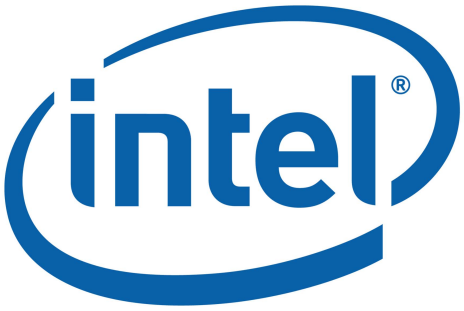


# Intel® Ethernet Controller X710/ XXV710/XL710

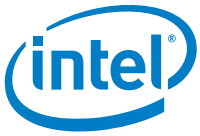
## Feature Support Matrix

**Ethernet Networking Division (ND)**

Revision 3.6
February 2020
332191-026

# Revision History

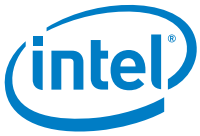
| Revision | Date | Comments |
|---|---|---|
| 3.6 | February 20, 2020 | Updates include the following:<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710". |
| 3.5 | January 31, 2020 | Updates include the following:<br>• General updates in support of Software Release 25.0 and NVM 7.20.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>• Updated Table 3, "Interface and CFG_ID Supported for XXV710".<br>• Updated Table 4, "Supported Media for XXV710".<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Updated Table 12, "NVM Transition Support for XXV710". |
| 3.4 | November 12, 2019 | Updates include the following:<br>• General updates in support of Software Release 24.3 and NVM 7.10.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>• Updated Table 3, "Interface and CFG_ID Supported for XXV710".<br>• Updated Table 4, "Supported Media for XXV710".<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710". |
| 3.3 | June 6, 2019 | Updates include the following:<br>• General updates in support of Software Release 24.0 and NVM 7.00.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>• Updated Table 3, "Interface and CFG_ID Supported for XXV710".<br>• Updated Table 4, "Supported Media for XXV710".<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Updated Table 12, "NVM Transition Support for XXV710". |
| 3.2 | February 26, 2019 | Updates include the following:<br>• General updates in support of Software Release 23.5.2 and NVM 6.80.<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710". |



| Revision | Date | Comments |
|---|---|---|
| 3.1 | November 19, 2018 | Updates include the following:<br>• General updates in support of Software Release 23.4 and NVM 6.80.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>• Updated Table 3, "Interface and CFG_ID Supported for XXV710".<br>• Updated Table 4, "Supported Media for XXV710".<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Updated Table 12, "NVM Transition Support for XXV710". |
| 3.0 | June 8, 2018 | Updates include the following:<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710". |
| 2.9 | June 1, 2018 | Updates include the following:<br>• General updates in support of Software Releases 23.1 and 23.2 and NVM 6.02.<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710". |
| 2.8 | January 19, 2018 | Updates include the following:<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710". |
| 2.7 | January 16, 2018 | Updates include the following:<br>• Updated document title.<br>• General updates in support of Software Releases 22.9 and 22.10 and NVM 6.02.<br>• Updated list of software releases and associated NVMs in "Features Supported" section.<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Updated Table 12, "NVM Transition Support for XXV710". |
| 2.6 | November 21, 2017 | Updates include the following:<br>• Updated footnote #5 in Table 9, "Software/NVM Compatibility for X710/XL710". |
| 2.5 | October 11, 2017 | Updates include the following:<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710". |
| 2.4 | August 31, 2017 | Updates include the following:<br>• Updated Table 2, "Supported Media Types for X710/XL710" to show support for "SFP SX/LX optical modules (single speed)" in Software Release 22.6.<br>• Updated Table 4, "Supported Media for XXV710" to show support for "SFP28 25G AOCs (Active Optical Cables)" and "SFP+ AOCs (Active Optical Cables)" in Software Release 22.6. |



