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DATA SHEET

MODEL 466

Adapter connects a SBus computer to a VMEbus system

Bit 3's Model 466 is an easy-to-use, cost effective way to share memory and special purpose boards between a SBus computer (SPARCstation) and a VMEbus system. The Model 466 Adaptor provides high speed data transfers between systems, and requires minimal software support.

Linked by the Model 466 Adaptor, these two powerful computing environments become even more powerful and versatile. From the VMEbus side of the Adaptor, you can take full advantage of SBus system resources for VMEbus applications. And, because the Adaptor card is treated as any other processor on the VMEbus, Model 466 can function as either a coprocessor or as the only bus master processor on the VMEbus.

From the SBus side, your system can function as a bus master on the VMEbus. Consequently, the SBus system can directly control and monitor a wide variety of VMEbus cards and high performance processors, as well as exchanging interrupts with the VMEbus.

Random access cycles from the SBus to the VMEbus or the optional Dual Port RAM are supported by the Adaptor.

The Model 466 Adaptor allows each bus to operate independently. The timing of the SBus and VMEbus 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 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 466 Adaptors to connect multiple computers and systems in star, daisy-chain or modified star/daisy-chain configurations.

COMMUNICATIONS BETWEEN SYSTEMS

The Model 466 uses Memory Mapped inter-system communication to control random access to VMEbus RAM, dual-port memory, and VMEbus 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. Using this interface, the SBus system can access up to 4G bytes of memory in the VMEbus system through a window in the SBus system's bus address space.

Memory Mapping permits high-speed random access 32-bit reads and writes from the SBus to the VMEbus at speeds comparable to reads and writes to local memory.

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

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. Window size is configured via configuration jumper settings on the SBus and VMEbus Adaptor cards.

In Page Mode, a window in the SBus bus address space is coupled with a 16-bit programmable register. The address within the window provides the lower 16-20 address bits. The I/O register provides the upper 16-12 bits of the 32-bit receiving bus

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address. Thus, the SBus system can scan 4G bytes of memory in the VMEbus system by paging through the VMEbus system's address space.

Memory Mapping also controls access to dual-port memory. Dual Port RAM is an optional card installed on the VMEbus 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, 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 include: 32K, 128K, 1M, 2M, 4M, and 8M byte cards.

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

INTERRUPT AND ERROR HANDLING

Model 466 supports interrupts from three sources:

- Pending VMEbus interrupts IRQ1 - IRQ7.
- Programmed interrupts to the SBus (PT interrupts).
- Interface error interrupts activated when a timeout, parity error, or bus error condition is detected on an Adaptor card.

Up to four interrupts can also be sent from the VMEbus system to the SBus. These interrupts are selected from eight possible sources: IRQ1 - IRQ7 and the PT interrupt.

Although there are several potential VMEbus interrupt sources, only one SBus interrupt signal is used. Therefore, an 8-bit status register and an interrupt control register are available for the SPARCstation interrupt handling routine to use to determine the VMEbus interrupt source.

One interrupt source, programmed interrupt to VMEbus (PR interrupt), can be generated from the SBus Adaptor card and sent to the VMEbus.

SYSTEM CONTROLLER MODE CAPABILITY

In addition to VMEbus control and bus master capabilities, the Model 466 Adaptor can provide the system controller functions. If the VMEbus system is used primarily as an expansion chassis for the SBus system, System Controller Mode eliminates the need to purchase an additional VMEbus system controller.

When configured as the system controller the Model 466 Adaptor provides level 3 bus arbitration, the VMEbus system clock and system reset, and the Bus Error (BERR) global timeout.

UTILITIES DISKETTE

Model 466 includes a Utilities Diskette that contains FORTH source code and example programs to help you write a device driver for the SBus Adaptor card. Files are stored on a 3.5" high-density diskette in TAR format.

Example programs include:

- An include file that defines many of the constants needed for the device driver, and that provides a structure for accessing Adaptor registers.
- A simple program that dumps the first few characters contained in the Dual Port RAM section.
- A program that uses the Adaptor's Page Mode features to dump a specific address on the remote bus.

TECHNICAL HIGHLIGHTS

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- Random access reads and writes from the SBus system to the VMEbus.
- Random access reads and writes from the SBus to Dual Port RAM.
- Random access reads and writes from the VMEbus system to Dual Port RAM.
- Flexible mapping of SBus address space to VMEbus memory and I/O address space.
- 32-, 16-, or 8-bit data transfers on the SBus.
- A32, A24 or A16 addressing from the SBus to the VMEbus.
- Software selectable byte and word swapping.
- SBus configuration ROM with FORTH code that contains driver and card information.
- VMEbus Adaptor card can function in System Controller Mode.
- Page Mode access to all VMEbus memory through a variable size window in SBus address space.
- Add up to 8M bytes of shared memory via optional Dual Port RAM cards.
- Interrupts can be passed from the VMEbus system to the SBus system.
- Parity checking on address, control and data lines on the SBus Adaptor card and on the interface between Adaptor cards.
- Power requirements -

  The VMEbus Adaptor card draws 3.5A at 5V.
  The SBus Adaptor card draws 1.0A at 5V.

- Environment-

  Temperature: 0 to 60 degrees C operating;
  -40 to 85 degrees C storage.

  Humidity: 0% to 90% non-condensing.

- 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.
- Meets IEEE 1014C VMEbus specifications.

REQUIRED COMPONENTS

- One SBus Adaptor card (included in the Model 466 package).
- One 6U VMEbus Adaptor card (included in the Model 466 package).
- A round EMI-shielded cable to connect the Adaptor cards (purchased separately from Bit 3).
- A device driver for the SBus system. The Utilities Diskette, included at no charge, provides FORTH code and example programs to help you access the SBus Adaptor card. Optional Models 943 and 944 Support Software include a device driver.

Each Model 466 package contains: one SBus 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 and type 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
```

- Cable (one required)

```
8' Round EMI-Shielded            Model 400-107

25' Round EMI-Shielded            Model 400-108
```

Bulkhead connector configurations (contact Bit 3 for configurations)

- Fiber-Optic Interfaces

```
Two Fiber Card            Model 400-5

Two Fiber Module            Model 400-50
```

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

- Support Software

Model 921 provides AIX software support tools for: logical devices, UNIX® standard read/write interface, interrupts, memory mapped interface and atomic instruction emulation; for use on RISC System/6000 only. For more information, request the Model 921 data sheet.

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