

## CS/EE 3710

National Semiconductor CR16  
Compact RISC Processor  
Baseline ISA and Beyond...

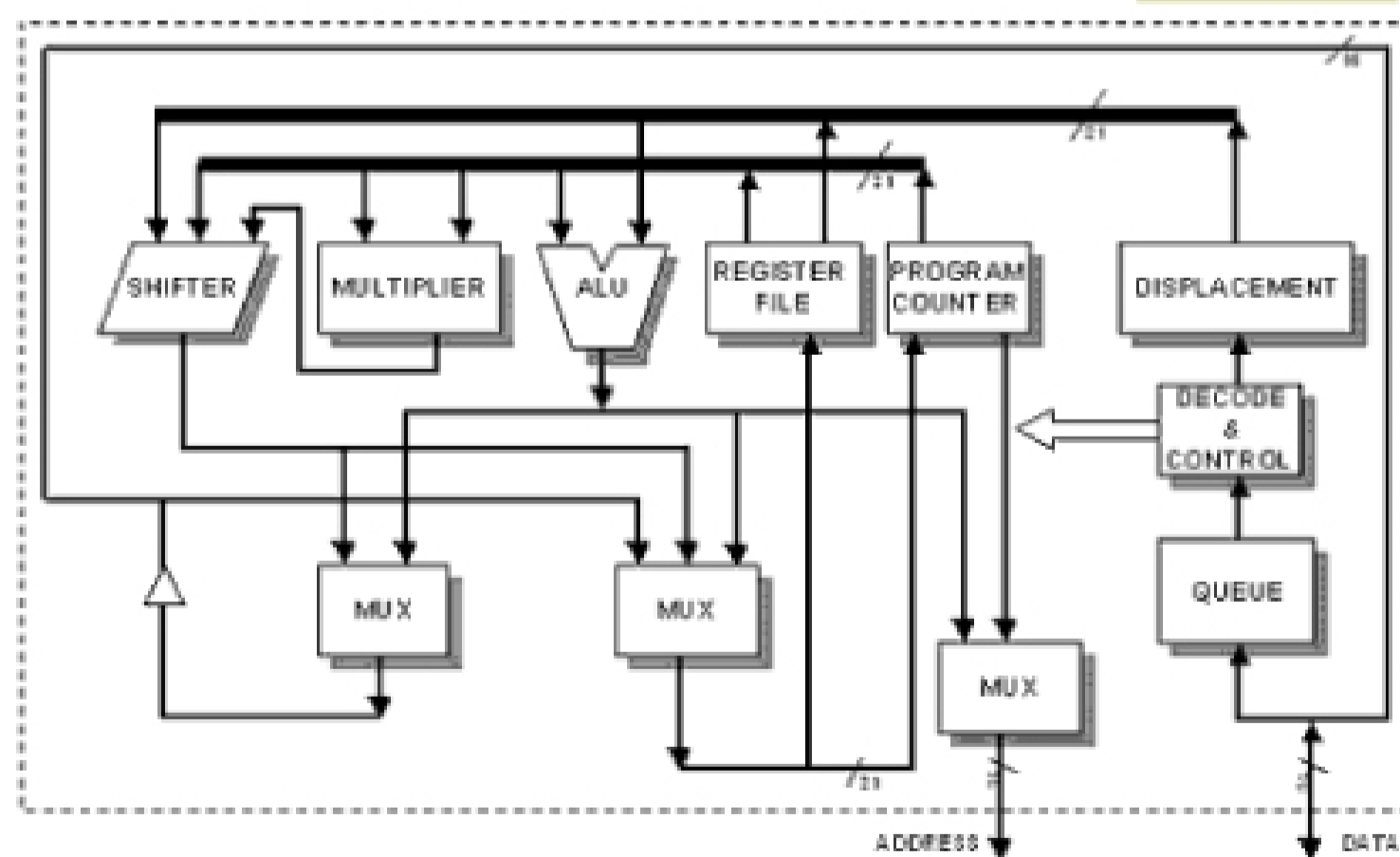
## CR16 Architecture

- ◆ Part of a microcontroller family from National Semiconductor
  - 16-bit embedded RISC processor core
  - Available in Synthesizeable Verilog HDL
  - Die size of 0.6 mm<sup>2</sup> @ 0.25μ
  - 2 Mbytes of linear address space
  - 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
  - Atomic memory-direct bit manipulation instructions
  - Save and Restore of Multiple Registers
  - Push and Pop of Multiple Registers
  - Hardware Multiplier Unit for fast 16-bit multiplication

