MIL-STD-1553
Interface to Gigabit Ethernet

Features

- Dual Redundant Mil-Std-1553 Bus Channel
- Bus Controller, Remote Terminal or Monitor Operation
- Periodic Message Scheduling
- Aperiodic Messages
- Full Status Monitoring of Transmit and Receive Events
- 32-bit Time-Stamping with one microsecond resolution
- Integrated three port Ethernet Switch
- Optional Power-over-Ethernet support

Description

The AFS-1553 provides a versatile MIL-STD-1553 Interface to Gigabit Ethernet which can be simultaneously accessed via UDP/IP protocol from up to ten separate applications running on one or multiple computers. Each application is assigned a separate User Number and can engage in both control and monitoring functions in support of an overall MIL-STD-1553 system.

UDP/IP protocol is supported by almost all operating systems and no special software licencing is required. The interfaces are delivered with many software examples to help the user to quickly get one's system up and running with a minimum effort so that one can concentrate one's overall system development.

The AFS-1553 can be configured as either a Bus Controller (BC), a Remote Terminal (RT) or as a dedicated Bus Monitor Terminal (MT).

Dimensions (L x W x H) = 104.0 x 108.5 x 30.0 mm

BC Function

When operating as a Bus Controller, the user enjoys full control over Periodic and Aperiodic communication including the selection of the active Dual Redundant data Bus. This is achieved via the expedient use of a Command FIFO and Transmit Scheduling facilities.

The Command FIFO provides basic access to all configuration registers, Dual Redundant Bus selection, Mode and Status Registers, and control over non-periodic transmissions. This FIFO has sufficient memory to store up to 85 System Commands.

The Transmit Scheduler provides the user with a simple means for regimenting Periodic Communications with full control over main and sub-frame messages. The scheduler uses the same command structure as used by the Command FIFO, except that it is organised to issue these System Commands in a deterministic series of major and minor communication frames with a fixed period.

The scheduler supports major frames with up to 1024 commands. Normally, these system commands are used to issue BC Commands to Remote Terminals, but they can also be used to switch dual redundant buses and other system parameters and registers in a deterministic manner.

Aperiodic and periodic transmissions mix naturally onto the buses with periodic transmissions taking priority.

Data for transmission is drawn from user defined locations in the Transmit Data Buffer. This memory is able to buffer up to 1k data words.

Data received from Remote Terminals is automatically transferred to locations in the Receive Data Buffer, which is organised as a cyclic buffer with a capacity for 256 data words. The Write Pointer to this buffer is stored with Time Stamp and other status information in the Message Status memory. This memory is also organised as a cyclic buffer, the contents of which can be automatically transferred with the Receive Data buffer etc. periodically to any host application. By the use of cyclic buffers, multiple host applications can read the Receive and Status Buffers without losing data. This would not be so, if instead, FIFOs were used to store this information.

RT Function

When the AFS-1553 is configured as a Remote Terminal, the Data buffering for transmission, reception and status monitoring functions in a similar manner as described above for BC Terminal operation, except that it does not instigate messages but simply responds as a slave to BC commands.

MT Function

The AFS-1553 can be configured as a Bus Monitor Terminal to capture receive data and bus status information, as described above, except that the user has the choice to monitor, either all Bus Traffic or just the traffic in relation to a particular terminal.

Software

The choice of Ethernet operating with UDP/IP protocol provides the user with a freedom unimaginable in the past. No longer is it necessary for a single program to control all of the communication with the interface card. With the AFS-1553, the user can divide the system into logical parts and implement them in separate applications, on the same computer or on separate computers attached to the network and these connections can be broken and re-connected while the system is working. No need to switch the system down when connecting a new host to the network.

And how about software drivers for my exotic operating system?

This should not be a problem. Almost all serious operating systems and software development environments provide support for the TCP/IP protocol stack, to which UDP belongs. You can take advantage of all the special tools and classes provided by these systems to easily connect to the UDP user ports on the card, or sending and receiving messages etc.

In addition to the support of readily available software development tools, the AFS-1553 comes with example software and support classes written in Visual C# and provided with source code. You don’t have to waste time struggling with an unfamiliar programming language and environment. You just continue with your favourite tools; they are almost certain to provide the support you need to access the Ethernet via UDP/IP and consequently the ÆSyBus devices. In addition, the AFS-1553 is provided with full documentation and various Windows based utility programs to help you configure IP addresses and check out your network connection

Functional Specifications

General Features

- 10 User assigned UDP Ports
- Onboard system Timer with support for external synchronisation

- Time Stamping of MIL-STD-1553 communications using a 20-bit microsecond and 20-bit second counters
- User configurable, message scheduling of data and other information to host applications, periodically and/or when necessary
- Full status monitoring including: Time Stamping, BC command words, RT status words, Error status, location and word count.
- Automatic capture of all receive data and status into user accessible cyclic data buffers
- Utilises standard message processor compliant to MIL-STD-1553B Notice 2 and Mil-Std-1760 Stores Management

BC Features

- Configurable Transmit Command Scheduler with capacity for 1024 periodic System Commands
- System Command FIFO for asynchronous system control, dual redundant bus switching and aperiodic communication
- Inter-message gap and minor frame period control

RT Features

- Automatic dual redundant bus switching

MT Features

- Choice of monitoring communication from a single Remote Terminal or all Remote Terminals

AFS-1553 Ordering Information

Part Number	Description
AFS-1553-BCRT-PoE	PoE Dual Redundant MIL. STD. 1553/ Ethernet Interface Module with Power over Ethernet
AFS-1553-BCRT-EP	EP Dual Redundant MIL. STD. 1553/ Ethernet Interface Module with External Power Input

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