

# ZyPer Installation Best Practices

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# System Description

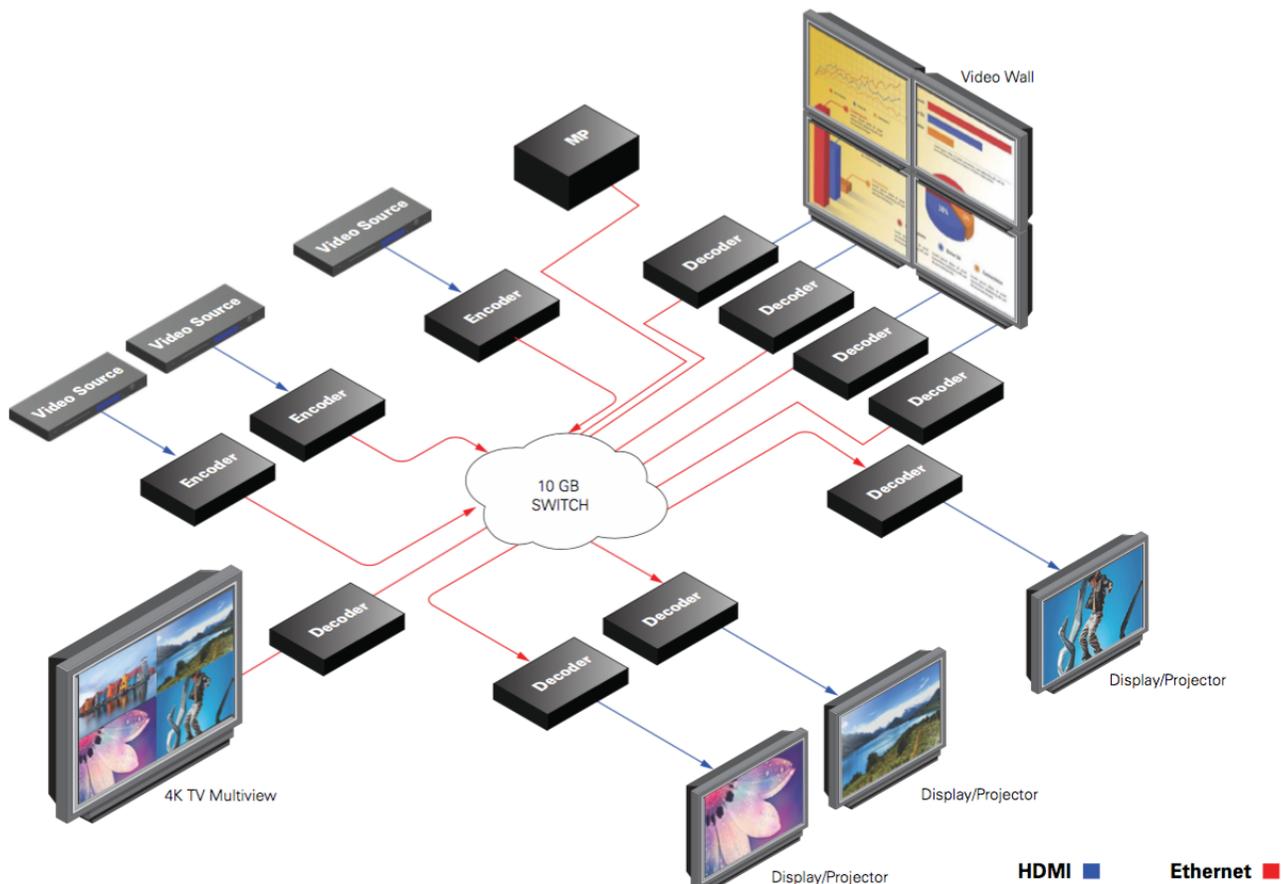
The ZyPer series of products from ZeeVee provide a means for transmitting and receiving up to 4K audio-visual information across a standard 1 or 10Gb IP network with outstanding quality at very low latencies.

**A minimal system consists of:**

- Video Source (Up to 4K)
- ZyPer Encoder device
- CatX Cable or Fiber cables with SFP modules
- ZyPer Decoder device
- Display device

**A fully realized system consists of:**

- (N) Video Sources (HDMI 2.0 support with HDR)
- (N) ZyPer Encoder devices
- 1 or 10Gb Ethernet switching Infrastructure (> (N+M) ports of non-blocking capacity)
- (M) ZyPer Decoder devices
- (M) Display devices
- ZyPerMP control node



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## Management Platform

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Installations will require a ZyPer Management Platform (ZMP). This device controls the operation and manages the connectivity between endpoints. The management platform is a hardened controller node that must reside on the same logical network as the ZyPer Encoders and Decoders. It runs a ZeeVee application as its sole function. The application presents an API to potential third party management platforms as well as hosting its own browser based management application.

