



Intel[®] Ethernet Controller X710/XXV710/XL710

Feature Support Matrix

Rev. 5.6

January 2024



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Revision History

Revision	Date	Comments
5.6	January 12, 2024	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 28.3 and NVM 9.X0.
5.5	August 22, 2023	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 28.2 and NVM 9.30.
5.4	February 24, 2023	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 28.0 and NVM 9.20. • ESXi 6.7 is no longer supported.
5.3	December 6, 2022	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 27.8 and NVM 9.10.
5.2	November 14, 2022	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 27.7 and NVM 9.10.
5.1	August 12, 2022	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 27.6 and NVM 9.00.
5.0	May 25, 2022	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 27.3 and NVM 8.70.
4.9	May 2, 2022	Updates include the following: <ul style="list-style-type: none"> • Table 10 iavf should be 4.4.2.
4.8	April 4, 2022	Updates include the following: <ul style="list-style-type: none"> • Updated Link modes 100 mb/s SGMII table footnote in Table, "Interface and CFG_ID Supported for X710/XL710".
4.7	March 29, 2022	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 27.1 and NVM 8.60.
4.6	October 19, 2021	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 26.6 and NVM 8.50.
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Revision	Date	Comments
4.5	August 13, 2021	Updates include the following: <ul style="list-style-type: none"> Updated Linux stable kernel version support in Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".
4.4	July 22, 2021	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 26.4 and NVM 8.40.
4.3	March 31, 2021	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 26.2 and NVM 8.30.
4.2	February 2, 2021	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 26.0 and NVM 8.20.
4.1	January 28, 2021	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 25.5 and NVM 8.15.
4.0	October 1, 2020	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 25.4 and NVM 8.10.
3.9	July 13, 2020	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 25.2 and NVM 8.00.
3.8	May 19, 2020	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 25.1 and NVM 7.30.
3.7	March 26, 2020	Updates include the following: <ul style="list-style-type: none"> Updated Table, "Software/NVM Compatibility for X710/XL710". Updated Table, "Software/NVM Compatibility for XXV710".
3.6	February 20, 2020	Updates include the following: <ul style="list-style-type: none"> Updated Table, "Software/NVM Compatibility for X710/XL710". Updated Table, "Software/NVM Compatibility for XXV710".
3.5	January 31, 2020	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 25.0 and NVM 7.20.
3.4	November 12, 2019	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 24.3 and NVM 7.10.
3.3	June 6, 2019	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 24.0 and NVM 7.00.
3.2	February 26, 2019	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 23.5.2 and NVM 6.80.
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Revision	Date	Comments
3.1	November 19, 2018	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 23.4 and NVM 6.80.
3.0	June 8, 2018	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710". • Updated Table, "Virtualized Operating System for X710/XXV710/XL710".
2.9	June 1, 2018	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Releases 23.1 and 23.2 and NVM 6.02.
2.8	January 19, 2018	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710". • Updated Table, "Virtualized Operating System for X710/XXV710/XL710".
2.7	January 16, 2018	Updates include the following: <ul style="list-style-type: none"> • Updated document title. • General updates in support of Software Releases 22.9 and 22.10 and NVM 6.02.
2.6	November 21, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated footnote #5 in Table, "Software/NVM Compatibility for X710/XL710".
2.5	October 11, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".
2.4	August 31, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Supported Media Types for X710/XL710" to show support for "SFP SX/LX optical modules (single speed)" in Software Release 22.6. • Updated Table, "Supported Media Types for XXV710" to show support for "SFP28 25G AOCs (Active Optical Cables)" and "SFP+ AOCs (Active Optical Cables)" in Software Release 22.6.
2.3	August 25, 2017	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Release 22.6 and NVM 6.01. • Removed "Priority Order" table. • Removed "Details on the Link Modes Attempted by XXV710 LESM" section.
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Revision	Date	Comments
2.2	April 21, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Supported Media Types for X710/XL710": <ul style="list-style-type: none"> — Added footnote to "QSFP AOCs" in the "40 GbE Media Supported" section. • Updated "Features Supported" section: <ul style="list-style-type: none"> — Added discussion of XXV710 link establishment. — Added Table, "Link Modes Attempted". — Added "Priority Order" table. • Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710": <ul style="list-style-type: none"> — Added Ubuntu operating systems. • Updated Table, "Software/NVM Compatibility for X710/XL710". • Updated Table, "Software/NVM Compatibility for XXV710".
2.1	February 10, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Software/NVM Compatibility for X710/XL710".
2.0	January 31, 2017	Updates include the following: <ul style="list-style-type: none"> • Updated Table, "Supported Media Types for X710/XL710": <ul style="list-style-type: none"> — Added 'SFP+ SR/LR multi-speed (1/10 GbE) optical modules' in the "1 GbE Media Supported" section. • Updated Table, "Supported Media Types for XXV710": <ul style="list-style-type: none"> — Added "SFP+ SR/LR multi-speed (1/10 GbE) optical modules" in the "1 GbE Media Supported" section. — Added "SFP+ loopback modules" in the "10 GbE Media Supported" section. • Updated Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710": <ul style="list-style-type: none"> — Added support for VMware vSphere 2016 (ESXi 6.5) OS. — Other OS version updates. • Updated Table, "Virtualized Operating System for X710/XXV710/XL710": <ul style="list-style-type: none"> — Added ESX.6.5 (vSphere 2016) Host OS. — Added Windows Server 2016 Host OS. • Updated Table, "Software/NVM Compatibility for X710/XL710". • Added Table, "Software/NVM Compatibility for XXV710". • Update Table, "NVM Transition Support for X710/XL710". • Added Table, "NVM Transition Support for XXV710".
1.9	November 18, 2016	Updates include the following: <ul style="list-style-type: none"> • General updates in support of Software Releases 21.1/21.3/22.2 and NVM 5.05/5.51. • Added Table, "Supported Media Types for XXV710".

