

UNITRONIX Pty Ltd

PO Box 486, Morisset NSW 2264

NSW: Tel: 61 2 4977 3511 Fax: 61 2 4977 3522

WA: Tel: 61 8 9455 2424 Fax: 61 8 9455 2458

unitsyd@unitronix.com.au www.unitronix.com.au

data sheet



APX-GNET-2/4

**Two/ Four Port Gigabit
AFDX/ ARINC664/ Ethernet
Test, Simulator and Monitor
Module for PCI-X**



www.aim-online.com



Right on Target

Avionics Databus Solutions

General Features

The APX-GNET is AIM's new ultra high performance intelligent PCI-X Bus module offering two or four Ports with full function test, simulation, monitoring and analyser functions for Gigabit AFDX (Avionics Full Duplex Switched Ethernet/ ARINC664) and Ethernet networks. A new, low power, dual core processor with 2x 1200MHz clock frequency and an internal bandwidth of 12GB/s provides onboard processing capabilities for even the most demanding AFDX and Ethernet applications. For high data throughput up to 4GB DDR2 RAM is accessible for the processors via a 64-bit databus running at 533MHz.

The latest high performance FPGA implementing the customised AFDX/ Ethernet MAC's enables the board to analyse incoming and modify outgoing data in real time. The APX-GNET-2 module provides two Gigabit AFDX/ ARINC664/ Ethernet ports configurable as two single ports or one dual redundant (AFDX/ ARINC664) channel each implementing either an optical (IEEE Std 802.3z/ 1000 Base-SX) or an electrical (IEEE Std 802.3ab/ 1000 Base-T, Twisted Pair/ RJ45) full duplex Ethernet Interface.

The APX-GNET-4 module provides four Gigabit AFDX/ ARINC664/ Ethernet ports configurable as four single ports or two dual redundant channels each implementing either an optical (IEEE Std 802.3z/ 1000 Base-SX) or an electrical (IEEE Std 802.3ab/ 1000 Base-T, Twisted Pair/ RJ45) full duplex Ethernet Interface.

Ports can operate concurrently in Traffic Simulator or Receiver/ Monitor modes with support for AFDX/ ARINC664 port related Frame Statistics. Virtual Link (VL) packet

capturing and monitoring features are complimented with powerful triggering and filtering capabilities.

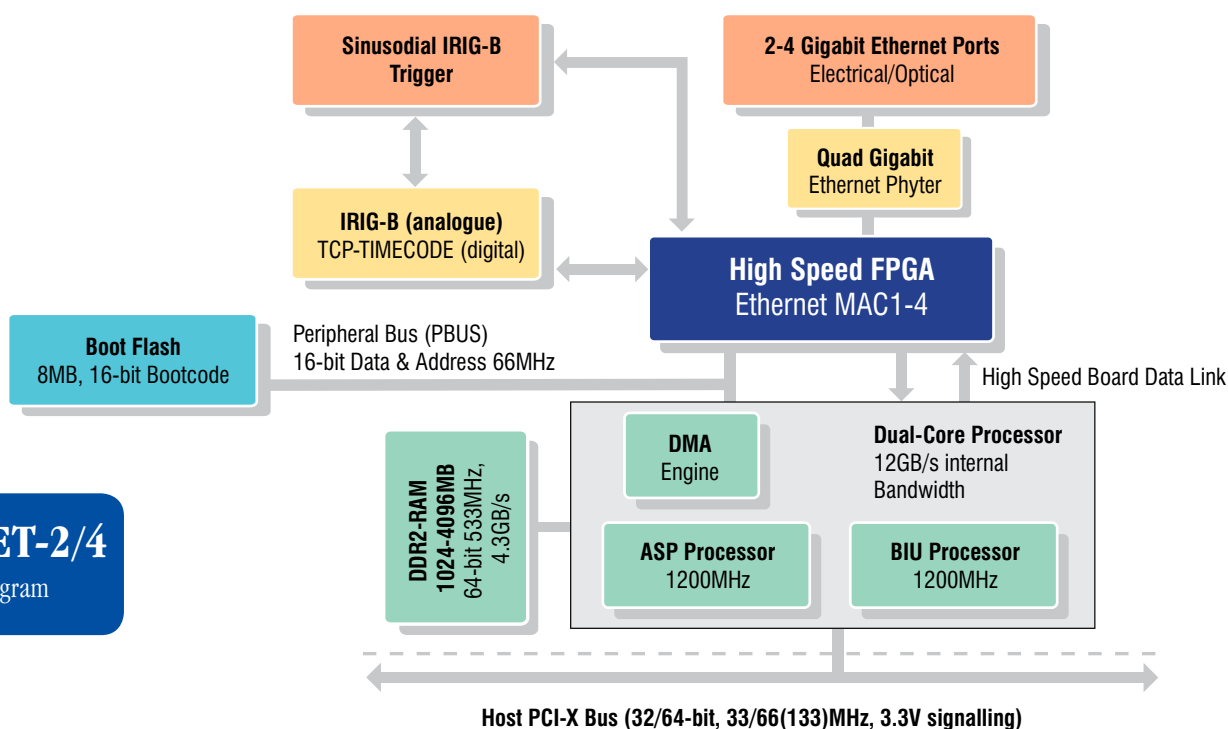
The APX-GNET module uses a new dual core processor design for highest performance. Up to 4GB DDR2 RAM is provided to implement large receive buffers and complex transmit scenarios onboard.

