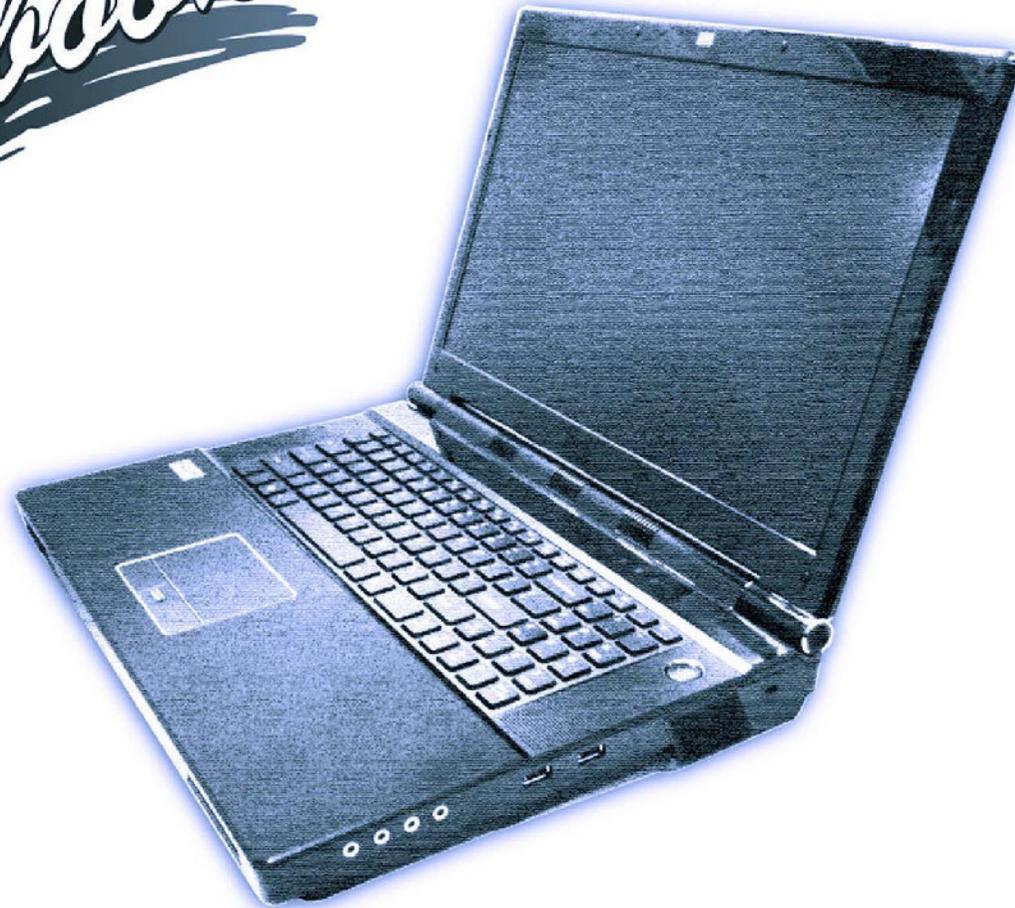


# *SERVICE MANUAL*

*notebook*



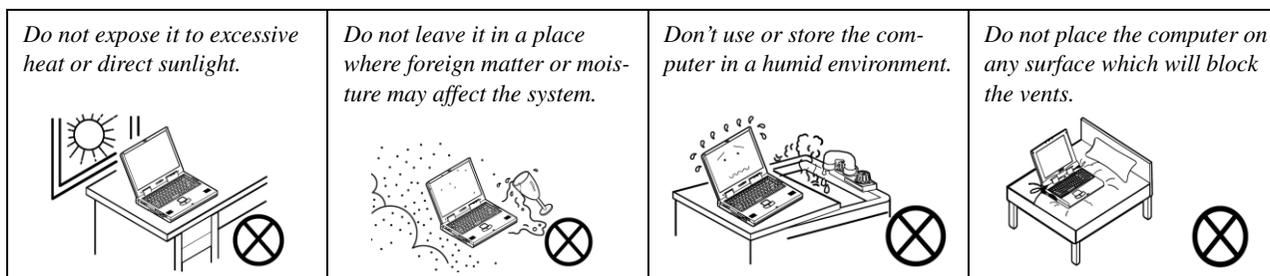
## Instructions for Care and Operation

The notebook computer is quite rugged, but it can be damaged. To prevent this, follow these suggestions:

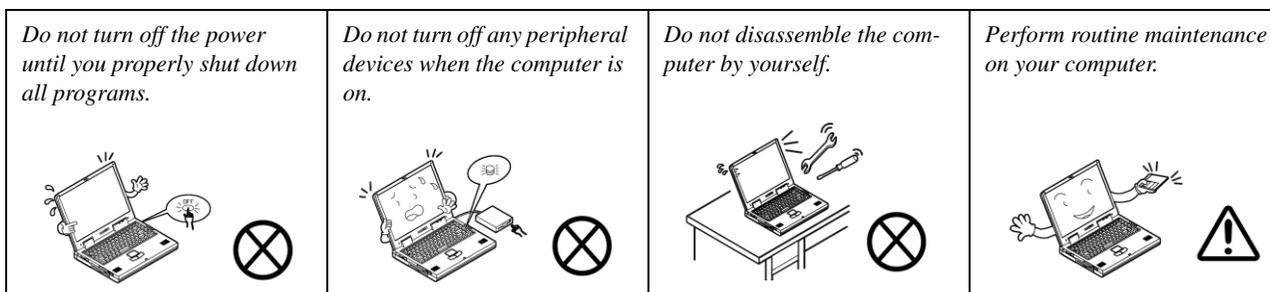
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



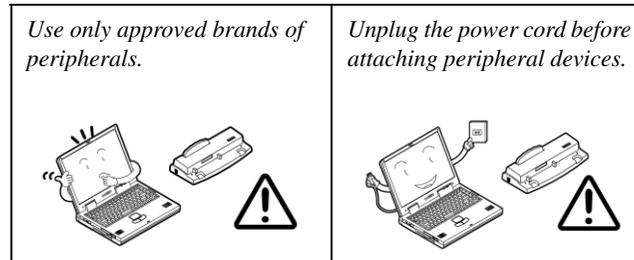
2. **Keep it dry, and don't overheat it.** Keep the computer and power supply away from any kind of heating element. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.



3. **Follow the proper working procedures for the computer.** Shut the computer down properly and don't forget to save your work. Remember to periodically save your data as data may be lost if the battery is depleted.



