Matrox Monarch HD

User Guide

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Welcome to Matrox Monarch HD

Matrox Monarch HD is a small, easy-to-use video streaming and recording appliance designed for professional video producers who need to simultaneously stream a live event and record the master quality version for post-event editing. By separating the task of recording from streaming in a single integrated unit, Matrox Monarch HD ensures that the Content Delivery Networks (CDNs) are focused on delivering quality video to your audience while you control the quality of the archive.

From any HDMI input source such as a camera or switcher, Matrox Monarch HD generates an H.264-encoded stream compliant with RTSP or RTMP protocols. While encoding the video at bit rates suitable for live streaming, Matrox Monarch HD simultaneously records a high-quality MP4 or MOV file to an SD card, a USB drive, or a network-mapped drive. Matrox Monarch HD is remotely controlled using any computer or mobile device with a web browser.

Supported input formats

Matrox Monarch HD supports the following video input formats:

- 1920 ×1080p at 23.98/24/50/59.94/60 fps.
- 1280 ×720p at 50/59.94/60 fps.
- 1920 ×1080i at 25/29.97 fps.

Supported operating systems and web browsers

Operating systems

The Matrox Monarch Finder (used to acquire the device network IP address when connected to a network with a DHCP server) and Matrox Monarch HD Firmware Updater support the following operating systems:

- Mac OS X Mavericks and Mountain Lion.
- Microsoft Windows 7.

Web browsers

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

- Microsoft Internet Explorer.
- Apple Safari.

Note If you experience display issues in the Command Center when using Monarch HD with Internet Explorer, disable Compatibility View.

Streaming

Monarch HD provides streaming settings for using RTSP and RTMP streaming protocols for use on Adobe Media Server, Wowza Media Server, a software video player, such as QuickTime and VLC, or any of the popular Content Delivery Networks (CDNs), such as YouTube Live and Ustream.

Recording

Monarch HD 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.

About this guide

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

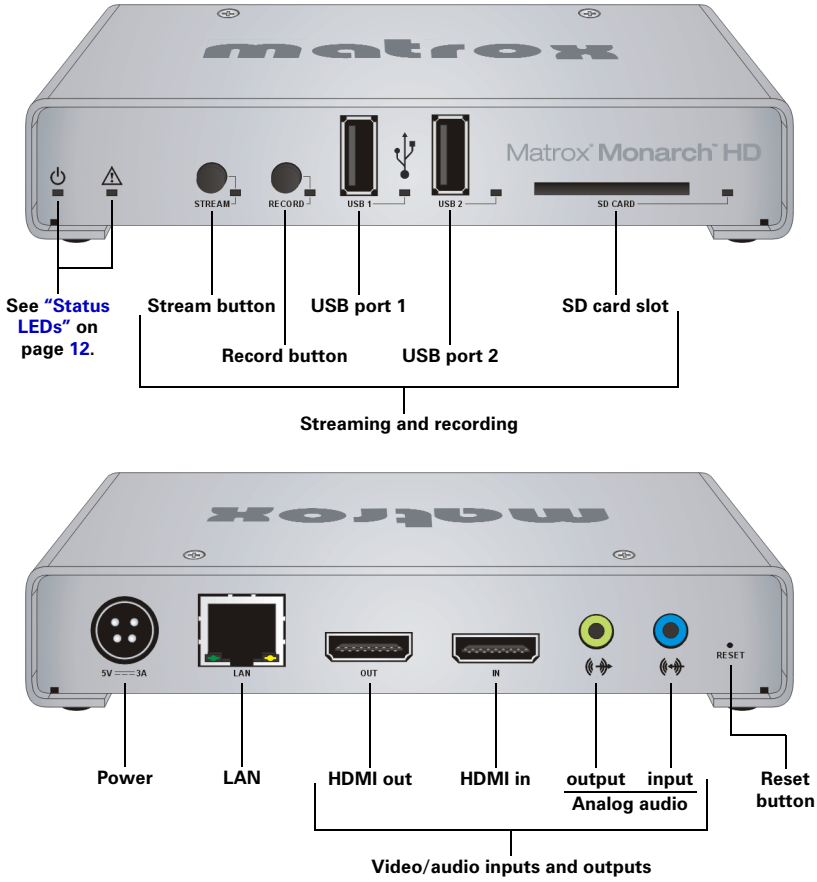
Style conventions

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 HD 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.

Matrox Monarch HD hardware

This section explains the Matrox Monarch HD hardware components. For hardware technical specifications, see Appendix A, "Matrox Monarch HD Specifications."



Streaming and recording

This section details the Monarch HD hardware components that are used for streaming and recording.

Stream button

The Stream button's functionality depends on the selected stream mode (RTSP or RTMP). The Stream button is disabled when Monarch HD is set to Record-only operating mode. For information on specifying your stream settings, see "Specifying stream settings" on page 28.

- **RTSP mode** If Monarch HD is set to stream in RTSP mode, the unit delivers stream data once a client connects to Monarch HD using the RTSP streaming protocol, and therefore does not require you to press the Stream button. When a client connects to Monarch HD, the Stream LED flashes.
- **RTMP mode** If Monarch HD is set to stream in RTMP mode, press the Stream button to begin streaming your input source to the stream destination specified in the stream settings. Pressing the Stream button starts the stream for that device only. If your Monarch HD is set to control multiple Monarch HD devices, you must use the control buttons on the **Control** page of the Command Center to start and stop streaming multiple Monarch HD devices on the network at the same time (see Chapter 5, "Streaming and Recording"). When streaming, the Stream LED flashes. Press the Stream button again to stop streaming.

Note The Stream button activates when you release the button. If you want to start/stop streaming and recording at the same time, press and hold the Stream and Record buttons and then release them at the same time.

Record button

Press the Record button to start recording your input source to the media selected in the record settings. The Record button is disabled when Monarch HD is set to Stream-only operating mode. For information on specifying your record settings, see "Specifying record settings" on page 33. Pressing the Record button starts the recording for that device only. If your Monarch HD is set to control multiple Monarch HD devices, use the control buttons on the **Control** page of the Command Center to start and stop recording multiple Monarch HD devices on the network at the same time (see Chapter 5, "Streaming and Recording"). When recording, the Record LED flashes. Press the Record button again to stop the recording. Unless a specific record duration limit was set in the record settings, Monarch HD limits the duration of each recording to five hours. The recording will automatically stop when the duration limit is reached.

Note The Record button activates when you release the button. If you want to start/stop recording and streaming at the same time, press and hold the record and Stream buttons and then release them at the same time.

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 the Monarch HD HDMI input. To select USB port 1 or 2 as the recording destination, see "Specifying record settings" on page 33.

Please note the following about using USB devices:

- Monarch HD 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 HD 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 HD 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 up to 30 seconds for Monarch HD to detect a newly connected USB device (verified on the status page).
- For USB 3.0 hard drives without a dedicated power supply, Monarch HD 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 HD 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 11).
- 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 24).

SD card

Use the SD card slot for recording the source connected to the Monarch HD HDMI input to an SD card. Monarch HD 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 “Specifying record settings” on page 33.

Remarks

- It may take up to 30 seconds for Monarch HD to detect a newly inserted SD card.
- When a recording is stopped, it may take up to ten seconds for Monarch HD to finalize the file, during which the SD card LED continues to flash. To avoid corrupted video files, do not remove the SD card when its LED is flashing.

Video/audio inputs and outputs

Matrox Monarch HD only supports HD video signals. If you connect an input signal with a resolution smaller than 1280×720, the Monarch HD will not detect the connected input, and the video output and web interface will display “No video signal”.

HDMI in

Provides an input for HD HDMI video (YUV or RGB) from a digital HDMI device for streaming and recording. The HDMI input supports the following video input formats:

- 1920×1080p at 23.98/24/50/59.94/60 fps
- 1280×720p at 50/59.94/60 fps
- 1920×1080i at 25/29.97 fps

Important Monarch HD does not support upscaling the input source for streaming or recording.

