Graphics Processing

How Stuff Works – Video Cards

Graphics Processing

Computers are responsible for processing large amounts of data used for different purposes. Graphics represents only a single, specialized type of processing.

Graphics (images and video) can also be among the most intensive types of processing, so there is extra attention paid to making it run as quickly as possible.

Graphics Processing by the CPU

The CPU is capable of processing any type of data, including graphics. Some modern computers, and all older computers, relied on the CPU for graphics by default.

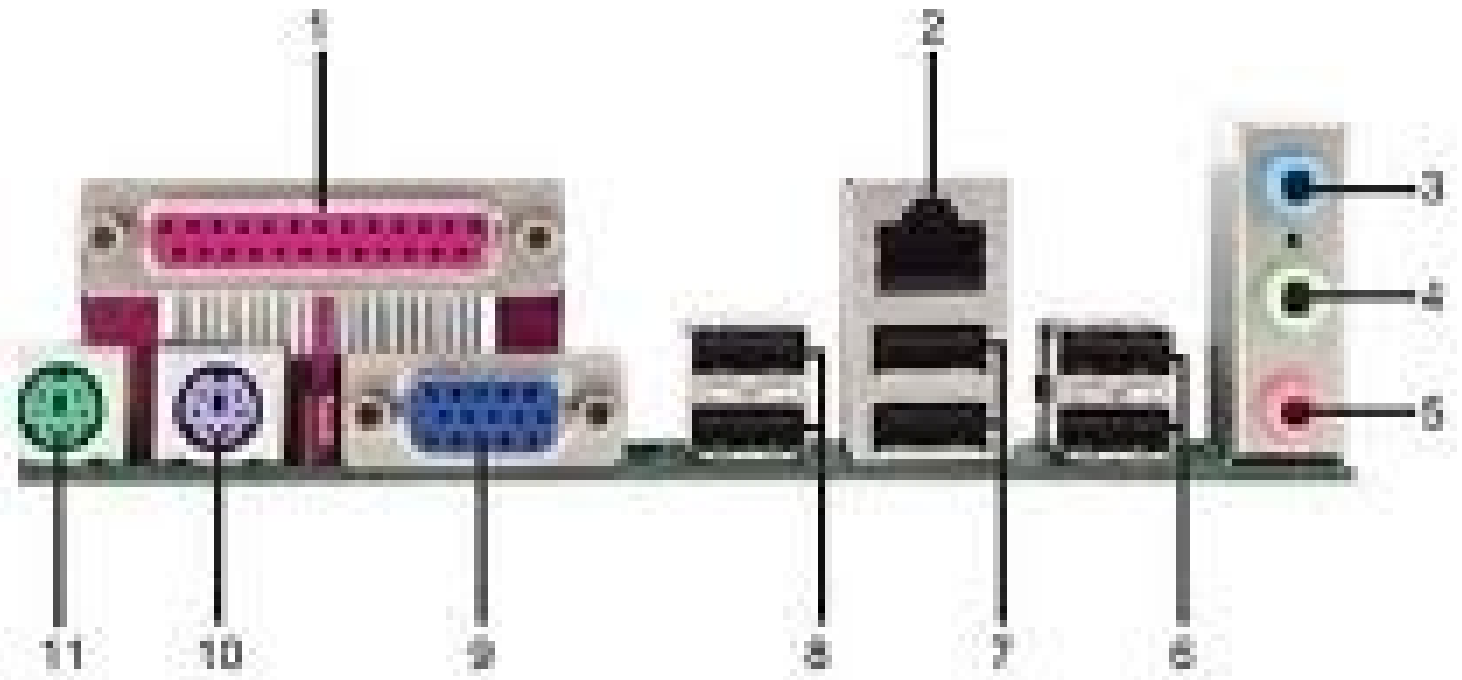
Since the CPU is for processing any type of data, it is not particularly good or fast with graphics.

