

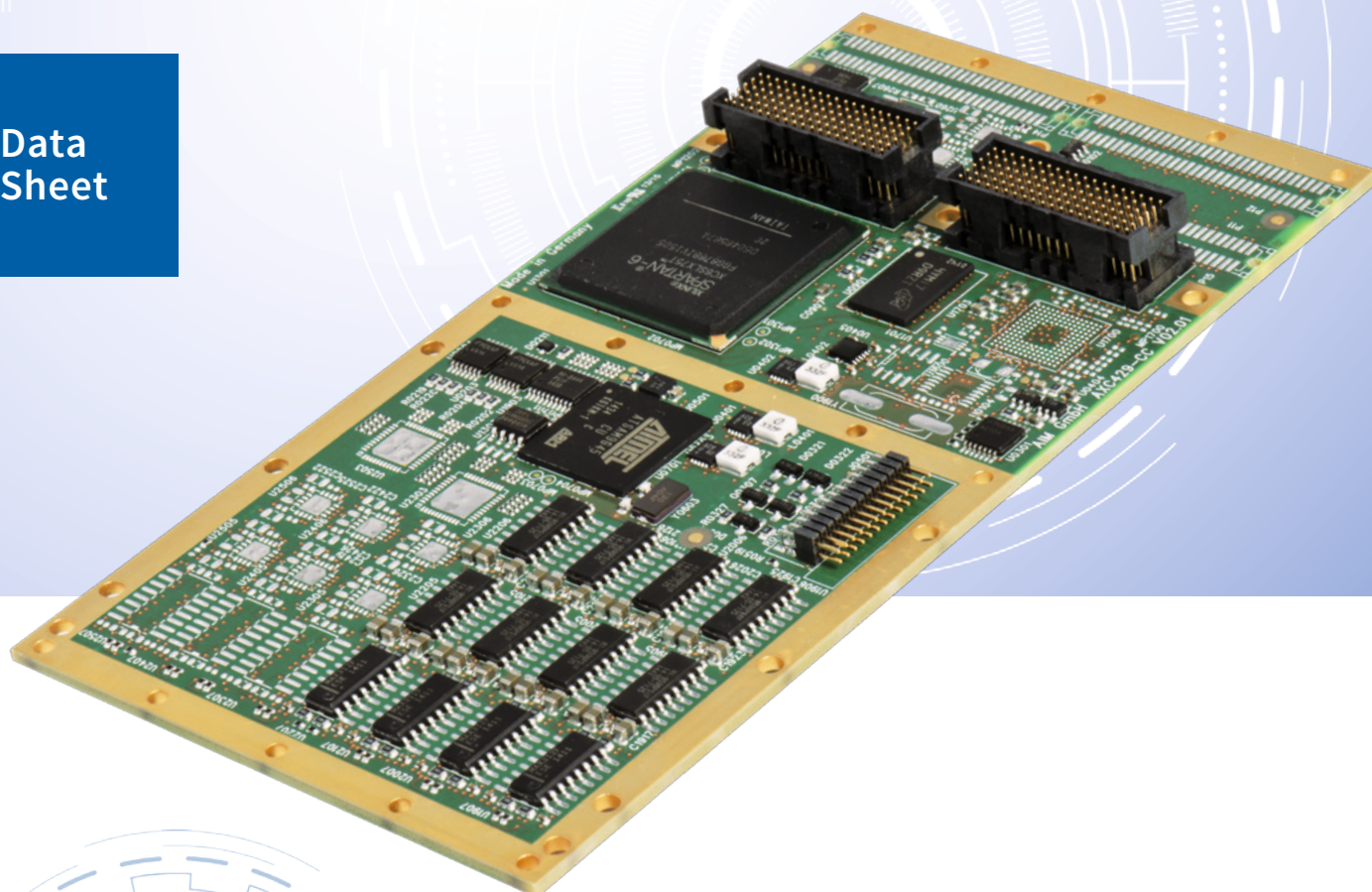


Avionics Databus
Solutions

AXE429-x

Rugged Embedded ARINC429
Conduction Cooled XMC Card

Data
Sheet



AXE429-x

Rugged Embedded ARINC429 Conduction Cooled XMC Card

General Features

The ► **AXE429-x** card is a member of AIM's family of PCI Express based XMC-Mezzanine (ANSI/VITA 42.3) modules targeted for embedded ► **ARINC429** applications.

The card is designed to meet or exceed vibration requirements as specified in ANSI/VITA 47 for class V3. It is also designed to meet the shock requirements specified in ANSI/VITA 47 for class OS2.

