0 | D2 | E0 | 70 | E0 | F0 | 70 | *1 |
| 76 | Del | E0 | 53 | E0 | D3 | E0 | 71 | E0 | F0 | 71 | *1 |
| 79 | ← | E0 | 4B | E0 | CB | E0 | 6B | E0 | F0 | 6B | *1 |
| 80 | Home | E0 | 47 | E0 | C7 | E0 | 6C | E0 | F0 | 6C | *1 |
| 81 | End | E0 | 4F | E0 | CF | E0 | 69 | E0 | F0 | 69 | *1 |
| 83 | ↑ | E0 | 48 | E0 | C8 | E0 | 75 | E0 | F0 | 75 | *1 |
| 84 | ↓ | E0 | 50 | E0 | D0 | E0 | 72 | E0 | F0 | 72 | *1 |
| 85 | PgUp | E0 | 49 | E0 | C9 | E0 | 7D | E0 | F0 | 7D | *1 |
| 86 | PgDn | E0 | 51 | E0 | D1 | E0 | 7A | E0 | F0 | 7A | *1 |
| 89 | → | E0 | 4D | E0 | CD | E0 | 74 | E0 | F0 | 74 | *1 |
| 110 | Esc | 01 | | 81 | | 76 | | F0 | | 76 | |
| 112 | F1 | 3B | | BB | | 05 | | F0 | | 05 | |
| 113 | F2 | 3C | | BC | | 06 | | F0 | | 06 | |
| 114 | F3 | 3D | | BD | | 04 | | F0 | | 04 | |
| 115 | F4 | 3E | | BE | | 0C | | F0 | | 0C | |
| 116 | F5 | 3F | | BF | | 03 | | F0 | | 03 | |
| 117 | F6 | 40 | | C0 | | 0B | | F0 | | 0B | |
| 118 | F7 | 41 | | C1 | | 83 | | F0 | | 83 | |
| 119 | F8 | 42 | | C2 | | 0A | | F0 | | 0A | |
| 120 | F9 | 43 | | C3 | | 01 | | F0 | | 01 | |
| 121 | F10 | 44 | | C4 | | 09 | | F0 | | 09 | *3 |

| Cap No. | Keytop | Code set 1 | | | | Code set 2 | | | | | Note |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Make | | Break | | Make | | Break | | | |
| 122 | F11 | 57 | | D7 | | 78 | | F0 | 78 | | *3 |
| 123 | F12 | 58 | | D8 | | 07 | | F0 | 07 | | *3 |
| 124 | PrintSc | *6 | | *6 | | *6 | | *6 | | | *6 |
| 126 | Pause | *7 | | *7 | | *7 | | *7 | | | *7 |
| X | Fn | — | | — | | — | | — | | | *4 |
| X | Win | E0 | 5B | E0 | DB | E0 | 1F | E0 | F0 | 1F | |
| x | App | E0 | 5D | E0 | DD | E0 | 2F | E0 | F0 | 2F | |

**Notes:**

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

*Table D-2  Scan codes with left Shift key*

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

**Note :** The table above shows scan codes with the left **Shift** key.  In combination with the right **Shift** key, scan codes are changed as listed below:

| | With left **Shift** | With right **Shift** |
|---|---|---|
| Set 1 | E0  AA _____ | E0  B6 |
| | E0  2A _____ | E0  36 |
| Set 2 | E0  F0  12_____ | E0  F0  59 |
| | E0  12 _____ | E0  59 |

*Table D-3  Scan codes in Numlock mode*

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

*Table D-4  Scan codes with Fn key*

| Cap No. | Keytop | Code set 1 Make | | Code set 1 Break | | Code set 2 Make | | Code set 2 Break | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 43 | ENT | E0 | 1C | E0 | 9C | E0 | 5A | E0 | F0 | 5A |
| 58 | L-CTRL | E0 | 1D | E0 | 9D | E0 | 14 | E0 | F0 | 14 |
| 60 | L-ALT | E0 | 38 | E0 | B8 | E0 | 11 | E0 | F0 | 11 |
| 121 | ARROW | 45 | | C5 | | 77 | | F0 | 77 | |
| 122 | NUMERIC | 45 | | C5 | | 77 | | F0 | 77 | |
| 123 | Scrl | 46 | | C6 | | 7E | | F0 | 7E | |

*Table D-5  Scan codes in overlay mode*

| Cap No. | Keytop | | Code set 1 | | Code set 2 | | |
|---|---|---|---|---|---|---|---|
| | | | Make | Break | Make | Break | |
| 09 | 8 | (8) | 48 | C8 | 75 | F0 | 75 |
| 10 | 9 | (9) | 49 | C9 | 7D | F0 | 7D |
| 11 | 0 | (*) | 37 | B7 | 7C | F0 | 7C |
| 23 | U | (4) | 4B | CB | 6B | F0 | 6B |
| 24 | I | (5) | 4C | CC | 73 | F0 | 73 |
| 25 | O | (6) | 4D | CD | 74 | F0 | 74 |
| 26 | P | (–) | 4A | CA | 7B | F0 | 7B |
| 37 | J | (1) | 4F | CF | 69 | F0 | 69 |
| 38 | K | (2) | 50 | D0 | 72 | F0 | 72 |
| 39 | L | (3) | 51 | D1 | 7A | F0 | 7A |
| 40 | ; | (+) | 4E | CE | 79 | F0 | 79 |
| 52 | M | (0) | 52 | D2 | 70 | F0 | 70 |
| 54 | . | (.) | 53 | D3 | 71 | F0 | 71 |
| 55 | / | (/) | E0    35 | E0    B5 | E0    4A | E0    F0    4A | |

