

**Toshiba Personal Computer  
Qosmio X300  
Maintenance Manual**

**TOSHIBA CORPORATION**

*[CONFIDENTIAL]*

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Toshiba Personal Computer Qosmio X300 Maintenance Manual

First edition June. 2008

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## Preface

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Qosmio X300, referred to as the Qosmio X300 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 Qosmio X300 system unit and each FRU.
- Chapter 2     Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3     Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4     Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices    The appendices describe the following:

- Handling the LCD module
- Board layout
- Pin assignments
- Keyboard scan/character codes
- Key layout
- Screw torque list
- Reliability

## Conventions

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

### *Acronyms*

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

Read Only Memory (ROM)

### *Keys*

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

### *Key operation*

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

### *User input*

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

**DISKCOPY A: B:**

### *The display*

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

```
Format complete  
System transferred
```

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# **Chapter 1**

## **Hardware Overview**

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## 1.1 Features

The Toshiba Qosmio X300 a full size notebook PC based on the Dual Core and Quad Core Processor, providing high-speed processing capabilities and advanced features. The computer employs a Lithium Ion battery that allows it to be battery-operated for a longer period of time. The display uses 17.1-inch WXGA/WSXGA LCD panel, at a resolution of 1440 by 900 pixels. The PGA socket supports BTO for the CPU so that the system can be designed to suit your needs.

The computer has the following features:

Processor (BTO)

The computer is equipped with one of the following Intel<sup>®</sup> processors.

- Intel<sup>®</sup> Dual Core<sup>™</sup> 2 Duo Processor
- Intel<sup>®</sup> Quad Core<sup>™</sup> 2 Duo Processor

Memory (BTO)

The computer has two SO-DIMMs slot comes standard with 1GB/2GB/4GB, accepting BTO/CTO for your memory requirements. It can incorporate up to 8 GB of main memory. It supports DDR3 at 1067/800MHz.

Battery Pack

The computer is powered by one rechargeable and removable 8 Cell Lithium Ion battery pack.

RTC Battery

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

Hard Disk Drive (HDD) (BTO)

The computer accommodates 9.5 mm and 12.5 mm two kinds of height HDD types with following storage capacities:

- 160/200/250/320 GB (9.5 mm thick) SATA (5,400rpm)
- 160/200/320 GB (9.5 mm thick) SATA (7,200rpm)

- 300/400/500 GB (12.5 mm thick) SATA (4,200rpm)
- 500 GB (12.5 mm thick) SATA (5,400rpm)

ODD (BTO)

- 12.7mm height DVD Super Multi drive supporting  $\pm$ R Double Layer
- 12.7mm height DVD Super Multi drive supporting  $\pm$ R Double Layer w/ Labelflash

Display (BTO)

The LCD displays available come with one of following types:

- 17.1" WXGA CSV 1-Lamp color display, resolution 1440×900
- 17.1" WSXGA CSV 1-Lamp color display, resolution 1680×1050

Graphics (BTO)

Intel PM45 with NB9E-GS/NB9E-GTX (depending on model)

Keyboard

The internal keyboard provides the embedded numeric overlay keys, dedicated cursor control overlay keys, and so on. The keyboard is compatible with the IBM<sup>®</sup> enhanced keyboard.

Pointing Device

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

External Monitor Port

The analog VGA port provides support for VESA DDC2B compatible functions.

Universal Serial Bus (USB) Ports

The computer has four 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.

IEEE1394

This port allows high-speed data transfer to take place between the computer and external devices such as digital video cameras.

Express Card Slot

A PC Card slot is provided to hold PC Card Standard Type II (5.0 mm) card, capable of using a variety of PC Cards including 16-bit Multiple Function PC Cards and 32-bit Card Bus Cards.

PC card HDD boot does not be supported.

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 card. It supports High speed SD, SDHC and SDIO. An I/O port heel cover is needed. This model does not support CF cards.

Sound system

The integrated sound system provides support for the computer's internal speakers and microphone, as allowing an external microphone and headphones to be connected via the appropriate jacks.

Internal Camera

It supports 1.3M pixels with/without auto macro. It comes with blue LED. Camera and microphone need to work separately.

HDMI Out Port (BTO)

HDMI out port can connect with Type A connector HDMI cable.



DisplayPort Out Port (BTO)

DisplayPort out port can connect with DisplayPort cable.

Headphones/S/PDIF/Line out Jack

This jack connects digital speakers or a stereo headphone (16 ohm minimum). When connected to a digital speaker or headphones, the internal speaker is automatically disabled. This jack can be used also as S/PDIF jack and enables connection of optical digital correspondence apparatus.

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 Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) and Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T). 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 that is compatible with other LAN systems based on Direct Sequence Spread Spectrum/Orthogonal Frequency Division Multiplexing radio technology that complies with the IEEE 802.11 Standard (Revision A, B, G or N Draft Ver. 1.0).

Internal Modem (BTO)

Some models are equipped with the 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.

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.

Finger Print (BTO)

This product 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. Just by swiping the finger against the fingerprint sensor.

Internal Camera (BTO)

The computer has an internal camera. The camera has 1.3 Mpix resolution support.

❑ Figures 1-1A/1-1B/1-1C show the computer and its system unit configuration, respectively.

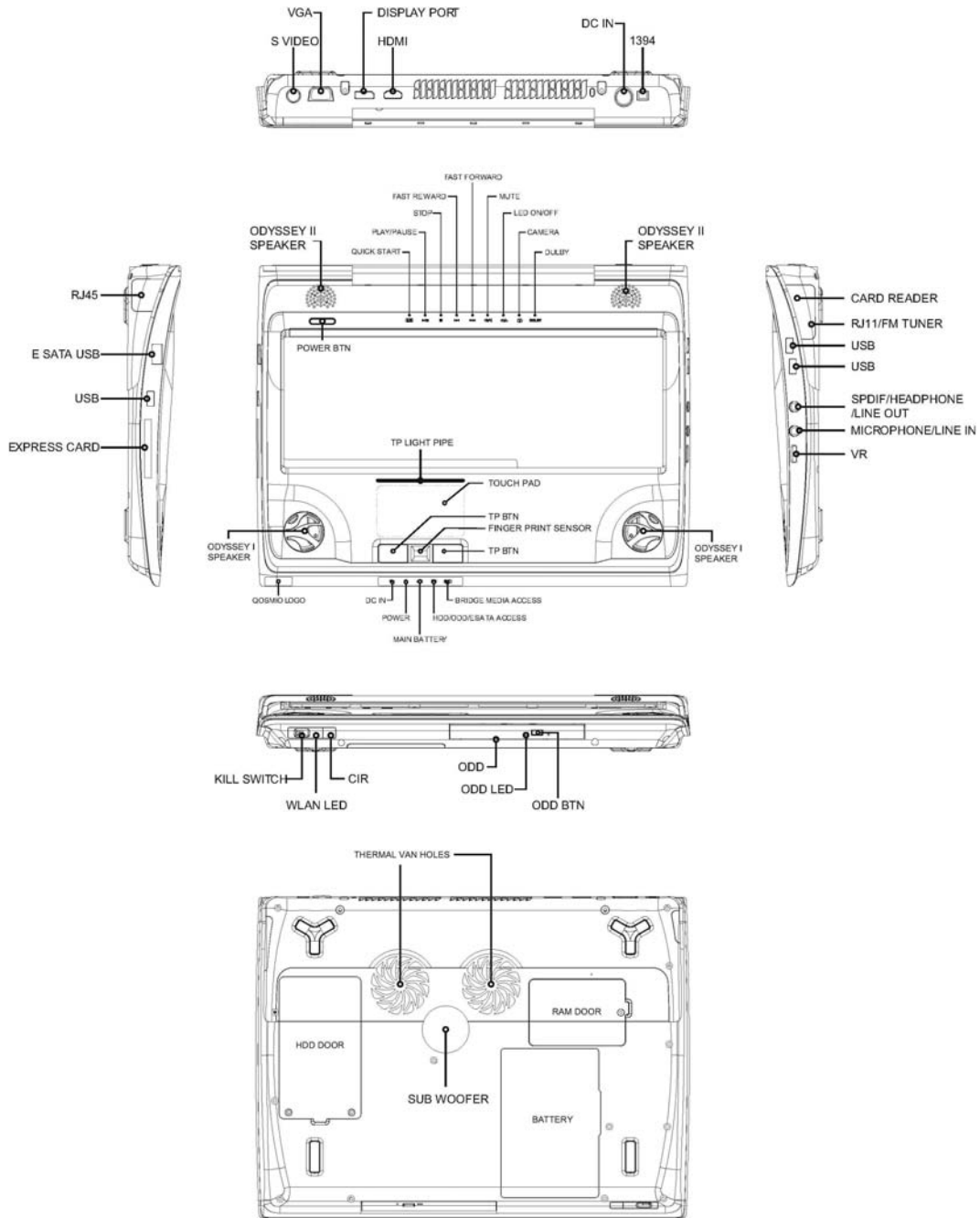


Figure 1-1A ID Parts Description Placement Part A

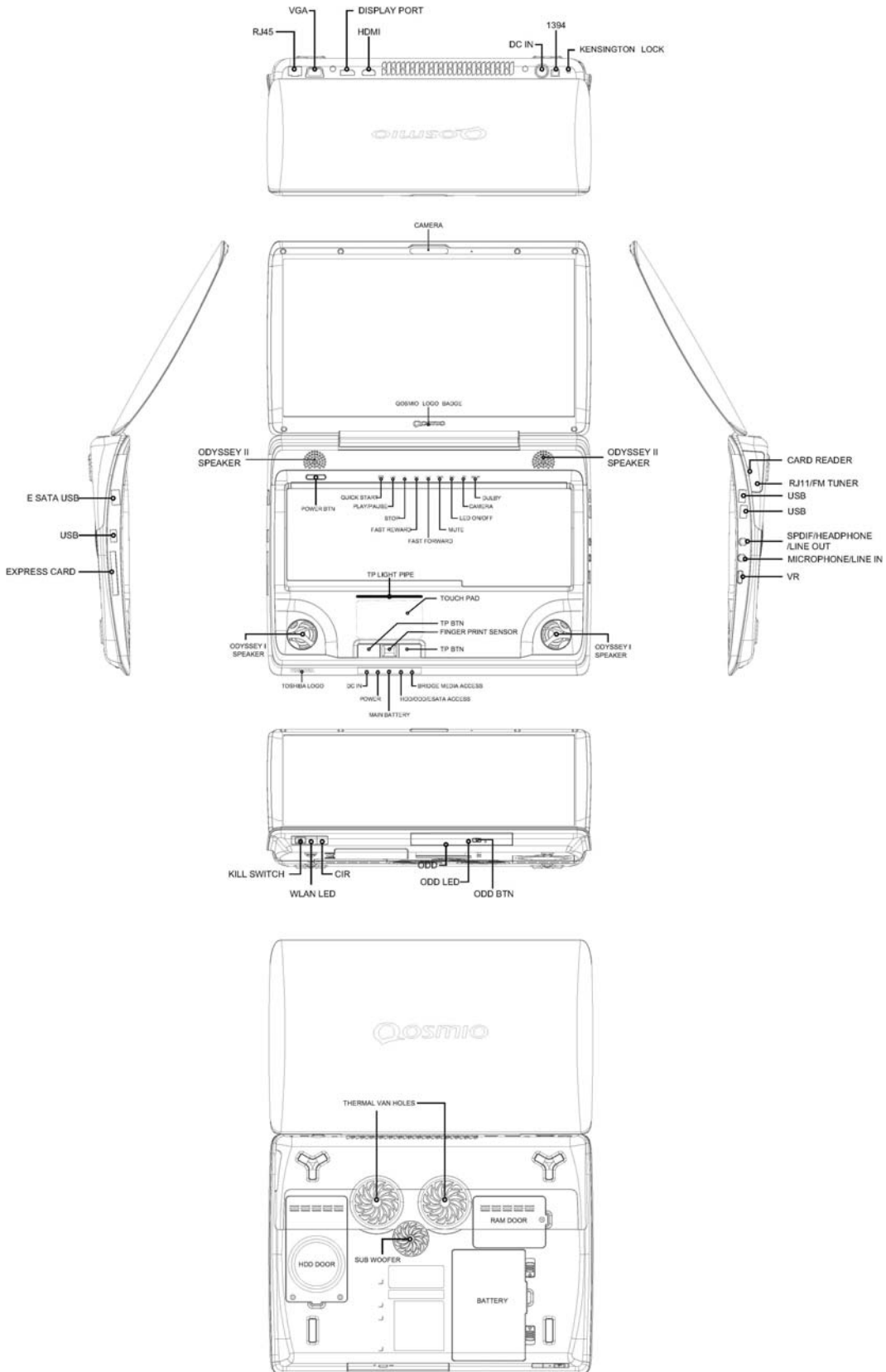


Figure 1-2B ID Parts Description Placement Part B



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® Dual Core™ 2 Duo Processor
- Intel® Quad Core™ 2 Duo Processor

Memory (BTO)

The computer has two SO-DIMMs slot comes standard with 1GB/2GB/4GB, accepting BTO/CTO for your memory requirements. It can incorporate up to 8 GB of main memory. It supports DDR2 at 1067/800MHz.

BIOS ROM

- 2048KB flash BIOS ROM
- ACPI-compliant BIOS
- SMBIOS V2.4

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**

- Daughter board with extension graphic card
- For Single:
  - NB9E-GTX with 1GB DDR3
  - NB9E-GS with 512MB DDR3
- HDMI 1.3a -CEC support
- DVI-D supported by conversion cable from HDMI
- Hybrid-Power/SLi support

**❑ Express Card Controller**

- Dummy card with ID shape
- Support USB/PCI Express signals
- One Express card slot/54

**❑ Audio Controller**

- Realtek Azalia ALC272
- Microsoft inbox audio driver support
- Software EQ support
- Synchronize to change sound output to HDMI when display is changed to HDMI out with audio output capability
- MAXX audio support by SW solution (BTO by image)

**❑ Wireless LAN Controller**

- Intel 11a/g (Golan), Intel 11bg (Golan), 11a/g/n (Kedron), (TBD)
- Intel 802.11a/g (Echo Peak 1x2 & Shirley Peak 1x2)
- Intel 802.11a/g/n (Echo Peak 3x3 Shirley Peak 3x3)
- Atheros 802.11a/g (XB62L 1x2), b/g (XB63L 1x2), a/b/g/n (XB72 2x3), a/b/g/n (XB92 2x2)
- Realtek 802.11bg (8187B 1X2) (TBD)
- Intel WiMAX 802.16e (Echo Peak 3x3)
- Normal screw for all model

## 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, 200, 250, 320, 400, and 500 GB.

The HDD is shown in Figure 1-3 and some of its specifications are listed in Table 1-1.

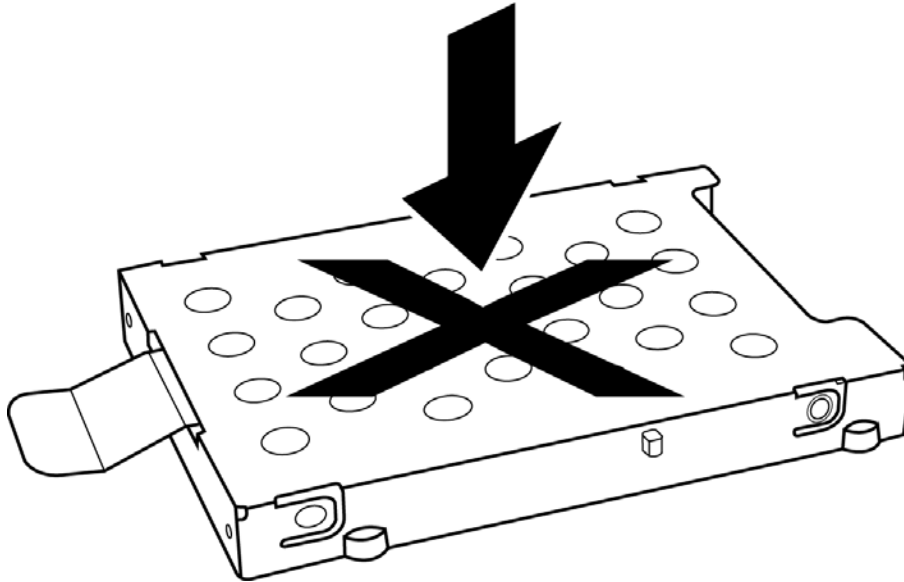


Figure 1-3 SATA HDD

Table 1-1 HDD Specifications

Item	Specifications						
	160 GB			200 GB			250 GB
Capacity (GB)							
Rotational Speed (RPM)	4200 RPM	5400 RPM	7200 RPM	4200 RPM	5400 RPM	7200 RPM	5400 RPM
Height	12.5 mm	9.5 mm	9.5mm	9.5 mm	9.5 mm	9.5mm	9.5 mm
User Data Sectors	312,581,808			390,721,968			488,397,168
Bytes / Sector	512			512			512



<b>Item</b>	<b>Specifications</b>				
Capacity (GB)	300 GB	320 GB		400 GB	500 GB
Rotational Speed (RPM)	4200 RPM	5400 RPM	7200 RPM	4200 RPM	4200 RPM
Height	12.5 mm	9.5 mm	9.5mm	12.5 mm	12.5
User Data Sectors	576,072,368	625,142,808		781,422,768	976,773,168
Bytes / Sector	512	512		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 4x speed, US CD-RW at 24x speed, High Speed CD-RW at 10x speed, DVD-R at 8x speed, DVD-RW at 6x speed, DVD+R at 8x speed, DVD+R (Double Layer) at 4x speed, DVD-R (Double Layer) at 4x speed, DVD+RW at 8x speed and DVD-RAM at 5x speed.

The DVD Super Multi drive is shown in Figure 1-4 and its specifications are listed in Table 1-2.

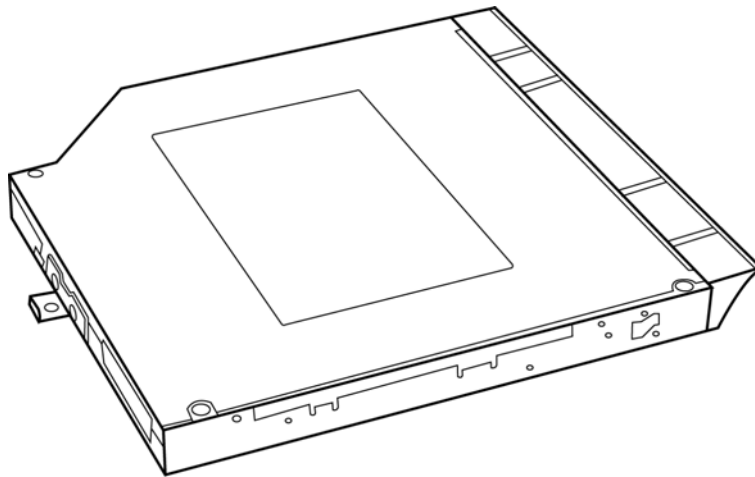


Figure 1-4 DVD Super Multi Drive

Table 1-2 DVD Super Multi Drive Specifications

Item	DVD-ROM Mode	CD-ROM Mode
Data Transfer Rate (Mbytes/s)	SATA 1.5G 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 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
  - Shows DC-IN (Red Color)
  - Shows Power (Red/Amber)
  - Shows Main Battery charging (Red/Amber 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.

## 1.5 Batteries

The computer has the following two types of batteries:

- Main Battery Pack
- Real Time Clock (RTC) Battery

### 1.5.1 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 so that it can resume it.

### 1.5.2 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 1-3 Quick/Normal Charging Time*

State	Charge Time	
Off-State Charge	8 Cell	About 4 hours max
On-State Charge	8 Cell	About 12 hours max

**NOTE:** The time required for normal charge depends on the power consumption by the system. Using the fluorescent lamp and frequently accessing the disk consume much power and lengthen the charge time.

Any of the following cases stops battery charge:

1. The battery becomes fully charged.
2. The AC adapter or battery pack is removed.
3. The battery or AC adapter voltage is abnormal.

Detection of full charge

A full charge is detected only when the battery is being charged by quick or normal charge.

A full charge is detected when either of the following conditions is met:

1. The current in the battery charging circuit drops below the predetermined value.
2. The charging time exceeds the fixed limit.

### **1.5.3 RTC Battery**

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

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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. Speaker            | 13. Camera    | 19. FM Tuner |
| 2. USB Floppy Drive | 8. Optical drive      | 14. Bluetooth | 20. E-SATA   |
| 3. Keyboard         | 9. Modem              | 15 HDMI       | 21.UWB       |
| 4. USB ports        | 10. Express card unit | 16. SPDIF     |              |
| 5. Display port     | 11. IEEE 1394 port    | 17. MIC       |              |
| 6. TouchPad         | 12. Wireless LAN      | 18. Finger    |              |

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

The following tools are necessary for implementing the troubleshooting procedures:

1. Diagnostics Disk (Repair and Sound Repair)
2. Phillips screwdriver (2 mm)
3. 6mm nut driver (for the helix screw nuts on the rear ports for CPU door)
4. 2DD or 2HD formatted work disk for floppy disk drive testing
5. Sycard (EXPRESS CARD test card)
6. Cleaning kit for floppy disk drive troubleshooting
7. Cleaning kit for optical drive troubleshooting
8. Multimeter
9. External monitor
10. USB compatible keyboard
11. Multimedia sound system with line-in and line-out ports
12. Headphones
13. USB test module and USB cable
14. Music CD
15. MIC module and MIC line
16. SPDIF line
17. Finger print module
18. FM generator& mp3
19. UWB D-LINK

20. E-SATA HDD

21. Display port device

## 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 Windows Vista is installed on the hard disk. Operating systems that were not preinstalled by Toshiba can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive, if installed, is empty. If no FDD module is installed, you should use an external FDD to run the diagnostics tests

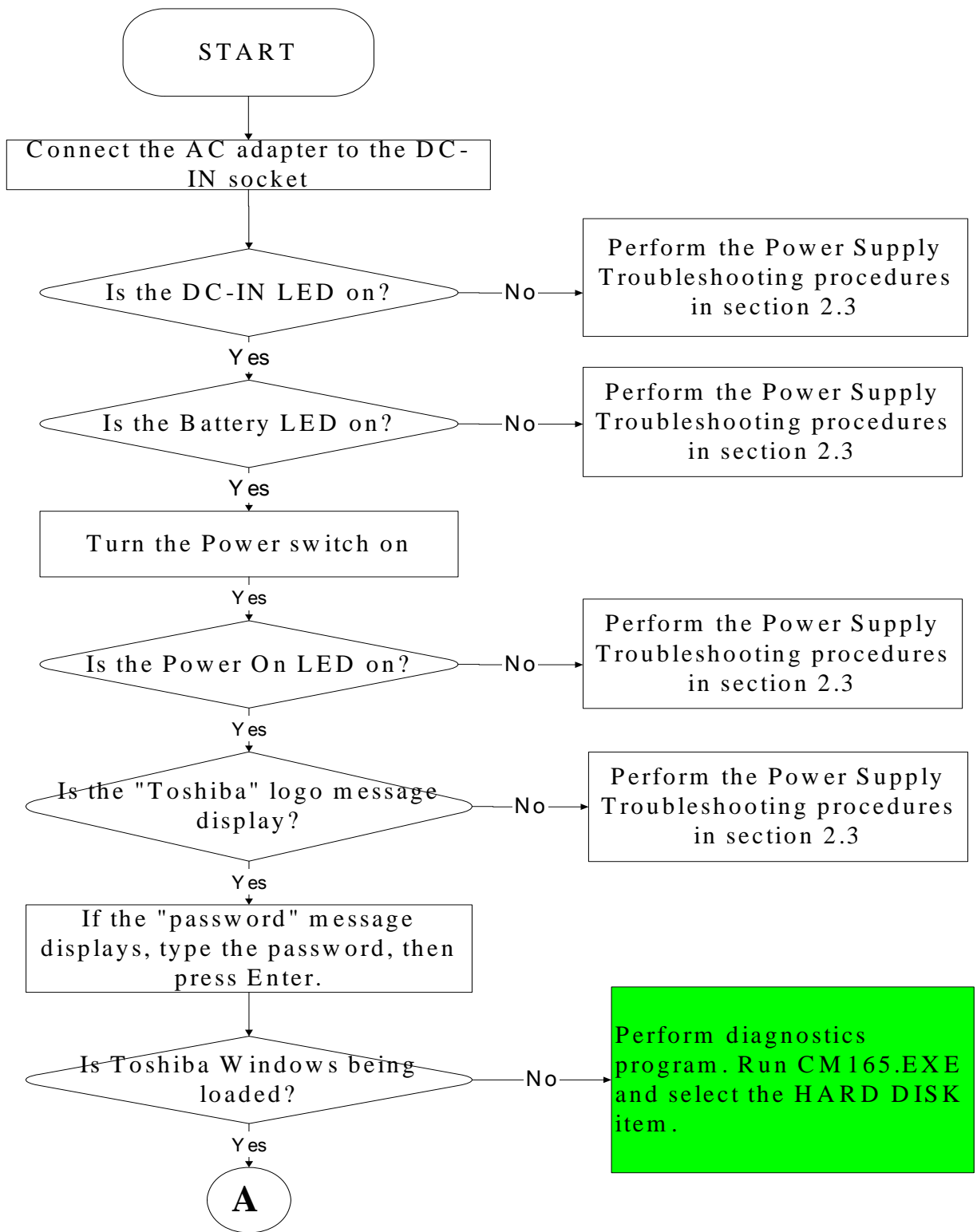


Figure 2-1 Troubleshooting flowchart (1/2)

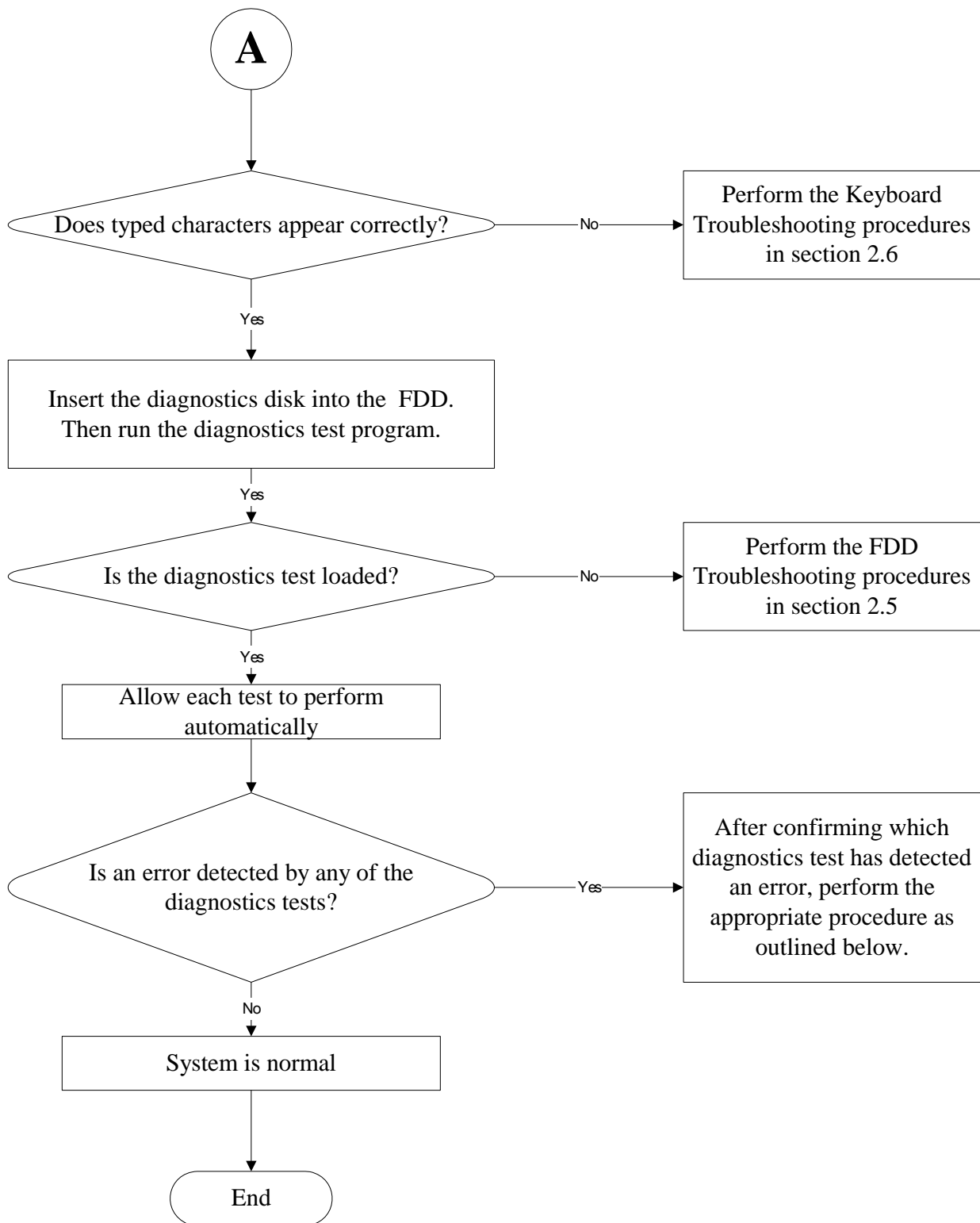


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.2
2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.3
3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.4
4. If an error is detected by the TouchPad test, perform the TouchPad Troubleshooting procedures in Section 2.7
5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.8 and the Optical Drive Troubleshooting Procedures in Section 2.9
6. If an error is detected by the fingerprint test, perform the fingerprinter troubleshooting Procedures in Section 2.22



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 2.5
2. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 2.6
3. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 2.8
4. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 2.10
5. If an error is detected when using the EXPRESS CARD unit, perform the EXPRESS CARD Troubleshooting procedures in Section 2.11
6. If an error is detected when using the IEEE1394 device, perform the IEEE1394 device Troubleshooting procedures in Section 2.12
7. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.13
8. If an error is detected when using the Bluetooth, perform the Bluetooth Troubleshooting procedures in Section 2.15
9. If an error is detected when using the HDMI TV, perform the HDMI TV troubleshooting procedures in Section 2.19.
10. If an error is detected when using the MIC, perform the MIC troubleshooting procedures in Section 2.21

## 2.3 Power Supply Troubleshooting

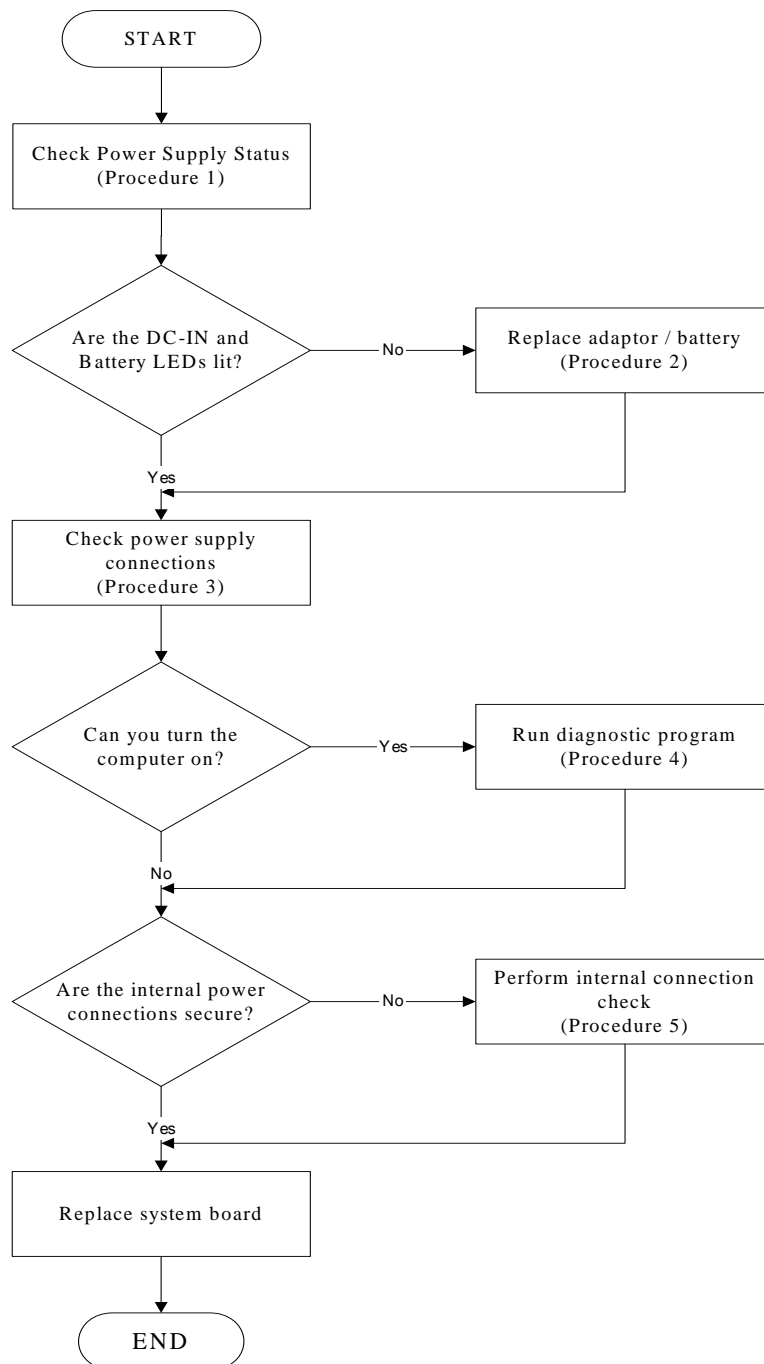


Figure 2-2 Power Supply Troubleshooting Process



The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures

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

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

### Procedure 1 Power Status Check

The following LEDs indicate the power supply status:

-  Battery LED
-  DC-IN LED

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

*Table 2-1 Battery LED*

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

Table 2-2 DC-IN LED

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

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

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

### **Procedure 2    Adaptor / battery replacement**

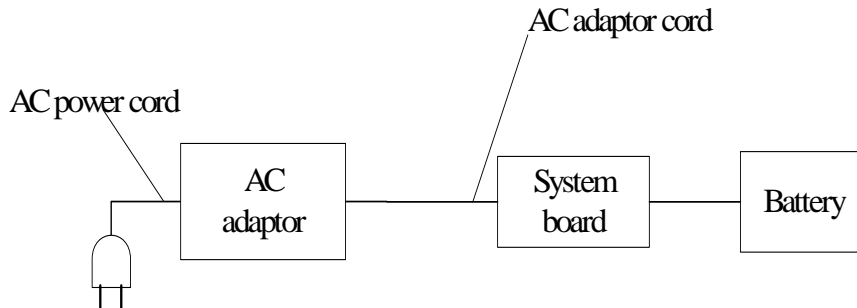
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

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

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

### Procedure 3 Power supply connection check

The power supply wiring diagram is shown below:



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

- Check 1 Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.
- Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.
- If the DC-IN input socket is loose, go to Procedure 5.
  - If it is not loose, go to Check 4.
- Check 4 Use a multi-meter to make sure that the AC adaptor output voltage is close to 19 V. If the output is several percent lower than 19 V, go to Check 5. If the output is close to 19 V, go to Check 6.
- Check 5 Connect a new AC adaptor or AC power cord.
- If the DC-IN LED does not light, go to Procedure 4.
  - If the battery LED does not light, go to Check 6.
- Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

#### **Procedure 4 Diagnostic check**

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

1. Reinstall the battery pack.
2. Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
3. Run the Diagnostic test following the procedures described in Chapter 3, Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

#### **Procedure 5 Replacement check**

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

- Check 1 Use a multi-meter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.
- Check 2 Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.
- Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.4 Display Troubleshooting

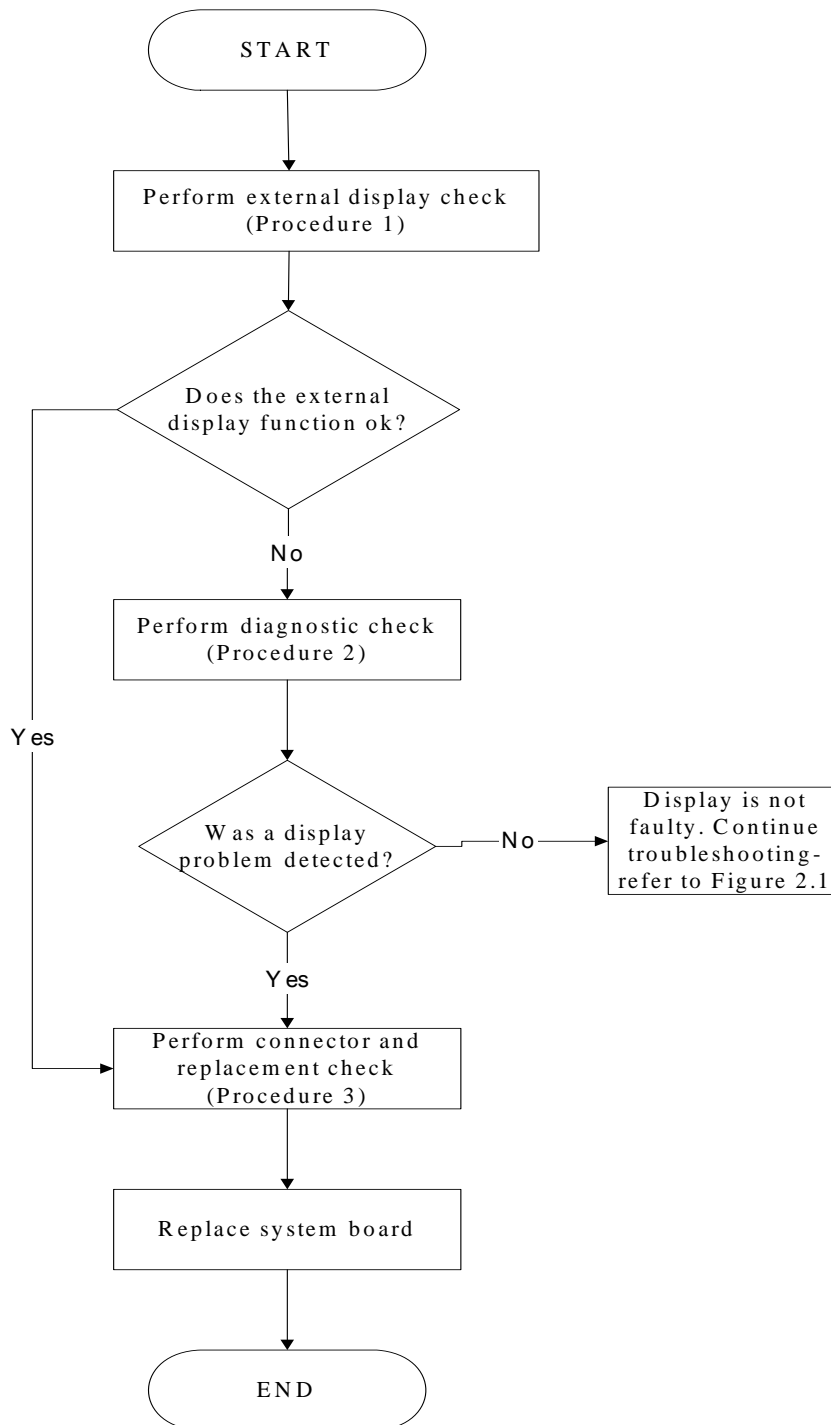


Figure 2-3 Display troubleshooting process

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

Procedure 1: External display check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

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

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

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

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

### **Procedure 2 Diagnostic check**

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

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



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

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

- Check 1    Make sure the DDR RAM module is seated properly. Test display again. If the problem still exists, replace the DDR RAM module. If the problem still exists, perform Check 2.
- Check 2    Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 3.
- Check 3    Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.
- Check 4    Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.
- Check 5    Replace the CPU with another of the same specifications. If the problem still exists, perform Check 6.
- Check 6    The system board may be damaged. Replace it with a new one.

## 2.5 Keyboard Troubleshooting

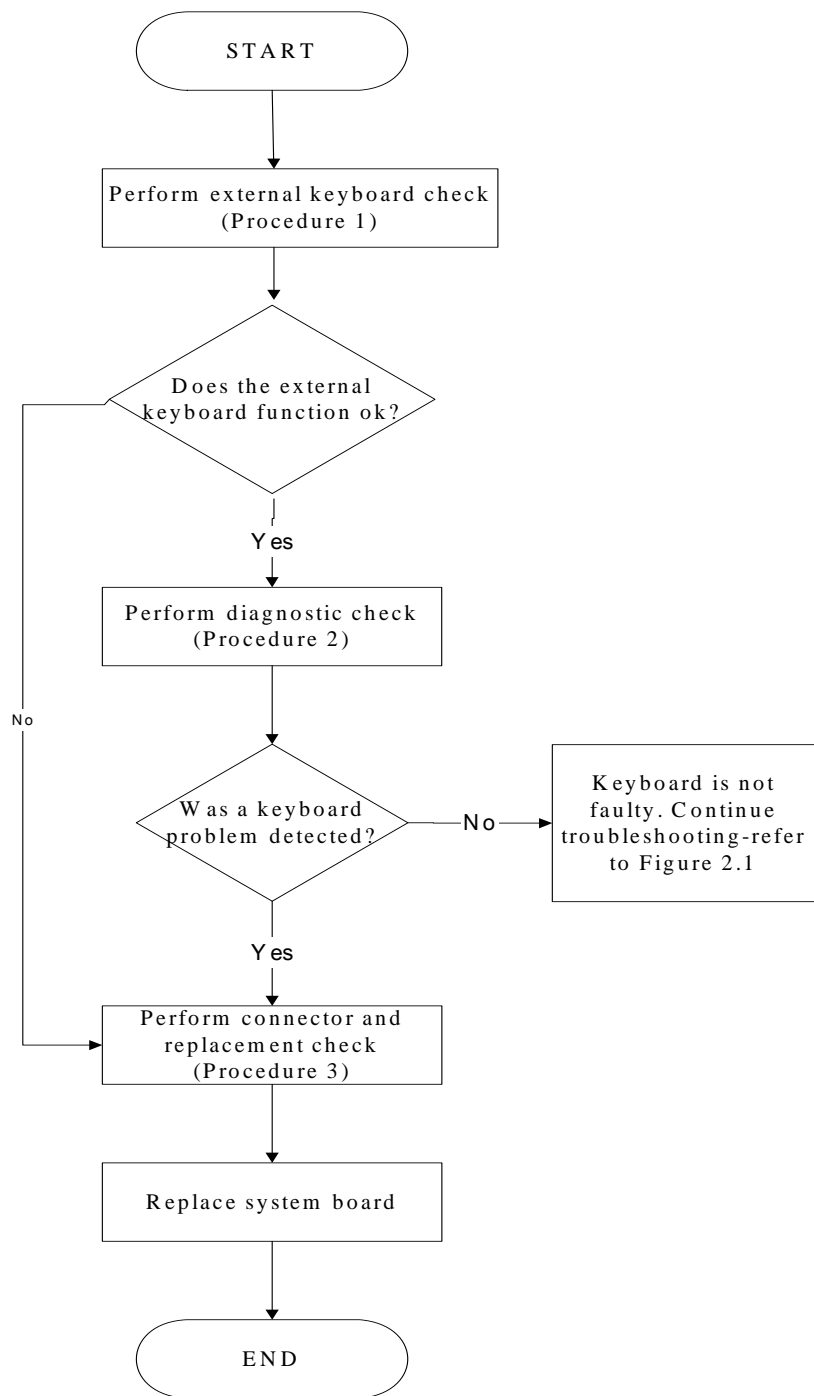


Figure 2-4 Keyboard troubleshooting process

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

Procedure 1: External keyboard check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

### **Procedure 1 External keyboard check**

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

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

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

### **Procedure 2 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 3. If an error does not occur, the keyboard is functioning ok.

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

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

- Check 1    Make sure the keyboard cable is firmly connected to the system board.  
            If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.
- Check 2    The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4.  
            If the problem still exists, perform Check 3.
- Check 3    The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

## 2.6 External USB Devices Troubleshooting

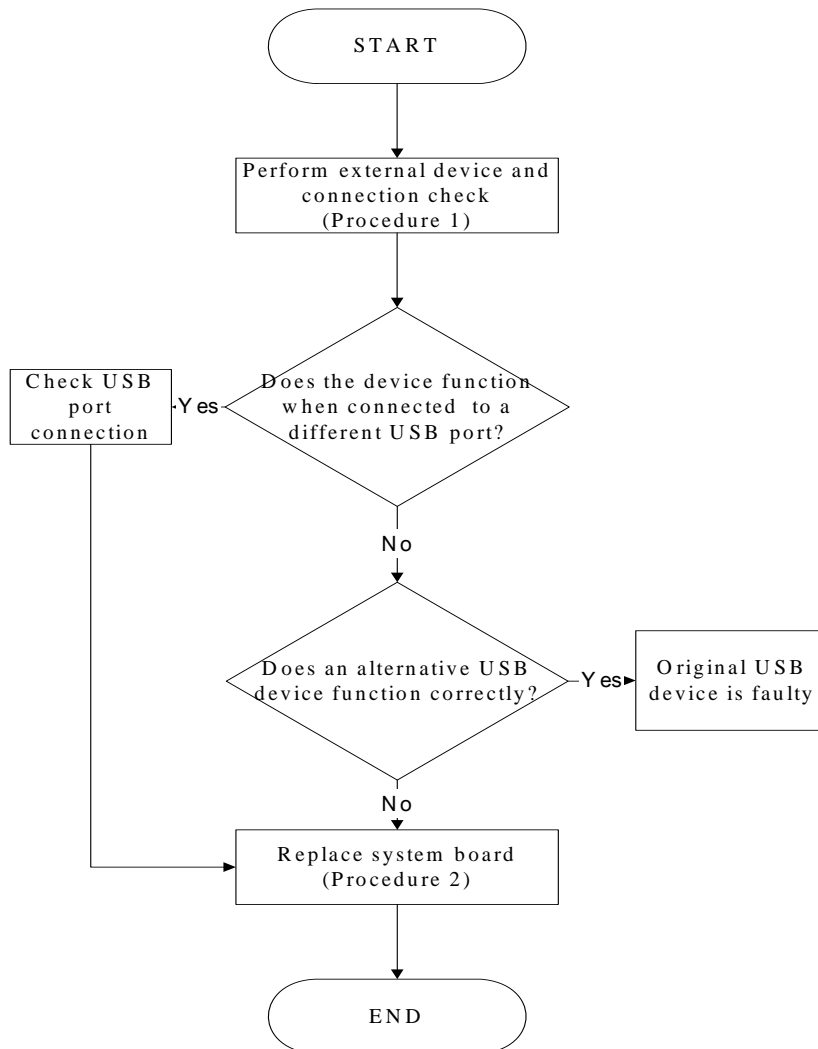


Figure 2-5 External USB device troubleshooting process

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

Procedure 1: External device and connection check

Procedure 2: Replace system board

### **Procedure 1 External device and connection check**

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

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

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

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

Check 3 Make sure that the USB socket is firmly secured to the system board of the computer. If the malfunction remains, the system board 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.

