Media Converters for Automotive Ethernet

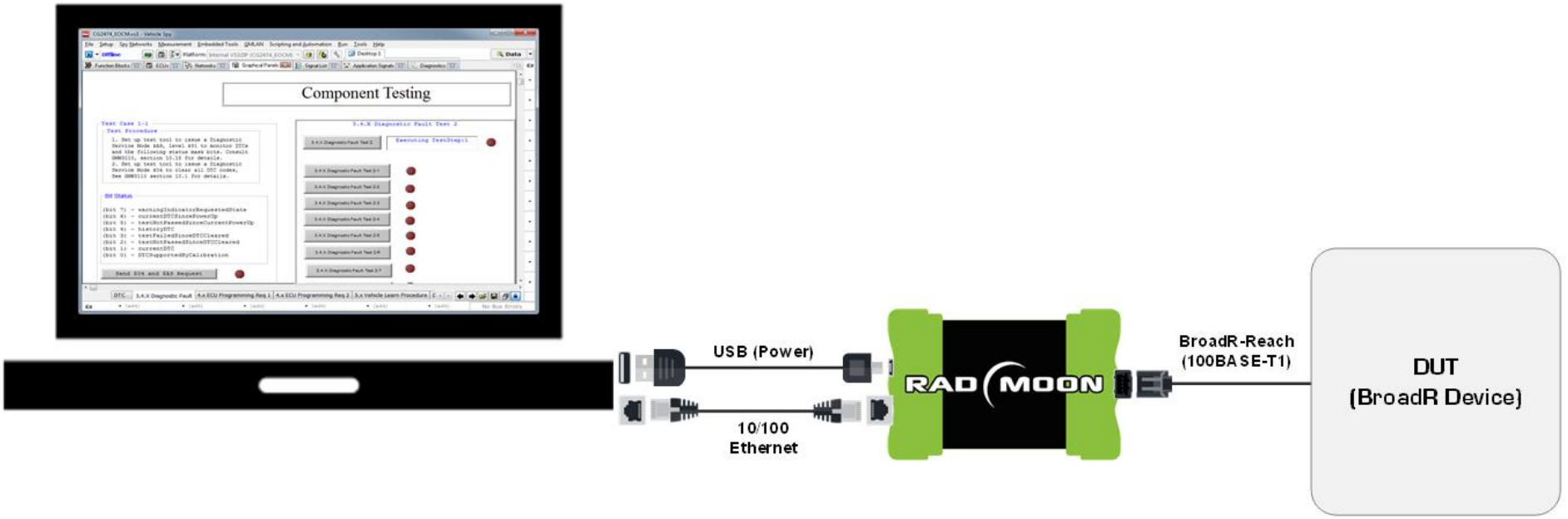
Media Converters for Automotive Ethernet

- Automotive Ethernet (AE) represents the latest in automotive networking.

- Many OEMs are now moving forward with this new technology, which promises high performance at low cost, especially for infotainment applications

Media Converters for Automotive Ethernet

- Media Convertors will be one of your first steps in testing and validating your Automotive Ethernet networks.

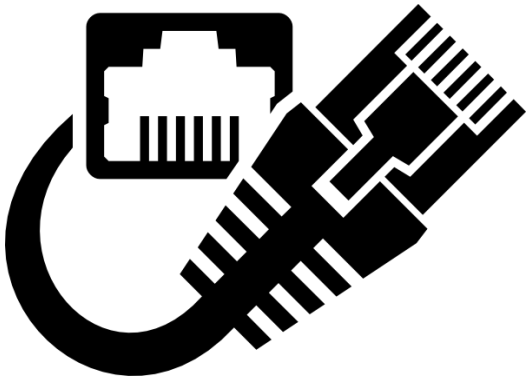


Media Converters the Basics…

- Automotive Ethernet traffic cannot be monitored using the same techniques employed for buses like CAN.
- Ethernet networks use star topology, so there is no single point to monitor an entire network.
- The sophisticated technology employed also means bit values cannot be interpreted directly from voltage levels.

Media Converters the Basics…

- To put it simply if you need to connect an automotive Ethernet 100/1000BASE-T1 connection to a standard 4/8 wire connection you need a Media Convertor to get the traffic to your PC/Device.



