1SourceVideo
Redefining Distribution

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

VISCA Camera Interface

06-21-19

This document covers the interface between ATEM Switchers and VISCA Protocol PTZ Cameras.

Most ATEM switchers have the ability to control PTZ (Pan, Tilt, and Zoom) actions on supported cameras and PTZ heads. There are two basic methods for controlling these cameras.

1. Using the RS-422 interface available on the supported ATEM switcher hardware.
2. PTZ through the SDI video ancillary data connected to supported cameras and heads.

This document will cover both types of interfaces.

1SourceVideo
Redefining Distribution
3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

ATEM Switcher PTZ Support

ATEM Model	VISCA RS-422	SDI PTZ	Control Type	Notes
TVS Legacy	None	None		
1ME Legacy	Yes	No	External Panel	
2ME Legacy	Yes	No	External Panel	
PS4K	No	Yes	External Panel	
1ME 4K	Yes	Yes	External Panel	
2ME 6G	Yes	Yes	External Panel	
2/4ME 12G	Yes	Yes	External Panel	
TVS HD	Yes	Yes	External Panel	
TVS HD Pro	Yes	Yes	Trackball and External Panel	Trackball is not a good PTZ Control
TVS 4K Pro	Yes	Yes	Trackball and External Panel	Trackball is not a good PTZ Control
Constellation	Yes	Yes	External Panel	

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

1. VISCA Protocol over RS-422 Serial Connections

Supported ATEM switchers that have the DE-9 Female RS-422 connector may be wired to PTZ cameras and heads that support a daisy chain RS-42 (or RS-232) input and output. The first camera is connected to the ATEM directly, while subsequent cameras are daisy-chained following the first camera. The ATEM control supports up to seven PTZ cameras with this method.

What Do I Need?

You must have a VISCA supported ATEM switcher from the following list:

- ATEM 1ME Legacy
- ATEM 2ME Legacy
- ATEM 1 M/E Production Studio 4K
- ATEM 2 M/E Production Studio 4K
- ATEM 2/4 M/E Broadcast Studio 4K
- ATEM TVS HD
- ATEM TVS HD Pro
- ATEM TVS 4K Pro
- ATEM Constellation

You must have an ATEM Broadcast Panel with Joystick or use the trackball on one of the ATEM Television Studio Pro (HD or 4K) models. The trackball is not a good method of controlling PTZ especially with on air type moves, but it will control the motion.

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Supported Broadcast Panels include:

- ATEM 1ME Legacy Broadcast Panel
- ATEM 1ME Advanced Panel
- ATEM 2ME Broadcast Panel

Connecting the Cameras

The following chart shows the connections to the serial port DE-9 Female on the back of supported ATEM models. This is the standard pinout for a SMPTE Receiving (or Controlled) device. The ATEM was originally designed to be controlled by an external interface, so the hardware reflects this. It does not mean the ATEM cannot control things, but it defines the pinout of the connector.

ATEM RS-422 Wiring

Pin	ATEM Signal	Twisted Pairing	Camera Signal
1	G	Gnd	
2	Tx- (A)	Paired with 7	Rx- In
3	Rx+ (B)	Paired with 8	Tx+ Out
4	G	Gnd	
5			
6	G	Gnd	
7	Tx+ (B)	Paired with 2	Rx+ In
8	Rx- (A)	Paired with 3	Tx- Out
9	G	Gnd	

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Notes:

- Twisted pair wire should be used for paired signals (+/-). Straight wiring may be used for very short runs.
- Transmit signals must be wired to Receive signals, plus to plus, minus to minus.
- In some documents the "+" is replaced with a "B" and the "-" is represented by an "A".
- Only one ground wire should be necessary.
- On the Camera end, wire to the "IN' connections as the "OUT" connections would loop to additional cameras.
- The ATEM RS-422 is configured as a DCE or Receiving type of Device. This is similar to a VTR.

Important information about wiring and signals

In early versions of the ATEM manual, the pinout diagram was incorrect. Engineering returned the exact definition of the ATEM RS-422 connector which matches the SMPTE specification. The manual has since been updated, and the above chart is correct.

Some research and real-life experiences led us to find that what SMPTE calls + and - are different than what some camera vendors call + and -. BMD use the SMPTE definition of RS-422 where the + signal is idle High (+5 Volts) and Data Low. And the - signal is idle low (Ground) and Data High. Vendors in different industries label this the opposite. There may also be confusion with the A and B terminology as well. So, to clearly state what BMD does is follow the SMPTE (and Sony) RS-422 standard outlined in the chart. The + (B) will be idle High at 5 Volts while the - (A) will be idle Low at Ground. Because of these differences, it may be necessary to reverse the + and - wires at the camera end to make things work. In all cases, Tx must connect to Rx and Rx must connect to Tx.

Testing the Cameras

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Once everything is connected, make sure the Baud rate in the cameras matches the Baud rate set on the ATEM control panel. Only ATEM control panels have control over PTZ cameras; this functionality is not implemented in the ATEM software. The ATEM panels will have a menu associated with Camera Control where you select the mode as VISCA and the Baud Rate. There is a Detect button that would be used to connect to the cameras. If connected correctly, Detect will return the number of cameras attached and everything should work at that point.

Troubleshooting VISCA PTZ

In the event the cameras are not connecting, it is best to reduce to a simple setup with only one camera. Obviously, verify the wiring as described. The most obvious problem at this point is the connection of the Plus and Minus signals. Simply reverse both of these connections and try again. Here are some further notes about troubleshooting.

