

**Toshiba Personal Computer  
Satellite & Satellite Pro  
Maintenance Manual**

**TOSHIBA CORPORATION**

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Toshiba Personal Computer Satellite Maintenance Manual

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## Preface

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

---

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# **Chapter 1**

## **Hardware Overview**

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## **Chapter 1      Contents**

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## **1.1 Features**

The Toshiba Satellite A660/A665/A667 Series and Dynabook TX/AX Series is a full-size PC notebook based on a Dual Core/Quad Core Processor, providing high-speed processing capabilities and advanced features. The computer employs a lithium ion battery that allows it to operate without a DC-in connection for extended periods of time. The display uses a 15.6" or 16" TFT LCD panel. The PGA socket supports BTO for the CPU so that the system can be designed to suit the customer's needs.

The computer has the following features:

Processor (BTO)

The computer is equipped with one of the following Intel® processors.

- Intel® Clarkfield Processor Support
- Intel® Arrandale Processor

Memory (BTO)

The computer has two SODIMM slots that come standard with 1GB, 2GB or 4GB BTO to meet various memory requirements. It can incorporate up to 8 GB of main memory. It supports DDR3 at 800MHz/1066MHz. or 1333MHz depending on the CPU.

Battery Pack

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

Hard Disk Drive (HDD) (BTO)

The computer accommodates one 9.5 mm HDD with the following storage options:

- 160/250/320/500/640GB SATA (5,400rpm)
- 320/500GB SATA (7,200rpm)
- 64GB/128/256/512GB TOSHIBA solid-state drive (SSD)

ODD (BTO)

- 12.7mm height DVD Super Multi drive (supporting DVD-R / -RW / +R / +RW / -RAM / -RDL / +RDL / CD-R / CD-RW) Double Layer with Labelflash

- 12.7mm height BD-Combo drive (supporting BD/DVD/CD/ DVD-R / -RW / +R / +RW / -RAM / -RDL / +RDL / CD-R / CD-RW)
- 12.7mm height BD-RE drive (supporting BD/DVD/CD/BD-R/BD-RE/ DVD-R / -RW / +R / +RW / -RAM / -RDL / +RDL / CD-R / CD-RW)

Display (BTO)

The computer display features one of the following LCD panels:

- 16"W 1366 x 768: color TFT/HD
- 15.6"W 1366 x 768: color TFT/HD

Graphics (BTO)

- Intel Arrandale for int. Gfx
- Nvidia N11M-GE1, N11P-GE1, N11E-GE1-LP, N11M-OP1 ( DDR3, 512/1024MB)

Keyboard (BTO)

The computer is equipped with an illuminated Toshiba 2010 A4 keyboard with 102 keys, including number pad. It is a Win7 compliant keyboard featuring a Windows key and application keys.

Pointing Device

The integrated Wide Touch Pad and two control buttons in the palm rest allow for control of the on-screen pointer and supports functions such as multi-touch touchpad gestures and window scrolling. The device also features a touchpad on/off button and an LED light bar.

External Monitor Port (BTO)

The analog VGA port provides support for VESA DDC2B compatible functions. A WDDM driver is ready for Windows 7.

Universal Serial Bus (USB) Ports

The computer has three USB 2.0 ports. 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. They also support Sleep and Charge function.

eSATA/USB Combo Port

The external eSATA/USB combo port executes high-speed data transfers to external devices and now supports shielded cable lengths of up to 2 meters outside the computer. The port also complies with the USB 2.0 standard

Express Card Slot

The internal Express Card slot is a universal slot. This slot supports ExpressCard34/54 and the slot is covered with a dummy card. It also supports USB/PCI Express signals.

Bridge Media Slot

This slot allows you to insert SD, MiniSD/ MicroSD (through adapter), Memory Stick/Memory Stick Duo (through adaptor), Memory Stick Pro/Memory Stick Duo (through adaptor), xD and MMC memory cards. It supports High-speed SD, SDHC and SD-IO. An I/O port heel cover is needed. This model does not support CF or Smart Media cards.

Sound system

The integrated sound system provides support for the computer's internal speakers and microphone, also allowing an external microphone and headphones to be connected via the appropriate jacks. It is composed of two Harman/Kardon *OdysseyII* 10cc internal speakers and an internal microphone (equipped with echo cancellation).

Internal Camera (BTO)

Camera supports 1.3M pixels without Auto Macro and comes with a blue LED indicator. (The internal camera is BTO with the internal microphone). The camera is not a rotation type.

HDMI Out Port (BTO)

HDMI 1.3 out port can connect with Type A connector HDMI cable. One HDMI cable can send and receive SD and HD video/audio and control signals.



❑ Headphones-Out Jack

This jack enables connection of stereo headphones (16 ohm minimum). When connected to headphones, the internal speakers are 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.

❑ LAN (BTO)

The computer has built-in support for Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T) and 10M/100M Ethernet LAN (10/100 megabits per second, 10/100BASE-T). It employs a Realtek 8111E for Gigabit LAN or 8105E 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 card. This WLAN module may come in with the following types (depending on the model):

- Realtek 802.11b/g, 8191SE (1x2)
- Atheros 802.11 HB95 (1x1)
- PumaPeak 802.11a/b/g (2x2), a/b/g/n (2x2)

❑ 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).

❑ Felica (BTO)

Some models feature an embedded Felica module writes and reads data to and from contactless Felica IC cards. Having no need for physical contact with the card, the Reader/Writer is immune to performance deterioration caused by wear and contamination, providing easy maintenance and long-term reliability.

❑ 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 a fast, reliable and secure means to achieve wireless communication in a small space. This module is Version 2.1 + EDR and is V3.0+HS support ready.

❑ Fingerprint Sensor (BTO)

The computer has a fingerprint utility installed for the purpose of enrolling and recognizing fingerprints. By enrolling the ID and password to the fingerprint authentication device, it is no longer necessary to input the password from the keyboard. The Fingerprint sensor is located at the center of the Touch Pad panel and is an Authentec AES1660.

❑ TV Tuner (BTO)

Some models are equipped with ATSC/NSTC for Express card type TV tuner and PCIE mini type for the reception and playback of DVBT.

❑ Sound system (BTO)

The integrated sound system provides support for the computer's internal speakers and microphone, also allowing an external microphone and headphones to be connected via the appropriate jacks. The computer has two Harman or Kardon (Odyssey2) speakers.

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

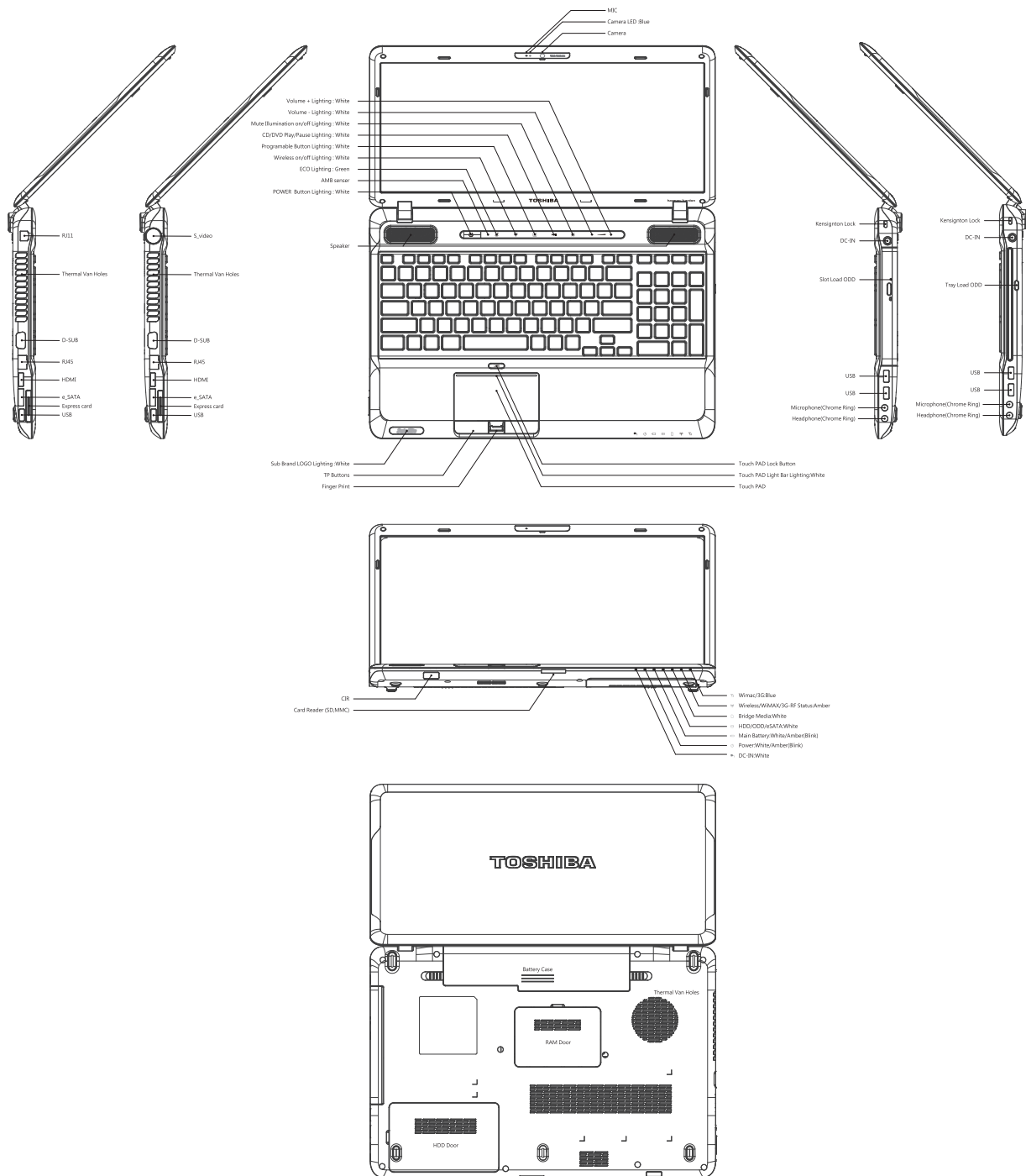
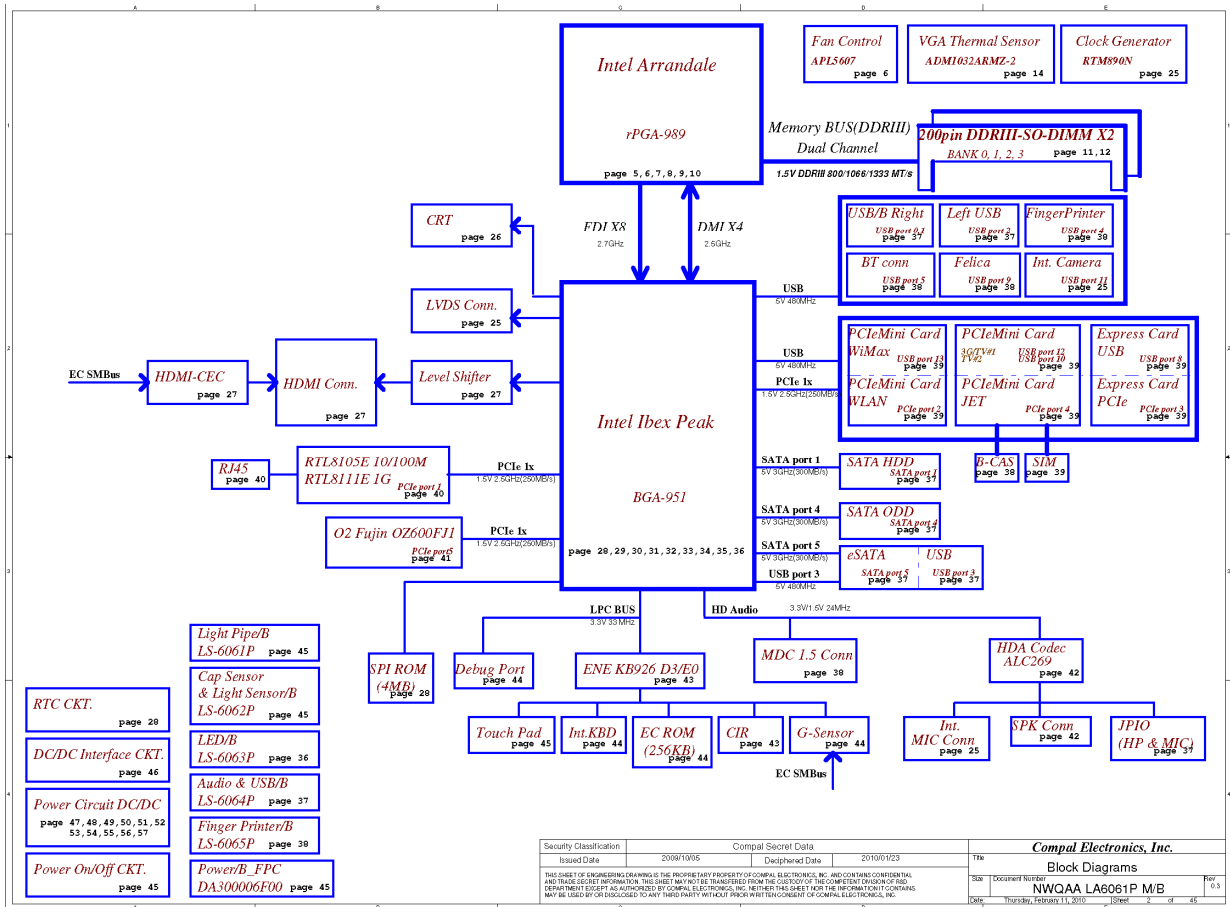
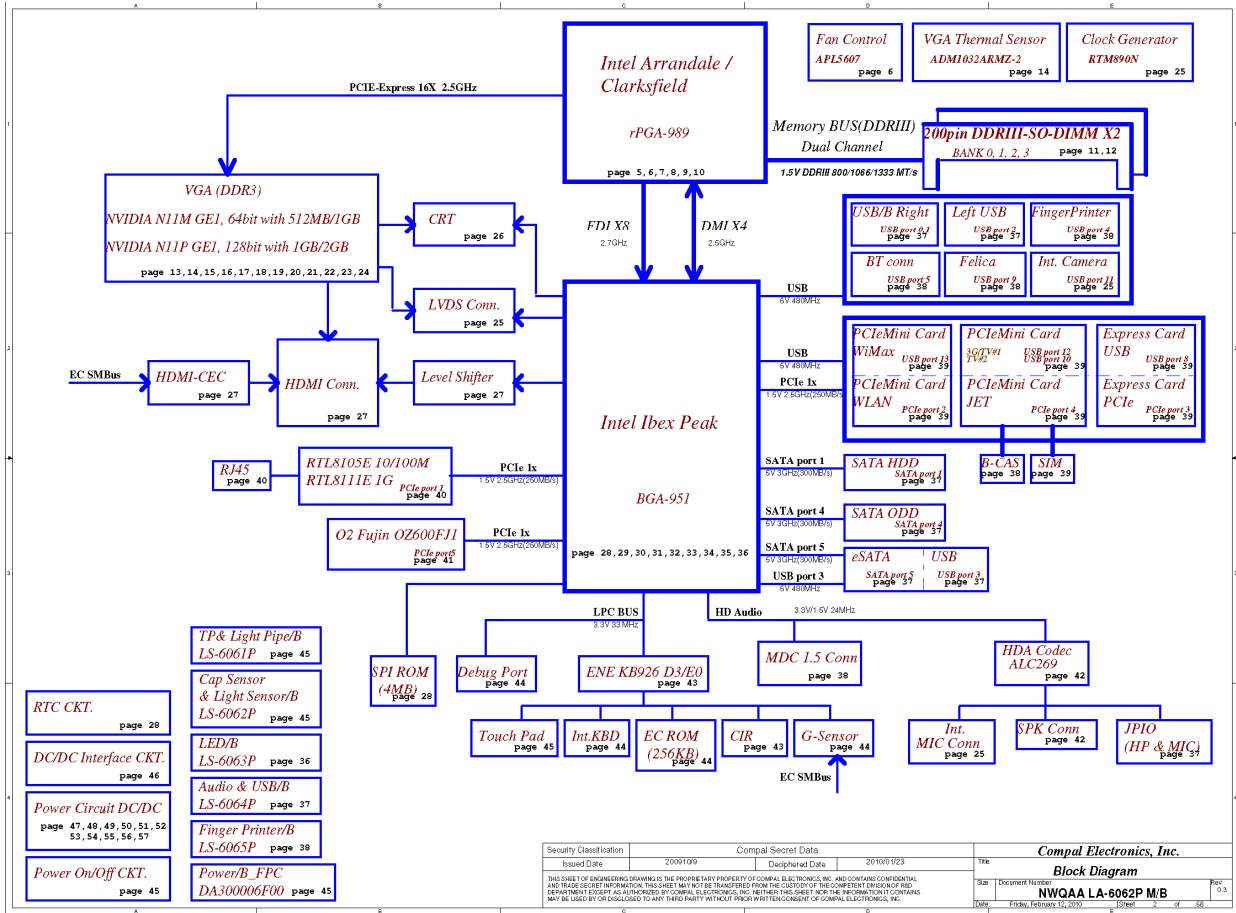


Figure 1-1A ID Parts Description Placement Part A





Security Classification	2009109	Compaq Secret Data	20100103	174	Compal Electronics, Inc.
ESOP Date	2009109	Chipset Date	20100103	174	Block Diagram
THIS SHEET OF DRAWINGS IS THE PROPERTY OF COMPAL ELECTRONICS, INC. AND CONTAINS CONFIDENTIAL AND TRADE SECRET INFORMATION. THIS SHEET MAY NOT BE TRANSFERRED FROM THE CUSTODY OF THE COMPETENT DIVISION OR REPRODUCED OR DISCLOSED TO ANY THIRD PARTY WITHOUT PRIOR WRITTEN CONSENT OF COMPAL ELECTRONICS, INC.					
NWQAA LA-6062P M/B				0.3	
Fishe, 1/10/10, 2010				0.3	

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

Processor (BTO)

The computer is equipped with one of the following Intel® processors:

- Intel® Clarksfield Processor
- Intel® Arrandale Processor

Memory (BTO)

The computer has two SODIMM slots that come standard with 1GB/2GB/4GB, BTO for various memory requirements. It can incorporate up to 8 GB of main memory. It supports DDR3 at 1066MHZ and 1333MHZ depending on the model.

BIOS ROM (EEPROM)

The system BIOS is one 4096KB ROM and the keyboard BIOS is one 256KB ROM, both of which are ACPI-compliant. 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
- ACPI2.0 b and PC2001 compliant
- Support SMBus specification V2.0
- 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
- Wireless LAN on/off button

❑ Graphics Controller

- Intel® HM55 as integrated graphics solution
- Following External Graphic solution with Intel PM55/HM55
- NVIDIA® GeForce® N11M-GE1/N11P-GE1/N11E-GE1-LP, N11M-OP1
- HDMI 1.3-CEC support

❑ Express Card Controller

- Support USB/PCI Express signals
- One Express Card slot 34

❑ Audio Controller

- Realtek Azalia ALC269
- 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, feather touch button, no mute function
- Microsoft inbox audio driver support
- Software EQ support
- Synchronize to change video and audio output to HDMI/DP
- MAXX audio support by SW solution (BTO by image)

❑ Wireless LAN Controller

- Realtek 802.11b/g, 8191SE (1x2)
- Atheros 802.11 HB95 (1x1)
- PumaPeak 802.11a/b/g (2x2), a/b/g/n (2x2)

## 1.2 2.5-inch HDD

The computer contains an extremely low-profile and lightweight, high-performance HDD. The HDD incorporates 9.5 mm / 12.5 mm height magnetic disk and mini-Winchester type magnetic heads. The HDD interface conforms to Serial ATA. Storage capacities supported are 160, 250, 320, 400, 500 and 640GB.

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

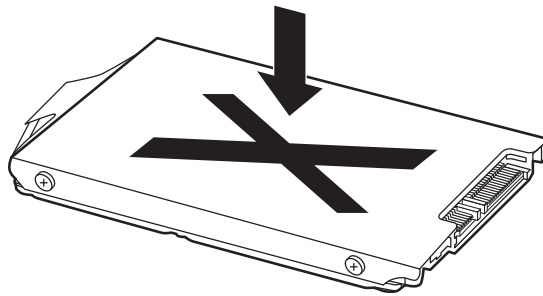


Figure 1-2 SATA HDD

Table 1-1 HDD Specifications

Item	Specifications		
Capacity (GB)	160GB	250G	320 GB
Rotational Speed (RPM)	5400 RPM	5400 or 7200 RPM	5400 or 7200 RPM
Height	9.5 mm	9.5 mm	9.5 mm
User Data Sectors	312,581,808	488,397,168	625,142,448
Bytes / Sector	512	512	512

Item	Specifications	
Capacity (GB)	500GB	640 GB
Rotational Speed (RPM)	5400 or 7200 RPM	5400 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 6x speed, CD-RW at 16x speed, DVD-R at 8x speed, DVD-RW at 8x speed, DVD+R at 8x speed, DVD+R (Double Layer) at 8x speed, DVD-R (Dual Layer) at 8x 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.

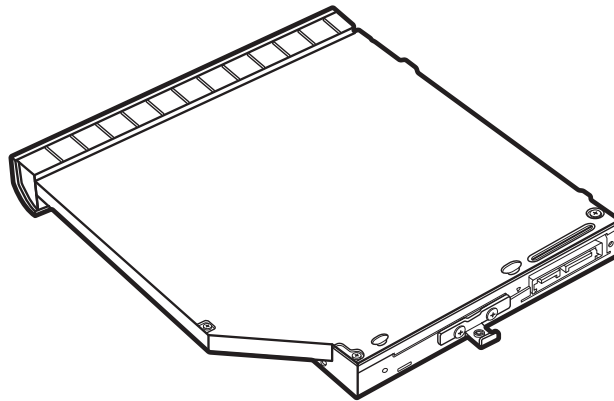


Figure 1-3 DVD Super Multi Drive

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-RAM, DVD+R, DVD+R (Double Layer), DVD+RW. 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-RE and BD-Combo drives

The BD-RE 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

The BD-RE and BD-Combo drives let you record data to writable CD/DVD discs. The drives can write CD-RW at 16x speed, CD-R at 24x speed, DVD-RAM at 5x speed, DVD+R DL at 4x speed, DVD-R DL at 4x speed, DVD+RW at 4x speed, DVD+R at 8x speed, DVD-RW at 6x speed, DVD-R at 8x speed.

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

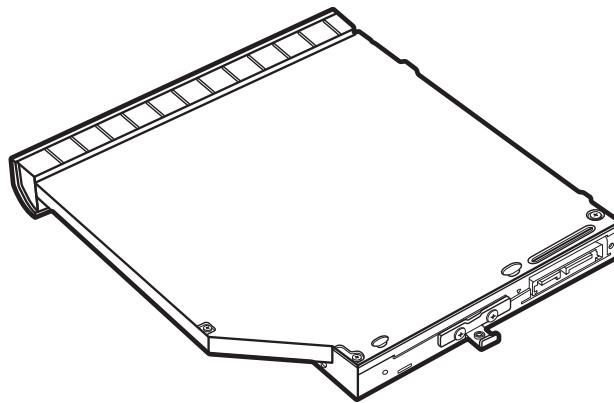


Figure 1-4 BD-RE or BD-Combo drive (depending on the model)

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) 16.6 (PIO mode 4, Multiword DMA mode 2)		
Access Time (ms)			
Average Random Access	130		
Data Buffer Size (Mbytes)	2MB		
Formats Supported	BD:		
	DVD: DVD-VIDEO, DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+R (Double Layer), DVD+RW.		
	CD: 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 color)
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 or 12 Cell	4 hours max
On-State Charge	3, 6 or 12 Cell	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 stop 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 maintain the current date, time and other system information in memory while the computer is turned off.

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# Chapter 2

## Troubleshooting Procedures

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## 2.1 Troubleshooting Introduction

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

- |              |                   |                    |                        |                  |
|--------------|-------------------|--------------------|------------------------|------------------|
| 1. Display   | 7. Optical driver | 13. HDMI CEC       | 4. TV-Tuner&B-Cas      | 25. LAN          |
| 2. Keyboard  | 8. Modem          | 19. 3D Sensor      | 20. Sleep & Charge     | 26. Light sensor |
| 3. USB ports | 9. Express card   | 15. Finger printer | 21. Bridge Media slot  | 27. HDD          |
| 4. MIC       | 10. Wireless LAN  | 16. E-SATA         | 22. Sleep & Play music | 28. CIR          |
| 5. Touch Pad | 11. Camera        | 17. Felica card    | 23. Wimax              |                  |
| 6. Speaker   | 12. Bluetooth     | 18. JET            | 24. 3G                 |                  |

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. Express card
4. Multimeter
5. External monitor
6. USB compatible keyboard
7. Multimedia sound system with line-in and line-out ports
8. Headphones
9. USB test module and USB cable
10. Music CD
11. MIC module and MIC line
12. Audio loopback
13. Finger print module
14. TV tuner signal generator
15. E-SATA HDD
16. Felica card
17. Remote controller
18. HDMI
19. CRT

## 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 floppy disk drive, if installed, is empty. If no ODD module is installed, you should use an external ODD to run the diagnostics tests

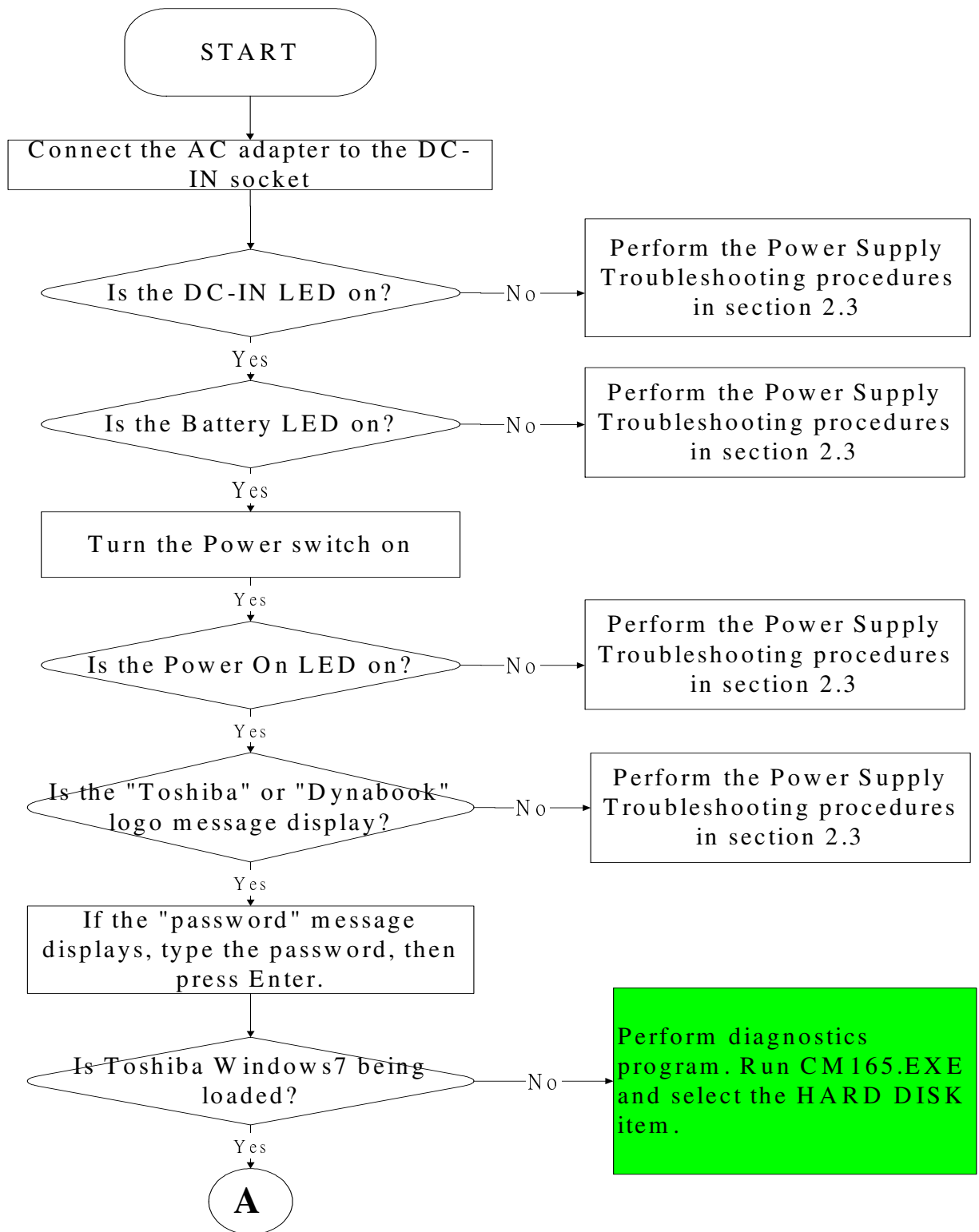


Figure 2-1 Troubleshooting flowchart (1/2)

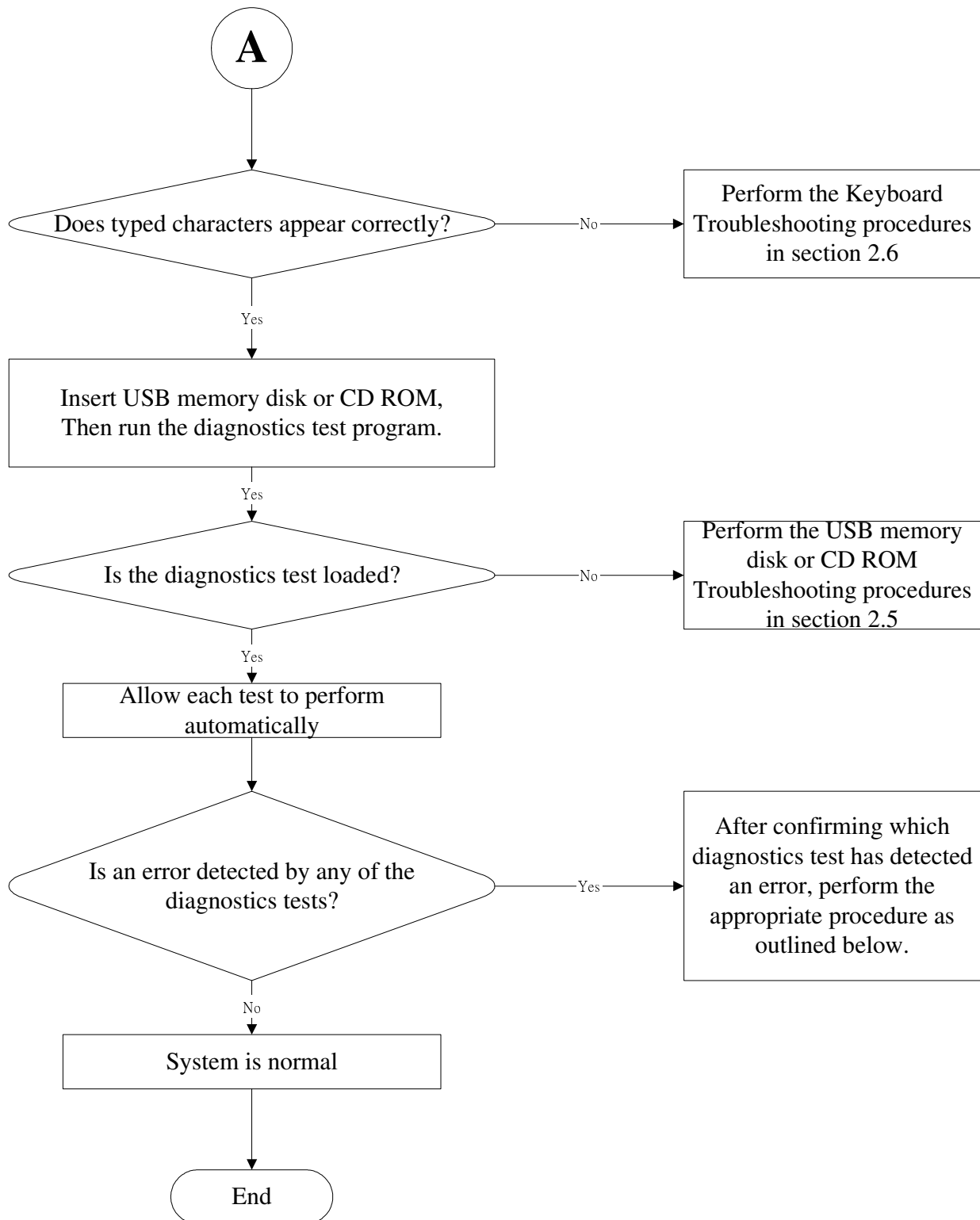


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.3
2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.4
3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.5
4. If an error is detected by the Touchpad test, perform the Touchpad Troubleshooting procedures in Section 2.8
5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.9 and the Optical Drive Troubleshooting Procedures in Section 2.10
6. If an error is detected when using the HDD/SSD, perform the HDD/SDD Troubleshooting procedures in Section 2.17
7. If an error is detected by the 3D sensor test, perform the 3D sensor troubleshooting Procedures in Section 2.25
8. If an error is detected when using the LAN, perform the LAN troubleshooting procedures in Section 2.31

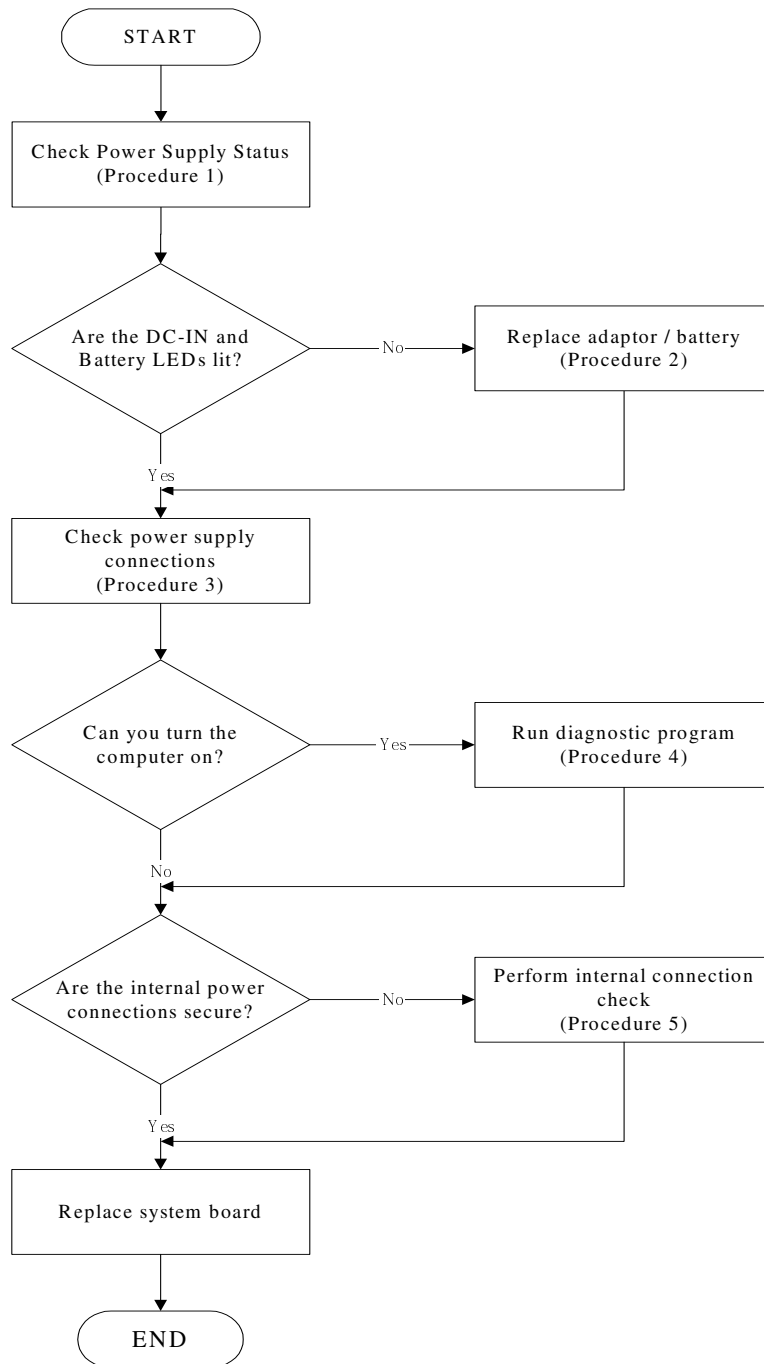
Other problems that are not covered by the diagnostics program may be discovered by a user.

1. If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 2.6
2. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 2.7
3. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 2.11
4. If an error is detected when using the express card unit, perform the express card Troubleshooting procedures in Section 2.12
5. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.13
6. If an error is detected when using the camera, perform the camera Troubleshooting procedures in Section 2.14
7. If an error is detected when using the Bluetooth, perform the Bluetooth Troubleshooting procedures in Section 2.15
8. If an error is detected when using the Bridge Media slot, perform the Bridge Media slot Troubleshooting procedures in Section 2.16
9. If an error is detected when using the CRT, perform the CRT failure troubleshooting procedures in Section 2.19.
10. If an error is detected when using the HDMI TV, perform the HDMI CEC troubleshooting procedures in Section 2.19.
11. If an error is detected when using the MIC, perform the MIC troubleshooting procedures in Section 2.20
12. If an error is detected when using the Finger print, perform the Finger printer troubleshooting procedures in Section 2.21
13. If an error is detected when using the E-SATA, perform the E-SATA troubleshooting procedures in Section 2.22
14. If an error is detected when using the felica card, perform the Felica troubleshooting procedures in Section 2.23
15. If an error is detected when using the JET, perform the JET troubleshooting procedures in Section 2.24
16. If an error is detected when using the Sleep charge, perform the Sleep & Charge troubleshooting procedures in Section 2.26





## 2.3 Power Supply Troubleshooting



*Figure 2-2 Power Supply Troubleshooting Process*

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

- Procedure 1: Power status check
- Procedure 2: Adaptor / battery replacement
- Procedure 3: Power supply connection check
- Procedure 4: Diagnostic check
- Procedure 5: Internal connection check

### **Procedure 1 Power Status Check**

The following LEDS indicate the power supply status:

 Battery LED

 DC-IN LED

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

*Table 2-1 Battery LED*

<b>Battery State</b>	<b>LED colors</b>	<b>Definition</b>
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**

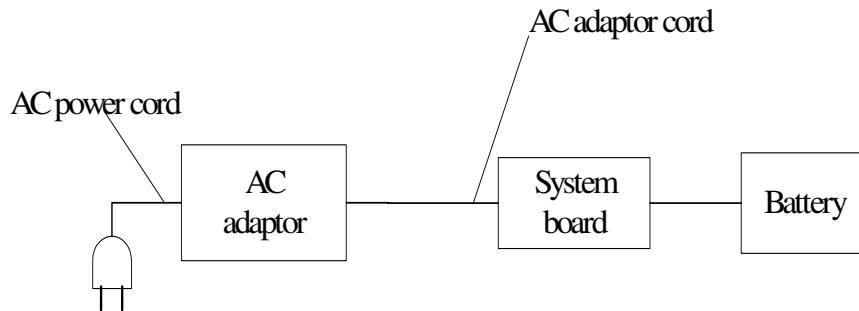
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

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 multi-meter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.
- Check 2    Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.
- Check 3    The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.4 Display Troubleshooting

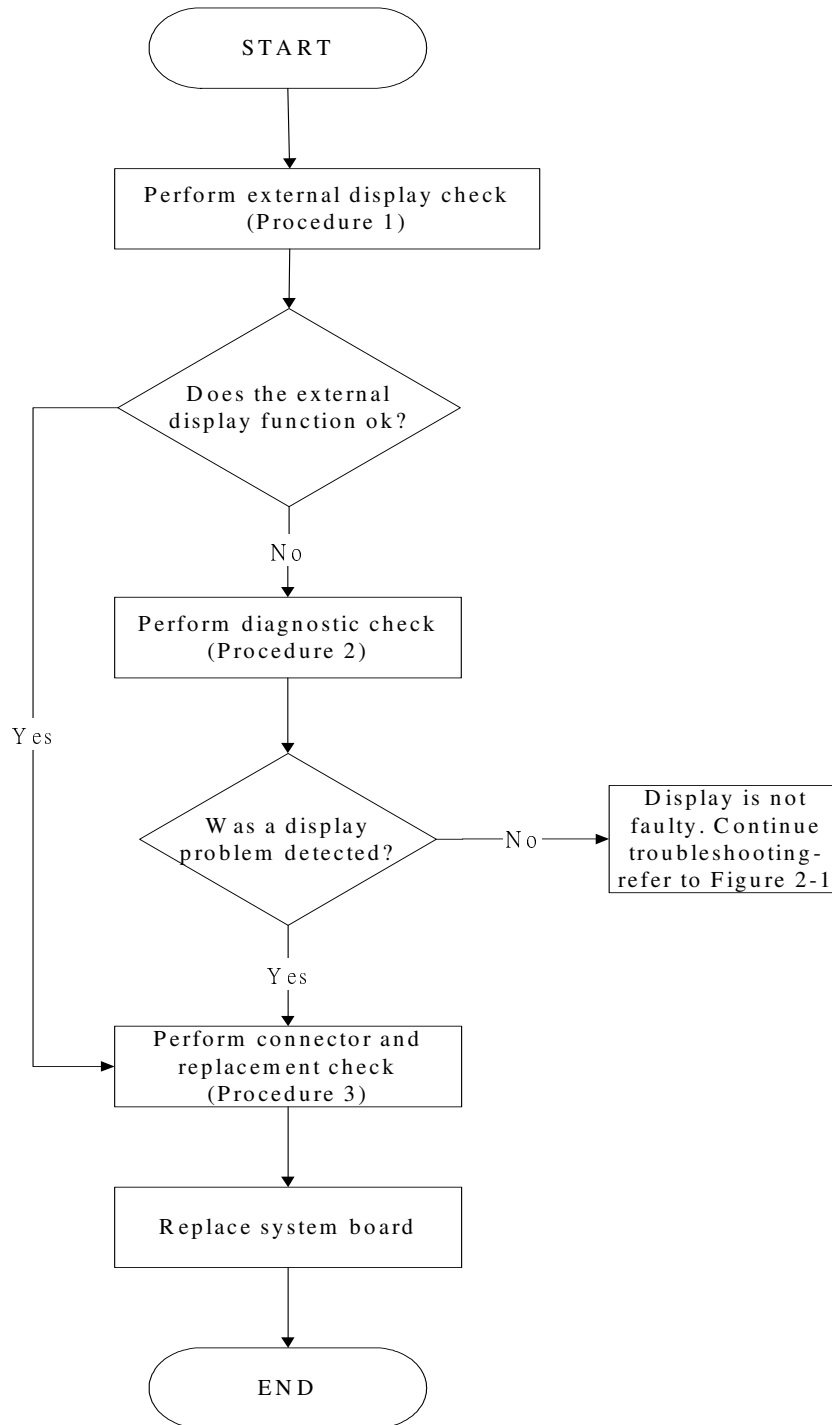


Figure 2-3 Display troubleshooting process

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

Procedure 1: External display check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

### **Procedure 1 External display check**

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

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

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

### **Procedure 2 Diagnostic check**

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

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



### **Procedure 3      Connector and replacement check**

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

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

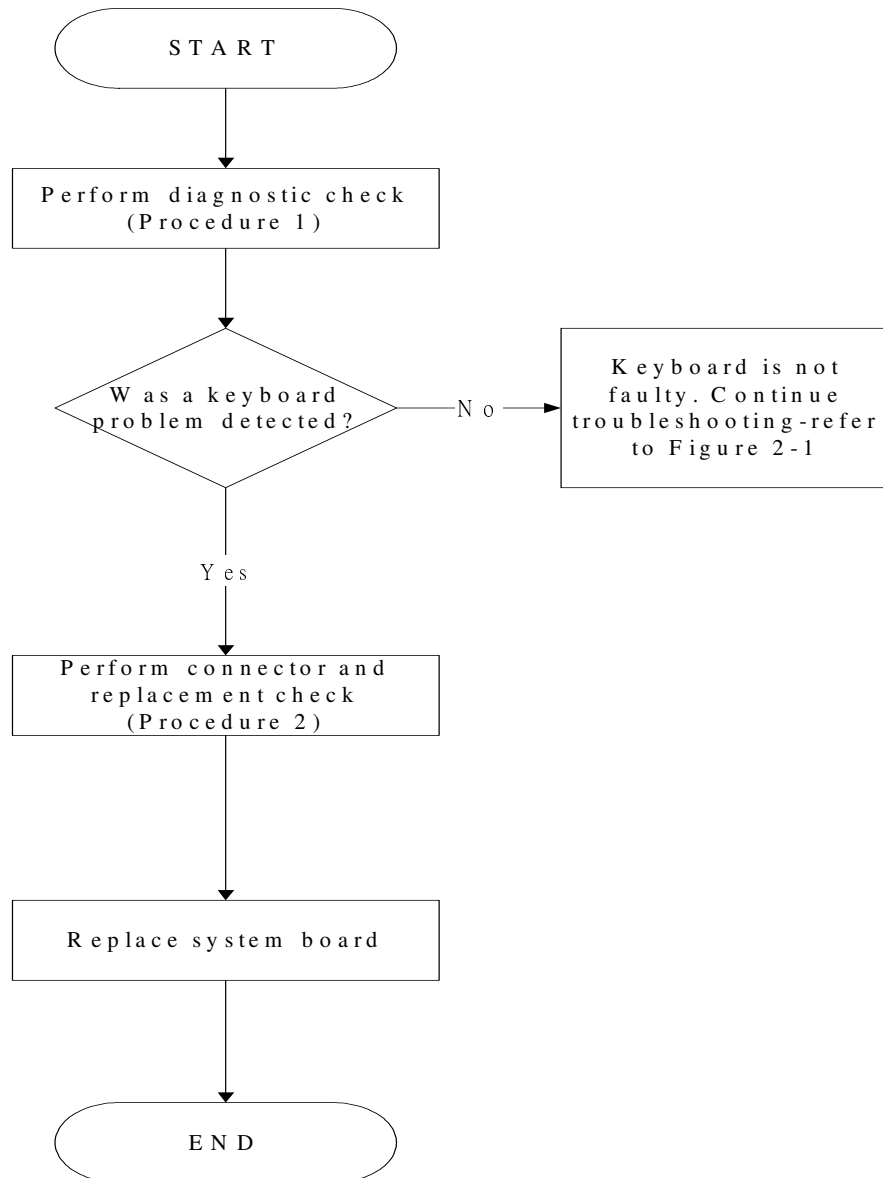


Figure 2-4 Keyboard troubleshooting process

To determine if the computer's 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 1. If there is still an error, go to Check 2.

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

If the problem still exists, perform Check 3.

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

## 2.6 External USB Devices Troubleshooting

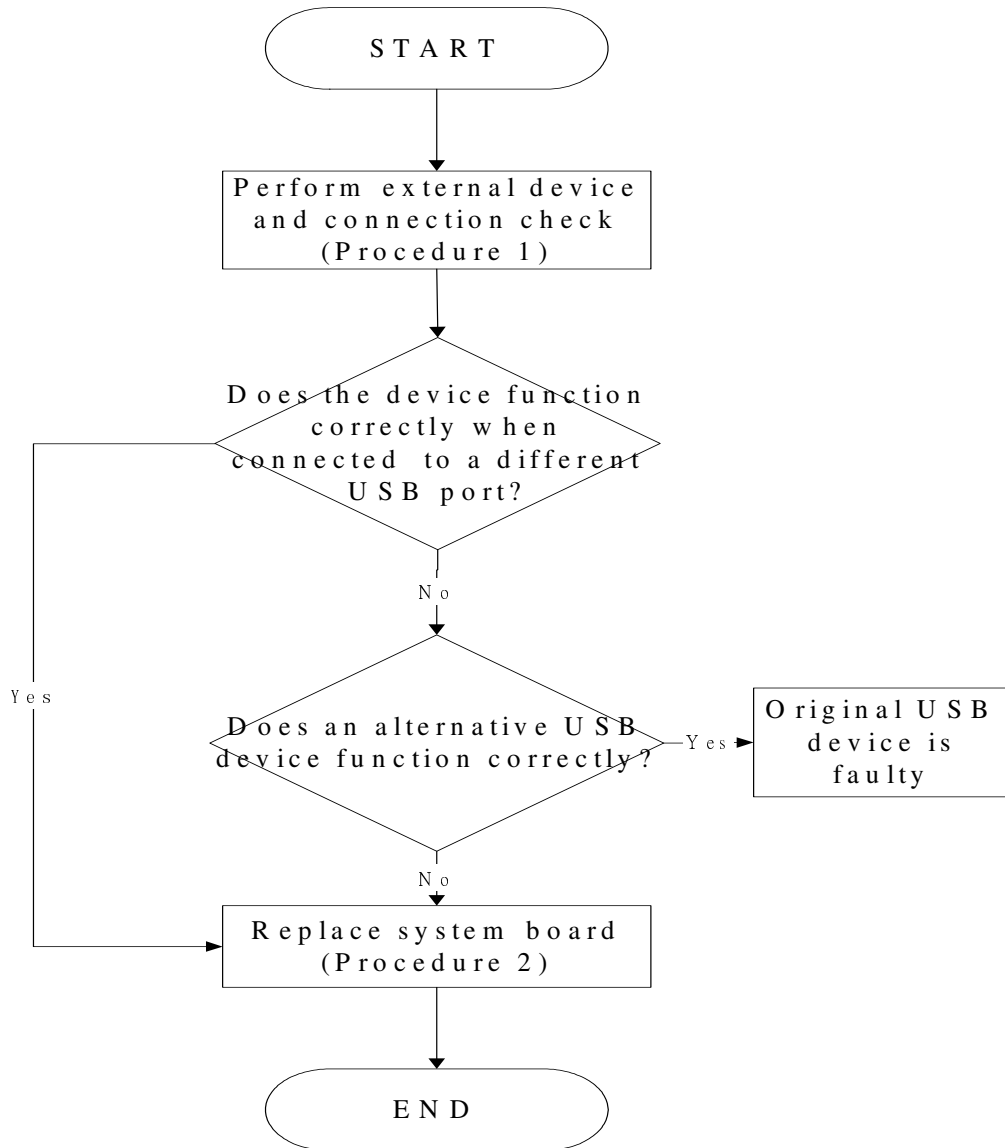


Figure 2-5 External USB device troubleshooting process

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 2-5 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 TV-Tuner Failure Troubleshooting

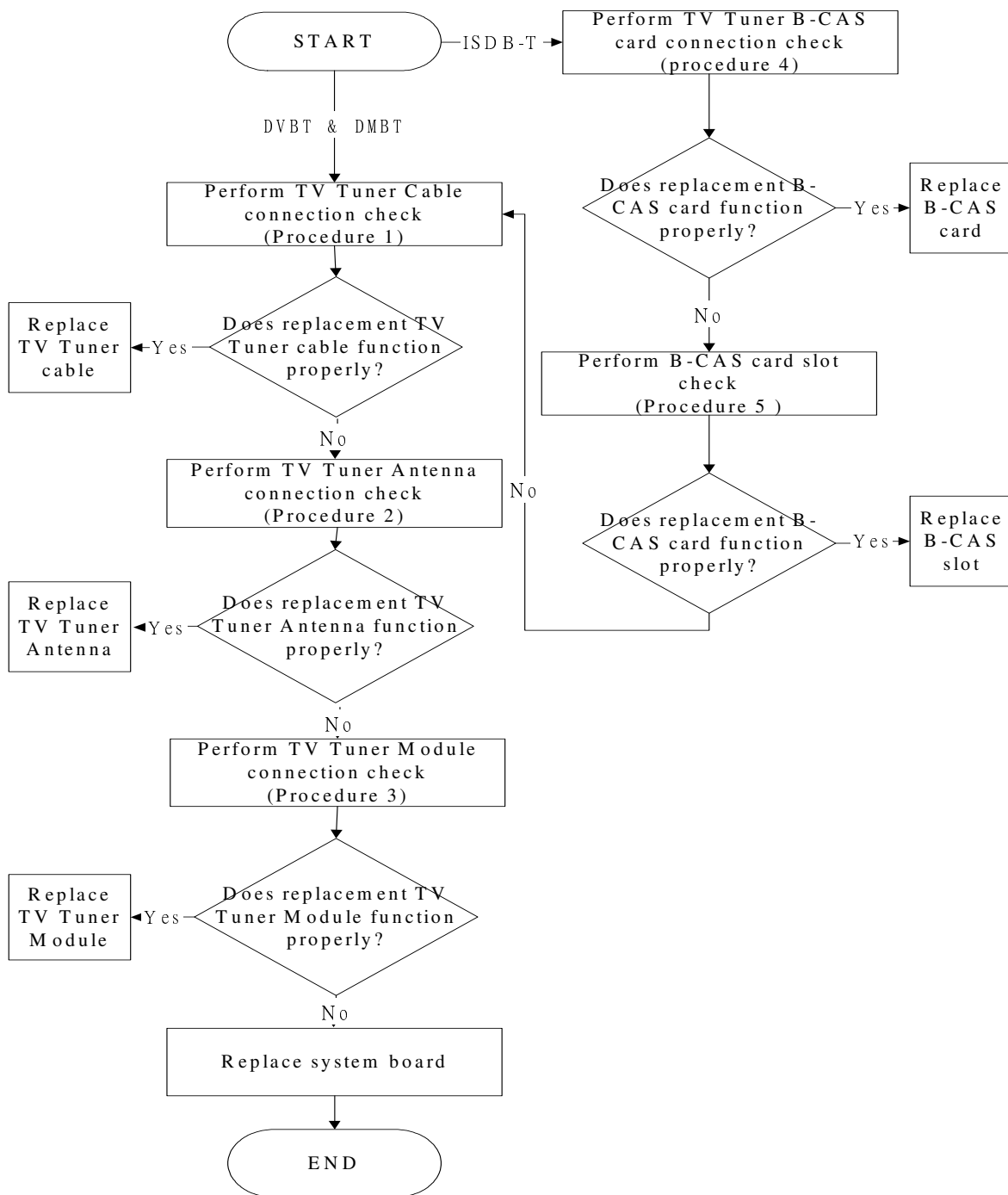


Figure 2-6 TV-out troubleshooting process

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

Procedure 1: TV Tuner cable connection check

Procedure 2: TV Tuner Antenna connection check

Procedure 3: TV Tuner Module connection check

### **Procedure 1 TV tuner Cable connection check**

The TV Tuner cable may be damaged or the connections may be loose. Use windows application to check device can work fine or not. If an error is located, Perform Check 1:

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

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

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

### **Procedure 2 TV tuner Antenna connection check**

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

Check 1 Make sure TV Tuner Antenna is firmly plugged into both the TV Tuner Module. If the antenna is connected correctly, go to Check 2.

