

## Selecting a Chipset

When choosing a motherboard, we will first look at the chipset, which is an integrated device that will pretty much summarize all of the possible potentialities that are available on the motherboard and in the computer. There are chipsets for servers, desktop and laptop computers. There are also three standard classifications for chipsets which are high performance, mainstream and economy. When we begin to study a chipset design, we should concentrate on the high performance design features, since many of the mainstream and economy chipsets used on motherboards and in personal computers use older style chipsets that have fewer capabilities.

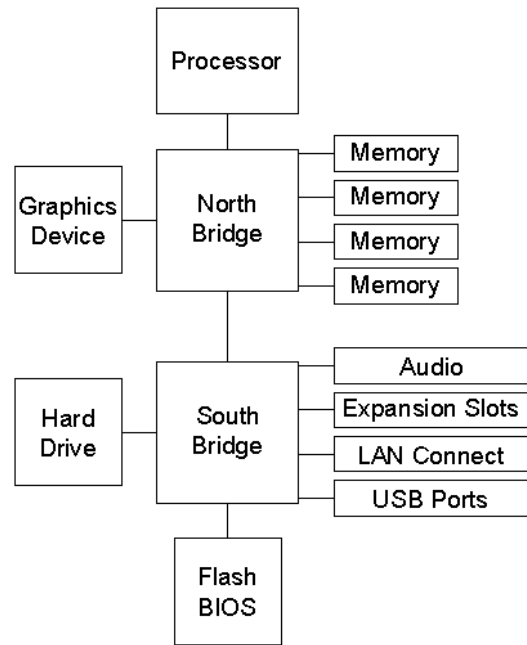


Figure 3.1 – Older Style Chipsets

The chipset has two integrated circuits, one is called the North Bridge and the second is named the South Bridge. The North Bridge interfaces with the faster components on the motherboard which are the processor, the memory, and the graphics. The South Bridge communicates with the rest of the devices on the motherboard such as hard drives, speakers, microphone, the flash BIOS, LAN connection, and items plugged into the USB ports such as the printer, keyboard, and pointing device.

The newest chipsets no longer have separate North and South Bridges. As we can see in the diagram, the graphics device and memory interface directly with the processor. As in previous designs, all of the other devices connect to the chipset. By integrating the North Bridge into the Processor these manufacturers are able to reduce motherboard cost and increase the access speed from the processor to the memory and the graphics controller.

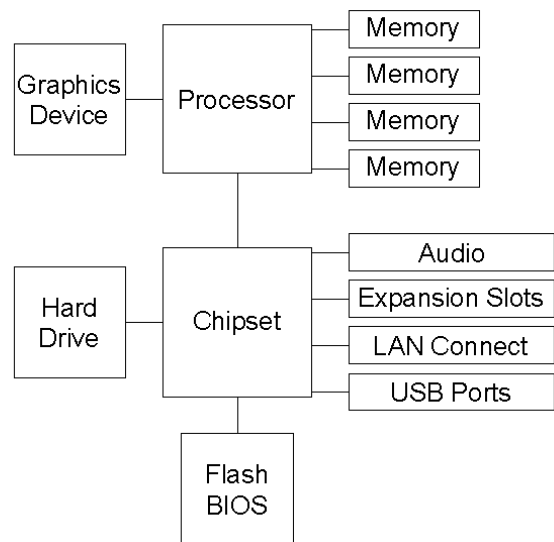


Figure 3.2 – Newer Style Chipsets

## Selecting a Chipset and Motherboard

In this chapter, we will examine an Intel X79 Chipset that uses the newer style. The following chart displays features of the high performance chipset.

### Intel X79 Chipset<sup>1</sup>

Processor	Second generation Intel Core I7
Processor Socket	LGA 2011
RAID Level	0,5 and 10
Intel Identity Protection Technology	Uses a way to tell if the user that is logging in to the computer is the individual who originally setup the account
PCI Express 2.0 Interface	5 GigaTransfers per second (GT/s) with up to 8 PCI Express 2.0 x1 slots
Intel High Definition Audio	Has multiple audio streams and jack re-tasking
Universal Serial Bus (USB)	Supports hi speed USB 2.0 data rates up to 480 Megabits per second (Mbps) for up to 14 USB 2.0 ports
Serial ATA (SATA) 6 Gb/s	Supports 2 data ports that allow up to 6 Gigabit per second data transfer rates
Serial ATA (SATA) 3 Gb/s	Supports 4 data ports that allow up to 3 Gigabit per second data transfer rates
eSATA	Supports a port for an external SATA device that allow up to 3 Gigabit per second data transfer rates
SATA Port Disable	Allows for disabling of internal and external SATA ports for security purposes
USB Port Disable	Allows for disabling of USB ports for security purposes
Intel Integrated 10/100/1000 MAC	Supports 10/100/1000 Mbps data rates for network connections
Green Technology	Lead-free and halogen free components

