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Mellanox ConnectX®-4 Firmware Release Notes

Rev 12.1100.6630

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Table of Contents

Chapter 1 Overview	6
1.1 Supported Devices	6
1.2 Supported Cables and Modules	7
1.2.1 Validated and Supported 10/40GbE Cables	7
1.2.2 Validated and Supported QDR/FDR10 Cables	9
1.2.3 Validated and Supported FDR Cables	10
1.2.4 Validated and Supported EDR Cables	11
1.3 Tested Switches	12
1.3.1 Tested QDR Switches	12
1.3.2 Tested 10/40GbE Switches	12
1.3.3 Tested FDR Switches	12
1.3.4 Tested EDR Switches	12
1.4 Tools, Switch Firmware and Driver Software	13
Chapter 2 Changes and New Features in Rev 12.1100.6630	14
Chapter 3 Known Issues	15
Chapter 4 Bug Fixes History	17
Chapter 5 Firmware Changes and New Feature History	18
Chapter 6 Unsupported Features and Commands	20
6.1 Unsupported Features	20
6.2 Unsupported Commands	20

List of Tables

Table 1:	Release Update History	5
Table 2:	Supported PSIDs	6
Table 3:	Validated and Supported 40GbE Cables	7
Table 4:	Validated and Supported QDR/FDR10 Cable	9
Table 5:	Validated and Supported FDR Cables	10
Table 6:	Validated and Supported EDR Cables	11
Table 7:	Tested QDR Switches	12
Table 8:	Tested 10/40GbE Switches	12
Table 9:	Tested FDR Switches	12
Table 10:	Tested EDR Switches	12
Table 11:	Tools, Switch Firmware and Driver Software	13
Table 12:	Firmware Rev 12.1100.6630 Changes and New Feature	14
Table 13:	Known Issues	15
Table 14:	Fixed Bugs List	17
Table 15:	Firmware Changes and New Feature History	18

Release Update History

Table 1 - Release Update History

Release	Date	Description
Rev 12.1100.6630	July 16, 2015	Initial version

1 Overview

These are the release notes for the ConnectX®-4 adapters firmware Rev 12.1100.6630. This firmware supports the following protocols:

- InfiniBand – SDR, QDR, FDR, EDR
- Ethernet (beta) - 10GigE, 25GigE, 40GigE, 50GigE 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](#).



ConnectX®-4 Ethernet adapter cards are currently at Beta level.

Table 2 - Supported PSIDs (Sheet 1 of 2)

Device Part Number	PSID	Device Name
MCX413A-BCAT	MT_2120110027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6
MCX414A-BCAT	MT_2130110027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6
MCX415A-BCAT	MT_2120111027	ConnectX®-4 EN network interface card, 40GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
MCX415A-CCAT	MT_2140110033	ConnectX®-4 EN network interface card, 100GbE single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
MCX416A-BCAT	MT_2130111027	ConnectX®-4 EN network interface card, 40GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
MCX416A-CCAT	MT_2150110033	ConnectX®-4 EN network interface card, 100GbE dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R
MCX453A-FCAT	MT_2160110021	ConnectX®-4 VPI adapter card, FDR IB 40GbE, single-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6
MCX454A-FCAT	MT_2170110021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x8, tall bracket, ROHS R6
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
MCX455A-FCAT	MT_2160111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, single-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6
MCX456A-FCAT	MT_2170111021	ConnectX®-4 VPI adapter card, FDR IB and 40GbE, dual-port QSFP28, PCIe3.0 x16, tall bracket, ROHS R6

Table 2 - Supported PSIDs (Sheet 2 of 2)

Device Part Number	PSID	Device Name
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

