Appendix C

VME64 and VME64x Function Mnemonics

Introduction

This appendix lists the functional mnemonics of the VME64 Standard and this standard. The signal/pin mnemonics listed in Appendix B are not included in this appendix. These mnemonics can be used to describe the functional capability of VME, VME64 and VME64x boards, backplanes and systems, where appropriate.

Mnemonic	Description
+12V	Backplane or system provides +12V power or board uses +12V power
+3.3V	Backplane or system provides +3.3V power or board uses +3.3V power
+5V	Backplane or system provides +5V power or board uses +5V power
-12V	Backplane or system provides -12V power or board uses -12V power
2eVME	Board supports the 2eVME protocol
A16	Performs 16 bit address transfers across the backplane
A24	Performs 24 bit address transfers across the backplane
A32	Performs 32 bit address transfers across the backplane
A40	Performs 40 bit address transfers across the backplane
A64	Performs 64 bit address transfers across the backplane
ADO	Board supports address only cycles without handshakes
ADOH	Board supports address only cycles with handshakes
AUX	Backplane or system provides auxiliary power or board uses auxiliary power
BLT	Performs block transfers across the backplane
BTO	Provides the bus timer time out function
CR/CSR	Board supports the CR/CSR function
D08	Performs 8 bit data transfers across the backplane
D16	Performs 16 bit data transfers across the backplane
D32	Performs 32 bit data transfers across the backplane
D64	Performs 64 bit data transfers across the backplane
ESD	Subrack or board supports the VME64x ESD scheme
EMC	Subrack or board supports the VME64x EMC scheme
ETL	Board uses the ETL devices for bus transceivers
FAIR	Bus requester supports the fair bus request mode
GA	Uses or provides geographical address.
GAP	Uses or provides geographical address parity
I(x)	Interrupter, which generates interrupts on level x - Where x ranges between 1 to 7
IE/HDL	Board uses the injection/extraction handles
IEL/HDL	Board uses the injection/extraction/locking handles
IE/COMB	Subrack provides the front rail comb for support of the injection/extraction handles

IH(x)	Interrupt handler processes interrupt level x - Where x ranges between 1 to 7
IH(x-y)	Interrupt handler processes interrupt levels x through y - Where x and y range between 1 to 7
J0	Backplane uses the 95 pin 2 mm connector in the J0 connector area
J0/S	A special connector (e.g. fiber optic or coaxial) in the J0 connector area
J1/96	Backplane uses the 96 pin connector in the J1 connector area
J1/160	Backplane uses the 160 pin connector in the J1 connector area
J2/96	Backplane uses the 96 pin connector in the J2 connector area
J2/160	Backplane uses the 160 pin connector in the J2 connector area
KEY	Subrack or board supports the VME64x keying scheme
Lock	Board support the locked cycles
MBLT	Performs multiplexed block transfers across the backplane
MTM	Board supports the IEEE 1149.5 MTM function
P0	Board uses the 95 pin 2 mm connector in the P0 connector area
P0/S	A special connector (e.g. fiber optic or coaxial) in the P0 connector area
P1/96	Board uses the 96 pin connector in the P1 connector area
P1/160	Board uses the 160 pin connector in the P1 connector area
P2/96	Board uses the 96 pin connector in the P2 connector area
P2/160	Board uses the 160 pin connector in the P2 connector area
PRI	Bus arbiter supports the priority mode
RETRY	Board supports protocols with 6U retry capability
RESP	Board support protocol with 3U response capability
RMW	Performs read-modify-write transfers across the backplane
ROR	Bus requester supports the release-on-request mode
RRS	Bus arbiter supports the round robin mode
RWD	Bus requester supports the release-when-done mode
SysCon	Provides the system controller functions including: BTO, arbitration, interrupt daisy chain driver and 16 MHz system clock driver
UAT	Performs unaligned transfers across the backplane
VPC	Backplane provides or board uses the pre-charge voltage power (Power provided or used must be included in the +5V power ratings)
W+12:x	Max +12V power provided by the backplane or system (in watts) - Or max. +12V power consumed by a board averaged over a one second period
W-12:x	Max -12V power provided by the backplane or system (in watts) - Or max. -12V power consumed by a board averaged over a one second period
W+3.3:x	Max +3.3V power provided by the backplane or system (in watts) - Or max. +3.3V power consumed by a board averaged over a one second period
W+5:x	Max +5V power provided by the backplane or system (in watts) - Or max. +5V power consumed by a board averaged over a one second period

Waux:x	Max auxiliary power provided by the backplane or system (in watts) - Or max. auxiliary power consumed by a board averaged over a one second period

Appendix D

IEEE 1101.2-1992 Background

Introduction

This is an informative appendix that provides some background information on IEEE 1101.2-1992 The Standard for Mechanical Core Specifications for Conduction Cooled Eurocards

Background

The architectural concepts and advantages offered by the VMEbus are already well understood and have been since its inception in October of 1981. However it was recognized in the late 1980's by a handful of defense-oriented board and system-level manufacturers, that the needs of the military marketplace for a more rugged and robust mechanical solution was required rather than the air cooled-only offerings of the time. Physical space is at a premium in tactical and strategic military aircraft, ships and ground vehicles. Conduction-cooling held the key to minimize electronic subsystems volume by ensuring high reliability through efficient thermal management techniques while increasing board and system-level functionality. Thus the need for a 6U x 160 mm VMEbus conduction-cooled standard was born.