*Table D-6  No.124 key scan code*

| Key top | Shift | Code set 1 | | | | | | Code set 2 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Make | | | Break | | | Make | | | Break | | |
| Prt Sc | Common | E0  2A  E0  37 | | | E0  B7  E0  AA | | | E0  12  E0  7C | | | E0  F0  7C  E0  F0  12 | | |
| | Ctrl + | E0  37 | | | E0  B7 | | | E0  7C | | | E0  F0  7C | | |
| | Shift + | E0  37 | | | E0  B7 | | | E0  7C | | | E0  F0  7C | | |
| | Alt + | 54 | | | D4 | | | 84 | | | F0  84 | | |

*Table D-7  No.126 key scan code*

| Key top | Shift | Code set 1 | | | | | | Code set 2 | | | | | | |
|---------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | **Make** | | | | | | **Make** | | | | | | |
| Pause | Common | E1 | 1D | 45 | E1 | 9D | C5 | E1 | 14 | 77 | E1 | F0 | 14 | F0 | 77 |
| | Ctrl | E0 | 46 | E0 | C6 | | | E0 | 7E | E0 | F0 | 7E | | | |

*:  This key generates only make codes.

# Appendix E  Key Layout

## 1.     United Status (US) Keyboard



*Figure US keyboard*

## 2.     Traditional Chinese (CH) Keyboard
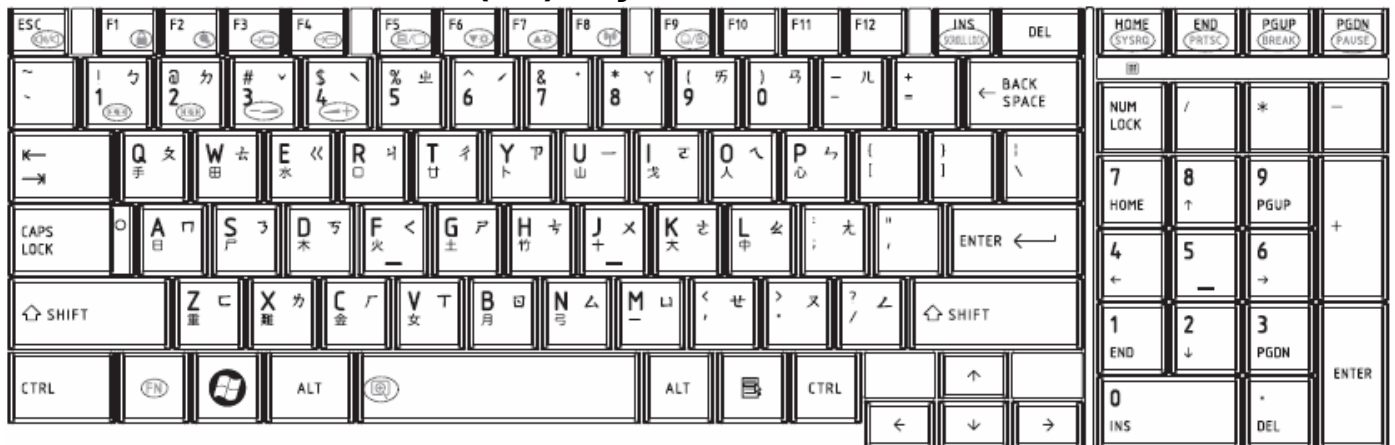


*Figure CH keyboard*

## 3.  Thai (TI) Keyboard
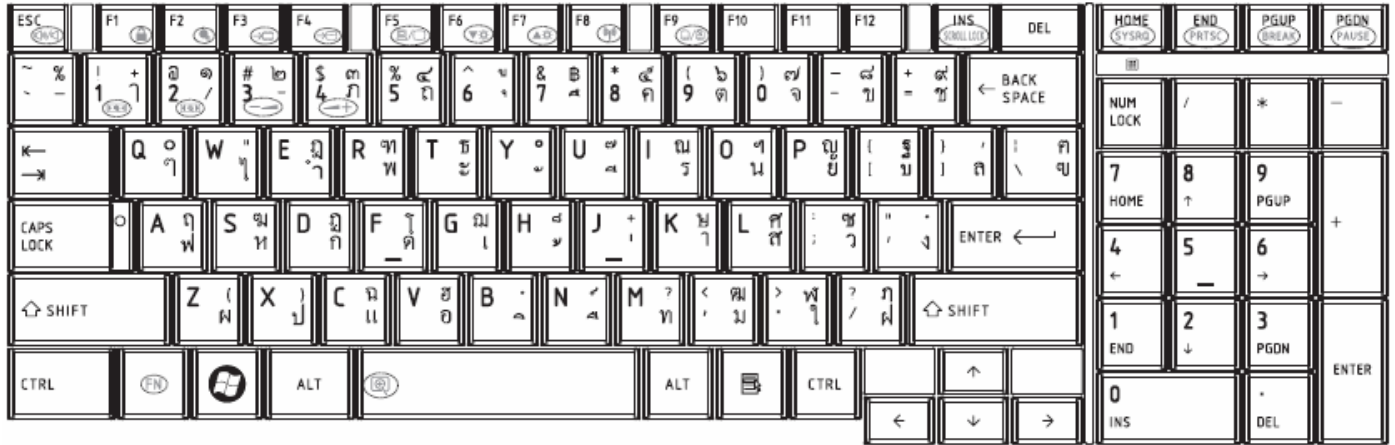
*Figure TI keyboard*

# 4. Korean (KO) Keyboard
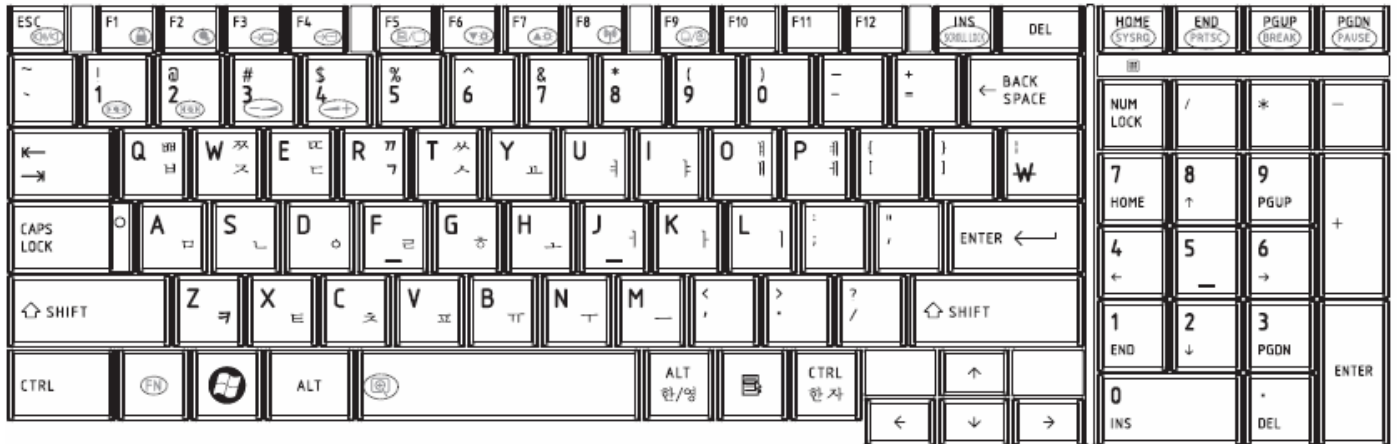


*Figure KO keyboard*

