DIREKTRONIK
Dataprodukter utöver det vanliga

Intelligent AV Distribution

ZyPerMX4/MX2

Quad/Dual Video Encoders

User Manual
June 2020
Firmware Release 2.13

Safety Instructions

Important Safety Instructions. Save These Instructions.

WARNING: When using electronic products, basic precautions should always be followed, including:

1. Keep these instructions.
2. Heed all warnings.
3. Follow all instructions.
4. Do not use this apparatus near water.
5. Clean only with a dry cloth.
6. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
7. Do not install or place this product near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
9. Power cord must be accessible to allow fro the removal of the power from the unit.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Unplug this apparatus during lightning storms or when unused for long periods of time.
12. Only use attachments/accessories specified by the manufacturer.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. WARNING: To reduce the risk of fire or electric shock do not place this apparatus in a position where it is exposed to dripping or splashing liquids, rain, moisture, or excessively high humidity. Objects containing liquid shall not be placed in proximity to the unit such that they present a risk of spillage onto the apparatus.

FCC Statement

FCC Compliance and Advisory Statement: This hardware device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed or used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment to an outlet on a circuit different from that to which the receiver is connected; 4) consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

Features and Package Contents

Features
- Input: Two or Four standard HDMI 1.4 inputs
  - Resolutions from common Standard Definition, through all resolutions including 1080p60, up to and including1920x1200 @ 60Hz.
- Standards-based H.264/MPEG-4 AVC video compression.
  - High-profile H.264/MPEG-4 AVC compression standard in real-time.
  - Adjustable video bandwidth targets from 1 Mbps through 10 Mbps.
  - Assignable Program Number and Channel Name inserted in encoded stream.
  - Output resolution can track input resolution, or be fixed at a static size.
- Audio input as component of HDMI input.
  - LPCM, AC3, MPEG1 Layer 2.
- Analog audio and/or composite video for Closed Captions. CC requires use of ZeeVee composite cable
- Output: one standard 10/100/1000Base-T Ethernet port.
  - Common communications protocols/methods supported to include TCP/IP, ARP, DHCP, ICMP (ping), IGMP, HTTP, RTP, UDP, RTMP and HLS.
- Output stream can be set to RTP, UDP, using either unicast or multicast addressing; or to RTMP or HLS unicast.
- HLS supported at up to **four** simultaneous sessions per video input.
- UDP/RTP video stream can be decoded by any number of Ethernet attached receiving devices.
  - PC / Mac, VLC, IP Set Top Box, IPSTB-enabled television, or custom appliance.
- Audio output in MP2, AC3 or AAC format
- Maestro Web GUI browser management of unit.
- Power-over-Ethernet (PoE) supported allowing for ZyPerMX4 or ZyPerMX2 to be powered by an appropriately capable switch or power injector.
- Software upgradable through the Maestro web management application.

What's In The Box

Here's what you can expect to find when you open the package:

1 x ZyPerMX4 or ZyPerMX2
1 x Power Adapter

Table of Contents

1   Getting Started

Panel Descriptions

Front View

ID	Name	Description
1	POWER	This LED indicator glows bright blue when the ZyPerMX4 is powered.
2	STATUS	The LED glows bright blue when the System Boot Process is complete and the ZyPerMX4/MX2 unit is functioning normally.
3	LED Panel	This LED Panel shows IP address for config and management
4	NAV / Control	This Button/Wheel is used to select different RESET options.

Rear View (ZyPerMX4)

ID	Name	Description
1	POWER	Connect the included 12V DC power supply to this power receptacle.
2	HDMI In (1-4)	Connect an HDMI cable from this port to the HD video source
3	Analog Audio / CC input (1-4)	Connect Analog Audio or Closed Caption source. (Optional with break out cable)
4	TRANSPORT / PoE	Connect an Ethernet cable from this port to a smart switch on the Local Area Network.

Installation

Basic Connections

1. Connect an HDMI cable from one of the **HDMI In** ports on the ZyPerMX4/MX2 to an HD video source.
2. Connect an Ethernet cable from the TRANSPORT connector, on the rear panel of the ZyPerMX4, to a LAN or directly to the PC.
3. Connect the included 12V DC power supply to the POWER connector on the rear panel of the ZyPerMX. (If not using PoE)

Connecting to the ZyPerMX4/MX2

By default, each ZyPerMX4/MX2 encoder uses a DHCP IP address if a DHCP server is found on the network. Otherwise the ZyPerMX4/MX2 will assign itself a Link-Local address. In order to connect to the unit, and depending upon your network setup, it may be necessary to adjust the IP settings of the computer so that it can connect to the ZyPerMX4/MX2. (**Note the IP address of the ZyPerMX4/MX2 can be obtained by looking at the LED panel on the unit.**)

Once the computer is reconfigured, launch a browser, and enter the IP address of ZyPerMX4/MX2 in the address bar to display the ZyPerMX4/MX2 Maestro web interface.

See Logging In (page 3) for more information on logging in to the Maestro web interface.

See Network Configuration (page 4) for details on setting a static IP address.
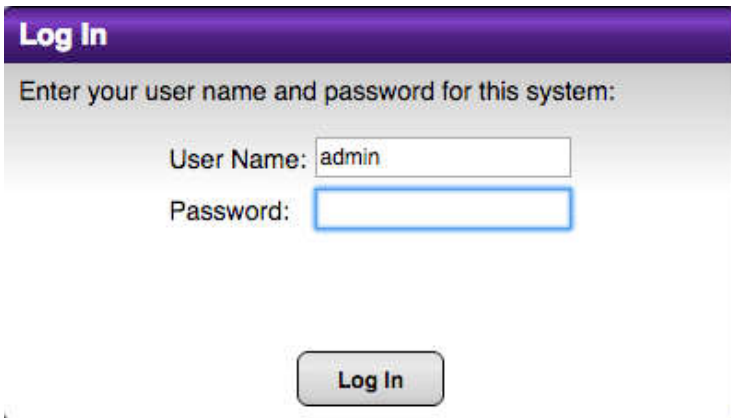
Sample Application Diagram
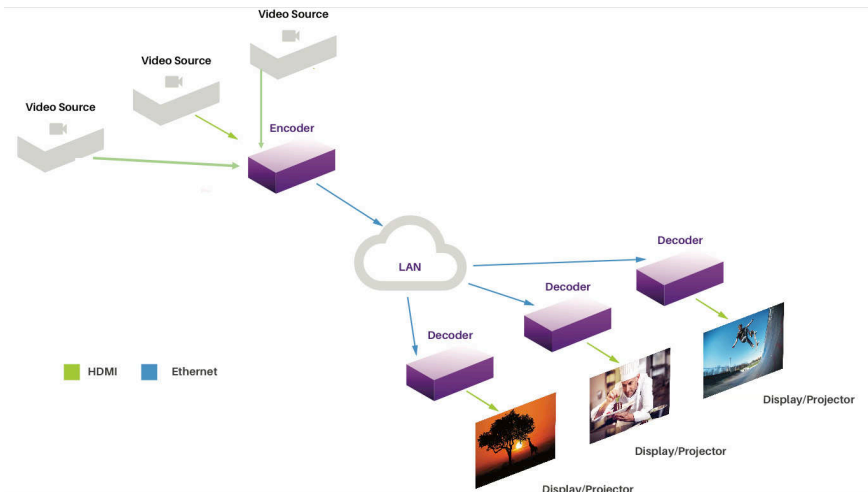
2   Basic Operation

The Maestro Web Interface

The ZyPerMX4/MX2 features the Maestro web interface. Maestro allows you to control and manage all features of the ZyPerMX4/MX2. To access Maestro, open a web browser and enter the IP address of the ZyPerMX4/MX2 into the address bar. We recommend using Firefox or Chrome browsers.

Logging In

1. Make sure that the computer used to access Maestro and the ZyPerMX4/MX2 encoder are on the same network. If a network is not being used, the ZyPerMX4/MX2 can be directly connected to the computer. In both cases, the ZyPerMX4/MX2 and the computer must be on the same subnet.