All cards are conduction cooled Rear I/O cards and have the capability to handle up to 32 ARINC429 channels with a maximum of 8 Open/Ground Avionics Level (+35V) Discrete Inputs and 8 Open/Ground Avionics Level (+35V) Discrete Outputs signals in addition to Trigger I/O. With the provided onboard flash memory the components boot up autonomously after power up.

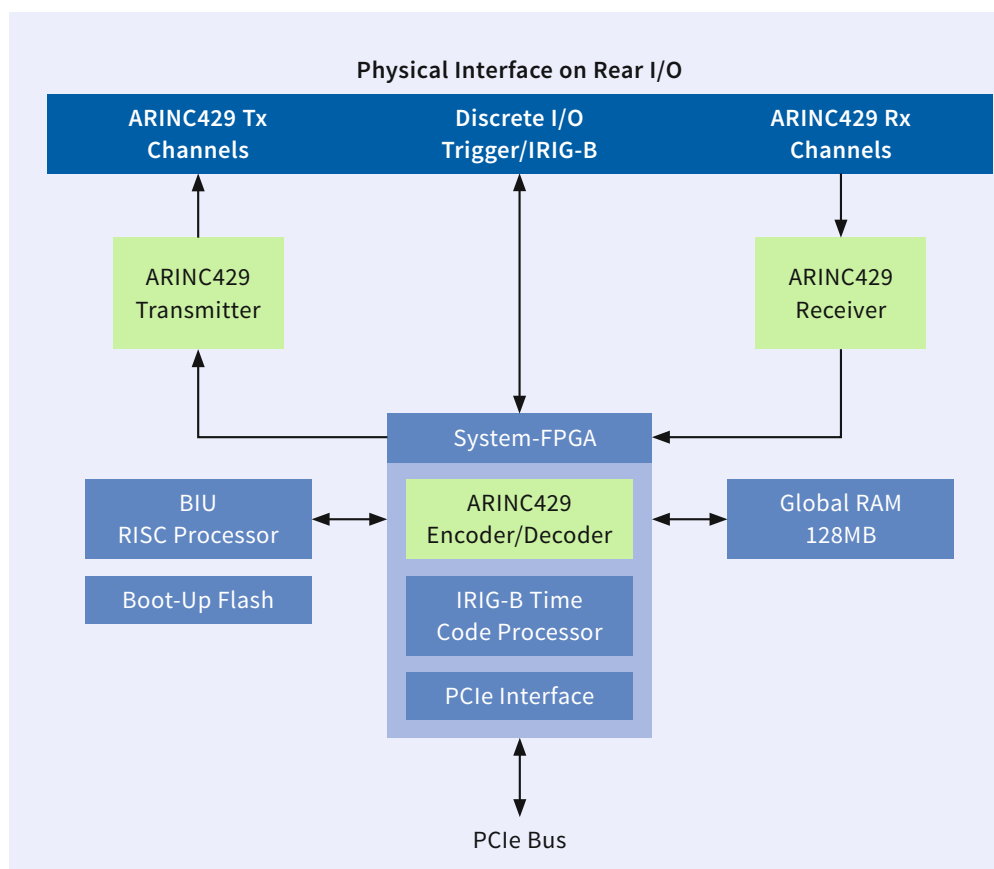
Therefore the cards are well prepared for embedded applications requiring fast and autonomous boot up to operational mode. An onboard IRIG-B analog time decoder is included with free-wheeling mode for time tag synchronization.

