Technical Data Sheet

USB 1553 MIL-STD-1553 Interface

USB Interface to MIL-STD-1553

Features

Up to 2 MIL-STD-1553 Channels
8 Avionics Discrete I/O
IRIG A/B PWM and AM
USB 2.0 Bus Powered
32 MB Data Memory
Small, Portable, and Rugged

Description

The USB 1553 series of products are pocket-sized USB adapters that enable computers to interface with MIL-STD-1553 avionics databuses. Having extensive 1553 functionality, they are used to communicate with, simulate, test, and monitor 1553 equipment and systems. Several models are available with different channel counts and capabilities.

Being a USB peripheral, the USB 1553 is compatible with virtually all modern PC laptop, desktop, tablet, and netbook computers. Plug and Play and Hot Swap features make it easy to install and move between computers. The USB 1553 supports maximum data throughput on all 1553 channels and has a large 32 MB built-in memory. With all its capability and versatility the USB 1553 is suitable for a wide range of applications in the lab and in the field.

Hardware

The USB 1553 is small, lightweight, and rugged. All power necessary for operation is provided via the single USB port. All models include eight avionics level input/output discretes and IRIG time synchronization/generation. Two LEDs indicate power and bus traffic by default, or they can be controlled by user software.

Depending upon the hardware model, each 1553 channel may be either single-function, multi-function, or bus monitor only. 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). 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 the USB 1553 and process messages to and from the avionics databuses. Functions include routines for transmitting, receiving, scheduling, recording, time-tagging, and manipulating data. The USB 1553 can use applications developed for other Ballard devices. Code migrates seamlessly from BTIDriver compatible devices or through a translation driver from older Ballard devices.

Alternatively, Ballard's optional CoPilot software provides easy-to-use, interactive tools for databus test, analysis, and simulation. CoPilot simplifies project development and provides added productivity through virtual instrument displays, flexible monitoring and analysis tools and a powerful scripting engine.

MIL-STD-1553

- Full MIL-STD-1553 functionality
- BC, RT, and/or Monitor
- Dual-redundant channels
- Models available: Single-function, Multi-function, and Bus Monitor only
- Error injection (Multi-function only)
- Transformer and direct coupled
- Transformer coupled cable included
- LEDs indicate bus traffic and errors

Software

- Universal BTIDriver™ API compatible
- Efficient DMA monitoring
- Compatible with other Ballard hardware
- Translator for older Ballard devices
- CoPilot® software (optional)

Benefits

- Small, lightweight, and rugged
- Portable, versatile, and durable
- Easy Plug and Play installation
- No external power supply needed
- Powerful protocol engine
- Secure locking connectors
- Free customer support for product life
- 3-year limited warranty standard
- FCC, CE and RoHS compliant

Applications

- 1553 analysis, test, and simulation
- Data loading
- Flightline and AOG support
- In the lab or in the field
- Replace plug-in cards

Ballard TECHNOLOGY

The Avionics Databus Innovators

www.ballardtech.com

USB 1553 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 RT)
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
RT "Shadow Monitor" mode

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 pipe 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
- USB 2.0 interface
- 8 Avionics Discrete I/O
- IRIG A/B input and output
- 2 LED indicators
- 32 MB on-board memory

Avionics Discrete I/O

8 programmable inputs/outputs
Output: Open/Gnd, 35 VDC, 200 mA (max), self monitoring, inductive load protected
Log transitions to sequential record

Time-tag/IRIG

48-bit hardware time-tag (1us resolution)
IRIG A or B, AM, PWM and PPS modes
Generate or synchronize (AM input only)
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
Bus Monitor only: Monitor Only
Jumper for direct coupled termination

Specifications

Component temperature: -40 to + 85 deg C
Storage temperature: -55 to +100 deg C
I/O Connector: HD44F D-Sub
Dim: 3.0 x 4.45 x 0.97 inch (76 x 113 x 25 mm)
Weight: under 5 oz (140 g)
Power: Single USB Port
MTBF: 1,500,000 hours

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
CoPilot analysis and test software (optional)
Call for latest language and OS support.

Ordering Information

USB Hardware

Part No.	Channel			
	1	2	3	4
UA1120	S	-	-	-
UA1130	M	-	-	-
UA1121	S	BM	-	-
UA1122	S	S	-	-
UA1131	M	BM	-	-
UA1133	M	M	-	-
UA1110	BM	-	-	-
UA1111	BM	BM	-	-
UA1140*	BM	BM	BM	BM

S = Single-function
M = Multi-function
BM = Bus Monitor only
** UA1140 channels are non-redundant*

Case color option: Black is standard. Add "/FTO" suffix for Flight Test Orange

CoPilot Systems

To include CoPilot put "CP-" before the above Part No.
Example: CP-UA1130

Accessories (Included)

1553 transformer-coupled I/O cable with PL-75 connectors (3 ft)
USB cable with screw-locks (5 ft)
Mating HD44P D-Sub I/O connector
Manuals and software CD

Ballard TECHNOLOGY

The Avionics Databus Innovators

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

BR173-20100322

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