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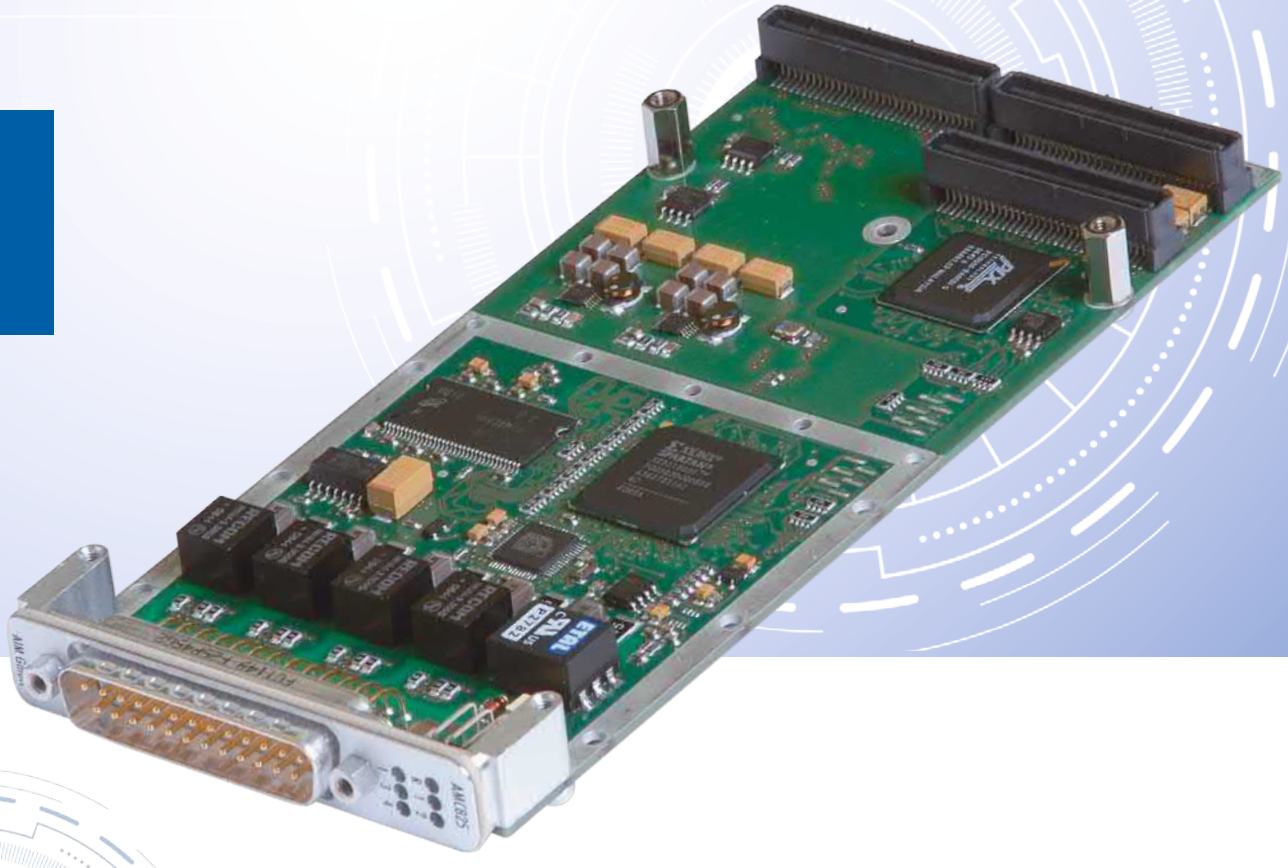
AMC825-4

PMC Module with 4 CAN bus Nodes ARINC825 compliant for Testing & Simulation of Avionic CAN bus Systems

Data Sheet



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AMC825-4

PMC Module with 4 CAN bus Nodes ARINC825 compliant for Testing & Simulation of Avionic CAN bus Systems

General Features

The ▸ **AMC825-4** PCI Mezzanine Card (PMC) can work either with full functionality as an active CAN node for testing and simulating or in listening-only mode for monitoring and recording purposes of Avionic ▸ **CAN bus (ARINC825)** applications on up to 4 electrically isolated CAN bus nodes concurrently.

All nodes are in conformance with the ISO11898-1/-2 standard. They are accessible by software separately and can be used as 4 independent CAN bus nodes.

