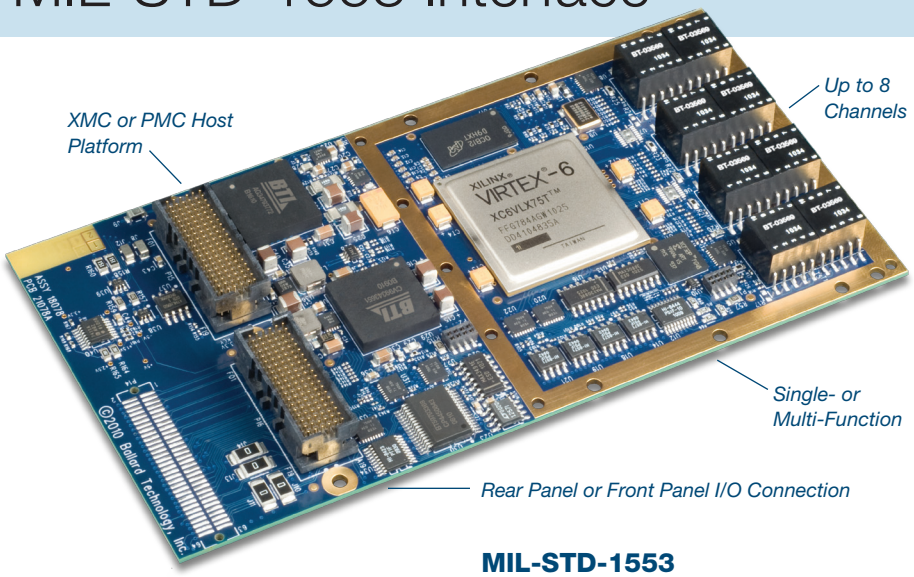
Technical Data Sheet

Mx5 MIL-STD-1553 Interface

XMC and PMC Interfaces to MIL-STD-1553



Features

Up to 8 MIL-STD-1553 Channels
Various Discrete I/O
IRIG A/B PWM and AM
64 MB ECC Data Memory
Extensive Built-in Test (BIT)
ARINC 429/717 Channels Optional

Description

The Mx5 family of XMC and PMC cards enable electronic systems to interface with up to eight (8) MIL-STD-1553 avionics databuses. They provide extensive 1553 functionality and are used to communicate with, simulate, test, and monitor 1553 equipment and systems. These high-density high-performance cards are suitable for applications ranging from test equipment to rugged deployable systems.

A wide selection of models is available: XMC and PMC, front and rear panel I/O, various 1553 channel counts and capabilities, and optional ARINC 429, 717, 708, and serial interfaces. They all include avionics discretes, timers, IRIG synchronization/generation, and differential interfaces usable as discrete I/O. All models may be used in either conduction or convection cooled systems. A separate brochure describes the ARINC protocol capabilities for the Mx5.

Hardware

Mx5 cards incorporate the latest 5th generation protocol engine and use bus mastering to yield high performance. They support maximum data throughput on all 1553 channels and have a large 64 MB built-in memory with error correction.

Depending upon the hardware model, 1553 channels may be either single-function or multi-function. Single-function channels can be configured in software as either a Bus Controller (BC), a Bus Monitor (BM), or up to 32 Remote Terminals (RTs). All models include comprehensive error detection and reporting. Multi-function channels have protocol error injection capability and can simultaneously be a BC, BM, and up to 32 RTs.

Software

Users can develop their own software applications with the included BTIDriver API. With only a few function calls a program can operate an Mx5 and process messages to and from the avionics databuses. Functions include routines for transmitting, receiving, scheduling, recording, time-tagging, and manipulating data. An Mx5 card can use applications developed for other Ballard devices. Code migrates seamlessly from BTIDriver compatible devices or through a translation driver from older Ballard devices.

MIL-STD-1553

- Full MIL-STD-1553 functionality
- BC, RT, and/or Monitor
- Dual-redundant channels
- Models available: Single-function and Multi-function
- Error injection (Multi-function only)

Software

- Universal BTIDriver™ API compatible
- Efficient DMA monitoring
- Compatible with other Ballard hardware
- Translator for older Ballard devices

Benefits

- Choice of XMC or PMC backplane
- Powerful protocol engine relieves host
- Mixed protocol saves system space
- Rugged design (MIL-STD-810)
- Free customer support for product life
- Standard limited warranty
- RoHS compliant

