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# **Chapter 1**

## **Hardware Overview**

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## 1.1 Features

The Toshiba Satellite/Satellite Pro C670/C675/L770/L775 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 C670/C675/L770/L775 computer is equipped with an Intel® Arrandale multi-chip package mobile processor. Included in this family of processors is an integrated graphic and memory controller die on the same package as the processor core die.

### Chipset

The Satellite/Satellite Pro C670/C675/L770/L775 is equipped with Mobile Intel HM55 Express Chipset.

### GPU (Graphics Processing Unit)

(1) Integrated graphic model: Intel integrated graphics (Mobile Intel HM55 Express Chipset)

(2) Discrete graphic model: NVIDIA N12M-GE-B, N12P-LP.

Discrete graphic model: NVIDIA N12M-GE or N12M-GV or N12P-LP (for L770/L775).

(3)

### Memory

The computer comes with two DDR3 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

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

- 250/320/500/640/750 GB

Optical Drive

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

Display

The PC comes with 17.3"W HD+(1600 x 900),CSV or Non-CSV LED backlight.

Keyboard

A4+10key size 101 key (US) / 102 key (UK) / 106 key (JP) 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® 7.

Pointing Device

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 4400mA/H or 5600mA/H depending on the model of computer.

Universal Serial Bus (USB2.0)

Two 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.

Media Card slot (for L770/L775)

The Media Card Slot can accommodate 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) 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.

Media Card slot (for C770/C775)

The Media Card Slot can accommodate types of media (SD/Mini SD (card adapter is needed)/Micro SD (card adapter is needed)/SDHC memory card/MMC) 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.

Sound system

The sound system is equipped with the following features:

- Azalia Link (Intel High Definition Audio I/F) built in the Intel HM55 + Realtek ALC269
- Amplifier: Realtek ALC269 built-in
- Speaker: ONKYO 1.2W/4ohm speaker

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.

Wireless LAN /Bluetooth (BTO)

The computer is equipped with PCI-E MiniCard type wireless LAN board that supports 802.11 b/g in the PCI-E MiniCard slot or combo with Bluetooth through USB interface. This function can be switched on and off by a keyboard hot-key.

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.

HDMI port(BTO, for L770/L775)

A HDMI port is provided which complies with the HDMI 1.4a standard

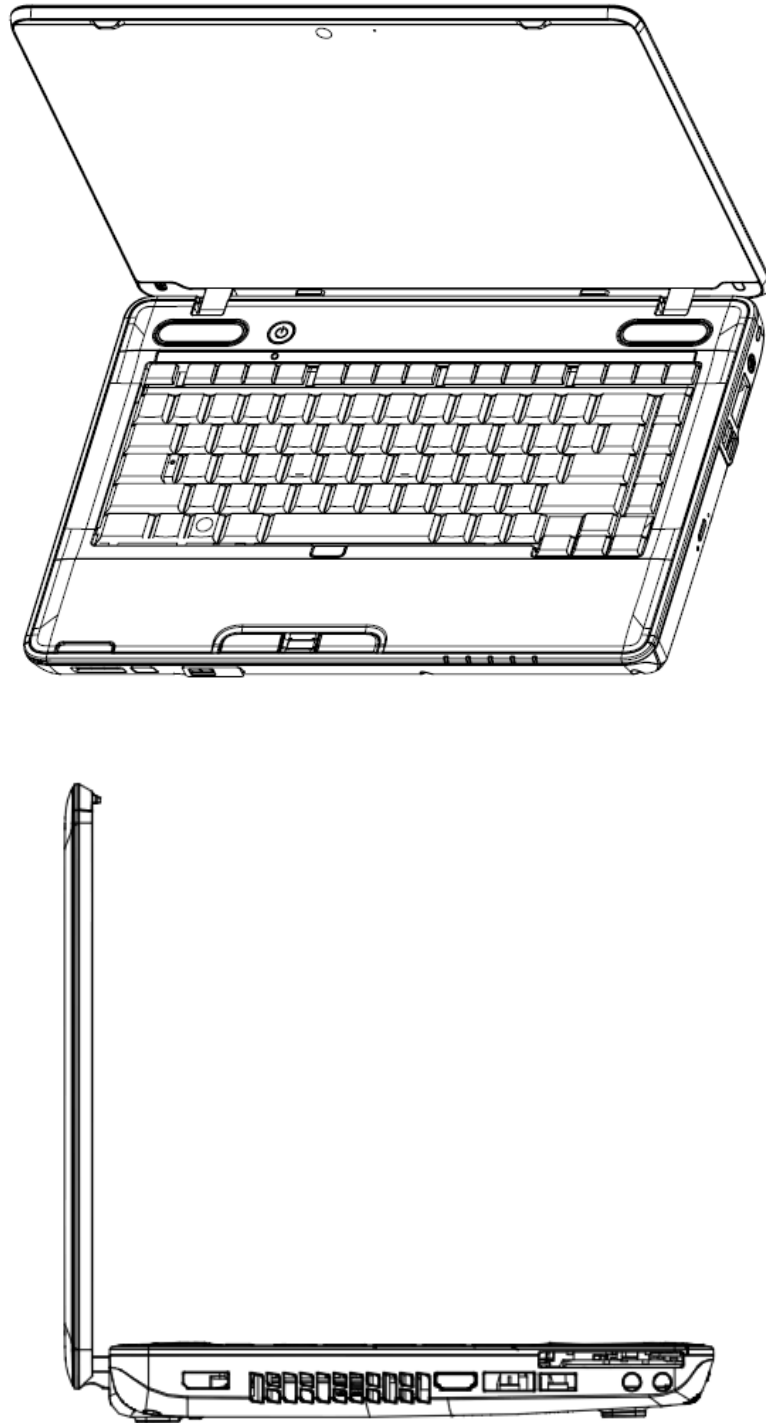
Headphone jack

The computer is equipped with a headphone jack.

Microphone Jack

The computer is equipped with a microphone jack.

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



*Figure 1-1 The front and left view of the computer*



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

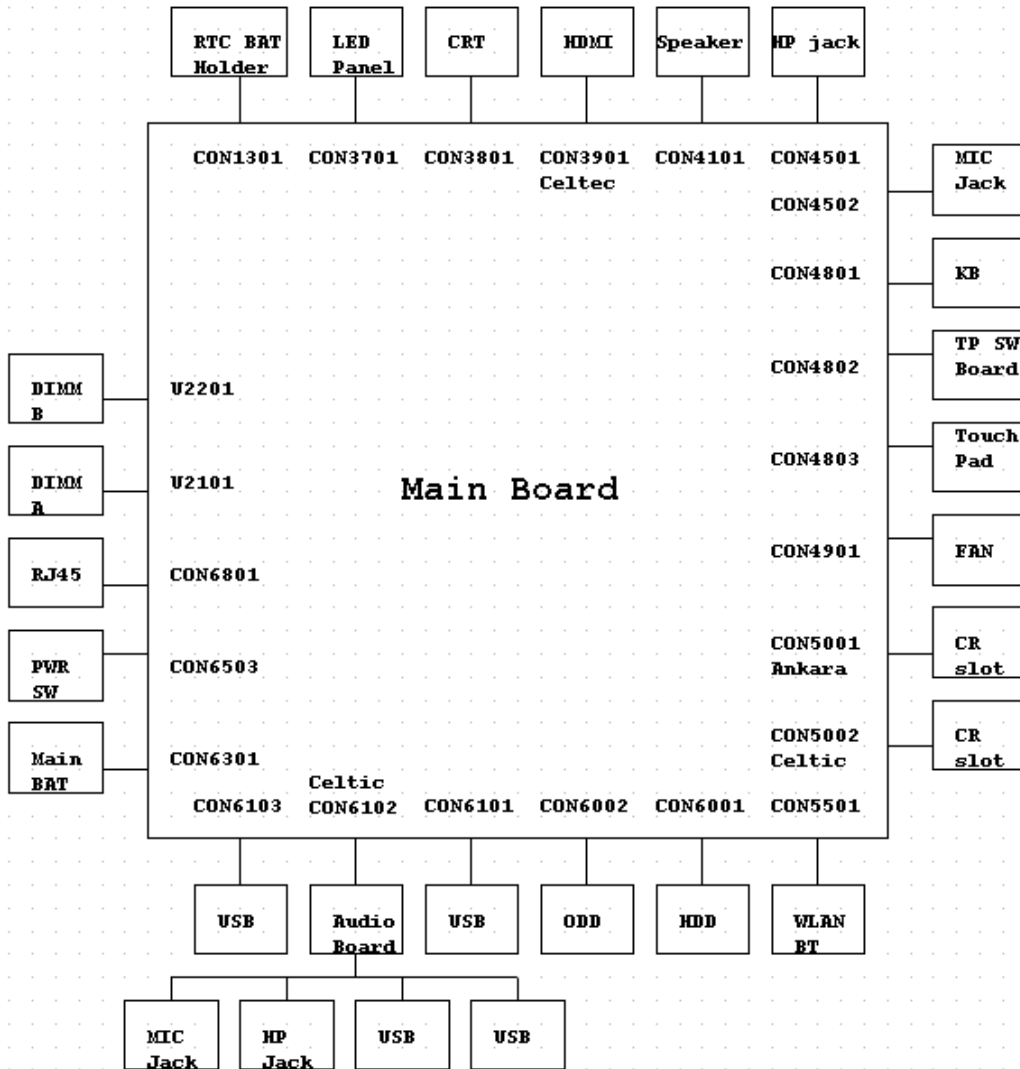


Figure 1-2 System unit configuration

## 1.2 System Unit Block Diagram

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

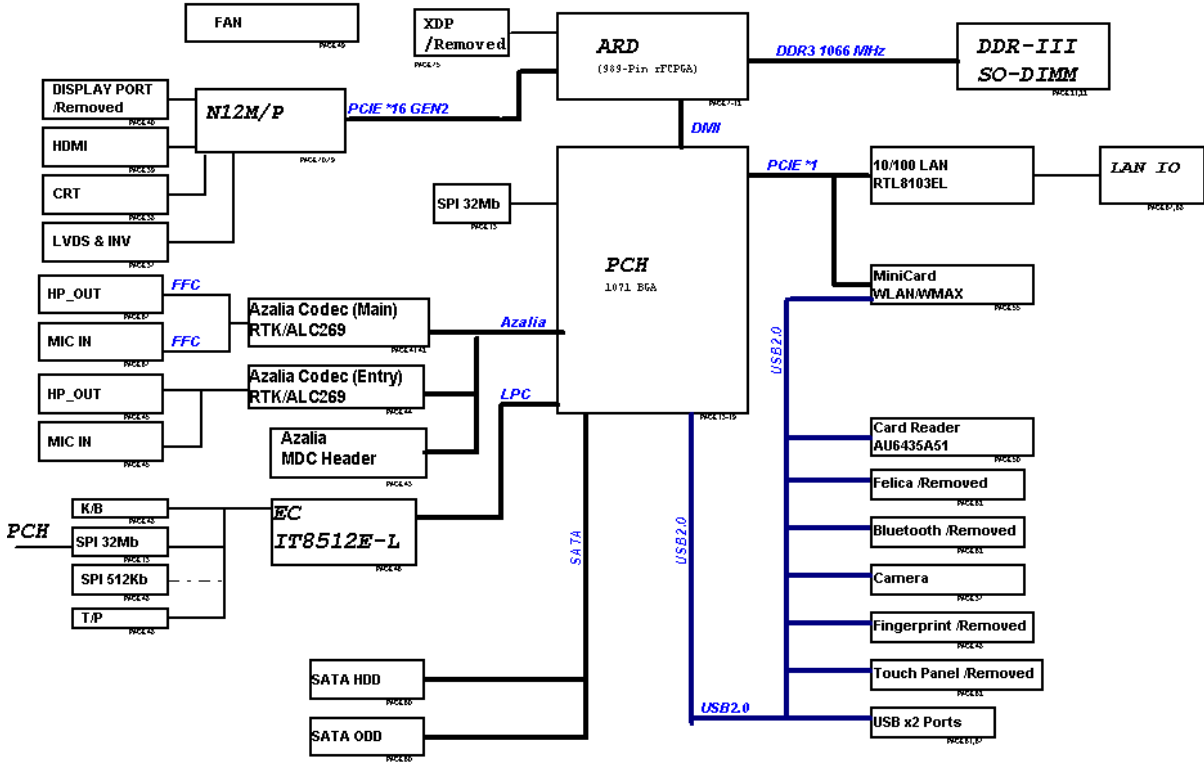


Figure 1-3 System unit block diagram

The system unit is composed of the following major components:

❑ Processor

- Intel® Arrandale multi-chip package mobile processor
- Core speed:
  - Intel® Core™ i5 processors:
    - I5-480M 2.66G/3M
  - Intel® Core™ i3 processors:
    - I3-380M 2.53G/3M, I3-390M 2.66G/3M
  - Intel® Pentium® processors:
    - P6200 2.13G/3M, P6300 2.26G/3M
- Features:
  - Dual core
  - Intel Hyper-Threading Technology (Intel HT Technology)
  - Intel Turbo Boost technology
  - Supports DDR3
  - Intel Fast Memory Access (Intel FMA)
  - 8GB maximum memory support
  - PCI Express: 1 16-lane PCI Express port, Supports PCI Express 2.0
  - Internal Graphics Controller: 500MHz core render clock @1.05V core voltage
  - DMI: 2GB/s (1GB/s each direction), point-to-point interface to PCH
  - Intel Flexible Display Interface (Intel FDI)
  - 988-pin 37.5 mm x 37.5 mm rPGA package (rPGA989A)

❑ BIOS EEPROM

- 32Mbit + 32Mbit(optional) 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
  - DDR3-SDRAM
  - 800/1066MHz
  - 1.5 volt operation
  - FBGA
- Memory Module
  - 204 pin, SO Dual In-line Memory Module (SO-DIMM)
  - PC8500
  - 1GB (1,024MB), 2GB (2,048MB), 4GB (4,096MB)

### □ Intel PCH

- One Intel® HM55 Express Chipset is used.
- Features:
  - DMI (Direct Media Interface)
  - PCI Express: 8 PCI Express root ports, Supports PCI Express 2.0
  - 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.
  - Integrater 10/100/1000 gigabit Ethernet MAC with system defense.
  - External SATA support
  - Intel High Definition Audio Interface: supports up to 4 codecs.
  - USB 2.0: 2 EHCI high-speed USB2.0 Host Controllers and 2 rate matching hubs, supporting up to 12 external ports.
  - ACPI Power Management Logic: Supports ACPI 3.0b.
  - Enhanced DMA Controller, interrupt controller and timer functions
  - SMBus controller: Supports SMBus 2.0 Specification with additional support for I<sup>2</sup>-C device.
  - Supports Intel Rapid Storage Technology
  - Supports Intel Active Management Technology
  - Supports Intel Virtualization Technology for Directed I/O
  - Supports Intel Trusted Execution Technology

- Supports buffered mode generating extra clocks from a clock chip
- Analog and Digital Display ports: supports Analog CRT, HDMI, DVI, DisplayPort, SDVO and LVDS.
- Firmware Hub (FWH) interface support
- Serial Peripheral Interface (SPI) support
- Intel Anti-Theft Technology
- Real-Time Clock: 256-byte battery-backed RAM
- Low Pin Count (LPC) I/F
- GPIO
- 1071-ball 27×25 FCBGA Package

❑ Card Reader Controller

- Realtek RTS5138 is used
- Futures:
  - USB 2.0 I/F
  - Support High-speed (480Mbps) and Full-speed (12Mbps) Data Transfer
  - SD/MMC, Memory Stick, XD Card Controller
  - 24-pin(6x6) QFN package

❑ Sound Controller

- Realtek ALC269
- Mono Microphone-in and stereo headphone-out.
- Internal digital Microphone
- Volume control: Digital control
- Stereo w/o box, 4 ohm / 1.2W.

❑ EC/KBC (Embedded Controller/Keyboard Controller)

- One NUVOTON NPCE795LA0DX chip functions as both EC and KBC.

❑ Clock Generator

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

❑ LAN Controller

- This controller has the following functions:
- Realtek RTL8105E-VL or RTL8111E-VL 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 / Bluetooth

- 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

## 1.3 HDD/SSD

### 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 250GB, 320GB, 500G, 640GB and 750GB.

The HDD is shown in figure 1-4. Specifications are listed in Table 1-1.

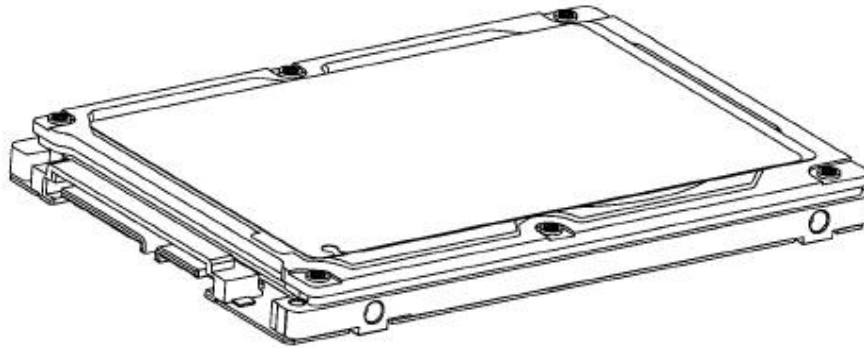


Figure 1-4 2.5-inch HDD

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

Item	Specifications		
Capacity (GB)	250 GB	320 GB	500 GB
Rotational Speed (RPM)	5400 rpm	5400 rpm	5400 rpm
Height	7.0 mm/9.5 mm	7.0 mm/9.5 mm	9.5 mm
User Data Sectors	488,397,168	625,142,448	976,773,168
Bytes / Sector	512	512	512

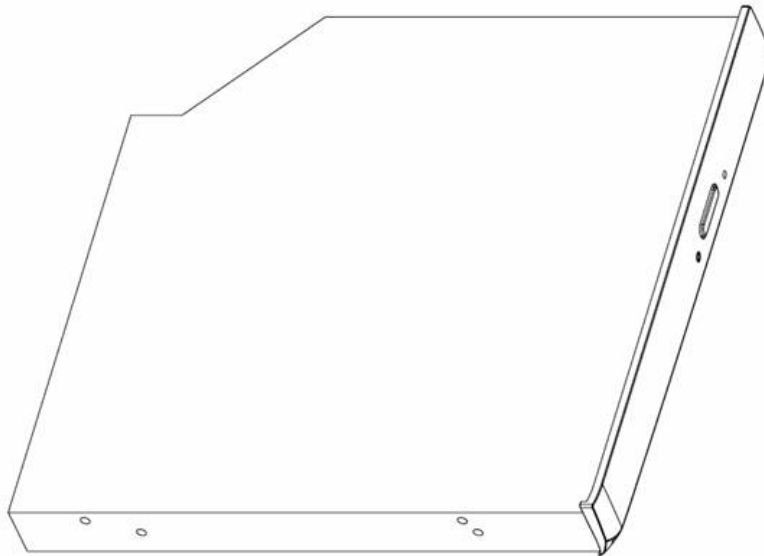
<b>Item</b>	<b>Specifications</b>	
<b>Capacity (GB)</b>	640 GB	750 GB
<b>Rotational Speed (RPM)</b>	5400 rpm	5400 rpm
<b>Height</b>	9.5 mm	9.5 mm
<b>User Data Sectors</b>	1,250,263,728	1,465,149,168
<b>Bytes / Sector</b>	512	512



## 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 4x speed, DVD±R at maximum 8x speed, DVD-RW at maximum 6x speed, DVD+RW at maximum 8x speed, DVD±R DL at maximum 3.3x~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*

The specifications are listed in Table 1-3.

Table 1-2 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	1MB	
Support Formats	CD-R CD-RW High Speed CD-RW Ultra Speed CD-RW DVD-R DVD-R DL DVD-RW DVD+R DVD+R DL DVD+RW DVD-RAM	

## 1.5 Keyboard

The keyboard has 100(US)/102(UK)/106(JP) keys that consist of character keys, number key 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 1-7 is a view of the keyboard.

