



Automotive Breaker Modules

Automate hot-plug, dual redundancy and fault injection testing for automotive links

Quarch
Data Sheet



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Highlights

- ▀ Supports a wide range of automotive links, from CAN to 1000Base-T1
- ▀ Removes manual intervention, for fully automated testing
- ▀ Simulate cable-pulls, link down, power loss, degraded links and more
- ▀ Precise and consistent timing control over test scenarios
- ▀ Completely transparent at the protocol layer
- ▀ Simple to control with your existing test automation system
- ▀ View fault events in real time, and see how it affects bus traffic

Use Cases

Link Down	Verify that failed links are detected and handled regardless of when they occur
Redundant Paths	Ensure dual redundant systems work seamlessly
Degraded Links	Test the effect of physical layer data errors due to degraded cabling over time
Safety Compliance	Demonstrate your designs are safe even in extreme failure cases





Physical Layer Fault Injection

Quarch breaker modules are unique fault injection devices, designed for R&D testing of new products

Breakers have switches on every relevant line on the bus. This includes both the power and signal pins.

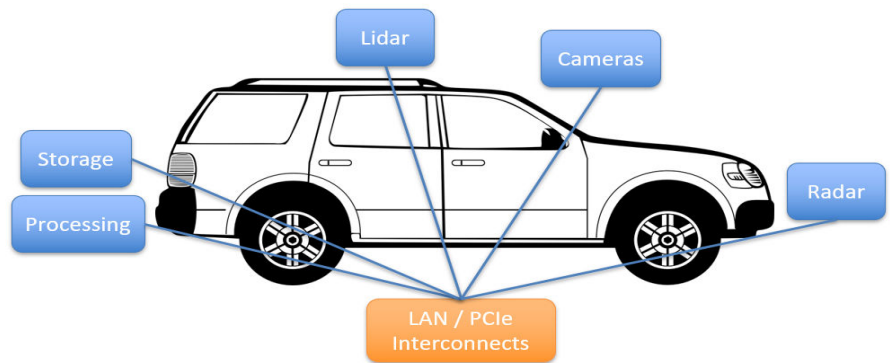
Individual control over each pin allows us to create almost any fault scenario. This can be anything from a total failure of one pin, to a precise glitch event that affects just a few bits of data. Physical layer fault injection provides a way to simulate degradation of a data link over time as cable damage and vibration affects the links.

The modules can be manually controlled for bench testing, or easily integrated into your existing test automation system as part of a fully automated test solution.

Target Infrastructure

Modern vehicles have a wide range of data links, many of which are now safety critical.

Cameras, radar and lidar sensors all require high speed communications interfaces. As these are integrated more into self driving and similar functions, testing becomes critical. Links WILL degrade and fail over time, and the vehicle must detect the issue and fail in a safe manner.



Supplied Parts

Each module comes with a 12v mains PSU and 2m USB cable

Also Required

Downloads - Our website contains many useful downloads to help you get started: www.quarch.com

- USB Drivers
- Technical Manuals
- Quick Start Guides
- Example Scripts
- TestMonkey GUI
- Quarch Power Studio





Support

Quarch provides direct support to all customers, regardless of the sales channel you use to purchase our equipment. We are available over email, or by phone during UK office hours. Our regional partners are also trained to handle many of the most common questions you might have.

Our support is normally free, though there may be charges if you require on-site training or significant development work. Please contact us if there is anything we can do to help.

Please see our website for access to drivers, technical manuals, quick-start guides, example scripts and more.

Email	Phone	Web
support@quarch.com	+44 1343 508 140	www.quarch.com/support

Ordering

Quarch have a network of specialist partners around the world. Please contact our partner in your region if you require a quote.

We recommend evaluating our products before purchase, so our partners will be happy to arrange a free evaluation unit.

Regional Contact Details

North America

SerialCables LLC
Colorado, California



Web www.serialcables.com

China, Hong Kong

Saniffer
Hong Kong



Web www.saniffer.com

India

ESA Group
Bangalore



Web www.esaindia.com

Taiwan

Reeper Technology
Taipei



Web www.reeper.com.tw/

Israel

EMY-Tech
Misgav



Web www.emy-tech.com

Europe and ROW

Quarch Technology
Scotland, UK



Web www.quarch.com

South Korea

JWill Technology
Seoul



Web www.jwill.co.kr

ASEAN Countries

Gopalam Embedded Systems
Singapore



Web www.embeddedsingapore.com





Products Versions

Product Code	Product Options
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QTLXXXX Product code, made up from options below

QTL2602 Automotive Multiprotocol Breaker

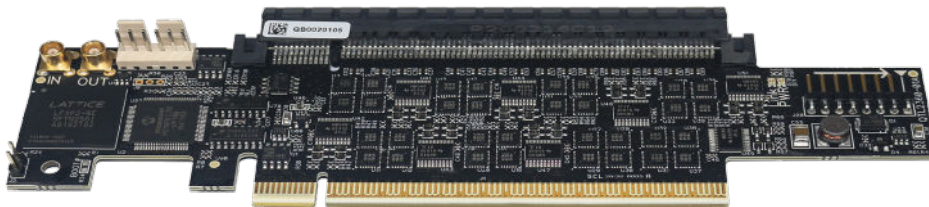
Related modules with automotive applications