Monarch HD 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 HD’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 HD analog audio input, see “Specifying audio input settings” on page 26.

HDMI out

Provides a preview of the HDMI input, and the audio selected as the audio input source. You can choose between the first two audio channels present in the HDMI input or the audio connected to the Monarch HD analog audio input (see “Specifying audio input settings” on page 26). HDCP and SD signals are not supported on this output. The HDMI output supports YUV and RGB devices. To monitor your input source, the HDMI monitor must support the video input format.

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 HDMI input or the audio connected to the Monarch HD analog audio input, see “Specifying audio input settings” on page 26.

Analog audio output

Provides an unbalanced stereo analog audio output for monitoring the audio selected as the audio input source.

LAN

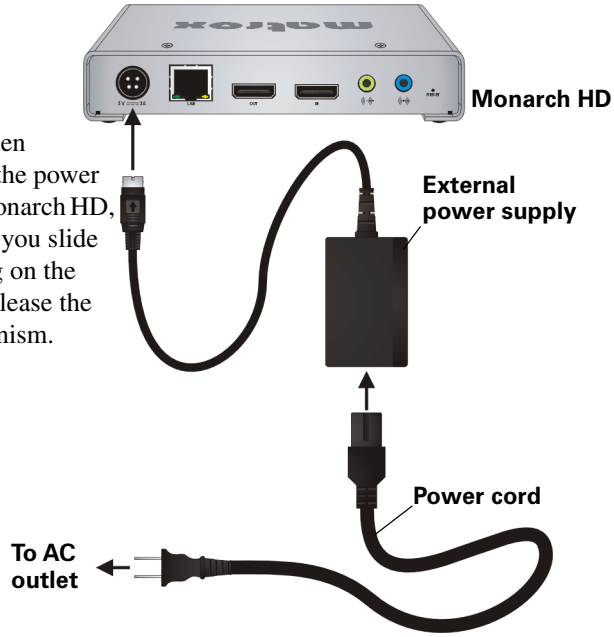
The LAN port is an auto-sensing 10/100/1000 Base-T Ethernet port used to connect Monarch HD to an Ethernet network via a standard RJ-45 Ethernet cable. For information on how to connect to a network, see Chapter 3, “Network Connection and Setup.”

Powering Monarch HD

Power the Monarch HD device using an AC outlet via the external power supply and a power cord. When power is supplied to Monarch HD, the device begins a power-up sequence during which all LEDs illuminate. The device is ready when two or more of the recording destination LEDs (USB port 1, USB port 2, SD Card) turn off, depending on your settings. To power off Monarch HD, disconnect Monarch HD from the power source. For power specifications, see Appendix A, “Matrox Monarch HD Specifications.”

Note When the device is powered off, all current settings are maintained and any logged errors are cleared (see “Monarch HD errors” on page 44).

Caution When disconnecting the power supply from Monarch HD, make sure that you slide back the casing on the connector to release the locking mechanism.



Using the Reset button

You can use the Monarch HD 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 11) also saves the Monarch’s IP address and status 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 factory reset allows you to switch to a Static IP (see“Switch to Static IP mode” on page 12), or load pre-configured Monarch settings from a configuration file on a USB device connected to USB port 2 (see “Automatic configuration” on page 24).

Remarks

- A power cycle of the Monarch HD 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 HD errors” on page 44).
- The Reset button is recessed in order to prevent unintended activation. Use a straightened paper clip, or similar device, to press the Reset button.
- 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 12.”

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 Monarch HD, press the Reset button on the device. The device begins a power-up sequence during which all LEDs illuminate. The device is ready when two or more of the recording destination LEDs (USB port 1, USB port 2, SD Card) turn off, depending on your settings.

Switch to Static IP mode

You can switch your Monarch HD device to Static IP mode by pressing the Record button while the Record 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 (all LEDs illuminate), the Record LED flashes for three seconds.
2. Press the Record button on the device while the Record 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 two or more of the recording destination LEDs (USB port 1, USB port 2, SD Card) turn off, depending on your settings.

Reset to factory defaults

When resetting Monarch HD using this method, all Monarch HD 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 12."

You can also use a factory reset to load pre-configured Monarch HD settings from a configuration file. For more information, see "Automatic configuration" on page 24.

To reset Monarch HD 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 all LEDs illuminate. The device is ready when all LEDs turn off except the Power (⏻), Stream, Record, and USB port 1 LEDs.

Status LEDs

This section explains the Monarch HD status LEDs.

LED	State	Condition
⏻	Green	Device is powered.
⚠	Yellow	Indicates that a streaming and/or recording error has occurred. This includes a physical disconnect of the network cable. The LED turns off when the error is cleared in the Command Center, when reconnected, or when a new stream and/or recording is successfully started. For information on how to view and clear errors, see "Monarch HD errors" on page 44.

LED	State	Condition
STREAM	OFF	Indicates that Monarch HD is set to Record-only mode. In this mode, the Stream button is disabled.
	Blue (solid)	Indicates that Monarch HD is set to stream in RTSP or RTMP mode.
	Blue (flash)	Streaming in progress. If set to RTSP mode, the Stream LED flashes when a client is currently connected to the Monarch HD device. If set to RTMP mode, the Stream LED flashes when a stream is started using the Stream button on the device or when using the control buttons in the Command Center. If a disconnection occurs while in Stream-only mode, the LED will flash faster while the device attempts to reconnect. The LED will go back to the regular flashing speed once it establishes a new connection.
STREAM and RECORD	Blue (solid)	Indicates a disconnection in Stream and Record mode. The LED will stop flashing upon disconnecting (The device is not trying to establish a new connection) and will stay this way until it is manually restarted.
RECORD	OFF	Indicates that Monarch HD is set to Stream-only mode. In this mode, the Record button is disabled.
	Red (solid)	Indicates that Monarch HD is set to record to the selected media.
	Red (flash)	Recording in progress.
USB ports 1/2	OFF	USB port 1/USB port 2 is not selected as the recording media, or Monarch HD is set to Stream-only mode.
	Red (solid)	USB port 1/USB port 2 is selected as the recording media.
	Red (flash)	Monarch HD is currently writing to the media device connected to USB port 1/USB port 2. Do not remove the USB device when its LED is flashing. Doing so may result in corrupted video files.

LED	State	Condition
SD CARD	OFF	The SD card slot is not selected as the recording destination, or Monarch HD is set to Stream-only mode.
	Red (solid)	The SD card slot is selected as the recording destination.
	Red (flash)	Monarch HD is currently writing to the SD card inserted in the SD card slot. Do not remove the SD card when its LED is flashing. Doing so may result in corrupted video files.

3

Network Connection and Setup

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

Introduction

The network connection and setup instructions depend on whether you'll be connecting Monarch HD 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 HD must be set to DHCP IP mode. If your network does not have a DHCP server, Monarch HD must be set to Static IP mode. By default, Monarch HD is set to DHCP IP mode. Once connected to a network, the stream and record settings are specified using the Monarch HD Command Center.

To access the Command Center, you must know the network IP address of the Monarch HD device. When connecting to a network with a DHCP server, the Monarch HD IP address is assigned by the DHCP server. In this case, you can use the Matrox Monarch Finder utility to find the Monarch HD IP address. When connecting to a network without a DHCP server, you must assign a static IP address to Monarch HD. A default IP address is provided when in Static IP mode.

Network connection and IP address

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

Note If you switch the network connection while Monarch HD is powered and the switch results in Monarch HD 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 HD device (see "Using the Reset button" on page 11).