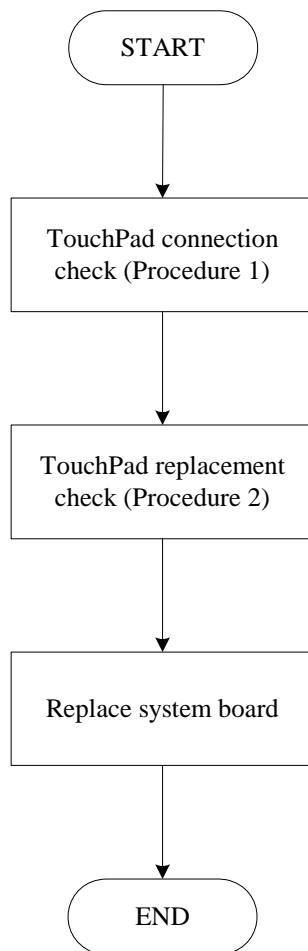
If the alternative USB device works correctly, the original device may be damaged and should be replaced.

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 TouchPad Troubleshooting



*Figure 2-7 Touchpad troubleshooting process*

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

Procedure 1: TouchPad connection check

Procedure 2: TouchPad replacement check

### **Procedure 1 TouchPad connection check**

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

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

### **Procedure 2 TouchPad replacement check**

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

## 2.8 Speaker Troubleshooting

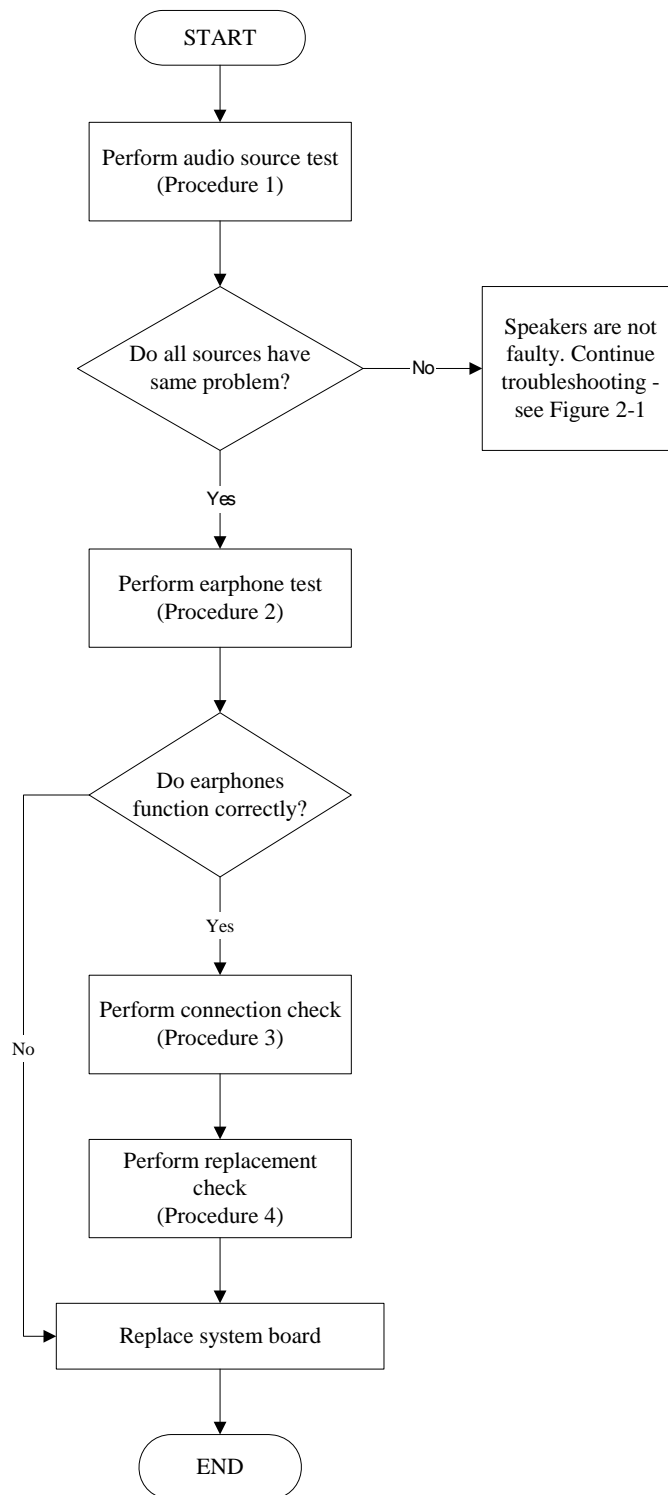


Figure 2-8 Speaker troubleshooting process



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

Procedure 1: Audio source test

Procedure 2: Earphone test

Procedure 3: Connection check

Procedure 4: Replacement check

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

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

### **Procedure 2 Earphone test**

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

### **Procedure 3 Connection check**

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

### **Procedure 4 Replacement check**

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

## 2.9 Optical Drive Troubleshooting

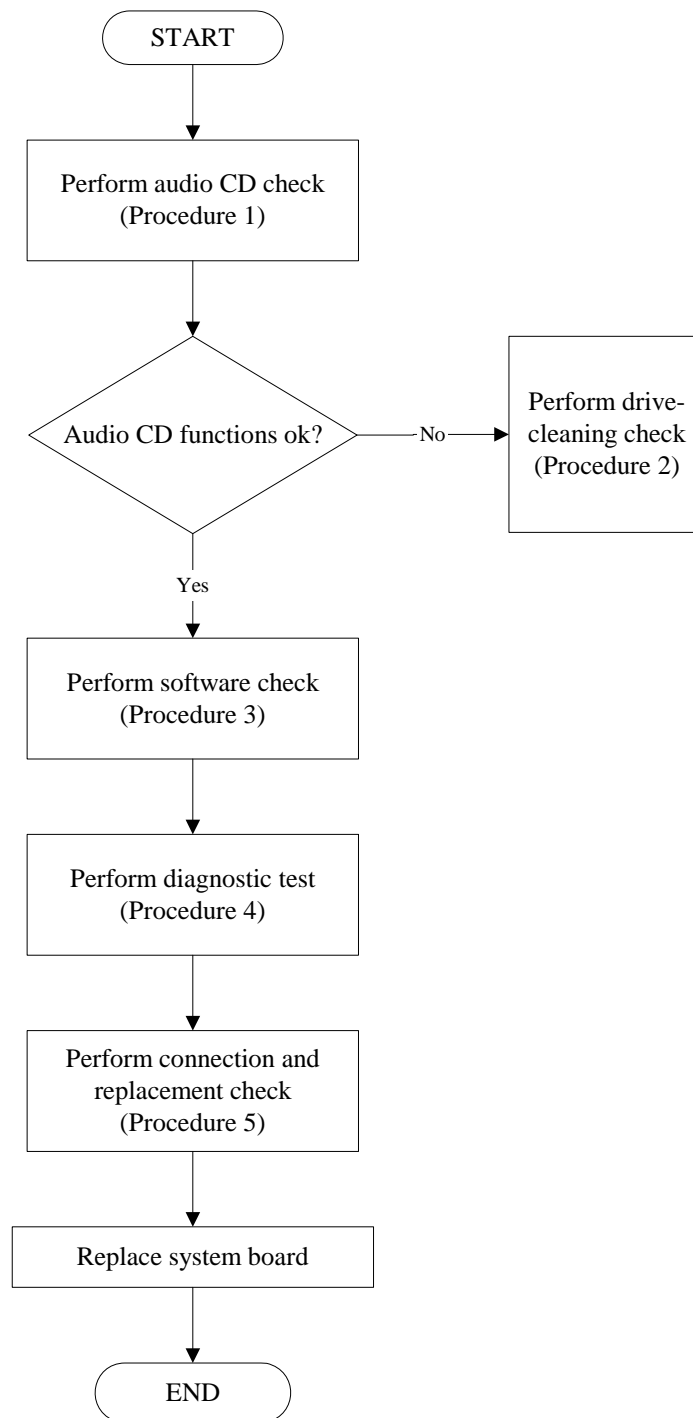


Figure 2-9 Optical drive troubleshooting process

This section describes how to determine if the computer's internal optical drive is functioning properly. The Satellite P200D / P205D Satellite Pro P200D EQUIUM P200D SATEGO P200D Series Maintenance Manual module bays can accommodate the following optical drives:

DVD SuperMulti supporting +-R Double Rayer

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

Procedure 1: Audio CD test

Procedure 2: Drive cleaning check

Procedure 3: Software check

Procedure 4: Connection and replacement check

### **Procedure 1 Audio CD check**

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

### **Procedure 2 Drive cleaning check**

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

### **Procedure 3 Software check**

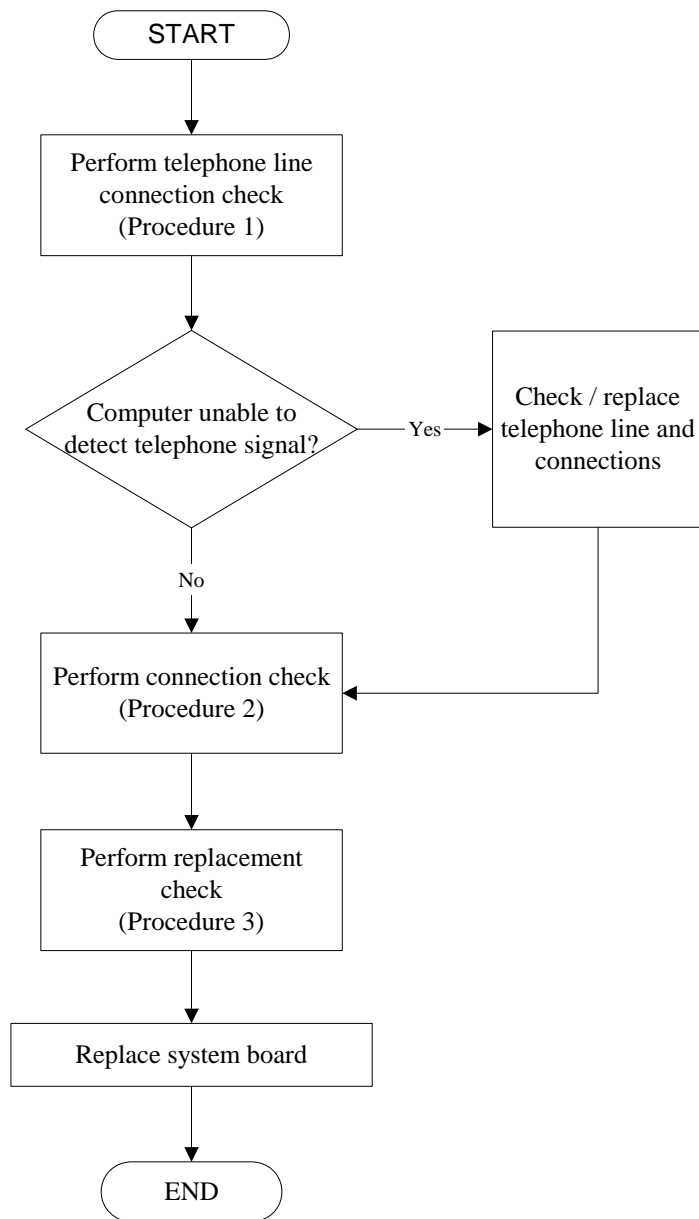
Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

#### **Procedure 4 Connection check and replacement check**

The optical drive connects to the system board. The drive may be disconnected, or the drive or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

- Check 1 Make sure the drive is firmly connected to the system board. If the connection is good and there is still an error, go to Check 2.
- Check 2 The drive or drive cable may be defective or damaged. Replace each with a new one following the steps in Chapter 4, *Replacement Procedures*. If the drive is still not functioning properly, perform Check 3.
- Check 3 The system board may be damaged. Replace it with new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.10 Modem Troubleshooting



*Figure 2-10 Modem troubleshooting process*

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

Procedure 1: Telephone line connection check

Procedure 2: Modem card connection check

Procedure 3: Modem card replacement check

### **Procedure 1 Telephone line connection check**

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

- Check 1 Make sure telephone cable is firmly plugged into both the telephone wall socket and the modem port of the computer. If the cable is connected correctly, go to Check 2.
- Check 2 Make sure the modem port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.
- Check 3 The telephone cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2.

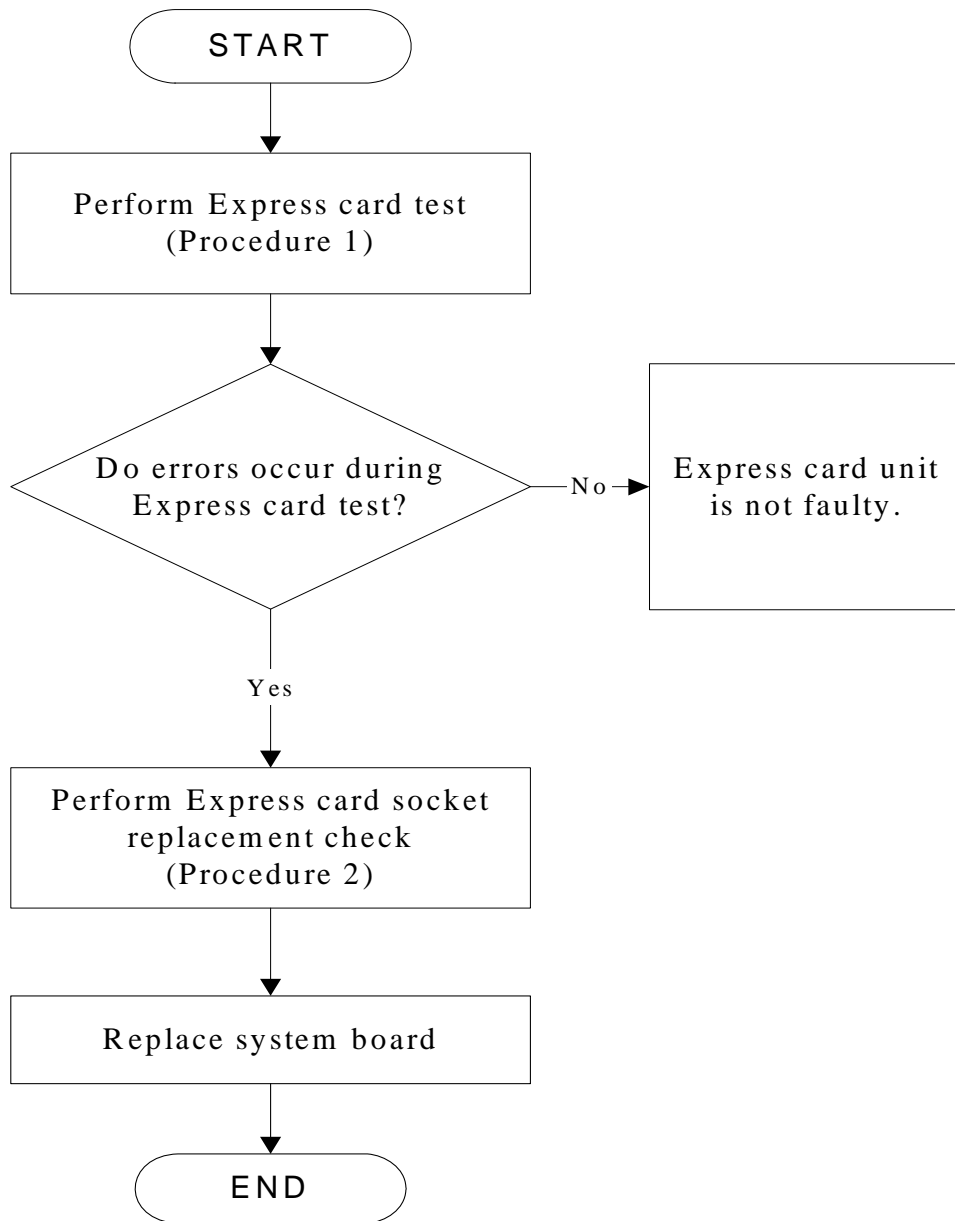
### **Procedure 2 Modem card connection check**

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

### **Procedure 3 Modem replacement check**

The modem card or RJ-11 jack may be faulty. Try replacing them. If the problem persists, the system board may be defective or damaged. Replace the System Board with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.11 Express card Troubleshooting



*Figure 2-11 Express card troubleshooting process*

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

Procedure 1: Express card test

Procedure 2: Express card socket replacement check

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

The Express test card contains a Express test program. Use windows application to check device can work fine or not. If an error occurs. Ensure the card in 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.



## 2.12 IEEE 1394 Troubleshooting

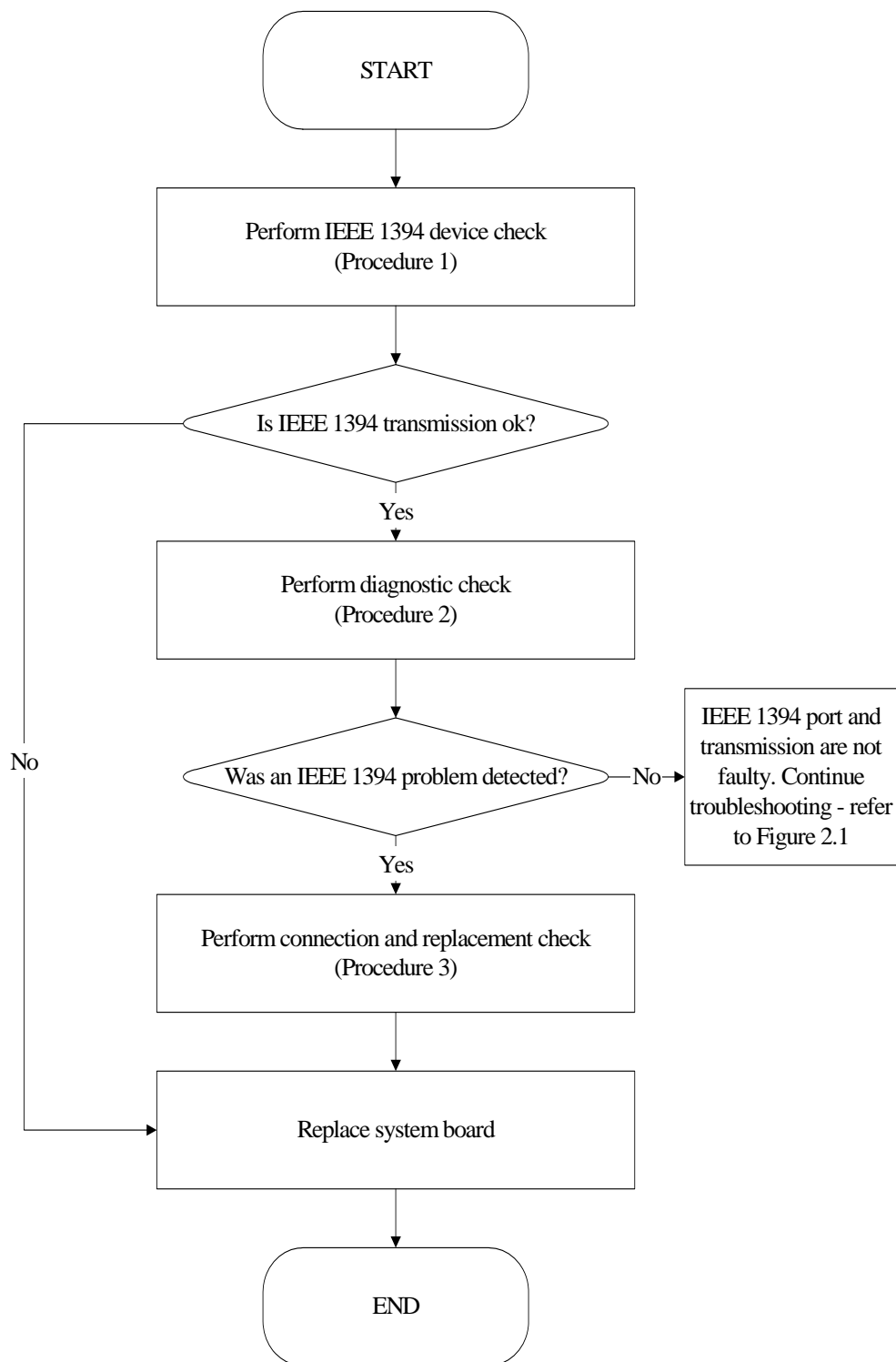


Figure 2-12 IEEE 1394 troubleshooting process

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

Procedure 1: IEEE 1394 device check

Procedure 2: Diagnostic check

Procedure 3: Connection and replacement check

### **Procedure 1 IEEE 1394 device check**

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

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

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

### **Procedure 2 Diagnostic check**

Run the Diagnostic Program, which will automatically execute the IEEE 1394 Device check. Refer to Chapter 3. Tests and Diagnostics for more information. PLS use windows application. If an error is located, go to Procedure 3.

If an error does not occur, the 1394 port is functioning properly.

### **Procedure 3 Connection and replacement check**

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

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

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

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

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

## 2.13 Wireless LAN Troubleshooting

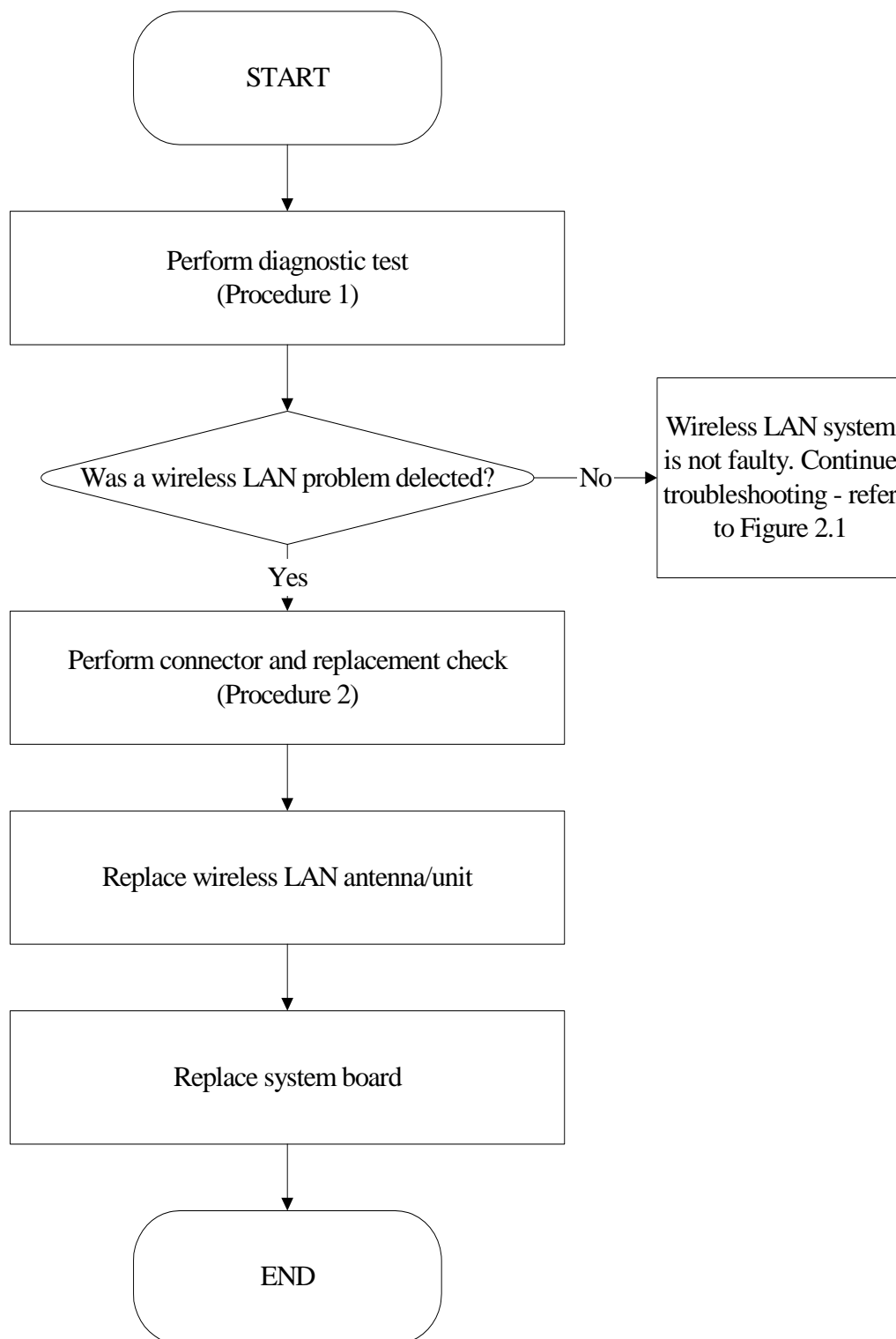


Figure 2-13 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source of a wireless LAN fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

### **Procedure 1 Diagnostic test**

Run the Diagnostic Program, which will automatically execute the wireless LAN device check. Test and Diagnostic for more information 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.

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

## 2.14 Camera Troubleshooting

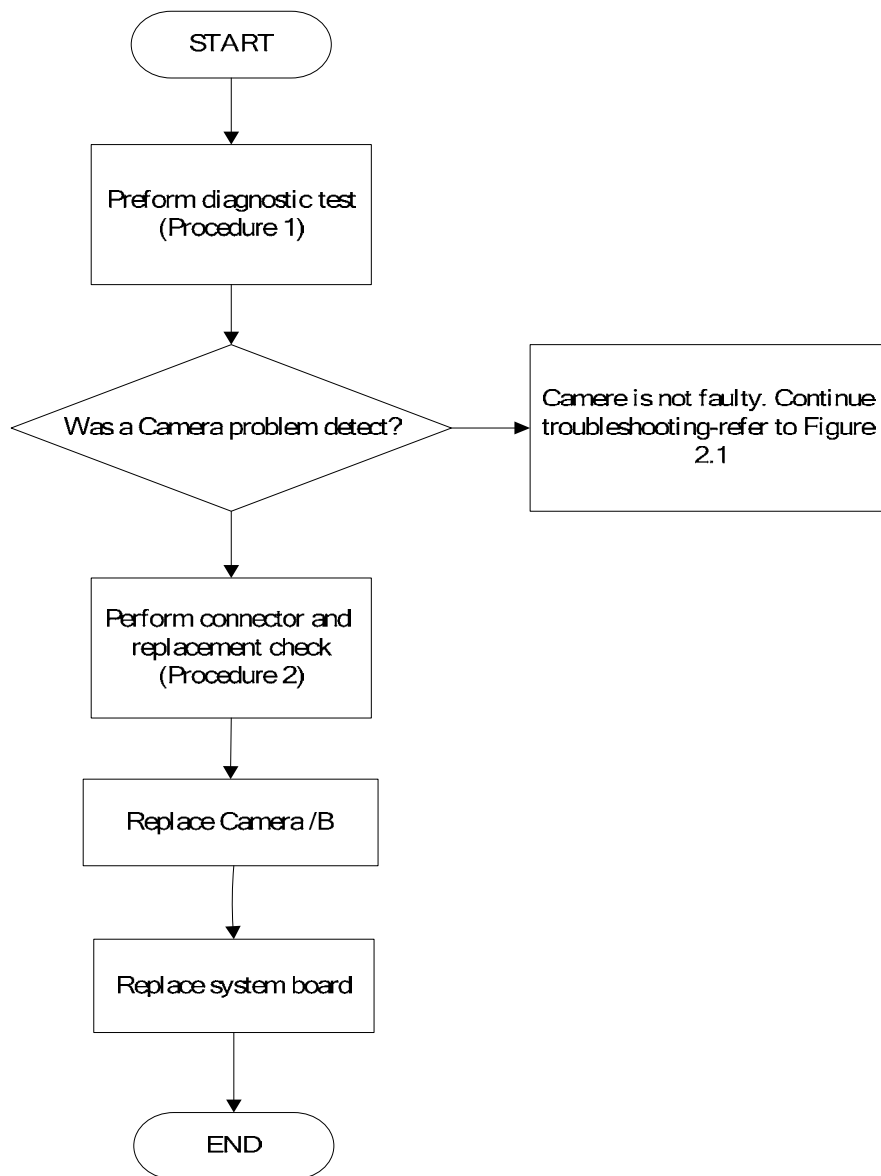


Figure 2-14 Camera troubleshooting process

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

Procedure 1: 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

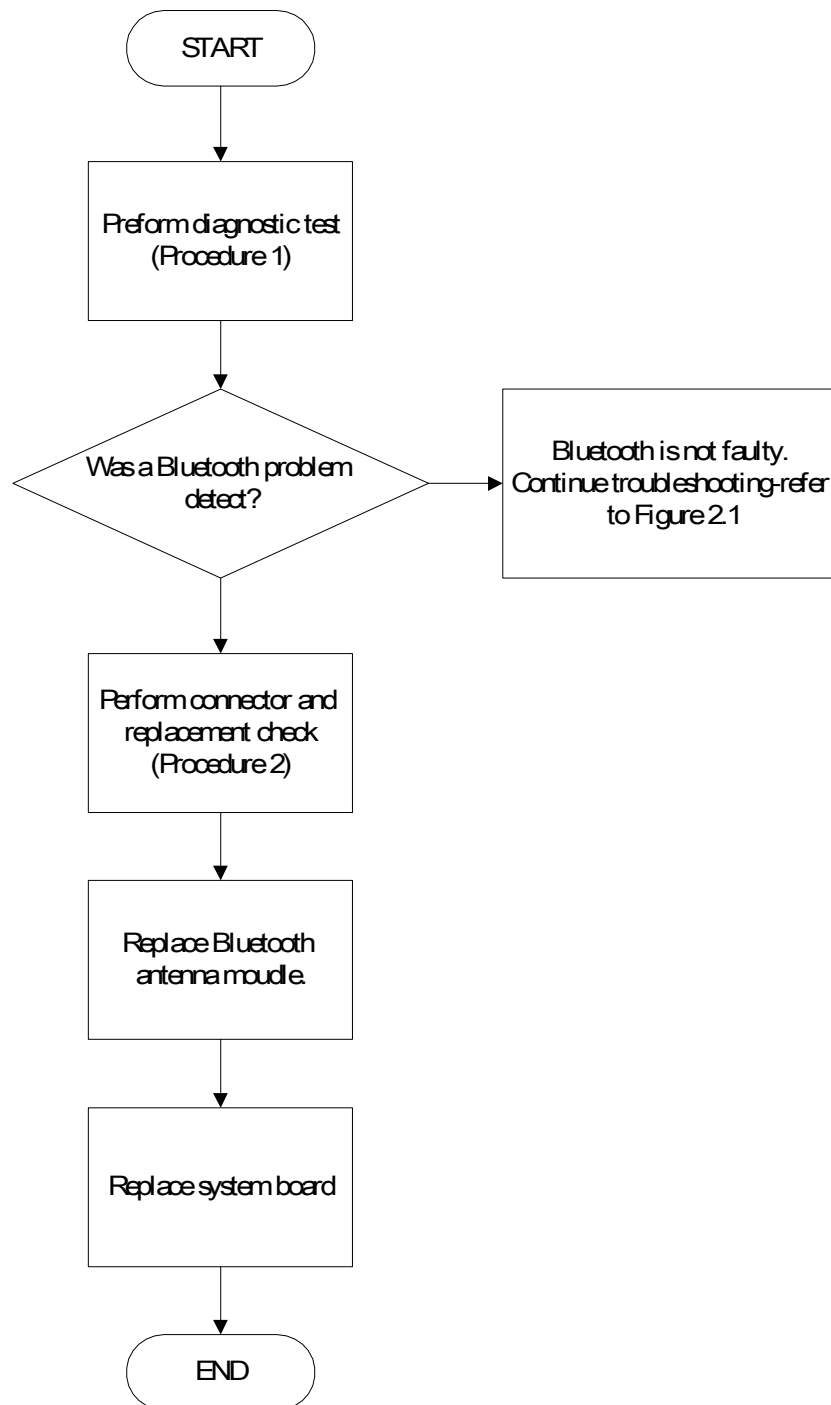


Figure 2-15 Bluetooth troubleshooting process



The Bluetooth antenna wire, Bluetooth module or system board may be the reason of a Bluetooth fault. Any of these components may be damaged. To determine if the computer's Bluetooth is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

### **Procedure 1 Diagnostic test**

Run the Diagnostic Program, which will automatically execute the Bluetooth device check. Refer to Chapter 3. Tests and Diagnostics for more information 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 7in 1 card Troubleshooting

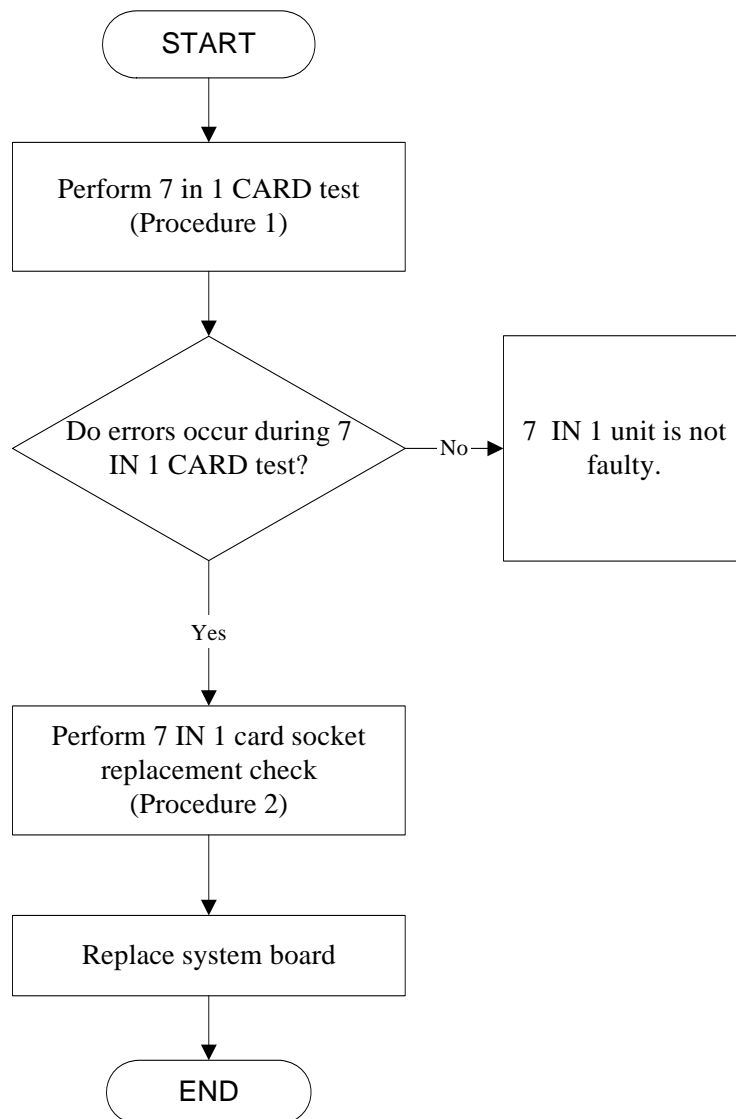


Figure 2-16 7 in 1 card troubleshooting process

This section describes how to determine if the 7 IN 1 Card player is functioning properly. The process is summarized in Figure 2-16. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: 7 in 1 card test

Procedure 2: 7 in1 socket replacement check

### **Procedure 1 7 in 1 card test**

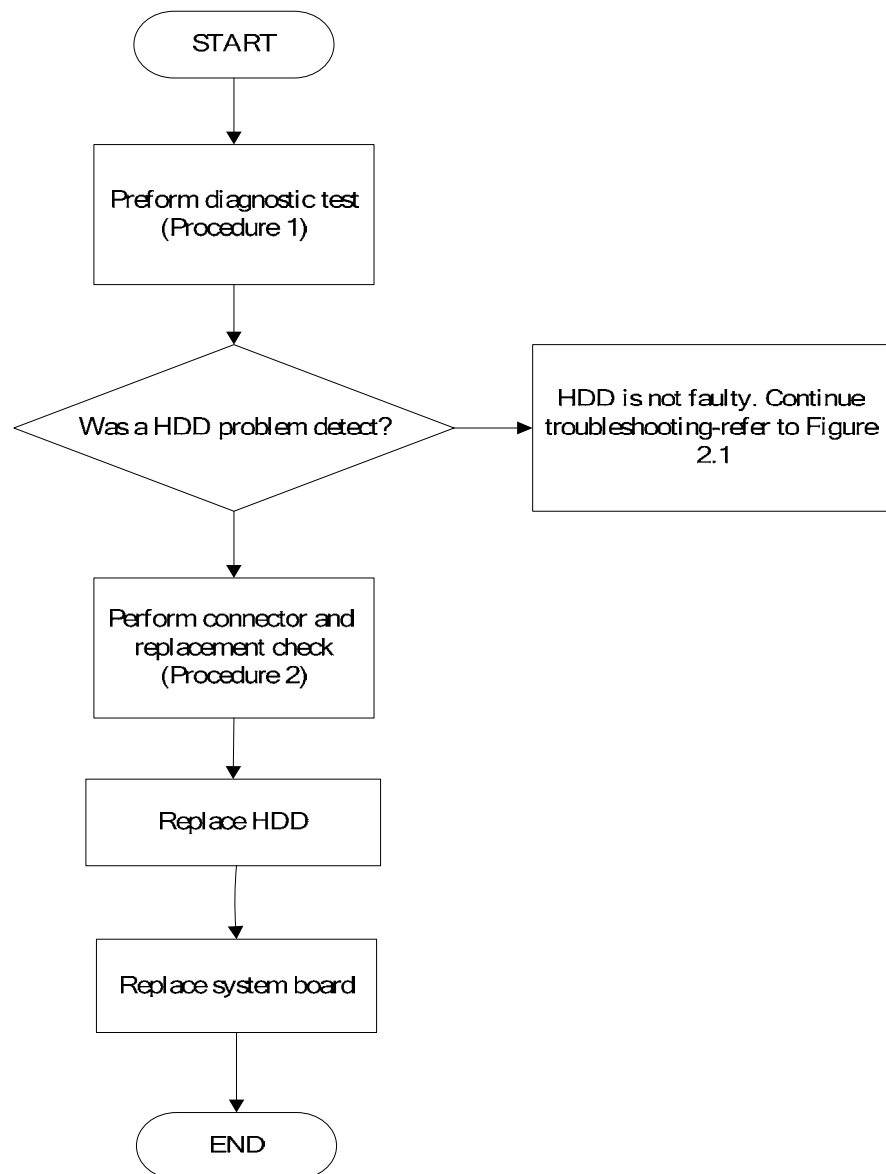
The 7 in 1 Card test PLS Use windows application to check device can work fine or not. Ensure the card in fully inserted into the socket before running the program.

If an error occurs during the 7 in 1 card test, perform Procedure 2. If no error occurs, it is likely that the original 7 in 1 card was faulty.

### **Procedure 2 7 in 1 Card socket replacement check**

The 7 in 1 Card socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

## 2.17 HDD Troubleshooting



*Figure 2-17 HDD troubleshooting process*

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

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

### **Procedure 1 Diagnostic test**

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

If an error is located, go to Procedure 2. If an error is not located, the HDD 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

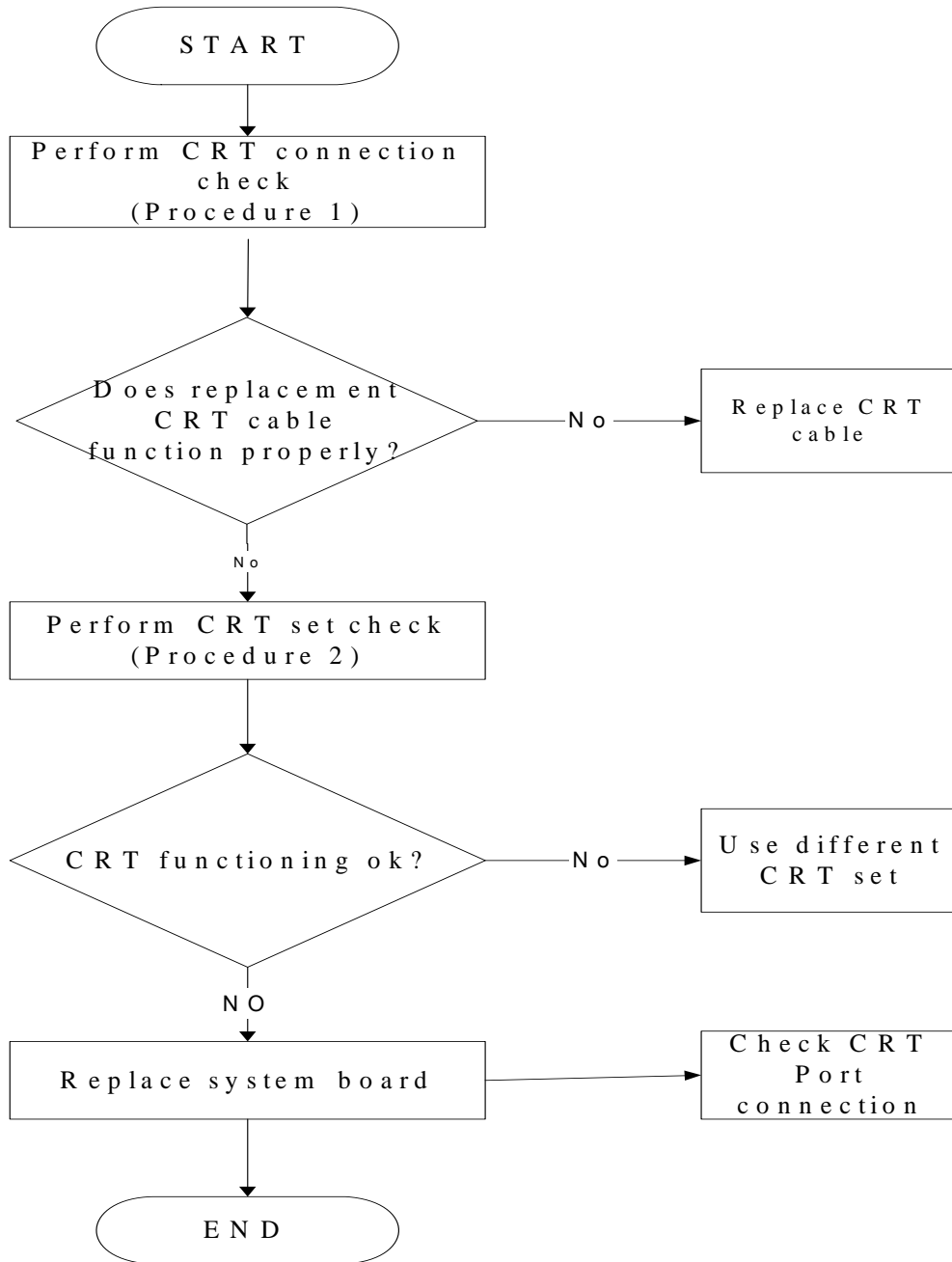


Figure 2-18 HDD troubleshooting process

To determine if the computer's CRT port is functioning properly, perform the following procedures. Figure 2-7 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 Troubleshooting

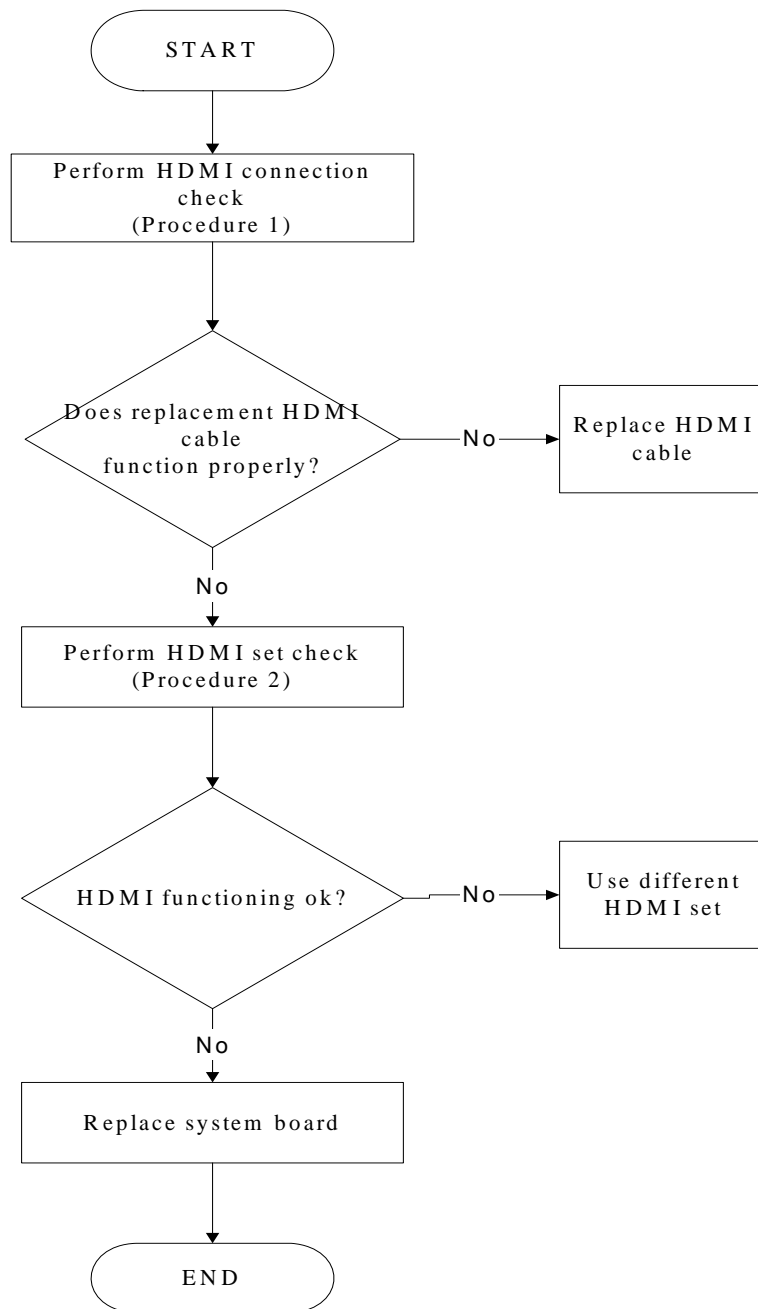


Figure 2-19 HDMI troubleshooting process

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

Procedure 1: HDMI connection check

Procedure 2: HDMI set check

### **Procedure 1 HDMI connection check**

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

- Check 1 Make sure HDMI cable is firmly plugged into both the CRT set and the CRT 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 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 SPDIF troubleshooting

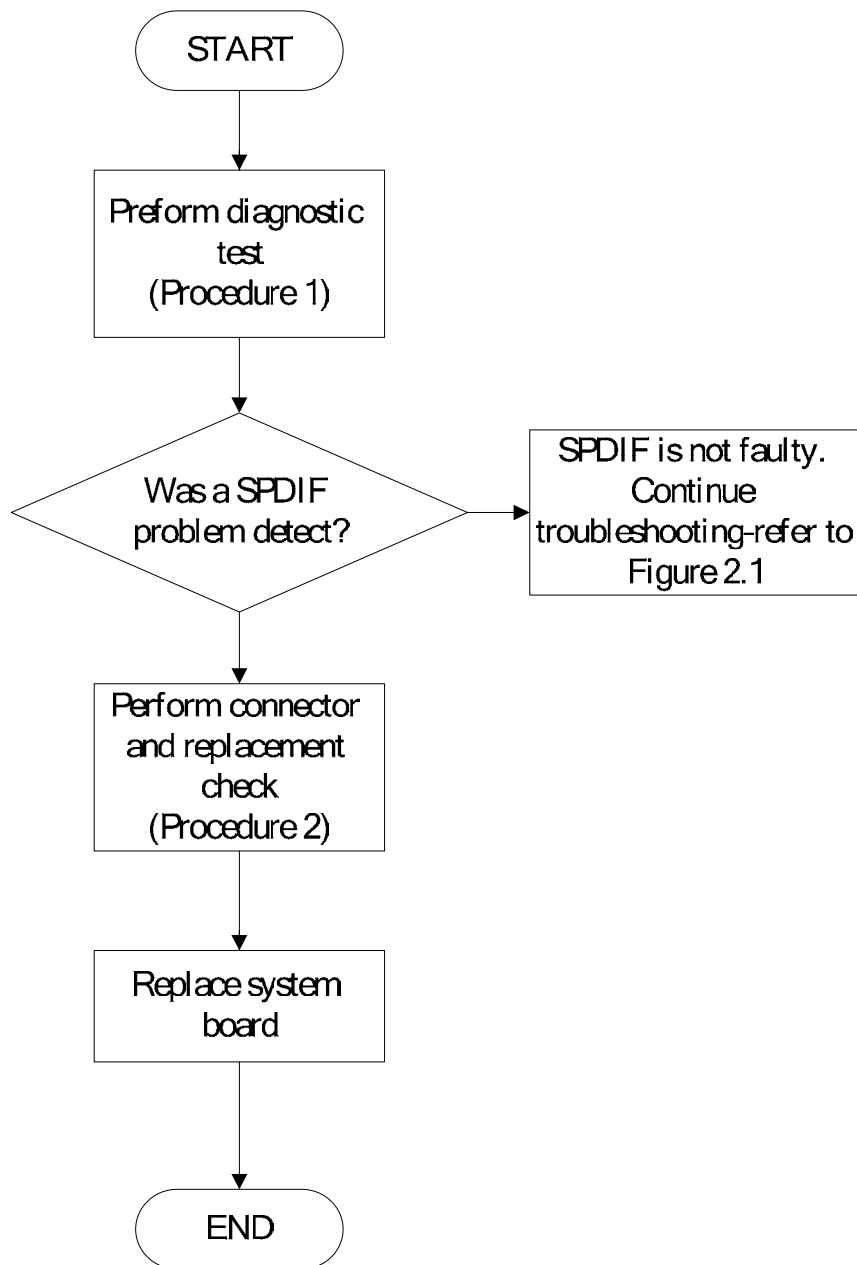


Figure 2-20 SPDIF troubleshooting process

The system board may be the reason of a SPDIF fault. The connector of system board may be damaged. To determine if the computer's SPDIF 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**

Use windows application to check device can work fine or not.