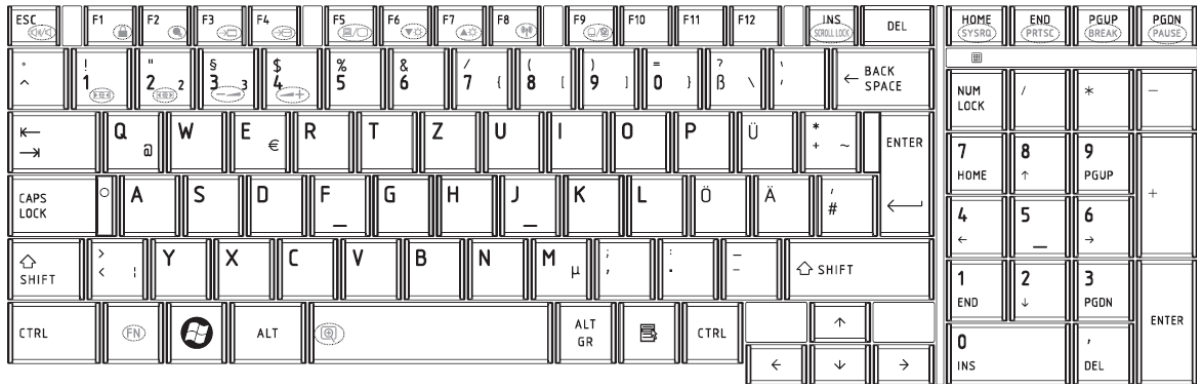


Figure 1-7 Keyboard

## 1.6 TFT Color Display

The TFT color display consists of 17.3-inch LCD module.

The LCD module used for the TFT color display uses a LED backlight as the light source and can display a maximum of 262,144 colors with 1600 x 900 resolution.

Table 1-4 lists the specifications.

*Table 1-3 LCD module specifications (1/1)*

Item	Specifications
	<b>17.3"W HD+(1600 x 900), CSV type,LED backlight</b>
Number of Dots	1,600 (W) * 900 (H)
Dot spacing (mm)	0.0796 (H) x 0.2388 (V) (TYP.)
Display range (mm)	382.08 (H) x 214.92 (V) (17.3 "diagonal)

## 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 1-5.

*Table 1-4 Power supply output rating*

Name	Voltage (V)	Use
+VCORE	VID (Intel spec)	CPU
+VFGX_CORE	VID(Intel spec)	Integrated graphic (UMA)
+VGA_VCORE	0.85/1.0	Discrete graphic (DSC)
+VCCP	1.05	CPU, PCH, Clock Gen, GPU
+1.5VS	1.5	CPU, Clock Gen, Mini Card
+1.5V	1.5	DDR3-SDRAM
+1.8VS	1.8	CPU, PCH
+0.75VS	0.75	DDR3-SDRAM
+3VSUS	3.3	PCH, Express Card, Mini Card, LAN
+3V	3.3	Camera, Card Reader
+3VS	3.3	PCH, DDR3-SDRAM, Clock Gen, LCD, HDMI SF,Codec, EC, HDD
+3VA	3.3V	PCH RTC, EC, SPI ROM
+5VA	5	USB S&C
+5VSUS	5	PCH, USB
+5VS	5	PCH, CRT, HDMI, Codec, Touch pad, FAN, HDD, ODD

## 1.8 Batteries

The computer has two types of batteries as follows:

- Main battery pack
- RTC battery

The battery specifications are listed in Table 1-6.

*Table 1-5 Battery specifications*

<b>Battery name</b>	<b>Material</b>	<b>Output voltage</b>	<b>Capacity</b>
Main battery(6 cell)	Lithium-Ion	10.8V	4400 mAh
Main battery(6 cell)	Lithium-Ion	10.8V	5600 mAh
RTC battery(CR2032)	Lithium	3.0 V	210 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 1-7 lists the charging time required for charges.

*Table 1-6 Time required for charges*

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

**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 1-8 lists the data preservation period of the RTC battery.

*Table 1-7 RTC battery charging/data preservation time*

<b>Status</b>	<b>Time</b>
Data preservation period (full capacity)	3.5 years



## 1.9 AC Adaptor

The AC adaptor is also used to charge the battery.

Table 1-9 lists the AC adaptor specifications.

*Table 1-8 AC adaptor specifications for integrated graphic model*

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 1-9 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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**Note:**

*In this document, mark ○,<sup>1</sup> 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 Bluetooth (BTO) ○,I
2 Main Board	7 LAN	12 Camera (BTO)
3 HDD	8 Wireless(WiDi WiFi) LAN	13 HDMI
4 Keyboard/Touch pad	9 Sound component	14 Touch Pad with gesture
5 Display	10 Card reader	15 Battery, RTC Battery

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 bootable USB key
2. An external CRT display (for Display troubleshooting)
3. A Card reader (for Card reader slot troubleshooting)
4. An external microphone (for Sound troubleshooting)
5. 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 7(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.

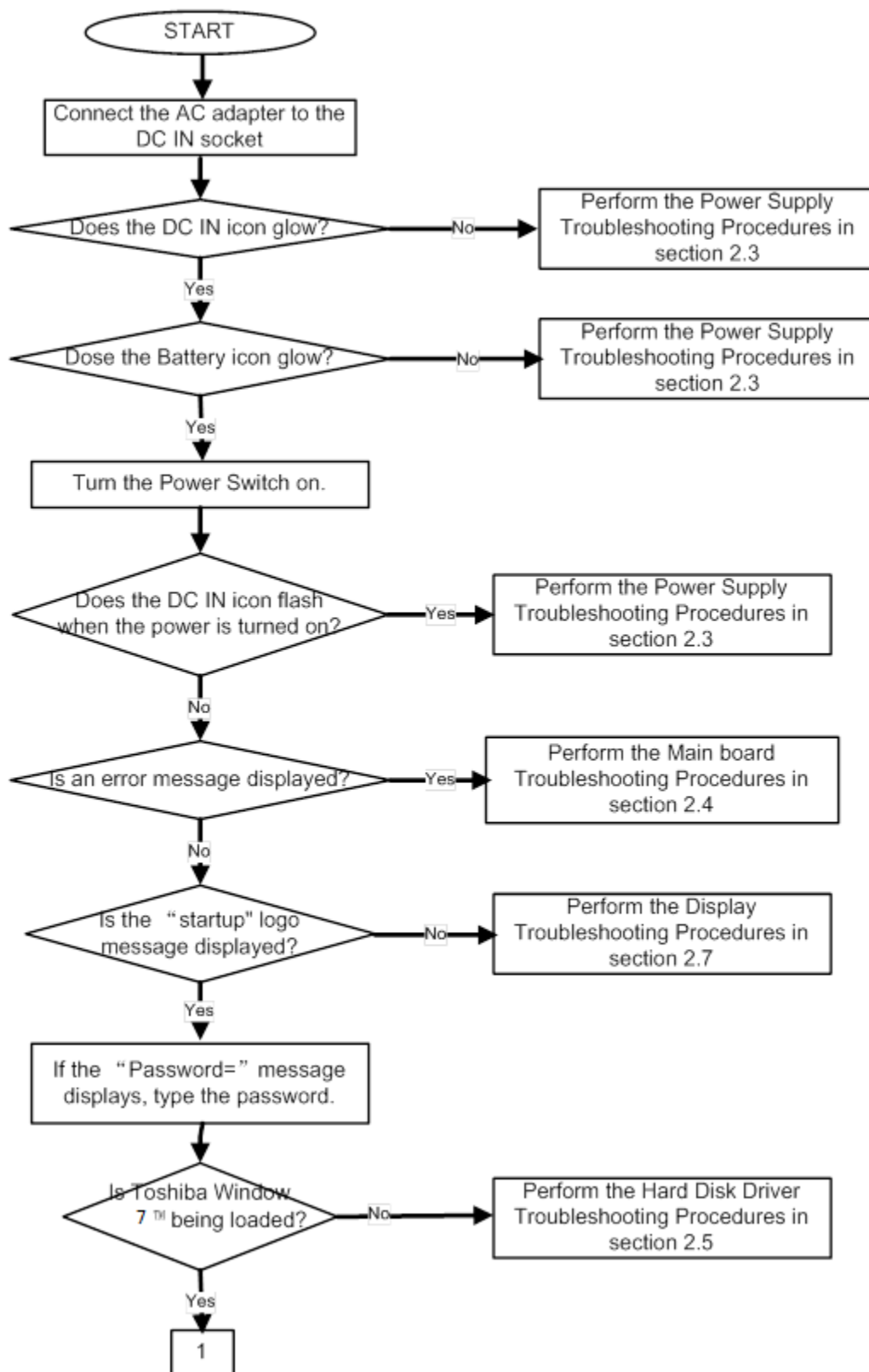


Figure 2-1 Troubleshooting flowchart (1/2)



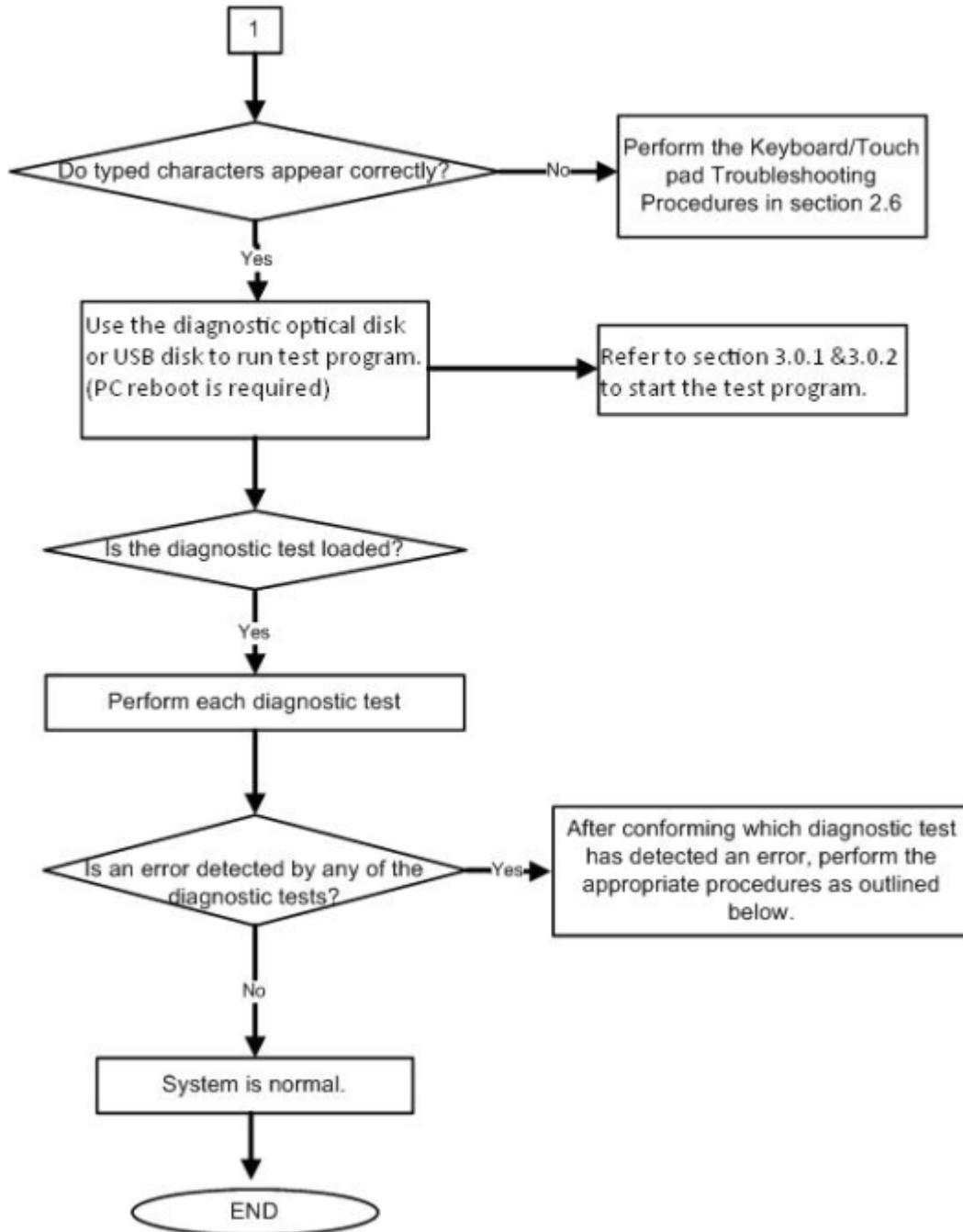


Figure 2-1 Troubleshooting flowchart (2/2)

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/BluRay test, perform the Optical Drive Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the Wireless(WiDi WiFi) LAN test, perform the Wireless(WiDi WiFi) LAN Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the sound test, perform the Sound Troubleshooting Procedures in Section 2.11.
9. If an error is detected on card reader, perform the card reader Slot Troubleshooting Procedures in Section 2.12.
10. If an error is detected on Bluetooth, perform the Bluetooth Troubleshooting Procedures in Section 2.13. ○,I
11. If an error is detected on camera, perform the camera Troubleshooting Procedures in Section 2.14.



## 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

Error code	Meaning
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

Error code	Meaning
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

Check 2 In the case of error code N0FT0A:

- 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 N0FB04:

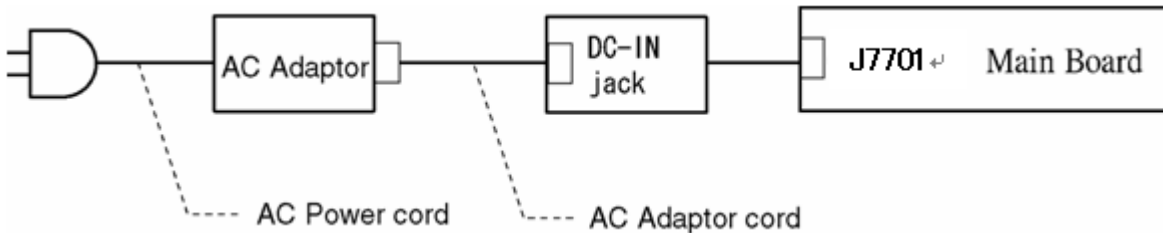
- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to the following step:
- Replace the battery pack with a new one. If the error still exists, go to Procedure 5.

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 **FREE-DOS** or Windows 7(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 2.6.

If the error message (15) appears, go to the HDD Troubleshooting Procedures in Section 2.5.

- (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.

- |                                    |                           |
|------------------------------------|---------------------------|
| <b>1. Model, BIOS and CPU Test</b> | <b>A. LID switch Test</b> |
| <b>2. Check MAC Test</b>           | <b>B. HDD Test</b>        |
| <b>3. PAD Test</b>                 | <b>C. Wireless Test</b>   |
| <b>4. LCDRGB Test</b>              | <b>D. SPEAKER Test</b>    |
| <b>5. Audio Test</b>               | <b>E. R/W DMI</b>         |
| <b>6. KB Test</b>                  | <b>F. FAN</b>             |
| <b>7. Memory Test</b>              | <b>G. VGA TEST</b>        |
| <b>8. FNTEST Test</b>              |                           |
| <b>9. LED Test</b>                 |                           |

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 Troubleshooting

This section describes how to determine if the HDD 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 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 FREE-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 FREE-DOS system disk, install system files on the HDD.

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

System transferred

**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 is formatted using the low level format program and the FREE-DOS FORMAT program. To format the HDD, start with Check 1 below and perform the other steps as required.

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

Format complete

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

- Check 2 Using the Diagnostics Disk, format the HDD 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 low level format is complete. Partition and format the HDD using the FREE-DOS FORMAT command.

Format complete

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

#### Procedure 4 Diagnostic Test Program Execution Check

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

If an error is detected during the HDD test, an error code and status will be displayed. Replace the HDD 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.

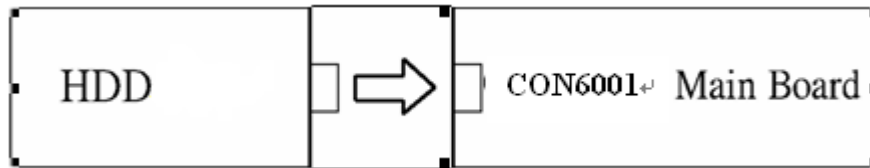
Table 2-4 HDD error code and status

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

#### Procedure 5 Connector Check and Replacement Check

The HDD may be disconnected, or the HDD 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.



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 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.

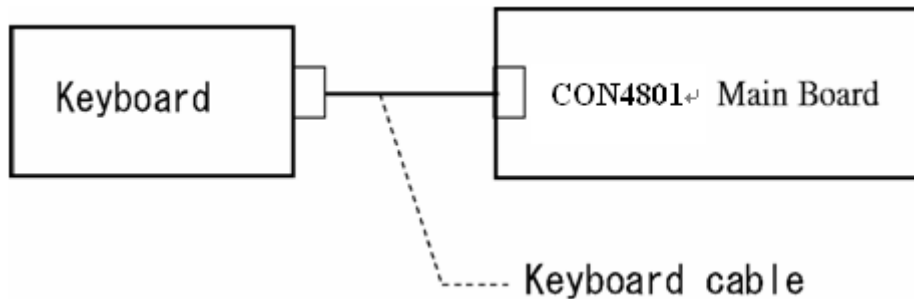
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

## 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:

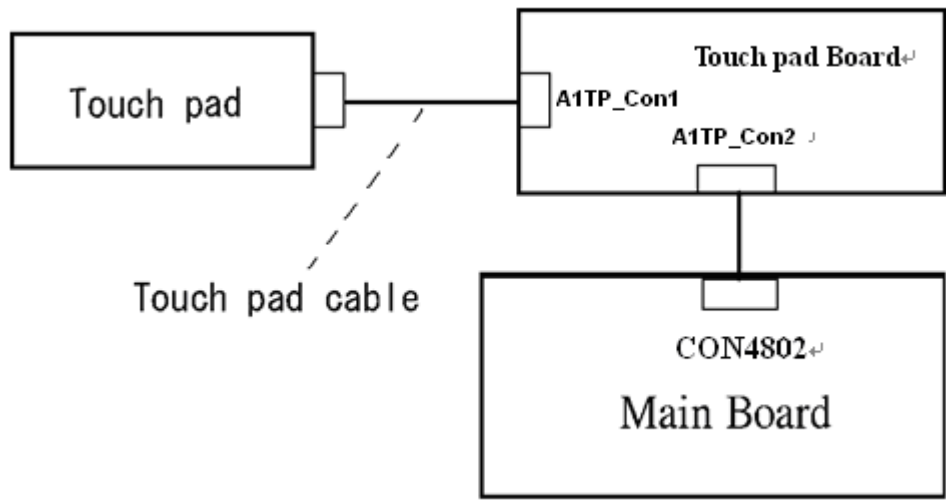
1. If the keyboard or AccuPoint malfunctions, start with Check 1.
2. If the touch pad malfunctions, start with Check 3.
3. If the power switch, InTouch button or Presentation button malfunctions, start with Check 5.

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

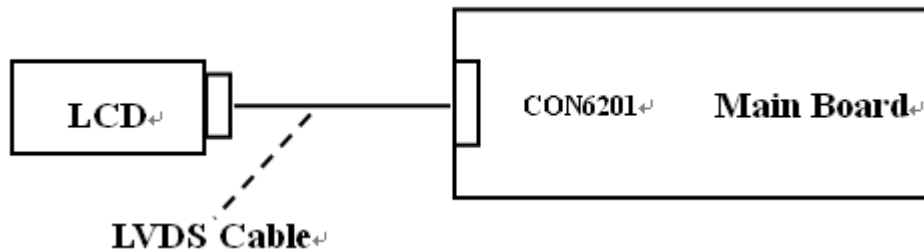
Connect an external monitor and turn on the computer. If there is no problem on it, the internal LCD may be defective. Go to Procedure 3. If there is any problem on the external monitor, the main board may be defective. Go to Procedure 2.

### 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.



#### **Procedure 4 Replacement Check**

LCD module and main board are connected to display circuits through 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 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,DVD±R/±RW/-RAM and BluRay 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,DVD±R/±RW/-RAM and BluRay Drive test program is stored on the Diagnostics Disk.

