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Mellanox ConnectX®-4 Firmware Release Notes

Rev 12.16.1020

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Release Update History

Table 1 - Release Update History

Release	Date	Description
Rev 12.16.1020	August, 01, 2016	Added Section 1.2.4, "Validated and Supported 50Gbs Cables" , on page 10
	June, 2016	Initial version of this firmware release.

1 Overview

These are the release notes for the ConnectX®-4 adapters firmware Rev 12.16.1020. This firmware supports the following protocols:

- InfiniBand - SDR, QDR, FDR10, FDR, EDR
- Ethernet - 1GigE, 10GigE, 25GigE, 40GigE, 50GigE, 56GigE¹ 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 PSIDs (Sheet 1 of 2)

Device Part Number	PSID	Device Name	FlexBoot	UEFI
MCX413A-BCAT	MT_2120110027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
MCX413A-GCAT	MT_2600110035	ConnectX®-4 EN network interface card, 50GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
MCX414A-BCAT	MT_2130110027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
MCX414A-GCAT	MT_2610110035	ConnectX®-4 EN network interface card, 50GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
MCX415A-BCAT	MT_2120111027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Yes	No
MCX415A-CCAT	MT_2140110033	ConnectX®-4 EN network interface card, 100GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Yes	No
MCX415A-GCAT	MT_2120110035	ConnectX®-4 EN network interface card; 50GbE single-port QSFP28; PCIe3.0 x16; ROHS R6	Yes	No
MCX416A-BCAT	MT_2130111027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Yes	No

1. 56 GbE 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 PSIDs (Sheet 2 of 2)

Device Part Number	PSID	Device Name	FlexBoot	UEFI
MCX416A-CCAT	MT_2150110033	ConnectX®-4 EN network interface card, 100GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R	Yes	No
MCX416A-GCAT	MT_2130110035	ConnectX®-4 EN network interface card; 50GbE dual-port QSFP28; PCIe3.0 x16; ROHS R6	Yes	No
MCX453A-FCAT	MT_2160110021	ConnectX®-4 VPI adapter card, FDR IB 40GbE, single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
MCX454A-FCAT	MT_2170110021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6	Yes	No
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	Yes	No
MCX455A-FCAT	MT_2160111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Yes	No
MCX456A-FCAT	MT_2170111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6	Yes	No
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	Yes	No

1.2 Supported Cables and Modules

Please refer to the LinkX™ Cables and Transceivers web page (www.mellanox.com -> Products -> Cables and Transceivers) 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-F	Mellanox Optical module, SX, 850nm
1GB/S	MC3208411-T-F	Mellanox optical module, Base-T

1.2.2 Validated and Supported 10/40GbE Cables

Table 4 - Validated and Supported 10/40GbE Cables

Speed	Cable OPN #	Description
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	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

Table 4 - Validated and Supported 10/40GbE Cables

Speed	Cable OPN #	Description
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-SR	MELLANOX OPTICAL MODULE ETH 10GBE 10GB/S SFP+ LC-LC 850NM SR UP TO 300M
10GB/S	MFM1T02A-LR	MELLANOX OPTICAL MODULE ETH 10GBE 10GB/S SFP+ LC-LC 1310NM LR UP TO 10KM
10GB/S	Cisco SFP-H10GB-CU1M	Cisco SFP+ cable
10GB/S	Cisco SFP-H10GB-CU3M	Cisco SFP+ cable
10GB/S	Cisco SFP-H10GB-CU5M	Cisco SFP+ cable
10GB/S	MC2309124-007	QSFP-4SFP10G
10GB/S	SFP-10G-SR	CISCO 10GBASE-SR SFP Module
40GB/S	MC2210128-003	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 3M
40GB/S	MC2210130-001	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 1M
40GB/S	MC2210130-002	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 2M
40GB/S	MC2210310-XXX	MELLANOX ACTIVE FIBER CABLE ETH 40GBE 40GB/S QSFP from 3M up to 100M
40GB/S	MC2210411-SR4L	MELLANOX OPTICAL MODULE 40GB/S QSFP MPO 850NM UP TO 30M
40GB/S	MC2210511-LR4	Mellanox® optical module, IB FDR10, 40Gb/s, QSFP, LC-LC, 1310nm, LR4 up to 10km
40GB/S	QSFP-H40G-CU1M	Cisco QSFP 40GbE cable
40GB/S	QSFP-H40G-CU3M	Cisco QSFP 40GbE cable
40GB/S	QSFP-H40G-CU5M	Cisco QSFP 40GbE cable
40GB/S	QSFP-40G-SR4	Cisco 40G QSFP Module
40GB/S	QSFP-40G-SR-BD	Cisco 40G QSFP Module
NA	MAM1Q00A-QSA	MELLANOX QSFP TO SFP+ ADAPTER

1.2.3 Validated and Supported QDR/FDR10 Cables

Table 5 - Validated and Supported QDR/FDR10 Cable

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
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-E	MELLANOX ACTIVE FIBER CABLE IB QDR/FDR10 40GB/S QSFP from 3M up to 100M
FDR10	MC2206310-XXX-F	MELLANOX ACTIVE FIBER CABLE IB QDR/FDR10 40GB/S QSFP from 3M up to 100M
FDR10	MC2206310-300-L	MELLANOX ACTIVE FIBER CABLE IB QDR/FDR10 40GB/S QSFP 300M
FDR10	MC2210411-SR4	MELLANOX OPTICAL MODULE 40GB/S QSFP MPO 850NM UP TO 100M
FDR10	MC2210411-SR4E	MELLANOX OPTICAL MODULE 40GB/S QSFP MPO 850NM UP TO 300M
FDR10	MFS4R12CB-XXX	MELLANOX ACTIVE FIBER CABLE VPI UP TO 40GB/S QSFP from 3M up to 100M

