CS/EE 3710

National Semiconductor CR16
Compact RISC Processor
Baseline ISA and Beyond…

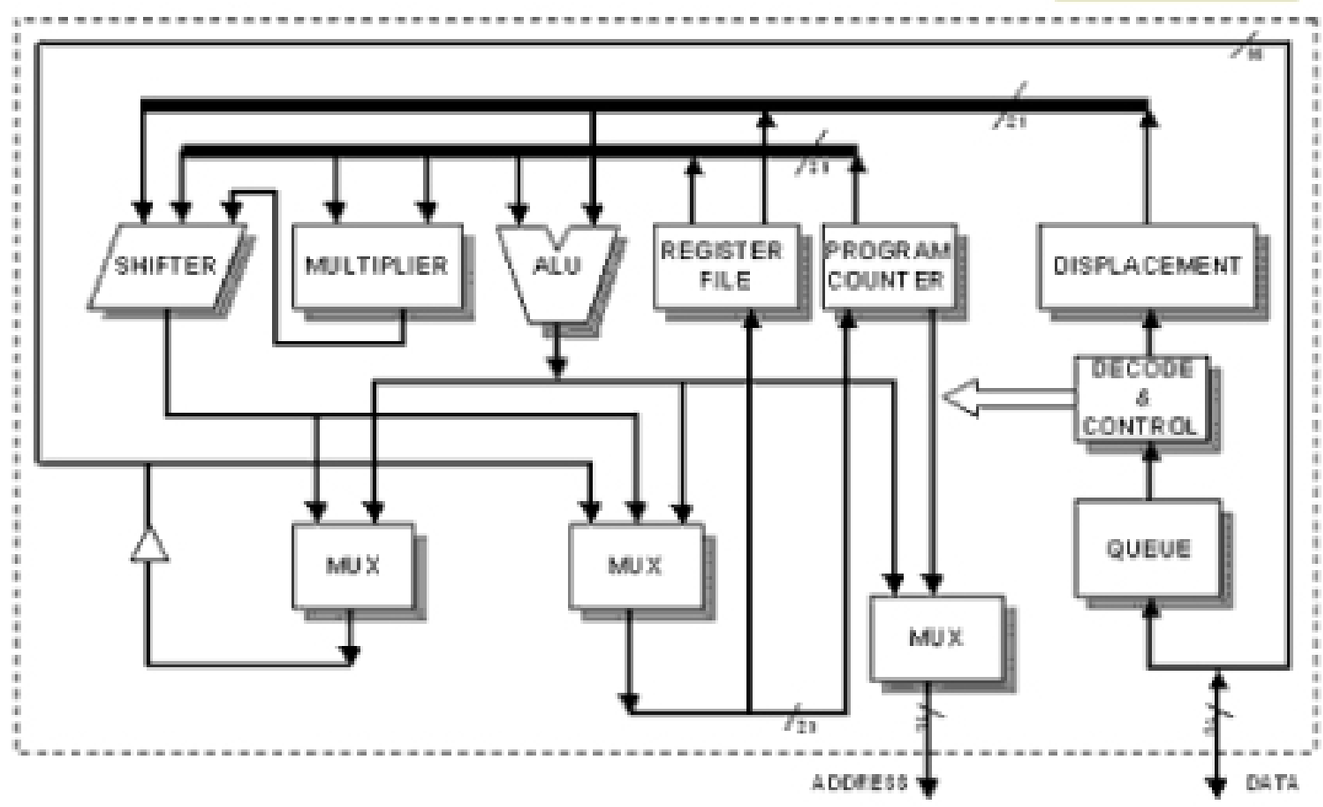
CR16 Architecture

- Part of a microcontroller family from National Semiconductor
  - 16-bit embedded RISC processor core
  - Available in Synethesizeable Verilog HDL
  - Die size of 0.6 mm2 @ 0.25µ
  - 2 Mbytes of linear address space (2^{21})
  - Less than 0.2mA per MHZ @ 3 Volts, 0.35µ
- This has morphed into the CP3000 family...

