

Airborne Telemetry

NBM-802-2 NetDAS Dual Ethernet Input Module *Airborne Data Acquisition Products*

DESCRIPTION

The NBM-802-2 monitors network traffic and extracts selected messages/words for insertion into an output data stream. for the NBM-802-2 block diagram. The key performance features of the NBM-802-2 are shown below:

- Operates as a "Bus Monitor" and tracks all traffic
- Triggers on up to 1024 unique messages based on various network parameters
- Select any word from any buffered message
- Trigger list contained in FLASH memory
- Programming supported by Vista TEC
- Messages are time tagged to 1 microsecond resolution; time is provided on the TEBus by the NetDAS NDC formatter.



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DESCRIPTION (Continued)

The NBM-802-2 module can acquire the full spectrum of traffic from the networks that it is monitoring. The core of the module is a high-performance FPGA that includes an embedded processor running application specific code. The application software integrates a TCP/IP stack for each input that controls the interface and collects data from the specified network. The module IP layer is responsible for reassembling fragments and ensuring that the complete message has been received before passing it onto the next higher layer.

Besides the standard data and time-tag (one per bus) parameters that the NBM-802-2 supplies, status information providing source bus information and number of messages received are available for insertion into the PCM output.

To electrically interface to the network, the NBM-802-2 module provides the necessary transformer coupling, and supplies a 37-pin connector with the differential Ethernet receive and transmit signals configured to ensure maximum signal integrity.

Network Data Processing

Overview

The NBM-802-2 has the ability to support the processing of network data in either parameter selection mode or all data mode. The internal FPGA and embedded processor functionality can be changed if these methods are not suitable to support a customer's unique processing requirements.

Parameter Selection Mode

In parameter selection mode, the user defines a message (message block) based upon the Ethernet network characteristics and data identifiers (as multiple message types could be exchanged between the same two devices). Once done, the user assigns channel names, input payload location (byte offset), length (in bytes) and output frame position of the selected parameters that are to be inserted into the output frame.

The NBM-802-2 uses a dual-ported RAM to support simultaneous writing and reading of parameters. In addition, the RAM is configured using a double-buffering method to allow a previously received message to be fully output before an update with new data is performed. This method ensures that the NBM-802-2 updates the RAM only as fast as new channel data is read from the Dual Port Ram. This way, data integrity is always preserved as long as all the data requiring correlation is sampled in sequence in the PCM frame.

Parameter Select Monitor Modes

Standard Operation – Dual Channel Ethernet Monitor

In standard mode, the NBM-802-2 can monitor data from two independent networks. The NBM-802-2 Ethernet Network Monitor is a "listen-only" module and does not interfere with normal network operation.

Message Block Processing

The module is fully programmable and can process monitored data from the target networks in one of two methods.

- The first is a simple All-Data mode in which network identifiers (source and destination addresses) and the data payload are inserted as individual bytes into the output stream in time sequence.
- The second method allows the user to select parameters from any number of messages that may be present on the network. These parameters are selected from various messages, which are defined by a unique combination of the source and destination addresses. Parameters can be 8, 16, 24 or 32 bits in length.

Along with the stored data, the NBM-802-2 also can provide the following information:

- **Message Time:** The NetDAS TEBus backplane provides continuous 1 microsecond time that allows any module to perform application-specific time-tagging functions. For 1553 bus monitoring, the NBM-802-2 time tags each message as it is received and makes it available as separate parameters for insertion into the PCM output stream. Each command word has its own unique time word parameters that allow the user to differentiate when each message has been received.
- **Status Bits:** Each message has a unique status word associated that provides the following information:
 - **Overflow:** whether a message has been received multiple times before the last received copy was output.
 - **Stale:** the same copy of a message is being output prior to the receipt of the next. This information is provided on a message basis rather than a word-by-word basis due to the message-coherency restrictions that ensure that a full message is output prior to an update from the next incoming-message.

ALL Data Select

In an ALL-BUS mode, the NBM-802-2 inserts all components, including, but not limited to, the destination address, source address, virtual link, data payload, CRC and derived status into the output stream. The NBM-802-2 also inserts a unique identifier prior to the destination address to allow the receiving equipment to recognize the start of a new message, which is then followed by the message time-tag. In this mode, the NBM-802-2 manages a FIFO scheme that provides the next value that is to be output, and will only enter a new message into the FIFO if sufficient space is available, which prevents the output of partial messages.

