data sheet

AMCX1553

Single, Dual or Quad Stream MIL-STD-1553A/B Test & Simulation Modules for PMC

Avionics Databus Solutions

Right on Target

AMCX1553

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

product guide

www.aim-online.com

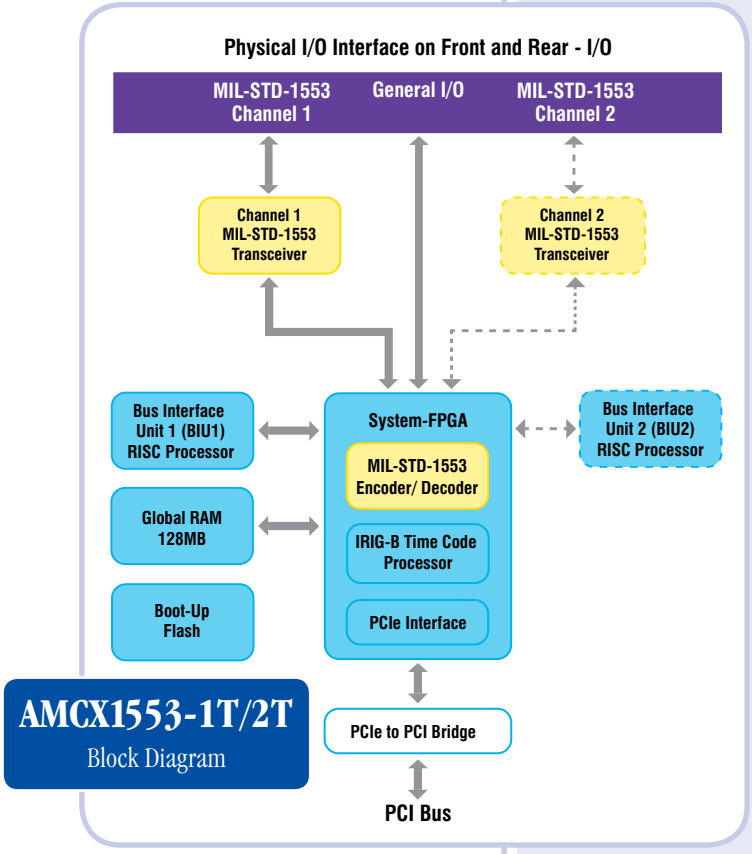
Right on Target

General Features

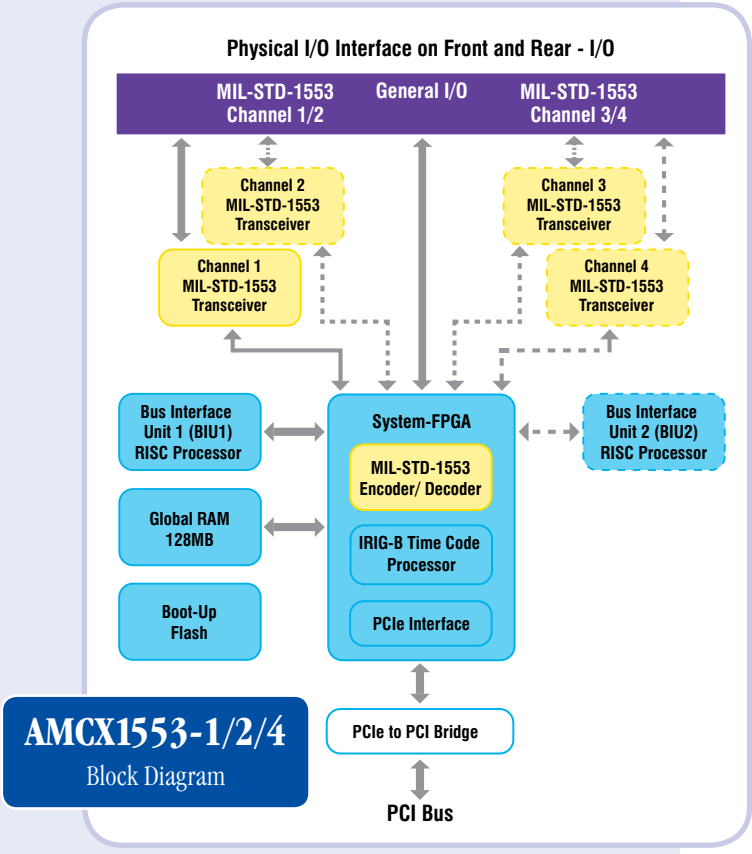
The AMCX1553 family of PCI Mezzanine (PMC) modules is targeted to embedded MIL-STD-1553A/B applications. The AMCX1553 full function version concurrently acts as Bus Controller, Multiple Remote Terminals (31) and Chronological/ Mailbox Bus Monitor. Versions with reduced functionality (Single Function or Simulator Only) are available as well as extended temperature range variants. All AMCX1553 cards have the capability to handle eight General Purpose Discrete I/O (GPIO) signals and also offer Trigger-I/O. With the provided onboard flash memory the components boot up autonomously after power up. Therefore the AMCX1553 cards are well prepared for MIL-STD-1760D and other embedded applications requiring fast and autonomous boot up to operational mode.

