Mellanox ConnectX®-4 Lx Firmware Release Notes

Rev 14.25.1020

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Release Update History

Table 1 - Release Update History

Release	Date	Description
Rev 14.25.1020	May 2, 2019	Initial version of this firmware release. This version introduces new Changes and Features (see Section 2, "Changes and New Features in Rev 14.25.1020", on page 18 and Section 4, "Bug Fixes History", on page 25).

1 Overview

These are the release notes for the ConnectX®-4 Lx adapters firmware Rev 14.25.1020.

This firmware supports the following protocols:

- Ethernet - 1GbE, 10GbE, 25GbE, 40GbE, 50GbE
- 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
MCX4111A-ACAT	MT_2410110034	ConnectX®-4 Lx EN network interface card, 25GbE single-port SFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4111A-XCAT	MT_2410110004	ConnectX®-4 Lx EN network interface card, 10GbE single-port SFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4121A-ACAT	MT_2420110034	ConnectX®-4 Lx EN network interface card; 25GbE dual-port SFP28; PCIe3.0 x8; ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4121A-XCAT	MT_2420110004	ConnectX®-4 Lx EN network interface card, 10GbE dual-port SFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4131A-BCAT	MT_2430110027	ConnectX®-4 Lx EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4131A-GCAT	MT_2430110032	ConnectX®-4 Lx EN network interface card, 50GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4411A-ACAN	MT_2450111034	ConnectX®-4 Lx EN network interface card for OCP; 25GbE single-port SFP28; PCIe3.0 x8; ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4411A-ACQN	MT_2450112034	ConnectX®-4 Lx EN network interface card for OCP with Host Management, 25GbE single-port SFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists

Table 2 - Supported Devices (Sheet 2 of 2)

Device Part Number	PSID	Device Name	FlexBoot	UEFI x86	UEFI ARM	Enable/ disable exprom Feature
MCX4421A-ACAN	MT_2470111034	ConnectX®-4 Lx EN network interface card for OCP, 25GbE dual-port SFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4421A-ACQN	MT_2470112034	ConnectX®-4 Lx EN network interface card for OCP with Host Management, 25GbE dual-port SFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4421A-ACUN	MT_0000000275	ConnectX®-4 Lx EN network interface card for OCP2.0, Type 1, without host management, 25GbE dual-port SFP28, PCIe3.0 x8, UEFI Enabled, no bracket	Present (Enabled)	Present (Enabled)	Present (Disabled)	Exists
MCX4421A-XCQN	MT_2470110004	ConnectX®-4 Lx EN network interface card for OCP with Host Management, 10GbE dual-port SFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Not Present	Exists
MCX4431A-GCAN	MT_2490111032	ConnectX®-4 Lx EN network interface card for OCP, with Host Management, 50GbE single-port QSFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4431M-GCAN	MT_2510111032	ConnectX®-4 Lx EN network interface card for OCP with Multi-Host and Host Management, 50GbE single-port QSFP28, PCIe3.0 x8, no bracket, ROHS R6	Present (Enabled)	Present (Disabled)	Present (Disabled)	Exists
MCX4111A-ACUT	MT_0000000267	ConnectX®-4 Lx EN network interface card, 25GbE single-port SFP28, PCIe3.0 x8, UEFI Enabled, tall bracket	Present (Enabled)	Present (Enabled)	Present (Disabled)	Exists
MCX4121A-ACUT	MT_0000000266	ConnectX®-4 Lx EN network interface card, 25GbE dual-port SFP28, PCIe3.0 x8, UEFI Enabled, tall bracket	Present (Enabled)	Present (Enabled)	Present (Disabled)	Exists
MCX4411A-ACUN	MT_0000000268	ConnectX®-4 Lx EN network interface card for OCP, without host management, 25GbE single-port SFP28, PCIe3.0 x8, UEFI Enabled, no bracket	Present (Enabled)	Present (Enabled)	Present (Disabled)	Exists
MCX4431A-GCA	MT_2490110032	ConnectX®-4 Lx EN network interface card for OCP, with Host Management, 50GbE single-port QSFP28, PCIe3.0 x8, no bracket	Present (Enabled)	Not Present	Not Present	Not Available

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
10GB/S	MC3309124-007	Mellanox® Passive Copper Cable, ETH 10GbE, 10Gb/s, SFP+, 7m

Table 4 - Validated and Supported 10GbE Cables

Speed	Cable OPN #	Description
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 wavelength, 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
10GB/S	FTLX1471D3BCL-ME	10GBASE-LR SFP+ 1310nm 10km DOM Transceiver Module
10GE	BN-QS-SP-CBL-5M	40G QSFP+ to 4xSFP+ DAC Breakout Direct Attach Cable 5m
10GE	1-2053783-1	SFP-H10G-CU1M
10GE	BN-QS-SP-CBL-5M	40G QSFP+ to 4xSFP+ DAC Breakout Direct Attach Cable 5m
10GE	CAB-SFP-SFP-1M	Arista Compatible 10G SFP+ Passive Cable 1m
10GE	CAB-SFP-SFP-5M	Arista Compatible 10G SFP+ Passive Cable 5m
10GE	FTLX8570D3BCL-C2	Cisco FET-10G 10-2566-02 FTLX8570D3BCL-C2 10Gbps Fabric Extender SFP+ Module
10GE	L45593-D178-B50	QSFP-4SFP10G-CU5M