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Revision	Date	Comments
1.8	June 9, 2016	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 20.7.1 and NVM 5.04.
1.7	April 6, 2016	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 20.7.1 and NVM 5.02/5.03.
1.6	February 9, 2016	Updates include the following: <ul style="list-style-type: none"> General updates in support of Software Release 20.7 and NVM 5.02.
1.5	December 18, 2015	Updates include the following: <ul style="list-style-type: none"> Update to future availability of GENEVE. Update to Table, "Software/NVM Compatibility for X710/XL710" — Added column for FreeBSD.
1.4	December 1, 2015	Updates include the following: <ul style="list-style-type: none"> Updated Table, "Virtualized Operating System for X710/XXV710/XL710". Updated Table, "Software/NVM Compatibility for X710/XL710" Updated Table, "NVM Transition Support for X710/XL710"
1.3	August 26, 2015	Updates include the following: <ul style="list-style-type: none"> Updated Feature Tables to add Software Release 20.3 features. Updated driver and tool version strings in Table, "Software/NVM Compatibility for X710/XL710".
1.2	June 15, 2015	Updates include the following: <ul style="list-style-type: none"> Updated future availability of SFP 1GBASE-T Transceiver (single speed). Updated Table, "General Features for X710/XXV710/XL710", including: <ul style="list-style-type: none"> Update to RSS Receive Queues for Windows vs. Linux. Update related to VXLAN (Linux only) cloud offloads. Updated Table, "Software/NVM Compatibility for X710/XL710". Updated Table, "NVM Transition Support for X710/XL710".
1.1	April 15, 2015	Updates include the following: <ul style="list-style-type: none"> Changes based on Software Release 20.0 and NVM 4.42. Added Table, "Operating System Support for Physical Function Driver for X710/XXV710/XL710". Added Table, "Virtualized Operating System for X710/XXV710/XL710". Added Table, "Software/NVM Compatibility for X710/XL710". Added Table, "NVM Transition Support for X710/XL710".
1.0	September 24, 2014	Initial public release.

1.0 Features Supported

The following tables list the feature support provided by the NVM and software drivers for a given release starting with the production release (Release 19.3, NVM 4.24). The *Intel® Ethernet Controller X710/XXV710/XL710 Datasheet* reflects the silicon device capability, while this document reflects what is actually supported in the NVM and software for a given release.

Notes:

- Throughout this document:
 - The Intel® Ethernet Controller X710/XL710 is represented as “X710/XL710”.
 - The Intel® Ethernet Controller XXV710 is represented as “XXV710”.
 - “X” = Supported with Intel NVM and software driver.
 - “---” = Not supported with Intel NVM and software driver.
- The following table lists software releases and associated NVMs:

Software Release Version	X710/XL710 NVM Version	XXV710 NVM Version	SRev
19.3 / 19.4	4.24 / 4.25 / 4.26	---	1
20.0	4.42	---	1
20.3	4.53	---	1
20.4.1	4.53	---	1
20.7	5.02	---	1
20.7.1	5.02 / 5.03	---	1
20.7.1	5.04	---	1
21.1	5.05	---	1
21.3 / 22.2	5.05	5.51	1
22.6 / 22.9 / 22.10 / 23.1 / 23.2	6.01	6.01 / 6.02	1
<i>continued...</i>			



Software Release Version	X710/XL710 NVM Version	XXV710 NVM Version	SRev
23.4	6.80	6.80	10
23.5.2	6.80	6.80	10
24.0	7.00	7.00	10
24.3	7.10	7.10	10
25.0	7.20	7.20	10
25.1	7.30	7.30	10
25.2	8.00	8.00	10
25.4	8.10	8.10	10
25.5	8.15	8.15	10
26.0	8.20	8.20	20
26.2	8.30	8.30	20
26.4	8.40	8.40	20
26.6	8.50	8.50	30
27.1	8.60	8.60	30
27.3	8.70	8.70	30
27.6	9.00	9.00	30
27.7	9.10	9.10	40
27.8	9.10	9.10	40
28.0	9.20	9.20	40
28.2	9.30	9.30	40
28.3	9.40	9.40	40

- Features and CFG_IDs not listed in this document are not officially supported.

1.1 X710/XL710 Devices

Table 1. Interface and CFG_ID Supported for X710/XL710

Feature	Supported in Release						
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 25.0	25.1 through 25.2	25.4 through 28.2	28.3
Link Modes 2x40 GbE							
Backplane (CFG_IDs supported):							
KR4/KR/KX (2.4)	X	X	X	X	X	X	X
XLAUI (2.61)	---	X	X	X	X	X	X
QSFP+ (CFG_IDs supported):							
XLPP/CR4 (4.5)	X	X	X	X	X	X	X
Link Modes 1x40 GbE							
Backplane (CFG_IDs supported):							
KR4/KR4/KX (2.0)	X	X	X	X	X	X	X
XLAUI (TBD)	---	---	---	---	X	X	X
QSFP+ (CFG_IDs supported):							
XLPP/CR4 (4.0)	X	X	X	X	X	X	X
Link Modes 4x10 GbE							
Backplane (CFG_IDs supported):							
KR (3.0/3.2)	---	---	X	X	X	X	X
KR (3.8)	X	X	X	X	X	X	X
SFI (7.0)	---	---	---	X	X	X	X
SFI (7.2)	---	X	X	X	X	X	X
QSFP+ (CFG_IDs supported):							
SFI (6.0)	X	X	X	X	X	X	X
SFI ¹ (6.4)	---	X	X	X	X	X	X

continued...

Feature	Supported in Release						
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 25.0	25.1 through 25.2	25.4 through 28.2	28.3
SFP+ (CFG_IDs supported):							
SFI (7.2)	X	X	X	X	X	X	X
10GBASE-T (CFG_IDs supported): ²							
SFI (10.01)	---	---	X	X	X	X	X
Link Modes 2x10 GbE							
Backplane (CFG_IDs supported):							
KR (0.5, 2.4)	X	X	X	X	X	X	X
KX4 (1.0)	X	X	X	X	X	X	X
XAUI ³	---	---	---	---	X	X	X
SFI (7.2)	---	X	X	X	X	X	X
SFP+ (CFG_IDs supported):							
SFI (7.2)	X	X	X	X	X	X	X
Link Modes 1 GbE							
SGMII	---	---	---	---	---	X	X
KX ⁴	---	---	---	---	---	X	X
Link Modes 100 Mb/s							
SGMII	---	---	---	---	---	X	X
<i>Notes:</i> 1. Supports two 10 GbE SFI direct attach connections in a QSFP+ connector. 2. Only supported with Intel® Ethernet Connection X557 device. 3. XAUI link can be achieved via parallel detection with a KR4 NVM image. 4. KX link can be achieved in any of the backplane images via auto-negotiation.							

