Mellanox ConnectX®-4 Firmware Release Notes

Rev 12.22.1002

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Release Update History

Table 1 - Release Update History

Release	Date	Description
Rev 12.22.1002	March 12, 2018	Added Bug Fix 1231791. See Section 4, "Bug Fixes History", on page 27
	February 28, 2018	Initial version of this firmware release. This version introduces new Changes and Features (see Section 2, "Changes and New Features in Rev 12.22.1002", on page 21) and Bug Fixes (see Section 4, "Bug Fixes History", on page 27).

1 Overview

These are the release notes for the ConnectX®-4 adapters firmware Rev 12.22.1002. This firmware supports the following protocols:

- InfiniBand - SDR, QDR, FDR10, FDR, EDR
- Ethernet - 1GigE, 10GigE, 25GigE, 40GigE, 50GigE, 56GigE[1] and 100GigE
- PCI Express 3.0, supporting backwards compatibility for v2.0 and v1.1

1.1 Supported Devices

This firmware supports the devices and protocols listed in Table 2

Table 2 - Supported Devices (Sheet 1 of 2)

Device Part Number	PSID	Device Name	FlexBoot	UEFI x86	UEFI ARM	Enable/ disable exprom feature
MCX413A-BCAT	MT_2120110027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX413A-GCAT	MT_2600110035	ConnectX®-4 EN network interface card, 50GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX414A-BCAT	MT_2130110027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX414A-GCAT	MT_2610110035	ConnectX®-4 EN network interface card, 50GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX415A-BCAT	MT_2120111027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX415A-CCAT	MT_2140110033	ConnectX®-4 EN network interface card, 100GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX415A-GCAT	MT_2120110035	ConnectX®-4 EN network interface card; 50GbE single-port QSFP28; PCIe3.0 x16; ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX416A-BCAT	MT_2130111027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX416A-CCAT	MT_2150110033	ConnectX®-4 EN network interface card, 100GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX416A-GCAT	MT_2130110035	ConnectX®-4 EN network interface card; 50GbE dual-port QSFP28; PCIe3.0 x16; ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists

1. 56GbE is a Mellanox propriety link speed and can be achieved while connecting a Mellanox adapter cards to Mellanox SX10XX switch series or connecting a Mellanox adapter card to another Mellanox adapter card.

Table 2 - Supported Devices (Sheet 2 of 2)

Device Part Number	PSID	Device Name	FlexBoot	UEFI x86	UEFI ARM	Enable/ disable exprom feature
MCX445A-CCAN	MT_2520110033	ConnectX-4 EN network interface card for OCP; 100GbE single-port QSFP28; PCIe3.0 x16; ROHS R6	Present (Enabled)	Not Present	Not Present	Not Available
MCX445A-ECAN	MT_2520110032	ConnectX-4 VPI network interface card for OCP; EDR IB (100Gb/s) and 100GbE single-port QSFP28; PCIe3.0 x16; ROHS R6	Present (Enabled)	Not Present	Not Present	Not Available
MCX453A-FCAT	MT_2160110021	ConnectX®-4 VPI adapter card, FDR IB 40GbE, single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX454A-FCAT	MT_2170110021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX455A-ECAT	MT_2180110032	ConnectX®-4 VPI adapter card, EDR IB (100Gb/s) and 100GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX455A-FCAT	MT_2160111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX456A-ECAT	MT_2190110032	ConnectX®-4 VPI adapter card, EDR IB (100Gb/s) and 100GbE, dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX456A-FCAT	MT_2170111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX456M-ECAT	MT_2190115032	ConnectX-4 VPI adapter card with Multi-Host Socket Direct supporting dual-socket server; EDR IB (100Gb/s) and 100GbE; dual-port QSFP28; 2x PCIe3.0 x8; ROHS R6	Present (Enabled)	Not Present	Not Present	Not Available
MCX445B-CCAN	MT_0000000094	ConnectX-4 EN network interface card for OCP; 100GbE single-port QSFP28; PCIe3.0 x16; no bracket; ROHS R6;	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX445B-ECAN	MT_0000000095	ConnectX-4 VPI network interface card for OCP; EDR IB (100Gb/s) and 100GbE single-port QSFP28; PCIe3.0 x16; no bracket; ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists

1.2 Supported Cables and Modules

Please refer to the LinkX™ Cables and Transceivers web page (http://www.mellanox.com/products/interconnect/cables-configurator.php) for the list of supported cables.

1.2.1 Validated and Supported 1GbE Cables

Table 3 - Validated and Supported 1GbE Cables

Speed	Cable OPN #	Description
1GB/S	MC3208011-SX	Mellanox Optical module, SX, 850nm
1GB/S	MC3208411-T	Mellanox® module, ETH 1GbE, 1Gb/s, SFP, Base-T, up to 100m

1.2.2 Validated and Supported 10GbE Cables

Table 4 - Validated and Supported 10GbE Cables

Speed	Cable OPN #	Description
10GB/S	CAB-SFP-SFP-1M	Arista 10GBASE-CR SFP+ Cable 1 Meter
10GB/S	CAB-SFP-SFP-3M	Arista 10GBASE-CR SFP+ Cable 3 Meter
10GB/S	CAB-SFP-SFP-5M	Arista 10GBASE-CR SFP+ Cable 5 Meter
10GB/S	MC2309124-004	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 4M
10GB/S	MC2309124-005	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 5M
10GB/S	MC2309130-001	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 1M
10GB/S	MC2309130-002	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 2M
10GB/S	MC2309130-003	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 3M
10GB/S	MC2309130-00A	Mellanox Passive Copper Cable ETH 10GBE 10GB/S QSFP TO SFP+ 0.5M
10GB/S	MC2609125-004	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 4M
10GB/S	MC2609125-005	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 5M
10GB/S	MC2609130-001	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 1M
10GB/S	MC2609130-002	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 2M
10GB/S	MC2609130-003	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 3M
10GB/S	MC2609130-0A1	Mellanox Passive Copper Hybrid Cable ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 1.5M
10GB/S	MC3309124-004	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 4M
10GB/S	MC3309124-005	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 5M
10GB/S	MC3309124-006	Mellanox® Passive Copper Cable, ETH 10GbE, 10Gb/s, SFP+, 6m

Table 4 - Validated and Supported 10GbE Cables

Speed	Cable OPN #	Description
10GB/S	MC3309124-007	Mellanox® Passive Copper Cable, ETH 10GbE, 10Gb/s, SFP+, 7m
10GB/S	MC3309130-001	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 1M
10GB/S	MC3309130-002	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 2M
10GB/S	MC3309130-003	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 3M
10GB/S	MC3309130-00A	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 0.5M
10GB/S	MC3309130-0A1	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 1.5M
10GB/S	MC3309130-0A2	Mellanox Passive Copper Cable ETH 10GBE 10GB/S SFP+ 2.5M
10GB/S	MFM1T02A-LR-F	Mellanox Optical Module ETH 10GBE 10GB/S SFP+ LC-LC 1310NM LR UP TO 10KM
10GB/S	MFM1T02A-SR-F	Mellanox Optical Module ETH 10GBE 10GB/S SFP+ LC-LC 850NM SR UP TO 300M
10GB/S	SFP-10G-SR	Cisco 10GBASE-SR SFP+ transceiver module for MMF, 850-nm wave-length, LC duplex connector
10GB/S	SFP-H10GB-CU1M	Cisco 1-m 10G SFP+ Twinax cable assembly, passive
10GB/S	SFP-H10GB-CU3M	Cisco 3-m 10G SFP+ Twinax cable assembly, passive
10GB/S	SFP-H10GB-CU5M	Cisco 5-m 10G SFP+ Twinax cable assembly, passive

1.2.3 Validated and Supported 25GbE Cables

The 25GbE cables can be supported in ConnectX-4 adapter cards only when connected to the MAM1Q00A-QSA28 module.

Table 5 - Validated and Supported 25GbE Cables

Speed	Cable OPN #	Description
25GbE	FTLF8536P4BCL	Finisar SFP+ transceivers 25Gb/s
25GbE	LTF8507-PC07	Hisense active fiber cable, 25GbE
25GbE	MCP2M00-A001	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 1m
25GbE	MCP2M00-A002	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 2m
25GbE	MCP2M00-A003	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 3m
25GbE	MCP2M00-A003AP	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 3m, 26AWG
25GbE	MCP2M00-A00A	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 0.5m
25GbE	MCP2M00-A01A	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 1.5m
25GbE	MCP2M00-A01A	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 1.5m

Table 5 - Validated and Supported 25GbE Cables

Speed	Cable OPN #	Description
25GbE	MCP2M00-A02A	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 2.5m
25GbE	MCP7F00-A001	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 TO 4XSFP28 1M
25GbE	MCP7F00-A002	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 TO 4XSFP28 2M
25GbE	MCP7F00-A003	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 TO 4XSFP28 3M
25GbE	MCP7F00-A003-AM	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 3M 30AWG
25GbE	MCP7F00-A005AM	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 to 4XSFP28 5M
25GbE	MCP7F00-A01A	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 to 4XSFP28 1.5M
25GbE	MCP7F00-A02A	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 4X25GBS QSFP28 to 4XSFP28 2.5M
25GbE	MFA2P10-Axxx	Mellanox® active optical cable 25GbE, SFP28, up to 100m
25GbE	MMA2P00-AS	Mellanox® transceiver, 25GbE, SFP28, LC-LC, 850nm, SR, up to 100m
25GbE	SFP-H25G-CU1M	25GBASE-CR1 Copper Cable 1-meter
25GbE	SFP-H25G-CU2M	25GBASE-CR1 Copper Cable 2-meter
25GbE	SFP-H25G-CU3M	25GBASE-CR1 Copper Cable 3-meter
25GbE	MMA2P00-AS	Mellanox® transceiver, 25GbE, SFP28, LC-LC, 850nm, SR, up to 100m
25GbE	MFA2P10-A100	Mellanox® active optical cable 25GbE, SFP28, 100m
25GbE	MFA7A50-C030	Mellanox Active Fiber Hybrid Solution ETH 100GBE TO 4X25GBE QSFP28 TO 4XSFP28 30M
25GbE	MCP2M00-A005E26L	Mellanox Passive Copper Cable, ETH, UP TO 25GB/S, SFP28, 5M, BLACK, 26AWG, CA-L

1.2.4 Validated and Supported 40GbE Cables

Table 6 - Validated and Supported 40GbE Cables

Speed	Cable OPN #	Description
NA	MAM1Q00A-QSA	Mellanox® cable module, ETH 10GbE, 40Gb/s to 10Gb/s, QSFP to SFP+
NA	MAM1Q00A-QSA28	Mellanox® cable module, ETH 25GbE, 100Gb/s to 25Gb/s, QSFP28 to SFP28
40GbE	MC2210126-004	Mellanox® Passive Copper Cable, ETH 40GbE, 40GbE, QSFP, 4m
40GbE	MC2210126-005	Mellanox® Passive Copper Cable, ETH 40GbE, 40GbE, QSFP, 5m

