

CS/EE 3710

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

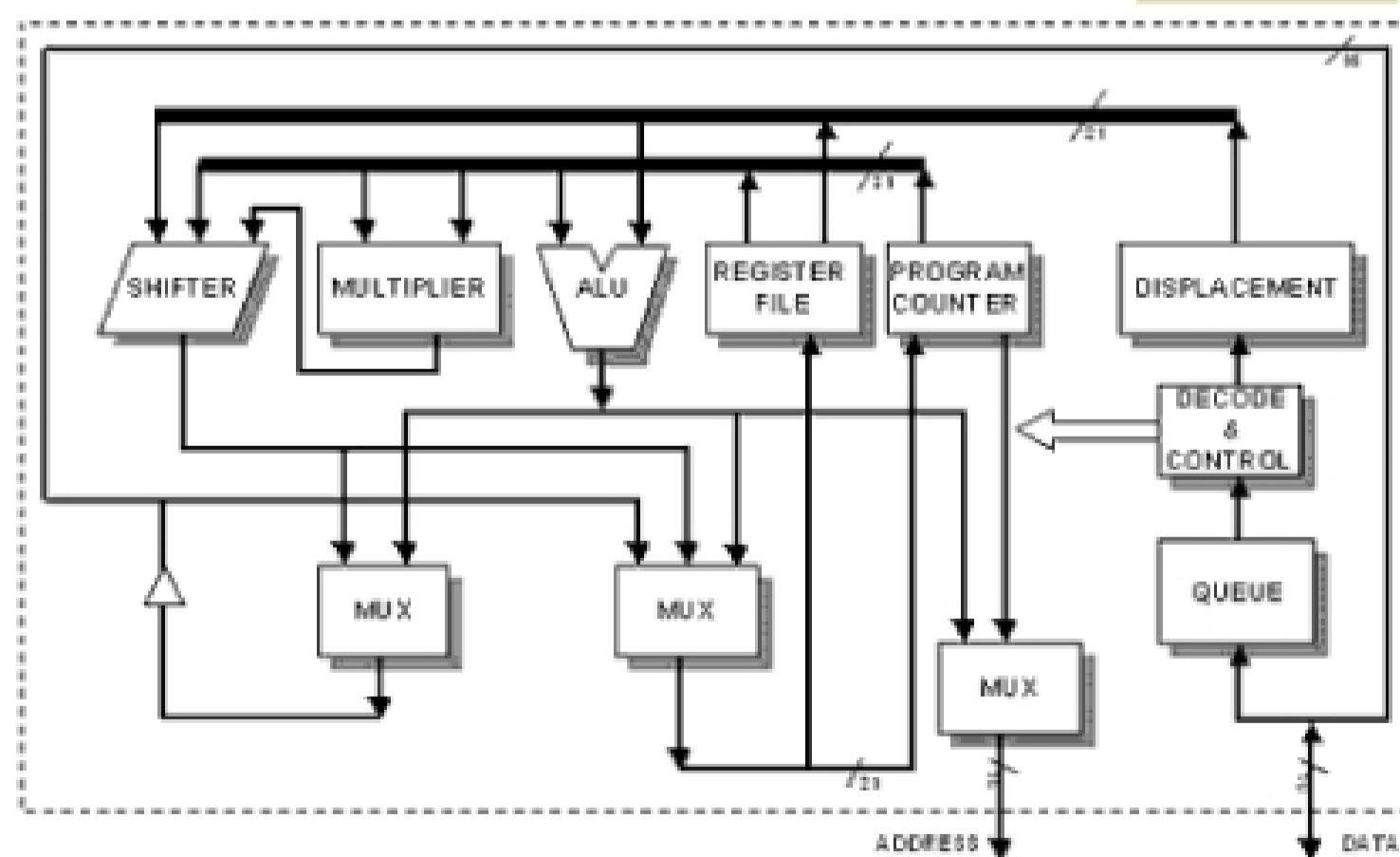
CR16 Architecture

- ◆ Part of a microcontroller family from National Semiconductor
 - 16-bit embedded RISC processor core
 - Available in Synthesizeable Verilog HDL
 - Die size of 0.6 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 configuration register
 - 3 debug-control registers

CR16 Registers