Table 2. Supported Media Types for X710/XL710

Feature	Supported in Release					
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 22.2	22.6 through 28.2	28.3
40 GbE Media Supported						
QSFP+ SR4 optics	X	X	X	X	X	X
QSFP+ LR4 optics ¹	---	---	---	X	X	X
QSFP AOCs (Active Optical Cables) ²	---	X	X	X	X	X
QSFP+ Intel® Ethernet Modular Optics and Cabling Solution	---	X	X	X	X	X
QSFP+ DA twinaxial cables	X	X	X	X	X	X
Active QSFP+ copper cables	---	---	---	---	---	---
QSFP+ Electrical loopback modules ³	X ⁴	X ⁴	X ⁴	X ⁴	X ⁴	X ⁴
10 GbE Media Supported						
SFP+ SR/LR single-speed (10 GbE)	X	X	X	X	X	X
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X	X	X	X	X
SFP+ DA twinaxial cables (up to 7m)	X	X	X	X	X	X
SFP+ AOCs (Active Optical Cables) ⁵	---	X	X	X	X	X
QSFP+ DA twinaxial breakout cables	X	X	X	X	X	X
QSFP+ SR4 breakout cables (4x10 GbE) ⁶	---	---	---	X	X	X
QSFP+ AOC breakout cables (4x10 GbE)	---	---	---	---	---	---
SFP+ 10G-LRM, 10G-ER and 10G-ZR	---	---	---	---	---	---
10GBASE-T with Intel® Ethernet Connection X557 only	---	---	X	X	X	X
SFP+ loopback modules ⁷	X ⁸	X ⁸	X ⁸	X ⁸	X ⁸	X ⁸
1 GbE Media Supported						
SFP 1GBASE-T Transceiver (single speed) ^{9,10}	---	---	X	X	X	X

continued...

Feature	Supported in Release					
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 22.2	22.6 through 28.2	28.3
SFP SX/LX optical modules (single speed)	---	---	---	---	X	X
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X	X	X	X	X
<i>Notes:</i> 1. Supporting LR4 requires more power and thus is disabled by default in QSFP+ NVM images from Intel. Contact your hardware vendor to see if the modules can be supported. 2. The AOC should be compliant to the 40 GbE XLPPPI electrical specification per IEEE 802.3. 3. Any loopback modules which has an EEPROM configuration that matches any of the supported media of the device should achieve link, with one exception: CR4 link cannot be achieved with loopback module without PCS Nonce Field Override register set. FW will eventually switch to XLPPPI and try link which should work. 4. Verification was done with Electronic Loopback 0dB Class4. Timbercon EL-12-07002-176 5. Only "Limiting Initialization" cables are supported. 6. Support limited to Intel® E40GQSFP40 40 Gb optics and AMPHENOL #943-99354-10005 (QSFP+, 5 m) cable. 7. Any loopback modules having an EEPROM configuration that matches any of the supported media of the device should achieve link. 8. Verification was done with SFP+: Amphenol SFP+ 3.5 dB APF14120016DKD P/N 610540001 9. Support limited to: Finisar FCLF-8521-3, Kinnex A XSFP-T-RJ12-0101-DLL, Avago ABCU-5710RZ. 10. Finisar FCLF8521P2BTL is described to be functionally equivalent to Finisar FCLF-8521-3.						

1.2 XXV710 Devices

Table 3. Interface and CFG_ID Supported for XXV710

Feature	Supported in Release	
	22.6 through 28.2	28.3
Link Modes 2x25 GbE		
Backplane (CFG_IDs supported):		
25GBASE-KR (12.0)	X	X
25G-AUI C2C (12.0)	X	X
SFP28 (CFG_IDs supported):		
25GBASE-CR (12.0)	X	X
25GBASE-SR/LR (12.0)	X	X
25G-AUI C2M (12.0)	X	X
10G-SFI (12.0)	X	X
<i>continued...</i>		

Feature	Supported in Release	
	22.6 through 28.2	28.3
Link Modes 1x25 GbE		
Backplane (CFG_IDs supported):		
25GBASE-KR (13.0)	X	X
25G-AUI C2C (13.0)	X	X
SFP28 (CFG_IDs supported):		
25GBASE-CR (13.0)	X	X
25GBASE-SR/LR (13.0)	X	X
25G-AUI C2M (13.0)	X	X
10G-SFI (13.0)	X	X

Table 4. Supported Media Types for XXV710

Supported Media Types ¹	Supported in Release			FEC Supported ²
	21.3 and 22.2	22.7 through 28.2	28.3	
25 GbE Media Supported				
SFP28 DA twin axial cable and QSFP28 DA breakout modules (SFP28 end only):				
• CA-25G-L	X	X	X	CL108 ³ RS-FEC
• CA-25G-S	X	X	X	CL74 ⁴ FC-FEC/BASE-R, CL108 RS-FEC
• CA-25G-N	X	X	X	No FEC, CL74 ⁴ FC-FEC/BASE-R, CL108 RS-FEC
SFP28 25GBASE-SR optical modules	X	X	X	CL108 ³ RS-FEC ⁵
SFP28 25GBASE-SR/10GBASE-SR optical modules	X	X	X	CL108 ³ RS-FEC ⁵
SFP28 25GBASE-LR optical modules	---	X	X	CL108 ³ RS-FEC ⁵
SFP28 25GBASE-ER	---	---	---	N/A
SFP28 25 GbE AOCs (Active Optical Cables)	---	X	X	No FEC, CL108 ³ RS-FEC
<i>continued...</i>				