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

Table 5 - Validated and Supported 25GbE Cables

Speed	Cable OPN #	Description
25GbE	MCP2M00-A005E26L	Mellanox® Passive Copper cable, ETH, up to 25Gb/s, SFP28, 5m, Black, 26AWG, CA-L
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
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	MMA2L20-AR	Mellanox® optical transceiver, 25GbE, 25Gb/s, SFP28, LC-LC, 1310nm, LR up to 10km
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
25GbE	FTLF1436P3BCL	25GE LR 10km SFP28 Optical Transceiver
25GbE	FTLF8536P4BCL	25GE SR SFP+ Optical Transceiver
25GbE	LTF8507-PC07	SFP28 AOC 25G Ethernet SFP28 Active Optical Cable

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
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	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-AOC10M	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
40GE	00D5811-N13445C	IBM Cable DAC 40GbE QSFP+ to QSFP+ Passive Copper 7m
40GE	L45593-D118-D10	QSFP-H40G-CU1M

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	CBL-00195-02	100GbE QSFP28 to QSFP28 copper cable 3M
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	MCP7F00-A005R26L	Mellanox® passive copper hybrid cable, ETH 100GbE to 4x25GbE, QSFP28 to 4xSFP28, 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
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	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

Table 8 - Validated and Supported 100GbE Cables

Speed	Cable OPN #	Description
100GbE	MMS1C00-C500	Mellanox® transceiver, 100GbE, QSFP28, MPO, 1550nm PSM4, up to 2km

1.3 Tested Switches

1.3.1 Tested 10GbE Switches

Table 9 - 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 10 - 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
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 11 - 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

Table 11 - Tested 100GbE Switches

Speed	Switch Silicon	OPN # / Name	Description	Vendor
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
100GbE	N/A	QFX5200-32C-32	32-port 100GbE Ethernet Switch System	Juniper
100GbE	N/A	S6820-56HF	48 SFP+ + 8 QSFP Ports 100GE Switch Ethernet	H3C

1.4 Tools, Switch Firmware and Driver Software

Firmware Rev 14.25.1020 is tested with the following tools, Switch firmware, and driver software:

Table 12 - Tools, Switch Firmware and Driver Software

	Supported Version
MLNX_OFED	4.6-1.0.1.1/4.5-1.0.1.0
MLNX_EN (MLNX_OFED based code)	4.6-1.0.1.1/4.5-1.0.1.0
WinOF-2	2.20/2.10
MFT	4.12.0
VMware	• ESXi 6.7 v4.17.15.16 • ESXi 6.5 v4.16.13.5 • ESXi 6.0 v4.15.13.2
MLNX-OS	3.8.1000
Onyx	3.8.1000
Quantum™ Firmware	27.2000.1142
Linux Inbox Drivers	• RH7.6 • Ubuntu 16.04.05
Windows Inbox Drivers	• Windows 2012 • Windows 2012 R2 • Windows 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 6.)

Firmware Rev 14.25.1020 supports the following FlexBoot:

Table 13 - Supported FlexBoot, UEFI

Expansion ROM	Supported Version
FlexBoot	3.5.701
UEFI	14.18.19

1.6   Revision Compatibility

Firmware Rev 14.25.1020 complies with the following programmer's reference manual:

- *Mellanox Adapters Programmer's Reference Manual (PRM), Rev 0.47 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 14.25.1020

Table 14 - Changes and New Features in Rev 14.25.1020

Feature/Change	Description
VSC Security	VSC security includes the mechanisms which will prevent a reasonable host from affecting other hosts from using VSC.
Zero Touch RoCE [Beta]	Zero touch RoCE enables RoCE to operate on fabrics where no PFC nor ECN are configured. This makes RoCE configuration a breeze while still maintaining its superior high performance.
ODP support for SRQ & XRC	Added support for send opcode operations targeting a SRQ/RMP with the receive WQEs using ODP memory. In case the receive WQE receives an ODP, the device will generate ODP notifications (EQE) and PFAULT will abort CQEs. **Note:** It is recommended to prefetch the memory used by the receive WQEs to reduce ODP occurrence as these have significant latencies and will cause a performance degradation.
Firmware Burning using DMA Pages	This new capability accelerates the firmware burning process by using Direct Memory Access (DMA) pages.
Auto-Sensing when using 25/10GbE Optical Modules	This new capability accelerates the network to auto-sense the port speed and use it when using a 25/10GbE optical module. Meaning, if the used module is 25GbE but the port is a 10GbE port, the speed used for that network will be 10GbE.
Package ID	Enabled Package ID configuration using server strap according OCP 3.0.
DPDK UIO	This capability provides a solution for improving user space drivers development, generic user space IO device services.
mlxconfig	Renamed the BOOT_RETRY_CNT1 parameter to BOOT_RETRY_CNT.
Reduced Firmware Upgrade Time	Reduced firmware upgrade time using mlxfwreset tool to ~3 seconds. Using this capability requires enabling PARTIAL_RESET_EN in mlxconfig and using MFT version 4.12.0 and up. The "PARTIAL" refers to not resetting the port modules (which is not mandatory for firmware upgrades). **Note:** Currently this capability only supports firmware upgrade and downgrades to firmware versions newer than XX.25.1020.
Bug Fixes	See Section 4, "Bug Fixes History", on page 25

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-Lx Firmware Archived Known Issues file
(http://www.mellanox.com/pdf/firmware/ConnectX4Lx-Firmware_Archived_Known_Issues.pdf)

Table 15 - Ethernet Rate Limit per VF in RoCE Mode Limitations

Adapter Card	Dual Port Device				Single Port Device	
	w/o LAG (TOTAL_VFS>32)		With LAG (TOTAL_VFS<32)		w/o LAG	
	w/o QoS	Full QoS	w/o QoS	Full QoS	w/o QoS	Full QoS
ConnectX-4 Lx	127	45	32	20	127	100