A couple of other points to double check:

- Requires ATEM Version 6.6 or later.
- The Baud rate selected on the panel must match that set on the camera.
- Some Sony cameras can use both RS232 and RS422. The ATEM uses RS422 only. Be sure to connect to the RS422 port on these cameras and configure the camera to use RS422 if applicable.
- Some cameras support VISCA over RS-232. This is possible by using appropriate RS-422 to RS-232 adapters. This configuration is not covered in this document.
- The remote port function on the ATEM must be set to PTZ as per instructions in the manual. This can also be done on the panel through the setup menu from the home menu.
- The user must press the Detect button on the panel to detect the connected cameras.
- Make sure the ATEM and the Broadcast Panel are powered up and connected.

Information on PTZ Control and Protocol

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

More information on PTZ Control may be found on the website at:

https://documents.blackmagicdesign.com/DeveloperManuals/BlackmagicPTZControl.pdf?_v=1523171700000

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

2. **PTZ over SDI Ancillary Data Connected to Supported Cameras**

Some ATEM switcher models will embed PTZ information through the ancillary data in the SDI video output. This signal is normally connected to Blackmagic cameras for Camera Control, Tally, and Talkback. The SDI method will control up to the number of switcher inputs on the ATEM. You may use either the VISCA over RS-422 or PTZ over SDI but you cannot use both on the ATEM.

At the camera end, there needs to be a method to extract PTZ data from the SDI. Currently, there are two Blackmagic devices that can do this - the Micro Studio 4K and the Camera Fiber Converter. Both of these have a DE-9 Female connector which provides a VISCA protocol to a supported camera head.

What Do I Need?

You must have an SDI PTZ supported ATEM switcher from the following list:

- ATEM Production Studio 4K
- ATEM 1 M/E Production Studio 4K
- ATEM 2 M/E Production Studio 4K
- ATEM 2/4 M/E Broadcast Studio 4K
- ATEM TVS HD
- ATEM TVS HD Pro
- ATEM TVS 4K Pro
- ATEM Constellation

You must also have an ATEM Broadcast Panel with Joystick, or use the trackball on one of the ATEM Television Studio Pro (HD or 4K) models. The trackball is not a good method of controlling PTZ especially with on air type moves, but it will control the motion.

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Supported Broadcast Panels include:

- ATEM 1ME Legacy Broadcast Panel
- ATEM 1ME Advanced Panel
- ATEM 2ME Broadcast Panel

At the camera end there must be a device that will extract PTZ data from the SDI return signal. Supported devices include:

- Micro Studio Camera via the Expansion Port
- Camera Fiber Converters via the DE-9 PTZ Port

The cameras must be connected to a supported PTZ head. Supported heads will not be listed here.

Connecting the Cameras

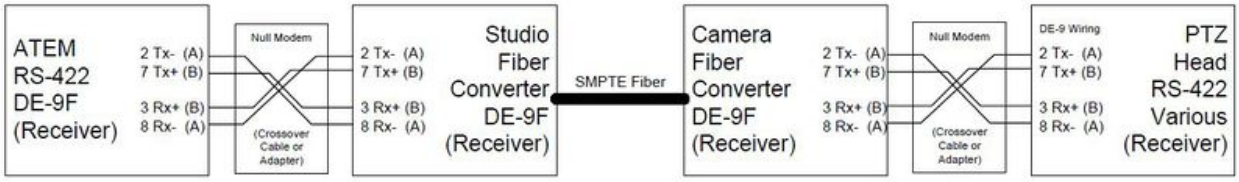
The two supported devices above are connected via SDI return feed. Any of the ATEM SDI outputs (except any down converted ones), will contain PTZ information in the ancillary data. Once connected to the input of the camera, the SDI PTZ information is converted to VISCA at an RS-422 serial port. This port would be connected to the PTZ head. The two Blackmagic device connections are described here:

Micro Studio Camera - The 15-pin expansion port on the Micro Studio camera has a DE-9 Female connector which may directly connect to a supported PTZ head. The DE-9 is configured as a Controlling (Transmitting) device so it will connect directly to a Receiving device with a direct cable.

Camera Fiber Converter - There is a DE-9 Female connector on the Camera Fiber Converter. This connector is configured as a Receiving (Controlled) device just like the ATEM hardware. To connect this to a PTZ head, it may be necessary to use a Null Modem Cable or wiring to cross over the Transmit and Receive lines. With the current Camera/Fiber firmware, either SDI PTZ or VISCA RS-422 may be utilized at the Studio

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Fiber Converter End. The Settings Menu on the Studio Fiber Converter has a “PTZ Source” menu where you select either “SDI from Switcher” or “9-pin from Studio Fiber Converter”. If using the 9-pin at the Studio Fiber Converter, you will also need a Null Modem between this connector and the ATEM 9-pin RS-422 Connector.



VISCA RS-422 Connection to Studio and Camera Fiber Converter

Troubleshooting SDI PTZ Control

When using SDI control of PTZ camera heads no detection is necessary as they are all wired one to one in a spider method rather than daisy chain. From the PTZ or Camera Control menus on the panels, select the desired camera and move the joystick. If there are initial problems, here are some things to check.

- Make sure the correct ATEM and panel are used according to the chart above.
- The wiring connections for serial control may require a Null Modem or crossover type cable. This must be wired correctly.

- The remote port on the ATEM must be set to VISCA, and menu selections on the panels would also be set to VISCA if available.
- When using SDI PTZ control with the ATEM, it is not possible to make a macro storing the position of the camera for recall.

3 Crown Plaza • Hazlet, NJ 07730
Phone: 844-270-2442• Fax: 732-290-0017

Information on PTZ Control and Protocol

More information on PTZ Control may be found on the website at:

https://documents.blackmagicdesign.com/DeveloperManuals/BlackmagicPTZControl.pdf?_v=1523171700000