# 5. United Kingdom (UK) Keyboard

*Figure UK keyboard*

## 6. US International (UI) Keyboard



*Figure UI keyboard*

## 7. Hebrew (HB) Keyboard
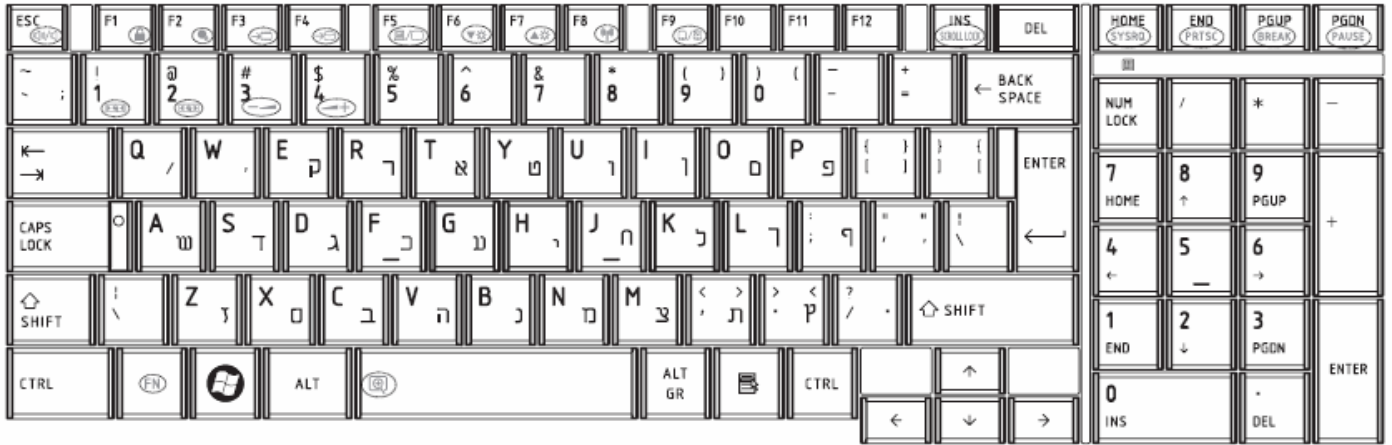
*Figure HB keyboard*

## 8. Danish (DM) Keyboard



*Figure DM keyboard*

## 9. Swiss (SW) Keyboard

*Figure SW keyboard*

## 10. Arabic (ARE) Keyboard
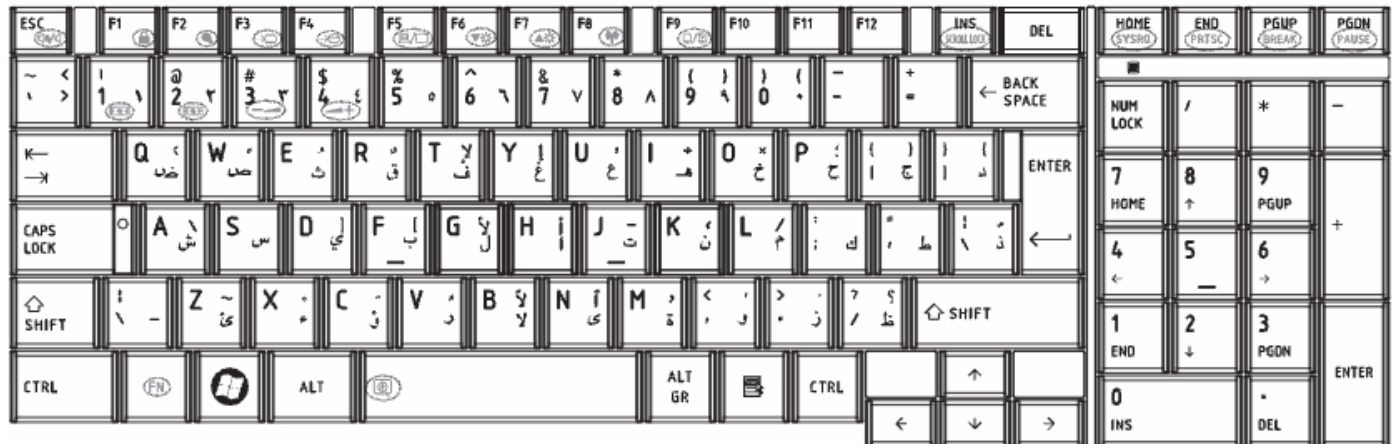


*Figure ARE keyboard*

## 11. Czech (CZ) Keyboard

*Figure CZ keyboard*

## 12.    Russian (RU) Keyboard
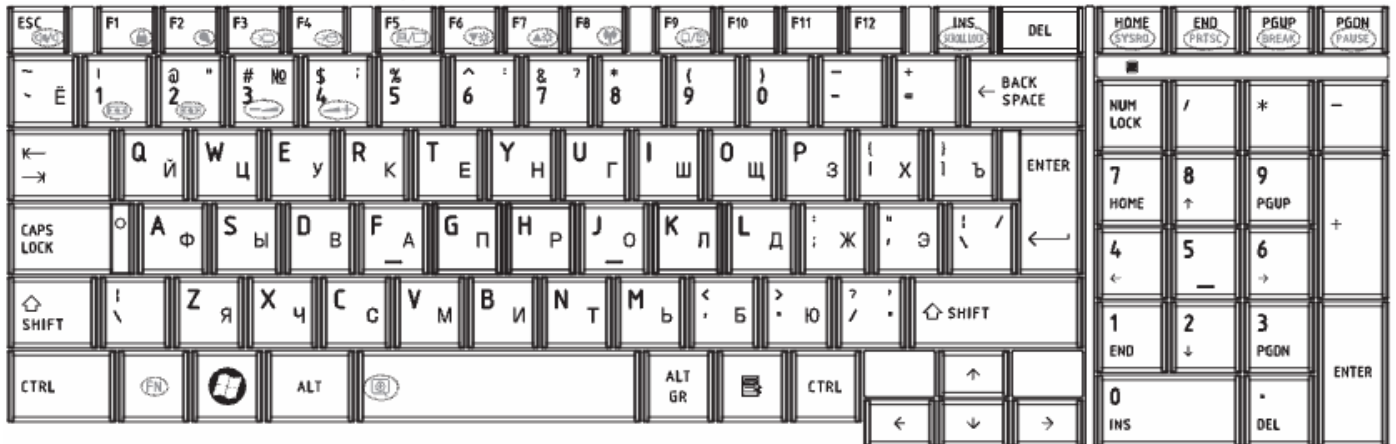


*Figure RU keyboard*
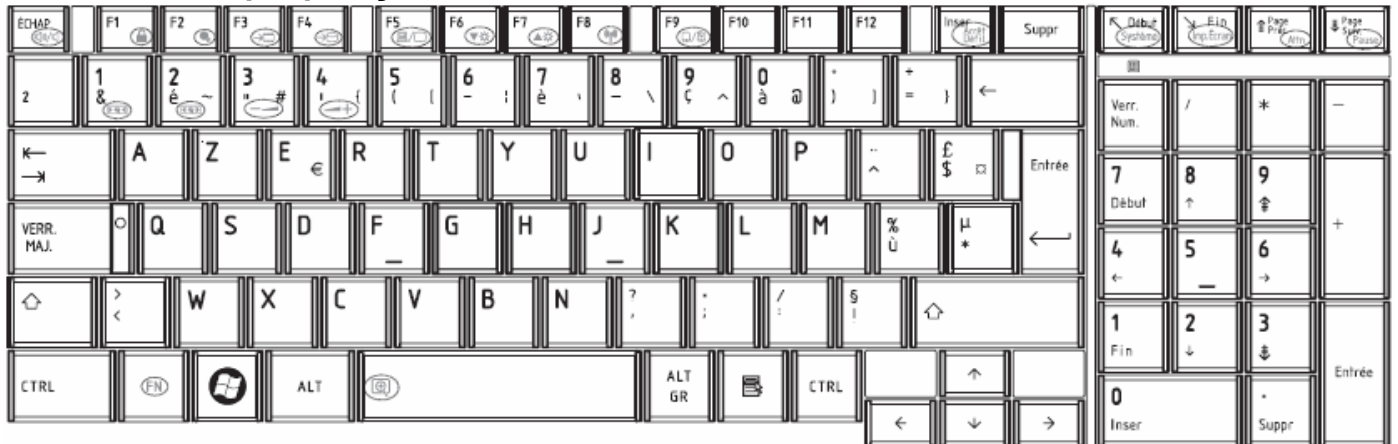
## 13.    Portuguese (PO) Keyboard