Check 2 Try connecting a different TV tuner Antenna to the computer. If the replacement TV tuner Antenna works, the original Antenna may be damaged. If the replacement Antenna does not work the TV tuner Module may be damaged. Go to Procedure 4.

### **Procedure 3 TV Tuner Module Connection check**

The TV Tuner Module connect may be faulty. Perform Check 1:

Check 1 Check the TV Tuner Module is firmly plugged into system board, if connection was correctly, go to check 2.

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

## 2.8 Touch Pad Troubleshooting

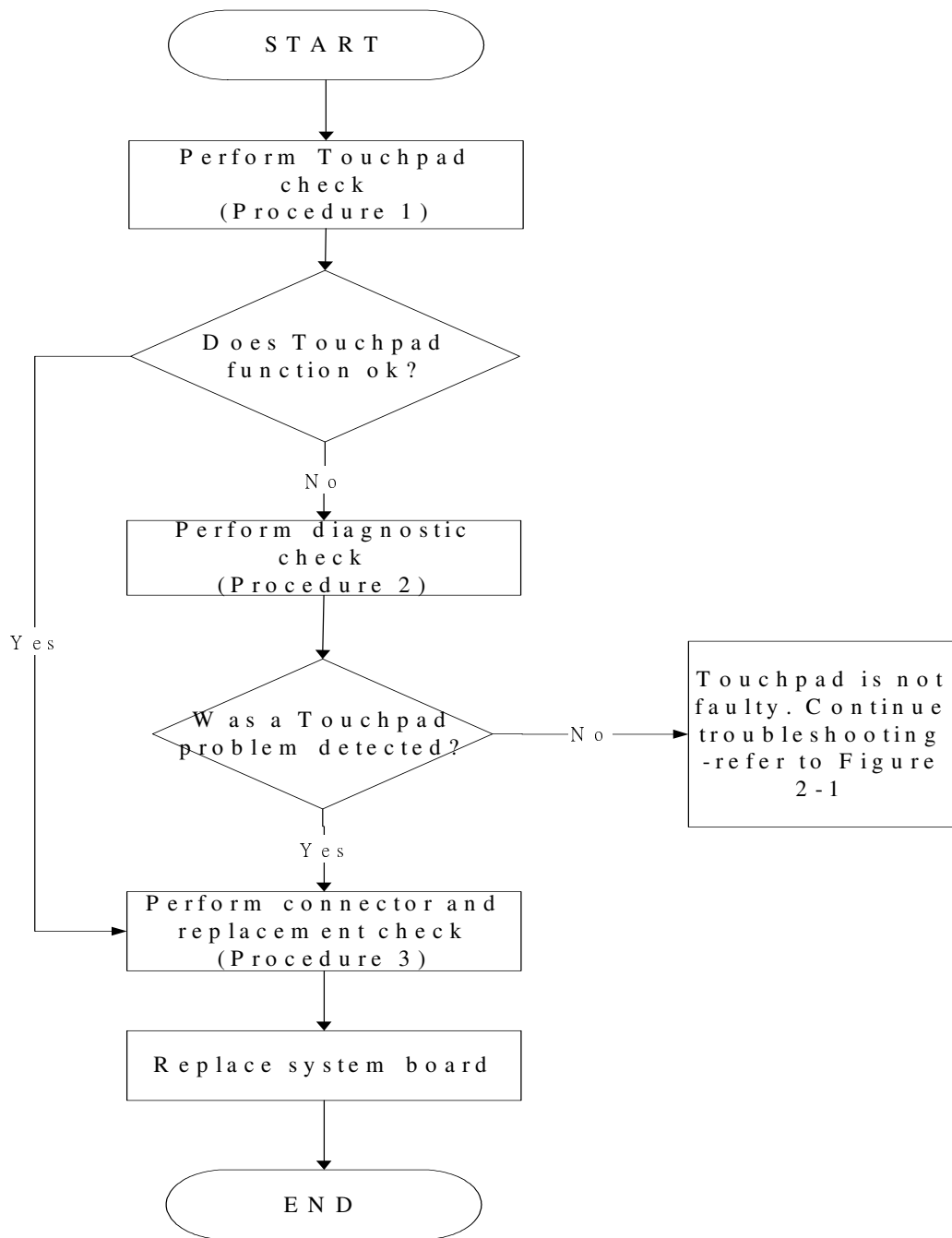


Figure 2-7 Touchpad troubleshooting process



To determine if the computer's built-in Touchpad is functioning properly, perform the following procedures. Figure 2-7 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.

## 2.9 Speaker Troubleshooting

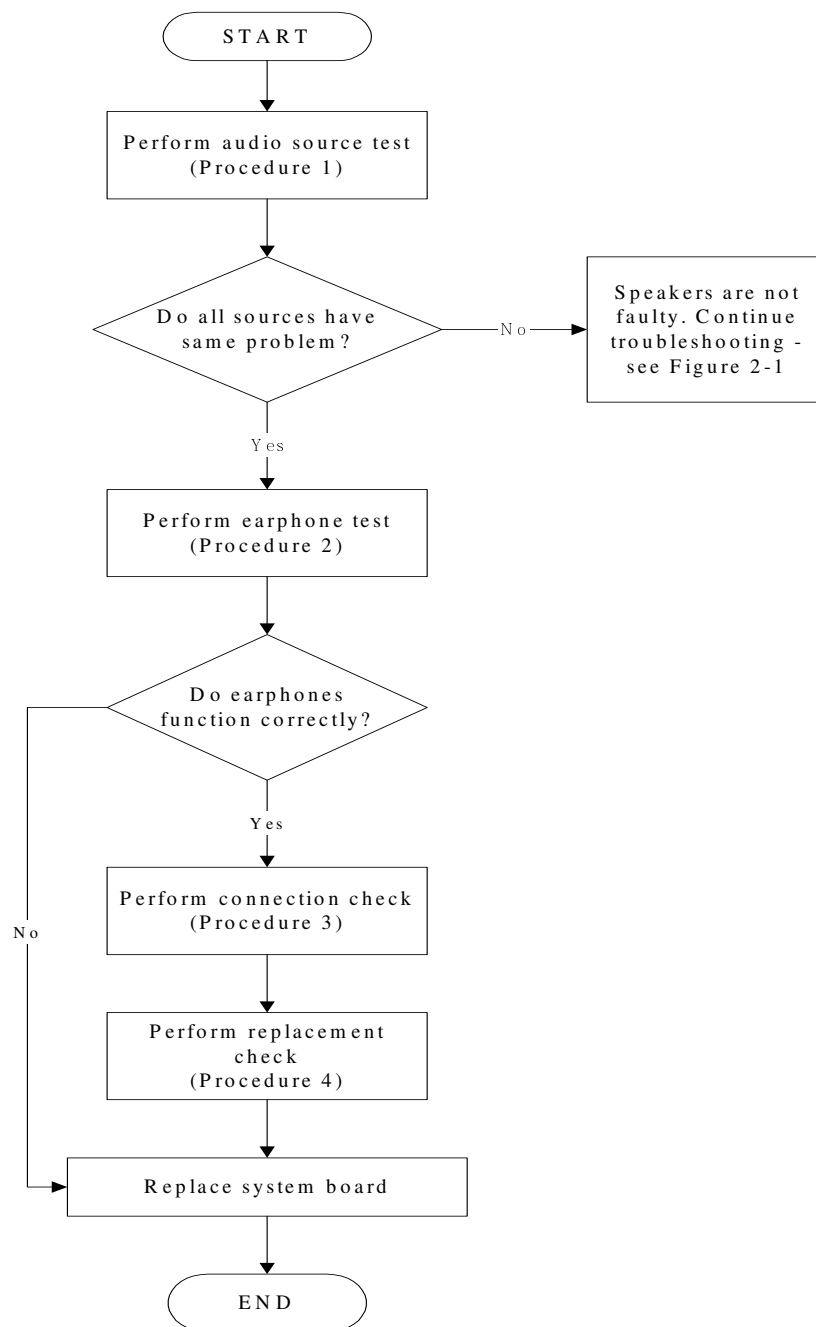


Figure 2-8 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 2-8 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

Procedure 1: Audio source test

Procedure 2: Earphone test

Procedure 3: Connection check

Procedure 4: Replacement check

### **Procedure 1      Audio source test**

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

### **Procedure 2      Earphone test**

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

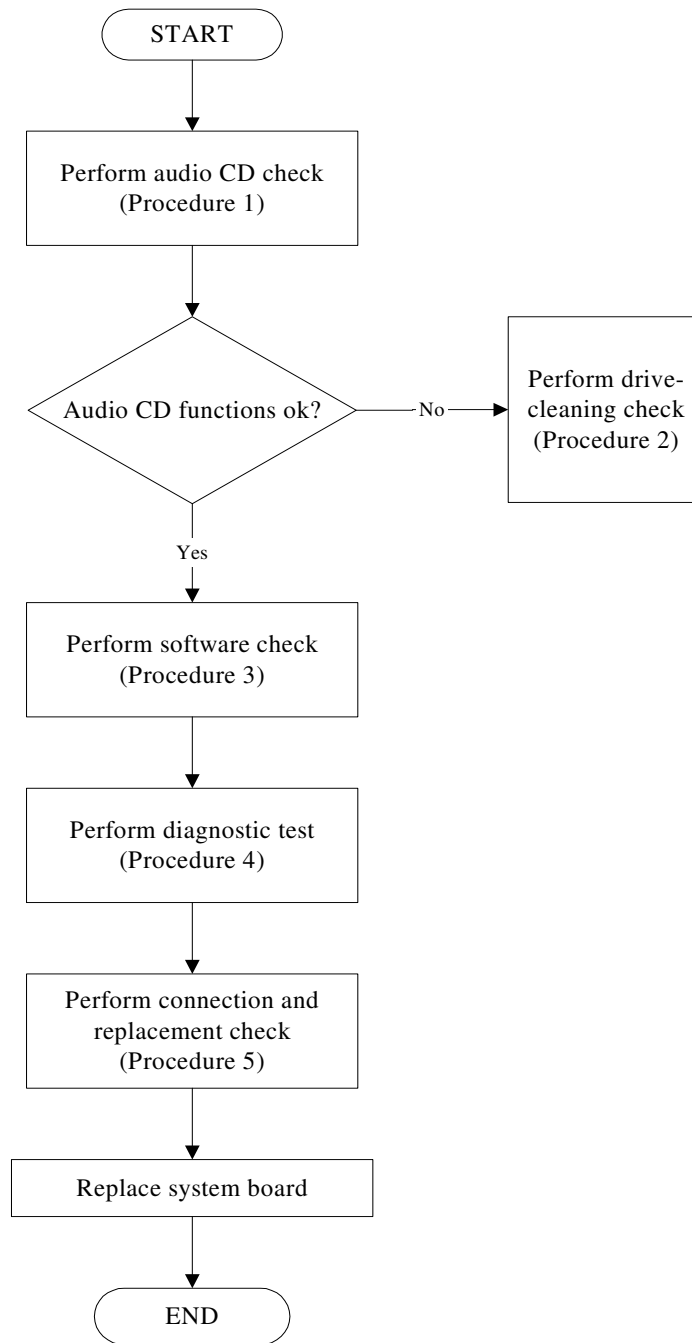
### **Procedure 3      Connection check**

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

### **Procedure 4      Replacement check**

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

## 2.10 Optical Drive Troubleshooting



*Figure 2-9 Optical drive troubleshooting process*

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite/Satellite Pro A660/A665/A667 Series/Dynabook TX/AX Series Maintenance Manual module bays can accommodate the following optical drives:

DVD SuperMulti supporting +-R Double Rayer

Blue-Ray ODD supporting

Figure 2-9 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**

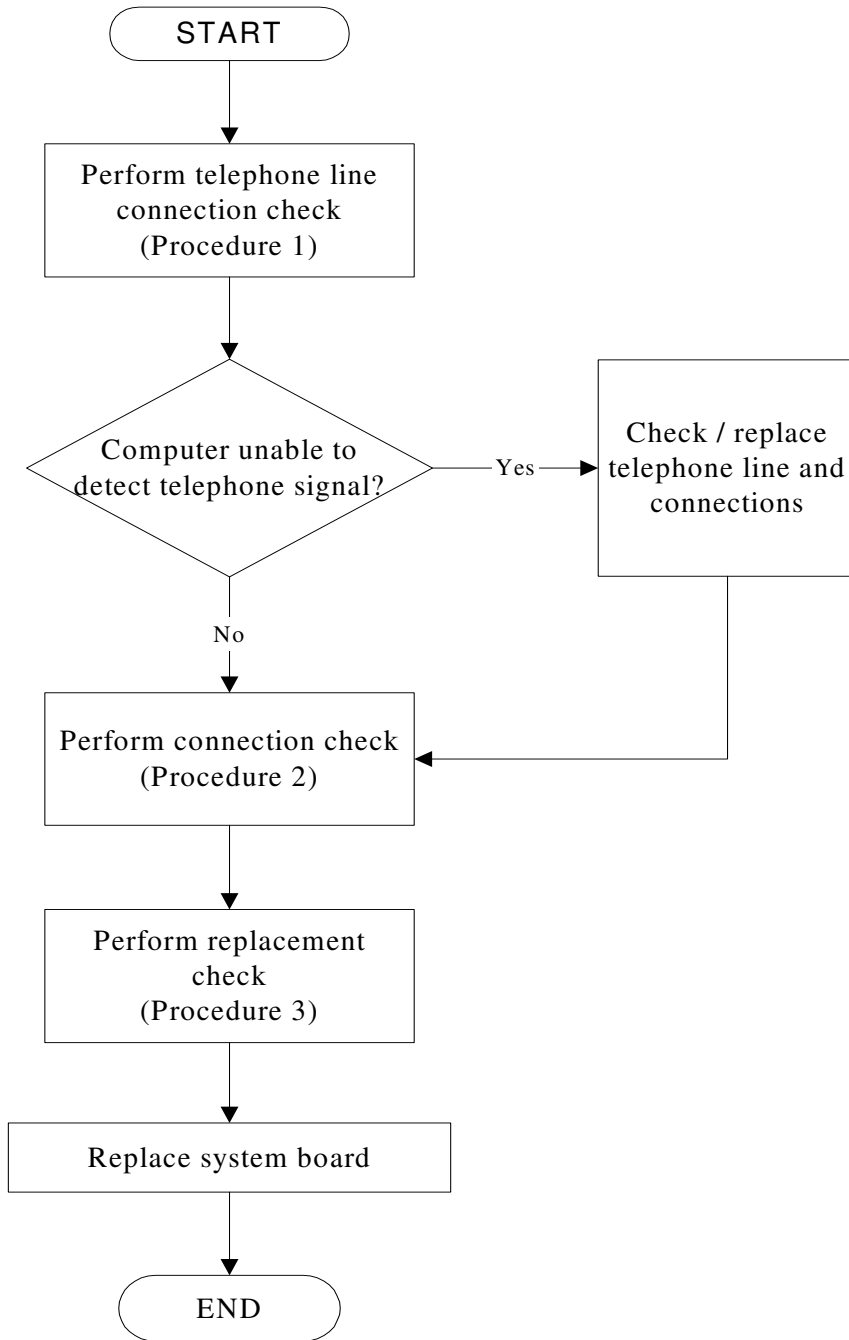
Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

**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*.

## 2.11 Modem Troubleshooting



*Figure 2-10 Modem troubleshooting process*



This section describes how to determine if the computer's modem is functioning properly. Figure 2-10 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.

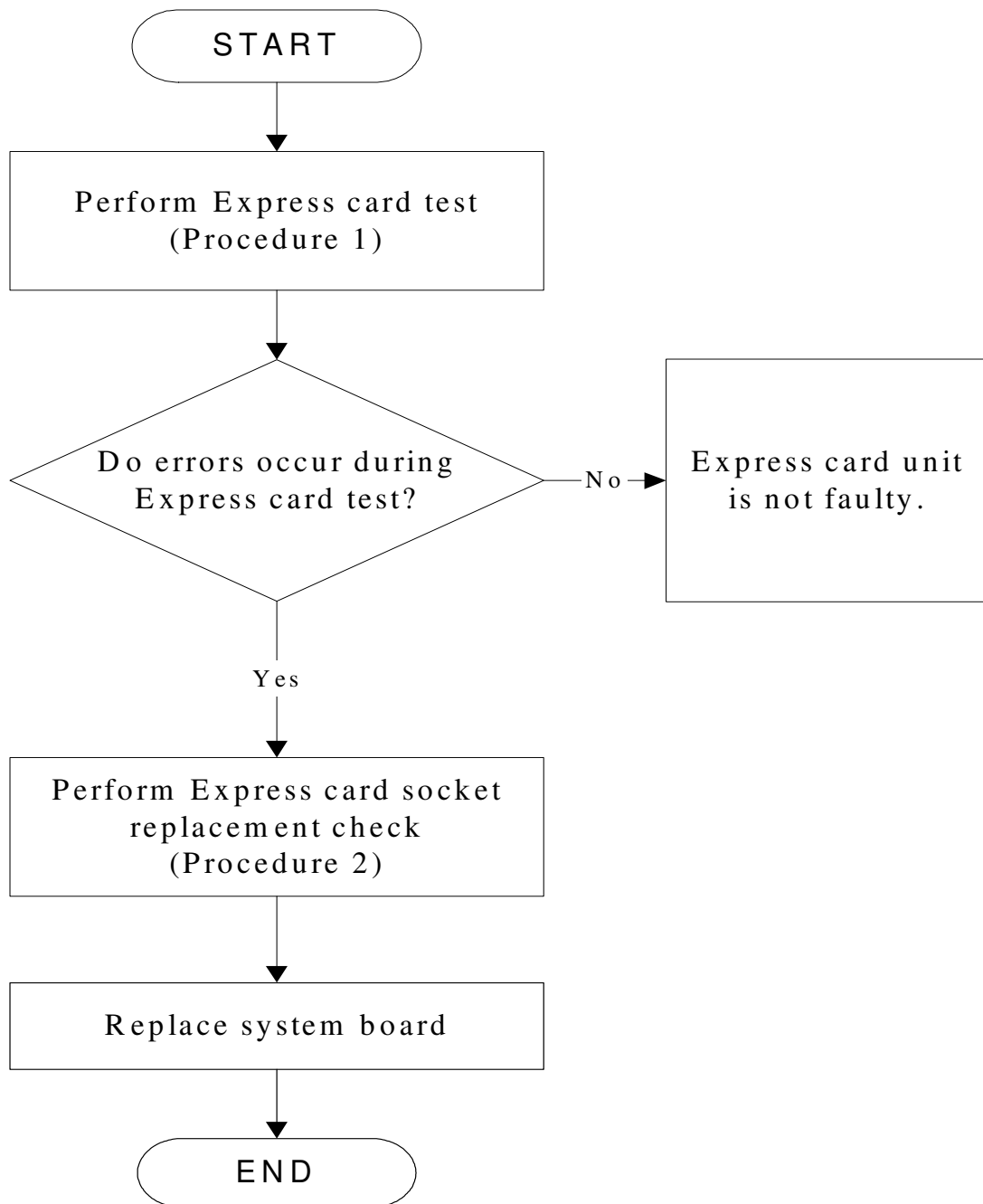
### **Procedure 2 Modem card connection check**

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*.

## 2.12 Express card Troubleshooting



*Figure 2-11 Express card troubleshooting process*

This section describes how to determine if the Express card player is functioning properly. The process is summarized in Figure 2-11. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Express card test

Procedure 2: Express card socket replacement check

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

The Express test card contains an Express test program. Use windows application to check device can work fine or not. Ensure the card is fully inserted into the socket before running the program.

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

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

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

### 2.13 Wireless LAN Troubleshooting

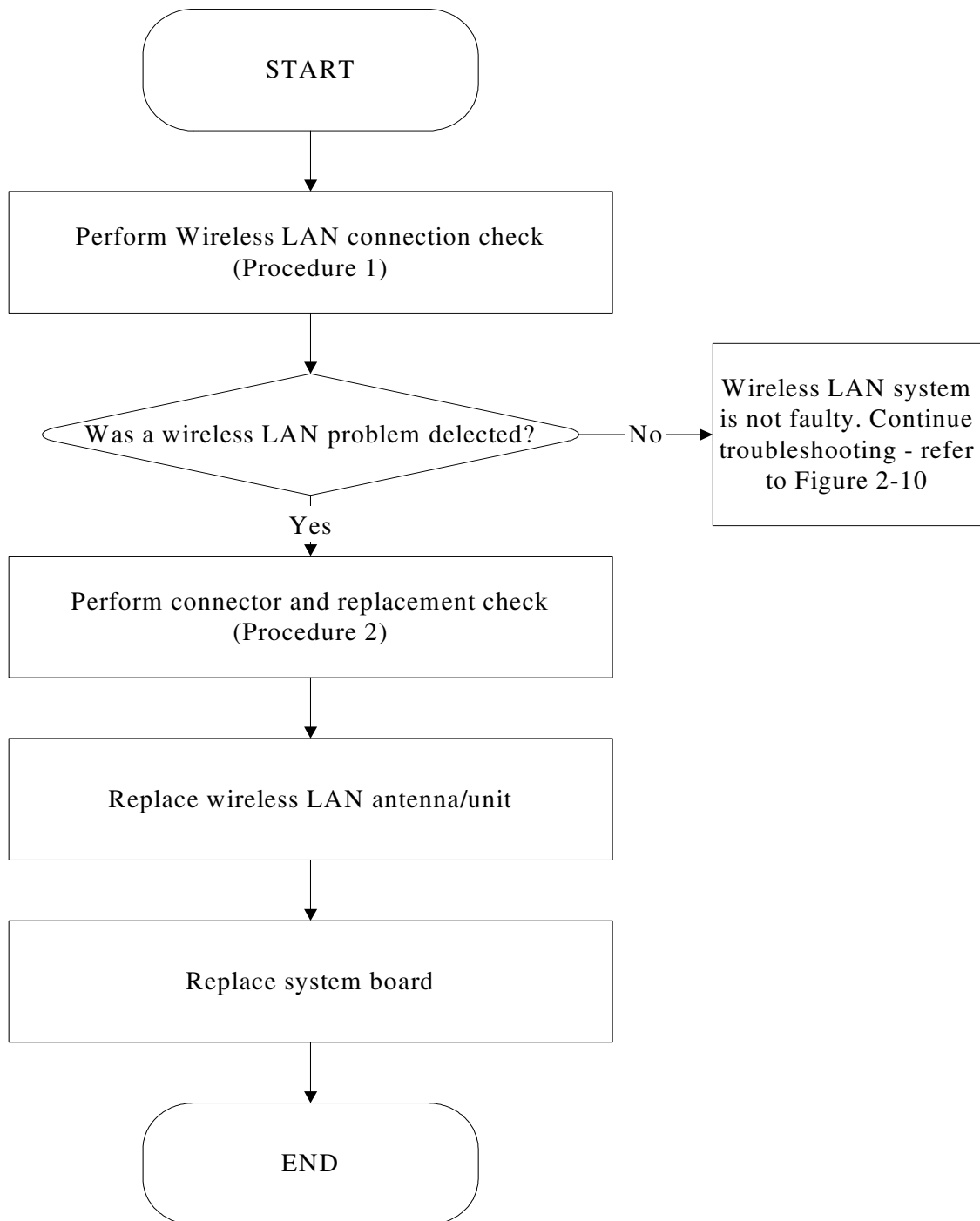


Figure 2-12 Wireless LAN troubleshooting process

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 2-12 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.

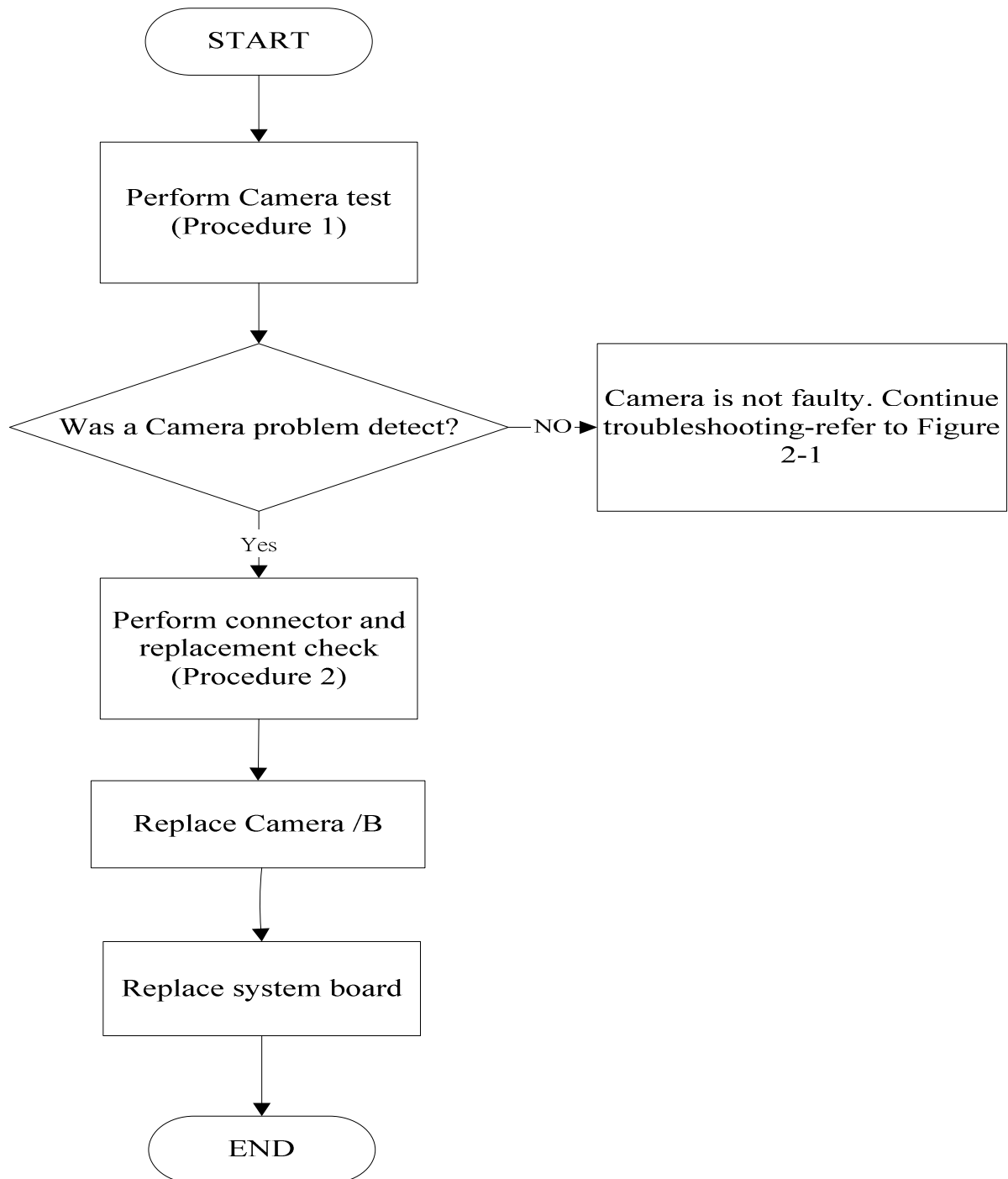
**Procedure 2 Connector and replacement check**

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.

## 2.14 Camera Troubleshooting





*Figure 2-13 Camera troubleshooting process*

The Camera board or system board may be the reason of a Camera fault. Either of these two components may be damaged. To determine if the computer's Camera is functioning properly, perform the following procedures. Figure 2-13 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.

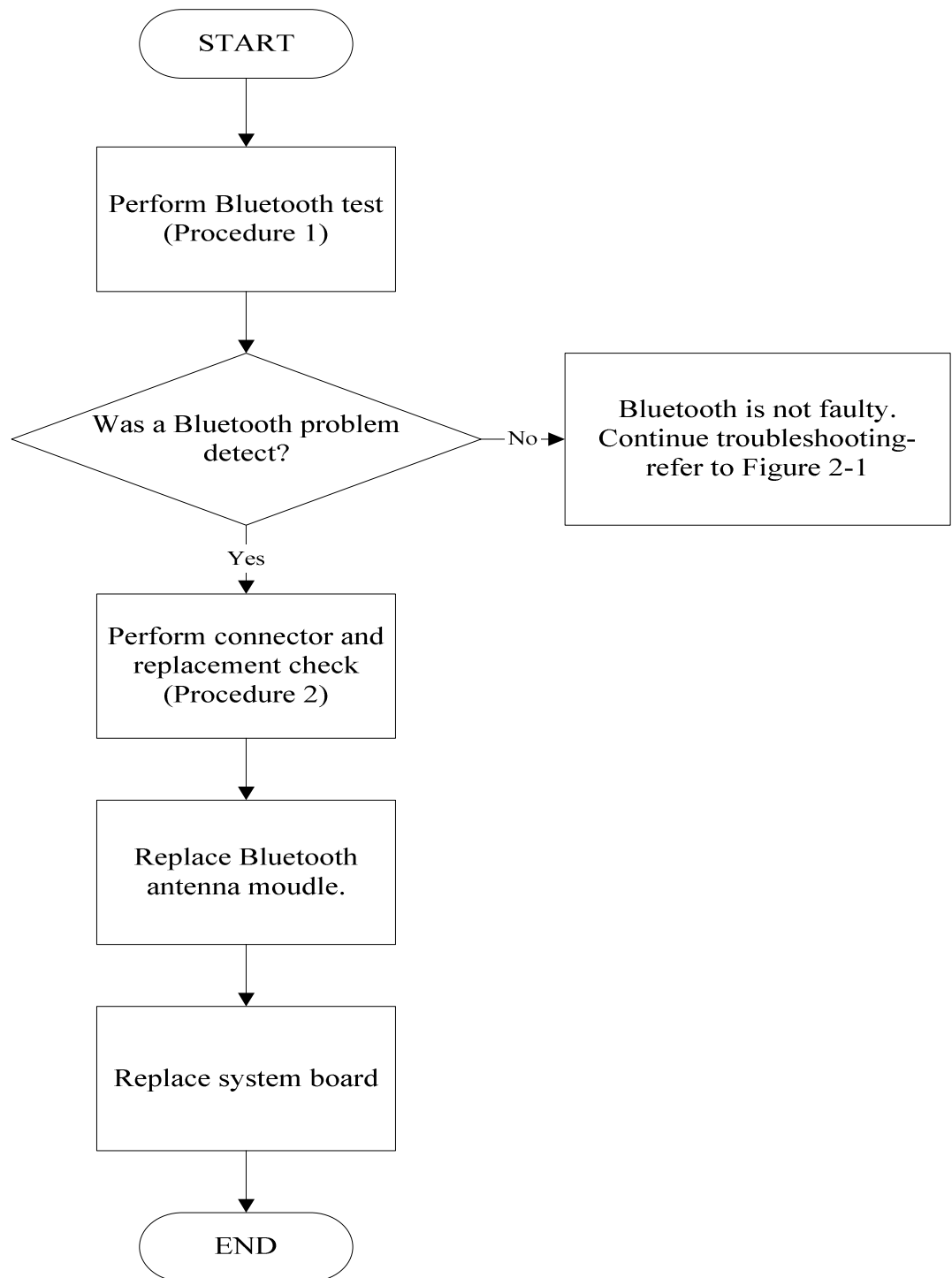
If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the Camera system is functioning properly.

### **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 FFC is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 The Camera board may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 3.
- Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.15 Bluetooth Troubleshooting



*Figure 2-14 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 2-14 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.



## 2.16 Bridge Media Slot Troubleshooting

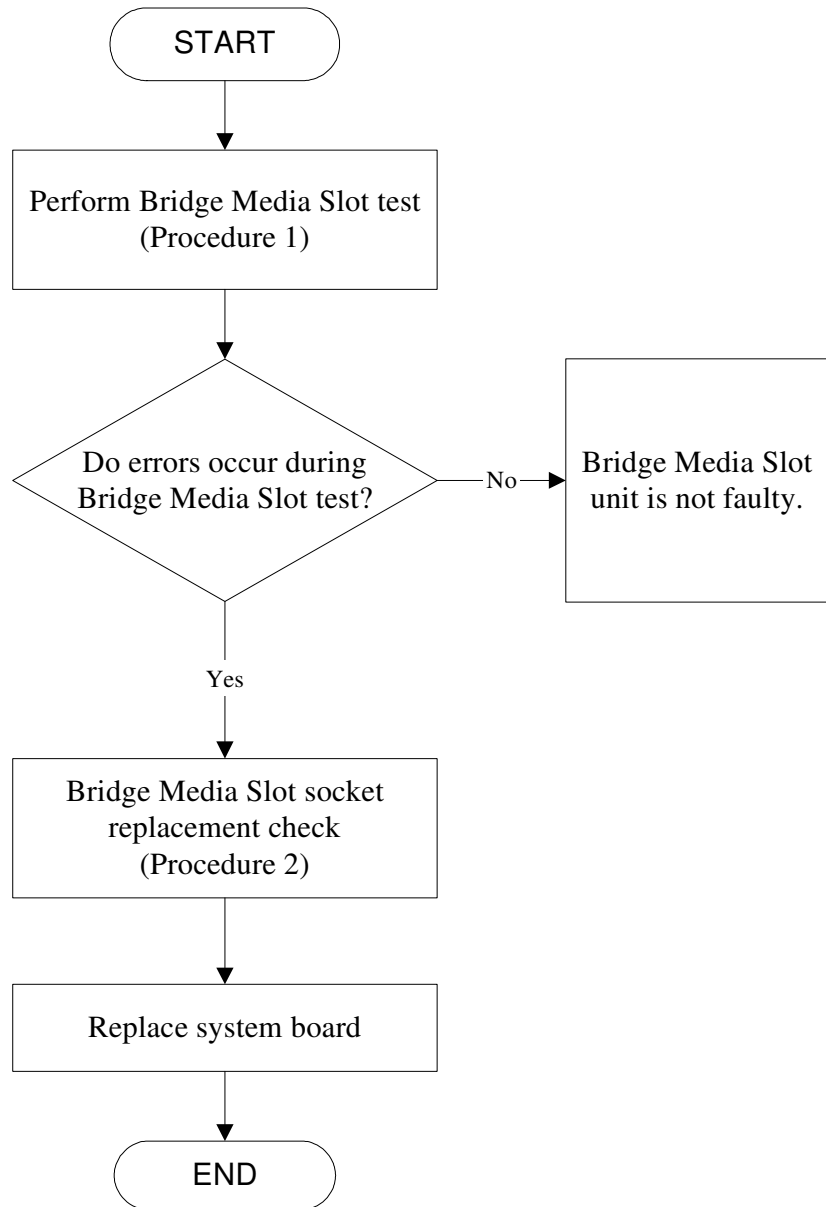


Figure 2-15 5 in 1 card troubleshooting process

This section describes how to determine if the Bridge Media Slot player is functioning properly. The process is summarized in Figure 2-15. 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 is 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.



## 2.17 HDD/SSD Troubleshooting

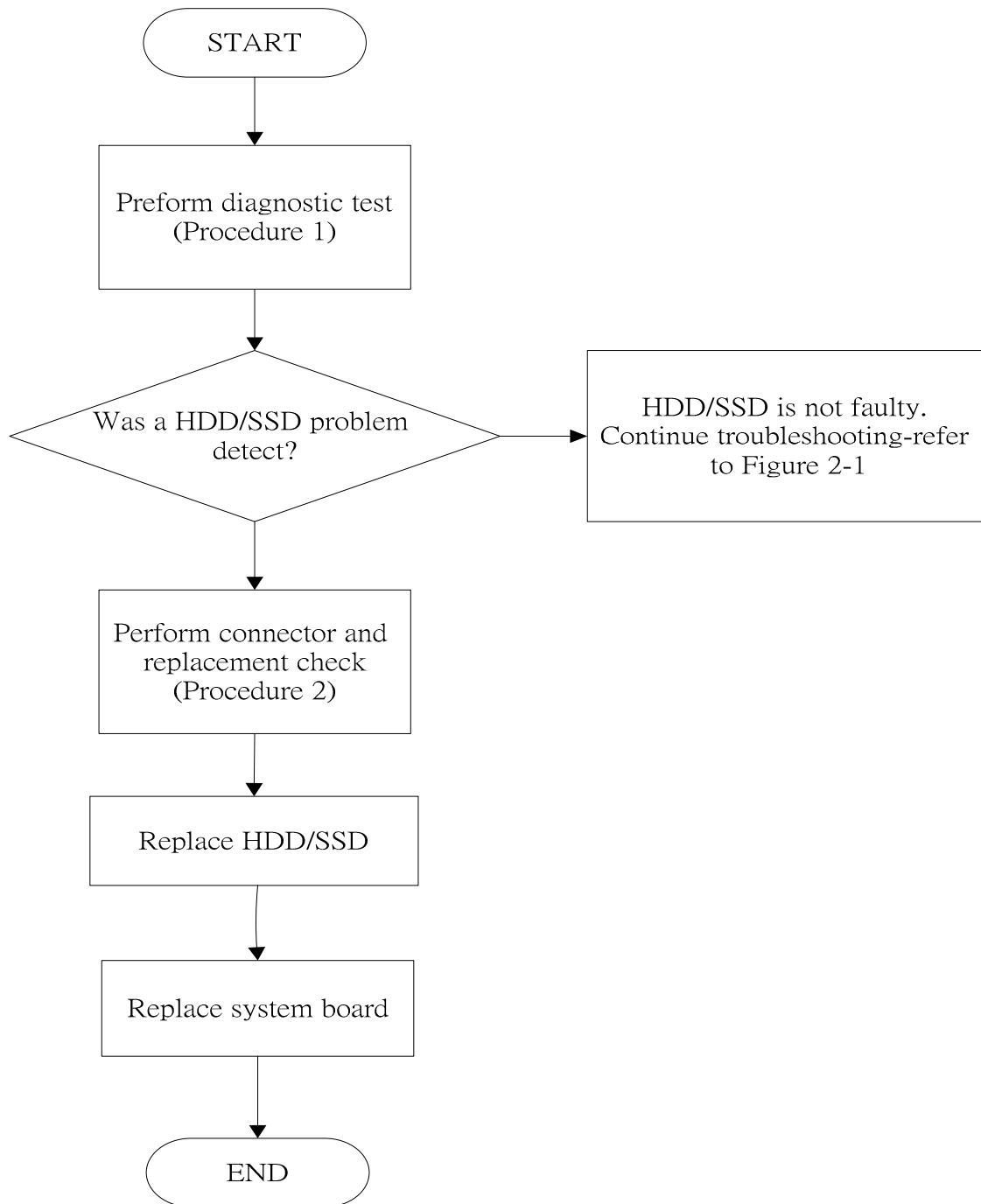


Figure 2-16 HDD/SDD troubleshooting process



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/SSD is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

**Procedure 1 Diagnostic test**

Run the Diagnostic Program, which will automatically execute the 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.

## 2.18 CRT Troubleshooting

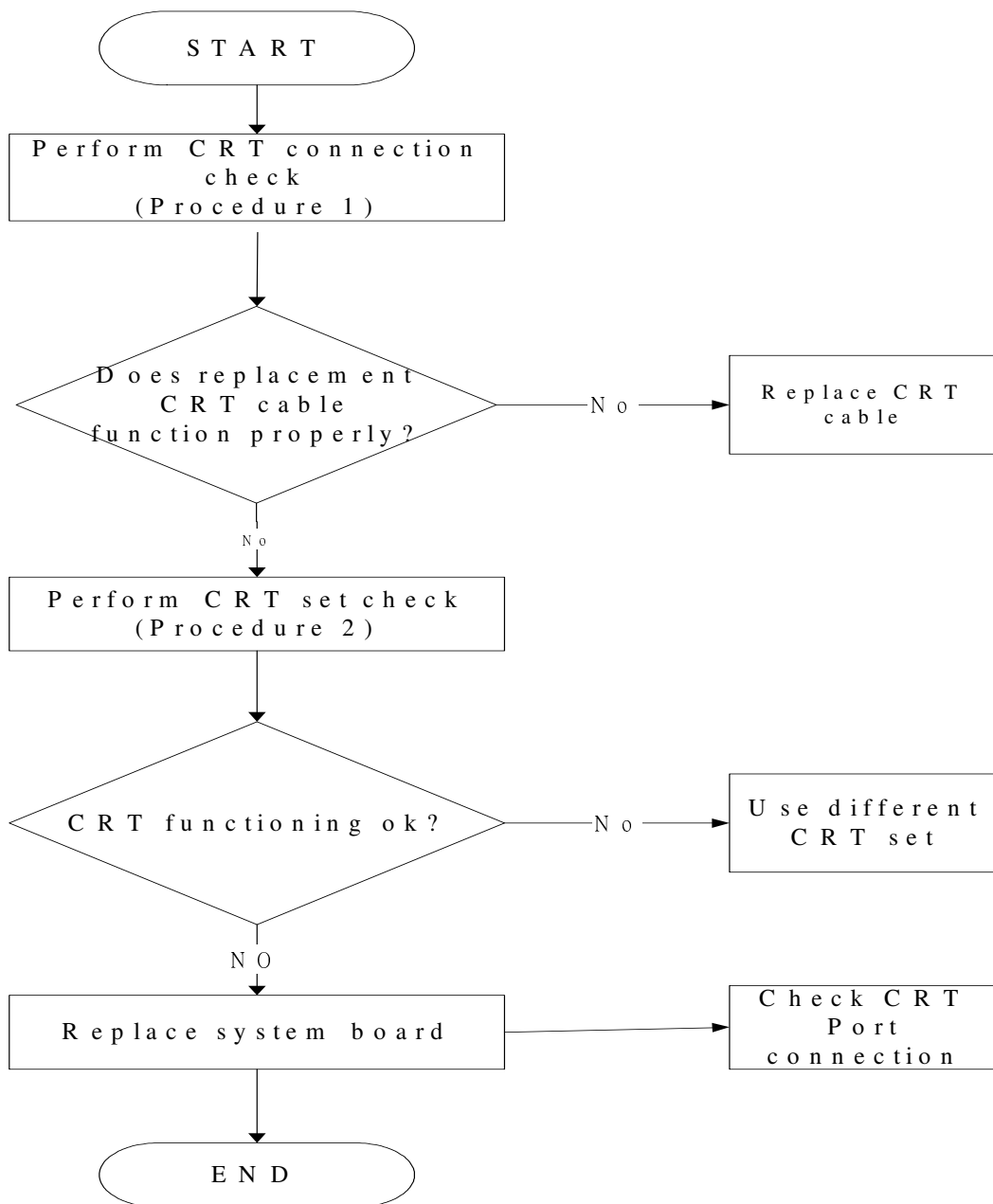


Figure 2-17 CRT troubleshooting process

To determine if the computer's CRT port is functioning properly, perform the following procedures. Figure 2-17 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.

## 2.19 HDMI CEC Troubleshooting

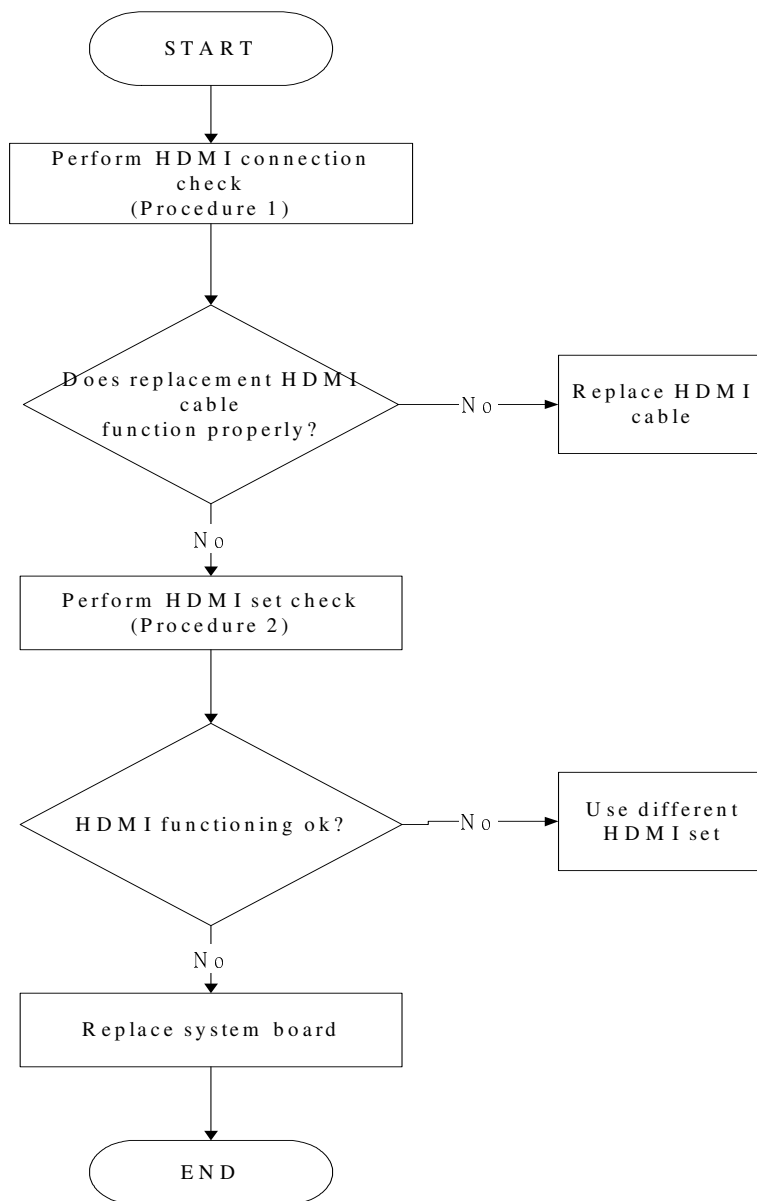


Figure 2-18 HDMI troubleshooting process

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

Procedure 1: HDMI connection check

Procedure 2: HDMI set check

**Procedure 1 HDMI CEC 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.

## 2.20 MIC Troubleshooting

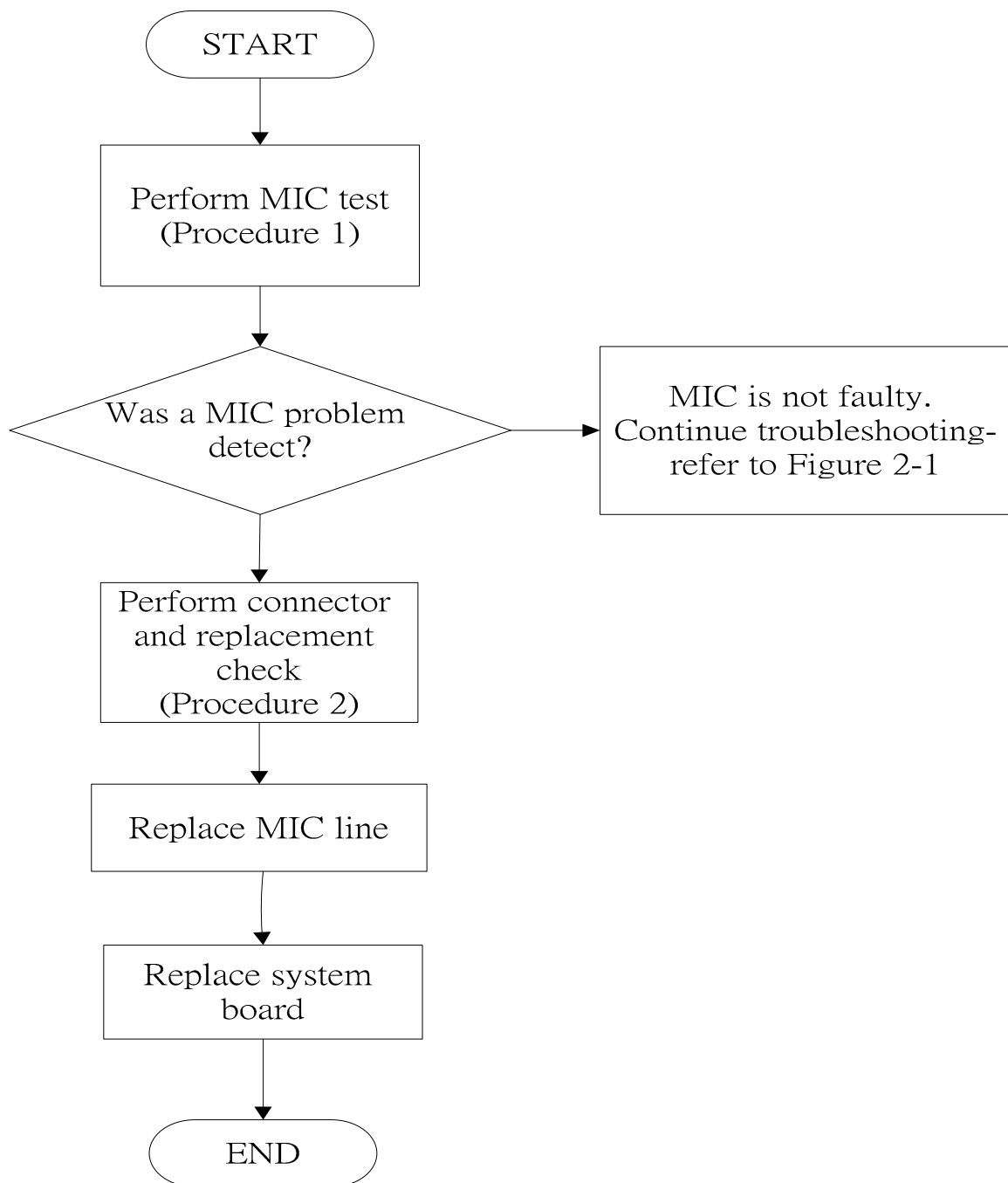


Figure 2-19. MIC troubleshooting process

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 2-19 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.

