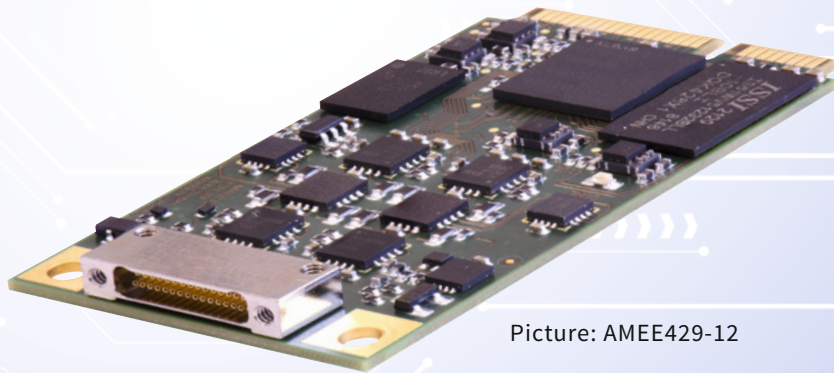# AMEE429-x

Rugged Embedded ARINC429
PCI Express Mini Card

**Data
Sheet**

Picture: AMEE429-12

AMEE429-x

Rugged Embedded ARINC429
PCI Express Mini Card

General Features

The ▶ **AMEE429-x** is a PCI Express Mini Card targeted for embedded ARINC429 applications.

The AMEE429-x module provides full function test, simulation, monitoring and databus analyzer capabilities for ARINC429 applications and is available in configurations for up to 8 receive channels as well as 4 fully software programmable for receive (Rx) or transmit (Tx) channels, which are configurable for high/low bit rates.

The AMEE429-x supports 2 avionic discrete input and 2 avionic discrete output signals to be monitored or generated. In addition 1 trigger output is provided.

An onboard high-precision free-wheeling IRIG-B time decoder supports time tagging on the AMEE429-x model and allows users to accurately synchronize the module to a common IRIG-B time source.

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.

A common Application Programming Interface (API) supports all ▶ **AIM ARINC429** modules.
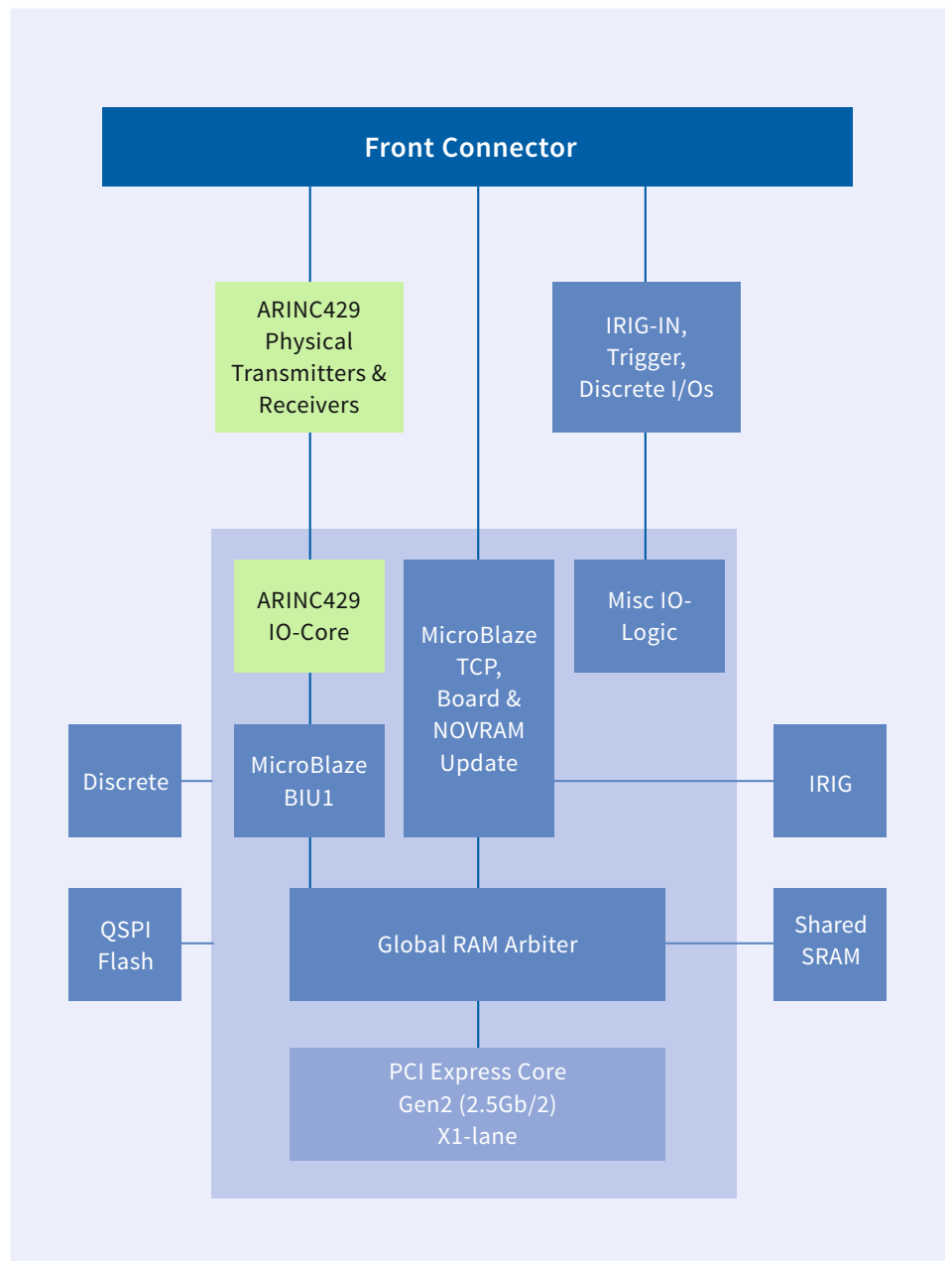
AMEE429-x Block Diagram

