

Installation and Operation Manual Videohub

Blackmagicdesign



Mac OS X™
Windows™
September 2014



Welcome

Thank you for purchasing Videohub!

We hope you share our dream for the television industry to become truly creative by allowing anyone to have access to the highest quality video.

Previously, high end television and post production required investing in millions of dollars of hardware, and professional SDI routers have always been way too costly for most people to afford. HD-SDI is even more expensive and, until now, only the largest post production and television facilities could afford HD-SDI routing. Videohub changes all that, even enabling you to pipe 2K film around your studio just like video.

This instruction manual contains all the information you'll need to install your Videohub, although it's always a good idea to ask a technical assistant for help if you are not sure what IP addresses are, or if you don't know much about computer networks. Videohub is easy to install, however there are a few slightly technical preferences you will need to set after you install it.

Please check our web site at www.blackmagicdesign.com and click the support page to download the latest updates to this manual and Videohub software. Lastly, please register your Videohub when downloading software updates so we can keep you updated when new software is released. We are constantly working on new features and improvements, so we would love to hear from you!

We hope you get years of use from your Videohub and have lots of fun connecting everyone in your facility together!

A stylized, handwritten signature of Grant Petty in black ink.

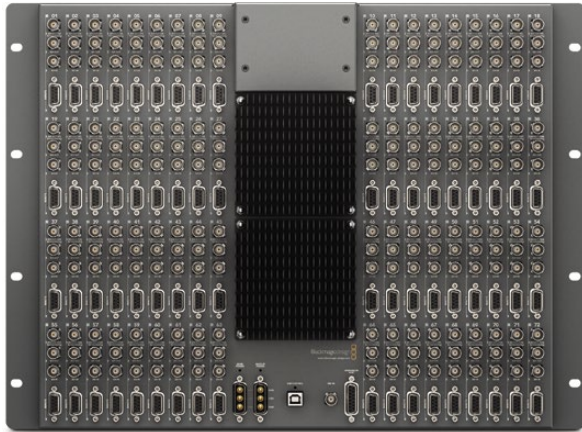
Grant Petty
CEO Blackmagic Design

5	Getting Started with Videohub Routers		
	Introducing Videohub Routers	5	
	Universal Videohub Modular Routers	5	
	Videohub All-In-One Routers	5	
	Choosing a Videohub Router	6	
	Connect to a Videohub Server with USB	7	
	Connect to an Ethernet Network	7	
	Plugging in Video	8	
	Installing the Videohub Software	8	
	Mac OS X installation	8	
	Windows installation	8	
	Updating your Videohub's Internal Software	9	
	Installing the Videohub Software on iPad	10	
	Configuring your Videohub Server Settings	11	
	Configuring Smart Videohub with the Control Panel	12	
	Configuring Videohub with Blackmagic Videohub Setup	12	
	Customize Input Labels	13	
	Customize Output Labels	13	
	Customize Remote Labels and Port Directions	13	
	Introducing Blackmagic Videohub Control	14	
15	Getting Started with Videohub Controllers		
	Introducing Videohub Controllers	15	
	Videohub Master Control	15	
	Videohub Smart Control	15	
	GPI and Tally Interface	15	
	Connecting USB to Configure the Control Panel	16	
	Plugging into an Ethernet Network	16	
	Control Panel Button Diagnostics	17	
	Updating the Software in your Videohub Controller	17	
	Setting up your Videohub Controller	18	
	Configuring Videohub Master Control	19	
	Configuring Videohub Smart Control	20	
	Setting up the GPI and Tally Interface	22	
	Configuring the GPI and Tally Interface	22	
	Labeling Pushbuttons	23	
24	Using Videohub Routers		
	Smart Videohub 40x40	24	
	Smart Videohub 20x20	26	
	Smart Videohub 12x12	28	
	Universal Videohub 288	30	
	Universal Videohub 288 Crosspoint Card	31	
	Router Control Cable	31	
	Power Supply	31	
	Building Universal Videohub 288	32	
	Installing a Universal Videohub 288 Crosspoint Card	32	
	Installing Interface cards	33	
	Installing a Universal Videohub Power Supply	33	
	Installing a Universal Videohub 450W Power Card	34	
	Installing a Universal Videohub 150W Power Supply	34	
	Universal Videohub 72	38	
	Universal Videohub 72 Crosspoint Card	39	
	Router Control Cable	39	
	Power Supply	39	
	Building Videohub 72	40	

Installing a Universal 72 Crosspoint Card	40		
Installing Interface cards	40		
Installing a Universal Videohub 450W Power Card	41		
SDI Interface Card	42		
Universal Videohub Deck Control Cable	42		
Universal Videohub Interface Cards	43		
Broadcast Videohub	44		
Studio Videohub	45		
Compact Videohub	46		
Micro Videohub	47		
Smart Videohub	48		
50		Controlling Videohub with Software	
Blackmagic Videohub Control	50		
Touchscreen Computers	55		
Apple iPad	56		
		58	Controlling Videohub with Hardware
		About Routing Levels	58
		How to Select Sources and Destinations	58
		Using Videohub Smart Control as a Cut-Bus Controller	64
		Using Videohub Smart Control as an XY Controller	64
		Configuring GPIs	65
		Configuring Tally	65
		67	Help
		70	Developer Information
		Blackmagic Videohub Ethernet Protocol v2.3	70
		Saving and Loading Labels with Telnet in Mac OS X	78
		Saving and Loading Labels with Telnet in Windows	79
		Videohub RS-422 Protocol	80
		83	Warranty



5 Getting Started with Videohub Routers



Broadcast Videohub



Studio Videohub



Smart Videohub 40x40



Smart Videohub 20x20



Smart Videohub 12x12

Introducing Videohub Routers

Videohub gives you freedom to customize your routing solution as you need and covers a range of needs for different facilities.

Universal Videohub Modular Routers

These routers are for larger facilities and ship as empty rack frames into which you can install whichever interface cards you need, depending on how many devices you want to connect. Universal Videohub 288 can route video over SDI and Optical interface cards to up to 288 destinations as well as control up to 288 devices remotely. Universal Videohub 72 also supports SDI and Optical interface cards and can route from 72 sources to up to 72 destinations while only taking up 9 rack units of space.

Videohub All-In-One Routers

Our all-in-one routers offer a solution for facilities that use only SDI equipment and come prebuilt so you don't have to do any installing of crosspoint cards or interface cards. Some models have RS-422 deck control ports, but if you don't need deck control then you might opt for one of the Smart Videohubs which operate as both a router and a control panel.

Every Videohub needs to be networked so it can be controlled by computers and pushbutton hardware control panels. Our software is customizable to make it as easy to operate as possible for whichever computer screen you are using. You can even set up your router to be controlled with an iPad!

If your Videohub has previously been set up, you can jump straight to Controlling Videohub with Software or Controlling Videohub with Hardware. These sections provide detailed information on how to change routes with a computer or pushbutton controllers.

6 Getting Started with Videohub Routers



Universal Videohub 72



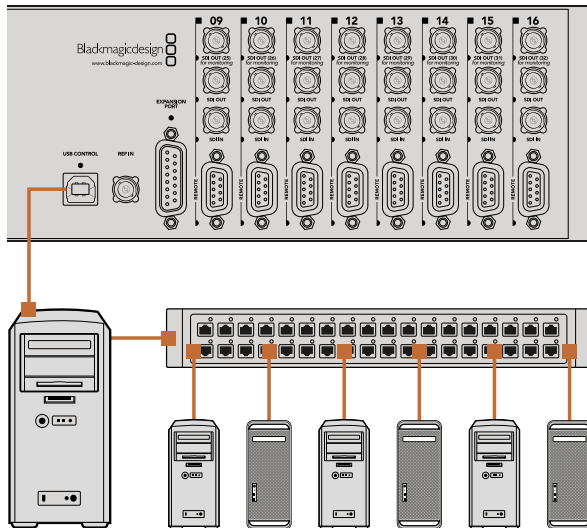
Universal Videohub 288

Choosing a Videohub Router

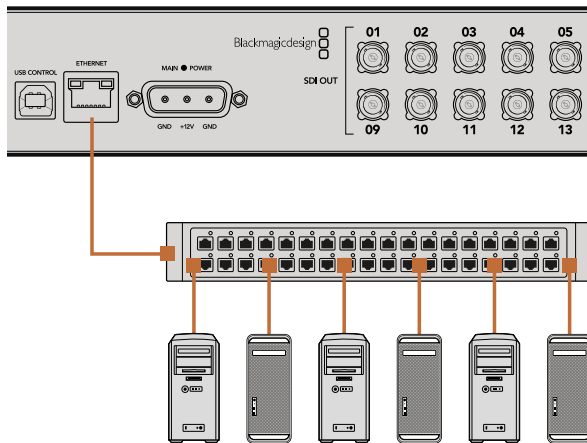
Check this table for an overview of each Videohub's capabilities to help you decide which model you will need. You can plan how to set it up so there are no nasty surprises. For example, it will tell you how many connections your Videohub has, how much rack space will be required and which connection options are available for controlling your Videohub.

Videohub Router	SDI Inputs	SDI Outputs	Optical IN/OUT	RS-422 Deck Control Ports	Software Control			Maximum Rack Units Required
					Ethernet	USB	RS-422	
Universal Videohub 288	288	288	✓	288	✓		✓	25
Universal Videohub 72	72	72	✓	72	✓		✓	9
Broadcast Videohub	72	144		72		✓		8
Studio Videohub	16	32		16		✓		2
Compact Videohub	40	40			✓	✓	✓	2
Smart Videohub 40x40 <small>Features pushbuttons and LCD for local control</small>	40	40			✓		✓	2
Smart Videohub 20x20 <small>Features pushbuttons and LCD for local control</small>	20	20			✓		✓	1
Micro Videohub	16	16			✓	✓	✓	1
Smart Videohub <small>Features 32 pushbuttons for local control</small>	16	16			✓	✓	✓	1
Smart Videohub 12x12 <small>Features push buttons and LCD for local control</small>	12	12			✓		✓	1

7 Getting Started with Videohub Routers



Studio Videohub connecting to a server via USB.



Micro Videohub connecting to an Ethernet Network.

Connect to a Videohub Server with USB

All-in-one Videohubs can connect to any computer on your local area IP based network via USB. One "server" computer on your network connects to Videohub via the plug and play USB connection, and shares the Videohub with other computers and iPads on your network in a similar way to USB printer sharing. You don't need a dedicated or powerful computer for this task.

The Videohub Server can be any computer running Mac OS X, Windows and any number of Mac OS X and Windows clients can connect to the server via USB.

To connect Videohub to the local area IP based network:

- Step 1.** Securely connect and power on all of the power supplies included with your Videohub.
- Step 2.** Connect the Videohub router to the Videohub Server computer with a standard USB 2.0 type A-B male cable.
- Step 3.** Connect the Videohub Server computer to your network switch. We strongly recommend connecting the Videohub Server computer with reliable Ethernet cables in preference to wireless networking. Wireless networking may be affected by interference from appliances and other wireless devices.

Connect to an Ethernet Network

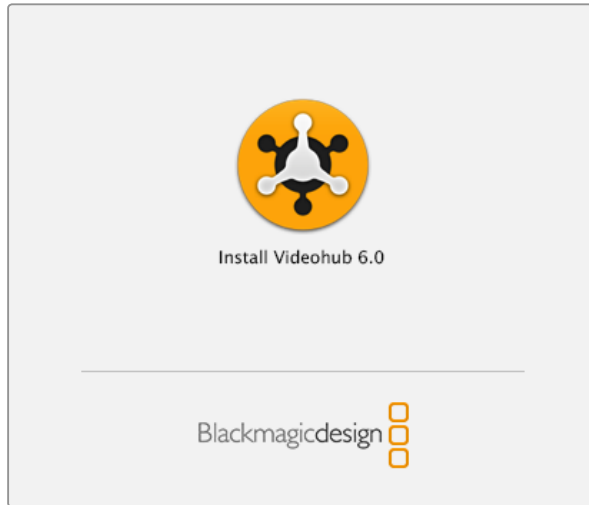
Many Videohub models have an Ethernet port and can connect directly to your Ethernet network switch and then to any computer on your local area IP based network. An integrated "Videohub Server" is used when router control is performed via Ethernet. This means you don't need a separate computer to act as the Videohub Server.

To connect Videohub to the local area IP based network:

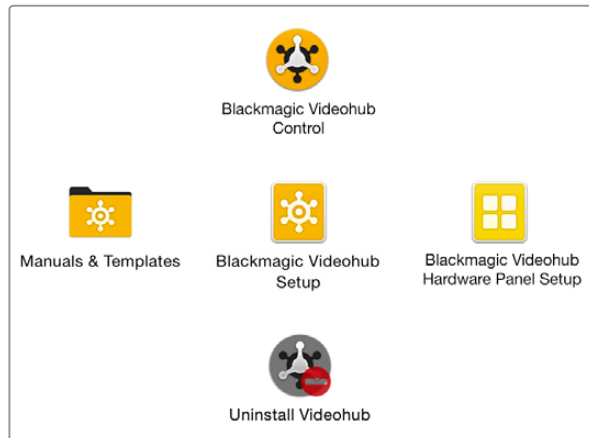
- Step 1.** Securely connect and power on all of the power supplies included with your Videohub.
- Step 2.** Connect your Videohub router to the network switch with a standard RJ45 Ethernet cable.

If you have a Universal Videohub 288 populated with two Crosspoint Cards, connect Ethernet cables to both for network failover redundancy. Your Universal Videohub 288 will have a single IP address, despite having two Ethernet connections to the network switch.

8 Getting Started with Videohub Routers



Double click the installer and follow the prompts.



The Blackmagic Videohub folder contains the three Videohub applications.

Plugging in Video

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI outputs. Additionally, the Smart Videohub 40x40, 20x20 and 12x12 also support 6G-SDI for Ultra HD video. All Videohub models feature regular-sized BNC ports which make it easy to connect to other SDI equipment using regular SDI cables. If you're connecting Videohub to SDI equipment which has miniature SDI connectors, such as DIN 1.0/2.3, we recommend using SDI cables which are terminated with a miniature connector at one end and a regular BNC at the other.

Installing the Videohub Software

Videohub software runs on the latest Mountain Lion and Mavericks versions of Mac OS X. On the Windows platform, the software runs on both 32 and 64-bit versions of Windows 7 and Windows 8.

