

# R15-MPCIE

## MIL-STD-1553 Mini PCI Express card

Abaco Systems' R15-MPCIE is the latest generation of performance and flexibility for MIL-STD-1553A/B Notice II on a Mini PCI Express® module. The rugged MIL-STD-1553 Mini PCI Express® card is ideal for harsh environments and is available in -40°C up to +85°C temperatures with one or two dual-redundant channels. The R15-MPCIE includes advanced API (Application Programming Interface) software that reduces application development time.

The R15-MPCIE is very small in size (30mm x 50.95mm x 4.7mm) and is lightweight for applications deployed in highly-constrained environments where platforms require SWaP solutions.

Standard features include IRIG-B signal Receiver/Generator with GPS synchronization, transformer coupling, 1-lane PCI Express support, 1 Mbyte of RAM per channel, 64-bit, 25 nanosecond message time-tagging, triggers, extensive BC and RT link-list structures, error injection/detection, avionics level discretes, external

RT addressing, automatic/manual RT Status Bit and Mode Code responses, along with advanced BC functionality. The R15-MPCIE Bus Monitors provide unparalleled error detection and 100% monitoring of fully loaded buses.

### Multi-function Interfaces

R15-MPCIE multi-function interfaces are easily configured to operate with simultaneous Bus Controller, 31 Remote Terminals and Bus Monitor functionality.

### Dual-function Interfaces

Dual-function R15-MPCIE interfaces have all the features and functionality of the multifunction versions, with either Bus Monitor and Bus Controller, or Bus Monitor and up to 31 Remote Terminals.

### Software

Abaco Systems provides our advanced 1553 API in source code, along with support for Windows® 7, 8, 8.1, 10, XP, Vista (32- and 64-bit), Server 2012 R1/R2, VxWorks®, Linux® and other operating systems.

### FEATURES:

- 1 or 2 dual-redundant MIL-STD-1553A/B Notice II channels
- Native 1-lane PCI Express interface (no bridge)
- Simultaneous Bus Controller, 31 Remote Terminals and Bus Monitor
- Multi-function and dual-function versions
- Standard with IRIG-B Receiver/Generator
- 64-bit, 25ns message time tagging (virtually unlimited time stamping)
- Two bi-directional avionics discretes
- Complete message programmability
- Flexible message status/interrupt generation
- I/O triggering and error injection/detection
- Rugged high retention connector optional
- Transition cabling to 1553 cable jacks optional
- Optional conformal coating
- Supportable throughout program lifetime with Product Lifetime Management (PLM) program

## RT15-MPCIE MIL-STD-1553 Mini PCI Express card

### Specifications

#### Physical

- Mini PCI Express interface card (30mm x 50.95 mm x 4.7mm)
- Weight: 14.4 grams

#### Environmental

- Standard operating temperature range: -40°C up to +85°C
- Relative humidity: 5 to 95% (non-condensing)
- Optional conformal coating configurations

#### Software support

- API - High-level libraries with source code included for Windows 7, 8, 8.1, 10, XP, Vista (32 and 64bit), Server 2012 R1/ R2, VxWorks 6.X and Linux
- IRIG-B Receiver (AM or DC/TTL) and Generator (DC/TTL)

#### Connections

- Transformer coupled 1553
- Two bidirectional avionics I/O discretes or user programmable as triggers
- One RS-485/422 transceiver for general I/O use and software selectable to be used and bi-directional differential discrete or triggering
- External RT addressing, modifiable in Flash
- Two open-drain 1553 activity-led outputs, can also be avionics outputs
- Transition cabling to 1553 cable jacks and I/O optional

#### Multi-function Operational Modes

- Simultaneous BC, 31 RTs and BM

#### Dual-function Operational Modes

- BM and BC or BM and 32RTs

#### Power (2 channels at 75% duty cycle)

- +3.3 VDC @ 1.05 A (typ.)
- 2.0 W power dissipated on board

#### On board Shared RAM

- 1 Mbyte (per dual-redundant channel)

#### Optional Configurations

- 1 or 2 dual-redundant channels
- 1 or 2 dual or multi-function channels
- Optional conformal coating
- Optional rugged high retention I/O connector
- Optional transition cabling

### Description

#### Bus Controller

- Programmable control over
  - Major and minor frame content and timing
  - inter-message gap times
  - Response time-out and late response
- Modify messages, data or setup while card is running
- Insert aperiodic messages into a running BC list
- "One-shot" mode for simplified BC operation
- Conditional message sequencing based on real-time message data or status
- Selectable interrupt generation and status messages on full range of system conditions or all detected errors
- Full error detection
  - Invalid word
  - Late response
  - Bit count error
  - Early response
  - High word
  - No response
  - Low word
  - Incorrect RT address
  - Inverted sync
  - Parity error
  - Manchester
- Extensive programmable error injection (on a per word basis)