1.2.4 Validated and Supported 50Gbs Cables

Table 6 - Validated and Supported 50Gbs Cables

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

Table 6 - Validated and Supported 50Gbs Cables

Speed	Cable OPN #	Description
50GE	MCP7H00-G02A	Mellanox Passive Copper Hybrid Cable ETH 100GBE TO 2X50GBS QSFP28 TO 2XQSFP28 2.5M

1.2.5 Validated and Supported FDR Cables

Table 7 - 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-XXX-E	MELLANOX ACTIVE FIBER CABLE VPI UP TO 56GB/S QSFP from 3M up to 100M
FDR	MC2207310-XXX-T	MELLANOX ACTIVE FIBER CABLE VPI UP TO 56GB/S QSFP from 3M up to 100M
FDR	MC2207312-050	MELLANOX ACTIVE FIBER CABLE VPI UP TO 56GB/S QSFP from 3M up to 300M
FDR	MC2207310-100	MELLANOX ACTIVE FIBER CABLE VPI UP TO 56GB/S QSFP from 3M up to 100M
FDR	MC2207411-SR4L	MELLANOX OPTICAL MODULE IB FDR 56GB/S QSFP MPO 850NM UP TO 30M

1.2.6 Validated and Supported EDR Cables

Table 8 - Validated and Supported EDR Cables

Speed	Cable OPN #	Description
100GB/S	MMA1B00-C100	Mellanox® transceiver, 100GbE, QSFP28, MPO, 850nm, up to 100m
100GB/S	MCP1600-C00A	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 0.5M
100GB/S	MCP1600-C001	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 1M
100GB/S	MCP1600-C002	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 2M
100GB/S	MCP1600-C003	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 3M
100GB/S	MFA1A00-CXXX-M	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, up to 100m
100GE	MFS1200-CXXX	Mellanox® active fiber cable, ETH 100GbE, 100Gb/s, QSFP, LSZH, up to 100m
EDR	MMA1B00-E100	Mellanox® transceiver, IB EDR, up to 100Gb/s, QSFP28, MPO, 850nm, up to 100m
EDR	MCP1600-E001	MELLANOX PASSIVE COPPER CABLE VPI 100GB/S QSFP LSZH 1M
EDR	MCP1600-E002	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-E00A	MELLANOX PASSIVE COPPER CABLE VPI 100GB/S QSFP LSZH 0.5M
EDR	MFA1A00-EXXX	MELLANOX active fiber cable, VPI, up to 100Gb/s, QSFP, up to 100m
EDR	MFS1200-EXXX	Mellanox® active fiber cable, IB EDR, up to 100Gb/s, QSFP, LSZH, up to 100m

1.3 Tested Switches

1.3.1 Tested QDR Switches

Table 9 - 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

1.3.2 Tested 10/40GbE Switches

Table 10 - Tested 10/40GbE 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
10GbE	SwitchX®	SX1016X-1BFR	64-Port 10GbE Switch System	Mellanox
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
40GbE	SwitchX®	SX1036B-1BFR	36-Port 40/56GbE Switch System	Mellanox
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

1.3.3 Tested FDR Switches

Table 11 - Tested FDR Switches

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

1.3.4 Tested 100GbE/EDR Switches

Table 12 - Tested 100Gb/s/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
100GbE	Spectrum	SN2700-CS2R	32-port Non-blocking 100GbE Open Ethernet Spine Switch System	Mellanox
100Gb/s	N/A	C3232C	High-Density, 100 Gigabit Ethernet Switch	Cisco
100Gb/s	N/A	7060CX	32-port 100Gb Switch	Arista

1.4 Tools, Switch Firmware and Driver Software

Firmware Rev 12.16.1020 is tested with the following tools, Switch firmware, and driver software:

Table 13 - Tools, Switch Firmware and Driver Software

	Supported Version
MLNX_OFED	3.3-1.0.0.0/3.2-2.0.0.0
MLNX_EN (MLNX_OFED based code)	3.3-1.0.0.0/3.2-2.0.0.0
WinOF-2	1.40/1.35
MFT	4.4.0/4.3.0
MLNX-OS	<ul style="list-style-type: none"> • SwitchX: 3.5.1002 • Switch-IB: 3.5.1000 • Spectrum: 3.6.0530
SwitchX®/SwitchX®-2 Firmware	9.3.7240
Spectrum™ Firmware	13.1100.34
SwitchX-IB™ Firmware	11.0300.0394
SwitchX-IB 2 Firmware	15.0400.0064
InfiniScale® V Firmware	7.4.3000/v7.4.2200
Linux Inbox Drivers	<ul style="list-style-type: none"> • RHEL5.9 • RHEL5.10 • RHEL5.11 • RHEL5.12 • RHEL6.0 • RHEL6.1 • RHEL6.2 • RHEL6.3 • RHEL6.4 • RHEL6.5 • RHEL6.6 • RHEL7.0 • RHEL7.1 • Ubuntu 12.04 • Ubuntu 14.04 • SLES11.2 • SLES11.3 • SLES12.0
Windows Inbox Drivers	<ul style="list-style-type: none"> • Windows Server 2016 (Beta)

1.5 Supported FlexBoot



Please be aware that not all firmware binaries contain FlexBoot (support may vary between cards, see [Section 1.1, “Supported Devices”, on page 6](#)).

