

**Toshiba Personal Computer**  
***Satellite U500/PORTEGE M900D***

**Maintenance Manual**

**TOSHIBA CORPORATION**

**File Number**

*[CONFIDENTIAL]*

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Toshiba Personal Computer Satellite U500/PORTEGE M900D/Dynabook Maintenance Manual

First edition June 2009

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## Preface

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This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer Satellite U500/PORTEGE M900D/Dynabook.

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

### SAFETY PRECAUTIONS

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

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

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

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

***NOTE:*** “*Note*” contains general information that relates to your safe maintenance service.

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

- Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1      Hardware Overview describes the Satellite U500/PORTEGE M900D/Dynabook 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
  - BIOS rewrite procedures
  - EC/KBC rewrite procedures

## 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 type face below:

```
Format complete  
System transferred
```

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# Table of Contents

---

## Chapter 1 Hardware Overview

<a href="#">1.1</a>	<a href="#">Features</a> .....	1-4
<a href="#">1.2</a>	<a href="#">System Unit Block Diagram</a> .....	1-10
<a href="#">1.3</a>	<a href="#">HDD/SSD</a> .....	1-15
<a href="#">1.4</a>	<a href="#">DVD Super Multi Drive</a> .....	1-17
<a href="#">1.5</a>	<a href="#">Keyboard</a> .....	1-19
<a href="#">1.6</a>	<a href="#">TFT Color Display</a> .....	1-20
<a href="#">1.7</a>	<a href="#">Power Supply</a> .....	1-21
<a href="#">1.8</a>	<a href="#">Batteries</a> .....	1-22
<a href="#">1.9</a>	<a href="#">AC Adaptor</a> .....	1-25

## Chapter 2 Troubleshooting Procedures

	<a href="#">Troubleshooting Procedures</a> .....	2-1
<a href="#">2.1</a>	<a href="#">Troubleshooting</a> .....	2-6
<a href="#">2.2</a>	<a href="#">Troubleshooting Flowchart</a> .....	2-7
<a href="#">2.3</a>	<a href="#">Power Supply Troubleshooting</a> .....	2-10
<a href="#">2.4</a>	<a href="#">Main Board Troubleshooting</a> .....	2-18
<a href="#">2.5</a>	<a href="#">HDD/SSD Troubleshooting</a> .....	2-23
<a href="#">2.6</a>	<a href="#">Keyboard and Touch pad Troubleshooting</a> .....	2-28
<a href="#">2.7</a>	<a href="#">Display Troubleshooting</a> .....	2-31
<a href="#">2.8</a>	<a href="#">Optical Drive Troubleshooting</a> .....	2-33
<a href="#">2.9</a>	<a href="#">Modem Troubleshooting</a> .....	2-35
<a href="#">2.10</a>	<a href="#">LAN Troubleshooting</a> .....	2-37
<a href="#">2.11</a>	<a href="#">Wireless LAN Troubleshooting</a> .....	2-38
<a href="#">2.12</a>	<a href="#">Sound Troubleshooting</a> .....	2-41
<a href="#">2.13</a>	<a href="#">Card Reader Slot Troubleshooting</a> .....	2-44
<a href="#">2.14</a>	<a href="#">PCI Express Card Slot Troubleshooting</a> .....	2-45

<a href="#">2.15</a>	<a href="#">Fingerprint Board(BTO) Troubleshooting</a>	2-46
<a href="#">2.16</a>	<a href="#">Bluetooth(BTO) Troubleshooting</a>	2-48
<a href="#">2.17</a>	<a href="#">3G(BTO) Troubleshooting</a>	2-50
<a href="#">2.18</a>	<a href="#">Camera(BTO) Troubleshooting</a>	2-52

### Chapter 3 Tests and Diagnostics

<a href="#">Tests and Diagnostics</a>		<a href="#">3-3</a>
<a href="#">3.1</a>	<a href="#">Model, BIOS and CPU Test</a>	3-6
<a href="#">3.1.1</a>	<a href="#">CPU Test</a>	3-7
<a href="#">3.1.2</a>	<a href="#">Memory Test</a>	3-8
<a href="#">3.2</a>	<a href="#">Check MAC Test</a>	3-10
<a href="#">3.3</a>	<a href="#">ACIN Test</a>	3-11
<a href="#">3.4</a>	<a href="#">Temperature Test</a>	3-12
<a href="#">3.5</a>	<a href="#">USB TEST</a>	3-13
<a href="#">3.6</a>	<a href="#">USBCCD Test</a>	3-14
<a href="#">3.7</a>	<a href="#">PAD Test</a>	3-15
<a href="#">3.8</a>	<a href="#">LCDRGB Test</a>	3-17
<a href="#">3.9</a>	<a href="#">VGA Test</a>	3-21
<a href="#">3.10</a>	<a href="#">Audio Test</a>	3-22
<a href="#">3.11</a>	<a href="#">Keyboard Test</a>	3-23
<a href="#">3.12</a>	<a href="#">Function TEST</a>	3-25
<a href="#">3.13</a>	<a href="#">LEDALL Test</a>	3-26
<a href="#">3.14</a>	<a href="#">STORE Test [CD/DVD-ROM TEST]</a>	3-27
<a href="#">3.15</a>	<a href="#">LID Switch Test</a>	3-28
<a href="#">3.16</a>	<a href="#">MS CARD Test</a>	3-29
<a href="#">3.17</a>	<a href="#">SD CARD Test</a>	3-31
<a href="#">3.18</a>	<a href="#">HDD Test</a>	3-33
<a href="#">3.19</a>	<a href="#">BATTERY Test</a>	3-34
<a href="#">3.20</a>	<a href="#">Touch LED Test</a>	3-35
<a href="#">3.21</a>	<a href="#">HDD 3D Protection</a>	3-36
<a href="#">3.22</a>	<a href="#">Speaker Test</a>	3-37
<a href="#">3.23</a>	<a href="#">Auto Run</a>	3-38

[3.0 Appendix:](#) .....3-39



## Chapter 4 Replacement Procedures

4.1	General .....	6
4.2	Battery pack .....	14
4.3	Express card.....	16
4.4	HDD module.....	17
4.5	Memory module.....	21
4.6	Wireless LAN card.....	23
4.7	Keyboard .....	26
4.8	Top cover.....	29
4.9	Bluetooth.....	32
4.10	Power Button Board .....	34
4.11	Fingerprint module .....	36
4.12	Touchpad on-off board .....	39
4.13	Main PCB .....	40
4.14	LAN Board .....	44
4.15	D/C IN Cable .....	46
4.16	Speaker .....	48
4.17	Remove LCD Module .....	50
4.18	CPU Heat sink/CPU .....	52
4.19	VGA Card.....	56
4.20	FAN 57	
4.21	LCD unit/Camera .....	59

## Appendices

Appendix A	Handling the LCD Module .....	A-1
Appendix B	Board Layout .....	B-1
Appendix C	Pin Assignments .....	C-1
Appendix D	Keyboard Scan/Character Codes .....	D-1
Appendix E	Key Layout.....	E-1
Appendix F	BIOS rewrite Procedures .....	F-1
Appendix G	EC/KBC rewrite Procedures.....	G-1

---

# **Chapter 1**

## **Hardware Overview**

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---

## Chapter 1 Contents

---

1.1	Features .....	1-4
1.2	System Unit Block Diagram .....	1-11
1.3	2.5-inch Hard Disk Drive.....	1-16
1.4	DVD Super Multi Drive.....	1-18
1.5	Keyboard.....	1-20
1.6	TFT Color Display.....	1-21
	1.6.1 LCD Module .....	1-21
	1.6.2 FL Inverter Board.....	1-21
1.7	Power Supply.....	1-22
1.8	Batteries .....	1-23
	1.8.1 Main Battery.....	1-23
	1.8.2 Battery Charging Control.....	1-24
	1.8.3 RTC battery.....	1-25
1.9	AC Adaptor.....	1-26

**Figures**

*Figure 1-1 The front of the computer* ..... 1-9  
*Figure 1-2 System unit configuration* ..... 1-10  
*Figure 1-3 System unit block diagram*..... 1-11  
*Figure 1-4 2.5-inch HDD*..... 1-16  
*Figure 1-6 DVD Super Multi drive* ..... 1-18  
*Figure 1-5 Keyboard*..... 1-20

**Tables**

*Table 1-1 2.5-inch HDD specifications (1/1)*..... 1-16  
*Table 1-2 1.8-inch SSD specifications (1/1)*. .... 1-17  
*Table 1-3 DVD Super Multi drive specifications (1/1)*..... 1-19  
*Table 1-4 LCD module specifications (1/1)*..... 1-21  
*Table 1-5 FL inverter board specifications* ..... 1-21  
*Table 1-6 Power supply output rating* ..... 1-22  
*Table 1-7 Battery specifications* ..... 1-23  
*Table 1-8 Time required for charges* ..... 1-24  
*Table 1-9 RTC battery charging/data preservation time*..... 1-25  
*Table 1-10 AC adaptor specifications* ..... 1-26  
*Table 1-11 AC adaptor specifications for discrete graphic model*..... 1-26

## 1.1 Features

The Toshiba Satellite/Satellite Pro U500/U505/507/PORTEGE M900/dynabook CX Personal Computer uses extensive Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features.

Refer to the Parts List for the configuration of each model and the available options.

### ❑ Microprocessor

The Satellite/Satellite Pro U500/U505/507/PORTEGE M900/dynabook CX computer is equipped with an Intel® Core2 Duo Processor, Intel® Pentium® Dual-Core mobile processor or Intel® Celeron Processor. These processors incorporate a math co-processor with L2 cache memory.

### ❑ Chipset

The Satellite/Satellite Pro U500/U505/507/PORTEGE M900/dynabook CX is equipped with Mobile Intel 4 Series Express Chipset Family and Intel ICH9-M.

### ❑ GPU (Graphics Processing Unit)

- (1) Intel integrated graphics (Mobile Intel 4 Series Express Chipset Family)
- (2) Discrete graphic model: AMD M92XT

### ❑ Memory

The computer comes with two DDR2 SO-DIMM slots. Two memory modules of 1GB (1,024MB), 2GB (2,048MB) or 4GB (4,096MB) can be installed, and it can incorporate up to 8GB of main memory.

### ❑ HDD/SSD

(1) HDD: The computer has a 2.5-inch SATA HDD. The following capacities are available:

- 160/250/320/400/500 GB

(2) SSD (BTO): The computer has a SSD port with SATA interface supporting TOSHIBA module type SSD.

### ❑ Optical Drive

The computer accommodates a fixed 12.7mm ODD with one of following types:

#### Comment [z1]:

Please add below item.  
1.eSATA/USB combo port  
2.webcam (BTO)  
3.SIM card Slot  
4.HDMI  
5.Headphone/s/PDIF jack  
6. Microphone jack  
7.Bluetooth (BTO)  
8. Fingerprint (BTO)  
9. Felica (JPN BTO)

#### Comment [z2]:

Please add AMD M92XT information.

#### Comment [z3]:

Please add the below sentence  
"It can incorporate up to 8GB of main memory."

#### Comment [z4]:

Please add SSD information.

#### Comment [z5]:

Please modify to the below info.  
The computer accommodates a fixed 12.7mm ODD with one of following types:  
• Tray Type DVD Super Multi +-R Double Layer drive  
• Tray Type DVD Super Multi +-R Double Layer with Label Flash™ drive  
• Slot Loading Type DVD Super Multi +-R Double Layer drive  
• Slot Loading Type DVD Super Multi +-R Double Layer with Label Flash™ drive

- Tray Type DVD Super Multi +-R Double Layer drive
- Tray Type DVD Super Multi +-R Double Layer with Label Flash™ drive
- Slot Loading Type DVD Super Multi +-R Double Layer drive
- Slot Loading Type DVD Super Multi +-R Double Layer with Label Flash™ drive

❑ Display

The PC comes with 13.3W WXGA (1280\*800) CCFL CSV.

❑ Keyboard

B5 size 86 key (US) and 87key (UK) keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft® Windows® Vista.

❑ Pointing Device

The touch pad and control buttons enable control of the on-screen pointer and scrolling of windows.

**Comment [z6]:**  
Modify sentence to  
“The touch pad and control buttons enable control of the on-screen pointer and scrolling of windows.”

❑ Batteries

The computer has two batteries: a rechargeable Lithium-Ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory). The capacity of the main battery pack can be either 6-cell or 12-cell depending on the model of computer.

**Comment [z7]:**  
Please add below sentence.  
“The capacity can be either 6 cell or 12 cell depending on the model of computer.”

❑ Universal Serial Bus (USB2.0)

Three USB ports are provided. The ports comply with the USB2.0 standard, which enables data transfer speeds 40 times faster than USB1.1 standard. USB1.1 is also supported.

❑ External monitor (RGB) port

The port enables connection of an external monitor, which is recognized automatically by Video Electronics Standards Association (VESA) Display Data Channel (DDC) compatible functions.

❑ ExpressCard slot

**Comment [z8]:**  
Please add type of Express Card

An Express Card slot is provided, and accommodates an Express Card. Support the standard 34mm wide module (ExpressCard / 34) and the standard 54mm wide module (ExpressCard / 54).

❑ Media Card slot

The Media Card Slot can accommodate all types of media (SD/Mini SD (card adapter is needed)/Micro SD (card adapter is needed)/SDHC memory card/MMC/Memory stick/Memory stick PRO/memory stick pro duo (card adapter is needed)/XD) with various capacities. Media cards let you easily transfer data from devices, such as digital cameras and Personal Digital Assistants, which use Media Card flash-memory.

**Comment [z9]:**  
Please input all types (SD/Mini SD/Micro SD/SDHC memory card/MMC/Memory stick/Memory stick PRO/memory stick pro duo/XD)

❑ Sound system

The sound system is equipped with the following features:

- Azalia Link (Intel High Definition Audio I/F) built in the Intel ICH9-M + Realtek ALC269
- Amplifier: Realtek ALC269 built-in

❑ Internal modem

The computer contains an MDC, enabling data and fax communication. The transfer rates are 56 Kbps for data reception. The actual speed depends on the line quality. The RJ11 modem jack is used to accommodate a telephone line.

❑ Internal LAN (BTO)

The computer is equipped with LAN circuits that support Ethernet LAN (10/100 Mbps or 10/100/1000 Mbps). It also supports Wakeup on LAN (WOL), Magic Packet and LED.

❑ Wireless LAN

The computer is equipped with PCI-E MiniCard type wireless LAN board that supports 802.11 a/b/g in the PCI-E MiniCard slot. This function can be switched on and off by a switch on the computer.

❑ eSATA / USB Combo port

The computer is equipped with an eSATA and USB combo port that supports connection of an external eSATA or USB device.



The USB port complies with the USB 2.0 standard, which enables data transfer speeds 40 times faster than USB1.1 standard. USB1.1 is also supported, and also supports Sleep and Charge function that can supply bus power to USB when the PC is sleeping.

❑ Webcam Module (BTO)

The computer is equipped with a webcam module which is embedded to transfer video data – to take still image and offer video stream for end user to preview/record motion image through USB 2.0 interface.

❑ SIM card slot

A user accessible SIM card slot is provided behind battery.

❑ HDMI port

A HDMI port is provided which complies with the HDMI 1.3 standard.

❑ Headphone / S/PDIF jack

The computer is equipped with a headphone jack which is shared with S/PDIF jack.

❑ Microphone Jack

The computer is equipped with a microphone jack.

❑ Bluetooth Module (BTO)

The computer is equipped with a Bluetooth module with antenna through USB interface.

❑ Fingerprint (BTO)

The fingerprint sensor can support on-chip fingerprint matching functionality and security engine.

❑ FeliCa (JPN BTO)

This computer is equipped with a FeliCa reader/writer that can writes and reads data to and from contactless FeliCa IC cards having no need for physical contact with the card.

The front of the computer is shown in figure 1-1.

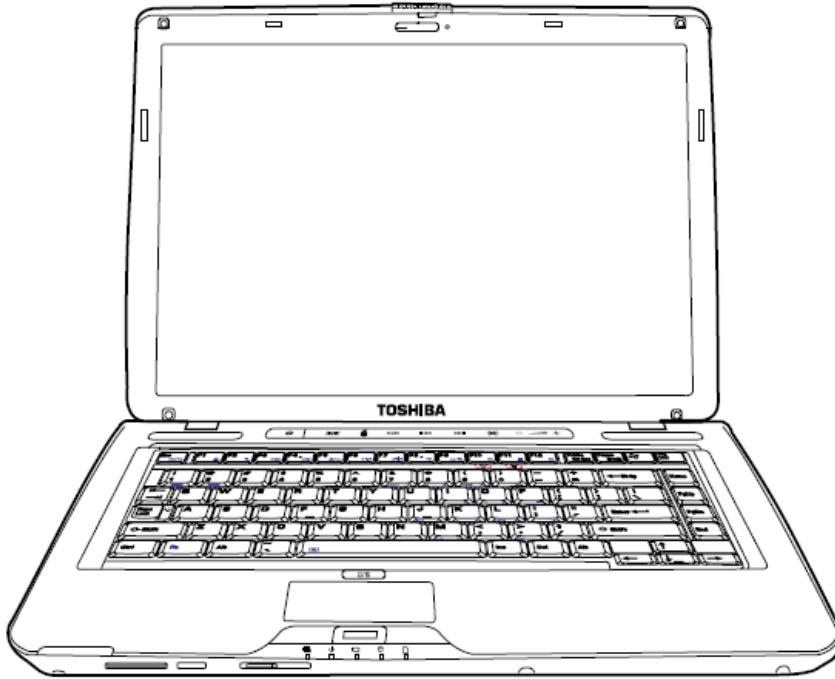


Figure 1-1 The front of the computer

## 1 Hardware Overview

The system unit configuration is shown in figure 1-2.

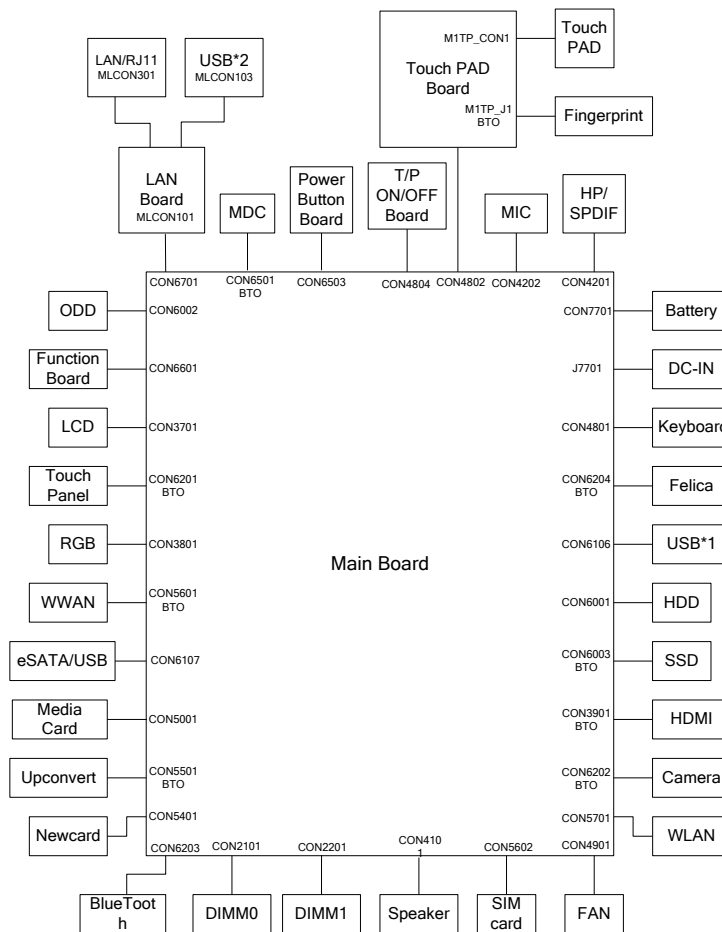


Figure 1-2 System unit configuration

## 1.2 System Unit Block Diagram

Figure 1-3 is a block diagram of the system unit.

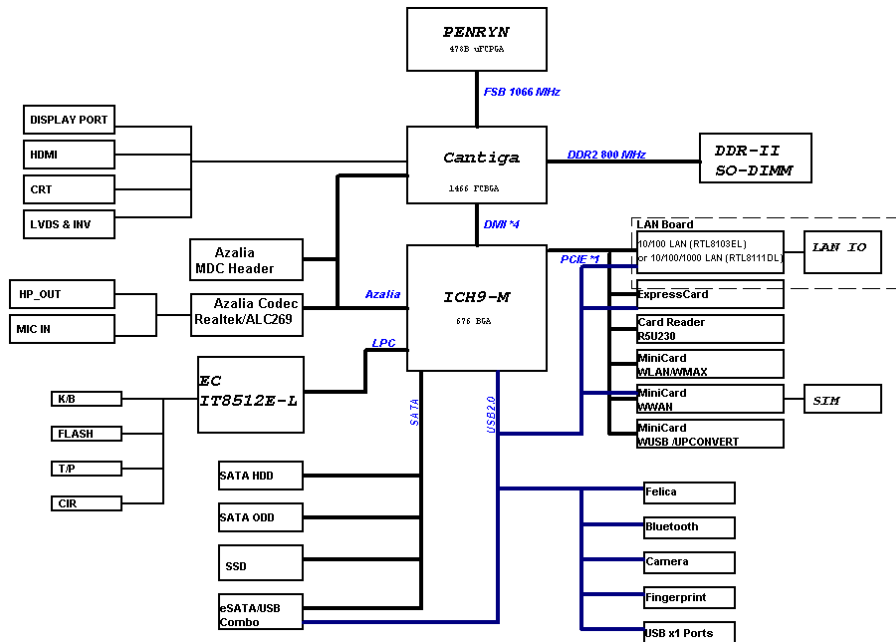


Figure 1-3 System unit block diagram

## 1 Hardware Overview

---

The system unit is composed of the following major components:

**Comment [z10]:**  
Please add BIOS ROM (Flash EEPROM) information.

### Processor

**Comment [z11]:**  
Please add core speed detail.

- Intel® Core2 Duo Processor, Intel® Pentium® Dual-Core mobile processor or Mobile Intel® Celeron Processor

- Core speed:

Intel® Core2 Duo mobile processors:

3.06GHz(T9900), 2.8GHz(P9700), 2.8GHz (T9600), 2.66GHz (P8800),  
2.53GHz (P8700), 2.26GHz (P7550), 2.2GHz (T6600), 2.1GHz (T6500),  
2.0GHz (P7350)

Intel® Pentium® Dual-Core mobile processor:

2.1GHz(T4300), 2.0GHz(T4200), 1.9GHz (T3100), 1.8GHz(T3000)

Mobile Intel® Celeron® Processors: 2.2GHz (900)

- 478-pin Micro FCPGA package

### BIOS EEPROM

- 8 Mbit SPI serial flash
- Supply voltage: 2.7~3.6V
- Low power consumption: active read: 10mA (typical); standby: 5uA (typical).
- 8-lead SOIC package

### Memory

Two memory slots are provided. Expansion up to 8GB is available.

- Memory
  - DDR2-SDRAM
  - 800MHz
  - 1.8 volt operation
  - FBGA

- Memory Module
  - 200 pin, SO Dual In-line Memory Module (SO-DIMM)
  - PC6400
  - 1GB (1,024MB), 2GB (2,048MB), 4GB (4,096MB)

❑ Intel GMCH (North Bridge)

- One Intel® 4 Series Express Chipset is used
- Features:
  - 667/800/1066 MHz FSB
  - Supports DDR2/DDR3
  - 8GB maximum memory support
  - Internal Graphics Controller: 533MHz core render clock @1.05V core voltage
  - DMI: 2GB/s (1GB/s each direction), point-to-point interface to ICH
  - 1329-ball 34 mm x 34 mm FCBGA package

❑ Intel ICH9-M (South Bridge)

- One Intel ICH9-M is used
- Features:
  - DMI (Direct Media Interface)
  - PCI Express: 6 PCI Express root ports, Supports PCI Express 1.1
  - PCI Bus I/F: Supports PCI Rev 2.3 Specification at 33 MHz
  - Integrated Serial ATA Host Controller: 6 SATA ports. Data transfer rates up to 3.0Gb/s. Integrated AHCI controller
  - External SATA support
  - Intel High Definition Audio Interface: Independent Bus Master logic for 8 general purpose streams: 4 input and 4 output
  - USB 2.0: 6 UHCI Host Controllers, supporting up to 12 external ports. 2 EHCI Host Controllers, supporting up to 12 external ports
  - Power Management Logic: Supports ACPI 3.0b. Support for “Intel SpeedStep Technology” processor power control and “Deeper Sleep” power state
  - Enhanced DMA Controller
  - SMBus controller: Supports SMBus 2.0 Specification

Comment [z12]:  
This should be ICH9-M

## 1 Hardware Overview

---

- Real-Time Clock: 256-byte battery-backed CMOS RAM
- Low Pin Count (LPC) I/F: Supports 2 Master/DMA devices
- GPIO
- 676-ball 31mm×31mm mBGA Package

### ❑ Card Reader Controller

- One Ricoh R5U230 is used
- Futures:
  - PCI Express I/F
  - SD/MMC, Memory Stick, XD Card Controller
  - 48-pin, 6mm×6mm, QFN Package

### ❑ Sound Controller

- Realtek ALC269
- Mono Microphone-in and stereo headphone-out shared with SPDIF.
- Internal Microphone
- Volume control: Digital control
- Stereo w/box L/R = 6.0cc/4.3cc, 4 ohm / 1.5W

### ❑ EC/KBC (Embedded Controller/Keyboard Controller)

- One ITE8512E chip functions as both EC and KBC.

### ❑ Clock Generator

- One Intel CK-505 compatible clock generator is used.
- This device generates the system clocks

### ❑ Modem Controller

- One MDC is used



- This controller has the following functions:

- One RJ11 port
- Digital line protection support
- V.92 (V.90) 56K Modem/FAX

❑ LAN Controller

- Realtek RTL8103EL or RTL8111DL is used (depending on model)
- This controller has the following functions:
  - PCIE I/F
  - Supports 10/100 Mbps or 10/100/1000 Mbps Ethernet
  - One RJ45 port
  - WOL support
  - Magic Packet support

❑ Wireless LAN

- One PCI-E MiniCard is used
- Support 802.11 a/b/g/n or 802.11 a/b/g or 802.11 b/g/n

❑ Sensor

- Thermal Sensor: One MAXIM MAX6657 or compatible chip is used

### 1.3 HDD/SSD

**Comment [z13]:**  
Please add SSD information.

#### 1.3.1 2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads. The computer supports a 160GB, 250GB, 320GB, 400GB and 500GB. The HDD is shown in figure 1-4. Specifications are listed in Table 1-1.

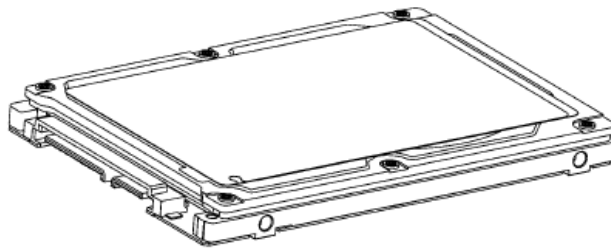


Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD specifications (1/1)

Item	Specifications		
Capacity (GB)	160 GB	250 GB	320 GB
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
Item	Specifications		
Capacity (GB)	400 GB	500 GB	
Rotational Speed (RPM)	5400 rpm	5400 rpm	
Height	9.5 mm	9.5 mm	
User Data Sectors	781,422,768	976,773,168	
Bytes / Sector	512	512	

### 1.3.2 SSD

The solid-state drive (SSD) is a data storage device that uses solid-state memory to store persistent data. A SSD emulates a hard disk drive interface, thus easily replacing it in most applications.

The computer supports a dedicated SSD port with TOSHIBA module type SSD. The SSD is shown in figure 1-5. Specifications are listed in Table 1-2.

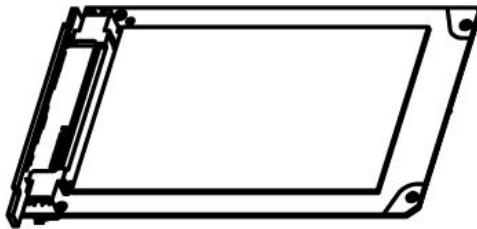


Figure 1-5 SSD

Table 1-2 1.8-inch SSD specifications (1/1).

Item	Specifications
Capacity (GB)	64 GB
Number of data heads	16
Number of user data cylinders	16,383
User Addressable Sectors in LBA Mode	125,045,424
Bytes / Sector	512

## 1.4 DVD Super Multi Drive

This drive is a combination of DVD-ROM and DVD±R/±RW/-RAM Drive. It is full-size and runs either 12cm (4.72-inch) or 8cm (3.15-inch) DVD/CDs without an adaptor. It reads DVDs at maximum 8x speed and CDs at maximum 24x speed. It also writes CD-R at maximum 24x speed, CD-RW at maximum 24x speed, DVD±R at maximum 8x speed, DVD-RW at maximum 6x speed, DVD+RW at maximum 8x speed, DVD±R DL at maximum 6x speed and DVD-RAM at maximum 3-5x speed.

The DVD is shown in figure 1-6.

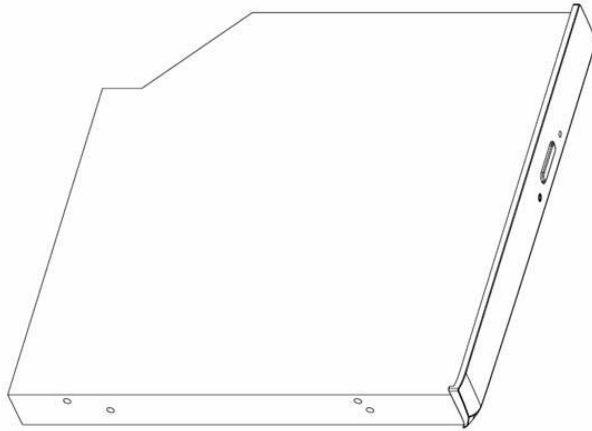


Figure 1-6 DVD Super Multi drive

**Comment [z14]:**  
Please add DVD drive photo.

The specifications are listed in Table 1-3.

Table 1-3 DVD Super Multi drive specifications (1/1)

Item	Specifications	
	DVD-ROM mode	CD-ROM mode
SATA Interface (Mbytes/s)	150 Mbyte/s	
Average access time (ms)	180ms Typ.	150ms Typ.
Data Buffer Capacity	2MB	
Support Formats	CD-DA, CD-ROM CD-ROM XA Photo CD (Multi-session) Video CD, CD-Extra(CD+), CD-Text DVD-ROM DVD-R DVD-Video DVD-RAM (4.7GB) DVD+R/RW, DVD+R DL DVD-RW(Ver. 1.1/1.2)	

## 1.5 Keyboard

The keyboard has 86(US)/87(UK) keys that consist of character keys and control keys, and is in conformity with JIS. The keyboard is connected to a membrane connector on the system board and is controlled by EC.

Figure 1-5 is a view of the keyboard.

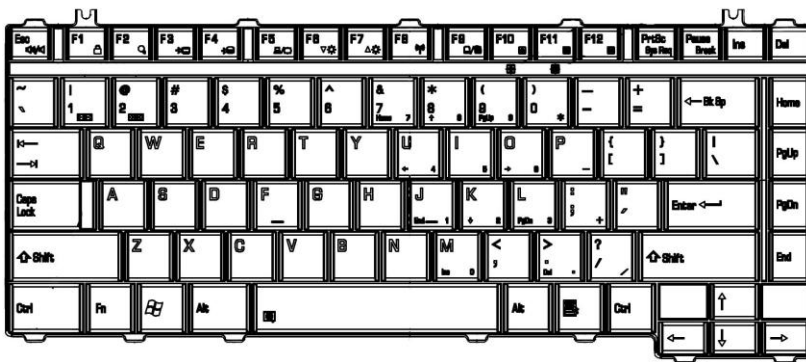


Figure 1-5 Keyboard

## 1.6 TFT Color Display

### 1.6.1 LCD Module

The TFT color display consists of 13.3-inch LCD module.

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 262,144 colors with 1280\*800 resolution.

Table 1-4 lists the specifications.

*Table 1-4 LCD module specifications (1/1)*

Item	Specifications
	13.3" WXGA (1280*800) CSV type
Number of Dots	1,280 (W) * 800 (H)
Dot spacing (mm)	0.2235(H) * 0.2235(V)
Display range (mm)	286.08(H) * 178.8(V)

### 1.6.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module.

Table 1-5 lists the FL inverter board specifications.

*Table 1-5 FL inverter board specifications*

Item		Specifications
		69N0VF110A01P
Input	Voltage (V)	9~20
	Current (A)	Typ:0.3
Output	Voltage (V)	Typ:640
	Current (mA)	Typ:6.00

## 1.7 Power Supply

The power supply provides different voltages to the system board and performs the following functions:

1. Determines that the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the battery icon, and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.

The power supply output rating is specified in Table 1-6.

*Table 1-6 Power supply output rating*

Name	Voltage (V)	Use
+V CORE	VID (Intel spec)	CPU
+VCCP	1.05	CPU, GMCH, ICH9-M
+1.5VS	1.5	CPU, GMCH, ICH9-M, Express Card, Mini Card
+1.8V	1.8	GMCH, DDR2-SDRAM
+0.9V	0.9	DDR2-SDRAM
+3VSUS	3.3	ICH9-M, Express Card, Mini Card, LAN, HDMI CEC
+3V	3.3	MDC
+3VS	3.3	Thermal Sensor, Clock gen, LCD, DDR2-SDRAM, ICH9-M, Express Card, Mini Card, EC, GMCH, Fingerprint, Card Reader, SSD, Bluetooth
+3VA	3.3V	EC, SPI ROM
+5VA	5	Function Board
+5VSUS	5	ICH9-M, USB
+5VS	5	FAN, ICH9-M, Audio, ODD, HDD, LED, Touchpad, Keyboard backlight, CCD, FeliCa, G-sensor



## 1.8 Batteries

The computer has two types of batteries as follows:

- Main battery pack
- RTC battery

The battery specifications are listed in Table 1-7.

*Table 1-7 Battery specifications*

Battery name	Material	Output voltage	Capacity
Main battery(6 cell)	Lithium-Ion	10.8V	4000 mAh
Main battery(12cell)	Lithium-Ion	10.8V	9000 mAh
RTC battery	Lithium	3.0 V	18 mAh

### 1.8.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. The main battery maintains the state of the computer when the computer enters into resume mode.

## 1.8.2 Battery Charging Control

Battery charging is controlled by an embedded controller (EC). The EC controls whether the charge is on or off and detects a full charge when the AC adaptor and battery are attached to the computer. The system charges the battery.

### Battery Charge

When the AC adaptor is attached, there are two types of charge: When the system is powered off and when the system is powered on. Table 1-8 lists the charging time required for charges.

Table 1-8 Time required for charges

Battery type	Power on (hours)	Power off (hours)
1st battery pack (6cell,12cell)	4-10 hours	4 hours max
RTC Battery	About 24 hours	About 24 hours

**NOTE:** The time required when the system is powered on is affected by the amount of power the system is consuming. Use of the fluorescent lamp and frequent disk access diverts power and lengthens the charge time.

If any of the following occurs, the battery charge process stops.

1. The battery becomes fully charged.
2. The AC adaptor or battery is removed.
3. The battery or output voltage is abnormal.

Detection of full charge

A full charge is detected only when the battery is charging at charge. A full charge is detected under any of the following conditions:

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

### 1.8.3 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-9 lists the data preservation period of the RTC battery.

*Table 1-9 RTC battery charging/data preservation time*

Status	Time
Data preservation period (full charge)	90 days

## 1.9 AC Adaptor

The AC adaptor is also used to charge the battery.

Table 1-10 & Table 1-11 list the AC adaptor specifications.