For the test, prepare test Media.

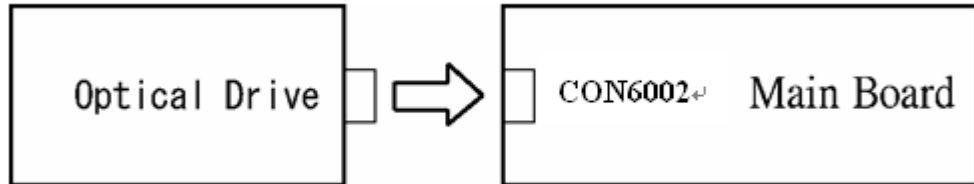
Then connect the Diagnostics HDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

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

**Procedure 2 Connector Check and Replacement Check**

The optical drive (DVD-ROM,DVD±R/±RW/-RAM and BluRay 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 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 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

## 2.10 Wireless(WiDi WiFi) LAN Troubleshooting

This section describes how to determine if the computer's Wireless(WiDi WiFi) 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(WiDi WiFi) 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.

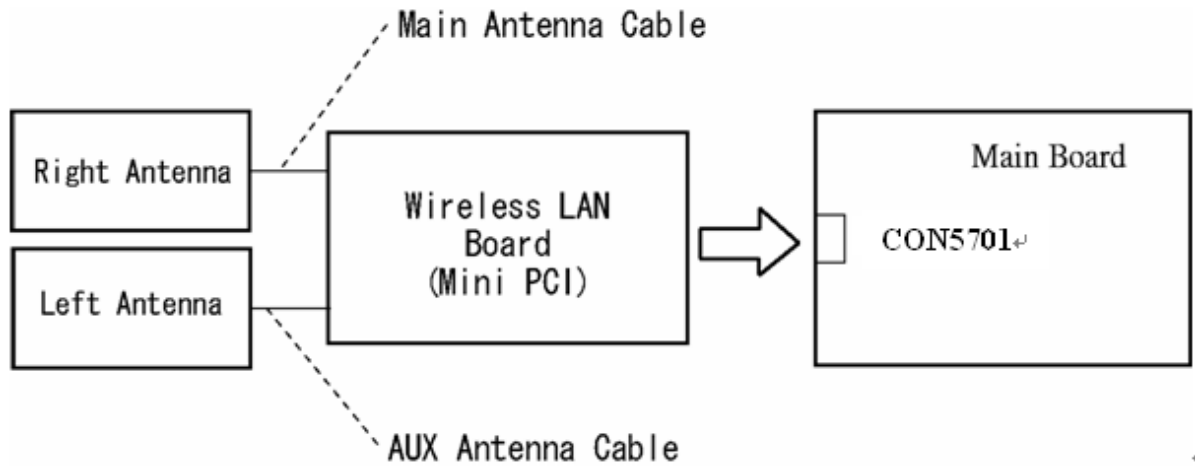
Check 1 Execute test program for the Wireless(WiDi WiFi) LAN function to check the transmitting-receiving function of the Wireless(WiDi WiFi) LAN. You will need a second computer that can communicate by the Wireless(WiDi WiFi) LAN.

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(WiDi WiFi) 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(WiDi WiFi) LAN board is firmly connected to CON5701 on the main board.

If the connector is disconnected, connect it firmly. If the Wireless(WiDi WiFi) LAN board is still not functioning properly, perform Check 2.

**Check 2** Make sure the Wireless(WiDi WiFi) LAN antenna cables are firmly connected to the Wireless(WiDi WiFi) LAN board.

If the Wireless(WiDi WiFi) LAN antenna cables are disconnected, connect them firmly. If the Wireless(WiDi WiFi) LAN board is still not functioning properly, go to Procedure 3.

### Procedure 3 Replacement Check

The Wireless(WiDi WiFi) LAN antenna, Wireless(WiDi WiFi) 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(WiDi WiFi) 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(WiDi WiFi) 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.



## 2.11 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

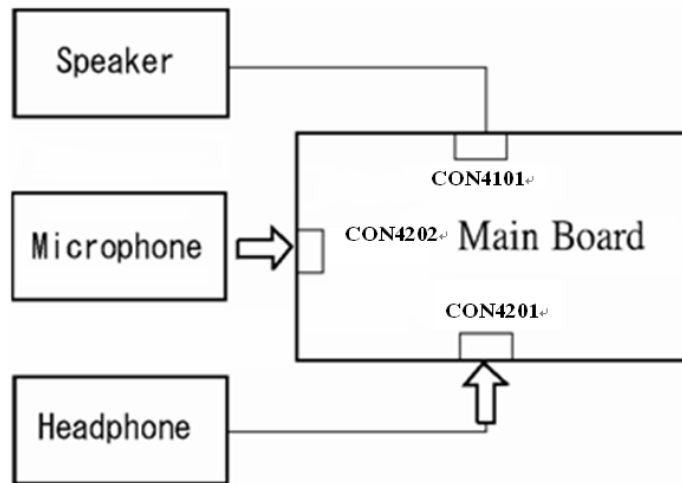
### Procedure 1 Diagnostic Test Program Execution Check

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.

## 2.12 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 7 (TM)

Procedure 2: Connector Check and Replacement Check

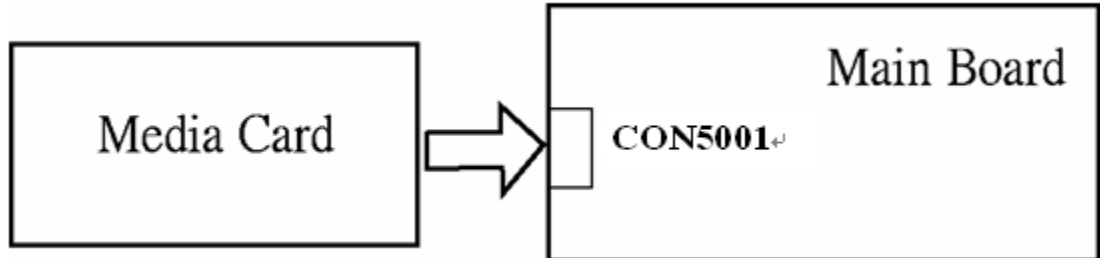
### Procedure 1 Check on Windows 7(TM)

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*.

## 2.13 Bluetooth (BTO) Troubleshooting ○,†

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.

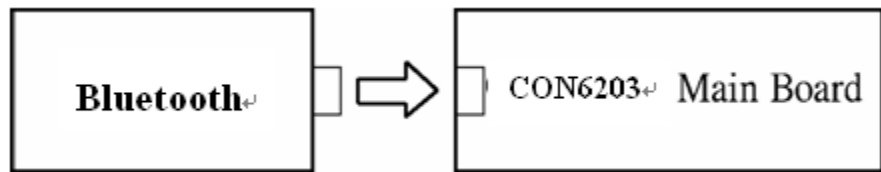
If any errors occur while executing the Bluetooth test, go to Procedure 2.

**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*.

## 2.14 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.

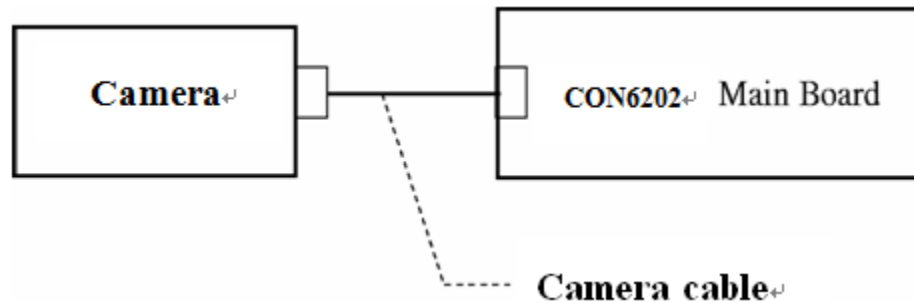
If any errors occur while executing the camera test, go to Procedure 2.

**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*.



## 2.15 HDMI

This section describes if the computer HDMI functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Check on Windows 7(TM)

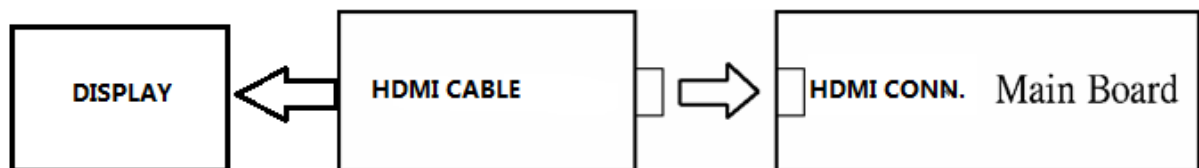
Procedure 2: Connect Computer to a display by HDMI cable

### Procedure 1 Check on Windows 7(TM)

Switch play device to “high digital output” and then go to Procedure 2.

### Procedure 2 Connect Computer to a display by HDMI cable

Make Sure HDMI cable is connected to connector on the Main board.



## 2.16 Touch Pad with gesture

This section describes if the computer **Touch Pad with gesture** functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Open a Photo

Procedure 2: Test touchpad by Gesture

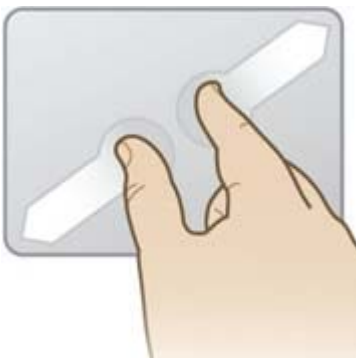
### Procedure 1 Open a Photo

### Procedure 2 Test touchpad by Gesture

Follow below can move photo.



Follow below can change photo dimension



## 2.17 Battery, RTC Battery

This section describes if the computer **battery and RTC battery** functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: AC in to charge the battery

Procedure 2: Log in BIOS

### **Procedure 1 AC in to charge the battery**

Make sure AC in for a while ,and then remove AC to see if battery has power and it can support computer on .

### **Procedure 2 Log in BIOS**

Log in BIOS to see if the system current time is the same with nature time.

If not ,please correct and check it matched nature time again after a wile.

---

# Chapter 3

## Tests and Diagnostics

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## Chapter 3 Contents

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# Tests and Diagnostics

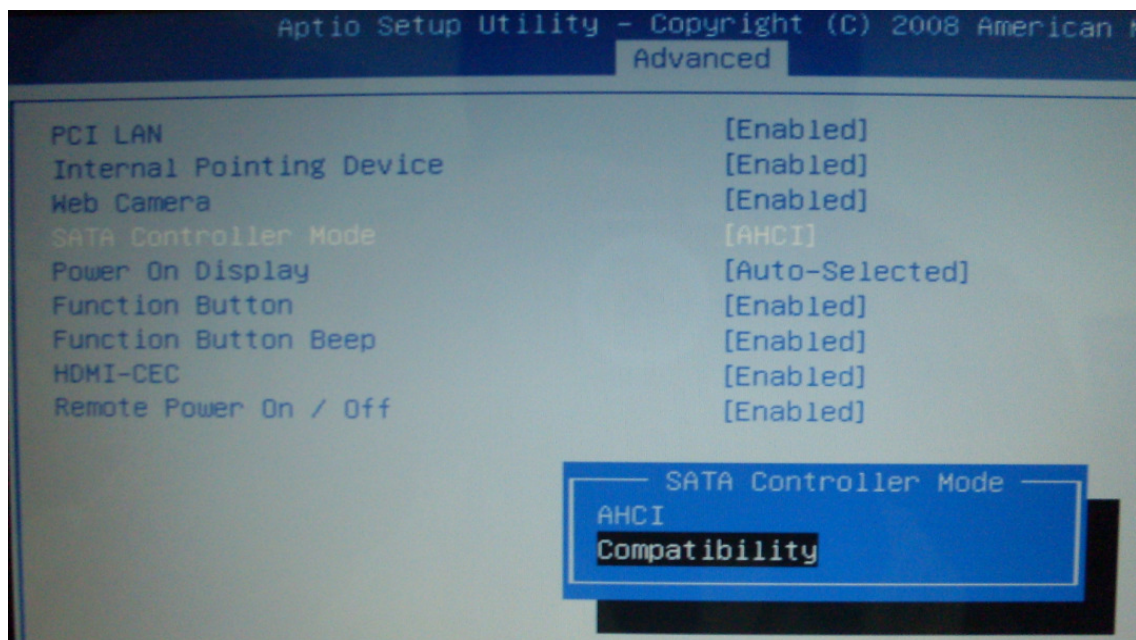
This chapter explains how to use the Diagnostic Test programs to test the functions of the computer's hardware modules. The test program should be stored on an optical media disk or a USB boot memory.

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. Enter BIOS → Advanced → System Configuration
4. Set SATA Controller Mode to “Compatibility” in BIOS.



4. After test, remember to set SATA Controller mode back to “AHCI”.

### 3.0.1 Test menu

The Test MENU consists of the following functions.

Due to web camera is USB device for this model, it can not be test by USB T&D file, so please test it by ISO T&D file.

USB file test menu

```
Ankara 10/10G/10AB/10R/10RG /dynabook
Ciltic 10/10G/20/20G/10RG /dynabook
Test Program for Toshiba
VER 1.10 2011/03/24
-----
1. Model, BIOS and CPU Test A. LID Switch Test
2. Check MAC Test          B. HDD Test
3. PAD Test                 C. Wireless Test
4. LCDRGB Test             D. SPEAKER Test
5. AUDIO Test              E. R/W DMI
6. KB Test                 F. FAN
7. MEMORY Test            G. UGA TEST
8. FNTEST Test
9. LED Test

Please Enter Your Choice -->
```

ISO file test menu

```
Ankara 10/10G/10AB/10R/10RG /dynabook
Ciltic 10/10G/20/20G/10RG /dynabook
Test Program for Toshiba
VER 1.10 2011/03/24
-----
1. Model, BIOS and CPU Test B. LID Switch Test
2. Check MAC Test          C. SD Card Test
3. PAD Test                 D. HDD Test
4. LCDRGB Test             E. Wireless Test
5. AUDIO Test              F. Webcam Test
6. KB Test                 G. SPEAKER Test
7. MEMORY Test            H. R/W DMI
8. FNTEST Test            I. FAN
9. STORE Test              J. UGA TEST
a. LED Test

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.

```
Ankara 10/10G/10AB/10R/10RG /dynabook
Ciltic 10/10G/20/20G/10RG /dynabook
Test Program for Toshiba
VER 1.10 2011/03/24
-----
1. Model, BIOS and CPU Test  A. LID Switch Test
2. Check MAC Test           B. HDD Test
3. PAD Test                  C. Wireless Test
4. LCDRGB Test              D. SPEAKER Test
5. AUDIO Test                E. R/W DMI
6. KB Test                   F. FAN
7. MEMORY Test              G. UGA TEST
8. FNTEST Test
9. LED Test

Please Enter Your Choice -->
```

**Note:**

Please make sure to set test PC SATA Controller Mode to “Compatibility” in BIOS and set SATA Controller Mode to “ACHI” after test.

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



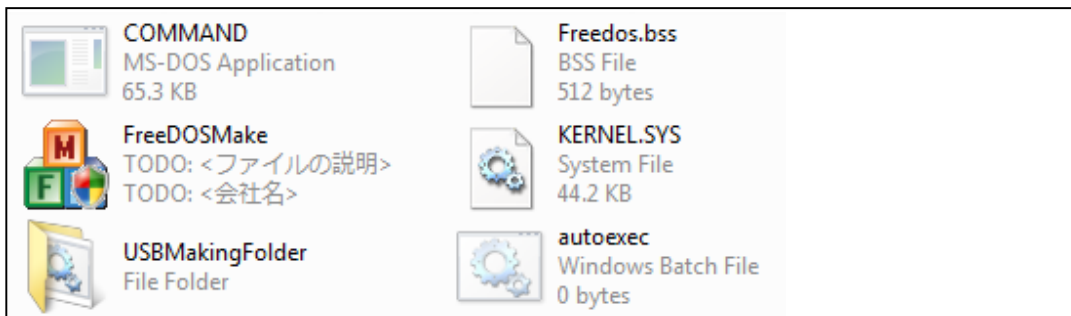
### 3.0.3 Executing the Diagnostic Test

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

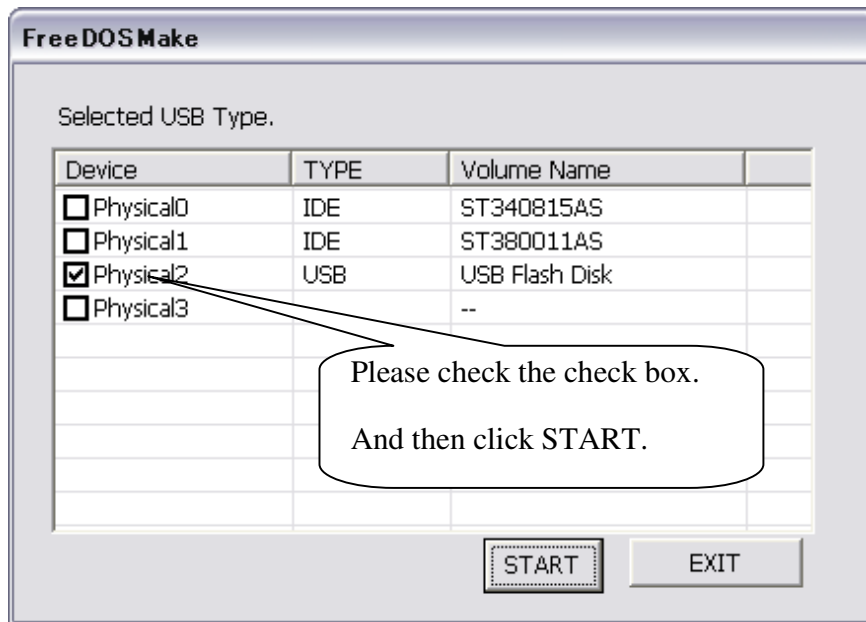
1. Please prepare Toshiba PC of Windows Win-7 OS.
2. Please copy the file for creating a USB-Bootable memory to PC.

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. And when you create USB-Bootable memory, please use only one USB-memory.
5. Run “FreeDOSMake.exe”. You can create USB-Bootable memory.
6. Unzip and copy whole test program to USB memory, overwrite all files.



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.

**NOTE:**

*Please make sure to set test PC SATA Controller Mode to "Compatibility" in BIOS.*

### 3.1 Model, BIOS and CPU Test

1. This test displays the two following information.
2. One is a Model and BIOS information display.
3. One is the information display of CPU and CPU test.
4. The following display is displaying of BIOS information.

```
DMI Utility Rev 1.26                               Built Date:06/06/2003
-----
SMBIOS Structure Table Address:F000:0480
Entry Point:E000:B660
DMI Revision:2.6
Structure Numbers:75

M/B Manufacturer   : Intel Corporation
M/B Product        : Oneonta Falls
M/B Version        : To be filled by O.E.M.
BIOS Vendor        : American Megatrends Inc.
BIOS Version       : 0.11
BIOS Release Date  : 01/07/2011
System Manufact.   : TOSHIBA
System Product     : SandyBridge Platform
System Version     : 1234567890
UUID               : E16A8E10-CBA1-9417-4A71-00E04C36000B

? Please check the Produce, ?
? UUID and BIOS Version.   ?
? T.C.                       ?

Return Code = 1
Press any key to continue . . .
```

**Note:**

*Press any key to turn to the 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:F000:0480
Entry Point:E000:B660
DMI Revision:2.6
Structure Numbers:75

Socket Type      : CPU 1
Manufacturer     : Intel
Version         : Intel(R) Core(TM) i5-2540M CPU @ 2.60GHz
Max./Cur./Ext.(MHz) : 4000/2600/100

Current date is Mon 03-28-2011
Current time is  2:55:20.92 pm

Please confirm the CPU Spec.
and current date/time.
T.C.

Press any key to continue . . .

```

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.