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

**Procedure 2 Connector and replacement check**

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

Check 1 the system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

### 2.21 MIC Troubleshooting

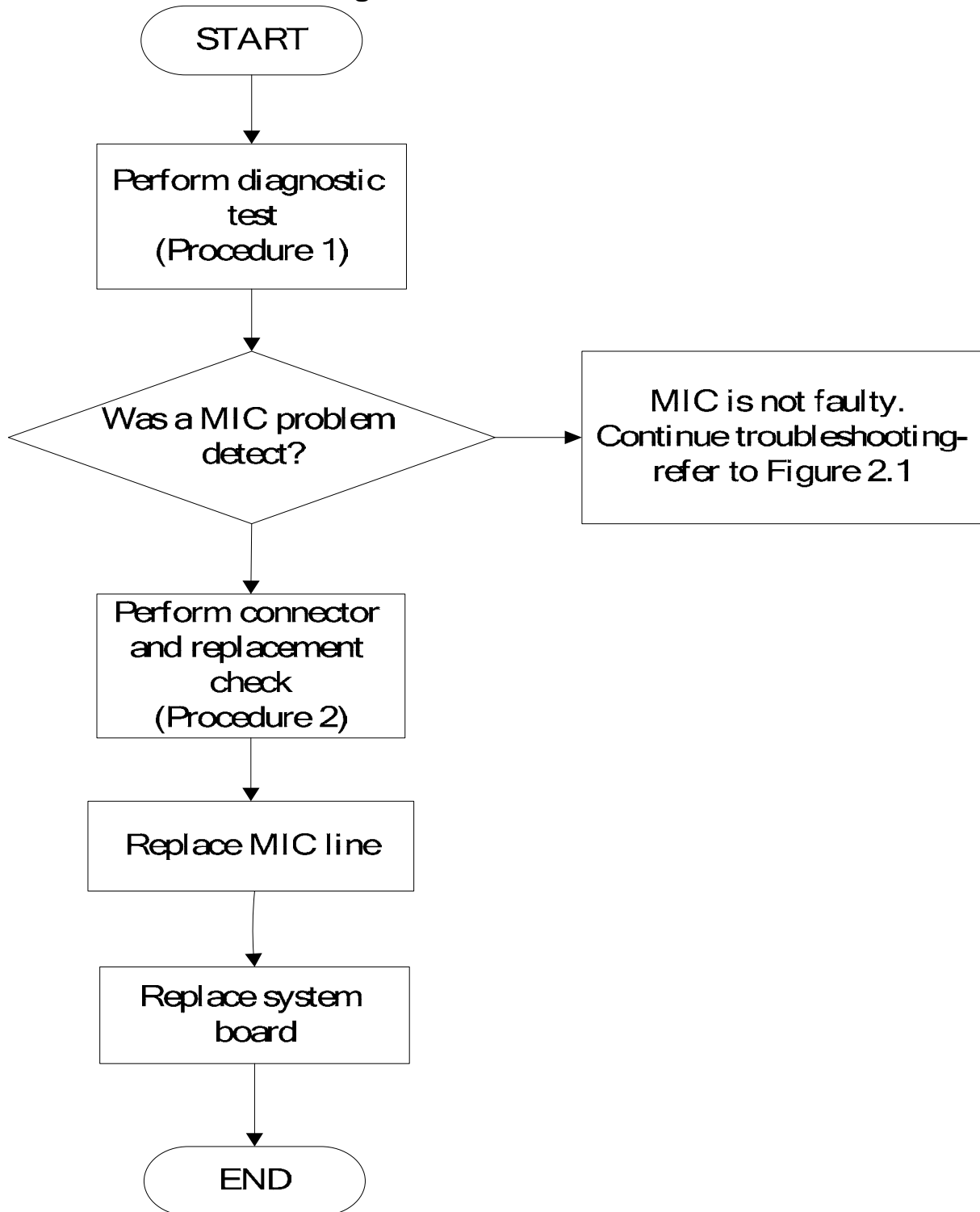


Figure 2.21. MIC troubleshooting process

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 2-14 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**

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

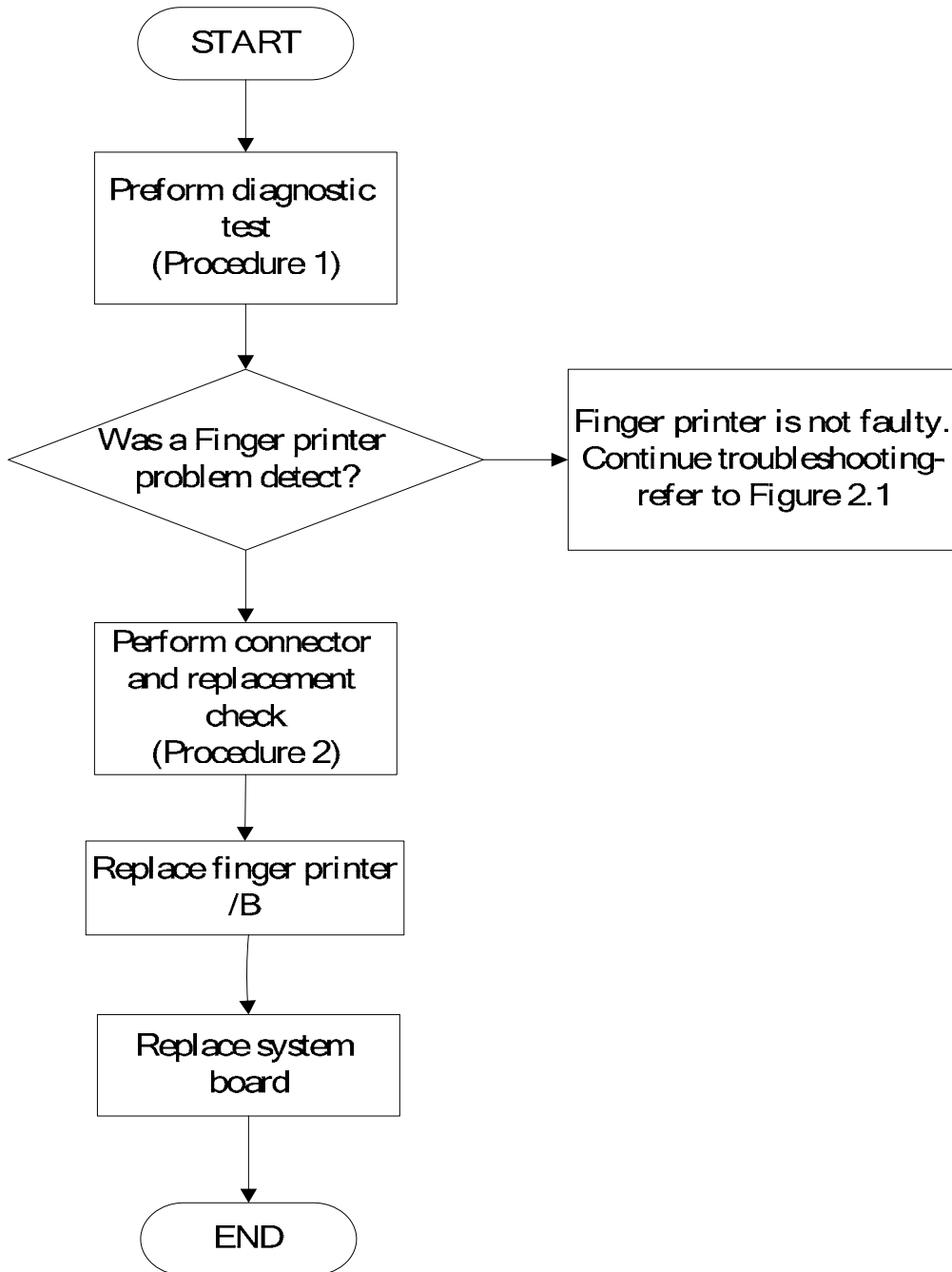
If tests and diagnostics result abnormal go to Procedure 2. If an error is not located, the MIC module functioning is properly.

### **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.

## 2.22 Finger printer troubleshooting



*Figure 2-22 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 2-22 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. If an error is not located, the Finger printer system is functioning properly.

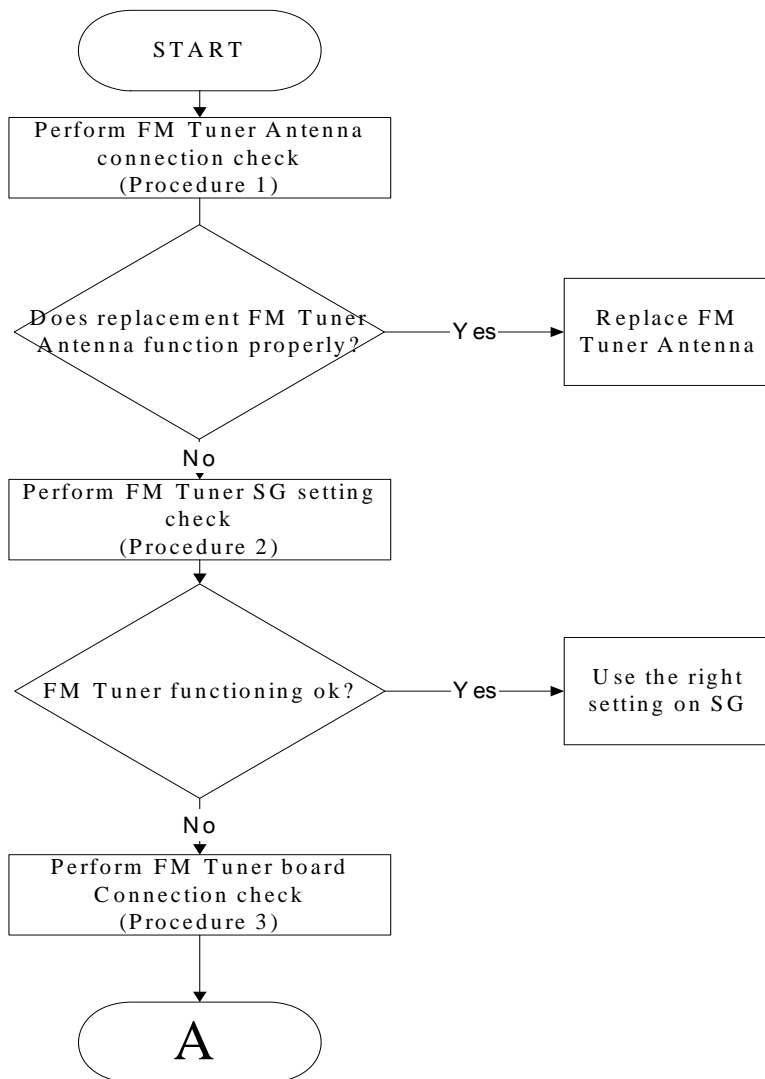
### **Procedure 2 Connector and replacement check**

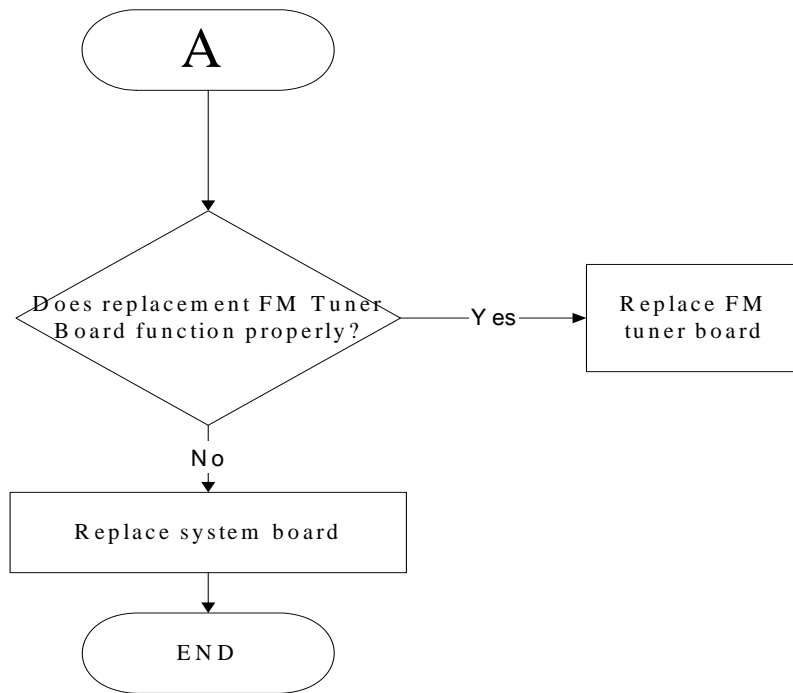
The Finger printer board or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

- 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.



## 2.23 FM tuner Failure Troubleshooting





*Figure 2-23 FM tuner troubleshooting process*

To determine if the computer's FM tuner port is functioning properly, perform the following procedures. Figure 2-23 outlines the process. Start with Procedure 1 and continue as instructed.

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Procedure 1: FM Tuner Antenna connection check

Procedure 2: FM Tuner SG setting check

Procedure 3: FM Tuner board connection check

### **Procedure 1 FM tuner Antenna connection check**

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

Check 1 Make sure FM Tuner Antenna is firmly plugged into FM Tuner port of the computer. If the Antenna is connected correctly, go to Check 2.

Check 2 Try connecting a different FM Tuner Antenna to the computer. If the replacement FM Tuner Antenna works, the original set may be damaged. If the replacement set does not work the FM Tuner SG setting may be incorrect, Go to Procedure 2

### **Procedure 2 FM Tuner SG setting check**

The FM Tuner SG setting may be faulty. Perform Check 1:

Check 1 Check the FM Tuner SG setting was right or wrong, if right; go to check 2, if wrong. Correct it and re-test. If fail symptom still exist, go to check 2.

Check 2 Try connecting a different FM tuner SG to the computer. If the replacement FM tuner SG works, the original set may be damaged. If the replacement set does not work the FM Tuner board may be damaged. Go to Procedure 3.

### **Procedure 3 FM Tuner board connection check**

The FM Tuner board may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure FM Tuner board FFC is firmly plugged into the system board. If the FFC is connected correctly, go to Check 2.

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

## 2.24 E-SATA Troubleshooting

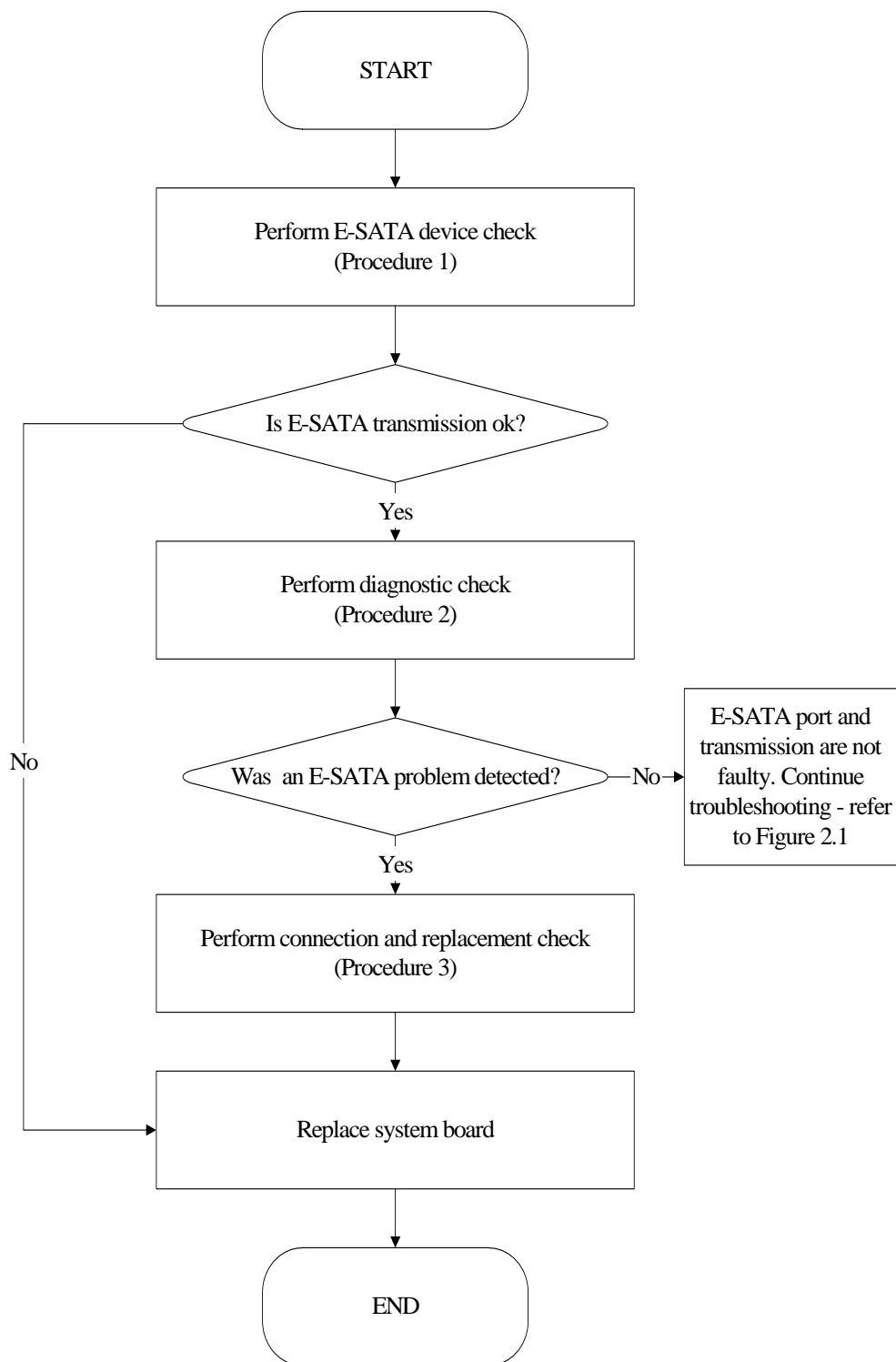


Figure 2-24 E-SATA troubleshooting process

To determine if the computer's E-SATA system 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: 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, then boot the computer for Windows Vista. 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 Diagnostic Program, which will automatically execute the E-SATA port test for transmission, Tests and Diagnostics for more information on how to run the program.

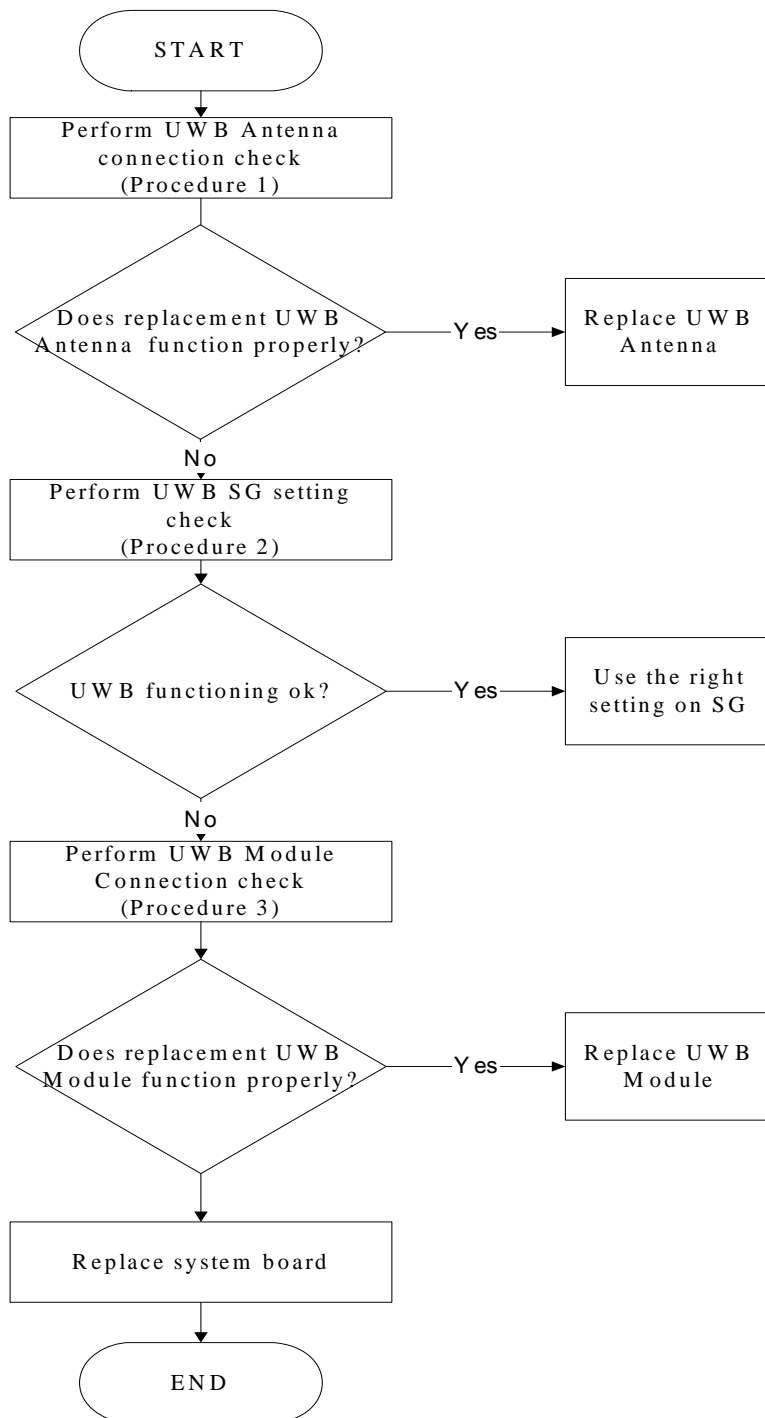
If an error is located, go to Procedure 3. If an error does not occur, the E-SATA port is functioning properly.

### **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.

## 2.25 UWB Troubleshooting



*Figure 2-27 UWB troubleshooting process*

To determine if the computer's UWB is functioning properly, perform the following procedures. Figure 2-27 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: UWB Antenna connection check

Procedure 2: UWB SG setting check

Procedure 3: UWB Module connection check

### **Procedure 1 UWB Antenna connection check**

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

Check 1 Make sure UWB Antenna is firmly plugged into UWB module of the computer. If the antenna is connected correctly, go to Check 2.

Check 2 Try connecting a different UWB Antenna to the computer. If the replacement UWB Antenna works, the original Antenna may be damaged. If the replacement Antenna does not work the UWB SG setting may be wrong. Go to Procedure 2.

### **Procedure 2 UWB SG setting check**

The UWB SG setting may be faulty. Perform Check 1:

Check 1 Check the UWB SG Setting was right or wrong, if right; go to check 2, if wrong. Correct it and re-test. If fail symptom still exist, go to check2

Check 2 Try connecting a different UWB SG to the computer. If the replacement UWB SG works, the original SG may be damaged. If the replacement set does not work the UWB module may be damaged. Go to Procedure 3.

### **Procedure 3 UWB Module connection check**

The UWB Module connect may be faulty. Perform Check 1:

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

Check 2 Try connecting a different UWB Module to the computer. If the replacement UWB 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.



## 2.26 Display port Troubleshooting

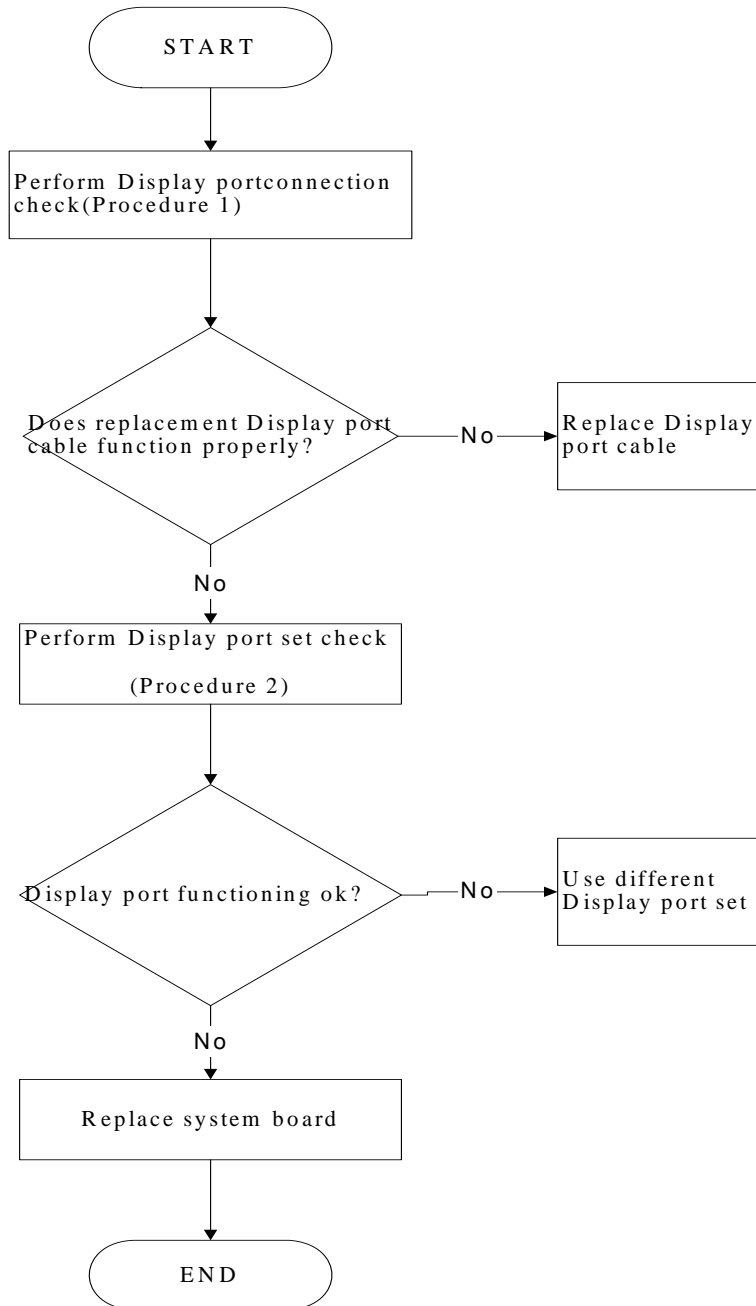


Figure 2-19 Display port troubleshooting process

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

Procedure 1: Display port connection check

Procedure 2: Display port set check

### **Procedure 1 Display port connection check**

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

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

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

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

### **Procedure 2 Display port set check**

The TV set may be faulty. Perform Check 1:

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

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

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# **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 Predator 10X version 1.0)** hardware modules. The Test & Diagnostic Program is stored on the T&D diskettes. The program consists of a series of tests that run automatically when the Diagnostics Program items are selected and executed.

**NOTES:** *To start the diagnostics, follow these steps*

1. *Check all cables for loose connections.*
2. *Exit this program when you are at Main Menu.*

The TEST & DIAGNOSTIC PROGRAM contains the following functional tests:

- CONFIG CHECK TEST
- BEEP SOUND TEST
- FAN ON/OFF TEST
- MAIN BATTERY CHARGE TEST
- FDD TEST
- Computrace TEST
- KEYBOARD TEST
- MOUSE(PAD) TEST
- LCD PIXELS MODE TEST
- MAGNETIC SWITCH TEST
- HDD R/W TEST
- LAN TEST
- RTC TEST
- IEEE1394 CODE TEST
- Speaker EQ Check&Rewrite
- Button Test
- HDCP Key Check
- Memory test
- 1<sup>st</sup> HDD Test
- 2<sup>nd</sup> HDD Test
- RDMI Test
- WDMI Test
- Memory R/W test

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

- The diagnostics diskette (3pcs)
- A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- A data CD disc (ODD Test)
- A LAN loopback

### 3.2 Executing the Diagnostic Test

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

1. Insert the diagnostics diskette #1 in the floppy disk drive and turn on the computer. (The diagnostics diskette contains the DOS boot files.) And then follow the instructions to swap with the diagnostics diskette #2 for T&D program installed in RAM driver. Diskette 3 was for memory read and write. PLS follow instructions to swap with the diagnostics diskette #3 for memory read and write.

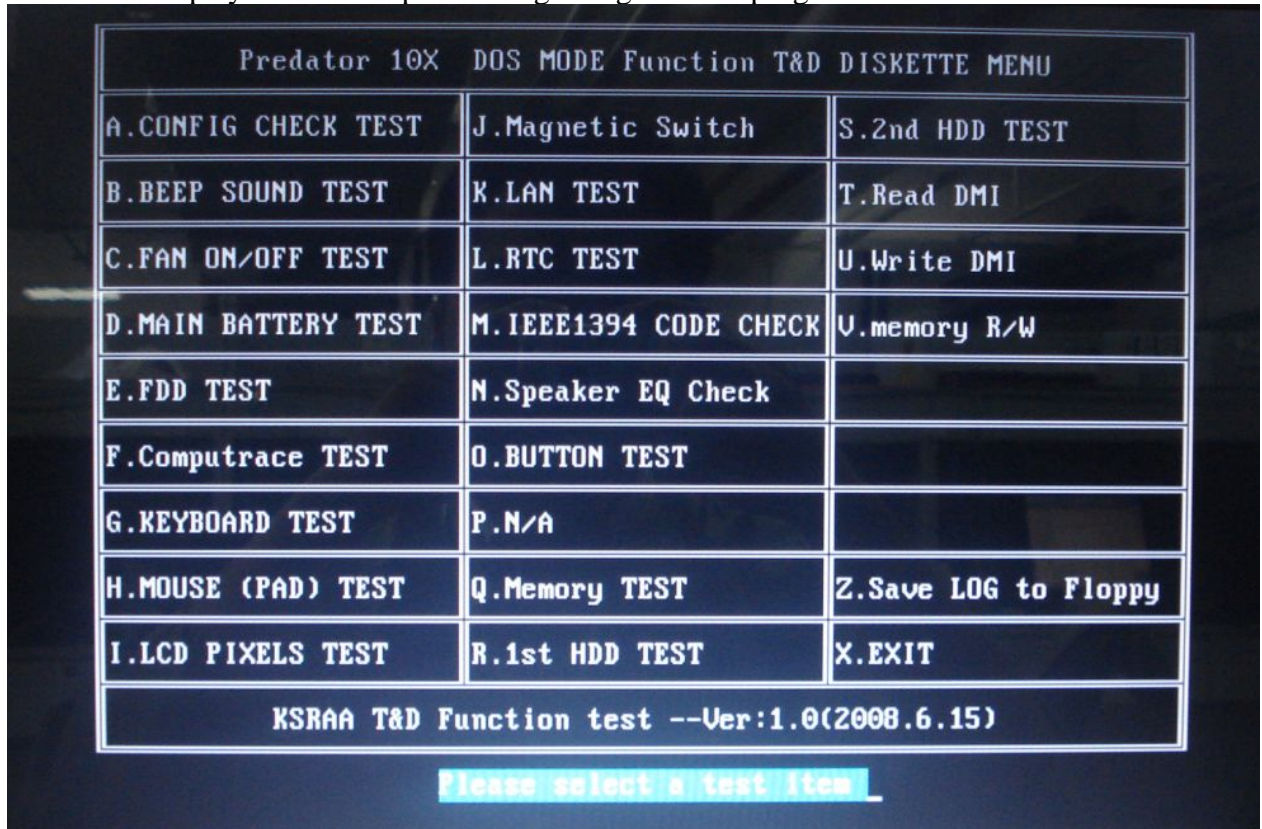
**NOTE:** To execute the CD test, make sure the CD is installed in the ODD drive.

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 diskette as reference at the end of test(s).

The test list is as the following:

- A. CONFIG CHECK TEST
- B. BEEP SOUND TEST
- C. FAN ON/OFF TEST
- D. MAIN BATTERY TEST
- E. FDD TEST
- F. Computrace TEST
- G. KEYBOARD TEST
- H. MOUSE (PAD) TEST
- I. LCD PIXELS MODE TEST
- J. MAGNETIC TEST
- K. LAN TEST
- L. RTC TEST
- M. IEEE1394 CODE TEST
- N. SPEAKER EQ CHECK TEST
- O. Button Test
- Q. Memory test
- R. 1st HDD Test
- S. 2nd HDD Test
- T. RDMI Test
- U. WDMI Test
- V. Memory R/W

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



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



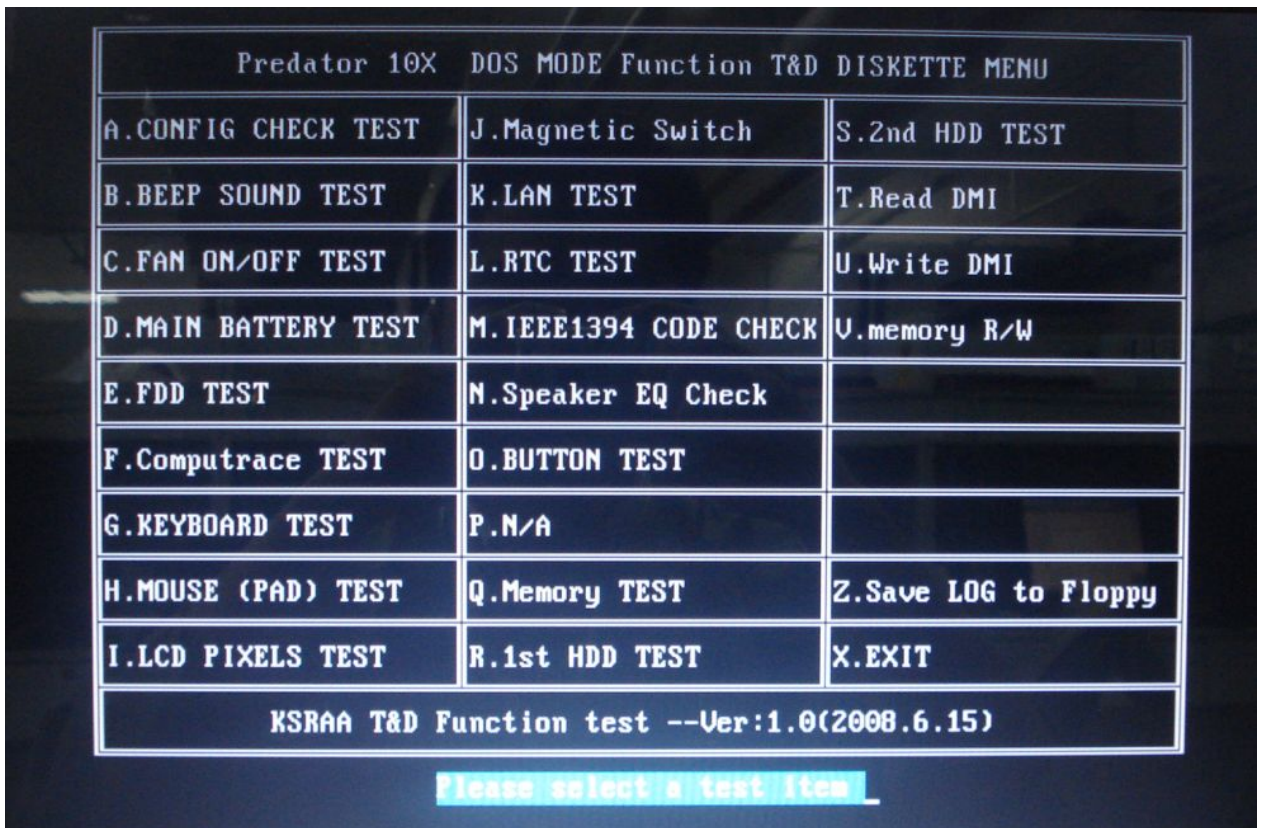




If an error is detected and a test fails, the following message displays:



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



### 3. Tests and Diagnostics

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It will skip this process if “N” key pressed.