*Table 1-10 AC adaptor specifications*

Parameter	Specification	
	2-pin	3-pin
Power	65W	
Input voltage	100V-240V	
Input frequency	50Hz-60Hz	
Input current	1.6A or less (100V-240V)	
Output voltage	19V	
Output current	0A to 3.42A (At constant voltage mode)	

*Table 1-11 AC adaptor specifications for discrete graphic model*

Parameter	Specification	
	2-pin	3-pin
Power	75W	
Input voltage	100V-240V	
Input frequency	50Hz - 60Hz	
Input current	1.5A or less (100V-240V)	
Output voltage	19V	
Output current	0A to 3.95A (At constant voltage mode)	

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# **Chapter 2**

# **Troubleshooting Procedures**

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## Chapter 2 Contents

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2.1	Troubleshooting .....	2-5
2.2	Troubleshooting Flowchart .....	2-6
2.3	Power Supply Troubleshooting .....	2-11
	Procedure 1 Icons in the LCD Check .....	2-11
	Procedure 2 Error Code Check .....	2-12
	Procedure 3 Connection Check .....	2-16
	Procedure 4 Charge Check .....	2-17
	Procedure 5 Replacement Check .....	2-18
2.4	Main Board Troubleshooting .....	2-19
	Procedure 1 Message Check .....	2-20
	Procedure 2 Diagnostic Test Program Execution Check .....	2-22
	Procedure 3 Replacement Check .....	2-23
2.5	HDD/SSD Troubleshooting .....	2-24
	Procedure 1 Message Check .....	2-24
	Procedure 2 Partition Check .....	2-25
	Procedure 3 Format Check .....	2-26
	Procedure 4 Diagnostic Test Program Execution Check .....	2-27
	Procedure 5 Connector Check and Replacement Check .....	2-27
2.6	Keyboard and Touch pad Troubleshooting .....	2-29
	Procedure 1 Diagnostic Test Program Execution Check .....	2-29
	Procedure 2 Connector Check and Replacement Check .....	2-30
2.7	Display Troubleshooting .....	2-32
	Procedure 1 External Monitor Check .....	2-32
	Procedure 2 Diagnostic Test Program Execution Check .....	2-32
	Procedure 3 Connector Check and Cable Check .....	2-32
	Procedure 4 Replacement Check .....	2-33
2.8	Optical Drive Troubleshooting .....	2-34
	Procedure 1 Diagnostic Test Program Execution Check .....	2-34
	Procedure 2 Connector Check and Replacement Check .....	2-35

2.9	Modem Troubleshooting.....	2-36
	Procedure 1 Diagnostic Test Program Execution Check.....	2-36
	Procedure 2 Connector Check and Replacement Check.....	2-37
2.10	LAN Troubleshooting.....	2-38
	Procedure 1 Diagnostic Test Program Execution Check.....	2-38
2.11	Wireless LAN Troubleshooting .....	2-39
	Procedure 1 Transmitting-Receiving Check.....	2-39
	Procedure 2 Antenna Connection Check.....	2-40
	Procedure 3 Replacement Check .....	2-41
2.12	Sound Troubleshooting.....	2-42
	Procedure 1 Diagnostic Test Program Execution Check.....	2-42
	Procedure 2 Connector Check .....	2-43
	Procedure 3 Replacement Check >>>>.....	2-44
2.13	Card Reader Slot Troubleshooting .....	2-45
	Procedure 1 Check on Windows VISTA(TM) .....	2-45
	Procedure 2 Connector Check and Replacement Check.....	2-45
2.14	PCI Express Card Slot Troubleshooting .....	2-46
	Procedure 1 Check on Windows VISTA(TM) .....	2-46
	Procedure 2 Connector Check and Replacement Check.....	2-46
2.15	Fingerprint Board(BTO) Troubleshooting .....	2-48
	Procedure 1 Diagnostic Test Program Execution Check.....	2-48
	Procedure 2 Connector Check and Replacement Check.....	2-49
2.16	Bluetooth(BTO) Troubleshooting ① .....	2-50
	Procedure 1 Diagnostic Test Program Execution Check.....	2-50
	Procedure 2 Connector Check and Replacement Check.....	2-51
2.17	3G(BTO) Troubleshooting ① .....	2-52
	Procedure 1 Diagnostic Test Program Execution Check.....	2-52
	Procedure 2 Connector Check and Replacement Check.....	2-53
2.18	Camera(BTO) Troubleshooting.....	2-54
	Procedure 1 Diagnostic Test Program Execution Check.....	2-54
	Procedure 2 Connector Check and Replacement Check.....	2-55

## Figures

Figure 2-1 Troubleshooting flowchart (1/2)..... 2-7

## Tables

Table 2-1 Battery icon ..... 2-11  
Table 2-2 DC IN icon ..... 2-11  
Table 2-3 Error code..... 2-12  
Table 2-4 HDD/SSD error code and status ..... 2-27

**Note:**

*In this document, mark ① means this function is for Intel platform only.*



## 2.1 Troubleshooting

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 Power Supply	6 Optical Drive	11 Card reader
2 Main Board	7 Modem	12 PCI Express Slot
3 HDD/SSD	8 LAN	13 FINGERPRINT BOARD (BTO)
4 Keyboard/Touch pad	9 Wireless LAN	14 Bluetooth (BTO) ①
5 Display	10 Sound component	15 3G (BTO) ①
		16 Camera (BTO)

The Diagnostics optical disk or USB disk operations are described in Chapter 3. Detailed Replacement Procedures are given in Chapter 4, *Replacement Procedures*.

The following tools are necessary for implementing the troubleshooting procedures:

The following tools are necessary for implementing the Diagnostics procedures:

For tools required for executing the Test Program, refer to the Chapter 3. For tools required for disassembling/assembling, refer to Chapter 4.

1. A set of tools for the debugging port test (test cable, test board, RS-232C cross cable, display,)
2. A PC with a serial port (for displaying debug port test result)
3. A bootable USB key
4. An external CRT display (for Display troubleshooting)
5. A Card reader (for Card reader slot troubleshooting)
6. An external microphone (for Sound troubleshooting)
7. Headphone (for Sound troubleshooting)

## 2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which FRU is malfunctioning. Before going through the flowchart steps, check the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Make sure that Toshiba Windows VISTA(TM) is installed on the hard disk. Non-Toshiba operating systems can cause the computer malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the HDD and optical drive bays are empty.

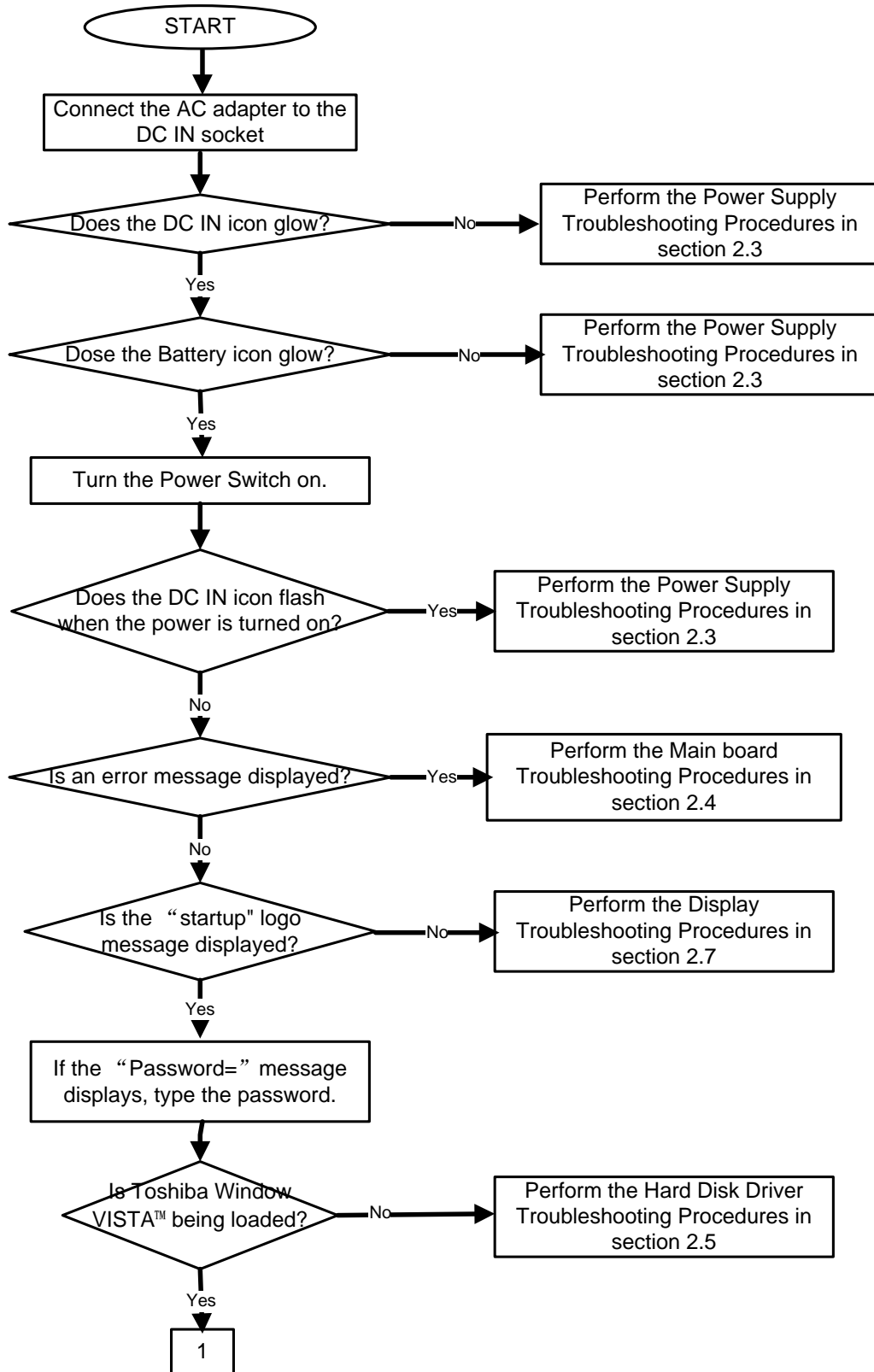


Figure 2-1 Troubleshooting flowchart (1/2)

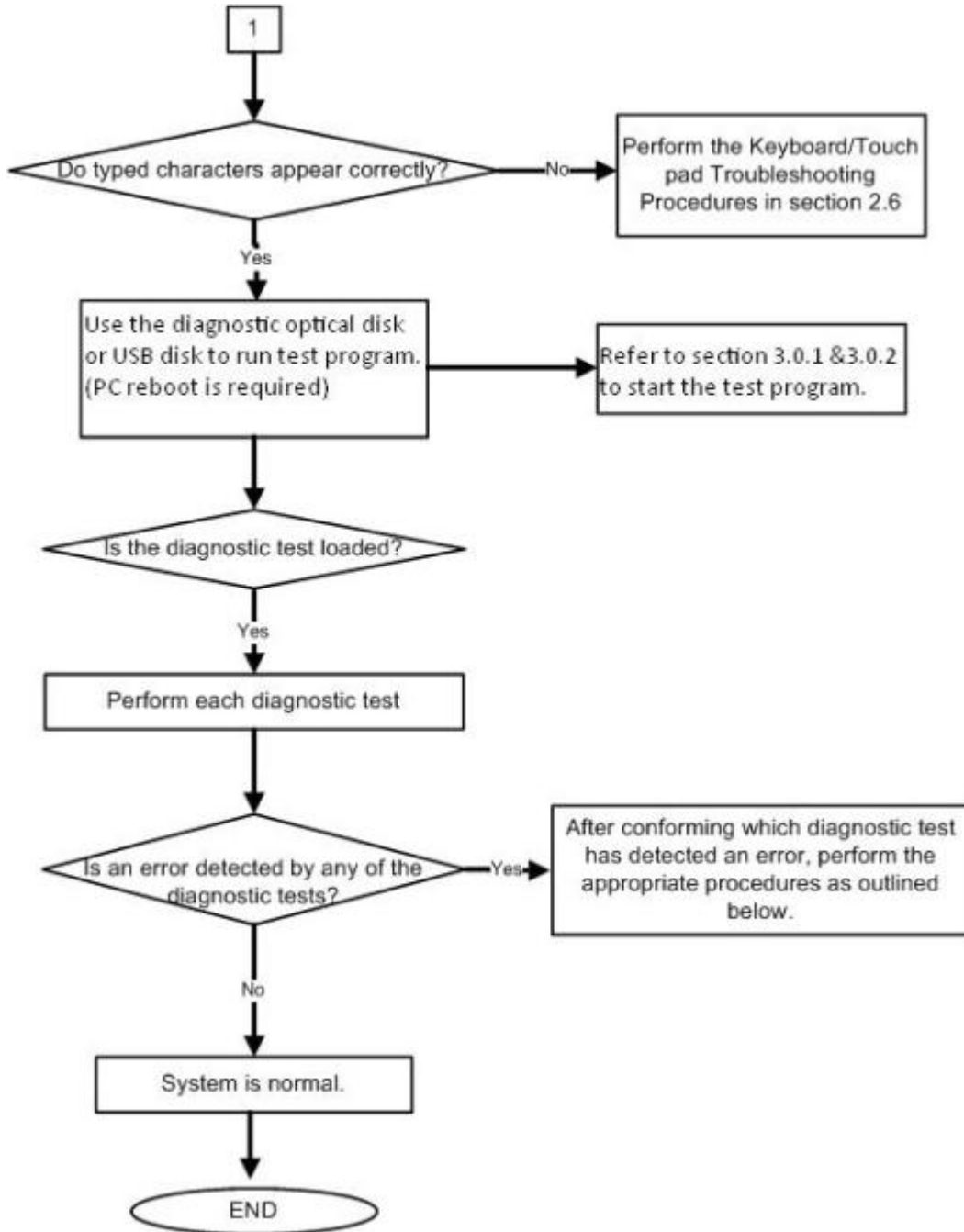


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Running Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error, then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the system test, memory test, real timer test, perform the Main Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the keyboard test, perform the Keyboard and Touch pad Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.12.
10. If an error is detected on card reader, perform the card reader Slot Troubleshooting Procedures in Section 2.13.
11. If an error is detected on PCI Express, perform the PCI Express Slot Troubleshooting Procedures in Section 2.14.
12. If an error is detected on Fingerprint board, perform the Fingerprint board Troubleshooting Procedures in Section 2.15.
13. If an error is detected on Bluetooth, perform the Bluetooth Troubleshooting Procedures in Section 2.16. ①
14. If an error is detected on 3G, perform the 3G Troubleshooting Procedures in Section 2.17. ①

15. If an error is detected on camera, perform the camera Troubleshooting Procedures in Section 2.18.

## 2.3 Power Supply Troubleshooting

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 procedures described in this section are:

Procedure 1: Icons in the LCD Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Charge Check

Procedure 5: Replacement Check

### Procedure 1 Icons in the LCD Check

The following Icons in the LCD indicate the power supply status:

- Battery icon
- DC IN icon

The power supply controller displays the power supply status through the Battery icon and the DC IN icon in the LCD as listed in the tables below. To check the power supply status, install a battery pack and connect an AC adaptor.

*Table 2-1 Battery icon*

Battery icon	Power supply status
Lights orange	Battery has been charging and AC adaptor is connected.
Lights white	Battery is fully charged and AC adaptor is connected.
Flashes orange	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 icon*

DC IN icon	Power supply status
Lights white	DC power is being supplied from the AC adaptor.
Doesn't light	Any condition other than those above.

## Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

*Table 2-3 Error code*

<b>Error code</b>	<b>Where Error occurs</b>
N0FB*	Battery
N0FT*	Power ON/OFF
N0FU*	Power management



Check 1 Compare the patterns in the hexadecimal error code to the tables below.

Battery

<b>Error code</b>	<b>Meaning</b>
N0FB01	FCC、LMD under Spec.
N0FB02	Initial Data of FCC、LMD is without updating
N0FB03	Battery Learning abnormal function
N0FB04	Battery Check Error
N0FB05	No battery Icon in Windows
N0FB06	Battery data is locked
N0FB07	Abnormal Display on Battery LED
N0FB08	Battery PIC VERSION ERROR
N0FB09	RTC battery current in abnormal condition
N0FB0A	Battery On/Off function Error
N0FB0B	Unseal error
N0FB0C	Communication Fail
N0FB0D	To charge&To Discharge electricity fail
N0FB0E	Vcc is Fail
N0FB0F	Temperature fail
N0FB0G	EEeprom address check error(Bq2060)
N0FB0H	Ovp fail
N0FB0J	Uvp fail
N0FB0K	Cfc fail
N0FB0L	No battery Icon in SideShow
N0FB0M	assistant Battery Check Error

Power ON/OFF

<b>Error code</b>	<b>Meaning</b>
N0FT01	Cannot Boot Up
N0FT02	System Hang UP when Boot UP
N0FT03	Repeat Boot UP
N0FT04	Auto Shutdown
N0FT05	System Hang Up when Run-In Test
N0FT06	Cannot Power Off by ON/OFF Switch
N0FT07	Can't Soft Power ON and Power OFF
N0FT08	Power On Error by Battery Input only
N0FT09	Reset Key Test Error
N0FT0A	Can't auto boot up when insert Adaptor
N0FT0B	Can't boot up by fast key.
N0FT0C	Can't auto slot on boot up with Slot in ODD.
N0FT0D	Cannot Boot Up by novo key
N0FT0E	system hang on when Power Off

Power management

<b>Error code</b>	<b>Meaning</b>
N0FU01	Cannot restore after Dos Suspend
N0FU02	System Hang Up after DOS Wake Up
N0FU03	Cannot Run Dos Suspend
N0FU04	Cannot restore after Windows Standby
N0FU05	System Hang Up after Windows Wake Up
N0FU06	Cannot Run Windows Standby
N0FU07	Suspend to disk failed
N0FU08	Power Management System Fail
N0FU09	MAX error fail
N0FU0A	Cannot restore after Linux Standby
N0FU0B	System Hang Up after Linux Wake Up
N0FU0C	Linux Standby function error

Check 2 In the case of error code NOFT0A:

- Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 19 V socket and wall outlet. If the cables are connected correctly, go to the following step:
- Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

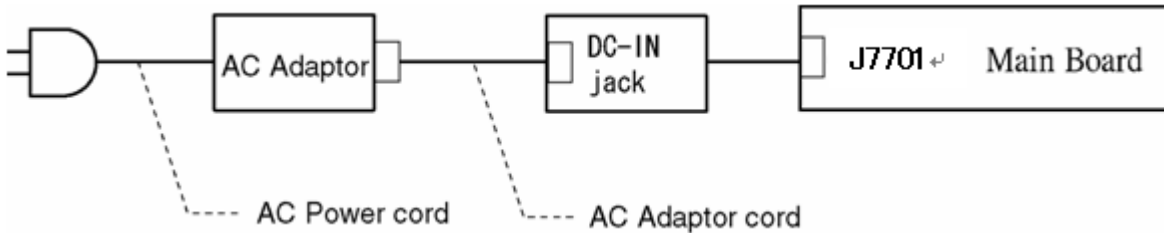
Check 3 In the case of error code NOFB04:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

Check 4 For any other error, go to Procedure 5.

### Procedure 3 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 the 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 jack socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure the DC IN jack is firmly connected to the connector J7701 on the main board.
- If the DC IN jack is not firmly connected, go to Procedure 5.
  - If it is connected, go to Check 4.
- Check 4 Use a multimeter to make sure 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 icon does not light, go to Procedure 5.
  - If the battery icon 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 icon still does not light, go to Procedure 4.

#### **Procedure 4 Charge 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.

**Check 1** Make sure the AC adaptor and AC power cord is firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).

**Check 2** Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.

**Check 3** The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.

**Check 4** The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.

**Check 5** Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

### **Procedure 5 Replacement Check**

The main board processor module 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 main board and connection. After checking the connections, perform the following Check 1:

- Check 1 Replace the AC adaptor with a new one. If the AC adaptor is still not functioning properly, perform Check 2.
- Check 2 Replace the main board with a new one following the steps described in Chapter 4, *Replacement Procedures*.

## 2.4 Main Board Troubleshooting

This section describes how to determine if the main board and CPU are defective or not functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Replacement Check

### Procedure 1 Message Check

When the power is turned on, the system performs the Power On Self Test (POST) installed in the BIOS ROM. The POST tests each IC on the main board and initializes it.

- ❑ If an error message is shown on the display, perform Check 1.
- ❑ If Toshiba MS-DOS or Windows VISTA(TM) is properly loaded, go to Procedure 2.

Check 1 If one of the following error messages appears on the screen, press **F1** as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

Press **F1** as the message instructs to return all system settings to their default values. Then the system reboots. Press **F2** to run setup.

If an error message (a) appears often when the power is turned on, replace the RTC battery. If any other error message displays, perform Check 2.

- (a) CMOS Battery Low  
Press **F2** to Run Setup, Press **F1** to Load Default Values and Continue.
- (b) RAM READ/WRITE Test Failed  
Press **F2** to Run Setup, Press **F1** to Load Default Values and Continue.
- (c) CMOS DATE/TIME Not Set  
Press **F2** to Run Setup, Press **F1** to Load Default Values and Continue.
- (d) CMOS Settings Wrong  
Press **F2** to Run Setup, Press **F1** to Load Default Values and Continue.
- (e) Primary Master Hard Disk Error  
Press **F2** to Run Setup, Press **F1** to Load Default Values and Continue.



Check 2 The POST checks the main board. When the POST detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (3), (5) or (11) appears, go to Procedure 3.

If the error message (12), (13) appears, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If the error message (15) appears, go to the HDD Troubleshooting Procedures in Section 2.6.

- (1). Refresh timer test failed
- (2). KBC BAT Test failed
- (3). RAM R/W test failed
- (4). KBC BAT Test failed
- (5). CMOS Battery Low
- (6). CMOS Settings Wrong
- (7). CMOS Date/Time Not Set
- (8). DMA Controller Error
- (9). DMA-1 Error
- (10). DMA-2 Error
- (11). Timer Error
- (12). Keyboard/Interface Error
- (13). PS2 Keyboard not found
- (14). PS2 Mouse not found
- (15). Primary Master Hard Disk Error

## Procedure 2 Diagnostic Test Program Execution Check

Execute the following tests from the Diagnostic Test Menu. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform these tests.

- |                             |                    |
|-----------------------------|--------------------|
| 1. Model, BIOS and CPU Test | D. STORE Test      |
| 2. Check MAC Test           | E. LID switch Test |
| 3. ACIN Test                | F. MSCARD Test     |
| 4. Temperature Test         | G. SDCARD Test     |
| 5. PAD Test                 | H. HDD Test        |
| 6. LCDRGB Test              | I. BATT Test       |
| 7. VGA Test                 | J. TOUCH LED Test  |
| 8. Audio Test               | K. PEGA3D_S Test   |
| 9. KB test                  | L. Webcam Test     |
| A. Memory Test              | M. Speaker Test    |
| B. FNTEST Test              | N. R/W DMI         |
| C. LEDALL Test              | O. Auto Run        |

If an error is detected during these tests, go to Procedure 3.

### **Procedure 3 Replacement Check**

The main board connectors may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform Check 1.

Check 1 Visually check for the following:

- a) Cracked or broken connector housing
- b) Damaged connector pins

If their connectors are in good condition, but there is still a problem, go to Check 2.

Check 2 The main board may be damaged. Replace the main board with a new one following the steps described in Chapter 4, *Replacement Procedures*.

## 2.5 HDD/SSD Troubleshooting

This section describes how to determine if the HDD/SSD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Message Check

Procedure 2: Partition Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

**CAUTION:** *The contents of the hard disk will be erased when you execute the HDD troubleshooting procedures. Transfer the contents of the hard disk to other storage media.*

### Procedure 1 Message Check

When the computer's HDD/SSD does not function properly, some of the following error messages may appear on the display. Start with Check 1 below and perform the other checks as instructed.

Check 1 If either of the following messages appears, go to Procedure 2. If the following messages do not appear, perform Check 2.

```
Insert system disk in drive
Press any key when ready .....
or
Non-System disk or disk error
Replace and press any key
```

Check 2 Make sure the Hard Disk option is set to not used. If it is set to not used, choose another setting and restart the computer. If the problem still exists, go to Procedure 2.

## Procedure 2 Partition Check

Insert the bootable USB key, restart the computer with Esc key pressing down. and choose boot from USB device. Perform the following checks:

- Check 1 Type **C :** and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Check 3.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba MS-DOS system disk. If the problem still exists, go to Procedure 3.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 3.
- Check 4 Remove the USB key and restart the computer. If the problem still exists, go to Procedure 3.
- Check 5 Using the **SYS** command on the Toshiba MS-DOS system disk, install system files on the HDD/SSD.

If the following message appears on the display, the system files have been transferred to the HDD/SSD. Restart the computer. If the problem still exists, go to Procedure 3.

~~System file~~

**NOTE:** *If the computer is running Windows 2000, OSR2 or higher and the hard disk has more than 512 MB capacity, the FDISK program will ask if you need support for a partition larger than 2GB. Select Y for large partition support; however, be sure to read the precaution regarding access by other operating systems.*

### Procedure 3 Format Check

The computer's HDD/SSD is formatted using the low level format program and the MS-DOS FORMAT program. To format the HDD/SSD, start with Check 1 below and perform the other steps as required.

- Check 1 Format the HDD/SSD and transfer system files using **FORMAT C:/S/U**. If the following message appears on the display, the HDD/SSD is formatted.

~~Format~~

If an error message appears on the display, refer to the Toshiba MS-DOS Manual for more information and perform Check 2.

- Check 2 Using the Diagnostics Disk, format the HDD/SSD with a low level format option. Refer to Chapter 3, *Tests and Diagnostics* for more information about the diagnostic program.

If the following message appears on the display, the HDD/SSD low level format is complete. Partition and format the HDD/SSD using the MS-DOS FORMAT command.

~~Format~~

If you cannot format the HDD/SSD using the Tests and Diagnostic program, go to Procedure 4.

#### Procedure 4 Diagnostic Test Program Execution Check

The HDD/SSD test program is stored in the Diagnostics Disk. Perform all of the HDD/SSD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the HDD/SSD test program.

If an error is detected during the HDD/SSD test, an error code and status will be displayed. Replace the HDD/SSD with a new one following the instructions in Chapter 4, *Replacement Procedures*. The error codes and statuses are listed in Table 2-7. If an error code is not generated or the problem still exists, go to Procedure 5.

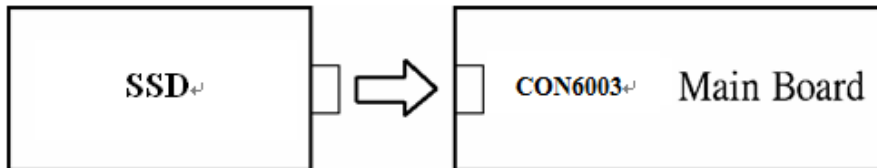
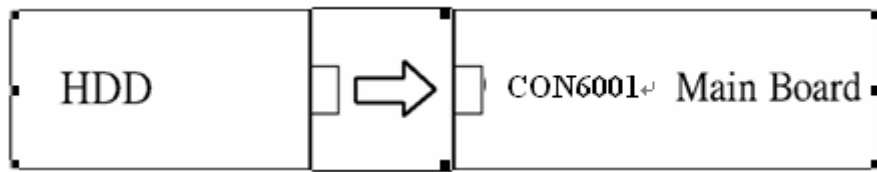
Table 2-4 HDD/SSD error code and status

Code	Status
N0FH01	Can't Detect HDD when Boot Up/Detect wrong model name If HD
N0FH02	HDD Data Error
N0FH03	HDD ATA/100 check error
N0FH04	HDD Type error
N0FH05	Hmonitor test fail
N0FH06	HDD Firmware version error
N0FH07	Shipping HDD restore ERROR
N0FH08	Shipping OS has been booted
N0FH09	Shipping OS version error
N0FH0A	shipping OS boot table error
N0FH0B	HDD Heating test Fail
N0FH0C	RAID function error
N0FH0D	2nd HDD function error
N0FH0E	SSD function error

#### Procedure 5 Connector Check and Replacement Check

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

- Check 1 Make sure the HDD is firmly connected to CON6001 on the main board. Make sure the SSD is firmly connected to CON6003 on the main board



If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

- Check 2 The HDD/SSD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 The Main board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.



## 2.6 Keyboard and Touch pad Troubleshooting

To determine if the computer's keyboard or touch pad is functioning properly, perform the following procedures. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

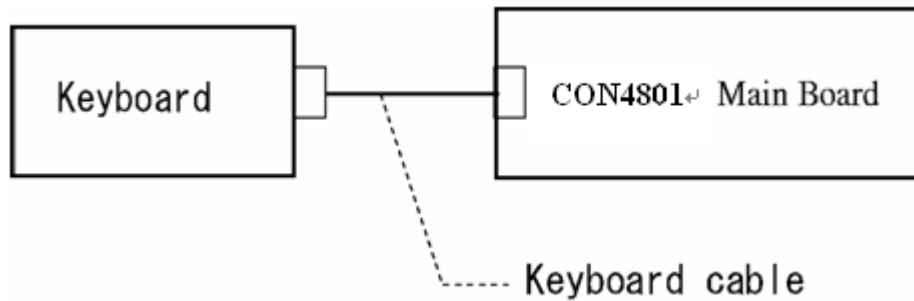
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

## Procedure 2 Connector Check and Replacement Check

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

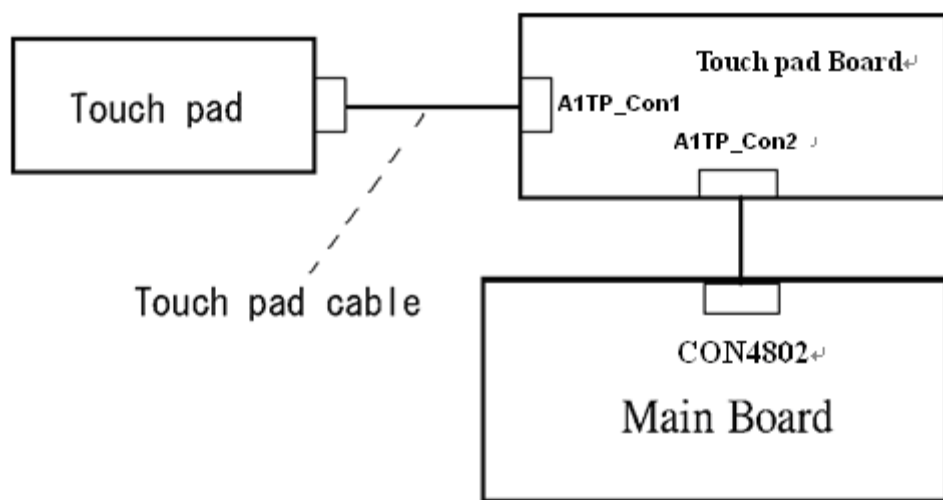
1. If the keyboard or AccuPoint malfunctions, start with Check 1.
2. If the touch pad malfunctions, start with Check 3.
3. If the power switch, InTouch button or Presentation button malfunctions, start with Check 5.

Check 1 Make sure the keyboard cable is securely connected to CON4801 on the main board.



If the connection is loose, reconnect firmly. If there is still an error, go to Check 2.

- Check 2 The keyboard or its cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.
- Check 3 Make sure the touch pad cable is firmly connected to A1tp\_Con1 on the touch pad board.



If the connection is loose, reconnect firmly. If there is still an error, go to Check 4.

- Check 4 The touch pad or the touch pad cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.
- Check 5 The main board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.7 Display Troubleshooting

This section describes how to determine if the computer's display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

- Procedure 1: External Monitor Check
- Procedure 2: Diagnostic Test Program Execution Check
- Procedure 3: Connector Check and Cable Check
- Procedure 4: Replacement Check

### Procedure 1 External Monitor Check

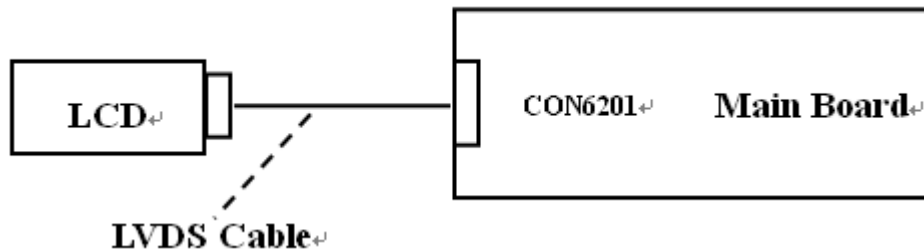
Connect an external monitor and turn on the computer. If there is no problem on it, the internal LCD may be defective. Go to Procedure 3. If there is any problem on the external monitor, the main board may be defective. Go to Procedure 2.

### Procedure 2 Diagnostic Test Program Execution Check

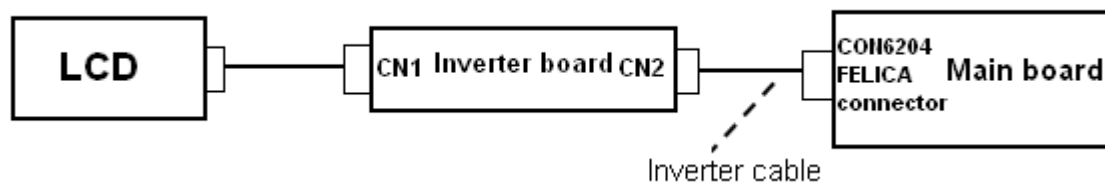
The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the main board. Connect the Diagnostics disk, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 3.

### Procedure 3 Connector Check and Cable Check

Check 1 The LCD and Main board are connected by inverter cable, inverter board and LVDS cable. Make sure the LVDS cable is firmly connected to Main board. If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Check 2.



- Check 2 Make sure inverter cable is firmly connected to inverter board with two side and main board. If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 4.



#### Procedure 4 Replacement Check

LCD module and main board are connected to display circuits through inverter board and LVDS cable. 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 The LVDS cable or inverter cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.
- Check 2 The inverter board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 The Main board or LCD panel may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.8 Optical Drive Troubleshooting

This section describes how to determine if the optical drive (DVD-ROM and DVD±R/±RW/-RAM Drive) in the Slim Select Bay is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

The DVD-ROM and DVD±R/±RW/-RAM Drive test program is stored on the Diagnostics Disk.

For the test, prepare test Media.

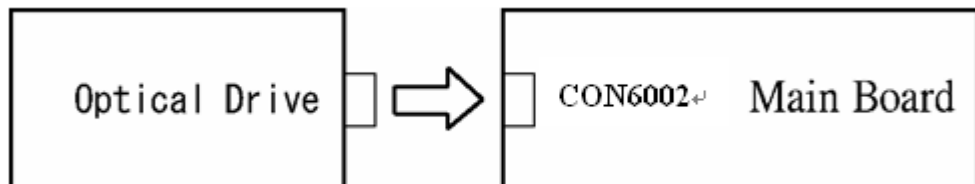
Then connect the Diagnostics HDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the DVD-ROM and DVD±R/±RW/-RAM Drive test, go to Procedure 2.

**Procedure 2 Connector Check and Replacement Check**

The optical drive (DVD-ROM and DVD±R/±RW/-RAM Drive) is connected to the main board. The connectors may be disconnected from the main board or may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the drive to test is firmly connected to CON6002 on the main board.



If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The drive may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 3.

Check 3 Replace the main board with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.9 Modem Troubleshooting

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

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Insert the LAN/Modem test program in the USB key, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the Sound/Modem/LAN test, go to Procedure 2.

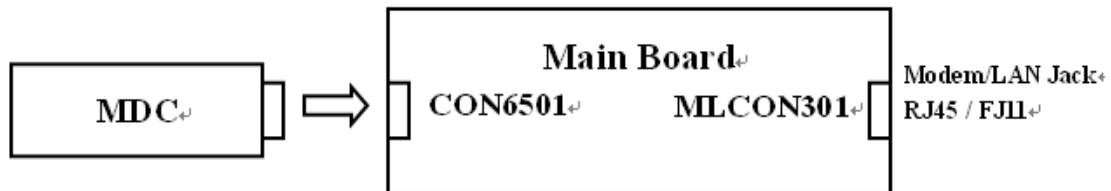


## Procedure 2 Connector Check and Replacement Check

The Modem is installed as an MDC (Modem Daughter Card). If the modem malfunctions, there may be a bad connection between the MDC and the main board. Or the MDC, main board or their connectors might be damaged.