Finding the Monarch HD's current IP address

In addition to using the Monarch Finder utility, there are two ways to quickly find the Monarch HD's current IP address. You can either use an HDMI monitor to display the address at boot up, or you can connect a USB device to the Monarch, and then reboot it, to automatically save the IP address (and Monarch status) to the USB device as a text file.

Displaying the IP address on an HDMI monitor

You must have your Monarch device's IP address to access the Command Center. This is a quick way of obtaining the IP address:

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

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

Saving the IP address and status to USB

You can save a file containing the Monarch HD's IP address and current status to a USB device, making this information easily accessible.

1. Insert a formatted USB device into the USB port 2 (see "USB ports 1 and 2" on page 7).
2. Reboot your Monarch HD by pressing the Reset button on the device. It is complete when two or more of the recording destination LEDs (USB port 1, USB port 2, SD Card) turn off (see "Device reboot" on page 11).

The Monarch HD 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 HD's current IP address" on page 16), or if you need to share status information for your unit.

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 HD 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 Finder utility to find the IP address of your Monarch HD device.

1. Connect an Ethernet cable between Monarch HD's LAN port and a network port.
2. Make sure that power is supplied to Monarch HD (see "Powering Monarch HD" on page 10).
3. Monarch HD 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 12), or set it to DHCP using the Command Center (see "Setting the IP mode" on page 41).
4. On a computer that is on the same network subnet as your Monarch HD device, download the Matrox Monarch Finder utility at www.matrox.com/video/support/. The Matrox Monarch Finder is available for both Mac OS and Windows systems.
5. Double-click the downloaded *MatroxMonarchFinder* file to open the finder utility.
6. In the **Matrox Monarch Finder** window, click **Scan**. The finder will detect all the Monarch HD devices that are connected to the same network subnet as your computer, and display each device's name and IP address. Take note of the IP address(es).

Tip If you have multiple Monarch HD devices, you may want to change the name of each device for easier identification (see "Device name and password" on page 22).

7 Open the Command Center (see "Accessing the Command Center" on page 19).

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 HD device. In this case, you must assign a static IP address to Monarch HD and you may be required to change your computer's network configuration to establish a connection between your computer and Monarch HD.

1 Power Monarch HD (see "Powering Monarch HD" on page 10).

2 Monarch HD must be set to Static IP mode. By default, Monarch HD is set to DHCP IP mode. You can switch Monarch HD to Static IP mode using the Reset button (see "Switch to Static IP mode" on page 12).

3 Establish a connection between Monarch HD and your computer using one of the following methods:

- Connect an Ethernet cable from Monarch HD's LAN port directly to your computer's Ethernet port.
- Connect an Ethernet cable from Monarch HD's LAN port to the same network switch as your computer.

4 In order for your computer to communicate with Monarch HD, your computer's IP address must be in the same network range as your Monarch HD's IP address. If it isn't, then you must change your computer's IP address accordingly. By default, the Monarch HD 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 HD using a point-to-point connection (direct connection between your computer and Monarch HD). The default IP address is not recommended for a traditional network setting. If you wish to use Monarch HD in Static IP mode over a network, after the initial setup we recommend that you change the static IP address of the Monarch HD 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 "Setting the IP mode" on page 41.

5 Open the Command Center (see "Accessing the Command Center" on page 19).

Accessing the Command Center

The Monarch HD Command Center is where you specify the Monarch HD settings and control the streaming and recording for a single Monarch HD device or multiple devices on the same network. A Monarch HD network IP address is required to access the Command Center (see "Network connection and IP address" on page 16).

1 Power Monarch HD and connect it to an Ethernet network.

2 Open your computer's web browser, type Monarch HD's IP address in the browser's address field and then press **ENTER**.

The Command Center opens.

Note Older versions of the Monarch firmware require a "*/Monarch"* after the IP address (for example, *192.168.68.11/Monarch*). If you have an older firmware version, consider upgrading to the latest firmware from the support section of our website: www.matrox.com/video/support.

3 Use the Command Center to specify your Monarch HD settings and to control streaming and recording (see Chapter 4, "Specifying Settings and Using the Command Center").

Logging in to the Command Center

The Command Center opens on the **Status** page. The **Status** and **About** pages in the Command Center can be accessed without logging in. To access any other page, such as the **Control** or **Stream Settings** page, click the menu item for the page that you want to access and then enter your username and password. By default, the username and password are set to *admin*. The username cannot be changed. If you wish to change the password for your Monarch HD device, see "Username and password" on page 22.

Updating the Monarch HD firmware

The firmware on your Monarch HD device is updated using the Matrox Monarch HD Firmware Updater. To view the current firmware version of your Monarch HD, see "Firmware version, warranty, and documentation" on page 45. The Matrox Monarch HD Firmware Updater is available for both Mac OS and Windows systems. A Monarch HD device's network IP address is required to update its firmware (see "Network connection and IP address" on page 16). Updating the Monarch HD firmware resets all settings to factory defaults, resets the device password to *admin*, and sets the device IP mode to DHCP.

Important To avoid damaging your Monarch HD hardware, make sure that you don't simultaneously update the same Monarch HD device using more than one instance of the updater.

1. Power Monarch HD and connect it to an Ethernet network.
2. On a computer that is on the same network subnet as the Monarch HD that you want to update, download the latest version of the Matrox Monarch HD Firmware Updater at www.matrox.com/video/support/.

Note You cannot update the Monarch HD firmware over a wireless network. The Matrox Monarch HD Firmware Updater must be on a computer that is connected to the network/router using a wired Ethernet connection.

3. Double-click the *MatroxMonarchHDFirmwareUpdater.exe* (Windows) or *MatroxMonarchHDFirmwareUpdater.app* (Mac OS) file to open the updater utility.
4. In the **Matrox Monarch HD Firmware Updater** window, enter the network **IP Address** of the Monarch HD device that you want to update, and then click **Add Monarch HD device**. On Windows systems, if you have multiple Monarch HD devices on the network, add the IP address for every device in the Matrox Monarch HD Firmware Updater and all Monarch HD devices will be updated in series. On Mac OS systems, you must update each device separately. To remove a Monarch HD device from the list, select the device and click **Remove Monarch HD device**.
5. Click **Update**. To view the status of the update in real time, click **Show log**.

Important To avoid damaging the Monarch HD hardware, do not remove power from Monarch HD during the firmware update. The Monarch HD device will turn off and on at different times during the update process. The update is complete when all LEDs turn off except the Power (⏻), Stream, Record, and USB port 1 LEDs.

6. The Monarch HD device is automatically set to DHCP IP mode when updating the firmware. To switch the device to Static IP mode after a firmware update, see "Switch to Static IP mode" on page 12.

4

Specifying Settings and Using the Command Center

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

Introduction

The Monarch HD Command Center is a web-based application that allows you to configure Monarch HD settings, control streaming and recording sessions, and import/export settings to or from other devices.

Note You must know the Monarch HD IP address to access the Command Center (see "Accessing the Command Center" on page 19).

Device name and password

The **Account** page in the Command Center is where you give a descriptive name to your Monarch HD device and change your Monarch HD password.

Accessing the Account page

To access the **Account** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Device > Account**.

Device name

By default, the device name is set to *Monarch HD*. You can give a unique name to each Monarch HD device for easy identification within the Command Center and the Matrox Monarch Finder utility. This is especially useful when you have multiple Monarch HD devices on the same network. To change the name of your Monarch HD, type the desired name in the **Device name** box, and then click **Change**.

Username and password

A username and password are required to access the options and features in the Monarch HD Command Center. Apart from the **Status** and **About** pages, which can be viewed without logging in, a username and password are required to access all other Command Center pages, such as the **Control** and **Stream Settings** pages.

By default, the Monarch HD 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 HD 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 12.