The purpose of the Management Platform is to interface user operational requests into the specific device-level control needed to effect connectivity changes, screen management, interface management, and distribute software and control data to all the endpoints of the overall system. The ZMP is the entity that ensures all the endpoints, are accounted for, operating properly, and performing the correct operation at the correct time.

Further, the ZMP is the element that guarantees security, manages access to the overall system and prevents rogue listeners or observers from snooping or spoofing unwanted content.

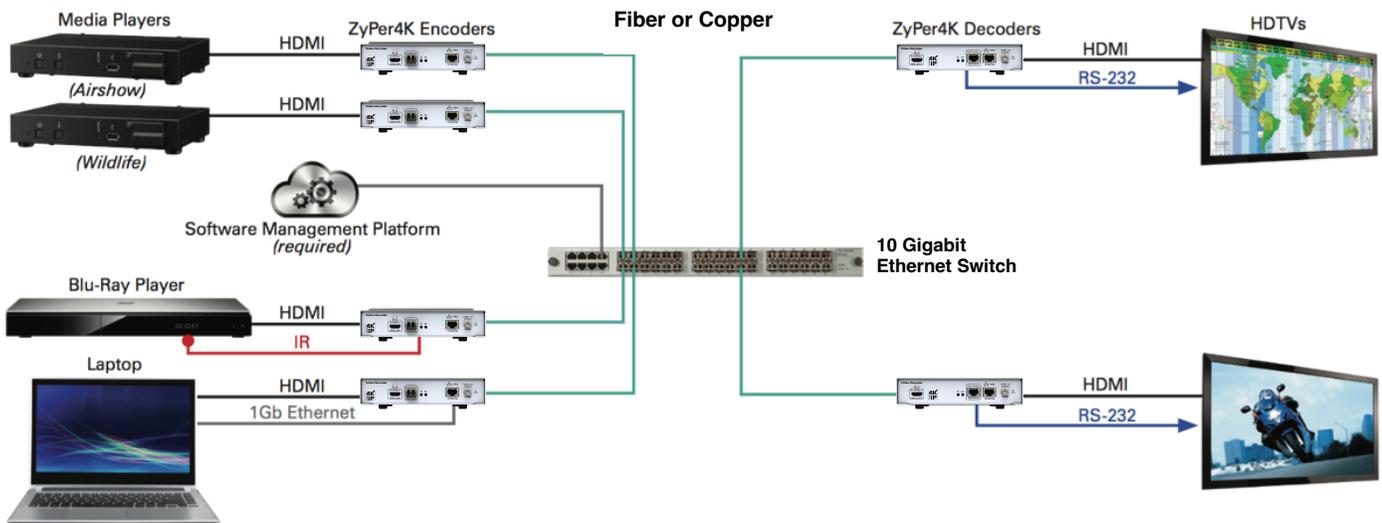
Multiple ZMP devices may be deployed in a redundant configuration to provide for fault tolerant control of the greater ZyPer overall system.

Operation of the ZMP, the browser based management application, and the ZyPer-API are beyond the scope of this manual and are documented separately in far greater detail in the *ZyPer Management Platform User Manual*. Documentation can be downloaded from the ZeeVee website.

