

AT&T SportsNet & ROOT SPORTS - XOS IRD Migration

Installation Guide

Revision A — June 24, 2022

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XOS overview

The XOS enables affiliates to receive video and audio programming offered by AT&T SportsNet & ROOT SPORTS.

Where to find information about XOS

This document describes how to configure and operate XOS.

For XOS installation and activation procedures, see the *AT&T SportsNet & ROOT SPORTS - XOS - Quick Start Guide*, which is shipped with the XOS. The document is also available online at this site: <https://www.harmonicinc.com/documentation/att-rsn/>.

The *Quick Deploy Rail System Installation Instructions* (p/n: 726957-002) describe how to install and use the rack mounting kit. The instructions are available from the Hewlett Packard Enterprise web site: <https://support.hpe.com>.

Abbreviations

The followings are abbreviations used in this document:

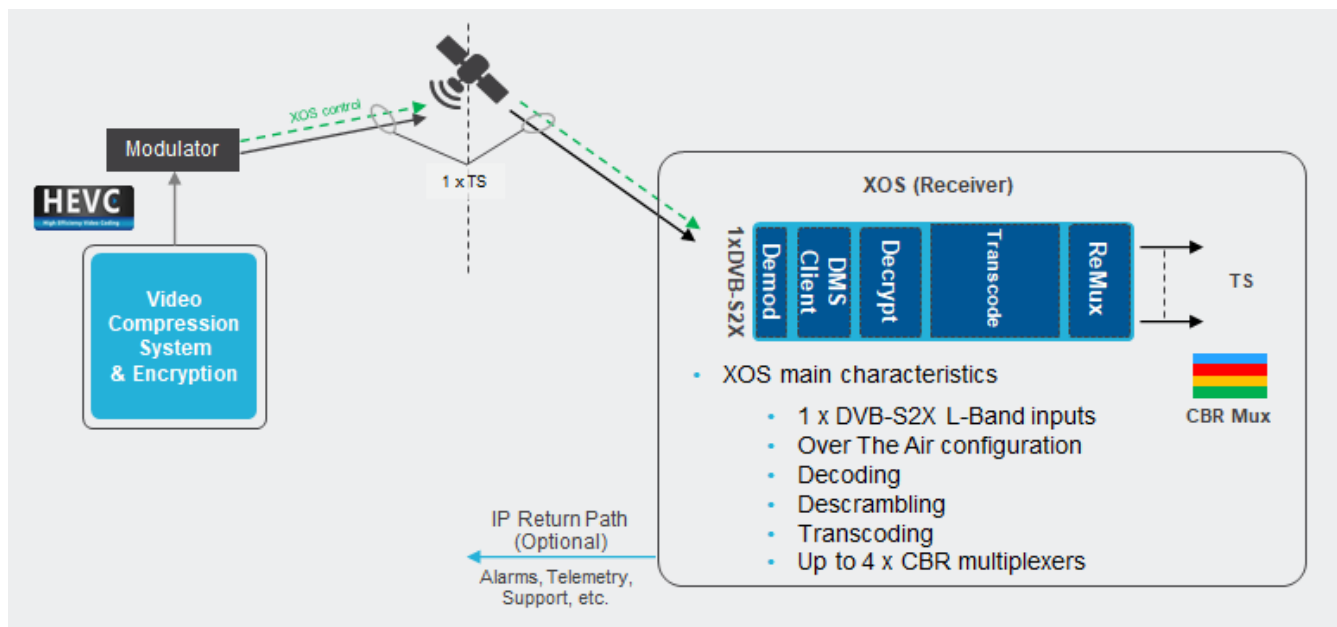
Term	Definition
A/V	Audio and video
ASI	Asynchronous Serial Interface
CBR	Constant Bit Rate
DMS	Distribution management system
GbE	Gigabit Ethernet
HD	High Definition
HPE	Hewlett Packard Enterprise
HVAC	High-voltage and air conditioning
HEVC	High Efficiency Video Coding
IRD	Integrated receiver-decoder (XOS)
MVPD	Multi-Channel Video Program Distributors
NIC	Network interface card
OTA	Over-the-Air
SD	Standard Definition

Term	Definition
SDI	Standard Digital Interface
TS	Transport Stream
UI	User interface
UDP	User Datagram Protocol
USB	Universal Serial Bus
VGA	Video Graphics Array
XOS	Harmonic Transcoder / Receiver (IRD)

XOS system architecture

General System Architecture:

AT&T SportsNet & ROOT SPORTS Affiliate Technology Support Team will provide management and authorization of each XOS over-the-air once you have installed and connected it to the AT&T SportsNet & ROOT SPORTS satellite transponders.

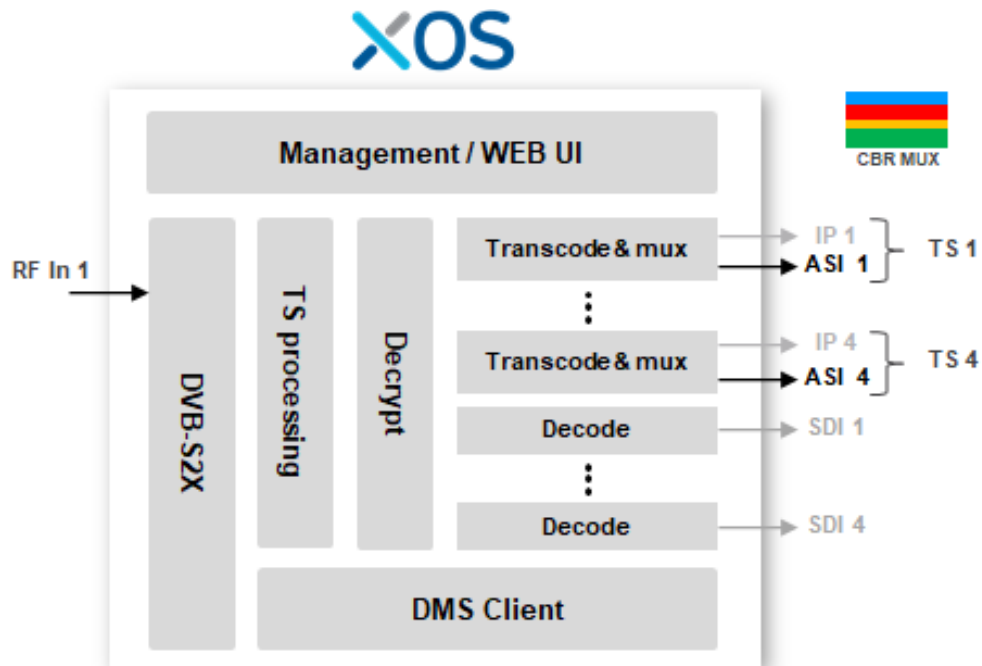


Distribution System Architecture:

The number of XOS servers you install is dependent on the affiliate site.

The XOS architecture is composed of the following functional components:

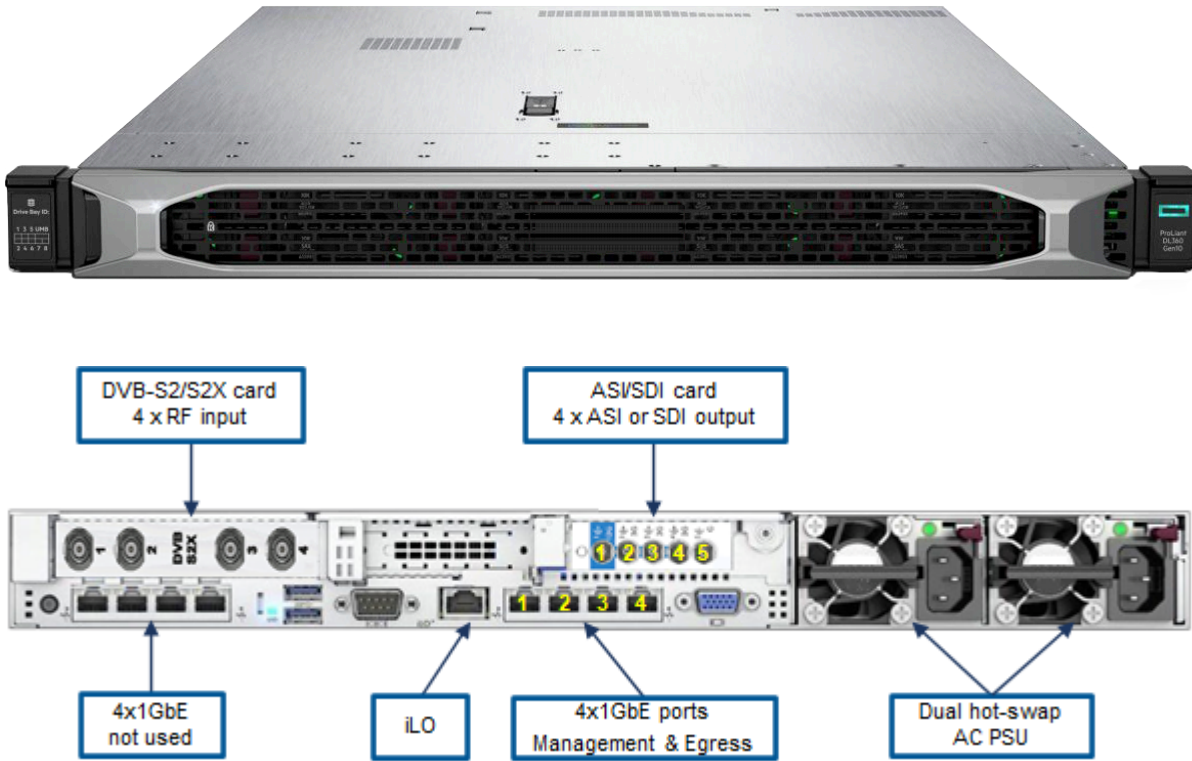
- **DVB-S2X** inputs to receive up to 4 x transponders.
- **TS Processing** extracts services and signaling.
- **Decrypt** descrambles entitled services.
- **Transcode & Mux** generates constant bit rate (CBR) multiplexed output.
- **DMS client** handles over-the-air configuration and upgrade.
- **Management / WEB UI** provides the interface for the following functions:
 - Extracting the XOS configuration, sent in a transport stream (TS) over satellite, and applying it when required.
 - Checking the radio frequency (RF) parameters.
 - Management of output services.
 - Monitoring and troubleshooting.



XOS hardware configuration

The hardware is composed of:

- 1 x XOS server platform
- 1 x DVB-S2X card
- 1 x SDI / ASI card
- 2 x 1GEth card (4 ports)
- 1 x SIM card reader for CAS inside the chassis



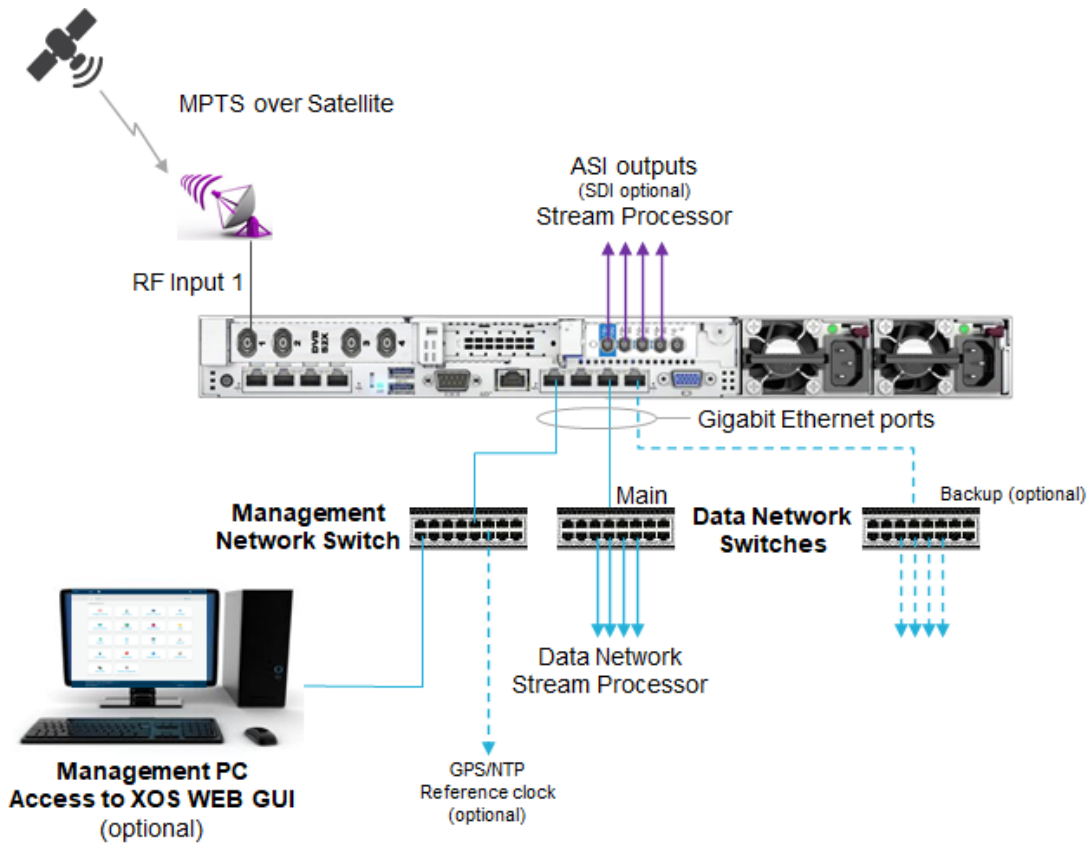
- Two hot swappable **AC Power supplies**.
- The **VGA** and the **USB** ports are only used to set the Management IP address.
- Four **1GbE** ports:
 - Port 1: Connected to management network.
 - Port 2: Not used.
 - Port 3: Connected to the data network switch
 - Port 4: Optional. Connected to the backup data network switch.
- Network interface card (NIC) on the left: Not used
- Four **DVB-S2X** RF ports:
 - Port 1 (RF input 1): Connected to the satellite downlink, to receive transponder TP17C.
 - Ports 2, 3 and 4: Not used.
- Eight **SDI/ASI** ports + Genlock port:
 - Ports 1 to 4 (ASI or SDI outputs): depends on configuration.
 - Port 5 (Bi/tri-level genlock input): Not used.

