# AX-429-16/32/64

3U AND 6U CPCI ARINC429 AVIONICS INTERFACES

- Sixteen, thirty-two, or sixty-four ARINC429 channels per card
- Programmable High/Low Speed Operation
- All Tx/Rx Channels operate concurrently
- Full Error Injection & Detection
- Cyclic / Acyclic Label Transmission
- On-board Application Support Processor
- Label Selective Trigger for Capture/ Filtering
- Sort by SDI field
- IRIG-B Time Generator/ Decoder - 'Sinusoidal Output' & 'Free Wheeling Mode'
- Real Time Record Replay & Post Analysis of Multiple Channels
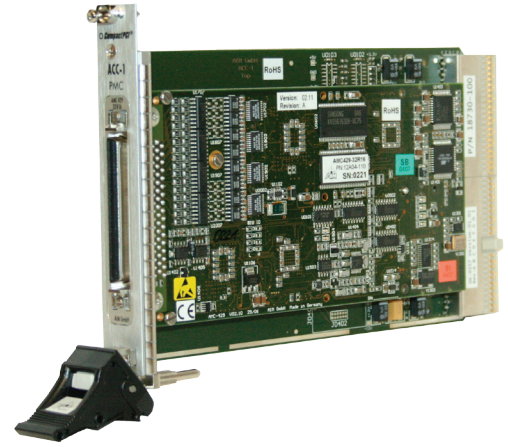
DESCRIPTION

The AX-429 module is a rugged, reliable, full featured, CompactPCI module designed to provide a stand-alone, ARINC429 interface for avionics applications. Up to 32 ARINC429 channels are supported on a 3U CompactPCI module., The AX-429 offers full functional test, simulation, monitoring and databus analyzer functions for ARINC429 test and simulation applications. Up to sixty four ARINC429 channels are supported with the 6U module configuration.

FEATURES

The AX-429 modules use on-board RISC processors, allowing each channel to operate and process data in real time at ARINC-429 high or low bit rates. One PMC module supports up to 32 channels, with 16 channels software programmable for Receive (Rx) or Transmit (Tx) mode and 16 channels statically configured as transmit or receive. Two PMC modules, installed on a 6U carrier card support up to 64 ARINC429 channels.

An on-board IRIG-B time decoder and generator allows users to accurately synchronize single or multiple AX-429 modules to a common time source. And the use of an on-board Application Support Processor (ASP) supports the execution of driver software, allowing user-specific test routines to be processed on-board, off-loading the test system's host processor.

The AX-429 modules are equipped with a single trigger output that can be used for synchronization with external measurement equipment.

Transmit Channel Operation

The AX-429 provides real-time simulation of up to 64 ARINC429 Transmitter Channels concurrently. Bit transmission rates of 12.5 kbits/sec and 100 kbits/sec as well as associated rise and fall times in accordance with the ARINC429 electrical specification are programmable on a per channel basis. Other features supported by the AX-429 include:
- Cyclic / Acyclic Label Transmission Mode and support for file transfer protocols
- Error injection for each Label Transfer: short gap, parity, bit count, coding
- Programmable gaps between Labels
- Transmit operation controlled by instruction lists
- Comprehensive instruction set: JUMP, CALL, COND-JUMP, TRANSFER

Receiver Channel Operation

The AX-429 provides real-time monitoring of up to 64 ARINC429 Receiver Channels concurrently. Receive channel features include:
- Multi-buffering with real-time data buffer updates
- Triggering and filtering:
- Upper and lower limit check
- Trigger on specific or any error
- Label content and sequential dependent trigger
- Label selective and label data contents dependent filter
- Label selective and label data contents dependent interrupts

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Discrete I/O

The AX-429 provides 8 digital inputs and 8 digital outputs. These signals are software controllable and are available on the -16 version of the AX-429 module. The outputs are open collector and support voltages to 50 volts. The inputs are compatible with input voltages to 30 volts.

Trigger Output

For external notification of ARINC429 bus events, a TTL trigger output signal is supported. Output signals can be generated on complex conditions of received labels or on the occurrence of transmit simulation events.

IRIG-B Time Code Decoder

An onboard IRIG-B time code decoder and generator provides synchronization of ARINC429 channels using single or multiple AX-429 modules. Multiple AX-429 modules can be synchronized to one common IRIG-B time code decoder and generator allowing synchronized time tagging of multiple ARINC429 channels. AX-429 cards can be synchronized to one common external IRIG-B source or to the free wheeling onboard Time Code Generator.

Physical Bus Replay

The AX-429 module is able to electrically reconstruct previously recorded ARINC429 data traffic physically to the bus with excellent timing accuracy. Recorded data files can also be selected for physical bus replay - facilitating systems integration and test with the ability to disable any or all ARINC429 labels from the recorded file.

