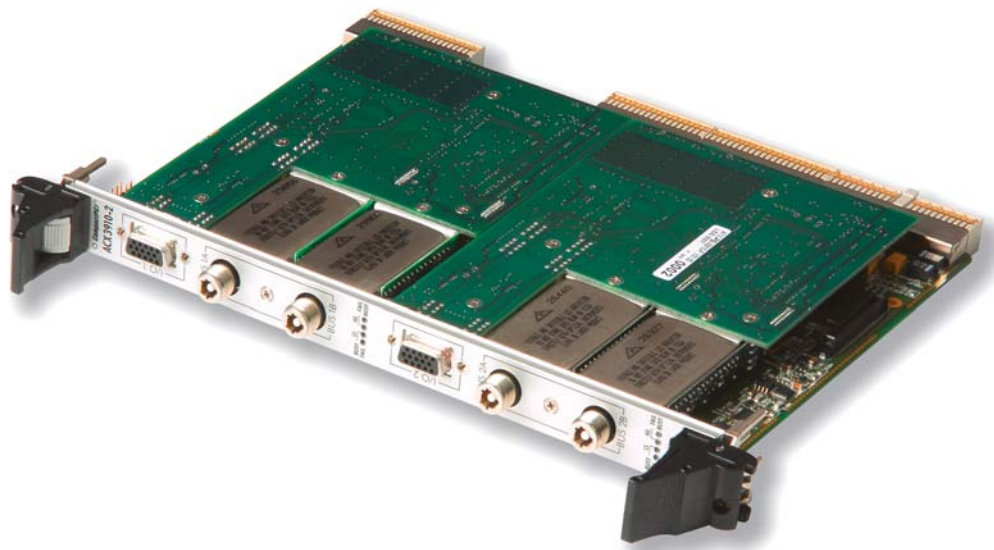


ACX3910-x



Single or Dual Stream
STANAG3910/ EFEX Interface
Test & Simulation Module for
Compact PCI



General Features

The ACX3910-x is a member of AIM's new fourth generation family of advanced cPCI modules for testing, analysing, simulating, monitoring/recording STANAG3910/ EFABus Express (EFEX) databuses. The ACX3910-x provides Bus Controller, Multiple Remote Terminal Simulation and Chronological/ Mailbox Bus Monitoring functions with all modes operating concurrently.



The standard ACX3910-x variant provides one or two fully independent Dual redundant STANAG3910 High Speed and Low Speed interfaces on a single 6U cPCI card form factor.

The ACX3910-x can be used for Protocol Testing and Simulation of STANAG3910 LS/HS Bus Controller, Multiple Remote Terminals and Chronological Monitoring at full bus loads. All BC/RT/BM operations are performed concurrently with no degradation in performance in any operational LS/HS mode. The HS section of the ACX3910 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 ACX3910-x incorporates full protocol error injection and detection and allows the reconstruction and replay of previously recorded electrical/ optical STANAG3910 bus traffic to the LS/HS databus with excellent timing accuracy.

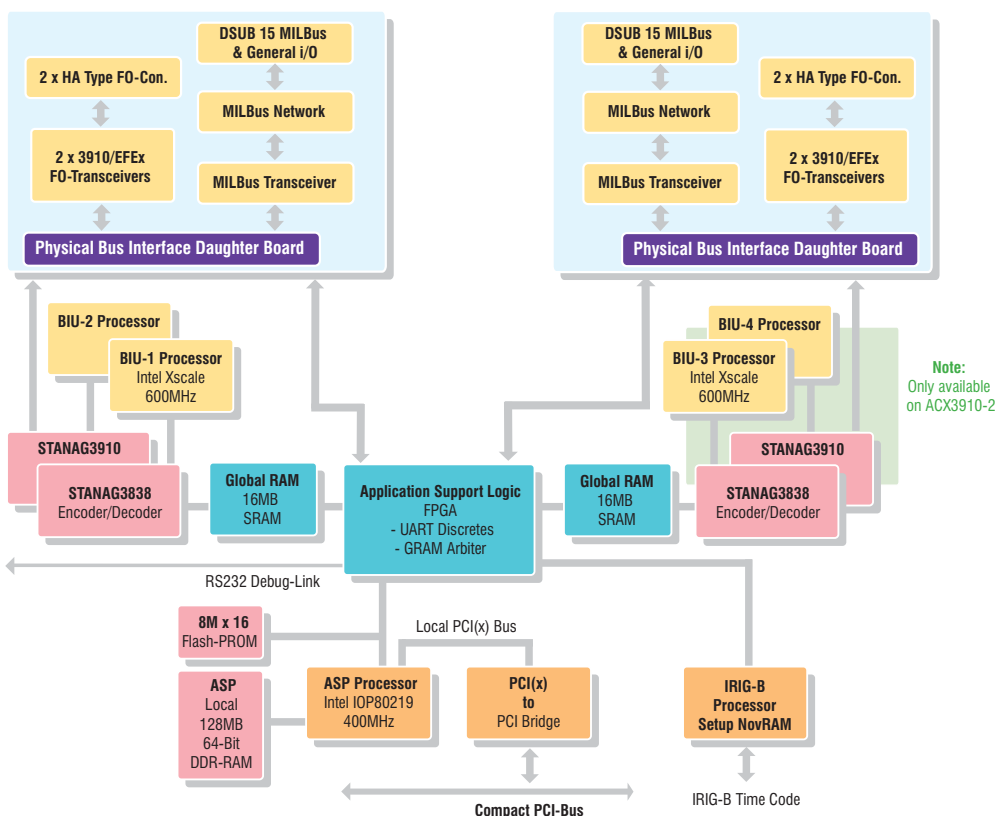
The ACX3910-x card uses AIM's Next Generation 'Common Core' (NCC) hardware design utilising multiple RISC processors with up to 32MB of global RAM and 128MB of ASP RAM. An onboard Application Support Processor (ASP) that executes the Driver Software onboard minimises the load on the host processing system. The onboard processing and large memory provided allows autonomous operation for real time applications and reduces interaction with the host processing system.