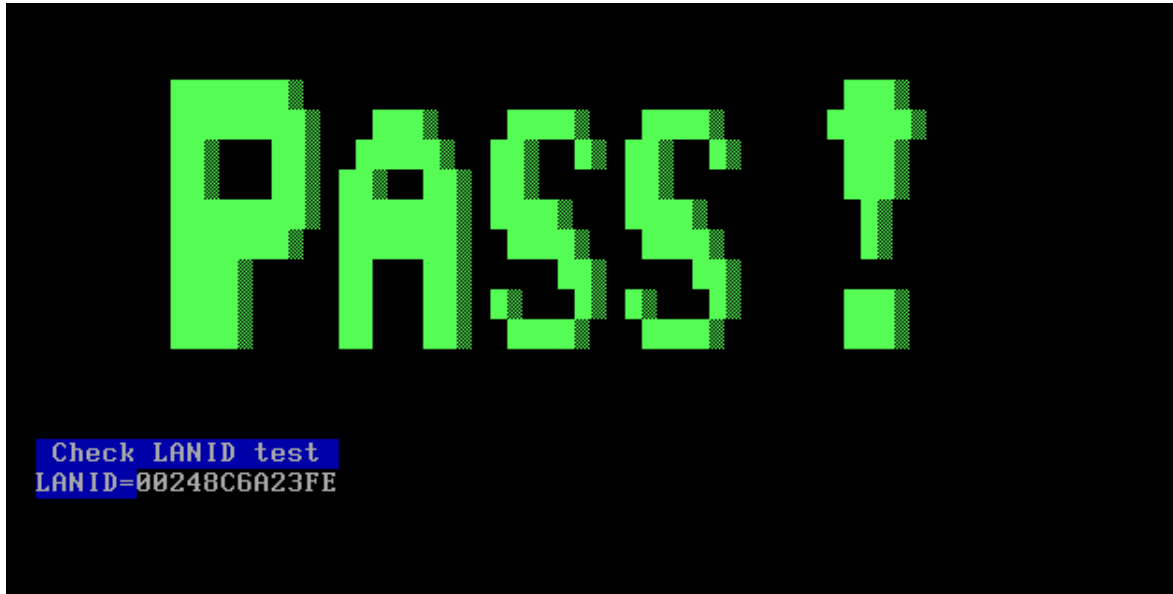
Read the CPU type, internal speed and CPU ID information from the related address and check if the information is the same as the customer order.

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

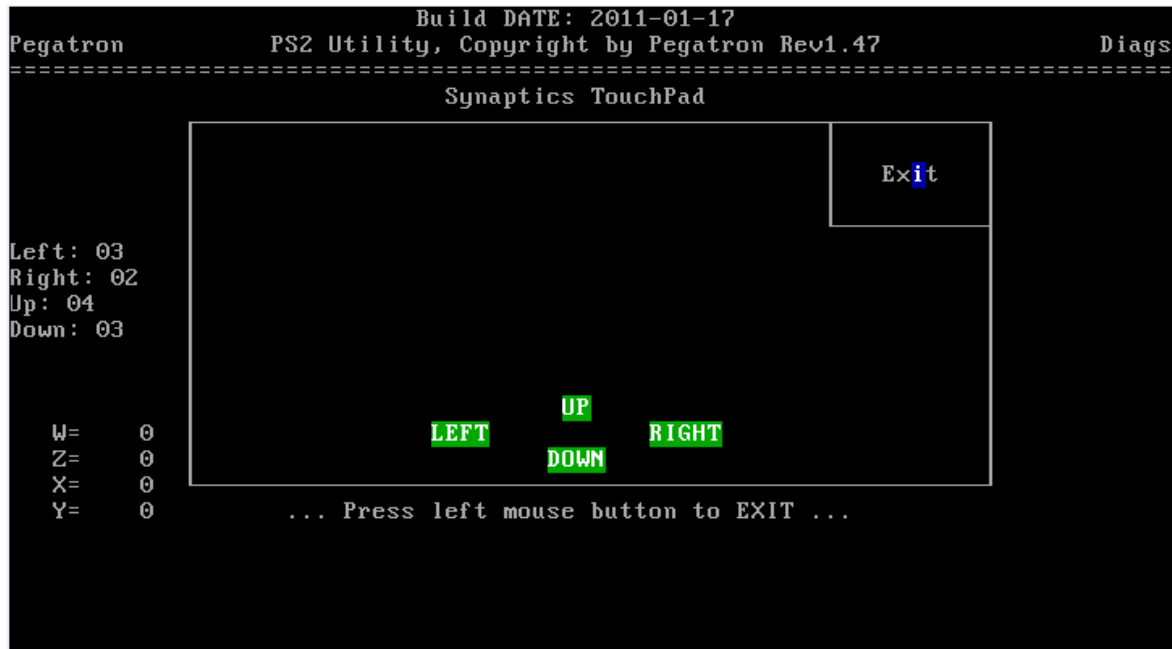
Read the MAC address from the Ethernet controller ROM and the MAC will appear on the screen..

**Note:**

*The batch file is testing the LAN card ID which shows on the screen.*

### 3.3 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.

#### 3.3.1. Diagnostic name: PS2.EXE

Diagnostic Version: 1.15 or later version.

#### 3.3.2. 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 - ta - ts - r 3 - l 3 - ae /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.

### *3 Tests and Diagnostics*

---

-t2 : Testing Left and Right button only.

-ae : Auto exit the program after the Left and Right button click time setting have reached the setting.

/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

### 3.4 LCDRGB Test

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

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

[Mode 100 640\*400 8M]



[Mode 101 640\*100 8M]





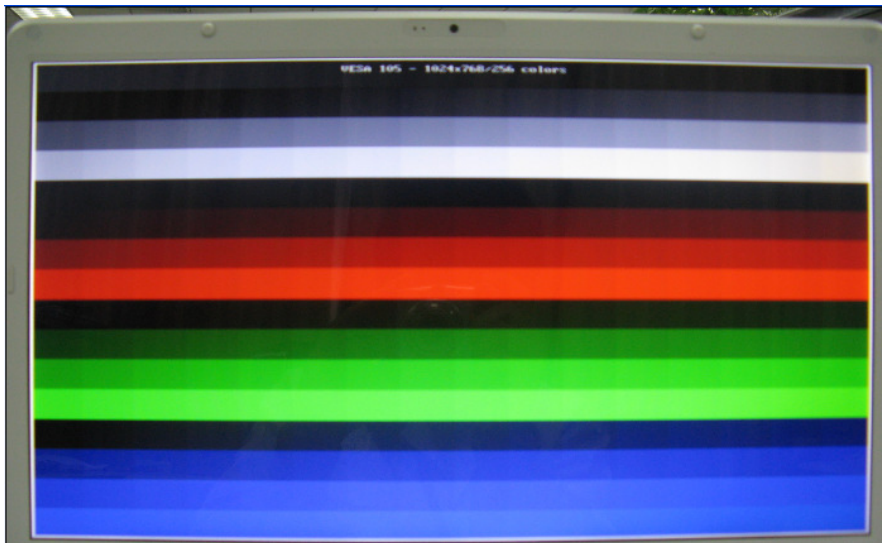
### 3 Tests and Diagnostics

---

[Mode 103 800\*600 16M]



[Mode 105 1024\*768 16M]



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

3.4.1. Diagnostic name: VIDEO.EXE

Diagnostic Version: 2.25.06 or later version.

3.4.2. 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 100
```

```
video -p -gc /RGB 101
```

```
video -p -bc /RGB 103
```

```
video -p -bc /RGB 105
```

-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

### 3.5 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 OUTPORT=15 INPORT=18 Playback/Recording:

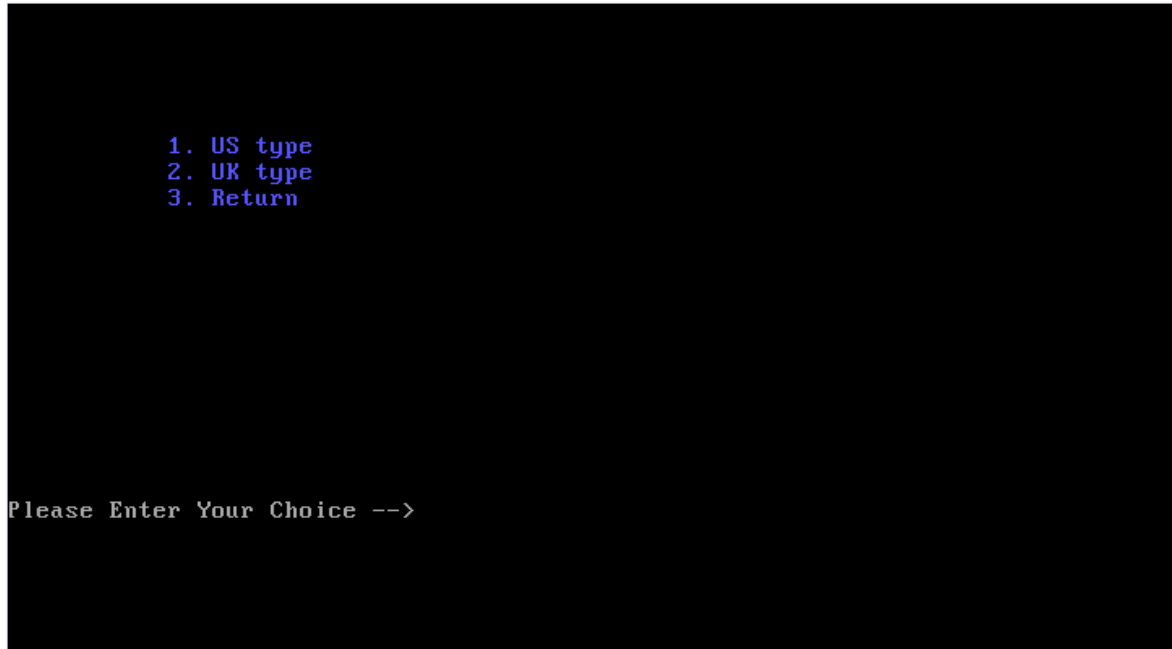
Copyright(C) 2008, Realtek Semiconductor CO. Ltd
```

```
*****
*****
*****
*****
*****
**** 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 ****
*****
*****
*****
*****
*****
```

**Note:**  
*To test the audio device function, you need to plug in the audio test cable.*

### 3.6 Keyboard Test

Please choose the corresponding KB type to test.



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



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

**NOTE:**

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

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

D diagnostic name: Keyboard.exe

Command: Keyboard.exe /r trsaeng.map trsaeng.xy trsaeng.cd

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

### 3.7 Memory Test

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

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

```
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 memsize.
  I.C.
```

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

Please Enter Your Choice -->
```

This chapter shows how to use the Diagnostics to test the functions of the memory size, speed and location.

3.7.1 Diagnostic name: SMBUS.EXE

Diagnostic Version: 1.37 or later version.

3.7.2 Principle and how to use:

- a. The SMBUS diagnostic consists of the following functions.

Memory sizes, memory speed and memory location.

Command line: a-1. mm -t 4 /s %MSIZE%

“-t 3” defines where the memory size will be tested.

“/s %MSIZE%” set the memory size.

- b. Please refer to the illustration above to see the memory information.

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

### 3.8 Function Test

Please enter “C” to select the function test. Test program will test several function and show the test result one by one. (Command: functest.exe /T).

```

Build DATE:2008-04-23
Pegatron   IRQ8 Tester using CMOS, Copywrite by Pegatron Rev1.10      Diags
=====
IRQ8 Periodic Interrupt 2 times within 2 ms --> OK
  Now Time: 20:37:13
Alarm Time: 20:37:14
Alarm Interrupt Test OK(0) ...
Start&Update Interrupt Test OK ...986

Current date is Wed 03-23-2011 Return_Code = 0

```

IRQ8 Test Passed!!  
Please check time and date  
T.C.

```

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

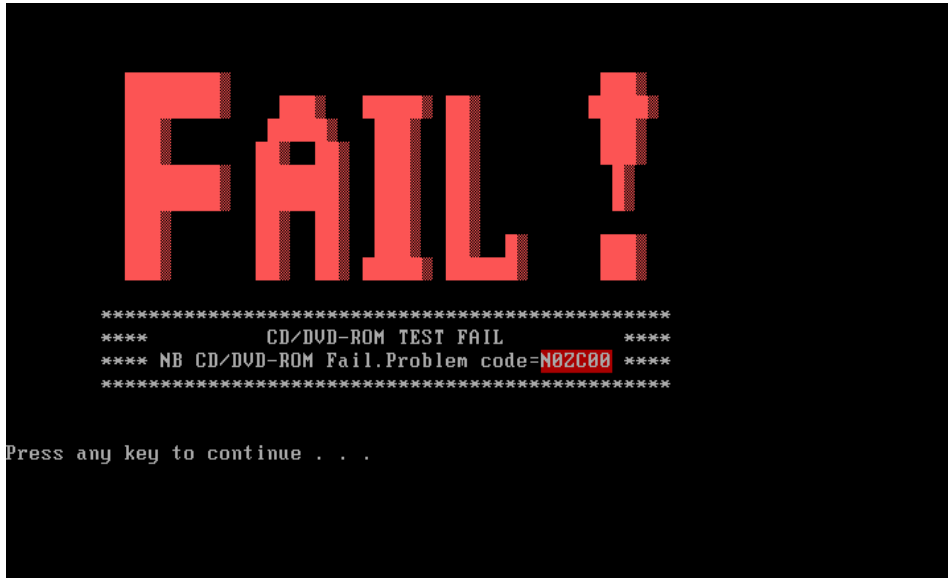
```

Function Test Passed!!  
T.C.



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

This Program will test if the CD/DVD-ROM works properly in the ODD mode , Please insert test CD **with ASUS.bpm** file in it before test, .



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

#### 3.10.1. Diagnostic name: PSATA.EXE

#### 3.10.2. 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."

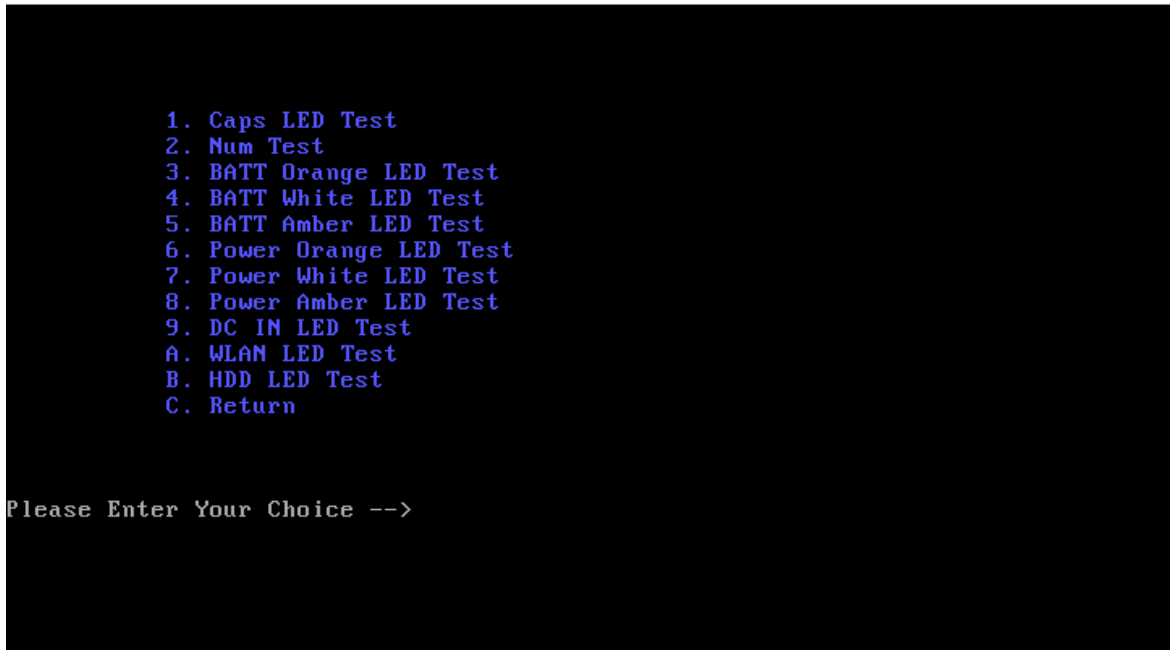
```
psata -d 3 -rep _ /cf "TO01"
```

Note:

When test the CD-ROM, the program will close the USB port, so you just can test it in the ODD mode.

### 3.10 LED Test

Please do as the screen notice you .



### 3.11 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.

#### 3.18.1. Diagnostic name: PMC.EXE

Diagnostic Version: 2.05.

#### 3.18.2. 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.




**Note:**

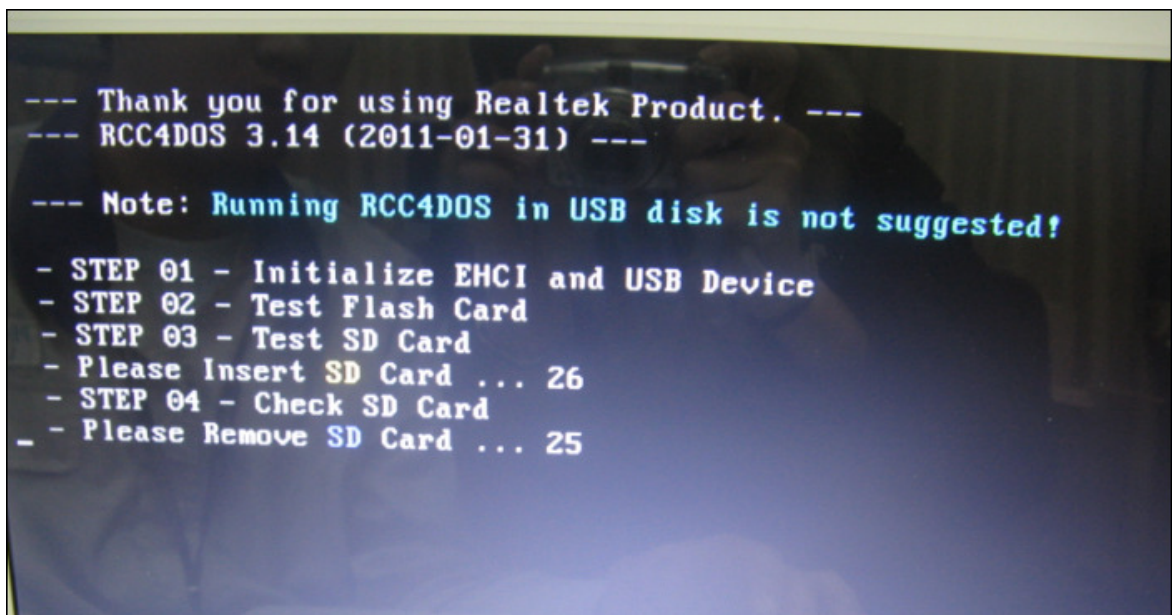
*When you test LID-Sw, please use your finger. Then check LCD bright or not.*

### 3.12 SDCARD Test

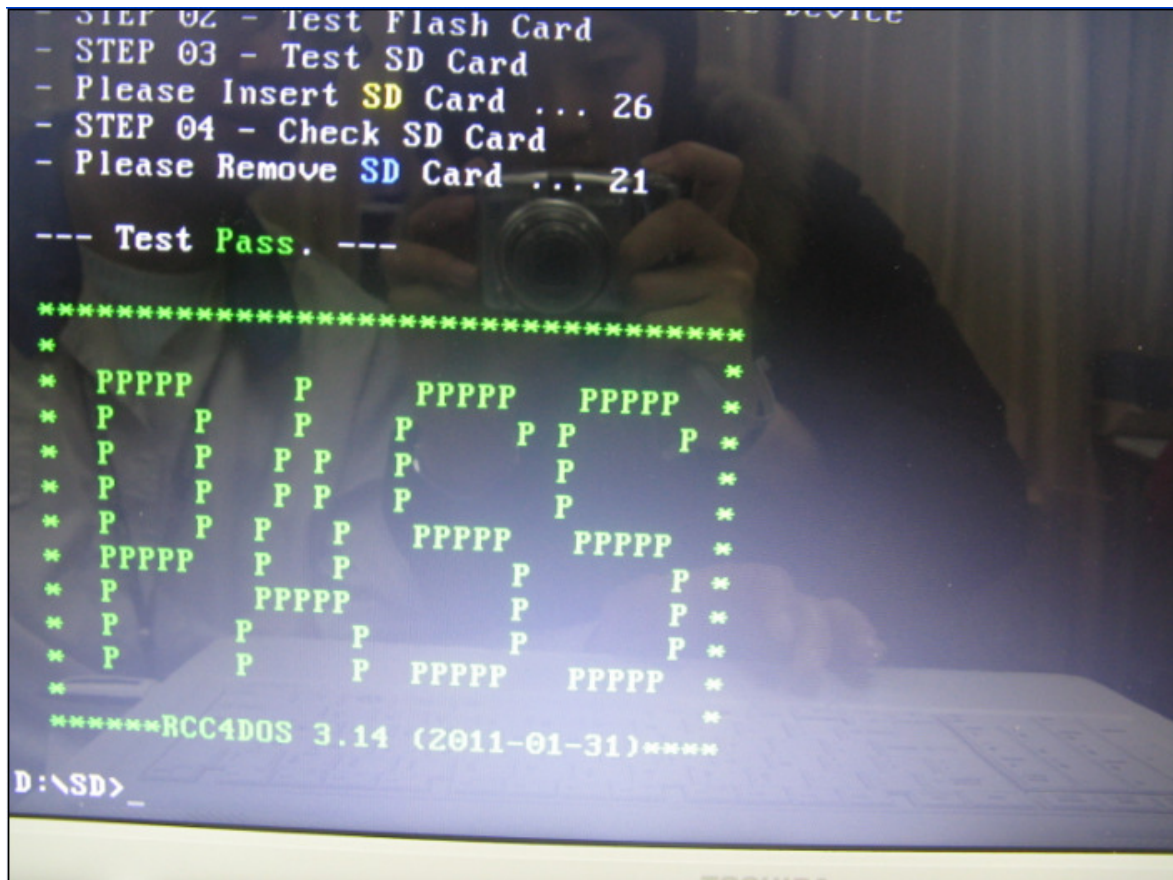
Due to the program will close all the USB connectors, it can not be test by USB file, so please test it by ISO file.



