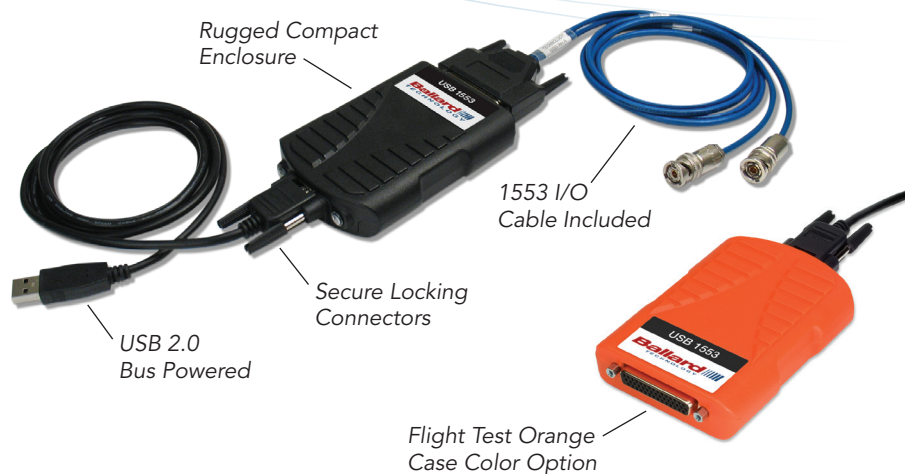


# USB 1553

## USB Avionics Interfaces for MIL-STD-1553

The USB 1553 family of pocket-sized USB adapters enable computers to communicate with, simulate, test, and monitor MIL-STD-1553 equipment and systems. These rugged USB 2.0 peripherals feature extensive 1553 functionality and are compatible with virtually all modern PC laptop, desktop, and tablet computers.



### Portable Avionics Interfaces

These versatile interfaces are suitable for a wide range of applications in the lab and in the field. They support maximum data throughput on all 1553 channels and have a large 32 MB built-in memory. All power necessary for operation is provided via the single USB port. Plug and Play and Hot Swap features make them easy to install and move between computers.

### Fully-Featured Design

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. All models include eight avionics level input/output discretes and IRIG time synchronization/generation.

### Easy-to-Use 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 hardware and process messages to and from the avionics databuses. Functions include routines for transmitting, receiving, scheduling, recording, time-tagging, and manipulating data. With BTIDriver, application code migrates seamlessly to and from other Ballard devices, reducing development time and costs.

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. Special bundled pricing is available when ordering CoPilot along with the USB interface hardware.

### KEY FEATURES

- Small, portable, and rugged
- Easy Plug and Play installation
- USB 2.0 Bus powered – no external power supply needed
- 1 or 2 MIL-STD-1553 Channels
- 8 Avionics Discrete I/O
- IRIG A/B PWM and AM
- 32 MB Data Memory
- Full MIL-STD-1553 functionality
  - Dual-redundant channels
  - BC, RT, and/or Monitor
  - Single-function, Multi-function, and Bus Monitor-only models available
  - Error injection (Multi-function)
  - LEDs indicate bus traffic and errors
- FCC, CE and RoHS compliant
- Boards also available without enclosure for embedded use
- 3-year limited warranty standard

## 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  
 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

### Standard Features

- 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  
 Can be used as syncs and triggers  
 Output: Open/Gnd, 200 mA (max), self monitoring, inductive load protected  
 Log transitions to sequential record

### Time-tag/IRIG

48-bit hardware time-tag (1 $\mu$ s 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  
 Bus Monitor only: Monitor Only  
 Transformer and direct coupling  
 Jumper for direct coupled termination

### Specifications

Component temp: -40 to +85 deg C  
 Storage temp: -55 to +100 deg C  
 I/O Connector: HD44F D-Sub  
 Dimensions: 3.0 x 4.45 x 0.97 in (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 LabVIEWTM  
 Windows®, Linux® and Solaris OS drivers  
 Translation DLLs for older Ballard devices  
 CoPilot analysis & test software (optional)  
 Call for latest language and OS support.

## Ordering Information

Hardware & CoPilot*	Hardware Only	Channel			
		1	2	3	4
CP-UA1133	UA1133	M	M	-	-
CP-UA1130	UA1130	M	-	-	-
CP-UA1122	UA1122	S	S	-	-
CP-UA1120	UA1120	S	-	-	-
CP-UA1131	UA1131	M	BM	-	-
CP-UA1121	UA1121	S	BM	-	-
CP-UA1111	UA1111	BM	BM	-	-
CP-UA1110	UA1110	BM	-	-	-
CP-UA1140**	UA1140**	BM	BM	BM	BM

\*Includes CoPilot analysis & test software

\*\*Channels are non-redundant

S = Single-function, M = Multi-function, BM = Bus Monitor only

### Options

To order, add the appropriate suffix to the above part number. Example: UA1133/NE

/FTO Flight Test Orange case (black case is standard)

/NE No Enclosure, Printed Circuit Board Assembly only, for embedded use

/FX Conformal coating (Parylene)

### 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

\*Except models with "/NE" option

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