

# HPC16083/HPC26083/HPC36083/HPC46083/HPC16043/ HPC26043/HPC36043/HPC46043/HPC16003/HPC26003/ HPC36003/HPC46003 High-Performance Microcontrollers

## General Description

The HPC16083, HPC16043 and HPC16003 are members of the HPC™ family of High Performance microControllers. Each member of the family has the same core CPU with a unique memory and I/O configuration to suit specific applications. The HPC16083 and HPC16043 have 8k and 4k bytes of on-chip ROM respectively. The HPC16003 has no on-chip ROM and is intended for use with external memory. Each part is fabricated in National's advanced microCMOS technology. This process combined with an advanced architecture provides fast, flexible I/O control, efficient data manipulation, and high speed computation.

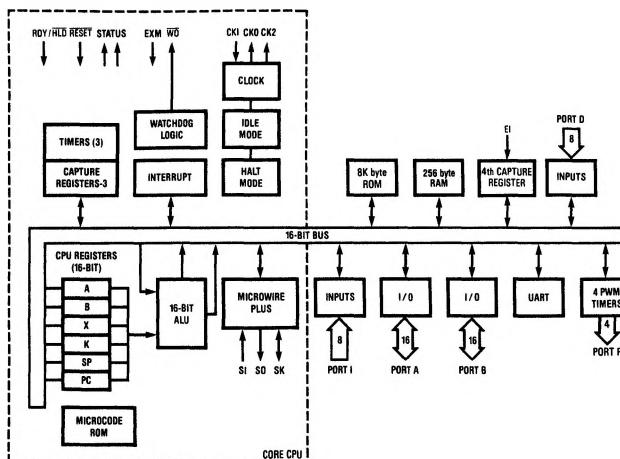
The HPC devices are complete microcomputers on a single chip. All system timing, internal logic, ROM, RAM, and I/O are provided on the chip to produce a cost effective solution for high performance applications. On-chip functions such as UART, up to eight 16-bit timers with 4 input capture registers, vectored interrupts, WATCHDOG™ logic and MICROWIRE/PLUSTM provide a high level of system integration. The ability to address up to 64k bytes of external memory enables the HPC to be used in powerful applications typically performed by microprocessors and expensive peripheral chips. The term "HPC16083" is used throughout this data-sheet to refer to the HPC16083, HPC16043 and HPC16003 devices unless otherwise specified.

The microCMOS process results in very low current drain and enables the user to select the optimum speed/power product for his system. The IDLE and HALT modes provide further current savings. The HPC is available in 68-pin PLCC, LCC and PGA packages.

## Features

- HPC family—core features:
  - 16-bit architecture, both byte and word
  - 16-bit data bus, ALU, and registers
  - 64k bytes of external memory addressing
  - FAST—240 ns for fastest instruction when using 17.0 MHz clock, 134 ns at 30 MHz
  - High code efficiency—most instructions are single byte
  - 16 x 16 multiply and 32 x 16 divide
  - Eight vectored interrupt sources
  - Four 16-bit timer/counters with 4 synchronous outputs and WATCHDOG logic
  - MICROWIRE/PLUS serial I/O interface
  - CMOS—very low power with two power save modes: IDLE and HALT
- UART—full duplex, programmable baud rate
- Four additional 16-bit timer/counters with pulse width modulated outputs
- Four input capture registers
- 52 general purpose I/O lines (memory mapped)
- 8k or 4k bytes of ROM, 256 bytes of RAM on chip (HPC16083, HPC16043)
- ROMless version available (HPC16003)
- Commercial (0°C to +70°C), industrial (-40°C to +85°C), automotive (-40°C to +105°C) and military (-55°C to +125°C) temperature ranges

## Block Diagram (HPC16083 with 8k ROM shown)



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