Firmware Rev 12.16.1020 supports the following FlexBoot:

Table 14 - Supported FlexBoot

	Supported Version
FlexBoot	3.4.812

1.6 Revision Compatibility

Firmware Rev 12.16.1020 complies with the following programmer’s reference manual:

- *Mellanox Adapters Programmer’s Reference Manual (PRM), Rev 0.31 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 12.16.1020

Table 15 - Firmware Rev 12.16.1020 Changes and New Feature

Feature/Change	Description
Bug Fixes	See Section 4, “Bug Fixes History” , on page 26

2.1 Features/Support to be Deprecated in the Next Release

The following support will be deprecated in the next release:

- 56GbE will not be supported in future ConnectX-4 firmware releases

3 Known Issues

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

Table 16 - Known Issues (Sheet 1 of 8)

Internal Ref.	Issue
-	<p>Description: Bit Error Rate is not optimal on QDR links</p> <p>WA: N/A</p> <p>Keywords: Link Speed</p>
572150	<p>Description: A low link speed issue occurs when connecting a ConnectX®-4 EDR adapter card with a QDR InfiniScale® IV based switch. The link is raised as DDR.</p> <p>WA: N/A</p> <p>Keywords: Link Speed</p>
-	<p>Description: To raise links with platforms based on the following ICs, comply with the following firmware version requirements:</p> <ul style="list-style-type: none"> • Connect-IB® - 10.10.4000 • Switch-IB™ - 11.200.120 (or MLNX-OS 3.4.3050) • Spectrum™ MLNX-OS - 3.5.1000 • ConnectX®-3 - 2.32.5100 • SwitchX® - 9.2.7300 (or MLNX-OS 3.3.5006) <p>WA: N/A</p> <p>Keywords: Interoperability</p>
682518	<p>Description: Interoperability issue between ConnectX-4 or ConnectX-4 Lx adapter cards and ConnectX-2 adapter card when trying to raise a 10GbE link.</p> <p>WA: N/A</p> <p>Keywords: Interoperability</p>
-	<p>Description: If QDR is not enabled for the switch's InfiniBand Port Speed while connected to ConnectX-3/ConnectX-3 Pro or Connect-IB® FDR adapters or to SwitchX® /SwitchX-2 FDR switches, links will rise at SDR or DDR (even if FDR is enabled)</p> <p>WA: Enable QDR (in addition to FDR) when connecting to peer ports running at FDR</p> <p>Keywords: Interoperability</p>
-	<p>Description: Qualified EDR cables currently work with EDR networks (EDR devices, Switch®-IB and ConnectX®-4) only.</p> <p>WA: N/A</p> <p>Keywords: Cables</p>
-	<p>Description: PCIe capability "Device S/N" returns false value.</p> <p>WA: N/A</p> <p>Keywords: PCI</p>

Table 16 - Known Issues (Sheet 2 of 8)

Internal Ref.	Issue
-	<p>Description: When the link is Gen2, entering or exiting L1 state may cause bad CRC or DLLP indication.</p> <p>WA: N/A</p> <p>Keywords: PCI</p>
600534	<p>Description: Configuration space power management capability PME_EN cannot be set.</p> <p>WA: N/A</p> <p>Keywords: PCI</p>
685062	<p>Description: MultiHost InfiniBand: OpenSM is supported over host0 only and the MAD_IFC usage is limited to host0 only.</p> <p>WA: Activate OpenSM and the MFT tools via host0</p> <p>Keywords: PCI</p>
-	<p>Description: PF direct pass-through is not supported (since PF FLR is not supported)</p> <p>WA: N/A</p> <p>Keywords: PF direct pass-through</p>
687113	<p>Description: Some Port Control Register do not return to the default value after the last port owner host restarts the driver.</p> <p>WA: Reboot or reset the driver. reboot / mlxfwreset</p> <p>Keywords: PRM</p>
-	<p>Description: Older MFT versions (4.0.0 and 3.8.0) may indicate that the latest GA firmware is old or that it cannot be compared with the existing firmware. A message similar to the below will be displayed upon firmware upgrade stage: # flint -d <mst device> -i <image> burn</p> <pre>Current FW version on flash: 12.1100.6630 New FW version: 12.0012.0572</pre> <p>Note: The new FW version is not newer than the current FW version on flash.</p> <pre>Do you want to continue ? (y/n) [n] : y</pre> <p>WA: Choose one of the options below to upgrade firmware:</p> <ul style="list-style-type: none"> Upgrade to the latest MFT version (4.1.0) Type "y" after the note flint provides <p>Run flint with the "-force" flag</p> <p>Keywords: Firmware Upgrade/MFT</p>

Table 16 - Known Issues (Sheet 3 of 8)

Internal Ref.	Issue
591240	Description: Traffic that is loopbacked due to QP.force_loopback being equaled to 1, is steered to the PF.
	WA: N/A
	Keywords: Ethernet Network
594964	Description: A minimum of 200 LFM is required in order to cool the MCX4411A-ACAN adapter card.
	WA: N/A
	Keywords: Temperature
601485/ 599810	Description: mlxfwreset does not function properly in old MFT versions after upgrading the firmware image.
	WA: Upgrade MFT to the latest release or use <code>reboot/power cycle</code> after upgrading firmware.
	Keywords: Firmware Tool
-	Description: Windows Server 2016 Inbox driver cannot work with firmware v12.12.0780
	WA: Use WinOF-2 v1.20 out-of-box driver
	Keywords: Windows Inbox Drivers
-	Description: Flashing the firmware requires server reboot. Firmware cannot be flashed twice without server reboot after first flashing
	WA: Reboot the server after firmware flashing
	Keywords: Upgrading/Downgrading
655688	Description: When arming SRQ for limit event, the device might issue an event with <code>context_index=0</code> .
	WA: N/A
	Keywords: RoCE
-	[For customers developing custom low level drivers] Description: VFs internal FLR is not supported in PF teardown HCA command.
	WA: Before unloading the PF driver, PF driver must disable all its active VFs by performing the following: 1. Run the <code>disable_hca</code> command on all the <code>function_ids</code> 2. Wait until firmware returns all VFs allocated pages.
	Keywords: Virtualization, FLR

