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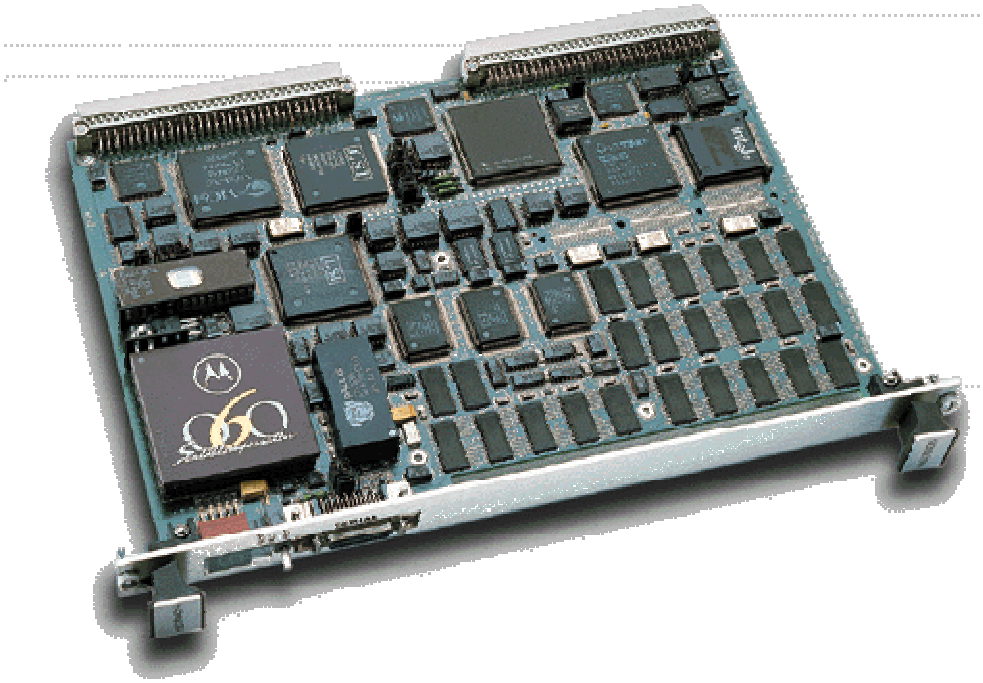
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Nitro240/260 CPU Board



Scalable 680x0 VME board for I/O intensive applications

- Nitro260 features a 50 MHz MC68060 CISC processor with superscalar pipeline architecture for maximum integer and floating point performance
- Nitro240 features a 33 MHz MC68040 CISC processor for economical integer and floating point performance
- MC68360 Quad Integrated Communication Controller - QUICC(TM) for flexible, high-speed serial communication
- 8, 16, 32, or 64 Mbytes of 2-way interleaved DRAM
- Up to 3.5 Mbytes user-accessible Flash Memory for large ROMed applications
- Optimized VME64 interface with sustained transfer rates in excess of 60 Mbytes/sec at 33 Mhz for demanding multiprocessing applications
- Flexible Corebus expansion bus fits standard and custom modules
- Two front-panel serial interface ports for flexible I/O
- ANSI-compatible SCSI II (fast and wide) interface and on-card Ethernet for high performance DMA-supported I/O
- In-house support for VxWorks and OS-9 real-time operating systems and development environments

- Quality assured by more than 20 years of experience, ISO 9001 certification and exclusive Gauntlet testing

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Heurikon's Nitro has been specifically designed to power real-time applications that demand high performance and reliable multiprocessing such as communications, high-speed printing, video-on-demand, machine vision, simulation, and other I/O intensive applications.

At the heart of the Nitro260 is Motorola's 50 MHz MC68060 CPU, and the Nitro240 is powered by the 33 MHz MC68040 CPU. The 68060 offers two to four times the performance of the 68040 and employs a superscalar architecture with dual 4-stage integer pipelines.

In addition to its two front-panel console serial ports, the board supports up to seven additional serial channels via Motorola's MC68360 QUad Integrated Communication Controller (QUICC). In its standard configuration, four of the QUICC chip's multi-protocol serial ports are routed through the VME P2 connector.

Two versions of the Nitro board are available: the Nitro60 is based on Motorola's 50 MHz .MC68060 processor, employing a superscalar architecture with dual 4-stage integer pipelines. The Nitro40 features the economical MC68040 processor and is fully compatible with the Nitro60

Wind River Systems' VxWorks and Microware's OS-9 software provide users with powerful real-time operating systems and a rich set of development tools.

Nitro's two front panel serial I/O ports provide multi-protocol data communications capability. A fast and wide SCSI II interface and on-board Ethernet; for high performance DMA supported I/O are included as standard.

