Vizrt SDI I/O Module User Guide

Version 1.1

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Created on

2021/05/18

Contents

1 Introduction

Commitments and requirements can change from production to production. A powerful, versatile platform for multi-source production and multi-screen delivery workflows, this module can quickly pivot to accommodate additional cameras, devices, displays or destinations.

With the system's turnkey installation and operation, you can easily assemble a network of modules to configure your own multi-system and multi-site workflows.
From increasing your available inputs and outputs, to merging established and emerging technologies, to linking locations across your network, this SDI I/O Module is a universal solution that adapts to your production needs.

- Translate up to eight compatible video sources to SDI or NDI for input, output, or a combination of both.
- Configure for dual-channel 4K Ultra HD at up to 60 frames per second with support for 3G-SDI quad-link grouping.
- Integrate with compatible systems and devices across your network for switching, streaming, display, and delivery.
- Stack modules in a single location or station in multiple locations to meet the demands of your productions.

1.1 Feedback And Suggestions

We encourage suggestions and feedback about our products and documentation. To give feedback and/or suggestions, please contact your local Vizrt customer support team at www.vizrt.com.

2 Setup

This section contains information on the following topics:

2.1 Command And Control

Tip: SDI IO's interface requires a monitor resolution setting of at least 1280x1024.

1. Connect an external computer monitor to the HDMI port on the backplate (see Input/Output Connections).
2. Connect the mouse and keyboard to USB ports also on the backplate.
3. Connect the power cord to SDI IO's backplate.
4. Turn on the computer monitor.
5. Press the Power switch on SDI IO's faceplate (located behind the drop-down door).

At this point, the blue Power LED illuminates, as the device boots up (if this does not happen, please check your connections and retry). Though not a requirement, we do strongly recommend that you connect the unit using an uninterruptable power supply (UPS), as for any mission critical system.

Likewise consider A/C power conditioning, especially in situations where local power is unreliable or noisy. Surge protection is especially important in some locales. Power conditioners can reduce wear on power supplies and other electronics, and provide a further measure of protection from surges, spikes, lightning and high voltage.

A word about UPS devices: Modified sine wave UPS devices are popular due to low manufacturing costs. However, such units should generally be viewed as being of low quality and possibly inadequate to fully protect the system from abnormal power events.

For a modest added cost, consider a pure sine wave UPS. These units can be relied on to supply very clean power, eliminating potential problems, and are recommended for applications demanding high reliability.

2.2 Input And Output Connections

External audio and video sources are connected to the appropriate inputs on SDI IO's backplane.

1. **HDMI:** Monitor port
2. **Ethernet:** Network connections

3. **USB:** Connects keyboard, mouse and other peripheral devices.
4. **Motherboard audio connectors**
5. **Genlock and SDI In/Out:** Provides HD-BNC connectors (High Density BNC)
6. **Power**

> **Note:** SDI connectors are initially assigned as either inputs or outputs in the Configuration dialog (Administration panel) at first launch, or later by using the **Exit to Admin** option to re-open it.

2.3 Networking

Generally, connecting a suitable cable from one of the two Gigabit Ethernet ports on SDI IO's backplane is all that is required to add it to a local area network (LAN).

In some cases, additional steps may be required. You can access the system Network and Sharing control panel to accomplish more extensive configuration tasks. If further help connecting is required, please consult your system administrator.

3 User Interface

This chapter explains the layout and options of the user interface, and how to configure SDI I/O audio and video input and output. It also introduces the various supplemental video production features SDI IO provides, including Proc Amps, Scopes and capture.

This section contains information on the following topics:

3.1 The Desktop

The SDI IO unit's default Desktop interface is shown below and provides very useful remote monitoring options in addition to configuration and control features.