2. Launch the web browser and enter the IP address of the ZyPerMX4/MX2 in the address bar. (IP address can be found on LED display of ZyPerMX4/MX2)

3. The Maestro interface will be displayed with the password dialog.

Log In

Enter your user name and password for this system:

User Name: admin

Password:

Log In

4. Enter the password. The default password is `admin` and is case-sensitive.

5. Click the **Log In** button.

Network Configuration

1. Login to the Maestro web interface. See the previous page for more information.

2. Click the **Network** tab and then select either **AV Port 1 & 2** or **AV Port 3 & 4.** Note the ZyPerMX2 only uses AV Ports 1 & 2.

3. The current network settings will be displayed.

4. Click the drop-down list, under **IP Type**, to select the desired network mode.

The default setting for **IPType** is `DHCP`.

Note that the ZyPerMX4 has 2 independent IP address while the ZyPerMX2 has only one IP address. There is an IP address for AV ports 1 & 2 and a different IP address for AV ports 3 & 4. Both addresses should be set using this procedure.

Once the ZyPerMX4/MX2 is properly configured, click the "lightbulb" icon, at any time, to physically identify the ZyPerMX4/MX2 on the network. This will cause the **Status** LED indicator on the front panel to flash rapidly for about 10 seconds.

5.   Locate the **IP Type** field:

    ► If this field is set to DHCP, then all network parameters are assigned automatically, providing there is a DHCP server connected to the network.

    ► If the **IP Type** is set to Static, then follow steps 6 - 9.

6.   Enter the IP address in the IP Address field. When a value is changed to valid address, the box will highlight in green. Note this is the Primary IP address for the ZyPerMX4.

7.   Enter the subnet mask in the **Mask** field.
8.   Enter the gateway address in the **Gateway** field.

9.   Repeat the procedure for **AV Port 3 &** 4. (ZyPerMX4 only) Click the **Apply** button to com-mit the changes. To discard recent changes, click the **Reset** button. Note that a reboot of the unit is required for these changes to take effect.

IP Stream Configuration (UDP, RTP and RTMP)

The ZyPerMX4/MX2 can be configured to output either unicast or multicast IP streams using UDP or RTP protocols. It can unicast using the RTMP protocol.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Click the **IP Streaming** tab.

3. To enable IP streaming, be sure that the **Enabled** drop-down box is set to `Enabled`. The default setting is `Disabled`. Note that each of the 4 streams (AV Ports) can be enabled or disabled independently.

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4.   Select either `UDP` or `RTP` or `RTMP` for the stream type from the **Transport** drop-down list. (Note that HLS configuration is covered in the next section.)

Port	Enabled		Transport		Stream IP		Stre
	Set All	▼	Set All	▼	Set All	▼	Set
1	Enabled	▼	HLS	▼	0.0.0.0		0
2	Enabled	▼	HLS	▼	0.0.0.0		0
3	Enabled	▼	HLS	▼	0.0.0.0		0
4	Enabled	▼	HLS	▼	0.0.0.0		0

```
UDP
RTP
UDP+HLS
RTP+HLS
RTMP
```

5.   Enter the destination IP address in the **Stream IP** field. If you enter a valid IP multicast address (range 224.0.0.0 to 239.255.255.255), any endpoint registered with that multicast receives the stream. If you enter a valid IP unicast address, only that specific address receives the IP stream. **Important note:** The 224.0.0.x range is used for protocol discovery and are flooded to every port. Because they are reserved and may not be constrained by IGMP snooping, we recommend against using them. If unicast, only the specifically addressed endpoint will receive the stream.

AV Port	Enabled		Transport		Stream IP		Stream Port	
	Set All	▼	Set All	▼	Set All	▼	Set All	▼
1	Enabled	▼	HLS	▼	0.0.0.0		0	
2	Enabled	▼	HLS	▼	0.0.0.0		0	
3	Enabled	▼	UDP	▼	224.1.4.7		21216	
4	Enabled	▼	RTP	▼	224.1.4.76		21216	

6.   Enter the port number in the **Stream Port** field. The supported port range is `1025` to `65534`. The destination IP port must not conflict with other IP protocols. If necessary, contact the System Administrator for assistance.

7.   Click the **Apply** button to save the changes or click the **Reset** button to discard any changes.

TS Type	Description
UDP	Uses less overhead; lacks packet acknowledgement or error correction.
RTP	Protocol built on top of UDP; delivers real-time multimedia and detects out of sequence packtets
RTMP	Protocol commonly used by Content Delivery Networks such as Wowza.

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8.   Move to the **Channel Plan** tab.
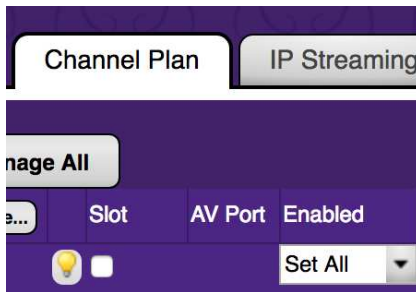
9.   Enter a Program number for each stream in the **Prog #** field.

10. Enter a description of the content in the **Name** field. Often, the viewing client will display the short channel name when tuning to different streams. The short name cannot exceed 7 characters in length. Letters, numbers, and spaces are permitted.

11. Enter a description of the content in the **Long Name** field. The long name cannot exceed 32 characters in length. Letters, numbers, and spaces are permitted.

12. Click the **Rating** drop-down list to select the desired Rating.
     The following ratings are supported: TV-G, TV-Y, TV-PG, TV-14, TV-MA, TV-MA-LSV

     This sets an audience rating for all entries in the program guide. This can be useful if some content should be excluded at some HDTVs. The values sent follow MPEG2 and CEA-766 specification, region 1 (USA), dimension 0 (TV-Rating). Note that TV-MA-LSV is the most extreme content, with LSV short for "Language, Sex, Violence".

13. Click the **Apply** button to save the changes or click the **Reset** button to discard any changes.

Note: UDP and RTP multicast streams can be viewed using many different decoders. One popular viewer/decoder for PCs is VLC. The link below provides a detailed example of how to use VLC to view a multicast stream.

https://youtu.be/bslkfZJh3iA

Preview Stream (UDP, RTP)

When the ZyPerMX4/MX2 is configured to output UDP or RTP multicast IP streams; it can also simultaneosly send out a Unicast motion JPEG that can be used for other purposes such as a preview stream in a 3rd control appliction.

1. Configure the ZyPerMX2/4 for UDP or RTP streaming as detailed in the prior section.

2. Point a connected web browser such as Chrome to the IP address of the ZyPerMX2/4 with the following port information to view the motion JPEG stream.

    IP_ADDRESS:8080/port_#.mjpg

    IP_ADDRESS = The IP Address of the ZyPerMX2 or ZyPerMX4

    > Note that the ZyPerMX4 has two IP Addresses.   One address for ports 1 & 2 and another address for ports 3 & 4

    port_# = This is the phyical port number on the ZyPerMX2 or ZyPerMX4. The ZyPerMX2 has 2 ports and the ZyPerMX4 has 4 ports.

    Example: http://192.168.0.26:8080/port_2.mjpg

3. Note that this preview stream is a lower resolution than the primary UDP or RTP stream and the frame rate will be 30fps. This stream is also Unicast. The system can support several simultaneous Unicast streams, but the number is not unlimited.

4. Note, the preview stream is only availble if selecting UDP or RTP streaming. It is not availalbe if selecting "UDP+HLS" or "RTP+HLS".

IP Stream Configuration (HLS)

The ZyPerMX4/MX2 can be configured to output an on-demand HLS stream via HTTP/HTTPS.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Click the **IP Streaming** tab.

AV Port	Enabled	Transport	Stream IP	Stream Port	Prog #	Name	Encryption	High Bitrate	Low Bitrate	Low Resolution	Stream URL
	Set All	Set All	Set All		Set All	Set All	Set All	Set All	Set All	Set All	
1	Enabled	HLS	0.0.0.0	0	472	MYTV-1	disable	6	3	720p30	http://192.168.4.21/media/MYTV-1.m3u8
2	Enabled	HLS	0.0.0.0	0	473	MYTV-2	disable	6	3	720p30	http://192.168.4.21/media/MYTV-2.m3u8
3	Enabled	UDP	224.1.4.74	21216	474	MYTV-1	disable	6	3	720p30	N/A
4	Enabled	UDP	224.1.4.75	21216	475	MYTV-2	disable	6	3	720p30	N/A

3. To enable IP streaming, be sure that the **Enabled** drop-down box is set to `Enabled`. The defaults settign is `Disabled`. Note that each of the streams (AV Ports) can be enabled or disabled independently.