Server configuration

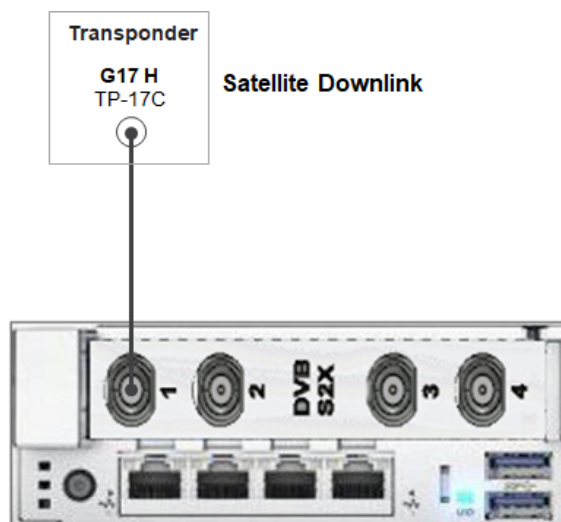
Server model	HPE ProLiant DL360 Gen10 8-SFF
Processor	2 x INTEL Xeon Gold 5220R
Hard Drives	SSD 480GB
Memory	96GB DDR
NIC	Card on the right: 4 x 1GbE ports (RJ45) Card on the left: 4 x 1GbE ports (RJ45) - Not used
Power	Dual redundant power supplies, hot swappable 100/240 VAC, 50/60 Hz input <i>Max power @ room temp = 440W, Max power @ Max temp (35C) = 500W</i>
Environmental	Operating temperature: 10°C to 35°C (50°F to 95°F) Non-operating temperature: -30°C to 60°C (-22°F to 140°F) Operating humidity: 8% to 90% EMC Class A: FCC, CE, VCCI, KC, CCC, TCVN, CTick, BSMI Product Safety: US/CA NRTL, CB Scheme, BIS, CCC, EAC, BSMI Product Materials: EU RoHS, China RoHS, EU REACH, WEEE
Physical	1-RU server, with built-in RF and ASI/SDI interfaces Dimensions (HxWxD): 4.3 x 43.5 x 70.7 cm (1.7 x 17.1 x 27.8 in) Weight: 15kg (33 Lbs)
Management (IPMI)	Yes, through the iLO service port on the server
Operating System	Linux

XOS connections

General diagram:



RF Input:



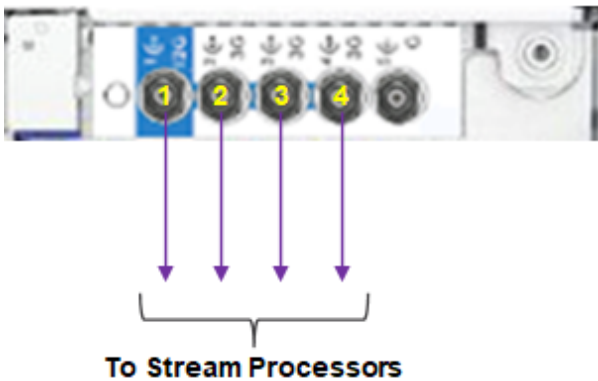
ASI / SDI outputs:

The choice between ASI or SDI outputs depends on the configuration:

Configuration	Output	Assignments are made
Without decoding processing	ASI	Manually. You manually assign ASI outputs to a TS multiplexer.
With decoding processing	SDI	Automatically. The first decoder is assigned to SDI output 1, the second decoder to SDI output 2, and so on.

ASI outputs

(SDI optional with license)
Depends on affiliate sites

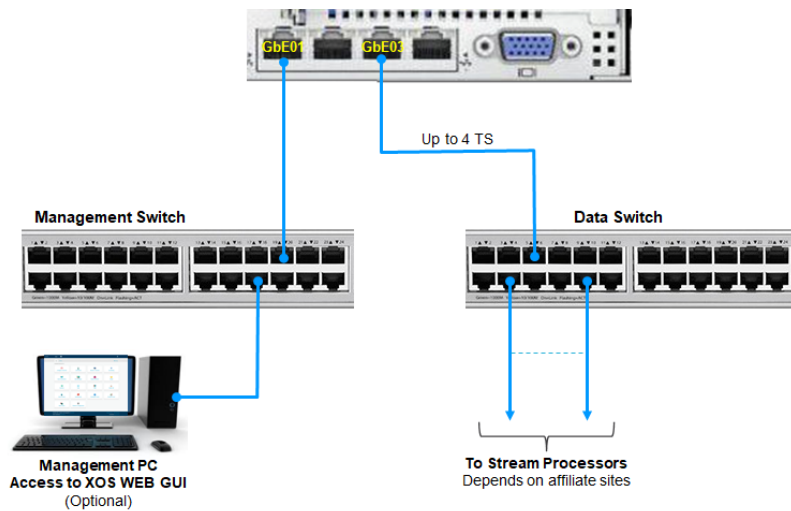


⚠ A license is required for using the SDI outputs.

Giga Ethernet ports:

The XOS connects to two different IP Ethernet networks:

- **Management Network:** for managing and operating the XOS via a management PC
- **Data Network:** for broadcasting from the TS multiplexers to the stream processors



- The two IP Ethernet networks must be separated. Use two different switches.
- The Management and the Data switches are not provided by Harmonic.
- The Management PC is optional, but recommended.

How to access the XOS

To access the XOS through the web user interface (UI), you must configure the following Management Network parameters of the XOS: IP address, netmask, and gateway on your local IP network.




Chrome or Firefox web browsers using HTTPs are recommended for accessing the XOS web UI.

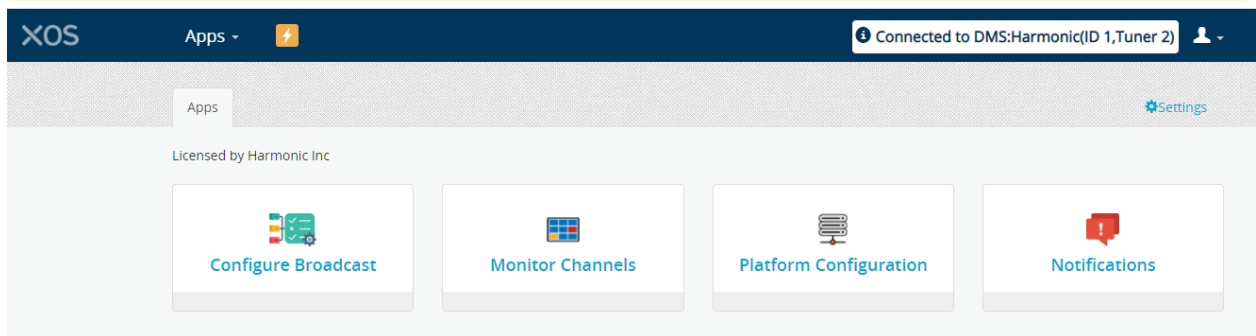
1. Configure the management IP parameters. See [How to configure the management IP parameters](#) for instructions.
2. Once the management parameters set, do the following:
 - a. In a web browser, type the URL of your XOS and press **Enter**. Example: <https://192.100.100.10>
 - b. Log in to the XOS using the following credentials:
 - Login = **xos**
 - Password = **xos-user**

How to configure and activate the XOS


The procedure below describes what you need to do to properly activate your XOS:

1. Install your XOS in a rack and make connections as shown in [XOS connections](#).
2. To access your XOS, you must configure its network settings. Refer to [How to access the XOS](#) and then to [How to configure the management IP parameters](#) for instructions.
3. Verify that XOS is connected to the DMS at the central headend. Once you are successfully logged in, check the message that appears at the top right of the landing page. This will state whether the XOS is connected or controlled by a head-end or DMS.


 If you do not see a Connected or Controlled message, check your RF connections by selecting the **Platform Configuration tile > RF Tab**. Make sure the RF levels are good on the tuner to which you are connected.



4. Enable the GbE03 data port and enter its IP settings to allow each multiplexer to be broadcasted in IP Multicast datagrams. See [How to configure the data IP ports](#) for instructions.

 For some affiliate sites, only ASI outputs are used. If this is the case **do no configure the IP data ports** to avoid having false alarms.

5. The XOS will perform a software and configuration update upon a successful connection to RF. This process is automatic and controlled by the DMS at AT&T SportsNet & ROOT SPORTS.

 This initialization step can take few hours. Make sure the XOS remains powered on and connected to the Satellite RF.

6. Once the software and the configuration updates are complete, check for the presence of the TS multiplexers. For instructions, see [How to check the presence of TS multiplexers](#).
7. Assign the TS multiplexer to an IP or an ASI output (depends on the requirements of the affiliate site). For instructions, see [How to assign a TS multiplexer to IP or ASI output](#).
8. Check for the presence of TS multiplexers (Programs) on the XOS outputs. For instructions, see [How to test the XOS configuration](#).

In addition, Harmonic recommends:

- Connecting the XOS to a DNS server. See [How to configure the DNS server IP address](#).
- Synchronizing the XOS with a NTP server. See [How to configure the time synchronization](#).

How to configure the management IP parameters

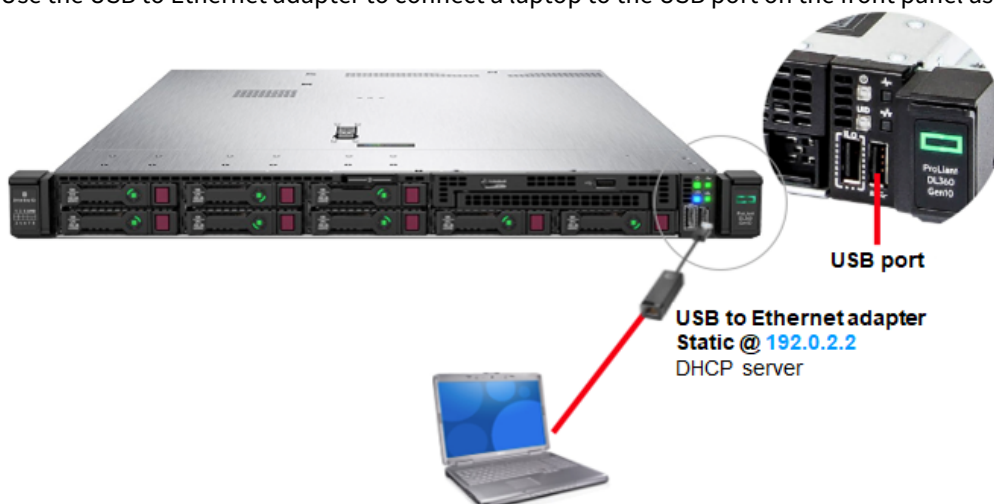
A USB to Ethernet adapter is included with the XOS. You can use the adapter for configuring the IP parameters on the XOS.

i The default factory network management parameters are:

- IP address: **192.168.1.200**
- Netmask: **255.255.255.0**

⚠ XOS checks for a DHCP server at boot up. Make sure no DHCP server is accessible during IP management configuration.

