



NVIDIA ConnectX-7 Adapter Cards Firmware Release Notes v28.43.1014

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Release Notes Update History

Version	Date	Description
28.43.101 4	November 2024	Initial release of this Release Notes version, This version introduces Changes and New Features and Bug Fixes .

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.

The ConnectX-7 smart host channel adapter (HCA) provides up to four ports of connectivity and 400Gb/s of throughput, hardware-accelerated networking, storage, security, and manageability services at data center scale for cloud, telecommunications, AI, and enterprise workloads. ConnectX-7 empowers agile and high-performance networking solutions with features such as Accelerated Switching and Packet Processing (ASAP2), advanced RoCE, GPUDirect Storage, and in-line hardware acceleration for Transport Layer Security (TLS), IP Security (IPsec), and MAC Security (MACsec) encryption and decryption. ConnectX-7 enables organizations to meet their current and future networking needs in both high-bandwidth and high-density environments.

The ConnectX-7 smart host channel adapter (HCA), featuring the NVIDIA Quantum-2 InfiniBand architecture, provides the highest networking performance available to take on the world's most challenging workloads. ConnectX-7 provides ultra-low latency, 400Gb/s throughput, and innovative NVIDIA In-Network Computing acceleration engines to provide additional acceleration to deliver the scalability and feature-rich technology needed for supercomputers, artificial intelligence, and hyperscale cloud data centers.

Firmware Download

Please visit [Firmware Downloads](#).

Document Revision History

A list of the changes made to this document are provided in [Document Revision History](#).

Firmware Compatible Products

These are the release notes for the NVIDIA® ConnectX®-7 adapters firmware. This firmware supports the following protocols:

- InfiniBand - EDR, HDR100², HDR², NDR200², NDR²
- Ethernet - 1GbE, 10GbE, 25GbE, 40GbE, 50GbE¹, 100GbE¹, 200GbE², 400GbE²
- PCI Express 5.0, supporting backwards compatibility for v4.0, v3.0, v2.0 and v1.1

¹. Speed that supports both NRZ and PAM4 modes in Force mode and Auto-Negotiation mode.

². Speed that supports PAM4 mode only.

Note

When connecting an NVIDIA-to-NVIDIA adapter card in ETH PAM4 speeds, Auto-Neg should always be enabled.

Supported Devices

NVIDIA SKU	Legacy OPN	PSID	Device Description
900-24768-0002-000	N/A	NVD000000054	Nvidia Dual ConnectX-7 Mezzanine Board for GB200 NVL systems, Crypto Enabled, Secure Boot Enabled, Partner Cool
900-9X7AH-004N-CT0	MCX713114 TC-GEAT	MT_000001048	NVIDIA ConnectX-7 Ethernet adapter card; FHHL; 25GbE/50GbE; quad-port SFP with

NVIDIA SKU	Legacy OPN	PSID	Device Description
			enhanced-SyncE & PTP; PPS In/Out; PCIe 5.0 x16; Crypto and Secure Boot
900-9X760-0078-MB1	MCX753436 MS-HEBB	MT_000001221	NVIDIA ConnectX-7 OCP3.0 SFF Adapter Card;200GbE (default mode) / NDR200 IB; Dual-port QSFP112; Multi-Host and Port Split capable; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled; Thumbscrew (Pull Tab) Bracket
900-9X7AH-0078-DTZ	MCX755106 AS-HEAT	MT_000000834	NVIDIA ConnectX-7 HHHL Adapter Card; 200GbE (default mode) / NDR200 IB; Dual-port QSFP112; PCIe 5.0 x16 with x16 PCIe extension option; Crypto Disabled; Secure Boot Enabled
900-9X7AH-0078-ST0	MCX713106 AS-VEAT	MT_000000840	NVIDIA ConnectX-7 HHHL Adapter Card; 200GbE; Dual-port QSFP112; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled
900-9X767-003N-DT0	MCX75210A AS-NEAT	MT_000000851	NVIDIA ConnectX-7 HHHL Adapter Card; NDR IB; Single-port OSFP; PCIe 5.0 2x8 in a row (Socket Direct); Crypto Disabled; Secure Boot Enabled
900-9X766-001N-ST0	MCX75310A AS-HEAT-N	NVD000000024	NVIDIA ConnectX-7 InfiniBand adapter card; 200Gb/s NDR200; single-port OSFP; PCIe 5.0 x16; secure boot; no crypto; for Nvidia DGX
900-9X720-00E0-S0B / 900-9X720-007N-SN1 / 900-9X720-00E0-S00 / 900-9X720-007N-SN0	MCX750500 B-OD0K / MCX750500 C-OD0K / MCX750500 B-OD00 / MCX750500 C-OD00	MT_000000891	Nvidia adapter card with four ConnectX-7; each up to 400Gb/s IB (default mode) or 400GbE; PCIe 5.0 x32; PCIe switch; crypto disabled; secure boot enabled
900-9X7AH-0058-DT1	MCX753106 AS-HEAT-N	NVD000000023	NVIDIA ConnectX-7 VPI adapter card; 200Gb/s; dual-port QSFP; single port InfiniBand and second port VPI (InfiniBand or Ethernet); PCIe 5.0 x16; secure boot; no crypto; for Nvidia DGX storage
900-9X7AX-004NMCO	MCX75343A MC-NEAC	MT_000001059	NVIDIA ConnectX-7 OCP3.0 TSFF Adapter Card; 400GbE / NDR IB (default mode); Single-port OSFP; Multi-Host and Socket Direct capable; PCIe 5.0 x16; Crypto Enabled; Secure Boot Enabled

