XMC1553-1/2/4

Single, Dual, or Quad Stream Conduction Cooled MIL-STD-1553A/B Test and Simulation Module for XMC

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General Features

The XMC1553 module is a rugged, reliable, full-featured PC Express Mezzanine (XMC) module designed to provide a stand-alone, flight-ready MIL-STD-1553A/B interface for avionics applications. Up to four independent, dual-redundant MIL-STD-1553A/B databus streams are provided on the XMC1553 module. Additionally, the XMC1553 offers full-function test, simulation, monitoring, and databus analyzer functions for MIL-STD-1553A/B applications.

An onboard IRIG-B time code decoder and generator allows users to accurately synchronize single or multiple XMC1553 modules to a common time source.

The XMC1553 module utilizes a simple, reliable, high performance FPGA-based hardware architecture featuring an embedded PowerPC and the highest data throughput in the industry on a flexible platform that can be easily adapted to meet a wide range of application needs. The XMC-1553 cards are configured with 128 MBytes of onboard memory, providing ample capacity to support high volumes of data and complex simulations.

The XMC1553 offers both transformer and direct coupling to the data buses and can be mounted on any of AIT's family of advanced carriers to provide PCI, PCI-X PCIe, VME, and VXI solutions.

Ten fully programmable (as input or output) TTL discrete I/O lines are provided. Discrete output voltage levels can be set up to 30 volts using an external power source.

Application software can access the XMC1553 module via AIT's common MIL-STD-1553A/B C/C++ Object Wrapper Layer (OWL) high-level application programmer's interface.

Application Support Processor

An onboard, 250Mhz, PowerPC Application Support Processor (ASP) is provided to support time-critical user application functions and interrupt service routines.

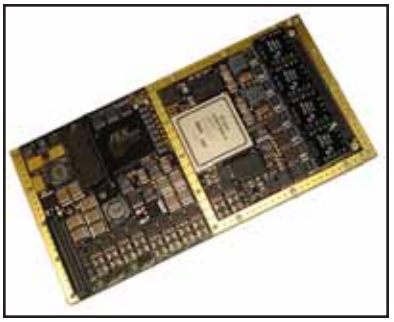
Bus Controller

The XMC1553 provides real-time Bus Controller (BC) functions on one, two, or four dual-redundant MIL-STD-1553A/B buses concurrently with multiple Remote Terminal (RT) and Chronological Monitor (CM) operation.

- Autonomous operation including sequencing of minor/major frames
- Support for acyclic message insertion/deletion during BC operation
- Programmable BC Retry without host interaction
- Full error injection down to word and bit level
- Multiple BC queue lists
- Synchronization of BC operation to trigger outputs
- 4 µsec intermessage gaps

Remote Terminals

The XMC1553 simulates up to 31 Remote Terminals (RT) including all sub-addresses on one, two, or four MIL-STD-1553A/B buses concurrently with BC and CM operation. Alternatively, each RT can operate in a passive receive only mode to monitor non-simulated RTs.



- Programmable response time for each RT with fast RT response at 4 µsecs
- Full mode code support
- Full error injection down to word and bit level
- Multiple RT queue lists

Chronological Bus Monitor

The XMC1553 offers full bus monitoring and analysis with time tagging of all bus traffic to 1 µsec resolution, including response and gap time measurements down to 8 nsec on one, two, or four MIL-STD-1553A/B buses concurrently with BC and RT operation.

- 100% data capture at full bus rates
- Full error injection/detection
- Filtering for complex triggers with sequencing
- Selective capture
- Bus activity statistics
- External trigger outputs
- Programmable data logging to file

Physical Bus Replay

The XMC1553 module is able to electrically replay previously recorded MIL-STD-1553A/B databus traffic physically to the bus with exact timing accuracy. Physical Replay mode enables users to disable any or all RT responses from the recorded files.

IRIG-B Time Code Decoder

An onboard IRIG-B time code decoder and generator allows synchronized time tagging of multiple MIL-STD-1553A/B streams using single or multiple XMC1553 modules. XMC1553 cards can be synchronized to one common external IRIG-B time source or to the free-wheeling onboard time code generator.

Discrete I/O
The XMC1553 module provides ten fully programmble (as input or output) discrete lines. Each discrete line is capable of TTL signaling. Optional output lines can drive up to 30V signals with an external supply and input lines are able to accept up to 30V signals.

Bus Coupling
The XMC1553 module provides both transformer and direct coupling for connection to the bus. Both coupling modes to the bus system are available at the front panel connector or at the back panel connector.

Application Interface
In support of application program interfaces to the XMC-1553, the module is supplied with AIT's MIL-STD-1553 Object Wrapper Layer (OWL) C/C++ interface library. The OWL provides an intuitive and easy-to-use object-oriented interface to the module. Adaptions supporting C#, Python, and other common programming languages ar available upon request. A rich suite of sample application and full documentation is also provided.

Driver Software Support
The XMC-1553 module is supplied with device drivers and a product-specific Software Development Kit (SDK) for various operating systems, including:

- Windows 7/XP/Vista
- Linux
- VxWorks
- Green Hills Integrity
- LynxOS

Ordering Information
XMC-1553-1/2/4
Single, dual, or quad stream, dual-redundant MIL-STD-1553A/B XMC card
Bus controller, multiple remote terminal simulator and chronological monitor
IRIG-B time code decoder
128 MByte onboard RAM
Front panel I/O and rear I/O access

XMC-1553M-1/2/4
Single, dual, or quad stream, single-function MIL-STD-1553A/B XMC module featuring one of the following:
- Bus controller
- 31 remote terminal simulation
- Chronological monitor

IRIG-B time code decoder
128 MByte onboard RAM
Front panel I/O and rear I/O access

Technical Data

System Interface:	x1 Lane PCI Express
Processors:	Embedded PowerPC (250MHz)
Memory:	128 MByte DDR2 SDRAM
Encoder/Decoder:	One, two, or four MIL-STD-1553A/B encoder/decoder with full error injection and detection capability
Time Tagging:	14 Digit (400 days) absolute IRIG-B time, 1 μsec resolution
Physical Bus Interface:	One, two, or four MIL-STD-1553A/B trapezoidal transceivers, direct coupled stubs and transformer coupled stubs available at front panel connector or back panel connector
Connectors:	68-pin VHDCI at front panel 1x Standard XMC Connector (P15) 1x Standard PMC Connector (P14)
General Purpose I/O:	Ten software programmable TTL I/O lines supporting up to 30V signaling with external reference supply
Dimensions:	Standard single wide XMC (143.7x74 mm) Hole and connector dimensions and locations per: ANSI/VITA 20-2001 (R2005)
Power Consumption:	TBD
Operating Temp. Range:	Standard: -40 degrees C...+85 degrees C ambient Conduction cooling available, primary and secondary ANSI/VITA-20-2001 (R2005) interfaces
Storage Temp:	-40 degrees C...+85 degrees C ambient
Humidity:	0 to 95% non-condensing

Additional Ordering Options

-CC
Add for conduction cooling

-CONF
Add for conformal coating

-XT
Add for extended temperature operation
Note: The XMC1553 is designed for extended temperature operations (-40 degrees C to +85 degrees C). If the -XT option is selected, the module is individually tested for operation over the extended temperature range prior to shipment.

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