



NVIDIA Quantum-2 Firmware Release Notes

v31.2010.5042

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Release Notes Update History

Revision	Date	Description
1.0	February 5, 2023	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 Download

Please visit nvidia.com/en-us/networking/ → Support → Support → Firmware Download

Document Revision History

A list of the changes made to this document are provided in [Changes and New Features](#) and [Changes and New Features History](#).

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	NVIDIA SKU	Description
QM9790	920-9B210-00FN-0D2 920-9B210-00FN-0D0	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	31.2010.5042
NVIDIA Quantum	27.2010.5042
ConnectX-7	28.35.2000

HCA/Switch	Firmware Version
ConnectX-6	20.35.2000
MFT	4.22.1-11

Supported Cables

Warning

NVIDIA does not support InfiniBand cables or modules not qualified or approved by NVIDIA.

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.
	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	MCP7Y50-N001	NVIDIA passive copper splitter cable, IB NDR 800Gb/s to 4×200Gb/s, OSFP to 4xOSFP, 1m
NDR	MCP7Y50-N01A	NVIDIApassive copper splitter cable, IB NDR 800Gb/s to 4×200Gb/s, OSFP to 4xOSFP, 1.5m
NDR	MCP7Y50-N002	NVIDIApassive copper splitter cable, IB NDR 800Gb/s to 4×200Gb/s, OSFP to 4xOSFP, 2m
NDR	MCP7Y00-N001	NVIDIA passive copper splitter cable, IB NDR 800Gb/s to 2×400Gb/s, OSFP to 2xOSFP, 1m
NDR	MCP7Y00-N01A	NVIDIApassive copper splitter cable, IB NDR 800Gb/s to 2×400Gb/s, OSFP to 2xOSFP, 1.5m
NDR	MCP7Y00-N002	NVIDIApassive copper splitter cable, IB NDR 800Gb/s to 2×400Gb/s, OSFP to 2xOSFP, 2m
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

Speed	Cable OPN #	Description
NDR	MCP4Y10-N01A	NVIDIA passive Copper cable, IB twin port NDR, up to 800Gb/s, OSFP, 1.5m
NDR	MCP4Y10-N002	NVIDIA passive copper cable, IB NDR, up to 800Gb/s, OSFP, 2m
HDR	MCP7Y70-H001	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 4×100Gb/s, OSFP to 4xQSFP56, 1m
HDR	MCP7Y70-H01A	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 4×100Gb/s, OSFP to 4xQSFP56, 1.5m
HDR	MCP7Y70-H002	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 4×100Gb/s, OSFP to 4xQSFP56, 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-H030**	NVIDIA active fiber splitter cable, IB HDR, 400Gb/s to 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
EDR	MCP7Y60-H002	NVIDIA passive copper splitter cable, IB HDR 400Gb/s to 2×200Gb/s, OSFP to 2xQSFP56, 2m

 **Warning**

*The minimal required firmware version for MMS4X00-NL-QP1 cable is 45.110.234. **The minimal required firmware version for MFA7U10-HOMFA7U10-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 network.nvidia.com/products/adapter-software/firmware-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
IB Router	Added support for NDR InfiniBand Router which enables isolation and connectivity between up to eight different InfiniBand subnets. The IB Router enables features such as Adaptive Routing (AR), Hash Based Forwarding (HBF), and Self-Healing Interconnect Enhancement for Inteligent Datacenters (SHIELD).
General	See Bug fixes .

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](#).

Internal Ref.	Issues
3301825	Description: The firmware does not return values for the counters "PortSwLifetimeLimitDiscards" and "PortSwHOQLifetimeLimitDiscards". Support has now been added for the counters.
	Keywords: Counters
	Discovered in Version: 31.2010.3118
	Fixed in Version: 31.2010.5042
3335002	Description: pFRN mirror v1 header pad count showed an invalid padding size.
	Keywords: PFRN
	Discovered in Version: 31.2010.4010
	Fixed in Version: 31.2010.5042

Changes and New Features History

This section includes history of changes and new feature of three major releases back. For older versions' history, please refer to their dedicated release notes.