QTL2182 Gen4 PCIe x16 Breaker Module

QTL2022 RJ-45 Breaker Module

QTL2171 SFP28 Breaker Module

QTL1309 USB 3 Breaker Module



PCIe x16 Card Module



RJ-45 Module



SFP28 Breaker Module





Technical Information

Connections	QTL2602	QTL2128	QTL2022	QTL2171	QTL1309
Host Side Connector	Screw Terminal	PCIe x16 Slot	RJ-45	SFP-28	USB3-B
Device Side Connector	Screw Terminal	PCIe x16 Slot	RJ-45	SFP-28	USB3-A
Max Speed	460MHz	16GT/s	10GBase-T	25G LAN	USB 3.0
Protocols	Multiple ^{*1}	PCIe	LAN	LAN, FC	USB
Signals Switched	4 Data+Power	All ^{*1}			

^{*1} All power, high speed data, mated and sideband pins are individually switched. GND pins are directly routed through the module.

Control	QTL2602	QTL2128	QTL2022	QTL2171	QTL1309
Power Supply	12v, PoE	Via Torridon Controller			
Control Ports	USB, LAN	Torridon Connector			
Triggering	√	SMA	X	X	X

Features	QTL2602	QTL2128	QTL2022	QTL2171	QTL1309
Basic (power) hot/swap	√	√	√	√	√
Full hot-swap	√	√	√	√	√
Pin Bounce Simulation	1uS minimum period				
Signal Glitch	Single/Cycle/PRBS				
Voltage Monitoring	X	√	√	√	√
Power Monitoring	X	√ ^{*1}	X	X	X
Active Signal Driving	X	√ ^{*2}	X	X	X

^{*1} Requires a feed from a Quarch PPM (QTL1999)

^{*2} Driving for low speed sideband signals

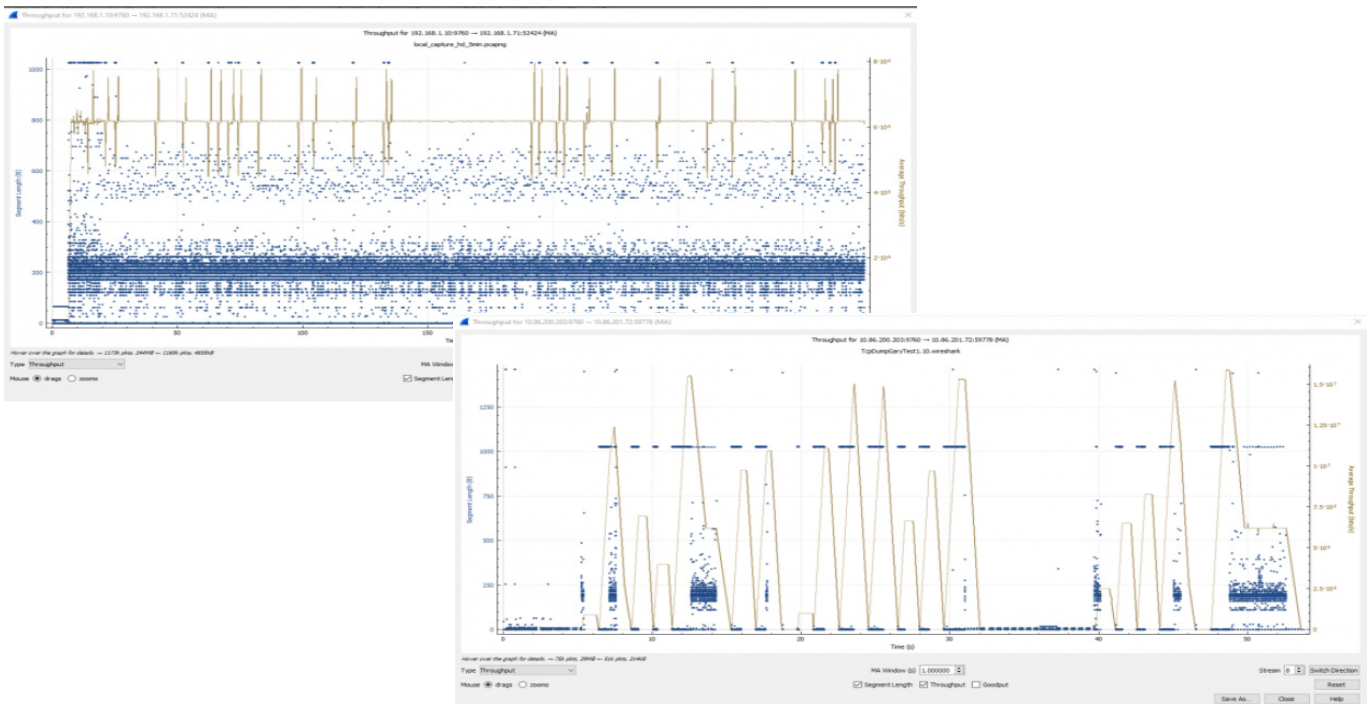




Data Display



The automotive breaker can display 1MHz sampling of data lines and injected glitch events. Here we can see glitch event disrupting data and causing a delay/reset on the bus.



Here we see clean TCP data (top) with high, consistent traffic. When injecting random glitch events, corresponding to 0.2% of the bus time, we see no error reported by the system, but effective data rate drops by around 50%