```
--- Thank you for using Realtek Product. ---  
--- RCC4DOS 3.14 (2011-01-31) ---  
  
--- Note: Running RCC4DOS in USB disk is not suggested!  
  
- STEP 01 - Initialize EHCI and USB Device  
- STEP 02 - Test Flash Card  
- STEP 03 - Test SD Card  
- Please Insert SD Card ... 29
```



```
--- Thank you for using Realtek Product. ---  
--- RCC4DOS 3.14 (2011-01-31) ---  
  
--- Note: Running RCC4DOS in USB disk is not suggested!  
  
- STEP 01 - Initialize EHCI and USB Device  
- STEP 02 - Test Flash Card  
- STEP 03 - Test SD Card  
- Please Insert SD Card ... 26  
- STEP 04 - Check SD Card  
- Please Remove SD Card ... 25
```



3.11.1. Diagnostic name: RSD.EXE

Diagnostic Version: 1.02.

3.11.2. 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.

3.11.3. Principle and how to use:

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

**Note:**

*Duo to the program will close all the USB connectors, it can not be test by USB file, so please test it by ISO file.*

### 3.13 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 -->

```

1. HDD Detect:

```

PATA&SATA Utility
Copyright by Pegatron, Build Date:2008-12-01 Rev1.34    Diagnostics
=====
... Device Information List ...

```

Num	Dev	Device Model	Serial Number	F/W Rev	LBA Size	HDD Size
3		ST250LT003-9YG14C	W0401DRG	0001TSM1	1D1C5970	250.06GB
5		MATSHITADUD-RAM UJ8A 0AS	YL33 069455	1.50		

```

Please confirm the HDD model ?
?
T.C.
Return_Code=-1

```

### 3 Tests and Diagnostics

---

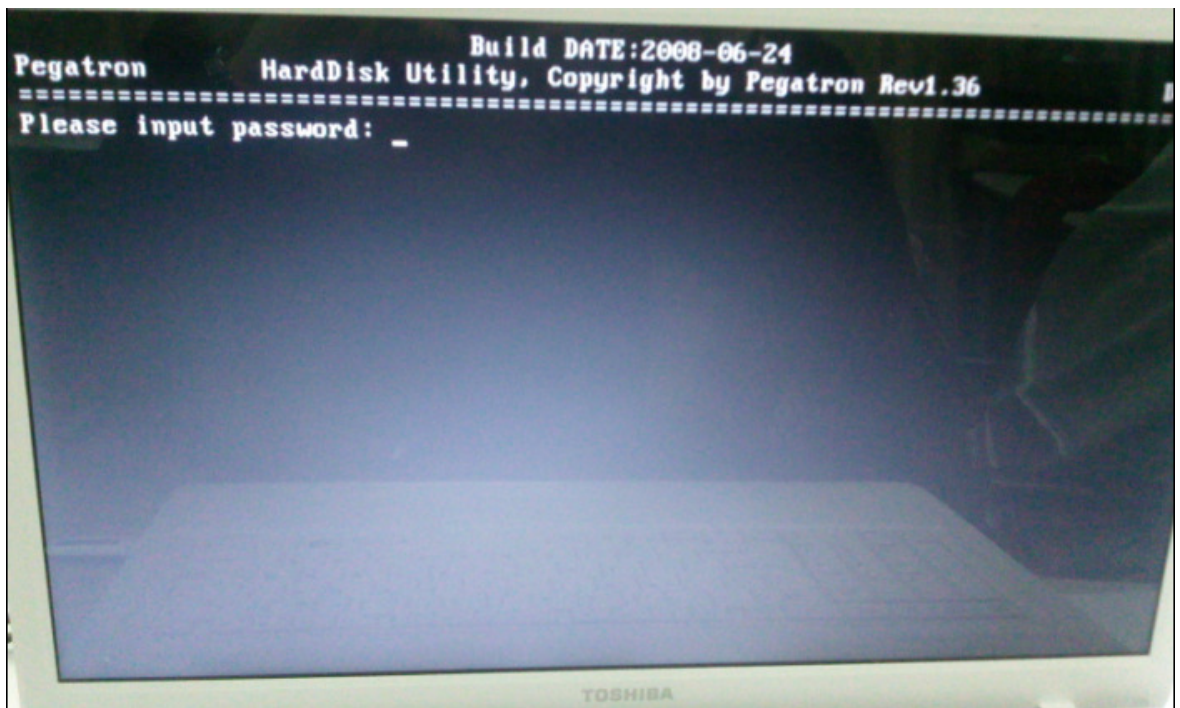
#### 2.Read HDD:

Build DATE:2008-06-24  
Pegatron HardDisk Utility, Copyright by Pegatron Rev1.36 Diags

=====  
... Read Twice Test ...  
=====

Num	Type	Device Model	LBA Size	HDD Size	Buffer Size(Sector) = 7F			
					R	W	B	C
81			1D1C5970	250.06GB	OK			OK
Start Time	End Time	Test Sector	Error Sector	Test Timer	Percent			
17:39:19		91BA4		7	0			

#### 3.R/W HDD:

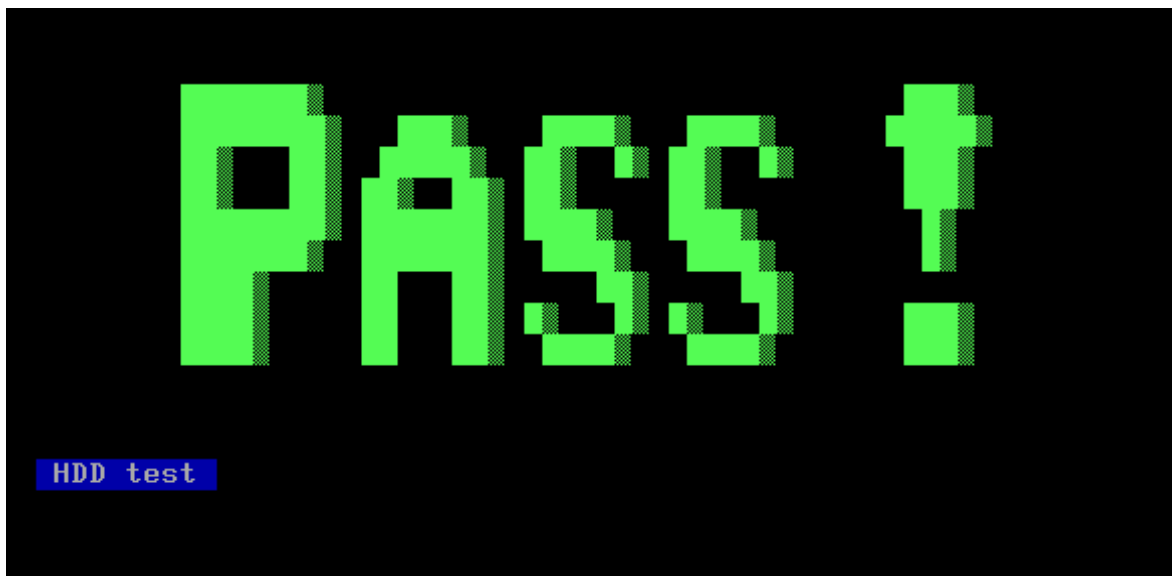


```

Build DATE:2008-06-24
Pegatron HardDisk Utility, Copyright by Pegatron Rev1.36 Diags
=====
... Read Write & Compare Test ...
=====

```

Num	Type	Device Model	LBA Size	HDD Size	Buffer Size(Sector) = 7F			
					R	W	B	C
81			1D1C5970	250.06GB	OK	OK	OK	OK
Start Time		End Time	Test Sector	Error Sector	Test Timer	Percent		
17:39:32			C85C2		8	0		

**Note:**

When test the read and write HDD, the password is: hard disk



### 3.14 Wireless Test

```
Build DATE:2008-10-30
Pegatron COMMON Tool, Copyright by Pegatron Rev2.26 Diags
=====
Search Data = NETWORK CONTROLLER
The Result Is :
Line 17 = 03 00 00 8086 0885 5F 8086 1305 NETWORK CONTROLLER

[WIRELESS device check PASS!!] ?
?                               ?
                               T.C.

Press any key to continue . . .

Return_Code=0
```

**Note:**

*This test program tests the WIRELESS device ID pass or fail.*

### 3.15 Web camera Test

This program is to check webcam ID.

Due to web camera is USB device for this model, it can not be test by USB file, so please test it by ISO file.



**Note:**

*When test the Web camera, the program will check the device ID, all of the USB ports will be closed, so you cannot test this one within the USB mode. Please test it in the ODD mode.*

### 3.16 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:**

*When you test the speaker, you can hear two piece of music, press “Y” to continue*

### 3.17 Read and write DMI Test

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
7. UUID

```
1. Read DMI
2. Write Manufacture
3. Write Product Name (32 byte)
4. Write Version (32 byte)
5. Write Number (32 byte)
6. Read Type11 (64 byte)
7. Read Type12 (64 byte)
8. Write Type11 (64 byte)
9. Write Type12 (64 byte)
A. Write UUID
B. Return

Please Enter Your Choice -->
```

DMI information:

### 3 Tests and Diagnostics

---

```
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
18: 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: ZH030YiG9yj2F
05: String: To Be Filled By O.E.M.
```

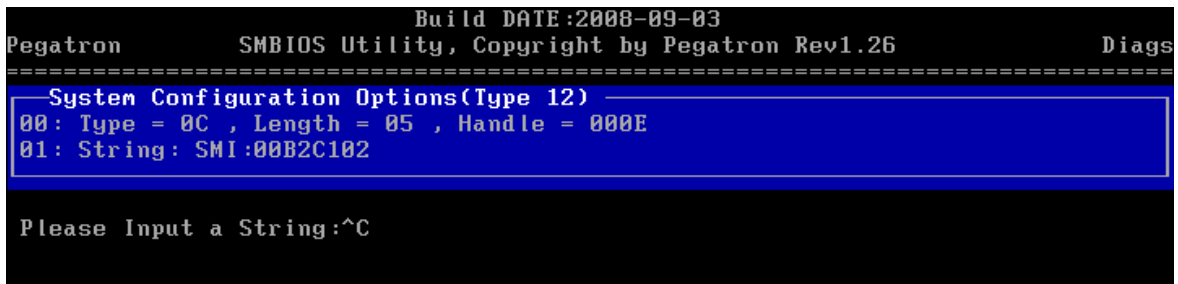
#### Read Type 12:

```
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 (64 bytes) :



Write Type 12 (64 bytes):



Write UUID:

UUID is built by 20 bytes random code and 12 bytes MAC address.



### 3.18 FAN Test

```
Build DATE:2010-12-08
Pegatron      Fan Utility, Copyright by Pegatron Rev2.78.00      Diags
=====TBSC=====
The fan no.0 Speed is 4300 RPM.

