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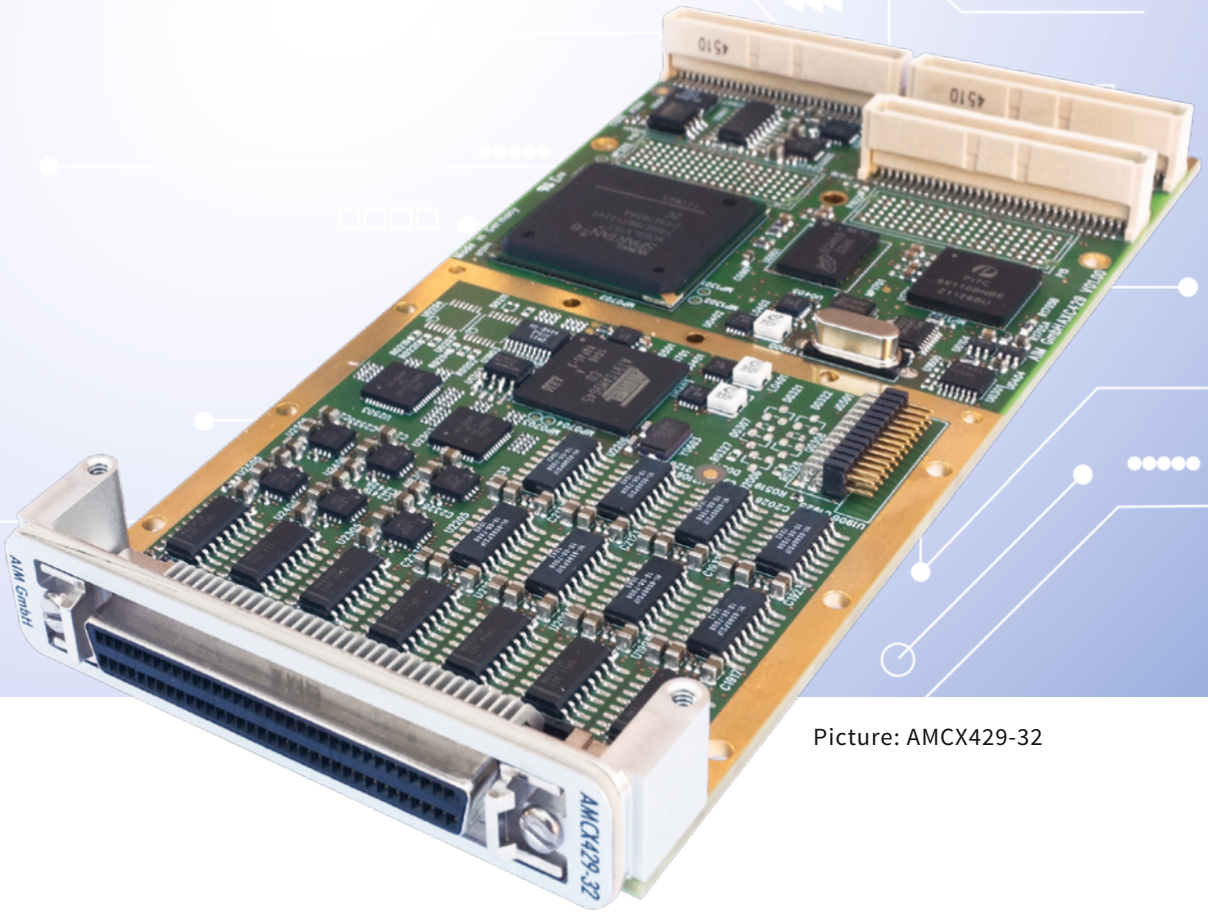
# AMCX429-x

## 8, 16 or 32 Channel ARINC429 Test & Simulation Modules for PMC

**Data Sheet**




Picture: AMCX429-32

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# AMCX29-x

## 8, 16 or 32 Channel ARINC429 Test & Simulation Modules for PMC

### General Features

The ► **AMCX429-x** card is a member of AIM's next generation of PMC modules targeted to embedded ► **ARINC429** applications.

The AMCX429-x offers full function test, simulation, monitoring and databus analyzer capabilities and is available in configurations with 8, 16 or 32 independent ARINC429 channels, fully software programmable for Receive (Rx) or Transmit (Tx) mode and configurable for high/low bit rates.
8 channels on the AMCX429-8, 16 channels on the AMCX429-16 module and 32 channels on the AMCX429-32.