Table 16 - Known Issues (Sheet 4 of 8)

Internal Ref.	Issue
-	<p>[For customers developing custom low level drivers] Description: VNodeInfo and VPortGuidInfo virtualization Attributes MADs are not supported.</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
-	<p>[For customers developing custom low level drivers] Description: The value of log_max_ra_res_qp in set_hca_cap command should be the same in all functions.</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
-	<p>Description: Function (PF/VF) TX port counters are not supported.</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
-	<p>Description: PF driver must work with pages event queue.</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
597718	<p>Description: Privileged Vport egress traffic is not blocked when Vport is not active</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
591240	<p>Description: Any local (internal) loopbacked packet is counted by the Vport counters, although Vport counters should count only traffic that crosses the Vport.</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
597718	<p>Description: Vport number in virtual trap might be reported incorrectly</p> <p>WA: N/A</p> <p>Keywords: Virtualization</p>
689471	<p>Description: Single FTE that catches both untagged and prio-tagged packets (by giving an FTE with match_value.vlan_tag = 0 and match_value.vid = 0) is currently not supported.</p> <p>WA: N/A</p> <p>Keywords: Ethernet Network</p>

Table 16 - Known Issues (Sheet 5 of 8)

Internal Ref.	Issue
688670	Description: Configuring the SM with VL weight 0 on some VL, and running traffic on it, causes the driver to hang during unload.
	WA: Cold power-cycle the server
	Keywords: QoS
677359	Description: When Clause 74 Fire-Code FEC is active, and there are FC corrected errors, both the <code>FC_correctable</code> counter and the <code>FC_uncorrectable</code> counter are increment.
	WA: N/A
	Keywords: Clause 74 Fire-Code FEC, Counters
691387/ 691415	Description: In a Multihost setup, when running a single TCP stream, you might experience sub optimal throughput.
	WA: Use multiple streams to reach optimal results
	Keywords: Multihost setup, Performance, TCP stream
693832	Description: In a Multihost InfiniBand setup, Host#0 should be loaded first and unloaded last. Currently the device does not support <code>reboot/stop_driver/flr</code> on Host#0 while other hosts are active. Note: Host0 can be selected by changing the INI
	WA: N/A
	Keywords: Multihost InfiniBand
693832	Description: In an InfiniBand Multihost and SR-IOV setups, traffic should contain GRH (GID index), traffic without GRH will be forwarded to <code>vport0</code> (“Host0”). OpenSM should be configured as follow (<code>opensm.conf</code>): <ul style="list-style-type: none"> • <code>virt_enable</code> should be 2 • Enable Qos: <code>qos TRUE</code>
	WA: N/A
	Keywords: Multihost setup
693832	Description: In a Multihost InfiniBand setup, only chassis reboot is supported
	WA: N/A
	Keywords: Multihost setup, chassis
691754	Description: <code>end_padding_mode</code> is required in <code>CREATE_QP</code> and not in <code>INIT_2_RTR</code> command as defined in the PRM
	WA: N/A
	Keywords: <code>end_padding_mode</code> , PRM

Table 16 - Known Issues (Sheet 6 of 8)

Internal Ref.	Issue
691490	Description: LR4 cable events are sent although the port is up
	WA: N/A
	Keywords: Management
736528	Description: On rare occasions during UEFI boot cycles system got stuck while WinPE is loaded. (OS WinPE, system DL160).
	WA: Power cycle revives the system
	Keywords: WinPE OS, UEFI boot cycles
-	Description: QoS must be configured the same for both ports in order for RoCE LAG to function properly.
	WA: N/A
	Keywords: RoCE LAG
759571	Description: Modifying the encap_id of FTE is not supported.
	WA: N/A
	Keywords: encap_id, FTE
756872	Description: Flow Counter is supported only for FTE that does not include a flow_tag or for FTE that have TIR as destination.
	WA: N/A
	Keywords: Flow Counter, FTE
756871	Description: Using Flow Counters in the FDB Flow Table causes the transmitted IB traffic vport counters to not function properly.
	WA: N/A
	Keywords: Flow Counter, FDB Flow Table, vport counters
756870	Description: Using Flow Counters in the FDB Flow Table may harm vport counters' clearing functionality.
	WA: N/A
	Keywords: Flow Counter, FDB Flow Table, vport counters
748292	Description: When a steering rule in the e-sw FDB includes an encap action and an external port as destination, a transmitted multicast packet that matches the rule is sent to the wire and the loopback and the locally looped back packet will also have an encap header.
	WA: N/A
	Keywords: FDB, multicast packet

Table 16 - Known Issues (Sheet 7 of 8)