NVIDIA SKU	Legacy OPN	PSID	Device Description
900-9X7AH-0076-ST0	MCX713106 AS-CEAT	MT_00 00000 843	NVIDIA ConnectX-7 HHHL Adapter Card; 100GbE; Dual-port QSFP112; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled
900-9X7AO-0003-ST0	MCX713104 AS-ADAT	MT_00 00000 849	NVIDIA ConnectX-7 HHHL Adapter Card; 25/50GbE; Quad-Port SFP56; PCIe 4.0 x16; Crypto Disabled; Secure Boot Enabled
900-9X766-003N-SR0	MCX75310A AC-NEAT	MT_00 00001 046	NVIDIA ConnectX-7 HHHL Adapter card; 400GbE / NDR IB (default mode); Single-port OSFP; PCIe 5.0 x16; Crypto Enabled; Secure Boot Enabled;
900-9X760-0078-MB0	MCX753436 MS-HEAB	MT_00 00000 833	NVIDIA ConnectX-7 OCP3.0 SFF Adapter Card; 200GbE (default mode) / NDR200 IB; Dual-port QSFP112; Multi-Host and Socket Direct capable; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled
900-9X721-003N-DT0	MCX75510A AS-NEAT	MT_00 00000 800	NVIDIA ConnectX-7 adapter card; 400Gb/s NDR IB; Single-port OSFP; PCIe 5.0 x16 with x16 Extension option (Socket Direct ready); Secure boot; No Crypto
900-9X766-003N-SQ0	MCX75310A AS-NEAT	MT_00 00000 838	NVIDIA ConnectX-7 HHHL Adapter card; 400GbE / NDR IB (default mode); Single-port OSFP; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled;
900-9X7AH-0088-ST0	MCX713106 AC-VEAT	MT_00 00000 841	NVIDIA ConnectX-7 HHHL Adapter Card; 200GbE; Dual-port QSFP112; PCIe 5.0 x16; Crypto Enabled; Secure Boot Enabled
900-9X7AH-0086-SQ0	MCX713106 AC-CEAT	MT_00 00000 842	NVIDIA ConnectX-7 HHHL Adapter Card; 100GbE; Dual-port QSFP112; PCIe 5.0 x16; Crypto Enabled; Secure Boot Enabled
900-9X760-0018-MB2	MCX753436 MC-HEAB	MT_00 00001 030	NVIDIA ConnectX-7 OCP3.0 SFF Adapter Card; 200GbE (default mode) / NDR200 IB; Dual-port QSFP112; Multi-Host and Socket Direct capable; PCIe 5.0 x16; Crypto Enabled; Secure Boot Enabled;
900-9X7AX-003NMC0	MCX75343A MS-NEAC	MT_00 00001 058	NVIDIA ConnectX-7 OCP3.0 TSFF Adapter Card; 400GbE / NDR IB (default mode); Single-port OSFP; Multi-Host and Socket Direct capable;

NVIDIA SKU	Legacy OPN	PSID	Device Description
			PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled
900-9X7AX-0039-SB0	MCX75343A AS-NEAC	MT_00 00000 784	NVIDIA ConnectX-7 VPI adapter card; NDR IB/400GbE OCP3.0 TSFF; Single-port OSFP; PCIe 5.0 x16; Secure boot; No Crypto
900-9X721-003N-DT1	MCX75510A AS-HEAT	MT_00 00000 839	NVIDIA ConnectX-7 adapter card; 200Gb/s NDR200 IB; Single-port OSFP; PCIe 5.0 x16 Extension option (Socket Direct ready); Secure boot; No Crypto
900-9X767-003N-DT1	MCX75210A AS-HEAT	MT_00 00000 850	NVIDIA ConnectX-7 HHHL Adapter Card; NDR200 IB; Single-port OSFP; PCIe 5.0 2x8 in a row (Socket Direct); Crypto Disabled; Secure Boot Enabled;
900-9X7AO-00C3-STZ	MCX713104 AC-ADAT	MT_00 00000 852	NVIDIA ConnectX-7 HHHL Adapter Card; 25/50GbE; Quad-Port SFP56; PCIe 4.0 x16; Crypto Enabled; Secure Boot Enabled
900-9X766-003N-ST0	MCX75310A AS-HEAT	MT_00 00000 844	NVIDIA ConnectX-7 HHHL Adapter Card; 200GbE / NDR200 IB (default mode); Single-port OSFP; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled;
900-9X7AH-0079-DTZ	MCX755106 AC-HEAT	MT_00 00001 045	NVIDIA ConnectX-7 HHHL adapter Card; 200GbE (default mode) / NDR200 IB; Dual-port QSFP112; PCIe 5.0 x16 with x16 PCIe extension option; Crypto Enabled; Secure Boot Enabled;
930-90000-0000-060	MCX755206 AS-NEAT-N	MT_00 00000 892	NVIDIA ConnectX-7 VPI adapter card; 400Gb/s IB and 200GbE; dual-port QSFP; PCIe 5.0 x16; dual slot; secure boot; no crypto; tall bracket for Nvidia DGX storage
900-9X7AH-0039-STZ	MCX715105 AS-WEAT	MT_00 00001 244	NVIDIA ConnectX-7 HHHL Adapter Card; 400GbE (default mode) / NDR IB; Single-port QSFP112; Port Split Capable; PCIe 5.0 x16 with x16 PCIe extension option; Crypto Disabled; Secure Boot Enabled
900-9X760-0078-MB1	MCX753436 MS-HEBB	MT_00 00001 221	NVIDIA ConnectX-7 OCP3.0 SFF Adapter Card; 200GbE (default mode) / NDR200 IB; Dual-port QSFP112; Multi-Host and Port Split capable; PCIe 5.0 x16; Crypto Disabled; Secure Boot Enabled; Thumbscrew (Pull Tab) Bracket

Driver Software, Tools and Switch Firmware

The following are the drivers' software, tools, switch/HCA firmware versions tested that you can upgrade from or downgrade to when using this firmware version:

Changes and New Features

Note

Security Hardening Enhancements: This release contains important reliability improvements and security hardening enhancements. NVIDIA recommends upgrading your devices' firmware to this release to improve the devices' firmware security and reliability.

Info

To generate PLDM packages for firmware updates, users must install and use the MFT version that corresponds with the respective firmware release.