## CR16 Block Diagram



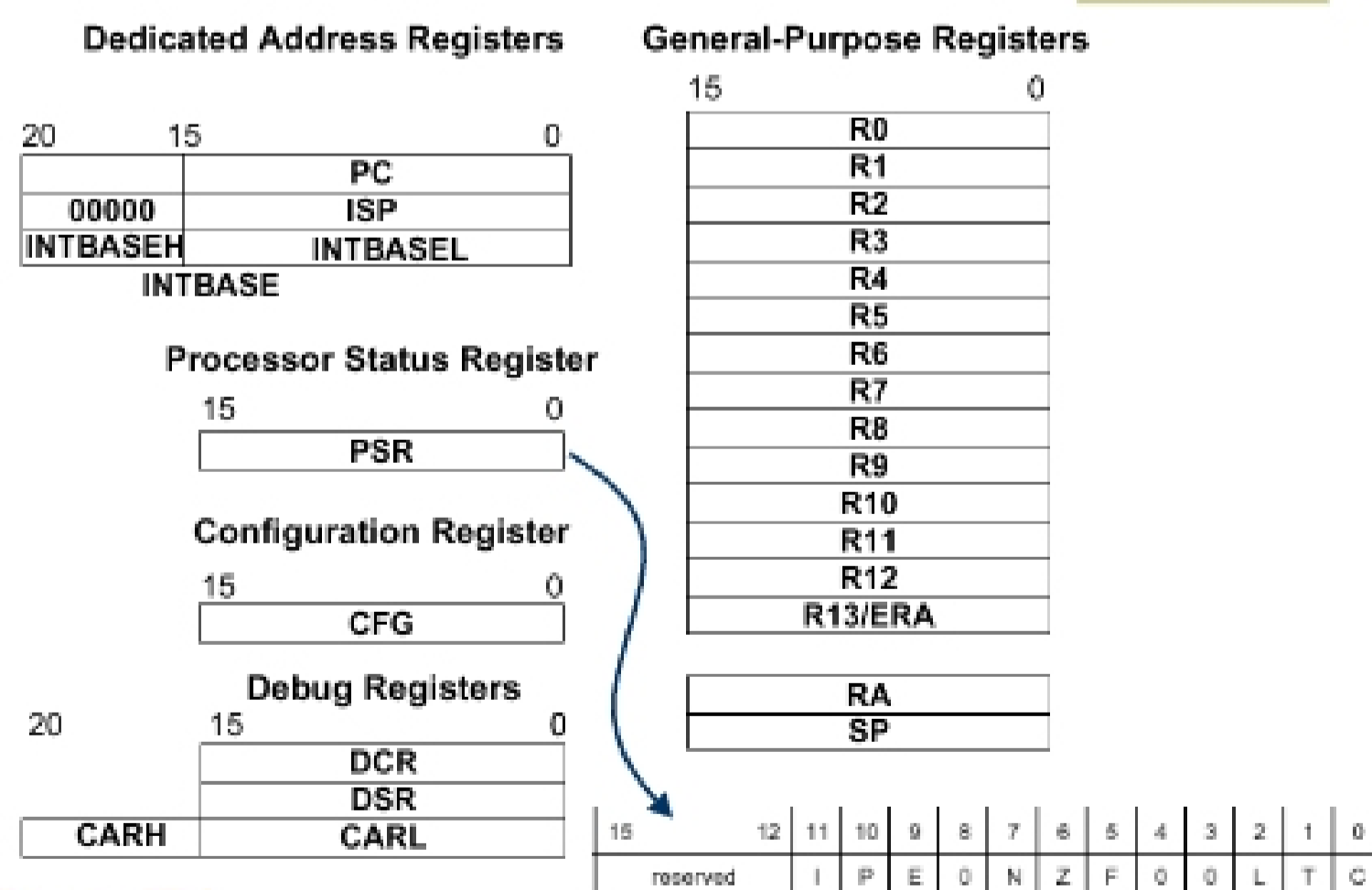
## CR16 Register Set

- ◆ 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 configuration register
  - 3 debug-control registers

University of Utah

CS/EE 3710

## CR16 Registers



University of Utah