Table 16 - Ethernet Rate Limit per VF in InfiniBand Mode Limitations

Adapter Card	Dual Port Device		Single Port Device	
	w/o LAG		w/o LAG	
	w/o QoS	Full QoS	w/o QoS	Full QoS
ConnectX-4 Lx	127	26	127	55

Table 17 - Known Issues (Sheet 1 of 6)

Internal Ref.	Issue
1754253	**Description:** Firmware downgrade followed by mlxfwreset/mstfwreset action may cause sideband management connection issues.
	Workaround: Reset the BMC
	Keywords: mlxfwreset/mstfwreset
	Discovered in Version: 14.25.1020
1753801	**Description:** In this release, the total firmware reset time is increased by 1 second.
	Workaround: N/A
	Keywords: Firmware reset
	Discovered in Version: 14.24.1000
1689186	**Description:** Changing priority to TC map during traffic might cause packet drops.
	Workaround: N/A
	Keywords: QoS
	Discovered in Version: 14.25.1020

Table 17 - Known Issues (Sheet 2 of 6)

Internal Ref.	Issue
1604699	**Description:** Ethernet RFC 2819 counter ether_stats_oversize_pkts and Ethernet IEEE 802.3 counter a_frame_too_long_errors share the same resource. Clearing each of them will affect the other.
	Workaround: N/A
	Keywords: Counters
	Discovered in Version: 14.25.1020
-	**Description:** When Packet Pacing is enabled, a wrong priority to TC mapping occurs.
	Workaround: • Configure the prio-to-tc mapping (using mlx_qos tool) to a tc that is higher than max_tc, were allowed. • Set the prio-to-tx mapping as the default in case max_tc != 8, were changed according to the spec.
	Keywords: Priority to TC mapping
	Discovered in Version: 14.25.1020
1498399	**Description:** If the XRC switches between SRQ/RMPs while there is an outstanding ODP on the responder XRC QP, a CQE with an error might be generated (that is not a PFAULT abort).
	Workaround: N/A
	Keywords: XRC SRQ/RMP ODP
	Discovered in Version: 14.25.1020
1546401	**Description:** vport_tc and para_vport_tc are not supported in this version.
	Workaround: N/A
	Keywords: SR-IOV vport_tc and para_vport_tc
	Discovered in Version: 14.24.1000
1566930	**Description:** In case a faulty cable is inserted, (either power issue or I2C error), the traffic LED is turned OFF although it is expected to be ON. and the amber LED is blinking as expected.
	Workaround: N/A
	Keywords: Cables
	Discovered in Version: 14.24.1000
1546492	**Description:** Executing the update_lid command while the IB port sniffer utility is active can stop the utility.
	Workaround: N/A
	Keywords: IB Sniffer
	Discovered in Version: 14.24.1000
1537898	**Description:** Initializing a function while the IB port sniffer utility is active can stop the utility.
	Workaround: N/A
	Keywords: IB Sniffer
	Discovered in Version: 14.24.1000

Table 17 - Known Issues (Sheet 3 of 6)

Internal Ref.	Issue
1027553	**Description:** While using e-switch vport sVLAN stripping, the RX steering values on the sVLAN might not be accurate.
	Workaround: N/A
	Keywords: e-sw vport sVLAN stripping, RX steering
	Discovered in Version: 14.24.1000
1426283	**Description:** An mlxconfig configuration followed by the init 0 command might cause the HCA to remain in high power instead of entering the standby state. Such behavior will require a server reboot after running the mlxconfig tool.
	Workaround: N/A
	Keywords: mlxconfig
	Discovered in Version: 14.24.1000
1332714	**Description:** The maximum "read" size of MTRC_STDB is limited to 272 Bytes.
	Workaround: Set the MTRC_STDB.read_size to the maximum value of 0x110=272 Bytes
	Keywords: Access register, MTRC_STDB, tracer to dmesg, fwtrace to dmesg
	Discovered in Version: 14.23.1020
1408994	**Description:** FTE with both forward (FWD) and encapsulation (ENCAP) actions is not supported in the SX NIC Flow Table.
	Workaround: N/A
	Keywords: SX NIC Flow Table
	Discovered in Version: 14.23.1020

1350794	**Description:** Encapsulation / Decapsulation support in steering has the following limitations:
	• Encapsulation / Decapsulation can be open on the FDB only if all VFs are non active.
	• Encapsulation / Decapsulation supports single mode only: FDB / NIC. Opening tables of both types is not supported.
	• RoCE is supported only when no Encapsulation / Decapsulation is opened on the FDB.
	• Encapsulation / Decapsulation per device support:
	
	`                              NIC      FDB`
	`ConnectX-4        encap  NO    YES    non MH`
	`                  decap  NO    NO`
	`ConnectX-4 Lx     encap  NO    YES      non MH`
	`                  decap  NO    YES`
	`ConnectX-5        encap  YES  YES`
	`              decap   YES  YES`

	Workaround: N/A
	Keywords: Steering Encapsulation / Decapsulation
	Discovered in Version: 14.23.1020
1398556	**Description:** Although the default FEC configuration of the MMA2L20-AR module is FC-FEC, different FEC configuration can be set by the PPLM access register / MLXLink.
	Workaround: N/A
	Keywords: FEC, PPLM access registry, MMA2L20-AR module
	Discovered in Version: 14.22.1002

Table 17 - Known Issues (Sheet 4 of 6)

