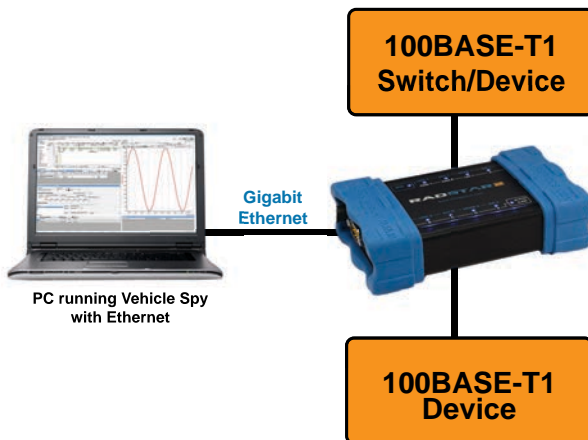


RAD-Star 2

Active Tap & Gateway for Automotive Ethernet

Intrepid's RAD-Star 2 is a multi-purpose active tap and media converter for Automotive Ethernet. Using the RAD-Star 2, you can monitor one pair of 100BASE-T1 (BroadR-Reach®) connections, or attach your laptop to two 100BASE-T1 ECUs or other devices. As a gateway to 10/100/1000BASE-TX, RAD-Star 2 makes any standard Ethernet device, laptop, or data logger compatible with 100BASE-T1.

The RAD-Star 2 has two 100BASE-T1 (BroadR-Reach®) PHYs, allowing it to tap a single link between ECUs and/or switch ports. It can also be configured to act as a media converter for up to two devices. In addition to its Automotive Ethernet capabilities, it offers 2x CAN FD channels.



Using the RAD-Star 2 as an active tap.

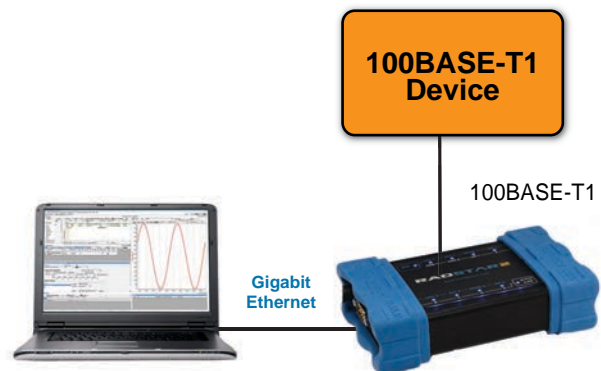
Applications:

The RAD-Star 2 has many features that make it the ideal tool for a variety of applications, including:

- ECU level and system level automated testing
- Automotive Ethernet network monitoring
- Network simulation / Restbus simulation
- Automotive Ethernet to CAN FD gateway applications
- ECU reflashing over Automotive Ethernet or CAN FD

Features

- Copies full-duplex communications between Automotive Ethernet master and slave with minimal latency
- Frames Encapsulation captures bad/rejected frames
- Timestamps all Ethernet and CAN FD frames with 10 ns accuracy
- Filtering and routing capabilities
- Serves as a 100BASE-T1 to 10/100/1000BASE-TX bridge with buffering capability
- Acts as a programmable 100BASE-T1 to CAN FD Gateway
- AVB, PTP, TSN Support
- Flexible design allows updated Ethernet MAC designs for future protocols



Using the RAD-Star 2 as a media converter.

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RAD-Star 2

RAD-Star 2 / Gateway Testing

The RAD-Star 2 has the ability to test between two ECUs (hosts) or between an ECU and a 100BASE-T1 switch, plus two CAN FD networks, with 10 ns time accuracy. This makes it ideal for ECU testing applications, as well as port-to-port and Ethernet-to-CAN FD latency testing.