*Figure PO keyboard*

## 14. Slovakian (SL) Keyboard



*Figure SL keyboard*

## 15. Italian (IT) Keyboard
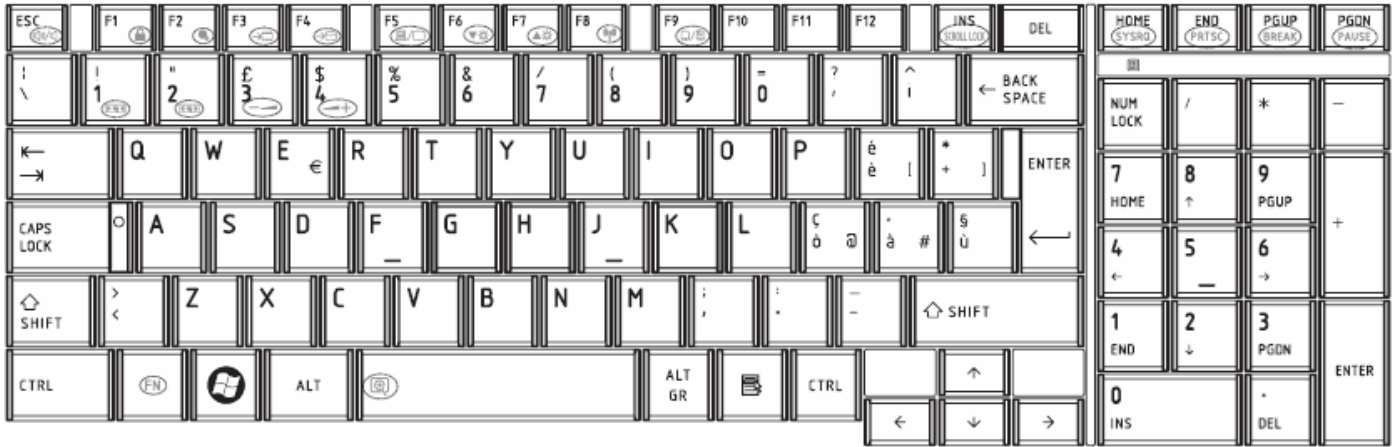
*Figure IT keyboard*

## 16. French (FR) Keyboard



*Figure FR keyboard*

## 17. German (GR) Keyboard

*Figure GR keyboard*

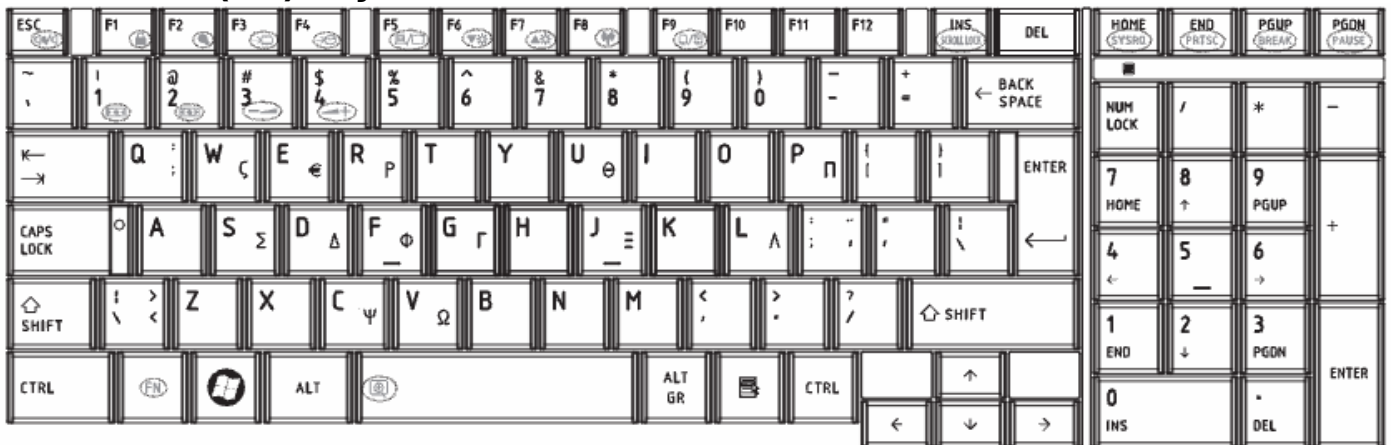## 18. Greek (GK) Keyboard



*Figure GK keyboard*

## 19. Hungarian (HG) Keyboard

Figure HG keyboard

## 20. Spanish (SP) Keyboard

Figure SP keyboard

## 21. Turkish (TR) Keyboard
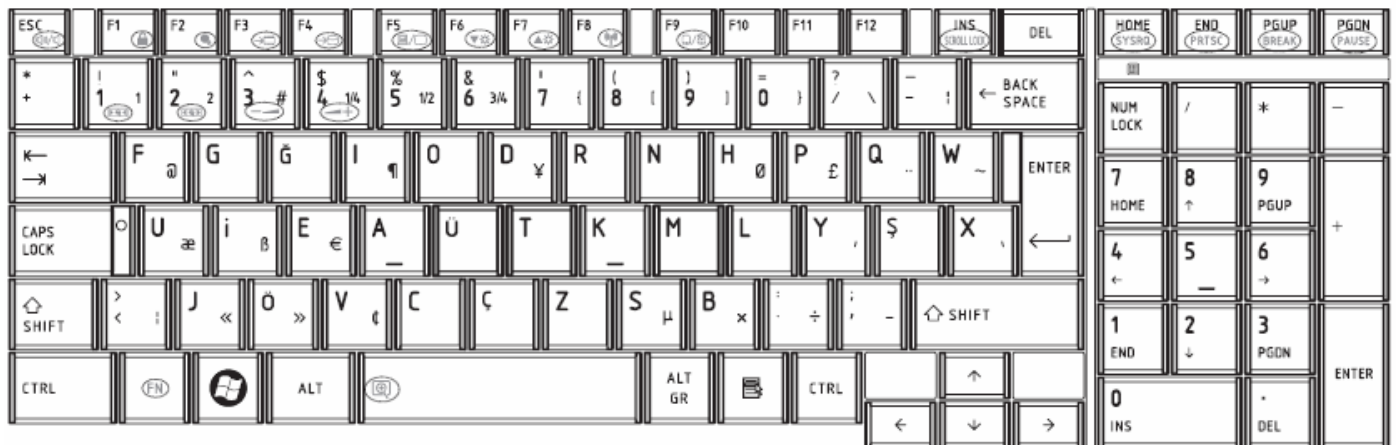
*Figure TR keyboard*

## 22. Turkish F (TF-F) Keyboard



*Figure TF-F keyboard*

## 23. Swedish (SD) Keyboard

*Figure SD keyboard*
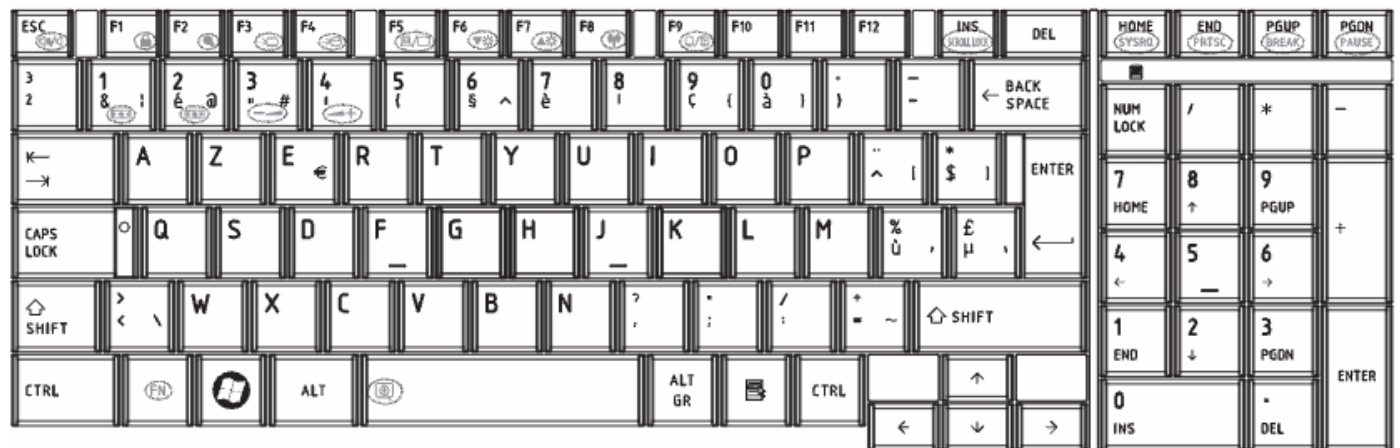
## 24. Belgian (BE) Keyboard