## 2.21 Finger printer troubleshooting

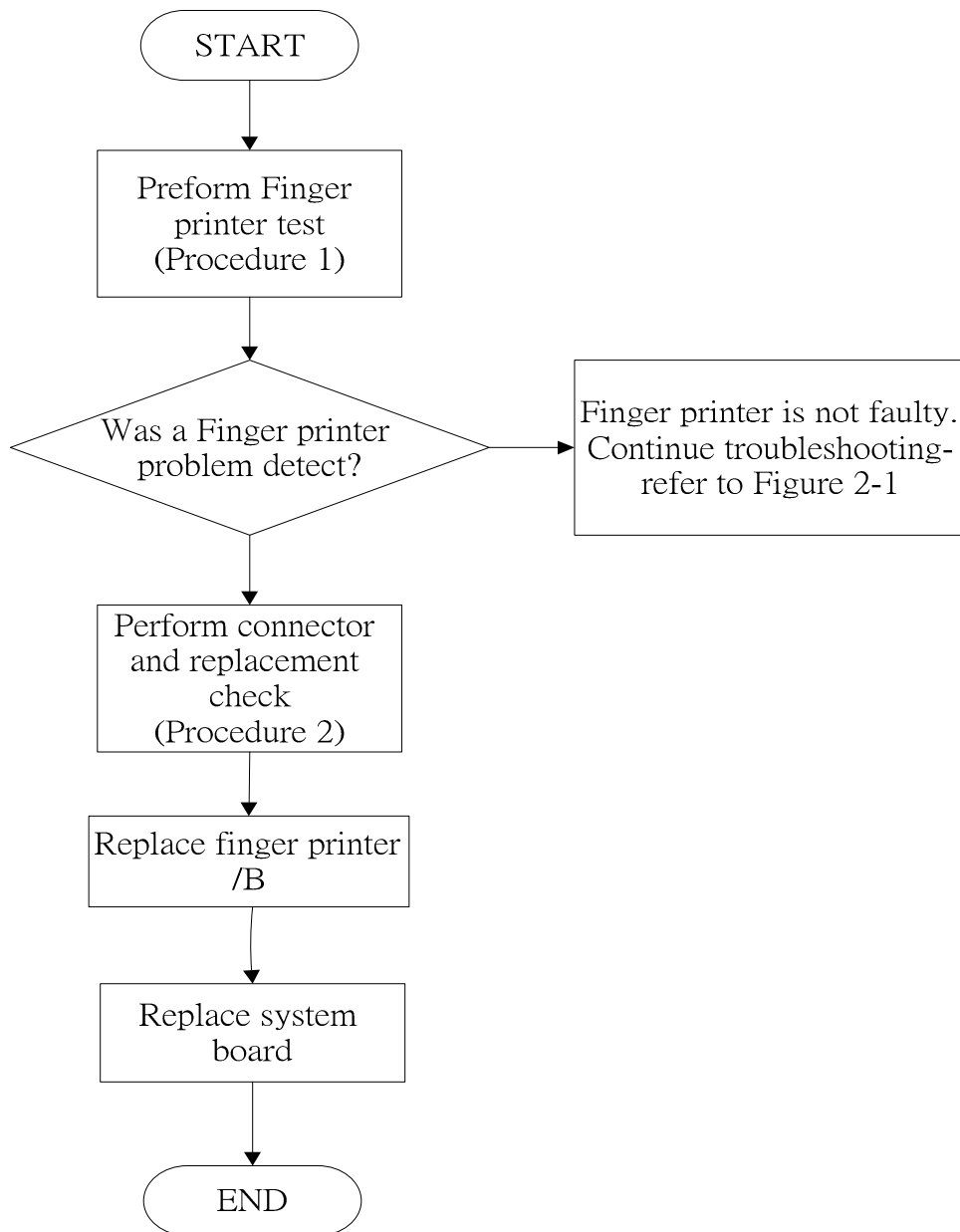


Figure 2-20 Finger printer troubleshooting process



The Finger printer board or system board may be the reason of a finger printer fault. Either of these two components may be damaged. To determine if the computer's Finger printer is functioning properly, perform the following procedures. Figure 2-20 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**

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 Finger printer system is functioning properly.

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

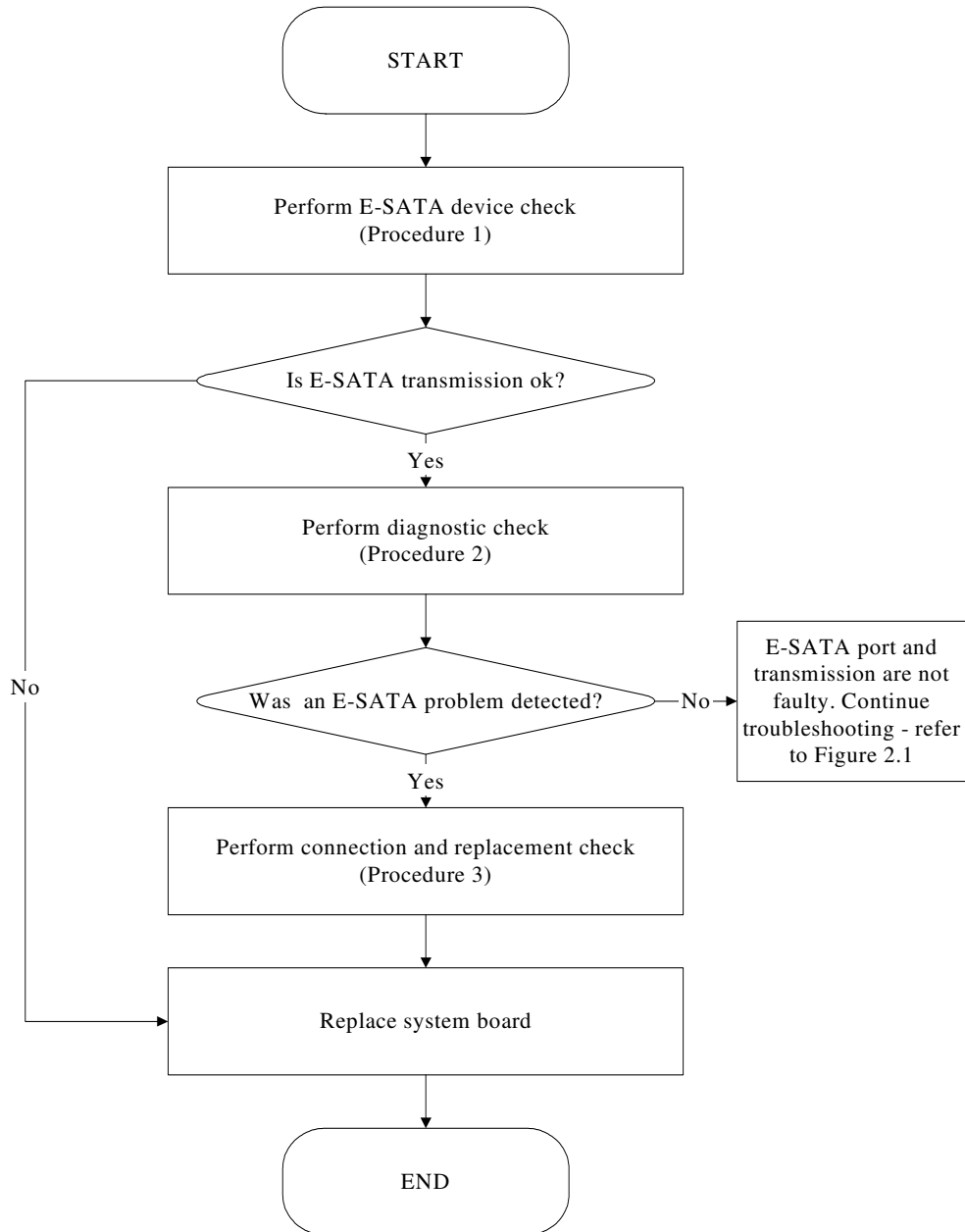
The Finger printer board or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

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

Check 2 The Finger printer board may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 3.

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

## 2.22 E-SATA Troubleshooting



*Figure 2-21 E-SATA troubleshooting process*

To determine if the computer's E-SATA system is functioning properly, perform the following procedures. Figure 2-21 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 E-SATA port, and then boot the computer for Windows7. The computer should automatically detect the E-SATA 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 E-SATA 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 E-SATA 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 E-SATA - compatible device and the E-SATA port of the computer. If the cable is connected correctly, go to Check 2.
- Check 2 Make sure the E-SATA 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.



## 2.23 Felica Troubleshooting

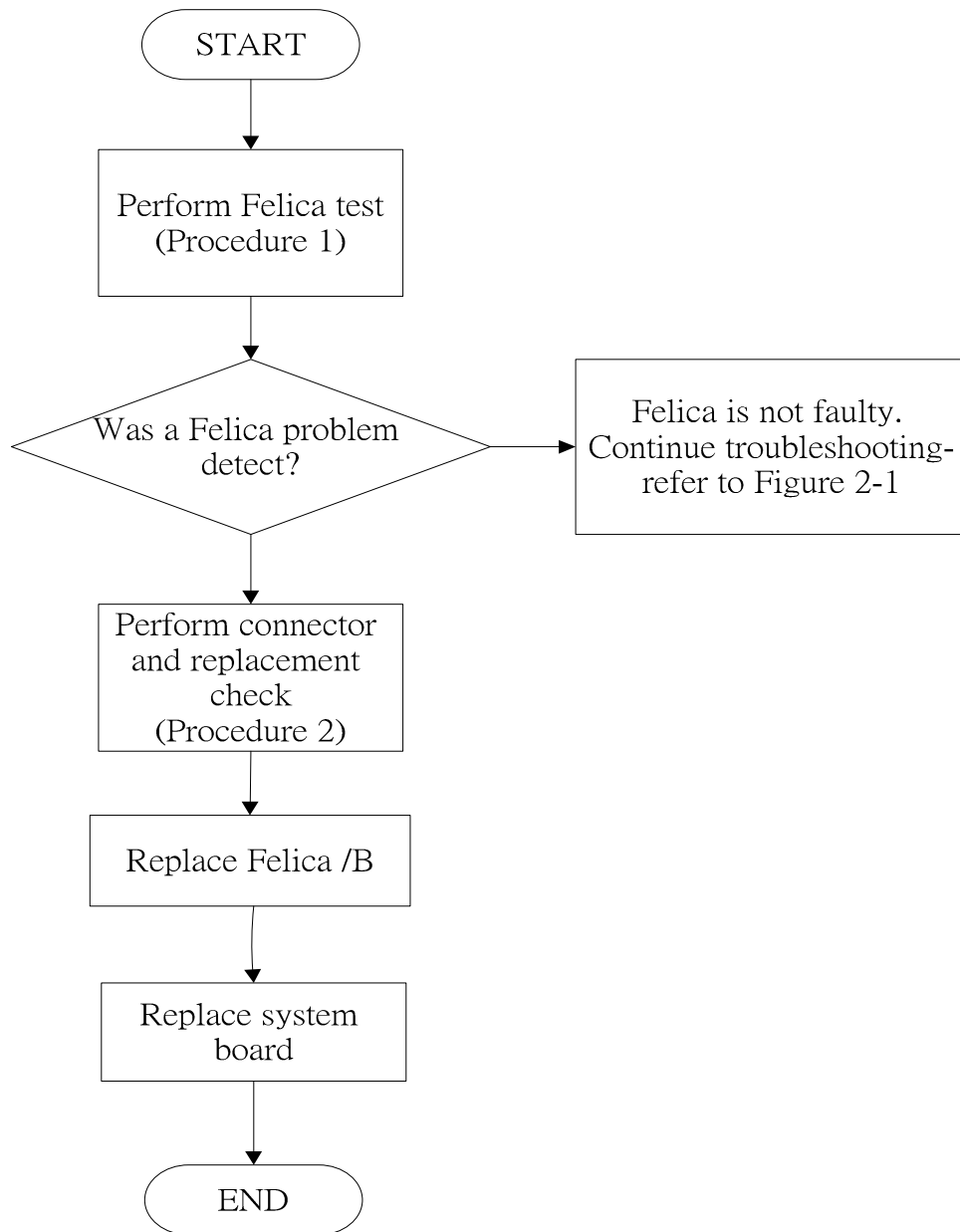


Figure 2-22 Felica troubleshooting process

To determine if the computer's built-in Felica is functioning properly, perform the following procedures. Figure 2-22 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: Felica connection check

Procedure 2: Felica replacement check

### **Procedure 1 Felica connection check**

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

Use windows application to check device can work fine or not .If an error is located, make sure the connection was ok. If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

### **Procedure 2 Felica replacement check**

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

## 2.24 JET Troubleshooting

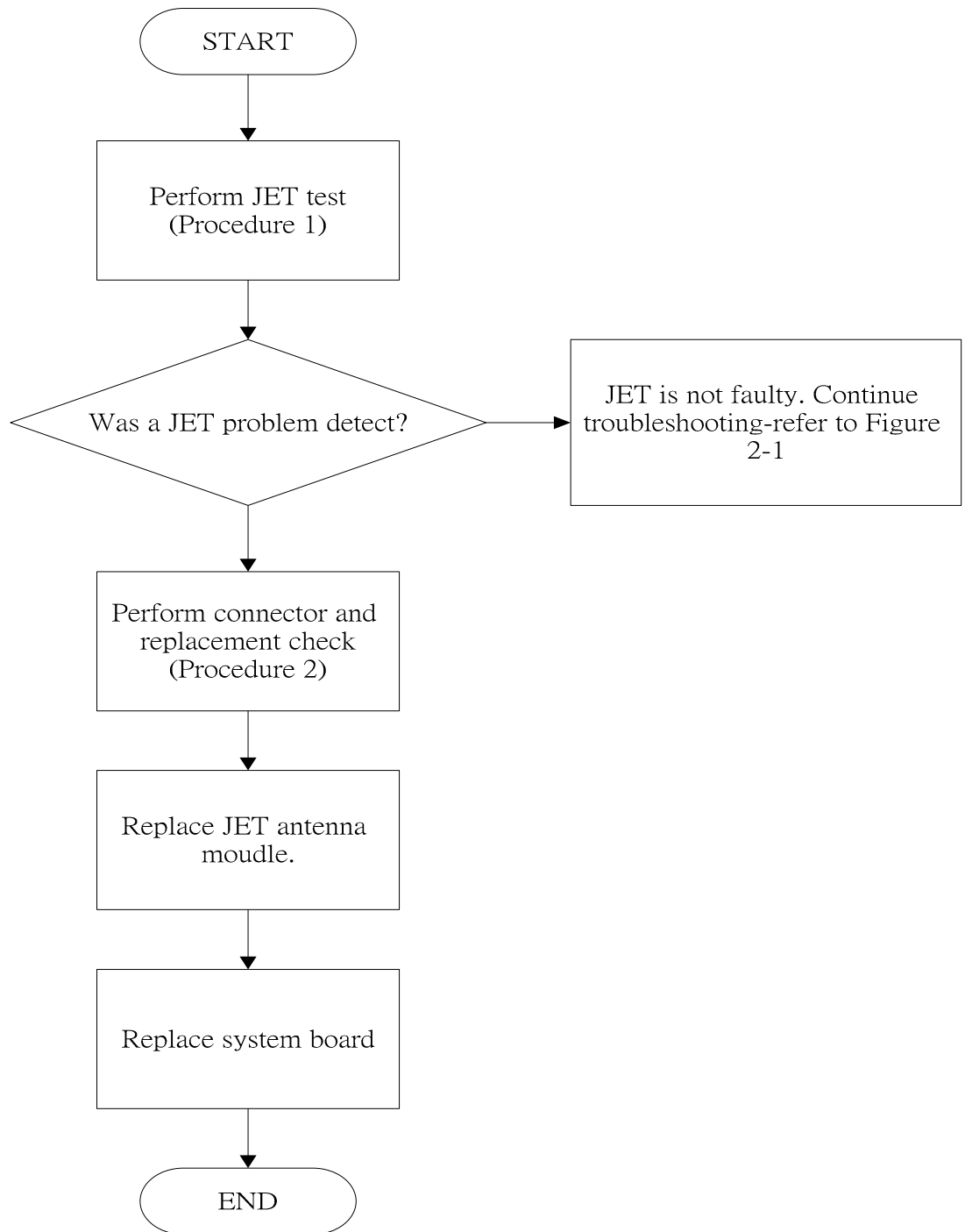


Figure 2-23 JET troubleshooting process

The JET antenna wire, JET module or system board may be the reason of a JET fault. Any of these components may be damaged. To determine if the computer's JET is functioning properly, perform the following procedures. Figure 2-23 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Windows Application check

Procedure 2: Connector and replacement check

**Procedure 1 Windows Application check**

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**

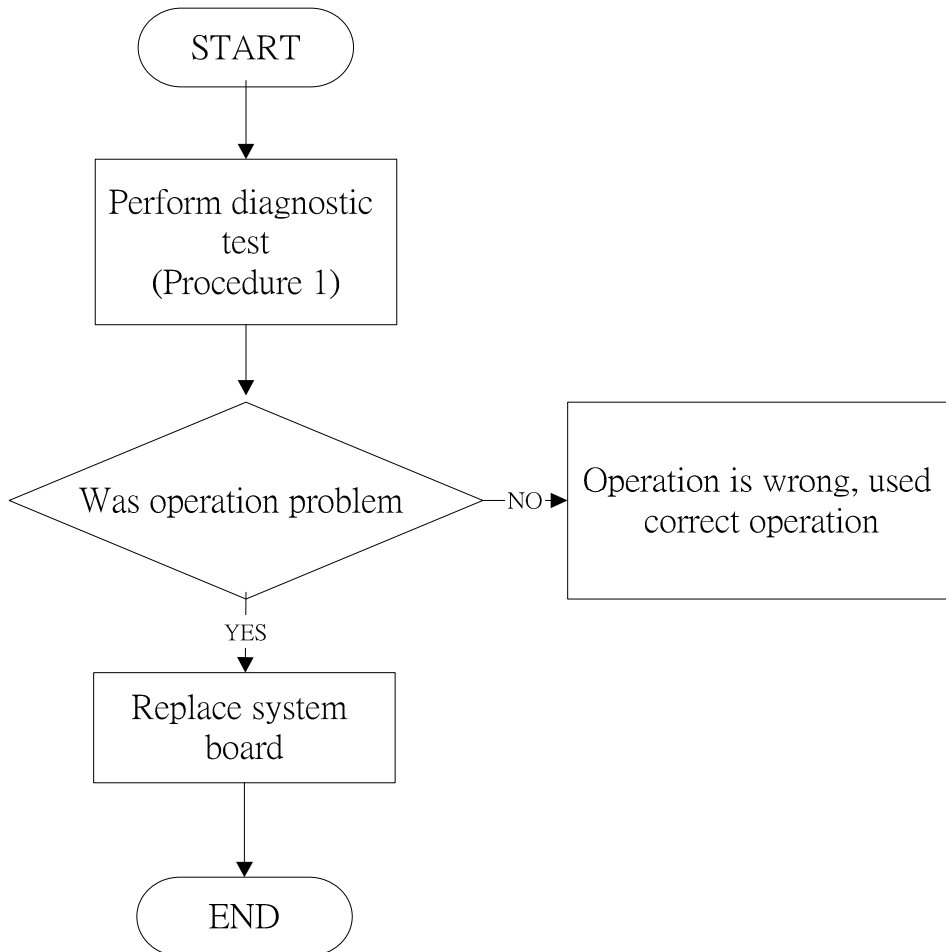
The JET, antenna module or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

- Check 1 Make sure that the JET antenna is firmly connected to the JET module (refer to Chapter 4 for instructions) and that the JET cable is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check that the JET communication switch is turned to "On", and then make sure that the communication LED on the left panel is lit. If the LED is lit but the JET 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 JET communication LED is not lit when the JET communication switch is turned to "On", go to Check 3.
- Check 3 The JET 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.





## 2.25 3D Sensor Troubleshooting



*Figure 2-24 3D sensor troubleshooting process*

The operation or system board may be the reason of 3D sensor fault. Either of these two may be damaged. To determine if the computer's 3D is functioning properly, perform the following procedures. Figure 2-24 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Replacement check

**Procedure 1 Diagnostic test**

Run the functioning Program on Windows model, which will display the 3D test result.

If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the 3D functioning is properly.

**Procedure 2 Replacement check**

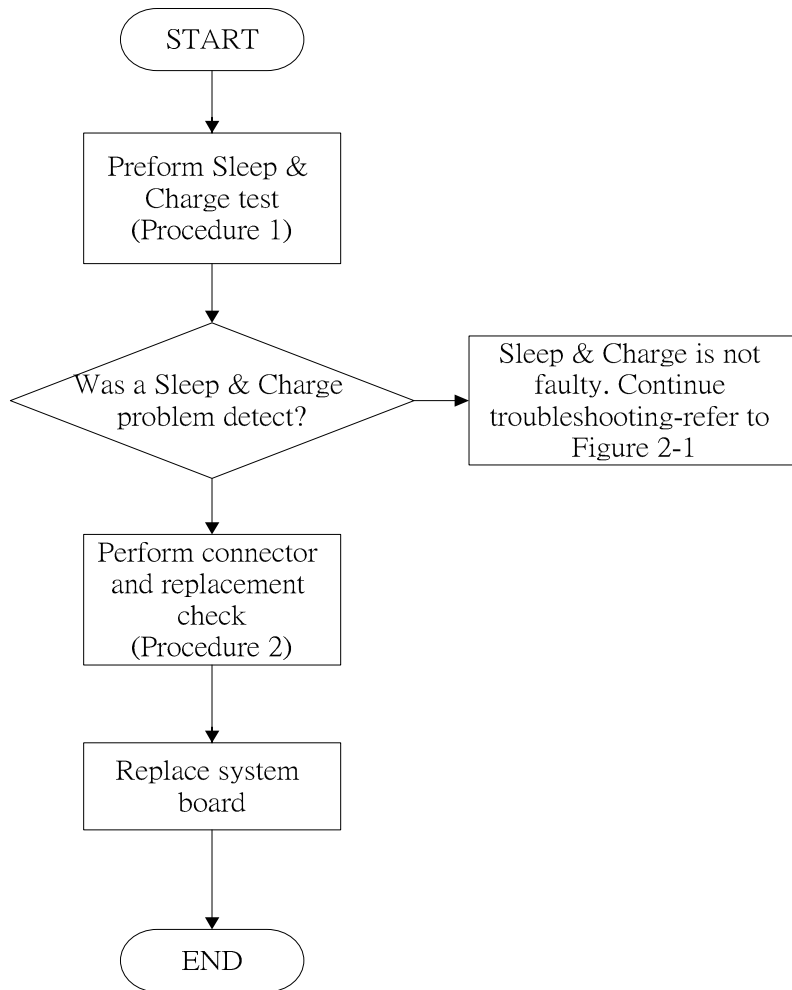
Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

Check 1 Make sure that 3D sensor test operation is correct, go to Check 2.

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



## 2.26 Sleep & Charge Troubleshooting



*Figure 2-25 Sleep & Charge troubleshooting process*

The system board may be the reason of a Sleep & Charge fault. The system board may be damaged. To determine if the computer's Sleep & charge is functioning properly, perform the following procedures. Figure 2-25 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: windows application test

Procedure 2: Replacement check

### **Procedure 1 windows application test**

Use windows application to check function can work fine or not. If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the Sleep & charge is functioning properly.

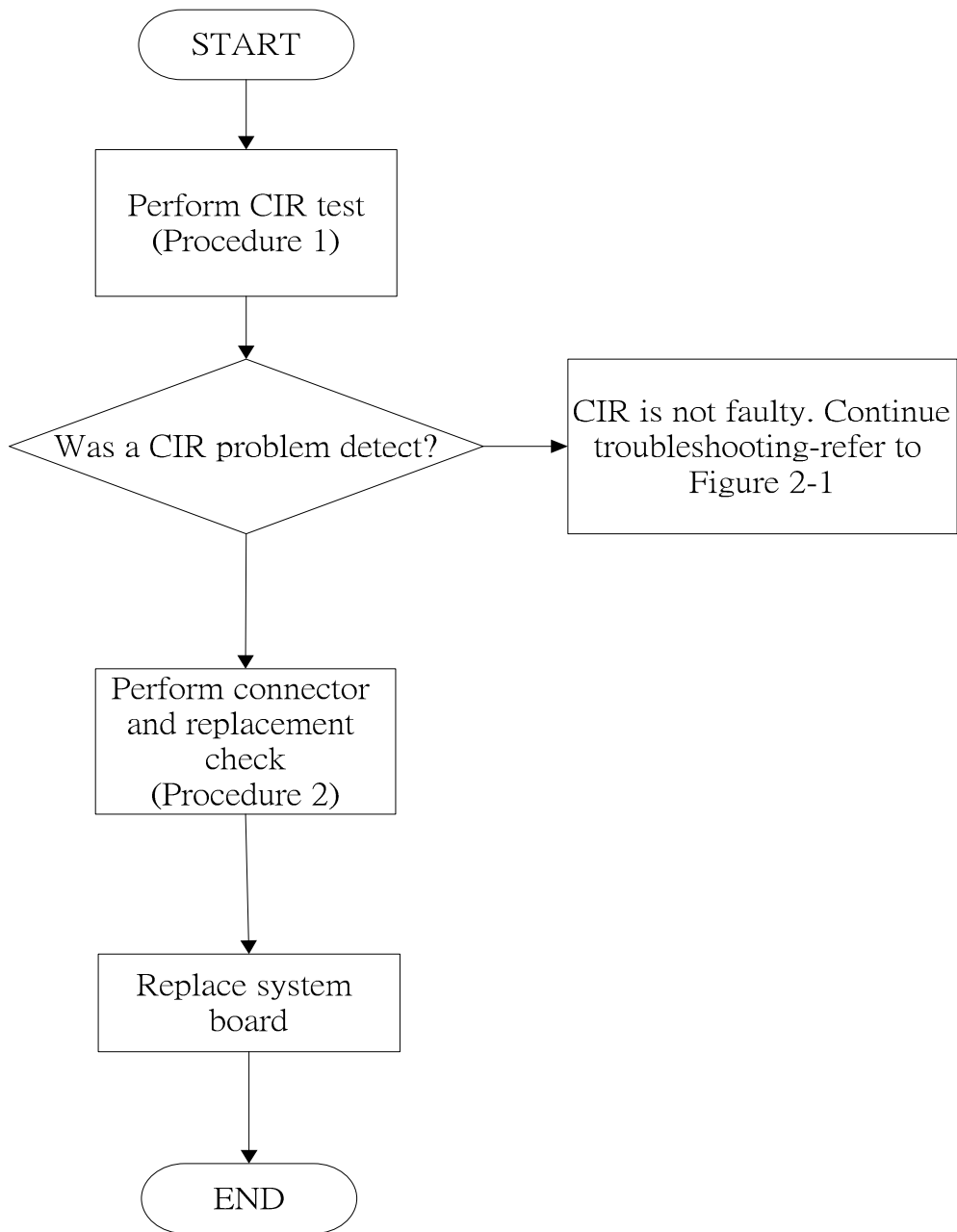
### **Procedure 2 Replacement check**

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

- Check 1 Make sure that Sleep & Charge test operation is correct, go to Check 2.
- Check 2 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.



## 2.27 CIR Troubleshooting



*Figure 2-26 CIR troubleshooting process*



The system board may be the reason of a CIR fault. The system board may be damaged. To determine if the computer's CIR is functioning properly, perform the following procedures. Figure 2-27 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**

Play MP3 in windows, use remote control to check the device can work fine or not.

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

**Procedure 2 Connector and replacement check**

The CIR 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 CIR operation is correct, go to Check 2.

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

## 2.28 Sleep & Play music Troubleshooting

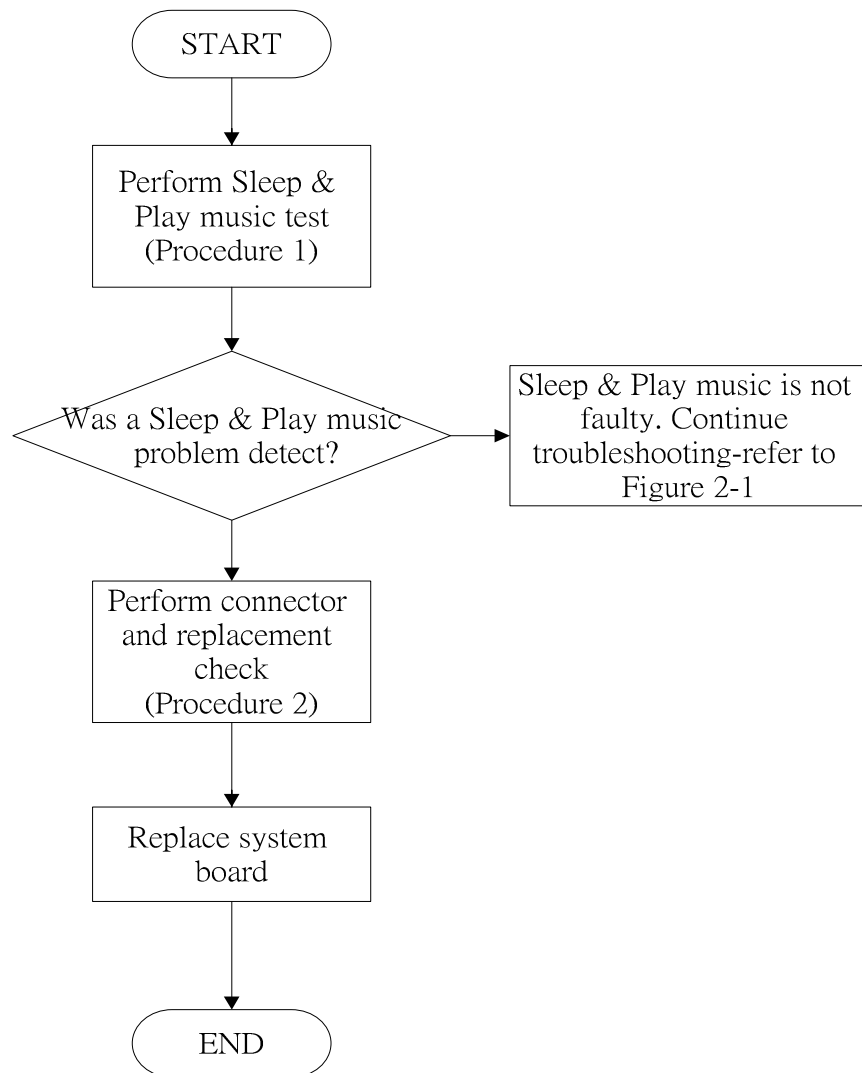


Figure 2-27 Sleep & Play music troubleshooting process

The system board may be the reason of a Sleep & Play music fault. The system board may be damaged. To determine if the computer's Sleep & Play music is functioning properly, perform the following procedures. Figure 2-25 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: windows application test

Procedure 2: Replacement check

### **Procedure 1 windows application test**

Test Sleep & Play music function with Audio loopback line and Multimedia sound system with line in and line out port, check the device can work fine or not.

If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the Sleep & Play music functioning is properly.

### **Procedure 2 Replacement check**

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

Check 1 Make sure that Sleep & Charge test operation is correct, go to Check 2.

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

## 2.29 Wimax Troubleshooting

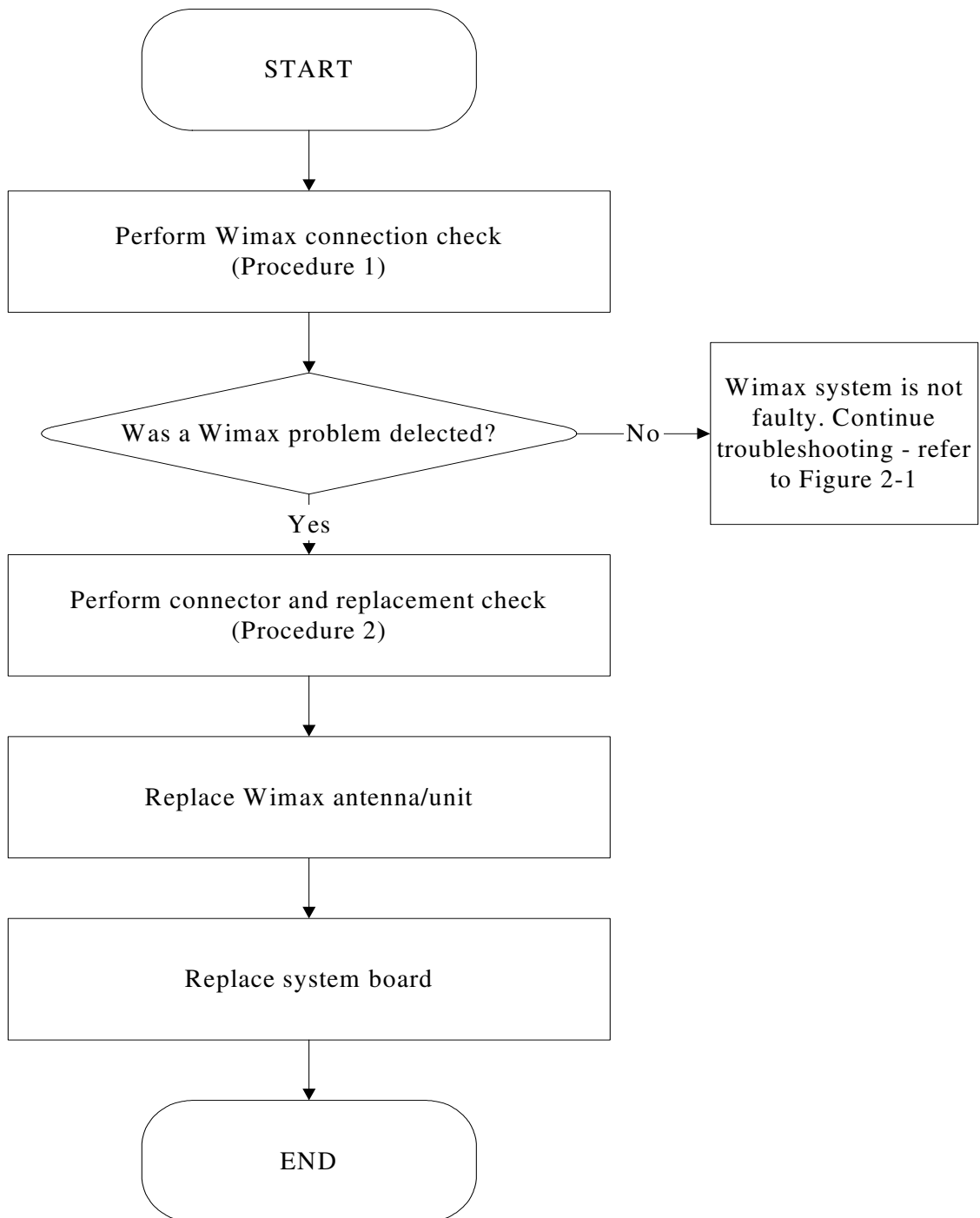


Figure 2-28 Wimax troubleshooting process

Notes: Wimax Antenna assemble rule as below:

Color of antenna	Assemble location
White antenna	Main/1
Black antenna	Aux/2

The Wimax antenna wire, Wimax unit or system board may each be the source of a Wimax fault. Any of these components may be damaged. To determine if the computer's Wimax system 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: Wimax connection test

Procedure 2: Connector and replacement check

**Procedure 1 Wimax connection check**

PLS use windows application. If an error is located, go to Procedure 2. If an error is not located, the Wimax system is functioning properly.

**Procedure 2 Connector and replacement check**

The Wimax antenna, Wimax 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 Wimax antenna is firmly connected to the Wimax module (refer to Chapter 4 for instructions) and that the Wimax 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.

## 2.30 3G Troubleshooting

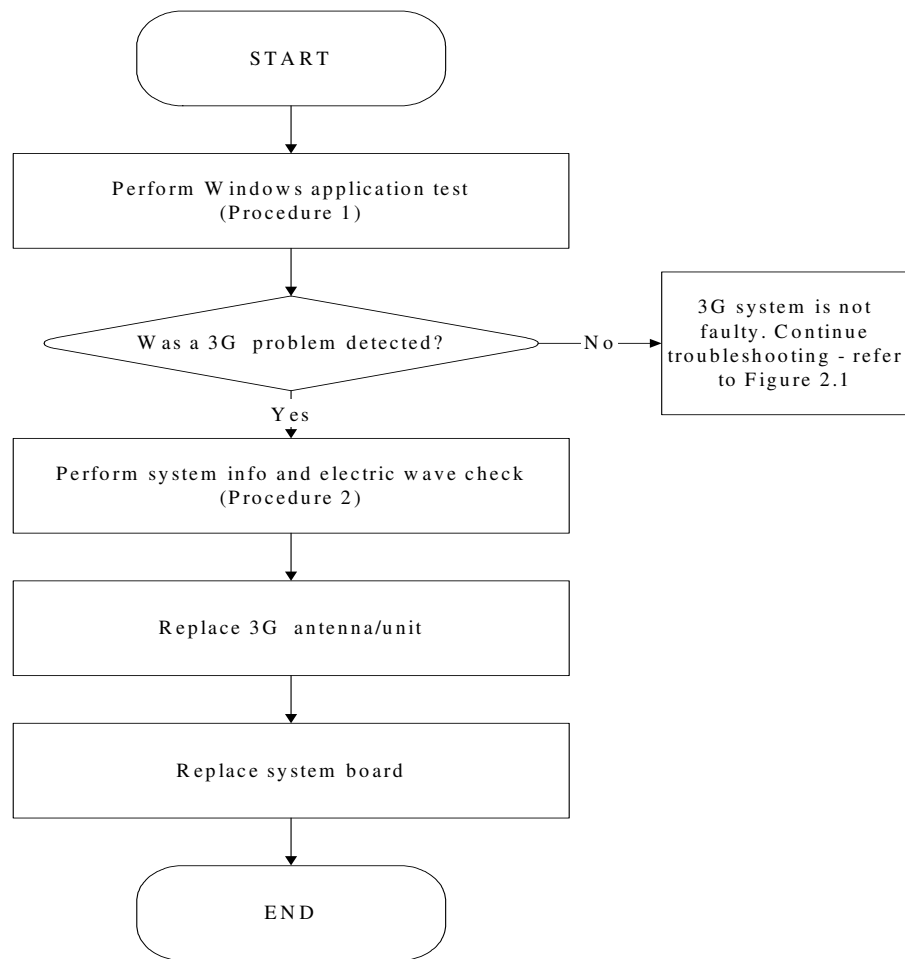


Figure 2-29 3G troubleshooting process

Notes: 3G Antenna assemble rule as below:

color of antenna	Assemble location
Red antenna	Main/1
Blue antenna	Aux/2

The 3G antenna wire, 3G unit or system board may each be the source of a 3G 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 2-17 outlines the process.

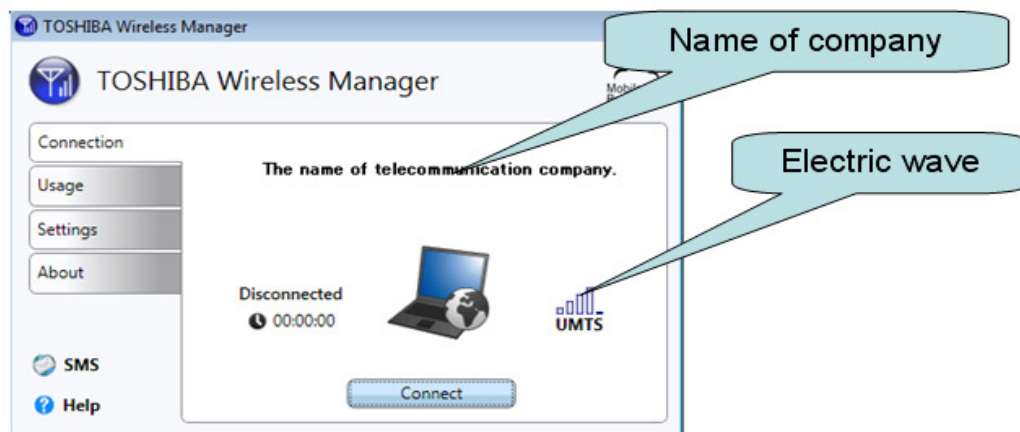
Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Windows Application check

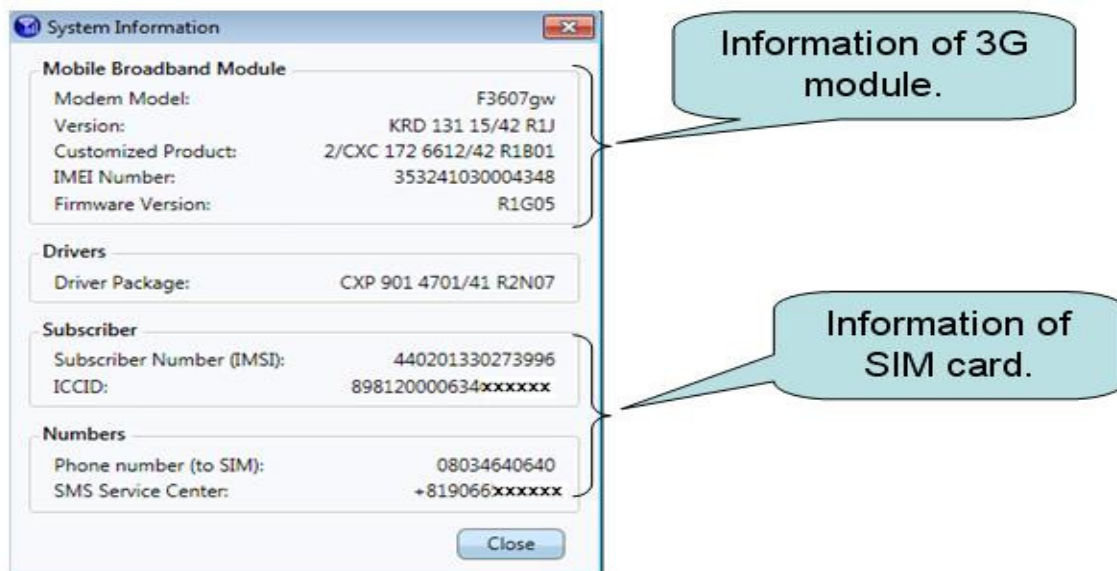
Procedure 2: Connector and replacement check

### Procedure 1 Windows Application check

1.> Please use TOSHIBA wireless manager. It displays the name of Telecommunication Company, and intensity of an electric wave.



2.> Please choose “About” and click “System Info”. “System Info” the Following data is displayed.



## Procedure 2 Connector and replacement check

The 3G antenna, 3G 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 3G antenna is firmly connected to the 3G module (refer to Chapter 4 for instructions) and that the 3G module is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check the wireless communication function is enabled by BIOS setup and FN+F8, and then make sure that the wireless communication LED on the front panel is light. If the LED is light but the 3G 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 function is enabled by BIOS setup and FN+F8, go to Check 3.
- Check 3 If the intensity of an electric wave is weak, an antenna should exchange. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.
- Check 4 If information of 3G module is not displayed, please exchange 3G module. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 5.
- Check 5 If information of SIM card is not displayed, please replace it with a new one following the instructions in Chapter 4.



## 2.31 LAN Troubleshooting

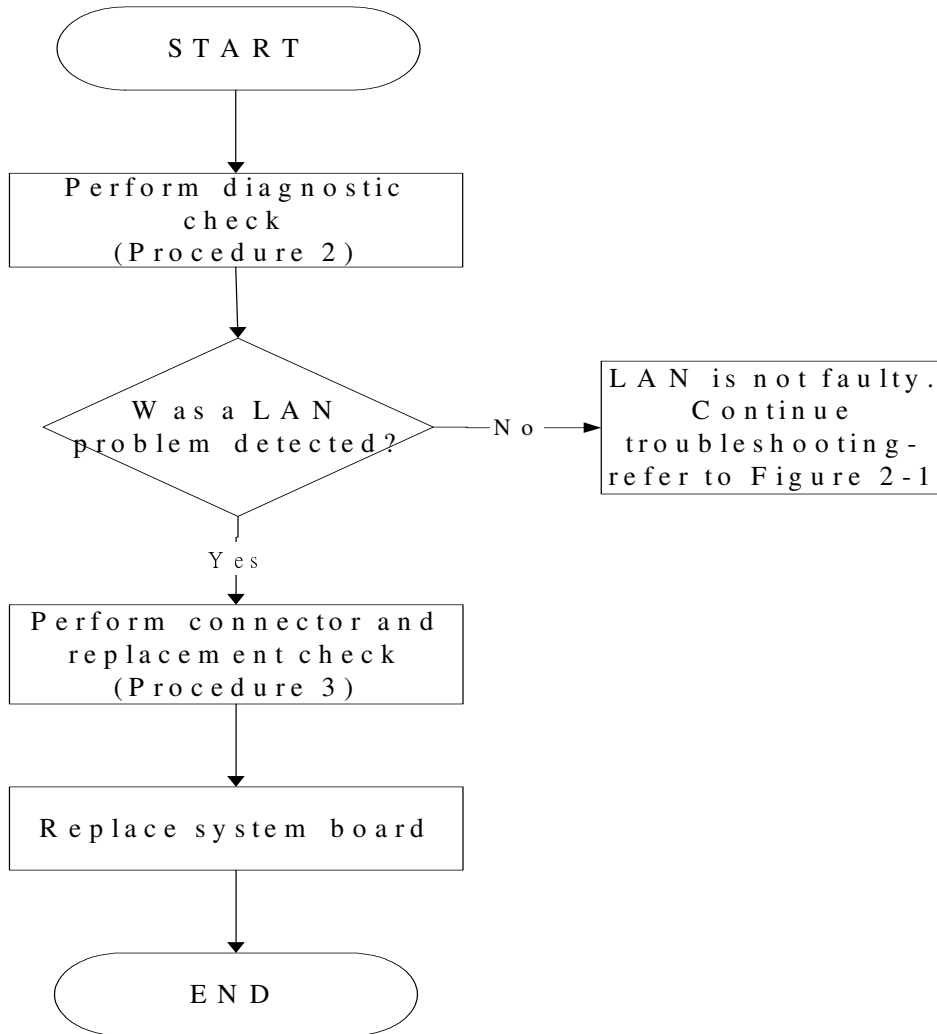


Figure 2-30 LAN troubleshooting process

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.

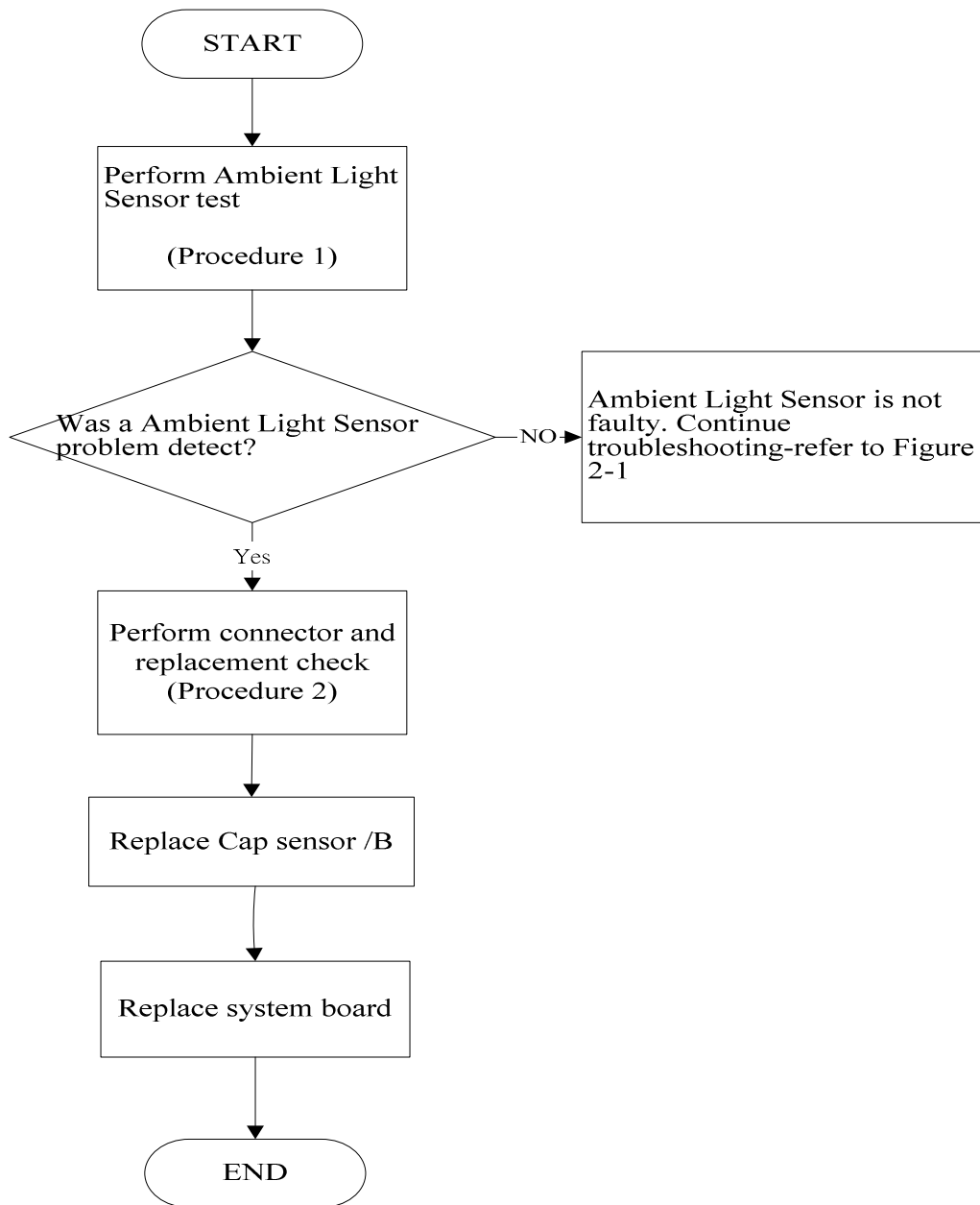
Check 1 Make sure the LAN cable is firmly connected to the LAN port of the system board.

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.

## 2.32 Ambient Light Sensor Troubleshooting



*Figure 2-31 Ambient Light Sensor troubleshooting process*

The Cap sensor board or system board may be the reason of an Ambient Light Sensor fault. Either of these two components may be damaged. To determine if the computer's Ambient Light Sensor is functioning properly, perform the following procedures. Figure 2-31 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 Ambient Light Sensor test result.

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

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

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

---

# **Chapter 3**

## **Tests and Diagnostics**

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### 3.1 The Diagnostic Test

This chapter explains how to use the Test & Diagnostic program to test the functions of the **(Base on Marseille 10/10G 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
- BUTTON TEST
- 1<sup>st</sup> HDD TEST
- Read DMI TEST
- Write DMI TEST
- 3D SENDOR TEST
- TP TYPE R/W 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 USB memory
- The diagnostics CD disk
- A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- 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:

Insert the diagnostics USB memory drive and turn on the computer. (The diagnostics diskette contains the Free-DOS boot files.) And then follow the instructions for T&D program installed in USB memory.