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

- Check 1 Make sure the MDC is firmly connected to CON6501 by MDC cable on the main board and the connector of the MDC.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

- Check 2 The MDC may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 3.
- Check 3 The modem jack or MDC cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 4.
- Check 4 The main board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

## **2.10 LAN Troubleshooting**

This section describes how to determine if the computer's LAN is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

### **Procedure 1 Diagnostic Test Program Execution Check**

Execute the LAN test program available as part of the LAN/Modem test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

## 2.11 Wireless LAN Troubleshooting

This section describes how to determine if the computer's Wireless LAN is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antenna Connection Check

Procedure 3: Replacement Check

### Procedure 1 Transmitting-Receiving Check

Make sure the wireless switch of the computer is turned "On." If it is not, please turn it on.

Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

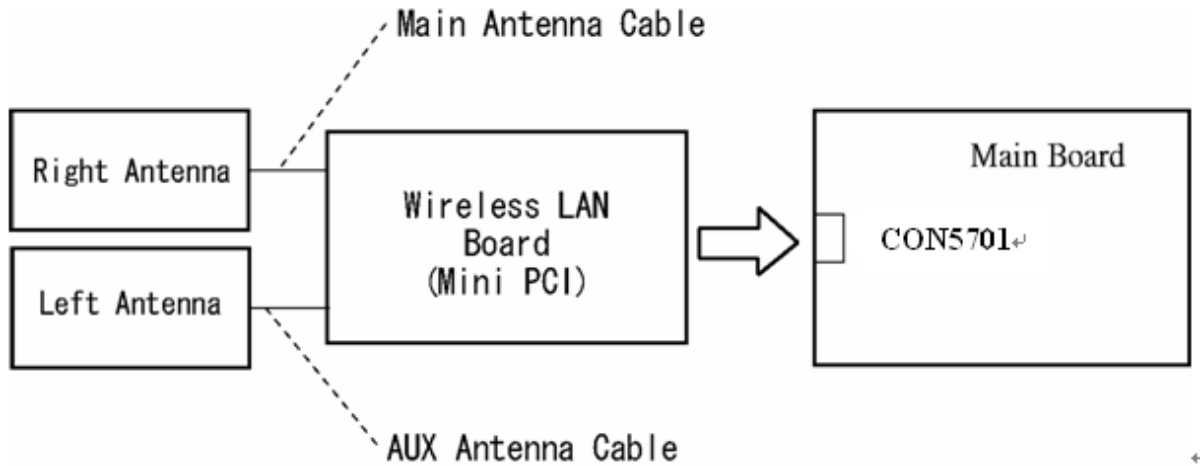
Check 1 Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN.

If the computer passes the test, the function is correctly working.

If the computer does not pass the test, perform Procedure 2.

## Procedure 2 Antenna Connection Check

The wireless LAN wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

**Check 1** Make sure the wireless LAN board is firmly connected to CON5701 on the main board.

If the connector is disconnected, connect it firmly. If the wireless LAN board is still not functioning properly, perform Check 2.

**Check 2** Make sure the wireless LAN antenna cables are firmly connected to the wireless LAN board.

If the wireless LAN antenna cables are disconnected, connect them firmly. If the wireless LAN board is still not functioning properly, go to Procedure 3.

### **Procedure 3 Replacement Check**

The wireless LAN antenna, wireless LAN board and the main board are connected to the 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 The wireless LAN board may be defective or damaged. Replace the board with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.
- Check 2 The wireless LAN antenna may be defective or damaged. Replace the antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.
- Check 3 The main board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

## 2.12 Sound Troubleshooting

This section describes how to determine if the computer's sound functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

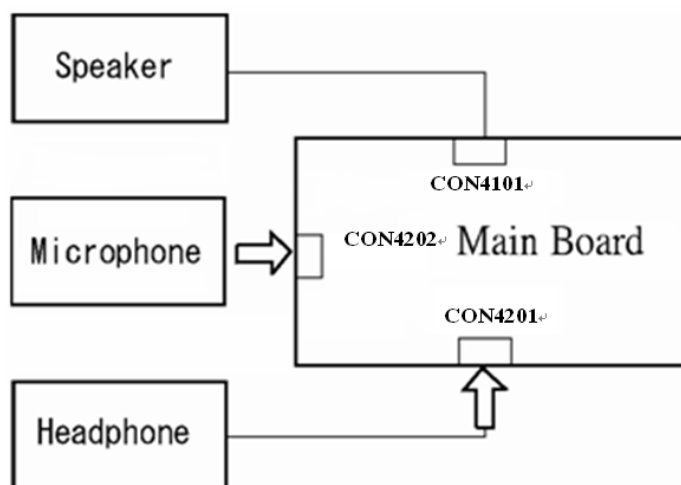
### **Procedure 1 Diagnostic Test Program Execution Check**

Insert the Sound test program in the USB key, 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 2.

## Procedure 2 Connector Check

The sound function-wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

If the stereo speakers do not work correctly, perform Check 1.

If the headphone does not work correctly, perform Check 2.

If the microphones do not work correctly, perform Check 3.

- Check 1 If the stereo speakers do not work properly, the speaker cable may be disconnected. Make sure the speaker cable is firmly connected to CON4101 on the Main board. If the stereo speakers are still not functioning properly, go to procedure 3.
- Check 2 If the headphone does not work properly, the headphone cable may be disconnected. Make sure the headphone cable is firmly connected to CON4201 on the Main board. If the sound function still does not work properly, go to procedure 3.
- Check 3 If the microphones do not work properly, the external microphone cable may be disconnected. When using the external microphone, make sure the external microphone cable is firmly connected to CON4202 on the Main board. If the microphones are still not functioning properly, go to procedure 3.

**Procedure 3 Replacement Check >>>>**

- Check 1 If the stereo speakers do not sound properly, the right or left speaker may be defective or damaged. Replace it with a new one. If the stereo speakers still do not work properly, go to Check 4.
- Check 2 If the headphone does not sound properly, the headphone jack may be defective or damaged. Replace it with a new one. If the sound function still does not work properly, go to Check 4.
- Check 3 If the microphones do not work properly, the microphone cable may be defective or damaged. Replace it with a new one. If the microphone still does not work properly, go to Check 4.
- Check 4 The Main board may be defective or damaged. Replace it with a new one.



## 2.13 Card Reader Slot Troubleshooting

This section describes how to determine if the computer's card reader functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Check on Windows VISTA (TM)

Procedure 2: Connector Check and Replacement Check

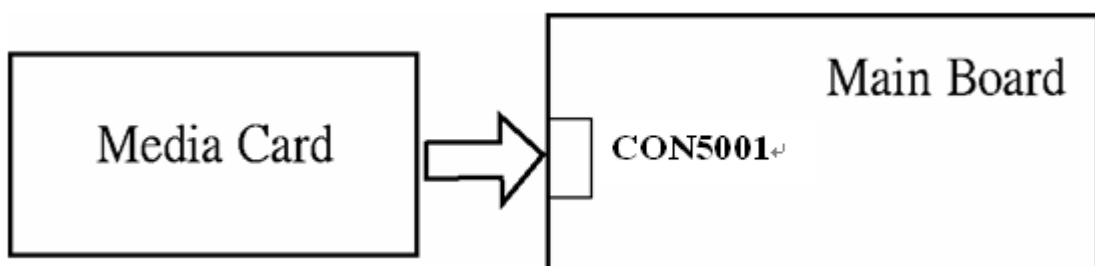
### Procedure 1 Check on Windows VISTA(TM)

Insert an MMC/SD/MS/MS(PRO) card into the slot. Check if the installed Windows recognizes automatically the MMC/SD/MS/MS(PRO) card and the data in the MMC/SD/MS/MS(PRO) card can be read.

If the card is not recognized or data are not read, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

The MMC/SD/MS/MS(PRO) card is connected to CON5001 on the Main board.



- Check 1 The MMC/SD/MS/MS(PRO) card and the Main board may be disconnected. Make sure the MMC/SD/MS/MS(PRO) card is firmly inserted to CON3301 on the Main board. If not, insert it firmly. If the MMC/SD/MS/MS(PRO) card is still not functioning properly, perform Check 2.
- Check 2 The MMC/SD/MS/MS(PRO) card may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 3.
- Check 3 The Main board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.

## 2.14 PCI Express Card Slot Troubleshooting

This section describes how to check PCI Express Card slot by inspecting a card with PCI Express interface.

Procedure 1: Check on Windows VISTA (TM)

Procedure 2: Connector Check and Replacement Check

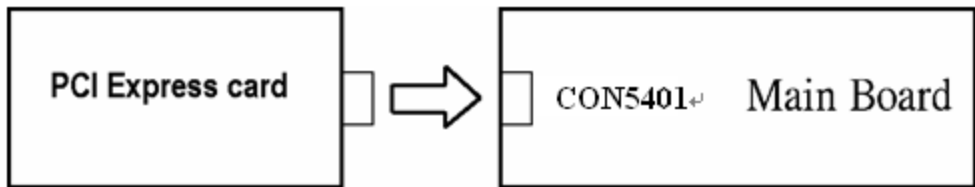
### Procedure 1 Check on Windows VISTA(TM)

Insert a PCI Express Card into the slot. Check if the installed Windows recognizes automatically the PCI Express Card.

If the card is not recognized, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

The PCI Express Card is connected to CON5401 on the Main board.



- Check 1 The PCI ExpressCard and the Main board may be disconnected. Make sure the PCI ExpressCard is firmly inserted to CON5401 on the Main board. If not, insert it firmly. If the PCI ExpressCard is still not functioning properly, perform Check 2.
- Check 2 The PCI ExpressCard may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 3.
- Check 3 The Main board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.



## 2.15 Fingerprint Board(BTO) Troubleshooting

This section describes how to determine if the computer's fingerprint board is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Insert the fingerprint board test program in the USB key, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

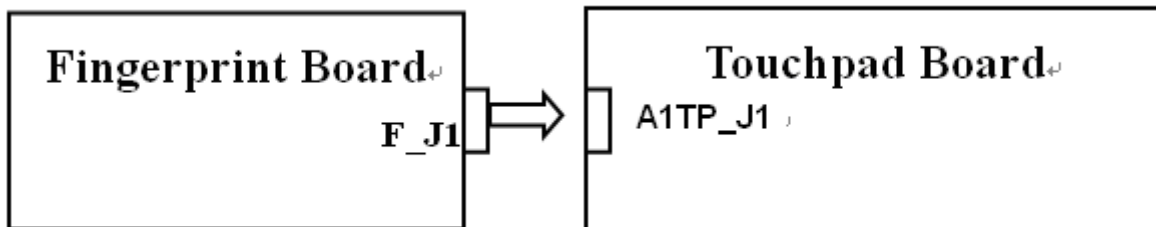
If any errors occur while executing the fingerprint board test, go to Procedure 2.

**Procedure 2 Connector Check and Replacement Check**

The fingerprint board is installed to the touchpad board. If the fingerprint board malfunctions, there may be a bad connection between the fingerprint board and the touchpad board. Or the fingerprint board or touchpad board might be damaged.

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

- Check 1 Make sure the fingerprint board is firmly connected to A1tp\_J1 on the touchpad board and the connector of the fingerprint board.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the fingerprint board is still not functioning properly, perform Check 2.

- Check 2 The fingerprint board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the fingerprint board is still not functioning properly, perform Check 3.
- Check 3 The touchpad board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.16 Bluetooth (BTO) Troubleshooting ①

This section describes how to determine if the computer's Bluetooth is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Insert the Bluetooth test program in the USB key, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

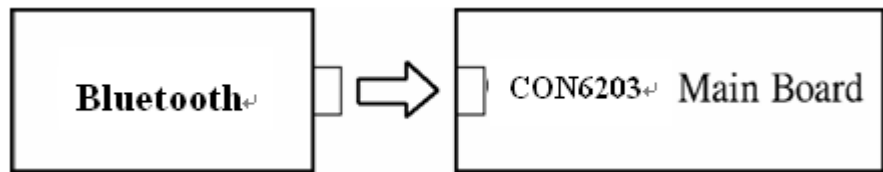
If any errors occur while executing the Bluetooth test, go to Procedure 2.

**Procedure 2 Connector Check and Replacement Check**

The Bluetooth is installed on the main board by Bluetooth cable. If the Bluetooth malfunctions, there may be a bad connection between the Bluetooth and the main board. Or the Bluetooth, main board or the Bluetooth cable might be damaged.

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

- Check 1 Make sure the Bluetooth is firmly connected to CON6501 by Bluetooth cable on the main board and the connector of the Bluetooth.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the Bluetooth is still not functioning properly, perform Check 2.

- Check 2 The Bluetooth may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 3.
- Check 3 The Bluetooth cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 4.
- Check 4 The main board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.17 3G (BTO) Troubleshooting ①

This section describes how to determine if the computer's 3G is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### **Procedure 1 Diagnostic Test Program Execution Check**

Insert the 3G test program in the USB key, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the 3G test, go to Procedure 2.

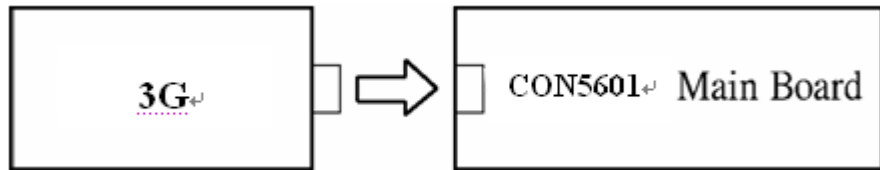


**Procedure 2 Connector Check and Replacement Check**

The 3G is installed as a 3G card. If the 3G malfunctions, there may be a bad connection between the 3G and the main board. Or the 3G or main board might be damaged.

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

- Check 1 Make sure the 3G is firmly connected to CON5601 on the main board and the connector of the 3G.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the 3G is still not functioning properly, perform Check 2.

- Check 2 The 3G may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the 3G is still not functioning properly, perform Check 3.
- Check 3 The main board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.18 Camera (BTO) Troubleshooting

This section describes how to determine if the computer's camera is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Insert the camera test program in the USB key, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

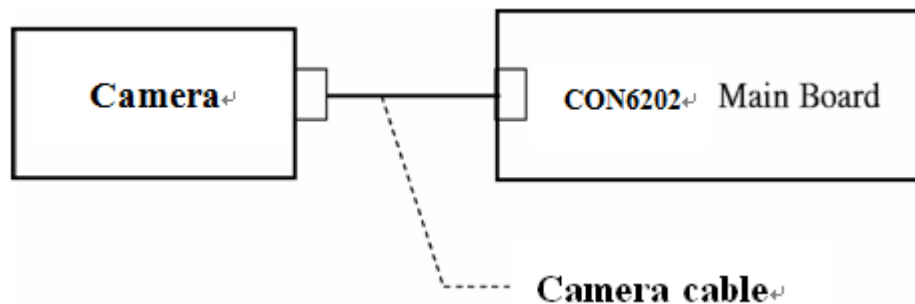
If any errors occur while executing the camera test, go to Procedure 2.

**Procedure 2 Connector Check and Replacement Check**

The camera is installed on the main board by camera cable. If the camera malfunctions, there may be a bad connection between the camera and the main board. Or the camera, main board or the camera cable might be damaged.

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

- Check 1 Make sure the camera is firmly connected to CON6202 by camera cable on the main board.



If a connector is disconnected, connect it firmly and repeat Procedure 1. If the camera is still not functioning properly, perform Check 2.

- Check 2 The camera may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the camera is still not functioning properly, perform Check 3.
- Check 3 The camera cable may be defective or damaged. Replace the LCD cover with a new one following the steps in Chapter 4, *Replacement Procedures*. If the camera is still not functioning properly, perform Check 4.
- Check 4 The main board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

---

# **Chapter 3**

## **Tests and Diagnostics**

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## Chapter 3 Contents

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<b>Tests and Diagnostics.....</b>	<b>3-3</b>
3.0.1 Test menu .....	3-3
3.0.2 Executing the Diagnostic Test .....	3-4
3.0.3 Executing the Diagnostic Test .....	3-5
3.1 Model, BIOS and CPU Test .....	3-7
3.1.1 CPU Test .....	3-8
3.2 Check MAC Test .....	3-9
3.3 ACIN Test .....	3-10
3.4 Temperature Test .....	3-11
3.5 Webcam Check .....	3-12
3.6 PAD Test.....	3-13
3.7 LCDRGB Test .....	3-15
3.8 VGA Test .....	3-19
3.9 Audio Test.....	3-20
3.10 Keyboard Test.....	3-21
3.11 Memory Test .....	3-23
3.12 Function TEST .....	3-25
3.13 LEDALL Test.....	3-26
3.14 STORE Test [CD/DVD-ROM TEST].....	3-27
3.15 LID Switch Test.....	3-28
3.16 MS CARD Test.....	3-29
3.17 SD CARD Test .....	3-31
3.18 HDD Test .....	3-33
3.19 BATTERY Test.....	3-35
3.20 Touch LED Test.....	3-36
3.21 HDD 3D Protection.....	3-37
3.22 Speaker Test .....	3-43
3.23 Read and Write DMI information .....	3-44
3.24 Auto Run .....	3-44
Appendix:.....	3-47

# Tests and Diagnostics

This chapter explains how to use the Diagnostic Test programs to test the functions of the computer's hardware modules. The test program should be stored on an optical media disk or a USB boot memory.

The test program menu will also consist of some programs which test the hardware function or display the current information of the computer.

To execute the auto run will automatically run all the test programs.

**NOTE:** Before starting the diagnostics, be sure to follow these steps:

1. Check all cables are connected firmly.
2. Exit any application and close Windows.
3. Check if [All Devices] is selected in the "Device Configure" in SETUP menu.

## 3.0.1 Test menu

The Test MENU consists of the following functions.

```

Menu of Arsenal Notebook Test Program for PEGA
                                VER 1.10      2009/05/22
-----
1. Model, BIOS and CPU Test  D. STORE Test
2. Check MAC Test           E. LID Switch Test
3. ACIN Test                F. MSCARD Test
4. Temperature Test         G. SDCARD Test
5. PAD Test                 H. HDD Test
6. LCDRGB Test              I. BATT Test
7. VGA Test                 J. Touch LED Test
8. Audio Test               K. PEGA3D_S Test
9. KB Test                  L. Webcamra Check
A. MEMORY Test             M. SPEAKER Test
B. FNTEST Test             N. R/W DMI
C. LEDALL Test             O. Auto Run

Please Enter Your Choice -->

```

Please enter the item number to choose and execute the test item.

### 3.0.2 Executing the Diagnostic Test

To start the Test PROGRAM on CD-ROM, follow these steps:

1. Burn the test program ISO image to an optical media disk.
2. Insert the optical media disk with the test program into optical device.
3. Turn on the power, and choose boot from optical device.
4. System will automatically run the test program and display the test menu.
5. When the test menu displays, please enter the item number to choose and execute the test item.

```
Menu of Arsenal Notebook Test Program for PEGA
VER 1.10 2009/05/22
-----
1. Model, BIOS and CPU Test  D. STORE Test
2. Check MAC Test           E. LID Switch Test
3. ACIN Test                 F. MSCARD Test
4. Temperature Test         G. SDCARD Test
5. PAD Test                  H. HDD Test
6. LCDRGB Test              I. BATT Test
7. VGA Test                  J. Touch LED Test
8. Audio Test                K. PEGA3D_S Test
9. KB Test                   L. Webcamra Check
A. MEMORY Test              M. SPEAKER Test
B. FNTEST Test              N. R/W DMI
C. LEDALL Test              O. Auto Run

Please Enter Your Choice -->
```

**Note:**

*If it fails in a test item, press “Ctrl+C” and “Y” back to main menu.*

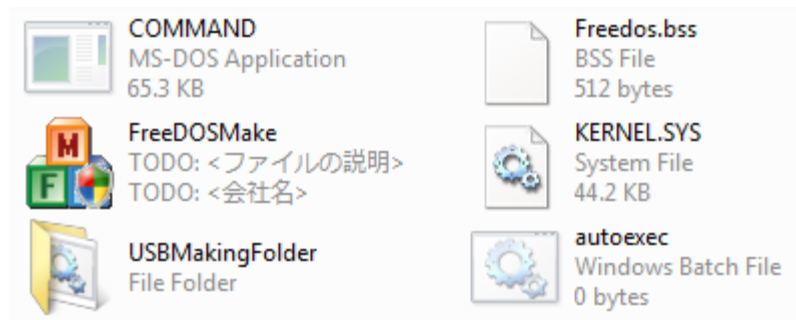
### 3.0.3 Executing the Diagnostic Test

To start the Test PROGRAM on USB boot disk, follow these steps:

1. Please prepare PC of Windows VISTA OS.
2. Please copy the file for creating a USB-Bootable memory to PC.

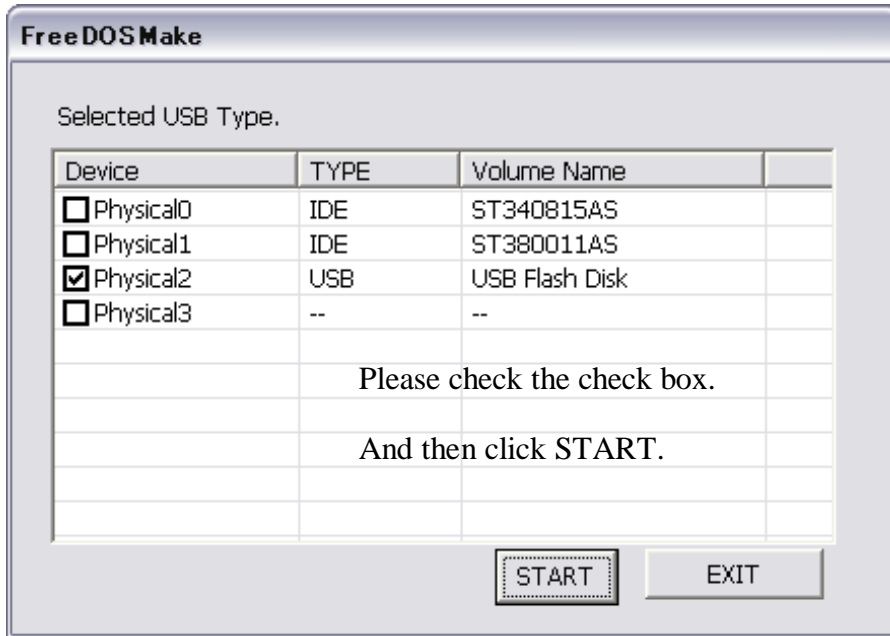
The filename of four files and one folder to copy is shown below.

- a) COMMAND.COM
- b) Freedos.bss
- c) FreeDOSMake.exe
- d) KERNEL.SYS
- e) Autoexec.bat
- f) Folder (USBMakingFolder)



3. Please format USB-memory in FAT mode before creating USB-Bootable memory.
4. Please copy the file prepared for USB-Bootable Memory to a USBMakingFolder.
5. And when you create USB-Bootable memory, please use only one USB-memory.
6. Run “FreeDOSMake.exe”. You can create USB-Bootable memory.





7. Turn on the Toshiba PC which need test, and choose boot from USB device.
8. System will automatically run the test program and display the test menu.
9. When the test menu displays, please enter the item number to choose and execute the test item.

### 3.1 Model, BIOS and CPU Test

```
DMI Utility Rev 1.26          Built Date:06/06/2003
-----
SMBIOS Structure Table Address:F000:AFF0
Entry Point:F000:C880
DMI Revision:0.0
Structure Numbers:46

M/B Manufacturer   : TOSHIBA
M/B Product        : To be filled by O.E.M.
M/B Version        : To be filled by O.E.M.
BIOS Vendor        : American Megatrends Inc.
BIOS Version       : V0.17t8
BIOS Release Date  : 04/06/2009
System Manufact.   : TOSHIBA
System Product     : To Be Filled By O.E.M.
System Version     : To Be Filled By O.E.M.
UUID               : FFFFFFFF-FFFF-FFFF-FFFF-FFFFFFFFFFFF

                                Latest update:
                                Please check the Product,
                                UUID and BIOS Version.
                                T.C.

Return Code = 1
```

**Note:**

*The screen will pause 10sec then turn to next step.*

### 3.1.1 CPU Test

Check CPU spec same with your fixture

Check Front side bus speed is real (The speed does match that of BIOS setup)

```
SMBIOS Structure Table Address:F000:B2E0
Entry Point:F000:CB90
DMI Revision:0.0
Structure Numbers:46

Socket Type      : CPU 1
Manufacturer    : Intel
Version         : Intel(R) Core(TM)2 Duo CPU
Max./Cur./Ext.(MHz) : 2666/2666/267

Current date is Thu 06-04-2009
Current time is 1:19:08.58 pm
```

This chapter shows how to use the Diagnostics to test the functions of the CPU speed, type and CPU ID code.

#### 3.1.1.1. Diagnostic name: CPU.EXE

Diagnostic Version: 2.10 or later version.

#### 3.1.1. 2.Principle and how to use:

a. The CPU diagnostic consists of the following functions.

The CPU types, internal speed and CPU ID.

Read the CPU type, internal speed and CPU ID information from the related address and check if the information is the same as the customer order.

b. Please refer to the illustration above to see the CPU information.

c. Type “CPU.exe /?” in the Free Dos prompt and you can see more details in the command line to help you check related information.

## 3.2 Check MAC Test

Check MAC address with the label on the motherboard



This chapter shows how to use the Diagnostics to test the MAC address of the Ethernet controller.

### 3.2.1. Diagnostic name: pg8168.exe

Diagnostic Version: 2.00 or later version.

### 3.2.2. Principle and how to use:

a. The pg8168 diagnostic consists of the following functions.

MAC Address read and checking function.

Command line:

Pg8168.exe /vmac

Read the MAC address from the Ethernet controller ROM and the MAC will appear on the screen..

### 3.3 ACIN Test

Please insert adopter then run this program. This subtest checks if the power port works properly.

This chapter shows how to use the Diagnostics to test the ACIN functions.

3.3.1 Plug in the power test program will display PASS



3.3.2 Unplug the power to test the program will show Fail.



If it fails in a test item, press “Ctrl+C” and “Y” back to main menu.

### 3.4 Temperature Test

Please execute the Temperature Test from test menu.

Test program will show the current CPU temperature result on RIO\_25Ch line.



### 3.5 Web camera Check

This program is to check webcamera device ID.



## 3.6 PAD Test

Press both the Left and Right Buttons three times to see if they work properly.



This chapter shows how to use the Diagnostics to test the pointing device functions.

### 3.6.1. Diagnostic name: PS2.EXE

Diagnostic Version: 1.15 or later version.

### 3.6.2. Principle and how to use:

a. The PS2 diagnostic tests the following functions.

Right & left button, move function.

Move the cursor and click Left and Right button to ensure the pointing device is working normally.

Command line: PS2.exe -l 3 -r 3 -t2 /tp2

-r <n> : At least “n” times to click right button for the right button testing. <n> means 1,2... depend on user’s setting.

-l <n> : At least “n” times to click left button for the left button testing. <n> means 1,2... depend on user’s setting.

-t2 : Testing Left and Right button only.



/TP2 : PS2 mouse testing, no driver need.

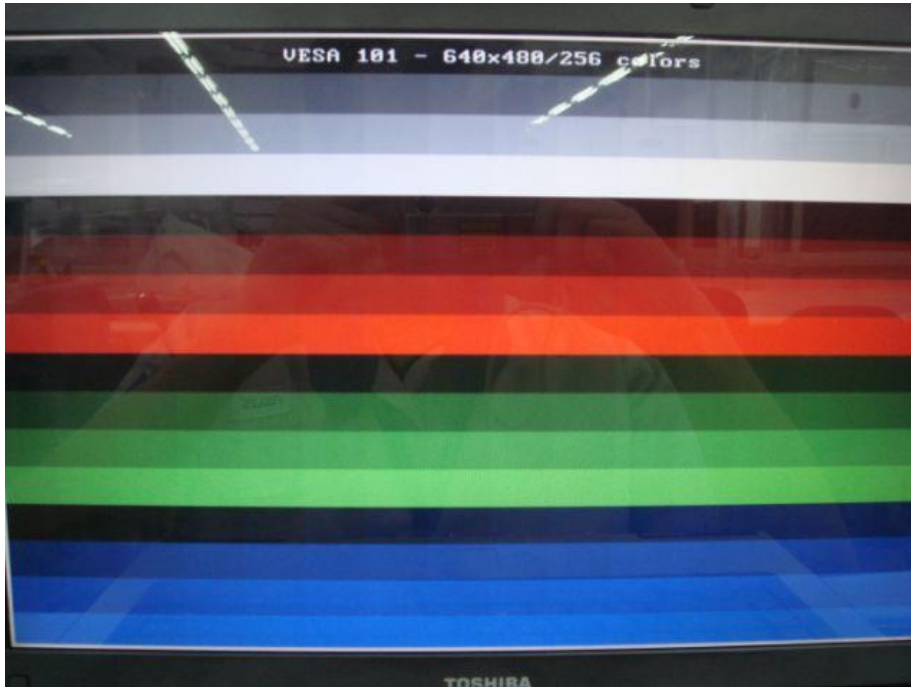
- b. Please refer to the illustration above to see the Touchpad test information.
- c. Type “PS2.exe /?” in the Free Dos prompt and you can see more details in the command line to help you check related information

### 3.7 LCDRGB Test

This subtest displays gradations for following modes. To change the mode, press **Enter**.

Command: `video.exe -i /t 162 99`

[Mode 101 640\*480 8M]



[Mode 103 800\*600 8M]



### 3 Tests and Diagnostics

---

[Mode 111 640\*480 16M]



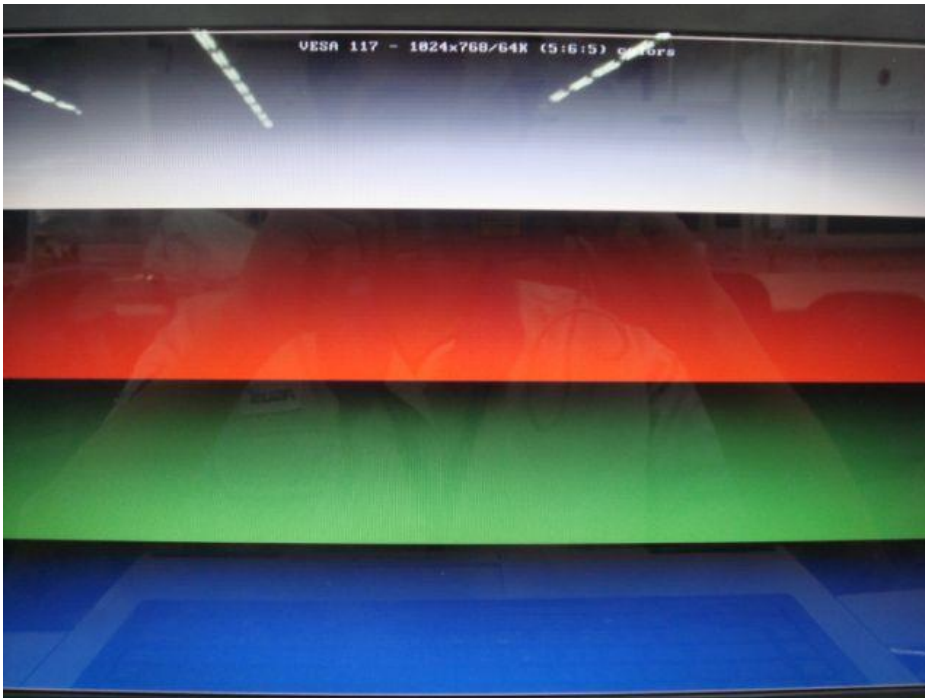
[Mode 114 800\*600 16M]



[Mode 105 1024\*768 8M]



[Mode 117 1024\*768 16M]



This chapter shows how to use the Diagnostics to test the LCD RGB/WB functions.

3.7.1. Diagnostic name: VIDEO.EXE

Diagnostic Version: 2.25.06 or later version.

3.7.2. Principle and how to use:

a. The VIDEO diagnostic tests following functions.

LCD test for R,G,B and BW.

Command line:

```
video -p -rc /RGB 111
```

```
video -p -gc /RGB 111
```

```
video -p -bc /RGB 111
```

-p: To set a pixel mode to display on the screen.

-rc | -gc | -bc: To set the color display on the screen.

```
VIDEO /F 117 A514
```

```
VIDEO /F 117 0000
```

```
VIDEO /F 117 05FE
```

To set the display mode White, Black and Blue shows on the screen.

b. Please refer to the illustration above to see the VIDEO test information.

c. Type "VIDEO.exe /?" in the Free Dos prompt and you can see more details in the command line to help you check related information

### 3.8 VGA Test

This chapter is part of the test card. This test focus on the function of VGA chip and VRAM.

**Note:**

*It may occur a blue screen for serveral minutes before 3D test when using a USB disk to test.*

### 3.9 Audio Test

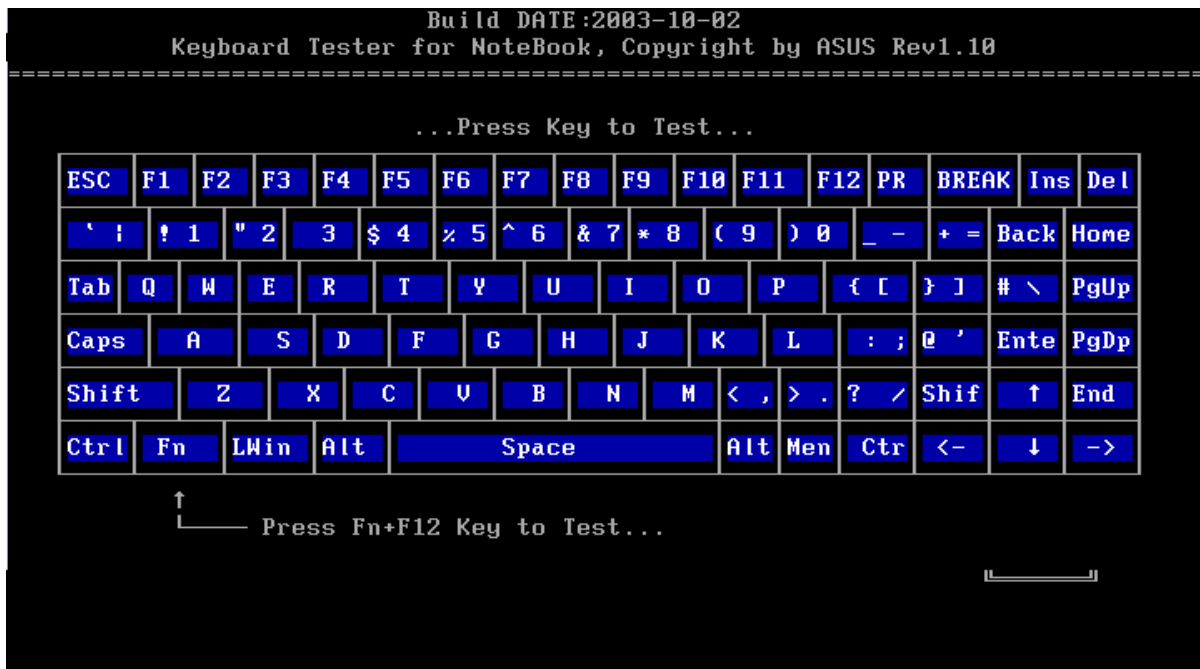
```
HD Codec DOS Test Program Version:3.45

Test HD Codec Reset Command (Link/Function Reset) :
  HD Codec Link/Function Reset Test Success!
Test Codec Complete Power Down(Primary) :
  Codec Complete Power Down Test Success!
Test HD Codec Register Get/Set Command :
  HD Codec Register Get/Set Command Test Success!
Test HD Codec Register Default Value :
  HD Codec Register Default Test Success!
Test OUTPUT=15 INPORT=18 Playback/Recording:

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

```
*****
*****
*****
*****
*****
**** PASS PASS PASS PASS PASS PASS PASS PASS PASS PASS ****
**** PASS PASS PASS PASS PASS PASS PASS PASS PASS PASS ****
**** PASS PASS PASS PASS PASS PASS PASS PASS PASS PASS ****
*****
*****
*****
*****
*****
```

### 3.10 Keyboard Test



**Press Fn +F12 to end the test**

**NOTE:**

*Press the Fn + F12 to exit the test can only work after pressing all keys on the keyboard.*

*If there are some failure keys which cause the test can not complete, you can NOT use Fn+ F12 to end test program. Please press "Ctrl + Shift" key (press Ctrl first then press Shift). And then release "Ctrl + Shift" key (release Shift first then release Ctrl). This hot key can help to exit the test program directly*

This chapter shows how to use the Diagnostic to test the functions of the keyboard.

Diagnostic name: Keyboard.exe



Command: `Keyboard.exe /r JUPITER.map JUPITER.xy JUPITER.cd`

- a. Please choose the different kind of keyboard language.
- b. Display the keyboard on the screen to indicate to the operator checking whether or not each key is correct.
- c. Type each key to finish the program.

### 3.11 Memory Test

This program will test the memory and shows you the total memory size.

