

Toshiba Personal Computer
NB300
Maintenance Manual

TOSHIBA CORPORATION

[CONFIDENTIAL]

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Toshiba Personal Computer NB300 SERIES MAINTENANCE MANUAL Maintenance Manual

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Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer NB300 SERIES MAINTENANCE MANUAL, referred to as the NB300 SERIES MAINTENANCE MANUAL 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 NB300 SERIES MAINTENANCE MANUAL Series system unit and each FRU.
- Chapter 2 Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3 Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4 Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices The appendices describe the following:

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

Conventions

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

Acronyms

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

Read Only Memory (ROM)

Keys

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

Key operation

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

User input

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

DISKCOPY A: B:

The display

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

```
Format complete  
System transferred
```

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Chapter 1

Hardware Overview

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1.1 Features

The Toshiba NB300 is a small-size PC notebook equipped with an Intel® Atom™ Processor, providing high-speed processing capabilities and advanced features. The computer employs a lithium ion battery that allows it to be battery-operated for long periods of time. The display uses 10.1-inch SD LCD panel. Many features can be Built To Order (BTO) to customize the system for each user.

The computer has the following features:

Processor

The computer is equipped with an Intel® Atom™ Processor N450/470 that is XD bit supported.

Memory (BTO)

The computer has one SODIMM slot which comes standard with 1GB/2GB, accepting BTO for your memory requirements. It can incorporate up to 1 GB (XP) or 2 GB (XP/Win7) of main memory. It supports DDR2 at 667MHz.

Battery Pack (BTO)

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

RTC Battery

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

Hard Disk Drive (HDD)

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

- 160/250 GB, S-ATA (5,400rpm)
- Additional HDD sizes may be introduced.

❑ Display

The LCD display comes with the following:

- 10.1" SD LCD, 1024 x 600 Resolution
- 10.1" HD LCD, 1366 x 768 Resolution

❑ Graphics

The computer uses Intel Pineview for integrated graphics display.

❑ Keyboard

The computer is equipped with a tile or flat keyboard. It comes with 85 or 86 keys supported and with optional Windows and application keys.

❑ Pointing Device

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

❑ External Monitor Port

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

❑ Universal Serial Bus (USB) Ports

The computer has three USB 2.0 ports. It is supported to daisy-chain a maximum of 127 USB devices. The serial data transfer rate is 480 Mbps or 12 Mbps and 1.5 Mbps. These ports support PnP installation and hot plugging. USB Sleep and Charge function can be supported by only one port of the left side. (mode 1-4)

❑ Bridge Media Slot

This slot allows you to insert SD/SDHC, MiniSD/ MicroSD (through adapter) and MMC memory cards. This model does not support CF cards, SmartMedia cards and Memory Sticks.

Sound system

The integrated sound system is composed of two 1.0W Zylux / FG internal speaker, an internal microphone and standard MIC-IN ports.

Internal Camera

A VGA webcam supports 0.3M/1.3M pixels and comes with an LED indicator. The camera is not a rotation type.

Internal Microphone

The computer has a built-in internal microphone equipped with echo-cancellation.

Headphones/Line-out Jack

This jack connects speakers or stereo headphones. When connected to speakers or headphones, the internal speaker is automatically disabled.

Microphone/Line-in Jack

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

LAN

The computer has built-in support for 10M/100M Ethernet LAN (10/100 megabits per second, 10/100BASE-T). It employs a Realtek 8103EL for 10M/100Mbit LAN.

Wireless LAN (BTO)

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

- Atheros 802.11 bg (HB95 1x1)

3G (BTO)

The 3G module employs a PCI Express Mini Card. It enables computer users to have mobile access to the internet or to a corporate network. The computer is equipped with either a Ericsson F3607gw model (which supports HSPA) or with a Sierra Module Gobi2000 model (which supports EVDO).

❑ Bluetooth (BTO)

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

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

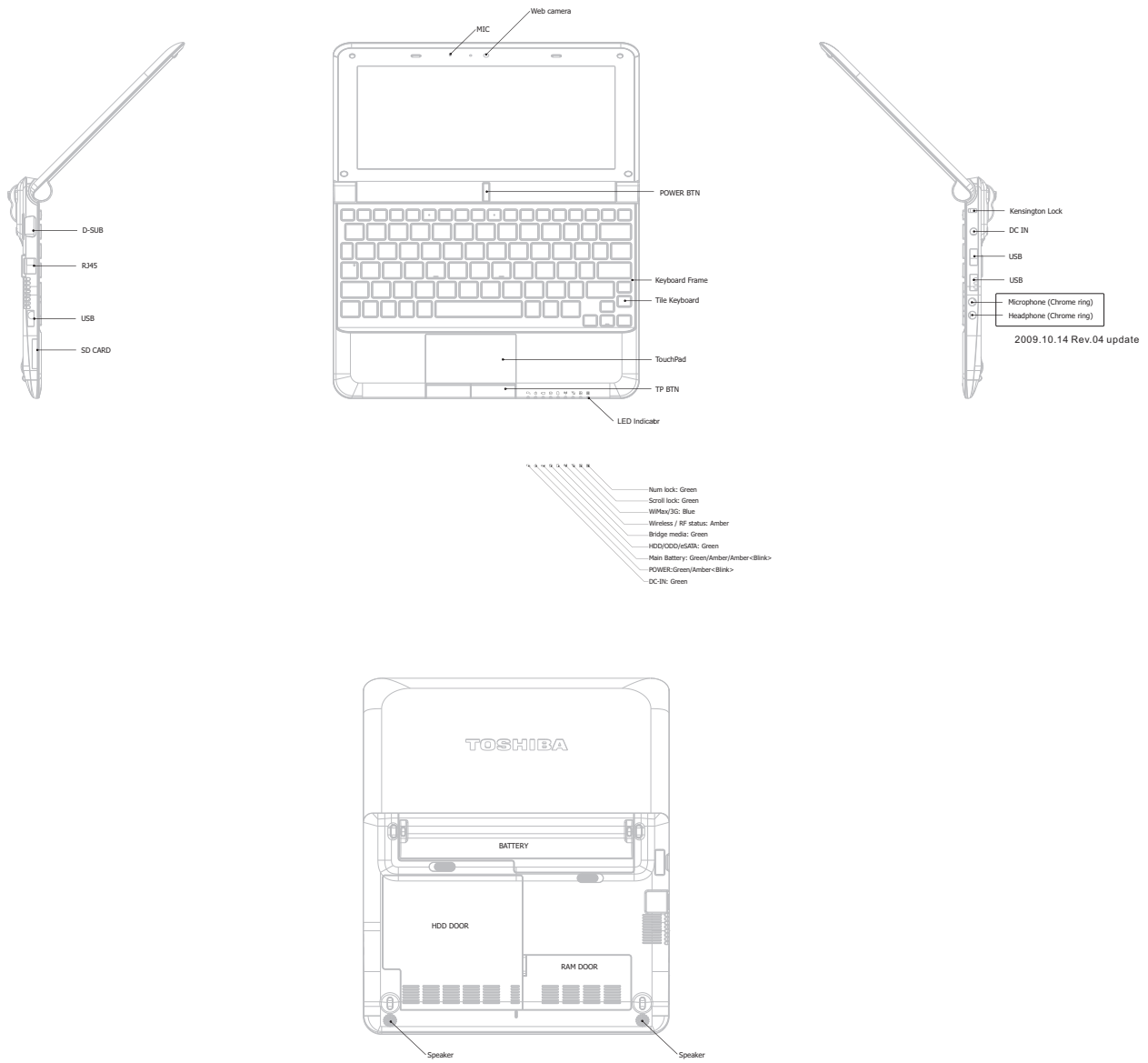
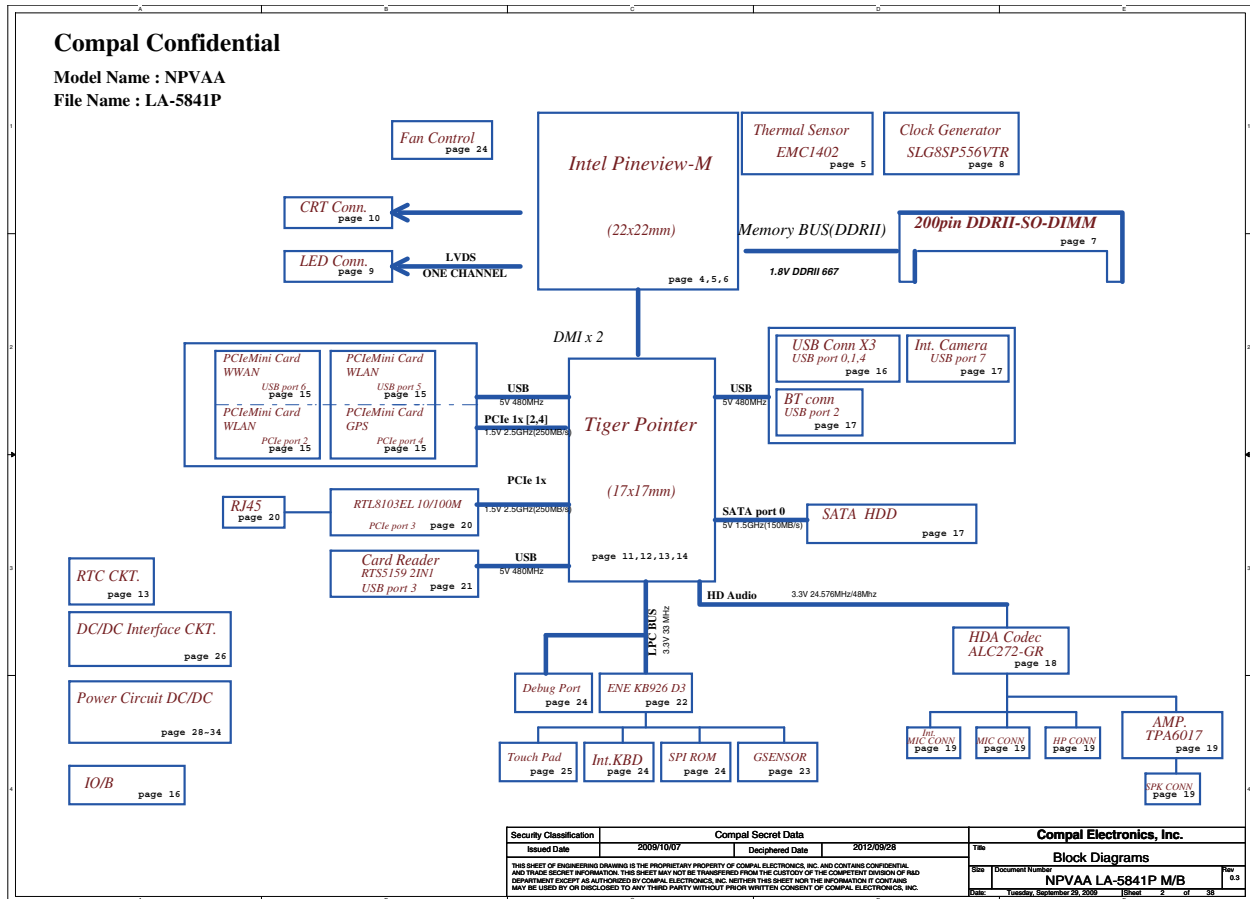


Figure 1-1A ID Parts Description Placement Part A



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

Processor

The computer is equipped with the following Intel[®] processor:

- Intel[®] Atom[™] Processor N450
- Intel[®] Atom[™] Processor N470

Memory (BTO)

The computer has one SODIMM slot which comes standard with 1GB/2GB, accepting BTO for your memory requirements. It can incorporate up to 1 GB (XP) or 2 GB (XP/Win7) of main memory. It supports DDR2 at 667MHz.

BIOS ROM (EEPROM)

The system BIOS and Keyboard BIOS share one single 2048KB flash ROM. The flash utility can be used to program both system and keyboard BIOS at the same time.

System Controllers

- ACPI2.0b and Windows Logo Program 3.0 compliant
- Support SMBus specification V2.0
- Hot keys for system control
- Audio volume output control
- Battery scope report and control
- Power switch control
- Internal Keyboard country selection

Graphics Controller

- Intel Pineview as integrated graphics solution
- TVAP and Smart External Monitor Support

Audio Controller

- Realtek Azalia ALC272
- One Audio-in port: Mic-in/Line-in
- One Audio-out port: Headphone-out/Line-out
- Internal Microphone (MIC with echo cancellation)
- Volume control: Digital control, Hot keys (Fn+3, Fn+4)
- Microsoft inbox audio driver support
- Software EQ support

Wireless LAN Controller

- Atheros 802.11 bg (HB95 1x1)
- WPS supported

1.2 2.5-inch HDD

The computer contains a low-profile and light-weight, high-performance HDD. The HDD interface conforms to Serial ATA. Storage capacities supported are 160, 250 and 320 GB.

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

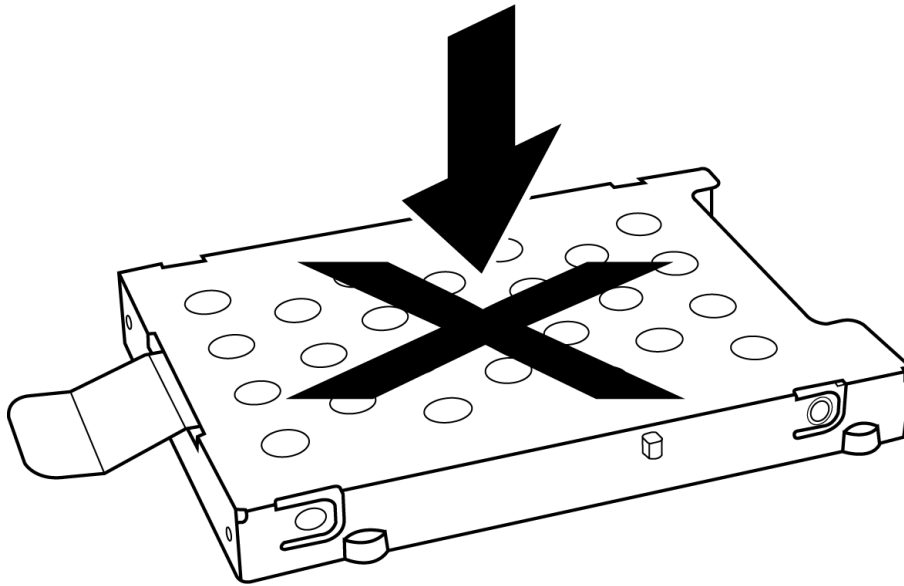


Figure 1-2 S-ATA HDD

Table 1-1 HDD Specifications

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

1.3 Power Supply

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

1. Power input monitor
 - Checks whether the AC adapter (DC power supply) is connected to the computer.
 - Checks whether the battery pack is connected to the computer.
 - Monitors the DC power supply input voltage (AC Adapter output voltage).
2. Power supply's internal control
 - Turns on and off the battery pack charging power supply.
 - Issues a charging current instruction to the PWM control IC of the battery pack charging power supply.
 - Controls the supply of DC power supply input (AC Adapter output) to the power supply unit.
 - Controls the supply of power to the system block (load/logic circuit side).
 - Controls forced shutdown if the power supply malfunctions.
3. Logic circuit control
 - Instructs the gate array to enable/disable tuning the power on.
 - Controls power-on/off operation.
4. Status display
 - Turns on the Power LED (in Green).
 - Battery indicator (in Green or Amber).
 - DC-IN indicator (in Green)
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.

1.4 Batteries

The computer has the following two types of batteries:

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

1.4.1 Main Battery

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

1.4.2 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 1-2 Quick/Normal Charging Time

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

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

Any of the following can stop battery charge:

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

Detection of full charge

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

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

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

1.4.3 RTC Battery

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

Chapter 2

Troubleshooting Procedures

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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. Wireless LAN | 13. 2 in 1 card |
| 2. HDD/SSD | 8. Camera | 14. CRT |

- | | | |
|--------------|---------------|---------------|
| 3. Keyboard | 9. Bluetooth | 15. LAN |
| 4. USB ports | 10. Headphone | 16. 3D sensor |
| 5. Touchpad | 11. MIC | |
| 6. Speaker | 12. 3G module | |

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

The following tools are necessary for implementing the troubleshooting procedures:

1. Phillips screwdriver (2 mm)
2. 6mm nut driver (for the helix screw nuts on the rear ports for RAM door)
3. 2DD or 2HD formatted work disk for floppy disk drive testing
4. Torx screw driver with type T6 bit for HDD door
5. USB memory disk
6. Multimeter
7. External monitor
8. USB compatible keyboard
9. Multimedia sound system with line-in and line-out ports
10. Headphones
11. USB test module and USB cable
12. MIC line

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 XP/Win7/Linux 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.

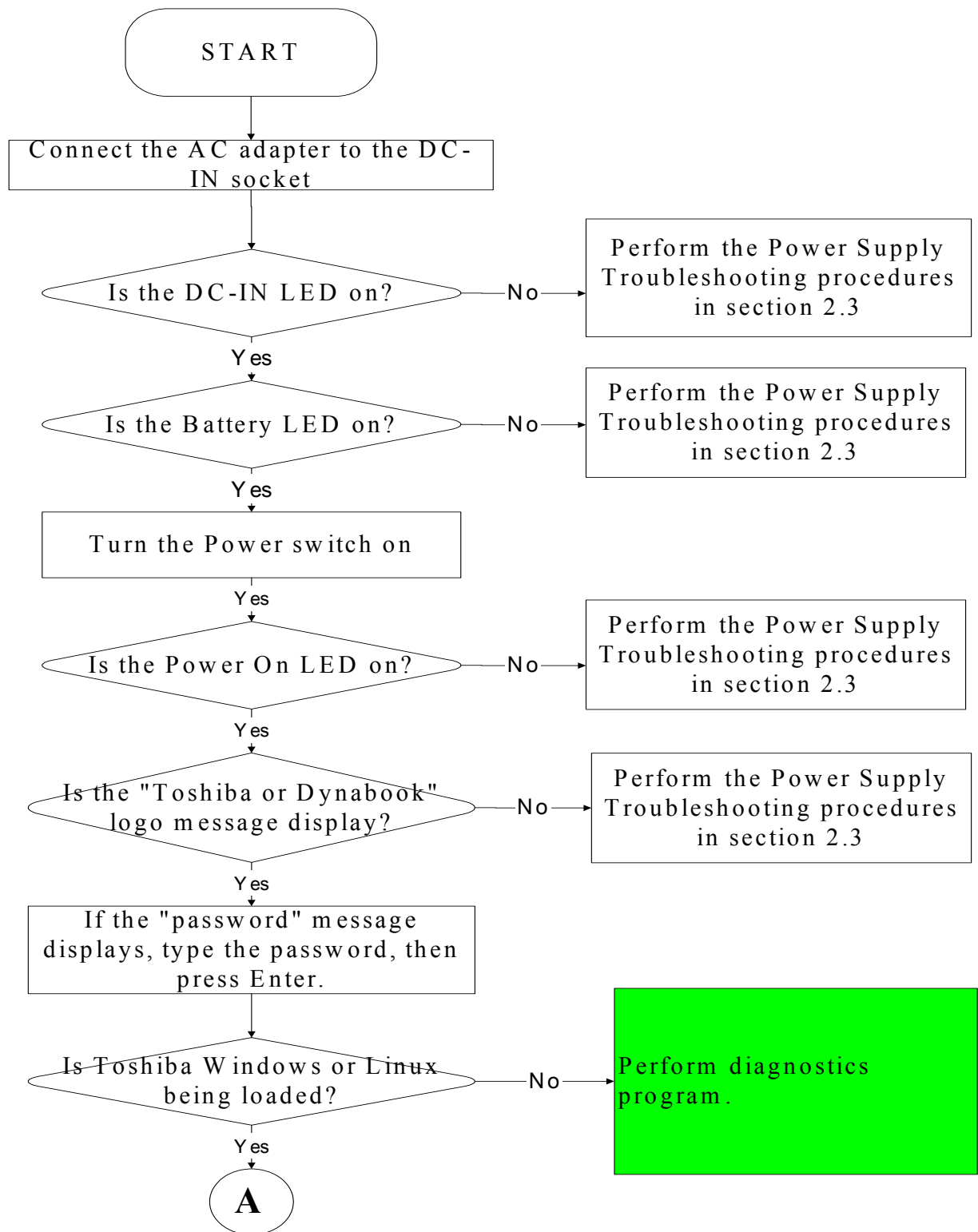


Figure 2-1 Troubleshooting flowchart (1/2)

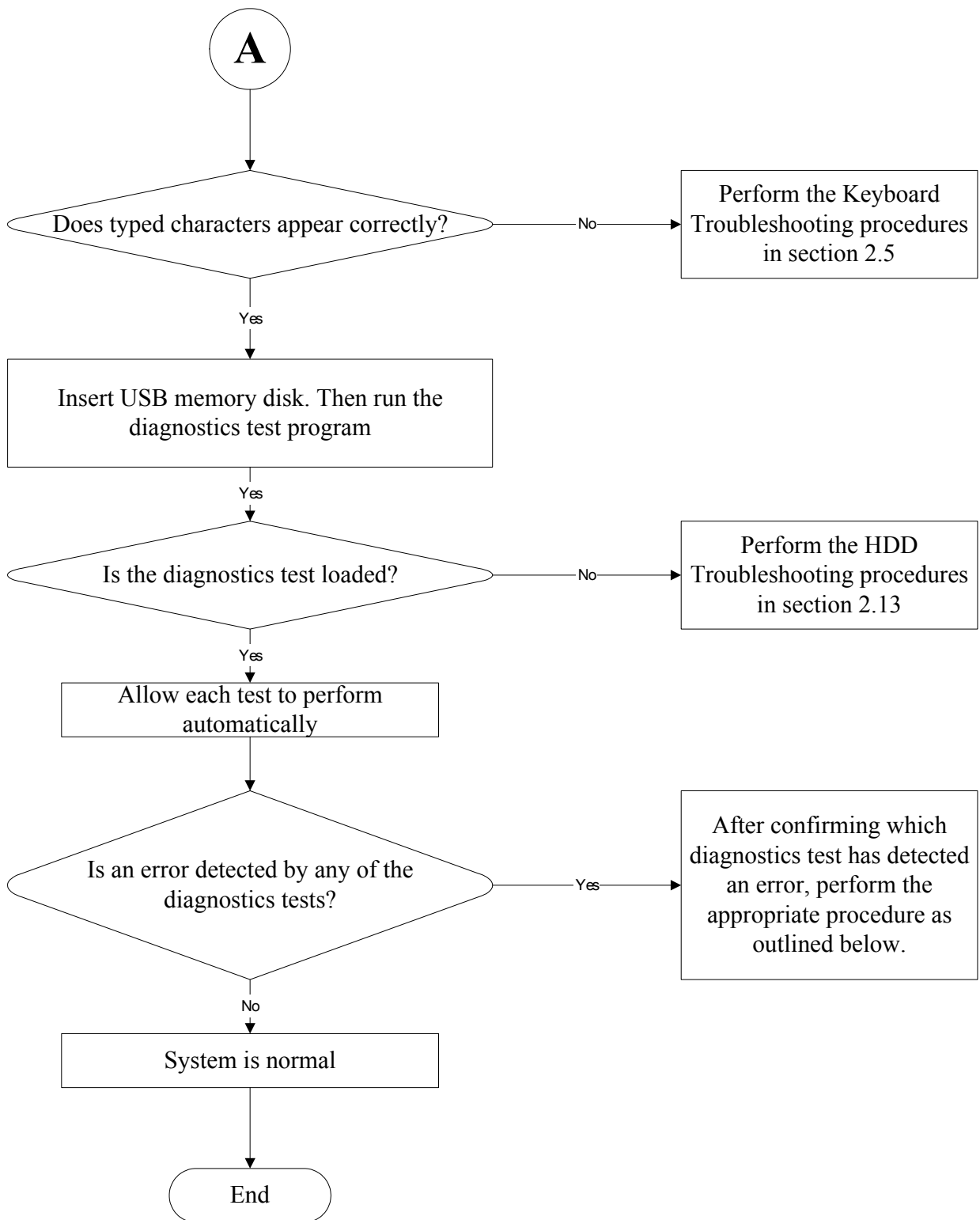


Figure 2-1 Troubleshooting flowchart (2/2)

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

1. If an error is detected by the battery test, perform the Power Supply Troubleshooting procedures in Section 2.3
2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 2.4
3. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 2.5
4. If an error is detected by the TouchPad test, perform the TouchPad Troubleshooting procedures in Section 2.7
5. If an error is detected by the audio test, perform the Speaker Troubleshooting procedures in Section 2.8

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

1. If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 2.6
2. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 2.8
3. If an error is detected when using the Wireless LAN, perform the Wireless LAN Troubleshooting procedures in Section 2.9
4. If an error is detected when using the Bluetooth, perform the Bluetooth Troubleshooting procedures in Section 2.11
5. If an error is detected when using the MIC, perform the MIC troubleshooting procedures in Section 2.16

2.3 Power Supply Troubleshooting

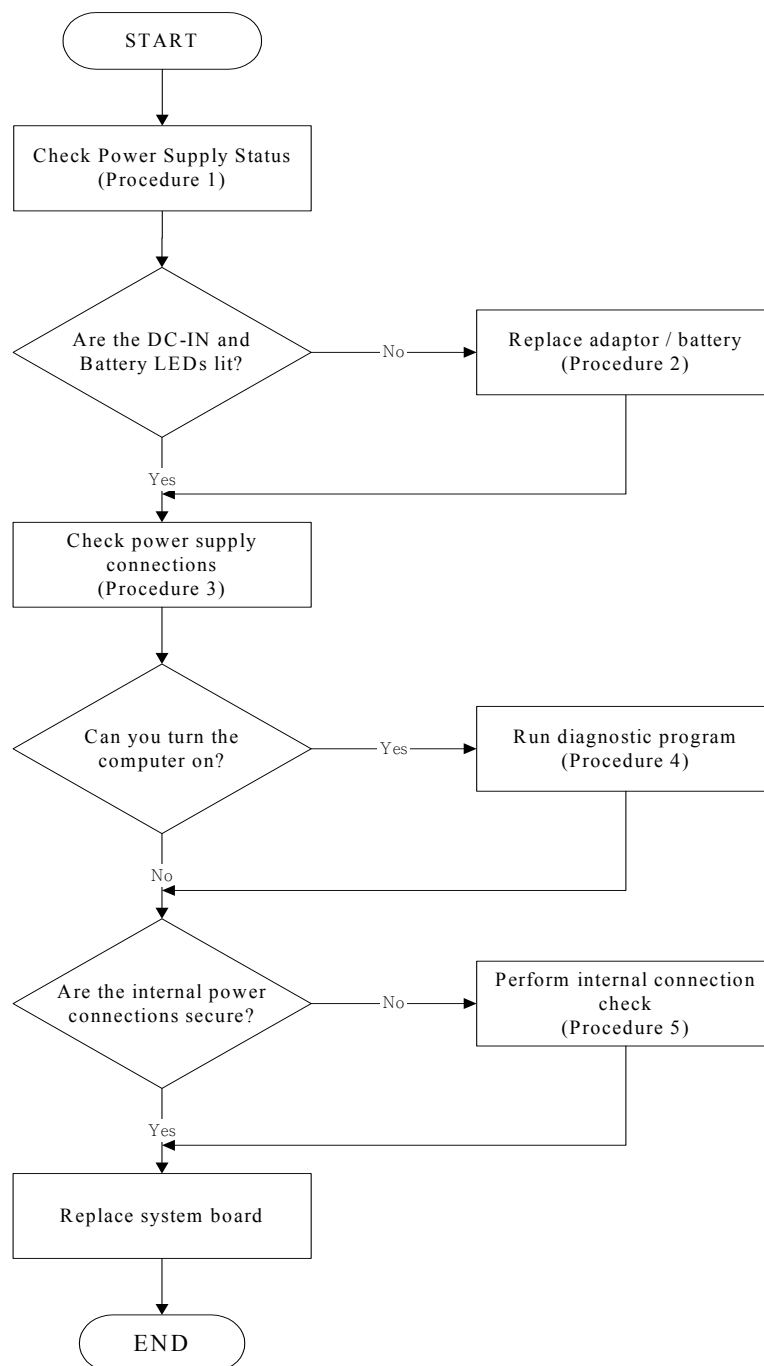


Figure 2-2 Power Supply Troubleshooting Process

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 LED	status
Lights Amber	Battery has been charging and AC adapter is connected.
Lights Green	Battery is fully charged and AC adapter is connected.
Flashes Amber	Battery charge is low. The AC adaptor must be connected to recharge the battery.
Doesn't light	Any condition other than those above.

Table 2-2 DC-IN LED

DC-IN LED	Power supply status
Solid on	AC power exists (LED is Green).
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

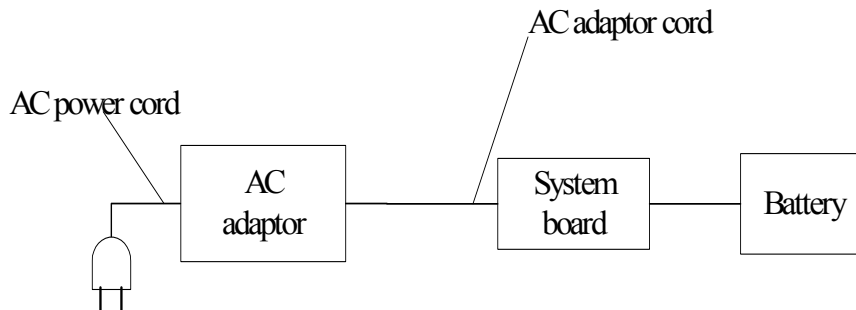
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

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

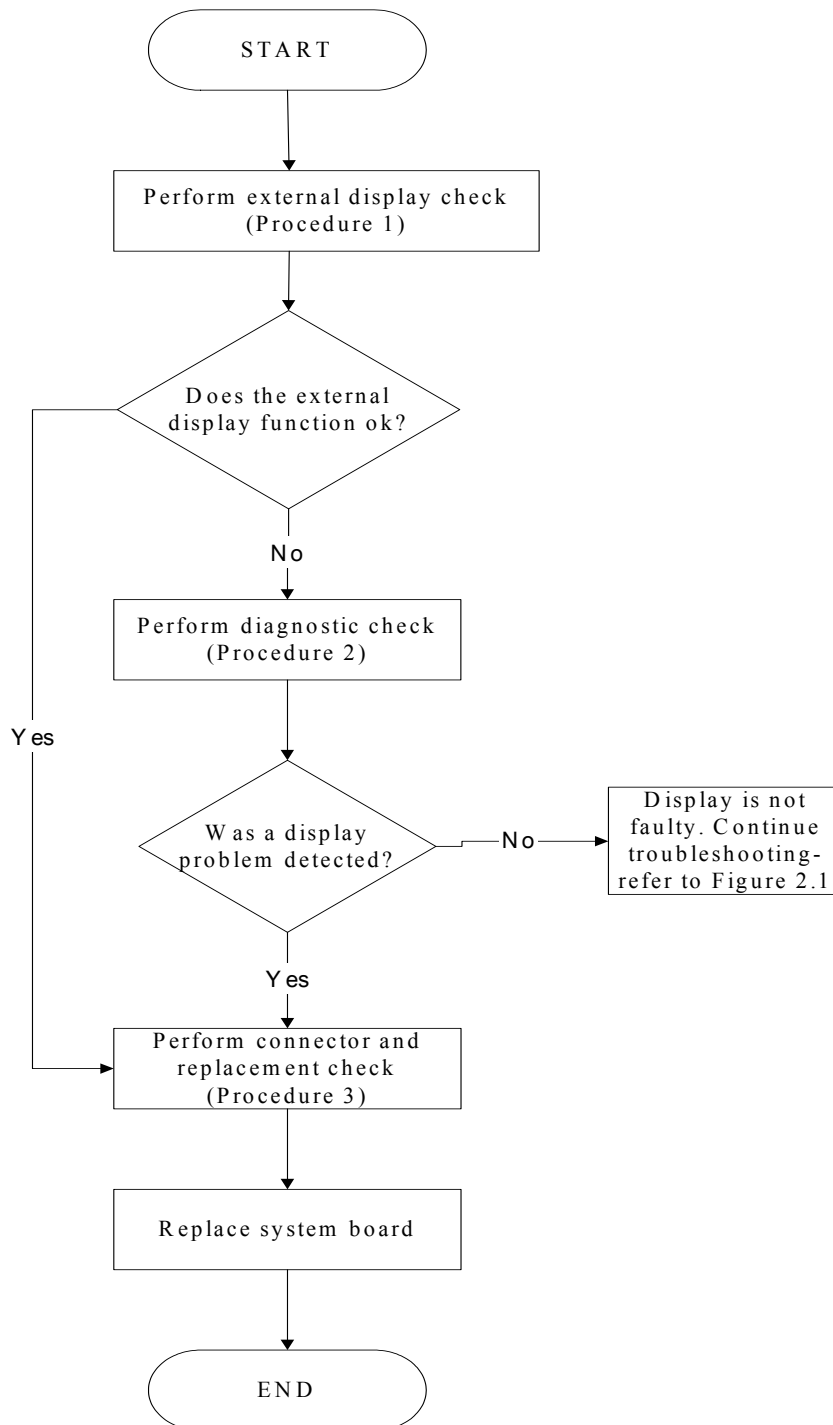


Figure 2-3 Display troubleshooting process

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 USB memory disk in the computer, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

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

Procedure 3 Connector and replacement check

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

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

2.5 Keyboard Troubleshooting

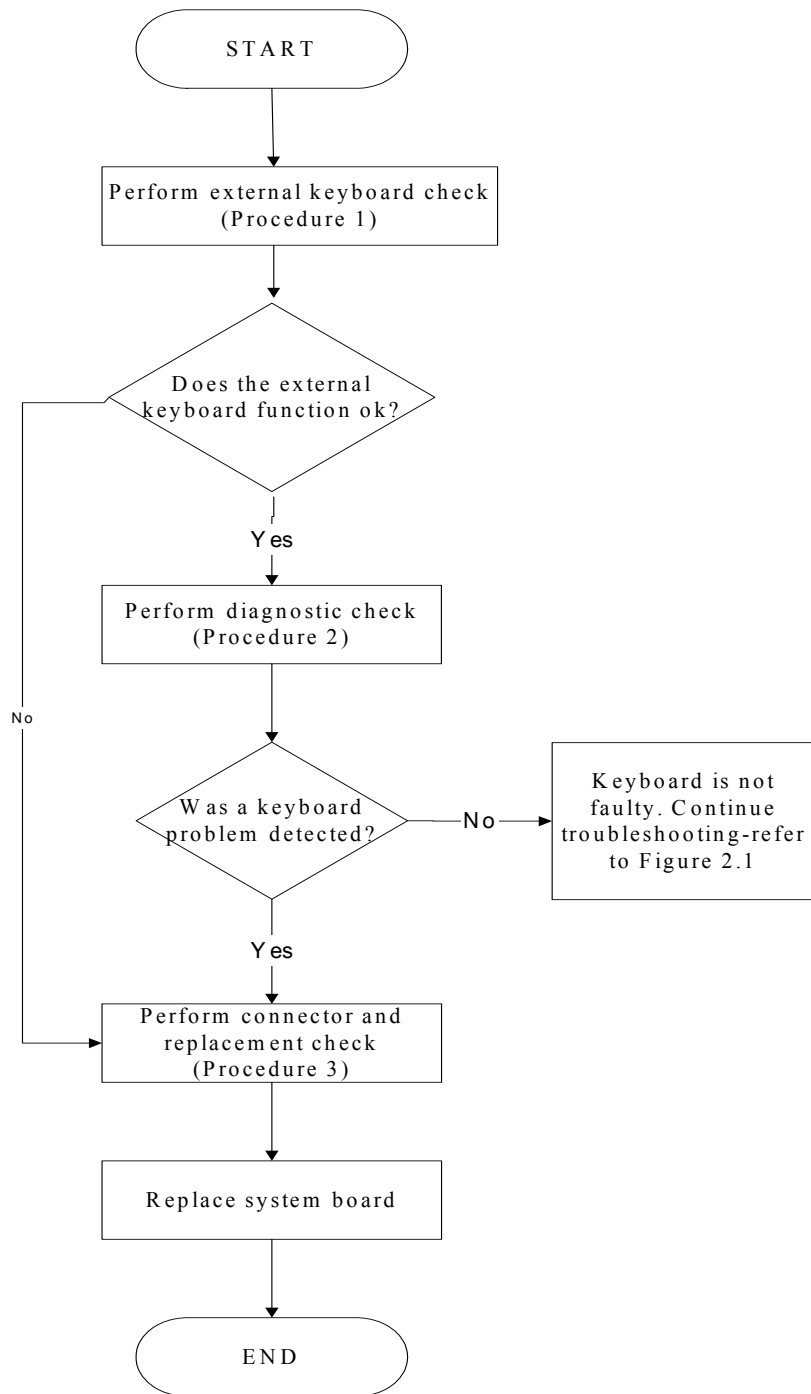


Figure 2-4 Keyboard troubleshooting process

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 (Perform can work fine and match Internal K/B) 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

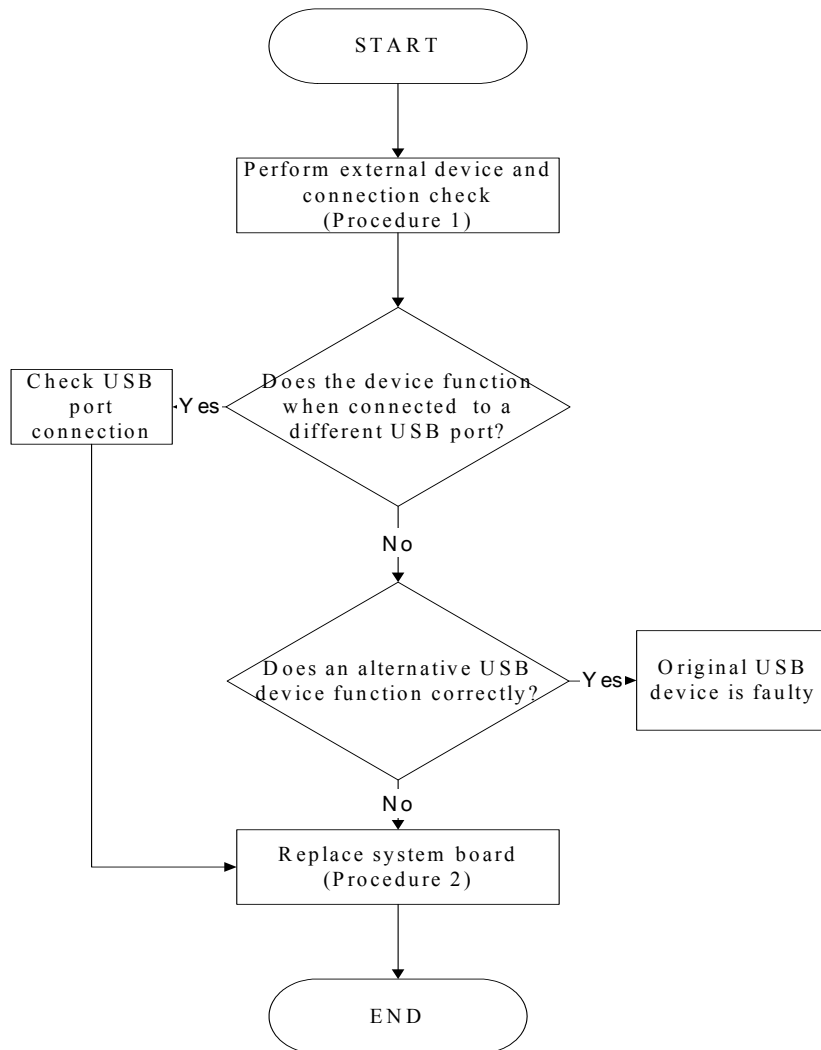


Figure 2-5 External USB device troubleshooting process

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 Touch pad Troubleshooting

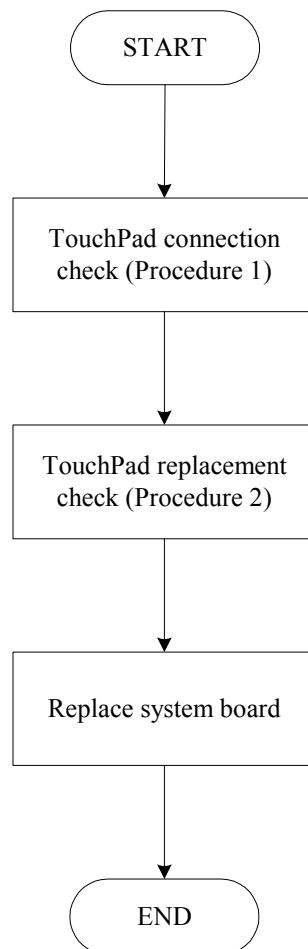


Figure 2-6 Touchpad troubleshooting process

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

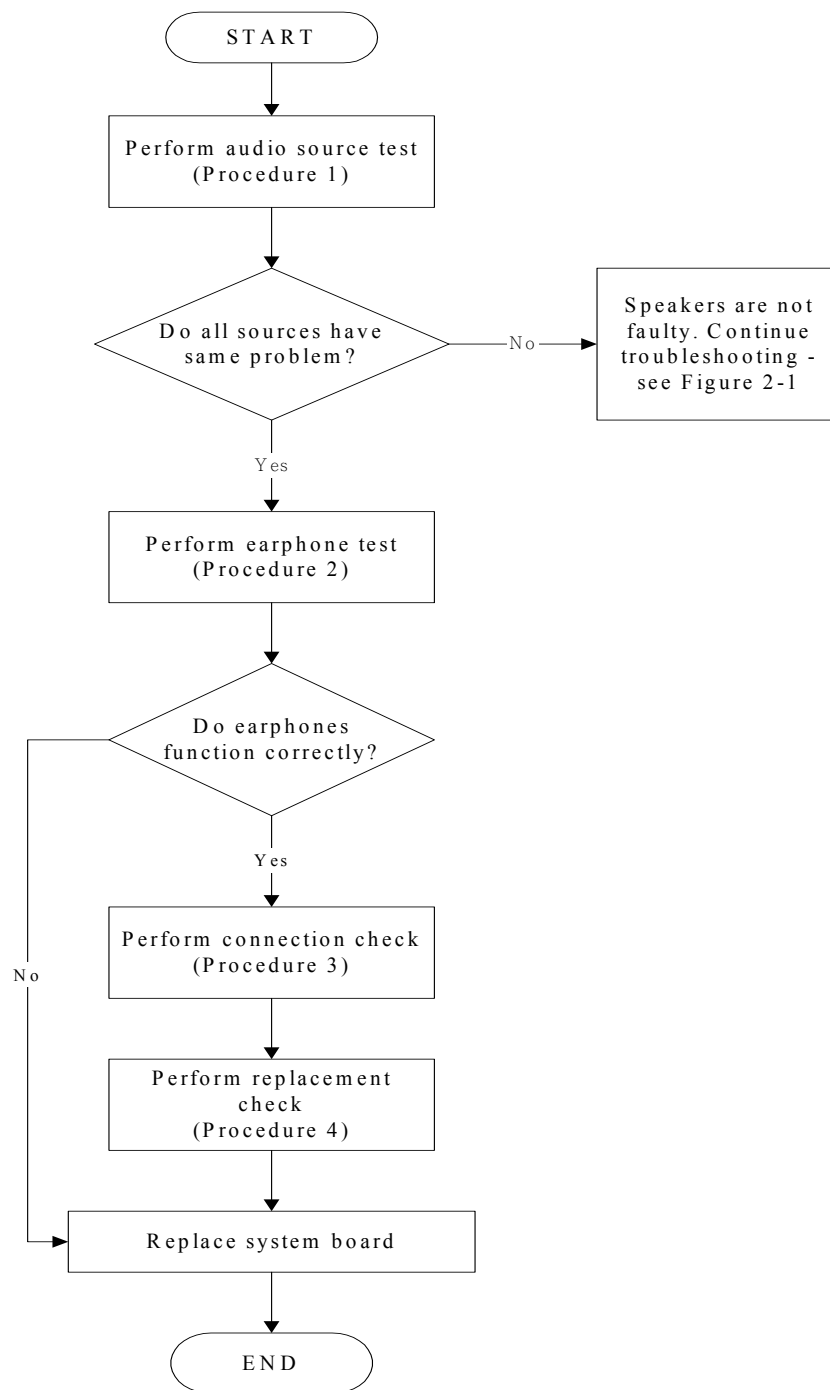


Figure 2-7 Speaker troubleshooting process

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 monaural 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 speakers are still not functioning properly, go to Procedure 4.

