

Intel[®] QSFP+ Configuration Utility

Quick Usage Guide

Networking Division (ND)

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Revision 1.0
332168-001



Revision History

Revision	Date	Comments
1.0	March 9, 2015	Initial release (Intel Public).



1.0 Introduction

This document demonstrates how to change operational modes on the Intel® Ethernet Converged Network Adapters XL710-QDA1 and XL710-QDA2 using the Intel® QSFP+ Configuration Utility (QCU).

The information in this document is for experienced system administrators who are familiar with server, network, and data center concepts and technologies.

2.0 QSFP+ Breakout Cable Support Added

Starting with version 20.0 of the Intel® Network Connections Software, single- and dual-port QSFP+ adapters can be configured for use with breakout cables, enabling four SFP+ connections from a single QSFP+ interface.

Note: The QCU tool and ability to switch the configuration is supported only on Intel® Ethernet Converged Network Adapters XL710-QDA1 and XL710-QDA2.

3.0 Obtaining New NVM Images

The [Intel Download Center \(X710 or XL710\)](#) is Intel's repository for the latest software and drivers for your Intel products.

Use the NVM Update Tool (NUP) included with the software release to upgrade your adapter to the latest NVM version. The QCU requires an NVM image version of 4.42 or later. Image version 4.42 is part of the Software Version 20.0 release. The NVM Update Package is also available at:

<http://downloadcenter.intel.com/download/24769>

Note: Update to the most current i40e driver prior to running the QCU Tool. Release 20.0 drivers for the Linux operating systems are required to be installed prior to running QCU.



4.0 Locating the Utility

After downloading the Intel® Network Connections Software 20.0, unzip its contents into the system to be updated and navigate to the appropriate directory for your operating system as shown in [Figure 1](#).

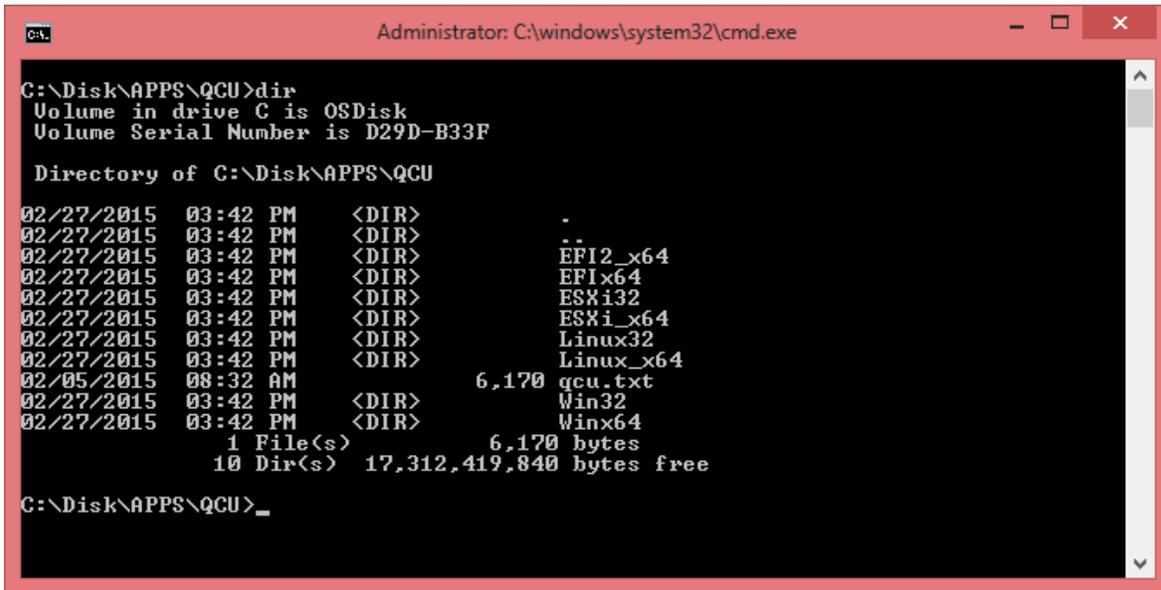


Figure 1. Locating the Tool

5.0 Using the Utility

Regardless of the operating system, QCU usage involves the same set of command-line arguments.

Note: Special operating system-specific troubleshooting information is located in [Section 6.0](#).

To display a list of options, issue QCU command with the **-help** argument, as follows:

```
QUCW64e.exe -help
```

An example is shown in [Figure 2](#).



```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\Administrator\Desktop\qcu\qcu\win64e>QCUW64e.exe -help
Intel(R) QSFP+ Configuration Utility

QCU version: v1.25.00.00
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Options:
/HELP or /?
    Displays command line help.
/VERSION
    Displays tool version information.
/EXITCODES
    Displays exit code help.
/DEVICES
    Displays supported devices present in the system.
/NIC=X
    Selects a specific adapter (1-32).
/INFO
    Displays supported QSFP+ link modes. Use only with /NIC.
/SET=[LINK MODE]
    Configures selected QSFP+ link mode. Use only with /NIC.

C:\Users\Administrator\Desktop\qcu\qcu\win64e>
```

Figure 2. QCU Options

To list available QSFP+ adapters that have been installed in the system, run the QCU with no additional options.

