ANET3910

Avionics Databus Solutions

STANAG3910/EFEX
Test & Simulation Module for Standard Ethernet

Data Sheet

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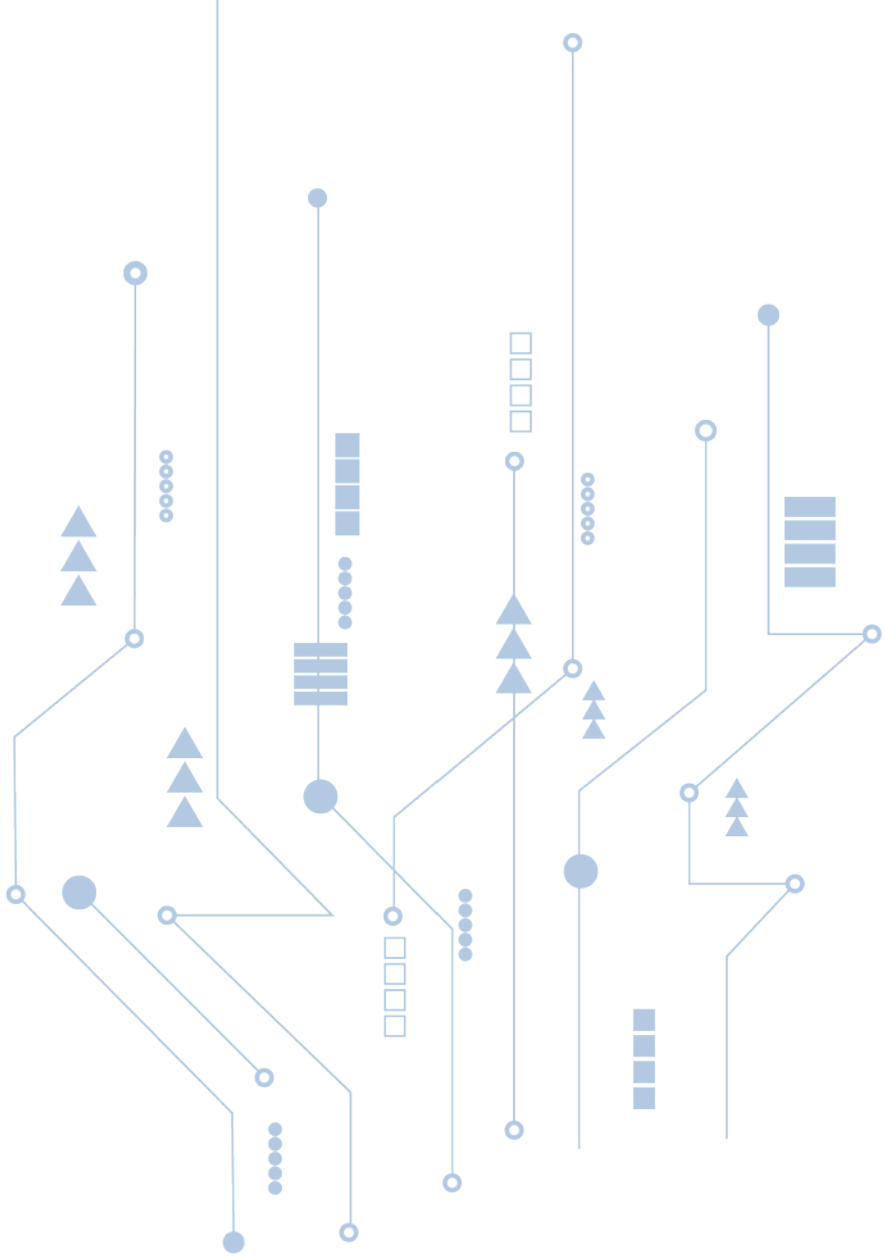


General Features

The ▸ **ANET3910** is a member of AIM's new line of Ethernet based modules for analysing, simulating, monitoring and testing ▸ **STANAG3910/EFAbus Express (EFEX)** databuses.
The ANET3910 concurrently acts as Bus Controller, Multiple Remote Terminals (31) and Chronological/Mailbox Bus Monitor.

The ANET3910 provides 1 fully independent dual redundant STANAG3910 High Speed (HS) and STANAG3838 Low Speed (LS) bus interface with an Ethernet based host connection.

The ANET3910 can be used for Protocol Testing and Simulation of STANAG3910 LS/HS Bus Controller, Multiple Remote Terminals and Chronological Monitoring at full bus loads.