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

Predator 10X DOS MODE Function T&D DISKETTE MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.2nd HDD TEST
B.BEEP SOUND TEST	K.LAN TEST	T.Read DMI
C.FAN ON/OFF TEST	L.RTC TEST	U.Write DMI
D.MAIN BATTERY TEST	M.IEEE1394 CODE CHECK	U.memory R/W
E.FDD TEST	N.Speaker EQ Check	
F.Computrace TEST	O.BUTTON TEST	
G.KEYBOARD TEST	P.N/A	
H.MOUSE (PAD) TEST	Q.Memory TEST	Z.Save LOG to Floppy
I.LCD PIXELS TEST	R.1st HDD TEST	X.EXIT
KSRAA T&D Function test --Ver:1.0(2008.6.15)		
Please select a test item_		

### 3.3 Display Configuration

This Item will show the unit configuration. It includes:

- ◆ CPU (CPU type; Cache ; CPU speed ;CPU FSB)
- ◆ DDRAM SIZE
- ◆ Panel ID
- ◆ HDD1 type & capacity (Vendor ID. Model .Firmware)
- ◆ HDD2 type & capacity (Vendor ID. Model .Firmware)
- ◆ VRAM size / VGA CHIP TYPE
- ◆ Battery cell (6cell;9cell;12cell)
- ◆ Wireless type
- ◆ LAN Type
- ◆ 1394
- ◆ Bluetooth
- ◆ SKUID
- ◆ Robson

The screen should display as below:



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

Press any key to continue . . .
```

### 3.5 Fan ON/OFF Test

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

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

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

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

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

```
**** Fan 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]?
```

### 3.6 Main Battery Charge Test

**NOTE:** The AC adaptor (120W, 19V) should be connected to successfully run this test.

This test shows and measures the main battery:

- ◆ Battery type (Lion)
  - ◆ Manufacturer (Sanyo/Panasonic/Sony)
  - ◆ Remain charge capacity (0 ~ 100%)
  - ◆ Charge function (PASS/FAIL)
- “Battery Is Full” showed when “remain charge capacities” is 100%

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



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

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

Charge Test-> [ PASS ]

Press any key to continue . . .
```

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

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

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

Charge Test-> [ FAIL ]

Press any key to continue . . .
```

### 3.7 FDD Test

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

The Floppy Disk Test includes three subtests of the:

1. Sequential seek/verify function (Range: Track 0 ~ 79)
2. Funnel code seek/verify function (Range: Track 0 ~ 79)
3. Write/Read/Compare pattern function (Range: Track 75 ~ 79)

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

The subtests run automatically.

**NOTE:** Press “Esc” key can skip the current subtest.

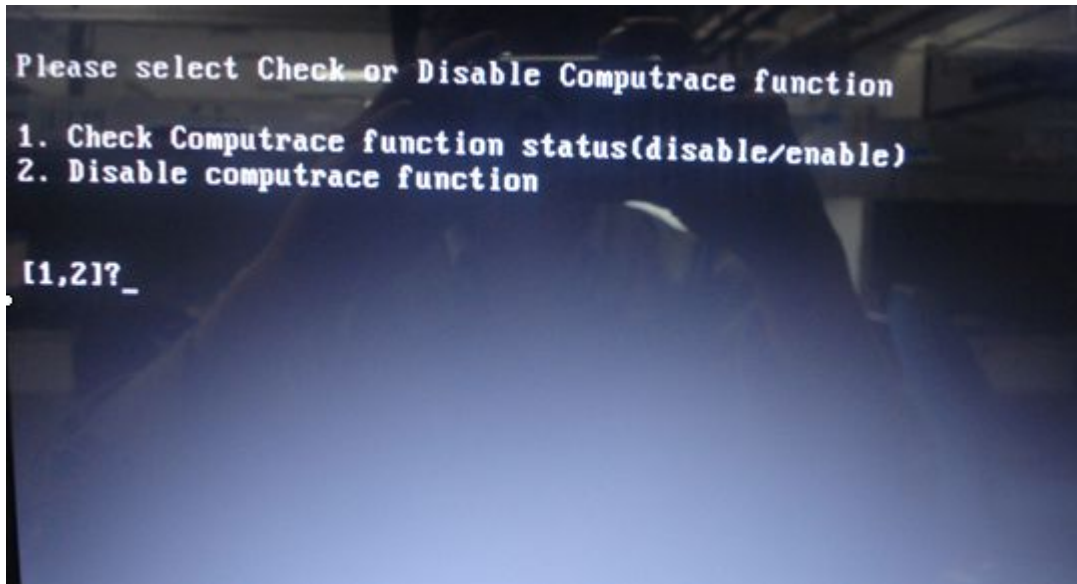
The screen should display as below, indicating whether the subtests pass or fail when finished.

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

### 3.8 Cumptrace Test

The computrace check will check your PC’s computrace function was disable or enable. And can disable computrace function.

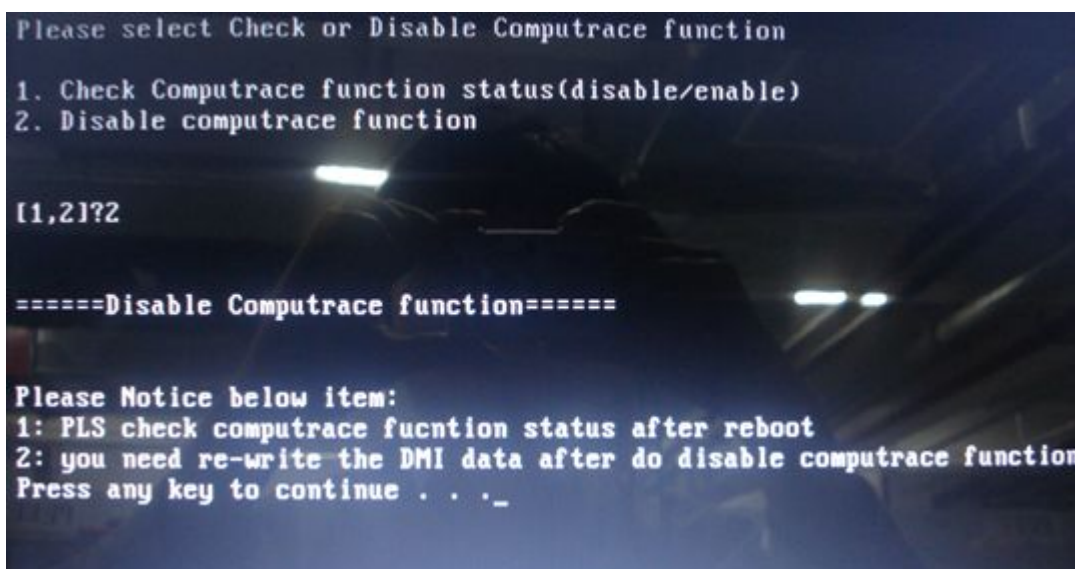




item1. The computrace check will check computrace function status was enable or disable. As below picture show.

item2. disable computrace function. As below picture show:

**NOTE:** 1. disable computrace function need reboot 1 times  
2. need re-write DMI Data after disable computrace function.



### 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.

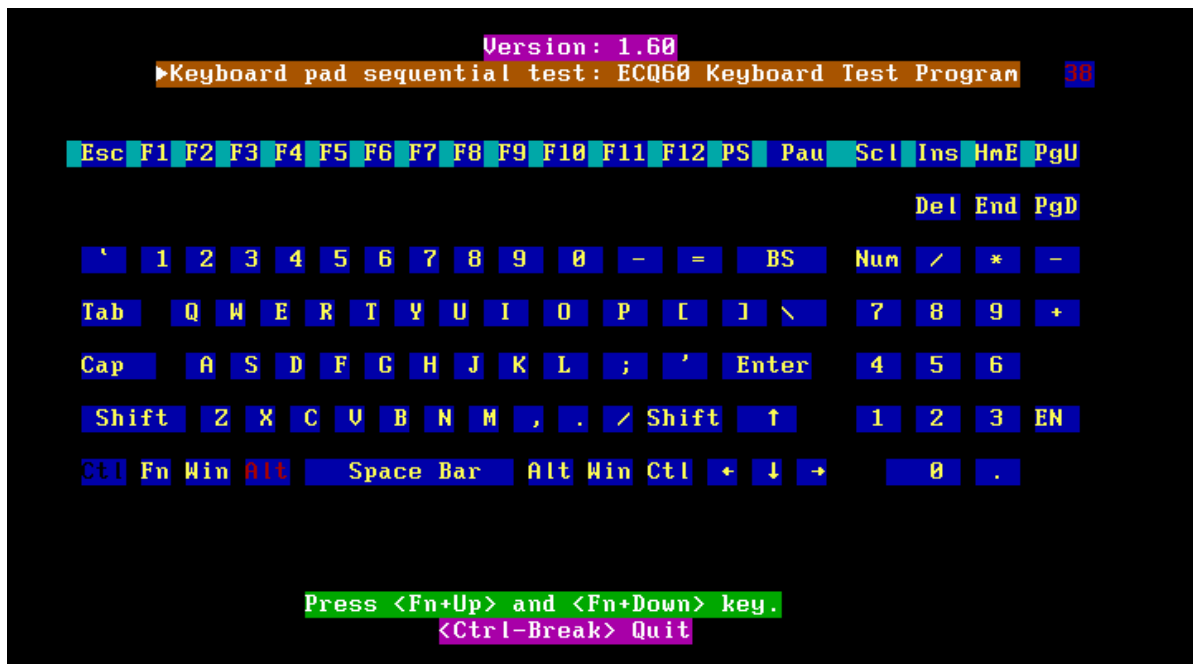
Before keyboard test starts, the keyboard matrix code should be chosen as below display:

1. **S** (US, for America)
2. **J** (Japan, for Japan)
3. **K**(German, for Europe)

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





**NOTE:** The “Fn” key cannot be tested in the keyboard test. To determine whether the “Fn” key is working correctly, press “Fn+F6 ” or “Fn+F7 ” keys to check if LCD display brightness change gradually.

### 3.10 Mouse (Pad) Test

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

1. Mouse Speed (on a scale from slow to fast)
2. Acceleration (Off, Low, Medium, High)
3. Button Assignments (Left + Right / Right button, either Unassigned or Drag Lock)
4. Swap Buttons (Left /Right)

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

The Touch Pad button subtest allows users to test their Touch Pad buttons. If the buttons are clicked, the cursors should appear in the corresponding box of the button figure that is displayed on the screen as below.



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

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

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

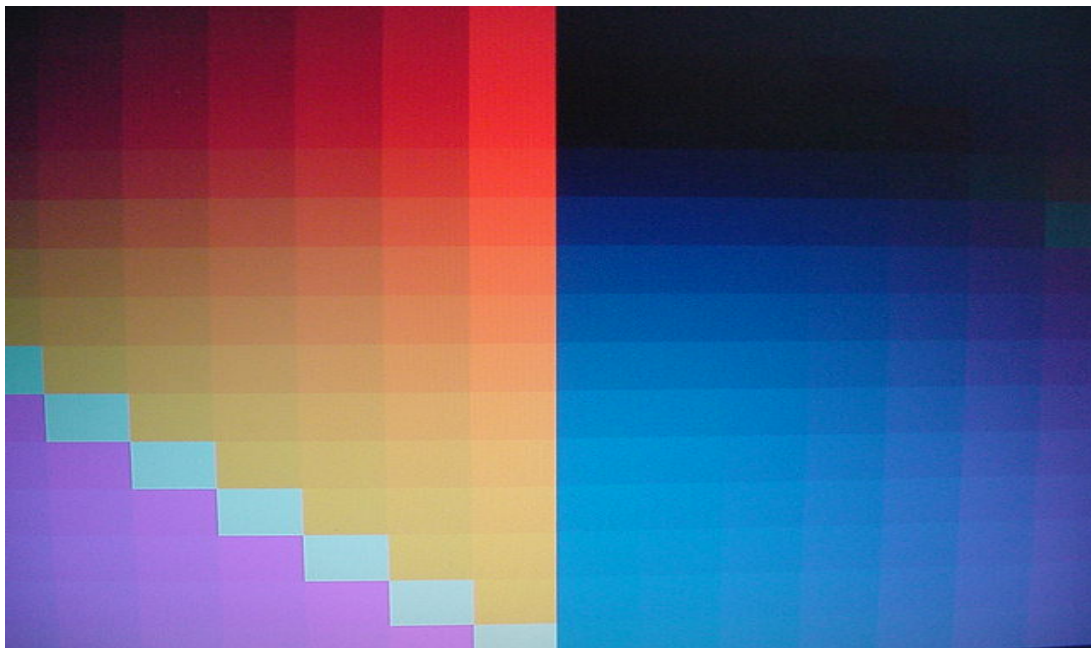
### 3. 11 LCD Pixels Mode Test

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

This test includes two modes of the test:

1. Text Mode
  - including 40\*25 (16 colors) and 80\*25 (2/16colors).
2. VGA Mode
  - including 320\*200 (4/16/256 colors), 640\*200 (2/16 colors), 640\*350 (2/16 colors), 640\*480 (2/16/256 colors), 800\*600 (256 colors) and 1024\*768 (256 colors).

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



### 3.12 Magnetic Switch Test

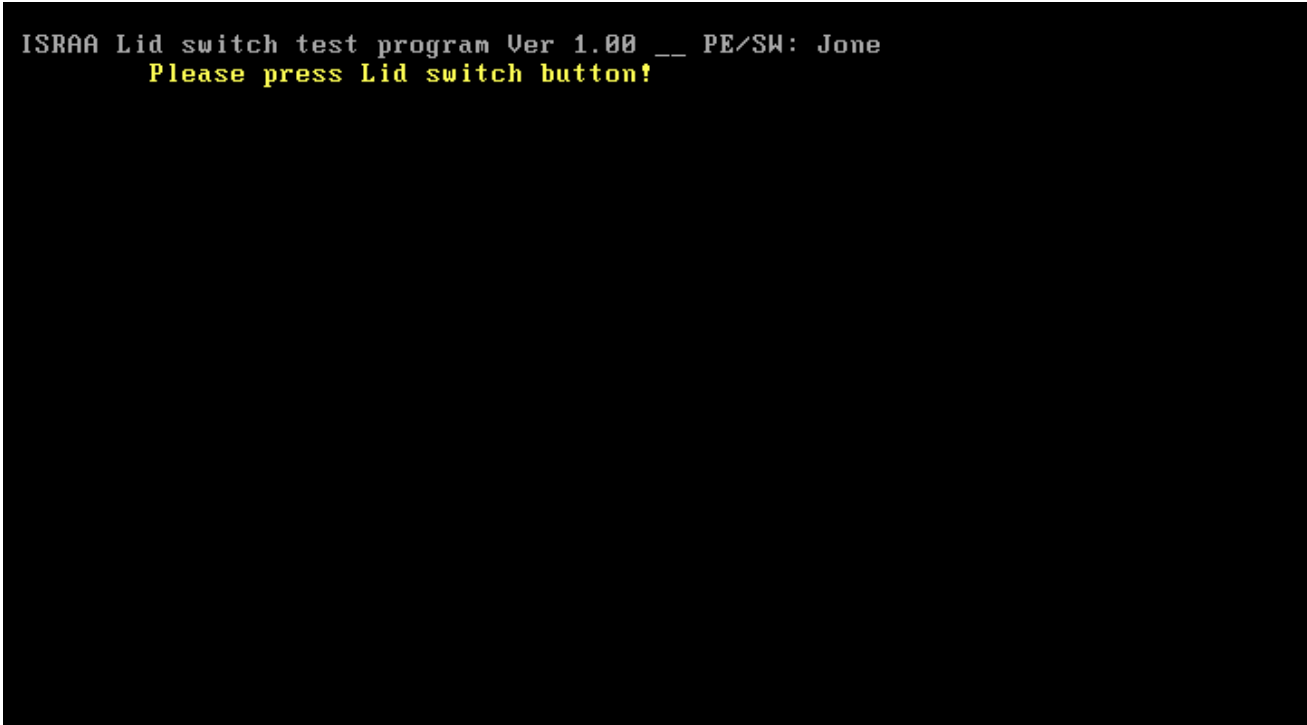
The lid switch test checks the lid function of the unit. When LCD cover closed, the lid should enable to turn off the display.

Follow below steps to run this test:

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

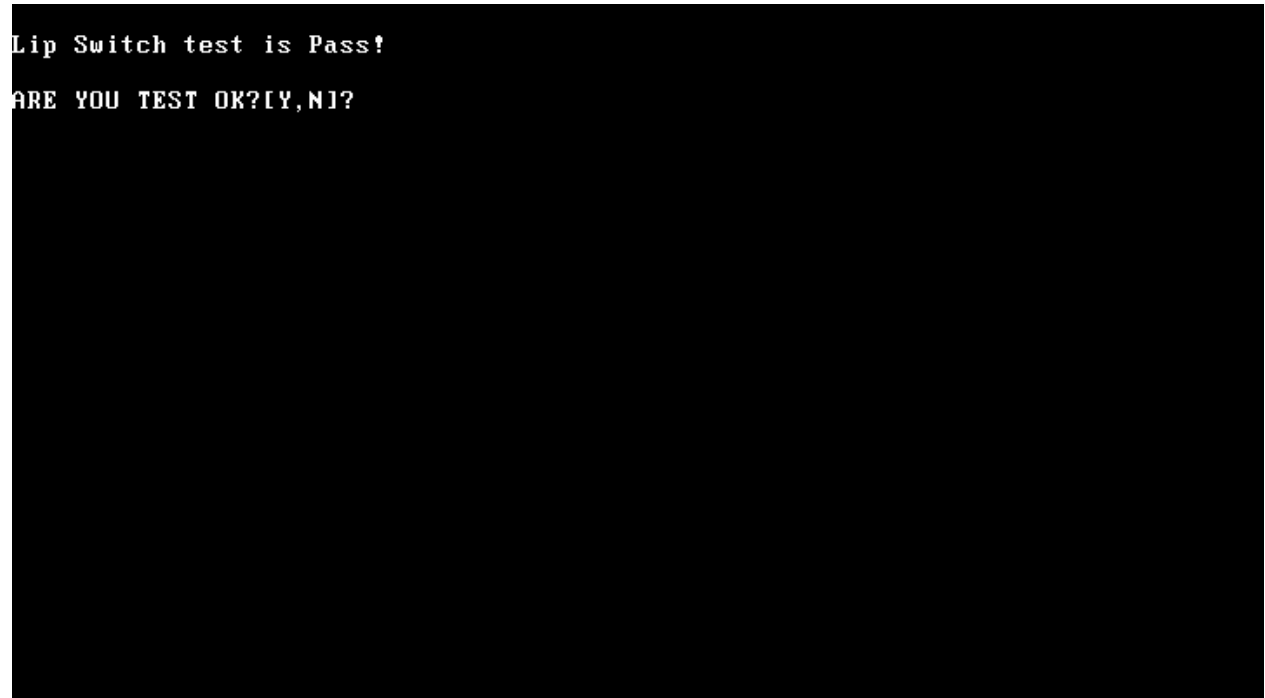
Then it will indicate whether the test is passed or failed.

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



```
ISRAA Lid switch test program Ver 1.00 __ PE/SW: Jone  
Please press Lid switch button!
```

2>. If the Lid switch test pass, it will show below display:



```
Lip 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: 4000H
- ◆ IRQ – BH, it's "IRQ 5".
- ◆ Node – it is "MAC Address".
- ◆ Line Frame – 1514 Bytes.
- ◆ Line Speed – 1000Mbps or 100Mbps or 10 Mbps.
- ◆ Bus ID – it's "E".

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.



```
MP Program for PCI/PCI-E Family LAN Product/Client 1.22 02-01-08 version
IOBASE = 4000H IRQ = 5 H Node:001EEC3637EC 1000M: 10K 100M: 5K 10M: 2K
VID =10ECH DID =8168H SVID =1179H SSID =FF00H Lan Adapters: 1
Now is: 1
Open Your MPLAN.CFG in this machine! 1000M Link OK 100M Link OK 10M Link OK
Test Item Result(Pass/Fail)
1.PG_LAN=false none
2.Reg_R/W=true Pass
3.Speed1000=true Pass Rxtimeout 1
4.Speed100=true Pass ROK= 2000 TOK= 2000
5.Speed10=true Pass Error= 0
6.Debug=true Ttimeout = 50
7.AutoRun=true

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

C:\MPLAN122>
```

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



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

### 3.14 RTC Test

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

The test runs automatically.

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

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

Please Check the result after test.

Press any key to continue . . .

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

Press any key to continue . . .
```

### 3.15 Read 1394 GUID

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

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

The figure below will be displayed:

```
====guid read====  
  
Please check RAM Connector GUID bar code.  
  
R1394 Code Check Program 1.0 PE/SW  
1394code=00023F557640016D  
  
Are you check OK? [Y,N]?
```

### 3.16 Speaker EQ (Equalizer Quality factor) Type Check&Re-Write

This test will check if the computer's EEPROM EQ type is correct.

The EQ Type test includes two subtests of the:

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

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

The figure below will be displayed:

```
Please select read or write EQ
1. Read EQ Type from EEPROM
2. Write EQ Type to EEPROM

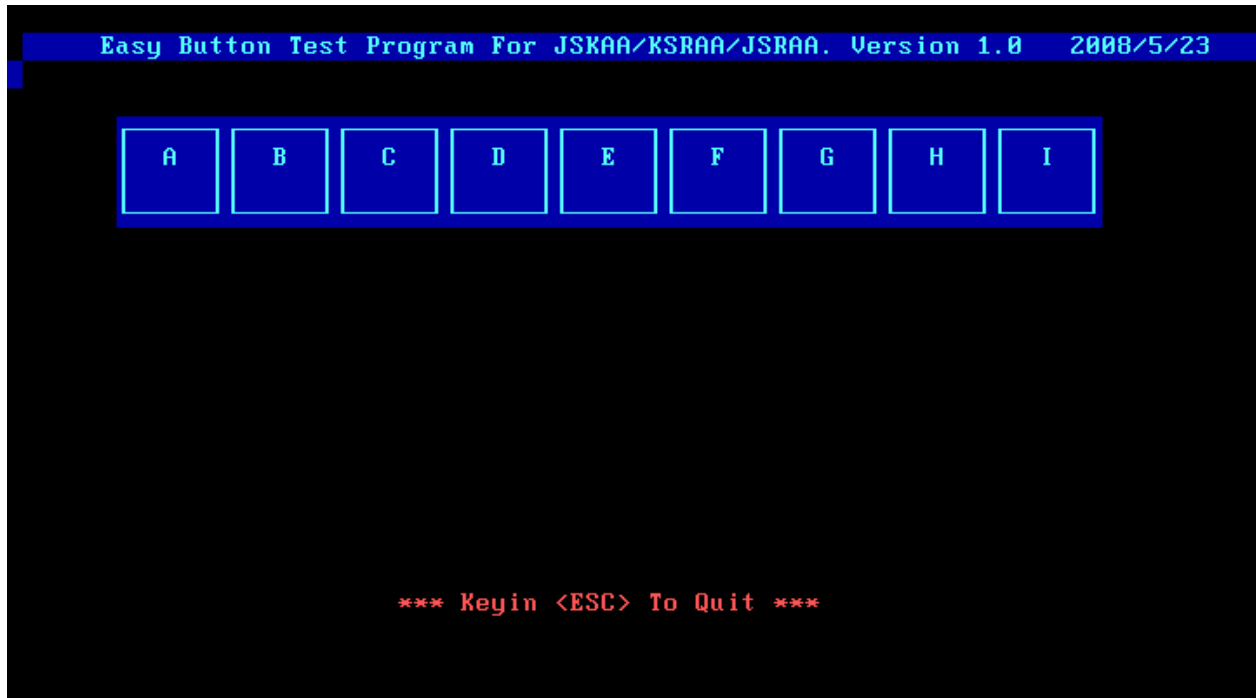
[1,2]?1

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

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

### 3.17 Sensor Button Test

The Sensor button test allows the user to manually test each of Sensor button buttons.



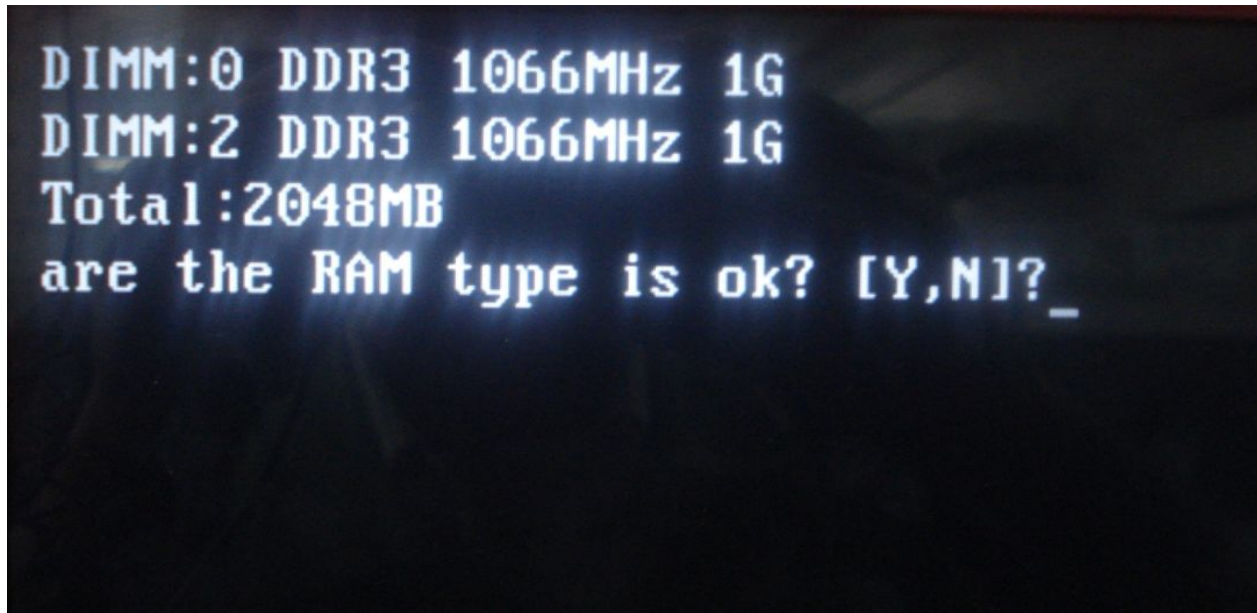
Press each of the buttons on the front panel in turn. A yellow bar will appear on the relevant section of the figure if the button passes the test.

Press **ESC** to quit the test.

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

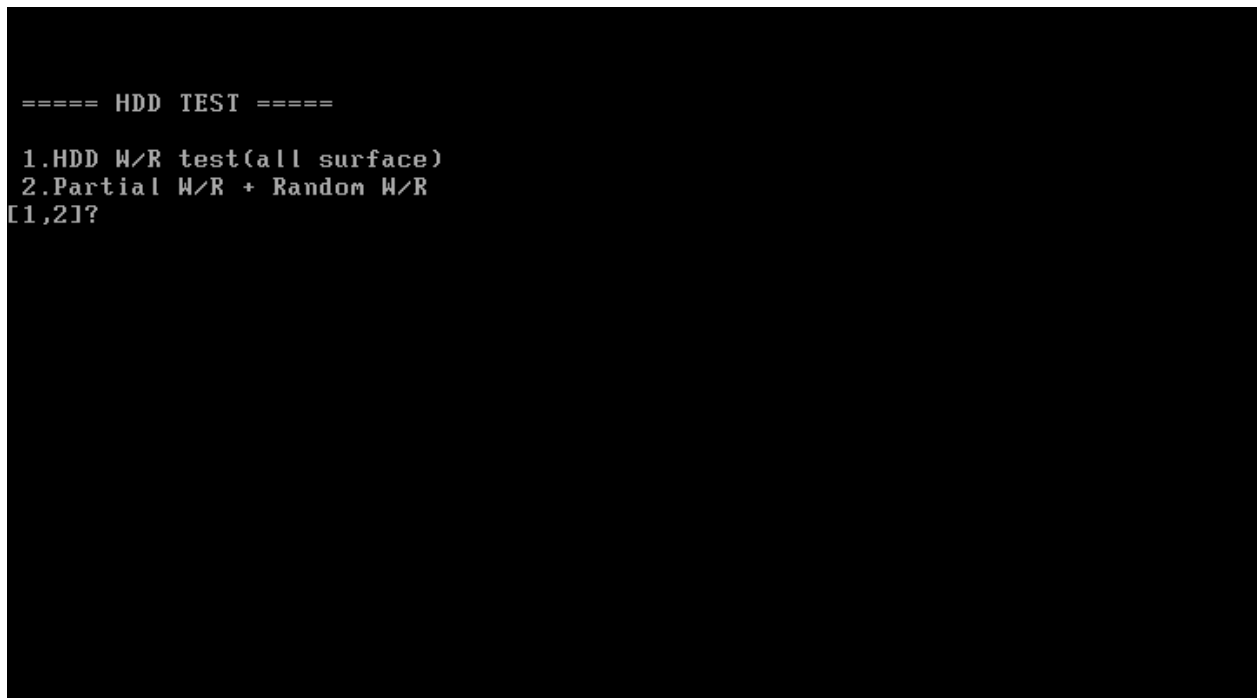
### 3.18 Memory test

This test will check if the computer's DDR RAM Vendor, frequency and size is correct in every slot.



### 3.19 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:



After you select the method, then input password: "hard disk", if input password is Right, the screen would display as below:

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

Press any key to continue . . .
```

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

```
Input Password is wrong
ARE YOU INPUT PASSWORD AGAIN?[Y,N]?
```

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

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

```
*** Hard disk test tools V1.60 Compal STD/TTF ***
Reset DISK1 .....Pass !
CHR Mode Cylinders=16383
CHR Mode Head=16
CHR Mode Sectors=63
CHR Mode Sizes=8455 MB

LBA Mode Sectors=390721968
LBA Mode Sizes =200050 MB

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

LBA Verify Sectors: 390721968.000000, C/H/S = 24321.000000 / 255.000000 / 63.000
LBA Sectors Verify ... PASS!

C:\>
```

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



```
*** Hard disk test tools V1.50 Compal TTF ***
HDD idle fail! --- 10

    HDD Type =
    Serial No. =
    Firmware Ver. =
Controller Type = 0087

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

### 3.20 2<sup>nd</sup> HDD Test

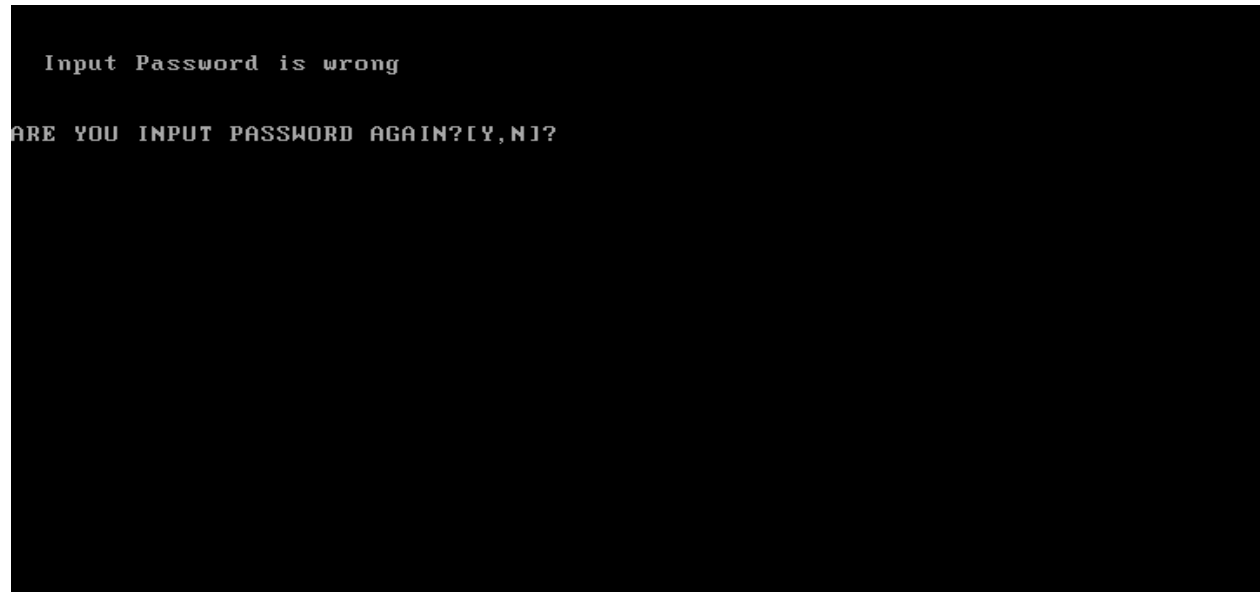
The HDD test allows the user to verify the 2<sup>nd</sup> HDD ok or not. Please select HDD test method, Choice HDD test method, Screen would display as below:

```
==== 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:

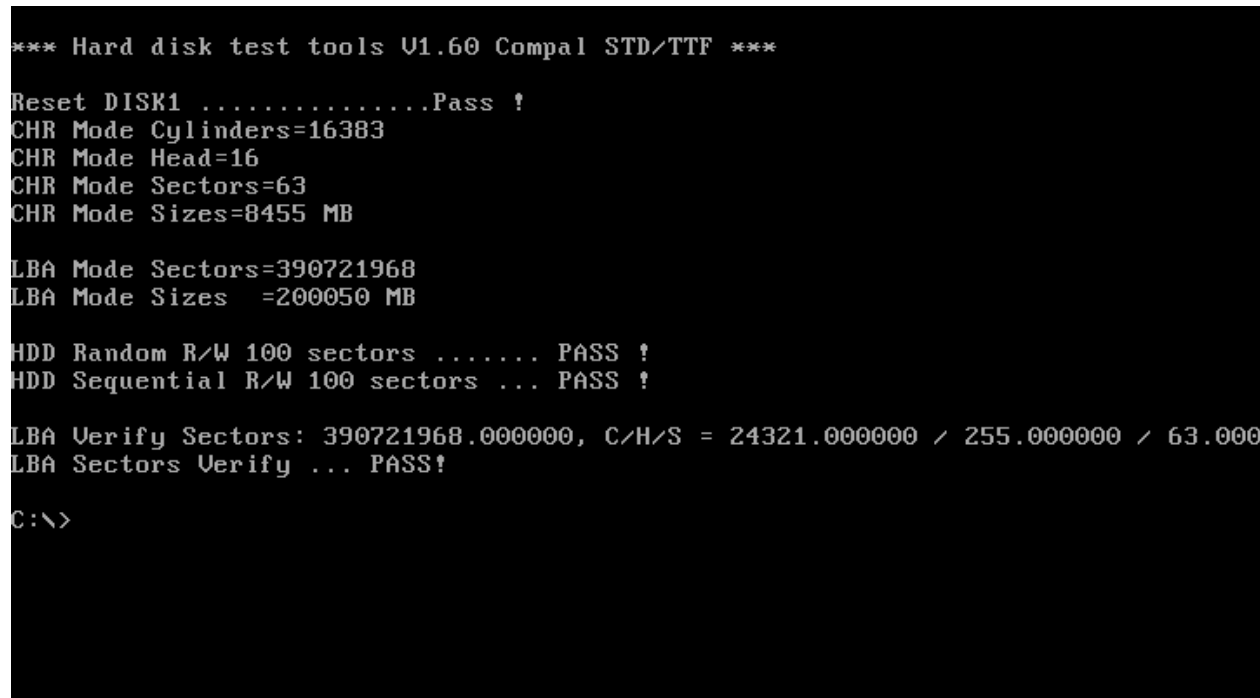
```
Input password is Right  
Press any key to Test HDD function  
  
Press any key to continue . . .
```

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



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

### 3.21 Read DMI

If you want to double check the DMI data, please select Read DMI item, the figure below will be displayed:

```
Manufacturer : TOSHIBA
Product_Name : *
Serial_Number : *
Version      : *
Asset_Number : *
UUID : F687B7BBB13611DDBB0640016D4930AEC
DEM_Strings : *
Are the DMI data is OK? [Y,N]?
```

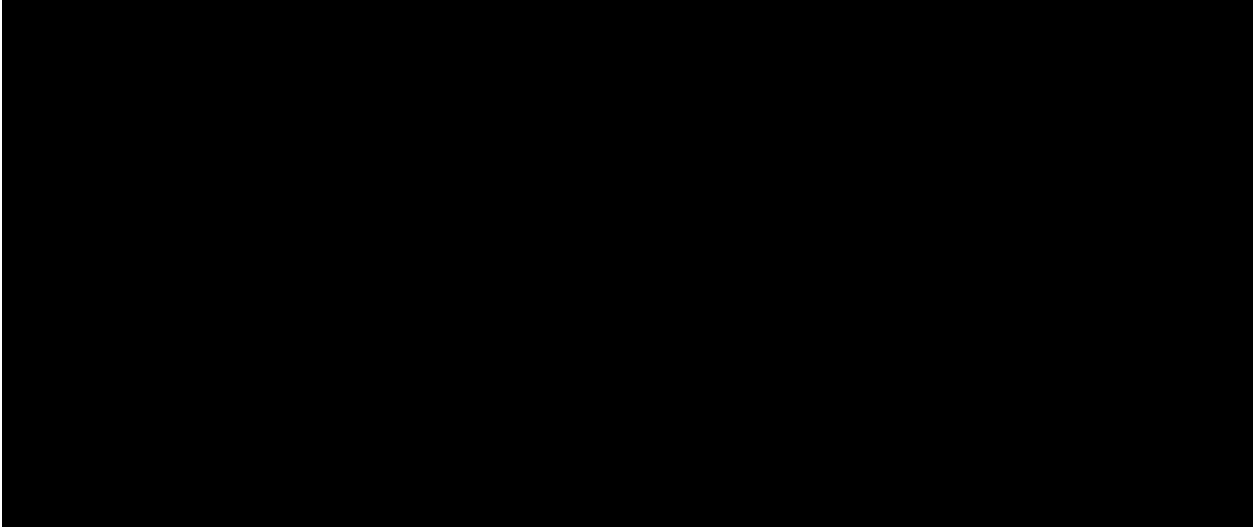
### 3.22 Write DMI

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

1. Write OME string
2. Write Version
3. Write Serial

#### 4. Write Product

```
please choice the item
1: Write OEM String
2: Write Version
3: Write Serial
4: Write Product
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 OEM String
 2: Write Version
 3: Write Serial
 4: Write Product
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:
```

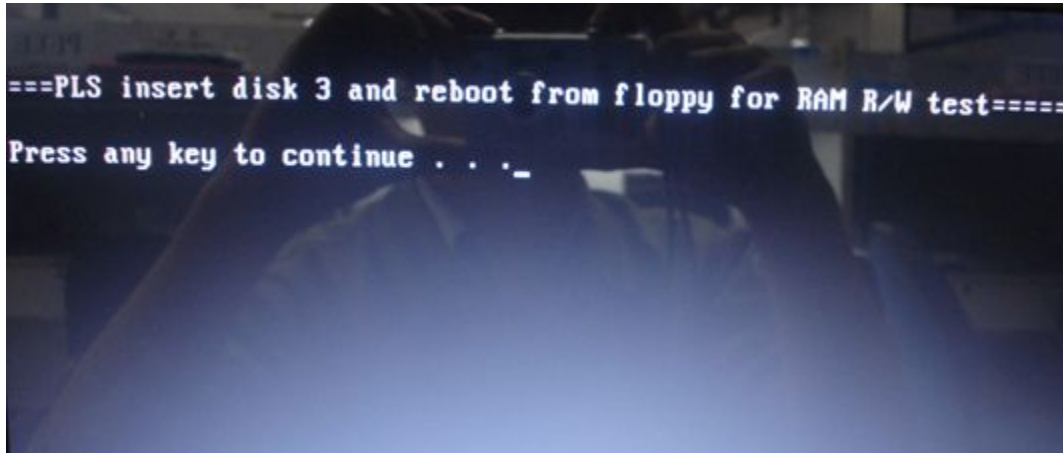
***NOTE:** should input correct DMI data, and should reboot the system that can make the setting effective.*

### 3.23 Memory R/W test

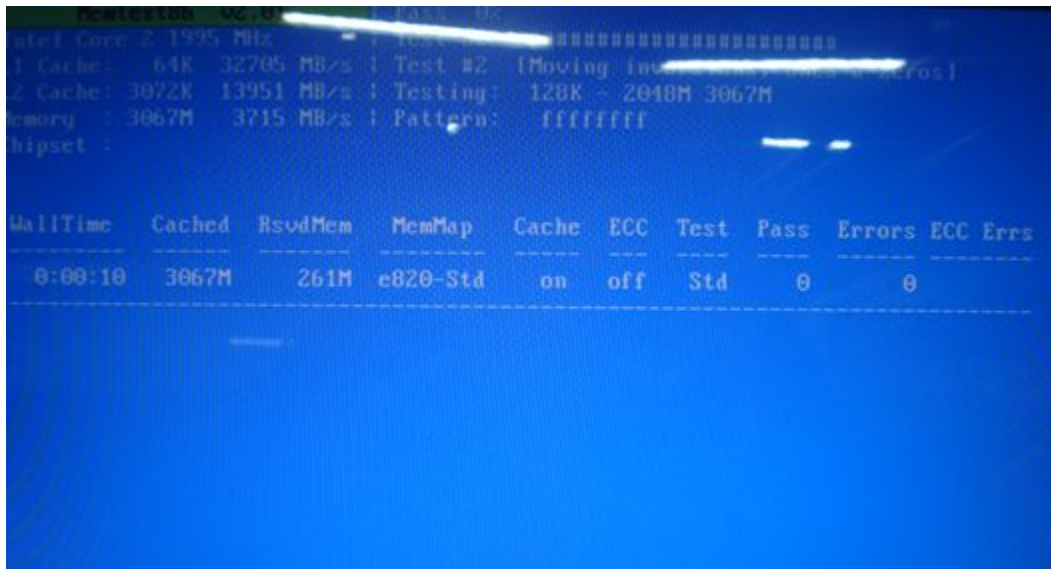
Memory R/W test will do memory read and write test.

***NOTE:** Memory R/W TEST need re-boot from disk3 to test*

PLS select V in disk2 test menu for test, system will show below picture after you select “V”:



After boot from disk3, test program will auto start, Test picture as below:



If the picture show as below. It means memory read and write pass.

### 3. Tests and Diagnostics

---

```

Root@186 ~ # memtest86+ -v -t 12 -p 0
Intel Core 2 1995 MHz | Test #6: (Moving Inversions, 32-bit pattern)
L1 Cache: 64K 32705 MB/s | Testing: 128K - 2048M 3067M
L2 Cache: 3072K 13951 MB/s | Pattern: fffffdfff
Memory : 3067M 3715 MB/s |
Chipset :

-----
WallTime  Cached  RsvdMem  MemMap  Cache  ECC  Test  Pass  Errors  ECC Errs
-----
8:26:21  3067M    261M    e820-Std  on    off  Std   12    0
-----