```
1. Memory Size Check
2. Memory Test
3. Return

Please Enter Your Choice -->
```

```
ASUS                      Build DATE:2007-01-10
Memory Utility, Copyright by ASUS Rev1.12                      Diags
=====
Memory Module Information:
  DIMM0 = 2048 MB,
  DIMM1 = Not installed
  DIMM2 = 2048 MB,
  DIMM3 = Not installed
  Total Memory Size = 4096 MB, Memory working speed = 0 MHz

  4096 MB

Please confirm the nonsense.
I.C.
```

This chapter shows how to use the Diagnostics to check memory size, and do memory read/write test.

#### 3.1.2.1 Diagnostic name: MM.EXE

### 3 Tests and Diagnostics

Diagnostic Version: 1.12 or later version.

Show the total memory size. Command: mm.exe -t 4 /s

```

Build DATE:2009-04-14
Pegatron Memory Test Utility, Copyright by Pegatron Rev3.40 Diags
=====
E820h No.01 Size: 2GB, 996MB, 0KB All mem.size: 3GB,1020MB, 576KB
Field 00000000:01600000h - 00000000:BF9FFFFFh Size ratio 74.38 %
Pattern No: 500 17 & 18 Pattern->08080808:08080808 & F7F7F7F7:F7F7F7F7
Target Page Field (2MB) St.Time End Time
00000000:45400000h-00000000:455FFFFFh 13:28:53 : :
Moving :
Comparing :
Success :
Failure :
0 10 20 30 40 50 60 70 80 90 100 %

```

#### 3.1.2.2 Diagnostic name: MEM.EXE

Diagnostic Version: 3.40 or later version.

Do memory read/write test. Command: mem.exe -fbs 22 2 -et 20 /TP

### 3.12 Function TEST

Test program will test several function and show the test result one by one.

(Command: functest.exe /T).


```
Build DATE:2004-11-25
IRQ8 Tester using CMOS, Copywrite by ASUS Rev1.08
=====
IRQ8 Periodic Interrupt 2 times within 2 ms --> OK
Now Time: 16:58:47
Alarm Time: 16:58:48
Alarm Interrupt Test OK(0) ...
Start&Update Interrupt Test OK ...992

Return_Code = 0
```



```
Build DATE:2004-05-04
FuncTest.exe, Copyright by ASUS Rev1.04
=====
Setting Clock... OK!
Testing DMA Controller: P8237A-5 #1, P8237A-5 #2, Page Register OK!
Testing Interrupt Controller ... OK!
Testing Protect Mode... OK!
Testing Coprocessor... OK!
Testing Clock... OK!
Testing Calendar... OK!

Return_Code=0
```



### 3.13 LEDALL Test

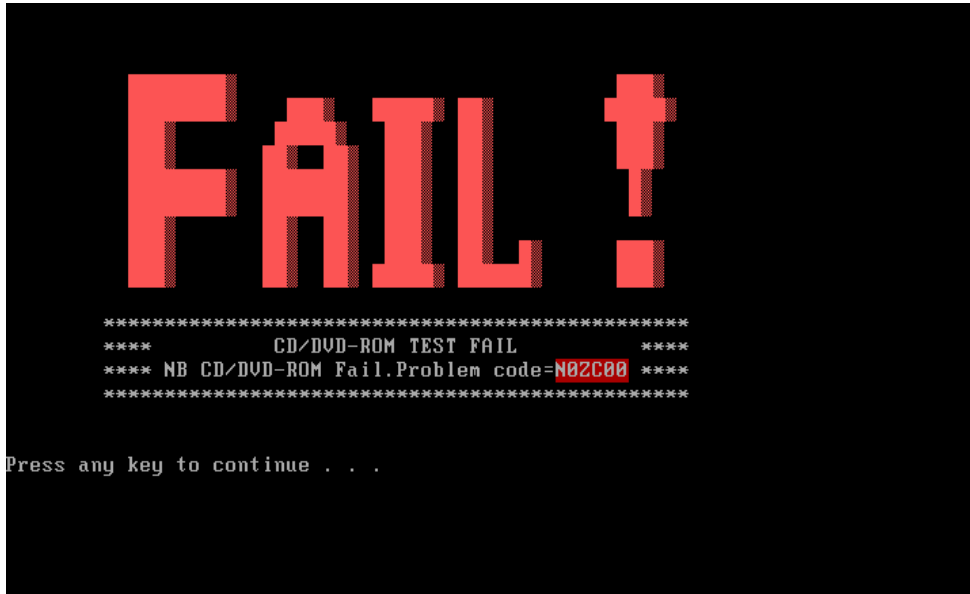
Test sequence:

1. PWRBTN\_LED      white
2. DC-IN LED        white
3. PWR\_ULED\_UP     orange
4. PWR\_WLED        white
5. BAT\_ULED\_UP     orange
6. BAT\_WLED        white
7. LOGO\_LED        white
8. Light\_GI\_Led     white
9. KB\_BL\_CTRL       white



### 3.14 STORE Test [CD/DVD-ROM TEST]

This Program will test if the CD/DVD-ROM works properly, please insert test CD before test.



This chapter shows how to use the Diagnostics to test the ODD functions.

3.14.1. Diagnostic name: PSATA.EXE

3.14.2. Principle and how to use:

a. The PSATA diagnostic consists of the following functions.

CD/DVD type , CD/DVD F/W.

Command line:

```
psata -d 3 -rep _ /cm "TSSTcorpCDW/DVD_TS-L462D"
```

Check the Secondary master IDE device and check if the device name is the same as "TSSTcorpCDW/DVD\_TS-L462D."

```
psata -d 3 -rep _ /cf "TO01"
```

Check the Secondary master IDE device and check if the device is F/W then check if the F/W version is same as "TO01."

b. Type "PSATA.exe /?" in the Free Dos prompt and you can see more details in the command line to help you check related information.

### 3.15 LID Switch Test

Run the test using the instructions in the image below.

This chapter shows how to use the Diagnostics to test the LID functions.

#### 3.15.1. Diagnostic name: PMC.EXE

Diagnostic Version: 2.05.

#### 3.15.2. Principle and how to use:

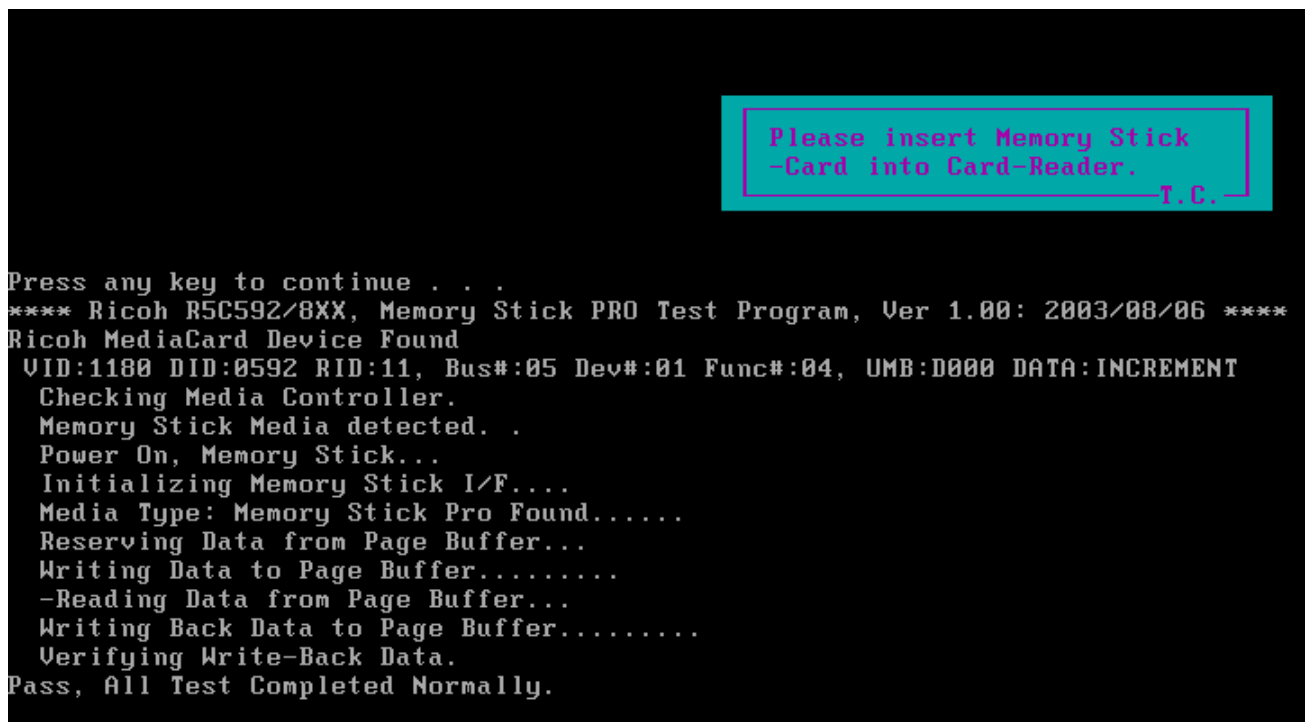
- a. The diagnostic of PMC detects whether the lid SW works or not.

After active LID function (close the upper cover) the program will read the EC (Embedded Controller) controller then use the read data to check if the LID switch function is correct.

- b. Type “PMC.exe /?” in the Free Dos prompt and you can see more details in the command line to help you check related information.

### 3.16 MS CARD Test

This chapter shows how to use the Diagnostics to test the card reader functions.





3.16.1. Diagnostic name: RMS2XX.EXE

Diagnostic Version: 1.02.

3.16.2. Principle and how to use:

Diagnostic provided by vendor which is an MS card test program that checks the MS card's read, write and protect function.

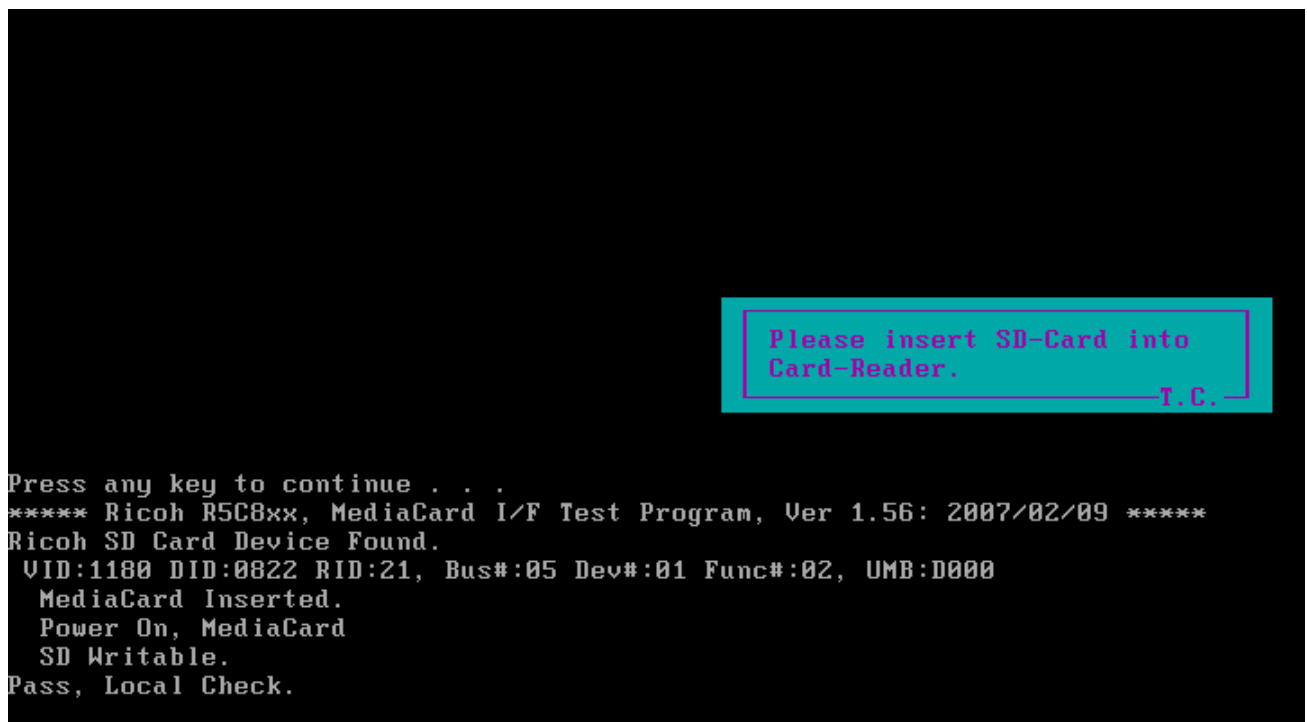
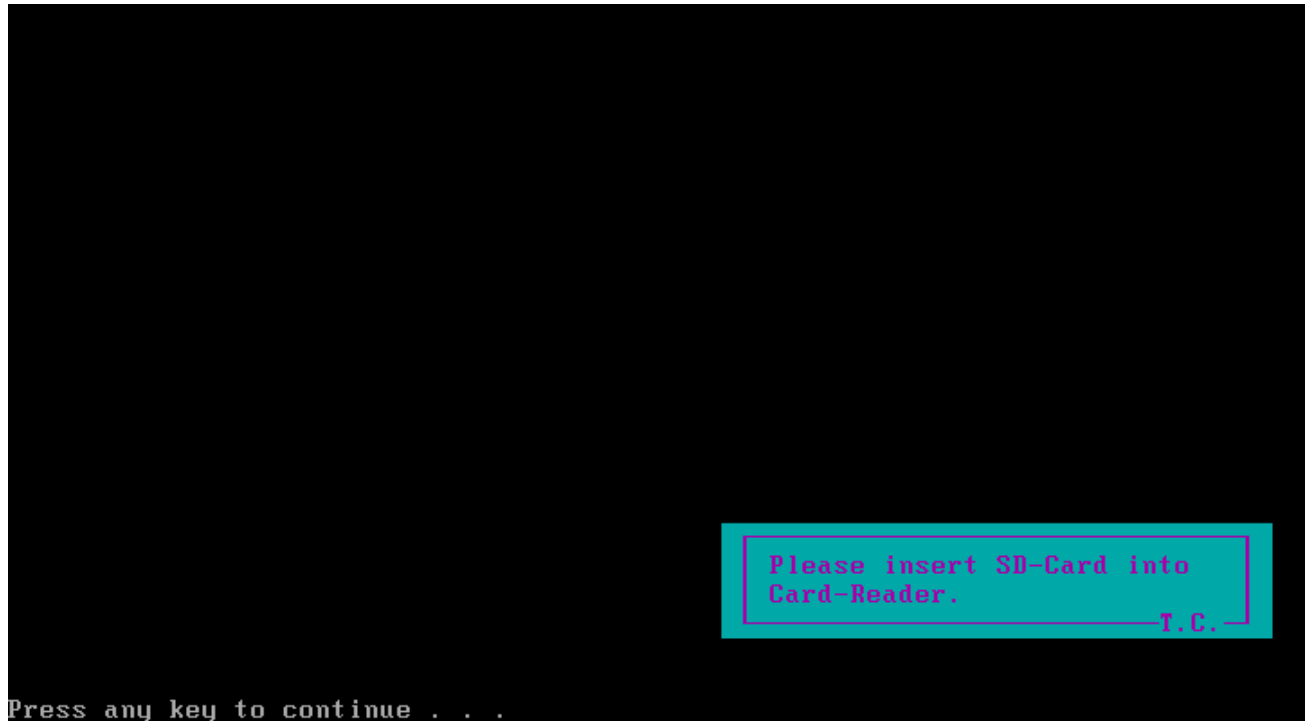
- a. The diagnostic of RMS2XX detects MS card and read /write data.

3.16.3. Principle and how to use:

Copy data into the card and compare with the master file to see if the data matches.

### 3.17 SD CARD Test

This chapter shows how to use the Diagnostics to test the card reader functions.



3.17.1. Diagnostic name: RSD.EXE

Diagnostic Version: 1.02.

3.17.2. Principle and how to use:

Diagnostic provided by vendor which is an SD card test program that checks the SD card's read, write and protect function.

- a. The diagnostic of RSD detects SD card and read /write data.

3.17.3. Principle and how to use:

Copy data into the card and compare with the master file to see if the data matches.

### 3.18 HDD Test

There are three items you can choose:

```

1. HDD Detect
2. HDD Read Test
3. HDD R/W Test
4. Return

Please Enter Your Choice -->

```

```

Build DATE:2007-05-07
ASUS Windows HardDisk Utility, Copyright by ASUS Rev1.02 TDC
=====
... Read Twice Test ...
-----
| Num | Model Name | FW Rev | LBA Size | R | W | B | C |
|----|-----|-----|-----|---|---|---|---|
| 1 | WDC WD1600AAJS-22WAA0 | 58.01D58 | 12A19EB0 | OK | | | OK |
|-----|-----|-----|-----|-----|-----|-----|-----|
| Buffer Size <KB> | Test LBA Sector | Error LBA Sector | Test Time |
|-----|-----|-----|-----|
| 400 | F1680 | | 17 |
|-----|-----|-----|-----|

```



**NOTE:**

*HDD R/W Test password: hard disk*

### 3.19 BATTERY Test

The battery test will provide the relate information of battery. This program can also test the battery charge / discharge function.

You can also find the battery cycle count information on this battery.

**NOTE:**

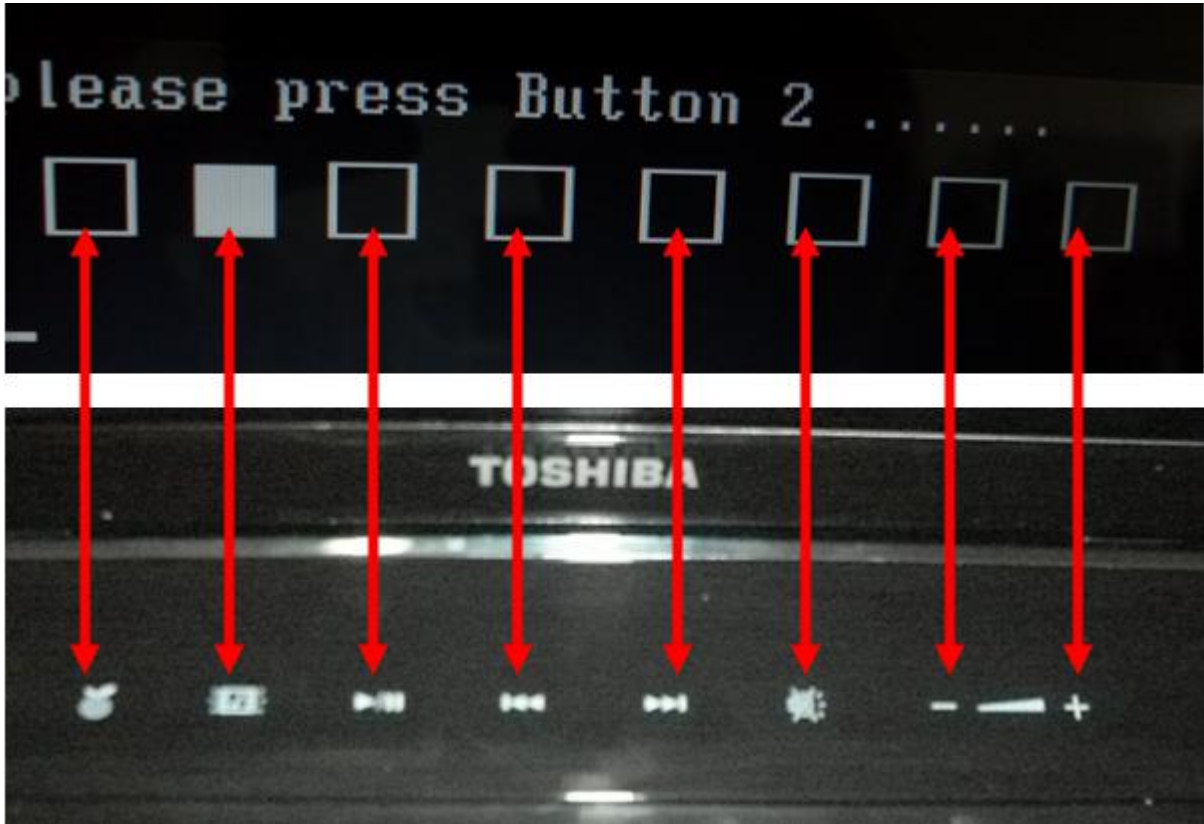
**How about buttery information? EX Vendor  
name and Number of Cell.**

*Please connect the AC adapter to system in battery charge test.*

*Please disconnect the AC adapter from system in battery discharge test*

### 3.20 Touch LED Test

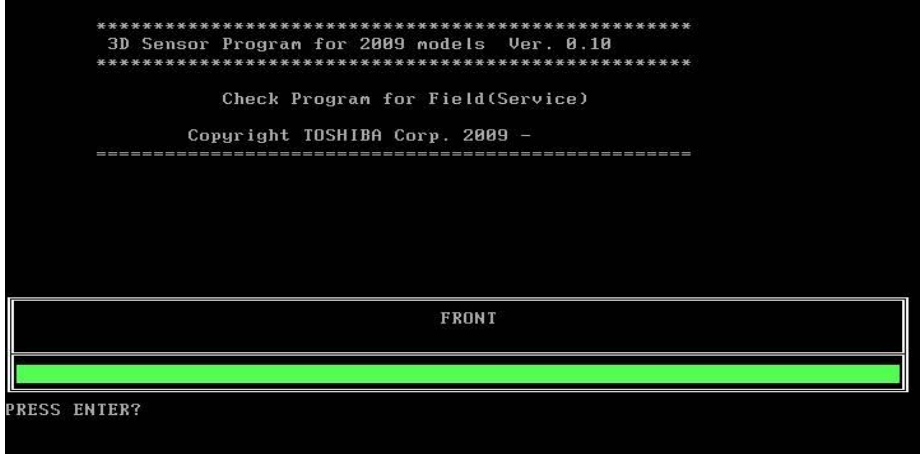
Hands touch the white box of three seconds, then next step



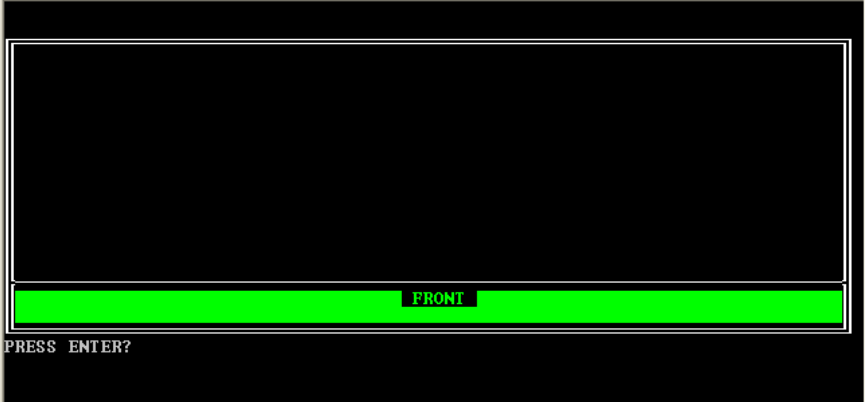
### 3.21 HDD 3D Protection


Place computer in five position as screen shows.


For Field inspection T&D, this program judges by sampling five kinds of data shown below.


No	Item	Contents
1	Access platform.	An access platform is leveling.
2	Test Fixture	The Fixture which fixes PC by 60 degree inclination is used. Vibration/shock doesn't take a PCB at the time of T&D inspection.
3	Test1	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p> <p>The portion which PC and Test-Fixture contact is green.</p>  <p>Set method of PC</p> <p style="text-align: center;">Z</p> <p style="text-align: center;">Upper</p> <p style="text-align: right;">X</p> <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>



4	Test2	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> <p>Rear</p> <p>Upper</p> <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
---	-------	--

5	Test3	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> <p>Right</p> <p>Upper</p> <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
---	-------	---

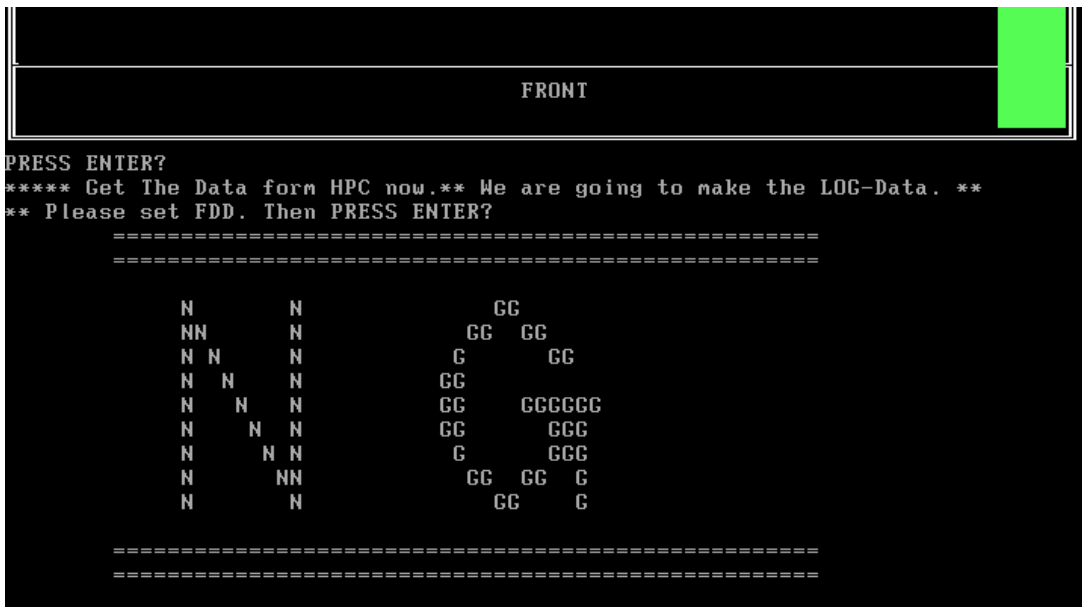
6	Test4	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> <p>Front</p> <p>Upper</p> <p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
---	-------	---

7	Test5	<p>The display of a test program and the set method of PC are shown below.</p> <p>Display of a Test Program</p>  <p>Set method of PC</p> <p style="text-align: center;">Left</p> <p style="text-align: center;">Upper</p>
		<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
8	Inspection	<p>Judgment</p> <p>If all data is less than ranges, it will be OK.</p>
9	Setting Calibration data	<p>When an inspection result is O.K., calibration at HPC.</p>

If the position is correct, it will show OK.



If the position is wrong, it will show NG.



## 3.22 Speaker Test

This program will test left channel, right channel and two wave files to test speaker function.

```
HD Codec DOS Test Program Version:3.45
Play a wave file (48k sampling rate/16-bits stereo file)
  You must hear some music. Yes/No ?
  Press 'Y' to stop playing(If the function is passed)
  Press 'N' key (If the function is failed)
1.Line_Out Left Channel Test
2.Line_Out Right Channel Test
Playing 44K wave file
Playing 48K wave file
  Playing properly finish !

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

**NOTE:**

*Please remove audio loopback plugs before test speaker.*

### 3.23 Read and Write DMI information

This program could read and write below strings from/to DMI block.

1. Manufacture
2. Product Name
3. Version
4. Serial Number
5. Type 11
6. Type 12

```
1. Read DMI
2. Write Manufacture
3. Write Product Name
4. Write Version
5. Write Number
6. Read Type11
7. Read Type12
8. Write Type11
9. Write Type12
A. Return

Please Enter Your Choice -->
```

DMI information:

```
Build DATE:2008-09-03
Pegatron      SMBIOS Utility, Copyright by Pegatron Rev1.26      Diags
=====
System Information(Type 1)
00: Type = 01 , Length = 1B , Handle = 0001
04: Manufacturer = TOSHIBA
05: Product Name = PORTEGE
06: Version = 12345
07: Serial Number = To Be Filled By O.E.M.
08: UUID = FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
10: Wake-up Type = 06
19: SKU Number = To Be Filled By O.E.M.
1A: Family = To Be Filled By O.E.M.

Return_Code=-1
```

**Read Type 11:**

```

Build DATE:2008-09-03
Pegatron      SMBIOS Utility, Copyright by Pegatron Rev1.26      Diags
=====
- OEM Strings(Type 11) -----
00: Type = 0B , Length = 05 , Handle = 000D
04: Count = 05
01: String: T
02: String: 6AAtpdr54-EkQ
03: String: k890VSws+0a7e
04: String: ZH030YiC9yj2F
05: String: To Be Filled By O.E.M.

```

**Read Type 12:**

```

Build DATE:2008-09-03
Pegatron      SMBIOS Utility, Copyright by Pegatron Rev1.26      Diags
=====
- System Configuration Options(Type 12) -----
00: Type = 0C , Length = 05 , Handle = 000E
04: Count = 04
01: String: SMI:00B2C102
02: String: DSN:          2 29TR20T
03: String: DSN:HMP125S6EFR8C-S6
04: String: DSN:203

```

**Write Type 11 (60 bytes) :**

```

Build DATE:2008-09-03
Pegatron      SMBIOS Utility, Copyright by Pegatron Rev1.26      Diags
=====
- OEM Strings(Type 11) -----
00: Type = 0B , Length = 05 , Handle = 000D
01: String: T

Please Input a String:^C

```

**Write Type 12 (64 bytes):**

```

Build DATE:2008-09-03
Pegatron      SMBIOS Utility, Copyright by Pegatron Rev1.26      Diags
=====
- System Configuration Options(Type 12) -----
00: Type = 0C , Length = 05 , Handle = 000E
01: String: SMI:00B2C102

Please Input a String:^C

```






## 3.24 Auto Run

Please enter “J” to select the auto run function. Test program will auto run all test items one by one as following sequence.

```
Menu of Arsenal Notebook Test Program for PEGA
                                VER 1.10      2009/05/22
-----
1. Model, BIOS and CPU Test  D. STORE Test
2. Check MAC Test           E. LID Switch Test
3. ACIN Test                 F. MSCARD Test
4. Temperature Test         G. SDCARD Test
5. PAD Test                  H. HDD Test
6. LCDRGB Test              I. BATT Test
7. VGA Test                  J. Touch LED Test
8. Audio Test                K. PEGA3D_S Test
9. KB Test                   L. Webcamra Check
A. MEMORY Test              M. SPEAKER Test
B. FNTEST Test              N. R/W DMI
C. LEDALL Test              O. Auto Run

Please Enter Your Choice -->
```

**Appendix:**

NO#	Equipment Description	Pegatron Part#	Supplier	Quantity	Remarks
1	Test CD				
2	Audio loopback jig	16-T10680922		1	
3	Memory Stick			1	
4	SD Card			1	

---

# **Chapter 4**

## **Replacement Procedures**

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---

**Chapter 4 Contents**

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4.1	General.....	4-5
4.2	Battery pack.....	4-12
4.3	Express card .....	4-14
4.4	Media card.....	4-16
4.5	HDD .....	4-18
4.6	Memory module.....	4-22
4.7	Wireless LAN card .....	4-25
4.8	Optical Disc Drive module .....	4-28
4.9	Keyboard.....	4-31
4.10	Top cover .....	4-34
4.11	Touch pad Board.....	4-38
4.12	Finger Print board .....	4-40
4.13	Bluetooth.....	4-42
4.14	Touch pad on/off board and Touch Pad Bracket.....	4-45
4.15	Power Board.....	4-48
4.16	LAN Board.....	4-50
4.17	Main PCB.....	4-52
4.18	Heat Sink.....	4-56
4.19	VGA Card .....	4-58
4.20	Fan.....	4-60
4.21	CPU .....	4-62
4.22	Speaker.....	4-65
4.23	DC-IN Cable .....	4-67
4.24	LCD Module .....	4-69
4.25	LCD unit/FL inverter.....	4-72
4.26	Camera.....	4-77

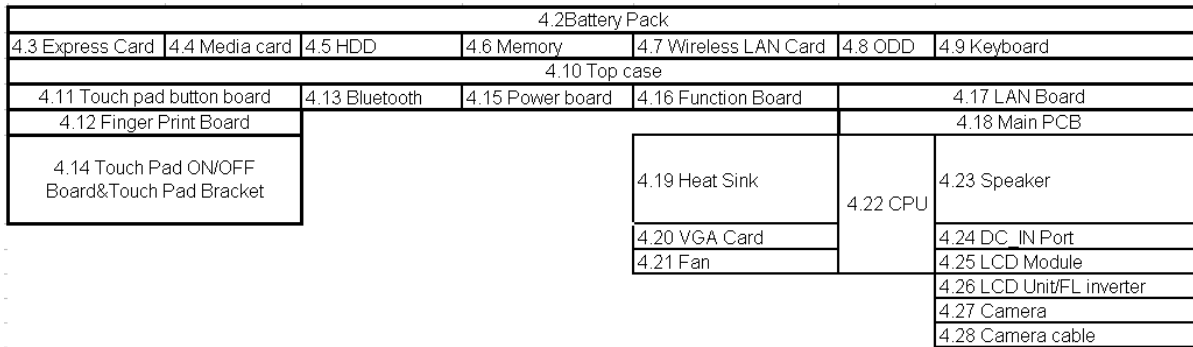
## Figures

Figure 4-1	Removing the battery pack.....	4-12
Figure 4-2	Removing the Express card .....	4-14
Figure 4-3	Removing the Media card .....	4-16
Figure 4-4	Removing the HDD cover .....	4-18
Figure 4-5	Removing the HDD assembly.....	4-19
Figure 4-6	Separating the HDD and HDD holder .....	4-20
Figure 4-7	Removing HDD Slot Cover.....	4-22
Figure 4-8	Removing the memory Module.....	4-23
Figure 4-9	Removing the Wireless LAN cover.....	4-25
Figure 4-10	Removing tapes and disconnecting wireless LAN antennas .....	4-26
Figure 4-11	Removing the Wireless LAN Card.....	4-26
Figure 4-12	Removing the Optical DISC Drive Module .....	4-28
Figure 4-13	Disassembling the Optical DISC Drive Module.....	4-29
Figure 4-14	Removing the screws securing keyboard cover.....	4-31
Figure 4-15	Removing the keyboard cover.....	4-31
Figure 4-16	Removing the screws securing keyboard plate .....	4-30
Figure 4-17	Lifting the Keyboard plate .....	4-32
Figure 4-18	Removing the screws on bottom case .....	4-34
Figure 4-19	Removing the screws and disconnecting the cable on the top case .....	4-35
Figure 4-20	Removing Top cover.....	4-36
Figure 4-21	Removing Touch pad FPC.....	4-38
Figure 4-22	Removing the touch pad button board .....	4-38
Figure 4-23	Separating the Touch pad button board from finger Print board .....	4-40
Figure 4-24	Removing the screws that fixing Bluetooth Bracket .....	4-42
Figure 4-25	Removing the Bluetooth .....	4-42
Figure 4-26	Separating the Bluetooth from its cable .....	4-43
Figure 4-27	Removing the touch pad ON/OFF Board.....	4-45
Figure 4-28	Removing the touch pad Bracket.....	4-46
Figure 4-29	Removing the power board.....	4-48

Figure 4-30	Removing the LAN board.....	4-50
Figure 4-31	Disconnecting the cables from main PCB and removing the screws .....	4-53
Figure 4-32	Removing the main PCB.....	4-53
Figure 4-33	Removing the Heat Sink .....	4-55
Figure 4-34	Applying new thermal pad .....	4-56
Figure 4-35	Removing the VGA Card.....	4-57
Figure 4-36	Removing the fan module .....	4-59
Figure 4-37	Applying new thermal Pad on the fan .....	4-60
Figure 4-38	Unlocking the CPU.....	4-61
Figure 4-39	Installing the CPU.....	4-63
Figure 4-40	Removing the screws that fixing the Speakers.....	4-64
Figure 4-41	Removing the screws that fixing the DC-IN cable Bracket .....	4-66
Figure 4-42	Removing the DC-IN cable.....	4-66
Figure 4-43	Removing the screws that fixing the LCD module and tear pieces of tape..	4-68
Figure 4-44	Removing the LCD Module.....	4-69
Figure 4-45	Removing the LCD Mask .....	4-71
Figure 4-46	Removing the FL Inverter .....	4-72
Figure 4-47	Removing the LCD Unit .....	4-72
Figure 4-48	Removing the LCD supports.....	4-73
Figure 4-49	Removing the coaxial cables .....	4-74
Figure 4-50	Removing two tapes that fixing the camera.....	4-76
Figure 4-51	Disconnecting the connector and Removing the Camera.....	4-76

## 4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional Express card and optional Media card, then follow the line on the chart to determine which FRU you must remove first in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.