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

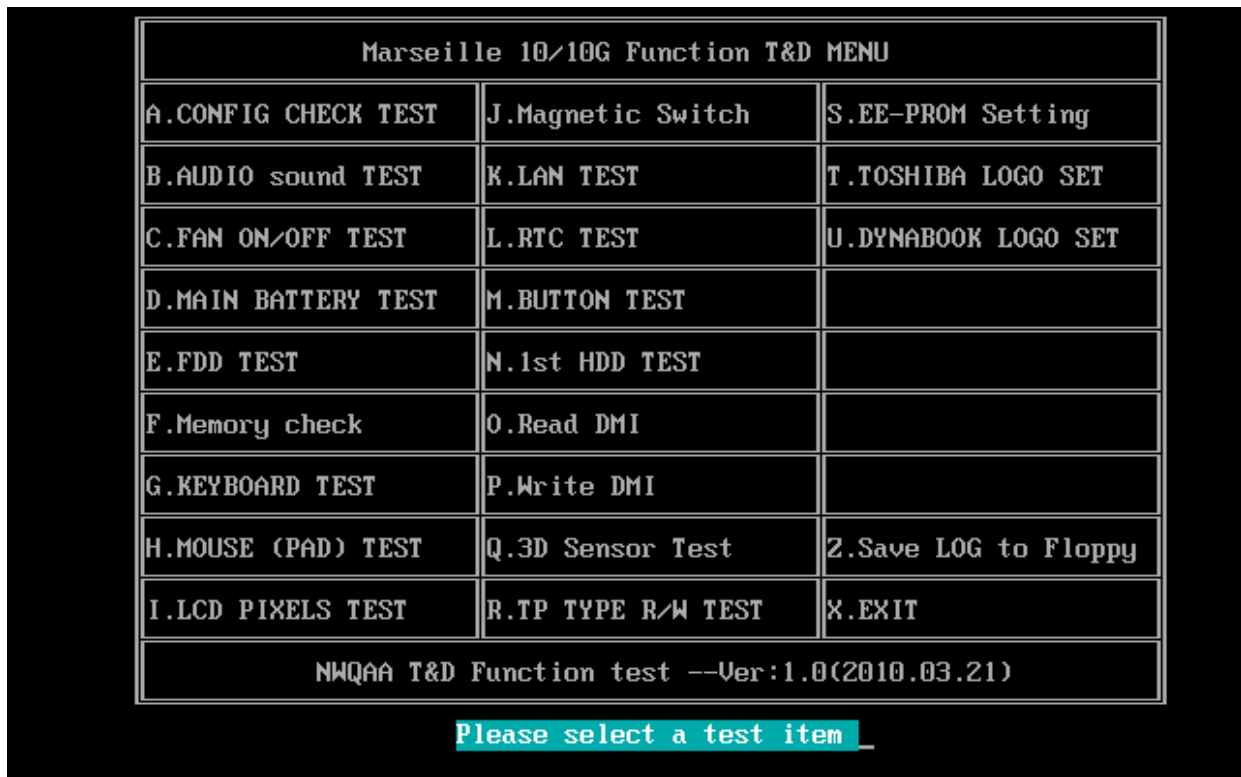
The T&D Program can run single test by you press corresponsive English letter of test item, and it also asks you if you like to copy test log file to USB memory as reference at the end of test(s).

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. BUTTON TEST
- N. 1st HDD TEST
- O. RDMI TEST
- P. WDMI TEST
- Q. 3D SENSOR TEST
- R. TP TYPE R/W TEST
- S. EE-PROM Setting
- T. TOSHIBA LOGO SET
- U. DYNABOOK LOGO SET



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



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



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



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.

Marseille 10/10G Function T&D MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.EE-PROM Setting
B.AUDIO sound TEST	K.LAN TEST	T.TOSHIBA LOGO SET
C.FAN ON/OFF TEST	L.RTC TEST	U.DYNABOOK LOGO SET
D.MAIN BATTERY TEST	M.BUTTON TEST	
E.FDD TEST	N.1st HDD TEST	
F.Memory check	O.Read DMI	
G.KEYBOARD TEST	P.Write DMI	
H.MOUSE (PAD) TEST	Q.3D Sensor Test	Z.Save LOG to Floppy
I.LCD PIXELS TEST	R.TP TYPE R/W TEST	X.EXIT
NWQAA T&D Function test --Ver:1.0(2010.03.21)		
Please select a test item _		

### 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;9cell;12cell)
- ◆ LAN Type
- ◆ Bluetooth
- ◆ SKUID

The screen should display as below:

```
=====
=====  
Configuration as Below  
=====
=====  
CPU TYPE=INTEL<R>CORE<TM>I5CPUM43002 .27GHZ  
DDRRAM SIZE=2048MB+2048MB  
Panel ID=160AT06-U01  
HDD1=TOSHIBA MK3265GSX  
VGA TYPE&VRAM SIZE=INTEL HM55  
Wireless TYPE= AtherosEU00  
BATT=9cell  
LAN TYPE=8111E  
Bluetooth=NO  
SKID= 98  
  
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.

Before Sound test start, you may see notice as below picture:

```
=====Speaker audio Test=====
Please listen to 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);

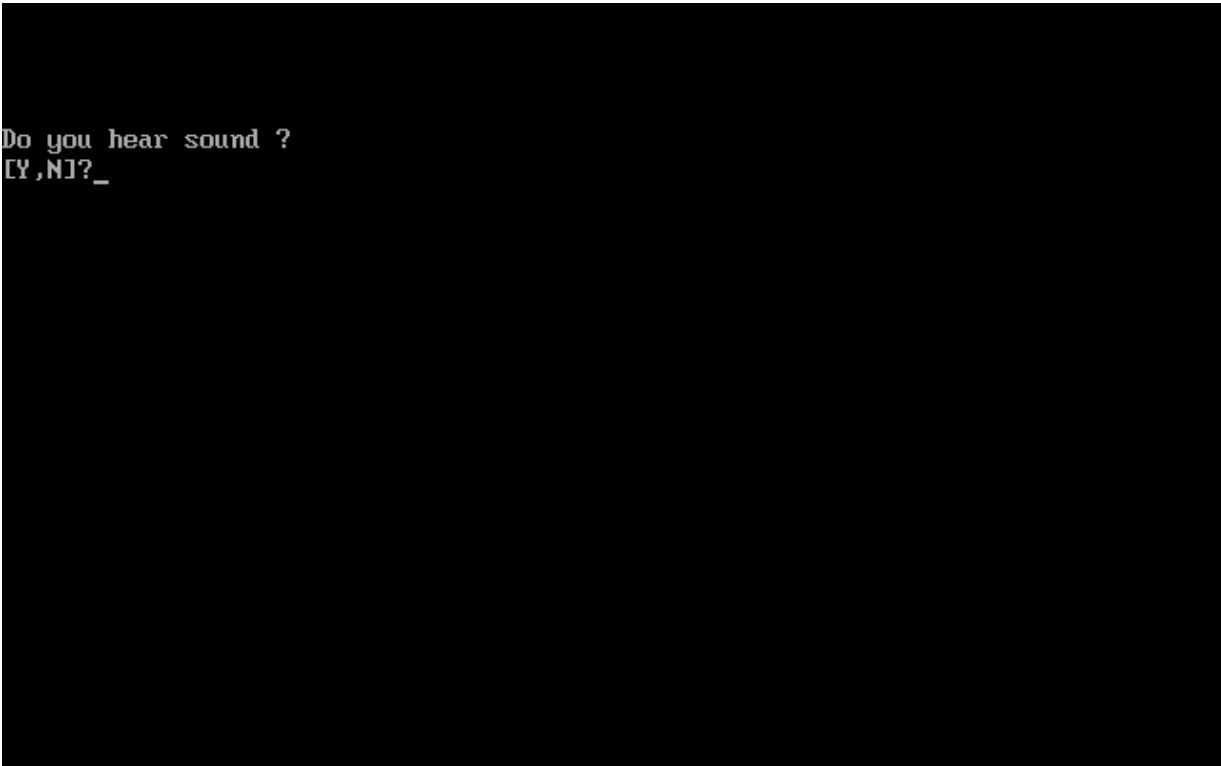
```
HD Codec DOS Test Program Version:3.47
Play a wave file (48k sampling rate/16-bits stereo file)
You must hear some music. Yes/No ?
Press 'Y' to stop playing(If the function is passed)
Press 'N' key (If the function is failed)
1.Line_Out Left Channel Test
2.Line_Out Right Channel Test
Playing 44K 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*_0*.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 :stopping..

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 0003
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
=====
Fan Speed Test :    4600    RPM    [PASS]
```

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

```
=====
COMPAL Electronic Inc.      [DOS] FanSpd.EXE  V2.0.0.1 0003
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
=====
Fan Speed Test :    1600    RPM    [FAIL]
```

```
=====
COMPAL Electronic Inc.      [DOS] FanSpd.EXE  V2.0.0.1 0003
Author : STD_CPM TEAM.
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.
Copyright (c) 2010 COMPAL Electronic Inc. All rights reserved.
=====
Fan Speed Test :    7200    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 SKU
- . 75W with 19V DC for Arrandale CPU and N11M VGA
- . 90W with 19V DC for Arrandale CPU and N11P VGA, Clarksfield CPU and N11M VGA
- . 120W with 19V DC for Clarksfield CPU and N11P VGA

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 : 72.4%
Charge Test-> [ PASS ]
Press any key to continue . . . _
```

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

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

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

Charge Test-> [ FAIL ]

Press any key to continue . . .
```

### 3. 7 FDD Test

**NOTE:** Before running the FDD test, prepare a formatted work diskette (1.44 MB). 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.

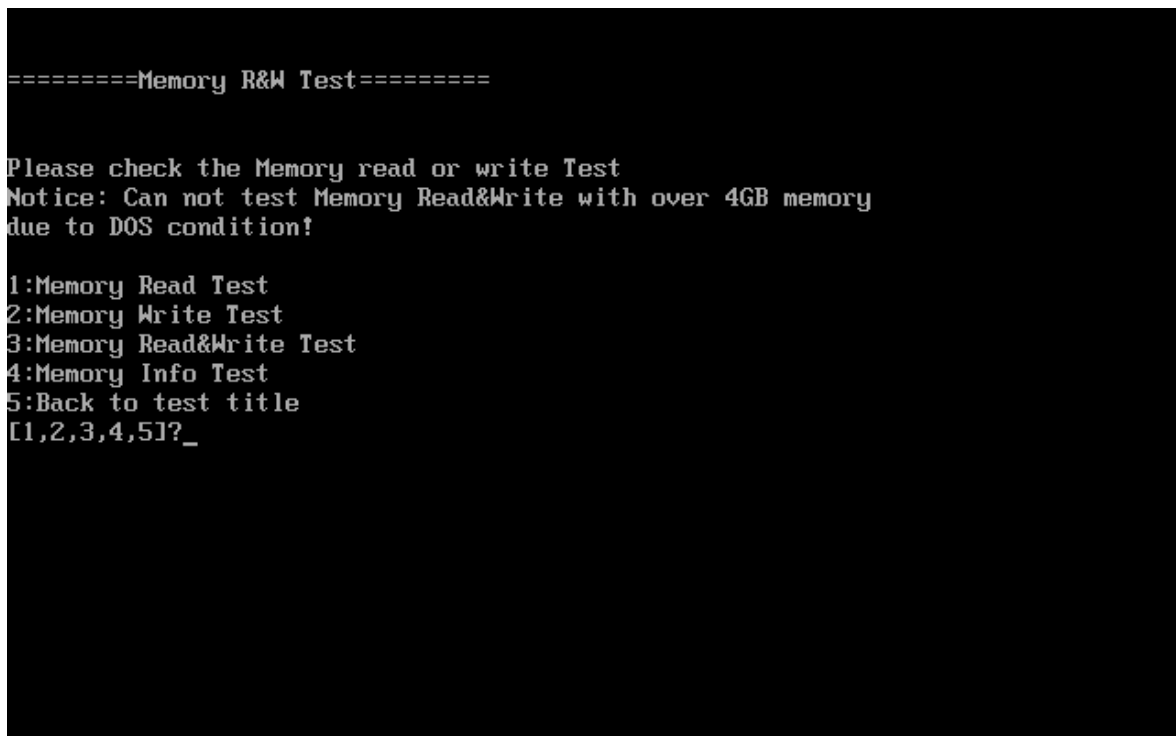
```
***** Fdd Test Program V1.3 *****
Testing Driver A: [1.44 MByte (Cyl:80, Head:2, Sec:18)]...
Testing Seq. seek/verify... Head: 01, Track: 79... [ PASS ]
Testing Fun. seek/verify... Head: 01, Track: 06...
```

### 3. 8 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 test title

A screenshot of a DOS-style memory test menu. The text is displayed in a monospaced font on a black background. The menu title is "=====-Memory R&W Test=====". Below the title, there is a prompt: "Please check the Memory read or write Test". A notice follows: "Notice: Can not test Memory Read&Write with over 4GB memory due to DOS condition!". The menu options are listed as: "1:Memory Read Test", "2:Memory Write Test", "3:Memory Read&Write Test", "4:Memory Info Test", and "5:Back to test title". At the bottom, there is a prompt for user input: "[1,2,3,4,5]?\_".

```
=====-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 test title
[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 1 =====  
Address: 00000000 : 3F5C8000  
                PASS!  
  
Are the RAM read data OK? [Y,N]?_
```

### Memory Write Test

```
= Write Test === block 1 =====  
Address: 00000000 : 3F5C8000  
                PASS!  
  
Are the RAM write data OK? [Y,N]?_
```

### Memory Read & Write Test

```
= Write Test === block 1 =====  
Address: 00000000 : 3F5C8000  
                                     PASS!  
Read test:  
Write test:  
Are the RAM R&W data OK? [Y,N]?_
```

### Memory Info Test

```
===== V1.0.0.1  
COMPAL Electronic Inc.  
Author : STD.SID TEAM.  
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.  
Copyright (c) 2008 COMPAL Electronic Inc. All rights reserved.  
=====
```

DIM: 0	Size0: 2048 MB
	Speed0: 1066
	Manufacturer0: Micron Technology
DIM: 1	Size2: 2048 MB
	Speed2: 1066
	Manufacturer2: Samsung

```
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

```

Version: 1.80
▶Keyboard pad sequential test: 102Key UK for TOSHIBA ◀

Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 IS DEL HmE END PgU PgD
' 1 2 3 4 5 6 7 8 9 0 ? ' BS Num / * -
Tab Q W E R T Z U I O P [ ] ENT 7 8 9 +
Cap A S D F G H J K L O A # 4 5 6
ST < Y X C V B N M ; : - ST ↑ 1 2 3 EN
Ctl Fn Win Alt Space Bar Alt Win Ctl + ↓ → 0 .

Press < Ctrl + Fn + Break > Quit
2010-03-26 by EE
    
```

Japan keyboard

```

Version: 1.80
▶Keyboard pad sequential test: 31D 106Key JP For Toshiba ▶87

Esc F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 INS DEL HmE END PgU PgD
h/w 1 2 3 4 5 6 7 8 9 0 - ~ - BC Nu / * -
Tab Q W E R T Y U I O P @ ] ENT 7 8 9 +
Cap A S D F G H J K L ; * } 4 5 6
ST Z X C V B N M < > ? - ST ↑ 1 2 3 EN
Ctl Fn Win Alt NC Space CG xx alt win CT + ↓ → 0 .

Press < Ctrl + Fn + Break > Quit
2010-03-26 by EE
    
```



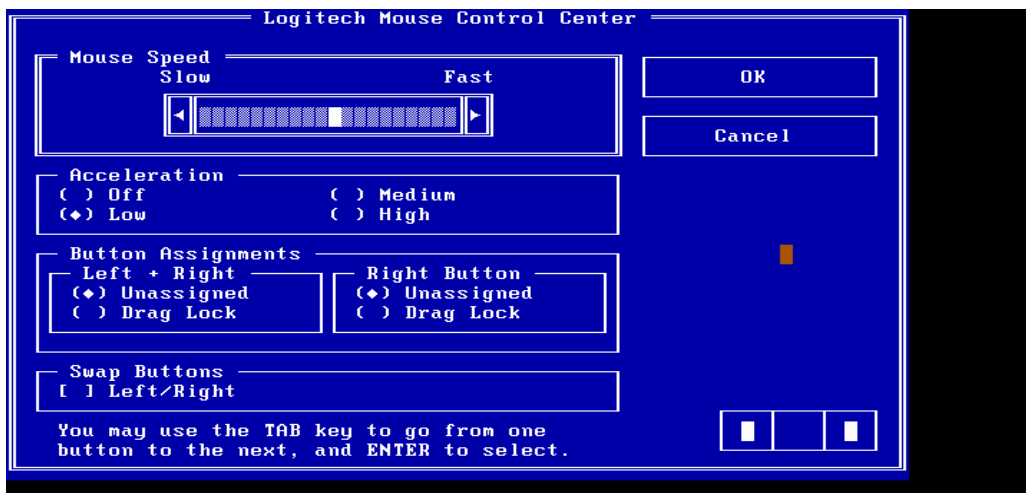
### 3.10 Mouse (Pad) Test

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:

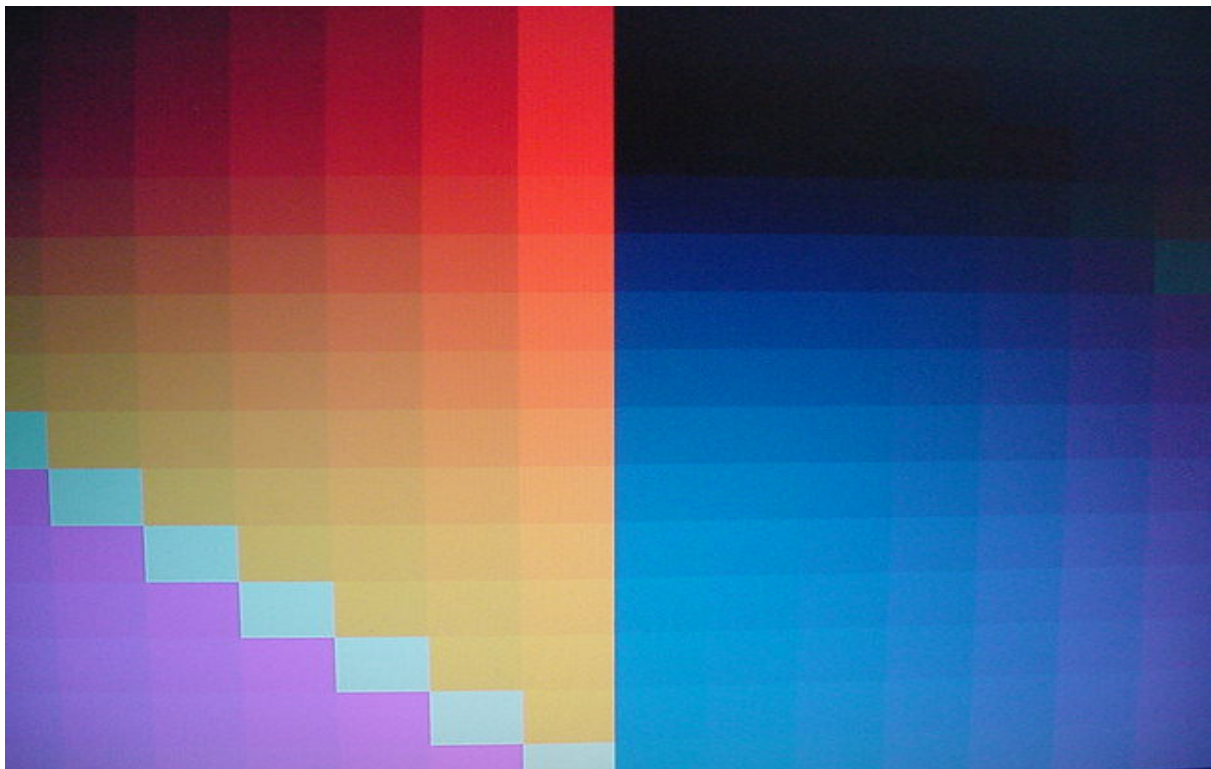
1. Text Mode

- 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

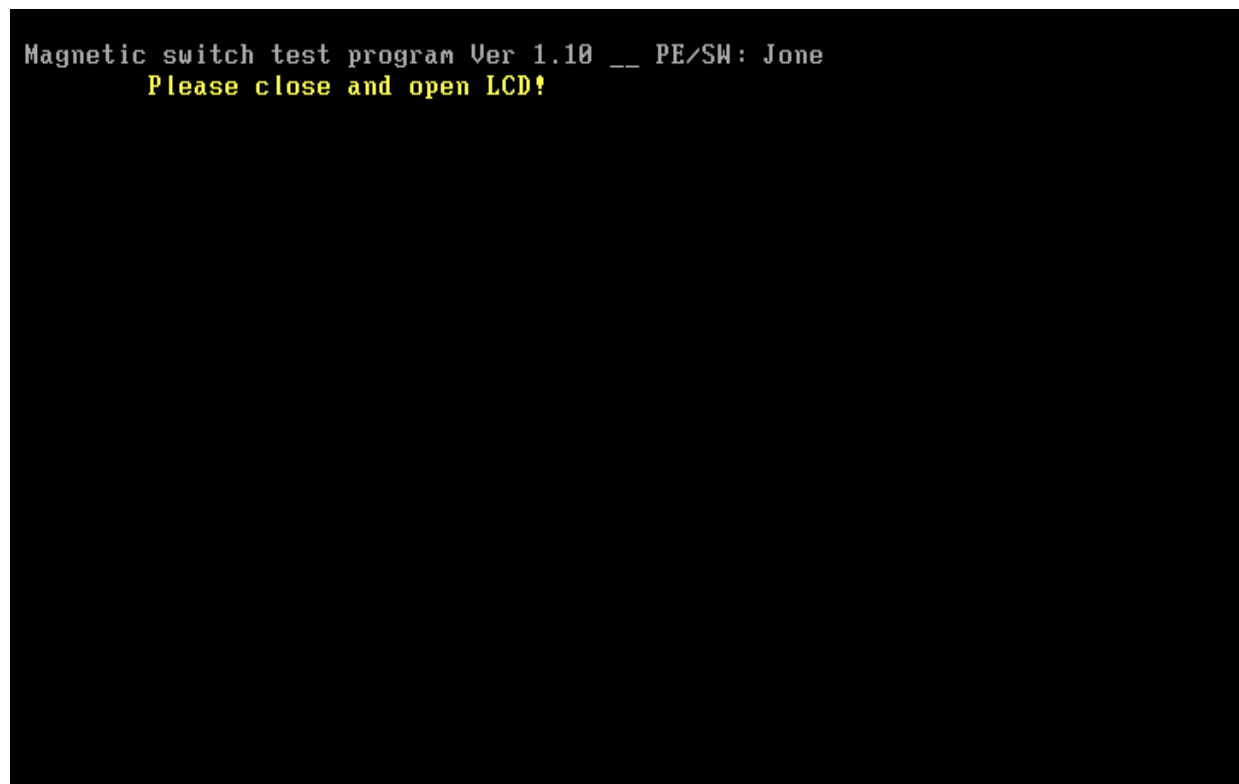
The Magnetic switch test checks the Magnetic function of the unit. When LCD cover closed, the Magnetic should enable to turn off the display.

Follow below steps to run this test:

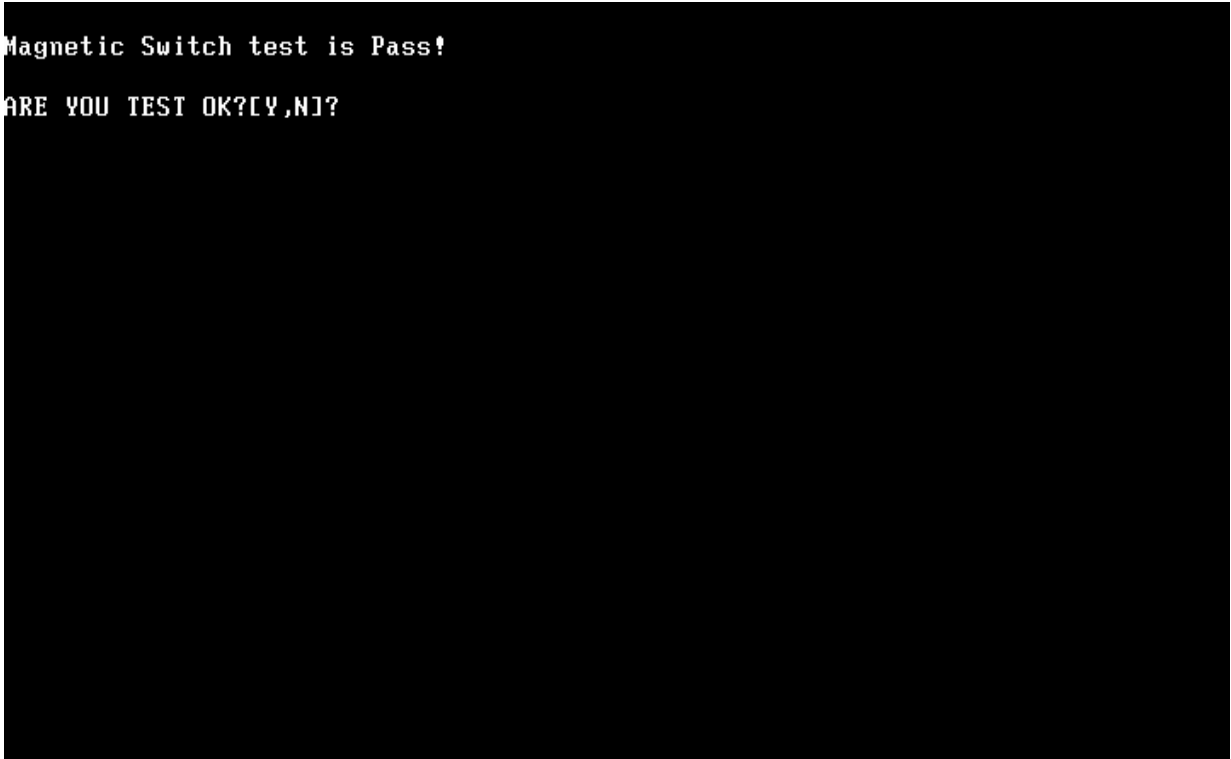
1. Close the LCD cover.
2. Open the LCD.

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 v1.26 10-12-2008
IOBASE = 3000H IRQ = 5 H Node:00262231172F 1000M: 5K 100M: 3K 10M: 1K
VID =10ECH DID =8168H SVID =1179H SSID =FF00H Lan Adapters: 1
PASS= 0 FAIL= 0 Now is: 1
Open Your MPLAN.CFG in this machine! 100M Link OK 10M
Test Item Result(Pass/Fail)
1.PG_LAN=false none
2.Reg_R/W=true Pass
3.Speed1000=true none Rxtimeout 1
4.Speed100=true Pass ROK= 2000 TOK=
5.Speed10=true Pass Error= 0
6.Debug=true Txtimeout = 50
7.AutoRun=true

***** Pass in debugging mode *****
Press 'ESC' key to exit ..
```

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

```
FAIL

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 = 11:30:23.04(4142304), CMOS TIME = 11:30:23(4142300)
DOS DATE: 09/03/2009, CMOS DATE: 09/03/2009
DATE & TIME test [ PASS ]

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

### 3.15 BUTTON TEST

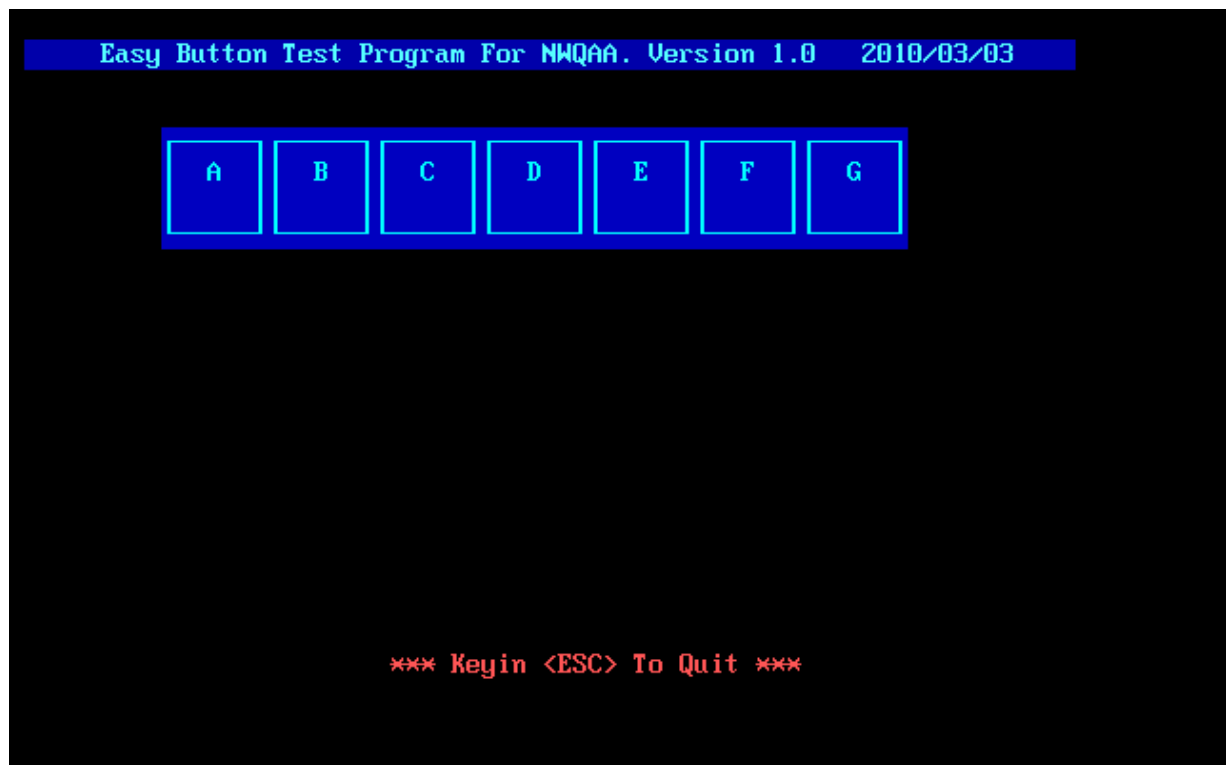
**NOTE:** Only for seven buttons SKU.

The tool for seven buttons SKU, the Screen would display as below:

```
=====button TEST=====

Please Check the result after test.
===notice: the tool only for seven button SKU===

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





Mechanical type buttons x 7 to relate with above showed.

BUTTON A → ECO

BUTTON B → Wireless on/off

BUTTON C → Illumination on/off

BUTTON D → Play/Pause

BUTTON E → Mute

BUTTON F → Volume -

BUTTON G → Volume +

### 3.16 1<sup>st</sup> HDD Test

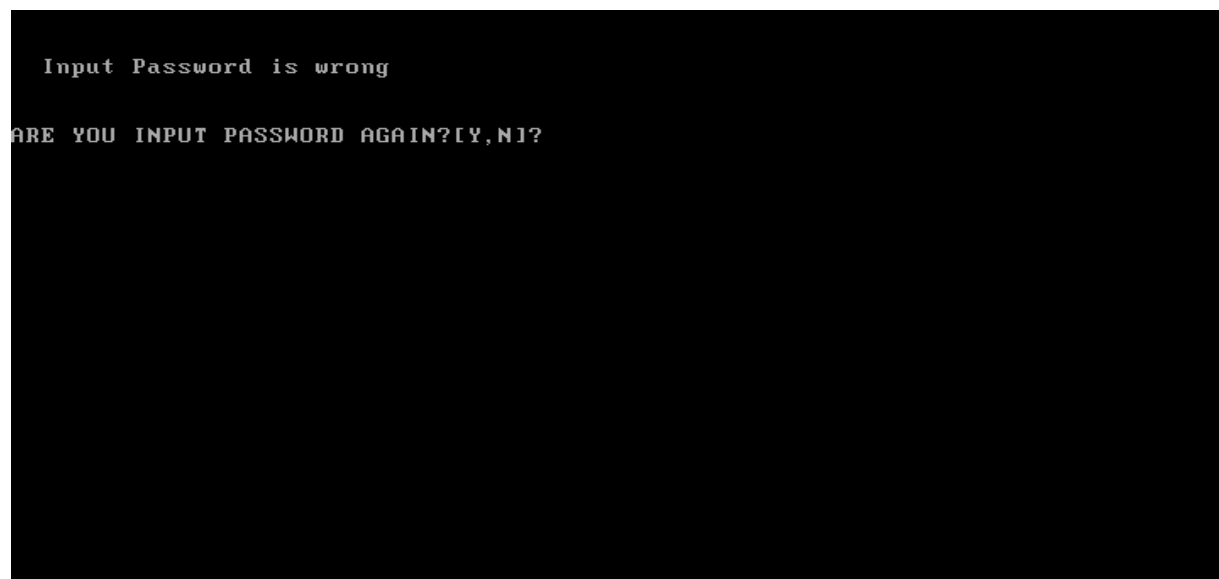
The HDD test allows the user to verify the 1<sup>st</sup> HDD ok or not. First, please select HDD test method, Screen would display as below:

```
==== HDD TEST ====  
1.HDD W/R test(all surface)  
2.Partial W/R + Random W/R  
[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:



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 U1.72 Compal STD/TTF ***
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=488397168
LBA Mode Sizes =250059 MB

HDD Random R/W 100 sectors ..... PASS !
HDD Sequential R/W 100 sectors ... PASS !

LBA Verify Sectors: 488397168, C/H/S = 30401 / 255 / 63
LBA Sectors Verify ... PASS!

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

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

```
*** Hard disk test tools U1.60 Compal STD/TTF ***
Reset DISK1 .....Pass !
Error ! Can't use Enhanced Disk Drive Support Function

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

**NOTE:** Press “Ctrl+Fn+Break” key to exit the HDD test program.

### 3.17 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 : Satellite A500
Serial_Number: 89478278K
Version      : PSAR3A-01M002
Asset_Number : *
UUID        : 892EAC268A7611DEAC210026223116DD
OEM_Strings : *
Are the DMI data is OK? [Y,N]?_
```

### 3.18 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 (64)

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:
```

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
please enter the num you choose: 1
please enter the OEM String: psmadk-011002

Modify OEM String to psmadk-011002

Jump to EEPROM Bank : 0

Erase EEPROM Start Offset : a0 End Offset:dd Size:62
.....
Jump to EEPROM Bank : 0

Flash EEPROM Start Offset : a0
.....
Confirm the data !
.....
Modify EM String success!

*****Please reboot the system.To make the setting effective
*****Do you want to modify other dmi ? *****
Press Y for Yes or N for No:
```

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

If you select “5”, program will go back to the Main Menu as below:

Marseille 10/10G Function T&D MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.EE-PROM Setting
B.AUDIO sound TEST	K.LAN TEST	T.TOSHIBA LOGO SET
C.FAN ON/OFF TEST	L.RTC TEST	U.DYNABOOK LOGO SET
D.MAIN BATTERY TEST	M.BUTTON TEST	
E.FDD TEST	N.1st HDD TEST	
F.Memory check	O.Read DMI	
G.KEYBOARD TEST	P.Write DMI	
H.MOUSE (PAD) TEST	Q.3D Sensor Test	Z.Save LOG to Floppy
I.LCD PIXELS TEST	R.TP TYPE R/W TEST	X.EXIT
NWQAA T&D Function test --Ver:1.0(2010.03.21)		

Please select a test item \_

### 3. 19 3D Sensor Test

### 3 Tests and Diagnostics

---

This test will check 3D Sensor function by your computer successful or not.

**NOTE:** Steps 1 → Keep test unit on platform which must be a flat horizontal surface, then click enter to test



**NOTE:** Steps 2 → Keep test unit vertical with platform, then click to test

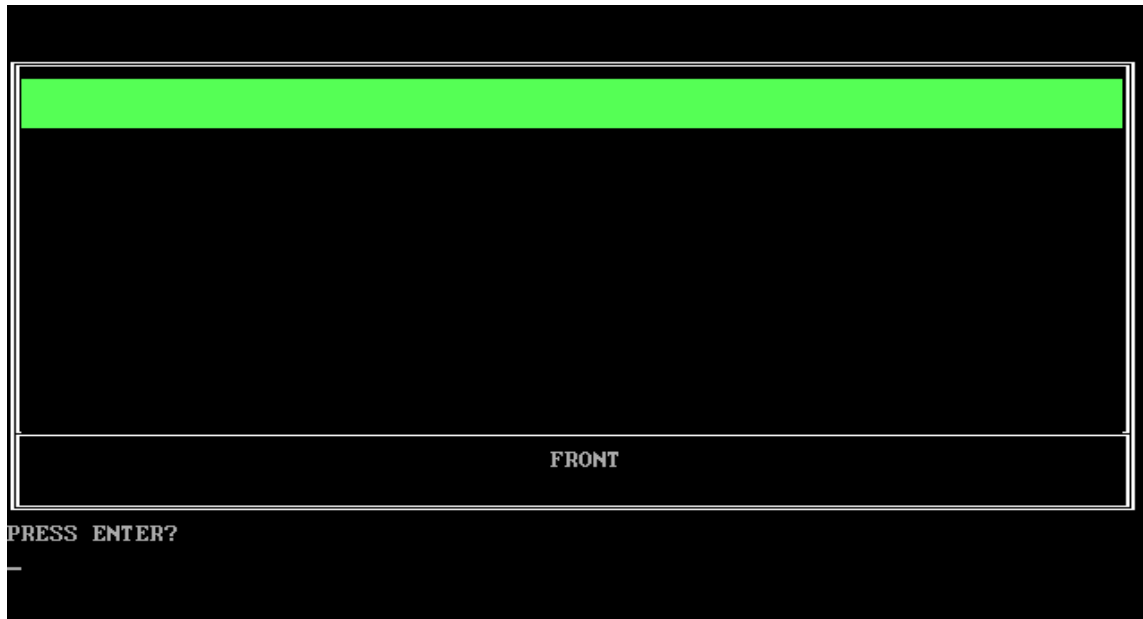


*NOTE: Steps 3 → Turn run 90 degree whirl, then click enter to test*

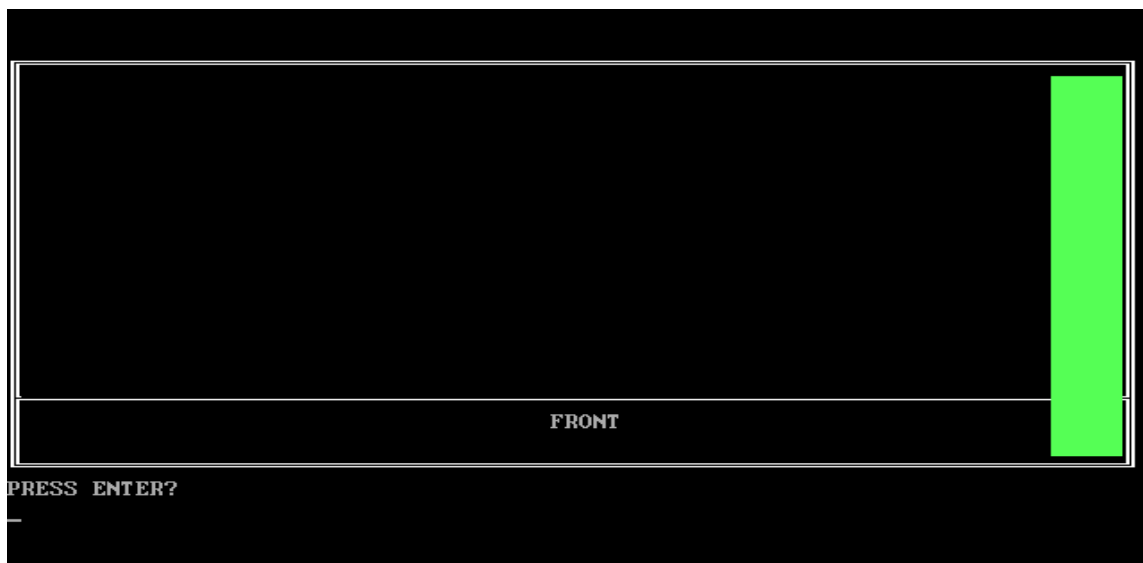


*NOTE: Steps 4 → Go on Turn run 90 degree whirl, then click enter to test*





**NOTE:** Step5 → Go on Turn run 90 degree whirl, then click enter to test



Check test result as below picture, PASS will show "OK", FAIL will show "NG".

```
FRONT

PRESS ENTER?
***** Get The Data form HPC now.** We are going to make the LOG-Data. **
** Please set FDD. Then PRESS ENTER?
=====
=====
      OO          K  K
     O O        K  K
    O  O       K  K
   O   O      K  K
  O    O     KK
 O     O    K  K
O      O   K  K
O       O  K  K
O        O K  K
OO         K  K
=====
=====

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

```
FRONT

PRESS ENTER?
***** Get The Data form HPC now.** We are going to make the LOG-Data. **
** Please set FDD. Then PRESS ENTER?
=====
=====
      N          N          GG
     NN         N          GG  GG
    N  N        N          G   GG
   N   N       N          GG
  N    N      N          GG  GGGGG
 N     N     N          GG   GGG
N      N    N          G   GGG
N       NN   N          GG  GG  G
N        N   N          GG   G
=====
=====

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

### 3.20 TP TYPE R/W TEST

This T/P TYPE R/W test checks the computer's T/P TYPE and users write T/P vendor ID into

## EEPROM

The test runs automatically.

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

```
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
Synaptics TP
  0 uS: C 42
 300 uS: D 07Version 2.1 (support ALL model)
01
Write Ok

  0 uS: C 42
 300 uS: D 00
2441400 uS: I E0(15)
2484300 uS: I 2A(15)
2526300 uS: I E0(15)
2565000 uS: I 37(15)
2604600 uS: I E0(15)
2666700 uS: I B7(15)
2704800 uS: I E0(15)
2769000 uS: I AA(15)return code = 0
return code = 0

*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
```

If write T/P type fail, the screen would display as below

```
====TP R/W TEST====
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
RETURN CODE: 0xFEECHO is off
#####
TP TYPE Write FAIL
#####
Press any key to continue . . ._
```

If read T/P type fail, the screen would display as below

```
====TP R/W TEST====
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
Synaptics TP
  0 uS: C 42
 1200 uS: D 07Version 2.1 (support ALL model)
01
Write Ok

  0 uS: C 42
 900 uS: D 00
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
RETURN CODE: 0xFEECHO is off
#####
TP TYPE READ FAIL
#####
Press any key to continue . . ._
```

If W/R T/P type passes, the screen would display as below

```
      0 uS: C 42
     900 uS: D 00
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
Synaptics TP
      0 uS: C 42
     2400 uS: D 07Version 2.1 (support ALL model)

SET EE=@

SET EEEE=01
Version 2.1 (support ALL model)

SET EE=@

SET EEEE=01
Version 2.1 (support ALL model)

SET EE=@

SET EEEE=01
Version 2.1 (support ALL model)
```



### 3.21 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:

- a. Set MIC Function Status in EEPROM (Disable/Enable)
- b. Set HDMI Function Status in EEPROM (Disable/Enable)
- c. Set CIR Function Status in EEPROM (Disable/Enable)
- d. Set Felica card Function Status in EEPROM (Disable/Enable)
- e. Set KBLED Function Status in EEPROM (Disable/Enable)
- f. Set Speaker EQ status in EE-PROM (Harman 2 Speaker/ No brand 2 Speaker)
- g. Set and Check SKUID Status(Set/Check)
- h. Set Front Edge logo status in EE-PROM (Disable/Enable)
- i. Set Wimax function status in EE-PROM (Disable/Enable)
- j. Set JET function flag in EE-PROM (Disable/Enable)
- k. Set 3G function flag in EE-PROM (Disable/Enable)
- l. Set NON\_OS language in EE-PROM (NONEOS/ HAVEOS)
- m. Set BIOS language in EE-PROM (English/Japanese/French)
- n. Set No Support Function Disable(Display port/Jet)
- o. Back To Test Title

```
Please select Check or Disable Function
a. Set MIC Function Status in EE-PROM (Disable/Enable)
b. Set HDMI Function Status in EE-PROM (Disable/Enable)
c. Set CIR Function status in EE-PROM (Disable/Enable)
d. Set Felica card Function status in EE-PROM (Disable/Enable)
e. Set KBLED function status in EE-PROM (Disable/Enable)
f. Set Speaker EQ status in EE-PROM(Harman 2 Speaker/No brand 2 Speaker)
g. Set and Check SKUID Status(Set/Check)
h. Set Front Edge logo status in EE-PROM(Disable/Enable)
i. Set Wimax function status in EE-PROM (Disable/Enable)
j. Set JET function status in EE-PROM (Disable/Enable)
k. Set 3G function status in EE-PROM (Disable/Enable)
l. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
m. Set BIOS language in EE-PROM (English/Japanese/French)
n. Set No Support Function Disable
o. Back To Test Title

Please select the test item(a,b,c,d,e,f,g,h,i,j,k,l,m,n,o)
```

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

**For example:** If you want to set MIC function, please press “a” or “A”, the screen will display as below:

```
Please select Check or Disable Function
a. Set MIC Function Status in EE-PROM (Disable/Enable)
b. Set HDMI Function Status in EE-PROM (Disable/Enable)
c. Set CIR Function status in EE-PROM (Disable/Enable)
d. Set Felica card Function status in EE-PROM (Disable/Enable)
e. Set KBLED function status in EE-PROM (Disable/Enable)
f. Set Speaker EQ status in EE-PROM(Harman 2 Speaker/No brand 2 Speaker)
g. Set and Check SKUID Status(Set/Check)
h. Set Front Edge logo status in EE-PROM(Disable/Enable)
i. Set Wimax function status in EE-PROM (Disable/Enable)
j. Set JET function status in EE-PROM (Disable/Enable)
k. Set 3G function status in EE-PROM (Disable/Enable)
l. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
m. Set BIOS language in EE-PROM (English/Japanese/French)
n. Set No Support Function Disable
o. Back To Test Title

Please select the test item(a,b,c,d,e,f,g,h,i,j,k,l,m,n,o) a
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)-> [ff]
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
a. Set MIC Function Status in EE-PROM (Disable/Enable)
b. Set HDMI Function Status in EE-PROM (Disable/Enable)
c. Set CIR Function status in EE-PROM (Disable/Enable)
d. Set Felica card Function status in EE-PROM (Disable/Enable)
e. Set KBLED function status in EE-PROM (Disable/Enable)
f. Set Speaker EQ status in EE-PROM(Harman 2 Speaker/No brand 2 Speaker)
g. Set and Check SKUID Status(Set/Check)
h. Set Front Edge logo status in EE-PROM(Disable/Enable)
i. Set Wimax function status in EE-PROM (Disable/Enable)
j. Set JET function status in EE-PROM (Disable/Enable)
k. Set 3G function status in EE-PROM (Disable/Enable)
l. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
m. Set BIOS language in EE-PROM (English/Japanese/French)
n. Set No Support Function Disable
o. Back To Test Title

Please select the test item(a,b,c,d,e,f,g,h,i,j,k,l,m,n,o)
```

You can select “m” or “M” disable all not support function, program will perform automatically as below:

```
A51 Display SET/CHECK PROGRAM ---Ver 1.0 [A51 SWDL]
Read(f5)-> [63]
SET NO Display TO SUPPORT!
Write(f5)-> [63]
Successful!
```



```
Set No Support Function All Disable OK
Press any key to continue . . . _
```

Press any key you can go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function

a. Set MIC Function Status in EE-PROM (Disable/Enable)
b. Set HDMI Function Status in EE-PROM (Disable/Enable)
c. Set CIR Function status in EE-PROM (Disable/Enable)
d. Set Felica card Function status in EE-PROM (Disable/Enable)
e. Set KBLED function status in EE-PROM (Disable/Enable)
f. Set Speaker EQ status in EE-PROM(Harman 2 Speaker/No brand 2 Speaker)
g. Set and Check SKUID Status(Set/Check)
h. Set Front Edge logo status in EE-PROM(Disable/Enable)
i. Set Wimax function status in EE-PROM (Disable/Enable)
j. Set JET function status in EE-PROM (Disable/Enable)
k. Set 3G function status in EE-PROM (Disable/Enable)
l. Set NON_OS function flag in EE-PROM (NONEOS/HAVEOS)
m. Set BIOS language in EE-PROM (English/Japanese/French)
n. Set No Support Function Disable
o. Back To Test Title

