

Architecture of Graphics Devices

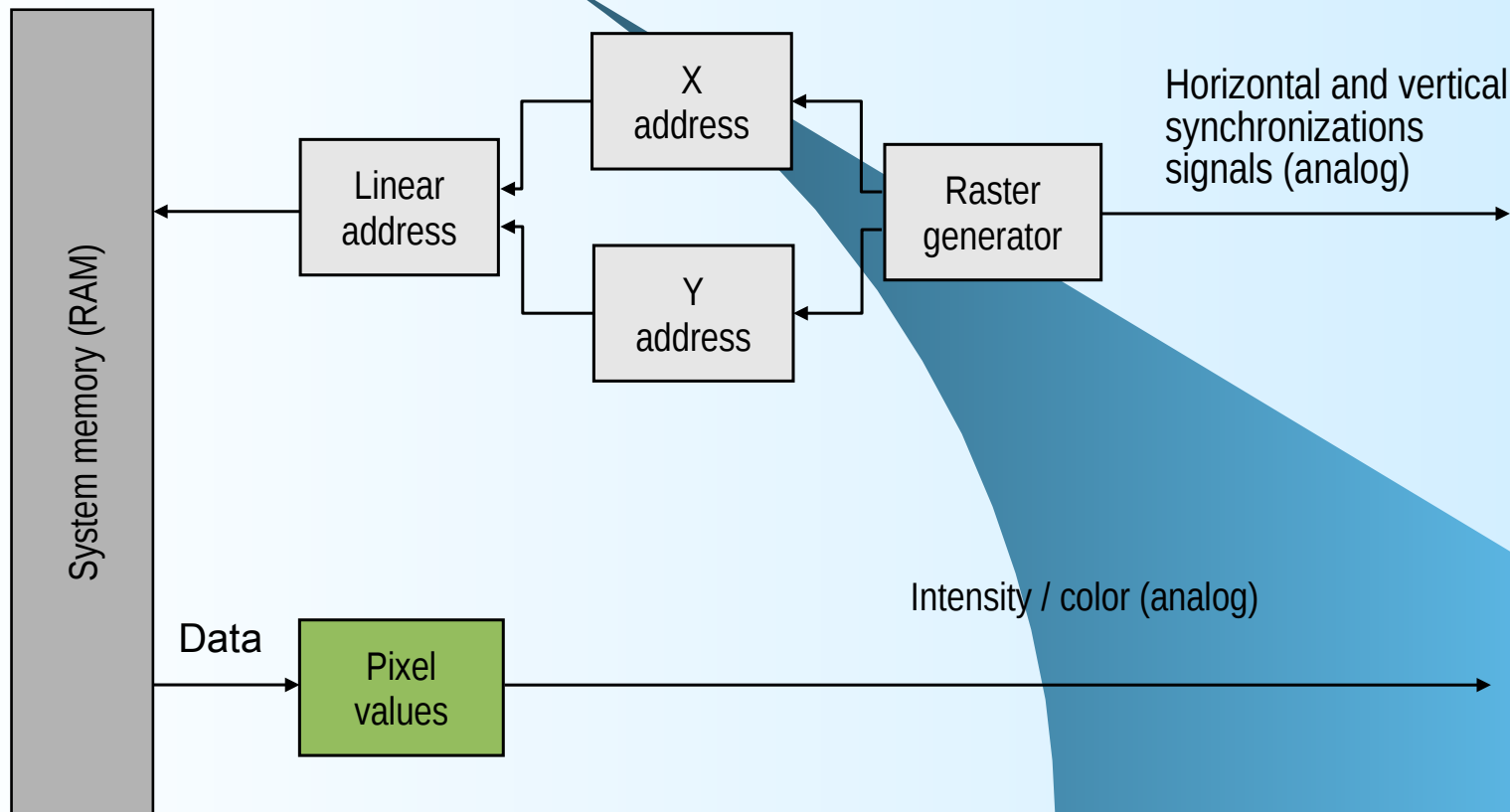
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Display systems

- Simple display system – video controller
- Display system with Single Address Space – SAS
- Display system with peripheral display processor
- Display system with integrated display processor
- Display system with AGP (Accelerated Graphics Port)
- Display system with PCI Express (Peripheral Component Interconnect)