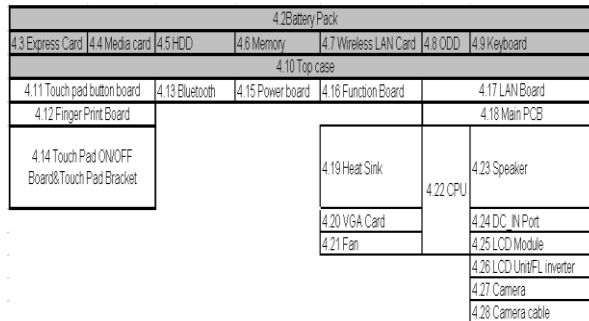


### How to see the chart:

This chart shows which unit(s) you need to remove in advance when you replace one unit.

### Example:

When you want to replace the Function Board, you need to remove units in the hatched boxes above the box in which the function Board is located



## Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

- DANGER:**
- 1) *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.  
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.*
  - 2) *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock.  
Also, do not disassemble individual components in first-level maintenance.*

- WARNING:**
- 1) *Turn off the power and disconnect the AC adapter from the power source, to avoid exposure to electric shock.*
  - 2) *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*
  - 3) *Be careful of edges and corners as these may cut.*

- CAUTION:**
- 1) *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*
  - 2) *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*
  - 3) *Before lifting out a FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*
  - 4) *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*
  - 5) *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*
  - 6) *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*



## Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
  - Dust and contaminants
  - Static electricity
  - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced a FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

## Disassembly Procedures

The computer has three basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnecter.

Standard pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

## Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will not pinch any cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing a FRU in the computer, confirm that the FRU and the computer are functioning properly.

## Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 point size 0 Phillips screwdriver
- One M2.5/M3 point size 1 Phillips screwdriver
- One screwdriver for stud screw
- One 4 mm flat-blade screwdriver
- Tweezers, to lift out screws that you cannot grasp with your fingers
- ESD mats for the floor and the table you are working on
- An ESD wrist strap or heel grounder
- Anti-static carpeting or flooring
- Air ionizers in highly static sensitive areas
- Plastic card the size of a credit card
- Antenna coaxial cable disconnecter

## Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

**CAUTION:** *Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.*

**NOTE:** *Toshiba recommends that you use an electric screwdriver for quick and easy operations.*

- M2            0.167 N·m (1.7 kgf·cm)
- M2.5        0.294 N·m (3.0 kgf·cm)
- M3            0.549 N·m (5.6 kgf·cm)

**NOTE:** *The computer contains several flathead screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.*

## Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- Even number length screw: brown
- Odd number length screw: white
- Special length screw: blue (Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.8 mm.)

## Marking of Screws on the Computer Body

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Kind of screws	Symbol
<input type="checkbox"/> BIND screw	B
<input type="checkbox"/> FLAT HEAD screw	F
<input type="checkbox"/> SUPER THIN HEAD screw	S
<input type="checkbox"/> TAPPING screw	T
<input type="checkbox"/> Other screws (Unique screws, STUD, etc.)	U

Examples:

- 6 mm BIND screw B6
- 12 mm BIND screw B12
- 4 mm FLAT HEAD screw F4  
(Indicates the screwed length in round number regardless the length of the stud.)

## 4.2 Battery pack

### Removing the Battery pack

To remove the battery pack, follow the steps below and refer to Figure 4-1.

**CAUTION:** When handling battery packs, be careful not to short-circuit the terminals. Also do not drop, hit or apply impact, do not scratch, break, twist or bend the battery pack.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and other external devices from the computer.
3. Turn the computer face down.
4. Release the **battery lock**. Pull out the **battery pack** while sliding the **battery latch** as shown in the following figure.

**NOTE:** For environmental reasons, do not throw away a spent battery pack.

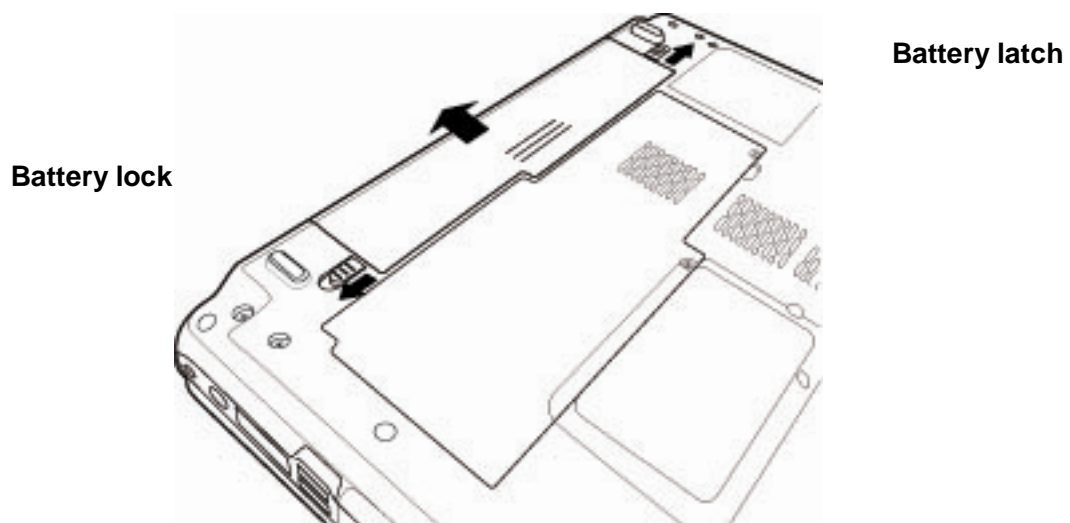


Figure 4-1 Removing the battery pack

## Installing the Battery pack

To install the battery pack, follow the steps below and refer to Figure 4-1.

**CAUTION:** *The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba for replacements.*

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

1. Turn off the power of the computer.
2. Connect the AC adapter and all other external devices to the computer.
3. Push the **battery pack** into the battery slot. Make sure the battery pack is installed securely.
4. Slide the **battery lock** into the lock position.

### 4.3 Express card

#### Removing the Express card

To remove the Express card, follow the steps below and refer to Figure 4-2.

**CAUTION:** Before you remove the Express card, refer to the notebook's documentation and to your operating system documentation for proper procedures and precautions.

1. Turn the computer face up.
2. Press the **Express card** to pop the Express card out.
3. Grasp the **Express card** and pull it out.

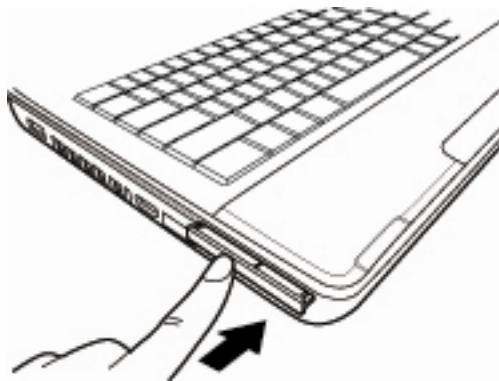


Figure 4-2 Removing the Express card



### **Installing the Express card**

To install the Express card, follow the steps below and refer to Figure 4-2.

1. Insert the **Express card** into the card slot.
2. Push it carefully to ensure a firm connection.

## 4.4 Media card

### Removing the Media card

To remove the Media card, follow the steps below and refer to Figure 4-3.

**CAUTION:** Before you remove the Media card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Push the **Media card** in and release it to pop the card out.
2. Grasp the **Media card** and pull it out.

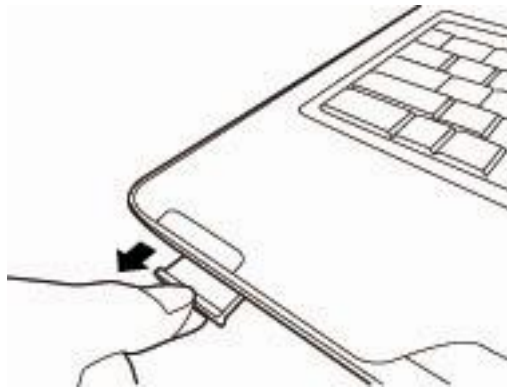


Figure 4-3 Removing the Media card

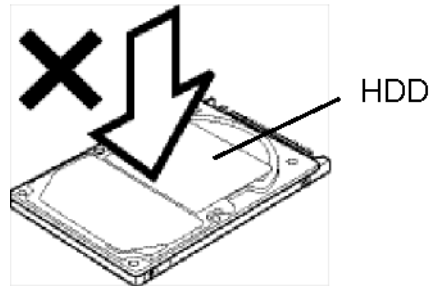
### **Installing the Media card**

To install the Media card, follow the steps below and refer to Figure 4-3.

1. Insert the **Media card** in the Media card slot.
2. Push it carefully to ensure a firm connection.

## 4.5 HDD

**CAUTION:** When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.



### Removing the HDD

To remove the HDD, follow the steps below and refer to Figure 4-4 to 4-6.

1. Turn the computer upside down.
2. Loosen the **screw** (with an e-ring) and remove the **HDD cover**.

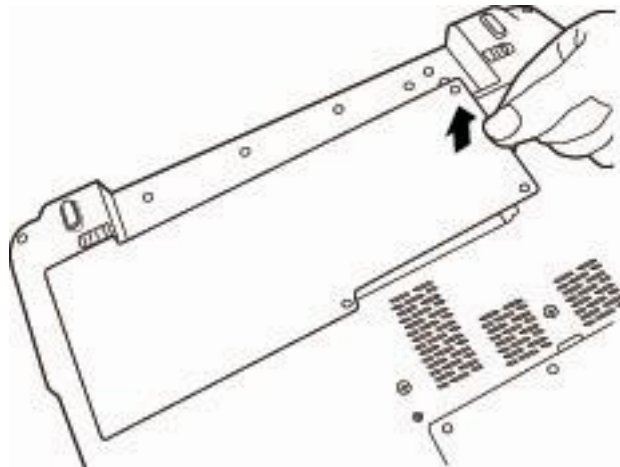


Figure 4-4 Removing the HDD cover

3. Remove the following screws securing HDD module.
  - M2×3L FLAT HEAD screw ×4
4. Pull the **tab** of the **HDD assembly** to remove it from the **connector** of the HDD cable. Be careful not to damage the connector.

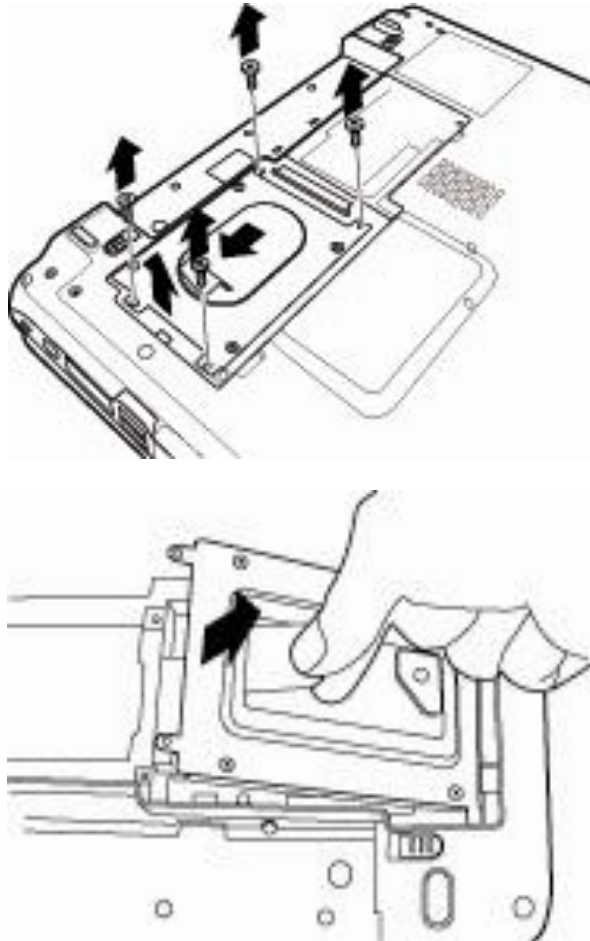


Figure 4-5 Removing the HDD assembly

**NOTE:** The following steps describe how to disassemble the HDD assembly, however, do not disassemble if the HDD is working properly.

5. Place the HDD assembly on a flat surface, and remove the following screws.
  - M3×4L FLAT HEAD screw ×4
6. Separate the **HDD** and **HDD bracket**.

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

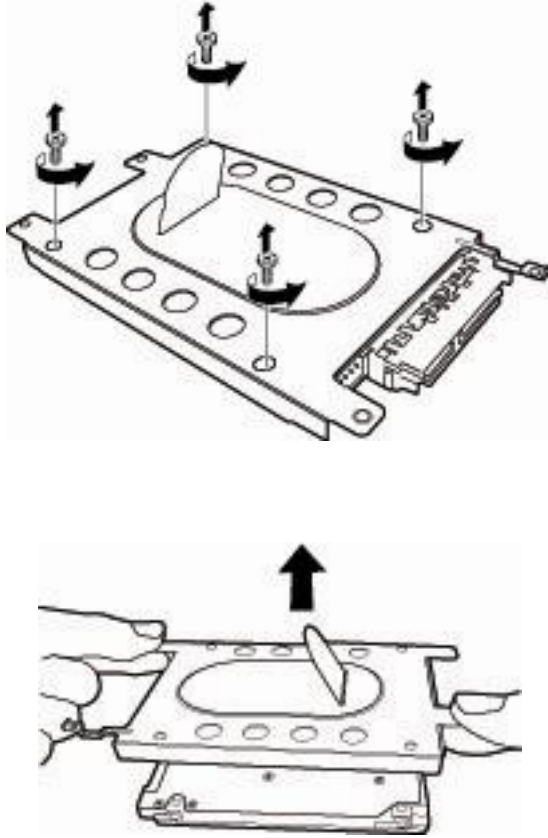


Figure 4-6 Separating the HDD and HDD bracket

## Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-4 to 4-6.

**CAUTION:** Do not hold the HDD by its top and bottom flat surfaces. It may damage the HDD.

1. Seat the **HDD** in the **HDD bracket** and secure the following screws.

- M3×4L FLAT HEAD screw ×4

2. Put the HDD into its slot and connect the **HDD** to the **connector**.

3. Secure them with the following **screws**.

- M2×3L FLAT HEAD screw ×4

**CAUTION:** Do not apply pressure to the center of the HDD pack. It may damage the HDD pack. Hold the HDD pack by its corners.

4. Set the **HDD cover** and secure it with the **screw** (with an e-ring).

## 4.6 Memory module

### Removing the Memory module

To remove the memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-7 to 4-8.

1. Loosen the **screw** (with an e-ring) and remove the **HDD cover**, underneath which there also installing the Memory module besides the HDD module.

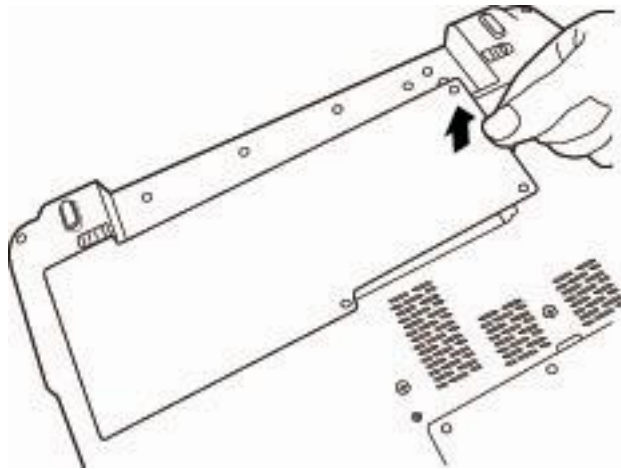
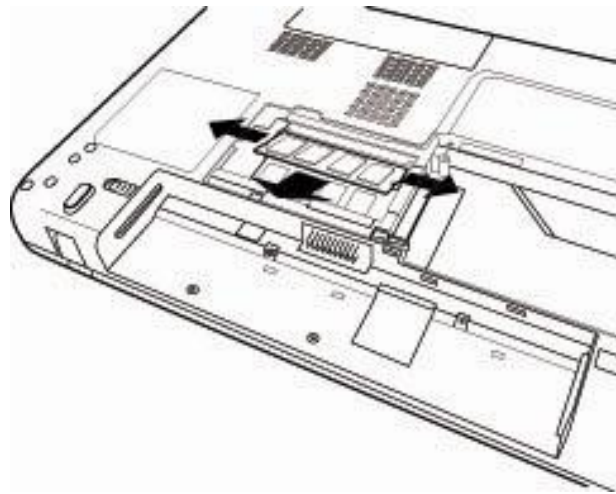


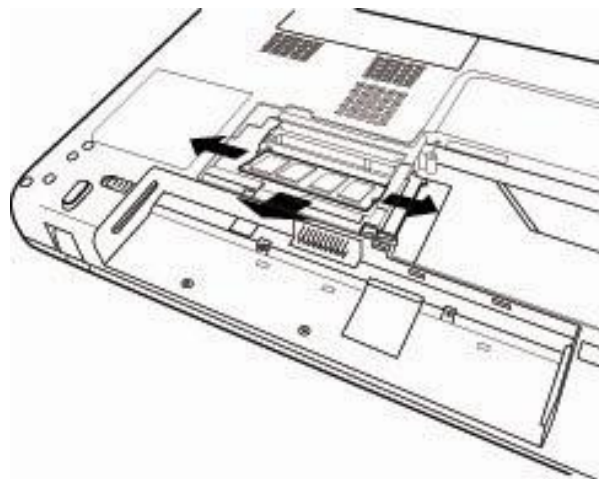
Figure 4-7 Removing the HDD cover



2. Press two **latches** outward and remove the **memory module**.



(the First one)



(the second one)

*Figure 4-8 Removing the memory module*

## Installing the Memory module

To install the memory module, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-7 to 4-8.

**CAUTION:** *When installing only one memory module, be sure to insert it into slot A. Otherwise, the computer or the memory may not work properly.*

*Do not touch the connectors on the memory module or on the computer. Dust and stains on the connectors may cause memory access problems.*

1. Insert the **memory module** into the connector slantwise and press it to connect firmly.

**CAUTION:** *The power must be turned off when you insert a memory module. Inserting a memory module with the power on might damage the module or the computer itself.*

*Never press hard or bend the memory module.*

2. Seat the **HDD cover** and secure it with the **screw** (with an e-ring).
3. When the power is turned on, the computer automatically checks the memory size. Confirm that the new memory is detected correctly.
4. If the memory is not detected, check that it is connected correctly.

## 4.7 Wireless LAN card

### Removing the Wireless LAN card

To remove the wireless LAN card, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-9 to 4-11.

**CAUTION:** Do not try to remove the wireless LAN card with the computer turned on. The computer or the wireless LAN card can be damaged. Do not touch the connectors on the wireless LAN card module on the computer. Debris on the connectors may cause wireless LAN card access problems.

1. Loosen the **screw** (with an e-ring) and remove the **wireless LAN cover**.

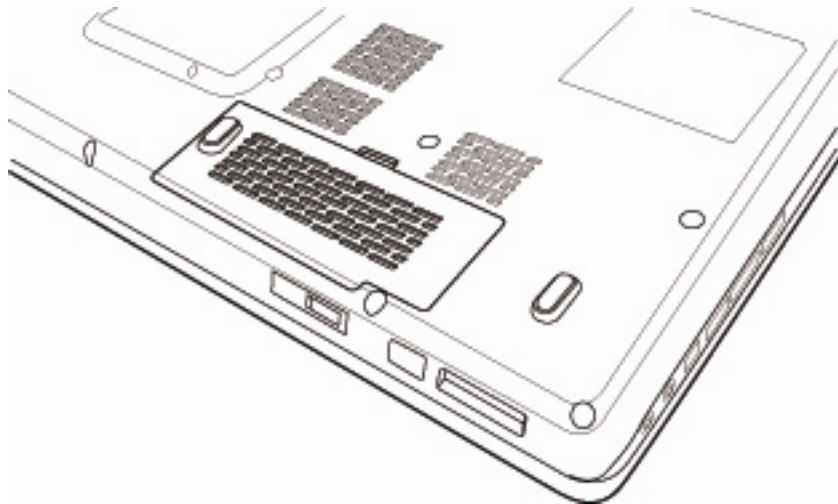
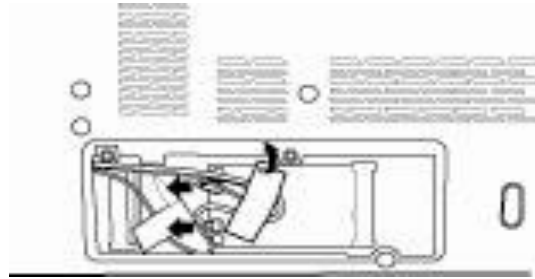
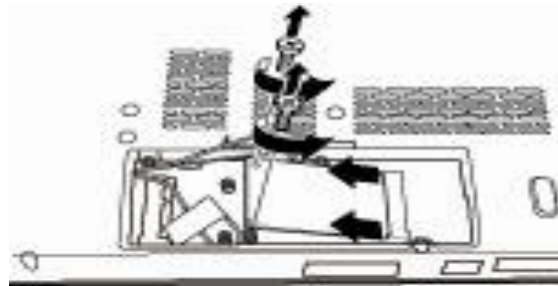


Figure 4-9 Removing the wireless LAN Cover

2. Tear one piece of tape that fixing the wireless LAN antennas.
3. Remove the following **screw** and **wireless LAN antennas**.
  - M2×3L                      FLAT HEAD screw                      ×2
4. Disconnect the **wireless LAN card** from the **connector** on the main board. Be careful not to damage the connector.
5. Remove the WLAN board from the system at the pop-up angle.



*Figure 4-10 Removing tape and disconnecting wireless LAN antennas*



*Figure 4-11 Removing the wireless LAN card*

## Installing the Wireless LAN card

To install the wireless LAN card, make sure that the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-9 to 4-11.

**CAUTION:** *Be sure to switch the computer off before installing the wireless LAN card. Otherwise, the computer or the wireless LAN card may be damaged.*

1. Insert the **wireless LAN card** into connector **at an angle** on the main board.
2. Gently push the wireless LAN card down and secure the wireless LAN card with the following **screw**.
  - M2×3L      FLAT HEAD screw      ×2
3. Connect the **wireless LAN antenna cables** (white antenna cable should be connected with the 2 connector; black antenna cable should be connected with the 1 connector) to the connectors on the wireless LAN card.

**CAUTION:** *There are two MAC address barcode labels in the package containing the new wireless LAN board. Apply one label on the wireless LAN board and one on the box the computer was in. Before you apply the new labels, remove the old ones from the wireless LAN board and the box. The computer may have MAC address barcode labels for both wired and wireless LANs. Be sure to replace the correct label.*

## 4.8 Optical Disc Drive module

### Removing the Optical Disc Drive module

To remove the Optical Disc Drive module, follow the steps below and refer to Figures 4-12 and 4-13.

**CAUTION:** *The Optical Disc Drive module can become hot with use. Be careful when removing the module.*

1. Remove the following **screw** securing the latch of the Optical Disc Drive.
  - M2×3L FLAT HEAD screw ×1
2. While pulling the module towards the direction of the arrow in the figure below, remove the **Optical Disc Drive module**.

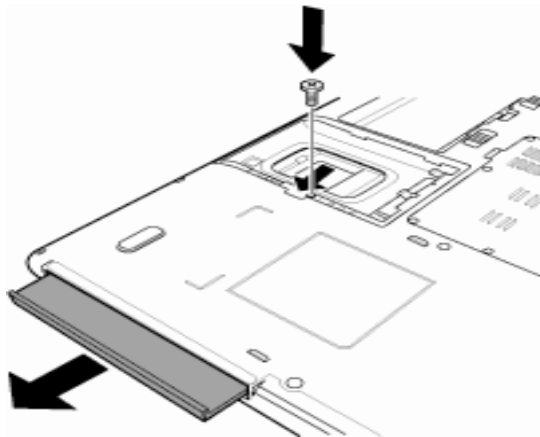
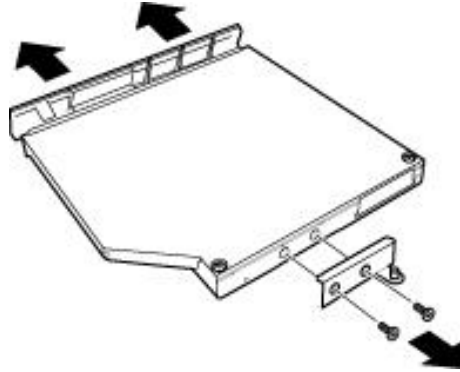


Figure 4-12 Removing the Optical Disc Drive module

3. Remove the following screws securing the ODD bracket.
  - M2×2.5L FLAT HEAD screw                    ×2



*Figure 4-13 Disassembling the Optical Disc Drive module*

## Installing the Optical Disc Drive module

To install the Optical Disc Drive module, follow the steps below and refer to Figures 4-12 and 4-13.

1. Set the **ODD bracket** and secure it with the following **screws**.
  - M2×2.5L FLAT HEAD screw ×2
2. Insert the **Optical Disc Drive module** firmly into the computer to connect it to the **connector** on the main board.
3. Secure one **screw as follows**. (The Optical Disc Drive is latched.)
  - M2×3L FLAT HEAD screw ×1

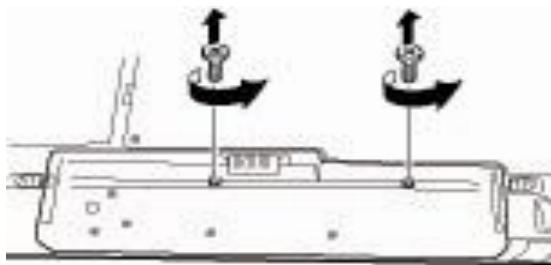


## 4.9 Keyboard

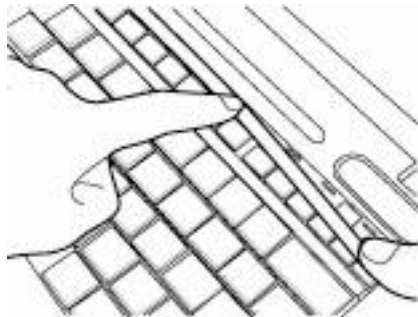
### Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figures 4-14 to 4-17.

1. Remove the following **screws** securing the bottom of the keyboard around on the bottom case.
  - M2×2.5L FLAT HEAD screw ×2
2. Turn the computer over and open the display and remove the keyboard cover.



*Figure 4-14 Removing the screws securing keyboard cover*



*Figure 4-15 Removing the keyboard cover*

3. Remove the following **screws** securing the keyboard plate on the Top case.

- M2×2L FLAT HEAD screw ×2

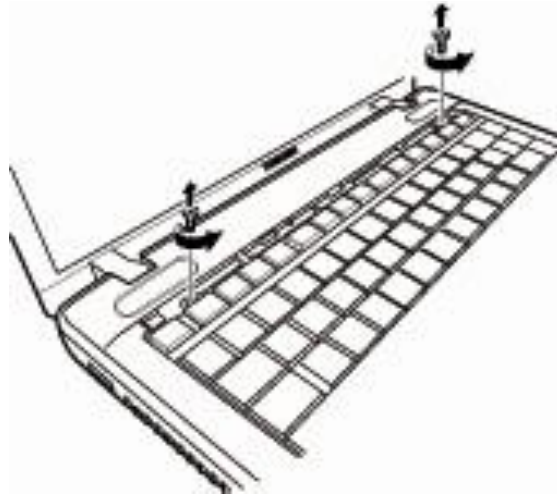


Figure 4-16 Removing the screws securing keyboard plate

4. Lift the **keyboard plate** upward a little and turn it facedown on the palm rest. Disconnect the **keyboard flexible cable and the LED cable** on the main board, and then remove the keyboard.

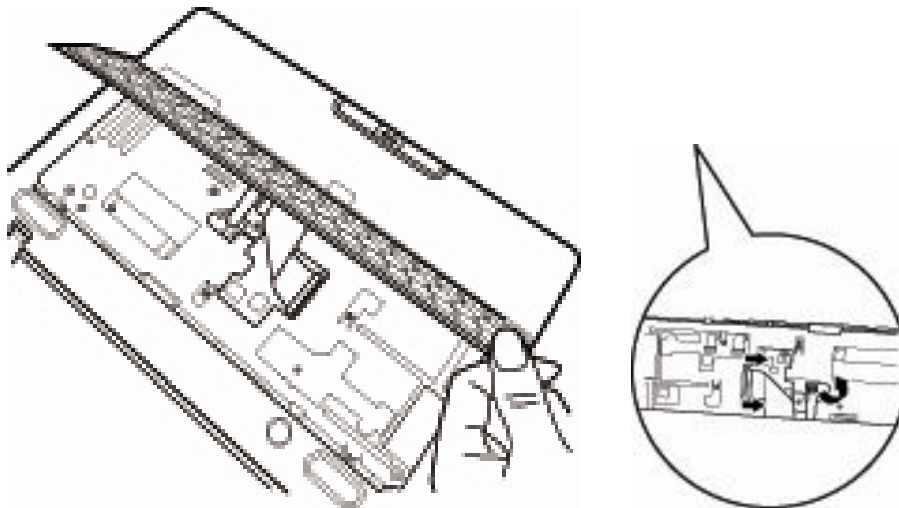


Figure 4-17 Lifting the keyboard plate

## Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figures 4-14 to 4-17.

1. Place the keyboard facedown on the top cover.
2. Connect the **keyboard flexible cable** and the **LED cable** on the main board.
3. Turn the **keyboard** face up and set it in place.
4. Secure the keyboard with two **screws** on the top case.
  - M2×2L      FLAT HEAD screw      ×2
5. Make sure that there is no gap between the keyboard and the edge of the top cover.
6. Place the keyboard around on the top case
7. Secure the keyboard around with two **screws** on the bottom case.
  - M2×2.5L      FLAT HEAD screw      ×2

## 4.10 Top cover

### Removing the Top cover

To remove the Top cover, follow the steps below and refer to Figures 4-18 to 4-20.

1. Remove the following screws securing the bottom case.

- M2×5L            FLAT HEAD screw            ×11
- M2.5×5L        FLAT HEAD screw            ×2
- M2×7L            FLAT HEAD screw            ×1
- M2×3L            FLAT HEAD screw            ×4

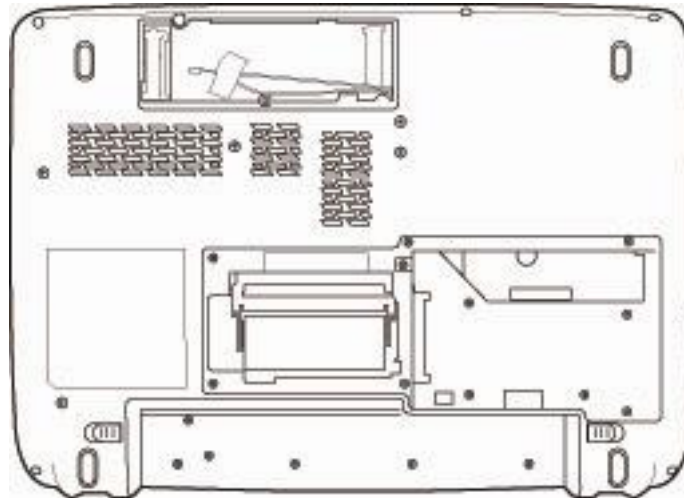


Figure 4-18 Removing the screws on the bottom case

2. Turn the bottom case face up and disconnect the **Touch pad FPC, Power Board FPC, Bluetooth cable, Finger print FPC** and **Touch Pad on/off FPC** from the main board.
3. Remove the following screws securing the Top cover.
  - M2×5L      FLAT HEAD screw      ×4

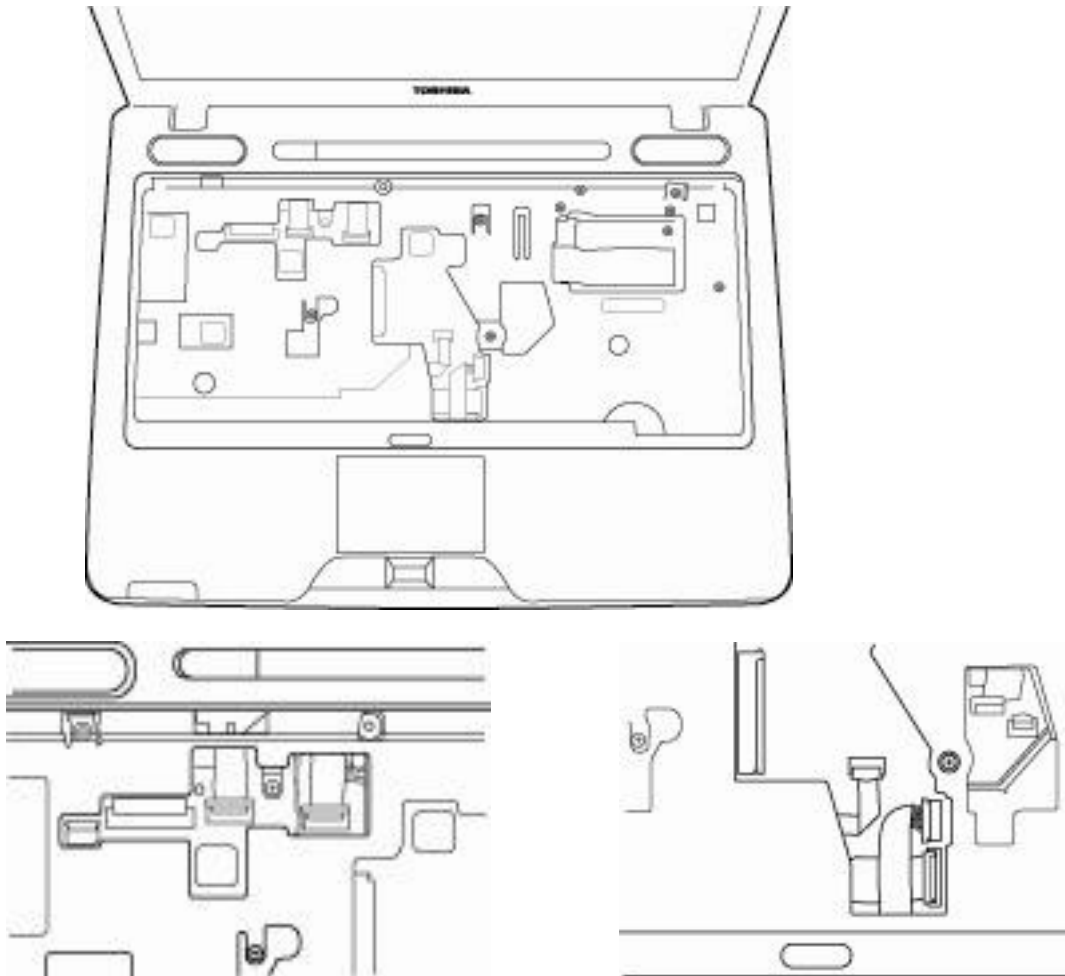


Figure 4-19 Removing the screws and disconnecting the cable on the top case

4. Separate the Top cover from the bottom case.

**NOTE:** remove the top cover according to the direction of the arrow.

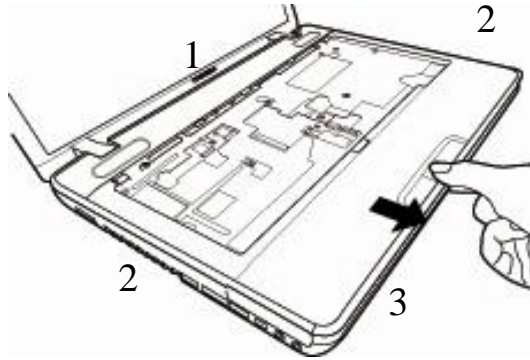


Figure 4-20 Removing Top cover

## Installing the Top cover

To install the top case, follow the steps below and refer to Figures 4-18 to 4-20.