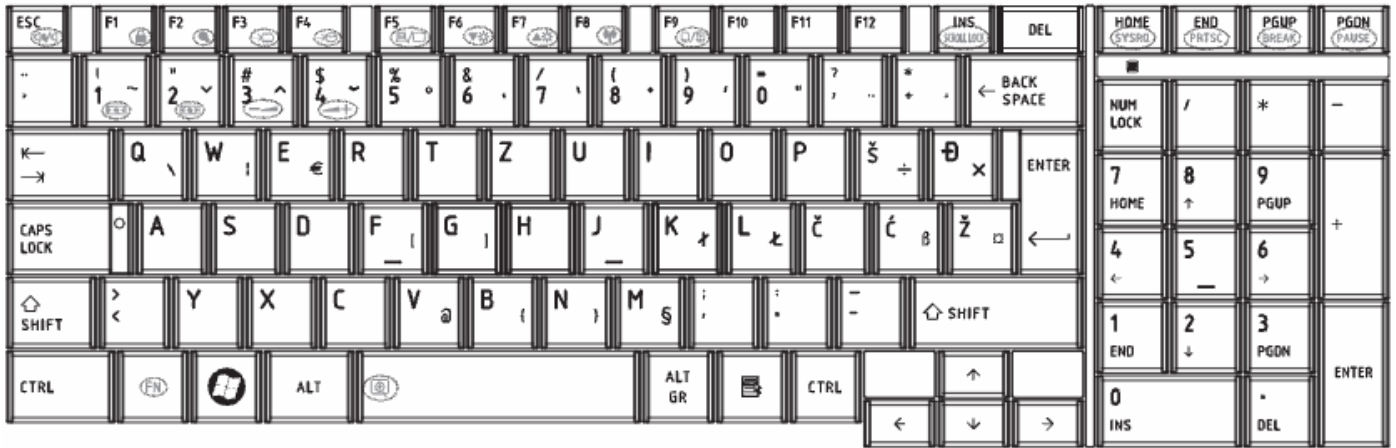*Figure BE keyboard*

## 25. Yugoslavian (YU) Keyboard

*Figure YU keyboard*

# 26. Norwegian (NW) Keyboard



*Figure NW keyboard*

# 27. Scandinavian (ND) Keyboard

*Figure ND keyboard*

# 28. Canadian Multinational (AC) Keyboard



*Figure AC keyboard*

# 29. Canadian Bilingual (CB) Keyboard

*Figure CB keyboard*

# 30. Romania (RO) Keyboard



*Figure RO keyboard*

# 31. Bulgaria (BU) Keyboard

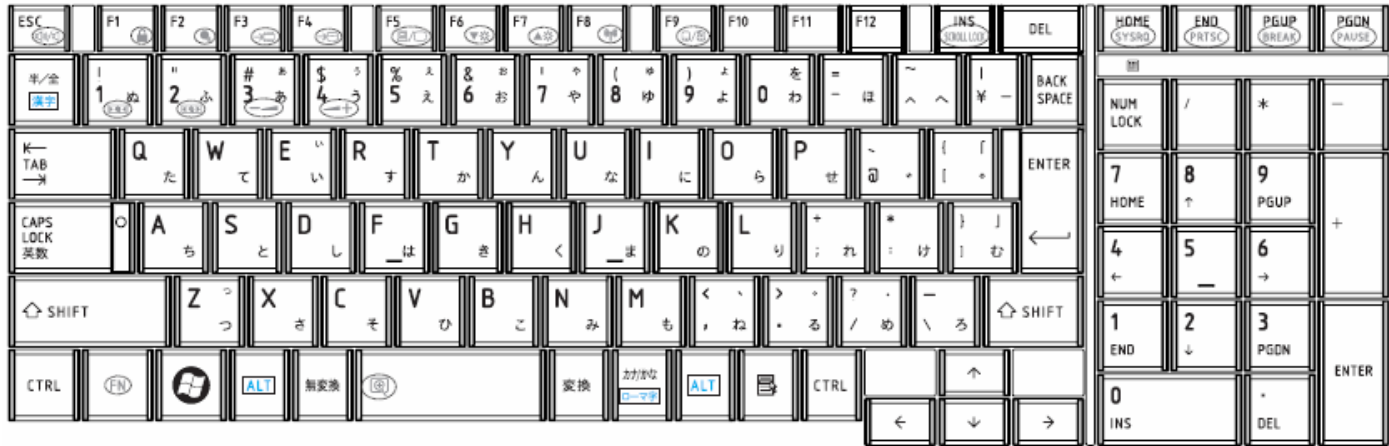*Figure BU keyboard*

## 32. Japanese (JP) Keyboard



*Figure JP keyboard*
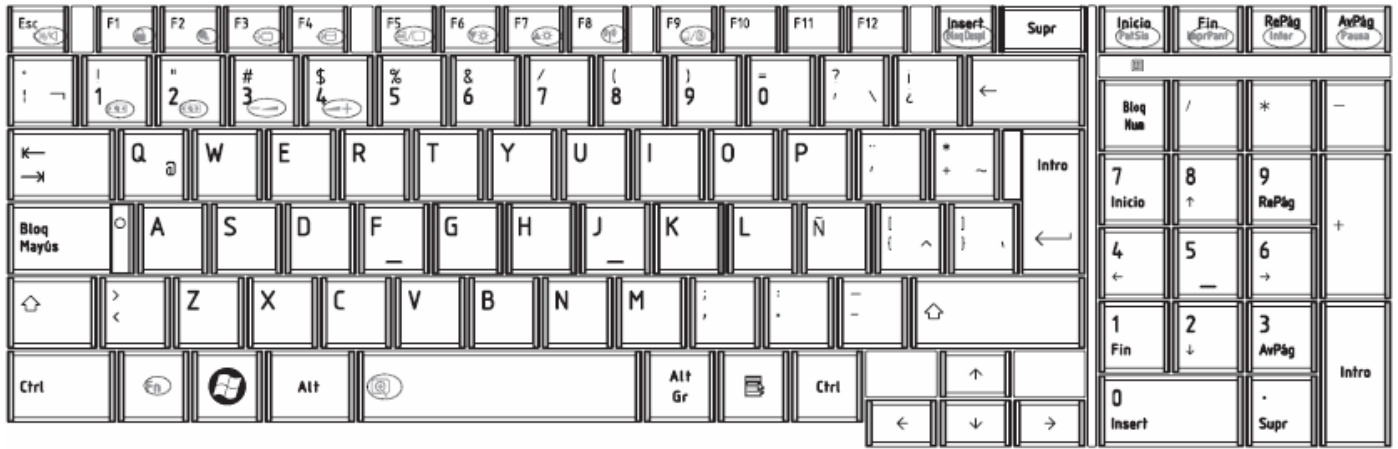
## 32. Latin American (LA) Keyboard

*Figure LA keyboard*

# NALAE SCREW TORQUE LIST

| | ITEM | SCREW P/N | DISCRIPTION | Q'ty | LOCATION | SCREW TORQUE |
|---|---|---|---|---|---|---|
| 1 | LCD ASSY | MACAJ0602G0 | M2*2.5(白鎳) | 6 | LCD HINGE BRK ASSY L&R TO LCD PANEL 17.3W" | 1.2~1.5Kgf.cm |
| 2 | | MAC925006G0 | M2.5*6(白鎳) | 6 | LCD BEZEL TO COVER | 2.5~3.0Kgf.cm |
| 3 | | | | 2 | LCD HINGE L&R TO LCD COVER | 2.5~3.0Kgf.cm |