#### Remote Terminal

- Multiple RT simulation (up to 31 RTs)
- Programmable error injection (on a per word basis)
- Modify data, status words or setup while card is running
- Programmable message content (linked message buffers)
- Selectable interrupts upon multiple conditions
- RT Map Monitoring

#### Bus Monitor

- Capture 100% fully loaded bus traffic with
  - Time-tagging
  - Word status
  - Error status
  - Message status
- Interrupts can be selected by RT / SA / WC
- Extensive filtering and triggering options
  - By individual RT/sub-address
  - Transmit, receive or broadcast mode codes
  - Internal or external triggering
  - Trigger output on user specified data
- Real-time bus playback with RT edit mode
- IRIG/GPS synchronization



## R15-MPCIE MIL-STD-1553 Mini PCI Express card

### Ordering information

<b>R15-MPCIE1D</b>	MIL-STD-1553 DUAL-FUNCTION, MINI PCI EXPRESS INTERFACE, SINGLE DUAL-REDUNDANT CHANNEL, 32BIT FW, 2 AND 1 DIFFERENTIAL DISCRETES, XFMR COUPLED, FIXED VOLTAGE, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>R15-MPCIE1M</b>	MIL-STD-1553 MULTI-FUNCTION, MINI PCI EXPRESS INTERFACE, SINGLE DUAL-REDUNDANT CHANNEL, 32BIT FW, 2 AND 1 DIFFERENTIAL DISCRETES, XFMR COUPLED, FIXED VOLTAGE, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>R15-MPCIE2D</b>	MIL-STD-1553 DUAL-FUNCTION, MINI PCI EXPRESS INTERFACE, TWO DUAL-REDUNDANT CHANNEL, 32BIT FW, 2 AND 1 DIFFERENTIAL DISCRETES, XFMR COUPLED, FIXED VOLTAGE, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>R15-MPCIE2M</b>	MIL-STD-1553 MULTI-FUNCTION, MINI PCI EXPRESS INTERFACE, TWO DUAL-REDUNDANT CHANNEL, 32BIT FW, 2 AND 1 DIFFERENTIAL DISCRETES, XFMR COUPLED, FIXED VOLTAGE, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RCONR15MPCIE</b>	10" CABLE WITH 50 POSITION SLIM STACK CONNECTOR TO A SCSI-50 FEMALE PC PANEL MOUNT CONNECTOR, ROHS COMPLIANT
<b>RCONR15MPCIER</b>	10" CABLE WITH RUGGED 37 POSITION CONNECTOR TO A SCSI-50 FEMALE PC PANEL MOUNT CONNECTOR, ROHS COMPLIANT
<b>RCONR15MPCIER-1</b>	10" CABLE WITH RUGGED 37 POSITION CONNECTOR TO A SCSI-50 FEMALE PC PANEL MOUNT CONNECTOR AND 9-14" CABLE SCSI-50 PIN (MALE) TO TWO CJ70 TWINAX, 3 LUG, 1553 CABLE JACK ENDS AND ONE DB37 (FEMALE), ROHS COMPLIANT
<b>RCONR15MPCIER-2</b>	10" CABLE WITH RUGGED 37 POSITION CONNECTOR TO A SCSI-50 FEMALE PC PANEL MOUNT CONNECTOR AND 9-14" CABLE SCSI-50 PIN (MALE) TO FOUR CJ70 TWINAX, 3 LUG, 1553 CABLE JACK ENDS AND ONE DB37 (FEMALE), ROHS COMPLIANT
<b>RCONR15MPCIE-1</b>	10" CABLE WITH 50 POSITION SLIM STACK CONNECTOR TO A 50-PIN SCSI FEMALE PC PANEL MOUNT CONNECTOR, AND 9-14" CABLE SCSI-50 PIN (MALE) TO TWO CJ70 TWINAX, 3 LUG, 1553 CABLE JACK ENDS AND ONE DB37 (FEMALE), ROHS COMPLIANT
<b>RCONR15MPCIE-2</b>	10" CABLE WITH 50 POSITION SLIM STACK CONNECTOR TO A 50-PIN SCSI FEMALE PC PANEL MOUNT CONNECTOR, AND 9-14" CABLE SCSI-50 PIN (MALE) TO FOUR CJ70 TWINAX, 3 LUG, 1553 CABLE JACK ENDS AND ONE DB37 (FEMALE), ROHS COMPLIANT
<b>RCONMPCIER</b>	RUGGED 37 POSITION CONNECTOR WITH 18" FLYING LEADS

### Optional Hardware

<b>K suffix</b>	Acrylic conformal coated
<b>R suffix</b>	Rugged high retention I/O connector
<b>L suffix</b>	Standard transition cable included
<b>V suffix</b>	Rugged high retention transition cable
<b>S suffix</b>	Acrylic conformal coated and standard transition cable
<b>X suffix</b>	Acrylic conformal coated and high retention transition cable
<b>1155-035-8</b>	PCI Express 1 Lane carrier card with 4 Mini PCI Express slots