Table 6 - Validated and Supported 40GbE Cables

Speed	Cable OPN #	Description
40GbE	MC2210128-003	Mellanox Passive Copper Cable ETH 40GBE 40GbE QSFP 3M
40GbE	MC2210130-001	Mellanox Passive Copper Cable ETH 40GBE 40GbE QSFP 1M
40GbE	MC2210130-002	Mellanox Passive Copper Cable ETH 40GBE 40GbE QSFP 2M
40GbE	MC2210130-00A	Mellanox® Passive Copper Cable, ETH 40GbE, 40GbE, QSFP, 0.5m
40GbE	MC2210130-00B	Mellanox® Passive Copper Cable, ETH 40GbE, 40GbE, QSFP, 0.75m
40GbE	MC2210310-XXX	Mellanox Active Fiber Cable ETH 40GBE 40GbE QSFP from 3M up to 100M
40GbE	MC2210411-SR4L	Mellanox Optical Module 40GbE QSFP MPO 850NM UP TO 30M
40GbE	MC2210411-SR4	Mellanox Optical Module 40GbE QSFP MPO 850NM UP TO 100M
40GbE	MC2210411-SR4E	Mellanox Optical Module 40GbE QSFP MPO 850NM UP TO 300M
40GbE	MC2210511-LR4	Mellanox® optical module, IB FDR10, 40GbE, QSFP, LC-LC, 1310nm, LR4 up to 10km
40GbE	QSFP-40G-SR-BD	Cisco 40GBASE-SR-BiDi, duplex MMF
40GbE	QSFP-40G-SR4	Cisco 40GBASE-SR4, 4 lanes, 850 nm MMF
40GbE	QSFP-H40G-ACU10M	Cisco 40GBASE-CR4 QSFP direct-attach copper cable, 10-meter, active
40GbE	QSFP-H40G-AOC-10M	Cisco 40GBase-AOC QSFP direct-attach Active Optical Cable, 10-meter
40GbE	QSFP-H40G-CU1M	Cisco 40GBASE-CR4 QSFP direct-attach copper cable, 1-meter, passive
40GbE	QSFP-H40G-CU3M	Cisco 40GBASE-CR4 QSFP direct-attach copper cable, 3-meter, passive
40GbE	QSFP-H40G-CU5M	Cisco 40GBASE-CR4 QSFP direct-attach copper cable, 5-meter, passive

1.2.5 Validated and Supported 50GbE Cables

Table 7 - Validated and Supported 50GbE Cables

Speed	Cable OPN #	Description
50GbE	MCP7H00-G001	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 1M
50GbE	MCP7H00-G002	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 2M
50GbE	MCP7H00-G003	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 3M
50GbE	MCP7H00-G01A	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 1.5M
50GbE	MCP7H00-G02A	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 2.5M

Table 7 - Validated and Supported 50GbE Cables

Speed	Cable OPN #	Description
50GbE	MFA7A20-C020	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 20m

1.2.6 Validated and Supported 100GbE Cables

Table 8 - Validated and Supported 100GbE Cables

Speed	Cable OPN #	Description
100GbE	AFBR-89CDDZ	QSFP28 Pluggable, Parallel Fiber-Optics Module 100 Gigabit Ethernet 850nm SR4, MMF, MPO Connector
100GbE	MCP1600-C001	Mellanox Passive Copper Cable ETH 100GBE 100GBS QSFP LSZH 1M
100GbE	MCP1600-C002	Mellanox Passive Copper Cable ETH 100GBE 100GBS QSFP LSZH 2M
100GbE	MCP1600-C003	Mellanox Passive Copper Cable ETH 100GBE 100GBS QSFP LSZH 3M
100GbE	MCP1600-C005E26L	Mellanox® Passive Copper cable, ETH 100GbE, 100GbE, QSFP28, 5m, Black, 26AWG, CA-L
100GbE	MCP1600-C00A	Mellanox Passive Copper Cable ETH 100GBE 100GBS QSFP LSZH 0.5M
100GbE	MCP1600-C01A	Mellanox® Passive Copper cable, ETH 100GbE, 100GbE, QSFP, LSZH, 1.5m
100GbE	MCP1600-C02A	Mellanox® Passive Copper cable, ETH 100GbE, 100GbE, QSFP, LSZH, 2.5m
100GbE	MCP1600-C03A	Mellanox® Passive Copper cable, ETH 100GbE, 100GbE, QSFP, PVC, 3.5m 26AWG
100GbE	MCP7H00-G005R26L	Mellanox® passive copper hybrid cable, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 5m, Colored, 26AWG, CA-L
100GbE	MFA1A00-C003	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 3m
100GbE	MFA1A00-C005	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 5m
100GbE	MFA1A00-C010	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 10m
100GbE	MFA1A00-C015	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 15m
100GbE	MFA1A00-C020	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 20m
100GbE	MFA1A00-C030	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 30m

Table 8 - Validated and Supported 100GbE Cables

Speed	Cable OPN #	Description
100GbE	MFA1A00-C050	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 50m
100GbE	MFA1A00-C100	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 100m
100GbE	MFA7A20-C020	Mellanox® active fiber hybrid solution, ETH 100GbE to 2x50GbE, QSFP28 to 2xQSFP28, 20m
100GbE	MFS1200-C005	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 5m
100GbE	MFS1200-C010	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 10m
100GbE	MFS1200-C015	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 15m
100GbE	MFS1200-C020	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 20m
100GbE	MFS1200-C030	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 30m
100GbE	MFS1200-C050	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 50m
100GbE	MFS1200-C100	Mellanox® Active Fiber Cable, ETH 100GbE, 100GbE, QSFP, LSZH, 100m
100GbE	MMA1B00-C100_B	Mellanox® transceiver, up to 100GbE, QSFP28, MPO, 850nm, up to 100m OM3
100GbE	MMA1B00-C100D	Mellanox® Transceiver, 100GbE, QSFP28, MPO, 850nm, up to 100m
100GbE	MMS1C00-C500	Mellanox® transceiver, 100GbE, QSFP28, MPO, 1550nm PSM4, up to 2km
100GbE	MMS1C00-C500	Mellanox® transceiver, 100GbE, QSFP28, MPO, 1550nm PSM4, up to 2km
100GbE	MMS1C00-CM	Mellanox® transceiver, 100GbE, QSFP28, MPO, 1550nm PSM4, up to 2km for internal use only
100GbE	MMS1C10-CM	Mellanox® active optical module, 100GbE, QSFP, MPO, 1310nm, PSM4
100GbE	MMS1C10-CM	Mellanox® active optical module, 100Gb/s, QSFP, MPO, 1310nm, PSM4
100GbE	MMS1C00-CM	Mellanox® transceiver, 100GbE, QSFP28, MPO, 1550nm PSM4, up to 2km

1.2.7 Validated and Supported QDR Cables

Table 9 - Validated and Supported QDR Cables

Speed	Cable OPN #	Description
QDR	MC2206125-007	Mellanox Passive Copper Cable IB QDR 40GB/S QSFP 7M
QDR	MC2206126-006	Mellanox Passive Copper Cable IB QDR 40GB/S QSFP 6M

1.2.8 Validated and Supported FDR10 Cables

Table 10 - Validated and Supported FDR10 Cables

Speed	Cable OPN #	Description
FDR10	MC2206128-004	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 4M
FDR10	MC2206128-005	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 5M
FDR10	MC2206130-001	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 1M
FDR10	MC2206130-002	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 2M
FDR10	MC2206130-003	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 3M
FDR10	MC2206130-00A	Mellanox Passive Copper Cable VPI UP TO 40GB/S QSFP 0.5M
FDR10	MC2206310-XXX	Mellanox Active Fiber Cable IB QDR/FDR10 40GB/S QSFP from 3M up to 100M
FDR10	MFS4R12CB-XXX	Mellanox Active Fiber Cable VPI UP TO 40GB/S QSFP from 3M up to 100M

1.2.9 Validated and Supported FDR Cables

Table 11 - Validated and Supported FDR Cables

Speed	Cable OPN #	Description
FDR	MC2207126-004	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 4M
FDR	MC2207128-003	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 3M
FDR	MC2207128-0A2	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 2.5M
FDR	MC2207130-001	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 1M
FDR	MC2207130-002	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 2M
FDR	MC2207130-00A	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 0.5M
FDR	MC2207130-0A1	Mellanox Passive Copper Cable VPI UP TO 56GB/S QSFP 1.5M
FDR	MC2207310-100	Mellanox Active Fiber Cable VPI UP TO 56GB/S QSFP from 3M up to 100M
FDR	MC2207310-XXX	Mellanox Active Fiber Cable VPI UP TO 56GB/S QSFP from 3M up to 100M
FDR	MC2207312-XXX	Mellanox Active Fiber Cable VPI UP TO 56GB/S QSFP from 3M up to 300M

Table 11 - Validated and Supported FDR Cables

Speed	Cable OPN #	Description
FDR	MC220731V-XXX	Mellanox® Active Fiber Cable, VPI, up to 56Gb/s, QSFP, up to 100m
FDR	MC2207411-SR4L	Mellanox Optical Module IB FDR 56GB/S QSFP MPO 850NM up to 30M
FDR	MCP170L-F001	Mellanox® Passive Copper Cable, VPI, up to 56Gb/s, QSFP, LSZH, 1m
FDR	MCP170L-F002	Mellanox® Passive Copper Cable, VPI, up to 56Gb/s, QSFP, LSZH, 2m
FDR	MCP170L-F003	Mellanox® Passive Copper Cable, VPI, up to 56Gb/s, QSFP, LSZH, 3m

1.2.10 Validated and Supported EDR Cables

Table 12 - Validated and Supported EDR Cables

Speed	Cable OPN #	Description
EDR	MCP1600-E001[a]	Mellanox Passive Copper Cable VPI 100GB/S QSFP LSZH 1M
EDR	MCP1600-E002[a]	Mellanox Passive Copper Cable VPI 100GB/S QSFP LSZH 2M
EDR	MCP1600-E003	Mellanox Passive Copper Cable VPI 100GB/S QSFP LSZH 3M
EDR	MCP1600-E004A26	Mellanox® Passive Copper cable, IB EDR, up to 100Gb/s, QSFP28, 4m, Blue, 26AWG
EDR	MCP1600-E00A[a]	Mellanox Passive Copper Cable VPI 100GB/S QSFP LSZH 0.5M
EDR	MCP1600-E01A[a]	Mellanox® Passive Copper cable, VPI, up to 100Gb/s, QSFP, LSZH, 1.5m
EDR	MCP1600-E02A	Mellanox® Passive Copper cable, VPI, up to 100Gb/s, QSFP, LSZH, 2.5m
EDR	MFA1A00-E005[a]	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 5m
EDR	MFA1A00-E010[a]	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 10m
EDR	MFA1A00-E015[a]	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 15m
EDR	MFA1A00-E020	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 20m
EDR	MFA1A00-E030	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 30m
EDR	MFA1A00-E050	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 50m
EDR	MFA1A00-E100	MELLANOX Active Fiber Cable, VPI, up to 100Gb/s, QSFP, 100m
EDR	MFS1200-E005	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 5m
EDR	MFS1200-E010	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 10m
EDR	MFS1200-E015	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 15m
EDR	MFS1200-E020	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 20m

Table 12 - Validated and Supported EDR Cables

Speed	Cable OPN #	Description
EDR	MFS1200-E030	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 30m
EDR	MFS1200-E050	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 50m
EDR	MFS1200-E100	Mellanox® Active Fiber Cable, IB EDR, up to 100Gb/s, QSFP, LSZH, 100m
EDR	MMA1B00-E100	Mellanox® Transceiver, IB EDR, up to 100Gb/s, QSFP28, MPO, 850nm, up to 100m

a. Forward Error Correction (FEC) is deactivated on this cable.

