SN74VMEH22501 Universal Bus Transceiver for the VMEbus™ Backplane

Overview of VMEbus Evolution

For over 20 years the VMEbus has served the market well. Like all well-designed technologies, the VMEbus has gone through several performance improvements. Each improvement has been compatible with the previous one, thus allowing for the longevity of the VMEbus technology.

The table (top right) shows the latest transfer protocol, 2eSST (two-edge source synchronous transfer), has an achievable performance of 320 MBps. *The only logic transceiver in the industry today that can transmit clean signals at 2eSST speeds down a standard VMEbus is the SN74VMEH22501.*

Date	Backplane	Protocol	Data Transfer Protocol	Theoretical Performance (MBps)	Achievable Performance (MBps)
1981	VME 3-row P1 and P2	BLT	Asynchronous 32-bit 4-edge handshake	40	~20
1989	VME64	MBLT	Asynchronous 64-bit 4-edge handshake	80	~40
1996	VME64x 5-row P1 and P2	2eVME	Asynchronous 64-bit 2-edge handshake	160	~70
1999	No change	2eSST	Synchronous 64-bit No handshake	320	~320

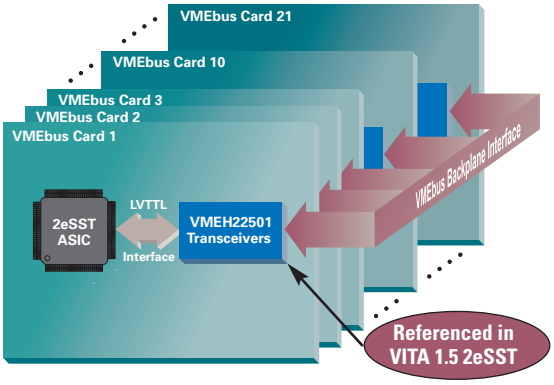
8x

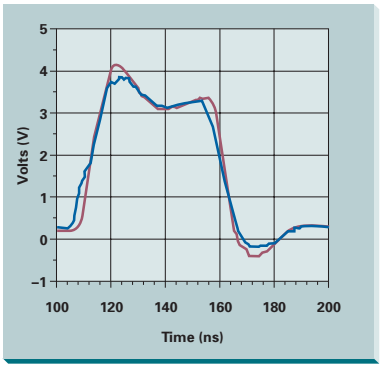
An 8x improvement in achievable performance from the VME64 backplane to 2eSST is now possible without any changes to the existing legacy backplane architecture.

Extensive Testing/Simulation Efforts Pay Back With Incredible Results

The proof is in the signal integrity. The waveforms presented are actual signals taken from a standard VME backplane under the tough, fully loaded case where the transmitting signal is generated from the center of the backplane.

Typical drivers such as ABT, ABTE or LVT are incapable of producing well-behaved, monotonic signals on a standard VME backplane.





Co-Development Effort Between Key Players

Texas Instruments and the VITA Standards Organization teamed to co-develop the 2eSST transceiver that meets the needs of the VMEbus community. This initiated the VME Renaissance, which is an industry-wide effort created by Motorola to boost VME technology acceptance.

VMEbus Technology™

VME Renaissance
Innovation, Performance, Investment Protection™

SN74VMEH22501 VMEbus Transceiver Features and Benefits

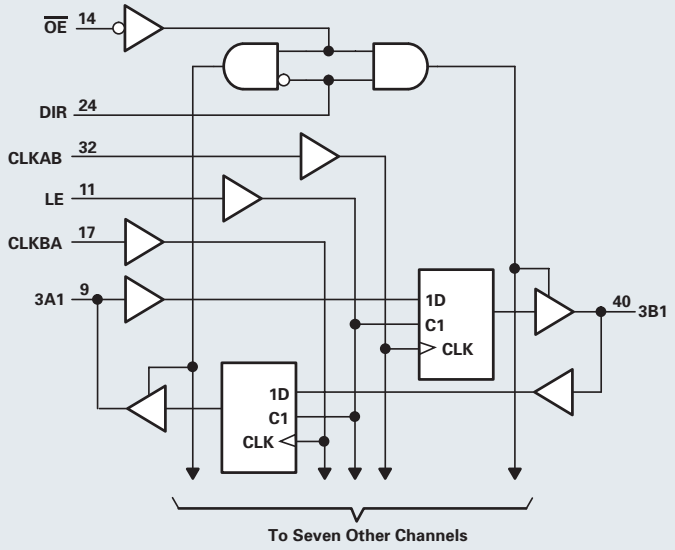
Features	Benefits
Backward compatible to existing logic	Can be used in systems where older backplane technologies such as ABT, ABTE and LVT are still present. New cards can use VME technology while the rest of the backplane remains unchanged.
V_{CC} = 3.3 V	Functionality in most popular supply voltage in the industry.
Output edge control	Reduces electromagnetic interference (EMI).
Pseudo-ETL input thresholds	Improved noise margins over traditional logic such as ABTE.
5-V-tolerant I/Os	Ability to interface with 5-V devices.
Bus hold (3A ports)	Eliminates the need for pull-up/-down resistors when bus is idle.
Series damping resistors	Improves ground bounce on the 3A port and Y outputs.
Flow-through architecture	Facilitates printed circuit board layout.
Multiple ground and supply pins	Minimizes high-speed switching noise.
64-mA I_{OL} specification	Permits backward compatibility to older VMEbus pull-up termination for open-drain outputs.

