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VMITCN-5521L TURBOchannel-to-VMEbus Adapter

- Allows DEC 5000 workstations to read from and write to any VME board in an external VME system
- TURBOchannel read/write I/O transactions to VMEbus
- Supports master(s) and slave(s) in the VMEbus chassis
- Supports A32, A24, A16, D32, D16, and D8 transfers in the VMEbus chassis
- User-configured software transparent default address mapping mode
- Software-controlled dynamic address mapping mode
- Generates all VMEbus signals required of a VMEbus master
- Programmable byte and word swapping hardware for sharing data between big-and little-endian computers
- Link consists of one 6U VMEbus board, one TURBOchannel option module board, and a variety of cable lengths
- Meets ANSI/IEEE STD 1014-1987 and TURBOchannel specification version 2B

PRODUCT OVERVIEW — The VMITCN-5521L is a high performance TURBOchannel-to-VMEbus adapter. This adapter allows a TURBOchannel host, such as a DEC System 5000 workstation, to function as a VMEbus master in an external VMEbus chassis. The VMITCN-5521L can function as a master controlling an external VMEbus chassis; or if placed in slot one of the VMEbus, can function as the only master in the chassis.

CONFIGURATION — The VMITCN-5521L consists of two boards and an interconnecting cable. One board is an interrupting TURBOchannel option module and the other board is a 6U form factor VMEbus master. Figure 1 is a block diagram of the VMITCN-5521L.

OPERATION — All single TURBOchannel cycles to the slot containing the TURBOchannel option board are repeated to memory-mapped cycles in the VMEbus chassis. Data transfers of 8, 16, and 32 bits are supported. TURBOchannel DMA transfers and VMEbus block transfers are not supported. VMEbus interrupts may be individually configured by the user for handling by the workstation CPU or by a local VMEbus CPU.

SOFTWARE TRANSPARENT AND/OR DYNAMIC ADDRESS MAPPING — The VMITCN-5521L provides mapping registers for translating TURBOchannel I/O address cycles into VMEbus address space cycles. The user may configure the power up default values for the Mapping Registers. Thus, when the number of mapping regions described below are sufficient for the application, the link is completely software transparent at power up and requires no additional initialization. When access to additional VMEbus address spaces are required, the user-defined default values in the Mapping Registers may be dynamically modified under program control.

A kernel-level ULTRIX Driver **must** be installed for the DEC workstation to access the VMITCN-5521L and the VMEbus assets. VMIC offers an ULTRIX Driver, model number VMITCN/SW-5521.

PHOTO NOT AVAILABLE

The VMITCN-5521L, option module ROM, register space, the VMEbus supervisory and nonprivileged short I/O (A16) address spaces, and the supervisory and nonprivileged VMEbus standard (A24) data spaces are available by default. In addition, the VMITCN-5521L provides access to any VMEbus address space, except for VMEbus block transfer spaces.

VMEbus BUS MASTER OPERATION — The VMITCN-5521L operates in single cycle mode. Each access to the VMEbus may require the VMITCN-5521L to arbitrate for VMEbus mastership. This will extend the TURBOchannel cycle. The VMITCN-5521L is a Release-on-Request (ROR) VMEbus master, thus, arbitration may not be required every cycle. VMEbus arbitration will never be required when the VMITCN-5521L is the only bus master in the VMEbus chassis.

BUS TIMEOUTS — The VMITCN-5521 links two functionally incompatible buses: the asynchronous VMEbus and the synchronous TURBOchannel. Cycle timing between the two types of buses is radically different and is wholly