Feature/Change	Description
	28.43.1014
PCIe Telemetry	Added support for PCIe Telemetry (NSM Type 2).
Programmable Congestion Control (PCC)	<p>Migrated PCC NP solution from ACE hardware platform to DPA hardware platform. The new capability is applicable to the following 2 modes:</p> <ul style="list-style-type: none">• PCC_INT_EN=True and PCC_INT_NP_RTT_DATA_MODE=INGRESS_BYTE• PCC_INT_EN=True and PCC_INT_NP_RTT_DATA_MODE=NO_DATA <p>The first mode is used to support ZTRCC RX bytes in RTT response.</p>

Feature/Change	Description
RDMA Telemetry	<p>Added the option to indicate an error CQE event on every selected function per eSwitch manager. This indication is defined as a new WQE including the relevant information about the error (such as: syndrome, function_id, timestamp, QPs num etc.).</p> <p>The feature is configured using a new general object: RDMA-Telemetry object, and depends on the following new caps:</p> <p><code>HCA_CAP.rdma_telemetry_notification_types</code> and <code>HCA_CAP.rdma_telemetry</code>.</p>
UID Permissions	<p>Extended kernel lockdown permission set. The following sub-operations can now be called by tools (permission TOOLS_RESOURCES) using new HCA capability bitmask field: <code>tool_partial_cap</code>.</p> <p>The 5 sub-operations are:</p> <ul style="list-style-type: none"> • QUERY_HCA_CAP with other function • QUERY_VUID with direct data • QUERY_ROCE_ADDRESS with other vport • SET_HCA_CAP with other function • POSTPONE_CONNECTED_QP_TIMEOUT with other vport <p>The new added caps are:</p> <ul style="list-style-type: none"> • <code>tool_partial_cap.postpone_conn_qp_timeout_other_vport</code>, • <code>tool_partial_cap.set_hca_cap_other_func</code> • <code>tool_partial_cap.query_roce_addr_other_vport</code> • <code>tool_partial_cap.query_vuid_direct_data</code> • <code>tool_partial_cap.query_hca_cap_other_func</code>
Cross E-Switch Scheduling	<p>Added support for QoS scheduling across multiple E-Switches grouped in a LAG. VPort members of a Physical Function can be added to a rate group from another Physical Function and rate limits of the group will apply to those VPort members as well.</p>
Jump from NIC_TX to FDB_TX	<p>Added <code>'table_type_valid'</code> and <code>'table_type'</code> fields to the steering action (STC) "Jump To Flow" table parameters to enable the user to jump from NIC_TX to FDB_TX and bypass the ACL table.</p>

Feature/Change	Description
Jump to TIR or queue from FDB on Tx	<p>Enabled hop reduction by bypassing NIC domain in various use cases. Such action reduces the number of hops (improves PPS) to deal with mass number of flows and devices.</p> <p>To enable this new capability, a new STC action type "JUMP_TO_FDB_RX" was added to allow jumping into the RX side of a table.</p>
Flex Parser: ARC-IN and ARC-OUT	<p>Increased the maximum number of supported "ARC-IN" from 1 to 8 and "ARC-OUT" from 3 to 8 for the dynamic flex parser.</p>
PSP Crypto Offload	<p>[Alpha] Added support for PSP Crypto offload transport mode.</p>
ZTR_RTTCC Histogram	<p>Added histogram support for rate and Round-Trip Time (RTT) in PCC ZTR_RTTCC.</p>
Bug Fixes	<p>See <i>Bug Fixes in this Firmware Version</i> section.</p>

Bug Fixes in this Firmware Version

Internal Ref.	Issue
4040226	Description: Added a recovery step in case of CQ doorbell getting lost during VF migration.
	Keywords: VF migration
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
3988375	Description: PLDM includes port temperature sensor PDR only if an active cable is connected.
	Keywords: Temperature sensor PDR
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
3837332	Description: Changed PCIe Gen4/5 new static configuration for VGA gain and CTLE.
	Keywords: PCIe, VGA, CTLE
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4120411	Description: Fixed an issue that occasionally caused PTP accuracy degradation for port speed configured to 1G or 10G.
	Keywords: PTP
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4134558	Description: Fixed an issue that resulted in MSIx reduction flow triggered with a wrong limitation (the total number of MSIx is reduced from 8k to 4k by mistake) when the dynamic MSIx feature is enabled and virtio emulation is disabled.

Internal Ref.	Issue
	Keywords: Dynamic MSIx
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4007123	Description: Fixed lossless packet drops at 400GB 4 lanes when using an optic fiber cable.
	Keywords: 400GB, 4 lanes, optic fiber cable
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4014351	Description: Fixed the query for FACTORY default NV configuration values. The firmware always returned the "next" value to be applied.
	Keywords: Access register MNVDA, QUERY / SET configurations
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4048886	Description: Fixed an issue related to override TP4 settings.
	Keywords: TP4 settings
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4001690	Description: Changed the CTLE and VGA gain for Gen4/5 starting point.
	Keywords: CTLE, VGA gain
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4066248	Description: Increased SPDM's RDT value.
	Keywords: SPDM
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4092754	Description: Fixed a rare certificate signature verification error.
	Keywords: Certificate signature verification

Internal Ref.	Issue
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4003534	Description: Fixed an issue that caused issues during the cables' linkup process after reinserting a module in multi ASIC platforms.
	Keywords: Cables
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014
4041723	Description: Fixed the user_cc_en default value (mlxreg).
	Keywords: mlxreg
	Discovered in Version: 28.42.1000
	Fixed in Release: 28.43.1014

Known Issues

VF Network Function Limitations in SR-IOV Legacy Mode

Dual Port Device	Single Port Device
127 VF per PF (254 functions)	127

VF Network Function Limitations in Switchdev Mode

Dual Port Device	Single Port Device
127 VF per PF (254 functions)	127

VF+SF Network Function Limitations in Switchdev Mode

Dual Port Device	Single Port Device
<ul style="list-style-type: none"> 127 VF per PF (254 functions) 512 PF+VF+SF per PF (1024 functions) 	<ul style="list-style-type: none"> 127 VF (127 functions) 512 PF+VF+SF per PF (512 functions)