On-board Graphics Processing

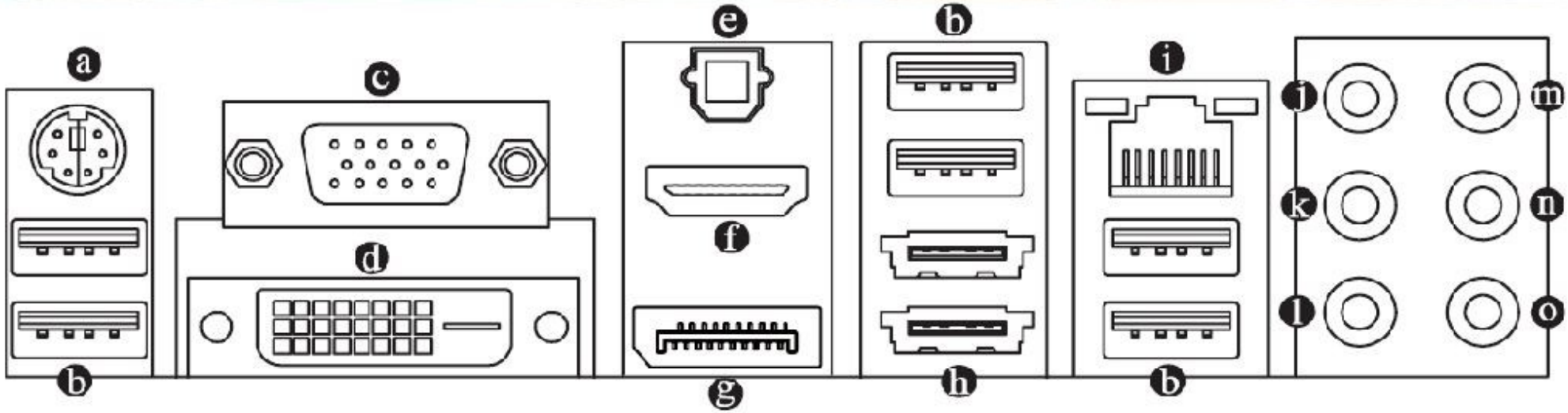
As graphics became more important to computer users, the graphics demands on the CPU became too much, slowing down the entire system.

Manufacturers started building a dedicated graphics processing unit right into the motherboard. This reduced the strain on the CPU, but the GPU included this way was generally very cheap and slow, to minimize costs.

1.4 ASRock I/O Plus™



1	Parallel Port	7	USB 2.0 Ports (USB9)
2	RJ-45 Port	8	USB 2.0 Ports (USB3)
3	Line In (Light Blue)	9	VGA Port
4	Line Out (Lime)	10	PS/2 Keyboard Port (Purple)
5	Microphone (Pink)	11	PS/2 Mouse Port (Green)
6	Shared USB 2.0 Ports (USB5)		



a: PS/2 Keyboard/Mouse
b: USB 3.0
c:VGA/D-SUB
d: DVI
e:S/PDIF Optical
f: HDMI
g: DisplayPort
h: eSATA 6GB/s
i: RJ-45 GBit LAN
j-o: 7.1 Audio Outputs