Nitro240/260 Technical Specs

Bus Interface

- **VMEbus**
- VME64 architecture with 64-bit data path, 32-bit addressing and 7 bus interrupts
- Operates in Master or Slave Mode (Compliance Level: D64A32(7))
- 64-bit and 32-bit wide block transfers using local DMA capability
- System level controller functions including 4 level arbitration
- Uses VIC64 VMEbus interface chip optimized via custom ASIC
- 2K D64 block transfer rates:

  - Nitro240 version:
    - Read - 63.06 MBytes/sec
    - Write - 64.88 MBytes/sec
  - Nitro260 version:
    - Read - 49.48 MBytes/sec
    - Write - 51.39 MBytes/sec

- **Mailbox interrupts**
- Allows remote control of Nitro via specified VMEbus addresses
- CPU interrupt, reset and VMEbus lock functions supported
- **Corebus**
- Mezzanine bus providing migration path for board customization
- 32-bit address bus; 32-bit data bus
- Multimaster Module Synchronous Bus for intelligent modules operating at speeds synchronous with CPU clock, 106 Mbytes/sec 4 word burst transfers @ 33 MHz
- Asynchronous Module Peripheral Bus for simple, low speed I/O and module configuration

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Processor & Memory Options

- **MC68060**
- Operates at 50 MHz internal, 25 MHz external
- Superscalar architecture with dual 4 stage integer pipelines
- 8 Kbyte on-chip instruction cache
- 8 Kbyte on-chip data cache

- 256 entry branch cache
- 100% upward user-level code compatible with 68040
- **MC68040**
- Operates at 66 MHz internal, 33 MHz external
- 4 Kbyte on-chip instruction cache
- 4 Kbyte on-chip data cache
- 100% upward user-level code compatible with 68060
- **Random Access Memory**
- 8, 16, 32 or 64 Mbytes DRAM with parity on-card
- 2 bank interleaved architecture with write posting buffers
- 70 ns page mode DRAM
- One parity bit per byte
- Transparent discrete hardware refresh
- Burst read wait states: 3-0-1-0
- Burst write wait states: 3-0-1-0
- **Read Only Memory**
- Up to 512 Kbyte capacity
- Supports 64K, 128K and 512K
- **Flash Memory**
- Up to 4 Mbytes total Flash Memory
- 512 Kbytes used for monitor and power-on diagnostics)
- Provides field upgradeable non-volatile program storage
- **Timers/Counters**
- Real-time clock with 10 msec resolution
- Three 32-bit timer/counters with 62.5 ns resolution
- Interrupt capability

Peripheral I/O

- **Serial Communication Ports**
- Motorola MC68360 Quad Integrated Communication Controller (QUICC)
- 4 independent high speed communication ports
- Supports HDLC/SDLC, AppleTalk, BISYNC, V.14, X.21, Bit Stream, and Frame Based serial I/O protocols (additional software may be required)
- 32-bit internal and external transfers
- Automatically performs efficient packing
- RISC based Communications Processor Module for communication protocol handling
- Single Address Mode for fastest transfers
- 2 independent and 14 dedicated serial DMA channels
- 12 port C interrupts on P2
- Optional configurations for access to all 7 QUICC serial channels

- **Console Serial I/O**
- Two front panel serial I/O ports provided via ASIC
- Transfer rates up to 1 Mbit/sec obtainable (cable length dependent)
- Intel 8251A UART emulation
- **Ethernet Interface**
- Intel 82596CA 32-bit LAN coprocessor
- In excess of 1 Mbyte/sec throughput obtained using TCP/IP protocol
- On-chip DMA and memory management
- On-chip FIFOs
- Conforms to IEEE 802.3
- 10 BASE 5 interface on P2 connector
- **Small Computer Systems Interface (SCSI)**
- NCR 53C720 SCSI I/O processor
- ANSI compatible SCSI 2 (fast & wide) permitting connection of up to seven additional independent, compatible I/O controllers
- 8-bit single ended,16-bit single ended or 16-bit differential drivers via P2 connector
- Supports variable block size and scatter/gather data transfers
- Supports 32-bit word data bursts with variable burst lengths
- Full 32-bit on-chip DMA to speed up memory-to-I/O transfers without host CPU intervention
- 20 Mbytes/sec 16-bit synchronous performance
- 10 Mbytes/sec 8-bit synchronous transfers
- High level programmer's interface (SCRIPTS)
- Low-level programmability

Software support

- Wind River Systems' VxWorks real-time operating system and development environment
- OS-9 real-time operating system
- pSOS+ real-time operating system
- HKMON on-board monitor and power-on diagnostics

Physical Characteristics

- Multilayer with ground and VCC planes
- Board size: 23.35 cm x 16.0 cm (9.19 in. x 6.3 in.)
- Estimated power requirements: +5VDC @ 4.3A, +12VDC @ 50mA,-12VDC @ 30 mA
- Operating range: 0 - 55 C, 85% relative humidity (non-condensing)
- **Front Panel**

- Serial connectors
- User programmable 7 segment display
- Reset / Interrupt switch

Target Applications

- Communications system control
- Video on demand server
- High-speed printing
- Test systems
- Embedded control

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