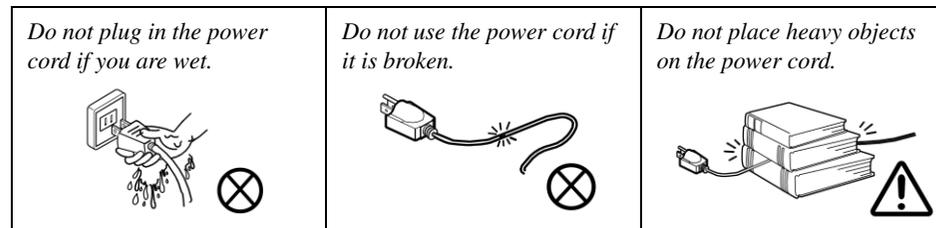
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



## Power Safety

The computer has specific power requirements:

- Only use a power adapter approved for use with this computer.
- Your AC adapter may be designed for international travel but it still requires a steady, uninterrupted power supply. If you are unsure of your local power specifications, consult your service representative or local power company.
- The power adapter may have either a 2-prong or a 3-prong grounded plug. The third prong is an important safety feature; do not defeat its purpose. If you do not have access to a compatible outlet, have a qualified electrician install one.
- When you want to unplug the power cord, be sure to disconnect it by the plug head, not by its wire.
- Make sure the socket and any extension cord(s) you use can support the total current load of all the connected devices.
- Before cleaning the computer, make sure it is disconnected from any external power supplies.



### Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines and power cord).

You must also remove your battery in order to prevent accidentally turning the machine on. **Before removing the battery disconnect the AC/DC adapter from the computer.**

## Battery Precautions

- Only use batteries designed for this computer. The wrong battery type may explode, leak or damage the computer.
- Do not continue to use a battery that has been dropped, or that appears damaged (e.g. bent or twisted) in any way. Even if the computer continues to work with a damaged battery in place, it may cause circuit damage, which may possibly result in fire.
- Recharge the batteries using the notebook's system. Incorrect recharging may make the battery explode.
- Do not try to repair a battery pack. Refer any battery pack repair or replacement to your service representative or qualified service personnel.
- Keep children away from, and promptly dispose of a damaged battery. Always dispose of batteries carefully. Batteries may explode or leak if exposed to fire, or improperly handled or discarded.
- Keep the battery away from metal appliances.
- Affix tape to the battery contacts before disposing of the battery.
- Do not touch the battery contacts with your hands or metal objects.

## Battery Guidelines

The following can also apply to any backup batteries you may have.

- If you do not use the battery for an extended period, then remove the battery from the computer for storage.
- Before removing the battery for storage charge it to 60% - 70%.
- Check stored batteries at least every 3 months and charge them to 60% - 70%.



### Battery Disposal

The product that you have purchased contains a rechargeable battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

### Caution

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used battery according to the manufacturer's instructions.

### Battery Level

Click the battery icon  in the taskbar to see the current battery level and charge status. A battery that drops below a level of 10% will not allow the computer to boot up. Make sure that any battery that drops below 10% is recharged within one week.

### Related Documents

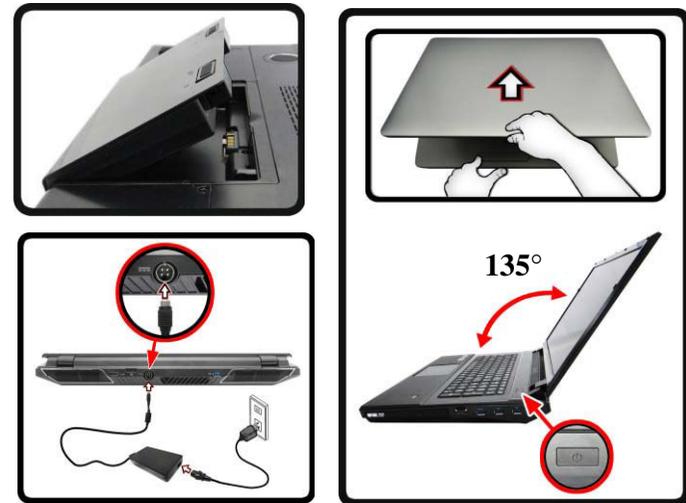
You may also need to consult the following manual for additional information:

#### User's Manual on CD

This describes the notebook PC's features and the procedures for operating the computer and its ROM-based setup program. It also describes the installation and operation of the utility programs provided with the notebook PC.

### System Startup

1. Remove all packing materials, and place the computer on a stable surface.
2. Insert the battery and make sure it is locked in position.
3. Securely attach any peripherals you want to use with the notebook (e.g. keyboard and mouse) to their ports.
4. Attach the AC/DC adapter to the DC-In jack at the rear of the computer, then plug the AC power cord into an outlet, and connect the AC power cord to the AC/DC adapter.
5. Use one hand to raise the lid/LCD to a comfortable viewing angle (it is preferable not to exceed 135 degrees); use the other hand to support the base of the computer (**Note: Never** lift the computer by the lid/LCD).
6. Raise the lid/LCD to a comfortable viewing angle, and press the power button.



*Figure 1*  
Computer with AC/DC Adapter Plugged-In /  
Opening the Lid/LCD

# System Specifications

## Processor Options

### Intel® Core™ i7 Processor

**i7-3940XM (3.00GHz), i7-3920XM (2.90GHz)**  
8MB L3 Cache, 22nm, DDR3-1600MHz, TDP 55W

**i7-3840QM (2.80GHz), i7-3820QM (2.70GHz)**  
8MB L3 Cache, 22nm, DDR3-1600MHz, TDP 45W

**i7-3740QM (2.70GHz), i7-3720QM (2.60GHz), i7-3610QM (2.30GHz)**  
6MB L3 Cache, 22nm, DDR3-1600MHz, TDP 45W

## LCD

### **P370EM:**

17.3" (43.94cm) FHD LCD

### **P370EM3:**

17.3" (43.94cm) FHD (1920 \* 1080), 120Hz  
Support 3D solution with NV 3D VISION Kit (Shutter Glasses Only)  
Built-in 3D IR Emitter

## Memory

Four 204 Pin SO-DIMM Sockets Supporting **DDR3 1333/1600MHz** Memory

Memory Expandable up to 32GB

## Core Logic

Intel® HM77 Chipset

## BIOS

AMI BIOS (48Mb SPI Flash-ROM)

## Security

Security (Kensington® Type) Lock Slot  
BIOS Password  
Fingerprint Reader Module  
TPM 1.2

## Video Adapter

### **P370EM:**

#### **AMD Radeon™ HD 7970M PCIe Video Card**

**2GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 (2nd Generation) Compatible  
Supports AMD CrossFireX Technology