Please select the test item(a,b,c,d,e,f,g,h,i,j,k,l,m,n,o)
```

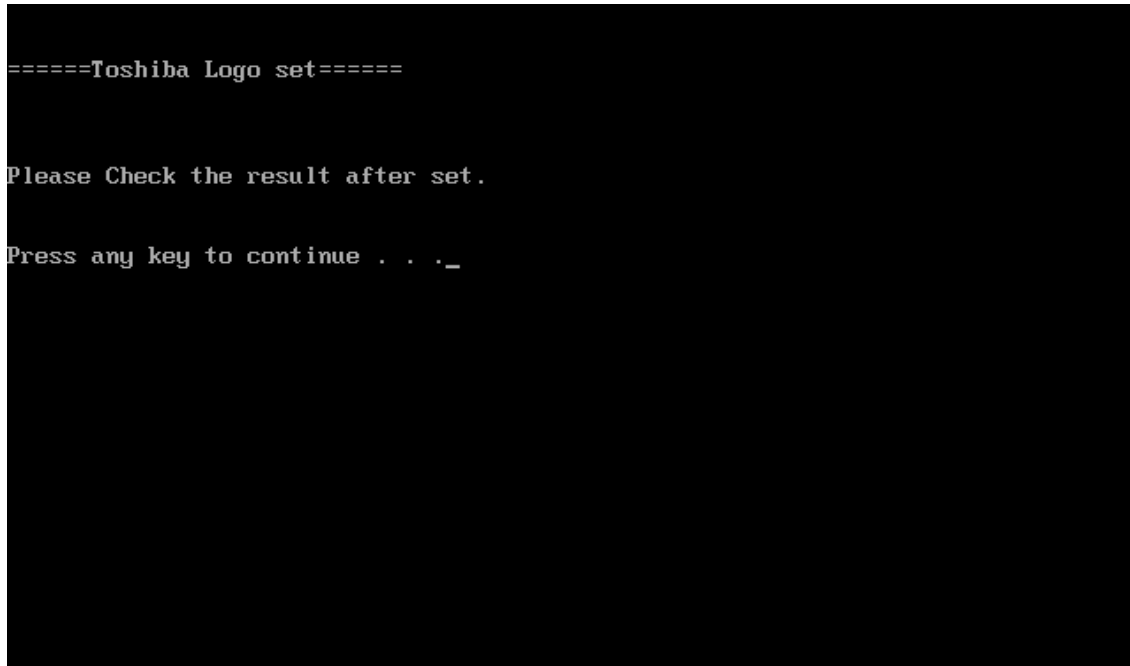
If you select “n” or “N”, program will go back to the Main Menu as below:

Marseille 10/10G Function T&D MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.EE-PROM Setting
B.AUDIO sound TEST	K.LAN TEST	T.TOSHIBA LOGO SET
C.FAN ON/OFF TEST	L.RTC TEST	U.DYNABOOK LOGO SET
D.MAIN BATTERY TEST	M.BUTTON TEST	
E.FDD TEST	N.1st HDD TEST	
F.Memory check	O.Read DMI	
G.KEYBOARD TEST	P.Write DMI	
H.MOUSE (PAD) TEST	Q.3D Sensor Test	Z.Save LOG to Floppy
I.LCD PIXELS TEST	R.TP TYPE R/W TEST	X.EXIT
NMQAA T&D Function test --Ver:1.0(2010.03.21)		
Please select a test item _		

### 3.22 Toshiba Logo set

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.



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



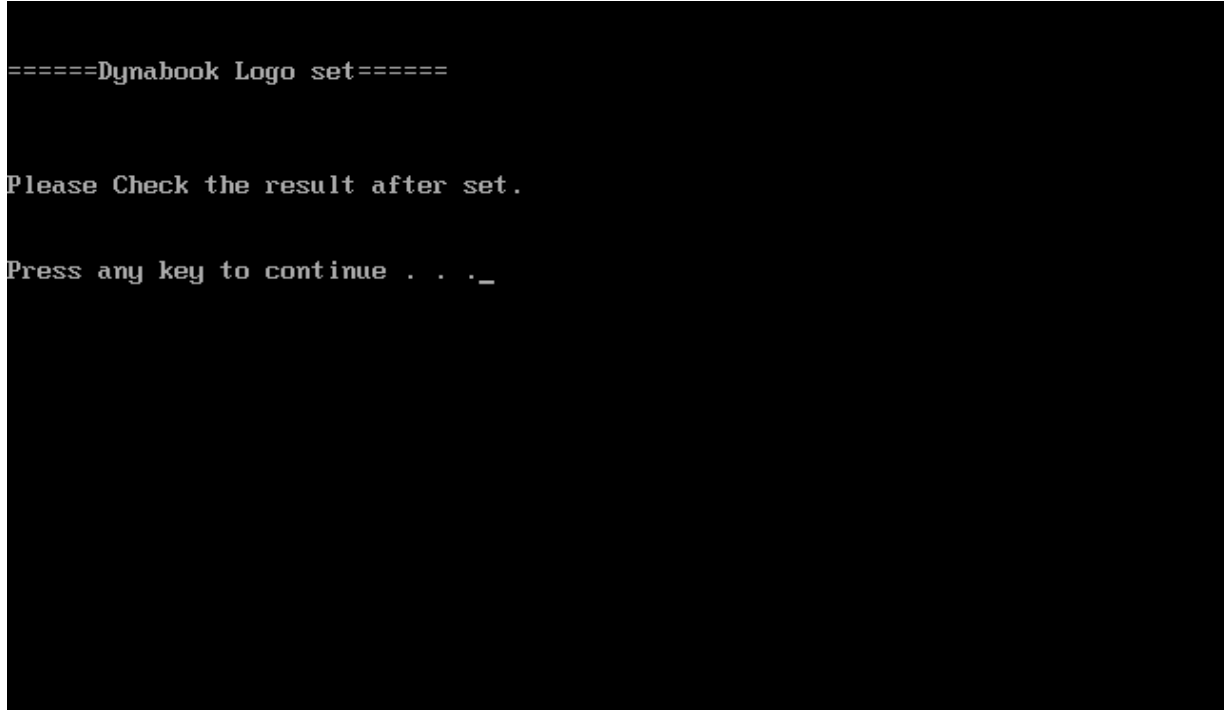
When Toshiba Logo set finish, please restart machine, when show below Logo:



### 3.23 Dynabook Logo set

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.



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



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



---

## **Chapter 4**

# **Replacement Procedures**

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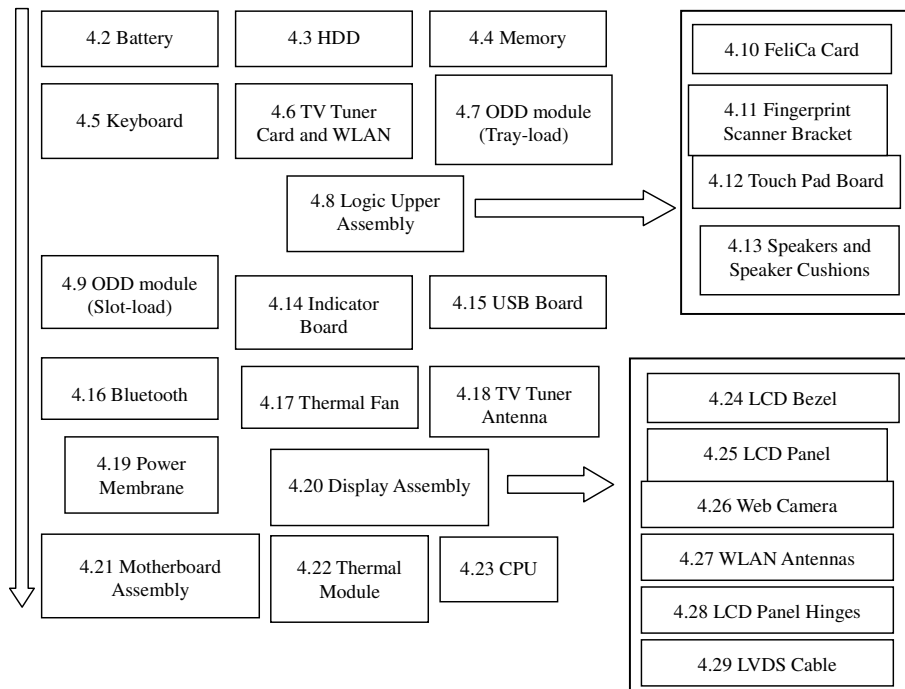
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## **4.1 General**

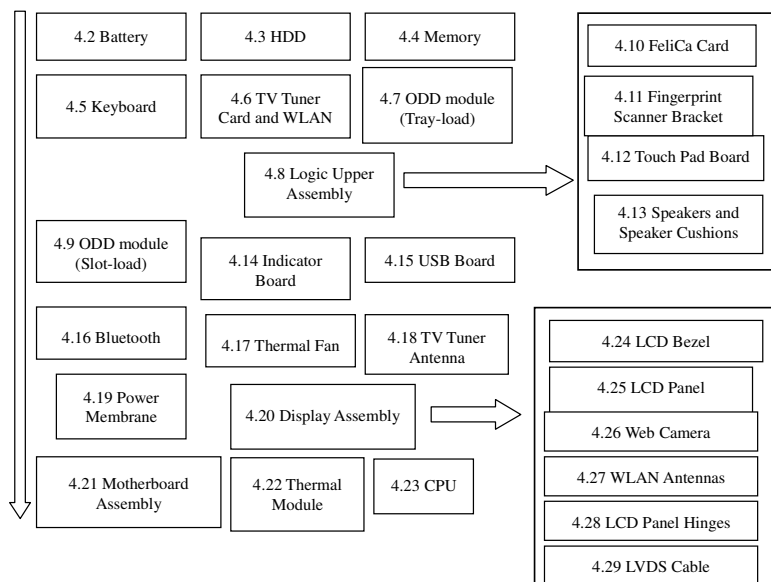
This chapter explains how to disassemble the laptop and replace Field Replaceable Units (FRUs). Some replacement procedures may not require you to remove all the surrounding FRUs to replace only one FRU. The chart below shows the FRUs in the order in which they should be removed in a top-down manner, 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.



How to use the chart (two examples):

- For removing the Motherboard:  
First, remove parts from 4.8 Keyboard Cover & Keyboard, 4.9 Logic Upper Assembly, 4.16 WLAN card, 4.15 Thermal Fan.
- For removing the LCD Module:  
First, remove 4.21 LCD Bezel Assembly, then remove 4.22 the LCD module and the Inverter Board.



### 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.

- |  |                        |
|--|------------------------|
| <input type="checkbox"/> M2 (2 mm)               | 0.22 N·m (2.2 kgf·cm)  |
| <input type="checkbox"/> M2.5 (2.5 mm)           | 0.36 N·m (3.5 kgf·cm)  |
| <input type="checkbox"/> M3 (3 mm)               | 0.51 N·m (5.0 kgf·cm)  |
| <input type="checkbox"/> M2.5x4 PSP TITE screws  | 0.204 N·m (2.0 kgf·cm) |
| <input type="checkbox"/> 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 safety lock to the unlock position.
3. Slide the battery release latch and remove the battery pack from the laptop as shown in Figure 4.1.

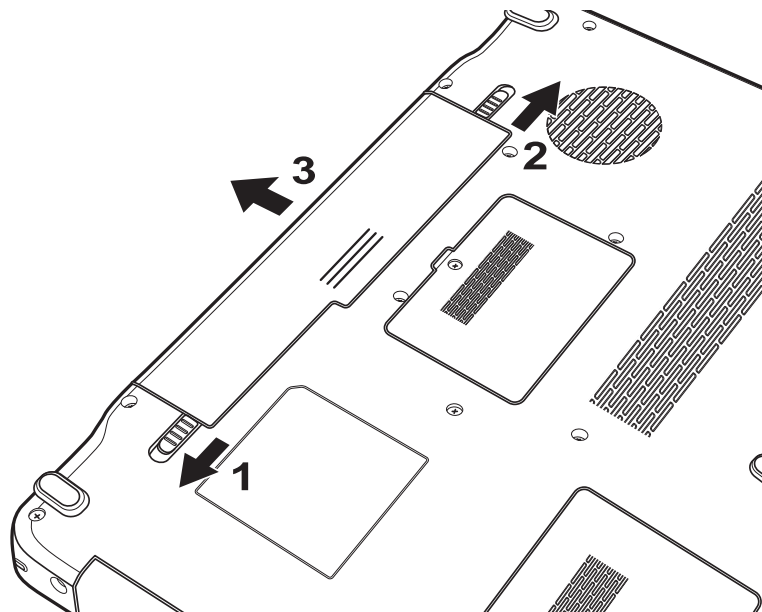


Figure 4.1 Removing the Battery Pack

**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 place. Check that the battery release latch slides in and stops with a click.
2. Slide the battery safety lock inward to the lock position.

## 4.3 HDD

### Removing the HDD

**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.

Remove the HDD (hard disk drive) according to the following procedures and Figures 4.2, 4.3, 4.4 and 4.5.

1. Remove one M2.5x8 screw securing the HDD door and remove the HDD door.

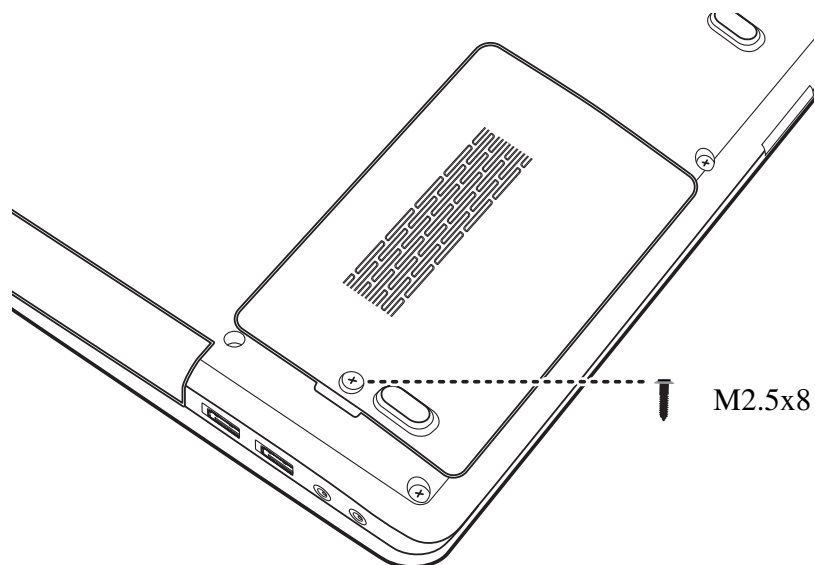


Figure 4.2 Removing the HDD door

2. Use your fingers to push the HDD in the direction indicated by the arrows in Figure 4.3.

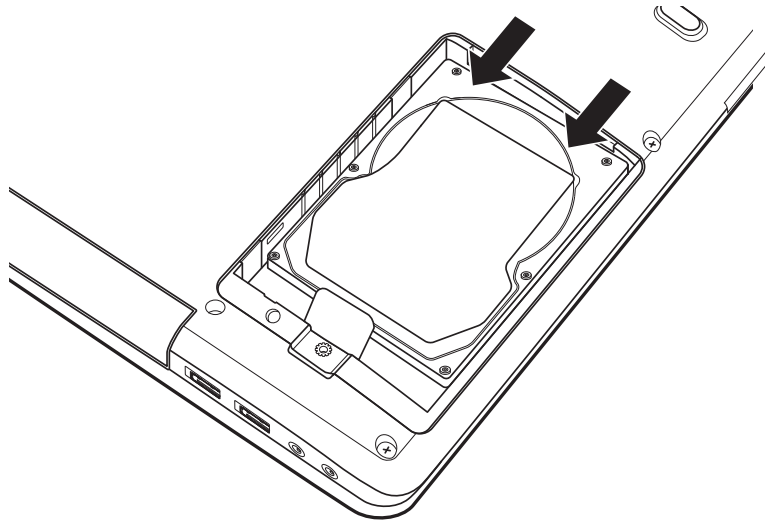


Figure 4.3 Releasing the HDD from the connector

3. Pull the tab and remove the HDD as shown in Figure 4.4.

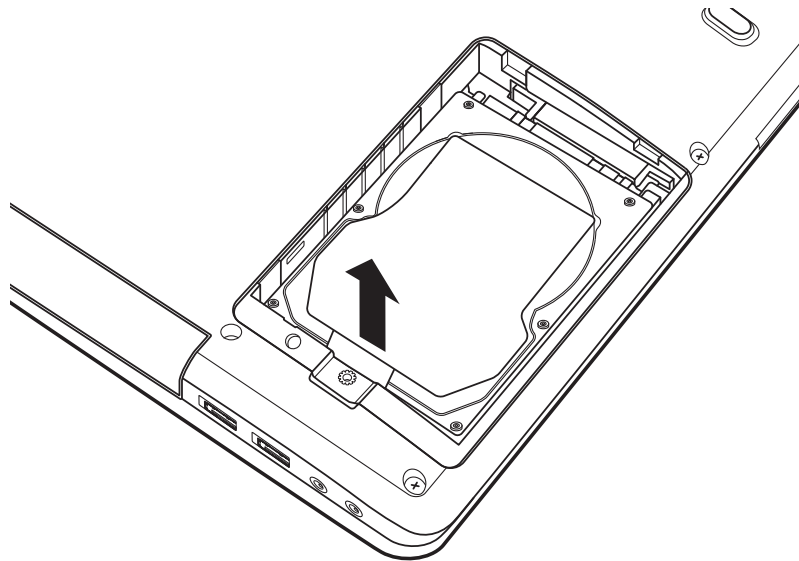


Figure 4.4 Removing the HDD from the HDD bay

**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 pack on a flat surface such as a desk.

5. Remove the four M3x3 screws with torque value 3.5kgf in order as indicated in Figure 4.5 and separate the HDD foil from the HDD.

**NOTE:** The HDD foil screws on this module are specific to the system. Screws from older systems are not compatible and must not be used on the HDD.

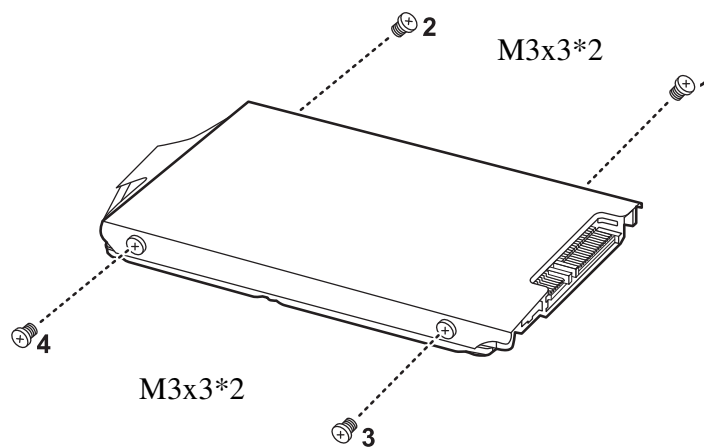


Figure 4.5 Removing the HDD foil

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

### Installing the HDD

Install the HDD according to the following procedures and Figure 4.6.

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

1. Place the HDD foil on the HDD.
2. Secure the HDD foil with four M3x3 screws in order as indicated in Figure 4.6.

**NOTE:** The HDD foil screws on this module have oversized heads and are specific to the system. Screws from older systems are not compatible and must not be used on the HDD.



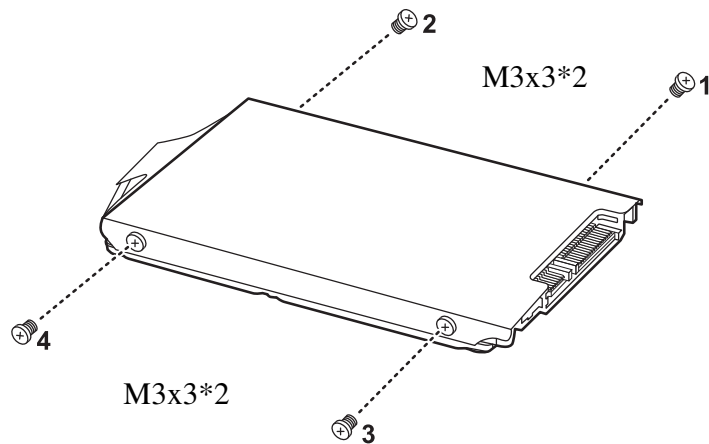


Figure 4.6 Securing the HDD foil

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

3. Install the HDD pack into the correct position in the laptop. Connect the HDD pack to the laptop.
4. Secure the HDD door by tightening one M2.5x8 screw.

## 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. Loosen the one M2.5x5.6 screw securing the RAM door as shown in Figure 4.7.
3. Remove the RAM door.

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

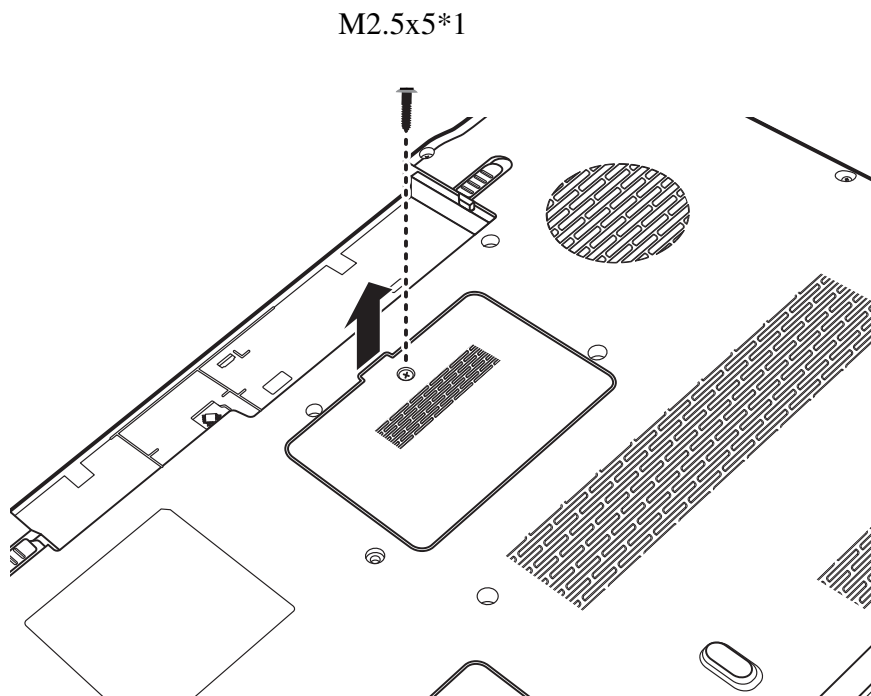


Figure 4.7 Removing the RAM door

4. Spread out the two memory lock latches so that the upper memory module pops up. Please follow the procedure as shown in Figure 4.8.

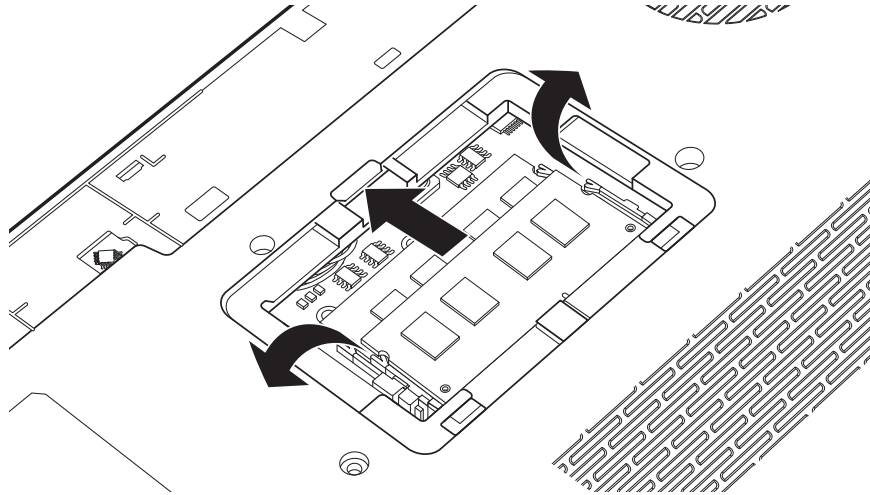


Figure 4.8 Removing the RAM from the connectors

5. Pull the upper memory module up and out at an angle, using care to avoid touching the connectors.
6. Repeat steps 4 and 5 to remove the lower memory module.

### 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 lower memory module into the connector at an angle of 45 degrees.
2. Press down on the memory module so that it is secured with both memory lock latches.
3. Repeat steps 1 and 2 to install the upper memory module.
4. Reinstall the optional RAM door.
5. Secure the RAM door with one M2.5x5 screw.

After 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 Keyboard

### Removing the Keyboard

Remove the keyboard according to the following procedures and Figures 4.9, 4.10, 4.11 and 4.12.

1. Close the laptop and turn it over. Remove the three M2.5x8 screws as shown in Figure 4.9.

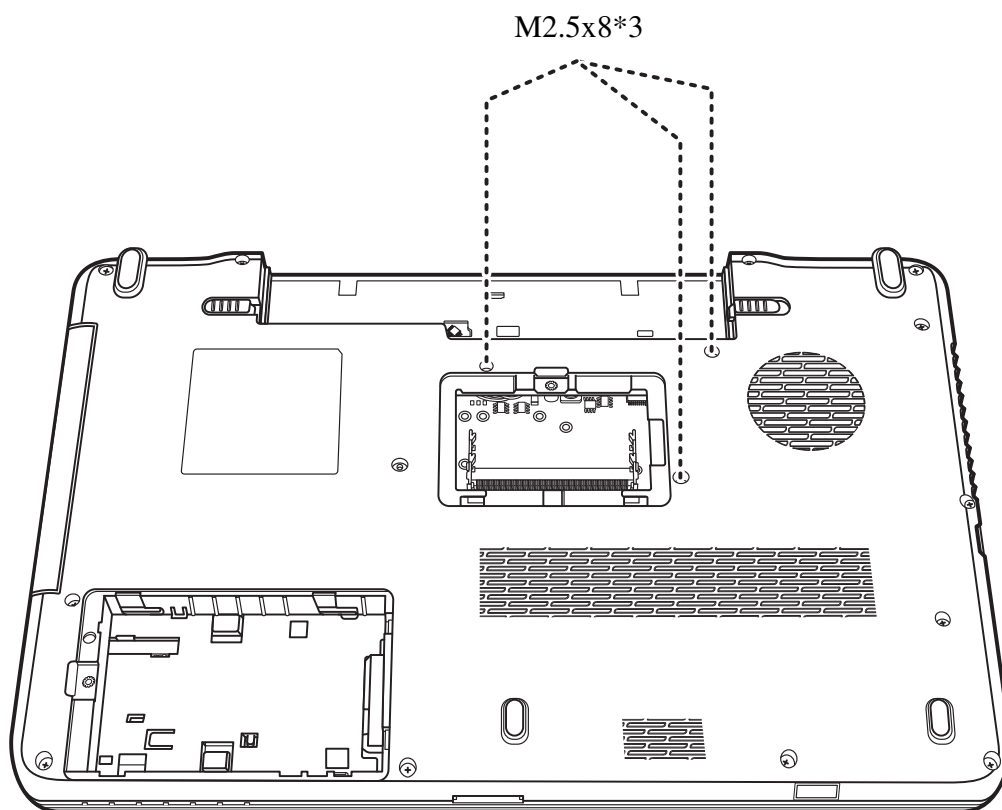
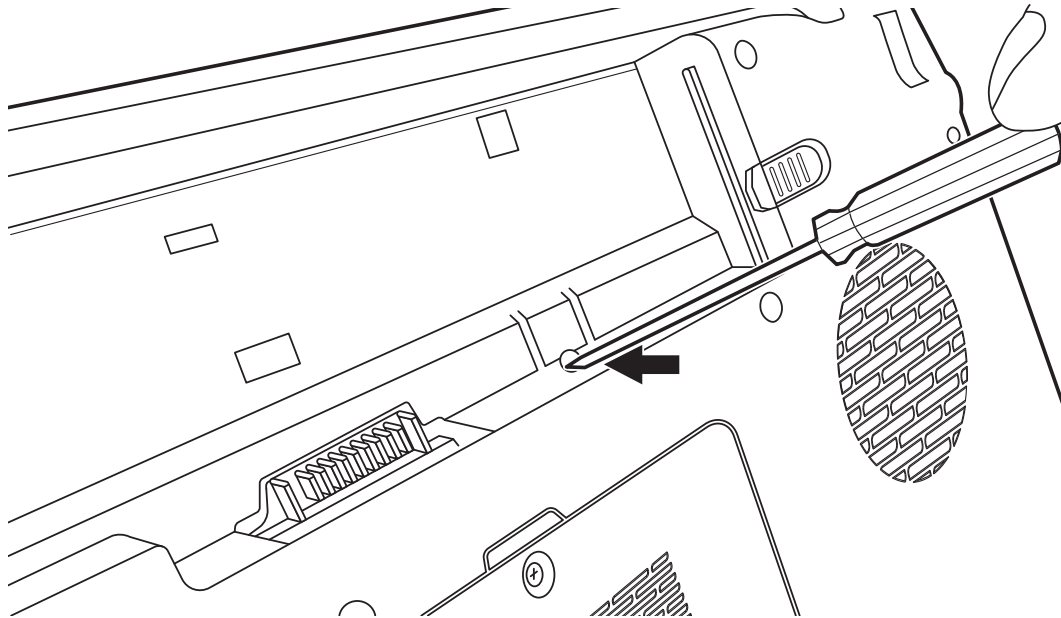


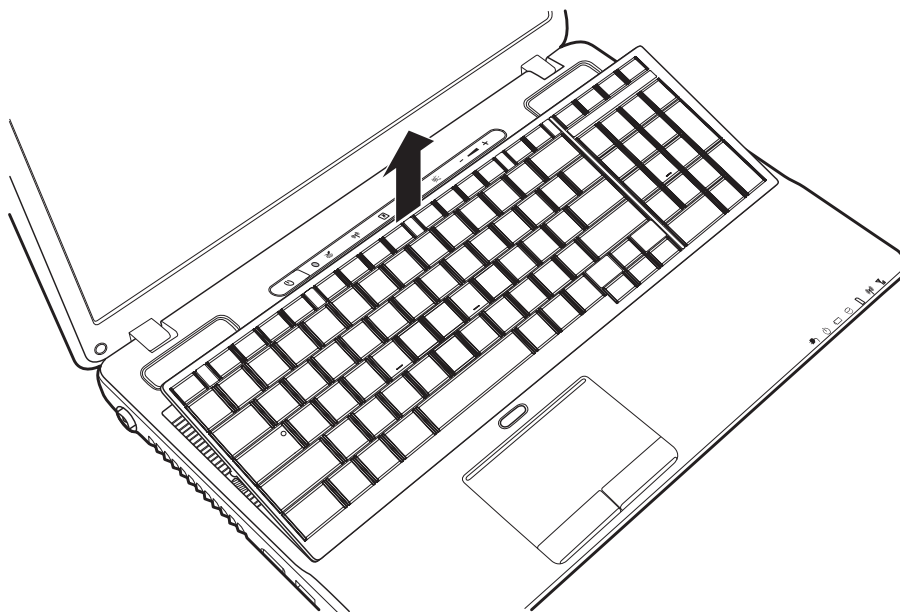
Figure 4.9 Removing the keyboard

2. Open the display panel and insert a pin into the opening in the battery bay to push the keyboard free, as indicated in Figure 4.10.



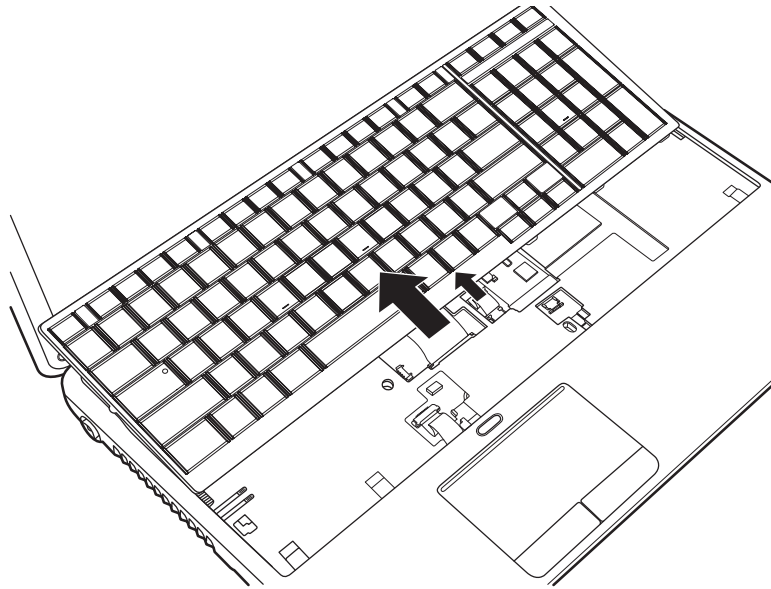
*Figure 4.10 Releasing the keyboard*

3. Lift up the keyboard and free it from the logic upper assembly as shown in Figure 4.11.



*Figure 4.11 Raising the keyboard*

4. Lift the keyboard up and disconnect the two cables on the back of the keyboard from the motherboard as shown in Figure 4.12. Remove the keyboard.



*Figure 4.12 Disconnecting the cables and removing the keyboard*

### **Installing the Keyboard**

Install the Keyboard according to the following procedures.

1. Connect the two cables on the back of the keyboard to the motherboard.
2. Place the keyboard in the correct position and press firmly downward to click into place, making sure the keyboard is secure at all points.
3. Close the laptop and flip it over.
4. Secure the keyboard with three M2.5x8 screws.

## 4.6 TV Tuner Card and WLAN Card

### Removing the TV Tuner Card

Remove the TV tuner card according to the following procedures and Figure 4.13.

1. Disconnect the antenna on the TV tuner card.
2. Remove one M2.5x5 screw on the TV tuner card as shown in Figure 4.13.
3. Pull the TV tuner card out at an angle.

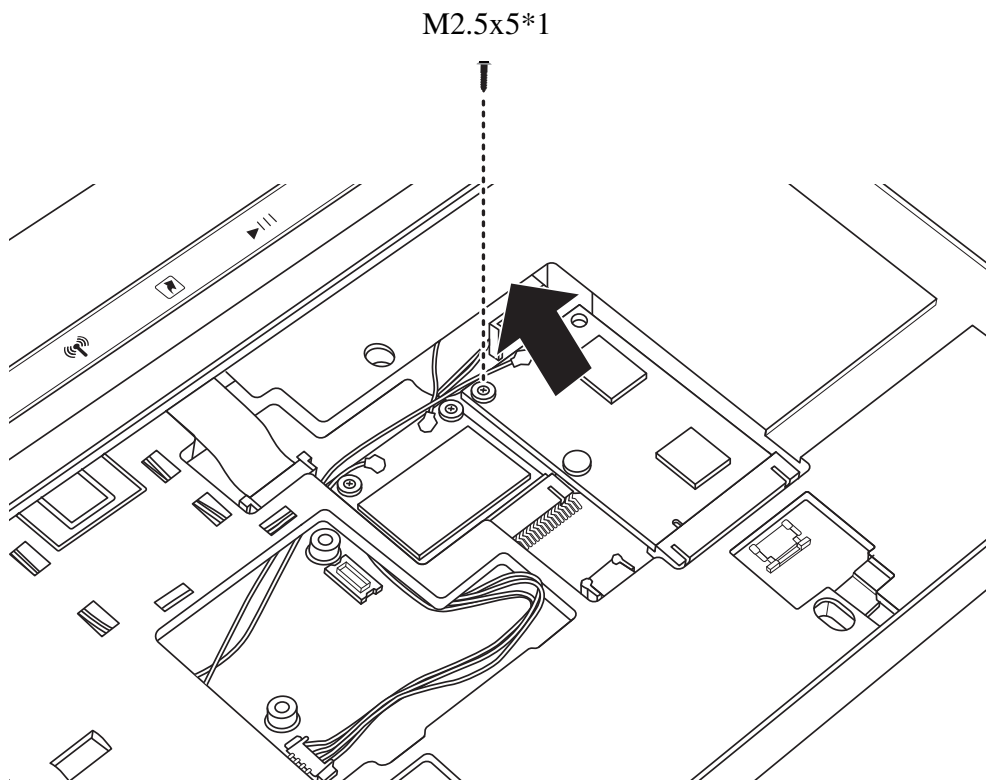


Figure 4.13 Removing the TV tuner card

### Removing the WLAN Card

Remove the WLAN card according to the following procedures and Figure 4.14.

1. Disconnect the two antennas on the WLAN card.
2. Remove one M2.5x5 screw securing the WLAN card as shown in Figure 4.14.
3. Pull the WLAN card out at an angle.

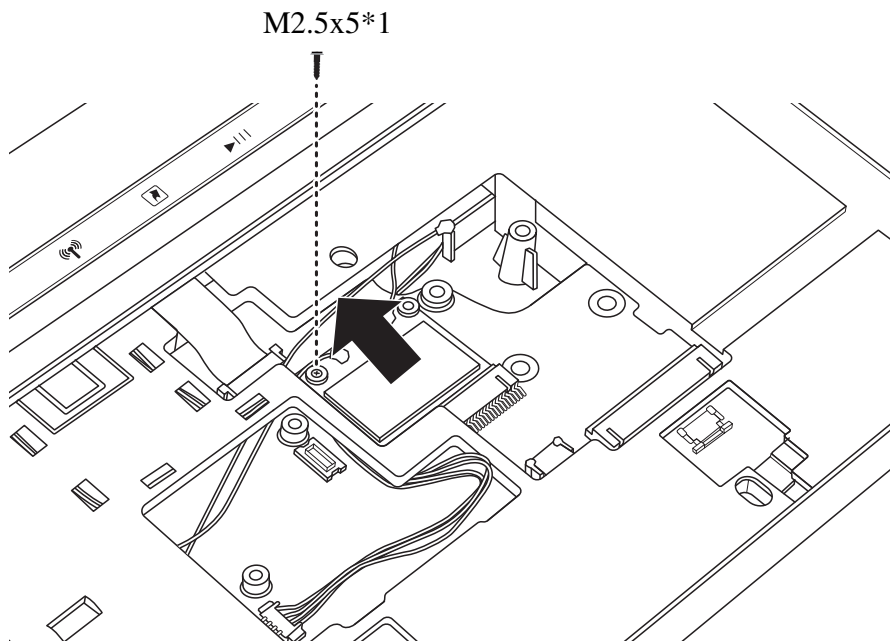


Figure 4.14 Removing the WLAN Card

### Installing the TV Tuner Card

Install the TV tuner card according to the following procedures.

1. Insert the TV tuner card into the connector as shown in Figure 4.13.
2. Press the TV tuner card down and secure it with one M2.5x5 screw.
3. Attach the antenna to the TV tuner card.



## **Installing the WLAN Card**

Install the WLAN card according to the following procedures.

1. Insert the WLAN card into the connector as shown in Figure 4.14.
2. Press the WLAN card down and secure it with one M2.5x5 screw.
3. Connect the black WLAN antenna (auxiliary) to the connector on the left of the WLAN card, and the white WLAN antenna (main) to the connector on the right.

## 4.7 ODD Module (Tray-load)

### Removing the ODD Module (Tray-load)

**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 module according to the following procedures and Figure 4.15.

1. Turn the laptop upside down.
2. Remove one M2.5x8 screw.
3. Pull the ODD module in the direction of the arrow as indicated in Figure 4.15.

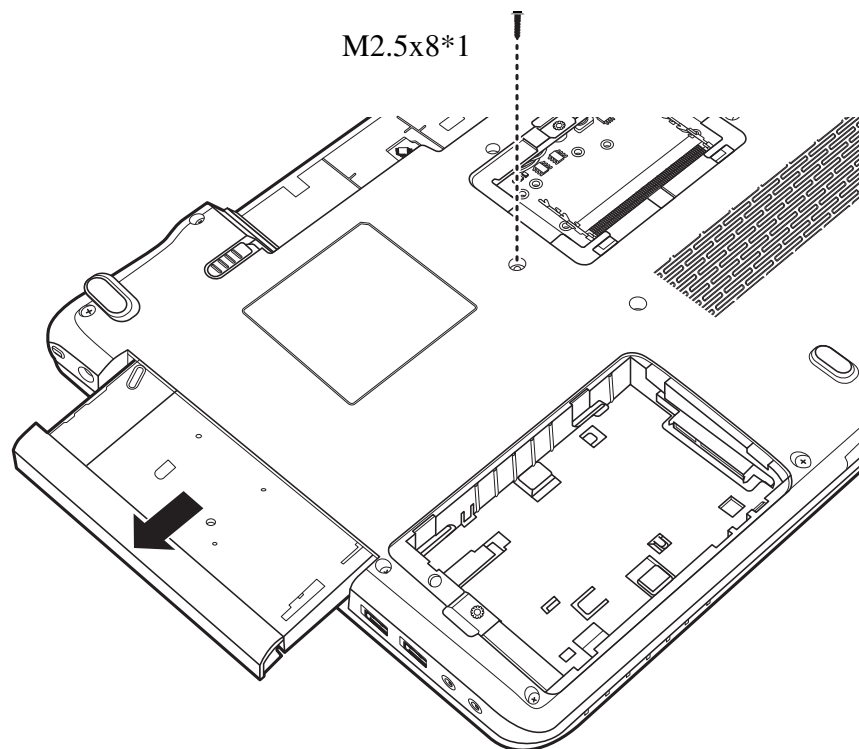


Figure 4.15 Removing the ODD module (Tray-load)

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

### Installing the ODD Module (Tray-load)

Install the ODD module according to the following procedures.

1. Insert the ODD into the ODD bay.
2. Slide the ODD inward until it meets the end.
3. Secure the ODD module with one M2.5x8 screw as indicated in Figure 4.15.

### Disassembling the ODD (Tray-load)

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

Disassemble the ODD according to the following procedures and Figure 4.16.

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

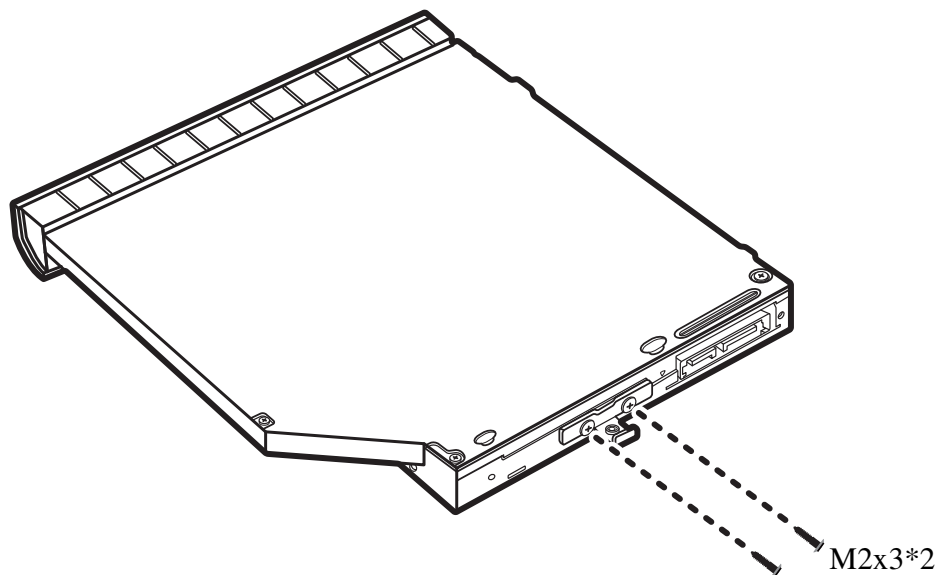
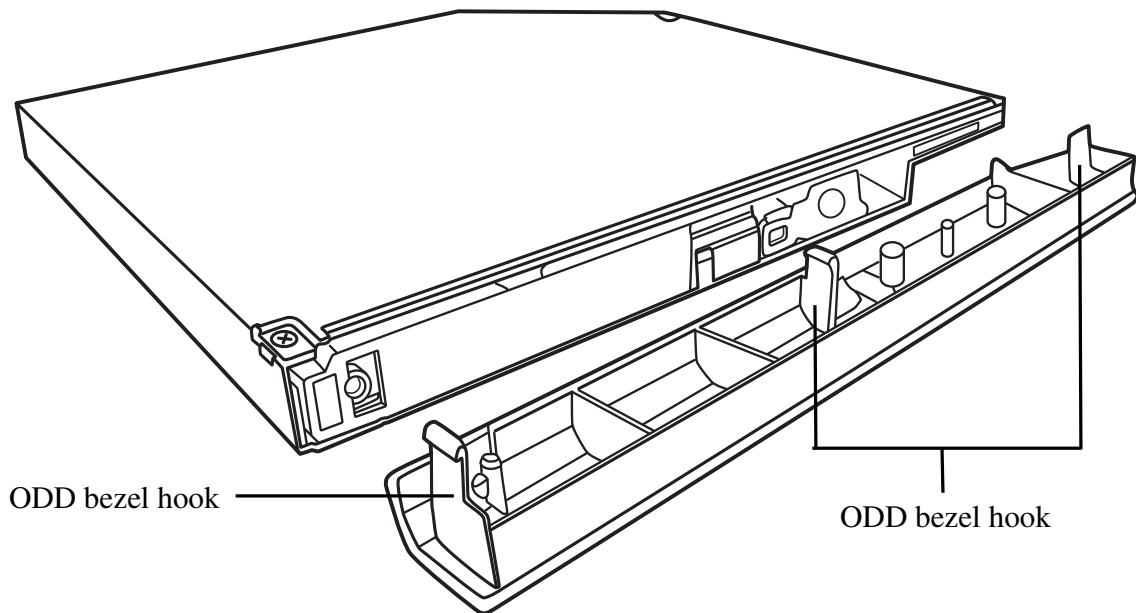


Figure 4.16 Removing the ODD bracket from the ODD

**CAUTION:** Be careful not to damage the hooks on the inside of the ODD bezel.



*Figure 4.17 Hooks on the inside of the Tray-load ODD bezel*

### **Assembling the ODD (Tray-load)**

Assemble the ODD according to the following procedures.

1. Seat the ODD bracket in the correct position and secure it with two M2x3 screws.

## 4.8 Logic Upper Assembly

### Removing the Logic Upper Assembly

Remove the logic upper assembly according to the following procedures and Figures 4.18, 4.19 and 4.20.

1. Close the laptop and turn it over. Remove the thirteen M2.5x8 screws securing the logic upper assembly as shown in Figure 4.18.

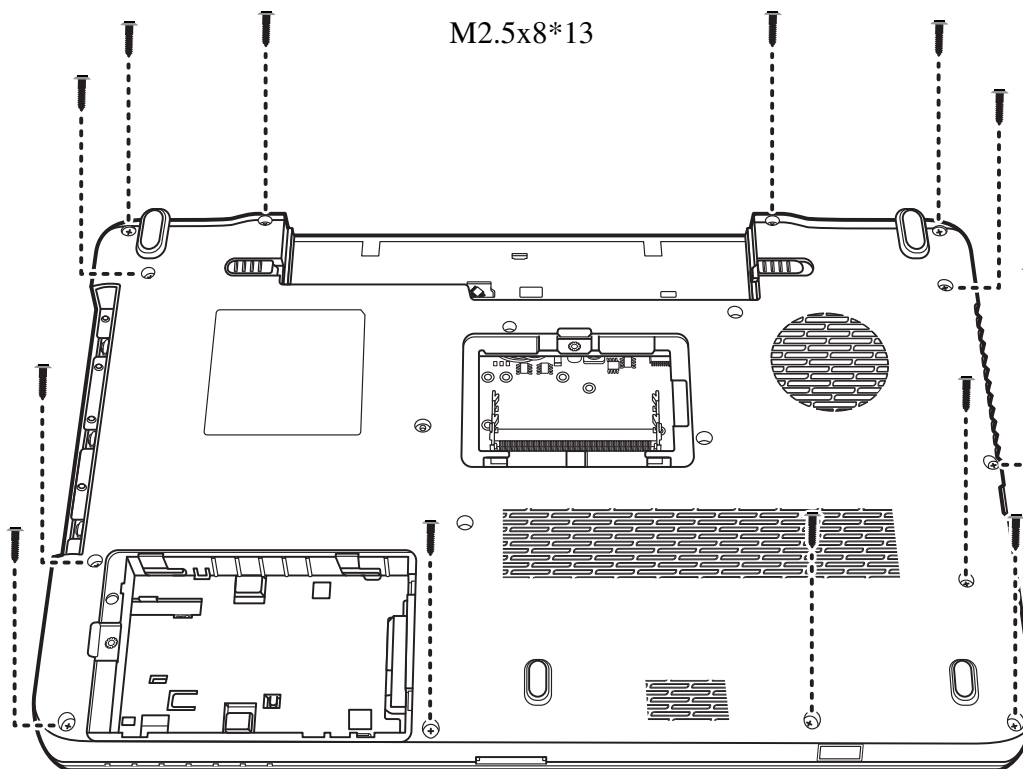


Figure 4.18 Removing thirteen screws from the bottom of the laptop

2. Turn the laptop over and open it. Remove the two M2.5x8 screws securing the logic upper assembly.
3. Disconnect the four connectors: one Control Panel FCC, one Fingerprint Scanner FCC, one speaker cable and one Touch pad cable as shown in Figure 4.19. Models featuring the optional FeliCa card will have a fifth connector. Disconnect the FeliCa card connector as shown in Figure 4.19 (where applicable).

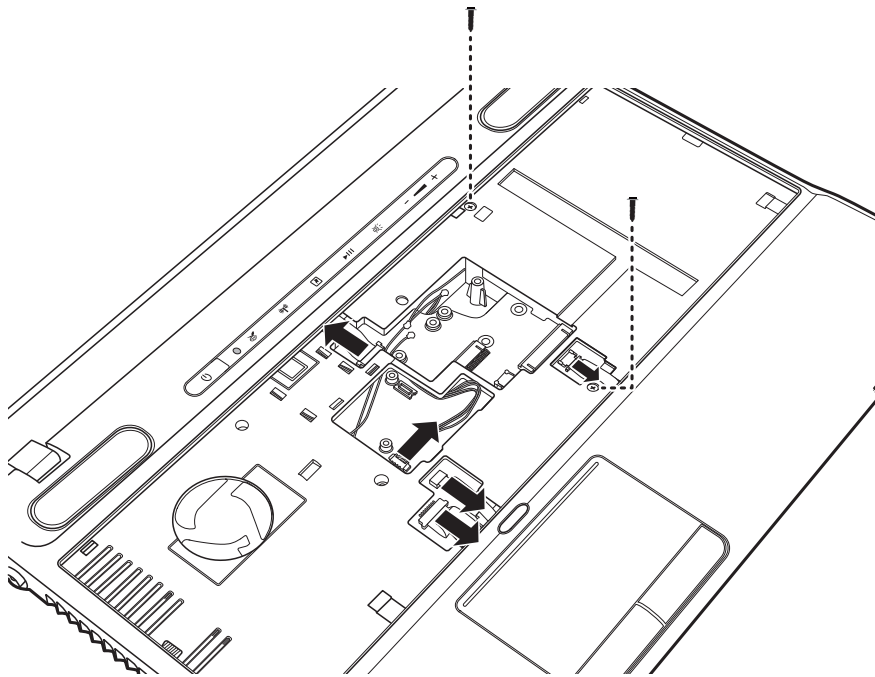


Figure 4.19 Disconnecting the cables and removing the upper logic assembly screw

4. Pry up the logic upper assembly from the bottom edge and remove it as shown in Figure 4.20.

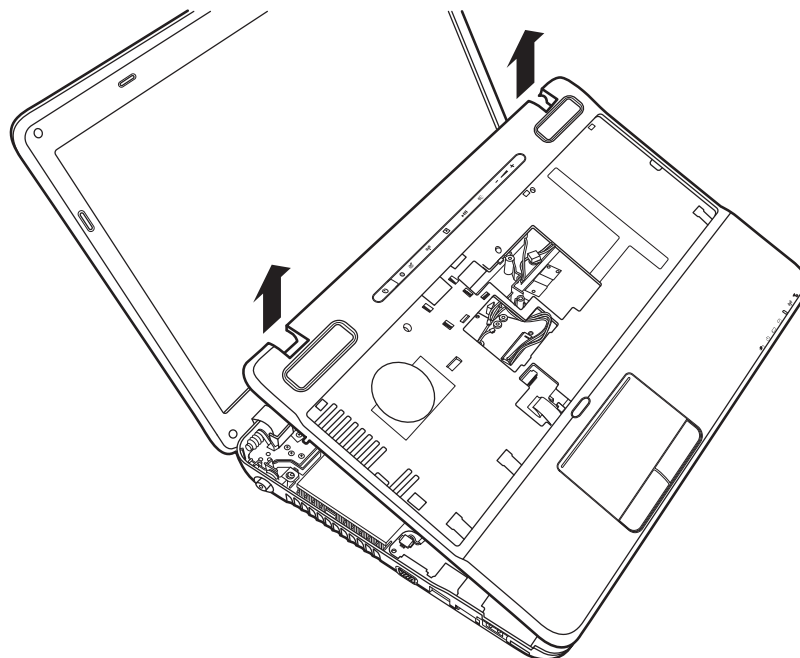


Figure 4.20 Removing the logic upper assembly

### **Installing the Logic Upper Assembly**

Install the logic upper assembly according to the following procedures.

1. Seat the logic upper assembly from the back edge and adjust to the correct position. Snap the logic upper assembly firmly into place.
  
2. Attach the four cables and secure the logic upper assembly with two M2.5x8 screws as indicated in Figure 4.19. Models featuring the optional FeliCa card will have a fifth connector. Connect the FeliCa card connector as shown in Figure 4.19 (where applicable).
  
3. Close the laptop and turn it upside down. Secure the logic upper assembly with thirteen M2.5x8 screws as indicated in Figure 4.18.

## 4.9 ODD Module (Slot-load)

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

### Removing the ODD Module (Slot-load)

Remove the ODD (optical disc drive) module according to the following procedures.

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

1. Remove the logic upper assembly from the system.
2. Lift and remove the ODD frame (straight up) from the logic lower assembly.
3. Push the ODD outward (into the empty space left by the ODD frame) to release it from the connector on the motherboard.
4. Lift and remove the ODD (straight up) from the logic lower assembly.
5. Carefully push the ODD button (eject button) outward and away from the logic lower assembly, then remove.

### Installing the ODD Module (Slot-load)

Install the ODD module according to the following procedures.

1. Replace the motherboard.
2. Place the ODD into the logic lower assembly (straight down) and slid it inward to connect with the motherboard.
3. Place the ODD frame into the space between the ODD and the right edge of the logic lower assembly.
