

**Matrox<sup>®</sup> Maevex<sup>™</sup> 5100 Series**  
**Managing video input and output options**  
**Reference document** (Rev. 1.01)

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## 1 Overview

Your Matrox Maevox 5100 Series hardware and software are designed to obtain the best possible video quality for your environment. Achieving the best video quality is done by limiting the number of transformations to the video between the source and the final output. Transformations to the resolution and frame rate of a video are the ones most likely to affect video quality.

For video playback on monitor and other devices, the resolution and frame rate of a video are converted to a display resolution and vertical refresh rate which is referred to as a display mode.

This document explains how to determine which display modes are used from the source device to monitors connected to your encoder and decoder units.

**Note:** This document assumes you're using version 1.03 of Matrox PowerStream software and firmware. If you're using a previous version of PowerStream software, certain references in this guide may not reflect the software you have.

### 1.1 More information

The following provide additional documentation such as the installation, the connection setup, and the hardware information for the Matrox products discussed in this document and on the software to configure these products.

- **Matrox Maevox 5100 Series User Guide** – provides information on installing and connecting your Maevox 5100 Series products.
- **Matrox PowerStream help** – provides information on PowerStream software features and options.

## 2 Understanding your Maeve environment

The following hardware components of a Matrox Maeve environment help determine which display modes are used.

- **Source** – A video source connected to an encoder. For example, a source can be a media player, a computer system, a camera, or another Maeve encoder.
- **Maeve Encoder** – An encoder is needed for each source in your Maeve environment. An encoder can transmit to a single decoder or to multiple decoders. An IP camera supporting RTSP transmissions can also be used to encode and transmit a stream.
- **Maeve Decoder** – A decoder is needed for each output in your environment. A computer system using VideoLAN® VLC media player as a video player can also be used to decode the signal from an encoder and play back video.

Matrox PowerStream software also helps determine which display modes are used.

## 3 Matrox PowerStream

Matrox PowerStream software enables you to remotely control, manage, and configure your MaeveX units from a controller system in your MaeveX environment.

### 3.1 Accessing PowerStream

To access PowerStream software:

- **Windows 8** – From the **Start** screen, click **PowerStream**.
- **Windows 7** – Click **Start** > **All Programs** (or **Programs**) > **Matrox Graphics\*** > **PowerStream**. (\* Depending on your version and configuration of Windows, this part of the step may not be necessary.)

For more information, see Matrox PowerStream help.

### 3.2 Enabling features

To access the control settings for a unit, double click the unit tile or click the **Settings** (⚙️) icon of the tile, then click **Control**.

Adjust your settings, then click **Apply** to apply your changes.

Use the following settings to modify the display mode for your MaeveX units:

- Encoder
  - **Processing** > **Capture** > **Frame rate**
  - **Processing** > **Encoding** > **Use specific video size**
  - **Output** > **Use pass through** or **Use confidence preview**
  - **Output** > **Size and transformations**
- Decoder
  - **Decoding** > **Crop video**
  - **Local output** > **Size and transformations**

For more information on Matrox PowerStream features and options, see the help file included with your PowerStream software.

## 4 Determining the display mode for your source

A source device uses the EDID information from the device connected to it (such as a monitor) to determine which display mode to use. A display mode is the combination of display resolution and vertical refresh rate (see [Supported display modes](#)).

Some sources (such as a computer system) can force a display mode. When forcing a display mode, the source disregards the EDID of the device, which may result in a loss of video quality.

Most sources can determine the best display mode to use for a device connected to it. Each device has a preferred display mode defined in its EDID. If the source supports that display mode, both the source and the device use that mode. If the source doesn't support that display mode, the source selects a display mode that both devices support. For more information, see your source device documentation or contact your source device manufacturer.

Depending on the **encoder** output method selected in PowerStream, your source uses the EDID of different devices to determine which display mode to use:

- **Pass through** – the source uses the EDID of the DVI or HDMI digital monitor connected to your encoder.
- **Confidence preview** – the source uses the EDID of the encoder.

## 5 Your encoder in pass through

Pass through is an encoder output method enabled in PowerStream. When pass through is enabled, the encoder transmits the signal between your source device and the monitor connected to the encoder, as if the source was connected directly to the monitor.

You can use pass through to see how your source video looks at the preferred display mode for your monitor and without transformations by the encoder.

### 5.1 Enabling pass through

To enable pass through, access your encoder control settings (see [Enabling features](#)). Select the **Output** tab, then enable **Use pass through**.

