

Setup & Test Specification


V1.4

Quarch Compliance Suite v1.09

FileActionHelp

SetupResults

Select Test



Connected

192.168.56.1

Server Name : localhost

Disconnect

Select a Test

Test Name	Version	Qtl Number	Licensed
Full range hotplug test	1.4	QCS1001	YES: Free
PCIe Lane Reduction	1.0	QCS1009	YES: Free
Power Margining	1.4	QCS1005	YES: Free
Power vs performance - Custom	1.0	QCS1007	YES: Free
Power vs performance - Free Test	1.0	QCS1008	YES: Free
Power vs performance - Drive Test	1.1	QCS1006	YES: Free
Pin-bounce during hotplug	1.3	QCS1002	YES: Free
Signal timing sweep during hotplug	1.4	QCS1003	YES: Free
UNH-IOL Plugfest - Basic hotplug	1.4	QCS1004	YES: Free

Description

Test Name: Full range hotplug test

Test Requirements:

Required Parts

- * 1x Quarch breaker module, appropriate for the physical layer interface being tested
- * 1x Quarch Controller, making the module available to the Host PC (LAN, USB or Serial)

Setup

- * Connect the breaker module between the Host PC and the DUT
- * Connect the breaker to the Quarch controller and power it up
- * Connect the Quarch controller to the Host PC (LAN, USB or Serial)

Test Running : UNH-IOL Plugfest - Basic hotplug

Server Status: Connected

Change History

1.0		Initial Release
1.1		Written in new format
1.3		Updated documentation
1.4		Improved report layout

Contents

Introduction

To compliment the UNH-IOL Hotplug test, Quarch has created the 'Hotplug full range test'. This test is designed to perform Hotplug tests across a larger range of delay timings than is specified in the standard UNH test.

Requirements

Host PC

- This is the PC which will mount the storage device under test (DUT). This system required admin privileges to install and execute the QCS server. Windows and Linux are supported.

Client PC

- This is the PC which will run the QCS client and record the results. This can be the same as the Host PC but it NOT recommended for this test. Windows and Linux are supported.

Quarch breaker module.

- A breaker module with the correct form factor and generation as the drive under test.

Device under Test (DUT)

- Your storage device. SAS, SATA and PCIe NVMe devices are supported.

> run:power up

Typical equipment layout

A typical equipment layout is shown below.

Begin the test

- Start QCS server of the Host PC
- > python -m quarchpy.run qcs

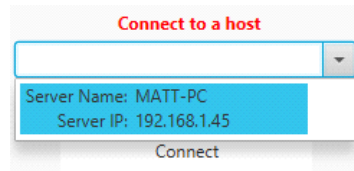
The server should start up almost immediately. Note the IP address and mDNS name which you will use to connect to the server later.

```
C:\WINDOWS\system32>python -m quarchpy.run qcs
Console Quick Edit Disabled

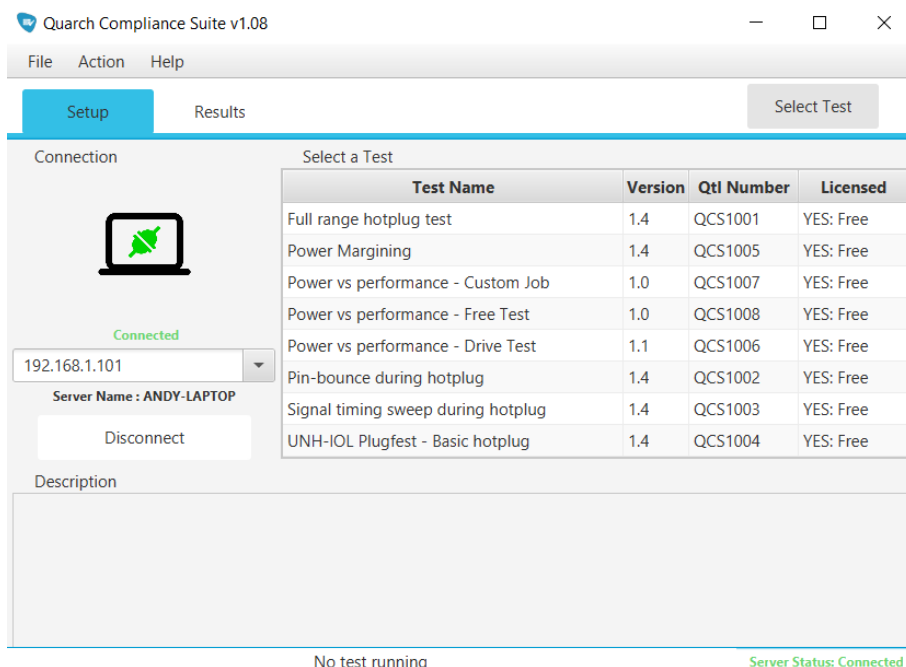
#####
                        Welcome to
                        Quarch Technology's
                        Quarch Compliance Suite
                        Quarchpy Version : 2.0.20.dev10
#####

DEBUG:root:Server Name: ANDY-LAPTOP
Server Name : ANDY-LAPTOP
Server IP : 192.168.1.101
Server Status : IDLE ( 02/05/2021, 10:51:22 )
DEBUG:root:Server IP: 192.168.1.101
_
```

