

Harmonic NMX Release Notes

Release: 9.3.0

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1. What's New in this NMX System Release

These release notes contain only information specific to new features and open/resolved issues for this NMX system release.

NMX Release	Electra X/X2/XVM Release	XOS Appliance Release	ProStream X Release
9.3.0.0.024	1.20.0.0.063	1.18.0.0.30 (ISO,BIN) 1.18.0.0.0.4 (RPM) 1.18.0.0.69 (vos_bundle)	3.4.1.0.051

1.1. What are the New Features for the NMX 9.3 system release

All the new features documented in these sections of this document are included in NMX 9.3:

- [NMX New Features](#)
- [Electra X/X2/XVM New Features](#)
- [ProStream X New Features](#)
- [XOS Appliance New Features](#)

WARNING

The support of ProStream 9000 has been removed from the NMX 9.3 release, including documentation in these release notes, as the product is now end-of-life.

WARNING

The new Electra X G3 chassis with Cascade Lake CPUs supports up to 3 SDI cards, or up to 24 SDI inputs. Customers who intend to deploy dense SDI encoding configurations must determine the maximum number of services that can be supported for their configuration through the Sales Benchmarking System. This is to prevent the configuration from overloading the CPU.

Currently, the server could overload in demanding configurations with no explicit alarm. Some symptoms of overload include corrupted transport output and unresponsive server.

1.2. What issues have been resolved for the NMX 9.3 system release

All the issues documented in these sections of this document have been resolved for NMX 9.3:

- [NMX Resolved Issues](#)
- [Electra X/X2/X2S Resolved Issues](#)
- [ProStream X Resolved Issues](#)
- [XOS Appliance Resolved Issues](#)
- [Resolved Security Issues](#)
 - [Security Changes to the NMX Recovery Image](#)

1.3. What issues are known for the NMX 9.3 system release

All the issues documented in these sections of this document have been resolved for NMX 9.3:

- [NMX Known Issues](#)
- [Electra X/X2/X2S Known Issues](#)
- [ProStream X Known Issues](#)
- [XOS Appliance Known Issues](#)

1.4. What are the NMX upgrade do's and don'ts?

- [NMX Upgrade Tips, Cautions, and Warnings 93xx](#)

2. NMX Upgrade Tips, Cautions, and Warnings 93xx

This section provides NMX upgrade tips and presents any cautions and warnings associated with the upgrade.

2.1. Service Pack for ProLiant (SPP) Upgrade on HPE servers

With each release, Harmonic tests our software with the most-recent release of HPE server firmware. HPE recommends that you keep your server firmware up to date.

- ❗ SPP version 2021.10.0 is not recommended on servers performing real-time processing (ProStream X, Electra X2, Electra X2S and XOS products).

2.2. Security Policy Reinforcement

Harmonic is continuously reinforcing the security policy of the products in order to comply to the highest security standards like CIS.

- ❗ On NMX, the Windows security settings is often reinforced in a new version of the recovery image. This can sometimes impact the accessibility to/from NMX server (e.g. for RDP sessions). In case of issues, please refer to chapters [NMX Recovery Image Versions and Compatibility 93xx](#) and [Security Changes to the NMX Recovery Image 93xx](#) for details on the security changes and recommendations.

2.3. Upgrades

2.3.1. NMX 9.3

There are no tips, cautions, or warnings specific to this release.

2.3.2. NMX 9.2

- ❗ The upgrade of NMX server to 9.2 release can cause the restart of XOS services that contains AC-4 audio streams.

3. NMX Release Details

3.1. NMX Introduction

NMX is a suite of software applications that provide configuration, control, monitoring, and fault management in Harmonic open digital compression systems. NMX supports geographically diverse broadcast sites through client/server architecture and is highly scalable, able to support small networks with only a few devices, as well as larger networks with a greater number of managed devices.

A complete description of the NMX architectural components and functionality can be found in the various documents provided with your purchase of NMX. These documents are installed to C:\Program Files\Harmonic\Documents during NMX installation.

End of Service and Support

The following product has reached the End of Service (EOS) date and is no longer supported with the upgrade to NMX 9.0.0 and later releases:

- **Electra 9200**
- **ProStream 9000**

The following products have reached the End of Service (EOS) date and are no longer supported with the upgrade to NMX 8.5.0 and later releases:

- **Electra 8100/8200/8300**
- **ProMedia X Origin**
- **Iris**

Remove or replace these devices from the original catalogs and maps **before** upgrading to the current NMX release.

NOTES:

- The Iris feature needs to be disabled prior to the upgrade to avoid any potential service disruption.
- GRID is not packaged with NMX. To obtain the latest version, please contact Harmonic Customer Support.
- **Warning on upgrading NMX to 8.5 or later for XOS products:** The output services may be interrupted for 20 seconds each time the new version of NMX server is started until the XOS is upgraded to the version included with the NMX upgrade.

3.2. NMX Package Contents

This NMX release contains the following software items:

- NMX application
- Adobe Reader (a third-party application)

Note:

Beginning with NMX 8.2.0, software for other devices has been removed from the NMX package. Contact Harmonic Support for information about downloading other device software.

Note:

Third-party software included in the NMX server package provided by Harmonic, or as part of the recovery image and described in this section, may include technical problems, and/or be out-of-date. Harmonic makes no commitment to provide up-to-date software, support, or to assume responsibility for issues with third-party software or documentation. Installing and/or running any other third-party software not listed above may impact NMX functionality or disrupt service and should be avoided.

3.3. Information About Non-Embedded Software

Important!

Contact your Harmonic representative if you are interested in Harmonic's non-embedded device software (e.g., Electra X, Electra X2S, ProStream XVM. etc.). Non-embedded software must be downloaded and installed separately from NMX.

Important! If you have an existing Electra X2S installation and want to upgrade to this NMX version, please contact Harmonic Technical Support.

3.4. NMX Documentation

NMX documentation is installed to your NMX Server PC with your NMX release.

Document	Where to find it
Release notes for the current NMX release	C:\Program Files\Harmonic\Release_Notes
Release notes for past NMX releases	C:\Program Files\Harmonic\Documents\Archive_Release_Notes
NMX context-sensitive help	From the NMX GUI, click the Help button (device properties) or the Help icon (service properties) on GUI pages

Document	Where to find it
REST API Document	C:\Program Files\Harmonic\Documents\NMX\REST_API
NMX Installation Guide NMX User Guide	C:\Program Files\Harmonic\Documents\NMX\Product_Guides
NMX AFA SNMP Interface Development Guide	C:\Program Files\Harmonic\Documents\NMX\AFA_SNMP_Agent
NMX supported devices guides: <ul style="list-style-type: none"> • Electra X2 Component Replacement Guide • Electra X2 Installation Guide • Electra X2S Getting Started Guide • Electra X2S Getting Started Guide for HPE ProLiant DL360 Gen10 • Electra XVM Installation Guide • Electra X Template User Guide • Ellipse 3000 Encoder Hardware Guide • Ellipse 3000 Encoder Quick Start Guide • Ellipse 3000 Encoder User Guide • ProStream 9000 Hardware Guide • ProStream 9000 Software Guide • ProStream 9000 to ProStream X Conversion Guide • ProStream XVM Installation Guide • ProStream X Installation Guide • ProStream X/XVM User Guide • ProView 8000 Installation Guide • ProView 8000 User Guide • ProView 7000 Hardware Installation Guide • ProView 7000 User Guide 	C:\Program Files\Harmonic\Documents\Device_Guides

Document	Where to find it
<p>NMX Technical Notes</p> <ul style="list-style-type: none">• Configuring ACE Services in Service Plan Editor• Configuring BMW Services on Electra_X• Configuring Electra VBR-CBR Services• Configuring Electra X / ProStream X Docker• Configuring NMX Server Redundancy• Configuring Platinum VX Switch• Configuring ProStream Audio Leveling• Configuring ProStream CAS Services• Configuring Slate Insertion for ProStream Output• DVB T2-MI Gateway Configuration Guide• Electra Series Port Socket Service _Redundancy• Getting Started with W&T 57730• Installing and Configuring XXCentOS for use with Electra X and ProStream X Dockers• Installing HIM and Deploying Electra X and ProStream X Docker• Integrating Cisco Switch with NMX• Managing Electra X CA Certificates• ProStream 1000/9000 Port/Socket/Service Redundancy• ProStream 9000 Splicing• Switch Configuration and Management• Using IPSec for RDP Connections	<p>C:\Program Files\Harmonic\Documents\NMX\Technical_Notes</p>

4. New Features

4.1. NMX New Features

The NMX software suite provides configuration, control, monitoring, and fault management for Harmonic open digital compression systems. NMX supports geographically diverse broadcast sites through client/server architecture and is highly scalable in its ability to support small networks with only a few devices, as well as larger networks with a greater number of managed devices.

NMX Release
9.3.0.0.024

4.1.1. Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
3rd Parties	MIT-Xpert iSIMS and iMUX v2022.1.0	NMX now supports the management of version 2022.1.0 of the MIT-Xpert iSIMS and iMUX servers.	NMXNG-7422
Redundancy	Eth Port redundancy usability for Electra X	Usage of GbE port redundancy of Electra X is now easier: a Port Redundancy option has been added in the device icon popup menu to directly see the redundancy status of all paired ports, and allows the user to switch a pair manually. Manual switching is now possible even when the paired port is in automatic mode.	NMXNG-5120
Redundancy	Faster (<1s) 1:1 XOS failover and N:M manual switchover in statmux systems	Harmonic now offers the best XOS failover timing in 1:1 architecture with ProStream X: less than 1s of service perturbation on any encoder failure. Note that it's seamless for any GbE port or network failure thanks to dual streaming with 2022-7 already introduced in previous versions. And manual switch-over is near seamless in 1:1 and N:M redundancy.	NMXNG-5018

		HHP must be disabled for this improvement to work.	
Redundancy	Manual mode for XOS TSoIP source redundancy	A manual mode has been added for the source redundancy of XOS, for TS over IP inputs. Existing manual switch commands are available in both manual and automatic modes.	NMXNG-6913
Redundancy	NMX server redundancy improvement Phase 1	1+1 NMX server redundancy has been improved: <ul style="list-style-type: none"> - Clear indication that automatic failover is not available when backup server is active. - Added protection to prevent from database corruption if operations are attempted while redundancy setup is still in progress - Much faster replication for huge files like device firmware - Automatic hosts file update - Redundancy possible with different time zones on the 2 servers. 	NMXNG-6757
Redundancy	ProStream X 2022-7 + enhanced TS redundancy in dual port mode	In dual port mode on ProStream X, when configuring Enhanced+2022-7 input redundancy (each TS providing 2022-7 paired streams), NMX now provisions stream 1 of backup TS on first port and stream 2 on second port, same as done for primary TS.	NMXNG-7298
Security	Miscellaneous improvements and vulnerability fixes	The NMX server security has been improved in accordance to Harmonic security policy: <ul style="list-style-type: none"> - Up to date Windows Server 2019 patches have been applied in the NMX recovery image. - Windows and SQL Server security settings of the NMX recovery image have been reinforced to comply with additional items of CIS benchmarking. - Some other vulnerabilities have been fixed (e.g. Validation Report access and login for Web Home page - see also Resolved Security Issues §). - NMX software is tested with the latest Symantec and McAfee anti-virus software, as well as Carbon Black EDR. 	NMXNG-7334
System	CP9000 v2.50, v2.60, v2.70	NMX now supports the management (alarm monitoring + cold/spare configuration) of version 2.50, 2.60 and v2.70 of the ViBE CP9000 contribution encoder.	NMXNG-7336
System	Electra X / ProStream X / XOS follow-up	NMX now supports all of the new features introduced in:	NMXNG-7339

		<p>* Electra X v1.20.0</p> <p>* ProStream X v3.4.0 (except the features indicated as "SAG only")</p> <p>* XOS Appliance v1.18.0 (except the features indicated as "SAG only")</p> <p>These new features are described in the appropriate section for these products in the Release Notes.</p>	
System	SW Timestamp for PTP in ProStream X	It's now possible from NMX Global Options to enable the SW Timestamp usage for PTP in ProStream X.	NMXNG-7636
System	Seamless Service Substitution in statmux (ProStream X)	<p>It is now possible to configure the Seamless Service Substitution feature of ProStream X with the output streams of Electra X and XOS that are declared in the same Network Group in NMX, in CBR and VBR. This enables the regionalization in VBR with service splice in central headend. In VBR, this is limited to one alternate/regionalized service per transport.</p> <p>Note that the user must add the alternate services to a dedicated transport (potentially unused) in ProStream X output. This must include the flow connection to an output port. In VBR, the dedicated transport must include the permanent services and the alternate service, with Divitrack enabled and an additional pool must be created with the related video (as done for regional statmux). [For CBR services (GA in NMX 9.1.0); For VBR services (Alpha in NMX 9.1.0/9.2.0, GA in NMX 9.3.0)].</p>	NMXNG-6619
System	XOS 2110 Inputs: selectable 2110-40 data stream for VITC	For 2110 inputs, user is now able to select the 2110-40 data stream that contains the VITC (ancillary time code)	NMXNG-7522
Usability	DRM Options: Widevine resource ContentProtection edit box improved	In NMX Global Options->DRM, the edition of custom string for Widevine resource ContentProtection element has been improved	NMXNG-7595
Usability	Density mode for XOS duplicated input service (read-only)	A "Duplicated Service Mode" section has been added in NMX Options/Service Miscellaneous panel to indicate the density mode used for the different types of input. Read-only with the current version of XOS.	NMXNG-6861
Usability	Max number of VLANs increased to 20 for XOS	It's now possible to define up to 20 VLANs in XOS device configuration	NMXNG-7474

Usability	Minimum DVB-SUB Bitrate configuration	"Teletext Timeout" property has been renamed "Minimum BitRate" for new minimum DVB-SUB bitrate feature of Electra X and XOS.	NMXNG-6665
Usability	Miscellaneous usability improvements	<ul style="list-style-type: none">- In the EMMG declaration, the limitation to 5 UDP ports has been removed.- In the Connection panel of Flow tab (NMX Designer), the Service Group level is now hidden when it has been configured as hidden in Service tab (default value)	NMXNG-7338
Usability	Multiple output TS with same NID/TSID (on different ProStream X)	It's now possible to configure in NMX the same NID/TSID to several output transports. For ProStream X output transports, they must be produced by different devices (i.e. different MUXGROUP values).	NMXNG-5179
Usability	PSI/SI repetition rate setting	User is now able to configure the repetition rate for all PSI/SI tables, thanks to a new global PSI/SI option "Configure Repetition Rate for Tables generated by ProStream X" (disabled by default). (Alpha in NMX 9.2.0, GA in NMX 9.3.0). Note that when enabled, NMX still requests user to enter an estimated bitrate value only used for TS bandwidth overflow validation.	NMXNG-5979

[19 issues](#)

4.2. Electra X/X2/XVM New Features

The Harmonic Electra™ X advanced media processor is the industry's first fully converged platform for broadcast and multi-screen content delivery, leveraging the PURE Compression Engine for cutting edge video quality.

Electra X/X2/XVM Release

1.20.0.0.063

4.2.1. Platform Information

Electra X	A fully qualified, tested and certified platform for running the Electra X software. Electra X is fully data center ready with dual power supplies and front to back air flow.
Electra XVM	<p>The virtualized, software-based nature of Electra XVM takes enterprise-class media processing out of the broadcast machine room and moves it to the data center. Hosted on the Harmonic VOS ecosystem, which runs in the VMware® vSphere virtual machine environment on an industry-standard blade server, Electra XVM provides hardware transparency and maximum operational flexibility. Please contact Harmonic for recommendations on processing hardware.</p> <div data-bbox="367 1073 1453 1247" style="border: 1px solid #f9e79f; padding: 10px; margin-bottom: 10px;"> <p>⚠ Note</p> <p>Please contact Professional Services for Electra XVM BIOS requirements outlined in the <i>Mandatory_Configurations_of_BIOS_VM_for_XVM_v09</i> document.</p> </div> <div data-bbox="367 1276 1453 1451" style="border: 1px solid #f9e79f; padding: 10px;"> <p>⚠ Note</p> <p>The density of XVM/VBR systems varies based on incoming rates and Mux rates. Please contact Harmonic Product Marketing for information.</p> </div>

4.2.2. Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
DPI	TEMI data pass-through inc. adaptation field extension	This feature is activated in Electra X when Proprietary Mode 88 is enabled in NMX Global Options->Services->Service Miscellaneous.	DVREQ-8710
Environment	ESXi version update for Electra XVM and ProStream XVM	Support ESXi version 7.0 on Electra XVM, ProStream XVM	DVREQ-8602
Inputs	Dynamic Input tuning based on component tag	Dynamic Input tuning based on matching the input component tag in the NMX GUI.	DVREQ-8595
Security	Miscellaneous security improvements	FTP server and NGINX Web server have been updated for security reasons	DVREQ-8743
System	Ivy bridge discontinued	Intel Ivy bridge processors (Xeon E5 v2 or earlier) discontinued in 2015 are no longer supported from this release. This affects ELC-X2-CHS-AC, ELC-X2-CHS-SDI-A-AC and XVM instances running on IvyBridge/ SandyBridge class server.	DVREQ-8732
System	Support of Divitrack with dual port streaming (Alpha)	In a broadcast architecture with statmux, it is now possible to use the dual GbE port mode on Electra X outputs and ProStream X inputs, with dual streaming and 2022-7 seamless switch. This removes the need of a trunk between the 1+1 IP switches and ensures a 100% seamless switch on any failure occurring on one GbE port or on one IP switch. (Alpha in NMX 9.3.0)	DVREQ-8654
Video	HEVC Compression improvements	HEVC compression improvements have been added in this release.	DVREQ-8703

[7 issues](#)

⚠ Important**GOP Configuration Restrictions for AVC OTT and HEVC OTT Encoding on Electra X**

When Electra X is used for AVC OTT and HEVC OTT encoding, Electra X and NMX allow a larger range of GOP configurations than Harmonic recommends for actual use. For best quality and performance, Harmonic recommends the following GOP configurations.

IDR Interval: Harmonic recommends an IDR Interval between 2 and 10 seconds.

GOP Structure (Mini-GOP Size - M):

If the output frame rate is	...and the output Video Format is	Recommended M values
between 20 and 60 frames/second	Progressive HD or SD *Interlaced HD or SD	Auto, 4, 8 Auto, 4
between 8 and 15 frames/second	Progressive HD or SD	Auto, 4
lower than 8 frames/second	Progressive HD or SD	Auto, 1

*When the output video is interlaced, it is expected that video frame rate is set to be the same as the frame rate of the input video.

In future releases, Harmonic may modify NMX and Electra X to enforce some of these recommendations, which may prevent some legacy configurations to be provisioned. Harmonic recommends that customers using configurations that do not comply with these recommendations consider modifying them.

4.3. XOS Appliance New Features

4.3.1. Release Information

XOS Appliance Release	NMX Release
1.18.0.0.30 (ISO,BIN)	9.3.0.0.024
1.18.0.0.0.4 (RPM)	
1.18.0.0.69 (vos_bundle)	

 **NOTE:**

Limited Availability (LA) of a New Feature is considered **GA-level quality** for a customer/customer segment and acceptable for on-air use.

4.3.2. XOS Appliance Components

The XOS Appliance is a software product that includes several components that are used depending on the required processing.

The XOS Appliance can be deployed as follows:

1. On appliances
2. As software on a compatible Linux server.

Available features depend upon the selected deployment and selected management (NMX, Standalone, API).

The XOS Appliance contents of this release note are organized by XOS component type.

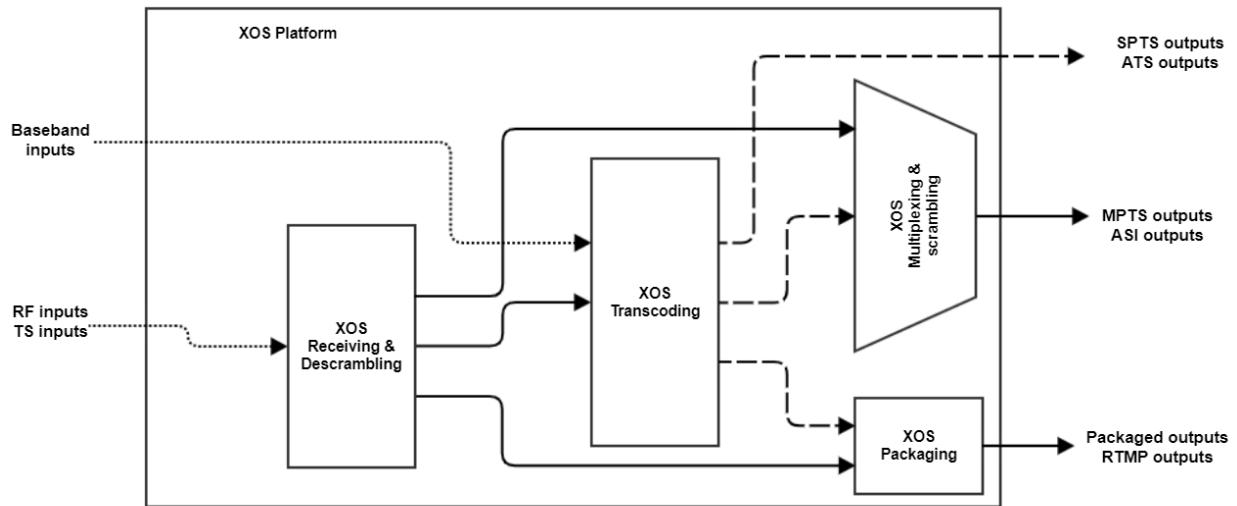


Figure 1. XOS Appliance Diagram

XOS Platforms

The XOS Platform refers to XOS components which are global to the product. This includes common software and for XOS appliances hardware components.

XOS Receiving & Descrambling

This component gathers features related to stream reception & descrambling.

XOS Transcoding

The XOS Transcoding components perform encoding from one or multiple channels sharing the same source. They also deliver SPTS and ATS outputs from broadcast and streaming applications.

XOS Multiplexing & Scrambling

The XOS Multiplexing components manage statmux and generate one or multiple MPTS from the outputs of XOS transcoding components and from external sources. These components are only supported through the XOS Standalone GUI and API in this release, not through NMX.

XOS Packaging

XOS Packaging is a carrier-grade system for preparing scalable, secure, live video streams for delivery over multi-screen OTT networks.

4.3.3. XOS Platforms New Features

Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Inputs	ATSC-1.0 RF input card (SAG)	ATSC RF input card can be installed from XOS 1.18.0. SW to control it will be available in a coming release.	NG-52625

[1 issue](#)

 **NOTE:**

Please contact Harmonic for recommendations on processing hardware.

Supported Appliances

Appliances are standard servers selected and configured by Harmonic. The XOS servers are fully data center-ready with dual power supplies and front to back air flow.

