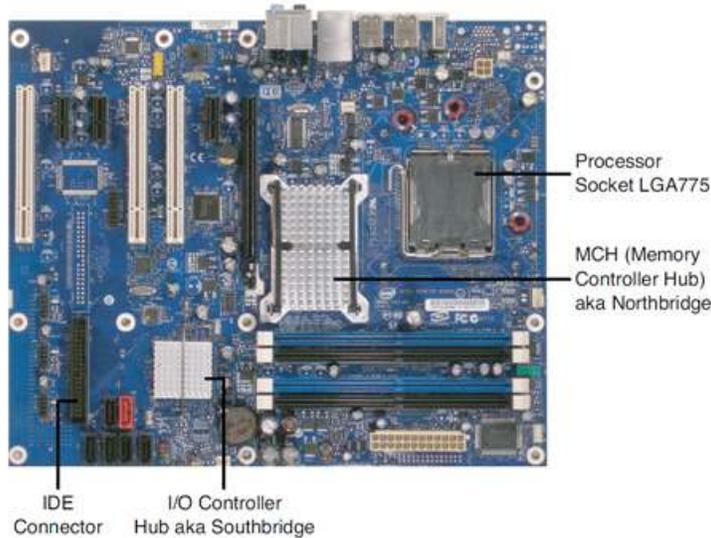
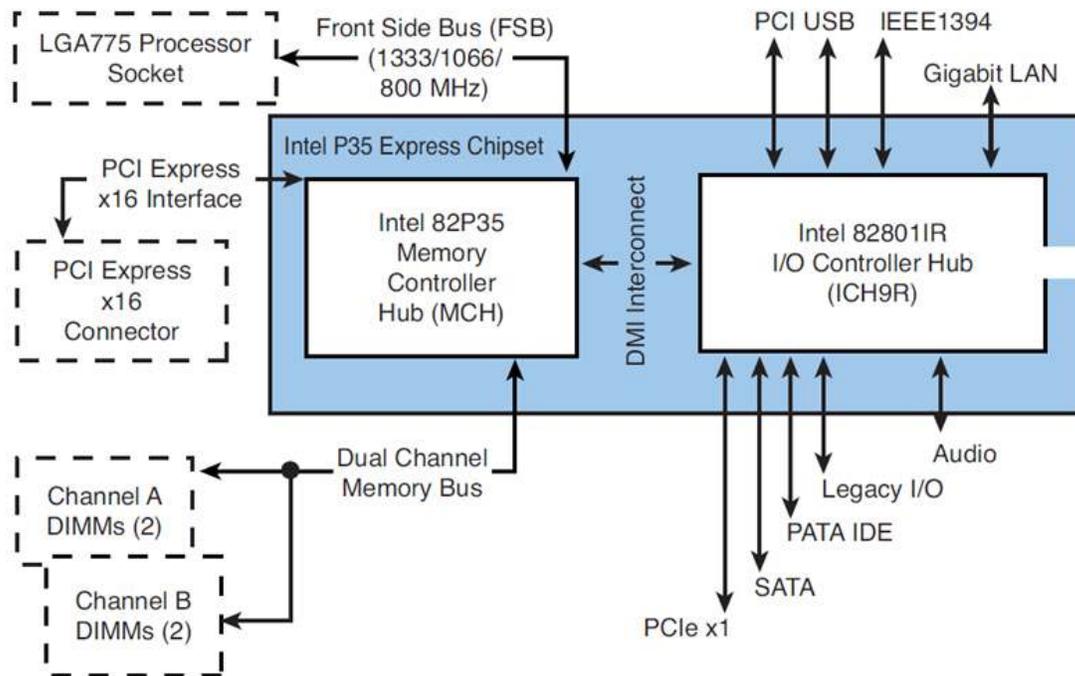


Older Intel motherboard designs used the northbridge/southbridge concept, but Intel gave names to each chip. The northbridge was known as the Memory Controller Hub (MCH) and the southbridge was known as the I/O Controller Hub (ICH).

An example of an Intel motherboard that uses this configuration is the model DP35DP; the following figure shows this motherboard and points out the processor, northbridge, and southbridge. This motherboard is part of an older computer I built in 2009 which I refer to in this book as Tower PC.



From this you can see the MCH (northbridge) and the ICH (southbridge). These make up the P35 chipset. Specifically, for this motherboard, these are the Intel 82P35 MCH and the Intel 82801R ICH. The following figure gives a rough idea of the connections between these and the rest of the motherboard.



You can see that there are three major buses (you can think of them as highways) that lead to and from the MCH:

- Front-side-bus (FSB): This connects the MCH to the processor (CPU) socket. On the DP35DP motherboard it is rated for 1,333, 1,066, or 800 MHz, which depends on what type of processor used. When deciding on a processor, make sure that it can run at one of the FSB speeds prescribed by the motherboard. It also needs to be compatible with, and adhere to the wattage maximum, of the motherboard's socket.

Note: The speed of the FSB is rated in Hertz (Hz), a unit of frequency defined as a number of cycles per second. In the DP35DP motherboard, the FSB can go as high as 1,333 MHz or 1.33 billion cycles per second (if it is not overclocked!). For a video primer on Hertz, bits, and bytes, access my website: <http://www.davidlprowse.com/220-801>.

- Memory bus: This set of wires connects the MCH to the RAM slots. It has also been referred to as the address bus.

- PCI Express x16 interface: This connects the MCH to the x16 PCIe slot used for video; usually there is only one of these slots on a motherboard.

The FSB and memory bus are parallel; however, PCI Express works in groups of serial buses called lanes, similar to the DMI mentioned previously.

The ICH provides connectivity to all the secondary buses, some of which are parallel buses (IDE and Audio) and some of which are serial buses (USB, SATA, IEEE 1394, and lesser PCIe slots).

Let's sum up the types of chipsets starting with the oldest.

- Older Intel motherboards: These utilize a northbridge and southbridge, which Intel called the MCH and ICH. The northbridge controls the connections to RAM and PCI Express x16 devices such as video cards. The southbridge connects to controllers such as SATA, IDE, USB, and PCI.

- Today's AMD-based motherboards: These also have a northbridge/southbridge chipset design. The main difference is that the northbridge controls only the connection to PCIe x16 devices; RAM is controlled by the processor.

- Newer Intel designs: These basically do away with the northbridge altogether, incorporating its functionality into the processor. The main chipset takes care of all secondary functions such as SATA and USB.