| Revision | Date | Comments |
|---|---|---|
| 2.3 | August 25, 2017 | Updates include the following:<br>• General updates in support of Software Release 22.6 with NVM 6.01.<br>• Updated list of software releases and associated NVMs in "Features Supported" section.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>• Added Table 3, "Interface and CFG_ID Supported for XXV710".<br>• Updated Table 4, "Supported Media for XXV710".<br>• Modified XXV710 Link Establishment State Machine (LESM) section.<br>• Removed "Priority Order" table.<br>• Removed "Details on the Link Modes Attempted by XXV710 LESM" section.<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Updated Table 12, "NVM Transition Support for XXV710". |
| 2.2 | April 21, 2017 | Updates include the following:<br>• Updated Table 2, "Supported Media Types for X710/XL710":<br>— Added footnote to "QSFP AOCs" in the "40 GbE Media Supported" section.<br>• Updated "Features Supported" section:<br>— Added discussion of XXV710 link establishment.<br>— Added Table 5, "Link Modes Attempted".<br>— Added "Priority Order" table.<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710":<br>— Added Ubuntu operating systems.<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 10, "Software/NVM Compatibility for XXV710". |
| 2.1 | February 10, 2017 | Updates include the following:<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710". |
| 2.0 | January 31, 2017 | Updates include the following:<br>• General updates in support of Software Release 21.3 NVM 5.05.<br>• Updated Table 2, "Supported Media Types for X710/XL710":<br>— Added 'SFP+ SR/LR multi-speed (1/10 GbE) optical modules' in the "1 GbE Media Supported" section.<br>• Added Table 4, "Supported Media for XXV710":<br>— Added "SFP+ SR/LR multi-speed (1/10 GbE) optical modules" in the "1 GbE Media Supported" section.<br>— Added "SFP+ loopback modules" in the "10 GbE Media Supported" section.<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710":<br>— Added support for VMware vSphere 2016 (ESXi 6.5) OS.<br>— Other OS version updates.<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710":<br>— Added ESX.6.5 (vSphere 2016) Host OS.<br>— Added Windows Server 2016 Host OS.<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Added Table 10, "Software/NVM Compatibility for XXV710"<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Added Table 12, "NVM Transition Support for XXV710" |
| 1.9 | November 18, 2016 | Updates include the following:<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710""<br>— Added support for Windows Server 2016 OS.<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710". |



| Revision | Date | Comments |
|---|---|---|
| 1.8 | June 9, 2016 | Updates include the following:<br>• General updates in support of Software Release 20.7.1 with NVM 5.04.<br>• Updated 4x10 Backplane Link Modes in Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>• Updated Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710". |
| 1.7 | April 6, 2016 | Updates include the following:<br>• General updates in support of Software Release 20.7.1.<br>• Updated Table 1, "Interface and CFG_ID Supported for X710/XL710".<br>— Added 10GBASE-T under supported 4x10 link modes.<br>• Updated Table 2, "Supported Media Types for X710/XL710".<br>— Added "QSFP+ Electrical loopback modules" in "40 GbE Media Supported" section.<br>— Added "10GBASE-T with Intel® Ethernet Connection X557 only" in "10 GbE media supported" section.<br>— Added footnote to "SFP 1GBASE-T Transceiver."<br>— Added "SFP+ loopback modules" in "10 GbE media supported." section<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710". |
| 1.6 | February 9, 2016 | Updates include the following:<br>• General updates in support of Software Release 20.7.<br>• Updated Table 2, "Supported Media Types for X710/XL710":<br>— QSFP+ LR-4 Optics<br>— QSFP+ SR4 breakout cables (4x10 GbE)<br>• Updated Table 6, "General Features for X710/XXV710/XL710".<br>— MSFT DCB (QoS support) 40 GbE<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Update5 Table 11, "NVM Transition Support for X710/XL710". |
| 1.5 | December 18, 2015 | Updates include the following:<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710" — Added column for FreeBSD. |
| 1.4 | December 1, 2015 | Updates include the following:<br>• Updated Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710"for Software Release 20.4.1.<br>• Updated Table 11, "NVM Transition Support for X710/XL710"for Software Release 20.4.1. |
| 1.3 | August 26, 2015 | Updates include the following:<br>• Updated Table 1 through Table 6 to add Software Release 20.3 features.<br>• Updated driver and tool version strings in Table 9.<br>• Updated Table 11 to provide NVM transition support data for Software Release 20.3. |
| 1.2 | June 15, 2015 | Updates include the following:<br>• Updated Table 6, "General Features for X710/XXV710/XL710":<br>— Update to RSS Receive Queues for Windows vs. Linux.<br>— Update related to VXLAN (Linux* only) cloud offloads.<br>• Updated Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Updated Table 11, "NVM Transition Support for X710/XL710".<br>• Other minor edits. |