#### **nVIDIA® GeForce GTX 670M PCIe Video Card**

**1.5GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 Compatible  
Supports nVIDIA® SLI Technology

#### **nVIDIA® GeForce GTX 670MX PCIe Video Card**

**3GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 Compatible  
Supports nVIDIA® SLI Technology

#### **nVIDIA® GeForce GTX 680M PCIe Video Card**

**4GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 Compatible  
Supports nVIDIA® SLI Technology

#### **nVIDIA® Quadro K5000M PCIe Video Card**

**4GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 Compatible  
OpenGL 4.1 Compatible

### **P370EM3:**

#### **nVIDIA® GeForce GTX 680M PCIe Video Card**

**4GB** GDDR5 Video RAM on board  
Microsoft DirectX® 11 Compatible  
Supports nVIDIA® SLI Technology

## Keyboard

**Illuminated** Full-Size "WinKey" Keyboard (with W/A/S/D Gaming Keys and Numeric keypad)

## Pointing Device

Built-in ClickPad (with Multi Gesture Functionality)

## Audio

High Definition Audio Compliant Interface  
S/PDIF Digital Output  
Two Speakers  
One Sub Woofer  
Built-In Microphone  
Sound Blaster® X-Fi™ MB2

## Interface

Four USB 3.0 Ports (Including one AC/DC Powered USB port)  
One USB 2.0 Port  
One eSATA Port (USB 2.0 Port Combined)  
One HDMI-Out Port  
One DisplayPort (Version is Video Controller Dependent)  
One S/PDIF Out Jack  
One Headphone/Speaker-Out Jack  
One Microphone-In Jack  
One Line-In Jack  
One RJ-45 LAN Jack  
One DC-In Jack

**Note:** External 7.1CH Audio Output Supported by Headphone, Microphone, Line-In and S/PDIF Out Jacks

## Storage

Up to Two **(Factory Option)** Changeable 2.5" (6cm) 9.5mm (h) **SATA** (Serial) Hard Disk Drives/Solid State Drives (SSD) supporting RAID level 0/1/ Recovery

**(Factory Option)** One mSATA Solid State Drive (SSD)

**(Factory Option)** One 12.7mm(h) Optical Device Type Drive (Super Multi Drive/Blu-Ray Combo Drive/Blu-Ray Writer Drive)

## Mini-Card Slots

Slot 1 for **WLAN** Module or **Combo WLAN and Bluetooth** Module

Slot 2 for mSATA **SSD**

## Card Reader

Embedded Multi-In-1 Push-Push Card Reader

MMC (MultiMedia Card) / RS MMC

SD (Secure Digital) / Mini SD / SDHC/ SDXC

MS (Memory Stick) / MS Pro / MS Duo

## Communication

Built-In Giga Base-TX Ethernet LAN

**(Factory Option)** 2.0M FHD PC Camera Module

**(Factory Option)** Bluetooth 2.1 + EDR Module

### WLAN/ Bluetooth Half Mini-Card Modules:

**(Factory Option)** Intel® Centrino® Ultimate-N 6300 Wireless LAN (**802.11a/g/n**)

**(Factory Option)** Intel® Centrino® Advanced-N 6235 Wireless LAN (**802.11a/g/n**) + Bluetooth

**4.0**

**(Factory Option)** Intel® Centrino® Wireless-N 2230 Wireless LAN (**802.11b/g/n**) + Bluetooth

**4.0**

**(Factory Option)** Wireless LAN (**802.11b/g/n**) + Bluetooth **4.0**

## Environmental Spec

### Temperature

Operating: 5°C - 35°C

Non-Operating: -20°C - 60°C

### Relative Humidity

Operating: 20% - 80%

Non-Operating: 10% - 90%

## Power

Removable 8-cell Smart Lithium-Ion Battery Pack, 89.21WH

Full Range AC/DC Adapter

AC Input: 100 - 240V, 50 - 60Hz

DC Output: 19.5V, 16.9A (**330W**)

## Dimensions & Weight

419mm (w) \* 293mm (d) \* 39.3 - 49.7mm (h)

Around 3.9kg with 1 Video Card, Battery and ODD

## Introduction

*Figure 1*  
**Top View**

1. Built-In PC Camera
2. PC Camera LED
3. Built-In Microphone
4. LCD
5. Speakers
6. LED Status Indicators
7. Power Button
8. Keyboard
9. ClickPad and Buttons
10. Fingerprint Reader Module

## External Locator - Top View with LCD Panel Open



## External Locator - Front & Right side Views



*Figure 2*  
**Front Views**

1. LED Power Indicators



*Figure 3*  
**Right Side Views**

1. Optical Device Drive Bay
2. Emergency Eject Hole
3. Combined eSATA/USB 2.0 Port
4. Powered USB 3.0 Port
5. 2 \* USB 3.0 Ports

## Introduction

### External Locator - Left Side & Rear View

*Figure 4*  
**Left Side View**

1. Security Lock Slot
2. RJ-45 LAN Jack
3. Multi-In-1 Card Reader
4. Line-In Jack
5. S/PDIF-Out Jack
6. Microphone-In Jack
7. Headphone-Out Jack