1.3 Tested Switches

1.3.1 Tested 10GbE Switches

Table 13 - Tested 10GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
10/40GbE	N/A	3064	48-port 10Gb/40Gb Switch	Cisco
10/40GbE	N/A	7050Q	16-port 40Gb Switch	Arista
10/40GbE	N/A	7050S	48-port 10Gb/40Gb Switch	Arista
10GbE	N/A	5548	Cisco 10GB ETH switch	Cisco
10GbE	N/A	G8264	BNT 10/40GB ETH switch	BNT
10GbE	N/A	QFX3500	Juniper 10/40GB ETH switch	Juniper
10GbE	N/A	S4810P-AC	48-port 10Gb/40Gb Switch	Force10
10GbE	SwitchX®	SX1016X-1BFR	64-Port 10GbE Switch System	Mellanox

1.3.2 Tested 40GbE Switches

Table 14 - Tested 40GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
10/40GbE	N/A	3064	48-port 10Gb/40Gb Switch	Cisco
10/40GbE	N/A	7050Q	16-port 40Gb Switch	Arista
10/40GbE	N/A	7050S	48-port 10Gb/40Gb Switch	Arista
40GbE	N/A	3132Q	Cisco 40GB ETH switch	Cisco
40GbE	N/A	7050QX	32-port 40Gb Switch	Arista
40GbE	N/A	G8316	BNT 40GB RackSwitch G8316	BNT

Table 14 - Tested 40GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
40GbE	N/A	S6000	32-port 40Gb Switch	Dell
40GbE	SwitchX®	SX1036B-1BFR	36-Port 40/56GbE Switch System	Mellanox

1.3.3 Tested 100GbE Switches

Table 15 - Tested 100GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
100GbE	N/A	7060CX	32-port 100Gb Switch	Arista
100GbE	N/A	93180YC-EX	48 x 10/25-Gbps fiber ports and 6 x 40/100-Gbps Quad Small Form-Factor Pluggable 28 (QSFP28) ports	Cisco
100GbE	N/A	C3232C	High-Density, 100 Gigabit Ethernet Switch	Cisco
100GbE	N/A	CE8860-4C-EI	24x10GE (SFP+) or 25GE (SFP28) and 2x100GE switch	Huawei
100GbE	Spectrum	SN2410-CB2F	48-port 25GbE + 8-port 100GbE Open Ethernet ToR Switch System	Mellanox
100GbE	Spectrum	SN2700-CS2R	32-port Non-blocking 100GbE Open Ethernet Spine Switch System	Mellanox
100GbE	Spectrum	SN2740-CB2F1	32-port Non-blocking 100GbE Open Ethernet Spine Switch System	Mellanox
100GbE	N/A	Wedge 100-32X R04	32-port 100G QSFP28 - Leaf/Spine Switch, power-to-port airflow, DC Power	Edgecore

1.3.4 Tested QDR Switches

Table 16 - Tested QDR Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
QDR	N/A	12300	36-Port 40Gb QDR Infiniband Switch, Management Module, Dual Power	QLogic
QDR	InfiniScale® IV	IS5025Q-1SFC	36-port 40Gb/s InfiniBand Switch Systems	Mellanox
QDR	InfiniScale® IV	Switch 4036	Grid Director™ 4036E	Mellanox

1.3.5 Tested FDR Switches

Table 17 - Tested FDR Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
FDR	SwitchX®	SX6018F-1SFR	18-port 56Gb/s InfiniBand/VPI Switch Systems	Mellanox
FDR	SwitchX®	SX6036F-1BFR	36-port 56Gb/s InfiniBand/VPI Switch Systems	Mellanox
FDR	SwitchX®	SX6506	108-Port 56Gb/s InfiniBand Director Switch	Mellanox
FDR	SwitchX®-2	SX6710-FB2F2	36-port 56Gb/s InfiniBand/VPI Switch Systems	Mellanox

1.3.6 Tested EDR Switches

Table 18 - Tested EDR Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
EDR	Switch-IB	SB7790-EB2F	36-port EDR 100Gb/s InfiniBand Switch Systems	Mellanox
EDR	Switch-IB 2	SB7800-ES2R	36-port Non-blocking Managed EDR 100Gb/s InfiniBand Smart Switch	Mellanox

1.4 Tools, Switch Firmware and Driver Software

Firmware Rev 12.22.1002 is tested with the following tools, Switch firmware, and driver software:

Table 19 - Tools, Switch Firmware and Driver Software

	Supported Version
MLNX_OFED	4.3-1.0.1.0/4.2-1.2.0.0
MLNX_EN (MLNX_OFED based code)	4.3-1.0.1.0/4.2-1.2.0.0
WinOF-2	1.90/1.80
MFT	4.9.0/4.8.0
VMware	• ESXi 6.5 v4.16.12.12 • ESXi 6.0 v4.15.12.12
MLNX-OS	• SwitchX: 3.6.4930 • Switch-IB: 3.6.4930 • Switch-IB 2: 3.6.4930 • Spectrum: 3.6.4930
SwitchX®/SwitchX®-2 Firmware	9.4.4040
Spectrum™ Firmware	13.1530.0136

Table 19 - Tools, Switch Firmware and Driver Software

	Supported Version
SwitchX-IB™ Firmware	11.1530.0136
SwitchX-IB 2 Firmware	15.1530.0136
InfiniScale® V Firmware	7.4.3000/v7.4.2200
Linux Inbox Drivers	• Ubuntu 14.04.3 • Ubuntu 14.04.4 • Ubuntu 15.04 • Ubuntu 15.10 • Ubuntu 16.04 • Ubuntu 16.04.1 • Ubuntu 16.10 • SLES12 • SLES12.1 • SLES12.2 • RHEL6.6 • RHEL6.7 • RHEL6.8 • RHEL7.1 • RHEL7.2 • RHEL7.3
Windows Inbox Drivers	Windows Server 2016

1.5 Supported FlexBoot, UEFI

Please be aware that not all firmware binaries contain FlexBoot or UEFI, support may vary between cards (see Section 1.1, “Supported Devices”, on page 7.)

Firmware Rev 12.22.1002 supports the following FlexBoot:

Table 20 - Supported FlexBoot, UEFI

Expansion ROM	Supported Version
FlexBoot	3.5.403
UEFI	14.15.19

1.6 Revision Compatibility

Firmware Rev 12.22.1002 complies with the following programmer’s reference manual:

- *Mellanox Adapters Programmer’s Reference Manual (PRM), Rev 0.45 or later,* which has Command Interface Revision 0x5. The command interface revision can be retrieved by means of the QUERY_FW command and is indicated by the field *cmd_interface_rev*.

2 Changes and New Features in Rev 12.22.1002

Table 21 - Changes and New Features in Rev 12.22.1002

Feature/Change	Description
Disable SL/diff Flow	Added support for disable SL/diff flow to avoid performance degradation for single queue using multiple priorities. This functionality should not be used when DCB (PFC, ETS) is enabled.
Software Reset Flow	Software Reset Flow enables the device to recover from fatal errors. The flow includes software detection of a fatal error, automatic creations of an mstdump file for future debug by the software, and resetting of the device. The feature is enabled using an mlxconfig command. **Note:** The flow is currently not supported on Multi host devices, Socket Direct devices and devices running management traffic (NCSI, MCTP).
Steering Discard Packet Counters	Any received packet which is dropped by the device is accounted for. To enable this functionality, the following counters were added to count the discard packets (per vport): • `nic_receive_steering_discard`: Number of packets that completed the NIC Receive Flow Table steering, and were discarded because they did not match any flow in the final Flow Table. • `receive_discard_vport_down`: Number of packets that were steered to a VPort, and discarded because the VPort was not in a state to receive packets. • `transmit_discard_vport_down`: Number of packets that were transmitted by a vNIC, and discarded because the VPort was not in a state to transmit packets.
Virtual Functions (VF)	Increased the number of VFs that can work with full VMQoS (8 TC) per PFs as follow: • in dual port devices to 20 VFs • in single port devices to 58 VFs
Pause Frame Duration and XOFF Resend Time	Increased the Pause Frame Duration and the XOFF Resend Time to the maximum value defined by the specification.
PCI Relax Ordering	mlxconfig configuration can now enable or disable forced PCI relaxed ordering in mkey_context. If this feature is enabled, the software per mkey configuration is ignored.
vport Mirroring	Packets are mirrored based on certain mirroring policy. The policy is set using the “set FTE command” that supports forward action in the ACL tables (ingress/egress). The firmware support the following destination list format: 1. new destination vport (analyzer) 2. another Flow Table this way, the driver can forward the SX/RX packet related to the vport once it reaches the ACL table (forward it to the analyzer vport).

Table 21 - Changes and New Features in Rev 12.22.1002

Feature/Change	Description
Resiliency: Special Error Event	Firmware uses error events to monitor the health of core transport engines, both Rx and Tx, and to detect if a system hang occurred and was not cured by other error mechanisms. Upon such detection, events are sent to the driver to perform any required action (e.g., software reset).
10GBaseT module	Added support for 10GBaseT modules connected to a QSFP cage. **Note:** This connectivity supported was only tested with eNet's E10GSFPT-ENC 10GBase-T SFP+ device, and 10Gtek's ASF-10G-T when using firmware v12.22.1002
QP's Creation Time	Accelerated QP's creation time.
SR-IOV LID based Routing Mode	SR-IOV default routing mode is now LID based. The configuration change is available via mlxconfig tool. Note that in such mode, the VF will get its own LID, hence the GRH is not required. **Note:** LID based routing support for vports is supported using SM v4.8.1
Expansion ROM	Added PXE and UEFI to additional ConnectX-4 adapter cards. ConnectX-4 now holds PXE, x86-UEFI and Arm-UEFI
Bug Fixes	See Section 4, "Bug Fixes History", on page 27

3 Known Issues

The following table describes known issues in this firmware release and possible workarounds.