Ordering Options							
Feb. 18, 1994 800-505521-000 C	A	B	C	-	D	E	F
VMITCN-5521L	-	0		-			
ABC = Cable Lengths 010 = 10-foot Cable 020 = 20-foot Cable 025 = 25-foot Cable							
Note							
VMITCN-5521L-025 consists of a VMEbus Board, a TURBOchannel option module, and a 25-foot cable.							
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constrained by the TURBOchannel backplane timing. The TURBOchannel being a high-speed synchronous bus structure, specifies a maximum time limit for a TURBOchannel transaction to occur. Since the VMITCN-5521's function is to make remote VMEbus resources appear as local TURBOchannel resources, an excursion outside this maximum time limit has some probability of occurring. An example of this, would be the VMEbus portion of the VMITCN-5521 residing in a VMEbus chassis with several other VMEbus masters. If the VMEbus is heavily used by the resident masters, and an TURBOchannel master requests use of the VMEbus, there is no time limit specified by VMEbus specification for the bus owning master to yield to the requesting master. Therefore in this instance, the cycle initiated on the TURBOchannel could easily overrun its maximum cycle time period. To circumvent a TURBOchannel time-out, the VMEbus portion of the VMITCN-5521 activates a timer upon a valid access to any VMEbus space. If the VMITCN-5521 is not granted the VMEbus by the VMEbus controller within 4 μ s (microseconds), it returns a TURBOchannel conflict acknowledge, for the current cycle to be retried at a later time.

Another potential time-out incident can occur as the result of a nonresponsive or missing VMEbus slave. The VMITCN-5521 after being granted the VMEbus, activates another timer. If the addressed VMEbus slave does not respond within 4 μ sec (microseconds), the VMITCN-5521 causes a system time-out.

EXPANSION — VMIC offers a variety of VME-to-VME repeaters, VME-to-VME DMA links, and reflective memory products that provide data communications between VMEbus chassis. Once the link to the VMEbus is established via the VMITCN-5521L, additional VMEbus chassis may be linked to the system with these products.

FUNCTIONAL CHARACTERISTICS

CONNECTION

Requirement: One 80-conductor round cable, up to 25 feet long (maximum).

TIMING

Interface Overhead:	<u>Read</u>	<u>Write</u>
Option Module SEL* to VMEbus AS*	860 ns	900 ns
Option Module SEL* to VMEbus DS*	940 ns	980 ns
VMEbus DTACK* to Option Module RDY*	470 ns	320 ns
Option Module SEL* Low to High	1.520 μ s	1.440 μ s

PERFORMANCE

Measured Transfer Rate:	<u>Read</u>	<u>Write</u>
	1.74 Mbytes/s	2.24 Mbytes/s

Note — Timing and performance measurements were taken as follows; 32-bit transfers, 25-foot cable, DECstation 5000 model 200, Force SRAM-5, VMEbus board in slot 1, no other master present in the VMEbus chassis.

PHYSICAL/ENVIRONMENTAL

Temperature Range: 0 to +55 °C, operating
-20 to +85 °C, storage

Relative Humidity Range: 20 to 80 percent,
noncondensing

Cooling:

VMEbus Board: Forced air convection
TURBOchannel Board: Forced air convection at
150 linear ft/min
(LFM) component side/50 LFM solder side

Dimensions:

Double height Eurocard (6U) (VMEbus Board)
TURBOchannel option module form factor

Power Requirements:

