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Right on Target

AIM-USA

ACX429-3U-x



**Four, Eight or Sixteen
Channel ARINC429 Test &
Simulation Module for
CompactPCI/ PXI (3U)**



www.aim-online.com



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data sheet

Avionics Databus Solutions

General Features

The ACX429-3U-x is a member of AIM's new fourth generation of advanced cPCI/ PXI (3U) modules for analysing, simulating, monitoring and testing of ARINC429 channels providing up to 16 channels on a 3U cPCI/ PXI standard module format. Four channels are available on the ACX429-3U-4, eight channels on the ACX429-3U-8 and sixteen channels on the ACX429-3U-16 module. All channels are software programmable for Receive (Rx) or Transmit (Tx) mode. The lower eight transmit channels provide variable output amplitudes, whereas the upper eight transmit channels are of fixed amplitude. ACX429-3U-4 and ACX429-3U-8 versions provide separate Tx and Rx pins on all channels, ACX429-3U-16 version provides shared Tx and Rx pins.

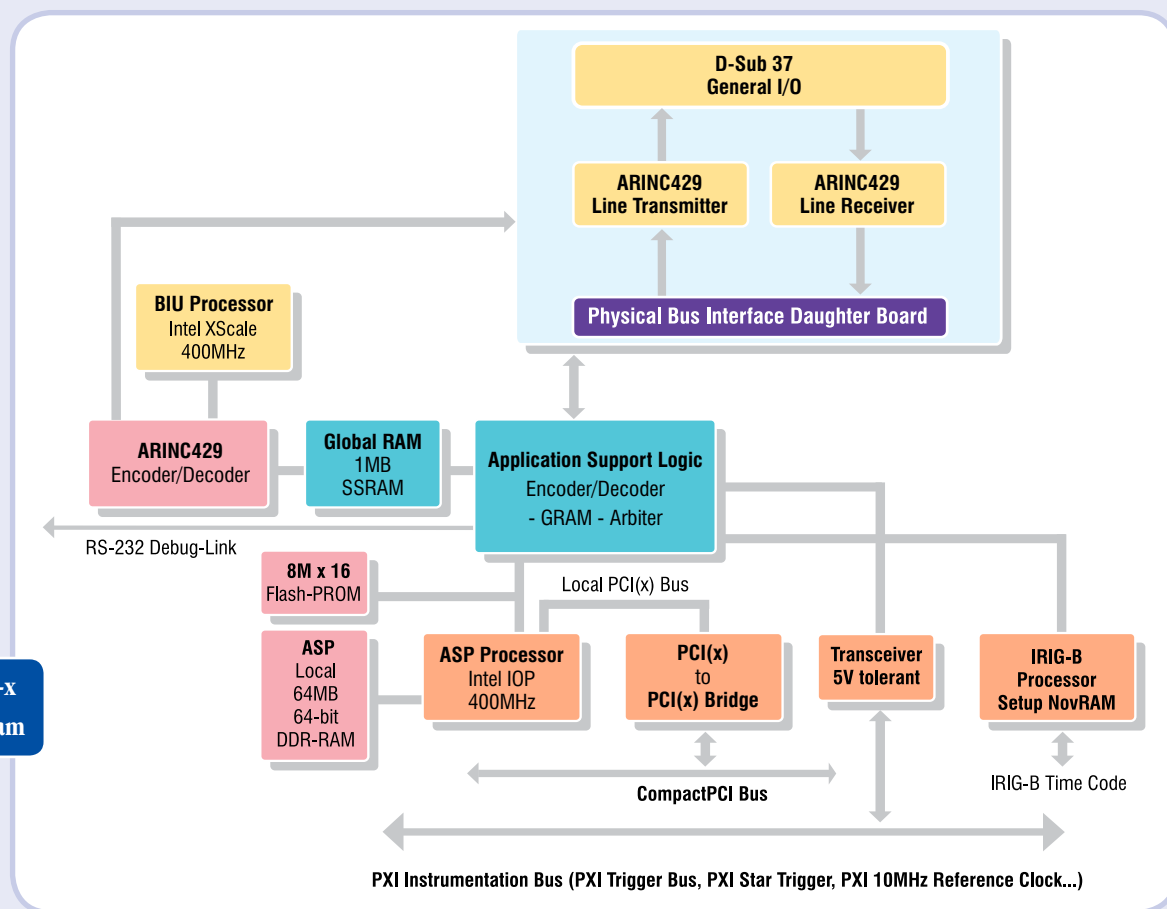
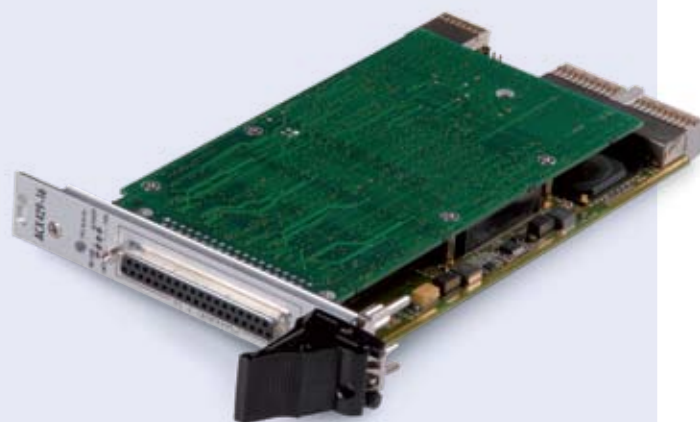
An onboard IRIG-B time encoder/ decoder allows users to accurately synchronize single or multiple ACX429-3U-x modules to a common time source.