AV Port	Enabled	Transport	Stream IP	Stream Port	Prog #	Name	Encry
	Set All	Set All	Set All	Set All	Set All	Set All	Set A
1	Enabled	HLS	0.0.0.0	0	472	MYTV-1	disab
2	Enabled	HLS	0.0.0.0	0	473	MYTV-2	disab
3	Disabled	HLS	224.1.4.74	21216	474	MYTV-1	disab
4	Enabled	UDP	224.1.4.75	21216	475	MYTV-2	disab

4. Select HLS for the stream type from the **Transport** drop-down list.

Port	Enabled	Transport	Stream IP	Stream Port
	Set All ▾	Set All ▾	Set All ▾	Set All ▾
1	Enabled ▾	HLS ▾	0.0.0.0	0
2	Enabled ▾	HLS ▾	0.0.0.0	0
3	Enabled ▾	HLS ▾	0.0.0.0	0
4	Enabled ▾	UDP ▾	0.0.0.0	0

RTP
HLS
UDP+HLS
RTP+HLS
RTMP

✔ Apply

At least one parame

5. Enter a Program number for each stream in the **Prog #** field.

Prog #	Name	Encryption	High Bitrate	Low Bitrate
Set All ▾	Set All ▾	Set All ▾	Set All ▾	Set All ▾
472	MYTV-1	disable ▾	6 ▾	3 ▾
473	MYTV-2	disable ▾	6 ▾	3 ▾
474	MYTV-1	disable ▾	6 ▾	3 ▾
475	MYTV-2	disable	6 ▾	3

6. Enter a description of the content in the **Name** field. The name field cannot exceed 7 charac-
   ters. Spaces are *not allowed* in the The **Name** field as it is used as part of the Address for
   HLS streaming. See following section.

7. Click the **Apply** button to save the changes or click the **Reset** button to discard any
   changes.

   Note: Any input to the ZyPerMX4 or ZyPerMX2 can be configured to simultaneously output
   both a multicast and HLS stream. Select either "UDP+HLS" or "RTP+HLS" in step 4 above.
   Be sure to set the IP Multicast address and Port Number as described on previous pages.

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HLS Stream Viewing

To view an HLS stream, point a browser to the following address:

http://<*IP_ADDRESS*>/media/<*name*>.m3u8

Example: http://192.168.1.15/media/MYTV-1.m3u8

You can also find the Stream URL in the IP Streaming tab on the far right.

Low Resolution	Stream URL
Set All ▼	
720p30 ▼	http://192.168.4.21/media/MYTV-1.m3u8
720p30 ▼	http://192.168.4.21/media/MYTV-2.m3u8
720p30 ▼	N/A
720p30 ▼	N/A

Important Note

The browser used to view HLS streams must be enabled for Native HLS Playback. This may involve installing a Plug-In to enable this functionality.

For example, Chrome requires a free Plug-In that can be downloaded and installed.

https://chrome.google.com/webstore/detail/native-hls-playback/emnphkkblegpebimobpbekeedfgemhof

Note: Chrome requires audio to be in MP2 format.

Firefox requires a Plug-In that can be downloaded and installed.

https://addons.mozilla.org/en-US/firefox/addon/native_hls_playback/?src=recommended

Note: Firefox requires audio to be in MP2 format

Safari does not require a Plug-In as HLS playback functionality is built in.

Edge does not require a Plug-In as HLS playback functionality is built in.

Note: Edge requires audio to be in AC3 format

HLS Streams can be directly sent to a Wowza server. See the following Wowza link for additional details:

https://www.wowza.com/docs/how-to-publish-and-play-a-live-stream-apple-hls

HLS Stream Limit

The ZyPerMX4-4 and ZyPerMX2-4 products can output up to 4 simultaneous HLS streams per HDMI input. Once this limit is reached, any additioanal devices attempting to access the HLS stream will receive the following message.

The ZyPerMX4/MX2 can be upgraded to support additional streams. Please see information below about license Key to enable additional streams.

Product Names, Part Numbers, HLS Stream Limits

Product Name	Part Number	Description
ZyPerMX4-4	ZMXENC4	Quad Encoder with support for up to 4 HLS streams per input port
ZyPerMX4-100	ZMXENC4-HLS	Quad Encoder with support for up to 100 HLS streams per port.
ZyPerMX2-4	ZMXENC2	Dual Encoder with support for up to 4 HLS streams per input port
ZyPerMX2-100	ZMXENC2-HLS	Dual Encoder with support for up to 100 HLS stream per port.
ZyPerMX4-Key	ZMXENC4-KEY	License key for upgrading from ZMXENC4-4 to ZMXENC4-100
ZyPerMX2-Key	ZMXENC2-KEY	License key for upgrading from ZMXENC2-4 to ZMXENC2-100

**Note**: Maximum number of HLS streams for "-100" products depends on datarate of the HLS streams. There is no message displayed when connection limit is reached. The user will see a very slow response from the system if limit is reached. Approximate limits are shown below:

1 Mbps = 100 streams per port.   2 Mbps = 75 streams per port.   3 Mbps = 50 streams per port. 6 Mbps = 25 streams per port.

Adjusting Video Settings

The ZyPerMX4/MX2 Video Encoder employs Variable Bit Rate (VBR) encoding when transmitting IP streams. Specifying the "High Bitrate" , "Low Bitrate" and "Low Resolution" for video will define the limits of IP stream transmission, without overloading the network bandwidth.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Click the **IP Streaming** tab.
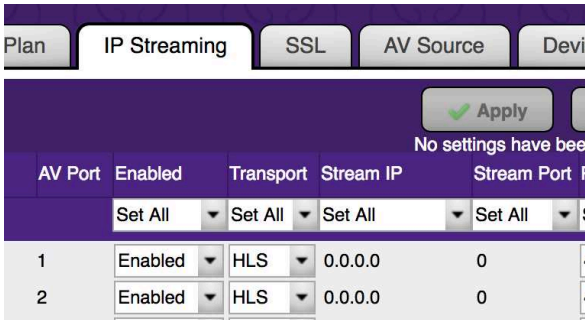
3. For UDP and RTP streams the High Bitrate setting is used. Note that the Low Bitrate setting and Low Resolution are disabled in these modes. Click the **High Bitrate** drop-down list to select a bitrate from 1-10 Mb/sec.
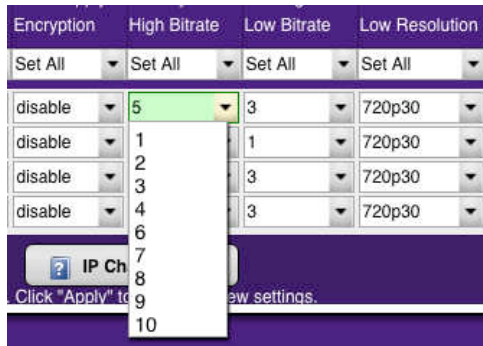
When in HLS mode, the ZyPerMX4/MX2 will output both a High Bitrate stream and a Low Bitrate stream simultaneously using the target bitrates specified. The High Bitrate stream will always be output at the same resolution and frame rate as the orignal input. The Low Bitrate stream will put out a reduced resolution stream. The resolution of this stream can be selected using the "Low Resolution" option.

Click the **Low Resolution** drop-down list and select the desired resolution of the Low Bitrate HLS stream.

Encryption	High Bitrate	Low Bitrate	Low Resolution
Set All	Set All	Set All	Set All
disable	6	3	720p30
disable	6	3	720p30
disable	6	3	720p30
disable	6	3	720p30

Note: To view an HLS stream, point a browser to the following address:

http://<*IP_ADDRESS*>/media/<*name*>.m3u8

Example: http://192.168.1.15/media/MYTV-1.m3u8

This will show the best stream that the HLS player can handle. Either the high or low bitrate.

