

**National Semiconductor Corporation**

**NS638**

**MicroVAX II™ Memory Module**

**Installation Guide**

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## 1. INSTALLATION

### 1.1. General

This document contains the basic information necessary for installing the *NS638* Memory Card. The *NS638* was designed to be used in the MicroVAX II™ line of computers and can be operated with, or in place of, the Digital Equipment Corporation (DEC®) model MS630 memory boards. The *NS638* is completely hardware and software compatible with the MicroVAX II systems by emulating two of DEC's MS630 models.

Please read this document in its entirety before proceeding with the installation of the unit.

### 1.2. Tools Required

No special tools are required for installation of the *NS638*. However, a pair of needle nose pliers will aid in installing or removing the slip-on configuration jumpers.

### 1.3. Unpacking and Inspection

Carefully unpack the memory module and visually examine it for damage, i.e. dented, bent or broken parts. Avoid touching the connector fingers along the bottom of the board.

#### CAUTION

Do not attempt to install or operate the memory card if any physical damage is apparent. Contact National Semiconductor for further instructions.

Examine the connector fingers very carefully for fingerprints or any foreign deposits. If any, use a soft cloth with alcohol or freon to clean the contacts before insertion into the system backplane.

### 1.4. System Integrity Verification

Prior to installing the *NS638*, all applicable tests and diagnostics should be run to verify the system integrity. If a problem is detected it should be corrected before proceeding with the installation of the memory card.

### 1.5. System Memory Capacity

The *NS638* memory card is configured at the factory for systems using less than the full 16 MByte memory capacity. If a full capacity system is being configured by installing two *NS638* memory modules, a jumper must be moved to indicate this configuration to the system. Table 1 indicates the System Memory Capacity jumper settings.

Table 1 - System Memory Capacity

Capacity	W1	W2
Less than 16 MBytes	Out	In
16 MBytes	In	Out

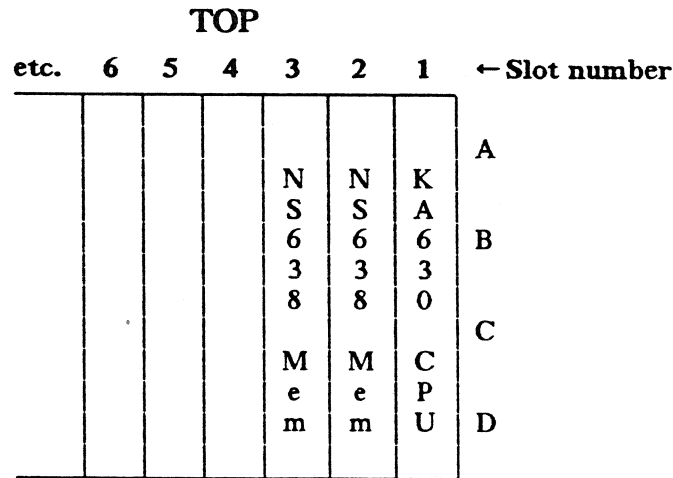
The W1 and W2 jumpers are located to the left of the memory array about three inches from the bottom of the board. Both jumpers share a common post. According to the positions shown on Table 1, the jumper will be installed in the vertical position for systems configured for 16 MBytes and in the horizontal position otherwise.

**1.6. Backplane Slot Selection**

The MicroVAX II backplane is organized as shown on Figure 1, where the memory expansion slots are indicated as slots 2 and 3. Choose slot 2 (closest to the CPU) for installation of the NS638 if no expansion memory is already in place (otherwise use slot 3).

Some memory modules fail to propagate from slot 2 to slot 3 the required memory signals (e.g. DEC's M7607) and should be placed in slot 3 with the NS638 inserted into slot 2. Note that no empty slot may exist between the expansion memory and the CPU.

**Figure 1 - MicroVAX II Backplane**



where: Slot 1 CPU  
 Slot 2,3 Expansion Memory  
 Slot rest Q-Bus I/O

If any dual-wide memory expansion card is moved, make sure it is placed into the bottom two (C and D) connectors of a given slot with a DEC M9047 grant card occupying the upper two (A and B) connector locations. Note that any unoccupied memory expansion slot *must* have a grant card inserted into the A and B connector locations.