The ACX429-3U-x modules use AIM's 'Next Generation Common Core' (NCC) hardware design utilising multiple RISC processors whereby all channels can operate concurrently at ARINC429 high or low bit rates with the intelligence to process data in real time. The use of an Application Support Processor (ASP) executing the driver software allows user specific test routines to be processed

onboard, significantly off-loading the host processor. The ACX429-3U-x cards are configured with 1MB of Global RAM and 64MB of ASP RAM.

Full function driver software is delivered with the ACX429-3U-x cards. The optional PBA.pro™ Databus Test & Analysis Tool (for Windows & Linux) and PAA-429/ ParaView Databus Analyzer/ Visualizer Software (for Windows) can also be purchased for use with ACX429-3U-x cards.

The module can be installed in standard cPCI (3U) slots, legacy PXI slots and PXI hybrid slots. If installed in a PXI slot, PXI Trigger I/O and a PXI System Reference Clock (10MHz) based time tag mode are supported.



ACX429-3U-x
Block diagram

Receiver Channel Operation

ACX429-3U-x modules provide real time monitoring of up to 16 ARINC429 Receiver Channels concurrently controlled by an onboard RISC Processor.

- *Triggering and Filtering*
- *Upper & Lower Limit Check*
- *Trigger on Specific or on any Error*
- *Label Content & Sequential Dependent Trigger*
- *Label Selective & Label Data Contents Dependant Interrupt*
- *Label Selective & Label Data Contents Dependant Filter*
- *Multi-Buffering with Real Time Data Buffer Updates*

Transmit Channel Operation

ACX429-3U-x modules provide real time simulation of up to 16 ARINC429 Transmitter Channels concurrently controlled by the onboard RISC Processor via instruction lists. Transmission rates are selectable for each channel at 12.5kbit/s or 100kbit/s with the associated rise/ fall time in accordance with the ARINC429 electrical specification.

- *Cyclic/ Acyclic Label Transmission Mode & Support for File Transfer Protocols*
- *Error Injection for each Label Transfer: Short Gap, Parity, Bit Count, Coding*
- *Programmable Gap between Labels: 0 to 255 Bits*
- *Transmit Operation Controlled by Instruction Lists*
- *Comprehensive Instruction Set: JUMP, CALL, COND-JUMP, TRANSFER*
- *Loop-back & Pollution Mode*



IRIG-B Time Encoder/ Decoder

ACX429-3U-x modules include an onboard IRIG-B time encoder/ decoder with a sinusoidal output and a 'free wheeling' mode for time tag synchronisation. This allows synchronisation of multiple ACX429-3U-x channels and modules to one common IRIG-B time input source or to the onboard time code generator of one ACX429-3U-x card as the reference for the correlation of data across multiple ARINC429 channels.

If installed in a PXI slot the input source can alternatively be switched from IRIG-B to the PXI System Reference Clock (10MHz) on the Instrumentation Bus to have a Time Tag synchronous to the PXI System Reference Clock.

Physical Bus Interface

ACX429-3U-x cards have integrated ARINC429 line Transmitter/ Receivers and selectable Transmission rate for each channel independently. Variable output amplitude is provided on the lower eight channels. All ARINC429 channels are available at the front plate connector.



