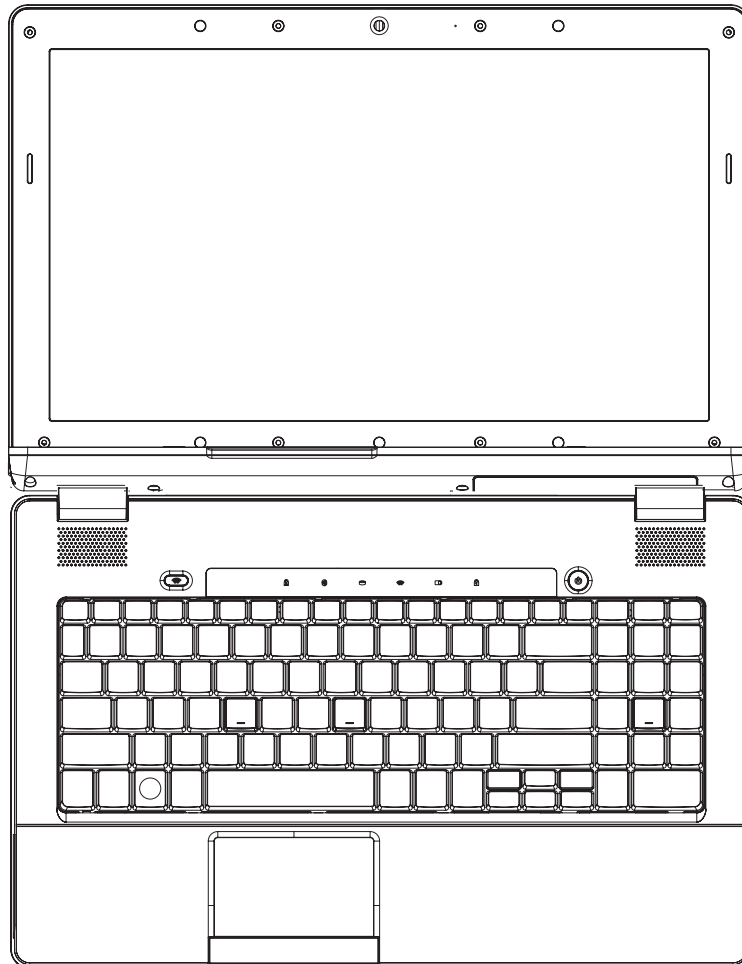


# SP15-Discrete Notebook PC

## Hardware User Guide



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# 1. Introducing the Notebook PC

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**About This User Guide**

**Safety Precautions**

**Transportation Precautions**

**Preparing your Notebook PC**



**NOTE:** Photos and icons in this document are used for artistic purposes only and do not show what is actually used in the product itself.

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# 1 Introducing the Notebook PC

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## General Overview

This document provides information on the various components in the Notebook PC and how to use them. The following are the major sections of this document:



1. Introducing the Notebook PC  
Introduces you to the Notebook PC and its documentation.
2. Knowing the Parts  
Gives you information on the Notebook PC's components.
3. Getting Started  
Gives you information on getting started with the Notebook PC.
4. Using the Notebook PC  
Gives you information on using the Notebook PC's components.

## Notes For The User

A few notes and warnings in bold are used throughout this document that you should be aware of in order to complete certain tasks safely and completely. These notes have different degrees of importance as described below:



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**NOTE: Tips and information for special situations.**

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**TIP: Tips and useful information for completing tasks.**

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**IMPORTANT! Vital information that must be followed to prevent damage to data, components, or persons.**

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**WARNING! Important information that must be followed for safe operation.**

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**< > Text enclosed in < > or [ ] represents a key on the keyboard; do not actually type the [ ] < > or [ ] and the enclosed letters.**

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## Safety Precautions

The following safety precautions will increase the life of the Notebook PC. Follow all precautions and instructions. Except as described in this document, refer all servicing to qualified personnel. Do not use damaged power cords, accessories, or other peripherals. Do not use strong solvents such as thinners, benzene, or other chemicals on or near the surface.



**IMPORTANT! Disconnect the AC power and remove the battery pack(s) before cleaning. Wipe the Notebook PC using a clean cellulose sponge or chamois cloth dampened with a solution of nonabrasive detergent and a few drops of warm water and remove any extra moisture with a dry cloth.**



**SAFE TEMP:** This Notebook PC should only be used in environments with ambient temperatures between 5°C (41°F) and 35°C (95°F).



**DO NOT** press or touch the display panel. Do not place together with small items that may scratch or enter the Notebook PC.



**DO NOT** expose to dirty or dusty environments. **DO NOT** operate during a gas leak. **DO NOT** use cut or damaged connection cables.



**DO NOT** place on uneven or unstable work surfaces. Seek servicing if the casing has been damaged.



**DO NOT** expose to or use near liquids, rain, or moisture. **DO NOT** use the modem during an electrical storm.



**CAUTION!** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.



**INPUT RATING:** Refer to the rating label on the bottom of the Notebook PC and be sure that your power adapter complies with the rating.



**DO NOT** carry or cover a Notebook PC that is powered ON with any materials that will reduce air circulation such as a carrying bag.



**DO NOT** leave the Notebook PC on your lap or any part of the body in order to prevent discomfort or injury from heat exposure.



**DO NOT** place or drop objects on top and do not shove any foreign objects into the Notebook PC. Do not block air vents.



**DO NOT** expose to strong magnetic or electrical fields. The electromagnetic field may cause the computer to malfunction.



**DO NOT** throw the Notebook PC in municipal waste. Check local regulations for disposal of electronic products.



**Battery safety warnings:**  
**DO NOT** throw the battery in fire.  
**DO NOT** disassemble the battery.  
**DO NOT** short circuit the contacts.  
**DO NOT** handle damaged or leaking batteries.

# 1 Introducing the Notebook PC

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## Transportation Precautions

To prepare the Notebook PC for transport, you should turn it OFF and disconnect all external peripherals to prevent damage to the connectors. The hard disk drive's head retracts when the power is turned OFF to prevent scratching of the hard disk surface during transport. Therefore, you should not transport the Notebook PC while the power is still ON. Close the display panel and check that it is latched securely in the closed position to protect the keyboard and display panel.



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**IMPORTANT! The Notebook PC's surface is easily dulled if not properly cared for. Be careful not to rub or scrape the Notebook PC surfaces.**

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### Cover Your Notebook PC

Purchase a carrying bag to protect the Notebook PC from dirt, water, shock, and scratches.



### Charge Your Batteries

If you intend to use battery power, be sure to fully charge your battery pack and any optional battery packs before going on long trips. Remember that the power adapter charges the battery pack as long as it is plugged into the computer and an AC power source. Be aware that it takes much longer to charge the battery pack when the Notebook PC is in use.



### Airplane Precautions

Contact your airline if you want to use the Notebook PC on the airplane. Most airlines will have restrictions for using electronic devices. Most airlines will allow electronic use only between and not during takeoffs and landings.



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**IMPORTANT! There are three main types of airport security devices: X-ray machines (used on items placed on conveyor belts), magnetic detectors (used on people walking through security checks), and magnetic wands (hand-held devices used on people or individual items). You can send your Notebook PC and diskettes through airport X-ray machines. However, it is recommended that you do not send your Notebook PC or diskettes through airport magnetic detectors or expose them to magnetic wands.**

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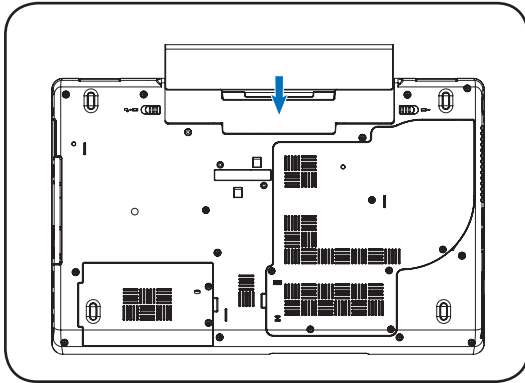
## Preparing your Notebook PC

These are only quick instructions for using your Notebook PC. Read the later pages for detailed information on using your Notebook PC.

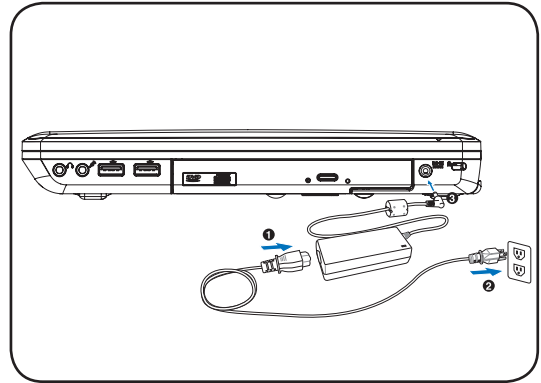


**IMPORTANT:** The SP15 discrete graphics model requires a 90W power adapter. A smaller 65W power adapter used in many Notebook PC's cannot be used with this model.

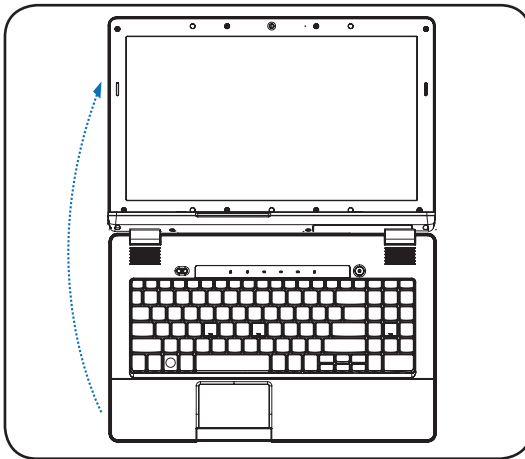
### 1. Install the battery pack



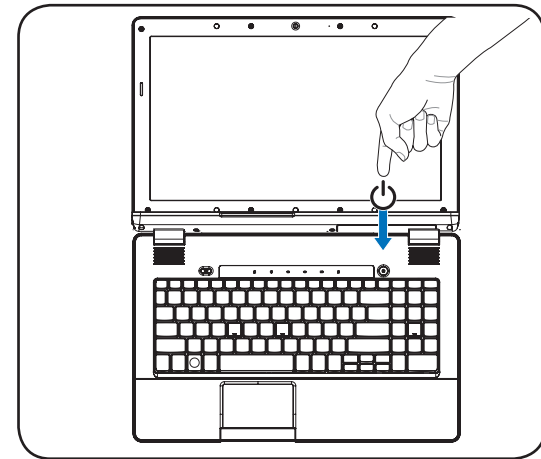
### 2. Connect the AC Power Adapter



### 3. Open the Display Panel



### 4. Turn ON the Notebook PC



**IMPORTANT!** Selected models may feature display panels that do not fully open to a 180-degree angle. When opening, do not force the display panel down to the table or else the hinges may break! Never lift the Notebook PC by the display panel!