Mac OS X installation

Step 1: Double click the installer file from the supplied media or from your downloads folder if you downloaded the software from the Blackmagic Design website.

Step 2: Follow the install prompts and Mac OS X will automatically install the software.

A folder called "Blackmagic Videohub" will be created within your Applications folder. The following three applications are contained within the folder: Videohub Control, Videohub Setup and Videohub Hardware Panel Setup.

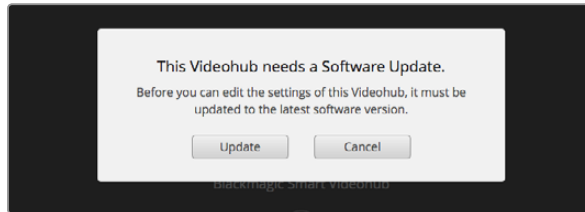
Windows installation

Step 1. Double click the installer file from the supplied media or from your downloads folder if you downloaded the software from the Blackmagic Design website.

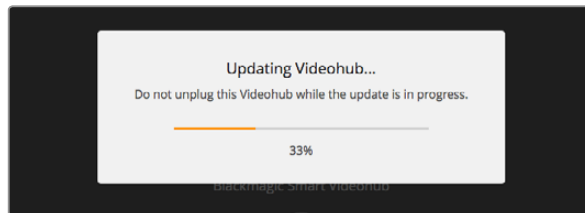
Step 2. Follow the install prompts and accept the terms in the License Agreement and Windows will automatically install the software.

Click the Windows Start button and then All Programs>Blackmagic Design>Videohub. The following three applications are contained within the folder: Videohub Control, Videohub Setup and Videohub Hardware Panel Setup.

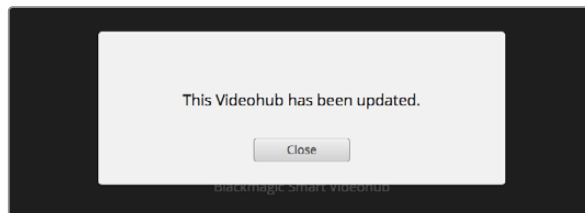
9 Getting Started with Videohub Routers



Click the Update button to install the new internal software.



Do not unplug the Videohub while the update is in progress.



Click the Close button to finish the update.

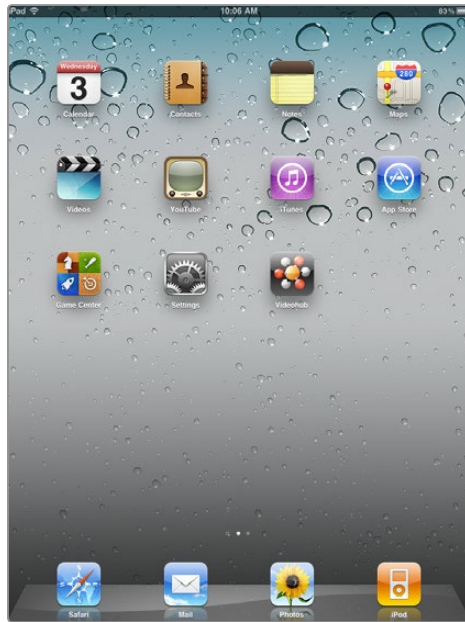
Updating your Videohub's Internal Software

Occasionally, the internal software in your Videohub will need to be updated. Updates to internal software can provide new features, compatibility with new hardware and support for new formats.

Please follow these steps to update your Videohub's internal software:

- Step 1:** Connect your computer to the Videohub's USB 2.0 connector.
- Step 2:** Launch Blackmagic Videohub Setup and it will automatically display any Videohubs that are connected to your network.
- Step 3:** Select your Videohub by clicking on either the picture or the configuration icon.
- Step 4:** The utility will inform you if an update is required.
- Step 5:** If an update is required, click the Update button and allow the software to install. Do not unplug the Videohub while the update is in progress.
- Step 6:** Click the Close button when the update is finished.

10 Getting Started with Videohub Routers



Download the Videohub app to your iPad

Installing the Videohub Software on iPad

The Videohub app for iPad can be downloaded using your iTunes Store account.

To download on your computer:

- Step 1.** Launch iTunes on your Mac OS X or Windows computer and click on iTunes Store button.
- Step 2.** Click in the Search Store field at the top-right of the window and enter "Videohub".
- Step 3.** Click on the Blackmagic Videohub iPad App to download the app to the iTunes library on your computer.
- Step 4.** Connect your iPad and use iTunes to sync applications to it.

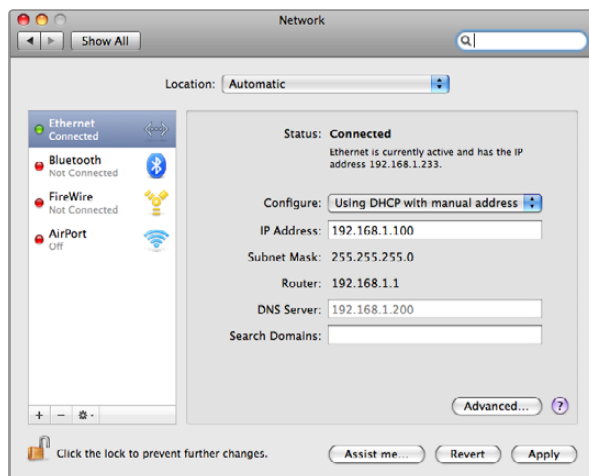
To download on your iPad:

- Step 1.** Tap the App Store icon.
- Step 2.** Tap the search field at the top of the screen and enter "Videohub".
- Step 3.** Click on the Free App button and then tap "Install App".

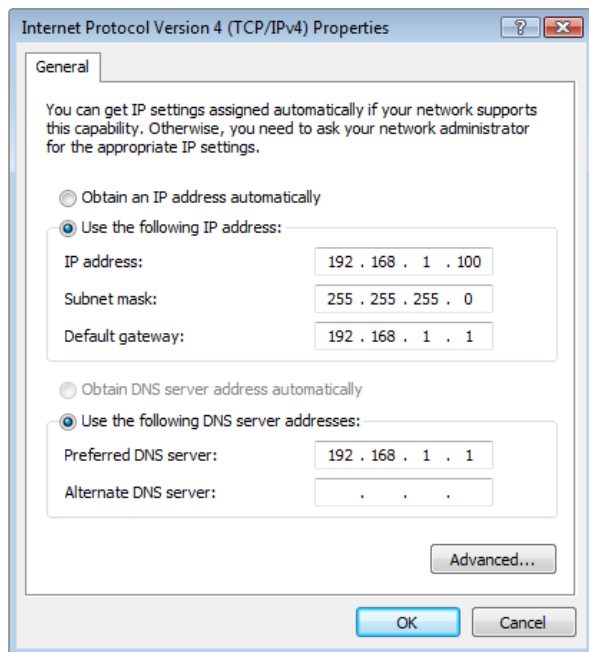


Videohub settings on iPad

11 Getting Started with Videohub Routers



Network Preferences in Mac OS X set to "Using DHCP with manual address" to provide a static IP address.



Network control panel in Windows set to "Use the following IP address" to provide a static IP address.

Configuring your Videohub Server Settings

If you will be using Ethernet to connect to your Videohub, refer to the "Configuring Videohub with Blackmagic Videohub Setup" section on the next page.

Videohubs without Ethernet are connected to a computer via USB and other control panels can see the Videohub by looking for this computer. It effectively becomes a "server", that all the other control panels on the network can connect to.

A Videohub "server" needs a static IP address and your network administrator will probably want to configure this for you. Please follow the steps below for your respective operating system.

Mac OS X

- Step 1.** Go to System Preferences
- Step 2.** Click on Network
- Step 3.** Check the IP address in the configuration information for your Ethernet or Airport network.
- Step 4.** Set the network configuration to either Using DHCP with manual address or Manually.

Windows 7

- Step 1.** Open Control Panel
- Step 2.** Click on the Network and Sharing Center.
- Step 3.** Next to your connection, click Local Area Connection for Windows 7.
- Step 4.** Click on Properties and Select Internet Protocol Version 4 (TCP/IPv4).
- Step 5.** Click on Properties. Ensure "Use the following IP address" has been selected.

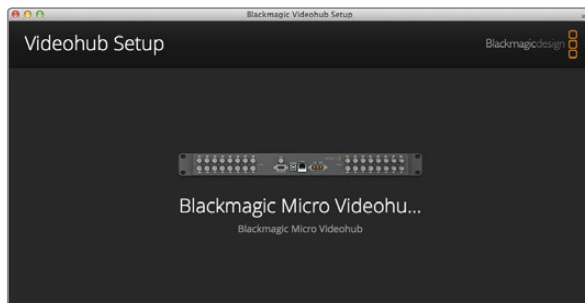
Windows 8

- Step 1.** From the desktop, hover over the right corner to bring up the charms bar.
- Step 2.** Click on Settings, then Control Panel.
- Step 3.** Click on the Network and Sharing Center.
- Step 4.** In the Network and Sharing Center, click on Change Adapter Settings on the left menu pane.
- Step 5.** Right click on your Ethernet connection and select Properties.
- Step 6.** Select Internet Protocol Version 4 (TCP/IPv4).
- Step 7.** Click the Properties button. Ensure "Use the following IP address" has been selected.

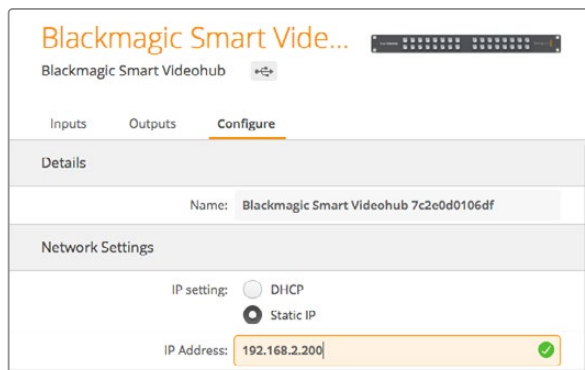
12 Getting Started with Videohub Routers

IP	IP Address	
Subnet	192.168.10.150	
Gateway		
	DEST Next Adjust	↻

Press the MENU button to enter the network page and use the TAKE button and rotary knob to set the IP address.



Blackmagic Videohub Setup.



The Videohub Server Configuration options will become active when an Ethernet-equipped Videohub is connected via USB.

Configuring Smart Videohub with the Control Panel

You can use the Smart Videohub's integrated control panel and LCD to configure network settings. Your router will be visible to other computers and hardware panels and these devices can then control the unit remotely and make the routing changes. If your router does not have a front panel control, then you should use Blackmagic Videohub Setup to configure your network settings. Please follow these steps to set the IP address:

- Step 1.** Press the MENU button to enter the network configuration page.
- Step 2.** If not already selected, use the rotary knob to select the "IP" tab.
- Step 3.** Press the TAKE button to highlight the first field and use the rotary knob to adjust this value.
- Step 4.** Repeat the process until you have set the desired IP address.
- Step 5.** Press the MENU button to exit the network configuration page.

If required, the Subnet and Gateway address can be set by the same method.

Configuring Videohub with Blackmagic Videohub Setup Ethernet Videohub Server Settings

If your Videohub contains an integrated Videohub Server, you can use Blackmagic Videohub Setup to set the IP address. Connect the Videohub to your computer via USB and follow these steps:

- Step 1.** Launch Blackmagic Videohub Setup and it will automatically display any Videohubs that are connected to your network.
- Step 2.** If you have multiple Videohubs you can use the left and right arrows to cycle through the devices. If for any reason your Videohub does not appear, click on the Plus Sign and enter your Videohub's IP address and then click Add.
- Step 3.** Select your Videohub by clicking on either the picture or the configuration icon.
- Step 4.** Click on the Configure tab and enable the Static IP button.
- Step 5.** Enter the IP address and if required, the Subnet Mask and Gateway address, and click Apply.
- Step 6.** Click the "Done" button to close the window.

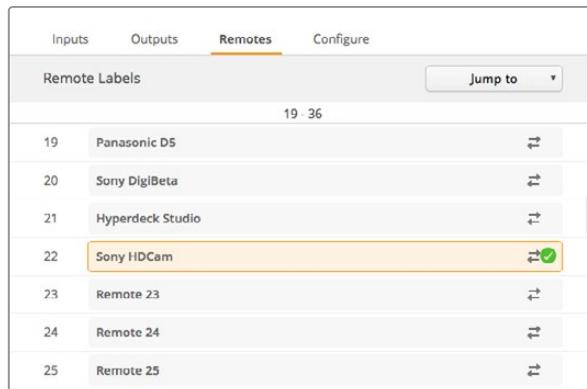
If controlling Videohub via RS-422, set the "Leitch protocol" switch to:

- "Leitch Client" if the Videohub is to act as a client of a connected control panel and to listen and respond to the control panel button presses.
- "Leitch Server" if the Videohub is to be controlled from an automation system or third party router control system.

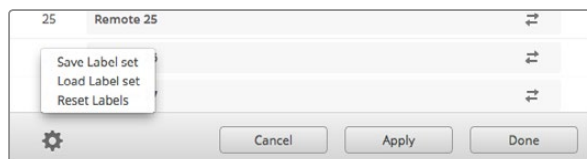
13 Getting Started with Videohub Routers



Customize Input Labels



Customize Remote Labels and Port Directions



Saving and Loading Labels

Blackmagic Videohub Setup is also used to enter labels. The labels are stored on the connected Videohub and are also visible on the other control panels.

Customize Input Labels

Step 1. Click on the "Inputs" tab and then click on the first input that you wish to label.

Step 2. Enter label names for your inputs and click the "Apply" button to save the changes.

Step 3. Click the "Done" button to close the window.

For larger Videohubs, use the "Jump to" dropdown menu to quickly jump to a different range of inputs.

Customize Output Labels

Step 1. Click on the "Outputs" tab and then click on the first output that you wish to label.

Step 2. Enter label names for your outputs and click the "Apply" button to save the changes.

Step 3. Click the "Done" button to close the window.

Customize Remote Labels and Port Directions

Step 1. Click on the "Remotes" tab and then click on the first remote that you wish to label.

Step 2. Enter the label name and then click on the Port Direction icon and select from Auto, In or Out.

