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**DATA SHEET**

**MODEL 453**

**Adaptor connects a NuBus computer to a VMEbus system**

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Bit 3's Model 453 Adaptor is a two card, high-bandwidth interface that connects an Apple Macintosh NuBus computer to a VMEbus system. Model 453 supports high-speed data transfers that allow fast, cost-effective sharing of memory and special purpose cards between systems. Inter-system communication is via random access reads and writes.

Model 453 allows a Macintosh computer to function as a bus master in the VMEbus system. Operating as the bus master, the Macintosh can directly control and monitor any card in the VMEbus chassis and can exchange interrupts with the VMEbus. Through the Adaptor, VMEbus users can take advantage of all resources in the Macintosh chassis.

The Model 453 Adaptor unites the NuBus and VMEbus so that:

- The Macintosh can directly address resources on the VMEbus system as though they were local.
- Random access reads and writes can be executed from the NuBus to the VMEbus.
- I/O commands and interrupts can be passed between systems.

Plus, the Macintosh processor can function as either a coprocessor or the only bus master processor in a remote VMEbus chassis.

Model 453 is more than a repeater-type device. With the Bit 3 Adaptor, each bus operates independently. The timing of the two buses is linked only when a memory or I/O reference is made to an address on one system that translates to a reference on the other. The integrity of the interface between the Adaptor cards is maintained by parity checks on address, control, and data lines.

The Adaptor functions as a slave NuBus device allowing memory references to it to pass to the VMEbus chassis. Although the VMEbus can not directly address the Macintosh computer, data can be passed by VMEbus masters to and from the NuBus via an optional shared Dual Port RAM card.

Other Bit 3 Adaptors, supporting a wide variety of buses, can be used with Model 453 Adaptors to connect multiple computers and systems in star, daisy-chain or modified star/daisy-chain configurations.

COMMUNICATION BETWEEN SYSTEMS

The Model 453 Adaptor supports several methods of inter-system communication, including: Direct Mode Memory Mapping, Dual Port RAM and I/O Windowing.

Memory Mapping provides an easy-to-use, flexible interface with low overhead that permits two processors to communicate via random-access memory reads and writes. Geographic addressing (the address of the Adaptor

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When configured for Super Slot Addressing, the super slot space available to the NuBus Adaptor card is divided into four 64M byte segments. One segment is allocated for accessing the VMEbus. A 16M byte sub-section of the 64M byte segment can be used to directly access the entire 24-bit VMEbus address space.

The VMEbus system can also be addressed through a 256K byte window in NuBus slot space. The window can be mapped to access all 16M bytes of 24 bit VMEbus address space. Mapping is accomplished via the Address Page Register on the NuBus Adaptor card, or by setting the address bias jumpers on the VMEbus Adaptor card.

Both slot space mapping methods extend the 256K byte window by adding address bits A18 - A24. There are, however, differences that may indicate use of one method over the other for certain applications. Specifically, the Address Page Register is programmed; therefore, it can be dynamically changed at run time. Address bias jumpers are hardware configured to set a fixed address and can also be used to confine VMEbus activity to specific window size up to 16M bytes.

Communication is also available via an optional Dual Port RAM card installed on the VMEbus Adaptor card. Dual Port RAM provides a memory buffer, saves the cost of additional memory (  ; and requires no additional VMEbus card slots.

http://www.bit3.com:80/ds453.html Go SEP OCT FEB 30 1995 1996 1997 About this capture
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The optional Dual Port RAM provides shared memory space accessible by random access reads and writes from either system. Dual Port RAM access uses only the bandwidth of the accessing bus. Therefore, transfer speed is increased and data can be exchanged with minimal impact on the performance of the other system's bus. Both systems can access Dual Port RAM simultaneously with the Adaptor arbitrating accesses.

Dual Port RAM cards now available from Bit 3, include: 32K, 128K, 1M, 2M, 4M and 8M byte cards.

I/O Windowing allows a NuBus processor to directly address all 64K bytes of VMEbus Short I/O Address Space.

Data transfers are 8-bit bytes, 16-bit words, or 32-bit longwords for both memory and I/O cycles. The VMEbus Adaptor card may also be configured as D16; in which case, 32-bit NuBus data transfers are split into two 16-bit VMEbus data transfers.

INTERRUPT AND ERROR HANDLING

Model 453 allows one signal per slot to interrupt the Macintosh mothercard. The interrupt can be generated by:

- Pending VMEbus interrupts (IRQ4 - IRQ1).
- A programmed interrupt to the NuBus.
- An Interface Error Interrupt activated when a timeout, parity error or bus error condition is detected on an Adaptor card.

A 16-bit Interrupt Status Register allows the interrupt handling routine to determine the source of the interrupt. Interrupt priority is assigned by software.

Error signals can be configured to result in an interrupt. If not specifically configured, an error signal will set a bit in the Error Status Register. This register can be polled by the user.

VMEbus SYSTEM CONTROLLER CAPABILITY

In addition to VMEbus control and bus master capabilities, the Model 453 Adaptor can function as the VMEbus system controller, if no other card is doing so. If the VMEbus system is to be used primarily as an expansion chassis for slave VMEbus cards, this feature saves the expense of an additional VMEbus system controller.

- Random access reads and writes from the NuBus to VMEbus devices.
- Flexible mapping of VMEbus memory and I/O address space to NuBus slot and super slot address space.
- A32 Addressing, and D16 or D8 Data Transfer mode support.
- NuBus Adaptor card meets IEEE 1196 specifications.
- VMEbus Adaptor card meets IEEE 1014 specifications.
- Write pipelining to the remote VMEbus or Dual Port RAM allows the NuBus processor to execute an instruction before a write is complete.
- NuBus 32-bit longword transfers can be split into two 16-bit transfers for the VMEbus.
- Add up to 8M bytes of shared memory via optional Dual Port RAM cards.
- Support for byte and word swapping in hardware.
- Interrupts can be exchanged between a VMEbus and NuBus.
- Parity checking on address, control and data lines on the NuBus Adaptor card and on the interface between Adaptor cards.
- Macintosh memory and I/O operations with the VMEbus may be 8-bit bytes, 16-bit words, or 32-bit longword transfers.
- Status register shows parity, timeout and bus error status. Status error interrupt supported.
- Round EMI-shielded cable to 25 feet.
- Recognized under the component program of Underwriter Laboratories, Inc.

REQUIRED COMPONENTS

- One NuBus Adaptor card (included in Model 453 package).
- One 6U VMEbus Adaptor card (included in Model 453 package).
- A round EMI-shielded cable to connect the Adaptor cards (purchased separately from Bit 3).

*Each Model 453 package contains: one NuBus Adaptor card, one VMEbus Adaptor card, a Utilities Diskette and a manual. A cable is required but is ordered separately so that you can specify the appropriate length for your installation.*

OPTIONS

- Dual Port RAM

```
32K byte            Model 400-201

128K byte            Model 400-202

1M byte            Model 400-203

2M byte            Model 400-204

4M byte            Model 400-205

8M byte            Model 400-206
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- Cable (one required)

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8' Round EMI-Shielded            Model 400-107

25' Round EMI-Shielded            Model 400-108
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Bulkhead connector configurations (contact Bit 3 for configurations)

Specifications subject to change without notice.

Pub. No. 100,173 06/91

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# NOTICE

Effective April 1, 1997

**Model 453**

NuBus To A34/D22 VMEbus Will Be Discontinued.

Repair Service Will Be Available Through April 1, 2005.

Orders for products will be accepted up to
March 1,1997 depending upon product availability.

No substitute available.

October 1, 1996

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Revised: October 22, 1996

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