Internal Ref.	Issue
1316221	**Description:** Health counter increases every 50ms instead of 10ms.
	Workaround: N/A
	Keywords: Health counter
	Discovered in Version: 14.22.1002
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: 14.22.1002
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: 14.22.1002
1213634	**Description: ASN1 – SET command on object 0x08:** Sending the `'reset port'` field with value 1 will cause the link to go down and up again but will not return the settings to their default values.
	Workaround: N/A
	Keywords: ASN1 – SET command on object 0x08
	Discovered in Version: 14.21.2010
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: 14.21.2010
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: 14.21.1000
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: 14.21.1000

Table 17 - Known Issues (Sheet 5 of 6)

Internal Ref.	Issue
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: 14.21.1000
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: 14.21.1000
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: 14.21.1000
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: 14.21.1000
1132277	**Description:** An encapsulated packet that its inner packet has a unicast MAC and its outer packet has a multicast MAC (or vice versa) might be counted by the hardware on the wrong vPort counter.
	Workaround: N/A
	Keywords: Packet encapsulation/decapsulation, unicast MAC, multicast MAC
	Discovered in Version: 14.21.1000
1059782	**Description:** If BMC does not support the recovery flow, no communication will occur after fwreset.
	Workaround: N/A
	Keywords: BMC
	Discovered in Version: 14.20.1010
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: 14.20.1010

Table 17 - Known Issues (Sheet 6 of 6)

Internal Ref.	Issue
1031744	**Description:** Same flow counter cannot be used on different table types.
	Workaround: N/A
	Keywords: Flow counter
	Discovered in Version: 14.20.1010
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: 14.20.1010

4 Bug Fixes History

Table 18 lists the bugs fixed in this release. For a list of old firmware Bug Fixes, please see ConnectX-4 Lx Firmware Archived Bug Fixes file (http://www.mellanox.com/pdf/firmware/ConnectX4Lx-Firmware_Archived_Bug_Fixes.pdf)

Table 18 - Bug Fixes History (Sheet 1 of 10)

Internal Ref.	Issue
1615586	**Description:** Fixed a rare issue that caused the QP to falsely transition into the error state as a result of handling duplicate read/atomic request followed by memory key invalidation.
	Keywords: CQE
	Discovered in Version: 14.24.1000
	Fixed in Release: 14.25.1020
1678824	**Description:** Fixed an issue that prevented the user to enable the port after disabling it in the VF NODNIC.
	Keywords: VF NODNIC
	Discovered in Version: 14.24.1000
	Fixed in Release: 14.25.1020
1606289	**Description:** Enlarged the number of modify fields to 16 to avoid IPv6 header rewrite failure.
	Keywords: IPv6 header rewrite
	Discovered in Version: 14.24.1000
	Fixed in Release: 14.25.1020
1627973	**Description:** Fixed an issue that prevented IB QP counters for Acks/Responses from working as a results the NACK/OOS counters showed as zero.
	Keywords: IB QP counters for Acks/Responses
	Discovered in Version: 14.24.1000
	Fixed in Release: 14.25.1020
1554104	**Description:** Set the stateless offloads cap to be permanently '1'.
	Keywords: Stateless offloads cap
	Discovered in Version: 14.24.1000
	Fixed in Release: 14.25.1020
1547318	**Description:** Fixed an issue that prevented the system from counting multicast/broadcast traffic on the ETH unicast vport counter when the driver did not specify the MAC address in the FTE match criteria of the Flow Table Entry in the eswitch's FDB table.
	Keywords: Multicast/broadcast traffic
	Discovered in Version: 14.23.1020
	Fixed in Release: 14.24.1000
1447157	**Description:** Fixed a standby deadlock that was caused when the PCIe reset arrived during traffic.
	Keywords: PCIe
	Discovered in Version: 14.23.1020
	Fixed in Release: 14.24.1000

Table 18 - Bug Fixes History (Sheet 2 of 10)

Internal Ref.	Issue
1284452/ 1282926	**Description:** Fixed an issue that caused the mlxconfig tool to present all possible expansion ROM images, instead of presenting only the existing images.
	Keywords: mlxconfig
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.24.1000
1487250	**Description:** Fixed an issue that prevented the SX error handling mechanism from clearing the counters when the max WQE's re-read attempts were completed successfully.
	Keywords: SX error handling mechanism, WQE, counters
	Discovered in Version: 14..23.1020
	Fixed in Release: 14.24.1000
1371032	**Description:** Fixed an issue related to the VF's EQ error that caused the health buffer to report to the host (PF) when the VF released the EQ buffer's memory before the EQ was destroyed.
	Keywords: EQ, health buffer
	Discovered in Version: 14.20.1010
	Fixed in Release: 14..24.1000
1424873	**Description:** Modifying VMQoS rate limiter parameters during traffic might cause transmission failure.
	Keywords: VMQoS, rate limiter
	Discovered in Version: 14.22.1002
	Fixed in Release: 14..24.1000
1475993	**Description:** Aligned the default tuning type in PHY TEST MODE to the device protocol.
	Keywords: PHY
	Discovered in Version: 14.23.1020
	Fixed in Release: 14..24.1000
1403211	**Description:** When a device is operating in Safe Mode state, and the user issues the mlxfwreset command, the device might fail to come-up correctly after the reset. **Note:** Do not run mlxfwreset when operating in a Safe Mode state.
	Keywords: mlxfwreset
	Discovered in Version: 14.23.1020
	Fixed in Release: 14..24.1000
1431772	**Description:** Fixed an issue that caused the max_qp_retry_freq_exceeded counter (including a CQE with error syndrome 0x97, and the QP moving to error state) to be activated only after exceeding the NIC Vport context max_qp_retry_limit, and not when reaching it.
	Keywords: max_qp_retry_freq_exceeded
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.24.1000
1295606	**Description:** Fixed an issue related to PCIe "Surprise link down" event reporting capability.
	Keywords: PCIe
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.24.1000

