NVIDIA Quantum-2 Firmware v31.2010.1404 Release Notes

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Release Notes Update History

Revision	Date	Description
1.0	January 26, 2022	Initial release of this release notes version.

Overview

Firmware, which is added at the time of manufacturing, is used to run user programs on the device and can be thought of as the software that allows hardware to run. Embedded firmware is used to control the functions of various hardware devices and systems, much like a computer's operating system (OS) controls the function of software applications. Firmware may be written into read-only memory (ROM), erasable programmable read-only memory (EPROM), or flash memory.

Firmware Compatible Products

These are the release notes for the NVIDIA Quantum™-2 firmware. This firmware complements the NVIDIA Quantum switch with a set of advanced features, allowing easy and remote management of the switch.

This firmware supports the following protocols:

- InfiniBand—SDR, EDR, HDR, NDR

Supported Switch Systems

This firmware supports the devices listed in the table below:

Model Number	Description
QM9790	NVIDIA Quantum 2 based NDR InfiniBand Switch, 64 NDR ports, 32 OSFP ports, 2 Power Supplies (AC), Standard depth

Firmware Interoperability

This firmware version has been validated to work against platforms with the following firmware and software versions.

HCA/Switch	Firmware Version
NVIDIA Quantum-2	31.2010.1404
NVIDIA Quantum	27.2010.1404
Switch-IB 2	15.2010.1404
ConnectX-6	20.32.1010

HCA/Switch	Firmware Version
MFT	4.18.1-7

Supported Cables

Switch and HCAs InfiniBand Cable Connectivity Matrix

NVIDIA Quantum™ based switches and NVIDIA® ConnectX® HCAs support HDR (PAM4, 50Gb/s per lane) and EDR (NRZ, 25Gb/s per lane) technologies. As the ConnectX adapter cards are identified by their maximum supported throughput (e.g., ConnectX-6 VPI 100Gb/s card can support either 2-lanes of 50Gb/s or 4-lanes of 25Gb/s), the exact connectivity will be determined by the cable that is being used.

As a reference:

Speed Mode	Speed Supported	Number of Lanes Used
NDR	400Gb/s InfiniBand	4 lanes of 100Gb/s
NDR200	200Gb/s InfiniBand	2 lanes of 100Gb/s
HDR	200Gb/s InfiniBand	4 lanes of 50Gb/s
HDR100	100Gb/s InfiniBand	2 lanes of 50Gb/s
EDR	100Gb/s InfiniBand	4 lanes of 25Gb/s

The following tables present the connectivity matrix, between NVIDIA Quantum based switches, ConnectX HCA, and the cables.

Switch-to-Switch Connectivity

NVIDIA Quantum-2 switches come with OSFP cages. NVIDIA Quantum and Switch-IB 2 switches come with QSFP cages. The connectivity matrix below are separated into multiple tables due to the above physical differences between the switches.

Switch	Switch	Cable			
		NDR Transceiver	NDR DAC/ACC	HDR DAC/ AOC	EDR DAC/ AOC
NVIDIA Quantum-2	NVIDIA Quantum-2	2 × NDR	2 × NDR	N/A	N/A
NVIDIA Quantum-2	NVIDIA Quantum	N/A	N/A	2 × HDR	2 × EDR
NVIDIA Quantum-2	Switch-IB 2	N/A	N/A	N/A	2 × EDR

HCA-to-Switch Connectivity

Switch	Adapter	Cable			
			HDR AOC	HDR DAC	HDR100 DAC/AOC (Copper Cables Only)
ConnectX-6 200Gb/s	NDR Switch	NVIDIA Quantum-2	2 × HDR	2 × HDR	4 × HDR100
ConnectX-6 100Gb/s		NVIDIA Quantum-2	N/A	2 × EDR	4 × HDR100
ConnectX-4/ ConnectX-5		NVIDIA Quantum-2	N/A	2 × EDR	N/A

Supported Link Speed

The table below lists the current supported link speed.

Speed	Cable	Cable Length [meters]	Limitations
NDR	Optical	Up to 30	NDR optical cables support only NDR speed.

Speed	Cable	Cable Length [meters]	Limitations
	Copper	Up to 2	
HDR	Optical	Up to 30	HDR optical cables support only HDR speed.
	Copper	Up to 2	

Validated and Supported Cables

Speed	Cable OPN #	Description
NDR	MMS4X00-NL*	NVIDIA twin port transceiver, 800Gbps,2xNDR, OSFP, 2xMPO, 1310nm SMF, DR8, up to 30m
NDR	MCP4Y10-N00A	NVIDIA passive copper cable, IB twin port NDR, up to 800Gb/s, OSFP, 0.5m
NDR	MCP4Y10-N00B	NVIDIA passive copper cable, IB NDR, up to 800Gb/s, OSFP, 0.75m
NDR	MCP4Y10-N001	NVIDIA passive copper cable, IB NDR, up to 800Gb/s, OSFP, 1m
NDR	MCP4Y10-N002	NVIDIA passive copper cable, IB NDR, up to 800Gb/s, OSFP, 2m
HDR	MFA7U10-H003**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 3m
HDR	MFA7U10-H005**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 5m
HDR	MFA7U10-H010**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 10m
HDR	MFA7U10-H015**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 15m
HDR	MFA7U10-H020**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 20m
HDR	MFA7U10-	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to

Speed	Cable OPN #	Description
	H030**	2×200Gb/s, OSFP to 2xQSFP56, 30m
HDR	MCP7Y60-H001	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 1m
HDR	MCP7Y60-H01A	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 1.5m
HDR	MCP7Y60-H002	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 2m

> (i) **Note**
>
> *The minimal required firmware version for MMS4X00-NL cable is 45.110.234.
>
> **The minimal required firmware version for MFA7U10-H0MFA7U10-H0xx is 40.120.327 .

