

AVX3910-x



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



Right on Target

Avionics Databus Solutions

General Features

The AVX3910-x is a member of AIM's new 4th generation family of advanced VMEbus modules for analysing, simulating, monitoring and testing STANAG3910/ EFABus Express (EFEX) databases.

The AVX3910-x modules provide Bus Controller, Multiple Remote Terminal Simulation and Chronological/ Mailbox Bus Monitoring functions with all modes operating concurrently. The standard AVX3910-x variant provides one or two fully independent dual redundant STANAG3910 Low Speed and High Speed interfaces on a single VMEbus card.

The AVX3910-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 AVX3910-x 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 AVX3910-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 AVX3910-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 on-board Application Support Processor (ASP) that executes the Driver

Software on-board minimises the load on the host processing system. The on-board 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 AVX3910-x modules.

Full function driver software is delivered with the AVX3910-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 AVX3910-x cards. For more details see the 'Driver Software' section below.

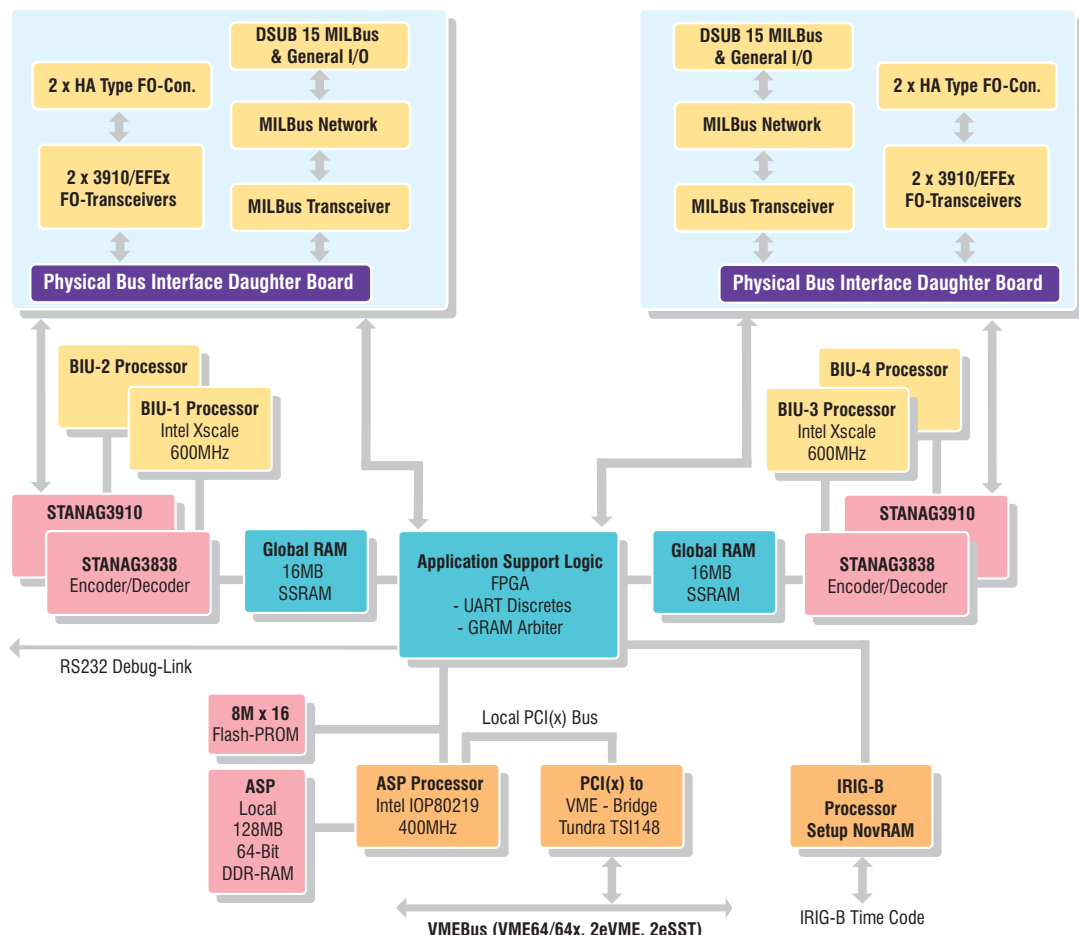
Special PBA.pro™ software components are available for supporting the SAE AS4112 RT Production Test Plan and components are also available for Optical testing for the fully programmable VOX3910-CTX-V module that can control parameters of the Databus optical waveform.

Two variants of the AVX3910-x Module are supported. The standard AVX3910-x provides a single slot solution with all the databus Electrical & Optical signals accessible on a single front panel. The AVX3910-x-CTX module variants provide a PREN3715 interface to connect a VOX3910-CTX-V module in an adjacent VMEbus slot. The VOX3910-CTX-V module provides a programmable Fibre Optic Front End for optical waveform testing.