Internal Ref.	Issue
747967	Description: Burning in firmware on the same device in parallel from multiple interfaces (e.g. PCIe and MTUSB) is not supported.
	WA: N/A
	Keywords: PCIe, MTUSB, burning in parallel
754914	Description: When e-switch FDB is not created, the VF functional loopback traffic is send to vport 0 (PF).
	WA: N/A
	Keywords: e-switch FDB, vport, SR-IOV
689503	Description: On some VLs, configuring the SM with a VL weight 0 and running traffic on it will cause the driver to hang during unload.
	WA: Cold power cycle the server.
	Keywords: VL, SM
747967	Description: Burning in firmware on the same device in parallel from multiple interfaces (e.g. PCIe and MTUSB) is not supported.
	WA: N/A
	Keywords: PCIe, MTUSB, burning in parallel
690890	Description: Updating a non-volatile configuration of port type TLV more than 50 times might cause system to hang.
	WA: Run <code>mlxconfig reset</code> after every 50 consecutive updates of port type TLV.
	Keywords: Non-volatile configuration, TLV
783742	Description: In order to raise 50GbE link when using ConnectX-4 firmware v12.16.1006 or newer, the following conditions must be met: <ul style="list-style-type: none"> • The minimum ConnectX-4 firmware version should be 12.16.1006 • The minimum ConnectX-4 Lx firmware version should be 14.16.1006 • The minimum MLNX-OS version should be 3.6.1000 (firmware v13.1100.0026)
	WA: N/A
	Keywords: MLNX-OS, 50G link
776830	Description: Performing warm reboot during firmware image burning for VPI/IB devices configured with IB port protocol, might cause the device to disappear from the PCIe.
	WA: Cold reboot the device instead
	Keywords: Warm/cold reboot

Table 16 - Known Issues (Sheet 8 of 8)

Internal Ref.	Issue	
770824	Description: Pressing the Power Down button resets the server and does not initiate the Standby flow (as init 0 does). As a result, both ports are up due to <code>keep_link_up</code> , which opens the port when the firmware is loaded.	
	WA: Use init 0 to start the Standby flow.	
	Keywords: Warm/cold reboot	
781039	Description: A server getting into a Standby mode while Packet-Pacing is enabled might cause firmware to hang and driver call-trace.	
	WA: Power Cycle the server (cold boot)	
	Keywords: Packet-Pacing	
774373	Description: The LEDs will not blink if the traffic is less than 0.1% of the link speed. The LEDs' new behavior is as follow:	
	BW Ratio	Pattern
	0%	1111_1111_1111_1111_1111_1111_1111_1111
	0.1% ... 25.0%	1111_1111_0000_0000_1111_1111_0000_0000
	25.1% ... 50.0%	1111_0000_1111_0000_1111_0000_1111_0000
	50.1% ... 75.0%	1100_1100_1100_1100_1100_1100_1100_1100
	75.1% ... 100%	1010_1010_1010_1010_1010_1010_1010_1010
	WA: N/A	
Keywords: LEDs, Blink, Link Speed		

4 Bug Fixes History

Table 17 lists the bugs fixed in this release.

Table 17 - Fixed Bugs List

Internal Ref.	Issue
773724	Description: Modified PCIe settings.
	Key Words: PCIe
	Discovered in Release: 12.14.1006
	Fixed in Release: 12.16.1020
670185	Description: Added protection from IOPX thermal diode destabilization to prevent UEFI IPv6 PXE boot failure on ConnectX-4 Lx 25GE OCP card.
	Key Words: UEFI, OCP card
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
780651	Description: Fixed an issue causing single port devices to query and write Physical Port TLVs to Port 2.
	Keywords: Physical Port TLVs, single port device
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
752392	Description: Enabled mlxfwreset to work using the PCIe Secondary Bus Reset.
	Keywords: mlxfwreset
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
775393	Description: Fixed an issue causing link flapping as a result, incorrect link settings.
	Keywords: Link flapping, link settings
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
756570	Description: Fixed an issue causing wrong alignment markers to be used when running 50G with Clause91 FEC enabled.
	Keywords: Clause91 FEC, 50G
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006

Table 17 - Fixed Bugs List

Internal Ref.	Issue
767281	Description: Reduced the default BAR size for VF (SR-IOV) from 5 (32 MB) to 1 (2MB).
	Keywords: BAR size for VF (SR-IOV)
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
735159/ 747595/ 752533	Description: Added legacy interrupts support in FlexBoot.
	Keywords: Interrupts, PXE
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
752343	Description: Modified the TX configuration to support EMI crossing margins in 16Ghz
	Keywords: TX configuration, EMI
	Discovered in Release: 12.14.2036
	Fixed in Release: 12.16.1006
691194	Description: In some cases, a Bit Error Rate is not optimal on 10G/40G links.
	Keywords: 10G/40G links, Bit Error Rate
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
689788	Description: Instability of Link Training Flow occurs during 100G Auto-Negotiation.
	Keywords: Link Training Flow, Auto-Negotiation
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
684496	Description: Fixed a rare issue which caused the command to hang when moved the QP to RESET and back to RTS.
	Keywords: QP, RTS
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
665089	Description: Improved RDMA READ bandwidth under packet lost scenario.
	Keywords: RDMA READ bandwidth
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036