Firmware Upgrade

Firmware upgrade may be performed directly from any previous version to this version. To upgrade firmware, please refer to the NVIDIA Firmware Tools (MFT) package at:

http://www.mellanox.com/page/management_tools

PRM Revision Compatibility

This firmware version complies with the NVIDIA Switches Programmer's Reference Manual (PRM), Rev 1.40 or later.

Changes and New Features

Keyword	Description
31.2010.1310	
Systems	Added GA-level support for NVIDIA Quantum-2-based switch QM9790.
Congestion Control	Added ES-level support for congestion control class key.
Vendor Key	Added ES-level support for vendor class key.
Hierarchy Information	Added support for Hierarchy Information mad.
Remote Debug Token	Added support for Remote Debug Token.
NVIDIA® Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)™	Added GA-level support for SHARPv2 for NVIDIA Quantum-2 systems.
Counters	Added support for PortVLXmitFlowCtlUpdateErrors counters.
Security	Added support for Secure Firmware and Secure Firmware Boot on NVIDIA Quantum-2 systems.

Bug Fixes in this Firmware Version

The following table provides a list of bugs fixed in this version. For a list of bug fixed from previous versions, see .Bug Fixes History v27.2010.11xx.

Internal Ref.	Issues
2798848	**Description:** In Quantum-2 systems, changing the SerDes Tx set values is not operational.
	Workaround: N/A
	Keywords: Tx
	Discovered in Version: 31.2010.1216

Known Issues

The following sections describe known issues in firmware releases and possible workarounds.

Internal Ref.	Issue
2923464	**Description:** When using MMS4X00-NL Optical module, on rare occasions port that is in NDR speed may get stuck and stay in Polling state.
	Workaround: On most occasions, toggling the port will solve the issue.
	Keywords: NVIDIA Quantum-2, NDR, Optical Module
	Discovered in Version: 31.2010.1404
2849215	**Description:** On NVIDIA Quantum-2 switches, when working with MFA7U10-H0xx cables, if one of the ports in a cage is disabled at the time of initialization by user configuration, reenabling the port will require toggling the link (i.e. enable disable enable).
	Workaround: N/A
	Keywords: NVIDIA Quantum-2, Cables
	Discovered in Version: 31.2010.1310
2910161	**Description:** In auto-negotiation flow, using copper cables when toggling both port's sides may cause the port to get stuck on rare occasions.
	Workaround: Toggle the port again.
	Keywords: Auto-Negotiation, Copper Cables
	Discovered in Version: 31.2010.1310
2872688	**Description:** On some occasions, when using NVIDIA Quantum-2 systems with Optical cables, the link up time can take a long time.
	Workaround: N/A

Internal Ref.	Issue
	Keywords: Link Up
	Discovered in Version: 31.2010.1310
2885798	**Description:** In NVIDIA Quantum-2 systems, effective errors may occur with short Copper cable MCP4Y10-N00B.
	Workaround: N/A
	Keywords: Copper Cables
	Discovered in Version: 31.2010.1310
2890632	**Description:** Currently, on NVIDIA Quantum-2 systems, changing the Optical module rate is not allowed.
	Workaround: N/A
	Keywords: Optical Modules
	Discovered in Version: 31.2010.1310
2859363	**Description:** When using NVIDIA Quantum-2 systems in Auto-Neg mode, NDR speed in one lane (1x) is not supported.
	Workaround: N/A
	Keywords: Auto-Neg
	Discovered in Version: 31.2010.1310
2838195	**Description:** Using NDR speed with Optical Transceivers causes bandwidth to be 350Gb/s instead of 400Gb/s in small packets.
	Workaround: N/A
	Keywords: Optical Transceivers
	Discovered in Version: 31.2010.1310
2834238	**Description:** When using Optical Transceiver, toggling a port in a cage may toggle the adjacent port in the cage.
	Workaround: N/A
	Keywords: Optical Transceivers, Port Toggle
	Discovered in Version: 31.2010.1310

Internal Ref.	Issue
2826373	**Description:** When using copper cables, link up time may take up to 5 minutes.
	Workaround: Arbitration table should be set using only the low priority VL arbitration table.
	Keywords: Auto Negotiation
	Discovered in Version: 31.2010.1310
955641	**Description:** VL_HIGH_LIMIT is not affecting the VL arbiter as expected.
	Workaround: Arbitration table should be set using only the low priority VL arbitration table.
	Keywords: VL Arbitration
	Discovered in Version: 31.2010.1310
1249608	**Description:** Configuring weight "0" for VL, results in unexpected behavior.
	Workaround: Arbitration table should be configured with weights other than "0".
	Keywords: VL Arbitration
	Discovered in Version: 31.2010.1310
2057793	**Description:** Congestion profiles in VS-MAD PortProfileSetting support only fixed mode. Percentage mode is not supported.
	Workaround: N/A
	Keywords: InfiniBand Congestion Control
	Discovered in Version: 31.2010.1310
Unsupported Features	Features that are not yet supported in the NVIDIA Quantum-2 systems: • IB Router • BER Monitor • Error Injection