The AMCX429-8/16/32 also supports up to 8 discrete inputs and 8 discrete outputs which can be monitored or generated.

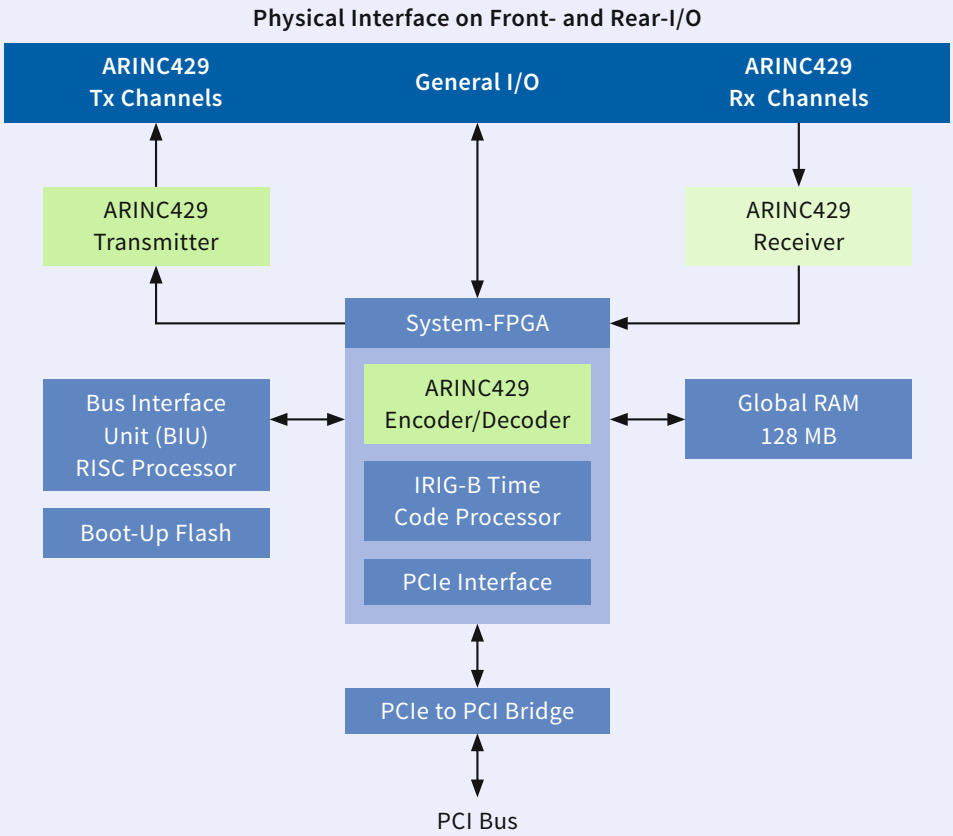
The AMCX429-x is designed to be installed on either a host carrier board to adapt to buses like standard PCI/PCIe, VME/VPX, cPCI/cPCIe or on an embedded host computer.

The AMCX429-x modules use a high performance RISC processor with 128MB of Global RAM whereby all channels can operate concurrently at ARINC429 high or low bit rates with the intelligence to process data in real time.

An onboard IRIG-B time encoder/decoder provides a sinusoidal output and free-wheeling mode for time tag synchronization on the system level when using one or more AMCX429-x or other AIM databus and network interfaces.

Full function driver software is delivered with the AMCX429-x cards in comprehensive Board Software Packages (BSPs) for different Operating Systems.

The optional ► **PBA.pro™** Databus test and analysis tool (for Windows and Linux) can also be purchased for use with AMCX429-x cards.




AMCX429-x
Block Diagram

## Transmit Channel Operation

AMCX429-x modules provide real time simulation of up to 32 ARINC429 Transmitter channels concurrently controlled by the on-board 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.