Applications

- Rugged deployed systems
- Embedded test systems
- High performance simulators
- Demanding requirements
- Mixed protocol systems
- Avionics upgrades and retrofits
- Databus health monitoring

Ballard TECHNOLOGY

The Avionics Databus Innovators

www.ballardtech.com

Mx5 MIL-STD-1553 Interface

MIL-STD-1553 Features

Bus Controller

Automatic or custom scheduling
Programmable: frame times, intermessage gaps, conditional retries, and branches
Run modes: continuous, loop N times, single-step
Start on software or external trigger
Aperiodic and one-shot messages
Sync out on all or selected messages
Programmable BC timeout values

Remote Terminal

Multi-terminal simulation (32 RTs)
Configurable 1553A or B response time
Programmable response time and status word bits
Auto Busy Bit option
Support for all 1553B mode codes
Selectable mode code subaddress
Enable broadcast on a per-RT basis
RT 31 as broadcast or valid RT
Configure/legalize selected SA/MCs
Multiple RT Map (Shadow) Monitor

Bus Monitor

Capture all 1553 traffic or filter by RT/SA
Capture and time-tag discrete I/O
Sequential record includes: command/status/data words, time-tag, errors, bus, and response time(s)
Efficient DMA monitor to host

Message Data

Comprehensive error detection
Guaranteed data integrity
Buffering schemes facilitate data handling:
Single buffers (default)
Circular lists transmit a repeated pattern
FIFO list buffers for sequential data
Data initialization options
Track activity by min, max, or elapsed time

Error Injection (Multi-Function only)

Trigger from software or an external signal
Inject errors in all or tagged messages
Parity, bit count, inverted sync, Manchester, gap, and word count (relative or absolute)

Other Features

Base Configuration

- Model dependent 1553 capability
- 6 Avionics Discrete I/O
- 2 In, 2 Out differential discretes
- 4 Virtual discretes
- IRIG A/B input and output
- 2 LED indicators
- 64 MB ECC (error correction) memory

Discrete I/O

Avionics discretes: programmable, open/Gnd, input/output
Differential discretes: RS-422
Virtual discrete: synchronize events
Log transitions to sequential record

Time-tag/IRIG

48-bit hardware time-tag (1µs resolution)
IRIG A or B, AM (input), PWM, and PPS
Generate or synchronize
Synchronize hardware time-tags

Interrupts/Logging

Poll or use interrupts
Configurable event log
Programmable event logging/interrupts from messages, BC schedule, and buffers

Channel Details

All channels dual redundant – Bus A and B
Single-function: BC, 32 RTs, or Bus Monitor
Multi-function: Error injection, BC, 32 RTs, and Bus Monitor simultaneously
Transformer coupling (direct optional)

Specifications

Component temperature: -40 to + 85 deg C
Storage temperature: -55 to +100 deg C
I/O Connectors: SCSI-68 (front I/O), P14/P16 (rear I/O)
Dim: 74 x 143.75 mm
ME5 (XMC) PCI Express bus: x4 lane, bus mastering, power adapts to VPWR
MP5 (PMC) PCI-X bus: 33/66/133 MHz, 32/64 bit, 3.3 VIO

Built-in Test Features

Power-on BIT (PBIT)
Continuous BIT (CBIT)
Initiated BIT (IBIT)

Software

Universal BTIDriver API for C/C++, C#, VB, VB.Net, and LabVIEW™
MS Windows® and Linux® OS drivers
Translation DLLs for older Ballard devices
Call for latest language and OS support.

Ordering Information

Hardware

Includes manuals and software CD.

Part Number Example: M**E**5**R**/**8M**/**FXY**

Form Factor
E = XMC, **P** = PMC
I/O Panel Connection
R = Rear I/O
F = Front I/O
1553 Channel Count
1-8 = 1-8 channels
Functionality (for all channels)
S = Single, **M** = Multi
Available Options
FXY = Conformal Coating
(Call for details on other options)

ARINC and multi-protocol models are also available. Call for more information.

Cables and Accessories

Order separately. Ballard offers a wide selection. Visit www.ballardtech.com or call for more information.

Ballard Technology is committed to quality and is AS9100 / ISO 9001 registered.

BR183-20101116

Ballard TECHNOLOGY

The Avionics Databus Innovators

Aerospace
Military
Commercial
Interfaces
Embedded Systems
Software

11400 Airport Road
Everett, WA 98204 USA
T 800.829.1553 **T** 425.339.0281
F 425.339.0915
E sales@ballardtech.com
W www.ballardtech.com