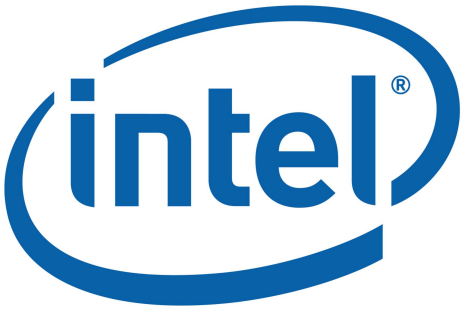

Intel® Ethernet Connection X722

Feature Support Matrix

Ethernet Networking Division (ND)

Revision 1.7
February 2020
336882-008

Revision History

Revision	Date	Comments
1.7	February 20, 2020	Updates include the following: • Updated Table 7, "Software Compatibility".
1.6	February 4, 2020	Updates include the following: • General updates in support of Software Release 24.3. • Updated Table 1, "Supported Link Modes". • Updated Table 2, "Supported Media Types". • Updated Table 3, "General Features". • Updated Table 4, "Operating System Support for Physical Function Driver". • Updated Table 5, "Operating System Support for RDMA Driver". • Updated Table 6, "Virtualized Operating System". • Updated Table 7, "Software Compatibility".
1.5	June 12, 2019	Updates include the following: • General updates in support of Software Release 24.0. • Updated Table 1, "Supported Link Modes". • Updated Table 2, "Supported Media Types". • Updated Table 3, "General Features". • Updated Table 4, "Operating System Support for Physical Function Driver". • Updated Table 6, "Virtualized Operating System". • Updated Table 7, "Software Compatibility".
1.4	March 6, 2019	Updates include the following: • General updates in support of Software Release 23.5.2. • Updated Table 7, "Software Compatibility".
1.3	November 19, 2018	Updates include the following: • General updates in support of Software Release 23.4. • Updated Table 1, "Supported Link Modes". • Updated Table 2, "Supported Media Types". • Updated Table 3, "General Features". • Updated Table 4, "Operating System Support for Physical Function Driver". • Updated Table 6, "Virtualized Operating System". • Updated Table 7, "Software Compatibility".
1.2	July 10, 2018	Updates include the following: • General updates in support of Software Releases 22.10, 23.1, and 23.2. • Updated Table 1, "Supported Link Modes". • Updated Table 2, "Supported Media Types". • Updated Table 3, "General Features". • Updated Table 7, "Software Compatibility".
1.1	January 19, 2018	Updates include the following: • Updated Table 4, "Operating System Support for Physical Function Driver". • Updated Table 5, "Operating System Support for RDMA Driver" • Updated Table 6, "Virtualized Operating System".
1.0	December 13, 2017	Initial release (Intel public).

Features Supported

Table 1 through Table 3 list the feature support provided by the software drivers for a given release starting with the production release (Release 22.0.1). The *Intel® C620 Series Chipset Platform Controller Hub Datasheet* reflects the silicon device capability, while this document reflects what is actually supported in the software for a given release.

Notes:

- Throughout this document:
  - The Intel® Ethernet Connection X722 is represented as "X722".
  - "X" = Supported with Intel software driver.
  - "---" = Not supported with Intel software driver.
- Features and CFG_IDs not listed in this document are not officially supported.

Table 1. Supported Link Modes

Feature	Supported in Release	
	22.0.1 through 24.0	24.3
10 Gb/s Native SFI/SFP+[1]	X	X
KR+X557 10GBASE-T 2x10 GbE[2]	X	X
KR+X557 10GBASE-T 4x10 GbE[2]	X	X
KX+ Marvell* 88E1512 2x1 GbE[3]	X	X
KX+ Marvell 88E1543 4x1 GbE[3]	X	X
KR+ CS4223 SFI/SFP+ 4x10 GbE	X	X
KR+ CS4227 SFI/SFP+ 2x10 GbE	X	X
SFI/QSFP+ 4x10 GbE	X	X
KR/KX Backplane	X	X

1. Supports four 10 Gb/s SFI direct attach connections in a QSFP+ connector.
2. Only supported with Intel® Ethernet Connection X557 device.
3. KX link can be achieved in any of the backplane images via auto-negotiation.