The power switch turns the Notebook PC ON and OFF or puts the Notebook PC into sleep or hibernation modes. Actual behavior of the power switch can be customized in Windows Control Panel > Power Options > System Settings.



## 2. Knowing the Parts

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### Basic sides of the Notebook PC



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**NOTE:** Photos and icons in this document are used for artistic purposes only and do not show what is actually used in the product itself.

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# 2 Knowing the Parts

## Top Side

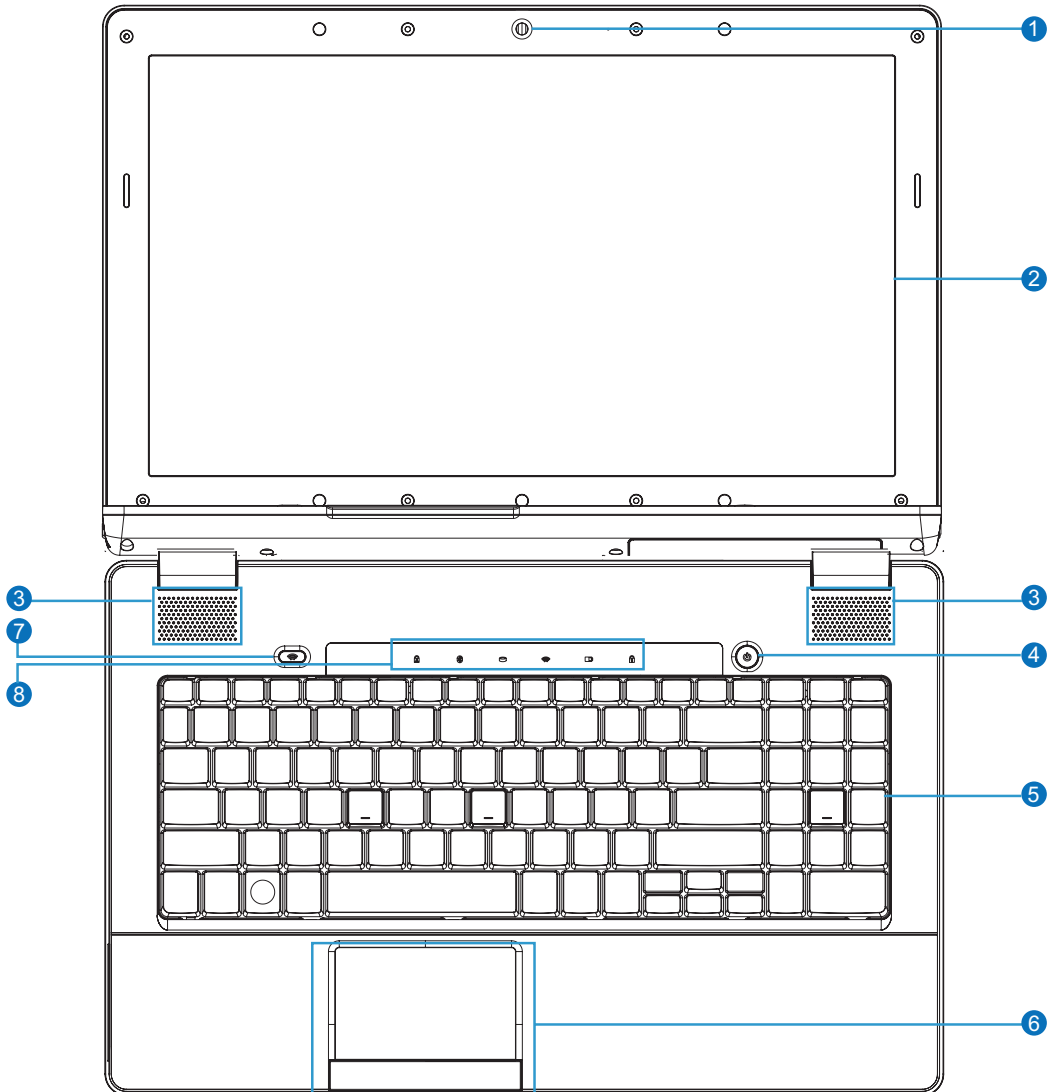
Refer to the diagram below to identify the components on this side of the Notebook PC.







**NOTE:** The keyboard will be different for each territory.







**IMPORTANT!** Selected models may feature display panels that do not fully open to a 180-degree angle, with such models do not attempt to force the display panel beyond its limit as it may cause damage to the device.







**1**  **Camera**  
 The built-in camera allows picture taking or video recording. Can be used with video conferencing and other interactive applications. 



**2**  **Display Panel**  
 The Notebook PC uses an ultra-clear flat panel which provides excellent viewing like that of desktop monitors without any harmful radiation or flickering, so it is easier on the eyes. Use a soft cloth without chemical liquids (use plain water if necessary) to clean the display panel. **WARNING:** The display panel is fragile. Do not to bend or press the panel. 


**3**  **Audio Speakers**  
 The built-in stereo speaker system allows you to hear audio without additional attachments. The multimedia sound system features an integrated digital audio controller that produces rich, vibrant sound (results improved with external stereo headphones or speakers). Audio features are software controlled. 

**4**  **Power Switch**  
 The power switch turns the Notebook PC ON and OFF or puts the Notebook PC into sleep or hibernation modes. Actual behavior of the power switch can be customized in Windows Control Panel “Power Options.” 

**5**  **Keyboard**  
 The keyboard provides keys with comfortable travel (depth at which the keys can be depressed) and palm rest for both hands. A Windows function key is provided to help ease navigation in the Windows operating system. 

**6**  **Touchpad and Buttons**  
 The touchpad with its buttons is a pointing device that provides the same functions as a desktop mouse. A software-controlled scrolling function is available after setting up the included touchpad utility to allow easy Windows or web navigation. 

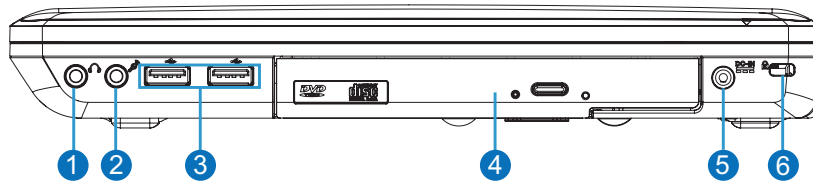
**7**  **Wireless Switch**  
 This switch allows you to toggle the Notebook PC’s wireless connection. See details for the switches in Section 3. 

**8**  **Status Indicators**  
 Status indicators represent various hardware/software conditions. See indicator details in Section 3. 

## 2 Knowing the Parts

### Right Side

Refer to the diagram below to identify the components on this side of the Notebook PC.



#### 1 Headphone Output Jack

The stereo headphone jack (1/8 inch) is used to connect the Notebook PC's audio out signal to amplified speakers or headphones. Using this jack automatically disables the built-in speakers.



#### 2 Microphone Input Jack

The mono microphone jack (1/8 inch) can be used to connect an external microphone or output signals from audio devices. Using this jack automatically disables the built-in microphone. Use this feature for video conferencing, voice narrations, or simple audio recordings.



#### 3 USB Ports (2.0/1.1)

The USB (Universal Serial Bus) ports are compatible with USB 2.0 or USB 1.1 devices such as keyboards, pointing devices, cameras, hard disk drives, printers, and scanners connected in a series up to 12Mbps/sec (USB 1.1) and 480Mbps/sec (USB 2.0). USB allows many devices to run simultaneously on a single computer, with some peripherals acting as additional plug-in sites or hubs. USB supports hot-swapping of devices so that most peripherals can be connected or disconnected without restarting the computer.



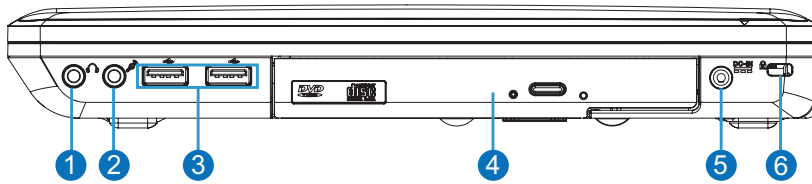
#### 4 Optical Drive

The Notebook PC comes in various models with different optical drives. The Notebook PC's optical drive may support compact discs (CD) and/or digital video discs (DVD) and may have recordable (R) or re-writable (RW) capabilities. See the marketing specifications for details on each model.



(continued on the next page)

## Right Side (cont.)



### 5 **DCIN** Power (DC) Input

The supplied power adapter converts AC power to DC power for use with this jack. Power supplied through this jack supplies power to the Notebook PC and charges the internal battery pack. To prevent damage to the Notebook PC and battery pack, always use the supplied power adapter.



**CAUTION:** The adapter may become warm to hot when in use. be sure not to cover the adapter and keep it away from your body.



**IMPORTANT:** The SP15 discrete graphics model requires a 90W power adapter. A smaller 65W power adapter used in many Notebook PC's cannot be used with this model.