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 10/40GbE Cables

Table 3 - Validated and Supported 40GbE Cables

Speed	Cable OPN #	Description
10GbE	MC2309124-004	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GbE QSFP TO SFP+ 4M
10GbE	MC2309124-005	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 5M
10GbE	MC2309124-006	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 6M
10GbE	MC2309124-007	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 7M
10GbE	MC2309130-001	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 1M
10GbE	MC2309130-002	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 2M
10GbE	MC2309130-003	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 3M
10GbE	MC2309130-00A	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S QSFP TO SFP+ 0.5M
10GbE	MC2609125-004	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 4M
10GbE	MC2609125-005	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 5M
10GbE	MC2609130-001	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 1M
10GbE	MC2609130-002	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 2M

Table 3 - Validated and Supported 40GbE Cables

Speed	Cable OPN #	Description
10GbE	MC2609130-003	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 3M
10GbE	MC2609130-0A1	MELLANOX PASSIVE COPPER HYBRID CABLE ETH 40GBE TO 4X10GBE QSFP TO 4X SFP+ 1.5M
10GbE	MC3309124-004	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 4M
10GbE	MC3309124-005	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 5M
10GbE	MC3309130-001	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 1M
10GbE	MC3309130-002	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 2M
10GbE	MC3309130-003	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 3M
10GbE	MC3309130-00A	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 0.5M
10GbE	MC3309130-0A1	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 1.5M
10GbE	MC3309130-0A2	MELLANOX PASSIVE COPPER CABLE ETH 10GBE 10GB/S SFP+ 2.5M
10GbE	Cisco SFP-H10GB-CU1M	Cisco SFP+ cable
10GbE	Cisco SFP-H10GB-CU3M	Cisco SFP+ cable
10GbE	Cisco SFP-H10GB-CU5M	Cisco SFP+ cable
10GbE	MC2309124-007	QSFP-4SFP10G
10GbE	SFP-10G-SR	CISCO 10GBASE-SR SFP Module
10GbE	MC2309124-007	QSFP-4SFP10G
40GbE	MC2210128-003	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 3M
40GbE	MC2210130-001	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 1M
40GbE	MC2210130-002	MELLANOX PASSIVE COPPER CABLE ETH 40GBE 40GB/S QSFP 2M
40GbE	MC2210310-XXX	MELLANOX ACTIVE FIBER CABLE ETH 40GBE 40GB/S QSFP from 3M up to 100M
40GbE	MC2210411-SR4L	MELLANOX OPTICAL MODULE 40GB/S QSFP MPO 850NM UP TO 30M
40GbE	QSFP-H40G-CU1M	Cisco QSFP 40GbE cable

Table 3 - Validated and Supported 40GbE Cables

Speed	Cable OPN #	Description
40GbE	QSFP-H40G-CU3M	Cisco QSFP 40GbE cable
40GbE	QSFP-H40G-CU5M	Cisco QSFP 40GbE cable
40GbE	QSFP-40G-SR4	CISCO 40G QSFP Module
40GbE	MAM1Q00A-QSA	MELLANOX QSFP TO SFP+ ADAPTER

1.2.2 Validated and Supported QDR/FDR10 Cables

Table 4 - Validated and Supported QDR/FDR10 Cable

Speed	Cable OPN #	Description
FDR10	MC2206128-004	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 4M
FDR10	MC2206128-005	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 5M
FDR10	MC2206130-001	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 1M
FDR10	MC2206130-002	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 2M
FDR10	MC2206130-003	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 3M
FDR10	MC2206130-00A	MELLANOX PASSIVE COPPER CABLE VPI UP TO 40GB/S QSFP 0.5M
FDR10	MC2206310-XXX-E	MELLANOX ACTIVE FIBER CABLE IB QDR/FDR10 40GB/S QSFP from 3M up to 100M
FDR10	MC2206310-XXX-T	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-015	MELLANOX ACTIVE FIBER CABLE VPI UP TO 40GB/S QSFP from 3M up to 100M