Loop-back & Pollution Mode

Receive and Transmit Channels can be paired to form a 'Loop-back' couple. Data received from the Receiver Channel are automatically transmitted on the selected Transmitter Channel with minimum delay. A special receiver Function Block mode can be used to modify (pollute) the received label prior to its re-transmission.

Physical Bus Replay

The ACX429-3U-x module can electrically reconstruct previously recorded ARINC429 data traffic physically to the bus with excellent timing accuracy. Recorded data files can be selected for Physical Bus Replay to perform systems integration and test with the ability to disable any or all ARINC429 labels from the recorded file.

PXI Instrumentation Bus

The PXI Hardware Specification adds electrical features for instrumentation by providing additional triggering and system clock capabilities. The ACX429-3U-x is compliant with the PXI Specification Revision 2.2 providing additional triggering and system clock capabilities on the Instrumentation Bus.

Operational features include:

- *One Trigger Input and one Trigger Output are available on the PXI Trigger Bus (software programmable)*
- *PXI System Reference Clock synchronous Time Tag Mode*
- *Time Tag Clear via PXI STAR Trigger Input*

The ACX429-3U-x is a hybrid slot compatible peripheral module.

Application Support Processor

The Application Support Processor (ASP) offers onboard 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 Realtime Operating System*

Driver Software

The Driver Software resides on the ACX429-3U-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 C++ , LabWindows/CVI etc. A LabView/VI application interface as well as LabViewRT drivers are provided.

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Technical Data

Sub-System Interface: cPCI/ PXI Bus Master & Slave, compliant with PCI-Standard Revision 2.3 and PXI-Specification Revision 2.2 (ECN 1), 33/66MHz, 32-bit, 5V & 3.3V compatible

Processors: One 32-bit, 400MHz XScale Processor for BIU, 400MHz Intel IOP for ASP

Memory: Global RAM: 1MB, ASP RAM: 64MB

Encoder/Decoder: Up to 16 ARINC429 Encoders/ Decoders with error injection & detection

Time Tagging: 46-bit absolute IRIG-B Time with 1 μ s resolution, sinusoidal IRIG-B output and 'free wheeling' mode; PXI System Reference Clock time tag mode

PXI Instrumentation Bus: PXI Trigger Bus port, PXI STAR Trigger Input, PXI System Reference Clock Input (10MHz)

Physical Bus Interface (PBI): Up to 16 ARINC429 Line Transmitters and 16 ARINC429 Line Receivers for a total of 16 Channels; Channels are user programmable for Rx or Tx; Transmitter Channels 1-8 with Variable Output Amplitude, Transmitter Channels 9-16 with Fixed Output Amplitude

Connectors: cPCI/ PXI Bus standard backplane connector;
37-way (female) D-Sub connector for ARINC429 Signals, Trigger & Time Code I/O;
PXI Module connections: J1 connector for standard 32-bit cPCI/ PXI Bus address, data, control signals; XJ4 (eHM) connector for instrumentation signals (Trigger Bus, Star Trigger Input, 10MHz System Reference Clock)

Dimensions: 100mm x 160mm - cPCI/ PXI Standard 3U card

Power Consumption:

10.5W - 11.2W Idle
10.7W - 18.4W Operating
Depending on number of channels and individual load

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

Weight: appr. 250g

Ordering Information

ACX429-3U-4

4 Channel cPCI/ PXI (3U) to ARINC429 Interface:

Software programmable Receiver/ Transmitter Channels with variable Output Amplitude;
IRIG-B Encoder/ Decoder; 1MB Global RAM, 64MB ASP RAM; 37-way (female) D-Sub Connector with separate Tx and Rx pins

ACX429-3U-8

8 Channel cPCI/ PXI (3U) to ARINC429 Interface:

Software programmable Receiver/ Transmitter Channels with variable Output Amplitude;
IRIG-B Encoder/ Decoder; 1MB Global RAM, 64MB ASP RAM; 37-way (female) D-Sub Connector with separate Tx and Rx pins

ACX429-3U-16

16 Channel cPCI/ PXI (3U) to ARINC429 Interface:

8 Software programmable Receiver/ Transmitter Channels with variable Output Amplitude plus 8 Software programmable Receiver/ Transmitter Channels with fixed Output Amplitude;
IRIG-B Encoder/ Decoder; 1MB Global RAM, 64MB ASP RAM; 37-way (female) D-Sub Connector with shared Tx and Rx pins

