

zeevee™

Signal Intelligence

ZyPerMX4

Quad Video Encoder

User Manual

July 2018



Safety Instructions

INSTRUCTIONS PERTAINING TO A RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS

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 for 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: Four standard HDMI 1.4 inputs
 - Resolutions from common Standard Definition, through all resolutions including 1080p60, up to and including 1920x1200 @ 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 and HLS.
- Output stream can be set to RTP, UDP, using either unicast or multicast addressing; or to HLS.
- 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 AC3 or MP2 format
- Maestro Web GUI browser management of unit.
- Power-over-Ethernet (PoE) supported allowing for ZyPerMX4 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
- 1 x Power Adapter



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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 ZyPer MX4 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



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 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

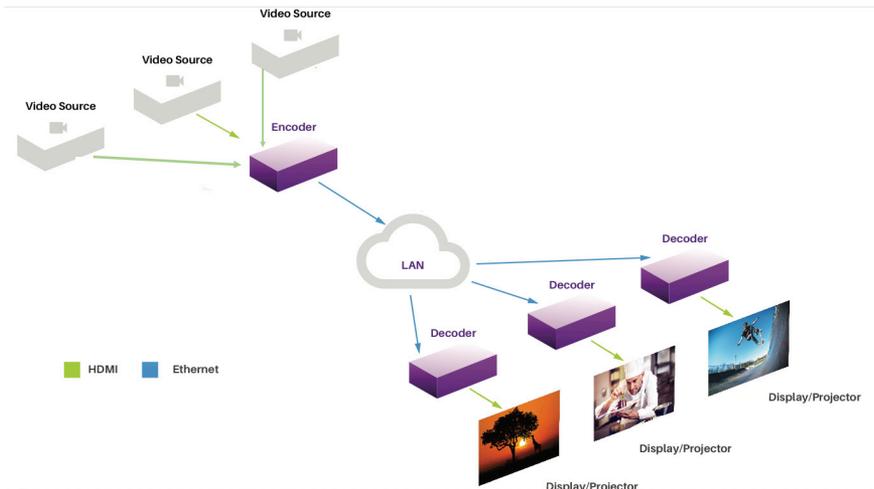
By default, each ZyPerMX4 encoder uses a DHCP IP address if a DHCP server is found on the network. Otherwise the ZyPerMX4 will assign itself a Link-Local address. In order to connect to the unit, and depending upon your network setup, it may be necessary to adjust the IP settings of the computer so that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



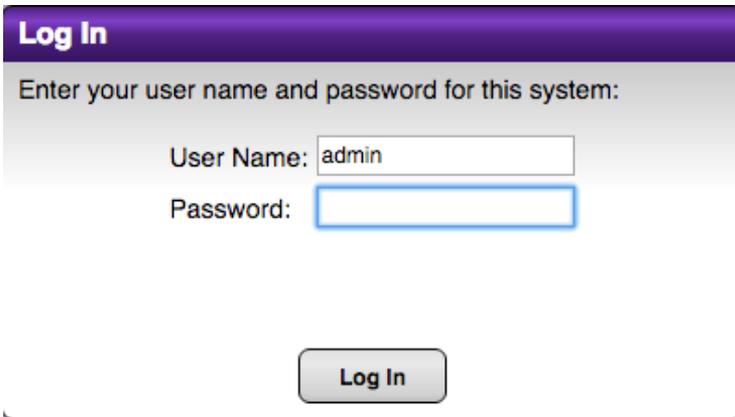
2 Basic Operation

The Maestro Web Interface

The ZyPerMX4 features the Maestro web interface. Maestro allows you to control and manage all features of the ZyPerMX4. To access Maestro, open a web browser and enter the IP address of the ZyPerMX4 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 encoder are on the same network. If a network is not being used, the ZyPerMX4 can be directly connected to the computer. In both cases, the ZyPerMX4 and the computer must be on the same subnet.
2. Launch the web browser and enter the IP address of the ZyPerMX4 in the address bar. (IP address can be found on LED display of ZyPerMX4)
3. The Maestro interface will be displayed with the password dialog.



Log In

Enter your user name and password for this system:

User Name:

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**

No settings have been changed from their default values.

IP Type	IP Address	Mask	Def. Gateway	MAC Address
Set All	Set All	Set All	Set All	
Static	192.168.4.21	255.255.255.0	192.168.4.1	00:1C:D5:FA:00:0C

No settings have been changed from their default values.

3. The current network settings will be displayed.
4. Click the drop-down list, under **IP Type**, to select the desired network mode.