Supported Media Types ¹	Supported in Release			FEC Supported ²
	21.3 and 22.2	22.7 through 28.2	28.3	
10 GbE Media Supported				
SFP+ SR/LR single-speed (10 GbE) optical modules	X	X	X	N/A
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X	X	N/A
SFP+ DA twinaxial cables (up to 7 m)	X	X	X	N/A
SFP+ AOCs (Active Optical Cables) ⁶	---	X	X	N/A
SFP28 DA twinaxial cables	X	X	X	N/A
SFP+ loopback modules ⁷	X ⁸	X ⁸	X ⁸	N/A
1 GbE Media Supported				
SFP 1GBASE-T transceiver (single speed) ^{9,10}	X ^{9,10}	X ^{9,10}	X ^{9,10}	N/A
SFP SX/LX optical modules (single speed)	---	X	X	N/A
SFP+ SR/LR multi-speed (1/10 GbE) optical modules	X	X	X	N/A
<i>Notes:</i> 1. Only Intel-branded modules are supported. Other cables and modules may function but are not validated by Intel. 2. Linking without FEC when it is required is not blocked by XXV710 firmware, but may result in poor link quality and is not supported. 3. CL108 = Clause 108 from the IEEE Specification. 4. CL74 = Clause 74 from the IEEE Specification. 5. The specification states that only CL108 RS-FEC is supported. However, some link partners may not support it. XXV710 firmware will attempt to link in all FEC modes. 6. Only "Limiting Initialization" cables are supported. 7. Any loopback modules having an EEPROM configuration that matches any of the supported media of the device should achieve link. 8. Verification was done with SFP+: Amphenol SFP+ 3.5 dB APF14120016DKD P/N 610540001 9. Support limited to: Finisar FCLF-8521-3, Kinnex A XSFP-T-RJ12-0101-DLL, Avago ABCU-5710RZ. 10. Finisar FCLF8521P2BTL is described to be functionally equivalent to Finisar FCLF-8521-3.				

1.2.1 XXV710 Link Establishment State Machine (LESM)

The XXV710 LESM enables increased interoperability with IEEE and 25 Gb Ethernet Consortium capable 25 GbE switches. This allows the XXV710 to link with devices that may not be fully compliant with the IEEE or Consortium specifications.

The following table shows the link modes the XXV710 firmware will attempt for the various supported media types. Since there are link partners that do not support RS-FEC, the LESM will attempt to get link instead of blocking the connection even when RS-FEC is required.

The LESM will attempt to achieve link for the configurations shown in **red text**. For these modes, it is important to note that the configured FEC is not the required FEC as specified by the IEEE 802.3by specification. This could result in high Bit Error Rate (BER), but it allows users to achieve link and pass data with non-spec compliant partners. Even though degraded performance can be seen as result of not having the properly-configured FEC, getting a link is better option than blocking the link.

The link modes shown in black are compliant to the IEEE802.3by specification and enable the proper FEC mode as required and appropriate. The link modes shown in **yellow table cells** are the expected or default link modes for a given media type.

For full details on LESM, refer to the “25G Link Establishment State Machines” section in the *Intel® Ethernet Controller X710/XXV710/XL710 Datasheet*.

Table 5. Link Modes Attempted for XXV710

Media Type	Link Modes				
	25G-AN	25G-AUI No-FEC	25G-AUI CL74 FC-FEC	25G-AUI CL108 RS-FEC	10G-SFI
SFP+ (10G) DA	—	—	—	—	X
25G-CA-N	X	X	X	X	X
25G-CA-S	X	X ¹	X	X	X
25G-CA-L	X	X ¹	X ¹	X	X
25G-SR	—	X ^{1,2}	X ¹	X	—
25G/10G-SR	—	X ^{1,2}	X ¹	X	X
25G-LR	—	X ^{1,2}	X ¹	X	—

Notes: 1. Link is attempted without the proper FEC mode when it is required and is not blocked by the XXV710 firmware. However, this may result in poor link quality and is not supported.
 2. 25G-SR optics are typically sold with a BER of either 10⁻¹² or 10⁻⁵. Clause 112 of IEEE802.3by specification requires RS-FEC for 10⁻⁵ SR optics. Optics labeled 10⁻¹² still default to attempting link with RS-FEC, as both ends of the link must have modules with that improved BER to safely link without FEC.

1.3 All Devices (X710, XXV710, and XXV710)

Table 6. General Features for X710/XXV710/XL710

Feature ¹	Supported in Release								
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 22.2	22.6 through 23.2	23.4 and 23.5.2	24.0 through 25.5	26.0 through 28.2	28.3
Link Flow Control	X	X	X	X	X	X	X	X	X
Priority Flow Control	X	X	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	X	X
Checksum Offload (IPv4/IPv6, SCTP, TCP, UDP, Tx/Rx)	X	X	X	X	X	X	X	X	X
Large Send Offload (TSO) (Up to 64 KB)	X	X	X	X	X	X	X	X	X
Header Split	---	---	---	---	---	---	---	---	---
VLANs	X	X	X	X	X	X	X	X	X
Teaming	X	X	X	X	X	X	X	X	X
Interrupt Moderation Rate	X	X	X	X	X	X	X	X	X
Message Signaled Interrupts (MSI)	X	X	X	X	X	X	X	X	X
Message Signaled Interrupts (MSI-X)	X	X	X	X	X	X	X	X	X
Jumbo Packet (4088 and 9014 bytes for Windows)	X	X	X	X	X	X	X	X	X
Receive Side Scaling (RSS)	X	X	X	X	X	X	X	X	X
RSS Receive Queues (Linux: 64 RSS PF queues / 4 VF queues ²) (Windows: 32 RSS PF queues / 4 VF queues)	X	X	X	X	X	X	X	X	X
OS2BMC	X	X	X	X	X	X	X	X	X
Wake from S1-S4	---	---	---	---	---	---	---	---	---
Wake from S5	X	X	X	X	X	X	X	X	X
DCB CEE	---	X	X	X	X	X	X	X	X
Fiber Channel over Ethernet (FCoE)	---	---	---	---	---	---	---	---	---

continued...

Feature ¹	Supported in Release								
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 22.2	22.6 through 23.2	23.4 and 23.5.2	24.0 through 25.5	26.0 through 28.2	28.3
FCoE Boot	---	---	---	---	---	---	---	---	---
Receive Side Coalescing (RSC) (Done by software)	X	X	X	X	X	X	X	X	X
IEEE 1588³ (Linux only and session-based, not per packet)	X	X	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	X	X
Remote Boot⁴: PXE	X	X	X	X	X	X	X	X	X
Remote Boot⁴: iSCSI	X	X	X	X	X	X	X	X	X
Secure NVM	X	X	X	X	X	X	X	X	X
TPH	---	---	---	---	---	---	---	---	---
LPLU	---	---	X ⁵	X ⁵	X ⁵	X ⁵	X ⁵	X ⁵	X ⁵
EEE	---	---	---	---	---	---	---	---	---
Malicious Driver	X	X	X	X	X	X	X	X	X
Recovery Mode⁶	---	---	---	---	---	X	X	X	X
IEEE Data Center Bridging (DCB):									
MSFT DCB (QoS support) 10 GbE	---	---	X	X	X	X	X	X	X
MSFT DCB (QoS support) 40 GbE	---	---	---	X	X	X	X	X	X
DCBx in FW	---	X	X	X	X	X	X	X	X
DCBx in SW (Linux only)	---	X	X	X	X	X	X	X	X
SW only DCB	---	---	---	---	---	---	---	---	---
Virtualization (SR-IOV):									
VMDq (for ESXi and Hyper-V only)	X	X	X	X	X	X	X	X	X
SR-IOV (ESXi, KVM, and 2012 R2 Hyper-V)	X	X	X	X	X	X	X	X	X
RSS in VF	X	X	X	X	X	X	X	X	X

continued...