Step 3. When you have finished labeling all your remotes click the "Apply" button to save the changes.

Step 4. Click the "Done" button to close the window.

Automatic port direction simplifies configuration and works well with most editing systems. However it can take up to half a minute to automatically detect and apply a change in port direction. If you need to make instant port direction changes, you can set the port direction manually.

For example, a capture card in a computer may be used to capture clips from in and out points on a tape deck. The capture card should be configured as an "In" port so it can control decks. Users of AVID Media Composer should also set the port direction manually to ensure reliable RS-422 communication.

Non-Roman character sets can be used with the Smart Videohub family.

Saving and Loading Labels

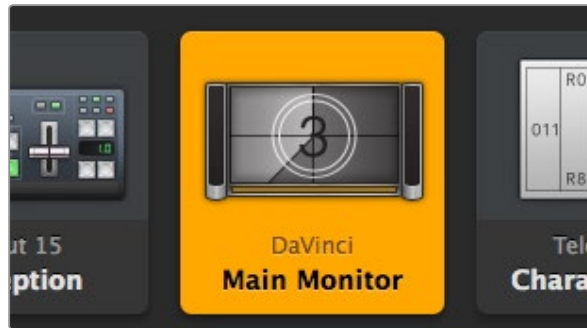
To save your labels, click on Settings (the gear icon) and select "Save Label set". Choose a location to store the file and click Save.

To load your labels, click on Settings and select "Load Label set". Navigate to your previously saved Label set file and click Load.

14 Getting Started with Videohub Routers



Videohub Control provides an intuitive, icon-driven representation of the Videohub connections.



This destination is unlocked and is available to any Videohub user on the network. The associated video source is illuminated in the Sources panel and the source name "DaVinci" is displayed.

Introducing Blackmagic Videohub Control

Blackmagic Videohub Control provides a fast and intuitive way to view and switch between multiple sources and destinations. Videohub Control is easy to use because it operates on a single video output at a time. Selecting a destination (output) pushbutton shows which source (input) is connected to it by illuminating the source pushbutton. To change the source, simply click on a different source pushbutton. It's that easy!

Selecting a Videohub

Launch Videohub Control and click on Settings (the gear icon) and choose "Select Videohub". Click on the Videohub that you wish to control. If you completed the previous section on customizing labels, the names you assigned will appear within the software.

Adding Pushbuttons

Select the Settings button and then select "Edit Buttons". Click on the Add button and choose whether to add a source or destination pushbutton. The Set Button window appears and allows you to set the SDI source or destination, RS-422 deck control and icon for the pushbutton. In most cases, deck control is grouped with the associated SDI connections.

Viewing Routes

In order to see which video source has been routed to a video destination, such as a monitor, press the button in the destinations panel to make the button illuminate. The associated video source button will illuminate in the sources panel, making it immediately obvious which source is connected to the monitor.

Switching Routes

In order to change the video source from a tape deck to a video camera, press a camera pushbutton in the sources panel to immediately illuminate the camera pushbutton and route video to the video monitor. The tape deck button is no longer illuminated and is disconnected from the video monitor.

See page 50 for more information on using Videohub Control.

15 Getting Started with Videohub Controllers



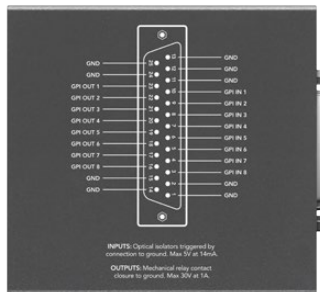
Videohub Master Control



Videohub Smart Control



GPI and Tally Interface



Pinout diagram of the DB25 connector

Introducing Videohub Controllers

Videohub Master Control

Videohub Master Control is a rack-mountable control panel with 30 backlit pushbuttons, LCD, scroll wheel and Ethernet connectivity designed to perform Videohub crosspoint switching without using a computer. Videohub Master Control can control all sources and destinations for any size of Videohub router, as well as RS-422 deck control.

Videohub Master Control uses port labels to aid in fast selection of equipment using software. 15 buttons can be configured and labeled to provide fast selection of common equipment types, e.g., cameras, decks and monitors. It also includes a loop through Ethernet port for connecting to additional control panels, Videohub routers or other network devices.

Only 1 rack unit high and less than an inch thick, you can rack-mount Videohub Master Control at the front or at the rear of the rack to leave space for other equipment.

Videohub Smart Control

Videohub Smart Control is a rack-mountable control panel with 40 backlit pushbuttons and Ethernet connectivity, which works with all models of Videohub. It can be configured to work with one or many SDI destination devices. Once configured for your SDI equipment and Videohub router, Videohub Smart Control no longer requires a computer and can immediately change SDI routes as desired.

When configured for a single SDI destination, such as a monitor or deck, the pushbuttons can instantly switch between 40 different SDI sources on the same Videohub router. When configured for multiple SDI destinations, destination buttons become gold, source buttons become white and the lower right button can be configured as a take button and illuminates red. Macro buttons illuminate green when enabled and each one can be configured to perform up to 16 simultaneous crosspoint switches.

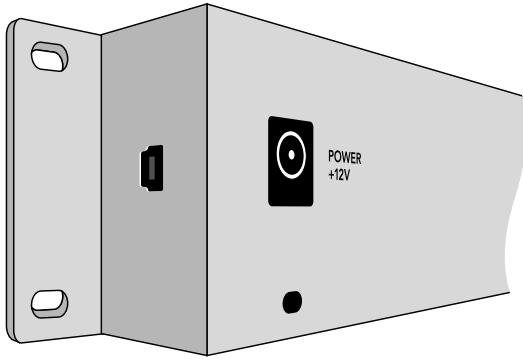
Only 1 rack unit high and less than an inch thick, you can rack-mount Videohub Smart Control at the front or at the rear of the rack to leave space for other equipment. If you don't have a rack, then you can leave it in a safe place on the floor!

GPI and Tally Interface

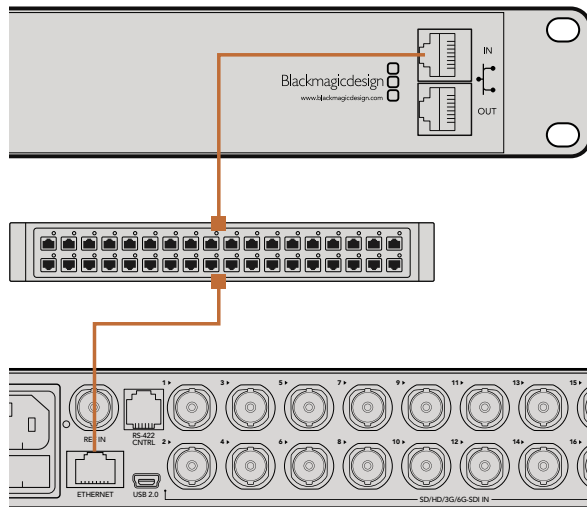
GPI and Tally Interface is a low cost alternative for multi-camera productions where a Camera Control Unit (CCU) operator needs to switch video from one of several cameras being controlled to a single monitor. It features 8 configurable GPIs and 8 configurable GPOs. The GPIs send commands to your Videohub by ethernet to switch the selected camera to the operator's monitor under certain crosspoint conditions. The GPOs send a tally signal to your cameras or other devices under certain crosspoint conditions.

Refer to the pinout diagram on the back of the unit when fabricating your custom cable.

16 Getting Started with Videohub Controllers



Side view of Videohub Smart Control showing the mini-B type USB port.



Videohub Smart Control connected to a Smart Videohub 20x20 via an Ethernet Network Switch.

Connecting USB to Configure the Control Panel

A USB 2.0 connection to a computer is used to configure the network settings of the Videohub Controller.

Be aware that the USB port of the Videohub Smart Control is inaccessible once it is installed in a rack. If you are likely to reconfigure Videohub Smart Control network settings periodically, then it may be convenient to permanently connect a USB cable to the unit before installing Videohub Smart Control in a rack.

Plugging into an Ethernet Network

In most facilities, Videohub is usually shared via an Ethernet network switch so it can be controlled by computers on the network as well as by Videohub control panels.

Videohub Master Control and Videohub Smart Control

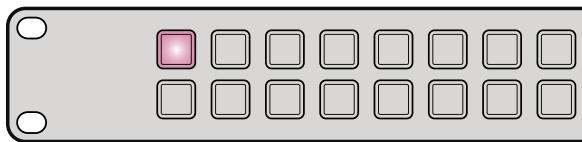
Videohub Master Control and Videohub Smart Control connect to any Videohub via standard Ethernet networking and can be powered over Ethernet or with an external power supply.

If your Ethernet switch does not provide power over Ethernet, use the included universal power supply.

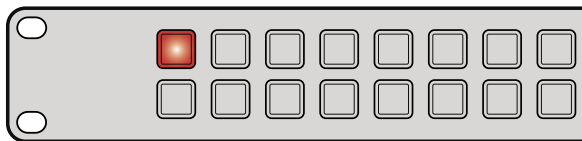
To connect a Videohub control panel to the local area IP based network:

- Step 1.** Connect the included power supply to your Videohub control panel. You can skip this step if your network switch provides power over Ethernet. No problem will be caused by connecting the power supply and power over Ethernet at the same time.
- Step 2.** Use the network In port on your Videohub control panel to connect to your network switch with a standard RJ45 Ethernet cable.
- Step 3.** You might also wish to connect another network device to the network Out port on your Videohub control panel, such as a Videohub router, another Videohub control panel or other network devices such as a computer or VoIP phone. The Out port does not provide power over Ethernet and any network device connected to this port will require its own power supply.

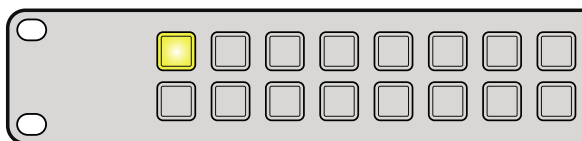
17 Getting Started with Videohub Controllers



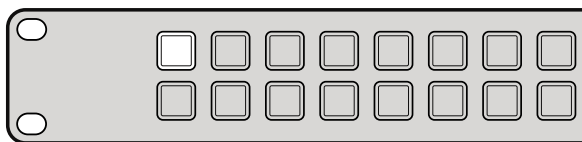
Videohub control panel is attempting to acquire an IP address.



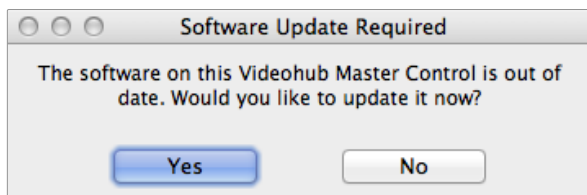
IP address has been acquired and control panel is attempting to connect to the Videohub Server.



Videohub Server is running an incompatible software or firmware version.



Control panel has successfully connected to the Videohub Server.



This message will appear if a internal software update is required.

Control Panel Button Diagnostics

When power is first connected to a Videohub control panel, all the buttons will display their test lights in the following sequence: red, green, blue and white. The top left button of a Videohub control panel indicates its network status, using the following diagnostic display:

Pink flashing light - unit is attempting to acquire an IP address. The button should quickly become red if the unit is set to use a static IP address, or if the unit successfully acquires an IP address from the DHCP server.

Red flashing light - unit has acquired an IP address and is attempting to connect to the Videohub Server. Make sure the Videohub Server computer is powered on and connected via Ethernet.

Yellow flashing light - unit has connected to a Videohub Server computer but the Videohub Server is running an incompatible software or firmware version. Update Videohub with the latest version of the Videohub software and firmware and then power cycle the Videohub control panel.

No flashing light - unit has successfully connected to the Videohub Server and is ready to control the Videohub if solid white, or solid white and gold, lights can be seen.

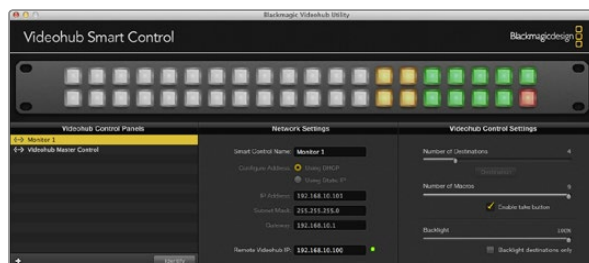
If the top left button took several minutes to turn red, the unit has failed to acquire an IP address and has eventually provided itself with a self-assigned AutoIP address in the 169.254.xxx.xxx format. Unless you wish to use an AutoIP address, disconnect and firmly reconnect the network cables to ensure they are properly connected, check for faulty network cables and make sure the DHCP server has spare IP addresses available. Unplug and reconnect all power sources from the Videohub control panel so it will request a new IP address from the DHCP server. The button should quickly become red. The unit will only perform these diagnostics when it is not selected in Videohub Hardware Panel Setup software.

Updating the Software in your Videohub Controller

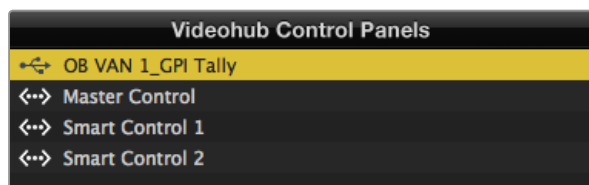
Follow these steps to check if your Videohub control panel's internal software is up to date:

- Step 1.** Connect your Videohub control panel to the computer via USB 2.0.
- Step 2.** Launch the Blackmagic Videohub Hardware Panel Setup.
- Step 3.** If a software update is required, the following message will appear: "Software Update Required. The software on this Videohub Control is out of date. Would you like to update it now?" Click Yes. The update will take about 2 minutes to complete.
- Step 4.** The message "Software Update Complete" should appear at completion of the update. Click OK to dismiss the message. Settings can be changed now if desired and this is a good opportunity to give each Videohub control panel a unique name.
- Step 5.** You can now unplug the USB cable from your Videohub control panel.

