ÆsyBus 429-USB

mbs Electronic Systems GmbH
Ringstrasse 3, D-82319 Starnberg
Tel.: +49 (0) 8151/918047
Fax: +49 (0) 8151/449646
info@mbs-electronics.com
www.mbs-electronics.com

High Performance ARINC 429 Interface to USB

Features

- up to 12 ARINC 429 channels (4Tx/8Rx) per module
- 4 Discrete functional pull-down outputs
- 10/100 Mbps Ethernet (ARINC 615A)
- Separate Receivers for monitoring Transmit driver outputs
- Support for periodic and asynchronous messages
- Advanced scheduling options
- Error detection and injection
- Time-stamping and Timer Synchronisation
- Lightning protection
- Extended Temperature Range

General Overview

mbs' ÆsyBus 429-USB Interface module to ARINC 429 was designed primarily to support portable applications and in particular Aircraft Portable Data Loaders which operate in accordance with ARINC 615-3/-4 and ARINC 615A specifications. The module's additional support for Ethernet is intended for data loading applications which combine the option for loading, either via ARINC 429 or 100 Mbps Ethernet. Despite the emphasis on Data Loading applications the module's high performance and feature rich compact design makes it the ideal choice for many other applications.

ARINC 429

ÆsyBus 429-USB modules have up to 4 Transmit and 8 Receive channels in a compact, low power, pocket size module which makes it the ideal choice for portable applications.

According to need, the user can select between two methods for transmitting ARINC 429 data.

- Dedicated FIFOs which are ideally suited for asynchronous transmissions, needed for file transfer applications, like data loading. Each FIFO buffers up to 1k ARINC 429 words, which are transmitted as soon as an opportunity occurs with a minimum allowable gap between words.
- Transmit Scheduler and Data Buffer, designed for periodic transmissions. This allows up to 128 individually assigned ARINC 429 words to be scheduled on to each of the 4 transmit channels with repetition rates from 10 ms to 4 seconds. Data is drawn from user assigned locations within the Transmit Data Buffer.

Asynchronous and periodic transmissions mix naturally on to the buses with periodic transmissions taking priority.

All ARINC 429 Receive channels feature Error Detection. Cyclic data buffers are provided for storing Receive data for each channel, prior to it being automatically transferred to applications on the host computers together with the appropriate Write Pointers.

Receive data is Time-Stamped with a 32-bit counter and a microsecond resolution. The counter can also be read directly and its value transferred to host applications with other data.

It is up to the user to maintain a record of the Cyclic Buffer Read Pointers. The concept of using cyclic buffers rather than FIFOs has a tremendous advantage, in that multiple host applications can read the receive data without it being lost, while FIFOs can only be read once before the data disappears.

Discrete Output

The module provides four discrete functional pull-down outputs compatible with the type used in aircraft for signalling to an LRU a request to start a data transfer operation.

Ethernet

Many modern aircraft have a mix of LRUs, some of which use ARINC 429, while others use Ethernet for Data Loading applications. With this in mind, the ÆsyBus 429-USB features a 10/100 Mbps fast Ethernet interface controlled via the USB data bus and output through the main

connector for easy connection to the Data Loading cable. The external Ethernet is accessed by software in the same way as any other Ethernet interface connected to the computer.

USB

The ÆsyBus 429-USB features an USB interface compliant to USB Specification 1.1 and 2.0, supporting USB Full and High Speed modes. It also features a high performance packet transfer rate over the USB bus using proprietary burst transfer mechanism (US Patent Approval). In this way it avoids the shortcomings prevalent in many other ARINC 429 to USB interfaces.

Software

Communication with the ARINC 429 and Discrete Outputs uses UDP/IP protocol like the **mbs**' ÆsyBus interface modules. This has the advantage, that multiple applications can simultaneously access the device, send messages and receive data. Furthermore, these protocols enjoy a level of support unmatched by any other communication protocol. Almost all develoment tools and operating systems support UDP/IP protocol. In addition, the ÆsyBus 429-USB is supplied with many example software applications in source code which can either be used directly or used as a basis for developing customised software to meet the exact project requirements.

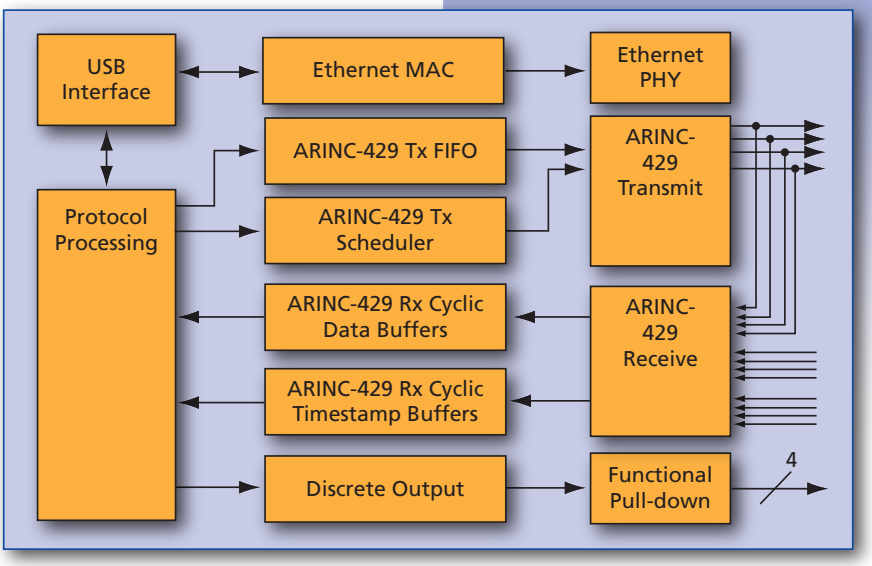

Figure 1: Functional block diagram of the ÆSyBus 429-USB.

Functional Specifications

USB Features

- USB Specification 1.1 and 2.0
- USB Full and High Speed operation
- high performance packet transfer

Discrete Output Features

- 4 Discrete functional Pull-down outputs

Ethernet Features

- 10/100 Mbps Ethernet
- Auto-negotiation

Environmental

- Lightning Protection
- -40°C to +80°C Operation

ARINC 429 Transmit Features

- 2 or 4 Transmit Channels
- Transmit speed select 12.5 k or 100 k bits/s
- Transmit Error insertion
- Transmit FIFOs for asynchronous transmission
- Transmit Scheduling
- Built-In Transmit Driver Loopback

ARINC 429 Receive Features

- 4 or 8 Receive channels
- Receive Error reporting
- Time Stamping of all Receive Data
- Cyclic buffers for receive data and Time Stamps
- User configurable data transfer scheduling to host applications, periodically and/or when necessary.

ÆsyBus 429-USB Ordering Information

Part Number	Description
Æ-429-USB-4T8R	4 Transmit 8 Receive ARINC 429 USB Module with 4 Discrete Outputs and 10/100 Mbps Ethernet
Æ-429-USB-2T4R	2 Transmit 4 Receive ARINC 429 USB Module with 4 Discrete Outputs and 10/100 Mbps Ethernet

mbs Electronic Systems GmbH
Friedrichshafener Straße 3
D-82205 Gilching
Tel.: +49 (0) 8105/7756900
Fax: +49 (0) 8151/449646
info@mbs-electronics.com
www.mbs-electronics.com