For a list of old firmware Know Issues, please see ConnectX-4 Firmware Archived Known Issues file (http://www.mellanox.com/pdf/firmware/ConnectX4-Firmware_Archived_Known_Issues.pdf)

Table 22 - Known Issues (Sheet 1 of 4)

Internal Ref.	Issue
1072060	**Description:** On rare occasions, retransmissions/packet loss under signature can cause error reporting and terminate the connection.
	Workaround: N/A
	Keywords: Retransmissions/packet loss
	Discovered in Version: 12.22.1002
1316221	**Description:** Health counter increases every 50ms instead of 10ms.
	Workaround: N/A
	Keywords: Health counter
	Discovered in Version: 12.22.1002
1284452/1282926	**Description:** mlxconfig tool presents all possible expansion ROM images, instead of presenting only the existing images.
	Workaround: N/A
	Keywords: mlxconfig
	Discovered in Version: 12.22.1002
1277762	**Description:** An Ethernet multicast loopback packet is not counted (even if it is not a local loopback packet) when running the `nic_receive_steering_discard` command.
	Workaround: N/A
	Keywords: Ethernet multicast loopback packet
	Discovered in Version: 12.22.1002
1190753	**Description:** When a dual-port VHCA sends a RoCE packet on its non-native port. and the packet arrives to its affiliated vport FDB, a mismatch might happen on the rules that match the packet source vport.
	Workaround: N/A
	Keywords: Dual-port VHCA, RoCE packet, vport FDB
	Discovered in Version: 12.22.1002
1079027/1126921	**Description:** Occasionally, when adding module info page for Bell 1G BaseT module to the mlxlink data, the information is not updated correctly.
	Workaround: N/A
	Keywords: Bell 1G BaseT module, mlxlink
	Discovered in Version: 12.21.2010

Table 22 - Known Issues (Sheet 2 of 4)

Internal Ref.	Issue
1177500	**Description:** QoS for SR-IOV between VPorts per Traffic Class and Para-VPort achieves the optimal performance on Port1.
	Workaround: N/A
	Keywords: vPort TC QoS
	Discovered in Version: 12.21.1000
1168594	**Description:** RoCE Dual Port Mode (a.k.a Multi-Port vHCA: MPV) is not supported in Multi-Host setups.
	Workaround: N/A
	Keywords: Multi-Port vHCA, Multi-Host
	Discovered in Version: 12.21.1000
1176407/1171665	**Description:** Secure Firmware devices block any "not secure" access to the CR-Space, private ICMDs and Flash random access commands. Thus, tools/capabilities such as ibdump or wqedump or packet sniffing do not function properly.
	Workaround: Load a secure customer token to use any blocked tools.
	Keywords: Secure Firmware
	Discovered in Version: 12.21.1000
783975	**Description:** In standby (WoL) mode with only 1 port of 10GbE, although the total IC consumption is as advertised, the actual current consumption in 3.3V rail might be higher by ~60mA than the advertised values.
	Workaround: N/A
	Keywords: ConnectX-4, IC power consumption
	Discovered in Version: 12.21.1000
855202	**Description:** Although the total IC consumption is as advertised, the actual current consumption of the EDR speed in the Vcore rail might be higher by 0.07W than the advertised values.
	Workaround: N/A
	Keywords: ConnectX-4, IC power consumption
	Discovered in Version: 12.21.1000
1119458	**Description:** When RoCE Dual Port Mode is enable, if VHCA0 has a different VLAN stripping configuration on its E-SW vport context than the configuration on the affiliated vport (VHCA1), the NIC steering on the VLAN might be wrong for the single-port VHCA traffic.
	Workaround: N/A
	Keywords: VLAN, dual port affiliation
	Discovered in Version: 12.21.1000

Table 22 - Known Issues (Sheet 3 of 4)

Internal Ref.	Issue
1159246	**Description:** OEM commands must be used with minre field == 0 when setting the host Rate Limiter, meaning the user is prevented from configuring bandwidth share fields of any hosts/PF.
	Workaround: N/A
	Keywords: Rate Limiter
	Discovered in Version: 12.21.1000
1047184	**Description:** RDMA `resq_local_length_error` and `resp_remote_invalid_request` counters do not function properly.
	Workaround: N/A
	Keywords: RDMA counters
	Discovered in Version: 12.21.1000
1121688/1047333	**Description:** On very rare occasions, when connecting ConnectX-4 NIC to the 4036 switch using 3-5M copper cables, the link might raise as DDR instead of QDR.
	Workaround: Reset the firmware
	Keywords: Link speed, QDR, DDR, ConnectX-4, cables
	Discovered in Version: 12.21.1000
1072337	**Description:** If a packet is modified in e-sw flow steering, the SX sniffer Flow Table (of the VF) will see the sniffed packet after the modification.
	Workaround: N/A
	Keywords: SX sniffer Flow Table
	Discovered in Version: 12.21.1000
1063904	**Description:** Messages with mkey signature on offset > 4GB are not supported.
	Workaround: N/A
	Keywords: Signature retransmission
	Discovered in Version: 12.20.1010
1063148	**Description:** Pause duration: Physical port counters count in 512bits quantas, instead of microseconds.
	Workaround: To normalize the counter, do not change the speed: `counter_value_in_microsec = current_counter_value * 512 / port_speed`
	Keywords: Pause duration, Physical port counters
	Discovered in Version: 12.20.1010
1048128	Description: Using ECN with RDMA Read backpressure on the NIC side, may cause low percentage of pauses.
	Workaround: N/A
	Keywords: ECN, RDMA
	Discovered in Version: 12.20.1010

Table 22 - Known Issues (Sheet 4 of 4)

Internal Ref.	Issue
1031744	**Description:** Same flow counter cannot be used on different table types.
	Workaround: N/A
	Keywords: Flow counter
	Discovered in Version: 12.20.1010
1009067	**Description:** In case of an ip_protocol match (on UDP/TCP) related to fragmented packet, the l4_type match might be missed when the hardware steering does not see the L4 headers.
	Workaround: Add to the driver ip_frag match for all steering rules that use ip_protocol match.
	Keywords: ip_protocol match, L4 headers
	Discovered in Version: 12.20.1010

4 Bug Fixes History

Table 23 lists the bugs fixed in this release. For a list of old firmware Bug Fixes, please see ConnectX-4 Firmware Archived Bug Fixes file (http://www.mellanox.com/pdf/firmware/ConnectX4-Firmware_Archived_Bug_Fixes.pdf)

Table 23 - Bug Fixes History (Sheet 1 of 7)

Internal Ref.	Issue
1231791	**Description:** Fixed an issue that caused the driver to return a wrong logical OR of the 2 physical ports, when querying the vport state when the LAG was enabled.
	Keywords: LAG, vport
	Discovered in Version: 12.21.2010
	Fixed in Release: 12.22.1002
1252833	**Description:** Increased the Full Wire Speed (FWS) threshold value to improve EDR link results.
	Keywords: Full Wire Speed (FWS) threshold, EDR
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.22.1002
1135140	**Description:** DCBX with a TSA protocol of Credit Based Shaper (CBS) is not supported. If enabled, it might result in a driver error message and unexpected QoS behavior.
	Keywords: DCBX, TSA protocol, Credit Based Shaper (CBS), QoS
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.22.1002
1281622	**Description:** Fixed an issue that resulted in “Destroy LAG” command failure if a VFs received an FLR while its affinity QPs were open.
	Keywords: ECMP / SR-IOV LAG
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.22.1002
1172293	**Description:** When RoCE Dual Port mode is enabled, tcpdump is not functional on the 2nd port.
	Keywords: Dual Port vHCA, Multi-port, RoCE Dual Port
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.22.1002
1124226	**Description:** Fixed an issue that caused QP connection timeout due to firmware not being able to handle duplicate packets with AckReq bit set. The fix stopped ignoring duplicate AckReq packets to avoid timeout on the sender side.
	Keywords: QP connection timeout
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010

Table 23 - Bug Fixes History (Sheet 2 of 7)

Internal Ref.	Issue
1179155	**Description:** MPFS load balance (`DUP_MAC_ACTION==LOAD_BALANCE(1)`) is not working as long as `IB_ROUTING_MODE/SRIOV_IB_ROUTING_MODE` is configured to LID.
	Keywords: MPFS load balance, LID, GID
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010
1155392	**Description:** Fixed an issue that caused a SX engine deadlock (the SX engine handles software port/priority changes for a specific Send Queue) when more than a single SX engine handled the "prio diff" flow simultaneously, thus caused the hardware to get stuck. The issue happened as the firmware releases the SX engine and waits for various operation to complete. However, due to a race that allows a different transaction to get into the SX engine and cause the lock to be taken by it, the SX engine release is prevented.
	Keywords: SX engine deadlock, system hang
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010
1168271	**Description:** Fixed an issue that caused the system to hang while changing QPTS/QPDPM/QPDP parameters during traffic.
	Keywords: QPTS/QPDPM/QPDP, system hang
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010
1190215	**Description:** Fixed unfairness between senders in RoCE LAG while ECN is configured.
	Keywords: RoCE LAG, ECN
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010
1121688	**Description:** Fixed an issue which displayed diagnostic counters only on the adapter that was initialized first, which is the counters' owner. The owner received correct values, while the other adapter only received zeros.
	Keywords: Diagnostic counters
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010
1175146	**Description:** Fixed an issue that caused the rdma_cm traffic to fail on the 2nd port when more than 32 VFs were configured, when the RoCE Dual Port vHCA (a.k.a Multi-Port vHCA: MPV) feature was enabled.
	Keywords: MPV
	Discovered in Version: 12.21.1000
	Fixed in Release: 12.21.2010

Table 23 - Bug Fixes History (Sheet 3 of 7)

Internal Ref.	Issue
1167218/ 1168567	**Description:** Fixed an issue related to RDMA_CM driver that might have caused the QP Rate Limit to be activate unexpectedly and reduce the bandwidth significantly on this QP.
	Keywords: Performance
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1122718	**Description:** Fixed an issue that caused low throughput when ECN was enabled in a many-to-one scenario.
	Keywords: ECN
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1126486	**Description:** Fixed a rare issue that caused the firmware to hang.
	Keywords: Firmware hang
	Discovered in Version: 12.10.1006
	Fixed in Release: 12.21.1000
1090723	**Description:** Fixed an issue that wrongly reported the maximum temperature in a setup as the current temperature regardless of the actual temperature.
	Keywords: PCI Gen4 receiver
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1091424	**Description:** Fixed Virtual Addressing Capability incorrect report in NC-SI (Sideband).
	Keywords: NC-SI
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1134021	**Description:** Improved RX sensitivity per Vcore.
	Keywords: RN, Vcore
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1099880	**Description:** Disabled the option to write to the protected modules to avoid receiving NACK upon module initialization.
	Keywords: Thermal temperature
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000

Table 23 - Bug Fixes History (Sheet 4 of 7)

Internal Ref.	Issue
1111202	**Description:**Enabled cold_flicks reset when sending invalidate_all command to invalidate all the ECs.
	Keywords: CQE, QoS
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
743242/ 938019	**Description:** SR-IOV min & max rate limiter can only support up to 64 VFs per port.
	Keywords: SR-IOV min & max rate limiter
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1046427/ 1047180	**Description:** Fixed the issue where ECN did not function as expected when the number of QPs > ~500 per host.
	Keywords: ECN
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1054335/ 1054671	**Description:** Fixed the issue where when using UD RoCE multicast traffic over SR-IOV, packets were scattered to all the attached QPs in the e-sw (PF and its VFs) and not only on the vport that was specified in the e-se FDB.
	Keywords: UD RoCE multicast traffic, SR-IOV
	Discovered in Version: 12.20.1010
	Fixed in Release: 12.21.1000
1060650	**Description:** Fixed a link issue on Intel 10GbE Optical module PN: R8H2F, Y3KJN.
	Keywords: Intel 10GbE Optical module
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1040099	**Description:** Fixed an issue that caused the link to raise as DDR instead of QDR after firmware reset when connected to switch 4036.
	Keywords: QDR, DDR
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
1052064	**Description:** Fixed an issue that caused the device to hang upon warm reboot.
	Keywords: Warm reboot
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010

Table 23 - Bug Fixes History (Sheet 5 of 7)