| 1 | MB ASSY | MAA000012G0 | M2x5 (白鎳) | 2 | HDD(H=4.3mm) CONNECTOR TO MB | 1.5~2.0Kgf.cm |
| 2 | | | | 2 | BATTERY (H=7.2mm) CONNECTOR TO MB | |
| 3 | | MA0000060G0 | M2x3 (NI 黑鎳) | 2 | MDC CARD TO MB STANDOFF BTO (BTO) | 2.0~2.5Kgf.cm |
| 4 | | | | 1 | WLAN CARD TO MB STANDOFF | |
| 1 | LOGIC ASSY | MA000007YG0 | M2.5x5 (黑鎳) | 1 | MB TO LOG LOW | 2.5~3.0Kgf.cm |
| 2 | | | | 2 | LCD HINGE R TO LOWER R | 2.5~3.0Kgf.cm |
| 3 | | | | 2 | LCD HINGE L TO LOWER L | 2.5~3.0Kgf.cm |
| 4 | | | | 3 | LOG UP TO MB TO LOG LOW | 2.5~3.0Kgf.cm |
| 5 | | | | 1 | LOG UP TO LOG LOW CLOSE FAN | 2.5~3.0Kgf.cm |
| 6 | | | | 1 | LOG UP TO ODD BOARD TO LOW | 2.5~3.0Kgf.cm |
| 7 | | | | 1 | LOG LOW TO MB TO LOG UP (FRONT LEFT SIDE) | 2.5~3.0Kgf.cm |
| 8 | | | | 1 | LOG LOW TO LOG UP (FRONT RIGHT SIDE CLOSE BT MODULE) | 2.5~3.0Kgf.cm |
| 9 | | | | 1 | LOG LOW TO MB TO LOG UP (FRONT MIDDLE SIDE CLOSE HDD CONNECTOR) | 2.5~3.0Kgf.cm |
| 10 | | | | 1 | LOG LOW TO LOG UP (FRONT RIGHT SIDE CLOSE HDD MODULE) | 2.5~3.0Kgf.cm |