### 6 **Kensington® Lock Port**

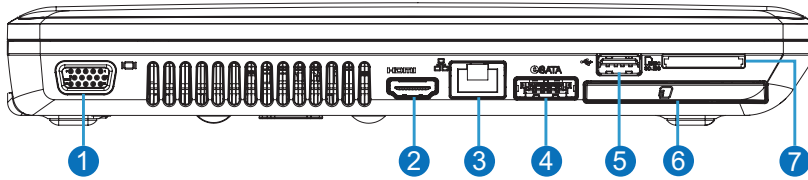
The Kensington® lock port allows the Notebook PC to be secured using Kensington® compatible Notebook PC security products. These security products usually include a metal cable and lock that prevent the Notebook PC to be removed from a fixed object. Some may also include a motion detector to sound an alarm when moved.



# 2 Knowing the Parts

## Left Side

Refer to the diagram below to identify the components on this side of the Notebook PC.



### 1 Display (Monitor) Output

The 15-pin D-sub monitor port supports a standard VGA-compatible device such as a monitor or projector to allow viewing on a larger external display.



### 2 HDMI Port

HDMI (High-Definition Multimedia Interface) is an uncompressed all-digital audio/video interface between any audio/video source, such as a set-top box, DVD player, and A/V receiver and an audio and/or video monitor, such as a digital television (DTV). Supports standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable. It transmits all ATSC HDTV standards and supports 8-channel digital audio.



### 3 LAN Port

The RJ-45 LAN port with eight pins is larger than the RJ-11 modem port and supports a standard Ethernet cable for connection to a local network. The built-in connector allows convenient use without additional adapters.



### 4 E-SATA / USB (2.0/1.1) Port

This port is compatible with both USB and Serial-ATA devices. External SATA or eSATA allows external connection of Serial-ATA devices originally designed for use inside the computer. It is up to six times faster than existing USB 2.0 & 1394 for external storage solutions and is also hot pluggable using shielded cables and connectors up to two meters.



### 5 USB Port (2.0/1.1)

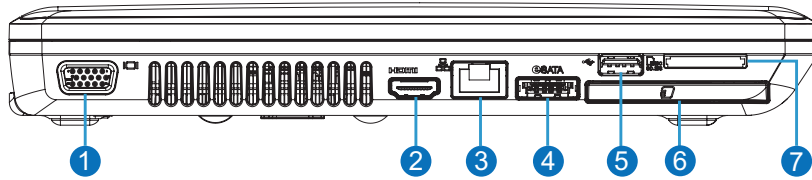
The USB (Universal Serial Bus) port is compatible with USB 2.0 or USB 1.1 devices such as keyboards, pointing devices, cameras, hard disk drives, printers, and scanners connected in a series up to 12Mbits/sec (USB 1.1) and 480Mbits/sec (USB 2.0). USB allows many devices to run simultaneously on a single computer, with some peripherals acting as additional plug-in sites or hubs. USB supports hot-swapping of devices so that most peripherals can be connected or disconnected without restarting the computer.



(continued on the next page)



## Left Side (cont.)



### **6** **ExpressCard Slot**

One 26pin Express card slot is available to support an ExpressCard/34mm or ExpressCard/54mm expansion card. This interface is faster by using a serial bus supporting USB 2.0 and PCI Express instead of the slower parallel bus used in the PC card slot. (Not compatible with previous PCMCIA cards.)



### **7** **Flash Memory Card Reader**

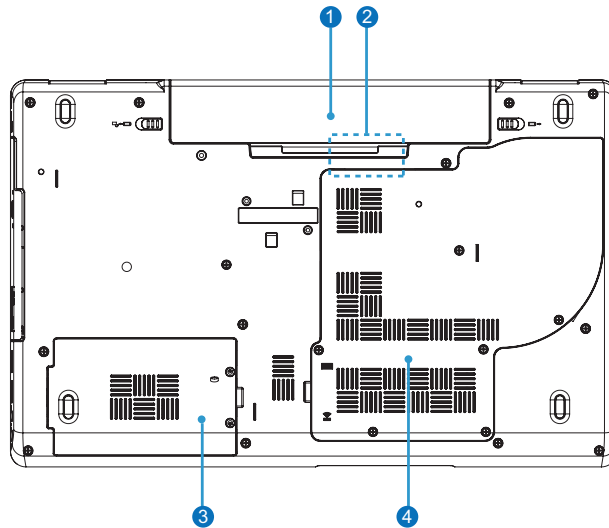
This Notebook PC has a built-in high-speed memory card reader that can conveniently read from and write to many flash memory cards used in devices such as digital cameras, MP3 players, mobile phones, and PDAs.



## 2 Knowing the Parts

### Bottom Side

Refer to the diagram below to identify the components on this side of the Notebook PC.



#### 1 Battery Pack

The battery pack is automatically charged when the Notebook PC is connected to an AC power source and maintains power to the Notebook PC when AC power is not connected. This allows use when moving temporarily between locations. Battery time varies by usage and by the specifications for this Notebook PC. The battery pack cannot be disassembled and must be purchased as a single unit.



#### 2 SIM Card Compartment (on selected models)

The SIM card compartment allows insertion of a SIM card for mobile broadband functions.



#### 3 Hard Disk Drive Compartment

The hard disk drive is secured in a compartment. Hard Disk Drive (HDD) is a non-volatile data storage device. It stores data on a magnetic surface layered onto hard disk platters. Visit an authorized service center or retailer for more information on the hard disk drive of your Notebook PC.



#### 4 Memory (RAM) Compartment

The memory compartment contains pre-installed RAM. RAM (Random Access Memory) is where operating system, application programs, and data in current use are kept so that they can be quickly reached. Visit an authorized service center or retailer for more information on the memory of your Notebook PC.



## 3. Getting Started

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**Power System**

**Special Keyboard Functions**

**Status Indicators**



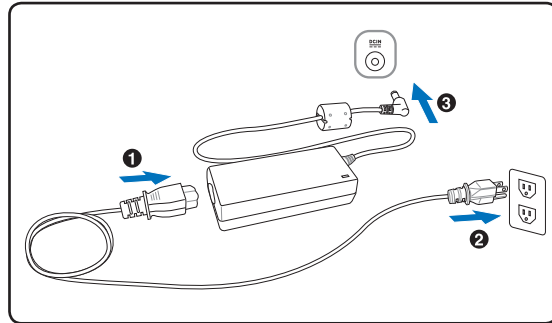
**NOTE:** Photos and icons in this document are used for artistic purposes only and do not show what is actually used in the product itself.

## Power System



### Using AC Power

The Notebook PC power is comprised of two parts, the power adapter and the battery power system. The power adapter converts AC power from a wall outlet to the DC power required by the Notebook PC. Your Notebook PC comes with a universal AC-DC adapter. That means that you may connect the power cord to any 100V-120V as well as 220V-240V outlets without setting switches or using power converters. Different countries may require that an adapter be used to connect the provided US-standard AC power cord to a different standard. Most hotels will provide universal outlets to support different power cords as well as voltages. It is always best to ask an experienced traveler about AC outlet voltages when bringing power adapters to another country.



**TIP:** You can buy travel kits for the Notebook PC that includes power and modem adapters for almost every country.

With the AC power cord connected to the AC-DC converter, connect the AC power cord to an AC outlet (preferably with surge-protection) and then connect the DC plug to the Notebook PC. Connecting the AC-DC adapter to the AC outlet first allows you to test the AC outlet's power and the AC-DC converter itself for compatibility problems before connecting the DC power to the Notebook PC. The power indicator on the adapter (if available) will light if the power is within accepted ranges.



**IMPORTANT!** Damage may occur if you use a different adapter to power the Notebook PC or use the Notebook PC's adapter to power other electrical devices. If there is smoke, burning scent, or extreme heat coming from the AC-DC adapter, seek servicing. Seek servicing if you suspect a faulty AC-DC adapter. You may damage both your battery pack(s) and the Notebook PC with a faulty AC-DC adapter.



**NOTE:** This Notebook PC may come with either a two or three-prong plug depending on territory. If a three-prong plug is provided, you must use a grounded AC outlet or use a properly grounded adapter to ensure safe operation of the Notebook PC.




**WARNING!** THE POWER ADAPTER MAY BECOME WARM TO HOT WHEN IN USE. BE SURE NOT TO COVER THE ADAPTER AND KEEP IT AWAY FROM YOUR BODY.

## Using Battery Power

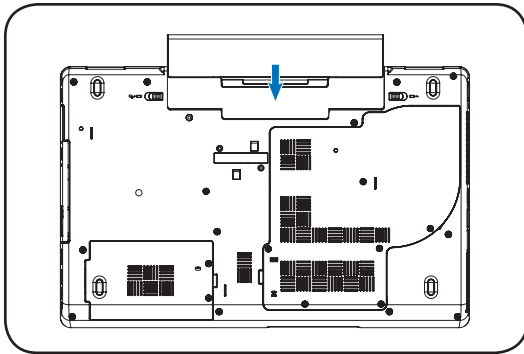
The Notebook PC is designed to work with a removable battery pack. The battery pack consists of a set of battery cells housed together. A fully charged pack will provide several hours of battery life, which can be further extended by using power management features through the BIOS setup. Additional battery packs are optional and can be purchased separately through a Notebook PC retailer.

## Installing and Removing the Battery Pack

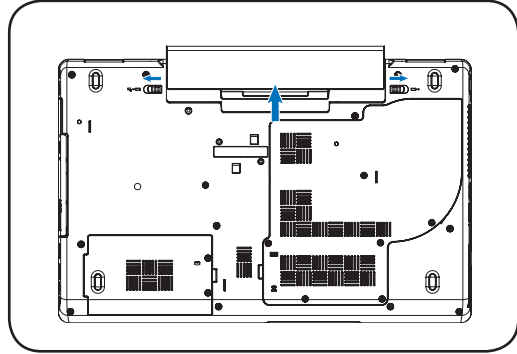
Your Notebook PC may or may not have its battery pack installed. If your Notebook PC does not have its battery pack installed, use the following procedures to install the battery pack.

 **IMPORTANT!** Never attempt to remove the battery pack while the Notebook PC is turned ON, as this may result in the loss of working data.

**To install the battery pack:**




**To remove the battery pack:**



 **IMPORTANT!** Only use battery packs and power adapters supplied with this Notebook PC or specifically approved by the manufacturer or retailer for use with this model or else damage may occur to the Notebook PC.