1. Use the USB to Ethernet adapter to connect a laptop to the USB port on the front panel as shown below:

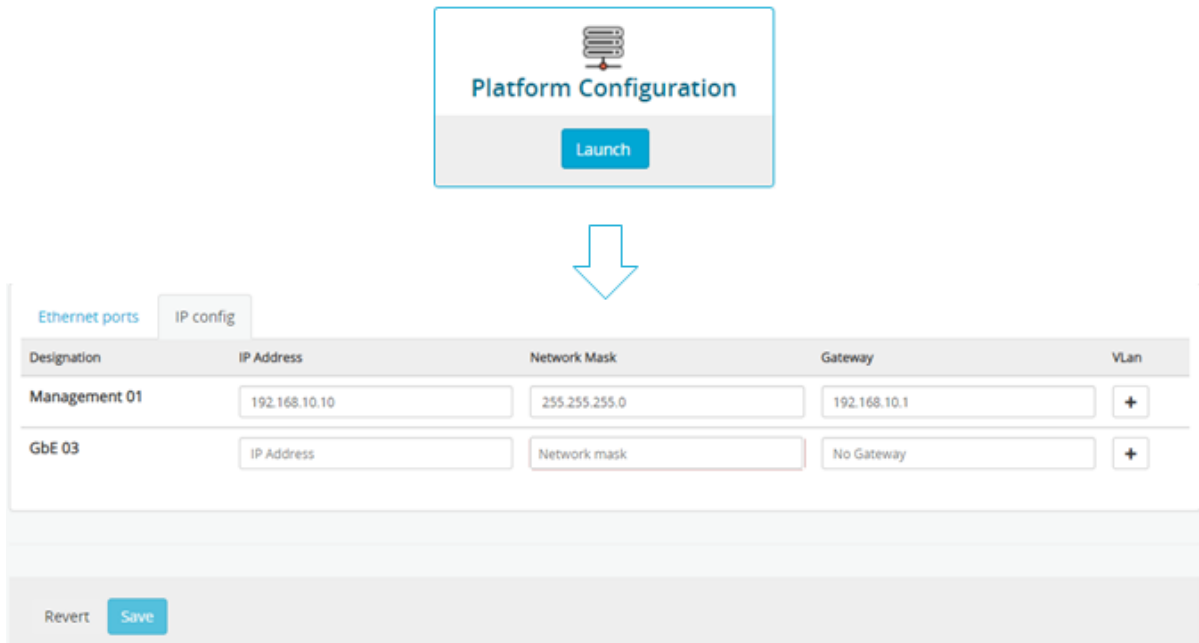


⚠ Note

When bezel is mounted, the USB front panel port is located behind the bezel.

2. Connect the power cord to the power supply on the rear panel of the XOS.
3. Connect the cable to the power source and turn on the power.
4. Wait for the XOS to complete boot process.
5. Power on the laptop.
6. In a web browser (Google Chrome recommended), type the IP address (<https://192.0.2.2>) and press **Enter**.
7. Enter the following credentials and click **Log in**:
 - Login: **xos**
 - Password: **xos-user**
8. Select the **Platform Configuration** tile and click **Launch**.

9. Select the **Network** tab followed by the **IP config** tab.



The diagram illustrates the navigation process. At the top, a box labeled "Platform Configuration" with a server icon and a "Launch" button is shown. A large blue arrow points down to a screenshot of the "Ethernet ports" configuration page. In this page, the "IP config" tab is selected. Below the tabs is a table with columns: Designation, IP Address, Network Mask, Gateway, and VLAN. The table contains two rows: "Management 01" and "GbE 03". The "Management 01" row has pre-filled values: IP Address 192.168.10.10, Network Mask 255.255.255.0, and Gateway 192.168.10.1. The "GbE 03" row has input fields for IP Address and Network mask, and a "No Gateway" field. Each row has a "+" button in the VLAN column. At the bottom of the page are "Revert" and "Save" buttons.

Designation	IP Address	Network Mask	Gateway	VLAN
Management 01	192.168.10.10	255.255.255.0	192.168.10.1	+
GbE 03	IP Address	Network mask	No Gateway	+


10. You can change the IP parameters of the **Management 01** port based on your management network IP plan or keep the default IP address.
11. Click **Save**

Your access to the XOS UI is now available at https://@IP_Mngt.

How to configure the data IP ports

The IP data ports are used to transport all multicast signals to the downstream equipment.

1. Launch the **Platform Configuration** application.
2. Select the **IP Settings / Ethernet ports** tabs.
3. Verify the **GbE 03** port is enabled. If not check the box.

 GbE 04 can be enabled if Teaming/Redundancy is required. Refer to [How to configure data ports redundancy](#) for instructions.

IP Settings | IP Monitoring | DNS | IP Routes | Time | RF | System Information | OneCare Portal

Ethernet ports | IP config

Designation	State	MAC address	Duplex	Speed	Redundancy			Main
					Active	Mode	Policy	
<input checked="" type="checkbox"/> Management 01		94-40-c9-3f-bc-34	AUTO	1000Mb/s		NONE	Manual	N/A
<input type="checkbox"/> Management 02		94-40-c9-3f-bc-35	AUTO	(Offline)				N/A
<input checked="" type="checkbox"/> GbE 03		94-40-c9-3f-bc-36	AUTO	1000Mb/s		NONE	Manual	N/A
<input type="checkbox"/> GbE 04		94-40-c9-3f-bc-37	AUTO	(Offline)				N/A

4. Select the **IP config** tab.

IP Settings | IP Monitoring | DNS | IP Routes | Time | RF | System Information | OneCare Portal

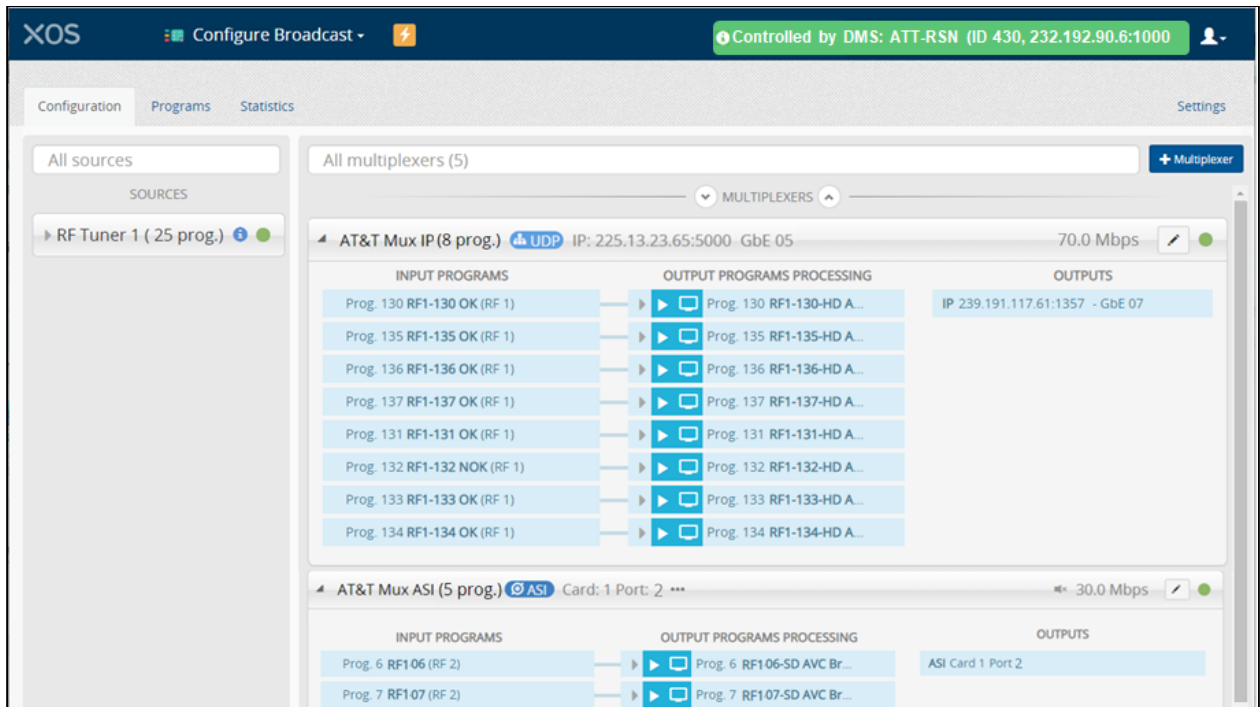
Ethernet ports | IP config

Designation	IP Address	Network Mask	Gateway	Vlan
Management 01	10.42.39.208	255.255.255.0	10.42.39.1	+
GbE 03	39.254.100.208	255.255.255.0	39.254.100.1	+

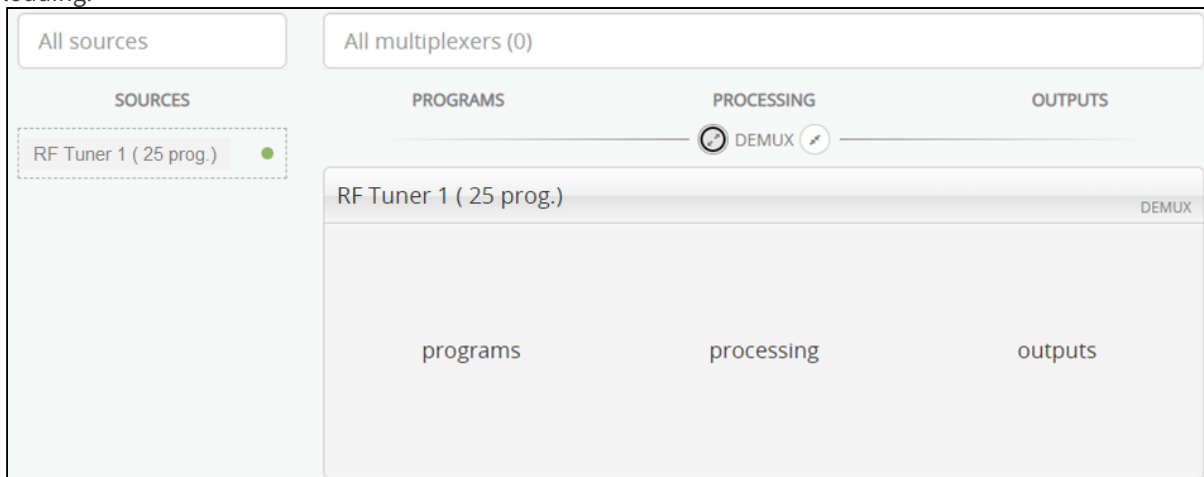
5. Set the IP Address, the Network Mask, and the Gateway of port GbE 03 based on your Data network IP plan or keep the default IP address (192.168.2.200).
6. Click **Save**.

How to check the presence of TS multiplexers

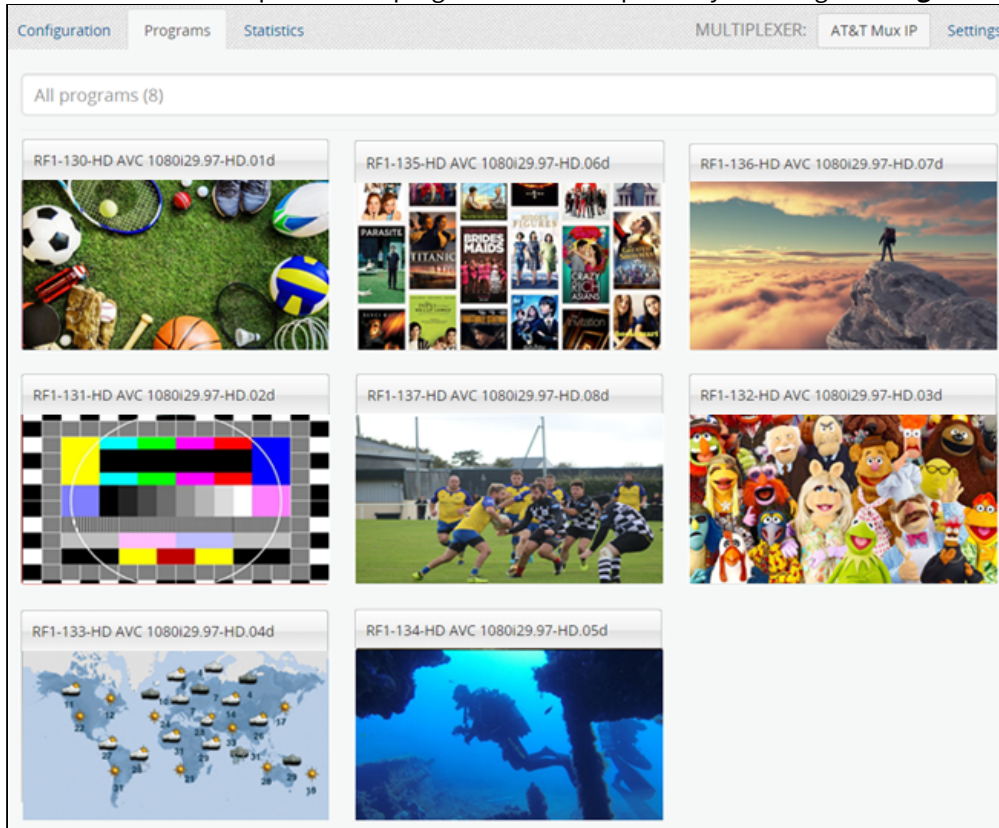
1. Launch the **Configure Broadcast** application.
2. The UI will be similar in appearance to this picture.



