

Technologies

**MIL-STD-1553
Product Overview**



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Avionics Interface Technologies MIL-STD-1553 Product Overview

GENERAL FEATURES

The Avionics Interface Technologies family of MIL-STD-1553 products are capable of supporting embedded applications as well as test, simulation, and analyzer applications. The MIL-STD-1553 products are available in multiple form factors, connecting to a variety of computer bus designs. AIT also offers extended temperature, conformal coating, and conduction cooling options.

AIT's MIL-STD-1553 products are based on an FPGA-based architecture. The FPGA design ensures compliance with the MIL-STD-1553 protocol as well as enabling error injection beyond the standard protocol for test applications. An onboard PowerPC CPU is integrated into the FPGA, minimizing host CPU interaction by overseeing instructions from the user host application. This enables autonomous operation with minimal interaction to the host CPU during time-critical embedded applications as well as test and simulation applications.

All MIL-STD-1553 products include an ANSI C application interface and an object-oriented application interface for C++, C#, and Visual Basic. The ANSI C application interface is a low-level interface that provides optimized interaction directly with the hardware. The object-oriented application interface supports C++ and .NET development environments for simplified software integration using the latest development tools. Device drivers are included for Windows, Linux, VxWorks and other real-time operating systems.

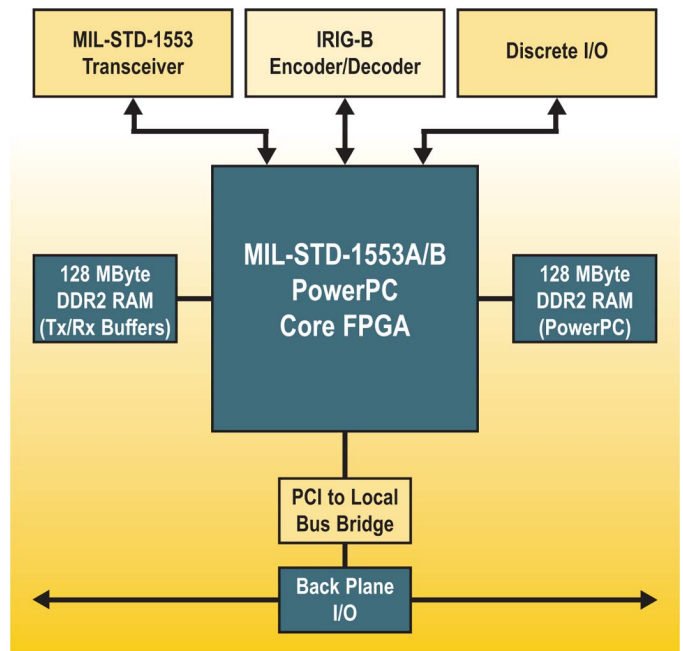
AIT has worked with National Instruments to optimize instrument drivers providing high level interfaces for LabVIEW, LabVIEW RT, and LabWindows applications.

FLIGHT SIMULYZER

Flight Simulyzer is a Windows-based MIL-STD-1553 analyzer software for use with AIT's boards. *Fight Simulyzer* enables a user to easily setup:

- ◆ Bus Controller schedules and asynchronous simulations
- ◆ Remote Terminal simulations
- ◆ Chronological Bus Monitor captures/recordings with trigger and filter definitions
- ◆ Replay operations

The intuitive GUI provides the ability to easily setup full bus simulations and the bus monitor without any programming. *Flight Simulyzer* supports all of the AIT MIL-STD-1553 board operations including triggering and filter setup and *Data Corruptor™*. All setups are stored in well-documented XML files allowing users to easily create setups directly from program specific configuration databases.



BUS CONTROLLER (BC)

- ♦ Autonomous operation including software-controlled sequencing of bus commands
- ♦ Minor/major frame operation
- ♦ Acyclic command insertion/deletion
- ♦ Full error injection down to word and bit level
- ♦ Multi-buffering with real-time buffer updates
- ♦ Four microsecond inter-message gap time

MULTIPLE REMOTE TERMINALS (RT)

- ♦ Simulate up to 31 RTs including all sub-addresses simultaneously
- ♦ Programmable response time for each RT
- ♦ Full error injection down to word and bit level
- ♦ Multi-buffering with real-time buffer updates and separate buffers assigned to each RT

CHRONOLOGICAL BUS MONITOR (BM)