Keyword	Description
31.2010.5002	
SHARP SAT Reliable Multicast	Added engineering-sample-level support for RMC request (SHARP SAT opcode 0xA) and RMC response (SHARP SAT opcode 0xB).
General	See Bug fixes .

Keyword	Description
31.2010.4102	
General	Stability improvements.
General	See Bug fixes .

Keyword	Description
31.2010.4010	
pFRN Collector	Added support for mirroring of PFRN packets towards UFM entity (collector) in the subnet.
PKEY Filter for Multicast	Added support for MulticastPKeyTrapSuppression (PKEY mismatch filtering).
Congestion Control Updates	Added support for 1kb granularity for the port congestion profiles.

Keyword	Description
SL-to-VL Mapping	Added switch support for port mask optimization of SL-to-VL Mapping Table configuration.
General	See Bug fixes .

Keyword	Description
31.2010.3118	
Hash-Based Routing	Enabled the reordering of sensitive traffic to load balance on multiple ports by using Hash-Based Routing.
General	See Bug fixes .

Keyword	Description
31.2010.3004	
Counters	Added support for PortXmitWaitVLExtended counters.
pFRN	Added support for pFRN (Proactive Fault Routing Notification) which allows for dynamic link failure detection and route correction for topologies based on Adaptive Routing
General	See Bug fixes .

Keyword	Description
31.2010.2300	
SHARPV3	Added GA-level support for aggregation jobs to run over parallel links.
General	Bug fixes .

Keyword	Description
31.2010.2246	

Keyword	Description
SHARPV3	Added beta-level support for aggregation jobs to run over parallel links.
General	Bug fixes.

Keyword	Description
31.2010.2110	
SHARPV3	Added GA-level support for SHARPV3 on Quantum-2 systems.
General	Bug fixes.

Keyword	Description
31.2010.2036	
Systems	Added power and system monitoring optimizations.
SHARP V3	Added beta-level support for SHARP V3 on Quantum-2 systems.
Hash Based Forwarding	Added alpha-level support for Hash Based Forwarding Routing Capability.
Security	Added security enhancements to QM9790 system.

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.

Keyword	Description
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 History

The following table provides a list of bugs fixed in previous versions. For a list of bug fixed from the current version, see [Bug Fixes](#).

Internal Ref.	Issues
3269531	Description: After multiple MSPS (Management System Power Supply register) calls, the switch gets stuck.
	Keywords: MSPS
	Discovered in Version: 27.2010.3118
	Fixed in Version: 27.2010.5002
3267152	Description: On NDR devices, when collecting BER data, the peer falls, causing the switch to hang.
	Keywords: BER COLLECT
	Discovered in Version: 31.2010.4102
	Fixed in Version: 31.2010.5002
3261861	Description: Connecting an HDR device to an NDR device with Optical cables longer than 30m causes degradation in the bandwidth.
	Keywords: HDR-to-NDR
	Discovered in Version: 31.2010.4102
	Fixed in Version: 31.2010.5002
2974424	Description: Currently, on cables that perform polarity inversion there is no link up.
	Keywords: Cables, Polarity Inversion
	Discovered in Version: 31.2010.3118
	Fixed in Version: 31.2010.5002

Internal Ref.	Issues
3199650	<p>Description: A physical link failure between switches while a SHARP job is running and utilizing the link can cause one of the switches to become invalid for further SHARP jobs. This can result in either a "No resource" response for new SHARP job requests or in jobs getting stuck. The bug fix requires SHARP version 3.2.</p>
	<p>Keywords: SHARP</p>
	<p>Discovered in Version: 31.2010.4010</p>
	<p>Fixed in Version: 31.2010.4102</p>
3245821	<p>Description: In case of an AR group table set request, the ARN mask is flushed for group that has an active pFRN timer.</p>
	<p>Keywords: PFRN</p>
	<p>Discovered in Version: 31.2010.4010</p>
	<p>Fixed in Version: 31.2010.4102</p>
3253717	<p>Description: mask_force_clear_timeout timer in pFRN feature was not functional (the mask was not cleared when the timer expired).</p>
	<p>Keywords: PFRN</p>
	<p>Discovered in Version: 31.2010.4010</p>
	<p>Fixed in Version: 31.2010.4102</p>
3242209	<p>Description: Set PFRN mad did not return error on wrong inputs in mask_clear_timer and mask_force_clear_timer fields.</p>
	<p>Keywords: PFRN</p>
	<p>Discovered in Version: 31.2010.4010</p>
	<p>Fixed in Version: 31.2010.4102</p>
3143685	<p>Description: The switch does not return transceiver SN or PNS. Access to flash was fixed using the MSGI register.</p>
	<p>Keywords: Transceiver</p>
	<p>Discovered in Version: 31.2010.2300</p>
	<p>Fixed in Version: 31.2010.4010</p>
3174239	<p>Description: On rare occasions, traps were not properly repressed, which caused redundant traps to be sent multiple times.</p>