<https://www.zeevee.com/documentation/>

## Setting up ZyPer System in Multipoint Environment

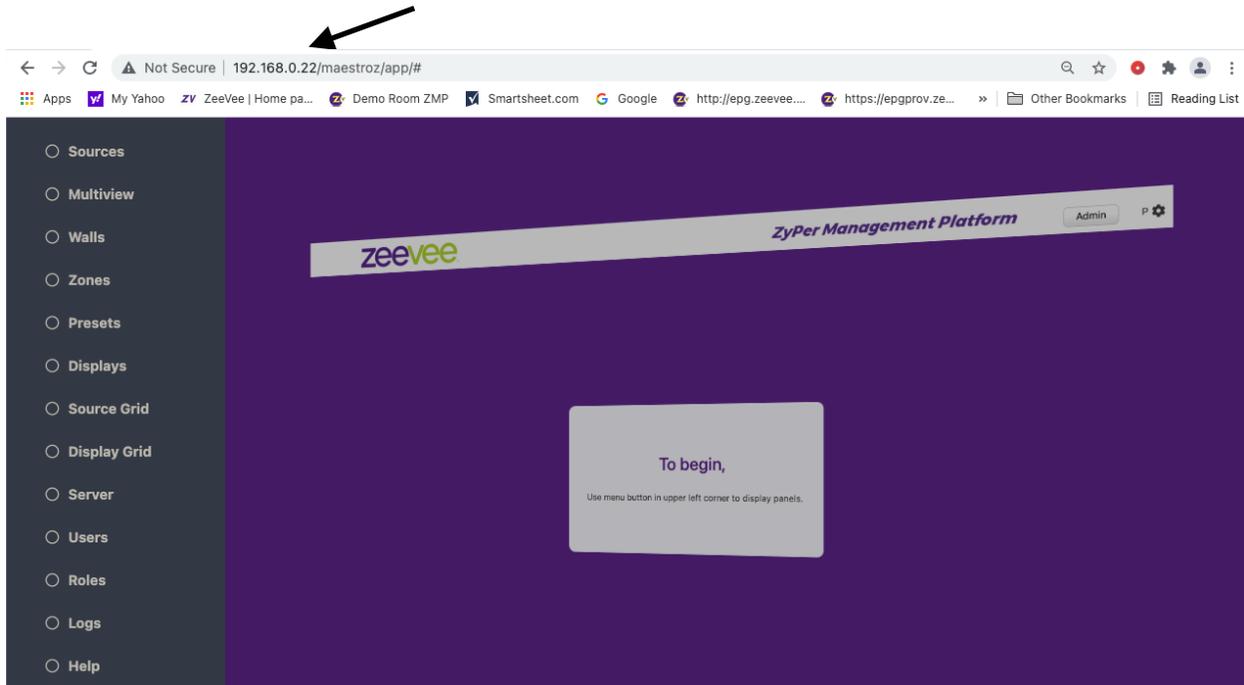
A multipoint, or switched environment involves connecting many sources to many displays. ZyPer allows you a flexible and scalable amount of input-output options without limitations. For example, in a 24-port configuration, you can configure a 1x23, 6x18, or 4x20 (and so on) system. A network switch is needed in these many to many configurations. These environments also require configuration through the ZyPer management software.



### To set up ZyPer in a multipoint environment, you have to:

- Connect the ZyPer Management Platform (ZMP) to the network switch
- Determine the IP Address of the ZMP (See the Management Platform User Guide for details)
- Connect all Encoders and Decoders to the 1 or 10Gb network
- Connect a PC or Laptop to the network switch.
  - Make sure laptop is on same “network” as the ZMP
- Open a Chrome browser and point it to the IP Address of the ZMP. (This opens the ZyPer Management Platform GUI)
- Login to the ZMP using the default username and password. “admin” / “admin”
- All devices (encoders and decoders) will automatically appear in ZMP

IP Address of ZMP



## Configuring the Encoders and Decoders

It is strongly recommended to use the ZMP browser based application to configure all of the ZyPer encoder and decoder units. It is also advised that this configuration be completed prior to any 3<sup>rd</sup> party control system programming being carried out. Testing and verification of ZyPer system functionality is also recommended using the API commands on the ZMP first, prior to any 3<sup>rd</sup> party control system programming.

**Configuration can include the following:**

**(Demo videos available for viewing on all of these topics. See ZeeVee Partner Portal. <https://partners.zeevee.com/English/>)**

1. Setting IP address for the units. (DHCP or Static)
2. Providing “logical” names for the units.
3. Setting up Video Walls
4. Setting up Multiview configurations. (ZyPer4K only)
5. Configuring baud rate, stop bits, parity for RS232 communications

6. Selecting default or custom EDID for encoder units
7. Enabling or disabling the 1Gb Utility port (ZyPer4K only)
8. Updating units to latest available firmware
9. Setting decoder units to a desired resolution output
10. Creating Zones (Grouping decoders together)
11. Creating “Presets”
  - 11.1. Presets are groups or lists of commands to be executed on demand at a later time. Useful to return a system to a desired state
12. Creating additional user login credentials and roles.
13. Scheduling “Presets” to run at specific days/times in the calendar.