- Start QCS application on the Client PC
- > Double click on the QCS icon to start
- Connect the Client to the Server
- Enter the IP address of the Server into the Client connection box. If 'zeroconf' is installed on the server then it should auto detect and be visible in the connection drop-down menu for fast connection.



- Select the test to run
- In this case, select the QCS1001, 'Full range hotplug test' and either double-click or select 'Select Test'



- This process can take 30 seconds or so, as the test is sent to the Server and the required applications are started on the Client.
- When the test is ready, the 'Start/Play' button will become available to begin running. If you want to change any setting for the test, you can do so now in the 'Custom Variables' window.
- When you have made any changes you require, press the run button to begin.

Link Speed

- Value to **compare** drive's link speed against

Lane Width

- Value to **compare** drive's lane width against

Select the devices

As the test starts running, you will be prompted to select the Quarch Breaker Module and storage device to use. The dialogs have a rescan button: just in case you have forgotten to plug something in!

Select the breaker module

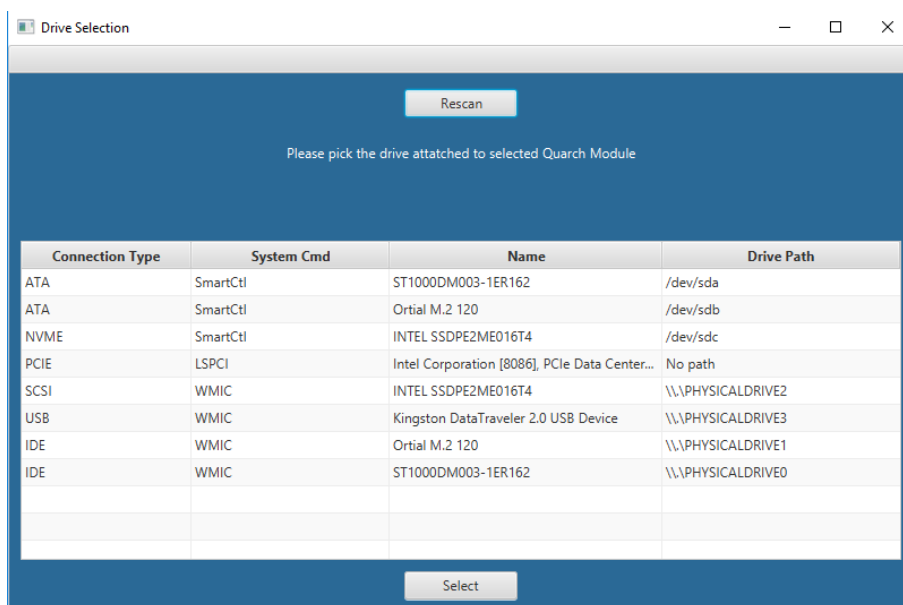
First you will be prompted to select the Breaker Module. Here we have a QTL2270 (Gen4 PCIe U.3) module connected to the Client PC via USB.