Feature ¹	Supported in Release								
	19.3 and 19.4	20.0	20.3 and 20.4.1	20.7 through 22.2	22.6 through 23.2	23.4 and 23.5.2	24.0 through 25.5	26.0 through 28.2	28.3
4 queues per VM ²	X	X	X	X	X	X	X	X	X
Intel® Ethernet Adaptive Virtual Function i40evf/iavf ⁷ 3.0.8 or later (out-of-tree version)	---	---	---	---	X	X	X	X	X
Cloud Offloads:									
VXLAN (Linux i40e only ⁸)	X	X	X	X	X	X	X	X	X
VXLAN (Windows Server 2016)	---	---	---	---	X	X	X	X	X
VXLAN (Windows Server 2019)	---	---	---	---	---	---	X	X	X
VXLAN (VMware driver)	---	---	X	X	X	X	X	X	X
NVGRE (Windows only)	X	X	X	X	X	X	X	X	X
GENEVE	---	---	---	---	X	X	X	X	X
Manageability Support:									
NC-SI	X	X	X	X	X	X	X	X	X
OS2BMC	X	X	X	X	X	X	X	X	X
SMBus	X	X	X	X	X	X	X	X	X
MCTP	---	---	---	---	X	X	X	X	X
PLDM Type 0 - Message Control and Discovery	---	---	---	---	---	---	---	X	X
PLDM Type 2 - Platform Monitoring and Control	---	---	---	---	---	---	---	X	X
PLDM Type 6 - Redfish Device Enablement	---	---	---	---	---	---	---	X ⁹	X ⁹
<p>Notes:</p> <ol style="list-style-type: none"> For features supported with DPDK drivers please refer to dpdk.org. 16 queues per VF is supported using Linux Kernel PF and poll mode VF only. The device only processes PTP packets using the Layer 2 packet format. Pre-Boot Option ROM should be stored in the Flash attached to the XL710. For 10GBASE-T applications only. The design of Recovery Mode precludes rollback to prior versions of the NVM, as indicated in Table 11 and Table 12. This is because the addition of the Recovery Mode capability changed the definition of some regions of the NVM to be write-protected. Rollback to a prior version requires access to these write-protected regions, and thus, the rollback would fail. The Linux i40evf driver is renamed to "iavf" starting in Software Release 24.0. 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. Supports read-only operation. 									

2.0 Operating Systems Supported

The following tables list the supported operating systems and virtualized operating systems, respectively. For the latest OS support, see <http://intel.com/support/ethernetos>.

Table 7. Operating System Support for Physical Function Driver for X710/XXV710/XL710

Operating System	In-box/In-distro	Additional Notes
Windows Server 2022	Yes ¹	64 bit only.
Windows Server 2019	Yes ¹	64 bit only.
Windows Server 2016	Yes ¹	64 bit only.
Windows 11	Yes	64 bit only.
Windows 10	Yes	64 bit only.
Linux: RHEL 9.3	Yes ¹	64 bit only.
Linux: RHEL 9.2	Yes ¹	64 bit only.
Linux: RHEL 9.1	Yes ¹	64 bit only.
Linux: RHEL 8.x/7.x	Yes ¹	64 bit only.
Linux: SLES 15 SP5	Yes ¹	64 bit only.
Linux: SLES 15 SP4	Yes ¹	64 bit only.
Linux: SLES 15 SP1	Yes ¹	64 bit only.
Linux: SLES 15	Yes ¹	64 bit only.
Linux: SLES 12 SP5	Yes ¹	64 bit only.
Linux: SLES 12 SP3	Yes ¹	64 bit only.
Linux: SLES 11 SP4	No	64 bit only.

continued...

Operating System	In-box/In-distro	Additional Notes
Linux Stable Kernel version 5.13/5.10/5.7/5.4/4.x/2.6	N/A	64 bit only.
Linux: Ubuntu 22.04 LTS	N/A	64 bit only.
Linux: Ubuntu 20.04 LTS	N/A	64 bit only.
Linux: Ubuntu 18.04 LTS	N/A	64 bit only.
Linux: CentOS 7.5/6.9	Yes ¹	64 bit only.
Linux: Debian 11	Yes	64 bit only.
VMware vSphere 8.0 (ESXi 8.0)	Yes	Driver available at VMware website.
VMware vSphere 7.0 (ESXi 7.0)	Yes	Driver available at VMware website.
VMware vSphere 2016 (ESXi 6.5)	No	Driver available at VMware website.
Solaris		Contact Oracle for release details
FreeBSD 14.0/13.x/12.4/12.3/11.3		64 bit only.
UEFI 2.4/2.3/2.1	N/A	
Option ROM support: Legacy PXE, Legacy iSCSI, x64 UEFI driver	N/A	
<i>Note:</i> 1. In-box does not apply to the XXV710.		