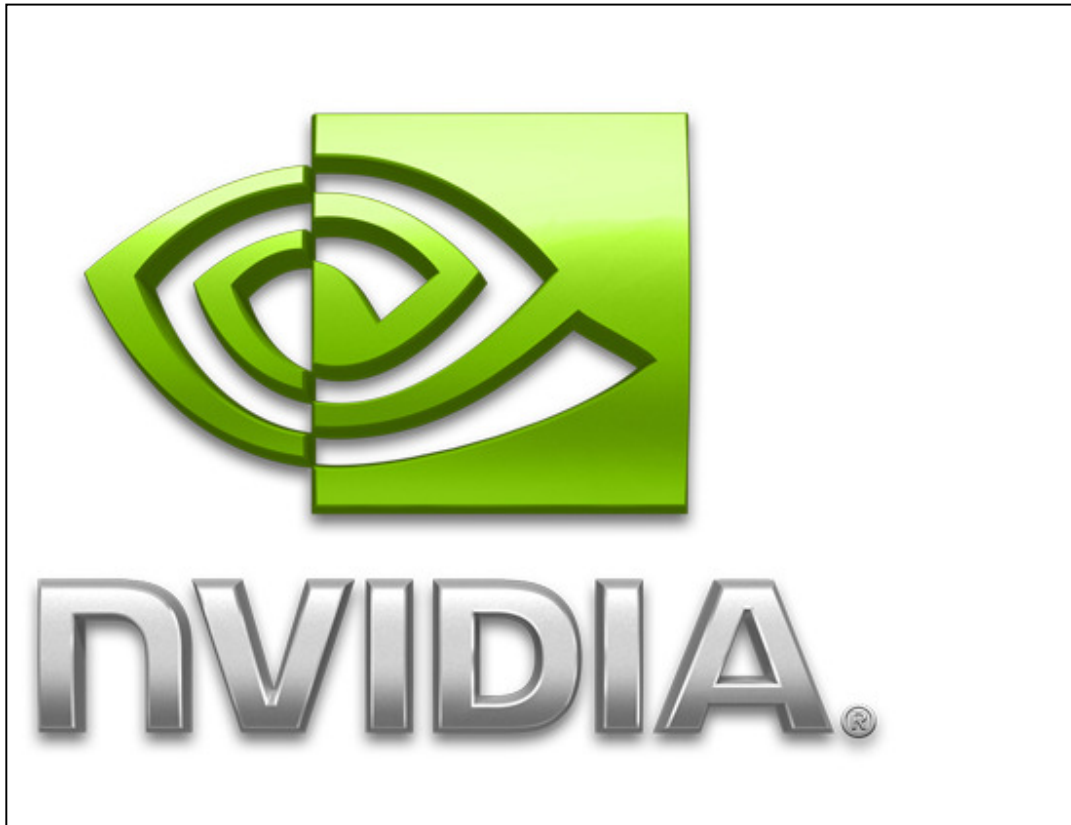
Return_Code=0
```

**Note:**

*The items will test the fan function, if it's not among the range of 3500-5500 RPM, it will show fail.*

### 3.19 VGA Test.




The program will auto run and shows like below, if the VGA card is OK, it will show pass on the screen.







**3.21 Appendix:**

NO#	Equipment Description	Quantity	Remarks
1	Test CD	1	
2	Audio loopback jig	1	
3	SD Card	1	

---

# **Chapter 4**

## **Replacement Procedures**

---

---

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---

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## 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.

4.2 Battery Pack					
4.2 Media card	4.4 HDD	4.5 Memory	4.6 ODD	4.7 Keyboard	
4.8 Top case					
4.9 Touch pad board	4.10 Speaker	4.12 Power board	4.13 WLAN Board	4.14 ODD Board	
4.11 Touch pad button board				4.15 Fan	4.16 Main PCB
				4.17 Heat Sink	4.18 CPU
					4.19 DC IN Port
					4.20 LCD Module
					4.21 LCD Unit
					4.22 Camera

**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:       sliver
- Odd number length screw:       black
- Special length screw:           sliver (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           F5  
(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. Push the **battery pack** into the battery slot. Make sure the battery pack is installed securely.
3. Slide the **battery lock** into the lock position.

## 4.3 Media card

### Removing the Media card

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

**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. Grasp the **Media card** and pull it out.

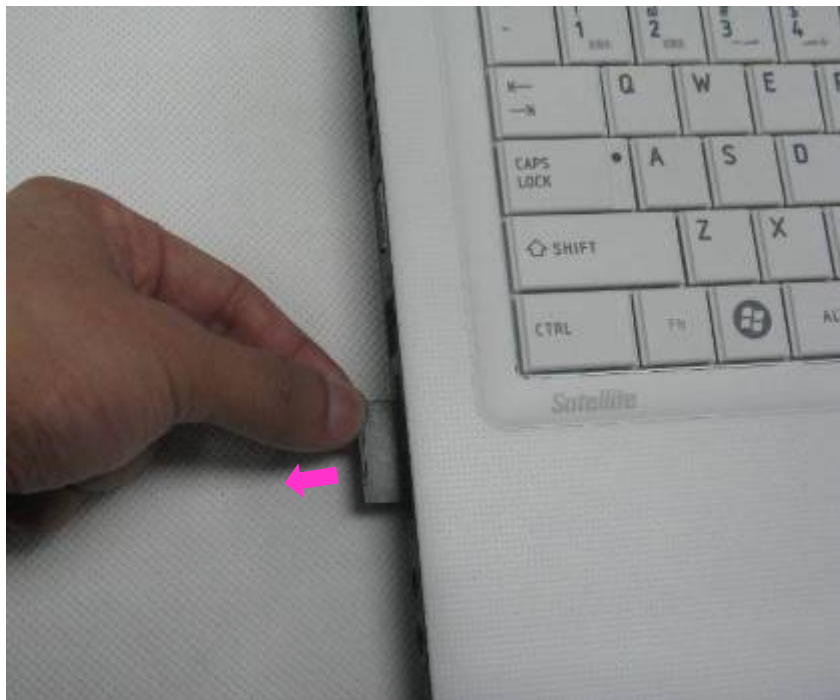


Figure 4-2 Removing the Media card



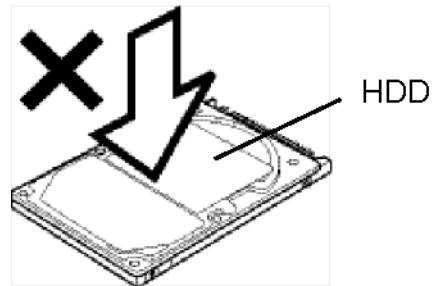
### **Installing the Media card**

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

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

## 4.4 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 4-3 to 4-4.

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

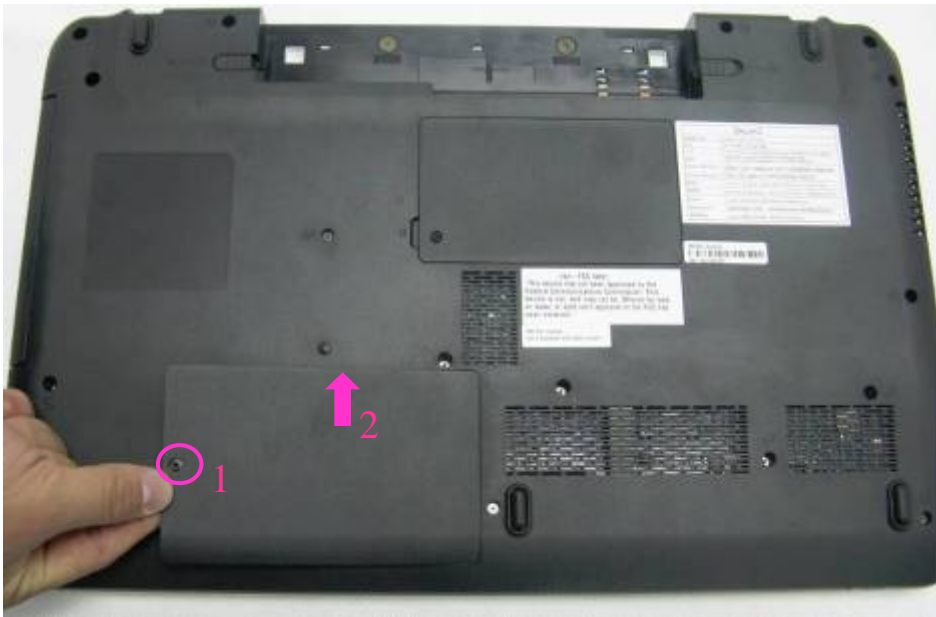


Figure 4-3 Removing the HDD cover

3. 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 4-4 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.

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

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



Figure 4-5 Separating the HDD and HDD Mylar

## Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-3 to 4-5.

**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 Mylar** 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**.

**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.*

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

## 4.5 Memory module

### Removing the Memory module

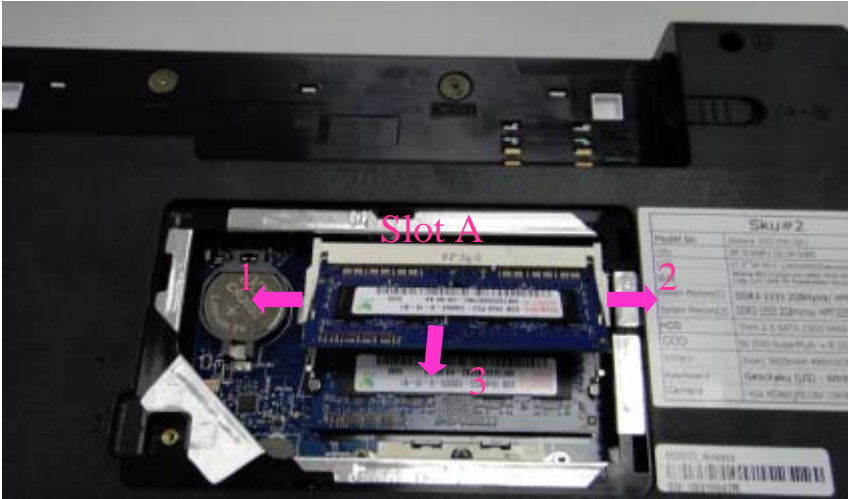
To remove the memory module, make sure the computer is in boot mode and powered off, follow the steps below and refer to Figures 4-6 to 4-7.

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

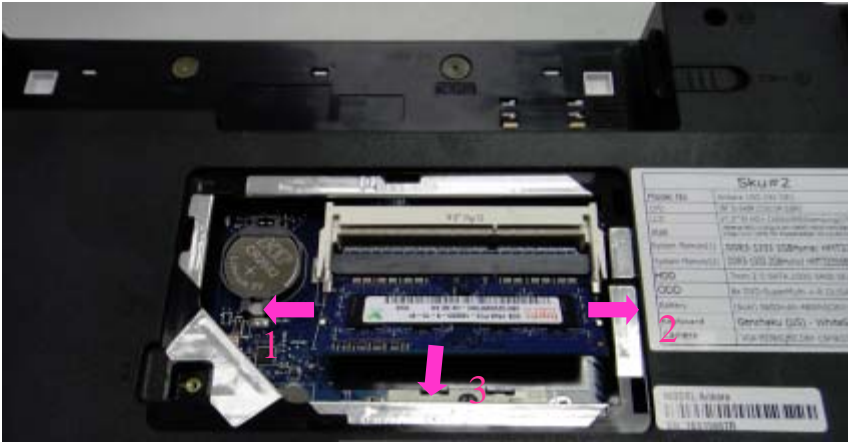


Figure 4-6 Removing the Memory cover

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



(the First one)



(the second one)

Figure 4-7 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 4-6 to 4-7.

**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 **Memory 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.



## 4.6 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 4-8 and 4-9.

**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.
  - M2×5L 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**.

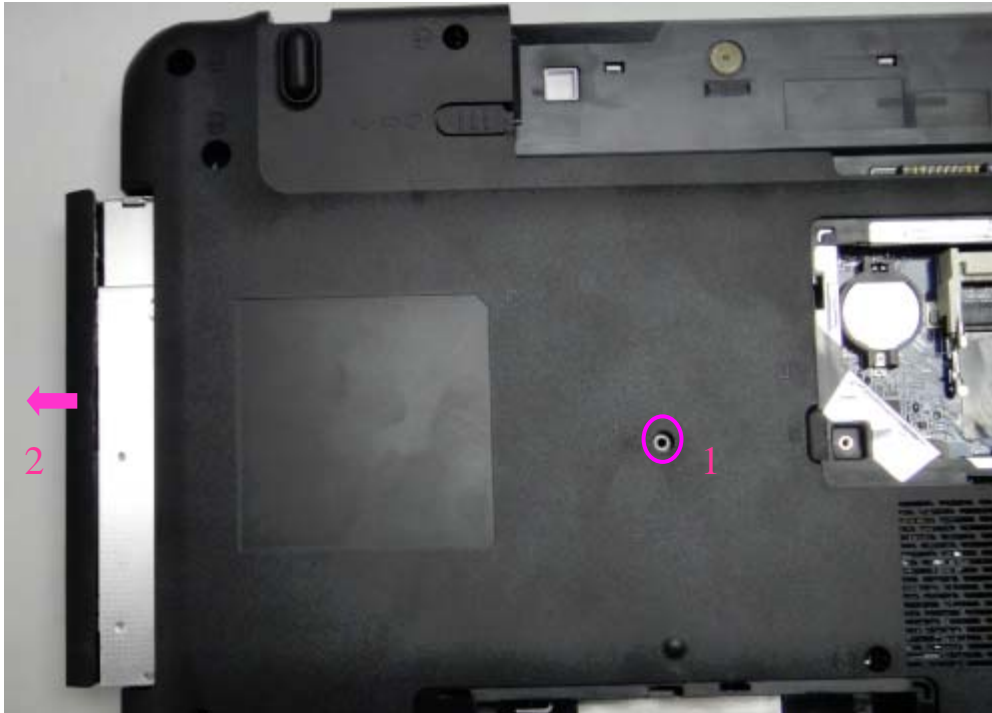
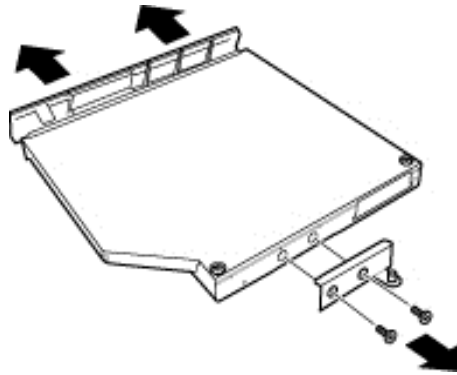


Figure 4-8 Removing the Optical Disc Drive module

3. Remove the following screws securing the ODD bracket.

- M2×2.5L FLAT HEAD screw ×2



*Figure 4-9 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 4-8 and 4-9.

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.)
  - M2×5L FLAT HEAD screw ×1

## 4.7 Keyboard

### Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figures 4-10 to 4-12.

1. Turn the computer over and open the display and remove the keyboard cover.



*Figure 4-10 Removing the keyboard cover*

2. Remove the following **screws** securing the keyboard plate on the Top case.
  - M2×2.5L FLAT HEAD screw ×4

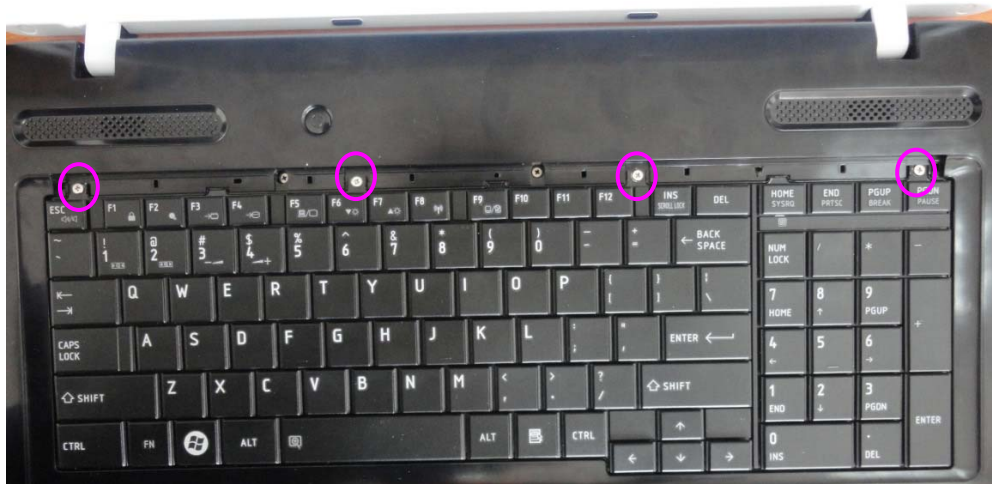


Figure 4-11 Removing the screws securing keyboard plate

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



Figure 4-12 Lifting the keyboard plate

## Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figures 4-10 to 4-12.

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

## 4.8 Top cover

### Removing the Top cover

To remove the Top cover, follow the steps below and refer to Figures 4-13 to 4-15.

1. Remove the following screws securing the bottom case.

- M2×5L            FLAT HEAD screw            ×12
- M2.5×5L        FLAT HEAD screw            ×3
- M2×2.5L        FLAT HEAD screw            ×2

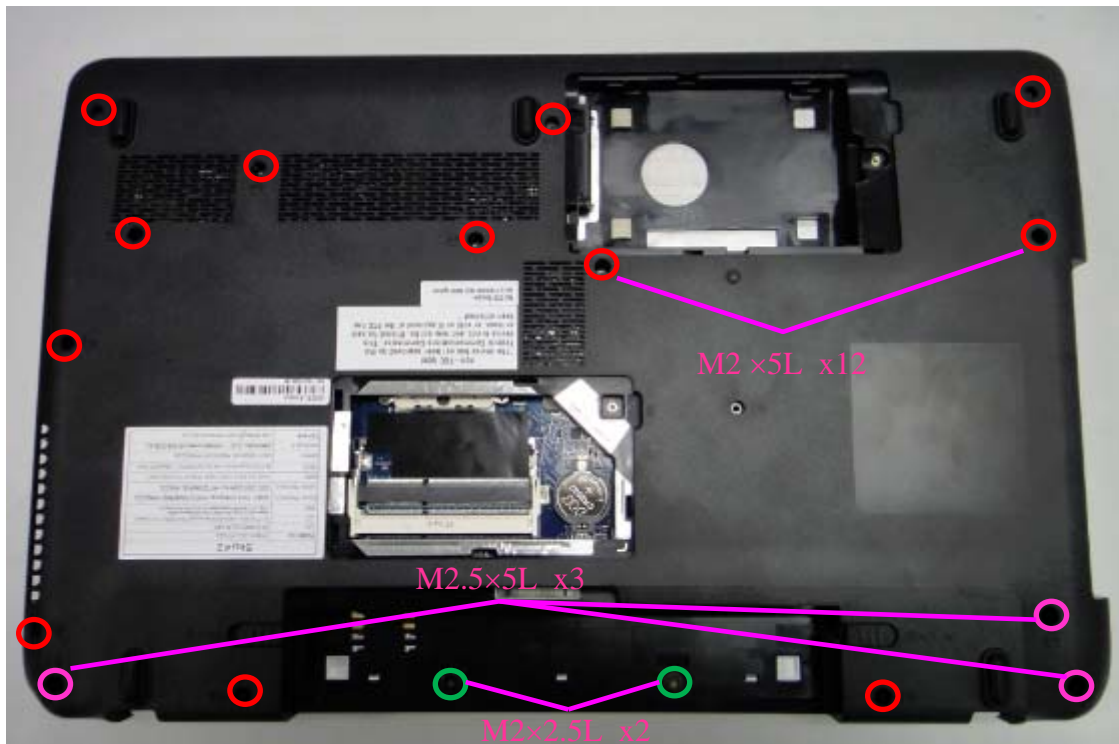


Figure 4-13 Removing the screws on the bottom case

2. Turn the bottom case face up and disconnect the **Touch pad FPC, Speaker cable,** from the main board.
3. Remove the following **screws** securing the Top cover.