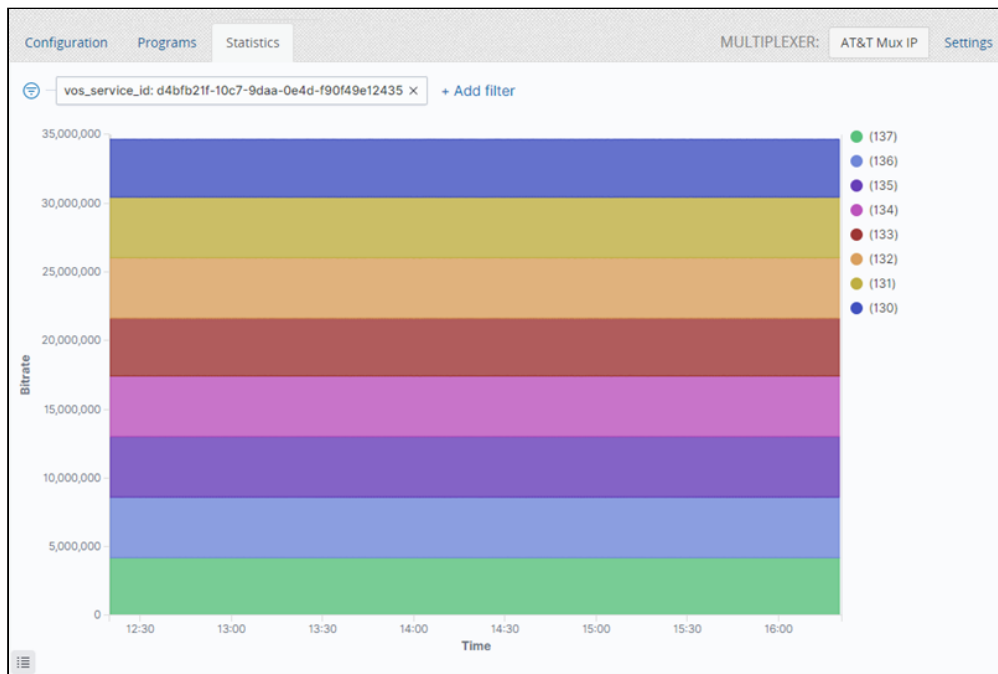
3. The UI is composed of the following components:
 - A message at the top of the UI specifies DMS is controlling the XOS.
 - The left side of the UI shows the RF tuners and the number of associated programs.
 - The right side of the UI shows the multiplexers associated to each tuner.
4. Click on a multiplexer to expand the display for a list of authorized programs.
 If no TS multiplexer is present, the UI will display as shown below. You must wait until the configuration finishes loading.



5. You can also check the presence of programs for a multiplexer by selecting the **Programs** tab:



6. In the **Statistics** tab, you can view the current bitrate allocation of the selected multiplexer's services.



How to assign a TS multiplexer to IP or ASI output

1. Select a multiplexer and click **Edit**.

The screenshot shows the 'EDIT MULTIPLEXER' dialog box. It has two main sections: 'GENERAL' and 'DESTINATION'. In the 'GENERAL' section, the 'NAME' field contains 'AT&T Mux IP' and the 'TS BITRATE' is set to '70' Mbps. In the 'DESTINATION' section, the 'OUTPUTS' list shows 'Primary IP' and 'ASI'. The 'IP ADDRESS' is '225.13.23.65', the 'PORT' is '5000', and the 'NETWORK' is 'GbE 05 (10.10.10.217)'. The 'MUTE' checkbox is checked. There is a '+ Remove output' button below the outputs list. At the bottom, there are 'Close', 'Delete', and 'Update' buttons.

2. Set the multicast IP Address based on your IP plan.
3. Select the IP data port (normally GbE03).
4. Set the UDP port number based on your IP plan.
5. By default the Primary IP output is muted. Clear the check box to unmute the output.
6. Click **Update** to commit your changes.

To add an ASI output, do the following:

1. Click the "+" button.
2. Select **ASI**.

The screenshot shows the 'EDIT MULTIPLEXER' dialog box. In the 'GENERAL' section, the 'NAME' field contains 'AT&T Mux ASI' and the 'TS BITRATE' is set to '30' Mbps. In the 'DESTINATION' section, the 'OUTPUTS' list shows 'Primary ASI' and 'IP'. The 'PORT' is set to '2'. There is a '+ Remove output' button below the outputs list. At the bottom, there are 'Close', 'Delete', and 'Update' buttons.

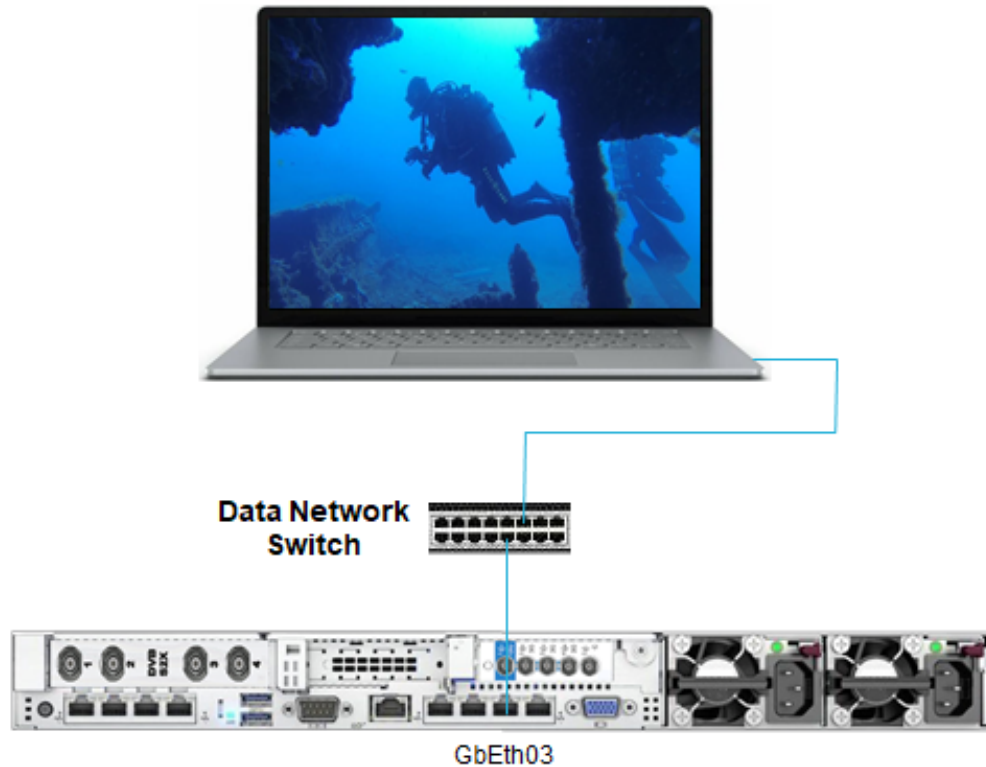
3. Enter the ASI port to be used.
4. Click **Update** to commit your changes.

How to check the XOS outputs

At the GbEth output

Depending on your configuration, each Multiplexer may be available on GbEth output, .

1. Connect one free IP port of the data network switch to the IP GbEth port of any PC.
2. Use any free media player (like Windows Media Player or VLC).



3. Open the media player and set the Multicast IP address of the multiplexer you want to check.
4. From the media player, select any program from the multiplexer.
5. The image of the selected program appears on the screen.
6. Repeat this process for any multiplexer assigned to an IP multicast output.

At the ASI output

Depending on your configuration, each multiplexer may be available on one of the ASI outputs.

1. According to the multiplexer you want to check, connect one free ASI output to a professional-grade decoder that contains an HDMI connector.
2. Assign this ASI output to the multiplexer.
3. Connect the HDMI connector to a TV.



4. From the decoder menu, select one of the available programs.
5. The image of the selected program appears on the screen.
6. Repeat this process for any multiplexer connected to an ASI output.

Monitoring and troubleshooting

How to monitor the RF input

RF default parameters

Each XOS comes with the RF parameters used by AT&T SportsNet & ROOT SPORTS.

Only RF port 1 is used and corresponds to the following transponder:

- RF1 = TP-17C - Satellite Intelsat Galaxy 17

The Local Oscillator frequency value is:

Port 1: 5.15 GHz

Tuner parameters:

Parameters	Tuner 1 TP-17C
Symbol Rate	30.00Msps
Carrier Frequency	4040 MHz
Polarization	H
Spectral Inversion	Normal
Modulation	8 PSK
FEC	5/6
Pilots	On
Pls Code	0
Roll Off (%)	20

RF inputs status

To check the RF inputs status:

1. Launch the **Platform Configuration** app.
2. Select the RF tab / Global settings to display the local Oscillator Frequency.


RF Card #1

Tuner 1 Tuner 2 Tuner 3 Tuner 4 Global settings

Port	Parameters	Value
Port #1	Oscillator Frequency (GHz):	5.15
Port #2	Oscillator Frequency (GHz):	oscillatorFrequency
Port #3	Oscillator Frequency (GHz):	oscillatorFrequency
Port #4	Oscillator Frequency (GHz):	oscillatorFrequency

Card parameters

LNB power ☐

 At some affiliate sites, the local Oscillator Frequency may need to be changed according to the downlink requirement.

3. Select Tuner 1 tab and check the box to enable it and display its parameters.

RF Card #1

Tuner 1 Tuner 2 Tuner 3 Tuner 4 Global settings

Enabled Parameters

☒ Upstream Demod : ☐

Symbol Rate (Msym/s) : 30.00

Carrier Frequency (GHz) : 4.040

Polarization : Horizontal

Spectral Inversion : Normal

Modulation and Fec : 8PSK_5_6

Pilots : On

Physical Layer Scrambling Seed : 0

Roll-Off (%) : 20%

Monitoring : ☐

4. At the bottom, check the status of the tuner (Reception and Carrier).

Status

sourceId: Tuner 1 × + Add filter

Reception

UTC Date	Tuner	RF Status	Power [dBm]	Link Margin [dB]	C/N [dB]	Eb/NO [dB]	PER
Apr 28, 2022 @ 09:27:49.866	Tuner 1	Locked	-47.5	8.94	18.3	14.35	0E-7

Export: Raw Formatted

Carrier

UTC Date	Modulation standard	Modulation	FEC	Symbol Rate [sym/s]	Frame Size	Frequency Offset [Hz]	Pilot	Roll Off	Inversion
Apr 28, 2022 @ 09:27:49.866	DVBS2	8 PSK	5/6	30,000,000	Normal	-1	On	20%	Normal

Export: Raw Formatted

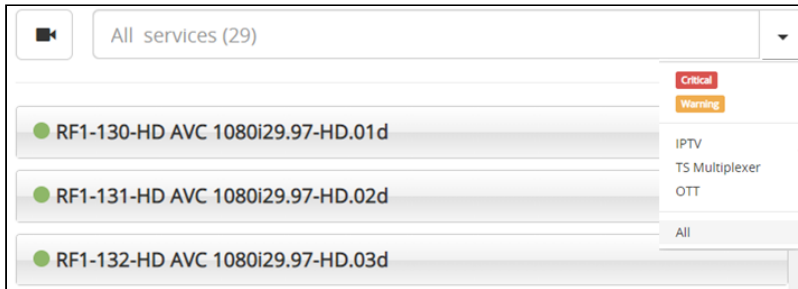
How to monitor channels and MPTS

From the home page, select the **Monitor Channels** application and click **Launch** to display the general view with all services.

You can customize the display on XOS by using filters to show current notifications.

Customize the display

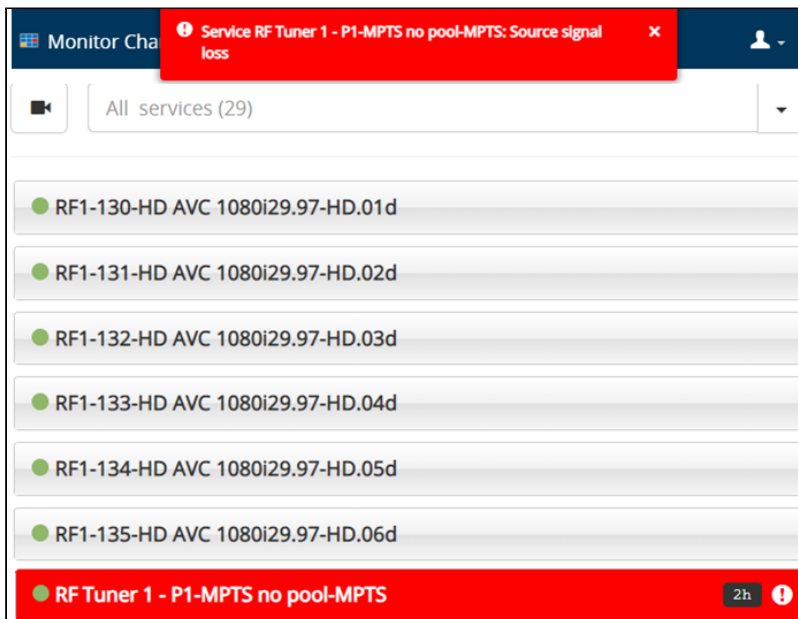
The menu at the top right allows you to filter the services to be displayed:



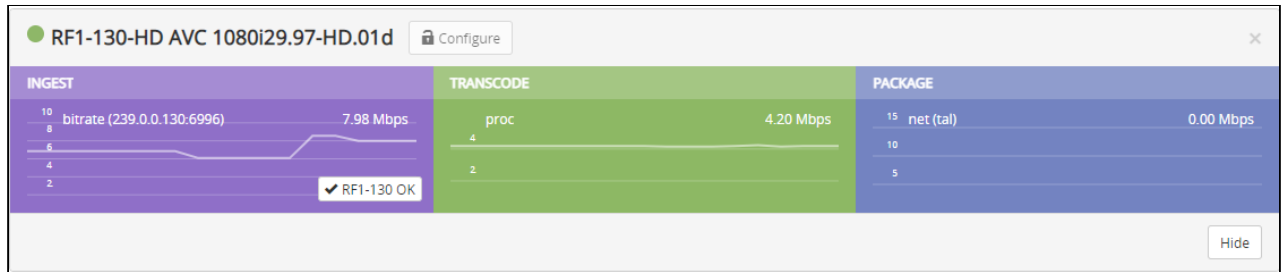
- **Critical:** Display only services with a critical notification.
- **Warning:** Display only services with a warning notification.
- **IPTV:** Display only services dedicated to IPTV output (not used).
- **TS Multiplexer:** Display only MPTS.
- **OTT:** Display only services dedicated to OTT output (not used).
- **All:** Display all services.