Key Features of the Bus Controller Mode include:

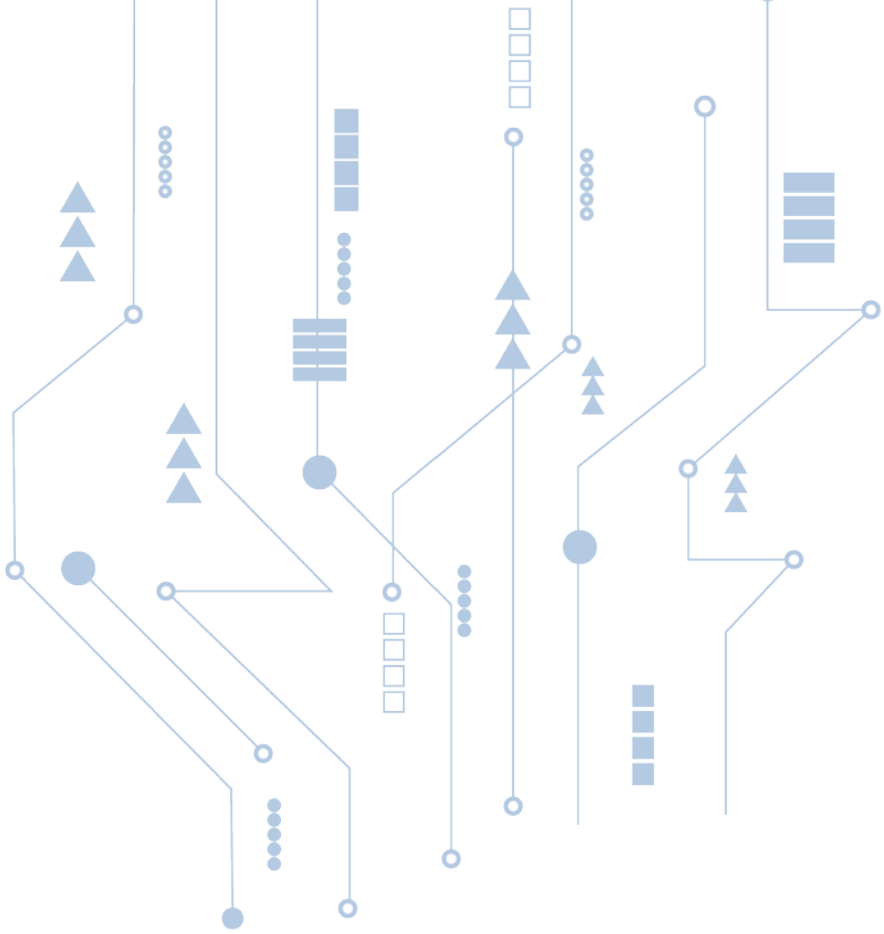
- Cyclic/Acyclic Label Transmission and Channel Loop Mode
- Error Injection for each Label Transfer: Short Gap, Parity, Bit Count, Coding
- Programmable Gap between Labels: 0 to 255-bit
- Simulate Zero-Jitter Scenarios using Virtual Label Transfers
- Multi-Buffering with Real Time Update supported per 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)

## Receive Channel Operation

AMCX429-x modules provide real time monitoring of up to 32 ARINC429 Receiver channels concurrently controlled by an onboard RISC Processor.

Key Features of the Remote Terminal Simulation Mode include:

- 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
- High Accuracy FPGA based Label Time Stamping



## Discretes

AMCX429-x modules provide up to 8 General Purpose Discrete I/O's (GPIO's). GPIO's can be used as simple digital inputs/outputs or to sample a digital output of an external system or to generate strobes to an external system.

## 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 AMCX429-x cards can electrically reconstruct and replay previously recorded ARINC429 channels physically to the ARINC429 bus with excellent timing accuracy. Record files can be selected for bus replay.

The additional capability to disable any or all ARINC429 labels from the replay enables smart systems integration and test to be performed.

## Physical Bus Interface

AMCX429-x cards have integrated ARINC429 line transmitters/receivers and selectable transmission rate for each channel independently. All ARINC429 channels are available at the front plate output connector or at the Rear-I/O connector.

## IRIG-B Time Encoder/Decoder

AMCX429-x cards include an onboard IRIG-B time encoder/decoder with sinusoidal output and free-wheeling mode for time tag synchronization.
This allows synchronization of multiple AMCX429-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 AMCX429-x card as the reference for the correlation of data across multiple ARINC429 channels.

## Driver Software

The Driver Software is supplied with the AMCX429-x module. A full function Application Programming Interface (API) is provided compatible with Windows and Linux. Host applications can be written in C and C++ or C#. A LabView/VI application interface is provided.