| Revision | Date | Comments |
|---|---|---|
| 1.1 | April 15, 2015 | Updates include the following:<br>• Changes based on Software Release 20.0.<br>• Added Table 7, "Operating System Support for Physical Function Driver for X710/XXV710/XL710".<br>• Added Table 8, "Virtualized Operating System for X710/XXV710/XL710".<br>• Added Table 9, "Software/NVM Compatibility for X710/XL710".<br>• Added Table 11, "NVM Transition Support for X710/XL710".<br>• General document reformatting. |
| 1.0 | September, 24 2014 | Initial public release. |

# Features Supported

Table 1 through Table 6 list the feature support provided by the NVM and software drivers at 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 at 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 |
|---|---|---|
| 19.3 / 19.4 | 4.24 / 4.25 / 4.26 | --- |
| 20.0 | 4.42 | --- |
| 20.3 / 20.4.1 | 4.53 | --- |
| 20.7 | 5.02 | --- |
| 20.7.1 | 5.02 / 5.03 | --- |
| 20.7.1 | 5.04 | --- |
| 21.3 / 22.2 | 5.05 | 5.51 |
| 22.6 / 22.9 / 22.10 / 23.1 / 23.2 | 6.01 | 6.01 / 6.02 |
| 23.4 / 23.5.2 | 6.80 | 6.80 |
| 24.0 | 7.00 | 7.00 |
| 24.3 | 7.10 | 7.10 |
| 25.0 | 7.20 | 7.20 |

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

# X710/XL710 Devices

## Table 1. Interface and CFG_ID Supported for X710/XL710

| Feature | Supported in Release | | | | |
|---|---|---|---|---|---|
| | 19.3/ 19.4 | 20.0 | 20.3/ 20.4.1 | 20.7 through 24.3 | 25.0 |
| **Link Modes 2x40 GbE:** | | | | | |
| Backplane (CFG_IDs supported): | | | | | |
| KR4/KR/KX (2.4) | X | X | X | X | X |
| XLAUI (2.61) | --- | X | X | X | X |
| QSFP+ (CFG_IDs supported): | | | | | |
| XLPPI/CR4 (4.5) | X | X | X | X | X |
| **Link Modes 1x40 GbE:** | | | | | |
| Backplane (CFG_IDs supported): | | | | | |
| KR4/KR4/KX (2.0) | X | X | X | X | X |
| XLAUI (TBD) | --- | --- | --- | --- | --- |
| QSFP+ (CFG_IDs supported): | | | | | |
| XLPPI/CR4 (4.0) | X | X | X | X | X |
| **Link Modes 4x10 GbE:** | | | | | |
| Backplane (CFG_IDs supported): | | | | | |
| KR (3.0/3.2) | --- | --- | X | X | X |
| KR (3.8) | X | X | X | X | X |
| SFI (7.0) | --- | --- | --- | X | X |
| SFI (7.2) | --- | X | X | X | X |
| QSFP+ (CFG_IDs supported): | | | | | |
| SFI (6.0) | X | X | X | X | X |
| SFI[1] (6.4) | --- | X | X | X | X |
| SFP+ (CFG_IDs supported): | | | | | |
| SFI (7.2) | X | X | X | X | X |
| 10GBASE-T (CFG_IDs supported):[2] | | | | | |
| SFI (10.21) | --- | --- | X | X | X |
| **Link Modes 2x10 GbE:** | | | | | |
| Backplane (CFG_IDs supported): | | | | | |
| KR (0.5, 2.4) | X | X | X | X | X |
| KX4 (1.0) | X | X | X | X | X |
| XAUI[3] | --- | --- | --- | --- | --- |
| SFI (7.2) | --- | X | X | X | X |
| SFP+ (CFG_IDs supported): | | | | | |
| SFI (7.2) | X | X | X | X | X |

