![Electronic Systems mbs logo]

Discrete I/O Interface to Gigabit Ethernet

Features

- 48 Independent Discrete Input / Output Ports
- All Ports individually configurable as Input or Output
- 1000 Mb/s Networked interface supporting up to 10 simultaneous applications on the same or separate computers
- 40-bit Time Stamping with 1 microsecond resolution
- Hardware and Software independent interface

Description

mbs' ÆsyBus product range provides Full Duplex Gigabit Ethernet/IP interfacing to various Avionics and Industrial data buses. ÆsyBus-DIO-48 provides this convenient high speed distributed interfacing capability for accessing 48 Discrete Input / Output Ports.

A separate document provides more detail on the ÆsyBus concept and how its unique architecture can be exploited to provide a cost effective, distributed interface and processing system with outstanding performance. Many new products are planned to expand this flexible, easy to program family.

Discrete Input / Output

The ÆsyBus-DIO-48 Discrete I/O to Gigabit Ethernet Interface Module provides 48 Discrete I/O Ports configurable for signal levels of 3.3V, 5V or as an external power input in the range 2.3V to 5.5V.

Host applications communicate with the Module using Ethernet and UDP/IP protocol, which is supported by all serious computer systems giving a platform independent connection. Each application first registers with the Module by logging on and when finished logoff to release resources for other applications. Up to ten separate applications can register with the Module at any time and access and control its resources.

The discrete I/O ports are arranged in 3 groups (channels) each with 16 ports. Changes in input signal level of any port in a Discrete I/O group causes the system to time-stamp the event, read the input status and store input status and time-stamps in Cyclic Buffers. A set of registers are provided where the Write Pointers for each Cyclic Buffer group can be read.

The idea is that copies of interesting cyclic buffers are transferred to host memory together with the current Write Pointers. If the user keeps a copy of the Read pointers, then it is a relatively simple matter to capture all monitored data in the order it was recorded. This type of buffer has the advantage over a conventional FIFO, in that it can be accessed by multiple users, multiple times, without loss of data. A Host Message Scheduler manages the automatic transfer of data to the host computer at regulated intervals, and only when needed.

Software

The choice of Ethernet data bus 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 ÆsyBus-DIO-48, 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.

How about software drivers for my operating system? This is not a problem! 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 ÆsyBus-DIO-48 comes with example software and API 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/IP and consequently the ÆsyBus devices. In addition, the ÆsyBus-DIO-48 comes with full documentation and various Windows-based utility programs to help you configure IP addresses and check out your network connection.
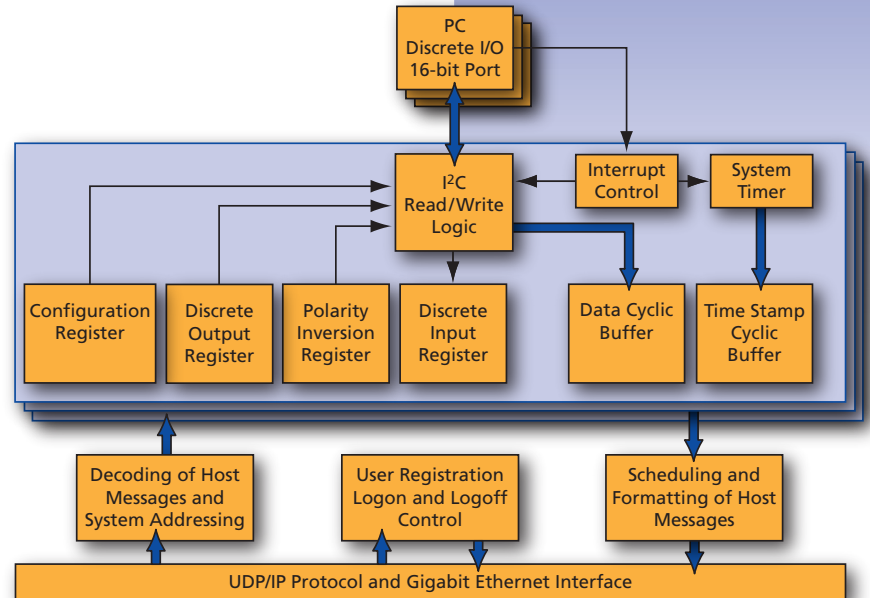
Figure 1: The ÆSyBus DIO provides Hardware Control of Time-Critical Tasks and acts as an automatic periodic Server of time-stamped Discrete Input Status.

Functional Specifications

General Features
- Gigabit Ethernet Networked Interface
- Support for up to 10 simultaneous applications
- On-board system Timer
- Scheduled data transfer to host computer
- Low latency
- Each port can be configured for either Input or Output operation. On reset, all ports default to input.

Discrete Output Features
- Up to 48 Discrete Outputs configured and controlled in groups of 16

Discrete Input Features
- Up to 48 Discrete Inputs configured in groups of 16
- 40-bit Time Stamping with 1 microsecond resolution
- Cyclic buffers for signal Input Status and Time Stamps
- Automatic data transfer to Host Applications
- Configurable Input polarity

Software
- Application Programming Interface (API) with source code
- Example Software applications with source code
- No special software drivers required. The Module uses the Ethernet and Internet Protocol of the computer.

ÆSyBus 429 Ordering Information

Part Number	Description
Æ - DIO-48-EC	Gigabit Ethernet Gateway to 48 Discrete I/O Ports in Eurocard Format
Æ - DIO-48-EP	Gigabit Ethernet Gateway to 48 Discrete I/O Ports. Stand-alone Module with connector for External Power Input
Æ - DIO-48-PoE	Gigabit Ethernet Gateway to 48 Discrete I/O Ports. Stand-alone Module with Power over Ethernet (PoE)