Internal Ref.	Issue
1047533	**Description:** Fixed an issue that caused the TX traffic not to send packets when using VF index (ARI) bigger than 127.
	Keywords: VFs
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1009614	**Description:** Fixed a scaling issue with more than 1k QPs for ECN by moving from per QP caching to per IP to allow better scale with number of host in the fabric.
	Keywords: Performance
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1041108	**Description:** Enabled firmware resync of the internal clocks after getting out of the standby mode to prevent PTP time sync from getting out of sync after system warm-rebooted due to system getting into a low-power (standby) mode.
	Keywords: PTP time sync, standby mode
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1047693	**Description:** When running RoCE over VRRP, enabled the device to receive RoCE packet with different source MAC than the original RoCE packet's destination MAC, to allow routing between different subnets.
	Keywords: RoCE over VRRP, Destination MAC
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1050234	**Description:** Fixed an issued that caused LLDP not to enable PFC configuration currently when DCBX transitioning flow control configurations was set from Global Pause to PFC.
	Keywords: RoCE Lossy & ECN
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1063449	**Description:** Fixed an issue that caused TX to get stuck when a link fail-over occurred in LAG and the firmware switched between the two ports. Additional credits reset flow were added when the firmware moved between different port,vl.
	Keywords: TX, LAG
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1047533	**Description:** Rephrased and improved external troubleshoot messages in PDDR register.
	Keywords: PDDR register
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010

Table 23 - Bug Fixes History (Sheet 6 of 7)

Internal Ref.	Issue
999261	**Description:** Improved SR-IOV performance.
	Keywords: SR-IOV
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
954822	**Description:**: The `ipoib_enhanced_offloads` indication in the HCA capabilities reports `0` while `SRIOV_EN=1`.
	Keywords: SR-IOV, IPoIB Offloads
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
959464	**Description:**When the Max Rate Limiter is enabled and a Teardown/FLR is issued upon the last gvmi with `max_rate_limiter` enabled Teardown/FLR, the hardware remains enabled (rate_limiter_en = 1). ** "`max rate limiter enabled`" = at least 1 (per chip). `create/modify_scheduling_elemnt` command has been issued by the driver, with `max_average_bw != 0`.
	Keywords: Teardown/FLR, Max Rate Limiter
	Discovered in Version: 12.18.1000
	Fixed in Release: 12.20.1010
1002884	**Description:** Fixed an issue that prevented ibdump from functioning properly on Connect-X-4 second port.
	Keywords: ibdump
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
981598	**Description:** Fixed an issue on an ETH port with SR-IOV enabled that prevented packets from reaching the BMC (failure in steering loopback resolution) if the BMC addresses were configured after VF initialization, and the VF was trying to send traffic to the BMC (that located on the same phy port).
	Keywords: BMC, SR-IOV, packets
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
906144	**Description:** Fixed an issue which caused the rate limiter not to function when setting a rate to tc 7.
	Keywords: QOS - ETH - rate limit per TC
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010

Table 23 - Bug Fixes History (Sheet 7 of 7)

Internal Ref.	Issue
893261	**Description:** Fixed the PCIe TX glitch during Recovery.Speed state of the link training to PCIe Gen3.
	Keywords: PCIe TX glitch
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
1002190	Description: Fixed an issue related to the PortRcvDataVLExtended/PortXmitDataVLExtended parameter that caused the counters' value to be reported in octets instead of dwrods.
	Keywords: Counters
	Discovered in Release: 12.18.2000
	Fixed in Release: 12.20.1010
1025741/ 781339/ 1050373	Description: QP ULP modes 0 and 1 cannot be assigned to the same Multicast group.
	Keywords: Multicast Group (MCG), QPs
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
913451	Description: Fixed an issue in standby (WoL) modes only that caused the actual current consumption in 1.2V rail to be higher by<33mA than the advertised values although the total IC consumption is as advertised.
	Keywords: Standby (WoL) modes, current consumption
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
852744	**Description:** Mapping an SL to VL 15 is currently not supported. Trying to do so, will cause a health buffer fatal internal error report.
	Keywords: SL to VL mapping
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010
1019003/ 1019039/ 995878	Description: Fixed an issue causing physical errors observed on Ixia 100GbE receiver.
	Keywords: Ixia 100GbE receiver
	Discovered in Release: 12.18.1000
	Fixed in Release: 12.20.1010

5 Firmware Changes and New Feature History

Table 24 - Firmware Changes and New Feature History (Sheet 1 of 11)

Feature/Change	Description
Rev. 12.21.2010	
Query vPort Environments (Debug Counters)	Debug counters are a group of counters that handle traffic performance issue related to firmware overhead in transport flow. The following are the additional counters added to this firmware version: • current_q_under_processor_handle • total_q_under_processor_handle • qp_priority_update_flow
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.21.1000	
Single PF for InfiniBand Dual Port Device	Added support for InfiniBand native (No SR-IOV) dual port device (Function per port is disabled). In this mode virtualization is not supported and ISSI = 0.
PTP Packets Time Stamping	Enables PTP packets time stamping upon packet's arrival to the port.
Explicit Congestion Notification (ECN)	Enabled ECN by default.
10G/40G Support on 100GbE AOC/transceivers	Added support for 10G/40G on 100GbE AOC/transceivers vs. non Mellanox devices
DC Connection Negative-Acknowledgment (CNAK) Enhancement	DC CNAK improves sent CNAK performance and avoids back pressure in ConnectX-4 adapter cards.
Receiver Signal Integrity Improvements	Raised the link only with phase greater than 15 ticks to improve signal integrity.
	Extended measurement test between 2 similar RX configurations.
	Moved the data path to use the second input buffer to improve signal integrity.
RoCE Dual Port Mode (a.k.a Multi-Port vHCA: MPV)	Enables the usage of a dual port Virtual HCA (vHCA) to share RDMA resources (e.g., MR, CQ, SRQ, PDs) across the two Ethernet (RoCE) NIC network ports and display the NIC as a dual port device. For this feature to function properly, the following requirements must be met: • Either the LAG or the Dual Port mode is enabled by the driver • Dual port device: both ports must be set as ETH • In ConnectX-4/ConnectX-4 Lx adapter cards, the maximum allowed number of VFs per PF is 32. • Function per port is enabled **Note:** This feature is only supported in single host device

Table 24 - Firmware Changes and New Feature History (Sheet 2 of 11)

Feature/Change	Description
DSCP	Added QPDPM register to support dynamic mapping between DSCP and priority.
	Added trust level for QoS prioritization according to the DSCP or PCP.
	Added ingress buffer management for: • ingress traffic mapping to a buffer according to priority • buffers sizes and lossless parameters
Steering Rules Rate Improvement	Improved steering rules update rate to up to 50K rules per sec.
Windows SR-IOV Enhanced eIPoIB	Enabled Windows SR-IOV Enhanced eIPoIB (without Secure Connection) for Windows-over-Windows setups.
Driver CR Dump	crdump operation takes a snapshot of the device's crspace dword-by-dword. It enables the driver to collect debug information upon firmware failure.
Secured Firmware Update	Secure Firmware Updates provides devices with the ability to verify digital signatures of new firmware binaries, in order to ensure that only officially approved versions are installed on the devices. **Note:** This feature is only available in adapter cards that support this feature.
Cables	Changed the default FEC mode for cables with attenuation 16 and below from RS to FC.
ECN	Enabled ECN (CongestionControl) by default for all priorities on Ethernet ports.
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.20.1010	
DSCP	Added trust level for QoS prioritization according to the DSCP or PCP.
	[Beta] Added ingress buffer management for: • ingress traffic mapping to a buffer according to priority • buffers sizes and lossless parameters
Secured Firmware Updates	**[Beta]** Secure Firmware Updates provides devices with the ability to verify digital signatures of new firmware binaries, in order to ensure that only officially approved versions are installed on the devices. **Note:** This feature is only available in adapter cards that support this feature.

Table 24 - Firmware Changes and New Feature History (Sheet 3 of 11)

Feature/Change	Description
Multi-Host/Socket Direct Routing to be LID based	**[InfiniBand only]** Changed the Multi-Host/Socket Direct routing to be LID based instead of GID based. Thus, GRH/GID index is not required. **Note:** This feature requires SM 4.8.1 and above.
Relaxed Ordering	**[Beta]** Added support for relaxed ordering write in memory keys.
RDMA Counters	Enhanced RDMA counter
TLV for PCI class code	Added 2 new per Host TLVs (see Table 33, "Per host Settings," on page 58)
Fast Teardown	Enables fast unloading driver by using Teardown HCA with op_mode=1 (force_close). For further information, refer to the PRM.
IPoIB Virtualization	Added support for enhanced IPoIB (QP.ulp == 2) in virtualized system (SR-IOV / Multi-Host / Socket Direct)
SFP Power Flow Improvement (level 2,1)	Added support for SFP power class.
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.18.2000	
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.18.1000	
RX Loss (BaseT link down indication)	Added logical link indication in SFP to BaseT modules and disabled logical link when peer port is down.
SFP Rate	Added support for 10GbE in 25GbE SFP optical modules
PDDR	Enables mlxlink tool to collect data on the PHY link status and provides link down reasons and additional link related information.
KR Tx Response	Enabled TX configuration response and movement during Link Training in Ethernet.
Phy Test mode	Added support at lane rate of 12.89Gb.
Head of Queue (HoQ) per TC	Limits the amount of time a packet may head a Traffic Class (TC) transmission queue, without being transmitted. Stale packets are discarded. Active by default for TCs adhering to link level flow control
User Access Region (UAR) 4KB Granularity Allocation	UAR page size currently is set to 4KB and not according to what the system page size determines.
No Driver NIC (NODNIC) Performance Improvement	Improved performance of: • Doorbell from User Access Region (UAR) • Clear interrupt from User Access Region (UAR
Counters	Added support for additional transport counters.
On Demand Paging (ODP) DC	Added ODP support for DC.
Scatter to CQE on Sender for DC	Enabled scatter-to-CQE for sent packets for DC.

Table 24 - Firmware Changes and New Feature History (Sheet 4 of 11)

Feature/Change	Description
CQ modify	Enabled moderation period modification in CQ modify command.
VMQ: Rate limit per Function	**[Beta]** Added support for minimum/maximum rate limit per vport in SR-IOV.
Network traffic between UEFI-Shell and OS	Enabled network traffic between UEFI-Shell and OS.
non-RDMA capable VFs	Enabled the PF to force disable RoCE for its VFs.
PRM: Access Registers	Added 2 new access registers: • Management Capabilities Mask Register • Ports CApabilities Mask Register Fields For further information, please refer to the PRM.
Loopback Enabled/Disabled	Enabled VNIC the control to enable/disable its local loopback traffic.
RDMA RX Flow Table	Added the option to open a receive RDMA Flow Table and to forward RoCE traffic to some destination QP.
Bug Fixes	See Section 4, “Bug Fixes History”, on page 27
Rev. 12.17.2020	
GENEVE & IP-in-IP Stateless Offload	**[Beta]** Added support for IP-in-IP and GENEVE network protocols encapsulated into IP frame (L2 tunneling). Encapsulation is suggested as a means to alter the normal IP routing for datagrams, by delivering them to an intermediate destination that would otherwise not be selected based on the (network part of the) IP Destination Address field in the original IP header. **Note:** For driver support, please see the Release Notes/User Manual of the relevant OS driver.
Bug Fixes	See Section 4, “Bug Fixes History”, on page 27
Rev. 12.17.1010	
Multi-Host LID Base Routing	Added support for Multi-Host LID base routing. This feature requires a new OpenSM (v4.7.1 and above which comes with MLNX_OFED 3.3-2.0.0.0) with the following attributes: • qos TRUE • lmc 2 (if there is no quad host in the fabric, you can set the lmc to 1) • virt_enabled 2 **Note:** Multi-Host LID base routing can be configured by the INI only. The default is 0
Resilient RoCE	Resilient RoCE is the ability to send RoCE traffic over a lossy network (a network without flow control enabled), without the need to enable flow control on the network. The ability is accomplished by enabling ECN on both the Switch and the Host.
Multi-Host L3/L4 Classification	Enables load balancing in the Multi PF Switch layer (MPFS) based on the L3/L4 headers

Table 24 - Firmware Changes and New Feature History (Sheet 5 of 11)

Feature/Change	Description
InfiniBand Multi-Host Isolation	Enabled isolation between separate Hosts using the same HCA. All the Hosts can be rebooted, the driver can be stopped and the FLR signal can be sent independently.