Active Tap Mode

A primary use of the RAD-Star 2 is to act as an active tap, transparently interposing itself between a pair of 100BASE-T1 (BroadR-Reach[®]) Automotive Ethernet devices. These can be either an ECU-to-switch or ECU-to-ECU link. The traffic from each device on a tapped link is forwarded to its partner, ensuring seamless operation of the network. Copies of all messages are also aggregated and sent to the PC over the RAD-Star 2's Gigabit Ethernet link, where they can be analyzed using Vehicle Spy Enterprise software.

Media Converter Mode

The RAD-Star 2 can also be configured to act as a media converter, allowing a PC to interact with two Automotive Ethernet ECUs. This allows you to simulate nodes, or perform direct diagnostics or ECU flashing. In addition, the "Pure" Media Converter Mode disables encapsulation of messages and allows connections between media of differing bit rates, buffering as needed.

Vehicle Spy Enterprise Software

The RAD-Star 2 is best when used with Intrepid's powerful Vehicle Spy Enterprise software. Vehicle Spy allows you to view traffic on your tapped or media-converted Automotive Ethernet networks, even bad or unrecognized frames, synchronized with CAN FD frames. You can also transmit messages from the PC to Automotive Ethernet ECUs, perform latency testing, ECU conformance testing, and much more.

General Specifications

- Fourth-generation neoVI architecture: over 10x the performance of earlier devices
- Interface to PC via 1000BASE-TX (NIC) or USB (240Mb/sec)
- Low power consumption
- Power Supply: 4.5-40V operation, barrel jack - use included NEOVI-PS or vehicle power
- Ten scriptable, multi-color LEDs indicate link status and modes of operation
- Two scriptable tactile switches for use in switching modes manually
- Temperature Range: -40C to +85C
- One Year Limited Warranty
- Field upgradeable flash firmware
- Standalone mode including scripting, receive messages, transmit messages, expressions, I/O, and transport layers
- J2534 and RP1210 A/B compatible for CAN/ISO15765
- Dimensions: 5.408" x 3.433" x 1.425" (137.37mm x 87.20mm x 36.20mm)
- Weight: 0.65lbs (295g)

Timing Specifications

- FPGA-measured 64-bit timestamping with 10 ns accuracy on all CAN FD/Ethernet networks
- Simultaneous operation on all CAN FD/Ethernet networks
- Supports queuing of data to support back-to-back message transmission, with buffering support > 1 GB

Ordering Information:

Part Number	Description
RAD-STAR2	RAD-Star 2 Active Tap/Gateway/Media Converter

*Specifications subject to change. Please contact Intrepid for the latest information.

Network Specifications - Automotive Ethernet

- 2x 100BASE-T1 PHYs (BCM89810)
- Automatic Master / Slave Configuration
- Link Up / Down Status monitoring
- Signal integrity monitoring
- Ethernet error reporting through specially designed MAC.
- 780ns PHY Rx, 240ns PHY Tx and 300ns internal latency (Total: 1,320ns)
- PTP - Precision Time Protocol support
- TSN - Frame Preemption (IEEE 802.1Qbu) / Express Traffic (IEEE 802.3br) support
- Additional protocols supported with software updates
- 100BASE-T1 ports can be configured to be in Media Converter, Tap, or "Pure" Media Converter modes (unencapsulated media converter)
- 10x programmable LEDs in the membrane to display the link, activity and mode of the 100BASE-T1 and CAN FD networks
- Implements Intrepid's specially designed MAC layer. This allows future changes and updates as a software update to the device allowing same hardware to support growing industry changes

Network Specifications - CAN / CAN FD

- 2x CAN / CAN FD Channels
- Two Dedicated ISO11898 Dual Wire CAN Physical Layer (MCP2561FD)
- Software switchable between ISO CAN FD and non-ISO (Bosch) CAN FD versions
- Up to 1 Mb Software Selectable Baud Rate for arbitration phase
- Up to 8 Mb Software Selectable Baud Rate for data phase
- Listen only mode support
- CAN FD implemented using the Bosch MCAN CAN Controller IP
- Software Selectable Termination resistors for CAN channels

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