# Technical Data

**System Interface**
32-bit/66MHz capable PCIbus (Rev. 2.2) compliant
**Processors**
1x 400MHz RISC Processor
**Memory**
128MB Global RAM (DDR-RAM),
2x8Mbit serial flash memory for BIU,
64Mbit serial flashmemory for LCA
**Encoder/Decoder**
Up to 32 encoders/decoders with full error injection and detection
**Time Tagging**
Sinusoidal 46-bit absolute IRIG-B time stamping with 1s resolution
**Trigger/General Purpose Discretes**
AMCX429-8/16:
4 Trigger Inputs and 4 Trigger Outputs,
8 General Purpose Discrete Inputs,
8 General Purpose Discrete Outputs
(Discretes with avionics level for In and Out).
All I/O's available on Front- and Rear-I/O connector
AMCX429-32:
1 Trigger Output available on front connector
**Physical Bus Interface**
Up to 32 ARINC429 transmitters and 32 ARINC429 line receivers for a total of 32channels. All channels are user programmable RX or TX
**Connectors**
68-pin, Mini D-Sub; signals are also available at Rear-I/O connector;
3x standard PMC connectors;
P11 and P12 for 32-bit PCI bus;
P14 for Rear I/O

# Ordering Information

**AMCX429-8**
8 Channel ARINC429 PMC Module: Software Programmable Receiver/ Transmitter Channels;
IRIG-B Time Encoder/Decoder,
128MB Global RAM, 4 Trigger Inputs and 4 Trigger Outputs, 8 General Purpose Discrete In- and Outputs

**AMCX429-16**
16 Channel ARINC429 PMC Module: Software Programmable Receiver/ Transmitter Channels;
IRIG-B Time Encoder/Decoder,
128MB Global RAM, 4Trigger Inputs and 4 Trigger Outputs, 8 General Purpose Discrete In- and Outputs

**AMCX429-32**
32 Channel ARINC429 PMC Module: Software Programmable Receiver/ Transmitter Channels;
IRIG-B Time Encoder/Decoder,
128MB Global RAM, 1 Trigger Output on Rear-I/O

**ACC-1**
CompactPCI (3U) Carrier Module with one PMC slot
**ACC-2**
CompactPCI (6U) Carrier Module with two PMC slots
**AVC-2**
VME (6U) Carrier Module with two PMC slots
**ACP-1**
PCI Carrier Module with one PMC slot

For PCI/PCI-Express Carrier Modules with one PMC slot please contact the factory

**Dimensions**
149mm x 74mm standard PMC format
**Power Consumption**
3 to 5.5W idle
3.3 to 8.8W operating
Depending on number of channels and individual load

**Operating Temperature Range**
Standard: 0°C to +70°C ambient
Extended: -40°C to +85°C
Conduction cooling available
**Storage Temperature**
-40°C to +85°C
**Humidity**
0 to 95% non-condensing

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AMCX429-x_11Jan2024

data sheet

# AVC-2/ AVC-2-CC

## VME Generic Carrier Card for PMC (PCIbus Mezzanine Card) Modules

product guide

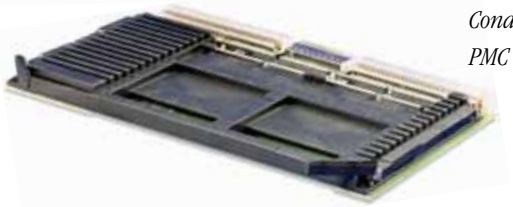
## General Features

The AVC-2/ AVC-2-CC is a single slot, double height (6U) VME64x, extended VMEbus module with two separate PMC slots. The Carrier Card is available as Air Cooled AVC-2 or Conduction Cooled AVC-2-CC variant. The functionality of both variants is nearly equal, except that the Conduction Cooled Carrier module is mounted with Conduction Cooled Frame compliant to CCPMC (ANSI/VISA 20-2001, R2005) and CCMC (IEEE Std 1101.2-1992, 2001) specification. The AVC-2-CC does not implement a Front Panel Interface rather than the Rear-I/O Interface functionality. The AVC-2/ AVC-2-CC uses an industry standard device providing the bridge between the VMEbus and PCIbus.
The AVC-2 fulfils the requirements of the VME64x extension plus the Interface for Rear-I/O. Each PMC-slot is in conformance with the Draft Standard Physical and Environmental Layers for PCI Mezzanine Cards (P1386.1/Draft 2.4).