**1.7. NS638 Installation**

To install the NS638 memory board, perform the following steps:

- 1) Carefully insert the NS638 memory board into the chosen slot and tighten the two card ejectors, making sure not to damage any ribbon cables or connector ejector clips in the process.
- 2) Connect the tagged end of the three-connector 50-pin data ribbon cable (supplied by DEC with the MicroVAX II system) to the CPU module. The cable is not polarized and can be inserted in either of two ways; just make sure no twists are introduced on

the cable.

- 3) Connect the middle connector of the cable to the memory board located in expansion slot 2. Tighten the latches to make sure that the connector is firmly attached to the header.
- 4) Repeat step 3 with the memory module located in expansion slot 3, if present. Leave dangling if no board is installed into that slot.
- 5) Apply power to the unit and verify that the LED on board the *NS638* is not lit. If "on", toggle switch S1 and the LED should go off. See next section for details on the use of switch S1.
- 6) Verify by running diagnostics or booting the operating system that the installed memory is visible and available to the system.

In MicroVMS™, *SHO MEM/PH* will show all configured memory as well as any bad pages. If the results are not as expected, check whether any memory size restrictions have been imposed via *GBLPAGES*, *PAGEDYN*, *NPAGEDYN*, *NPAGEVIR*, *VIRTUAL-PAGECNT*, *WSDEC*, *WSINC*, *WSMAX*, etc. during of a previous Sysgen process.

NOTE
When configuring a 16 MByte system, <i>SHO MEM/PH</i> should indicate all memory as being present with two pages (1 kByte) bad. This is to be expected since those pages are reserved by the system.

- 7) Close the backplane cover door and replace the side panel of the enclosure. The installation is now complete.

### 1.8. On/Off-Line Switch

The on/off-line switch, S1, is a feature that allows the user to disconnect the *NS638* memory board from the system data bus without having to physically remove the board from the backplane. A red LED near the switch will be ON if the board is off-line.

The MicroVAX II system is designed to detect failing areas in memory and to reconfigure itself to only utilize those areas which it has detected as being operational. It does this by mapping out the pages containing any identified failures.

The user will never have the need to utilize the *NS638's* off-line feature due to any RAM component failures, but may find this feature useful in case a catastrophic failure of a data interface component occurs or as a convenience during DEC's system maintenance procedures. The 1 Megabyte of memory resident on the CPU module will allow system operation to proceed at reduced performance with any expansion memory modules disabled or not present.

Please note that configuration of the system for 16 MBytes disables the 1 MByte memory on the CPU, therefore in this specific case, both *NS638s* must be placed off-line to enable the CPU memory. It should also be noted that the MicroVAX II system will not size memory past the first "removed" memory card, so if the card in slot 2 is deactivated, any memory in slot 3 will not be correctly recognized by the system.

**1.9. Further Assistance**

If any problems occur during installation, please do not hesitate to call National Semiconductor Technical Support for assistance.

## 2. MAINTENANCE

### 2.1. General

The *NS638* itself does not require maintenance on a regularly scheduled basis. System diagnostics should be run from time to time to verify correct operation.

### 2.2. Troubleshooting

In the event problems are encountered after all the installation steps have been completed:

- 1) Check to make sure that all power supplies are operational. Verify that +5V is applied to the backplane. Be sure power supplies are within tolerance.
- 2) Make sure the on/off-line switch is in a position such that the *NS638* is enabled, i.e., with the on-board LED extinguished.
- 3) Be sure the system is configured properly. Verify that all modules are installed with the components facing towards the CPU slot.
- 4) Verify that the DMA priority chain is maintained by either installed modules or DEC M9047 grant continuity cards.
- 5) Make sure that all system cables are properly installed and that the cables are connected at each end. Verify that the data cable is intact and does not exhibit any damages.
- 6) If other memory expansion modules are present (e.g. DEC's M7607), repeat the installation with the *NS638* installed into slot 2. Some modules fail to propagate the required memory control signals from slot 2 to slot 3.
- 7) If the problem persists, remove the *NS638* from the system, replace the M9047 grant card into the top connectors (A and B), and restart the system. The system should be operational at a reduced performance. If not, call for DEC maintenance.