The HS section of the ANET3910 supports EFAbus Direct Digital Links (DDL) and Fibre Optic DDL (FODDL) acquisition.
EFAbus Express (EFEX) extensions to the STANAG3910 protocol are fully supported and both protocols are co-resident and accessible by a software switch.

The ANET3910 incorporates full protocol error injection and detection and allows the reconstruction and replay of previously recorded optical STANAG3910 bus traffic to the LS/HS databus with excellent timing accuracy.

All ANET3910 modules provide 8 General Purpose Discrete I/O (GPIO) signals and also offer Trigger-I/O.
The ANET3910 module is based on AIM's latest 'Common Core' hardware design which provides Ethernet and USB interfaces.

The onboard ASP (Application Support Processor) is running under Linux OS.
This offers a scalable and flexible platform for hosting various onboard applications.
Per default, the ASP executes the AIM Network Sever (ANS) for use by customer applications via the standard AIM Application Programming Interface.

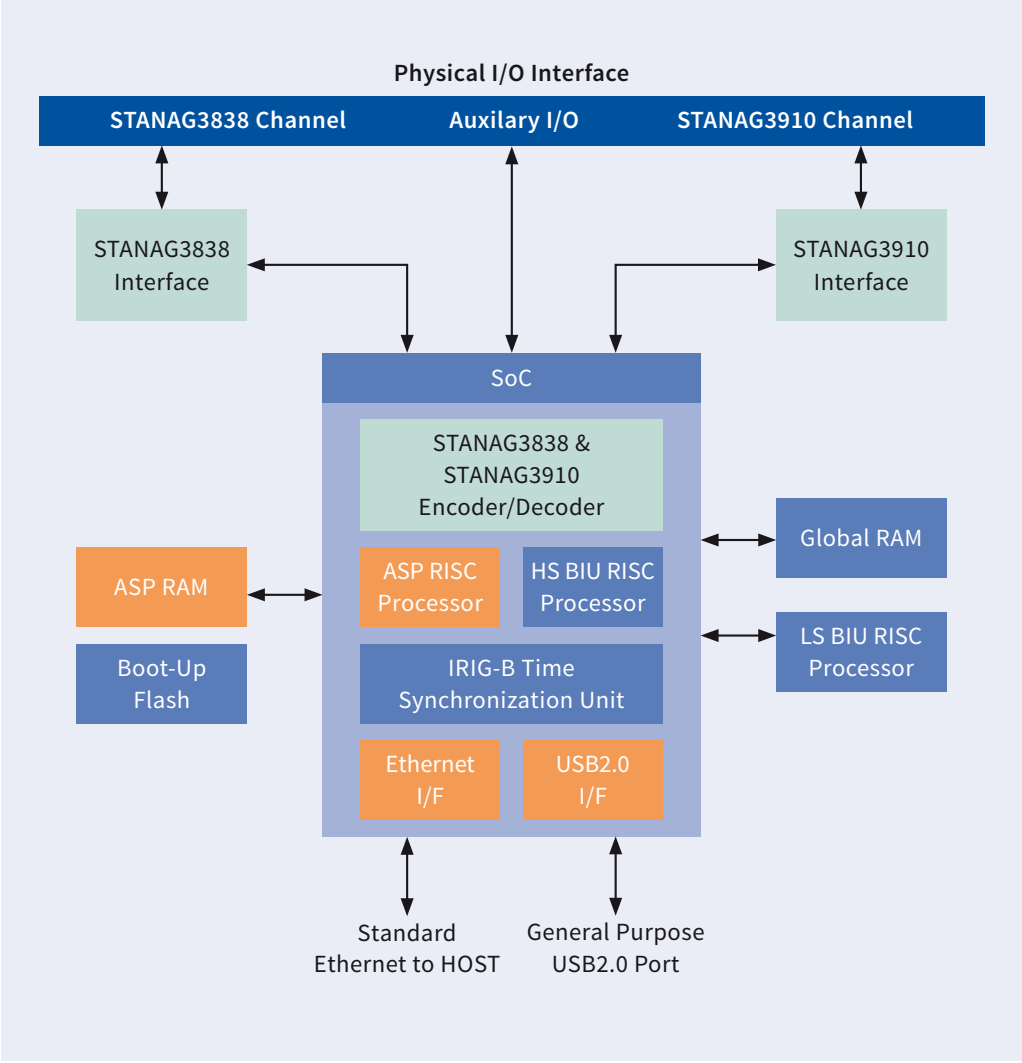
ASP Application Software development is supported via the standard Ethernet interface. A cross tool chain for ASP can be provided and also standard Linux debugging features like GDB are available.
The use of onboard processing and large memory enables autonomous operation with minimal interaction with the host PC.