4.5 A at 5 V (for VME board)
1.5 A at 5 V (for TURBOchannel board)

TRADEMARKS

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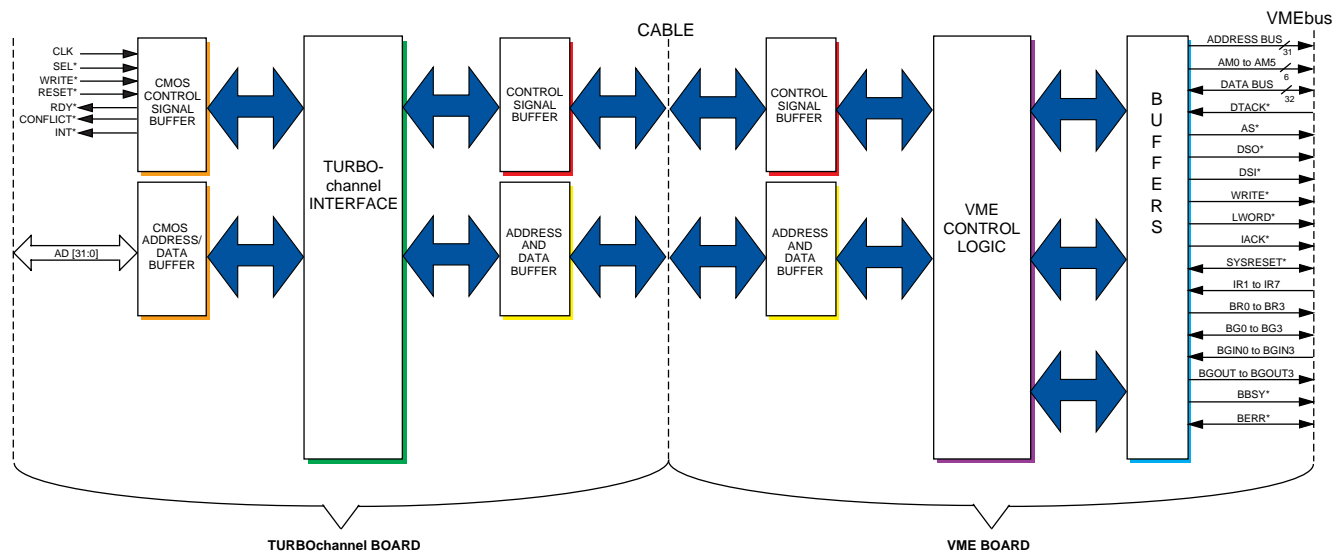


Figure 1. VMITCN-5521L Block Diagram

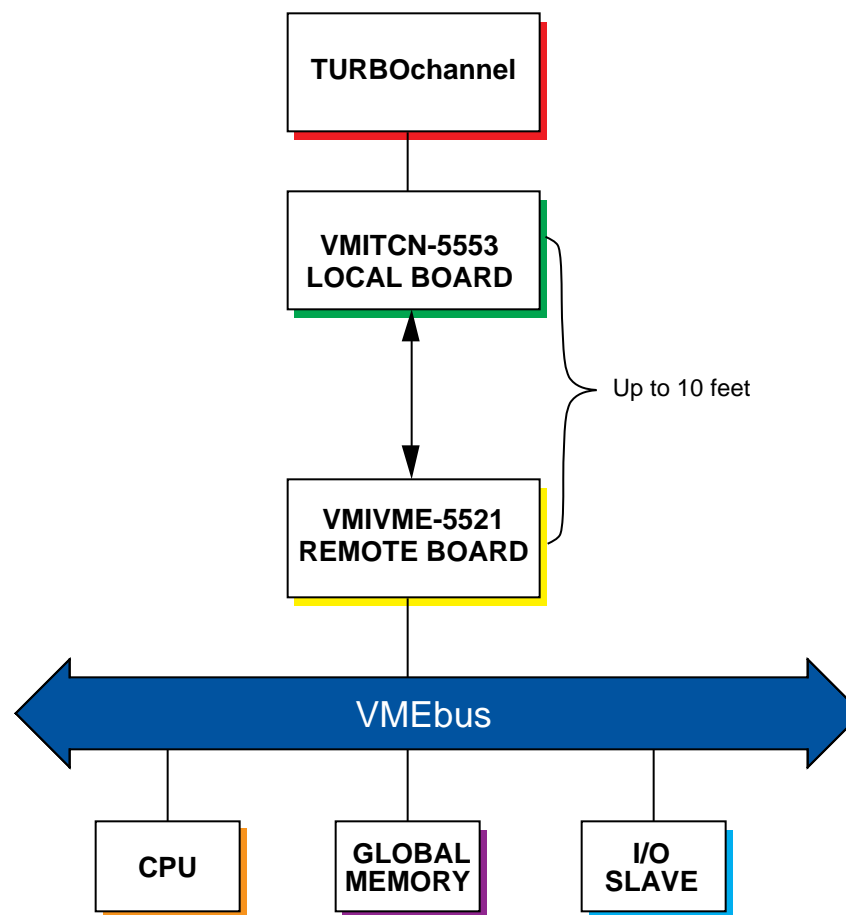


Figure 2. Typical Configuration Utilizing the VMITCN-5521L Adapter



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