4. Align the ODD button (eject button) with (the outside of) the logic lower assembly and carefully push it inward to secure it in place the ODD into the ODD bay.
5. Slide the ODD inward until it meets the end.



**Disassembling the ODD (Slot-load)**

**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 4.21.

1. Remove the two M2x3 screws securing the ODD bracket to the ODD.
2. Remove the ODD bracket from the ODD.
3. Remove the M2x3 screw securing the ODD board to the ODD.
4. Remove the ODD board from the ODD.

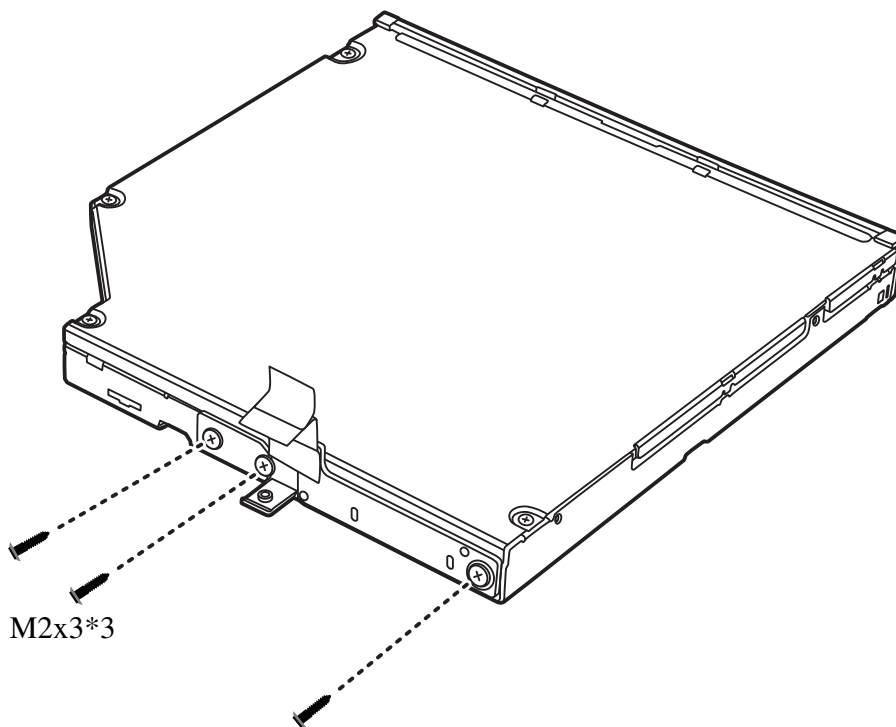


Figure 4.21 Disassembling the Slot-load ODD

### **Assembling the ODD (Slot-load)**

Assemble the ODD according to the following procedures and Figure 4.21.

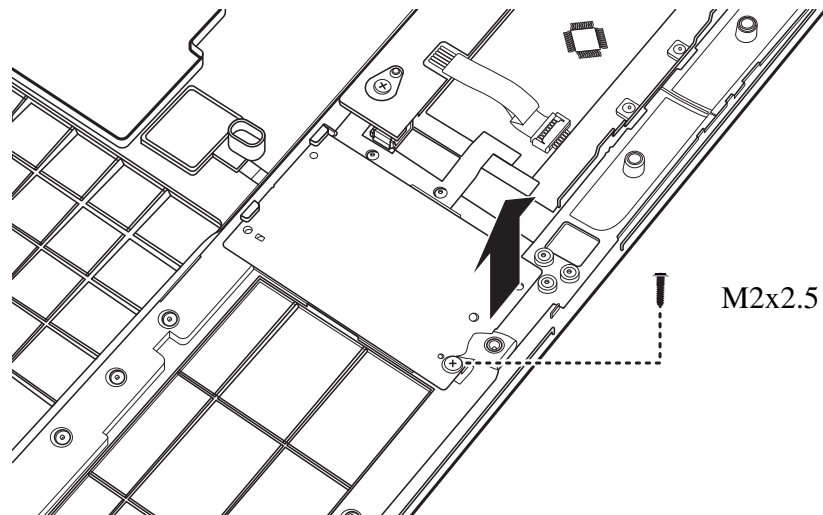
1. Place the ODD board in the correct position and secure it with one M2x3 screw.
  
  
  
  
  
  
  
  
  
  
2. Place the ODD bracket in the correct position and secure it with two M2x3 screws.

## 4.10 FeliCa Card

### Removing the FeliCa Card

Remove the FeliCa card according to the following procedures and Figure 4.22.

1. Turn the logic upper assembly upside down.
2. Remove one M2x2.5 screw securing the FeliCa card to the logic upper assembly. Lift the FeliCa card by the front edge and remove it.



*Figure 4.22 Removing the FeliCa card from the logic upper assembly*

### Installing the FeliCa Card

Install the FeliCa card according to the following procedures.

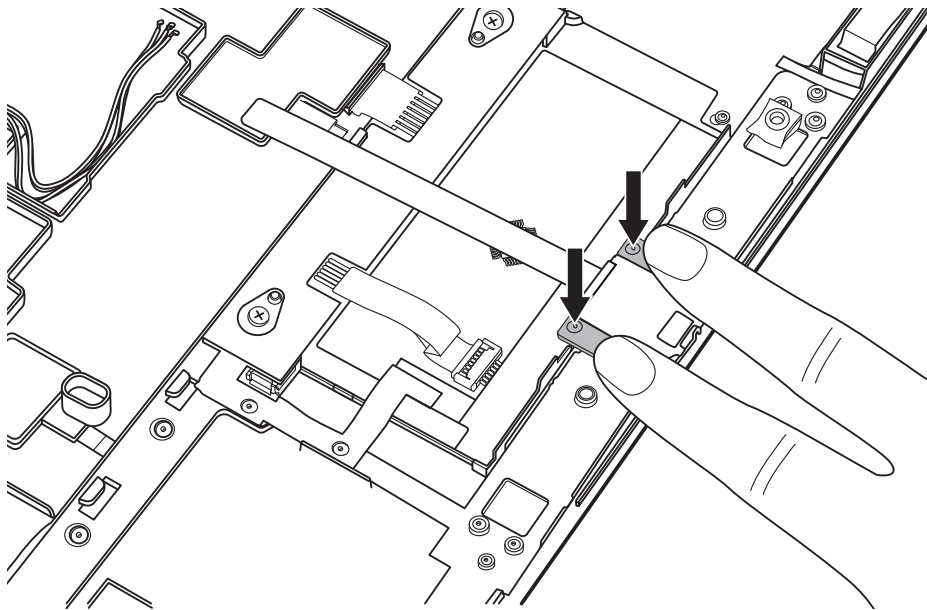
1. Turn the logic upper assembly upside down. Seat the FeliCa card in the proper position.
2. Secure the FeliCa card with one M2x2.5 screw.

## 4.11 Fingerprint Scanner Bracket

### Removing the Fingerprint Scanner Bracket

Remove the fingerprint scanner bracket according to the following procedures and Figures 4.23, 4.24 and 4.25.

1. Turn the logic upper assembly upside down.
2. Use your fingers to press and hold down the wings on either side of the fingerprint scanner bracket as shown in Figure 4.23.



*Figure 4.23 Raising the fingerprint scanner bracket from the logic upper assembly*

3. While still holding down the wings, grasp the fingerprint scanner bracket by the top and bottom edge and work it in the direction indicated in Figure 4.24 until the bracket becomes loose.

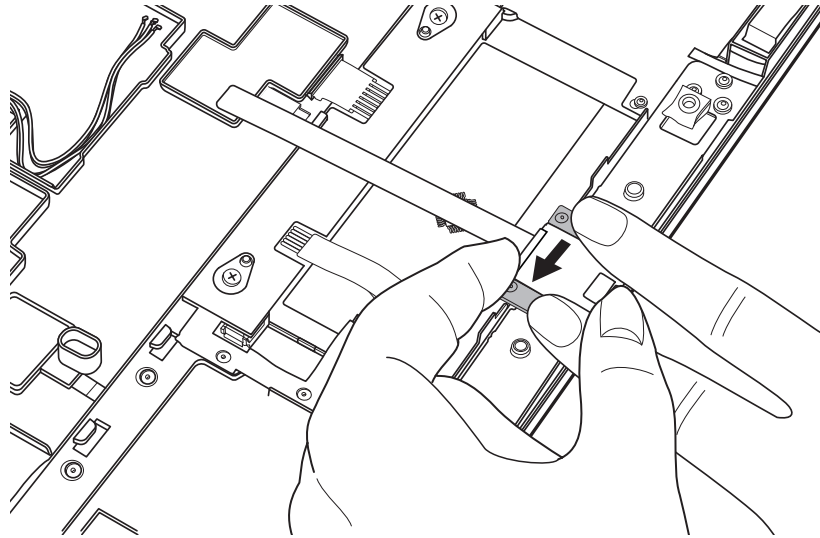


Figure 4.24 Working the fingerprint scanner bracket loose

4. Lift the edge of the fingerprint scanner bracket as shown in Figure 4.25, and remove it from the system.

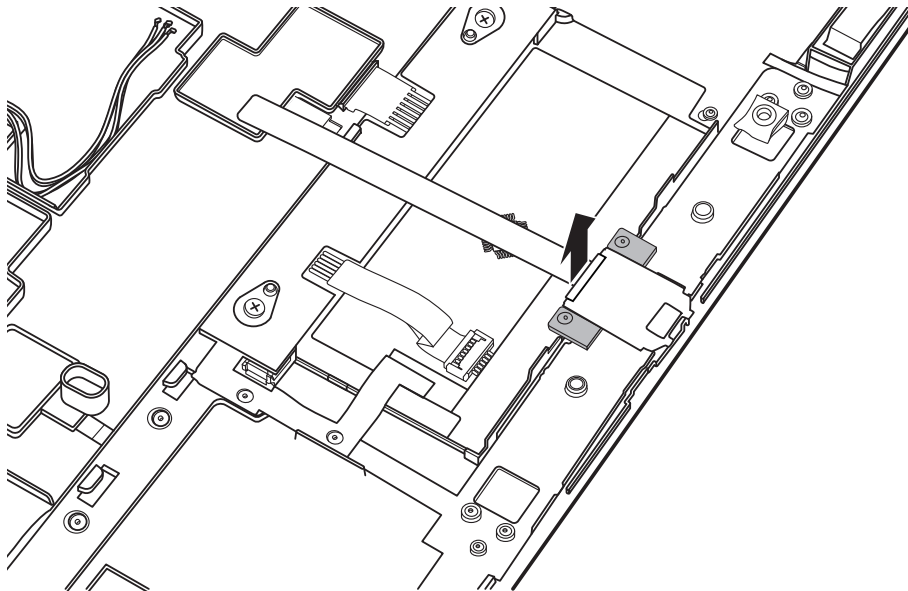


Figure 4.25 Removing the fingerprint scanner bracket from the logic upper assembly

### **Installing the Fingerprint Scanner Bracket**

Install the fingerprint scanner bracket according to the following procedures.

1. Turn the logic upper assembly upside down.
2. Use your fingers to press and hold down the wings on either side of the fingerprint scanner bracket as shown in Figure 4.23.
3. Place the bottom edge of the fingerprint scanner bracket in the proper position.
4. Lower the top edge of the fingerprint scanner bracket and press down until it snaps into place.

## 4.12 Touch Pad Board

### Removing the Touch Pad Board

Remove the touch pad board according to the following procedures and Figure 4.26.

1. Disconnect the cable from the touch pad board to the touchpad.
2. Remove the two M2x5 screws securing the touch pad board to the logic upper assembly. Lift the bottom edge of the touch pad board to release it from the tab securing the top edge. Remove the touch pad board.

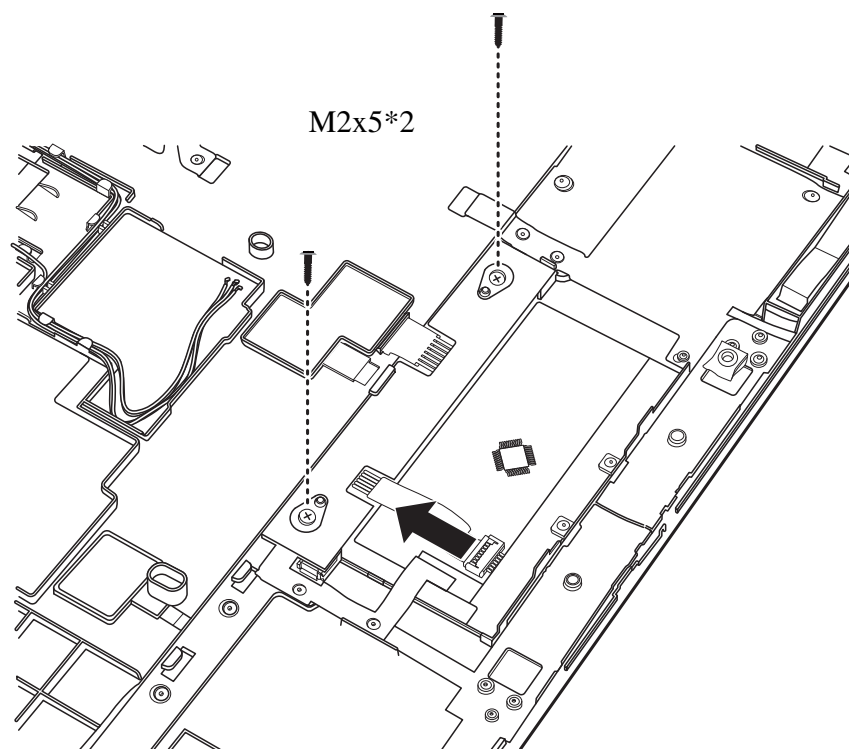


Figure 4.26 Removing the touch pad board

### Installing the Touch Pad Board

Install the touch pad board according to the following procedures.

1. Seat the touch pad board in the correct place on the logic upper assembly, ensuring the top edge is secure under the tab on the logic upper assembly.
2. Secure the touch pad board with the two M2x5 screws.
3. Connect the touch pad board cable to the touch pad.

## 4.13 Speakers and Speaker Cushions

### Removing the Speakers

Remove the speakers according to the following procedures and Figure 4.27.

1. Pull the FCC cable covering the speaker cables from the slot as indicated in Figure 4.27.
2. Pull the speaker cables from the routing channel.
3. Remove the four M2.5x6.5 screws securing the speakers to the logic upper assembly and remove the speakers.

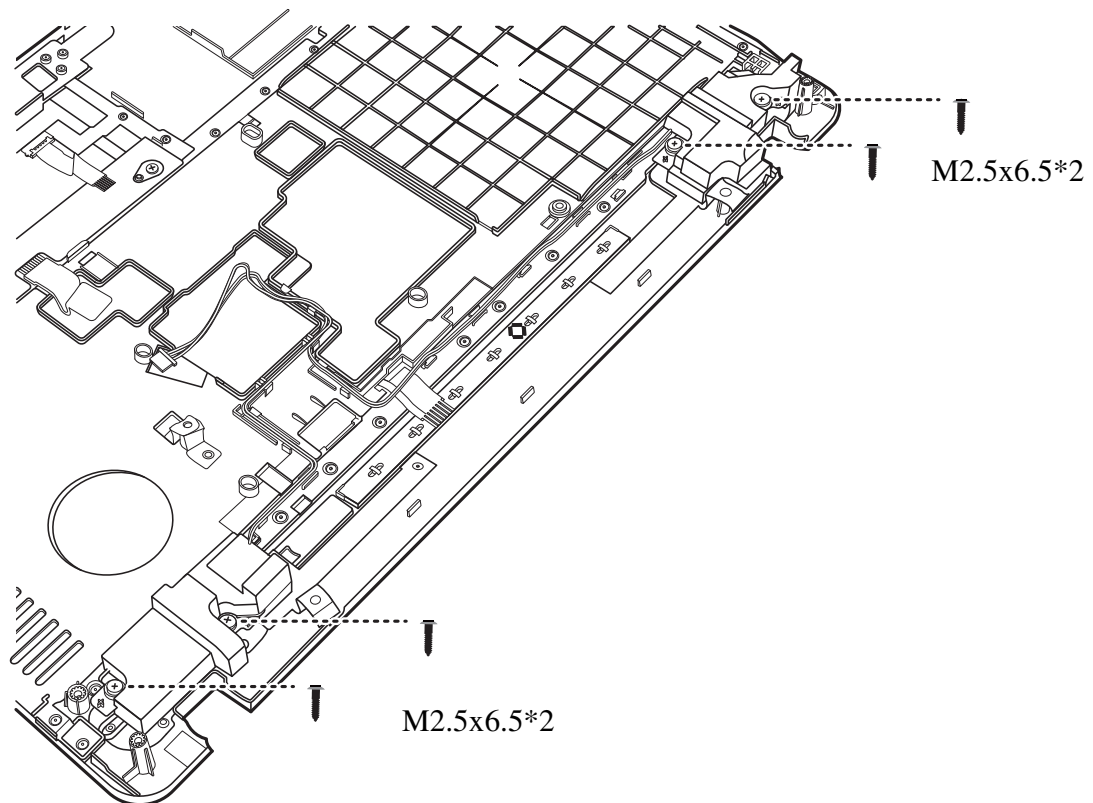


Figure 4.27 Removing the speakers



### Removing the Speaker Cushions

Remove the speaker cushions according to the following procedures and Figure 4.28.

1. Remove the four speaker cushions from the speakers.

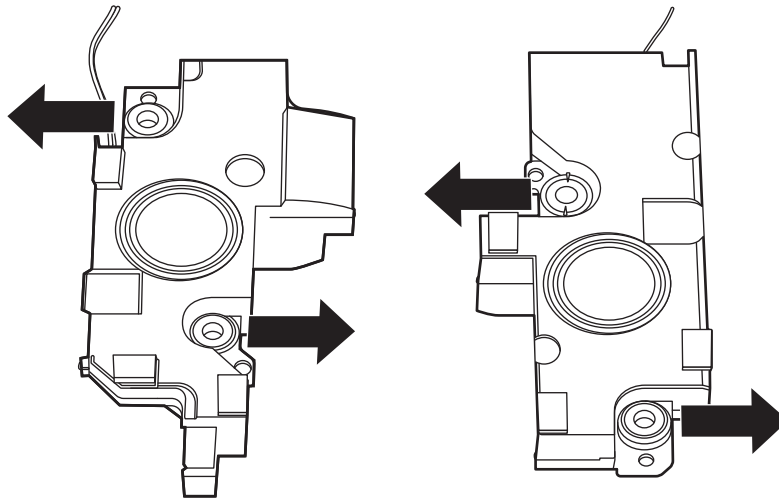


Figure 4.28 Removing the speaker cushions

### Installing the Speaker Cushions

Install the speaker cushions according to the following procedures.

1. Pinch the speaker cushions and insert them into the speakers.

### Installing the Speakers

Install the speakers according to the following procedures.

1. Seat the speakers in the correct position on the logic upper assembly.
2. Secure the four M2.5x6.5 screws as shown in Figure 4.27.
3. Route the speaker cables in the routing channels on the logic upper assembly.

## 4.14 Indicator Board

### Removing the Indicator Board

Remove the indicator board according to the following procedures and Figure 4.29.

1. Disconnect the indicator board cable from the motherboard.
2. Lift the indicator board out of the slot and remove it.

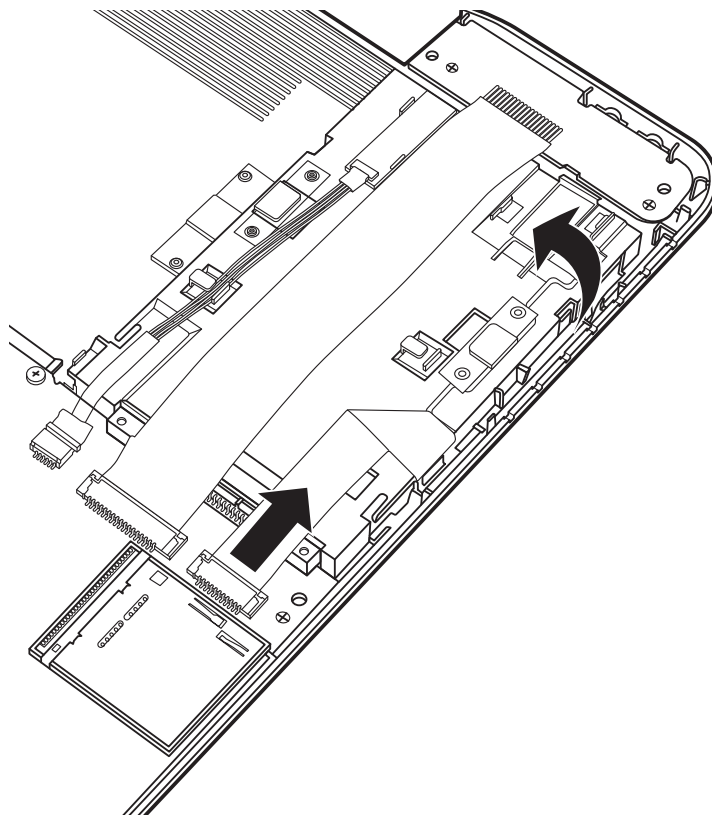


Figure 4.29 Removing the indicator board

### Installing the Indicator Board

Install the indicator board according to the following procedures.

1. Place the indicator board in the slot and attach the cable to the motherboard as shown in Figure 4.29.

## 4.15 USB Board

### Removing the USB Board

Remove the USB board according to the following procedures and Figure 4.30.

1. Disconnect the USB board cable from the motherboard.
2. Lift the USB board from the back edge to release it from the catch and remove it.

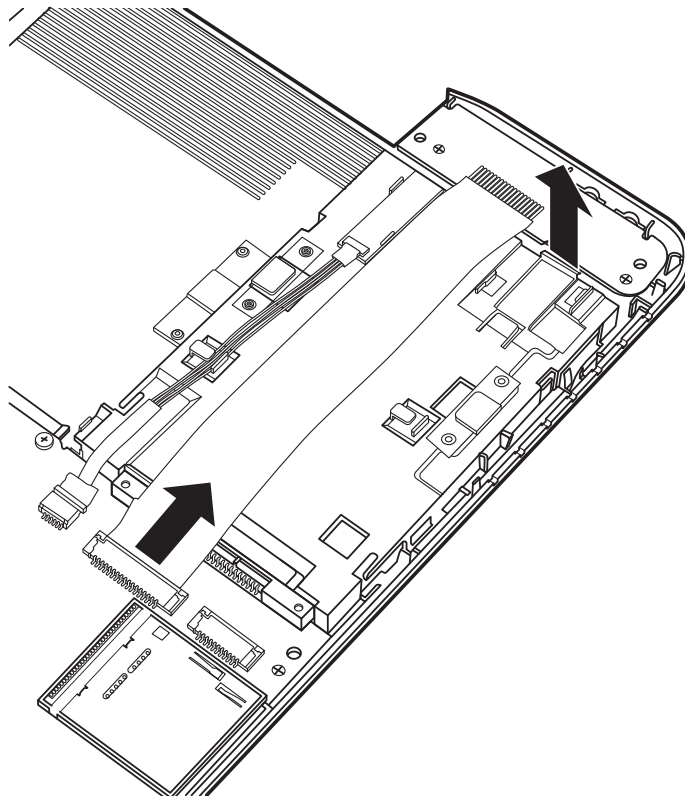


Figure 4.30 Removing the USB board

### Installing the USB Board

Install the USB board according to the following procedure:

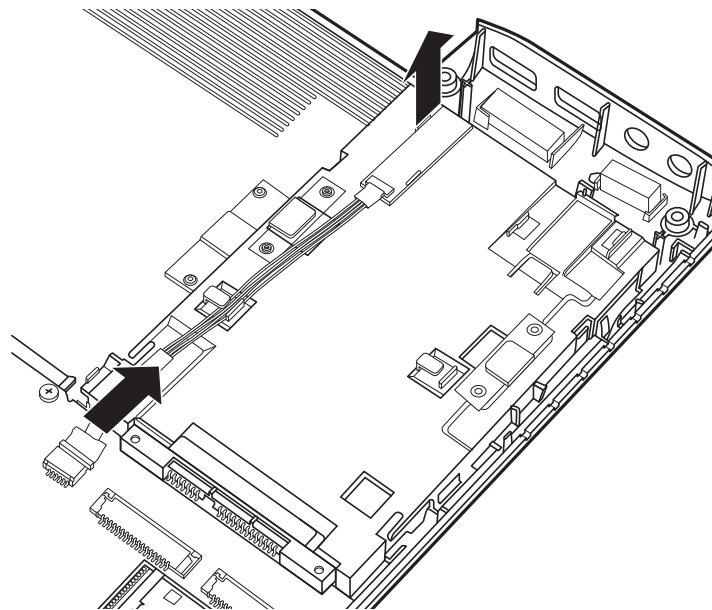
1. Seat the USB board in the proper position and snap it into place.
2. Connect the USB board cable to the motherboard.

## 4.16 Bluetooth

### Removing the Bluetooth

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

1. Disconnect the Bluetooth cable from the motherboard.
2. Remove the Bluetooth from the cradle by prying upward on the upper outside edge as shown in Figure 4.31.
3. Remove the Bluetooth.



*Figure 4.31 Removing the Bluetooth*

### Installing the Bluetooth

Install the Bluetooth according to the following procedures.

1. Seat the Bluetooth in the correct position and snap it into place.
2. Connect the cable to the motherboard.

## 4.17 Thermal Fan

### Removing the Thermal Fan

Remove the thermal fan according to the following procedures and Figure 4.32.

1. Remove the two M2x5 screws from the thermal fan as shown in Figure 4.32.
2. Disconnect the cable from the motherboard.
3. Remove the thermal fan.

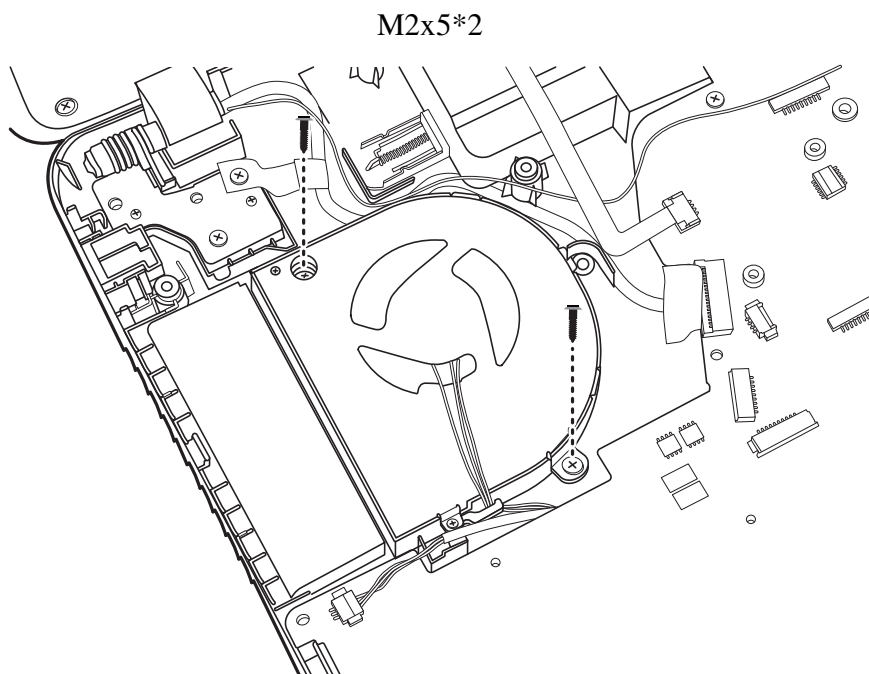


Figure 4.32 Removing the thermal fan

### Installing the Thermal Fan

Install the thermal fan according to the following procedures.

1. Seat the thermal fan in the correct position.
2. Secure the thermal fan with two M2x5 screws.
3. Connect the cable to the motherboard.

## 4.18 TV Tuner Antenna

### Removing the TV Tuner Antenna

Remove the TV tuner antenna according to the following procedures and Figure 4.33.

1. Pull the TV tuner antenna cable from the routing channel and remove the connector from the bracket as shown in Figure 4.33. Remove the TV tuner antenna.

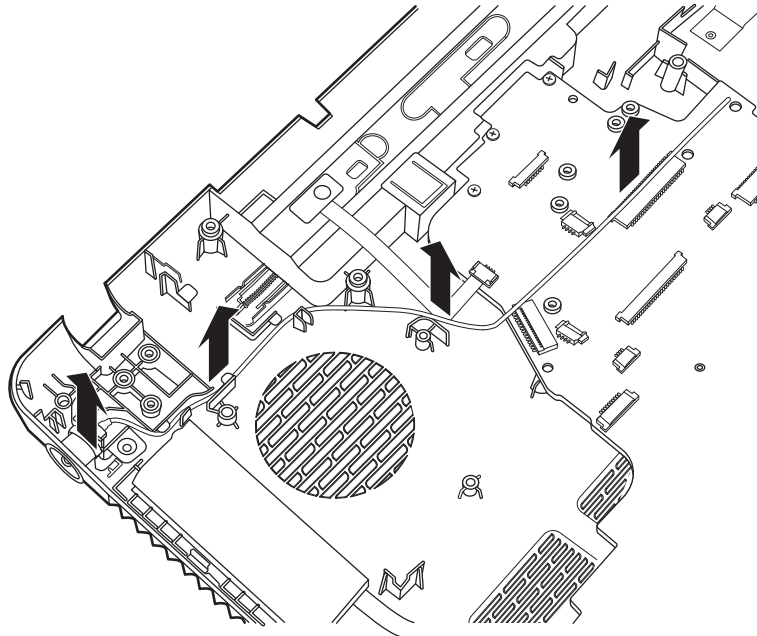


Figure 4.33 Removing the TV tuner antenna

### Installing the TV Tuner Antenna

Install the TV tuner antenna according to the following procedure.

1. Place the TV tuner antenna connector in the bracket and push it down. Route the TV tuner antenna cable in the routing channels.

## 4.19 Power Membrane

### Removing the Power Membrane

Remove the power membrane according to the following procedures and Figure 4.34.

1. Disconnect the power membrane from the motherboard.
2. Peel off and remove the power membrane, taking care not to damage or tear it.

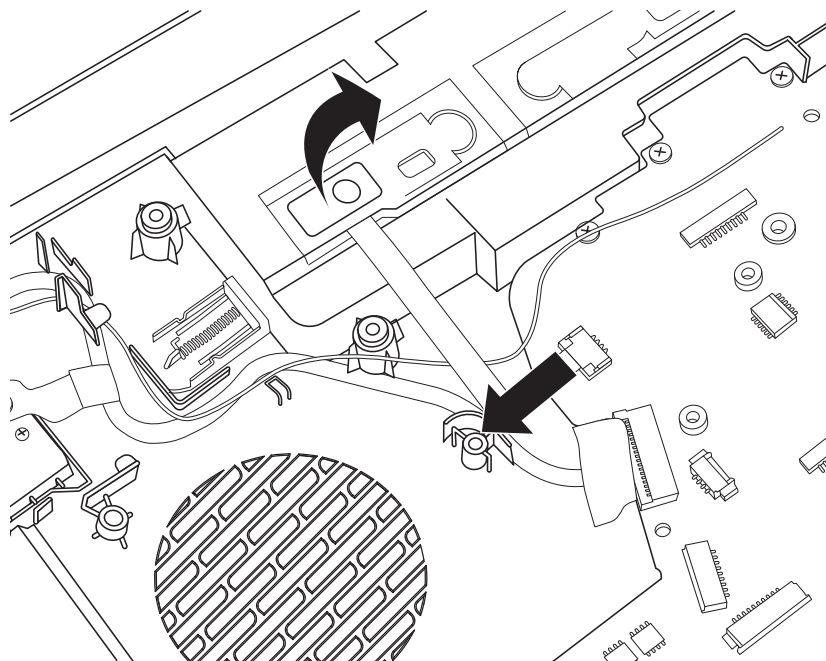


Figure 4.34 Removing the power membrane

### Installing the Power Membrane

Install the power membrane according to the following procedures.

1. Seat the power membrane in the correct place and adhere it to the lower logic assembly.
2. Connect the power membrane to the motherboard.

**NOTE:** Where possible reuse the power membrane. If the power membrane is faulty or is compromised during removal install a new power membrane.

## 4.20 Display Assembly

### Removing the Display Assembly

Remove the display assembly according to the following procedures and Figure 4.35.

1. Lift up the LVDS cable tab as shown in Figure 4.35.
2. Peel back the tape on the LVDS cable connector and disconnect the LVDS cable.
3. Remove the six M2.5x5 screws securing the display assembly as shown in Figure 4.35.
4. Remove the display assembly.

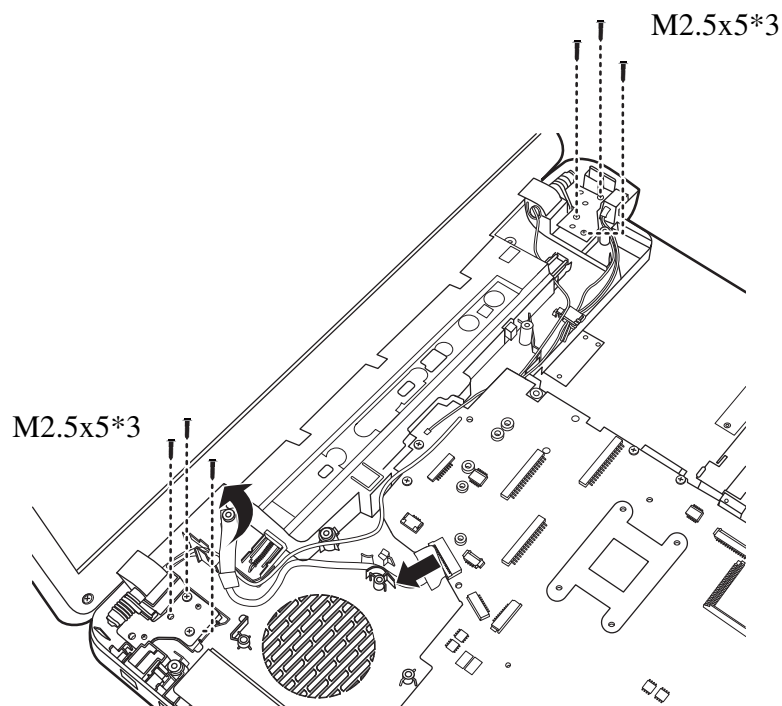


Figure 4.35 Removing the display assembly



## **Installing the Display Assembly**

Install the display assembly according to the following procedures.

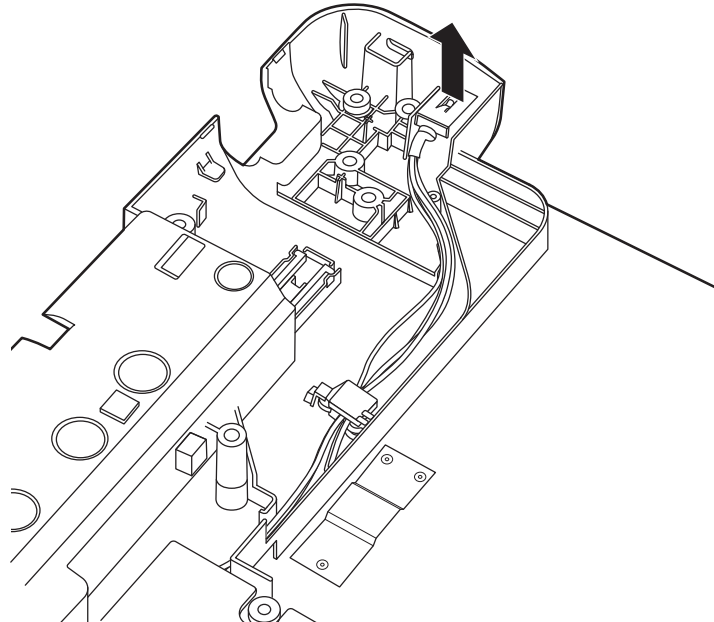
1. Hold the display assembly in the correct position and secure it with four M2.5x5 screws.
2. Connect the LVDS cable to the motherboard and secure the tape.
3. Secure the LVDS cable tab in the correct position as shown in Figure 4.35.

## Motherboard Assembly

### Removing the Motherboard Assembly

The motherboard assembly comes in two different models. Remove the motherboard assembly of each model according to the following procedures and Figures 4.36 and 4.37.

1. Slide the DC in cable upward and remove it from the connector slot as shown in Figure 4.36.



*Figure 4.36 Removing the DC in cable from the connector slot*

2. Remove the M2.5x5 screw securing the motherboard as shown in Figure 4.37.
3. Raise the motherboard from the right edge and slide it out, taking care not to damage the connector ports.

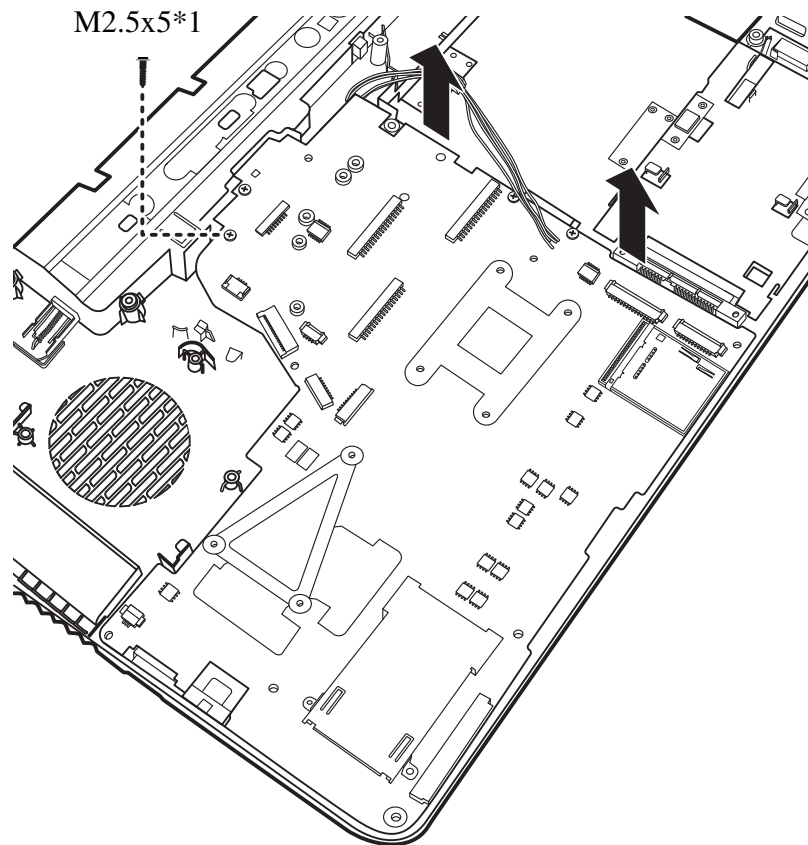


Figure 4.37 Removing the discreet motherboard from the system

### Installing the Motherboard

Install the motherboard according to the following procedures.

1. Seat the motherboard in the correct position.
2. Secure the motherboard with one M2.5x5 screw as shown in Figure 4.37.
3. Slot the DC in cable into the connector port slot and press the wires into the channels on the logic lower assembly.

## 4.21 Thermal Module

### Removing the Thermal Module

The thermal module comes in two different models: a UMA model and a Discrete model. Remove the thermal module of each model according to the following procedures and Figures 4.38 and 4.39.

**CAUTION:**

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

- 1. The unit can become very hot during operation. Be sure to let it cool down before starting the repair work.*
- 2. Use care when removing and disassembling the unit in order to avoid damage.*
- 3. If you remove the thermal module, please use a soft cloth with alcohol to clean it. Reapply Shinetsu 7762 grease before installing the thermal module. If you use a new thermal module, please ensure to remove the release paper first.*

#### For the Discrete Model

1. Remove the three M2.5x6.5 spring screws and the four M2.5x6 spring screws in order as shown in Figure 4.38.
2. Remove the thermal module.

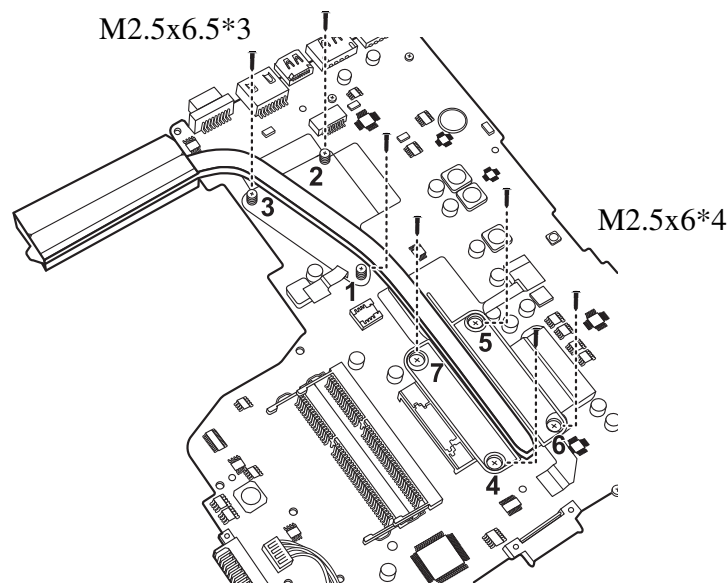
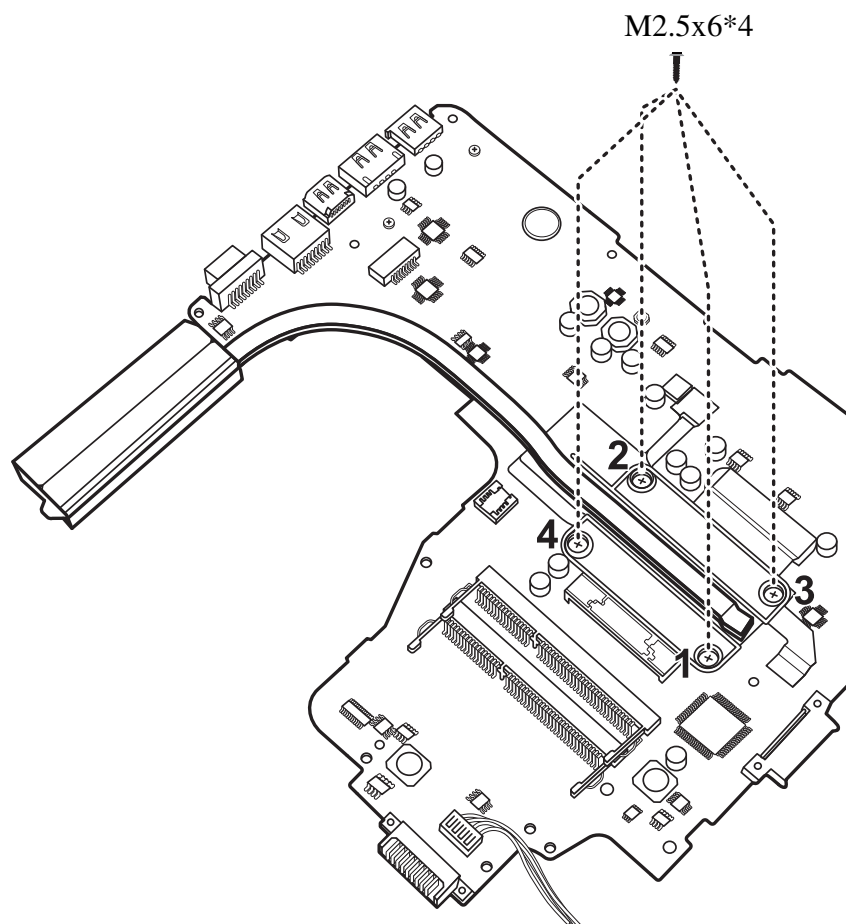


Figure 4.38 Removing the thermal module (Discrete model)

**For the UMA Model**

1. Remove the four M2.5x6 screws in order as shown in Figure 4.39.
2. Remove the thermal module.



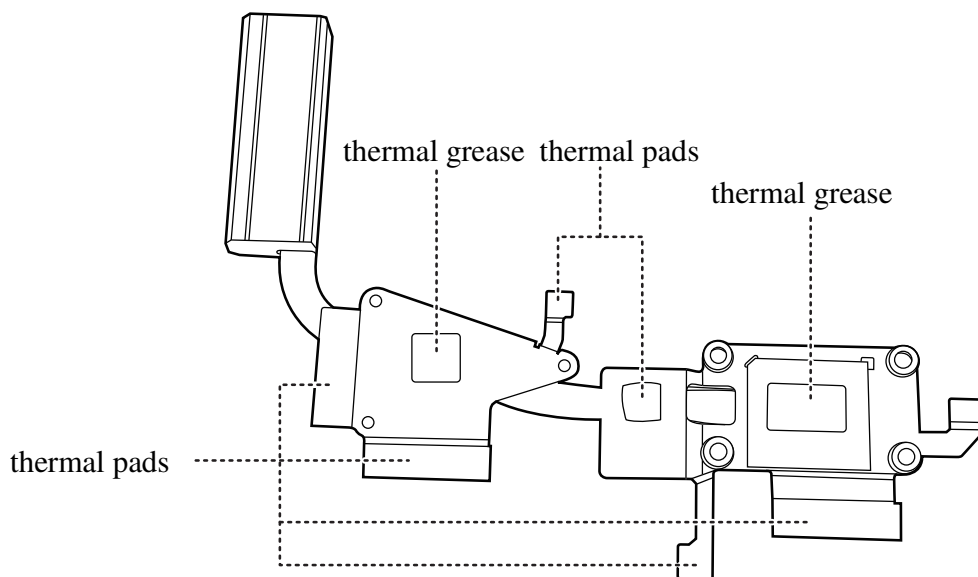
*Figure 4.39 Removing the thermal module (UMA model)*

## Installing the Thermal Module

The thermal module comes in two different models: a UMA model and a Discrete model. Install the thermal module of each model according to the following procedures.

### For the Discrete model

1. Reapply Shinetsu 7762 thermal grease on the VGA thermal pads as shown in Figure 4.40. If you use a new thermal module, remove the release papers on the thermal pads first.



*Figure 4.40 Reapplying Shinetsu 7762 grease on the thermal module and remove any release papers*

2. Seat the thermal module on the motherboard in the correct position and secure the four M2.5x6 spring screws and the three M2.5x6.5 spring screws according to the number sequence sealed on the thermal module as shown in Figure 4.41.

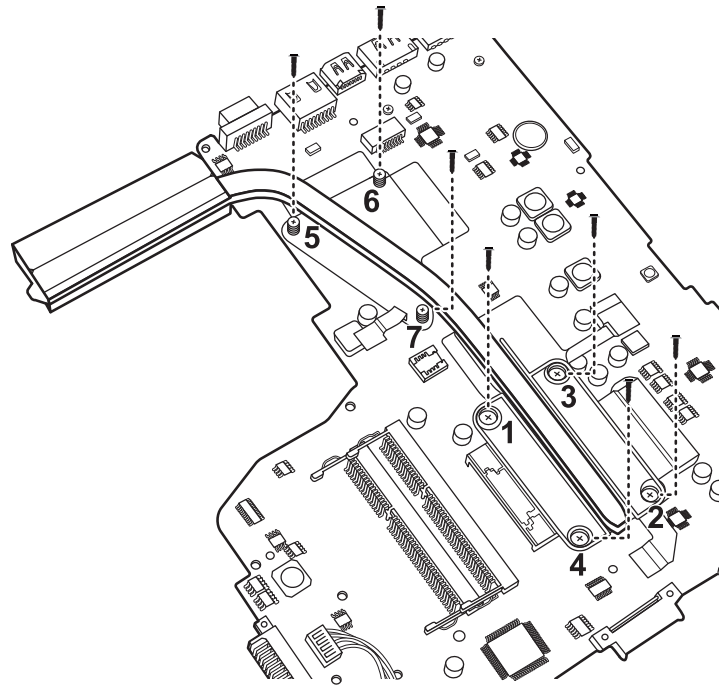


Figure 4.41 Installing the thermal module (Discrete model)

**For the UMA Model**

1. Reapply Shinetsu 7762 thermal grease on the thermal pad as shown in Figure 4.42. If you use a new thermal module, remove the release papers on the thermal pads first.

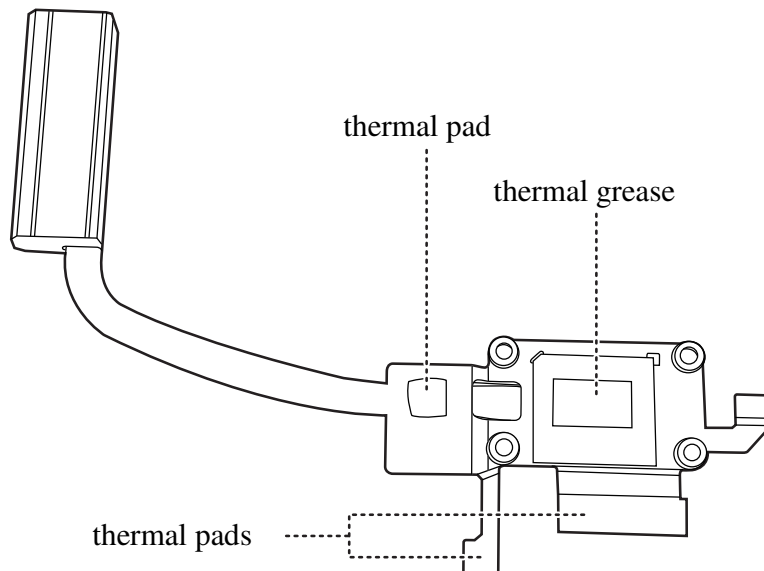


Figure 4.42 Reapplying Shinetsu 7762 grease on the thermal module and remove any release papers