In the above list presented by Intel on their chipset web page, we can see that we need to be familiar with many modern component of current computer design such as Redundant Array of Independent Disk (RAID) and what does 0, 5, and 10 mean. We can only use second generation Intel Core I7 processors on a motherboard using the Intel X79 chipset. Other devices such as Serial ATA, USB ports and 10/100/1000 Network ports we probably already recognize. However, in this textbook, we will present all the current and even the older devices that we can plug into the motherboard.

Whether we buy Intel, AMD or another chipset design, we will get several features that are proprietary to that manufacture. These can be security characteristics and using a green technology. Many suppliers will study their competitor and offer similar traits but not all performance chipsets are the same and we have to read the entire specification and even study professional reviews of computers using these integrated devices to be as sure as we can be that the chipset and then the motherboard will function efficiently.

After we choose the chipset that provides all of the features we potentially want, we have to locate a manufacture that has placed the integrated device on its motherboard.

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<sup>1</sup> Intel® X79 Express Chipset, 2011, Intel Corporation, December 28, 2011, <<http://www.intel.com/content/www/us/en/chipsets/performance-chipsets/x79-express-chipset.html>>

## Selecting a Motherboard with the Chipset

Intel Corporation has a Motherboard Selector application on their website. A computer technician can use the search keywords “Intel Motherboard Selector Tool” and then quickly find the application listed at the top of most Website Search Engines. We will filter our motherboard selection by processor and select the 2<sup>nd</sup> Generation Intel Core I7 Extreme Processor from the list box.

Processor	Chipset	Socket	BIOS	Additional Features	5VSB I
2nd Generation Intel® Core™ i7 Extreme Processor (LGA2011)	X79	2011	X79 Extreme		≤60 mA
Intel® Core™ i7-9XX Processor LGA1366	X79	2011	X79 Extreme		≤60 mA
Intel® Core™ i7-8XX Processor LGA1156	X58	1366	L1.35		≤90 mA
Intel® Core™ i5-7XX Processor LGA1156	P55	1156	L1.13		≤60 mA
Intel® Core™2 Extreme Edition Quad-Core Processor (1600MHz FSB)	P55	1156	P1.40		≤60 mA
Intel® Core™2 Extreme Edition Quad-Core Processor (1066MHz FSB)	P55	1156	P1.30		≤80 mA
Intel® Core™2 Extreme Edition Processor (1066MHz FSB)	P55	1156	P1.30		≤60 mA
Intel® Core™2 Quad Processor	P45/ICH10R	775	L0.18		≤80 mA
2nd Generation Intel® Core™ i5 Processor LGA1155	P45/ICH10R	775	L0.17		≤80 mA
2nd Generation Intel® Core™ i7 Processor LGA1155	G41/ICH7	775	L1.02		≤80 mA
Intel® Core™2 Quad Processor (1333MHz FSB)	G31/ICH7	775	L1.71		≤80 mA
Intel® Core™ i5-6XX Processor LGA1156	P43/ICH10	775	P1.10		
Intel® Core™ i3-5XX Processor LGA1156	P45/ICH10	775	P1.20		
Intel® Pentium® G6950 Processor LGA 1156	P45/ICH10R	775	P1.10		
Intel® Core™2 Extreme Edition Quad-Core Processor (1333MHz FSB)	P67	1155	UEFI P67 Ex		≤60 mA
Intel® Core™2 Duo Processor (1066MHz FSB)	Intel P67	1155	UEFI P67 Pr		≤60 mA
Intel® Pentium® Dual-Core Processor					