Table 2. Supported Media Types

Feature	Supported in Release	
	22.0.1 through 24.0	24.3
10 GbE Media Supported:		
SFP+ SR/LR single-speed (10 GbE)	X	X
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X
SFP+ DA twinaxial cables (up to 7 meters)	X	X
SFP+ AOCs (Active Optical Cables)	X	X
QSFP+ DA twinaxial breakout cables	X	X
QSFP+ SR4 breakout cables	---	---
QSFP+ AOC breakout cables	---	---
SFP+ 10G-LRM, 10G-ER and 10G-ZR	---	---
QSFP+ SR4/LR multi-speed (1/10 GbE) optical module	---	---
1 GbE Media Supported:		
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X
SFP branded SFP SX/LX optical modules (single speed)	---	---
SFP 1GBASE-T Transceiver (single speed)	---	---
SFP+ legacy 1 GbE modules	---	---

Table 3. General Features

Feature	Supported in Release						
	22.0.1	22.2/ 22.5	22.7/ 22.9/ 22.10	23.1/ 23.2	23.4/ 23.5.2	24.0	24.3
Link Flow Control[1]	X	X	X	X	X	X	X
Priority Flow Control	X	X	X	X	X	X	X
Transmit Allocation Buffers Driver Uses (Range 128-4096, default is 512)	X	X	X	X	X	X	X
Checksum Offload (IPv4/IPv6, SCTP, TCP, UDP, Tx/Rx)	X	X	X	X	X	X	X
Generic Receive Offloads	X	X	X	X	X	X	X
Large Send Offload (TSO) (Up to 64 KB)	X	X	X	X	X	X	X
Header split	X	X	X	X	X	X	X
VLANs	X	X	X	X	X	X	X
LBFO Teaming	X	X	X	X	X	X	X
ANS Teaming	---	---	---	---	---	---	---
Persistent LLDP	---	---	---	---	---	X	X
Interrupt Moderation Rate	X	X	X	X	X	X	X
Message Signaled Interrupts (MSI)	X	X	X	X	X	X	X

Table 3. General Features (Continued)

Feature	Supported in Release						
	22.0.1	22.2/ 22.5	22.7/ 22.9/ 22.10	23.1/ 23.2	23.4/ 23.5.2	24.0	24.3
Message Signaled Interrupts (MSI-X)	X	X	X	X	X	X	X
Jumbo Packet (4088 and 9014 bytes)	X	X	X	X	X	X	X
Receive Side Scaling (RSS)	X	X	X	X	X	X	X
RSS Receive Queues (Linux: 128 RSS PF Queues / 4 VF Queues) (Windows: 182 RSS PF Queues / 4 VF Queues)	X	X	X	X	X	X	X
OS2BMC	X	X	X	X	X	X	X
Wake from S1–S4	---	---	---	---	---	---	---
Wake from S3, S4 (client OS only)	X	X	X	X	X	X	X
Wake from S5	X	X	X	X	X	X	X
DCB	X	X	X	X	X	X	X
Fiber Channel over Ethernet (FCoE)	---	---	---	---	---	---	---
FCoE Boot	---	---	---	---	---	---	---
Receive Side Coalescing (RSC)[2] (Done by software)	X	X	X	X	X	X	X
IEEE 1588[3] (Linux* only and session-based, not per packet)	X	X	X	X	X	X	X
Intel® Ethernet Flow Director (Intel® Ethernet FD) (SW ATR and sideband Add Filter cmd – Linux only)	X	X	X	X	X	X	X
MFP	---	---	---	---	---	---	---
Remote Boot[4]**: PXE**	X	X	X	X	X	X	X
Remote Boot[4]**: iSCSI**	X	X	X	X	X	X	X
Secure NVM	X	X	X	X	X	X	X
TPH	X	X	X	X	X	X	X
LPLU[5]	X	X	X	X	X	X	X
EEE	---	---	---	---	---	---	---
Malicious Driver	X	X	X	X	X	X	X
Azure Stack Additional Qualification (AQ) Certification[6]	---	X	X	X	X	X	X
IEEE Data Center Bridging (DCB):							
MSFT DCB (QoS support) 10 GbE	X	X	X	X	X	X	X
DCBx in FW	X	X	X	X	X	X	X
DCBx in SW (Linux only)	X	X	X	X	X	X	X
SW only DCB	---	---	---	---	---	---	---