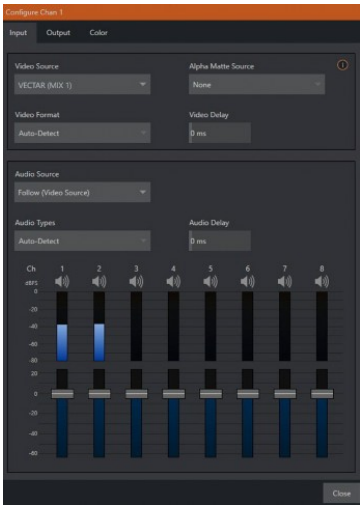
The Desktop interface includes dashboards running across the top and the bottom of the screen. By default, the large middle section of the Desktop is divided into quadrants, each displaying one video 'channel'. Beneath each channel's viewport is a toolbar (Note that additional viewport toolbar controls are hidden when not in use, or until you move the mouse pointer over a viewport).

Continue reading for an overview of the SDI IO Desktop features.

3.1.1 Configure Channels

SDI IO allows you to select different audio and video sources for each channel via the Configure panel. Click the gear next to the channel label below a viewport to open its Configure panel.

Input Tab



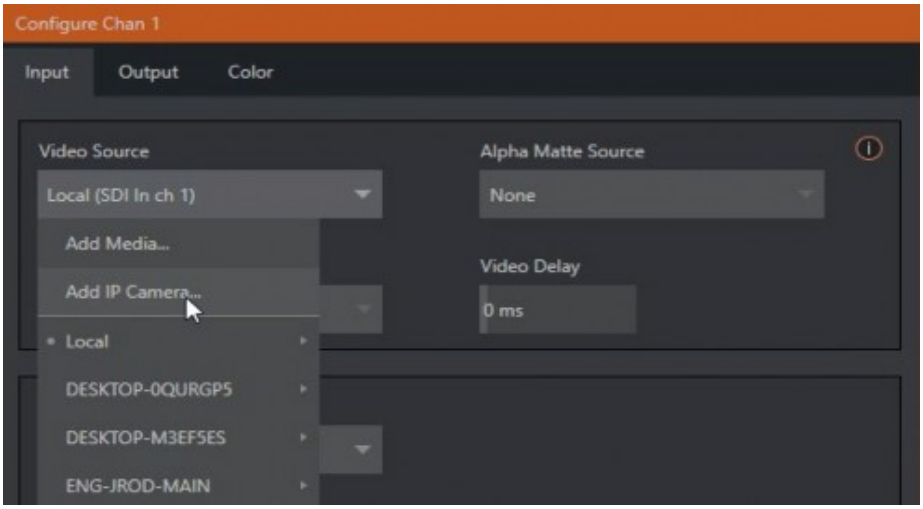
Controls in the tabbed Input pane lets you select audio and video sources for this channel and set their format. You can immediately choose any NDI or SDI connector configured as an input (the latter are shown in the Local group), a webcam or PTZ camera with compatible network output, or even an input from a suitable external A/V capture device (quad-link selections list the four associated SDI input numbers that are used, for reference).

> **Note:** The Alpha Matte Source menu allows you to configure key/fill inputs, where the transparency and fill color information for an NDI output with embedded alpha are supplied by two separate SDI inputs (note that the video format of both sources must match).

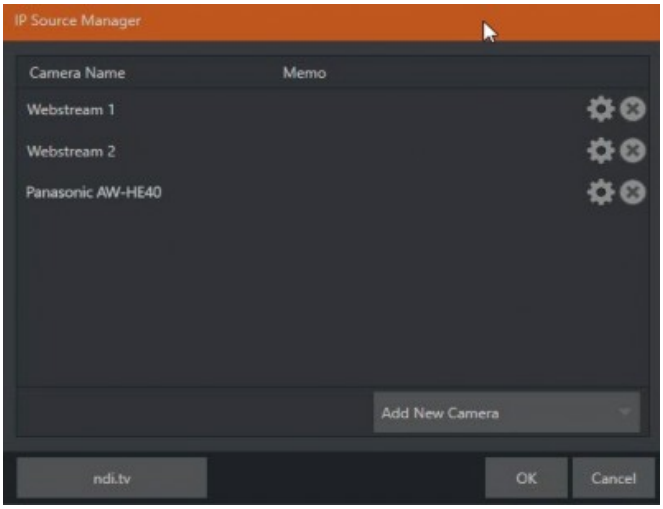
See also Key/Fill Connections for key/fill connection details.