## Table 1. Interface and CFG_ID Supported for X710/XL710 [continued]

| Feature | Supported in Release | | | | |
|---|---|---|---|---|---|
| | 19.3/ 19.4 | 20.0 | 20.3/ 20.4.1 | 20.7 through 24.3 | 25.0 |
| **Link Modes 1 GbE:** | | | | | |
| SGMII | --- | --- | --- | --- | --- |
| KX[4] | --- | --- | --- | --- | --- |
| **Link Modes 100 Mb/s:** | | | | | |
| SGMII | --- | --- | --- | --- | --- |

1. Supports two 10 Gb 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/ 19.4 | 20.0 | 20.3/ 20.4.1 | 20.7 through 22.2 | 22.6 through 24.3 | 25.0 |
| **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 Gb)[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 |
| 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 |

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 XLPPI 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 XLPPI 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 E40QSFPSR 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.

# XXV710 Devices

## Table 3. Interface and CFG_ID Supported for XXV710

| Feature | Supported in Release | |
|---|---|---|
| | 22.6 through 24.3 | 25.0 |
| **Link Modes 2x25 GbE:** | | |
| Backplane (CFG_IDs supported): | | |
| 25GBASE-KR (12.0) | X | X |
| 25GBASE-AUI C2C (12.0) | X | X |
| SFP28 (CFG_IDs supported): | | |
| 25GBASE-CR (12.0) | X | X |
| 25GBASE-SR/LR (12.0) | X | X |
| 25GBASE-AUI C2M (12.0) | X | X |
| 10 Gb SFI (12.0) | X | X |
| **Link Modes 1x25 GbE:** | | |
| Backplane (CFG_IDs supported): | | |
| 25GBASE-KR (13.0) | X | X |
| 25GBASE-AUI C2C (13.0) | X | X |
| SFP28 (CFG_IDs supported): | | |
| 25GBASE-CR (13.0) | X | X |
| 25GBASE-SR/LR (13.0) | X | X |
| 25GBASE-AUI C2M (13.0) | X | X |
| 10 Gb SFI (13.0) | X | X |

## Table 4. Supported Media for XXV710

| Supported Media Types[1] | Supported in Release | | | FEC Supported[2] |
|---|---|---|---|---|
| | 21.3/ 22.2 | 22.6 through 24.3 | 25.0 | |
| **25 GbE Media Supported:** | | | | |
| SFP28 DA twinaxial 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 |

## Table 4. Supported Media for XXV710 [continued]

| Supported Media Types[1] | Supported in Release | | | FEC Supported[2] |
|---|---|---|---|---|
| | 21.3/ 22.2 | 22.6 through 24.3 | 25.0 | |
| SFP28 25 GbE AOCs (Active Optical Cables) | --- | X | X | No FEC, CL108[3] RS-FEC |
| **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 (1G/10G) optical modules | X | X | X | N/A |

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.

# XXV710 Link Establishment State Machine (LESM)

The XXV710 LESM enables increased interoperability with IEEE and 25G 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.

Table 5 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. 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 highlight 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

| Media Type | Link Modes | | | | |
|---|---|---|---|---|---|
| | 25G-AN | 25G-AUI-No-FEC | 25G-AUI CL74 FC-FEC | 25G-AUI CL108 RS-FEC | 10G-SFI |
| SFP+ (10 Gb) 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 | — |

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.