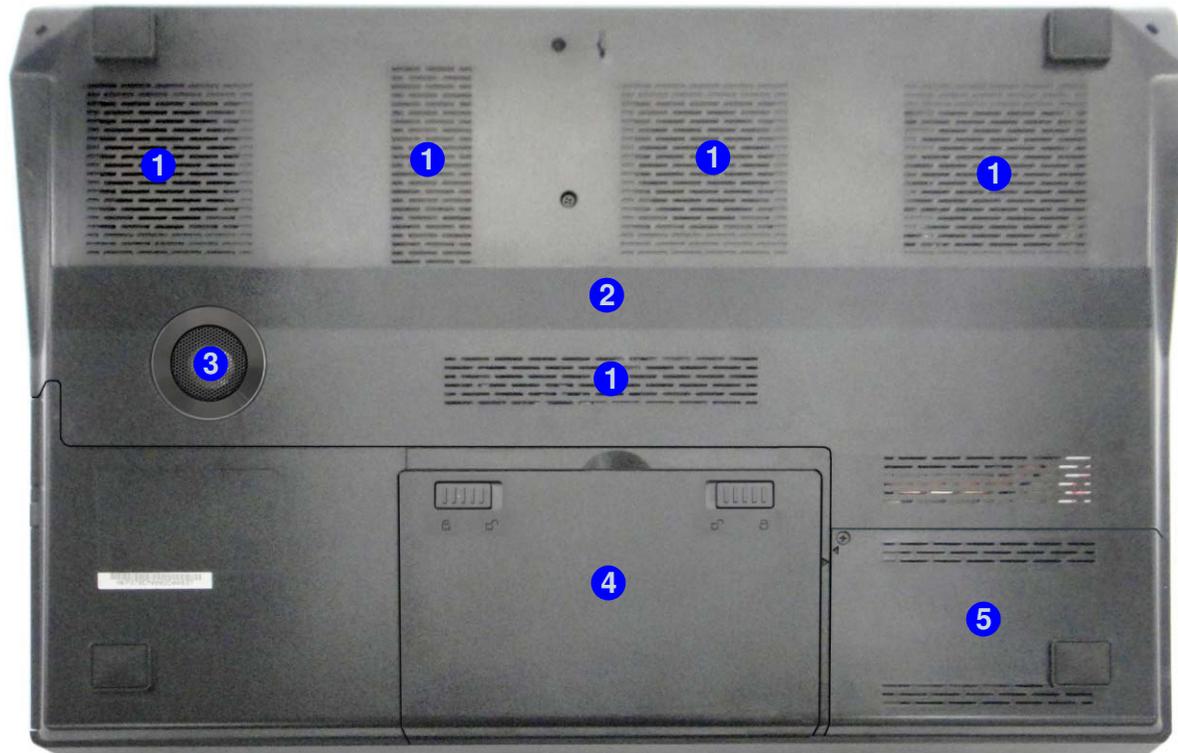


*Figure 5*  
**Rear View**

1. Fan Outlet/Intake
2. HDMI-Out Port
3. Display Port
4. DC-In Jack
5. 1 \* USB 3.0 Port



## External Locator - Bottom View



*Figure 6*  
**Bottom View**

1. Fan Outlet/Intake
2. Component Bay Cover
3. Sub Woofer
4. Battery
5. HDD Bay



### Overheating

To prevent your computer from overheating make sure nothing blocks the vent/fan intakes while the computer is in use.

## Disassembly

---

**NOTE:** All disassembly procedures assume that the system is turned **OFF**, and disconnected from any power supply (the battery is removed too).

### Maintenance Tools

The following tools are recommended when working on the notebook PC:

- M3 Philips-head screwdriver
- M2.5 Philips-head screwdriver (magnetized)
- M2 Philips-head screwdriver
- Small flat-head screwdriver
- Pair of needle-nose pliers
- Anti-static wrist-strap

### Connections

Connections within the computer are one of four types:

Locking collar sockets for ribbon connectors	To release these connectors, use a small flat-head screwdriver to gently pry the locking collar away from its base. When replacing the connection, make sure the connector is oriented in the same way. The pin1 side is usually not indicated.
Pressure sockets for multi-wire connectors	To release this connector type, grasp it at its head and gently rock it from side to side as you pull it out. Do not pull on the wires themselves. When replacing the connection, do not try to force it. The socket only fits one way.
Pressure sockets for ribbon connectors	To release these connectors, use a small pair of needle-nose pliers to gently lift the connector away from its socket. When replacing the connection, make sure the connector is oriented in the same way. The pin1 side is usually not indicated.
Board-to-board or multi-pin sockets	To separate the boards, gently rock them from side to side as you pull them apart. If the connection is very tight, use a small flat-head screwdriver - use just enough force to start.

### Maintenance Precautions

The following precautions are a reminder. To avoid personal injury or damage to the computer while performing a removal and/or replacement job, take the following precautions:

1. **Don't drop it.** Perform your repairs and/or upgrades on a stable surface. If the computer falls, the case and other components could be damaged.
2. **Don't overheat it.** Note the proximity of any heating elements. Keep the computer out of direct sunlight.
3. **Avoid interference.** Note the proximity of any high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage components and/or data. You should also monitor the position of magnetized tools (i.e. screwdrivers).
4. **Keep it dry.** This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.
5. **Be careful with power.** Avoid accidental shocks, discharges or explosions.
  - Before removing or servicing any part from the computer, turn the computer off and detach any power supplies.
  - When you want to unplug the power cord or any cable/wire, be sure to disconnect it by the plug head. Do not pull on the wire.
6. **Peripherals** – Turn off and detach any peripherals.
7. **Beware of static discharge.** ICs, such as the CPU and main support chips, are vulnerable to static electricity. Before handling any part in the computer, discharge any static electricity inside the computer. When handling a printed circuit board, do not use gloves or other materials which allow static electricity buildup. We suggest that you use an anti-static wrist strap instead.
8. **Beware of corrosion.** As you perform your job, avoid touching any connector leads. Even the cleanest hands produce oils which can attract corrosive elements.
9. **Keep your work environment clean.** Tobacco smoke, dust or other air-borne particulate matter is often attracted to charged surfaces, reducing performance.
10. **Keep track of the components.** When removing or replacing any part, be careful not to leave small parts, such as screws, loose inside the computer.

### Cleaning

Do not apply cleaner directly to the computer, use a soft clean cloth.

Do not use volatile (petroleum distillates) or abrasive cleaners on any part of the computer.



#### Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines). It is advisable to also remove your battery in order to prevent accidentally turning the machine on.

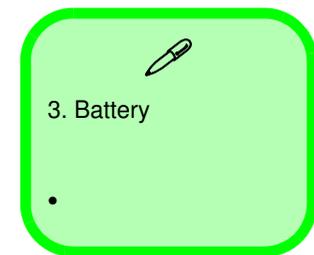
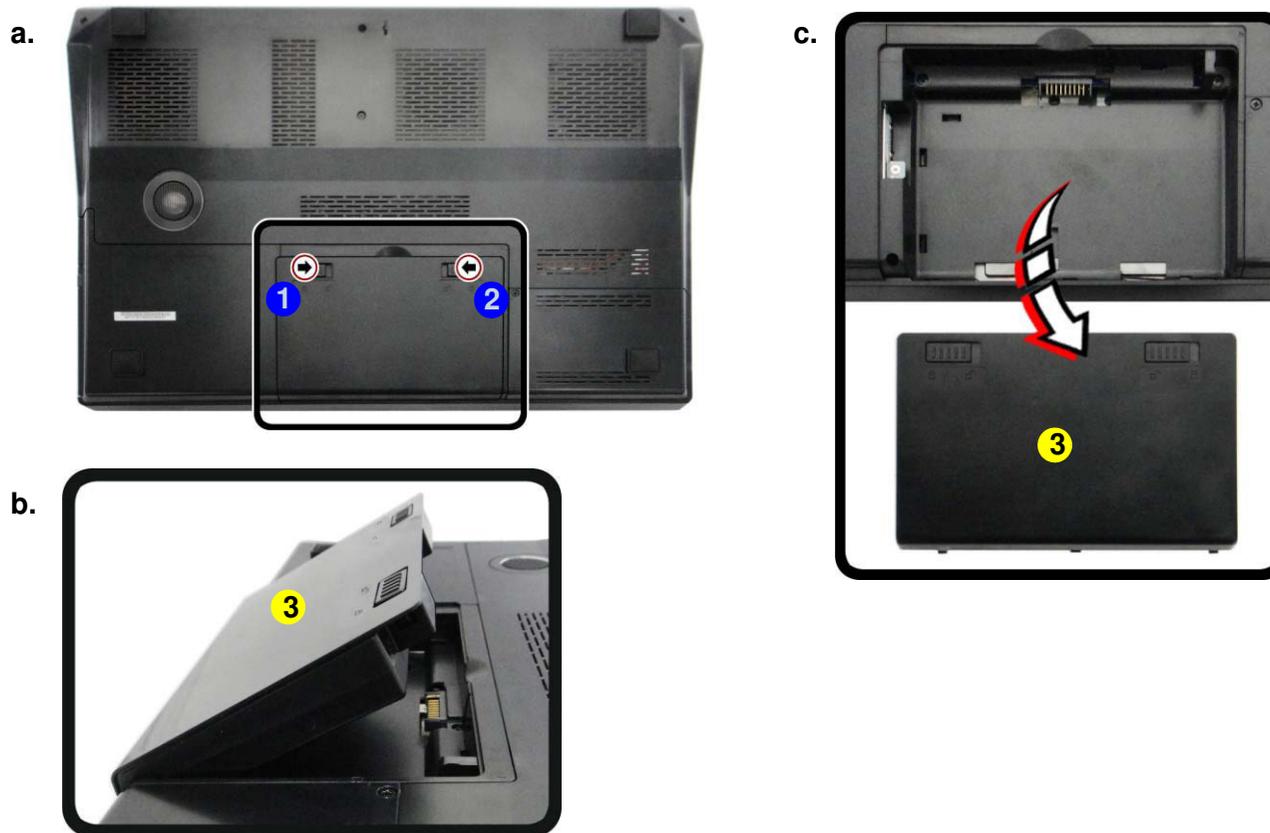
## Removing the Battery