Procedure 4 Replacement check

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

2.9 Wireless LAN Troubleshooting

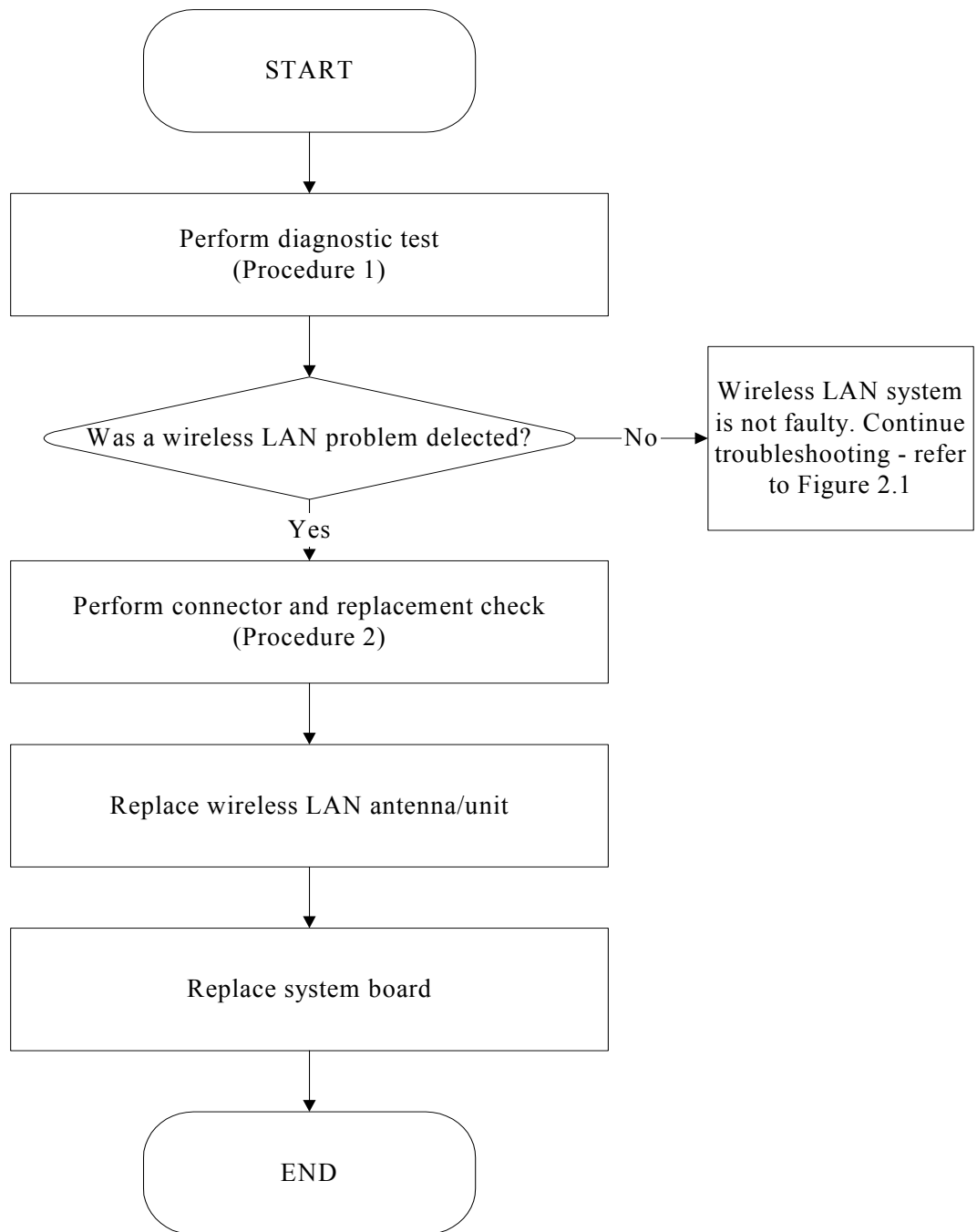


Figure 2-8 Wireless LAN troubleshooting process

Notes: W/L Antenna assemble rule as below:

color of antenna	assemble location
White antenna	Main/1
Black antenna	Aux/2

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

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Test and Diagnostic for more information on the program.

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

Procedure 2 Connector and replacement check

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

- Check 1 Make sure that the wireless LAN antenna is firmly connected to the Wireless LAN 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 function is enable by BIOS setup and FN+F8 , and then make sure that the wireless communication LED on the front panel is light. If the LED is light but the 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 function is enabled by BIOS setup and FN+F8, go to Check 3.
- Check 3 The wireless LAN unit may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.10 Camera Troubleshooting

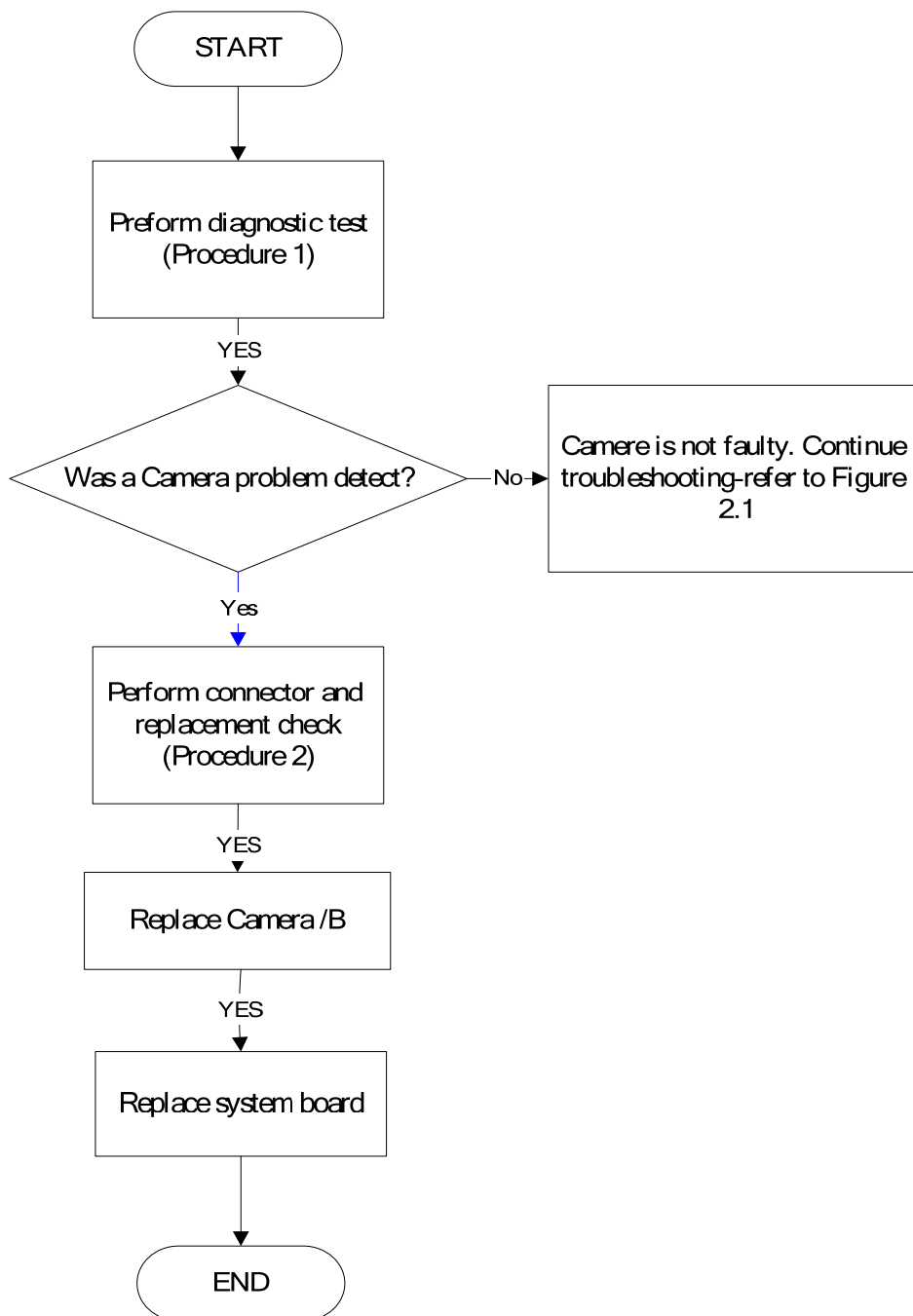


Figure 2-9 Camera troubleshooting process

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

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the functioning Program in windows, which will display the Camera test result.

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

Procedure 2 Connector and replacement check

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

- Check 1 Make sure that the Camera board cable is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 The Camera board may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 3.
- Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.11 Bluetooth Troubleshooting

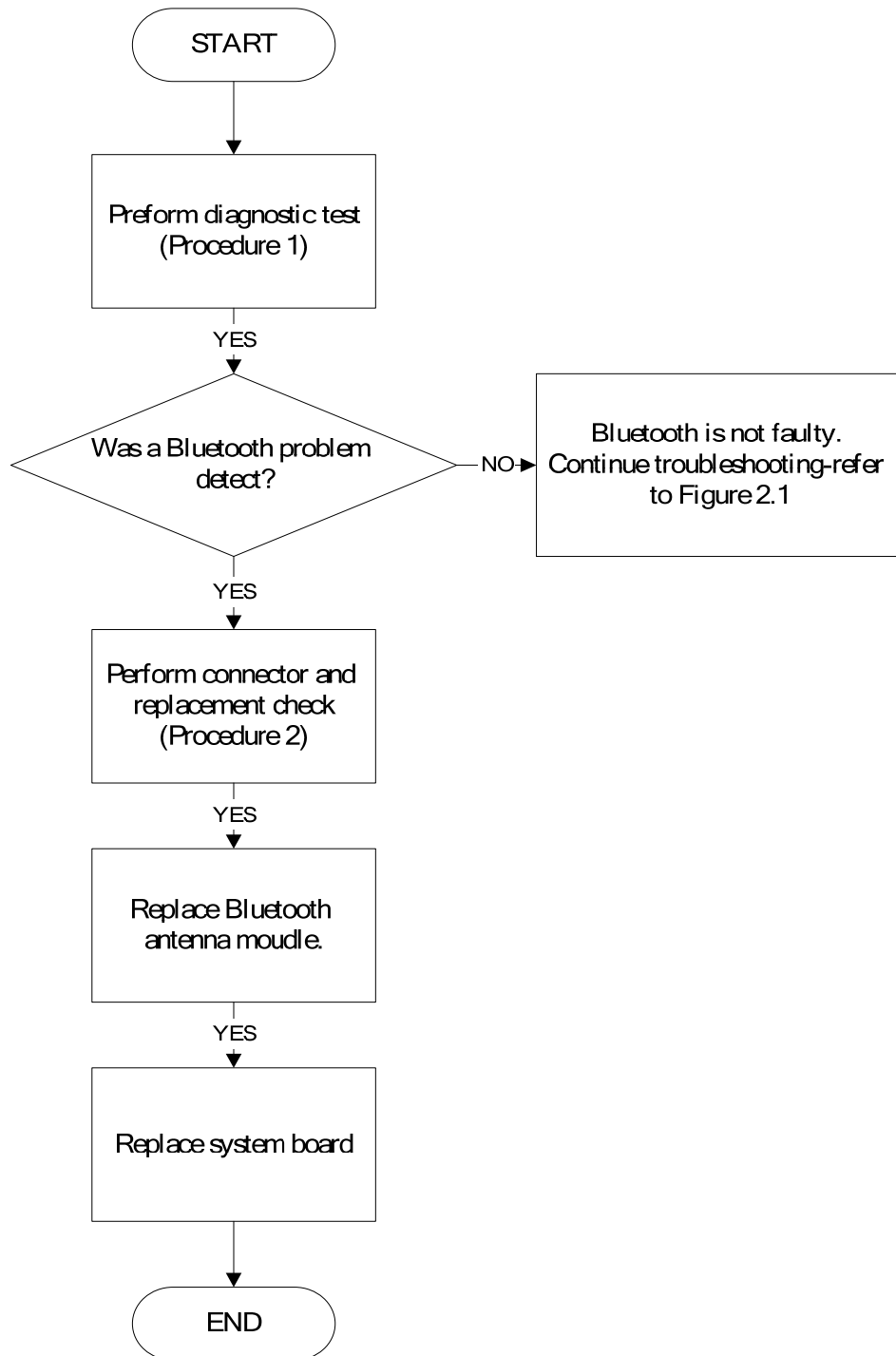


Figure 2-10 Bluetooth troubleshooting process

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

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

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

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

Procedure 2 Connector and replacement check

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

- Check 1 Make sure the Bluetooth cable is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check the wireless communication function is enabled by BIOS setup and FN+F8, then make sure that the communication LED on the left panel is lit. If the problem persists, or if the Bluetooth communication LED is not lit when the wireless communication function is enabled by BIOS setup and FN+F8 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.

2.12 2in1 card Troubleshooting

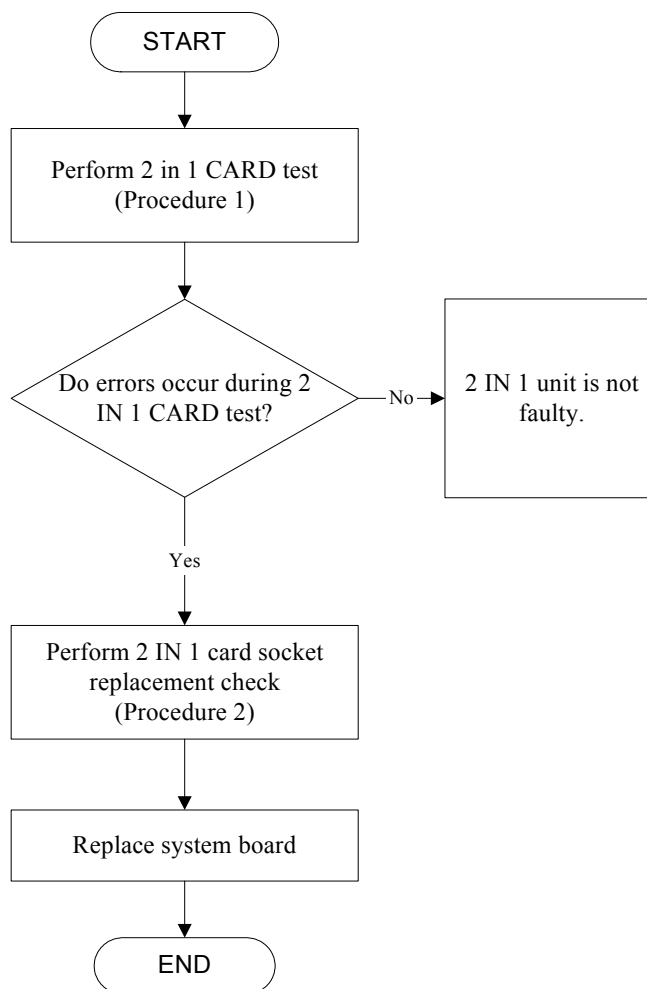


Figure 2-11 2in 1 card troubleshooting process

This section describes how to determine if the 2 IN 1 Card 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: 2 in 1 card test

Procedure 2: 2 in 1 card socket check

Procedure 1 2 in 1 card test

The 2 in 1 Card test card contains a 2 in 1 card test program. Ensure the card is fully inserted into the socket before running the program.

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

Procedure 2 2 in 1 Card socket check

The 2 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 check the socket. If the problem persists, the system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4.

2.13 HDD/SSD Troubleshooting

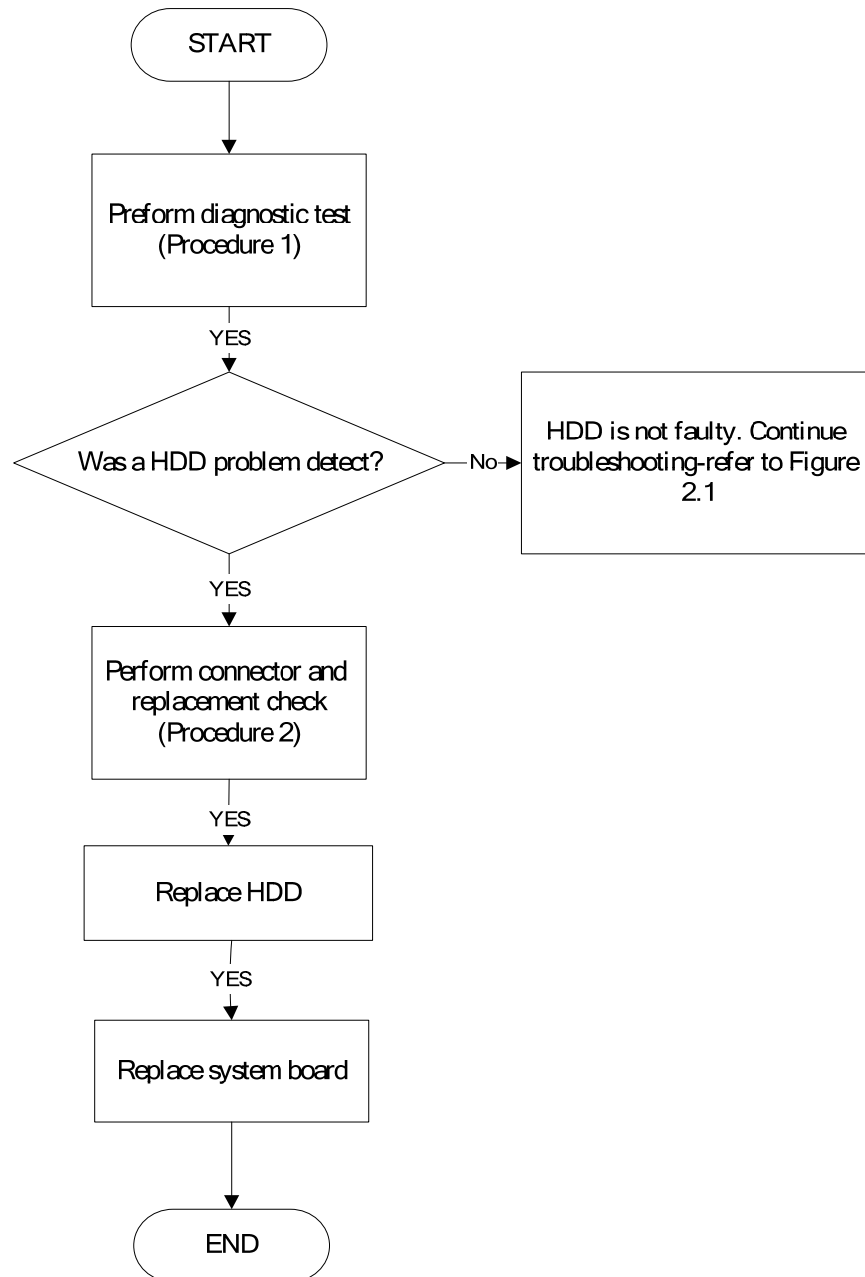


Figure 2-12 HDD troubleshooting process

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.

2.14 CRT Troubleshooting

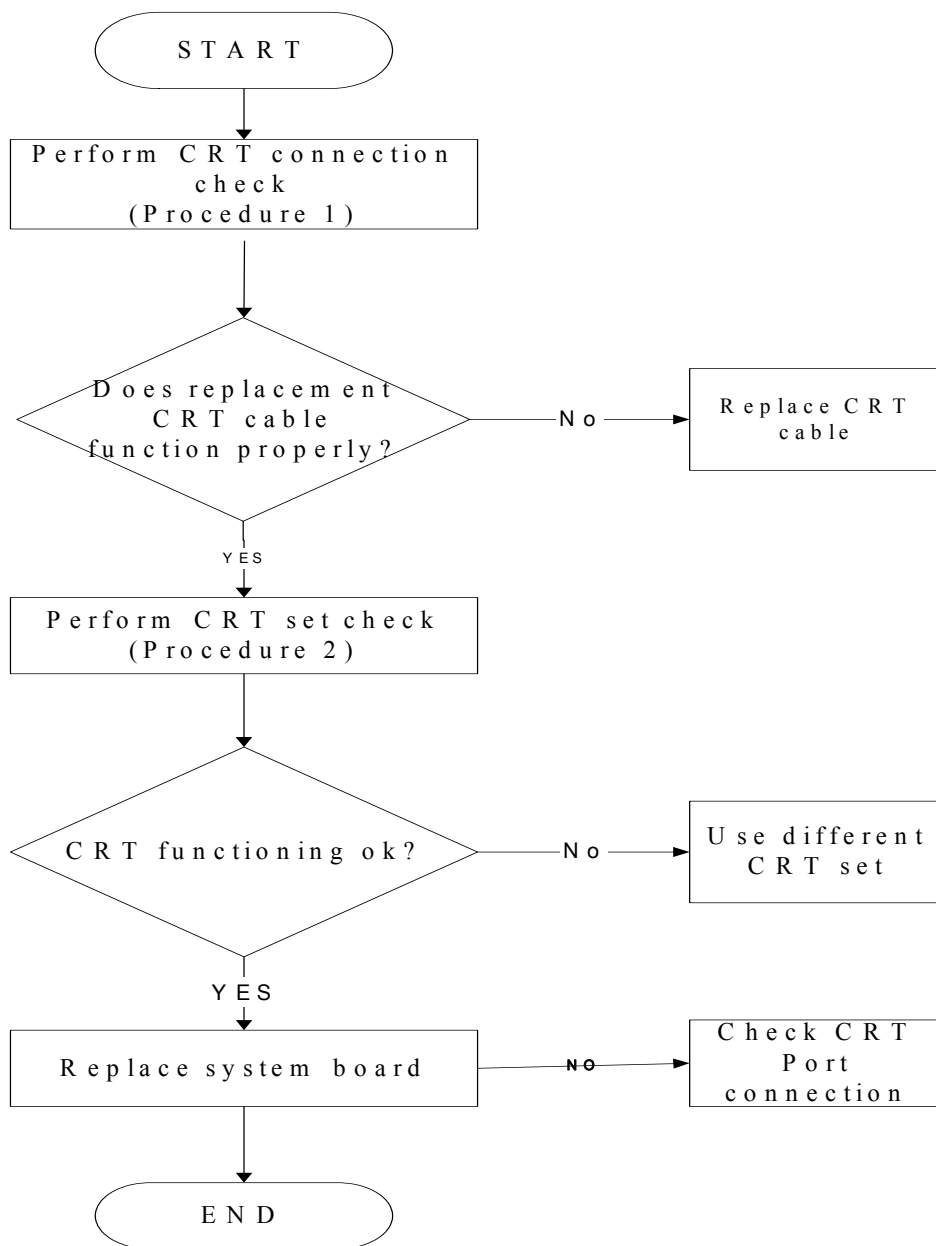


Figure 2-13 CRT troubleshooting process

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. 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.

2.15 LAN Troubleshooting

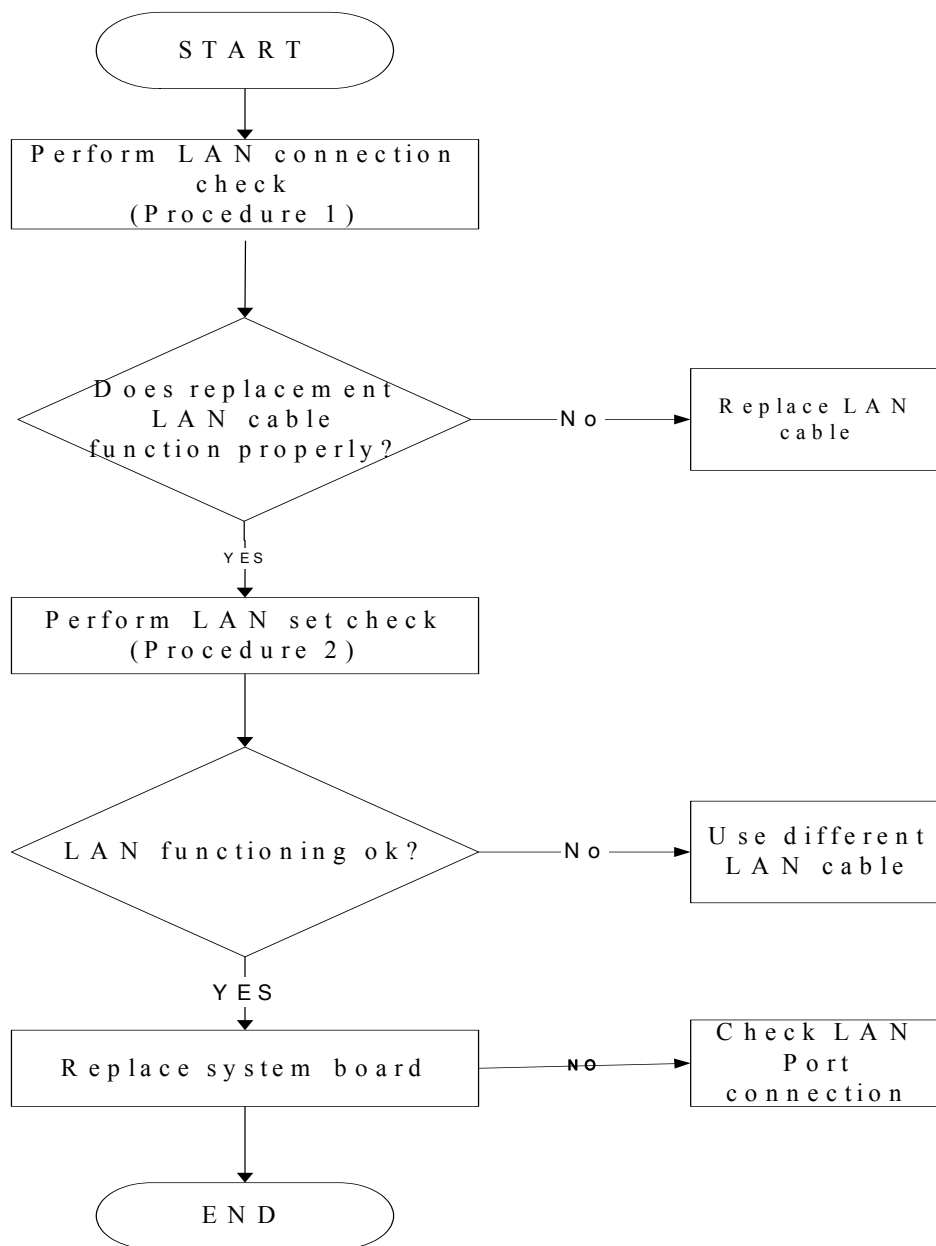


Figure 2-14 LAN troubleshooting process

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

Procedure 1: LAN connection check

Procedure 2: LAN set check

Procedure 1 LAN connection check

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

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

Procedure 2 LAN set check

The LAN set may be faulty. Perform Check 1:

- Check 1 Try using the set for LAN 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 LAN cable to the computer. If the replacement LAN cable 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.

2.16 MIC Troubleshooting

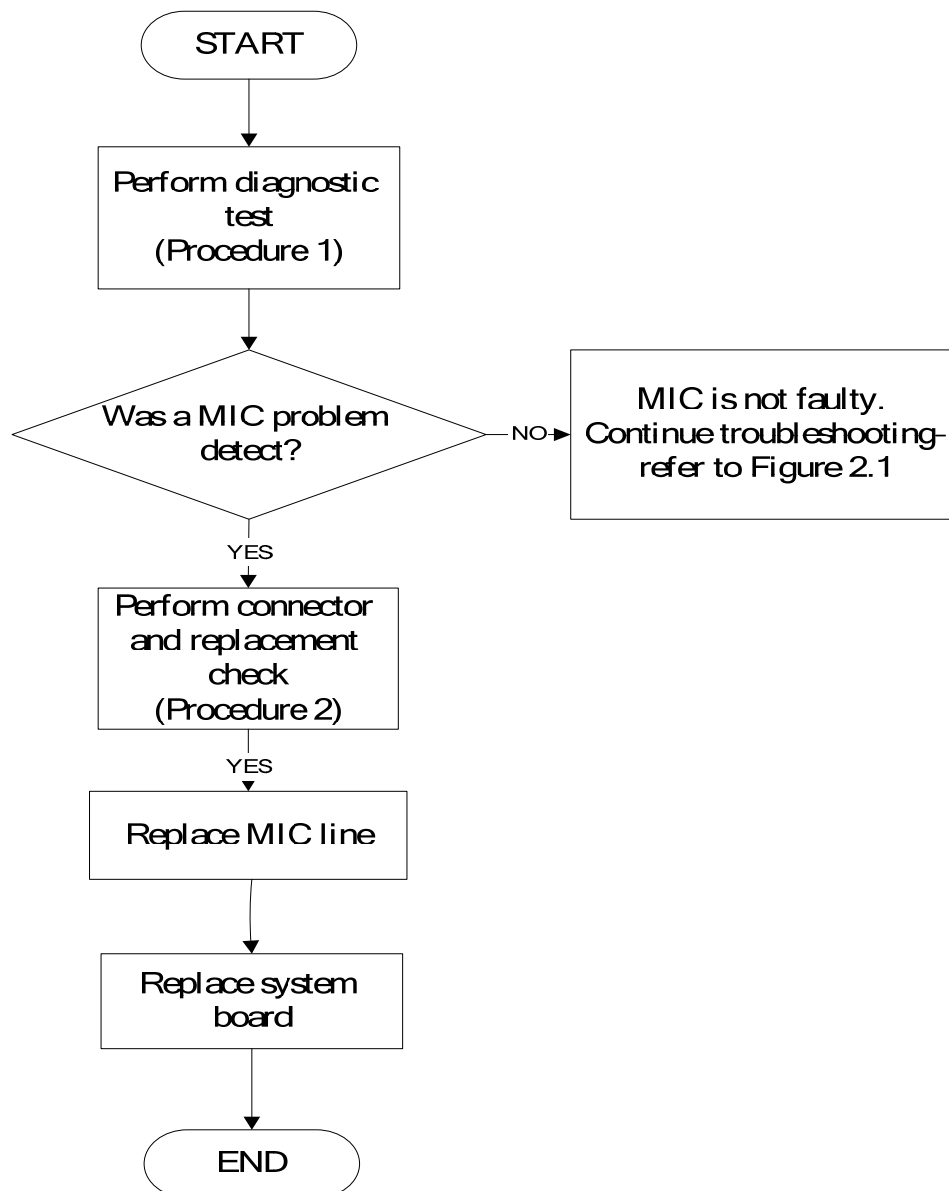


Figure 2-15. MIC troubleshooting process

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 2-15 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 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.