## Battery Care

The Notebook PC's battery pack, like all rechargeable batteries, has a limit on the number times it can be recharged. The battery pack's useful life will depend on your environment temperature, humidity, and how your Notebook PC is used. It is ideal that the battery be used in a temperature range between 5°C and 35°C (41°F and 95°F). You must also take into account that the Notebook PC's internal temperature is higher than the outside temperature. Any temperatures above or below this range will shorten the life of the battery. But in any case, the battery pack's usage time will eventually decrease and a new battery pack must be purchased from an authorized dealer for this Notebook PC. Because batteries also have a shelf life, it is not recommended to buy extras for storing.

 **WARNING!** For safety reasons, **DO NOT** throw the battery in fire, **DO NOT** short circuit the contacts, and **DO NOT** disassemble the battery. If there is any abnormal operation or damage to the battery pack caused by impact, turn OFF the Notebook PC and contact an authorized service center.



## 🔌 Powering ON the Notebook PC

The Notebook PC's power-ON message appears on the screen when you turn it ON. If necessary, you may adjust the brightness by using the hot keys. If you need to run the BIOS Setup to set or modify the system configuration, press [F2] upon bootup to enter the BIOS Setup. If you press [Tab] during the splash screen, standard boot information such as the BIOS version can be seen. Press [ESC] and you will be presented with a boot menu with selections to boot from your available drives.



**NOTE:** Before bootup, the display panel flashes when the power is turned ON. This is part of the Notebook PC's test routine and is not a problem with the display.



**IMPORTANT!** To protect the hard disk drive, always wait at least 5 seconds after turning OFF your Notebook PC before turning it back ON.



**WARNING!** DO NOT carry or cover a Notebook PC that is powered ON with any materials that will reduce air circulation such as a carrying bag.



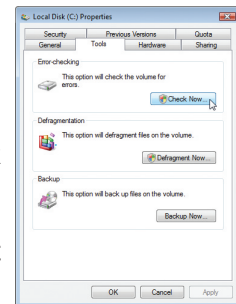
## The Power-On Self Test (POST)

When you turn ON the Notebook PC, it will first run through a series of software-controlled diagnostic tests called the Power-On Self Test (POST). The software that controls the POST is installed as a permanent part of the Notebook PC's architecture. The POST includes a record of the Notebook PC's hardware configuration, which is used to make a diagnostic check of the system. This record is created by using the BIOS Setup program. If the POST discovers a difference between the record and the existing hardware, it will display a message on the screen prompting you to correct the conflict by running BIOS Setup. In most cases the record should be correct when you receive the Notebook PC. When the test is finished, you may get a message reporting "No operating system found" if the hard disk was not preloaded with an operating system. This indicates that the hard disk is correctly detected and ready for the installation of a new operating system.



## Self Monitoring and Reporting Technology


The S.M.A.R.T. (Self Monitoring and Reporting Technology) checks the hard disk drive during POST and gives a warning message if the hard disk drive requires servicing. If any critical hard disk drive warning is given during bootup, backup your data immediately and run Windows disk checking program. To run Windows disk checking program: click Start > select Computer > right-click a hard disk drive icon > choose Properties > click the Tools tab > click Check Now > click Start. You can also select "Scan ... sectors" for more effective scan and repair but the process will run slower.

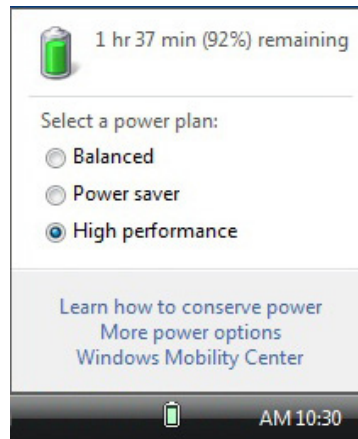


**IMPORTANT!** If warnings are still given during bootup after running a software disk checking utility, you should take your Notebook PC in for servicing. Continued use may result in data loss.

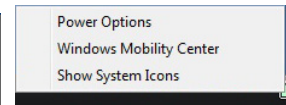
## Checking Battery Power

The battery system implements the Smart Battery standard under the Windows environment, which allows the battery to accurately report the amount of charge left in the battery. A fully-charged battery pack provides the Notebook PC a few hours of working power. But the actual figure varies depending on how you use the power saving features, your general work habits, the CPU, system memory size, and the size of the display panel.

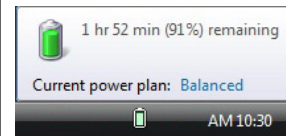
 **NOTE: Screen captures shown here are examples only and may not reflect what you see in your system.**



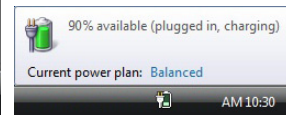
Left-click the battery icon



Right-click the battery icon




Cursor over the battery icon without power adapter.



Cursor over the battery icon with power adapter.


 **NOTE: You will be warned when battery power is low. If you continue to ignore the low battery warnings, the Notebook PC eventually enters suspend mode (Windows default uses STR).**

 **WARNING! Suspend-to-RAM (STR) does not last long when the battery power is depleted. Suspend-to-Disk (STD) is not the same as power OFF. STD requires a small amount of power and will fail if no power is available due to complete battery depletion or no power supply (e.g. removing both the power adapter and battery pack).**

## Charging the Battery Pack

Before you use your Notebook PC on the road, you will have to charge the battery pack. The battery pack begins to charge as soon as the Notebook PC is connected to external power using the power adapter. Fully charge the battery pack before using it for the first time. A new battery pack must completely charge before the Notebook PC is disconnected from external power. It takes a few hours to fully charge the battery when the Notebook PC is turned OFF and may take twice the time when the Notebook PC is turned ON. The battery status indicator on the Notebook PC turns OFF when the battery pack is charged.

 **NOTE: The battery stops charging if the temperature is too high or the battery voltage is too high.**

 **WARNING! Do not leave the battery pack discharged. The battery pack will discharge over time. If not using a battery pack, it must continued to be charged every three months to extend recovery capacity or else it may fail to charge in the future.**

# 3 Getting Started

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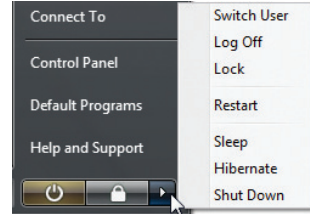
## Power Options


The power switch turns ON and OFF the Notebook PC or putting the Notebook PC into sleep or hibernation modes. Actual behavior of the power switch can be customized in Windows Control Panel “Power Options.”

For other options, such as “Switch User, Restart, Sleep, or Shut Down,” click the arrowhead next to the lock icon.

## Restarting or Rebooting

After making changes to your operating system, you may be prompted to restart the system. Some installation processes will provide a dialog box to allow restart. To restart the system manually, choose Restart.



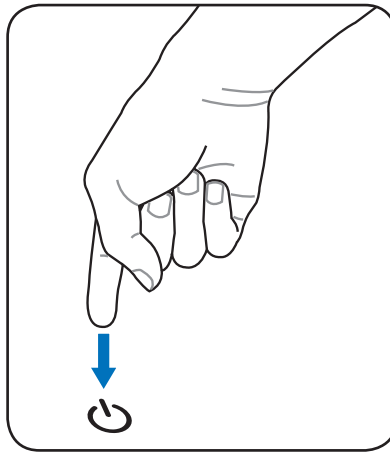
 **IMPORTANT!** To protect the hard drive, wait at least 5 seconds after turning OFF your Notebook PC before turning it back ON.

---

## Emergency Shutdown

In case your operating system cannot properly turn OFF or restart, there is a manual way to shutdown your Notebook PC:

Hold the power button  over 4 seconds



 **IMPORTANT!** Do not use emergency shutdown while data is being written; doing so can result in loss or destruction of your data.

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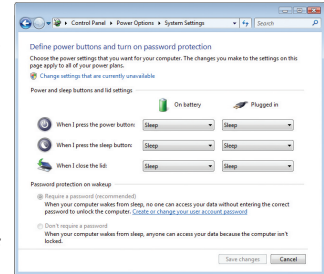


## Power Management Modes

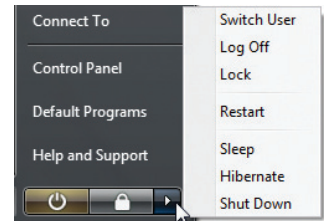
The Notebook PC has a number of automatic or adjustable power saving features that you can use to maximize battery life and lower Total Cost of Ownership (TCO). You can control some of these features through the Power menu in the BIOS Setup. ACPI power management settings are made through the operating system. The power management features are designed to save as much electricity as possible by putting components into a low power consumption mode as often as possible but also allow full operation on demand.

### Sleep and Hibernate

Power management settings can be found in the Windows > Control Panel > Power Options. In System Settings, you can define “Sleep/Hibernate” or “Shut Down” for closing the display panel or pressing the power button. “Sleep” and “Hibernate” saves power when your Notebook PC is not in use by turning OFF certain components. When you resume your work, your last status (such as a document scrolled down half way or email typed half way) will reappear as if you never left. “Shut Down” will close all applications and ask if you want to save your work if any are not saved.



Sleep is the same as Suspend-to-RAM (STR). This function stores your current data and status in RAM while many components are turned OFF. Because RAM is volatile, it requires power to keep (refresh) the data. Click the Start button and the arrowhead next to the lock icon to see this option. You can also use the keyboard shortcut [Fn F1] to activate this mode. Recover by pressing any keyboard key except [Fn]. (NOTE: The power indicator will blink in this mode.)



Hibernate is the same as Suspend-to-Disk (STD) and stores your current data and status on the hard disk drive. By doing this, RAM does not have to be periodically refreshed and power consumption is greatly reduced but not completely eliminated because certain wake-up components like LAN needs to remain powered. “Hibernate” saves more power compared to “Sleep”. Click the Start button and the arrowhead next to the lock icon to see this option. Recover by pressing the power button. (NOTE: The power indicator will be OFF in this mode.)

### Thermal Power Control

There are three power control methods for controlling the Notebook PC’s thermal state. These methods cannot be configured by the user and should be known in case the Notebook PC should enter these states. The following temperatures represent the chassis temperature (not CPU).