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AVX3910-2
Block Diagram



Bus Controller

The AVX3910-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 AVX3910-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, MID and Sub-Address
- 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 AVX3910-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 AVX3910-x module can reconstruct previously recorded STANAG3910/ EFEX databus 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 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 AVX3910-x modules support 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 databus 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

AVX3910-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 AVX3910-x streams and modules to one common 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 AVX3910-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 databus system is software programmable.

Driver Software Support

The AVX3910-x is supplied with a BSP (Board Software Package) for integration of the AVX3910-x into embedded VME Systems. The BSP comprises an Application Interface Library, Sample Code for VxWorks and Manuals. VxWorks Operating System is supported per default. For an easy integration of the AVX3910-x under other Operating Systems, the source code (C/C++) of the Driver Library, which provides support for OS specific abstraction is included in the BSP. The AIM Network Server (ANS) for VxWorks is available to control AVX3910-x cards remotely from a Windows host via customer applications or by AIM's PBA.pro™ Databus Test & Analysis Software.

AVX3910-x

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STANAG3910/ EFEX Interface
Test & Simulation Module
for VMEbus

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Technical Data

Sub-System Interface: 32/64-bit VMEbus Master & Slave; A64, A32, A24 & A16 Addressing; BLT, MBLT, 2eVME and 2eSST Protocol

Compliance: ANSI/ VITA 1-1994 VME64, ANSI/ VITA1.1-1997 VME64 Extensions, ANSI/ VITA 1.5-199x 2eSST. Address-Only-With-Handshake & Read-Modify-Write (RMW) support (ADOH, can be used to transfer special coded information, i.e. lock commands that are used to lock ports of multiported resources)

Controller: Tundra TSI148

Processors: two or four 32-bit, 600MHz Xscale Processors for BIU(s) and 400MHz Intel IOP as ASP

Memory: 16MB for AVX3910-1, 2x 16MB for AVX3910-2, 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 1 μ s 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 on-board terminated Bus Network

Frontplate mounted Connectors on a standard AVX3910-x:

STANAG3910/ EFEX connections

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

STANAG3838/ MIL-STD-1553B connections

High Density DSUB 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

Frontplate mounted Connectors on a

CTX-Version:

AVX3910-x Module:

STANAG3910/ EFEX connections

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

STANAG3838/ MIL-STD-1553B connections

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

VOX3910-CTX-V 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 AVX3910-x Module
BNC Connector for HS-Trigger Output

Dimensions: 160mm x 233mm - VME standard 6U card

Weight: AVX3910-1 appr. 480g/ AVX3910-2 appr. 650g/ VOX3910-CTX-V appr. 520g

Power Consumption: AVX3910-2 appr.

24W 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

Ordering Information

AVX3910-1

Single Stream, Dual Redundant VMEbus to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder, 16MB Global RAM, 128MB ASP RAM, 1 General Purpose Discrete I/O on Front-I/O. On-board, Dual Redundant Fibre Optic Front End (FOFE)

AVX3910-1-CTX

Single Stream, Dual Redundant VMEbus to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder, 16MB Global RAM, 128MB ASP RAM
Includes: 1x VOX3910-CTX-V: Fully Programmable Fibre Optical Front End (FOFE) Module for the VMEbus, Provides EFABus Optical Validation Testing Capabilities
Note: Requires 2 VMEbus Slots

AVX3910-2

Dual Stream, Dual Redundant VMEbus to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder, 2x 16MB Global RAM, 128MB ASP RAM, 1 General Purpose Discrete I/O on Front-I/O. On-board, Dual Redundant Fibre Optic Front Ends (FOFE)

AVX3910-2-CTX

Dual Stream, Dual Redundant VMEbus to STANAG3910/ EFEX Interface: BC, Multi RT Simulator with Mailbox & Chronological Monitor, IRIG-B Encoder/ Decoder, 2x 16MB Global RAM, 128MB ASP RAM, 1 General Purpose Discrete I/O on Front I/O. Includes: 1x On-board, Dual Redundant Fibre Optic Front End (FOFE) + 1x VOX3910-CTX-V: Fully Programmable Fibre Optic Front End Module for the VMEbus, provides EFABus Optical Validation Testing Capabilities. Note: Requires 2 VMEbus Slots

Simulator Only

versions available (except for AVX3910-1/2-CTX)
BC, Multi RT Simulator with Mailbox Monitor

Monitoring Only

versions available (except for AVX3910-1/2-CTX)
Chronological Monitor Only

ACB-HD15-1

Ready Made Adapter Cable (2.0 m):
From 15-pin HD-Sub to two Twinax Connectors
for all variants of AVX3910-1/ AVX3910-2 cards

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 AVX3910-1/ AVX3910-2 cards