## Configuring the Network

Either the 10Gb or 1Gb network must be configured properly to support AV traffic on that network. Specifically it must support multicast communications across the network. Some network switches will come pre-configured to support multicast and AV traffic while other switches will need to be manually configured. Below is a short list of basic requirements/settings for the network.

1. Enable IGMP Snooping
  - a. Must be enabled
2. Enable IGMP Snooping on VLAN used by ZyPer4K system
  - a. Must be enabled when all ports default to VLAN used by ZyPer4K system
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
  - b. **Cisco switches – No IP IGMP Snooping TCN Flood**
5. Filter Unregistered Multicast (different wording than number 4 above)
  - a. Must be enabled if found
6. Disable IGMP Query (**Except on Cisco switches**)
7. Disable IGMP Query on VLAN used by ZyPer4K system

8. Set IGMP Version to IGMP V2
  - a. Must be set if found
9. Enable FASTLEAVE on port X
  - a. Should be enabled, if found
10. Enable FASTLEAVE for VLAN used by ZyPer4K system
  - a. Should be enabled if found
11. Disable Multicast Storm Control on **Netgear switches**. (*Security-Traffic Control-Storm Control-Multicast Storm Control = Disable*)
12. Jumbo Frame or (Frame Size)
  - a. Enable or set to 9000 bytes or larger (**Not required for ZyPer4K**)
13. IGMP Report Flood Mode
  - a. Should be enabled if found

More specific network configuration details can be found in the detailed network requirements documents for the ZyPer4K, ZyPerUHD60 and ZyPerUHD.

[Z4K Network Requirements & Security Considerations](#)

[ZyPerUHD60 Network Requirements](#)

[ZyPerUHD Network Requirements](#)

## Controlling the ZyPer System

The ZyPer system can be controlled via the ZyPer Management Platform browser application. However experience has shown that most customers will use a 3rd party control system instead. The selected 3rd party control system must be able to pass commands to the ZMP API.

In order to accomplish this the integrator/programmer can issue commands from the 3rd party control system manually or make use of a driver/module to accomplish common tasks.

A module or driver is an interface between the primary controller (Crestron, RTI, Control4 etc..) and the ZeeVee Management Platform (ZMP). Think of the module or driver as a translator. It will translate commands from the primary control system into the appropriate commands that can be understood by the ZMP.

**Note:** Not all ZMP API commands are supported by the module/driver. (There are well over 100 individual commands and several hundred command options)

Our goal has been to support the most common and basic commands to allow routing of video from any source to any destination as well as some special features such as multiview and video walls.

ZeeVee has drivers/modules available for the following 3rd party control systems. Crestron, RTI, Q-Sys, Control4. Additionally support is built into Aveo System, Game View, PepperDash, Utelogy and ISAAC.

Many customers have used control systems without the assistance of a driver. Examples include AMX, Extron and many custom proprietary systems.

Source Code to available modules is available on the ZeeVee connectivityXchange.

<https://github.com/ConnectivityXchange>

## 3rd Party Control System Configuration Tips

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### Basic Setup

Regardless of the Control System used to control the ZyPer equipment, it is a requirement that the ZyPer Management Platform (ZyPerMP) must be present.

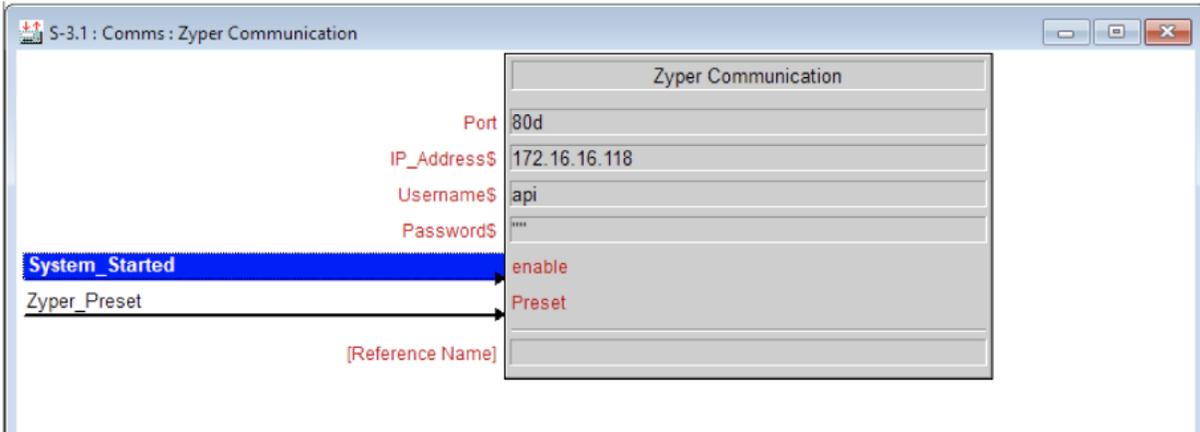
1. The ZyPerMP IP address should be configured either via DHCP or given a static address.
2. The ZyPerMP IP address MUST be on the same network as the primary hardware controller. (*Crestron 4-Series controller, Control4 EA1, EA3, EA5, DTVGameControl iPad*)
3. All ZyPer endpoints should be configured using either the ZyPer MP Graphical User Interface (GUI) or via the ZyPerMP API (Telnet).
  - a. Assign all endpoints a logical name (Encoders and Decoders)
  - b. Design/create any video walls and give them logical names
  - c. Design/create any multiview displays and give them logical names (ZyPer4K only)