A Delay setting is provided for both audio and video sources, allowing precise A/V synchronization where A/V source timing differs.

Clips and IP Sources

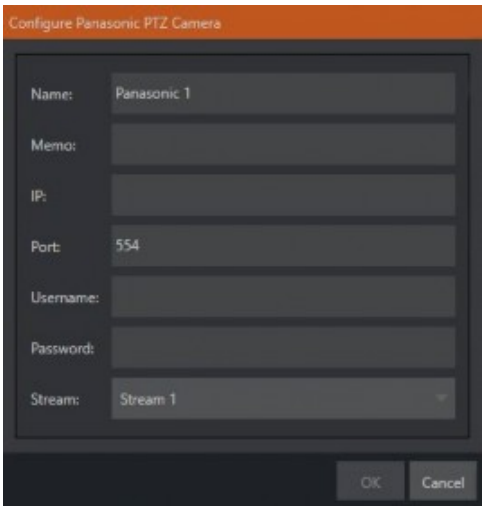


As mentioned in the previous section, an IP (network) source (such as a PTZ camera with NDI network video output) can be directly selected. The Video Source drop down menu contains an Add Media item to let you select a video file and Add IP Camera menu item.



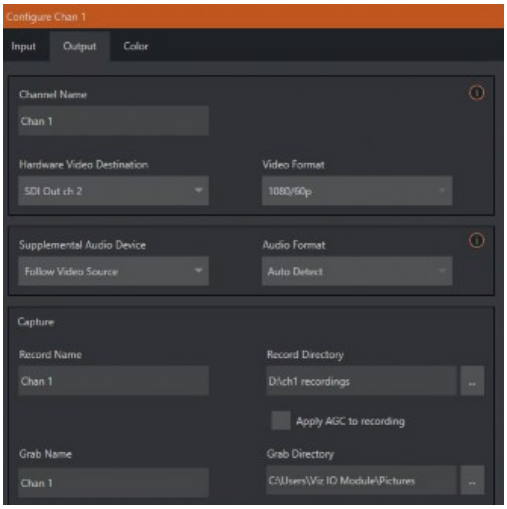
Clicking the Add IP Camera entry opens the IP Source Manager. Adding entries to the list of sources shown in this panel causes corresponding entries for new sources to appear in the Local group shown in the Video Source menu of the Configure Channel panel.

To use, click the **Add New Camera** menu, select a source type from the dropdown list provided. This opens a dialog suited to the particular source device you wish to add, such as one of the numerous supported PTZ camera brands and models.



Note: After adding an IP source, you must exit and restart the software for the new settings to be applied.

Output Tab



The second tab in the Configure Channel pane hosts settings related to output from the current channel.

NDI Output

Output from channels assigned to local SDI input sources is automatically sent to your network as NDI signals. The editable Channel Name identifies output from this channel to other NDI-enabled systems on the network.

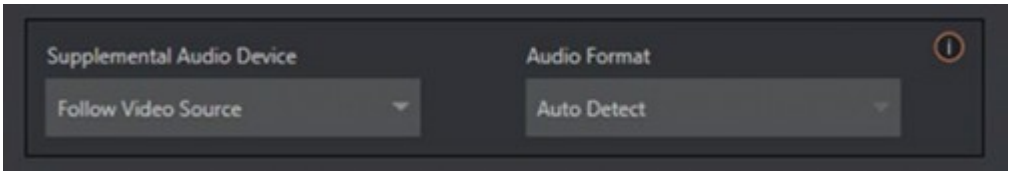
> **Note:** NDI Access Manager, included in NDI Tools (available without charge from https://ndi.tv/tools/), can be used to control access to NDI source and output streams.

