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DATA SHEET

MODEL 422

Adapter connects a VMEbus system to a MULTIBUS 1 computer

Share memory and special purpose cards between a VMEbus system and a MULTIBUS I computer with Bit 3's easy-to-use, cost-effective Model 422 Adaptor. The Model 422 Adaptor provides high-speed data transfers between the VMEbus and MULTIBUS I and requires minimal software support.

The Model 422 Adaptor allows:

- Both systems to directly address resources on the other system as though they were local.
- Random access reads and writes to be executed between systems.
- Blocks of data, I/O commands, and interrupts to be passed between systems.

The Adaptor can be configured in a transmitter/receiver or transmitter/transmitter relationship. In a transmitter/receiver configuration, the Adaptor card in one system functions as a slave device allowing memory references to it to pass to the other chassis. When configured for transmitter/transmitter capability, both systems can function as a transmitter and appear as a bus master processor on the other system. No intermediate software drivers are required for the bus master to communicate with memory or I/O on the other system.

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.

Other Bit 3 Adaptors, supporting a wide variety of buses, can be used with Model 422 Adaptors to connect multiple computers and systems in star, daisy-chain or modified star/daisy-chain configurations.

COMMUNICATION BETWEEN SYSTEMS

Model 422 uses Memory Mapped inter-system communication to control access to remote bus RAM, dual-port memory, and remote bus I/O.

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. Each system can access up to 16M bytes of memory in the other system through a window in the accessing system's bus address space.

The address location and size of three separate memory windows are selected by configuration jumpers. The windows provide access to the following:

- Remote bus memory space,
- Remote bus I/O space,
- Optional Dual Port RAM.

Two Memory Mapping techniques are supported: Direct Mode (with address biasing) and Page Mode. Either technique may be used to control access to remote bus memory and dual-port memory. Access to remote bus I/O is not affected by the mapping mode.

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Direct Mode has a one-to-one relationship between address windows. Data are transferred through one window directly into an equal size window on the other bus.

In Page Mode, a 64K byte window in the host's bus address space is coupled with an 8-bit programmable register. The address within the window provides the lower 16 address bits. The I/O register provides the upper eight bits of the 24-bit destination address. Thus, the host system can scan 16M bytes of memory in the destination system by paging through the destination system's address space.

Memory Mapping also controls access to dual-port memory. Dual Port RAM is an optional card installed on either Adaptor card. Dual Port RAM provides a memory buffer; saves the cost of additional memory cards; and requires no additional VMEbus card slots.

Optional Dual Port RAM provides shared memory space that is accessible by random access reads and writes from either system. Dual Port RAM access uses only the bandwidth of the accessing bus. Consequently, 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; the Adaptor arbitrates accesses.

Dual Port RAM cards now available from Bit 3 for the Model 422 Adaptor, include: 32K, 128K, 1M, 2M, 4M, and 8M byte cards.

Memory Mapping is also used to control access to remote bus I/O.

INTERRUPT AND ERROR HANDLING

Model 422 supports interrupts from three sources:

- Any combination of four VMEbus backpanel interrupts, IRQ4 - IRQ1, can be passed to the MULTIBUS I computer. Conversely, any four MULTIBUS I interrupts can be passed to the VMEbus system.
- Programmed interrupts can be passed in either direction.
- The Interface Error Interrupt can be activated when a timeout or parity error condition is detected on an Adaptor card.

An Adaptor card control register provides acknowledgment of interrupts and vector passing.

SYSTEM CONTROLLER CAPABILITY

If there is no system controller in the VMEbus application, the VMEbus Adaptor card can be configured with jumpers to drive the VMEbus SYSCLOCK and to act as a single level bus arbiter on level 3. Also, if there is no system controller on the MULTIBUS, the MULTIBUS Adaptor card can be configured with jumpers to drive BCLK and CCLK on the MULTIBUS. Additional system controller type cards are not needed.

TECHNICAL HIGHLIGHTS

- Random access reads and writes between computer systems.
- Flexible mapping of one system's address space to and from the other's memory and I/O address space.
- A24 or A16 VMEbus Addressing and D16 or D8 Data Transfer mode support.
- MULTIBUS I Adaptor card meets IEEE 796 specifications.
- VMEbus Adaptor card meets IEEE 1014C specifications.
- Dual Port RAM supports full 32-bit longword data transfers from the VMEbus to the local Dual Port RAM card.
- Page Mode allows access to 16M bytes of memory through 64K byte page size.
- 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 MULTIBUS I and VMEbus.
- Parity checking on address, control and data lines on the interface between Adaptor cards.
- VMEbus memory and I/O operations with the MULTIBUS I may be either byte or word transfers.
- Power requirements -

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The VMEbus Adaptor card draws 4.5A at 5V.

The MULTIBUS I Adaptor card draws 4.5A at 5V.
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- Environment -

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Temperature:          0 to 60 degrees C operating;

                      -40 to 85 degrees C storage.

Humidity:             0% to 90% non-condensing.
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- Round EMI-shielded copper-conductor cable to 25 feet. Cable is available in standard 8-foot and 25-foot lengths.
- Fiber-Optic Interfaces are available as an option.
- Recognized under the component program of Underwriter Laboratories, Inc.

REQUIRED COMPONENTS

- One VMEbus Adaptor card (included in Model 422 package).
- One MULTIBUS I Adaptor card (included in Model 422 package).
- A round EMI-shielded cable to connect the Adaptor cards (purchased separately from Bit 3).

Each Model 422 package contains: one VMEbus Adaptor card, one MULTIBUS I Adaptor card, and a manual. A cable is required but is ordered separately so that you can specify the appropriate length for your installa tion.

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 400-101

25' Round EMI-Shielded            Model 400-102
```

Bulkhead connector configurations (contact Bit 3 for configurations)

- Fiber-Optic Interfaces

```
Two Fiber Card            Model 400-5

Two Fiber Module            Model 400-50
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(Fiber-Optic Cards are for the VMEbus system only; Modules may be used with either the MULTIBUS I or VMEbus system. Two Fiber-Optic Interfaces are required. For more information, request the Model 400 Fiber-Optic Interface data sheet.)

- Fiber-Optic Cable

High-quality, OFNP-grade, 62.3/125 micron glass duplex cable with tight buffer construction and ST-style connectors; standard cables are 5 meters (approximately 16') in length; custom lengths up to 2 km are available.

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