The following appliances are supported in this release:

Part	Description	Applications
XOS Platforms		
HWR-XOS-CHS-MODEL-L	XOS: 1RU HPE, 2 AC, 8 GBE, FRONT PANEL, SD/HD/UHD, LARGE MODEL	<ul style="list-style-type: none"> SD/HD/UHD encoding & transcoding Additional UHD transcoding with UHD card
HWR-XOS-CHS-MODEL-M	XOS: 1RU HPE, 2 AC, 8 GBE, FRONT PANEL, SD/HD, MEDIUM MODEL	<ul style="list-style-type: none"> SD/HD encoding & transcoding OTT packaging
HWR-XOS-CHS-MODEL-S	XOS: 1RU, 2 AC, 6 GBE, FRONT PANEL, SD/HD, SMALL MODEL	<ul style="list-style-type: none"> SD/HD encoding & transcoding
HWR-XOS-CHS-7000	XOS: 1RU HPE, 2 AC, 8 GBE, CLASS 7000, SD/HD/UHD	<ul style="list-style-type: none"> SD/HD/UHD encoding & transcoding
HWR-XOS-CHS-4000 HWR-ELCXOS-CHS-1RU-2AC-C1	XOS: 1RU HPE, 2 AC, 8 GBE, CLASS 4000, SD/HD	<ul style="list-style-type: none"> SD/HD/UHD encoding & transcoding Additional UHD transcoding with UHD card
HWR-PKGX-CHS-1RU-2AC-G1		<ul style="list-style-type: none"> OTT Packaging

Appliance Options

The following options are available to add to your XOS Platform:

Label	Description	Harmonic Sales Ref
10G	Dual port 10GbE SFP+ <ul style="list-style-type: none"> 10G SFP+ modules ordered separately 	HWR-OPT-DUAL-10GBE-NO-SFP

Label	Description	Harmonic Sales Ref
25G	Dual port 25GbE SFP+ <ul style="list-style-type: none"> • 10G or 25G • SFP+/SFP28 modules ordered separately 	HWR-OPT-DUAL-10GBE-NO-SFP
UHD	UHD Accelerator card <ul style="list-style-type: none"> • 1 HEVC UHD CBR encoding 	HWR-XOS-OPT-1UHD
SDI#1	SDI input card <ul style="list-style-type: none"> • 8x SD/HD-SDI or 4x 3G SDI • UHD as 4x3G-SDI (Quadrant mode) • Mini DIN connectors • Break out cables to order separately 	HWR-XOS-OPT-SDI-8IN
SDI#2	SDI input card <ul style="list-style-type: none"> • 8x SD/HD/3G-SDI, • UHD as 4x 3G-SDI (Quadrant or 2SI)) • Mini DIN connectors • Break out cables to order separately 	HWR-XOS-OPT-SDI-8X3G
ASI	ASI output card <ul style="list-style-type: none"> • 4x ASI output ports • Mini BNC connectors • Break out cables to order separately 	HWR-XOS-OPT-SDI-ASI-4
S2X	DVB-S2X input card <ul style="list-style-type: none"> • 4x RF ports • 8x Demodulators 	HWR-XOS-OPT-DVBS2X

Supported Appliance Configurations

Servers can have free PCI slots for optional cards.

NOTE:

All these configurations include NMX as a Management Interface.

Slot numbering as shown in NMX.

In all the SDI configurations, the SDI card number is 1 to x (contiguous values), left to right.

Examples:

- SDI boards in left and right : left is card #1, right is card #2.
- SDI boards in middle and right: middle is card #1, right is card #2.
- SDI boards in left, middle and right: left is card #1, middle is card #2, right is card #3.

Transcoding Applications

XOS Small with option cards

	SLOT1 (Top)	SLOT2 (Bottom)
1	empty	empty
2	SDI#1	empty

XOS Medium/Large server with SDI and NIC cards only

	SLOT1 (Left)	SLOT2 (Middle)	SLOT3 (Right)
1	empty	empty	empty
2	SDI#1	empty	empty
3	SDI#1	empty	SDI#1
4	SDI#2	empty	empty
5	SDI#2	empty	SDI#2
6	SDI#1	SDI#2	SDI#3
7	10G	empty	empty
8	25G	empty	empty

	SLOT1 (Left)	SLOT2 (Middle)	SLOT3 (Right)
9	10G	empty	SDI#1
10	25G	empty	SDI#1
11	10G	SDI#1	SDI#1
12	25G	SDI#1	SDI#1

XOS Large server with UHD cards

	SLOT1 (Left)	SLOT2 (Middle)	SLOT3 (Right)
1	empty	UHD	empty
2	empty	UHD	UHD
3	SDI#1	UHD	empty
4	SDI#1	UHD	UHD
5	SDI#2	UHD	empty
6	SDI#2	UHD	UHD
7	25G	UHD	empty
8	25G	UHD	UHD

XOS Medium/Large server with ASI/DVB-S2X cards

	SLOT1 (Left)	SLOT2 (Middle)	SLOT3 (Right)
1	S2X	empty	ASI

Packaging Only Applications

XOS Medium with NIC cards only

	SLOT1 (Left)	SLOT2 (Middle)	SLOT3 (Right)
1	empty	empty	empty
2	10G	empty	empty

Software Deployments

As a Linux application

The XOS Appliance can be deployed as a Linux application (RPM package) on standard Linux servers with minimal specs.

These servers can be provided by Harmonic (reference platforms) or directly by the customer (custom hardware).

Available features may differ from appliances:

- PCI cards such as SDI input cards or UHD HW acceleration cards are not supported,
- Hardware monitoring is limited to some HW alarms. Complete monitoring is performed using tools provided by the hardware manufacturer (iLO and HP One View for HP servers),
- Software deployment and updates are performed by third party mechanisms or by HIM (Harmonic Infrastructure Manager),
- Network set-up is part of Operating System set-up and is not available in NMX or in Stand Alone user interface.
- When declared under NMX, only 4 video/data ports are usable (Rx5/Tx5, Rx6/Tx6, Tx7, Tx8).

4.3.4. XOS Receiving and Descrambling New Features

Highlighted Features

In this NMX release, there are no new features for XOS Receiving and Descrambling.

4.3.5. XOS Transcoding New Features

Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Audio	Adv. AC-4 settings (SAG)	Settings for full AC-4 encoding configuration are now available in SAG.	NG-44794
Audio	New audio types (SAG)	New audio types can be set to indicate the default recommended language and the language in which the program was produced according to ISO 13818 (SAG).	NG-45640
Audio	Upsignal DD 2.0	Dolby AC-3 stereo can be signalled as a 5.1 signal to downstream devices.	NG-53426
Broadcast	PSIP spooling (SAG)	PSIP spooling from Triveni injector is supported (SAG)	NG-38156
Data	DVB-Sub: min bitrate	Minimum bit rate can be set on DVB-SUB.	NG-51034
Data	SCTE-104 to DVB-TA	Pass through of SCTE-104 commands compliant with DVB-TA for targeted ad applications. (Alpha in XOS 1.17.0/NMX 9.2.0, GA in XOS 1.18.0/NMX 9.3.0)	NG-43302
Inputs	HLS hitless redundancy	In case of failure, seamless switch to a backup HLS source is supported. Switch happens at segment boundaries.	NG-54066
Inputs	Manual source redundancy	Source redundancy now includes a full manual mode.	NG-52858
System	UHD 2160p25/p29.97	UHD encoding 2160p25/29.97 for broadcast applications can be configured from SAG in addition to NMX.	NG-60231
Video	ATSC-3.0 Statmux (SAG)	Set top box mode "HEVC single PPS" is now supported for ATSC-3.0 standalone VBR applications (SAG).	NG-42741
Video	Additional Frame rate conversions	Additional frame rate conversions are now supported: p25->i25, p23.98,p29.97->i29.97	NG-27614
Video	EyeQ Dashboard (SAG)	Dashboard with EyeQ rate savings is now available in SAG.	NG-58099
Video	HDR-10+ support	HDR-10+ standard is now supported.	NG-53793
Video	HEVC 1080p25 VBR	HEVC 1080p25 is now supported for VBR applications.	NG-47869
Video	P pictures as P	P pictures are now signalled as P pictures instead of B when using HW accelerator for UHD encoding.	NG-57666

Video	Static ST 2086 metadata	HDR-10 metadata (ST 2086) can now be customized.	NG-56392
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[16 issues](#)

4.3.6. XOS Multiplexing and Scrambling New Features

Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Broadcast	PSIP spooling (SAG)	PSIP spooling from Triveni injector is supported (SAG)	NG-38156

[1 issue](#)

4.3.7. XOS Packaging New Features

Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Packaging	DASH custom subtitle label	DASH - Specify custom stream name during live stream grooming to be used as DASH subtitle track label, for Live	NG-51960
Packaging	Improved ATSC-3.0 CC	Interoperability regarding captions in ATSC-3.0 applications is improved.	NG-47689
Packaging	Live HSS push-packaging of E-AC-3/DD+ audio	Live HSS push-packaging (HTTP POST) of E-AC-3/DD+ audio Requires custom support by proprietary downstream server, as E-AC-3 is not part of official HSS specification.	NG-49351
Usability	DRM Options: Widevine resource ContentProtection edit box improved	In NMX Global Options->DRM, the edition of custom string for Widevine resource ContentProtection element has been improved	NMXNG-7595

[4 issues](#)

4.4. ProStream X New Features

ProStream® X is a new family of high-throughput and high-performance software-based stream processors enabling multiplexing, scrambling, and splicing.

ProStream X is leveraging a software-based implementation and, as such, can be deployed throughout two types of infrastructure deployment environment: virtualized (XVM) or appliance (X).

The Harmonic ProStream X video stream processor and gateway leverages advances in IT infrastructure to provide best-in-class, high-performance stream processing for mission-critical broadcast, cable, satellite, IPTV, and OTT delivery applications. As the successor to the market-leading ProStream 9100 stream processor, the software-based ProStream X system allows users to leverage the versatility and agility of software-based infrastructure. The platform integrates 10 Gbps throughput with a variety of advanced video processing applications, including multiplexing, splicing, blackout switching, and DVB CSA3 encryption. ProStream X also serves as a high-throughput IP gateway featuring socket address flipping.

ProStream X runs on a 1-RU COTS HPE® server and pairs with the Harmonic Electra™ X2 advanced media processor to deliver a compact solution for encoding and distributing superior-quality IP video streams. This high-density architecture reduces the amount of rack space required to meet fluctuating stream processing requirements, helping operators reduce CAPEX and OPEX. High reliability and simplified serviceability result in an all-in-one-box experience for high-throughput stream processing at low TCO.

SD, HD, and UHD formats, and MPEG-2, MPEG-4 AVC, and HEVC codecs are all supported on ProStream X.

ProStream® XVM is a stream processor software application targeted at virtualized environments, enabling deployment over generic IT infrastructure (typically blade servers). Processing density depends on blade CPU performance. This type of environment is compliant with the Electra XVM for a complete virtualized statistical multiplexing solution.

The Harmonic ProStream XVM virtualized stream processor leverages advances in IT infrastructure to provide a software-based solution for scrambling, multiplexing and statistical multiplexing of SD and HD MPEG video.

ProStream XVM is designed to run on common hardware platforms in IT data center environments. The system pairs with the Harmonic Electra™ XVM virtualized media processor to deliver a completely software-based, broadcast-ready solution for scrambling, multiplexing, re-multiplexing, and statistical multiplexing.

ProStream X and ProStream XVM Release 3.4.x are supported under SAG and under the NMX management system. It is associated with the NMX 9.3.x release.

Note

For ProStream X running on HPE servers, Harmonic recommends BIOS version U32 v2.54 and firmware version 0.2.3.0.

Special upgrade procedure for devices setup with NMX Device Redundancy (Hot:Warm - automatic switching)

Note

This procedure is only relevant when upgrading the firmware version from lower than 2.9.1 to 2.9.1 or higher!

1. Make sure that the devices are in the following initial state: <Device 1, Active>, <Device 2, Inactive>.
2. Change the Device Redundancy in NMX from Automatic mode to Manual Mode.
3. Upgrade Device 2 and wait till it is back up with the new build.
4. Perform a manual switch-over to Device 2 (with the new build).
5. Make sure that the devices are now in the following state: <Device 1, Inactive>, <Device 2, Active>.
6. Upgrade Device 1 and wait till it is back up with the new build.
7. Change the Device Redundancy in NMX from Manual mode to Automatic Mode.

Note

A downgrade from firmware version 2.9.1 or higher to older versions is seamless.
An upgrade from firmware version 2.9.1 to higher version is also seamless.

ProStream X Release

3.4.1.0.051

Platform Information

ProStream X	ProStream X is a SW based appliance. It is an HPE OEM DL360 Gen10 8-SFF CTO Server-SKU (869121-B21). Dual sockets CPU 4210R, 64-GB RAM , SSD, 1 RU.
ProStream XVM	<p>The Harmonic ProStream® XVM virtualized stream processor leverages advances in IT infrastructure to provide a software-based solution for statistical multiplexing of SD and HD MPEG video.</p> <p>The statmux controller is part of the ProStream XVM environment and can control ProStream XVM statmux pools managed by the NMX system, in a fully virtualized environment.</p>

4.4.1. Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Environment	ESXi version update for Electra XVM and ProStream XVM	Support ESXi version 7.0 on Electra XVM, ProStream XVM	DVREQ-8602
Miscellaneous Improvements	Miscellaneous improvements in ProStream X	A few improvements were added to this release: 1. Changing the Scrambling name for Synamedia's special code 2. Removed the limitations from loopback port sockets 3. Added an alarm when switching from NMX to SAG and no clear config was applied	DVREQ-8753
Multiplexing	Convert IP to ASI passthrough (transparent) mode	Convert IP to ASI passthrough (transparent) mode, for SFN (DVB-T/T2) networks	DVREQ-8733
Networking	SRT with URL support	Add SRT Support on ProStream via URL address (compatible with VOS360)	DVREQ-8702
Platform	Support for 8 ports ASI Dektec card	Added support for the 8 ports ASI Dektec card. PN: PRM-X-OPT-ASI-OCTO	DVREQ-8745
Redundancy	CW Synchronization between 2 separate sites	<ul style="list-style-type: none"> • Unique solution only with Nagra scrambling • Supporting the CW Sync feature on dual site level, means a Full Site CW Sync between all 4 ProStream X devices (2 at each site) to allow the downstream descrambler device (STB) to accommodate a near seamless switch between any of the 4 ProStream X devices, regardless of the site they are coming from 	DVREQ-8726
Redundancy	Faster (<1s) 1:1 XOS failover and N:M manual switchover in statmux systems	Reduced the impact of XOS switchover in 1:1 with ProStream X in a DiviTrackoIP system, to sub second	DVREQ-8550
Redundancy	Support 2022-7 WITH VLAN Tagging	Added support for seamless redundancy SMPTE 2022-7 With VLAN Tagging	DVREQ-8740
Scrambling	Enhanced security for P-code	Separate the P-code firmware from the GA firmware. Only customers that purchase this capability will be able to receive the version and will require a specific key for the transaction	DVREQ-8754


Table generation	Added EIT table actuals regenerate and EIT others passthrough	Added an improvement to EIT manipulation by adding the ability to have EIT actual Regenerate and to passthrough the "EIT other" tables.	DVREQ-8737
Table generation	Capability to define repetition rate for PSI/SI tables instead of bitrate	Added the capability to define the repetition rate for PSI/SI tables, instead of bitrate. This is also added in NMX.	DVREQ-8690


[11 issues](#)

4.4.2. Compatibility Information for CableOS

Deployment of this ProStream X release must be done in accordance with the following compatibility constraints:

- CableOS Pebble (RPD): version 1.8.3 or higher
- CableOS Core: version 1.8.3 or higher

 In this version IPv6 is not supported for HHP.

 When upgrading from ProStream X Release 2.5.x to Release 2.6.x, existing IPv6 parameters need to be reconfigured.

 In a 1+1 cluster, the user can define an independent pair of GM clocks per ProStream X device.

4.5. Electra X2S New Features

The Harmonic Electra™ X advanced media processor is the industry's first fully converged platform for broadcast and multi-screen content delivery, leveraging the PURE Compression Engine for cutting edge video quality.

Electra X2S Release	ProStream XVM Release	NMX VM Release
1.20.0.0.063	3.4.1.0.051	9.3.0.0.024

Platform Information

Electra X2S	The Electra X2S is a system in a 1RU server box, combining the performance of Electra X, ProStream X and controlled by the rich functionality of NMX.
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4.5.1. Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
No issues found			

4.6. Ellipse 3000 New Features

The Ellipse 3000 family of encoders presents an advanced concept in contribution applications, providing broadcasters with multiple simultaneous MPEG-2 or MPEG-4/AVC (H.264) video encoding and DSNG modulation .

Ellipse 3000 encoder supports all SD and HD MPEG-2 and MPEG-4 AVC codecs at 4:2:0 or 4:2:2 chroma subsampling with 8 or 10 bits. Fully firmware upgradeable, the encoders offer a smooth and cost-effective migration path from MPEG-2 SD 4:2:0 8-bit to AVC HD 4:2:2 10-bit compression schemes, making them among the most versatile contribution encoders available. Options for re-multiplexing and cascading allow the devices to operate on a stand-alone basis with no need for external multiplexers or PSI generators.

Ellipse 3000 Release

3.3.5.0.76

4.6.1. Highlighted Features

In this NMX release, there are no new Ellipse 3000 encoder features.

4.7. ProView 7100 New Features

The Harmonic ProView™ 7100 is a single rack unit (1RU) scalable receiver, DVB descrambler, multi-format video decoder, video transcoder, and MPEG stream processor. The modular ProView 7100 addresses the full spectrum of content reception applications from single channel decoding to descrambling and re-multiplexing of multiple transport streams.

ProView 7100 Release

4.3.5.0.88

Note

To upgrade from release 4.0.0.0.26, reboot the device and then start the upgrade.

4.7.1. Highlighted Features

In this NMX release, there are no new ProView 7100 features.


4.8. ProView 8100 New Features

ProView™ 8100 is an advanced Integrated Receiver Decoder (IRD) platform that optimizes primary distribution of video content over satellite, ASI or IP delivery networks. With an advanced feature set and compact design, the ProView 8000 IRD family increases workflow efficiencies, cost savings, and reliability for global broadcasters and service providers, simplifying the migration to an IP infrastructure and launch of value-added services.

The ProView 8100 is ideal for use in a wide range of applications, from basic monitoring to end-point delivery from the distribution network. The IRD can act as a stand-alone unit or as part of a widely dispersed primary distribution network under the control of Harmonic's DMS™ video Distribution Management System. DMS provides broadcasters and service providers with powerful control tools for remotely managing large device populations, enabling secure broadcast of video content over satellite or IP delivery.

ProView 8100 Release

1.6.1.0.23

 A hardware/software upgrade from ProView 8130 to 8140 is not possible!

4.8.1. Highlighted Features

The following features are highlighted in this release:

Roadmap Feature Category	Roadmap Feature Name	Release Note Information	Key
Decoding	Support for up to four embedded Audios	<p>Added up to four audio decoding capabilities in ProView 8140, a model with both new hardware and software.</p> <p>Notes:</p> <ul style="list-style-type: none"> - The 3rd and 4th audios are for embedded SDI only. - The basic license for decoding the first 2 audios remains the same, but an additional separate license is required for decoding the 3rd and 4th audios. (FW-PVR-8140-ADEC-4AUD) <p>On top of the 4 audio licenses, all the following audio codecs require separate licenses:</p> <ul style="list-style-type: none"> - AAC LC - AAC LC 2.0 audio - AAC LC 5.1 audio decode or pass through - AAC LC 5.1 audio down-mix to 2.0 audio - HE AAC v1 and v2 audio - HE AAC 2.0 audio 	DVREQ-8647

- HE AAC v1 5.1 audio down-mix to 2.0 audio
- HE AAC v1 5.1 audio decode or passthrough
- Dolby Digital / Dolby Digital Plus
- Dolby Digital® 2.0
- Dolby Digital® 5.1 decode or passthrough
- Dolby Digital® 5.1 down-mix to 2.0
- Dolby E/Linear PCM passthrough

RF Modulation	Support for DVB-S2X(c) Input	Added DVB-S2X RF input in ProView 8140, a model with both new hardware and software.	DVREQ-8648
		<p>Notes:</p> <ul style="list-style-type: none"> - For DVB-S2X 8SPK, 16PSK and 32PSK - separate licenses needs to be bought. <p>The licenses that need to be implemented are:</p> <ul style="list-style-type: none"> - FW-PVR-8K-DVBS2X-8PSK - FW-PVR-8K-DVBS2X-16APSK - FW-PVR-8K-DVBS2X-32APSK - FW-PVR-8K-DVBS2X-64MBAUD 	
Video delivery over the internet	Support new Zixi library in ProView 8100	Added support for updated Zixi library (version 1.14) within the ProView 8100.	DVREQ-8442

3 issues

5. Resolved Issues

5.1. NMX Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
NMX-71401	PSX-13422	The T2-MI Stream ID limit was incorrect.
NMX-71496	NMX-71495	A "Low System Resources" error caused a failed validation.
NMX-71503	NMX-71408	An internal process was causing system speed issues.
NMX-71607	NMX-71556	NIT descriptors were missing during domain manager startup.
NMX-71611	NMX-71090	The code to start daemons was missing from switch to backup flow.
NMX-71619	NMX-71614	An internal error occurred after a PSX input discovery update.
NMX-71664	NMX-71656	Communication errors between NMX and PSX caused system crashes.
NMX-71694	NMX-71693	The NIT static version under VLAN did not provision to PSX.
NMX-71706	NMX-71697	XOS TS Discovery was not working on VLAN.
NMX-71721	NMX-71720	The "Backup Low Disk Space Alarm" was not raised when the main NMX was active.
NMX-71727	NMX-71698	The inventory information was empty after an upgrade.
NMX-71731	NMX-71724	An upgrade caused an internal error.
NMX-71745	NMX-71703	The Automation Service Plan Batch was not applied.
NMX-71756	NMX-71751	Could not modify "priority" in Pool Video Properties with current NMX Catalog.
NMX-71758	NMX-71757	NMX did not provision the attribute for DPI PID when setting SPS to SCTE35.
NMX-71813	NMX-71800	A change to the virtual streams caused the service plan batch to incorrectly execute.
NMX-71830	NMX-71829	A hardware mismatch alarm on Proview prevented NMX from starting.
NMX-71833	NMX-71824	An unexpected edition error in spreadsheet regarding backup socket.
NMX-71901	NMX-71900	A missing input socket provision on main PSX with backup provision caused an error.

