PMC429

Advanced Four, Eight, 16, or 32 Channel ARINC 429 Test & Simulation Module for PMC

Avionics Interface Technologies

GENERAL OVERVIEW

AIT's PMC429-4/8/16/32 is a rugged, reliable, full-featured PCI Mezzanine (PMC) module designed to provide a stand-alone, flight-ready ARINC 429 interface for avionics applications. Up to 32 channels are provided on the module. Each channel can be individually configured to Transmit (Tx) or Receive (Rx) and to operate at the high or low bit rates defined by ARINC 429. The PMC429 offers test, simulation, monitoring, and databus analyzer functions.

The PMC429 module utilizes a simple and realiable FPGA-based hardware architecture with a flexible platform that provides the highest data throughput performance in the industry and that can be easily adapted to meet a wide range of application needs. The PMC429 cards are configured with 128 MBytes of onboard memory, providing ample capacity to support high volumes of data and complex simulations.

An onboard IRIG-B time code decoder and generator allows users to accurately synchronize single or multiple PMC429 modules to a common time source. AIT's PMC429 module is equiped with a single trigger output that can be used for synchronization with external measurement equipment. Additionally, the card can be mounted on any of AIT's family of advanced carriers to provide PCI, PCI-X, PCIe, PC104+, USB, cPCI/PXI, VME, XMC, and VXI solutions.

Application software can access the PMC429 module via AIT's ARINC 429 C/C++ Object Wrapper Layer (OWL) high-level application interface.

PHYSICAL BUS REPLAY

AIT's PMC429 module is able to replay previously recorded ARINC 429 data traffic physically to the bus with the same timing accuracy. Recorded data files can be selected for physical bus replay to perform systems integration and testing.

KEY FEATURES

- Four, Eight, 16, or 32 Software Programmable Tx/Rx Channels
- Programmable High/Low Speed Operation
- All Tx/Rx Channels can operate concurrently at High Speed rates
- Full Error Injection and Detection
- Rate-oriented Label Transmission
- Label Selective Trigger for Capture/Filtering
- Sort by SDI field
- IRIG-B Time Code Encoder/Decoder for Data Correlation
- Real-Time Recording & Post Analysis of Multiple Channels
- Application Interface supporting C++, C#, and .net Development
- Device Driver Support: Windows, Linux, VxWorks, and other operating systems
- *Flight Simulyzer* ARINC 429 Analyzer Software
- *Flight Director* Windows-based Parameter Processing Software

IRIG-B TIME CODE ENCODER/DECODER

An onboard IRIG-B time code encoder and decoder is available on non-conduction-cooled boards. This allows synchronization of ARINC 429 channels using single or multiple PMC429 modules. The IRIG-B can operate as a stand-alone to provide a common IRIG-B time source. In addition, it has an onboard free-wheeling mode.

TRANSMIT CHANNEL OPERATION

AIT's PMC429 provides real-time simulation of up to 32 ARINC 429 transmitter channels concurrently. Bit transmission rates are selectable for each channel and both the 12.5 kbits/sec and 100 kbits/sec transmit modes are supported. Associated rise and fall times are in accordance with the ARINC 429 electrical specification.

- Rate-oriented, block, and acyclic label transmission modes support all simulation needs
- Error injection for each label transfer: short gap, parity, bit count, coding
- Programmable gap between labels

RECEIVER CHANNEL OPERATION

AIT's PMC429 provides real-time simulation of up to 32 ARINC 429 receiver channels concurrently.

- Label/SDI selective receive, sequential receive modes
- Multi-buffering with real-time data buffer
- Triggering and filtering:
    - Upper and lower limit check
    - Trigger on specific or any error
    - Label contents and sequential-dependent trigger
    - Label selective and label data contents-dependent filter
    - Label selective and label data contents-dependent interrupts

TRIGGER OUTPUT

For external notification of ARINC 429 bus events, a TTL trigger output signal is supported. Output signals can be generated on complex conditions of received labels or on the occurence of transmit simulation events.

BUS COUPLING

AIT's PMC429 card has integrated ARINC 429 line transmitter/receivers programmable by software for Trasmit (Tx) or Receive (Rx) mode and selectable transmission rate for each channel independently. All ARINC 429 channels and controls are available at the front panel output connector and the rear input/output connector.

SOFTWARE SUPPORT

AIT's PMC429 is delivered with AIT's ARINC 429 Software Development Kit (SDK) which includes software driver support for Windows, Linux, and LabView RT. The SDK provides multiple application interfaces including support for C/C++, C#, and VB.NET. High-level LabView Virtual Instruments (VI) are provided with each module in support of intuitive application development. A simple soft front panel Graphical User Interface (GUI) application is also delivered with each module. The ARINC 429 SDK optionally includes AIT's *Flight Simulyzer* analyzer software and *Flight Director* Windows-based parameter processing software.

TECHNICAL DATA

Sub-System

Interface:	64-bit, 33/66MHz PCIbus (Rev 2.2) compliant
Memory:	128 MByte DDR2 SDRAM
Encoder/Decoder:	Up to 32 encoders and decoders with error injection and detection
Time Tagging:	14 digit (400 day) absolute IRIG-B Time with 1 μsec resolution
Bus Coupling:	32 ARINC 429 independent and full software programmable (as Tx or Rx) ARINC 429 channels
Connectors:	Front panel 68-pin VHDCI connector All signals also available at rear I/O connector (P14) 4x Standard PMC connectors
Dimensions:	Standard single wide PMC 143.7 x 74 mm Hole and connector dimensions and locations per: ANSI/VITA 20-2001 (R2005)

Power

Consumption:	5.88 Watts (idle) 10 Watts (active, 32 channels at full rate Tx with 400 Ohm load)
Temp. Range:	-40° C to +85° C ambient designed for extended temperature operations
Storage Temp:	-40° C to +85° C ambient
Humidity:	0 to 95% non-condensing

- Conduction-cooling available, primary and secondary ANSI/VITA-20-2001 (R2005) interfaces, rear I/O access only

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