SN74VMEH22501 VMEbus Transceiver — Pin Configurations and Functionality

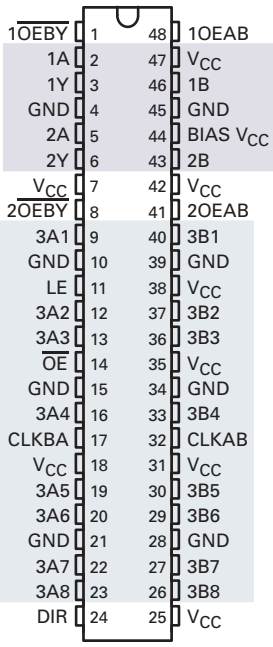
UBT Transceiver Function Table†

Inputs				Output 3B	Mode
$\overline{OE}$	LE	CLKAB	3A		
H	X	X	X	Z	Isolation
L	L	H	X	B_0‡	Latched storage of 3A data
L	L	L	X	B_0§	
L	H	X	L	L	True transparent
L	H	X	H	H	
L	L	↑	L	L	Clocked storage of 3A data
L	L	↑	H	H	

†3A-to-3B data flow is shown; 3B-to-3A data flow is similar but uses CLKBA.
‡Output level before the indicated steady-state input conditions were established, provided that CLKAB was high before LE went low.
§Output level before the indicated steady-state input conditions were established.

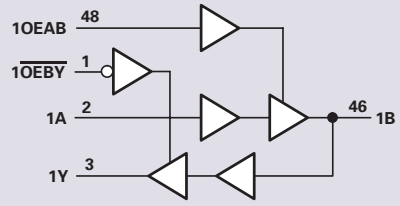


SN74VMEH22501
DGG or DGV Package
(Top View)



1-Bit Bus Transceiver Function Table

Inputs		Output	Mode
OEAB	$\overline{OEBY}$		
L	H	Z	Isolation
H	H	A data to B bus	True driver
L	L	B data to Y bus	
H	L	A data to B bus, B data to Y bus	True driver with feedback path



For the complete line of logic products, visit: logic.ti.com

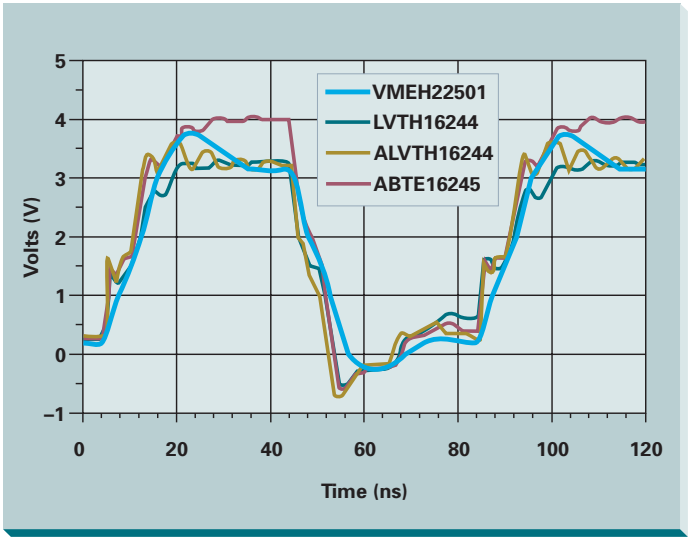
Ordering Information

Available in BGA

T_A	Package†		Orderable Part Number	Top-Side Marking
0 to 85°C	TSSOP – DGG	Tape and reel	SN74VMEH22501DGGR	VMEH22501
	TVSOP – DGV	Tape and reel	SN74VMEH22501DGVR	VK501
	VFBGA – GQL	Tape and reel	SN74VMEH22501GQLR	VK501

†Package drawings, standard packing quantities, thermal data, symbolization and PCB design guidelines are available at: www.ti.com/sc/package

Transceiver Performance Comparison



SN74VMEH22501 performs better even against popular logic devices on a standard backplane with Thevenin termination.

For More Information about SN74VMEH22501

Product Folder:
www.ti.com/sc/device/SN74VMEH22501

Data Sheet:
www-s.ti.com/sc/techlit/sces357

Application Report:
www-s.ti.com/sc/techlit/scea028

VME Home Page:
www.ti.com/vme

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