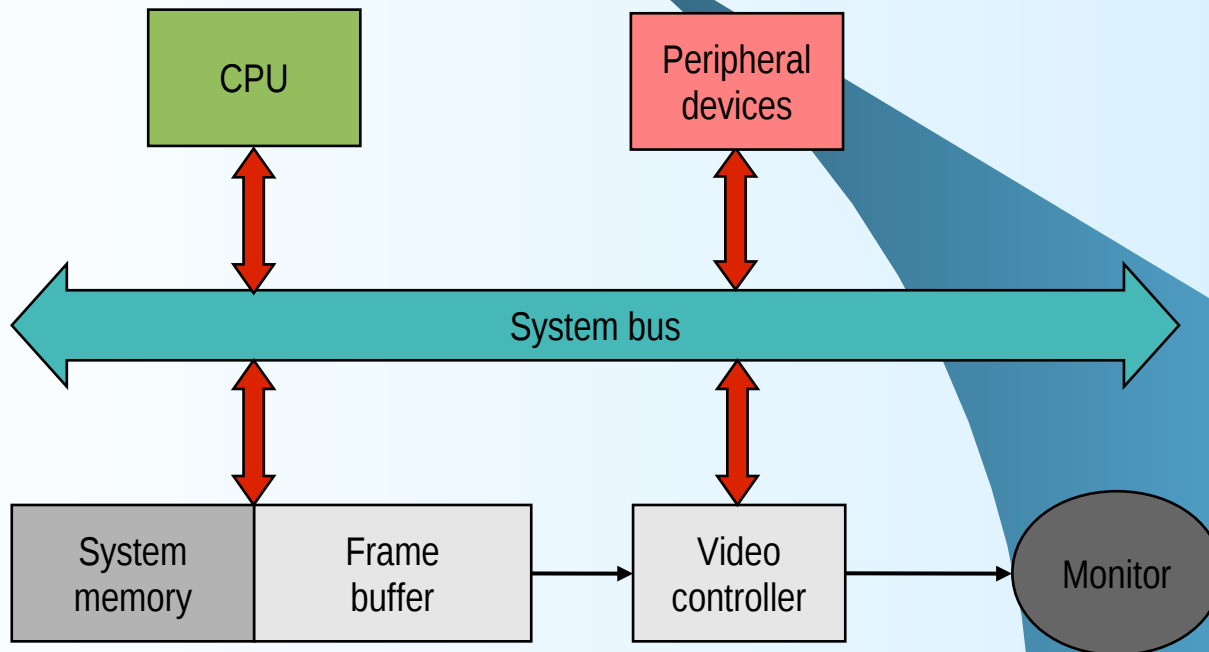
Video Controller Function

- Calculates the linear address in memory from X and Y values.
- Controls display with horizontal and vertical deflection signals.
- Converts the value from memory to color using LUT.