A full range of MIL-STD-1553 protocol errors can be injected/ detected. The AMCX1553 modules can electrically reconstruct and replay previously recorded MIL-STD-1553A/B record files physically to the MIL-STD-1553A/B bus with excellent timing accuracy. The AMCX1553-n offers an interface for 1, 2 or 4 dual redundant bus streams, the AMCX1553-nT provides 1 or 2 dual redundant bus streams. The AMCX1553 modules are designed to be installed on either a carrier board to adapt to buses like standard PCI/PCIe, VME/VPX or cPCIe or on an embedded host computer. An onboard IRIG-B time encoder/ decoder is included with sinusoidal output and 'free wheeling' mode for time tag synchronisation on system level using one or more AMCX1553 cards.

The Physical Bus Interface (PBI) on the AMCX1553-1/2/4 modules provides transformer bus coupling (direct coupling available on request) and fixed output amplitude to the MIL-STD-1553A/B bus. The AMCX1553-1T/2T modules provide programmable Bus Coupling, an onboard Bus Network and variable output amplitude to the MIL-STD-1553A/B bus. Full function driver software is delivered with the AMCX1553 cards in comprehensive Board Software Packages (BSP's) for different Operating Systems. The optional PBA.pro™ Databus Test & Analysis Tool (for Windows & Linux) can also be purchased for use with AMCX1553 modules.



AMCX1553-1T/2T
Block Diagram



AMCX1553-1/2/4
Block Diagram

Bus Controller

The AMCX1553 modules provide real time Bus Controller functions on each independent, dual redundant MIL-STD-1553A/B Databus channel, concurrently with Multiple RT and Chronological Bus Monitor operation. The 400MHz RISC processor provides true simulation of BC operations, without host computer interaction.

Key Features of the Bus Controller Mode include:

- *Autonomous Operation including Sequencing of Minor/ Major Frames*
- *Acyclic Message Insertion/ Deletion*
- *Programmable BC Retry without Host Interaction*
- *Full Error Injection down to Word and Bit Level*
- *Multi-Buffering with Real Time Data Buffer Updates*
- *Synchronisation of BC Operation to external Trigger Inputs*

Multiple Remote Terminal

The AMCX1553 modules simulate up to 31 Remote Terminals, including all sub addresses on each MIL-STD-1553A/B channel, concurrently with BC and Chronological Monitor operation. Alternatively each of the 31 RT's can operate in message orientated Mailbox Monitor Mode to monitor Non-Simulated RT's.

Key features of the Remote Terminal Simulation Mode include:

- *Programmable Response Time for each RT*
- *Programmable & Intelligent Response to Mode Codes*
- *Full Error Injection down to Word and Bit Level*
- *Multi-Buffering with Real Time Data Buffer Updates*

Chronological Bus Monitor

The AMCX1553 modules provide full bus monitoring and analysis with time tagging of all bus traffic to 1μs resolution including response time and gap time measurement down to 250ns concurrently with BC and Multi RT operation.

Key features of the Chronological Bus Monitor:

- *100% Data Capture on each Channel*
- *Autonomous Message Synchronisation and Full Error Detection*
- *Two Dynamic Complex Triggers with Sequencing*
- *Message Filter and Selection Capture*
- *Bus Activity Recording independent from Trigger and Capture Mode*
- *External Trigger Outputs*
- *Programmable Response Timeout*

Physical Bus Replay

The AMCX1553 modules can electrically reconstruct and replay previously recorded MIL-STD-1553A/B record files physically to the MIL-STD-1553A/B bus with excellent timing accuracy. Record files can be selected for Bus Replay. The additional capability to disable any or all RT responses from the MIL-STD-1553A/B replay enables smart systems integration and test to be performed.