Table 18 - Bug Fixes History (Sheet 3 of 10)

Internal Ref.	Issue
1434863	**Description:** Fixed an issue that resulted in the link partner experiencing false active linkup when plugging in a base-T cable to a closed port.
	Keywords: Interfaces
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.24.1000
1424873	**Description:** Modifying VMQoS rate limiter parameters during traffic might cause transmission failure.
	Keywords: VMQoS, rate limiter
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.24.1000
1392583	**Description:** Fixed an issue that caused errors on PCIe link 0 while link 1 was rebooted due to a wrong PCIe serdes configuration on a Multi-Host adapter card that was configured as 2 hosts.
	Keywords: EQ, health buffer
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.23.1020
1417642	**Description:** Fixed an issue that showed the link as down even when the link was up due to missing asynchronous event.
	Keywords: Asynchronous event
	Discovered in Version: 14.23.1000 (Internal)
	Fixed in Release: 14.23.1020
1391409	**Description:** Fixed a rare scenario that resulted in NMI hardware failure.
	Keywords: Virtualization, NMI
	Discovered in Version: 14.18.1000
	Fixed in Release: 14.23.1020
1433172	**Description:** Fixed a rare scenario that resulted in TX pipe getting hang.
	Keywords: TX pipe
	Discovered in Version: 14.18.1000
	Fixed in Release: 14.23.1020
1288757	**Description:** Closed the vport as part of the fast teardown flow, to prevent Ack to be sent without been scatter to memory.
	Keywords: Fast Teardown Flow
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.23.1020
1356954	**Description:** Fixed an issue that occasionally caused the link to drop after running the 'reboot' command due to I2C being stuck.
	Keywords: I2C stuck, link in polling
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.23.1020

Table 18 - Bug Fixes History (Sheet 4 of 10)

Internal Ref.	Issue
1390343	**Description:** Fixed an issue that caused the tx_pause_storm_warning_events and the tx_pause_storm_error_events counters to increase even when there was TX pause.
	Keywords: TX pause storm events
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.23.1020
1225025	**Description:** Fixed a congestion control issue in large scale A2A case.
	Keywords: Congestion Control
	Discovered in Version: 14.21.2010
	Fixed in Release: 14.23.1020
1331545	**Description:** Fixed a congestion control issue that occurred in a system with a large number of QPs.
	Keywords: Congestion Control
	Discovered in Version: 14.21.2010
	Fixed in Release: 14.23.1020
1333168	**Description:** Fixed an issue that resulted in a wrong sensor state report when running the PLDM sensor reading command and when a negative temperature was set with the hook.
	Keywords: Temperature
	Discovered in Version: 14.22.1002
	Fixed in Release: 14.23.1020
1342760	**Description:** Fixed a speed issue for link mode Speed25GBaseSR.
	Keywords: Link speed
	Discovered in Version: 14.21.2010
	Fixed in Release: 14.23.1020
1063148	**Description:** Pause duration: Physical port counters count in 512bits quantas, instead of microseconds.
	Keywords: Pause duration, Physical port counters
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.23.1020
1187411	**Description:** Added the option to avoid unintentionally powering off the backplane port cage upon reboot when in standby mode.
	Keywords: Backplane port cage, standby mode
	Discovered in Version: 14.21.1000
	Fixed in Release: 14.22.1002
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: 14.21.2010
	Fixed in Release: 14.22.1002

Table 18 - Bug Fixes History (Sheet 5 of 10)

Internal Ref.	Issue
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: 14.21.1000
	Fixed in Release: 14.22.1002
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: 14.21.1000
	Fixed in Release: 14.22.1002
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: 14.21.1000
	Fixed in Release: 14.22.1002
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: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.21.1000
	Fixed in Release: 14.21.2010

Table 18 - Bug Fixes History (Sheet 6 of 10)

Internal Ref.	Issue
1190215	**Description:** Fixed unfairness between senders in RoCE LAG while ECN is configured.
	Keywords: RoCE LAG, ECN
	Discovered in Version: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.21.1000
	Fixed in Release: 14.21.2010
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: 14.20.1010
	Fixed in Release: 14.21.1000
1122718	**Description:** Fixed an issue that caused low throughput when ECN was enabled in a many-to-one scenario.
	Keywords: ECN
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.21.1000
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: 14.20.1010
	Fixed in Release: 14.21.1000
1091424	**Description:** Fixed Virtual Addressing Capability incorrect report in NC-SI (Sideband).
	Keywords: NC-SI
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.21.1000
1134021	**Description:** Improved RX sensitivity per Vcore.
	Keywords: RN, Vcore
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.21.1000

Table 18 - Bug Fixes History (Sheet 7 of 10)

Internal Ref.	Issue
1099880	**Description:** Disabled the option to write to the protected modules to avoid receiving NACK upon module initialization.
	Keywords: Thermal temperature
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.21.1000
1111202	**Description:** Enabled cold_flicks reset when sending invalidate_all command to invalidate all the ECs.
	Keywords: CQE, QoS
	Discovered in Version: 14.20.1010
	Fixed in Release: 14.21.1000
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: 14.20.1010
	Fixed in Release: 14.21.1000
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: 14.20.1010
	Fixed in Release: 14.21.1000
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: 14.20.1010
	Fixed in Release: 14.21.1000
1060650	**Description:** Fixed a link issue on Intel 10GbE Optical module PN: R8H2F, Y3KJN.
	Keywords: Intel 10GbE Optical module
	Discovered in Release: 14.18.2000
	Fixed in Release: 14.20.1010
1052064	**Description:** Fixed an issue that caused the device to hang upon warm reboot.
	Keywords: Warm reboot
	Discovered in Release: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010