1. Install the Top cover on the bottom case.
2. Secure the following screws on the Top cover.
  - M2×5L            FLAT HEAD screw            ×4
3. Connect the Touch pad FPC, Power Board FPC, Bluetooth cable, Finger print cable and Touch pad ON/OFF cable with connector on the main PCB, and turn the bottom case face down.
4. Secure the following screws on the bottom case.
  - M2×5L            FLAT HEAD screw            ×11
  - M2.5×5L         FLAT HEAD screw            ×2
  - M2×7L            FLAT HEAD screw            ×1
  - M2×3L            FLAT HEAD screw            ×4

## 4.11 Touch pad Board

### Removing the Touch pad Board

To remove the touch pad Board, follow the steps below and refer to Figures 4-21 and 4-22.

1. Remove one piece of tape and disconnect the Touch pad board FPC, disconnect the FPC that connecting the touch pad with touch pad board.

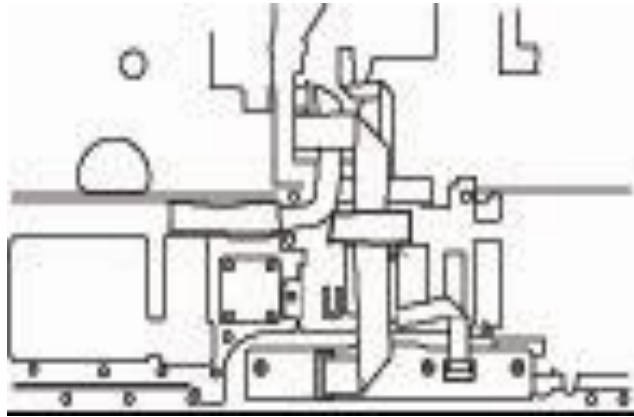


Figure 4-21 Removing touch pad FPC

2. Remove the following **screws** securing the **touch pad board** and remove the touch pad board from the Top cover.

- M2×3L FLATHEAD screw ×2

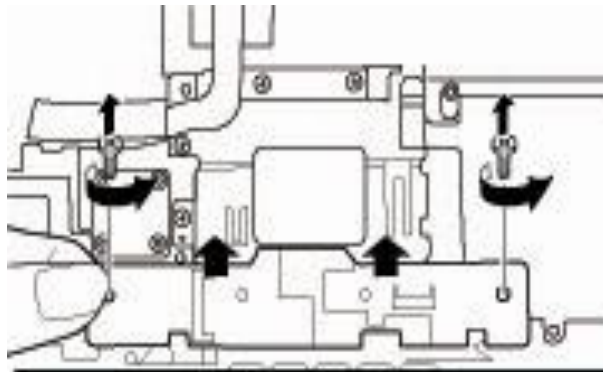


Figure 4-22 Removing the touch pad Button board



## Installing the Touch pad board

To install the touch pad button, follow the steps below and refer to Figures 4-21 and 4-22.

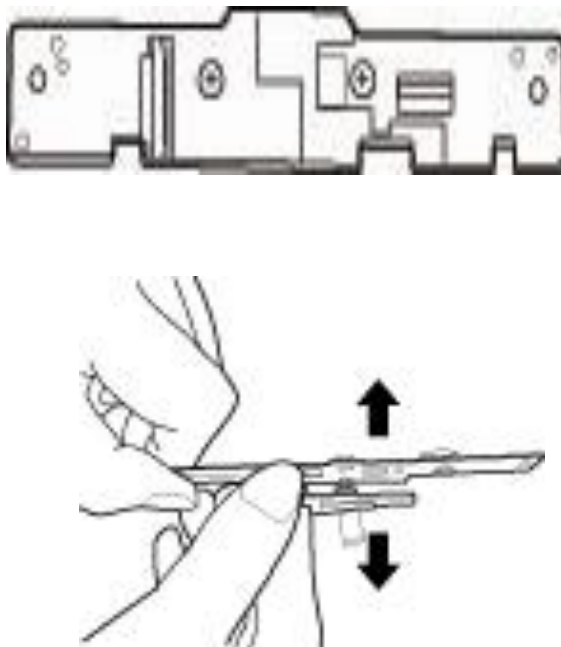
1. Install the **touch pad board** to the slot and secure it with 2 screws.
  - M2×3L FLATHEAD screw ×2
2. Connect the FPC cable that connecting the touch pad board with the touch pad, connect the touch pad board FPC and paste one piece of tape to fix it.

## 4.12 Finger Print board

### Removing the Finger Print board

To remove the Finger Print board, follow the steps below and refer to Figure 4-23.

1. Remove the following **screws** on the Touch pad button board.
  - M2×3L FLAT HEAD screw ×2
2. Separate the touch pad button board with finger print board. (be careful about the connector in case of damage)



*Figure 4-23 Separating the touch pad board from finger Print board*

## Installing the Finger Print board

To install the Finger Print board, follow the steps below and refer to Figure 4-23.

1. Seat the **Finger Print board** in place while inserting the connector side into the guide.
2. Secure the following **screws** on Touch pad button board.
  - M2×3L      FLAT HEAD screw      ×2

## 4.13 Bluetooth

### Removing the Bluetooth

To remove the Bluetooth, follow the steps below and refer to Figures 4-24 to 4-26.

1. Tear one piece of tape that fixing the Bluetooth cable and remove 2 screws on the Bluetooth cover.
  - M2×3L FLAT HEAD screw ×2
2. Take the Bluetooth cover and Bluetooth out of the system.



Figure 4-24 Removing the Bluetooth Bracket

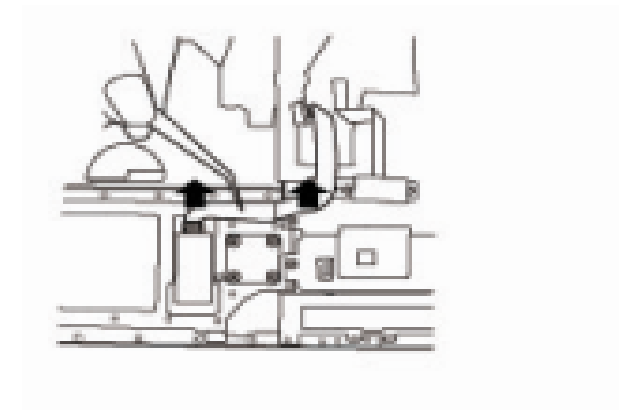
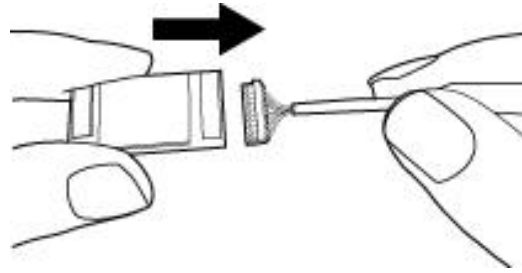


Figure 4-25 Removing the Bluetooth

3. Separate the Bluetooth cable from the Bluetooth module.



*Figure 4-26 Separating the Bluetooth From its cable*

## Installing the Bluetooth

To install the Bluetooth, follow the steps below and refer to Figures 4-24 to 4-26.

1. Connecting the Bluetooth cable with Bluetooth.
2. Install the Bluetooth on the Top case.
3. Install the Bluetooth cover on the Top case and secure the Bluetooth cover with the following **screws**.
  - M2×3L FLAT HEAD screw ×2
4. Paste one piece of tape to fix the Bluetooth cable.

## 4.14 Touch pad on/off board and Touch Pad Bracket

### Removing the Touch pad on/off board and Touch pad bracket

To remove the touch pad button on/off board and Touch Pad bracket, follow the steps below and refer to Figure 4-27 and 4-28.

1. Tear one piece of tape and remove the **screws** as the following which fix the Touch pad on/off board, and then take the touch pad on/off board out of the top case.
  - M2×3L FLAT HEAD screw ×2

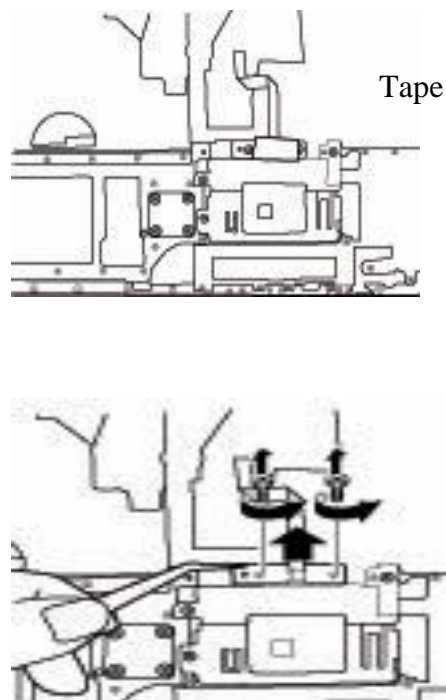


Figure 4-27 Removing the touch pad on/off Board

2. Remove the **screws** as the following that fixing the touch pad bracket and tear the tape, and then take the touch pad bracket out of the top case.

- M2×3.5L FLAT HEAD screw ×3

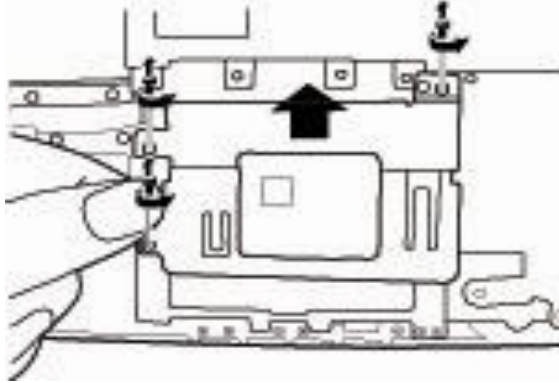


Figure 4-28 Removing the touch pad Bracket



## Installing the Touch pad on/off board and Touch pad Bracket

To install the touch pad on/off board and Touch Pad bracket, follow the steps below and refer to Figure 4-27 and 4-28.

1. Install the Touch pad bracket on the Top case and secure the screws as the following and paste the tape.
  - M2×3.5L FLAT HEAD screw ×3
  
2. Install the Touch pad on/off board on the top case and secure the screws as the following, and then paste on piece of tape to fix it.
  - M2×3L FLAT HEAD screw ×2

## 4.15 Power Board

### Removing the Power Board

To remove the Power Board, follow the steps below and refer to Figures 4-29.

1. Remove 1 screw as the following that fixing the power board.
  - M2×3 FLAT HEAD screw ×1
2. Take the power board out of the top case.

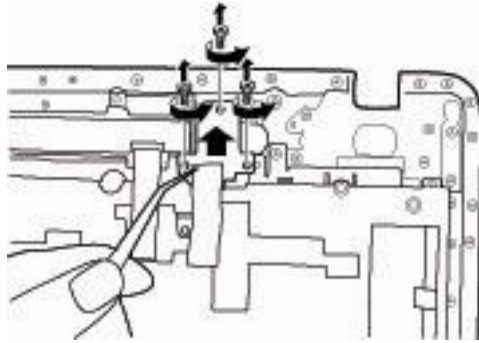


Figure 4-29 Removing the Power board

## Installing the Power Board

To install the Power Board, follow the steps below and refer to Figures 4-29.

1. Place the Power Board on the system.
2. Secure the screw as the following.
  - M2×3 FLAT HEAD screw ×1

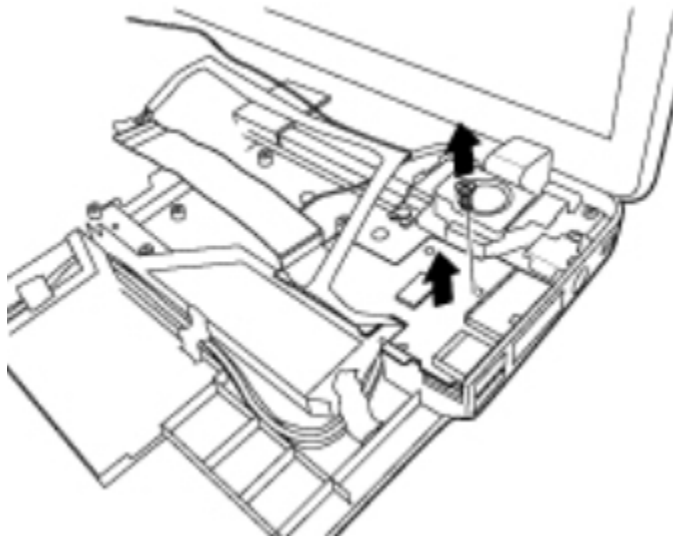
## 4.16 LAN Board

### Removing the LAN Board

To remove the LAN Board, follow the steps below and refer to Figures 4-30.

1. Tear 2 piece of tape and remove the screw as the following, Disconnect the Connector and take the LAN board out of the system.

- M2×5L FLAT HEAD screw ×1



*Figure 4-30 Removing the LAN board*

## Installing the LAN Board

To install the LAN Board, follow the steps below and refer to Figures 4-30.

1. Install the LAN board on the bottom case, connect the connector and paste two pieces of tape to fix it, secure the screw as the following.
  - M2×5L      FLAT HEAD screw      ×1

## 4.17 Main PCB

### Removing the Main PCB

To remove the Main PCB, follow the steps below and refer to Figures 4-31 and 4-32.

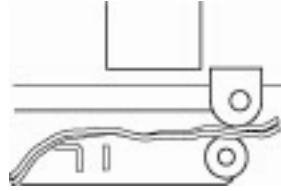
1. Disconnect the **speaker cable**, **DC-IN Port cable**, **Coaxial cable** and **camera cable** from the main PCB and remove six pieces of tape (10\*30mm) securing the **speaker cable**, remove the screws as the following that fixing the LVDS cable.

- M2×2L FLAT HEAD screw ×1

2. Remove the screws as the following, and then take the mental bracket and motherboard out of the system.

- M2×2.5L FLAT HEAD screw ×2

- M2×5L FLAT HEAD screw ×2



**CAUTION:**  
When routing speaker cable, please put it by the rib, as picture shown. Please do not put the speaker cable on the rib.

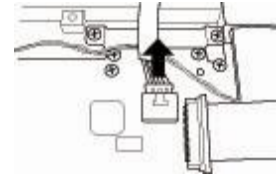
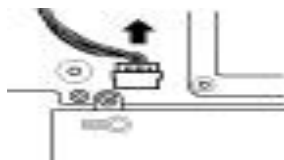
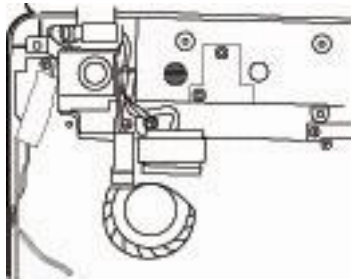
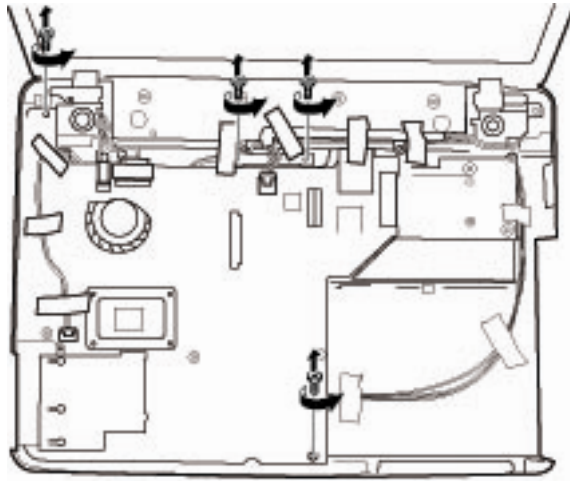


Figure4-31 Disconnecting the Cables from main PCB and removing the screws

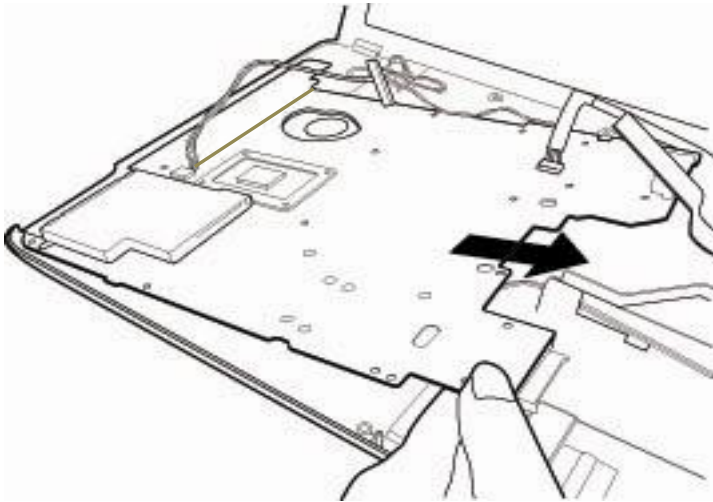


Figure 4-32 Removing the main PCB.

### Installing the Main PCB

To install the Main PCB, follow the steps below and refer to Figures 4-31 and 4-32.

1. Install the main PCB and mental bracket on the bottom case, and secure the main PCB and mental bracket to the bottom case using the following screws.
  - M2×5L FLAT HEAD screw ×2
  - M2×2.5L FLAT HEAD screw ×2
2. Connect the speaker cable, DC-IN Port cable, Coaxial cable and Camera cable with the main PCB and paste six pieces of tape to secure the speaker cable. Secure the screw as the following that fixing the coaxial cable.
  - M2×2L FLAT HEAD screw ×1





## 4.18 Heat Sink

### Removing the heat sink

To remove the heat sink, follow the steps below and refer to Figure 4-33.

1. Remove the following **screws** securing the heat sink by order.
  - M2×3L FLAT HEAD screw ×6
2. Take the **heat sink** from the slot.

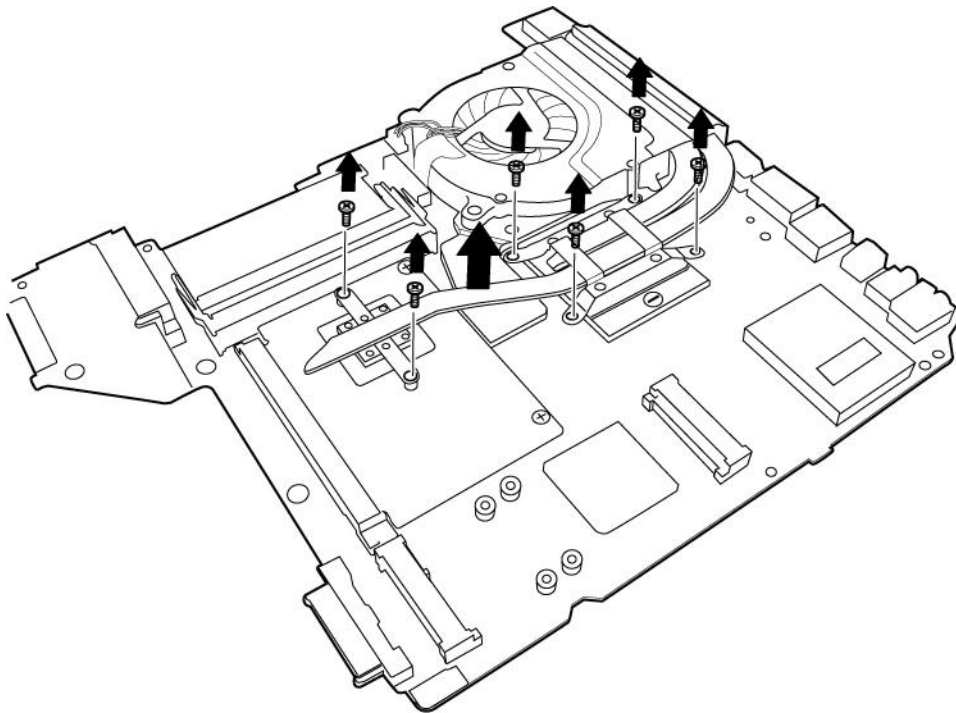


Figure4-33 Removing the Heat Sink

**CAUTION:** Remove the screws in the order of mark “6”, “5”, “4”, “3”, “2” and “1” on the CPU holder.

## Installing the Heat Sink

To install the Heat Sink, follow the steps below and refer to Figure 4-33 and 4-34.

1. Apply new thermal pad on the heat sink as shown in the following figure. Stick the thermal pad on heat sink follow the mark. (Be sure to clean off all old pads before applying new thermal pad).

**CAUTION:** When installing the CPU, apply new thermal pad on the top of the CPU chip. When installing the fin, make sure the bottom of the fin covers the top of the CPU.

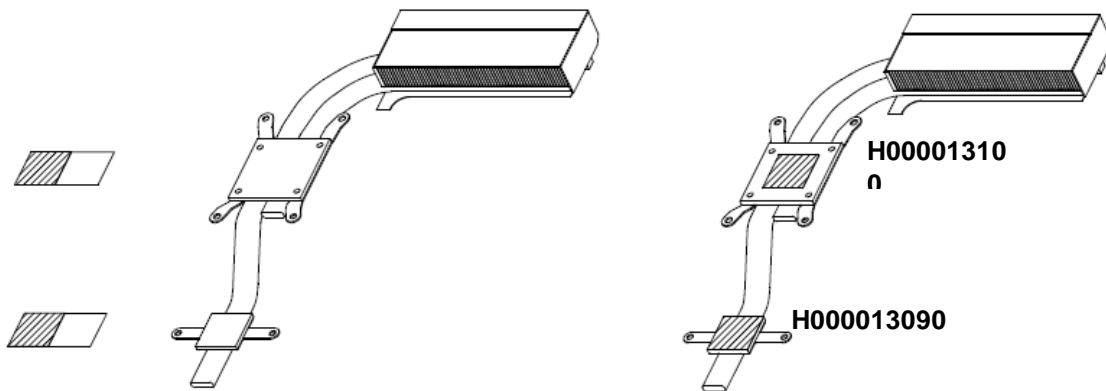


Figure 4-34 Applying new thermal pad

2. Install the CPU heat sink
3. Secure the CPU heat sink with the following screws in the numbered order as shown on the holder.

M2×3L      FLAT HEAD screw      ×6

## 4.19 VGA Card

### Removing the VGA Card

To remove the VGA Card, follow the steps below and refer to Figure 4-35.

1. Remove the following **screws** securing **the VGA Card**.
  - M2×5L FLAT HEAD screw ×2
2. Remove the VGA from the slot.

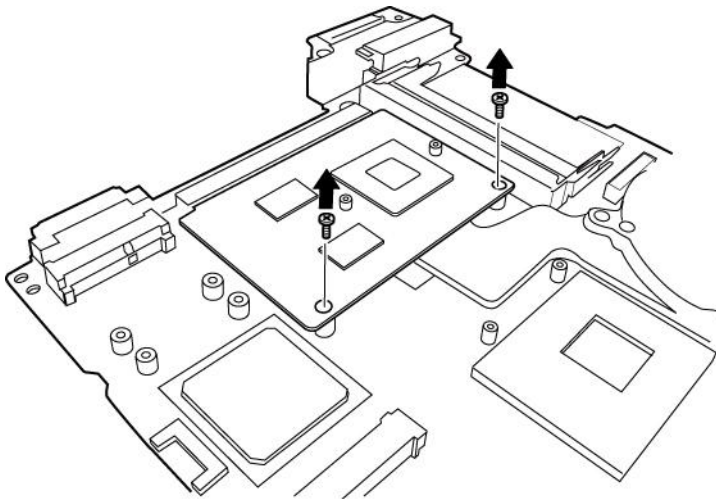


Figure4-35 Removing the VGA Card

## Installing the VGA Card

To install the VGA Card, follow the steps below and refer to Figure 4-35.

1. Install the **VGA Card**.
2. Secure the **VGA Card** with the following **screws**.
  - M2×5L      FLAT HEAD screw      ×2

## 4.20 Fan

### Removing the Fan

To remove the fan, follow the steps below and refer to Figure 4-36.

1. Remove the following **screws** securing the fan and disconnect the fan cable that connecting the fan with motherboard.

- M2×5L FLAT HEAD screw ×3

2. Remove the **fan** from the slot.

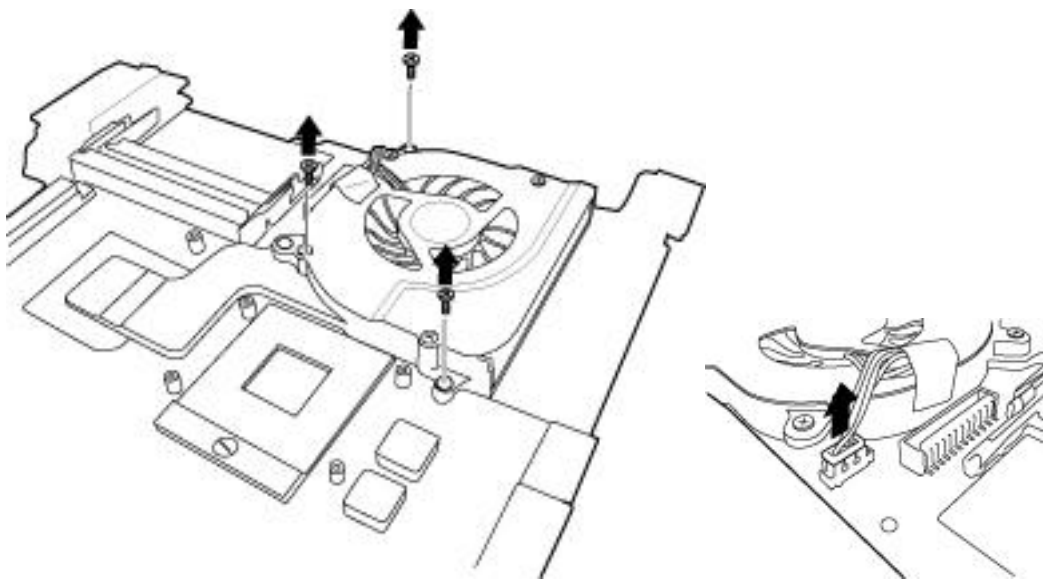
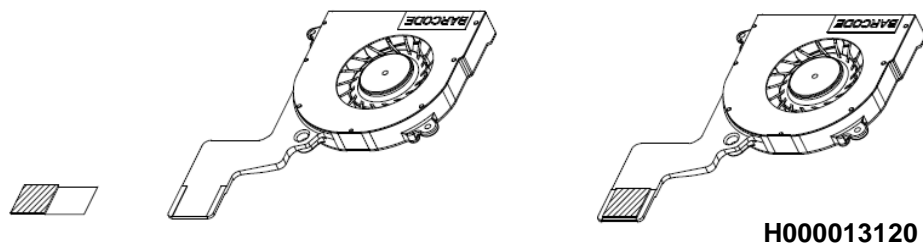


Figure4-36 Removing the Fan Module

## Installing the Fan

To install the fan, follow the steps below and refer to Figure 4-36 and 4-37.

1. Apply new thermal pad on the fan as shown in the following figure. Stick the thermal pad on fan follow the mark. (Be sure to clean off all old pad before applying new thermal pad).



*Figure 4-37 Apply new thermal pad on the fan*

2. Install the fan.
3. Secure the fan with the following screws and connect the cable that connecting the fan cable with motherboard.
  - M2×5L FLAT HEAD screw ×3

## 4.21 CPU

### Removing the CPU

To remove the CPU, follow the steps below and refer to Figures 4-38.

**CAUTION:** 1) The CPU can become very hot during operation. Be sure to let it cool before starting repair work.

2) When you remove the CPU, wipe the grease off of the top of the CPU. Apply new grease before installing.

**CAUTION:** When removing the heat sink, be careful not to damage the CPU under the fin.

Thoroughly clean the grease from the thermal module.

1. Unlock the **CPU** by turning the **cam** counterclockwise on the CPU socket 180 degrees using a flat-blade screwdriver.

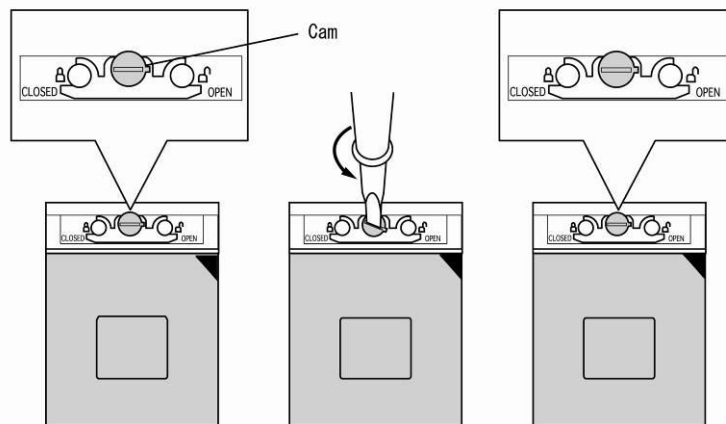


Figure 4-38 Unlocking the CPU



2. Remove the **CPU**.

**CAUTION:** *When removing the CPU, lift it straight up. Otherwise, pins on the CPU may be damaged.*

## Installing the CPU

To install the CPU, follow the steps below and refer to Figures 4-38 to 4-39.

4. Make sure the **cam** is in the open position.
5. Seat the **CPU** in the CPU socket. Make sure the direction and position of CPU is correct to avoid damaging pins on the CPU.

**CAUTION:** Place the CPU as shown below. (Pay attention to the position of the triangle mark on the CPU.)

6. Secure the **CPU** by turning the **cam** on the CPU socket 180 degrees clockwise with a flat-blade screwdriver (in the order shown in the figure below).

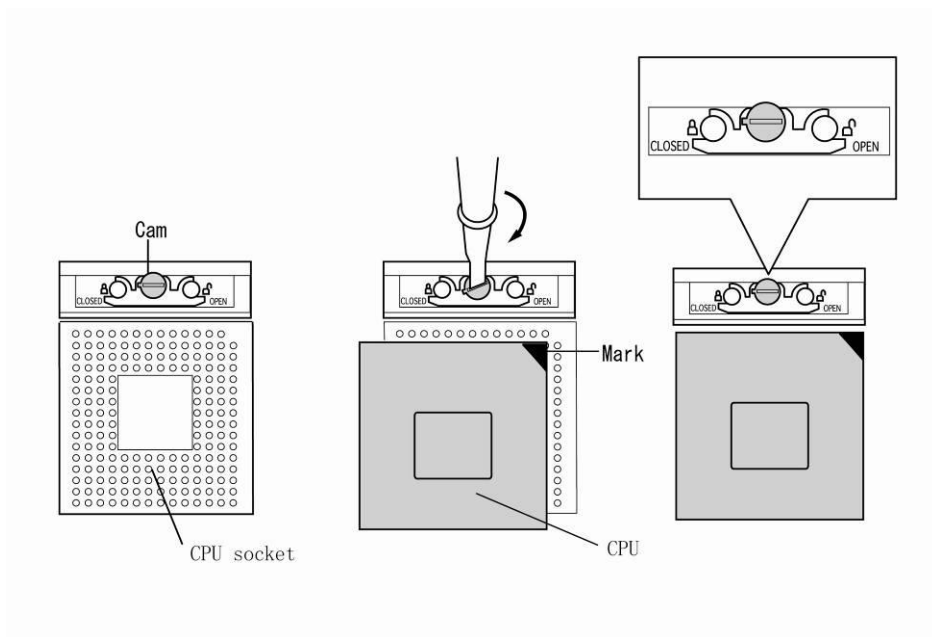


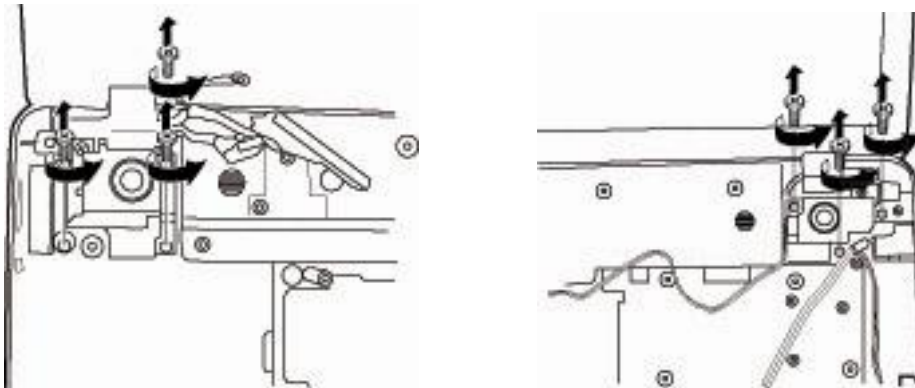
Figure 4-39 Installing the CPU

## 4.22 Speaker

### Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-40.

1. Remove the following **screws** securing the two speakers.
  - M2×2L FLAT HEAD screw ×6
2. Remove the speaker from the bottom case.



*Figure 4-40 Removing the screws that fixing the speakers*

## Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-40.

1. Install the two **speakers**.
2. Secure the following screws on two **speakers**.
  - M2×2L FLAT HEAD screw ×6

## 4.23 DC-IN Cable

### Removing the DC-IN cable

To remove the DC-IN cable, follow the steps below and refer to Figure 4-41 to 4-42.

1. Remove the following screw securing the **DC-IN cable**.
  - M2×4L FLAT HEAD screw ×1
2. Remove the DC-IN cable Bracket and DC-IN cable from the bottom case.

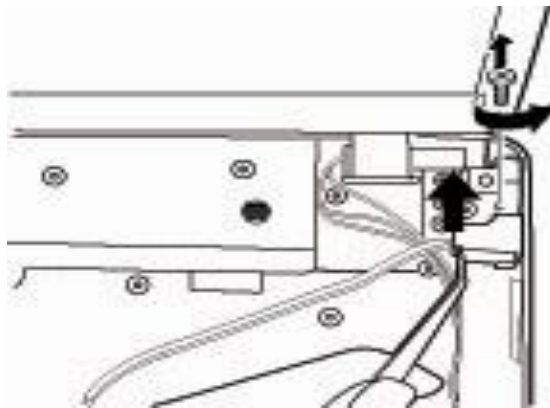


Figure 4-41 Removing the DC-IN cable Bracket

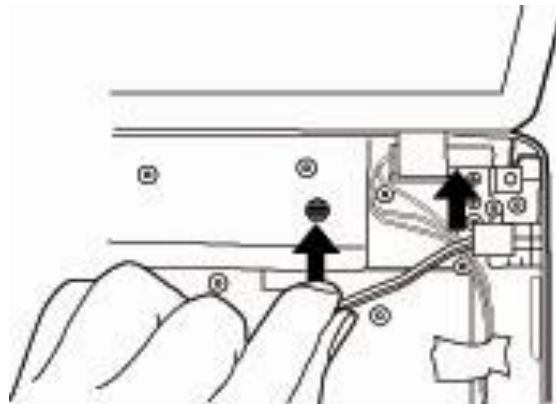


Figure 4-42 Removing the DC-IN cable

### Installing the DC-IN cable

To install the DC-IN cable, follow the steps below and refer to Figure 4-41 to 4-42.