# All Devices (X710, XXV710, and XXV710)

## Table 6. General Features for X710/XXV710/XL710

| Feature[1] | Supported in Release | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 19.3/ 19.4 | 20.0 | 20.3/ 20.4.1 | 20.7 through 22.2 | 22.6 through 23.2 | 23.4/ 23.5.2 | 24.0/ 24.3 | 25.0 |
| **Link Flow Control** | X | X | X | X | X | X | X | X |
| **Priority Flow Control** | 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 |
| **Checksum Offload** (IPv4/IPv6,SCTP,TCP,UDP,Tx/Rx) | X | X | X | X | X | X | X | X |
| **Large Send Offload (TSO)** (Up to 64 KB) | X | X | X | X | X | X | X | X |
| **Header Split** | --- | --- | --- | --- | --- | --- | --- | --- |
| **VLANs** | X | X | X | X | X | X | X | X |
| **Teaming** | X | X | X | X | X | X | X | X |
| **Interrupt Moderation Rate** | X | X | X | X | X | X | X | X |
| **Message Signaled Interrupts (MSI)** | X | X | X | X | X | X | X | X |
| **Message Signaled Interrupts (MSI-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 |
| **Receive Side Scaling (RSS)** | 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 |
| **OS2BMC** | X | X | X | X | X | X | X | X |
| **Wake from S1–S4** | --- | --- | --- | --- | --- | --- | --- | --- |
| **Wake from S5** | X | X | X | X | X | X | X | X |
| **DCB CEE** | --- | X | X | X | X | X | X | X |
| **Fiber Channel over Ethernet (FCoE)** | --- | --- | --- | --- | --- | --- | --- | --- |
| **FCoE Boot** | --- | --- | --- | --- | --- | --- | --- | --- |
| **Receive Side Coalescing (RSC)** (Done by software) | X | 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 | 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 |
| **Remote Boot[4]: PXE** | X | X | X | X | X | X | X | X |
| **Remote Boot[4]: iSCSI** | X | X | X | X | X | X | X | X |
| **Secure NVM** | X | X | X | X | X | X | X | X |
| **TPH** | --- | --- | --- | --- | --- | --- | --- | --- |

## Table 6. General Features for X710/XXV710/XL710 [continued]

| Feature[1] | Supported in Release | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 19.3/ 19.4 | 20.0 | 20.3/ 20.4.1 | 20.7 through 22.2 | 22.6 through 23.2 | 23.4/ 23.5.2 | 24.0/ 24.3 | 25.0 |
| **LPLU** | --- | --- | X[5] | X[5] | X[5] | X[5] | X[5] | X[5] |
| **EEE** | --- | --- | --- | --- | --- | --- | --- | --- |
| **Malicious Driver** | X | X | X | X | X | X | X | X |
| **Recovery Mode[6]** | --- | --- | --- | --- | --- | X | X | X |
| **IEEE Data Center Bridging (DCB):** | | | | | | | | |
| MSFT DCB (QoS support) 10 GbE | --- | --- | X | X | X | X | X | X |
| MSFT DCB (QoS support) 40 GbE | --- | --- | --- | 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 | --- | --- | --- | --- | --- | --- | --- | --- |
| **Virtualization (SR-IOV):** | | | | | | | | |
| VMDq (for ESXi and Hyper-V only) | 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 |
| RSS in VF | X | X | X | X | X | X | X | X |
| 4 queues per VM[2] | 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 |
| **Cloud Offloads:** | | | | | | | | |
| VXLAN (Linux i40e only[8]) | X | X | X | X | X | X | X | X |
| VXLAN (Windows Server 2016) | --- | --- | --- | --- | X | X | X | X |
| VXLAN (Windows Server 2019) | --- | --- | --- | --- | --- | --- | X | X |
| VXLAN (VMware driver) | --- | --- | X | X | X | X | X | X |
| NVGRE (Windows only) | X | X | X | X | X | X | X | X |
| GENEVE | --- | --- | --- | --- | X | X | X | X |
| **Manageability Support:** | | | | | | | | |
| NC-SI | X | X | X | X | X | X | X | X |
| OS2BMC | X | X | X | X | X | X | X | X |
| SMBus | X | X | X | X | X | X | X | X |