  - M2×5L      FLAT HEAD screw      ×4

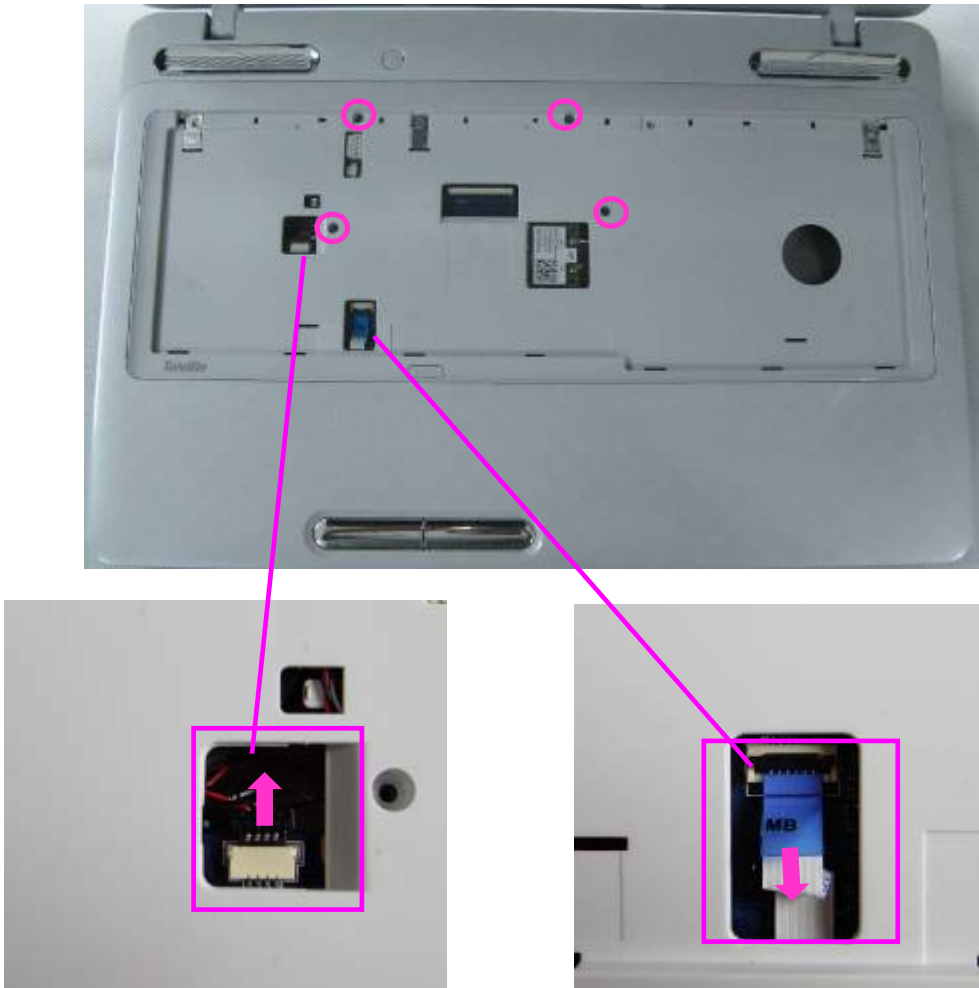


Figure 4-14 Removing the screws and disconnecting the cable on the top case



4. Separate the Top cover from the bottom case.

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

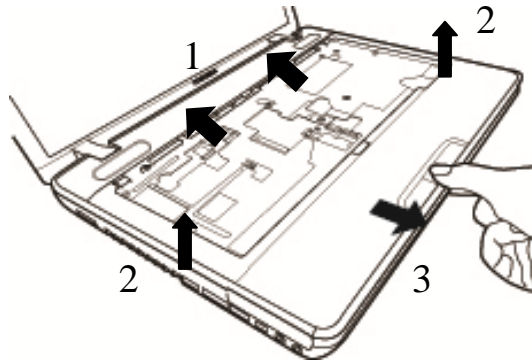


Figure 4-15 Removing Top cover

## Installing the Top cover

To install the top case, follow the steps below and refer to Figures 4-13 to 4-15.

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 and Speaker 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          ×12
  - M2.5×5L        FLAT HEAD screw          ×3
  - M2×2.5L        FLAT HEAD screw          ×2

## 4.9 Touch pad Board

### Removing the Touch pad Board

To remove the touch pad Board, follow the steps below and refer to Figures 4-16 and 4-17.

1. Disconnect the Touch pad board FPC and remove one screw that fixing the Touch pad bracket, then remove the bracket

M2×5L FLATHEAD screw ×1

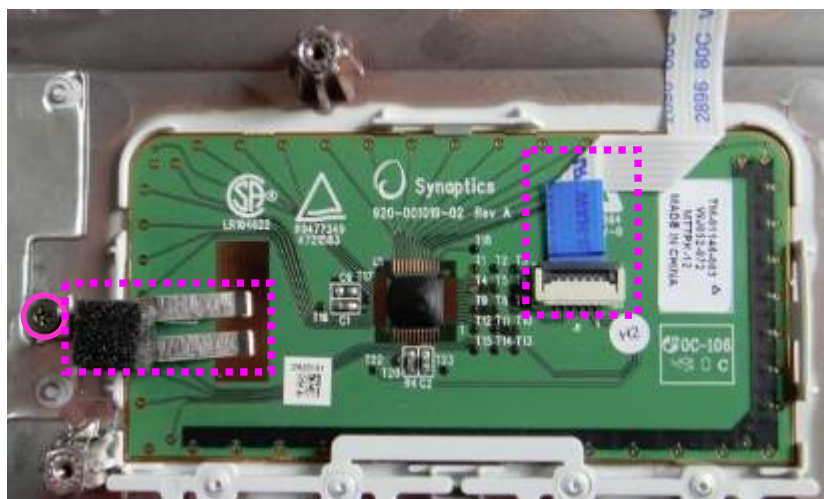
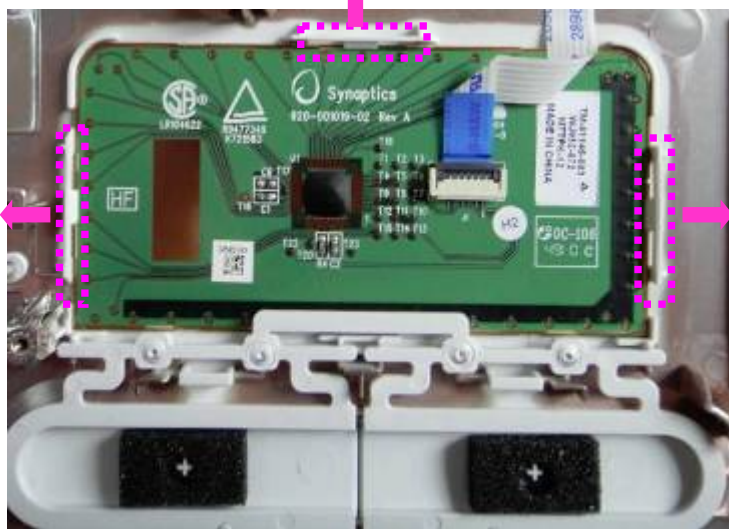
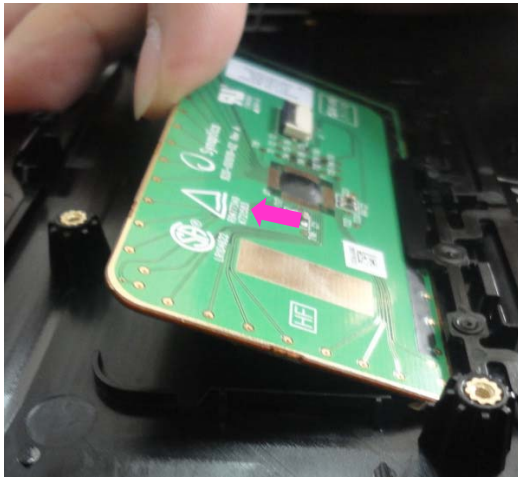


Figure 4-16 Removing touch pad FPC and the screw

2. Push the three ribs towards the direction of the arrow, then pull the board out of the slot carefully due to it is pasted on the TOP case.



3. Remove the touch pad board from the Top cover.



*Figure 4-17 Removing the touch pad Touch pad board*

### Installing the Touch pad board

To install the touch pad button, follow the steps below and refer to Figures 4-16 and 4-17.

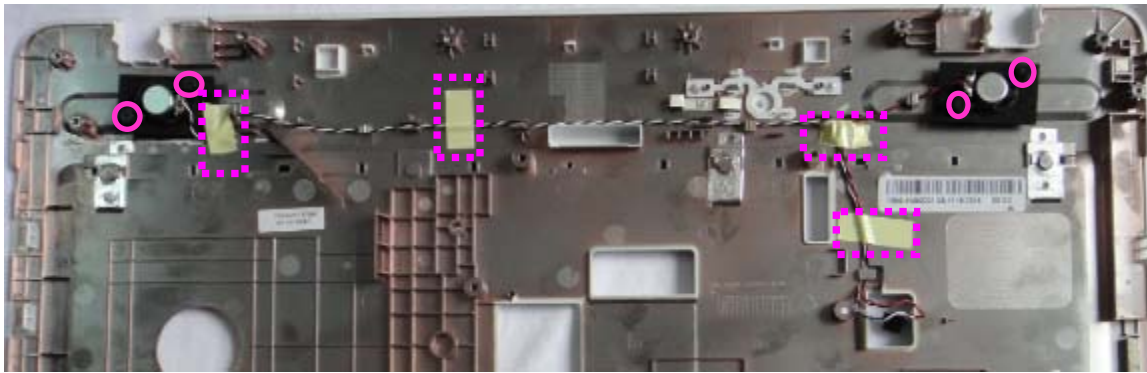
1. Install the **touch pad board** to the slot and secure it with 1 screw.
  - M2×5L FLATHEAD screw ×1
2. Connect the FPC cable that connecting the touch pad board.

## 4.10 Speaker

### Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-18.

1. Tear four piece of tape on the TOP case
2. Remove the following **screws** securing the two speakers.
  - M2×5L FLAT HEAD screw ×4
3. Remove the speaker from the TOP case.



*Figure 4-18 Removing the screws that fixing the speakers*

## Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-18.

1. Install the two **speakers**.
2. Secure the following screws on two **speakers**.
  - M2×5L FLAT HEAD screw ×4
3. Paste four piece of tape on the TOP case

## 4.11 Touch pad Button board

### Removing the Touch pad button board

To remove the touch pad button board, follow the steps below and refer to Figure 4-19.

1. Disconnect the cable and remove the screws as the following which fix the Touch pad button board, and then take the touch pad button board out of the top case.
  - M2×5L FLAT HEAD screw ×1

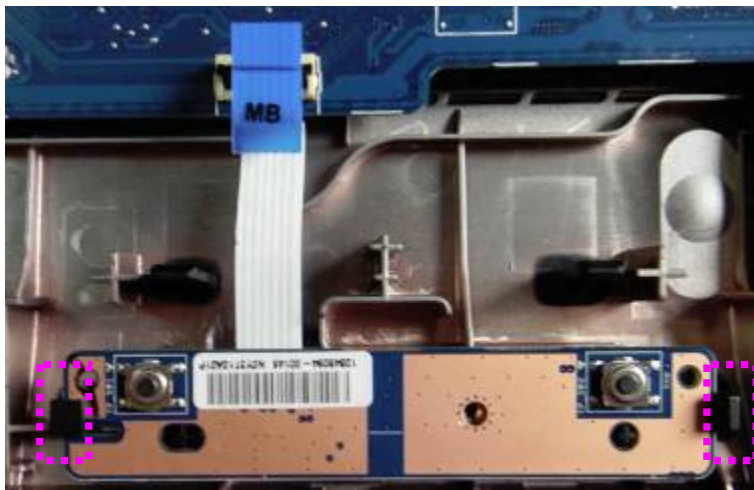
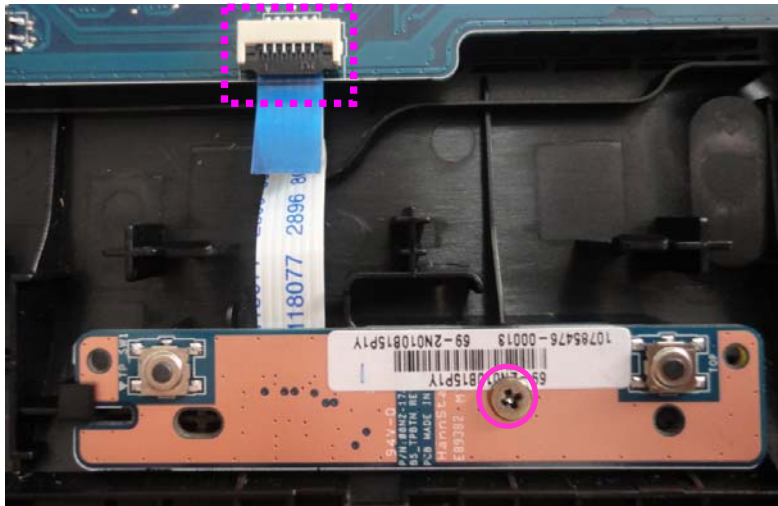


Figure 4-19 Removing the touch pad button Board



### Installing the Touch pad button board

To install the touch pad button board, follow the steps below and refer to Figure 4-19.

1. Install the Touch pad button board on the top case and secure the screws as the following, and then connect the cable.
  - M2×5L FLAT HEAD screw ×1

## 4.12 Power Board

### Removing the Power Board

To remove the Power Board, follow the steps below and refer to Figures 4-20.

1. Take the power board out of the bottom case.

Push the rib on left side down, and push on edge of the power board to left at the same time.

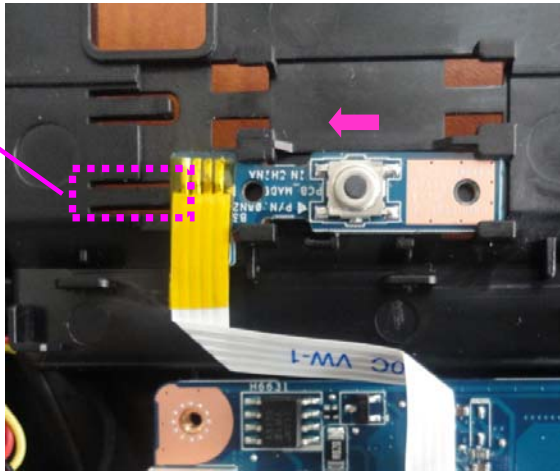


Figure 4-20 Removing the Power board

### **Installing the Power Board**

To install the Power Board, follow the steps below and refer to Figures 4-20.

1. Place the Power Board on the bottom case and push it to right gently.

## 4.13 WLAN Board

### Removing the WLAN Board

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

1. Disconnect the Connector.
2. Remove the screw as the following, and take the WLAN board out of the system.

- M2×5L FLAT HEAD screw ×1

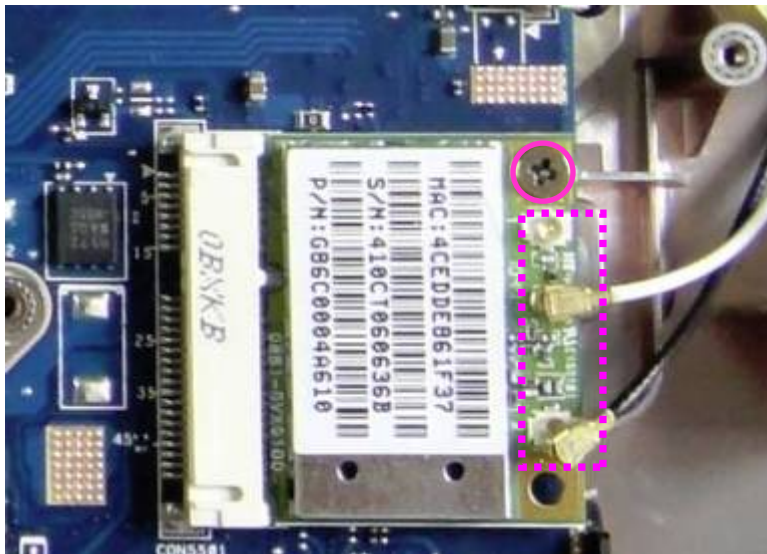


Figure 4-21 Removing the WLAN board

## Installing the WLAN Board

To install the WLAN Board, follow the steps below and refer to Figures 4-21.

1. Install the WLAN board on the bottom case, secure the screw as the following.
  - M2×5L FLAT HEAD screw ×1
2. Connect the connector.

## 4.14 ODD Board

### Removing the ODD Board

To remove the ODD Board, follow the steps below and refer to Figure 4-22.

1. Disconnect the ODD cable.
2. Remove the following screws securing the ODD Board.
  - M2×5L FLAT HEAD screw ×1
3. Remove the ODD Board from the slot.

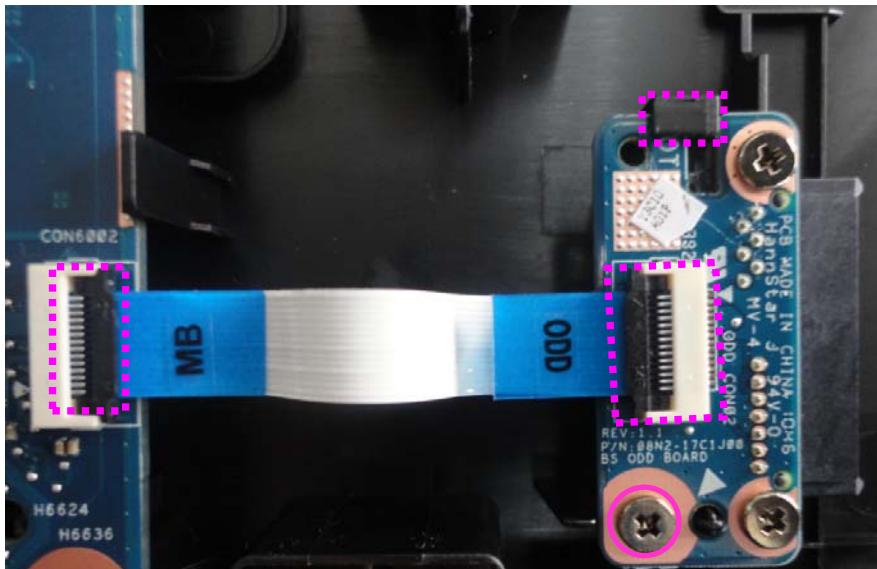


Figure4-22 Removing the ODD Board

## Installing the ODD Board

To install the ODD Board, follow the steps below and refer to Figure 4-22.

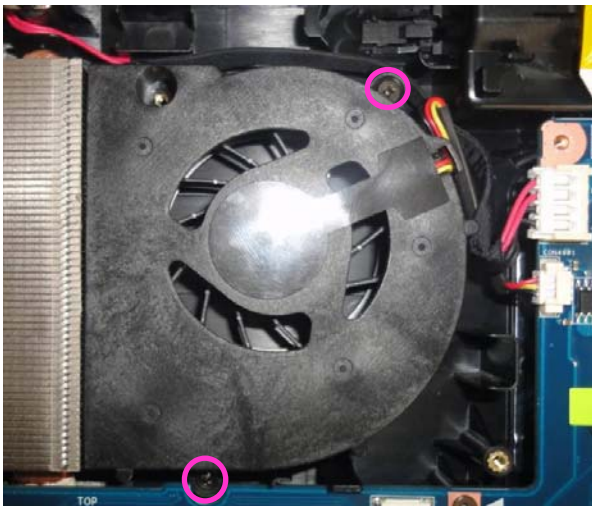
1. Install the **ODD Board** to the slot.
2. Secure the **ODD Board** with the following **screws**.
  - M2×5L      FLAT HEAD screw      ×1
3. Connect the ODD cable.

## 4.15 Fan

### Removing the Fan

To remove the fan, follow the steps below and refer to Figure 4-23.

1. Remove the following **screws** securing the fan and disconnect the fan cable that connecting the fan with motherboard.
  - M2×5L FLAT HEAD screw ×2
2. Remove the **fan** from the slot.



*Figure4-23 Removing the Fan Module*



