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## Desktop Chipset And Processor Overview

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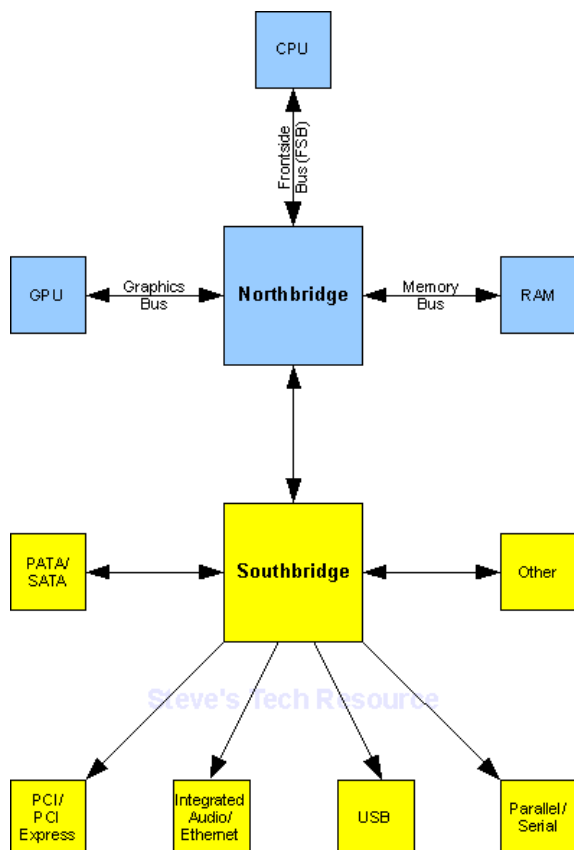
### 1. Introduction

A **chipset** specifies/defines the performance and functional capabilities of a motherboard. The two primary components of a chipset are the northbridge chip and the southbridge chip. The **northbridge** chip sits between and interfaces with the central processing unit (CPU), the graphics processing unit (GPU), and the system memory (RAM). The northbridge buses are high bandwidth. Each northbridge chip supports specific types of CPU, GPU, and RAM. Since the type of CPU, GPU, and RAM determines overall system performance, it is the northbridge chip which defines the performance capabilities of a chipset.



Graphics processing unit (GPU) refers to an integrated graphics processing unit (integrated GPU) or a graphics card processing unit (add-in GPU) installed to a graphics-dedicated AGP or PCI Express slot. Both integrated GPUs, and add-in GPUs installed into the graphics-dedicated AGP or PCI Express slots, interface with the northbridge.

The northbridge chip also interfaces with the southbridge chip. The **southbridge** chip sits between and interfaces with the computer's additional devices, including; hard disks and optical drives (PATA/SATA), cards installed in PCI/PCI Express expansion slots, integrated audio and ethernet, USB and Firewire devices, serial and parallel devices, and any other devices that can be used. The southbridge buses are lower bandwidth than the northbridge buses. Each southbridge chip supports specific types and numbers of additional devices that can be used. Since the types and numbers of other devices that can be used determines system functionality, it is the southbridge chip which defines the functional capabilities of a chipset:



PC-compatible chipsets are divided into two types: 1.) Intel chipsets, which use an Intel processor, and 2.) AMD chipsets, which use an AMD processor. Intel chipset manufacturers include Intel, NVIDIA, ATI, VIA, and SiS. AMD chipset manufacturers include AMD, NVIDIA, ATI, VIA, and SiS.

*i* ATI, known primarily for their graphics cards, started producing Intel and AMD chipsets a couple years ago. AMD acquired ATI in October 2006. Since AMD and Intel are competitors in the chipset and processor market, there are mutual conflicts of interest in ATI continuing to produce Intel chipsets. As a result, ATI is not likely to produce any more Intel chipsets and it is suggested that one interested in an Intel chipset obtain a motherboard with a non-ATI Intel chipset.

Perhaps one of the most overlooked chipset developments over the past year or so is the advancement in GPU technology, including both integrated GPUs and add-in GPUs. For mainstream users the newer integrated GPUs support the Windows Vista Aero graphical user interface (GUI), multiple monitors, HD video, and other graphics/video features, which should more than suffice. These newer integrated GPUs include the [Intel Graphics Media Accelerator 3000 \(Intel GMA 3000\) Family \(intel.com\)](http://intel.com), the [NVIDIA GeForce Motherboard GPUs for Intel and AMD Platforms \(nvidia.com\)](http://nvidia.com), and the [AMD Radeon X1250 GPU \(amd.com\)](http://amd.com). For extreme gamers, there are a number of newer chipsets which support dual add-in GPUs installed into graphics-dedicated PCI Express slots. These include the high-end Intel performance desktop [Intel 975X Express chipset \(intel.com\)](http://intel.com) and [Intel X38 Express chipset \(intel.com\)](http://intel.com), the [NVIDIA nForce SLI chipsets \(slizone.com\)](http://slizone.com), and the [ATI/AMD CrossFire chipsets \(ati.amd.com\)](http://ati.amd.com).

