

# **Matrox Monarch HDX**

User Guide

January 15, 2019

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Digital Video Solutions

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## Your notes

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# Your notes

# 1

## Introduction

This chapter lists the Monarch HDX supported input formats, system requirements, and describes the Monarch HDX documentation.

## Welcome to Matrox Monarch HDX

The Matrox Monarch HDX is a simple and versatile video encoding appliance specifically designed for broadcasters and webcasters who need a flexible solution that is powerful enough to take on today's demanding video delivery workflows.

Monarch HDX offers 3G-SDI and HDMI inputs with frame-synchronization to correct any discontinuity at the input, and two independent H.264 encoders that can be assigned to individual tasks. By providing two encoders in a single device, Monarch HDX can tackle any job; from streaming to two different locations, to recording a proxy quality file while simultaneously recording master quality version for post-event editing, to using one encoder for streaming while the other records at higher quality for VOD downloads.

Whether used as a live streaming encoder or video recorder, the Monarch HDX can integrate seamlessly into virtually any SD and HD installation.

## Supported input formats

Matrox Monarch HDX supports the following video input formats:

- 1920 × 1080p at 23.98/24/25/29.97/30/50/59.94/60 fps
- 1920 × 1080i at 25/29.97 fps
- 1280 × 720p at 50/59.94/60 fps
- 720 × 576i at 25 fps (SDI only)
- 720 × 486i at 29.97 fps (SDI only)

## Supported operating systems

The Matrox Monarch HDX Utils application is used to perform firmware updates and acquire the device network IP address when connected to a network with a DHCP server. The application supports the following operating systems:

- Mac OS X El Capitan
- Microsoft Windows 10



**Note** You must have Microsoft .NET Framework installed. This release was tested with the latest version: <http://www.microsoft.com/en-ca/download/>

Other operating systems may work but have not been fully validated through internal testing. Before trying another operating system, please contact [MonarchHDXSupport@matrox.com](mailto:MonarchHDXSupport@matrox.com) with any questions.

## Supported Web browsers

Matrox Monarch HDX has been tested for use with the following Web browsers:

- Microsoft Internet Explorer
- Apple Safari

Other browsers may work but have not been fully validated through internal testing.



**Note** If you experience display issues in the Command Center when using Monarch HDX with Internet Explorer (11 or higher), disable Compatibility View and set the Document mode to Edge:

- 8 From Internet Explorer, go to **Tools > Compatibility View Settings**, clear **Display intranet sites in Compatibility View**, and then click **Close**.
- 9 Press **F12** to open the developer tools interface, select **Edge (default)** from the document mode drop-down menu, and then press **F12** to close the tools.

The Command Center should now display properly.

## Streaming

Monarch HDX provides streaming settings for using RTSP and RTMP streaming protocols for use on media servers, video players and Content Delivery Networks (CDNs).

## Recording

Monarch HDX provides settings for recording your input source for video on demand (VOD), high-quality editing, and archiving/previewing purposes.

## About this guide

This guide provides you with information about connecting and using your Matrox Monarch HDX device.

### Style conventions

The following style conventions are used in this guide:

- The names of files, folders, and documents appear in *italics*. For example:
  - The data is stored in the *Sample.mov* file.
  - The file is located in the *Clips* folder.
  - Please refer to your *Matrox Monarch HDX Release Notes*.
- Menus and commands that you need to choose are displayed in the form **Menu > Command**. For example, **File > Save** means click **File** in the menu bar, and then click **Save** in the menu that appears.

## Your notes

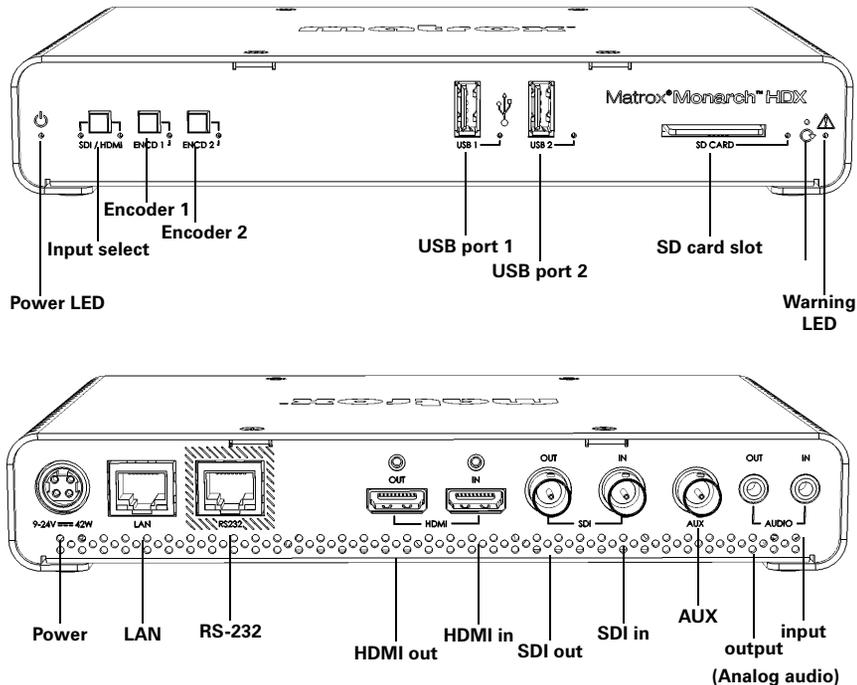
# 2

## **Matrox Monarch HDX Hardware and Connections**

This chapter describes the Matrox Monarch HDX connections (video/audio, LAN, and recording), buttons, status LEDs, and shows how to power and reset Monarch HDX.

## Matrox Monarch HDX hardware

This section explains the Matrox Monarch HDX hardware components. For hardware technical specifications, see [Appendix D, “Matrox Monarch LCS Specifications.”](#)



### Input select button (SDI/HDMI)

With the **Input select** button, you can select from either an HDMI or SDI input source, and an LED illuminates indicating which source is in use. You can also select the input source in the Command Center.



**Important** While streaming or recording, any attempt to switch between inputs by pressing the **Input select** button will not have any effect, whether or not the front panel buttons have been disabled. This is the case only for the **Input select** button; however, selecting **Disable front panel buttons on this Monarch HDX device** under the **Control** tab of the **Device** page disables all three buttons.

## Encoder buttons (ENCD 1 and ENCD 2)

The encoder buttons' functionality depends on the encoding mode you have selected for each encoder in the Command Center. Press the selected encoder's button to start streaming or recording your input source to the media or location specified in the Command Center.

Pressing the selected encoder's button starts the streaming or recording for that Monarch device only. When streaming or recording, the selected channel encoder's LED flashes. Press the selected encoder's button again to stop streaming/recording.

You can also use the control buttons in the Command Center to control the Monarch HDX device. If your Monarch HDX is set to control multiple Monarch HDX devices, you **must** use the Command Center control buttons. For more information, see [“Using the Command Center side menu”](#) on page 24.



**Note** An encoder button activates when you release the button. If you want to start/stop streaming and/or recording on both encoders at the same time, press and hold the encoder buttons and then release them at the same time. You can also start/stop both encoders at once in the Command Center (see [“Command Center control buttons”](#) on page 26).

Encoder button use differs depending on whether you are recording, or the stream mode you selected in the Command Center:

- **RTSP mode** If Monarch HDX is set to stream in RTSP mode, the encoder's LED will be on (solid). The unit delivers stream data once the encoder button is pressed, and then the selected encoder channel's LED flashes, but the data will only start to stream when a client connects to Monarch HDX using the RTSP streaming protocol. Pressing the encoder button enables a connection to the Monarch device, and pressing it again will sever the connection and the LED will return to the solid lit state.
- **RTMP mode** If Monarch HDX is set to stream in RTMP mode, press the selected encoder's button to begin streaming your input source to the stream destination specified in the stream settings. Pressing the encoder's button starts the stream for that device only.
- **Record mode** If the Monarch HDX is set to record, press the selected encoder's button to begin recording your input source to either an SD card, a USB device, or a network folder, as specified in the record settings. Pressing the encoder's button starts or stops the recording for that device only.

For information on specifying your settings, see [“Encoder Settings”](#) on page 33.

## USB ports 1 and 2

Use the USB ports to connect a USB 2.0 or 3.0 media device for recording the source connected to one of the Monarch HDX inputs. To select USB port 1 or 2 as the recording destination, see [“Encoder Settings”](#) on page 33.

Please note the following about using USB devices:

- Monarch HDX writes to all USB devices (including USB 3.0 devices) at USB 2.0 speeds.
- The performance of USB keys or “thumb drives” varies. Many of these devices are optimized for “read” operations, while the Monarch HDX requires sustained “write” capabilities. For best results, especially at higher recording data rates, powered USB drives are recommended. In some cases, SD cards may be more suitable when small portable media is required.
- Monarch HDX supports USB devices with FAT32 or NTFS file systems. Media may need to be reformatted if not recognized by the Monarch.
- USB devices with password protection are not supported.
- It may take a few seconds for Monarch HDX to detect a newly connected USB device (verified on the **Status** page—see [“Status page”](#) on page 26).
- For USB 3.0 hard drives without a dedicated power supply, Monarch HDX may not be able to sufficiently power more than one USB 3.0 drive at a time.
- When a recording is stopped, it may take a few moments for Monarch HDX to finalize the file, during which the USB LED continues to flash. To avoid corrupted video files, do not remove the USB device when its LED is flashing.
- Connecting a USB device to USB port 2 and then performing a device reboot allows you to save the Monarch’s current IP address and status as a text file (see [“Device reboot”](#) on page 13).
- Connecting a USB device to USB port 2 and then performing a factory reset allows you to load pre-configured Monarch settings (see [“Automatic Configuration”](#) on page 46).

## SD card

Use the SD card slot for recording the source connected to one of the Monarch HDX inputs to an SD card. Monarch HDX supports SD and SDHC cards with FAT32 or NTFS file systems. To ensure that your SD card is fast enough to record at higher bit rates, we recommend using an SD card with a Class 10 speed rating. To select the SD card slot as the recording destination, see [“Encoder Settings”](#) on page 33.

### Remarks

- It may take a few seconds for Monarch HDX to detect a newly inserted SD card.

- When a recording is stopped, the SD card LED continues to flash while the Monarch HDX finalizes the file. It is recommended to not remove the SD card when its LED is flashing.
- SD cards with password protection are not supported.

## LAN

The LAN port is an auto-sensing 10/100/1000 Base-T Ethernet port used to connect Monarch HDX to an Ethernet network via a standard RJ-45 Ethernet cable. For information on how to connect to a network, see [Chapter 3, “Network Connection and Setup](#).

## RS-232

The RS-232 port is currently for internal use only.

## Video/audio inputs and outputs

Matrox Monarch HDX supports both SD (SDI only) and HD video signals, and auto-detects input source information; however, it does not support upscaling the input source for streaming or recording.



**Note** If you apply the encoder settings before the input is connected, and the actual input resolution or frame rate is smaller than the resolution or frame rate you specified in the encoder settings, the Monarch will stream/record at the input resolution/frame rate since upscaling is not supported. However, the **Status** page will display the previously selected encoding resolution/frame rate, and not the actual input resolution/frame rate.

### HDMI out

Provides a preview of the selected SDI or HDMI input. For audio, you have the following options:

- Use the first pair of embedded HDMI audio channels.
- Use the first pair of embedded SDI audio channels.
- Use the analog pair.

For more information, see [“Audio Input Settings”](#) on page 31.

To display your input source, your monitor must support the input resolution. If your monitor does not, an error message will appear. For supported resolutions, see [“HDMI in](#) and [“SDI in](#).



**Note** While SD resolutions are not supported at the HDMI output, if the SDI input is SD, the HDMI output will display a “windowboxed” version of the picture in HD.

## HDMI in

Provides an input for HD HDMI video (YUV or RGB) from a digital HDMI device for streaming and recording. For information on supported HDMI input formats, see [“Supported input formats”](#) on page 2.

Monarch HDX supports the first two channels of uncompressed embedded audio from the HDMI input source for streaming and recording. HDCP and SD sources are not supported on this input. You can monitor the HDMI input source by connecting an HDMI monitor to Monarch HDX's HDMI output. To select whether to stream and record the first two audio channels present in the HDMI input or the audio connected to the Monarch HDX analog audio input, see [“Audio Input Settings”](#) on page 31.

## SDI out

Provides a preview of the selected SDI or HDMI input. For audio, you have the following options:

- Use the first pair of embedded HDMI audio channels.
- Use the 16 SDI audio channels.
- Use the analog pair.



**Note** For more information, see [“Audio Input Settings”](#) on page 31.

To monitor your input source, the SDI monitor must support the video input format.

## SDI in

Provides an input for SDI video (YUV only) from an SDI device for streaming and recording. For information on supported SDI input formats, see [“Supported input formats”](#) on page 2.

Monarch HDX supports the first two channels of uncompressed embedded audio from the SDI input source for streaming and recording. You can monitor the SDI input source by connecting an SDI monitor to Monarch HDX's SDI output. To select whether to stream and record the first two audio channels present in the SDI input or the audio connected to the Monarch HDX analog audio input, see [“Audio Input Settings”](#) on page 31.

## AUX

The AUX connector is currently for internal use only.