Internal Ref.	Issue
4030457	Description: This release does not support InfiniBand (IB) over Windows OS when using ConnectX-7 MCX75310AAS-NEAT and MCX75310AAC-NEAT OPNs.
	Workaround: N/A
	Keywords: InfiniBand, Windows
	Detected in version: 28.42.1000
2169950	Description: When decapsulation on a packet occurs, the FCS indication is not calculated correctly.
	Workaround: N/A
	Keywords: FCS

Internal Ref.	Issue
	Discovered in Version: 28.42.1000
-	Description: Downgrading the following adapter cards (MCX713104AS-ADAT & MCX713104AC-ADAT) to a lower version than 20.39.2048 is not supported.
	Workaround: N/A
	Keywords: Downgrade
	Discovered in Version: 28.40.1000
3728450	Description: SW_RESET with a pending image is currently not supported.
	Workaround: N/A
	Keywords: SW_RESET
	Discovered in Version: 28.40.1000
3735988	Description: In IB system, RTT_response_sl feature does not work with Sniffer tools (e.g., Wireshark/Tcpdump/).
	Workaround: N/A
	Keywords: Health buffer, sniffer, RTT
	Discovered in Version: 28.40.1000
3614362	Description: When connected to a Spectrum-1 switch system using NRZ 25G optic module supporting DME in NO FEC, an EFF BER of -13 may be seen once in 200 toggles.
	Workaround: To raise the link, re-toggle the port.
	Keywords: Spectrum-1, NRZ, BER, port toggling
	Discovered in Version: 28.39.1002
3629216	Description: mlxfwreset level 3 command is not supported for MCX750500B-0D00 / MCX750500B-0D0K / MCX755206AS-NEAT-N P/N.
	Workaround: <ol style="list-style-type: none"> 1. Enable mlxfwreset level 4. <pre>mlxfwreset -d <dev> r -l 4 -y</pre> 2. Reboot the server.
	Keywords: mlxfwreset level 3
	Discovered in Version: 28.39.1002

Internal Ref.	Issue
-	<p>Description: The I²C clock fall time is lower than the 12ns minimum defined in the I2C-bus specification. For further information, refer to the I²C-bus Specification, Version 7.0, October 2021, https://www.i2c-bus.org/.</p> <p>Workaround: N/A</p> <p>Keywords: I²C clock</p> <p>Discovered in Version: 28.39.1002</p>
3179534	<p>Description: 25G/lane speeds are not supported on 200GbE optic cables.</p> <p>Workaround: N/A</p> <p>Keywords: Cables, 200GbE</p> <p>Discovered in Version: 28.39.1002</p>
3435259	<p>Description: The host enables the device to populate only 1 bus. When opening extra 2 Physical ports, moving from dual-port to quad-port, the user can open 2 less Virtual Functions.</p> <p>Workaround: N/A</p> <p>Keywords: VF, dual-port, quad-port</p> <p>Discovered in Version: 28.39.1002</p>
3525865	<p>Description: Unexpected system behavior might be observed if the driver is loaded while reset is in progress.</p> <p>Workaround: N/A</p> <p>Keywords: Sync 1 reset, firmware reset</p> <p>Discovered in Version: 28.39.1002</p>
3363753	<p>Description: The link is down when connected to the MMS1V00-WM (DR4) optical module.</p> <p>Workaround: N/A</p> <p>Keywords: 400G, link down</p> <p>Discovered in Version: 28.38.1002</p>
3439438	<p>Description: When connecting to a High Speed Traffic Generator in 400G speed, the linkup time may takes up to 3 minutes.</p> <p>Workaround: N/A</p>

Internal Ref.	Issue
	<p>Keywords: 400G, linkup time</p> <p>Discovered in Version: 28.38.1002</p>
-	<p>Description: When upgrading from firmware v28.35.2000 to a newer one, the default port speeds of adapter cards MCX755106AS-HEAT/ MCX755106AC-HEAT will change from InfiniBand to Ethernet.</p> <p>Workaround: To change it back to InfiniBand, please follow the instructions in the ConnectX-7 hardware User Manual.</p> <p>Keywords: Firmware upgrade, port type, MCX755106AS-HEAT/ MCX755106AC-HEAT</p> <p>Discovered in Version: 28.37.1014</p>
3376224	<p>Description: FEC override is not supported when working with NRZ speeds on PAM4 Optical modules.</p> <p>Workaround: N/A</p> <p>Keywords: FEC override, NRZ, PAM4</p> <p>Discovered in Version: 28.37.1014</p>
3262845	<p>Description: In the ConnectX-7 adapter card with P/N MCX750500B-0D0K, the "Fatal Error Reporting Enable" bit controls both the fatal and the non-fatal ERR MSG forwarding. The "Non-Fatal Error Reporting Enable" bit does not affect the ERR MSG forwarding.</p> <p>Workaround: N/A</p> <p>Keywords: Fatal Error Reporting Enable" bit, PCIe, MCX750500B-0D0K</p> <p>Discovered in Version: 28.36.1010</p>
3329109	<p>Description: MFS1S50-H003E cable supports only HDR rate when used as a split cable.</p> <p>Workaround: N/A</p> <p>Keywords: HDR, split cable, MFS1S50-H003E</p> <p>Discovered in Version: 28.36.1010</p>
2844036	<p>Description: When using the "Dual Write" feature with QP buffer bigger than the maximum outstanding WQEs (128), the data being sent on the standby QP can be corrupted.</p> <p>Workaround: Limit the QP buffer size when using "Dual Write" up to 128</p>

Internal Ref.	Issue
	WQEs. Keywords: Dual-write, QP Discovered in Version: 28.36.1010
3178339	Description: PCIe PML1 is disabled. Workaround: N/A Keywords: PCIe PML1 Discovered in Version: 28.35.1012
3033910	Description: BAR misses caused by a memory write/read actions are not reported in the AER and the device status. Workaround: N/A Keywords: BAR miss, AER Discovered in Version: 28.34.4000
3140645	Description: 3 rd party servers may hang after warm reboot due to the PCIe switch. Workaround: N/A Keywords: PCIe, 3rd party servers Discovered in Version: 28.34.4000
-	Description: Changing dynamic PCIe link width is not supported. Workaround: N/A Keywords: PCIe Discovered in Version: 28.34.1002
3141072	Description: The "max_shaper_rate" configuration query via QEEC mlxreg returns a value translated to hardware granularity. Workaround: N/A Keywords: RX Rate-Limiter, Multi-host Discovered in Version: 28.34.1002
2870970	Description: GTP encapsulation (flex parser profile 3) is limited to the NIC domain. Encapsulating in the FDB domain will render a 0-size length in GTP header.