NMX-71908	NMX-71891	The background picture for network maps was not displayed when opening NMX Operator from NMX ONLY Client.
NMX-71909	NMX-71907	Input colorimetry parameters were not updated for all XOS subservices.
NMX-71919	NMX-71918	Unexpected alarms occurred in the Syslog interface.
NMX-71923	NMX-71922	Could not set PSX service redundancy for some services.
NMX-71938	NMX-71937	NMX installation on Windows 2019 servers that was in corporate domain with SQL 2017 caused errors.
NMX-71941	NMX-71940	The DVBSub descriptor was overwritten when the Encoder VANC parameter was changed.
NMX-71951	NMX-71950	Service Plan Sync stopped working.
NMX-71979	NMX-71977	The NMX search function wasn't working correctly.
NMX-72019	NMX-72018	A backup PSX failed to stream Secondary IP on its RTP Egress stream.
NMX-72073	NMX-72072	Could not transcode different ChannelMode for IP shared audio.
NMX-72140	NMX-72116	When the "Mirror Identical" option was checked, source parameters of mirror output were not editable

30 issues

5.2. Electra X/X2/XVM Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
ACP-15888		An ELX2 2022-6 Input with 1080p50 and dual mode was not functioning properly with excessive input frame drop.
ACP-15943	ACP-15919	An unsupported input video frame rate caused alarms after an upgrade.
ACP-15956	ACP-15934	ELCX input socket redundancy - switch was triggered when set to manual mode.
ACP-16012	ACP-15958	The AC-4 metadata was not working properly.
ACP-16051	ACP-15869	Electra XVM had a high CPU load on the host.
ACP-16056		Issues were resolved for the ElectraXVM HW Compatibility upgrade for the ACP 1.20 release.
ACP-16066	ACP-16055	SDIoIP input caused an alarm and excessive input frame drop.
ACP-16067	ACP-16059	The output video degraded after performing a manual PSX redundancy switch.
ACP-16068	ACP-16052	"Service Initializing" occurred on an Electra XVM after switching from FILE to LIVE.

[9 issues](#)

5.3. XOS Appliance Resolved Issues

This section contains the resolved issues for the XOS Appliance. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

5.3.1. XOS Platforms Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
NG-62338	After switching OTT services to XOS backup, some services started slowly.
1 issue	

5.3.2. XOS Receiving and Descrambling Resolved Issues

In this NMX release, there are no Resolved Issues for XOS Receiving and Descrambling features.

For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
No issues found	

5.3.3. XOS Transcoding Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
NG-58677	The AC-4 metadata was not working properly.
NG-59689	An incorrect codec was detected.
NG-60374	Macroblocking issues were found on the MPEG-2 output with AVC source (3:2 pulldown).
NG-60482	No IDR on SCTE35 TimeSignal for duplicated channel.

NG-60855	Video decoding alarm was stuck.
NG-61548	With UHD service Corefiles were generated up to 40G in file size.
NG-61842	Transmission of XOS output streams were intermittently paused for 20 ms.
NG-62288	The closed caption descriptor (0x86) was generated even with no data.
NG-62338	After switching OTT services to XOS backup, some services started slowly.
NG-62546	DVB subtitles were displayed incorrectly.
NG-62773	Incorrect subtitle descriptors were displayed.

11 issues

5.3.4. XOS Multiplexing and Scrambling Resolved Issues

In this NMX release, there are no Resolved Issues for XOS Multiplexing and Scrambling features.

For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
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No issues found

5.3.5. XOS Packaging Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
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NG-57846	After an XOS upgrade, timed metadata insertion errors were raised on packager (parental control).
NG-60385	The notification "fail to connect Timed Metadata with target:xxxx" was triggered in the backup device occasionally after N:M redundancy switching. The notification was resolved after the service went online and offline.

2 issues

5.4. ProStream X Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
PSX-7219		When the system was flooding the log, the linux pipe was consuming the system's memory, and Watchdog was not running, the application crashed due to a lack of memory.
PSX-13640	PSX-13638	After upgrading to ProStream X version 3.2.1.0.25, GbE Output Buffer Overflow alarms occurred when DataTrack was enabled.
PSX-13721	PSX-12660	ProStream X crashed - a segmentation fault occurred after upgrading to version 2.9.9.
PSX-13749	PSX-12209	When you had an ASI card installed, you disabled standalone Device Redundancy on the backup, and selected the option of Clear Config, the ports and TSs were removed.
PSX-13919	PSX-13918	Some REST API queries did not work when there was an unassigned ASI card under NMX.
PSX-13974	PSX-13973	The CA descriptor showed reserved bits "000" instead of the expected "111".
PSX-13981	PSX-13980	When the TS had free space, DataTrack increased the pool size to use it, and if the increase was not effective in reducing the free space, it kept increasing.
PSX-13988	PSX-13987	The expired FW-PRM-X-SPARE license was used instead of the FW-COS-PRM-X-BASE license to cover FW-PRM-X-BASE-1.
PSX-13990		A video VBV overflow occurred on an MPEG2 HD service.
PSX-14013	PSX-14012	When using 2 VLANs of which the socket from the second VLAN was a mirror and Identical Mirror was checked, the traffic from the mirror socket was shown in the Management Interface.
PSX-14015	PSX-14014	ProStream X crashed in the CollectorWriteToCycBuff code area.
PSX-14031	PSX-14030	ProStream X didn't scramble after an upgrade from 2.9.7 to 3.3.1.0.57.
PSX-14037	PSX-14036	The mirror TS had only null packets when Identical Mirror was enabled with Override IP.
PSX-14079	PSX-14063	An incorrect license alarm for fw-prm-x-dvb-cw occurred on ProStream X.
PSX-14120	PSX-14119	Source parameters for SDT regenerate were missing in SAG.
PSX-14127	PSX-14126	A memory leak occurred on a system with ATSC input tables.
PSX-14250	PSX-14248	Unicast routes were missing in the ProStream port configuration when the unicast destination IP was on a different subnet.
PSX-14251	PSX-14224	Sometimes a major outage occurred.

PSX-14268	PSX-14267	An alert message occurred when trying to set Logical Channel Number higher than 999.
PSX-14271	PSX-14270	An exception occurred when trying to delete CA Descriptors under NIT.
PSX-14312	PSX-14311	An XOS IRD sometimes failed to fully descramble a common video component.

[21 issues](#)

5.5. Ellipse 3000 Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Rn Summary - Resolved
ELLIPSE-2766	BISS was not working on the source service when it was cascaded to another service with BISS.

[1 issue](#)

5.6. ProView 7100 Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
IRP-11668	ZDC-3214	On some streams, OSD DVB Subtitles did not clear until the next subtitle appeared.
IRP-11642	IRP-11621	Audio was missing on SDI when decoding 1080p (AVC/HEVC).
IRP-11633	ZDC-3457	Manual time changes in SAG were overwritten by auto refresh before they were applied.
IRP-11631		MPE output was not recognized by some equipment.
IRP-11628		Dolby-E was not properly passed to SDI out when decoding some streams.
IRP-11627	IRP-11624	SCTE-35 to SCTE-104 conversion did not work with duration above 6553 seconds.
IRP-11623		SAG did not present language descriptor for ZHO (Chinese) and MSA (Malay) DVB Subtitles.
IRP-11622		OSD DVB subtitles were presented briefly when subtitles field page_time_out == 0.
IRP-11620	IRP-11567	The SAG did not load when the inserted CAM name contained special characters.
IRP-11618		Was unable to change some RF port parameters, that are not DMS configurable, while controlled by DMS.
IRP-11611	ZDC-3468	False "CAM Authentication Failure" alarm was raised when working with old SMiT Conax CAMs.
IRP-11607		Some ports on the DVB-S/S2/S2X card did not recover after an RF signal loss caused by bad weather.
IRP-11583		Closed Captions did not work with some content when AFD was enabled.
IRP-11578	IRP-11569	Filtering according to CA descriptors was not performed on some CAMs.
IRP-11553	IRP-11519	The recovery time of de-jittering mechanism when working with multiple input IP sockets was improved.
IRP-11543		SAG didn't load when there was an invalid language descriptor at the program PMT.
IRP-11532	ZDC-3321	Black background appeared on DVB subtitles when the CLUT background value was missing.

IRP-11509		When upgrading from 3.X to 4.X, failure to upgrade DB caused the unit to lose the management IP address.
IRP-11502	IRP-11497	Devices under DMS control that were downgraded from 4.X to 3.X and then back, were missing some programs.
IRP-11498	IRP-11494	Configuration is restored to defaults when upgrading transcoders from 3.X to 4.X.
IRP-11487		On a device with DVB-S/S2/S2X, a bitrate higher than 79Mbps was not supported.
IRP-11466		When experiencing severe RF noise, a transcoded program sometimes got stuck and didn't recover.
IRP-11462		Online help did not work properly in the Chrome browser.
IRP-11450	IRP-11443	When under DMS control, the NIT, EIT, and TDT were forced to be passed.
IRP-11415		Descrambling failed when using SmartDTV NAGRA CAM.
IRP-11406		A decoding failure alarm occurred when manually selecting codec Dolby-E.
IRP-11401		When removing a program that has a PID in common with another program and both use VMX descrambling, the descrambling failed for one crypto-period.
IRP-11386		The GI stream (0x80) wasn't automatically decoded and a decoding failure alarm was shown.
IRP-11368		FIC: Audio dropped on Musicam and Dolby-E passthrough on a customer specific stream.
IRP-11349	IRP-11343	ProView 7100 video decoding of low-delay (P only) MPEG-2 sometimes stopped working after input loss.
IRP-11330	IRP-11322	DMS: Back-to-back blackout events failed to perform.
IRP-11317	AFR-41502	Closed Captions were not clear when transcoding MPEG to H264.
IRP-11315	IRP-11314	The transcoder did not support large MVs generated by Electra.
IRP-11301	IRP-11295	Occasionally ProView crashes after DMS was configured to work in standalone mode.
IRP-11291	IRP-11290	DMS: DCT deactivation time was extended from 5 minutes to 24 hours.
IRP-11239	IRP-11238	When decoding 1080p, some subtitles were missing on the VANC output with SMPTE-2038 VBI PID.
IRP-10747		There was no support for 4:2:2 decoding of AVC / MPEG-2 and for AVC-I in this release.
IRP-10744		When working in HEVC mode, there were no alarms for unsupported content.

38 issues

5.7. ProView 8100 Resolved Issues

The following issues have been resolved. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
ZDC-3588	IRP-11665	After RF input recovers from failure, sometimes there was no bitrate after specific CAM type (SMiT NDS CAS ID 0x9A5)
ZDC-3567		When working in Automatic redundancy mode, SNMP always reflected Primary port as active
ZDC-3518	IRP-11654	Some OSD DVB Subs were missing when decoding specific customer's stream
ZDC-3517	IRP-11650	Video output may be affected when processing and inserting a large number of splice NULL messages to SCTE-104 VANC
ZDC-3516	IRP-11649	White line appeared on top of DVB subs when they change while decoding a specific customer's stream
ZDC-3515	IRP-11647	SCTE-35 OON message auto_return flag was ignored, causing double RTN GPI trigger for messages with duration
ZDC-3506		On 8130 configuration changes on any RF port affected the LNB configuration, regardless of the LNB selected port
ZDC-3504	IRP-11624	SCTE-35 to SCTE-104 conversion didn't work when duration value was above 6553 seconds
ZDC-3464	IRP-11415	Specific SmarDTV NAGRA CAM failed to descramble when configured by the device
ZDC-3463	IRP-11574	T2-MI Processing mode was not available in SAG when device doesn't have T2-MI de-framing license
ZDC-3461	ZDC-3457	Manual Time changes were often ran over by auto refresh before they were applied

11 issues

6. Known Issues

6.1. NMX Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
NMX-71835		Cannot change the time zone.	The following workarounds can be used to change time zone: <ol style="list-style-type: none">1. From an elevated command prompt, run 'timedate.cpl' and change the time zone.2. From Server Manager, select Local Server and click on Time Zone to change it.

1 issue

6.2. Electra X/X2/XVM Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
ACP-16008	ACP-15953		For AC4 use case, using Manual Metadata Source mode, Static Level adjustment "other than "0" will use -27 dB as the base level, regardless of what the Dialogue Level is set to.
ACP-16073		PID missing alarm is not raised when the configured pid is missing from source during runtime.	When the configured PID is missing from the source during runtime, the PID missing alarm is not raised.
ACP-16192		The Static Level adjustment for AC3 has no effect on the output dialnorm.	
ACP-16193		For AC4, the Metadata Program Number is not properly extracted.	
4 issues			

6.3. XOS Appliance Known Issues

This section contains the known issues for the XOS Appliance. For specific resolved issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Warning!

We do not recommend downgrading the XOS Appliance to any previous version. This may cause instability in UHD encoding.

6.3.1. XOS Platforms Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
NG-33594		Input Port Redundancy, configured using Automatic Redundancy in XOS, is not working properly.	The video no longer flows when the redundancy is triggered. Port Redundancy for 2022-6 sources (10GbE Input) is not supported.
NG-57060		After creating a transcoding profile, SAG will not allow further editing or saving.	Create a new transcoding profile and save it.
NG-60154		Configuration parameters for the Broadcom NIC introduced input CC errors on XOS-4000 and XOS-7000 systems.	Corrected configuration parameters for the Broadcom NIC which was introducing input CC errors on XOS-4000 and XOS-7000 systems.
NG-63930	NMX-72138	Sometimes SDIPortSignalLoss is not asserted in NMX	SDIPortSignalLoss is not asserted in the NMX when source is disconnected from SDI port. Workaround: To manage redundancy on SDI failure, you can proceed in NMX 'Configure Global Alarms' by : 1. Disable SDIPortSignalLoss alarm (won't be displayed even if Restatus) 2. Check 'trigger redundancy' for 'NoInputDataReceived' alarm, to be able to switch device for this alarm occurrence. This workaround will allow to manage automatic redundancy, until the SDIPortSignalLoss Alarm issue is fixed

4 issues

6.3.2. XOS Receiving and Descrambling Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
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No issues found

6.3.3. XOS Transcoding Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
NG-23243		The Output TS Bitrate alarm takes a long time to be asserted and remitted.	Workaround: Configure the input bitrate below the configured passthrough bitrate. When the input audio bitrate exceeds the configured passthrough audio bitrate, the alarm is not asserted, and it is not remitted after the input audio bitrate drops below the configured passthrough bitrate.
NG-24563		Activating / deactivating Harmonic ALC leveler affects the service output.	Disruption is around 6 seconds.
NG-24799		When the audio passthrough bitrate is set lower than the source audio bitrate, an Insufficient TS Bitrate alarm is raised from XOS.	Workaround: Increase the audio bitrate.
NG-25573		Silence is experienced instead of expected nulls for missing audio when starting with a bad source.	
NG-26499		Dolby AC-4 transcode bitrate is fixed when the input bitrate is less than the configured bitrate for 1.0 and 2.0 channel mode.	This is a limitation of the Dolby AC4 encoder.
NG-27187		There is no video standard mismatch alarm for video input.	There is no video mismatch alarm in cases of service provisioned as SD with real input in HD .
NG-27580	PSX-5591	The video bitrate can exceed the pool bitrate for a short period of time when multiple redundancy switches are performed in a short sequence.	This occurs when ProStream X device redundancy is triggered.
NG-35314		XOS/VOS is missing a picture in picture (PIP) service with an alternate source if the PIP audio is not shared with the main.	Workaround : Share the audio between PIP and main.

NG-35355	The "Time zone" modification is not considered in the Nielsen configuration.	Workaround : Deactivate then activate the Service Plan.
NG-36121	XOS/VOS produces a PES length error at the AC-4 audio PID.	
NG-38110	If the Provider name is longer than 256 characters, then the output contains no PSI table.	The output contains only audio, video, and NULL packets when SDT provider name length is longer than 256 characters.
NG-46579	The geo-redundancy synchro PTS and IDR settings used to synchronize two different XOS HITS units failed.	Workaround: Perform a service restart, then synchronize.
NG-51259	The Automatic Alternate Source switching process takes up to 15 seconds when 2022-6 contains OP47.	
NG-59762	Dialnorm from VANC audio metadata is not following input when using "Extract from input mode."	Dialnorm from VANC audio metadata is not following input when using "Extract from input mode." User needs to set it with NMX
NG-61524	Change on the fly for video output is not supported seamlessly.	
NG-61854	The ST-2086 setting can't be different for duplicate service case.	

16 issues

6.3.4. XOS Multiplexing and Scrambling Known Issues

In this NMX release, there are no Known Issues for XOS Multiplexing and Scrambling features.

For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
No issues found			

6.3.5. XOS Packaging Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
NG-17809		Source redundancy may not work during the first few minutes after a service/source/destination update.	The active input resets to the first source even if manually switched to the second during that period. After this period the socket switch request can be successfully reiterated.
NG-30305		After changing the Input Video bitrate in NMX the HLS manifest does not change as expected.	Workaround: Disable and then enable the channel when you change an HLS parameter (or any package parameter). This provokes a stop of all the packages belonging to the channel.
NG-63352		During XOS service start or manual switchover, some services may start slowly due to file operations performed by DRM	

3 issues

6.4. ProStream X Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
PSX-13521	PSX-13507	An alarm is raised when there is no communication to a specific table generator when Triveni is configured on the ProStream X docker	
PSX-13561	PSX-7704	The ProStream X Entitlement Management Message Generator (EMMG) does not support Broadcast mode, only UDP and TCP modes.	
PSX-13747	PSX-8843	Registration for HHP (v1/2) fails on interface with virtual IP address (VIPA).	Workaround: Either reset the port HHP-wise - enable 1 more port and use it to uncheck and then check the faulty video port, or perform HHP over ports without VIPA.
PSX-13802	PSX-13491	The VLAN interface is created when running a ProStream docker with and without CONTROL_PLATFORM=1	
PSX-13807	PSX-8890	With 500 SPTS in and 500 SPTS out, there is no output after deactivating and reactivating the Service Configuration.	
PSX-13821	PSX-11377	On the Backup XVM device, the CW Sync Interface remains with the Default value even though changes are made to the CW Sync interface on the Video Port on the Primary device.	
PSX-13826	PSX-12695	Both ECMG and EMMG messaging are not supported using IPv6.	
PSX-13846	PSX-12691	Splicing is not working with the IPv6 GbE interface for both management and video.	
PSX-13850	PSX-12990	Unable to select TS in socket properties if TS is set to "Identical."	

PSX-13954	PSX-13410	There is no bitrate on PIDs after deleting the virtual service when the service is scrambled.	
PSX-13963		Bitrates lower than 260kb may not be detected at the input. There is no such limitation on the output.	
PSX-14121		Input IP has CC errors when DekTec ASI card Input receives more than 1480Mbps.	
PSX-14258		If the Windows Dark mode is enabled, some the Platform page information turns transparent.	
PSX-14314	PSX-14313	SAG can't be opened due to control characters on input service name.	Only alphanumeric characters and special characters : & <> _ - are supported

14 issues

6.5. Ellipse 3000 Known Issues

In this NMX release, there are no Known Issues for Ellipse 3000 features.

For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

6.6. ProView 7100 Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
IRP-11481	IRP-11207	Firmware activation fails in IE, during an upgrade or a downgrade.	
IRP-11465	ZDC-3208	DMS: The system sometimes reboots after a DMS redundancy break.	
IRP-11240		A "Critical SW failure" alarm is raised while decoding a program with the wrong BISS key.	
IRP-11199		After upgrading with a decoder board, there may be false critical SW failure alarms.	Workaround: Reboot the device again and the alarm will be remitted.
IRP-11033	ZDC-3070	Re-insertion from VBI ES is supported only if the VBI PID is according to SMPTE-2038.	
IRP-10669		Decoder: HEVC does not recover after 60 hours of RF noise long-run.	
IRP-10444		After the upgrade from software version 3.x to 4.0, the user's customized passwords cannot be used.	
IRP-10410		Upgrading from ProView version 3.6/7 to 4.x while ProView devices are in N:1 redundancy (under NMX) might be service affecting for 2 minutes.	Workaround: Stop the redundancy and only then perform the upgrade. Once all devices are in version 4.x, restore the redundancy.
IRP-10343		Upgrade to software version 4.0 or higher can only be performed from software version 3.6 or higher.	
IRP-10321		NMX: Device redundancy does not work when one device runs on software version 4.x and another on version 3.x.	
IRP-10305		Preset files from software version 3.x cannot be downloaded to software version 4.0.	All presets in software version 4.0 are XML-based.

IRP-10108		When using more than 1 program with a common PMT on the TS output (Multiplex mode), a PMT PID conflict occurs.
IRP-9787		SCTE-104 is not inserted on lines 22 and 23.
IRP-9621	ZDC-1261	Web GUI: There is no indication that TDT/TOT is present in the stream on the output multiplexer.
IRP-9574	ZDC-2105	It is not possible to set the language on the BISS Aston Pro CAM through the web GUI.
IRP-9436		Seamless switching does not work when IP IN is configured without de-jittering.
IRP-7631		The decoder blanking mode "Bar" is not displayed on HDMI output.
IRP-7315		The SDI audio groups work with an audio sample rate of 48 kHz only.

18 issues

6.7. ProView 8100 Known Issues

The following known issues remain in this release. For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Known	Release Note Information
ZDC-3654		In some rare cases, the device may revert to default settings after a power cycle.	
ZDC-3619		High PCR Jitter is experienced at low symbol rate with FEC 3/4.	
ZDC-3595	ZDC-3566	Rarely after software reboot, RF Port 2 Link Margin is reduced by > 3db.	
ZDC-3527		Failure to upgrade to versions with new Zixi library from versions below 1.5.0.	Workaround: Before upgrading to 1.5.4 or 1.6, upgrade to any 1.5.X version first.
ZDC-3388		A Zixi link performance degradation occurs when high input bitrate and FEC are enabled.	
ZDC-3172		A BISS key that is used by a program in Transparent mode, cannot be removed using the front panel.	
ZDC-2978	IRP-10622	SAG displays 0 bitrate when the Decoder Service mode is set to Fixed PID.	
ZDC-2791	IRP-9787	SCTE-104 is not inserted on lines 22 and 23.	
ZDC-2110		The MMI session does not close when the MMI dialog box is closed, during its session initialization.	Workaround: The CAM should be reset to close the MMI session.
ZDC-2105		It is not possible to set the language on the BISS Aston Pro CAM through the web GUI.	
ZDC-2087		When adding a new program in Transparent mode, the GUI shows an incorrect name.	
ZDC-1964		After disabling and re-enabling the Logical Output, there may be an overflow alarm for several seconds.	

ZDC-1794	Web GUI: A few parameters, such as PAT, CAT, PMT, and SDT tables, are not displayed in the Logical output after changing the display mode to Table View.
ZDC-1450	Web GUI: Only Russian/English/Hebrew service names are recognized.
ZDC-1407	A "Program Descrambling Failure" alarm is raised on the decoder configured to 'Automatic' and 'CA Device=None' when the same program is also configured to the output as multiplex.
ZDC-1278	Web GUI: A user with Monitor privileges can change parameters in the GUI.
ZDC-1261	Web GUI: There is no indication that TDT/TOT is present in the stream on the output multiplexer.
ZDC-1246	Web GUI: Some of the table properties can be modified when the receiver is in Transparent mode.
ZDC-1142	Web GUI: The error message "PID Conflict may occur in the output" does not appear.
ZDC-792	The decoder cannot decode HD AVC video with a bitrate higher than 40 Mbps.
ZDC-40	The Carrier Frequency label isn't updated according to the selected LNB frequency band.

21 issues

7. Resolved Security Issues

The following section contains resolved security issues that were made for this NMX release. The security issues are listed per product.