Pass complete, no errors, press Esc to exit

```

You can press ESC to exit test after test pass!



---

## **Chapter 4**

# **Replacement Procedures**

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Figure 4-41 Removing the 17.1-inch LCD module and screws ..... 4-63

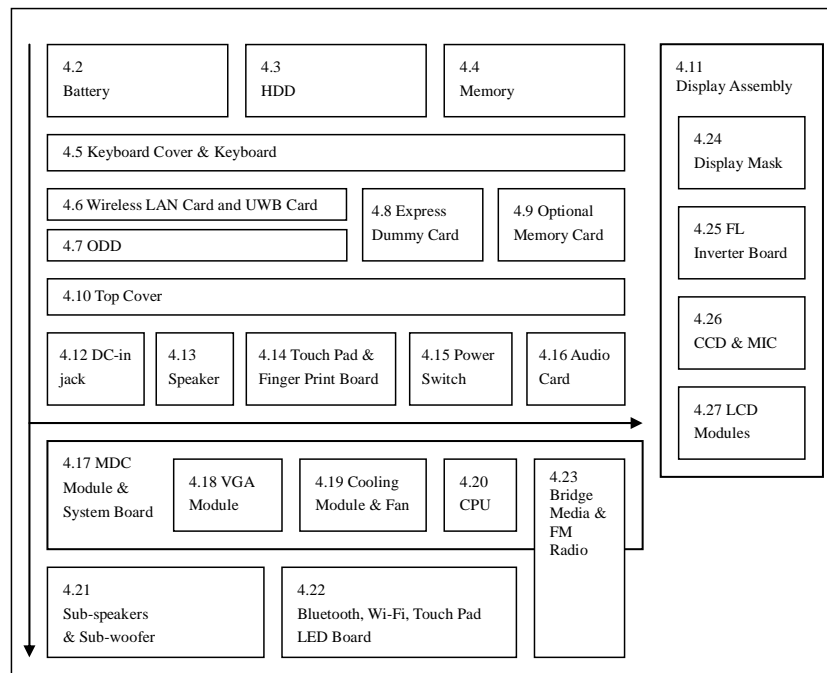
Figure 4-42 Removing the cable..... 4-63





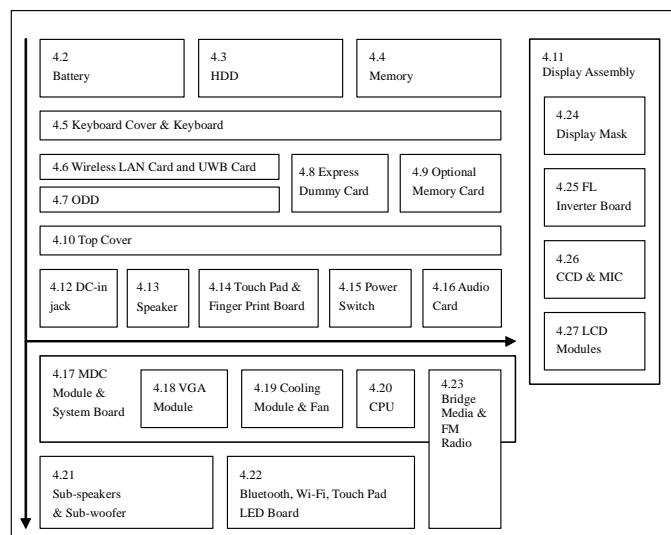
## 4.1 General

This chapter explains how to disassemble the computer 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 System Board:  
First, remove the top cover with the display assembly. Then, remove the HDD, selectable bay module, Bluetooth card, keyboard, and wireless LAN card, all of which are shown above the top cover with the display assembly.
- For removing the LCD Module:  
First, remove the display mask and FL inverter board, both of which are shown above the LCD module.



**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 genuine batteries or replacement batteries authorized by Toshiba. Batteries other than those differ in specifications and are incompatible with the computer. 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 FL inverter carry high voltages. When you partially disassemble the computer 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 computer off and remove the AC adapter from the electrical outlet.*
- 2. Because the battery in the computer 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 computer 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 raising 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 computer or Toshiba-recommended equivalents.*
5. *To avoid the risk of electrical shock, make sure that all the replacement components meet the specifications of the computer 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 computer, 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 computer only when an abnormality has occurred.

Use only the recommended tools.

To run and store the computer, 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 computer 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 computer, 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 to handle components that have sharp edges or corners.

After you have replaced a FRU, check that the FRU works correctly to ensure normal computer 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 came 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 computer after you have disassembled the computer and fixed the component that caused the problem.

When reassembling the computer, 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 computer 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"/> M2x3                                  | 1.2~1.5Kgf-cm |
| <input type="checkbox"/> M2x3 (ODD Module to ODD Bracket)      | 1.5~2.0Kgf-cm |
| <input type="checkbox"/> M2x4                                  | 1.5~2.0Kgf-cm |
| <input type="checkbox"/> M2x4(TMA Thermal Module to TMA-PLATE) | 2.0~2.5Kgf-cm |
| <input type="checkbox"/> M2x6                                  | 1.5~2.0Kgf-cm |
| <input type="checkbox"/> M2x6(Thermal Fan to MB standoff)      | 2.0~2.5Kgf-cm |
| <input type="checkbox"/> M2.5x4                                | 2.5~3.0Kgf-cm |
| <input type="checkbox"/> M2.5x6                                | 2.5~4.5Kgf-cm |
| <input type="checkbox"/> M2.5x10                               | 2.5~3.0Kgf-cm |
| <input type="checkbox"/> M3x3                                  | 1.5~2.5Kgf-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 even-numbered length      Brown
  - Screws of an odd-numbered length      White
  - Screws of a special length      Black
- Screws of a special length are those of a length having decimal places, such as 2.5 mm.

### **Symbols of Screws on the Computer Body**

For easy maintenance, the screw types are shown on the computer 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 computer upside down so that the back is facing you.
2. Slide out the battery lock.
3. Slide the battery release latch and remove the battery pack from the computer.

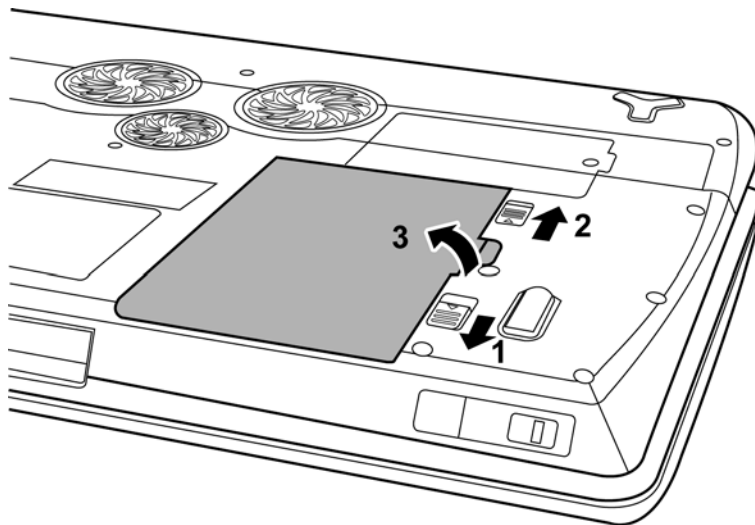


Figure 4-1 Removing the battery pack

**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 and Figure 4-1.

**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.*

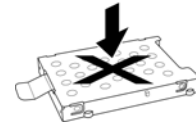
**NOTE:** *Visually check the battery's terminals. If they are dirty, clean them with a dry cloth.*

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 in the battery lock.

## 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.

1. Remove two M2.5x4 HDD cover screws that secure the HDD and then remove the HDD cover.

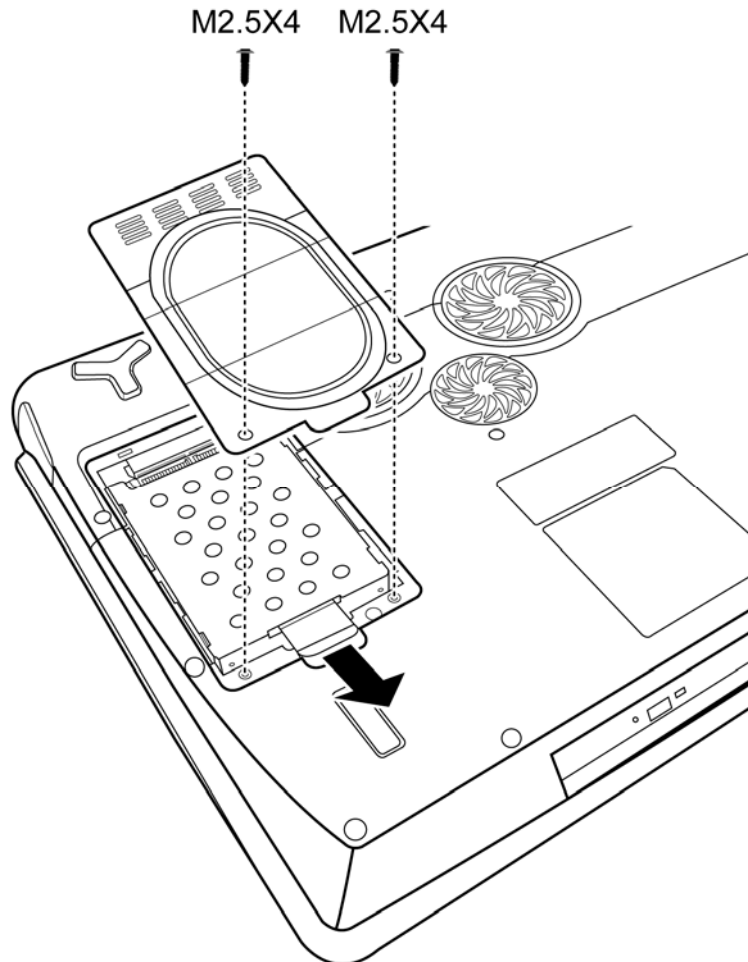


Figure 4-2 Removing the HDD pack cover

2. Remove the HDD pack by pulling on the tab attached to the pack, following the direction of the arrows.

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

3. Place the HDD pack on a flat surface such as a desk.
4. To separate the chassis from the HDD, remove four M3x3 screws.

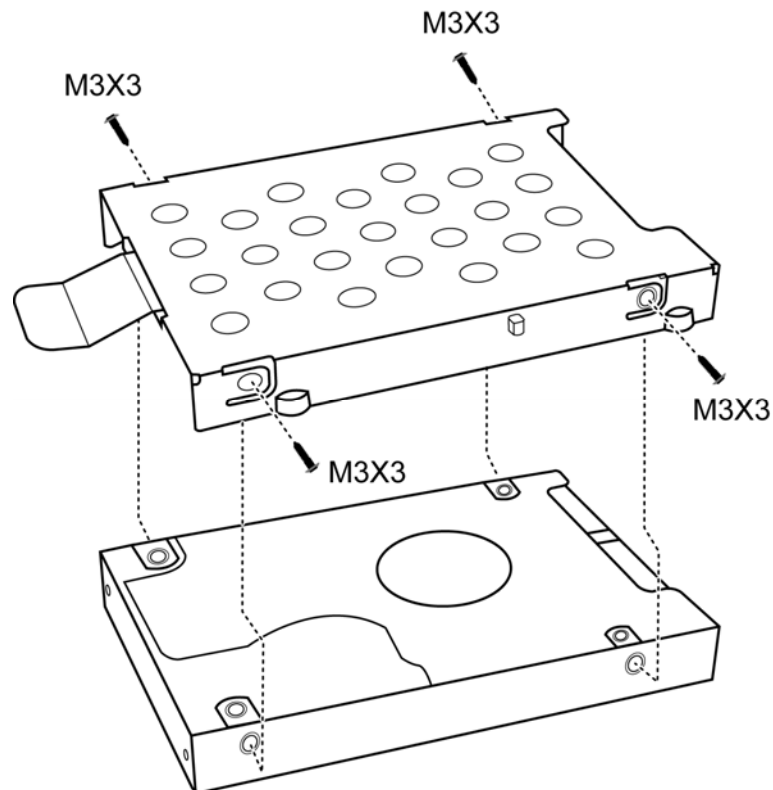


Figure 4-3 Removing the HDD chassis

**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 Figures 4-2, 4-3.

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

1. Place the HDD into the HDD chassis.
2. Secure the HDD and its chassis with four M3x3 screws.

**CAUTION:** *To prevent the HDD bracket from being distorted when installing the HDD pack into the computer, 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 computer. Connect the HDD pack to the computer, holding the HDD pack by its sides.
4. Insert the HDD pack.
5. Secure the HDD cover by tightening the HDD cover screw.

## 4.4 Memory

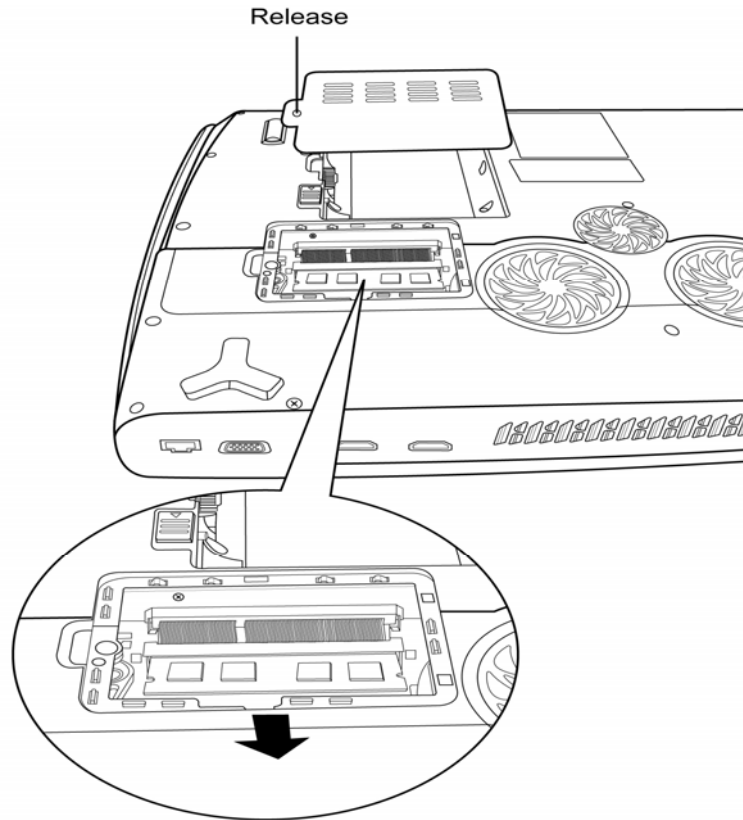
### Removing the Optional Memory

Remove the optional memory (module) according to the following procedures and Figure 4-4 after checking that the computer is turned off in boot mode.

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

1. Turn the computer upside down.
2. Release the screw that secures the optional memory cover.
3. Remove the memory cover.

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



*Figure 4-4 Removing the optional memory cover*

4. Spread out the two memory lock latches so that the memory module pops up.
5. Pull the memory module up and out at an angle, using care to avoid touching the connectors.

### **Installing the Optional Memory**

Install the optional memory (module) according to the following procedures and Figure 4-4 after checking that the computer is turned off in boot mode.

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

1. Insert the 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. Reinstall the optional memory cover.
4. Secure the optional memory cover with the optional memory cover securing screw.

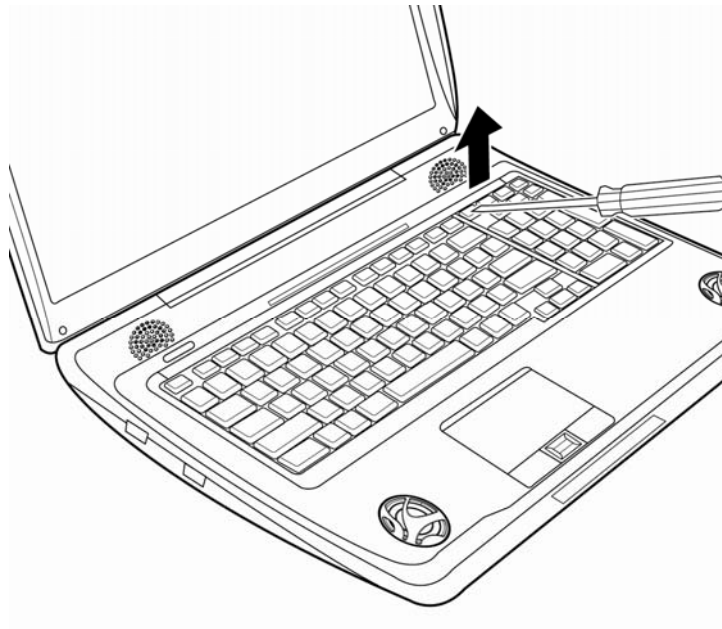
After the computer is turned on, check the hardware configuration in the Hardware Setup or TSETUP program to make sure that the installed memory module has been recognized by the system. If it has not been recognized yet, check the connections.

## **4.5 Keyboard Cover and Keyboard**

### **Removing the Keyboard Cover and Keyboard**

Remove the Keyboard Cover and Keyboard according to the following procedures and Figures 4-5, 4-6.

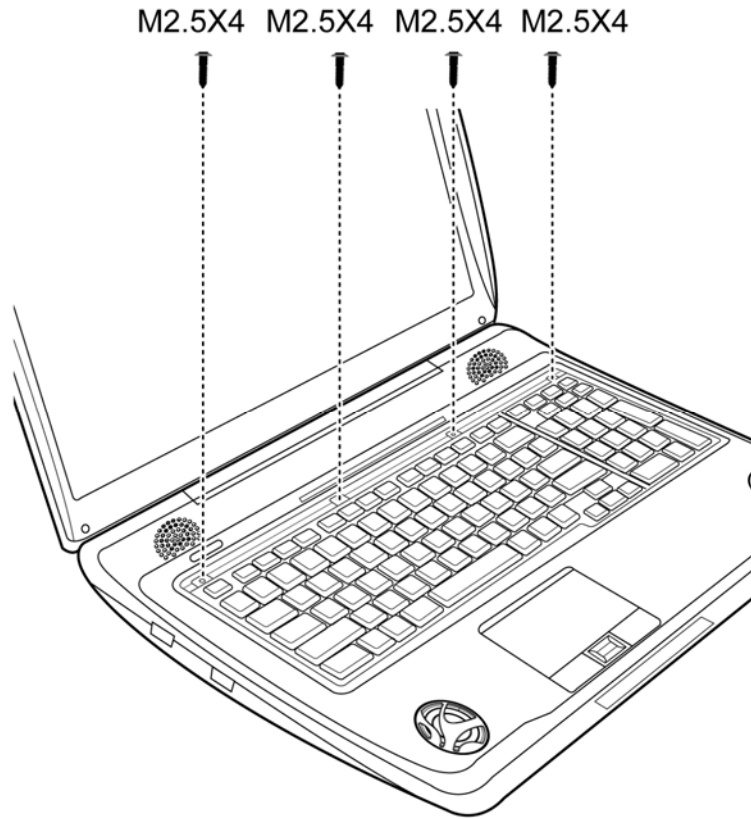
1. Use a pointed object to lift the keyboard from the computer.
2. Remove the keyboard cover.



*Figure 4-5 Removing the keyboard cover*



3. Remove four M2.5x4 screws and then disconnect the keyboard FFC.
4. Remove the keyboard.



*Figure 4-6 Removing the keyboard*

**Installing the Speaker Cover and Keyboard**

Install the speaker cover and keyboard according to the following procedures and Figures 4-5, 4-6.

1. Connect the keyboard FFC with the keyboard.
2. Secure the keyboard with four M2.5x4 screws.
3. Place the keyboard cover in the correct position and gently push down the cover to have it locked in place.

## 4.6 Wireless LAN Card and UWB Card

### Removing the Wireless LAN Card and UWB Card

Remove the wireless LAN card according to the following procedures and Figures 4-7 and 4-8.

**CAUTION:** Do not touch the connectors on the wireless LAN card and in the computer with your bare hands. Wireless LAN cards can fail if they are contaminated with sweat, natural oils, etc. from your hands.

1. Remove the two M2x4 screws securing the UWB card.
2. Disconnect one antenna cable.
3. Pull the UWB card up and out at an angle.

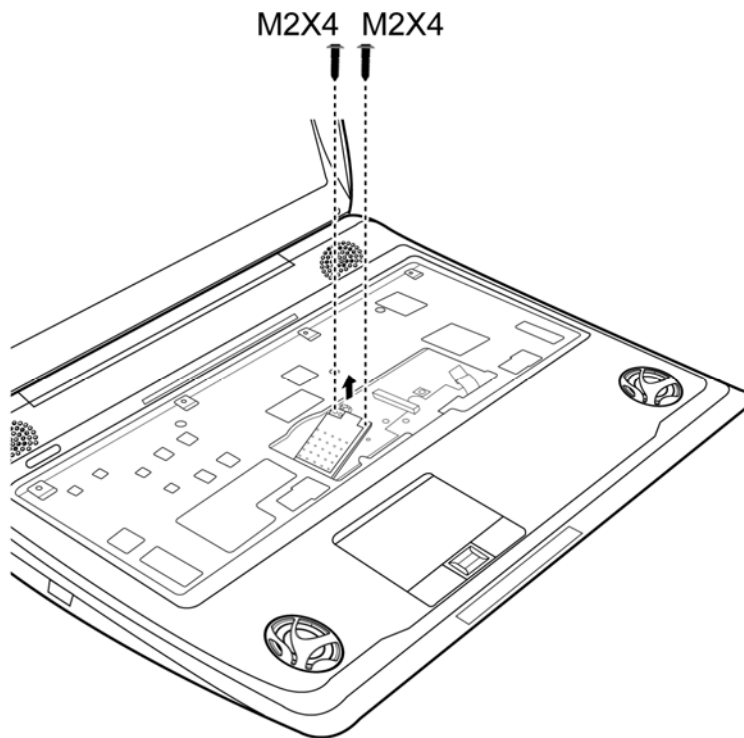
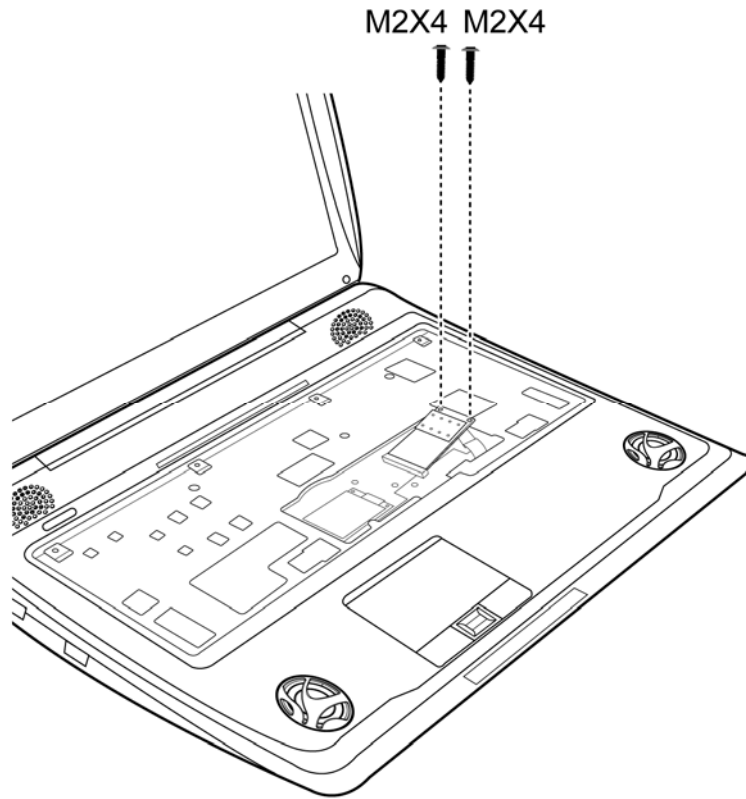


Figure 4-7 Removing the UWB card

4. Remove the two M2x4 screws securing the Wireless LAN card.
5. Disconnect 2 or 3 antenna cables (depending on the model).

6. Pull the Wireless LAN card up and out at an angle.



*Figure 4-8 Removing the Wireless LAN card*

### **Installing the Wireless LAN card and UWB Card**

Install the wireless LAN card and UWB card according to the following procedures and Figures 4-7, 4-8.

1. Insert the wireless LAN card into the connector an angle of 45 degrees.
2. Connect 2 or 3 antenna cables (depending on the model).
3. Press down on the wireless LAN card to secure it with two M2x4 screws.
4. Insert the UWB card into the connector an angle of 45 degrees.
5. Connect one antenna cable.
6. Press down on the UWB card to secure it with two M2x4 screws.

***CAUTION:*** Do not touch the connectors on the wireless LAN card and in the computer with your bare hands. Wireless LAN cards can fail if they are contaminated with sweat, natural oils, etc. from your hands.

## 4.7 ODD

### Removing the ODD Bay Module

**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 bay module according to the following procedures and Figures 4-9, 4-10.

1. Turn the computer upside down.
2. Remove one M2.5x6 screw.

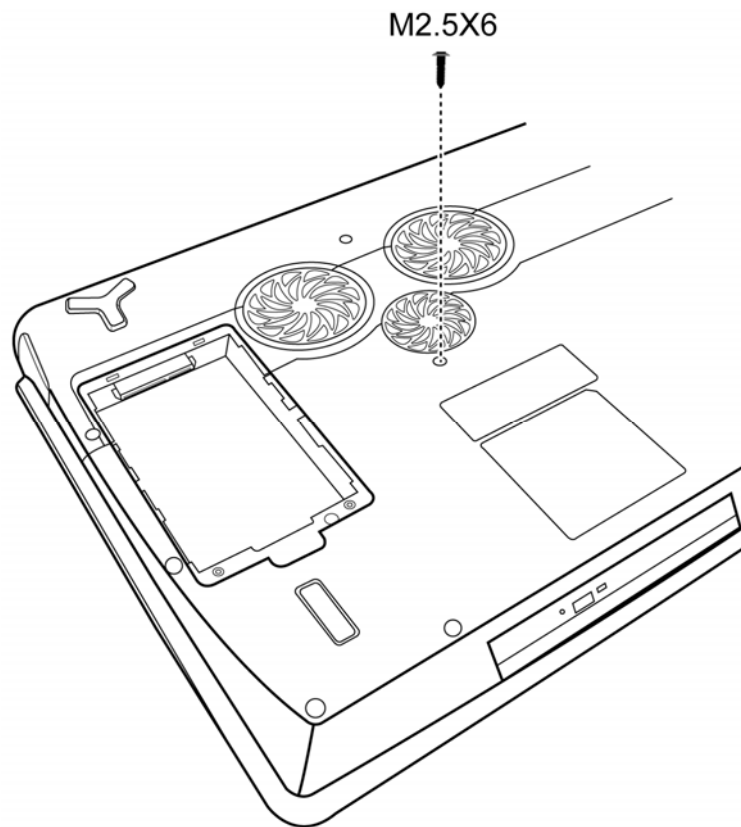
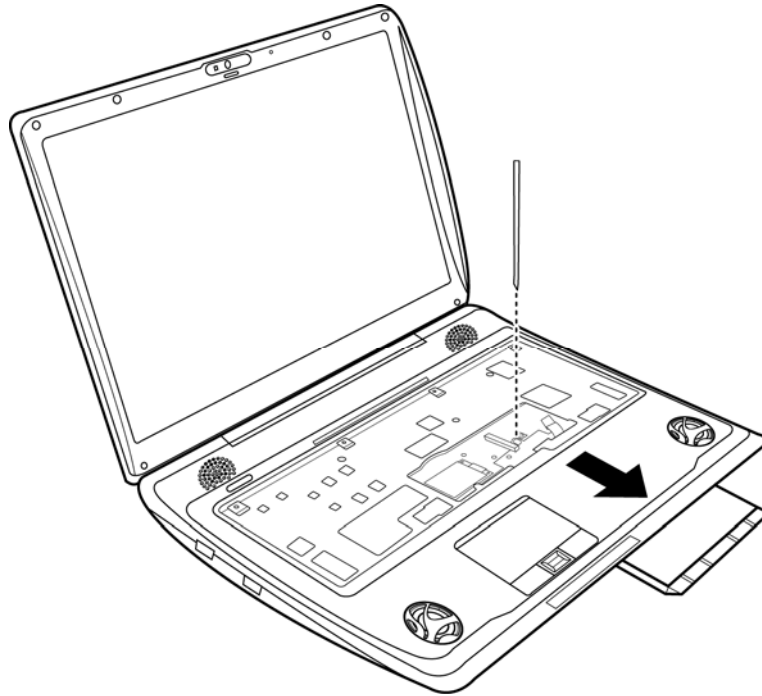


Figure 4-9 Removing the screw on the bottom

3. Turn the notebook right side up.
4. Use a thin tool to release the lock.

5. Slide out on the ODD bay module in the direction of the arrow.



*Figure 4-10 Removing the ODD bay module*

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

### **Installing the ODD Bay Module**

Install the ODD bay module according to the following procedures and Figures 4-9, 4-10.

1. Place the ODD bay module in the correct position and slide it in.
2. Push it in until it clicks into place.
3. Place the ODD module in the correct position.
4. Secure the ODD bay module with one M2.5x6 screw.



### Disassembling the ODD Drive

**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 drive according to the following procedures and Figure 4-11.

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

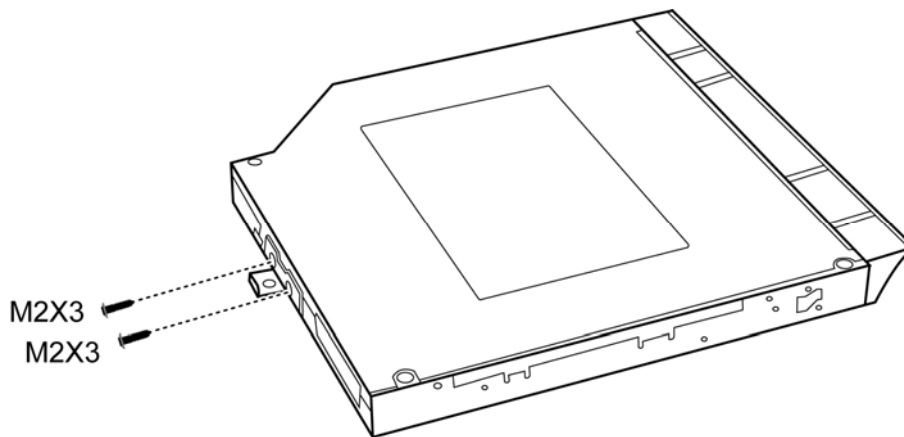


Figure 4-11 Removing the bracket from the ODD drive

3. Take one paper clip insert ODD bezel emergency hole injection the ODD module, then remove ODD bezel left side snap hook.

### Assembling the ODD Drive

Assemble the ODD drive according to the following procedures and Figure 4-11.

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

## 4.8 Express Dummy Card

### Removing the Optional Express Dummy Card or PC Card

Remove the optional Express Dummy Card or PC card according to the following procedures and Figure 4-12, after checking that the computer is turned off in boot mode.

**CAUTION:** Install or remove the Express Dummy Card or PC card correctly, according the manuals for the Express Dummy Card or PC card and the operating system you are using.

1. Push the Express Dummy Card or PC card to be removed until it stops then release the memory card.
2. When the card pops out, grasp it and pull it out.

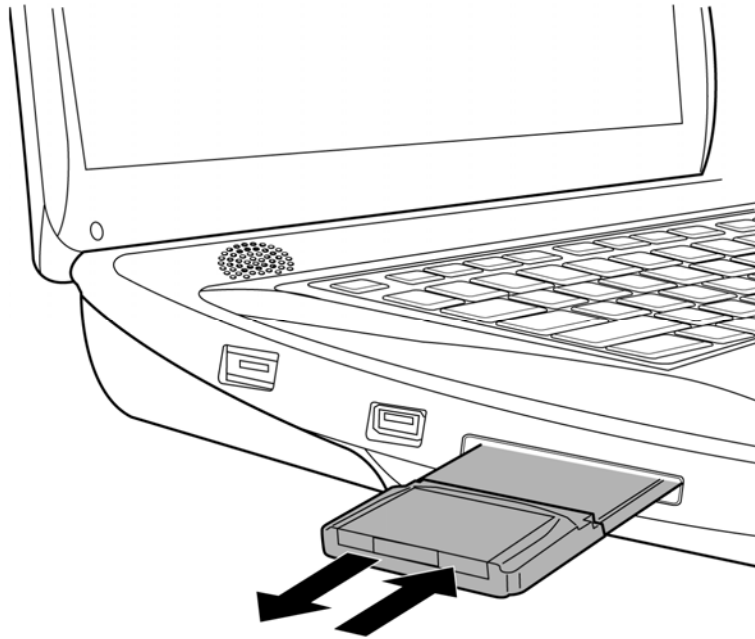


Figure 4-12 Removing the Express Dummy Card or PC card