1. For features supported with DPDK drivers please refer to dpdk.org.
2. 16 queues per VF is supported using Linux Kernel PF and poll mode VF only.
3. The device only processes PTP packets using the Layer 2 packet format.
4. Pre-Boot Option ROM should be stored in the Flash attached to the XL710.
5. For 10GBASE-T applications only.
6. 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.
7. The Linux i40evf driver is renamed to "iavf" starting in Software Release 24.0.
8. 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.

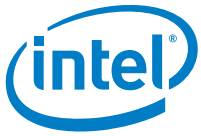
# Operating Systems Supported

Table 7 and Table 8 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 2012 | No | 64 bit only. No SR-IOV support. |
| Windows Server 2012 R2 | No | 64 bit only. |
| Windows Server 2016 | Yes[1] | 64 bit only. |
| Windows Server 2019 | Yes[1] | 64 bit only. |
| Linux: RHEL 6.10/7.5 | Yes[1] | 64 bit only. |
| Linux: SLES 11 SP4 | No | 64 bit only. |
| Linux: SLES 12 SP3 | Yes[1] | 64 bit only. |
| Linux: SLES 15/15 SP1 | Yes[1] | 64 bit only. |
| Linux Stable Kernel version 2.6/4.x | N/A | 64 bit only. |
| Linux: Ubuntu 16.04.3 LTS[2] | N/A | 64 bit only. |
| Linux: Ubuntu 18.04. LTS[2] | N/A | 64 bit only. |
| Linux: CentOS 6.9/7.5 | Yes[1] | 64 bit only. |
| VMware vSphere 2015 (ESXi 6.0) | No | Driver available at VMware website. |
| VMware vSphere 2016 (ESXi 6.5) | No | Driver available at VMware website. |
| VMware vSphere 6.7 (ESXi 6.7) | Yes | Driver available at VMware website. |
| Solaris | | Contact Oracle for release details |
| FreeBSD 11.3/12.0 | | 64 bit only. |
| UEFI 2.1/2.3/2.4 | N/A | |
| Option ROM support: Legacy PXE, Legacy iSCSI, x64 UEFI driver | N/A | |

1. In-box does not apply to XXV710.
2. Out-of-tree driver only.



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

| Virtualized OS | Host OS | PF Driver | Guest OS | Guest OS VF Driver |
|---|---|---|---|---|
| VMware vSphere | ESXi 6.0 (vSphere 2015)<br>ESXi 6.5 (vSphere 2016)<br>ESXi 6.7 (vSphere 6.7) | ESX i40en | RHEL 6.10<br>RHEL 7.5<br>SLES 11 SP4<br>SLES 12 SP3<br>SLES 15<br>SLES 15 SP1<br>Ubuntu 16.04.3 LTS<br>Ubuntu 18.04 LTS | i40evf/iavf[1] |
| | | | Windows Server 2012 R2<br>Windows Server 2016<br>Windows Server 2019 | V40E/iavf[2] |
| Linux | RHEL 6.10/KVM<br>RHEL 7.5/KVM<br>SLES 11 SP4/KVM<br>SLES 12 SP3/KVM<br>SLES 15/KVM<br>SLES 15 SP1/KVM<br>Ubuntu 16.04.3 LTS/KVM<br>Ubuntu 18.04 LTS/KVM | Linux i40e | RHEL 6.10<br>RHEL 7.5<br>SLES 11 SP4<br>SLES 12 SP3<br>SLES 15<br>SLES 15 SP1<br>Ubuntu 16.04.3 LTS<br>Ubuntu 18.04 LTS | i40evf/iavf[1] |
| | | | Windows Server 2012 R2<br>Windows Server 2016 | V40E/iavf[2] |
| | | | FreeBSD 11.3/12.0 | iXLv/iavf[3] |
| Windows Hyper-V | Windows Server 2012 R2 | I40EA | Windows Server 2012 R2<br>Windows Server 2016<br>Windows Server 2019 | V40E/iavf[2] |
| | Windows Server 2016 | I40EA | RHEL 6.10<br>RHEL 7.5<br>SLES 11 SP4<br>SLES 12 SP3<br>SLES 15<br>SLES 15 SP1<br>Ubuntu 16.04.3 LTS<br>Ubuntu 18.04 LTS | i40evf/iavf[1] |
| | | | Windows Server 2012 R2<br>Windows Server 2016<br>Windows Server 2019 | V40E/iavf[2] |
| | Windows Server 2016 | I40EA | RHEL 6.10<br>RHEL 7.5<br>SLES 11 SP4<br>SLES 12 SP3<br>SLES 15<br>SLES 15 SP1<br>Ubuntu 16.04.3 LTS<br>Ubuntu 18.04 LTS | i40evf/iavf[1] |
| | | | Windows Server 2012 R2<br>Windows Server 2016<br>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 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.