### 5.2 Using pass through

When using pass through:

- The source uses the EDID of the DVI or HDMI digital monitor connected to the **HDMI OUT** connector of your encoder to determine which display mode to use. **\*\*If no EDID is detected, the source may disable its video output and capture is impossible.\*\***
- The encoder must support the display mode used by the source for capture, encoding, streaming, or recording to work. For more information, see [Supported display modes](#).
- The output settings (such as **Size and transformations** and **Image appearance**) for your encoder have no effect and are disabled.
- If capture isn't working on your encoder, the source video plays on your monitor.
- No analog video signal is received, so there's no video output on the **VGA** connector (analog video output).



## 6 Your encoder in confidence preview

Confidence preview is the default output method for an encoder. When confidence preview is enabled, your encoder receives the video signal, just like a monitor would. Use confidence preview if no monitor is connected to your encoder. Use confidence preview to view the effects of transformations configured through the output settings of your encoder.

In confidence preview, your encoder shows the video received by the source, not the decoded stream. The transformations are done directly to the display mode received from the source, which may be different from the display mode of the encoded stream. For more information, see [The display mode of your stream or recording](#).

### 6.1 Enabling confidence preview

By default, your encoder is configured to **Use confidence preview**. To make sure **Use confidence preview** is enabled, access your encoder **Control** settings (see [Enabling features](#)). Select the **Output** tab, then enable **Use confidence preview**.

### 6.2 Using confidence preview

No monitor needs to be connected to your encoder. The source detects the EDID of the encoder and uses the encoder's preferred display mode of 1920×1080 @ 60Hz.

In confidence preview, the output settings (such as **Size and transformations** and **Image appearance**) are used to output the video. Use these output settings to output to a DVI or HDMI digital monitor connected to the **HDMI Out** connector of your encoder and to an analog monitor connected to the **VGA** connector.

When using confidence preview:

- The source uses the EDID of the encoder to determine which display mode to use. The preferred display mode of the encoder is 1920×1080 @ 60Hz.
- The output settings (such as **Size and transformation** and **Image appearance**) are used to output the video to the monitors connected to your encoder.
- Your encoder can output to a DVI or HDMI digital monitor connected to the **HDMI Out** connector, to an analog monitor connected to the **VGA** connector, or to both.
- Your encoder outputs the same display mode to both the **HDMI Out** and **VGA** connector.
- The encoder can force a display mode, or it can use the EDID of the monitor detected to determine which display mode to use.

## 6.2.1 Using force display mode

The **Force display mode** option of your encoder affects the display mode your encoder uses to output to its monitor.

If **Force display mode** is enabled, your encoder uses the selected display mode to output the video signal. For more information, see [Supported display modes](#).

If **Force display mode** is disabled, your encoder uses the EDID of the monitor detected to determine which display mode to use.

- If a DVI or HDMI monitor is connected to the **HDMI Out** connector of your encoder, the encoder uses the EDID of that monitor to output.

To determine the best display mode to use, each monitor has a preferred display mode defined in its EDID. If your unit supports that display mode, both the unit and the monitor use that mode. If the unit doesn't support that display mode, the unit selects a display mode that both devices support. For more information, see your monitor documentation or contact your monitor manufacturer.

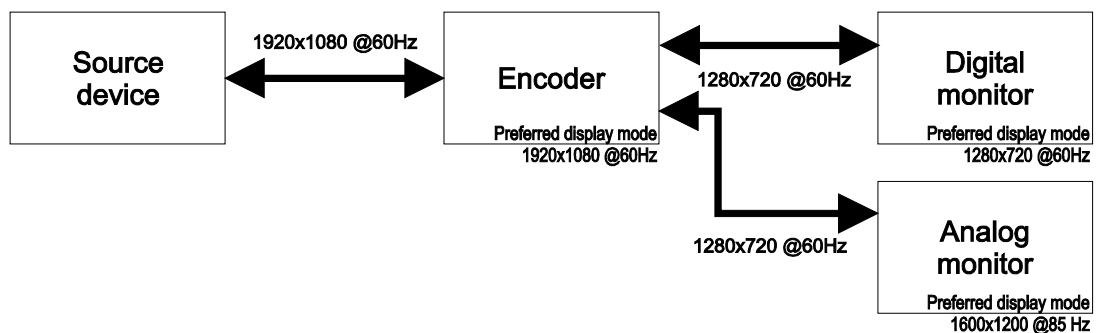


Figure 1: Confidence preview with a digital monitor and 'Force display mode' disabled

- If no monitor is connected to the **HDMI Out** connector, or if **Video output type** is set to **VGA**, the encoder uses its preferred display mode of 1920×1080 @ 60Hz.

