USB 429
ARINC 429/717 Interfaces

Features

Up to 16 ARINC 429 Channels
Up to 4 ARINC 717 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

USB Interfaces to ARINC 429 and 717

The USB 429 family of pocket-sized USB adapters enable computers to communicate with, simulate, test, and monitor ARINC 429 and 717 equipment and systems. These rugged USB 2.0 peripherals feature extensive 429/717 functionality and are compatible with virtually all modern PC laptop, desktop, and tablet computers.

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 ARINC 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.

Hardware

Models are available with ARINC 429 channels only, ARINC 717 channels only, or a combination of both. All include eight avionics level input/output discretes and IRIG time synchronization/generation. They also provide useful non-standard functionality, such as a range of data rates, use of parity as data, and error injection. Once configured, the USB hardware performs all the protocol processing. It manages the reception, transmission, error checking, time-tagging and buffering of messages—freeing user software to focus on high-level application-specific processing.

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 ARINC 429 and 717 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.

ARINC 429

- Full ARINC 429 functionality
- Mix of receive and transmit channels
- Handles periodic and transfer protocols
- Message filters and schedules
- Standard and non-standard bit rates
- Error detection and selective injection
- Variety of syncs and triggers
- Several message buffering schemes
- ARINC 575 support
- LEDs indicate bus traffic

Software

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

Benefits

- 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

- 429/717 analysis, test, and simulation
- Data loading
- Flightline and AOG support
- In the lab or in the field
- Replace plug-in cards

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ARINC 429 Features

General

Numeric and file transfer protocols
Standard and custom bit rates
  12.5 and 100 kb/s standard
  Configurable per channel
  Wide range of custom bit rates
Set parity per channel (odd/even/data)
Sync output on all or selected messages
Internal self-test bus

Message Data

Buffering schemes facilitate data handling:
  Guaranteed data integrity
  Current value buffers (default)
  Circular lists transmit a repeated pattern
  FIFO list buffers for sequential data
  Asynchronous list buffers
Message record contains the ARINC word, time-tag, channel, speed, error data, min/max elapsed time, hit counter, and/or gap time

Receivers

Automatic bit rate detection
Receive message filtering (Label/SDI)
Current value and list buffers
Error detection: gap, timing, length, parity
Log and/or interrupt on errors

Transmitters

Single, scheduled, and asynchronous messages
Tag messages for error injection, sync out, and logging/interrupts
Error injection: parity, inter-message gap
Externally trigger all or selected messages

Transmit Schedules

Schedules: automatic or explicit
Automatic based on repetition rates
Contain messages (labels), gaps, and controls for pausing, halting, pulsing discrete outputs, and event logging
Modes: Continuous or single step for debugging

Other Features

Base Configuration

- Model dependent 429/717 capability
- USB 2.0 interface
- 8 avionics discrete I/O
- IRIG A/B input and output
- 2 LED indicators
- 32 MB on-board memory

Sequential Monitor

A time-tagged record of selected activity on ARINC 429, 717, and discrete I/O
Filter 429 data by channel/label/SDI
Includes ARINC data, channel, speed, errors, and time-tag
Efficient DMA monitor pipe to host

ARINC 717

Software selectable biphase/bipolar
Subframe and superframe support
Data rates: 64 to 8192 words per second

Avionics Discrete I/O

8 programmable inputs/outputs
Can be used as syncs and triggers
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 (1µs resolution)
IRIG A or B, AM (input), PWM, and PPS
  Generate or synchronize
  Synchronize hardware time-tags

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 in (76 x 113 x 25 mm)
Weight: under 5 oz (140 g)
Power: Single USB port (325 mA max)
MTBF: 1,200,000 hours

Interrupts/Logging

Poll or use interrupts
Configurable event log
Programmable event logging/interrupts from messages, tx schedules, and buffers

Software

Universal BTIDriver API for C/C++, C#, VB, VB.Net, and LabVIEW™
Windows®, Linux® and Solaris OS drivers
Translation DLLs for older Ballard devices
Williamsburg protocol library
CoPilot analysis and test software (optional)
Call for latest language and OS support.

Ordering Information

*Hardware & CoPilot**	*Hardware Only*	*ARINC 429*	*ARINC 717*
CP-UA1440	UA1440	12R4T	–
CP-UA1430	UA1430	8R4T	–
CP-UA1420	UA1420	4R2T	–
CP-UA1410	UA1410	1R1T	–
CP-UA1431	UA1431	8R4T	2R2T
CP-UA1401	UA1401	–	2R2T

**Includes CoPilot analysis & test software*
nRnT = number of Receive/Transmit channels

Options

To order, add the appropriate suffix to the above part number. Example: **UA1431/NE**

/FTO	Flight Test Orange case (black case is standard)
/NE	No Enclosure, Printed Circuit Board Assembly only, for embedded use
/FXY	Conformal coating (Parylene)

Accessories (Included*)

USB cable with screw-locks (5 ft)
Mating HD44P D-Sub I/O connector
Manuals and software CD
**Except models with "/NE" option*

Similar Products (on www.ballardtech.com)

- **USB MULTI** – Multi-protocol version of this interface.
- **TS 717 Test Set** – ARINC 717/573/429 kit with carrying case and cable for use with Digital Flight Data Recorder.
- **DL 615 Data Loader** – Turns any MS Windows® PC into an ARINC 615-3 and ARINC 603 data loader.

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

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