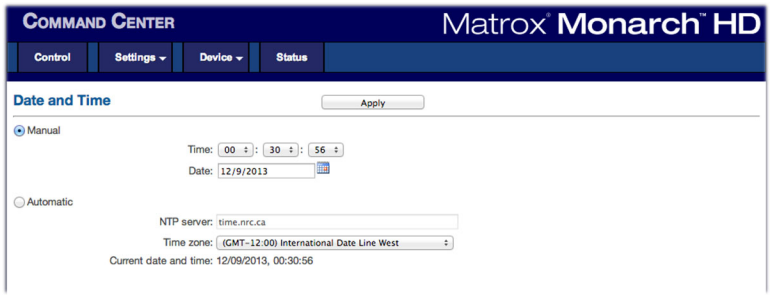
Setting the device date and time

The **Date and Time** page in the Command Center lets you set the date and time for your Monarch HD device. You can set the date and time manually or automatically by using an NTP server. The date and time are used in the naming of the recorded files (see "Path and filename" on page 38).

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

Accessing the Date and Time page

To access the **Date and Time** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Device > Date and Time**.



Setting the date and time manually

1. Select **Manual**.
2. Set the **Time**, and enter a **Date** in the format DD/MM/YYYY, or click to select a date from the calendar.
3. Click **Apply**. You'll be notified that Monarch HD will be rebooted in order to apply the changes.

Setting the date and time automatically

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.

1. Select **Automatic**.
2. Enter a local or public **NTP server** address. The default NTP server address is time.nrc.ca.
3. Select a **Time zone** from the list. The current date and time associated with the selected NTP server and time zone are displayed next to **Current date and time**.
4. Click **Apply**. You'll be notified that Monarch HD will be rebooted in order to apply the changes.

Automatic configuration

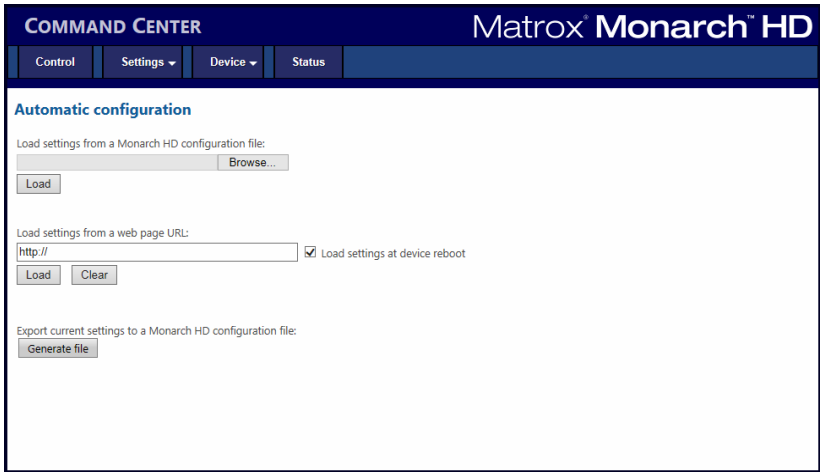
The **Automatic configuration** page in the Command Center is where you can export the current Monarch HD settings to an XML file (called the *Monarch HD configuration file*), import settings from a previously-created configuration file, or import settings from the same XML hosted on a web page URL.

When you have a Monarch HD configuration file, you can also copy it to a USB device, connect the device to USB port 2, and 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 16.

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

Accessing the Automatic configuration page

To access the **Automatic configuration page**, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Device > Automatic configuration**.



Loading settings from a Monarch HD configuration file

You can import Monarch settings from a previously-generated Monarch HD 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 25).

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

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

Loading settings from a web page URL

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 25). This option is particularly useful when there is a need to oversee the Monarch HD operation from a central control environment. You can set bit rates and destinations by managing a web page instead of logging into the Monarch HD Command Center.

1. Go to the **Automatic configuration** page of the Command Center.
2. In the **Load settings from a web page URL** 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 HD automatically load the settings from the specified URL the next time it boots up.

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

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

Generating a configuration file

You can export the current settings of your Monarch HD device as a Monarch HD 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 devices.

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

1. Go to the **Automatic configuration** page of the Command Center.
2. Under **Export current settings to a Monarch HD configuration file**, click **Generate file**.
3. Select a save location. Do not change the filename (MonarchSettings.xml) if you plan to automatically configure a Monarch from a USB device (see "Automatically importing Monarch settings on factory reset" on page 26).

The Monarch HD 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 HD can automatically import configuration settings from a Monarch HD configuration file that is on a USB device connected to the Monarch's USB port 2.

1. Copy the Monarch HD configuration file to a USB device (see "Generating a configuration file" on page 25).

Note The configuration file must have the original filename given by the Monarch HD when the file was generated (MonarchSettings.xml).

2. Connect the USB device to the Monarch HD's USB port 2 (see "USB ports 1 and 2" on page 7).
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 12).

The Monarch HD boots up with your settings loaded.

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

Specifying audio input settings

The **Audio Settings** page in the Command Center lets you set the audio input source that will be used for streaming and recording, and the audio sample rate for your analog audio source. If controlling multiple devices, each device on the network streams and records the audio based on its own audio settings.

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

Accessing the audio settings

To access the audio settings, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Settings > Audio**.

Audio source

Select the Monarch HD audio input source that will be used for streaming and recording. Monarch HD supports two audio channels for streaming and recording. You can choose to use either the first two audio channels from your HDMI input source, or the stereo audio source connected to Monarch HD's analog audio input (see "Video/audio inputs and outputs" on page 9). Monarch HD uses the AAC audio format for streaming and recording. To monitor the selected audio source, you can use either the HDMI or analog audio output.

Note You can choose whether or not to include audio when streaming and recording in the stream and record settings, respectively.

Analog audio sample rate

If using analog audio, select the desired sample rate for your analog audio input source. If you are using an HDMI audio input source, this option is unavailable (appears dimmed) because the sample rate is determined by the digital signal.

The default setting is 48 kHz, but you can choose any of the available options. 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.

Audio bit rate

Select the bit rate to which you want to stream the audio. This setting applies to both the stream and record settings.

Note (Analog audio only) To select the 32 kb/s bit rate, you must first select 22.05 kHz for the **Analog audio sample rate**.

Monarch HD operating modes

To ensure the highest possible streaming/recording video data rates based on your needs, Monarch HD offers three operating modes:

- **Stream only** This mode disables the record functionality for your Monarch HD. In this mode, the maximum average video data rate for streaming is set to 20 000 kb/s.
- **Record only** This mode disables the stream functionality for your Monarch HD. In this mode, the maximum average video data rate for recording is set to 30 000 kb/s.
- **Stream and record** This mode allows you to simultaneously stream and record with your Monarch HD device. In this mode, the maximum average video data rate for streaming is 10 000 kb/s, and the combined maximum average video data rate for streaming and recording is 30 000 kb/s. For example, if the average video data rate for streaming is set to the maximum value of 10 000 kb/s, the maximum average video data rate for recording is 20 000 kb/s.

Specifying the operating mode

You can set the Monarch HD operating mode in either the **Stream Settings** page or **Record Settings** page.

Important Changes made to the operating mode are automatically and instantly applied. The **Apply** button in the **Stream Settings** page and **Record Settings** page does not apply to the operating mode setting.