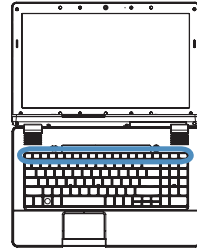
- The fan turns ON for active cooling when temperature reaches the safe upper limit.
- The CPU decreases speed for passive cooling when the temperature exceeds the safe upper limit.
- The system shuts down for critical cooling when temperature exceeds the maximum safe upper limit.



## Special Keyboard Functions

### Colored Hot Keys

The following defines the colored hot keys on the Notebook PC's keyboard. The colored commands can only be accessed by first pressing and holding the function key while pressing a key with a colored command.



**NOTE: The Hot Key locations on the function keys may vary depending on model but the functions should remain the same.**



Moon Icon (F1): Places the Notebook PC in suspend mode (either Save-to-RAM or Save-to-Disk depending on sleep button setting in power management setup).



Signal Icon (F2): Wireless Models Only: Toggles the internal wireless LAN ON or OFF with an on-screen-display. When enabled, the corresponding wireless indicator will light. Windows software settings are necessary to use the wireless LAN.



Open Sun Icon (F3):  
Increases the display brightness



Filled Sun Icon (F4):  
Decreases the display brightness



LCD/Monitor Icons (F5): Toggles between the Notebook PC's LCD display and an external monitor in this series: Notebook PC LCD -> External Monitor -> Both. (This function does not work in 256 Colors, select High Color in Display Property Settings.) NOTE: Must connect an external monitor "before" booting up.



Speaker X Icon (F7):  
Toggles the speakers ON and OFF (only in Windows OS)



Speaker Low Icon (F8):  
Decreases the speaker volume (only in Windows OS)



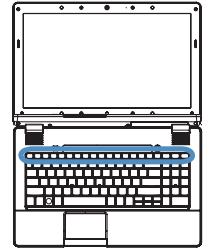
Speaker High Icon (F9):  
Increases the speaker volume (only in Windows OS)




















3G Icon (F10): Toggles the mobile broadband function ON or OFF. A SIM card is necessary to access the this function via your mobile internet service provider. (on selected models only)

(continued on the next page)

## Colored Hot Keys (cont.)



- 
- 

**Bluetooth Icon (F11):** Toggles the internal bluetooth ON or OFF with an on-screen-display. Windows software settings are necessary to connect to bluetooth devices. (on selected models only)
- 
- 

**Camera Icon (F12):** Toggles the built-in camera ON (enabled) and OFF (disabled). Disabling the camera will prevent any images or videos from being taken and transmitted accidentally.
- 
- 

**Scr Lk (NumLk):** Toggles the “Scroll Lock” ON and OFF. Allows you to use a larger portion of the keyboard for cell navigation. 
- 
- 

**Battery Icon (Home):** Toggles Intel’s Configuration Center ON and OFF.
- 
- 

**Play/Pause Icon ( ^ ):**  
Plays or pauses media in the media player.
- 
- 

**Stop Icon ( v ):**  
Stops a media player during playback.
- 
- 

**Rewind Icon ( < ):**  
Rewinds or moves the media a step backwards during playback.
- 
- 

**Fast-forward Icon ( > ):**  
Fast-forwards or moves the media a step forward during playback.

# 3 Getting Started

## Microsoft Windows Keys

There are two special Windows keys on the keyboard as described below.



The key with the Windows Logo activates the Start menu located at the bottom left of the Windows desktop.



The other key, that looks like a Windows menu with a small cursor, activates the properties menu and is equivalent to pressing the right mouse button on a Windows object.

## Keyboard as Cursors

The keyboard can be used as cursors while Number Lock is ON or OFF in order to increase navigation ease while entering numeric data in spreadsheets or similar applications.

With Number Lock OFF, press [Fn] and one of the cursor keys shown below. For example [Fn][8] for up, [Fn][K] for down, [Fn][U] for left, and [Fn][O] for right.

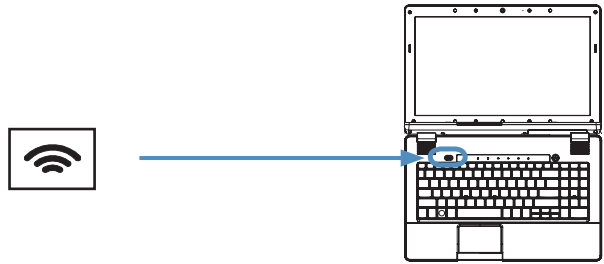
With Number Lock ON, use [Shift] and one of the cursor keys shown below. For example [Shift][8] for up, [Shift][K] for down, [Shift][U] for left, and [Shift][O] for right.



**NOTE:** The red arrows are illustrated here for your reference. They are not labeled on the keyboard as shown here.

## Switches and Status Indicators

### Switches



#### **Wireless Switch**

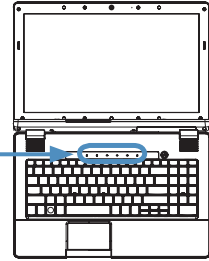
Wireless Models Only: Toggles the internal wireless LAN or Bluetooth (on selected models) ON or OFF with an on-screen display. When enabled, the corresponding wireless indicator will light. Windows software settings are necessary to use the wireless LAN or Bluetooth.



(continued on the next page)

## Switches and Status Indicators (cont.)

### Status Indicators



#### **Capital Lock Indicator**

Indicates that capital lock [Caps Lock] is activated when lighted. Capital lock allows some of the keyboard letters to type using capitalized letters (e.g. A, B, C). When the capital lock light is OFF, the typed letters will be in the lower case form (e.g. a,b,c).



#### **Bluetooth Indicator**

This is only applicable on models with internal Bluetooth (BT). This indicator will light to show that the Notebook PC's built-in Bluetooth (BT) function is activated.



#### **Drive Activity Indicator**

Indicates that the Notebook PC is accessing one or more storage device(s) such as the hard disk. The light flashes proportional to the access time.



#### **Wireless Indicator**

This is only applicable on models with built-in wireless LAN and/or built-in Bluetooth. When the built-in wireless LAN and/or built-in Bluetooth is enabled, this indicator will light. (Windows software settings are necessary.)



#### **Battery Charge Indicator**

The battery charge indicator shows the status of the battery's power as follows:

ON: The Notebook PC's battery is charging when AC power is connected.

OFF: The Notebook PC's battery is charged or completely drained.

Blinking: Battery power is less than 10% and the AC power is not connected.



#### **Number Lock Indicator**

Indicates that number lock [Num Lk] is activated when lighted. Number lock allows some of the keyboard letters to act as numbers for easier numeric data input.



## 4. Using the Notebook PC

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**Pointing Device**  
**Storage Devices**  
**Connections**



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**NOTE:** Photos and icons in this document are used for artistic purposes only and do not show what is actually used in the product itself.

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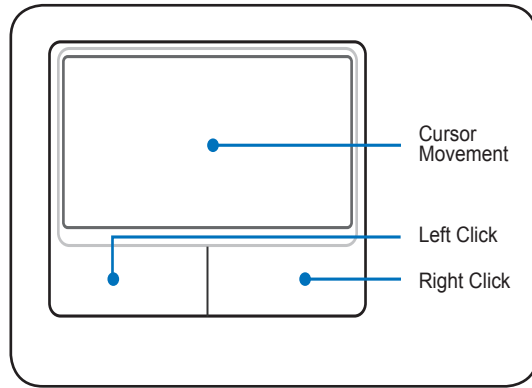
# 4 Using the Notebook PC

## ☐ Pointing Device

The Notebook PC's integrated touchpad pointing device is fully compatible with all two/three-button and scrolling knob PS/2 mice. The touchpad is electrostatic sensitive and contains no moving parts; therefore, mechanical failures can be avoided. A device driver is still required for working with some application software.



**IMPORTANT! Do not use any objects in place of your finger to operate the touchpad or else damage may occur to the touchpad's surface.**

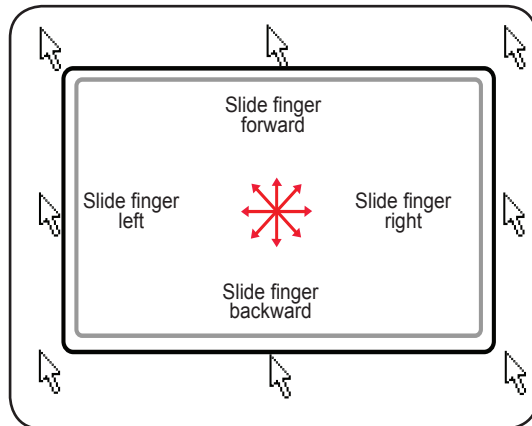


## Using the Touchpad

Light pressure with the tip of your finger is all that is required to operate the touchpad. Because the touchpad is electrostatic sensitive, objects cannot be used in place of your fingers. The touchpad's primary function is to move the cursor around or select items displayed on the screen with the use of your fingertip instead of a standard desktop mouse. The following illustrations demonstrate proper use of the touchpad.

### Moving The Cursor

Place your finger in the center of the touchpad and slide in a direction to move the cursor.

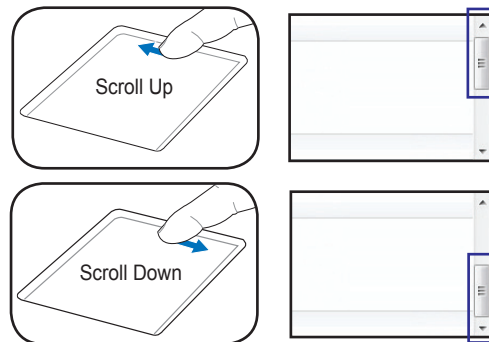


### Scrolling (on selected models)

Slide your finger up or down on the right side to scroll a window up or down.