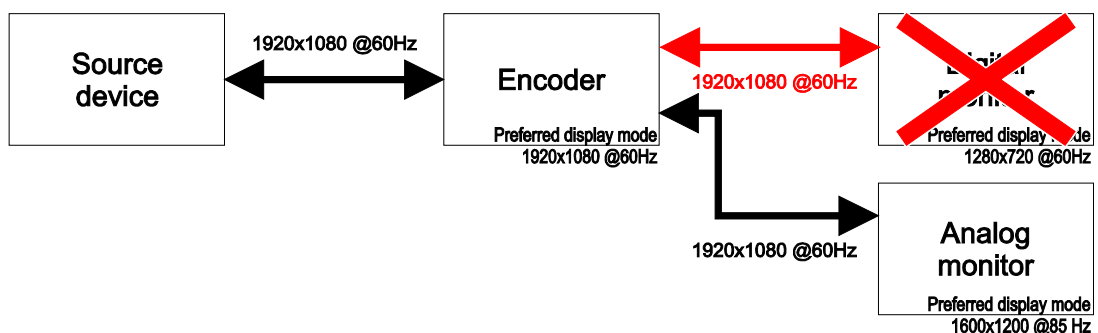


Figure 2: Confidence preview with no digital monitor and 'Force display mode' disabled

If your analog monitor doesn't support 1920×1080 @ 60Hz, we recommend you enable **Force a display mode** and select a display mode your analog monitor supports.

## 6.2.2 Display modes in confidence preview: source vs. output

In confidence preview, the encoder may output a display resolution smaller than the one received from the source. This difference requires scaling of the original source video to fit the display mode used at output. This is the first scaling transformation that can occur to a video source. The second involves the PowerStream **Scaling** option (see [Scaling](#)).

If the source display mode is smaller than or equal to the output display mode, the encoder doesn't scale the video, but black borders may appear around the video. PowerStream may scale the video to fit the output display mode (see [Scaling](#)).

**Note:** Your monitor may scale the video regardless of the PowerStream settings selected. For more information, see your monitor documentation.

## 7 The display mode of your stream or recording

When the encoder captures the source, it uses the source display mode. You may want use a different display mode to stream (or record) the video such as to lower bandwidth during transmission.

The following PowerStream options can affect the display mode of your stream or recording:

- **Capture > Frame rate** – Reduces the frame rate of the video.
- **Encoding > Use specific video size** – Encodes the video with a different resolution. If the video size specified is different than the source resolution, the source video is scaled to fit the video size.

For more information, see [Enabling features](#).

## 8 Your decoder

Your decoder has a single output method. It's equivalent to the confidence preview option for your encoder.

Your decoder follows these guidelines:

- It uses the display mode of the video stream received by an encoder.
- The display resolution of the video stream can be reduced by using the **Crop video** option in PowerStream. For more information, see [Enabling features](#).
- The output settings (such as **Size and transformation** and **Image appearance**) are used to send the video signal to the monitor connected to the decoder.
- It can force a display mode, or it can use the EDID of the monitor detected to determine which display mode to use.

### 8.1 Using the 'Force display mode' option

Enabling or disabling the **Force display mode** option affects the display mode your decoder uses to output to the monitor.

- If **Force display mode** is enabled, your decoder uses the selected display mode to output the video signal. For more information, see [Supported display modes](#).
- If **Force display mode** is disabled, your decoder uses the EDID of the DVI or HDMI digital monitor connected to its **HDMI** connector to determine which display mode to use to output the video signal.

To determine the best display mode to use, each monitor has a preferred display mode defined in its EDID. If your unit supports that display mode, both the unit and the monitor use that mode. If the unit doesn't support that display mode, the unit selects a display mode that both devices support. For more information, see your monitor documentation or contact your monitor manufacturer.

## 9 Scaling

PowerStream enables you to select the proper **Scaling** option for the **Local output** setting of your encoders (in confidence preview) and decoders. This option defines how your unit shows the video when the video resolution doesn't match the output resolution (or resolution of the display mode).