Table 18 - Bug Fixes History (Sheet 8 of 10)

Internal Ref.	Issue
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: 14.18.2000
	Fixed in Release: 14.20.1010
1013035	**Description:** Removed the following false alarm asserts reported in Multi-Host environment: • host blocked due to flow control credits • dead irisc timer indication was increased
	Keywords: False alarm asserts, Multi-Host
	Discovered in Release: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
1047533	**Description:** Rephrased and improved external troubleshoot messages in PDDR register.
	Keywords: PDDR register
	Discovered in Release: 14.18.1000
	Fixed in Release: 14.20.1010
999261	**Description:** Improved SR-IOV performance.
	Keywords: SR-IOV
	Discovered in Release: 14.18.1000
	Fixed in Release: 14.20.1010

Table 18 - Bug Fixes History (Sheet 9 of 10)

Internal Ref.	Issue
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: 14.18.1000
	Fixed in Release: 14.20.1010
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: 14.18.1000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.1000
	Fixed in Release: 14.20.1010
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: 14.18.2000
	Fixed in Release: 14.20.1010
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: 14.18.1000
	Fixed in Release: 14.20.1010

Table 18 - Bug Fixes History (Sheet 10 of 10)

Internal Ref.	Issue
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: 14.18.1000
	Fixed in Release: 14.20.1010
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: 14.18.1000
	Fixed in Release: 14.20.1010
1019003/ 1019039/ 995878	Description: Fixed an issue causing physical errors observed on Ixia 100GbE receiver.
	Keywords: Ixia 100GbE receiver
	Discovered in Release: 14.18.1000
	Fixed in Release: 14.20.1010

5 Firmware Changes and New Feature History

Table 19 - Firmware Changes and New Feature History (Sheet 1 of 10)

Feature/Change	Description
Layer 3 Encapsulation	Added support for an additional layer (Layer 3) of packet processing at the hypervisor level that enables adding and removing protocol headers (e.g., the MAC address is removed during encapsulation, and added during decapsulation) for the encapsulated traffic.
e-switch Steering Rule	Enabled e-switch steering rule in the NIC without matching it with the Directional MACs (DMAC) protocol. Now the rule is only according to the MC/UC bit.
IB Sniffer Tool	The IB Sniffer utility provides the user the ability to capture the e-switch traffic directly to a hypervisor queue.
Transmission Histogram Counters	Added support for the transmission histogram counter set as part of the Ethernet extended group counters.
Events Generation by the Hardware upon Counter Incrementation	Enabled the hardware to generate an event upon counter incrementation, in order to reduce an overhead from the software from reading rarely updated counters such as error counters.
NODNIC Connectivity	Enables NOIDNIC connectivity to the network through the e-switch and not directly to the physical port.
QP and Mkey Values	Enabled setting the QP and the Mkey values by the software upon these resources creation.
PCIe Atomic	Enabled advanced PCIe atomic operations. The HCA will perform PCIe atomic operations as a requestor towards the host memory when receiving compatible atomic messages from the network, and according to the configuration of NV_SW_OFFLOAD_CONFIG pci_atomic_mode field and the PCI AtomicOp Requester Enable bit in the Device Control 2 register.
TIR Destination from the FDB	Enabled a single TIR destination from the FDB.
WRED	Changed the WRED default mode to OFF for Multi-Host adapter cards.
TX Steering Rule on in WQE Ethernet Segment	Added support for TX steering rule on flow_table_metadata in WQE Ethernet segment.
L3 Encapsulation/Decapsulation in the Reformat Context Allocation	Added L3 encapsulation/decapsulation support in the reformat context allocation. • L3 encapsulation removes L2 headers and adds generic L3 tunnel encapsulation. • L3 decapsulation removes the generic L3 tunnel decapsulation and L2 header.
Flow Steering Header Modification	Added support for flow steering header modification (header rewrite) for IPv4 TTL header for loopback traffic (VF-VF/VF-PF). **Note:** TTL modification for traffic from the network is currently not supported.
Teardown: Fast Mode	**[Developers only]** Moved the fast teardown HCA cap bit to offset 0x1c.4:1.
Virtual Functions/QoS	Enabled Virtual Functions to read QPDPM/QPDP/QPTS.
Message vs. Payload based flow control QP Configuration	Added support for requester QP packet based on E2E credits mode. The new flow control supports HCA-to-switch RDMA traffic packet-based End-2-End.
Multi PCI RDMA IB	This capability enables the user to expose two PCI/IB devices per network port.
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Steering	Enabled a single TIR destination from the FDB.

Table 19 - Firmware Changes and New Feature History (Sheet 2 of 10)

Feature/Change	Description
Rev. 14.23.1020	
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: 0-21, 33-45 VFs (22-32 VFs has single TC) • in single port devices to: 0-64 VFs
InfiniBand	Added support for IPoIB non-default Partition Keys (PKeys). Now the PKey values can be modified in the PKey table without the need of recreating the IPoIB (underlay) QPs.
SR-IOV in Multi-Host/Socket-Direct	[Beta] Added support for SR-IOV in Multi-Host/Socket-Direct.
Virtualization	Reduced firmware's memory consumption to increase the supported number of VFs per PF to up to 100.
Tools/Driver Version	Added support for QUERY_DRIVER_VERSION command. This command allows the PF driver to query its VFs driver version which was set by the SET_DRIVER_VERSION command.
Resiliency	Shutting Down RDMA QPs with Excessive Retransmissions is a mechanism used to detect excessive retransmissions for an RC connection, and to close the connection in response to it. If the number of retransmissions due to a Local Ack Timeout, NAK-Sequence Error, or Implied NAK, during a specified period, exceeds the specified threshold, the QP will be handled as if the IB spec defined Retry Count was exceeded.
Diagnostic Counters	Added new diagnostic counters to evaluate the number of ICMC hits and misses for particular resources.
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.22.1002	
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.