- ♦ Full monitoring of all bus traffic to 1 microsecond resolution
- ♦ Response and gap time measurements down to 8 nanosecond resolution
- ♦ Full error detection (AS4116 compliant)
- ♦ Complex triggering
- ♦ Message filter and selective capture

IRIG-B TIME CODE ENCODER/DECODER

- ♦ All boards include IRIG-B input for synchronization to a common time source
- ♦ IRIG-B encoder with sinusoidal output and free-wheeling mode

PHYSICAL BUS REPLAY

- ♦ Electronically reconstruct previously recorded 1553A/B bus traffic
- ♦ Selective filter RT data

DISCRETE I/O

- ♦ Five to 10 fully-programmable (input or output) discrete lines
- ♦ Output lines can drive up to 30V (with external power)

PMC1553-1/2/4

- ♦ Single, dual, or quad stream, dual-redundant interface module for PMC



XMC1553-1/2/4

- ♦ Single, dual, or quad stream, dual-redundant interface module for XMC

PCI-C1553-1/2/4

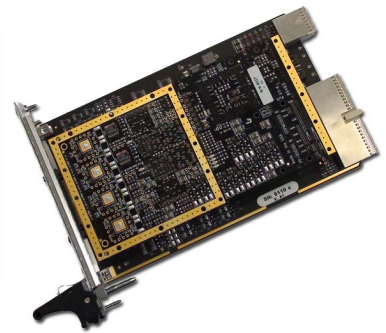
- ♦ Single, dual, or quad stream, dual-redundant interface module for PCI

PCIe-C1553-1/2/4

- ♦ Single, dual, or quad stream, dual-redundant interface module for PCIe

PXI-C1553-1/2/4

- ♦ Single, dual, or quad stream, dual-redundant interface module for cPCI/PXI
- ♦ PXI interrupter, star trigger, and clock



PC104p-1553-1/2

- ♦ Single or dual stream, dual-redundant interface module for PC/104+

USB1553

- ♦ Single or dual stream, dual-redundant interface module for USB

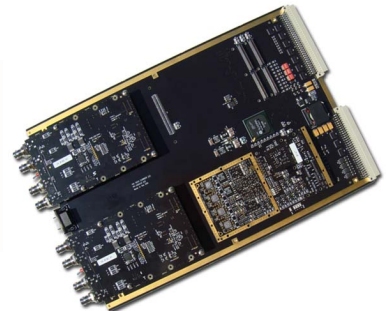


VME1553-1/2/4/6/8

- ♦ Multi-stream, dual-redundant interface module
- ♦ Two PMC sites

VXI1553-1/2/4/6/8

- ♦ Multi-stream, dual-redundant interface module for VXI
- ♦ Two PMC sites



EMBEDDED PROGRAMMING

The MIL-STD-1553 SDK includes a low level C application interface that is optimized for highly critical embedded applications that require efficient access to hardware data buffers. This low level application interface and its supporting drivers are delivered with source code (for Linux, VxWorks, and others).

OBJECT-ORIENTED PROGRAMMING

The MIL-STD-1553 SDK also includes a high level object-oriented library that provides a C++ application interface as well as a .NET application interface supporting C# and Visual Basic applications. These high level application interfaces provide an intuitive MIL-STD-1553 focused interface that simplifies software development when compared to the low level C application interface. It provides both hardware (the same PCI is common across all form factors) and development environment independence interface.

REMOTE OBJECT SERVICES (ROS)

Remote Object Services make AIT's hardware available to applications running in other processes or on other hosts in the network. It supports heterogeneous networks of host where the server (hosting the MIL-STD-1553 hardware) may use a different operating system than the clients hosting the applications software. This service is simple to configure and install and provides intuitive support for distributed applications that frees the application programmer from concern about the underlying communications between the server and client hosts.

LabVIEW, LabVIEW REAL-TIME, and LabWindows

The MIL-STD-1553 SDK includes high level support for LabVIEW and LabWindows applications. MIL-STD-1553 instrument drivers are provided for both environments including support for operations on realtime targets (LabVIEW RT). The instrument drivers provide users with a high level interface that supports the setup and configuration utilizing configuration files created within the *Flight Simulyzer* GUI applications. The instrument drivers are optimized to take full advantage of the advanced onboard functions provided by the FPGA and embedded processors of the MIL-STD-1553 hardware modules in order to support time critical real-time applications.

