data sheet

AP104-429-x

4, 8 or 16 Channel ARINC429 Test & Simulation Module for PC/104-Plus

Avionics Databus Solutions

www.aim-online.com

Right on Target

General Features

The AP104-429-x is a member of AIM's new family of advanced PC/104-Plus modules targeted to embedded ARINC429 applications. The AP104-429-x offers full function test, simulation, monitoring and databus analyser capabilities for ARINC429 applications on up to 16 channels concurrently.

Four channels are available on the AP104-429-4, eight channels on the AP104-429-8 and sixteen channels on the AP104-429-16 module. Extended temperature range variants are available as well. All channels are software programmable for Receive (Rx) or Transmit (Tx) mode. Transmit channels are of fixed output amplitudes. All AP104-429-x cards have the capability to handle eight General Purpose Discrete I/O (GPIO) signals and also offer Trigger I/O.

A full range of ARINC429 protocol errors can be injected/ detected. The AP104-429-x modules can electrically reconstruct and replay previously recorded ARINC429 record files physically to the bus with excellent timing accuracy.

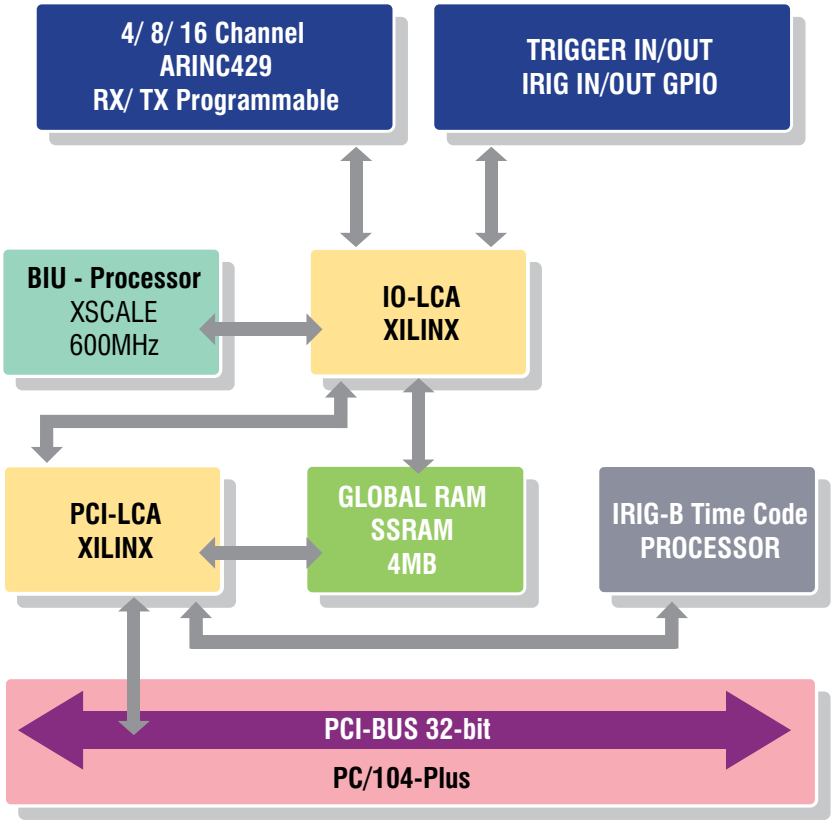
The PC/104-Plus module is designed to be installed on either a host carrier board to adapt to buses like standard PCI, VME or cPCI or on an embedded host computer with PC/104-Plus ports.

All channels can operate concurrently at ARINC429 high or low bit rates with the intelligence to process data in real time. The AP104-429-x cards are configured with 4MB of Global RAM.

An onboard IRIG-B time encoder/ decoder is included with sinusoidal output and 'free wheeling' mode for time tag synchronisation on the system level using one or more AP104-429-x cards or any IRIG-B compatible modules.

Full function driver software is delivered with the AP104-429-x cards in comprehensive Board Software Packages (BSP's) for different Operation Systems. The optional PBA.pro™ Databus Test & Analysis Tool (for Windows & Linux) can also be purchased for use with AP104-429-x modules.

AP104-429-16
Block Diagram



Receive Channel Operation

AP104-429-x modules provide real time monitoring of up to 16 ARINC429 Receiver Channels concurrently controlled by an onboard RISC Processor.