2. Seat the thermal module on the motherboard in the correct position and secure the four M2.5x6 screws according to the number sequence as shown in Figure 4.43.

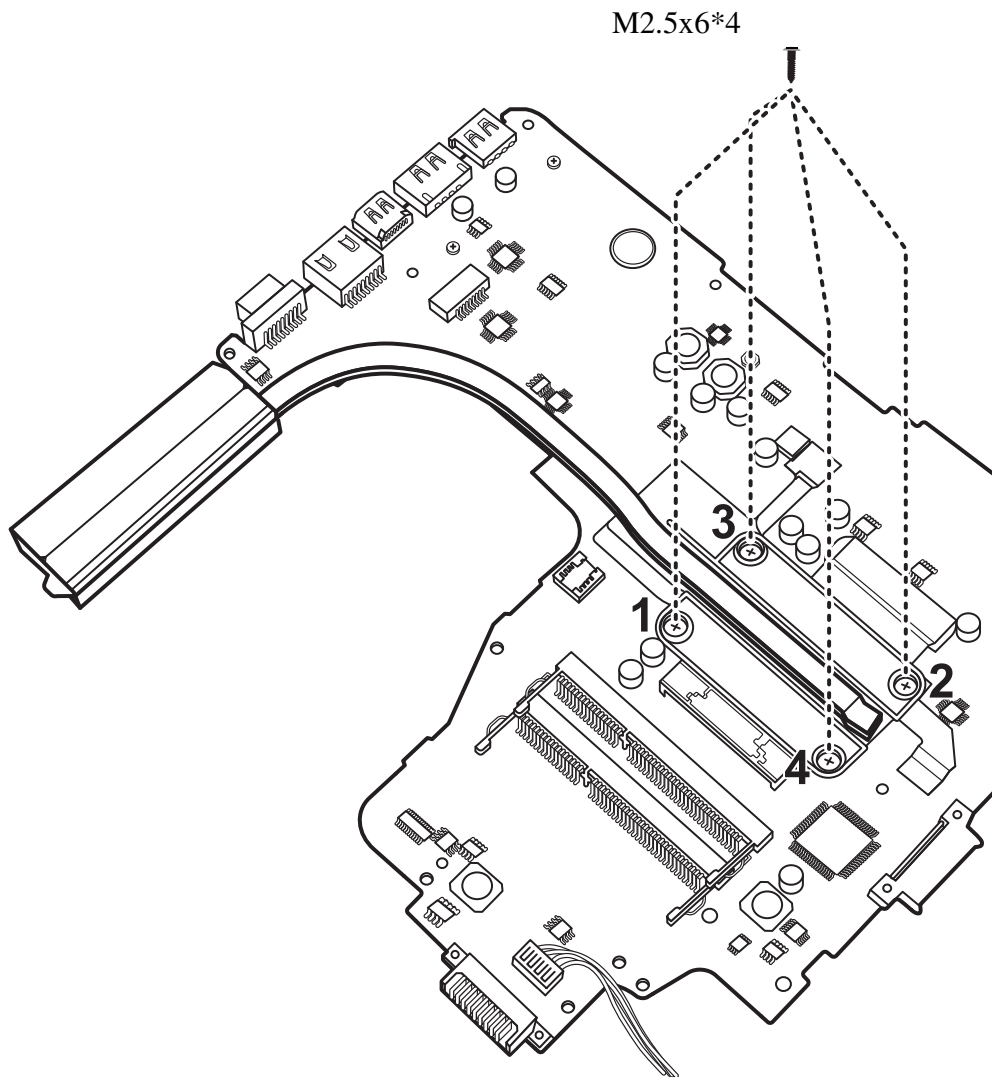


Figure 4.43 Installing the thermal module (UMA model)



## 4.22 CPU

### Removing the CPU

Remove the CPU according to the following procedures and Figure 4.44.

**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. Use a flat blade screwdriver to unlock the CPU by rotating the cam on the CPU socket counterclockwise to the unlock position, aligning the divot on the cam with the 'unlocked' icon as shown in Figure 4.44.
2. Remove the CPU.

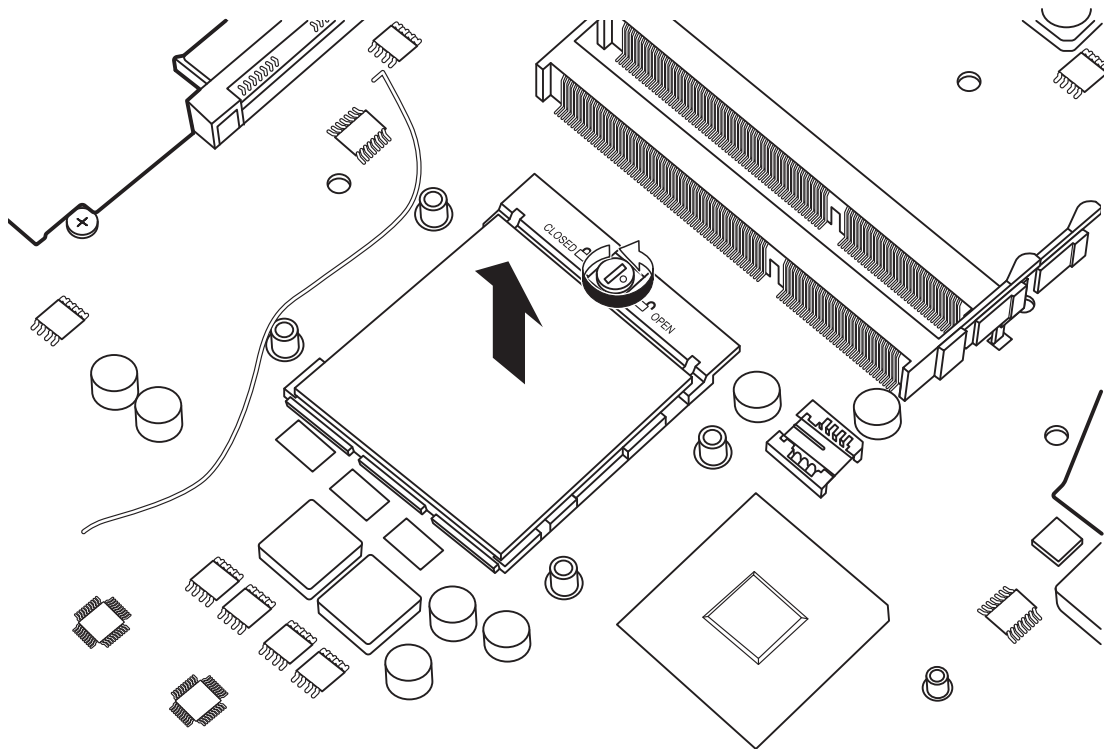


Figure 4.44 Removing the CPU

## **Installing the CPU**

Install the CPU according to the following procedures.

1. Check to ensure 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 using the triangle marker as a guide.
3. Rotate the cam clockwise to the lock position with a flat blade screwdriver.

## 4.23 LCD Bezel

### Removing the LCD Bezel

Remove the LCD bezel according to the following procedures and Figures 4.45 and 4.46.

1. Remove the four rubber seals from the LCD bezel and four M2.5x5 screws securing the LCD bezel to the display assembly as shown in Figure 4.45.

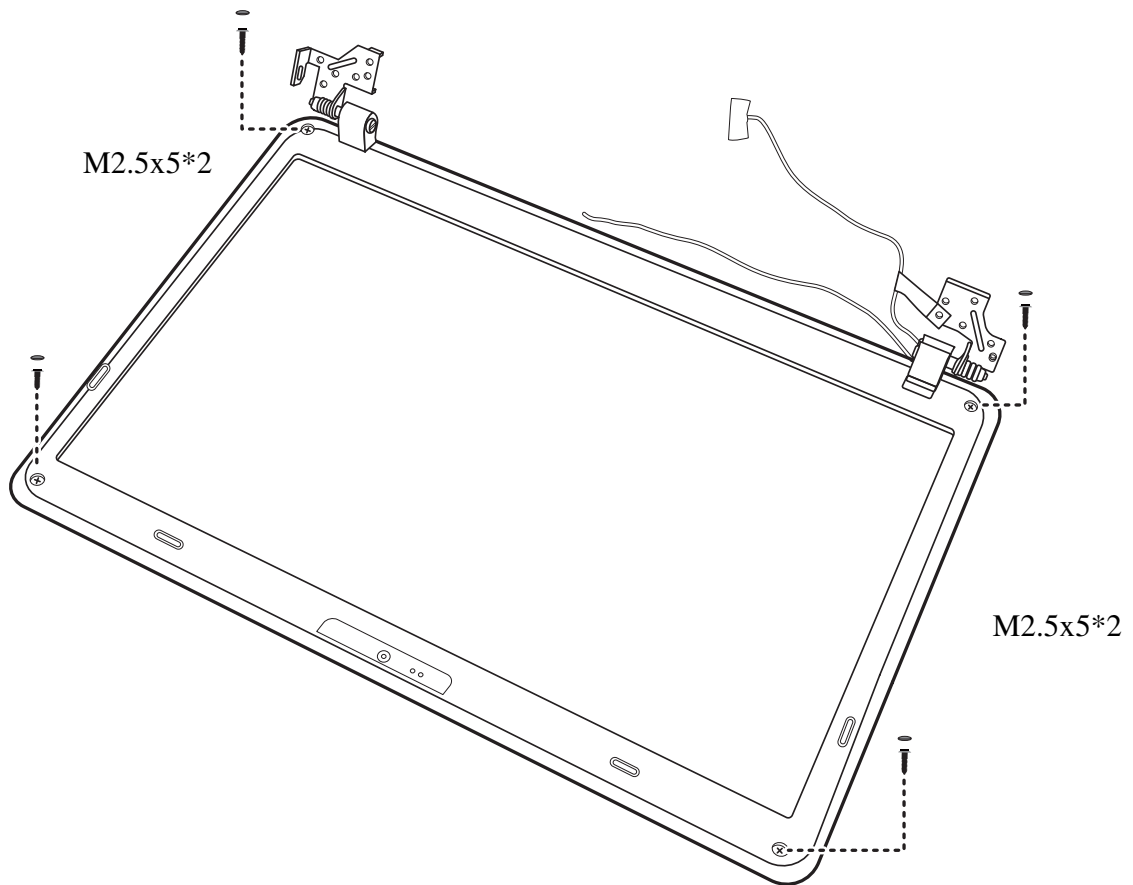
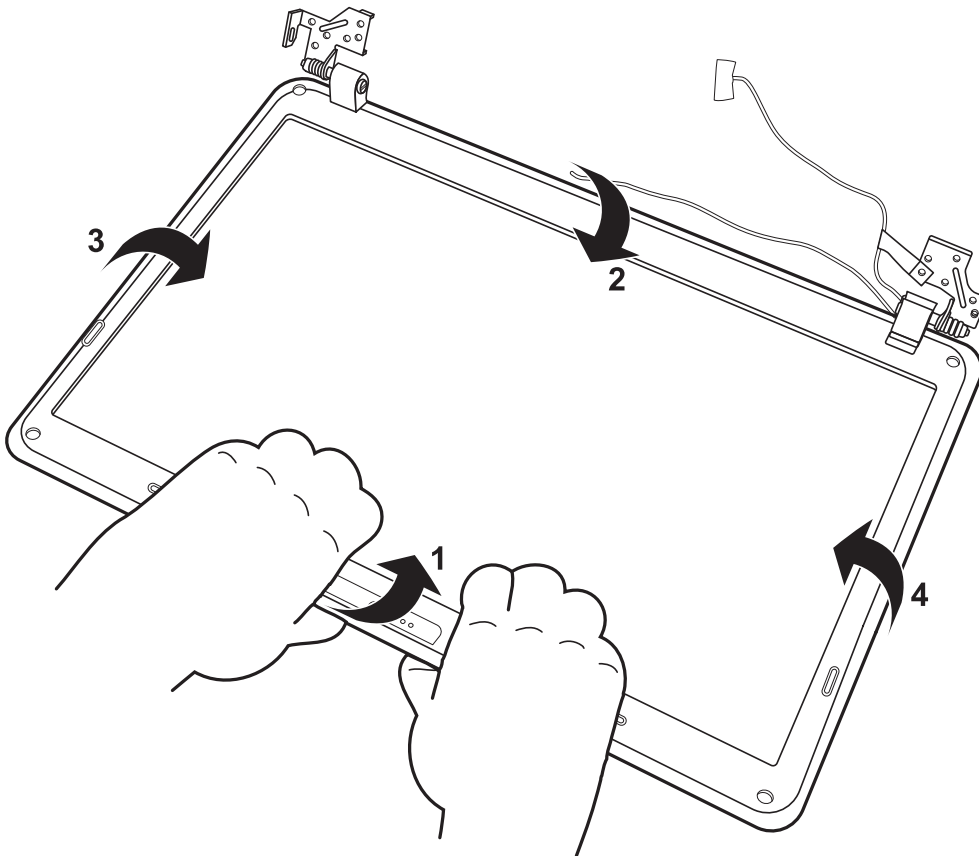


Figure 4.45 Removing four screws securing the LCD bezel to the display assembly

2. Pry up the LCD bezel from the outside bottom and outside top edges. Work your way around the outside edges of the LCD bezel until it is free of the display assembly as shown in Figure 4.46.
  
3. Remove the LCD bezel.



*Figure 4.46 Prying up the LCD bezel from the outside edges*

## **Installing the LCD Bezel**

Install the LCD bezel according to the following procedures.

1. Seat the LCD bezel in the correct position on the display assembly.
2. Press the LCD bezel assembly down onto the display assembly until it snaps into place. Work your way around the face of the LCD bezel ensuring that it is securely snapped into place at all points.
3. Secure the LCD bezel to the display assembly with the four M2.5x5 screws and cover the screws with the rubber seals.

**CAUTION:** Take care not to pinch the WLAN and 3G (optional) antennas when installing the LCD bezel. Ensure the antenna cables are properly routed as indicated in the section WLAN Antennas.

## 4.24 LCD Panel

### Removing the LCD Panel

Remove the LCD panel according to the following procedures and Figure 4.47 and 4.48.

1. Remove the four M2.5x5 screws securing the LCD panel to the display assembly.

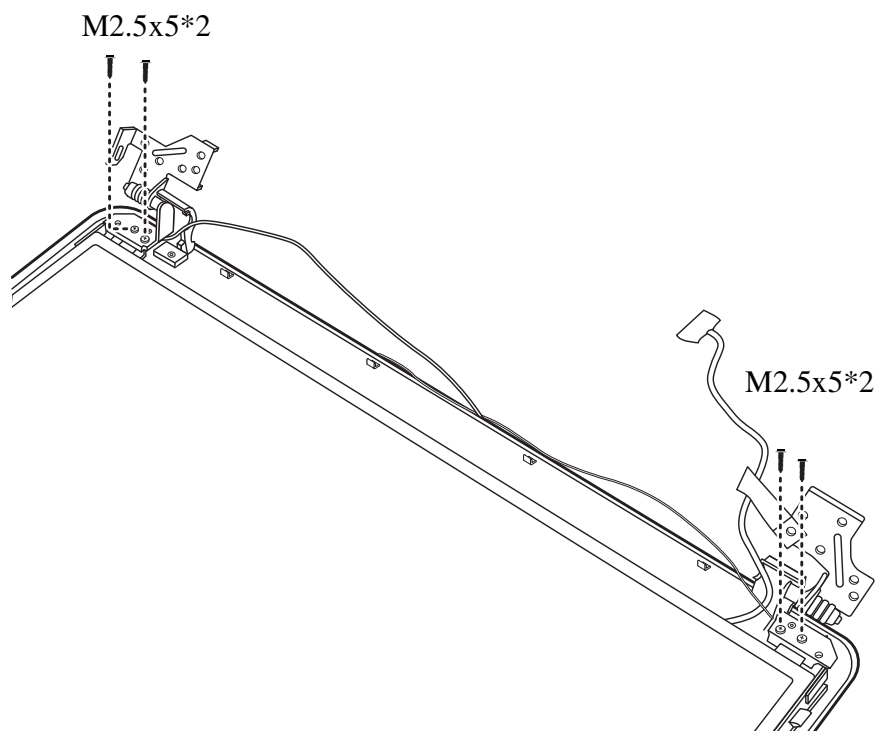
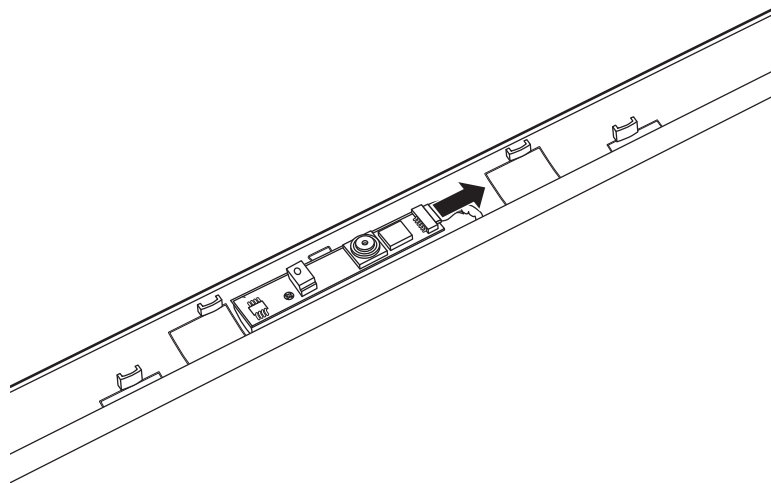


Figure 4.47 Removing the LCD panel from the display assembly

2. Disconnect the Webcam cable.
3. Remove the LCD panel from the display assembly.



*Figure 4.48 Disconnecting the Webcam*

### **Installing the LCD Panel**

Install the LCD panel according to the following procedures.

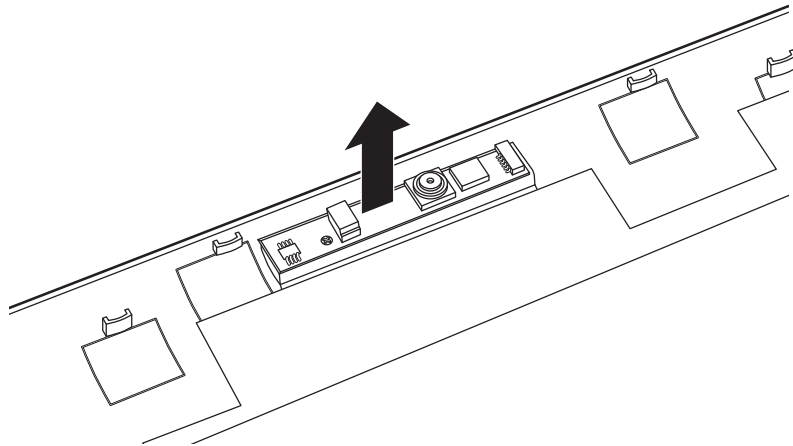
1. Seat the LCD panel in the correct position and connect the webcam cable.
2. Secure the LCD panel with the four M2.5x5 screws.

## 4.25 Web Camera

### Removing the Web Camera

Remove the web camera according to the following procedures and Figure 4.49.

1. Peel the web camera upward from the bottom edge and remove it from the display assembly.



*Figure 4.49 Removing the web camera from the display assembly*

### Installing the Web Camera

Install the web camera according to the following procedures.

1. Seat the web camera in the correct position and secure it to the display assembly.



## 4.26 WLAN Antennas

### Removing the WLAN Antennas

Remove the WLAN antennas according to the following procedures and Figure 4.50.

1. Peel back the tinfoil flaps securing the WLAN antennas to the display assembly, taking care not to tear or damage the foil.
2. Pull out the WLAN antenna cables from the routing channels.
3. Peel up the WLAN antennas heads. Remove the WLAN antennas from the system.

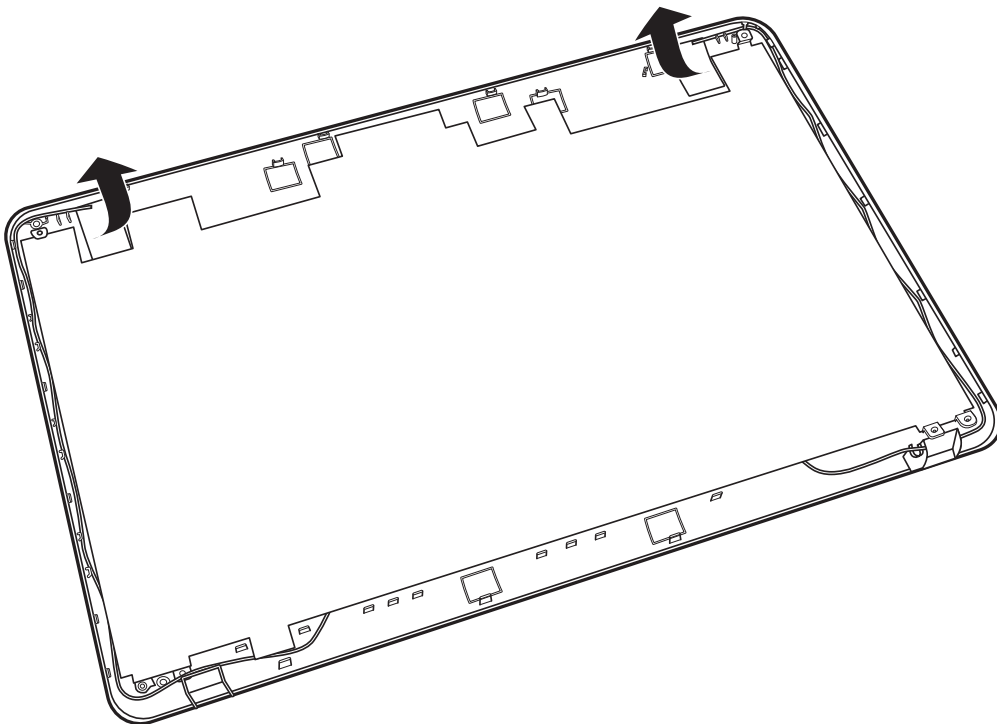


Figure 4.50 Removing the WLAN antennas from the display assembly

### Installing the WLAN Antennas

Install the WLAN antennas according to the following procedures.

1. Place the WLAN antenna heads in the correct position and adhere them to the display panel.
2. Route the WLAN antennas in the routing channels. Take care to route the antennas properly through the channels as indicated in Figure 4.51.

**CAUTION:** The black and white WLAN antennas should run parallel to the edge of the LCD display assembly. The optional 3G antennas (where present) will diverge from the WLAN antennas at the top of the unit, as shown in Figure 4.51 .

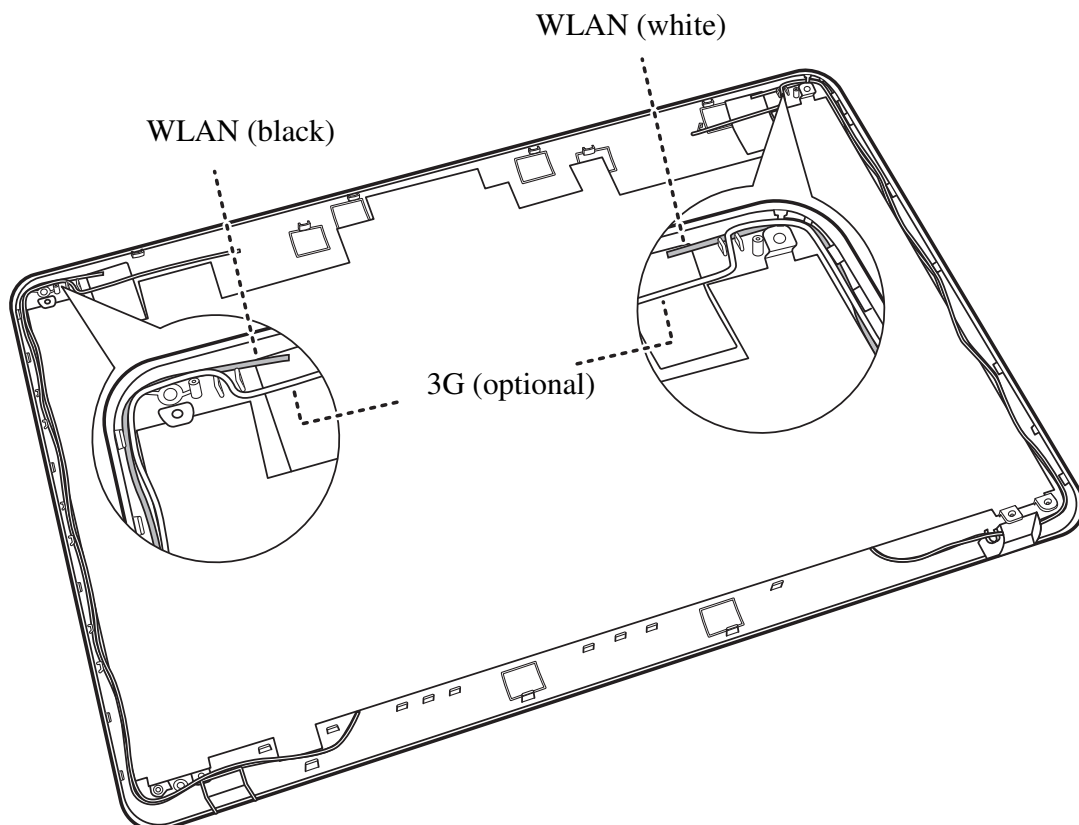


Figure 4.51 Routing the WLAN antennas onto the display assembly

**NOTE:** The black antenna should be on the left hand side of the screen cover and the white antenna should be on the right.

## 4.27 LCD Panel Hinges

### Removing the LCD Panel Hinges

Remove the LCD panel hinges according to the following procedures and Figure 4.52.

1. Remove the six M2x3 screws securing the LCD panel hinges to the LCD panel.
2. Remove the LCD panel hinges.

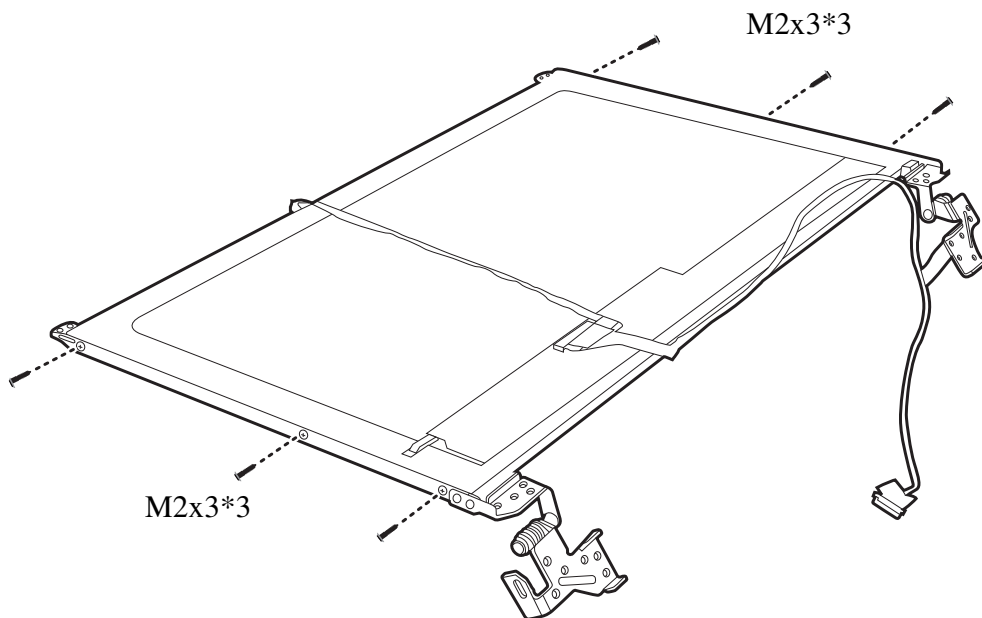


Figure 4.52 Removing the LCD panel hinges from the LCD Panel

### Installing the LCD Panel Hinges

Install the LCD panel hinges according to the following procedures.

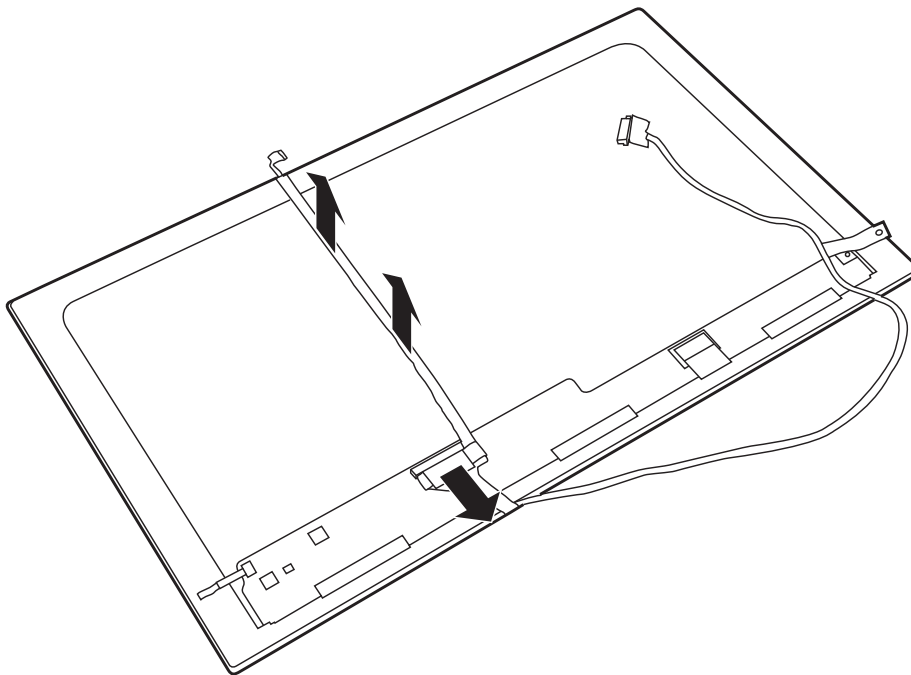
1. Place the LCD panel hinges in the correct position on the LCD panel and secure with four M2x3 screws.

## 4.28 LVDS Cable

### Removing the LVDS Cable

Remove the LVDS cable according to the following procedures and Figure 4.53.

1. Disconnect the LVDS cable from the display assembly. Peel off and remove the LVDS cable from the back of the LCD panel, taking care not to damage the LCD panel.



*Figure 4.53 Removing the LVDS cable from the LCD panel*

### Installing the LVDS Cable

Install the LVDS cable according to the following procedures.

1. Place the LVDS cable in the correct position and adhere it to the LCD panel.
2. Connect the LVDS cable to the connector on the LCD panel.

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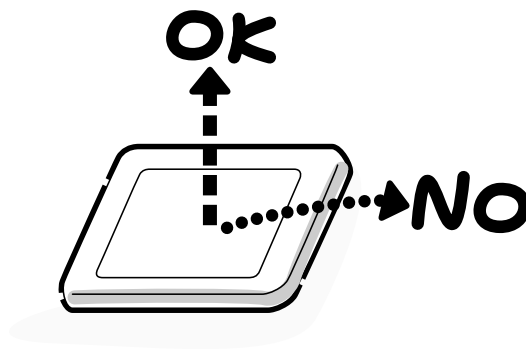
## Appendix A Handling the LCD Module

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### Precautions for handling the LCD module

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

1. When installing the LCD module in the display assembly, make sure that you seat it so that it is properly aligned and maximum visibility of the display is maintained.



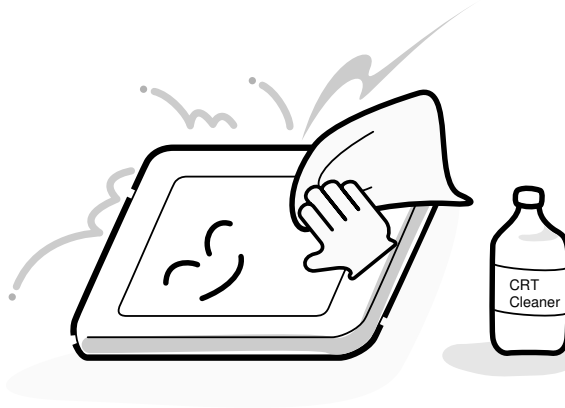
2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

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



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

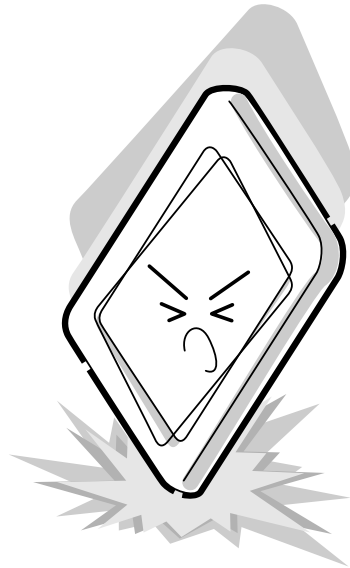
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a soft cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



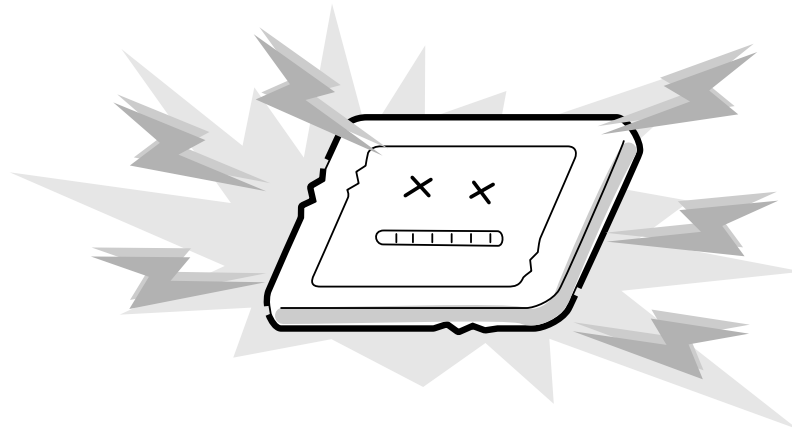
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



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



6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.



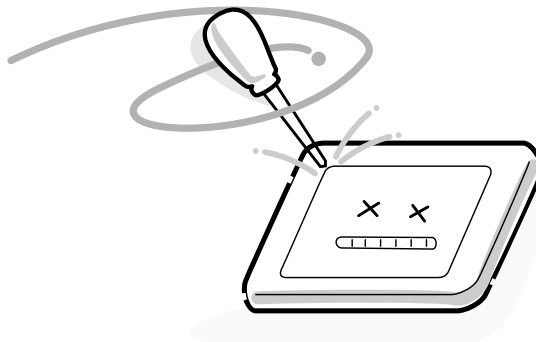
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



8. Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.

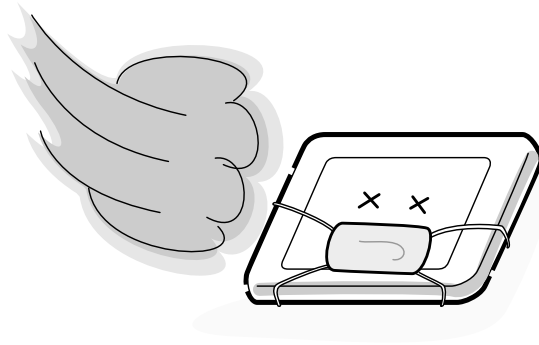


9. Do not disassemble the LCD module. Disassembly can cause malfunctions.





10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



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## Appendix B Board Layout

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### B.1 System Board Top View (UMA)

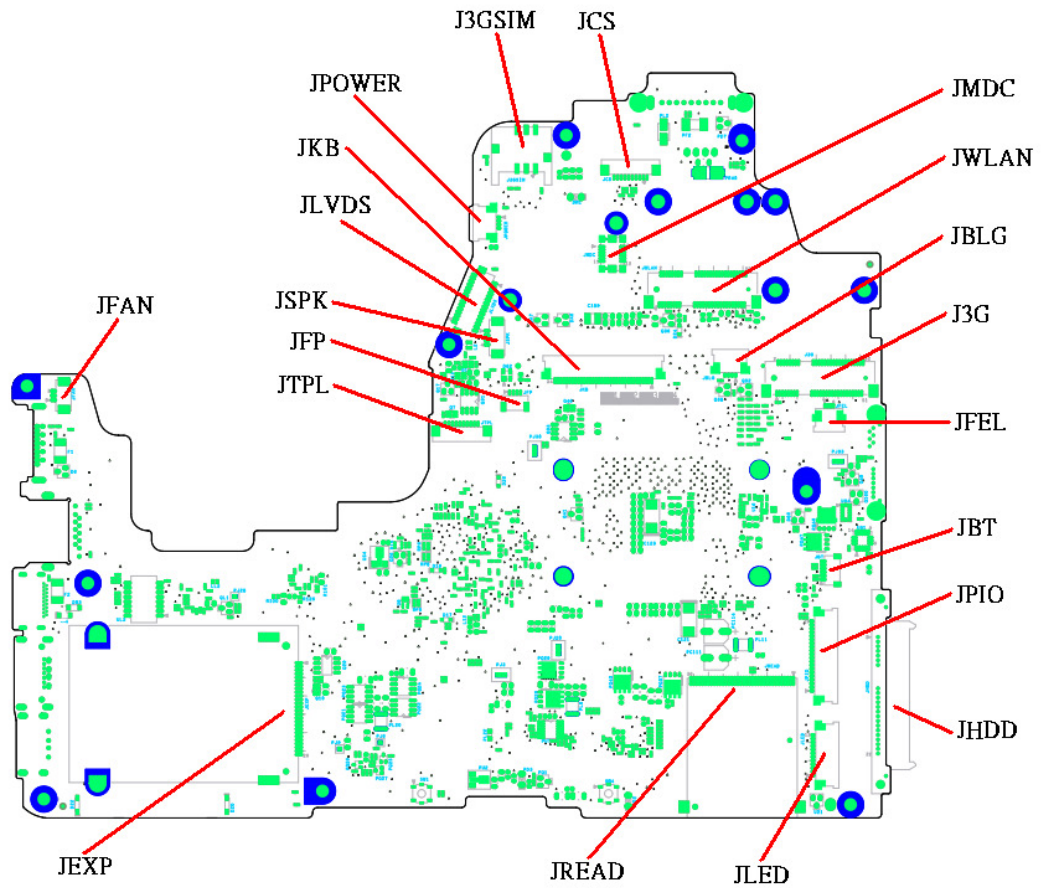


Figure B-1 System Board Layout (Top)

## B.2 System Board Bottom View (UMA)

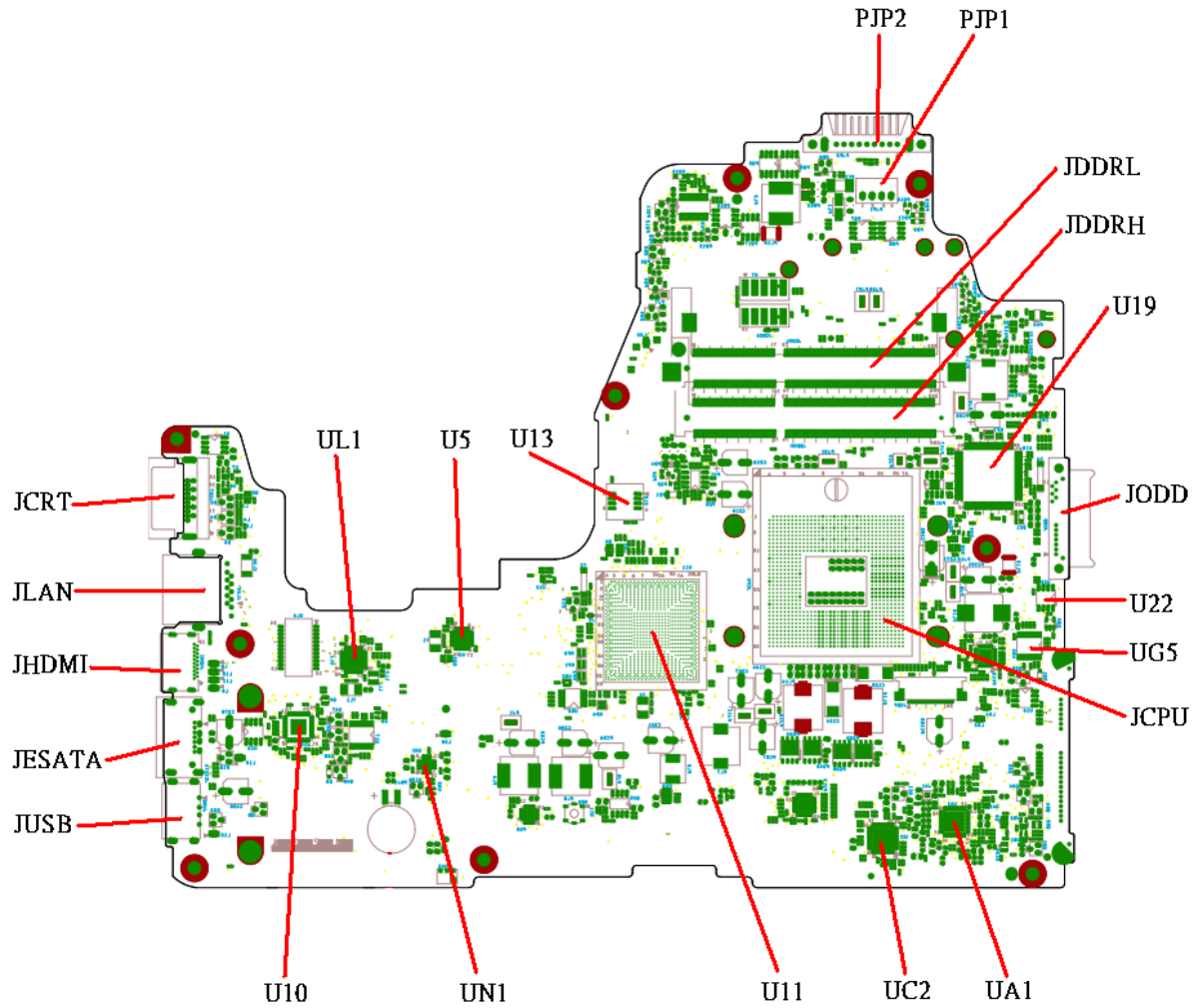


Figure B-2 System Board Layout (Bottom)

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

<b>Number</b>	<b>Name</b>
U11	Platform Controller Hub (BD82HM55 SLGZS B3)
U5	Clock Generator (RTM890N-631-VB-GRT)
U19	EC (KB926QFE0)
U13	BIOS ROM (4MB SPI)
U22	EC ROM (256KB SPI)
UA1	CODEC (ALC269Q-VB5-GR)
UC2	Card Reader Controller (JMB385-QGAZ0C)
UL1	LAN Controller (RTL8105E/RTL8111E -VB-GR)
U10	HDMI Level Shift (ASM1442)

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

<b>Number</b>	<b>Name</b>
JCPU	CPU Socket
JFAN	Fan conn.
JLVDS	LVDS conn.
JCRT	CRT conn.
JHDMI	HDMI conn.
JPIO	USB & Audio/B conn.
JHDD	SATA HDD conn.
JODD	ODD conn.
JFEL	FELICA conn.
JESATA	ESATA/USB Combo conn.
JBT	Bluetooth conn.
JWLAN	WLAN conn.
JLAN	LAN conn.
JUSB	USB conn.
JDDRH, JDDRLL	DDRIII conn.
JKB	Keyboard conn.
JREAD	5 in 1 Card Reader conn.
JSPK	Speaker conn.
JPOWER	Power/B conn.
JMDC	MDC conn.

J3G	3G conn.
JFP	Finger Printer conn.
JTPL	TP& Light Pipe/B conn.
J3GSIM	3G SIM CARD conn.
PJP1	AC Adaptor conn.
PJP2	Battery conn.
JCS	CapSensor/B conn.
JLED	LED/B conn.
JEXP	Express Card conn.
JBLG	Keyboard LED conn.

### B.3 System Board Top View (Discrete)

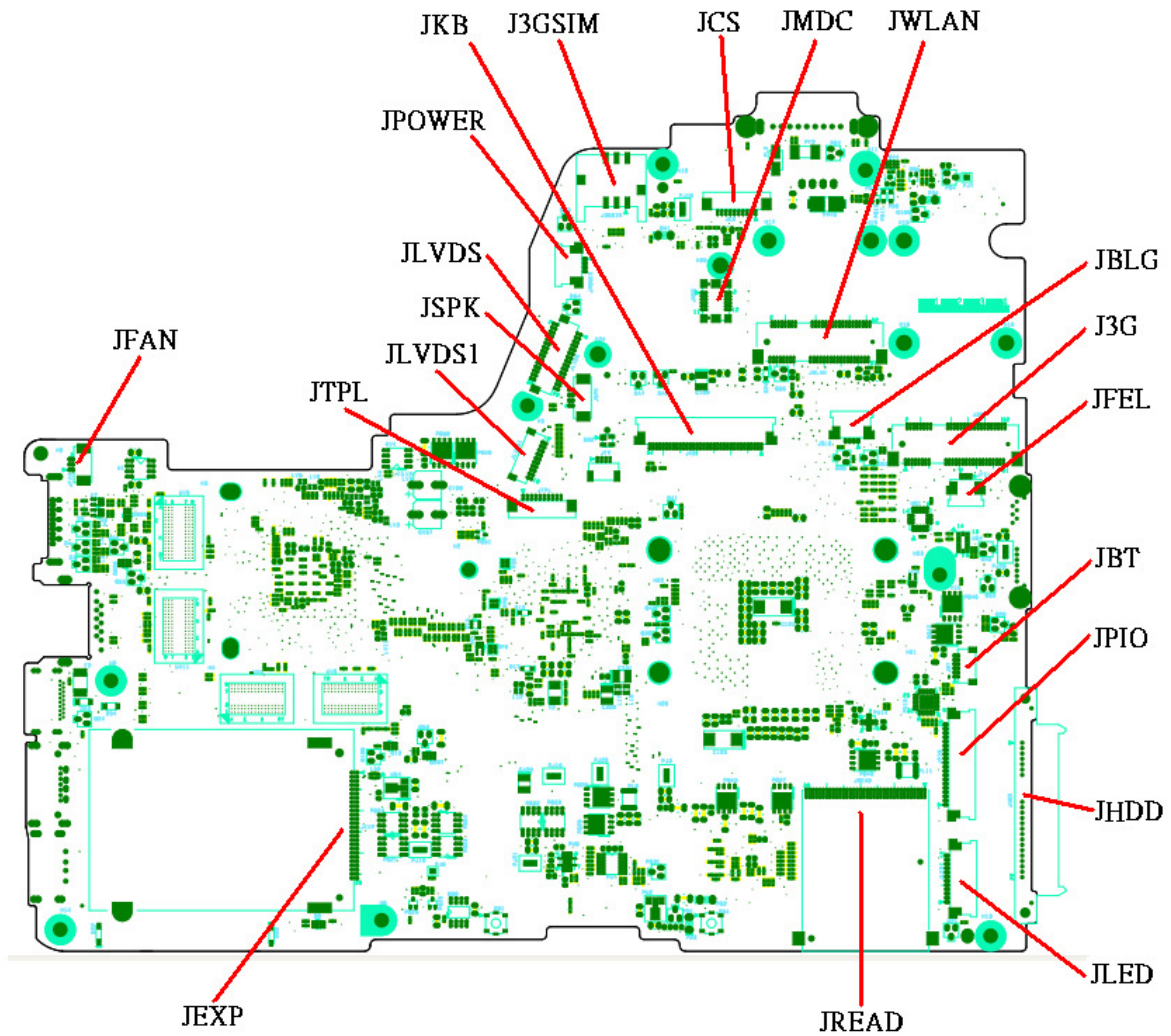


Figure B-3 System Board Layout (Top)

## B.4 System Board Bottom View (Discrete)

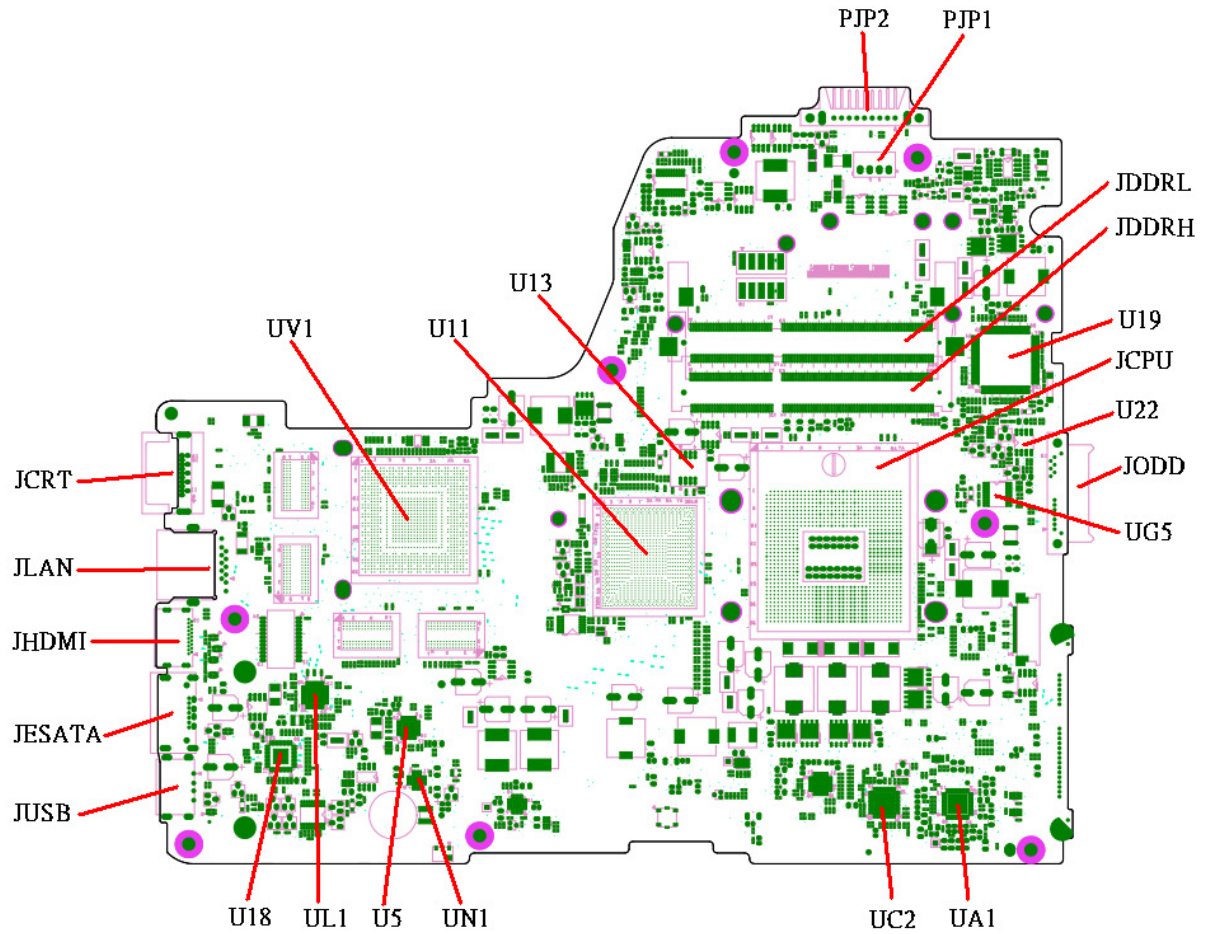


Figure B-4 System Board Layout (Bottom)



*Table B-3 System Board ICs (top and bottom)*

<b>Number</b>	<b>Name</b>
U11	Platform Controller Hub (BD82HM55 SLGZS B3)
U5	Clock Generator (RTM890N-631-VB-GRT)
U19	EC (KB926QFE0)
U13	BIOS ROM (4MB SPI)
U22	EC ROM (256KB SPI)
UA1	CODEC (ALC269Q-VB5-GR)
UC2	Card Reader Controller (JMB385-QGAZ0C)
UL1	LAN Controller (RTL8105E/RTL8111E -VB-GR)
U18	HDMI Level Shift (ASM1442)
UV1	GPU (nVIDIA N11P/N11M)

*Table B-4 System Board Connectors (top and bottom)*

<b>Number</b>	<b>Name</b>
JCPU	CPU Socket
JFAN	Fan conn.
JLVDS	LVDS conn.
JLVDS1	LVDS/B conn.
JCRT	CRT conn.
JHDMI	HDMI conn.
JPIO	USB & Audio/B conn.
JHDD	SATA HDD conn.
JODD	ODD conn.
JFEL	FELICA conn.
JESATA	ESATA/USB Combo conn.
JBT	Bluetooth conn.
JWLAN	WLAN conn.
JLAN	LAN conn.
JUSB	USB conn.
JDDRH, JDDRL	DDRIII conn.
JKB	Keyboard conn.
JREAD	5 in 1 Card Reader conn.
JSPK	Speaker conn.
JPOWER	Power/B conn.



JMDC	MDC conn.
J3G	3G conn.
JFP	Finger Printer conn.
JTPL	Touch/B conn.
J3GSIM	3G SIM CARD conn.
PJP1	AC Adaptor conn.
PJP2	Battery conn.
JCS	CapSensor/B conn.
JLED	LED/B conn.
JEXP	Express Card conn.
JBLG	Keyboard LED conn.

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## Appendix C Pin Assignments

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### 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 (30-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+3VS_LVDS_CAM		2	LCD_EDID_CLK	
3	USB20_P11_R	O	4	LCD_EDID_DATA	O
5	USB20_N11_R	O	6	INT_MIC_CLK	O
7	GND		8	INT_MIC_DATA	
9	LVDS_TXOUT0+	O	10	LED_PWM	O
11	LVDS_TXOUT0-	O	12	BKOFF#_R	O
13	LVDS_TXOUT1+		14	GND	
15	LVDS_TXOUT1-	O	16	LCD_ENVDD	
17	LVDS_TXOUT2+	O	18	+LCD_VDD	
19	LVDS_TXOUT2-	O	20	+3VS	
21	LVDS_TXCLK+	O	22	+LCD_VDD	O
23	LVDS_TXCLK-	O	24	+LCD_VDD	O
25	GND	O	26	NA	
27	NA	O	28	+LCD_INV	O
29	NA		30	+LCD_INV	O

### C.3 JLVDS1

Table C-3 LVDS/B pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	LVDS_TZOUT0+	O	2	LVDS_TZOUT0-	O
3	LVDS_TZOUT1+	O	4	LVDS_TZOUT1-	O
5	LVDS_TZOUT2+	O	6	LVDS_TZOUT2-	O
7	LVDS_TZCLK+	O	8	LVDS_TZCLK-	O
9	+5VALW		10	GND	

### C.4 JCRT

Table C-4 CRT pin assignments (15-pin)

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

### C.5 JHDMI

Table C-5 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	HDMI_CEC	O	14	NC	-

15	HDMI_SCLK	O	16	HDMI_SDATA	O
17	GND	-	18	+HDMI_5V_OUT	O
19	HDMI_HPD	O			

## 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	
3	SATA_PTX_C _DRX_N1		4	GND	
5	SATA_PRX_D TX_N1		6	SATA_PRX_D TX_P1	
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 JODD

Table C-7 SATA ODD I/F pin assignments (13-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	SATA_PTX_C _DRX_P4	
3	SATA_PTX_C _DRX_N4		4	GND	
5	SATA_PRX_D TX_N4		6	SATA_PRX_D TX_P4	
7	GND		8	NC	
9	+5VS_ODD		10	+5VS_ODD	
11	NC		12	GND	

13	GND				
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## 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_N3_RL	
3	USB20_P3_RL		4	GND	
5	GND		6	SATA_PTX_C_DRX_P5	
7	SATA_PTX_C_DRX_N5		8	GND	
9	SATA_PRX_DTX_N5		10	SATA_PRX_DTX_P5	
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_P5	I/O	4	USB20_N5	I/O
5	BT_RESET#	O	6	BT_DET#	I

## C.10 JFP

Table C-10 Finger Printer Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USB20_N4	I/O
3	USB20_P4	I/O	4	GND	

## C.11 JFEL

Table C-11 Felica Connector pin assignments (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+FLICA_VCC	-	2	USB20_N9	I/O
3	USB20_P9	I/O	4	GND	
5	NC		6	NC	
7	NC		8	NC	

## C.12 JWLAN

Table C-12 WLAN Connector pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
A1	NC		A2	+3V_WLAN	
A3	NC		A4	GND	
A5	BT_CTRL		A6	+1.5VS	
A7	CLKREQ_WLAN#		A8	NC	
A9	GND		A10	NC	
A11	CLK_WLAN#		A12	NC	
A13	CLK_WLAN		A14	NC	
A15	GND		A16	NC	
A17	NC		A18	GND	
A19	NC		A20	WL_OFF#	
A21	GND		A22	PLT_RST#	
A23	PCIE_PRX_WLAN TX_N2		A24	+3V_WLAN	
A25	PCIE_PRX_WLAN TX_P2		A26	GND	
A27	GND		A28	+1.5VS	
A29	GND		A30	PM_SMBCLK	
A31	PCIE_PTX_C_WL ANRX_N2		A32	PM_SMBDATA	