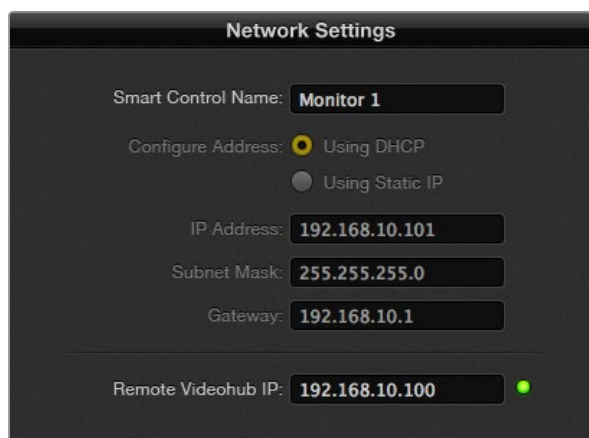
18 Getting Started with Videohub Controllers



The Blackmagic Videohub Hardware Panel Setup automatically searches your network for any Videohub control panels.



Any Ethernet or USB connected control units will be listed in the Videohub Control Panels pane with a corresponding icon.



Blackmagic Videohub Hardware Panel Setup network settings

Setting up your Videohub Controller

Configuring Videohub Hardware Panel Setup

When you launch Blackmagic Videohub Hardware Panel Setup, any Videohub control panels discovered on the network will be listed in the Videohub Control Panels pane next to an Ethernet network icon. If several Videohub control panels are listed, but you don't know which one is which, select one of them and then press Identify. This will cause all the buttons of the selected Videohub control panel to flash white.

Select the desired Videohub control panel and you will be able to change its name and control settings. Network settings will remain grayed out and can only be changed via USB.

If the desired Videohub control panel is not found on the network, the unit might not have received an IP address via DHCP. To manually configure the unit with appropriate network settings:

- Step 1.** Connect the Videohub control panel to your computer via a USB 2.0 cable.
- Step 2.** Launch Blackmagic Videohub Hardware Panel Setup. If the utility prompts you to update the software, follow the prompts to complete the update.
- Step 3.** The USB-connected panel will be automatically selected in the Videohub Control Panels pane and will display a USB icon next to its name. You can change all name, network and control settings for the USB-connected unit. When you are finished, the USB cable can be removed.

If your Videohub control panel is selected in the control utility, the pushbuttons on the unit will light up to match what is displayed in the software interface.

Network Settings

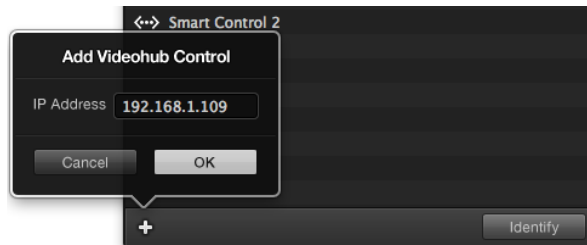
Each Videohub control panel requires an IP address to communicate with Videohub via your IP network.

When configuring a Videohub control panel via USB, you can choose DHCP or Static IP. DHCP automatically obtains all the network settings for your Videohub control panel and is the easier choice.

If you decide to use a static IP address, please ask your system administrator for a spare IP address to avoid creating a conflict on your network. You will then need to complete the IP address, subnet mask and gateway details for your Videohub control panel. You must use a static IP address if you are connecting directly to an Ethernet-equipped Videohub, such as Compact Videohub, without using a network switch.

You will also need to complete the IP details for the remote Videohub that you wish to control with your Videohub control panel. The remote Videohub is the Videohub Server. This could refer to a Videohub Server computer or an integrated Videohub Server onboard a Videohub model such as Universal Videohub 72.

19 Getting Started with Videohub Controllers



You can manually add a Videohub control panel, by IP address, to the list of Videohub Control Panels.

Add Videohub Control

If you already know the IP address of a Videohub control panel but it hasn't automatically appeared in the Videohub Control Panels pane, you can add the unit manually.

- Step 1.** Press the + (add device) button at the bottom of the Videohub Control Panels pane.
- Step 2.** Type in the IP address of the Videohub Control Panel and press OK.
- Step 3.** The Videohub Control Panel will appear in the list with any other devices that are connected to the Videohub.

If the Blackmagic Videohub Hardware Panel Setup does not find a Videohub control panel at the specified address, you can use the Utility to manually add a Videohub control panel when connected via Ethernet or USB.

Load/Save Settings

You can apply settings from an already configured Videohub control panel to other units.

Once you have set up your Videohub Control Panel's settings, choose File>Save Settings. This is useful if you want to set up several units the same way, or keep a back up of your settings.

After loading pre-configured settings on another control panel, you only need to update network settings, including the control panel name.

Configuring Videohub Master Control

Videohub Hardware Panel Setup software lets you customize the hardware features of each Videohub control panel.

Backlight

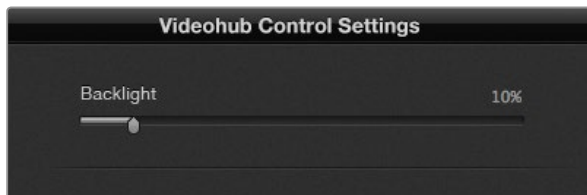
Adjust the backlight slider as desired to vary the brightness of all backlit buttons.

Creating Button Labels

15 of the buttons can be labeled within the control utility to provide fast selection of common equipment types such as cameras, VTRs and monitors.

If you haven't done so already, you should standardize the port labels on your Videohub router before labeling any buttons on your Videohub control unit.

Please refer to page 13 for detailed information on customizing your labels.



You can adjust the brightness of all backlit buttons in Videohub Master Control.

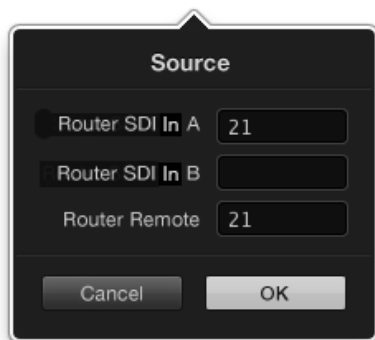
20 Getting Started with Videohub Controllers



Click on the desired button to edit its label.



Videohub Smart Control configured with multiple destinations.



Enter the number of the Videohub port to which the SDI device is connected.

You are now ready to label the Videohub Master Control buttons.

- Step 1.** Launch the Videohub Hardware Panel Setup and select your Videohub Master Control from the Panels pane.
- Step 2.** Click one of the 15 buttons in the picture of the panel. Enter a text label so it partially matches the labels of SDI and deck control ports that you previously entered for your router.
- Step 3.** Click OK and continue labeling the other buttons as desired.
- Step 4.** You can immediately test the buttons as you program them and verify the SDI routes are valid. You can refer to page 23 for instructions on how to label the physical pushbuttons.

Configuring Videohub Smart Control

Videohub Hardware Panel Setup lets you customize the hardware features of each Videohub control panel.

Number of Destinations

Videohub Smart Control can be configured as a Cut-Bus controller or as an XY controller. When configured as a Cut-Bus controller, every button represents an SDI source and there is only one destination.

When configured as an XY controller, Videohub Smart Control can work with up to 20 destinations. The source buttons will illuminate white and the destination buttons will illuminate gold. Use this configuration if you don't intend to dedicate a Videohub Smart Control unit to each destination device.

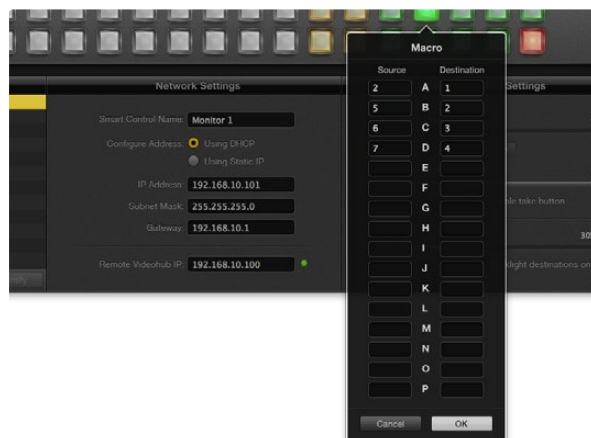
Cut-Bus Configuration

- Step 1.** Drag the Number of Destinations slider to 1.
- Step 2.** Click on the Destination button. In the Router SDI Out A field, enter the number of the Videohub output port to which the destination device is connected. If your destination device is receiving dual link HD-SDI or dual stream 3D, you will also need to enter an output port number into the Router SDI Out B field. There is a Router Remote field if your Videohub is also routing RS-422 deck control to the destination device.
- Step 3.** Click OK to confirm. All the buttons will become white, indicating that they are all sources.
- Step 4.** Click on each white button in the software interface to configure the source buttons.
- Step 5.** In the Router SDI In A field, enter the number of the Videohub input port to which the source device is connected. If your destination device is receiving dual link HD-SDI or dual stream 3D, you will also need to enter an input port number into the Router SDI In B field. There is a Router Remote field if your Videohub is also routing RS-422 deck control from the source device.
- Step 6.** Click OK to confirm.

21 Getting Started with Videohub Controllers



Click on the desired Destination button to configure it.



Up to 16 crosspoint routes can be changed by a single macro.



The Take button illuminates red in the lower right corner.

XY Controller Configuration

- Step 1.** Drag the Number of Destinations slider to the desired number.
- Step 2.** You can now configure the destination buttons by clicking on each gold button in the software interface. In the Router SDI Out A field, enter the number of the Videohub output port to which the destination device is connected. If your destination device is receiving dual link HD-SDI or dual stream 3D, you will also need to enter an output port number in to the Router SDI Out B field. There is also a Router Remote field if your Videohub is also routing RS-422 deck control to the destination device.
- Step 3.** Click OK to confirm. If you increase the number of destination buttons, there will be a matching decrease in the number of available source buttons.
- Step 4.** Click on each white button in the software interface to configure the source buttons.
- Step 5.** In the Router SDI In A field, enter the number of the Videohub input port to which the source device is connected. If your destination device is receiving dual link HD-SDI or dual stream 3D, you will also need to enter an input port number into the Router SDI In B field. There is also a Router Remote field if your Videohub is also routing RS-422 deck control from the source device.
- Step 6.** Click OK to confirm.

Number of Macros

Macros allow you to make up to 16 crosspoint routing changes simultaneously with a single button press.

- Step 1.** Drag the Number of Macros slider to enable up to 10 macro buttons. As you increase the number of macro buttons, there will be a matching decrease in the number of available source buttons.
- Step 2.** Click a green macro button to reveal the corresponding Macro window and enter up to 16 pairs of sources and destinations.
- Step 3.** When finished, click OK to save the routes and close the window.

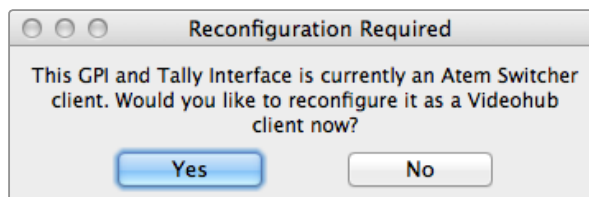
Take Button

When the Enable Take Button checkbox is active, the lower right button on the control interface turns red. Use this if you want a confirmation option to come up before your route change takes place. Press the red take button to confirm your route change. The take button can be used with both Cut-Bus and XY controller configurations and can also be used with macros.

Backlight

Adjust the backlight slider to vary the brightness of the backlit buttons as desired. Enable Backlight Destinations Only if you wish to disable the backlighting of the white source buttons.

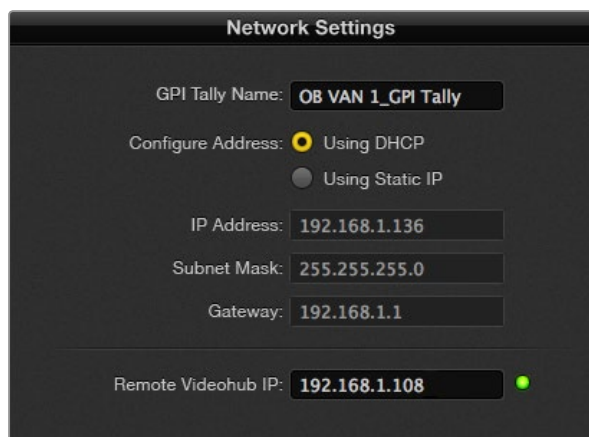
22 Getting Started with Videohub Controllers



You will need to reconfigure your GPI and Tally Interface to work with Videohub.



GPI and Tally Interface connected via USB.



Enter a GPI and Tally Name and the IP address of the Videohub you want to connect to.

Setting up the GPI and Tally Interface

The GPI and Tally Interface is configured using the Videohub Hardware Panel Setup. Before you can use the GPI and Tally Interface, you may need to install the latest version of the software.

- Step 1.** Connect the power adapter to the GPI and Tally Interface.
- Step 2.** Connect the GPI and Tally Interface to your computer with a USB Type A to B cable.
- Step 3.** Open the software and it will detect whether your GPI and Tally Interface has been configured for a Videohub before. If it has the software will open without any need for changes. Otherwise a message will tell you your GPI and Tally Interface has been configured for use with an ATEM Switcher and will need to be reconfigured for use with Videohub. Click Yes. After a few moments the GPI and Tally Interface will be reconfigured as a Videohub client.

Configuring the GPI and Tally Interface

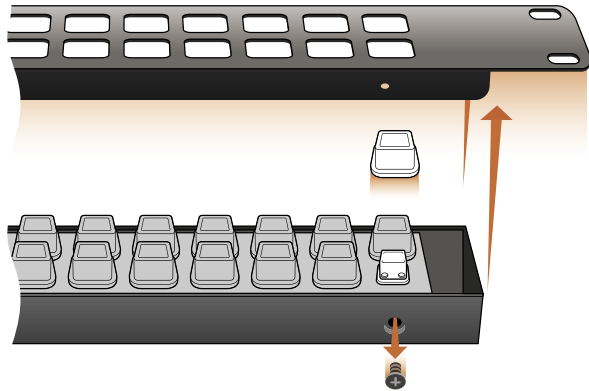
If your Videohub does not have an ethernet port, or if it is only accessible over a network:

- Step 1.** Connect a USB type A to B cable from your GPI and Tally Interface to your computer.
- Step 2.** Connect an ethernet cable from the ethernet IN port on your GPI and Tally Interface to your ethernet switcher.
- Step 3.** Open Videohub Hardware Panel Setup.
- Step 4.** You should see your GPI and Tally Interface with a USB icon next to it in the Videohub Control Panels pane. Give your GPI and Tally Interface a unique name so it can be easily recognized. To do so, click inside the GPI and Tally Name field and type a name.
- Step 5.** Check the option to configure your IP address either Using DHCP or a Static IP. Depending on your setup, you may choose either so it's probably a good idea to check with your network administrator to see which is the better option.
- Step 6.** In the Remote Videohub IP field, enter the IP address of the Videohub you want to connect to. A red light next to the field will turn green and the LED on the GPI and Tally interface will illuminate when a connection has been established.