Key Features

- Robust and low power PCI Express Mini Card
- 4 programmable Tx/Rx ARINC429 Channels plus up to 8 fixed ARINC429 Rx Channels
- Available Variants:
  – Embedded (no Error Injection, no Physical Bus Replay and no Channel Loop/Pollution Mode)
  – Test and Simulation (available upon Request)
  – Various number of channels available:
  > 4 Channels: 4Tx/Rx
  > 8 Channels: 4Tx/Rx + 4Rx
  > 12 Channels: 4Tx/Rx + 8 Rx
- Concurrent Operation on all Channels (Simulation/Monitoring)
- Full Error Injection Capability (Test and Simulation Variant only)
- Full Error Detection Capability
- Multi-Level Triggering for Capturing/ Filtering
- Real Time Traffic Recording
- Real Time synchronized Bus Replay (Test and Simulation Variant only)
- 31-pin Screw Lock I/O Connector
- IRIG-B Time Decoder for Data Correlation (IRIG-B Input only)
- 2 Avionic Level Discrete Inputs (1 Discrete Input can be programmatically switched to Trigger Input)
- 2 Avionic Level, open Collector Discrete Outputs
- 1 TTL Trigger Output
- Drivers for Windows, Linux and further Operating Systems (contact Factory)
- Software compatible with AIM's Family of ▶ ARINC429 Cards

Transmit Channel Operation

- Cyclic/Acyclic Label Transmission
- Error Injection for each Label Transfer:
  – Short Gap, Parity, Bit Count, Coding (Test and Simulation Variant only)
- 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
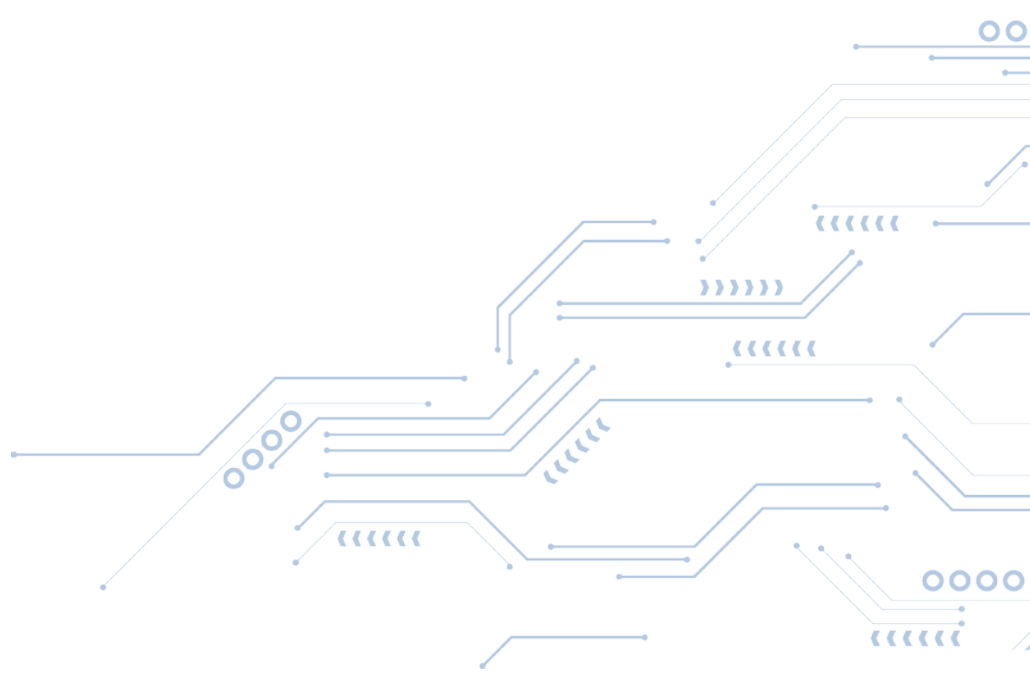
- Reconstruction of previously recorded ARINC429 Traffic physically to the Bus with excellent Timing Accuracy (Physical Replay/Test and Simulation Variant only)
- Notification on Label Tranmit (configurable per Label Transfer)
- Channel Loop/Pollution Mode (Test and Simulation Variant only)