For detailed information including systems options contact Abaco Systems

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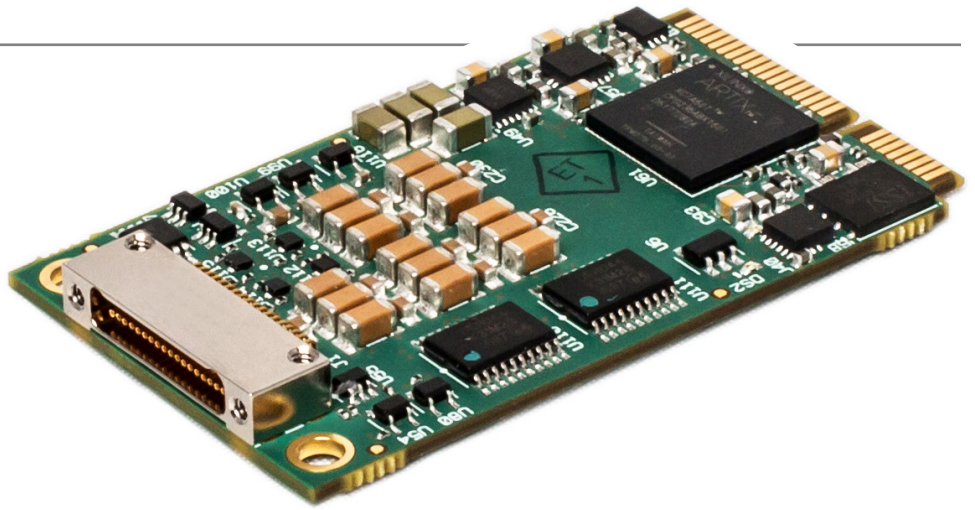
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# RAR-MPCIE

## ARINC High Density Mini PCI Express Interface

### Hardware

Available in a range of configurations to match your needs, the RAR-MPCIE provides complete, integrated databus functionality for ARINC 429, ARINC 575 and selected 2-wire, 32-bit protocols. The RAR-MPCIE supports maximum data throughput on all channels while providing onboard message scheduling, label filtering, multiple buffering options, time-tagging, error detection and avionics-level I/O discretes.

Two RAR-MPCIE configurations offer combinations of ARINC 429 channels along with ARINC 717/573 Dual-Mode functionality. Dual-Mode functionality programmatically supports either HBP (Harvard Bi-Phase) or BPRZ (Bi-Polar Return to Zero) across a very wide range of bit rate/subframe combinations.

The RAR-MPCIE comes as standard with IRIG-B DC level signal and can be utilized to synchronize time stamps across multiple boards.

The RAR-MPCIE is very small in size (30mm x 50.95mm x 4.7mm) and is lightweight for applications deployed in highly-constrained environments where platforms require minimum SWaP solutions.

### Architecture

The RAR-MPCIE features include independent, software programmable data rates and parity, error detection. 2 MBytes of on-board RAM provide large transmit and receive data buffers. All channels operate

independently. Discretes support TTL to four avionics-level inputs and four outputs while open-drain outputs enhance (bi-directional) application flexibility.

### Software

Abaco Systems' software tools and solutions significantly reduce the time required to integrate ARINC 429 and other avionics protocols into your application. Included with the RAR-MPCIE is our flexible, high-level, API (Application Programming Interface) support for Microsoft Windows 7, 8, 8.1, 10, Server 2012 R1/R2, Vista, XP (32-bit/64-bit), VxWorks and Linux. Our powerful API supports multiple cards, and is compatible with Abaco Systems API support on PCI, PCIe, PMC, PC/104-Plus, Express Card, AMC and Compact PCI platforms. Optional software includes LabVIEW.

### Data Handling

On-board firmware, and a high-level API are integrated to provide total flexibility in monitoring and generating ARINC bus traffic. Simultaneous scheduled and burst mode (FIFO) messaging is supported on all ARINC 429 transmit channels. Each ARINC 429 receive channel provides simultaneous dedicated and buffered mode storage, along with label/SDI filtering. Three different methods are provided to buffer received data:

- Buffered mode utilizes a separate circular buffer for each channel.
- Merged mode combines all received data into a single, time-sequenced circular buffer.
- Dedicated mode provides a snapshot of the latest data.