The APX-GNET module is available with following optional software:

- *PBA.pro™, the most scalable and flexible application framework focusing on Test, Simulation and Integration under Windows and Linux offering AFDX/ ARINC664 or Standard Ethernet Analyser functionality including decoding of Payload Data*
- *fdXplorer, the AFDX/ ARINC664 Network Analyser Software for Windows*
- *ParaView, the Parameter Visualiser Software for Windows*
- *EasyLOAD-615A, the AFDX/ ARINC664/ Ethernet Dataloader for Windows*



APX-GNET-2/4 Block Diagram



Traffic Generation

The APX-GNET provides real time Traffic Generation on all ports concurrently. Different Traffic Generation modes are available:

Generic Traffic Simulation (based on the Setup of Frame Lists):

- Simulation of Standard Ethernet Traffic with fully programmable Frame Attributes (Protocol Headers, Protocol Payload Data, Timing, Physical Error Injection)
- Simulation of AFDX/ ARINC664 Traffic with fully programmable Frame Attributes (VL Number, IP/UDP Headers and Payload, Sequence Numbering control, Physical and Logical Error Injection)
- Autonomous Payload Generation Modes with support for Timetag Insertion into Frame Payload for Delay/ Latency Measurements in Network Integration Applications
- Fully programmable Timing and Sequencing of Frames

AFDX/ ARINC664 Message Simulation (based on Virtual Links and IP/UDP Protocol):

- Support for VL based Traffic Shaping and Sequence Numbering of UDP Messages and single Ethernet Frames
- Onboard IP/UDP Protocol Stacks implemented on ASP
- Automatic UDP Sampling Port Simulation controlled by onboard ASP
- Support for UDP Queuing Port Simulation

Physical Replay of previously recorded, looped or pre-generated streams of Ethernet/ AFDX/ ARINC664 Frames:

- Based on Frame Timestamp and Inter Frame Gap for highest precision Timing and Accuracy
- Replay Synchronisation of multiple Ports via external Time Code

Synchronisation of transmissions across multiple ports is achieved by using Strobe Inputs/ Outputs. Physical Error Injection is supported for generation of CRC, Inter Frame Gap, Alignment and Frame Size Errors in the Generic Simulation and the AFDX/ ARINC664 Message Simulation mode.

AFDX/ ARINC664 specific Redundancy Handling is supported in Generic Simulation and the AFDX/ ARINC664 Message Simulation mode.

Traffic Reception and Monitoring

The APX-GNET provides real time Traffic Reception on all ports concurrently. Different Traffic Receiver modes are available:

Chronological Receive Mode:

- Sequential Storage of Frames in a dynamically adapted onboard Buffer
- Programmable Data Capture Modes - Trace after Trigger & Recording
- Time Stamping of captured Frames with extended IRIG-B Time Code with 100ns Resolution incl. Inter Frame Gap Measurement
- Physical Error Detection for CRC, Gap, Size and Alignment Errors
- Powerful Filtering, Complex Triggering and Capture Modes allows users to select only the Frames, Data and Errors of Interest
- Support for AFDX/ ARINC664 specific Virtual Link Activity Information (e.g. Error, Counters, Utilisation)
- Support for AFDX/ ARINC664 specific VL oriented Filtering
- Configurable AFDX/ ARINC664 specific Error Detection (invalid MAC/IP Addresses, Traffic Shaping Violation, invalid VL Frame Size/ Frame Integrity) on a per VL Basis

AFDX/ ARINC664 Message Reception (based on Virtual Links and IP/UDP Protocol):

- Individual circular Buffer Queues (configurable) for each UDP Message including Time Stamping of each stored Message with extended IRIG-B Time Code with 100ns resolution
- Configurable AFDX/ ARINC664 specific Error Detection (invalid MAC/IP Addresses, Traffic Shaping Violation, invalid VL Frame Size/ Frame Integrity) on a per VL Basis

In both modes Global Statistics Information is available providing information about the received number of frames, the number/ type of errors detected, the size distribution of received frames, etc. Furthermore AFDX/ ARINC664 specific redundancy handling is fully supported in both Receiver modes.

In a special mode (Loop/ Pollution), the Chronological Receiver and Replay Transmit modes can be combined to receive and re-transmit data with an optional modification (e.g. for in-line data modification/ corruption purposes).

Application Support Processor

The 1200MHz Application Support Processor (ASP) provides unique on-module processing functions typically provided by host PC processing systems.