The breaker module must be available to the **Host** PC. If this is not the case, you will not see it shown here.

[illegible]

Select the storage device (DUT)

Next you will be prompted to select the storage device to test.



Be sure that you select the correct DUT.

Selecting the wrong drive will show fail test points throughout half of the test as the drive being monitored in QCS is not the drive being hotplugged.

View test progress

This test suite with default variables is fast to complete, currently under 5 minutes depending on how fast the drive under test enumerates. Customizing the test variables will increase this total test time.

Real time results are displayed in the log. Any failures will be clearly marked in red, and noted on the error counters.

If many failures occur early on, it is likely that you have a problem with the setup of the equipment. Expanding the failed rows gives more information on the failure.

Common test failures

- **Command to a Quarch module fails to get a response.**
 - Module has become disconnected or powered down. Check your cabling.
- **Command to a Quarch module returns a bad command or invalid parameter error.**
 - The Module connected is not the correct one for the test, or it required an upgrade.
- **The DUT is not removed from the system correctly during the power cycle test.**
 - The wrong DUT may be selected. Make sure you have chosen the right device. If uncertain, you can use TestMonkey or TorridonTerminal to manually hot swap the DUT and verify that it is powering the correct drive.
- **The DUT is not enumerated on the system after each hotplug test.**
 - Does the DUT and Host system support hot plug? If you cannot manually hot plug a device in the Host and have it enumerated correctly, then the test will not work.

Test specification

Basis for testing

This test is based on expanding the UNH-IOL hotplug test range of timing. For white papers on hotplug please visit the Quarch Website.

Your comments, requests and suggestions are very welcome and can be directed to support@quarch.com.

Future versions of the test suite will aim to include these improvements where practical.

Assumptions

We assume that the drive connected is in 'optimal' condition, to begin testing (ie: that it is empty and in 'out the box' condition).

We assume setup is correct with DUT and Host being capable of hotplug.

We assume PC's are connected across LAN.

Test itinerary

- Hotplug timings used are the following
 - 0mS
 - 5mS
 - 10mS
 - 25mS
 - 50mS
 - 75mS
 - 100mS
 - 250mS
 - 500mS
 - 1000mS
- Each timing is repeated once (*This can be edited in the custom variables*).
- Every repeat checks for both drive removal and insertion for the system & link speed, lane width if the drive is of type NVMe PCIe.
- By default, the DUT is expected to enumerate within 15 seconds of the power up command. In rare occasions where this is exceeded, this variable can be changed inside of the custom variables.

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Passing a pull event.

After sending a “run power down” to the Quarch module, the test will consistently query the system command used to find the drive. A drive passes this check point if it is successfully removed from the list of drives returned from the system command.

Passing a plug event.

After sending a “run power up” to the Quarch module, the test will consistently query the system command used to find the drive. A drive passes this check point if it is successfully added to the list of drives returned from the system command.

Passing a link speed check – NVMe / PCIe devices.

After the DUT is powered up and discovered, the test queries the LSPCI command using “lspci -vvv”, giving a very verbose output of the drive capabilities. Found within these capabilities is its current link speed. A drive passes this check point if the link speed is consistent as to what was expected. By default – This is the link speed a drive has at the beginning of the test.

Passing a lane width check – NVMe / PCIe devices.

After the DUT is powered up and discovered, the test queries the LSPCI command using “lspci -vvv”, giving a very verbose output of the drive capabilities. Found within these capabilities is its current lanewidth. A drive passes this check point if the lane width is consistent as to what was expected. By default – This is the lane width a drive has at the beginning of the test.