

USB 429 ARINC 429/717 Interface

USB Interface to
ARINC 429 and 717

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

Description

The USB 429 series of products are pocket-sized USB adapters that enable computers to interface with ARINC 429 and ARINC 717 avionics databuses. Having extensive functionality, they are used to communicate with, simulate, test, and monitor ARINC 429/717 equipment and systems. Several models are available with different channel counts and capabilities.

Being a USB peripheral, the USB 429 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 429 supports maximum data throughput on all ARINC channels and has a large 32 MB built-in memory. With all its capability and versatility the USB 429 is suitable for a wide range of applications in the lab and in the field.

Hardware

The USB 429 is small, lightweight, and rugged. All power necessary for operation is provided via the single USB port. The number and combination of ARINC 429 and 717 channels depends on the hardware model. All models include eight avionics level input/output discretes and IRIG time synchronization/generation. In addition, the USB 429 provides useful non-standard functionality, such as a range of data rates, use of parity as data, and error injection.

Once configured, the USB 429 hardware performs all the protocol processing. It manages the reception, transmission, error checking, time-tagging and buffering of messages. This frees the software to focus on high-level user-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 429 and process messages to and from the avionics databuses. Functions include routines for transmitting, receiving, scheduling, recording, time-tagging, and manipulating data. The USB 429 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 ARINC 429 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.



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

Ballard TECHNOLOGY

The Avionics Databus Innovators

www.ballardtech.com

USB 429 ARINC 429/717 Interface

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
 Sub-frame and super-frame support
 Data rates: 64, 128, 256, 512, 1024, 2048, 4096, 8192 words per second
 ARINC 717 Monitor Utility software

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 (1 us resolution)
 IRIG A or B, AM, PWM and PPS modes
 Generate or synchronize (AM input only)
 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 inch (76 x 113 x 25 mm)
 Weight: under 5 oz (140 g)
 Power: USB bus-powered (325 mA max)
 MTBF: 1,200,000 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
 Williamsburg protocol library
 ARINC 717 Monitor Utility
 CoPilot analysis and test software (optional)
Call for latest language and OS support.

Interrupts/Logging

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

Ordering Information

USB Hardware

Part No.	ARINC 429	ARINC 717
UA1410	1R1T	–
UA1420	4R2T	–
UA1440	12R4T	–
UA1401	–	2R2T
UA1431	8R4T	2R2T

nR = number of receive channels
 nT = number of transmit channels
 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-UA1431

Accessories (Included)

USB cable with screw-locks (5 ft)
 Mating HD44P D-Sub I/O connector
 Manuals and software CD



The Avionics Databus Innovators

Aerospace Interfaces
 Military Embedded Systems
 Commercial Software

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