Hardware Video Destination

The Hardware Video Destination menu allows you to direct video output from the channel to an SDI connector on the system's backplane that is configured as an output (or another video output device connected to and recognized by the system). Video Format options supported by the device are provided in a menu at right (quad-link selections list the four associated SDI output numbers that are used, for reference).

See also Key/Fill Connections for key/fill connection details.

Supplemental Audio Device



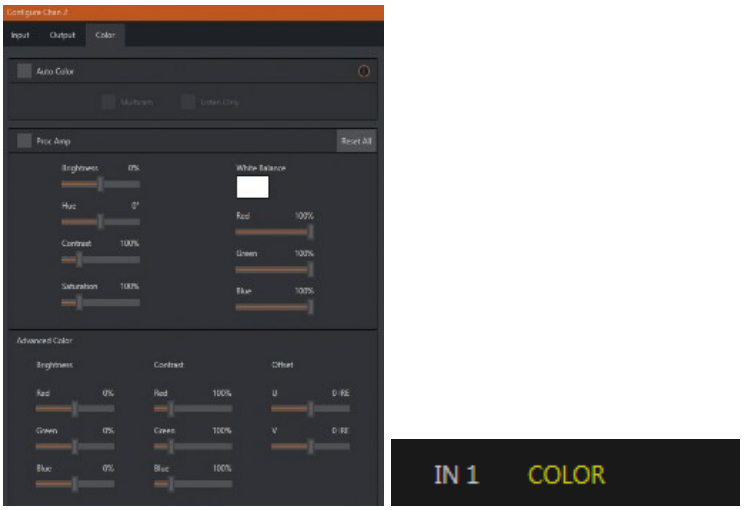
The Supplemental Audio Device allows you to direct audio output to system sound devices as well as well as any supported third part audio devices you may connect (typically by USB). As required, Audio Format options are provided in a menu at right.

Capture

This tab is also where you assign the path and filename for captured video clips and stills.
The initial Record and Grab Directories are the default Videos and Pictures folders on the system, but we strongly encourage you to use fast network storage volumes or an external drive connected to one of the (blue) USB3 ports on SDI's rear panel for video capture especially.

> **Note:** Recording NDI sources is not supported.

Color Tab



The Color tab provides an extensive set of tools for adjusting the color characteristics of each video channel. Choosing Auto Color automatically adapts color balance as lighting conditions change over time.

> **Note:** Proc Amp adjustments are applied after Auto Color processing.

By default, each camera with Auto Color enabled is processed by itself. Enable Multicam to process multiple cameras as a group.

To apply Multicam processing to a source without its own colors being evaluated, check *Listen Only*.

Or enable Listen Only for all Multicam group members except one to make that source the master color reference.

> **Note:** Custom settings in the Color tab trigger a COLOR notification message that appears in the footer below the viewport of the channel.

3.2 First Launch And Configuration

The physical SDI connectors can be flexibly assigned as either inputs or inputs. Alternative layouts for the connectors are available in the Configure Vizrt SDI I/O Connectors panel, which is normally shown on first launch, but which can also be selected to open on exiting the Live Desktop.

3.2.1 Configure I/O Connectors

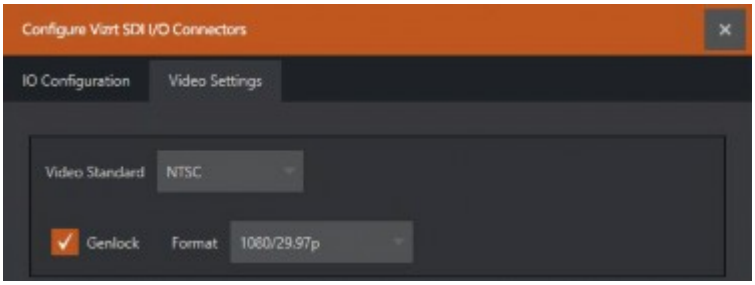
I/O Configuration Tab

As mentioned above, this dialog is shown on first launch, but can be accessed later upon existing the Live Desktop to make modifications to the configuration. Select either the IO Configuration or Genlock tabs, according to your need.