To see details for a particular adapter, including the current configuration and available alternative configurations, use the **/nic=x** and **/info** options, as shown in Figure 3.

```
Administrator: C:\Windows\system32\cmd.exe
C:\Users\Administrator\Desktop\qcu\qcu\win64e>QCUW64e.exe /nic=1 /info
Intel(R) QSFP+ Configuration Utility

QCU version: v1.25.00.00
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Adapter supports QSFP+ Configuration modification.
Current Configuration: 2x40
Supported Configurations: 1x40 2x40 4x10 2x2x10

C:\Users\Administrator\Desktop\qcu\qcu\win64e>
```

Figure 3. Adapter Details



Note: Adapters with older firmware may appear in the list, but are NOT configurable.

To change the configuration of an adapter, use the **/set=** option with one of the following configurations:

- **1x40** to enable a single QSFP+ port in 40 Gb/s mode.
- **2x40** to enable dual QSFP+ ports in 40 Gb/s mode.
- **4x10** for using a single QSFP+ port and breakout cable (connection to four 10 Gb/s SFP+ link partners).
- **2x2x10** for using dual QSFP+ ports with breakout cables (connection to two 10 Gb/s SFP+ link partners for each QSFP+ port).

The QCU currently offers all configuration options for an adapter running updated firmware, even though the selected configuration might be physically impossible. This will be corrected in a future release. At this time the user **MUST** select a valid configuration.

Note: Attempting to configure a single-port adapter for 2x2x10 (which requires two QSFP+ ports) simply makes half of the ports unusable.

Valid configurations include:

- Intel® Ethernet Converged Network Adapters XL710-QDA2(8086-1583): 2x40, 2x2x10, 4x10
- Intel® Ethernet Converged Network Adapters XL710-QDA1(8086-1584): 1x40, 4x10

Figure 4 shows the correct syntax to change “NIC 1” from one QSFP+ 40 GbE port to four individual 10 GbE ports.

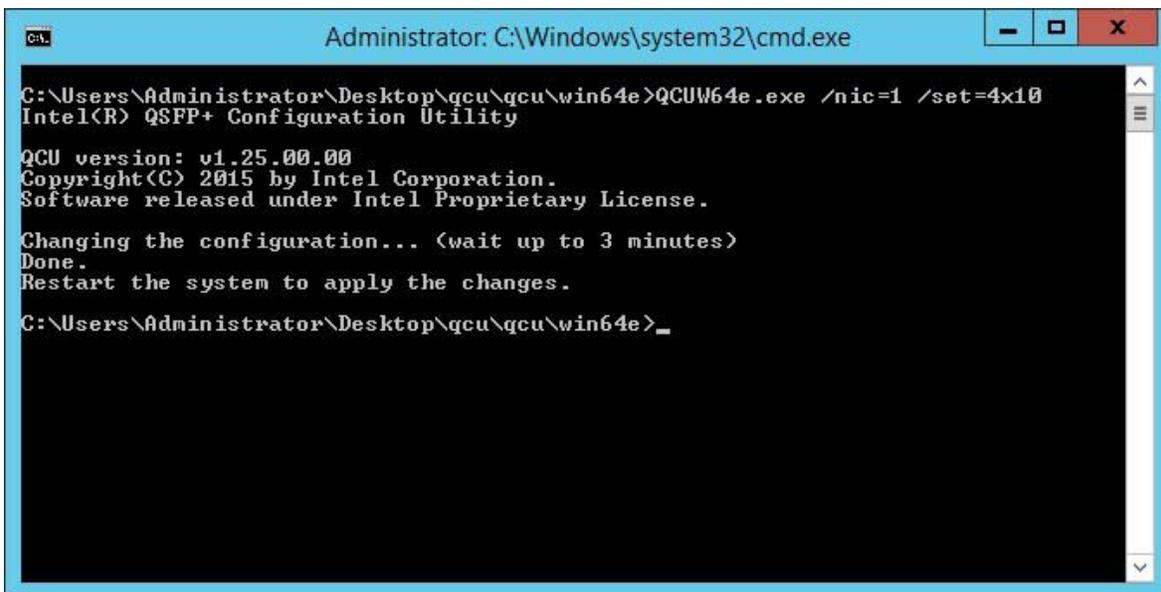


Figure 4. 1x40 to 4x10

Figure 4 shows that a system restart is required to allow the adapters to adopt their new configurations. Prior to restarting the systems, run the QCU tool with the **/devices** option to view the difference between the two physically identical adapters; one configured using **/set=2x40** and the other with **/set=4x10**, as shown in Figure 5.



```
Administrator: C:\Windows\system32\cmd.exe

C:\Users\Administrator\Desktop\qcu\qcu\win64e>QCUW64e.exe /devices
Intel(R) QSFP+ Configuration Utility

QCU version: v1.25.00.00
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NIC S:Bus Ven-Dev Mode Adapter Name
=== =====
1) 00:02 8086-1583 4x10 Intel(R) Ethernet Converged Network Adapter XL710-Q2
2) 00:03 8086-1583 2x40 Intel(R) Ethernet Converged Network Adapter XL710-Q2

C:\Users\Administrator\Desktop\qcu\qcu\win64e>
```