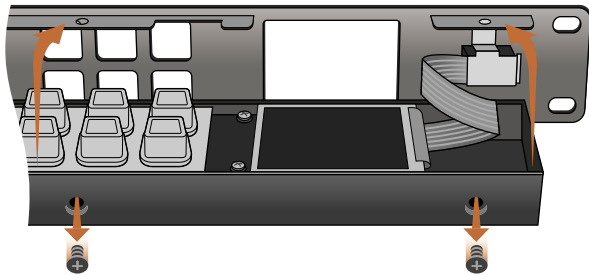
If you do not know the IP address of your Videohub:

- Step 1.** Connect the Videohub to your computer via USB.
- Step 2.** Launch the Videohub software and click on Videohub Server Preferences.
- Step 3.** Note down the IP address in the Remote Videohub IP address field.

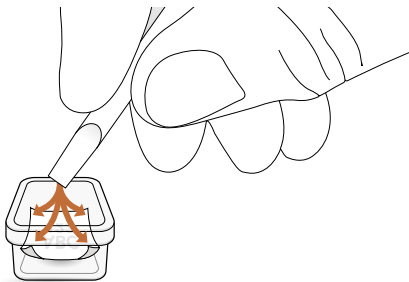
23 Getting Started with Videohub Controllers



For Videohub Smart Control and Smart Videohub, remove the 8 screws, lift off the face plate and then the button caps.



For Videohub Master Control, remove the 8 screws, lift off the face plate and carefully allow the face plate to lie down next to the rest of the unit. Then remove the button caps.



Lightly press the four corners of the square label into the rounded corners of the clear cap.

Labeling Pushbuttons

Videohub Master Control and Videohub Smart Control have removable face plates, which provide access to the pushbuttons for labeling.

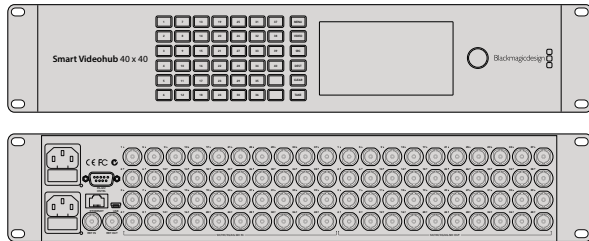
Included with the software installer is a Videohub Control Labels folder containing both PDF and Adobe Illustrator template files. You can print and use either of these files for labeling the buttons. The Illustrator file contains text boxes so you can add your text labels before printing them out. If you don't have Adobe Illustrator, you can just fill out and print the PDF file labels. Then cut out the square labels so they are ready to be inserted into the buttons.

To remove the face plate:

- Step 1.** Power off the unit, disconnect all cables and lay it flat with the buttons facing upwards.
- Step 2.** Using a No. 2 Phillips head screwdriver, remove the 8 screws found on the top and bottom sides of the faceplate.
- Step 3.** Gently lift the face plate off the unit. If you have a Videohub Master Control, take care not to pull on the data cable that connects the scroll wheel to the rest of the unit.
- Step 4.** The button caps can be easily lifted off with your fingers. Remove the clear cap from a button that you wish to label, while taking care to avoid lifting the silicon button membrane.
- Step 5.** Loosely place the printed label into the upturned clear cap.
- Step 6.** Use a pointy device, such as the tip of a screwdriver, to lightly press the four corners of the square paper label into the four rounded corners of the clear cap.
- Step 7.** Reinstall the clear cap containing the printed label. As the clear cap is pressed down onto its silicon button, the paper label will be pushed forward, and neatly held flat against the window of the clear cap. Repeat for as many buttons as you wish to label.
- Step 8.** Lower the face plate back into position, making sure the Blackmagic Design logo is the correct way up. If you have a Videohub Master Control, make sure the data cable tucks neatly into place.
- Step 9.** Reinstall the eight screws.

Congratulations! Your Videohub control unit is now ready to use!

24 Using Videohub Routers



Smart Videohub 40x40

Smart Videohub 40x40 is a small router with a built in control panel and LCD and is perfect for locations where minimal space is available, such as outside broadcast trucks. It features 40 SDI inputs, 40 SDI outputs, reference input and output, a redundant universal power supply and powerful Videohub routing control software.

All SDI connections support auto detection of SD, HD, 3G-SDI and 6G-SDI, and reclocking on all SDI outputs. Simultaneous routing of Ultra HD, HD, SD video and DVB-ASI are supported with Smart Videohub 40x40.

Local router control is easy and intuitive using the built in control panel and LCD, and requires no configuration and no computer. The LCD allows you preview source and destination video without an external monitor.

Remote router control can also be performed via 10/100Base-T Ethernet or serial connections. If router control is performed via Ethernet, the integrated "Videohub Server" is used and you need only provide an Ethernet cable to connect Smart Videohub 40x40 to your Ethernet network switch.

Third party router controllers can control Smart Videohub 40x40 via Ethernet, or as an RS-422 slave device, for router crosspoint switching.

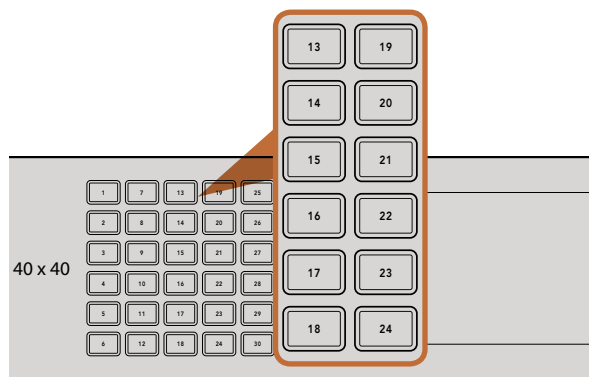
Occasionally, the internal software of the Smart Videohub 40x40 will need to be updated. Blackmagic Videohub Setup will prompt you if an update is required. The utility uses the USB 2.0 connection and you will need to provide a USB 2.0 type A Male to Mini B cable.

Smart Videohub 40x40 is 2 rack units high and features a shallow form factor. You will need to leave enough space in your equipment rack to install the Smart Videohub hardware. You can rack-mount Smart Videohub 40x40 at the front or at the rear of the rack to leave space for other equipment.

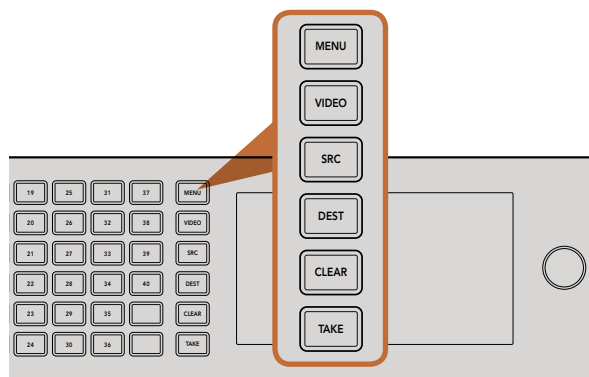
Smart Videohub 40x40 includes a redundant universal power supply for use in all countries. To use redundancy you will need to provide two standard IEC cords with C13 connectors and two mains power sockets. A third power socket will be required if you decide to use a dedicated server computer.

Turn the page for instructions on how to make route changes with the control panel and LCD. Alternatively, if you need to learn how to integrate your router into an existing network, turn to page 7.

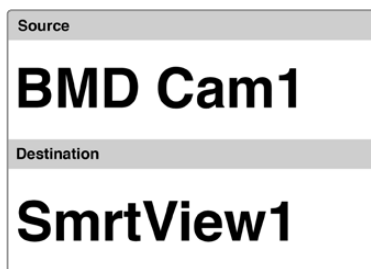
25 Using Videohub Routers



The numbered pushbuttons correspond to either the SDI inputs (sources) or SDI outputs (destinations).



Menu buttons allow for simple and quick route changes.



The LCD provides instant feedback of route selections and changes and allows you preview source and destination video without an external monitor.

Using the Smart Videohub 40x40 Control Panel and LCD

Smart Videohub 40x40 features a built in control panel and LCD. Routing changes can be made without needing a computer by simply using the numbered pushbuttons. Remote router control can also be used.

Menu Buttons Explained

MENU

Switches between the routing display and the network configuration page.

VIDEO

Use this button in conjunction with the SRC and DEST buttons to display either the Source or Destination video on the LCD.

SRC

Press this button and then a numbered pushbutton to select your Source.

DEST

Press this button and then a numbered pushbutton to select your Destination.

CLEAR

Press this button to discard a route change.

TAKE

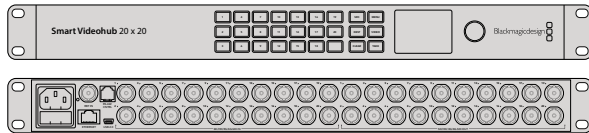
Press this button to confirm a route change.

Changing Routes

- Step 1.** Select the DEST button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Destination numbers. The lower half of the LCD displays the Destination and will change accordingly. If you have already customized your labels, the device name eg: "SmartView1" will be displayed.
- Step 2.** Select the SRC button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Source numbers. The numbers will scroll in alphabetical order and not the numerical order. The top half of the LCD displays the Sources and will change accordingly. If you have already customized your labels, the device name will be displayed. The CLEAR button will flash white and the TAKE button will flash red. Press the TAKE button to confirm the route change. Or, you can press the CLEAR button to discard the route change.

The pushbuttons override any existing routes, including destinations locked with Videohub software.

26 Using Videohub Routers



Smart Videohub 20x20

Smart Videohub 20x20 is a tiny router with a built in control panel and LCD and is perfect for locations where minimal space is available, such as outside broadcast trucks. It features 20 SDI inputs, 20 SDI outputs, reference input, a universal power supply and powerful Videohub routing control software.

All SDI connections support auto detection of SD, HD, 3G-SDI and 6G-SDI, and reclocking on all SDI inputs. Simultaneous routing of Ultra HD, HD, SD video and DVB-ASI are supported with Smart Videohub 20x20.

Local router control is easy and intuitive using the built in control panel and LCD, and requires no configuration and no computer. The LCD allows you preview source and destination video without an external monitor.

Remote router control can also be performed via 10/100Base-T Ethernet or serial connections. If router control is performed via Ethernet, the integrated "Videohub Server" is used and you need only provide an Ethernet cable to connect Smart Videohub 20x20 to your Ethernet network switch.

Third party router controllers can control Smart Videohub 20x20 via Ethernet, or as an RS-422 slave device, for router crosspoint switching.

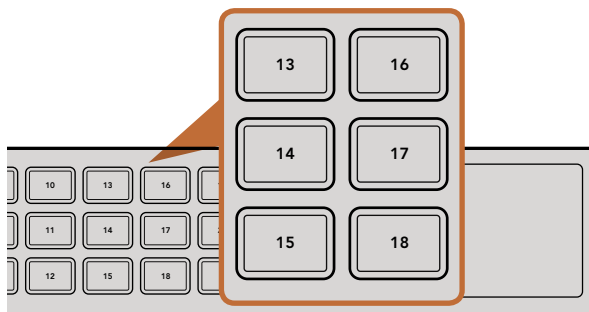
Occasionally, the internal software of the Smart Videohub 20x20 will need to be updated. Videohub Setup will prompt you if an update is required. The utility uses the USB 2.0 connection and you will need to provide a USB 2.0 type A Male to Mini B cable.

Smart Videohub 20x20 is 1 rack unit high and features a shallow form factor. You will need to leave enough space in your equipment rack to install the Smart Videohub hardware. You can rack-mount Smart Videohub 20x20 at the front or at the rear of the rack to leave space for other equipment.

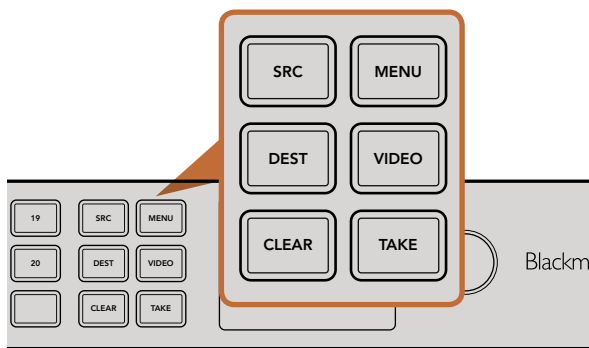
Smart Videohub 20x20 includes a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector and a mains power socket. A second power socket will be required if you decide to use a dedicated server computer.

Turn the page for instructions on how to make route changes with the control panel and LCD. Alternatively, if you need to learn how to integrate your router into an existing network, turn to page 7.

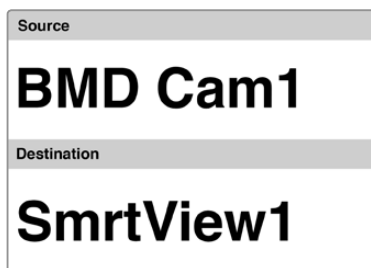
27 Using Videohub Routers



The numbered pushbuttons correspond to either the SDI inputs (sources) or SDI outputs (destinations).



Menu buttons allow for simple and quick route changes.



The LCD provides instant feedback of route selections and changes and allows you preview source and destination video without an external monitor.

Using the Smart Videohub 20x20 Control Panel and LCD

Smart Videohub 20x20 features a built in control panel and LCD. Routing changes can be made without needing a computer by simply using the numbered pushbuttons. Remote router control can also be used.

Menu Buttons Explained

SRC

Press this button and then a numbered pushbutton to select your Source.

DEST

Press this button and then a numbered pushbutton to select your Destination.

CLEAR

Press this button to discard a route change.

MENU

Toggles between the routing display and the network configuration page.

VIDEO

Use this button in conjunction with the SRC and DEST buttons to display either the Source or Destination video on the LCD.