Internal Ref.	Issue
	<p>Workaround: N/A</p> <p>Keywords: GTP encapsulation</p> <p>Discovered in Version: 28.34.1002</p>
3081264	<p>Description: 10G/40G speeds are not supported on MFS1S00-XXXX modules (200G optics) in ConnectX-7 adapter cards.</p> <p>Workaround: N/A</p> <p>Keywords: Optical cables</p> <p>Discovered in Version: 28.33.4030</p>
3070590	<p>Description: PLL modules are not supported in ConnectX-7 ethernet adapter cards.</p> <p>Workaround: N/A</p> <p>Keywords: PLL</p> <p>Discovered in Version: 28.33.4030</p>
3070409	<p>Description: When connecting a ConnectX-7 adapter card to a ConnectX-6 Dx or an NVIDIA Spectrum-3 switch, NRZ speeds are not raised when using 200GbE optical cable.</p> <p>Workaround: Configure PHY_FEC_OVERRIDE on the ConnectX-7 side for the requested speed.</p> <p>Keywords: Optical cables, NRZ, ConnectX-6 Dx, NVIDIA Spectrum-3, 200GbE optical cable</p> <p>Discovered in Version: 28.33.4030</p>
2993531	<p>Description: PML1 is disabled by default. Enabling it might result in server hanging.</p> <p>Workaround: N/A</p> <p>Keywords: PML1</p> <p>Discovered in Version: 28.33.2028</p>
-	<p>Description: Upgrading to firmware 28.33.2028 from any previous Engineering Sample (earlier than version 28.98.2406) must be done before installing WinOF-2 v2.90 driver and requires going through the following steps:</p> <ol style="list-style-type: none"> 1. Upgrade to 28.98.2406 version while the driver is disabled.

Internal Ref.	Issue
	<p data-bbox="347 254 1451 331">2. Upgrade to firmware version 28.33.2028 (the driver can be enable at this stage).</p> <p data-bbox="302 386 553 422">Workaround: N/A</p> <p data-bbox="302 449 730 485">Keywords: Firmware upgrade</p> <p data-bbox="302 512 805 548">Discovered in Version: 28.33.2028</p>
-	<p data-bbox="302 573 1312 651">Description: Downgrading from firmware 28.33.2028 to any previous Engineering Sample firmware is not supported.</p> <p data-bbox="302 674 553 709">Workaround: N/A</p> <p data-bbox="302 737 771 772">Keywords: Firmware downgrade</p> <p data-bbox="302 800 805 835">Discovered in Version: 28.33.2028</p>

cond

PreBoot Drivers (FlexBoot/UEFI)

FlexBoot Changes and New Features

For further information, please refer to the [FlexBoot Release Notes](#).

UEFI Changes and Major New Features

For further information, please refer to the [UEFI Release Notes](#).

Validated and Supported Cables and Switches

Validated and Supported Cables and Modules

Cables Lifecycle Legend

InfiniBand/Ethernet Support

Note

Upon firmware upgrade, after reset, the default port configuration could be changed.

To set the right configuration, run:

```
mlxconfig -d <mst device> s LINK_TYPE_P1=1/2 LINK_TYPE_P2=1/2
```

where:

- LINK_TYPE_P1 - sets the configuring protocol for port 1
- LINK_TYPE_P2 - sets the configuring protocol for port 2
- (1/2) - values used for the different protocols:
 - 1 – for InfiniBand

- 2 - for Ethernet

NDR / 400GbE Cables


Note

* MMA4Z00-NS-FLT transceiver is used with the following ConnectX-7 adapter cards **ONLY**: MCX750500B-0D0K / MCX750500C-0D0K / MCX750500B-0D00 / MCX750500C-0D00.

HDR / 200GbE Cables

HDR100 Cables

EDR / 100GbE Cables

 **Note**

EDR links raise with RS-FEC.

FDR / 56GbE Cables

50GbE Cables

40GbE Cables

25GbE Cables

10GbE Cables

1GbE Cables

Supported 3rd Party Cables and Modules

Tested Switches

NDR / 400GbE Switches

Speed	NVIDIA SKU	Legacy OPN	Description
NDR	920-9B210-00FN-xxx	QM9790	NVIDIA Quantum-2 based NDR InfiniBand EVB Switch, 64 NDR ports, 32 OSFP ports, non-blocking switching capacity of 51.2Tbps, 2 Power Supplies (AC), Standard depth, Unmanaged, P2C airflow, Rail Kit, RoHS6
NDR	920-9B210-	QM9700	NVIDIA Quantum 2 based NDR InfiniBand Switch, 64 NDR ports, 32 OSFP ports, 2 Power Supplies (AC), Standard depth, Managed, P2C airflow, Rail Kit