## Installing the Fan

To install the fan, follow the steps below and refer to Figure 4-23

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

## 4.16 Main PCB

### Removing the Main PCB

To remove the Main PCB, follow the steps below and refer to Figures 4-24 and 4-25.

1. Disconnect the **FAN cable**, **DC-IN Port cable**, and **Coaxial Cable** from the main PCB, remove the screws as the following, and then take the motherboard out of the system.

- M2×5L FLAT HEAD screw ×1

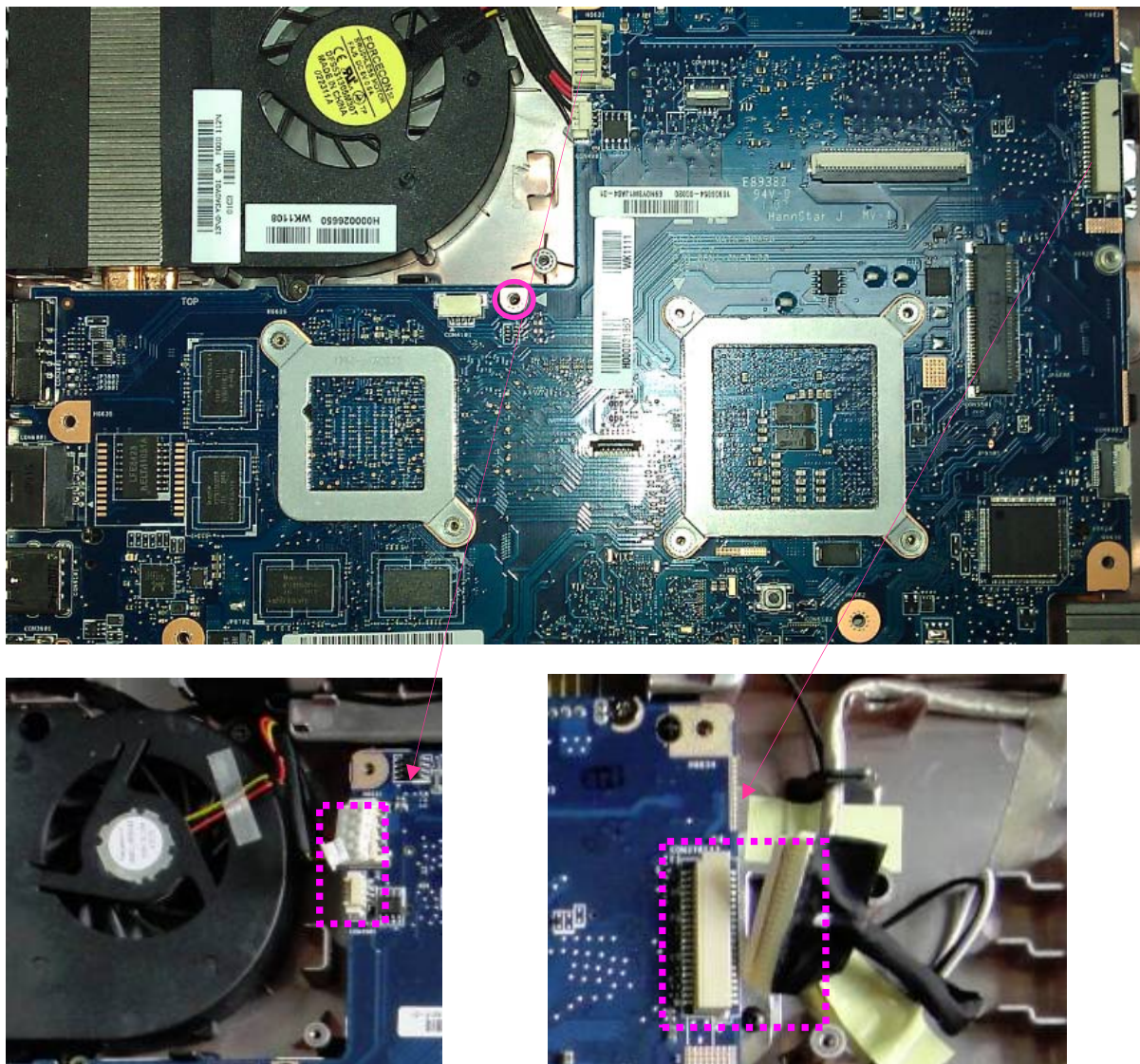


Figure4-24 Disconnecting the Cables from main PCB and removing the screws



*Figure 4-25 Removing the main PCB from the bottom case*

## Installing the Main PCB

To install the Main PCB, follow the steps below and refer to Figures 4-24 and 4-25.

1. Install the main PCB on the bottom case, and secure the main PCB to the bottom case using the following screws.
  - M2×5L FLAT HEAD screw ×1
2. Connect the **FAN cable**, **DC-IN Port cable** and **Coaxial Cable** to the main PCB.

## 4.17 Heat Sink

### Removing the heat sink

To remove the heat sink, follow the steps below and refer to Figure 4-26.

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.

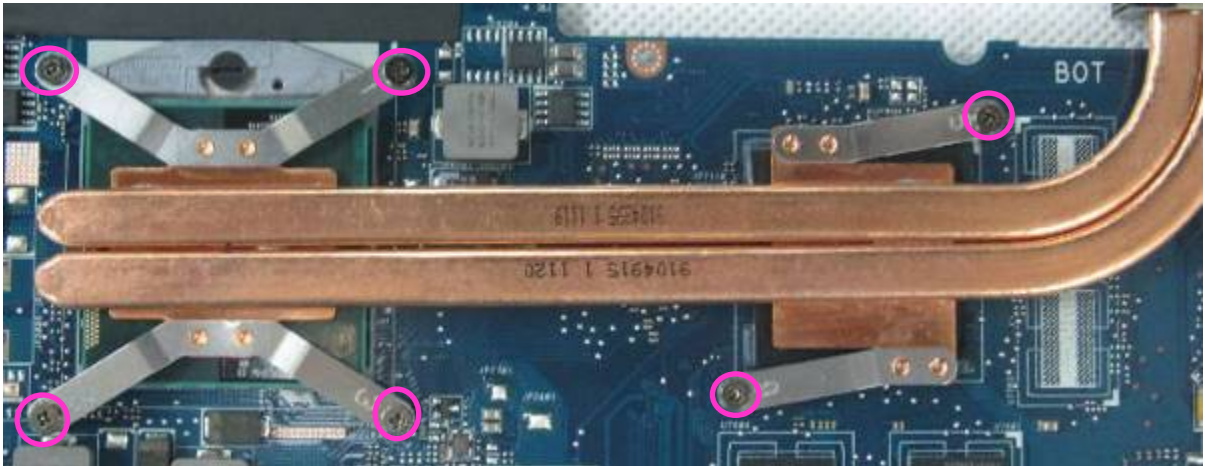


Figure4-26 Removing the Heat Sink

**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 4-26 and 4-27.

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

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

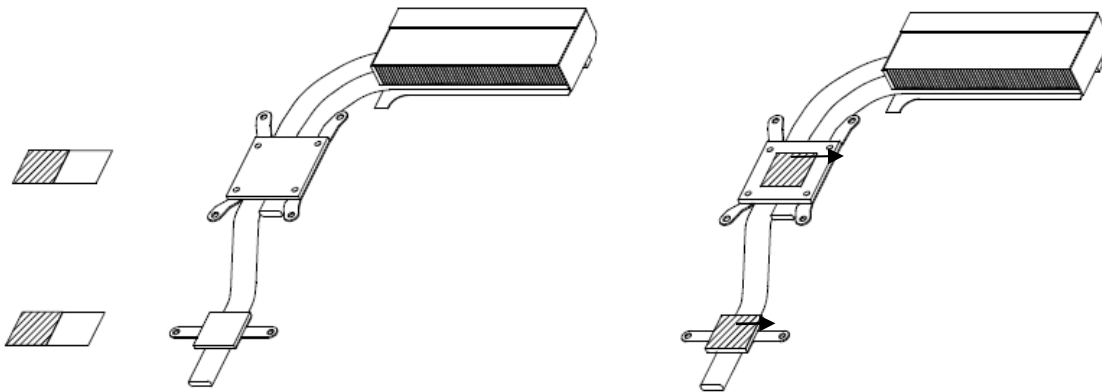


Figure 4-27 Applying new grease

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

## 4.18 CPU

### Removing the CPU

To remove the CPU, follow the steps below and refer to Figures 4-28.

**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.

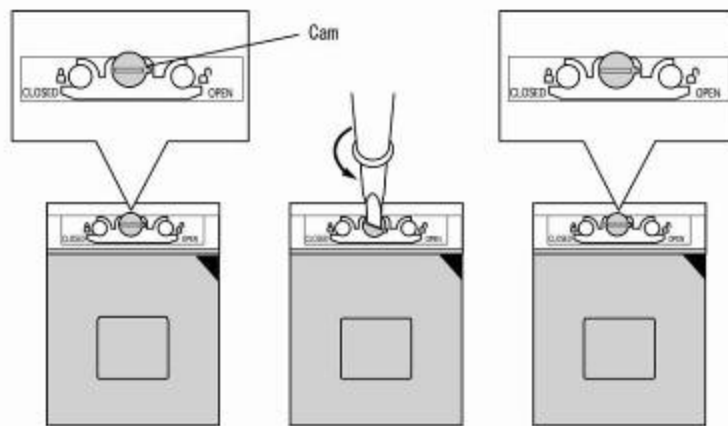


Figure 4-28 Unlocking the CPU

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 4-28 to 4-29.

1. Make sure the **cam** is in the open position.
2. 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.)

3. 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).

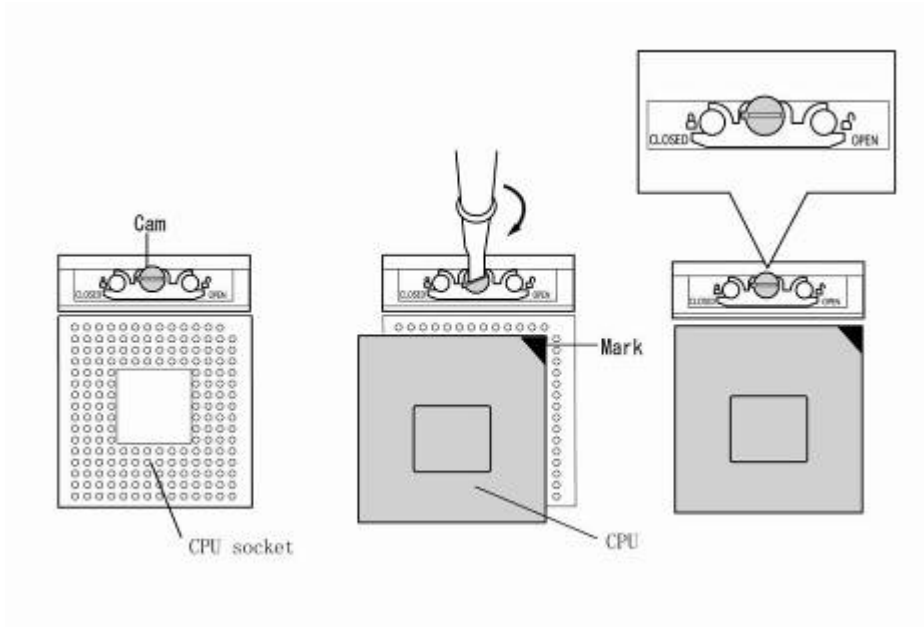


Figure 4-29 Installing the CPU



## 4.19 DC-IN Cable

### Removing the DC-IN cable

To remove the DC-IN cable, follow the steps below and refer to Figure 4-30.

1. Remove the DC-IN cable from the bottom case.



*Figure 4-30 Removing the DC-IN cable*

### Installing the DC-IN cable

To install the DC-IN cable, follow the steps below and refer to Figure 4-30.

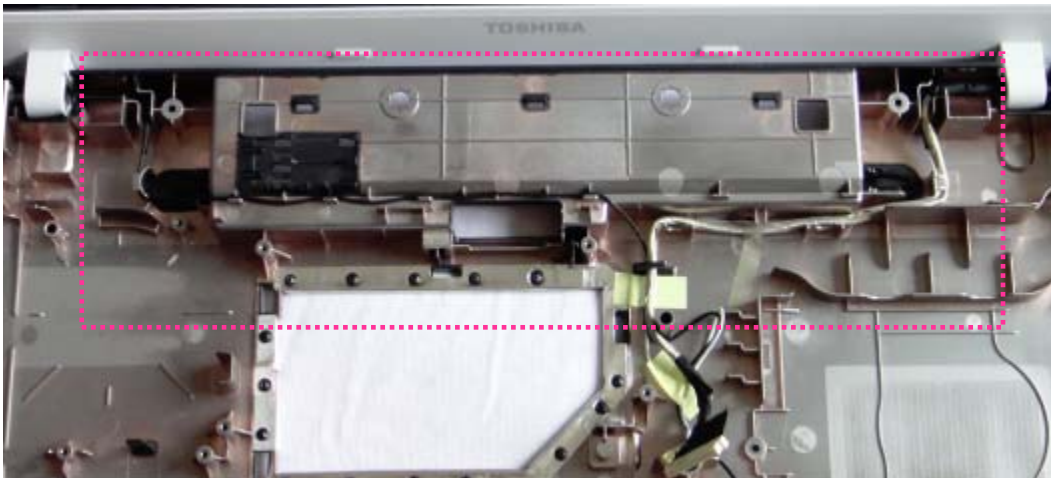
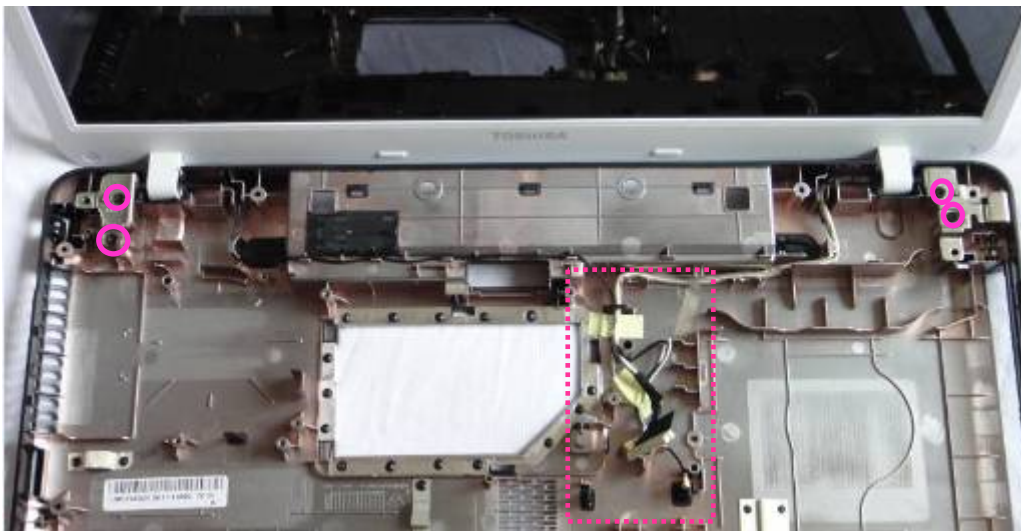
1. Install the DC-IN cable on the bottom case.

## 4.20 LCD Module

### Removing the LCD Module

To remove the LCD Module, follow the steps below and refer to Figure 4-31 to 4-32.

1. Remove two 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 ×4



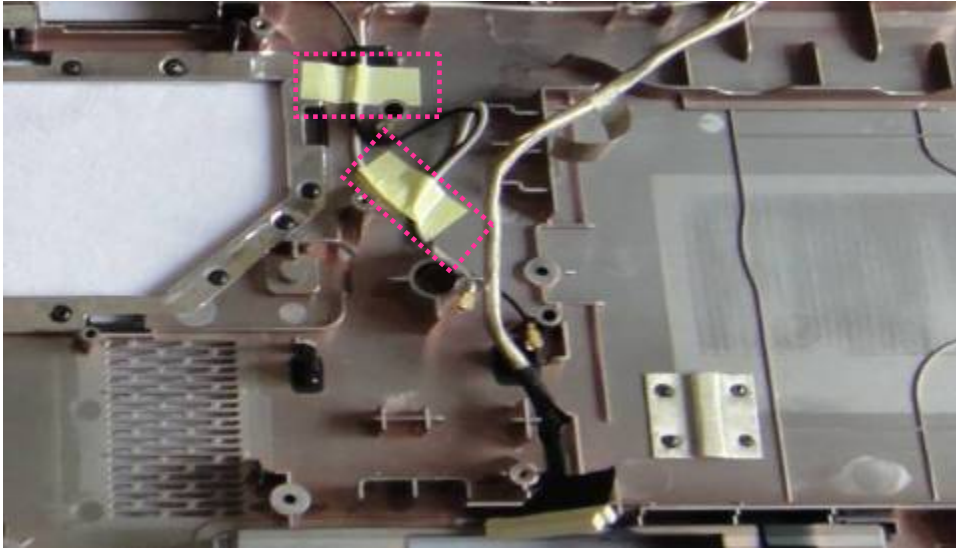


Figure 4-31 Removing the Screws and tape

3. Remove the LCD module out of the system.

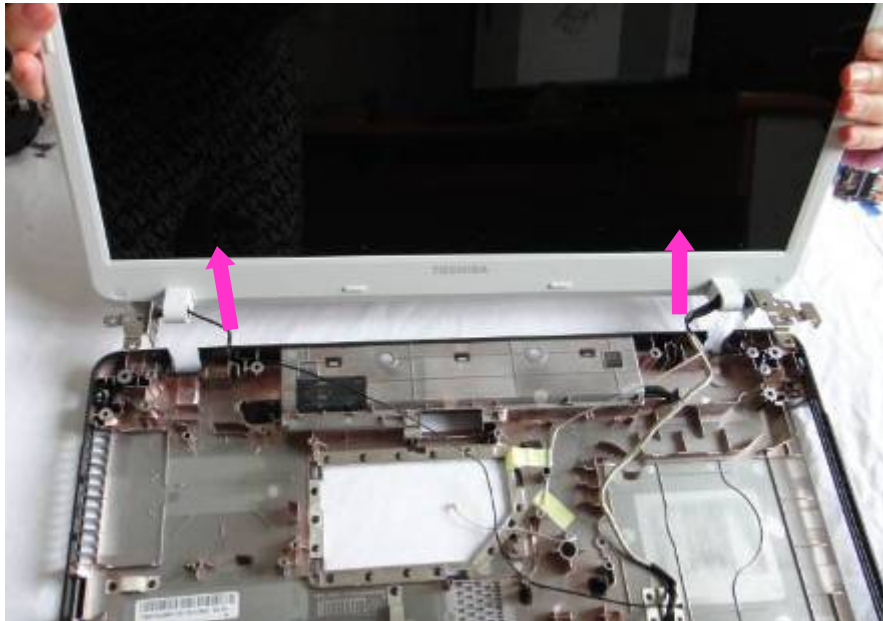


Figure 4-32 Removing the LCD Module

## Installing the LCD Module

To install the LCD Module, follow the steps below and refer to Figure 4-31 to 4-32.

1. Install the **LCD Module**.
2. Secure the following screws on the LCD Module.
  - M2.5×5L FLAT HEAD screw ×4
3. Paste two pieces of tape to fix the Wireless LAN cable and Coaxial cable and arrange the cables along the **cable routing**.

## 4.21 LCD unit

### Removing the LCD unit

To remove the LCD unit, follow the steps below and refer to Figures 4-33 to 4-36.

1. Remove six screw cover on the LCD bezel.
2. Remove the following **screws** securing the LCD bezel.
  - M2.5×5L (K) screw ×6
3. Remove the **LCD bezel** as arrow shown while releasing the latches.



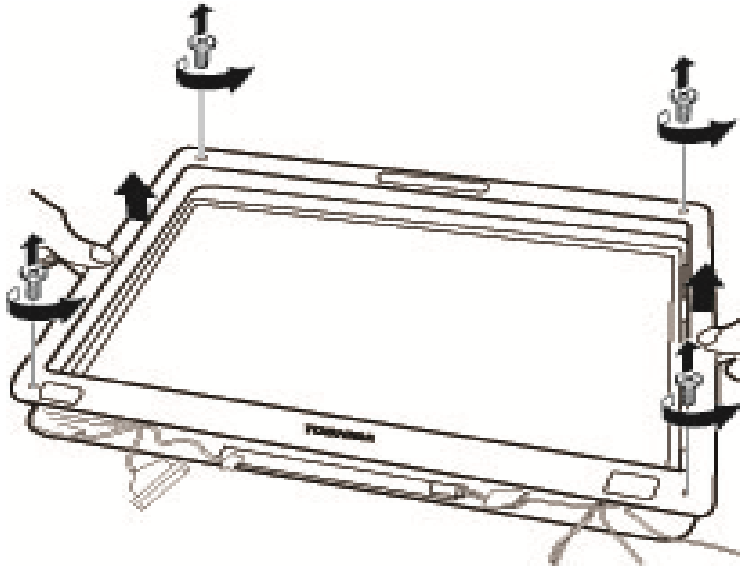


Figure 4-33 Removing the LCD bezel

4. Disconnect the camera cable



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



*Figure 4-34 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.

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

- M2×2.5L FLAT HEAD screw ×6

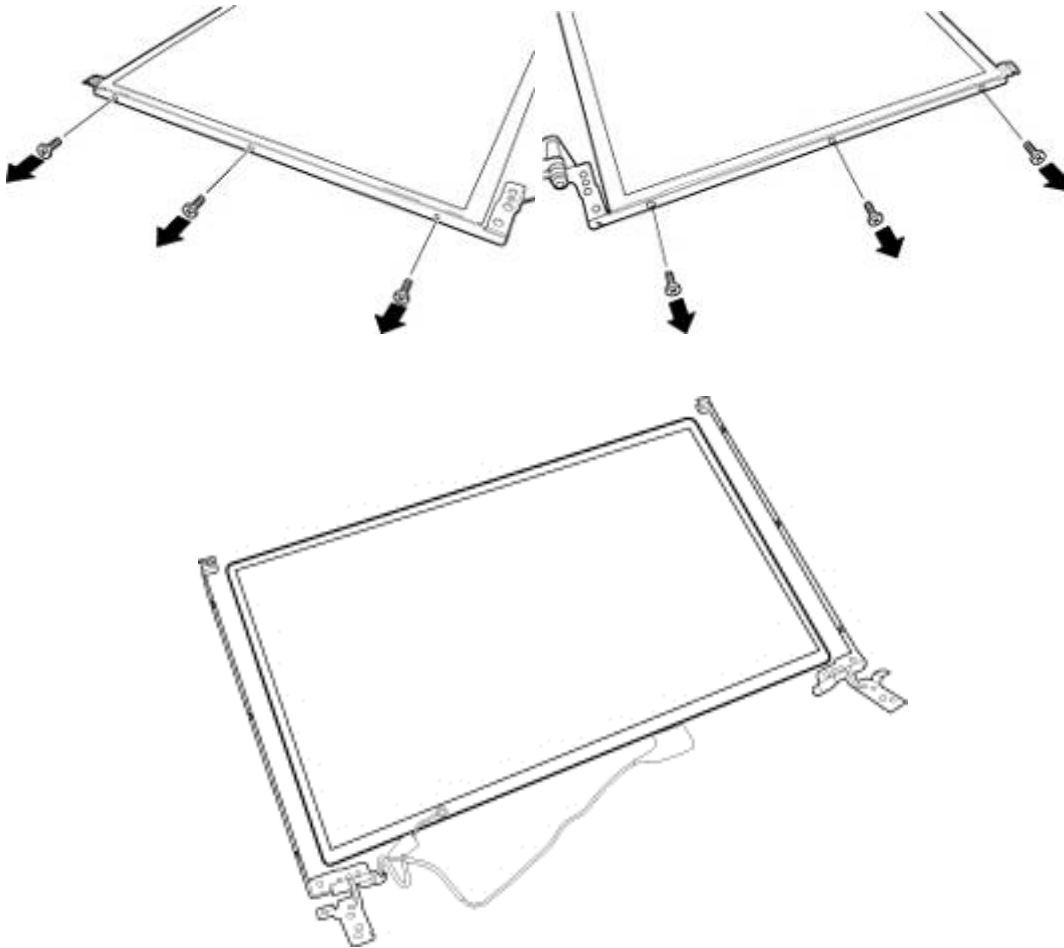
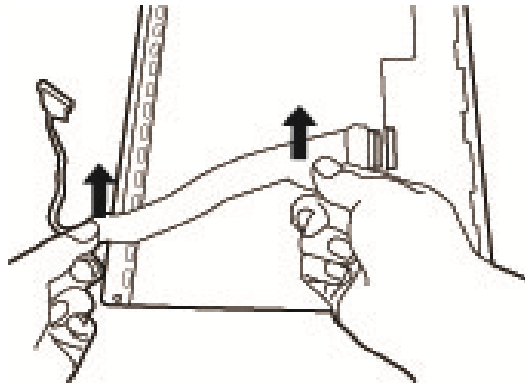


Figure 4-35 Removing the LCD supports



8. Disconnect coaxial cable from the connector and remove the cable.



*Figure 4-36 Removing the coaxial cable*

## Installing the LCD unit

To install the LCD unit, follow the steps below and refer to Figures 4-33 to 4-36.

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.*

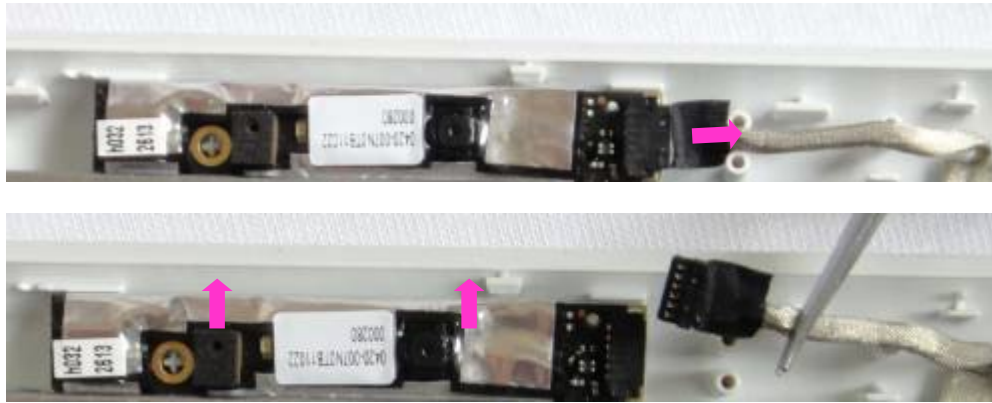
4. Seat the **LCD unit** on the display cover.
5. Secure the following **screws** to attach the LCD unit.
  - M2.5×5L FLAT HEAD screw ×2
6. Connect the camera cable.
7. Seat the **LCD mask** pressing firmly all around to secure the latches.
8. Secure the LCD mask with the following **screws**.
  - M2.5×5L (K) screw ×6

## 4.22 Camera

### Removing the Camera

To remove the camera, follow the steps below and refer to Figures 4-37.

1. Disconnect the cable and take the camera out of the LCD back cover.



*Figure 4-37 Disconnecting the connector and Removing the Camera*

### Installing the Camera

To install the camera, follow the steps below and refer to Figures 4-37.

1. Install the **Camera** on the **LCD back cover**.
2. Connect the cable.