## Analog audio output

Provides an unbalanced stereo analog audio output for monitoring the audio selected as the audio input source. The analog audio output will always be in sync with the HDMI video output when coming from embedded SDI or HDMI inputs or analog input as long as this analog signal is already in sync with the selected video input.



**Note** The analog audio output syncs best with the SDI video output. SDI and HDMI video signals may be slightly out of sync from each other; however, their respective embedded audio signals will be in sync with their respective video.

### Analog audio input

Allows you to input an unbalanced stereo analog audio source for streaming and recording. To select whether to stream and record the first two audio channels present in the selected video input or the audio connected to the Monarch HDX analog audio input, see [“Audio Input Settings”](#) on page 31.

### Powering Monarch HDX

Power the Monarch HDX device using an AC outlet via the external power supply and a power cord. When power is supplied to Monarch HDX, the Power (⏻) LED goes on, and the device begins a power-up sequence during which various LEDs will flash on and off. The Warning LED (⚠) will begin to flash early during the boot up sequence, and once it stops flashing, the Monarch HDX is ready for use.

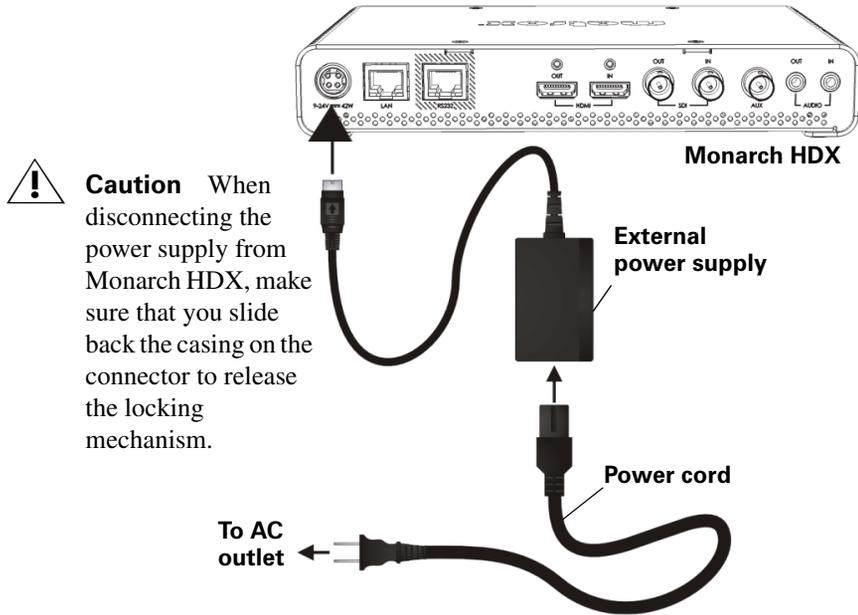


**Note** The Warning LED (⚠) may remain on if there is an error condition (see [“Status page”](#) on page 26 for more information).

To power off Monarch HDX, disconnect Monarch HDX from the power source. For power specifications, see [Appendix D, “Matrox Monarch LCS Specifications”](#).



**Note** When the device is powered off, all current settings are maintained and any logged errors are cleared (see [“Monarch HDX errors”](#) on page 28).



## Using the Reset button

You can use the Monarch's Reset button to reboot the device (quick button press), or reset the device to factory defaults (long press of at least five seconds).

In addition to the typical reasons for rebooting the Monarch (fixing errors or other issues), a reboot (see [“Device reboot”](#) on page 13) also saves the Monarch's IP address and status (see [“Status page”](#) on page 26) to a connected USB device (USB port 2) as a text file. This is a convenient way to find the Monarch's IP address.

A reset allows you to switch to a Static IP (see [“Switch to Static IP mode”](#) on page 13), or load pre-configured Monarch settings from a configuration file on a USB device connected to USB port 2 (see [“Automatic Configuration”](#) on page 48).

### Remarks

- The Reset button is recessed in order to prevent unintended activation. Use a straightened paper clip, or similar device, to press the Reset button.
- A power cycle of the Monarch HDX performs a simple reboot, not a reset to factory defaults.

- When using the Reset button, any saved profiles for streaming and recording are maintained, and all logged errors are cleared (see “[Monarch HDX errors](#)” on page 28).
- Holding the Reset button pressed for more than five seconds will reset the device to factory defaults.

### Device reboot

When performing a device reboot, all current settings are maintained, including the IP mode (DHCP or Static) that was set prior to the reboot.



**Note** To reboot the device and switch to Static IP mode, see “[Switch to Static IP mode](#)” on page 13”.

If you have a USB device connected to USB port 2 on the Monarch device, the Monarch’s current IP address and status is saved to the USB device as a text file. This is a convenient way to find the Monarch’s IP address.

To reboot the Monarch, do one of the following:

- Using a paper clip, press the recessed pinhole Reset button on the front of the device.
- Open the Matrox Monarch HDX Utils application, select the Monarch HDX device you wish to reboot, and then click **Reboot Selected**.

During a standard boot up sequence, various LEDs will flash on and off. The Warning (  ) LED will begin to flash early during the boot up sequence, and once it stops flashing, the Monarch HDX is ready for use.

### Switch to Static IP mode

You can switch your Monarch HDX device to Static IP mode by pressing the **ENCD 2** button while the Encoder 2 LED flashes during the power-up sequence.

- 1 Press the Reset button on the device to initiate a device reboot. During the power-up sequence (see “[Powering Monarch HDX](#)” on page 11, the Encoder 2 LED flashes for three seconds.
- 2 Press the **ENCD 2** button on the device while the Encoder 2 LED is flashing. This sets the device to Static IP mode and the Static IP address to its default address (169.254.1.11).

The device is ready when the Warning (  ) LED stops flashing; however, the Warning LED (  ) may remain on if there is an error condition (see “[Status page](#)” on page 26 for more information).

### Reset to factory defaults

When resetting Monarch HDX using this method, all Monarch HDX settings reset to factory defaults, the device password resets to *admin*, and the device powers up in DHCP IP mode for connecting to a network with a DHCP server,

such as a router. To switch the device to Static IP mode after performing a factory reset, see [“Switch to Static IP mode”](#) on page 13.

You can also use a factory reset to load pre-configured Monarch HDX settings from a configuration file. For more information, see [“Automatic Configuration”](#) on page 48).

To reset Monarch HDX to factory defaults, press and hold the Reset button on the device for at least five seconds. The device begins a power-up sequence during which various LEDs will flash on and off. The Warning () LED will begin to flash early during the boot up sequence, and once it stops flashing, the Monarch HDX is ready for use.

The Warning LED () may remain on if there is an error condition (see [“Status page”](#) on page 26 for more information).

## Status LEDs

This section explains the Monarch HDX status LEDs.

LED	State	Condition
	Green	Device is powered.
	Yellow	Indicates that an error has occurred. This includes streaming, recording, fan or temperature-related errors, and/or a physical disconnection of the network cable. The LED turns off when the error is cleared in the Command Center (e.g. streaming error) and/or when the error has been resolved (e.g. temperature-related error). For information on how to view and clear errors, see <a href="#">“Monarch HDX errors”</a> on page 28.
SDI/HDMI	Green	Indicates which input is in use (HDMI or SDI).
ENCODER 1/2	OFF	Indicates that the encoder is not in use.
	Blue (solid)	Indicates that the channel is in streaming mode and ready to stream. The LED will return to solid blue when the streaming is stopped.
	Blue (flash)	The LED switches from solid to flashing blue when you start the streaming process, and will revert to solid blue when you stop it. The behavior is the same for RTMP and RTSP.
	Blue (flashing fast)	The channel is trying to (automatically) reconnect to a media server.
	Red (solid)	Indicates that the channel is ready to start recording.
	Red (flash)	Indicates that the channel is recording. The LED will toggle between the two states (flashing and solid red) when the recording operation is turned on or off.
USB ports 1/2 and SD CARD	OFF	Indicates that the port/slot is not selected and/or that neither encoder is in Record mode.
	Red (solid)	Indicates that the port/slot has been selected and that an encoder is in Record mode.
	Red (flash)	Monarch HDX is currently writing to the media device (USB device or SD card). Do not remove the media device when its LED is flashing. Doing so may result in corrupted video files.

## Your notes

# 3

## **Network Connection and Setup**

This chapter explains how to connect Monarch HDX to a network, and how to obtain the Monarch HDX IP address to access the Monarch HDX Command Center. It also explains how to update the Monarch HDX firmware.

## Introduction

The network connection and setup instructions depend on whether you'll be connecting Monarch HDX on a network with a DHCP server, such as through a router, or a network without a DHCP server.

If connecting to a network with a DHCP server, Monarch HDX must be set to DHCP IP mode. If your network does not have a DHCP server, Monarch HDX must be set to Static IP mode. By default, Monarch HDX is set to DHCP IP mode. Once connected to a network, the stream and record settings are specified using the Monarch HDX Command Center.

To access the Command Center, enter the Monarch's IP address into your web browser and press **ENTER**, or use the Monarch HDX Utils application. On a DHCP-enabled network, the DHCP server assigns the IP address to the Monarch, so you must use the Monarch HDX Utils application to find the IP address. When connecting to a network without a DHCP server, you must assign a static IP address to Monarch. A default IP address is provided when in Static IP mode.

## Monarch HDX Utils application

The Monarch HDX Utils application is available for both Mac OS and Windows systems, and you can use it to do the following:

- Identify Monarch devices on a network and list their IP addresses.
- Open the Monarch HDX web based UI (Command Center) by double-clicking an identified device on the displayed list.
- Update Monarch HDX firmware (see [“Updating the Monarch HDX firmware”](#) on page 22).
- Reboot Monarch HDX devices (see [“Device reboot”](#) on page 13).



**Important** It is not recommended to simultaneously update the same Monarch HDX device using more than one instance of the Monarch HDX Utils. Do not sever the network connection during the update process.

## Network connection and IP address

This section explains how to connect Monarch HDX to a network with or without a DHCP server, and describes how to acquire the Monarch HDX IP address.



**Note** If you switch the network connection while Monarch HDX is powered and the switch results in Monarch HDX getting a new network IP address, you must power cycle the device to apply the new IP address. To power cycle the device, use the Reset button on the Monarch HDX device (see [“Using the Reset button”](#) on page 12).

## Finding the Monarch HDX's current IP address

You must know your Monarch device's IP address to access the Command Center. There are three ways to find the Monarch HDX's current IP address:

- You can see it displayed on an HDMI monitor at device boot up.
- You can have it automatically saved to a connected USB device when rebooting the Monarch HDX.
- Use the Monarch HDX Utils application to view all connected Monarch HDXs and their IP addresses.

### Displaying the IP address on an HDMI monitor

The Monarch HDX's IP address is displayed on a connected HDMI monitor at device boot up:

- 1 Connect the Monarch HDX to an HDMI monitor.
- 2 Power up the Monarch HDX.

When the Monarch HDX boots up, the IP address appears on the screen for approximately 30 seconds before being replaced by the selected input signal.

### Saving the IP address and status to USB

You can save a file containing the Monarch HDX's IP address and current status to a USB device, making this information easily accessible (see [“Status page”](#) on page 26).

- 1 Insert a formatted USB device into the USB port 2 (see [“USB ports 1 and 2”](#) on page 8).
- 2 Reboot your Monarch HDX. It is complete once the Warning () LED stops flashing (see [“Device reboot”](#) on page 13).

The Monarch HDX IP address and status information are now saved to a text file on the USB device.

This file can be helpful if you do not have an HDMI monitor (see [“Finding the Monarch HDX's current IP address”](#) on page 19), or if you need to share status information for your unit.

### Finding the IP address with Monarch HDX Utils

The Monarch HDX Utils application will indicate the IP addresses of the Monarch devices in your network. See [“Connecting to a network with a DHCP server \(DHCP IP mode\)”](#) for details.

## Connecting to a network with a DHCP server (DHCP IP mode)

When connecting to a network with a DHCP server, such as through a router, the Monarch HDX IP address is assigned by the DHCP server. Although other methods exist for obtaining the IP address of a device on a DHCP server, such as from a DHCP-server client list, these instructions detail how to use the Matrox Monarch HDX Utils to find the IP address of your Monarch HDX device.

- 1 Connect an Ethernet cable between Monarch HDX's LAN port and a network port.
- 2 Make sure that power is supplied to Monarch HDX (see “[Powering Monarch HDX](#)” on page 11).
- 3 Monarch HDX must be set to DHCP IP mode (default). If you need to switch the device from Static IP mode to DHCP IP mode, you can either reset the device to factory defaults (see “[Reset to factory defaults](#)” on page 13), or set it to DHCP using the Command Center (see “[IP Setup tab](#)” on page 55).
- 4 From a computer that is on the same network subnet as your Monarch HDX device, download the Matrox Monarch HDX Utils application at [www.matrox.com/video/support/](http://www.matrox.com/video/support/).

Matrox Monarch HDX Utils is available for both Mac OS and Windows systems (see “[Monarch HDX Utils application](#)” on page 18).

- 5 Double-click the downloaded file to open the Monarch HDX Utils. If Universal Plug and Play (UPnP) is enabled on your network, the utility will automatically scan for Monarch devices. To scan manually, click the **Find All** button.

All the Monarchs on the same network subnet as your computer will be displayed, along with their IP addresses and other information.

- 6 Open the Command Center (see “[Accessing the Command Center](#)” on page 22).