Specifying stream settings

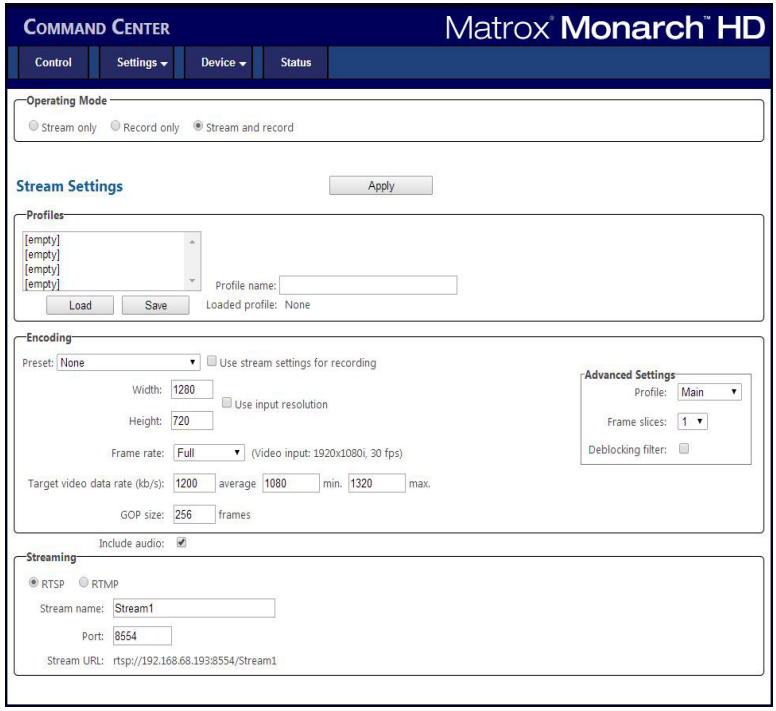
The **Stream Settings** page in the Command Center lets you set the stream settings for the Monarch HD device. If controlling multiple devices, each device on the network streams based on its own stream settings. For details on how to start/stop streaming, see Chapter 5, “Streaming and Recording.”

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

Accessing the stream settings

To access the stream settings, open the Monarch HD Command Center (see “Accessing the Command Center” on page 19), and then choose **Settings > Stream**.

Note The stream settings cannot be modified when Monarch HD is set to Record-only mode (see "Monarch HD operating modes" on page 28).



Operating mode

Select the Monarch HD operating mode as detailed in "Monarch HD operating modes" on page 28.

Stream profiles

Monarch HD lets you save up to four stream profiles that you can load at any time. Saving a new stream profile saves the current encoding and streaming settings.

Saving a stream profile

1. Specify your stream 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**.

Loading a stream profile

1. From the **Profile** list, select a profile.
2. Click **Load**. The loaded profile will appear next to **Loaded profile**. If a change is then made to any of the stream settings, "(modified)" will appear next to the loaded profile name.

Encoding options

Specify the following H.264 encoding settings for streaming.

Presets

Monarch HD comes with predefined presets that you can use to quickly set your encoding settings. A preset automatically sets all encoding settings, however, you should verify that the preset frame rate is appropriate for your encoding. You can also use a preset as a starting point when specifying your stream encoding settings. To use a preset:

1. Select the desired preset from the **Preset** list.
2. Specify the **Frame rate** setting as detailed in "Frame rate" on page 30.

Note 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.

Use stream settings for recording

In Stream-and-record operating mode, select this option to use the stream encoding settings also for recording.

Video resolution

Select the resolution to which you want to stream by typing values for the **Width** and **Height**. You can also select **Use input resolution** to stream at your input source's original resolution. Monarch HD does not support upscaling the input source for streaming. When streaming at a resolution with a width greater than 1280 and/or height greater than 720, the maximum supported frame rate is 30 fps.

Note In Stream-and-record operating mode, if the current record encoding resolution exceeds a width of 1280 and/or height of 720, and you want to stream at a resolution greater than 1280×720, the stream and record settings must use the same encoding settings. In this case, you must select the **Use stream settings for recording** option.

Frame rate

You can choose to stream at your input source's **Full** frame rate, or at a **Half** or a **Quarter** of your source's frame rate.

Note If your input source is 1920×1080p at 50/59.94/60 fps and the streaming resolution is set to a width greater than 1280 and/or height greater than 720, the maximum supported streaming frame rate is 30 fps. If **Full** is selected from the **Frame rate** list, the frame rate will automatically be set to **Half** of the input source's frame rate after clicking **Apply**.

Target video data rate

Enter the target **average** video data rate for your stream. When entering an average data rate, the **minimum** and **maximum** data rates are automatically set to 90% and 110% of the average data rate, respectively. The default minimum and maximum values are suitable in most instances, however, you can change the minimum and maximum values to suit your needs. The maximum average video data rate for streaming depends on the selected operating mode (see "Monarch HD operating modes" on page 28). Monarch HD uses a variable data rate when encoding.

GOP size

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

Include audio

Select **Include audio** to stream the selected audio source (see "Audio source" on page 27) along with the video. Monarch HD uses the AAC audio format for streaming. Clear this option if you do not want to include audio in your stream.

Advanced settings

- **Profile** Set the H.264 encoding profile for your stream to either **Baseline**, **Main**, or **High**. Typically, High profile provides the best image quality and is suitable in most instances. However, depending on the decoder used when viewing the stream, such as with mobiles 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 may be useful when a multi-slice decoder device is used to view the stream.
- **Deblocking filter** Select this option to remove blockiness from the encoded video when streaming. This option is especially useful when a low video data rate is required.

Streaming options

Monarch HD 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. In RTSP mode, Monarch HD acts as a streaming server to which clients can connect via a media server, software video player, or CDN 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 HD can send stream data to a CDN or media server that supports the RTMP streaming protocol.

Using the RTSP streaming protocol

1. Select **RTSP**.
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 HD network via a Wowza Media Server, software video player, or CDN that supports the RTSP streaming protocol.

Remarks

- As soon as you apply RTSP stream settings, Monarch HD is ready to deliver RTSP streams to clients, and will begin streaming data once a client connects to Monarch HD using the RTSP streaming protocol. Monarch HD will continue to do so until it is no longer in RTSP mode. There is no need to use the Stream button located on the Monarch HD device or the Stream button in the Command Center to start streaming.
- If you get choppy video when streaming to VLC media player, you must enable the Real-time Transport Protocol (RTP) in VLC. To do this, open the VLC media player, go to the **Advanced Preferences** screen, choose **Input / Codecs > Demuxers > RTP/RTSP**, and then select **Use RTP over RTSP (TCP)**.

Using the RTMP streaming protocol

1. Select **RTMP**.
2. Specify the destination **Server URL** and **Stream name** provided by your CDN or server administrator. If your CDN provides a streaming **XML file**, or when using Wowza Streaming Engine Manager, you can load the streaming XML file instead of entering the server URL and stream name. To do so, use the **Choose File** button to select the file, and then click **Load**. When loading a streaming XML file, just the destination information (server URL and stream name) from the streaming XML file will be loaded. If the streaming

XML file contains encoding information, those settings will not be loaded. Click **Clear** 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.

3. If your Flash-based server or CDN uses the "ModuleRTMPAuthenticate" method for RTMP authentication, a username and password is 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.
4. Start streaming the Monarch HD input source to a CDN or media server as detailed in Chapter 5, "Streaming and Recording."

Specifying record settings

The **Record Settings** page in the Command Center lets you set the record settings for the Monarch HD device. Monarch HD 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. Because FAT32 limits the recording file size to 4 GB, you must use an NTFS drive if your recorded file will be greater than 4 GB. If controlling multiple devices, each device on the network records based on its own record settings. For details on how to start/stop recording, see Chapter 5, "Streaming and Recording."