Physical Bus Interface

AX-429 cards have integrated ARINC429 line transmitter/receivers which are programmable by software for Receive (Rx) or Transmit (Tx) mode with selectable transmission rate for each channel. All ARINC429 channels and controls are available at module's front panel output connector.

SOFTWARE

The AX-429 module is supplied with a Board Support Package (BSP) for Windows 2000/XP/ME. An ATEasy driver, sample code, high level C and C++ interface libraries, and documentation is provided. To support an application program interface to the AX-429, the module is supplied with AIM-USA's ARINC429 Object Wrapper Layer (OWL) C and C++ interface library. The ARINC429 OWL provides an intuitive and easy to use object oriented interface to the module.

APPLICATIONS

•Automatic Test Equipment (ATE)
•LRU and SRU test
•System level test

AVIONICS

Geotest
Marvin Test Systems, Inc.

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SPECIFICATIONS

TIMING

SYSTEM INTERFACE	64-Bit, 33 Mhz PCIbus (Rev. 2.2) compliant
PROCESSORS	2 x 600 MHz RISC Processors
MEMORY	4 MByte of global RAM, 64 MByte of ASP RAM
ENCODER/DECODER	Up to 32 Encoders/Decoders with Error Injection and Detection per PMC module
ARINC429 INTERFACE	Up to 32 ARINC429 Transmitters and 32 ARINC429 Receivers per PMC module. Note that the 16 lower channels are user programmable as Tx or Rx with the upper 16 channels fixed as Tx or Rx channels. 64 ARINC429 channels are supported for a 6U module configuration (two PMC modules).
DATA RATE	Programmable: High and low bit rate (100 Kb/s & 12.5 Kb/s)
PROGRAMMABLE LABEL GAP RANGE	0 to 255 ARINC429 bits
ERROR INJECTION	Gap error (-1 bit),Bit count error (+/- 1 bit), Coding error (bit position 12), Parity error
RECEIVE BIT RATE RANGE	+/- 10%
ERROR DETECTION	Gap error, bit count error, coding error, parity error
MEASUREMENT GAP RANGE BETWEEN TWO LABELS	0.0 to 58.75 bits, .25 bit resolution
TRIGGER IN	TTL input, rising edge sensitive, pulse width >100 ns
TRIGGER OUT	TTL output with 82 ohm series resistor, 150 ns pulse
DISCREET I/O	8 inputs, 0 to 35 volts, VIH >= 3 volts, VIL <= 0.8 volts. 8 outputs, 0 to 50 volts, open collector, Io = 100 ma max. Note: I/O only available on -16 version.

IRIG – B TIME TAG

IRIG-B TIME TAG DECODER	46 bit (1 year) absolute IRIG-B Time range with 1 usec resolution
DECODER CHARACTERISITICS	AM sinewave or square wave. Modulation ratio: 3:1 to 6:1. Input amplitude: 0.5 Vp-p to 5 Vp-p. Input impedance: > 10 K ohms, AC coupled. Time jitter: +/- 1.5 us. Lock time: 1 to 5 seconds. Long term stability: < 1 ppm, < 10 minutes to high precision
ENCODER CHARACTERISTICS	Absolute accuracy: +/ 50 ppm. Waveform: AM sinusoid. Output amplitude: 0.5 Vp-p to 3Vp-p, 2 K ohm load. Carrier frequency: 1 KHz

GENERAL

INTERFACE CONNECTOR	Front panel 68-pin SCSI connector
SIZE	3U and 6U, single slot cPCI modules
POWER CONSUMPTION	8.7 watts (16 channels, 400 ohm load) 14 watts (32 channels, 16 transmit, 400 ohm load)
OPERATING TEMP. RANGE	Standard: 0° C to +45° C. Extended : -15° C to +65° C
STORAGE TEMP	-40° to +85° C
HUMIDITY	0 to 95% non-condensing
WEIGHT	150 g, approx.

ORDERING INFORMATION

AX-429-3U-16 AX-429-3U-32R16 AX-429-3U-32T16	3U 16, or 32 channel ARINC429 card. Software Programmable Receiver/Transmitter Channels. -16: 16 programmable channels -32R16: 16 programmable channels, 16 Rx channels -32T16: 16 programmable channels, 16 Tx channels
AX-429-6U-32 AX-429-6U -64T32 AX-429-6U – 64R32	6U, 64 channel ARINC429 card. Software Programmable Receiver/Transmitter Channels. -32: 32 programmable channels -64R32: 32 programmable channels, 32 Tx channels -64T32: 32 programmable channels, 32 Rx channels. Note: Contact factory for other channel configurations.
-XT	Add for extended temperature operation

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