Speed	NVIDIA SKU	Legacy OPN	Description
	00FN-xxx		
400 GbE	920-9N42F-00RI-xxx	SN5600	NVIDIA Spectrum-4 based 800GbE 2U Open Ethernet switch with ONIE and NOS Authentication, 64 OSFP ports and 1 SFP28 port, 2 power supplies (AC), x86 CPU, Secure-boot, standard depth, C2P airflow, Tool-less Rail Kit
400 GbE	920-9N301-00xB-xxx	SN4700	NVIDIA Spectrum-3 based 400GbE, 1U Open Ethernet switch, 32xQSFP-DD ports, x86 CPU, standard depth
400 GbE	920-9N312-00xB-xxx	SN4410	NVIDIA Spectrum-3 based 400GbE 1U Open Ethernet switch, 24 QSFPDD28 and 8 QSFP-DD ports, 2 Power Supplies (AC), x86 CPU, standard depth
400 GbE	N/A	Wedge 400	Meta: Wedge 400-48X 400GbE Data Center Switch
400 GbE	N/A	Cisco Nexus 3432D-S	Cisco Nexus 3432D-S, 32 fixed 400-Gigabit Ethernet QSFP-DD ports with backward compatibility for QSFP56, QSFP28, and QSFP+

HDR / 200GbE Switches

Speed	NVIDIA SKU	Legacy OPN	Description
HDR	920-9B110-00FH-xxx	MQM8700	NVIDIA Quantum HDR InfiniBand Switch, 40 QSFP56 ports, 2 Power Supplies (AC), x86 dual core, standard depth, P2C airflow, Rail Kit
HDR	920-9B110-00FH-xxx	MQM8790	NVIDIA Quantum HDR InfiniBand Switch, 40 QSFP56 ports, 2 Power Supplies (AC), unmanaged, standard depth, P2C airflow, Rail Kit
200 GbE	920-9N302-00xA-xxx	MSN4600V	NVIDIA Spectrum-3 based 200GbE 2U Open Ethernet switch, 64 QSFP56 ports, 2 Power Supplies (AC), x86 CPU, standard depth

Speed	NVIDIA SKU	Legacy OPN	Description
200 GbE	920-9N210-C1x7-xxx	MSN3700	NVIDIA Spectrum-2 based 200GbE Open Ethernet switch, 32 QSFP56 ports, x86 CPU, standard depth

100GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
100GbE	Spectrum-3	MSN4600-XXXX	64-port Non-blocking 100GbE Open Ethernet Switch System	NVIDIA
100GbE	Spectrum-2	MSN3700C-XXXX	32-port Non-blocking 100GbE Open Ethernet Switch System	NVIDIA
100GbE	Spectrum-2	MSN3420-XXXX	48 SFP + 12 QSFP ports Non-blocking 100GbE Open Ethernet Switch System	NVIDIA
100GbE	Spectrum	MSN2700-XXXX	32-port Non-blocking 100GbE Open Ethernet Switch System	NVIDIA
100GbE	N/A	QFX5200-32C-32	32-port 100GbE Ethernet Switch System	Juniper
100GbE	N/A	7060CX-32S	32-port 100GbE Ethernet Switch System	Arista
100GbE	N/A	3232C	32-port 100GbE Ethernet Switch System	Cisco
100GbE	N/A	N9K-C9236C	36-port 100GbE Ethernet Switch System	Cisco
100GbE	N/A	93180YC-EX	48-port 25GbE + 6-port 100GbE Ethernet Switch System	Cisco
100GbE	N/A	S6820-56HF	H3C S6850-56HF L3 Ethernet Switch with 48 SFP28 Ports and 8 QSFP28 Ports	H3C
100GbE	N/A	BMS T7032-IX7	32 QSFP28 ports support for 10/25/40/50/100GbE	Quanta Mesh

Release Notes History

Changes and New Feature History

Note

This section includes history of changes and new feature of 3 major releases back. For older releases history, please refer to the relevant firmware versions.

Feature/Change	Description
	28.42.1000
Memory Slow Release	Added a new command interface "Memory slow release" to enable/disable holding memory pages for a defined period of time. Once the timer expires, the firmware will return the pages to the driver.
PXE Filters	Added support for configuring PXE boot filters' setting from the HII menu to filter only PXE packets (DHCP, TFTP, ARP, ICMP) during boot on UEFI environment.
Precision Timing (PTM)	Added support for Precision Timing (PTM). This new capability ensures seamless operations, synchronized data access, faster response times, and optimal AI performance, enhancing cloud offerings' reliability and scalability.
PTP	Improved the PTP accuracy for ports with link speed of 25G or above.
Kernel Lockdown	Added support for MVTs register via a miscellaneous driver using the access_register PRM command.
AN/LT Visibility	Added an LT logger that provides visibility of the LT status, process and parameters sent and received during the flow.

Feature/Change	Description
Steering SF Traffic to a Specific PF MSI-X	MSI-X on SF can be received now through the PF's MSI-X vector.
Bug Fixes	See <i>Bug Fixes in this Firmware Version</i> section.

Feature/Change	Description
28.41.1000	
ODP Event	Added support for the following prefetch fields on ODP event: pre_demand_fault_pages, post_demand_fault_pages.
TRNG FIPS Compliance	Implemented Deterministic Random Bit Generator (DRBG) algorithm on top of firmware TRNG (the source for raw data input) in accordance with NIST SP800-90A.
400GbE, Single-Port, OSFP to OSFP-RHS cable	Added support for 400GbE speed (8X50G) in Single-Port OSFP adapter cards including link training and auto-negotiation when connecting OSFP to OSFP-RHS cables.
PSP	Added support for PSP in Hardware Steering.
NVConfig	Added a new NVConfig option to copy AR bit from the BTH header to the DHCP header.
Steering	Added the option provide field's offset and length in Steering add_action option.
Steering Match	Added support for steering match on packet l4_type through FTG/FTE.
Packet's Flow Label Fields	Added support for setting, adding or copying the flow_label fields from the packet.
BAR Pages	<p>Added support for 64KB pages.</p> <p>Note: Configuring BAR_PAGE_ALIGNMENT to ALIGN_64KB(2) while one of the following is configured will cause the device to ignore the BAR_PAGE_ALIGNMENT configuration:</p> <ul style="list-style-type: none"> • PF_NUM_PF_MSIX>256 on any of the Physical Functions • VIRTIO_EMULATION_HOTPLUG_TRANS/VIRTIO_NET_EMULATION_PF_PCI_LAYOUT/ VIRTIO_NET_EMULATION_VF_PCI_LAYOUT/ VIRTIO_BLK_EMULATION_PF_PCI_LAYOUT/

Feature/Change	Description
	VIRTIO_BLK_EMULATION_PF_PCI_LAYOUT=VIRTIO_TRANSITIONAL(1)
Flex Parser Merge Mechanism	Extended Flex Parser merge mechanism to support hardware capabilities.
Flex Parser	Enabled the option to disable the native parser when the parse graph node is configured with the same conditions.
Flex Parser	Added support for father/son headers parsing.
LRO	Added support for tunnel_offload in LRO.
Bug Fixes	See <i>Bug Fixes in this Firmware Version</i> section.