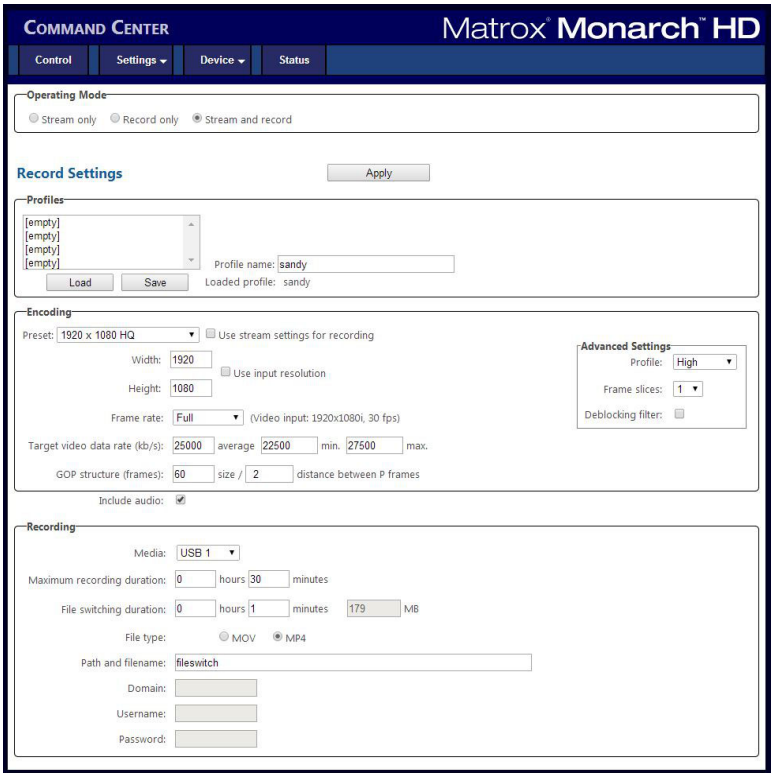
For approximate recording file sizes based on the average video data rate and recording duration, and approximate maximum file durations given the average video data rate and available disk space, see "Recording file sizes and duration" on page 39.

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

Accessing the record settings

To access the record settings, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Settings > Record**.

Note The record settings cannot be modified when Monarch HD is set to Stream-only mode (see "Monarch HD operating modes" on page 28).



Operating mode

Select the Monarch HD operating mode as detailed in "Monarch HD operating modes" on page 28.

Record profiles

Monarch HD lets you save up to four record profiles that you can load at any time. Saving a new record profile saves the current encoding and recording settings.

Saving a record profile

1. Specify your record 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**.

Loading a record profile

1. From the **Profile** list, select a profile.
2. Click **Load**. The loaded profile will appear next to **Loaded profile**. If a change is then made to any of the record settings, "(modified)" will appear next to the loaded profile name.

Encoding options

Specify the following H.264 encoding settings for recording.

Presets

Monarch HD comes with predefined presets that you can use to quickly set your encoding settings. A preset automatically sets all encoding settings, however you should verify that the preset frame rate is appropriate for your encoding. You can also use a preset as a starting point when specifying your record encoding settings. Monarch HD provides the following 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.
- **YouTube** Used for creating recorded files for delivery to most video on demand (VOD) streaming applications.

To use a preset:

1. Select the desired preset from the **Preset** list.
2. Specify the **Frame rate** setting as detailed in "Frame rate" on page 36.

Use stream settings for recording

In Stream-and-record operating mode, select this option to use the stream encoding settings also for recording.

Video resolution

Select the resolution to which you want to record by typing values for the **Width** and **Height**. You can also select **Use input resolution** to record at your input source's original resolution. Monarch HD does not support upscaling the input source for recording.

Note In Stream-and-record operating mode, if the current stream encoding resolution exceeds a width of 1280 and/or height of 720, and you want to record at a resolution greater than 1280×720, the stream and record settings must use the same encoding settings. In this case, you must select the **Use stream settings for recording** option.

Frame rate

You can choose to record at your input source's **Full** frame rate, or at a **Half** or a **Quarter** of your source's frame rate.

Note If your input source is 1920×1080p at 50/59.94/60 fps and the recording resolution is set to a width greater than 1280 and/or height greater than 720, the maximum supported recording frame rate is 30 fps. If **Full** is selected from the **Frame rate** list, the frame rate will automatically be set to **Half** of the input source's frame rate after clicking **Apply**.

Target video data rate

Enter the target **average** video data rate for your recording. When entering an average data rate, the **minimum** and **maximum** data rates are automatically set to 90% and 110% of the average data rate, respectively. The default minimum and maximum values are suitable in most instances, however, you can change the minimum and maximum values to suit your needs. The maximum average video data rate for recording depends on the selected operating mode (see "Monarch HD operating modes" on page 28). Monarch HD uses a variable data rate when encoding.

GOP structure

Type the **GOP size** (distance between I frames) and **distance between P frames** to which you want to encode your input source for recording. Monarch HD uses the IBP pattern when encoding for recording. For example, a GOP size of 15 and a distance between P frames of 3 creates a GOP structure of IBBPBBPBBPBBPBBI.

Include audio

Select **Include audio** to record the selected audio source along with the video. Monarch HD uses the AAC audio format for recording. Clear this option if you do not want to record audio. For more information on configuring audio settings, see "Specifying audio input settings" on page 26.

Advanced settings

- **Profile** Set the H.264 encoding profile for your stream. You can select either **Baseline**, **Main**, or **High**. Typically, High profile provides the best image quality and is suitable in most instances. However, depending on the decoder used when viewing the recorded file, such as with mobiles 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 recording may be useful when a multi-slice decoder device is used to view the recorded file.

- **Deblocking filter** Select this option to remove blockiness from the encoded video for recording. This option is especially useful when a low video data rate is required.

Recording options

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 HD 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 7, and "SD card" on page 8.

Maximum recording duration

Enter a **Maximum recording 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, and will stop only when your storage media is full.

The maximum file duration can include multiple files. For example, if you specify a five-hour recording duration, but you have entered a file switching duration (see "File switching duration" on page 37) of one hour, your overall recording session will stop after five hours (assuming the storage media has enough space), but Monarch HD will create five individual hour-long files.

File switching duration

Enter a **File switching duration** to separate your recording session into more than one file at predetermined intervals. For example, if you enter a duration of 30 minutes, Monarch HD will close the current file and start recording to a new file every 30 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 36).

Remarks

- The maximum file switching duration you can set is four hours and fifty minutes.
- If you enter a file switching duration of 0, Monarch HD will automatically switch to a new file every four hours and fifty minutes. This is a precaution that will avoid possible data loss that may occur from having files that are too large.
- On FAT32 storage media, file switching will occur automatically after 4 GB. This is a limitation of the FAT32 file system architecture. You can stop

recording at any time, either by using the control buttons in the Command Center (see "Control buttons" on page 51), or the Stream and Record buttons on the Monarch HD device (see "Streaming and recording" on page 6).

File type

Select the type of file that will be recorded. You can create either an **MOV** or **MP4** (MPEG-4) 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 HD will not create new folders. Each recorded filename contains the base name, date, and time using the following naming convention:

Basename-[YYYY-MM-DD_HH-MM-SS].mov or *.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.

- **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 base name. 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*.
- **Network** Use this option to record your input source to a shared folder on the network. The method for entering the path and filename depends on the operating system of the computer that contains the shared folder.
  - **Windows** 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 to which you want to record, followed by the shared folder name, and then the base name for the file in the following format:

    //IP address/shared folder name/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 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 record to the network location.
  - **Mac OS X Mountain Lion/Lion** When recording to a shared folder that is on a Mac OS X Mountain Lion or Lion system on the network, the folder to which you want to save the file must be shared using the

Network File System (NFS) file-sharing protocol (see "Sharing a Mac OS X Mavericks/Mountain Lion folder using NFS protocol" on page 40).

Important Shared folders that use a file-sharing protocol other than NFS are not supported with Monarch HD for recording.

When entering the path and filename, 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 base name for the file in 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**.

Domain, username, and password

When recording your source input to a network location (see "Media" on page 37) and Monarch HD 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.

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, Monarch HD limits the duration of each recording to four hours and fifty 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	25 000
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	33.8 GB
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	25 000
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

Sharing a Mac OS X Mavericks/Mountain Lion folder using NFS protocol

To record to a shared folder that is on a Mac OS X Mountain Lion or Lion system on the network (see "Path and filename" on page 38), the folder must be shared using the Network File System (NFS) file-sharing protocol as explained below.