### **Installing the Optional Express Dummy Card or PC Card**

Install the Express Dummy Card or PC card according to the following procedures and Figure 4-12, after checking that the computer is turned off in boot mode.

1. Insert the Express Dummy Card or PC card.
2. Gently push it and release when it clicks in place.
3. Check that the card is seated securely.

After the Express Dummy Card or PC card is installed, check the hardware configuration in the Hardware Setup or TSETUP program to make sure that the Express Dummy Card or PC card is compatible with the current hardware configuration.

## 4.9 Optional Memory Card

### Removing the Optional Memory Card

Remove the memory card according to the following procedures and Figure 4-13, after checking that the computer is turned off in boot mode.

1. Open the card cover.
2. Push the memory card to be removed until it stops then release the memory card.
3. When the memory card pops out, grasp it and pull it out.

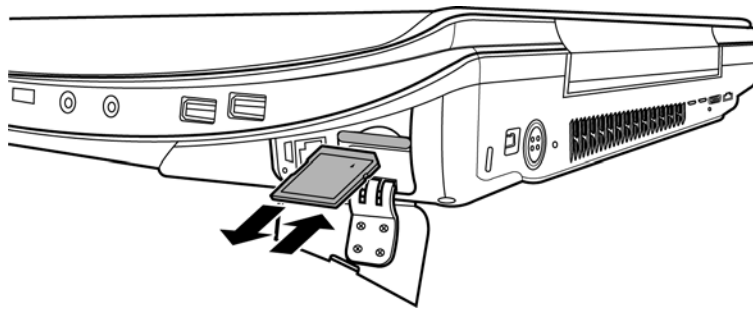


Figure 4-13 Removing the memory card

### Installing the Optional Memory Card

Install the memory card according to the following procedures and Figure 4-13, after checking that the computer is turned off in boot mode.

1. Insert the memory card gently until it stops and is seated securely.
2. Check that the memory card is seated securely.

After the PC card is installed, check the hardware configuration in the Hardware Setup or TSETUP program to make sure that the PC card is compatible with the current hardware configuration.

## 4.10 Top Cover

### Removing the Top Cover

Remove the top cover according to the following procedures and Figures 4-14 and 4-15.

1. Turn the computer upside down and remove the following 18 screws:
  - fourteen M2.5x10 screws
  - two M2.5x6 screws
  - two M2.5x4 screws

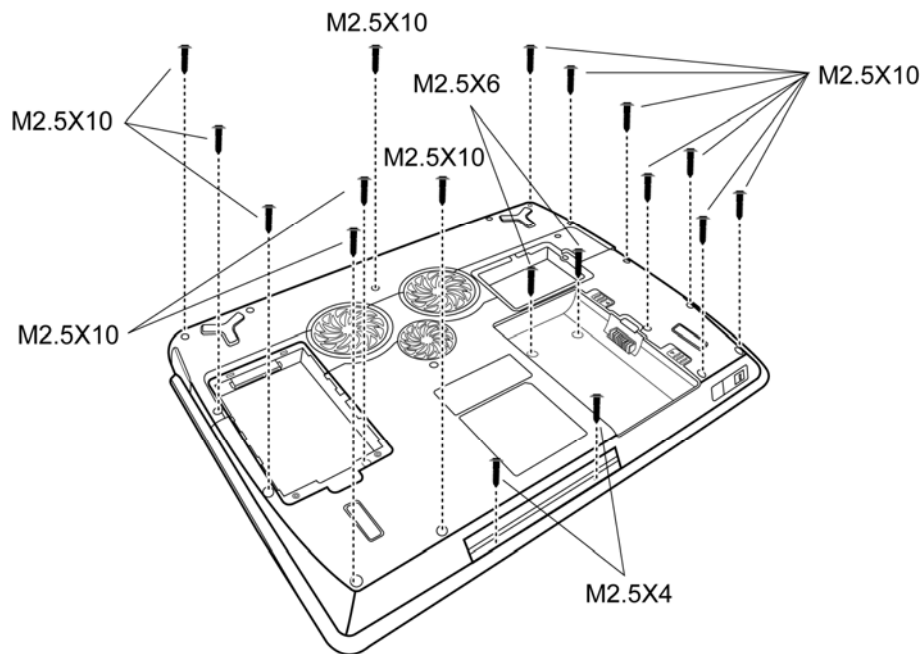


Figure 4-14 Removing the screws from the bottom of the computer

2. Turn the computer right side up.
3. Remove three M2.5x10 black flat head screw.
4. Disconnect the eight cables as indicated by arrow in the following figure.

5. Lift up the top cover.

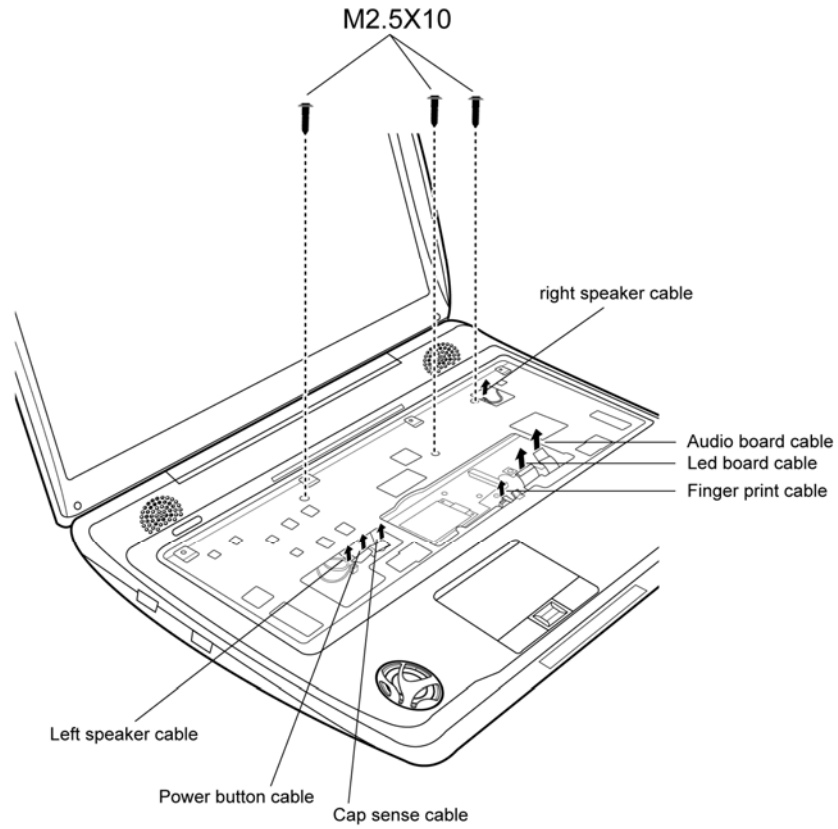


Figure 4-15 Removing the screws and cables from the computer

### **Installing the Top Cover**

Install the top cover with the display assembly according to the following procedures and Figures 4-14, 4-15.

1. Seat the top cover, adjusting its position.
2. Connect the eight cables as indicated in Figure 4-15.
3. Secure the top cover with three M2.5x10 screws.
4. Turn the computer upside down and secure it with the following 18 screws:
  - fourteen M2.5x10 screws
  - two M2.5x6 screws
  - two M2.5x4 screws

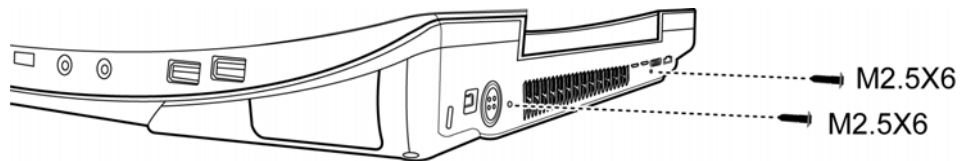
## 4.11 Display Assembly

### Removing the Display Assembly

**CAUTION:** Use care to avoid that the antenna cable is not caught between the display assembly and computer.

Remove the display assembly according to the following procedures and Figures 4-16, 4-17.

1. Turn the computer so the rear is facing you and remove two M2.5x6 screws.
2. Restore the normal computer placement and open the display panel.

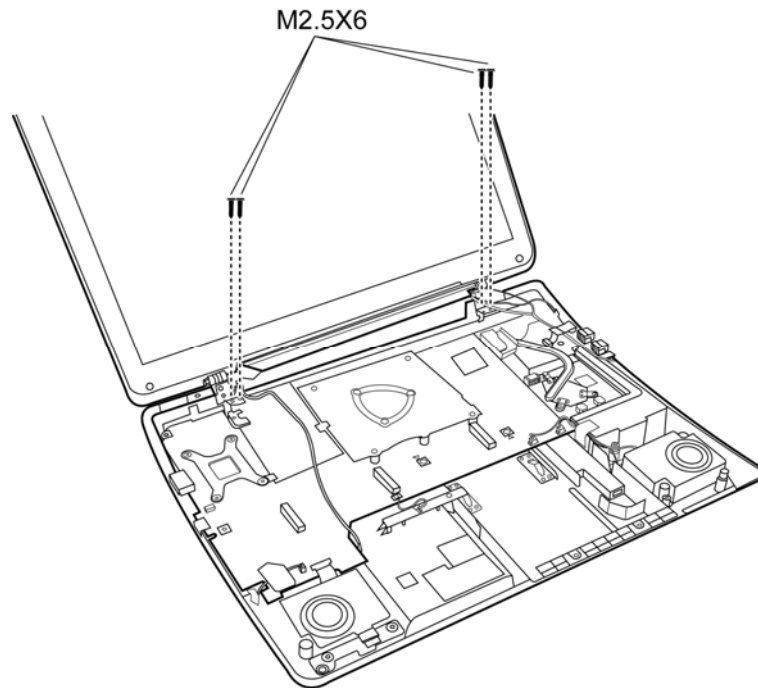


*Figure 4-16 Removing the screws from the rear of the computer*

3. Disconnect the cables on the system board.
4. Remove four M2.5x6 screws securing the LCD module to the top cover.



5. Remove the display module.



*Figure 4-17 Removing the display assembly*

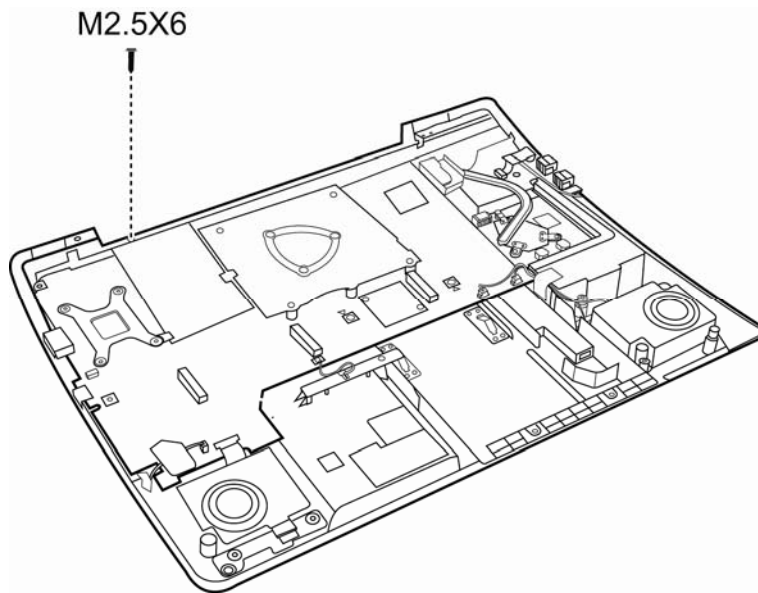
### **Installing the Display Assembly**

Install the display assembly according to the following procedures and Figures 4-16, 4-17.

1. Place the display panel in the correct position.
2. Connect the display cables to the system board.
3. Secure the display assembly with four M2.5x6 screws.
4. Close the display panel and turn the computer so the rear is facing you and secure two M2.5x6 screws.

**Removing the hinge cover**

1. Remove one M2.5x6 screw.



*Figure 4-18 Removing the hinge cover*

**Installing the hinge cover**

1. Secure the hinge cover with one M2.5x4 screws.

## 4.12 DC-in jack

Removing the DC-in jack according to the following procedures and Figure 4-19.

1. Put right hand to touch the rib on the wall of the bottom case wall.
2. Put left hand to hold DC-in jack on 2 sides (inside and outside).
3. Push wall of bottom case by right hand (1) and rotate DC-in jack to apart by left hand (2).

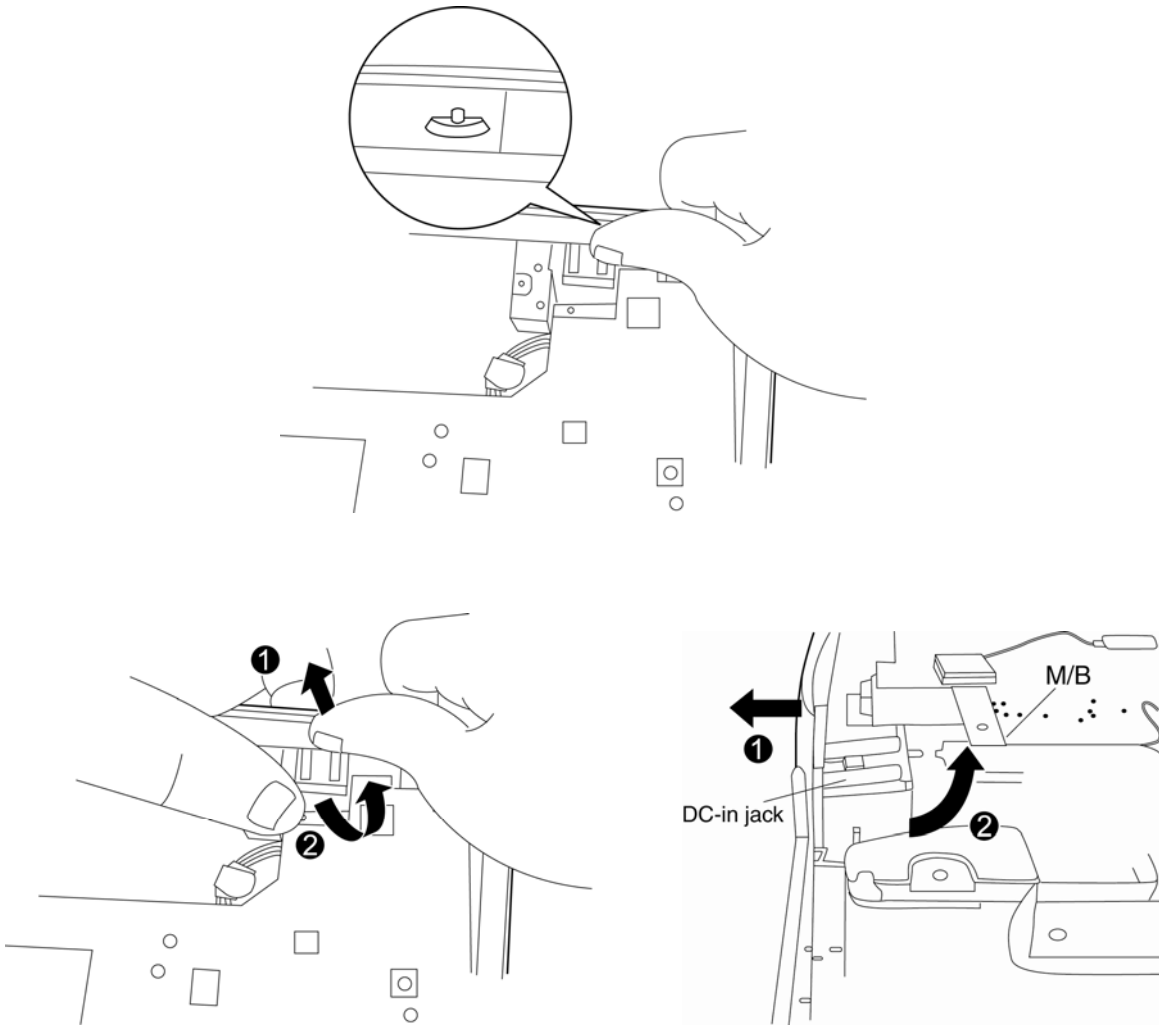


Figure 4-19 Removing the DC-in jack

## 4.13 Speakers

### Removing the Speakers

Remove the Speakers according to the following procedures and Figure 4-20.

1. Remove two M2.5x6 screws securing the left speaker.
2. Remove two M2.5x6 screws securing the right speaker.
3. Remove the speaker cable from the wire guide.
4. Remove the left and right speakers.

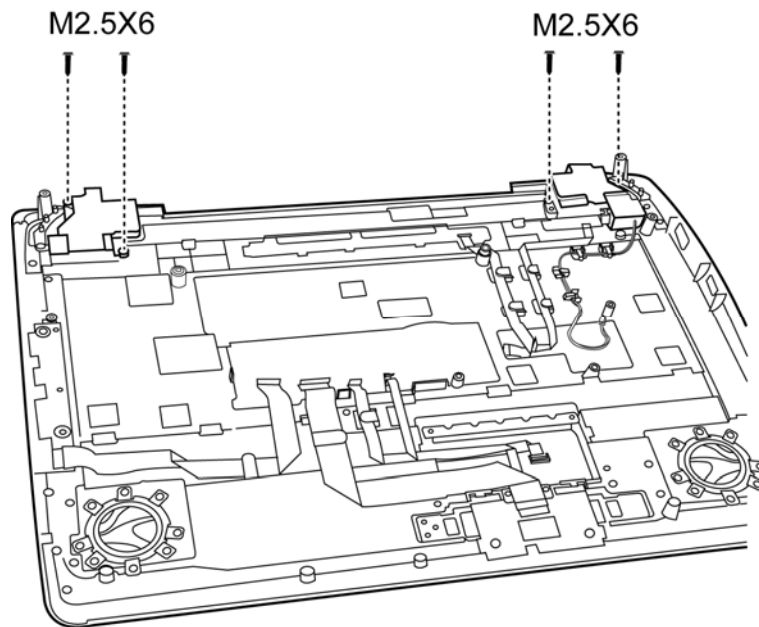


Figure 4-20 Removing the speakers

**CAUTION:** Use care to avoid that the speaker cable is not caught on the top cover of the computer.

### **Installing the Speakers**

Install the speakers according to the following procedures and Figure 4-20.

1. Seat the left and right speaker in the correct position.
2. Route the speaker cable in the wire guide.
3. Secure the left speaker with two M2.5x6 screws.
4. Secure the right speaker with two M2.5x6 screws.

## 4.14 Touch Pad and Finger Print Board

### Removing the Touch Pad and Finger Print Board

Remove the touch pad and finger print board according to the following procedures and Figure 4-21.

1. Remove two flat cables from the wire guide.
2. Disconnect the three touch pad flat cables attached to the touch pad board.
3. Remove two M2.5x4 screws securing the touch pad.
4. Remove the touch pad bracket, touch pad and finger print board.

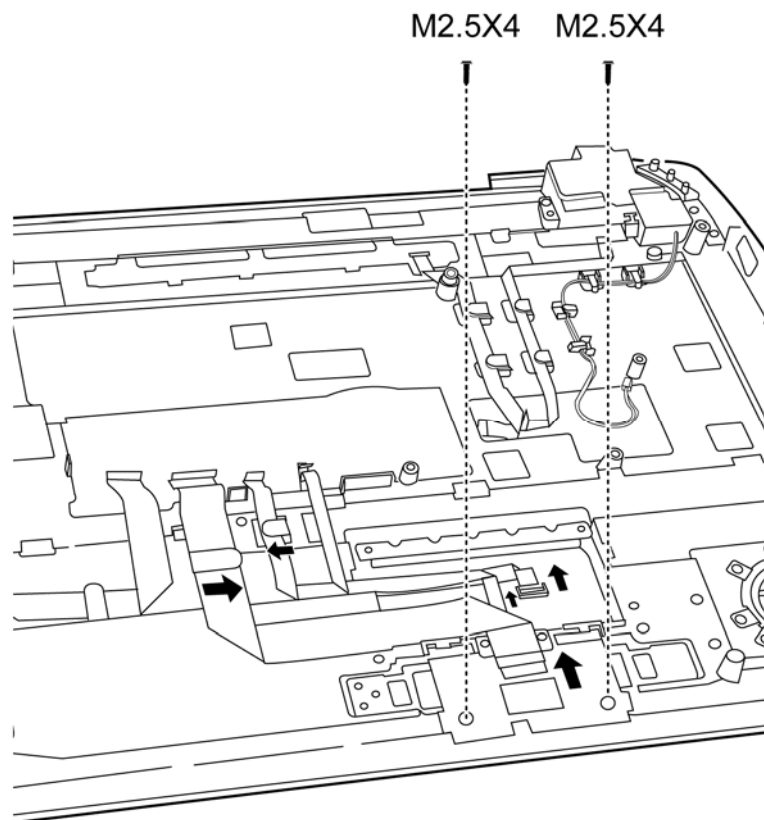


Figure 4-21 Removing the touch pad and finger print board

### **Installing the Touch Pad and Finger Print Board**

Install the touch pad and Finger Print board according to the following procedures and Figure 4-21.

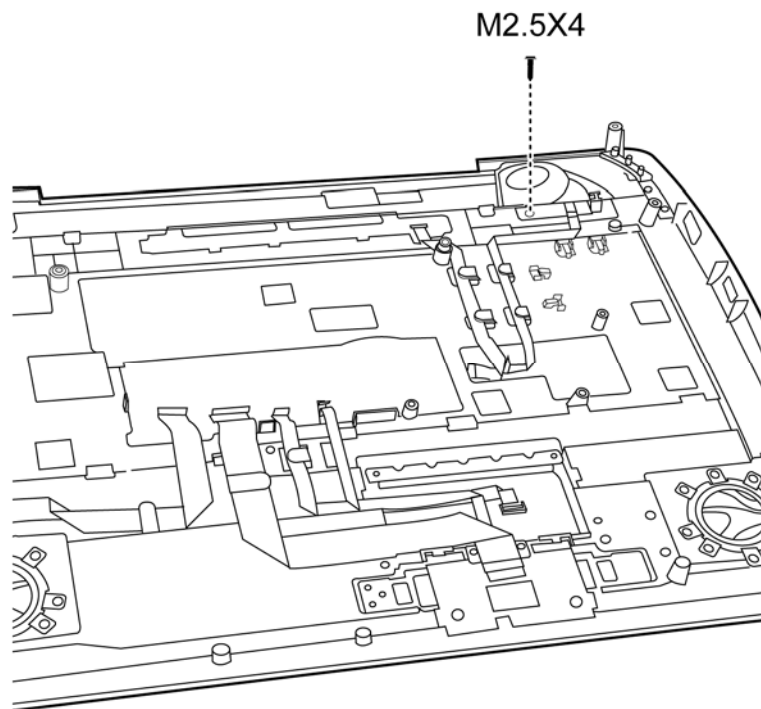
1. Seat the finger print board, touch pad, and touch pad bracket in the correct position and secure with two M2.5x4 screws
2. Connect the three touch pad flat cables to the touch pad board.
3. Put in place the two flat cables in the wire guide.

## 4.15 Power Switch

### Removing the power switch

Remove the power switch according to the following procedures and Figure 4-22.

1. Release one power switch flat cable from the wire guide.
2. Remove one M2.5x4 screw from the power board.
3. Separate the power board from the top cover.



*Figure 4-22 Removing the power switch board*

### Installing the power switch board

Install the power switch according to the following procedures and Figure 4-22.

1. Seat the power switch board in the correct place on top cover.
2. Secure the board with one M2.5x4 screw.
3. Put the power switch board flat cable in the wire guide.



## 4.16 Audio Card

### Removing the Audio Card

Remove the audio card according to the following procedures and Figure 4-23.

1. Release one audio card flat cable from the wire guide.
2. Remove one M2.5x4 screw.
3. Separate the card from the top cover.

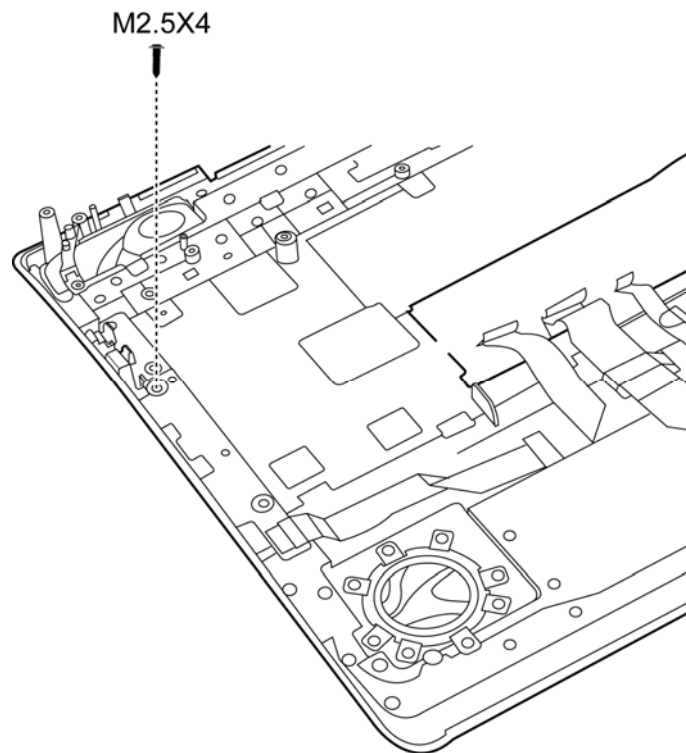


Figure 4-23 Removing the audio card

**Note:** Be careful of the kill switch button for the audio board. It can be damaged when installing the audio board. Make sure it is in the correct position.

### **Installing the audio card**

Install the audio card according to the following procedures and Figure 4-23.

1. Seat the audio card in the correct place on the top cover.
2. Secure the card with one M2.5x4 screw.
3. Connect the audio card with the flat cable
4. Put the cable in the wire guide.

## 4.17 MDC Module & System Board

### Removing the System Board

Remove the MDC Module and System Board according to the following procedures and Figure 4-24.

1. Remove two M2.5x4 screws securing the MDC module.
2. Remove the MDC module.
3. Disconnect six cables attached on the system board.
4. Remove three M2.5x4 screws on the system board.
5. Remove one M2.5x6 screw on the lower hinge cover.
6. Remove the system board.

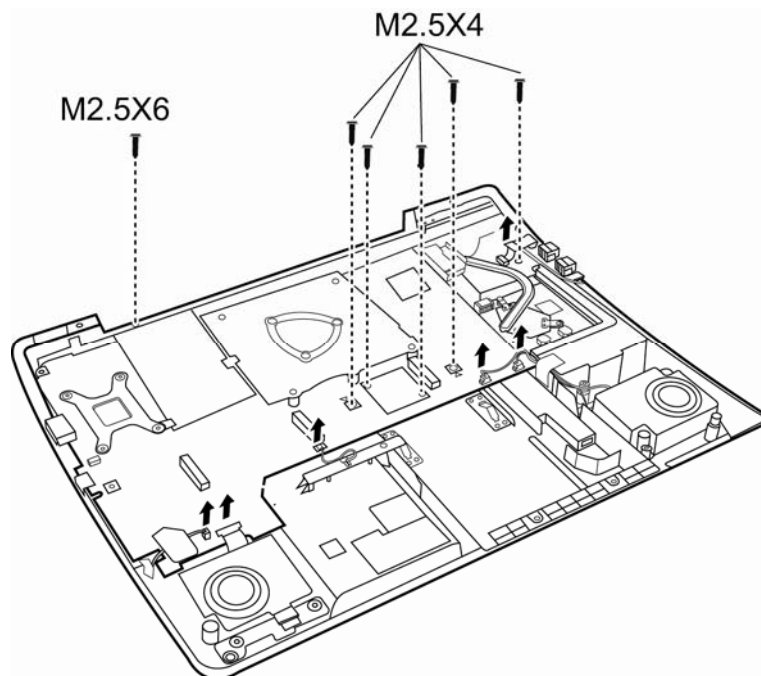


Figure 4-24 Removing the MDC Module and System Board

**Installing the MDC Module and System Board**

Install the MDC Module and System Board according to the following procedures and Figure 4-24.

1. Seat the system board in the correct place on the computer's base.
2. Secure one M2.5x6 screw on the lower hinge cover.
3. Secure the board to the computer's base with three M2.5x4 screws.
4. Connect six cables with the system board.
5. Seat the MDC Module in the correct place and secure them with two M2.5x4 screws.

## 4.18 VGA Board and VGA Cooling Module

### Removing the VGA Board and VGA Cooling Module

Remove the VGA Board and VGA Cooling Module according to the following procedures and Figure 4-25.

1. Remove four M2.5x4 screws on the VGA board.

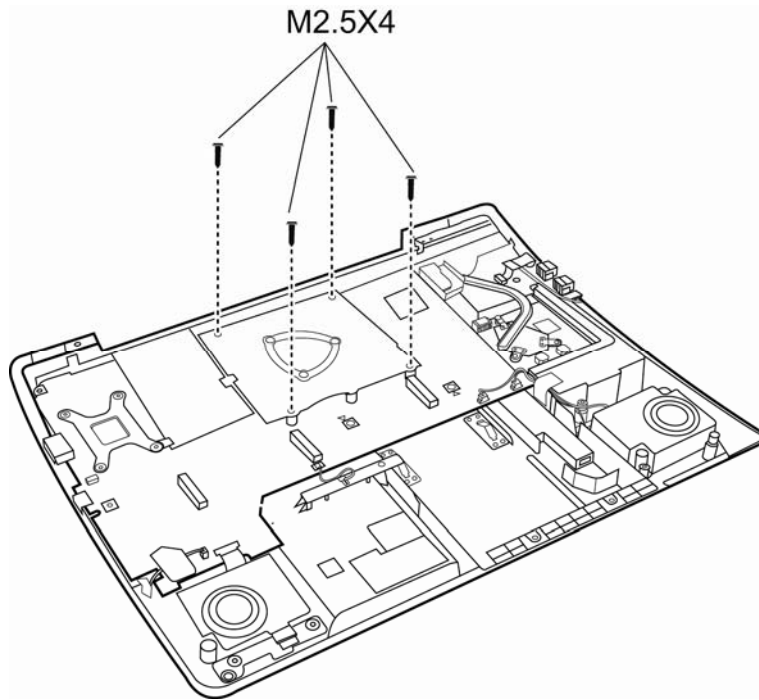
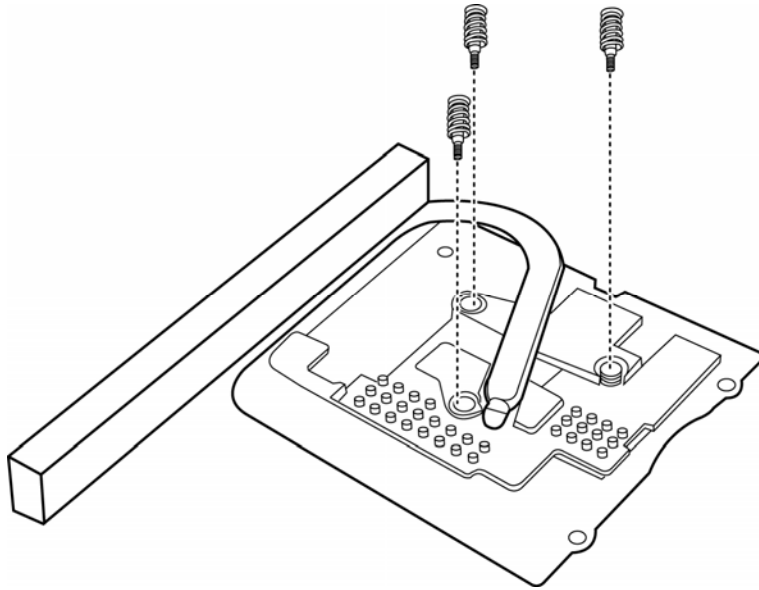


Figure 4-25 Removing VGA board screws

2. Remove three spring screws securing the VGA Cooling Module and VGA Board.

3. Remove the VGA cooling module from the VGA board.



*Figure 4-26 Removing the VGA Cooling Module and VGA Board*

### Installing the VGA Board and VGA Cooling Module

Install the VGA Board and VGA Cooling Module according to the following procedures and Figure 4-27.

1. Seat the VGA Cooling Module on the VGA board.
2. Secure the VGA board with three spring screws.
3. Secure the VGA board with four M2.5x4 screws.

**CAUTION:** If you remove the VGA Cooling Module, please use soft cloth with alcohol to clean the VGA board and VGA Cooling Module. Reapply Shinetsu 7762 grease before installing the VGA Cooling Module. If you use one new VGA Cooling module, please make sure remove the release paper firstly.

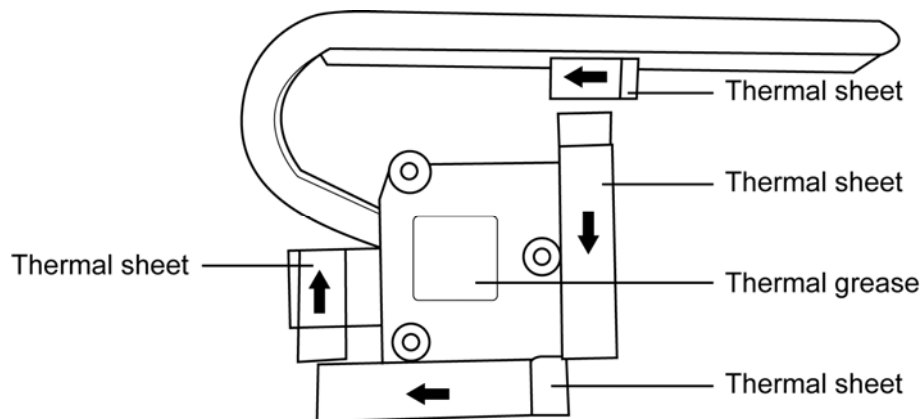


Figure 4-27 Removing the release paper from the VGA Cooling Module

## 4.19 CPU Cooling Module and Fan

### Removing the CPU Cooling Module and Fan

**CAUTION:**

When removing the cooling module, keep the following in mind:

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

Do not touch or cause damage to the fan in the cooling module.

Remove the CPU cooling module and fan according to the following procedures and Figures 4-28, 4-29.

1. Remove one M2x6 screws and four spring screws.

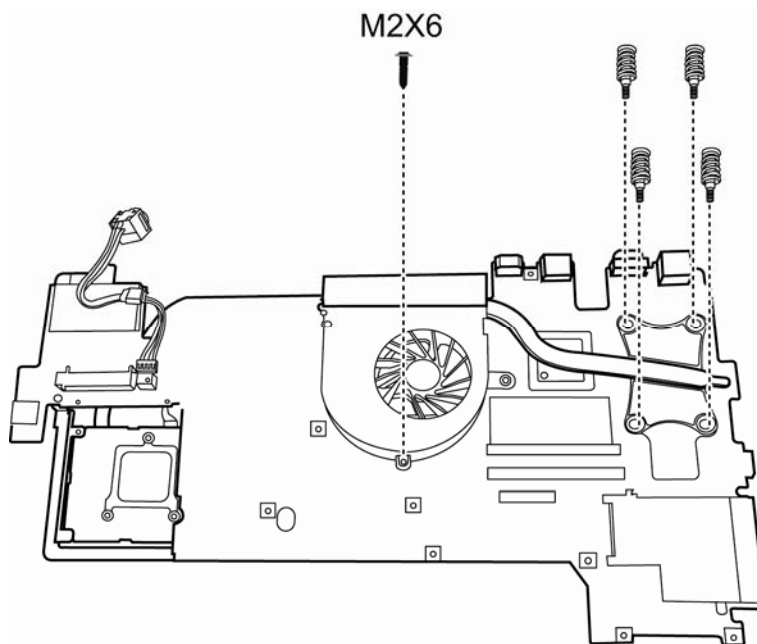
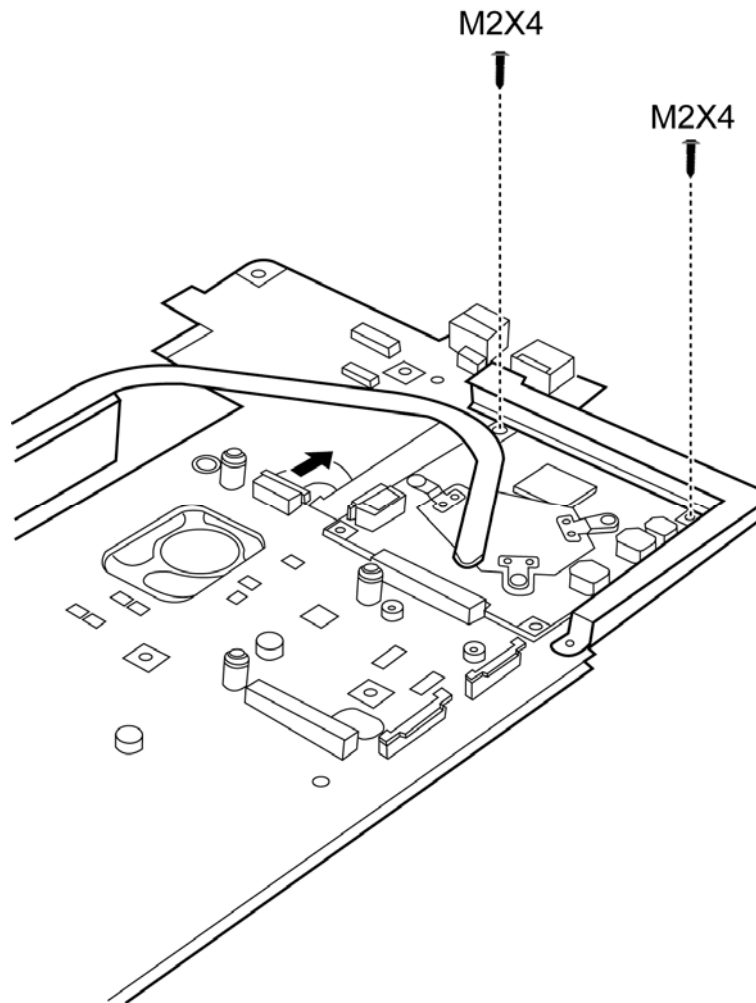


Figure 4-28 Removing the screws



2. Turn the board upside down.
3. Remove one cable connecting the cooling module.
4. Remove two M2x4 screws.
5. Remove the cooling module and fan.



*Figure 4-29 Removing the CPU cooling module and fan*

6. Remove three M2x4 screws from 3 to 1.

7. Remove the TMA thermal.

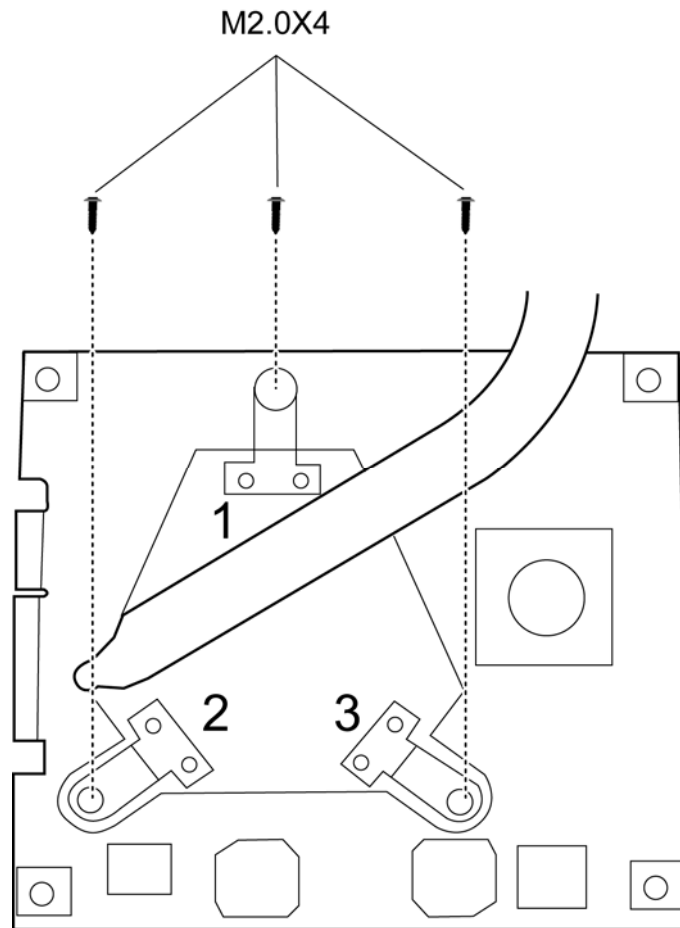


Figure 4-30 Removing the TMA thermal

## Installing the CPU Cooling Module and Fan

Install the cooling Module according to the following procedures and Figures 4-31.

1. Install the CPU cooling module into the correct position in the computer.
2. Seat the CPU cooling module and bracket in the correct position and secure them with two M2x4 screws.
3. Connect the cable to the cooling module.
4. Turn to the other side and seat the fans in the correct places.
5. Secure them with two M2x6 screws and four spring screws.

### **CAUTION:**

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

1. *Be sure to confirm the correct position for the module.*
2. *Secure the relevant screws on the main board according to the number sequence sealed on the heat sink module.*
3. *If you remove the CPU cooling Module, please use soft cloth with alcohol to clean the CPU and CPU Cooling Module. Reapply Shinetsu 7762 grease before installing the CPU Cooling Module. If you use one new CPU Cooling module, please make sure remove the release paper firstly.*