**NOTE: A software-controlled scrolling function is available after setting up the included touchpad utility to allow easy Windows or web navigation.**

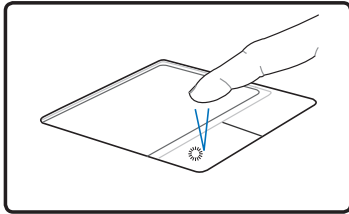




## ☐ Touchpad Usage Illustrations

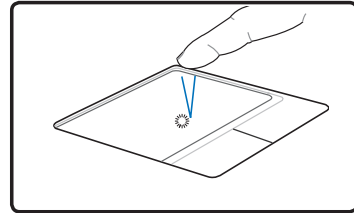
Clicking/Tapping - With the cursor over an item, press the left button or use your fingertip to touch the touchpad lightly, keeping your finger on the touchpad until the item is selected. The selected item will change color. The following 2 examples produce the same results.

Clicking



Press the left cursor button and release.

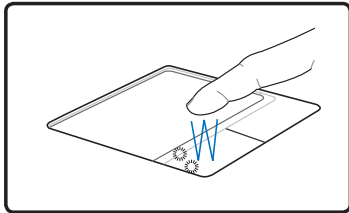
Tapping



Lightly but rapidly strike the touchpad.

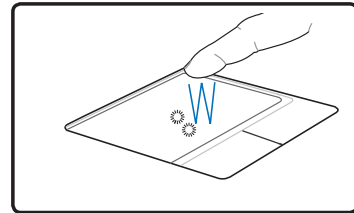
Double-clicking/Double-tapping - This is a common skill for launching a program directly from the corresponding icon you select. Move the cursor over the icon you wish to execute, press the left button or tap the pad twice in rapid succession, and the system launches the corresponding program. If the interval between the clicks or taps is too long, the operation will not be executed. You can set the double-click speed using the Windows Control Panel "Mouse." The following 2 examples produce the same results.

Double-Clicking



Press the left button twice and release.

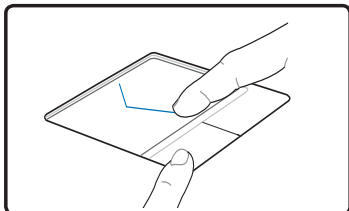
Double-Tapping



Lightly but rapidly strike the touchpad twice.

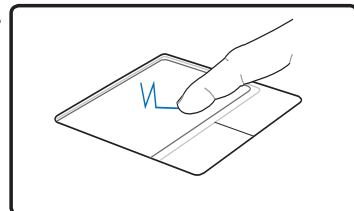
Dragging - Dragging means to pick up an item and place it anywhere on the screen you wish. You can move the cursor over the item you select, and while keeping the left button depressed, moving the cursor to the desired location, then release the button. Or, you can simply double-tap on the item and hold while dragging the item with your fingertip. The following illustrations produce the same results.

Dragging-Clicking



Hold left button and slide finger on touchpad.

Dragging-Tapping



Lightly strike the touchpad twice, sliding finger on touchpad during second strike.

# 4 Using the Notebook PC

## ☐ Caring for the Touchpad

The touchpad is pressure sensitive. If not properly cared for, it can be easily damaged. Take note of the following precautions.

- Make sure the touchpad does not come into contact with dirt, liquids or grease.
- Do not touch the touchpad if your fingers are dirty or wet.
- Do not rest heavy objects on the touchpad or the touchpad buttons.
- Do not scratch the touchpad with your finger nails or any hard objects.

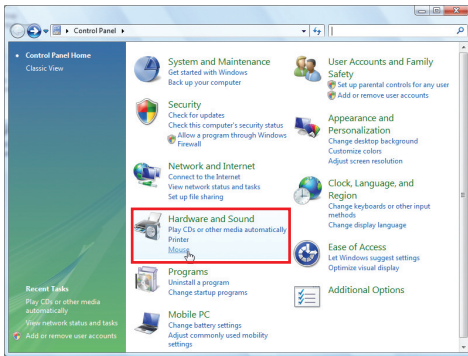


**NOTE: The touchpad responds to movement not to force. There is no need to tap the surface too hard. Tapping too hard does not increase the responsiveness of the touchpad. The touchpad responds best to light pressure.**

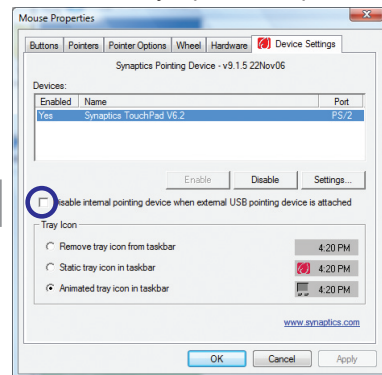
## ☐ Automatic Touchpad Disabling

Windows can automatically disable the Notebook PC's touchpad when an external USB mouse is attached. This feature is normally OFF, to turn ON this feature, select the option in Windows Control Panel > Mouse Properties > Device Settings (or USB mouse connection).

Control Panel Home

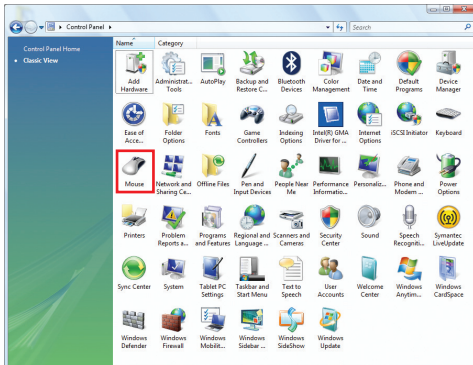


Models with Synaptics touchpad.

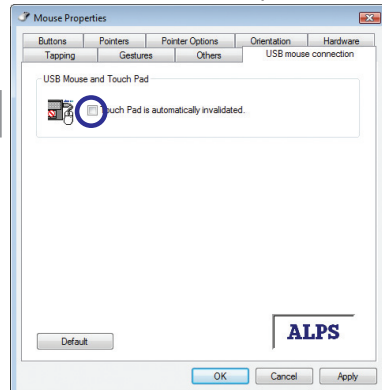


Select this option to enable this feature.

Control Panel - Classic View



Models with ALPS touchpad.



Select this option to enable this feature.

## Storage Devices

Storage devices allow the Notebook PC to read or write documents, pictures, and other files to various data storage devices. This Notebook PC has the following storage devices:

- Hard Disk Drive
- Memory (RAM)
- Optical Drive
- Flash Memory Card Reader
- ExpressCard

### Hard Disk Drive

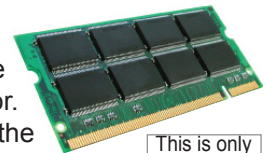
Hard disk drives have higher capacities and operate at much faster speeds than floppy disk drives and optical drives. The Notebook PC comes with a replaceable hard disk drive. Current hard drives support S.M.A.R.T. (Self Monitoring and Reporting Technology) to detect hard disk errors or failures before they happen.



**IMPORTANT! Poor handling of the Notebook PC may damage the hard disk drive. Handle the Notebook PC gently and keep it away from static electricity and strong vibrations or impact. The hard disk drive is the most delicate component and will likely be the first or only component that is damaged if the Notebook PC is dropped.**

### Memory (RAM)

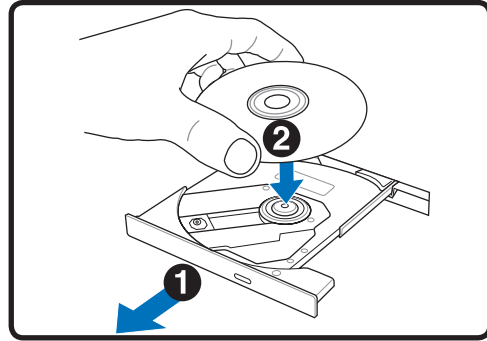
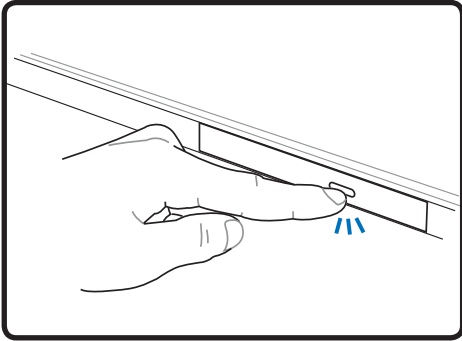
RAM (Random Access Memory) is the component in a computer where the operating system, application programs, and data in current use are kept so that they can be quickly reached by the computer's processor. Upon startup the BIOS automatically detects the amount of memory in the system and configures CMOS accordingly during the POST (Power-On-Self-Test) process.



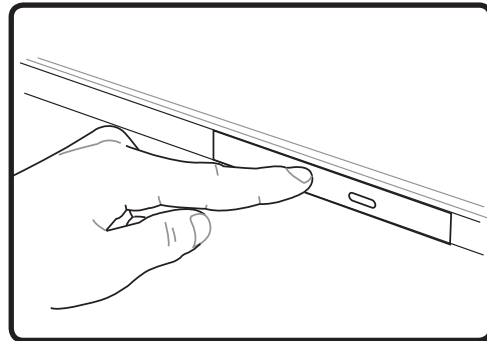
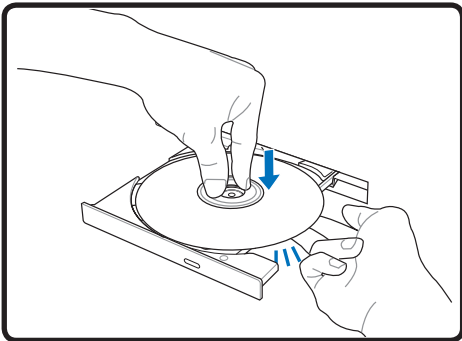
This is only an example.

## Ⓞ Optical Drive

### Inserting an optical disc



1. While the Notebook PC's power is ON, press the drive's eject button and the tray will eject out partially.
2. Gently pull on the drive's front panel and slide the tray completely out. Be careful not to touch the drive lens and other mechanisms. Make sure there are no obstructions that may get jammed under the drive's tray.

