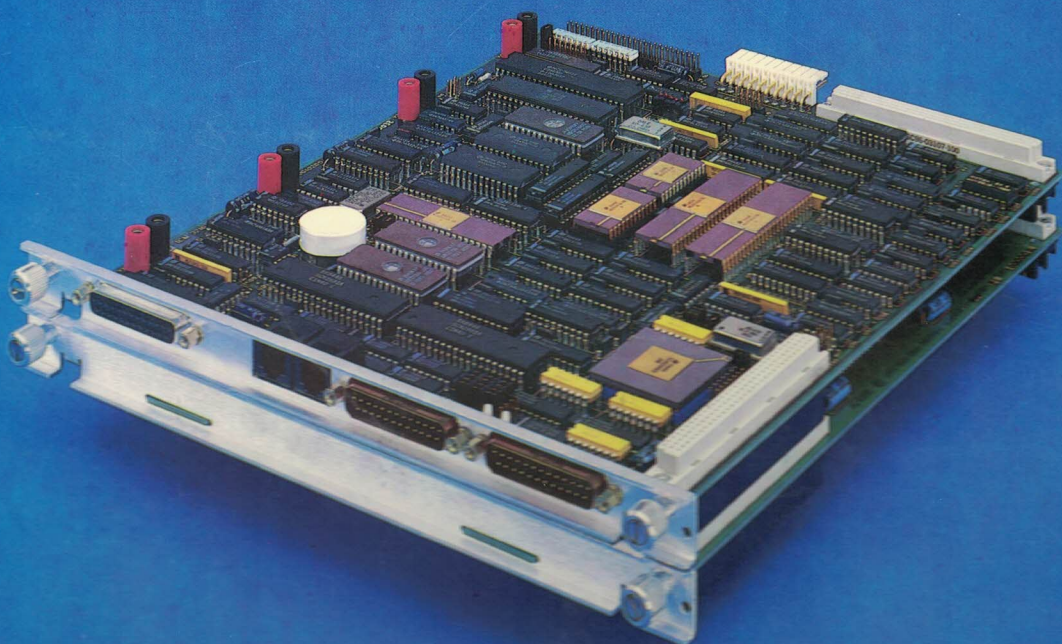# ICM-3216

A Series 32000 Based Board-Level Product with VAX Power at Microcomputer Cost.

ICM-3216: A Series 32000™ board-level product with VAX™ power at microcomputer cost.

The ICM-3216 is a complete computer system contained on two 11.02 inch (300 mm) by 9.18 inch (233 mm) printed circuit boards. This Integrated Computer Module will add the power of the Series 32000 processor chip set to National Semiconductor's line of board level microcomputer products. The CPU cluster, serial ports, printer port, SCSI interface and MiniBus Interface reside on the CPU unit. Memory resides on one printed circuit board which is the same size as the CPU unit. It provides one to eight megabytes of memory and interfaces to the CPU via a local memory bus with no wait states at 10 MHz.

ICM-3216 Feature Highlights:

- Uses the complete Series 32000 chip set (CPU, TCU, MMU, FPU and ICU).
- 1 to 8 megabytes of 150 nsec DRAM providing CPU access to memory with no wait states when operating at 10 MHz.
- Four RS232 compatible serial ports.
- Centronics compatible parallel port.
- Small Computer System Interface (SCSI).
- "MiniBus" expansion bus for interfacing special purpose modules.

Small Computer System Interface (SCSI)
ICM-3216 supports the full SCSI interface. The SCSI interface is an ANSI standard and supports the control of mass storage devices like rigid disk, floppy disk and streaming tape. The interface is controlled by an I/O channel controller supporting the full asynchronous SCSI protocol, including arbitration and recognition. The full SCSI bandwidth of 1.5 megabytes per second in or out of memory is supported.

MiniBus
MiniBus is used to provide interface between the CPU unit and "personality" units. Currently under design are graphics, Ethernet® and serial I/O modules. MiniBus is a high performance 16-bit synchronous bus and uses an LSI single chip bus interface controller which provides full bus compatibility.

Operating System
System V/Series 32000 has been ported to this system. System V/Series 32000 is a validated port of UNIX System V Release 2.0 version 2. This operating system provides optimal use of the Series 32000 architecture. It supports demand-paged virtual memory and offers Job Control as well as File and Record Locking. "C" and FORTRAN compilers, the Series 32000 assembler and all 32000 language support tools are provided. Reconfigurable binary drivers have been written for rigid disk, streaming tape, serial ports and the parallel port.

This operating system is available on streaming tape as an unbundled binary system. The source for the above drivers will be provided for use as examples for those wishing to generate their own drivers.

National Semiconductor Corporation
MICROCOMPUTER SYSTEMS DIVISION

ICM-3216 Block Diagram

CPU BOARD

CPU CLUSTER
NS32016 CPU
NS32201 TCU
NS32082 MMU
NS32081 FPU
NS32202 ICU

RS232
SERIAL INTERFACE

PARALLEL
PRINTER
INTERFACE

ARBC
ARBBUS

I/O
CONTROLLER
(SCSI)

CLOCK/
CALENDAR

SCSI
TARGETS

MEMORY BOARD

1 TO 8
MBYTE
DRAM

National Semiconductor
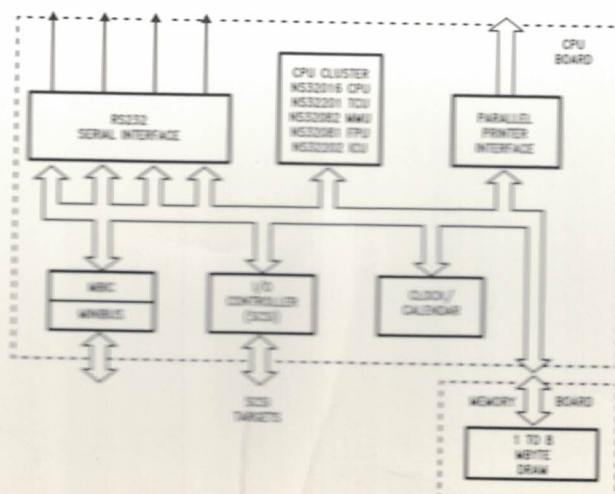
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