An onboard IRIG-B time encoder/ decoder that provides both sinusoidal and a free wheeling mode is included for time tag synchronisation at the system level for single or multiple ACX3910-x modules.

Full function driver software is delivered with the ACX3910-x cards in a comprehensive Board Software Package (BSP).

The optional PBA.pro™ Databus Test & Analysis Tool (for Windows & Linux) and PBA-3910/ ParaView Databus Analyser/ Visualiser Software (for Windows) can also be purchased for use with ACX3910-x cards.

ACX3910-x Block Diagram



Special PBA.pro™ software components are available for supporting the SAE AS4112 RT Production Test Plan and components are also available for Optical testing for the fully programmable VOX3910-CTX-C module that can control parameters of the Databus optical waveform.

Three variants of the ACX3910-x Module are supported. The ACX3910-x provides a single 6U slot solution with all the Databus Electrical & Optical signals accessible on a single front panel. The ACX3910-x-T variant in conjunction with an ACTM3910-x transition module provides access to all Electrical and Optical Signals at the rear. Additional Discrete signals are provided in this configuration.

The ACX3910-x-CTX module variant provides a PREN3715 interface to connect an external VOX3910-CTX-C module.

The VOX3910-CTX-C module provides a programmable Fibre Optic Front End for optical waveform testing.



Bus Controller

The ACX3910-x provides a real time Bus Controller (BC) function for each 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 Initialise Time & 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
- Synchronisation of BC operation to external trigger inputs
- LS Bus 4µs Inter Message Gaps

Multiple Remote Terminal

The ACX3910-x 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 & Intelligent Response to Mode Codes
- Multi-Buffering with Real Time Data Buffer Updates
- Supports EFABus Message Multiplexing

Chronological Bus Monitor

The ACX3910-x 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 initialise time is supported. LS/HS messages are time tagged to a 1µs resolution. LS Response Time and inter message gaps as well as HS Transmitter Initialise 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 Word
- LS/HS Data Word in Limits

Monitor and Bus Traffic Capture:

- Up to 32MB of onboard memory for LS/HS messages
- Trigger on Start, Centre and End
- LS/HS Message Counters

Physical Bus Replay

The ACX3910-x module can reconstruct previously recorded STANAG3910/ EFEX data bus traffic to both the LS Electrical and HS Optical data bus simultaneously with excellent timing accuracy. Recorded data files can be selected for Physical Bus Replay to perform systems testing with the ability to disable any or all RT responses from the replay to support advanced integration testing.

EFABus Express(EFEX) Functionality

The ACX3910-x 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 via a software 'switch' fully accessible at the API Level.

Key functions of the EFEX mode operation include:

EFEX Bus Control

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

EFEX RT Simulation

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

EFEX Bus Monitoring

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

EFEX Bus Analyser Software

AIM provides Bus Analyser Software specially extended to support EFEX data bus testing applications offered as PBA.pro™ Test and Analysis Tool (for Windows & Linux) and PBA-3910-XP/ ParaView-3910 Databus Analyser/ Visualiser Software (for Windows).