Note that HLS URLs are case sensitive.

You can manually select either the low or high bitrate steam in the following manner.

http://<*IP_ADDRESS*>/media/<*name*><High>.m3u8   High Bitrate

http://<*IP_ADDRESS*>/media/<*name*><Low>.m3u8   Low Bitrate

**Example**: http://192.168.1.15/media/MYTV-1High.m3u8

Example: http://192.168.1.15/media/MYTV-1Low.m3u8

AV Source Settings

The ZyPerMX4/MX2 Video Encoder by default will provide HDCP handshaking to any connected source. This can cause undesired HDCP encrypted video to be sent to the ZyPerMX4/MX2 that will be not be encoded. For example an Apple laptop computer will automacilly output HDCP compatible video if it detects the HDCP handshake.

The ZyPerMX4/MX2 can disable this HDCP handshake so that laptops will not automatically send HDCP encrypted output. To disable HDCP handshaking, the ZyPerMX4/MX2 can be put into Laptop mode.

1.   Login to the Maestro web interface. See Logging In (page 3) for more information.

2.   Click the **AV Source** tab.
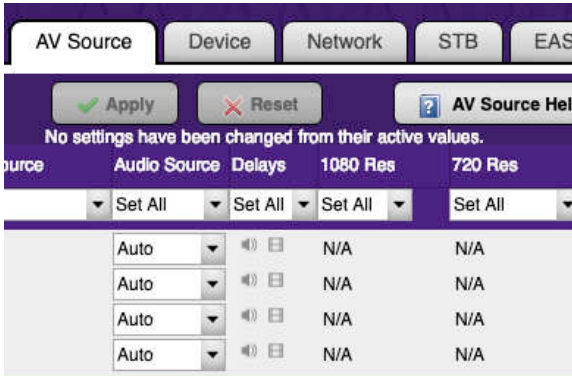
3.   Be sure that the **Show advanced controls** button is clicked in the lower left corner of the window.

4.   Find the **HDCP** column to the right of the window and set the appropriate inputs to Laptop.
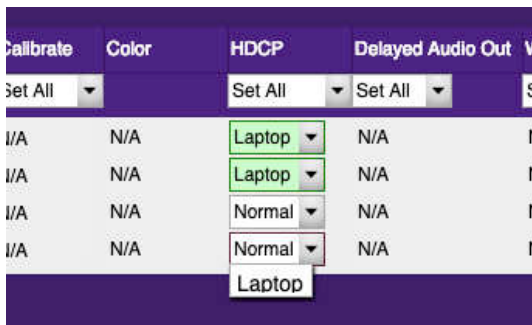
5.   Click the **Apply** button to save the settings.

Adjusting Audio Settings

The ZyPerMX4/MX2 Video Encoder supports either MP2, AC3 or AAC audio formats in the created stream. The default is MP2. You can change the desired audio format manually.

1.   Login to the Maestro web interface. See Logging In (page 3) for more information.

2.   Click the **Device** tab.
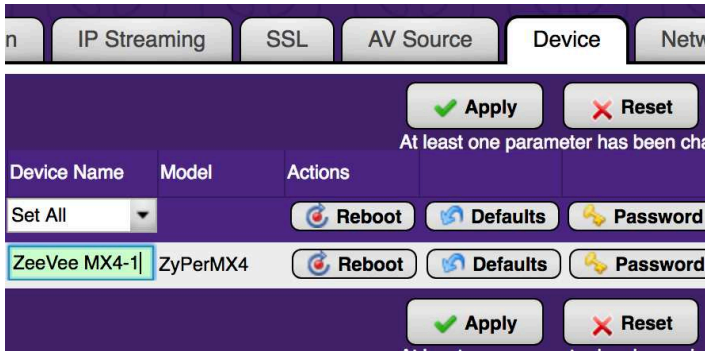
3.   In the lower left area of the screen click on **Show advanced controls**.
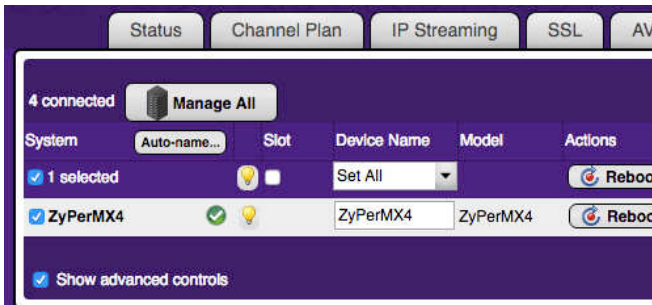
4.   To the right of the screen you can now select the Digital Audio format desired. (MP2, AC3 or AAC) Be sure to save any changes and reboot the system. **Note:** All 4 channels will be set to the same format.

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HLS Encryption

When using the HLS functionality for IP streaming, you can enable secure connections for those streams by generating and uploading an SSL certificate via Maestro. This certification will only be used for HLS video streaming. There is a multistep process to use HLS encryption as detailed below.

1.   Login to the Maestro web interface. See Logging In (page 3) for more information.
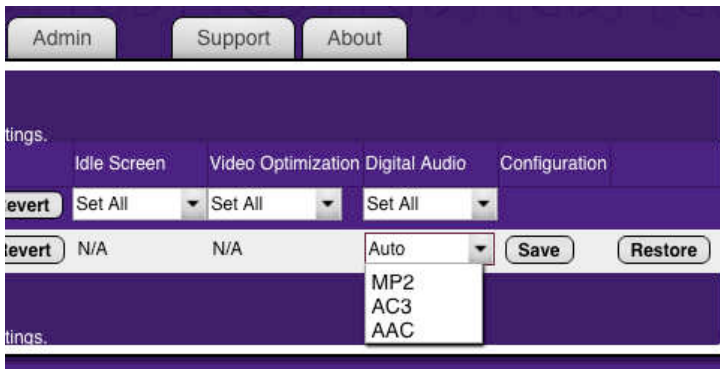
2.   Click the **IP Streaming** tab.

Plan	IP Streaming	SSL	AV Source	Devi

				✔ Apply	
				No settings have beer	

AV Port	Enabled	Transport	Stream IP	Stream Port	F
	Set All ▼	Set All ▼	Set All ▼	Set All ▼	S
1	Enabled ▼	HLS ▼	0.0.0.0	0	4
2	Enabled ▼	HLS ▼	0.0.0.0	0	4

3.   Set the Transport method to HLS and enable Encryption. Be sure to Apply any changes.

Name	Encryption	High Bitrate	Low Bitrate	Low Resolution
Set All ▼	Set All ▼	Set All ▼	Set All ▼	Set All ▼
MYTV-1	disable ▼	6 ▼	3 ▼	720p30 ▼
MYTV-2	enable	6 ▼	3 ▼	720p30 ▼
MYTV-1	disable ▼	6 ▼	3 ▼	720p30 ▼
MYTV-2	disable	6 ▼	3	720p30

Once that's applied then you will be running in HLS mode and the actual video data being sent will be encrypted.

However, the HTTP exchanges will still be in the clear (i.e. no encryption via https).
That means that the encryption key and initialization vectors will be passed in the clear as well.

To protect against that you have to configure the HTTP server for SSL. To do that you go to the SSL tab and upload a security certificate and key exchange files and enable SSL and define your domain that matches your security certificate (issued by a certificate issuing service – NOT by ZeeVee). These certificates are typically only valid for a period of time and then they expire and the user has to renew them. Failure to do so will result in https no longer working properly.

When requesting a security certificate some data must be entered. This can be done form the "SSL" tab in Maestro:

4. Click the SSL/RTMP tab

5. Generate CSR (Certificate Signing Request). This will provide you with 2 files: The CSR and your Private key. Send your CSR file off to a signing authority and they will return via email a signed certificate file to you along with a certificate chain file.

   Important Note: Be sure to save the Private Key file, as it will be needed when uploading the certificate. If you do not have the Private Key file, you will need to start the process over, including requesting the certificate from the signing authority again.

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6. When you are sent the certificate by the certificate signing authority you want to use; you need to go back to the "SSL" tab and upload it.