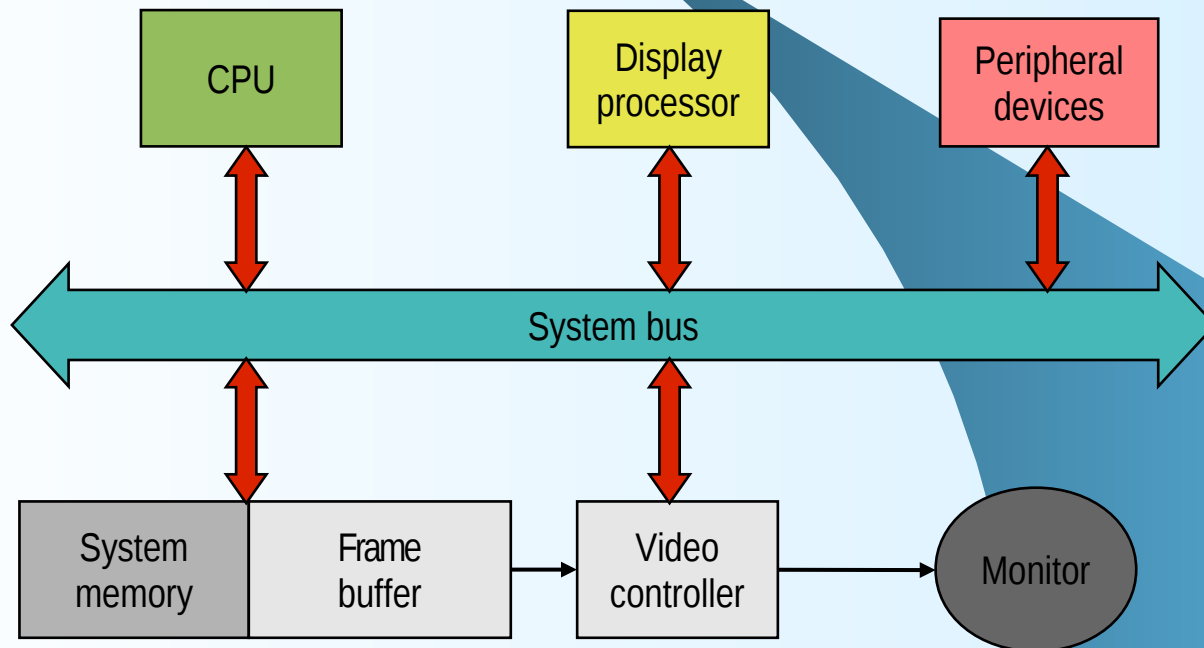
Simple Display System

- Graphics processor is missing, decomposition into the raster must be done by the CPU.
- Video controller has only screen memory (framebuffer) available.



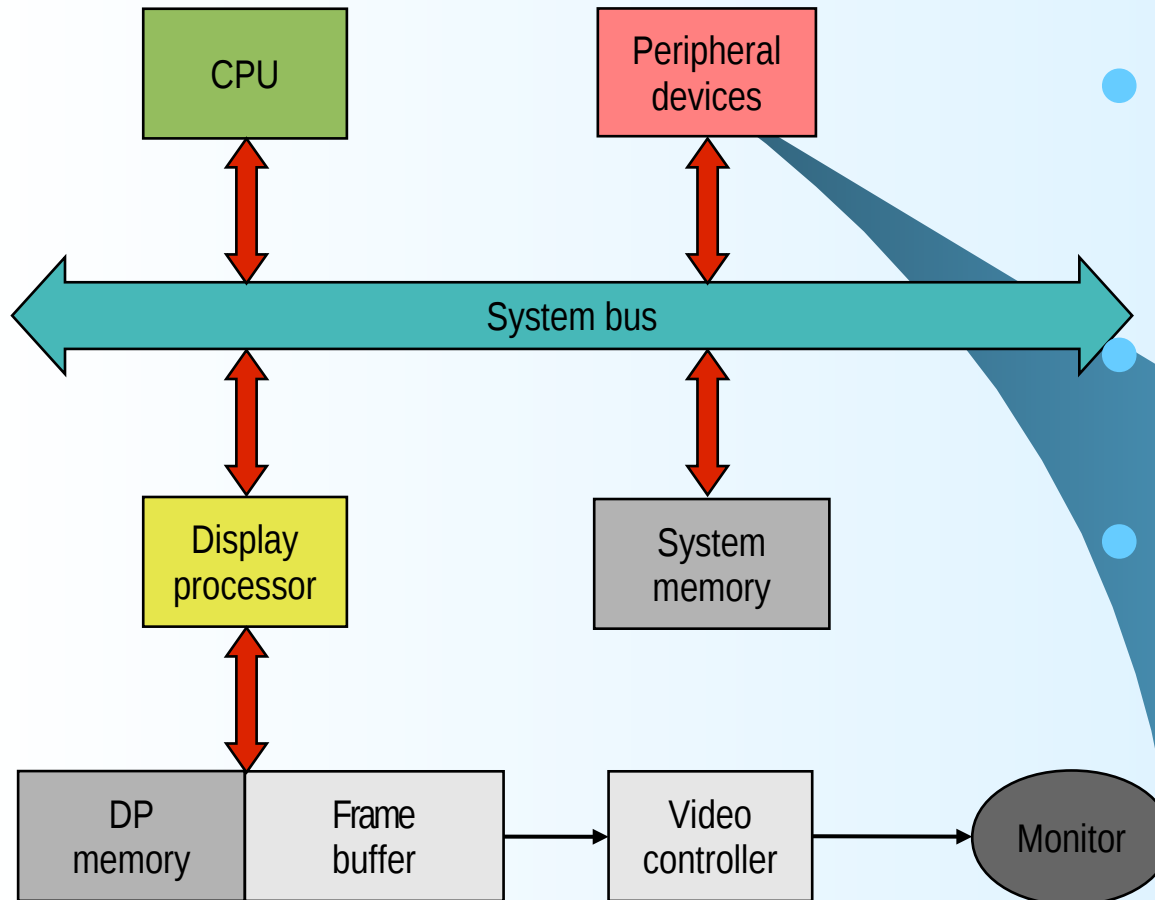
Display System with Single Address Space