The IEEE 1101.2 standard ensures complete mechanical interchangeability and intermateability of multiple vendor's conduction-cooled VMEbus circuit card assemblies (CCAs) into compliant chassis in a format suitable for military and rugged applications. In addition, 1101.2-compliant CCAs are both electrically and physically compatible with existing commercial environment, double-height, 160 mm Eurocard boards and chassis, providing a flexible software development environment. This greatly reduces the costs and mitigates the risk associated with direct technology insertion into deployed military systems, supporting the concept of P3I (Pre-Planned Product Improvement).

Conduction-cooled CCAs are used wherever convection (or forced-air) cooling is not possible nor appropriate for particular severe environment applications. However, conduction-cooled CCAs used in physically hostile and extended temperature environments present certain design challenges. Of prime concern is the layout and protection of relatively fragile electronic components to ensure effective heat transfer to the card edge. For example, the CCA might consist of an electrically insulated, metallic heat conduction plate permanently heat/pressure bonded to a printed wiring board (PWB) or could possibly be represented by a set of copper thermal vias (or pathways) embedded within the layers of the PWB itself. In either case, the heat management layer conducts the heat generated by the board's active and passive components, through the heat management layer, to the edge of the CCA where the heat is extracted by the chassis, reducing thermal gradients and "hot spots" on the board which can adversely affect reliability. In addition, stiffening ribs are added to increase mechanical rigidity. This three-dimensional PWB and thermal management sub-assembly requires tight tolerances to ensure that it does not interfere with other CCAs in the chassis and it provides an accurate, mechanically stabile fixed reference platform for repeatable insertion into the chassis slot. The resultant assembly contributes superior resistances to high levels of vibration and shock, guaranteeing a mechanically stabile and reliable mounting surface for electronic components capable of surviving severe environments.

It is undeniable that the IEEE 1101.2-1992 standard has assisted in ushering in a new era to the embedded rugged and defense computer marketplace. Yesterday's proprietary, point-solutions are giving way to the adoption of open architecture standards and open systems solutions. This greatly decreases electronic subsystem development times and attributable costs, while also decreasing overall logistics and life-cycle costs by capitalizing on existing defense-oriented corporate infrastructures with the application of logistics control and configuration management. As a test to its founders, the VMEbus continues to migrate and grow with technology advances, continually increasing performance, bandwidth and functionality - while maintaining forward and backward compatibility - securing an enviable position of flourishing well into the next century.

Appendix E

IEEE 1101.x Mechanical Feature References

Introduction

This appendix lists the various mechanical features and associated reference specification. This is provided to as a quick search aid for finding the specific requirement when implementing a specific mechanical features.

IEEE 1101.1-1991 IEEE Standard for Mechanical Core Specifications for Microcomputers Using IEC 603-2 Connectors

Feature	**Reference**
General PCB sizes and tolerances	Clauses 6, 7, 8 & 9
Front mounted PCB assembly test and inspection dimension (DT2)	Table 5
General backplane sizes and tolerances	Clause 10
Backplane bow; static and dynamic	Clause 11 (8)
General non-EMC subrack sizes and tolerances	Clause 11
Subrack assembly test and inspection dimension (Dc)	Table 7
Non-EMC front panels	Figures 13 & 14
Front panel, PCB, connector & backplane relationships	Figure 15
Board to board relationship	Figure 16

IEEE 1101.10-1996 IEEE Standard for additional Mechanical Specification for Microcomputers using the IEEE 1101.1 Equipment Practice

Feature	**Reference**
EMC subrack interface dimensions	Clause 5
EMC PCB front panel and filler panel interface dimensions	Clause 5
EMC front panel and PCB relationship	Figure 5
Keying and alignment pin	Clause 6
Programming key	Figure 10
Programming of keys	Figure 11
Alignment pin test dimensions	Figure 12
Protective solder side cover	Clause 7
(for PCB mounting holes, see IEEE 1101.1, Figures 3, 4 and 5)	
Subrack injector/extractor details	Clause 8
Subrack injector/extractor test dimensions	Figure 15
Injector/extractor details	Figure 15
Front panel assemble with injector/extractor test dimensions (G)	Table 6
ESD protection	Clause 9
160 pin (5 row) connector mounting details	Clause 10

IEEE P1101.11 IEEE Standard for Rear Plug-In Units for Microcomputers using the IEEE 1101.1 Equipment Practice, and the IEEE P1101.10 additional Mechanical Specifications, Draft 1.0, July 23, 1996

Feature	**Reference**
Inline mounting of rear PCB assemblies	Clause 5
Rear mounted PCB sizes	Clause 6
Rear mounted PCB assembly test and inspection dimension (DT2)	Table 2
Connector orientation and labeling	Clause 7
Rear mounted PCB assembly subrack test and inspection dimensions (RDc and RDx)	Clause 8
Backplane thickness	Clause 9
Connector labeling	Clause 10
Connector performance	Clause 12
Connector alignment	Clause 13
Front and rear PCB panel assembly safety ground	Clause 15
J0 2mm connector mounting on backplane	Appendix A