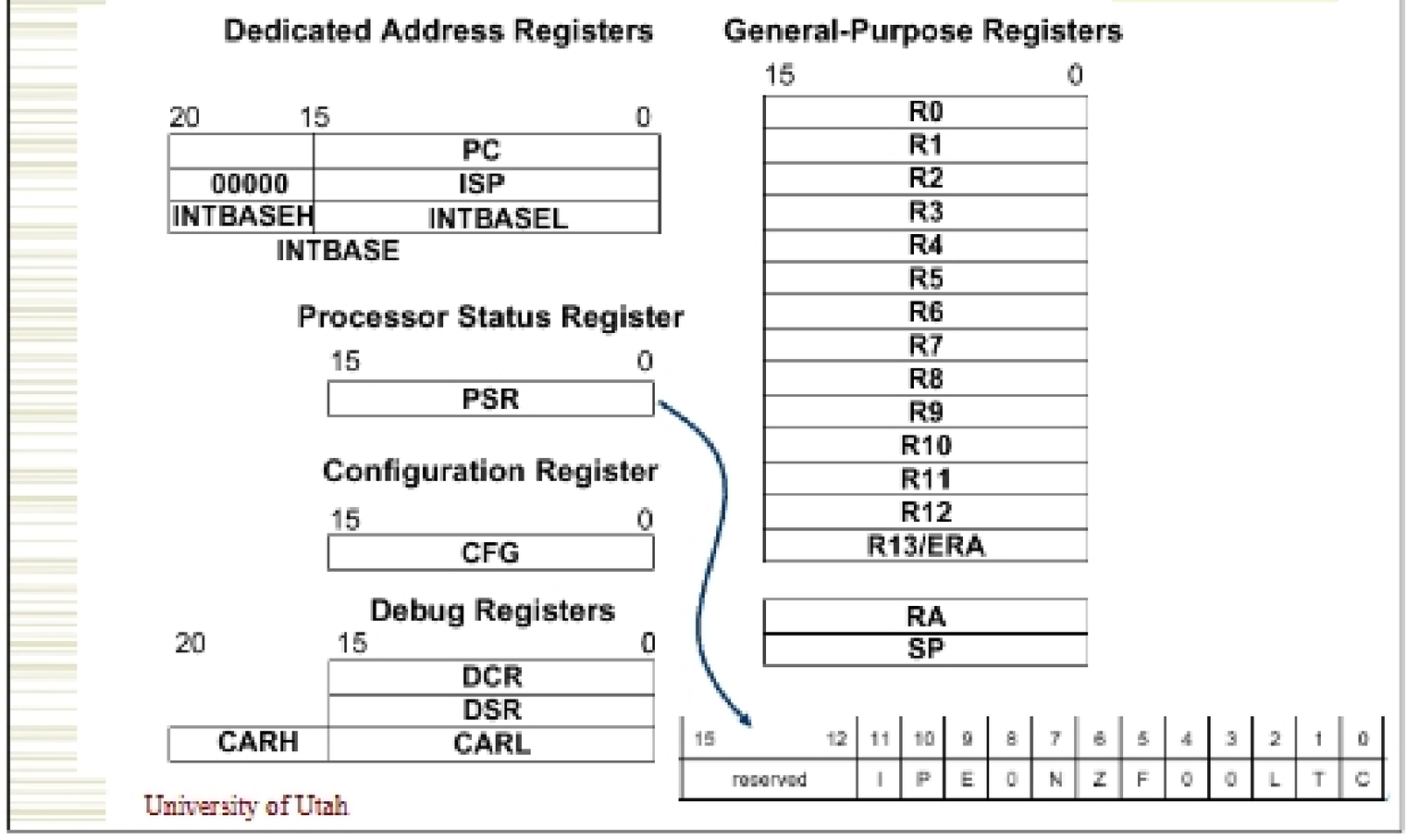
CR16 Architecture

- More specs…
  - Static 0 to 66 MHz clock frequency
  - Direct bit manipulation instructions
  - Save and Restore of Multiple Registers
  - Push and Pop of Multiple Registers
  - Hardware Multiplier Unit for fast 16-bit multiplication
  - Interrupt and exception handling

CR16 Block Diagram



CR16 Register Set

- All registers are 16 bits wide
  - Except address registers which are 21 bits
  - Original version used 18 bits…
- 16 general purpose registers
- 8 processor registers
  - 3 dedicated address registers (PC, ISP, INTBASE)
  - 1 Processor Status Register
  - 1 configutation register
  - 3 debug-control registers

CR16 Registers