- Display processor, CPU and video controller use only system memory.
- Part of system memory is reserved for framebuffer.
- It solves the problem of doublebuffering.



Display System with Peripheral Display Processor

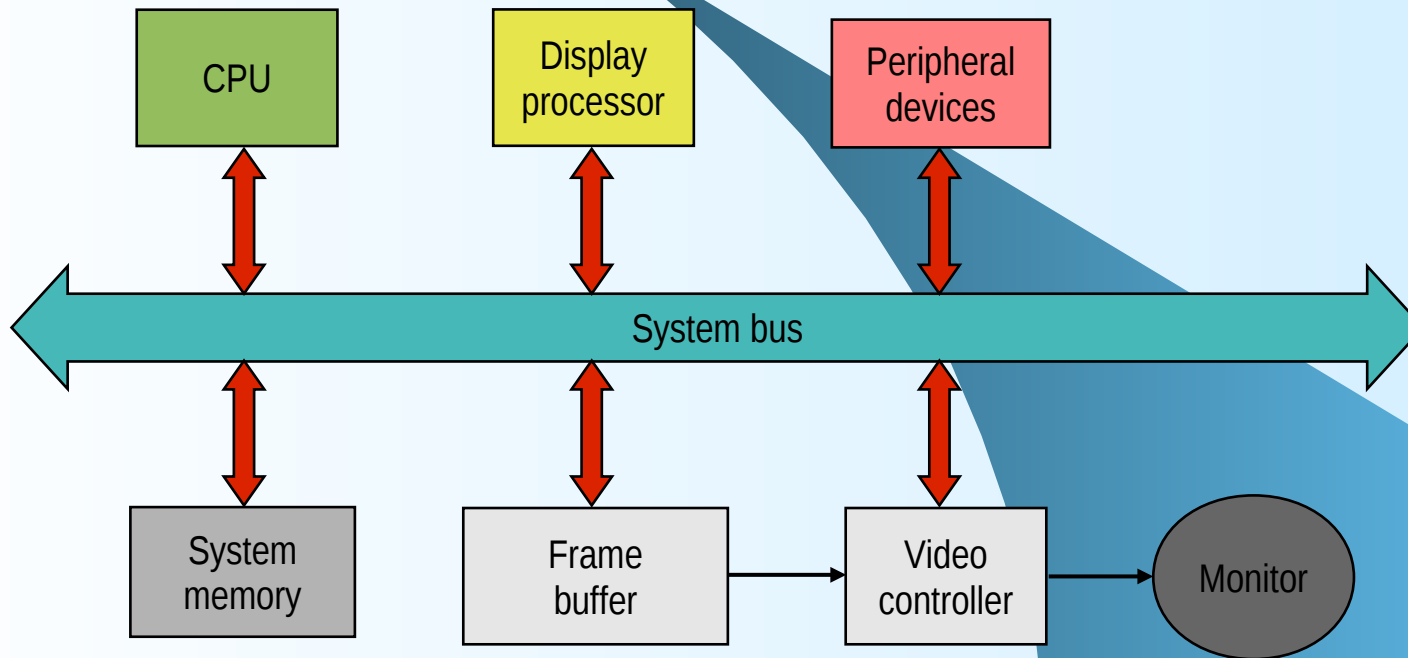
- Decomposition into the raster is performed by the display processor.
- Framebuffer is only accessible through DP (peripheral).



- The DP has its memory in which the display list (DL) is stored.
- DL contains frequently executed commands.
- Sometimes double-buffering is required.