A33	PCIE_PTX_C_WL ANRX_P2		A34	GND	
A35	GND		A36	USB20_N13	
A37	GND		A38	USB20_P13	
A39	+3V_WLAN		A40	GND	

A41	+3V_WLAN		A42	LED_WIMAX#	
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A43	GND		A44	NC	
-----	-----	--	-----	----	--

A45	NC		A46	NC	
-----	----	--	-----	----	--

A47	NC		A48	+1.5VS	
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A49	NC		A50	GND	
-----	----	--	-----	-----	--

A51	NC		A52	+3V_WLAN	
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## C.13 J3G

Table C-13 3G Connector pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
A1	NC		A2	+3VS	
A3	XBCLKM		A4	GND	
A5	BCCDET		A6	+1.5VS	
A7	CLKREQ_JET#		A8	+UIM_PWR	
A9	GND		A10	UIM_DATA	
A11	CLK_JET#		A12	UIM_CLK	
A13	CLK_JET		A14	UIM_RESET	
A15	GND		A16	COMMON	
A17	BCRSTM		A18	ISDBT_DET	
A19	BCPWON		A20	RF_OFF#	
A21	GND		A22	PLT_RST#	
A23	PCIE_PRX_JETTX_N4		A24	+3VS	
A25	PCIE_PRX_JETTX_P4		A26	GND	
A27	GND		A28	+1.5VS	
A29	GND		A30	USB20_P10_TV	
A31	PCIE_PTX_C_JETRX_N4		A32	USB20_N10_TV	
A33	PCIE_PTX_C_JETRX_P4		A34	GND	
A35	GND		A36	USB20_N12	
A37	GND		A38	USB20_P12	
A39	+3VS		A40	GND	
A41	+3VS		A42	LED_WIMAX#	
A43	GND		A44	CPLGP1	
A45	NC		A46	TMPTU1_SXP	
A47	TMPTU2_SXP		A48	+1.5VS	
A49	NC		A50	GND	
A51	NC		A52	+3VS	



## C.14 JEXP

Table C-14 New Card Connector pin assignments (26-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	USB20_N4_R	
3	USB20_P4_R		4	CP_USB#	
5	NC	-	6	NC	
7	PM_SMBCLK		8	PM_SMBDATA	
9	+1.5VS_CARD		10	+1.5VS_CARD	
11	EC_SWI#		12	+3VALW_CARD	
13	PERST#		14	+3VS_CARD	
15	+3VS_CARD		16	CLKREQ#	
17	EXP_CPPE#		18	CLK_NEW#	
19	CLK_NEW		20	GND	
21	PCIE_PRX_NEWT X_N3		22	PCIE_PRX_NEW TX_P3	
23	GND		24	PCIE_PTX_C_NE WRX_N3	
25	PCIE_PTX_C_NE WRX_P3		26	GND	

## C.15 JLAN

Table C-15 LAN Connector pin assignments (14-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	RJ45_MIDI2+	I/O
5	RJ45_MIDI2-	I/O	6	RJ45_MIDI1-	I/O
7	RJ45_MIDI3+	I/O	8	RJ45_MIDI3-	I/O
9	+3V_LAN		10	LAN_SK_LINK#_ R	
11	+3V_LAN		12	LAN_ACTIVITY# _R	
13	LANGND		14	LANGND	

## C.16 JLED

Table C-16 LED/B Connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VALW		2	+5VS	
3	WIMAX_LED_GN D#		4	WL_BT_LED#	
5	DC_IN		6	PWR_ON_LED#	
7	PWR_SUSP_LE D#		8	HDD_LED#	
9	CR_LEDCON#		10	BATT_FULL_LE D#	
11	BATT_CHG_LO W_LED#		12	GND	

## C.17 JDDRH

Table C-17 SODIMM I/F pin assignments (204-PIN)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+VREF_DQA	-	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	DDRA_CKE0	O	74	DDRA_CKE1	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_BS0	O	110	DDR_A_RAS#	O

111	+1.5V	-	112	+1.5V	-
113	DDR_A_WE#	O	114	DDRA_SCS0#	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	DDRA_SCS1#	O	122	NC	-
123	+1.5V	-	124	+1.5V	-
125	NC	-	126	+DDR_VREF_CA_	-
				DIMMA	
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_D43	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_D53	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	PM_EXTTS#	O
199	+3VS	-	200	PM_SMBDATA	I/O
201	GND	-	202	PM_SMBCLK	I/O
203	+0.75VS	-	204	+0.75VS	-

## C.18 JDDR1

Table C-18 SODIMM I/F pin assignments (204-PIN)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+VREF_DQB	-	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	SM_DRAMRST#	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_B_CKE0	O	74	DDR_B_CKE1	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	DDR_B_CLK0	O	102	DDR_B_CLK1	O
103	DDR_B_CLK0#	O	104	DDR_B_CLK1#	O
105	+1.5V	-	106	+1.5V	-
107	DDR_B_MA10	O	108	DDR_B_BS1	O
109	DDR_B_BS0	O	110	DDR_B_RAS#	O
111	+1.5V	-	112	+1.5V	-
113	DDR_B_WE#	O	114	DDR_B_SCS0#	O
115	DDR_B_CAS#	O	116	DDR_B_ODT0	O
117	+1.5V	-	118	+1.5V	-

119	DDR_B_MA13	O	120	DDR_B_ODT1	O
121	DDR_B_SCS1#	O	122	NC	-
123	+1.5V	-	124	+1.5V	-
125	NC	-	126	+DDR_VREF_CA_DIMMB	-
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_D43	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_D53	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	GND	-	198	PM_EXTTTS#	O
199	+3VS	-	200	PM_SMBDATA	I/O
201	+3VS	-	202	PM_SMBCLK	I/O
203	+0.75VS	-	204	+0.75VS	-

## C.19 JKB

Table C-19 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.20 JPIO

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

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

## C.21 JCS

Table C-21 FUN/B connector pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VALW		2	+3VL	
3	+3VS		4	ESB_DAZ	
5	ESB_CKZ		6	CAP_INT#	
7	CAP_RST#		8	EC_SMB_CK2	
9	EC_SMB_DA2		10	GND	

## C.22 JPOWER

Table C-22 POWER/B connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	POWER_ON_LED		2	+5VALW	
3	ON/OFFBTN#		4	GND	

## C.23 JREAD

Table C-23 CARD READER connector pin assignments (36-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	XD_RB#		2	XD_RE#	
3	XD_CE#		4	XD_CLE	
5	XD_ALE		6	SDCMD_MSBS_X DWE#	
7	XDWP#_SDWP#		8	XD_SD_MS_D0	
9	XD_SD_MS_D1		10	XD_SD_MS_D2	
11	XD_SD_MS_D3		12	SDCMD_MSBS_X DWE#	
13	GND		14	+VCC_OUT	
15	MS_CLK		16	XD_SD_MS_D3	
17	MS_CD#		18	XD_SD_MS_D2	
19	XD_SD_MS_D0		20	XD_SD_MS_D1	
21	SDCMD_MSBS_X DWE#		22	GND	
23	+VCC_OUT		24	SD_CLK	
25	XD_SD_MS_D0		26	XD_SD_MS_D2	
27	XD_SD_MS_D3		28	XD_SD_D4	
29	XD_SD_MS_D1		30	XD_SD_D5	
31	XD_SD_D6		32	XD_SD_D7	
33	+VCC_OUT		34	XD_CD#	
35	XDWP#_SDWP#		36	SD_CD#	

## C.24 J3GSIM

Table C-24 3G CARD connector pin assignments (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+VCC_SIM		2	SIM_RESET	
3	SIM_CLK		4	GND	
5	UIM_VPP		6	SIM_DATA	
7	NC		8	NC	

## C.25 JSPK

Table C-25 SPK connector pin assignments (4-pin)

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

## C.26 JTPL

Table C-26 TP& Light Pipe/B connector pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VS		2	TP_CLK	
3	TP_DATA		4	SW_L	
5	SW_R		6	GND	
7	TP_LED#		8	KSI6	
9	KSO0		10	GND	

## C.27 JBLG

Table C-27 Keyboard LED connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VS_LED		2	NC	
3	NC		4	GND	

## C.28 JUSB

Table C-28 USB connector pin assignments (8-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCC		2	USB20_N2_R	
3	USB20_P2_R		4	GND	
5	GND		6	GND	
7	GND		8	GND	

## C.29 JMDC

Table C-29 MDC connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	+MDC_VCC	-
3	AZ_SDOOUT_MD	O	4	NC	-
5	GND	-	6	+3VALW	-
7	AZ_SYNC_MD	O	8	GND	-
9	AZ_SDIN1_MD	I	10	GND	-
11	AZ_RST_MD#	O	12	AZ_BITCLK_MD	O

## C.30 PJP1

Table C-30 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.31 PJP2

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

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
58	Ctrl(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



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

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
122	F11	57	D7	78	F0 78		*3
123	F12	58	D8	07	F0 07		*3
124	PrintSc	*6	*6	*6	*6		*6
126	Pause	*7	*7	*7	*7		*7
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	Key	Code set 1		Code set 2	
No.	top	Make	Break	Make	Break
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12
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 <b>Shift</b>	With right <b>Shift</b>
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap	Key	Code set 1		Code set 2	
No.	top	Make	Break	Make	Break
75	INS	E0 2A E0 52	E0 D2 E0 AA	E0 12 E0 70	E0 F0 70 E0 F0 12
76	DEL	E0 2A E0 53	E0 D3 E0 AA	E0 12 E0 71	E0 F0 71 E0 F0 12
79	←	E0 2A E0 4B	E0 CB E0 AA	E0 12 E0 6B	E0 F0 6B E0 F0 12
80	Home	E0 2A E0 47	E0 C7 E0 AA	E0 12 E0 6C	E0 F0 6C E0 F0 12
81	End	E0 2A E0 4F	E0 CF E0 AA	E0 12 E0 69	E0 F0 69 E0 F0 12
83	↑	E0 2A E0 48	E0 C8 E0 AA	E0 12 E0 75	E0 F0 75 E0 F0 12
84	↓	E0 2A E0 50	E0 D0 E0 AA	E0 12 E0 72	E0 F0 72 E0 F0 12
85	PgUp	E0 2A E0 49	E0 C9 E0 AA	E0 12 E0 7D	E0 F0 7D E0 F0 12
86	PgDn	E0 2A E0 51	E0 D1 E0 AA	E0 12 E0 7A	E0 F0 7A E0 F0 12
89	→	E0 2A E0 4D	E0 CD E0 AA	E0 12 E0 74	E0 F0 74 E0 F0 12
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		Code set 1		Code set 2	
No.	Keytop	Make	Break	Make	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	
8	7	HOME	47		C7		6C	F0	6C	
9	8	↑	48		C8		75	F0	75	
10	9	PGUP	49		C9		7D	F0	7D	
55	/	/	E0 35		E0 B5		E0 4A	E0 F0	4A	
5	4	←	4B		CB		6B	F0	6B	
6	5		4C		CC		73	F0	73	
7	6	→	4D		CD		74	F0	74	
9	*	*	37		B7		7C	F0	7C	
2	1	END	4F		CF		69	F0	69	
3	2	↓	50		D0		72	F0	72	
4	3	PGON	51		D1		7A	F0	7A	
12	-	-	4A		CA		7B	F0	7B	
11	0	INS	52		D2		70	F0	70	
54	.	DEL	53		D3		71	F0	71	
13	+	+	4E		CE		79	F0	79	
43	Enter	Enter	E0 1C		E0 9C		E0 5A	E0 F0	5A	

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

<b>Key top</b>	<b>Shift</b>	<b>Code set 1</b>	<b>Code set 2</b>
----------------	--------------	-------------------	-------------------

		<b>Make</b>	<b>Make</b>
--	--	-------------	-------------

Pause	Common	E1 1D 45 E1 9D C5	E1 14 77 E1 F0 14 F0 77
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	Ctrl	E0 46 E0 C6	E0 7E E0 F0 7E
--	------	-------------	----------------

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\*: This key generates only make codes.

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# Appendix E Key Layout

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## 1. United Status (US) Keyboard



Figure US keyboard

## 2. Traditional Chinese (CH) Keyboard

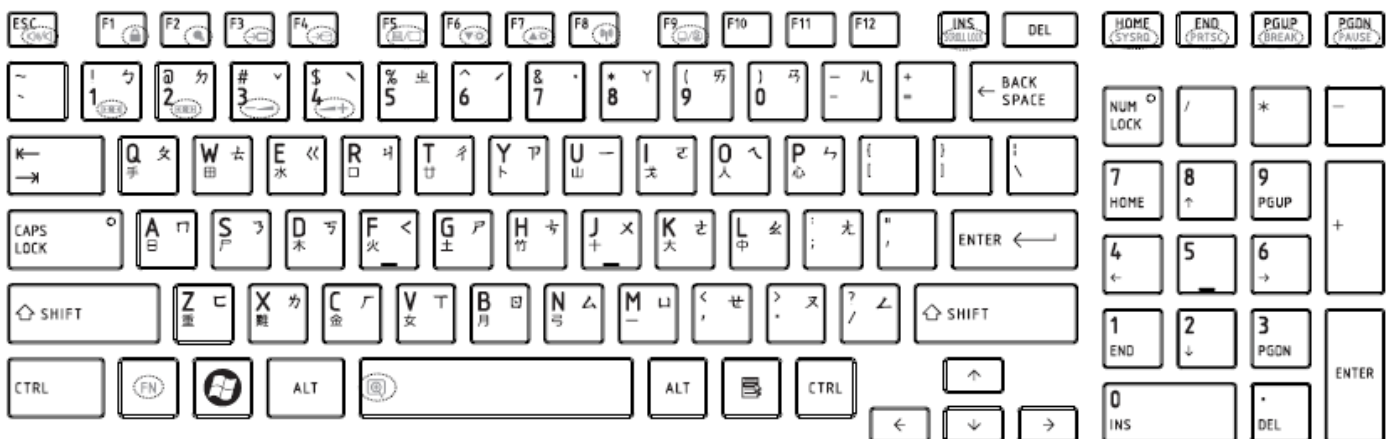


Figure CH keyboard

## 3. Thai (TI) Keyboard



Figure TI keyboard

#### 4. Korean (KO) Keyboard

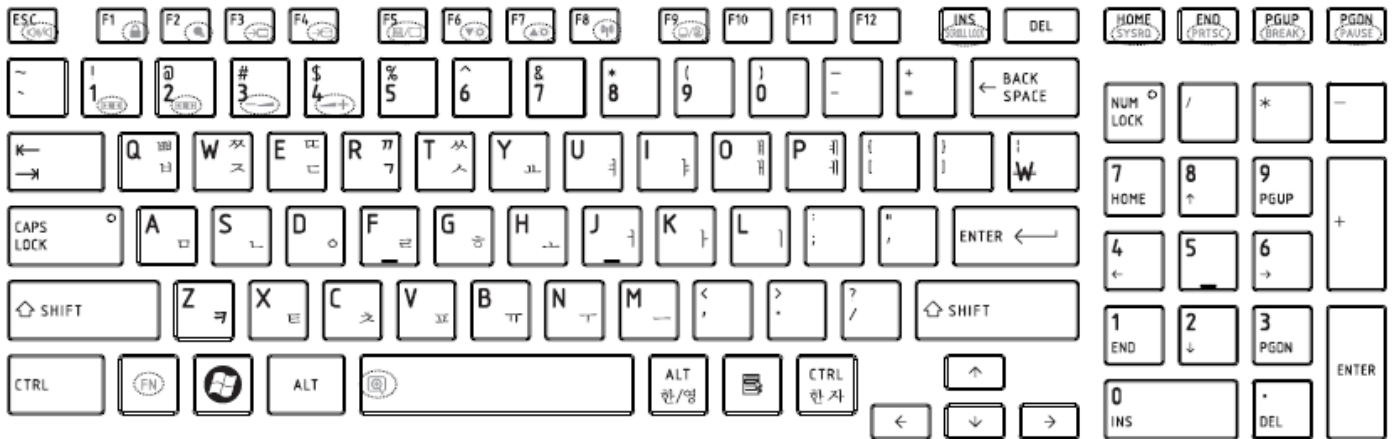


Figure KO keyboard

#### 5. United Kingdom (UK) Keyboard



Figure UK keyboard

## 6. US International (UI) Keyboard

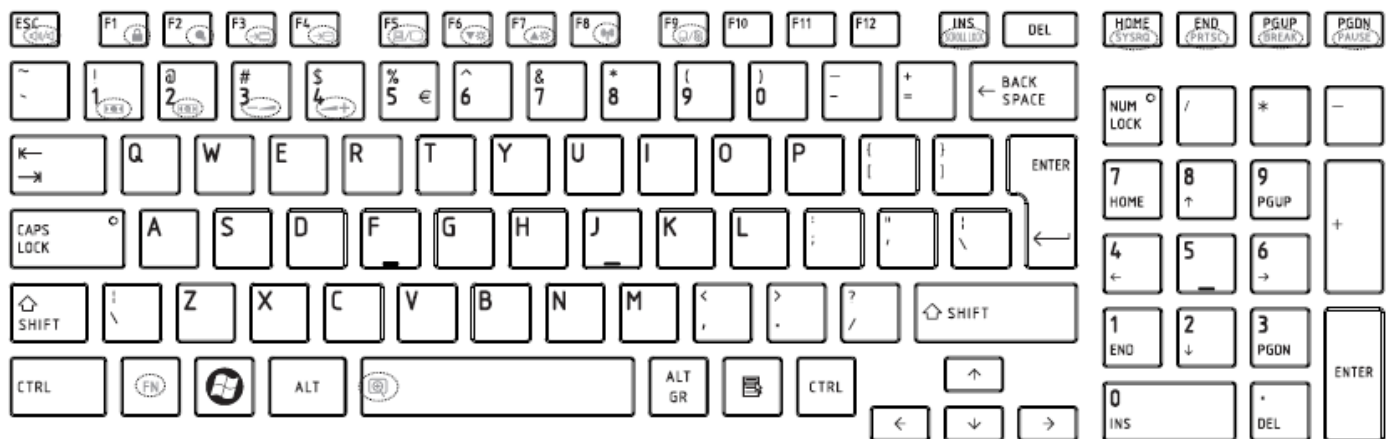


Figure UI keyboard

## 7. Hebrew (HB) Keyboard





Figure HB keyboard

## 8. Danish (DM) Keyboard

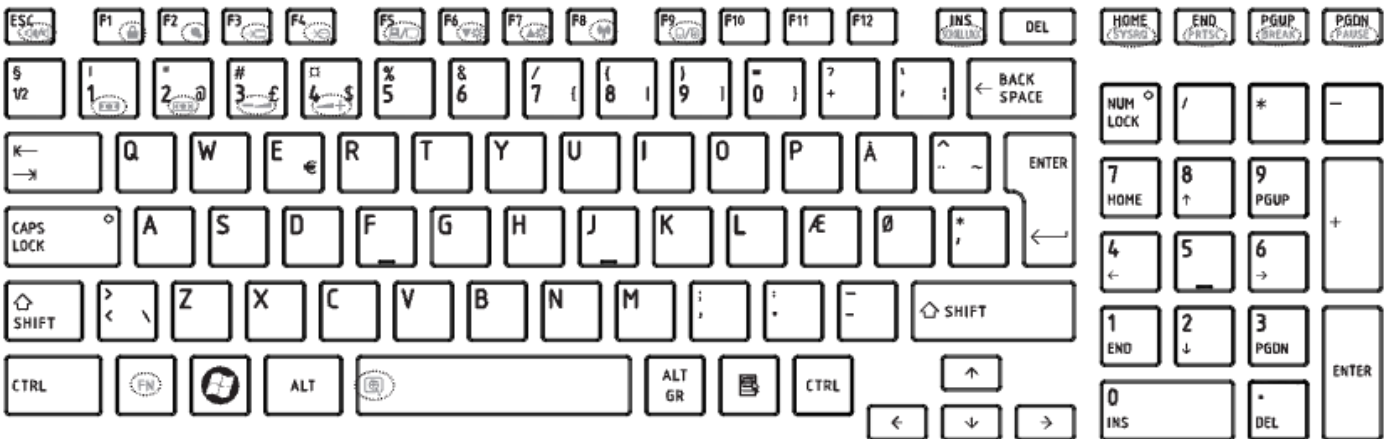


Figure DM keyboard

## 9. Swiss (SW) Keyboard

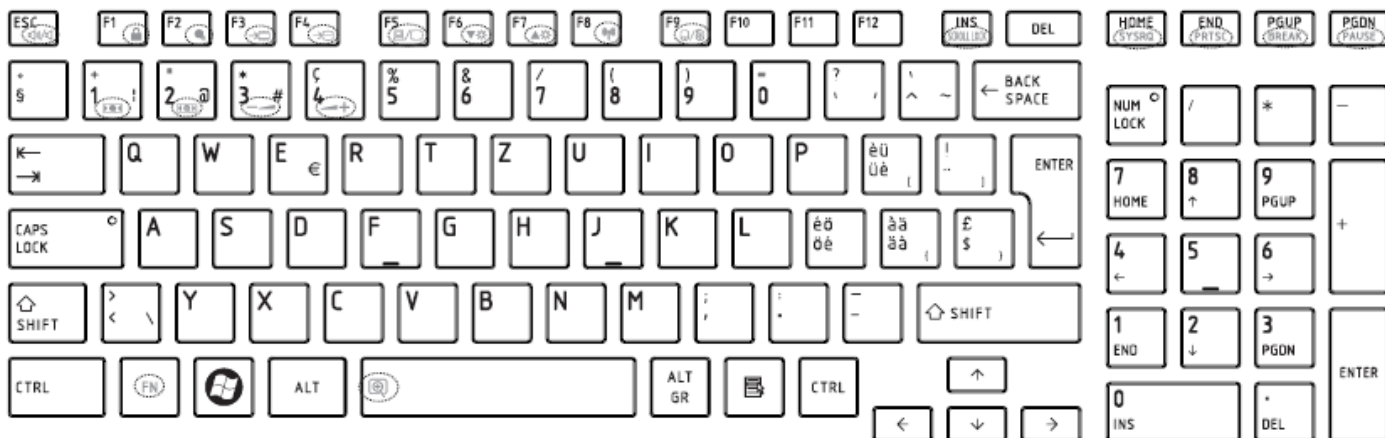


Figure SW keyboard

## 10. Arabic (ARE) Keyboard

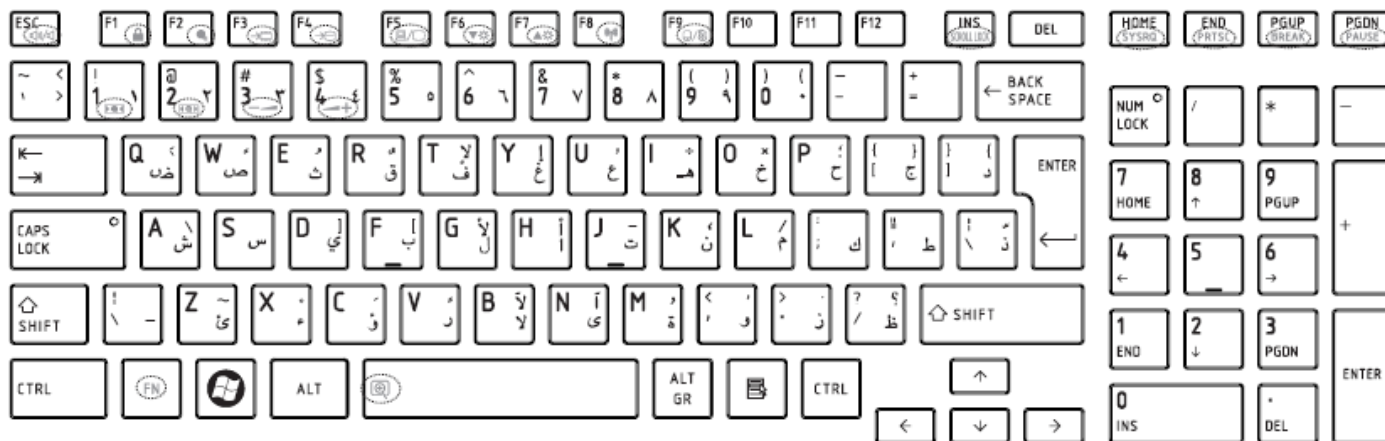


Figure ARE keyboard

## 11. Czech (CZ) Keyboard

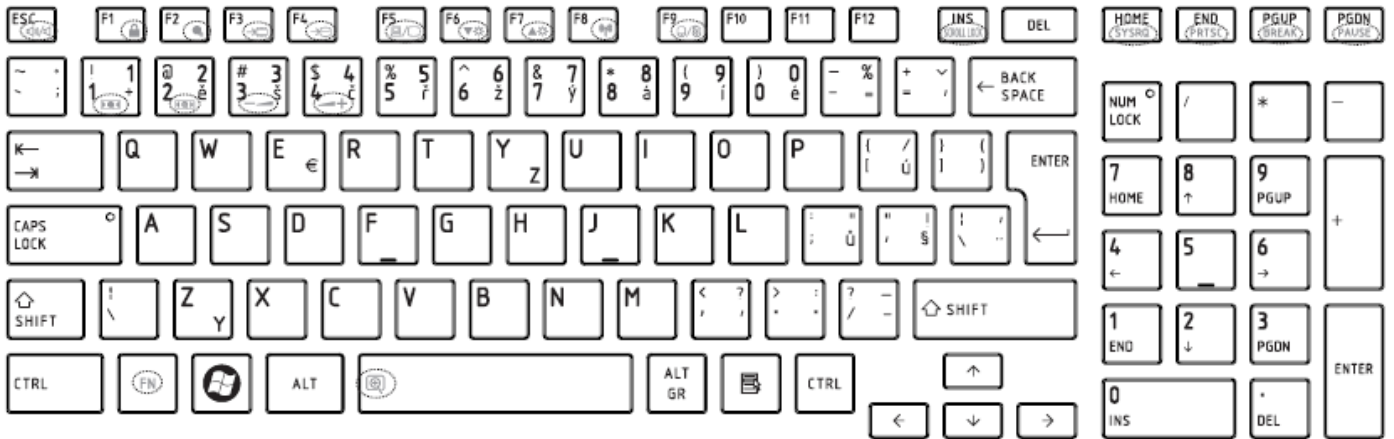


Figure CZ keyboard

## 12. Russian (RU) Keyboard

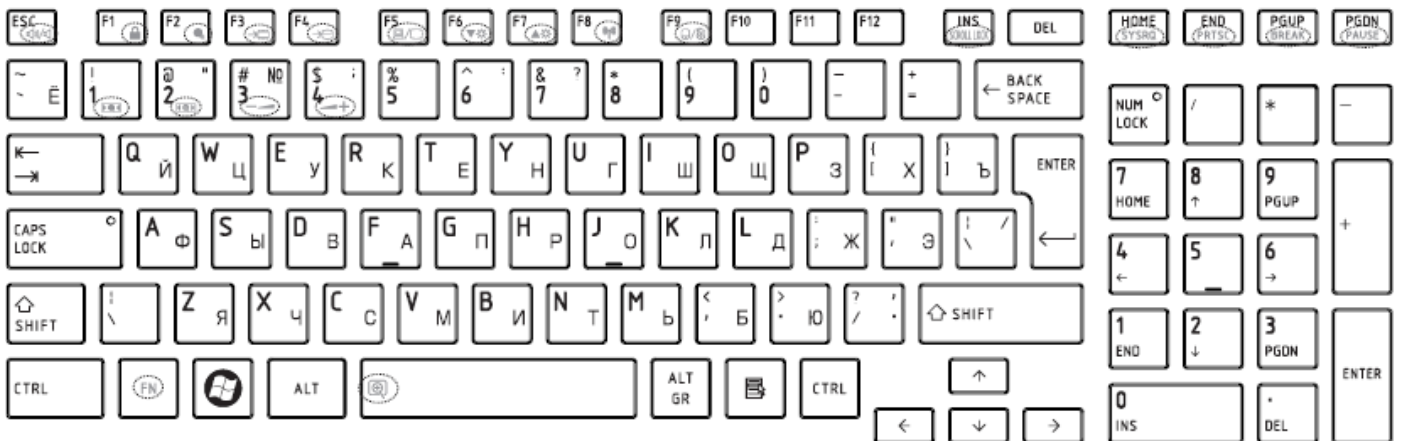


Figure RU keyboard

## 13. Portuguese (P0) Keyboard

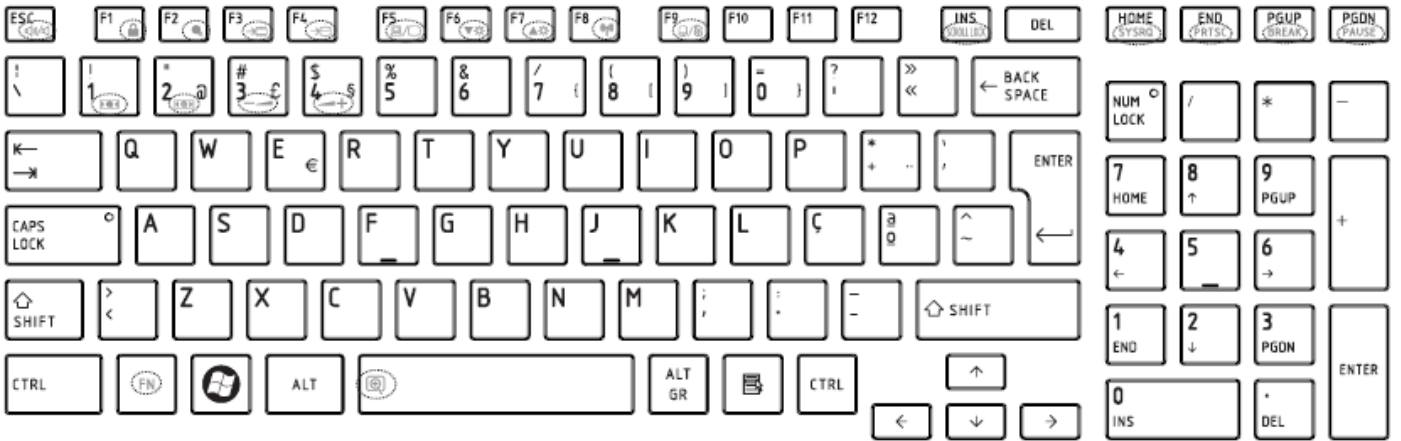


Figure PO keyboard

## 14. Slovakian (SL) Keyboard

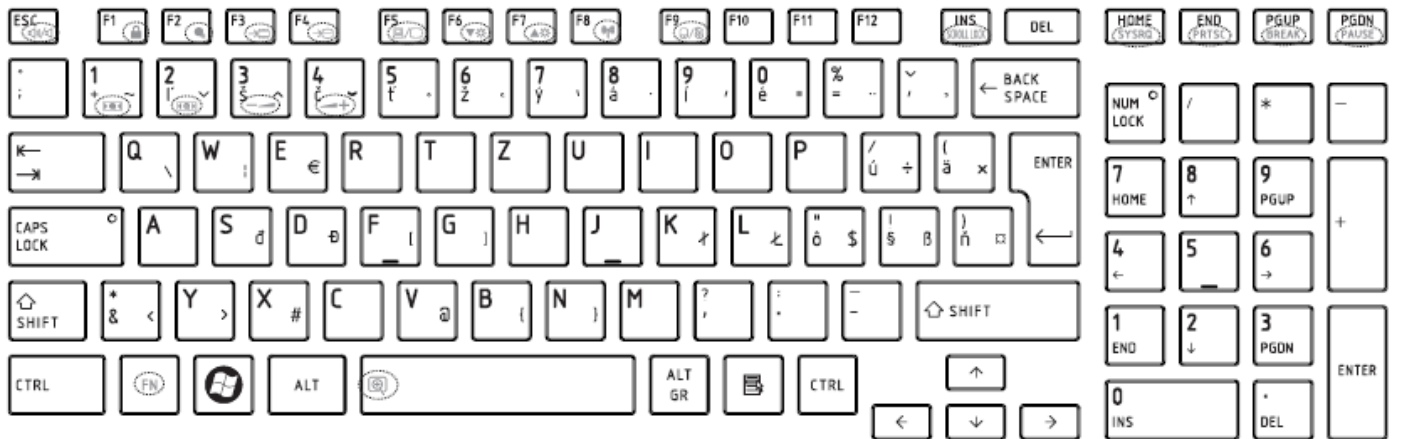


Figure SL keyboard

## 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

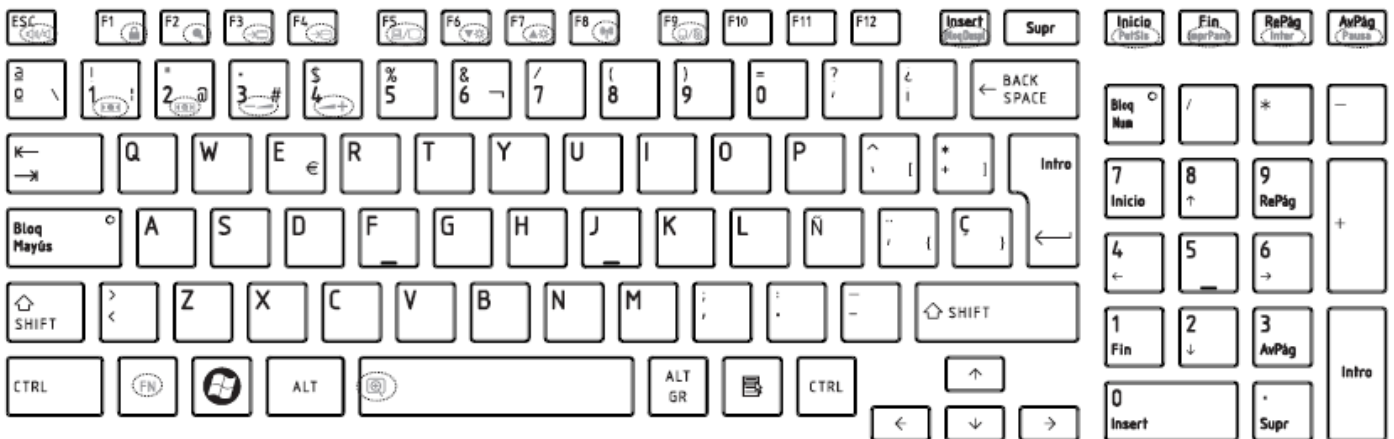


Figure SP keyboard

## 21. Turkish (TR) Keyboard

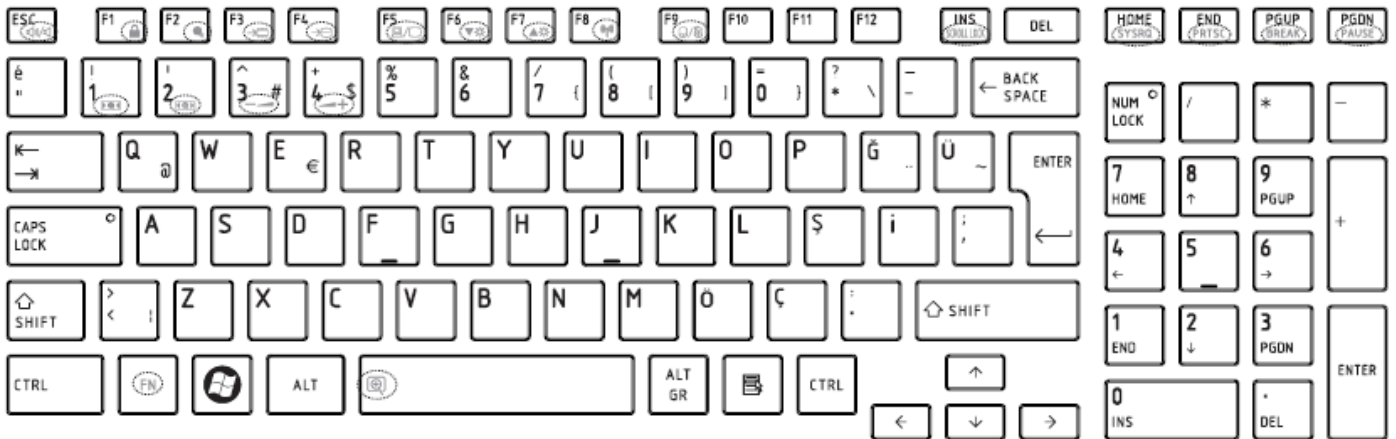


Figure TR keyboard

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



Figure TF-F keyboard

## 23. Swedish (SD) Keyboard



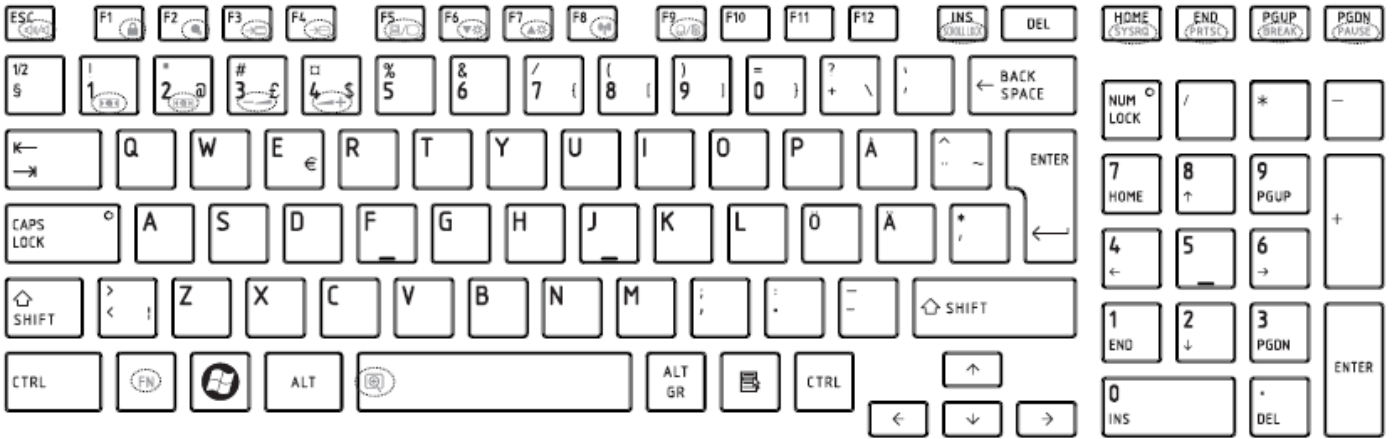


Figure SD keyboard

## 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

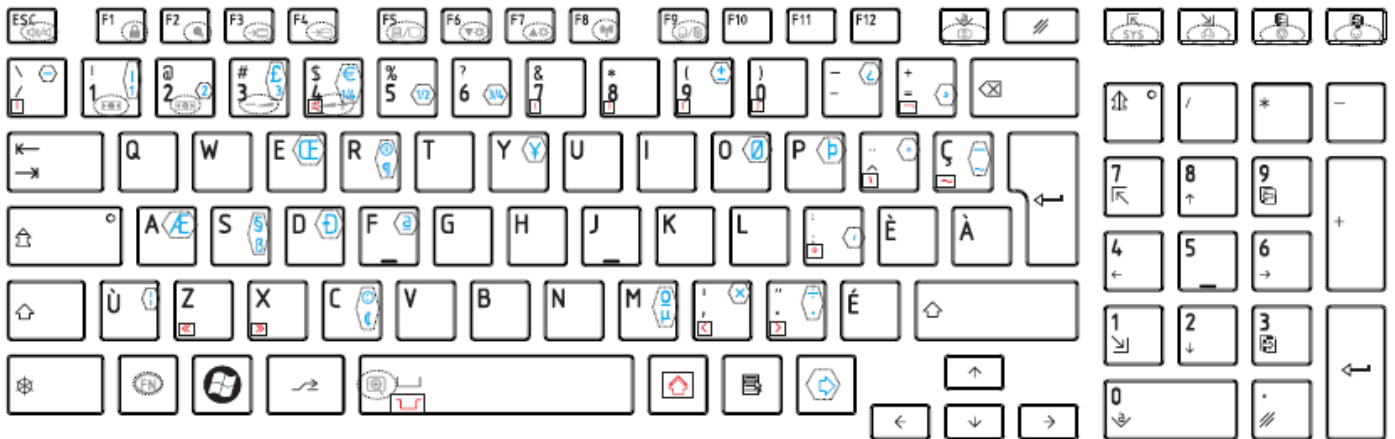


Figure AC keyboard

## 29. Canadian Bilingual (CB) Keyboard



Figure CB keyboard

### 30. Romania (RO) Keyboard



Figure RO keyboard

### 31. Bulgaria (BU) Keyboard

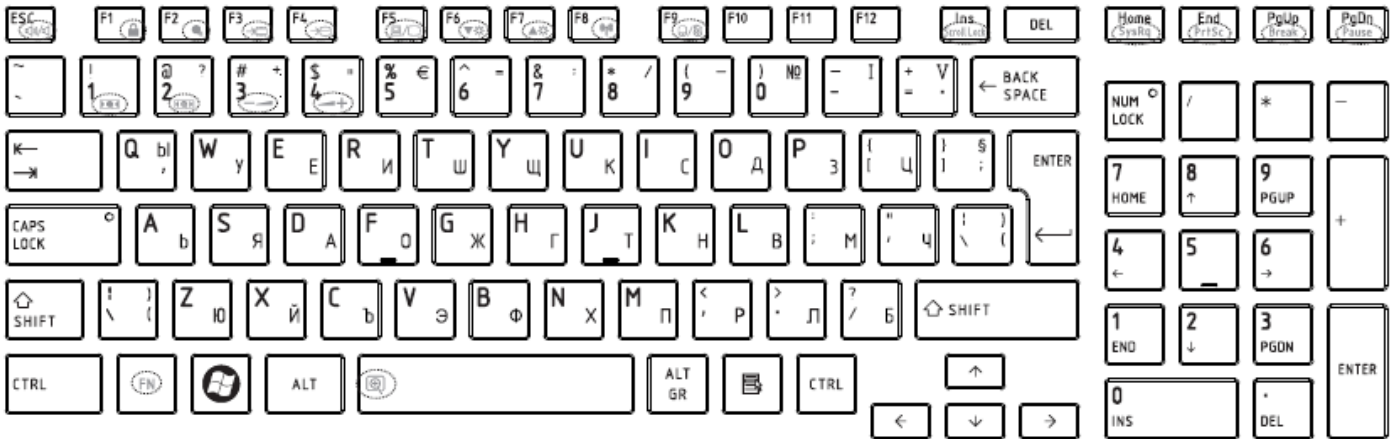


Figure BU keyboard

### 32. Japanese (JP) Keyboard

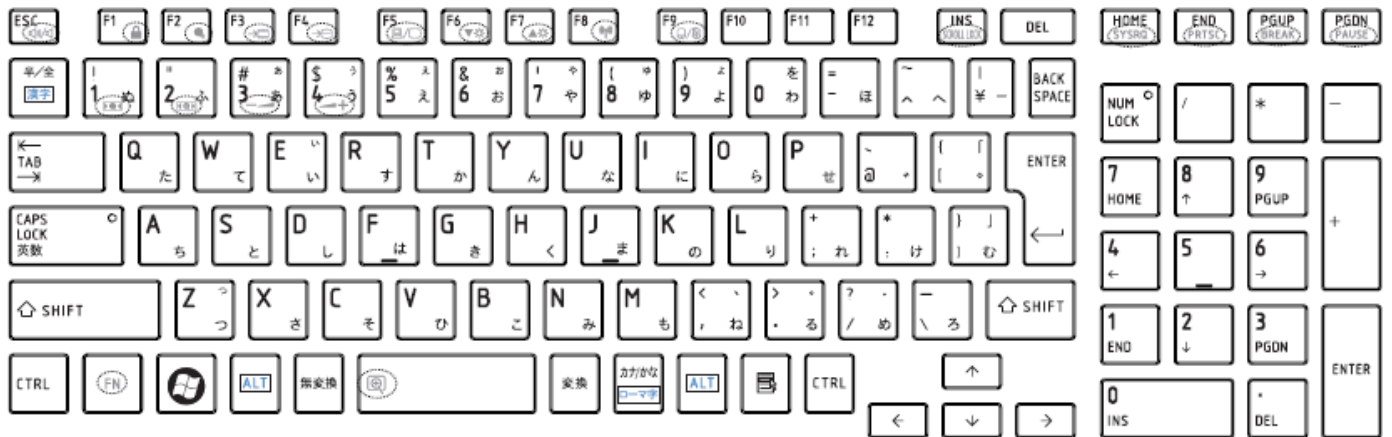


Figure JP keyboard

### 32. Latin American (LA) Keyboard

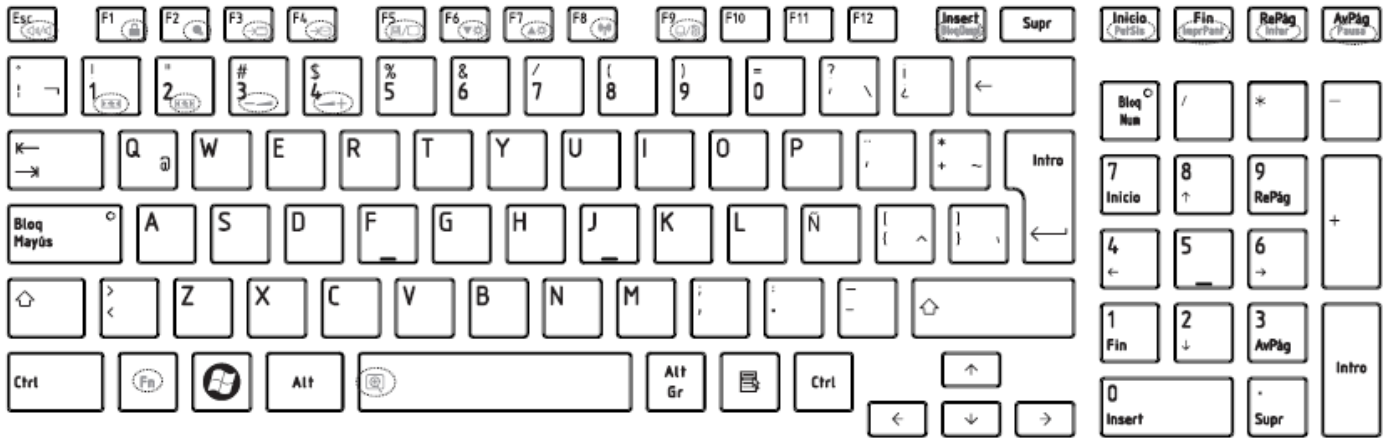


Figure LA keyboard

## Appendix F Series Screw Torque List (NWQAA/NWQAE)

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
LCD ASSY				
MAAA00153G0	M2.0*3	6	LCD BRK TO LCD PANEL(R/L)	1.2~1.5kg
MMCK25050G0	M2.5*5	4	LCD BRK L&R to LCD Cover	2.5~3.0 kg
MMCK25050G0	M2.5*5	4	LCD Bezel to LCD Cover	2.5~3.0 kg
MB				
MAA000012G0	M2.0*5	2	Battery connector	2.5~3.0 kg
MAA000012G0	M2.0*5	2	EXP connector	2.5~3.0 kg
MAA000012G0	M2.0*5	2	ODD CONN TO MB	2.5~3.0 kg
MAA000012G0	M2.0*5	2	HDD connector	2.5~3.0 kg
MMCK25050G0	M2.5*5	1	MINI card to MB standoff	2.5~3.0 kg
MAAA00153G0	M2.0*3	2	MDC card to MB standoff	2.5~3.0 kg
AM077000C00	SPRING SCREW	4	CPU Thermal to CPU Thermal to mb standoff	2.5~3.0 kg
MA0000096G0	SPRING SCREW	3	VGA Thermal to mb standoff	2.5~3.0 kg
HDD ASSY				
MA00000HYG0	M3*3	4	HDD Brk to HDD	2.5~3.0 kg
ODD ASSY				
MAAA00153G0	M2*3	2	ODD BRK to ODD	1.2~1.5kg
LOG UP				
MA000009KG0	M2.5*6.5	3	Speaker to Up	2.5~3.0 kg
MAA000012G0	M2.0*5	2	TP on/off & Light bar PCB to Upper	2.5~3.0 kg
MACAJ0602G0	M2.0*2.5	2	FELICA to Upper (BTO)	2.5~3.0 kg
LOGIC ASSY				
MMCK25050G0	M2.5*5	6	Hinge Brk to Lower	2.5~3.0 kg

MMCK25050G0	M2.5*5	1	MB TO LOWER	2.5~3.0 kg
MA000005YG0	M2.5*8	2	Low to USB Board to up	2.5~3.0 kg
MAA000012G0	M2.0*5	2	FAN module	2.5~3.0 kg
MAA000012G0	M2.0*5	2	ODD connector	2.5~3.0 kg
MA000005YG0	M2.0*8	2	Low to Up	2.5~3.0 kg
MA000005YG0	M2.5*8	1	Low to KB	2.5~3.0 kg
MA000005YG0	M2.5*8	14	LOWER TO UPPER	2.5~3.0 kg
MA000005YG0	M2.5*8	1	HDD DOOR TO LOWER	2.5~3.0 kg
MA0000035G0	M2.5X5.6	1	RAM door to Low	2.5~3.0 kg
MA000005YG0	M 2.5*8	1	KB support to low	1.2~1.5kg
MACAJ0602G0	M2.0*2.5	1	TP finger to UP	2.5~3.0kg
MA000005YG0	M2.5 *8	1	KB support to MB to Low	2.5~3.0kg
MA000005YG0	M2.5 *8	1	Low to TV tuner to UP	2.5~3.0kg
MA000005YG0	M2.5 *8	2	Low to Mb to KB	2.5~3.0kg
MA000005YG0	M2.5 *8	5	Low to Mb to Up	2.5~3.0kg
MA000005YG0	M2.5 *8	2	Low to Hinge Brk to Up	2.5~3.0kg
MA000005YG0	M2.5 *8	1	Low to Odd brk	2.5~3.0kg



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## Appendix G Reliability

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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	

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