Receive Channel Operation

- 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 Monitoring (individual Buffer per Channel) or Global Monitoring (common Buffer for all Channels)
- Continuous or Single Shot Capturing Modes
- Complex Triggering and Filtering Functions
- Loop of received Data to configurable transmit Channel with Label Data Modification Capability

Physical Bus Interface

- 4 ARINC429 Line Transmitters/Receivers and selectable transmission Rate for each Channel independently
- Up to 8 ARINC429 Line Receivers
- Fixed Transmitter Output Amplitude (~11V)
- All ARINC429 Channels are available at the ruggedized I/O Connector

IRIG-B Time Decoder (Input)

- Onboard, free-wheeling IRIG-B Time Decoder
- Synchronize with multiple ▶ AIM Modules or any IRIG-B compatible Module

Discrete and Trigger I/O

- 2 Avionic Level Discrete Input Signals (1 Discrete Input can be programmatically switched to Trigger Input)
- 2 Avionic Level, open Collector Discrete Output Signals
- 1 TTL Trigger Output

Driver Software Support

- Common Application Programming Interface ▶ (API)
- Drivers for Windows, Linux and further Operating Systems (contact Factory)

Configuration Options

- Embedded (no Error Injection, no Physical Bus Replay and no Channel Loop/Pollution Mode)
- Test and Simulation (additionally with Error Injection, Physical Bus Replay and Channel Loop/Pollution Mode))
- Various number of channels available:
  > 4 Channels: 4Tx/Rx
  > 8 Channels: 4Tx/Rx + 4Rx
  > 12 Channels: 4Tx/Rx + 8 Rx
- Tx Inhibit (all Channels fixed to Rx)
- Conformal Coating

Technical Data

Express Interface
Single Lane Full PCI Express (Gen2)
Mini Card, compatible with the
PCI Express Base Specification rev. 2.1

Memory
2MByte, synchronous SRAM

Processor Core
Multiple FPGA based embedded Processors
for ARINC429 Protocol Handling and Time
Synchronization

Encoder/Decoder
Up to 4 Encoders/Decoders with full
Error Injection and Detection plus up
to 8 Decoders with full Error Detection

Time Tagging
46-bit absolute IRIG-B formatted

Discrete I/O
2 Avionic Discrete Inputs;
2 Avionic Discrete Outputs (Output 3.3V/
Open Collector)

Trigger I/O
1 Trigger Output Line, TTL compatible

Physical Bus Interface
4 ARINC429 Transmitters and 4 ARINC429
Line Receivers, which are user programma-
ble Rx or Tx plus up to 8 ARINC429 Receivers

Connector
Male 31-pin Screw Lock I/O Connector
(mating Female Connector Information
on Request)

Dimensions
PCI Express Mini Card (F2 Standard)
50.95mm x 30mm
Note: max. Standard Height (top) is
exceeded by the Front Connector

Supply Voltage
Standard PCI Express Mini Card Supply
+3.3V, +1.5V

Power Consumption
@3.3V aux: TBD (approx. 3.6W);
@1.5V max: TBD (approx. 0.56W)
With normal Busload on all Channels

Operating Temperature Range
-40°C to +85°C

Storage Temperature Range
-40ºC to +85ºC

Humidity
5 up to 95% (non-condensing)

Ordering Information

AMEE429-x
Rugged Embedded 4/8/12 Channel
PCI Express Mini Card

Common Features
Up to 12 ARINC429 Channels (4 programma-
ble TX/Rx Channels and 0/4/8 Rx Channels),
IRIG-B Time Decoder, 2 Avionic Discrete
Inputs, 2 Avionic Discrete Outputs,
1 TTL Trigger Output,
2MB Global RAM, Extended Temperature
Range
Including Driver Software for Windows,
Linux and further Operating Systems
(contact factory)
Available as:
– AMEE429-4 (4Tx/Rx Channels)
– AMEE429-8 (4 Tx/Rx Channels +
  4 Rx Channels)
– AMEE429-12 (4 Tx/Rx Channels +
  8 Rx Channels)

Options

Test and Simulation
Including Error Injection, Physical Bus
Replay Functionality and Channel
Loop/Pollution Mode,
add suffix **-T** to Part Number

Tx Inhibit
All Channels fixed to Rx,
add suffix **-I** to Part Number

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

▶ **AIM Office Contacts:**

AIM GmbH
Sasbacher Str. 2
D-79111 Freiburg / Germany
Phone +49 (0)761 4 52 29-0
Fax   +49 (0)761 4 52 29-33
sales@aim-online.com

AIM GmbH – Munich Sales Office
Terofalstr. 23a
D-80689 München / Germany
Phone +49 (0)89 70 92 92-92
Fax   +49 (0)89 70 92 92-94
salesgermany@aim-online.com

AIM UK Office
Cressex Enterprise Centre, Lincoln Rd.
High Wycombe, Bucks. HP12 3RB / UK
Phone +44 (0)1494-446844
Fax   +44 (0)1494-449324
salesuk@aim-online.com

AIM USA LLC
Seven Neshaminy Interplex
Suite 211 Trevose, PA 19053
Phone 267-982-2600
Fax   215-645-1580
sales@aim-online.us