- IP and UDP Layer of the AFDX Protocol
- Onboard Driver Software Execution
- Frame Loop and Pollution between Rx and Tx Ports
- Runs under Real Time Operating System

IRIG-B Time Encoder/ Decoder

An onboard IRIG-B time encoder/ decoder allows synchronisation of multiple AFDX ports using multiple APX-GNET modules. Modules can be synchronised using an external IRIG-B time source or the onboard time decoder of one module as the reference for accurate correlation of data across multiple AFDX ports.

Physical Bus Interface

The APX-GNET provides 2 or 4 ports with either an electrical IEEE Std 802.3ab or an IEEE Std 802.3z front end.

- Customised Media Access Controllers (MAC's) implemented in FPGA optimised for AFDX
- Large internal FPGA Burst Buffers running at full system speed
- SFP (Small Form Pluggable) Transceiver allowing the customer to change the front end from optical to electrical or vice versa

IEEE Std 802.3ab/ 1000 Base-T

- 8-socket Network Interface connectors - RJ45 Twisted Pair

IEEE Std 802.3z/ 1000 Base-SX

- 850nm Oxide VCSEL laser transmitter
- Duplex LC connector
- 50/ 125µm MMF or 62.5/ 125µm MMF usable

Driver Software Support

The APX-GNET module is supplied with an Application Programming Interface (API) and Drivers compatible with Windows and Linux.

APX-GNET-2/4

APX-GNET-2/4

Two/ Four Port Gigabit
AFDX/ ARINC664/ Ethernet
Test, Simulator and Monitor
Module for PCI-X

AIM Office Contacts:

AIM GmbH

Sasbacher Str.2
79111 Freiburg
Germany
Tel: +49 761 45 22 90
Fax: +49 761 45 22 93 3
email: sales@aim-online.com

Vertriebsbüro München
Terofalstrasse 23 a
80689 München
Germany
Tel: +49 89 70 92 92 92
Fax: +49 89 70 92 92 94
email: salesgermany@aim-online.com

AIM UK

Cressex Enterprise Centre
Lincoln Road
High Wycombe
Bucks, HP12 3RB
UK
Tel: +44 1494 446844
Fax: +44 1494 449324
email: salesuk@aim-online.com

AIM-USA

Seven Neshaminy Interplex
Suite 211
Trevose
PA 19053
USA
Tel: 267-982-2600
Toll Free: 877-520-1553
Fax: 215-645-1580
email: salesusa@aim-online.com

www.aim-online.com



Right on Target

Technical Data

Sub-System Interface:

PCI-X (133)bus 1.0b with up to 1066MB/s of bandwidth. (PCI compatible) 3.3V only

Processors:

Dualcore, 2x 1200MHz RISC Processors

Memory:

up to 4GB DDR2 RAM running at 533MHz

Encoder/Decoder:

Two/ Four Gigabit AFDX specific Ethernet MAC's

Time Tagging:

IRIG-B Time with 100ns resolution

Physical Bus Interface (PBI):

APX-GNET-2 Two full duplex AFDX/ Ethernet ports configurable to one dual-redundant AFDX/ Ethernet channel

APX-GNET-4 Four full duplex AFDX/ Ethernet ports configurable to two dual-redundant AFDX/ Ethernet channels

Connectors:

- PCI-X back plane connector

APX-GNET-2 electrical:

- 2x RJ-45 connector in SFP Module
- 1x 15-way D-SUB connector (female) for Time Code and Trigger I/O
- 1x 16-way board to board connector for Time Code and Trigger I/O (no front connector)

APX-GNET-2 optical:

- 2x Duplex LC connector in SFP Module
- 1x 15-way D-SUB connector (female) for Time Code and Trigger I/O
- 1x 16-way board to board connector for Time Code and Trigger I/O (no front connector)

APX-GNET-4 electrical:

- 4x RJ-45 connector in SFP Module
- 1x 16-way board to board connector for Time Code and Trigger I/O (no front connector)

APX-GNET-4 optical:

- 4x Duplex LC connector in SFP Module
- 1x 16-way board to board connector for Time Code and Trigger I/O (no front connector)

Dimensions:

175mm x 107mm 'short length' Standard PCI Format

Power Consumption:

Appr. 12W (APX-GNET-2/ operating)

Operating Temp. Range:

Standard: 0°C... +55°C ambient

Storage Temp.

-40°C ... +85°C ambient

Humidity:

0 to 95% non-condensing

Ordering Information

APX-GNET-2-p-m

Two Port PCI-X to Gigabit AFDX/ Ethernet Interface: Traffic Simulator, Receiver and Chronological Monitor; Including IRIG-B Time Encoder/ Decoder

Ordering options:

-p: physical front end (e = electrical interface or o = optical interface)

-m: onboard memory option (1GB, 2GB or 4GB)

APX-GNET-4-p-m

Four Port PCI-X to Gigabit AFDX/ Ethernet Interface: Traffic Simulator, Receiver and Chronological Monitor; Including IRIG-B Time Encoder/ Decoder

Ordering options:

-p: physical front end (e = electrical interface or o = optical interface)

-m: onboard memory option (2GB or 4GB)

Please contact AIM for further types of optical front end SFP modules.

Electrical SFP



Optical SFP