Media Converters for Automotive Ethernet (100BASE-T1)

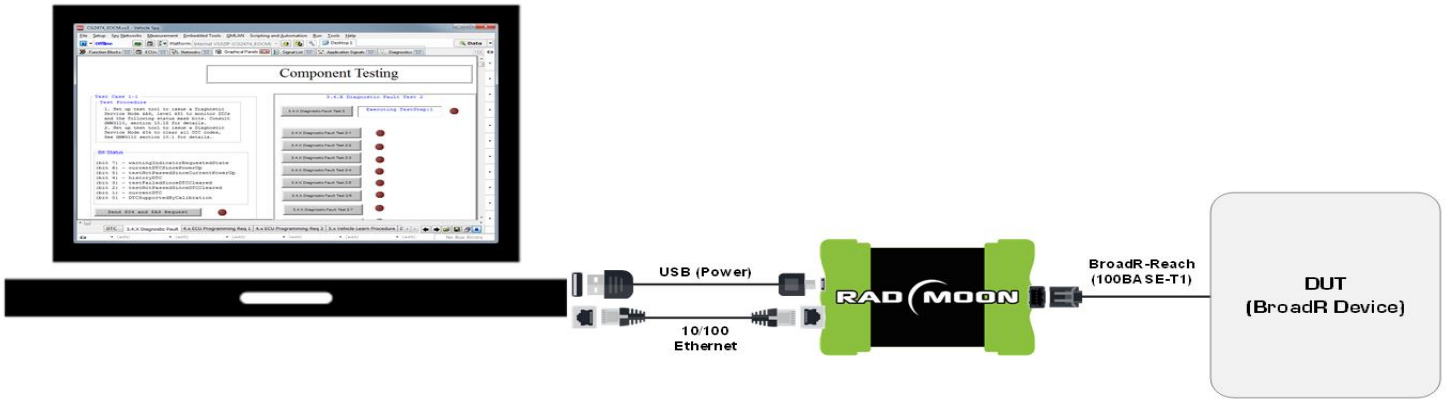
The RAD-MOON

- The Rad-Moon is your 100BASE-T1 to conventional 10/100 RJ45 ethernet convertor.

Media Converters for Automotive Ethernet (100BASE-T1)

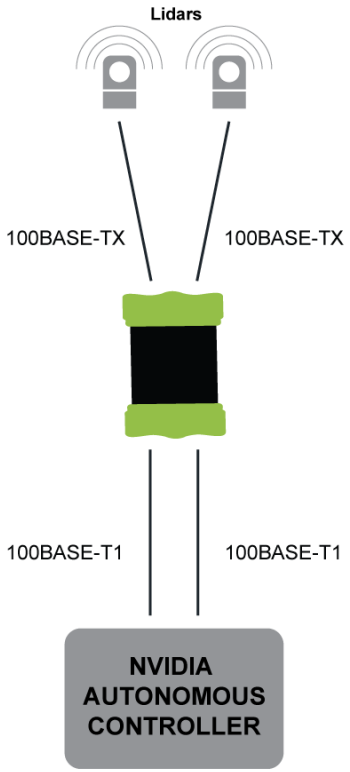
The RAD-MOON

- Whenever any data is received over either connection, it is automatically sent out on the other, creating a seamless link between the two attached devices. Full-duplex operation is supported, so data can be sent in both directions simultaneously.



The RAD-MOON DUO

- The RAD-MOON DUO has a USB-C port and TWO Conventional 10/100 ports to support multiple connections for a PC interface. This combination and other upgrades like scripting capability, PHY status via LEDS, and more connections for the growing amount of equipment being outfitted for autonomy and safety make the RAD-MOON DUO a compelling choice.



The RAD-MOON DUO

- The RAD-MOON DUO has TWO Conventional 10/100 ports to support multiple connections for a very useful combination of connectivity like LIDAR that uses conventional 10/100 connections to Autonomous controllers that are already outfitted for Automotive ethernet 100BASE-T1 .