Table 3. General Features (Continued)

Feature	Supported in Release						
	22.0.1	22.2/ 22.5	22.7/ 22.9/ 22.10	23.1/ 23.2	23.4/ 23.5.2	24.0	24.3
Virtualization (SR-IOV):							
VMDq (For ESX and Hyper V Only)	X	X	X	X	X	X	X
SR-IOV (KVM and 2012 R2 Hyper V)	X	X	X	X	X	X	X
RSS in VF	X	X	X	X	X	X	X
4 queues per VM	X	X	X	X	X	X	X
Cloud Offloads:							
VXLAN (Linux i40e only[7])	X	X	X	X	X	X	X
VXLAN (VMware driver)	---	---	X	X	X	X	X
VXLAN (Windows Server 2019 only)	---	---	---	---	---	X	X
NVGRE (Windows only)	X	X	X	X	X	X	X
GENEVE (ESX[8])	---	---	X	X	X	X	X
GENEVE (Linux)	---	---	X	X	X	X	X
Manageability Support:							
NC-SI	X	X	X	X	X	X	X
OS2BMC	X	X	X	X	X	X	X
SMBus	X	X	X	X	X	X	X
SR-IOV supported on 1 GbE PHY	---	---	---	---	---	---	---
DCB/DCBX for 1 GbE SKU	---	---	---	X	X	X	X
iWARP on 1 GbE SKU	X	X	X	X	X	X	X
iWARP on 10 GbE SKU							
NDK 1.0/NDK 2.0 mode 2	X	X	X	X	X	X	X
NDK 2.0 mode 3	---	---	---	---	---	---	---
Linux iWARP SR-IOV	X	X	X	X	X	X	X

1. A 10 GbE controller port can either be configured to receive 802.3x Link Flow Control (LFC) packets or 802.1Qbb/802.3bd PFC packets. It does not support the reception of both types of packets simultaneously over the same port.
2. Not supported in VF.
3. The device only processes PTP packets using the Layer 2 packet format.
4. X722 has an integrated flash. OROM is stored in the 10 GbE region of flash.
5. For 10GBASE-T applications only.
6. For Software Release 24.0, the Azure Stack Additional Qualification (AQ) Certification is for Windows Server 2016 only. Windows Server 2019 will be supported in future releases.
7. All Linux i40e support refers to the driver posted on intel.com and sourceforge.net. OS vendors may release feature on different schedules. Contact OS vendor for more information.
8. For ESX, only Native mode driver will support these features going forward.

Operating Systems Supported

Table 4 through Table 6 list the supported operating systems and virtualized operating systems.

Table 4. Operating System Support for Physical Function Driver

Operating System	In-box/ In-distro	Additional Notes
Windows Server 2012 R2	No	64 bit only.
Windows Server 2016 RS3/RS4	No	64 bit only.
Windows Server 2019	No	64 bit only.
Windows 10 Client WS	No	64 bit only.
Windows PE	No	64 bit only.
Windows 10 (Client RS 3)	No	64 bit only.
Windows 10 (Client RS 4)	No	64 bit only.
Linux: RHEL 7.7	Yes	64 bit only.
Linux: RHEL 8.0	Yes	64 bit only.
Linux: SLES 12 SP5	Yes	64 bit only.
Linux: SLES 15 SP1	Yes	64 bit only.
Linux: CentOS 6.9/7.3	No	64 bit only.
Linux: Ubuntu 16.04 LTS/18.04 LTS	Yes	64 bit only.
Linux Stable Kernel version 2.6/4.x	N/A	64 bit only.
Solaris		Contact Oracle for release details.
FreeBSD 11		64 bit only.
UEFI 2.1/2.3/2.4	N/A	
Option ROM support: Legacy PXE, Legacy iSCSI, x64 UEFI driver	N/A	

Table 5. Operating System Support for RDMA Driver

Operating System	In-box/ In-distro	Additional Notes
Windows Server 2012 R2	Yes	64 bit only.
Windows Server 2016	Yes	64 bit only.
Linux: RHEL 7.7	Yes	64 bit only.
Linux: RHEL 8.0	Yes	64 bit only.
Linux: SLES 12 SP5	Yes	64 bit only.
Linux: SLES 15 SP1	Yes	64 bit only.
Linux Stable Kernel version 2.6/4.x	N/A	64 bit only.