Table 17 - Fixed Bugs List

Internal Ref.	Issue
736195	Description: Added support for pnat = 1 in HCA <code>access_reg</code> command as required by the <code>ibdiagnet</code> tool.
	Keywords: <code>access_reg</code> command, <code>ibdiagnet</code>
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
696486	Description: Increased the steering hash tables static size from 128 to a maximum of 32K entries.
	Keywords: Steering hash tables static size
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
691649	Description: Prevented miscalculation of module temperature when using 100Gb/s cables (OPN: MFA1A00-Cxxx for 100GbE and MFA1A00-Exxx for IB EDR).
	Keywords: 100Gb/s cables
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
687096	Description: Fixed an issue which caused the device to hang when resetting <code>qkey/pkey</code> violation counter via <code>port_info</code> mad.
	Keywords: <code>qkey/pkey</code> violation counter, <code>port_info</code> mad
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
693446	Description: Reduced one hop for Unicast RX steering, steering pipes balancing.
	Keywords: Ethernet Steering performance
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
690614	Description: Non-volatile configuration of Port Type TLV more than 50 times might cause system hang.
	Keywords: Non-volatile configuration, Port Type TLV
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036

Table 17 - Fixed Bugs List

Internal Ref.	Issue
691043	Description: Enabled RoCE IPv4 Multicast prevents MCG command from failing when an IPv4 is mapped to an IPv6 address.
	Keywords: RoCE IPv4 Multicast
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
649696/ 690681	Description: If the PF driver or the tool (e.g. ethtool) use PAOS DOWN command (e.g. by ifconfig down or ip link set down), loopback traffic is blocked for all functions on this port (PF<->VFs / VF<->VF) In Multihost loopback, the traffic will be blocked once the firmware receives the PAOS down command from all PFs. However, the loopback traffic will not be blocked when the port is down due to the physical link (for example: cable plugged out, switch port down).
	Keywords: Multihost loopback
	Discovered in Release: 12.14.1100
	Fixed in Release: 12.14.2036
659307	Description: Fixed a 25G and 50G link issue when Clause 91 RS FEC was active.
	Keywords: 25G and 50G link, Clause 91 RS FEC
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.14.1100
676877	Description: Added a missing invalidation of eSwitch cache upon FLR which caused the upcoming driver load to either fail or not to be able to transmit.
	Keywords: Packet Transmit, FLR
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
668221	Description: Fixed an issue which prevented Vport counters from counting local loopback packets. Packets now are filter by the self-loopback prevention.
	Keywords: Vport, local loopback packets
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
667288	Description: Reported INTx as unsupported to allow PFs Passthrough on PowerKVM.
	Keywords: Passthrough, PowerKVM
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.14.1100

Table 17 - Fixed Bugs List

Internal Ref.	Issue
596637	Description: SR-IOV Ethernet supports up to 18 VFs per port only.
	Keywords: Virtualization
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
591240	Description: Fixed and incident what allowed local (internal) loopbacked packets to be counted by the Vport counters, although Vport counters should count only traffic that crosses the Vport.
	Keywords: Virtualization
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
664558	Description: Fixed an issue preventing driver loading or TX traffic sending upon reboot, after ungraceful driver unload.
	Keywords: Driver Load
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
657680	Description: Fixed casting of BMC MAC before steering API.
	Keywords: BMC, Steering API
	Discovered in Release: 12.12.1240
	Fixed in Release: 12.14.1100
614403	Description: Fixed the PCI write flow to take into consideration the PCI MTU. This fix eliminates the need for NOPs in the flow, which resulted from PPC larger PCI MTU. The single queue limitation for READ is due to a hardware limitation of the number of READ request in a given time.
	Keywords: PCI MTU
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.14.1100
630327	Description: Fixed a case that caused FlexBoot to not work as expected with systems that run with "large bar" enabled (Above 4G Decoding) over Connect-IB or ConnectX-4 HCAs.
	Keywords: FlexBoot, 4G Decoding
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.14.1100

Table 17 - Fixed Bugs List

Internal Ref.	Issue
629563	Description: Fixed an over-subscription on the RX buffer when Flow Control was not enabled which caused the RX pipe to hang.
	Keywords: Flow Control
	Discovered in Release: 12.12.0780
	Fixed in Release: 12.12.1240
631225	Description: Fixed an issue causing the firmware to hang when running ibdiagnet. The received DiagData MAD included the following values: <ul style="list-style-type: none"> • Clear_all = 1 • PageNum = 0 • Port_select = 0 To prevent the firmware from hanging, a port check was added to Set() as well.
	Keywords: ibdiagnet
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.12.1240
638024	Description: Fixed an issue causing Port 2's GPIO present to be mapped to the wrong value in ConnectX-4 EN 50GbE single-port adapter card OPN MCX414A-GCAT
	Keywords: Port Link
	Discovered in Release: 12.12.1100
	Fixed in Release: 12.12.1240
-	Description: Removed request for Forward Error Correction (FEC) on copper cables of 2m or shorter. In order to work with Switch-IB without FEC, a minimum firmware version of 11.0200.0120 is required
	Keywords: Cables
	Discovered in Release: 12.1100.6630
	Fixed in Release: 12.12.0780
565905	Description: Fixed a LED issue in adapter cards with bi-color LEDs. The LEDs were activated simultaneously due to a firmware issue.
	Keywords: LEDs
	Discovered in Release: 12.1100.6630
	Fixed in Release: 12.12.0780