### Module/Driver Setup

Every control system is different but will have some common features when it comes to basis setup and configuration.

1. The IP address of the ZyPerMP must be provided so that the primary controller can communicate with the ZyPerMP.

- Where the IP address is provided will vary based on the control system. Below are some examples
  - Crestron – SIMPL Windows under IP\_Address field for the Zyper Communication logic module. See image below:



- Control4 – Composer, System Design-Properties tab, IP Address field.
2. The names of endpoints must be provided. Similar to the IP\_address detailed above.
  3. The names of Multiview's (ZyPer4K only) need to be provided.
    - Crestron – SIMPL Windows in the appropriate Multiview logic module.
    - Control4 – Create a “virtual” encoder and assign it appropriate multiview name and set the “Input Join Type” to multiview.

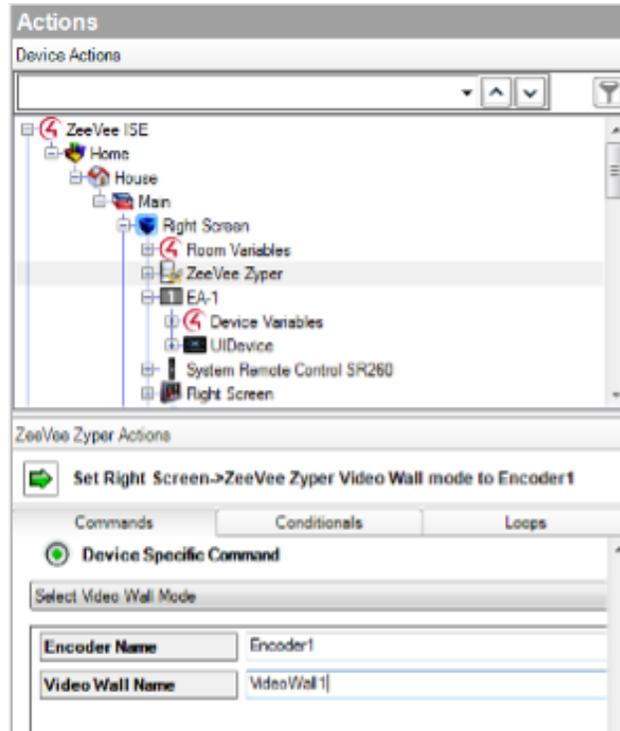
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## Video Walls

Video walls are configured differently depending on the control system.

- Crestron – Similar to IP address and multiview. SIMPL Windows in the appropriate Video Wall logic module.
- Control4 – Video Walls need to assigned to a special programmed command. For example, a Red Button press on the SR260 remote control. In *Composer* highlight the room, select Programming and Commands. Select the “Red Button”. Then in the Actions window select ZeeVee ZyPer, scroll down to Device Specific Command. Enter the Encoder and Video Wall Names. (See image below)

## RS232



The Management Platform (ZMP) must first be linked to the specific endpoint to send RS232 information. This can be done with either the dataConnect or switch command.

Examples:

```
dataConnect Dec1 server rs232 tunnelPort 1234
```

```
switch Dec1 server rs232
```

**Note:** The feature of dataConnect was added to allow a third party to connect to the ZMP server with a specific port and pass raw or telnet API commands (depending on the mode) to the server and port which is designated for a particular encoder or decoder.

When using any control system; that system is actually talking to our MP and not to any specific endpoint.