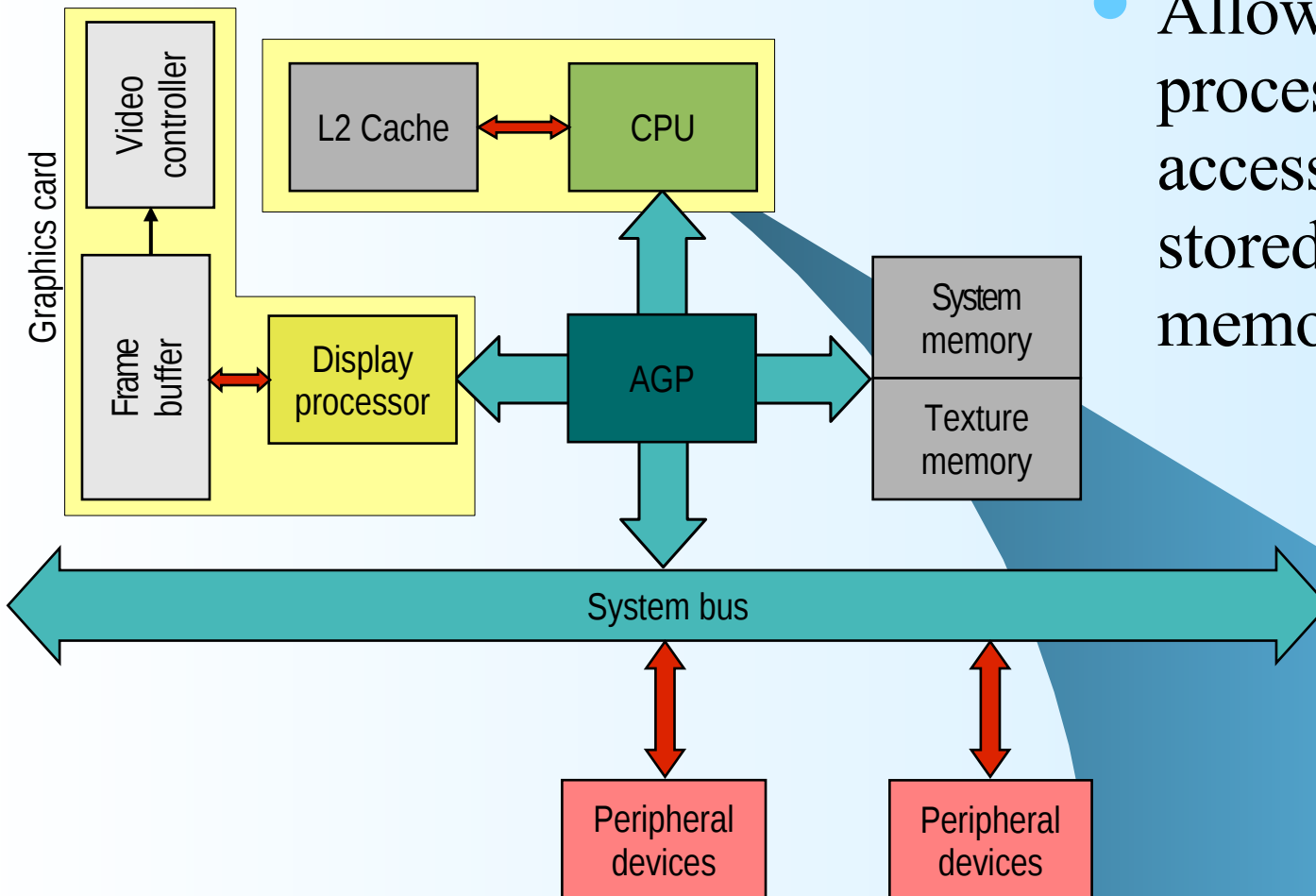
Display System with Integrated Display Processor

- It has a similar architecture to SAS, but framebuffer is not part of system memory.
- This separation allows faster access to frame memory as well as system memory.



Display System with AGP

- AGP unburden system bus and connects CPU with display processor and system memory.



- Allows the display processor to quickly access textures stored in the system memory.

Display System PCI Express

- It has faster data transfer than AGP.
- Connects not only CPU, DP and RAM but also input/output devices – USB, hard disks, audio, ethernet and other devices.