Figure 3.2 – Intel X79 Chipset

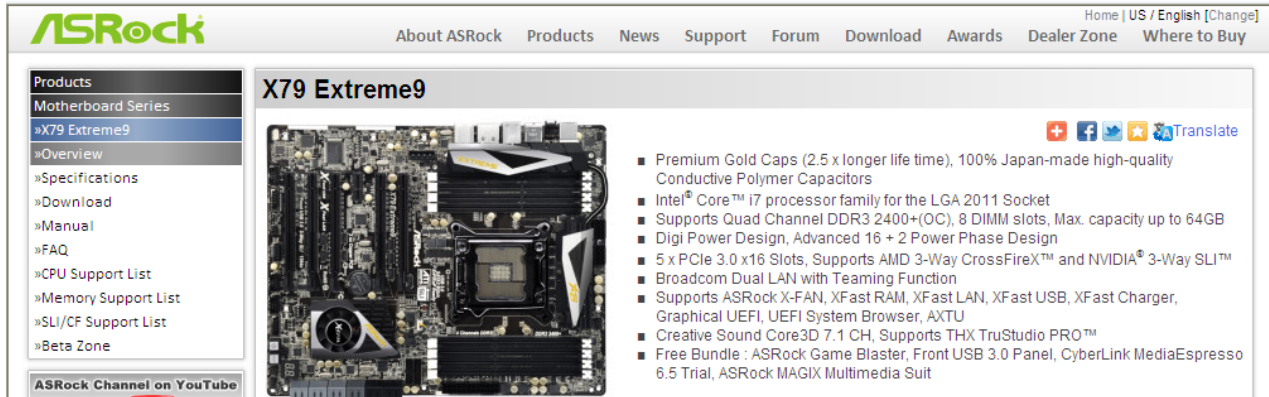
The list is then curtailed to a smaller set of boards that available for that processor. After a few more months, we will find other companies completing and marketing their own version of a motherboard using the same chipset. These companies are ASRock, ASUS, Biostar, ECS, EVGA, Foxconn, Gigabyte, MSI and Supermicro. Major distributors of computers such as Dell and Hewlett –Packard do not sell their motherboards separately so we would buy the entire computer from their company and not a single board.

Manufacturer	Model	Form Factor	Memory	Chipset	Socket	BIOS	Additional Features	5VSB I
Asrock	X79-Extreme4	ATX	DDR3	Intel X79	2011	X79 Extreme		≤60 mA
Asrock	X79-Extreme4	mATX	DDR3	Intel X79	2011	X79 Extreme		≤60 mA

Figure 3.3 – Intel X79 Chipset

From our research, we can that currently, ASRock Incorporated advertises the X79 Extreme.

## Selecting a Chipset and Motherboard



The screenshot shows the ASRock website's product page for the X79 Extreme9 motherboard. The page layout includes a top navigation bar with links for 'About ASRock', 'Products', 'News', 'Support', 'Forum', 'Download', 'Awards', 'Dealer Zone', and 'Where to Buy'. A left sidebar contains a 'Products' menu with 'Motherboard Series' expanded to show 'X79 Extreme9'. The main content area features a large image of the motherboard, a list of key features, and social media sharing options.

**X79 Extreme9**

- Premium Gold Caps (2.5 x longer life time), 100% Japan-made high-quality Conductive Polymer Capacitors
- Intel® Core™ i7 processor family for the LGA 2011 Socket
- Supports Quad Channel DDR3 2400+(OC), 8 DIMM slots, Max. capacity up to 64GB
- Digi Power Design, Advanced 16 + 2 Power Phase Design
- 5 x PCIe 3.0 x16 Slots, Supports AMD 3-Way CrossFireX™ and NVIDIA® 3-Way SLI™
- Broadcom Dual LAN with Teaming Function
- Supports ASRock X-FAN, XFast RAM, XFast LAN, XFast USB, XFast Charger, Graphical UEFI, UEFI System Browser, AXTU
- Creative Sound Core3D 7.1 CH, Supports THX TruStudio PRO™
- Free Bundle : ASRock Game Blaster, Front USB 3.0 Panel, CyberLink MediaEspresso 6.5 Trial, ASRock MAGIX Multimedia Suit

**Figure 3.4 – ASRock Motherboard using the Intel X79 Chipset**

We will notice that the features on the main board are within the capabilities of the Intel X79 chipset.