Feature/Change	Description
	28.40.1000
Socket Direct Single netdev Mapped to Two PCIe Devices	<p>Enabled Single Netdev mapping to two PCIe devices (Socket Direct).</p> <p>Now multiple devices (PFs) of the same port can be combined under a single netdev instance. Traffic is passed through different devices belonging to different NUMA sockets, thus saving cross-NUMA traffic and allowing apps running on the same netdev from different NUMAs to still feel a sense of proximity to the device and achieve improved performance.</p> <p>The netdev is destroyed once any of the PFs is removed. A proper configuration would utilize the correct close NUMA when working on a certain app/CPU.</p> <p>Currently, this capability is limited to PFs only, and up to two devices (sockets). To enable the feature, one must configure the same Socket Direct group (non zero) for both PFs through mlxconfig SD_GROUP.</p>
Port Rate Limiting	Added a new access register (PBWS) to set the port maximum bandwidth to a value between 95% to 100%.
ACL	Added support for egress ACL to the uplink by adding a new bit to the Set Flow Table Entry: allow_fdb_uplink_hairpin.
Live Migration	Added support for live migration with MPV and IPSEC. This capability enables creating cross-vhca objects, however, they can only be created between affiliated GVMIs.

Feature/Change	Description
	If <code>HCA_CAP.migratable</code> bit is set, <code>HCA_CAP.cross_vhca_object_to_object_supported</code> and <code>HCA_CAP.allowed_object_for_other_vhca_access</code> refer to affiliated VHCA's only.
Alternative Bill of Materials (BOM)	NVIDIA is adding an alternative Bill of Materials (BOM) for the specified affected items (MCX713104AS-ADAT & MCX713104AC-ADAT) to enhance production yields. The new alternate BOM requires updating to a minimum firmware version of 28.39.2048.
Bug Fixes	See <i>Bug Fixes in this Firmware Version</i> section.

Bug Fixes History

Note

This section includes history of 3 major releases back. For [older releases history](#), please refer to the relevant firmware versions.

Internal Ref.	Issue
3868155	Description: Enabled the usage of different TX presets for Link Training (LT), LT timer, and inhibit timer non-SPEC values.
	Keywords: Link Training (LT)
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000
3949320	Description: Fixed the partition default value in firmware when MFT builds the bin file. Additionally, in "root certificate" partition, modified the discovery flow in case both of the "root certificate" partition are invalid by erasing them before they are used.

Internal Ref.	Issue
	<p>Keywords: Partition</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>
3985535	<p>Description: Fixed an issue that caused RDE PortMetrics property Transceivers.SupplyVoltage to be reflected in incorrect units of 100uV instead of V.</p> <p>Keywords: RDE</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>
3938744	<p>Description: Prevented HCA_CAP from allowing rogue drivers to create more EQs than the number allowed in the HCA_CAP.max_num_eqs.</p> <p>Keywords: HCA_CAP</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>
3859451	<p>Description: PLDM connector PDR is now not reported if a cable is not connected to prevent incomplete data display.</p> <p>Keywords: PLDM connector PDR</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>
3754309	<p>Description: Added the PPHCR register (responsible of showing histograms) to the GMP mads flow used to query registers via the mlxlink tool.</p> <p>Keywords: FEC histograms</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>
3882607	<p>Description: Fixed a downgrade issue that resulted in failure when downgrading to v28.37.1014.</p> <p>Keywords: Firmware downgrade</p> <p>Discovered in Version: 28.41.1000</p> <p>Fixed in Release: 28.42.1000</p>

Internal Ref.	Issue
3855011	Description: Blocked access to invalid CR-SPACE registers when the adapter cards are secured.
	Keywords: CR-SPACE registers
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000
3908476	Description: Fixed an issue that resulted in device assert when using DCBX CEE.
	Keywords: DCBX CEE
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000
3652616	Description: Fixed an issue that prevented CNP or RTT counters from wrapping around properly.
	Keywords: CNP, RTT, counter
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000
3730919	Description: Fixed an issue where the CR_SPACE was open to any read operation, even though some reads could lock the gateway. Bad reads from CR_SPACE will now result in a bad_access error being returned.
	Keywords: CR_SPACE, Gateway
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000
3976276	Description: Fixed an issue that prevented the SFF module from accessing the EEPROM data when removing the CMIS module and inserting the SFF module instead of it.
	Keywords: EEPROM, SFF, CMIS
	Discovered in Version: 28.41.1000
	Fixed in Release: 28.42.1000

Internal Ref.	Issue
3675068	Description: Added the TX_SCHEDULER_FWS_REACTIVITY nvconfig flag to solved an mlnx_qos ETS settings issue.
	Keywords: nvconfig, ETS
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3787123	Description: Improved ZTR_RTTCC algorithm fairness when running with 4K MTU.
	Keywords: PCC
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3729783	Description: Fixed an issue where Congestion Control could malfunction due to an invalid database.
	Keywords: Congestion Control
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3814806	Description: Fixed an issue that prevented PLDM command <code>Get Schema URI</code> from functioning properly when there were no base RDE resource IDs.
	Keywords: PLDM
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3814821	Description: Fixed an issue that prevented RDE Port resource from showing 400Gb speed in CapableLinkSpeedGbps and in MaxSpeedGbps in some InfiniBand cards.
	Keywords: 400Gb, InfiniBand, RDE
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3807206	Description: Changed BER monitor default values to alarm on symbol and effective BER.
	Keywords: BER