2.17 3D Sensor Troubleshooting

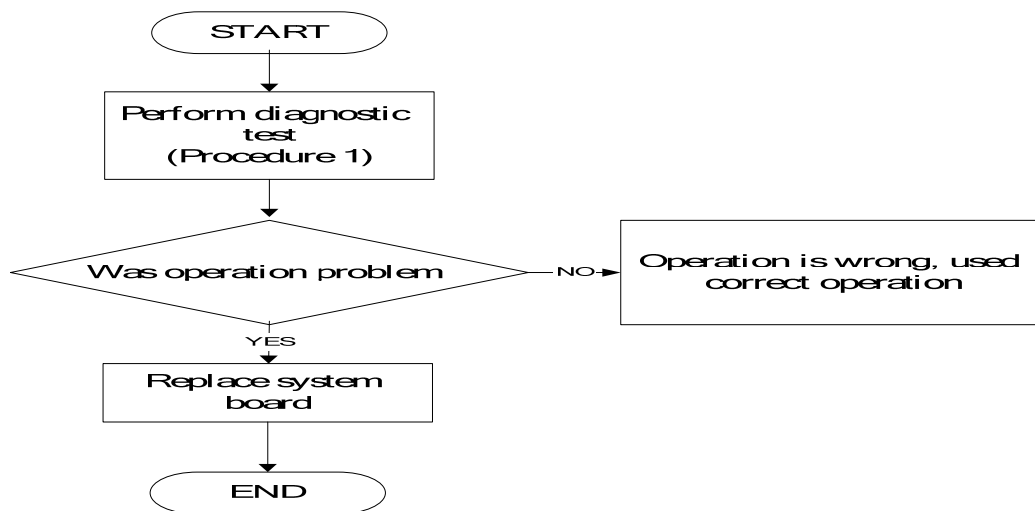


Figure 2-16. 3D sensor troubleshooting process

The operation or system board may be the reason of 3D sensor fault. Either of these two may be damaged. To determine if the computer's 3D is functioning properly, perform the following procedures. Figure 2-16 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Replacement check

Procedure 1 Diagnostic test

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

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

Procedure 2 Replacement check

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

- Check 1 Make sure that 3D sensor test operation is correct, go to Check 2.
- Check 2 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

2.25 3G Troubleshooting

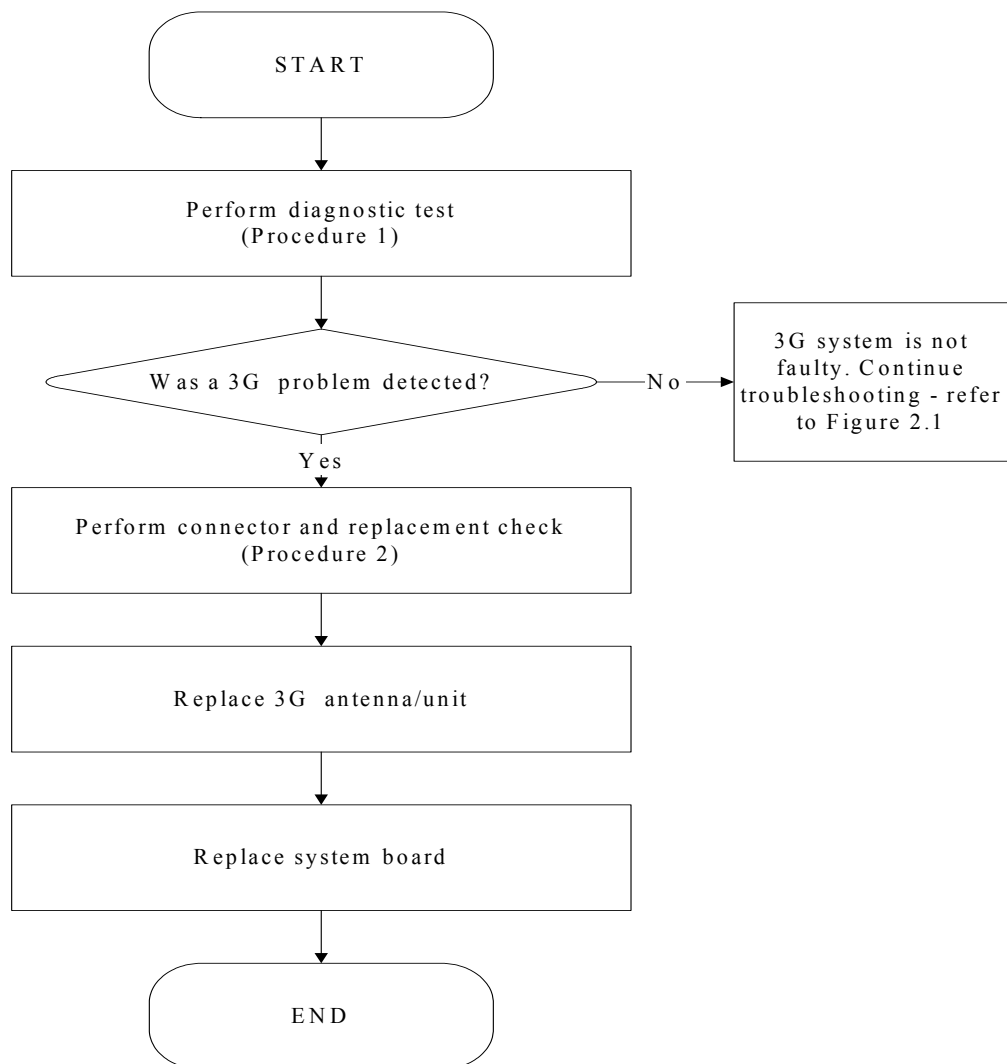


Figure 2-17 3G troubleshooting process

Notes: 3G Antenna assemble rule as below:

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

The 3G antenna wire, 3G unit or system board may each be the source of a 3G fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is

functioning properly, perform the following procedures. Figure 2-24 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:

- 1.> Copy test program “m-tool.exe” into test unit “Operate System Disk”
- 2.> Enter into Windows, then click Star menu & run “CMD”
- 3.> Key in command “mtool conf”

It will show 3G conf information, including 3G module name & FW & IMEI and SIM card IMSI.

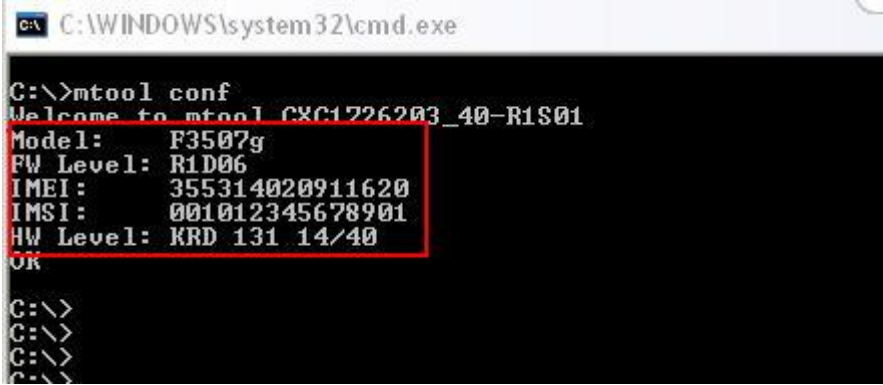
a.> 3G module name:

b.> Module FW:

c.> 3G IMEI:

d.> SIM card IMSI

e.> HW Level



```
C:\WINDOWS\system32\cmd.exe
C:\>mtool conf
Welcome to mtool CXC1726203_40-R1S01
Model: F3507g
FW Level: R1D06
IMEI: 355314020911620
IMSI: 001012345678901
HW Level: KRD 131 14/40
OK
C:\>
C:\>
C:\>
C:\>
```

Procedure 2:

Connector and replacement check

The 3G antenna, 3G unit or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

- Check 1 Make sure that the 3G antenna is firmly connected to the 3G module (refer to Chapter 4 for instructions) and that the 3G module is securely slotted into the system board. If the problem persists, go to Check 2.
- Check 2 Check the wireless communication function is enabled by BIOS setup and FN+F8, and then make sure that the wireless communication LED on the front panel is light. If the LED is light but the 3G function is still faulty, the antenna may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the wireless LAN LED is not light when the wireless communication function is enabled by BIOS setup and FN+F8, go to Check 3.
- Check 3 3G unit may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.
- Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Chapter 3

Tests and Diagnostic

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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 Tampa Bay 10A+10B+10C T&D version 1.0)** hardware modules. The program consists of a series of tests that run automatically when the Diagnostics Program items are selected and executed.

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

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

The TEST & DIAGNOSTIC PROGRAM contains the following functional tests:

- CONFIG CHECK TEST
- AUDIO SOUND TEST
- FAN ON/OFF TEST
- MAIN BATTERY CHARGE TEST
- FDD TEST
- MEMORY CHECK
- KEYBOARD TEST
- MOUSE(PAD) TEST
- LCD PIXELS MODE TEST
- MAGNETIC SWITCH TEST
- LAN TEST
- RTC TEST
- 3D G-SENSOR TEST
- HDD TEST
- READ DMI TEST
- WRITE DMI TEST
- TOSHIBA LOGO SET
- DYNABOOK LOGO SET
- TP TYPE R/W TEST
- EE-PROM SETTING

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

- The diagnostics USB memory
- A formatted working diskette for the floppy disk drive test (Floppy Disk Drive Test)
- A LAN loopback

3.2 Executing the Diagnostic Test

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

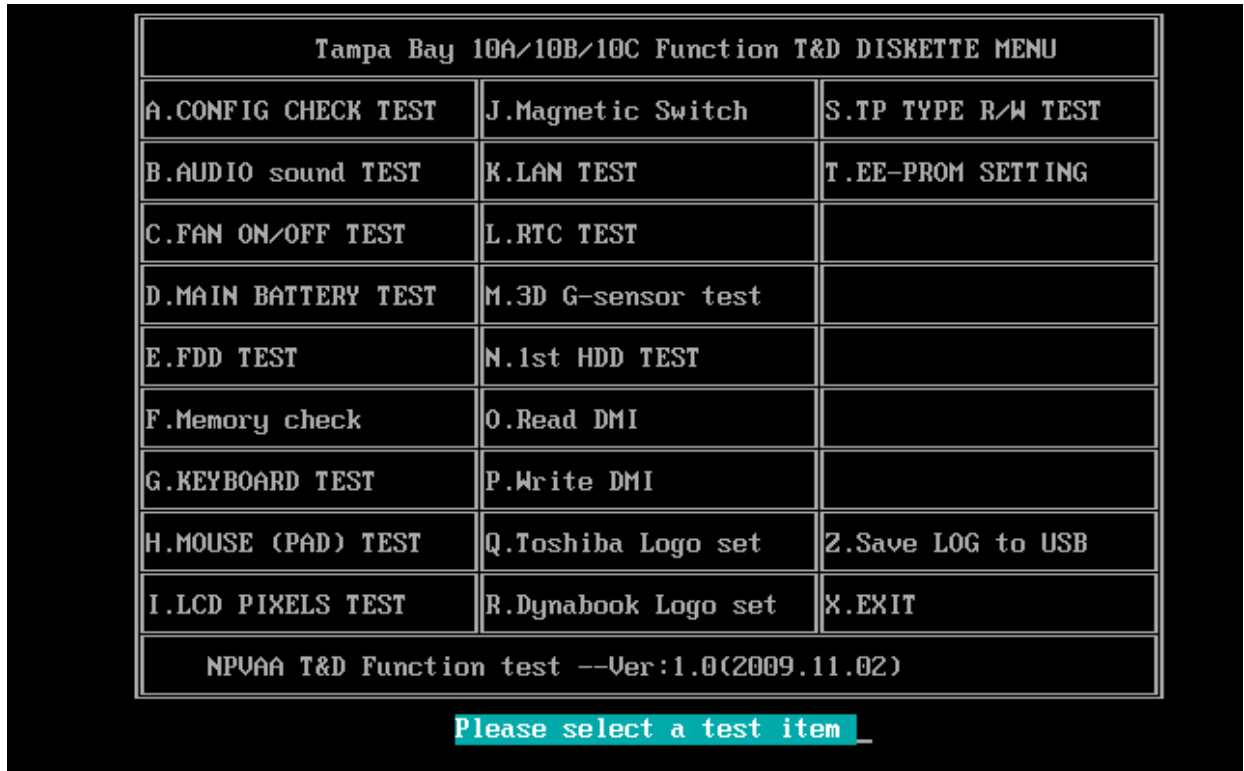
Insert the diagnostics USB memory and turn on the computer. (The diagnostics USB memory contains the Free-DOS boot files.) And then follow the instructions for T&D program installed in USB memory.

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

The test list is as the following:

- A. CONFIG CHECK TEST
- B. AUDIO SOUND TEST
- C. FAN ON/OFF TEST
- D. MAIN BATTERY TEST
- E. FDD TEST
- F. MEMOY CHECK
- G. KEYBOARD TEST
- H. MOUSE (PAD) TEST
- I. LCD PIXELS MODE TEST
- J. MAGNETIC TEST
- K. LAN TEST
- L. RTC TEST
- M. 3D G-SENSOR TEST
- N. 1st HDD TEST
- O. RDMI TEST
- P. WDMI TEST
- Q. TOSHIBA LOGO SET
- R. DYNABOOK LOGO SET
- S. TP TYPE R/W TEST
- T. EE-PROM SETTING

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



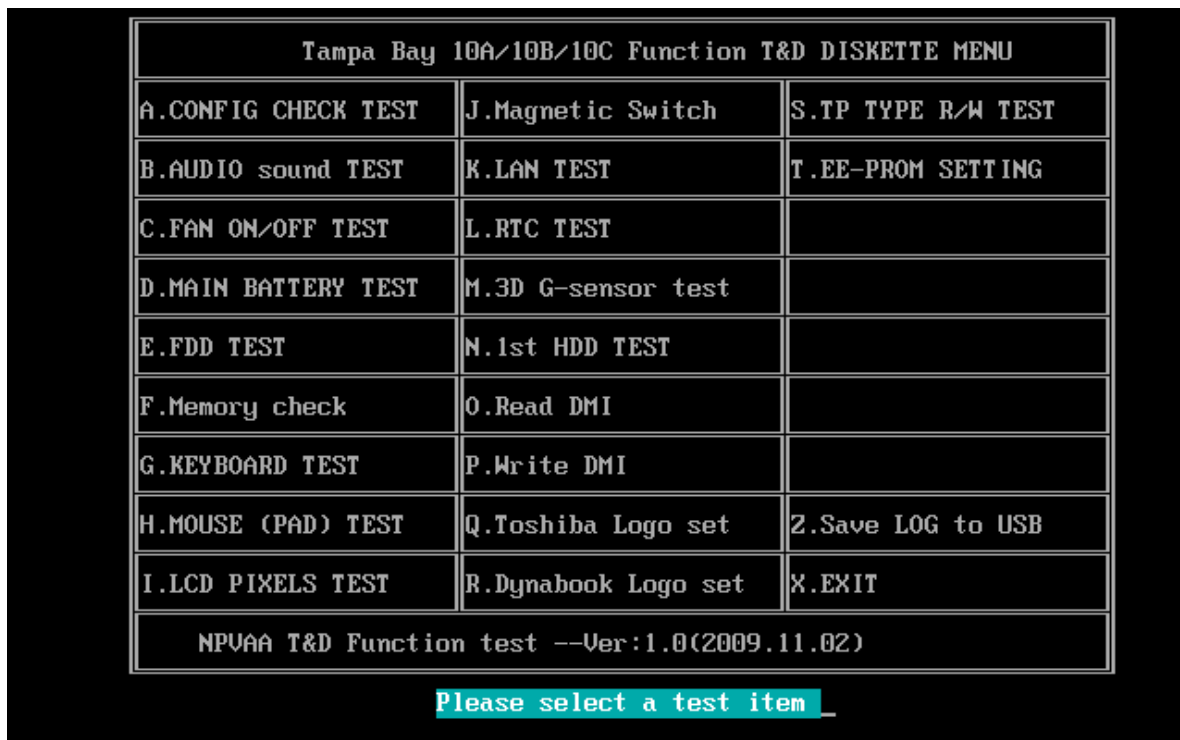
If the test result passes, the following display will show up:



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



Then press any key for next actions, the below display presented.



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
- ◆ HDD type & capacity (Vendor ID. Model.)
- ◆ VRAM size / VGA CHIP TYPE
- ◆ Battery cell (3cell; 6cell.)
- ◆ Wireless type
- ◆ LAN Type
- ◆ Bluetooth

The screen should display as below:

```
=====
===== Configuration as Below =====
=====
CPUYPE=Atom-N450
CPUCache=512KB
CPUSpeed=1.66GHZ
CPUFSB=667MHZ
DDRAMSIZE=2048GHZ800MHZ
PanelID=AUO_B101AW03V0
HDD=TOSHIBA_MK2555GSX
VRAMSIZE&VGATYPE=Inte1945GSE
BATT=6cell
WirelessTYPE= Atheros0D200
LANTYPE=8101E
Bluetooth=BT

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

3.4 Audio sound test

The audio sound test allows the user to aurally confirm the speaker functions. And the speaker will send out music during test.

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

Before the Audio Test, you will see below note:

```
=====Speaker audio Test=====
1.Please adjust volume to max level.
2.Please listen to speaker will send out sound

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

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

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

```
HD Codec DOS Test Program Version:3.47

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

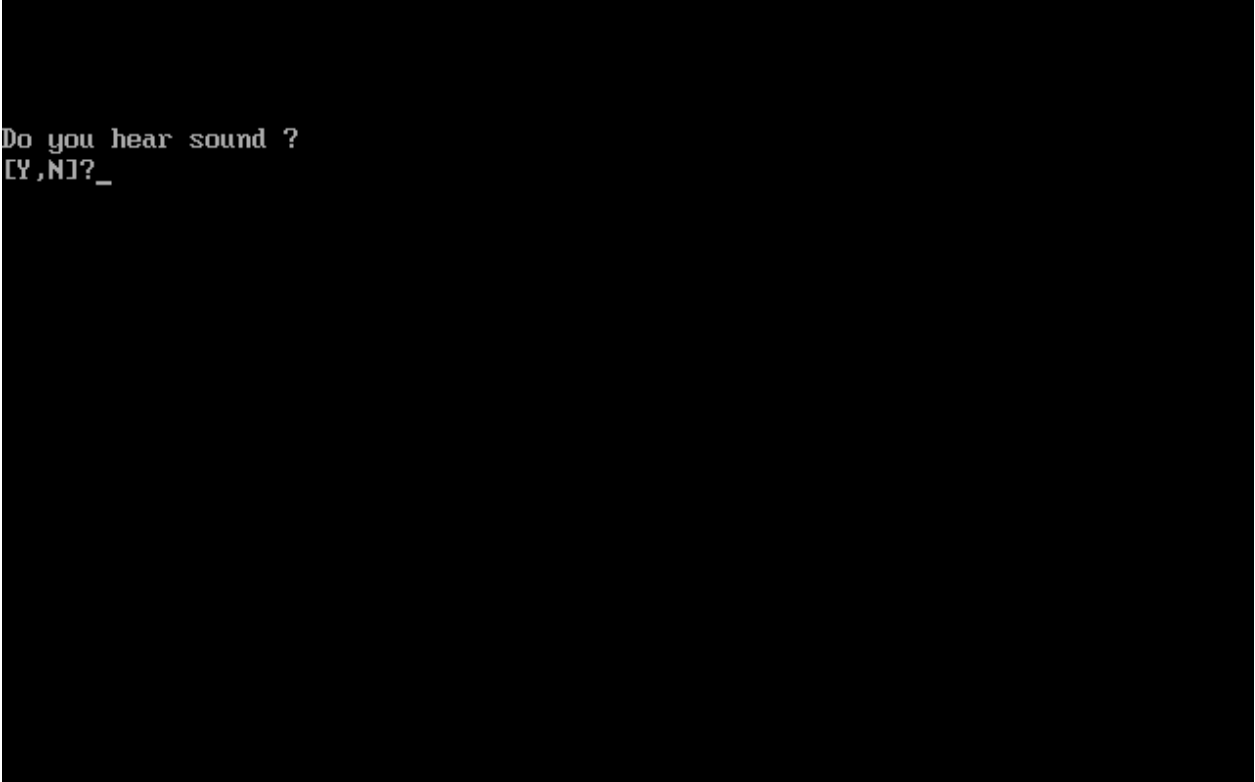
Copyright(C) 2008, Realtek Semiconductor CO. Ltd
```

If the function test fail, you can press “N” to stop test, and then it will display as below;

```
HD Codec DOS Test Program Version:3.47
*****
1. Fail Playback Test
*****
*****
Please send the autest.cfg and *.log files(autest.log and I*_0*.log)
to Realtek.
```

3. Tests and Diagnostics

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



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

3.5 Fan ON/OFF 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 left side of unit whether fan is “ON”.

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

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

```
**** Fan ON/OFF Test ,Please Listen To The FAN Sound !! ****
Press Any Key To Fan On Test ..
Fan On Test :rotating.. ( Press Any Key To Fan Off Test )
Fan Off Test :stopping..

Do you feel FAN rotating wind?

[Y,N]?
```

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

```
EC_Value: 2c 44
**** Fan Test Program For A51 Use V1.1 2005/2/3 ****

FAN Speed Test :      5400 RPM [PASS]      5400

Press any key to continue . . .
```

3. Tests and Diagnostics

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

```
EC_Value: 4 4
*** Fan Test Program For A51 Use V1.1 2005/2/3      ***
FAN Speed Test :      4500 RPM [FAIL]
```


3.6 Main Battery Charge Test

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

. 30W with 19V DC for ALL SKU

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

The Floppy Disk Test includes three subtests of the:

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

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

The subtests run automatically.

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

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

```
***** Fdd Test Program U1.3 *****
Testing Driver A: [1.44 MByte (Cyl:80, Head:2, Sec:18)]...
Testing Seq. seek/verify... Head: 01, Track: 79... [ PASS ]
Testing Fun. seek/verify... Head: 01, Track: 06...
```

3.8 Memory check

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

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

1. Memory Read test
2. Memory Write test
3. Memory Read & Write test
4. Memory INFO test

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

Please check the Memory read or write Test
1: Memory Read test
2: Memory Write test
3: Memory Read&Write test
4: Memory INFO test
[1,2,3,4]?_
```

When you execute this test, after you press the related number, the test picture will show as below:

Memory Read Test

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

Memory Write Test

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

Memory Read & Write Test

```
= Write Test == block 2 =====  
Address: 00000001 : 37FF8000  
Write Test fails at: 137FF8000 : 2  
Read test:  
Write test:  
are the RAM R&W is ok? [Y,N]?_
```

Memory Info Test

```
=====Memory R&W Test=====  
  
Please check the Memory read or write Test  
  
1:Memory Read Test  
2:Memory Write Test  
3:Memory Read&Write Test  
4:Memory Info Test  
[1,2,3,4]?4  
=====  
COMPAL Electronic Inc. V1.0.0.1  
Author : STD.SID TEAM.  
WARNING: THIS PROGRAM IS FOR INTERNAL USE ONLY.  
Copyright (c) 2008 COMPAL Electronic Inc. All rights reserved.  
=====  
DIM: 0  
Size0: 2048 MB  
Speed0: 800  
Manufacturer0:  
  
are the RAM type ok? [Y,N]?_
```

NOTE: Base on normal status, the **Memory Info** speed show **800/667**, then the RAM is **DDR2**; if speed show **1066**, and then the RAM is **DDR3**.

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.

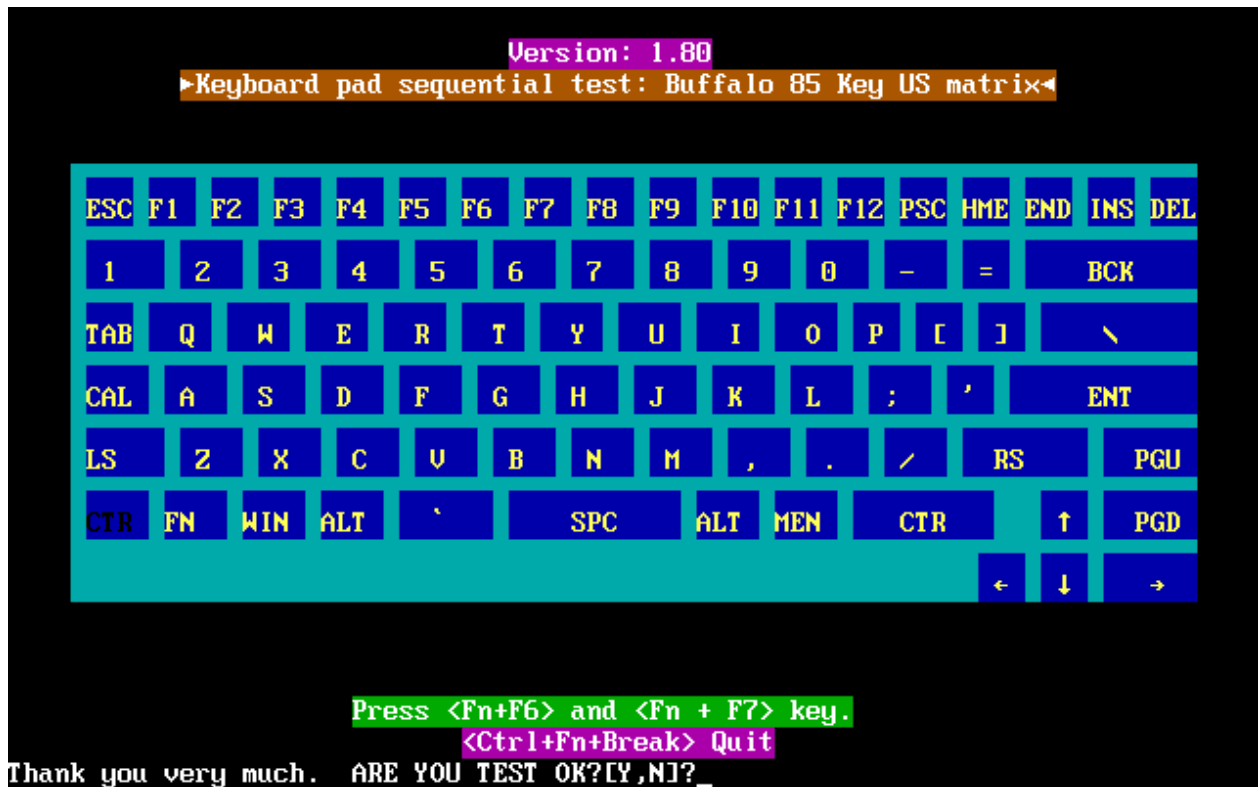
Before keyboard test starts, the keyboard matrix code should be chosen as below display:

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

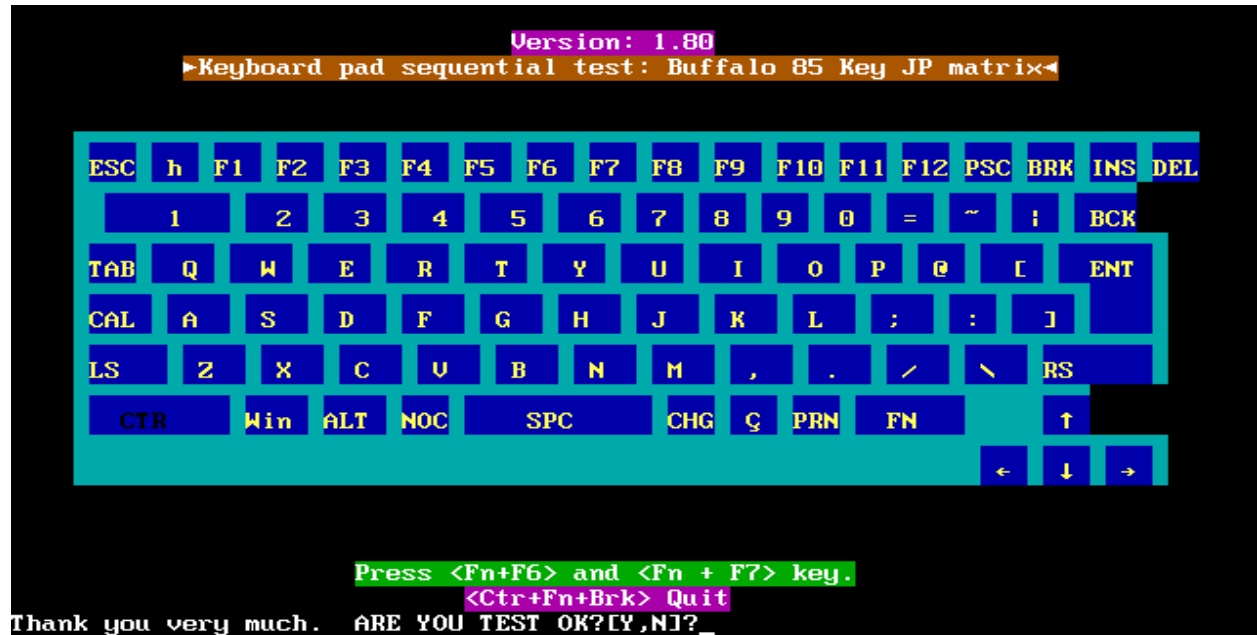
When you execute this test, the keyboard layout is drawn on the display. When any key is pressed, the corresponding key on the screen changes to black as shown below.

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

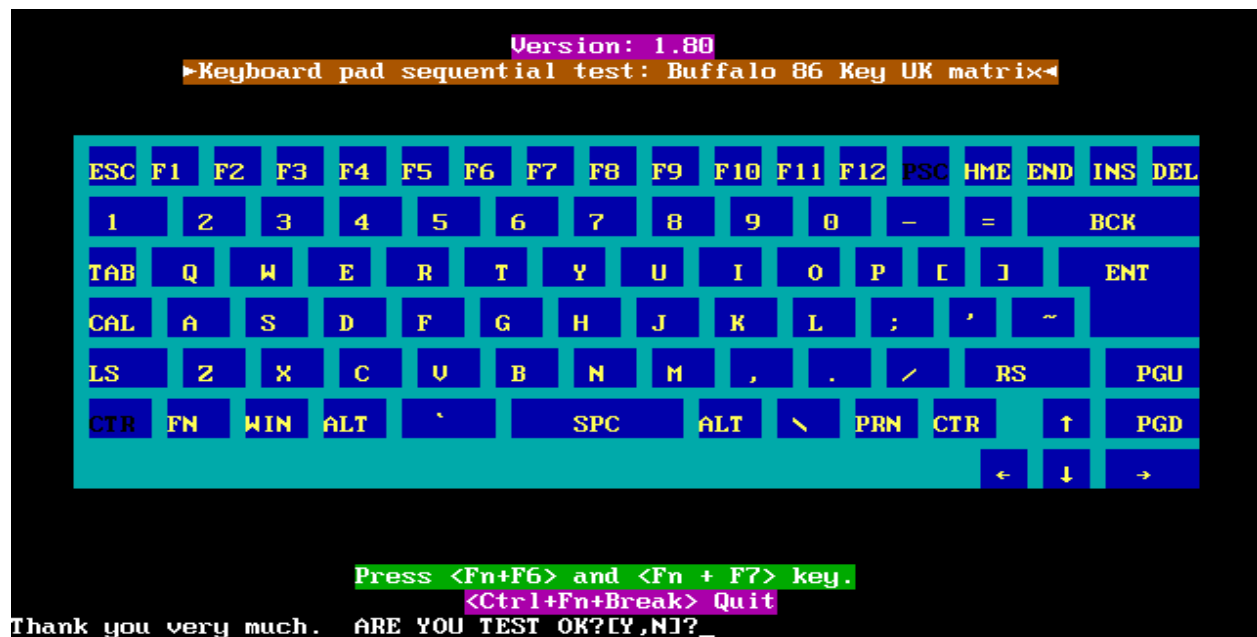
US Keyboard



Japan keyboard



UK 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.

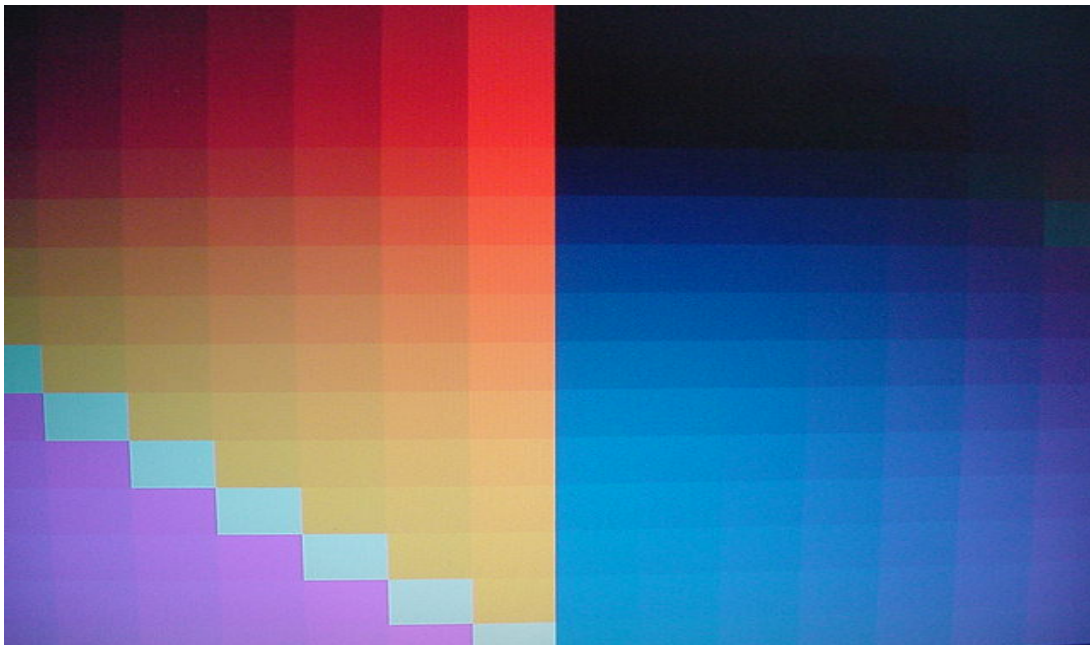
3.11 LCD Pixels Mode Test

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 (2/4/16 colors), 640*200 (2/16 colors), 640*350 (2/16 colors), 640*480 (2/16/256 colors).

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



3.12 Magnetic Switch Test


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

Follow below steps to run this test:

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

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

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



```
Magnetic switch test program Ver 1.10 __ PE/SW: Jone  
Please close and open LCD!
```

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

```
Magnetic Switch test is Pass!
```

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

3.13 LAN Test

The LAN test checks the LAN full-duplex environment.

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

And LAN information will show on the test screen:

- ◆ IO Base – Port: A000H
- ◆ IRQ – BH, it's "IRQ B".
- ◆ Node – it is "MAC Address".
- ◆ Line Speed –1000 Mbps or 100Mbps or 10 Mbps.
- ◆ Bus ID – it's "09".

The LAN test includes three subtests of the:

1. Speed1000
2. Speed100
3. Speed10

The subtests run automatically.

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

1.Please plug-in the Loopback into LAN port.
2.Please see test result in middle of display.
  (Pass: 000 , Fail: xxx )

Press any key to continue . . .
```

3. Tests and Diagnostics

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 = A000H IRQ = B H Node:001EEC3EC8DA 1000M: 10K 100M: 5K 10M: 2K
VID =10ECH DID =8136H SVID =1179H SSID =FF00H Lan Adapters: 1
Now is: 1
Open Your MPLAN.CFG in this machine! 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 none Rxtimeout 1
4.Speed100=true Pass ROK= 2000 TOK= 2000
5.Speed10=true Pass Error= 0
6.Debug=true Txtimeout = 50
7.AutoRun=true

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

E:\LAN>
```

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



3.14 RTC Test

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

The test runs automatically.

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

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

Please Check the result after test.

Press any key to continue . . .

Wait for zero counter...
Testing...
DOS TIME = 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 . . .
```

The screen will show below picture, if RTC test is OK.



The screen will show below picture, if RTC test is FAIL.

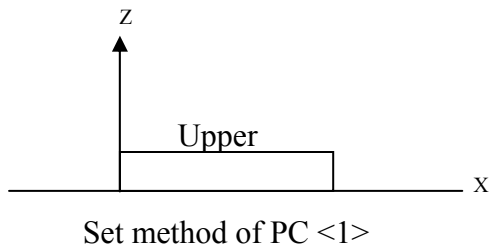
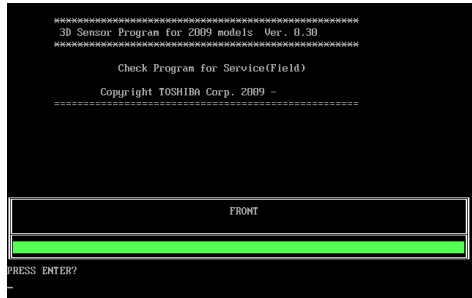


3.15 3D G-sensor test

NOTE: please keep 90 degree between logic upper and LCD panel when test

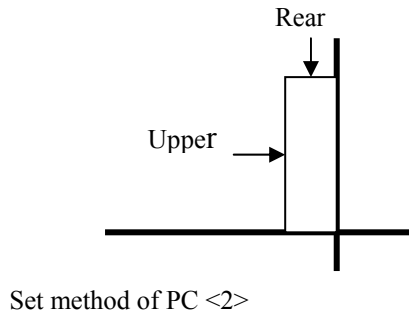
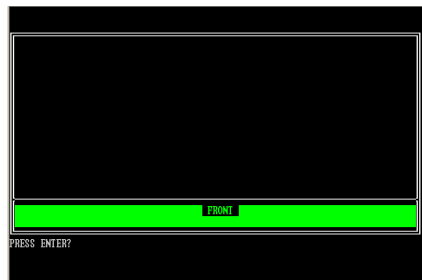
The display of a test program and the set method of PC are shown below.

Display of a Test Program, The portion which PC and Test-Fixture contact is green.

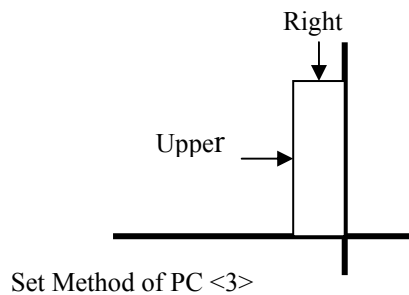


If the picture shows as below, it means the 3D G-sensor function is OK

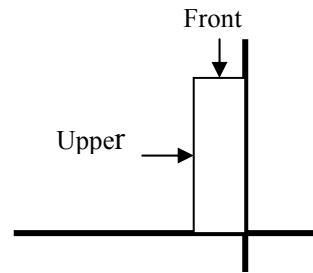
Test 2 :



Test 3:

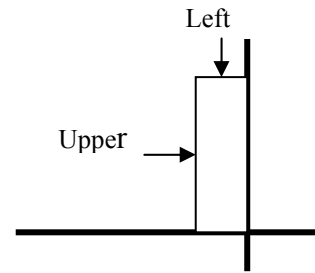
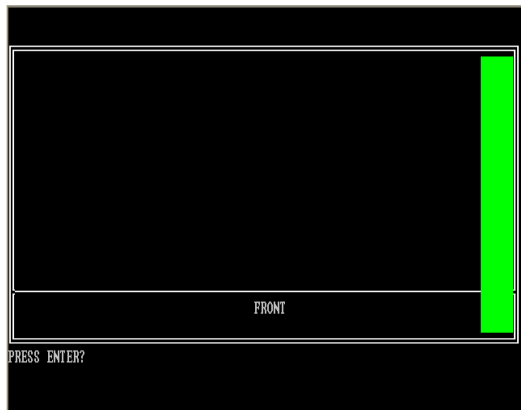


Test 4:



Set method of PC <4>

Test 5:

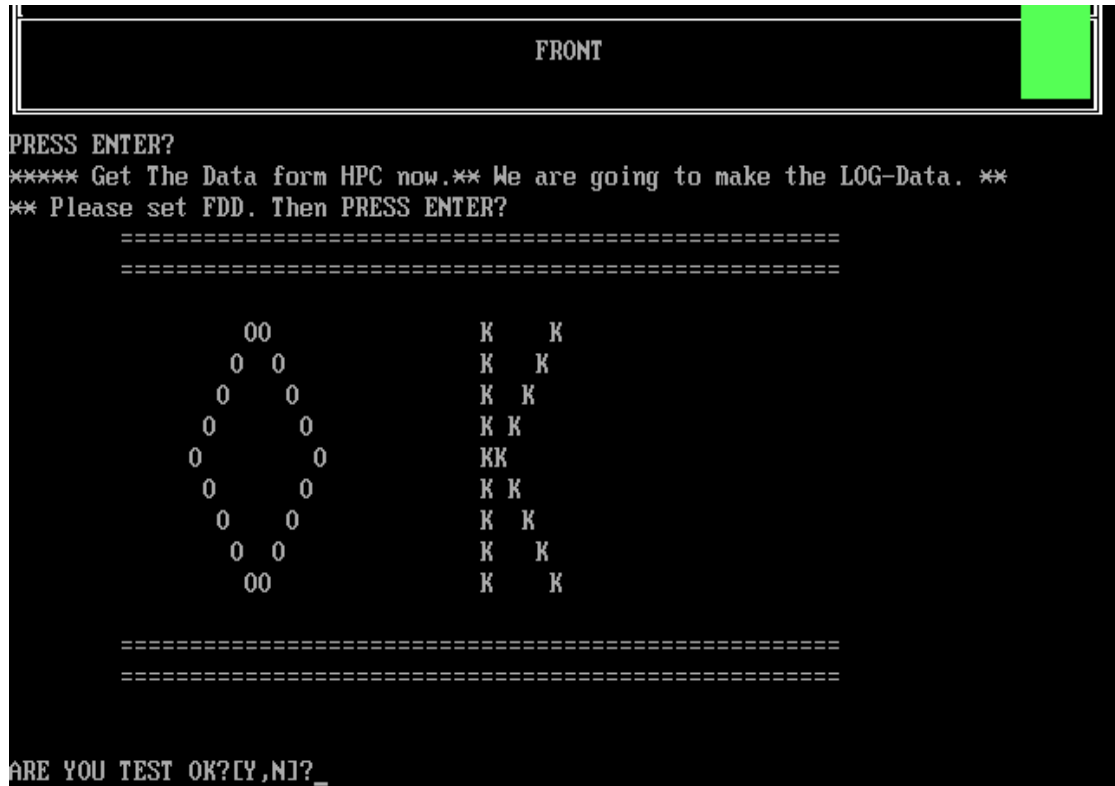


Set method of PC <5>

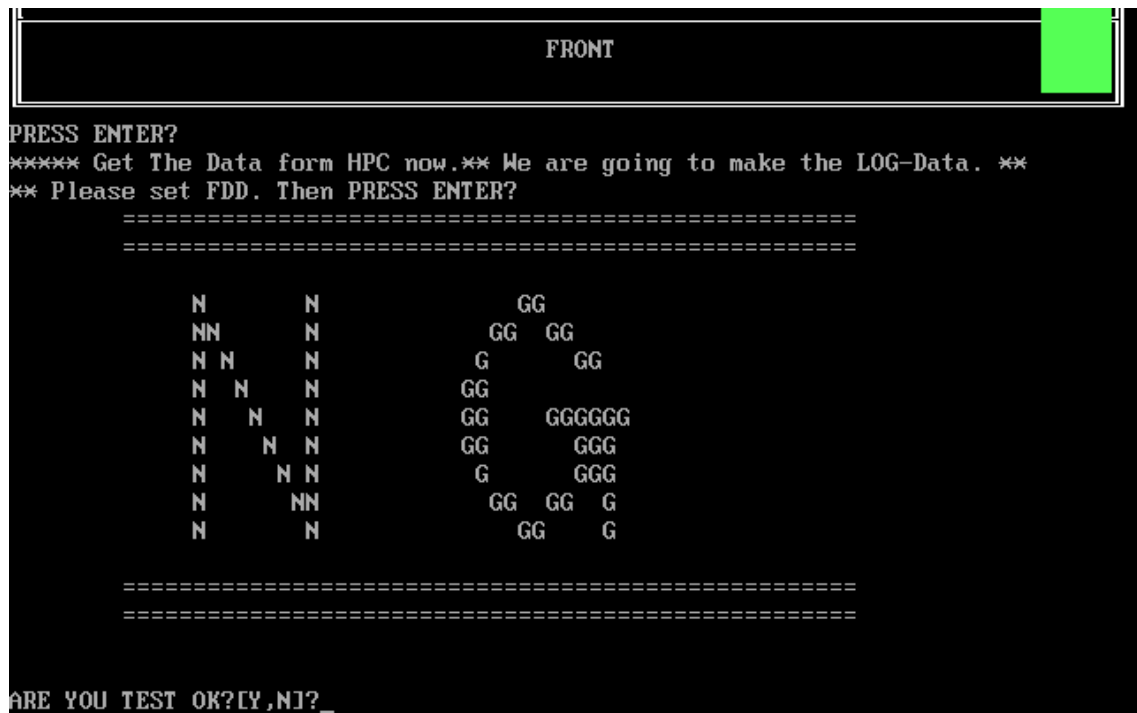
Test Result

A test result is displayed when a test is completed. A display of result is O.K. or NG.