**Tip** If you have multiple Monarch HDX devices, you may want to change the name of each device for easier identification (see “[Account tab](#)” on page 52).

## Connecting to a network without a DHCP server (Static IP mode)

When connecting to a network without a DHCP server, the network does not assign an IP address to your Monarch HDX device. In this case, you must assign a static IP address to Monarch HDX and you may be required to change your computer's network configuration to establish a connection between your computer and Monarch HDX.

- 1 Power Monarch HDX (see [“Powering Monarch HDX”](#) on page 11).
- 2 Monarch HDX must be set to Static IP mode. By default, Monarch HDX is set to DHCP IP mode. You can switch Monarch HDX to Static IP mode using the Reset button (see [“Switch to Static IP mode”](#) on page 13).
- 3 Establish a connection between Monarch HDX and your computer using one of the following methods:
  - Connect an Ethernet cable from Monarch HDX’s LAN port directly to your computer’s Ethernet port.
  - Connect an Ethernet cable from Monarch HDX’s LAN port to the same network switch as your computer.
- 4 In order for your computer to communicate with Monarch HDX, your computer’s IP address must be in the same network range as your Monarch HDX’s IP address. If it isn’t, then you must change your computer’s IP address accordingly. By default, the Monarch HDX static IP address is set to 169.254.1.11. If you’re using the default static IP address, you must change your computer’s IP address and subnet mask to the following:
  - **IP address** 169.254.1.10
  - **Subnet mask** 255.255.0.0



**Note** The default static IP address is designed primarily for the initial setup of Monarch HDX using a point-to-point connection (direct connection between your computer and Monarch HDX). The default IP address is not recommended for a traditional network setting. If you wish to use Monarch HDX in Static IP mode over a network, after the initial setup we recommend that you change the static IP address of the Monarch HDX device to an address that is more suitable to your network. You can change the static IP address in the Command Center as specified in [“IP Setup tab”](#) on page 55.

- 5 Open the Command Center (see [“Accessing the Command Center”](#) on page 22).



**Note** For more details on Monarch HDX IP modes, see [“IP Setup tab”](#) on page 55.

## Accessing the Command Center

The Monarch HDX Command Center is where you specify the Monarch settings and control the streaming and recording for a single Monarch device or multiple devices on the same network. The Command Center is accessible via Monarch HDX Utils (see “[Monarch HDX Utils application](#)” on page 18) or by typing your Monarch HDXs network IP address in the address field of your web browser (see “[Network connection and IP address](#)” on page 18).

To access the Command Center, power the Monarch HDX and connect it to an Ethernet network, and then do one of the following:

- From your web browser, type the Monarch HDX IP address in the address field, and then press **ENTER**.
- With Matrox Monarch HDX Utils open, double-click any of the listed devices to open the Command Center.

The Command Center opens to configure your Monarch HDX settings and control streaming and recording (see [Chapter 4, “Using the Command Center](#)”).

The Command Center opens on the **Status** page, which you can access without logging in (see “[Status page](#)” on page 26). To access other pages, click the menu item for the page that you want, and then enter your username and password. By default, the username and password are set to *admin*. You cannot change the username but you can change the password (see “[Device name and password](#)” on page 52).

## Updating the Monarch HDX firmware

The firmware on your Monarch HDX device is updated using the Matrox Monarch HDX Utils application. To view the current firmware version of your Monarch HDX, see “[File Management tab](#)” on page 60. The Matrox Monarch HDX Utils is available for both Mac OS and Windows systems. For more information on the Utils application, see “[Monarch HDX Utils application](#)” on page 18.

A Monarch HDX device’s network IP address is required to update its firmware (see “[Network connection and IP address](#)” on page 18).

- 1 Power Monarch HDX and connect it to an Ethernet network.
- 2 On a computer that is on the same network subnet as the Monarch HDX that you want to update, download the latest version of Matrox Monarch HDX Utils at [www.matrox.com/video/support/](http://www.matrox.com/video/support/).



**Note** It is not recommended to update the Monarch HDX firmware over a wireless network. Matrox Monarch HDX Utils should be on a computer that is connected to the network/router using a wired Ethernet connection.

- 3 Double-click the *MatroxMonarchHDXUtils.exe* (Windows) or *MatroxMonarchHDXUtils.app* (Mac OS) file to open the Monarch HDX Utils.
- 4 Open the Matrox Monarch HDX Utils, select the network **IP Address** of the Monarch HDX device that you want to update, and then click **Update Selected**. If you have multiple Monarch HDX devices on the network, select the IP address for every device in the Matrox Monarch HDX Utils by clicking **Select All**, and then all Monarch HDX devices will update in series.



**Important** Do not disconnect the Monarch from the network or power source during the firmware update.

During a firmware update, the USB 1, USB 2 and SD card LEDs will cycle on and off. Once complete, the device will automatically reboot, and the Warning (⚠) LED will begin to flash. Once it stops flashing, the device is ready to use.



**Note** The Warning LED (⚠) may remain on if there is an error condition (see “[Status page](#)” on page 26 for more information).

## Installing the Monarch SSL certificate

You can connect to the Monarch Command Center using HTTPS encryption to prevent your username and password from being visible to someone on the network. To connect using the HTTPS protocol, you must first install the Monarch SSL certificate to authenticate the Command Center webpage.



**Note** Before you get the SSL certificate, make sure that your Monarch device is set to the correct time zone for its location, otherwise the certificate will not be valid. For more information, see “[Date and Time tab](#)” on page 54.

- 1 Run the Monarch HDX Utils application.
- 2 Click **Get SSL certificate** and download the certificate to your computer.
- 3 If you are using Mac OS, do the following (for Windows go to step 4):
  - a Open the certificate file *MonarchSSLCertificate.crt*.  
The **Keychain Access** window opens.
  - b Click **Always trust**, enter your Mac OS password, then click **Update Settings**.  
The Monarch certificate now appears in the **Certificates** list.
  - c Right-click the Monarch certificate and select **Get Info**.
  - d Click the **Trust** menu triangle to expand the menu.
  - e From the **When using this certificate** field, select **Always Trust**, enter your Mac OS password, then click **Update Settings**.
- 4 If you are using Windows, do the following:

- a** Double-click the certificate file *MonarchSSLCertificate.crt*.  
The **Certificate** window opens.
- b** Click **Install Certificate...**
- c** In the **Certificate Import Wizard**, click **Next**.
- d** Select **Place all certificates in the following store**, then click **Browse**.
- e** From the list displayed, select **Trusted Root Certification Authorities**, then click **OK**.
- f** Click **Next**, then click **Finish**.  
You will be asked to confirm the installation.
- g** Click **Yes**.

The Monarch certificate is authenticated, and HTTPS encryption is now available when connecting to the Monarch Command Center.

# 4

## Using the Command Center

This chapter describes how to specify settings in the Monarch HDX Command Center, and view Monarch HDX information.

## Introduction

The Monarch HDX Command Center is a web-based application that allows you to configure Monarch HDX settings, and control streaming and recording sessions. You can enter the network IP address of your Monarch HDX device in your browser, or use the Monarch HDX Utils to access the Command Center (see [“Accessing the Command Center”](#) on page 22).

## Command Center control buttons

Each encoder has its own button for starting or stopping sessions. Their appearance changes based on the encoding mode you select for that encoder. The top button is for Encoder 1, and the bottom button is for Encoder 2 (see [“Monarch HDX encoding modes”](#) on page 34).

You can also control the Monarch HDX by using the encoder buttons on the Monarch HDX device. For more information, see [Chapter 2, “Matrox Monarch HDX Hardware and Connections”](#).

The following table details the different states of the control buttons.

	Button	Function
Stream		This button indicates that an encoder is set to stream (but not which streaming mode). Click this button to start streaming the input source. If controlling multiple Monarch HDX devices, those devices set to stream will begin to stream their input sources as well.
		This pulsing button indicates that an encoder is currently streaming. Click this button to stop streaming. If controlling multiple Monarch HDX devices, those devices set to stream will stop streaming as well.
Record		Click this button to start recording the input source. If controlling multiple Monarch HDX devices, those devices will begin to record their input sources as well.
		This pulsing button indicates that an encoder is currently recording its input source. Click this button to stop recording. If controlling multiple Monarch HDX devices, those devices will stop recording their input source as well.
Disabled		Although not a button, this is the placeholder of a disabled encoder’s control button. This is only seen when no encoding mode ( <b>None</b> ) is selected on the <b>Encoder Settings</b> page.

	Button	Function
Link		This button links both encoder buttons. Operating as a single button, pressing it starts or stops the sessions (streaming or recording) of active encoders (one or both).

## Status page

The **Status** page in the Command Center provides a summary of the Monarch HDX status and settings, as well as any logged errors. You can view this page without logging in; however, encoder information will display only when you have logged in.

To access the **Status** page, open the Monarch HDX Command Center (see “[Accessing the Command Center](#)” on page 22), and then click **Status**.



The screenshot shows the Matrox Monarch HDX Command Center interface. The main content area is titled "Status" and displays the following information:

- Device name:** Monarch HDX (TW)
- Control status:** Single Device
- Video input:** No video input
- Audio input:** No audio input
- Temperature status:** Normal Fan status: Normal
- Encoder 1:**
  - Operating mode: RTMP
  - Settings: 1280x720p, 60/50 fps, 10000 kb/s
  - RTSP: rtsp://192.168.66.1/Stream1
  - RTMP:
  - Record media: USB1, no drive present
- Encoder 2:**
  - Operating mode: None
  - Settings: 1280x720p, 60/50 fps, 10000 kb/s
  - RTSP: rtsp://192.168.66.1/Stream1
  - RTMP:
  - Record media: USB1, no drive present
- Preview Stream:** rtsp://192.168.66.1/Preview

Below the status information, there is a "Messages" section with a text area containing "Video input not present" and a "Clear" button.

## Previewing the input

Click **Show preview** to display a real-time preview of what you are streaming or recording. The preview is independent of your primary encoding channels.

**i** **Important** QuickTime 7 must be installed on the connected computer for preview to work (see [www.apple.com](http://www.apple.com) or [www.microsoft.com](http://www.microsoft.com) for download).

The **Show preview** button launches or hides the viewing window. What you see and hear in the viewing window depends on your input source. The preview stream can also be accessed by a third party device using the address on the **Status** page.

**T** **Tip** If you have trouble viewing the preview stream, try setting QuickTime's streaming transport protocol to UDP mode.



**Note** The **Show preview** option is enabled by default, but you can disable it from the **Control** tab on the **Device** page.

### Preview window limitations

To ensure the highest quality delivery of streaming and/or recording processes, the preview may be unavailable when the encoders are set to operate at specific settings. In these cases, the **Show preview** button is still clickable, but only a blank preview display and an error message appears.

The following are the settings at which a preview will not be available:

Encoder 1	Encoder 2
1920 × 1080p, 60/50 fps	<b>None</b>
<b>None</b>	1920 × 1080p, 60/50 fps
Both at 1920 × 1080p, 30/25 fps with one encoder streaming in <b>RTMP</b> mode	
Both encoders in use with at least one encoder at 1280 × 720p, 60/50 fps	

### Monarch HDX errors

The Warning LED illuminates on the Monarch HDX device when an error occurs. Unless you receive a pop-up error when using the buttons in the **Device** page's **Control** tab (see “[Control tab](#)” on page 46), the error will display in the **Messages** section on the **Status** page (see “[Status page](#)” on page 27).



**Note** The **Status** page displays the errors pertaining to that Monarch HDX device only. To monitor device function when controlling multiple devices (see “[Enabling multi-device control](#)” on page 47), we recommend that you open the Command Center for each Monarch HDX device.

When you click the **Clear messages** button on the **Status** page, the logged errors are deleted from the list and the Warning LED will turn off if it is not a fan or temperature-related error (see “[Fan and Temperature errors](#)”).



**Note** An error will not be reported if the audio connected to Monarch HDX's analog audio input is lost or missing. If this occurs, the stream and/or recording continues, but will not contain audio.

### Streaming and recording errors

Streaming and recording errors that don't appear as a pop up error on the **Control** tab are instantly logged in the **Messages** section of the **Status** page. Clicking the **Clear messages** button on the **Status** page deletes the logged error from the list and the Warning LED turns off (see “[Status page](#)” on page 27). The Warning LED will also turn off if you successfully start a new stream and/or recording.



**Note** Powering off or resetting Monarch HDX will clear streaming and recording errors from the device.

### Fan and Temperature errors

The fan is located under the device, and a constant readout of both the fan and the temperature statuses appear above the **Messages** section of the **Status** page. A fan or temperature error will be indicated in this area as well. No fan or temperature-related error message will be shown in the **Messages** section (see “[Status page](#)” on page 27).



**Important** This error won't stop the device; however, we recommend that you address the issue as soon as possible.

The display reads “Normal” for the fan and temperature when the fan is operating without a problem. If a fan and/or temperature error occurs, the status will change to “Faulty” and/or “Critical”. The error status will remain as long as a problem is detected and has not been resolved. The Warning LED will turn off when the condition is corrected, and the **Status** page will automatically update the fan/temperature status back to Normal.

The temperature may come down on its own over time, and so the Warning LED will turn off and the fan and temperature statuses will return to Normal; however, the Warning LED will light up again and the error status will display if/when the temperature rises once more.