Table 4 - 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

1.2.3 Validated and Supported FDR Cables

Table 5 - 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

1.2.4 Validated and Supported EDR Cables

Table 6 - Validated and Supported EDR Cables

Speed	Cable OPN #	Description
EDR	MCP1600-C00A	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 0.5M
EDR	MCP1600-C001	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 1M
EDR	MCP1600-C002	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 2M
EDR	MCP1600-C003	MELLANOX PASSIVE COPPER CABLE ETH 100GBE 100GBS QSFP LSZH 3M
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-E003	MELLANOX active fiber cable, VPI, up to 100Gb/s, QSFP, 3m
EDR	MFA1A00-E005	MELLANOX active fiber cable, VPI, up to 100Gb/s, QSFP, 5m
EDR	MFA1A00-E050	MELLANOX active fiber cable, VPI, up to 100Gb/s, QSFP, 50m
EDR	MFA1A00-E100	MELLANOX active fiber cable, VPI, up to 100Gb/s, QSFP, 100m

1.3 Tested Switches

1.3.1 Tested QDR Switches

Table 7 - Tested QDR Switches

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

1.3.2 Tested 10/40GbE Switches

Table 8 - Tested 10/40GbE Switches

Speed	Switch Family	OPN # / Name	Description
10/40GbE	N/A	3064	48-port 10Gb/40Gb Switch
10/40GbE	N/A	7050Q	16-port 40Gb Switch
10/40GbE	N/A	7050S	48-port 10Gb/40Gb Switch
10GbE	SwitchX®	SX1016X-1BFR	64-Port 10GbE Switch System
10GbE	N/A	5548	Cisco 10GB ETH switch
40GbE	SwitchX®	SX1036B-1BFR	36-Port 40/56GbE Switch System
40GbE	N/A	3132Q	Cisco 40GB ETH switch
40GbE	N/A	7050QX	32-port 40Gb Switch

1.3.3 Tested FDR Switches

Table 9 - Tested FDR Switches

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

1.3.4 Tested EDR Switches

Table 10 - Tested EDR Switches

Speed	Switch Family	OPN # / Name	Description
EDR	Switch-IB	SB7790-EB2F	36-port EDR 100Gb/s InfiniBand Switch Systems

1.4 Tools, Switch Firmware and Driver Software

Firmware Rev 12.1100.6630 is tested with the following tools, SwitchX® firmware, and driver software:

Table 11 - Tools, Switch Firmware and Driver Software

	Supported Version
MLNX_OFED	3.0-2.0.0/3.0-1.0.1
MLNX_EN (MLNX_OFED based code)	3.0-2.0.0/3.0-1.0.1
WinOF-2	1.10 (Beta)
MFT	4.0.0
SwitchX®/SwitchX®-2 Firmware	v9.3.2000
SwitchX-IB™ Firmware	v11.0100.0112
InfiniScale® V Firmware	v7.4.3000/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"> • 2012 • 2012R2

2 Changes and New Features in Rev 12.1100.6630

Table 12 - Firmware Rev 12.1100.6630 Changes and New Feature

Category	Description
Virtualization	<ul style="list-style-type: none">• Added support for SR-IOV IB• Added support for MADs Virtualization Attributes according to <code>ib_virt_annex_v17</code>
PRM	<ul style="list-style-type: none">• Updated virtualization command set according to PRM 0.26
Configuration tools	<ul style="list-style-type: none">• Enabled SR-IOV, <code>NUM_VFS</code> and <code>INT_LOG_MAX_PAYLOAD_SIZE</code> configuration via the <code>mlxconfig</code> tool