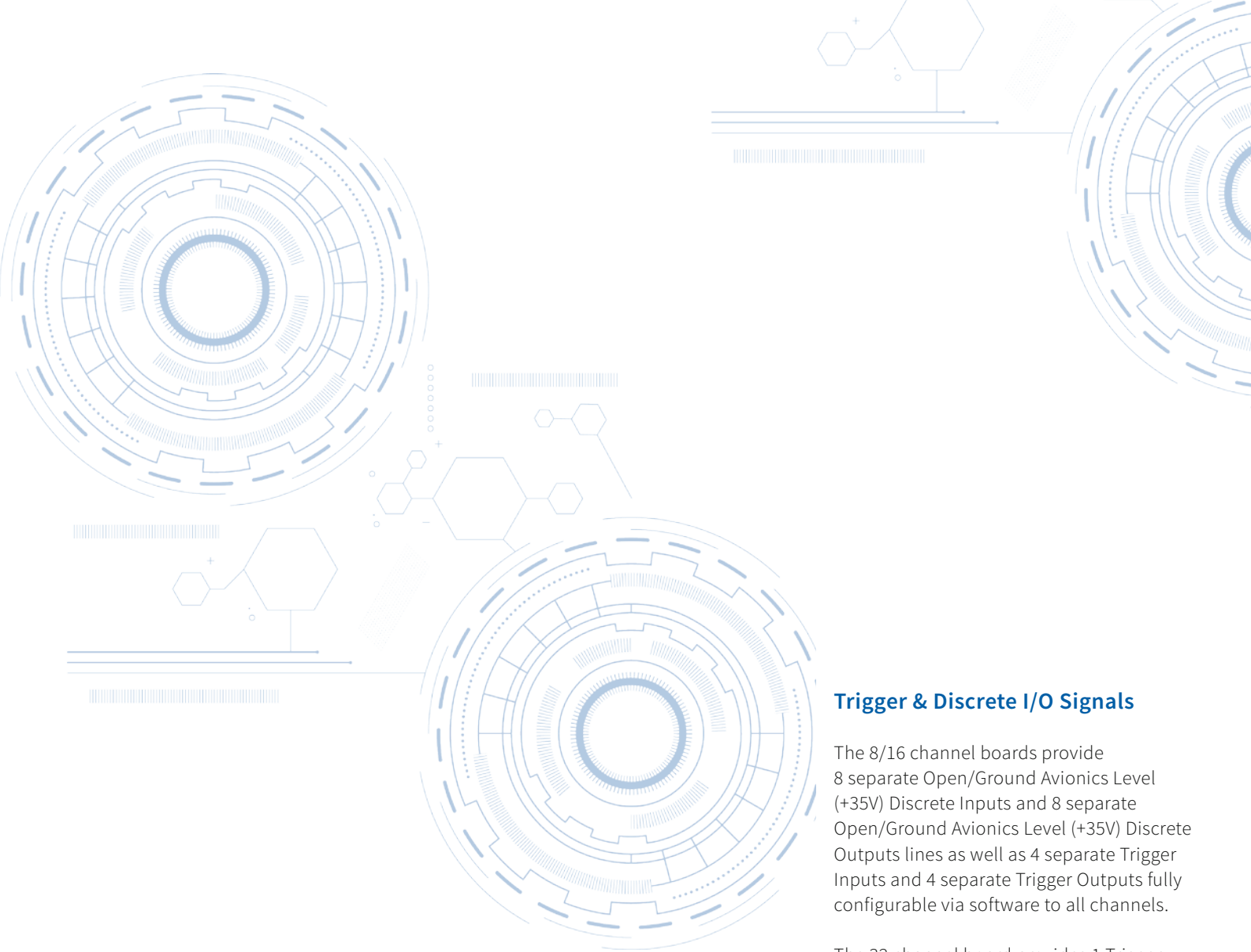
AIM's XMC card utilizes the latest AIM Common Hardware Core derived from the existing AXC429-x ARINC429 test and simulation interface, to deliver low power consumption and high performance for rugged environments and embedded applications.

Key Features

- Low Power Consumption -4.3W Max. @100% duty cycle for 8 channel ARINC429
- -40°C to +85°C operating temperature range
- VITA 47 shock and vibration qualified
- P16 Rear I/O XMC connectors
- High performance RISC processors onboard:
 - Host CPU offload for low CPU utilization and deterministic bus timing
 - Hard Real Time Precision and Timing
- DMA Engine for optimized bus transfers and low PCIe bus utilization
- 128MB Global RAM onboard for data scheduling and buffering
- Flexible and upgradeable firmware design provides full control of Obsolescence and Configuration Management
- Up to 32 fully programmable Tx/Rx ARINC429 channels:
 - No limitation on transmitter duty cycle
 - Tx Inhibit for Monitoring Only Applications (assembly option)
 - Programmable channel type locking available on request
- 8/16 channel versions:
 - 8 Open/Ground Avionics Level (+35V) Discrete Inputs
 - 8 Open/Ground Avionics Level (+35V) Discrete Outputs
 - 4 digital Trigger Inputs and 4 digital Trigger Outputs
- 32 channel version:
 - 1 digital Trigger Output
- IRIG-B Input

AXE429-x
Block Diagram





Transmitter Operation

AXE429-x modules provide real time simulation support of up to 32 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 and fixed Tx output amplitude.

Key Features:

- Cyclic/Acyclic Label Transmission
- Label Rate oriented Transmission Mode
- Dynamic, FIFO based Transmission Mode for application scenarios with demand for high flexibility
- Programmable Gap between Labels: 0 to 255bit
- Simulate Zero-Jitter Scenarios using Virtual Label Transfers
- Multi-Buffering with Real Time Update supported per individual Label Transfer
- Interrupt Generation on Label Transmit (configurable per Label Transfer)

Receiver Operation

AXE429-x modules provide real time monitoring of up to 32 ARINC429 Receiver channels with full error detection (Bit Count, Coding, Gap, Parity), concurrently controlled by an onboard RISC Processor.