The fan operates as an uptake under the device. For good fan operation, ensure that the device is not placed on top of paper, and that it used in an area with adequate air circulation. If a fan or temperature error occurs:

- Check that the fan is spinning and is unobstructed.
- Verify that the area has suitable sufficient ventilation and that the ambient temperature has not risen.

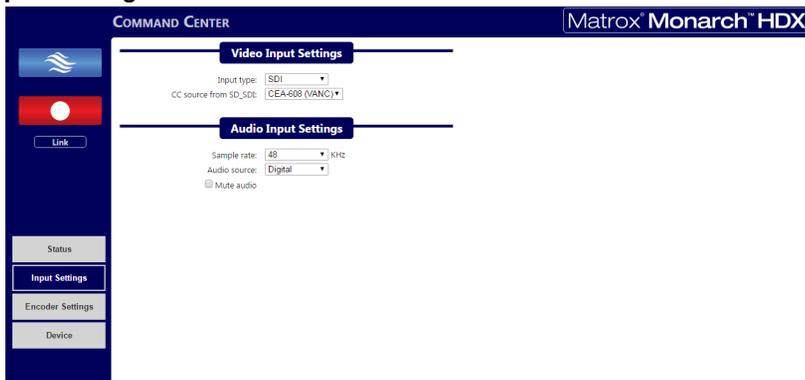
## Input Settings

The **Input Settings** page in the Command Center lets you set the video and audio input sources used for streaming and recording. When controlling multiple devices, each device on the network streams and records the video and audio based on its individual settings.



**Important** To save changes made on the **Input Settings** page, you must click the **Apply** button. If you leave the **Input Settings** page before applying the settings, all changes will be lost.

To access the video and audio settings, open the Monarch HDX Command Center (see “[Accessing the Command Center](#)” on page 22), and then choose **Input Settings**.



### Video Input Settings

Under **Video Input Settings**, you can set the input type (SDI or HDMI), and specify the type of closed captioning metadata (if any) that is present in the source video.

#### Input type

Monarch HDX has two selectable video input settings: **HDMI** and **SDI**.

Inputs for both formats are on the back of the device, and only one can be the source for streaming and recording at a time. You can switch between inputs from the Command Center or by using the control button; however, only after a streaming or recording session has been stopped. If you attempt to switch the inputs while encoding, the encoder will stop, and will have to be restarted to encode from the new input.

#### CC source from SD\_SDI

If your source video contains both **CEA-608 (VANC)** and **EIA-608 (Line 21)** closed captioning information, this setting specifies which type you want the Monarch HDX to encode for output.

Please note the following:

- This setting only specifies which type of closed captioning you want Monarch HDX to encode; it does not **enable** the encoding of closed captioning. To enable closed captioning, you must do so from the **Encoder settings**. For more information, go to [“Include captions”](#) on page 39.
- This setting is only applicable when your input type is **SDI** and your source video is SD quality. This setting has no effect if your input type is **HDMI**.
- This setting is only applicable when your source video includes both types of closed captioning. If your source video contains only one type, Monarch HDX will encode (assuming **Include captions** is selected in the Encoder settings) whichever type of closed captioning the video contains, regardless of what option you select here.

## Audio Input Settings

Under **Audio Input Settings**, you can set the audio sample rate, the source for your audio input, or mute the audio.

### Sample Rate

You can select the desired sample rate for either your digital or analog audio input source.

### Remarks

- Both digital (HDMI or SDI) and analog audio can be sampled, or re-sampled at the embedded rates of 22.05, 24, 32, 44.1 and 48 kHz.
- The analog audio input is converted to the selected sample rate before encoding.
- Selecting the highest sample rate provides the best audio quality, but also increases the total bit rate required to maintain this quality for streaming and/or recording.

For information on audio bit rate, see [“Audio Codec Settings”](#) on page 34.

### Audio Source

You can select either **Analog** or **Digital** (embedded) as the audio input source to be used for streaming/recording.

### Remarks

- Monarch HDX supports two audio channels for streaming and recording, and whether you are using an SDI or HDMI source, only the first two channels are selected by the device for encoding (see [“Video/audio inputs and outputs”](#) on page 9).
- Only two (2) audio channels per input source are available for any source (SDI, HDMI or analog), except when an SDI source is output in SDI—then you can access all 16 channels.

- The embedded audio from an SDI source is only available when SDI video is selected, and the embedded audio from an HDMI source is only available when HDMI video is selected.



**Note** For more information, see [“Video/audio inputs and outputs”](#) on page 9).

- Monarch HDX uses the AAC audio format for streaming and recording. To monitor the selected audio source, you can use any of the audio outputs (SDI, HDMI or analog).

### **Mute audio**

**Mute audio** lets you mute the audio at any time while streaming or recording, without interrupting your session. Selecting **Mute audio** disables all audio.



**Note** You can also choose to not include the audio when streaming or recording from within the encoder settings, before your session begins (see [“Include audio”](#) on page 38).

## Encoder Settings

The **Encoder Settings** page in the Command Center lets you set stream and record settings for the Monarch HDX device. Monarch HDX also lets you save profiles and has several presets that can speed up the start of a project, meaning that you do not have to recall every parameter for repeated encoder settings (see “[Profiles](#) and “[Presets](#)).



**Note** If controlling multiple devices, each device on the network operates on its own stream/record settings (see “[Enabling multi-device control](#)” on page 47).



**Important** To save changes made in the **Encoder Settings** page, you must click the **Apply** button. If you leave the **Encoder Settings** page before applying the settings, all changes will be lost.

To access the stream and record settings, open the Monarch HDX Command Center (see “[Accessing the Command Center](#)” on page 22), and then choose **Encoder Settings**.

## Profiles

Monarch HDX lets you save up to eight profiles that you can load at any time. Profiles apply to both encoders, and contain encoding parameters and destination information detailing where the encoded video and audio is being sent (see “[Status page](#)” on page 27), whether you are recording or streaming.

You can save multiple profiles to the Monarch HDX based on your needs, and saved profiles can be loaded instantly without having to re-enter data. Whether you use preset or custom parameters, you only need to enter them once, and then save them as a unique profile.

## Loading a profile

- 1 From the **Profile** list, select a profile.
- 2 Click **Load**. The loaded profile will appear in the Save field. If a change is then made to any of the settings, the **Save** button will become red, indicating that clicking it will save the new settings over the current profile.

## Saving a profile

- 1 Specify your record or streaming settings.
- 2 From the **Profile** list, select an empty profile, or a previously saved profile that you want to overwrite.
- 3 Type a **Profile name**.
- 4 Click **Save**.

## Audio Codec Settings

Select the bit rate at which you want to stream the audio. This setting applies to both the stream and record settings. Depending on the option you select, this setting has an effect on the **Audio Input Settings**. See [“Audio Input Settings”](#) on page 31 for more information.

## Monarch HDX encoding modes

As the Monarch HDX offers two encoders in a single device, it is a versatile tool that allows a variety of operations, including but not limited to:

- Streaming to two different locations (maximum average video data rate: 20 Mb/s total).
- Recording a proxy quality file, while simultaneously recording master quality version (maximum average video data rate: 30 Mb/s).
- Using one encoder for streaming while the other records at higher quality for VOD downloads.

The Monarch HDX has three encoding modes with their own options and capabilities: Record, RTMP (streaming), and RTSP (streaming).

### Record

**Record** mode saves the source to a USB device, an SD card, or to a network shared folder. Recordings can be done at different bit rates in case you need to deliver content to devices with varying decoding capabilities.

When a recording is stopped, it may take a few seconds for Monarch HDX to finalize the file. If recording to a USB device or SD card, the USB/SD card LED continues to flash during the finalization process. To avoid corrupted video files, do not remove the USB device or SD card when its LED is flashing.

Monarch HDX provides settings for recording your input source for video on demand (VOD), high-quality editing, and archiving/previewing purposes.

Content can be recorded to MOV and MP4 file formats on a FAT32 or NTFS file system.



**Note** If you need to record files exceeding 4 GB, an NTFS drive should be used. For approximate recording file sizes based on the average video data rate and recording duration, and approximate maximum file durations given the average video data rate and available disk space, see [Appendix A, “Recording file size and duration.”](#)

## RTMP and RTSP streaming

There are two types of streaming standards available:

- **RTMP** Real-time Messaging Protocol: A popular protocol for transmitting audio, video, and data with Flash media. You have three different options for RTMP streaming (see [“RTMP streaming options”](#) on page 35).
- **RTSP** Real-time Streaming Protocol: A network control protocol for media servers, controlling media sessions between end points.

Having two separate encoders allows you to stream to two different destinations, or have a higher quality stream sent to a single destination.

Whether streaming in **RTMP** or **RTSP** mode, either encoder can stream up to 10Mb/s, allowing you to simultaneously stream to two destinations, or you can set the device for up to 20Mb/s streaming quality for a single encoding destination; however, to achieve this, you must set the other encoder to **None**.



**Note** The maximum frame rate for streaming in **RTMP** mode is 30 fps when both encoders are in use.

## RTMP streaming options

When RTMP mode is selected, another drop-down exposes three selections:

**Default** Streams with an optimized methodology for communicating with RTMP servers (recommended for most RTMP streaming).

**Legacy** This uses a RTMP streaming protocol identical to those used in older Monarch releases (use this option if you have difficulty using Default with another RTMP protocol).

**Wowza Cloud** RTMP protocol optimized for Wowza Cloud account users.

The **Wowza Cloud** option uses the Wowza token mechanism to establish secure communications through the Wowza streaming cloud. The token is a code used to connect.

Mode: RTMP

Preset: None

Resolution: 720 W 480 H

Frame rate (fps): 30/25 1920x1080, 0 fps

Target Data Rate (kb/s): 5000

Include audio:

**Advanced Settings**

GOP structure: 10 frames

Profile: High

Frame slices: 1

Min Target Data Rate (kb/s): 4500

Max Target Data Rate (kb/s): 5500

Deblocking filter:

**Destination**

Connection Code:

When you select **Wowza Cloud**, a **Connection Code** (Wowza token) field appears under the **Destination** section. You will have to enter all connection information (login, password, stream name, location, URL, etc) in your Wowza Cloud account.

Once you are provided a token, enter the code in the **Connection Code** field. Click **Apply**. Once the Monarch confirms the code, the **Connection Code** field displays the code with “Authenticated” beside it and a **Deactivate** button appears.

Press the **Deactivate** button to clear the code currently being used. Wowza connection codes are valid for only 24 hours.

**Destination**

Connection Code:  Authenticated

If the Monarch is unable to make a connection (e.g. invalid code or lack of a network connection), an error message will display and “Failed” appears beside the **Connection Code** field. If the Wowza code is invalid, a message will also be a message on the **Status** page.

**Destination**

Connection Code:  Failed



**Note** Performing a device reset will also clear the code.

## Presets

Monarch HDX is preloaded with several streaming and recording presets that define all the encoding parameters, including resolution and bit rate. A preset automatically sets all encoder settings. Whether streaming or recording, you can also use a preset as a starting point when specifying your encoder settings:

- Monarch HDX provides standard definition and HQ streaming presets; however, some presets may not be compatible for use with all CDNs. To avoid streaming issues, ensure that a preset's settings, such as video resolution and video data rate, are supported by your CDN.
- Besides standard definition presets, Monarch HDX provides the following recording preset types:
  - **HQ** Used for creating recorded files that will be edited for high-quality production.
  - **Proxy** Suitable for creating recorded files at smaller file sizes. This is especially useful when creating files for previewing or archiving, or when recording long-duration content.

Use a preset by selecting one from the **Preset** list.

## Resolution

You can select the stream/record resolution you want by entering values for the width and height. You can also select **Use input resolution** to stream or record at your input source's original resolution. The Monarch HDX does not support upscaling the resolution or frame rate of the input source (for streaming or recording).



**Note** If you apply the encoder settings before the input is connected, and the actual input resolution is smaller than the resolution you specified in the encoder settings, the Monarch will stream/record at the input resolution since upscaling is not supported. However, the **Status** page will display the previously selected encoding resolution, and not the actual input resolution.

## Frame rate

The **Frame rate** drop-down menu lists the available resolution options, based on your source's frame rate. You can choose to stream or record at your input source's frame rate, or at a lower frame rate. The Monarch HDX does not support upscaling the resolution or frame rate of the input source (for streaming or recording).



**Note** The maximum frame rate for streaming in **RTMP** mode is 30 fps when both encoders are in use.

The following table lists the frame rates (in fps) and their associated Command Center selections:

Source Frame rate	Command Center Selection	Encoded Frame rate
59.94 or 60	<b>60/50</b>	59.94 or 60
	<b>30/25</b>	29.97 or 30
	<b>15/12.5</b>	14.98 or 15
50	<b>60/50</b>	50
	<b>30/25</b>	25
	<b>15/12.5</b>	12.5
29.97 or 30	<b>30/25</b>	29.97 or 30
	<b>15/12.5</b>	14.98 or 15
25	<b>30/25</b>	25
	<b>15/12.5</b>	12.5
23.98 or 24	<b>24</b>	23.98 or 24



**Note** Prior to connecting your input source, if you select **60/50** as the frame rate, but your source is only 30, 29.97 or 25 fps, the **Frame rate** selection will switch to the source's frame rate (**30/25** - see the table above) when the source is connected (**24** is the only option for input sources at either 23.98 or 24 fps). The **Status** page will display the previously selected encoding frame rate, and not the actual input frame rate.