And an error flag is returned at the end of a program.



If the picture shows as below, it means the 3D G-sensor function is NG



3.16 HDD Test

NOTE: You can press “Ctrl + Fn + Break” key to stop HDD test if you want

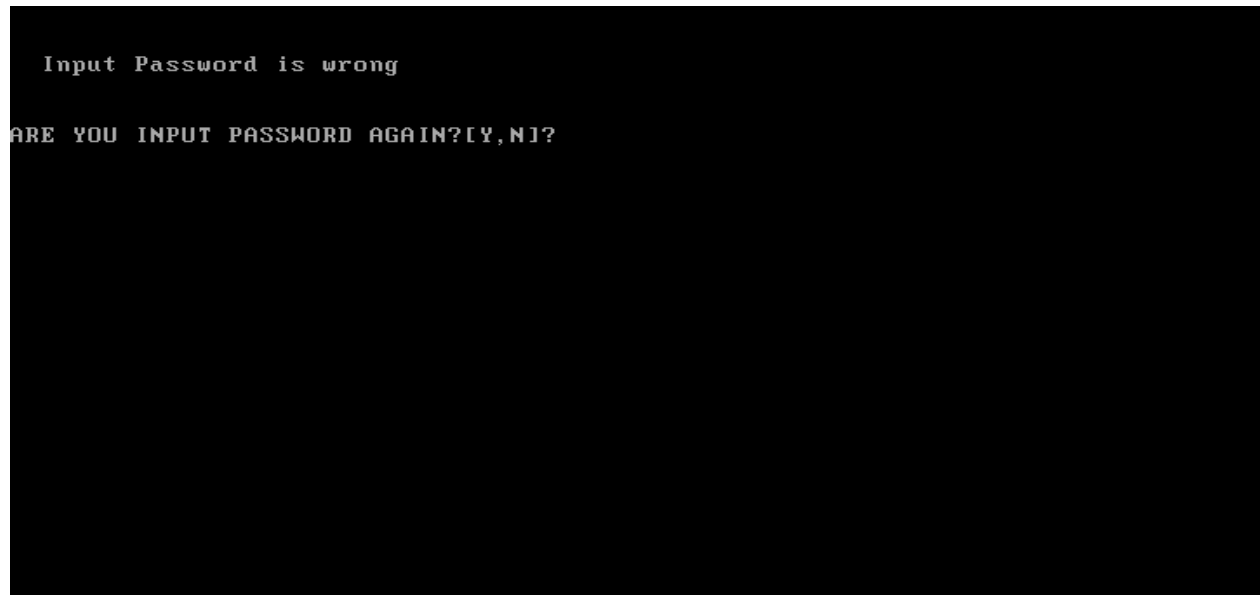
The HDD test allows the user to verify the HDD ok or not. First, please select HDD test method, Screen would display as below:

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

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

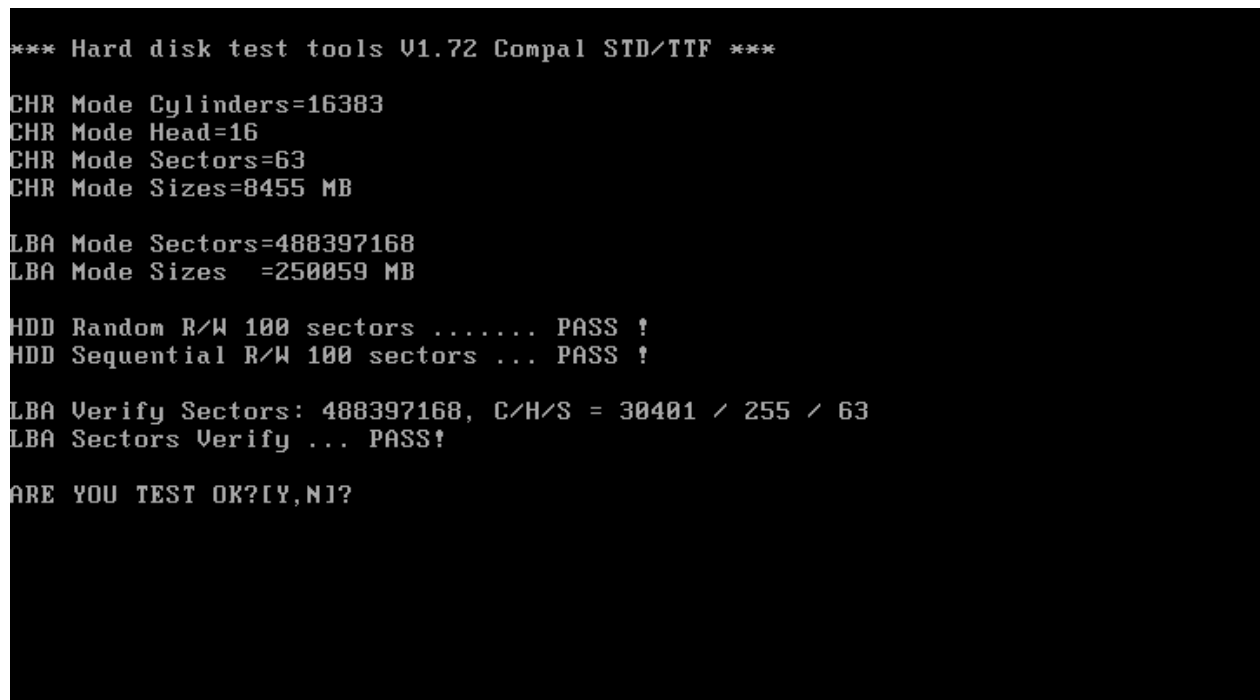
```
Input password is Right  
Press any key to Test HDD function  
  
Press any key to continue . . .
```

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



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

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



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

```
*** Hard disk test tools V1.60 Compaq STD/TTF ***  
Reset DISK1 .....Pass !  
Error ! Can't use Enhanced Disk Drive Support Function  
ARE YOU TEST OK?(Y,N)?
```

3.17 Read DMI

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

```
Manufacturer : TOSHIBA
Product_Name : Satellite A355D
Serial_Number : X8116579K
Version      : PSALEU-004005
Asset_Number : *
UUID        : 6C64768B8CE211DD8A58001EEC40A110
OEM_Strings : PSALEU-004005,SQ004806V04,11Q40
Are the DMI data is OK? [Y,N]?
```

3.18 Write DMI

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

1. Write Product (32)
2. Write Serial (32)
3. Write Version (32)
4. Write OEM String (64)

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

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

```
please choice the item
 1: Write Product
 2: Write Serial
 3: Write Version
 4: Write OEM String
please enter the num you choose: 4
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!

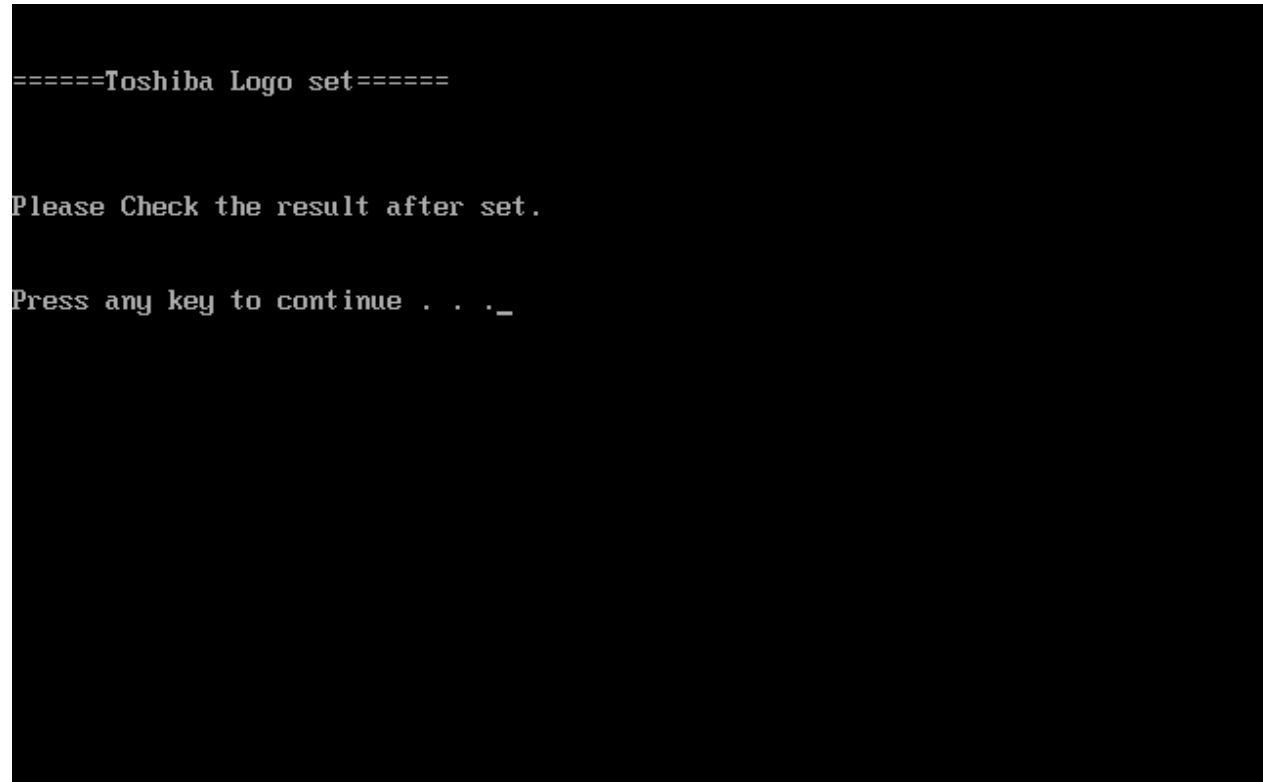
*****Please reboot the system.To make the setting effective
*****Do you want to modify other dmi ? *****
Press Y for Yes or N for No: _
```

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

3.19 Toshiba Logo set

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

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



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



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



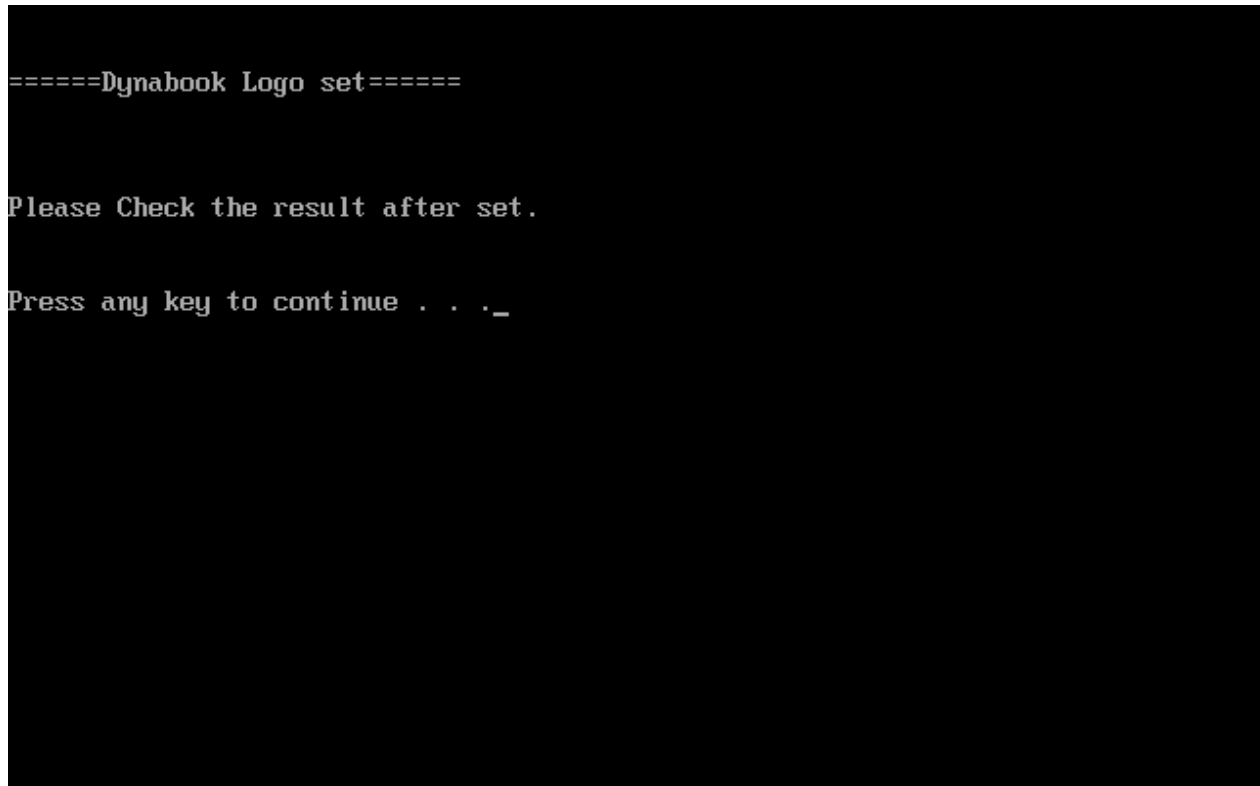
If an error is detected and a test fails, the following message displays:



3.20 Dynabook Logo set

Set the computer's Dynabook Logo for Japan SKU.

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



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



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



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



3.21 TP TYPE R/W TEST

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

The test runs automatically.

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

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

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

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

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

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

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

```
====TP R/W TEST====
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
Synaptics TP
  0 uS: C 42
 1200 uS: D 07Version 2.1 (support ALL model)
01
Write Ok
  0 uS: C 42
 900 uS: D 00
*****
* TP Check by EC JaFerLan V1.3 on 2009/02/12 *
*****
RETURN CODE: 0>FEECHO is off
#####
  TP TYPE READ FAIL
#####
Press any key to continue . . . _
```

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

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

SET EE=@

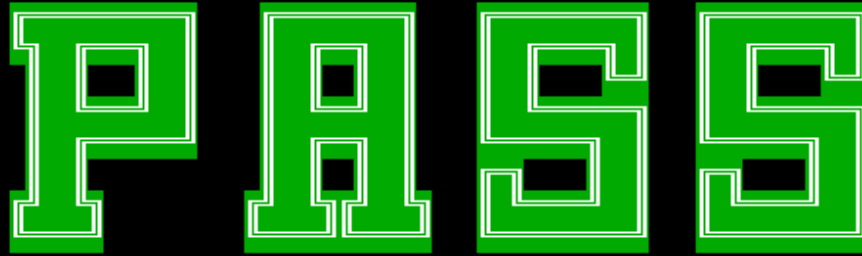
SET EEEE=01
Version 2.1 (support ALL model)

SET EE=@

SET EEEE=01
Version 2.1 (support ALL model)

SET EE=@

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

PASS

Press any key to continue . . . _

3.22 EE-PROM SETTING

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

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

The screen should display as below:

```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?_
```

If press "1" to set MIC function status in EE-PROM, the screen should display as below:

```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?1

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

[Y,N]?_
```

3. Tests and Diagnostics

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

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

```
A51 I-MIC SET/CHECK PROGRAM ---Ver 1.0 [A51 SWDL]
Read(f5)-> [9f]
SET I-MIC TO SUPPORT!
Write(f5)-> [df]
Successful!
Press any key to continue . . .
-
```

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

```
A51 I-MIC SET/CHECK PROGRAM ---Ver 1.0 [A51 SWDL]
Read(f5)-> [df]
SET NO I-MIC TO SUPPORT!
Write(f5)-> [9f]
Successful!
Press any key to continue . . .
-
```

Then press any key go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function
1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?_
```

If press “2” to set 3G function status in EE-PROM, the screen should display as below:

```
Please select Check or Disable Function
1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?2

1. Please check SPEC of this unit whether has 3G? (Y=3G, N=N03G)

[Y,N]?_
```

3. Tests and Diagnostics

Please check related information to judge this unit whether has 3G function.

If this unit has 3G function, press “Y” then program will set 3G enable automatically as below:

```
A51 3G EQ VALUE SET/CHECK PROGRAM V1.0 [A51 SMDL]
Read(f2)-> [08]
SET 3G Exist EQ!
Write(f2)-> [0c]
Successful!
Press any key to continue . . .
-
```

If this unit has no 3G function, press “N” then program will set 3G disable automatically as below:

```
A51 3G EQ VALUE SET/CHECK PROGRAM V1.0 [A51 SMDL]
Read(f2)-> [0c]
SET 3G NOT Exist EQ!
Write(f2)-> [08]
Successful!
Press any key to continue . . .
-
```

Then press any key go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function
1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?_
```

If press “3” to set WIMAX function status in EE-PROM, the screen should display as below:

```
Please select Check or Disable Function
1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?3

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

[Y,N]?_
```

3. Tests and Diagnostics

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

If this unit has WIMAX function, press “Y” then program will set WIMAX enable automatically as below:

```
A51 WiMAX EQ VALUE SET/CHECK PROGRAM V1.0 [A51 SWDL]
Read(f2)-> [08]
SET WiMAX Exist EQ!
Write(f2)-> [0a]
Successful!
Press any key to continue . . .
-
```

If this unit has no WIMAX function, press “N” then program will set WIMAX disable automatically as below:

```
A51 WiMAX EQ VALUE SET/CHECK PROGRAM V1.0 [A51 SWDL]
Read(f2)-> [08]
SET WiMAX NOT Exist EQ!
Write(f2)-> [08]
Successful!
Press any key to continue . . .
-
```

Then press any key go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function
1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title


[1,2,3,4,5,6]?_
```

If press “4” to set BIOS language in EE-PROM, the screen will display as below:

```
Please select which BIOS language need set? (1=English,2=Japanese,3=French)


[1,2,3]?_
```


If press “1” to set English BIOS language in EE-PROM, the screen will display as below:



```
Status: 78  
Language Setting: English  
Press any key to continue . . .  
-
```

If press “2” to set Japanese BIOS language in EE-PROM, the screen will display as below:



```
Status: 78  
Language Setting: Japanese  
Press any key to continue . . .  
-
```

If press “3” to set French BIOS language in EE-PROM, the screen will display as below:

```
Status: 78  
Language Setting: French  
Press any key to continue . . .  
-
```

Then press any key go back to EE-PROM SETTING option as below:

```
Please select Check or Disable Function  
  
1. Set MIC Function Status in EE-PROM (Disable/Enable)  
2. Set 3G Function Status in EE-PROM (Disable/Enable)  
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)  
4. Set BIOS language in EE-PROM (English/Japanese/French)  
5. Set No Support Function Disable  
6. Back To Test Title  
  
[1,2,3,4,5,6]?_
```

If press “5” to disable all no support function, program will perform automatically as below:

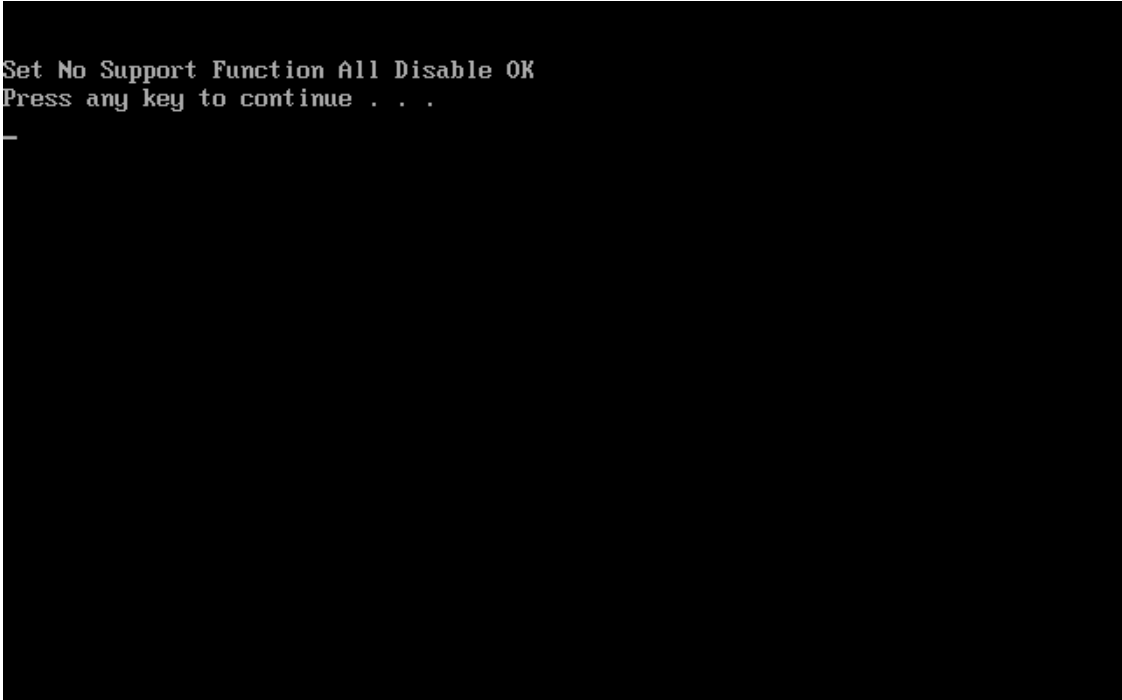
```
A51 HDMI SET/CHECK PROGRAM ---Ver 1.1 [A51 SWDL]
Read(f5)-> [df]
SET HDMI PORT NOT SUPPORT!
Write(f5)-> [df]
Successful!
```

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

```
A51 Felica EQ VALUE SET/CHECK PROGRAM V1.2 [A51 SWDL]
Read(f2)-> [08]
SET Felica NOT Exist EQ!
Write(f2)-> [08]
Successful!
```

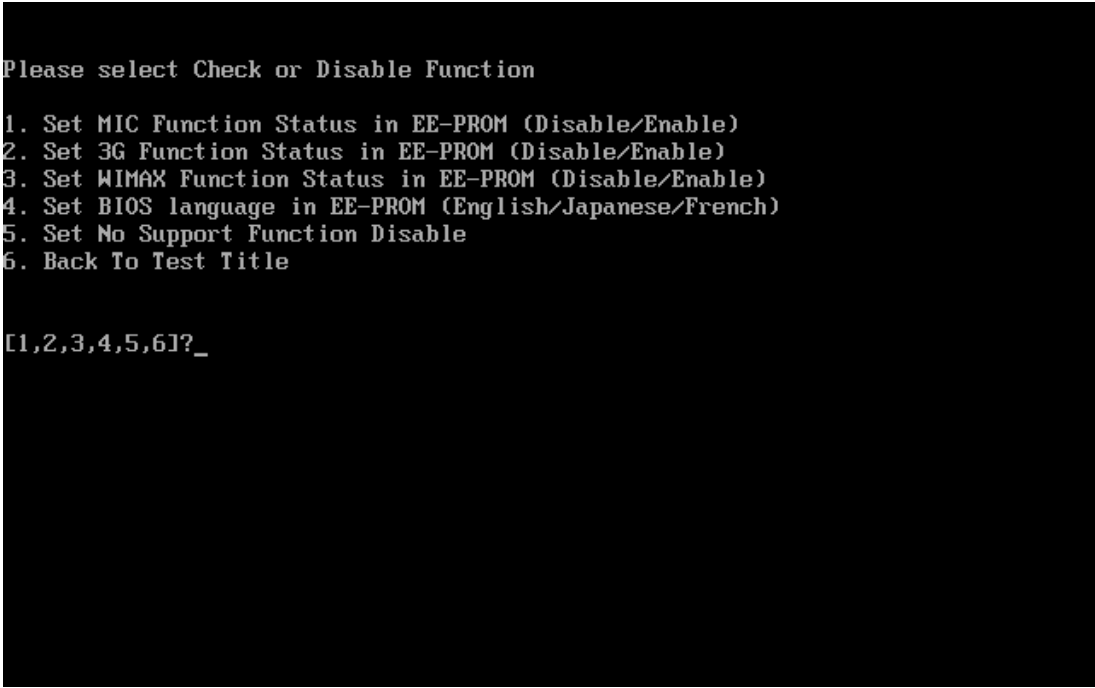
```
A51 K/B LED EQ VALUE SET/CHECK PROGRAM V1.0 [A51 SWDL]
Read(e2)-> [fe]
SET K/B LED Disable EQ!
Write(e2)-> [fe]
Successful!
```

```
A51 UMB EQ VALUE SET/CHECK PROGRAM V1.1 [A51 SWDL]
Read(f2)-> [08]
SET UMB NOT Exist EQ!
Write(f2)-> [08]
Successful!
```



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

Then press any key to go back to EE-PROM SETTING option as below:



```
Please select Check or Disable Function

1. Set MIC Function Status in EE-PROM (Disable/Enable)
2. Set 3G Function Status in EE-PROM (Disable/Enable)
3. Set WIMAX Function Status in EE-PROM (Disable/Enable)
4. Set BIOS language in EE-PROM (English/Japanese/French)
5. Set No Support Function Disable
6. Back To Test Title