Media Converters for Automotive Ethernet (100/1000BASE-T1)

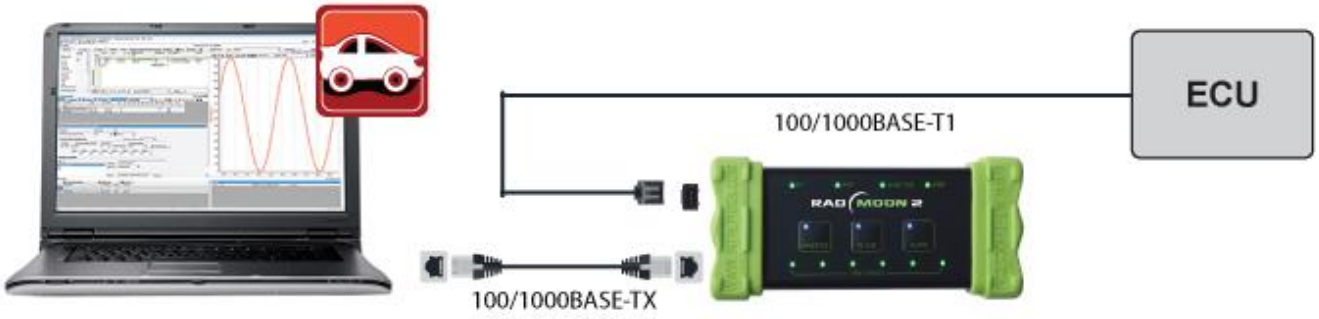
The RAD-MOON 2

- Intrepid's RAD-Moon 2 is the most advanced Ethernet Media Converter for Automotive Ethernet
- 100/1000BASE-T1 via Marvell 88Q2112 PHY
- Programmable membrane label with LEDs to show PHY and network status
- Membrane switches allow switching between 100BASE-T1 and 1000BASE-T1, and selecting master, slave or automatic PHY configuration

Media Converters for Automotive Ethernet (100/1000BASE-T1)

The RAD-MOON 2

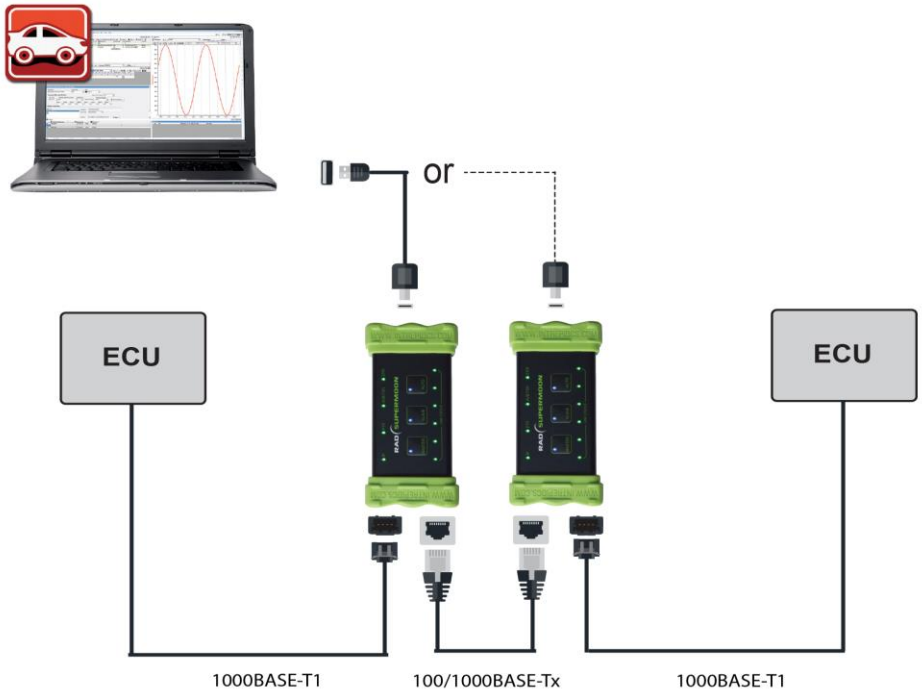
RAD-MOON 2 allows for configuration via the Membrane buttons for Auto/Manual configurations as well as 100/1000 BASE-T1



The RAD-SUPERMOON

- Connect two RAD-SuperMoons to make an active tap that copies full-duplex communications between two hosts or a host and switch port with very low latency.
- Configure and monitor PHY registers via USB 3 (USB 3.1 Gen1, 3.2 Gbps).