1. Install the DC-IN cable and DC-IN cable bracket on the bottom case.
2. Secure the following screw securing DC-IN cable

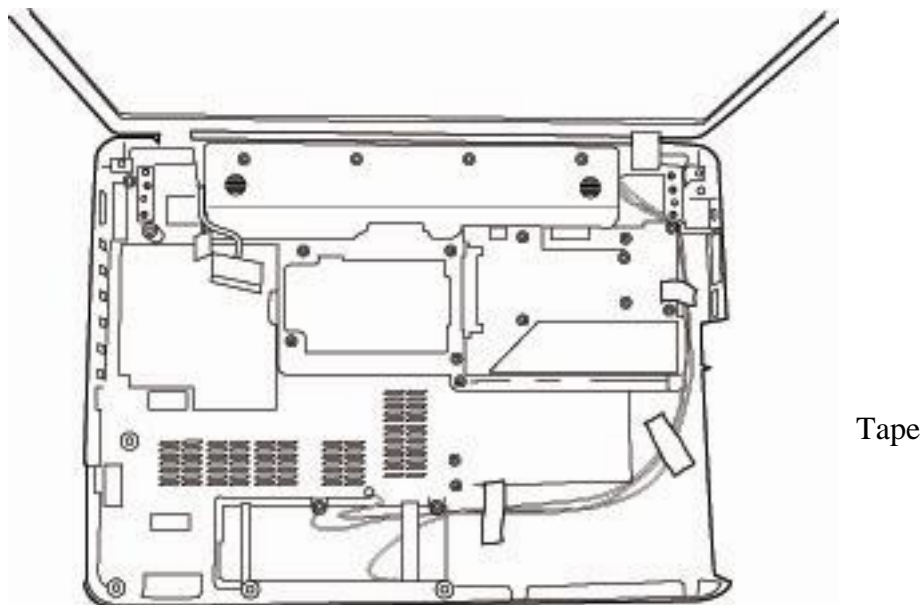
- M2×4L FLAT HEAD screw ×1

## 4.24 LCD Module

### Removing the LCD Module

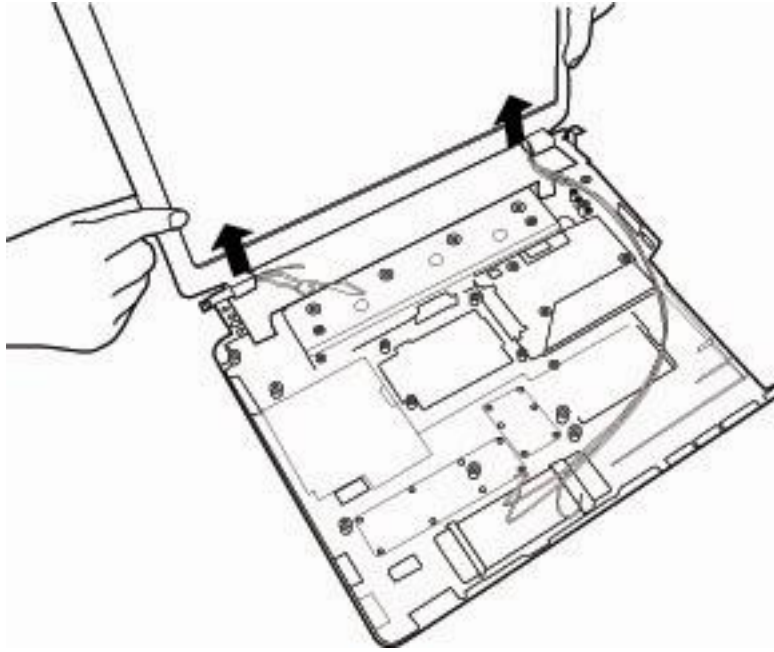
To remove the LCD Module, follow the steps below and refer to Figure 4-43 to 4-44.

1. Remove three pieces of tape securing the Wireless LAN Cable and Coaxial Cable and pull the cables out of the cable guide.
2. Remove the following screws securing the LCD Module.
  - M2.5×5L FLAT HEAD screw ×6



*Figure 4-43 Removing the Screws and tape*

3. Remove the LCD module out of the system.



*Figure 4-44 Removing the LCD Module*



## Installing the LCD Module

To install the LCD Module, follow the steps below and refer to Figure 4-43 to 4-44.

1. Install the **LCD Module**.
2. Secure the following screws on the LCD Module.
  - M2.5×5L      FLAT HEAD screw                  ×6
3. Paste 3 pieces of tape to fix the Wireless LAN cable and Coaxial cable and arrange the cables along the **guides**.

## 4.25 LCD unit/FL inverter

### Removing the LCD unit/FL inverter

To remove the LCD unit/FL inverter, follow the steps below and refer to Figures 4-45 to 4-49.

1. Remove the following **screws** securing the LCD bezel.
  - M2×5L (K) screw ×4
2. Remove the **LCD bezel** as arrow shown while releasing the latches.

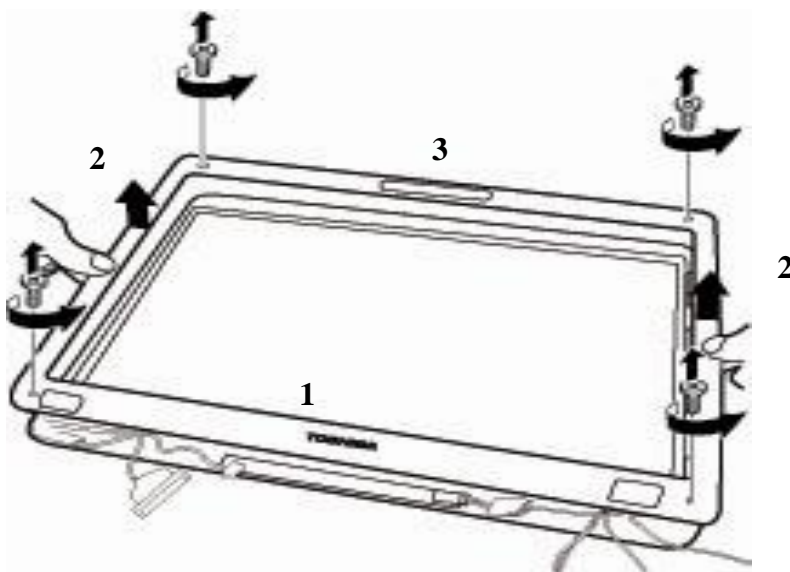


Figure 4-45 Removing the LCD bezel

3. Remove 1 piece of **tape** securing **FL cable** and disconnect the **FL cable** from **connector CN1**, and **HV cable** from **connector CN2**, and then remove the **FL inverter**.

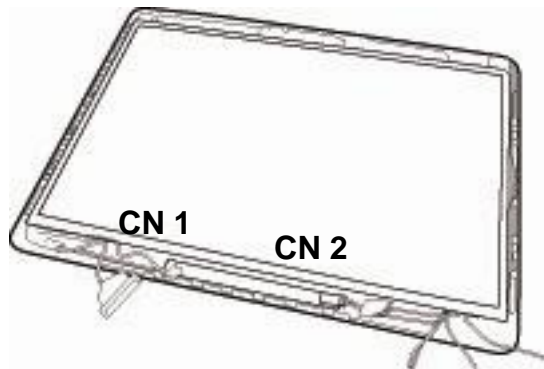


Figure 4-46 Removing the FL inverter

4. Remove the following screws securing the LCD unit on LCD back cover.
  - M2.5×4L FLAT HEAD screw      ×2
5. Remove the **LCD unit** from **LCD back cover**, and place the LCD back cover facedown on a protective surface.

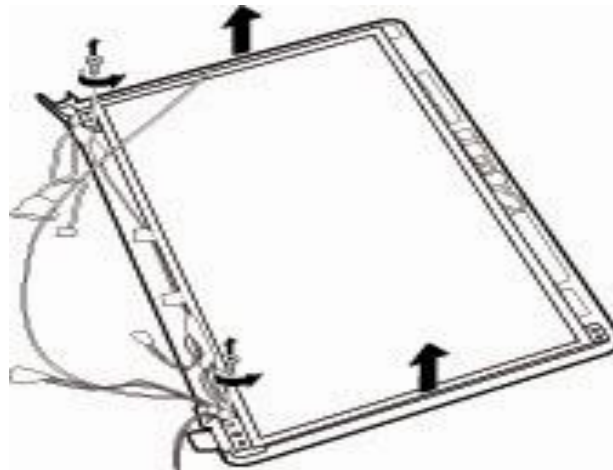


Figure 4-47 Removing the LCD Unit

**NOTE:** 1) Be careful not to apply pressure to the ICs along the edge of LCD unit. The ICs are easily damaged.

2) For environmental reasons, do not throw away a malfunctioning LCD unit (or FL). Please follow local ordinances or regulations for its disposal.

6. Remove the following screws securing the LCD supports and then remove them.

- M2×2.5L FLAT HEAD screw ×6

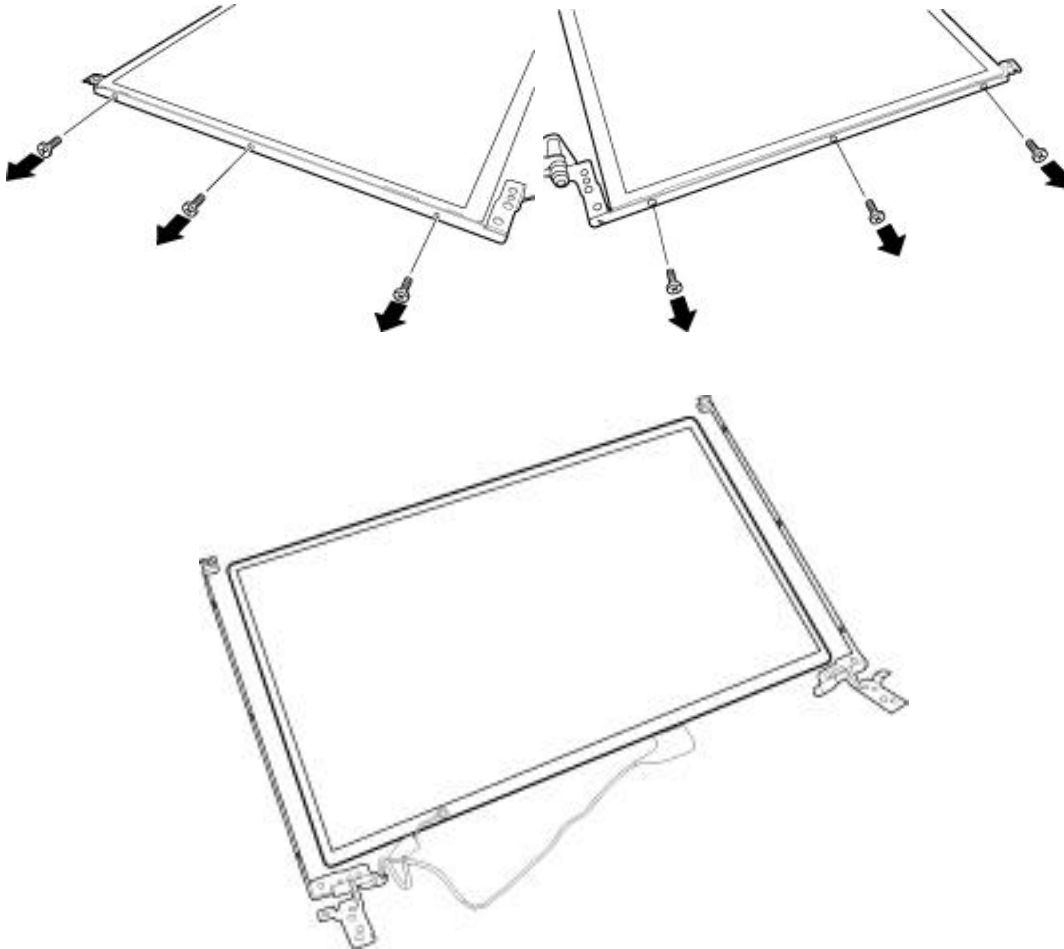
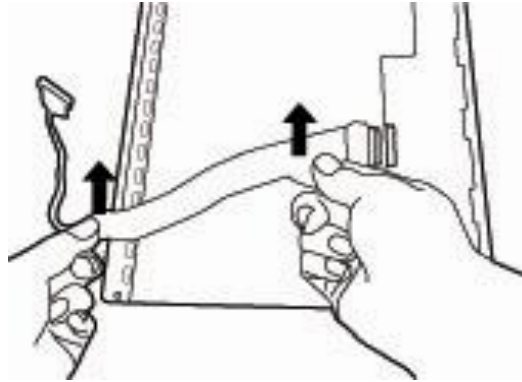


Figure 4-48 Removing the LCD supports

6. Remove one piece of tape on coaxial cable connector.
7. Disconnect coaxial cable from the connector and remove the cable.



*Figure 4-49 Removing the coaxial cable*

### Installing the LCD unit / FL inverter

To install the LCD unit / FL inverter, follow the steps below and refer to Figures 4-44 to 4-49.

1. Connect the LCD cable to the LCD unit.
2. Secure one piece of tape on LCD cable connector.
3. Seat two LCD supports on the LCD and secure them with the following **screws**.
  - M2×2.5L FLAT HEAD screw ×6

*CAUTION: When installing the LCD support, do not mistake the left for the right and vice versa. "L" for the left, "R" for the right and "UP" for the up of the bracket are marked on the bracket.*

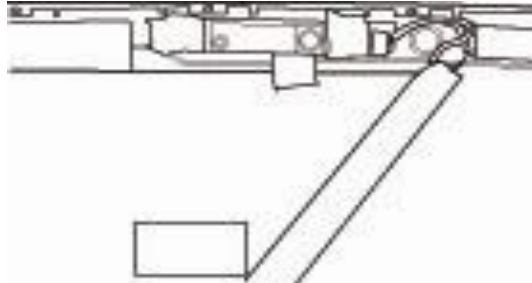
5. Seat the **LCD unit** on the display cover.
6. Secure the following **screws** to attach the LCD unit.
  - M2.5×4L FLAT HEAD screw ×2
7. Connect the **FL cable** to connector **CN1** and the **HV cable** to connector **CN2**, then fix 1 piece of **tape** on the **HV cable**.
8. Install the **FL inverter** in place.
9. Seat the **LCD mask** pressing firmly all around to secure the latches.
10. Secure the LCD mask with the following **screws**.
  - M2×5L (K) screw ×4

## 4.26 Camera

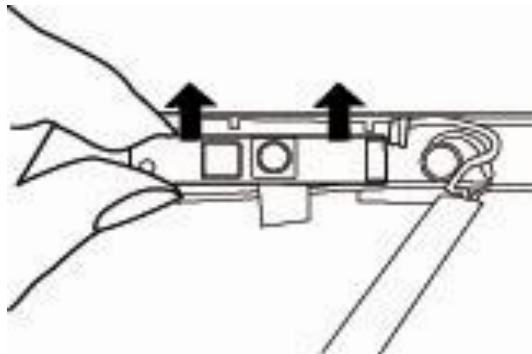
### Removing the Camera

To remove the camera, follow the steps below and refer to Figures 4-50 and 4-51.

1. Tear two piece of tape that fixing the camera, disconnect the cable and take the camera out of the LCD back cover.



*Figure 4-50 Removing two tapes that fixing the camera*



*Figure 4-51 Disconnecting the connector and Removing the Camera*

## **Installing the Camera**

To install the camera, follow the steps below and refer to Figures 4-50 and 4-51.

1. Install the **Camera** on the **LCD back cover**.
2. Connect the cable and paste two pieces of tape to fix it.



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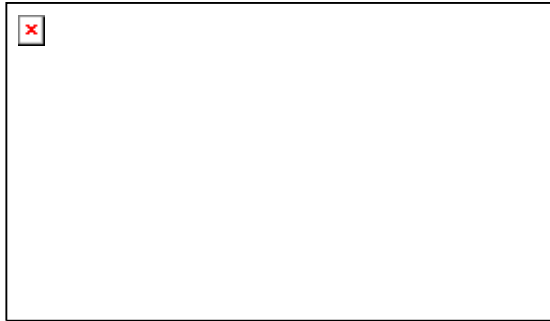
## Appendix A Handling the LCD Module

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### Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



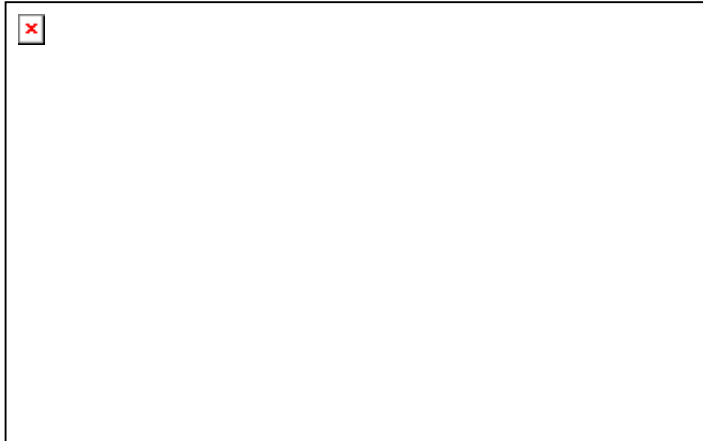
2. For the LCD module, be careful to align the four holes at the right side and left side of the LCD module with the corresponding holes in the LCD cover before securing the module with four screws.

Do not force the module into place, because stress can affect its performance. Also, the panel's polarized surface is easily scarred, so be carefully when handling it.

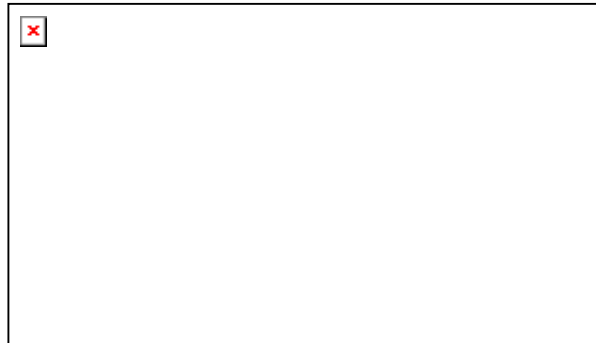


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

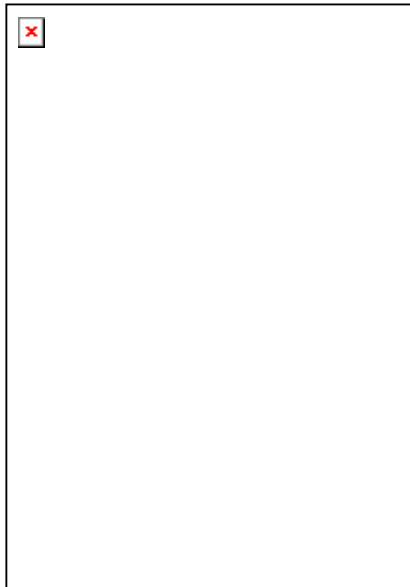
If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



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.



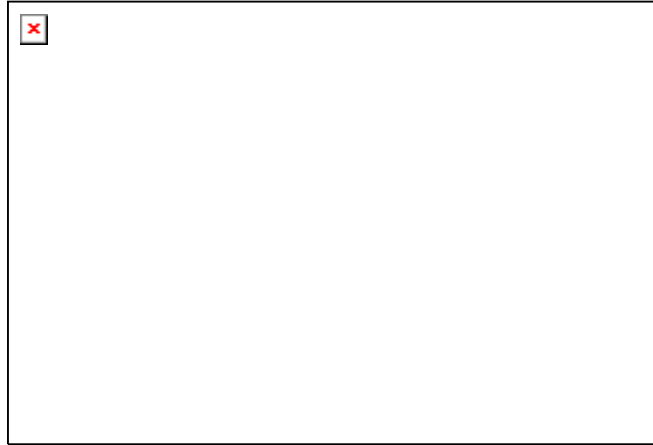
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground 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 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 Main Board Front View

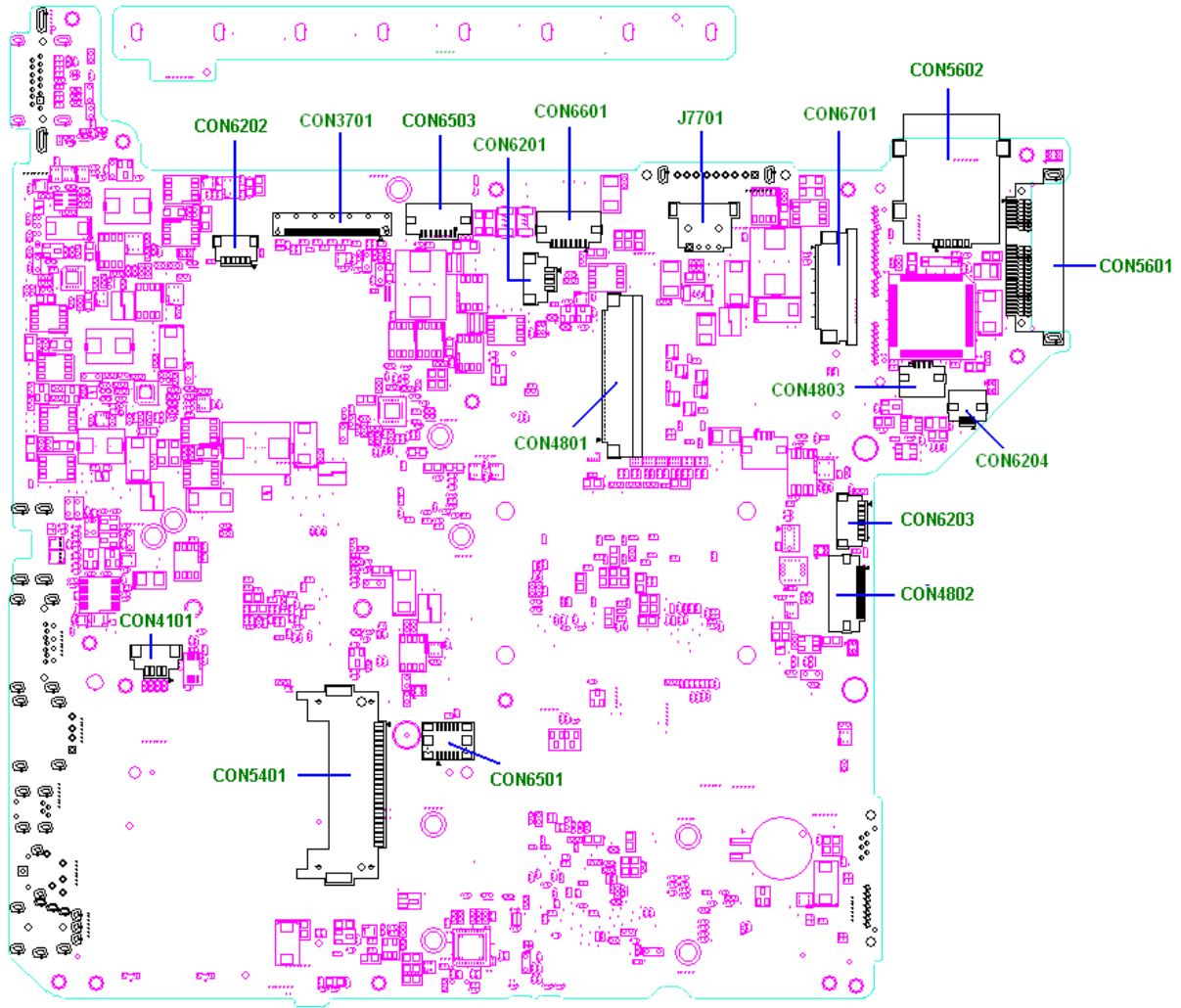


Figure B-1 Main board layout (front)

Table B-1 Main board connectors (front)

Number	Name
CON6202	Camera / Int. MIC connector
CON3701	LVDS connector
CON6503	Power button connector
CON6601	FUNCTION BRD connector
CON6201	TouchPanel connector
CON4801	KB connector
CON5602	SIM card slot
CON5601	Mini card connector
CON6701	LAN BRD connector
CON4803	Keyboard LED connector
CON4804	TP ON/OFF connector
CON6204	FELICA connector
CON6203	Blue tooth connector
CON4802	Touch Pad connector
CON4101	Internal speaker connector
CON5401	New Card slot
CON6501	Modem connector
J7701	DC IN connector





Table B-2 Main board connectors (back)

Number	Name
CBT_CON1 (HOT BAR)	FUNCTION BRD connector
CON3801	RGB connector
CON4901	FAN connector
CON7701	Battery Connector
CON6502	DEBUG CARD connector
CON6001	HDD connector
CON6002	ODD connector
CON6003	SSD connector
CON2101	Memory slot
CON2201	Memory slot
CON5501	Mini card connector
CON0701	AMD HDT Debug connector
CON3501	Graphics MXM connector
CON5701	Mini card connector
CON5001	Media Card slot
CON3901	HDMI connector
CON6107	eSATA / USB Combo connector
CON6106	USB connector
CON5101	1394 connector
CON4202	MIC JACK
CON4201	HP/ SPDIF JACK

### B.3 LAN Board Front and Back View

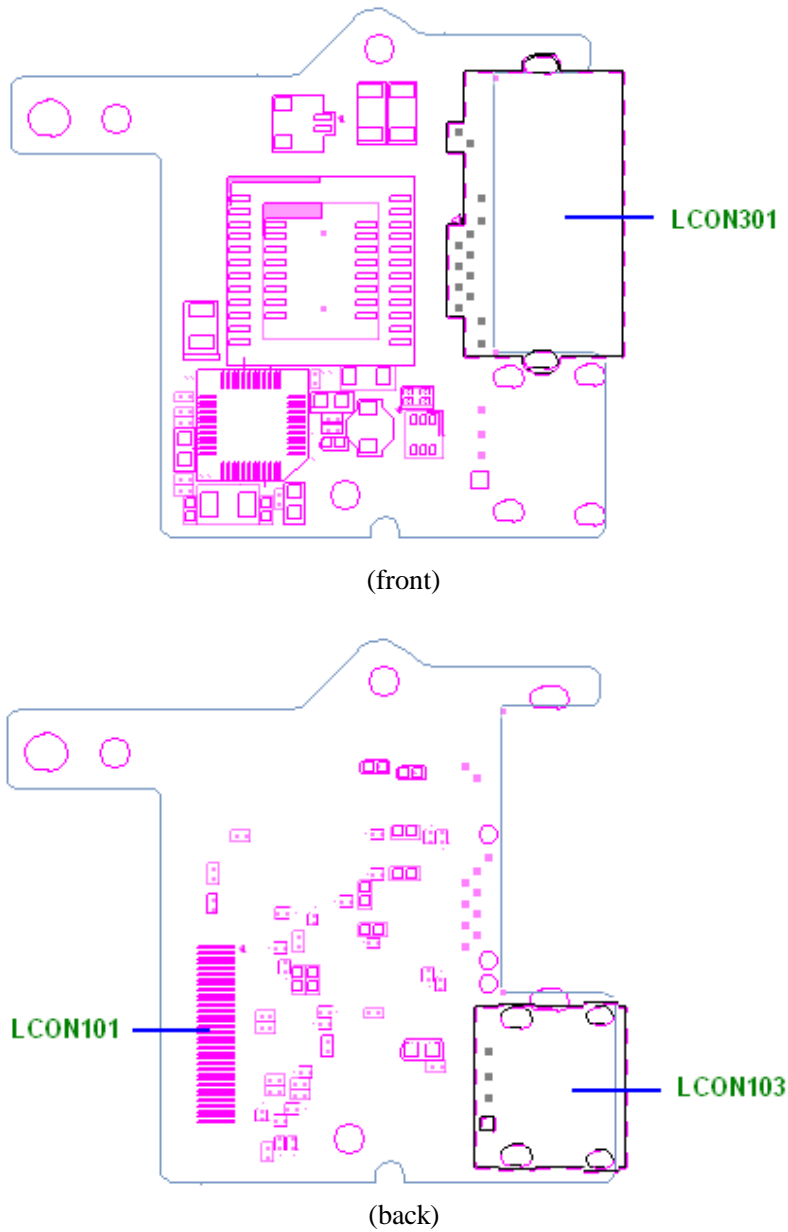


Figure B-3 LAN Board layout (front/back)

Table B-3 LAN Board connectors (front/back)

Number	Name
LCON301	RJ45 / FJ11 JACK
LCON103	USB JACK

LCON101 (HOT BAR)	LAN board interface
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## B.4 Touchpad Board Front and Back View

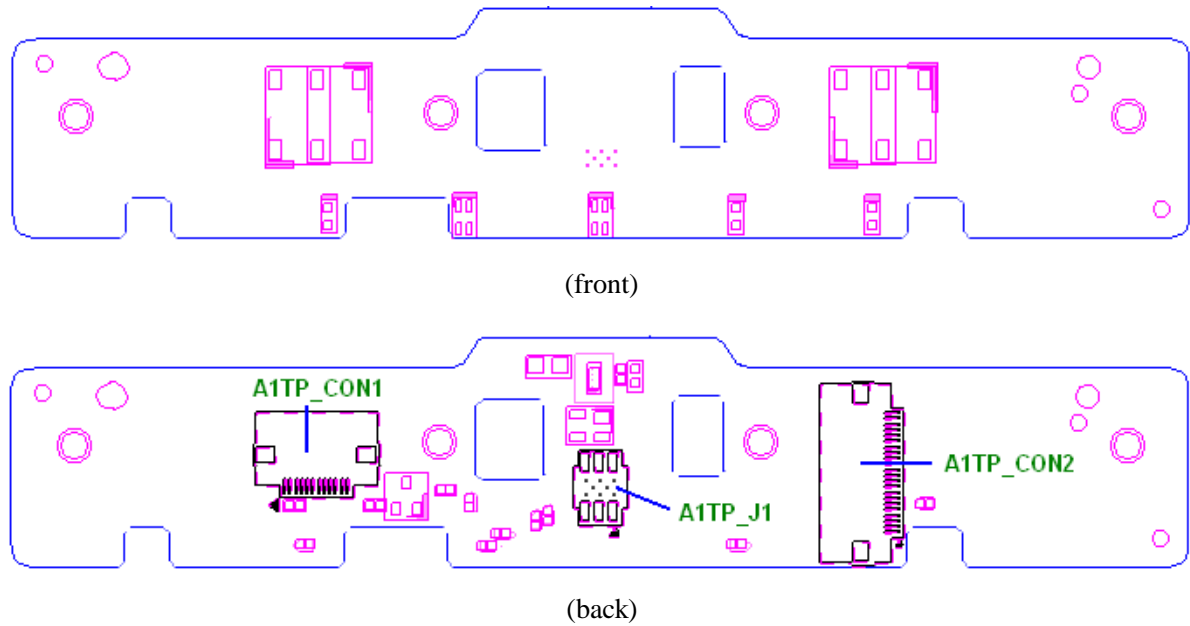


Figure B-4 Touchpad Board layout (front/back)

Table B-4 Touchpad Board connector (back)

Number	Name
A1TP_CON1	Touch Pad Module connector
A1TP_J1	Touch Pad BD to FP BD connector
A1TP_CON2	Touch Pad BD to MB connector

### B.5 Finger Printer Board Front and Back View

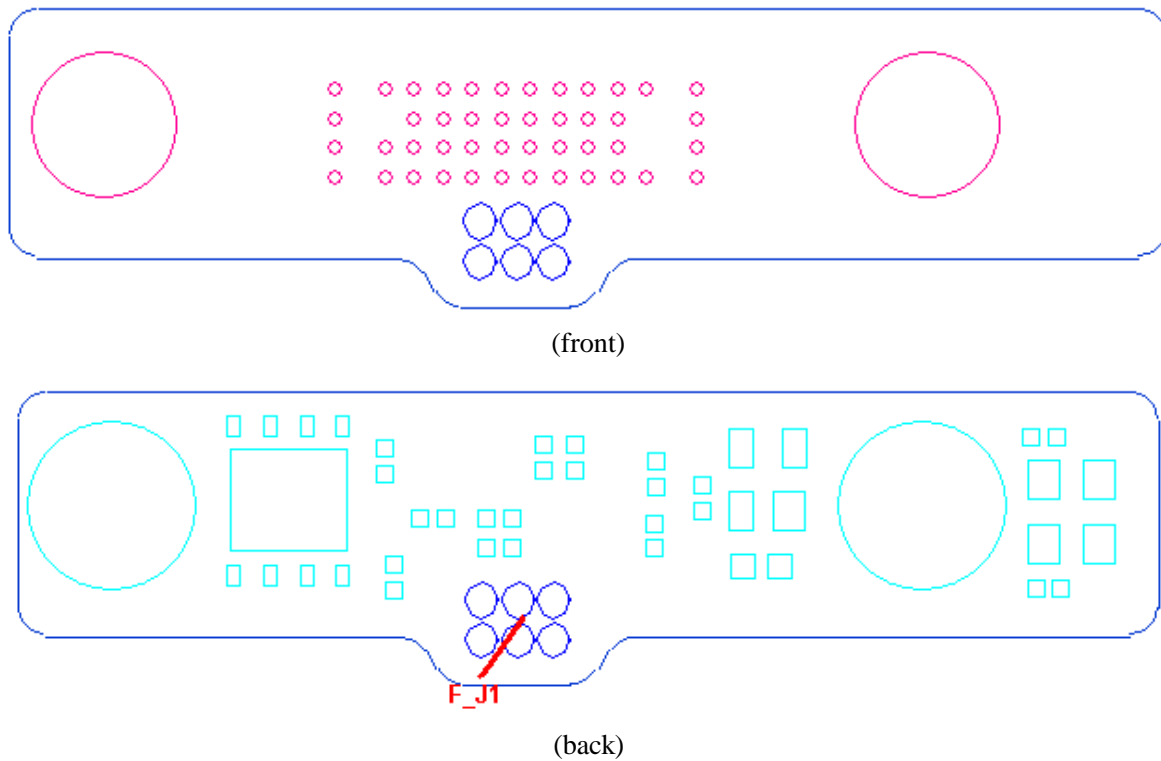
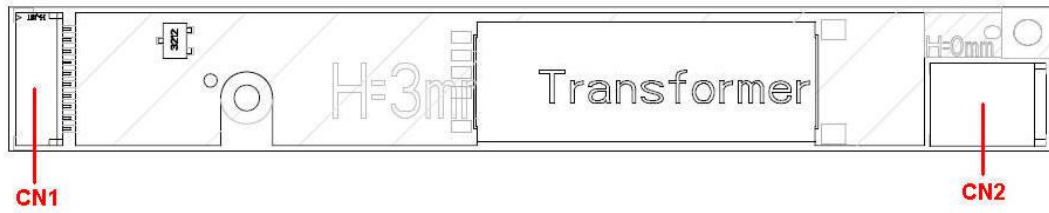


Figure B-5 Finger Printer Board layout (front/back)

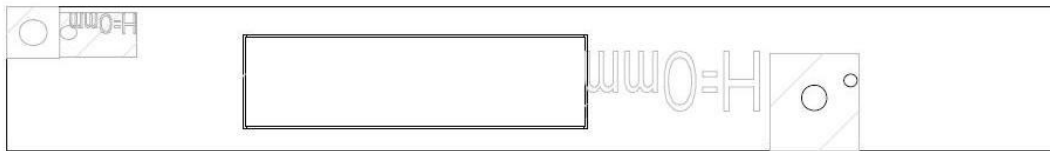
Table B-5 Finger Printer Board connectors (back)

Number	Name
F_J1	PF BD to Touch Pad BD interface

## B.6 Inverter Board Front and Back View



(front)



(back)