Table 6. Virtualized Operating System

Virtualized OS	Host OS	PF Driver	Guest OS	Guest OS VF Driver
Linux	RHEL 7.7/KVM RHEL 8.0/KVM SLES 12 SP5/KVM SLES 15 SP1/KVM	Linux i40e	RHEL 7.7 RHEL 8.0 SLES 12 SP5 SLES 15 SP1	i40evf/iavf[1]
			Windows Server 2012 R2 Windows Server 2016 Windows Server 2019	V40E/iavf[2]
			FreeBSD 11	iXLv/iavf[3]
Windows Hyper-V	Windows Server 2012 R2	I40EB	Windows Server 2012 R2 Windows Server 2016 Windows Server 2019	V40E/iavf[2]
	Windows Server 2016 Windows Server 2019	I40EB	RHEL 7	i40evf/iavf[1]
			Windows Server 2012 R2 Windows Server 2016 Windows Server 2019	V40E/iavf[2]
VMware vSphere	ESX 6.0 U3 ESX 6.5 U3 ESX 6.7 G3	ESX i40en	RHEL 7	i40evf/iavf[1]
			Windows Server 2012 R2 Windows Server 2016 Windows Server 2019	V40E/iavf[2]

1. The Linux i40evf driver is renamed to "iavf" starting in Software Release 24.0.
2. The Windows V40E driver is renamed to "iavf" starting in Software Release 24.0.
3. The FreeBSD iXLv driver is renamed to "iavf" starting in Software Release 24.0.

NVM and Software Compatibility

With the X722 adapters, both the firmware (device NVM image) and network drivers are field-serviceable, and the NVM image and network driver are updated as a matched set. Updating the device image and driver together can increase key features including performance, manageability, media types, physical port counts, virtualization, offloads, remote boot options, VLAN support, teaming, and Receive Side Scaling.

Table 7 indicates the Intel Ethernet Connections Software releases. Intel recommends that you update the NVM and Software Driver to compatible versions.

Note: Update to the device driver for the given release prior to updating the NVM.

Table 7. Software Compatibility

Software Release Version	i40e (Windows)	i40e (Linux)[1]	i40evf/iavf[2] (Linux)[1,3]	ixl (FreeBSD)	i40iw/i40iwvf
22.0.1	22.0.1	2.0.19	2.0.16	1.7.11	0.7.50
22.2	22.2	2.0.23	2.0.22	1.7.11	0.7.50
22.5	22.5	2.0.30	2.0.30	1.7.12	0.7.52
22.7	22.7	2.2.4	3.1.4	1.7.39	1.0.22
22.9	22.9	2.3.6	3.2.5	1.8.1	1.2.0
22.10	22.10	2.4.3	3.4.2	1.9.5	1.2.9
23.1	23.1	2.4.6	3.5.6	1.9.7	1.4.5
23.2	23.2	2.4.10	3.5.13	1.9.8	1.6.16
23.4	23.4	2.7.12	3.6.11	1.10.4	1.7.6
23.5.2	23.5.2	2.7.29	3.6.15	1.10.4	1.7.6
24.0	24.0	2.8.43	3.7.34	1.11.9	1.8.18
24.3	24.3	2.10.19.30	3.7.61.20	1.11.20	1.8.18

1. These are out-of-tree versions.
2. The Linux i40evf driver is renamed to "iavf" starting in Software Release 24.0.
3. For devices that are AVF compliant as described here (https://www.intel.com/content/www/us/en/products/docs/network-io/ethernet/controllers/ethernet-adaptive-virtual-function-hardware-spec.html), AVF base mode features are supported across NVM/PF combinations. Advanced features for VF drivers might require an update to NVM and PF/AVF drivers.

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