The RAD-SUPERMOON

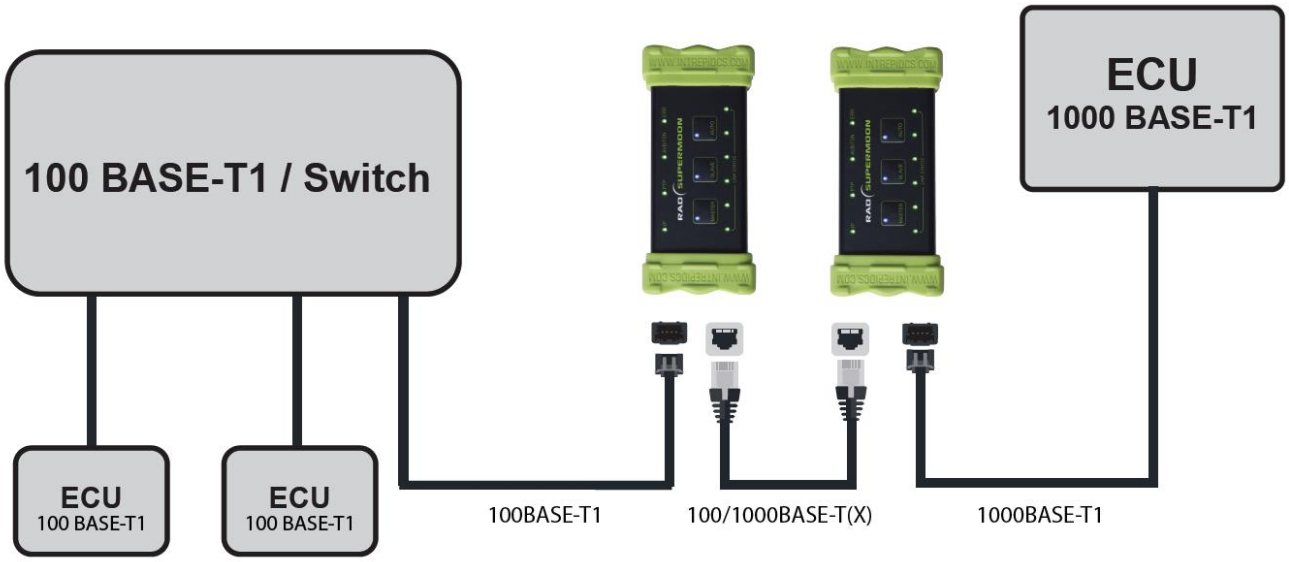


Two RAD-Supermoons can be used together as an active tap

- Connect two RAD-SuperMoons to make an active tap that copies full-duplex communications between two hosts or a host and switch

The RAD-SUPERMOON

Use RAD-SuperMoons to connect a
100BASE-T1 switch to a 1000BASE-T1 ECU.



RAD-SuperMoons can connect a 100BASE-T1 switch to a 1000BASE-T1 ECU.

The RAD-SUPERMOON

SQI Indicators

On the side of the case are 4 multi-color LED's tied to the Automotive Ethernet SQI (Signal Quality Index). There are 12 discrete levels for the SQI which directly correlates to the BER (Bit Error Rate) reported by the PHY as it receives frames

	SQI Levels	Indication
Green	9-12	Good (BER < 10E-20)
Blue	5-8	Acceptable
Red	1-4	Poor (BER > 10E-7)

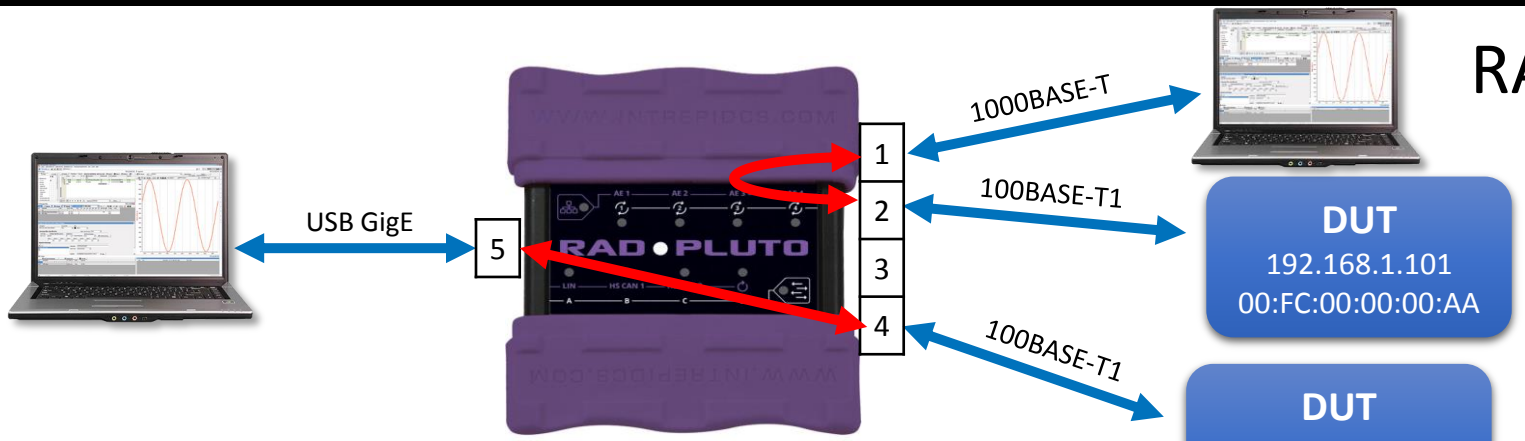
Media Converters for Automotive Ethernet (100/1000BASE-T1)