Physical Bus Interface

The AMCX1553-1/2/4 modules provide Transformer Bus Coupling (Direct coupling can be provided instead of Transformer coupling/ configuration options available at time of order) and fixed output amplitude for connection to the MIL-STD-1553A/B Bus stub.

The AMCX1553-1T/2T modules provide programmable Bus Coupling, an onboard Bus Network and variable output amplitude to the MIL-STD-1553A/B bus. All MIL-STD-1553A/B signals are provided at the Front Panel connectors or Rear-I/O connector.

Trigger/ General Purpose Discrete I/O Signals

The Front-I/O connectors provide one trigger input and one trigger output (shared between Bus Controller and Bus Monitor) for each MIL-STD-1553A/B channel. Additionally user programmable Discrete I/O signals, two on the AMCX1553-1/2/4 and six on the AMCX1553-1T/2T, can be accessed via Front-I/O. The PMC's Rear-I/O Interface provides three separate trigger inputs and three trigger outputs for Bus Controller, Remote Terminal and Bus Monitor for each MIL-STD-1553A/B channel. All eight onboard General Purpose Discrete I/O signals, which are user programmable for input or output can be accessed via Rear-I/O. Voltage levels of all trigger signals and General Purpose Discrete I/O's are TTL compatible, whereas the General purpose Discrete I/O's are designed to handle avionics level as well.

IRIG-B Time Encoder/ Decoder

AMCX1553 modules include an onboard IRIG-B time encoder/decoder with sinusoidal output and 'free wheeling' mode for time tag synchronisation. This allows synchronisation of multiple AMCX1553 modules to one common IRIG-B time input source or to the onboard time code generator of one AMCX1553 module as the reference for correlation of data across multiple MIL-STD-1553A/B streams.

Driver Software

The Driver Software is supplied with the AMCX1553 module. A full function Application Programming Interface (API) is provided compatible with Windows XP/XPembedded/Vista/7 and Linux and for embedded VME systems (e.g.VxWorks). Drivers for other embedded applications are available upon request. Please contact the factory for further details on driver availability for a particular operating system and host platform. Host application can be written in C and C++. A LabView/VI application interface is provided.

AMCX1553

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

AIM Office Contacts:

AIM GmbH
Sasbacher Str.2
79111 Freiburg
Germany
Tel: +49 761 45 22 90
Fax: +49 761 45 22 93 3
email: sales@aim-online.com

Vertriebsbüro München
Terofalstrasse 23 a
80689 München
Germany
Tel: +49 89 70 92 92 92
Fax: +49 89 70 92 92 94
email: salesgermany@aim-online.com

AIM UK
Cressex Enterprise Centre
Lincoln Road
High Wycombe
Bucks, HP12 3RB
UK
Tel: +44 1494 446844
Fax: +44 1494 449324
email: salesuk@aim-online.com

AIM-USA
Seven Neshaminy Interplex
Suite 211
Trevose, PA 19053
USA
Tel: 267-982-2600
Toll Free: 877-520-1553
Fax: 215-645-1580
email: salesusa@aim-online.com

www.aim-online.com

Right on Target

Technical Data

System Interface: 32-bit/ 33MHz PCIbus (Rev. 2.2) compliant

Processors: One or two 400MHz RISC Processors

Memory: 128MB Global RAM (DDR-RAM), 2x 8M-bit serial flash memory for BIU's, 64M-bit serial flash memory for LCA

Encoder/ Decoder: Up to two (AMCX1553-2T) or up to four (AMCX1553-4) MIL-STD-1553A/B Encoders/ Decoders with full error injection and detection

Time Tagging: Sinusoidal 46-bit absolute IRIG-B Time stamping with 1μs resolution

Trigger/ General Purpose Discretes: Full Trigger configuration on Rear-I/O PMC connector P14; one Trigger Input and Trigger Output for each channel available with two (AMCX1553-1/2/4) or six (AMCX1553-1T/2T) General Purpose Discrete I/O's (avionics level) on the front panel connector.