Notifications display

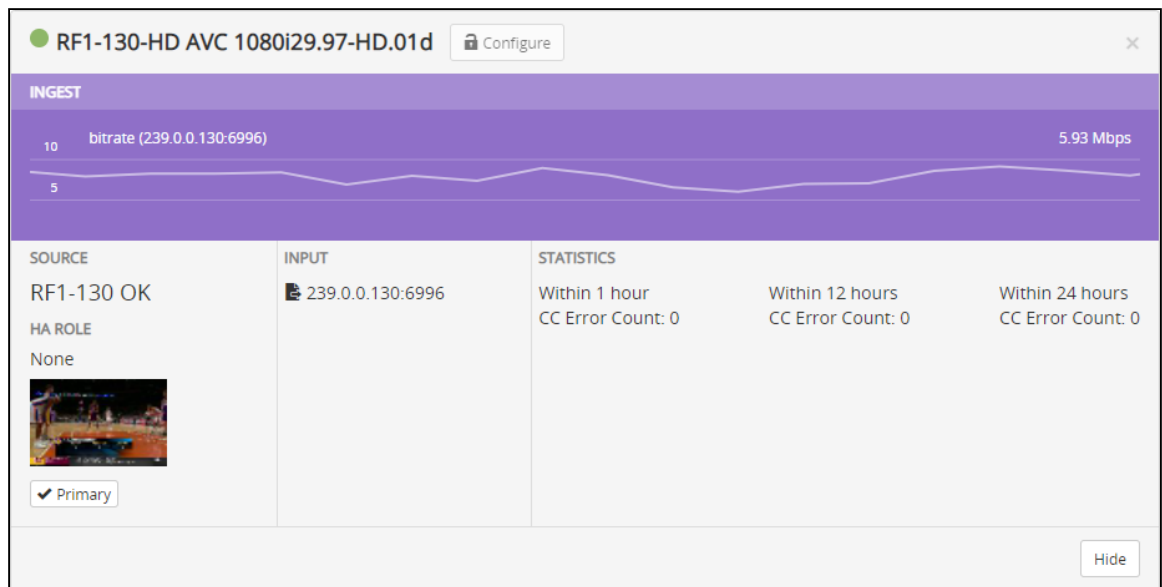
From the general view:



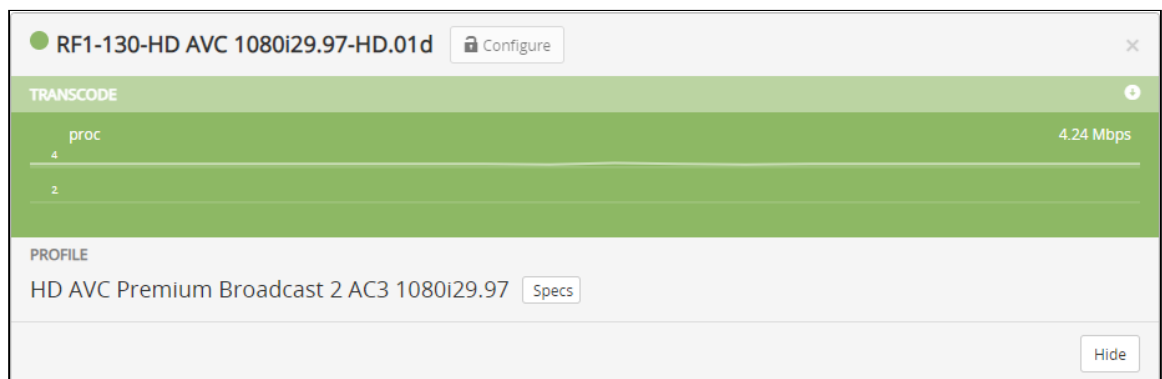
From the selected service:



- On the **INGEST** panel, verify the service bitrate.



- On the **TRANSCODE** panel, verify the processing bitrate.



Click **Specs** to display the technical specifications of the transcoding profile

HD AVC Premium Broadcast 2 AC3 1080i29.97

PROFILE

×

Type

IPTV

Architect

Harmonic Inc

Last updated

Oct 28, 2021

Lab Wizard

Specs:

VIDEO

+

AUDIOS

+

STREAM BASED AUDIOS

+

DATA

+

TS Bitrate

6000000 Mbps

Set-Top Box

DVB

Audio Matching Mode

By Language

Output PMT PID

480

PIP Output PMT PID

-1

Close

- On the **PACKAGE** (IP service) panel, verify the video output bitrate.

● RF1-130-HD AVC 1080i29.97-HD.01d

Configure

×

PACKAGE

15 net (tal)

0.00 Mbps

10

5

PROFILE

Broadcast Divitrack Destination


IP : PORT

0.0.0.0: 9999

DESTINATION

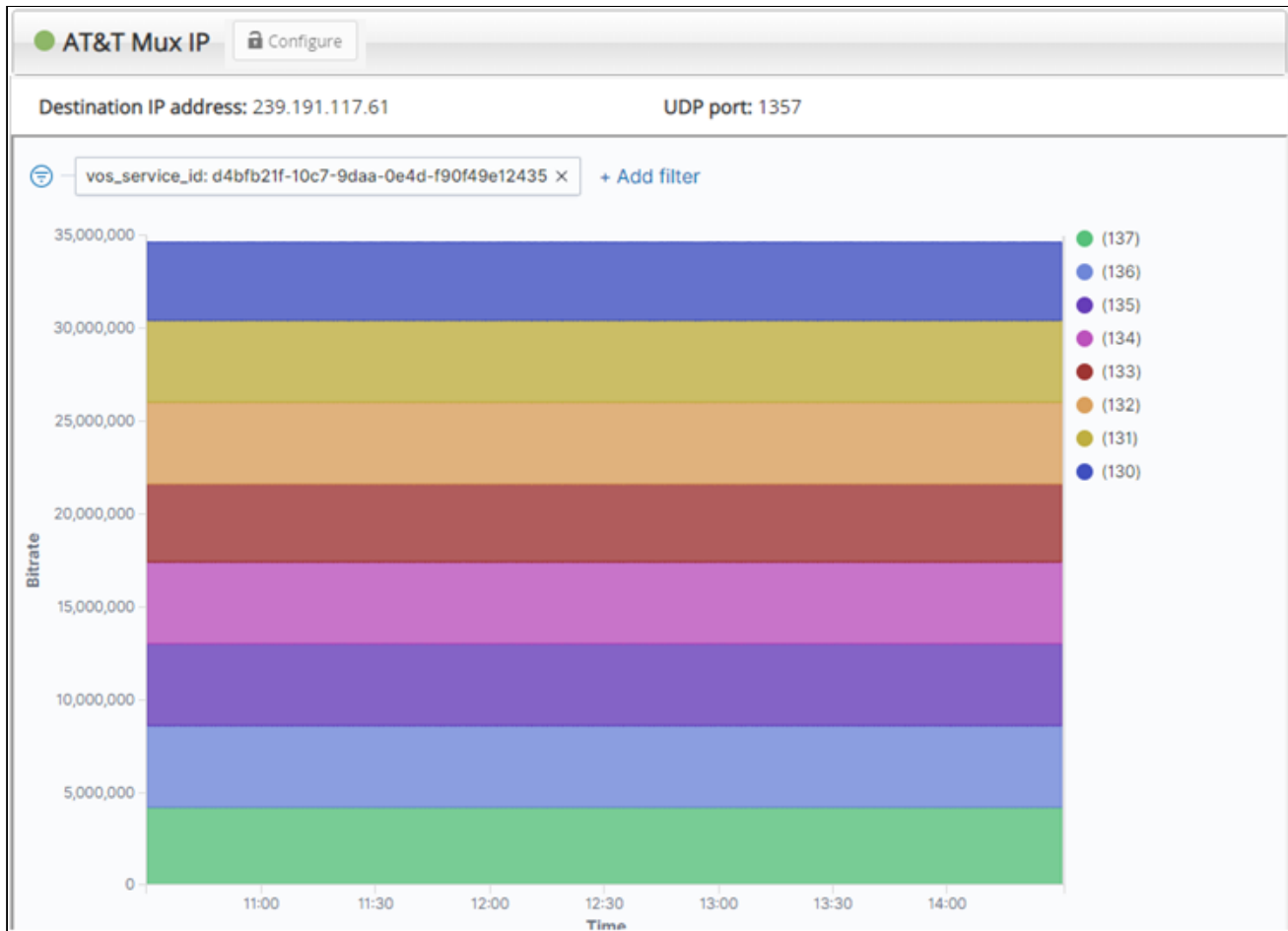
HD.01d

Hide

 Access to the configuration is not allowed.

TS multiplexers monitoring:

Click on any TS Multiplexers to display its bitrate statistics.

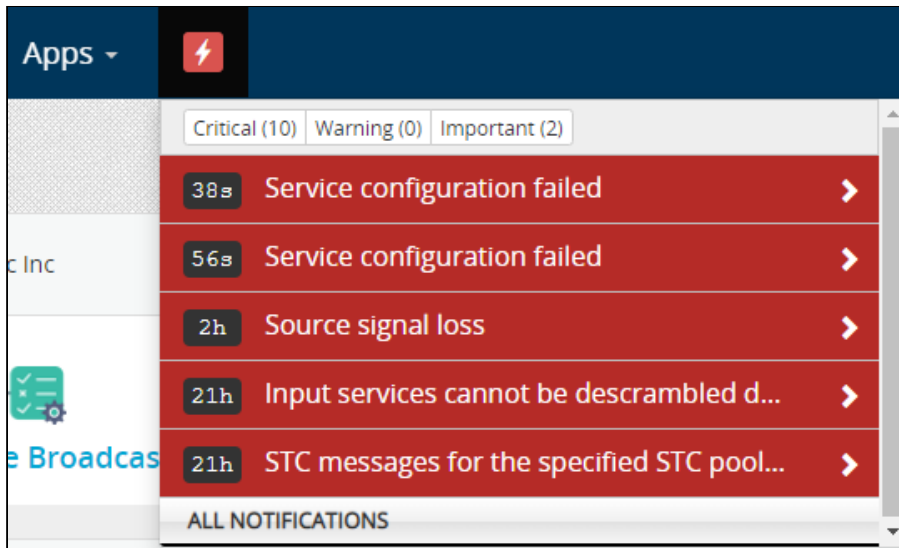


How to monitor alarms and events

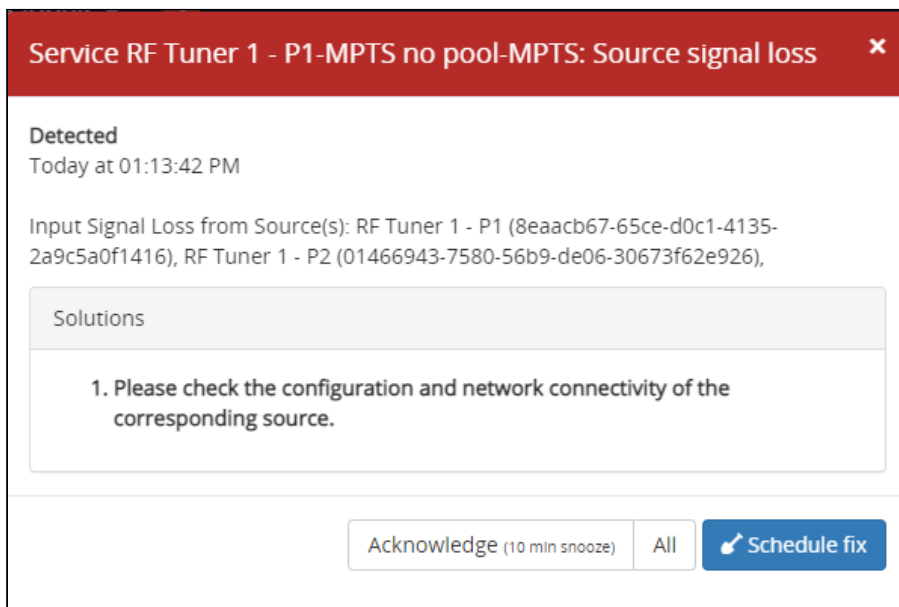
You can display all notifications generated by the XOS.

Displaying the current alarms and events

The current notifications can be displayed by clicking on the **Flash** icon at the top left.