7.1. NMX Resolved Security Issues

Please refer to [Security Changes to the NMX Recovery Image](#), § "Version 1.9".

7.1.1. Security Changes to the NMX Recovery Image

The security changes to the NMX Recovery Image are included here for reference.

Version 1.9

Security Vulnerability	Comments
Ensure 'Require a password when a computer wakes (on battery)' is set to 'Enabled'	
Ensure 'Require a password when a computer wakes (plugged in)' is set to 'Enabled'	
Ensure 'Allow Telemetry' is set to 'Enabled: 0 - Security (Enterprise Only)' or 'Enabled: 1 - Basic'	
Ensure 'Do not show feedback notifications' is set to 'Enabled'	
Ensure 'Toggle user control over Insider builds' is set to 'Disabled'	
Ensure 'Setup: Control Event Log behavior when the log file reaches its maximum size' is set to 'Disabled'	
Ensure 'Setup: Specify the maximum log file size (KB)' is set to 'Enabled: 32,768 or greater'	

Security Vulnerability	Comments
Ensure 'Turn off Data Execution Prevention for Explorer' is set to 'Disabled'	
Ensure 'Turn off heap termination on corruption' is set to 'Disabled'	
Ensure 'Turn off shell protocol protected mode' is set to 'Disabled'	
Ensure 'Configure local setting override for reporting to Microsoft MAPS' is set to 'Disabled'	
Ensure 'Configure Attack Surface Reduction rules' is set to 'Enabled'	
Ensure 'Configure Attack Surface Reduction rules: Set the state for each ASR rule' is configured.	
Ensure 'Prevent users and apps from accessing dangerous websites' is set to 'Enabled: Block'	
Ensure 'Scan all downloaded files and attachments' is set to 'Enabled'	
Ensure 'Turn off real-time protection' is set to 'Disabled'	
Ensure 'Turn on behavior monitoring' is set to 'Enabled'	
Ensure 'Scan removable drives' is set to 'Enabled'	
Ensure 'Turn on e-mail scanning' is set to 'Enabled'	
Ensure 'Configure detection for potentially unwanted applications' is set to 'Enabled: Block'	

Security Vulnerability	Comments
Ensure 'Turn off Microsoft Defender AntiVirus' is set to 'Disabled'	
Ensure 'Do not allow drive redirection' is set to 'Enabled'	Remote client drive redirection (using \\tsclient) will not longer work from an RDP connection. To change this setting, use gpedit.msc and locate: "Computer Configuration\Policies\Administrative Templates\Windows Components\Remote Desktop Services\Remote Desktop Session Host\Device and Resource Redirection\Do not allow drive redirection"
Ensure 'Do not delete temp folders upon exit' is set to 'Disabled'	
Ensure 'Do not use temporary folders per session' is set to 'Disabled'	
Ensure 'Prevent downloading of enclosures' is set to 'Enabled'	
Ensure 'Allow indexing of encrypted files' is set to 'Disabled'	
Ensure 'Configure Windows Defender SmartScreen' is set to 'Enabled: Warn and prevent bypass'	
Ensure 'Allow Windows Ink Workspace' is set to 'Enabled: On, but disallow access above lock' OR 'Disabled' but not 'Enabled: On'	
Ensure 'Allow user control over installs' is set to 'Disabled'	
Ensure 'Turn on PowerShell Script Block Logging' is set to 'Disabled'	
Ensure 'Turn on PowerShell Transcription' is set to 'Disabled'	

Security Vulnerability	Comments
Ensure 'Allow Basic authentication' is set to 'Disabled'	
Ensure 'Allow unencrypted traffic' is set to 'Disabled'	
Ensure 'Disallow Digest authentication' is set to 'Enabled'	
Ensure 'Allow Basic authentication' is set to 'Disabled'	
Ensure 'Allow unencrypted traffic' is set to 'Disabled'	
Ensure 'Disallow WinRM from storing RunAs credentials' is set to 'Enabled'	
Ensure 'Orphaned Users' are Dropped From SQL Server Databases	
Ensure 'CLR Assembly Permission Set' is set to 'SAFE_ACCESS' for All CLR Assemblies	

Version 1.8

Security Vulnerability	Comments
Ensure 'Change the time zone' is set to 'Administrators, LOCAL SERVICE'	To change the time zone, run 'timedate.cpl' from an elevated command prompt, or use Server Manager, select Local Server and click on Time Zone.
Ensure 'Deny access to this computer from the network' to include 'Guests, Local account and member of Administrators group' (MS only)	Local accounts and members of Administrators group are allowed access from the network. Restriction is added only for Guests.
Ensure 'Deny log on through Remote Desktop Services' is set to 'Guests, Local account' (MS only)	Only guests are denied RDP access in NMX server. RDP access to Local accounts is still enabled.

Security Vulnerability	Comments
Ensure 'Accounts: Administrator account status' is set to 'Disabled' (MS only)	Local Administrator account is disabled and renamed (old-admin). It cannot be used to login to NMX server anymore. A new local administrator account, hlsadmin, is added with same password as before.
Configure 'Accounts: Rename administrator account'	Local Administrator account is disabled and renamed (old-admin).
Ensure 'Domain member: Digitally encrypt or sign secure channel data (always)' is set to 'Enabled'	
Ensure 'Interactive logon: Smart card removal behavior' is set to 'Lock Workstation' or higher	
Ensure 'Network security: LAN Manager authentication level' is set to 'Send NTLMv2 response only. Refuse LM&NTLM'	This setting can cause issues in RDP from a PC with incompatible LAN Manager authentication. User should contact with the IT support in case of issues.
Ensure 'User Account Control: Admin Approval Mode for the Built-in Administrator account' is set to 'Enabled'	
Ensure 'User Account Control: Behavior of the elevation prompt for administrators in Admin Approval Mode' is set to 'Prompt for consent on the secure desktop'	
Ensure 'User Account Control: Behavior of the elevation prompt for standard users' is set to 'Automatically deny elevation requests'	
Ensure 'Windows Firewall: Domain: Firewall state' is set to 'On (recommended)'	
Ensure 'Windows Firewall: Domain: Settings: Display a notification' is set to 'No'	
Ensure 'Windows Firewall: Domain: Logging: Name' is set to '%SystemRoot%\System32\logfiles\firewall\domainfw.log'	
Ensure 'Windows Firewall: Domain: Logging: Size limit (KB)' is set to '16,384 KB or greater'	

Security Vulnerability	Comments
Ensure 'Windows Firewall: Domain: Logging: Log dropped packets' is set to 'Yes'	
Ensure 'Windows Firewall: Domain: Logging: Log successful connections' is set to 'Yes'	
Ensure 'Windows Firewall: Private: Firewall state' is set to 'On (recommended)'	
Ensure 'Windows Firewall: Private: Settings: Display a notification' is set to 'No'	
Ensure 'Windows Firewall: Private: Logging: Name' is set to '%SystemRoot%\System32\logfiles\firewall\privatefw.log'	
Ensure 'Windows Firewall: Private: Logging: Size limit (KB)' is set to '16,384 KB or greater'	
Ensure 'Windows Firewall: Private: Logging: Log dropped packets' is set to 'Yes'	
Ensure 'Windows Firewall: Private: Logging: Log successful connections' is set to 'Yes'	
Ensure 'Windows Firewall: Public: Firewall state' is set to 'On (recommended)'	
Ensure 'Windows Firewall: Public: Settings: Display a notification' is set to 'No'	
Ensure 'Windows Firewall: Public: Logging: Name' is set to '%SystemRoot%\System32\logfiles\firewall\publicfw.log'	
Ensure 'Windows Firewall: Public: Logging: Size limit (KB)' is set to '16,384 KB or greater'	
Ensure 'Windows Firewall: Public: Logging: Log dropped packets' is set to 'Yes'	
Ensure 'Windows Firewall: Public: Logging: Log successful connections' is set to 'Yes'	

Security Vulnerability	Comments
Ensure 'Audit Application Group Management' is set to 'Success and Failure'	
Ensure 'Audit PNP Activity' is set to include 'Success'	
Ensure 'Audit IPsec Driver' is set to 'Success and Failure'	
Ensure 'Audit Other System Events' is set to 'Success and Failure'	
Ensure 'Audit Security System Extension' is set to include 'Success'	
Ensure 'Prevent enabling lock screen camera' is set to 'Enabled'	
Ensure 'Prevent enabling lock screen slide show' is set to 'Enabled'	
Ensure 'Allow users to enable online speech recognition services' is set to 'Disabled'	
Ensure 'Allow Online Tips' is set to 'Disabled'	
Ensure LAPS AdmPwd GPO Extension / CSE is installed (MS only)	
Ensure 'Do not allow password expiration time longer than required by policy' is set to 'Enabled' (MS only)	
Ensure 'Password Settings: Password Length' is set to 'Enabled: 15 or more' (MS only)	
Ensure 'Apply UAC restrictions to local accounts on network logons' is set to 'Enabled' (MS only)	
Ensure 'NetBT NodeType configuration' is set to 'Enabled: P-node (recommended)'	
Ensure 'MSS: (DisableIPSourceRouting IPv6) IP source routing protection level (protects against packet spoofing)' is set to 'Enabled: Highest protection, source routing is completely disabled'	

Security Vulnerability	Comments
Ensure 'MSS: (DisableIPSourceRouting) IP source routing protection level (protects against packet spoofing)' is set to 'Enabled: Highest protection, source routing is completely disabled'	
Ensure 'MSS: (EnableICMPRedirect) Allow ICMP redirects to override OSPF generated routes' is set to 'Disabled'	
Ensure 'MSS: (NoNameReleaseOnDemand) Allow the computer to ignore NetBIOS name release requests except from WINS servers' is set to 'Enabled'	
Ensure 'MSS: (SafeDllSearchMode) Enable Safe DLL search mode (recommended)' is set to 'Enabled'	
Ensure 'MSS: (ScreenSaverGracePeriod) The time in seconds before the screen saver grace period expires (0 recommended)' is set to 'Enabled: 5 or fewer seconds'	
Ensure 'MSS: (WarningLevel) Percentage threshold for the security event log at which the system will generate a warning' is set to 'Enabled: 90% or less'	
Ensure 'Prohibit installation and configuration of Network Bridge on your DNS domain network' is set to 'Enabled'	
Ensure 'Prohibit use of Internet Connection Sharing on your DNS domain network' is set to 'Enabled'	
Ensure 'Require domain users to elevate when setting a network's location' is set to 'Enabled'	
Ensure 'Include command line in process creation events' is set to 'Disabled'	
Ensure 'Encryption Oracle Remediation' is set to 'Enabled: Force Updated Clients'	
Ensure 'Remote host allows delegation of non-exportable credentials' is set to 'Enabled'	

Security Vulnerability	Comments
Ensure 'Boot-Start Driver Initialization Policy' is set to 'Enabled: Good, unknown and bad but critical'	
Ensure 'Configure registry policy processing: Do not apply during periodic background processing' is set to 'Enabled: FALSE'	
Ensure 'Continue experiences on this device' is set to 'Disabled'	
Ensure 'Enumeration policy for external devices incompatible with Kernel DMA Protection' is set to 'Enabled: Block All'	
Ensure 'Block user from showing account details on sign-in' is set to 'Enabled'	
Ensure 'Do not display network selection UI' is set to 'Enabled'	
Ensure 'Do not enumerate connected users on domain-joined computers' is set to 'Enabled'	
Ensure 'Enumerate local users on domain-joined computers' is set to 'Disabled' (MS only)	
Ensure 'Turn off app notifications on the lock screen' is set to 'Enabled'	
Ensure 'Turn off picture password sign-in' is set to 'Enabled'	
Ensure 'Turn on convenience PIN sign-in' is set to 'Disabled'	
Ensure 'Remote Access' Server Configuration Option is set to '0'	
Ensure 'CHECK_POLICY' Option is set to 'ON' for All SQL Authenticated Logins	
Ensure 'Maximum number of error log files' is set to greater than or equal to '12'	

Security Vulnerability	Comments
Ensure 'Enable RPC Endpoint Mapper Client Authentication' is set to 'Enabled' (MS only)	
Ensure 'Allow Microsoft accounts to be optional' is set to 'Enabled'	
Ensure 'Configure enhanced anti-spoofing' is set to 'Enabled'	
Ensure 'Turn off Microsoft consumer experiences' is set to 'Enabled'	
Ensure 'Require pin for pairing' is set to 'Enabled: First Time' OR 'Enabled: Always'	
Ensure 'Do not display the password reveal button' is set to 'Enabled'	
Ensure 'Enumerate administrator accounts on elevation' is set to 'Disabled'	
Ensure 'Require secure RPC communication' is set to 'Enabled'	
Ensure 'SQL Server Audit' is set to capture both 'failed' and 'successful logins'	
Ensure 'Hide Instance' option is set to 'Yes' for Production SQL Server instances	

Version 1.7

One security setting was reinforced for this version: **only one RDP session is authorized at a time.**

Version 1.6

Security Vulnerability	Comments
Ensure the sa Login Account is set to 'Disabled'	A new administrative user sqlroot is created with same password as original sa user. Going forward this user should be used for all SQL administrative activities including those originating from NMX (eg: catalog management).
Ensure the sa Login Account has been renamed	
Ensure no login exists with the name sa	
Ensure 'Interactive logon: Number of previous logons to cache (in case domain controller is not available)' is set to '4 or fewer logon(s)' (MS only)	
Ensure 'Audit Account Lockout' is set to include 'Failure'	
Ensure 'Audit Group Membership' is set to include 'Success'	
Ensure 'Audit Other Logon/Logoff Events' is set to 'Success and Failure'	
Ensure 'Audit Special Logon' is set to include 'Success'	
Ensure 'Audit Detailed File Share' is set to include 'Failure'	
Ensure 'Audit File Share' is set to 'Success and Failure'	
Ensure 'Audit Other Object Access Events' is set to 'Success and Failure'	
Ensure 'Audit Removable Storage' is set to 'Success and Failure'	
Ensure 'Audit Authorization Policy Change' is set to include 'Success'	

Security Vulnerability	Comments
Ensure 'Audit MPSSVC Rule-Level Policy Change' is set to 'Success and Failure'	
Ensure 'Audit Other Policy Change Events' is set to include 'Failure'	
Ensure 'Turn off Microsoft Peer-to-Peer Networking Services' is set to 'Enabled'	
Ensure 'Require user authentication for remote connections by using Network Level Authentication' is set to 'Enabled'	
Ensure 'Set time limit for active but idle Remote Desktop Services sessions' is set to 'Enabled: 15 minutes or less'	<p>Any RDP session which is idle for over 15 minutes will be disconnected. If required, user can change this using gpedit.msc and going to:</p> <p><i>Local Computer Policy->Computer Configuration->Administrative Templates->Windows Components->Remote Desktop Services->Remote Desktop Session Host->Session Time Limits</i></p>
Ensure 'Set time limit for disconnected sessions' is set to 'Enabled: 1 minute'	<p>Any disconnected session is closed after 1 minute. When a session is closed, all applications open on the session are also closed. If required, user can change this using gpedit.msc and going to:</p> <p><i>Local Computer Policy->Computer Configuration->Administrative Templates->Windows Components->Remote Desktop Services->Remote Desktop Session Host->Session Time Limits</i></p>
Ensure 'Manage preview builds' is set to 'Enabled: Disable preview builds'	
Ensure 'Select when Preview Builds and Feature Updates are received' is set to 'Enabled: Semi-Annual Channel, 180 or more days'	
Ensure 'Turn off Help Experience Improvement Program' is set to 'Enabled'	

7.2. Electra X/X2/XVM Resolved Security Issues

The following resolved security issues are included in this release of NMX.

For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
-----	------------------------	-----------------------

No issues found

7.3. XOS Appliance Resolved Security Issues

There are no XOS Appliance Resolved Security Issues are included in this release of NMX.

For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
-----	------------------------	-----------------------

No issues found

7.4. ProStream X Resolved Security Issues

The following resolved security issues are included in this release of NMX.

For specific known issues in earlier releases, refer to the archived release notes at: C:\Program Files\Harmonic\Documents\Archive_Release_Notes.

Key	Multi Branch Parent	Rn Summary - Resolved
-----	------------------------	-----------------------

No issues found

8. H/W and F/W Compatibility

8.1. Supported Devices

8.1.1. Supported Harmonic Devices

⚠ Important!

Whenever you upgrade your device hardware, you will need to re-create the devices in your NMX network map and service maps. Delete old devices and services from your network and service maps and re-create them with the correct device type.

⚠ Important!

Important! If you have an existing Electra X2S installation and want to upgrade to this NMX version, please contact Harmonic Technical Support.

⚠ Important!

GRID is no longer packaged, starting with NMX 8.5.0. To obtain the latest version, please contact Harmonic Customer Support.

Device	Type	Version
NMX	Network Management System	9.3.0.0.024
Electra X2S	Statmux in a box	9.3.0.0.024 1.20.0.0.063 3.4.1.0.051
Electra X	Encoder	1.20.0.0.063
Electra XVM	Virtual Encoder	1.20.0.0.063
Ellipse 3000	Encoder	3.3.5.0.76

Device	Type	Version
ProStream X/XVM/Docker	Stream Processor	3.4.1.0.051
ProView 7100	Integrated Receiver-Decoder	4.3.5.0.88
ProView 8100	Integrated Receiver-Decoder	1.6.1.0.23
SMD 9200	Modulator	3.0.0 3.2.1
SMD 9300	Modulator	M6100_1.4.2.38683 M6100_1.4.11.47223
ProStream 3600	Modulator	v2.30 Nov 9 2009 10:41:37 v8.41 May 25 2012 12:53:38
XOS Appliance	Receiver/Processor	1.18.0.0.30 (ISO,BIN) 1.18.0.0.0.4 (RPM) 1.18.0.0.69 (vos_bundle)

Other Supported Harmonic Devices

Tested vs. Supported Versions

NMX supports all the subsequent patches for versions listed under “Supported Versions,” but QA tests only the specific versions listed under “Tested Versions.”

Device	Type	Tested Versions	Supported Patch Versions
Amethyst III	ASI or IP Smart Switch	02.00.01 02.22.02 02.22.03 02.22.05 02.22.06	02.00.xx 02.22.xx

Device	Type	Tested Versions	Supported Patch Versions
ProSwitch	ASI or IP Smart Switch	01.00.00 01.10.00 01.20.00 01.30.00 02.00.00 02.10.00	01.00.xx 01.10.xx 01.20.xx 01.30.xx 02.00.xx 02.10.xx
NetProcessor 9030/9040	T2-gateway function	05.00.03 05.11.00	05.00.xx 05.11.xx
Electra VS	Encoder / Transcoder	05.00.01 05.10.04 05.11.04 05.12.00 05.14.00	05.00.xx 05.10.xx 05.11.xx 05.12.xx 05.14.xx
Electra XT	Dense Transcoder	02.00.01 02.50.00 02.60.01 02.61.00 02.62.00 02.64.00 02.70.03 02.71.00 02.80.00 02.90.00 03.00.00 03.10.00	02.00.xx 02.50.xx 02.60.xx 02.61.xx 02.62.xx 02.64.xx 02.70.xx 02.71.xx 02.80.xx 02.90xx 03.00.xx 03.10.xx
ViBE CP9000	Contribution encoder	02.00.00 02.10.00 02.50.00 02.60.00 02.70.00	NA
RD9000	Contribution decoder	01.5.0 01.7.0 01.8.0 01.9.0 01.10.0 01.11.0	NA

Device	Type	Tested Versions	Supported Patch Versions
Spectrum XE	Compressed Layout	02.10.00 2.50.02.006 3.00.01.020 03.10 03.20 03.40 03.50 03.60 03.70 03.80 04.00	02.10.xx 02.50.xx 03.00.xx 03.10.xx 03.20.xx 03.40.xx 03.50.xx 03.60.xx 03.70.xx 03.80.xx 04.00.xx

8.1.2. Supported Third-Party Devices

The following third-party products are **supported** in this NMX release:

Device Type	Vendor / Family in NMX	Model	Supported Firmware
Audio Encoder	QBit radio encoder	QBit 561	v2.250
Audio Encoder	2Wcom audio encoder	IP-8e	v2.05.12
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Sirius 800	
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Sirius 600	
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Pyxis	SDC Na-00743 SW-P-02 over IP
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Halo	SC12 V1.10 LARGE
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Cygnus	
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Freeway	SC12 V1.10 LARGE

Device Type	Vendor / Family in NMX	Model	Supported Firmware
Baseband Router	UTAH (Probel SWP-02 protocol)	100/UDS	v 02.03
Baseband Router	(GV) Snell (Probel SWP-02 protocol)	Vega (100 series)	Controller v3.17.1.6093 Vega Routing v3.17b.31
Baseband Router	(GV) Miranda (NV9000 controller with NP0017 protocol)	NVision 8576	v 4.4.0, v 4.6.2
Baseband Router	(GV) Miranda (NV9000 controller with NP0017 protocol)	NVision 8256	v 4.4.0, v 4.6.2
Baseband Router	(GV) Miranda (NV9000 controller with NP0017 protocol)	NVision 5128	v 4.4.0, v 4.6.2
Baseband Router	Nevion (MRP protocol)	Vikinx Sublime (Video only)	v2.7.2
Baseband Router	Nevion (MRP protocol)	VikinX Sublime X2	v6.1.1
Baseband Router	Harris/Imagine (Leitch Pass Thru protocol)	Panacea	v 1.46
Baseband Router	Harris/Imagine (Leitch Pass Thru protocol)	Platinum	v 4.x
Baseband Switch	Harris/Imagine (Leitch Pass Thru protocol)	Platinum VX	v1.3.8
Baseband Router	Harris/Imagine (Leitch Pass Thru protocol)	Integrator	v 4.46
Baseband Router	Harris/Imagine (Leitch Pass Thru protocol)	Leitch Xplus	
Baseband Router	Harris/Imagine (Leitch Pass Thru protocol)	Leitch HD	

Device Type	Vendor / Family in NMX	Model	Supported Firmware
Baseband Switch	DEV	DEV 1951	32-0037 S.01
Baseband Router	Evertz (Quartz protocol)	EQX family (10 and 26 at least)	1 0 88
HIM (Harmonic Infrastructure Manager)	Red Hat Ansible Tower	Ansible AWX	1.10.0.0.37
IP Switch	Cisco switches are listed in the next section.		
Modulator	Radyne	DM240XR-100S-A	F 05377-Y
Modulator	Radyne	DM240XR-100S-LBAND	
Modulator	Radyne	DM240XR-200S	
Modulator	Radyne	DM240XR-200S-A	
Modulator	Radyne	DM240XR-200S-LBAND	
Modulator	Radyne	DM240XR-300S	
Modulator	Radyne	DM240XR-300S-A	
Modulator	Radyne	DM240XR-300S-LBAND	
Modulator	Sencore	ASM988A	
Modulator	Newtec	MCX7000	v2.5.2
Modulator	Newtec	M6100	v2.11.7
Other	Keepixo	AL2000	3.3.r62572
Other	Asentria/Omnitronix GPI box	S410	HAR312G
Other	Asentria/Omnitronix GPI box	SL 10	HAR312G

Device Type	Vendor / Family in NMX	Model	Supported Firmware
Other	W&T GPI box	57730	v1.44
Other	Nevion/TVIPS	CP 541/TNS 541/TNS 544	1.0.21 2.4.0 2.8.0
Other	Nevion/TVIPS	CP 515/TNS 515	4.0.38
Other	Enensys	NN6 – T2 Gateway	v 2.7.7
Other	Enensys	NN6 – T2 Gateway - IP	3.6.3
Other	Enensys	HDm Smart Gate T2 Gateway	v3.10.1
Other	Enensys	NN6- MIP inserter	v 3.4.7
Other	Enensys	HDm Smart Gate T (MIP inserter)	v4.1.6
Other	Enensys	ASI Guard	v 2.1.1
Other	Enensys	IPGuardE2	1.3.1
Other	Enensys	IPGuard v2	2.7.3
Other	Grass Valley A/B Switch	8972PX	
Other	MIT-xperts	iSIMS	2022.1.0
Other	MIT-xperts	iMUX	2022.1.0
Receiver	Motorola	DSR 4410	0000c8:007924:00019 E
Receiver	Cisco/SA	D9650	v 2.33
Receiver	Cisco/SA	D9850	v 2.33
Receiver	Sencore	MRD 3187A – 1Ch	v 6.1.0-v 6.2.1
Receiver	Sencore	MRD 3187B – 1 Ch	v 7.3.1
Receiver	Sencore	MRD 3187A – 2 Ch	v 6.1.0-v 6.2.1

Device Type	Vendor / Family in NMX	Model	Supported Firmware
Receiver	Sencore	MRD 3187B – 2 Ch	v 7.3.1
RF Switch	Newtec	USS0202 / USS0212	v2.4.8 v3.4.8
RF Switch	Quintech	SRM 2150	v 2.75
RF Switch	Quintech	SRM 200	v 2.75
RF Switch	Quintech	SRR 070	v 1.58
RF Switch	Quintech	QRM 2500	Fv4.49
RF Switch	Universal	10943B-D485 (L-band)	v 1.01
RF Switch	Universal	10942B-D485 (IF-band)	v 1.01
RF Switch	Universal	10943B-SE10-4 (L-band)	2.01 2.02
RF Switch	Universal	10942B-S3E10 (IF-band)	2.01 2.02
Time Server	NTP Time Server Monitor	Meinberg	v 1.04

Note: for Baseband Routers, cross-point control is supported on all models but the alarm monitoring is only supported on Snell, Utah and Harris/Imagine models.