TAKE

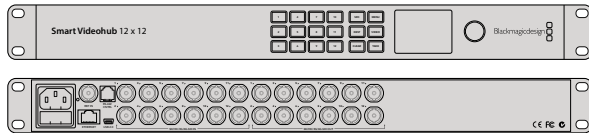
Press this button to confirm a route change.

Changing Routes

- Step 1.** Select the DEST button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Destination numbers. The lower half of the LCD displays the Destination and will change accordingly. If you have already customized your labels, the device name eg: "SmartView1" will be displayed.
- Step 2.** Select the SRC button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Source numbers. The numbers will scroll in alphabetical order and not the numerical order. The top half of the LCD displays the Sources and will change accordingly. If you have already customized your labels, the device name will be displayed. The CLEAR button will flash white and the TAKE button will flash red. Press the TAKE button to confirm the route change. Or, you can press the CLEAR button to discard the route change.

The pushbuttons override any existing routes, including destinations locked with Videohub software.

28 Using Videohub Routers



Smart Videohub 12x12

Smart Videohub 12x12 is a tiny router with a built in control panel and LCD and is perfect for locations where minimal space is available, such as outside broadcast trucks. It features 12 SDI inputs, 12 SDI outputs, reference input, a universal power supply and powerful Videohub routing control software.

All SDI connections support auto detection of SD, HD, 3G-SDI and 6G-SDI, and reclocking on all SDI inputs. Simultaneous routing of Ultra HD, HD, SD video and DVB-ASI are supported with Smart Videohub 12x12.

Local router control is easy and intuitive using the built in control panel and LCD, and requires no configuration and no computer. The LCD allows you preview source and destination video without an external monitor.

Remote router control can also be performed via 10/100Base-T Ethernet or serial connections. If router control is performed via Ethernet, the integrated "Videohub Server" is used and you need only provide an Ethernet cable to connect Smart Videohub 12x12 to your Ethernet network switch.

Third party router controllers can control Smart Videohub via Ethernet, or as an RS-422 slave device, for router crosspoint switching.

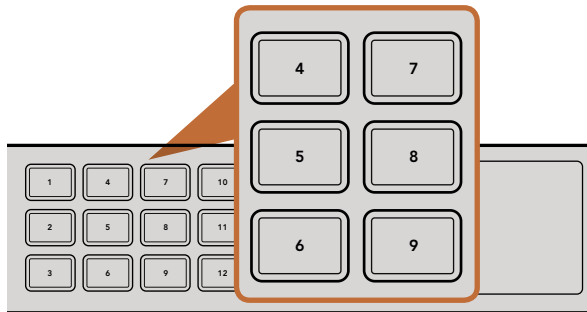
Occasionally, the internal software of the Smart Videohub 12x12 will need to be updated. Videohub Setup will prompt you if an update is required. The utility uses the USB 2.0 connection and you will need to provide a USB 2.0 type A Male to Mini B cable.

Smart Videohub 12x12 is 1 rack unit high and features a shallow form factor. You will need to leave enough space in your equipment rack to install the Smart Videohub hardware. You can rack-mount Smart Videohub at the front or at the rear of the rack to leave space for other equipment.

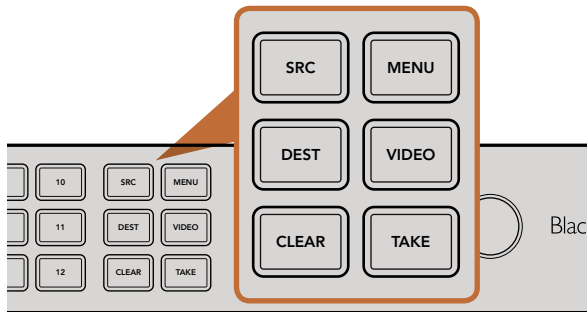
Smart Videohub 12x12 includes a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector and a mains power socket. A second power socket will be required if you decide to use a dedicated server computer.

Turn the page for instructions on how to make route changes with the control panel and LCD. Alternatively, if you need to learn how to integrate your router into an existing network, turn to page 7.

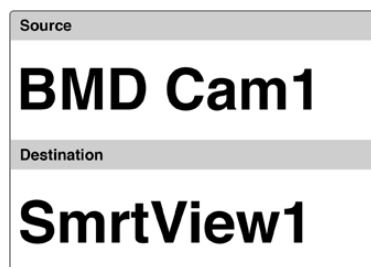
29 Using Videohub Routers



The numbered pushbuttons correspond to either the SDI inputs (sources) or SDI outputs (destinations).



Menu buttons allow for simple and quick route changes.



The LCD provides instant feedback of route selections and changes and allows you preview source and destination video without an external monitor.

Using the Smart Videohub 12x12 Control Panel and LCD

Smart Videohub 12x12 features a built in control panel and LCD. Routing changes can be made without needing a computer by simply using the numbered pushbuttons. Remote router control can also be used.

Menu Buttons Explained

SRC

Press the SRC button and then a numbered pushbutton to select your Source.

DEST

Press the DEST button and then a numbered pushbutton to select your Destination.

CLEAR

Press the CLEAR button to discard a route change.

MENU

Press the MENU button to toggle between the routing display and the network configuration page.

VIDEO

Press the VIDEO button and then either the SRC or DEST buttons to display the video on the LCD.

TAKE

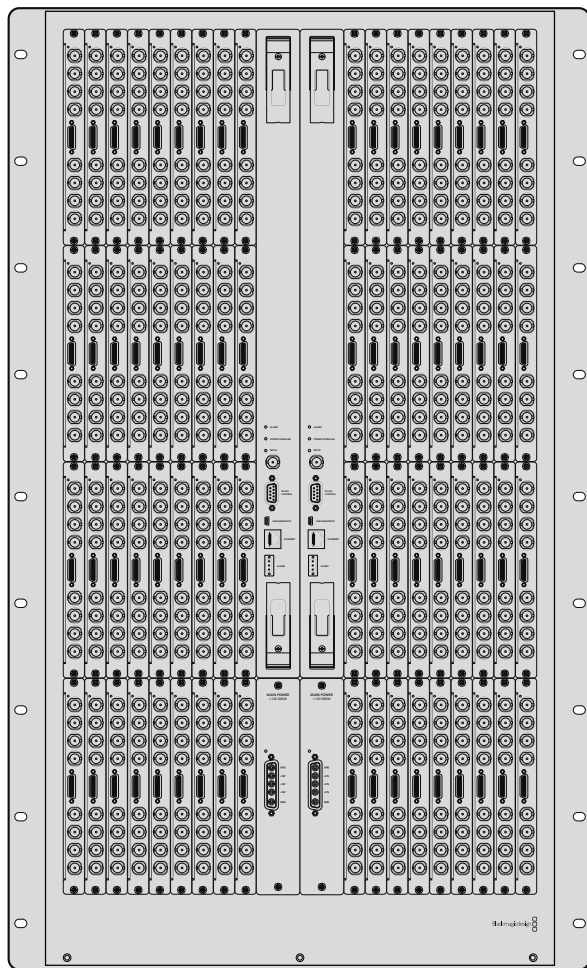
Press this button to confirm a route change.

Switching Routes

- Step 1.** Select the DEST button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Destination numbers. The lower half of the LCD displays the Destination and will change accordingly. If you have already customized your labels, the device name eg: "SmartView1" will be displayed.
- Step 2.** Select the SRC button and then a numbered pushbutton. Alternatively, you can use the rotary knob to scroll through the Source numbers. The numbers will scroll in alphabetical order and not the numerical order. The top half of the LCD displays the Sources and will change accordingly. If you have already customized your labels, the device name will be displayed. The CLEAR button will flash white and the TAKE button will flash red. Press the TAKE button to confirm the route change. Or, you can press the CLEAR button to discard the route change.

The pushbuttons override any existing routes, including destinations locked with Videohub software.

30 Using Videohub Routers



Universal Videohub 288

What you need to get started

Universal Videohub 288 is a large, modular router ideally suited to very large facilities and broadcasters. It features a 72 card rack frame that can be filled with any combination of BNC SDI or optical fiber SDI interface cards.

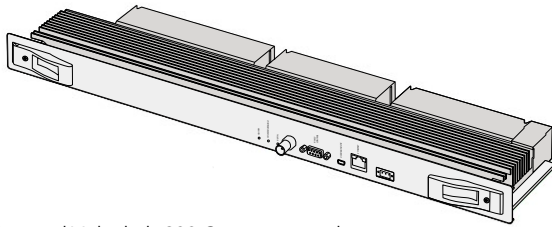
When fully populated with two Universal Videohub 288 Crosspoint cards, two power cards, 72 interface cards and 72 deck control cables, Universal Videohub 288 provides 288 SDI inputs, 288 SDI outputs, 288 bidirectional RS-422 deck control ports, reference input, redundant crosspoint processor, redundant Ethernet networking, redundant power and powerful Videohub routing control software for Mac OS X and Windows.

Occasionally, the internal software of the Universal Videohub 288 will need to be updated. Videohub Setup will prompt you if an update is required. The utility uses the USB 2.0 connection and you will need to provide a USB 2.0 type A to mini B male cable.

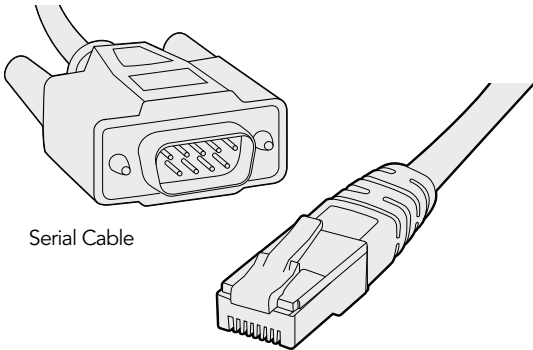
Universal Videohub 288 ships as an empty rack frame, except for a removable fan tray and fans. All other hardware components, such as SDI interface cards and power supplies, must be purchased and installed separately. Read the following section to help you decide which components you will need before you build your Universal Videohub 288.

Pages 42-43 provide information on the different interface cards available for your Universal Videohub.

31 Using Videohub Routers

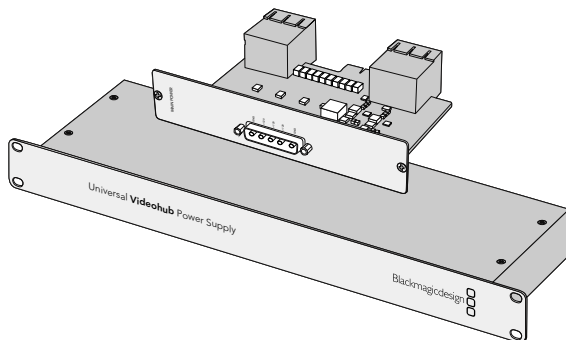


Universal Videohub 288 Crosspoint card



Serial Cable

Standard RJ45 Ethernet Cable



Universal Videohub Power Supply includes a power card, 1 RU chassis and connecting power cable.

Universal Videohub 288 Crosspoint Card

This module contains the crosspoint processor for switching video routes and changing deck control ports. Ethernet, USB and serial ports are located on the card for router control.

A Reference input is located on the card for connection to a tri-level sync or black burst genlock signal.

An Alarm light will illuminate on the card if user intervention is required, e.g., if inadequate cooling has caused Videohub to overheat. Alarm notification is supplied by the GPI (General Purpose Interface) output to other devices.

A Power Overload light will illuminate on the card if inadequate power is being supplied to the unit for the number of cards installed.

You will need a number 01 size Pozidriv screwdriver to install the Universal Videohub 288 Crosspoint card.

Router Control Cable

Remote router control is performed via 10/100Base-T Ethernet or serial. If router control is performed via Ethernet, the integrated Videohub Server is used. This means you only need to provide an Ethernet cable to connect Universal Videohub 288 to your Ethernet network switch.

Third party router controllers can control Universal Videohub 288 via Ethernet, or as an RS-422 slave device, for router crosspoint switching. Please refer to the Developer Information section of this manual for Videohub and RS-422 protocols.

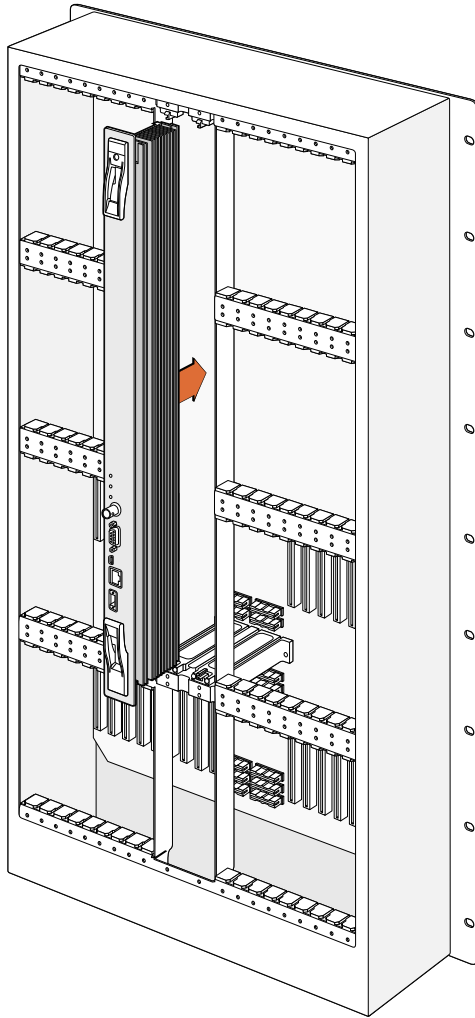
Power Supply

When fully populated and running at maximum power consumption, Universal Videohub 288 can be powered by a single Universal Videohub Power Supply.

The Universal Videohub Power Supply package includes a power card with a single connection to a 1 RU size rack mount chassis which contains the power supply.

The Universal Videohub Power Supply chassis contains a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector.

32 Using Videohub Routers



Building Universal Videohub 288

25 rack units of space should be reserved for the installation of Universal Videohub 288 and two rack mount power supply chassis, allowing free space for heat dissipation. Only 23 RU is required if Universal Videohub 288 is mounted at the top of an open rack as heat can be dissipated from the top.

Universal Videohub 288 is 18 RU high and 6 inches thick. You can rack mount Universal Videohub 288 facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment.

Universal Videohub 288 contains electrostatic sensitive devices. It is essential to discharge yourself of static electricity before handling any of these devices, just as you would when installing devices into a computer. We recommend the use of an antistatic wrist strap when handling any of these devices.

