



RAR15XF-TB

High Density MIL-STD-1553 and ARINC 429 Thunderbolt 3 Device

Abaco Systems' multi-protocol RAR15XF-TB integrates our market-leading MIL-STD-1553 A/B Notice II and ARINC 429 functionality with the power and scalability of the Intel® Thunderbolt™ 3 interface. Thunderbolt 3 tunnels PCI Express™ over a 40 Gbps connection that delivers enhanced performance for external devices. This makes the RAR15XF-TB an ideal solution for use in the lab or flight line where a portable avionics device is needed. Or, users can take advantage of the PCIe performance to expand an existing test system without the expense of adding bus slots or fixed mezzanine cards. Additionally, the convenience of Power-over-Thunderbolt 3 simplifies installation and portability

MIL-STD-1553 Features

The RAR15XF-TB includes advanced API (Application Programming Interface) software that reduces application development time. Standard MIL-STD-1553 features include 8 MBytes of RAM, 64-bit, 25 ns message time tagging, extensive bus controller (BC) and remote terminal (RT) link-list structures, error injection/detection, automatic/manual RT status bit and mode code responses, along with advanced BC functionality. The RAR15XF-TB bus monitors provide exceptional error detection. Conformal coating is optional on the RAR15XF-TB.

ARINC 429 Message Handling

On-board firmware, large data buffers, 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 messages:

- Buffered mode utilizes a separate circular buffer for each channel.
- Merged mode combines all received messages into a single, time-sequenced circular buffer
- Dedicated mode provides a snapshot of the latest message by label or label+SDI

ARINC 429 Architecture

The RAR15XF-TB features include independent, software programmable data rates and parity error detection, and error injection. All channels operate independently.

bus controller, up to 31 remote terminals and bus monitor functionality.

MIL-STD-1553 Dual-function Interfaces

Dual-function RAR15XF-TB interfaces have all the features of the multi-function versions, with either bus monitor and bus controller or bus monitor and 31 remote terminals (RTs).

Software

Abaco Systems provides an advanced MIL-STD-1553 and ARINC 429 API including source code for any Thunderbolt 3 compatible operating system including Microsoft® Windows™ 10 (64-bit) and Linux® (pending).

MIL-STD-1553 Multi-function Interfaces

RAR15XF-TB multi-function interfaces are easily configured to operate with simultaneous

Contact your local sales person for additional operating system information.

FEATURES:

- 2 or 4 dual-redundant MIL-STD-1553A/B Notice II channels
- 10 ARINC 429 receive channels
- 4 or 8 bidirectional ARINC 429 channels
- Thunderbolt 3 (PCIe®) connection
- Power over Thunderbolt 3 (based on USB power delivery)
- Optional mounting brackets available
- Standard commercial operating temperature (0° to +70°C)
- MIL-STD-1553: Simultaneous bus controller (BC), up to 31 remote terminals (RT) and bus monitor (BM)
- MIL-STD-1553: Multi-function or dual-function (BC and BM or RT and BM) 1553 operation
- Bi-directional avionics level discretes individually configurable as MIL-STD-1553 output or input triggers
- Flexible hardware remote terminal addressing
- IRIG receiver
- 64-bit, 25ns message time-tagging
- External differential time-tag reset and clock inputs
- Complete message programmability
- Flexible message status/interrupt generation
- Error injection/detection
- 1760 level compatible
- RoHS compliant to EU directive 2002-95-EC

RAR15XF-TB High Density MIL-STD-1553 and ARINC 429 Thunderbolt 3 Device

Device Specifications

Physical

- 85mm x 165mm x 25mm aluminum enclosure
- Includes 68-pin SCSI Avionics cable and Thunderbolt 3 cable
- Optional Mounting Kit available

Environmental

- Standard operating temperature range: 0° to 70°C.
- Relative humidity: 5% to 90% (non-condensing)

Power

- Power supplied over Thunderbolt 3 interface. No external power required.