An onboard IRIG-B time decoder allows users to accurately synchronize single or multiple modules to a common time source. All supported signals are available through front-I/O and rear-I/O interface.

The AMC825-4 module consists of FPGA based CAN interface controllers as well as a FPGA based 32-bit microcontroller core and a separate processor for IRIG-B synchronization with high resolution time stamping.

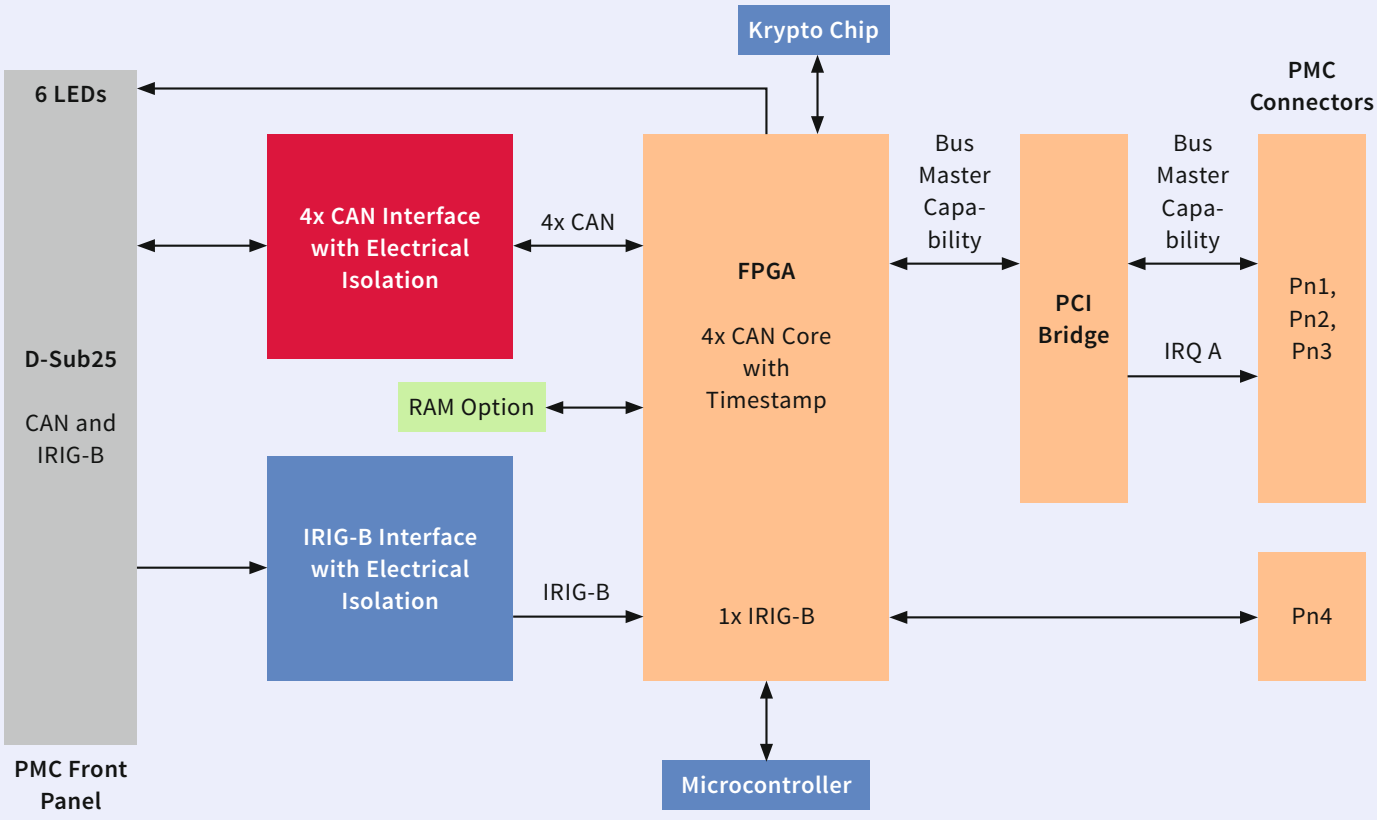
All nodes are operating concurrently at CAN bus high speed bit rate of up to 1Mbit/s with the intelligence to process scheduling of CAN frames in real time on-board to significantly off-load the host processor.