Table 17 - Fixed Bugs List

Internal Ref.	Issue
-	Description: Fixed an FDR10 incorrect speed indication reported due to the usage of a translation function from the hardware speed to the PRM speed twice.
	Keywords: Port Link
	Discovered in Release: 12.1100.6440
	Fixed in Release: 12.12.0780
592712	Description: Fixed a Phy manager PCS event handling when the port's next state was disable.
	Keywords: Phy Management
	Discovered in Release: 12.1100.6630
	Fixed in Release: 12.12.0780
561387	Description: Fixed an issue that caused invalid data returned by EyeOpening MAD.
	Keywords: MADs
	Discovered in Release: 12.1100.6440
	Fixed in Release: 12.12.0780
552595	Description: Fixed a system call trace event on ConnectX-4 OCP mezz card
	Keywords: Ethernet Network
	Discovered in Release: 12.1100.6440
	Fixed in Release: 12.12.0780
552462	Description: Fixed an issue which caused hardware fatal error when running ibdump.
	Keywords: Diagnostic Tools
	Discovered in Release: 12.1100.6440
	Fixed in Release: 12.12.0780
552227	Description: Reduced the VF ICM footprint for VFs.
	Keywords: Virtualization
	Discovered in Release: 12.1100.6440
	Fixed in Release: 12.1100.6630

5 Firmware Changes and New Feature History

Table 18 - Firmware Changes and New Feature History

Firmware Version	Description
12.16.1006	<ul style="list-style-type: none"> • Explicit Congestion Notification (ECN): 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: $\text{server_total_bar_size} \geq (\text{num_pfs}) * (2\log_pf_uar_bar_size + 2\log_vf_uar_bar_size * \text{total_vfs})$ $\text{server_total_msix} \geq (\text{num_pfs}) * (\text{num_pf_msix} + \text{num_vfs_msix} * \text{total_vfs})$ • 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 (ASAP²) 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 ASAP² 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: 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 26

Table 18 - Firmware Changes and New Feature History

Firmware Version	Description
12.14.2036	<ul style="list-style-type: none"> • 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. • Bug Fixes: See Section 4, “Bug Fixes History”, on page 26
12.14.1100	<ul style="list-style-type: none"> • 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. • Multihost 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 Multihost 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: <ul style="list-style-type: none"> • Changed port configuration which required link re-training (such as speed) • PAOS down • 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.
12.12.1240	<ul style="list-style-type: none"> • See Section 4, “Bug Fixes History”, on page 26

Table 18 - Firmware Changes and New Feature History

Firmware Version	Description
12.12.1100	<ul style="list-style-type: none"> • Reduced the port link-up time when negotiating according to Clause 73 (DME)
12.12.0780	<ul style="list-style-type: none"> • 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 • Enhanced Transmission Selection standard (ETS) • Explicit Congestion Notification (ECN) • Priority Flow Control (PFC) • PCIe Function Level Reset (FLR) • Power Management L2/L3 flow support • Self Loopback support • Transport Domain support • CQ2EQ remapping • Added support for the following commands: <ul style="list-style-type: none"> • MODIFY/QUERY_ESW_VPORT_CONTEXT • QUERY/MODIFY_CONG_STATUS • QUERY/MODIFY_CONG_PARAMS • QUERY_CONG_STATISTICS • ADD/DELETE_VXLAN_UDP_DPORT • VXLAN/NVGRE Stateless offload In this release, this feature is supported through Windows ONLY • SR-IOV EN (at Beta level) • CQE zipping • Dynamically Connected (DC) transport • Wake-on-Lane/Standby • FlexBoot/UEFI support • Non-Volatile Configuration (NVConfig). For the complete list, please refer to Section 8, on page 47.
12.12.0780	<ul style="list-style-type: none"> • Enabled port management. Now one port can be set as Ethernet and one as InfiniBand.
12.1100.6630	<ul style="list-style-type: none"> • Added support for SR-IOV • Added support for MADs Virtualization Attributes according to ib_virt_annex_v17 • Updated virtualization command set according to PRM 0.26 • Enabled SR-IOV, NUM_VFS and INT_LOG_MAX_PAYLOAD_SIZE configuration via the mlxconfig tool

Table 18 - Firmware Changes and New Feature History

Firmware Version	Description
12.0100.6440	<ul style="list-style-type: none"> • Initial Release of ConnectX®-4 adapter cards • InfiniBand port speed up to EDR • Ethernet port speed up to 100GigE • Function per port • Dynamically Connected transport • Unreliable Datagram Connection transport • Atomic Operation • CORE-Direct® <ul style="list-style-type: none"> • 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 <p>Note: All the Ethernet features listed below are at Beta level.</p> <ul style="list-style-type: none"> • 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 • 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 • NC-SI over RMIi support • 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 19 - FlexBoot Changes and New Feature

Version	Description
3.4.812	<ul style="list-style-type: none"> • 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)
3.4.719	<ul style="list-style-type: none"> • Added IPv6 support • Added x64 architecture support in ConnectX-4 and Connect-IB adapter cards • Removed support for the following SHELL CLI commands: <ul style="list-style-type: none"> • 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 <p>For further information, please refer to: http://ipxe.org/cmd</p> <ul style="list-style-type: none"> • Synced the source with iPXE (upstream sync)
3.4.650	<ul style="list-style-type: none"> • Added support for .mrom images larger than 128kB • Added support for ConnectX-4 EN and ConnectX-4 Lx EN • Synced the source with iPXE (upstream sync) • Moved to flat real mode when calling INT 1a,b101 to avoid BIOSes issues • Added support for detecting Spanning Tree Protocol non-forwarding ports (RSTP/MSTP)