IRIG-B Time Encoder/ Decoder

ACX3910-x modules include an onboard IRIG-B time encoder/ decoder with a sinusoidal output with a 'free wheeling' mode for time tag synchronisation. This allows synchronisation of multiple ACX3910-x streams and modules to one common external IRIG-B time input source.

Application Support Processor

The onboard Application Support Processor (ASP) offers processing functions typically provided by the host processor system.

Operational features include:

- Driver Software Execution onboard
- Dynamic Data Generation
- Possibility of Customer Specific Programming of the ASP
- Runs under Nucleus + Operating System

Physical Bus Interface

The Physical Bus Interface (PBI) including Fibre Optic Front End (FOFE) and 1553 Transceiver is implemented completely on a single board. Bus Interface Unit (BIU)

Processors support the encoder/ decoder functions for 3910/EFEX and

STANAG3838 protocols. The ACX3910-x main board also supports both High Speed (HS) and MIL-STD-1553B Low Speed (LS) bus connections including a resistive terminated bus network as well as I/O connections for Triggering and IRIG-B signals. Coupling to an external data bus system is software programmable.

Driver Software Support

The Driver Software resides on the ACX3910-x module. A full function Application Programming Interface (API) is provided compatible with Windows 2000/XP/Vista and Linux. Host Applications can be written in MSVC, Visual Basic, Delphi, Borland C++ etc. A LabView/LabVIEW RT application interface and LabWindows/ CVI Function Panels are provided.



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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

3703 N. 200th St.
Elkhorn,
NE 68022
USA
Tel: 1-866-AIM-1553
1-866-AIM-A429
Fax: 1-402-763 9645
email: salesusa@aim-online.com

Technical Data

Sub-System Interface: PCI Bus Master & Slave,
Revision 2.3 and 32/64-bit, 5V & 3.3V compatible

Processors: Two 32-bit 600MHz Xscale Processors for
each 1553 & 3910 BIU, 64-bit 400MHz Intel IOP for ASP

Memory: Global RAM: 16MB for ACX3910-1, 2x 16MB for
ACX3910-2; 128MB ASP DDR-RAM

Encoder/ Decoder: 2x STANAG3910 and 1553
Transceiver with full Error Injection & Detection Capability

Time Tagging: 46-bit absolute IRIG-B Time with 1µs
resolution, sinusoidal IRIG-B output with 'free wheeling'
mode

Physical Bus Interface (PBI): 2x Physical Bus
Interface (PBI) including Fibre Optic Front End and 1553
Transceiver; Dual MIL-STD-1553B Transceiver with
Variable Output Amplitude and Programmable Bus
Coupling and onboard terminated Bus Network

**Connectors: Frontplate mounted Connectors on
a standard ACX3910-x:**

STANAG3910/ EFEX connections

2 or 4 HA06-N Aircraft style Fibre Optic Connectors with
normal orientation

STANAG3838/ MIL-STD-1553B connections

High Density D-Sub 15-way Connector including
3910/1553 TTL-Trigger I/O, RS-232 Maintenance, IRIG-B
Time Code I/O Signals and One Discrete I/O Signal

**Rear mounted Connectors on an ACX3910-x-T
(in conjunction with an ACTM3910-x Rear-I/O
Module):**

STANAG3910/ EFEX connections

2 or 4 HA06-N Aircraft style Fibre Optic Connectors with
normal orientation

STANAG3838 / MIL-STD-1553B connections

D-Sub 9-way Connector with the MIL-STD-1553 signals.
High-Density D-Sub 26-way Connector for 1553/3910
TTL-Trigger I/O, RS-232 Maintenance, IRIG-B Time Code
I/O signals and General Purpose Discrete I/O signals

Frontplate mounted Connectors on a CTX

Version:

ACX3910-x Module:

STANAG3910/ EFEX connections

2 (ACX3910-2-CTX) HA06-N Aircraft style Fibre Optic
Connectors with normal orientation
PREN3715 Connector to connect to VOX3910-CTX-C
programmable Fibre Optic Frontend (FOFE)

STANAG3838/ MIL-STD-1553B connections

High-Density D-Sub 15-way Connector including
3910/1553 TTL-Trigger I/O, RS-232 Maintenance and
IRIG-B Time Code I/O signals

VOX3910-CTX-C Module:

STANAG3910/ EFEX connections

5x SMA Type Fibre Optic Connectors for Bus A/B,
attenuated Bus A/B, special Channel Output; PREN3715
Connector to connect to ACX3910-x Module; BNC
Connector for HS-Trigger Output

Dimensions: CompactPCI Standard 6U Card format,
160mm x 230mm

Power Consumption:

20.5W typical @ +5VDC
4W typical @ +12VDC
1W typical @ -12VDC

Operating Temp. Range: Standard 0°C...+45°C
Extended -15°C...+60°C ambient

Storage Temp. Range: -40°C...+85°C ambient

Humidity: 0 to 95% non-condensing

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Specifications are subject to change without notice.

