Digital Equipment Corporation
PDP-6 & 10

Rick Lin and Keegan Griffee
PDP-6 (1963-1966)

• Hardware Architecture
  • 36-bit words
  • 18-bit addressing, 256k word memory
  • Magnetic-core Memory
• ISA
  • Very symmetrical
  • One-and-a-half address
  • Every instruction consists of a:
    • 9-bit opcode
    • 4-bit register code
    • 23-bit effective address field
    • 1-bit indirect bit
    • 4-bit register code
    • 18-bit offset
PDP-6

• Achievements
  • Supported time sharing
    • Status bit selecting between two operating modes
    • Supervisor and User modes
  • Could handle 20 - 30 users (with a single disk drive)
  • TOPS-10 Operating System
    • Introduction of virtual memory

• Problems
  • Prone to failure
  • Large ‘6205’ boards would often break
    • Mechanical couplings
    • Powering related failures from powering on/off
PDP-6 Success?

• Complex and expensive
• Difficult to install
• Difficult to operate
• Targeted technical users in academia
• 23 total sold
• Claimed this was the end of their 36-bit machines
PDP-10 (1966 – 1980s)

• Hardware Architecture
  • 36-bit words
  • 18-bit addressing
  • 16xGeneral-purpose 36-bit registers
  • 3 major processors
    • KA10 – Flip chip transistors
    • KI10 – TTL SSI (Small Scale Integrated Circuit)
    • KL10 – ECL (Emitter Coupled Logic)

• ISA
  • Almost same as the PDP-6
  • Used byte instructions
Time Sharing Architecture

• OS: TOPS-10 (later TOPS-20)
• Virtual Memory
• Supervisor mode
  • Instruction addresses correspond directly to physical memory
  • Access I/O operations via Unimplemented User Operations (Uuo’s)
• User mode
  • Addresses are translated to physical memory
PDP-10 Influences

• Birth of Open Source Development
  • Assembled different components from non-DEC developers
• Birth of variety of operating systems used
  • ITS (Incompatible Time Sharing by MIT)
• CompuServe data centers
• Paul Allen and Bill Gates to design Altair BASIC
References

- http://gordonbell.azurewebsites.net/computer_engineering/00000511.htm

Picture source

- http://gordonbell.azurewebsites.net/computer_engineering/00000518.htm
- http://imgur.com/gallery/EaYMabg