A general purpose USB 2.0 port is available e.g. for USB memory devices, used by the onboard OS and onboard applications like customer specific programs. An onboard IRIG-B time Encoder/Decoder is included with sinusoidal output and 'free-wheeling' mode for time tag synchronization via the dedicated IRIG-B Inputs/Outputs.
The physical bus interface provides programmable bus coupling modes and variable output amplitude for the STANAG3838 bus output voltage.

Full function software support for application development on Windows and Linux hosts is delivered with the ANET3910 modules in comprehensive Board Software Packages (BSP's).
The execution of customer written Python scripts on the Application Support Processor of the ANET3910 is supported per default. For the development and execution of onboard customer applications (written in C/C++), an optional S/W tool set (ANET-ADK) is available.

The standard ▸ **PBA.pro™** Databus Test and Analysis Tool for Windows or Linux based hosts can also be optionally purchased for use with ANET3910 modules.

ANET3910 Block Diagram



Bus Controller

The ANET3910 provides real time Bus Controller (BC) functions for the dual redundant STANAG3910 LS/HS databus system including data buffer queues for generation of dynamic data functions such as EFAbus Dynamic Tags for LS/HS messages.

Key Features of the Bus Controller Mode include:

- Autonomous operation including sequencing of LS Minor/Major Frames
- Acyclic message Insertion/Deletion
- Programmable BC Retry without host interaction
- Programmable HS Transmitter Initialize Time and HS Receiver Timeout
- Full LS/HS Error Injection down to word and bit level
- Supports EFAbus Message Multiplexing
- Multi-Buffering with Real Time Data Buffer Updates
- Synchronization of BC operation to external Trigger inputs
- LS Bus 4µs Inter Message Gaps

Multiple Remote Terminal

The ANET3910 can simulate up to 31 LS/HS Remote Terminals with all sub-addresses each providing individually programmable Response Time. Each HS RT simulates all 128 Message Identifiers (MID). LS/HS RT's can be programmed in 'Mailbox Monitor Mode' for non-simulated RT's.
The interface provides data buffer queues allowing the generation of dynamic data functions such as EFAbus Dynamic Tags for LS/HS messages.

Key features of the Remote Terminal Simulation Mode include:

- Programmable Response Time for each RT with fast RT Response at 4µs
- Multi-Buffering for each simulated RT, Sub-Address and MID
- Full LS/HS Error Injection for each simulated RT, Sub-Address and MID down to word and bit level
- Programmable and Intelligent Response to Mode Codes
- Multi-Buffering with Real Time Data Buffer Updates
- Multi-Buffering with Real Time Data Buffer

Physical Bus Replay

The ANET3910 module can reconstruct previously recorded STANAG3910/EFEX data bus traffic to both the LS Electrical and HS Optical databus simultaneously with excellent timing accuracy. Recorded data files can be selected for Physical Bus Replay.

The additional capability to disable any or all RT responses from the STANAG3910 replay enables smart systems integration and test to be performed.

