



# GEN4 PCIe Card and Drive Modules

Automate hot-plug, dual redundancy and fault injection testing for GEN4 PCIe card devices

Quarch  
Data Sheet



# GEN4 PCIe Card and Drive Modules

Automate hot-plug, dual redundancy and fault injection testing for GEN4 PCIe Card devices



## Highlights

- Supports the full range of PCIe devices
- Removes manual intervention, for fully automated testing
- Precise and consistent timing control over hot-swap scenarios
- Completely transparent at the protocol layer
- Create and test many different fault conditions
- Simple to control with your existing test automation system

## Use Cases

<b>System Qualification</b>	Run repeated test cycles with bounds testing of all possible hot-swap and lane width scenarios
<b>Regression Testing</b>	Automated regression tests spot issues earlier during development
<b>RAID Testing</b>	Force drive rebuilds, single/double RAID faults
<b>Failover Testing</b>	Test dual redundancy, fault monitoring and performance during a failure
<b>Fault Injection</b>	Simulate a large number of fault scenarios





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## Hot Swap

PCIe data is switched with high speed RF switches, ensuring that our modules are almost totally transparent to the storage system. Host/Device connections will appear as if they are directly attached.

Individual control over each pin allows us to create almost any possible hot-swap or fault scenario. Precise timing ensures that every test can be exactly re-created. Versions are available with inrush current limits, to help high power devices hot-plug on hosts with limited power supply capacity.

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.

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## Module Range

The Gen4 range expanding rapidly as the interface gains traction. If you do not see the module you require, please let us know and we can get a time scale for you.

**HS** Modules also switch the PCIe lanes and have an additional injection port to allow power margining and measurement from our Programmable Power Module.

All modules support data rates up to 16GT/s.

Active signal driving is support for signals such as PERST, CLKREQ and WAKE. The exact signals driven varies from module to module

All the PCIe Card modules support some form of power monitoring; basic internal

measurement in the case of the 'Lite' module while the remaining devices have an injection port for the Power Module.

Interface options depend on the controller you chose, but include simple Serial, USB and LAN options. These can be accessed from almost any scripting language. You will need to purchase a separate controller to use this module.

Drive modules can be combined with other Torridon modules as part of a full test-automation system.

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## Supplied Parts

Each module comes with a 40cm interface cable, for connection to a controller.

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## Also Required

**Controller** - You will require one slot on a Torridon Controller for each Cable Module

**Downloads** - Our website contains many useful downloads to help you get started: [www.quarch.com](http://www.quarch.com)

USB Drivers

Technical Manuals

Quick Start Guides

Example Scripts

TestMonkey GUI





## 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



Email [sales@serialcables.com](mailto:sales@serialcables.com)  
Web [www.serialcables.com](http://www.serialcables.com)  
Phone +1 303-495-2320

### China, Hong Kong

Saniffer  
Hong Kong



Email [sales@saniffer.com](mailto:sales@saniffer.com)  
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Phone +86 21-58480285

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ESA Group  
Bangalore



Email [quarchsales@esaindia.com](mailto:quarchsales@esaindia.com)  
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### Taiwan

Reeper Technology  
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### Israel

EMY-Tech  
Misgav



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Web [www.emy-tech.com](http://www.emy-tech.com)  
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### Europe and ROW

Quarch Technology  
Scotland, UK

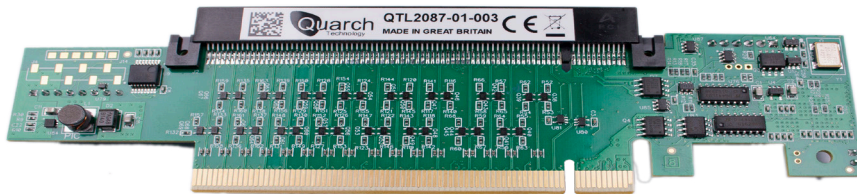


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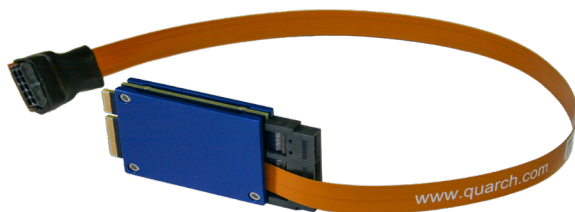


## Products Versions

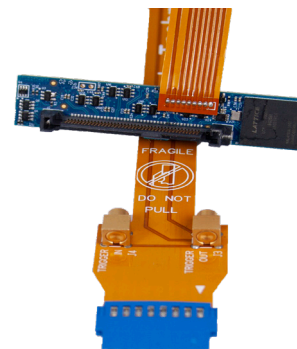
Product Code	Product Options
<b>QTLXXXX</b>	Product code, made up from options below
<b>QTL2087</b> <b>QTL2128</b>	Gen4 PCIe x16 HS Card Module + Triggering Gen4 PCIe x16 HS Card Module
<b>QTL2207</b> <b>QTL2266</b>	Gen4 PCIe U.2 Drive Module Gen4 PCIe U.2 Drive Module + Triggering
<b>QTL2245</b> <b>QTL2270</b>	Gen4 PCIe U.3 Drive Module Gen4 PCIe U.3 Drive Module +Triggering
<b>QTL2161</b> <b>QTL2272</b>	Gen4 EDSFF x8 Card Module Gen4 EDSFF x8 Card Module +Triggering
<b>QTL2161</b> <b>QTL2272</b>	Gen4 EDSFF x4 Card Module Gen4 EDSFF x4 Card Module +Triggering
<b>QTL2322</b> <b>QTL2395</b>	Gen4 M.2 M-Key Card Module Gen4 M.2 M-Key Card Module +Triggering