- *Label Oriented Receive Mode (individual Buffers for each Label with Multi-Buffering and Real Time Updates)*
- *Chronological Receive Mode per Channel with 1µs Resolution Time Stamping*
- *Chronological Mode concurrent to Label Oriented Receive Mode*
- *Local (one Buffer per Channel) or Global Monitoring (one Buffer all Channels)*
- *Continuous or Single Shot Capturing Modes*
- *Support of SDI Handling*
- *Interrupt Generation on Label Reception (configurable per Label/ SDI)*
- *Complex Triggering and Filtering Functions*
- *Loop of received Data to configurable Transmit Channel with Label Data Modification Capability*

Transmit Channel Operation

AP104-429-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 12.5 kbit/s or 100 kbit/s with the associated rise/ fall time in accordance with the ARINC429 electrical specification.

- *Cyclic/ Acyclic Label Transmission and Channel Loop Mode*
- *Error Injection for each Label Transfer: Short Gap, Parity, Bit Count, Coding*
- *Programmable Gap between Labels: 0 to 255 Bit*
- *Simulate Zero-Jitter Scenarios using Virtual Label Transfers*
- *Multi-Buffering with Real Time Update supported per individual Label Transfer*
- *Reconstruction of previously recorded ARINC429 Traffic physically to the Bus with excellent Timing Accuracy (Physical Replay)*
- *Interrupt Generation on Label Transmit (configurable per Label Transfer)*

ARINC429 Physical Bus Interface

AP104-429-x cards have integrated ARINC429 line Transmitter/ Receivers and selectable transmission rate for each channel independently. Transmit channels are of fixed output amplitudes.

General Purpose Discrete I/O

The AP104-429-x provides eight General Purpose Discrete I/O's (GPIO). The GPIO's can be used as simple discrete inputs or outputs to generate strobes (e.g. to another AP104-429-x card) or to sample external digital input signals (e.g. from another AP104-429-x card). The Discrete I/O lines accept standard TTL levels as well as avionic levels from 0-30V DC.

IRIG-B Time Encoder/ Decoder

AP104-429-x cards include an onboard IRIG-B time encoder/ decoder with sinusoidal output and 'free wheeling' mode for time tag synchronisation. This allows synchronisation of multiple AP104-429-x cards or any IRIG-B compatible modules to one common external IRIG-B time input source or to the onboard time code generator of one AP104-429-x card as the reference for the correlation of data across multiple ARINC429 channels.

Driver Software Support

A full function Application Programming Interface (API) is provided compatible with Windows and Linux. Drivers for other Operating Systems especially used in embedded applications are available upon request. Please contact the factory for further details on driver availability for a particular Operating System and host platform.
Host applications for the AP104-429-x can be written in C and C++.

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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
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

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Technical Data

System Interface: PC/104-Plus, Version 2.3 compliant; 32-bit/ 33MHz PCIbus (Rev. 2.2) compliant; 3.3V, 5V tolerant IO's;

Burst operation on PCI for efficient data transfer; One interrupt output to PCIbus

Processor: 32-bit 600MHz RISC Processor

Memory: 4MB Global RAM

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

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

Trigger: Four trigger inputs and four trigger outputs

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 are of fixed output Amplitude

Connectors: PC/104-Plus stackable PCI and ISA connectors, 34-way ribbon cable connector for ARINC429 connections, 20-way ribbon cable connector for Trigger I/O, GPIO and IRIG-B signals, separate 6-way IRIG-B ribbon cable connector

(for mating connectors please refer to the AP104-429-x Hardware Manual)

Dimensions: 95.9mm x 90.2mm

Supply Voltage: 3.3V, 5V, +12V, -12V

Power Consumption: 11W typical, depending on number of channels and individual load

Operating Temp. Range: Standard 0°C...+70°C, Extended -40°C...+85°C ambient

Storage Temp. Range: -40°C...+85°C

Humidity: 0 to 95% non-condensing

Ordering Information

AP104-429-4

4 Channel ARINC429 PC/104-Plus Module:

Software Programmable Receiver/ Transmitter Channels; IRIG-B Time Encoder/ Decoder

4MB Global RAM, 8 General Purpose Discrete I/O's

AP104-429-8

8 Channel ARINC429 PC/104-Plus Module:

Software Programmable Receiver/ Transmitter Channels; IRIG-B Time Encoder/ Decoder

4MB Global RAM, 8 General Purpose Discrete I/O's

AP104-429-16

16 Channel ARINC429 PC/104-Plus Module:

Software Programmable Receiver/ Transmitter Channels; IRIG-B Time Encoder/ Decoder

4MB Global RAM, 8 General Purpose Discrete I/O's

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