Physical Bus Interface

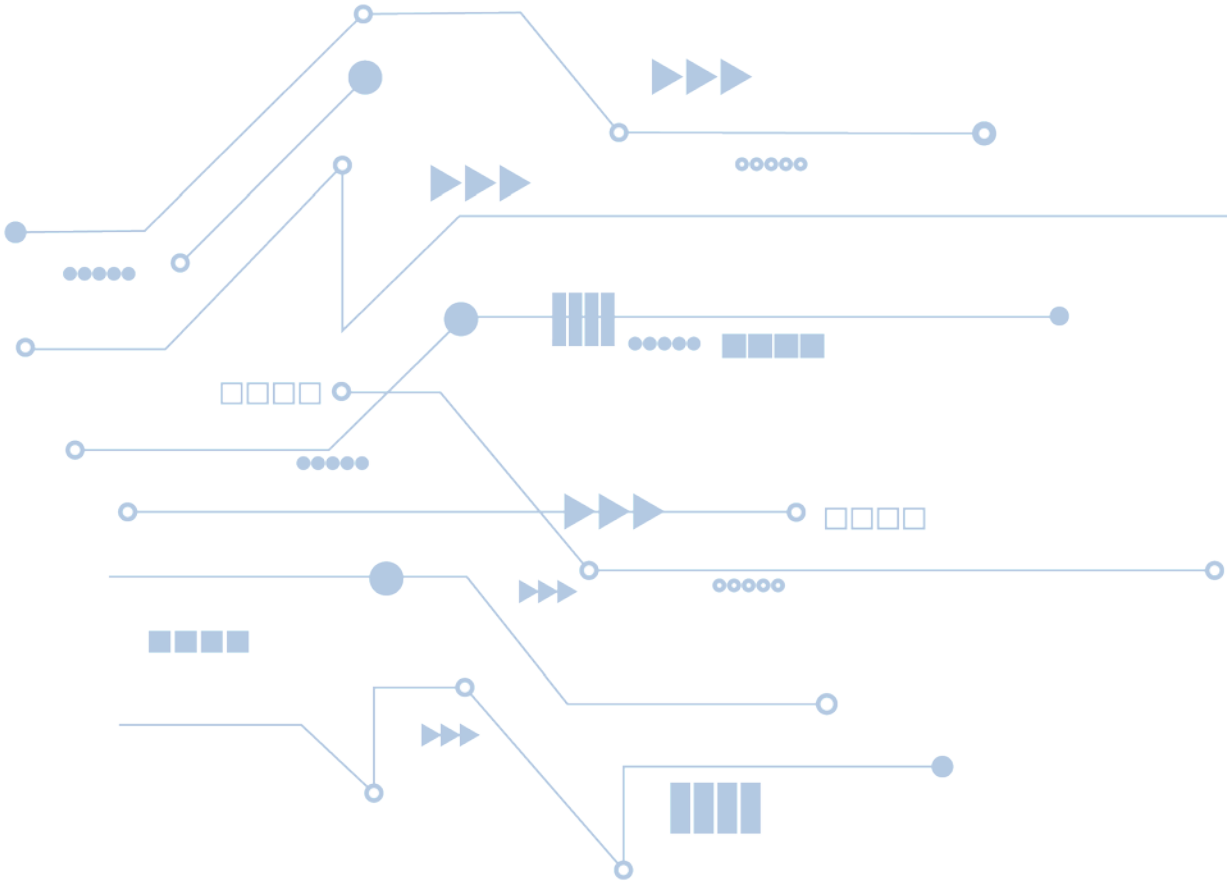
The Physical Bus Interface, which includes the Fibre Optic Front End (FOFE) for the HS-Bus and the STANAG3838 Transceiver and coupling Network for the LS-Bus, is implemented completely onboard.

Both Interfaces are implemented for Dual Redundant operation. The ANET3910 also supports both High Speed (HS) and STANAG3838 Low Speed (LS) bus connections including a resistive terminated bus network as well as I/O connections for Triggering and IRIG-B signals.

The coupling to an external data bus system is software programmable and provides isolated, transformer, direct or Network coupling, where the last one can be used for the direct connection of a single Terminal (BC/RT). Furthermore, the LS interface provides software programmable, variable output amplitude.

IRIG-B Time Encoder/Decoder

ANET3910 modules include an onboard IRIG-B time Encoder/Decoder with a sinusoidal output and 'free-wheeling' mode for time tag synchronization.
This allows synchronization over the dedicated IRIG-B Inputs and Outputs of multiple ANET3910 cards to 1 common IRIG-B time input source or to the onboard time code generator of 1 ANET3910 card as the reference for the correlation of data across multiple STANAG3910/EFEX streams.



Trigger-/General Purpose Discrete I/O Signals

The Auxiliary I/O connector provides BC and BM Trigger Inputs and BC and BM Trigger Outputs. Additionally up to 8 user programmable General Purpose Discrete I/O signals are available on this I/O connector. Voltage levels of all trigger signals and General Purpose Discrete I/O's are TTL compatible whereby the General Purpose Discrete I/O's are designed to handle avionics level as well.

EFAbusExpress (EFEX) Functionality

The ANET3910 module supports EFAbus Express (EFEX) protocol in all operating modes and at full bus rates.
EFEX functionality is co-resident with STANAG3910 protocol to support either Tranche I or Tranche II Typhoon aircraft standard. Selection of STANAG3910 or EFEX mode is done via a software switch.