Supported options for all versions of AMC825 cards include:

- Rear-I/O
- Conduction Cooling/Conformal Coating for Embedded Applications
- Extended Temperature Range (on request)

The AMC825-4 module operates also with the PBA.pro™ Databus Test and Analysis Tool for Windows and Linux.

AMC825-4 Block Diagram



CAN bus Channel Operation

The AMC825-4 module provides real time simulation of up to 4 CAN bus nodes concurrently via FPGA based CAN control engine with an additional 32-bit micro-controller. Each CAN bus operation speed is programmable in the range from 10kbit/s up to 1Mbit/s in accordance with the CAN 2.0B specification. Automatic baud rate detection is available.

The AMC825-4 supports the 11-bit and 29-bit message ID operation in ID oriented (Object) mode. A listening-only mode is available for chronological monitoring (FIFO mode). All basic CAN node functions are implemented in accordance with ISO11898, CAN 2.0 A/B.

Traffic Generation

AMC825-4 transmitter operation allows users to fully program all relevant fields of the CAN bus message protocol including an 11-bit or 29-bit message identifier, RTR bit, data length code and up to 8 user defined data bytes. Synchronization of transmissions across multiple ports is supported.

Cyclic/Acyclic ID Transmission Mode

- Programmable Inter Message Timing available
- Single Shot or Automatic Retry Function if Arbitration lost
- Arbitration Lost Notification
- CAN bus compliant Error Handling
- Message and Error Counters

Physical Bus Interface

The AMC825-4 cards have integrated CAN bus transceivers which are compliant with the ISO11898-2 high speed specification. The CAN bus interfaces are electrically isolated by default. All 4 ARINC825 nodes are available at the front-I/O provided at one 25-way D-Sub (male) connector and at the rear-I/O connector interface.

The following signals are provided on both interfaces:

- 4 ARINC825 (CAN bus) Nodes (on Rear-I/O TTL Level only)
- IRIG-B Input analog and RS-422 compatible

IRIG-B Time Decoder

AMC825-4 cards have an onboard IRIG-B time decoder with 1µs resolution and an automatic free-wheeling detection.
This allows synchronization of multiple AMC825-4 cards to one common IRIG-B time source for the correlation of data across multiple ARINC825 CAN bus nodes.

Operation Modes

The AMC825-4 module provides different operation modes for all 4 CAN bus nodes. The board basically supports 2 different operational modes, the object and the FIFO mode. In the object mode each configured message ID has a separate buffer where message data and status information are stored in case of receiving IDs.
In the object mode, IDs can also be configured to be transmitted cyclically (scheduled transmission).
In the FIFO mode all or selected IDs are time stamped and stored in a FIFO in case of receiving IDs. The FIFO mode can be also used for transmitting IDs by passing the IDs to be sent to a transmit FIFO.
In case of scheduled transmit operation the FIFO mode can be used in parallel e.g. to insert an acyclic transmission of IDs.

Independent from the selected modes above the board can be configured to operate in a listening-only mode which allows a passive monitoring of a CAN bus without disturbance of the existing traffic.

Furthermore automatic handling of CAN RTR-frame is supported via an auto-answer mode.

- Object and FIFO Transmit/Receive Modes supported
- CAN bus Listening-Only Mode for passive Monitoring
- Data Buffering with Real Time Data Updates
- Scheduled Transmission of IDs
- Acyclic Transmission of IDs
- ID oriented dependent Filtering
- Time Stamping of received Frames with IRIG-B Time Code 1µs Resolution
- Auto-Answer Mode for automatic RTR Frame Handling
- Physical Error Detection, Bit Error, CRC-/Format Error, Bit Stuffing Error
- Event Generation

Driver Software

The AMC825-4 modules are supplied with an Application Programming Interface (API) and Driver Software compatible with Windows, Linux and VxWorks.

Application Software

An ARINC825 resource component is available for AIM's ▶ **PBA.pro™** Databus Test and Analysis Tool including Tx and Rx simulation capabilities, a chronological Bus Monitor and support for decoding of payload data within CAN messages.
This allows to implement a powerful CAN bus/ARINC825 analyzer or a complete test system in conjunction with other AIM avionics databus interfaces and PBA.pro™ supported 3rd party hardware.