### 9.1 Scaling options

The scaling options for the local output of your Maeve units are:

- **Center in display** – If the video resolution is smaller than the output resolution, the video is centered in the monitor and has a black border around the video. For example, if the video resolution is 1280×1024 and the output resolution is 1920×1080, the video is a 1280×1024 image, centered, with a black border around the video to fit a 1920×1080 output.

If the video resolution is larger than the output resolution, the video is scaled to fit the output resolution while keeping the aspect ratio of the video. For example, if the video resolution is 1920×1080 and the output resolution is 1600×1200, the video is scaled to 1600×900, centered, with a black border around the video to fit a 1600×1200 output.

- **Stretch to display** – If your video resolution doesn't match the output resolution, the video is stretched or downscaled to fit the entire screen without a black border (the aspect ratio isn't preserved). There may be loss of image quality due to scaling.
- **Fit in display** – If the video resolution is less than the output resolution, the video is scaled, preserving the video aspect ratio. Black borders on the top or sides of the video may appear if the aspect ratios of the video and monitor don't match. For example, if the video resolution is 1360×768 and the output resolution is 1600×1200, the video is scaled horizontally and vertically to fit the output resolution, without distorting the image.

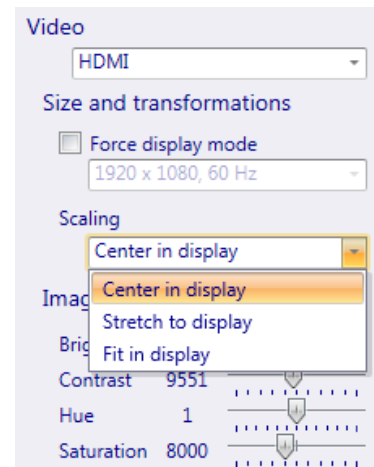


Figure 3: Scaling options



Figure 4: Results of scaling options

## 10 Supported display modes

	At encoder input <sup>1</sup> (HDMI IN)	On output with 'Force display mode' enabled	
		On encoder	On decoder
<b>1920×1200@60Hz</b>	✓	✓	✓
<b>1920×1080@60Hz</b>	✓	✓	✓
<b>1680×1050@60Hz</b>	✓	✓	✓
<b>1600×1200@60Hz</b>	✓	✓	✓
<b>1600×900@60Hz</b>	✓	✓	✓
<b>1440×900@60Hz</b>	✓	✓	✓
<b>1400×1050@60Hz</b>	✓	✓	✓
<b>1366×768@60Hz</b>	Not supported	✓	✓
<b>1360×768@60Hz</b>	✓	✓	✓
<b>1280×1024@60Hz</b>	✓	✓	✓
<b>1280×960@60Hz</b>	✓	✓	✓
<b>1280×768@60Hz</b>	Not supported	✓	✓
<b>1280×720@60Hz</b>	✓ <sup>2</sup>	✓	✓
<b>1280×720@50Hz</b>	✓ <sup>2</sup>	✓	✓
<b>1024×768@60Hz</b>	✓	✓	✓
<b>852×480@60Hz</b>	Not supported	✓	✓
<b>848×480@60Hz</b>	Not supported	✓	✓
<b>800×600@60Hz</b>	✓	✓	✓
<b>720×576@50Hz</b>	✓ <sup>2</sup>	✓	✓
<b>720×480@60Hz</b>	✓ <sup>2</sup>	✓	✓
<b>640×480@60Hz</b>	✓	✓	✓
<b>1080p50</b>	✓ <sup>2</sup>	✓	✓
<b>1080i60</b>	✓ <sup>2</sup>	Not supported	Not supported
<b>1080i50</b>	✓ <sup>2</sup>	Not supported	Not supported
<b>1080p30</b>	✓ <sup>2</sup>	✓	✓

For additional display mode support, contact Matrox Technical Support.

<sup>1</sup> While using the PowerStream **Use pass through** option for your encoder, your source may use an unsupported display mode. The encoder must support the display mode used by the source for capture, encoding, streaming, or recording to work.

<sup>2</sup> This display mode is supported in the extension block of the EDID. For more information on the HDMI resolutions supported by your output devices, see your output device documentation or contact your output device manufacturer.

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**Appendix A: Change Log**

<b>Rev</b>	<b>Date</b>	<b>Description</b>
1.00	August 26, 2014	Initial release.
1.01	September 12, 2014	Removal of NDA, confidential and add bold to 5.2, bullet one, last line. Added revision to title page.