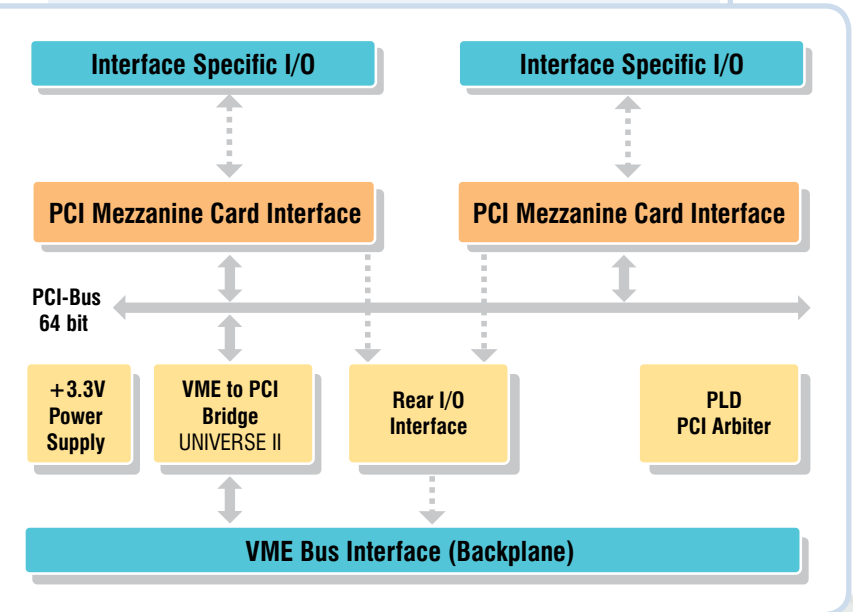
*Key features of the AVC-2/ AVC-2-CC module:*

- *Easily configured with any combination of PMC modules*
- *Combine different interface types and functions on one VME card*
- *User configurable base address*
- *Front panel LED's for VMEbus/ PCIbus activity/ failure display (only provided @ air cooled variant)*
- *Fully compliant to VME64x - extended VMEbus*
- *Hosts PMC modules designed to PMC standard P1386.1/Draft 2.4*
- *Driver Software Library for VxWorks and LynxOS available*

*AVC-2 carrier for Air Cooled PMC modules*



*AVC-2-CC carrier for Conduction Cooled PMC modules*




### PMC Module Interface

*The AVC-2/ AVC-2-CC is designed to plug all standard Air Cooled or Conduction Cooled PMC modules with a maximum PCIbus width of 64-bit operating at 33MHz. The AVC-2/ AVC-2-CC carrier board supports the +5.0V PCIbus signaling, hence only +5.0V tolerant devices may be used. The use of a voltage keying pin protects against false PMC assembly.*

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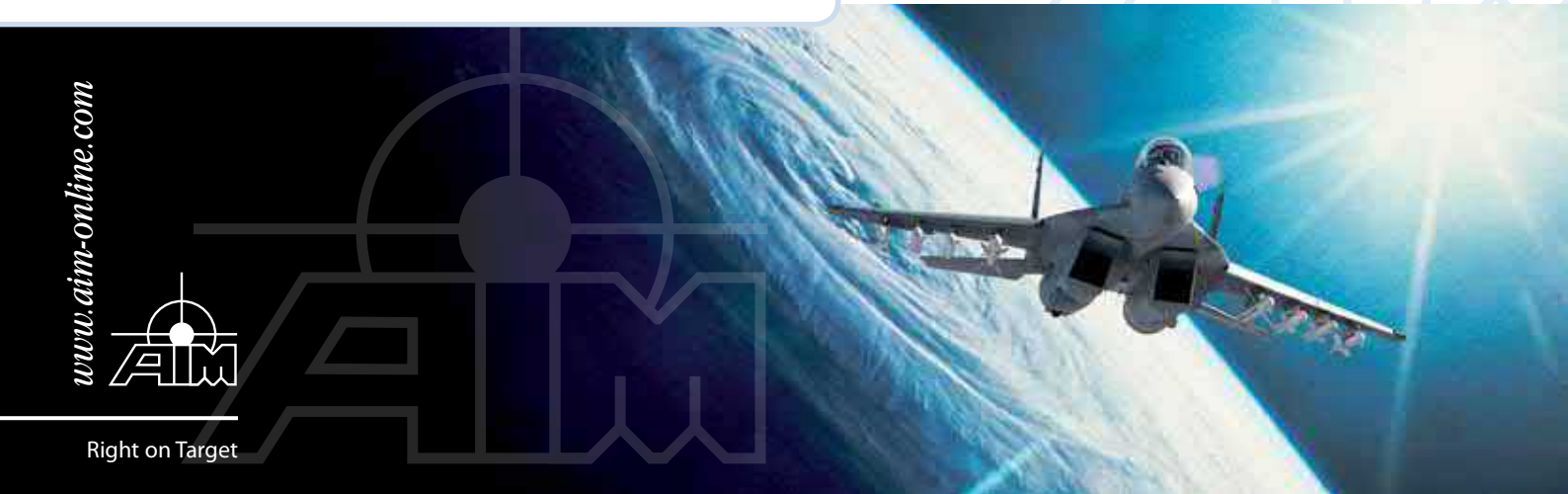