| 11 | | | | 1 | LOG LOW TO USB BOARD TO LOG UP (FRONT RIGHT SIDE) | 2.5~3.0Kgf.cm |
|---|---|---|---|---|---|---|
| 12 | | | | 1 | LOG LOW TO MB TO LOG UP (LEFT MIDDLE SIDE CLOSE D-SUB) | 2.5~3.0Kgf.cm |
| 13 | | | | 1 | LOG LOW TO MB TO LOG UP (LEFT MIDDLE SIDE CLOSE VGA) | 2.5~3.0Kgf.cm |
| 14 | | | | 1 | LOG LOW TO MB TO LOG UP (MIDDLE SIDE CLOSE CPU) | 2.5~3.0Kgf.cm |
| 15 | | | | 1 | LOG LOW TO MB TO LOG UP (MIDDLE SIDE CLOSE HDD CONNECTOR) | 2.5~3.0Kgf.cm |
| 16 | | | | 1 | LOG LOW TO USB BOARD TO LOG UP (RIGHT MIDDLE SIDE CLOSE USB) | 2.5~3.0Kgf.cm |
| 17 | | | | 1 | LOG LOW TO UP (REAR LEFT SIDE CLOSE THERMAL FIN) | 2.5~3.0Kgf.cm |
| 18 | | | | 1 | LOG LOW TO HINGE LEFT TO UP (REAR LEFT SIDE) | 2.5~3.0Kgf.cm |
| 19 | | | | 1 | LOG LOW TO UP (REAR LEFT SIDE CLOSE FAN) | 2.5~3.0Kgf.cm |
| 20 | | | | 1 | LOG LOW TO UP (REAR RIGHT SIDE CLOSE ODD) | 2.5~3.0Kgf.cm |
| 21 | | | | 1 | LOG LOW TO HINGE RIGHT TO UP (REAR RIGHT SIDE) | 2.5~3.0Kgf.cm |
| 22 | | | | 1 | LOG LOW TO LOG UP (REAR RIGHT SIDE CLOSE RIGHT SPEAKER) | 2.5~3.0Kgf.cm |
| 23 | | | | 1 | LOG LOW TO LOG UP (FRONT SIDE TP MODULE) | 2.5~3.0Kgf.cm |

| | | | | 1 | LOG LOW TO ODD BRACKET | 2.5~3.0Kgf.cm |
|---|---|---|---|---|---|---|
| 24 | | | | 1 | LOG LOW TO ODD BRACKET | 2.5~3.0Kgf.cm |
| 25 | | | | 1 | LOG LOW TO LOG UP (HDD AREA) | 2.5~3.0Kgf.cm |
| 26 | | MA000005WG0 | M2.5x3 (黑鎳) | 2 | KEYBOARD TO UP LEFT & RIGHT SIDE | 2.5~3.0Kgf.cm |
| 27 | | | | 2 | KEYBOARD TO UP TP LOW AT MIDDLE SIDE | 2.5~3.0Kgf.cm |
| 28 | | MA000008PG0 | M2x2 (NI 黑鎳大頭) | 3 | LOG LOW TO LOG UP (BATTERY AREA) | 1.5~2.0Kgf.cm |
| 1 | HDD ASSY | MA00000HYG0 | M3x3 (白鎳) | 4 | HDD BRK TO HDD | 2.5~3.0Kgf.cm |
| 1 | ODD BOARD ASSY | MAA000012G0 | M2x5 (白鎳) | 2 | ODD CONNECTOR H6.0mm CONNECTOR TO ODD BOARD | 1.5~2.0Kgf.cm |
| 1 | THERMAL MODULE | MAA000012G0 | M2x5 (白鎳) | 2 | THERMAL FAN TO LOW | 2.5~3.0Kgf.cm |
| 2 | | AM08W000200 | SPRING SCREW 黑鎳 | 4 | CPU-THERMAL-SINK TO CPU-PLATE Intel & AMD use AM08W000200 | 2.0~2.5Kgf.cm |
| 3 | | MA0000096G0 | SPRING SCREW 白鎳 | 3 | VGA THERMAL SINK TO VGA-PLATE (BTO) | 2.0~2.5Kgf.cm |
| 1 | LOG LOWER ASSY | MA000007YG0 | M2.5x5 (黑鎳) | 1 | TP BOARD TO LOW | 2.5~3.0Kgf.cm |
| 1 | ODD ASSY | MA0000060G0 | M2x3 (NI 黑鎳) | 2 | ODD MODULE TO ODD BRK | 1.5~2.0Kgf.cm |
| 1 | other parts | MA0000035G0 | M2.5*5 半牙( 黑鎳) | 1 | RAM DOOR TO LOW (FIX ON DOOR) | 2.5~3.0Kgf.cm |

# Appendix G   Reliability

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

*Table G-1  MTBF*

| Component | Time (hours) |
|---|---|
| LCD | 10,000 |
| Keyboard | |
| HDD | 300,000 |
| Optical (DVD/CD) drive | |
| AC adaptor | |