[1,2,3,4,5,6]?_
```

3. Tests and Diagnostics

If press “6” program will go back to test title as below:

Tampa Bay 10A/10B/10C Function T&D DISKETTE MENU		
A.CONFIG CHECK TEST	J.Magnetic Switch	S.TP TYPE R/W TEST
B.AUDIO sound TEST	K.LAN TEST	T.EE-PROM SETTING
C.FAN ON/OFF TEST	L.RTC TEST	
D.MAIN BATTERY TEST	M.3D G-sensor test	
E.FDD TEST	N.1st HDD TEST	
F.Memory check	O.Read DMI	
G.KEYBOARD TEST	P.Write DMI	
H.MOUSE (PAD) TEST	Q.Toshiba Logo set	Z.Save LOG to USB
I.LCD PIXELS TEST	R.Dynabook Logo set	X.EXIT
NPVAA T&D Function test --Ver:1.0(2009.11.02)		
Please select a test item_		

Chapter 4

Replacement Procedures

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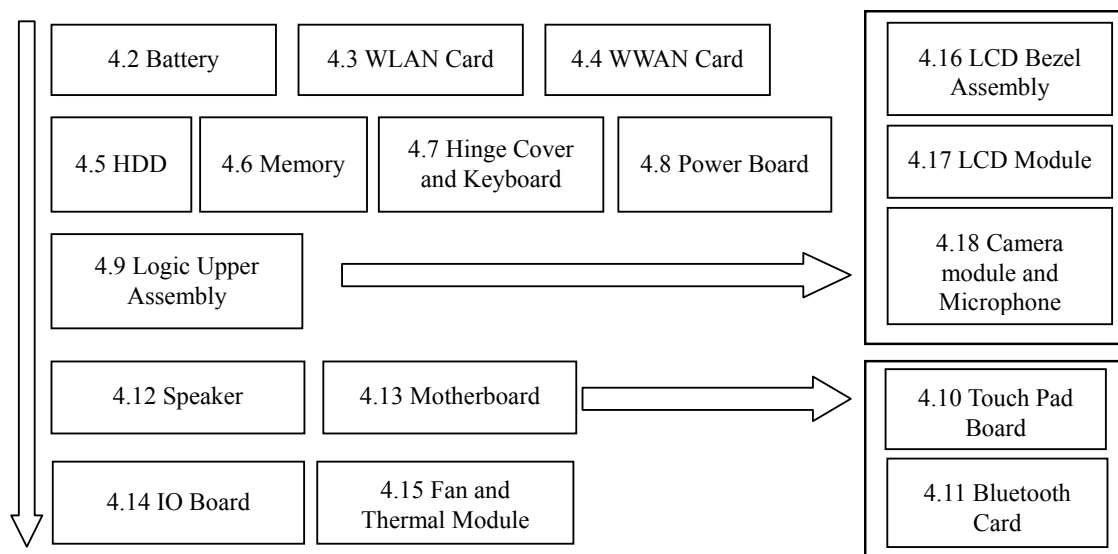
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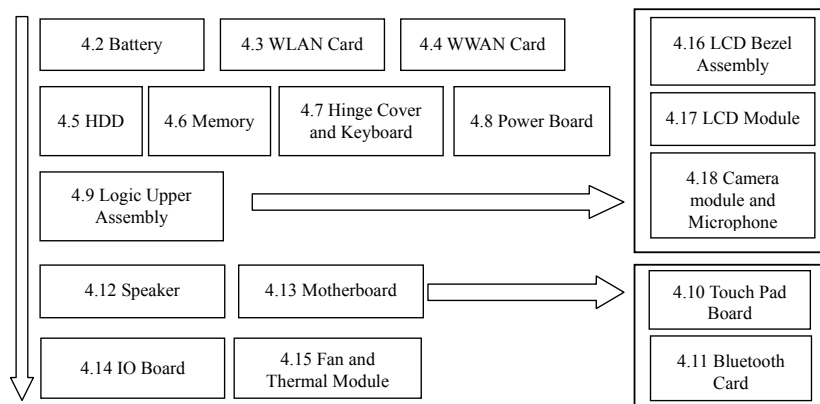
4.1 General

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



How to use the chart (two examples):

- For removing the Motherboard:
First, remove parts from 4.7 Hinge Cover & Keyboard, 4.8 Power Board and 4.9 Logic Upper Assembly
- For removing the LCD Module:
First, remove Logic Upper Assembly, then remove the LCD Bezel Assembly.



Safety Precautions

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

DANGER:

- 1. Always use the original batteries or replacement batteries authorized by Toshiba. Batteries other than those differ in specifications and are incompatible with the laptop. They may burst or explode. To avoid leakage of alkaline solutions, never heat or disassemble the battery packs. Never throw the battery packs into a fire. If this is violated, they will explode.*
- 2. The components such as the power supply and inverter carry high voltages. When you partially disassemble the laptop and turn on the components, use extreme care not to touch the connectors and components to avoid the risk of electrical shock. Do not disassemble individual components during first-level maintenance.*

WARNING:

- 1. To avoid the risk of electrical shock, turn the laptop off and remove the AC adapter from the electrical outlet.*
- 2. Because the battery in the laptop is left charged, the risk of electrical shock remains even after the AC adapter is removed from the electrical outlet. To avoid the risk of electrical shock, be sure to remove any metal jewelry or accessories such as necklaces, bracelets, and rings before starting work. Never work with damp or wet hands.*
- 3. To avoid personal injury, use care to avoid the sharp edges or corners of the components.*

CAUTION:

1. *Before replacing a component, make sure that the replacement component meets the required specifications. To avoid laptop failures, never use components that do not meet the specifications.*
2. *To avoid internal damage such as short circuits and fire, never drop metal objects such as screws, pins, paper clips, etc. into the components. When a screw is removed, be sure to replace a screw that is the same size as the original screw. Make sure that all the screws are fastened securely. Loose screws can cause short circuits, overheating, smoke, or fire.*
3. *Before removing a FRU or other component, make sure that all the component cables have been disconnected to avoid the risk of electrical shock caused by accidental contact with the energized components.*
4. *For AC input, be sure to use the AC adapter and AC power cable that come with your laptop or Toshiba-recommended equivalents.*
5. *To avoid the risk of electrical shock, make sure that all the replacement components meet the specifications of the laptop and that all the cables and connectors are fastened securely.*
6. *Inside the PC are components that become hot during operation (such as the CPU and cooling module). To avoid burns, let the hot components cool down before starting inspection or repair task.*

Before You Begin

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

Disassemble the laptop only when an abnormality has occurred.

Use only the recommended tools.

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

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

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

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

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

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

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

To avoid personal injury, use care to handle components that have sharp edges or corners.

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

Disassembly Procedures

The cable connectors come in these two basic types:

- Pressure plate connectors
- Normal pin connectors

To remove a pressure plate connector, pull up the tabs on either side of the connector's plastic pressure plate and gently pull the cable out of the connector. To reconnect the cable to the pressure plate's connector, raise the pressure plate up to a satisfactory height and slide the cable into the connector. Secure the cable in the correct position by pressing down the sides of the pressure plate so that the plate is flush with the sides of the connector. Grasp and pull the cable gently to check that the cable is connected firmly. If the cable 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 laptop after you have disassembled the laptop and fixed the component that caused the problem.

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

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

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

Tools and Equipment

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

- One 2 mm Phillips screwdriver
- One 4 mm flat-blade screwdriver
- Torx screwdriver with type T6 bit.
- Tweezers (for pulling out screws)
- ESD mats (for the floor and work desks)
- An ESD wrist strap or heel grounder
- Anti-static carpets or flooring
- Air ionizers (for highly electrostatic sensitive areas)
- A plastic card (in credit card size)

Screw Tightening Torque

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

- | | |
|--|--------------------------------|
| <input type="checkbox"/> M2 (2 mm) | 0.15~0.20 N·m (1.5~2.0 kgf·cm) |
| <input type="checkbox"/> M2.5 (2.5 mm) | 0.26~0.30 N·m (2.5~3.0 kgf·cm) |
| <input type="checkbox"/> M3 (3 mm) | 0.26~0.30 N·m (2.5~3.0 kgf·cm) |
| <input type="checkbox"/> M2.5x4 screws | 0.26~0.30 N·m (2.5~3.0 kgf·cm) |
| <input type="checkbox"/> M2.5x6 screws | 0.26~0.30 N·m (2.5~3.0 kgf·cm) |

Colors of Screw Shanks

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

- Screws of an odd-numbered length Blue
- Screws of a special length Black
(Screws of a special length are those of a length having decimal places, eg - 2.5 mm).

Symbols of Screws on the Laptop Body

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

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

Symbol examples

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

4.2 Battery

Removing the Battery Pack

Remove the battery pack according to the following procedures.

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

1. Turn the laptop upside down so that the bottom is facing you.
2. Slide the battery safety lock to the unlock position.
3. Slide the battery release latch and remove the battery pack from the laptop.

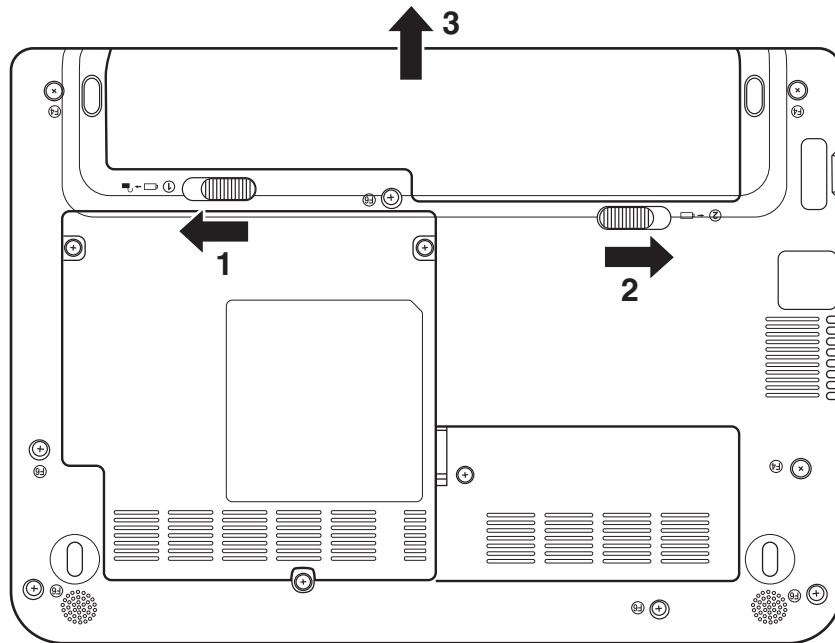


Figure 4.1 Removing the Battery Pack

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

Installing the Battery Pack

Install the battery pack according to the following procedures.

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

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

1. Gently insert a new or recharged battery pack into place. Check that the battery release latch slides in and stops with a click.
2. Slide in the battery safety lock to the lock position.

4.3 WLAN Card

Removing the WLAN Card

Remove the WLAN card according to the following procedures.

1. Remove one M2.5x3 and one M2.5x10 TORX screws securing the HDD door. Lift up the HDD door under 60 degrees and remove it.

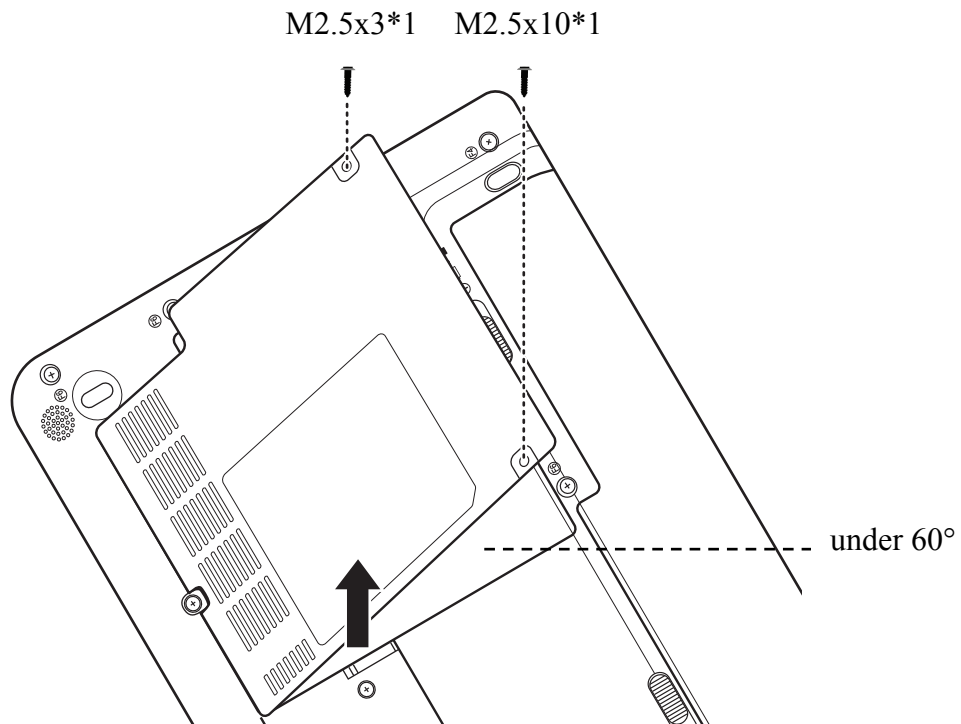


Figure 4.2 Remove one M2.5x3 and one M2.5x10 TORX screws

2. Detach the two antennas on the WLAN card.

3. Remove two M2x4 screws that secure the WLAN card.

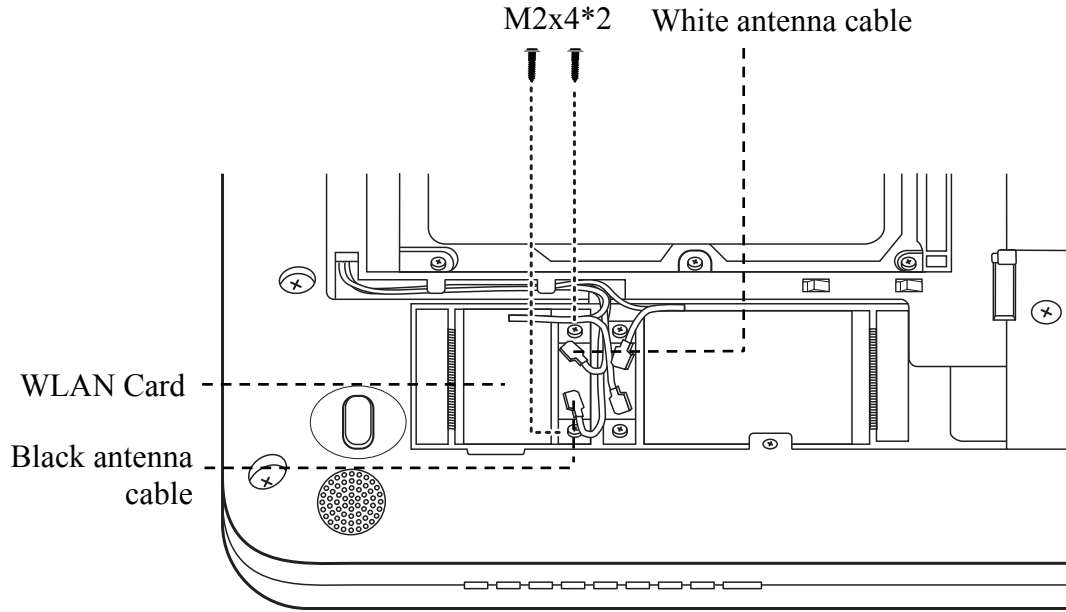


Figure 4.3 Detach two antennas and remove two screws

4. Pull the WLAN card out at an angle.

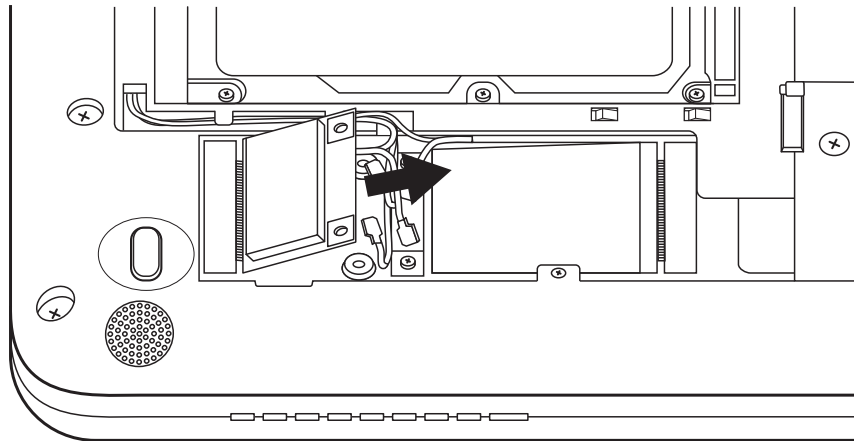


Figure 4.4 Removing the WLAN card

Installing the WLAN Card

Install the WLAN card according to the following procedures.

1. Insert the WLAN card into the connector.
2. Press the card down and secure it with two M2x4 screws.
3. Attach the two antennas to the WLAN card. The white (MAIN) antenna to the #1 connector and the black (AUX) antenna to the #2 connector.

4.4 WWAN Card

Removing the WWAN Card

Remove the WWAN card according to the following procedures.

1. Detach the two antennas on the WWAN card.
2. Remove two M2x4 screws that secure the WWAN card.

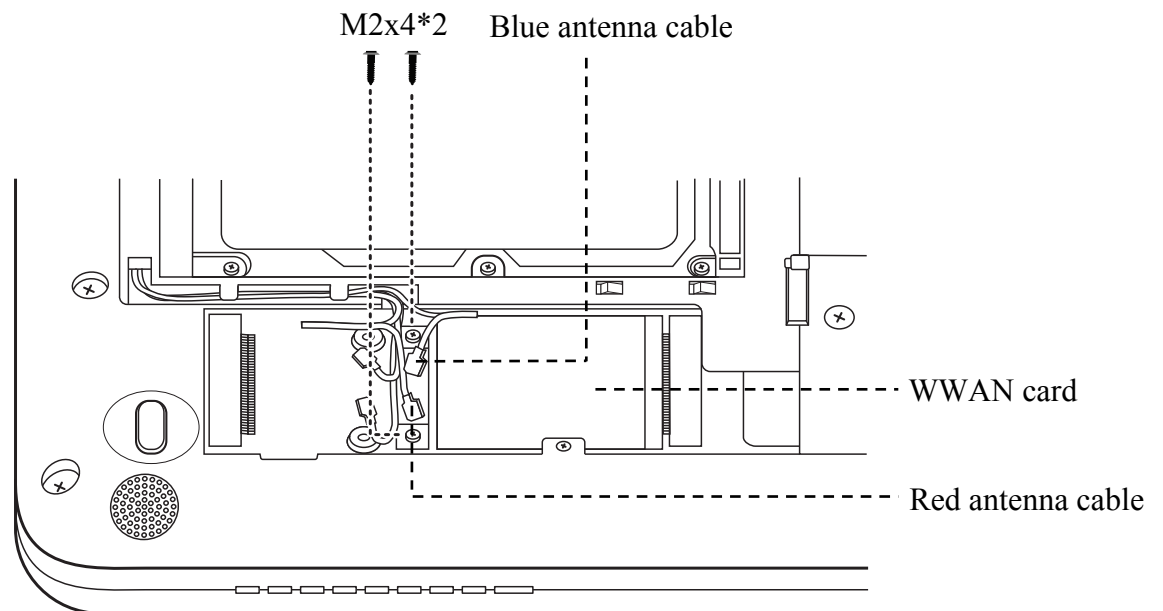


Figure 4.5 Detach two antennas and remove two screws

3. Pull the WWAN card out at an angle.

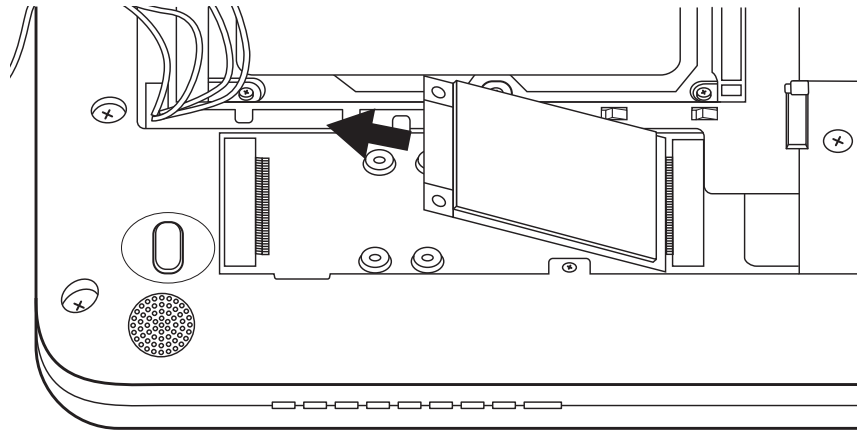


Figure 4.6 Remove the WWAN card

Installing the WWAN Card

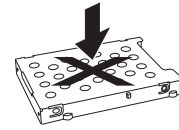
Install the WWAN card according to the following procedures.

1. Insert the WWAN card into the connector.
2. Press the card down and secure it with two M2x4 screws.
3. Attach the two antennas to the WWAN card. The red (MAIN) antenna to the MAIN connector and the blue (AUX) antenna to the AUX connector.

4.5 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.

1. Slide the HDD pack horizontally to disconnect it from HDD connector.

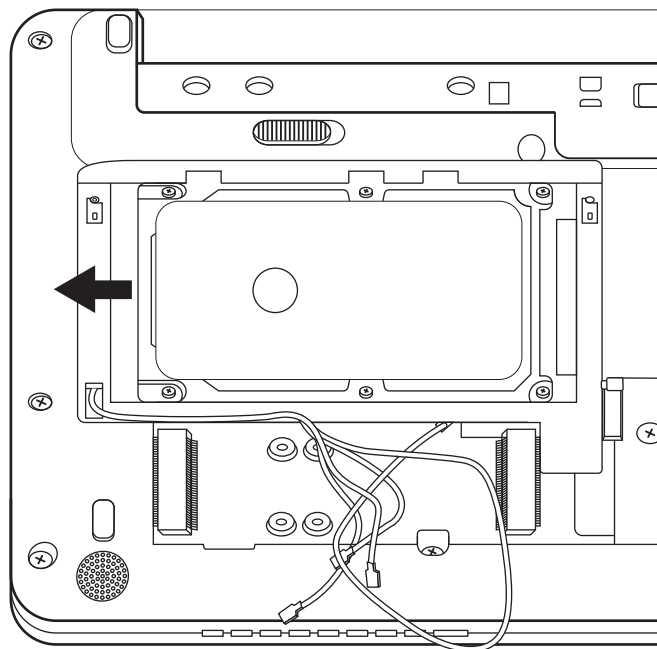


Figure 4.7 Slide the HDD pack horizontally

2. Lift up and remove the HDD pack from HDD bay.

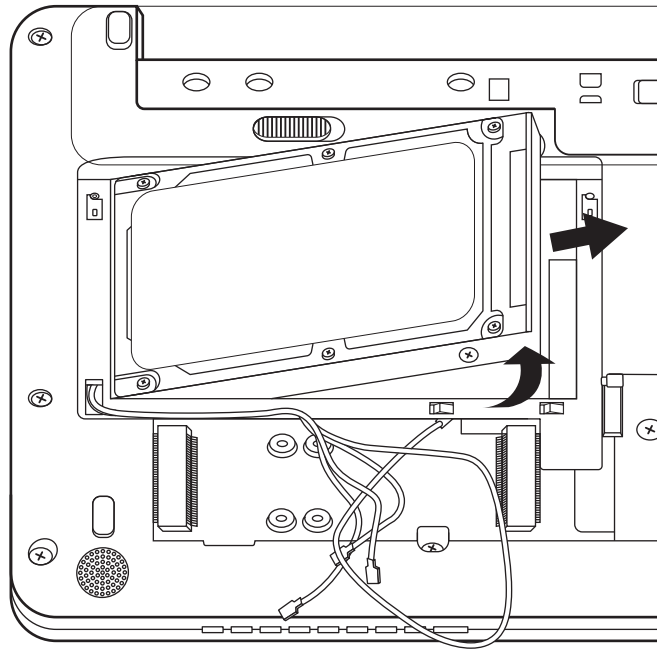


Figure 4.8 Removing the HDD from the HDD bay

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

3. Place the HDD pack on a flat surface such as a desk.

4. To separate the plate from the HDD, remove four M3x3 screws.

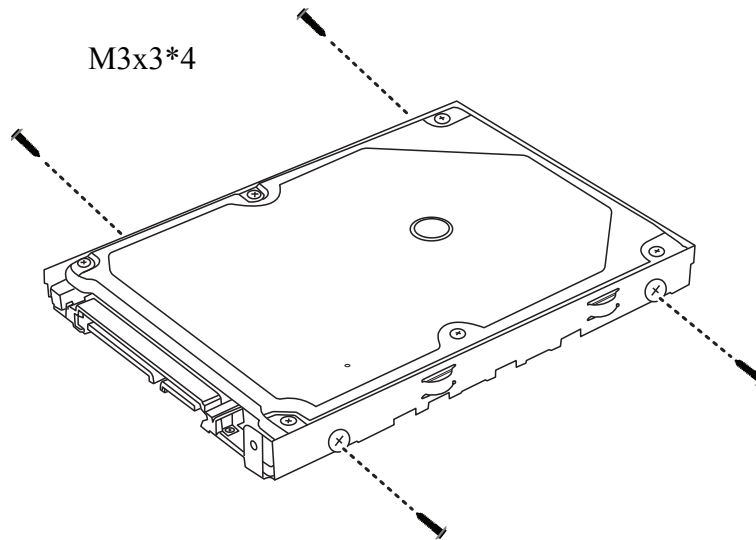


Figure 4.9 Removing the HDD plate

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

Installing the HDD

Install the HDD according to the following procedures.

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

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

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

3. Install the HDD pack into the correct position in the laptop. Connect the HDD pack to the laptop.

4.6 Memory

Removing the Optional Memory

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

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

1. Turn the laptop upside down.
2. Remove one M2.5x4 screw that secures the RAM door.
3. Remove the RAM door.