Import SSL certificate files

Select a PEM file

Choose a certificate file, key file, and optional chain file to upload. The slot must be restarted in order for the HTTP server to install it.

Select a Certificate .pem file:
Click to browse...

Select a Private key file:
Click to browse...

Select a Certificate Chain .pem file:
Click to browse...

[Upload and Reboot Now] [Upload and Reboot Later] [Cancel]

7. Once you upload your certificate, private key file, and certificate chain files, select "Upload and Reboot Later" (you still have some work to do). You will be back at the SSL tab and you need to enable SSL and enter the domain that matches your certificate:

SSL Enabled	Webserver Domain	Generate CSR	Upload Certificate
Set All ▼			
Enabled ▼		**Generate CSR**	**Upload Certificate**
Enabled			
Disabled ▼		**Generate CSR**	**Upload Certificate**
Disabled			

Click Apply, then click "Apply and Reboot Now"

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Stream RTMP to a Wowza Server

RTMP streams can be sent directly to a Wowza server for more widespread distribution of the AV signal.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Select the SSL/RTMP tab.

- The right side of the screen will have fields used for streaming to a Wowza server.

- The **IP Address** field is the IP Address of the Wowza Server this stream should be sent to.

- The **Port** field is the Port number of the Wowza Server this port is streaming to.

- The **App. Name** field is the Application Name configured on the Wowza Server this stream is connected to.

- The **Login ID** field is the Login Name configured on the Wowza Server for this stream.

- The **Password** field is the Password required for this stream to log into the Wowza Server.

Note: The Digital Audio output from the MX4/MX2 must be set to AAC. Make this change in the Device Tab. Enter the configuration changes here first and then set the port(s) Transport Type to RTMP in the IP Streaming Tab. You **MUST** set IP streaming to a valid Multicast address and Port number.

HLS Streams can also be directly sent to a Wowza server. See the following Wowza link for additional details:

https://www.wowza.com/docs/how-to-publish-and-play-a-live-stream-apple-hls

Displaying Device Information

The **Status** page is automatically displayed after logging in to Maestro. This page displays video and audio input/output information, firmware version, and status messages.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. The **Status** tab will be selected automatically.
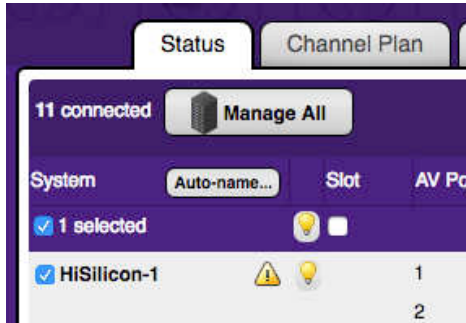
- The **System** field displays the name of the ZyPerMX4/MX2. This name can be changed. See the next page for more information.

- Click the "lightbulb" icon to physically identify the ZyPerMX4/MX2 on the network. When this icon is clicked, the **Status** LED indicator on the front panel will flash rapidly for about 10 seconds.

- The **Video** field displays the video input and output resolution. In the illustration below, the input is 720p60 and the output is 720p60. Video input and output resolution cannot be changed. To change the video bitrate see Adjusting Audio and Video Settings (page 15).

- The **Audio** field displays the input audio type and the output audio type.

- The **Model** field displays the name of the model of the ZyPerMX4/MX2.

- The **Firmware** field displays the current version of firmware.

- The **Uptime** field displays the time, in days and hours, since the unit was last re-booted.

- The **Temp** field displays the ZyPerMX4/MX2 unit internal temperature

- The **Enet Average** field displays current average output on the Ethernet port

> **Note:** This field can be helpful to determine if HLS streaming level has been reached

- The **Messages** field receives messages reported by the ZyPerMX4/MX2, during operation.

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Changing the Device Name

By default, the ZyPerMX4/MX2 is automatically assigned a name by combining the string "ZyPerMX4" or "ZyPerMX2" and the MAC address of the ZyPerMX4/MX2. This name can easily be changed to something more descriptive using the procedure below.

1. Login to the Maestro web interface. See The Maestro Web Interface (page 3) for more information.

2. Click the **Device** tab.

3. Enter the desired name in the **Device Name** field.
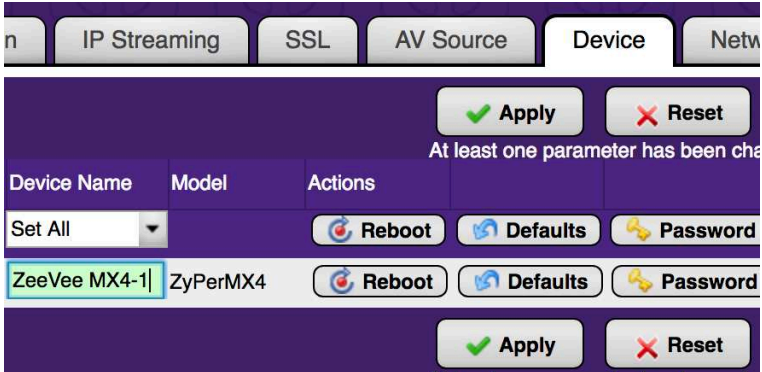
4. Click the **Apply** button to save the changes or click the **Reset** button to cancel changes and revert to the previous settings.

Resetting the ZyPerMX4

The ZyPerMX4/MX2 can be reset to factory-default settings by clicking the **Default** button under the **Device** tab or by pressing the **NAV / Control** button on the unit. (See next page for details) When the ZyPerMX4 is reset to factory-default settings, the IP address will be reset to will be set to `DHCP` mode.

► Using Maestro

1. Login to the Maestro web interface. See The Maestro Web Interface (page 3) for more information.

2. Click the **Device** tab.

3. Click the **Default** button, under **Actions**.
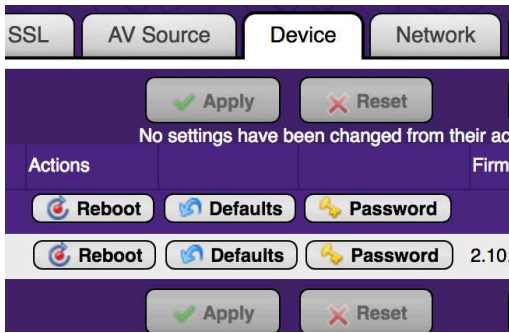
4. The following dialog will be displayed, prompting to confirm the reset procedure.

5. Click the **Reset** button to reset the ZyPerMX4/MX2 to factory-default settings. Click the **Cancel** button to return to the **Device** tab.
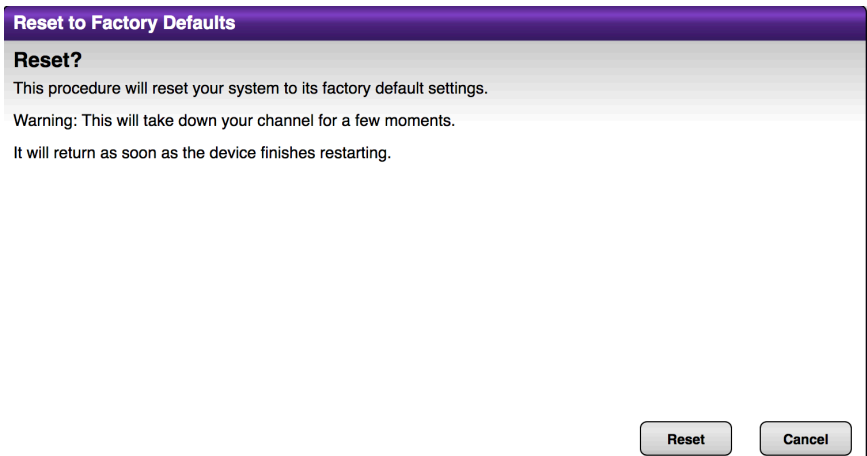
► Using the **Reset** Button/Wheel (NAV / Control)

1. Locate the NAV / Control button on the front of the unit. This is both a button and wheel.

2. Disconnect power from the ZyPerMX4/MX2. While applying power, rotate dial to the Left to reset the ZyPerMX4/MX2 to factory defaults. Rotate dial to the Right to revert the ZyPerMX4/MX2 to previously installed version of firmware. Be sure to hold the dial either Right or Left until reboot begins.