The IO Configuration tab makes it a simple matter to select presets using graphic representations that depict the connector layout on the backplane.

> **Note:** Certain selections may require rebooting the system to re-initialize the SDI hardware.

Video Settings Tab



The second tab in this configuration panel is labeled Video Settings, and its controls are discussed next.

Video Standard

The Video Standard option is an important one, since it determines the framerate 'family' that the hardware is able to access, and thus what formats will be available for input and output. Options are NTSC and PAL.

Genlock

The Genlock input on SDI IO's backplane is for connection of a house sync or reference signal (typically a black burst signal intended specifically for this purpose). Many studios use this method to synchronize equipment in the video chain. Genlocking is commonplace in higher-end production environments, and genlock connections are typically provided on professional gear.

If your equipment allows you to do so, you should genlock all hardware sources supplying SDI I/O, and the SDI I/O unit. To connect the genlock source, supply the reference signal from the house sync generator to the Genlock connector on the backplane.

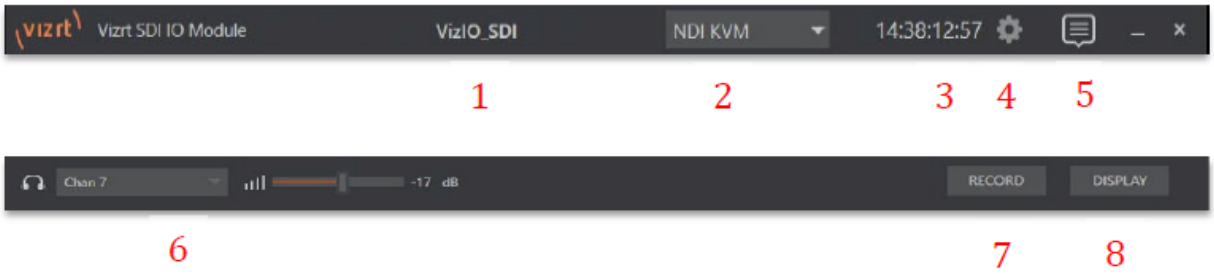
> ⚠ **Note:** The unit can use SD (Bi-level) or HD (Tri-level) reference (if the Genlock switch is disabled, the unit operates in an internally managed free running mode instead).

In the Genlock control group, select the format of the reference signal you are supplying.

At this point, we're ready to proceed to the Live Desktop, which is the normal operating environment.

3.3 Titlebar And Dashboard

SDI IO's Titlebar and Dashboard are home to a number of important displays, tools and controls. Prominently located at the top and bottom of the Desktop, the Dashboard occupies the full width of the screen.



The various elements presented in these two bars are listed below (starting from the left):

1. **Machine name:** The system network name supplies the prefix identifying NDI output channels.
2. **NDI KVM menu:** Options to control SDI IO remotely via NDI connection.
3. **Time Display**
4. **Configuration**
5. **Notifications Panel**
6. **Headphones Source and Volume**
7. **Record**
8. **Display**

Of these items, some are so important that they rate their own chapters. Others are detailed in various sections of this guide (cross references to the relevant sections of the manual are provided above).

3.3.1 Titlebar Tools

NDI KVM

Thanks to NDI®, it is no longer necessary to configure complicated hardware KVM installations to enjoy remote control over your SDI I/O system. The free NDI Studio Monitor application for brings network KVM connectivity to any Windows® system on the same network.

To enable NDI KVM, use the titlebar NDI KVM menu to select an operating mode, choosing between Monitor Only or Full Control (which passes mouse and keyboard operations to the remote system).