*i* Like a CPU accesses data loaded in system memory, a GPU accesses data loaded in graphics memory. Add-in GPUs come equipped with graphics memory on the graphics card itself. Integrated GPUs, on the other hand, do not come equipped with graphics memory. Instead, integrated GPUs use system memory to fulfill their graphics memory requirement. Hence, integrated GPUs reduce the amount of system memory available for the operating system and applications and, if one decides to use an integrated GPU, one might consider installing more system memory.

A motherboard is simply an implementation of a chipset. There are numerous motherboard manufacturers and many of them produce Intel chipset motherboards as well as AMD chipset motherboards. Some of the more well known desktop motherboard manufacturers include [abit \(abit.com.tw\)](http://abit.com.tw), [ASUS \(asus.com\)](http://asus.com), [EPoX \(epox.com\)](http://epox.com), [GIGABYTE \(giga-byte.com\)](http://giga-byte.com), [Intel \(intel.com\)](http://intel.com), and [MSI \(msi.com.tw\)](http://msi.com.tw).

*!* If interested in running the graphics intensive Aero GUI of Windows Vista Home Premium, Business, and Premium, make sure the motherboard carries or qualifies for the Certified for Windows Vista Logo. For additional information on the Windows Logo Program, see [Additional Reading \(below\)](#).

## 2. Intel Desktop Chipsets

**2.1. Intel Desktop Chipsets: By Intel ([intel.com](http://intel.com))**

- [Intel Performance Desktop Chipsets \(intel.com\)](http://intel.com)
- [Intel Mainstream Desktop Chipsets \(intel.com\)](http://intel.com)
- [Intel Value Desktop Chipsets \(intel.com\)](http://intel.com)

**2.2. Intel Desktop Chipsets: By NVIDIA**

- [NVIDIA nForce 600 Series For Intel \(nvidia.com\)](http://nvidia.com)
- [NVIDIA nForce 500 Series For Intel \(nvidia.com\)](http://nvidia.com)
- [NVIDIA nForce4 Family For Intel \(nvidia.com\)](http://nvidia.com)

**2.3. Intel Desktop Chipsets: By VIA**

- [VIA P-Series For Intel \(via.com.tw\)](http://via.com.tw)

**2.4. Intel Desktop Chipsets: By SiS**

- [SiS Intel Core 2 Duo Chipsets \(sis.com\)](http://sis.com)
- [SiS Intel Pentium 4 Chipsets \(sis.com\)](http://sis.com)

**2.5. Intel Desktop Chipsets: By ATI ([ati.amd.com](http://ati.amd.com))***i*

ATI, known primarily for their graphics cards, started producing Intel and AMD chipsets a couple years ago. AMD acquired ATI in October 2006. Since AMD and Intel are competitors in the chipset and processor market, there are mutual conflicts of interest in ATI continuing to produce Intel chipsets. As a result, ATI is not likely to produce any more Intel chipsets and it is suggested that one interested in an Intel chipset obtain a motherboard with a non-ATI Intel chipset.

- [ATI CrossFire Xpress 3200 For Intel \(ati.amd.com\)](http://ati.amd.com)
- [ATI Radeon Xpress 1250 For Intel \(ati.amd.com\)](http://ati.amd.com)
- [ATI Radeon Xpress 1100 For Intel \(ati.amd.com\)](http://ati.amd.com)
- [ATI Radeon Xpress 200 For Intel \(ati.amd.com\)](http://ati.amd.com)

**3. AMD Desktop Chipsets****3.1. AMD Desktop Chipsets: By AMD ([amd.com](http://amd.com))**

- [AMD 690 Series Chipset \(amd.com\)](http://amd.com)
- [AMD 580X CrossFire Chipset \(amd.com\)](http://amd.com)
- [AMD 570X CrossFire Chipset \(amd.com\)](http://amd.com)
- [AMD 480X CrossFire Chipset \(amd.com\)](http://amd.com)
- [ATI Radeon Xpress 1100 Series For AMD \(amd.com\)](http://amd.com)
- [ATI Radeon Xpress 200 Series For AMD \(amd.com\)](http://amd.com)