## Target video data rate

Enter the target video data rate for your recording (average data rate). The default minimum and maximum values (see “[Minimum and Maximum target video data rates](#)” on page 40) are suitable in most instances, however, you can change the minimum and maximum values to suit your needs. When entering an average data rate, the **Minimum** and **Maximum** target video data rates are automatically set to 90% and 110% of the target video data rate, respectively. The maximum average video data rate for streaming or recording depends on the encoding mode (see “[Monarch HDX encoding modes](#)” on page 34). Monarch HDX uses a variable data rate when encoding.

## Include audio

You must select **Include audio** to stream/record the selected audio source (see “[Audio Source](#)” on page 31) along with the video. If you want to change this setting, you must do so before starting a streaming/recording session; otherwise, you will need to stop the session, make the change, and then restart.

Monarch HDX uses the AAC audio format for streaming and recording.

## Include captions

If your source video contains closed caption information, you can select **Include captions** to have the Monarch HDX encode the captions for output. Monarch HDX supports encoding of CEA-608, CEA-708, and EIA-608 captions in the following resolutions:

- 1920 × 1080p at 29.97 and 59.94 fps
- 1920 × 1080i at 29.97 fps
- 1280 × 720p at 59.94 fps
- 720 × 486i at 29.97 fps

Please note the following:

- For captions to be included in the video output, your **Input type** must be **SDI** (see “[Video Input Settings](#)” on page 30), and you must select a compatible frame rate. For example, you cannot choose 15 fps.
- If your source video contains both CEA-608 (VANC) and EIA-608 (Line 21) captions, you must choose which type of captioning to encode. For more information, see “[CC source from SD\\_SDI](#)” on page 30.

## Advanced settings

### GOP structure

Enter the **GOP structure** (distance between I frames) to which you want to encode your input source for streaming or recording. Monarch HDX uses the IP pattern when encoding for streaming. For example, a GOP structure of 10 creates a GOP of IPPPPPPPPPI.

Your CDN may use the term “keyframe interval” instead of GOP structure. Although related to the GOP size value, the keyframe interval is expressed in seconds and refers to the length of time between anchor frames. To set the Monarch’s **GOP structure** based on the keyframe interval required by your CDN, use the following formula:

- *Monarch GOP Size = Encoding frame rate × Required keyframe interval.*

For example, if your video input is 1920 × 1080 @ 30 fps, and your CDN requires a keyframe every 2 seconds, set your Monarch **GOP structure** to 60 ( $60 = 30 \times 2$ ).

### Profile

Set the H.264 encoder profile for your stream or recording to either **Baseline**, **Main**, or **High**. Typically, the **High** profile provides the best image quality and is suitable in most instances. However, depending on the decoder used when

viewing the stream or the recorded file, such as with mobile devices, a **Main** or **Baseline** profile may be required.

### Frame slices

You can choose to slice each frame into **2**, **4**, or **8** sections when encoding, or you can select **1** to encode the frame as a whole. Slicing each frame when encoding the video for streaming or recording may be useful when a multi-slice decoder device is used to view the stream or recorded file.

### Minimum and Maximum target video data rates

The **Minimum** and **Maximum** video data rates are automatically set to 90% and 110% of whatever you set as the target video data rate. For more information on minimum and maximum video data rates and how they are used with the **Target video data rate**, see “[Target video data rate](#)” on page 38.

### Deblocking filter

Select this option to remove blockiness from the encoded video when streaming or recording. This option is especially useful when a low video data rate is required (see “[Target video data rate](#)” on page 38).

## Destination settings (streaming)

Monarch HDX provides options for using RTSP and RTMP streaming protocols for use on Adobe Media Servers, Wowza Media Servers, software video players such as QuickTime and VLC, or any of the popular Content Delivery Networks (CDNs), such as YouTube Live and Ustream (RTMP mode only). In RTSP mode, Monarch HDX acts as a streaming server to which clients can connect via a media server or software video player that supports the RTSP streaming protocol. If you want to stream to more than a handful of clients, we recommend using a dedicated media server to send streams to clients. In RTMP mode, Monarch HDX can send stream data to a CDN or media server that supports the RTMP streaming protocol.

### Using the RTSP streaming protocol

- 1 Select **RTSP** mode.
- 2 Enter a **Stream name**.
- 3 Enter the network **Port** through which the clients will connect.
- 4 A **Stream URL** is automatically generated based on your settings. Provide this URL to a client to connect to your Monarch HDX network via a Wowza Media Server or software video player that supports the RTSP streaming protocol.
- 5 (Optional) **Enable jumbo frames**. Enabling jumbo frames changes the IP packet size of the stream from 1500 bytes to 9216 bytes. This option may improve performance on certain networks; however, not all networks support larger packet sizes. This option is disabled by default.

## Remarks

- In **RTSP** mode, Monarch HDX will only start streaming data to clients once the selected encoder button (on the front panel or in the Command Center) is pushed. The streaming will continue until it is stopped, by pressing the encoder button once more (see “[Command Center control buttons](#)” on page 26).
- If you get choppy video when streaming to VLC media player, you must enable the Real-time Transport Protocol (RTP) in VLC. Proceed by doing one of the following:
  - **Windows** Open the VLC media player, open **Tools > Preferences**, and then choose the **Input / Codecs** tab. In the Network section, select **RTP over RTSP (TCP)**.
  - **Mac** Open the VLC media player, open **VLC > Preferences**, and then choose the **Input / Codecs** tab. In the **Codecs / Muxers** section, select **Use RTP over RTSP (TCP)**.

## Using the RTMP streaming protocol

- 1 Select **RTMP** mode.
- 2 Select one of the following:
  - **Default** Streams with an optimized methodology for communicating with RTMP servers (recommended for most RTMP streaming). If you select this option, proceed to step 3.
  - **Legacy** This uses a RTMP streaming protocol identical to those used in older Monarch releases (use this option if you have difficulty using Default with another RTMP protocol). If you select this option, proceed to step 3.
  - **Wowza Cloud** RTMP protocol optimized for Wowza Cloud account users. If you select this option, see “[RTMP streaming options](#)” on page 35 for more information on how to proceed.
  - If other options are available (such as **Facebook** or **YouTube**), see the section “[Pairing tab](#)” on page 56 for more information.
- 3 Click **Browse...** to load the **Server URL** and **Stream name** from an XML file (Wowza Streaming Engine only), or enter the **Server URL** and **Stream name** manually in the fields provided. You can only load destination information (server URL and stream name) from an XML file. Encoding information will not be loaded. Clear the **Server URL** field to remove the XML file. Clear the **Stream name** field to remove the loaded streaming XML file.



**Important** Please note the following:

- If the stream name, username, or password is included in the stream URL, do not enter the information in the respective text boxes.

- Streaming XML files are not the same as Monarch HD configuration XML files.
- 4 If your Flash-based server or CDN uses the “ModuleRTMPAuthenticate” method for RTMP authentication, a username and password are used for authentication, however, username and password information is not included as part of the stream URL or streaming XML file. In this case, you must enter the stream **Username** and **Password** in the text boxes provided.
- 5 Start streaming the Monarch HDX input source to a CDN or media server.



**Note** The maximum frame rate for streaming in **RTMP** mode is 30 fps when both encoders are in use.

## Destination settings (record)

Specify the following settings for recording:

### Media

Select the media to which you want to record your input source. You can choose either a USB or SD card slot on the Monarch HDX device, or a network location.

For more information on using USB devices or SD cards, including the known limitations of each, see the sections “[USB ports 1 and 2](#)” on page 8, and “[SD card](#)” on page 8.

### Save file as

The **Save file as** option allows you to choose the filename format of your recorded files. You can choose from three formats:

- **Filename only** Uses your specified filename to identify recorded files (e.g. *Basename.mov/mp4*). If a recording session results in a file being segmented into multiple files, a three-digit incrementing number (starting at 001) will also be added to the filename from the second file onwards (e.g. *Basename001.mov/mp4*, *Basename002.mov/mp4*, etc).

The three-digit value is needed to differentiate between the multiple files created by file segmentation. For more information on how file segmentation works, see “[File Segment Duration](#)” on page 44.



### Warning

- If you use this filename format, you must make sure to change the filename before manually starting a new recording, otherwise the old recorded file will be overwritten. A recording is manually started by pressing the appropriate encoder button(s) on the device or by clicking the Record button in the Command Center.
- Do not use the **Filename only** option if you plan on consolidating your files with the Matrox File Consolidator. Because the filename differs from

the second file onwards, the consolidator will not be able to recognize that the segmented files are part of the same recorded sequence.

- **Filename with date/time** Uses your specified filename, adds the start date/time of the recording session, and adds a three-digit number that increments when file segmentation occurs (e.g. *Basename-[YYYY-MM-DD\_HH-MM-SS]-000.mov/mp4*). For more information on how file segmentation works, see [“File Segment Duration”](#) on page 44.

If file segmentation occurs, each file will have the same date/time in the filename; that is, the start date/time of the first file in the sequence. The three-digit incrementing number is then used to differentiate the files.

For example, a recording that is segmented into three (3) files will result in the following:

- *MyRecordedFile-[2015-12-01\_13-30-45]-000.mov/mp4*
- *MyRecordedFile-[2015-12-01\_13-30-45]-001.mov/mp4*
- *MyRecordedFile-[2015-12-01\_13-30-45]-002.mov/mp4*

The date/time in the filename only changes when you manually stop a recording and then start a new one, in which case it will be the start date/time of the first file in the new sequence.

- **Filename with numeric counter** Uses your specified filename, adds a two-digit number that increments when you manually stop/start the recording, and adds a three-digit number that increments when file segmentation occurs (e.g. *Basename00000.mov/mp4*). For more information on how file segmentation works, see [“File Segment Duration”](#) on page 44.

The two-digit number increments with each manual stop/start of the recording, up to 99 times, after which it resets to 00. As with date/time, this number does not increment with file segmentation. For example, if you have three (3) files that you created by manually starting and stopping the recording session, it will result in the following:

- *MyRecordedFile00000.mov/mp4*
- *MyRecordedFile01000.mov/mp4*
- *MyRecordedFile02000.mov/mp4*

The three-digit number increments when file segmentation occurs. For example, a recording that is segmented into three (3) files could look as follows:

- *MyRecordedFile00000.mov/mp4*
- *MyRecordedFile00001.mov/mp4*

– *MyRecordedFile00002.mov/mp4*

Another example would be if you have multiple files created by manual stop/start, and only the third file is segmented into two additional files. That would look as follows:

– *MyRecordedFile00000.mov/mp4*

– *MyRecordedFile01000.mov/mp4*

– *MyRecordedFile02000.mov/mp4*

– *MyRecordedFile02001.mov/mp4*

– *MyRecordedFile02002.mov/mp4*



**Important** Blank spaces are not supported in the base name. Use underscores in place of blank spaces. For example, enter *Recording1\_Stage1* instead of *Recording1 Stage1* as the base name for the file.

### Maximum recording duration

Enter a duration to set an overall time limit for your recording session. The session will automatically end when this limit is reached, or when the selected storage media is full (whichever occurs first). If you enter a value of 0, the recording session will continue indefinitely until manually stopped; otherwise, it will stop only when your storage media is full. This setting represents your desired recording length. The actual length is determined by the size of your storage device.



**Note** The number of files created at the end of the session is dependent on the overall length of your recording session and whether or not you have entered a value in the **File Segment Duration** fields (see “[File Segment Duration](#) for more information).

Assuming the storage media has enough space, an entry in the **Maximum file duration** field will result in the Monarch HDX creating multiple recording files when:

- You have entered a maximum recording duration longer than 4 hours and 50 minutes.
- You have entered a file segment duration of 0, and your recording lasts longer than 4 hours and 50 minutes.
- You have entered a file segment duration longer than 1 minute.

### File Segment Duration

If you enter a duration in the **File Segment Duration** fields (hr and/or min), at the specified interval, the Monarch HDX will create a new file, splitting your recording session over multiple files. For example, if you enter a duration of 30 minutes, Monarch HDX will close the current file and start recording to a new file every 30 minutes.

The maximum file segment duration you can set is 4 hours and 50 minutes. If you leave the setting at the default duration of 0, the Monarch HDX will automatically switch to a new file every 4 hours and 50 minutes.

The size of the created files (in approximated MBs) is displayed next to the duration. The file size adjusts depending on the video data rates you set in the encoding options (see “[Target video data rate](#)” on page 38).



**Important** Please note the following:

- On FAT32 storage media, file segmenting will occur automatically after 4 GB.
- Because FAT32 limits the recording file size to 4 GB, you must use an NTFS drive if your recording file will be greater than 4 GB.

### File type

Select the type of file that will be recorded. You can create either an **MOV** or **MP4** file.

### Path and filename

Specify the destination and filename for your recording based on your recording destination. When specifying the path, all folders in the path must already exist. Monarch HDX will not create new folders. For more information on how to set up shared folders for Windows or Mac OS, see [Appendix B, “Sharing a network folder,”](#) on page 61.



**Important** Blank spaces are not supported in the base name. Use underscores in place of blank spaces. For example, enter *Recording1\_Stage1* instead of *Recording1 Stage1* as the base name for the file.

### Domain, Username, and Password

When recording your source input to a network location (see “[Media](#)” on page 42) and Monarch HDX is not on the same domain as the network, enter the network domain. If required, also enter the **Username** and **Password** that is used to access the network.