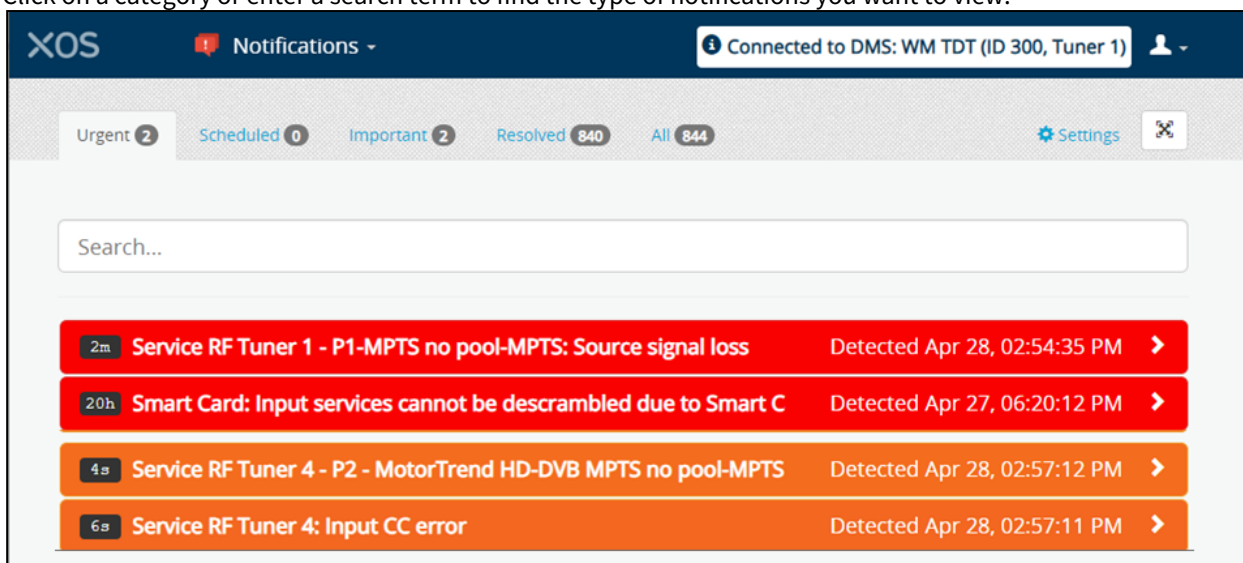
Clicking on a notification opens a popup window that describes more details:



Managing notifications

From the **Notifications** application, you can view, filter, or forward alerts and schedule dates and times to resolve notifications.

1. Launch the **Notifications** application.
2. Click on a category or enter a search term to find the type of notifications you want to view.



Urgent	Notifications that are labeled as Critical or Warning .
Scheduled	Notifications you have scheduled or acknowledged but not yet fixed.
Important	Notifications that have a lower severity level than those marked as Critical or Warning .
Resolved	Notifications that you have fixed.
All	A complete list of all notifications.

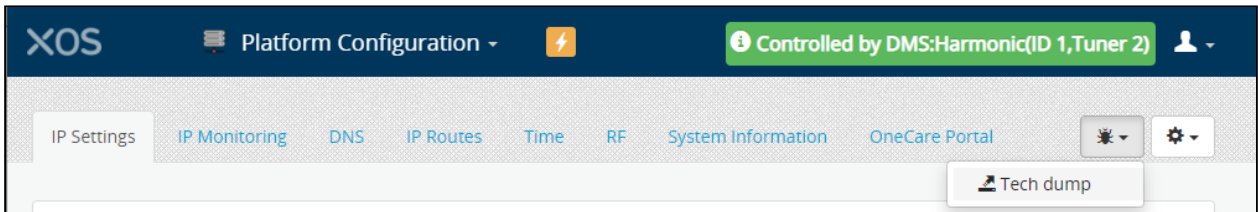
3. Click a single notification to view details.

How to generate technical report

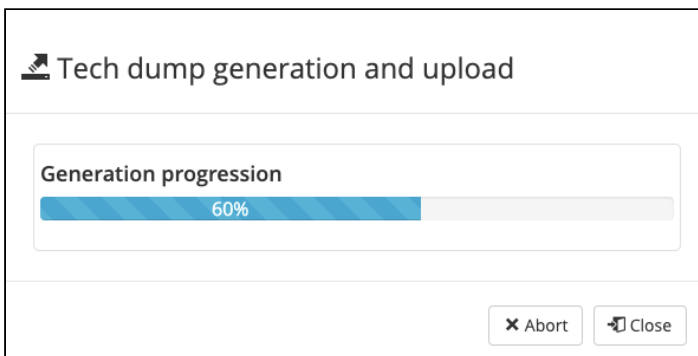
XOS has a mechanism for generating a technical report, named the TechDump file. This file may be requested by a Harmonic employee in cases where you have contacted Technical Support. In addition, when reporting a case, attaching the technical report can ease the analysis of the issue.

To generate the TechDump file, do the following:

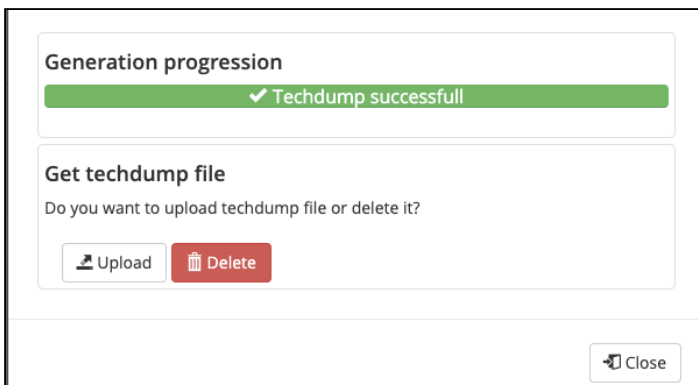
1. Launch the **Platform Configuration** application.
2. On the top right of the UI, click on the **Tech dump** button to open a dialog box.



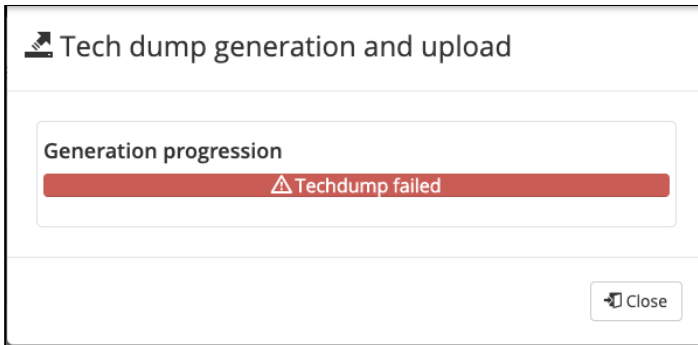
3. Click **Generate**.
4. The progress of the report generation is displayed. If necessary, you can click on the **Abort** button to stop the generation of the TechDump file.



5. If the technical report is successfully generated, the following message displays. Click **Upload** to open a browser and select the file destination.



6. If the report fails to generate, the following message displays.
Close the dialog box and try again.



TechDump generation status:

When the generation status box is closed, you can still follow the progress of the report generation by the appearance of the **Tech dump** button:



The TechDump is empty.




The TechDump is in progress.



The TechDump failed.



The TechDump is ready and can be uploaded.

 A message is generated when the report is ready or has failed to generate.

Troubleshooting steps

If you experience any problems with the equipment use the procedures below to help you understand or solve the issue.

Item	Potential solution
No access to the web UI	Verify that the IP address is correct.
	Make sure that you use https for the URL.
	Make sure that you use Chrome or Firefox browsers.
	Check the IP connection between the XOS and the host PC.
Locating alarm and event notifications	In the page header (current notifications).
	In the Notifications app (current and closed notifications).
Understanding alarm and event notifications	Notifications are displayed in the following syntax: title, description, recommendation.
	For more information, refer to How to monitor alarms and events .
RF input issues	Launch the Platform Configuration app and select the RF / Tuner tab
	Check the LO frequency: make sure that this value is conform to the characteristics of its antenna (the LNB).
	Check the tuner settings.
	Check the statistics: look at the different counter values for a few minutes. See How to monitor the RF inputs for information.
	Check the antenna connectivity.
	From another XOS (if available), check the same tuner input.
Service missing in the MPTS output	
Notifications present	Tuner input signal loss (see RF input issues above).

Item	Potential solution
	Descrambling caused by a Smart card issue: read the recommendation in the notification.
	No Smart card issue, but the input is scrambled: contact your provider.
	RF card failure: read the recommendation in the notification. Contact your provider to change the RF card if required.
No notifications present	<p>Launch the Monitor Channels application and verify the following:</p> <ul style="list-style-type: none"> • If the service is absent from the list: <ul style="list-style-type: none"> ◦ Verify you subscribed to it. ◦ Check in RF monitoring that the XOS is under central head-end control. ◦ If both are ok, contact your provider. • Check if this service is present in the other MPTS outputs. • Check the blackout of the service for specific events.
A MPTS output is missing	
Notification present	ASI output failure.
	An Ethernet link is down.
	IP address conflict.
No notifications present	<p>Launch the Monitor Channels app and verify the following:</p> <ul style="list-style-type: none"> • Verify you subscribed to it • Check in RF monitoring that the XOS is under central head-end control • If both are OK, contact your provider
ASI output	If there is no signal on this output, check the port number on your subscriber portal.
	Change ASI port assignment on the portal and check output
IP output	Check IP address and port on your subscriber portal.
	Check your network connectivity between the XOS and the receiver (QAM modulator).
	Try to connect the receiver directly to the XOS.

Item	Potential solution
Environment notifications	
RF card temperature or CPU temperature	Check the temperature in the room.
	Verify there is no obstruction to the XOS airflow.
Ethernet link down	Check the connectivity.
NTP sync loss or DNS server sync loss	Check the NTP or DNS server (local server).
	Check network connectivity (remote server).

General recommendations

Providing the best possible description makes it easier to solve the issue. Try and provide the following:

- The circumstances of the failure.
- Any symptoms. For example, the video output became black.
- Is it a temporary, a repetitive, or a permanent issue?
- Any impact to service in order to define the severity?
- Alarms description: Give an exact and full wording of the alarms.

Advanced configuration

How to configure the DNS server IP address

If required, the XOS can be connected to DNS server. This type of configuration requires Internet connectivity for operation.

1. Launch **Platform Configuration**.
2. Select the **DNS** tab.
3. Click on "+" button to add a server.
4. Set the IP address to your local DNS server or external DNS server. This example shows Google public DNS servers:

The screenshot displays the 'DNS' configuration page. The top navigation bar includes tabs for 'IP Settings', 'IP Monitoring', 'DNS' (active), 'IP Routes', 'Time', 'RF', 'System Information', and 'OneCare Portal'. The main content area is titled 'DNS SERVER ADDRESS' and features a '+' button for adding new servers. Two servers are currently configured: '8.8.8.8' and '8.8.4.4', each with a corresponding 'x' button to remove it. At the bottom of the configuration area, there are 'Revert' and 'Save' buttons.

5. Click **Save**.

How to configure the time synchronization

If required, the XOS can be connected to an NTP server for time synchronization. This type of configuration requires Internet connectivity for operation.

1. Launch **Platform Configuration**.
2. Select the **Time** tab.
3. Click on "+" button to add a server.
4. Set the IP address to your local NTP server or external NTP server. This example shows Google public NTP servers:

The screenshot shows the 'Time' configuration page. The top navigation bar includes 'IP Settings', 'IP Monitoring', 'DNS', 'IP Routes', 'Time' (selected), 'RF', 'System Information', and 'OneCare Portal'. The main content area has two sections: 'NTP SERVER ADDRESS' and 'PTP CONFIGURATION'. In the 'NTP SERVER ADDRESS' section, there is a '+' button to add a server, and two existing servers are listed: '216.239.35.0' and '216.239.35.4', each with a '-' button to remove it. Below the list, it says 'Max number of NTP reached.' In the 'PTP CONFIGURATION' section, it says 'No PTP defined.' with a '+ Define PTP' button. At the bottom of the page, there are 'Revert' and 'Save' buttons.

5. Click **Save**.

How to configure the iLO port

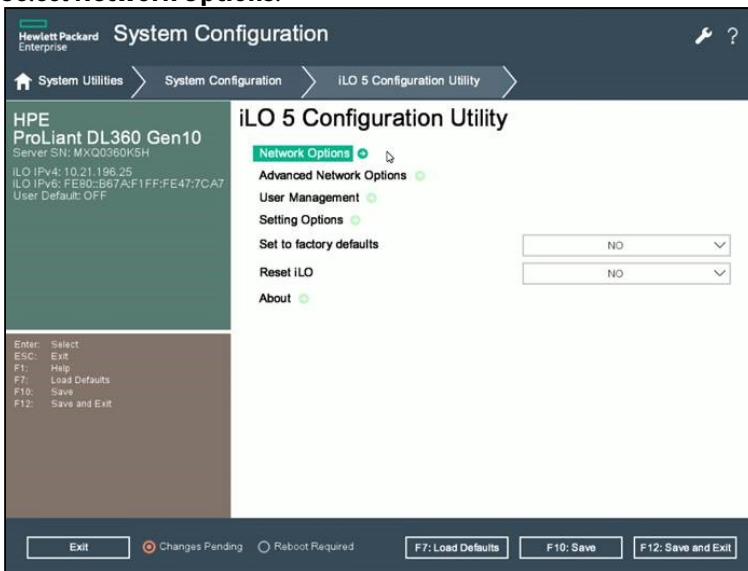
The iLO server management can be accessed through the Ethernet Management port (iLO and Management share the same port).