Cisco Switches Support

For monitoring purposes, NMX supports the following Cisco Catalyst and Nexus switches family generically, i.e., in the following model/option combinations and OS versions:

- Cisco Catalyst 2960, 3560, 3650, 3750 and 3850
- Cisco Catalyst 4948, 4500 and 6500 series
- Cisco Catalyst 9200, 9300 and 9500 series
- Cisco Nexus 9000 series: tested with models 9372PX-E, 9372TX-E, 9372PX, 93180 and 93240.

All new deployments requiring the use of the Cisco switches listed here should be declared in NMX as Cisco Catalyst 1RU, Cisco Catalyst modular or Cisco Nexus.

Due to the many Cisco models with respective port/uplink options and different versions of the Cisco OS, be advised that all combinations have not been tested, but are supported for generic implementations. Report any

deployment difficulties to Harmonic Tech Support. Note that NMX does not support upgrading firmware for generic or legacy Cisco switches.

If your deployment requires NMX to monitor port-level alarms on the switches, install one of the following legacy Cisco switch models (declared as Cisco Legacy), which have the appropriate firmware:

Device Type	Vendor	Model	Supported Firmware
IP Router	Cisco	Catalyst 3750_24TS 24 ports Catalyst 3750G-24TS 24 port+ 4 uplinks Catalyst 3750-48TS 24 ports	v 12.2(35)
IP Router	Cisco	Catalyst 4948 48 ports Catalyst 4948 48 ports + 4x1G uplinks	v 12.2(25)EWA v 12.2(53)SG8
IP Router	Cisco	Catalyst 6500 Series	v 12.2(18)SXF17a
IP Router	Cisco	Catalyst 3750x 24 ports Catalyst 3750x 24 ports + 4x 1G uplinks Catalyst 3750x 24 ports + 4x 1G & 2x10G uplinks Catalyst 3750x 48 ports Catalyst 3750x 48 ports + 4x 1G uplinks Catalyst 3750x 48 ports + 4x 1G & 2x10G uplinks	v 12.2(55)SE3(UNIVERSALK9)
IP Router	Cisco	Catalyst 3560x 24 ports Catalyst 3560x 24 ports +4x 1G uplinks Catalyst 3560x 24 ports + 4x 1G & 2x10G uplinks Catalyst 3560x 48 ports Catalyst 3560x 48 ports +4x 1G uplinks Catalyst 3560x 48 ports + 4x 1G & 2x10G uplinks	v 12.2(55)SE5(UNIVERSALK9)

Device Type	Vendor	Model	Supported Firmware
IP Router	Cisco	Catalyst 3850_48T 48 ports Catalyst 3850_48T 48 ports + 4x 1G uplinks Catalyst 3850_48T 48 ports + 4x 10G uplinks Catalyst 3850_48T 48 ports + 2x 1G & 2x 10G uplinks	03.02.03.SE
IP Router	Cisco	Catalyst 3650_24TS	03.07.02E

You must always use the Cisco switch CLI, GUI or equivalent tools to configure the switch before installing it in the NMX network.

8.2. Unsupported Devices

8.2.1. Unsupported Harmonic Devices

The following table lists the Harmonic devices that have reached their End of Service (EOS) with their corresponding NMX release.

NMX Release	Devices No Longer Supported
9.3.x	<ul style="list-style-type: none"> • ProStream 9000
9.0.x	<ul style="list-style-type: none"> • Electra 9200
8.5.x	<ul style="list-style-type: none"> • Electra 8100/8200/8300 • ProMedia X Origin • Iris
8.2.x	<ul style="list-style-type: none"> • ProMedia Live • ProMedia Package • ProMedia Origin 1.x • ProStar
8.0.x	<ul style="list-style-type: none"> • ProStream 1000 • Ion Encoder • Audio Encoder • Ion AVC HD • Ion AVC SD • Electra 1000 • Electra 5000 • Electra 5400 • Electra 7000 • ProView 2900
7.8.x	<ul style="list-style-type: none"> • Ion AVC SD • Ion AVC HD • Electra 1000
7.6.x	<ul style="list-style-type: none"> • bNSG

NMX Release	Devices No Longer Supported
7.3.x	<ul style="list-style-type: none"> • Ellipse 1000 • Ellipse 2000
6.x	<ul style="list-style-type: none"> • ProStream 1000 Mentor • ProStream 1000 256M Platform • ASI-RMX card (unsupported beginning with NMX 7.0) • ProStream 2000 Digital Splicer • ProStream 4000 Multiscreen Transcoder • ProStream 8000 IP Digital Mosaic System • NSG (8108, 9116, 9000-3G/6G/40G) Universal EdgeQAM • MV encoders • MN 20 • BNG Multiplexers and EdgeQAMs • Optical Transport Devices • DDM • Terayon CherryPicker

Note:

NMX 7.0 no longer supports ProStream 1000 devices with ASI-RMX cards; replace your ASI-RMX cards with ASI-SCR cards before upgrading to NMX 7.0.

NMX will not upgrade catalogs with ProStream 1000 devices with ASI-RMX cards. To upgrade to NMX 7.0 from earlier releases, see the [NMX_InstallGuide.pdf](#).

Note:

The Electra 8310 series with multi-screen services only is not supported; it can only be used in conjunction with a 60 Hz Broadcast service.

8.2.2. Unsupported Third-Party Devices

No third-party device support was dropped from this NMX release.

8.3. NMX Recovery Image Versions and Compatibility

The purpose of NMX Recovery Image updates is to deliver NMX servers and OVA with the up to date Windows patches and other security hardening. These images are available to customers for already deployed systems to take advantage of this hardening, without obligation to upgrade to the latest NMX software. The version number of the recovery image is available in the file c:\Utilities\Version.txt of the NMX server (latest version of the history).

 **Note:**

The NMX recovery images do not apply on custom hardware (i.e., a server provided by the customer). A specific setup procedure provided in the NMX Installation Guide must be performed instead.

8.3.1. Notes on Updating the NMX Recovery Image

Customers can also update the Windows Server 2019 image on their deployed NMX servers without applying the new recovery image. A section has been added in the NMX Install Guide that details the procedure to update your existing image (starting with NMX v8.9 / image v1.5) to same level as the latest recovery image.

The Windows updates validated with NMX can be installed directly on NMX server (or through a WSUS server), but **we strongly recommend using the latest NMX Recovery Image**.

Beginning with NMX 8.9, the Python version included with NMX has been upgraded from v2.7 to v3.9. Python scripts created and used in previous NMX releases may not run in 8.9 and should be converted.

Every NMX recovery image since WS2012 image v2.6 comes with the User Account Control (UAC) enabled by default for increased security. Since NMX Domain Manager client application requires Windows Administrator privileges, this can cause the appearance of warning messages each time you launch these applications on the NMX server. To prevent these messages from being generated, you must change the Windows UAC setting. Consult the Windows Server documentation for details.

8.3.2. NMX Recovery Images

ISO images can be found in the "NMX Recovery Image" page of Harmonic Software Download Portal. This section contains lists of the supported image versions, and their compatibility with NMX software and hardware platforms provided by Harmonic.

Windows Server 2019

NMX 8.5 and later releases require Windows Server 2019 (WS2019). The upgrade procedure from WS2012 to WS2019 recovery image is provided in NMX Installation Guide.

Please note that the high password security policy is enforced by default in the image (you can change it after the first time you log in), with the following rules:

- On first Windows login, user is forced to change the default password

- Complex password rule is enforced
- Password expiration is set to 90 days
- When changing a password, the 12 previous passwords are forbidden

Please also note that NMX 8.4 and earlier releases are not supported on WS2019.

 **Note:**

In order to follow **CIS Security Benchmark Compliance**, the Windows security settings are reinforced in the recovery image versions (you can find the details of these settings in § "Security Changes to the NMX Recovery Image" of this RN). This can bring some restrictions when the recovery image is updated, like the main following ones:

From recovery version 1.5 onward, the '**Allow Remote Shell Access local computer**' policy is **Disabled**. If you need to install an **Active Directory**, or any other server role that requires this policy to be enabled, then you must enable it manually.

From recovery version 1.7 onward, the '**Restrict Remote Desktop Services users to a single Remote Desktop Services**' policy is **Enabled**. If you need several simultaneous RDP sessions, then you must disable it manually (see NMX Install Guide for details).

From recovery version 1.8 onward:

- Default **"Administrator" Windows account has been disabled and replaced by "hlsadmin"** (default password unchanged). Note that the default user account for NMX application login remains "Administrator".
- The '**Apply UAC restrictions to local accounts on network logons**' policy is **Enabled**. For example, local admin accounts cannot access admin shares (ADMIN\$, C\$ etc.). If you need such access, then you must disable this policy manually.
- The '**Network security: LAN Manager authentication level**' policy is set to '**Send NTLMv2 response only\Refuse LM&NTLM**'. Remote PC that needs to connect to NMX server (e.g. for RDP session) shall use NTLMv2 authentication protocol, or you must change the policy manually.
- The '**Change the time zone**' is set to '**Administrators, LOCAL SERVICE**'. To change the time zone, run 'timedate.cpl' from an elevated command prompt, or use Server Manager, select Local Server and click on Time Zone.

Some potential issues related to security policy reinforcement and how to fix them is indicated in § "Troubleshooting NMX" of NMX Install Guide.

Version	Date	Changes	NMX Version Information
1.9	01/24/2022	<ul style="list-style-type: none">• Installed Windows security updates till date• Installed updates for other Microsoft products till date• Windows security settings reinforced to comply to a lot more items of CIS benchmarking.• Upgraded FileZilla (3.57.0), ElasticSearch (7.16.3)	Released with 9.3.0.0 GA Min NMX version: 8.5.0

Version	Date	Changes	NMX Version Information
1.8	12/06/2021	<ul style="list-style-type: none">• Installed Windows security updates till date• Installed updates for other Microsoft products till date• Windows security settings reinforced to comply to a lot more items of CIS benchmarking.• Default "Administrator" Windows account disabled and replaced by "hlsadmin" (default password unchanged)	Released with 9.2.0.0 GA Min NMX version: 8.5.0

Version	Date	Changes	NMX Version Information
1.7	06/25/2021	<ul style="list-style-type: none">• Installed Windows security updates till date• Installed updates for other Microsoft products till date• Windows security settings reinforced. In particular, only one RDP session authorized, and local user session is locked after 15 minutes of idle time.	Released with 9.1.0.0 GA Min NMX version: 8.5.0

Version	Date	Changes	NMX Version Information
1.6	03/31/2021	<ul style="list-style-type: none">• Installed Windows security updates till date• Installed updates for other Microsoft products till date• Windows security settings reinforced to comply to additional items of CIS benchmarking. As part of them, idle RDP connections will now disconnect in 15 minutes.• The sa user of SQL server has been disabled and replaced by a new user name (see NMX Install Guide).	Released with 9.0.0.0 GA Min NMX version: 8.5.0

Version	Date	Changes	NMX Version Information
1.5	12/15/2020	<ul style="list-style-type: none"> • Installed Windows security updates till date • Installed updates for other Microsoft products till date • Windows security settings reinforced to comply to most items of CIS benchmarking. In particular, Remote Shell Access is disabled by default (must be enabled if Active Directory is required) • Some vulnerability fixes (see § Resolved Security Issues) 	<p>Released with 8.9.0.0 GA</p> <p>Min NMX version: 8.5.0</p>
1.4	08/18/2020	<ul style="list-style-type: none"> • Installed Windows security updates till date 8/18 • Installed updates for other Microsoft products till date 8/18 • Installed .Net 4.8 framework • Added Adobe Acrobat Reader DC tool in NMX OVA 	<p>Released with 8.8.0.0 GA</p> <p>Min NMX version: 8.5.0</p>

Version	Date	Changes	NMX Version Information
1.3	05/27/2020	<ul style="list-style-type: none">• Installed Windows security updates until May 2020• Installed updates for other Microsoft products until May 2020• Disabled static key ciphers which are potentially vulnerable to security risks	Released with 8.7.0 GA Min NMX version: 8.5.0
1.2	03/12/2020	<ul style="list-style-type: none">• Installed Windows security updates until March 2020• Installed updates for other Microsoft products until March 2020• Installed the required drivers/ software from the Gen10 Service Pack for ProLiant (SPP) applicable for the HPE servers	Released with 8.6.0 GA Min NMX version: 8.5.0

Version	Date	Changes	NMX Version Information
1.1	12/06/2019	<ul style="list-style-type: none"> Support for Windows Server 2019 and SQL Server 2017 Installed Windows security updates until November 2019 Installed updates for other Microsoft products until November 2019 Changes related to the Windows security policy 	Released with 8.5.0 LA and GA Min NMX version: 8.5.0

Windows Server 2012 R2 (Only supports NMX 8.4 and earlier releases.)

From NMX 8.4.x onward, TLS 1.0 has been disabled for security reasons. If a downgrade to an earlier release of NMX is required, TLS 1.0 must be manually enabled before the downgrade for NMX to work correctly. Please contact Harmonic Customer Support for this specific operation.

Version	Date	Changes	NMX Version Information
3.2	10/14/2020	<ul style="list-style-type: none"> Installed Windows security updates till date (10/14/2020) Installed updates for other Microsoft products till date (10/14/2020) 	Released - Standalone Min NMX version: 7.8.2.0 NOTE: Only OVAs are created.
3.1	03/04/2020	<ul style="list-style-type: none"> Installed Windows security updates till date (03/04) Installed updates for other Microsoft products till date (03/04) 	Released without NMX version Min NMX version: 7.8.2.0

Version	Date	Changes	NMX Version Information
3.0	11/22/2019	<ul style="list-style-type: none"> • Installed Windows security updates till date (11/22) • Installed updates for other Microsoft products till date (11/22) • Fixed the issue related to the Dell R230 server support (NMX-66334) 	<p>Released with 8.4.2</p> <p>Min NMX version: 7.8.2.0</p>
2.9	08/21/2019	<ul style="list-style-type: none"> • Added support for HPE DL360 Gen10 platform (excluding HW alarm monitoring) • Installed Windows security updates till date (8/21) • Installed updates for other Microsoft products till date (8/21), in particular SP3 of SQL server 2014 which is required for NMX 8.4 	<p>Released with 8.4.0 (see the note above)</p> <p>Min NMX version: 7.8.2.0</p>
2.7	07/09/19	<ul style="list-style-type: none"> • Installed Windows security updates till date (05/20) • Installed updates for other Microsoft products till date (05/20) • Changes to pre-configure the server for Ansible 	<p>Released with 8.3.0</p> <p>Min NMX version: 7.8.2</p>
2.6	03/26/19	<ul style="list-style-type: none"> • Installed Windows security updates till date • Installed updates for other Microsoft products till date • Enabled Windows Firewall 	<p>Released with 8.2.0</p> <p>Min NMX version: 7.8.2</p>
2.5	01/02/19	<ul style="list-style-type: none"> • Installed Windows security updates till date • Installed updates for other Microsoft products till date • Disabled ElasticSearch service by default 	<p>Released with 8.1.0</p> <p>Min NMX version: 7.8.2</p>

Version	Date	Changes	NMX Version Information
2.4	11/20/18	<ul style="list-style-type: none"> • Installed Windows security updates till date • Installed updates for other Microsoft products till date • NMX-62897: Microsoft Internet Explorer Security Update for September 2017 • NMX-62893: Microsoft Visual Studio Security Update for July 2018 – KB4336919 • NMX-62891: Microsoft Security Update for SQL Server (ADV180002) (Spectre/ Meltdown) – KB4056898 • NMX-62887: Microsoft Internet Explorer Cumulative Security Update (MS15-124) – KB3104002 • NMX server hardening requirements to comply to CIS benchmarks standard. • Installed Elastic Search and Kibana 	<p>Released with 8.1.0</p> <p>Min NMX version: 7.8.2</p>
2.2	09/13/18	<ul style="list-style-type: none"> • Installed Windows security updates till date • Installed updates for other Microsoft products till date • Fixed vulnerabilities detected by Qualys scan 	<p>Released with 8.0.1.0</p> <p>Min NMX version: 7.5.0</p>
2.1	07/30/18	<ul style="list-style-type: none"> • Installed Windows security updates till date • Changes to reduce the size of the recovery image 	<p>Released with 8.0.0</p> <p>Min NMX version: 7.5.0</p>
2.0	06/22/18	<ul style="list-style-type: none"> • Installed Windows security updates till date 	<p>Released with 8.0.0</p> <p>Min NMX version: 7.5.0</p>

Version	Date	Changes	NMX Version Information
1.9	03/16/18	<ul style="list-style-type: none"> Installed Windows security updates till date 	Released with 7.8.2.0 Min NMX version: 7.5.0
1.8	12/01/17	<ul style="list-style-type: none"> Installed Windows security updates till date 	Released with 7.8.0.1 Min NMX version: 7.5.0
1.7	08/30/17	<ul style="list-style-type: none"> NMX-59662 Added Intel video driver NMX-59696 Cleared default windows product key to prevent licensing issues 	Released with 7.8.0.0 Min NMX version: 7.5.0
1.6	07/27/17	<ul style="list-style-type: none"> Added support for Dell R230 XL Server Installed Windows security updates till date 	Released with 7.7.2.0 Min NMX version: 7.5.0
1.5	06/05/17	<ul style="list-style-type: none"> Installed Windows security updates till date Installed Windows security patch for WannaCry Ransomware 	Released with 7.6.3.0 Min NMX version: 7.5.0
1.4	10/13/16	<ul style="list-style-type: none"> Updated DTC settings for GRID server Installed driver for NMX server front panel Installed Windows security updates till date 	Released with 7.5.4.0 Min NMX version: 7.5.0
1.3	02/19/16	<ul style="list-style-type: none"> Applicable to Intel Wildcat, Dell R620 and Dell R230 servers. Fixed the issue of duplicate device SN ID. 	Released with 7.5.0.0 Min NMX version: 7.5.0

9. Hardware Platforms

9.1. Supported Hardware Platforms

This NMX release is supported on the following hardware server platforms provided by Harmonic:

Harmonic Part Number	Configuration
NMX-HWP-3G-A	<ul style="list-style-type: none"> • HPE DL360 Gen10 • 2 x Xeon Silver 4208 (2.1GHz) • 64GB RAM • 2 x 480GB SSD drive in RAID1 • 4 x 1GbE ports • Dual power supply, Hot swappable • WS2019 / SQL Server 2017 • Downgrade to WS2012 / SQL Server 2014 required for NMX < 8.5. • Win2019-Recovery-Image_v1.1 or higher • Win2012-Recovery-Image_v2.9 or higher (NMX < 8.5).
NMX-HWP-3F-A NMX-HWP-3F-B	<ul style="list-style-type: none"> • INTEL Wildcat Pass R1304WT2 • 2 x 2.4GHz Intel Xeon E5-2620v3, 6 cores, 15M Cache • 16GB RAM (NMX-HWP-3F-A) or 32 GB (NMX-HWP-3F-B) • 480 GB SSD • 4 x 1GbE Ports • Dual power supply, Hot swappable • Upgrade to WS2019 / SQL Server 2017 required for NMX 8.5. • Upgrade of NMX-HWP-3F-A to 32GB required for NMX 8.5. • Win2019-Recovery-Image_v1.1 or higher. • Win2012-Recovery-Image_v1.3 or higher (NMX < 8.5).