**3.2. AMD Desktop Chipsets: By NVIDIA**

- [NVIDIA nForce 600 Series For AMD \(nvidia.com\)](http://nvidia.com)
- [NVIDIA nForce 500 Series For AMD \(nvidia.com\)](http://nvidia.com)
- [NVIDIA nForce4 Family For AMD \(nvidia.com\)](http://nvidia.com)
- [NVIDIA nForce3 Family For AMD \(nvidia.com\)](http://nvidia.com)

**3.3. AMD Desktop Chipsets: By VIA**

- [VIA K8 Series For AMD \(via.com.tw\)](http://via.com.tw)
- [VIA K7 Series For AMD \(via.com.tw\)](http://via.com.tw)

**3.4. AMD Desktop Chipsets: By SiS**

- [SiS AMD 64 Chipsets \(sis.com\)](http://sis.com)
- [SiS AMD Athlon XP Chipsets \(sis.com\)](http://sis.com)

**4. Intel Desktop Processors****4.1. Intel Core Processor Family: Performance ([intel.com](http://intel.com))**

- [Intel Core2 Extreme Processor \(intel.com\)](http://intel.com)
- [Intel Core2 Quad Processor \(intel.com\)](http://intel.com)
- [Intel Core2 Duo Processor \(intel.com\)](http://intel.com)

*i*

The Intel Core2 Duo Processor should not be confused with the older low power consumption [Intel Core Duo Processor \(intel.com\)](http://intel.com) or the mainstream Intel Pentium Dual-Core Processors listed below.

#### 4.2. [Intel Pentium Processor Family: Mainstream \(intel.com\)](#)

- [Intel Pentium Processor Extreme Edition \(intel.com\)](#)
- [Intel Pentium Dual-Core Processor \(intel.com\)](#)
- [Intel Pentium D Processor \(intel.com\)](#)
- [Intel Pentium 4 Processor Extreme Edition Supporting Hyper-Threading Technology \(intel.com\)](#)
- [Intel Pentium 4 Processor Supporting Hyper-Threading Technology \(intel.com\)](#)

#### 4.3. [Intel Celeron Processor Family: Value \(intel.com\)](#)

- [Intel Celeron Processor \(intel.com\)](#)
  - [Intel Celeron D Processor \(intel.com\)](#)
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### 5. AMD Desktop Processors

#### 5.1. [AMD Athlon 64 Processor Family: Performance \(amd.com\)](#)

- [AMD Athlon 64 FX Processor \(amd.com\)](#)
- [AMD Athlon 64 X2 Dual-Core \(amd.com\)](#)
- [AMD Athlon 64 Processor \(amd.com\)](#)

#### 5.2. [AMD Sempron Processor: Value \(amd.com\)](#)

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### 6. Additional Reading

- [Intel Performance/Mainstream Desktop Chipsets Comparison Chart \(compare.intel.com\)](#).
- [Intel Value Desktop Chipsets Comparison Chart \(compare.intel.com\)](#).
- [Intel Express Chipsets \(intel.com\)](#).
- [Intel \(Core2 And Pentium\) Desktop Processor Comparison Chart \(compare.intel.com\)](#).
- [Intel Celeron Desktop Processor Comparison Chart \(compare.intel.com\)](#).
- [Intel Processor Demo \(intel.com\)](#) (extremely informative Flash demonstration covering Intel processor features, including; L2 cache, clock speed, front side bus, hyper-threading technology, dual-core technology, enhanced Intel speedstep technology, Intel extended memory 64 technology, execute disable bit, Intel virtualization technology, and socket types).
- [Intel Graphics: Making The Most Of Your Visual Experience \(intel.com\)](#).
- [Intel Graphics Comparison Guide \(download.intel.com\) \(.pdf\)](#).
- [Intel Clear Video Technology \(intel.com\)](#).
- [AMD Desktop Processor Solutions Comparison Chart \(products.amd.com\)](#).
- [NVIDIA Motherboard GPUs: Featuring NVIDIA GeForce GPUs And NVIDIA nForce MCPs: Product Comparison Chart \(nvidia.com\) \(.pdf\)](#).
- [Windows Vista Buy Or Upgrade: Look For The Logo. Experience The Difference \(microsoft.com\)](#).
- [FAQ For Windows Logo Program V. 3.0 For Hardware \(microsoft.com\)](#).
- [Tom's Hardware's 2007 CPU Charts \(tomshardware.com\)](#).

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