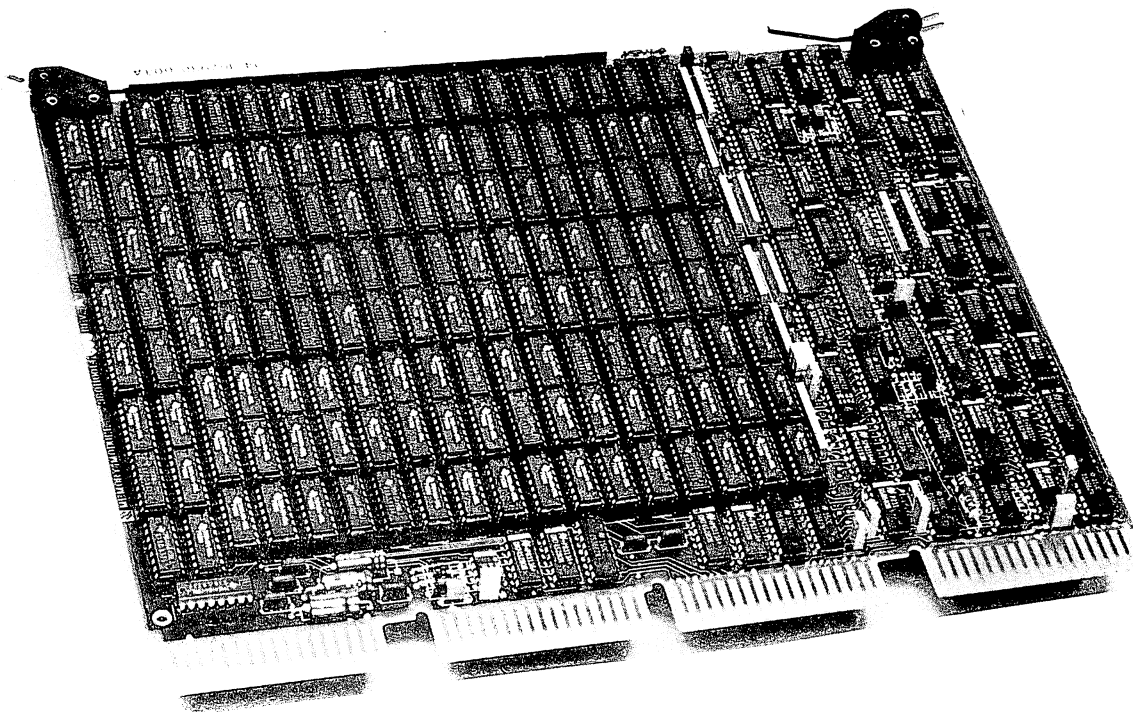


NS23S RAM Memory Card

512K/2048K x 18 Bits



- LSI-11 Q-Bus compatibility
- Block-mode DMA transfer
- Parity generation & checking
- LED parity-error indicator
- 18/22 bit addressing option
- Selectable I/O space (2, 4, 8-KB)

- 1.0M-Byte capacity
- DEC-compatible CSR
- 50 nsec access time
- "Quad" width card
- Socketed RAMs

2.0MB + 4.0MB
capacity
available
using 256K DRAM's

Description

National's NS23S is a 512K x 18 (1.0MB) dynamic random access memory card fully compatible with all Q-Bus systems, including all LSI-11, LSI-11/23 Plus, LSI-11/73 and Micro/PDP-11 systems. The card features very high speed, high density packaging and options not previously available to significantly improve system performance.

The design includes a block-mode DMA transfer ("auto-increment") option which allows the new disk controllers to transfer a block of 16 words to memory with only one initializing address cycle. Sequential disk transfers to/from memory can now be accomplished in half the time required with older systems, where every data cycle is multiplexed with an associated address cycle.

The NS23S also improves system performance through the use of high-speed (150ns) DRAM's and a unique cycle-initiate scheme which provides Q-Bus access times of 50ns on both Read and Write operations.

The NS23S includes an on-board Control & Status Register (CSR) and parity generation and checking

circuitry, which are required for operation in the LSI-11/23 Plus and Micro/PDP-11 systems. The CSR allows program control of certain parity functions and provides diagnostic information if parity error occurs, permitting the user to locate the 4K block where the error occurred.