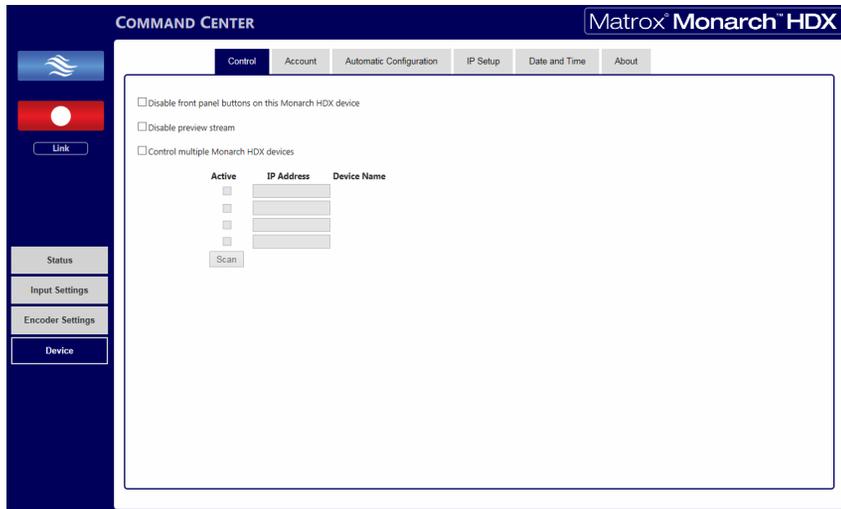
## Device page

The **Device** page is where you access various settings related to all aspects of the Monarch HDX and its operation. You access these settings by clicking the tabs at the top of the **Device** page. A username and password are required to access the options and features of the **Device** page.

### Control tab

The **Control** tab lets you control the streaming and recording for your Monarch HDX device, and up to four other Monarch HDX devices connected on the same network. You can also use the encoder buttons on a Monarch HDX device to stream and record for that device, but you cannot control other devices with the encoder buttons. For more information, see “[Encoder buttons \(ENCD 1 and ENCD 2\)](#)” on page 7.

To access the **Control** tab, open the Monarch HDX Command Center (see “[Accessing the Command Center](#)” on page 22), and then click **Control**.



### Disabling the front panel buttons on the Monarch HDX device

You can disable the encoder control buttons on the Monarch HDX device to prevent someone from inadvertently switching inputs or stopping a streaming or recording session. This option only applies to the Monarch HDX you are connected to, and not other Monarch HDX devices you may be controlling.

⇒ **To disable the encoder buttons:**

- 1 In the Command Center, click **Device > Control**.

For more information, see “[Accessing the Command Center](#)” on page 22.

## 2 Select **Disable front panel buttons on this Monarch HDX device.**

The input select and encoder buttons on the Monarch HDX device are disabled.



**Note** By default, the front panel buttons are enabled (i.e. this feature is off). When required, this button-disabling feature must be performed after a factory reset.

### **Disabling the preview**

When the Monarch HDX is idle and you do not want to display what the camera/input is sending the device, you can disable the preview of what will be captured or streamed by selecting **Disable preview stream** (see “[Previewing the input](#)” on page 27 for more information).

### **Enabling multi-device control**

Monarch HDX allows you to start and stop the streaming and recording for itself and four other Monarch devices on the network at the same time.

Each device streams and records the input source connected to its HDMI input based on its own stream and record settings. To control multiple devices, you must use the control buttons (see “[Command Center control buttons](#)” on page 26) in the Command Center instead of the encoder buttons located on a Monarch HDX device, which control the streaming and recording for that device only.

You can control multiple Monarch HDX devices from any of the devices on the network. When enabling the control of multiple devices in a device’s Command Center, that device becomes the primary device and the devices being controlled become secondary devices. The control buttons in the Command Center of the primary device can then be used to control the other devices on the network. You can have more than one primary device on the network, with each primary device controlling its secondary devices. For example, if you have three Monarch HDX devices on the network, you can set device one to control devices two and three, and you can also set device two to control devices one and three.



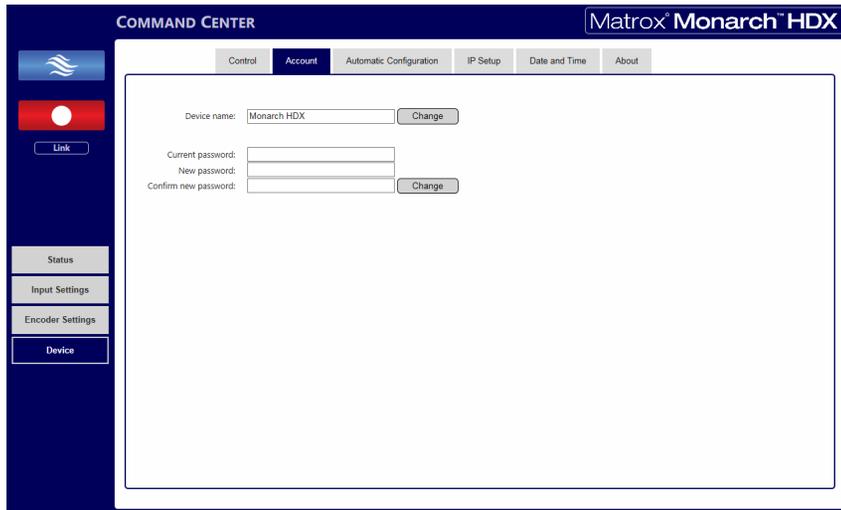
#### **To enable multi-device control:**

- 1 In the Command Center, click **Device > Control**.
- 2 Select **Control multiple Monarch HDX devices**.
- 3 For each Monarch HDX device that you want to control, enter the network **IP address** of the device. Click **Scan** after entering the IP address to verify if the device can be found on the network.

Activate or deactivate the control for a Monarch HDX device by selecting or clearing the device’s **Active** box.

## Account tab

The **Account** tab in the Command Center is where you give a descriptive name to your Monarch HDX device and change your Monarch HDX password. To access the **Account** tab, open the Monarch HDX Command Center, and then choose **Device > Account**.



### Device name and password

By default, the device name is set to *Monarch HDX*. You can give a unique name to each Monarch HDX device for easy identification within the Command Center and the Matrox Monarch HDX Utils (see “[Monarch HDX Utils application](#)” on page 18). This is especially useful when you have multiple Monarch HDX devices on the same network. To change the name of your Monarch HDX, type the desired name in the **Device name** box, and then click **Change**.

By default, the Monarch HDX username and password are set to *admin*. The device username cannot be changed, however, we do suggest that you change the device password. To change the Monarch HDX password, enter the current and new passwords, and then click **Change**. For information on resetting the password to factory default, see “[Reset to factory defaults](#)” on page 13.

### Automatic Configuration

The **Automatic Configuration** tab in the Command Center is where you can export the current Monarch HDX settings to an XML file (called the *Monarch HDX configuration file*), import settings from a previously-created configuration file, or import settings from the same XML file hosted on a web page.

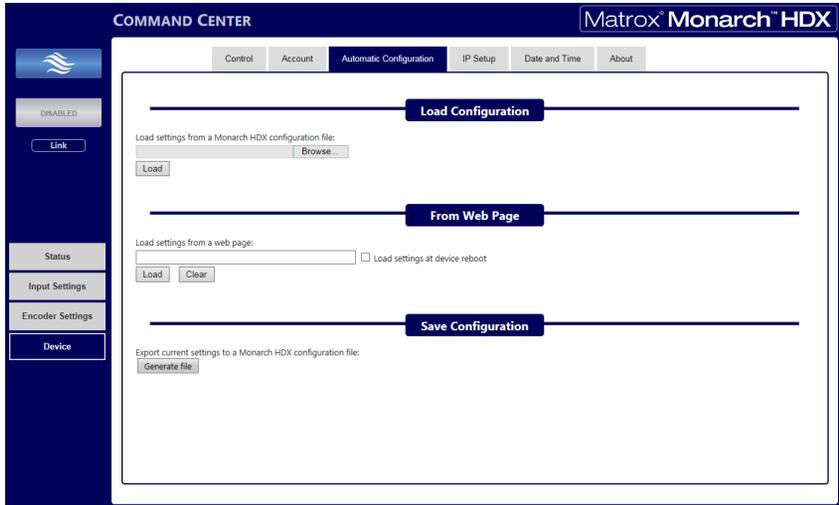
When you have a Monarch HDX configuration file, you can copy it to a USB device, connect the device to USB port 2, and then perform a factory reset to

automatically load the settings. For more information on performing a factory reset, see “[Network connection and IP address](#)” on page 18.

The option to boot up Monarch HDX with all settings loading automatically from a USB device, or loading settings from a web page at device reboot, allows you to deploy other Monarch devices without logging in to the Command Center.

## Accessing the Automatic Configuration tab

To access the **Automatic Configuration** tab, open the Monarch HDX Command Center (see “[Accessing the Command Center](#)” on page 22), and then choose **Device > Automatic Configuration**.



## Loading settings from a Monarch HDX configuration file

You can import settings from a previously-generated Monarch HDX configuration file. The file must be located on your computer or somewhere that is accessible from your computer (see “[Generating a configuration file](#)” on page 50).

- 1 Go to the **Automatic Configuration** tab of the Command Center.
- 2 Under **Load settings from a Monarch HDX configuration file**, click **Browse**.
- 3 Select the file you want to load.
- 4 Click **Load**.

Your Monarch HDX settings will now match those of the chosen configuration file.

## Loading settings from a web page

You can import Monarch settings from a specific web page that is hosting the configuration file generated in the Command Center (see [“Generating a configuration file”](#) on page 50). This option is particularly useful when there is a need to oversee the Monarch HDX operation from a central control environment. You can set bit rates and destinations by managing a web page instead of logging into the Monarch HDX Command Center.

- 1 Go to the **Automatic Configuration** tab of the Command Center.
- 2 In the **Load settings from a web page** field, type the URL address of a page hosting the configuration parameters.
- 3 Click **Load**.
- 4 (Optional) Select **Load settings at device reboot** if you want to have your Monarch HDX automatically load the settings from the specified URL the next time it boots up.

Your settings will now match those of the chosen configuration file.



**Note** With **Load settings at device reboot** selected, you only need to reboot/reset your Monarch HDX and it checks the specified URL for updated settings.

## Generating a configuration file

You can export your current settings as a Monarch HDX configuration file, which you can then save to your computer, to a USB device connected to your computer, or to a network drive. You can then use the configuration file to configure other Monarch HDX devices.



**Note** You cannot save to a USB device connected to the Monarch HDX.

- 1 Go to the **Automatic Configuration** tab of the Command Center.
- 2 Under **Export current settings to a Monarch HDX configuration file**, click **Generate file**.
- 3 Select a save location. Do not change the filename (*MonarchHDXSettings.xml*) if you plan to automatically configure a Monarch from a USB device (see [“Automatically importing Monarch settings on factory reset”](#)).

The Monarch HDX configuration file is created, and contains all the Monarch settings as XML parameters.

## Automatically importing Monarch settings on factory reset

On factory reset, the Monarch HDX can automatically import configuration settings from a Monarch HDX configuration file that is on a USB device connected to the USB port 2.

- 1 Copy the Monarch HDX configuration file to a USB device (see “[Generating a configuration file](#)”).



**Note** The configuration file must have the original filename, given by the Monarch HDX when the file was generated (*MonarchHDXSettings.xml*).

- 2 Connect the USB device to the Monarch HDX's USB port 2 (see “[USB ports 1 and 2](#)” on page 8).
- 3 Perform a factory reset by pressing and holding the Reset button on the device for at least five seconds (see “[Reset to factory defaults](#)” on page 13).

The Monarch HDX boots up with your settings loaded.



**Note** For more information on Monarch configuration files, including generating or editing configuration files, consult the *Matrox Monarch HDX Dev Tools Reference Guide*, which is provided in PDF format in the Matrox Monarch HDX Support section of our website at [www.matrox.com/video/support](http://www.matrox.com/video/support).

## IP Setup tab

The **IP Setup** tab in the Command Center lets you switch the Monarch HDX IP mode between DHCP and Static. By default, Monarch HDX is set to DHCP mode.



**Important** Changing the IP mode will end the current Command Center session. To access the Monarch HDX Command Center again via IP address, you will need to enter a different Monarch HDX IP address in your browser's address field. If switching to Static mode, you may also be required to change your computer's network configuration. For information on obtaining the Monarch HDX IP address and accessing the Command Center in DHCP or Static mode, see [Chapter 3, “Network Connection and Setup](#).

To access the **IP Setup** tab, open the Monarch HDX Command Center, and then choose **Device > IP Setup**.

The screenshot shows the 'Matrox Monarch HDX' Command Center interface. The 'IP Setup' tab is active. Under the 'DHCP' section, the 'DHCP' radio button is selected. The 'Static' section has input fields for IP address (192.168.66.159), Subnet mask (255.255.255.0), Gateway, and DNS server. A checkbox labeled 'Display this Monarch HDX on the network as a UPnP device' is checked. The left sidebar contains a 'Link' button and a 'Device' menu item.

### Setting the IP mode to DHCP

Set Monarch HDX to DHCP IP mode when connecting to a network with a DHCP server, such as through a router.

- 1 Select **DHCP**.
- 2 Click **Apply**.