No settings have been changed from their default values.

IP Type	IP Address	Mask	Def.
Set All	Set All	Set All	Set
Static	192.168.4.21	255.255.255.0	192

DHCP

No settings have been changed from their default values.

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

Note that the ZyPerMX4 has 2 independent 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 is properly configured, click the "lightbulb" icon, at any time, to physically identify the ZyPerMX4 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.

AV Port 1 & 2		AV Port 3 & 4	
IP Type	IP Address	Mask	Def. Gateway
Set All ▼	Set All ▼	Set All ▼	Set All ▼
Static ▼	192.168.4.219	255.255.255.0	192.168.4.1

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

AV Port 1 & 2		AV Port 3 & 4	
IP Type	IP Address	Mask	Def. Gateway
Set All ▼	Set All ▼	Set All ▼	Set All ▼
Static ▼	192.168.4.219	255.255.255.0	192.168.4.1

9. Repeat the procedure for **AV Port 3 & 4**. Click the **Apply** button to commit 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 and RTP)

The ZyPerMX4 can be configured to output either unicast or multicast IP streams using UDP or RTP protocols.

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
	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. 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.

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

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	HLS	224.1.4.74	21216
4	Enabled	RTP	224.1.4.75	21216

At least one parameter must be set.

UDP
HLS

✓ Apply

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.

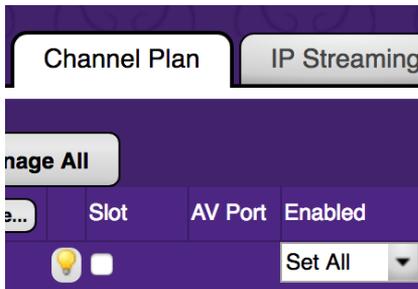
AV Port	Enabled	Transport	Stream IP	Stream Port
	Set All	Set All	Set All	Set All
1	Enabled	HLS	0.0.0.0	0
2	Enabled	HLS	0.0.0.0	0
3	Enabled	UDP	224.1.4.7	21216
4	Enabled	RTP	224.1.4.76	21216

At least one parameter must be set.

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 packets.

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.

Prog #	Name	Long Name	Rating
Set All ▾	Set All ▾	Set All ▾	Set All ▾
1	MYTV-1	HD Video Ov	TV-G ▾
2	MYTV-2	HD Video Ov	TV-G ▾
3	MYTV-3	HD Video Ov	TV-G ▾
4	MYTV-4	HD Video Ov	TV-G ▾

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.

IP Stream Configuration (HLS)

The ZyPerMX4 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.

The screenshot shows the IP Streaming configuration page. At the top, there are tabs for 'IP Streaming', 'SSL', 'AV Source', 'Device', 'Network', 'STB', 'EAS Config', 'Admin', 'Support', and 'About'. Below the tabs are 'Apply' and 'Reset' buttons, and an 'IP Channel Help' link. A message states: 'No settings have been changed from their active values.' Below this is a table with the following columns: AV Port, Enabled, Transport, Stream IP, Stream Port, Prog #, Name, Encryption, High Bitrate, Low Bitrate, Low Resolution, and Stream URL. The table contains 4 rows of data:

AV Port	Enabled	Transport	Stream IP	Stream Port	Prog #	Name	Encryption	High Bitrate	Low Bitrate	Low Resolution	Stream URL
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

At the bottom, there are 'Apply' and 'Reset' buttons, and an 'IP Channel Help' link.

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 4 streams (AV Ports) can be enabled or disabled independently.

The screenshot shows the IP Streaming configuration page. At the top, there are tabs for 'Plan', 'IP Streaming', 'SSL', 'AV Source', 'Device', 'Network', and 'S'. Below the tabs are 'Apply' and 'Reset' buttons, and an 'IP Channel Help' link. A message states: 'No settings have been changed from their active values.' Below this is a table with the following columns: AV Port, Enabled, Transport, Stream IP, Stream Port, Prog #, Name, and Encry. The table contains 4 rows of data:

AV Port	Enabled	Transport	Stream IP	Stream Port	Prog #	Name	Encry
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

At the bottom, there are 'Apply' and 'Reset' buttons, and an 'IP Channel Help' link.

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

At least one parameter must be set

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	HLS	224.1.4.74	21216
4	Enabled	RTP	224.1.4.75	21216

UDP
HLS

✓ Apply

- 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

- Enter a description of the content in the **Name** field. The name field cannot exceed 7 characters. Spaces are **not allowed** in the **Name** field as it is used as part of the Address for HLS streaming. See following section.
- Click the **Apply** button to save the changes or click the **Reset** button to discard any changes.

