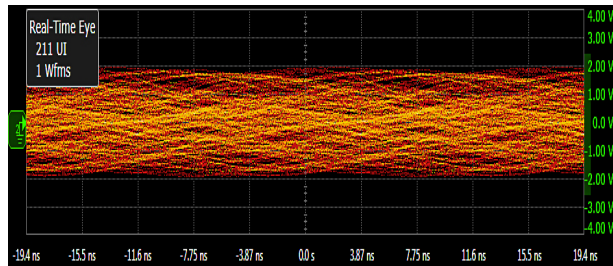Product Fact Sheet
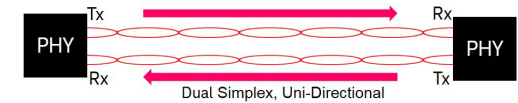# Keysight Automotive Ethernet 100BASE-T1 Separation Solutions

To accompany N8847A Automotive Ethernet Protocol Triggering and Decode Application used on S-Series oscilloscopes.

An automotive Ethernet operates as a full-duplex communication link over one twisted pair. However, both the decoding of the protocol and analysis of link signal quality required that each link direction be looked at separately and independently.

Keysight offers two different solutions to separate and give access to both link directions. One solution is intended for protocol analysis only ❶, while the other allows both protocol analysis and detailed signal quality analysis ❷.

Normal Ethernet 100BASE-TX

Dual Simplex, Uni-Directional

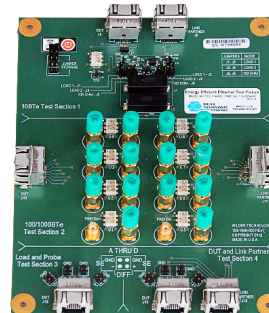Automotive Ethernet 100BASE-T1

Full Duplex, Bi-Directional

Automotive Ethernet signals are transmitted in both directions simultaneously on a single-pair cable. That's why the Automotive Ethernet waveform observed on the scope is chaotic.

	❶ Wilder Fixture	❷ Keysight Separation
Signal ratio	1:1 [1]	1.1
Connector type	RJ-45	SMA
Signal Quality Analysis		●
Protocol Analysis	●	●

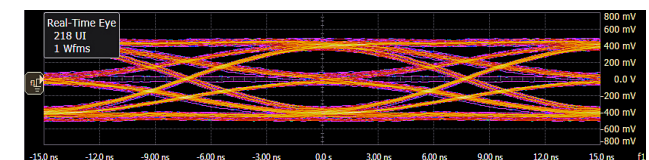1. Although signal ration 1:1 there is some inherent loss in this method

❶ Separating bi-directional signals for decode

The Wilder Technologies EEE fixture provides an RJ45 interface to the link's endpoints in both directions. Differential SMA's provide directional pickoff ability into the oscilloscope. The signal presented to the scope can be used for protocol decoding.

❷ Separating bi-directional signals without degrading signal quality

Loss and latency are characterized and accounted for through the entire signal path. This allows for meaningful signal characterization, as well as protocol decode, of each direction in an active link.
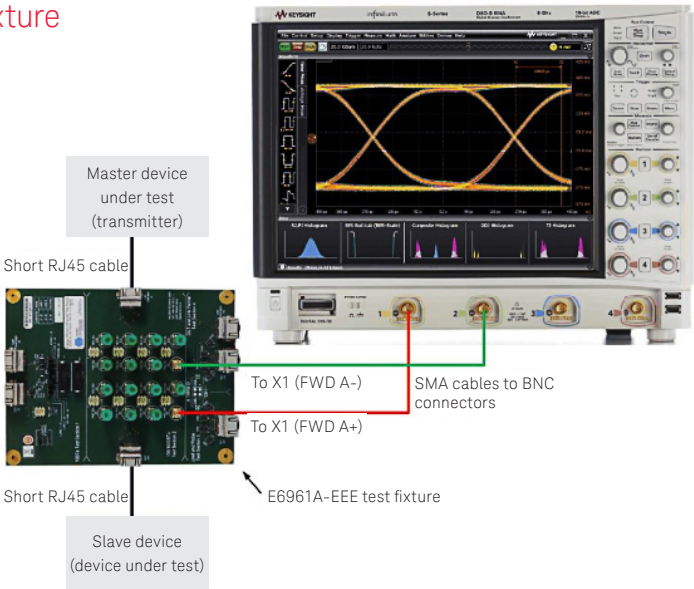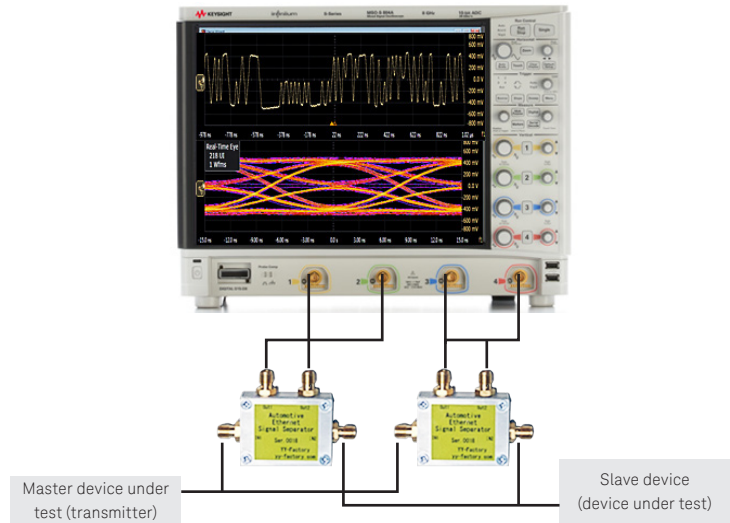
Recommended configuration

Product/Description	Stand alone part number	Part number through bundled solution
Oscilloscope		
Oscilloscope Infiniium S-Series, 4 channels, 2.5 GHz or higher	DSOS254A	E6961A-OSC
Trigger and decode		
Protocol decode software		N8847A
Wilder fixture		E6961A-EEE
Custom Keysight separation solution[1]		Fixture x2, N5465B
Compliance test software		
100BASE-T1 compliance		N6467B
1000BASE-T1 compliance		E6960A
Accessories for full compliance testing		
Ethernet test fixture	N5395C	E6961A-ETF
Oscilloscope probes	1131B and E2678A x 2	E6961A-PRO
Frequency divider board		E6961A-FDB
SMA cables and adapters		E6961A-SMA x4 E6961A-ADP x2
Additional hardware for full compliance testing		
Network analyzer	E5071C	E6961A-ENA
Arbitrary waveform generator	81150A	E6961A-AWG

1. The Keysight separation solution is sold as a custom solution - please contact your sales representative for product numbers and pricing.

Thoroughly covering 100Base-T1 PHY compliance

Keysight is the first vendor in the market that provides a full lineup of test solutions to cover PHY compliance tests for transmitters, receivers, and cables/connecters.

Wilder fixture

Master device under test (transmitter)

Short RJ45 cable

To X1 (FWD A-)

SMA cables to BNC connectors

To X1 (FWD A+)

Short RJ45 cable

E6961A-EEE test fixture

Slave device (device under test)

Keysight's separation solution

Master device under test (transmitter)

Slave device (device under test)

KEYSIGHT
TECHNOLOGIES