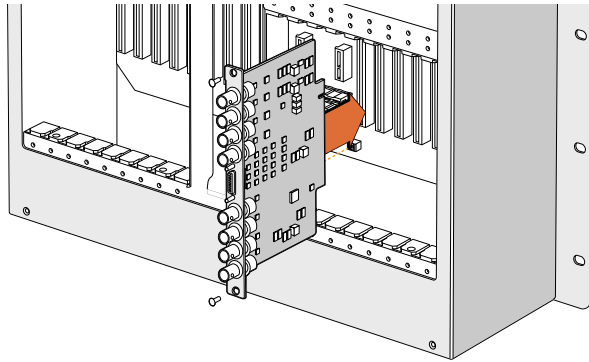
Installing a Universal Videohub 288 Crosspoint Card

Now that your Universal Videohub 288 has been mounted in a rack, it needs to be fitted with a crosspoint card. The crosspoint card is the brains of Universal Videohub and performs video route and deck control switching. Universal Videohub 288 Crosspoint cards are hot-swappable, meaning they are designed to be installed and removed while the Universal Videohub is running.

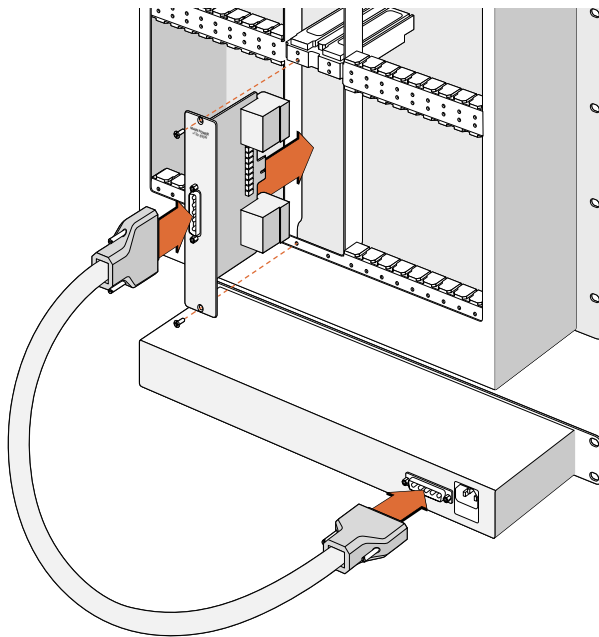
- Step 1:** Hold the crosspoint card in a vertical orientation by its two levers. The BNC, Ethernet and other ports should be towards the bottom end of the card.
- Step 2:** Gently insert the card into its slot, ensuring the top and bottom edges follow the black guides.
- Step 3:** Firmly push both levers flat to fully engage the multi-pin connectors with the motherboard. Mating pins ensure that the card precisely engages with the motherboard without damaging the multi-pin connectors.
- Step 4:** Use a number 01 size Pozidriv screwdriver to secure the two levers on the crosspoint card.

It is common to install a second crosspoint card for failover redundancy and we recommend doing this. If two crosspoint cards are installed, all video routes and port labels will be safely retained even if one card becomes faulty and has to be replaced. To remove the blanking plate from the right crosspoint card slot, you will need to use a number 02 size Pozidriv screwdriver.

33 Using Videohub Routers



Installing a Universal Videohub SDI Interface Card.



The Universal Videohub Power Supply consists of a power card which is inserted into the Universal Videohub 288 and then connected to a 1 RU chassis located under the Universal Videohub 288.

Installing Interface cards

Installing a Universal Videohub SDI Interface or Universal Videohub Optical Interface is easy and the steps are the same for installing each type of interface card.

- Step 1:** Hold the card in a vertical orientation with the identification LED at the top of the card. The identification LED looks like a pin hole near the top left of the top connector.
 - Step 2:** Gently insert the card along its guides until it plugs firmly into the PCI slot on the motherboard.
 - Step 3:** Use a number 02 size Pozidriv screwdriver to secure the card to the Universal Videohub frame.
- Pages 42-43 provide information on the different interface cards available for your Universal Videohub.

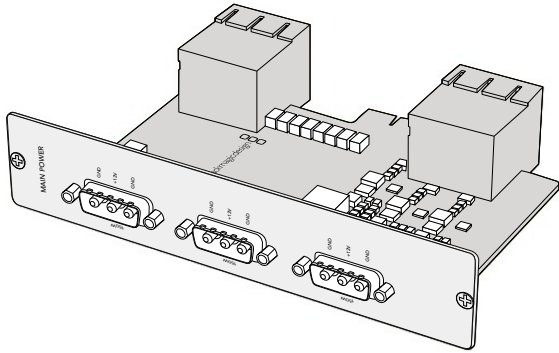
Installing a Universal Videohub Power Supply

The Universal Videohub Power Supply package consists of a power card, a power cable and a 1 RU chassis containing the power supply. A second Universal Videohub Power Supply can be installed under the first power supply for failover redundancy. You will need to provide a standard IEC cord with a C13 connector for each power supply.

- Step 1:** Ensure that any new power supplies are disconnected from any electrical source. Orient the power card so that the MAIN POWER label appears at the top of the card.
- Step 2:** Insert the power card into either of the two power card slots.
- Step 3:** Use a number 02 size Pozidriv screwdriver to secure the power card with its two screws. If you have a second power card, install it now into the spare power card slot.
- Step 4:** Connect the power cable from the power card to the power supply. Tighten the thumb screws on both power connectors. Repeat this step if you have a second power card and second power supply. It does not matter which power card connects to which power supply.
- Step 5:** Connect an IEC cord from each power supply to a mains wall socket and turn on the power.

Congratulations! Your Universal Videohub 288 is now ready to start routing video!

34 Using Videohub Routers



Universal Videohub 450W Power Card can be connected to three 150W power bricks.

Installing a Universal Videohub 450W Power Card

While designed for the Universal Videohub 72, the lower cost Universal Videohub 450W Power Card can be used as a low power supply option for Universal Videohub 288.

The Universal Videohub 450W Power Card requires three 150W brick power supplies, which are sold separately. This power option may be considered due to its lower cost but is slightly underpowered and will not power a fully populated Universal Videohub 288 under all card combinations. This power supply should only be considered if attempting to minimize the cost of purchasing a Universal Videohub 288.

A second Universal Videohub 450W Power Card with three power bricks can be connected to the Universal Videohub 288 to ensure continued operation should the first power card fail.

- Step 1.** Orient the power card so that the MAIN POWER label appears at the top of the card.
- Step 2.** Insert the power card into its slot on the motherboard. Use a number 02 size Pozidriv screwdriver to secure the power card with its two screws.
- Step 3.** Check the Power Overload light on the crosspoint card. If the Power Overload light is on, you will have to remove some cards to ensure that all installed cards are receiving power. If the Power Overload light continues to illuminate even after verifying that all three brick power supplies are working, Universal Videohub 288 has been populated with too many cards. You will need to discard your low power supply and upgrade to a Universal Videohub Power Supply.

Installing a Universal Videohub 150W Power Supply

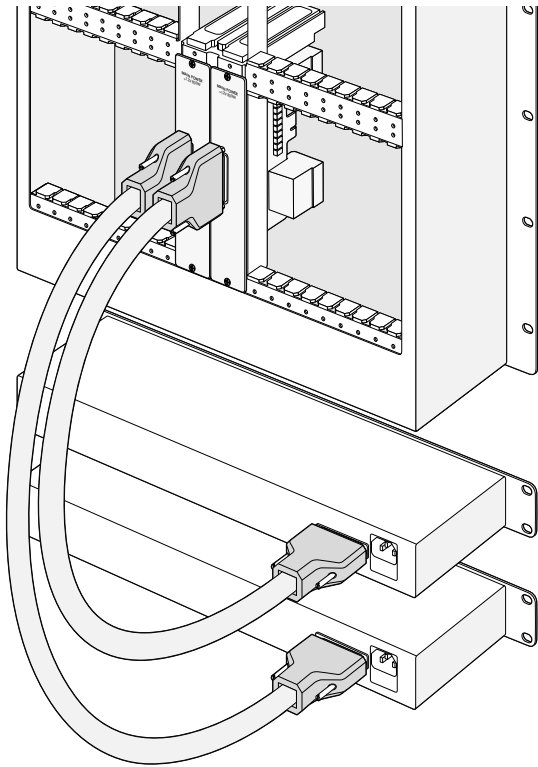
The Universal Videohub 150W Power Supply is a brick style power supply which connects to a Universal Videohub 450W Power Card. You will need to connect 3 power supplies for each Universal Videohub 450W Power Card you install in a Universal Videohub 288. You will need to provide a standard IEC cord with a C13 connector for each power supply.

Adding a Universal Videohub 150W Power Supply

- Step 1.** Ensure that any new brick power supplies are disconnected from any electrical source.
- Step 2.** Connect each new power supply to the Universal Videohub 450W Power Card.
- Step 3.** Tighten the thumb screws on all power connectors.
- Step 4.** Connect an IEC cord from each new power supply to the wall socket and turn on the power.

If you need to remove or replace a power brick while Universal Videohub 288 is still running from a second power card and set of power supplies, power off the brick while being careful to avoid switching off power to the remaining power supplies. Unplug the IEC cord and then unscrew and disconnect the power supply from the Universal Videohub 450W Power Card.

35 Using Videohub Routers



Two Universal Videohub Power Supplies can be installed for power redundancy with the Universal Videohub 288.

Installing a second Power Supply while Universal Videohub 288 is running

If you wish to install a redundant or replacement power supply while Universal Videohub 288 is already running from a power supply, please carry out the installation procedure in the following order:

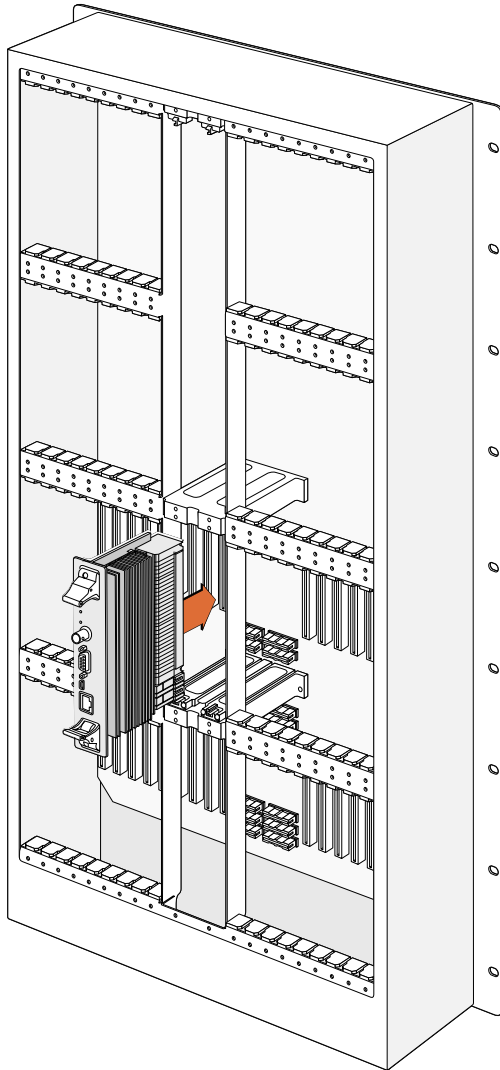
- Step 1.** Ensure that the new power supply is disconnected from any electrical source.
- Step 2.** Orient the new power card so that the MAIN POWER label appears at the top of the card. Now insert the power card into the spare power card slot.
- Step 3.** Use a number 02 size Pozidriv screwdriver to secure the power card with its two screws.
- Step 4.** If you are installing a redundant power supply for the first time, install the 1 RU chassis below the first power supply, leaving 1 RU of clearance between the two power supplies for heat dissipation. If you are installing a replacement power supply, install the replacement 1 RU chassis where the faulty unit was previously located.
- Step 5.** Connect the new power cable between the connectors on the new power card and the new power supply. Tighten the thumb screws on both power connectors.
- Step 6.** Connect an IEC cord from the new power supply to the wall socket and turn on the power.

Removing a Power Supply while Universal Videohub 288 is running

If you need to remove a faulty power supply while Universal Videohub 288 is running from another power supply, please carry out the removal procedure in the following order:

- Step 1.** Switch off the power to the faulty power supply and unplug its IEC cord.
- Step 2.** Disconnect the power cable between the power card and the faulty power supply.
- Step 3.** Remove the faulty 1 RU chassis and associated power card. Ensure all components from the faulty unit are placed somewhere where they will not be confused with a new replacement unit.

36 Using Videohub Routers



Installing a Universal Videohub 72 Crosspoint Card

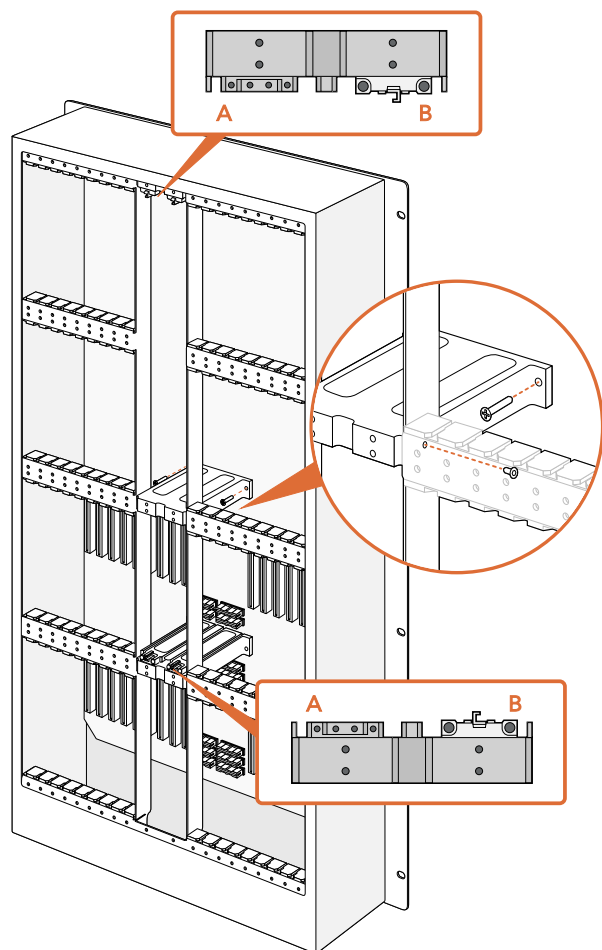
A single Universal Videohub 72 Crosspoint card can be installed in the left crosspoint card slot of a Universal Videohub 288. The Universal Videohub 72 Crosspoint card is limited to supporting 18 interface cards and does not support crosspoint redundancy. This card should only be considered if attempting to minimize the initial cost of purchasing a Universal Videohub 288. When using a Universal Videohub 72 Crosspoint card, only the bottom row of 18 interface cards can be used. A Universal Videohub 288 Crosspoint card must be used if you want to install more than 18 interface cards.