95 Virtual Functions (VF) per Port	Increased the number of VFs from 64 to 95 per Physical Function (PF).
	Note: When increasing the number of VFs, the following limitations must be taken into consideration:
	`server_total_bar_size >= (num_pfs)*(2log_pf_uar_bar_size + 2log_vf_uar_bar_size*total_vfs)`
	`server_total_msix >= (num_pfs)*(num_pf_msix + num_vfs_msix *total_vfs)`
	Note: For the maximum number of VFs supported by your driver, please refer to your drivers' Release Notes or User Manual.

QoS per VFs	**[InfiniBand Only]** Added support for multiple VLs in SR-IOV/mutli-host environments. **Note:** The number of VLs can be configured by the NVCONFIG. The default VL number is 4 VLs.
InfiniBand Rate Limit per QP (static rate)	Added support for QP Rate Limit in InfiniBand.
HCA Port Flap Counter	Added support for Port Flap Counter.
Fixed Buffer Size (KSM)	Limits the buffer size for all entries to improve performance. KSM is used when associating Key Length My Virtual Address (KLMs) with fixed memory size.
NULL Mkey	This entry (null_mkey) is use to indicate non-present KLM/KSM entries. When accessing is, it causes the device to generate page fault event.
Out-of-Band Online Firmware Update: Firmware Update over PLDM	PLDM firmware burning is based on the DMTF spec DSP0267 (draft 9). The feature enables upgrading firmware and expansion ROM images using the PLDM protocol over MCTP (over PCIe). By doing so, a supporting BMC can query and upgrade the firmware without using OS based tools.
New Group in Ports Performance Counters (PPCNT)	Added a new physical layer statistics counters group. The new group includes BER counters, FEC error correction, clear time, and additional physical layer counters. For further information, please refer to the Ethernet Adapters Programming Manual (PRM).
Permanent Link Up Mode	Enables the user to set a certain link up state for an unlimited period of time. This mode has 3 states: • Aux power (standby) • Reboot/boot/driver unloaded - the server is active and no driver is up • Driver is up - at least one driver is up (the time between init HCA and teardown or FLR)

Table 24 - Firmware Changes and New Feature History (Sheet 6 of 11)

Feature/Change	Description
No Driver NIC (NODNIC) Performance Improvement	Added support for Doorbell from User Access Region (UAR).
SR-IOV: Rate Limit Per Function	**[Beta]** Added support for maximum rate limit per function in SR-IOV.
Firmware Resiliency: Suppress Pauses	Allows the user to configure the adapter card to stop sending pauses after x when the receive port is unavailable (in a hang state).
Performance Back-pressure Counters	**[Beta]** Added support for new performance counters.
Data Center Bridging Exchange (DCBX)	DCBX is used by DCB devices to exchange configuration information with directly connected peers. DCBX uses Link Layer Discovery Protocol (LLDP) to exchange parameters between two link peers. For further information, please refer to the PRM.
Access Register: Default Values Revert	Allows network port registers to revert to their default values when the driver is restarted or the host is rebooted.
Link up Modes	Added additional network link up modes. The new modes decide when to keep the network link up. The new modes are: • keep_eth_link_up • keep_ib_link_up • keep_link_up_on_boot • keep_link_up_on_standby
Bug Fixes	See Section 4, “Bug Fixes History”, on page 27
Rev. 12.16.1020	
Bug Fixes	See Section 4, “Bug Fixes History”, on page 27
Rev. 12.16.1006	
Explicit Congestion Notification (ECN)	**[Beta]** Explicit Congestion Notification (ECN) is an extension to the Internet Protocol and to the Transmission Control Protocol. ECN allows end-to-end notification of network congestion without dropping packets.

64 VFs per port	Increased the number of VFs from 32 to 64 per PF.
	Note: When increasing the number of VFs, the following limitations must be taken into consideration:
	`server_total_bar_size >= (num_pfs)*(2log_pf_uar_bar_size + 2log_vf_uar_bar_size*total_vfs)`
	`server_total_msix >= (num_pfs)*(num_pf_msix + num_vfs_msix *total_vfs)`

RoCE Link Aggregation (RoCE LAG)	**[Beta]** RoCE Link Aggregation provides failover and link aggregation capabilities. In this mode, only one IB port, that represents the two physical ports, is exposed to the application layer. For further information, please refer to the PRM.

Table 24 - Firmware Changes and New Feature History (Sheet 7 of 11)

Feature/Change	Description
OVS Offload	Mellanox Accelerated Switching And Packet Processing (ASAP^2) Direct technology allows to offload OVS by handling OVS data-plain in Mellanox ConnectX-4 / ConnectX-4 Lx NIC hardware (Mellanox Embedded Switch or eSwitch) while maintaining OVS control-plain unmodified. The current actions supported by ASAP^2 Direct include packet parsing and matching, forward, drop along with VLAN push/pop or VXLAN encap/decap and HW based packet/byte flow statistics.
Virtual Extensible LAN (VXLAN) encapsulation/decapsulation	Virtual Extensible LAN (VXLAN) is a network virtualization technology that improves scalability problems associated with large cloud computing deployments. It tunnels Ethernet frames within Ethernet + IP + UDP frames. Mellanox implements VXLAN encapsulation and decapsulation in the hardware.
Data Center Bridging Exchange (DCBX)	**[Beta]** DCBX is used by DCB devices to exchange configuration information with directly connected peers. DCBX uses Link Layer Discovery Protocol (LLDP) to exchange parameters between two link peers. For further information, please refer to the PRM.
FCS no scatter / FCS check	Enables the user to control whether or not to scatter Frame Check Sequence (FCS) or to check FCS functionality.
Packet Pacing	**[Beta]** Send Queues (SQ/ Send queue of QP) may be individually rate limited, thus, allowing granular rate control over specific SW-defined flows. A rate-limited flow is allowed to transmit a few packets before its transmission rate is evaluated, and the next packet is scheduled for transmission accordingly.
PRBS Patterns Generation and Tuning	A new PHY test mode in which the device can generate different PRBS patterns for SerDes tuning purpose. For further information, please refer to PRM registers: PPAOS, PPTT, PPRT.
Management Controller Transport Protocol (MCTP) over PCI	Added support for MCTP host management over PCI
OCBB / OCSD support after mlxfwreset	Added support for OCBB/OCSD memory pointers restoration after mlxfwreset
MCTP media migration	Added support for MCTP media migration between SMBUS and PCI
Cables	Removed the RX amplitude configuration on some cable types
Bug Fixes	See Section 4, “Bug Fixes History”, on page 27
Rev. 12.14.2036	
IPoIB checksum and LSO offload	Added IPoIB checksum and LSO offload support
Scatter FCS in RQ	Enables software to scatter or strip FCS in RQ.

Table 24 - Firmware Changes and New Feature History (Sheet 8 of 11)

Feature/Change	Description
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.14.1100	
CQE Time Stamping	Keeps track of the creation of a packet. A time-stamping service supports assertions of proof that a datum existed before a particular time.
Priority Flow Control (PFC)	Applies pause functionality to specific classes of traffic on the Ethernet link.
RDMA retransmission counters	Custom port counters provide the user a clear indication about RDMA send/receive statistics and errors.
Link Layer Discovery Protocol (LLDP)	The Link Layer Discovery Protocol (LLDP) is a vendor-neutral Link Layer protocol in the Internet Protocol Suite used by network devices for advertising their identity, capabilities, and neighbors on a IEEE 802 LAN. The protocol is formally defined in IEEE 802.1AB.
1GbE and 56GbE Link Speed	ConnectX-4adapters now support 1Gb/s and 56GbE Ethernet connectivity in addition to 10GigE, 25GigE, 40GigE, 50GigE, and 100GigE
Flow Steering Counters	Provides a clear indication of Flow Steering statistics and errors.
WQE Inline Header	The minimal amount of packet headers inlined in the WQE's Eth Segment.
table-miss Flow	A flow table may include a table-miss flow entry, which renders all Match Fields wildcards. If a packet does not match a flow entry in a flow table, this is a table miss. The behavior on a table miss depends on the table configuration. A table-miss flow entry in the flow table may specify how to process unmatched packets.
Multi-Host InfiniBand	Enables connecting multiple compute or storage hosts into a single interconnect adapter by separating the adapter PCIe interface into multiple and independent PCIe interfaces.
SR-IOV (EN eSwitch & RoCE)	Single Root IO Virtualization (SR-IOV) is a technology that allows a physical PCIe device to present itself multiple times through the PCIe bus.
Vector Calculation/ Erasure Coding Offload	Uses the HCA for offloading erasure coding calculations.
Firmware Image Time Stamping for Multi-Host Environment	Enables the administrator to add a timestamp to the firmware they want to upgrade to avoid situations where one host tries to upgrade the firmware and another tries to downgrade; which may lead to two or more unnecessary server reboots. For further information, please refer to MFT User Manual.
Link params modification via access registers	The change includes the following: 1. Changed port configuration which required link re-training (such as speed) 2. PAOS down 3. PAOS up This change, will cause the link to toggle and new configurations to take effect.

Table 24 - Firmware Changes and New Feature History (Sheet 9 of 11)

Feature/Change	Description
Checksum Calculation on Image/Device	Flint utility allows performing an MD5 checksum on the non-persistent sections of the firmware image. For further information, please refer to MFT User Manual.
Rev. 12.12.1240	
Bug Fixes	See Section 4, "Bug Fixes History", on page 27
Rev. 12.12.1100	
Port Link	Reduced the port link-up time when negotiating according to Clause 73 (DME)
Rev. 12.12.0780	
PCI	• PCIe Function Level Reset (FLR) • Power Management L2/L3 flow support
Ethernet Network	• Large Receive Offload (LRO) • Large Send Offload (LSO) • Receive Side Scaling (RSS) • Global Pause • RoCEv1.0/RoCEv2.0 • Flow Steering • Sniffer Ethernet • Rate Limiter (at Beta level) • Multi packet WQE • Minimal Bandwidth Guarantee (ETS) • Explicit Congestion Notification (ECN) • Priority Flow Control (PFC)

PRM	• Self Loopback support
	• Transport Domain support
	• CQ2EQ remapping
	• Added support for the following commands:
	  • `MODIFY/QUERY_ESW_VPORT_CONTEXT`
	  • `QUERY/MODIFY_CONG_STATUS`
	  • `QUERY/MODIFY_CONG_PARAMS`
	  • `QUERY_CONG_STATISTICS`
	  • `ADD/DELETE_VXLAN_UDP_DPORT`

Virtualization	• VXLAN/NVGRE Stateless offload In this release, this feature is supported through Windows ONLY • SR-IOV EN (at Beta level)
Performance	• CQE zipping
InfiniBand Network	• Dynamically Connected (DC) transport
Misc	• Wake-on-Lane/Standby • FlexBoot/UEFI support