Harmonic Part Number	Configuration
NMX-HWP-2F-A	DELL R230 XL <ul style="list-style-type: none"> • 1X 3.0 GHz Intel Xeon E3-1220v5, 4 cores, 8M Cache • 8GB RAM <ul style="list-style-type: none"> - 16GB RAM starting with Rev B (2/2019) 2 x 500 GB 7200 rpm RAID1 HDD (Mirror) <ul style="list-style-type: none"> - 2 x 1 TB RAID1 HDD starting with Rev A (3/2018) 2 x 1GbE Ports <ul style="list-style-type: none"> • Single power supply • Upgrade to WS2019 / SQL Server 2017 required for NMX 8.5. • Upgrade to 32GB required for NMX 8.5. • Win2019-Recovery-Image_v1.1 or higher. • Win2012-Recovery-Image_1.6 or higher (NMX < 8.5)
NMX-HWP-3F1-A	Same as NMX-HWP-3F-A (but delivered with WS2008). <ul style="list-style-type: none"> • Upgrade to WS2019 / SQL Server 2017 required for NMX 8.5. • Upgrade to 32GB required for NMX 8.5. • Win2019-Recovery-Image_v1.1 or higher. • Win2012-Recovery-Image_1.6 or higher (NMX < 8.5)

Note: the server can also be a custom hardware platform provided by customer. In such case, the platform and OS must comply to minimum requirements described in the NMX Installation Guide. The NMX recovery images don't apply on custom hardware, a specific setup procedure provided in the NMX Installation Guide must be performed,

9.2. Unsupported Hardware Platforms

This NMX release is not supported on the following server platforms:

Part Number	Configuration
DELL11P4-PRO	Dell 860, 1GB RAM, Win 2000 Pro, SQL
DELL11P4-SQL-S	Dell 860, 1GB RAM, Win Svr 2000, SQL 2000
R-DELL11P4-SQL-S	Dell 860, 1GB RAM, Win Svr 2000, SQL 2000
DELL11P4-SQL-S-4	Dell 860, 1GB RAM, Win Svr 2003, SQL 2008
DELL12PX-SQL-S-01	Dell 1950-III, 4GB RAM, Win Svr 2003, SQL 2000
DELL12PX-SQL-S-2K	Dell 1950-III, 4GB RAM, Win Svr 2000, SQL 2000
DELL12PX-SQL-S-3-01	Dell 1950-III, 4GB RAM, Win Svr 2000, SQL 2000
R-DELL12PX-SQL-S	Dell 1950, 2GB RAM, Win Svr 2000, SQL 2000
NMX-HWP-2D-A	Dell R200, 2GB RAM, Win 2003, SQL 2000
NMX-HWP-2D-B	Dell R200, 2GB RAM, Win 2003, SQL 2000
NMX-HWP-3D-B	Dell R610, 4GB RAM, Win Svr 2003, SQL 2000
NMX-HWP-3D-D	Dell R610, 4GB RAM, Win Svr 2003, SQL 2000
DELL11P4-SQL-S-2K	Dell 2950, 2GB RAM, Win Svr 2000, SQL 2000
HWP-DELL-2D-NMX-A	Dell R210, 4GB RAM, Win Svr 2003, SQL 2008
HWP-DELL-2D-NMX-D	Dell R210, 4GB RAM, Win Svr 2003, SQL 2008
NMX-HWP-2D-A-01	Dell R210, 4GB RAM, Win Svr 2003, SQL 2008

Part Number	Configuration
NMX-HWP-2D-D	Dell R210, 4GB RAM, Win Svr 2003, SQL 2008
NMX-HWP-2D-E	Dell R210, 4GB RAM, Win Svr 2003, SQL 2008
DMS-HWP-3D-A	Dell R610, 4GB RAM, Win Svr 2003, SQL 2008
HWP-DELL-3D-NMX-A	Dell R610, 4GB RAM, Win Svr 2003, SQL 2008
HWP-DELL-3D-NMX-D	Dell R610, 4GB RAM, Win Svr 2003, SQL 2008
NMX-HWP-3D-A	Dell R610, 4GB RAM, Win Svr 2003, SQL 2008
NMX-HWP-3D-A-02	Dell R610, 16GB RAM, Win Svr 2003, SQL 2008
NMX-HWP-3D-D	Dell R610, 16GB RAM, Win Svr 2003, SQL 2008
HWP-DELL-2E-NMX-A	DELL R210-II , 8GB RAM, Win Svr 2008, SQL 2008
HWP-DELL-2E-NMX-C	DELL R210-II , 8GB RAM, Win Svr 2008, SQL 2008
HWP-DELL-3E-NMX-A	DELL R620 , 16GB RAM, Win Svr 2008, SQL 2008
HWP-DELL-3E-NMX-C	DELL R620 , 16GB RAM, Win Svr 2008, SQL 2008

10. NMX Sizing and Scalability

10.1. Recommendations

This section provides information on sizing limits and scalability of NMX software, running on the high-end hardware platform (NMX-HWP-3F-A). It does not cover the sizing and performance of devices managed by NMX.

10.1.1. Maximum Recommended Figures

NMX does not artificially limit the number of devices, streams, clients, GUIs, etc., that can be operational at any given time; the limits in NMX scalability are related to the resulting performances. This allows NMX to support as many of these components as possible given the customer's network, network bandwidth, server performance, etc. These limits can also depend on what the customer considers acceptable for their environment. For example, one criterion is the NMX Domain Manager startup time; the startup time must be less than 5 minutes in Harmonic performance tests.

The primary factor in system scale is the number of provisioned streams in the server. But there are many combinations of factors (device types, architecture, service number) and usability criteria, so it can be very difficult to provide accurate summary tables of limits.

Here are some recommended maximum limits for some typical system configurations:

System Configuration	Max Recommended Elementary Streams per NMX
MPTS VBR, with 6 NG's of (10:2 Electra X + 1:1 ProStream 9K or X) – 84 devices	2640 ES
IPTV, with 10 NG's of 10:2 Electra X – 120 devices	9600 ES
OTT, with 4 NG's of xx Electra X	4400 ES (one video profile considered as one ES), 400 inputs SPTS, 13200 descriptors

NG = Network Group in NMX

Note

The maximum recommended number of devices managed under one NMX server is 200 (this excludes logical devices like inputs and outputs of the system).

Note

The management of a very large system can be split into several NMX servers that can be declared as proxy-sites in a central NMX for a centralized view of the entire system.

10.1.2. Sizing Related to ProStream X Management

With NMX 8.2 and later versions, a dedicated type of service plan, named "Service Plan X" is proposed in NMX in addition to the standard service plan. Service Plan X enables higher maximum sizing for ProStream X management. It is only applicable to ProStream X output transports with or without Electra X/XOS encoders, with or without DiviTrack. This feature is in Limited Availability in 8.2; please contact Harmonic support before using it. The maximum recommended sizing manageable by NMX is the following:

Sizing Item	Unit	Standard Service Plan	Service Plan X
Total TS	TS	500	1,000
FEC TS	TS	500	1,000
Total Services	Services	500	1,000
Scrambled Services	Services	500	1,000
PIDs (all service components and tables)	PIDs	3,000	6,000
ECMs	ECMs	500	1,000
EMMs	EMMs	500	1,000
Statmux Pools (internal PS-X limitation)	Pools	35	35
Statmux Services (internal PS-X limitation)	Services	128	128

11. NMX and Device Licenses

Licenses are required for some device features that NMX supports, and you cannot enable those features without the appropriate license. You can add or renew licenses to your system using the Harmonic License Manager. Most licenses are permanent; once enabled, the feature will continue to function without raising license-related alarms.

- To add or renew device licenses, you need to download the Harmonic License Manager. Contact Harmonic Technical Support if you need access to the Harmonic License Manager and a user account. For more information, refer to the NMX Licensing Support section in the *NMX User Guide* or *NMX Installation Guide* at: C:\Program Files\Harmonic\Documents\NMX\Product_Guides.
- To review device license types and descriptions in the NMX Release Notes, go to the device's New Features section whose licenses you want to review. For example: NMX Release Notes > NMX and Device Licenses > Electra X Firmware Licenses.

Alert

Temporary licenses included with NMX or supported devices are provided for Demo purposes and are not intended for production systems. Contact Harmonic Technical Support if you want to remove temporary licenses.

Note

XOS licenses are not managed through the Harmonic License Manger.

Note

In order for an NMX VM to be managed by the Harmonic License Manager, it must not be cloned. The best way to create an NMX VM is to start from the OVA file released by Harmonic to avoid licensing problems.

11.1. NMX Licenses

Licensing enables specific NMX features; contact Harmonic Technical Support to purchase licenses or review the *NMX_InstallGuide.pdf*, section "Licensing Information."

The following NMX features can be licensed:

Name	Description	Release
LIC-NMX-COLD-SPARE	Software License to make NMX server a cold spare unit. Enables base SW and all NMX features operating for 90 days after each power-cycle. Only shipped with a purchased NMX cold spare server.	NMX 9.1.0
LIC-NMX-BASE	NMX base permanent simplified license . Includes all monitoring-only devices, DPI provisioning and Consolidated Alarms client. It embeds SW-NMX-BASE-7-E, SW-NMX-DPI-E and SW-NMX-CAO-E licenses in the server.	NMX 8.2.0
LIC-NMX-BASE-BCK	NMX base permanent simplified license for backup server. Includes all monitoring-only devices, DPI provisioning and Consolidated Alarms client. It embeds SW-NMX-BACKUP-7-E, SW-NMX-DPI-E and SW-NMX-CAO-E licenses in the server.	NMX 8.2.0
LIC-NMX-BASE-VM	VM NMX base permanent simplified license . Includes all monitoring-only devices, DPI provisioning and Consolidated Alarms client. It embeds SW-NMX-BASE-7-VM-E, SW-NMX-DPI-E and SW-NMX-CAO-E licenses in the server.	NMX 8.2.0
LIC-NMX-BASE-BCK-VM	VM NMX base permanent simplified license for backup server. Includes all monitoring-only devices, DPI provisioning and Consolidated Alarms client. It embeds SW-NMX-BACKUP-7-VM-E, SW-NMX-DPI-E and SW-NMX-CAO-E licenses in the server.	NMX 8.2.0
SW-NMX-REST-API-E	Software license for Managing and Monitoring devices and services using NMX Restful API. Per NMX server (Back up NMX server also requires a license).	NMX 7.6.1
SW-NMX-BASE-7-VM-E	VM Permanent classic license with full access to NMX (excluding DPI, EIS and RESTAPI features).	NMX 7.3
SW-NMX-BACKUP-7-VM-E	Backup VM classic Permanent license with full access to NMX (excluding DPI, EIS and RESTAPI features).	NMX 7.3
SW-NMX-BASE-7-E	Permanent classic license with full access to NMX (excluding DPI, EIS and RESTAPI features).	NMX 7.0
SW-NMX-BACKUP-7-E	Permanent classic license with full access to NMX (excluding DPI, EIS and RESTAPI features).	NMX 7.0

Name	Description	Release
SW-NMX-EIS-E	Software license to enable NMX Internal EIS (Event Information Scheduler) – ProStream CAS. Per NMX server (Back up NMX server also requires license).	NMX 7.0
SW-NMX-DPI-E	Software license to enable provisioning DPI PIDs and/or sending SCTE104 commands to the encoders in NMX. Per NMX server (Back up NMX server also requires license).	NMX 7.0
SW-NMX-DEMO-E	NMX Demo license – Temporary enables all software option - 90 Days. Per NMX server. SW-NMX-BASE-xx license must first be removed before installing SW-NMX-DEMO-E license.	NMX 7.0
SW-NMX-DCO-E	NMX Client License (Designer, Operator) – one provided with Server. One license per additional client to be connected at the same time.	NMX 7.0
SW-NMX-SEO-E	NMX Software Stream Editor License. Stream editor client – one provided with Server. One license per additional client to be connected at the same time.	NMX 7.0
SW-NMX-CAO-E	NMX Software Consolidated Alarm License. Consolidated Alarms client.	NMX 7.0

 **Note:**

EIS, DPI and RESTAPI licenses are required for each of the servers that are using the interface. For example, a main and spare NMX will require 2 licenses in total.

11.1.1. License for Device Management

The following NMX license is required per device whose configuration is managed by NMX, when LIC-NMX-BASE or LIC-NMX-BASE-VM has been ordered:

Name	Description
LIC-NMX-DEVICE-CONF	Software license for Management of device whose configuration is under NMX control (Electra X/XOS, ProStream X, SDI routers and 2:1 switches, etc.). Per device. Monitoring-only devices does not require any license. Backup NMX does not require this license.

11.1.2. Legacy Licenses for Device Management

The following legacy NMX licenses are required per managed device or channel, only when LIC-NMX-BASE or LIC-NMX-BASE-VM has not been ordered:

Name	Description
SW-LIC-10	Software license for Monitoring Only devices. For Electra VS, Electra XT, Spectrum XE, NetProcessor 9030/40, ProView 7100, ProView 8100, 3rd party monitoring (like Cisco switch, Newtec M6100 and MCX7000, ...). Per device.
SW-LIC-20	Software license for Management and Monitoring class 20 devices. For Amethyst III, ProSwitch, Electra 9k or other legacy encoders (CBR, internal statmux), third party monitoring + control (Newtec USS or Quintech switch, ...), Router <32x32, and GPI contact closure monitored device. Per device.
SW-LIC-30	Software license for Managing and Monitoring class 30 devices. For Electra 9k or other legacy encoders (statmux). Per channel.
SW-LIC-40	Software license for Managing and Monitoring class 40 devices. For ProStream 9k (remux only excl. scrambling), ProStream X/XVM (remux only excl. scrambling), ProMedia Live. Per device.
SW-LIC-50	Software license for Managing and Monitoring class 50 devices. For ElectraX/XVM/XOS, ProStream 9k (all features included), ProStar, ProStream X/XVM (all features included), ProMedia Live/Package or Packager, ProMedia X Origin, Packager XOS. Per device/node.
SW-LIC-60	Software license for Managing and Monitoring class 60 devices. For NxM routers larger than 32x32. Per router.
SW-LIC-100	Software license for Management and Monitoring class 100 device - 3rd party umbrella management connections. Per 3rd party application connection.

11.2. Electra X Firmware Licenses

Licensing enables specific Electra firmware features; contact Harmonic Technical Support to purchase licenses.

Warning

If a licensed service on Electra X expires while a channel is running, all services could be affected.

Note:

Where "*" is used, the * is a wildcard that can be replaced by "VM" or "2", meaning that "X*" can be either "X2" or "XVM". The simplified licenses are addressed after these tables.

The following firmware features can be licensed on Electra platforms, and are supported in the corresponding initial NMX release.

License Name	Description	Electra X Release	NMX Release
LIC-ELC-X2-COLD-SPARE	Firmware license: COLD SPARE for all Electra X2 functions for 90 days. Applies to the G3 generation appliances. One per chassis required.	1.18.0	9.1
FW-ELC-X*-LAB	Firmware option for Electra X platforms. Lab License. This enables all firmware options for lab verification and interoperability testing. For non-commercial use only, license is not valid for customer facing and / or revenue bearing services.	1.0.0.0	7.0.0.7

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-DEMO	Firmware option for Electra X platforms, enabling all video & audio encoding and all video & audio decoding supported and licensed functions. For use for support purposes only (non-commercial); this is a temporary license and will expire after 45 days.	1.0.0.0	7.0.0.7
Electra X Platform Licenses			
FW-ELC-X*-BASE-1	Firmware option for Electra X platforms. Base License.	1.0.0.0	7.0.0.7
Video Input Options			
FW-ELC-X2-SDI-IN-SD	Firmware option for Electra X platforms enabling one SDI input in SD 576i or 480i 4:2:2 format.	1.1.0.0	7.3.0.0
FW-ELC-X2-SDI-IN-HD	Firmware option for Electra X platforms enabling one SDI input in HD 1080i, 1080psf or 720p 4:2:2 format.	1.1.0.0	7.3.0.0
FW-ELC-X*-IP-IN-SD	Firmware option for Electra X platforms enabling one IP input service in SD 576i or 480i 4:2:2 format.	1.1.0.0	7.3.0.0
FW-ELC-X*-IP-IN-HD	Firmware option for Electra X platforms enabling one IP input service in HD 1080i, 1080psf or 720p 4:2:2 format.	1.1.0.0	7.3.0.0
FW-ELC-X*-IP-IN-HD-2022-6	Firmware option for Electra X platforms enabling one IP SMPTE 2022-6 input service in HD 1080i, 1080psf or 720p 4:2:2 format.	1.3.0.0	7.5.0.0
FW-ELC-X*-IP-IN-SD-2022-6	Firmware option for Electra X platforms enabling one IP SMPTE 2022-6 input service in SD 576i or 480i 4:2:2 format.	1.3.0.0	7.5.0.0

License Name	Description	Electra X Release	NMX Release
Broadcast Video Encode Options			
FW-ELC-X*-ENC-HD-MP2	Firmware option for Electra X platforms to enable HD MPEG-2 video encoding. One per video stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-EYEQ-HD	Firmware license for Electra X enabling EyeQ for AVC IPTV broadcast encoding up to 1080p60. One per output stream required. This license is permanent and will appear as FW-ELC-*-*ENC-EYEQ-HD on the encoder. AVC* licenses are required in addition to this license. The number of profiles supported per chassis depends on profile resolutions and frame rates.	1.6.0.0	7.8.0.0
FW-ELC-X*-ENC-SD-MP2	Firmware option for Electra X platforms to enable SD MPEG-2 video encoding. One per video stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-HD-AVC	Firmware option for Electra X platforms to enable HD AVC video encoding. One per video stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-SD-AVC	Firmware option for Electra X platforms to enable SD AVC video encoding. One per video stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-PIP-AVC	Firmware option for Electra X platforms, enabling output of one Low Resolution Channel (96x96, 128x96 or 192x192) AVC main or baseline profile. One per video stream required.	1.1.0.0	7.3.0.0
FW-ELC-X*-ENC-HD-HEVC	Firmware option for Electra X platforms to enable HD HEVC video encoding. One per video stream required.	1.3.0.0	7.5.0.0
FW-ELC-X*-ENC-SD-HEVC	Firmware option for Electra X platforms to enable SD HEVC video encoding. One per video stream required.	1.3.0.0	7.5.0.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-ENC-SD-ALL	Firmware option for Electra X platforms, enabling encoding of one channel in any codec SD 576i or 480i. Supports audio pass-through. One per video stream required.	1.1.0.0	7.3.0.0
FW-ELC-X*-ENC-HD-ALL	Firmware option for Electra X platforms, enabling encoding of one channel in any codec HD 1080p or 720p, or any codec SD 576i or 480i. One per video stream required.	1.1.0.0	7.3.0.0
FW-ELC-X*-ENC-HD-AVC-DNSE-8CH-B	Firmware option for Electra X platform, enabling encoding of eight channels in High Density mode for AVC HD 1080p, 1080i or 720p, 4:2:0 mode. This option does not enable encoding in High VQ mode.	1.2.2.0	7.4.2.0
MultiScreen Video Encode Options			
FW-ELC-X*-ENC-MW-AVC-SBR-HHD	Firmware option for Electra X platforms, enabling output of one Mobile/Web Bit Rate video stream AVC Main or Baseline Profile, up to 30/25 fps and up to 1080Px1920 with MPEG2 Transport Stream output.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-MW-AVC-SBR-HD	Firmware option for Electra X platforms to enable the output of one Mobile/Web Bit Rate video stream AVC Main or Baseline Profile, up to 30/25 fps and up to 720px1280 with MPEG2 Transport Stream output.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-MW-AVC-SBR-SD	Firmware option for Electra X platforms to enable the output of one Mobile/Web Bit Rate video stream AVC Main or Baseline Profile, up to 30/25 fps and up to 480X260 with MPEG2 Transport Stream output.	1.0.0.0	7.0.0.7

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-ENC-MW-HEVC-SBR-SD	Firmware option for Electra X platforms, enabling output of one Mobile/Web Bit Rate video stream HEVC Main or Baseline Profile, up to 30/25 fps and up to 480x360 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-MW-HEVC-SBR-HD	Firmware option for Electra X platforms, enabling output of one Mobile/Web Bit Rate video stream HEVC Main or Baseline Profile, up to 30/25 fps and up to 720px1280 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-MW-HEVC-SBR-HHD	Firmware option for Electra X platforms, enabling output of one Mobile/Web Bit Rate video stream HEVC Main or Baseline Profile; 30/25 fps 1080px1920, 60/50 fps 720px1280, and up to 30/25 fps and up to 720px1280 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-OTT-AVC-SD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are AVC progressive only, up to 30/25 fps, and up to 720x576 with MPEG2 Transport Stream output.	1.1.1.0	7.3.1.0
FW-ELC-X*-ENC-OTT-AVC-BSD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are AVC, progressive or interlaced, up to 60/50 fps, and up to 720x576 with MPEG2 Transport Stream output.	1.1.1.0	7.3.1.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-ENC-OTT-AVC-HD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are AVC, progressive only, up to 30/25 fps, and up to 1920x1080 with MPEG2 Transport Stream output.	1.1.1.0	7.3.1.0
FW-ELC-X*-ENC-OTT-AVC-BHD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are AVC, progressive or interlaced, up to 60/50 fps, and up to 1920x1080 with MPEG2 Transport Stream output.	1.1.1.0	7.3.1.0
FW-ELC-X*-ENC-OTT-HEVC-SD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are HEVC Main Profile, AVC Main or Baseline Profile, progressive only, up to 30/25 fps, and up to 720x576 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-OTT-HEVC-HD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are HEVC Main Profile, AVC Main or Baseline Profile, progressive only, up to 30/25 fps, and up to 1920x1080 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-OTT-HEVC-BSD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are HEVC Main Profile, AVC Main or Baseline Profile, progressive or interlaced, up to 60/50 fps, and up to 720x576 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-ENC-OTT-HEVC-BHD	Firmware option for Electra X platforms, enabling output of one full OTT profile set of video streams. Supported formats are HEVC Main Profile, AVC Main or Baseline Profile, progressive or interlaced, up to 60/50 fps, and up to 1920x1080 with MPEG2 Transport Stream output.	1.2.0.0	7.4.0.0
FW-ELC-X*-ENC-OTT-EYEQ-BHD	Firmware option for Electra X platforms, allowing EyeQ rate control for one OTT output profile set. *-ENC-OTT-AVC* licenses are required in addition to this license to encode a profile set. Supported formats are AVC progressive or interlaced, up to 60/50 fps	1.4.0.0	7.6.0.0
Audio Encoding and Processing Options			
FW-ELC-X*-AUD-ENC-DD-MC	Firmware option for Electra X platforms to enable AC-3 multichannel audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-DD-ST	Firmware option for Electra X platforms to enable AC-3 stereo audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-DDP-MC	Firmware option for Electra X platforms to enable E-AC-3 multichannel audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-DDP-ST	Firmware option for Electra X platforms to enable E-AC-3 stereo audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-AC4-MC	Firmware option for Electra X platforms to enable AC-4 multichannel audio encoding. One per audio stream required.	1.7.1.0	8.0.1.0
FW-ELC-X*-AUD-ENC-AC4-ST	Firmware option for Electra X platforms to enable AC-4 stereo audio encoding. One per audio stream required.	1.7.1.0	8.0.1.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-AUD-ENC-AAC-MC	Firmware option for Electra X platforms to enable AAC/HE AAC multichannel audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-AAC-ST	Firmware option for Electra X platforms to enable AAC/HE AAC stereo audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-ENC-MP2-ST	Firmware option for Electra X platforms to enable MPEG 1 Layer 2 stereo audio encoding. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-LVL-MC	Firmware option for Electra X platforms to enable multichannel audio leveling. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-LVL-ST	Firmware option for Electra X platforms to enable stereo audio leveling. One per audio stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-AUD-HALC-MC	Firmware option enabling Harmonic algorithm Automatic loudness control of one multi-channel 5.1 or 2.0 embedded audio stream. This license is permanent, enforced and has a count of 1. One per audio stream required.	1.8.0.0	8.1.0.0
FW-ELC-X*-AUD-HALC-ST	Firmware option enabling Harmonic algorithm Automatic loudness control of one embedded 2.0 audio stream. This license is permanent, enforced and has a count of 1. One per audio stream required.	1.8.0.0	8.1.0.0
FW-ELC-X*-AUD-NEILSEN-MC	Firmware option for Electra X platform to enable Nielsen watermarking insertion on one 5.1 or 2.0 audio stream. One per audio stream required.	1.3.0.0	7.5.0.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-AUD-NEILSEN-ST	Firmware option for Electra X platform to enable Nielsen watermarking insertion on one 5.1 or 2.0 audio stream. One per audio stream required.	1.3.0.0	7.5.0.0
FW-ELC-X*-AUD-NEILSEN-DEC	FW option for Electra X2 platform for decoding Nielsen watermarking with logs, for the left channel. used for RTVOD. This license is permanent, enforced and has a count of 1. Complement to Nielsen watermarking license. FW-ELC-X*-AUD-NEILSEN-MC or FW-ELC-X*-AUD-NEILSEN-ST is mandatory.	1.8.0.0	8.1.0.0
Ancillary Options			
FW-ELC-X*-DPI	Firmware option for Electra X platforms to enable DPI and SCTE 35 support. One per DPI stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-DPI-ESAM-XCODE	Firmware option for Electra X platforms to enable Support ESAM interfaces	1.0.0.0	7.0.0.7
FW-ELC-X*-DT-LAN	Firmware option for Electra X platforms to enable DiviTrack over IP LAN functionality	1.0.0.0	7.0.0.7
FW-ELC-X*-DT-WAN	Firmware option for Electra X platforms to enable DiviTrack over IP WAN functionality	1.0.0.0	7.0.0.7
FW-ELC-X*-FEC	Firmware option for Electra X platforms to enable FEC on IP output. One per chassis required.	1.0.0.0	7.0.0.7
FW-ELC-X*-PSIP-REGEN	Firmware option for Electra X platforms to enable PSIP table regeneration. One per chassis required.	1.0.0.0	7.0.0.7
FW-ELC-X*-ENC-UPCONV	Firmware option for Electra X platforms to enable broadcast quality up conversion or cross conversion of the SD or HD input video	1.0.0.0	7.0.0.7