3 Known Issues

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

Table 13 - Known Issues

Index	Issue	Description	Workaround
1.	Link	FDR10 is currently not supported	-
1.		Bit error rate is not optimal on QDR links	-
2.	Port Link	EDR links activate Forward Error Correction (FEC)	-
3.	Interoperability	To raise links with platforms based on the following ICs, comply with the following firmware version requirements: <ul style="list-style-type: none"> • ConnectX®-3 - 2.32.5100 • SwitchX® - 9.2.7300 (or MLNX-OS 3.3.5006) • Connect-IB® - 10.10.4000 • Switch-IB™ - 11.0.1250 (or MLNX-OS 3.4.1102) 	-
4.		If QDR is not enabled for the switch's InfiniBand Port Speed while connected to ConnectX-3/ConnectX-3Pro or Connect-IB® FDR adapters or to SwitchX® /SwitchX-2 FDR switches, links will rise at SDR or DDR (even if FDR is enabled)	Enable QDR (in addition to FDR) when connecting to peer ports running at FDR
5.	Cables	Qualified EDR cables currently work with EDR networks (EDR devices, Switch®-IB and ConnectX®-4) only.	-
6.	Port management	Setting one port as Ethernet and one as InfiniBand is currently not supported.	-
7.	PCI	Power Management L2L3 flow is currently not supported.	-
8.		PCIe capability "Device S/N" returns false value.	-
9.		When the link is Gen2, entering or exiting L1 state may cause bad CRC or DLLP indication.	-
10.	LEDs	In adapter cards with bi-color LEDs, the LEDs might be activated simultaneously due to a firmware issue. This behavior does not affect the hardware functionality.	-
11.	Virtualization	Function (PF/VF) TX port counters are not supported.	-

Table 13 - Known Issues

Index	Issue	Description	Workaround
12.	Virtualization	[For customers developing custom low level drivers] VFs internal FLR is not supported in PF tear-down HCA command.	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.
13.		PF driver must work with pages event queue.	-
14.		[For customers developing custom low level drivers] VNodeInfo and VPortGuidInfo virtualization Attributes MADs are not supported.	-
15.		[For customers developing custom low level drivers] The value of <code>log_max_ra_res_qp</code> in <code>set_hca_cap</code> command should be the same in all functions.	-
16.	DC transport	DC transport is not supported when SR-IOV is enabled.	-
17.	Miscellaneous	PF direct pass-through is not supported (since PF FLR is not supported).	-

4 Bug Fixes History

Table 14 lists the bugs fixed in this release.

Table 14 - Fixed Bugs List

Index	Issue	Description	Discovered in Release	Fixed in Release
1.	Virtualization	Reduced the VF ICM footprint for VFs.	12.0100.6440	12.1100.6630

5 Firmware Changes and New Feature History

Table 15 - Firmware Changes and New Feature History

Firmware Version	Category	Description
12.0100.6440	All	<ul style="list-style-type: none"> Initial Release of ConnectX®-4 adapter cards
	Port Speed	<ul style="list-style-type: none"> InfiniBand port speed up to EDR Ethernet port speed up to 100GigE
	Virtualization	<ul style="list-style-type: none"> Function per port
	InfiniBand Network	<ul style="list-style-type: none"> 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
	Ethernet Network	<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
General	<ul style="list-style-type: none"> 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 	

Table 15 - Firmware Changes and New Feature History

Firmware Version	Category	Description
12.0100.6440 (cont.)	Host management	• NC-SI over RMII support
	MAD	• Config space address in MAD management class 0x09

6 Unsupported Features and Commands

6.1 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
- NC-SI interface is not enabled in Connect-IB® firmware
- PCIe Function Level Reset (FLR)
- SM is not supported on VFs

6.2 Unsupported Commands

- QUERY_MAD_DEMUX
- SET_MAD_DEMUX
- PAGE_FAULT_RESUME
- ACTIVATE_TRACER
- DEACTIVATE_TRACER
- MODIFY/QUERY_ESW_VPORT_CONTEXT
- ACCESS_REG_SPACE
- ACCESS_REG_SPACE_DWORD
- ACTIVATE/DEACTIVATE_TRACER
- QUERY/MODIFY_CONG_STATUS
- QUERY/MODIFY_CONG_PARAMS
- QUERY_CONG_STATISTICS
- ADD/DELETE_VXLAN_UDP_DPORT
- QUERY/MODIFY_SCHED_QUEUE