

Computer Systems

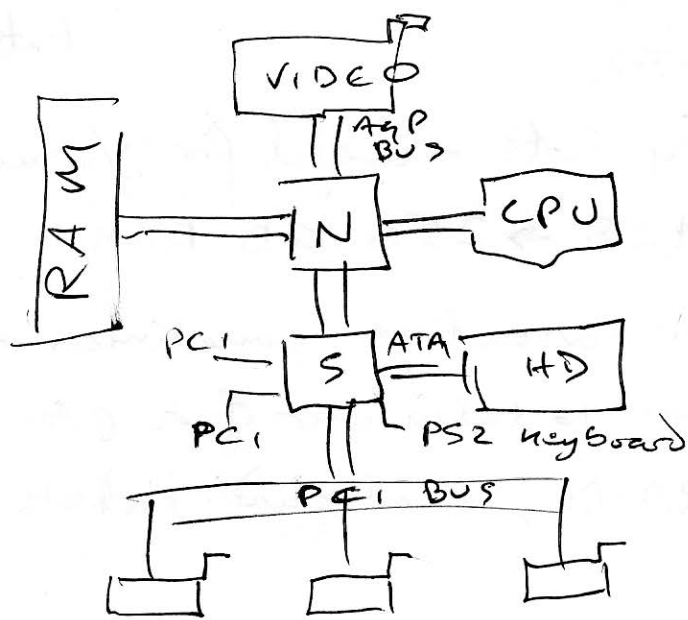
Jed Gibbs
for
Charlton Rodda

PC Architecture in depth 16:00hrs

Kirk Martinez 13 Nov 2015 wk 7

Demonstrates 2009? - probably earlier! 68020s available in 1988
motherboard with a Motorola
68020 CPU with an FPU 2cm away in the
board - so slow. Programmable chip with bios.
huge area of RAM about 25cm x 40cm -
only 4MB of RAM as density so low.

'Classic PC Architecture'



N = North Bridge (fast)

S = South Bridge (slow)

both are PCIe switches

0.5 → 8 GB/s

bandwidth

See slide for 'Previous Intel architecture'

Beware bottlenecks, especially if trying to attach a fast RAID array to a slow bus.

Kirk removes opteron CPU from board, revealing about 20 pins x 20 pins of in/outs on the back of chip.

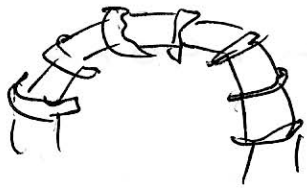
has 2 x 16 pin bit PCIe;

~~some~~ ^{3x} 64 bit slots;

huge heatsink over the north bridge;

watch battery to maintain the time;

fan connectors, floppy drive connectors,



inductors ('push power away')

and capacitors ("pull ~~batter~~ power" and are like small batteries")

Server motherboards

Have more memory slots - useful for Virtual Machines - often 128 → 256 GB RAM

ECC RAM - error correcting, sometimes even 'hot' redundant RAM to take over if a RAM stick fails. Onboard RAID; dual quad sockets for RAM

AMD Turrona initiative inspired Intel

Modern Intel chipset. North/South Bridge now on a ^{SINGLE} custom chip

QPI - Quick Path Interconnect

Takes chunks of data.

Sata 3 is about 600 mBytes/s - which is becoming too slow for SSDs. 6 Gbits/s

BIOS - basic input/output system

Firm ware on the motherboard, stored in flash so can be updated.

MS-DOS used i/o functions in Bios to help standardize PCs

Loads first sector of disk into RAM

UEFI

Replaces old BIOS. CPU-independent. ARM/intel uses NVRAM to boot OS.

Summary

Chipsets define the paths/buses