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-PIC-VPP-BASIC	Firmware option for Electra X platforms to enable video pre-processing features like MCTF. This is the basic option.	1.0.0.0	7.0.0.7
FW-ELC-X*-608TO708-CC-XCODE	Firmware option for Electra X platforms to enable 608/708 closed caption conversion. One per video stream required.	1.0.0.0	7.0.0.7
FW-ELC-X*-DPI-ADSMART	Firmware option for Electra X platform for DPI ADSMART support. One license per output service required.	1.3.0.0	7.5.0.0
FW-ELC-X*-TTEXT-DVBSUB-BURN	Firmware option for Electra X platform, enabling burning Teletext or DVB subtitle information onto the video. One license per video input required.	1.3.0.0	7.5.0.0
FW-ELC-X*-TTXT-TO-DVBSUB-XCOD	Firmware option for Electra X platform enabling Teletext to DVB subtitle transcoding. One license per output data stream required.	1.5.0.0	7.7.0.0
Graphics and Playout Options			
FW-ELC-X*-LOGO-BASIC	Firmware option for Electra X platforms to enable basic static Logo 500x500 pixels maximum size	1.0.0.0	7.0.0.7
FW-ELC-X*-SLATE-BASIC	Firmware option for Electra X platforms to enable full screen slate replacement. The slate is a still image with no associated audio	1.0.0.0	7.0.0.7
FW-ELC-X*-DPI-AUTOMATION	Firmware option for Electra X platforms for DPI based automation server communication. This is used for controlling graphics and playout.	1.2.0.0	7.4.0.0

License Name	Description	Electra X Release	NMX Release
FW-ELC-X*-PLAY-FILE-BASIC	Firmware option for Electra X platforms to enable playback of local files. One per subtitle stream. This license is permanent, enforced and has a count of 1.	1.2.0.0	7.4.0.0
FW-ELC-X*-STREAM-SWITCH-BASIC	Firmware option for Electra X for seamless switching between live input sockets.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-1-SD	Firmware option for Electra X platforms enabling SD Graphics insertion allowing 1 layer of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-1-HD	Firmware option for Electra X platforms enabling HD Graphics insertion allowing 1 layer of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-4-SD	Firmware option for Electra X platforms enabling SD Graphics insertion allowing 4 independent layers of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-4-HD	Firmware option for Electra X platforms enabling HD Graphics insertion allowing 4 layers of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-8-SD	Firmware option for Electra X platforms enabling SD Graphics insertion allowing 8 independent layers of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0
FW-ELC-X*-GFX-8-HD	Firmware option for Electra X platforms enabling HD Graphics insertion allowing 8 layers of graphics, PNG, WAV and SWF support.	1.2.0.0	7.4.0.0

11.2.1. Simplified Licenses

The simplified licenses provide easy ordering of Electra X by gathering the features of several part numbers under a single part number. The following table gives the correspondence between the simplified licenses and the detail licenses.

Electra X2

New License	Description	Included Detail Licenses	
LIC-ELC-X2-ENC-HD-PLUS	SW LICENSE HD PLUS ENCODING (1080P60/1080I) ONE CHANNEL	Part Number	QTY
		FW-ELC-X2-SDI-IN-HD	1
		FW-ELC-X2-IP-IN-HD	1
		FW-ELC-X2-ENC-UPCONV	1
		FW-ELC-X2-PIC-VPP-BASIC	1
		FW-ELC-X2-LOGO-BASIC	1
		FW-ELC-X2-SLATE-BASIC	1
		FW-ELC-X2-ENC-HD-HEVC	1
		FW-ELC-X2-ENC-OTT-HEVC-BHD	1
		FW-ELC-X2-DT-WAN	1
		FW-ELC-X2-ENC-PIP-AVC	1
		FW-ELC-X2-ENC-1SEG-AVC	1
		FW-ELC-X2-AUD-ENC-AAC-MC	12
		FW-ELC-X2-AUD-ENC-MP2-ST	12
		FW-ELC-X2-DPI	1
FW-ELC-X2-FEC	1		
FW-ELC-X2-608TO708-CC-XCODE	1		

New License	Description	Included Detail Licenses	
LIC-ELC-X2-ENC-HD	SW LICENSE HD OTT ENCODING (720P60/1080P30) ONE CHANNEL	Part Number	QTY
		FW-ELC-X2-SDI-IN-HD	1
		FW-ELC-X2-IP-IN-HD	1
		FW-ELC-X2-ENC-UPCONV	1
		FW-ELC-X2-PIC-VPP-BASIC	1
		FW-ELC-X2-LOGO-BASIC	1
		FW-ELC-X2-SLATE-BASIC	1
		FW-ELC-X2-ENC-OTT-HEVC-HD	1
		FW-ELC-X2-ENC-SD-HEVC	1
		FW-ELC-X2-ENC-OTT-HEVC-BSD	1
		FW-ELC-X2-ENC-PIP-AVC	1
		FW-ELC-X2-ENC-1SEG-AVC	1
		FW-ELC-X2-AUD-ENC-AAC-MC	12
		FW-ELC-X2-AUD-ENC-MP2-ST	12
		FW-ELC-X2-DPI	1
FW-ELC-X2-FEC	1		

New License	Description	Included Detail Licenses					
		<table border="1"> <thead> <tr> <th data-bbox="1013 260 1341 331">Part Number</th> <th data-bbox="1341 260 1464 331">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1013 331 1341 449">FW-ELC-X2-608TO708-CC-XCODE</td> <td data-bbox="1341 331 1464 449">1</td> </tr> </tbody> </table>	Part Number	QTY	FW-ELC-X2-608TO708-CC-XCODE	1	
Part Number	QTY						
FW-ELC-X2-608TO708-CC-XCODE	1						

New License	Description	Included Detail Licenses	
LIC-ELC-X2-ENC-SD-PLUS	SW LICENSE SD PLUS ENCODING (560P60/480I/576I) ONE CHANNEL	Part Number	QTY
		FW-ELC-X2-SDI-IN-HD	1
		FW-ELC-X2-IP-IN-HD	1
		FW-ELC-X2-PIC-VPP-BASIC	1
		FW-ELC-X2-LOGO-BASIC	1
		FW-ELC-X2-SLATE-BASIC	1
		FW-ELC-X2-ENC-SD-HEVC	1
		FW-ELC-X2-ENC-OTT-HEVC-BSD	1
		FW-ELC-X2-DT-WAN	1
		FW-ELC-X2-ENC-PIP-AVC	1
		FW-ELC-X2-ENC-1SEG-AVC	1
		FW-ELC-X2-AUD-ENC-AAC-MC	12
		FW-ELC-X2-AUD-ENC-MP2-ST	12
		FW-ELC-X2-DPI	1
		FW-ELC-X2-FEC	1
FW-ELC-X2-608TO708-CC-XCODE	1		

New License	Description	Included Detail Licenses	
LIC-ELC-X2-ENC-SD	SW LICENSE SD OTT ENCODING (480P30/576P25) ONE CHANNEL	Part Number	QTY
		FW-ELC-X2-SDI-IN-HD	1
		FW-ELC-X2-IP-IN-HD	1
		FW-ELC-X2-PIC-VPP-BASIC	1
		FW-ELC-X2-LOGO-BASIC	1
		FW-ELC-X2-SLATE-BASIC	1
		FW-ELC-X2-ENC-OTT-HEVC-BSD	1
		FW-ELC-X2-ENC-PIP-AVC	1
		FW-ELC-X2-ENC-1SEG-AVC	1
		FW-ELC-X2-AUD-ENC-AAC-MC	12
		FW-ELC-X2-AUD-ENC-MP2-ST	12
		FW-ELC-X2-DPI	1
		FW-ELC-X2-FEC	1
FW-ELC-X2-608TO708-CC-XCODE	1		

New License	Description	Included Detail Licenses							
LIC-ELC-X2-GFX-8-HD-SD	SW LICENSE FOR HD OR SD GRAPHICS INSERTION UP TO 8 GFX LAYERS	<table border="1"> <thead> <tr> <th data-bbox="1055 336 1341 411">Part Number</th> <th data-bbox="1341 336 1453 411">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1055 411 1341 520">FW-ELC-X2-GFX-8-HD</td> <td data-bbox="1341 411 1453 520">1</td> </tr> <tr> <td data-bbox="1055 520 1341 625">FW-ELC-X2-GFX-8-SD</td> <td data-bbox="1341 520 1453 625">1</td> </tr> </tbody> </table>	Part Number	QTY	FW-ELC-X2-GFX-8-HD	1	FW-ELC-X2-GFX-8-SD	1	
Part Number	QTY								
FW-ELC-X2-GFX-8-HD	1								
FW-ELC-X2-GFX-8-SD	1								

New License	Description	Included Detail Licenses							
LIC-ELC-X2-BBOIP	SW LICENSE TO ENABLE A HD/SD INPUT SERVICE DELIVERED OVER S2110 OR S2022-6	<table border="1"> <thead> <tr> <th data-bbox="1040 821 1341 896">Part Number</th> <th data-bbox="1341 821 1453 896">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1040 896 1341 1005">FW-ELC-X2-IP-IN-SD-2022-6</td> <td data-bbox="1341 896 1453 1005">1</td> </tr> <tr> <td data-bbox="1040 1005 1341 1110">FW-ELC-X2-IP-IN-SD-2110</td> <td data-bbox="1341 1005 1453 1110">1</td> </tr> </tbody> </table>	Part Number	QTY	FW-ELC-X2-IP-IN-SD-2022-6	1	FW-ELC-X2-IP-IN-SD-2110	1	
Part Number	QTY								
FW-ELC-X2-IP-IN-SD-2022-6	1								
FW-ELC-X2-IP-IN-SD-2110	1								

Electra XVM

New License	Description	Included Detail Licenses	
LIC-ELC-XVM-ENC-HD-PLUS	SW LICENSE HD PLUS ENCODING (1080P60/1080I) ONE CHANNEL	Part Number	QTY
		FW-ELC-XVM-IP-IN-HD	1
		FW-ELC-XVM-ENC-UPCONV	1
		FW-ELC-XVM-PIC-VPP-BASIC	1
		FW-ELC-XVM-LOGO-BASIC	1
		FW-ELC-XVM-SLATE-BASIC	1
		FW-ELC-XVM-ENC-HD-HEVC	1
		FW-ELC-XVM-ENC-OTT-HEVC-BHD	1
		FW-ELC-XVM-DT-WAN	1
		FW-ELC-XVM-ENC-PIP-AVC	1
		FW-ELC-XVM-ENC-1SEG-AVC	1
		FW-ELC-XVM-AUD-ENC-AAC-MC	12
		FW-ELC-XVM-AUD-ENC-MP2-ST	12
		FW-ELC-XVM-DPI	1
FW-ELC-XVM-FEC	1		

New License	Description	Included Detail Licenses					
		<table border="1"> <thead> <tr> <th data-bbox="1011 264 1343 329">Part Number</th> <th data-bbox="1343 264 1468 329">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1011 329 1343 489">FW-ELC-XVM-608TO708-CC-XCODE</td> <td data-bbox="1343 329 1468 489">1</td> </tr> </tbody> </table>	Part Number	QTY	FW-ELC-XVM-608TO708-CC-XCODE	1	
Part Number	QTY						
FW-ELC-XVM-608TO708-CC-XCODE	1						

New License	Description	Included Detail Licenses	
LIC-ELC-XVM-ENC-HD	SW LICENSE HD OTT ENCODING (720P60/1080P30) ONE CHANNEL	Part Number	QTY
		FW-ELC-XVM-IP-IN-HD	1
		FW-ELC-XVM-ENC-UPCONV	1
		FW-ELC-XVM-PIC-VPP-BASIC	1
		FW-ELC-XVM-LOGO-BASIC	1
		FW-ELC-XVM-SLATE-BASIC	1
		FW-ELC-XVM-ENC-OTT-HEVC-HD	1
		FW-ELC-XVM-ENC-SD-HEVC	1
		FW-ELC-XVM-ENC-OTT-HEVC-BSD	1
		FW-ELC-XVM-ENC-PIP-AVC	1
		FW-ELC-XVM-ENC-1SEG-AVC	1
		FW-ELC-XVM-AUD-ENC-AAC-MC	12
		FW-ELC-XVM-AUD-ENC-MP2-ST	12
		FW-ELC-XVM-DPI	1
FW-ELC-XVM-FEC	1		

New License	Description	Included Detail Licenses					
		<table border="1"> <thead> <tr> <th data-bbox="990 264 1338 331">Part Number</th> <th data-bbox="1338 264 1468 331">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="990 331 1338 489">FW-ELC- XVM-608TO708-CC- XCODE</td> <td data-bbox="1338 331 1468 489">1</td> </tr> </tbody> </table>	Part Number	QTY	FW-ELC- XVM-608TO708-CC- XCODE	1	
Part Number	QTY						
FW-ELC- XVM-608TO708-CC- XCODE	1						

New License	Description	Included Detail Licenses	
LIC-ELC-XVM-ENC-SD-PLUS	SW LICENSE SD PLUS ENCODING (560P60/480I/576I) ONE CHANNEL	Part Number	QTY
		FW-ELC-XVM-IP-IN-HD	1
		FW-ELC-XVM-PIC-VPP-BASIC	1
		FW-ELC-XVM-LOGO-BASIC	1
		FW-ELC-XVM-SLATE-BASIC	1
		FW-ELC-XVM-ENC-SD-HEVC	1
		FW-ELC-XVM-ENC-OTT-HEVC-BSD	1
		FW-ELC-XVM-DT-WAN	1
		FW-ELC-XVM-ENC-PIP-AVC	1
		FW-ELC-XVM-ENC-1SEG-AVC	1
		FW-ELC-XVM-AUD-ENC-AAC-MC	12
		FW-ELC-XVM-AUD-ENC-MP2-ST	12
		FW-ELC-XVM-DPI	1
		FW-ELC-XVM-FEC	1
FW-ELC-XVM-608TO708-CC-XCODE	1		

New License	Description	Included Detail Licenses	
LIC-ELC-XVM-ENC-SD	SW LICENSE SD OTT ENCODING (480P30/576P25) ONE CHANNEL	Part Number	QTY
		FW-ELC-XVM-IP-IN-HD	1
		FW-ELC-XVM-PIC-VPP-BASIC	1
		FW-ELC-XVM-LOGO-BASIC	1
		FW-ELC-XVM-SLATE-BASIC	1
		FW-ELC-XVM-ENC-OTT-HEVC-BSD	1
		FW-ELC-XVM-ENC-PIP-AVC	1
		FW-ELC-XVM-ENC-1SEG-AVC	1
		FW-ELC-XVM-AUD-ENC-AAC-MC	12
		FW-ELC-XVM-AUD-ENC-MP2-ST	12
		FW-ELC-XVM-DPI	1
		FW-ELC-XVM-FEC	1
		FW-ELC-XVM-608TO708-CC-XCODE	1

New License	Description	Included Detail Licenses							
LIC-ELC-XVM-GFX-8-HD-SD	SW LICENSE FOR HD OR SD GRAPHICS INSERTION UP TO 8 GFX LAYERS	<table border="1"> <thead> <tr> <th data-bbox="1060 275 1352 344">Part Number</th> <th data-bbox="1352 275 1466 344">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1060 344 1352 457">FW-ELC-XVM-GFX-8-HD</td> <td data-bbox="1352 344 1466 457">1</td> </tr> <tr> <td data-bbox="1060 457 1352 571">FW-ELC-XVM-GFX-8-SD</td> <td data-bbox="1352 457 1466 571">1</td> </tr> </tbody> </table>		Part Number	QTY	FW-ELC-XVM-GFX-8-HD	1	FW-ELC-XVM-GFX-8-SD	1
Part Number	QTY								
FW-ELC-XVM-GFX-8-HD	1								
FW-ELC-XVM-GFX-8-SD	1								

New License	Description	Included Detail Licenses							
LIC-ELC-XVM-BBOIP	SW LICENSE TO ENABLE A HD/SD INPUT SERVICE DELIVERED OVER S2110 OR S2022-6	<table border="1"> <thead> <tr> <th data-bbox="1032 772 1352 842">Part Number</th> <th data-bbox="1352 772 1466 842">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="1032 842 1352 955">FW-ELC-XVM-IP-IN-SD-2022-6</td> <td data-bbox="1352 842 1466 955">1</td> </tr> <tr> <td data-bbox="1032 955 1352 1068">FW-ELC-XVM-IP-IN-SD-2110</td> <td data-bbox="1352 955 1466 1068">1</td> </tr> </tbody> </table>		Part Number	QTY	FW-ELC-XVM-IP-IN-SD-2022-6	1	FW-ELC-XVM-IP-IN-SD-2110	1
Part Number	QTY								
FW-ELC-XVM-IP-IN-SD-2022-6	1								
FW-ELC-XVM-IP-IN-SD-2110	1								

11.3. XOS Firmware Licenses

Licensing enables specific XOS firmware features; contact Harmonic Technical Support to purchase licenses.

Name	Description	XOS Release	NMX Release
XOS Platform Licenses			
SWR-ELCXOS-BASE-APPLIANCE SWR-XOS-BASE-APPLIANCE	Software license for deploying XOS application on a XOS server. One license per serve	1.6	8.0
SWR-ELCXOS-BASE-BAREMETAL SWR-XOS-BASE-SOFTONLY	Software license for deploying XOS application on a compatible platform. One license per server	1.6	8.0
SWR-XOS-COLD-SPARE	Software license for deploying XOS application on a cold spare XOS server. One license per server	1.15	9.0
XOS Service Licenses			
LIC-ELCXOS-ENC-UHD-PLUS LIC-XOS-ENC-UHD-PLUS	Software license for XOS platform enabling encoding for one UHD+ TV service. The license allows 1 video encoding at 2160p50/60, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs.	1.6	8.0

Name	Description	XOS Release	NMX Release
LIC-ELCXOS-ENC-UHD LIC-XOS-ENC-UHD	Software license for XOS platform enabling encoding for one UHD TV channel. The license allows 1 video encoding at 2160p25/30, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs.	1.6	8.0
LIC-ELCXOS-ENC-HD-PLUS LIC-XOS-ENC-HD-PLUS	Software license for XOS platform enabling encoding for one HD+ TV service. The license allows 1 video encoding at 1080p50/60 or 1080i25/i30, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs.	1.6	8.0

Name	Description	XOS Release	NMX Release
LIC-ELCXOS-ENC-HD LIC-XOS-ENC-HD	Software license for XOS platform enabling encoding for one HD TV service. The license allows 1 video encoding at 720p50/60 or 1080p25/p30, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs.	1.6	8.0
LIC-ELCXOS-ENC-SD-PLUS LIC-XOS-ENC-SD-PLUS	Software license for XOS platform enabling encoding for one SD+ TV channel. The license allows 1 video encoding at 560p50/60 or 576i25 or 480i30, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs. This license is limited to one platform capacity.	1.6	8.0

Name	Description	XOS Release	NMX Release
LIC-ELCXOS-ENC-SD LIC-XOS-ENC-SD	Software license for XOS platform enabling encoding for one SD TV service. The license allows 1 video encoding at 480p30 or 575p25, up to 11 AVC/HEVC progressive video encoding of any sub resolution/frame rate from the same source, 12 audio encoding. The supported codecs are HEVC/AVC/MPEG-2 for video and MPEG-1/AAC for audio. The supported source is SDI or compressed (MPEG-2/AVC/HEVC for video, AAC/MPEG-1 for audio). The price excludes any license fees necessary to practice or otherwise related to AVC/HEVC codecs.	1.6	8.0
XOS Additional Service Licenses			
LIC-ELCXOS-HDR LIC-XOS-HDR	Software license for XOS platform enabling HDR processing (Dolby Vision, HDR cross conversion, HDR tone mapping). This license is for one video up to 2160p resolution.	1.6	8.0
LIC-XOS-HDR-BCOM	Software license for XOS platform enabling HDR processing (Dolby Vision, HDR cross conversion, HDR tone mapping) and HDR tone expansion with B-COM technology for one video up to 2160p resolution.	1.6	8.2
LIC-XOS-HDR-BCOM-HD	Software license for XOS platform enabling HDR processing (Dolby Vision, HDR cross conversion, HDR tone mapping) and HDR tone expansion with B-COM technology for one video up to 1080p resolution.	1.8	8.2
LIC-XOS-VID-NAGRA	Software license for XOS platform enabling support of NagraVision video watermarking. This license is per TV service.	1.11	8.6
LIC-ELCXOS-AUD-DOLBY LIC-XOS-AUD-DOLBY	Dolby audio codecs (Dolby Digital, Digital+, Dolby AC-3, Dolby AC-4, Dolby E)	1.6	8.0

Name	Description	XOS Release	NMX Release
LIC-XOS-AUD-NIELSEN	Software license for XOS platform enabling Nielsen watermarking for one audio of one TV Channel.	1.9.1	8.4
LIC-XOS-ALC	Software license for XOS platform enabling support of Automatic Loudness Control for audios of one TV channel.	1.6	8.0
LIC-XOS-EAS	Software license for XOS platform enabling EAS (Emergency Alert System) processing for one TV channel.	1.9.1	8.4
LIC-XOS-ENC-EYEQ	Software license for XOS platform enabling EyeQ encoding for one TV channel. TV encoding licenses are requested in addition to this license.	1.6	8.0
LIC-XOS-TTXT-TO-DVBSUB	Software license for XOS platform enabling support of transcoding to DVB subtitles. This license is per TV service with a maximum of 3 DVB subtitles.	1.14	8.9
LIC-XOS-MEZZA-NMI	Software license for XOS platform enabling receiving Sony lightly compressed streams for one TV service.	1.8	8.0
LIC-XOS-MUX	Software license for XOS enabling TS multiplexing including SI/PSI advanced management and Statistical Multiplexing. This license is per output service.	1.13	Not Available
LIC-XOS-UNCOMP-2022-6	Software license enabling one IP SMPTE 2022-6 input service.	1.8	8.0
LIC-XOS-UNCOMP-2110	Software license enabling one IP SMPTE 2110 input service.	1.11	8.6
XOS OTT Packaging Licenses			
LIC-ELCXOS-OTT-EGRESS-S LIC-XOS-OTT-EGRESS-S	RTMP & OTT packaging for 3 Mbps	1.6	8.0

Name	Description	XOS Release	NMX Release
LIC-ELCXOS-OTT-EGRESS-M LIC-XOS-OTT-EGRESS-M	RTMP & OTT packaging for 100 Mbps	1.6	8.0
LIC-ELCXOS-OTT-EGRESS-L LIC-XOS-OTT-EGRESS-L	RTMP & OTT packaging for 1 Gbps	1.6	8.0

11.4. ProStream X/XVM Licenses

Licensing enables specific ProStream firmware features; contact Harmonic Technical Support to purchase licenses.