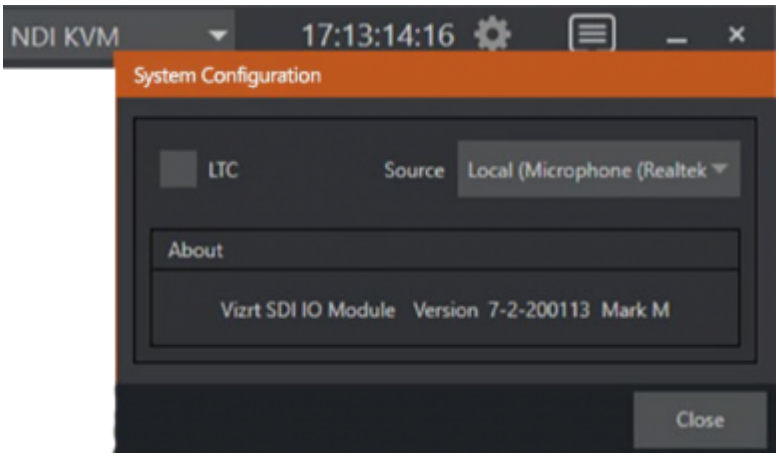
The Security option lets you apply NDI Group control to limit who can view the NDI KVM output from the host system.

To view the output from the remote system and control it, select **[*Your SDI I/O Device Name*] > User Interface** in the Studio Monitor application supplied with the free NDI Tool pack, and enable the KVM button overlaid at upper-left when you move the mouse pointer over the screen.

> **Tip:** Note that Studio Monitor's KVM toggle button can be relocated to a more convenient spot by dragging.

This feature gives you a great way to control the system around your studio or campus. With the User Interface running full-screen in Studio Monitor on a receiving system, it's really hard to remember that you're actually controlling a remote system. Even touch is supported, meaning you can run the User Interface output on a Microsoft Surface™ system for portable touch control over your entire live production system (almost all of the interface screengrabs shown in this manual were grabbed from Studio Monitor while controlling the remote system in the manner described above).

System Configuration



The System Configuration panel for is opened by clicking the **Configuration** (gear) icon found in the upper-right corner of the screen.

Timecode

LTC timecode support can be activated by choosing an input using the LTC Source menu to choose almost any audio input to receive the timecode signal over and enabling the checkbox at left.

Notifications

The Notifications panel opens when you click the 'text balloon' gadget at right in the Titlebar. This panel lists any information messages the system provides, including any cautionary alerts.

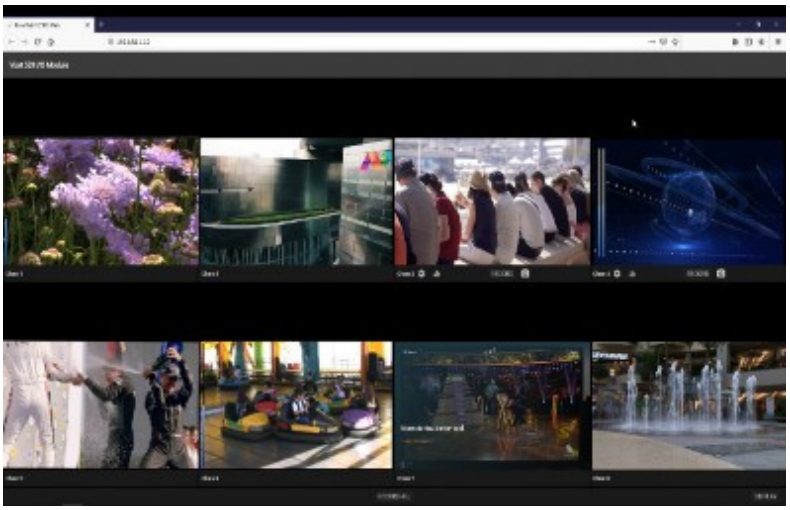
> **Tip:** You can clear individual entries using by right-clicking to show the item's context menu, or the **Clear All** button in the panel's footer.