Table 19 - Firmware Changes and New Feature History (Sheet 3 of 10)

Feature/Change	Description
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).
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 v14.22.1002
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 Lxadapter cards. ConnectX-4 Lx now holds PXE, x86-UEFI and Arm-UEFI
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.21.2010	
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 25
Rev. 14.21.1000	

Table 19 - Firmware Changes and New Feature History (Sheet 4 of 10)

Feature/Change	Description
Receiver Signal Integrity Improvements	Raised the network 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.
Dynamic Bandwidth Allocation per Host	Added support for new chassis MC OEM commands which allowed dynamically configuring rate limit and bandwidth share, per host and physical function.
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
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 25
Rev. 14.20.1010	
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

Table 19 - Firmware Changes and New Feature History (Sheet 5 of 10)

Feature/Change	Description
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.
Relaxed Ordering	**[Beta]** Added support for relaxed ordering write in memory keys.
RDMA Counters	Enhanced RDMA counter
Outbound Buffer Overflow Mechanism	Added the ability to enable and disable drop of packets in case of PCIe outbound buffer overflow. In addition added a counter for counting these drops.
TLV for PCI class code	Added 2 new per Host TLVs (see Table 21, "Supported Non-Volatile Configurations," on page 47)
Fast Teardown	Enables fast unloading driver by using Teardown HCA with op_mode=1 (force_close). For further information, refer to the PRM.
SFP Power Flow Improvement (level 2,1)	Added support for SFP power class.
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.18.2000	
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.18.1000	
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.
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.

Table 19 - Firmware Changes and New Feature History (Sheet 6 of 10)

Feature/Change	Description
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 25
Rev. 14.17.2020	
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 25
Rev. 14.17.1010	
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

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.

HCA Port Flap Counter	Added support for Port Flap Counter.

Table 19 - Firmware Changes and New Feature History (Sheet 7 of 10)

Feature/Change	Description
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 tear-down or FLR)
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 25
Rev. 14.16.1020	
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.16.1006	
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.

Table 19 - Firmware Changes and New Feature History (Sheet 8 of 10)

Feature/Change	Description

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.
OVS Offload	Mellanox Accelerated Switching And Packet Processing (ASAP^2) Direct technology allows to offload OVS by handling OVS data-plane in Mellanox ConnectX-4 / ConnectX-4 Lx NIC hardware (Mellanox Embedded Switch or eSwitch) while maintaining OVS control-plane 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 25
Rev. 14.14.2036	
Scatter FCS in RQ	Enables software to scatter or strip FCS in RQ.
Bug Fixes	See Section 4, "Bug Fixes History", on page 25

Table 19 - Firmware Changes and New Feature History (Sheet 9 of 10)

Feature/Change	Description
Rev. 14.14.1100	
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 Link Speed	ConnectX-4 Lx adapters now support 1Gb/s Ethernet connectivity in addition to 10GigE, 25GigE, 40GigE, 50GigE
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.
Strided WQE User Space	Striding RQ is a receive queue comprised by work queue elements (i.e. WQEs), where multiple packets of LRO segments (i.e. message) are written to the same WQE.
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.
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. 14.12.1240	
Bug Fixes	See Section 4, "Bug Fixes History", on page 25
Rev. 14.12.1100	
Port Link	Reduced the port link-up time when negotiating according to Clause 73 (DME)
Rev. 14.12.0780	

Table 19 - Firmware Changes and New Feature History (Sheet 10 of 10)

Feature/Change	Description
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	• Strided SRQ
	• 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
Misc	• Wake-on-Lane/Standby • FlexBoot/UEFI support
Non-Volatile Configuration	• Non-Volatile Configuration (NVConfig). For the complete list, lease refer to Section 8, on page 47.

6 PreBoot Drivers (FlexBoot/UEFI)

6.1 FlexBoot Changes and New Features

For further information, please refer to FlexBoot Release Notes
https://docs.mellanox.com --> Software --> Firmware Management --> PreBoot Drivers (FlexBoot/UEFI)

6.2 UEFI Changes and Major New Features

For further information, please refer to UEFI Release Notes
https://docs.mellanox.com --> Software --> Firmware Management --> PreBoot Drivers (FlexBoot/UEFI)

7 Unsupported Features and Commands

7.1 Unsupported Features

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

Table 20 - Unsupported Features

Feature	CX-4 Lx
The following service types: • SyncUMR • Mellanox transport • RAW IPv6	No
INT-A not supported for EQs only MSI-X	No
PCI VPD write flow (RO flow supported)	No
Streaming Receive Queue (STRQ) and collapsed CQ	No
Subnet Manager (SM) on VFs	No
DC in Multi-Host, SR-IOV, and Ethernet (RoCE)	No
RoCE LAG for VFs	No
RoCE LAG in Multi-Host/Socket-Direct	No
Mutlihost Ethernet	No