Key Features:

- Label Oriented Receive Mode (individual Buffers for each Label with Multi-Buffering and Real Time Updates)
- Chronological Receive Mode per channel with 1 μ s Resolution Time Stamping
- Chronological Receive Mode concurrent to Label Oriented Receive Mode
- Local (1 buffer per channel) or Global Monitoring (1 buffer all channel)
- Continuous or Single Shot Chronological Capturing Modes
- Support of SDI Handling
- Interrupt Generation on Label Reception (configurable per Label/SDI)
- Complex Triggering and Filtering Functions
- High Accuracy FPGA based Label Time Stamping of 1 μ s Resolution

Trigger & Discrete I/O Signals

The 8/16 channel boards provide 8 separate Open/Ground Avionics Level (+35V) Discrete Inputs and 8 separate Open/Ground Avionics Level (+35V) Discrete Outputs lines as well as 4 separate Trigger Inputs and 4 separate Trigger Outputs fully configurable via software to all channels.

The 32 channel board provides 1 Trigger Output fully configurable via software to all channels.

IRIG-B Time Decoder

The card provides an analog IRIG-B input for time synchronization of multiple cards to 1 common IRIG-B time input source.

Driver Software

An Application Programming Interface (API) is provided along with operating system specific drivers for Windows, Linux and VxBus.

Please contact your local sales representative for other operating systems. Host applications can be written in C, C++, or C#. LabVIEW/VI application interfaces as well as LabVIEW-RT drivers are also provided.

Technical Data

System Interface

XMC Single Lane, 2.5Gb/s PCIe
V1.1 compliant; Compliance; ANSI/VITA
42.3-2006

Processors

1x 400MHz RISC Processors

Memory

128MB Global RAM (DDR-RAM),
2x 8Mbit serial flash memory for BIUs,
64Mbit serial flash memory for FPGA

Encoder/Decoder

Up to 32 ARINC429 Encoder/Decoder
with full error detection

Time Tagging

46bit absolute IRIG-B Time stamping
with 1µs resolution, derived from
IRIG-B-122 Input or free-wheeling

Trigger/General Purpose Discrete I/O

8/16 channel boards:
4 Trigger Inputs, 4 Trigger Outputs
8 Open/Ground Avionics Level (+35V)
Discrete Inputs
8 Open/Ground Avionics Level (+35V)
Discrete Outputs
32 channel board:
1 Trigger Output

Physical Bus Interface

Up to 32 ARINC429 Transmitters and
32 ARINC429 Line Receivers for a total of
32 channels.
All channels are user programmable Rx or
Tx available via Rear I/O

Dimensions

143.75 x 74mm Conduction cooled format

Power Consumption

8 channels @3.3V:
Min. 3.3W (Idle Mode), Max. 4.3W
(100% Bus Operation*), @5V: <0.5W
16 channels @3.3V:
Min. 3.5W (Idle Mode), Max. 6W
(100% Bus Operation*), @5V: <0.5W
32 channels @3.3V:
Min. 5W (Idle Mode), Max. 9W
(100% Bus Operation*), @5V: <0.5W
* 12,5kHz; worst case load (400Ohm || 30nF)

Operating Temperature Range

Extended: -40°C to +85°C

Storage Temperature Range

-55°C to +105°C

Humidity

0 to 95% non-condensing

Qualified to ANSI/VITA 47-2005 (R2007)

Environmental Conditions List

- Operating Temperature Class CC3 in
Conduction Cooled and Class AC3/FC3
in Air Cooled Applications
- Vibration Class V3 according to
MIL-STD-810G, Method 514.6, Procedure I
- Operating Shock Class according to
MIL-STD-810G, Method 516.6, Procedure I
- Operating Humidity according to
MIL-STD-810G, Method 507.5, Procedure II
- Altitude Test according to MIL-STD-810G,
Method 500.5, Procedure II

Ordering Information

AXE429-8

8 Channel ARINC429 XMC Module

AXE429-16

16 Channel ARINC429 XMC Module

AXE429-32

32 Channel ARINC429 XMC Module

Common Features:

Software Programmable Receiver/
Transmitter Channels;
IRIG-B Time Decoder, 128MB Global RAM,
8 Discrete Inputs/8 Discrete Outputs
(except for AXE429-32);
All I/O via XMC P16 Rear I/O connector,
extended Temperature Range,
Conduction Cooled.

Options:

Tx Inhibit

Available as assembly option,
add suffix -I to Part Number

Solder

RoHS (default); for leaded solder
option please contact the factory

Conformal Coating

Available as costed option,
add suffix -COAT to Part Number

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