The footer of the Notifications panel also features **Performance** and **Web Browser** buttons, discussed next.

Performance

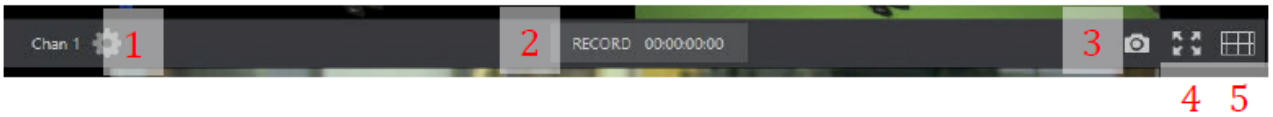
Once the Notifications panel is opened, it shows the performance levels of your CPU, Memory, GPU, Drive and NIC 1 (network interface controller).

Web Browser



In addition to the remote-control features provided for your SDI I/O system by the integrated NDI KVM feature, the unit also hosts a dedicated webpage. The **Web Browser** button at the bottom of the Notifications panel provides a local preview of this webpage, which is served to your local network to let you control the system from another system on your network. To visit the page externally, copy the IP address shown beside the **Web Browser** button in the Notification panel into the address field of a browser on any computer on your local network.

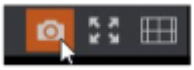
3.3.2 Viewport Tools



SDI I/O's channels each have a toolbar beneath their respective viewports. The various elements comprising the toolbar are listed below from left to right:

1. Channel name – Can be changed by clicking on the label, and also in the Configure Channel panel.
    a. A Configuration gadget (gear) pops up next to the channel name when the mouse is over a viewport.
2. Record and Record Time – The record button below each viewport toggled recording that channel; the **RECORD** button in the bottom dashboard opens a widget enabling capture from any SDI input.
3. Grab – the base filename and path for still image grabs are set in the Configure Channel panel.
4. Full screen
5. Overlays

Grab



A Grab Input tool is located in the lower right corner below the monitor for each channel. By default, still image files are stored in the system Pictures folder. The path can be modified in the Output window for the channel (see the Output heading above).

Fullscreen

Clicking this button expands the video display for the selected channel to fill your monitor. Press **ESC** on your keyboard or click the mouse to return to the standard display.

Overlay

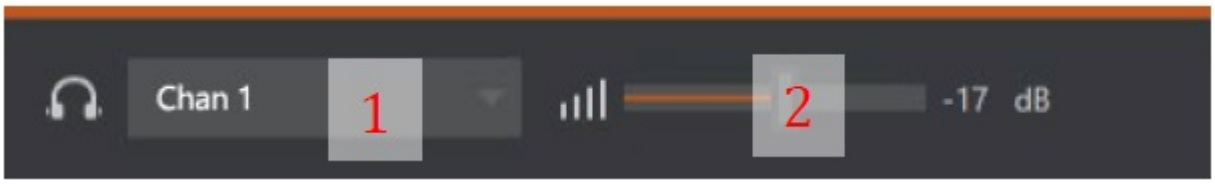
Found in the lower right corner of each channel, Overlays can be useful for visualizing safe zones, centering and more. To use an overlay, just click on an icon in the list; more than one overlay can be active at the same time.

3.3.3 Dashboard Tools

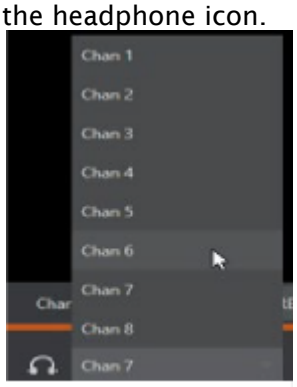
Audio (Headphones)

You can connect a headset to the (green) audio output jack on the rear of SDI I/O's motherboard.

Controls for Headphone audio are found in the lower-left corner of the dashboard at the bottom of the screen.