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# AVC-2/ AVC-2-CC

*VME Generic Carrier Card for PMC (PCIbus Mezzanine Card) modules*

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## Technical Data

**VME to PCI Bridge:** 64-bit VME interface; fully compliant with PCI Standard (Revision 2.1); VME master and slave capability; PCI master and slave capability; Integral FIFOs buffer multiple transactions in both directions; MBLT, BLT, ADOH, RMW and LOCK support; Programmable DMA controller with linked list support; Nine user programmable slave images on both busses; Four mailboxes and location monitor for message oriented systems; Eight semaphores; Full VMEbus system controller functionality; PCIbus burst size of 128bytes; Supports coupled, posted and prefetched cycles on both busses; Provides clock speed of 33MHz with no wait states on PCIbus; Provides flexible mapping of hardware and software interrupts on both busses; Implemented using Industry leading VME to PCI Bridge device (TUNDRA UNIVERSE II)

**PCIbus:**
Provides the connection between the PMC Interfaces to the VMEbus Interface
Fully compliant to PCIbus Specification Rev 2.1
PCIbus width of 64-bit
PCIbus operation of 33MHz
Priority based PCIbus Arbiter

**PMC Slot 1+2:**
- Each PMC slot provides 64-bit, 33MHz PCIbus operation
- At AVC-2 Carrier modules, each PMC slot provides the capability for Front- / Rear-I/O (VME64x Mapping) interfaces
- At AVC-2-CC Carrier modules, each PMC slot provides only Rear-I/O (VME64x Mapping) interface

**Front Panel (only AVC-2 variant):**
The Front Panel provides two breakouts for using the standard PMC- Front Panel bezel

**Front Panel LEDs (only AVC-2 variant):**
A System Indicator Array is located at the top end of the Front Panel for indicating assertion of the SYSFAIL line, the VMEbus activity, the PCIbus activity and PCIbus errors

**Dimensions:** Double Height (6U) Board (233mm x 20mm x 160mm), Single-Width, 0.80 pitch

**Power Supply:** +5VDC, 2W typical without any PMC module installed

**Weight:**
- AVC-2 (Air Cooled): appr. 290g (without any PMC module installed)
- AVC-2-CC (Conduction Cooled): appr. 640g (without any PMC module installed)

**Temperature (all variants):** 0 to +45°C Standard Operating
-15 to +60°C Extended Temperature (AVC-2)
-40 to +85°C Extended Temperature (AVC-2-CC)
-40 to +85°C Storage

**Humidity:** 0 to 95% (non condensing)
Conformal Coating available on request

## Ordering Information

**AVC-2** VME bus Carrier (6U)
Air Cooled Carrier Module with two PMC slots
Note: Connector P0 will only be assembled upon request, please specify on the order.
Note: VME64x compliant IEEE 1001 Ejector Handles are assembled by default. Original VME ScanBe Handles are available upon request, please specify on the order.

**AVC-2-CC** VME bus Carrier (6U)
Conduction Cooled Carrier Module with two PMC slots
Note: Connector P0 will be assembled by default (Rear-I/O, PMC-Site 1)