Ordering Information

ACX3910-6U-1 Single Stream, Dual Redundant cPCI (6U) to
STANAG3910/ EFEX Interface: BC, Multi RT Simulator with
Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder,
16MB Global RAM, 128MB ASP RAM, 8 General Purpose
Discrete I/O's on Rear-I/O or 1 General Purpose Discrete I/O on
Front-I/O; onboard Dual Redundant Fibre Optic Front End
(FOFE)

ACX3910-6U-1-T Single Stream, Dual Redundant cPCI (6U)
to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with
Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder,
16MB Global RAM, 128MB ASP RAM, 4 Discrete IN + 4
Discrete OUT on ACTM3910-1 (Rear-I/O) or 1 General Purpose
Discrete I/O (Front-I/O); Includes ACTM3910-1 Transition
Module with Dual Redundant Fibre Optic Front End (FOFE)

ACX3910-6U-1-CTX Single Stream, Dual Redundant cPCI
(6U) to STANAG3910/ EFEX Interface: BC, Multi RT Simulator
with Mailbox & Chronological Monitor, IRIG-B Encoder/
Decoder, 16MB Global RAM, 128MB ASP RAM, 8 General
Purpose Discrete I/O's on Rear-I/O; 1x VOX3910-CTX-C:
Fully Programmable Fibre Optical Front End (FOFE) Module
for cPCI (6U); Provides EFABus Optical Validation Testing
Capabilities; Note: Requires 2 cPCI (6U) Slots

ACX3910-6U-2 Dual Stream, Dual Redundant cPCI (6U)
to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with
Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder,
2x 16MB Global RAM, 128MB ASP RAM, 8 General Purpose
Discrete I/O's on Rear-I/O or 1 General Purpose Discrete I/O
on Front-I/O; onboard Dual Redundant Fibre Optic Front Ends
(FOFE)

ACX3910-6U-2-T Dual Stream, Dual Redundant cPCI (6U) to
STANAG3910/ EFEX Interface: BC, Multi RT Simulator with
Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder,
2x 16MB Global RAM, 128MB ASP RAM, 4 Discrete IN + 4
Discrete OUT on ACTM3910-2 (Rear-I/O) or 1 General Purpose
Discrete I/O (Front-I/O); Includes ACTM3910-2 Transition
Module with two Dual Redundant Fibre Optic Front Ends
(FOFE)

ACX3910-6U-2-CTX Dual Stream, Dual Redundant cPCI
(6U) to STANAG3910/ EFEX Interface: BC, Multi RT Simulator
with Mailbox & Chronological Monitor, IRIG-B Encoder/
Decoder, 2x 16MB Global RAM, 128MB ASP RAM, 8 General
Purpose Discrete I/O's on Rear-I/O or 1 General Purpose
Discrete I/O on Front-I/O; Includes: 1x onboard,
Dual Redundant Fibre Optic Front End (FOFE) + 1x VOX3910-
CTX-C: Fully Programmable Fibre Optical Front End (FOFE)
Module for cPCI (6U); Provides EFABus Optical Validation
Testing Capabilities; Note: Requires 2 cPCI (6U) Slots

Simulator Only versions available (except for
ACX3910-6U-1/2-CTX);

BC, Multi RT Simulator with Mailbox Monitor

Monitor Only versions available (except for
ACX3910-6U-1/2-CTX): Chronological Monitor only

ACB-PCI-1 Ready Made Adapter Cable (2.0 m):

From D-Sub to two Twinax Connectors for ACTM3910-6U-1
Transition Module (all variants of ACX3910-6U-1-T cards)

ACB-PCI-2 Ready Made Adapter Cable (2.0 m):

From D-Sub to four Twinax Connectors for ACTM3910-6U-2
Transition Module (all variants of ACX3910-6U-2-T cards)

ACB-HD15-1 Ready Made Adapter Cable (2.0 m):

From 15-pin HD-Sub to two Twinax Connectors for all variants
of ACX3910-6U-1/ ACX3910-6U-2 cards (with Front-I/O)

ACB-HD15-1-F Ready Made Adapter Cable (2.0 m):

From 15-pin HD-Sub to two Twinax Connectors and 9-pin
D-Sub Connector for Trigger I/O, IRIG-B and Discrete I/O's
for all variants of ACX3910-6U-1/ ACX3910-6U-2 cards
(with Front-I/O)