In addition, the NS23S provides a visual output via a red LED, in event a parity error is detected. This aids in isolating a faulty card where several memories are employed in a system. The memory is totally compatible with DEC's hardware and software, so all standard system diagnostics can be used to identify a fault. The Installation Guide shipped with the card provides a DRAM locator chart to allow isolation to a specific part, which can then be replaced on-site, since the DRAM's are mounted in sockets. The NS23S can be optionally configured for either the older 128K-word (18-bit) addressing space, or for LSI-11/23, Micro/PDP-11, and LSI-11/73 4MB (22-bit) address space. In either case, the card can be assigned anywhere in the address field, beginning on 4K-word boundaries.

Performance Characteristics

Timing

Function	Mode	Access	Cycle
READ	DATI	50 ns	450 ns
WRITE (byte)	DATO (B)	50 ns	450 ns
R/M/W (byte)	DATIO (B)	700 ns	925 ns
READ (Block)	DATBI	50 ns	450 ns
WRITE (Block)	DATBO	50 ns	450 ns

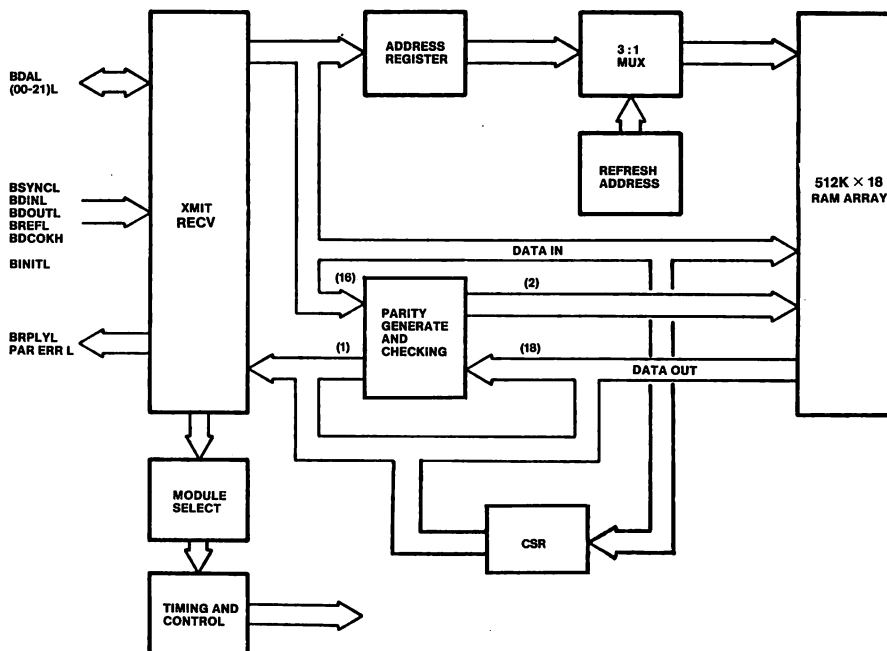
Power

Operating: +5.0 Volts, 4.0 amps (max.)
 Standby: +5.0 Volts, 2.8 amps (max.)
 Battery backup: +5.0 Volts, 1.7 amps (max.)

Compatibility:

Memory: Compatible with DEC MSV11-L series
 Backplanes: All DEC Q-Bus backplanes, except the H9281 Series.

NS23S Functional Block Diagram



LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



National Semiconductor Corporation
 2900 Semiconductor Drive
 Santa Clara, Calif. 95051
 U.S.A.
 Tel. (408) 7 21 50 00
 Telex (910) 339-9240

National Semiconductor GmbH
 Industriestraße 10
 D-8080 Fürstenfeldbruck
 West Germany
 Tel. (08141) 103-0
 Telex 5 27 649

National Semiconductor GmbH
 Fürstennieder Straße 5
 D-8000 München 21
 Tel. (089) 5 60 12-0
 Telex 5 22 772

National Semiconductor (UK) Ltd.
 301 Harpur Centre,
 Horne Lane,
 Bedford
 MK401TR
 Tel. (0234) 4 71 47
 Telex 826 209

National Semiconductor S.A.
 Expansion 10000
 28, rue de la Redoute
 F-92260 Fontenay-aux-Roses
 Tel. (1) 660.8140
 Telex 250 956

National Semiconductor S.p.A.
 Via Solferino, 19
 I-20121 Milano
 Tel. (02) 6596140/6/7/8/9
 Telex 332835