Table 8. Virtualized Operating System for X710/XXV710/XL710

Virtualized OS	Host OS	PF Driver	Guest OS	Guest OS VF Driver
VMware vSphere	ESXi 8.0 (vSphere 8.0) ESXi 7.0 (vSphere 7.0) ESXi 6.7 (vSphere 6.7) ESXi 6.5 (vSphere 2016)	ESX i40en	RHEL 8.3 RHEL 7.9/7.5 SLES 15 SP1 SLES 15 SLES 12 SP3 SLES 11 SP4 Ubuntu 18.04 LTS	i40evf/iavf ¹
			Windows Server 2019 Windows Server 2016	V40E/iavf ²
Linux	RHEL 8.3/KVM RHEL 7.9/KVM RHEL 7.5/KVM SLES 15 SP1/KVM SLES 15/KVM SLES 12 SP3/KVM SLES 11 SP4/KVM Ubuntu 18.04 LTS/KVM	Linux i40e	RHEL 8.3 RHEL 7.9/7.5 SLES 15 SP1 SLES 15 SLES 12 SP3 SLES 11 SP4 Ubuntu 18.04 LTS	i40evf/iavf ¹
			Windows Server 2019 Windows Server 2016	V40E/iavf ²
			FreeBSD 13.0/12.0/11.3	iXLv/iavf ³
<i>continued...</i>				

Virtualized OS	Host OS	PF Driver	Guest OS	Guest OS VF Driver
Windows Hyper-V	Windows Server 2019	I40EA	RHEL 8.3 RHEL 7.9/7.5 SLES 15 SP1 SLES 15 SLES 12 SP3 SLES 11 SP4 Ubuntu 18.04 LTS	i40evf/iavf ¹
			Windows Server 2019 Windows Server 2016	V40E/iavf ²
	Windows Server 2016	I40EA	RHEL 8.3 RHEL 7.9/7.5 SLES 15 SP1 SLES 15 SLES 12 SP3 SLES 11 SP4 Ubuntu 18.04 LTS	i40evf/iavf ¹
			Windows Server 2019 Windows Server 2016 Windows Server 2012 R2	V40E/iavf ²
<p>Notes: 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.</p>				

3.0 NVM and Software Compatibility

With Intel® Ethernet Network 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.

The following tables indicate the sets of NVM images and Intel® Ethernet Controllers Software releases that go together. Intel recommends that you update the NVM and Software Driver to compatible versions.

NOTE

Update to the device driver for given release prior to running the NVM update tool.

Table 9. Software/NVM Compatibility for X710/XL710

Software Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
19.3	4.24 4.25	1.24.9.0	19.3	1.0.15	N/A	N/A	N/A	N/A	N/A
19.4	4.26	1.24.18.1	19.4	1.1.23	N/A	N/A	1.2.4	N/A	N/A
20.0	4.42	1.24.33.8	20.0	1.2.37 1.2.38	N/A	1.2.48	1.3.6	1.24.35.1	N/A
20.3	4.53	1.25.20.03	20.3	1.3.38 1.3.39.1	N/A	1.3.38	1.4.5	2.25.18.03	N/A
20.4.1	4.53	1.25.20.12	20.4.1	1.3.46 1.3.47	N/A	1.3.45	1.4.8	2.25.18.3	N/A
<i>continued...</i>									



Software Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
20.7	5.02	1.26.17.9	20.7						
20.7.1	5.02 5.03 ⁵	1.26.17.11	20.7.1	1.4.25 1.5.16	1.4.15 1.5.14	For ESX 6.0: 1.5.8 For ESX 6.5: 1.5.8 For ESX 6.7: 1.7.1	1.4.26 1.4.27	2.26.17.6 2.27.10.1	N/A
	5.04								
21.1 21.3 22.2	5.05	1.26.17.11 1.28.19.4	21.1 21.3 22.0 22.2	1.5.25 ⁶ 1.6.42 ⁶ 2.0.19 2.0.23	1.5.14 1.6.41 2.0.16 2.0.22	1.7.11	1.6.8 1.7.10 1.7.11	2.28.1.6 2.28.19.5 2.28.22.4	N/A
22.6 22.9 22.10 23.1 23.2	6.01	1.30.2.11 1.30.22.1 1.30.22.3	22.6 22.9 22.10 23.1 23.2	2.1.26 2.3.6 2.4.3 2.4.6 2.4.10	3.0.8 3.2.5 3.4.2 3.5.6 3.5.13	1.7.11	1.7.12 1.9.5 1.9.7 1.9.8	2.30.2.9 2.30.22.0 2.30.23.0 2.32.6.6	N/A
23.4	6.80	1.32.20.28	23.4	2.7.12	3.6.11	1.7.11	1.10.4	2.32.20.28	N/A
23.5.2	6.80	1.32.20.30	23.5.2	2.7.29	3.6.15	1.7.11	1.10.4	2.32.20.28	N/A
24.0	7.00	1.33.15.1	24.0	2.8.43	3.7.34	1.8.6	1.11.9	2.33.15.1	N/A
24.3	7.10	1.34.17.3	24.3	2.10.19.30	3.7.61.20	1.9.5	1.11.20	2.34.17.3	1.34.17.5
25.0	7.20	1.34.22.6	25.0	2.10.19.82	3.7.61.20	1.10.6	1.11.22	2.34.17.3	1.34.22.5
25.1	7.30	1.35.23.3	25.1	2.11.29	3.9.5	1.10.9.0	1.11.29	EOL	1.35.23.2
25.2	8.00	1.35.33.4	25.2	2.12.6	4.0.1	1.10.9.0	1.12.2	EOL	1.35.33.3
25.4	8.10	1.35.42.7	25.4	2.14.13	4.0.1	1.10.9.0	1.12.3	EOL	1.35.42.7
25.5	8.15	1.35.42.7	25.5	2.14.13	4.0.1	1.10.9.0	1.12.3	EOL	1.35.49.0
26.0	8.20	1.35.57.4	26.0	2.14.13	4.0.2	1.12.3.0	1.12.13	EOL	1.35.57.1
26.2	8.30	1.37.1.1	26.2	2.15.9	4.1.1	1.13.1.0	1.12.16	EOL	1.37.1.0
26.4	8.40	1.37.13.5	26.4	2.16.11	4.2.7	1.13.1.0	1.12.24	EOL	1.37.13.3

continued...

Software Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
26.6	8.50	1.37.28.0	26.6	2.17.4	4.2.7	For ESXi 6.5: 1.14.3.0 For ESXi 6.7: 1.14.3.0 For ESXi 7.0: 2.1.5.0 ⁷	1.12.29	EOL	1.37.28.0
27.1	8.60	1.38.3.7	27.1	2.18.9	4.4.2	For ESXi 6.5: 1.16.3.0 For ESXi 6.7: 1.16.3.0 For ESXi 7.0: 2.2.4.0 ⁷	1.12.32	EOL	1.38.3.6
27.3	8.70	1.38.13.1	27.3	2.19.3	4.4.2.1	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.16.4.0 For ESXi 7.0: 2.2.7.0	1.12.35	EOL	1.38.13.4
27.6	9.00	1.39.5.5	27.6	2.20.12	4.5.3	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.17.2.0 For ESXi 7.0: 2.3.4.0	1.12.35	EOL	1.39.5.5
27.7	9.10	1.39.20.2	27.7	2.21.12	4.6.1	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.18.1.0 For ESXi 7.0: 2.4.1.0	1.12.40	EOL	1.39.20.1
27.8	9.10	1.39.24.0	27.8	2.22.8	4.7.0	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.18.1.0 For ESXi 7.0: 2.4.2.0	1.12.40	EOL	1.39.24.0

continued...