3. The unit will reboot and after about 60 seconds, the unit will be ready for use.

Rebooting the ZyPerMX4/MX2

The ZyPerMX4/MX2 can be rebooted using Maestro. All configuration settings are saved through

reboots.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Click the Device tab.

3. Click the Reboot button, under Actions.
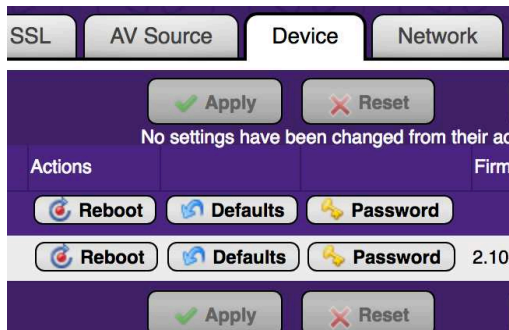
4. Confirm the Reboot action to initiate the reboot.

Setting the Password

The default login password for the Maestro web interface is `admin`. This password can be changed using the following procedure. To recover a lost or forgotten password, see Recovering a Lost Password (page 27).

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

2. Click the **Device** tab.

3. Click the **Password** button, under **Actions**.
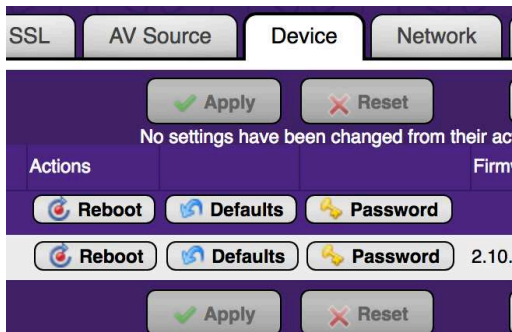
4. Enter the new password in the top field, then retype the password in the bottom field. All passwords must be 4 to 16 characters in length and are restricted to alphanumeric (letters and numbers) characters.

5. Click the **Change** button to accept the changes. Click the **Cancel** button to return to the **Device** tab without any changes.

Recovering a Lost Password

The ZyPerMX4/MX2 does not provide any built-in safeguards for lost or forgotten passwords.

The ZyPerMX4/MX2 must be reset to factory-default settings using the NAV / Control button on the front panel. Use the `admin` password to login and then change the password under the **Device** tab.

1. Locate the **NAV / Control** button on the front of the unit. This is both a button and wheel.


2. Disconnect power from the ZyPerMX4/MX2. While applying power, rotate dial to the Left to reset the ZyPerMX4/MX2 to factory defaults. Rotate dial to the Right to revert the ZyPerMX4/MX2 to previously installed version of firmware. Be sure to hold the dial either Right or Left until reboot begins.

3. The unit will reboot and after about 60 seconds, the unit will be ready for use.

4. Follow the steps under Setting the Password (page 26) to complete the process.

Note: All IP streaming customization settings will be lost as a result of a factory reset.

Updating the Firmware

Firmware updates will be available when required. Contact Technical Support for more information.

1. Download the firmware to the desired location on your computer.

2. Login to the Maestro web interface. See Logging In (page 3) for more information.

3. Click the **Device** tab.

4. Click the **Update** button, under **Actions**.
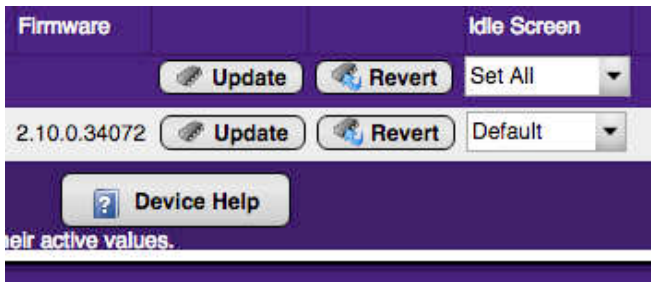
5. The following dialog will be displayed. Click the **Browse** button to select the firmware file.
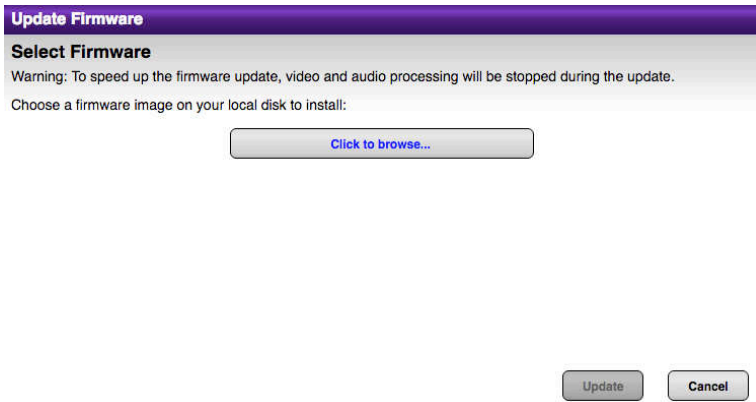
6. Click the **Update** button to begin the firmware update process.

7. Once the firmware as been applied, the ZyPerMX4/MX2 will automatically reboot.

8. The firmware update process is now complete and the unit is ready for use.

Note: Video will be lost during a firmware update but all configuration settings will be saved.

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STB Tab
DirecTV H.25 Set Top Box Control

The ZyPerMX4/MX2 has the ability to remotely control/manage DirecTV H.25 set top boxes. **Important:** If you do not have a DirecTV H.25 please do not make changes to any fields found in this tab.

1. Click on the **STB** tab

P Streaming	SSL/RTMP	AV Source	Device	Network	**STB**	EAS Config	Admin

	✔ Apply	✖ Reset		? Set Top Box Help	

No settings have been changed from their active values.

		STB Device				STB Power			STB Ch
ort	Name	Long Name	STB IP	Receiver ID	Access card #	Config	Actual	Force	Config
	Set All ▾	Set All ▾				Set All ▾		Set All ▾	
	Sales1	HD Video Ov	0.0.0.0	N/A	N/A	On ▾	N/A	Disabled ▾	1
	Sales2	HD Video Ov	0.0.0.0	N/A	N/A	On ▾	N/A	Disabled ▾	1
	Sales3	HD Video Ov	0.0.0.0	N/A	N/A	On ▾	N/A	Disabled ▾	1
	Sales4	HD Video Ov	0.0.0.0	N/A	N/A	On ▾	N/A	Disabled ▾	1

2. Enter the IP address of the H.25 into the STB IP field.   Once you have programmed the IP addresses of the connected set top boxes through the boxes themselves and through Maestro, information from each managed unit such as power status (on/off), current channel, and program information is pulled into the STB tab.

    This information updates approximately every 5-10 seconds.

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STB Power			STB Channel			STB Channel Names		
Config	Actual	Force	Config	Actual	Force	Link	Call Sign	Program Name
Set All ▼		Set All ▼			Set All ▼	Set All ▼		
On ▼	N/A	Disabled ▼	1	N/A	Disabled ▼	Disabled ▼	N/A	N/A
On ▼	N/A	Disabled ▼	1	N/A	Disabled ▼	Disabled ▼	N/A	N/A
On ▼	N/A	Disabled ▼	1	N/A	Disabled ▼	Disabled ▼	N/A	N/A
On ▼	N/A	Disabled ▼	1	N/A	Disabled ▼	Disabled ▼	N/A	N/A

STB power

In the STB Power section, you can power individual units on or off. The "on" or "off" text in the Actual field indicates the current state of the set top box for the specified input port **(on the ZeeVee unit).**

In the STP power section:

1. Click in the Config field and choose on or off.

2. (optional) Click in the Force field to enable (or disable), the associated set top box to "force" the setting you specify. With Force enabled, Maestro will query the box automatically and periodically and set the command to your configuration. For example, if the set top box is turned off, yet it's configured in Maestro as "on," an enabled Force sends a command to set the power on to match the Maestro setting.