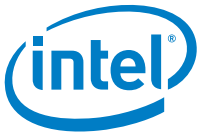
Table 9 and Table 10 indicate the sets of NVM images and Intel Ethernet Controllers Software releases that go together. Intel recommends that you update the NVM and Software Driver to compatible versions.

**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) | ixl (FreeBSD) | QSFP Config. Utility (QCU) | Ethernet Port Config. Tool (EPCT) |
|---|---|---|---|---|---|---|---|---|---|
| 19.3 | 4.24<br>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<br>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<br>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<br>1.3.47 | N/A | 1.3.45 | 1.4.8 | 2.25.18.3 | N/A |
| 20.7 | 5.02 | 1.26.17.9 | 20.7 | 1.4.25<br>1.5.16 | 1.4.15<br>1.5.14 | For ESX 6.0: 1.5.8<br>For ESX 6.5: 1.5.8<br>For ESX 6.7: 1.7.1 | 1.4.26<br>1.4.27 | 2.26.17.6<br>2.27.10.1 | N/A |
| 20.7.1 | 5.02<br>5.03[4] | 1.26.17.11 | 20.7.1 | | | | | | |
| | 5.04 | | | | | | | | |
| 21.1<br>21.3<br>22.2 | 5.05 | 1.26.17.11<br>1.28.19.4 | 21.1<br>21.3<br>22.0<br>22.2 | 1.5.25[5]<br>1.6.42[5]<br>2.0.19<br>2.0.23 | 1.5.14<br>1.6.41<br>2.0.16<br>2.0.22 | 1.7.11 | 1.6.8<br>1.7.10<br>1.7.11 | 2.28.1.6<br>2.28.19.5<br>2.28.22.4 | N/A |
| 22.6<br>22.9<br>22.10<br>23.1<br>23.2 | 6.01 | 1.30.2.11<br>1.30.22.1<br>1.30.22.3 | 22.6<br>22.9<br>22.10<br>23.1<br>23.2 | 2.1.26<br>2.3.6<br>2.4.3<br>2.4.6<br>2.4.10 | 3.0.8<br>3.2.5<br>3.4.2<br>3.5.6<br>3.5.13 | 1.7.11 | 1.7.12<br>1.9.5<br>1.9.7<br>1.9.8 | 2.30.2.9<br>2.30.22.0<br>2.30.23.0<br>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 | 2.7.79 | 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 |

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. All NVMs in this release are 5.02 except 10GBASE-T NVM, which are 5.03.
5. Earlier versions of the driver (i.e., 1.5.x and 1.6.x) should work, but have not been fully validated.



