RAF-EC-2P

RoHS Dual Port ARINC 664 ExpressCard Interface

Features

- AFDX/ARINC 664 dual port interface (two independent 10/100 Mbps full-duplex ports)
- RoHS Compliant
- 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 to 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
- Two input and output triggers per channel

Architecture

GE Intelligent Platforms' RAF-EC-2P is a high performance interface for monitoring, generating or analyzing full-bandwidth AFDX-ARINC 664 protocol traffic. GE's 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. Read 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 boards. In addition, I/O triggers, error detection/injection, and link / protocol level statistics are provided.

AFDX/ARINC 664 Performance

The RAF-EC-2P features two independent 10/100 Mbps full- duplex ports, capable of simultaneously receiving back to back Ethernet frames with 12 byte interframe gaps at a rate of 100Mbps each. Each port is capable of transmitting back to back Ethernet frames with 12 byte interframe gaps at a rate of 100Mbps; with both ports transmitting simultaneously, current express card technology limits the total rate to not less than 50% rate for two channels simultaneously or 100% performance for one channel at a time.

Software

The RAF-EC-2P 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 function for transmitting and receiving Ethernet frames. Frames from multiple ports can be logged or replayed using the open-source ntar log-file format. AFDX-A 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 Ethereal is included to provide GUI analysis of logged files.

RAF-EC-2P – RoHS Dual Port ARINC 664 ExpressCard Interface

Specifications

Physical
- ExpressCard
- Dimensions: Standard 54mm Express Card dimensions

Environmental
- Card operating temperature: 0° C to +55° C
- Extended temperature: -40° C to +65° C available (operating case temperature range not to exceed -40° C to +65° C)
- Storage temperature: -50° C to +100° C
- Relative humidity: 5 to 90% (non-condensing)

Software
- Microsoft® Windows® 7 (32 and 64bit) and XP support. Contact factory about availability of support for additional operating environments (including LabVIEW.)
- Cpcap API Library
- AFDX-A API Library
- Ethereal GUI for ntar file analysis

Connections
- Transition cable is provided
- 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

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 counter for Link level errors
  - Physical symbol
  - Invalid preamble symbol
  - Invalid or missing SFD
  - Unaligned frame
  - IFG too short
  - Frame too short
  - Frame too long
  - CRC errors

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 or 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 Watts max

Ordering Information

RAF-EC-2P	AFDX Express Card, dual port interface, RoHS compliant
-R suffix	Operating case temperature range not to exceed -40° C. to +65° C

Optional Software

BT-AFDX-A	ARINC 664 part 7 traffic analyzer
BT-AIL-A2	ARINC 429 and 664 part 7 (with generic EDE) traffic analyzer

About GE Intelligent Platforms

GE Intelligent Platforms is a division of GE that offers software, control systems, services, and expertise in automation and embedded computing. We offer a unique foundation of agile and reliable technology providing customers a sustainable competitive advantage in the industries they serve, including energy, water, consumer packaged goods, oil and gas, government and defense, and telecommunications. GE Intelligent Platforms is headquartered in Charlottesville, VA. For more information, visit www.ge-ip.com.

GE Intelligent Platforms Contact Information

Americas: **1 877 429 1553** Global regional phone numbers are listed by location on our web site at **defense.ge-ip.com/avionics-contacts**

defense.ge-ip.com/avionics

02.12 GFA-1039A