Technical Data

System Interface
32-bit; 33/66MHz +3,3V (+5V tolerant)
PCIbus (Rev. 2.2) compliant
Processors
FPGA based 32-bit Microcontroller Core and 8051 Processor for IRIG-B handling
Memory
64MB DRAM (optional)
Encoder/Decoder
FPGA based CAN bus Controller Core
Time Tagging
46-bit absolute IRIG-B Time Code, 1µs resolution; free-wheeling
Physical Bus Interface
Up to 4x ISO11898-2 compliant high speed transceivers. Each CAN bus node is electrically isolated.
All signals are available at Front-I/O and at Rear-I/O Interface
Front-I/O Interface Connector
1x 25-way D-Sub (male) connector, providing 4 independent electrically isolated CAN bus nodes, and IRIG-B Time Code Input (analog IRIG-B and RS422)

Ordering Information

AMC825-4
4 CAN bus nodes ARINC825 on PCI Mezzanine Card (PMC module), Software programmable CAN bus nodes, IRIG-B Time Stamping

ACP825-4
ARINC825 to PCI Module comprising an AMC825-4 installed on an ACP-1, PCI Carrier Card

ACC825-3U-4
ARINC825 to CPCI Module (3U) comprising an AMC825-4 installed on an ACC-1, CPCI Carrier Card (3U)

ACC825-6U-X **X= (4, 8)**
ARINC825 to CPCI Module (6U) comprising one or two AMC825-4 cards installed on the ACC-2, CPCI Carrier Card (6U)

AVC825- X **X= (4, 8)**
ARINC825 to VME Module comprising one or two AMC825-4 cards installed on the AVC-2, VME Carrier Card

Rear-I/O Interface Connector
1x Standard PMC Connector Position Pn4. Includes all signals which are available through Front-I/O Interface
Note: CAN bus is available at TTL level only
PMC/PCI Interface Connector
Pn1, Pn2 for PCI Bus Interface (Rev. 2.2) compliant
32-bit, 33/66MHz, +3,3V (+5V tolerant)

Dimensions
149mm x 74mm, Standard PMC Format
Operating Temperature Range
Standard: 0°C to +50°C ambient
Extended: on request
Storage Temperature
-40°C to +85°C

Conduction cooling available

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data sheet

AVC-2/ AVC-2-CC

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

product guide

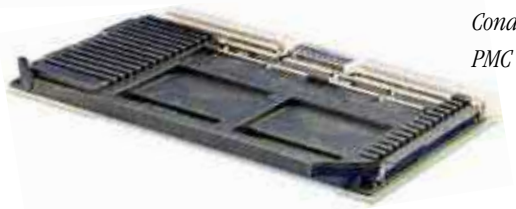
General Features

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).

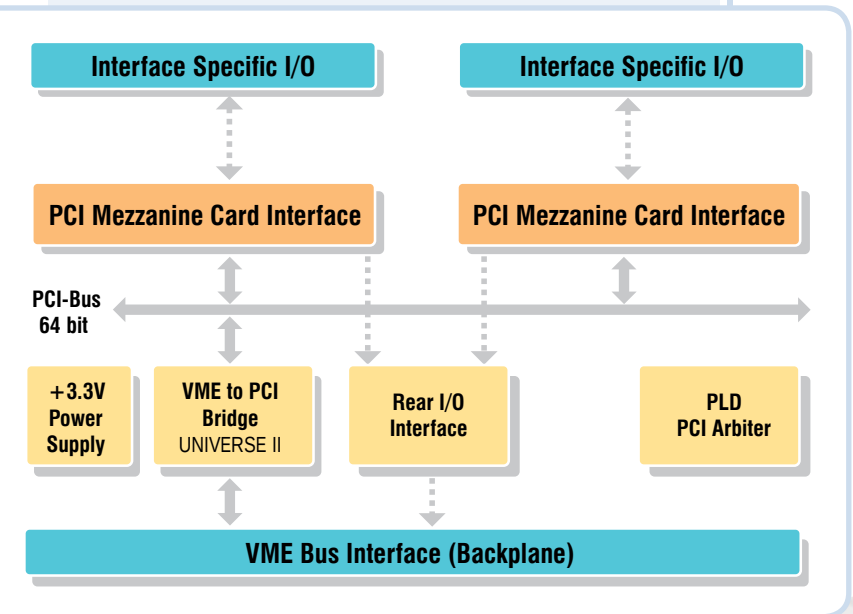
Key features of the AVC-2/ AVC-2-CC module:

- *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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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)