Software Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
28.0	9.20	1.39.32.6. signed	28.0	2.22.18	4.8.2	For ESXi 7.0: 2.5.2.0	1.12.40	EOL	1.39.32.5. signed
28.2	9.30	1.39.56.9	28.2	2.23.17	4.9.1	2.5.2.0	1.13.4	EOL	1.39.56.9
28.3	9.40	1.40.5.5	28.3	2.24.6	4.9.5	2.7.2.0	1.13.5	EOL	1.40.5.5

- Notes:
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.
 4. Drivers posted in VMware Compatibility Guide (VCG) might differ in version from drivers listed in this document at publication. Refer to <https://www.vmware.com/resources/compatibility/search.php> for latest compatible versions.
 5. All NVMs in this release are 5.02 except 10GBASE-T NVM, which are 5.03.
 6. Earlier versions of the driver (i.e., 1.5.x and 1.6.x) should work, but have not been fully validated.
 7. i40en-2.1.5.0 and i40en-2.2.x have both Native and ENS driver capabilities.

Table 10. Software/NVM Compatibility for XXV710

SW Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
21.3 / 22.2	5.51	1.28.19.4	21.3 22.0 22.2	1.6.42 2.0.19 2.0.23	1.6.41 2.0.16 2.0.22	For ESX 6.0: 1.5.8 For ESX 6.5: 1.5.8 For ESX 6.7: 1.7.1	1.7.10 1.7.11	N/A	N/A
22.6 22.9 22.10 23.1 23.2	6.01 6.02	1.30.2.11 1.30.22.1 1.30.22.3	22.6 22.9 22.10 23.1 23.2	2.1.26 2.3.6 2.4.3 2.4.6 2.4.10	3.0.8 3.2.5 3.4.2 3.5.6 3.5.13	1.7.11	1.7.12 1.9.5 1.9.7 1.9.8	2.30.2.9 2.30.22.0 2.30.23.0 2.32.6.6	N/A
23.4	6.80	1.32.20.28	23.4	2.7.12	3.6.11	1.7.11	1.10.4	2.32.20.28	N/A
23.5.2	6.80	1.32.20.30	23.5.2	2.7.29	3.6.15	1.7.11	1.10.4	2.32.20.28	N/A
24.0	7.00	1.33.15.1	24.0	2.8.43	3.7.34	1.8.6	1.11.9	2.33.15.1	N/A
24.3	7.10	1.34.17.3	24.3	2.10.19.30	3.7.61.20	1.9.5	1.11.20	2.34.17.3	1.34.17.5
25.0	7.20	1.34.22.6	25.0	2.10.19.82	3.7.61.20	1.10.6	1.11.22	2.34.17.3	1.34.22.5
25.1	7.30	1.35.23.3	25.1	2.11.29	3.9.5	1.10.9.0	1.11.29	EOL	1.35.23.2
25.2	8.00	1.35.33.4	25.2	2.12.6	4.0.1	1.10.9.0	1.12.2	EOL	1.35.33.3
25.4	8.10	1.35.42.7	25.4	2.14.13	4.0.1	1.10.9.0	1.12.3	EOL	1.35.42.7
25.5	8.15	1.35.42.7	25.5	2.14.13	4.0.1	1.10.9.0	1.12.3	EOL	1.35.49.0
26.0	8.20	1.35.57.4	26.0	2.14.13	4.0.2	1.12.3.0	1.12.13	EOL	1.35.57.1
26.2	8.30	1.37.1.1	26.2	2.15.9	4.1.1	1.13.1.0	1.12.16	EOL	1.37.1.0
26.4	8.40	1.37.13.5	26.4	2.16.11	4.2.7	1.13.1.0	1.12.24	EOL	1.37.13.3
26.6	8.50	1.37.28.0	26.6	2.17.4	4.2.7	For ESXi 6.5: 1.14.3.0 For ESXi 6.7: 1.14.3.0 For ESXi 7.0: 2.1.4.0 ⁵	1.12.29	EOL	1.37.28.0

continued...



SW Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
27.1	8.60	1.38.3.7	27.1	2.18.9	4.4.2	For ESXi 6.5: 1.16.3.0 For ESXi 6.7: 1.16.3.0 For ESXi 7.0: 2.2.4.0 ⁵	1.12.32	EOL	1.38.3.6
27.3	8.70	1.38.13.1	27.3	2.19.3	4.4.2.1	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.16.4.0 For ESXi 7.0: 2.2.7.0	1.12.35	EOL	1.38.13.4
27.6	9.00	1.39.5.5	27.6	2.20.12	4.5.3	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.17.2.0 For ESXi 7.0: 2.3.4.0	1.12.35	EOL	1.39.5.5
continued...									

SW Release Version	NVM Version	NVM Update Tool Version	i40e (Windows)	i40e (Linux) ¹	i40evf/iavf ² (Linux) ^{1,3}	i40en (ESX) ⁴	ixl (FreeBSD)	QSFP Config. Utility (QCU)	Ethernet Port Config. Tool (EPCT)
27.7	9.10	1.39.20.2	27.7	2.21.12	4.6.1	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.18.1.0 For ESXi 7.0: 2.4.1.0	1.12.40	EOL	1.39.20.1
27.8	9.10	1.39.24.0	27.8	2.22.8	4.7.0	For ESXi 6.5: 1.16.4.0 For ESXi 6.7: 1.18.1.0 For ESXi 7.0: 2.4.2.0	1.12.40	EOL	1.39.24.0
28.0	9.20	1.39.32.6. signed	28.0	2.22.18	4.8.2	For ESXi 7.0: 2.5.2.0	1.12.40	EOL	1.39.32.5. signed
28.2	9.30	1.39.56.9	28.2	2.22.17	4.9.1	2.5.2.0	1.13.4	EOL	1.39.56.9
28.3	9.40	1.40.5.5	28.3	2.24.6	4.9.5	2.7.2.0	1.13.5	EOL	1.40.5.5

Notes: 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.
4. Drivers posted in VMware Compatibility Guide (VCG) might differ in version from drivers listed in this document at publication. Refer to <https://www.vmware.com/resources/compatibility/search.php> for latest compatible versions.
5. i40en-2.1.5.0 and i40en-2.2.x have both Native and ENS driver capabilities.