If you are confident in undertaking upgrade procedures yourself, for safety reasons it is best to remove the battery.

1. Turn the computer off, remove the AC/DC adapter and turn it over.
2. Slide the latch **1** - **2** in the direction of the arrow and carefully pull the battery **3** up.
3. Lift the battery **3** up (*Figure b*) and out of the battery bay.

*Figure 1*  
**Battery Removal**

- a. Slide the latch and hold it in place.
- b. Pull the battery up.
- c. Lift the battery out of the bay as indicated.



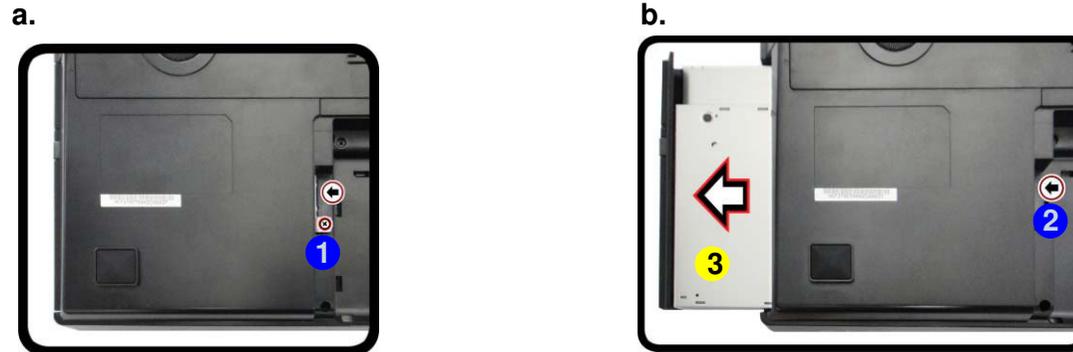
## Disassembly

*Figure 2*  
**Optical Device  
Removal**

- Remove the screw.
- Push the optical device out of the computer.

## Removing the Optical (CD/DVD) Device

- Turn off the computer, and turn it over and remove the battery ([page 2 - 5](#)).
- Remove the screw at point **1**, and use a screwdriver to carefully push out the optical device at point **2**.
- Push the optical device drive **3** out of the bay and reverse the process to install the new device.



### Blu-Ray Device Bezel Removal

Note that some Blu-Ray modules (e.g. Pioneer) have a small piece of mylar inserted in the left side (as viewed front on) of the bezel cover; in order to prevent the bezel cover of the module from being removed accidentally. If you need to replace the bezel cover, you will need to use a screwdriver to ease out and remove the mylar before attempting to remove the bezel cover. You will need to re-insert the mylar when replacing the bezel cover.



- Optical Device
  - 1 Screw

## Removing the Hard Disk Drive

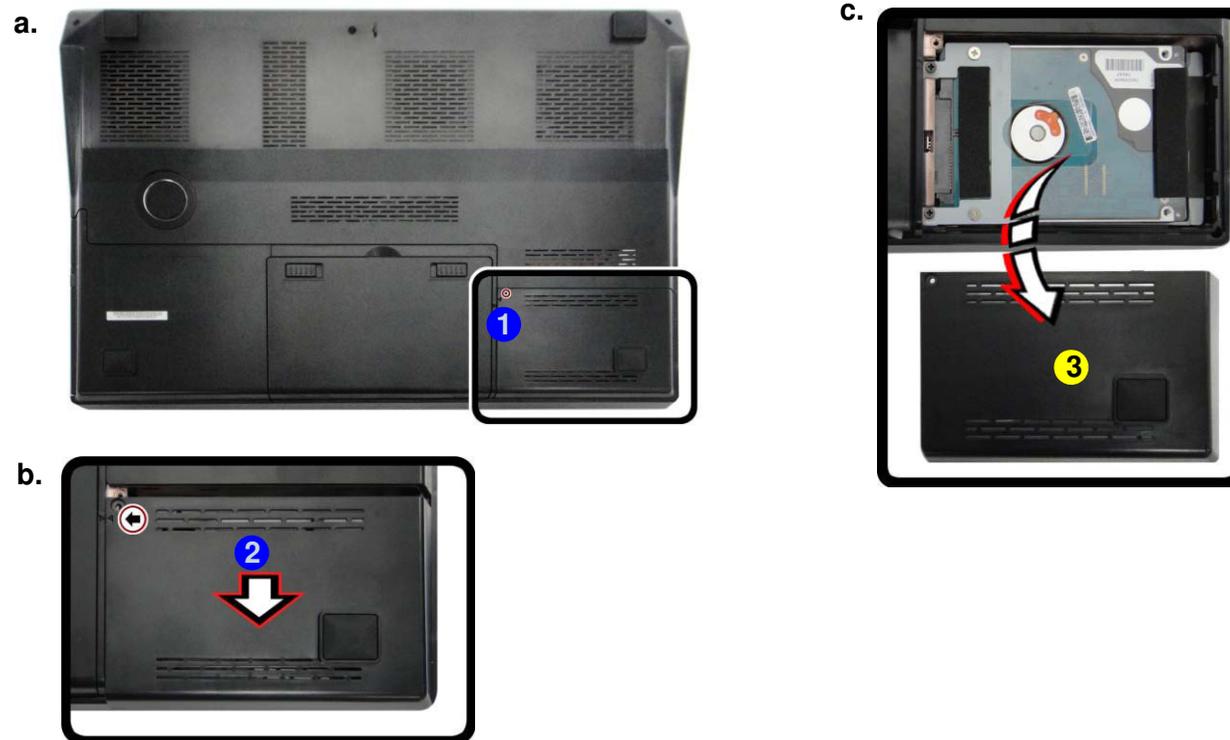
The hard disk drive is mounted in a removable case and can be taken out to accommodate other 2.5" SATA hard disk drives with a height of 9.5mm (h). Follow your operating system's installation instructions, and install all necessary drivers and utilities (as outlined in **Chapter 4 of the User's Manual**) when setting up a new hard disk.