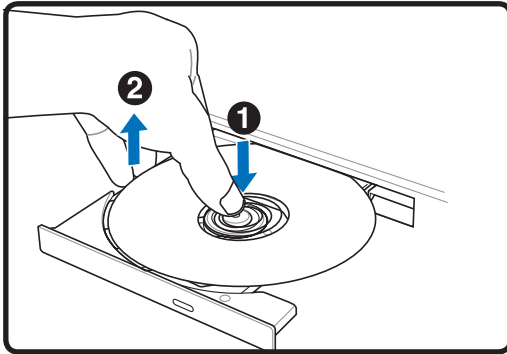


3. Hold the disc by the edge and face the disc's printed side up. Push down on both sides of the disc's center until the disc snaps onto the hub. The hub should be higher than the disc when correctly mounted.
4. Slowly push the drive's tray back in. The drive will begin reading the table of contents (TOC) on the disc. When the drive stops, the disc is ready to be used.

**NOTE:** It is normal to hear as well as feel the disc spinning with great intensity in the optical drive while data is read.

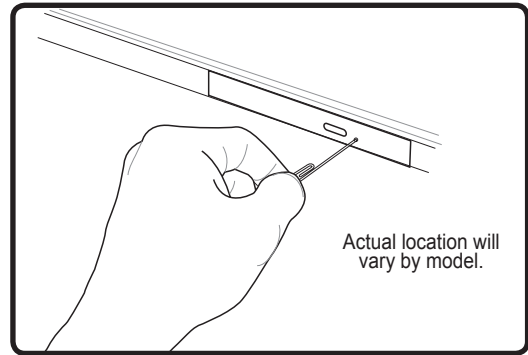
## ⦿ Optical Drive (Cont.)

### Removing an optical disc



Eject the tray and gently pry the edge of the disc upwards at an angle to remove the disc from the hub.

### Emergency eject



The emergency eject is located in a hole on the optical drive and is used to eject the optical drive tray in case the electronic eject does not work. Do not use the emergency eject in place of the electronic eject. Note: Make sure not to stab the activity indicator located in the same area.

## Using the Optical Drive

Optical discs and equipment must be handled with care because of the precise mechanics involved. Keep in mind the important safety instructions from your disc suppliers. Unlike desktop optical drives, the Notebook PC uses a hub to hold the disc in place regardless of the angle. When inserting a disc, it is important that the disc be pressed onto the center hub or else the optical drive tray will scratch the disc.



**WARNING!** If the disc is not properly locked onto the center hub, the disc can be damaged when the tray is closed. Always watch the disc closely while closing the tray slowly to prevent damage.

An optical drive letter should be present regardless of the presence of a disc in the drive. After the disc is properly inserted, data can be accessed just like with hard disk drives; except that nothing can be written to or changed on the disc. Using the proper software, a CD-RW drive or DVD+CD-RW drive can allow CD-RW discs to be used like a hard drive with writing, deleting, and editing capabilities.

Vibration is normal for high-speed optical drives due to unbalanced discs or prints. To decrease vibration, use the Notebook PC on an even surface and do not place labels on the disc.

## Listening to Audio CDs

The optical drives can play audio CDs, but only the DVD-ROM drive can play DVD audio. Insert the audio CD and Windows automatically opens an audio player and begins playing. Depending on the DVD audio disc and installed software, it may require that you open a DVD player to listen to DVD audio. You can adjust the volume using hotkeys or Windows speaker icon on the taskbar.

# 4 Using the Notebook PC

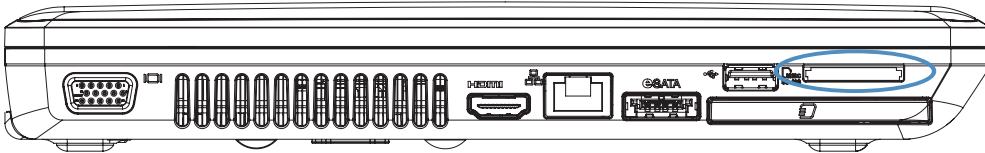
## Flash Memory Card Reader

Normally a memory card reader must be purchased separately in order to use memory cards from devices such as digital cameras, MP3 players, mobile phones, and PDAs. This Notebook PC has a built-in memory card reader that can use many flash memory cards as shown in the example below. The built-in memory card reader is not only convenient, but also faster than most other forms of memory card readers because it utilizes the internal high-bandwidth PCI bus.



**IMPORTANT! Flash memory card compatibility varies depending on Notebook PC model and flash memory card specifications. Flash memory card specifications constantly change so compatibility may change without warning.**

## Flash Memory Card Examples



MMC (Multimedia Card)  
MMC Plus  
RS-MMC (Reduced Size) (with MMC adapter)



SD (Secure Digital)  
miniSD (with SD adapter)



SDHC (Secure Digital High Capacity)  
microSD (with SD adapter)



Memory stick (MS) / PRO / MagicGate / Select



Memory Stick Duo/Duo Pro/MagicGate (with MS adapter)



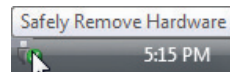
Memory Stick Micro (with MS adapter)



**IMPORTANT! Never remove cards while or immediately after reading, copying, formatting, or deleting data on the card or else data loss may occur.**

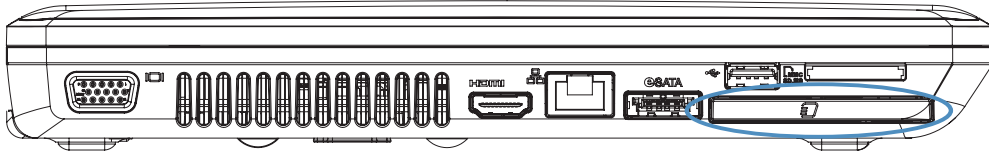


**WARNING! To prevent data loss, use “Windows Safely Remove Hardware” on the taskbar before removing the flash memory card.**

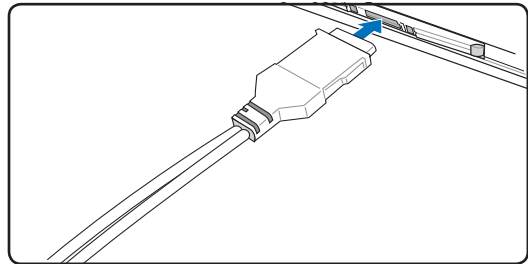
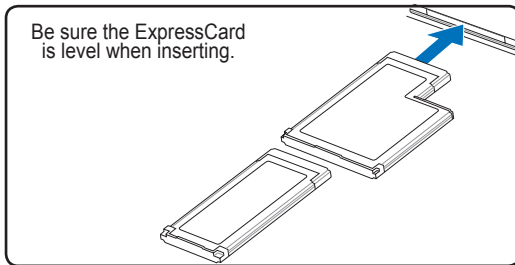


## ExpressCard

One 26pin Express card slot is available to support one ExpressCard/34mm or one ExpressCard/54mm expansion card. This new interface is faster by using a serial bus supporting USB 2.0 and PCI Express instead of the slower parallel bus used in the PC card slot. (Not compatible with previous PCMCIA cards.)



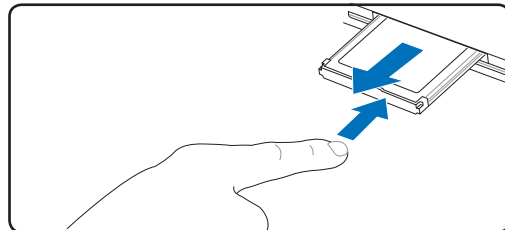
### Inserting an ExpressCard



1. If there is an ExpressCard socket protector, remove it using the “Removing an ExpressCard” instructions below.
2. Insert the ExpressCard with the connector side first and label side up. Standard ExpressCards will be flush with the Notebook PC when fully inserted.
3. Carefully connect any cables or adapters needed by the ExpressCard. Usually connectors can only be inserted in one orientation. Look for a sticker, icon, or marking on one side of the connector representing the top side.

### Removing an ExpressCard

The ExpressCard slot does not have an eject button. Press the ExpressCard inwards and release to eject the ExpressCard. Carefully pull the ejected ExpressCard out of the socket.



## Connections

### Network Connection


Connect a network cable, with RJ-45 connectors on each end, to the modem/network port on the Notebook PC and the other end to a hub or switch. For 100 BASE-TX / 1000 BASE-T speeds, your network cable must be category 5 or better (not category 3) with twisted-pair wiring. If you plan on running the interface at 100/1000Mbps, it must be connected to a 100 BASE-TX / 1000 BASE-T hub (not a BASE-T4 hub). For 10Base-T, use category 3, 4, or 5 twisted-pair wiring. 10/100 Mbps Full-Duplex is supported on this Notebook PC but requires connection to a network switching hub with “duplex” enabled. The software default is to use the fastest setting so no user-intervention is required.

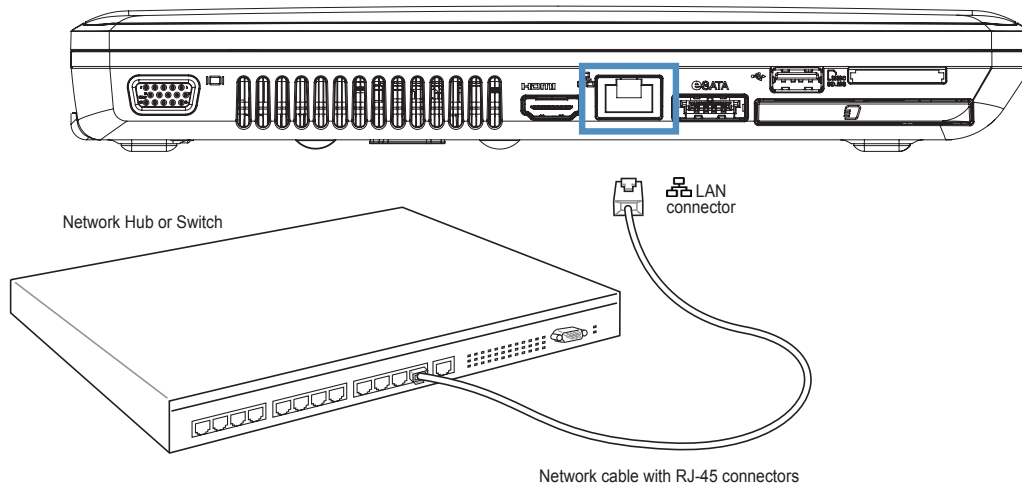
 **1000BASE-T (or Gigabit) is only supported on selected models.**

### Twisted-Pair Cable

The cable used to connect the Ethernet card to a host (generally a Hub or Switch) is called a straight-through Twisted Pair Ethernet (TPE). The end connectors are called RJ-45 connectors, which are not compatible with RJ-11 telephone connectors. If connecting two computers together without a hub in between, a crossover LAN cable is required (Fast-Ethernet model). (Gigabit models support auto-crossover so a crossover LAN cable is optional.)