1. The audio source supplied to the Headphone jack can be selected using the menu next to the headphone icon.



2. The Volume for the selected source can be adjusted moving the slider provided at right (double-click this control to reset it to the default 0dB value).

Record

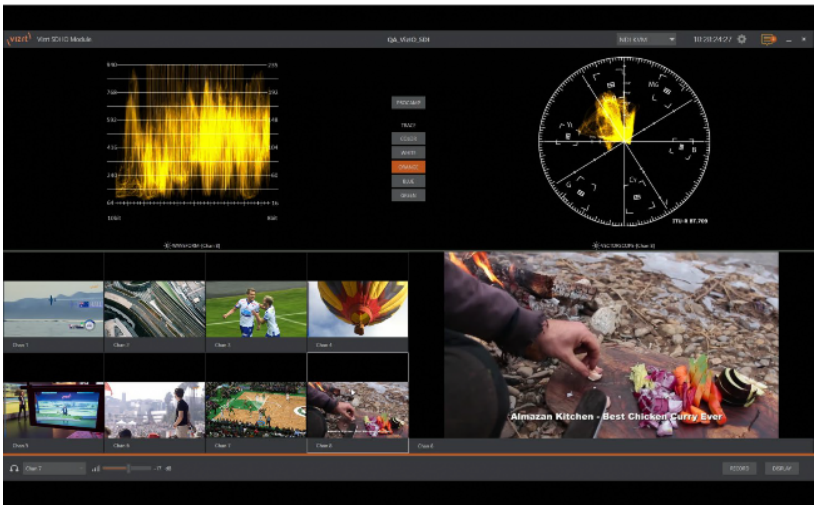
The **Record** button is also located in the lower-right corner of the dashboard (Figure 2-25). Click it to open a widget allowing you to begin or stop recording of individual channels (or start/stop all recordings.)

> **Note:** The destinations for recorded clips, their base file names and other settings are controlled in the Configuration panel. Recording NDI sources is not supported. The Share Local Recorder Folders can be used to expose local folders assigned to capture duties on your network, making it easy to access captured files externally.

Display

In the bottom-right corner of the Dashboard at the bottom of the (primary) screen, the Display widget offers a variety of layout options to let you viewing channels individually or in groups, as well letting you configure a second monitor.

Waveform and Vectorscope features are shown when you select the SCOPES option in the Display widget.



4 Appendices

This section contains information on the following topics:

4.1 Key And Fill Connections

Key/Fill output using two SDI output connectors is supported as follows:

- SDI connectors numbered 1-4 show video and alpha options in their Configure Channel Format menu. Selecting this option sends video fill from the source to the designated SDI connector (let's refer to it as SDIn) and places the matte output on the SDI output connector SDI(n+4). For example, suppose the unit is configured with four inputs and four outputs:
  - In this configuration, SDI connectors 5-8 serve as outputs.
  - If the Format for SDI 5 is set to a "video and alpha" option in its Output tab, SDI 9 will supply the corresponding matte output.

4.2 NDI

What is NDI?

In a nutshell, Network Device Interface (NDI) technology is the world's most prolific video over IP protocol for live production. NDI allows systems and devices to identify and communicate with each other, and to encode, transmit, and receive high quality, low latency, frame-accurate video and audio over IP in real time.

NDI enabled devices and software have the potential to greatly enhance your video production pipeline, by making video input and output available anywhere your network runs. Vizrt systems and a growing number of third-party systems provide direct support for NDI, both for ingest and output.

Although SDI IO provides many other useful features, it is purposely designed primarily to turn SDI sources into NDI signals.

For more extensive details on NDI, please visit https://ndi.tv/about-ndi/.

4.3 Third Party Licenses

This product uses a number of third-party software libraries under license. Related license requirements are defined in documentation installed on the product. To view these licenses, please click the Additional Licenses link provided in the Help menu on the **Startup > Home** page shown upon launching the product.