Table 24 - Firmware Changes and New Feature History (Sheet 10 of 11)

Feature/Change	Description
Non-Volatile Configuration	• Non-Volatile Configuration (NVConfig). For the complete list, lease refer to Section 9, on page 58.
Port management	• Enabled port management. Now one port can be set as Ethernet and one as InfiniBand.
Rev. 12.1100.6630	
Virtualization	• Added support for SR-IOV • Added support for MADs Virtualization Attributes according to ib_virt_annex_v17
PRM	• Updated virtualization command set according to PRM 0.26
Configuration tools	• Enabled SR-IOV, NUM_VFS and INT_LOG_MAX_PAYLOAD_SIZE configuration via the mlxconfig tool
Rev. 12.0100.6440	
All	• Initial Release of ConnectX®-4 adapter cards
Port Speed	• InfiniBand port speed up to EDR • Ethernet port speed up to 100GigE
Virtualization	• Function per port

InfiniBand Network	• Dynamically Connected transport
	• Unreliable Datagram Connection transport
	• Atomic Operation
	• CORE-Direct®
	  • Provides Collective Off-loading in HCA
	  • Frees CPU to perform computation in parallel with collective operations
	• T10 DIF pipeline Data Integrity Signature off-loading (at beta level)
	• User Memory Registration (UMR)
	• Automatic Path Migration
	• On Demand Paging (ODP) - Memory can now be used without pinning memory beforehand.
	• Congestion Control
	• Shrink Address Vectors for RC and UD
	• Programmable Port/Node GUID

Ethernet Network	**Note:** All the Ethernet features listed below are at Beta level. • Large Receive Offload (LRO) • Large Send Offload (LSO) • Receive Side Scaling (RSS) • Global Pause • RoCEv1/RoCEv2. RoCE is supported only in Reliable Connection (RC) transport • Flow Steering

Table 24 - Firmware Changes and New Feature History (Sheet 11 of 11)

Feature/Change	Description
General	• Thermal monitoring and protection • Port LEDs indications • NVConfig Tool • Suspend to RAM (S3) support • Diagnostic counters vendor-specific MAD support, as defined by VS-MAD spec version 1.2 • Physical Port Counter - Beta level • Q Counter - Beta level • Firmware burning (using mstflint) when the driver is down • CPLD field upgrade • V Port commands
Host management	• NC-SI over RMII support
MAD	• Config space address in MAD management class 0x09

6 FlexBoot Changes and New Features

For further information, please refer to FlexBoot Release Notes (www.mellanox.com > Software > InfiniBand/VPI Drivers > FlexBoot).

Table 25 - FlexBoot Changes and New Features (Sheet 1 of 3)

Version	Description
Rev. 3.5.403	
Enable/Disable FlexBoot in EXPROM via mlxconfig	Added PXE support to additional ConnectX-4 adapter cards. Enabling/Disabling FlexBoot in ConnectX-4 in EXPROM is done via mlxconfig. The default value is: • FLEXBOOT enable Please note, not all cards are compiled with FlexBoot. For the full list of the OPNs compiled with FlexBoot, please refer to Section 1.1, "Supported Devices", on page 7
VLAN Priority	Set the default VLAN priority to 0.
Link Aggregation Control Protocol (LACP)	LACP support is disabled by default. It can be enabled via mlxconfig.
Rev. 3.5.305	
PXE Boot	Added ESC option as an abort key during PXE boot process.
FlexBoot Link Aggregation Control Protocol (LACP)	Enabled/disabled FlexBoot LACP support by editing the INI configuration.
Serial Console	Removed Serial Console support in the ConnectX-4 adapter card.
Upstream sync	Synced the source with iPXE (upstream sync)
Rev. 3.5.210	
Promiscuous VLAN mode	Added support for promiscuous VLAN mode.
MTU	**[InfiniBand]** Added support for configurable MTU.
Expansion ROM version	Enabled expansion ROM (`exp_rom`) version exposition according to the new specification (e.g. expose ARCH in flint tool).
FlexBoot UI	Added a FlexBoot menu support for `NV_POWER_CONF`. Now power consumption configuration is supported from the FlexBoot menu.
	Enhanced FlexBoot/firmware debug capability using Flexboot UI. Added the `reg_dump` option to the `panic_behavior` configuration in the FlexBoot menu
Bug Fixes	See Section 6.2, "FlexBoot Bug Fixes History", on page 54
Rev. 3.5.110	
Networking	Ethernet only: The MTU value is set to 1500 upon driver's bring up.
Rev. 3.5.109	
Performance	Performance enhancements in Ethernet mode

Table 25 - FlexBoot Changes and New Features (Sheet 2 of 3)

Version	Description
FlexBoot UI	Added support for "Undi network wait timeout"
	Enhanced FlexBoot/firmware debug capability using Flexboot UI
Upstream sync	Synced the source with iPXE (upstream sync)
Rev. 3.4.903	
iSCSI re-imaging	Enables the user to install a new image on active ISCSI target
FlexBoot UI	Added new configuration for network link type for supported cards (ConnectX-4 VPI cards)
	Enabled boot configuration menu in ConnectX-4 when the physical port is IB
Booting	Enabled booting with non-default Pkey in ConnectX-4 when the physical port is IB
Link Status	Removed link status line printout at boot time
Boot Menu	Changed the Bus:Device:Function format in boot menu, from `PCI-Bus:Dev.Func` to `0000:Bus:Dev.Func`
Upstream sync	Synced the source with iPXE (upstream sync)
Rev. 3.4.812	
FlexBoot UI	Added debug prints option in the FlexBoot boot menu. For further information, please refer to FlexBoot and UEFI User Manual.
System Diagnosis	Added the ability to diagnose problems in released ROMs by enabling the debug log levels for specific modules. **Note:** This ability should be used only when debug session is needed.
Interrupts	Added support for ConnectX-4/ConnectX-4 Lx interrupts
Upstream sync	Synced the source with iPXE (upstream sync)
Rev. 3.4.719	
IPv6	Added IPv6 support
x64 Architecture	Added x64 architecture support in ConnectX-4 and Connect-IB adapter cards

Table 25 - FlexBoot Changes and New Features (Sheet 3 of 3)

Version	Description
SHELL CLI	Removed support for the following SHELL CLI commands: • Non-volatile option storage commands • SAN boot commands • Menu commands • Login command • Sync command • DNS resolving command • Time commands • Image crypto digest commands • Loopback testing commands • VLAN commands • PXE commands • Reboot command For further information, please refer to: http://ipxe.org/cmd
Upstream sync	Synced the source with iPXE (upstream sync)
Rev. 3.4.650	
Image size	Added support for .mrom images larger than 128kB
Adapter Cards	Added support for ConnectX-4 EN and ConnectX-4 Lx EN
Flat real mode	Moved to flat real mode when calling INT 1a,b101 to avoid BIOSes issues
Spanning Tree Protocol	Added support for detecting Spanning Tree Protocol non-forwarding ports (RSTP/MSTP)
Upstream sync	Synced the source with iPXE (upstream sync)

6.1 FlexBoot Known Issues

Table 26 - FlexBoot Known Issues (Sheet 1 of 7)

Internal Ref.	Description
1295727	**Description:** In Secure Host mode, the Ctrl + B option will be “read only” and changes will not be applied and may cause unknown behavior.
	WA: N/A
	Keywords: Secure Host mode, Ctrl + B option
	Discovered in Version: 3.5.403
1066544	**Description:** Chain-loading boot-loaders that works with interrupts fails to boot on multi-host adapter cards
	Workaround: N/A
	Keywords: Chain-loading, boot
	Discovered in Version: 3.5.403
1157875	**Description:** Pressing any of the arrow keys during boot might cause the boot process to be aborted.
	Workaround: N/A
	Keywords: Abort boot, arrows, FlexBoot
	Discovered in Release: 3.5.305
1149467	**Description:** Chain-loading "ipxe.pxe" and "undionly.kpxe" over InfiniBand is currently not supported when using DHCP client identification based on InfiniBand 32-bit Prefix+GUID (as with FlexBoot).
	Workaround: N/A
	Keywords: FlexBoot, chainload, InfiniBand, undionly.kpxe, ipxe.pxe
	Discovered in Version: 3.5.305
841198	**Description:** FlexBoot fails to boot when the following occurs: • Boot priority is set to iSCSI • The iSCSI TCP/IP parameters via DHCP is disabled • iSCSI boot fails or iSCSI boot to target configuration is set to disable
	Workaround: N/A
	Keywords: PXE boot, iSCSI
843377/849223	**Description:** The physical MAC assigned via the boot menu is displayed as zeroes instead of the set MAC when ConnectX-4 VPI adapter card is configured as InfiniBand.
	Workaround: N/A
	Keywords: Physical MAC, Boot menu

Table 26 - FlexBoot Known Issues (Sheet 2 of 7)

Internal Ref.	Description
656001	**Description:** Booting from WDS and Windows DHCP server when only Option 66 is enabled (without Option 67), is not supported.
	Workaround: N/A
	Keywords: DHCP
776057	**Description:** Citrix PVS boot is not supported.
	Workaround: N/A
	Keywords: Citrix PVS boot
689460	**Description:** FlexBoot uses system UUID to generate the client DUID-UUID as per RFC 6355, the data conveyed with DHCPv6 Code 1 (Option ID).
	Workaround: N/A
	Keywords: DUID-UUID
928217	**Description:** Installing ESXi 6.5/6.0 on iSCSI target is currently not supported.
	Workaround: N/A
	Keywords: ESXi 6.5/6.0, iSCSI target
689460	**Description:** To use the DHCP server to identify ipxe requests when using `undionly.kpxe` or `ipxe.pxe` when booting over IB requires special configuration. (see the Workaround below).

	Workaround: Add to the DHCP host declaration the MAC identification alongside the option 61 DUID.
	For example:
	`host ib-client1 {`
	`option dhcp-client-identifier =`
	`ff:00:00:00:00:00:02:00:00:02:c9:00:<Port-GUID> ;`
	`hardware ethernet <Port-MAC> ;`
	`fixed-address <IPoIB Address> ;`
	`filename "ipxe.pxe" ;`
	`if exists user-class and option user-class = "iPXE" { filename "pxelinux.0" ; }`
	`}`

	Keywords: undionly.kpxe or ipxe.pxe

Table 26 - FlexBoot Known Issues (Sheet 3 of 7)

Internal Ref.	Description
928217	**Description:** Due to interoperability issue between the ESXi installer and the lpxelinux bootloader, when trying to install ESXi 6.5 on iSCSI target using lpxelinux.0 as a boot-loader, a PSOD occurs.

	Workaround: Use FlexBoot (or iPXE) to load mboot.c32 directly instead of pxelinux.0 using the script below:
	`#!ipxe`
	`set base /nfs/Esxi-6.5_INBOX`
	`chain ${base}/mboot.c32 -c ${base}/boot.cfg BOOTIF=01-${mac:hexhyp}`
	
	where the "`set base ...`" specifies a suitable absolute path.
	Note: iPXE does not need an absolute path, however, mboot.c32 requires it.