The following feature(s) can be licensed on the ProStream platform, and are supported in the corresponding initial NMX release.

11.4.1. ProStream X Licenses

Name	Description	ProStream X Release	NMX Release
FW-PRM-X-COLD-SPARE	Firmware license: COLD SPARE for all ProStream functions for 90 days. Applies to the G3 generation appliances. One per chassis required.	3.2	9.1
FW-PRM-X-SRT-TS	ProStream X SRT license. License per TS.	3.2	9.1
FW-PRM-X-DTMB-TS	ProStream X SFN DTMB Adaptation of one TS.	2.9.9.0	9.0
FW-PRM-X-SELC-EHP	ProStream X Encryption Hacking Prevention Scrambling Firmware License.	2.9.9.0	9.0
FW-PRM-X-DVB-VOD-CHS	ProStream X real-time DVB encryption of VoD programming (Tier-based or Session-based encryption). One per device (or docker instance).	2.9.7.0	8.8.0
FW-PRM-X-SFN	ProStream X MIP Insertion (SFN) DVB-T support. This option allows the SFN Adaptation of 1 first or additional TS.	2.9.0.0	8.5.0
FW-PRM-X-AD-INSERTION	ProStream X Ad insertion (DPI splicing) support. One per service required.	2.8.0.0	8.4.0
FW-PRM-X-T2MI-GTW	ProStream X generation of one DVB T2-MI stream over ASI or IP. One license per T2-MI stream required.	2.8.0.0	8.4.0
FW-PRM-X-SELC-SCR	ProStream X Selective Encryption firmware license. One per service required.	2.4.5.0	8.1

Name	Description	ProStream X Release	NMX Release
FW-PRM-X-TS-PLAYER	ProStream X internal file player support firmware license per TS.	2.4.0.0	8.0
FW-PRM-X-TBL-SPOOLING	ProStream X firmware license enabling (P)SI/PSIP table carousel delivered from a specific table generator. One per transport stream required.	2.1.1.0	7.8
FW-PRM-X-DT-TARGET-BTR-SRV	ProStream X Target Average bitrate per service within the statmux pool and with minimum degradation of the video quality. One per service is required.	2.2.0.0	7.8
FW-PRM-X-DATATRACK	ProStream X DataTrack license that enables adding external data/ Audio PIDs to the statmux pool. One per TS(MUX) is required.	2.2.0.0	7.8
FW-PRM-X-EAS-SCTE18-SRV	ProStream X EAS with SCTE18 Trigger license.	2.3.1.0	7.8.2
FW-PRM-X-RESTAPI-L2L-SRV	ProStream X Live to live signaling license per service with RESTAPI.	2.3.1.0	7.8.2
FW-PRM-X-RESTAPI-SCTE35-SRV	ProStream X SCTE35 generation firmware license per service with RESTAPI.	2.3.1.0	7.8.2
FW-PRM-X-SCTE35-SRV	ProStream X SCTE35 insertion firmware license. One per service required.	2.3.1.0	7.8.2
FW-PRM-X-DES-FIX-SRV	ProStream X AES Fixed key De-scrambling firmware license. One per service required.	2.3.1.0	7.8.2
FW-PRM-X-DT-REGIONAL-SRV	ProStream X license for sharing common services between regional statmux pools. The license is per one duplicate of the common services.	2.1.0.0	7.7
FW-PRM-X-RESTAPI	ProStream X RESTAPI firmware license.	2.1.0.0	7.7
FW-PRM-X-2G-GATEWAY	ProStream X 2 Gbps throughput license.	2.0.0.0	7.6.2

Name	Description	ProStream X Release	NMX Release
FW-PRM-X-BASE	ProStream X Base license.	2.0.0.0	7.6.2
FW-PRM-X-DEMO	ProStream X firmware license for all functions for 90-day demo usage. For non-commercial use only.	2.0.0.0	7.6.2
FW-PRM-X-LAB	ProStream X firmware license for Lab use only.	2.0.0.0	7.6.2
FW-PRM-X-SPARE	ProStream X COLD SPARE firmware license for all ProStream functions for 30 days. Applies to the G1 generation appliances. One per chassis required.	2.0.0.0	7.6.2
FW-PRM-X-DEVICE-REDUNDANCY	ProStream X Stand Alone Device Redundancy firmware license. One per chassis required.	2.0.0.0	7.6.2
FW-PRM-X-SLATE-SRV	ProStream X firmware license for Slate Insertion. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-EAS-SRV	ProStream X firmware license for Emergency Alert System. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-FEC-TS	ProStream X FEC firmware license. One per Transport Stream required.	2.0.0.0	7.6.2
FW-PRM-X-DT-POOL	ProStream X firmware license for statmux controller. One DivitrackIP license per pool required.	2.0.0.0	7.6.2
FW-PRM-X-DVB-CW	ProStream X DVB SCR firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-DVB-CSAV3-CW	ProStream X DVB CSA V3 scrambling firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-AES-CW	ProStream X AES SCR firmware license. One per service is required.	2.0.0.0	7.6.2

Name	Description	ProStream X Release	NMX Release
FW-PRM-X-BISS-FIX-SRV	ProStream X BISS Fixed key firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-SCR-FIX-SRV	ProStream X Fixed Key firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-SELC-EHP	ProStream X Encryption Hacking Prevention Scrambling firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-SRV-SUB	ProStream X Splicing Service Substitution firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-ESAM	ProStream X ESAM interface Firmware License. One per service required.	2.0.0.0	7.6.2
FW-PRM-X-BLCKOUT-VIRD	ProStream X ESAM for Blackout solution Firmware License. One per VIRD/channel required.	2.0.0.0	7.6.2
FW-PRM-X-BDS-SRV	ProStream X FW option for connection to BDS for Invidi support. One per service required.	2.0.0.0	7.6.2

11.4.2. ProStream X for CableOS Licenses

Name	Description	ProStream X Release	NMX Release
FW-COS-PRM-X-SPARE	Firmware license: COLD SPARE for all ProStream for CableOS functions for 90 days. Applies to the G3 generation appliances. One per chassis required.	3.3.1	9.2
FW-COS-PRM-X-DVB-VOD-CHS	ProStream X for CableOS real-time DVB encryption of VoD programming (Tier-based or Session-based encryption). One per device (or docker instance).	3.3.1	9.2

Name	Description	ProStream X Release	NMX Release
FW-COS-PRM-X-EAS-SCTE18-SRV	ProStream X for CableOS EAS with SCTE18 Trigger license.	3.3.1	9.2
FW-COS-PRM-X-RESTAPI	ProStream X for CableOS RESTAPI firmware license.	3.3.1	9.2
FW-COS-PRM-X-2G-GATEWAY	ProStream X for CableOS 2 Gbps throughput license.	3.3.1	9.2
FW-COS-PRM-X-BASE	ProStream X for CableOS Base license.	3.3.1	9.2
FW-COS-PRM-X-DEMO	ProStream X for CableOS firmware license for all functions for 90-day demo usage. For non-commercial use only.	3.3.1	9.2
FW-COS-PRM-X-LAB	ProStream X for CableOS firmware license for Lab use only.	3.3.1	9.2
FW-COS-PRM-X-DEVICE-REDUNDANCY	ProStream X for CableOS Stand Alone Device Redundancy firmware license. One per chassis required.	3.3.1	9.2
FW-COS-PRM-X-EAS-SRV	ProStream X for CableOS firmware license for Emergency Alert System. One per service required.	3.3.1	9.2
FW-COS-PRM-X-DVB-CW	ProStream X for CableOS DVB SCR firmware license. One per service required.	3.3.1	9.2
FW-COS-PRM-X-DVB-CSAV3-CW	ProStream X for CableOS DVB CSA V3 scrambling firmware license. One per service required.	3.3.1	9.2
FW-COS-PRM-X-AES-CW	ProStream X for CableOS AES SCR firmware license. One per service is required.	3.3.1	9.2

11.4.3. ProStream XVM Licenses

Name	Brief Description	ProStream XVM Release	NMX Release
FW-PRM-XVM-SRT-TS	ProStream XVM SRT license. License per TS.	3.2	9.1
FW-PRM-XVM-AD-INSERTION	ProStream XVM Ad insertion (DPI splicing) support. One per service required	2.8.0.0	8.4.0
FW-PRM-XVM-SELC-SCR	ProStream XVM Selective Encryption firmware license. One per service required.	2.4.5.0	8.1
FW-PRM-XVM-TS-PLAYER	ProStream XVM internal file player support firmware license per TS.	2.4.0.0	8.0
FW-PRM-XVM-DATATRACK	ProStream XVM DataTrack license that enables adding external data/ Audio PIDs to the statmux pool. One per TS(MUX) is required.	2.2.0.0	7.8
FW-PRM-XVM-EAS-SCTE18-SRV	ProStream XVM EAS with SCTE18 Trigger license.	2.3.1.0	7.8.2
FW-PRM-XVM-RESTAPI-L2L-SRV	ProStream XVM Live to live signaling license per service with RESTAPI.	2.3.1.0	7.8.2
FW-PRM-XVM-RESTAPI-SCTE35-SRV	ProStream XVM SCTE35 generation firmware license per service with RESTAPI.	2.3.1.0	7.8.2
FW-PRM-XVM-SCTE35-SRV	ProStream XVM SCTE35 insertion firmware license. One per service required.	2.3.1.0	7.8.2
FW-PRM-XVM-DES-FIX-SRV	ProStream XVM AES Fixed key De-scrambling firmware license. One per service required.	2.3.1.0	7.8.2
FW-PRM-XVM-DT-REGIONAL-SRV	ProStream XVM license for sharing common services between regional statmux pools. The license is per one duplicate of the common services.	2.1.0.0	7.7

Name	Brief Description	ProStream XVM Release	NMX Release
FW-PRM-XVM-RESTAPI	ProStream XVM RESTAPI firmware license.	2.1.0.0	7.7
FW-PRM-XVM-TBL-SPOOLING	ProStream XVM firmware license enabling (P)SI/PSIP table carousel delivered from a specific table generator. One per transport stream required.	2.1.1.0	7.7.2
FW-PRM-XVM-DT-TARGET-BTR-SRV	ProStream XVM Target Average bitrate per service within the statmux pool and with minimum degradation of the video quality. One per service is required.	2.1.1.0	7.7.2
FW-PRM-XVM-DVB-CW	ProStream XVM DVB SCR firmware license. One per service required.	1.5	7.6
FW-PRM-XVM-AES-CW	ProStream XVM AES SCR firmware license. One per service is required.	1.5	7.6
FW-PRM-XVM-BISS-FIX-SRV	ProStream XVM BISS Fixed key firmware license. One per service required.	1.5	7.6
FW-PRM-XVM-SCR-FIX-SRV	ProStream XVM Fixed Key firmware license. One per service required.	1.5	7.6
FW-PRM-XVM-BDS-SRV	ProStream XVM FW option for connection to BDS for Invidi support. One per service required.	1.5	7.6
FW-PRM-XVM-SELC-EHP	ProStream XVM Encryption Hacking Prevention Scrambling firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-XVM-SRV-SUB	ProStream XVM Splicing Service Substitution firmware license. One per service required.	2.0.0.0	7.6.2
FW-PRM-XVM-ESAM	ProStream XVM ESAM interface Firmware License. One per service required.	2.0.0.0	7.6.2

Name	Brief Description	ProStream XVM Release	NMX Release
FW-PRM-XVM-BLCKOUT-VIRD	ProStream XVM ESAM for Blackout solution Firmware License. One per VIRD/channel required.	2.0.0.0	7.6.2
FW-PRM-XVM-BASE	ProStream XVM Base license.	1.3	7.5
FW-PRM-XVM-DEMO	ProStream XVM firmware license for all functions for 90-day demo usage. For non-commercial use only.	1.3	7.5
FW-PRM-XVM-LAB	ProStream XVM firmware license for Lab use only.	1.3	7.5
FW-PRM-XVM-SPARE	ProStream XVM COLD SPARE firmware license for all ProStream functions. For 30 days. One per chassis.	1.3	7.5
FW-PRM-XVM-REDUNDANCY	ProStream XVM Stand Alone Device Redundancy firmware license. One per chassis required.	1.3	7.5
FW-PRM-XVM-SLATE-SRV	ProStream XVM firmware license for Slate Insertion. One per service required.	1.3	7.5
FW-PRM-XVM-EAS-SRV	ProStream XVM firmware license for Emergency Alert System. One per service required.	1.3	7.5
FW-PRM-XVM-FEC-TS	ProStream XVM FEC firmware license. One per Transport Stream required.	1.3	7.5
FW-PRM-XVM-DT-POOL	ProStream XVM firmware license for statmux controller. One DiviTrackIP license per pool.	1.3	7.5

11.4.4. Simplified Licenses

The simplified licenses provide easy ordering of ProStream X by combining the features of several different parts under one part number. The following tables show the correspondence between the simplified licenses and the details licenses

ProStream X

New license	Description	Included detail licenses																				
LIC-PRM-X-BASE	ProStream X base license enabling basic multiplexer function including RestAPI. One license per ProStream X appliance is required.	<table border="1"> <thead> <tr> <th colspan="2" data-bbox="906 415 1284 483">LIC-PRM-X-BASE</th> </tr> <tr> <th data-bbox="906 489 1195 556">Part Number</th> <th data-bbox="1200 489 1284 556">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="906 562 1195 630">FW-PRM-X-BASE</td> <td data-bbox="1200 562 1284 630">1</td> </tr> <tr> <td data-bbox="906 636 1195 724">FW-PRM-X-RESTAPI</td> <td data-bbox="1200 636 1284 724">1</td> </tr> </tbody> </table>	LIC-PRM-X-BASE		Part Number	QTY	FW-PRM-X-BASE	1	FW-PRM-X-RESTAPI	1												
LIC-PRM-X-BASE																						
Part Number	QTY																					
FW-PRM-X-BASE	1																					
FW-PRM-X-RESTAPI	1																					
LIC-PRM-X-SCRAMBLING	Scrambling license for single (one) channel for the following scrambling options: DVB CSAv2, AES, BISS-1, Fixed Key scrambling, Fixed key descrambling, selective encryption, and Enhanced Hacking Protection (EHP).	<table border="1"> <thead> <tr> <th colspan="2" data-bbox="906 768 1344 835">LIC-PRM-X-SCRAMBLING</th> </tr> <tr> <th data-bbox="906 842 1256 909">Part Number</th> <th data-bbox="1261 842 1344 909">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="906 915 1256 993">FW-PRM-X-AES-CW</td> <td data-bbox="1261 915 1344 993">1</td> </tr> <tr> <td data-bbox="906 999 1256 1077">FW-PRM-X-DVB-CW</td> <td data-bbox="1261 999 1344 1077">1</td> </tr> <tr> <td data-bbox="906 1083 1256 1161">FW-PRM-X-BISS-FIX-SRV</td> <td data-bbox="1261 1083 1344 1161">1</td> </tr> <tr> <td data-bbox="906 1167 1256 1245">FW-PRM-X-DES-FIX-SRV</td> <td data-bbox="1261 1167 1344 1245">1</td> </tr> <tr> <td data-bbox="906 1251 1256 1329">FW-PRM-X-SCR-FIX-SRV</td> <td data-bbox="1261 1251 1344 1329">1</td> </tr> <tr> <td data-bbox="906 1335 1256 1413">FW-PRM-X-SELC-EHP</td> <td data-bbox="1261 1335 1344 1413">1</td> </tr> <tr> <td data-bbox="906 1419 1256 1497">FW-PRM-X-SELC-SCR</td> <td data-bbox="1261 1419 1344 1497">1</td> </tr> <tr> <td data-bbox="906 1503 1256 1514"></td> <td data-bbox="1261 1503 1344 1514"></td> </tr> </tbody> </table>	LIC-PRM-X-SCRAMBLING		Part Number	QTY	FW-PRM-X-AES-CW	1	FW-PRM-X-DVB-CW	1	FW-PRM-X-BISS-FIX-SRV	1	FW-PRM-X-DES-FIX-SRV	1	FW-PRM-X-SCR-FIX-SRV	1	FW-PRM-X-SELC-EHP	1	FW-PRM-X-SELC-SCR	1		
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LIC-PRM-X-SWITCHING	Switching license for single (one) channel for the following switching options: EAS, EAS SCTE-18 Triggering, Live-to-live switching (Seamless Program Substitution), external slate insertion switching , BDS connection for Invidi support , blackout switching and ESAM interface support.	<table border="1"> <thead> <tr> <th colspan="2">LIC-PRM-X-SWITCHING</th> </tr> <tr> <th>Part Number</th> <th>QTY</th> </tr> </thead> <tbody> <tr> <td>FW-PRM-X-BDS-SRV</td> <td>1</td> </tr> <tr> <td>FW-PRM-X-BLCKOUT-VIRD</td> <td>1</td> </tr> <tr> <td>FW-PRM-X-EAS-SCTE18-SRV</td> <td>1</td> </tr> <tr> <td>FW-PRM-X-EAS-SRV</td> <td>1</td> </tr> <tr> <td>FW-PRM-X-ESAM</td> <td>1</td> </tr> <tr> <td>FW-PRM-X-SLATE-SRV</td> <td>1</td> </tr> </tbody> </table>	LIC-PRM-X-SWITCHING		Part Number	QTY	FW-PRM-X-BDS-SRV	1	FW-PRM-X-BLCKOUT-VIRD	1	FW-PRM-X-EAS-SCTE18-SRV	1	FW-PRM-X-EAS-SRV	1	FW-PRM-X-ESAM	1	FW-PRM-X-SLATE-SRV	1
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LIC-PRM-X-ADVANCED-SM	Advanced Statmux tool for up to 6 video channels with Target Average Bitrate and one DataTrack (1 TS) . For enabling DiviTrack Statmux (per pool), a separate license should be quoted.	<table border="1"> <thead> <tr> <th colspan="2">LIC-PRM-X-SWITCHING</th> </tr> <tr> <th>Part Number</th> <th>QTY</th> </tr> </thead> <tbody> <tr> <td>FW-PRM-X-DT-TARGET-BTR-SRV</td> <td>6</td> </tr> <tr> <td>FW-PRM-X-DATATRACK</td> <td>1</td> </tr> </tbody> </table>	LIC-PRM-X-SWITCHING		Part Number	QTY	FW-PRM-X-DT-TARGET-BTR-SRV	6	FW-PRM-X-DATATRACK	1								
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ProStream XVM

New license	Description	Included detail licenses								
LIC-PRM-XVM-BASE	ProStream XVM base license enabling basic multiplexer function including RestAPI. One license per ProStream X appliance is required.	<table border="1"> <thead> <tr> <th colspan="2">LIC-PRM-XVM-BASE</th> </tr> <tr> <th>Part Number</th> <th>QTY</th> </tr> </thead> <tbody> <tr> <td>FW-PRM-XVM-BASE</td> <td>1</td> </tr> <tr> <td>FW-PRM-XVM-RESTAPI</td> <td>1</td> </tr> </tbody> </table>	LIC-PRM-XVM-BASE		Part Number	QTY	FW-PRM-XVM-BASE	1	FW-PRM-XVM-RESTAPI	1
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LIC-PRM-XVM-SCRAMBLING	Scrambling license for single (one) channel for the following scrambling options: DVB CSAv2, AES, BISS-1, Fixed Key scrambling, Fixed key descrambling, selective encryption, and Enhanced Hacking Protection (EHP).	<table border="1"> <thead> <tr> <th colspan="2" data-bbox="911 279 1390 352">LIC-PRM-XVM-SCRAMBLING</th> </tr> <tr> <th data-bbox="911 352 1302 422">Part Number</th> <th data-bbox="1302 352 1390 422">QTY</th> </tr> </thead> <tbody> <tr> <td data-bbox="911 422 1302 510">FW-PRM-XVM-AES-CW</td> <td data-bbox="1302 422 1390 510">1</td> </tr> <tr> <td data-bbox="911 510 1302 598">FW-PRM-XVM-DVB-CW</td> <td data-bbox="1302 510 1390 598">1</td> </tr> <tr> <td data-bbox="911 598 1302 672">FW-PRM-XVM-BISS-FIX-SRV</td> <td data-bbox="1302 598 1390 672">1</td> </tr> <tr> <td data-bbox="911 672 1302 745">FW-PRM-XVM-DES-FIX-SRV</td> <td data-bbox="1302 672 1390 745">1</td> </tr> <tr> <td data-bbox="911 745 1302 819">FW-PRM-XVM-SCR-FIX-SRV</td> <td data-bbox="1302 745 1390 819">1</td> </tr> <tr> <td data-bbox="911 819 1302 892">FW-PRM-XVM-SELC-EHP</td> <td data-bbox="1302 819 1390 892">1</td> </tr> <tr> <td data-bbox="911 892 1302 966">FW-PRM-XVM-SELC-SCR</td> <td data-bbox="1302 892 1390 966">1</td> </tr> <tr> <td data-bbox="911 966 1302 1020"></td> <td data-bbox="1302 966 1390 1020"></td> </tr> </tbody> </table>	LIC-PRM-XVM-SCRAMBLING		Part Number	QTY	FW-PRM-XVM-AES-CW	1	FW-PRM-XVM-DVB-CW	1	FW-PRM-XVM-BISS-FIX-SRV	1	FW-PRM-XVM-DES-FIX-SRV	1	FW-PRM-XVM-SCR-FIX-SRV	1	FW-PRM-XVM-SELC-EHP	1	FW-PRM-XVM-SELC-SCR	1		
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