**Tip** See “[Network connection and IP address](#)” on page 18 for instructions on how to connect Monarch HDX to a network with a DHCP server, and how to acquire the Monarch HDX network IP address to access the Command Center.

### Setting the IP mode to Static

Set Monarch HDX to Static IP mode when connecting to a network without a DHCP server.

- 1 Select **Static**.
- 2 Enter a static **IP address** for your Monarch HDX. Unless you change this address, the default static IP address will be used (169.254.1.11). If you reset the device in Static IP mode (see “[Switch to Static IP mode](#)” on page 13), the static IP address reverts to default.



**Note** When connecting multiple Monarch HDX devices on the same network, each Monarch HDX device must have a unique network IP address.

- 3 Enter the **Subnet mask** on your network to which Monarch HDX is connected. By default, the subnet mask is set to 255.255.255.0.
- 4 Enter the **Gateway** IP address and **DNS server**.

5 Click **Apply**.



**Tip** See [Chapter 3, “Network Connection and Setup](#) for instructions on how to connect Monarch HDX to a network without a DHCP server, how to change your computer’s network configuration to establish a connection between your computer and the Monarch HDX device, and how to access the Command Center.

### **Preventing Monarch HDX from appearing as a UPnP device on the network**

The Monarch HDX uses the Simple Service Discovery Protocol (SSDP) to broadcast itself as a Universal Plug and Play (UPnP) device. This means that it will appear in Windows Explorer (not visible in Mac OS) as if it were a printer, external hard drive, or similar UPnP device.

This feature is enabled by default, and makes it easier to find the Monarch HDX on a network if you do not know the device IP address. However, for security reasons you may not want the Monarch HDX to appear on your network for anyone to see. If so, you can disable SSDP to prevent the Monarch HDX from appearing as a UPnP device.



#### **To prevent the Monarch HDX from appearing:**

- 1 Access the Monarch HDX Command Center (see [“Accessing the Command Center”](#) on page 22).
- 2 Choose **Device > IP Setup**.
- 3 Clear **Display this Monarch HDX on the network as a UPnP device**.
- 4 Click **Apply**.

The Monarch HDX will no longer be visible in Windows Explorer as a UPnP device. You may need to restart Windows Explorer for Monarch HDX to no longer appear on the network.

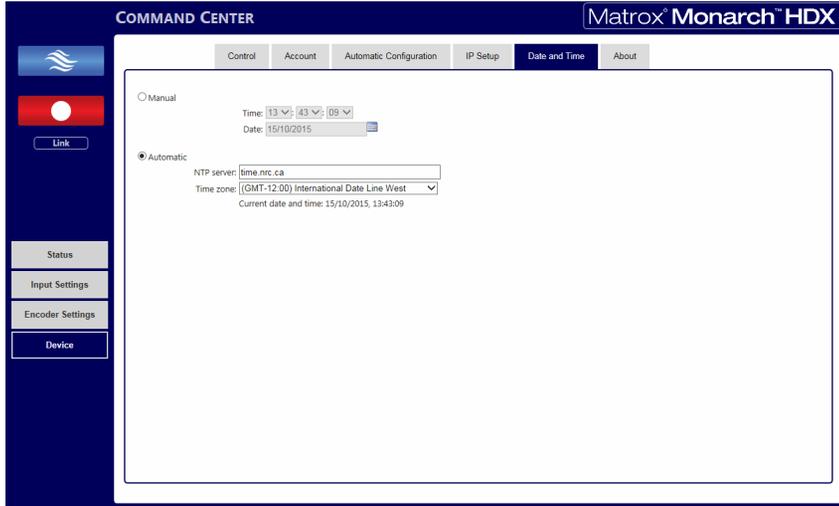


**Note** By using this option, this Monarch device will not automatically appear on the Monarch HDX Utils list of connected devices. You must use the **Find All** button for the Monarch HDX to appear.

## Date and Time tab

The **Date and Time** tab in the Command Center lets you set the date and time for your Monarch HDX device. The date and time are used in the naming of the recorded files (see “[Path and filename](#)” on page 45).

To access the **Date and Time** tab, open the Monarch HDX Command Center, and then choose **Device > Date and Time**.



### Setting the device date and time

You can set the date and time manually or automatically by using an NTP server.



**Important** To save changes made in the **Date and Time** tab, you must click the **Apply** button. A Monarch HDX hardware reboot is required to apply the changes. If you leave the **Date and Time** tab before clicking **Apply**, all changes will be lost.

Manually	Automatically*
<ol style="list-style-type: none"> <li><b>1</b> Select <b>Manual</b>.</li> <li><b>2</b> Set the <b>Time</b>, and enter a <b>Date</b> in the format DD/MM/YYYY, or click  to select a date from the calendar.</li> <li><b>3</b> Click <b>Apply</b>. You'll be notified that Monarch HDX will be rebooted in order to apply the changes.</li> </ol>	<ol style="list-style-type: none"> <li><b>1</b> Select <b>Automatic</b>.</li> <li><b>2</b> Enter a local or public <b>NTP server</b> address. The default NTP server address is time.nrc.ca.</li> <li><b>3</b> Select a <b>Time zone</b> from the list. The current date and time associated with the selected NTP server and time zone are displayed next to <b>Current date and time</b>.</li> <li><b>4</b> Click <b>Apply</b>. You'll be notified that Monarch HDX will be rebooted in order to apply the changes.</li> </ol>

\*Setting the date and time automatically requires a local or public NTP server address. An Internet connection is required to use a public NTP server.

## Pairing tab

The **Pairing** tab in the Command Center allows you to link your Monarch device with third-party live video web services such as YouTube Live and Facebook Live. Once paired to the service, Monarch can stream (RTMP) directly to these services with no additional configuration required.

To access the **Pairing** tab, open the Monarch HD Command Center (see “[Accessing the Command Center](#)” on page 22), then choose **Device > Pairing**.



To pair your Monarch device with a third-party service, follow the steps below:

- 1 Go to the **Pairing** tab of the Command Center.  
If your Monarch is connected to a network that has internet access, you will see a value in the **User device code** field. This is a randomly generated code that identifies your Monarch to the third-party service.  
If you do not see a code, or the Verification URL is not clickable, check your internet connection and/or proxy server settings.
- 2 Select the **User device code** you want to verify with YouTube Live or Facebook Live and copy it to your clipboard.
- 3 Click **Verification URL** to be redirected to the third-party verification page.
- 4 Paste your **User device code** and submit it where indicated to add your Monarch device to the third-party service.
- 5 After the third-party has added your Monarch device, go back to the **Pairing** page in the Command Center.
- 6 Click **Verify**.

Your Monarch device has been verified for live streaming with the third-party service.

- 7 Go to the **Encoder** page of the Command Center.
- 8 From the **Mode** drop-down list, select **RTMP**.

The screenshot shows the 'Encoder 1' configuration interface. The 'Mode' dropdown menu is open, displaying the following options: Default (highlighted), Legacy, Wowza Cloud, YouTube, and Facebook. Other visible settings include:
 

- Preset: None
- Resolution: 1280
- Frame rate (fps): 30/25

- 9 Select **YouTube** or **Facebook** and then click **Apply**.

Monarch pairing with third-party services is complete. When you next start an RTMP stream, it will stream live to your third-party account or channel.

- i** **Important** If you select **Facebook** as your third-party pairing service, and you want to start an RTMP stream on the other Monarch encoder at the same time, you must use either the **Default** or **Legacy** modes, and you can only stream to a personal or company website. This is an intentional limitation to comply with Facebook's terms and conditions.

## About tab

The **About** tab in the Command Center lets you see the serial number and current firmware version of your Monarch HDX device, provides a link to the latest Monarch HDX documentation (an Internet connection is required), and displays the Matrox Limited Warranty for Monarch HDX.



**Note** To update the Monarch HDX firmware, see “[Updating the Monarch HDX firmware](#)” on page 22.

To access the **About** tab, open the Monarch HDX Command Center, and then choose **Device > About**.

**COMMAND CENTER** Matrox<sup>®</sup> Monarch<sup>™</sup> HDX

Control Account Automatic Configuration IP Setup Date and Time **About**

Device firmware version: [redacted]  
 Serial Number: [redacted]  
 Documentation: [Click here](#) for the Matrox Monarch HDX documentation.  
 Hardware warranty: [Click here](#) for the Matrox Monarch HDX warranty.  
 Third-party licenses: [Click here](#) for the list of open source content and licenses.

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# A

## **Recording file size and duration**

This appendix contains tables of approximated recording file sizes and recording lengths.

## Recording file sizes and duration

The following tables list the approximate recording file size based on the average video data rate and recording duration, and the approximate maximum recording duration given the average video data rate and available disk space.



**Note** Unless a specific recording duration limit was set in the record settings, your Monarch device limits the duration of each recording to 4 hours and 50 minutes. The recording will automatically stop when the duration limit is reached.

### Approximate file size

Recording Duration	Average Video Data Rate (kb/s)				
	500	2000	5000	15 000	25000
5 min	18.8 MB	75 MB	188 MB	563 MB	938 MB
30 min	112.5 MB	450 MB	1.1 GB	3.4 GB	5.6 GB
60 min	225 MB	900 MB	2.3 GB	6.8 GB	11.3 GB
3 hrs	675 MB	2.7 GB	6.8 GB	20.3 GB	33.8GB
4 hrs 50 min	1.1 GB	4.5 GB	11.3 GB	33.8 GB	56.3 GB

### Approximate maximum recording duration

Disk Space	Average Video Data Rate (kb/s)				
	500	2000	5000	15 000	25000
4 GB	17.8 hrs	4.4 hrs	107 min	36 min	21 min
16 GB	71.1 hrs	17.8 hrs	7.1 hrs	2.4 hrs	85 min
32 GB	142.2 hrs	35.6 hrs	14.2 hrs	4.7 hrs	2.8 hrs
64 GB	284.4 hrs	71.1 hrs	28.4 hrs	9.5 hrs	5.7 hrs
256 GB	1138 hrs	284.4 hrs	114 hrs	38 hrs	22.8 hrs
1 TB	4444.4 hrs	1111.1 hrs	444.4 hrs	148.1 hrs	89 hrs

# B

## **Sharing a network folder**

This appendix provides instructions for sharing network folders with the Monarch.

## Introduction

This appendix describes how to set up shared folders on a Windows or Mac system so they can be used as destination folders for Monarch recordings.



**Important** Please note the following about creating shared folders:

- When specifying the path, all folders in the path must already exist. Monarch will not create new folders.
- When creating a shared folder for Monarch recordings (see “[Destination settings \(for recording\)](#)” on page 46), you must also specify the basename of the file since you are creating the file at that point.

## Recording to folders on a USB or SD card

When recording to a USB device or SD card, enter the folder(s) on the recording device to which you want to record, if applicable, followed by the basename.

For example, if you want to name your file “Recording1”, and save the file in a folder named “Files” that is contained within another folder named “Project” on the root directory, enter *Project/Files/Recording1*. If you want to save the file in the media device's root directory, enter *Recording1*.

## Recording to folders on a network drive

This option allows you to record to a shared folder on the network. The method for entering the location depends on the operating system of the computer that contains the shared folder. For more information on supported operating systems, see “[Supported operating systems](#)” on page 2.

### On a Windows system

When recording to a shared folder that is on a Windows system on the network, you must enter the IP address of the location on the network that will receive the file, followed by the shared folder name, and then the basename .

Use the following format:

*//IP address/shared folder name/basename*

For example, if you want to name your file “Recording1”, and send the file to a shared folder named “Files” that is located on a network computer with an IP address of “123.456.7.890”, enter *//123.456.7.890/Files/Recording1*.



**Important** If the network destination has a firewall, it must be disabled in order to send the file to the network location.

## On a Mac OS system

When recording to a shared folder that is on a Mac OS system on the network, the folder to which you want to send the file must be shared using the Network File System (NFS) file-sharing protocol.

To share a folder using the NFS protocol, the full path to the folder that you want to share is required. You can obtain the full path to the folder by right-clicking the folder, and then clicking **Get Info**.



**Important** Shared folders that use a file-sharing protocol other than NFS are not supported.

- 1 On the computer that contains the folder that you want to share, make sure that you're logged in as an administrator and that your user account has a password. User accounts that do not have a password cannot be used to share a file using the NFS protocol.
- 2 In the **Finder** menu, choose **File > New Finder Window**.
- 3 In the **Applications** folder, click the **Utilities** folder, and then click **Terminal**.
- 4 In the **Terminal** window, type the following command, where “Path” is the full path to the folder that you want to share:

```
echo /Path -mapall=$(logname)| sudo tee -a /etc/exports
```

For example, to share a folder named *Files* that is located on the *Desktop* under *Matrox* in the *Users* root directory folder, type the following command:

```
echo /Users/Matrox/Desktop/Files -mapall=$(logname)| sudo tee -a /etc/exports
```

For added security, you can restrict write access to the folder to one device by adding the IP address of the Monarch device that you want to use to write to the folder. For example, if the IP address of the Monarch device is *169.254.1.11*, type the following command:

```
echo /Users/Matrox/Desktop/Files 169.254.1.11 -mapall=$(logname)| sudo tee -a /etc/exports
```

- 5 Press **ENTER**.
- 6 Type your user account password, and then press **ENTER**.
- 7 Type the following command:

```
sudo nfsd restart
```

- 8 Press **ENTER**.
- 9 Close the **Terminal** window.