7.2 Unsupported Commands

- QUERY_MAD_DEMUX

- SET_MAD_DEMUX

- CREATE_RQ - MEMORY_RQ_RMP

- MODIFY_LAG_ASYNC_EVENT

8 Supported Non-Volatile Configurations

Table 21 - Supported Non-Volatile Configurations

Configuration	mlxconfig Parameter Name	Class	TLV ID
NV_MEMIC_CONF	MEMIC_BAR_SIZE	GLOBAL (0)	0x6
	MEMIC_SIZE_LIMIT		
NV_HOST_CHAINING_CONF	HOST_CHAINING_MODE		0x8
	HOST_CHAINING_DESCRIPTORS		
	HOST_CHAINING_TOTAL_BUFFER_SIZE		
NV_FLEX_PARS_CONF	FLEX_PARSER_PROFILE_ENABLE		0xe
	FLEX_IPV4_OVER_VXLAN_PORT		
NV_ROCE_1_5_CONF	ROCE_NEXT_PROTOCOL		0x10
NV_INTERNAL_RESOURCE_CONF	ESWITCH_HAIRPIN_DESCRIPTORS		0x13
	ESWITCH_HAIRPIN_TOT_BUFFER_SIZE		
NV_GLOBAL_PCI_CONF	NON_PREFETCHABLE_PF_BAR		0x80
	NUM_OF_VFS		
	SRIOV_EN		
	PF_LOG_BAR_SIZE		
	VF_LOG_BAR_SIZE		
	NUM_PF_MSIX		
	NUM_VF_MSIX		
NV_TPT_CONF	INT_LOG_MAX_PAYLOAD_SIZE		0x82
NV_POWER_CONF	SW_RECOVERY_ON_ERRORS		0x88
	RESET_WITH_HOST_ON_ERRORS		
	ADVANCED_POWER_SETTINGS		
NV_SW_OFFLOAD_CONFIG	CQE_COMPRESSION		0x10a
	IP_OVER_VXLAN_EN		
	PCI_ATOMIC_MODE		
	LRO_LOG_TIMEOUT0		
	LRO_LOG_TIMEOUT1		
	LRO_LOG_TIMEOUT2		
	LRO_LOG_TIMEOUT3		
NV_IB_DC_CONF	LOG_DCR_HASH_TABLE_SIZE		0x190
	DCR_LIFO_SIZE		
NV_VPI_LINK_TYPE	LINK_TYPE	PHYSICAL_PORT (2)	0x12

Table 21 - Supported Non-Volatile Configurations

Configuration	mlxconfig Parameter Name	Class	TLV ID
NV_ROCE_CC	ROCE_CC_PRIO_MASK	PHYSICAL_PORT (2)	0x107
	ROCE_CC_ALGORITHM		
NV_ROCE_CC_ECN	CLAMP_TGT_RATE_AFTER_TIME_INC		0x108
	CLAMP_TGT_RATE		
	RPG_TIME_RESET		
	RPG_BYTE_RESET		
	RPG_THRESHOLD		
	RPG_MAX_RATE		
	RPG_AI_RATE		
	RPG_HAI_RATE		
	RPG_GD		
	RPG_MIN_DEC_FAC		
	RPG_MIN_RATE		
	RATE_TO_SET_ON_FIRST_CNP		
	DCE_TCP_G		
	DCE_TCP_RTT		
	RATE_REDUCE_MONITOR_PERIOD		
	INITIAL_ALPHA_VALUE		
	MIN_TIME_BETWEEN_CNPS		
	CNP_802P_PRIO		
	CNP_DSCP		
NV_LLDP_NB_CONF	LLDP_NB_DCBX		0x10a
	LLDP_NB_RX_MODE		
	LLDP_NB_TX_MODE		
NV_LLDP_NB_DCBX	DCBX_IEEE		0x18e
	DCBX_CEE		
	DCBX_WILLING		
NV_KEEP_LINK_UP	KEEP_ETH_LINK_UP		0x190
	KEEP_IB_LINK_UP		
	KEEP_LINK_UP_ON_BOOT		
	KEEP_LINK_UP_ON_STANDBY		
NV_QOS_CONF	NUM_OF_VL		0x192
	NUM_OF_TC		
	NUM_OF_PFC		
NV_MPFS_CONF	DUP_MAC_ACTION	PHYSICAL_PORT (2)	0x196
	SRIOV_IB_ROUTING_MODE		
	IB_ROUTING_MODE		

Table 21 - Supported Non-Volatile Configurations

Configuration	mlxconfig Parameter Name	Class	TLV ID
NV_HCA_CONF	PCI_WR_ORDERING	HOST-FUNCTION (3)	0x112
	MULTI_PORT_VHCA_EN		
NV_EXTERNAL_PORT_CTRL	PORT_OWNER		0x192
	ALLOW_RD_COUNTERS		
	RENEG_ON_CHANGE		
	TRACER_ENABLE		
NV_ROM_BOOT_CONF2	IP_VER		0x195
	BOOT_UNDI_NETWORK_WAIT		
NV_ROM_UEFI_CONF	UEFI_HII_EN		0x196
NV_ROM_UEFI_DEBUG_LEVEL	BOOT_DBG_LOG		0x206
	UEFI_LOGS		
NV_ROM_BOOT_CONF1	BOOT_VLAN		0x221
	LEGACY_BOOT_PROTOCOL		
	BOOT_RETRY_CNT		
	BOOT_LACP_DIS		
	BOOT_VLAN_EN		
NV_ROM_IB_BOOT_CONF	BOOT_PKEY		0x222
NV_PCI_CONF	ADVANCED_PCI_SETTINGS	HOST (7)	0x80
SAFE_MODE_CONF	SAFE_MODE_THRESHOLD		0x82
	SAFE_MODE_ENABLE		