### FEATURES:

- Up to eight Rx and four Tx ARINC 429 channels
- High performance, high density interface with large buffers
- Advanced, high-level software API included for Microsoft® Windows® 7, 8, 8.1, 10, Server 2012 R1/R2, Vista, XP (32-bit/64-bit), VxWorks and Linux®
- Supports maximum data throughput on all channels simultaneously
- 4-input/output bi-directional discretes supporting avionics-level voltages
- Independent, software-programmable bit rates for all channels
- Error injection/detection
- Support for 2-wire ARINC 573, 575, and 717
- IRIG-B Receiver/Generator standard

## RAR-MPCIE ARINC High Density Mini PCI Express Interface

### Specifications

#### ARINC 429 Receive Channels

- Number of channels: up to 8
- Data rates: 12.5 KHz, 100 KHz or 5 KHz to 150 KHz programmable
- Standard input levels:  $\pm 6.5$  to  $\pm 13$  VDC (A to B)
- Filtering: label and/or SDI
- Parity: odd, even or none
- Error reporting: parity

#### ARINC 429 Transmit Channels

- Number of channels: up to 4
- Data rates: 12.5 KHz, 100 KHz or 5 KHz to 150 KHz programmable
- Output level:  $\pm 10$  VDC typical (A to B)
- Parity: odd, even or none
- Error injection option: parity, gap, high or low bit count

#### Discrete Inputs and Outputs

- Number of inputs: 4
- Supports monitoring of TTL/CMOS/Avionics level voltages
- Number of outputs: 4
- Low side switches, each capable of sinking 200ma

#### Optional Configurations

- A wide range of Rx/Tx combinations
- ARINC 573/717 Bi-Polar RZ and Harvard Bi-Phase
- Optional acrylic conformal coating
- Optional rugged high retention I/O connector
- Optional I/O transition cabling
- Contact factory for custom configurations

#### Power (typical)

- +3.3 VDC @ 1.05 A (typ.)
- 1.82 W power dissipated on board
- Weight 8.6 grams

#### Software

- Advanced, high-level software API included for Microsoft Windows 7, 8, 8.1, 10, Server 2012 R1/R2, Vista, XP (32-bit/64-bit), VxWorks and Linux (please check latest support versions with sales)
- Labview for Windows operating systems

#### Physical

- Mini PCI Express interface card (30mm x 50.95 mm x 4.7mm)
- Operation Temperature range -40°C to +85°C
- Storage Temperature range -50°C to +100°C
- Relative humidity: 5 up to 95% (non-condensing)

### Ordering information

<b>RAR-MPCIE-22</b>	ARINC 429 INTELLIGENT 1 LANE MINI PCI EXPRESS CARD WITH 2 RX, 2 TX CHANNELS, 4 DISCRETES, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RAR-MPCIE-42</b>	ARINC 429 INTELLIGENT 1 LANE MINI PCI EXPRESS CARD WITH 4 RX, 2 TX CHANNELS, 4 DISCRETES, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RAR-MPCIE-44</b>	ARINC 429 INTELLIGENT 1 LANE MINI PCI EXPRESS CARD WITH 4 RX, 4 TX CHANNELS, 4 DISCRETES, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RAR-MPCIE-84</b>	ARINC 429 INTELLIGENT 1 LANE MINI PCI EXPRESS CARD WITH 8 RX, 4 TX CHANNELS, 4 DISCRETES, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RAR-MPCIE-73J</b>	ARINC 429 INTELLIGENT 1 LANE MINI PCI EXPRESS CARD WITH 7 RX, 3 TX CHANNELS, 1 RX, 1 TX ARINC 717 CHANNELS, 4 DISCRETES, IRIG-B, ROHS COMPLIANT, NO CABLE
<b>RCONRARMPCIER</b>	10" CABLE WITH RUGGED 37 POSITION CONNECTOR TO A 37-PIN D-SUB FEMALE PC PANEL MOUNT CONNECTOR, WITH D-SUB MATING CONNECTOR, ROHS COMPLIANT
<b>RCONRARMPCIE</b>	10" CABLE WITH 50 POSITION SLIM STACK CONNECTOR TO A 37-PIN D-SUB FEMALE PC PANEL MOUNT CONNECTOR, WITH D-SUB MATING CONNECTOR, ROHS COMPLIANT
<b>RCONMPCIER</b>	RUGGED 37 POSITION CONNECTOR WITH 18" FLYING LEADS

### Optional Hardware

<b>K suffix</b>	Acrylic conformal coated
<b>M suffix</b>	Acrylic coated with rugged high retention I/O connector
<b>R suffix</b>	Rugged high retention I/O connector
<b>L suffix</b>	Standard transition cable included
<b>V suffix</b>	Rugged high retention transition cable included
<b>S suffix</b>	Acrylic conformal coated and standard transition cable included
<b>X suffix</b>	Acrylic conformal coated and rugged high retention transition cable included
<b>1155-035-8</b>	PCI Express 1 Lane carrier card with 4 Mini PCI Express slots

### Optional Software

<b>CEI-LV</b>	LabVIEW support for ARINC 429
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