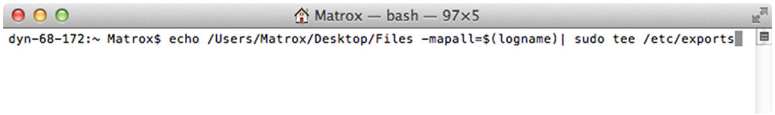
Note To share a folder using the NFS protocol, the full path to the folder that you want to share is required. You can obtain the full path to the folder by right-clicking the folder, and then clicking **Get Info**.

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 /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
   /etc/exports
   ```



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

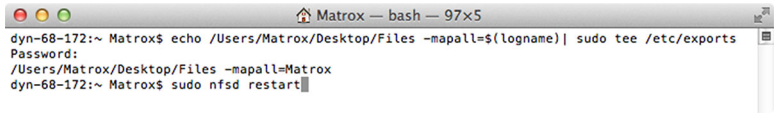
```
echo /Users/Matrox/Desktop/Files 169.254.1.11 -mapall=$(logname)| sudo
tee /etc/exports
```

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.

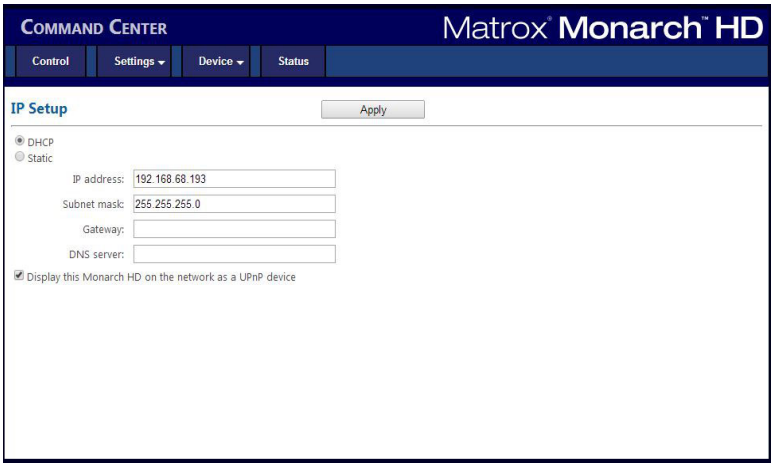
Setting the IP mode

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

Important Changing the IP mode will end the current Command Center session. To access the Monarch HD Command Center again, you'll need to enter a different Monarch HD 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 HD IP address and accessing the Command Center in DHCP or Static mode, see Chapter 3, "Network Connection and Setup."

Accessing the IP Setup page

To access the **IP Setup** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Device > IP Setup**.



Setting the IP mode to DHCP

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

1. Select **DHCP**.
2. Click **Apply**.
3. See "Network connection and IP address" on page 16 for instructions on how to connect Monarch HD to a network with a DHCP server, and how to acquire the Monarch HD network IP address to access the Command Center.

Setting the IP mode to Static

Set Monarch HD 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 HD. 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 12), the static IP address reverts to default.

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

3 Enter the **Subnet mask** on your network to which Monarch HD is connected. By default, the subnet mask is set to 255.255.255.0.

4 If required by your network configuration, enter the **Gateway** IP address and **DNS server**.

5 Click **Apply**.

6 See Chapter 3, "Network Connection and Setup" for instructions on how to connect Monarch HD 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 HD device, and how to access the Command Center.

Hiding Monarch HD from appearing as a UPnP device on the network

The Monarch HD 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 a printer, external hard drive, or similar UPnP device.

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

⇨ **To hide the Monarch HD:**

1 Access the Monarch HD Command Center (see "Accessing the Command Center" on page 19).

2 Choose **Device > IP Setup**.

3 Clear **Display this Monarch HD on the network as a UPnP device**.

4 Click **Apply**.

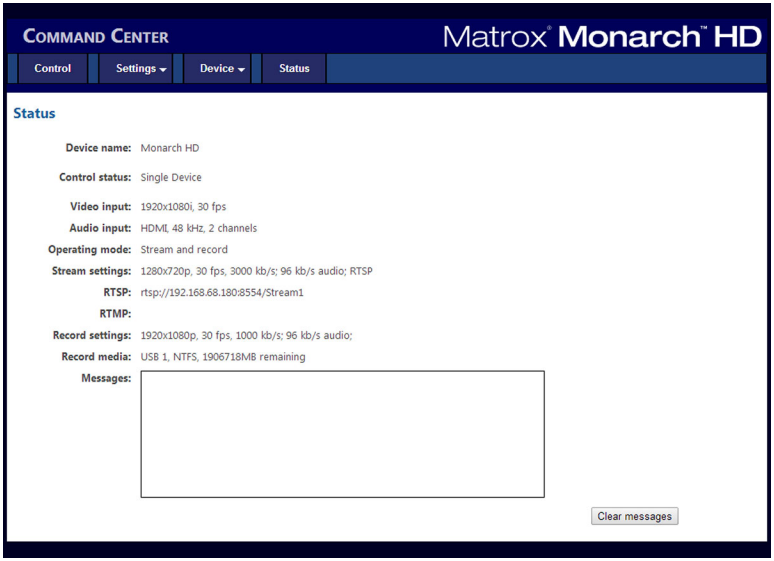
The Monarch HD will no longer be visible in Windows Explorer as a UPnP device. You may need to restart Windows Explorer for Monarch HD to disappear.

Viewing the Monarch HD status

The **Status** page in the Command Center provides a summary of the Monarch HD status and settings, as well as any logged errors. This page can be viewed without logging in.

Accessing the Status page

To access the **Status** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then click **Status**.



Monarch HD errors

When a streaming or recording error occurs, the ⚠ LED illuminates on the Monarch HD device. Unless you receive a pop-up error when using the buttons in the Command Center's **Control** page (see "Command Center Control page" on page 49), the error will be logged in the **Messages** section of the **Status** page.

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

Viewing and clearing errors

Streaming and recording errors that don't appear as a pop up error on the **Control** page are instantly logged in the **Messages** section of the **Status** page. The **Status** page displays the errors pertaining to that Monarch HD device only. To monitor streaming and/or recording when controlling multiple devices (see "Control streaming and recording for multiple devices on the same network" on page 48), we recommend that you open the Command Center for each Monarch

HD device. When you click the **Clear messages** button on the **Status** page, the logged errors are deleted from the list and the ⚠ LED turns off. The ⚠ LED will also turn off if you successfully start a new stream and/or recording.

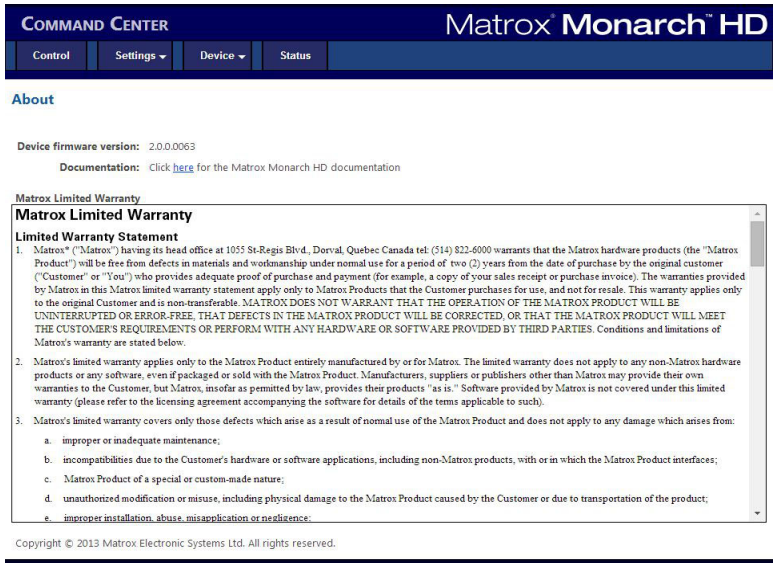
Note Powering off or resetting Monarch HD will clear all errors from the device.

Firmware version, warranty, and documentation

The **About** page in the Command Center lets you see the current firmware version of your Monarch HD device, provides a link to the Monarch HD documentation, and displays the Matrox Limited Warranty for Monarch HD. This page can be viewed without logging in.

Accessing the About page

To access the **About** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then choose **Device > About**.



Firmware version

Displays the current firmware version of your Monarch HD device. To update the Monarch HD firmware, see "Updating the Monarch HD firmware" on page 19.

5

Streaming and Recording

This chapter explains how to control streaming and recording for a single Monarch HD device, and multiple Monarch HD devices.

Introduction

Monarch HD lets you stream and record the input source connected to Monarch HD's HDMI input. If you have multiple Monarch HD devices connected to the same network, you can also control the streaming and recording of multiple devices from one device's Command Center.

Remarks

- Unless a specific record duration limit was set in the record settings, Monarch HD limits the duration of each recording to five hours. The recording will automatically stop when the duration limit is reached.
- When a recording is stopped, it may take up to ten seconds for Monarch HD 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.

Control streaming and recording for a single device

To control streaming and recording for a single Monarch HD device, you can use the following two methods:

- Use the control buttons in the Command Center (see "Control buttons" on page 51).
- Use the Stream and Record buttons on the Monarch HD device (see Chapter 2, "Matrox Monarch HD Hardware and Connections").

Control streaming and recording for multiple devices on the same network

Monarch HD allows you to start and stop the streaming and recording for up to five 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 "Control buttons" on page 51) in the Command Center instead of the Stream and Record buttons located on a Monarch HD device, which control the streaming and recording for that device only.

You can control multiple Monarch HD 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 HD 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. For details on enabling multi-device control in a Monarch HD's Command Center, and using the control buttons to stream and record, see "Command Center Control page.