3. Click Apply to **save.**

The entire block of set top box units under management can be controlled simultaneously by clicking Set All option at the top of the column.

STB Channel Number

In the STB Channel Number section, you can set the desired channel number to be sent to the set top box. The number in the Actual field indicates the current channel set to the STB for the specified input port (on the ZeeVee unit).

To set STP channel numbers:

1. Click in the Config field and enter the desired channel number for the STB.

2. (optional) Click in the Force field to enable (or disable), the associated set top box to "force" the setting you specify. With Force enabled, Maestro will query the box automatically and periodically and set the command to your configuration. For example, if "242" appears in the Actual field, yet it's configured in Maestro as "142," an enabled Force sends a command to set the channel to 142 to match the Maestro setting.

3. Click Apply to save.

The currently active channel number the STB uses may vary from the configured value because of events at the STB (reconfiguration, STB firmware download, etc.). If "Force" is enabled, that condition corrects at the next automatic interval. If not in Force mode and there is a mismatch, the STB channel number can be manually resent to be corrected.

If Maestro detects a mismatch between the configured channel and the actual active channel at the STB, a triangular warning flag will be displayed next to that value.

STB Channel Names

You can assign the Call Sign and Program Name to a ZeeVee channel using the Link option in the STB Channel Names section. These fields populate automatically as do all the fields from a ZeeVee unit when the set top box is assigned to it.

If you enable the Link function, the Call Sign (for example, CNBCHD) will be used for the ZeeVee Channel Name field and Program Name (for example, Closing Bell) will be used for the Long Channel Name field. You cannot edit these fields when the Link option is enabled.

To link STB Channel Names with program information:

1. Click in the Link field and choose enabled or disabled.

2. Click Apply to save.

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The Support Page

The **Support** page is similar to the Status page and current information about the ZyPerMX4/MX2.

1. Login to the Maestro web interface. See Logging In (page 3) for more information.

Click the **Support** tab on the far-right of the screen.
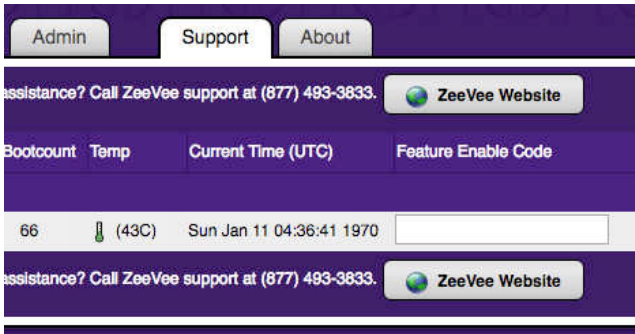
System

Shows the unit being managed.

Send Troubleshooting Report

This button allows for generating a troubleshooting report used by technical support to view the configuration and error logs of the unit. By default a 'light' version of the report is generated. If the check box for a "full report" is checked the report may take several minutes to generate.

If the unit is connected to the internet and can communicate with the servers at ZeeVee, the reports generated will automatically be sent to the server. If the unit cannot communicate with servers at ZeeVee, an option to download the report will be shown and the report can be emailed to the support team at support@zeevee.com.

Serial

Serial number of the unit

Model

Model number of the unit (ZyPerMX4 or ZyPerMX2)

Firmware

Firmware revision unit is currently running

Uptime

Total time since last boot

Boot Count

Total number of reboots the unit has gone through

Temp

The thermometer will show green (ok), orange (warning) or red (critical) and the temp listed is the average internal temperature of the unit

Current time

Time of the unit, always displayed in UTC. Time and Date can be set via an NTP server (Network tab)

Feature Enable Code

This field allows for ZeeVee to enable specially licensed features, such as private test mode(s), on a case by case basis. The code will be provided by ZeeVee technical support after specific approval from ZeeVee management. Enter the code into the field and click apply. A reboot is required for the code to take effect.

Please be sure to save the code information in a safe place. If the unit is reset to factory defaults the code will need to be reapplied.

3   Appendix

Specifications

Video Input	2 or 4 x HDMI Type A, 19-pin, female
Input Signal	0.5 ~ 1.2 Vp-p
Input DDC Signal	5 Vp-p (TTL)
Video Output	1 x LAN (PoE), 10/100/1000Base-T
Output Type	H.264/MPEG-4 AVC, HLS (Low/High datarate)
Video Encoding Bit Rate	1 Mbps ~ 10 Mbps (configurable)
Input / Output Resolutions	**60 Hz**
	720 x 480i/p Note: 480i converts to 480p60 1280 x 720i/p Note: 720i converts to 720p60 1920 x 1080i/p Note: 1080i converts to 1080p60
	50 Hz
	720 x 576i/p Note: Converts to 1280 x 720p50
	1920 x 1080i/p Note: 1080i to 1080p50
	30 Hz
	1280 x 720p 1920 x 1080p
	25 Hz
	1920 x 1080p
	24 Hz
	1920 x 1080p
Audio Input	2 or 4 x HDMI Type A, 19-pin, female, 4 x 3.5mm mini-jack (Analog audio)
Audio Sampling Rate	48 kHz
Audio Compression Format	AC3, MP2, AAC
Operating Temperature	+32 ºF to +113 ºF (0 ºC to +45 ºC)
Operating Humidity	10% to 90% (non-condensing)
Storage Temperature	-4 ºF to +140 ºF (-20 ºC to +70 ºC)
Storage Humidity	10% to 90% (non-condensing)
Power Input	12V DC / 1A
Power Consumption	12W (max)
Dimensions (W x H x D)	7.09 in x 4.41 in x 1.34 in (180 mm x 112 mm x 34 mm)

FAQ

Network

Question: In a Point to Point environment how should the MX4 or MX2 and MXE+ be configured?

Answer: First, on the networking front be sure that both the MX4/MX2 and MXE+ are set for static IP with addresses on the same subnet. ZeeVee would recommend RTP for P2P installations. RTP has more timing and synchronization information built into the protocol.

Question: In a network environment how best should the MX4/MXE+ be configured?

Answer: In a network environment, the ZyPerMX4/MX2 should be configured for UDP/ RTP and multicast.

Question: How does channel beaconing work?

Answer: The ZV channel beacon uses the 239.13.1.19 multicast address. The MX4/MX2 uses this address to publish its channels across the network. In a single layer 2 network this should always work. In a routed layer 3 network, this multicast address needs to be added to the router's forwarding table explicitly. By default, routers will not forward this address. The actual command to do this varies by router.

Question: What is included in the beacon signal?

Answer: The beacon includes the multicast group, port and source IP address.

Question: What other Network protocols are required to support the ZyPerMX4/MXE+?

Answer: For an installation of more than a couple of MX4/MX2 sources, the layer 2 Ethernet switch needs to be a smart switch that supports IGMP and multicast traffic management ands vary by vendor.

Question: Should every MX4/MX2 stream in the system be configured with a different multicast address?   (UDP and RTP streaming)

Answer: Each MX4/MX2 stream needs to be configured for a different multicast address for proper stream bandwidth management. Network switches filter based on the IP multicast address only. If multiple MX4/MX2 streams are configured with the same multicast address with different ports, all the packets with that multicast address will be forwarded to any MXE+'s tuned to any one of those channels. This will overwhelm the Ethernet processing on the MXE+ and cause video artefacts.

Question: What is the range of multicast addresses that can be used by the MX4/MX2?

Answer: The full range of multicast addresses is from 224.0.0.0 to 239.255.255.255

Question: What is the maximum Router hop limit or TTL of a multicast stream?

Answer: The maximum hop limit is 9. Therefore, the TTL = 10.

Miscellaneous

Question: What is the max length of HDMI cable that can be used on the MX4/MX2 before it starts to not detect the source?

Answer: This will depend on the quality of the HDMI cable. ZeeVee has verified functionality with HDMI cables up to 25 feet in length.

Question: What is the recommended Video Bitrate setting for the ZyPerMX4/MX2 when streaming video to ZvMXE+ devices?

Answer: The recommended Video Bitrate in this case is 6 Mbit/sec.   Settings higher than this will cause unacceptable video breakup with the ZvMXE+.   Note that higher bitrates can be used when streaming to some other video decoders.