Physical Bus Interface: MIL-STD-1553B Trapezoidal Transceivers; Three Trigger-I/O's per channel and 8 General Purpose Discrete I/O's available at Rear-I/O connector;
One Trigger Input and Output per channel available at front panel connector

• IRIG-B Time Code In/ Out • 3x Standard PMC connectors • P11 and P12 for 32-bit PCI Bus • P14 for Rear-I/O

AMCX1553-1/2/4: Transformer Bus Coupling (Direct coupling can be provided instead of Transformer coupling/ configuration options available at time of order); Two 15-way (female) High Density D-Sub; Up to four independent MIL-STD-1553A/B channels

AMCX1553-1T/2T: Programmable Bus Coupling (Isolated, Direct, Transformer, Onboard Bus Network); One 9-way (female) D-Sub and one 15-way (female) High Density D-Sub; Up to two independent MIL-STD-1553A/B channels

Dimensions: 149 x 74mm Standard PMC format
143.75 x 74mm Conduction cooled format for AMCX1553-1/2/4

Thermal Conduction Cooling: Enhanced thermal performance for Conduction Cooling in extended temperature range for AMCX1553-1/2/4

Power Consumption:	Typical Values for AMCX1553-4 @ 3.3V: Min. Power: 2.8W (Idle Mode) Max. Power: 7.3W (100% Bus Operation) Typical Values for AMCX1553-2T @ 3.3V: Min. Power: 3.3W (Idle Mode) Max. Power: 7.9W (100% Bus Operation)
Operating Temp. Range:	Standard 0°C ...+70°C ambient Extended temperature range -40°C...+85°C Conduction cooled versions available for AMCX1553-1/2/4
Storage Temp:	-40°C...+85°C
Humidity:	0 to 95% non-condensing

Ordering Information

AMCX1553-1 Single Stream, Dual Redundant MIL-STD-1553A/B PMC Module:
BC, Multi-RT Simulator with Mailbox & Chronological Monitor; IRIG-B Time Decoder, 128MB Global RAM, 8 General Purpose Discrete I/O's

AMCX1553-1T Single Stream, Dual Redundant MIL-STD-1553A/B PMC Module:
BC, Multi-RT Simulator with Mailbox & Chronological Monitor; IRIG-B Time Decoder, programmable Bus Coupling and onboard Bus Network, variable output amplitude, 128MB Global RAM, 8 General Purpose Discrete I/O's

AMCX1553-2 Dual Stream, Dual Redundant MIL-STD-1553A/B PMC Module:
BC, Multi-RT Simulator with Mailbox & Chronological Monitor; IRIG-B Time Decoder, 128MB Global RAM, 8 General purpose Discrete I/O's

AMCX1553-2T Dual Stream, Dual Redundant MIL-STD-1553A/B PMC Module:
BC, Multi-RT Simulator with Mailbox & Chronological Monitor; IRIG-B Time Decoder, programmable Bus Coupling and onboard Bus Network, variable output amplitude, 128MB Global RAM, 8 General Purpose Discrete I/O's

AMCX1553-4 Quad Stream Dual Redundant MIL-STD-1553A/B PMC Module:
BC, Multi-RT Simulator with Mailbox & Chronological Monitor; IRIG-B Encoder/ Decoder, 128MB Global RAM, 8 General purpose Discrete I/O's

Simulator Only versions available BC, Multi RT Simulator with Mailbox Monitor

Single Function versions available Chronological Monitor & Mailbox Monitor OR Bus Controller OR Multi RT and Mailbox Monitor

ACB-HD15-1 Ready Made Adapter Cable (2.0m): from 15-pin High Density D-Sub to two Twinax Connectors PL-75

ACB-HD15-1-F Ready Made Adapter Cable (2.0m): from 15-pin High Density D-Sub to two Twinax Connectors PL-75 and 9-pin D-Sub Connector for Trigger-I/O and IRIG-B

ACB-PCI-1 Ready Made Adapter Cable (2.0m): from D-Sub to two TWINAX Connectors PL-75

ACB-HD15-2 Ready Made Adapter Cable (2.0m): from 15-pin High Density D-Sub to four Twinax Connectors PL-75

ACB-HD15-2-F Ready Made Adapter Cable (2.0m): from 15-pin High Density D-Sub to four Twinax Connectors PL-75 and 9-pin D-Sub Connector for Trigger-I/O and IRIG-B

ACB-PCI-2 Ready Made Adapter Cable (2.0m): from 15-pin High Density D-Sub to four Twinax Connectors PL-75 and 9-pin D-Sub Connector for Trigger-I/O and IRIG-B

For all variants of AMCX1553-4 cards use **two** of ACB-HD15-2/ ACB-HD15-2-F Adapter Cables

ACC-1 CompactPCI (3U) Carrier module with one PMC slot

ACC-2 CompactPCI (6U) Carrier Module with two PMC slots

AVC-2 VME (6U) Carrier Module with two PMC slots

ACP-1 PCI Carrier Module with one PMC slot

For PCI Express **Carrier Modules** with one PMC slot please contact the factory