### Hard Disk Upgrade Process

1. Turn off the computer, and turn it over and remove the battery ([page 2 - 5](#)).
2. Locate the Hard disk bay cover and remove the screw **1**.
3. Slide the bay cover **3** in the direction of the arrow **2**.
4. Carefully lift the bay cover **3** off the computer ([Figure 3c](#)).

*Figure 3*  
**HDD Assembly Removal**

- a. Remove the screw.
- b. Slide the cover in the direction of the arrow.
- c. Remove the bay cover.





3. Hard disk Bay Cover

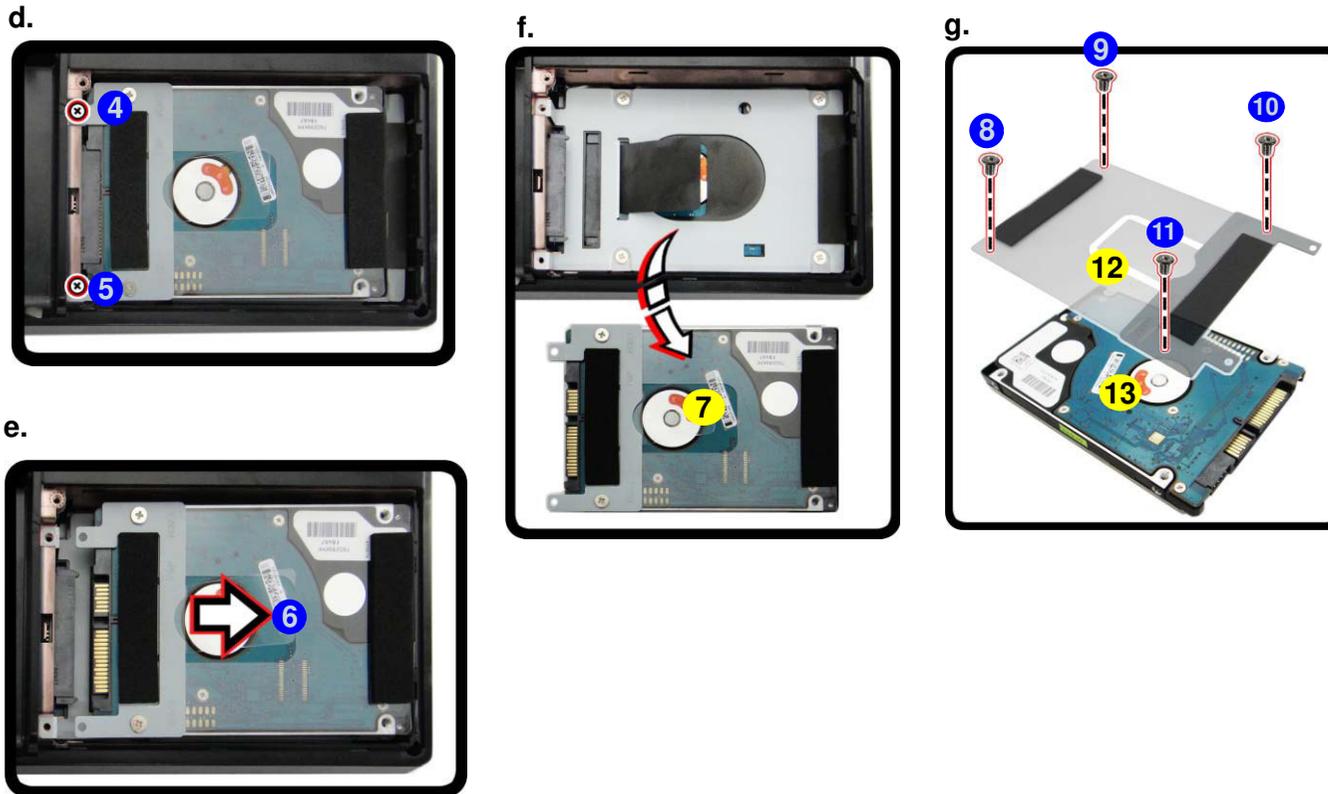
- 1 Screw

## Disassembly

### Figure 4 HDD Assembly Removal (cont'd.)

- d. Remove the screws.  
e. Slide the HDD in the direction of the arrow.  
f. Lift the hard disk assembly out of the computer.  
g. Remove the screws and mylar from HDD.

5. Remove screws 4 - 5.  
6. Grip the tab and slide the hard disk assembly in the direction of the arrow 6 (Figure 4e).  
7. Carefully lift the hard disk assembly 7 out of the computer (Figure 4f).  
8. Remove screws 8 - 11 and hard disk mylar 12 from the hard disk(s) 13 (Figure 4g).  
9. Reverse the process to install a new hard disk (do not forget to replace all the screws and cover).