When sending RS232 commands to an encoder or decoder via the MP you must follow very specific syntax.

The ZeeVee API command is: send <decoder\_name> rs232 text

Here are examples on this. (Assume decoder name is *Dec1*)

Input command: send Dec1 rs232 hello

Received at Dec1: hello (Note, no line feed or carriage return)

Input command: send Dec1 rs232 hello\r\n

Received at Dec1: hello (with carriage return and line feed)

Input command: send Dec1 rs232 hello world

Received at Dec1: Nothing. You get an error. Bad syntax. You cannot have a space between hello and world.

Input command send Dec1 rs232 hello\_world

Received at Dec1: hello\_world (Note, no line feed or carriage return)

Input command send Dec1 rs232 "hello world"

Received at Dec1: hello world (Note, no line feed or carriage return)

Input command send Dec1 rs232 "hello world"\r\n

Received at Dec1: Nothing. You get an error. Bad syntax. Token \r\n is invalid.

You need to contain the line feed and carriage return symbols inside the quotes in this case.

Input command send Dec1 rs232 "hello world\r\n"

Received at Dec1: hello world (with carriage return and line feed)

### **Text can also be Hexadecimal Code as shown below:**

Input command:

send Dec1 rs232 \x48\x65\x6c\x6c\x6f\x20\x57\x6f\x72\x6c\x64\x0A\x0D

Received at Dec1: Hello World (with carriage return and line feed)

The Management Platform also has the ability to receive RS232 communications that were input into a ZyPer endpoint. To view any such RS232 string, you use the "show responses" command.

Example:

Zyper\$ show responses DEC1 rs232 since 0

device(d8:80:39:59:bf:57);

device.rs232Response.0; string="Have a great day!\x0D"

device.rs232Response.1; string="\x0A"

lastChangeId(2);

Success

### **Important Note**

When using Crestron as the control system, you need to append an extra \ symbol before the Carriage return symbol. Otherwise carriage return does not work.

Example using Crestron to turn on/off LG display.

LG TV

ON

```
send DecoderName rs232 \x6B\x61\x20\x30\x31\x20\x30\x31\x0D
```

OFF

```
send DecoderName rs232 \x6B\x61\x20\x30\x30\x20\x30\x30\x0D
```

## **Additional Documentation**

*ZyPer Management Platform User Guide* - Contains details on the ZMP including Browser based GUI, all API commands, Event Mechanisms, SNMP and LLDP Support.

This document is available on the ZeeVee website:

<https://www.zeevee.com/documentation/>

## Appendix

### Fast-Switched vs. Genlocked Mode

The ZyPer4K provides two uniquely different modes for joining video/audio between a source (encoder) and display (decoder). The chart below details the differences between these two modes.

Feature	Fast-Switched	Genlocked
Latency	1-frame of latency. (16-33ms depending on frame rate of source video).	0 frames of latency. Less than 100µs
Transition Appearance	Instantaneous if switching between sources at same resolution and frame rate	Visible blanking of display when switching between sources
Scaling	Automatic decoder scaling up or down to preferred resolution of the display (As determined by display EDID)	Source is not scaled. What comes in at source is presented to display exactly as input. (Note: Special Genlock-scaled mode is available)
HDR	HDR input is automatically reduced to 8-bits at output	HDR input is maintained exactly at output.
Dolby / Encoded Audio	AC3 or other encoded audio formats are passed from encoder to decoder	AC3 or other encoded audio formats are passed from encoder to decoder
Video Wall	Video walls are not supported in Fast-Switched mode (Join command for walls defaults to Genlock-scaled)	Video walls are technically always in Genlock-scaled mode
Multiview	Multiview is supported in Fast-Switch mode	Multiview is not supported in Genlocked mode
Video Disconnect	Disconnecting video ( <b>Join None</b> ) will maintain a black screen output. (Video not technically disconnected)	Disconnecting video ( <b>Join None</b> ) will disconnect the video stream entirely. No video output from decoder.
USB, IR, RS232	None of these items are associated with Fast-Switched or Genlocked mode	

**Notes:** Video Disconnect refers to the existing join between encoder and decoder. If existing join is Fast-Switched then a “Join None” command simply puts out a fully black video output from the decoder. If the existing join is Genlocked, then a “Join None” command disconnects the video stream and nothing is output from the decoder. This can be verified by looking at the VID light on the ZyPer4K decoder.