EFEX BC Simulation:

- EFEX Bus Controller Simulation of all Transfer types
- Control, Status and Status/Data Command Frame Control
- Control of Gap and Wait Time Setting
- EFEX Mode Code Support
- Error Injection/Detection
- EFEX Mixed Mode Simulation and Monitoring

EFEX RT Simulation:

- EFA/EFEX Dual Mode RT Simulation for all EFEX BC Commands
- EFEX HS RT Response Time Setting Control for SD and S Frame
- HS Mode Code
- Error Injection

EFEX Bus Monitoring:

- Chronological and Mailbox Bus Monitoring of EFEX BusTraffic
- Capture and Decoding of CC/MC, SD/S Frames with Time Tag
- Monitor Trigger on Command, SD/S Frame, ADW and DSI
- EFEX Transfer Error Detection
- Monitor Trigger on HS Frame Bus Errors
- EFEX Bus Recording and Replay at full Bus Rates

EFEX Bus Analyzer Software:

AIM provides ▶ **PBA.pro™** Bus Analyzer Software specially extended to support EFEX data bus testing applications (for Windows and Linux).
For legacy PBA-3910/ParaView-3910 Databus Analyzer/Visualizer Software (for Windows) please contact the factory.

Chronological Bus Monitor

The ANET3910 includes a powerful LS/HS Chronological Bus Monitor and analysis function with multiple trigger and programmable capture capabilities. Accurate time tagging of both LS and HS messages, inter message gaps, response time and transmitter initialize time is supported. LS/HS messages are time tagged with a 1µs resolution. LS response time and inter message gaps as well as HS transmitter initialize time are measured down to 0.25µs.

Key features of the Chronological Bus Monitor include:

- Multi-Level Complex Sequence Trigger on LS/HS Error, LS/HS Words and LS/HS Data Word in Limits
- Monitor and Bus Traffic Capture with 16MB of Onboard Memory for LS/HS Messages
- Trigger on Start, Centre and End
- LS/HS Message Counters

Software Support

Comprehensive Driver Software is supplied with the ANET3910 module. A full function Application Programming Interface (API) is provided compatible with Windows and Linux. Host applications can be written in C and C++. A LabView VI application interface is also provided (Windows only).

The configuration of the ANET3910 is supported via a built-in Web based configuration application, accessible via any standard Web browser. The ANET3910 Linux OS on the ASP is pre-configured for the support of Mass Data storage devices at the USB port and with a Python installation for the execution of Python scripts.

Technical Data

System Interface
10/100/1000Mbit/s IEEE802.3 standard Ethernet interface

Processors
Dual Core RISC Processor @800MHz for HS-BIU and ASP, 400MHz RISC Processor for LS-BIU

Memory
16MB Global RAM, 1GB ASP-RAM and 512MB Flash Memory for ASP

Encoder/Decoder
STANAG3910/STANAG3838 with full error injection and detection capability

Time Tagging
Sinusoidal 46-bit absolute IRIG-B time stamping with 1µs resolution

Trigger I/O
BC/BM Trigger Input and Output lines, TTL compatible on Auxiliary connector

General Purpose Discretes
8 bi-directional Discrete I/O signals on Auxiliary connector

Physical Bus Interface
Dual Redundant Electrical Front End and STANAG3838 Front End with variable output amplitude and programmable bus coupling modes

STANAG3838 Connectors
High-Density D-Sub 15-way connector

STANAG3910 Connectors
2x HA06-N aircraft style Fibre Optic connectors with normal orientation

Ethernet
RJ-45 female standard Ethernet connector

Auxiliary I/O
15-pin High-Density D-Sub connector for Discrete I/O, IRIG-B and Trigger signals

DC Power
DC low voltage power jack connector

USB Port
USB 2.0 Type A connector

Power Supply
9-12VDC input (external power adaptor included 110V-240VAC, 50-60Hz)

Dimensions
120mm x 180mm x 26mm

Power Consumption
Typical 12.5W @12VDC (@50% Busload)

Operating Temp. Range
Standard Temperature Range: 0°C to 50°C
Extended Temperature Range: -15°C to 60°C

Storage Temperature
-40°C to +85°C

Humidity
0 to 95% non-condensing

Ordering Information

ANET3910
Single Stream, Dual Redundant Standard Ethernet to STANAG3910/EFEX Interface: BC, Multi RT Simulator with Mailbox & Chronological Monitor; IRIG-B Time Encoder/Decoder, 8 General Purpose Discrete I/O's, BC/BM Trigger-I/O, 16MB Global RAM, 1GB ASP RAM, 1x USB 2.0 General Purpose Port; Onboard FOFE modules with 2x EFAbus Optical connectors

ANET-ADK
ANET onboard Software Development Kit including documentation, samples and tool chain; requires Linux based development platform

ACB-HD15-1
Ready Made Adapter Cable (2.0m): From 15-pin HD-Sub to 2 Twinax Connectors PL-75 for all variants of ANET3910 cards

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