Software Support

- API – High-level libraries with source code included.
- GUI – Optional BusTools/1553 GUI Bus Analysis, Simulation, and Data Logging software (MIL-STD 1553 multi-function boards only)

On-board Shared RAM

- 8 MBytes

ARINC 429 Specifications

ARINC 429 Receive Channels

- 10 receive channels
- Data rates: 12.5 kHz, 100 kHz or 5 kHz to 150 kHz programmable
- Standard input levels: ± 6.5 to ± 13 VDC (A to B)
- Filtering: Label and/or SDI
- Parity checking enabled or disabled
- Error reporting: Parity, message size, message gap

ARINC 429 Bidirectional Channels

- Up to 8 fully compliant bidirectional channels
- Data rates: 12.5 kHz, 100 kHz or 5 kHz to 150 kHz programmable
- Transmit output level: ± 10 VDC (A to B)
- Parity Injection: Odd, even, or disabled
- Transmit error injection: message gap, high or low bit count

MIL-STD-1553 Specifications

Multi-function Operational Modes

- Simultaneous BC, 31 RTs and BM

Dual-function Operational Modes

- BC and BM or 31 RTs and BM

Timing

- Independent 64-bit, 25 ns message time-tagging per channel
- Time can be programmed via the host or by a MIL-STD-1553 trigger
- All timers can be synchronized to 0 via the host
- Timers can independently use IRIG time
- Differential IRIG-B receive, single ended, IRIG TX

- Selectable external time-tag clock input provided
- Selectable external time tag reset input provided

Discretes

- 6 or 12 bidirectional avionics discretes

RT Addressing

- External (via discretes) Flash-based channel offsets
- Flash-based only

Bus Controller

- Programmable control over major and minor frame content and timing – Inter-message gap times
- Programmable control over response time-out and late response
- Modify messages, data or setup on the fly
- Insert aperiodic messages into a running BC list
- 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
- Programmable error injection (on a per word basis) See full error detection/injection section
- Synchronize BC operation to external time source or trigger
- Multiple BC data buffers

Full error detection/injection

- Invalid word – Late response
- Bit count error – Early response
- High word – No response
- Low word – Incorrect RT address
- Inverted sync – Parity error
- Manchester – Invalid command

Remote Terminal

- Multiple RT simulation (up to 31 RTs)
- Programmable error injection (on a per word basis) See Full error detection/injection above
- Modify data, status words or setup while card is running
- Programmable message content
- Selectable interrupts
- RT Map Monitoring

Bus Monitor

- Capture bus traffic with:
 - Time-tagging – Error status
 - Word status – Message status
- Interrupts can be selected by RT / SA / WC
- Extensive filtering and triggering options
 - By individual RT/subaddress
 - 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

Ordering information

RAR15XF-1042DTB	MIL-STD-1553 and ARINC 429 Thunderbolt 3 module with 10RX, 4 Bidirectional, ARINC 429 Channels; 2 Ch Dual-function 1553, commercial temperature, Fixed Volt, Relay Coupled, 12 Avionics Discretes, Thunderbolt 3 interface cabler
RAR15XF-1042MTB	MIL-STD-1553 and ARINC 429 Thunderbolt 3 module with 10RX, 4 Bidirectional, ARINC 429 Channels; 2 Ch Multi-function 1553, commercial temperature, Fixed Volt, Relay Coupled, 12 Avionics Discretes, Thunderbolt 3 interface cable
RAR15XF-1084DTB	MIL-STD-1553 and ARINC 429 Thunderbolt 3 module with 10RX, 8 Bidirectional, ARINC 429 Channels; 4 Ch Dual-function 1553, commercial temperature, Fixed Volt, Relay Coupled, 6 Avionics Discretes, Thunderbolt 3 interface cable
RAR15XF-1084MTB	MIL-STD-1553 and ARINC 429 Thunderbolt 3 module with 10RX, 8 Bidirectional, ARINC 429 Channels; 4 Ch Multi-function 1553, commercial temperature, Fixed Volt, Relay Coupled, 6 Avionics Discretes, Thunderbolt interface 3 cable

Optional Hardware

-K suffix	Conformal coating
2220-011-8	Optional Bulkhead Bracket Kit, TB3 CMC Adapter

For other options see your local sales person.

Optional Software

BT-1553	BusTools/1553 GUI software for Bus Analysis, Simulation, and Data Logging. Under select versions of Microsoft Windows
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