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	<code>http://192.168.4.21/media/MYTV-1.m3u8</code>
720p30	<code>http://192.168.4.21/media/MYTV-2.m3u8</code>
720p30	N/A
720p30	N/A

HLS Stream Limit

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



The ZyPerMX4 can be upgraded to support additional streams. Please contact ZeeVee for additional information on this upgrade.

Adjusting Video Settings

The ZyPerMX4 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.

AV Port	Enabled	Transport	Stream IP	Stream Port
Set All	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. 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 2-10 Mb/sec.

Encryption	High Bitrate	Low Bitrate	Low Resolution
Set All	Set All	Set All	Set All
disable	6	3	720p30
disable	6	3	720p30
disable	2	3	720p30
disable	3	3	720p30
	4		
	5		
	7		
	8		
	9		
	10		

When in HLS mode, the ZyPerMX4 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 original 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

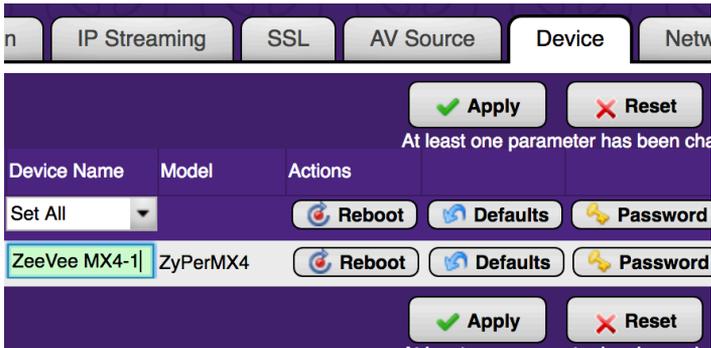
Example: `http://192.168.1.15/media/MYTV-1High.m3u8`

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

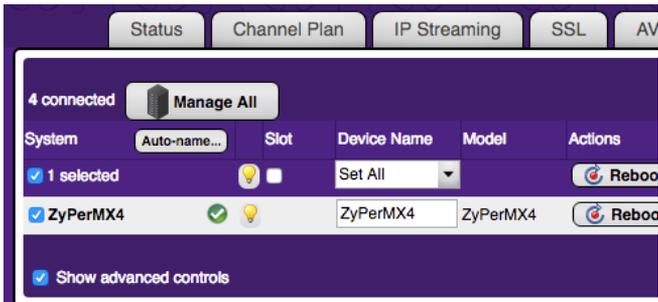
Adjusting Audio Settings

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

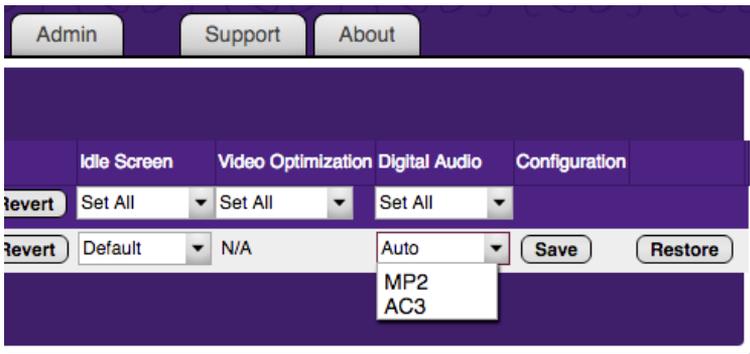
1. Login to the Maestro web interface. See [Logging In \(page 3\)](#) for more information.
2. Click the **Device** tab.



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 or AC3) Be sure to save any changes and reboot the system. **Note:** All 4 channels will be set to the same format.



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.

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. 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
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 from the "SSL" tab in Maestro:

4. Click the SSL tab

SSL configuration interface showing the 'SSL' tab selected. The interface includes buttons for 'Apply' and 'Reset', and a message indicating that at least one parameter has been changed. The configuration area is divided into columns for 'SSL Enabled', 'Webserver Domain', 'Generate CSR', and 'Upload Certificate'. The 'SSL Enabled' dropdown is set to 'Set All', and the 'Webserver Domain' dropdowns are set to 'Disabled'. There are two rows of configuration options, each with a 'Generate CSR' and 'Upload Certificate' button.

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.

Create CSR

Generate a Certificate Signing Request file

Generate a Certificate Signing Request (CSR) file that can be sent to a signing authority.