The folder is now a shared folder.

- 10** Now that you have created the shared folder, you must specify the folder path in the Monarch Command Center.

When entering the folder, you must enter the IP address of the location on the network to which you want to record, followed by the full path to the shared folder from the root directory, and then the basename.

Use the following format:

*//IP address:/full path to shared folder/basename*

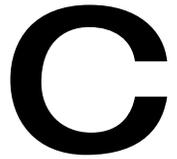
For example, if you want to name your file “Recording1” and save the file to a shared folder named “Files” that is located on the Desktop under “Matrox” in the Users root directory folder on a network computer with an IP address of “123.456.7.890”, enter the following:

*//123.456.7.890:/Users/Matrox/Desktop/Files/Recording1*



**Tip** You can obtain the full path to the shared folder by right-clicking the folder, and then clicking **Get Info**.

The Monarch can now record to the shared folder.



## **Matrox Monarch HDX Specifications**

This appendix provides specifications for the Monarch HDX hardware.

## General

- **Regulatory compliance**
  - EMC: FCC Class A, CE Mark Class A, ACMA C-Tick Mark
  - RoHS Directive 2011/65/EU
- **Weight**
  - 0.6 kg
- **Power**
  - Input: 9-24 VDC
  - Connector: DIN4
  - Total power consumption: 20-30 Watts (42 max)
- **Power Supply**
  - Line voltage: 100-240 VAC
  - Frequency: 50-60 Hz
  - Input connector: IEC320-C8
  - Output connector: DIN4 Locking power
  - Output: 12VDC (42 W)
- **International Adapter**
  - US/UK
  - European

## Connections

- **HDMI input**
  - Supported video input formats (auto-detected):
    - 1920 × 1080p at 23.98/24/25/29.97/30/50/59.94/60 fps
    - 1920 × 1080i at 25/29.97 fps
    - 1280 × 720p at 50/59.94/60 fps
  - HDMI YCbCr 4:2:2 / RGB
  - HDMI embedded audio, 2-channel
  - HDCP not supported
  - Standard Type A HDMI connector (19 pins)
- **HDMI output**
  - HDMI YCbCr 4:2:2 / RGB
  - HDMI embedded audio, 2-channel
  - Standard Type A HDMI connector (19 pins)
- **SDI input**

- Supported video input formats (auto-detected):
  - 1920 × 1080p at 23.98/24/25/29.97/30/50/59.94/60 fps
  - 1920 × 1080i at 25/29.97 fps
  - 1280 × 720p at 50/59.94/60 fps
  - 720 × 576i at 25 fps
  - 720 × 486i at 29.97 fps
- 8-channel (16 passthrough), 24-bit SDI embedded audio, 48 kHz sample rate, synchronous
- SDI compliant with SMPTE 259M/292M/424M(Level A)/425M
- BNC connector (75 Ω), terminated
- Full audio and VANC preservation
- Passthrough of video input signal (SDI or HDMI) and up to 16 channels of audio
- Automatic video relay bypass
- **SDI output**
  - SDI compliant with SMPTE 259M/292M/424M(Level A)/425M
  - 8-channel (16 passthrough), 24-bit SDI embedded audio, 48 kHz sample rate, synchronous
  - BNC connector (75 Ω)
- **Unbalanced analog audio input**
  - 1x stereo 3.5 mm (1/8") stereo jack
  - Input impedance: Hi-Z
  - Nominal live level -10 dBv with 4 dB headroom
- **Unbalanced analog audio output**
  - 1x stereo 3.5 mm (1/8") stereo jack
  - Output impedance: 25 Ω
  - Nominal live level -10 dBv with 4 dB headroom
- **Analog In to Analog Out audio performances at Line Level (-10dBv)**
  - THD+N at 1kHz: < .042%
  - Frequency response: 20 Hz to 20 KHz +/- 1 dB
  - Signal-to-noise ratio: Typical 80 dB
- **Data ports**
  - 2 x 2.0 USB ports
  - 1 x auto-sensing 10/100/1000 Base-T Ethernet J-45 port
  - 1 x SD/SDHC card slot.

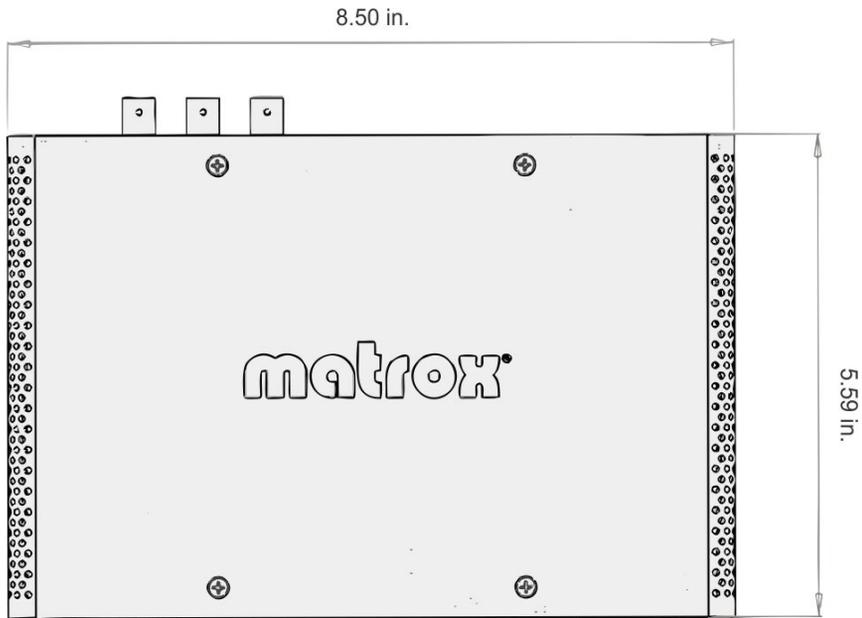
## Environmental specifications

- Minimum/maximum room operating temperature: 0 to 40° C
- Minimum/maximum storage temperature: -20 to 60° C
- Maximum altitude for operation: 3,000 meters
- Maximum altitude for transport: 12,000 meters
- Operating humidity: 20 to 80% relative humidity (non-condensing)
- Storage humidity: 5 to 95% relative humidity (non-condensing)

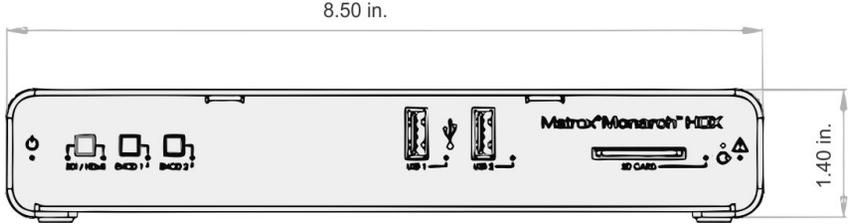
## Dimensions

The dimensions for the Monarch HDX are as follows.

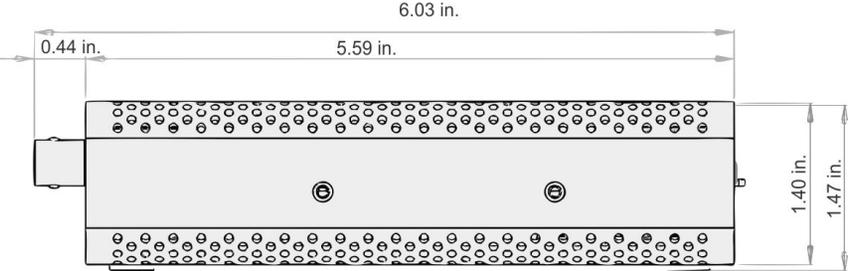
### Top



Front



Side



## Your notes

# D

## **Matrox Customer Support**

This appendix explains how you can register your Matrox product and obtain customer support.

## How to get Matrox customer support

If you have a problem that you're unable to solve by referring to the documentation for your Matrox product, please contact your Matrox representative. He or she should be able to help you quickly correct any installation or system configuration problem.

If your representative is unable to solve your problem, contact Matrox for further information and assistance.

### Registration

You can register your Matrox product in the Matrox Support section of our website at [www.matrox.com/video/support](http://www.matrox.com/video/support).

Only registered users are entitled to customer support, utilities, special promotional offers, and access to our user forum.

### Keep up to date with our website

In addition to registering your Matrox product, our website offers you up-to-the-minute information about Matrox products and software updates. Be sure to place our site in your favorites or bookmarks:

[www.matrox.com/video/support](http://www.matrox.com/video/support).

### Contacting us

Matrox is proud to offer worldwide customer support. Please use the contact information for your Matrox product and area as provided on our website at [www.matrox.com/video/support](http://www.matrox.com/video/support).

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## Your notes

# Compliance Statements

## USA

### FCC Compliance Statement

#### Remark for the Matrox hardware products supported by this guide

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### WARNING

Changes or modifications to this unit not expressly approved by the party responsible for the compliance could void the user's authority to operate this equipment. The use of shielded cables for connection of the equipment and other peripherals is required to meet FCC requirements.

## Canada

### (English) Industry Canada Compliance Statement

CAN ICES-3 (A)/NMB-3 (A)

#### Remark for the Matrox hardware products supported by this guide

These digital devices do not exceed the Class A limits for radio noise emission from digital devices set out in the Radio Interference Regulation of Industry Canada.

### (Français) Conformité avec les exigences de l'Industrie Canada

CAN ICES-3 (A)/NMB-3 (A)

#### Remarque sur les produits matériels Matrox couverts par ce guide

Ces appareils numériques n'émettent aucun bruit radioélectrique dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par Industrie Canada.

## Europe

### (English) European user's information – Declaration of Conformity

#### Remark for the Matrox hardware products supported by this guide

These devices comply with EC Directive 2014/30/EU for a Class A digital device. They have been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures. To meet EC requirements, shielded cables must be used to connect the equipment and other peripherals. These products have been tested in a typical Class A compliant host system. It is assumed that these products will also achieve compliance in any Class A compliant system.

### (Français) Informations aux utilisateurs Européens – Déclaration de conformité

#### Remarque sur les produits matériels Matrox couverts par ce guide

Ces unités sont conformes à la directive communautaire 2014/30/EU pour les unités numériques de classe A. Les tests effectués ont prouvé qu'elles sont conformes aux normes EN55022/CISPR22 et EN55024/CISPR24. Le fonctionnement de ces produits dans un environnement résidentiel peut causer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre les mesures appropriées. Pour respecter les impératifs communautaires, les câbles de connexion entre l'équipement et ses périphériques doivent être blindés. Ces produits ont été testés dans un système hôte typique compatible classe A. On suppose qu'ils présenteront la même compatibilité dans tout système compatible classe A.

### (Deutsch) Information für europäische Anwender – Konformitätserklärung

#### Anmerkung für die Matrox Hardware-Produktunterstützung durch dieses Handbuch

Diese Geräte entsprechen EG Direktive 2014/30/EU für ein digitales Gerät Klasse A. Sie wurden getestet und entsprechen demnach EN55022/CISPR22 und EN55024/CISPR24. In einer Wohnumgebung können diese Produkte Funkinterferenzen erzeugen, und der Benutzer kann genötigt sein, entsprechende Maßnahmen zu ergreifen. Um EG-Anforderungen zu entsprechen, müssen zum Anschließen des ausrüstung und anderer Peripheriegeräte abgeschirmte Kabel verwendet werden. Dieses Produkt wurden in einem typischen, der Klasse A entsprechenden, Host-System getestet. Es wird davon ausgegangen, daß diese Produkte auch in jedem Klasse A entsprechenden System entsprechend funktionieren.

### (Italiano) Informazioni per gli utenti europei – Dichiarazione di conformità

#### Nota per i prodotti hardware Matrox supportati da questa guida

Questi dispositivi sono conformi alla direttiva CEE 2014/30/EU relativamente ai dispositivi digitali di Classe A. Sono stati provati e sono risultati conformi alle norme EN55022/CISPR22 e EN55024/CISPR24. In un ambiente domestico, questi prodotti possono causare radiointerferenze, nel qual caso all'utente potrebbe venire richiesto di prendere le misure adeguate. Per soddisfare i requisiti CEE, l'apparecchiatura e le altre periferiche vanno collegati con cavi schermati. Questi prodotti sono stati provati in un tipico sistema host conforme alla Classe A. Inoltre, si dà per scontato che questi prodotti acquisiranno la conformità in qualsiasi sistema conforme alla Classe A.

### (Español) Información para usuarios europeos – Declaración de conformidad

#### Observación referente a los productos de hardware de Matrox apoyados por este manual

Estos dispositivos cumplen con la directiva de la CE 2014/30/EU para dispositivos digitales de Clase A. Dichos dispositivos han sido sometidos a prueba y se ha comprobado que cumplen con las normas EN55022/CISPR22 y EN55024/CISPR24. En entornos residenciales, estos productos pueden causar interferencias en las comunicaciones por radio; en tal caso el usuario deberá adoptar las medidas adecuadas. Para satisfacer las disposiciones de la CE, deberán utilizarse cables apantallados para conectar el equipo y demás periféricos. Estos productos han sido sometidos a prueba en un típico sistema anfitrión que responde a los requisitos de la Clase A. Se supone que estos productos cumplirán también con las normas en cualquier sistema que responda a los requisitos de la Clase A.





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