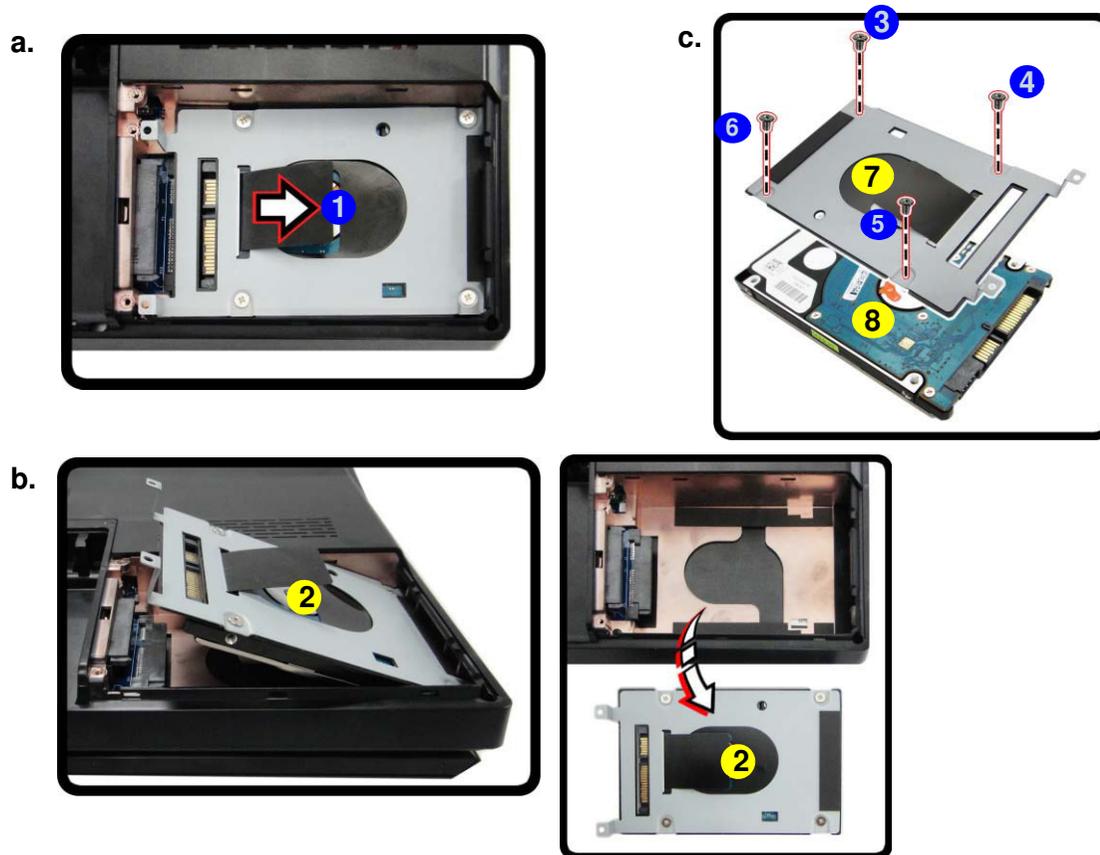


7 Hard Disk Assembly  
12. Hard Disk Mylar  
13. Hard Disk

- 6 Screws

## Removing the Hard Disk(s) in the Secondary HDD Bay

1. Turn **off** the computer, and turn it over and remove the battery.
2. The secondary hard disk bay is located under the first hard disk.
3. Grip the tab and slide the hard disk assembly in the direction of the arrow **1** (*Figure 5a*).
4. Lift the hard disk assembly **2** out of the compartment (*Figure 5b*).
5. Remove the screws **3** - **6** to release the hard disk **8** from the case **7** (*Figure 5c*).
6. Reverse the process to install any new hard disk(s).



*Figure 5*  
**Secondary HDD  
Assembly Removal**

- a. Slide the secondary hard disk assembly in the direction of the arrow.
- b. Lift the secondary hard disk assembly out of the computer.
- c. Remove the screws to release the hard disk from the case.



- 2. Hard Disk Assembly
- 7. Hard Disk Case
- 8. Hard Disks
- 4 Screws

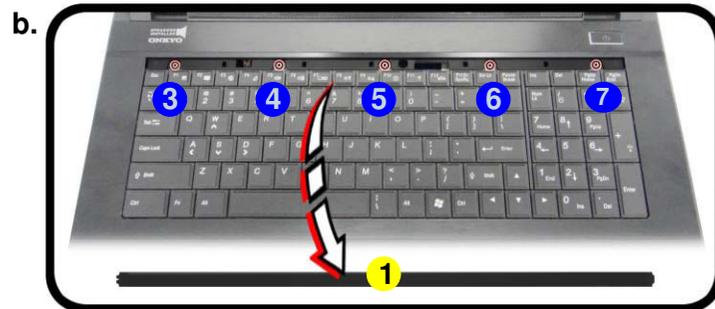
## Disassembly

*Figure 6*  
**Keyboard Removal**

- Unsnap the LED cover at point 2 using non-metallic instrument.
- Lift the LED cover module and remove the screws from the keyboard.
- Disconnect the cables from the locking collar.
- Remove the keyboard.

## Removing the Keyboard

- Turn off the computer, and turn it over and remove the battery ([page 2 - 5](#)).
- Turn the computer over, open the Lid/LCD, and carefully unsnap up the center cover module **1** from point **2** (between F11 & F12) using non-metallic instrument.
- Lift up the center cover module **1** off the computer.
- Remove screws **3** - **7** from the keyboard.
- Carefully lift the keyboard **8** up, being careful not to bend the keyboard ribbon cable.
- Disconnect the keyboard ribbon cable **9** from the locking collar socket **10**, and the keyboard LED cable **11** from its locking collar socket **12**.
- Remove the keyboard **8**.
- Reverse the process to replace the keyboard (make sure to reconnect the keyboard cable).



- 1. Center Cover Module
- 8. Keyboard
- 5 Screws



### Re-Inserting the Keyboard

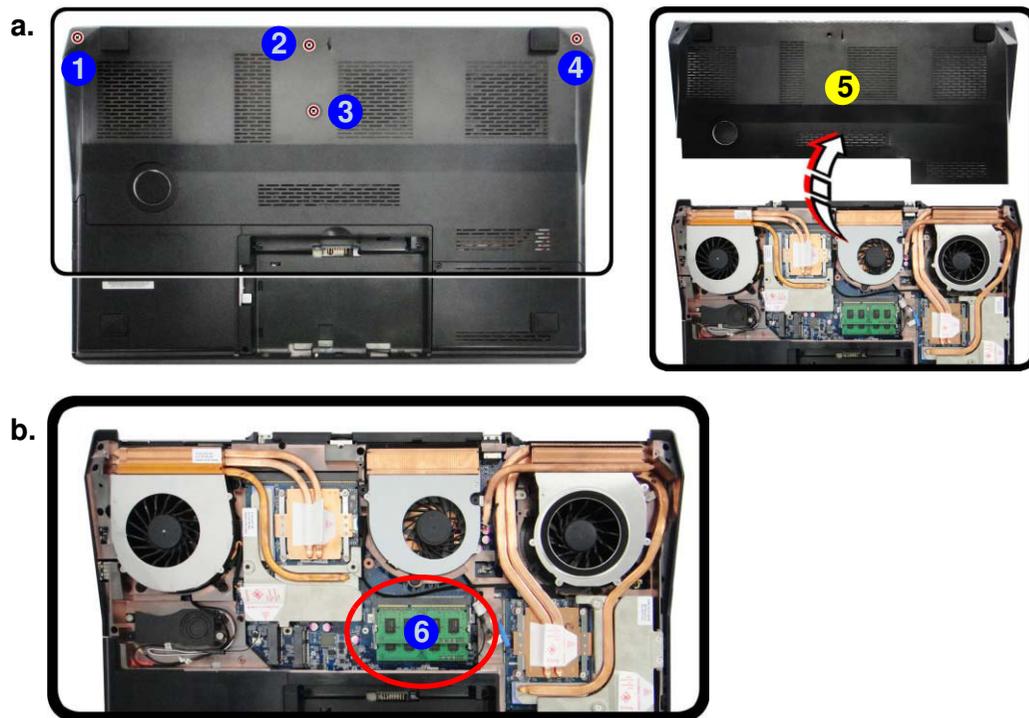
When re-inserting the keyboard firstly align the keyboard tabs at the bottom of the keyboard with the slots in the case.