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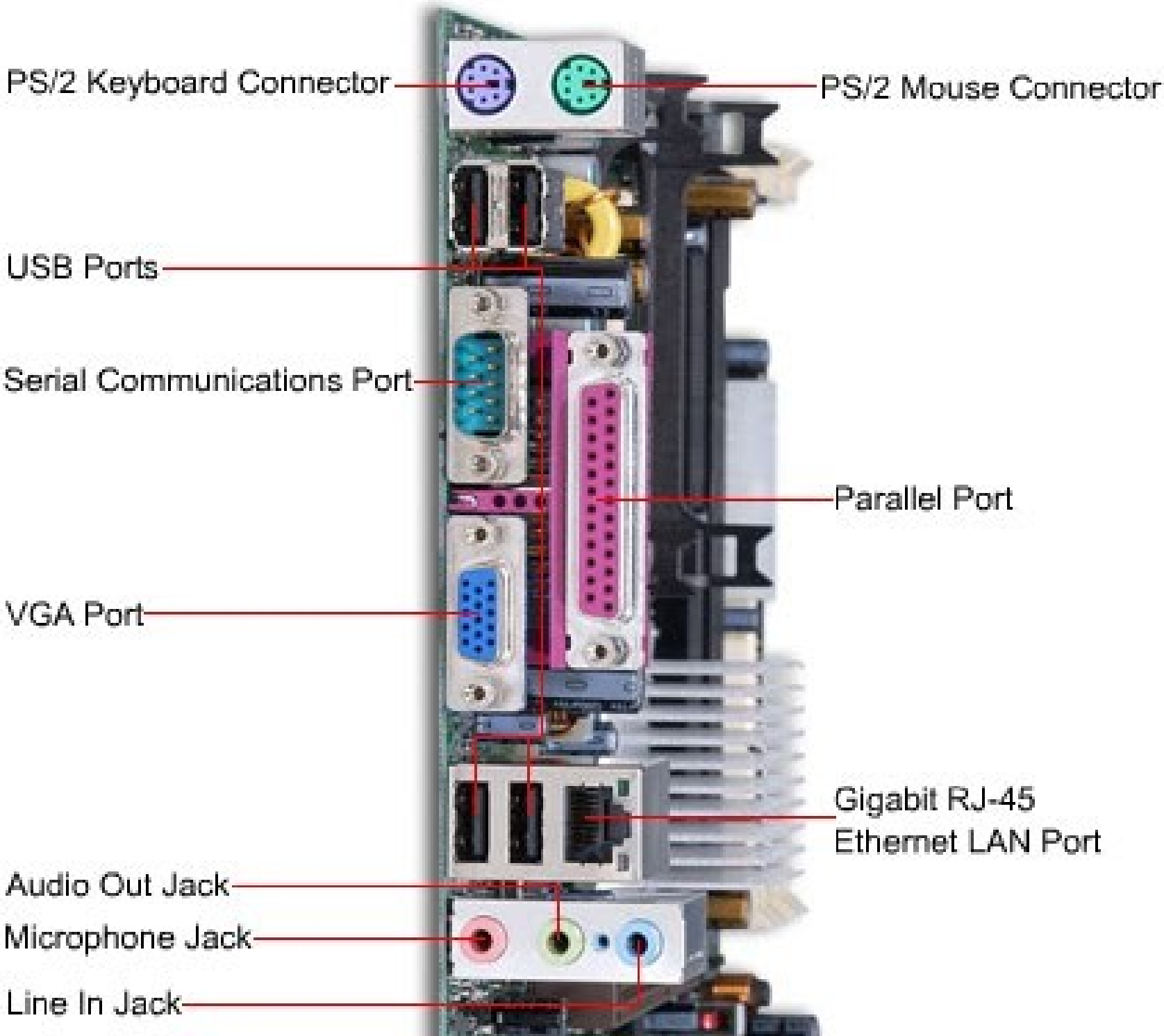
PS/2 Keyboard Connector
PS/2 Mouse Connector
USB Ports
Serial Communications Port
Parallel Port
VGA Port
Gigabit RJ-45
Ethernet LAN Port
Audio Out Jack
Microphone Jack
Line In Jack

Dedicated Graphics Processing

- For even greater performance and capabilities, the best option is a separate peripheral card, called a video card or graphics card.
- A video card contains
  - a dedicated GPU
  - extra memory (including cache)
  - cooling system

Graphics Intensive Applications

- Some uses of the computer have particularly intensive graphics requirements
  - gaming
  - graphical simulation of reality
    - includes many games
    - architecture
  - video & graphical processing
    - movies & media
    - photographic manipulation
  - desktop environment
    - multiple windows, special effects

Graphics Performance

- CPU only (slowest)
  - CPU not optimized for graphics processing
  - regular RAM used to store video data
- on-board GPU (better)
  - specialized for graphics
  - frees CPU for other processing
- dedicated video card with GPU (much better)
  - GPU usually higher quality than on-board
  - includes faster RAM for video, including cache