NVIDIA Quantum-2 Firmware Release Notes v31.2010.5108

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Release Notes Update History

Revision	Date	Description
1.0	March 8, 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	31.2010.5108
NVIDIA Quantum	27.2010.5108
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.
NDR	Copper	Up to 2	
HDR	Optical	Up to 30	HDR optical cables support only HDR speed.
HDR	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-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 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
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
3362685	**Description:** In QM9700 systems, when a transceiver module is plugged in when only one of the optic cables is connected (while the second cable is disconnected), the port LED may be incorrectly displayed on the disconnected side.
	Keywords: Port LED, Optic Cables
	Discovered in Version: 31.2010.4102
	Fixed in Version: 31.2010.5108
3377608	**Description:** When operating in dynamic trees allocation mode, MAD error responses might be received in libsharp.
	Keywords: sharp_am, libsharp
	Fixed in Version: 31.2010.5108
3362200	**Description:** In rare cases that involve stress of traffic, unexpected hardware fast path behavior may occur, possibly leading to the switch firmware hanging when toggling the ports.
	Keywords: Turbo Path
	Discovered in Version: 31.2010.5002
	Fixed in Version: 31.2010.5108

Known Issues

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

Internal Ref.	Issue
3323781	**Description:** GMP MADs with GRH header towards the Router are not supported.
	Workaround: N/A
	Keywords: Routers
	Discovered in Version: 31.2010.5042
2922333	**Description:** In some cases, MMS4X00-NL1.2 may have low BER.
	Workaround: N/A
	Keywords: Signal Integrity
	Discovered in Version: 31.2010.2110
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
955641	**Description:** VL_HIGH_LIMIT is not affecting the VL arbiter as expected.

Internal Ref.	Issue
	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

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
31.2010.5108	
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.

Keyword	Description
31.2010.5002	
SHARP SAT Reliable Multicast	Added e ngineering-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.
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	
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.
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
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

Internal Ref.	Issues
3269531	**Description:** After multiple MSPS (Management System Power Supply register) calls, the switch gets stuck.
	Keywords: MSPS
	Discovered in Version: 31.2010.3118
	Fixed in Version: 31.2010.5002
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

Internal Ref.	Issues
	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	**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.
	Keywords: SHARP
	Discovered in Version: 31.2010.4010
	Fixed in Version: 31.2010.4102
3245821	**Description:** In case of an AR group table set request, the ARN mask is flushed for group that has an active pFRN timer.
	Keywords: PFRN
	Discovered in Version: 31.2010.4010
	Fixed in Version: 31.2010.4102
3253717	**Description:** mask_force_clear_timeout timer in pFRN feature was not functional (the mask was not cleared when the timer expired).

Internal Ref.	Issues
	Keywords: PFRN
	Discovered in Version: 31.2010.4010
	Fixed in Version: 31.2010.4102
3242209	**Description:** Set PFRN mad did not return error on wrong inputs in mask_clear_timer and mask_force_clear_timer fields.
	Keywords: PFRN
	Discovered in Version: 31.2010.4010
	Fixed in Version: 31.2010.4102
3143685	**Description:** The switch does not return transceiver SN or PN when trying to call via mlxlink or ibdiagnet.
	Keywords: SN, PN, mlxlink, ibdiagnet
	Discovered in Version: 31.2010.2300
	Fixed in Version: 31.2010.4010
3174239	**Description:** On rare occasions, traps were not properly repressed, which caused redundant traps to be sent multiple times.
	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

Internal Ref.	Issues
	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
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

Internal Ref.	Issues
	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
	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

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

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