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

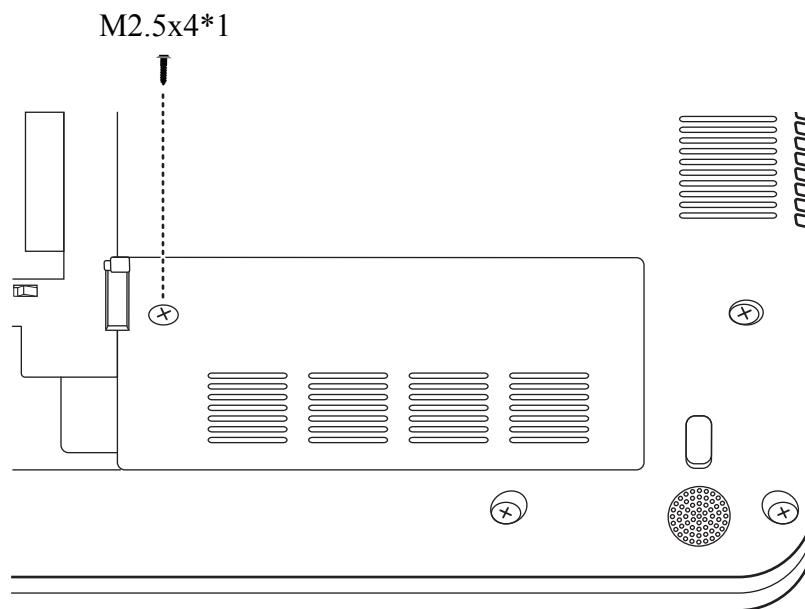


Figure 4.10 Removing the RAM door

4. Spread out the two memory lock latches so that the memory pops up. Please follow the procedure as shown in Figure 4.11.

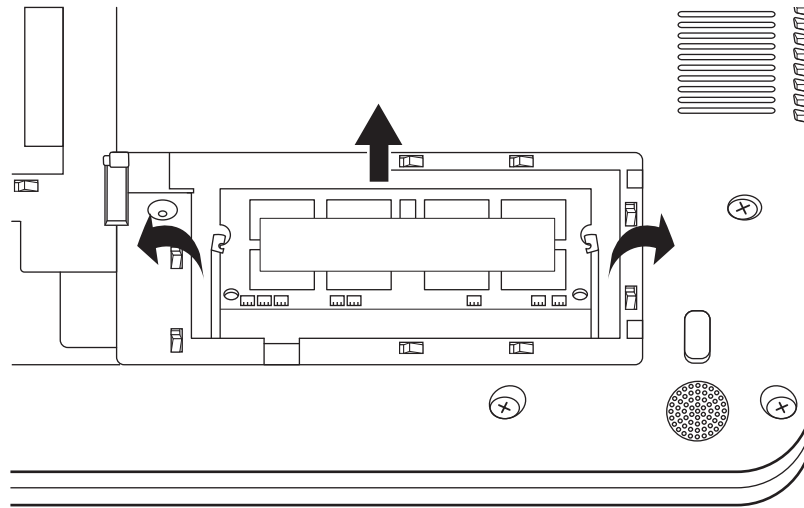


Figure 4.11 Removing the RAM from the laptop

5. Pull the memory up and out at an angle, using care to avoid touching the connectors.

Installing the Optional Memory

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

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

1. Confirm the location of the DDR thermal pad on the motherboard.

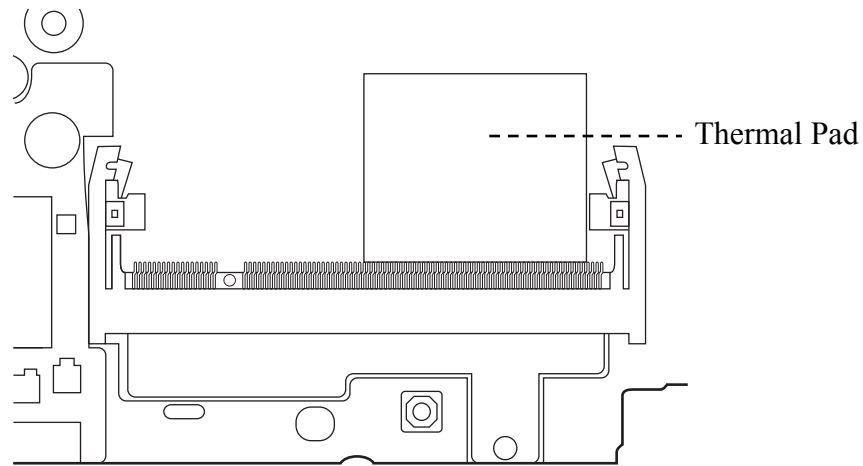


Figure 4.12 Confirm the location of the DDR thermal pad

2. Insert the memory into the connector at an angle of about 30 degrees.
3. Press down on the memory module so that it is secured with both memory lock latches.
4. Press the upper corners of the memory module to make sure it is secured by the metal springs.

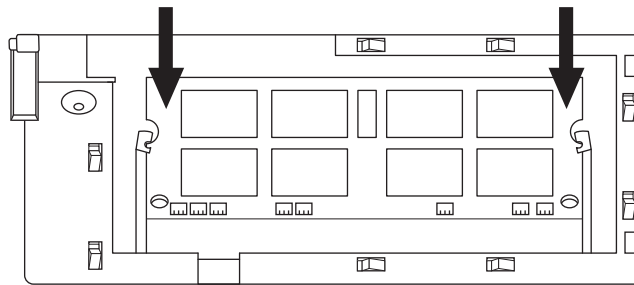


Figure 4.13 Press the upper corner of the memory

5. Reinstall the RAM door.
6. Secure the RAM door with one M2.5x4 screw.

Note: If the thermal pad is broken, please follow the steps below to replace it with a thermal pad.

1. Remove the protection film (a transparent Mylar) from the thermal pad.

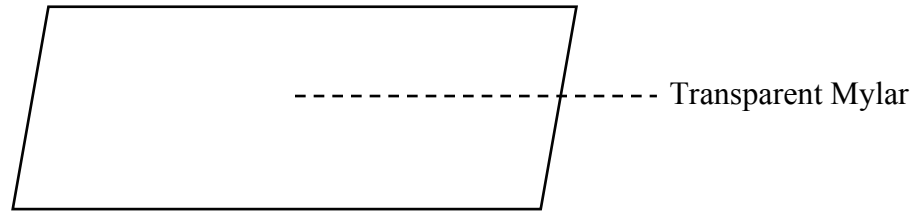


Figure 4.14 Remove the protection film

2. Stick the thermal pad on the motherboard in the correct position.

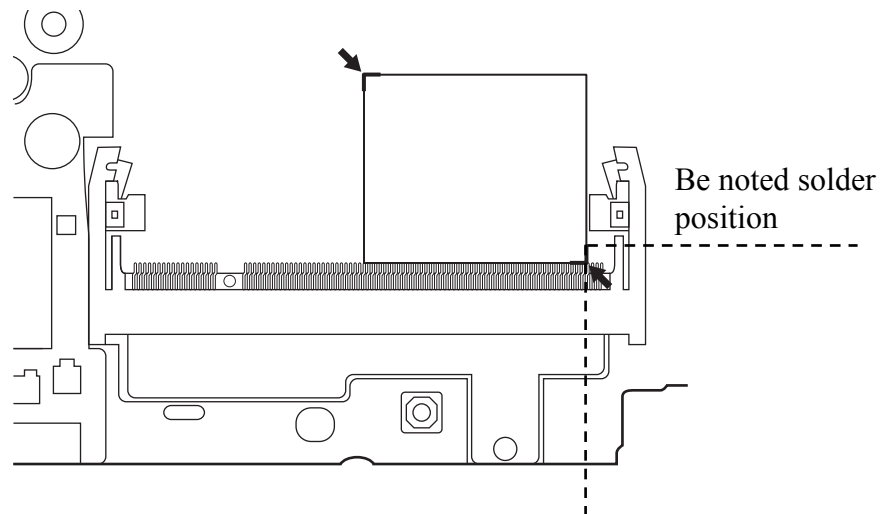


Figure 4.15 Stick the thermal pad on the motherboard in the correct position

3. Remove the sticker on the front side of the thermal pad.



Figure 4.16 Remove the sticker on the front side of the thermal pad

If the motherboard is replaced with a new one, there will be a new thermal stuck on the motherboard. Please remove the sticker on the thermal pad before installing the memory module.

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

4.7 Hinge Cover and Keyboard

Remove the Hinge Cover and Keyboard according to the following procedures.

Removing the Hinge Cover

Remove the hinge cover according to the following procedures.

1. Remove three M2.5x4 screws as indicated in Figure 4.17.

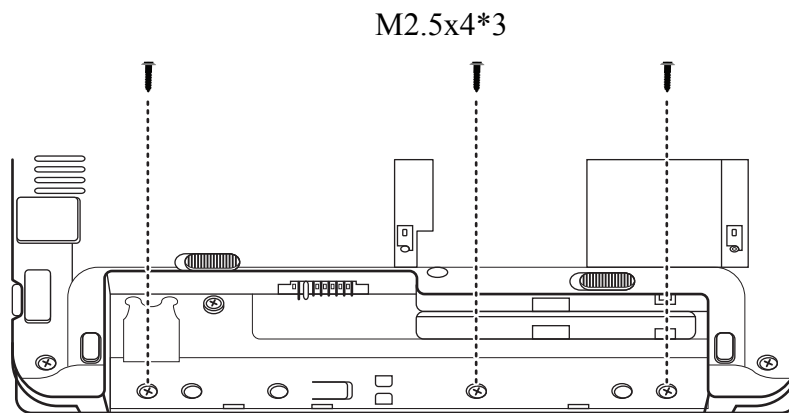


Figure 4.17 Remove three screws

2. Turn the laptop right side up.

3. Open the laptop. Squeeze the hinge cover with both hands and remove it in the direction of the arrows in Figure 4.18.

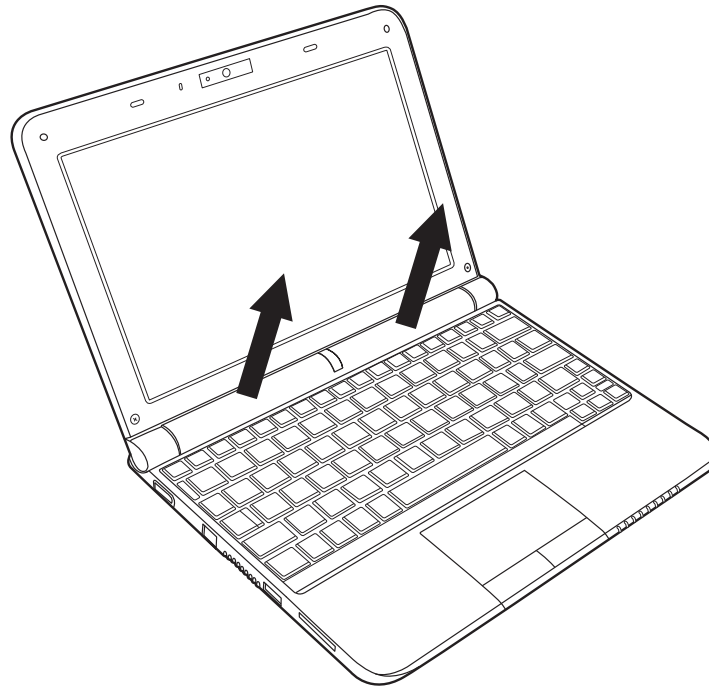


Figure 4.18 Removing the hinge cover

Removing the Keyboard

Remove the Keyboard according to the following procedures.

1. Turn the laptop upside down and remove one M2.5x4 and one M2.5x6 screws.

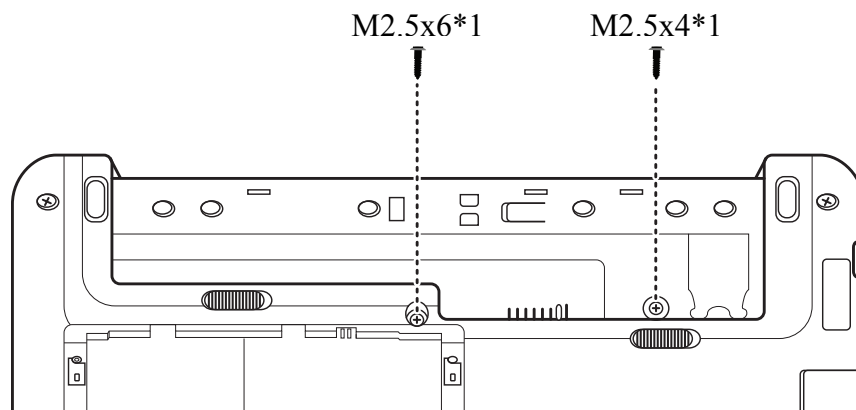


Figure 4.19 Remove two screws

2. Turn the laptop right side up and open the laptop.
3. Pry up the keyboard cover from the right side and remove it.

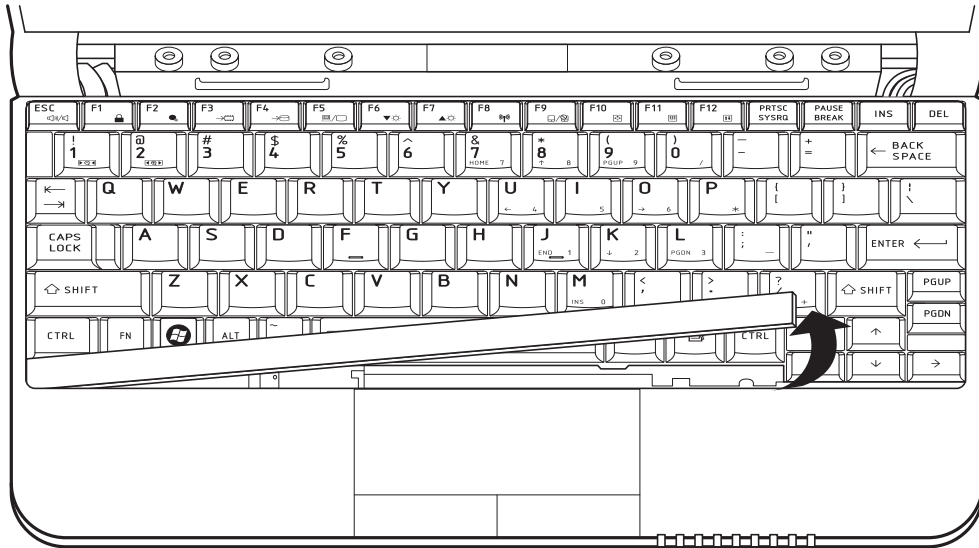


Figure 4.20 Removing the keyboard cover

4. Pry up the keyboard from the top and move it up.

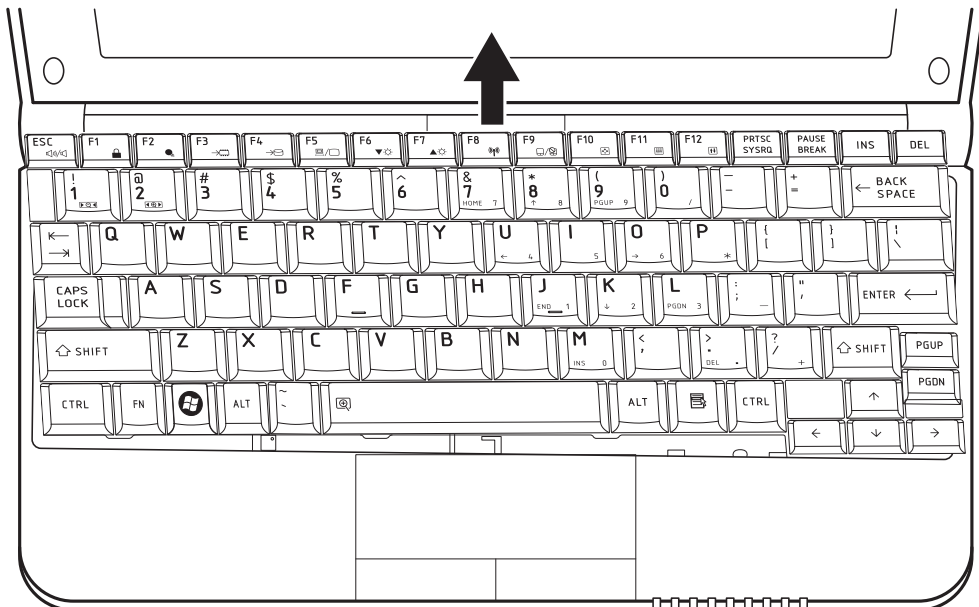


Figure 4.21 Pry up the keyboard

5. Disconnect the cable connecting to the motherboard and remove the keyboard.

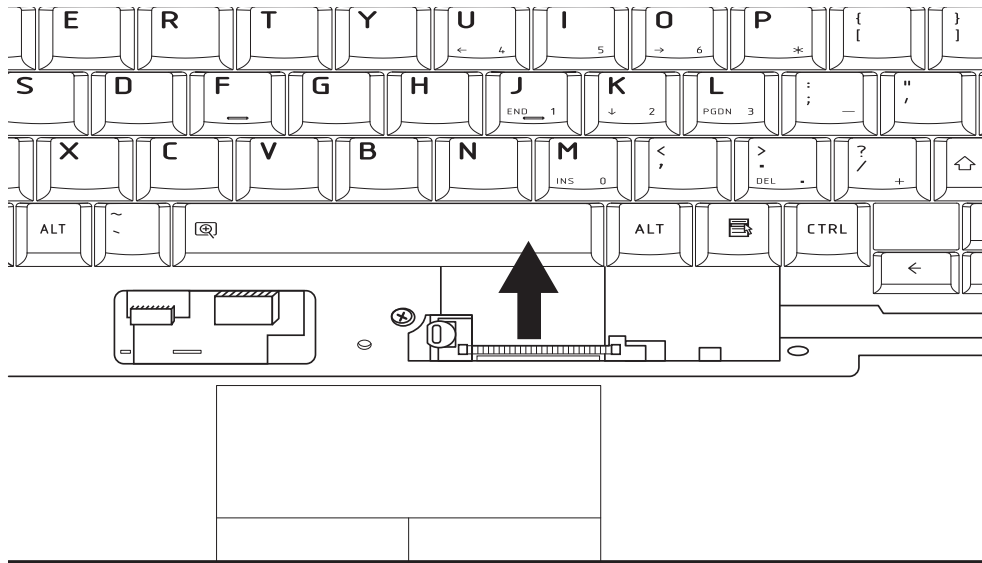


Figure 4.22 Disconnect the cable

Installing the Hinge Cover and Keyboard

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

1. Attach the cable from the underside of the keyboard to the connector on the motherboard assembly.
2. Seat the keyboard in its correct position making sure the four hooks on either side are fastened.
3. Seat the keyboard cover in the correct position and firmly click into place.
4. Open the laptop.
5. Seat the hinge cover in the correct position and firmly click into place.
6. Close the laptop.
7. Turn the laptop upside down. Secure the hinge cover with three M2.5x4 screws. Secure the keyboard with one M2.5x4 and one M2.5x6 screws.

4.8 Power Board

Removing the Power Board

Remove the power board according to the following procedures and Figure 4.23.

1. Carefully remove any adhesive tape covering the power board cable.
2. Remove the power board cable from the motherboard.

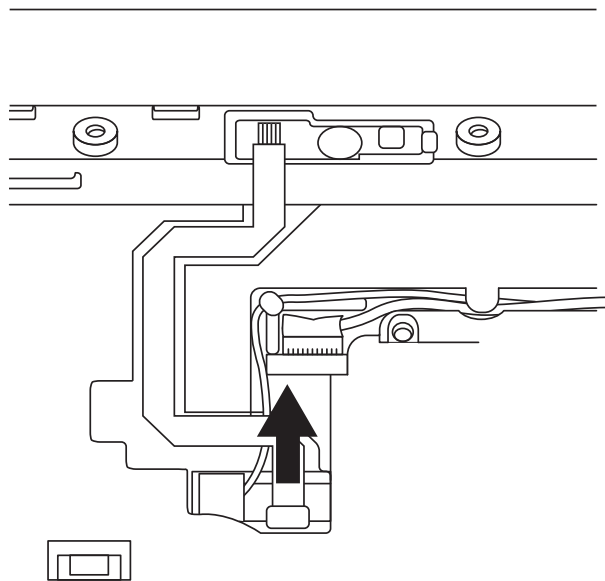


Figure 4.23 Remove the power board cable

3. Press down the finger that protrudes to the power board on its left side. Slide the power board left to remove it.

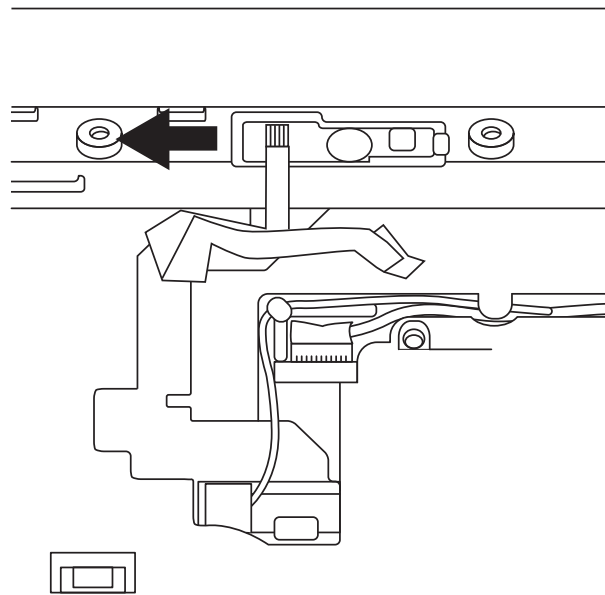


Figure 4.24 Removing the Power Board

Note: Be careful not to damage the Power Board when connecting it with the cable. Make sure the card is seated in the correct position.

Installing the Power Board

Install the power board according to the following procedures.

1. Seat the power board in the correct position on the logic upper assembly.
2. Slide the power board to the end of the track until the latch clicks into place.
3. Place the power board cable into the connector on the motherboard.
4. Secure the power board cable with adhesive tape.

4.9 Logic Upper Assembly

Removing the Logic Upper Assembly

Remove the logic upper assembly according to the following procedures.

1. Disconnect three cables as indicated in Figure 4.25.

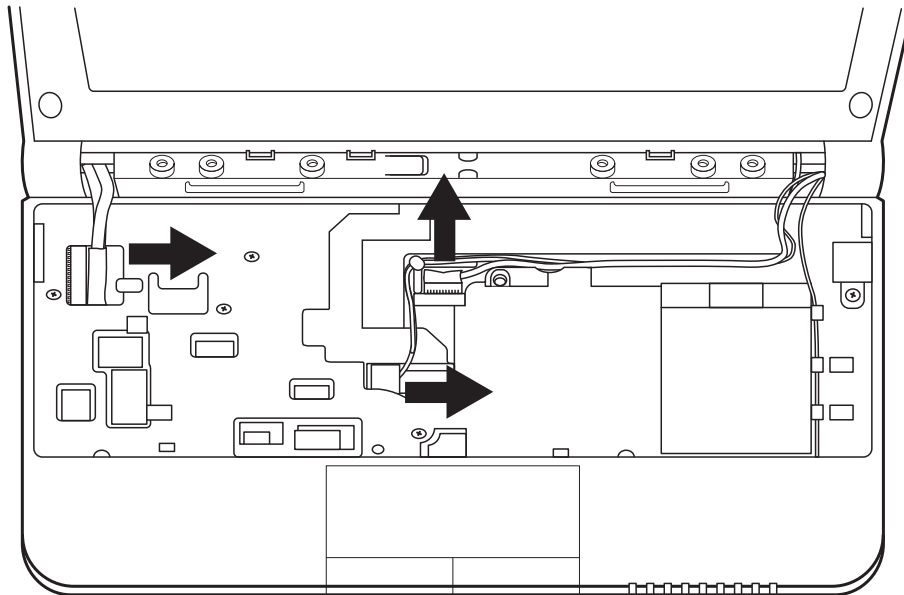


Figure 4.25 Disconnect three cables

Note: Pull the tape on the CMOS connector normally to detach the CMOS cable. Do not pull the cable itself.

2. Turn the laptop upside down and pry up the antennas from the routing channel.

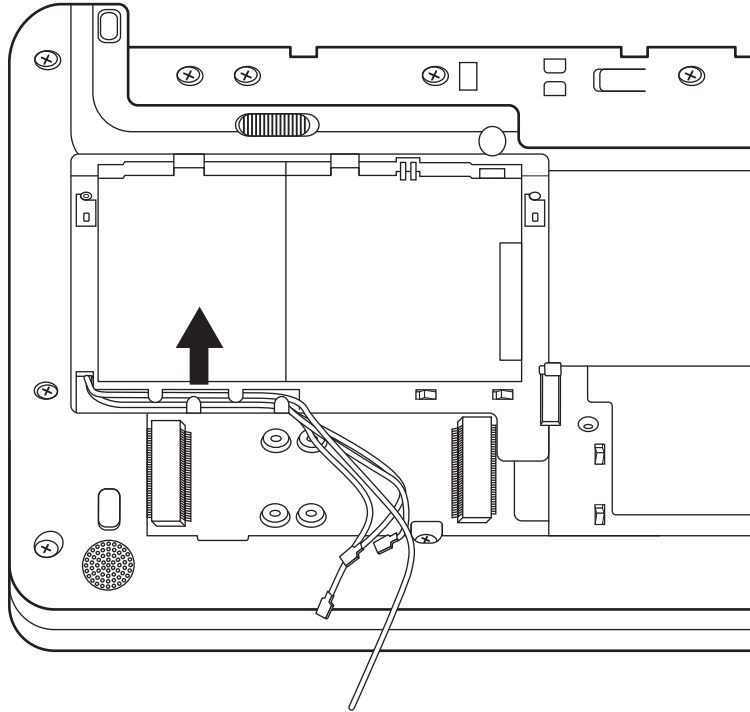


Figure 4.26 Pry up the antennas

3. Turn the laptop right side up and open it. Pull out the antennas and the LVDS cable, CMOS cable and microphone cable from the routing channel as indicated in Figure 4.27. Remove two M2.5x6 screws.

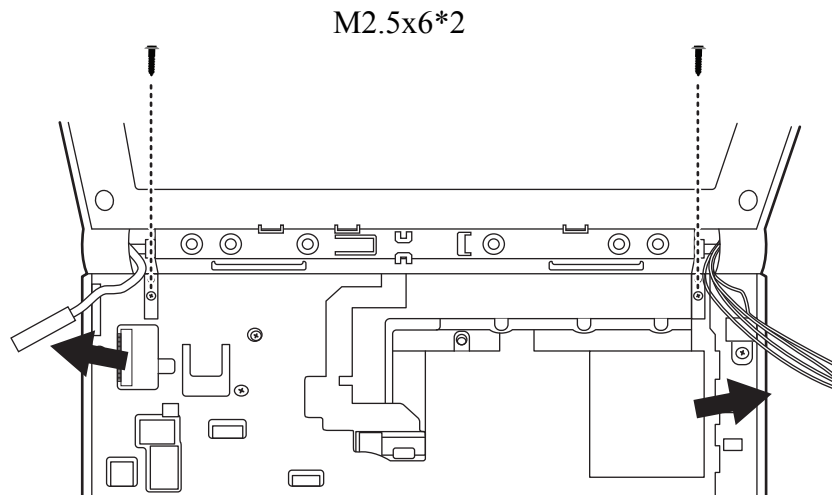


Figure 4.27 Pull out cables and remove two screws

4. Close the laptop. Remove two M2.5x6 screws as indicated in Figure 4.28 and remove the LCD module.

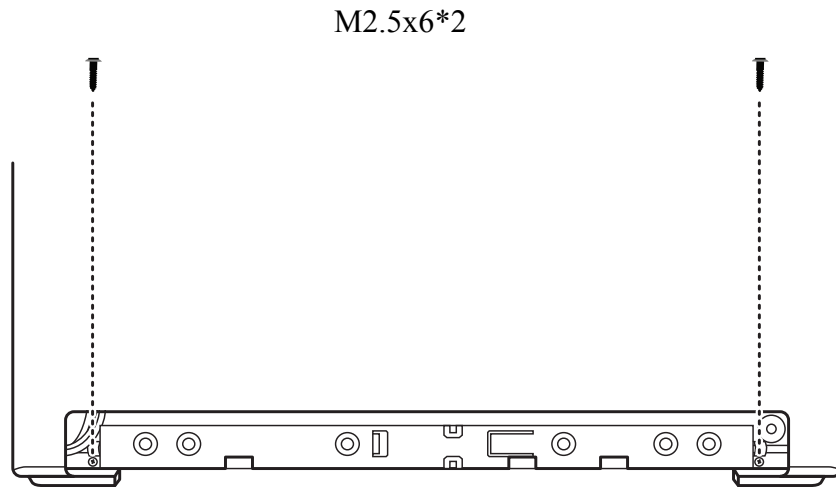


Figure 4.28 Remove two screws and remove the LCD module

5. Turn the laptop right side up. Remove five M2.5x6 screws and detach two cables as indicated in Figure 4.29.

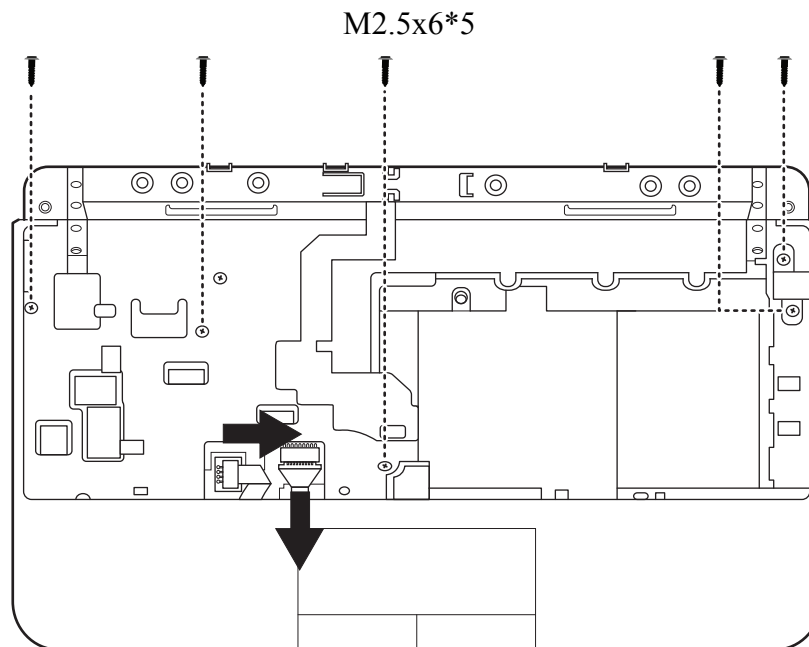


Figure 4.29 Remove five screws and detach two cables

6. Turn the laptop upside down and remove six M2.5x6 and two M2.5x4 screws as indicated in Figure 4.30.

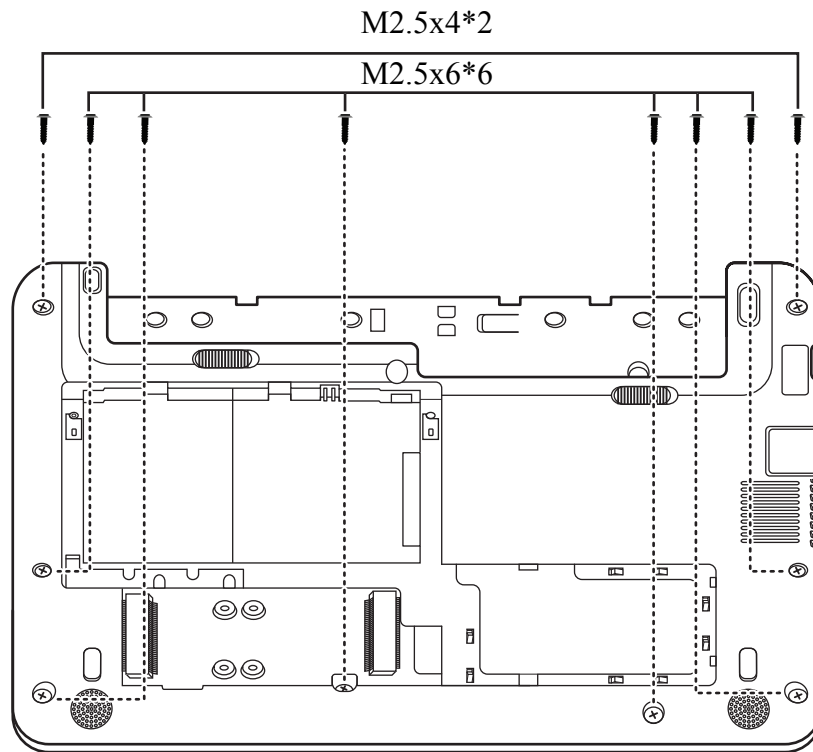


Figure 4.30 Remove screws

7. Hold the bottom base assembly with your left hand and pull down the logic upper assembly with your right hand. Pry up the logic upper assembly with your right hand and separate it from the bottom base assembly.

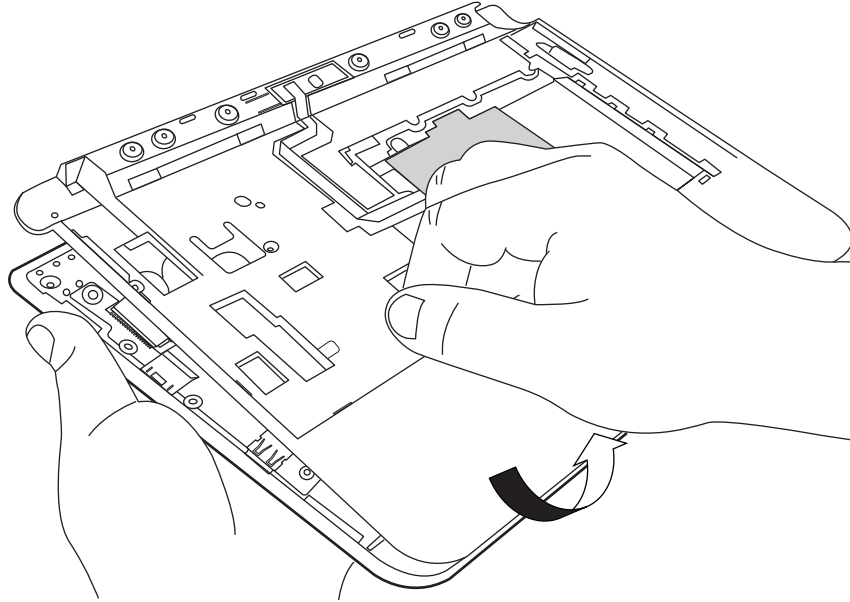


Figure 4.31 Remove the logic upper assembly

Installing the Logic Upper Assembly

Install the logic upper assembly according to the following procedures.

1. Seat the logic upper assembly to the front of the laptop, and adjust to the correct position.
2. Turn the laptop right side up. Connect the Bluetooth and TouchPad cables to the motherboard and secure five M2.5x6 screws.
3. Seat the LCD module in the correct position and secure it with two M2.5x6 screws.
4. Route the CMOS cable, microphone cable and antennas to the routing channel. Connect the LVDS cable, CMOS cable and microphone cable to the motherboard.
5. Close the laptop. Secure the LCD module with two M2.5x6 screws on the back side.
6. Turn the laptop upside down and secure the logic upper assembly with six M2.5x6 and two M2.5x4 screws.

NOTE: Take extra care in routing cables and antennas on Logic upper assembly. Improperly routed cables can become pinched or damaged and cause malfunction.

4.10 Touch Pad Board

Removing the touch pad board

Remove the touch pad board according to the following procedures.

1. Detach the cable from the touch pad and peel off the mylar on the touch pad board.

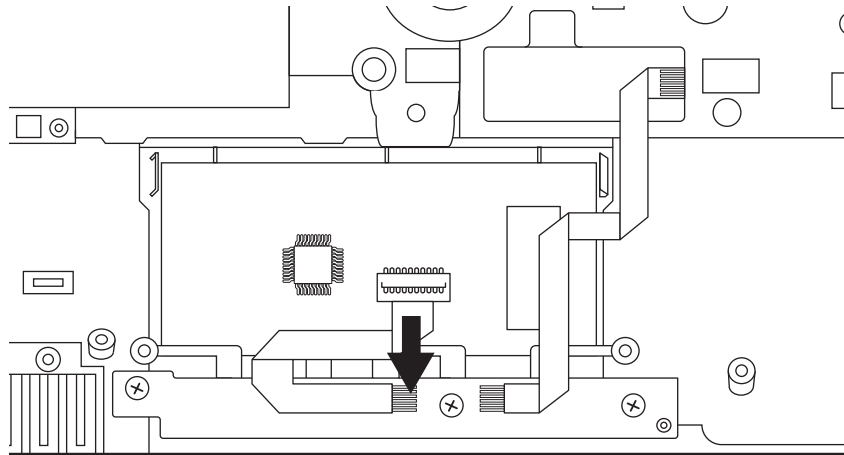


Figure 4.32 Detach the cable

2. Remove one M2x3 screw and two M2x4 screws and remove the touch pad board from the logic upper assembly.

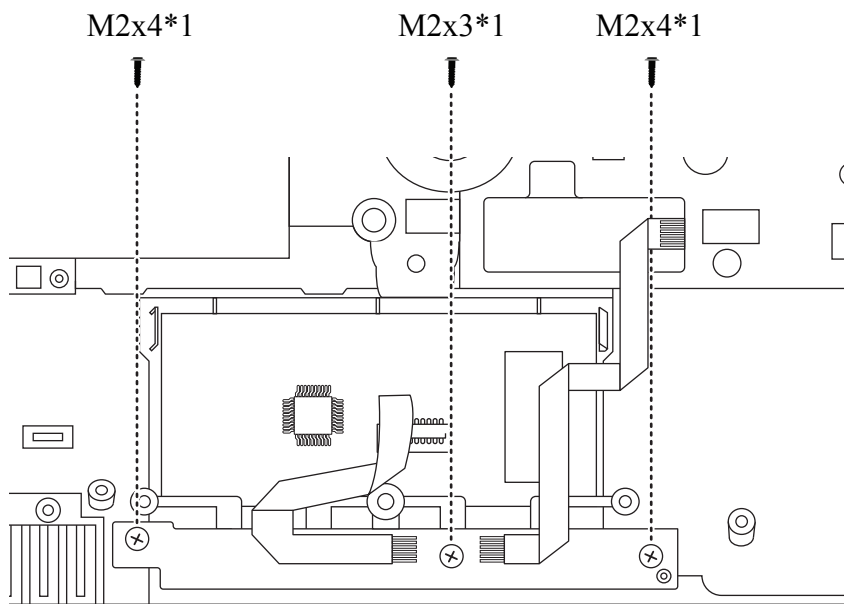


Figure 4.33 Remove three screws and remove the touch pad board

3. Remove the touch pad bracket from the logic upper assembly.

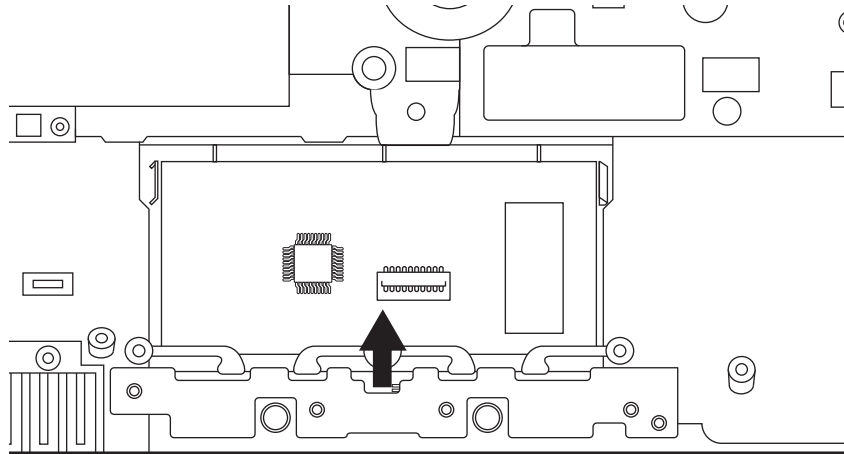


Figure 4.34 Remove the touch pad bracket

Installing the Touch Pad board

Install the touch pad board according to the following procedures.

1. Seat the touch pad bracket in the correct position on the logic upper assembly.
2. Seat the touch pad board in the correct position. Secure the touch pad board to the logic upper assembly with one M2x3 and two M2x4 screws.
3. Paste the mylar on the touch pad board.
4. Connect the cable to the touch pad.

4.11 Bluetooth Card

Removing the Bluetooth card

Remove the Bluetooth card according to the following procedures.

1. Pry up the Bluetooth card and remove the cable from the logic upper assembly carefully because there is a double sided adhesive applied on the cable.

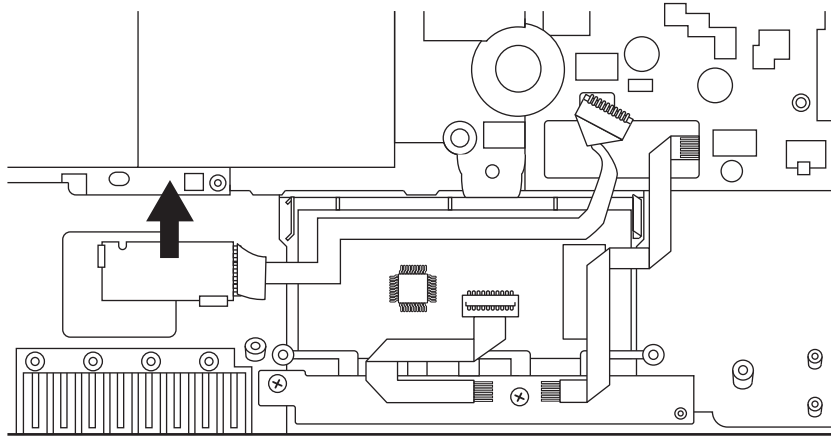


Figure 4.35 Remove the Bluetooth card

2. Detach the cable from the Bluetooth card.

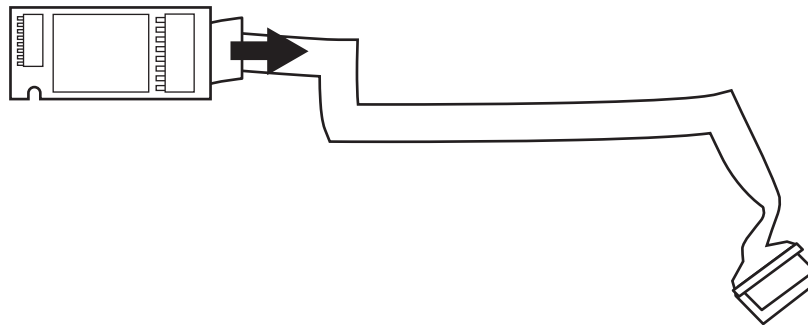


Figure 4.36 Detach the cable from the Bluetooth card

Installing the Bluetooth Card

Install the Bluetooth card according to the following procedures.

1. Connect the cable to the Bluetooth card.
2. Seat the Bluetooth card in the correct position on the logic upper assembly.

4.12 Speaker

Removing the Speaker

Remove the Speaker according to the following procedures.

1. Detach the cable and remove the right speaker.

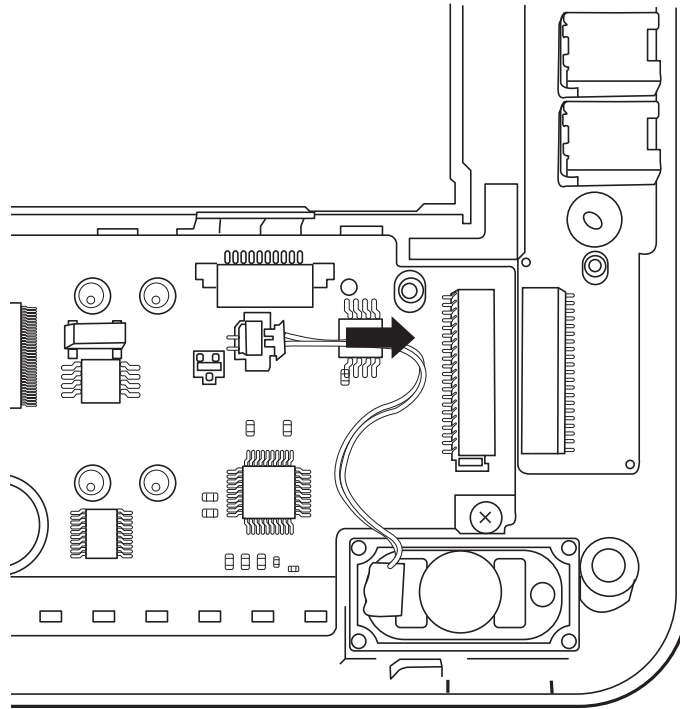


Figure 4.37 Remove the right speaker

2. Detach the cable and remove the left speaker.

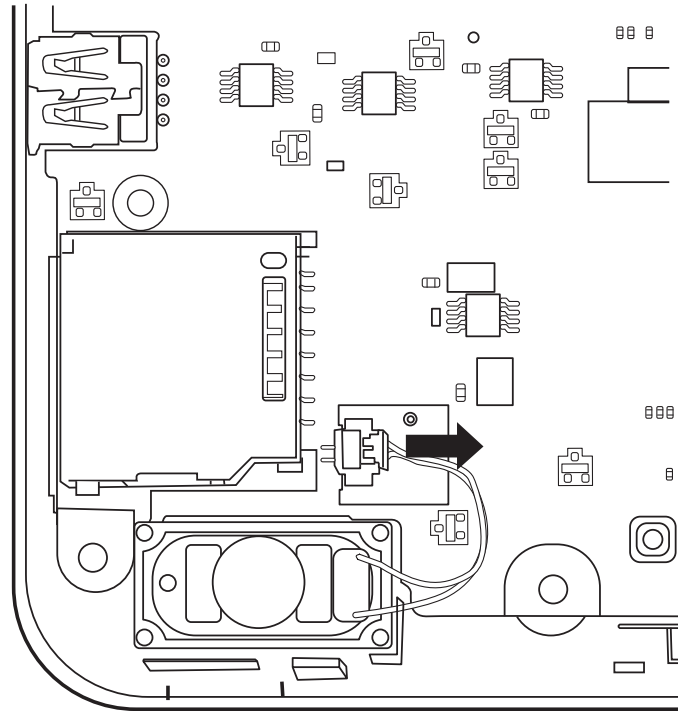


Figure 4.38 Remove the left speaker

Installing the Speaker

Install the speaker according to the following procedures.

1. Seat the speakers in the correct position and connect the cables to the motherboard.

4.13 Motherboard

Removing the Motherboard

Remove the motherboard according to the following procedures.

1. Remove two M2.5x4 screws.

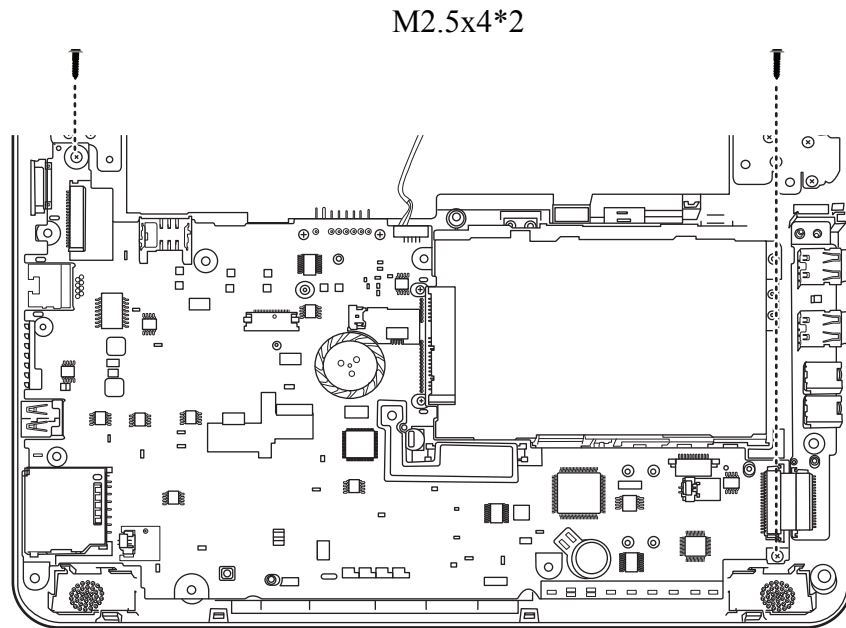


Figure 4.39 Remove two screws

2. Remove the DC IN bracket.

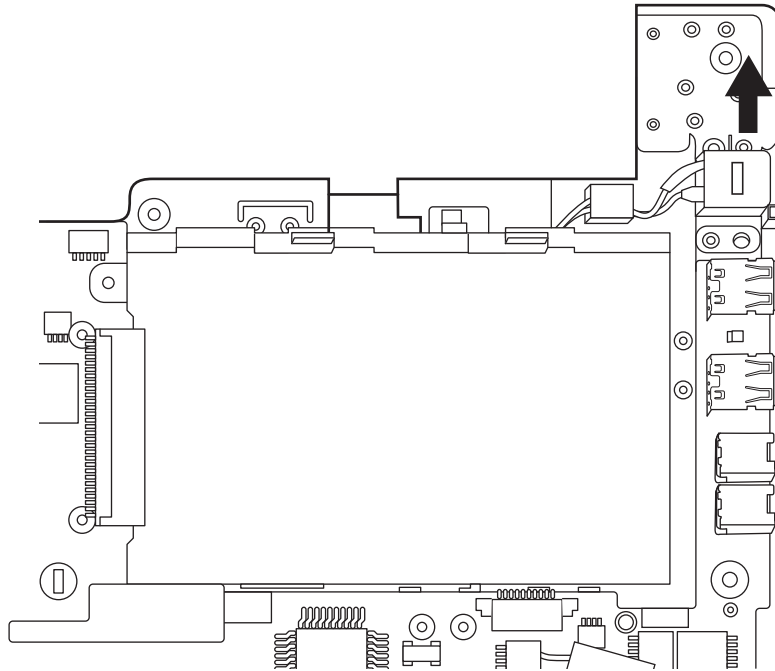


Figure 4.40 Removing the DC IN bracket

3. Pull out the DC IN cable from the routing channel.

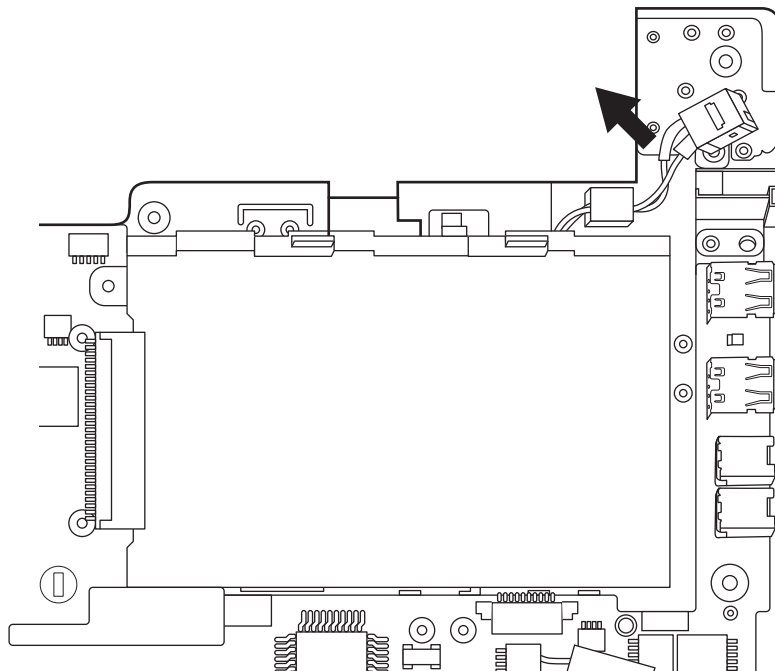


Figure 4.41 Pull out the DC IN cable

4. Detach the IO board cable from the motherboard. Use your hands to pick up the motherboard in the direction of the arrows as shown in figure 4.42.

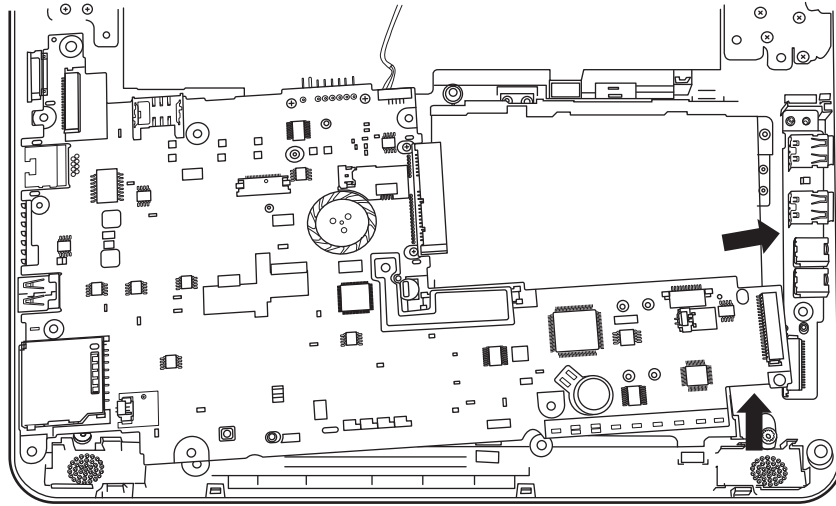


Figure 4.42 Picking up the motherboard

5. Remove the motherboard from the bottom base assembly.

Installing the Motherboard

Install the motherboard according to the following procedures.

1. Before seat the motherboard on the logic lower assembly, pull out the any cables to avoid them being pressed.