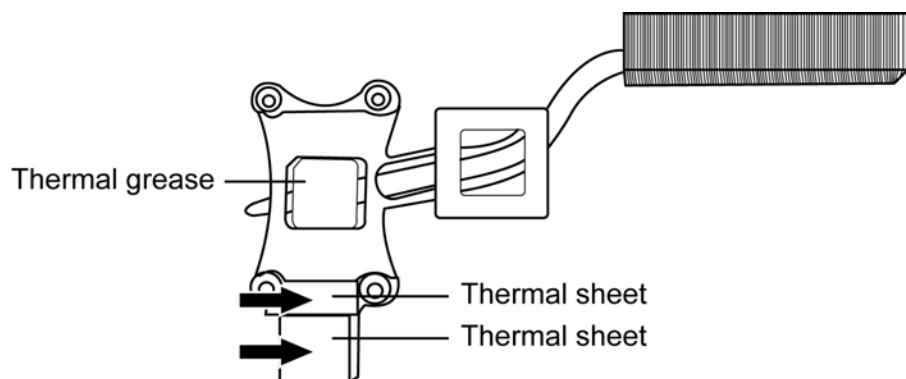


Figure 4-31 Removing the release paper from the CPU Cooling Module

## 4.20 CPU

### Removing the CPU

**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.

Remove the CPU according to the following procedures and Figures 4-32, 4-33 and 4-34.

1. Unlock the CPU by rotating the cam on the CPU socket to the left with a flat-blade screwdriver (in the order shown in the figure below).
2. Remove the CPU.

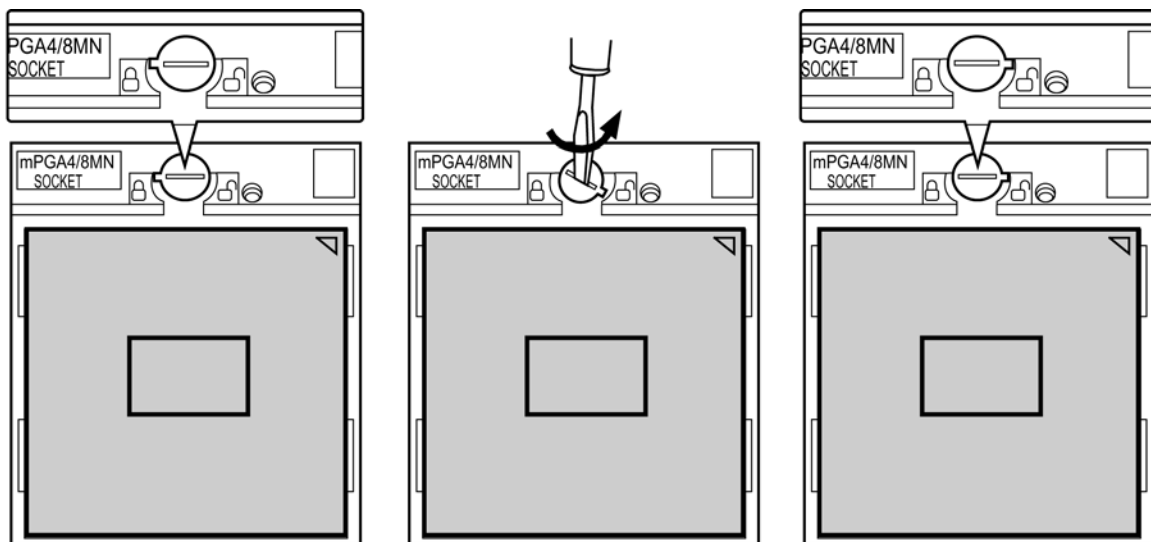


Figure 4-32 Removing the CPU

## Installing the CPU

Install the CPU according to the following procedures and Figures 4-29, 4-30.

1. Check that the triangle on the cam is in the unlock position.
2. Attach the CPU to the correct position in the CPU socket. Align the CPU with the CPU socket by using the triangle as a guide.

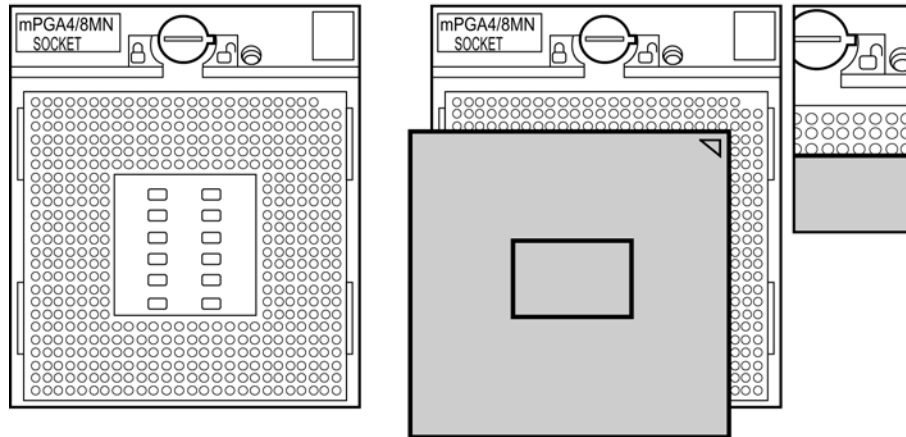
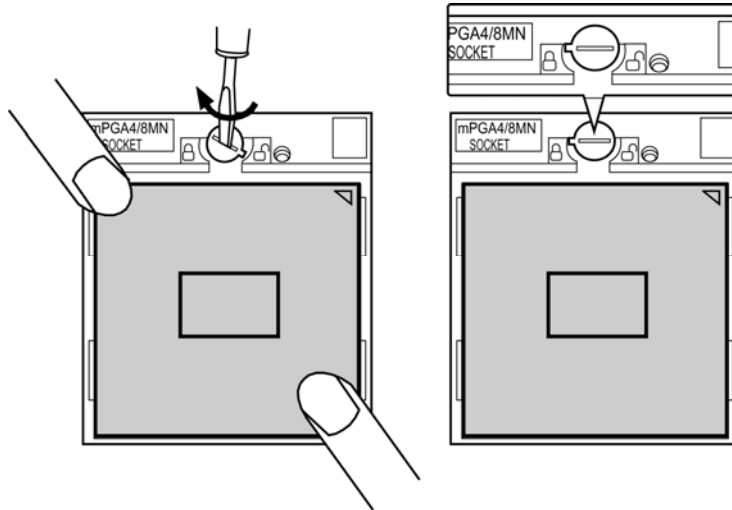


Figure 4-33 Installing the CPU

**CAUTION:** Seat the CPU by aligning the triangle with the shaded area.

3. Secure the CPU by rotating the cam to the right with a flat-blade screwdriver.



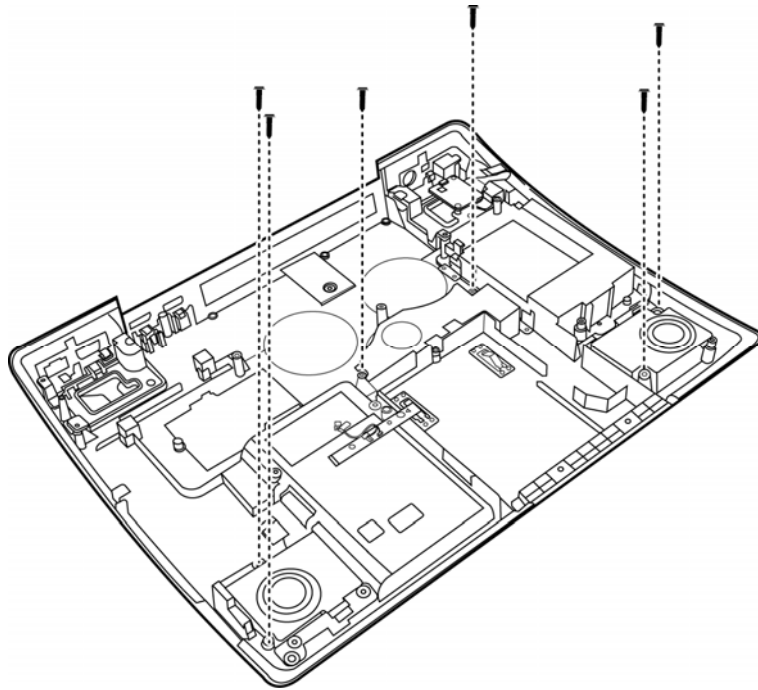
*Figure 4-34 Securing the CPU*

## **4.21 Sub-speakers and Sub-woofer**

### **Removing the Sub-speaker and Sub-woofer**

Remove the Sub-speakers and sub-woofer according to the following procedures and Figure 4-35.

1. Remove six screws (of a special size) on the bottom of the computer.
2. Remove the right and left sub-speakers and the subwoofer.



*Figure 4-35 Removing Sub-speakers and Sub-woofer*

### **Installing the Sub-speakers and Sub-woofer.**

Install the Sub-speakers and Sub-woofer according to the following procedures and Figure 4-35.

1. Seat the sub-speakers and sub-woofer in the correct places on the bottom of the computer.
2. Secure them with six screws (of a special size).

## 4.22 Bluetooth, Wi-Fi Switch, and Touch Pad LED Board

### Removing Bluetooth, Wi-Fi Switch, and Touch Pad LED Board

Remove Bluetooth, Wi-Fi Switch, and Touch Pad LED Board according to the following procedures and Figure 4-36.

1. Remove one M2.5x4 screw to separate the Wi-Fi Switch from the board.
2. Remove one M2.5x4 screw to separate the Touch Pad LED board.
3. Remove the Bluetooth card by lifting it up from the board with a gentle pull.

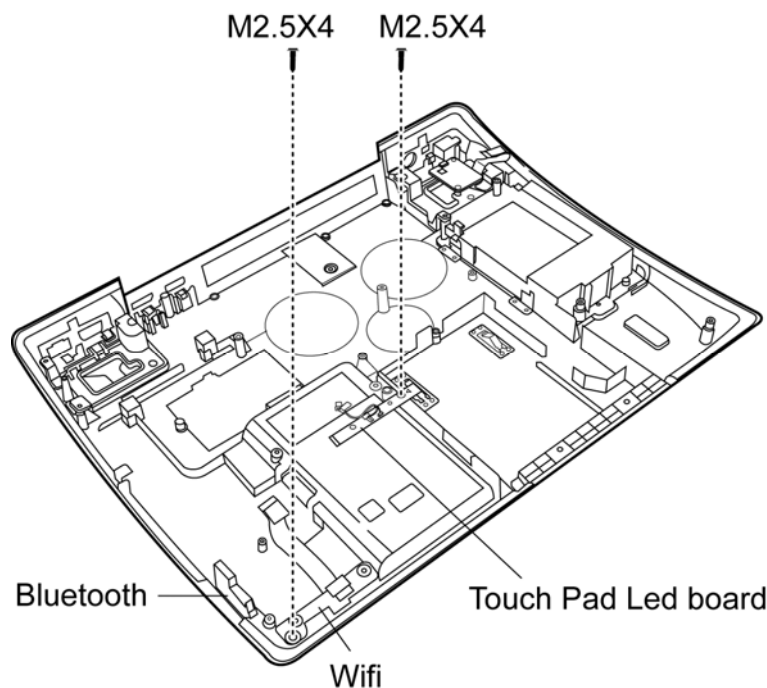


Figure 4-36 Removing Bluetooth, Wi-Fi Switch, and Touch Pad LED Board

### Installing Bluetooth, Wi-Fi Switch, and Touch Pad LED Board

Install Bluetooth, Wi-Fi Switch, and Touch Pad LED Board according to the following procedures and Figure 4-36.

1. Secure the Wi-Fi Switch to the board with one M2.5x4 screw.
2. Secure the Touch Pad LED board to the board with one M2.5x4 screw.
3. Gently push down the Bluetooth card into the bluetooth slot on the board.

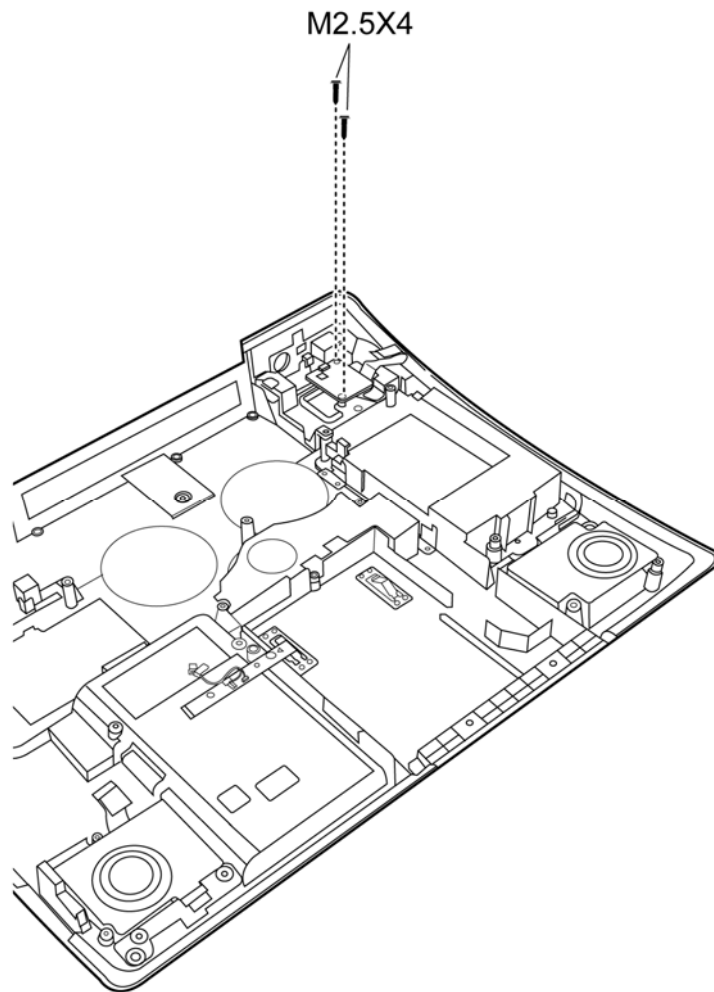


## **4.23 Bridge Media and FM Radio Modules**

### **Removing the Bridge Media module and FM Radio modules**

Remove the Bridge Media and FM Radio modules according to the following procedures and Figure 4-37.

1. Remove two M2.5x4 screws.
2. Remove the Bridge Media and FM Radio modules.



*Figure 4-37 Removing Bridge Media and FM Radio modules*

## 4.24 Display Mask

### Removing the Display Mask

Remove the display mask according to the following procedures and Figure 4-38.

1. Remove six mask seals from the display mask.
2. Remove six M2.5x6 screws.
3. Follow the direction indicated by arrows in the figure to apply some force to release the mask from the base.

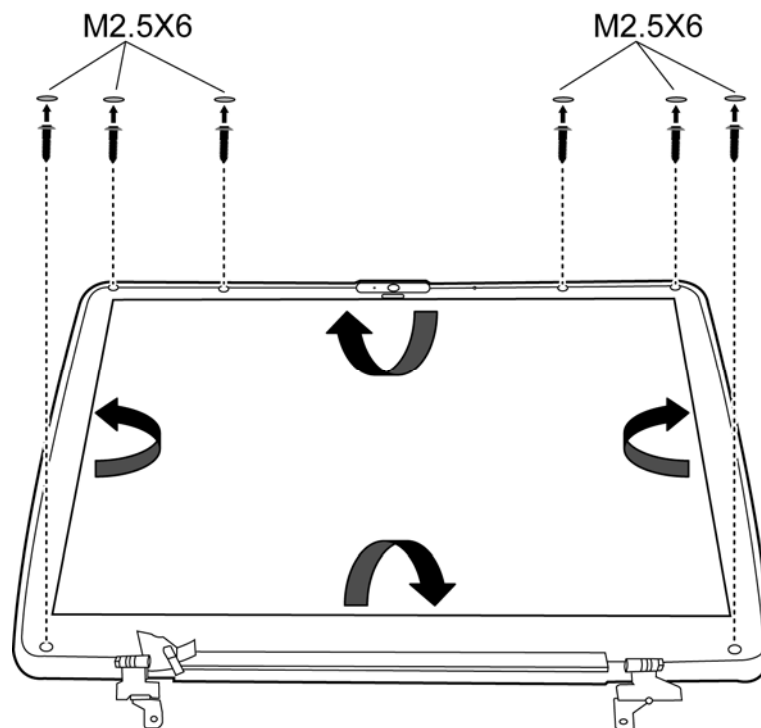


Figure 4-38 Removing the display mask

### **Installing the Display Mask**

Install the display mask according to the following procedures and Figure 4-38.

1. Seat the display mask in the correct position.
2. Secure the display module with six M2.5x6 screws.
3. Place the six mask seals on the screw holes.

## 4.25 FL Inverter Board

### Removing the FL Inverter Board

Remove the FL inverter board according to the following procedures and Figure 4-39.

1. Remove one M2x4 screw and disconnect wires.
2. Lift the LCD module and FL inverter board.

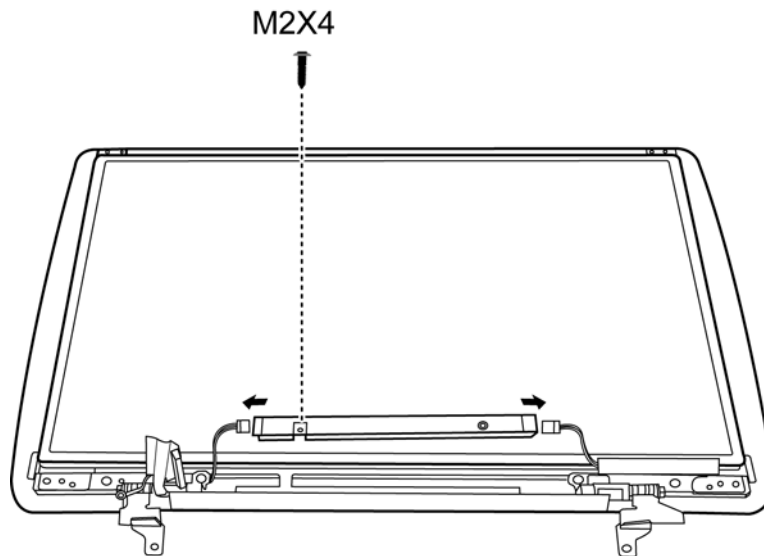


Figure 4-39 Removing the FL Inverter board

### Installing the FL Inverter Board

Install the FL inverter board according to the following procedures and Figure 4-39.

1. Seat the LCD module, FL inverter board in the correct position.
2. Secure the FL inverter board with one M2x4 screw and connect the wires.

## 4.26 CCD Board, MIC and Antenna

### Removing the CCD Board, MIC and Antenna

Remove the CCD Board, MIC and Antenna according to the following procedures and Figure 4-40.

1. Disconnect the CCD cable from the CCD module connector and remove the CCD board.

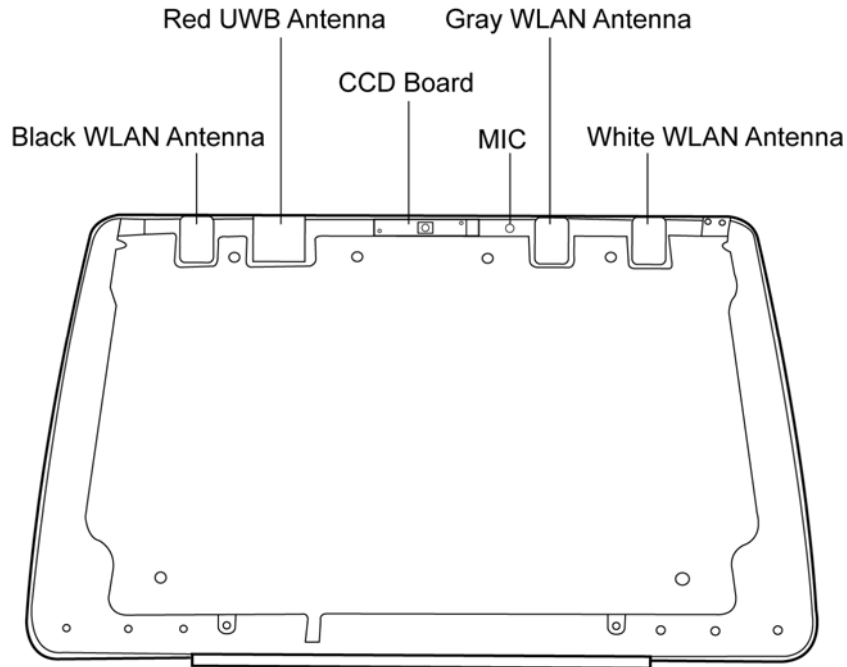


Figure 4-40 Removing the CCD board and MIC

2. Lift the MIC and antenna cable from the display rear cover.

### Installing the CCD Board, MIC and Antenna

Install the CCD Board, MIC and Antenna according to the following procedures and Figure 4-40.

1. Connect the CCD module cable to CCD module connector.
2. Seat the CCD module, MIC and antenna in the correct position.

## 4.27 LCD Modules

**NOTE:** ICs are fragile. Use extreme care not to apply pressure to the ICs along the edges of the LCD module.

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

**NOTE:** The LCD/FL cable must be carefully peeled away before disconnecting it from the module.

### Removing the 17.1-inch LCD module

Remove the 17.1-inch LCD module according to the following procedures and Figures 4-41, 4-42.

1. Remove six M2.5x6 screws on the top of the LCD bracket.
2. Remove six M2x3 screws on two sides of the LCD (three on each side).

3. Separate the LCD module.

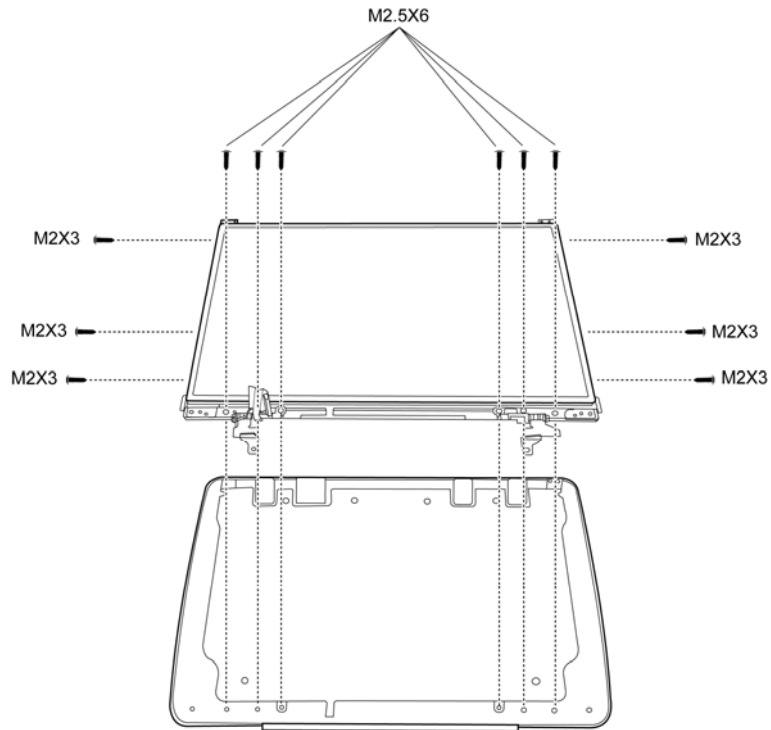


Figure 4-41 Removing the 17.1-inch LCD module and screws

4. Remove the tape and LCD/FL cable connector. Then disconnect the LCD/FL cable.

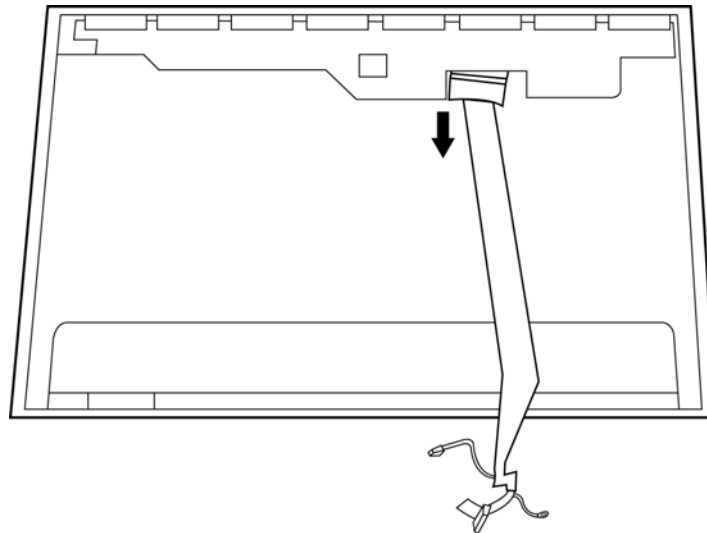


Figure 4-42 Removing the cable

### **Installing the 17.1-inch LCD Module**

**NOTE:** LCD/FL cable must be carefully peeled away before disconnecting it from the module.

Install the 17.1-inch LCD module according to the following procedures and Figures 4-41, 4-42.

1. Turn the LCD upside down.
2. Connect the LCD/FL cable to the LCD module connector.
3. Turn the LCD right side up.
4. Place the LCD bracket in the correct position and secure it with six M2x3 screws on two sides of the LCD.
5. Secure six M2.5x6 screws on the top of the LCD bracket.



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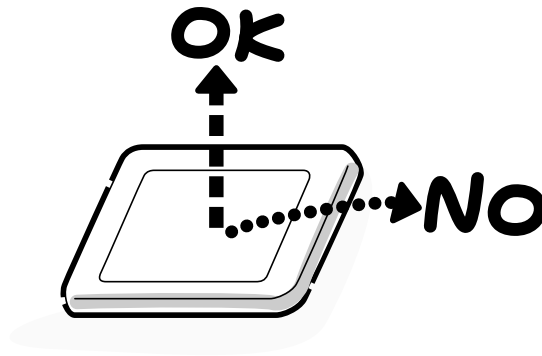
## Appendix A Handling the LCD Module

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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.

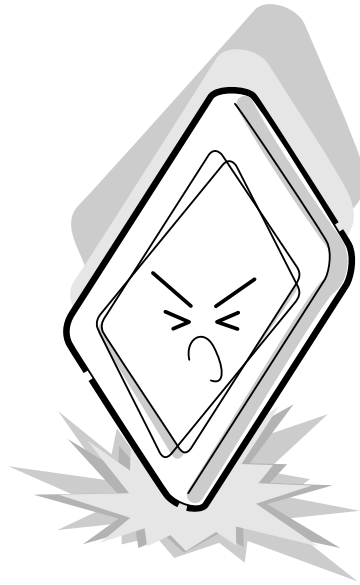
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a soft cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



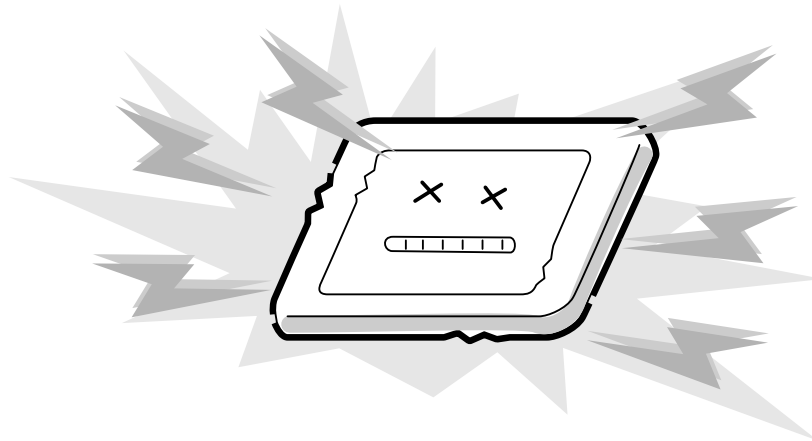
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



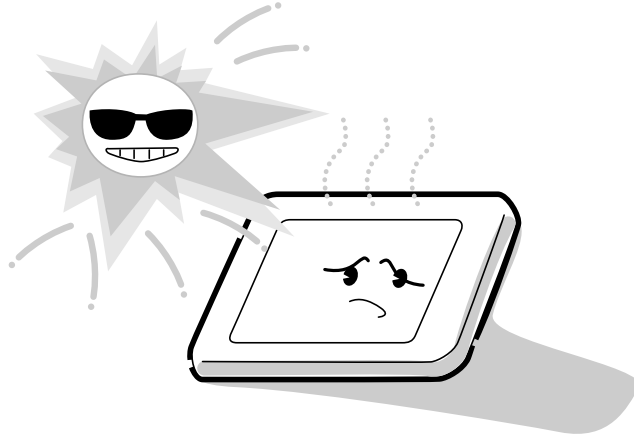
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



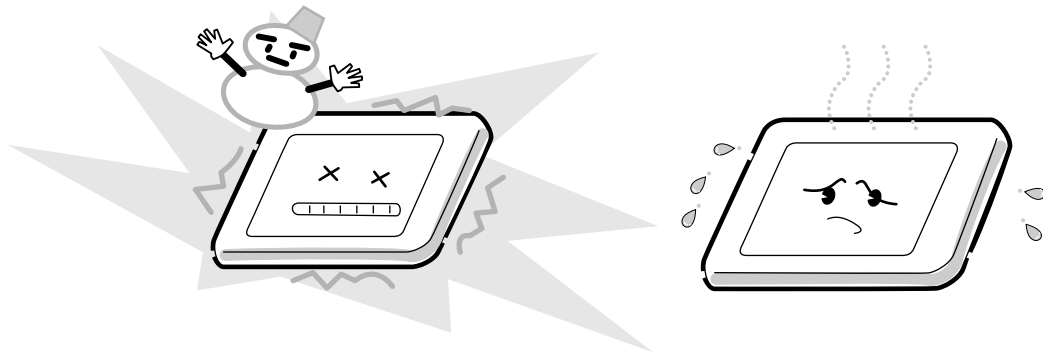
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.



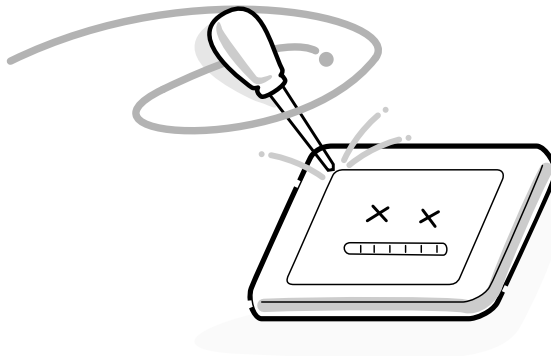
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



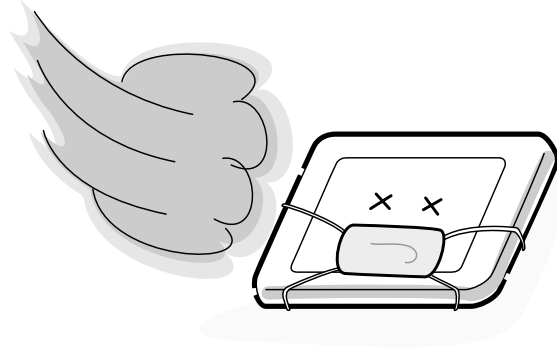
8. Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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

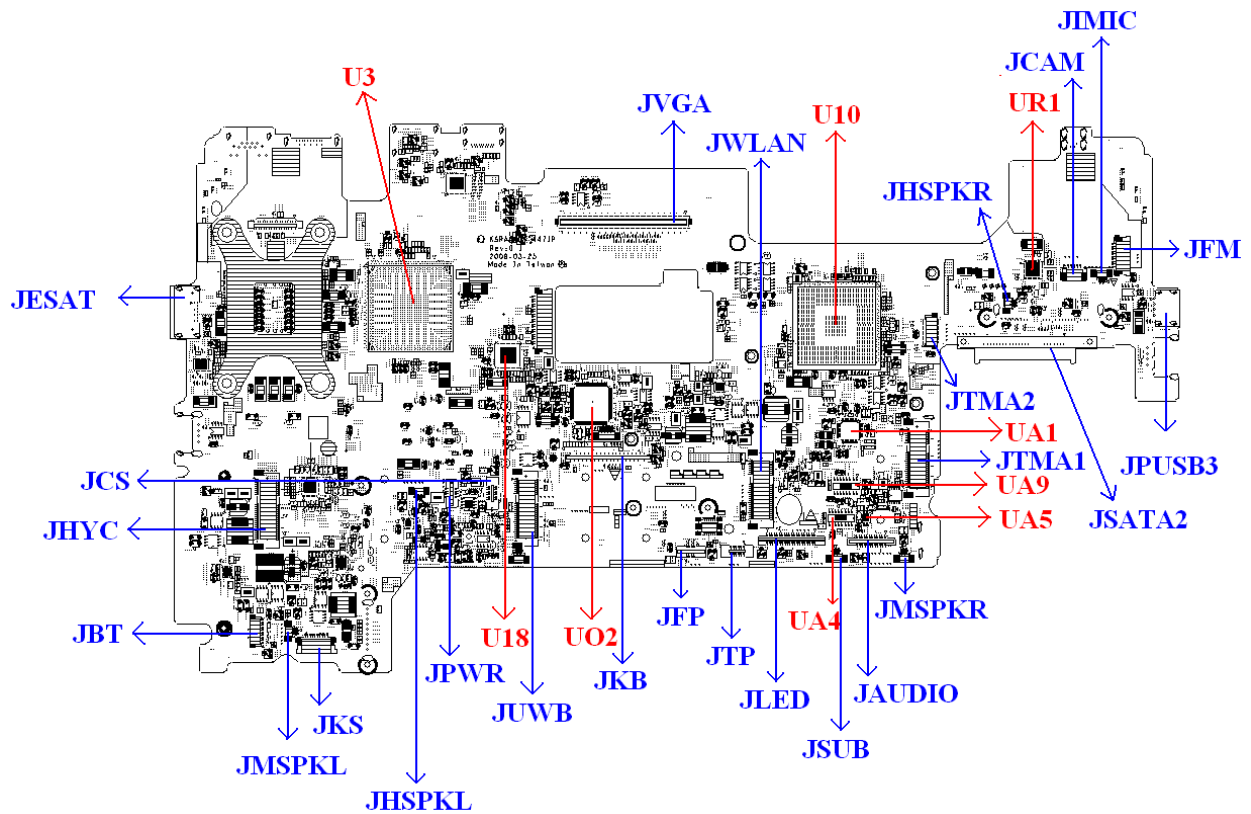


Figure B-1 System Board Layout (Top)

## B.2 System Board Bottom View

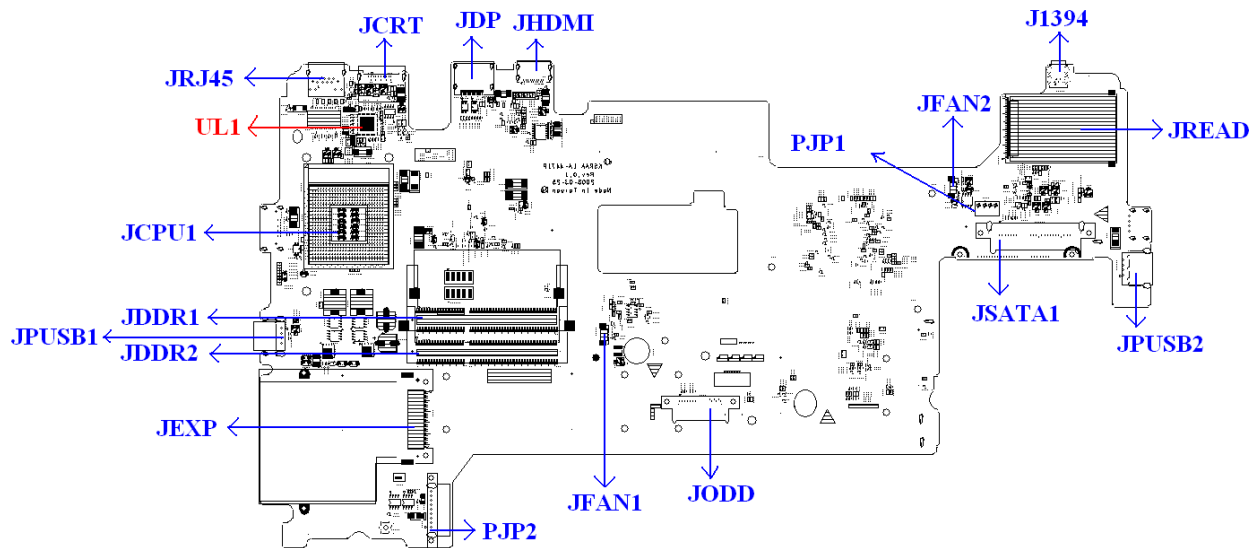


Figure B-2 System Board Layout (Bottom)

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

Number	Name
U3	North bridge Intel Cantiga PM
U10	South bridge Intel ICH9-M
UO2	EC ENE KB926
UL1	RTL8111C
UR1	Card Reader JMB280
UA1	HD Audio codec ALC268+272
UA4, UA9	Amplifier APA2068
UA5	Amplifier APA3011
U19	Clock Generator ICS9LPRS365BGLFT

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

<b>Number</b>	<b>Name</b>
JCPU1	CPU Socket
JFAN1, JFAN2	Fan conn.
JDDR1, JDDR2	DDRIII conn.
JCRT	CRT conn.
JVGA	VGA/B conn.
J1394	1394 conn.
JREAD	7 in 1 Card Reader conn.
JRJ45	RJ45 conn.
JIMIC	Microphone conn.
JTMA1, JTMA2	TMA conn.
JMSPKL, JHSPKL, JMSPKR, JHSPKR	Speaker conn.
JEXP	Express Card conn.
JWLAN	WLAN conn.
JSATA2	2 <sup>ND</sup> SATA HDD conn.
JSATA1	1 <sup>ST</sup> SATA HDD conn.
JODD	ODD conn.
JCAM	Camera conn.
JBT	Bluetooth conn.
JPUSB1, JPUSB2, JPUSB3	USB conn.
JFP	Fingerprint/B conn.
JKB	Keyboard conn.
JTP	TP/B conn.
JPWR	Power/B conn.
JUWB	UWB conn.
JKS	KillSwitch/B conn.
JLED	LED/B conn.
JCS	CapSensor/B conn.
JAudio	Audio/B conn.
JFM	FMTuner/B conn.
JESAT	ESATA conn.
JHYC	Robson/B conn.



JSUB	Sub-woofer conn.
PJP1	AC Adaptor conn.
PJP2	Battery conn.

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## Appendix C Pin Assignments

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### System Board

#### C.1 JP3,JP4

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

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

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

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

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

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

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

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

## C.2 JP5

Table C-2 RGB I/F pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+5VS	-	2	DSUB_15_CLK	I/O
3	DSUB_12_DAT A	I/O	4	CRT_VSYNC	O
5	CRT_HSYNC	O	6	GND	-
7	CRT_B_L	O	8	DSUB_12_DATA	I/O
9	CRT_B_L	O	10	GND	-
11	CRT_B_L	O	12	GND	-

### C.3 JP10

Table C-3 2nd HDD I/F pin assignments (22-pin)

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

### C.4 JP11

Table C-4 1st HDD I/F pin assignments (22-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	A+	
3	A-		4	GND	
5	B-		6	B+	
7	GND		8	V33	
9	V33		10	V33	
11	GND		12	GND	
13	GND		14	V5	
15	V5		16	V5	
17	GND		18	NC	
19	GND		20	NC	
21	NC		22	NC	-

## C.5 JP12

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

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NC	I	2	NC	I
3	NC	-	4	NC	-
5	IDE_ODDRST#	O	6	IDE_DD8	I/O
7	IDE_DD7	I/O	8	IDE_DD9	I/O
9	IDE_DD6	I/O	10	IDE_DD10	I/O
11	IDE_DD5	I/O	12	IDE_DD11	I/O
13	IDE_DD4	I/O	14	IDE_DD12	I/O
15	IDE_DD3	I/O	16	IDE_DD13	I/O
17	IDE_DD2	I/O	18	IDE_DD14	I/O
19	IDE_DD1	I/O	20	IDE_DD15	I/O
21	IDE_DD0	I/O	22	IDE_DDREQ	I
23	GND	-	24	IDE_DIOR#	O
25	IDE_DIOW#	O	26	GND	O
27	IDE_DIORDY	I	28	IDE_DDACK#	O
29	IDE_IRQ	I	30	NC	O
31	IDE_DA1	O	32	+5VS	-
33	IDE_DA0	O	34	IDE_DA2	I
35	IDE_DCS1#	O	36	IDE_DCS3#	-
37	+5VS	-	38	+5VS	O
39	+5VS	-	40	+5VS	-
41	+5VS	-	42	+5VS	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	SEC_CSEL	-	48	GND	-
49	NC	-	50	NC	-
53	NC		54	NC	



## C.6 JP15

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

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

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

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

## C.6 JP16

Table C-6 New Card I I/F pin assignments (26-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USB20_N9	I/O
3	USB20_P9	I/O	4	CP_USB#	O
5	NC	-	6	NC	-
7	ICH_SMBCLK	O	8	ICH_SMBDATA	I/O
9	+1.5VS_CARD	O	10	+1.5VS_CARD	O
11	EC_SWI#	O	12	+3VALW_CARD	O
13	PERST#	O	14	+3VS_CARD	O
15	+3VS_CARD	O	16	CLKREQ#	I
17	EXP_CPPE#	O	18	CLK_PCIE_CARD#	O
19	CLK_PCIE_CARD	O	20	GND	-
21	PCIE_PTX_C_IRX_N1	O	22	PCIE_PTX_C_IRX_P1	O
23	GND	-	24	PCIE_ITX_C_PRX_N1	I
25	PCIE_ITX_C_PRX_P1	I	26	GND	-

## C.7 JP9

Table C-7 LCDS I/F (40-pin)

Pin No.	Signal name	Function
1	+INV	Power for Panel
2	+INV	Power for Panel
3	+INV	Power for Panel
4	+INV	Power for Panel
5	NC	Non-Connection
6	NC	Non-Connection
7	GND	GND
8	GND	GND
9	VGA_TXOUT0-	Panel Data Signals