2-Letter Country Code:

State/Province:

City/Locality:

Company/Organization:

Domain:

Generate File

Cancel

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:

Select a Private key file:

Select a Certificate Chain .pem file:

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:

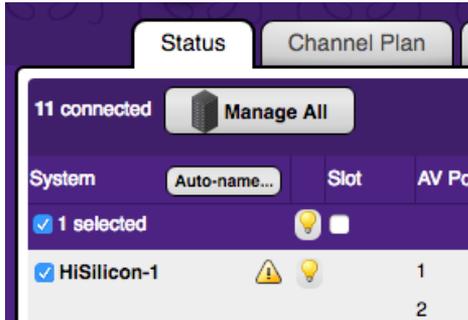
SSL Enabled	Webserver Domain	Generate CSR	Upload Certificate
Set All			
Enabled	<input type="text"/>	<input type="button" value="Generate CSR"/>	<input type="button" value="Upload Certificate"/>
Enabled			
Disabled	<input type="text"/>	<input type="button" value="Generate CSR"/>	<input type="button" value="Upload Certificate"/>
Disabled			

Click Apply, then click “Apply and Reboot Now”

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. This name can be changed. See the next page for more information.
- Click the “lightbulb” icon to physically identify the ZyPerMX4 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.

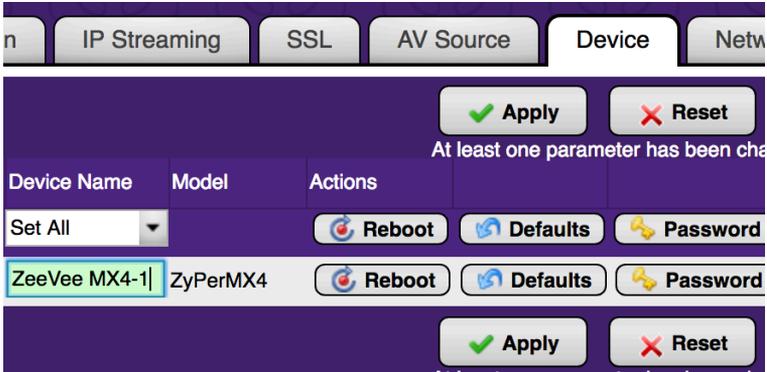
Slot #	Video	Audio
HDMI	720p60 → 720p60	AUTO SPDIF-PCM → MP2
HDMI	720p60 → 720p60	AUTO SPDIF-PCM → MP2
HDMI	720p60 → 720p60	AUTO SPDIF-PCM → MP2
HDMI	1080p60 → 1080p60	AUTO SPDIF-PCM → MP2

- The **Model** field displays the name of the model of the ZyPerMX4.
- 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 unit internal temperature
- The **Enet Average** field displays current average output on the Ethernet port
- The **Messages** field receives messages reported by the ZyPerMX4, during operation.

Changing the Device Name

By default, the ZyPerMX4 is automatically assigned a name by combining the string “ZyPerMX4” and the MAC address of the ZyPerMX4. 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

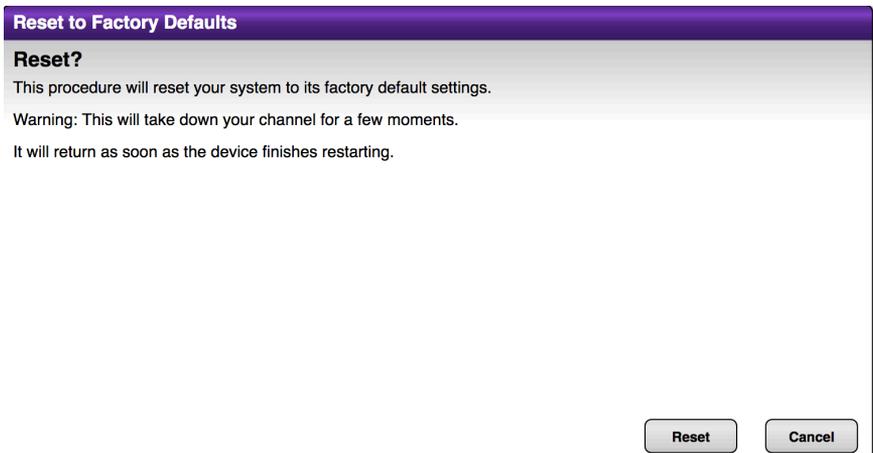
The ZyPerMX4 can be reset to factory-default settings by clicking the **Default** button under the **Device** tab or by pressing the **NAV / Control** button on the unit. (See next page for details) When the ZyPerMX4 is reset to factory-default settings, the IP address will be reset to will be set to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