2. Align the connectors on the left side to their corresponding holes in the bottom base assembly.
3. Seat the motherboard down in the bottom base assembly.
4. Put the DC IN connector in the lower DC IN trough and route the cable from left to right in the routing channel.
5. Seat the DC IN bracket in its correct position.
6. Connect the IO board cable to the motherboard.
7. Secure two M2.5x4 screws.

4.14 IO Board

Removing the IO Board

Remove the IO board according to the following procedures.

1. Pry up the IO board a little from the left side, then remove it from the bottom assembly.

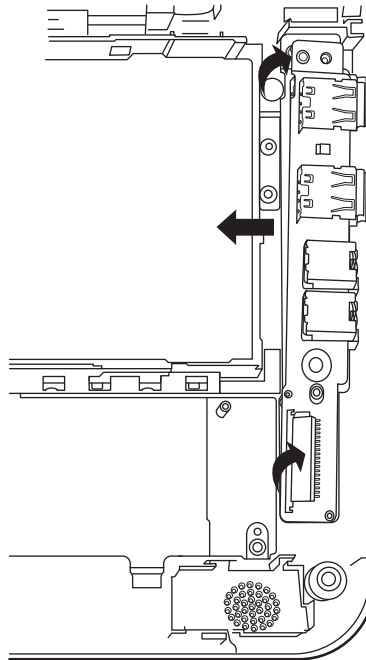


Figure 4.43 Remove the IO board

Installing the IO Board

Install the IO board according to the following procedures.

1. Seat the IO board in the correct position on the bottom base assembly.

4.15 Fan and Thermal Module

Removing the Fan and the Thermal Module

Remove the thermal fan module according to the following procedures.

CAUTION:

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

1. *The unit can become very hot during operation. Be sure to let it cool down before starting the repair work.*
2. *Use care when removing and disassembling the unit in order to avoid damage.*

1. Detach one cable and remove one M2x4 screw. Remove the fan.

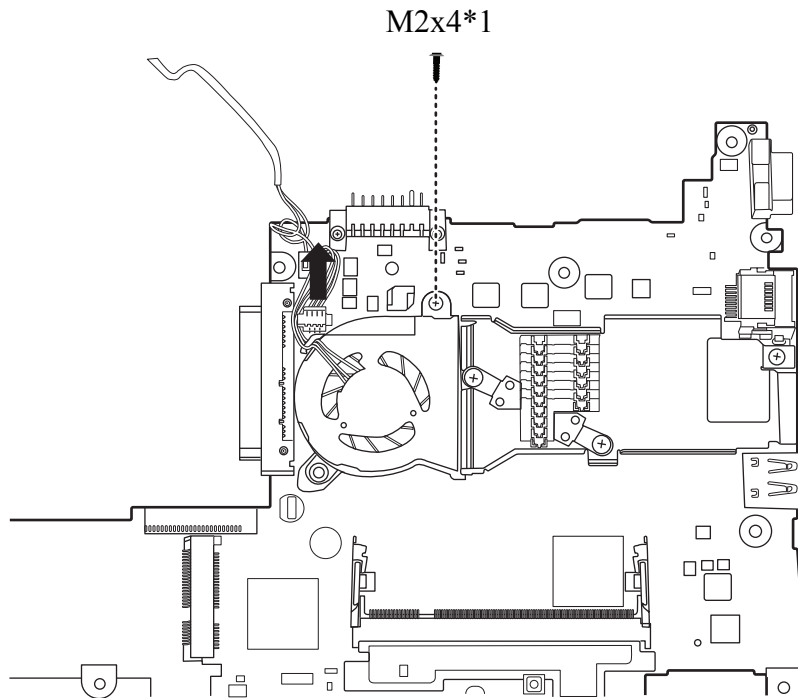


Figure 4.44 Remove the fan

2. Remove three M2x2.5 screws according to the sequence indicated in Figure 4.45 remove the thermal module.

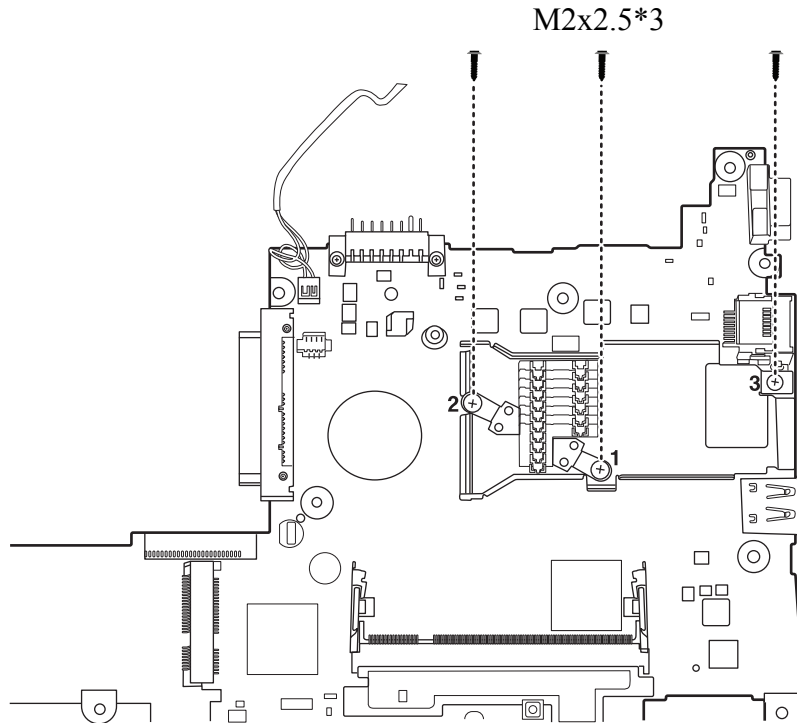


Figure 4.45 Remove three screws

Installing the Fan and the Thermal Module

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

1. Reapply Shinetsu 7762 grease on the thermal module as shown in Figure 4.46.

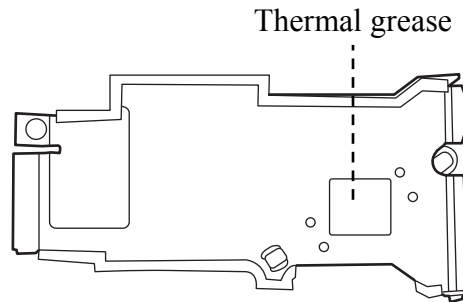


Figure 4.46 Reapply Shinetsu 7726 grease on the thermal module

2. Seat the thermal module in the correct position and secure it with three M2x2.5 screws in the sequence indicated in Figure 4.47.

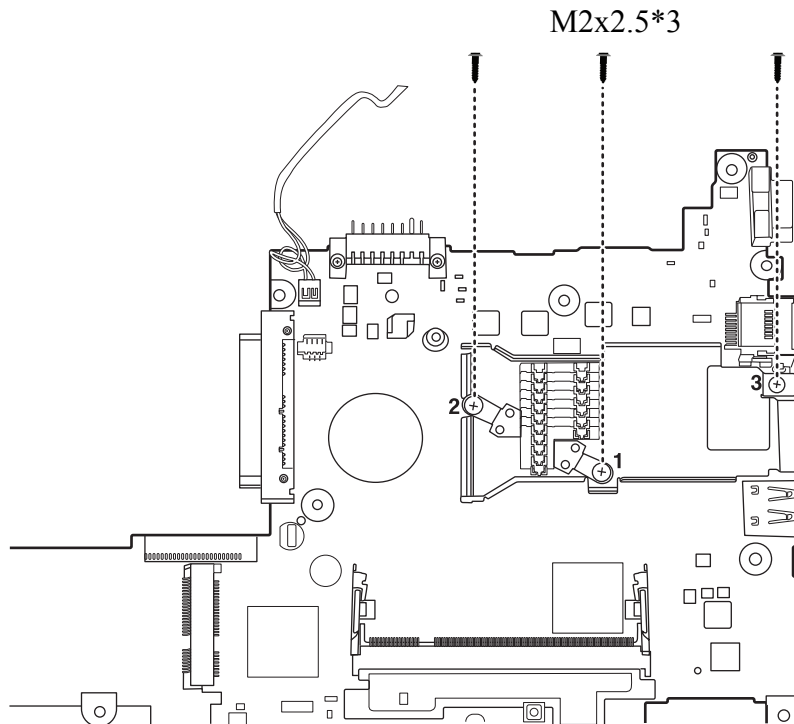


Figure 4.47 Securing the thermal module

3. Seat the fan in the correct position on the motherboard and secure it with one M2x4 screws.

4.16 LCD Bezel Assembly

Removing the LCD Bezel Assembly

Remove the LCD bezel assembly according to the following procedures.

1. Remove the two screw rubbers that cover the screws.
2. Remove two M2.5x5 screws as shown in Figure 4.48.

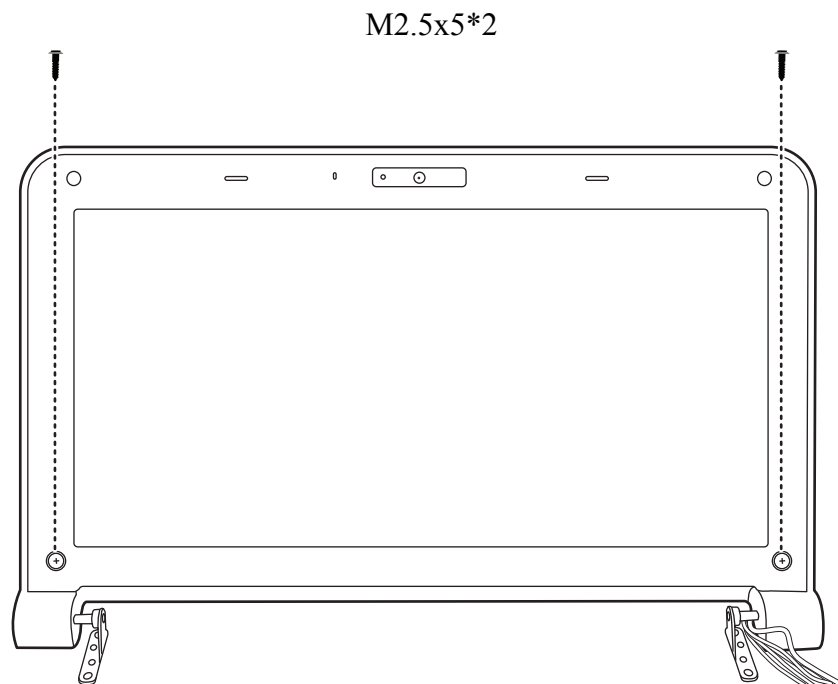


Figure 4.48 Removing screws from the LCD Bezel Assembly

3. Pry up the bezel from left and then right as shown in Figure 4.49.

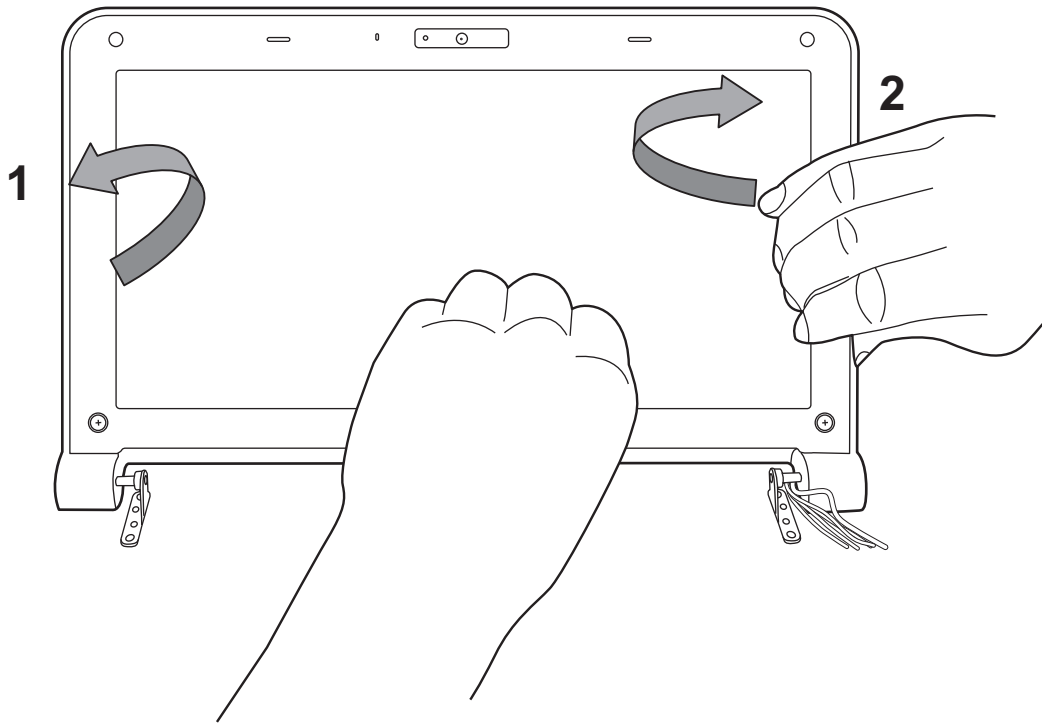


Figure 4.49 Removing the bezel from the hinge wall

4. Press the hinge cover part on the bottom of the bezel and pull up the bezel.

5. Pry up the bezel from bottom to top and remove the bezel.

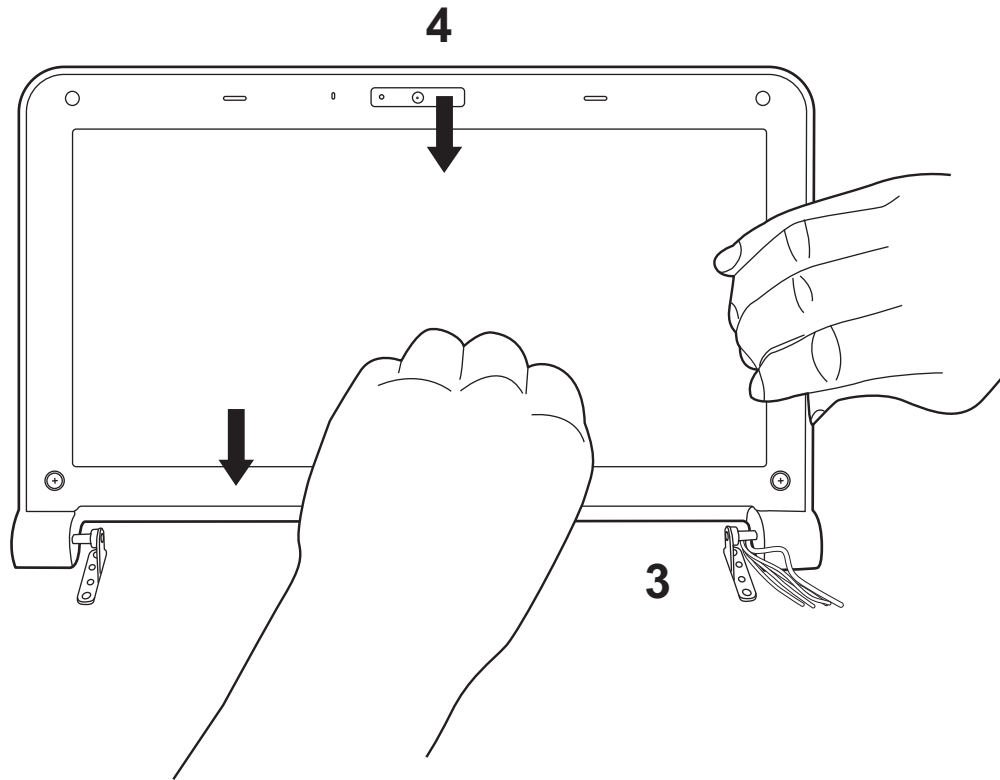


Figure 4.50 Removing the bezel

NOTE: The sides of the bezel are secured tightly. Remove slowly and take extra caution to prevent your nails from becoming broken or from scratching the LCD surface.

Installing the LCD Bezel Assembly

Install the LCD bezel assembly according to the following procedures.

NOTE: *Take extra care in routing cables and antennas on the LCD module. Improperly routed cables can become pinched or damaged and cause malfunction.*

1. Seat the LCD bezel assembly in the correct position.
2. Press the bezel hinge wall against the cover hinge wall. Press the left and right side of the bezel as shown in Figure 4.49. Make sure the bezel clicks into place.
3. Secure it to the display assembly with two M2.5x5 screws.
4. Adhere the two screw rubbers to the screws.

4.17 LCD Module

Removing the LCD Module

Remove the LCD module according to the following procedures.

1. Pull out all cables and antennas from the routing channel.

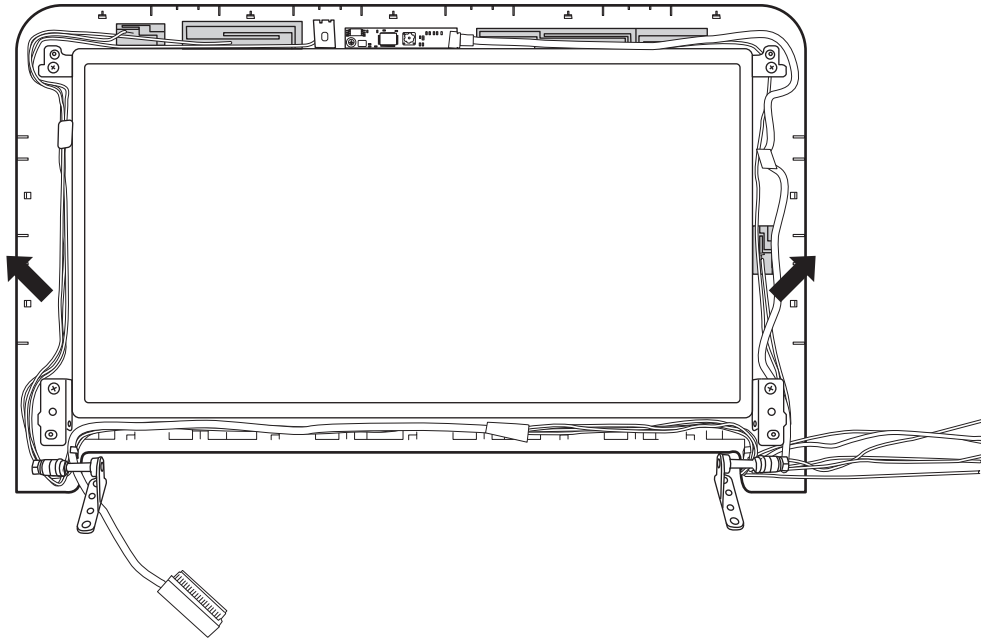


Figure 4.51 Pull out cables and antennas

2. Remove four M2.5x4 screws securing the LCD module to the LCD cover assembly.

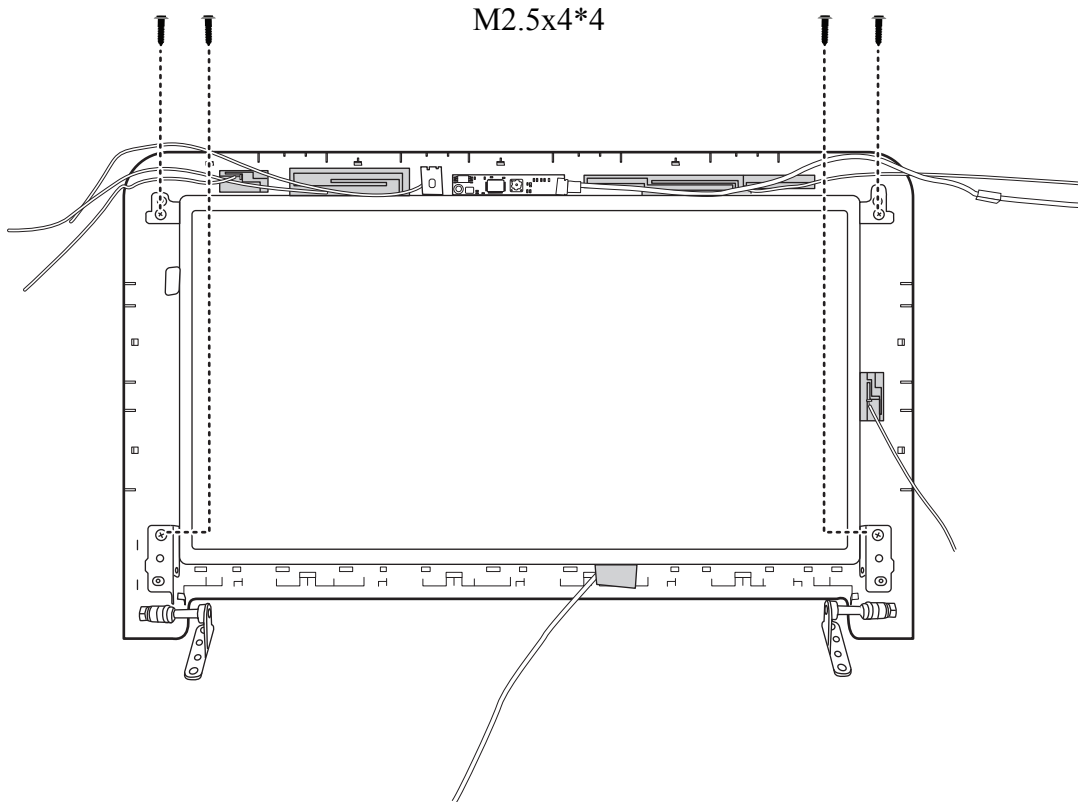


Figure 4.52 Removing the screws from the LCD module

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

4. Remove four M2x3 screws that secure the LCD hinge assembly to the LCD panel and then remove the LCD hinge assembly.

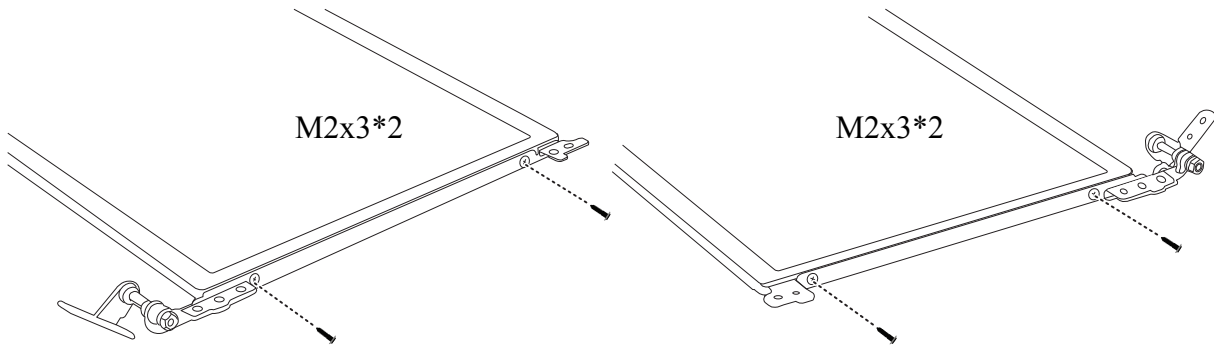


Figure 4.53 Removing the LCD Hinge Assembly

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

6. Remove the tape and LVDS cable connector. Then detach the LVDS cable.

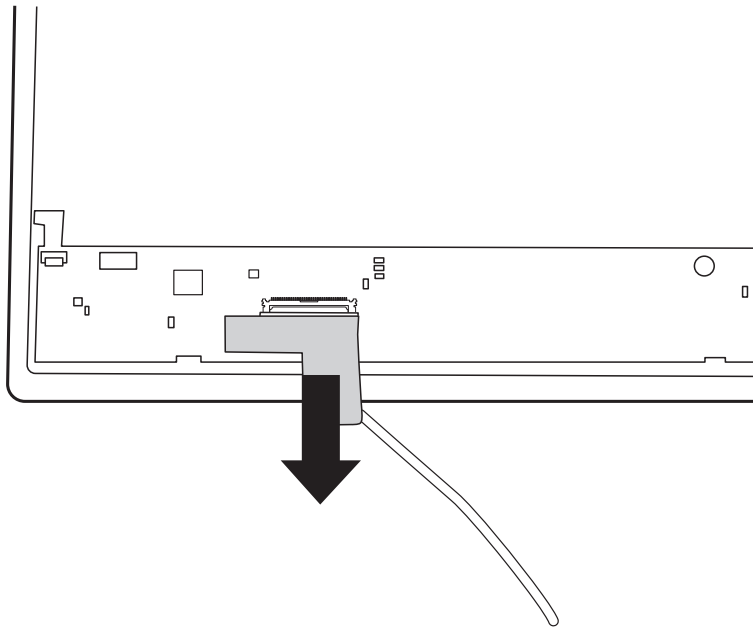


Figure 4.54 Removing the LVDS cable

NOTE:

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

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

The LVDS cable must be carefully peeled away before disconnecting it from the LCD panel.

Installing the LCD Module

Install the LCD module according to the following procedures.

NOTE: *Take extra care in routing cables and antennas on the LCD module. Improperly routed cables can become pinched or damaged and cause malfunction.*

1. Turn the LCD module cover and place it face down on a protective surface such as a foam pad.
2. Connect the LVDS cable to the LCD panel connector and adhere with tape.
3. Turn the LCD right side up.
4. Seat the LCD hinge assembly in the correct position beside the LCD panel and secure it with four M2x3 screws.
5. Seat the LCD module in the correct position in the LCD cover assembly.
6. Secure the LCD module to the LCD cover assembly with four M2.5x4 screws.
7. Route all the cables and antennas carefully in the routing channel.

4.18 Camera module and Microphone

Removing the Camera module and Microphone

Remove the Camera module and Microphone according to the following procedures.

1. Peel off the foil covering the microphone and remove the microphone.

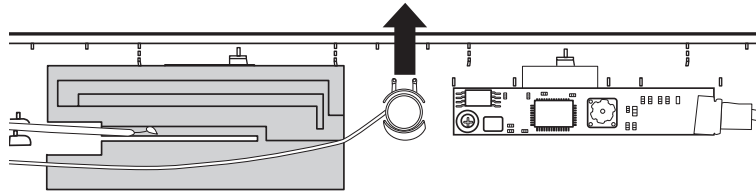


Figure 4.55 Removing the Microphone

2. Disconnect the Camera cable from the Camera module connector and remove the Camera module.

NOTE: Camera module is fastened by adhesive tape. Remove it slowly and carefully.

Installing the Camera module and Microphone

Install the Camera module and Microphone according to the following procedures.

NOTE: *Take extra care in routing cables and antennas on the LCD module. Improperly routed cables can become pinched or damaged and cause malfunction.*

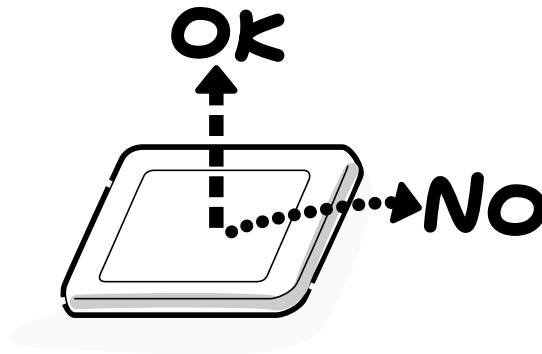
1. Connect the Camera module cable to Camera module connector.
2. Seat the Camera module and microphone in the correct position on the LCD cover assembly.
3. Seat the microphone in the correct position on the LCD cover assembly and cover it with the foil.

Appendix A Handling the LCD Module

Precautions for handling the LCD module

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

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



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

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



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

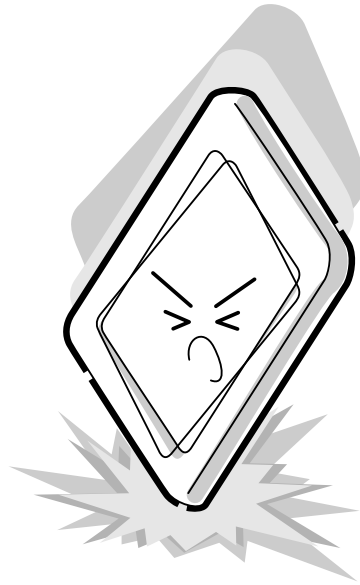
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a soft cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



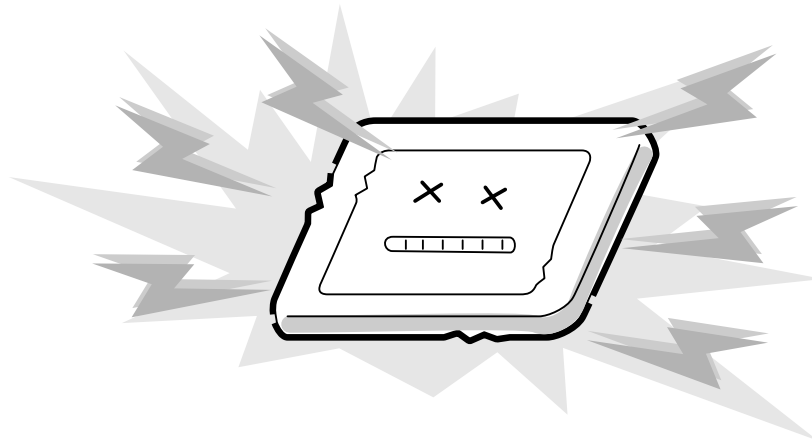
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



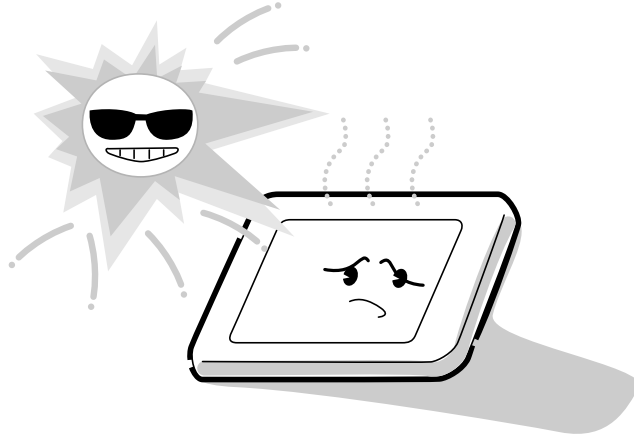
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



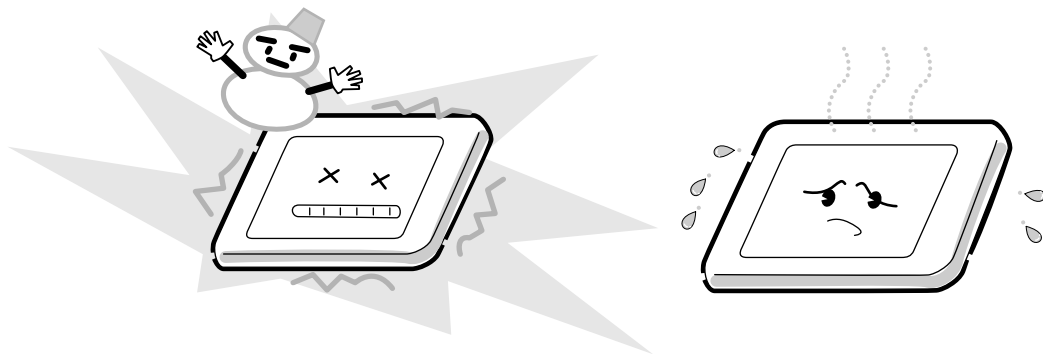
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle grounding device when handling the module.



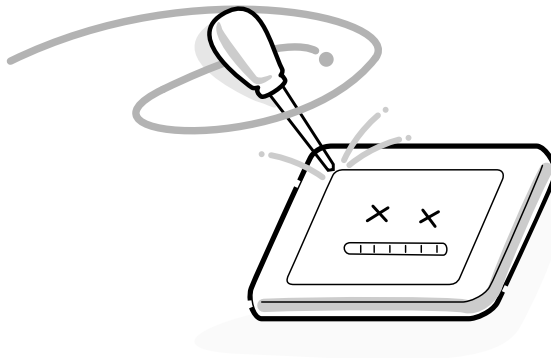
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



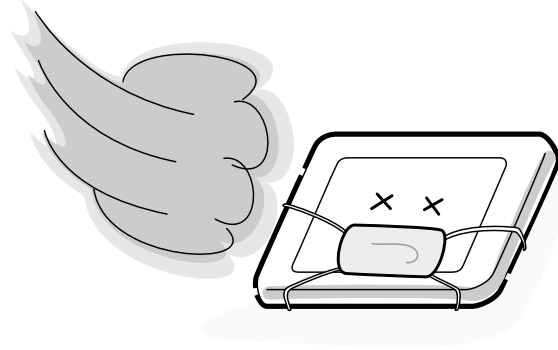
8. Do not store the module at temperatures below its specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



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



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



Appendix B Board Layout

B.1 System Board Top View

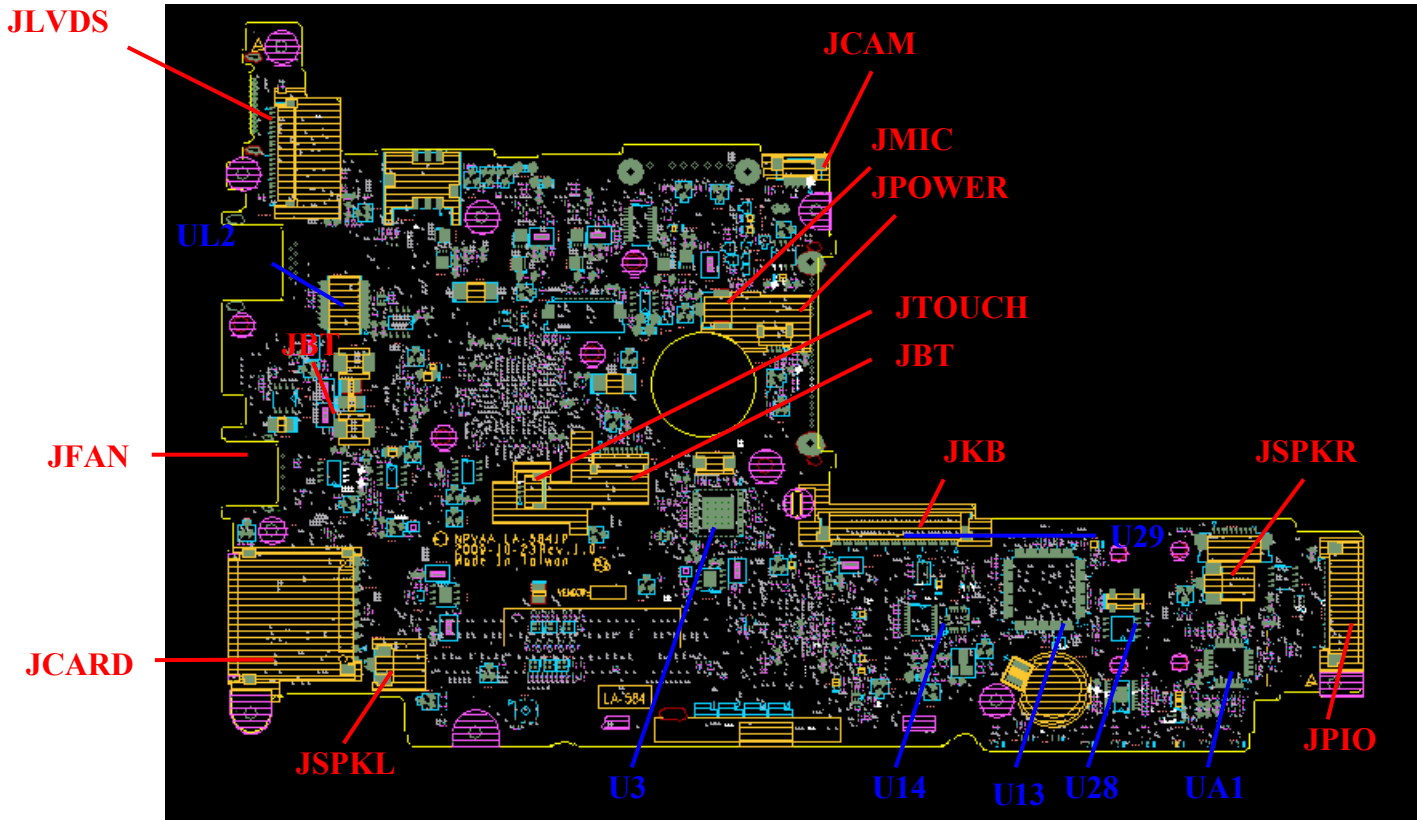


Figure B-1 System Board Layout (Top)

B.2 System Board Bottom View

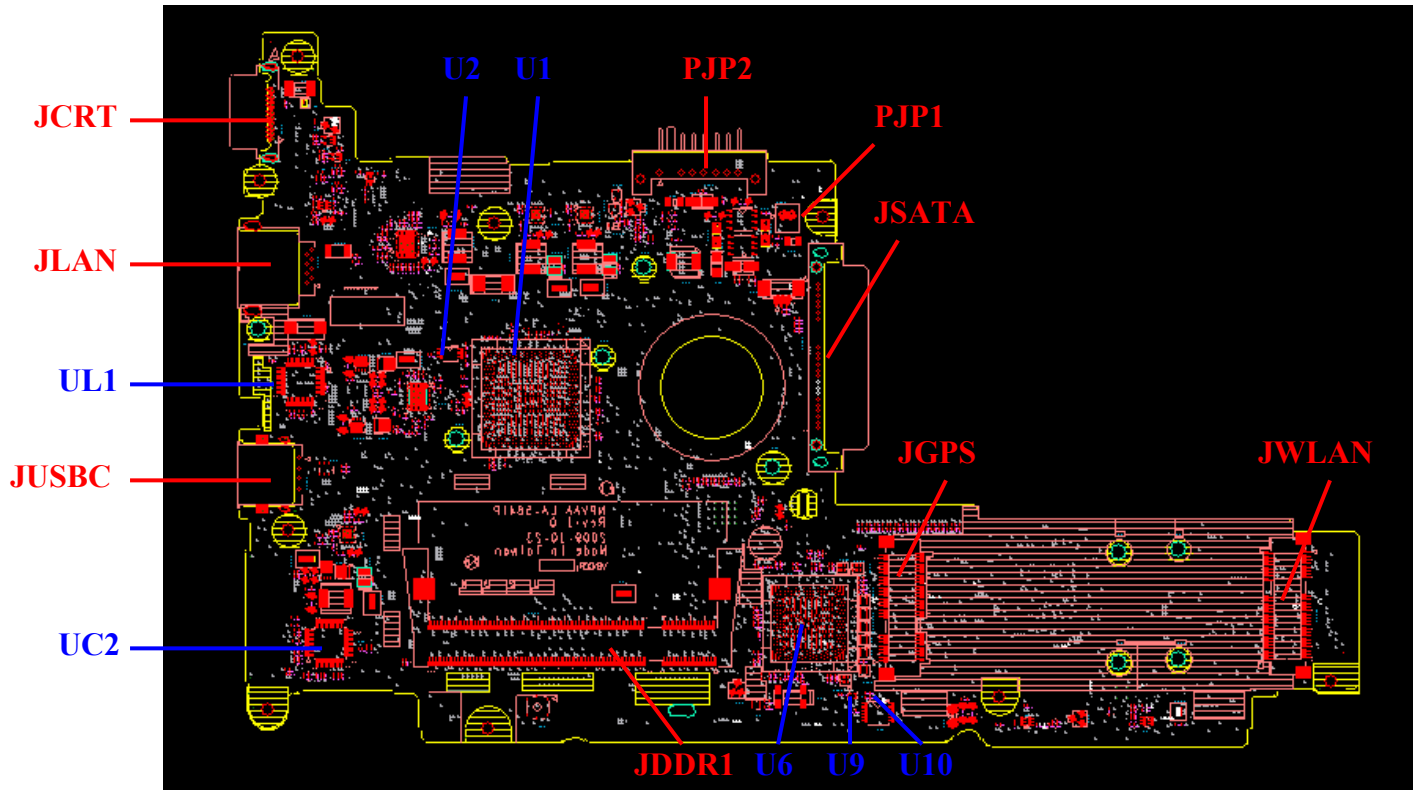


Figure B-2 System Board Layout (Bottom)

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

Number	Name
U1	Intel Atom_N450 or N470
U2	Thermal Sensor_EMC1402
U3	Clock Generator_SLG8SP556VTR
U6	South Bridge Intel Tiger point
U9	USB TS3USB221RSER
U10	USB BUS SW_SN74CBT3125PWRG4
U13	EC_KB926QFC0
U14	G-sensor_TSH35TR
U19	FAN Control IC_APL5607KI-TRG
U28	BIOS ROM
UA1	Codec_ALC272-GR
UC1	Card Reader_RTS5159-GR
UL1	10/100 LAN_RTL8103EL-GR
UL2	LAN Transformer_S X'FORM_LFE8456E-R

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

Number	Name
JLVDS	LVDS conn.
JFAN	Fan conn.
JDDR	DDRII conn.
JCRT	CRT conn.
JPOWER	Power/B conn.
JSATA	SATA HDD conn.
JCARD	Card Reader conn.
JMIC	Microphone conn.
JSPKR	Speaker conn.
JSPKL	Speaker conn.
JLAN	LAN conn.
JGPS	GPS conn.
JWLAN	WLAN conn.
JPIO	I/O/B conn.
JUSBC	USB/C conn.
JCAM	Camera conn.
JBT	Bluetooth conn.
JEXMIC	External MIC conn.
JKB	Keyboard conn.
JTOUCH	TP/B conn.
PJP1	AC Adaptor conn.
PJP2	Battery conn.

Appendix C Pin Assignments

System Board

C.1 JFAN

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

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

C.2 JLVDS

Table C-2 LVDS I/F pin assignments (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+LEDVDD		2	NC	
3	+LCDVDD_L		4	+3VS	
5	LCD_PWM		6	BKOFF#	
7	LVDS_SDA		8	LVDS_SCL	
9	GND		10	LVDS_A0	
11	LVDS_A0#		12	GND	
13	LVDS_A1		14	LVDS_A1#	
15	GND		16	LVDS_A2	
17	LVDS_A2#		18	GND	
19	LVDS_ACLK		20	LVDS_ACLK#	

C.3 JCRT

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

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

C.4 JSATA

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

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	SATA_ITX_C_DRX_P0	
3	SATA_ITX_C_DRX_N0		4	GND	
5	SATA_IRX_DT_X_N0		6	SATA_IRX_DT_X_P0	
7	GND		8	+3VS	
9	+3VS		10	+3VS	
11	GND		12	GND	
13	GND		14	+5VS	
15	+5VS		16	+5VS	
17	GND		18	NC	
19	GND		20	NC	
21	NC		22	NC	

C.5 JBT

Table C-5 Bluetooth Connector pin assignments (10-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	USB20_P2	
3	USB20_N2		4	WLAN_BT_CLK	
5	BT_DET#		6	BT_RESET#	
7	WLAN_BT_DATA		8	+BT_VCC	
9	+3VS		10	GND	

C.6 JCAM

Table C-6 Internal Camera Connector pin assignments (5-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+CAM_VDD		2	USB20_N7_R	I/O
3	USB20_P7_R	I/O	4	GND	
5	GND				

C.7 JWLAN

Table C-7 WLAN/WiMax Connector pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NC		2	+3VALW	
3	WLAN_BT_DATA		4	GND	
5	WLAN_BT_CLK		6	+1.5VS	
7	WLAN_CLKREQ#		8	NC	
9	GND		10	NC	
11	CLK_PCIE_WLAN#		12	NC	
13	CLK_PCIE_WLAN		14	NC	
15	GND		16	NC	
17	NC		18	GND	
19	NC		20	XMIT_OFF#	
21	GND		22	PLT_RST#	
23	PCIE_PTX_C_IRX_N 2		24	+3VALW	
25	PCIE_PTX_C_IRX_P 2		26	GND	
27	GND		28	+1.5VS	
29	GND		30	CLK_SMBCLK	
31	PCIE_ITX_C_PRX_N 2		32	CLK_SMBDATA	
33	PCIE_ITX_C_PRX_P 2		34	GND	