	Keywords: mboot.c32, PSOD,
976878	**Description:** When using bootloader grub2 to boot WDS, if the WDS boot fails, an RSOD might appear.
	Workaround: N/A
	Keywords: Bootloader grub2, WDS, RSOD
1072419	**Description:** The FlexBoot DHCP loops indefinitely when it continuously gets NACK on the DHCP requests On some setups, it might also cause an RSOD after a a continues looping.
	Workaround: N/A
	Keywords: Bootloader grub2, WDS, RSOD
-	**Description:** Several BIOS vendors have limited boot-vector space and may not display FlexBoot in their boot menu.
	Workaround: Disable the embedded NIC boot agent in BIOS
	Keywords: BIOS
-	**Description:** In several BIOS, the server might hang during FlexBoot booting due to wrong configuration of the PMM.
	Workaround: N/A
	Keywords: BIOS
-	**Description:** Only EBX, ESI, DS, ES registers can be saved in Boot Entry.
	Workaround: N/A
	Keywords: BIOS

Table 26 - FlexBoot Known Issues (Sheet 4 of 7)

Internal Ref.	Description
-	**Description:** If a client returned control to the BIOS after a successful connection to an iSCSI target (but did not boot from it), then, unexpected behavior may occur.
	Workaround: Follow the instructions described in the FlexBoot UM for the proper iSCSI boot/install
	Keywords: BIOS
673114/ 821899	**Description:** FlexBoot banner might not be shown in some BIOSes.
	Workaround: N/A
	Keywords: BIOS
-	**Description:** In some cases, PXE boot will not work if the client was given only the filename without next-server (siaddr).
	Workaround: N/A
	Keywords: PXE Boot
-	**Description:** PXE boot after iSCSI boot with static configuration is currently not supported.
	Workaround: N/A
	Keywords: PXE Boot
-	**Description:** Boot over VLAN with IB port is currently not supported.
	Workaround: N/A
	Keywords: PXE Boot
-	**Description:** Some faulty boot loaders do not close the underlying UNDI device which may result in unexpected behavior and possible system crash after the OS starts to load.
	Workaround: N/A
	Keywords: PXE Boot
-	**Description:** Chain-loading gPXE stack is not supported.
	Workaround: N/A
	Keywords: PXE Boot
647143	**Description:** Executing a partial boot loop while only downloading the NBP and selecting localboot is unsupported and may cause undefined behavior.
	Workaround: N/A
	Keywords: PXE Boot

Table 26 - FlexBoot Known Issues (Sheet 5 of 7)

Internal Ref.	Description
670421	**Description:** Using filename for PXE boot with rootpath for hooking an iSCSI target (to install) is not supported when the PXE boot loader uses UNDI API, since all traffic must get to the boot loader.
	Workaround: N/A
	Keywords: PXE Boot
-	**Description:** iSCSI over IB is not tested.
	Workaround: N/A
	Keywords: iSCSI
-	**Description:** iSCSI over DCB is not supported.
	Workaround: N/A
	Keywords: iSCSI
-	**Description:** FlexBoot supports only a single active iSCSI connection. Thus, when iSCSI-boot via Port 1 succeeds to connect but fails to boot, it will fail to connect via Port 2.
	Workaround: N/A
	Keywords: iSCSI
-	**Description:** Boot retries is currently not functional when booting from iSCSI.
	Workaround: N/A
	Keywords: iSCSI
655800	**Description:** iSCSI over IPv6 is not supported.
	Workaround: N/A
	Keywords: iSCSI
-	**Description:** Boot menu is displayed as READ ONLY if the HCA card does not support flash configuration.
	Workaround: N/A
	Keywords: User Interface
-	**Description:** FlexBoot Boot Menu will not be visible in serial output.
	Workaround: N/A
	Keywords: User Interface

Table 26 - FlexBoot Known Issues (Sheet 6 of 7)

Internal Ref.	Description
-	**Description:** Large Receive Offload (LRO) and iSCSI may not interoperate due to a bug in current Linux kernel distributions.
	Workaround: Disable LRO in the IPoIB module when using iSCSI. See the Mellanox FlexBoot user's manual for details under the Diskless Machines chapter (InfiniBand Ports).
	Keywords: Networking
-	**Description:** 56Gb/s is currently not supported.
	Workaround: N/A
	Keywords: Link Speed
-	**Description:** Setting the number of Virtual Functions higher than the machine's memory capability may cause memory issues and system instability.
	Workaround: N/A
	Keywords: Virtualization
-	**Description:** SLAM, FTP, HTTPS and SRP are currently not supported.
	Workaround: N/A
	Keywords: Protocols
-	**Description:** Occasionally, using the Spanning Tree Protocol (STP) in the switches may cause packet drops and boot failure in the system.
	Workaround: Enable the "edgemode" if disabled on the switch, or use either portfast or edgemode functionality on the switch ports connected to the NICs.
	Keywords: Protocols
-	**Description:** FCoE, BCV are not supported.
	Workaround: N/A
	Keywords: Protocols
655800	**Description:** IPv6 can only run if a RADVD service is running in the network.
	Workaround: N/A
	Keywords: Protocols
-	**Description:** IPv6 over IB is not supported.
	Workaround: N/A
	Keywords: Protocols

Table 26 - FlexBoot Known Issues (Sheet 7 of 7)

Internal Ref.	Description
655800	**Description:** Enabling IPv6 first and then IPv4 is currently not supported.
	Workaround: N/A
	Keywords: Protocols

6.2 FlexBoot Bug Fixes History

Table 27 - FlexBoot Bug Fixes History (Sheet 1 of 2)

Version	Issue
1157875	**Description:** Pressing any of the arrow keys during boot might cause the boot process to be aborted.
	Keywords: Abort boot, arrows, FlexBoot
	Discovered in Release: 3.5.305
	Fixed in Release: 3.5.403
1113560	**Description:** Fixed an issue that prevented the first iSCSI target parameters to be reset to their default values.
	Keywords: iSCSI target
	Discovered in Release: 3.5.110
	Fixed in Release: 3.5.305
843209	**Description:** Fixed and issue which cause the link not to raise in the second port which is set as IB when the first port is ETH in PXE.
	Keywords: Link up, Ports
	Discovered in Release: 3.4.903
	Fixed in Release: 3.5.110
847950	**Description:** Fixed wrong default value of Boot-To-Target in FlexBoot configuration.
	Keywords: Boot-To-Target, FlexBoot configuration
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.903
691148	**Description:** When connecting a pre-configured port with VLAN to an IB fabric, the port runs as Ethernet port with the VLAN tag.
	Keywords: VLAN, Port Management
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.903
792432	**Description:** Booting PXE using Grub2.X over HP G9/G8 servers results in system hang.
	Keywords: PXE boot, Grub2.X, HP G9/G8
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.903

Table 27 - FlexBoot Bug Fixes History (Sheet 2 of 2)

Version	Issue
737512	**Description:** If the client gets "PXE boot menu" when contacting the DHCP, it will PXE boot first regardless of the boot priority.
	Keywords: ISCSI, DHCP
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.812
690792	**Description:** If the PMM fails to allocate memory, the system hangs since Flex-Boot cannot load from the expansion ROM.
	Keywords: PMM, expansion ROM
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.812
697291	**Description:** In ConnectX-4, the PXE boot time measurement over TFTP Ethernet is 1:30 min for image size of 1GB, TFTP InfiniBand is 1:20 min, and iSCSI boot time measurement is 8 seconds for image size of 25 MB.
	Keywords: PXE Boot
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.812
689068	**Description:** In hybrid BIOSes, if the BIOS loads legacy driver without closing the UEFI driver, the legacy driver fails to load.
	Keywords: BIOS, legacy mode
	Discovered in Release: 3.4.719
	Fixed in Release: 3.4.812
634794	**Description:** Enabled 'boot_pci_busdevfn' initialization when booting from UNDI loader.
	Keywords: UNDI loader
	Discovered in Release: 3.4.650
	Fixed in Release: 3.4.719
-	**Description:** Removed the instruction that enabled write-protected section modifications after POST.
	Keywords: PXE Boot
	Discovered in Release: 3.4.650
	Fixed in Release: 3.4.719

7 UEFI Changes and Major New Features

Table 28 - UEFI Changes and New Features

Category	Description
Rev. 14.15.19	
Enable/Disable UEFI in EXPROM via mlxconfig	Added UEFI support to additional ConnectX-4 adapter cards. • ConnectX-4 adapter cards are compiled with x86-UEFI and Arm-UEFI Enabling/Disabling UEFI in ConnectX-4 in EXPROM is done via mlxconfig. The default values are: • UEFI_X86 disabled • UEFI_AARCH64 disabled For the full list of the OPNs, please refer to Section 1.1, "Supported Devices", on page 7

7.1 UEFI Known Issues

The following is a list of general limitations and known issues of the various components of this UEFI release.

Table 29 - UEFI Known Issues

Internal Ref.	Description
1295727	**Description:** In Secure Host mode, the Hii protocol will be "read only", changes will not be applied and it may cause unknown behavior.
	WA: N/A
	Keywords: Secure Host mode
	Discovered in Version: 14.15.19
798073	**Description:** UEFI driver is not supported on Supermicro X9DEW (BIOS version 3.0c).
	WA: N/A
	Keywords: BIOS, Supermicro X9DEW
-	**Description:** Burning the UEFI driver will remove the Flexboot driver (Legacy BIOS driver) from the firmware.
	WA: N/A
	Keywords: UEFI burning, Flexboot

8 Unsupported Features and Commands

8.1 Unsupported Features

The following advanced feature are unsupported in the current firmware version:

- Service types not supported:
  - SyncUMR
  - Mellanox transport
  - PTP
  - RAW IPv6
  - PTP (IEEE 1588)
- INT-A not supported for EQs only MSI-X
- PCI VPD write flow (RO flow supported)
- Streaming Receive Queue (STRQ) and collapsed CQ
- Precise clock synchronization over the network (IEEE 1588)
- SM is not supported on VFs
- DC is not supported in: Multi-Host, SR-IOV, and Ethernet (RoCE)
- RoCE LAG for VFs and Multi-Host/Socket-Direct are not supported in RoCE LAG
- Mutlihost Ethernet

8.2 Unsupported Commands

- QUERY_MAD_DEMUX
- SET_MAD_DEMUX
- PAGE_FAULT_RESUME
- ACTIVATE_TRACER
- DEACTIVATE_TRACER
- ACCESS_REG_SPACE
- ACCESS_REG_SPACE_DWORD
- ACTIVATE/DEACTIVATE_TRACER
- QUERY/MODIFY_SCHED_QUEUE
- CREATE_RQ - MEMORY_RQ_RMP
- MODIFY_LAG_ASYNC_EVENT

9 Supported Non-Volatile Configurations

Table 30 - Per-physical Port Settings

Name	Parameter Index
VPI settings	0x12
RoCE CC	0x107
RoCE CC ECN	0x108
LLDP_NB_DCBX	0x18E
NV_QOS_CONF	0x192
NV_QOS_CAP	0x193
NV_KEEP_LINK_UP	0x190

Table 31 - Global Settings

Name	Parameter Index
PCI settings	0x80
PCI setting capabilities	0x81
TPT settings	0x82
TPT capabilities	0x83
Option ROM ini	0x100
Option ROM capabilities	0x101
NV_SW_OFFLOAD_CONF	0x10A
NV_PACKET_PACING	0x10C

Table 32 - Per host/function Settings

Name	Parameter Index
Wake-on-LAN	0x10
External Port	0x192

Table 33 - Per host Settings

Name	Parameter Index
NV_PCI_CONF	0x80
NV_PCI_CAP	0x81