10	+LCDVDD	Power for Panel
11	VGA_TXOUT0+	Panel Data Signals
12	+LCDVDD	Power for Panel
13	VGA_TXOUT2-	Panel Data Signals
14	+3VS	Power for Panel
15	VGA_TXOUT2+	Panel Data Signals
16	INVT_PWM	Power for Panel
17	VGA_TXOUT1-	Panel Data Signals
18	DISPOFF#	LCD back light
19	VGA_TXOUT1+	Panel Data Signals
20	DAC_BRIG	Inverter Control signal
21	GND	GND
22	GND	GND
23	VGA_TXCLK-	Panel Clock Signals
24	VGA_LCD_CLK	LCD back light
25	VGA_TXCLK+	Panel Clock Signals
26	VGA_LCD_DATA	LCD DATA
27	GND	GND
28	GND	GND
29	VGA_TZOUT1+	Panel Data Signals
30	GND	GND
31	VGA_TZOUT1-	Panel Data Signals
32	GND	GND

33	VGA_TZOUT2+	Panel Data Signals
34	GND	GND
35	VGA_TZOUT2-	Panel Data Signals
36	GND	GND
37	VGA_TZOUT0+	Panel Data Signals
38	VGA_TZCLK-	Panel Clock Signals
39	VGA_TZOUT0-	Panel Data Signals
40	VGA_TZCLK+	Panel Clock Signals

## C.8 JP41,JP42

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

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

## C9 JP37

*Table C-9 K/B connector pin assignments (34-pin)*

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

33	KSO16	O	34	+3VS	I
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## C.10 JP39

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

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	RES0	-
3	IAC_SDATA_OUT	O	4	RES1	-
5	GND	-	6	3.3V	O
7	IAC_SYNC	I/O	8	GND	-
9	IAC_SDATA_IN	I/O	10	GND	-
11	IAC_RESET	I/O	12	IAC_BITCLK	I/O

## C.11 PJP1

*Table C-11 AC Adaptor Connector pin assignments (4-pin)*

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

## C.12 PJP2

*Table C-12 Battery Connector pin assignments (11-pin)*

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	GND	
3	EC_SMCA	I/O	4	EC_SMDA	I/O
5	BATT_TEMPA	I	6	B/I	I
7	ID	I	8	BATT_S1	I/O
9	BATT_S1	I/O			

## C.12 JP18

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

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	AGND	-	2	MIC1_L_1	I
3	MIC1_R_1	I	4	MIC_SENSE	I

5	GND	-	6	NC	-
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### C.13 JP21

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

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	HPL	O
3	HPR	O	4	HP_SENSE	I
5	GND	-	6	NC	-

## Appendix D Keyboard Scan/Character Codes

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

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
01	' ~	29	A9	0E	F0	0E
02	1 !	02	82	16	F0	16
03	2 @	03	83	1E	F0	1E
04	3 #	04	84	26	F0	26
05	4 \$	05	85	25	F0	25
06	5 %	06	86	2E	F0	2E
07	6 ^	07	87	36	F0	36
08	7 &	08	88	3D	F0	3D
09	8 *	09	89	3E	F0	3E
10	9 (	0A	8A	46	F0	46
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
24	I	17	97	43	F0	43
25	O	18	98	44	F0	44
26	P	19	99	4D	F0	4D
27	[ {	1A	9A	54	F0	54
28	] }	1B	9B	5B	F0	5B

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

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
29	\	2B	AB	5D	F0	5D	*5
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	
38	K	25	A5	42	F0	42	
39	L	26	A6	4B	F0	4B	
40	; :	27	A7	4C	F0	4C	
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	
53	, <	33	B3	41	F0	41	
54	. >	34	B4	49	F0	49	
55	/ ?	35	B5	4A	F0	4A	
57	Shift (R)	36	B6	59	F0	59	
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	



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

Cap No.	Keypop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
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
90	Num Lock	45	C5	77	F0	77	*2
91	Numeric 7	47	C7	6C	F0	6C	*2
92	Numeric 4	4B	CB	6B	F0	6B	*2
93	Numeric 1	4F	CF	69	F0	69	*2
95	Numeric /	E0 35	E0 B5	E0 4A	E0 F0	4A	*2
96	Numeric 8	48	C8	75	F0	75	*2
97	Numeric 5	4C	CC	73	F0	73	*2
98	Numeric 2	50	D0	72	F0	72	*2
99	Numeric 0	52	D2	70	F0	70	*2
100	Numeric *	37	B7	7C	F0	7C	*2
101	Numeric 9	49	C9	7D	F0	7D	*2
102	Numeric 6	4D	CD	74	F0	74	*2
103	Numeric 3	51	D1	7A	F0	7A	*2
104	Numeric .	53	D3	71	F0	71	*2
105	Numeric -	4A	CA	7B	F0	7B	*2
106	Numeric +	4E	CE	79	F0	79	*2
108	Numeric Enter	E0 1C	E0 9C	E0 5A	E0 F0	5A	*2
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	

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		
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		
122	F11	57		D7		78		F0 78		
123	F12	58		D8		07		F0 07		
124	PrintSc	*6		*6		*6		*6		*6
125	Scroll Lock	46		C6		7E		F0 7E		
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. \* Change to Arrow function mode when Numlock Off..
3. \* Combination with the **Fn** key gives different codes.
4. \* The **Fn** key does not generate a code by itself.
5. \* This key corresponds to key No. 42 in a 102-key model.
6. \* Refer to Table D-6, No. 124 key scan code.
7. \* Refer to Table D-7, No. 126 key scan code.

Table D-2 Scan codes with left Shift key

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

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

	With left <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 Function of Numeric key for Numlock On/Off mode

Cap No.	Key top	Numlock On	Numlock Off
90	Num Lock	Numlock Off	Numlock On
91	Numeric 7	7	HOME
92	Numeric 4	4	←
93	Numeric 1	1	END
95	Numeric /	/	/
96	Numeric 8	8	↑
97	Numeric 5	5	NULL
98	Numeric 2	2	↓
99	Numeric 0	0	INS
100	Numeric *	*	*
101	Numeric 9	9	PGUP
102	Numeric 6	6	→
103	Numeric 3	3	PGDN
104	Numeric .	.	DEL
105	Numeric -	-	-
106	Numeric +	+	+
108	Numeric Enter	Enter	Enter

Table D-4 Scan codes in Numlock mode

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

Cap No.	Keytop	Code set 1				Code set 2			
		Make		Break		Make		Break	
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A				
58	L-CTRL	E0 1D	E0 9D	E0 14	E0 F0 14				
60	L-ALT	E0 38	E0 B8	E0 11	E0 F0 11				

Table D-6 No.124 key scan code

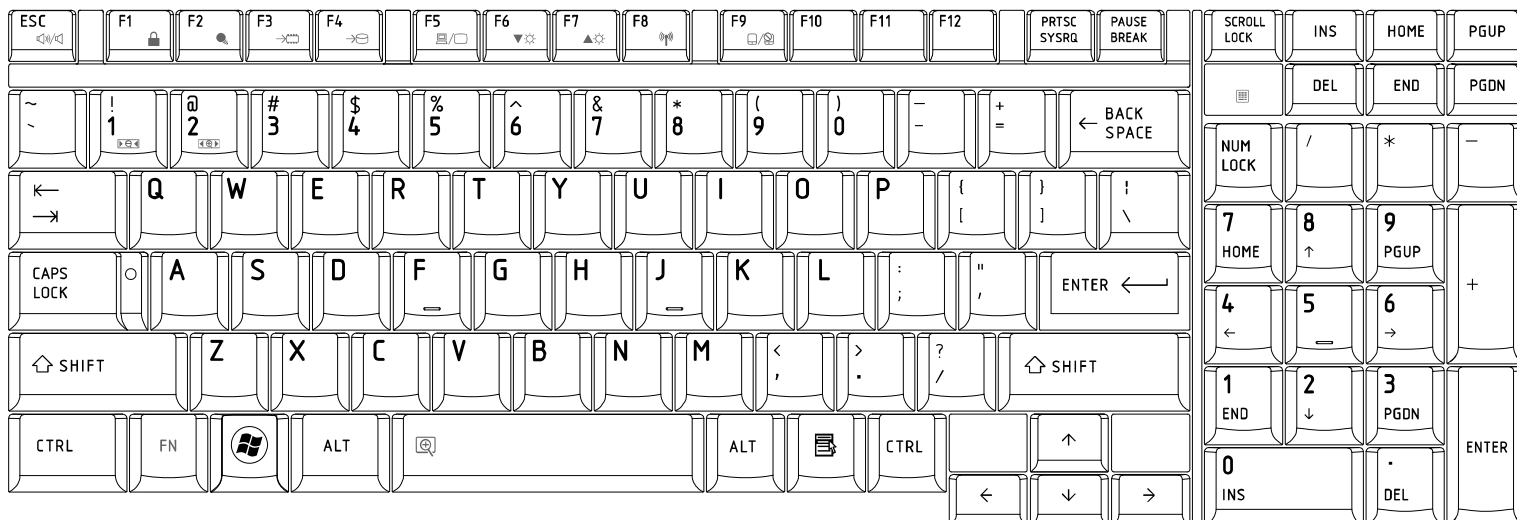
Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A E0 37	E0 B7 E0 AA	E0 12 E0 7C	E0 F0 7C E0 F0 12				
	Ctrl +	E0 37	E0 B7	E0 7C	E0 F0 7C				
	Shift +	E0 37	E0 B7	E0 7C	E0 F0 7C				
	Alt +	54	D4	84	F0 84				

Table D-7 No.126 key scan code

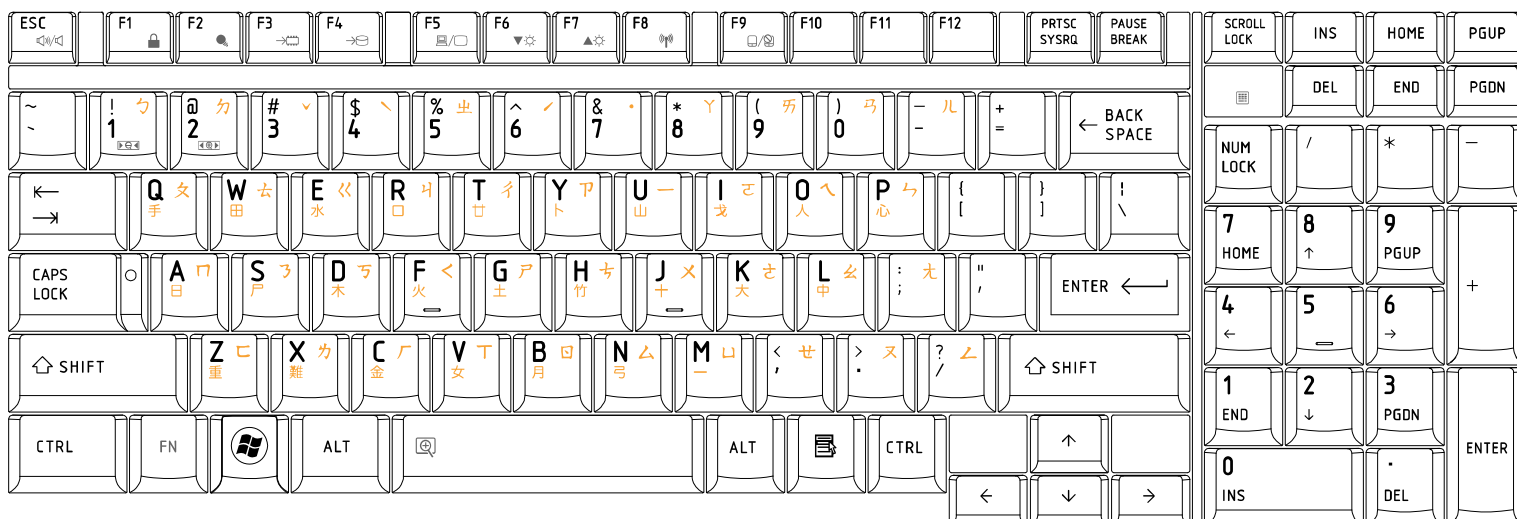
Key top	Shift	Code set 1				Code set 2			
		Make				Make			
Pause	Common	E1 1D 45 E1 9D C5	E1 14 77 E1 F0 14 F0 77						
	Ctrl	E0 46 E0 C6	E0 7E E0 F0 7E						

\*: This key generates only make codes.

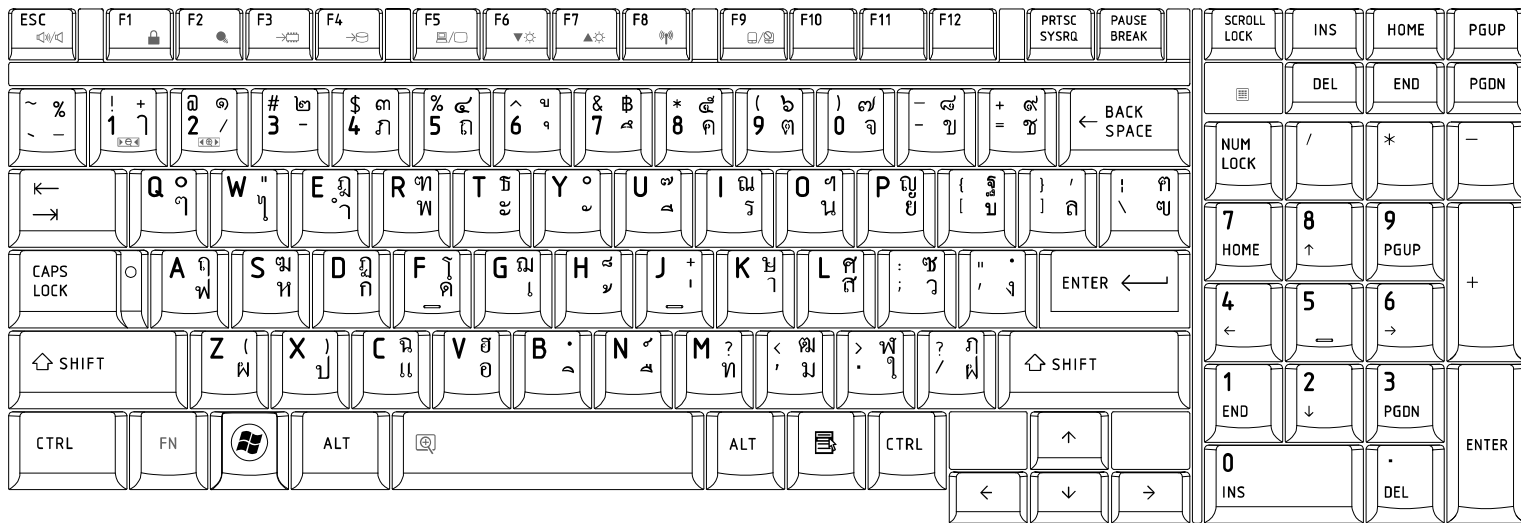
# 1. United Status (US) Keyboard



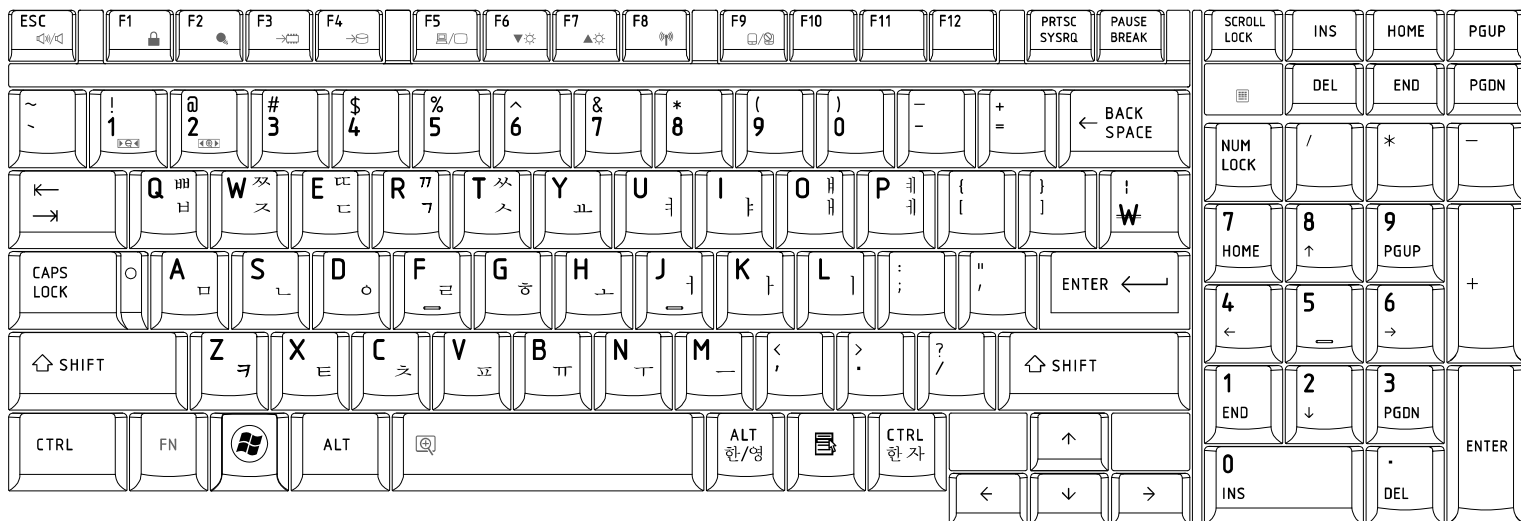
# 2. Traditional Chinese (CH) Keyboard



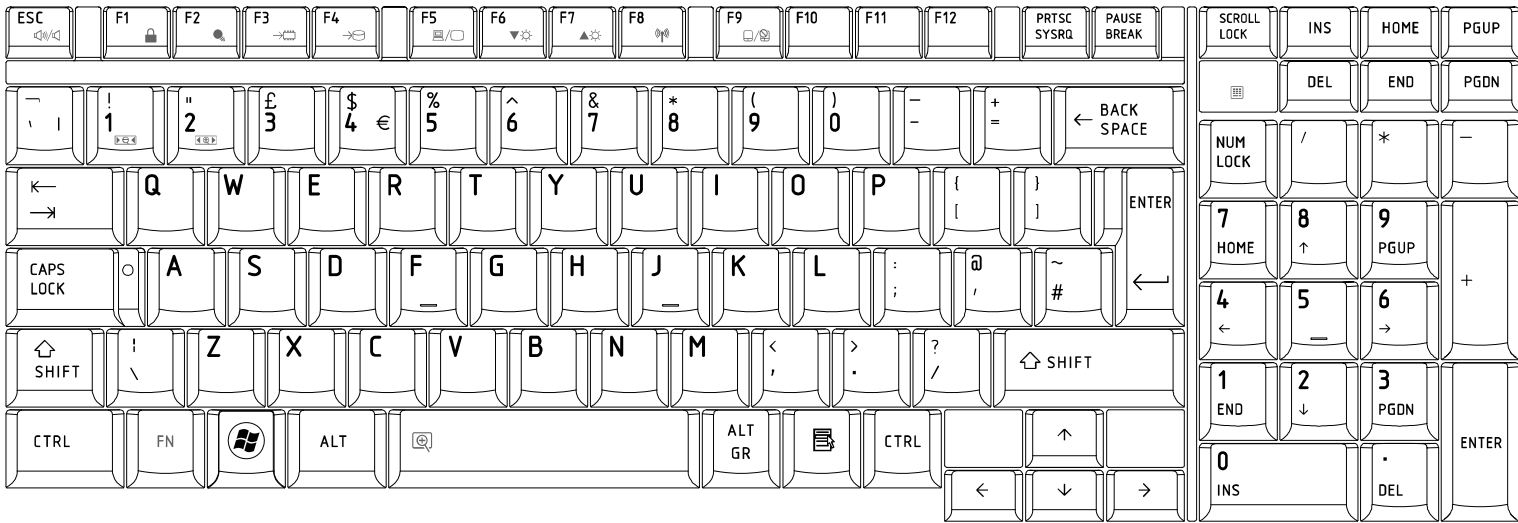
### 3. Thai (TI) Keyboard



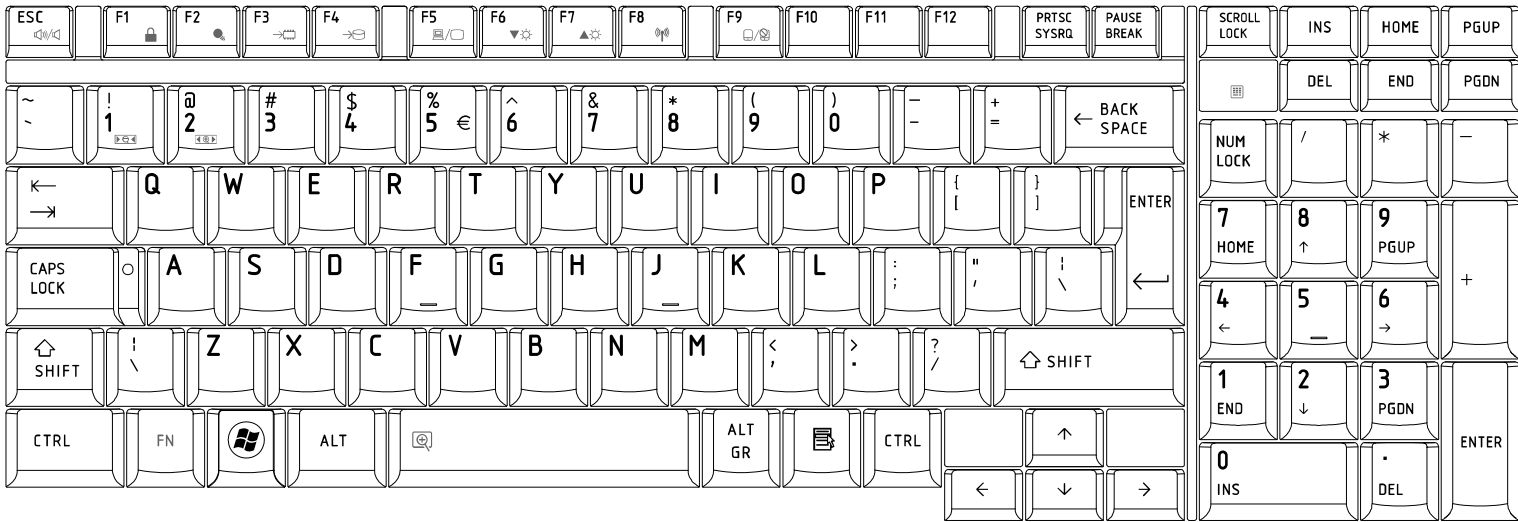
### 4. Korean (KO) Keyboard



## 5. United Kingdom (UK) Keyboard

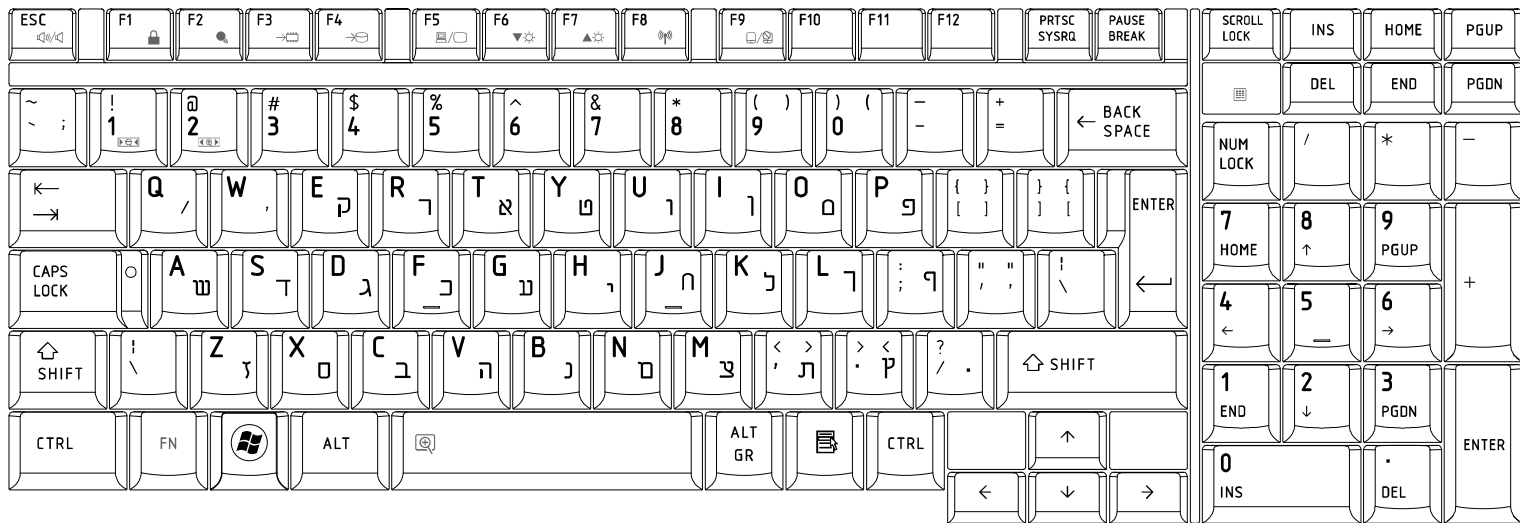


## 6. US International (UI) Keyboard





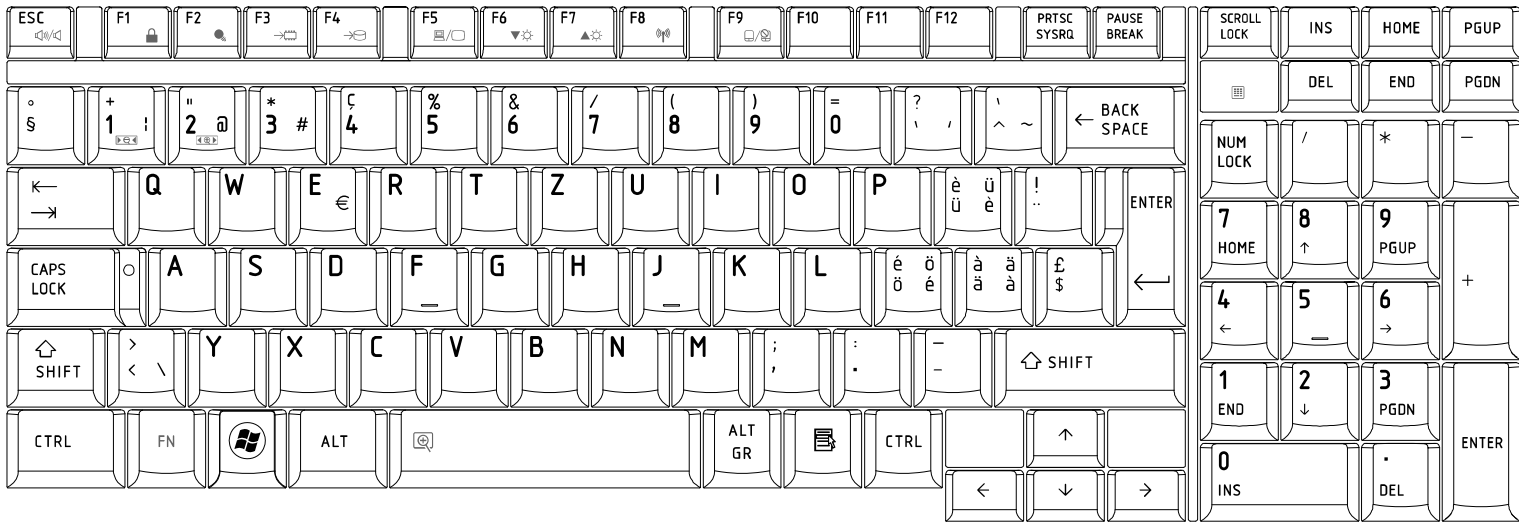
## 7. Hebrew (HB) Keyboard



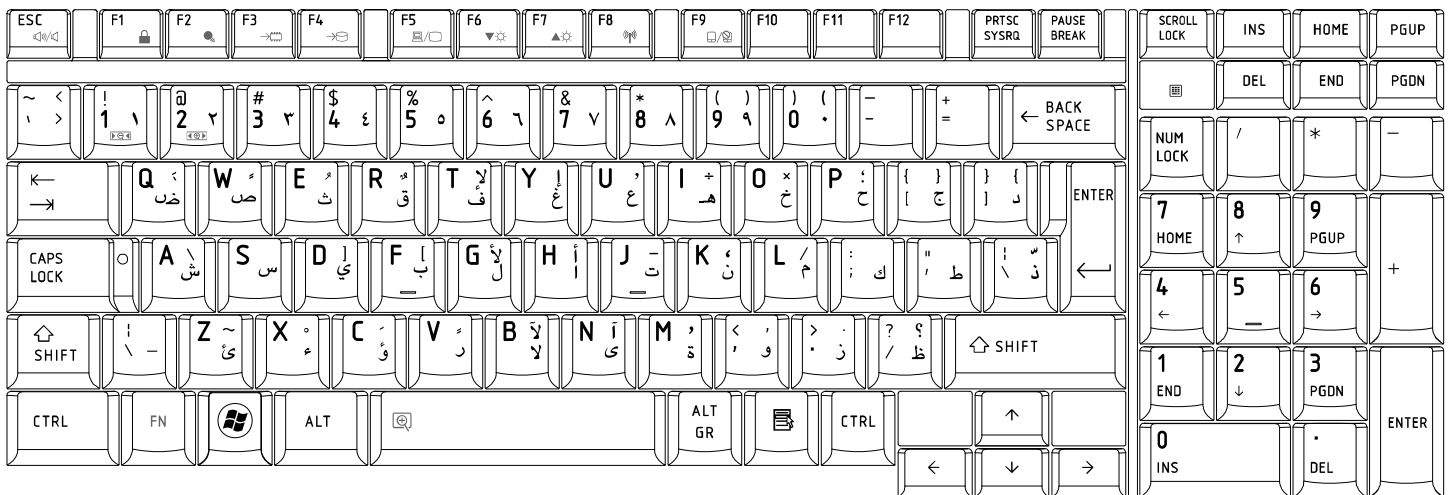
## 8. Danish (DM) Keyboard



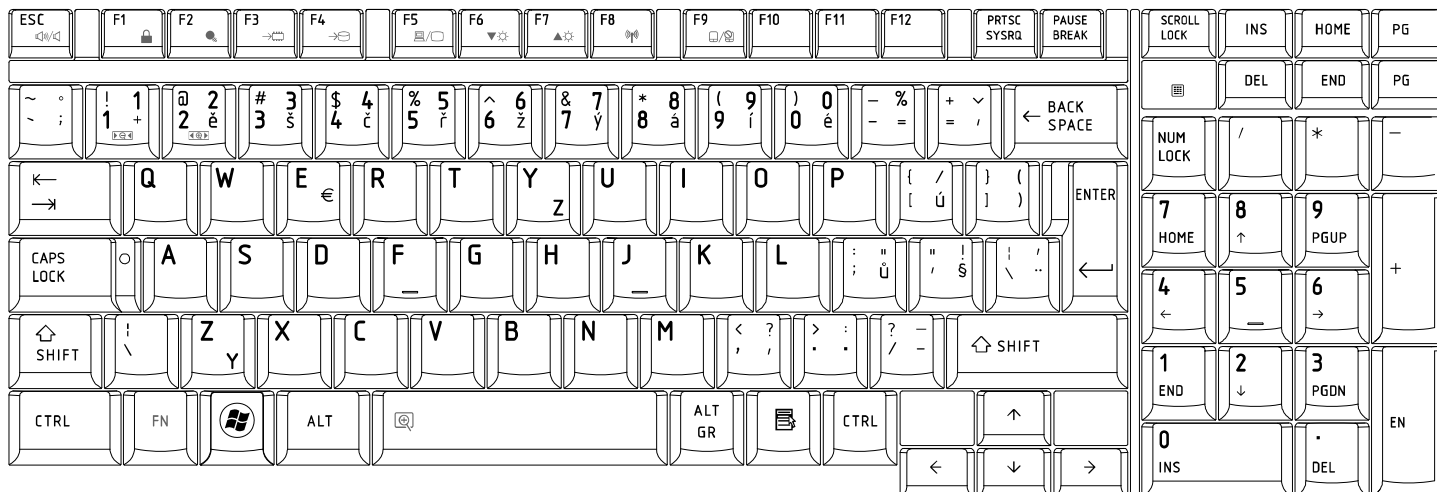
## 9. Swiss (SW) Keyboard



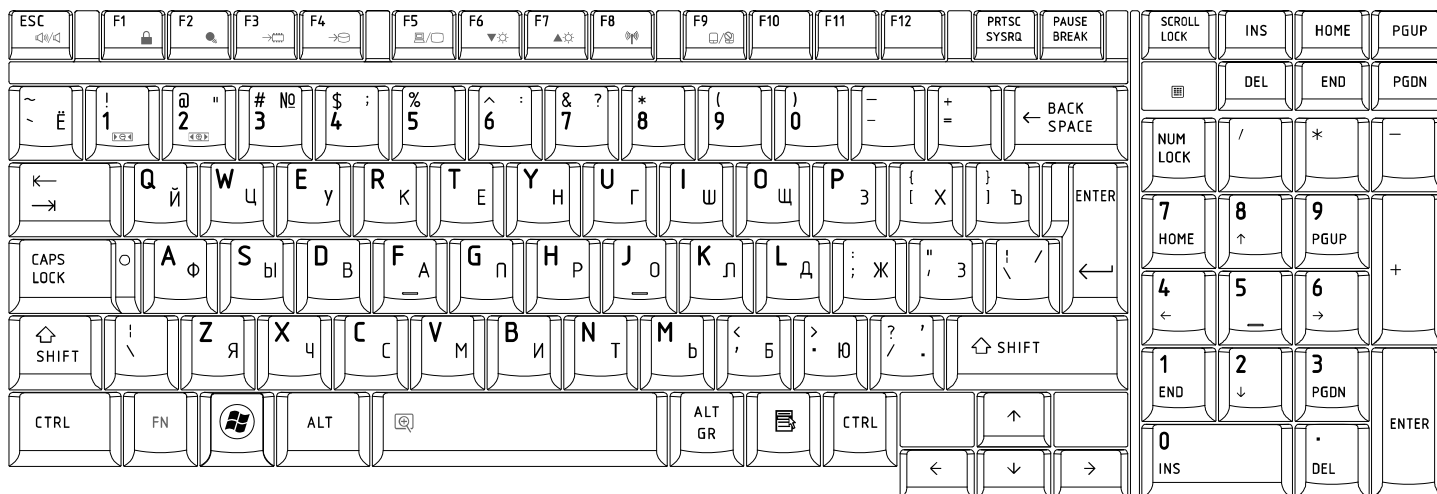
## 10. Arabic (ARE) Keyboard



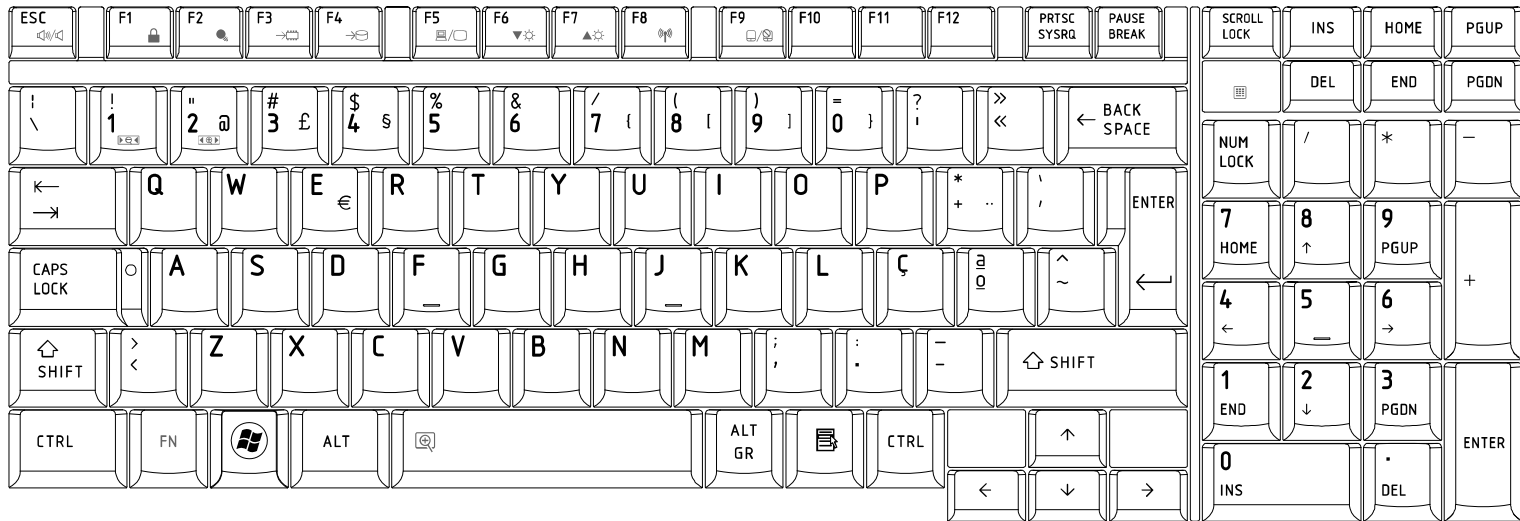
## 11. Czech (CZ) Keyboard



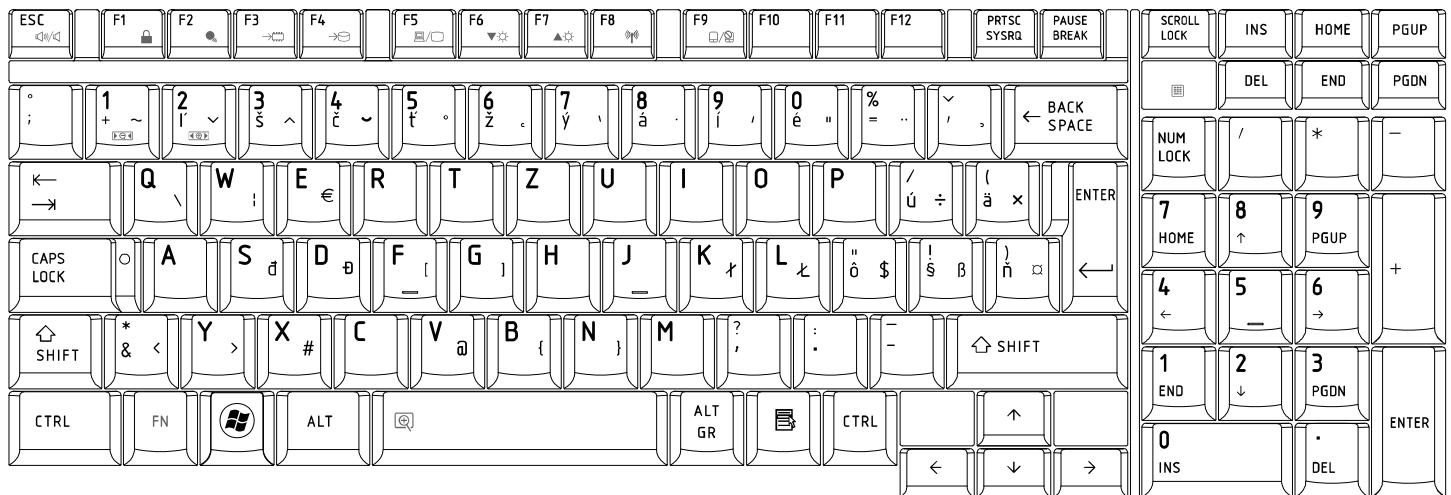
## 12. Russian (RU) Keyboard



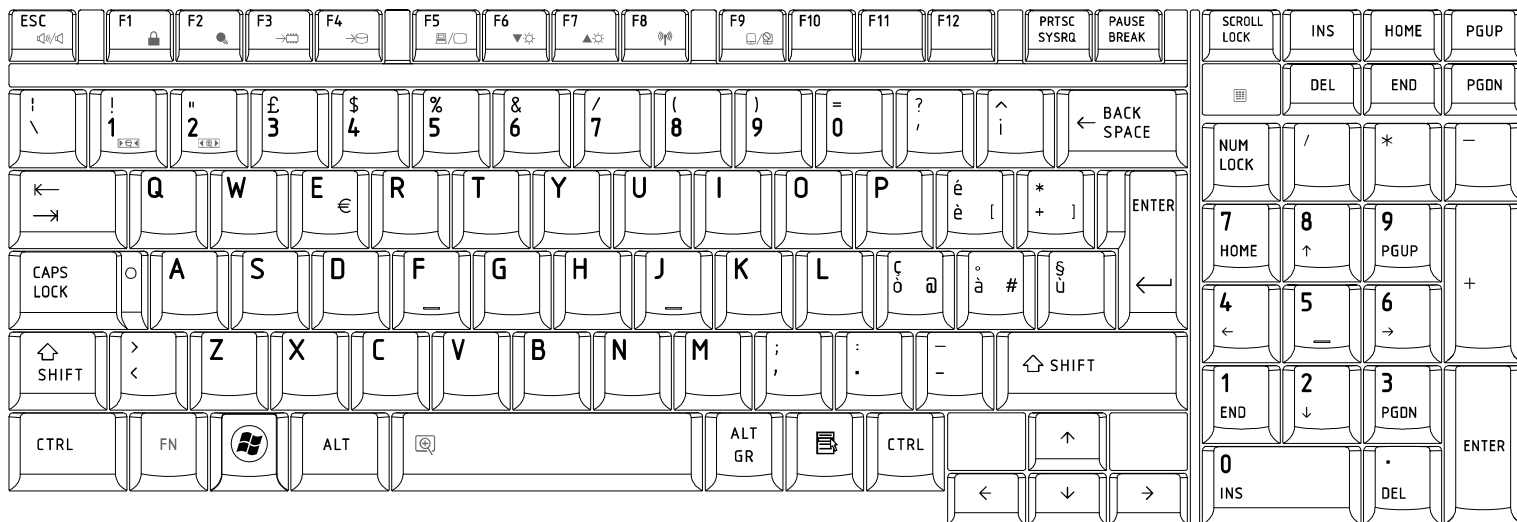
## 13. Portuguese (P0) Keyboard



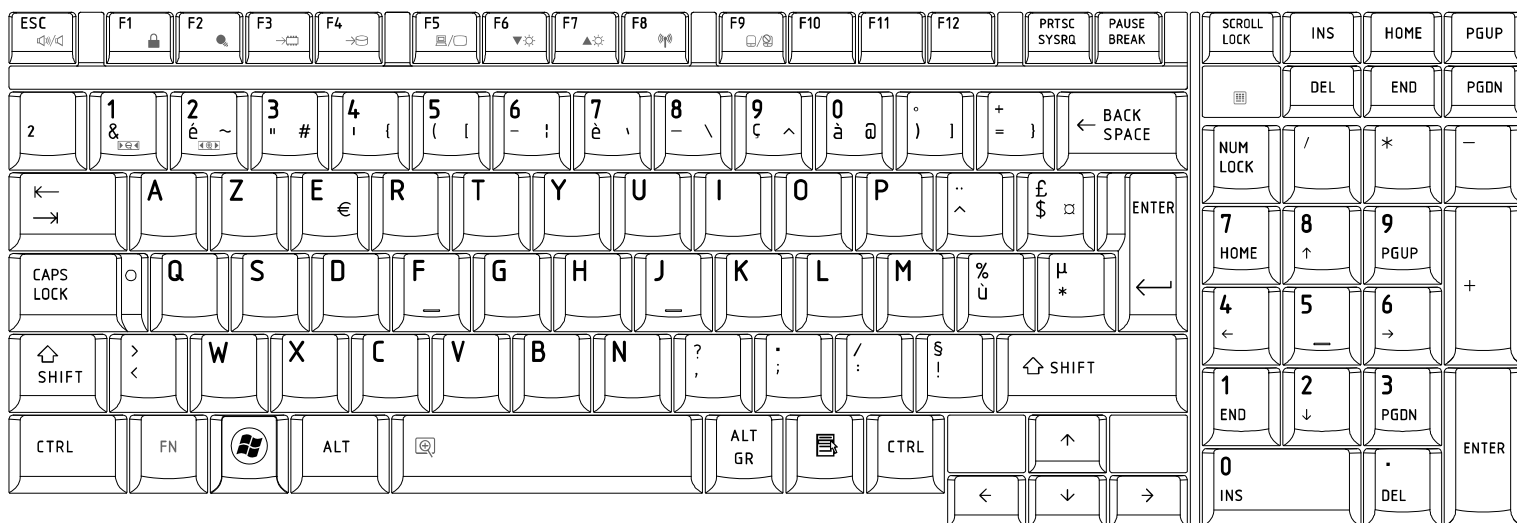
## 14. Slovakian (SL) Keyboard



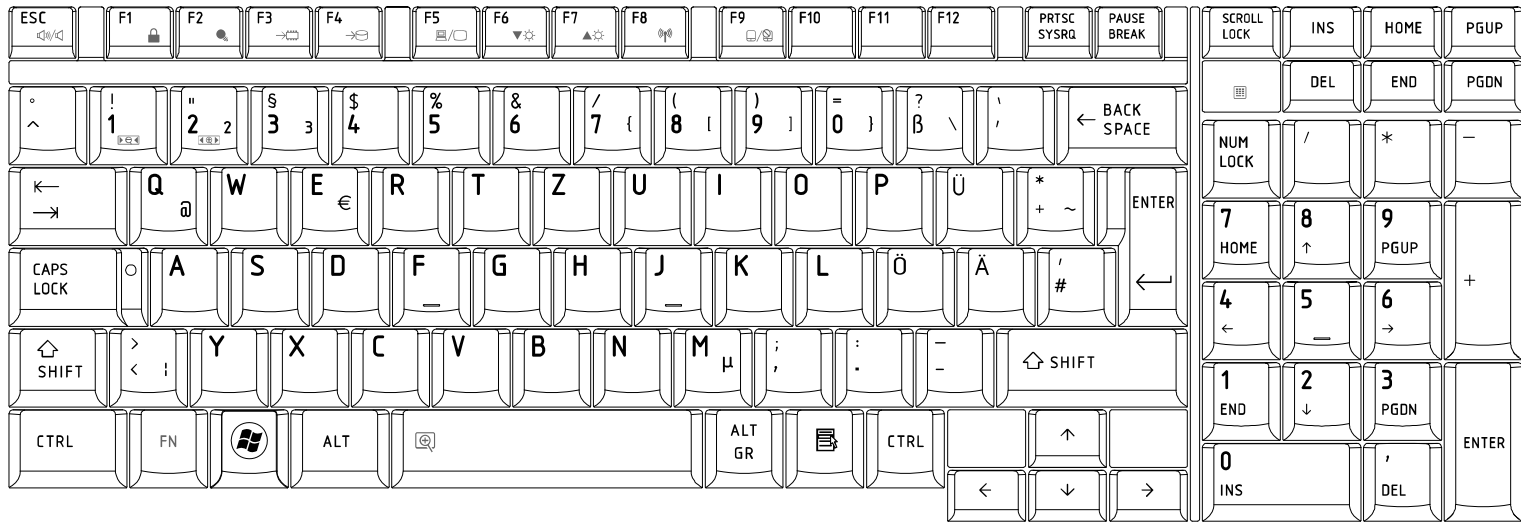
## 15. Italian (IT) Keyboard



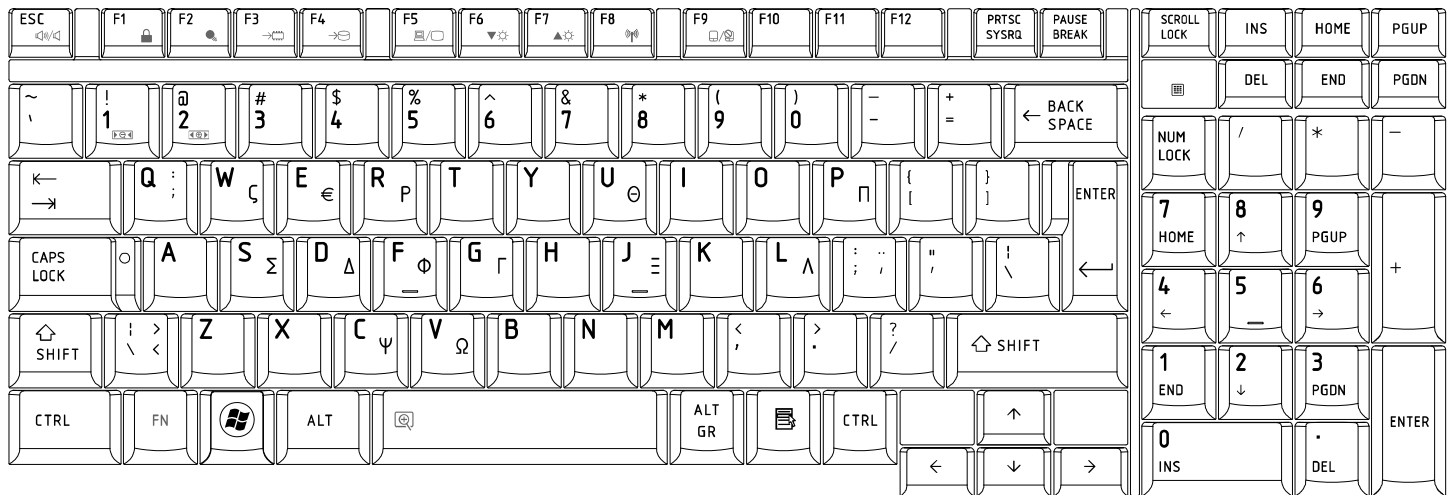
## 16. French (FR) Keyboard



## 17. German (GR) Keyboard



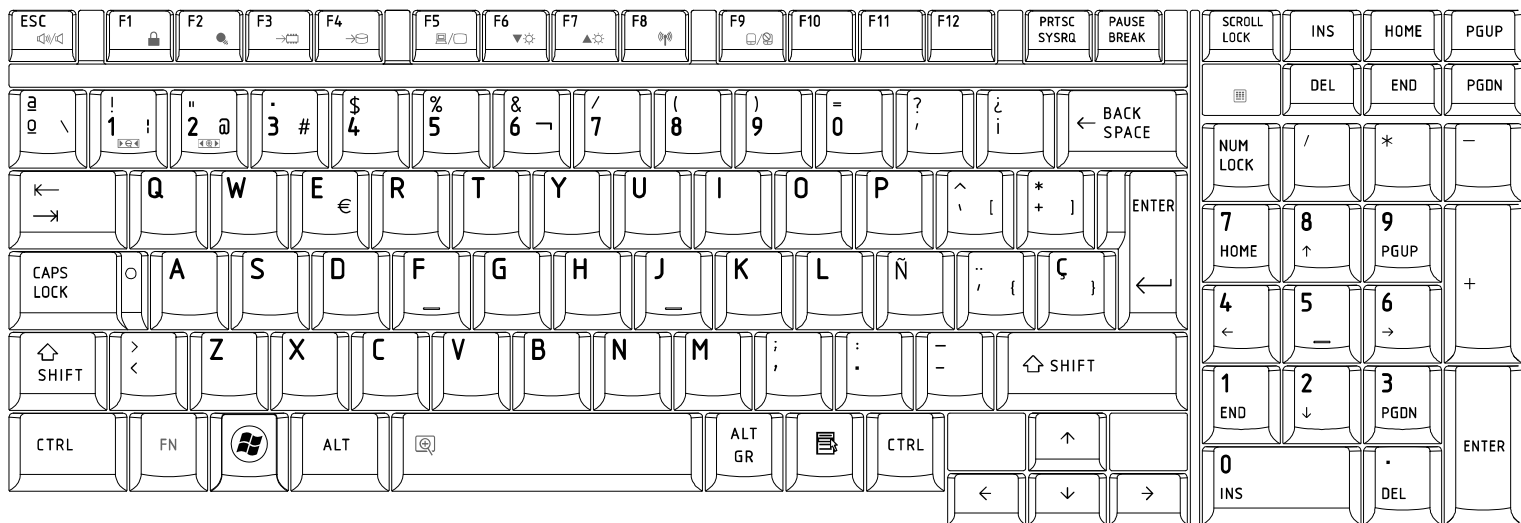
## 18. Greek (GK) Keyboard



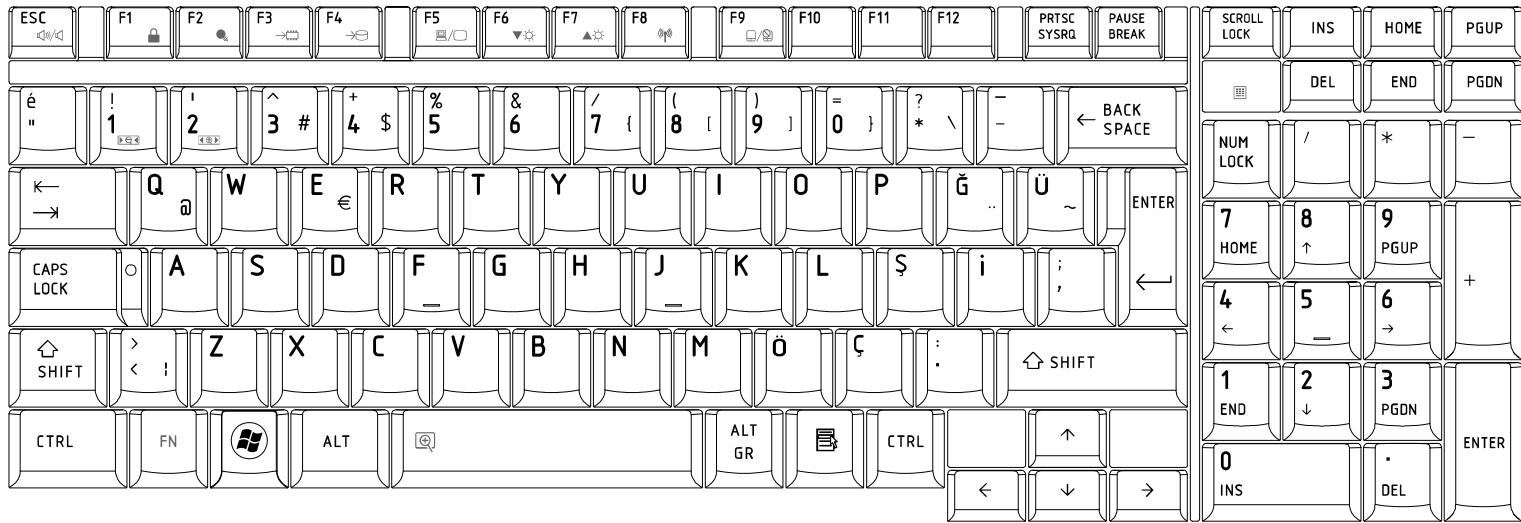
## 19. Hungarian (HG) Keyboard



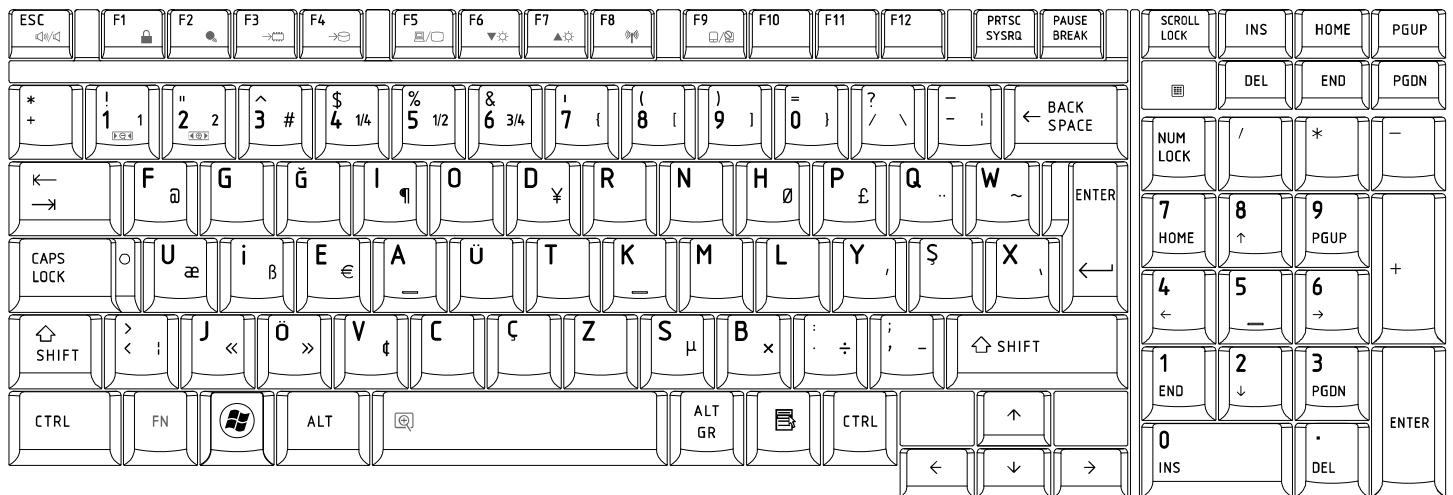
## 20. Spanish (SP) Keyboard



## 21. Turkish (TR) Keyboard

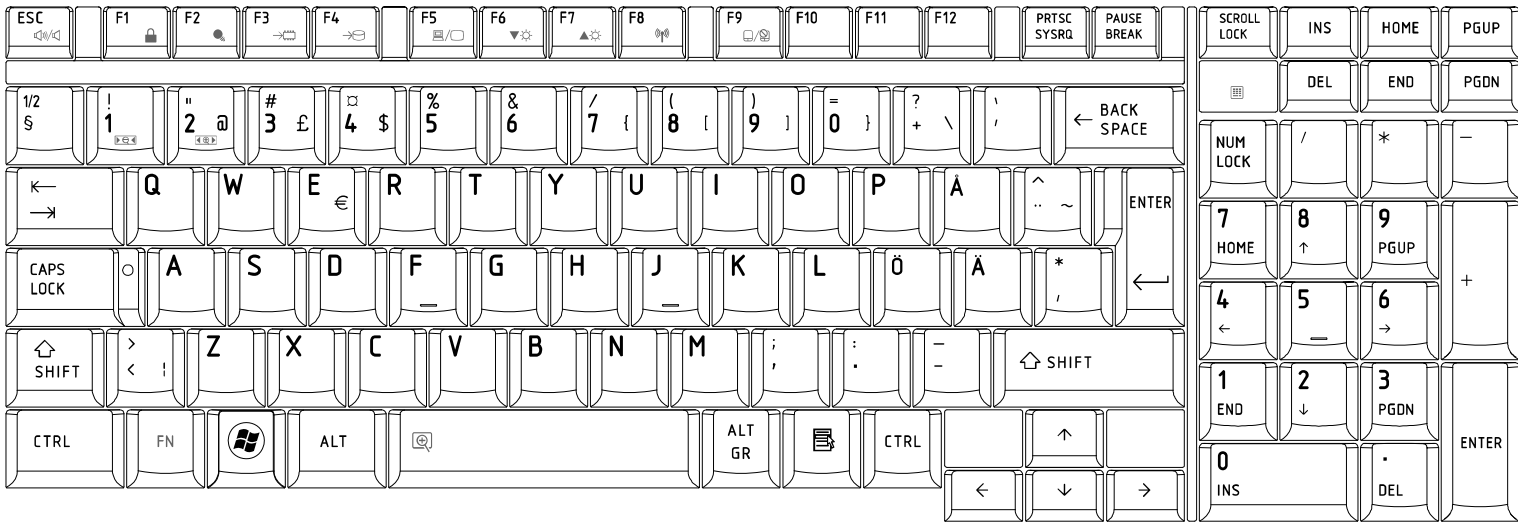


## 22. Turkish F (TR-F) Keyboard

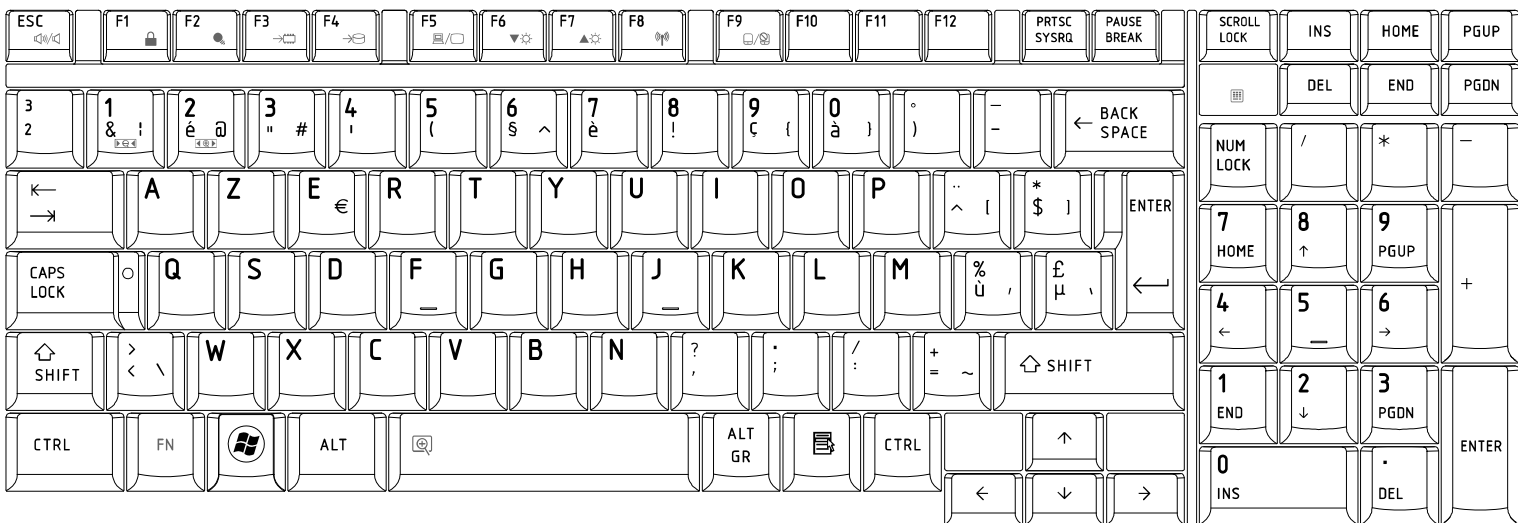




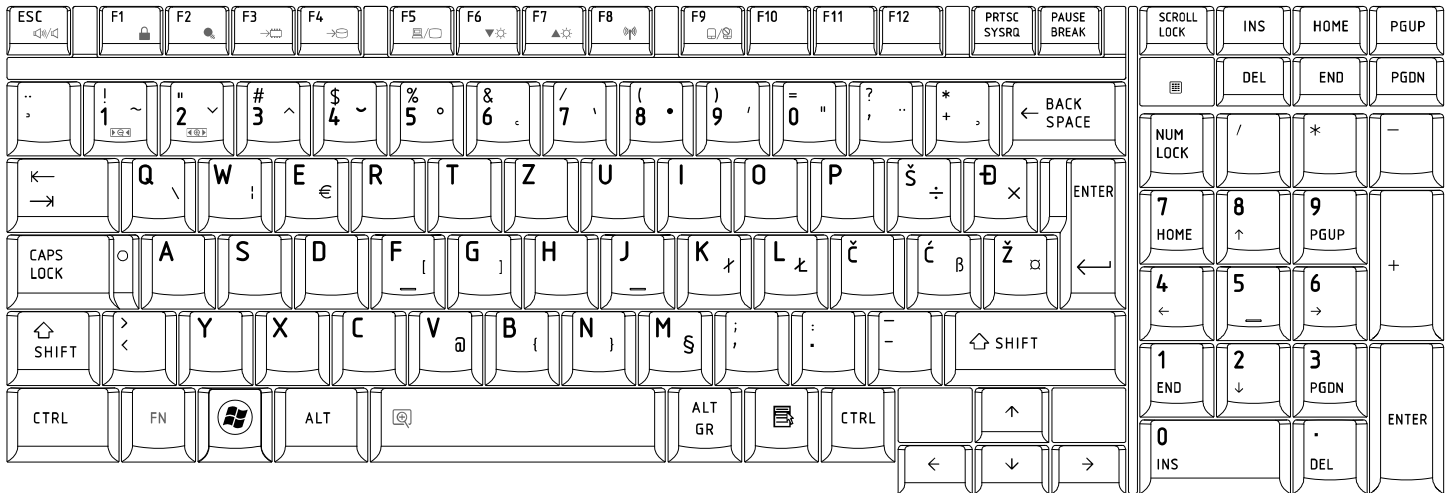
## 23.Swedish (SD) Keyboard



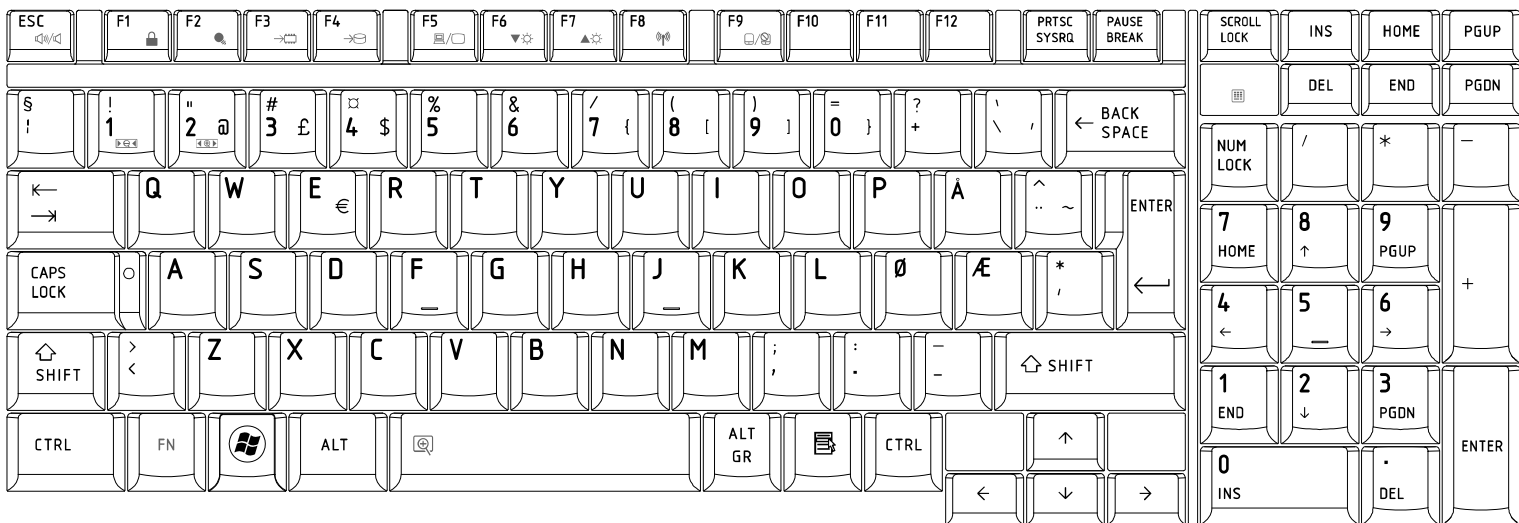
## 24.Belgian (BE) Keyboard



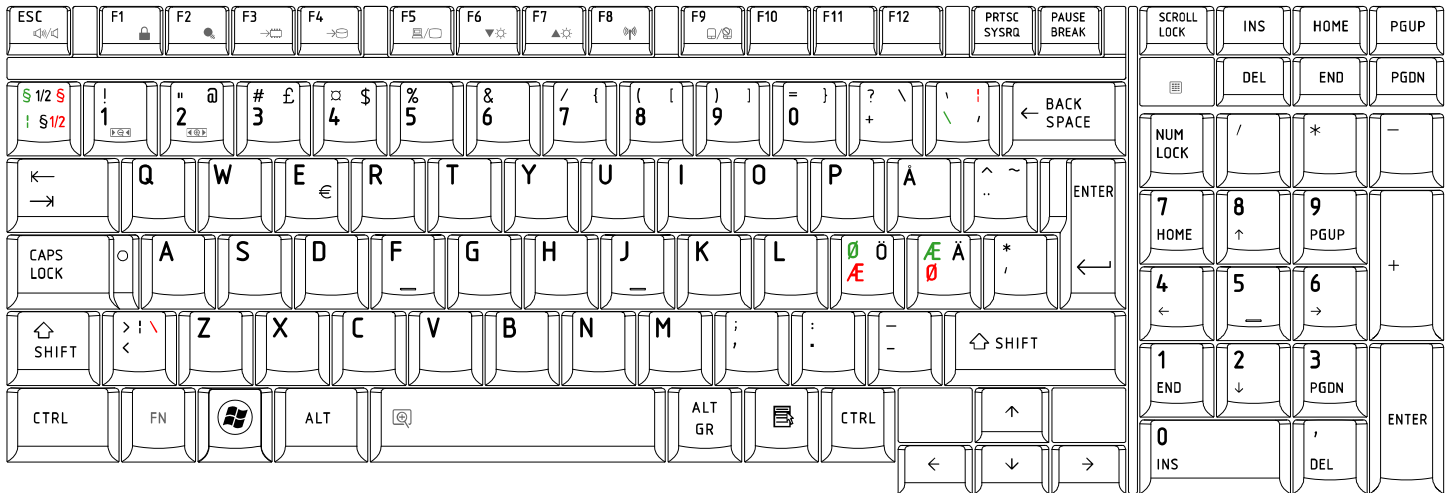
## 25. Yugoslavian (YU) Keyboard



## 26. Norwegian (NW) Keyboard



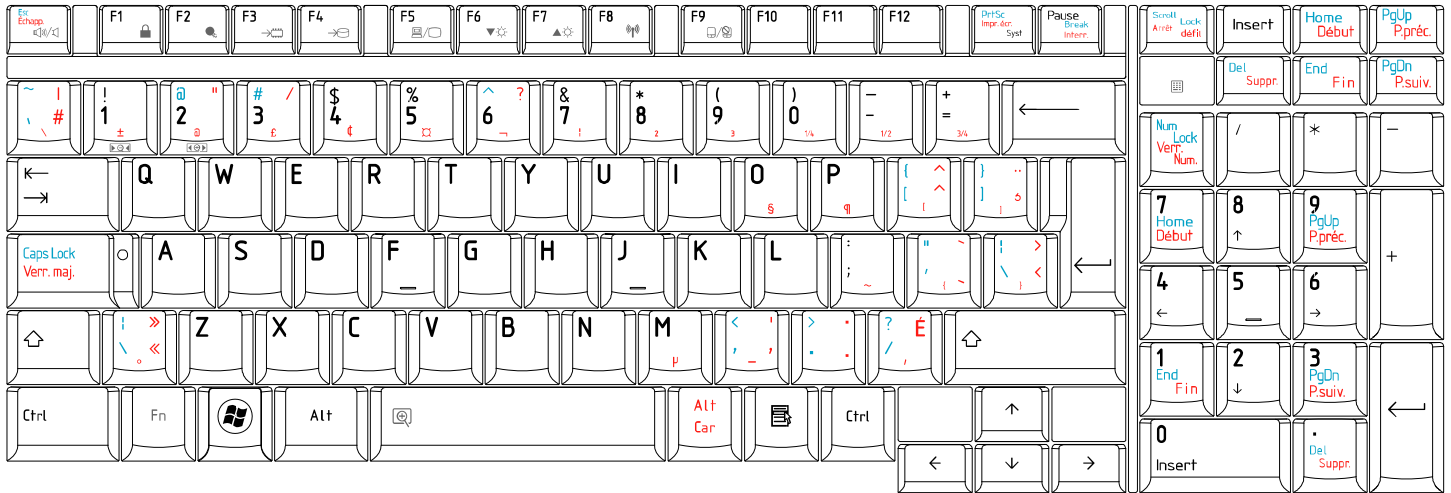
## 27.Scandinavian (ND) Keyboard



## 28.Canadian Multinational(AC)Keyboard



## 29. Canadian Bilingual (CB) Keyboard



## 30. Japanese (JP) Keyboard



## Appendix F Series Screw Torque List

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
MA0000060G0	M2.0*3	6	LCD HINGE BRK ASSY L&R TO LCD PANEL 17w"	1.2~1.5Kgf-cm
MACK20040G0	M2.0*4	1	INVERTER TO HINGE WALL	1.5~2.0Kgf-cm
MA0000062G0	M2.5*6	6	LCD HINGE L&R TO LCD COVER	2.5~3.0Kgf-cm
		6	LCD BEZEL TO COVER	2.5~3.0Kgf-cm
MMCK20080G0	M2.0*8	2	1ST HDD(H=16.6mm) CONNECTOR TO MB	1.5~2.0Kgf-cm
MACB20251G0	M2.0*6	2	EXPRESS-CARD CONNECTOR TO MB	1.5~2.0Kgf-cm
		2	2ND HDD(H=1.9mm) CONNECTOR TO MB	1.5~2.0Kgf-cm
		2	ODD-CONN TO MB	1.5~2.0Kgf-cm
		2	BATTERY CONNECTOR TO MB	1.5~2.0Kgf-cm
MACK20040G0	M2.0*4	2	EXPRESS CARD HOUSING TO MB	1.5~2.0Kgf-cm
		2	WLAN CARD TO MB STANDOFF	2.0~2.5Kgf-cm
		2	UWB CARD TO MB STANDOFF	2.0~2.5Kgf-cm
		2	DRIVER CACHE TO MB STANDOFF	2.0~2.5Kgf-cm
		2	TMA CARD TO TMA BRK	2.0~2.5Kgf-cm
		2	TMA BRK TO MB	2.0~2.5Kgf-cm
MA0000061G0	M2.5*4	2	MDC CARD TO MB STANDOFF BTO FM MODULE TO SADDLE R BTO	2.5~3.0Kgf-cm
		6	VGA BOARD SLI TO M/B Single VGA board*4	2.5~3.0Kgf-cm
MA0000062G0	M2.5*6	2	SPEAKER(R) TO LOG UP	2.5~3.0Kgf-cm
		2	SPEAKER(L) TO LOG UP	2.5~3.0Kgf-cm
MA0000061G0	M2.5*4	1	POWER PCB TO LOG UP	2.5~3.0Kgf-cm
		1	AUDIO PCB TO LOG UP	2.5~3.0Kgf-cm
		2	TP BUTTON PCB TO LOG UP	2.5~3.0Kgf-cm
MA0000061G0	M2.5*4	2	SADDLE L&R TO LOW	2.5~3.0Kgf-cm
MACB20251G0	M2.0*6	4	THERMAL FAN TO MB STANDOFF VGA10G w/o TMA use MACB20251G0*2 VGA10G w TMA use MACB20251G0*2 VGA10H w/o TMA use MACB20251G0*4 VGA10H w TMA use MACB20251G0*4	2.0~2.5Kgf-cm
AM01O000300 AM04I000600(black)	SPRING SCREW	4	CPU-THERMAL-SINK TO CPU-PLATE	2.5~3.0Kgf-cm
		3	VGA1 THERMAL SINK TO VGA-PLATE NB9E USE AM01O000300 / NB9P USE AM04I000600(black)	2.5~3.0Kgf-cm
		3	VGA2 THERMAL SINK TO VGA-PLATE NB9E USE AM01O000300 / NB9P USE AM04I000600(black)	2.5~3.0Kgf-cm
MACK20040G0	M2.0*4	3	TMA THERMAL SINK TO TMA-PLATE	2.0~2.5Kgf-cm
MA0000061G0	M2.5*4	1	KILL SWITCH BOARD TO LOW	2.5~3.0Kgf-cm
		1	T/P LED BOARD TO LOW	2.5~3.0Kgf-cm
		3	MB TO LOG LOW	2.5~3.0Kgf-cm
		2	LOG LOW TO LOG UP (ODD AREA)	2.5~3.0Kgf-cm
		4	KEYBOARD TO UP	2.5~3.0Kgf-cm
		2	HDD DOOR TO LOG LOW	2.5~3.0Kgf-cm
MA0000062G0	M2.5*6	1	LOG LOW HINGE WALL TO LOW	2.5~3.0Kgf-cm
		4	LCD HINGE R&L TO SADDLE R&L	4.0~4.5Kgf-cm

		2	LOW REAR SIDE TO HINGE R&L TO SADDLE	2.5~3.0Kgf-cm
		1	HEEL COVER TO LOW TO SADDLE L	2.5~3.0Kgf-cm
		1	LOW HINGE COVER TO M/B TO LOW	2.5~3.0Kgf-cm
		1	LOG LOW TO ODD BRACKET	2.5~3.0Kgf-cm
		1	HEEL COVER TO LOW TO SADDLE R	2.5~3.0Kgf-cm
		2	LOG LOW TO MB TO LOG UP (BATT INSIDE WALL)	2.5~3.0Kgf-cm
		3	LOG UP TO MB TO LOG LOW	2.5~3.0Kgf-cm
MAC925010G0	M2.5*10	2	LOG LOW TO KS PCB TO LOG UP (FRONT LEFT SIDE)	2.5~3.0Kgf-cm
		2	LOG LOW TO MB TO LOG UP (FRONT LEFT SIDE)	2.5~3.0Kgf-cm
		1	LOW TO TO M/B TO LOG UP (MIDDLE LEFT) NEAR RAM DOOR	2.5~3.0Kgf-cm
		2	LOW TO SADDLE TO M/B TO LOG UP (REAR LEFT SIDE)	2.5~3.0Kgf-cm
		1	LOG LOW TO CPU FAN TO MB STANDOFF	2.5~3.0Kgf-cm
		2	LOG LOW TO LOG UP (FRONT RIGHT SIDE)	2.5~3.0Kgf-cm
		1	LOG LOW TO AUDIO BOARD TO LOG UP (MIDDLE LEFT) NEAR HDD DOOR	2.5~3.0Kgf-cm
		1	LOG LOW TO M/B TO LOG UP (HDD DOOR INSIDE)	2.5~3.0Kgf-cm
		1	LOW TO M/B TO LOG UP (MIDDLE RIGHT SIDE)	2.5~3.0Kgf-cm
		1	LOW TO SADDLE R TO LOG UP (REAR RIGHT SIDE)	2.5~3.0Kgf-cm
		MA0000035G0	M 2.5*5	1
SPEAKER SCREW	Assembled on Speaker	2	RIGHT SIDE FRONT SPEAKER BOX	2.5~3.0Kgf-cm
		2	LEFT SIDE FRONT SPEAKER BOX	2.5~3.0Kgf-cm
		2	SUBWOOFER	2.5~3.0Kgf-cm
MAAA03032G0	M3.0*3	4	MAIN HDD BRK TO HDD	2.0~2.5Kgf-cm
		4	2ND HDD BRK TO HDD	2.0~2.5Kgf-cm
MA0000060G0	M2.0*3	2	ODD MODULE TO ODD BRK	1.5~2.0Kgf-cm

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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*

<b>Component</b>	<b>Time (hours)</b>
LCD	10,000
Keyboard	60,000
HDD	300,000
Optical (DVD/CD) drive	60,000
AC adaptor	60,000