35	GND		36	USB20_N6	
37	GND		38	USB20_P6	
39	+3VALW		40	GND	
41	+3VALW		42	LED_WIMAX#	
43	GND		44	NC	
45	NC		46	NC	
47	NC		48	+1.5VS	
49	EC_TX_P80_DATA		50	GND	
51	EC_RX_P80_CLK		52	+3VALW	

C.8 JLAN

Table C-8 LAN Connector pin assignments (12-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	RJ45_MIDI0+	I/O	2	RJ45_MIDI0-	I/O
3	RJ45_MIDI1+	I/O	4	NC	
5	NC		6	RJ45_MIDI1-	I/O
7	NC		8	NC	

C.9 JGPS

Table C-9 GPS Connector pin assignments (52-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NC		2	+3VS	
3	NC		4	GND	
5	NC		6	+1.5VS	
7	WWAN_CLKREQ#		8	+UIM_PWR	
9	GND		10	UIM_DATA	
11	CLK_PCIE_WWAN#		12	UIM_CLK	
13	CLK_PCIE_WWAN		14	UIM_RST	
15	GND		16	UIM_VPP	
17	NC		18	GND	
19	NC		20	UWB_OFF#	
21	GND		22	PLTRST#	
23	PCIE_PTX_C_IRX_N4		24	+3VS	
25	PCIE_PTX_C_IRX_P4		26	GND	
27	GND		28	+1.5VS	
29	GND		30	CLK_SMBCLK	
31	PCIE_ITX_C_PRX_N4		32	CLK_SMBDATA	
33	PCIE_ITX_C_PRX_P4		34	GND	
35	GND		36	USB20_N5	
37	GND		38	USB20_P5	
39	+3VS		40	GND	
41	+3VS		42	LED_WIMAX#	
43	GND		44	NC	
45	NC		46	NC	
47	NC		48	+1.5VS	
49	NC		50	GND	
51	NC		52	+3VS	

C.10 JDDR1

Table C-10 SODIMM I/F pin assignments (200-PIN) (1/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+DIMM_VREF		2	GND	
3	GND		4	DDR_A_D4	
5	DDR_A_D0		6	DDR_A_D5	
7	DDR_A_D1		8	GND	
9	GND		10	DDR_A_DM0	
11	DDR_A_DQS#0		12	GND	
13	DDR_A_DQS0		14	DDR_A_D6	
15	GND		16	DDR_A_D7	
17	DDR_A_D2		18	GND	
19	DDR_A_D3		20	DDR_A_D20	
21	GND		22	DDR_A_D21	
23	DDR_A_D16		24	GND	
25	DDR_A_D17		26	DDR_A_DM2	
27	GND		28	GND	
29	DDR_A_DQS#2		30	M_CLK_DDR0	
31	DDR_A_DQS2		32	M_CLK_DDR#0	

Table C-10 SODIMM I/F pin assignments (200-PIN) (2/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
---------	-------------	-----	---------	-------------	-----

33	GND		34	GND	
35	DDR_A_D18		36	DDR_A_D22	
37	DDR_A_D19		38	DDR_A_D23	
39	GND		40	GND	
41	GND		42	GND	
43	DDR_A_D9		44	DDR_A_D12	
45	DDR_A_D8		46	DDR_A_D13	
47	GND		48	GND	
49	DDR_A_DQS#1		50	PM_EXTTTS#0	
51	DDR_A_DQS1		52	DDR_A_DM1	
53	GND		54	GND	
55	DDR_A_D10		56	DDR_A_D14	
57	DDR_A_D11		58	DDR_A_D15	
59	GND		60	GND	
61	DDR_A_D24		62	DDR_A_D28	
63	DDR_A_D25		64	DDR_A_D29	
65	GND		66	GND	
67	DDR_A_DM3		68	DDR_A_DQS#3	
69	NC		70	DDR_A_DQS3	
71	GND		72	GND	
73	DDR_A_D26		74	DDR_A_D30	
75	DDR_A_D27		76	DDR_A_D31	
77	GND		78	GND	
79	DDR_CKE0		80	DDR_CKE1	
81	+1.8V		82	+1.8V	
83	NC		84	NC	
85	DDR_A_BS2		86	DDR_A_MA14	
87	+1.8V		88	+1.8V	
89	DDR_A_MA12		90	DDR_A_MA11	
91	DDR_A_MA9		92	DDR_A_MA7	
93	DDR_A_MA8		94	DDR_A_MA6	
95	+1.8V		96	+1.8V	

Table C-10 SODIMM I/F pin assignments (200-PIN) (3/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
97	DDR_A_MA5		98	DDR_A_MA4	
99	DDR_A_MA3		100	DDR_A_MA2	
101	DDR_A_MA1		102	DDR_A_MA0	
103	+1.8V		104	+1.8V	
105	DDR_A_MA10		106	DDR_A_BS1	
107	DDR_A_BS0		108	DDR_A_RAS#	
109	DDR_A_WE#		110	DDR_CS0#	
111	+1.8V		112	+1.8V	
113	DDR_A_CAS#		114	M_ODT0	
115	DDR_CS1#		116	DDR_A_MA13	
117	+1.8V		118	+1.8V	
119	M_ODT1		120	NC	
121	GND		122	GND	
123	DDR_A_D32		124	DDR_A_D36	
125	DDR_A_D33		126	DDR_A_D37	
127	GND		128	GND	
129	DDR_A_DQS#4		130	DDR_A_DM4	
131	DDR_A_DQS4		132	GND	
133	GND		134	DDR_A_D38	
135	DDR_A_D34		136	DDR_A_D39	
137	DDR_A_D35		138	GND	
139	GND		140	DDR_A_D44	
141	DDR_A_D40		142	DDR_A_D45	
143	DDR_A_D41		144	GND	
145	GND		146	DDR_A_DQS#5	
147	DDR_A_DM5		148	DDR_A_DQS5	
149	GND		150	GND	
151	DDR_A_D42		152	DDR_A_D46	
153	DDR_A_D43		154	DDR_A_D47	
155	GND		156	GND	
157	DDR_A_D48		158	DDR_A_D52	
159	DDR_A_D49		160	DDR_A_D53	

Table C-10 SODIMM I/F pin assignments (200-PIN) (4/4)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
161	GND		162	GND	
163	NC		164	M_CLK_DDR1	
165	GND		166	M_CLK_DDR#1	
167	DDR_A_DQS#6		168	GND	
169	DDR_A_DQS6		170	DDR_A_DM6	
171	GND		172	GND	
173	DDR_A_D50		174	DDR_A_D54	
175	DDR_A_D51		176	DDR_A_D55	
177	GND		178	GND	
179	DDR_A_D56		180	DDR_A_D60	
181	DDR_A_D57		182	DDR_A_D61	
183	GND		184	GND	
185	DDR_A_DM7		186	DDR_A_DQS#7	
187	GND		188	DDR_A_DQS7	
189	DDR_A_D58		190	GND	
191	DDR_A_D59		192	DDR_A_D62	
193	GND		194	DDR_A_D63	
195	CLK_SMBDATA		196	GND	
197	CLK_SMBCLK		198	GND	
199	+3VS		200	GND	

C.11 JMIC

Table C-11 Internal Microphone Connector pin assignments (2-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	MIC2_L		2	MIC2_R	
3	GND			GND	

C.12 JPIO

Table C-12 IO Connector pin assignments (20-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCA		2	+USB_VCCA	
3	+USB_VCCA		4	+USB_VCCA	
5	NC		6	USB20_N1	
7	USB20_P1		8	GND	
9	GND		10	USB20_N0	
11	USB20_P0		12	GND	
13	GND		14	HP_R	
15	HP_L		16	AGND	
17	MIC1_L		18	MIC1_R	
19	NBA_PLUG		20	MIC_SENSE	

C.13 JKB

Table C-13 Keyboard Connector pin assignments (34-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	NC		2	NC	
3	CAPS_LED#		4	+3VS	

5	KSI1		6	KSI6	
7	KSI5		8	KSI0	
9	KSI4		10	KSI3	
11	KSI2		12	KSI7	
13	KSO15		14	KSO12	
15	KSO11		16	KSO10	
17	KSO9		18	KSO8	
19	KSO13		20	KSO7	
21	KSO6		22	KSO14	
23	KSO5		24	KSO3	
25	KSO4		26	KSO0	
27	KSO1		28	KSO2	
29	NC		30	NC	
31	NC		32	NC	
33	NC		34	NC	

C.14 JUSBA

Table C-14 USB Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCA		2	USB20_N0_R	
3	USB20_P0_R		4	GND	

C.15 JUSBB

Table C-15 USB/B Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCA		2	USB20_N1_R	
3	USB20_P1_R		4	GND	

C.16 JUSBC

Table C-16 USB/B Connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	+USB_VCCB		2	USB20_N4_R_S	
3	USB20_P4_R_S		4	GND	

C.17 JPOWER

Table C-17 POWER/B connector pin assignments (4-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	PWR_ON_LED#		2	PWR_ON_LED	
3	ON/OFFBTN#_R		4	GND	

C.18 JCARD

Table C-18 CARD READER connector pin assignments (11-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	SD_DATA3		2	SDCMD	
3	GND		4	+VCC_3IN1	
5	SDCLK		6	GND	
7	SD_MS_DATA0		8	SD_DATA1	
9	SD_DATA2		10	SDWP#	
11	SDCD#				

C.19 JSPKR

Table C-19 SPKR connector pin assignments (4-pin)

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

C.20 JSPKL

Table C-20 SPKR connector pin assignments (4-pin)

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

C.21 JTOUCH

Table C-21 T/P connector pin assignments (6-pin)

Pin No.	Signal name	I/O	Pin No.	Signal Name	I/O
1	GND		2	TP_CLK	
3	TP_DATA		4	+5VS	

Appendix D Keyboard Scan/Character Codes

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

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

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

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

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

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

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

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

Notes:

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

Table D-2 Scan codes with left Shift key

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

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

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

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				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-4 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
80	Pause	*8		*8	
81	Break	*8		*8	
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C6	7E	F0 7E

Note:

8. * Refer to Table D-7, No. 126 key scan code.

Table D-5 Scan codes in overlay mode

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

Table D-6 No.124 key scan code

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

Table D-7 No.126 key scan code

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

*: This key generates only make codes.

Appendix E Key Layout

1. United Status (US) Keyboard



Figure US keyboard

2. Traditional Chinese (CH) Keyboard



Figure CH keyboard

3. Thai (TI) Keyboard



Figure TI keyboard

4. Korean (KO) Keyboard

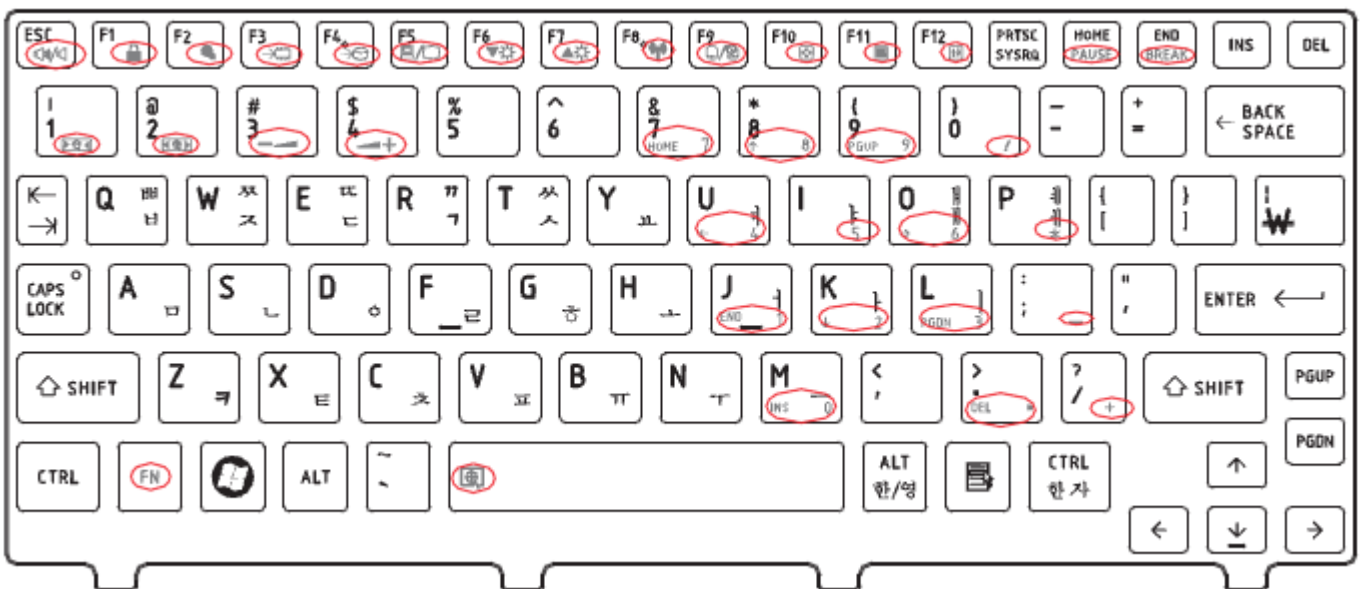


Figure KO keyboard

5. United Kingdom (UK) Keyboard



Figure UK keyboard

6. US International (UI) Keyboard



Figure UI keyboard

7. Hebrew (HB) Keyboard



Figure HB keyboard

8. Danish (DM) Keyboard

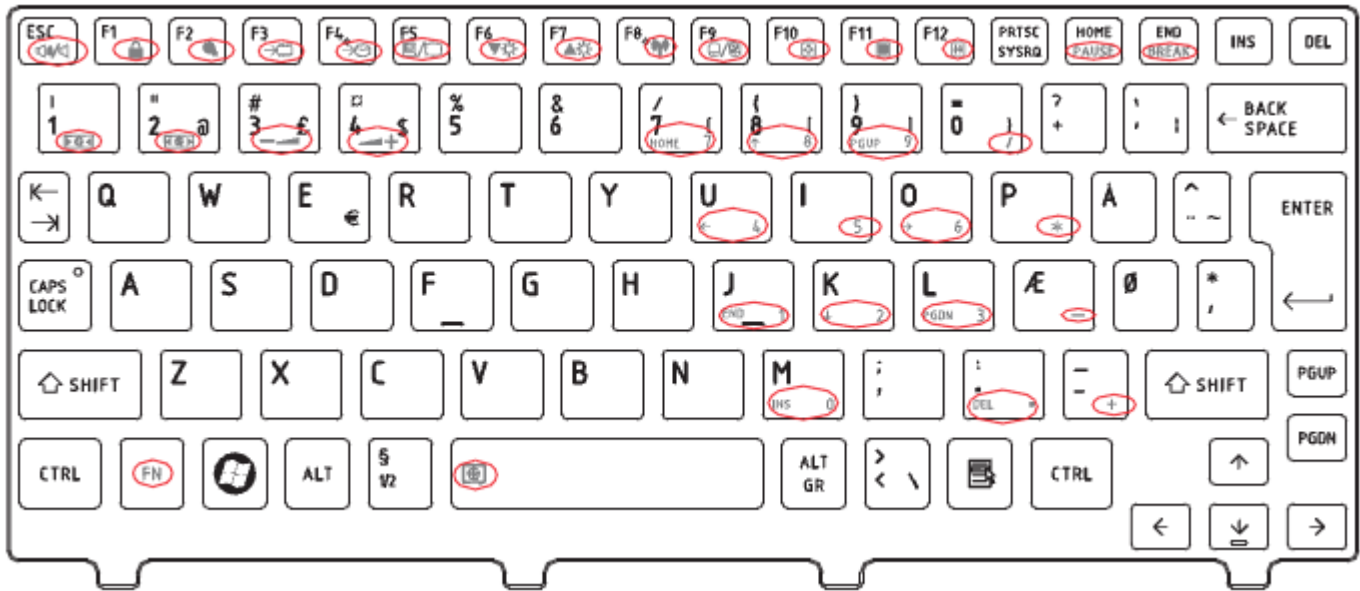


Figure DM keyboard

9. Swiss (SW) Keyboard



Figure SW keyboard

10. Arabic (ARE) Keyboard



Figure ARE keyboard

11. Czech (CZ) Keyboard



Figure CZ keyboard

12. Russian (RU) Keyboard



Figure RU keyboard

13. Portuguese (PO) Keyboard



Figure PO keyboard

14. Slovakian (SL) Keyboard

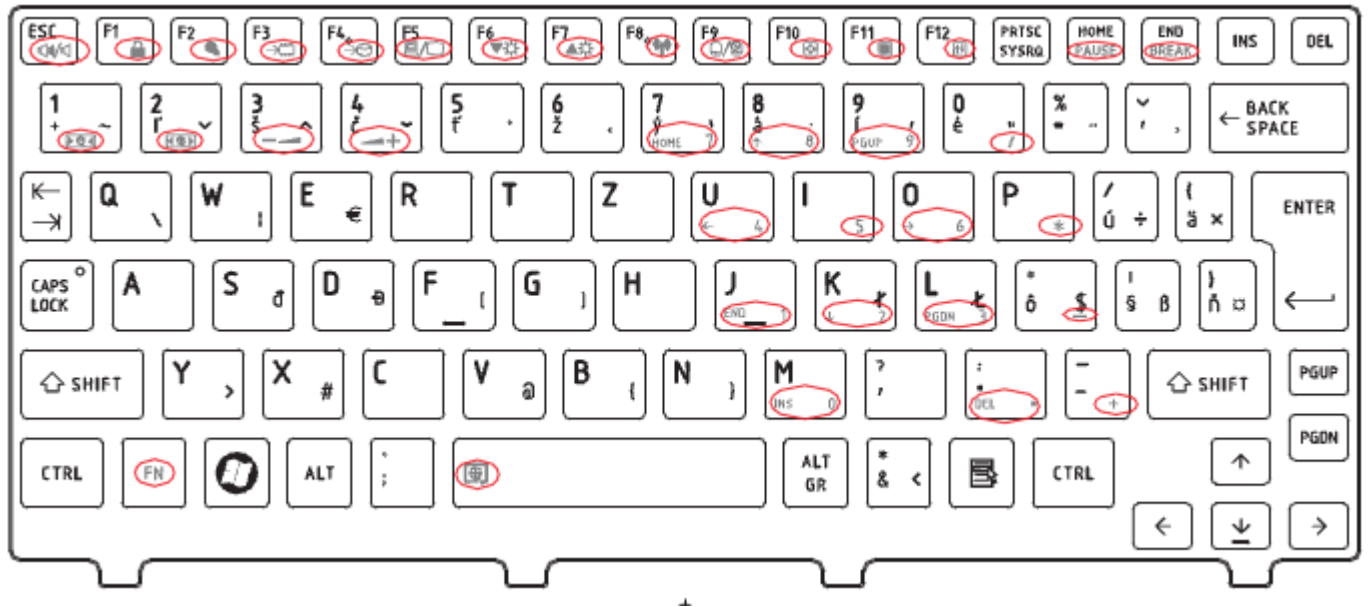


Figure SL keyboard

15. Italian (IT) Keyboard

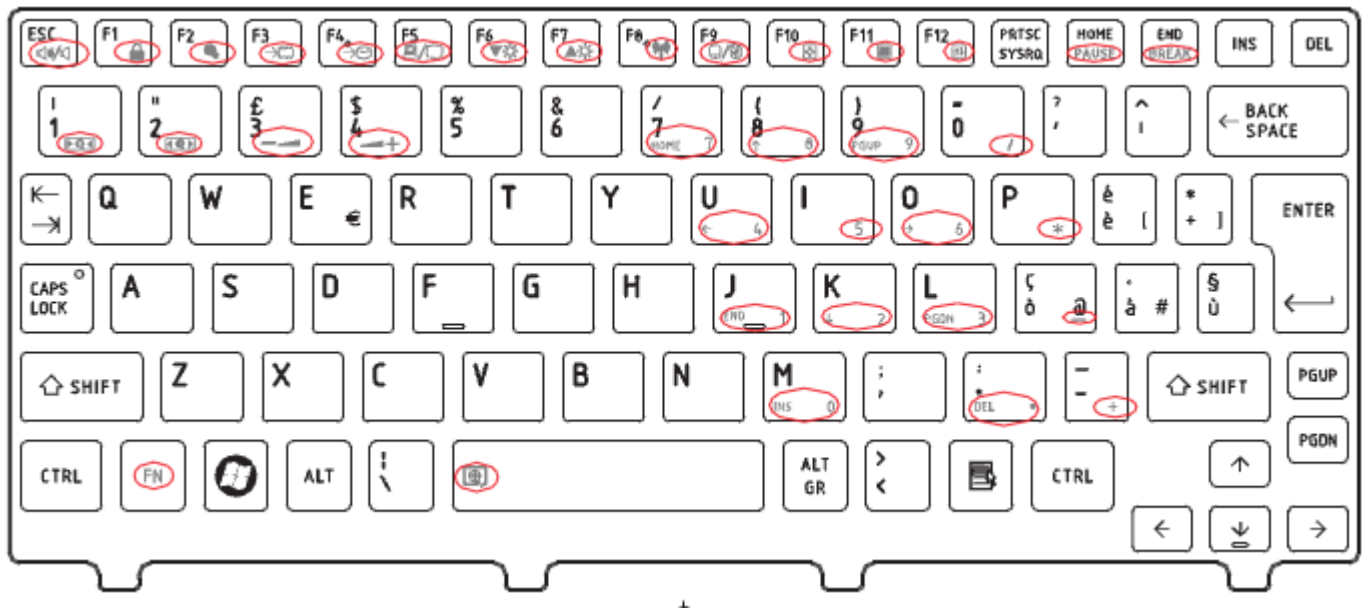


Figure IT keyboard

16. French (FR) Keyboard



Figure FR keyboard

17. German (GR) Keyboard



Figure GR keyboard

18. Greek (GK) Keyboard



Figure GK keyboard

19. Hungarian (HG) Keyboard



Figure HG keyboard

20. Spanish (SP) Keyboard

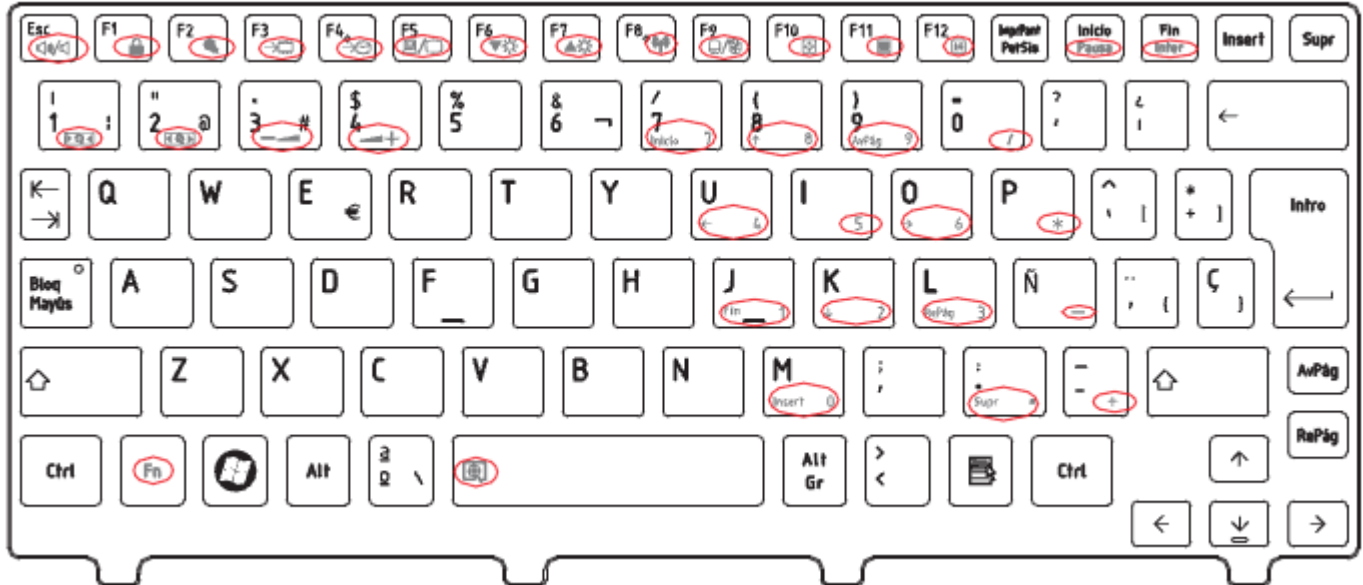


Figure SP keyboard

21. Turkish (TR) Keyboard

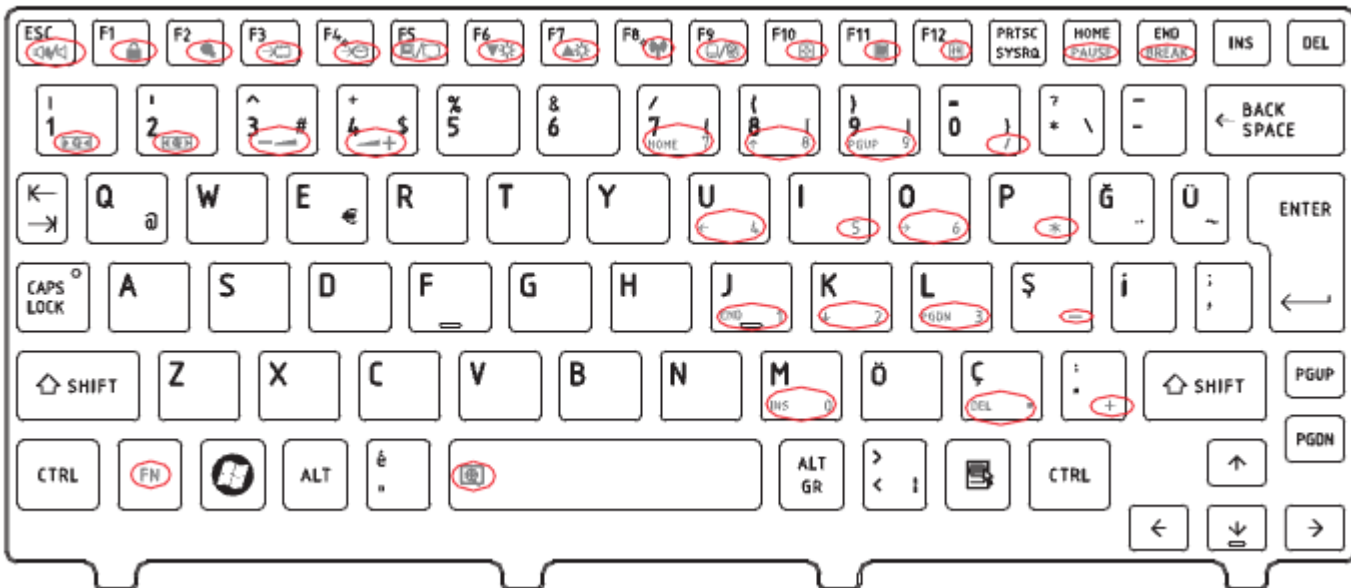


Figure TR keyboard

22. Turkish F (TF-F) Keyboard

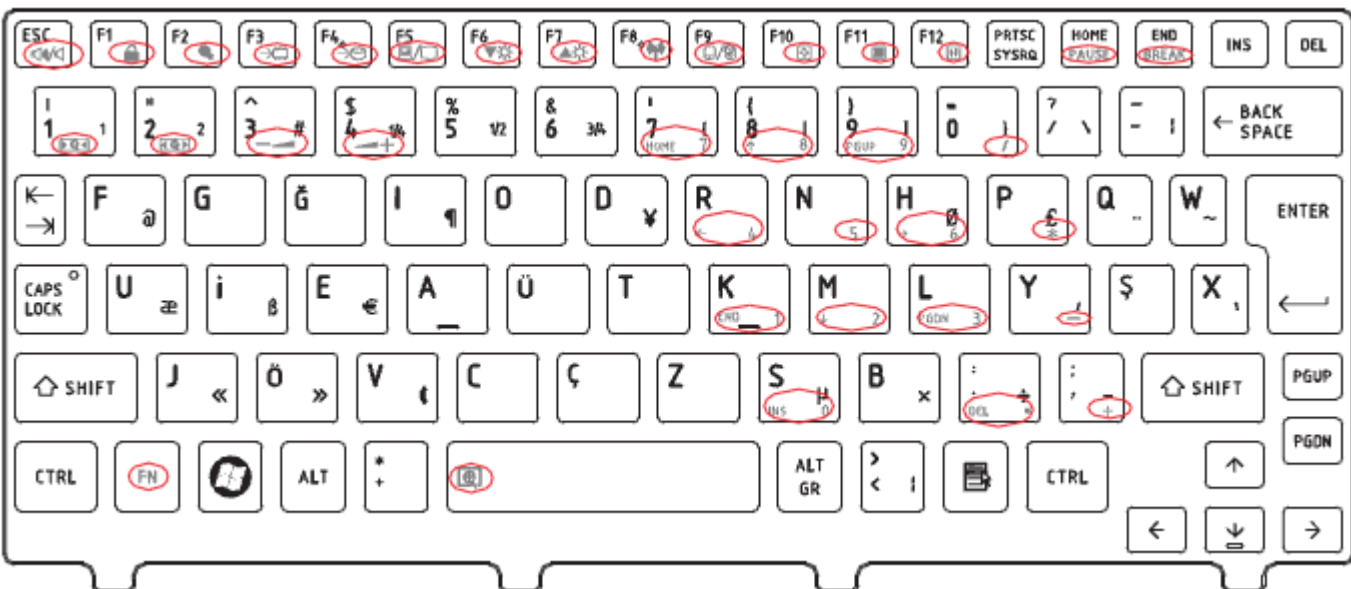


Figure TF-F keyboard

23. Swedish (SD) Keyboard

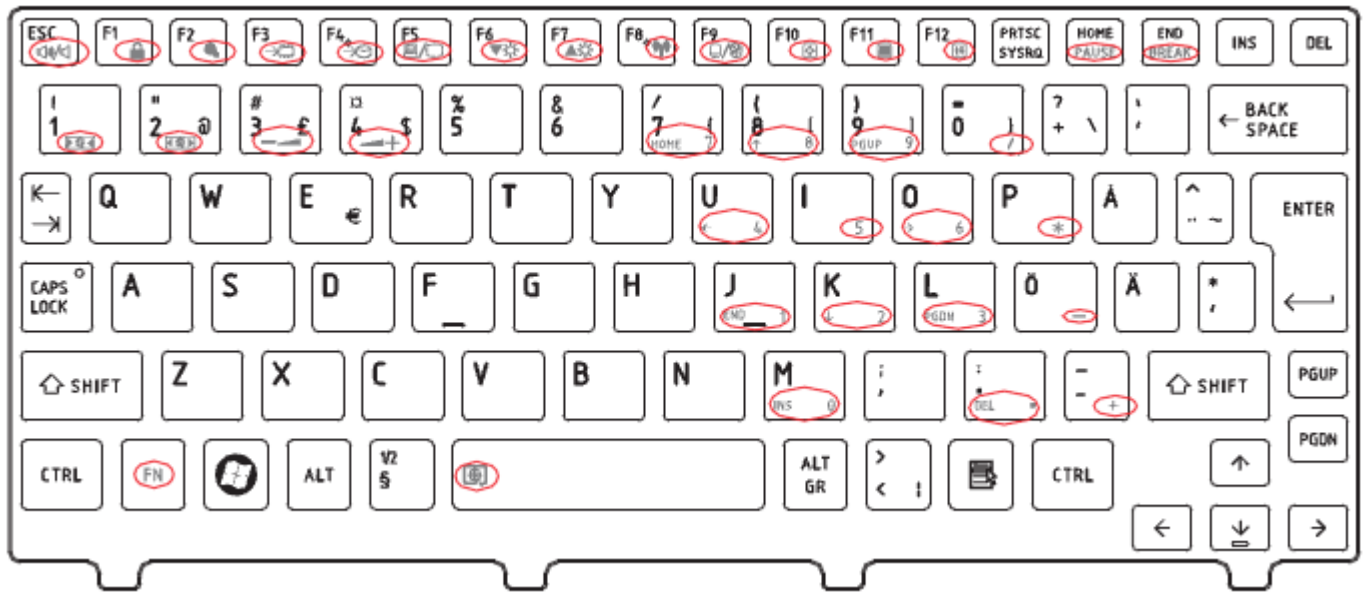


Figure SD keyboard

24. Belgian (BE) Keyboard

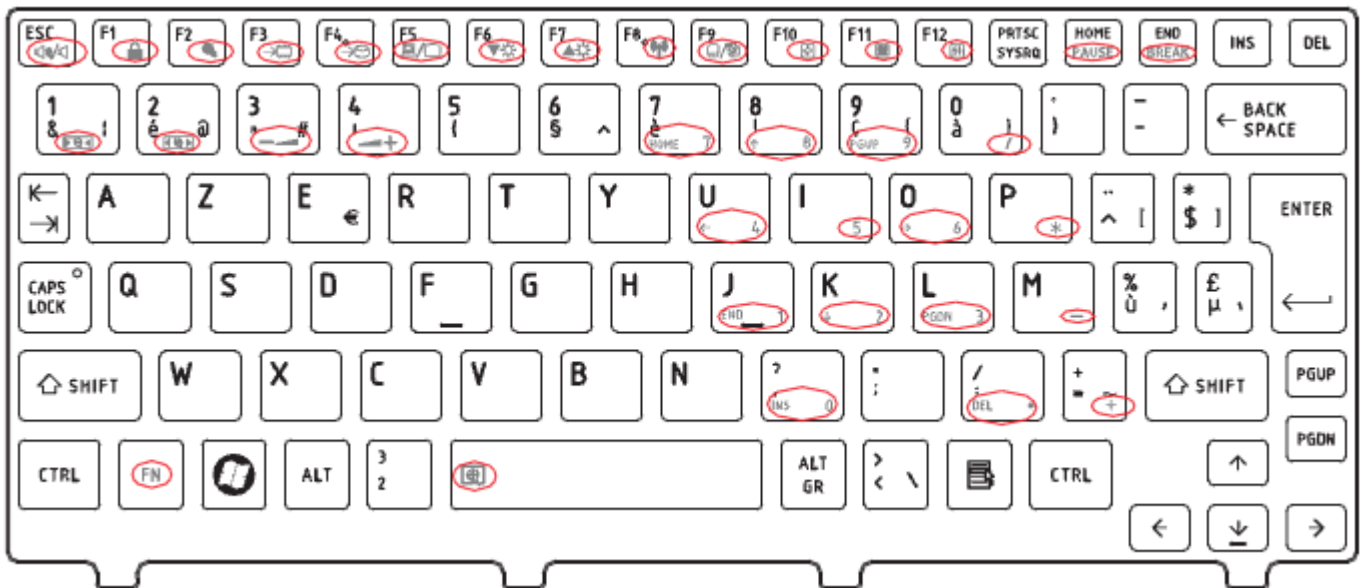


Figure BE keyboard

25. Yugoslavian (YU) Keyboard



Figure YU keyboard

26. Norwegian (NW) Keyboard



Figure NW keyboard

27. Scandinavian (ND) Keyboard



Figure ND keyboard

28. Canadian Multinational (AC) Keyboard



Figure AC keyboard

29. Canadian Bilingual (CB) Keyboard



Figure CB keyboard

30. Romania (RO) Keyboard

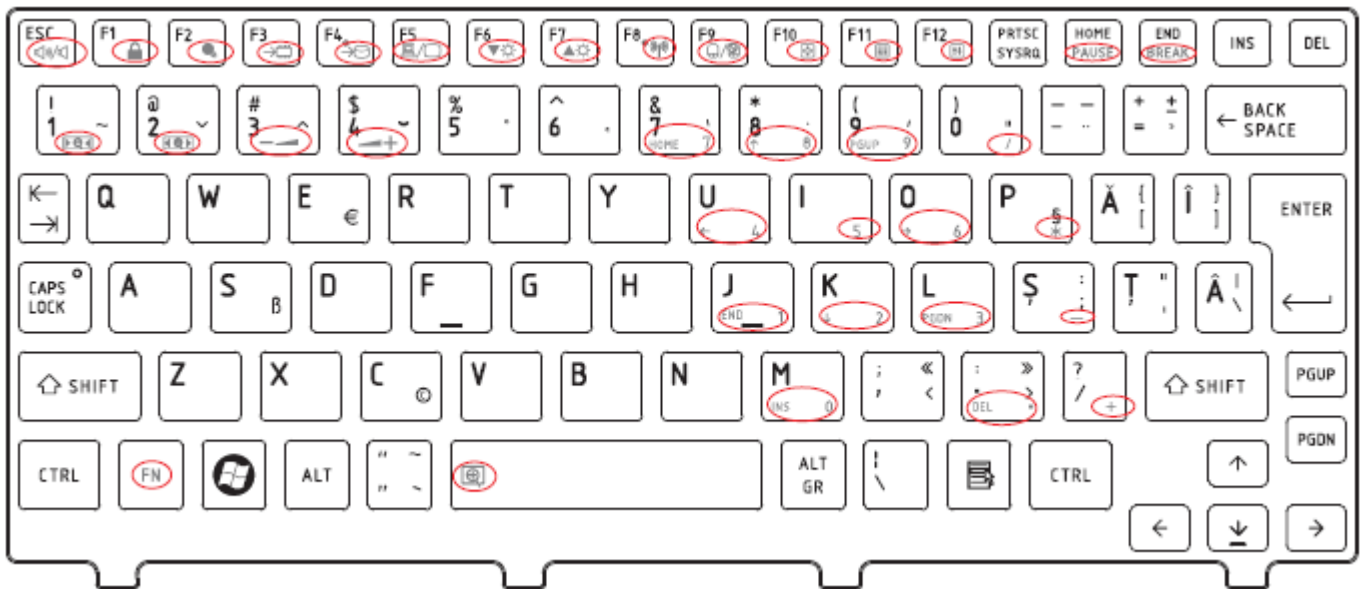


Figure RO keyboard

31. Bulgaria (BU) Keyboard



Figure BU keyboard

32. Japanese (JP) Keyboard

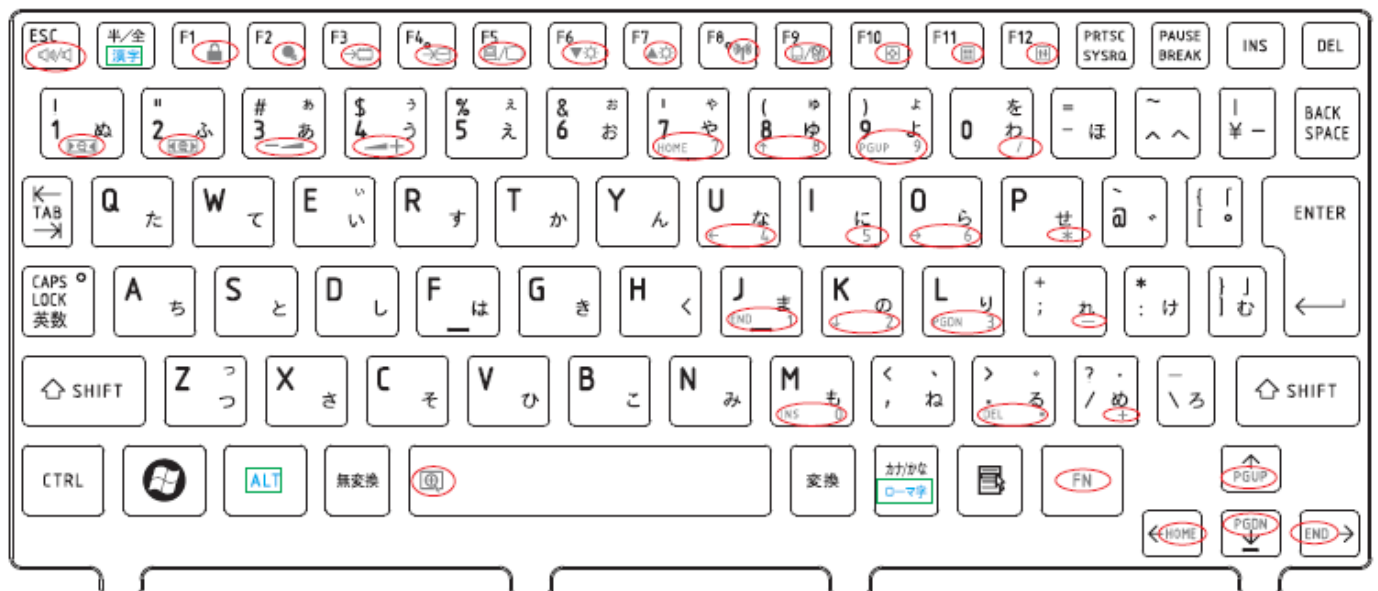


Figure JP keyboard

Appendix F Series Screw Torque List (NPVAA)

Table F-1 Series Screw Torque List

SCREW P/N	SCREW SPEC	Q'ty	LOCATION	SCREW TORQUE
LCD ASSY				
MA00000CKG0	M2.5x5	2	BEZEL TO BRK_R/L_ASSY TO COVER_SUB_ASSY	2.5~3.0kgfcm
MA000006BG0	M2.5x4	4	BRK_R/L_ASSY TO LCD_COVER_SUB	2.5~3.0kgfcm
MA00000DHG0	M2x3	4	BRK_R/L_ASSY TO LCD PANEL	1.2~1.5kgfcm
MB				
MA00000EOG0	M2X4	2	BATTERY CONN TO MB	
		2	HDD CONN TO MB	
		2	WLAN_CARD TO MB	
		2	WWAN_CARD TO MB	
MACK20040G0	M2X4	1	THERMAL_ASSY TO MB	1.5~2.0kgfcm
MACK20025G0	M2x2.5	5		
HDD ASSY				
MC DK03030G0	M3x3	4	HDD BRK TO HDD	2.5~3.0Kgf.cm
LOGIC UP				
MACK20040G0	M2x4	1	UP_TP_BTN_BRK TO UPPER	1.5~2.0Kgf.cm
		2	UP_TP_BTN_PCB TO UPPER	
LOGIC ASSY				
MA000006BG0	M2.5x4	2	MB TO LOG LOW	2.5~3.0kgfcm
		2	LOW TO UP (Hinge side)	
		1	LOW TO MB TO UP TO KB	
		3	UP TO UP HINGE CAP (Battery Side)	
MAA010002G0	M2.5x6	1	LOW TO MB TO UP (Card Reader)	
		5	UP TO MB TO LOW (K/B AREA)	
		4	LOW TO MB TO UP (Front Side)	
		1	LOW TO IO PCB TO UP	
		1	LOW TO UP TO KB	
MA00000FMG0	M2.5x3	1	HDD DOOR TO LOWER	
			MA00000FOG0	M2.5x10
MA00000DMH0	M2.5*4 半牙	1	RAM DOOR TO LOW	

Appendix G Reliability

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

Table G-1 MTBF

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