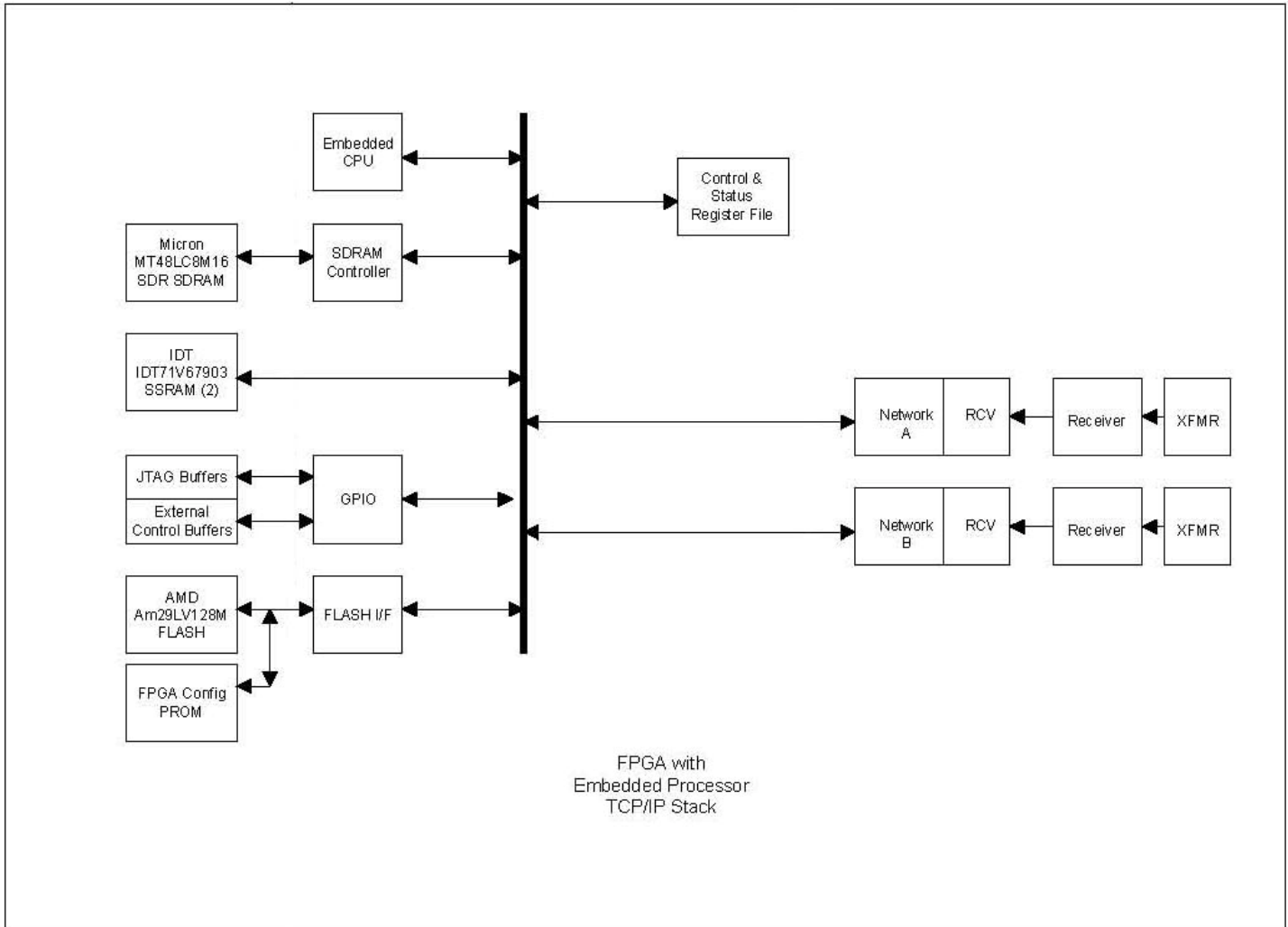
Time Tagging

The NetDAS formatter continuously places time on the internal TE BUS at a rate of 100 times per second and simultaneously runs a 1 MHz Clock. From these two signals, each NetDAS module has the ability to generate time-tags that are accurate to one microsecond for their specific application. On the NBM-802-2, each incoming message causes the internal circuitry to latch time from the internal TE Bus. This time-tag is an additional parameter that can be placed into the output PCM data.

SPECIFICATIONS

Control / Status	
Inputs	
Number	2
Input Level	Refer to IEEE802.3 Fast Ethernet 10 Base-T / 100 Base-Tx (10/100 Mbits/s) RJ-45 Fast Ethernet Interface Compatible

Control Specifications



NBM-802-2 Functional Block Diagram

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