To configure static IP addresses for iLO and Management ports through the local console, do the following:

1. Connect the monitor, keyboard, and mouse to the XOS.
2. Turn on the platform.
3. During startup, press **F9** for the System Utilities option.



4. Select **System Configuration**.
5. Select **iLO 5 Configuration Utility**.
6. Enter the iLO username and password (the user and password details are located on a sticker on top of the server).
7. Select **Network Options**.



8. From the **Network Interface Adapter** menu, select **Shared Network Port-LOM**.
9. From the **DHCP Enable** menu, select **OFF**.
10. Enter the appropriate static network details in the fields.

System Configuration

System Utilities > System Configuration > ILO 5 Configuration Utility > Network Options

HPE ProLiant DL360 Gen10
 Server SN: MxQ0360KSH
 ILO IPV4: 10.21.196.25
 ILO IPV6: FE80:B67A:F1FF:FE47:7CA7
 User Default: OFF

Network Options

MAC Address: B4:7A:F1:47:7C:A7

Network Interface Adapter: Shared Network Port - LOM

VLAN Enable: OFF

DHCP Enable: OFF

DNS Name: ILOMXQ0360KSH

IP Address: 10.21.196.25

Subnet Mask: 255.255.255.0

Gateway IP Address: 10.21.196.1

Enter: Select
 ESC: Exit
 F1: Help
 F7: Load Defaults
 F10: Save
 F12: Save and Exit

Exit | Changes Pending | Reboot Required | F7: Load Defaults | F10: Save | F12: Save and Exit

11. Select **F12: Save and Exit** to confirm the changes and to restart the platform.

How to configure the SNMP trap destination

The XOS offers a **Rest API** in the UI so you can configure the list of SNMP recipients for the trap destination.

⚠ SNMPv2 and SNMPv3 versions are currently supported.

Default SNMP traps

Two types of SNMP traps is sent to the recipient:

- Single notification trap
- Global synchronization trap

Global synchronization trap

This global synchronization trap is optional and periodic. The trap contains information about all the active notifications and the value of the counter when the trap was last sent to the current recipient.

The send period is determined by the setting of the **syncTrapTimePeriod** field of notification recipients. To set the value, refer to Configuring the SNMP recipient.

On the receiver side, any difference with last received counter indicates a trap loss.

Single notification trap

A trap on each notification appearance or disappearance is sent to the recipient. This trap contains only the notification.

A counter is incremented for each trap. Any discontinuity detected on receiver side indicates a trap loss.

Connecting to REST-API

The connection is made via a URL link containing the management IP address of the XOS.

For example: <https://198.18.18.100/doc/api-doc/>

Harmonic VOS Developer API

hitsoperator

STOP - If you are relying on a call documented exclusively in this section to operate normally be aware that you will have issues during upgrades as we make undocumented breaking changes to the calls described exclusively in the section.

If you want calls that are fully documented and for which backward compatibility is maintained they are found in the [Public API](#)

We do understand that in the course of an integration project we might be wrong about everything you need to do so we provide as a courtesy access to a fully documented API.

If you believe you need to rely on one of these calls please let your customer success team know and we will consider moving the call into our [Public API](#) section where we commit to backward compatibility and notification of changes.

This page is for reference and testing only.

For API integration, please visit [Settings](#) to create OAuth client apps.

[Go this link to use previous Developer API UI](#)

VOS 1.0

[Base URL: 198.18.92.51:443/cluster1/vos-api]
/vos-api/dev-api/v1/

VOS Developer REST APIs

[Harmonic Inc.](#)

Filter by tag

Enter your credentials:

- username: **xos**
- password: **xos-user**

Configuring the SNMP recipient

1. In the Filter by tag field, enter **notification**.
2. In the Notification panel, select **PUT /notification/v1/recipients**.
3. In the Parameters strip, click **Try it out** to configure the recipient parameters.

PUT /notification/v1/recipients Update notification recipients

Parameters Try it out

4. The following parameters must be set:
 - **syncTrapTimePeriod**: Synchronization trap time period in seconds, default value is 60. Set to 0 to disable the global SNMP synchronization trap.
 - **sendAllNotifications**: To receive notifications update, set it to **true**.
 - **address**: Recipient IP address.
 - **enabled**: *True or false* sending SNMP traps to recipient.
 - **version**: *SNMP_V2 or SNMP_V3*.
5. Configure the SNMPv2Settings:
 - **communityName**: Security name for community-based SNMP.
6. Configure the SNMPv3Settings:
 - **username**: The security name of the user (typically the user name).
 - **authenticationProtocol**: The authentication protocol ID to be associated with this user. If set to null, this user only supports unauthenticated messages.
 - **authenticationPassphrase**: The authentication passphrase. If not null, authenticationProtocol must also be not null.
 - **privacyProtocol**: The privacy protocol ID to be associated with this user. If set to null, this user only supports unencrypted messages.
 - **privacyPassphrase**: The privacy passphrase. If not null, privacyProtocol must also be not null.

Some parameters are mandatory, regardless of the SNMP version (v2 or v3). To check which are required, select the Model tab. The parameters with a red asterisk are mandatory.

Edit Value | Model

```

com.harmonicinc.vos.notification.settings.NotificationRecipient {
  emailRecipients* > [...]
  snmpRecipients* com.harmonicinc.vos.notification.settings.NotificationSnmpRecipients {
    recipients*
    Recipients who receive SNMP traps
    com.harmonicinc.vos.notification.settings.SnmpRecipient {
      address* string
        Address of recipient
      enabled* boolean
        Enable or disable this entry
      snmpV2Settings* com.harmonicinc.vos.notification.settings.SnmpV2Settings
        > {...}
      snmpV3Settings* com.harmonicinc.vos.notification.settings.SnmpV3Settings
        > {...}
      version* string
        Supported SNMP version, default is SNMPv2
      Enum:
        > Array [ 2 ]
    }
  }
  sendAllNotifications* boolean
    Flag to indicate that all notifications will be sent to the default trap OID
    when no other is configured for the notification
  syncTrapTimePeriod* integer($int32)
    Synchronization trap time period in seconds, default value is 60. Set to 0 to
    disable SNMP synchronization trap
}
  
```

Click **Execute** to run the configuration. Note that by clicking **Execute**, the previous configuration is erased. Also, by default, there is no existing configuration at the first connection to the Rest-API.

If the configuration is executed and there are problems with it, an error message will appear with details below the Responses strip:

Responses Response content type: "JSON"

Curl

```

curl -X PUT "https://198.18.92.51/vos-api/notification/v1/recipients" -H "accept: */*" -H "Content-Type: application/json" -H "Authorization: Basic aG10c29wZ2ZhdG9yOmhpdm9wZmZpbG1hbnQz" -H "X-XSRF-TOKEN: ef5197b0-5a80-467c-ae4-02d67d1b1079" -d "{
  \"emailRecipients\": [], \"snmpRecipients\": { \"recipients\": [ { \"address\": \"198.18.100.100\", \"enabled\": true,
  \"snmpV2Settings\": { \"communityName\": \"public\" }, \"snmpV3Settings\": { \"userName\": \"\", \"version\": \"SNMP_V2\" }
  }, \"sendAllNotifications\": true, \"syncTrapTimePeriod\": } }"
  
```

Request URL

```

https://198.18.92.51/vos-api/notification/v1/recipients
  
```

Server response

Code	Details
400	<p>Error:</p> <p>Response body</p> <pre> { "result": false, "message": "The exception occurred during request execution. Please find more details in the logs" } </pre> <p>Response headers</p> <pre> access-control-allow-origin: https://198.18.92.51 cache-control: no-cache, no-store, max-age=0, must-revalidate content-length: 114 content-type: application/json; charset=utf-8 date: Wed14 Apr 2021 07:11:45 GMT expires: Thu01 Jan 1970 00:00:00 GMT pragma: no-cache server: nginx/1.15.9 strict-transport-security: max-age=15724800; includeSubDomains x-content-type-options: nosniff x-frame-options: SAMEORIGIN x-xss-protection: 1; mode=block </pre>

Configuration examples

Configuration with **SNMP v2** settings

The configuration below defines 198.18.100.100 as the trap receiver. The protocol used is SNMP v2.

Parameters

Cancel

Name	Description
recipients * required (body)	recipients
Edit Value Model	

```
{  "emailRecipients": [],  "snmpRecipients": {    "recipients": [      {        "address": "198.18.100.100",        "enabled": true,        "snmpV2Settings": {          "communityName": "public"        },        "snmpV3Settings": {          "userName": ""        },        "version": "SNMP_V2"      }    ],    "sendAllNotifications": true,    "syncTrapTimePeriod": 60  }
```

Cancel

Parameter content type
application/json

Execute

To help with your configuration, copy the text below in the parameters field. Change any settings as needed:

```
{
  "emailRecipients": [],
  "snmpRecipients": {
    "recipients": [
      {
        "address": "198.18.100.100",
        "enabled": true,
        "snmpV2Settings": {
          "communityName": "public"
        },
        "snmpV3Settings": {
          "userName": ""
        },
        "version": "SNMP_V2"
      }
    ],
    "sendAllNotifications": true,
    "syncTrapTimePeriod": 0
  }
}
```

Configuration with **SNMP v3** settings

The configuration below defines 198.18.100.101 as the trap receiver. The protocol used is SNMP v3.

Parameters

Cancel

Name	Description
recipients * required (body)	recipients Edit Value Model

```
{
  "emailRecipients": [],
  "snmpRecipients": {
    "recipients": [
      {
        "address": "198.18.100.101",
        "enabled": true,
        "snmpV2Settings": {
          "communityName": ""
        },
        "snmpV3Settings": {
          "authenticationPassphrase": "md6sas086",
          "authenticationProtocol": "MD5",
          "privacyPassphrase": "Jks4e2Zs@",
          "privacyProtocol": "DES",
          "userName": "MD5DES"
        },
        "version": "SNMP_V3"
      }
    ],
    "sendAllNotifications": true,
    "syncTrapTimePeriod": 0
  }
}
```

Cancel

Parameter content type
application/json

Execute

To help with your configuration, copy the text below in the parameters field. Change any settings as needed:

```
{
  "emailRecipients": [],
  "snmpRecipients": {
    "recipients": [
      {
        "address": "198.18.100.101",
        "enabled": true,
        "snmpV2Settings": {
          "communityName": ""
        },
        "snmpV3Settings": {
          "authenticationPassphrase": "md6sas0&6",
          "authenticationProtocol": "MD5",
          "privacyPassphrase": "Jks4e2Zs@",
          "privacyProtocol": "DES",
          "userName": "MD5DES"
        },
        "version": "SNMP_V3"
      }
    ],
    "sendAllNotifications": true,
    "syncTrapTimePeriod": 0
  }
}
```

Configuration with two recipients

To add recipients, copy the text surrounded in green. Add this block for each recipient.

Parameters

Cancel

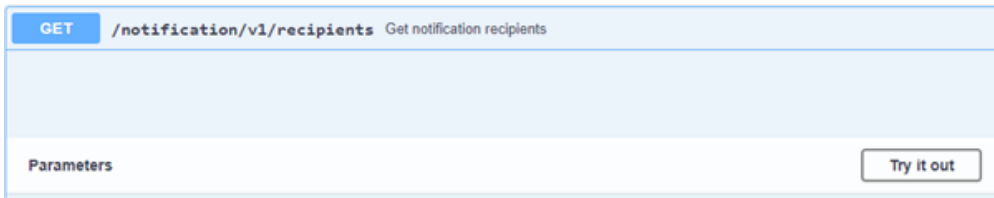
Name	Description
recipients <small>required</small>	recipients
(body)	
Edit Value Model	

```
{
  "emailRecipients": [],
  "snmpRecipients": {
    "recipients": [
      {
        "address": "198.18.100.100",
        "enabled": true,
        "snmpV2Settings": {
          "communityName": "public"
        },
        "snmpV3Settings": {
          "userName": ""
        },
        "version": "SNMP_V2"
      },
      {
        "address": "198.18.100.150",
        "enabled": true,
        "snmpV2Settings": {
          "communityName": "public"
        },
        "snmpV3Settings": {
          "userName": ""
        },
        "version": "SNMP_V2"
      }
    ],
    "sendAllNotifications": true,
    "syncTrapTimePeriod": 0
  }
}
```

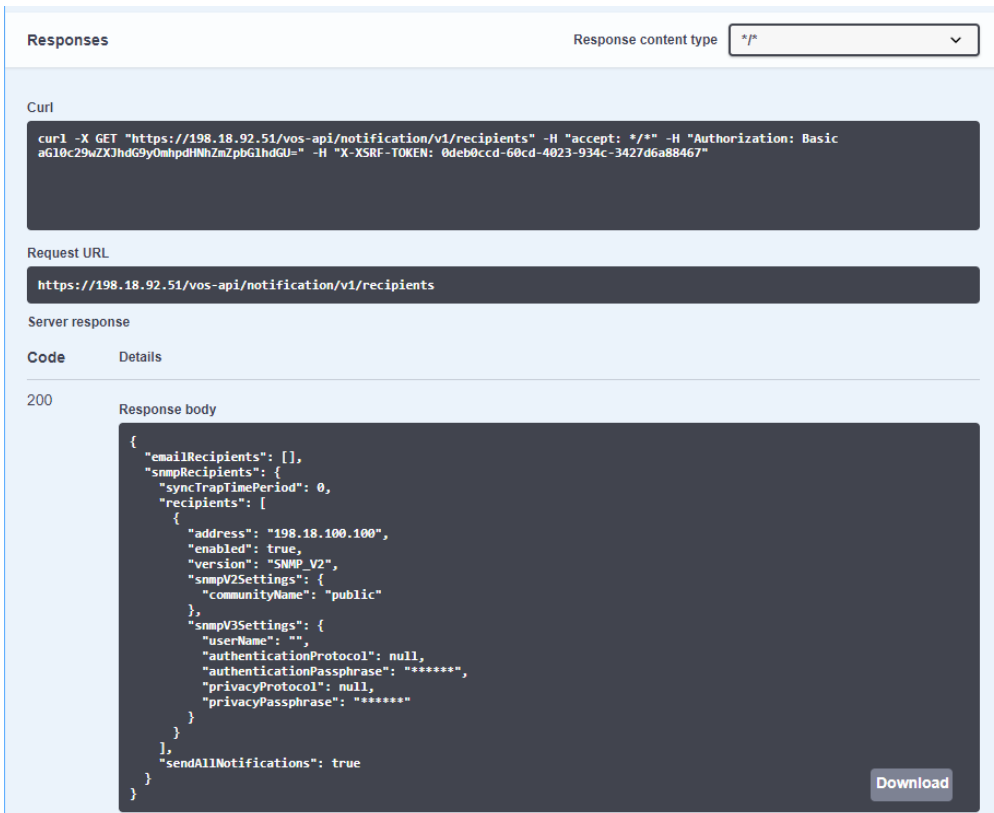
Checking the REST-API configuration

Verify the Rest-API configuration has been updated to the XOS.