 Example of the Notebook PC connected to a Network Hub or Switch for use with the built-in Ethernet controller.





## Wireless LAN Connection

The optional built-in wireless LAN is a compact easy-to-use wireless Ethernet adapter. Implementing the IEEE 802.11 standard for wireless LAN (WLAN), the optional built-in wireless LAN is capable of fast data transmission rates using Direct Sequence Spread Spectrum (DSSS) and Orthogonal Frequency Division Multiplexing (OFDM) technologies on 2.4GHz/5GHz frequencies. The optional built-in wireless LAN is backward compatible with the earlier IEEE 802.11 standards allowing seamless interfacing of wireless LAN standards.

The optional built-in wireless LAN is a client adapter that supports Infrastructure and Ad-hoc modes giving you flexibility on your existing or future wireless network configurations for distances up to 40 meters between the client and the access point.

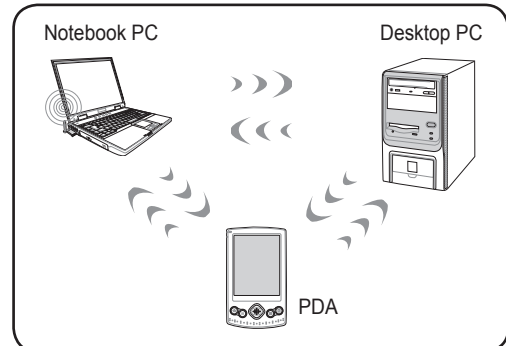
To provide efficient security to your wireless communication, the optional built-in wireless LAN comes with a 64-bit/128-bit Wired Equivalent Privacy (WEP) encryption and Wi-Fi Protected Access (WPA) features.

These are examples of the Notebook PC connected to a Wireless Network.

### Ad-hoc mode

The Ad-hoc mode allows the Notebook PC to connect to another wireless device. No access point (AP) is required in this wireless environment.

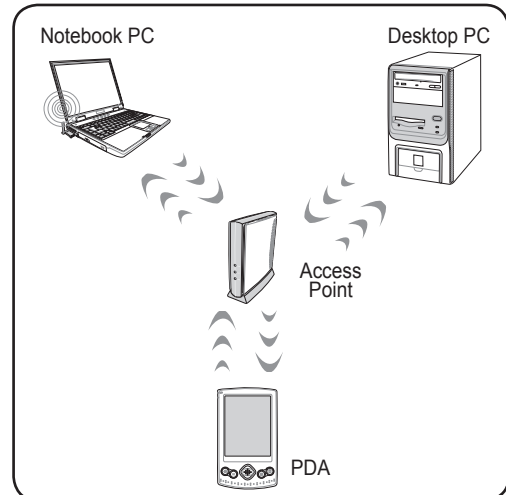
(All devices must install optional 802.11 wireless LAN adapters.)



### Infrastructure mode

The Infrastructure mode allows the Notebook PC and other wireless devices to join a wireless network created by an Access Point (AP) (sold separately) that provides a central link for wireless clients to communicate with each other or with a wired network.

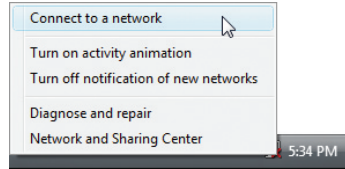
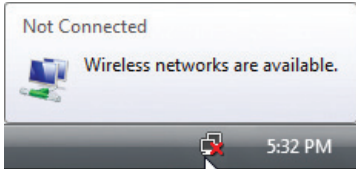
(All devices must install optional 802.11 wireless LAN adapters.)



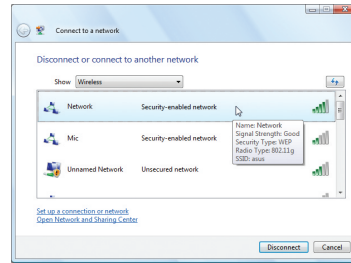
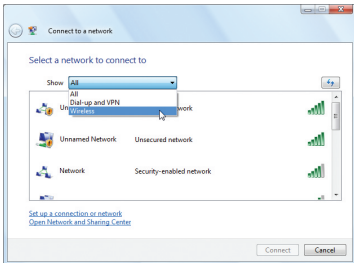
# 4 Using the Notebook PC

## Windows Wireless Network Connection Connecting to a network

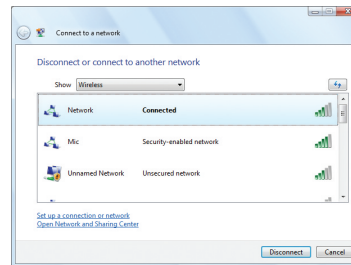
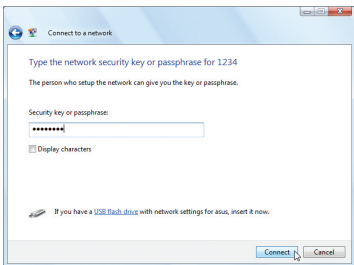
1. Switch ON the Wireless function if necessary for your model (see switches and/or special keyboard functions in Section 3).



2. You should see the “Not Connected” network icon.
3. Right click on the network icon and select **Connect to a network**.



4. Select “Show **Wireless**” if you have many networks in your area.
5. Select the wireless network you want to connect to.



6. When connecting, you may have to enter a password.
7. After connection has been established, “Connected” will be shown.

# A. Appendix

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## Declarations and Safety Statements

### Federal Communications Commission Statement



**NOTE: Photos and icons in this document are used for artistic purposes only and do not show what is actually used in the product itself.**

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## Declarations and Safety Statements

### DVD-ROM Drive Information

The Notebook PC comes with an optional DVD-ROM drive or a CD-ROM drive. In order to view DVD titles, you must install your own DVD viewer software. Optional DVD viewer software may be purchased with this Notebook PC. The DVD-ROM drive allows the use of both CD and DVD discs.

### Regional Playback Information

Playback of DVD movie titles involves decoding MPEG2 video, digital AC3 audio and decryption of CSS protected content. CSS (sometimes called copy guard) is the name given to the content protection scheme adopted by the motion picture industry to satisfy a need to protect against unlawful content duplication.

Although the design rules imposed on CSS licensors are many, one rule that is most relevant is playback restrictions on regionalized content. In order to facilitate geographically staggered movie releases, DVD video titles are released for specific geographic regions as defined in “Region Definitions” below. Copyright laws require that all DVD movies be limited to a particular region (usually coded to the region at which it is sold). While DVD movie content may be released for multiple regions, CSS design rules require that any system capable of playing CSS encrypted content must only be capable of playing one region.



**NOTE: The region setting may be changed up to five times using the viewer software, then it can only play DVD movies for the last region setting. Changing the region code after that will require factory resetting which is not covered by warranty. If resetting is desired, shipping and resetting costs will be at the expense of the user.**

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### Region Definitions

#### Region 1

Canada, US, US Territories

#### Region 2

Czech, Egypt, Finland, France, Germany, Gulf States, Hungary, Iceland, Iran, Iraq, Ireland, Italy, Japan, Netherlands, Norway, Poland, Portugal, Saudi Arabia, Scotland, South Africa, Spain, Sweden, Switzerland, Syria, Turkey, UK, Greece, Former Yugoslav Republics, Slovakia

#### Region 3

Burma, Indonesia, South Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand, Vietnam

#### Region 4

Australia, Caribbean (Except US Territories), Central America, New Zealand, Pacific Islands, South America

#### Region 5

CIS, India, Pakistan, Rest of Africa, Russia, North Korea

#### Region 6

China

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## Optical Drive Safety Information

### Laser Safety Information

Internal or external optical drives sold with this Notebook PC contains a CLASS 1 LASER PRODUCT. Laser classifications can be found in the glossary at the end of this user's manual.



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**WARNING: Making adjustments or performing procedures other than those specified in the user's manual may result in hazardous laser exposure. Do not attempt to disassemble the optical drive. For your safety, have the optical drive serviced only by an authorized service provider.**

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### Service warning label



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**CAUTION: INVISIBLE LASER RADIATION WHEN OPEN. DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS.**

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## FC Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



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**WARNING! The use of a shielded-type power cord is required in order to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.**

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(Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.)

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## FC FCC Radio Frequency Interference Requirements

This device is restricted to INDOOR USE due to its operation in the 5.15 to 5.25GHz frequency range. FCC requires this product to be used indoors for the frequency range 5.15 to 5.25GHz to reduce the potential for harmful interference to co-channel of the Mobile Satellite Systems.

High power radars are allocated as primary user of the 5.25 to 5.35GHz and 5.65 to 5.85GHz bands. These radar stations can cause interference with and / or damage this device.



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**IMPORTANT: This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.**

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## **FCC Radio Frequency (RF) Exposure Caution Statement**

This equipment complies with FCC RF exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure compliance requirements, please follow operation instructions in the user's manual. This equipment is for operation within 5.15 GHz and 5.25GHz frequency ranges and is restricted to indoor environments only.



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**FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. "The manufacturer declares that this device is limited to Channels 1 through 11 in the 2.4GHz frequency by specified firmware controlled in the USA."**

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## **FCC RF Exposure Guidelines (Wireless Clients)**

This device has been tested for compliance with FCC RF Exposure (SAR) limits in typical portable configurations. In order to comply with SAR limits established in the ANSI C95.1 standards, it is recommended when using a wireless LAN adapter that the integrated antenna is positioned more than [20cm] from your body or nearby persons during extended periods of operation. If the antenna is positioned less than [20cm] from the user, it is recommended that the user limit the exposure time.