The RAD-SUPERMOON

Buffered Media Converter: Not only bridging 1000BASE-T1 and 1000BASE-T, but the ability to connect networks of different speeds with the use of internal buffering.

Low Latency Active Tap: Same functionality as the active tap described above, but configured for “cut-through” traffic (as opposed to “Store & Forward”) This minimizes latency introduced by the tap, but at the cost of not being able to transmit messages from Vehicle Spy (coming soon)

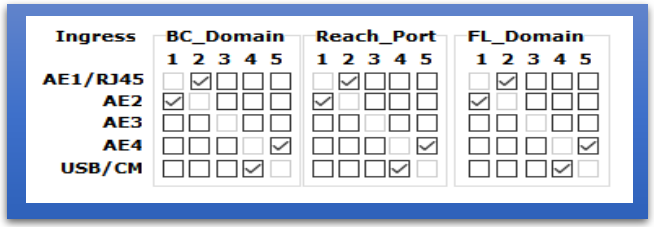
Media Converters for Automotive Ethernet (SWITCHES)



RAD-PLUTO

Make exclusive connection between 2 ports. Block traffic from all other ports.

- Broadcast Domain: Block broadcast messages from select ports.
- Reach_Port: Selectively block traffic between ports.
- Flood Domain: Block flooding of unknown addresses to selected ports.



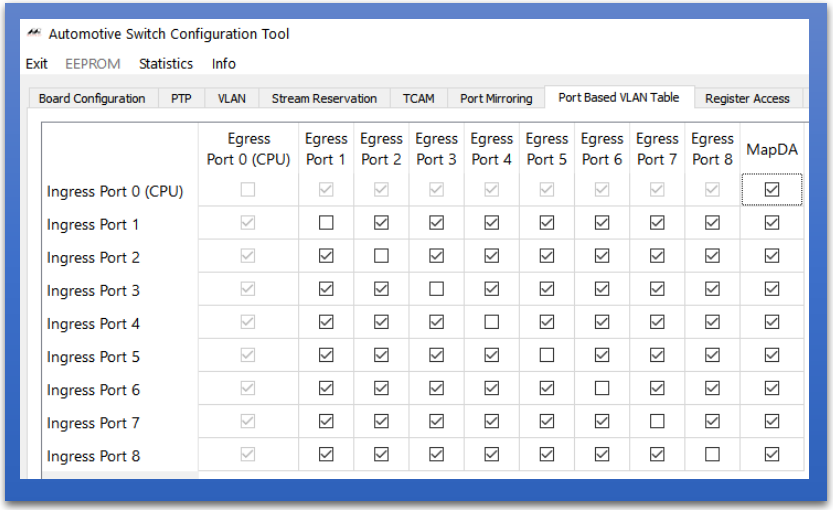
2 things to note

- A switch is a "Store and Forward" device which introduces more latency than a "true" media converter.
- Ideally configure the switch to flood ports on unknown MAC addresses.

Media Converters for Automotive Ethernet (SWITCHES)

- Similar to Pluto
- Different Config Interface
- 2 More Ports
- 1000BASE-T1 Available
- ***Advanced*** configurations allow “Cut-Through” operation

RAD-JUPITER



Thank You