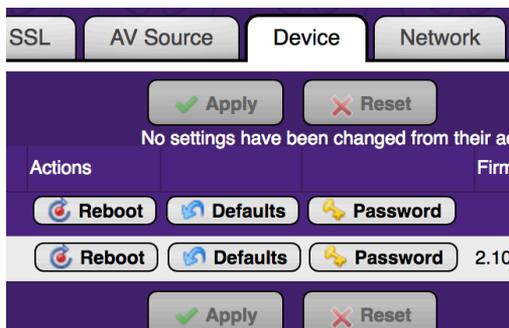


2. Disconnect power from the ZyPerMX4. Press and hold the NAV / Control button while applying power. Release once the LED screen presents options. Rotate dial to the Right to reset the ZyPerMX4 to factory defaults. Rotate dial to the left to revert the ZyPerMX4 to previously installed version of firmware.
3. The unit will reboot and after about 60 seconds, the unit will be ready for use.

Rebooting the ZyPerMX4

The ZyPerMX4 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 \(page 23\)](#).

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.

Change Password

Enter New Password

This wizard will change your password on this device. Enter a new password below:

New Password:

Repeat:

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 does not provide any built-in safeguards for lost or forgotten passwords. The ZyPerMX4 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. Press and hold the NAV / Control button while applying power. Release once the LED screen presents options. Rotate dial to the Right to reset ZyPerMX4 to factory defaults. Rotate dial to the left to revert the ZyPerMX4 to previously installed version of firmware.
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 \(page 22\)](#) to complete the process.

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

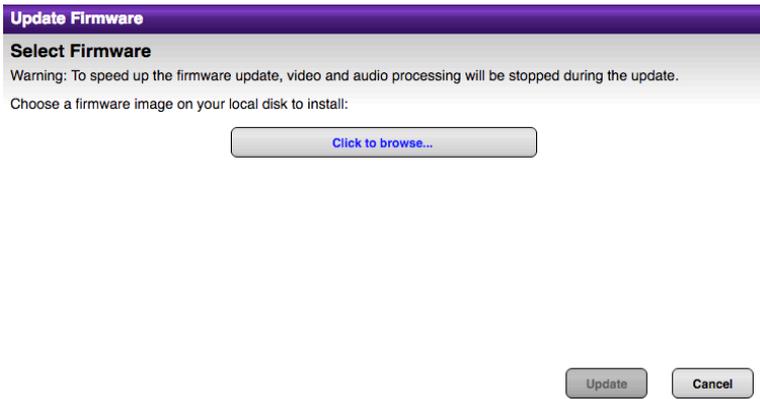
Updating the Firmware

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 has been applied, the ZyPerMX4 will automatically reboot.
8. The firmware update process is now complete and the unit is ready for use.

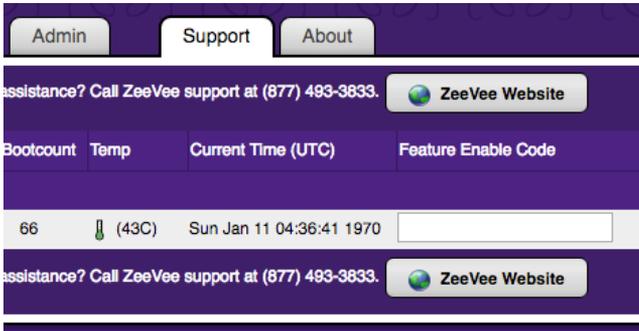
Note: Video will be lost during a firmware update but all configuration settings will be saved.

The Support Page

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

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)

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	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 480p 1280 x 720p 1920 x 1080p
	30 Hz 1280 x 720p 1920 x 1080p
Audio Input	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
Operating Temperature	+32 °F to +113 °F (0 °C to +45 °C)
Operating Humidity	10% to 90% (non-condensing)
Storage Temperature	-4 °F to +140 °F (-20 °C to +70 °C)
Storage Humidity	10% to 90% (non-condensing)

Power Input	12 V DC / 1 A
Power Consumption	12 W (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 and MXE+ be configured?

Answer: First, on the networking front be sure that both the MX4 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 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 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 other Network protocols are required to support the ZyPerMX4/MXE+?

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

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

Answer: Each MX4 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 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?

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

Miscellaneous

Question: What is the max length of HDMI cable that can be used on the MX4 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 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 strip out any HDCP encoding?

Answer: Please contact ZeeVee Support

Warranty

ZyPerMX4 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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