Internal Ref.	Issues
	Keywords: Traps
	Discovered in Version: 31.2010.3118
	Fixed in Version: 31.2010.4010
3002314	Description: On rare occasion, when port is configured to mloop toggle may cause link to not rise.
	Keywords: Optic in Mloop
	Discovered in Version: 31.2010.2110
	Fixed in Version: 31.2010.3118
3127727	Description: On rare occasion, when egress port is split to two, the egress port may get stuck due to wrong Fast Path configuration.
	Keywords: Switch Hang, Fast Path, Split
	Discovered in Version: 31.2010.3004
	Fixed in Version: 31.2010.3118
3082569	Description: In some traffic patterns involving small packets, the PortRcvErrors counter may mistakenly count events of local physical errors due to an internal flow in the hardware that involves link packets.
	Keywords: Counters
	Discovered in Version: 31.2010.2246
	Fixed in Version: 31.2010.3004
3085427	Description: On rare occasions, SHARP semaphore may remain locked on a port following an event of a port link down or an application crash.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036
	Fixed in Version: 31.2010.3004
3011581	Description: On rare occasions, job failures with SharpError trap may be experienced as a result of previous jobs that have failed.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036
	Fixed in Version: 31.2010.3004

Internal Ref.	Issues
3000602	Description: After disconnecting MMS4X00-NL* cable and connecting Ultron cable to the same port, ports fails to link up.
	Keywords: Cables
	Discovered in Version: 31.2010.2110
	Fixed in Version: 31.2010.2300
3060122	Description: In the event of link fault of a link between root switch and non-root switch during the run of a job, the next job run on the non-root switch may fail.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036
	Fixed in Version: 31.2010.2300
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.
	Keywords: NDR, Optical Module
	Discovered in Version: 31.2010.1404
	Fixed in Version: 31.2010.2246
2859363	Description: When using NVIDIA Quantum-2 systems in Auto-Neg mode, NDR speed in one lane (1x) is not supported.
	Keywords: Auto-Negotiation
	Discovered in Version: 31.2010.1310
	Fixed in Version: 31.2010.2246
3033131	Description: The number of flows changed from 2 to 1, as intended.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2110
	Fixed in Version: 31.2010.2246
2972388	Description: Running of concurrent jobs may lead to states where jobs unexpectedly terminate or get stuck.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036

Internal Ref.	Issues
	Fixed in Version: 31.2010.2110
2982113	Description: On rare occasions, job resource cleanup may fail.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036
	Fixed in Version: 31.2010.2110
2971339	Description: During high load scenarios, performance degradation may be experienced.
	Keywords: SHARPV3
	Discovered in Version: 31.2010.2036
	Fixed in Version: 31.2010.2110
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).
	Keywords: NVIDIA Quantum-2, Cables
	Discovered in Version: 31.2010.1310
	Fixed in Version: 31.2010.2036
2890632	Description: On NVIDIA Quantum-2 systems, changing the Optical module rate was not allowed.
	Keywords: Optical Modules
	Discovered in Version: 31.2010.1310
	Fixed in Version: 31.2010.2036
2885798	Description: In NVIDIA Quantum-2 systems, effective errors may occur with short Copper cable MCP4Y10-N00B.
	Workaround: N/A
	Discovered in Version: 31.2010.1310
	Fixed in Version: 31.2010.2036
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.

Internal Ref.	Issues
	Keywords: Auto-Negotiation, Copper Cables
	Discovered in Version: 31.2010.1310
	Fixed in Version: 31.2010.2036

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