1. In the Notification panel, select **GET /notification/v1/recipients**



2. In the Parameters strip, click **Try it out**.
3. Click **Execute** to get the configuration.

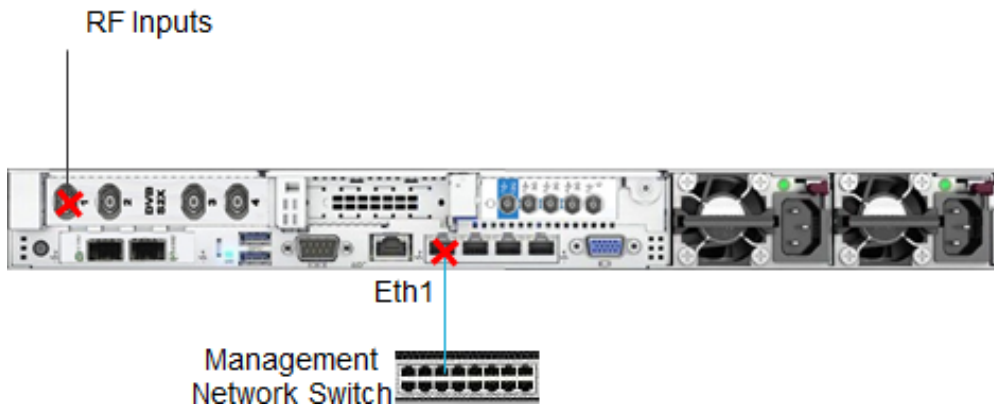


4. Verify this configuration corresponds to your configuration.

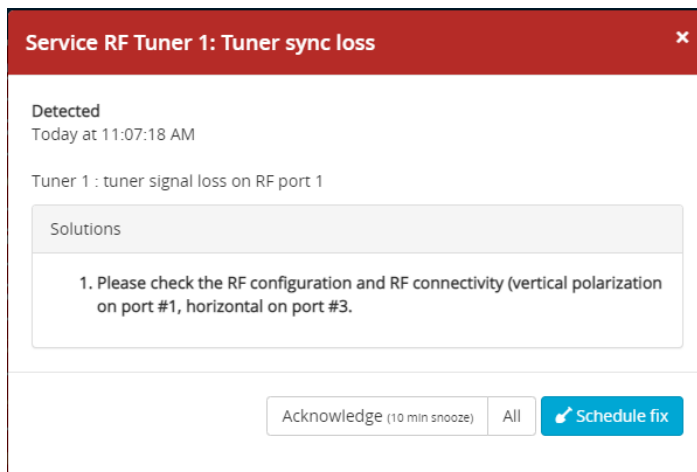
Creating an alarm

Generate an alarm that triggers a notification:

1. Disconnect any cable as show in the diagram below



2. For example, disconnect the RF 1 cable.
3. From the XOS Web GUI, launch **Notifications** application.
4. The following notification appears



5. From the recipient, check to see if you received the trap with the same notification.


MIB file

The MIB file for XOS SNMP traps is available at <https://www.harmonicinc.com/documentation/att-rsn/>.

How to configure ports redundancy

The XOS provides two modes of redundancy with the Management and the Data IP ports:

- **TEAMING:** Both ports use the same IP Address. While the main port is active, the second port is up, but the traffic is down. This allows both ports to be connected to the same IP switch.
- **REDUNDANCY:** Each port uses a different IP Address and are both active. They can be connected to the same IP switch or to two different IP switches.

 Harmonic recommends using a separate network for Redundancy mode. If a separate network is not possible, configure a different VLAN for each port.

The Redundancy Policy, for both modes, offers several possibilities:

Mode	Switch	Switch Back
Auto / revert on backup failure	Automatic switch for alarm detection on the main port.	Switch back for alarm detection on the backup port and if the main port is healthy.
Auto / revert on healthy main	Automatic switch for alarm detection on the main port.	Switch back when the main port is healthy.
Manual	The switch is performed by the operator.	The switch back is performed by the operator if the main port is healthy.
Auto / manual revert	Automatic switch for alarm detection on the main port.	The switch back is performed by the operator if the main port is healthy.
Dual (only available when Redundancy mode is set)		

How to configure the teaming mode

This example describes how to configure teaming mode on the management port.

From the **IP Settings / Ethernet ports** tab:

1. Enable the second management port.
2. Set the redundancy Mode to **TEAMING**.
3. Set the redundancy Policy.

The screenshot shows the 'Ethernet ports' tab with the 'IP config' sub-tab selected. A table lists four ports: Management 01, Management 02, GbE 03, and GbE 04. Management 01 and 02 are checked and active. GbE 03 and 04 are unchecked and offline. The 'Redundancy' section for Management 01 and 02 shows the mode set to 'TEAMING' and the policy set to 'Manual'. A dropdown menu for the policy is open, showing options: 'Auto / revert on backup failure', 'Auto / revert on healthy main', 'Manual', and 'Auto / manual revert'.

Designation	State	MAC address	Duplex	Speed	Redundancy			
					Active	Mode	Policy	Main
<input checked="" type="checkbox"/> Management 01		94-40-c9-3f-ac-18	AUTO	100Mb/s		TEAMING	Manual	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Management 02		94-40-c9-3f-ac-19	AUTO	(Offline)				<input type="checkbox"/>
<input checked="" type="checkbox"/> GbE 03		94-40-c9-3f-ac-1a	AUTO	1000Mb/s				N/A
<input type="checkbox"/> GbE 04		94-40-c9-3f-ac-1b	AUTO	(Offline)		NONE		N/A

4. Move to the **IP config** sub-tab to check the teaming

The screenshot shows the 'IP config' sub-tab. It displays a table with two rows: 'Management 01 / Management 02 Teaming' and 'GbE 03'. Each row has fields for IP Address, Network Mask, and Gateway, along with a '+' button for VLAN configuration. At the bottom, there are 'Revert' and 'Save' buttons.

Designation	IP Address	Network Mask	Gateway	Vlan
Management 01 / Management 02 Teaming	10.43.6.66	255.255.255.0	10.43.6.1	+
GbE 03	70.70.70.66	255.255.255.0	70.70.70.1	+

5. Click **Save**.

How to configure the redundancy mode

From the **IP Settings** tab:

1. Click **Ethernet ports** tab.
2. Enable the GbE04 port.
3. Set the redundancy Mode to **REDUNDANCY**.
4. Set the redundancy Policy.

Ethernet ports		IP config							
Designation	State	MAC address	Duplex	Speed	Redundancy				Main
					Active	Mode	Policy		
<input checked="" type="checkbox"/> Management 01		94-40-c9-3f-bc-34	AUTO	1000Mb/s					
<input type="checkbox"/> Management 02		94-40-c9-3f-bc-35	AUTO	(Offline)		NONE		Manual	N/A
<input checked="" type="checkbox"/> GbE 03		94-40-c9-3f-bc-36	AUTO	1000Mb/s					<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> GbE 04		94-40-c9-3f-bc-37	AUTO	(Offline)		REDUNDANCY		Manual	<input type="checkbox"/>

5. Click **IP config** tab.
6. Set the network parameters of the GbE04 backup port.

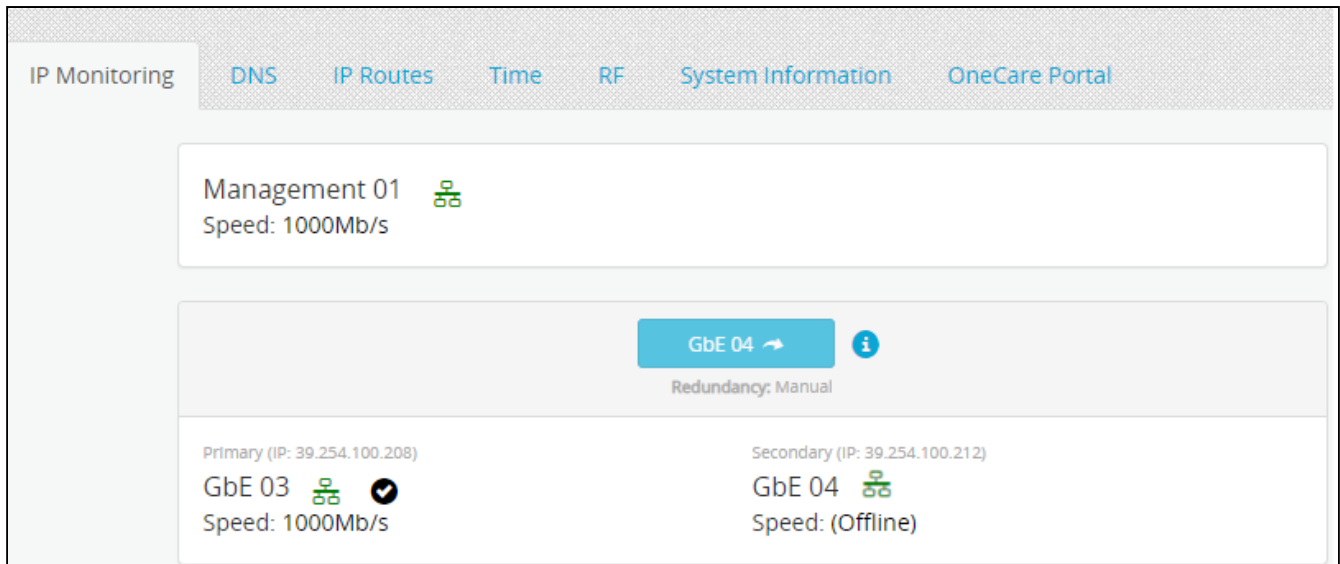
Ethernet ports		IP config			
Designation	IP Address	Network Mask	Gateway	Vlan	
Management 01	10.42.39.208	255.255.255.0	10.42.39.1		+
GbE 03 	39.254.100.208	255.255.255.0	39.254.100.1		+
GbE 04 	39.254.100.212	255.255.255.0	39.254.100.2		+

Revert **Save**

7. Click **Save**.

How to manage manual redundancy

From the **IP Monitoring** tab:



Click the **GbE 04** button to switch manually.

The GbE 03 becomes offline and thus all TS are broadcasted through the GbE 04.

Contacting Technical Support

Contact and help for AT&T SportsNet & ROOT SPORTS and affiliates

For Survey, IRD fulfillment, IRD installation and initial configuration support:

Harmonic Professional Services Phone: (408) 490-6521, 7 a.m. to 4 p.m. Pacific Time, Monday through Friday

Email: ATT-RSN-HELP@harmonicinc.com

Harmonic corporate contact information

Phone numbers and addresses for the corporate office.

Harmonic corporate address

2590 Orchard Parkway
San Jose, CA 95131 - U.S.A.

Harmonic corporate telephone numbers

Tel. 1.800.788.1330 (from the U.S. and Canada)
Tel. +1.408.542.2500 (outside the U.S. and Canada)
Fax. +1.408.542.2511

Harmonic Technical Assistance Center contact information

A list of phone numbers and important links for the Harmonic Technical Assistance Center (TAC).

Region	Telephone Technical Support
Americas	888.673.4896 (888.MPEG.TWO) 408.490.6477
Europe, the Middle East and Africa (EMEA)	+44.1252.555.450
India	+91.120.498.3199
China	+86.10.5798.2626
Japan	+81.3.5614.0524
Asia Pacific (APAC) – Other Territories	+852.3184.0045 +65.6542.0050

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