Figure 5. Device Differences

6.0 Troubleshooting and Additional Information

The message shown in Figure 6 appears when attempting to update adapters with older NVMs than the minimum version.

QSFP+ Configuration modification is not supported by this adapter.

```
Administrator: C:\Windows\system32\cmd.exe

C:\Users\Administrator\Desktop\qcu\qcu\win64e>QCUW64e.exe /nic=1 /set=4x10
Intel(R) QSFP+ Configuration Utility

QCU version: v1.25.00.00
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QSFP+ Configuration modification is not supported by this adapter.

C:\Users\Administrator\Desktop\qcu\qcu\win64e>_
```

Figure 6. QSFP+ Configuration Modification Not Supported



The QCU tool returns an exit code by default. A list of possible exit codes is available via the **/exitcodes** option, as shown in [Figure 7](#).

- To view this code under Linux, type `echo $?`.
- To view this code under Windows, type `echo %errorlevel%`.

```
Administrator: C:\windows\system32\cmd.exe

C:\Disk\APPS\QCU\Winx64>QCUW64e.exe /exitcodes
Intel(R) QSFP+ Configuration Utility

QCU version: v1.24.35.01
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Exit Codes:
 0x0 := Requested action executed successfully.
 0x1 := Insufficient privileges to run the utility.
 0x2 := Invalid adapter selected.
 0x3 := Bad command line parameter.
 0x4 := Unsupported link mode selected.
 0x5 := Adapter does not support link mode selection.
 0x6 := No adapter selected.
 0x7 := Memory allocation error.
 0x8 := No base driver available.
 0x9 := Unsupported base driver version detected.
 0xA := QSFP+ configuration for selected adapter not supported by this utility version.

C:\Disk\APPS\QCU\Winx64>
```

Figure 7. Exit Codes

The QCU tool can generate a debug log for advanced troubleshooting.

- Under Linux, enable the log using either of the following methods. The log is saved in `/var/log/iqvlinux.log`.
 - `export QV_DEBUG_LOG=0xffffffff` before running QCU/.
 - `run QV_DEBUG_LOG=0xffffffff ./qcu`.
- Under Windows, enable the debug log by setting the Environment Variable `QV_DEBUG_LOG=0xffffffff`.
 - Sysinternals DebugView must be installed.
 - Set an Environment Variable through the Control Panel:
 - System Properties > Advanced > Environment Variables**
 - Set an Environment Variable through the command line:

```
set EV_DEBUG_LOG=0xffffffff
```

The variable must be set before running QCU.



7.0 Known Issues

Windows

No unexpected Windows behavior was observed after running of the QCU tool.

Side effect:

Before applying the new QSFP+ link mode change, the tool calls **SetupDiRemoveDevice()** method (equivalent to using the Uninstall option in the Device Manager) on each X710 physical function (PF) except function 0. After a successful or unsuccessful **/SET** operation, only one adapter's port is visible in the system until the reboot.

Linux

No unexpected Linux behavior was observed after running of the QCU tool.

Side effect:

Before applying the link mode change, the tool removes all X710 physical functions (PF) except the function 0, by writing "1" to the *sysfs* files:

```
/sys/bus/pci/devices/[segment]:[bus]:[device].[function]/remove
```

After a successful or unsuccessful **/SET** operation, only one adapter's port is visible in the system until the reboot.

8.0 More Information

For more information on the Intel® Ethernet X710/XL710 adapter family, go to the following links:

- Intel® 10 Gigabit Server Adapters, Virtualization, Intel® Ethernet Converged Network Adapter X710 Series
<http://www.intel.com/content/www/us/en/network-adapters/converged-network-adapters/ethernet-x710.html>
- Intel® Ethernet Controller XL710 Series, Intelligent Systems, Embedded Developers & Engineers
<http://www.intel.com/content/www/us/en/embedded/products/networking/ethernet-controller-xl710-family.html>
- Intel® Ethernet Converge Network Adapters X710 Product Brief
<http://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/ethernet-x710-brief.pdf>
- Intel® Ethernet Controller XL710 Product Brief
<http://www.intel.com/content/dam/www/public/us/en/documents/product-briefs/xl710-10-40-gbe-controller-brief.pdf>



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