*Figure B-7 Inverter Board layout (front/back)*

*Table B-7 Inverter Board connectors (front)*

Number	Name
CN1	Input connector
CN2	Output connector

## Appendix C Pin Assignments

### Main board

#### C.1 CON2101 SO-DIMM0 connector (200-pin)

Table C-1 SO-DIMM0 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	M_VREF_MCH	-	2	GND	-
3	GND	-	4	M_A_DQ61	I/O
5	M_A_DQ58	I/O	6	M_A_DQ63	I/O
7	M_A_DQ57	I/O	8	GND	-
9	GND	-	10	M_A_DM7	I/O
11	M_A_DQS#7	I/O	12	GND	-
13	M_A_DQS7	I/O	14	M_A_DQ59	I/O
15	GND	-	16	M_A_DQ62	I/O
17	M_A_DQ60	I/O	18	GND	-
19	M_A_DQ56	I/O	20	M_A_DQ54	I/O
21	GND	-	22	M_A_DQ50	I/O
23	M_A_DQ51	I/O	24	GND	-
25	M_A_DQ55	I/O	26	M_A_DM6	I/O
27	GND	-	28	GND	-
29	M_A_DQS#6	I/O	30	M_CLK_DDR0	
31	M_A_DQS6	I/O	32	M_CLK_DDR#0	
33	GND	-	34	GND	-
35	M_A_DQ49	I/O	36	M_A_DQ48	I/O
37	M_A_DQ53	I/O	38	M_A_DQ52	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	M_A_DQ42	I/O	44	M_A_DQ20	I/O
45	M_A_DQ45	I/O	46	M_A_DQ46	I/O
47	GND	-	48	GND	-
49	M_A_DQS#5	I/O	50	NC	-
51	M_A_DQS5	I/O	52	M_A_DM5	I/O
53	GND	-	54	GND	-
55	M_A_DQ18	I/O	56	M_A_DQ44	I/O
57	M_A_DQ19	I/O	58	M_A_DQ47	I/O
59	GND	-	60	GND	-
61	M_A_DQ39	I/O	62	M_A_DQ38	I/O

Table C-1 SO-DIMM0 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	M_A_DQ32	I/O	64	M_A_DQ34	I/O
65	GND	-	66	GND	-
67	M_A_DM4	I/O	68	M_A_DQS#4	I/O
69	NC	-	70	M_A_DQ4	I/O
71	GND	-	72	GND	-
73	M_A_DQ33	I/O	74	M_A_DQ37	I/O
75	M_A_DQ36	I/O	76	M_A_DQ35	I/O
77	GND	-	78	GND	-
79	M_CKE0	I	80	M_CKE1	I
81	+1.8V	-	82	+1.8V	-
83	NC	-	84	NC	-
85	M_A_BS2	I	86	M_A_A14	-
87	+1.8V	-	88	+1.8V	-
89	M_A_A12	I/O	90	M_A_A11	I/O
91	M_A_A9	I/O	92	M_A_A7	I/O
93	M_A_A8	I/O	94	M_A_A6	I/O
95	+1.8V	-	96	+1.8V	-
97	M_A_A5	I/O	98	M_A_A4	I/O
99	M_A_A3	I/O	100	M_A_A2	I/O
101	M_A_A1	I/O	102	M_A_A0	I/O
103	+1.8V	-	104	+1.8V	-
105	M_A_A10	I/O	106	M_A_BS1	I
107	M_A_BS0	I	108	M_A_RAS#	I
109	M_A_WE#	I	110	M_CS#0	I
111	+1.8V	-	112	+1.8V	-
113	M_A_CAS#	I	114	M_ODT0	I
115	M_CS#1	I	116	M_A_A13	I/O
117	+1.8V	-	118	+1.8V	-
119	M_ODT1	I	120	NC	-
121	GND	-	122	GND	-
123	M_A_DQ31	I/O	124	M_A_DQ30	I/O
125	M_A_DQ27	I/O	126	M_A_DQ26	I/O
127	GND	-	128	GND	-
129	M_A_DQS#3	I/O	130	M_A_DM3	I/O
131	M_A_DQS3	I/O	132	GND	-



Table C-1 SO-DIMM0 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
133	GND	-	134	M_A_DQ24	I/O
135	M_A_DQ29	I/O	136	M_A_DQ28	I/O
137	M_A_DQ25	I/O	138	GND	-
139	GND	-	140	M_A_DQ23	I/O
141	M_A_DQ16	I/O	142	M_A_DQ21	I/O
143	M_A_DQ19	I/O	144	GND	-
145	GND	-	146	M_A_DQS#2	I/O
147	M_A_DM2	I/O	148	M_A_DQS2	I/O
149	GND	-	150	GND	-
151	M_A_DQ22	I/O	152	M_A_DQ20	I/O
153	M_A_DQ17	I/O	154	M_A_DQ47	I/O
155	GND	-	156	GND	-
157	M_A_DQ13	I/O	158	M_A_DQ15	I/O
159	M_A_DQ11	I/O	160	M_A_DQ9	I/O
161	GND	-	162	GND	-
163	NC	-	164	M_CLK_DDR1	I
165	GND	-	166	M_CLK_DDR#1	I
167	M_A_DQS#1	I/O	168	GND	-
169	M_A_DQS1	I/O	170	M_A_DM1	I/O
171	GND	-	172	GND	-
173	M_A_DQ8	I/O	174	M_A_DQ14	I/O
175	M_A_DQ12	I/O	176	M_A_DQ10	I/O
177	GND	-	178	GND	-
179	M_A_DQ2	I/O	180	M_A_DQ7	I/O
181	M_A_DQ3	I/O	182	M_A_DQ1	I/O
183	GND	-	184	GND	-
185	M_A_DM0	I/O	186	M_A_DQS#0	I/O
187	GND	-	188	M_A_DQS0	I/O
189	M_A_DQ0	I/O	190	GND	-
191	M_A_DQ4	I/O	192	M_A_DQ5	I/O
193	GND	-	194	M_A_DQ6	I/O
195	SMB_DAT_S	I/O	196	GND	-
197	SMB_CLK_S	I/O	198	GND	-
199	+3VS	-	200	GND	-

## C.2 CON2201 SO-DIMM1 connector (200-pin)

Table C-2 SO-DIMM1 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	M_VREF_MCH	-	2	GND	-
3	GND	-	4	M_B_DQ59	I/O
5	M_B_DQ63	I/O	6	M_B_DQ62	I/O
7	M_B_DQ58	I/O	8	GND	-
9	GND	-	10	M_B_DM7	I/O
11	M_B_DQS#7	I/O	12	GND	-
13	M_B_DQS7	I/O	14	M_B_DQ61	I/O
15	GND	-	16	M_B_DQ57	I/O
17	M_B_DQ56	I/O	18	GND	-
19	M_B_DQ60	I/O	20	M_B_DQ48	I/O
21	GND	-	22	M_B_DQ51	I/O
23	M_B_DQ54	I/O	24	GND	-
25	M_B_DQ53	I/O	26	M_B_DM6	I/O
27	GND	-	28	GND	-
29	M_B_DQS#6	I/O	30	M_CLK_DDR2	I
31	M_B_DQS6	I/O	32	M_CLK_DDR#2	I
33	GND	-	34	GND	-
35	M_B_DQ50	I/O	36	M_B_DQ49	I/O
37	M_B_DQ55	I/O	38	M_B_DQ52	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	M_B_DQ42	I/O	44	M_B_DQ40	I/O
45	M_B_DQ44	I/O	46	M_B_DQ45	I/O
47	GND	-	48	GND	-
49	M_B_DQS#5	I/O	50	NC	-
51	M_B_DQS5	I/O	52	M_B_DM5	I/O
53	GND	-	54	GND	-
55	M_B_DQ47	I/O	56	M_B_DQ41	I/O
57	M_B_DQ43	I/O	58	M_B_DQ46	I/O
59	GND	-	60	GND	-
61	M_B_DQ35	I/O	62	M_B_DQ36	I/O

Table C-2 SO-DIMM1 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	M_B_DQ38	I/O	64	M_B_DQ32	I/O
65	GND	-	66	GND	-
67	M_B_DM4	I/O	68	M_B_DQS#4	I/O
69	NC	-	70	M_B_DQS4	I/O
71	GND	-	72	GND	-
73	M_B_DQ34	I/O	74	M_B_DQ37	I/O
75	M_B_DQ39	I/O	76	M_B_DQ33	I/O
77	GND	-	78	GND	-
79	M_CKE2	I	80	M_CKE3	I
81	+1.8V	-	82	+1.8V	-
83	NC	-	84	NC	-
85	M_B_BS2	I	86	M_B_A14	-
87	+1.8V	-	88	+1.8V	-
89	M_B_A12	I	90	M_B_A11	I
91	M_B_A9	I	92	M_B_A7	I
93	M_B_A8	I	94	M_B_A6	I
95	+1.8V	-	96	+1.8V	-
97	M_B_A5	I	98	M_B_A4	I
99	M_B_A3	I	100	M_B_A2	I
101	M_B_A1	I	102	M_B_A0	I
103	+1.8V	-	104	+1.8V	-
105	M_B_A10	I	106	M_B_BS1	I
107	M_B_BS0	I	108	M_B_RAS#	I
109	M_B_WE#	I	110	M_CS#2	I
111	+1.8V	-	112	+1.8V	-
113	M_B_CAS#	I	114	M_ODT2	I
115	M_CS#3	I	116	M_B_A13	I
117	+1.8V	-	118	+1.8V	-
119	M_ODT3	I	120	NC	-
121	GND	-	122	GND	-
123	M_B_DQ30	I/O	124	M_B_DM25	I/O
125	M_B_DQ31	I/O	126	M_B_DM26	I/O
127	GND	-	128	GND	-
129	M_B_DQS#3	I/O	130	M_B_DM3	I/O
131	M_B_DQS3	I/O	132	GND	-
133	GND	-	134	M_B_DQ29	I/O

Table C-2 SO-DIMM1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
135	M_B_DQ24	I/O	136	M_B_DQ28	I/O
137	M_B_DQ27	I/O	138	GND	-
139	GND	-	140	M_B_DQ23	I/O
141	M_B_DQ22	I/O	142	M_B_DQ19	I/O
143	M_B_DQ18	I/O	144	GND	-
145	GND	-	146	M_B_DQS#2	I/O
147	M_B_DM2	I/O	148	M_B_DQS2	I/O
149	GND	-	150	GND	-
151	M_B_DQ17	I/O	152	M_B_DQ16	I/O
153	M_B_DQ20	I/O	154	M_B_DQ21	I/O
155	GND	-	156	GND	-
157	M_B_DQ15	I/O	158	M_B_DQ10	I/O
159	M_B_DQ9	I/O	160	M_B_DQ11	I/O
161	GND	-	162	GND	-
163	NC	-	164	M_CLK_DDR3	I
165	GND	-	166	M_CLK_DDR#3	I
167	M_B_DQS#1	I/O	168	GND	-
169	M_B_DQS1	I/O	170	M_B_DM1	I/O
171	GND	-	172	GND	-
173	M_B_DQ13	I/O	174	M_B_DQ14	I/O
175	M_B_DQ12	I/O	176	M_B_DQ8	I/O
177	GND	-	178	GND	-
179	M_B_DQ3	I/O	180	M_B_DQ7	I/O
181	M_B_DQ2	I/O	182	M_B_DQ6	I/O
183	GND	-	184	GND	-
185	M_B_DM0	I/O	186	M_B_DQS#0	I/O
187	GND	-	188	M_B_DQS0	I/O
189	M_B_DQ1	I/O	190	GND	-
191	M_B_DQ4	I/O	192	M_B_DQ5	I/O
193	GND	-	194	M_B_DQ0	I/O
195	SMB_DAT_S	I/O	196	GND	-
197	SMB_CLK_S	I/O	198	+3VS_SET	-
199	+3VS	-	200	GND	-

**C.3 CON6002 SATA interface ODD connector (13-pin)***Table C-3 ODD connector (13-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
S1	GND	-	S2	SATA_TXP2	I
S3	SATA_TXN2	I	S4	GND	-
S5	SATA_RXN2	O	S6	SATA_RXP2	O
S7	GND	-			
P1	NC	-	P2	+5VS	-
P3	+5VS	-	P4	NC	-
P5	GND	-	P6	GND	-

**C.4 CON6001 SATA interface HDD connector (22-pin)***Table C-4 HDD connector (22-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
S1	GND	-	S2	SATA_TXP1	I
S3	SATA_TXN1	I	S4	GND	-
S5	SATA_RXN1	O	S6	SATA_RXP1	O
S7	GND	-			
P1	+3VS	-	P2	+3VS	-
P3	+3VS	-	P4	GND	-
P5	GND	-	P6	GND	-
P7	+5VS	-	P8	+5VS	-
P9	+5VS	-	P10	GND	-
P11	NC	-	P12	GND	-
P13	NC	-	P14	NC	-
P15	NC	-			

**C.5 CON6003 SATA interface SSD connector (BTO) (24-pin)***Table C-5 SSD connector (24-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VS	-	2	+3VS	-
3	+5VS	-	4	+3VS	-
5	+5VS	-	6	+3VS	-
7	+5VS	-	8	+3VS	-
9	NC	-	10	NC	-
11	GND	-	12	GND	-
13	NC	-	14	SATA_TXP0	I
15	GND	-	16	SATA_TXN0	I
17	NC	-	18	GND	-
19	NC	-	20	SATA_RXN0	O
21	GND	-	22	SATA_RXP0	O
23	NC	-	24	GND	-

**C.6 CON5001 Media card connector (45-pin)***Table C-6 Media card connector (45-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SD-DAT2	I/O	2	SD_DAT3	I/O
3	MMC_DAT4	I/O	4	SD_CMD	I/O
5	MMC_DAT5	I/O	6	GND	-
7	CARD_3V3	-	8	GND	-
9	CARD_3V3	-	10	MS_CLK	I
11	MS_D3	I/O	12	MS_INS#	O
13	MS_D2	I/O	14	MS_D0	I/O
15	MS_D1	I/O	16	MS_BS	I
17	GND	-	18	SD_CLK	I
19	MMC_DAT6	I/O	20	GND	-
21	MMC_DAT7	I/O	22	SD_DAT0	I/O
23	SD_DAT1	I/O	24		
25	SD_CD#	O	26	GND	-
27	XD_CD#	O	28	XD_RDY	I
29	XD_RE#	I	30	XD_CE#	I
31	XD_CLE#	I	32	XD_ALE	I
33	XD_WE#	I	34	XD_WP#	I
35	GND	-	36	XD_D0	I/O
37	XD_D1	I/O	38	XD_D2	I/O
39	XD_D3	I/O	40	XD_D4	I/O
41	XD_D5	I/O	42	XD_D6	I/O
43	XD_D7	I/O	44	CARD_3V3	-
45	SD_WP #	O			

## C.7 CON4201 H/P interface connector (8-pin)

Table C-7 H/P interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	JACK1_D#	I	2	HP_JACK_R	O
3	HP_JACK_L	O	4	GND	-
5	JACK2_D#	I		JACK_IN	I
A	GND	-	B	VCC_SPDIF	-
C	SPDIF_OUT	O			

## C.8 CON5701 WLAN Mini Card interface connector (52-pin)

Table C-8 Mini Card interface connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	+3VS	-
3	BT_CHDATA	I/O	4	GND	-
5	BT_CHCLK	I	6	+1.5VS	-
7	MINI3CLK_REQ#	O	8	NC	-
9	GND	-	10	NC	-
11	CLK_PCIE_MINIC ARD3#	I	12	NC	-
13	CLK_PCIE_MINIC ARD3	I	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	WLAN_ON/OFF#	I
21	GND	-	22	PLTRST#_M	I
23	PCIE_RXN5	O	24	+3VS	-
25	PCIE_RXP5	O	26	GND	-
27	GND	-	28	+1.5VS	-
29	GND	-	30	NC	-
31	PCIE_TXN5	I	32	NC	-
33	PCIE_TXP5	I	34	GND	-
35	GND	-	36	USB_PN5	I/O
37	GND	-	38	USB_PP5	I/O
39	+3VS	-	40	GND	-
41	+3VS	-	42	WIMAX_LED#	O
43	GND	-	44	WIFI_LED#	O
45	NC	-	46	NC	-
47	NC	-	48	+1.5VS	-
49	NC	-	50	GND	-
51	NC	-	52	+3VS	-



## C.9 CON5501 Upconvert Mini Card interface connector(BTO) (52-pin)

Table C-9 Mini Card interface connector (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	MINI1CLK_REQ#	O	8	NC	-
9	GND	-	10	NC	-
11	CLK_PCIE_MINI CARD#	I	12	NC	-
13	CLK_PCIE_MINI CARD	I	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	WUSB_ON/OFF#	I
21	GND	-	22	PLTRST#_M	I
23	PCIE_RXN2	O	24	+3VS	-
25	PCIE_RXP2	O	26	GND	-
27	GND	-	28	+1.5VS	-
29	GND	-	30	NC	-
31	PCIE_TXN2	I	32	NC	-
33	PCIE_TXP2	I	34	GND	-
35	GND	-	36	NC	-
37	GND	-	38	NC	-
39	+3VS	-	40	GND	-
41	+3VS	-	42	NC	-
43	GND	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	+1.5VS	-
49	NC	-	50	GND	-
51	NC	-	52	+3VS	-

## C.10 CON5601 WWAN Mini Card interface connector(BTO) (52-pin)

Table C-10 Mini Card interface connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	+3VS_WWAN	-
3	NC	-	4	GND	-
5	NC	-	6	+1.5VS	-
7	NC	O	8	SIM_VCC	-
9	GND	-	10	SIM_DIO	-
11	CLK_PCIE_WWAN#	I	12	SIM_CLK	-
13	CLK_PCIE_WWAN	I	14	SIM_RST	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	3G_ON	I
21	GND	-	22	PLTRST#_M	I
23	PCIE_RXN3	O	24	+3VS_WWAN	-
25	PCIE_RXP3	O	26	GND	-
27	GND	-	28	+1.5VS	-
29	GND	-	30	NC	-
31	PCIE_TXN3	I	32	NC	-
33	PCIE_TXP3	I	34	GND	-
35	GND	-	36	USB_PN4	-
37	GND	-	38	USB_PP4	-
39	+3VS_WWAN	-	40	GND	-
41	+3VS_WWAN	-	42	WWAN_LED#	-
43	GND	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	+1.5VS	-
49	NC	-	50	GND	-
51	NC	-	52	+3VS_WWAN	-

**C.11 CON5602 SIM Card connector(BTO) (12-pin)***Table C-11 MDC interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
C1	SIM_VCC_C	-	C2	SIM_RST	I
C3	SIM_CLK	I	C5	GND	-
C6	NC	-	C7	SIM_DIO	I/O

**C.12 CON6501 MDC interface connector(BTO) (12-pin)***Table C-12 MDC interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	ACZ_SDOOUT_MDC	I	4	NC	-
5	GND	-	6	+3V	-
7	ACZ_SYNC_MDC	I	8	GND	-
9	ACZ_SDIN1	O	10	GND	-
11	ACZ_RST#_MDC	I	12	ACZ_BCLK_MDC	I

**C.13 CON3901 HDMI connector(BTO) (19-pin)***Table C-13 Modem connector (19-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	HDMI_TX2+_R	I	2	GND	-
3	HDMI_TX2-_R	I	4	HDMI_TX1+_R	I
5	GND	-	6	HDMI_TX1-_R	I
7	HDMI_TX0+_R	I	8	GND	-
9	HDMI_TX0-_R	I	10	HDMI_CLK+_R	I
11	GND	I	12	HDMI_CLK-_R	I
13	HDMI_CEC	I	14	NC	
15	HDMI_DDCCLK_R	I	16	HDMI_DDCDAT_R	I/O
17	GND		18	+5V_HDMI	
19	HDMI_HPD_C	O			

**C.14 CON4801 Keyboard interface connector (34-pin)***Table C-14 Keyboard interface connector (34-pin)*

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

**C.15 CON4802 MB to Touch PAD Board connector (22-pin)***Table C-15 MB to Touch PAD Board connector (22-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VSUS	-	2	+5V	-
3	+5VS	-	4	+5VS	-
5	+3VA	-	6	+3VS	-
7	+3V	-	8	CB_LED#	I
9	HDD_LED#	I	10	TP_DAT	I/O
11	TP_CLK	I/O	12	GND	-
13	LID_SW#	O	14	LIGHT_GI_LED#	I
15	DC_IN_LED#	I	16	PWR_WLED#	I
17	PWR_ULED_UP#	I	18	BAT_WLED#	I
19	BAT_ULED_UP#	I	20	GND	-
21	USB_PN2	I/O	22	USB_PP2	I/O

**C.16 CON4804 Touch PAD ON/OFF connector (4-pin)***Table C-16 Touch PAD Button connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VS	-	2	NC	-
3	TP_ON	O	4	GND	-

**C.17 CON4202 Microphone In connector (8-pin)***Table C-17 Microphone In connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A_GND	-	2	MIC_IN_AC_E	I
3	NC	-	4	MIC_EXT_JD#	-
5	A_GND		6		
7	A_GND	I	8	A_GND	-

**C.18 CON6503 Power Button connector (8-pin)***Table C-18 Power Button connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	SMB1_CLK	I
3	SMB1_DAT	I/O	4	NC	-
5	+3VS		6	+5V	
7	PWRBTN_LED#	I	8	PWR_SW#	O

**C.19 CON6601 Function Board connector (8-pin)***Table C-19 Function Board connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VA	-	2	+5VS	I
3	LID_SW#	I	4	SMB2_CLK_FN	I
5	SMB2_DAT_FN	I/O	6	INT_FN	O
7	GND	-	8	GND	-

### C.20 CON6701 MB to LAN Board connector (34-pin)

Table C-20 MB to LAN Board connector (34-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+3VS		2	SUSCLK_FM	I
3	GND		4	SMB_CLK_FM	I
5	SMB_DAT_FM	I/O	6	FM_AUDIO_R	I
7	FM_AUDIO_L	I	8	INTX_FM#	I
9	+3VSUS	-	10	+3VSUS	-
11	PCI_RST#	I	12	PCIE_WAKE#	O
13	PCIE_LOM_CLK REQ#	O	14	GND	-
15	PCIE_RXP1	O	16	PCIE_RXN1	O
17	GND	-	18	PCIE_TXP1	I
19	PCIE_TXN1	I	20	GND	-
21	CLK_PCIE_LAN	I	22	CLK_PCIE_LAN#	I
23	GND	-	24	+5V_USB	-
25	+5V_USB	-	26	+5V_USB	-
27	+5V_USB	-	28	+5V_USB	-
29	USB_PN0	I/O	30	USB_PP0	I/O
31	GND	-	32	USB_PN1	I/O
33	USB_PP1	I/O	34	GND	-

### C.21 CON4101 Speaker connector (4-pin)

Table C-21 Speaker connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	H_SPKR-	O	2	H_SPKR+	O
3	H_SPKL-	O	4	H_SPKL+	O

### C.22 CON6106 USB\*1 connector (4-pin)

Table C-22 USB\*1 connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USBP6+	I/O
3	USBP6-	I/O	4	+5VUSB6	-

**C.23 CON6107 eSATA/USB Combo connector (11-pin)***Table C-23 Speaker connector (11-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VUSB7	-	2	USBP7-_C	I/O
3	USBP7+_C	I/O	4	GND	-
5	GND	-	6	SATA_TXP3_C	I
7	SATA_TXN3_C	I	8	GND	-
9	SATA_RXN3_C	O	10	SATA_RXP3_C	O
11	GND	-			

**C.24 CON3701 LCD connector (40-pin)***Table C-24 LCD connector (40-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	AC_INV	-	2	AC_INV	-
3	AC_INV	-	4	NC	-
5	BACK_EN_C	I	6	LCD_BL_PWM_C	I
7	NC	-	8	GND	-
9	GND	-	10	GND	-
11	LVDS_CLKBP	I	12	LVDS_CLKBM	I
13	GND	-	14	LVDS_YB2P	I
15	LVDS_YB2M	I	16	GND	-
17	LVDS_YB1P	I	18	LVDS_YB1M	I
19	GND	-	20	LVDS_YB0P	I
21	LVDS_YB0M	I	22	GND	-
23	LVDS_CLKAP	I	24	LVDS_CLKAM	I
25	GND	-	26	LVDS_YA2P	I
27	LVDS_YA2M	I	28	GND	-
29	LVDS_YA1P	I	30	LVDS_YA1M	I
31	GND	-	32	LVDS_YA0P	I
33	LVDS_YA0M	I	34	LVDS_DDC_DATA	I/O
35	LVDS_DDC_CLK	I	36	GND	-
37	+3VS	-	38	+LCD_VCC	-
39	+LCD_VCC	-	40	NC	-

**C.25 CON3801 RGB connector (15-pin)***Table C-25 RGB connector (15-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RED	I	2	GREEN	I
3	BLUE	I	4	NC	-
5	GND:	-	6	GND	-
7	GND	-	8	GND	-
9	+5VS	-	10	GND	-
11	NC	-	12	DDC2BD_S	I/O
13	HSYNC	I	14	VSYNC	I
15	DDC2BC_S	I			

**C.26 CON5401 Newcard interface connector (26-pin)***Table C-26 Newcard interface connector (26-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USBP10-	I/O
3	USBP10+	I/O	4	CP_USB#	I
5	NC	-	6	NC	-
7	SCL_3V	I	8	SDA_3V	I/O
9	+1.5VS_PE	-	10	+1.5VS_PE	-
11	PCIE_WAKE#	I	12	+3V_PE	-
13	PERST#	I	14	+3VS_PE	-
15	+3VS_PE	-	16	NEWCARD_CLK_REQ#	O
17	CP_PE#	I	18	CLK_PCIE_NEW_CARD#	I
19	CLK_PCIE_NEW_CARD	I	20	GND	-
21	PCIE_RXN4	O	22	PCIE_RXP4	O
23	GND	-	24	PCIE_TXN4	I
25	PCIE_TXP4	I	26	GND	-



**C.27 J7701 DC-IN connector (4-pin)***Table C-27 DC-IN connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	GND	-
3	D_A/D_DOCK_IN	-	4	D_A/D_DOCK_IN	-

**C.28 CON7701 Battery connector (9-pin)***Table C-28 Battery connector (9-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BAT_CON_F	-	2	BAT_CON_F	-
3	NC		4	GND	-
5	TS1#_C	O	6	SMB0_DAT_C	I/O
7	SMB0_CLK_C	I	8	GND	-
9	GND	-			

**C.29 CON4901 FAN connector (4-pin)***Table C-29 FAN connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	FAN0_TACH	O	2	GND	-
3	FAN_PWM	I	4	+5VS_FAN	-

**C.30 CO6202 Camera Module connector (BTO) (6-pin)***Table C-30 Camera Module connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MIC_INT_P	I	2	MIC_INT_N	I
3	GND	-	4	USBP3+	I/O
5	USBP3-	I/O	6	+5VS_Camera	-

**C.31 CON6201 Touch Panel connector (BTO) (6-pin)***Table C-31 Touch Panel connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	USBP8+	I/O
3	USBP8-	I/O	4	+3VS_TPN	-

**C.32 CO6204 Felica Module connector (BTO) (6-pin)***Table C-32 Felica Module connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VS_FELICA	-	2	USBP11-	I/O
3	USBP11+	I/O	4	GND	-
5	NC	-	6	GND	-

**C.33 CO6204 Bluetooth connector (BTO) (8-pin)***Table C-33 Bluetooth connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+3VS	-	2	BT_RST#	I
3	BT_ON/OFF#	I	4	BT_CHDATA	I/O
5	BT_CHCLK	I	6	GND	-
7	USBP11-	I/O	8	USBP11+	I/O

## Touch PAD Board

### C.34 A1TP\_CON1 Touch PAD board to Touch PAD connector (12-pin)

Table C-34 Touch PAD Board to Touch PAD connector (12-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VS_A1TP	-	2	+5VS_A1TP	-
3	A1TP_DAT	I/O	4	A1TP_CLK	I
5	GND	-	6	GND	-
7	NC	-	8	A1LightGuide_ON_OFF	-
9	NC	-	10	A1TP_LEFT#	O
11	A1TP_RIGHT#	O	12	NC	-

### C.35 A1TP\_CON2 Touch PAD to MB Board connector (22-pin)

Table C-35 MB to Touch PAD Board connector (22-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VSUS_A1LED	-	2	NC	-
3	+5VS_A1TP	-	4	+5VS_A1TP	-
5	+3VA_A1HS	-	6	+3VS_A1FP	-
7	+3V_LED	-	8	A1TP_CardReader_White#	I
9	A1TP_HDD_ESATA_White#	I	10	A1TP_DAT	I/O
11	A1TP_CLK	I/O	12	GND	-
13	A1HS_CL#	O	14	A1LightGuide_ON_OFF	I
15	A1TP_DC_IN #	I	16	A1TP_PW_WHITE#	I
17	A1TP_PW_Umber#	I	18	A1TP_Batt Meter_White1#	I
19	A1TP_Batt Meter_Amber#	I	20	GND	-
21	A1FP_USB_D-	I/O	22	A1FP_USB_D+	I/O

**C.36 A1TP\_J1 Touch PAD Board to Fingerprint connector (6-pin)***Table C-36 Touch PAD Board to Fingerprint connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	F_+1.8VS_A1FP	-	2	A1FP_USB_D-	I/O
3	T_GND	-	4	A1FP_USB_D+	I/O
5	F_+3VS_A1FP	-	6	+3VS_A1FP	-

**LAN Board****C.37 LCON301 LAN/RJ11(BTO) interface connector (14-pin)***Table C-37 LAN/RJ11 interface connector (14-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	L_TXP	I/O	2	L_TXN	I/O
3	L_RXP	I/O	4	L_TRLP2	I/O
5	L_TRLM2	I/O	6	L_RXN	I/O
7	L_TRLP3	I/O	8	L_TRLM3	I/O
9	+3VSUS_L	-	10	LED_1000#	I
11	+3VSUS_L	-	12	LED_100#	I
13	RING_J	I/O	10	TIP_J	I/O

**C.38 LCON103 USB\*1 connector (4-pin)***Table C-38 USB\*1 connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	+5VUSB0	-	2	USBP0-	I/O
3	USBP0+	I/O	4	DGND	-

**C.39 LCON302 Modem connector(BTO) (2-pin)***Table C-39 Modem connector (2-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	RING	I/O	2	TIP	I/O

## 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	*1
09	8 *	09	89	3E	F0	3E	*1
10	9 (	0A	8A	46	F0	46	*1
11	0 )	0B	8B	45	F0	45	*1
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	*1
24	I	17	97	43	F0	43	*1
25	O	18	98	44	F0	44	*1
26	P	19	99	4D	F0	4D	*1
27	[ {	1A	9A	54	F0	54	
28	] }	1B	9B	5B	F0	5B	

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

Cap No.	Keytop	Code set 1		Code set 2		Note
		Make	Break	Make	Break	
29	\	2B	AB	5D	F0 5D	*2
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	*1
38	K	25	A5	42	F0 42	*1
39	L	26	A6	4B	F0 4B	*1
40	; :	27	A7	4C	F0 4C	*1
41	' "	28	A8	52	F0 52	
43	Enter	1C	9C	5A	F0 5A	
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	*1
53	, <	33	B3	41	F0 41	
54	. >	34	B4	49	F0 49	*1
55	/ ?	35	B5	4A	F0 4A	*1
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	
60	Alt (L)	38	B8	11	F0	11	
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70	*4
76	Del	E0 53	E0 D3	E0 71	E0 F0	71	*4
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B	*4
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C	*4
81	End	E0 4F	E0 CF	E0 69	E0 F0	69	*4
83	↑	E0 48	E0 C8	E0 75	E0 F0	75	*4
84	↓	E0 50	E0 D0	E0 72	E0 F0	72	*4
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D	*4
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A	*4
89	→	E0 4D	E0 CD	E0 74	E0 F0	74	*4
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	Refer to table 2-25								
126	Pause	Refer to table 2-25								
202	Fn									*5
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

**Notes:**

1. \* Scan codes differ by overlay function.
2. \* This key corresponds to key No. 42 in the 102 key mode.
3. \* Combination with the **Fn** key makes different codes.
4. \* Scan codes differ by mode.
5. \* The Fn key does not generate a code by itself..

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

**Note :** The table above shows scan codes with the left **Shift** key.

In combination with the right **Shift** key, scan codes are changed as listed below:

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

Table D-3 Scan codes in Numlock mode

Cap 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

Table D-4 Scan codes with Fn key

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
121	NUMERIC	45	C5	77	F0 77
122	ARROW	45	C5	77	F0 77
123	Scrl	46	C6	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1				Code set 2			
			Make		Break		Make		Break	
08	7	(7)	47		C7		6C		F0 6C	
09	8	(8)	48		C8		75		F0 75	
10	9	(9)	49		C9		7D		F0 7D	
11	0	(/)	E0 35	E0 B5	E0 4A	E0 F0 4A				
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	(*)	37		B7		7C		F0 7C	
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	;	(-)	4A		CA		7B		F0 7B	
52	M	(0)	52		D2		70		F0 70	
54	.	(.)	53		D3		71		F0 71	
55	/	(+)	4E		CE		79		F0 79	

Table D-6 No.124 key scan code

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

Table D-7 No.126 key scan code

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

\*: This key generates only make codes.

## Appendix E Key Layout

### E.1 United Kingdom (UK) Keyboard

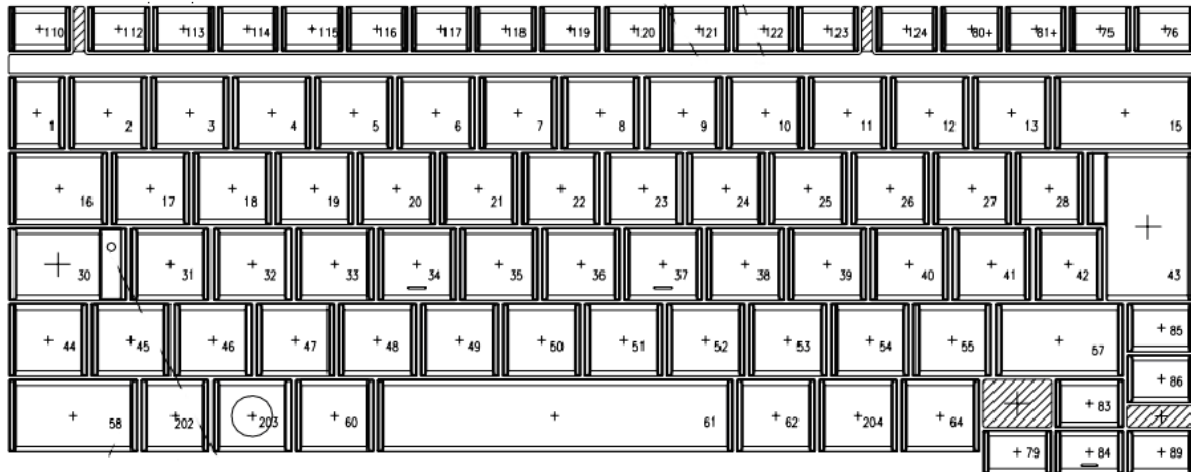


Figure E-1 UK keyboard

### E.2 United States (US) Keyboard



Figure E-2 US keyboard

### E.3 Japanese (JP) Keyboard



Figure E-3 JP keyboard

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## Appendix F BIOS rewrite procedures

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This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

### Tools

To rewrite the BIOS, you need the following tool:

- Bootable USB key for the computer that has renewed BIOS data.

### Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card, connect the USB key which has the latest BIOS document to the system.
4. Turn on the power with Esc key pressing down, and choose boot from USB device.
5. Enter to the BIOS document and execute the "UBIOS.bat".
6. The BIOS rewriting starts.
7. When the process is completed, the system automatically shutdown.

<p><b>NOTE:</b></p> <ol style="list-style-type: none"><li>1. Connect the AC adapter to the computer when you rewrite the BIOS.</li><li>2. Do not turn off the power while you are rewriting the BIOS. If the rewrite fails, it might be impossible to start up the computer.</li><li>3. If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been erased. In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.</li></ol>
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## Appendix G EC/KBC rewrite procedures

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This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

### Tools

To rewrite the EC/KBC, you need the following tool:

- Bootable USB key for the computer that has renewed BIOS data.

### Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
  2. Connect the AC adaptor to the computer when you rewrite the EC/KBC.
  3. Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.
  4. If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC have been erased. In this case, insert the BIOS/EC/KBC rewriting disk and the EC/KBC will be rewritten.
  5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card, connect the USB key which has the latest BIOS document to the system.
4. Turn on the power with Esc key pressing down, and choose boot from USB device.
5. Enter to the BIOS document and execute the “UBIOS.bat”.
6. The BIOS rewriting starts.
7. When the process is completed, the system automatically shutdown.