Command Center Control page

The **Control** page lets you control the streaming and recording for your Monarch HD device. If you have other Monarch HD devices connected to the same network, you can also control the streaming and recording for up to four other devices at the same time. You can also use the Stream and Record buttons directly on a Monarch HD device to stream and record, however, you will not be able to control other devices on the network.

Accessing the Control page

To access the **Control** page, open the Monarch HD Command Center (see "Accessing the Command Center" on page 19), and then click **Control**.

Disabling Stream and Record buttons on the Monarch HD device

You can disable the physical Stream and Record buttons on the Monarch HD device to prevent someone from inadvertently stopping a streaming or recording session. This option only applies to the Monarch HD you are connected to, and not other Monarch HD devices you may be controlling.

To disable the Stream and Record buttons:

1. In the Command Center, click **Control**.

   For more information, see "Accessing the Command Center" on page 19.

2. Select **Disable Stream and Record buttons on this Monarch HD device**.

The Stream and Record buttons on the Monarch HD device are disabled.

Note This button disable feature is off by default and, when required, would also need to be performed after a factory reset.

Enabling multi-device control

This section details how to enable multi-device control of up to four other devices in the Command Center (see "Control streaming and recording for multiple devices on the same network" on page 48).

1. In the Command Center, click **Control**.
2. Select **Control multiple Monarch HD devices**.
3. For each Monarch HD 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. For information on acquiring a Monarch HD's IP address, see "Network connection and IP address" on page 16.
4. Activate or deactivate the control for a Monarch HD device by selecting or clearing the device's **Active** box.

Control buttons

The following table details the different states of the control buttons in the Command Center.

Note Depending on the selected operating mode (see "Monarch HD operating modes" on page 28), stream or record functionality may not be available.

	Button	Function	
Stream		Start stream (RTMP)	This button indicates that the Monarch HD device is set to stream in RTMP mode. Click this button to start streaming the input source connected to Monarch HD's HDMI input. If controlling multiple Monarch HD devices, those devices set to stream in RTMP mode will begin to stream their input sources as well.
		Stop stream (RTMP)	This button indicates that the Monarch HD device is currently streaming in RTMP mode. Click this button to stop streaming. If controlling multiple Monarch HD devices, those devices set to stream in RTMP mode will stop streaming as well. The devices on the network that are streaming in RTSP mode will continue to stream.
		Streaming (RTSP)	This button indicates that the Monarch HD device is currently set to stream in RTSP mode. In RTSP mode, the unit delivers stream data once a client connects to Monarch HD using the RTSP streaming protocol, and therefore does not require you to click the Stream button to start streaming.
		Stream disabled	Indicates that Monarch HD is currently set to Record-only operating mode.
Record		Start record	Click this button to start recording the input source connected to Monarch HD's HDMI input. If controlling multiple Monarch HD devices, those devices will begin to record their input sources as well.

	Button	Function	
Record (cont'd)		Stop record	This button indicates that the Monarch HD device is currently recording its input source. Click this button to stop recording. If controlling multiple Monarch HD devices, those devices will stop recording their input source as well.
		Record disabled	Indicates that Monarch HD is currently set to Stream-only operating mode.
Stream and Record		Start stream (RTMP) and record	This button lets you start simultaneous streaming and recording, and is available only when the Monarch HD device is set to stream in RTMP mode. Click this button to start streaming and recording the input source connected to Monarch HD's HDMI input. If controlling multiple Monarch HD devices, those devices will begin to stream and record their input sources as well. To stop streaming and recording, you can either stop streaming and recording at the same time, or use the separate Stop stream and Stop record buttons to stop each process separately.
		Stop stream (RTMP) and record	Click this button to simultaneously stop streaming and recording the input source connected to Monarch HD's HDMI input. If controlling multiple Monarch HD devices, those devices will stop streaming and recording their input sources as well.
		Stream and record button disabled	The stream and record button is disabled. This button appears when Monarch HD is currently either streaming or recording, or when Monarch HD is set to Stream-only or Record-only operating mode.

General

- **Regulatory compliance**
  - FCC Class B, CE Mark Class B, ACMA C-Tick Mark, VCCI
  - RoHS Directive 2002/95/EC
- **Dimensions**
  - Length 142 mm (5.6")
  - Width 109 mm (4.3")
  - Height 31 mm (1.22")
- **Power**
  - Line voltage: 100-240 VAC, 0.5 A
  - Frequency: 50-60 Hz
  - Input: External AC/DC adapter (IEC320-C8)
  - Output: +5VDC, 3A max
  - Total power consumption: 15 watts
  - DIN4 locking power connector

Connections

- **HDMI input**
  - Supported video input formats (auto-detected):
    - 1920×1080p at 23.98/24/50/59.94/60 fps
    - 1280×720p at 50/59.94/60 fps
    - 1920×1080i at 25/29.97 fps
  - HDMI Y,Cb,Cr 4:2:2 / RGB
  - First two channels of embedded audio
  - Standard Type A HDMI connector (19 pins)
- **HDMI output**
  - Passthrough of video input signal
  - HDMI Y,Cb,Cr 4:2:2 / RGB
  - Passthrough of two channels of embedded audio
  - Standard Type A HDMI connector (19 pins)
- **Unbalanced analog audio input**
  - 1x stereo pair
  - 3.5 mm (1/8") stereo jack
  - Input impedance: Hi-Z

- **Unbalanced analog audio output**
  - 1x stereo pair
  - 3.5 mm (1/8") stereo jack
  - Output impedance: 25 Ω
  - THD+N at 1 kHz, 10 kΩ, nominal level: < 0.042%
  - Frequency response: 20 Hz to 20 kHz +/- 1 dB
  - Channel separation, nominal level: -85 dB
  - Signal-to-noise ratio: -88 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 40º C
- Minimum/maximum storage temperature: –20 to 60º 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)

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.

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.

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.

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