Internal Ref.	Issue
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3682915	Description: Fixed a performance issue by enabling CC to allow queues to receive fair bandwidth.
	Keywords: Performance, CC, bandwidth
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000
3706132 / 3768905	Description: Fixed an issue that resulted in VF FLR being stuck when his PF triggered the FLR as well.
	Keywords: VF FLR, PF
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.41.1000

Internal Ref.	Issue
3712016	Description: Fixed an issue that prevented Congestion Control from behaving properly when GRH is used in traffic of an IB cluster.
	Keywords: IB Congestion Control, CNP, SL
	Discovered in Version: 28.39.1002
	Fixed in Release: 28.40.1000
3174038	Description: SPDM requests received while CPLD burn flow is in progress may be answered with incorrect responses.
	Keywords: SPDM
	Discovered in Version: 28.34.1002
	Fixed in Release: 28.40.1000
3110297	Description: When ConnectX-7 adapter card is configured to use the Auto-Negotiation mode, 400G_8x linkup cannot be raised.
	Keywords: 400G_8x, linkup
	Discovered in Version: 28.34.4000
	Fixed in Release: 28.40.1000

Internal Ref.	Issue
3339818	<p>Description: When performing a stress toggling on a ConnectX-7 adapter card that is connected to the MMA1Z00-NS400 cable and the speed is set to 100G_1x with interleaved FEC, a long linkup time of up to 5 min may occur.</p> <p>Keywords: Toggling, MMA1Z00-NS400</p> <p>Discovered in Version: 28.36.1010</p> <p>Fixed in Release: 28.40.1000</p>
3339919	<p>Description:</p> <ul style="list-style-type: none"> • When raising a link using 200G optical cables while connecting a ConnectX-7 to a ConnectX-7, raising a link with width less than the maximum provided by the cable with speed 25G lane is not supported. • When raising a link using 400G optical cables while connecting a ConnectX-7 to a ConnectX-7, raising a link with width less than the maximum provided by the cable with speed 50G or 25G lane is not supported. <p>Keywords: Link up speed</p> <p>Discovered in Version: 28.36.1010</p> <p>Fixed in Release: 28.40.1000</p>
3312483	<p>Description: WoL packets may not working properly if sent to Unicast destination MAC.</p> <p>Keywords: WoL packets, Unicast destination MAC</p> <p>Discovered in Version: 28.36.1010</p> <p>Fixed in Release: 28.40.1000</p>
3275394	<p>Description: When performing PCIe link secondary-bus-reset, disable/enable or mlxfwreset on AMD based Genoa systems, the device takes longer then expected to link up, due to a PCIe receiver termination misconfiguration.</p> <p>Keywords: PCIe</p> <p>Discovered in Version: 28.37.1014</p> <p>Fixed in Release: 28.40.1000</p>
3457472	<p>Description: Disabling the Relaxed Ordered (RO) capability (relaxed_ordering_read_pci_enabled=0) using the vhca_resource_manager is currently not functional.</p>

Internal Ref.	Issue
	<p>Keywords: Relaxed Ordered</p> <p>Discovered in Version: 28.37.1014</p> <p>Fixed in Release: 28.40.1000</p>
3606136	<p>Description: In rare cases, linkup time of NDR and NDR200 with MMA4Z00-NS400 may take longer than 60 seconds.</p> <p>Keywords: Cables, NDR, NDR200, linkup time</p> <p>Discovered in Version: 28.39.1002</p> <p>Fixed in Release: 28.40.1000</p>
3683068	<p>Description: Added back the Digital Feedforward Equalizer (DFFE) hardware component to improve the signal integrity link.</p> <p>Keywords: Digital Feedforward Equalizer (DFFE)</p> <p>Discovered in Version: 28.38.1002</p> <p>Fixed in Release: 28.40.1000</p>
3708035	<p>Description: Fixed an issue with Selective-Repeat configuration which occasionally caused retransmission to wait for timeout instead of out-of-sequence NACK.</p> <p>Keywords: RoCE, SR</p> <p>Discovered in Version: 28.38.1002</p> <p>Fixed in Release: 28.40.1000</p>
3695219	<p>Description: Enabled the lowest minimum rate for SW DCQCN to enable congestion control to hold a larger amount of QPs without pauses or drops.</p> <p>Keywords: Congestion control, PCC, DCQCN</p> <p>Discovered in Version: 28.38.1002</p> <p>Fixed in Release: 28.40.1000</p>
3637429	<p>Description: Fixed an issue that caused the secondary ASIC run module init to fail due to missing condition.</p> <p>Keywords: Secondary device, EEPROM</p> <p>Discovered in Version: 28.38.1002</p> <p>Fixed in Release: 28.40.1000</p>

Internal Ref.	Issue
369394 5	Description: Fixed an issue that kept the adapter cards' quad ports UP when using breakout cables / QSFP-split-4. Now when a 4 alignment loss is noticed, the link in 25G/lane Ethernet is dropped.
	Keywords: Quad ports, link up, breakout cables / QSFP-split-4
	Discovered in Version: 28.38.1002
	Fixed in Release: 28.40.1000
360732 9	Description: Modified PCIe switch downstream port EQLZ.PH1 timing to 3ms.
	Keywords: PCIe switch downstream port
	Discovered in Version: 28.38.1002
	Fixed in Release: 28.40.1000
361760 6	Description: Fixed a rare race condition in NODNIC teardown that caused commands to hang on regular PF.
	Keywords: NODNIC teardown
	Discovered in Version: 28.36.1010
	Fixed in Release: 28.40.1000

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Product	Version	Legal Notices and 3rd Party Licenses
Firmware	xx.43.1000	<ul style="list-style-type: none">• HCA Firmware EULA• 3rd Party Unify Notice• License
MLNX_OFED	24.10-0.7.0.0	<ul style="list-style-type: none">• License• 3rd Part Notice
MFT FreeBSD	4.30.0-139	<ul style="list-style-type: none">• 3rd Party Notice• License
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