## Removing the System Memory (RAM)

The computer has three memory sockets for 204 pin Small Outline Dual In-line Memory Modules (SO-DIMM) DDR III (DDR3) supporting 1333/1600 MHz. The main memory can be expanded up to 16GB. The total memory size is automatically detected by the POST routine once you turn on your computer.

### Primary System Memory Upgrade Process

1. Turn off the computer, and turn it over to remove the battery ([page 2 - 5](#)).
2. Remove screws **1** - **4** and component bay cover **5**.
3. The RAM module will be visible at point **6** on the mainboard ([Figure 7b](#)).



*Figure 7*  
**RAM-1 Module Removal**

- a. Remove screws and component bay cover.
- b. Locate the module.



#### Contact Warning

Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.



5. Component Bay Cover

- 4 Screws

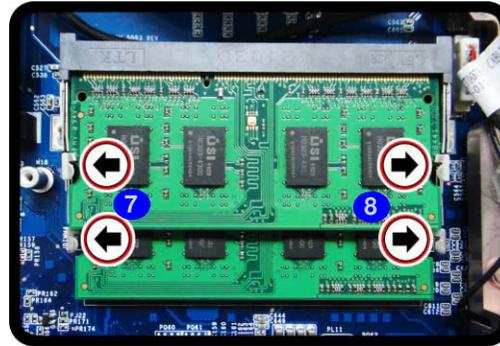
## Disassembly

Figure 8  
RAM-1 Module  
Removal (cont'd.)

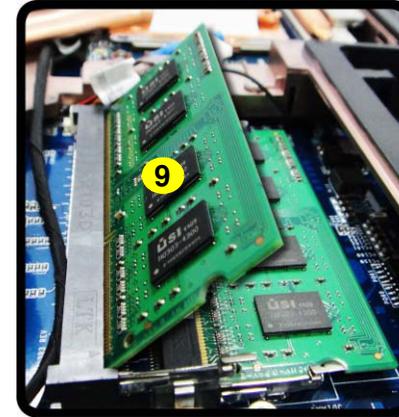
- c. Gently pull the release latch in the direction indicated.
- d. Remove the module.

4. Gently pull the two **release latches 7 & 8** on the sides of the memory socket in the direction indicated by the arrows (**Figure 8c**).
5. The RAM module **9** will pop-up, and you can then remove it.
6. Pull the latches to release the second module if necessary

c.



d.



7. Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
8. The module's pin alignment will allow it to only fit one way. Make sure the module is seated as far into the socket as it will go. **DO NOT FORCE** the module; it should fit without much pressure.
9. Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
10. Replace the component bay cover and screws.
11. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.



9. RAM Module

## Secondary System Memory Upgrade Process

1. Turn off the computer, and turn it over to remove the battery ([page 2 - 5](#)), and keyboard ([page 2 - 10](#)).
2. The RAM module will be visible at point **1** on the mainboard ([Figure 9a](#)).



3. Gently pull the two **release latches** **2** & **3** **on the sides of the memory socket in the direction indicated by the arrows** ([Figure 8c](#)).
4. The RAM module **4** will pop-up, and you can then remove it.
5. Pull the latches to release the second module if necessary
6. Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
7. The module's pin alignment will allow it to only fit one way. Make sure the module is seated as far into the socket as it will go. **DO NOT FORCE** the module; it should fit without much pressure.
8. Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
9. Replace the screws and keyboard.
10. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.

*Figure 9*  
**RAM-2 Module Removal**

- a. Locate the module.
- b. Gently pull the release latch in the direction indicated.
- c. Remove the module.



### Contact Warning

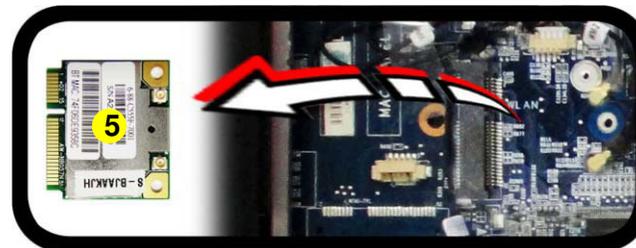
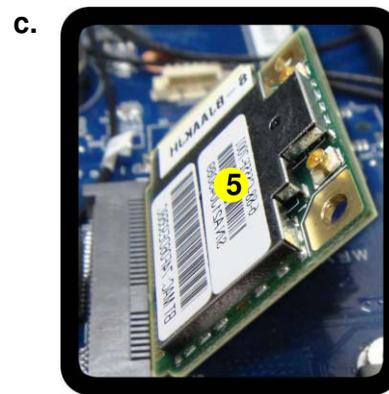
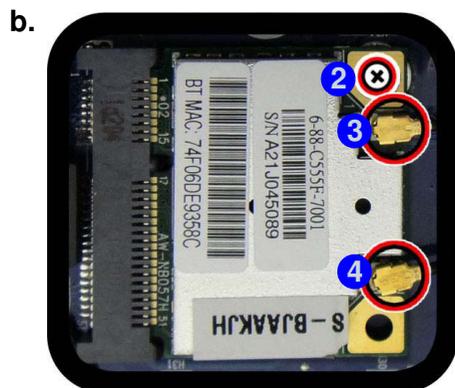
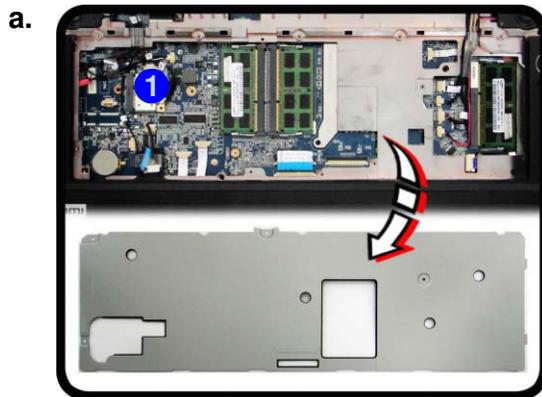
Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.



### 4. RAM Module

## Removing the Wireless LAN Module

1. Turn off the computer, and turn it over, remove the battery ([page 2 - 5](#)), keyboard and keyboard shielding plate ([page 2 - 10](#)).
2. The Wireless LAN Module will be visible at point **1**.
3. Remove the screw **2** and carefully disconnect cables **3** - **4**.
4. The Wireless LAN Module **5** ([Figure c](#)) will pop-up, and you can remove it.



*Figure 21*  
**Wireless LAN  
Module Removal**

- a. Locate the WLAN module.
- b. Remove the screw and disconnect the cables.
- c. Remove the WLAN module.

Note: Make sure you reconnect the antenna cables.