x16 Card Module



EDSFF x8 Module



U.2 Drive Module

## Required Controllers - One port on a controller is required for each module

Product Code	Description	
<b>QTL1260</b>	<b>Torridon Interface Kit</b> Simple USB and Serial control options for bench testing	
<b>QTL1461</b>	<b>4 Port Torrison Controller</b> Control up to 4 modules via Serial/LAN/USB connection	
<b>QTL1079</b>	<b>28 Port Torrison Controller</b> Control up to 28 modules via Serial, LAN or USB connection	

## Accessories

Product Code	Description
<b>QTL999</b>	<b>HD Programmable Power Module</b> Power margining any uA range power measurement, ideal for PCIe devices
<b>QTL1558</b>	<b>40cm Torrison Double Ended Interface Cable (Female to Female)</b> Replacement cable for Card Modules, connects Module to Controller
<b>QTL1870</b>	<b>100cm Torrison Double Ended Interface Cable (Female to Female)</b> Replacement cable for Card Modules, connects Module to Controller
<b>QTL1381</b>	<b>100cm Torrison Extension Cable (Male to Female)</b> Extends an existing Double Ended Torrison cable or fixed Drive Module Cable



## Technical Information

Connections	QTL2087	QTL2128	QTL2207	QTL2266	QTL2245	QTL2270
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Host Side Connector	PCIe x16		U.2		U.3	
Device Side Connector	PCIe x16		U.2		U.3	
Max Speed	16GT/s					
Protocols	PCIe			PCIe/SAS/SATA/GENz		
Signals Switched	All <sup>1</sup>					

Connections (cont)	QTL2161	QTL2272	QTL2334	QTL2351	QTL2322	QTL2395
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Host Side Connector	EDSFF x8	EDSFF x4		M.2		
Device Side Connector	EDSFF x8	EDSFF x4		M.2		
Form Factor	E1.L	E1.S		M-Key		
Max Speed	16GT/s					
Protocols	PCIe			PCIe, SATA		
Signals Switched	All <sup>1</sup>					

<sup>1</sup> All power, high speed data, mated and sideband pins are individually switched. GND pins are directly routed through the module.

Control	QTL2087	QTL2128	QTL2207	QTL2266	QTL2245	QTL2270
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Power Supply	Via Torridon Controller					
Control Ports	Torridon Connector					
Triggering	SMA	X	X	MCX	X	MCX
Power Injection Port	√	√	X	X	X	X

Control (cont)	QTL2161	QTL2272	QTL2334	QTL2351	QTL2322	QTL2395
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Power Supply	Via Torridon Controller					
Control Ports	Torridon Connector					
Triggering	X	MCX	X	MCX	X	MCX
Power Injection Port	X	X	X	X	X	X





Dimensions	QTL2087	QTL2128	QTL2207	QTL2266	QTL2245	QTL2270
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Offsets Drive By	41.94mm			11.86mm		
Length/Width	167.67mm			69.05mm		
Height	-			15.9mm		
Compatible Devices	x1 - x16 PCIe Cards			SSDs,HDDs		

Dimensions (cont)	QTL2161	QTL2272	QTL2334	QTL2351	QTL2322	QTL2395
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Offsets Drive By	52.02mm		53.8		-	
Length/Width	38.4mm		31.50		80mm	
Height	-		-		-	
Compatible Devices	E1.L x4 - x8		E1.S x4		M-Key	

Features	QTL2087	QTL2128	QTL2207	QTL2266	QTL2245	QTL2270
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Basic (power) hot/swap	√	√	√	√	√	√
Full hot-swap	√	√	√	√	√	√
Pin Bounce Simulation	Simple/Custom. 10uS minimum period		Simple/Custom. 1uS minimum period			
Signal Glitch	Single/Cycle/PRBS. 50nS minimum length					
Voltage Monitoring	√	√	√	√	√	√
Power Monitoring	Requires Power Module		X	X	X	X
Active Signal Driving	CLKREQ, WAKE, PERST and similar (depending on the interface)					

Features (cont)	QTL2161	QTL2272	QTL2334	QTL2351	QTL2322	QTL2395
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Basic (power) hot/swap	√	√	√	√	√	√
Full hot-swap	√	√	√	√	√	√
Pin Bounce Simulation	Simple/Custom. 1uS minimum period					
Signal Glitch	Single/Cycle/PRBS. 50nS minimum length					
Voltage Monitoring	√	√	√	√	√	√
Power Monitoring	X	X	X	X	X	X
Active Signal Driving	CLKREQ, WAKE, PERST and similar					

Controllers	All Modules
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Serial Control	Supported on all Controllers
USB Control	Supported on all Controllers
REST Control	Supported on QTL1079 and QTL1461
Telnet Control	Supported on QTL1079 and QTL1461