Question: Can the ZyPerMX4/MX2 strip out any HDCP encoding?

Answer: Please contact ZeeVee Support

Recommended Switches

The following 1Gbit switches are recommended for use with the MX4/MX2. Please note this is not an all-inclusive list. There are many other switches available that will function with the MX4/MX2.

Manufacturer	Model #	Number of 1Gbit Ports	Notes
Netgear	M4300-28G	24	Includes four 10Gb ports
Netgear	M4300-52G	48	Includes four 10Gb ports
Netgear	M4300-28G-PoE+	24	Supports PoE+
Netgear	M4300-52G-PoE+	48	Supports PoE+
Netgear	S3300-28X	24	Includes four 10Gb ports
Netgear	S3300-52X	48	Includes four 10Gb ports
Netgear	S3300-28X-PoE+	24	Supports PoE+
Netgear	S3300-52X-PoE+	48	Supports PoE+
Netgear	GS728TP	24	Supports PoE+
Arista	7010T-48	48	Includes four 10Gb ports
Luxul	XMS-7048P	48	Supports PoE+
Luxul	XMS-5248P	48	Supports PoE+
Luxul	XMS-2624P	24	Supports PoE+
Luxul	AMS-2624P	24	Supports PoE+
Luxul	AMS-4424P	24	Supports PoE+

Switch Configuration Options

Some Switches will work directly out of the box with zero configuration required. Nearly all switches however will provide the user some ability to customize the configuration. The list below includes various switch configuration options that ZeeVee has encountered. Look for these or similar options when configuring your switch.

1. Enable IGMP Snooping
    a.Must be enabled
2. Enable IGMP Snooping on VLAN used by ZyPerMX2/4
    a.Must be enabled when all ports default to VLAN1
3. Filter/Drop unregistered Multicast traffic
    a. If not applied, the behavior of the switch will be to broadcast multicast packets if the switch has no known destination for that packet.
    b. Must be enabled if found
4. Unregistered Multicast Flooding
    a.Must be disabled if found
5. Filter Unregistered Multicast (different wording than number 4 above)
    a.Must be enabled if found
6. Disable IGMP Query
7. Disable IGMP Query on VLAN used by ZyPerMX2/4
8. Validate IGMP IP Header
    a. Must be disabled if found
9. Set IGMP Version to IGMP V2
    a. Must be set if found
10. Enable FASTLEAVE on port X
    a. Should be enabled, if found
11. Enable FASTLEAVE for VLAN used by ZyPerMX2/4
    a. Should be enabled if found

Warranty

ZyPerMX4/MX2 Series of Equipment
ZeeVee, Inc. July, 2018

LIMITED THREE YEAR WARRANTY
ZeeVee warrants your ZeeVee ZyPerMX4 Series of Equipment ("ZyPerMX4 Equipment") against defects in materials and workmanship for a period of three (3) years from the date of purchase. ZeeVee's limited warranty extends only to the original end user purchaser or any person receiving the ZeeVee ZyPerMX4 Equipment as a gift from the original end user purchaser and to no other purchaser or transferee. All warranties implied by law, including any implied warranties of merchantability and fitness for a particular purpose, are expressly limited to the duration of this express limited warranty. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

EXCLUSIVE REMEDY FOR ZEEVEE ZyPerMX4 EQUIPMENT
At the option of ZeeVee, the ZeeVee ZyPerMX 4Equipment will be repaired or replaced with a new, repaired or refurbished product (whichever ZeeVee deems as necessary) if it becomes defective or inoperative. If ZeeVee cannot reasonably repair or replace the ZeeVee ZyPerMX4 Equipment then ZeeVee may, at its sole discretion, refund the original purchase price or the current retail price of the ZeeVee ZyPerMX4 Equipment. If ZeeVee chooses to repair or replace the ZeeVee ZyPerMX4 Equipment, or to refund the purchase price, this will be the exclusive remedy. With the exception of any warranties implied by the law of any state of the USA, this express limited warranty is exclusive and in lieu of all other warranties, guarantees, agreements and similar obligations of ZeeVee.

THE ABOVE WARRANTIES ARE SUBJECT TO ALL CONDITIONS LISTED BELOW:
• You must have proof of purchase from an authorized ZeeVee dealer to receive warranty service. A sales receipt or other document showing that you purchased the ZeeVee ZyPer MX Equipment is considered proof of purchase.

• Warranty coverage begins the day the original end user purchaser or any person receiving the ZeeVee ZyPerMX4 Equipment as a gift from the original end user purchaser purchased the ZeeVee ZyPerMX4 Equipment.

• All ZeeVee ZyPerMX4 Equipment, including replacement products are covered only for the original warranty period. When the warranty on the original product expires, the warranty on the replacement product also expires.

• If we determine that the problem is not covered under the limited warranty, we will notify you and inform you of service or replacement alternatives that are available to you on a fee basis.

• In the case of a paid repair: at the option of ZeeVee, the ZeeVee ZyPerMX4 Equipment will be repaired or replaced with a new, repaired, refurbished, or comparable product (whichever ZeeVee deems as necessary).

• ZeeVee ZyPerMX4 Equipment must be purchased through an authorized ZeeVee Distribution Partner and Dealer/Reseller. Check www.ZeeVee.com for a list of authorized distributors and a list of any expressly excluded Dealer/Resellers. ZeeVee does not warrant equipment purchased through grey market resellers or certain internet resellers.

WHAT THESE WARRANTIES EXCLUDE
Your warranties do NOT cover:

• Labor charges for installation or set-up of the ZeeVee ZyPerMX4 Equipment.

• Shipping, tax or duty charges for return or replacement of unit

• Repairs or replacement due to misuse, accident, lightning damage, unauthorized repair, power surges, or other causes not within the control of ZeeVee.

• Any modifications or other changes to the ZeeVee ZyPerMX4 Equipment, including but not limited to software or hardware modification in any way other than as expressly authorized by ZeeVee, will void these limited warranties. Except in the case of hardware or software provided by ZeeVee, installing modifications, "hacks," or utilizing service access or "back doors" will void these limited warranties.

• Reception or transmission problems caused by signal conditions, Internet connection problems, or any other communication systems outside the unit.

• Expendable accessories included in ZeeVee ZyPerMX4 Equipment such as batteries.

• Any ZeeVee ZyPerMX4 Equipment that has been modified or adapted to enable it to operate in any country other than the country for which it was designed, manufactured, approved, and/or authorized.

• Any ZeeVee ZyPerMX4 Equipment that has altered or missing serial numbers.

• Any ZeeVee ZyPerMX4 Equipment that has been opened or otherwise tampered with.

• Problems that are directly caused as a result of using any third party accessories, parts or components.

MAKE SURE YOU KEEP…
Please keep your sales receipt and any other documentation showing proof of purchase. Also, keep the original box and packaging material in case you need to return your ZeeVee ZyPerMX4 Equipment.

TO GET WARRANTY SERVICE
Warranty service will be provided by ZeeVee. If you believe you need service for your ZeeVee ZyPerMX4 Equipment, please contact ZeeVee by calling our Customer Care Center at (877)-4ZeeVee; (877)-493-3833. If it is determined that the product needs to be returned for service or exchange, you will receive a Return Material Authorization ("RMA") number. Our agents will help you through the process through which you can return the product. ZeeVee is not responsible for Customer products received without an RMA number and may reject such products.

TO GET OUT-OF-WARRANTY SERVICE
To obtain out-of-warranty service for your ZeeVee ZyPerMX4 Equipment, please contact ZeeVee by calling our Customer Care Center at (877) 4ZEEVEE; (877) 493-3833 for information on the possibility of and any costs for repair or replacement of out-of-warranty products. No agent, company, dealer, distributor, or person is authorized to change, modify, or extend the terms of these warranties in any manner.

LIMITATION OF LIABILITY
In no event will ZeeVee be liable for any amount greater than the retail price of the ZeeVee ZyPerMX4 Equipment. ZeeVee shall not be liable for any incidental or consequential damages (including lost profits) for breach of any express or implied warranty on the ZeeVee ZyPerMX4 Equipment. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary from State to State.

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