6.1 FlexBoot Known Issues

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
-	<p>Description: Several BIOS vendors have limited boot-vector space and may not display FlexBoot in their boot menu.</p> <p>WA: Disable the embedded NIC boot agent in BIOS</p> <p>Keywords: BIOS</p>
-	<p>Description: In several BIOS, the server might hang during FlexBoot booting due to wrong configuration of the PMM.</p> <p>WA: N/A</p> <p>Keywords: BIOS</p>
-	<p>Description: Only EBX,ESI,DS,ES registers can be saved in Boot Entry.</p> <p>WA: N/A</p> <p>Keywords: BIOS</p>
-	<p>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.</p> <p>WA: Follow the instructions described in the FlexBoot UM for the proper iSCSI boot/install</p> <p>Keywords: BIOS</p>
673114	<p>Description: FlexBoot banner might not be shown in some BIOSes.</p> <p>WA: N/A</p> <p>Keywords: BIOS</p>
-	<p>Description: In some cases, PXE boot will not work if the client was given only the file-name without next-server (siaddr).</p> <p>WA: N/A</p> <p>Keywords: PXE Boot</p>
-	<p>Description: In ConnectX-4, the PXE boot time measurement over TFTP Ethernet is 3:40 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.</p> <p>WA: N/A</p> <p>Keywords: PXE Boot</p>
-	<p>Description: PXE boot after iSCSI boot with static configuration is currently not supported.</p> <p>WA: N/A</p> <p>Keywords: PXE Boot</p>

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
-	Description: Boot over VLAN with IB port is currently not supported.
	WA: 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.
	WA: N/A
	Keywords: PXE Boot
-	Description: Chain-loading gPXE stack may result in undesirable behavior.
	WA: 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.
	WA: N/A
	Keywords: PXE Boot
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.
	WA: N/A
	Keywords: PXE Boot
-	Description: iSCSI over IB is not tested.
	WA: N/A
	Keywords: iSCSI
-	Description: iSCSI over DCB is not supported.
	WA: 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.
	WA: N/A
	Keywords: iSCSI

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
-	Description: Boot retries is currently not functional when booting from iSCSI.
	WA: N/A
	Keywords: iSCSI
655800	Description: IPv6 is not supported.
	WA: N/A
	Keywords: iSCSI
-	Description: Boot menu is displayed as READ ONLY if the HCA card does not support flash configuration.
	WA: N/A
	Keywords: User Interface
-	Description: FlexBoot Boot Menu will not be visible in serial output.
	WA: N/A
	Keywords: User Interface
-	Description: FlexBoot Boot Menu will not be shown in ConnectX-4 if the physical port is IB.
	WA: N/A
	Keywords: User Interface
-	Description: FlexBoot Boot Menu will not be shown in ConnectX-4 and ConnectX-4 Lx if the physical port is IB
	WA: N/A
	Keywords: User Interface
-	Description: Large Receive Offload (LRO) and iSCSI may not interoperate due to a bug in current Linux kernel distributions.
	WA: 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: Flexboot supports only 2K MTU.
	WA: N/A
	Keywords: Networking

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
-	Description: 56Gb/s is currently not supported.
	WA: N/A
	Keywords: Link Speed
-	Description: Blink LEDs are currently not supported.
	WA: N/A
	Keywords: LED
-	Description: Setting the number of Virtual Functions higher than the machine's memory capability may cause memory issues and system instability.
	WA: N/A
	Keywords: Virtualization
-	Description: SLAM, FTP, HTTPS and SRP are currently not supported.
	WA: 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.
	WA: 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.
	WA: N/A
	Keywords: Protocols
655800	Description: IPv6 can only run if a RADVD service is running in the network.
	WA: N/A
	Keywords: Protocols
-	Description: IPv6 over IB is not supported.
	WA: N/A
	Keywords: Protocols
655800	Description: IPv6 over WDS is not supported.
	WA: N/A
	Keywords: Protocols

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
655800	Description: Enabling IPv6 first and then IPv4 is currently not supported.
	WA: N/A
	Keywords: Protocols
656001	Description: Booting from WDS and Windows DHCP server when only Option 66 is enabled (without Option 67), is not supported.
	WA: N/A
	Keywords: DHCP
691148	Description: When connecting a pre-configured port with VLAN to an IB fabric, the port runs as Ethernet port with the VLAN tag.
	WA: Disable VLAN in the boot menu before connecting the Ethernet port to the Infini-Band fabric.
	Keywords: VLAN, Port Management
735159	Description: LACP packets handling is not supported during boot.
	WA: N/A
	Keywords: PXE boot
735159	Description: Interrupts are not supported.
	WA: N/A
	Keywords: Interrupts
-	Description: As ConnectX-4 and Connect-IB HCAs do not support FlexBoot menu, pressing Ctrl-B will not open the UI menu although the Ctrl-B prompt at the FlexBoot banner is present..
	WA: N/A
	Keywords: Ctrl-B, ConnectX-4 and Connect-IB HCAs, FlexBoot menu
776057	Description: Citrix PVS boot is not supported.
	WA: N/A
	Keywords: Citrix PVS boot
780862	Description: Set default (CTRL+d key) feature is not supported in Wake-On-Lan setting.
	WA: N/A
	Keywords: CTRL+d, WoL

Table 20 - FlexBoot Known Issues

Internal Ref.	Issue
792432	Description: Booting PXE using Grub2.X over HP G9/G8 servers results in system hang.
	WA: N/A
	Keywords: PXE boot, Grub2.X, HP G9/G8

6.2 FlexBoot Bug Fixes History

Table 21 - FlexBoot Bug Fixes History

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 FlexBoot 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 Unsupported Features and Commands

7.1 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)
- Data integrity validation of control structures
- SM is not supported on VFs
- DC is not supported in: SR-IOV, and RoCE
- RoCE LAG for VFs and Multihost are not supported in RoCE LAG
- FLR is not supported in Multihost InfiniBand

7.2 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

8 Supported Non-Volatile Configurations

Table 22 - 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

Table 23 - 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 24 - Per host/function Settings

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