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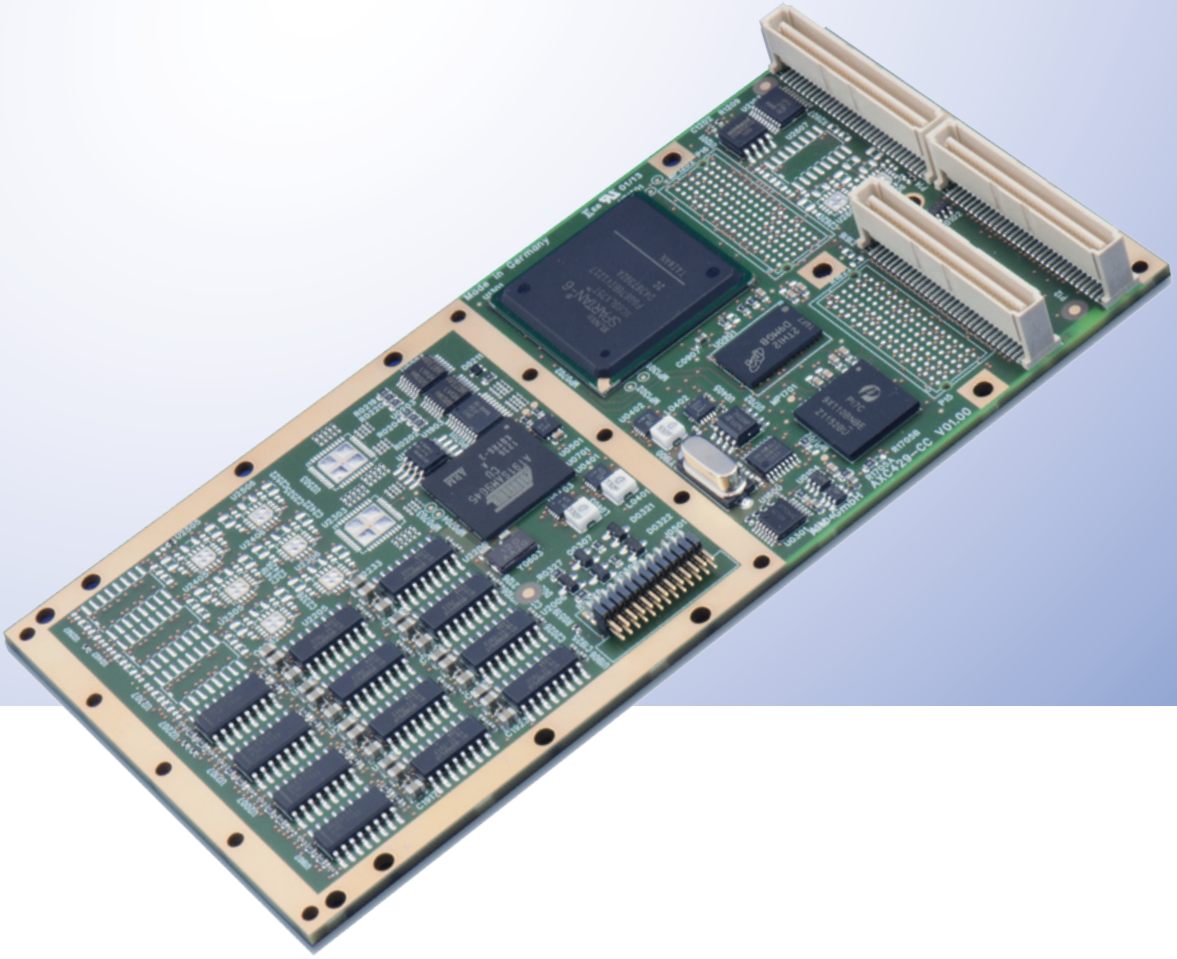
Solutions

AMCE429-x

Rugged Embedded ARINC429
Conduction Cooled PMC Card

Data Sheet



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AMCE429-x

Rugged Embedded ARINC429 Conduction Cooled PMC Card

General Features

The AMCE429-x card is a member of AIM's family of PCI Express based PMC-Mezzanine (IEEE1386.1) 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.