## 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) | ixl (FreeBSD) | QSFP Config. Utility (QCU) | Ethernet Port Config. Tool (EPCT) |
|---|---|---|---|---|---|---|---|---|---|
| 21.3 / 22.2 | 5.51 | 1.28.19.4 | 21.3<br>22.0<br>22.2 | 1.6.42<br>2.0.19<br>2.0.23 | 1.6.41<br>2.0.16<br>2.0.22 | For ESX 6.0: 1.5.8<br>For ESX 6.5: 1.5.8<br>For ESX 6.7: 1.7.1 | 1.7.10<br>1.7.11 | N/A | N/A |
| 22.6<br>22.9<br>22.10<br>23.1<br>23.2 | 6.01<br>6.02 | 1.30.2.11<br>1.30.22.1<br>1.30.22.3 | 22.6<br>22.9<br>22.10<br>23.1<br>23.2 | 2.1.26<br>2.3.6<br>2.4.3<br>2.4.6<br>2.4.10 | 3.0.8<br>3.2.5<br>3.4.2<br>3.5.6<br>3.5.13 | 1.7.11 | 1.7.12<br>1.9.5<br>1.9.7<br>1.9.8 | 2.30.2.9<br>2.30.22.0<br>2.30.23.0<br>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 | 2.7.79 | 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 |

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.

Additionally, the NVM update package that comes with the Intel Ethernet Controllers Software Release allows updates from older NVM versions. Table 11 and Table 12 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 |
| 4.24/4.25/ 4.26 | N/A[3] | Yes[4] | Yes[5] | Yes[6] | Yes[7,8] | Yes[8,9,10] | Yes[8,9,11] | Yes[8,9,12] | Yes[8,9,13] |
| 4.42 | No | N/A[3] | Yes[4] | Yes[4] | Yes[8] | Yes[8,9] | Yes[8,9] | Yes[8,9] | Yes[8,9] |
| 4.53 | No | Yes[4] | N/A[3] | Yes[4] | Yes[4] | 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] | N/A[3,14] | Yes[4] | Yes[9] | Yes[8,9] | Yes[8,9] | Yes[8,9] |
| 6.01 | No | Yes[8] | Yes[4] | Yes[4] | N/A[3] | Yes[9] | Yes[9] | Yes[8,9] | Yes[8,9] |
| 6.80 | No | No | No | No | No | N/A[3] | Yes[9] | Yes[9] | Yes[8,9] |
| 7.00 | No | No | No | No | No | Yes[4] | N/A[3] | Yes[9] | Yes[9] |
| 7.10 | No | No | No | No | No | No | Yes[4] | N/A[3] | Yes[9] |
| 7.20 | No | No | No | No | No | No | No | Yes[4] | N/A[3] |

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, then NVM 6.80.
11. Must transition to NVM 4.42, then NVM 7.00.
12. Must transition to NVM 4.42, then NVM 7.10.
13. Must transition to NVM 4.42, then NVM 7.20.
14. Transitions from NVM 5.02, 5.03, and 5.04 to NVM 5.05 are permitted.

## 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 |
| 5.51 | N/A[3] | Yes[4] | Yes[5] | Yes[5,6] | Yes[5,6] | Yes[5,6] |
| 6.01/6.02 | Yes[4] | N/A[3,7] | Yes[5] | Yes[5,6] | Yes[5,6] | Yes[5,6] |
| 6.80 | No | No | N/A[3] | Yes[5] | Yes[5,6] | Yes[5,6] |
| 7.00 | No | No | Yes[4] | N/A[3] | Yes[5] | Yes[5,6] |
| 7.10 | No | No | No | Yes[4] | N/A[3] | Yes[5] |
| 7.20 | No | No | No | No | Yes[4] | N/A[3] |

1. 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.
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. Rollback version is incremented when performing this update, therefore downgrade is not permitted to previous version.
6. Should work, but has not been fully validated.
7. Transitions from NVM 6.01 to NVM 6.02 are permitted.

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