



# CNIC-A2P

## Dual Port ARINC 664 PMC Interface

### Features

- AFDX/ARINC 664 dual port interface (two independent 10/100 MHz full duplex ports)
- Available as PMC, PCI and cPCI
- 33/66 MHz, 32-bit PCI interface
- Includes AFDX and low-level Software Developer's Kit (SDK) at no additional charge.
- Advanced reception features
  - 20 nsec time-tags
  - IRIG-B synchronization
  - DMA transfer to host
  - Full throughput capability
  - Link level error detection
- Advanced transmission scheduling
  - Highly accurate
  - Flexible scheduling modes
  - DMA transfer from host
  - Full throughput capability
  - Link level error injection
- Advanced software support
  - Flexible packet capture API
  - AFDX / ARINC 664 API
  - XML configuration format
  - Integrated log file format
  - Berkeley packet filter engine
- Four bi-directional avionics level discretes
- Input and output triggers per channel
- Built-in test features

### Architecture

GE Intelligent Platforms' CNIC-A is a high performance interface for monitoring, generating or analyzing full-bandwidth AFDX/ARINC 664 protocol traffic. GE Intelligent Platforms' exclusive pipeline architecture maximizes packet throughput using parallel controllers and efficient DMA transfers, thereby avoiding the bottlenecks of CPU-based interface solutions.

Configurable as either one dual-redundant AFDX/ARINC 664 interface or two independent ports, users have complete access to all frame and header data. Each incoming packet is tagged with a 20 nsec resolution, 64-bit time-tag. Real time traffic generation is highly accurate. An IRIG-B receiver/generator is included for synchronization to external IRIG-B time sources and for synchronizing multiple CNIC-A boards. In addition, I/O triggers, error detection/injection, BIT, and link/protocol level statistics are provided.

### AFDX/ARINC 664 Performance

Multiple CNIC-As in the same PC have been benchmarked at full bandwidth supporting all channels with 2000 VLs (Virtual Links), multiple Ports on each VL and minimum payloads (17 bytes).

### Advanced Software Support

The CNIC-A comes with all the software development tools needed for user application development at no extra charge. The Cpcap, packet capture library, provides a complete set of functions for transmitting and receiving Ethernet frames. Frames from multiple ports can be logged or replayed using the open-source ntar log-file format. CFDX implements the ARINC 664/AFDX protocol stack including End Systems, redundancy management, Virtual Links, and Ports. An advanced XML-based Configuration File format is used to specify End Systems, and an AFDX-aware version of Ethernet is included to provide GUI analysis of logged files.



# CNIC-A2P Dual Port ARINC 664 PMC Interface

## Specifications

### Physical

- PMC mezzanine board
- Available for PCI and 3U or 6U cPCI formats

### Environmental

- Commercial operating temp. range: 0°C to +70°C
- Optional temperature range: -40°C to +85°C
- Relative humidity: 5 to 90% (non-condensing)

### Software

- Windows® XP, 2000, 2003 and Linux® support. Contact factory about availability of support for additional operating environments (including Linux, VxWorks®, and LabVIEW).
- Cpcap API Library
- CFDX API Library
- Etheral GUI for ntar file analysis.

### Connections

- Two IEEE 802.3 compliant Ethernet RJ-45 connectors
- High density 15-pin D-sub connector for In/Out triggers per port and four bi-directional avionics-level discretes

### PCI Signal Compatibility

- Universal (5V or 3.3V)
- 66/33 MHz PCI bus operation
- DMA Tx/Rx data transfers
- CNIC-A2PX (on a PCI carrier) is compatible with PCI-X 1.0 and PCI slots

### Timing Reference

- 64-bit time tag
- IRIG-B receiver (AM or TTL/DC)
- IRIG-B generator (TTL/DC)
- IRIG-B PPS synchronization with time tag
- Software-selectable internal wrap

### Triggering

- Wait for external trigger to transmit
- Output when marked frame is transmitted
- Output when error-free packet received
- Output when error packet received

### Port Parameters

- Full duplex IEEE 802.3 compliant ports
- Software-selectable 10/100 Mbps data rates
- Software-selectable auto-negotiation
- Software-selectable internal wrap

### Ethernet Frame Reception

- Ethernet frames transferred to host buffers via DMA
- Min-to-copy capability
- High resolution time-tagging with 20 nsec resolution
- Link level error detection

### Receive Statistics (64-bit counters)

- Separate counters for Link level errors
  - Physical symbol
  - Invalid preamble symbol
  - Invalid or missing SFD
  - Preamble length too short
  - Unaligned frame
  - IFG too short
  - Frame too short
  - Frame too long
  - CRC errors
- Total bytes received
- Total count of error free packets received
- Total count of packets with errors received
- Dropped packets

### Ethernet Frame Transmission

- Ethernet frames transferred from host buffers via DMA
- Transmission scheduling with 20 nsec resolution
- Flexible scheduling modes
  - Minimum IFG delay (960 nsec between frames)
  - Per-frame specified delays (multiple conditions)
  - On external trigger
  - Playback delay modes
- Interrupt generation on user-identified frames

### Transmit Statistics (64-bit counters)

- Total packets transmitted
- Total bytes transmitted

### Error Injection

- Physical symbol error
- Preamble (symbol and length) errors
- Framing (byte alignment) error
- SFD (Start frame delimiter) error
- CRC error

### Power (max.)

- +3.3 VDC: 950 mA

## AFDX-A Architecture

|            |   |
|------------|---|
| User Level | Avionics Applications<br><b>AFDX-A API</b><br>Condor Packet Capture Library (Cpcap) |
| Windows OS | Windows CNIC Driver   |

Hardware Level



## Ordering Information

|                  |   |
|------------------|---|
| <b>CNIC-A2P</b>  | Dual port 10/100 full duplex PMC module for ARINC 664/AFDX support                                    |
| <b>CNIC-A2PX</b> | Dual port 10/100 full duplex PCI card (PMC on carrier) for ARINC 664/AFDX support                     |
| <b>CNIC-A2P3</b> | Dual port 10/100 full duplex 3U CompactPCI card (PMC on carrier) for ARINC 664/AFDX support           |
| <b>CNIC-A2PF</b> | Dual port 10/100 full duplex 6U CompactPCI card (PMC on carrier) for ARINC 664/AFDX support           |
| <b>-R</b>        | Ruggedized, ext temp (only available on PMC native board)   |
| <b>-C</b>        | Conduction cooled, conformal coated, extended temp, no front I/O (only available on PMC native board) |

## About GE Intelligent Platforms

GE Intelligent Platforms, a General Electric Company (NYSE: GE), is an experienced high-performance technology company and a global provider of hardware, software, services, and expertise in automation and embedded computing. We offer a unique foundation of agile, advanced and ultra-reliable technology that provides customers a sustainable advantage in the industries they serve, including energy, water, consumer packaged goods, government and defense, and telecommunications. GE Intelligent Platforms is a worldwide company headquartered in Charlottesville, VA and is part of GE Home and Business Solutions. For more information, visit [www.ge-ip.com](http://www.ge-ip.com).

## GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**

Global regional phone numbers are listed by location on our web site at [www.ge-ip.com/contact](http://www.ge-ip.com/contact)

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