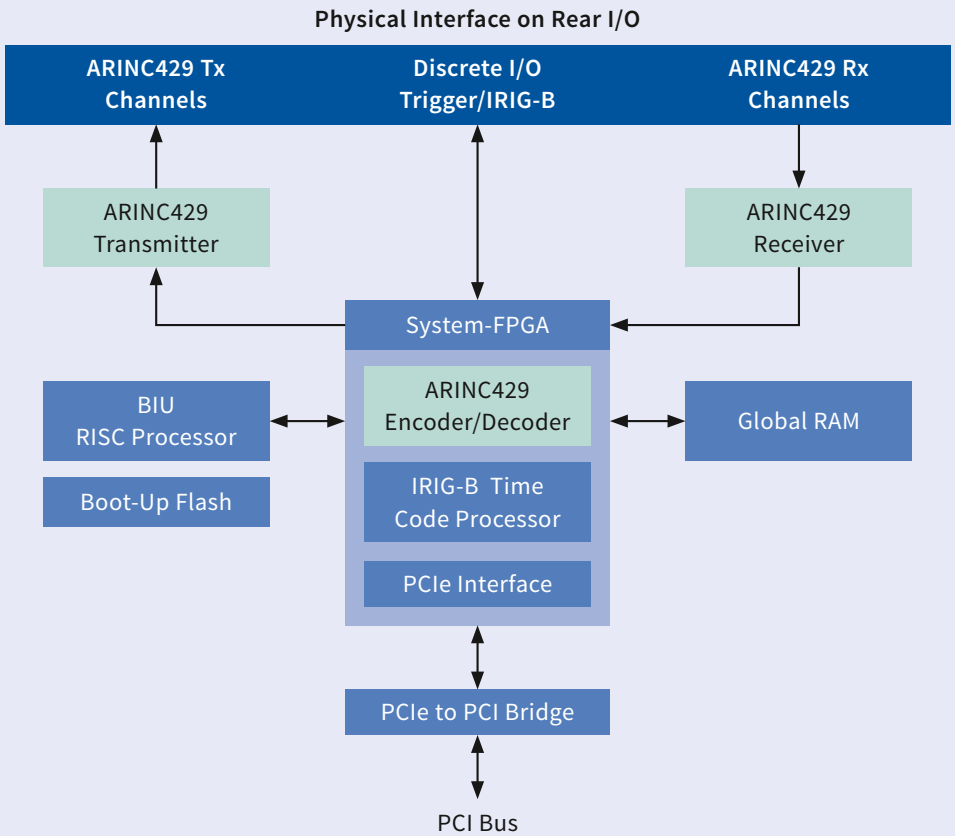
All cards are conduction cooled Rear I/O cards and have the capability to handle up to 32 ARINC429 channels with a maximum of 8 Open/Ground Avionics Level (+35V) Discrete Inputs and 8 Open/Ground Avionics Level (+35V) Discrete Outputs signals in addition to Trigger I/O.
With the provided onboard flash 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 analogue time decoder is included with free-wheeling mode for time tag synchronization.

AIM's PMC 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 ARINC429 channels
- -40°C to +85°C operating temperature range
- VITA 47 shock and vibration qualified
- Pn4 Rear I/O PMC connector
- 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 upgradable 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
- 4/8/16 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



AMCE429-x Block Diagram

Transmitter Operation

AMCE429-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

AMCE429-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 1µs 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

Trigger & Discrete I/O Signals

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

IRIG-B Time Decoder

The card provides an analogue 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 low level 32-/64bit operating system specific drivers for Windows 7/8/10, Linux and VxWorks.

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
32bit/66MHz capable PCIbus (Rev. 2.2) compliant
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
4/8/16 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
4 channels @3.3V:
Min. 3.0W (Idle Mode), Max. 3.3W
(100% Bus Operation*), @5V: < 0.5W
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

Ordering Information

AMCE429-4
4 Channel ARINC429 PMC Module
AMCE429-8
8 Channel ARINC429 PMC Module
AMCE429-16
16 Channel ARINC429PMC Module
AMCE429-32
32 Channel ARINC429 PMC Module

Common Features:
Software Programmable Receiver/ Transmitter Channels;
IRIG-B Time Decoder, 128MB Global RAM,
8 Discrete Inputs/8 Discrete Outputs (except for AMCE429-32);
All I/O via PMC P14 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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