Additionally, the NVM update package that comes with the Intel® Ethernet Controllers Software Release allows updates from older NVM versions. The following tables indicate the version of NVM from which the tool allows updates.

Table 11. NVM Transition Support for X710/XL710

Current (Old) NVM	New NVM (with Associated Tools, and Base Driver Version) ^{1,2}																								
	4.24/4.25/4.26	4.42	4.53	5.02/5.03/5.04/5.05	6.01	6.80	7.00	7.10	7.20	7.30	8.00	8.10	8.15	8.20	8.30	8.40	8.50	8.60	8.70	9.00	9.10	9.20	9.30	9.40	
4.24/4.25/4.26	N/A ³	Yes ⁴	Yes ⁵	Yes ⁶	Yes ^{7,8}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}	Yes ^{8,9,10}
4.42	No	N/A ³	Yes ⁴	Yes ⁴	Yes ⁸	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}

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Current (Old) NVM	New NVM (with Associated Tools, and Base Driver Version) ^{1,2}																								
	4.24/ 4.25/ 4.26	4.42	4.53	5.02/ 5.03/ 5.04/ 5.05	6.01	6.80	7.00	7.10	7.20	7.30	8.00	8.10	8.15	8.20	8.30	8.40	8.50	8.60	8.70	9.00	9.10	9.20	9.30	9.40	
4.53	No	Yes ⁴	N/A ³	Yes ⁴	Yes ⁴	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}
5.02/ 5.03/ 5.04/ 5.05	No	Yes ⁴	Yes ⁴ es ₄	N/A ^{3,11}	Yes ⁴	Yes ⁹	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}
6.01	No	Yes ⁸	Yes ⁴	Yes ⁴ es ₄	N/A ³	Yes ⁴	Yes ⁹	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}	Yes ^{8,9}
6.80	No	No	No	No	No	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
7.00	No	No	No	No	No	Yes ⁴	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
7.10	No	No	No	No	No	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
7.20	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
7.30	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
8.00	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸	Yes ⁸
8.10	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.15	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.20	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.30	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.40	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.50	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.60	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.70	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes
9.00	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes
9.10	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes
9.20	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes

continued...

Current (Old) NVM	New NVM (with Associated Tools, and Base Driver Version) ^{1,2}																								
	4.24/ 4.25/ 4.26	4.42	4.53	5.02/ 5.03/ 5.04/ 5.05	6.01	6.80	7.00	7.10	7.20	7.30	8.00	8.10	8.15	8.20	8.30	8.40	8.50	8.60	8.70	9.00	9.10	9.20	9.30	9.40	
9.30	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	
9.40	No	No	No	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes

Notes: 1. NVM transition must be done with the Tools and Base Driver from the latest release. Refer to Table 9 for supported NVM, Tools, and Base Driver versions.
2. Each step of a NVM transition requires a reboot (PCIe reset) and in rare cases a power cycle.
3. Updating to same image again is allowed.
4. Rollback is allowed between supported versions and NVM configuration versions where the rollback version is the same.
5. Must transition to NVM 4.42, then NVM 4.53.
6. Must transition to NVM 4.42, then NVM 5.02/5.03/5.04/5.05.
7. Must transition to NVM 4.42, then NVM 6.01.
8. Should work, but has not been fully validated.
9. Rollback version is incremented when performing this update, therefore downgrade is not permitted to previous version.
10. Must transition to NVM 4.42, before upgrade to NVM 6.80 - 8.60.
11. Transitions from NVM 5.02, 5.03, and 5.04 to NVM 5.05 are permitted.

NOTE

The MinSRev on your device determines if you can downgrade to an older SRev. For details on how this works, see the [Minimum Security Revision Control for Intel® Ethernet Products Application Note](#) (Doc ID: 635205).

Table 12. NVM Transition Support for XXV710

Current (Old) NVM	New NVM (with Associated Tools, and Base Driver Version) ^{1,2}																				
	5.51	6.01/6.02	6.80	7.00	7.10	7.20	7.30	8.00	8.10	8.15	8.20	8.30	8.40	8.50	8.60	8.70	9.00	9.10	9.20	9.30	9.40
5.51	N/A ³	Yes ⁴	Yes ⁵	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,7}	Yes ^{5,6}	Yes ^{5,8}	Yes ^{5,6}	Yes ^{5,9}	Yes ^{5,6}	Yes ^{5,10}	Yes ^{5,6}	Yes ^{5,11}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}
6.01/6.02	Yes ⁴	N/A ^{3,12}	Yes ⁵	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}
6.80	No	No	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}	Yes ^{5,6}
7.00	No	No	Yes ⁴	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
7.10	No	No	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
7.20	No	No	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
7.30	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
8.00	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶	Yes ⁶
8.10	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.15	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.20	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.30	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.40	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.50	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8.60	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes	Yes
8.70	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes	Yes
9.00	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes	Yes
9.10	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes	Yes
9.20	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes	Yes
9.30	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³	Yes
9.40	No	No	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	Yes ⁴	N/A ³

Notes:

- NVM transition must be done with the Tools and Base Driver from the latest release. Refer to Table 10 for supported NVM, Tools, and Base Driver versions.
- Each step of a NVM transition requires a reboot (PCIe reset) and in rare cases a power cycle.
- Updating to same image again is allowed.
- Rollback is allowed between supported versions and NVM configuration versions where the rollback version is the same.
- Rollback version is incremented when performing this update, therefore downgrade is not permitted to previous version.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Should work, but has not been fully validated.
- Transitions from NVM 6.01 to NVM 6.02 are permitted.

NOTE

The MinSRev on your device determines if you can downgrade to an older SRev. For details on how this works see the [Minimum Security Revision Control for Intel® Ethernet Products Application Note](#) (Doc ID: 635205).