The short length of the Universal Videohub 72 Crosspoint card, compared with the Universal Videohub 288 Crosspoint card, requires the installation of an additional supporting bridge in the center of the Universal Videohub 288. When upgrading to a Universal Videohub 288 Crosspoint card at a later time, the additional supporting bridge must be removed.

The additional supporting bridge, short blanking plate and associated screws are available as a separate package from your Videohub dealer. Torx T8, Torx T10, number 01 and number 02 size Pozidriv screwdrivers are required to install the additional supporting bridge and the Universal Videohub 72 Crosspoint card.

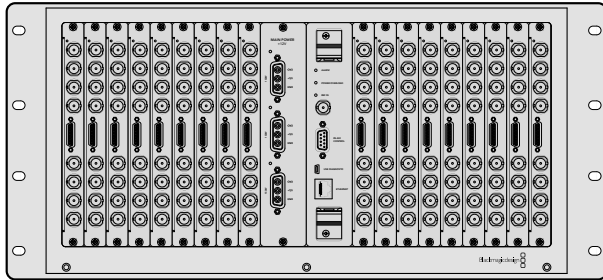
- Step 1.** Ensure power is switched off and disconnected from Universal Videohub 288.
- Step 2.** Use a number 02 size Pozidriv screwdriver to remove the blanking plate from the right crosspoint card slot.
- Step 3.** Use a number 02 size Pozidriv screwdriver to remove the blanking plates from the interface card slots for SDI ports 73-216.
- Step 4.** Maneuver the supporting bridge through the crosspoint card slots and rest it flat on the motherboard, with the card guides facing up, while taking great care to avoid damaging the multi-pin connectors on the motherboard.
- Step 5.** Stand the supporting bridge so the holes in its left and right feet are positioned over the corresponding mounting holes on the motherboard standoffs. The card guides should face the lower supporting bridge at the bottom of the crosspoint slots.
- Step 6.** Secure the left and right feet of the supporting bridge with the number 02 size Pozidriv screws.
- Step 7.** Secure the left and right legs of the supporting bridge with the two Torx T10 screws as shown in the accompanying illustration. These screws are installed horizontally.

37 Using Videohub Routers



- Step 8.** Use a Torx T8 screwdriver to remove the silver catches from the two supporting bridges at the top and bottom of the left crosspoint slot. In the accompanying illustration, the letter "A" indicates the location on the left side of the supporting bridges where the silver catches have been removed. When upgrading to a Universal Videohub 288 Crosspoint card at a later time, you will need to reinstate the silver catches, so make sure you keep them in a safe place. The silver catches shown at "B" should not be removed. They will be required if installing a Universal Videohub 288 Crosspoint card in the right crosspoint card slot in the future.
- Step 9.** To install the Universal Videohub 72 Crosspoint card, hold the card in a vertical orientation by its two levers. The BNC, Ethernet and other ports should be towards the bottom end of the card. Gently insert the unit into its slot, below the additional supporting bridge, and ensure the top and bottom edges of the card follow the black guides. Now firmly push both levers flat to fully engage the multi-pin connectors with the motherboard. Mating pins ensure that the card precisely engages with the motherboard without damaging the multi-pin connectors. Use a number 01 size Pozidriv screwdriver to secure the screws on the two levers of the crosspoint card.
- Step 10.** The short length of the Universal Videohub 72 Crosspoint card means that a short blanking plate should also be installed to cover the rest of the long crosspoint slot. The short blanking plate can be secured with a number 02 size Pozidriv screwdriver.
- Step 11.** Use a number 02 size Pozidriv screwdriver to reinstate the blanking plate for the right crosspoint card slot.
- Step 12.** Reinstall the blanking plates for the interface card slots for SDI ports 73-216. Interface cards must only be installed in the bottom row, for SDI ports 1-72, when a Universal Videohub 72 Crosspoint card is used.

38 Using Videohub Routers



Universal Videohub 72

What you need to get started

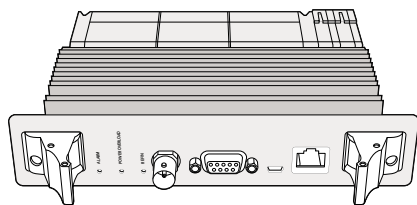
Universal Videohub 72 is a medium-sized modular router ideal for growing facilities. It features an 18 card rack frame that can be filled with any combination of BNC SDI or optical fiber SDI interface cards. When fully populated with a crosspoint card, a power card, 18 SDI interface cards and 18 deck control cables, Universal Videohub 72 provides 72 SDI inputs, 72 SDI outputs, 72 bidirectional RS-422 deck control ports, reference input, redundant power supply options and powerful Videohub routing control software for Mac OS X and Windows.

Occasionally, the internal software of the Universal Videohub 72 will need to be updated. Videohub Setup will prompt you if an update is required. The utility uses the USB 2.0 connection and you will need to provide a USB 2.0 type A to mini B male cable.

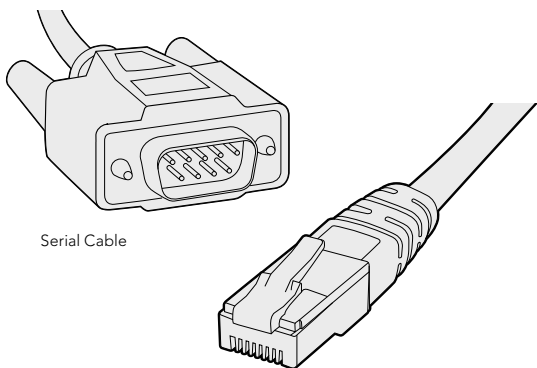
Universal Videohub 72 ships as an empty rack frame, except for a removable fan tray and fans. All other hardware components, including SDI interface cards, deck control cables, crosspoint card and power supplies must be purchased and installed separately. SDI interface cards can be purchased as your facility grows and don't need to be installed all at once. This section is designed to help you decide which components you will need before you build your Universal Videohub 72.

Pages 42-43 provide information on the different interface cards available for your Universal Videohub.

39 Using Videohub Routers

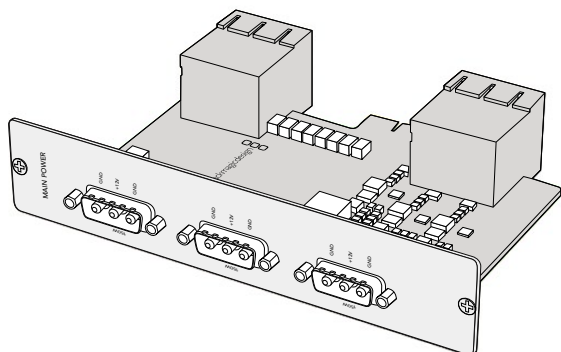


Universal Videohub 72 Crosspoint card



Serial Cable

Standard RJ45 Ethernet Cable



Universal Videohub 450W Power Card can be connected to three 150W power bricks

Universal Videohub 72 Crosspoint Card

This module contains the crosspoint processor for switching video routes and changing deck control ports. Ethernet, USB and serial ports are located on the card for router control.

A Reference input is located on the card for connection to a tri-level sync or black burst genlock signal.

An Alarm light will illuminate on the card if user intervention is required, e.g., if inadequate cooling has caused Videohub to overheat. Alarm notification is supplied by the GPI (General Purpose Interface) output to other devices.

A Power Overload light will illuminate on the card if inadequate power is being supplied to the unit for the number of cards installed.

Router Control Cable

Remote router control is performed via 10/100Base-T Ethernet or serial. If router control is performed via Ethernet, the integrated Videohub Server is used. This means you only need to provide an Ethernet cable to connect Universal Videohub 72 to your Ethernet network switch.

Third party router controllers can control Universal Videohub 72 via Ethernet, or as an RS-422 slave device, for router crosspoint switching. Please refer to the Developer Information section of this manual for Videohub and RS-422 protocols.

Power Supply

The Universal Videohub 450W Power Card provides connections for up to three 150W brick-style power supplies, which must be purchased separately.

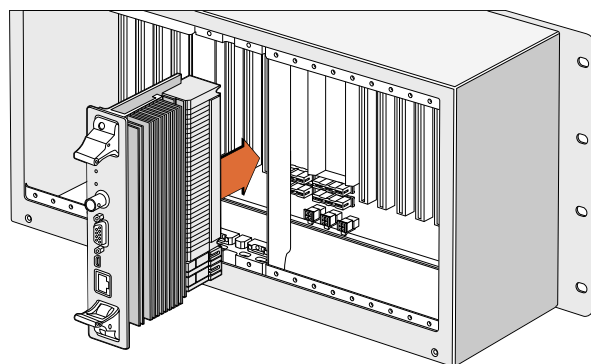
When fully populated and running at maximum power consumption, Universal Videohub 72 can be powered by two 150W brick power supplies. A third power supply can be connected to ensure continued operation should one power supply fail. The 150W power supplies are universal power supplies for use in all countries. You will need to provide a standard IEC cord with a C13 connector for each power supply. When fully populated with three power supplies, three mains power sockets will be required.

The high power supply designed for Universal Videohub 288 is ill-suited to Universal Videohub 72 because it doesn't provide power redundancy to Universal Videohub 72, is more expensive and requires an additional 1 RU of space below Universal Videohub 72.

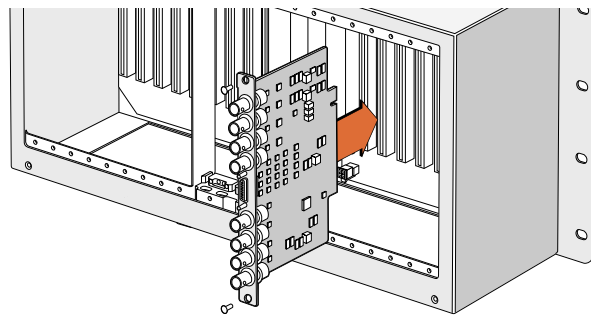
Building Videohub 72

9 rack units of space should be reserved for the installation of Universal Videohub 72 including access space for the drop-down fan tray as well as free space for heat dissipation. Only 7 RU is required if Universal Videohub 72 is mounted at the top of an open rack. Universal Videohub 72 is 5 rack units high and 6 inches thick. You can rack-mount Universal Videohub 72 facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment. 2 RU of space should be left above Universal Videohub 72 for heat dissipation unless mounted at the top of an open rack where there is no obstruction to airflow above.

Universal Videohub 72 contains electrostatic sensitive devices. It is essential to discharge yourself of static electricity before handling any of these devices, just as you would when installing devices into a computer. We recommend the use of an antistatic wrist strap when handling any of these devices.



Installing a Universal Videohub 72 Crosspoint Card.



Installing a Universal Videohub SDI Interface.

Installing a Universal 72 Crosspoint Card

Now that your Universal Videohub 72 has been mounted in a rack, it needs to be fitted with a crosspoint card. The crosspoint card is the brains of any Universal Videohub and performs video route and deck control switching. Universal Videohub 72 Crosspoint cards are hot-swappable, meaning they are designed to be installed and removed while the Universal Videohub is running.

- Step 1:** Hold the crosspoint card in a vertical orientation by its two levers. The BNC, Ethernet and other ports should be towards the bottom end of the card.
- Step 2:** Gently insert the card into its slot, ensuring the top and bottom edges follow the black guides.
- Step 3:** Firmly push both levers flat to fully engage the multi-pin connectors with the motherboard. Mating pins ensure that the card precisely engages with the motherboard without damaging the multi-pin connectors.
- Step 4:** Use a number 01 size Pozidriv screwdriver to secure the two levers on the crosspoint card.

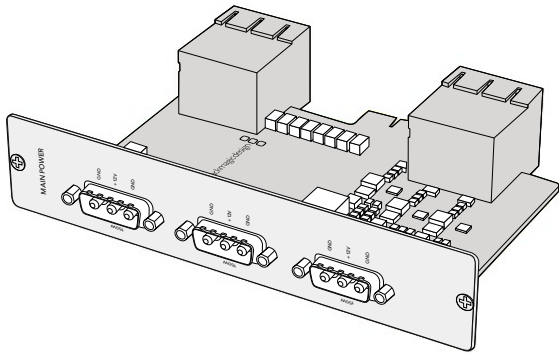
Installing Interface cards

Installing a Universal Videohub SDI Interface or Universal Videohub Optical Interface is easy and the steps are the same for installing each type of interface card.

- Step 1:** Hold the card in a vertical orientation with the identification LED at the top of the card. The identification LED looks like a pin hole near the top left of the top connector.
- Step 2:** Gently but firmly insert the card so that it follows its guides and plugs into the PCI slot in the motherboard. Use a number 02 size Pozidriv screwdriver to secure the interface card to the Universal Videohub frame.

Pages 42-43 provide information on the different interface cards available for your Universal Videohub.

41 Using Videohub Routers



Universal Videohub 450W Power Card can be connected to three 150W power bricks.

Installing a Universal Videohub 450W Power Card

The Universal Videohub 450W Power Card features three power connectors, which can be connected to 150W power supply bricks for up to 450W of power. This power card is suitable for powering a fully populated Universal Videohub 72 with two power supplies connected. A third connected power supply provides failover redundancy should one power supply fail.

- Step 1:** Ensure that the power supply is disconnected from any electrical source.
- Step 2:** Orient the power card so that the MAIN POWER label appears at the top of the card.
- Step 3:** Insert the power card into its slot on the motherboard. Use a number 02 size Pozidriv screwdriver to secure the power card with its two screws.
- Step 4:** Connect three Universal Videohub 150W Power Supplies.

If you need to remove or replace the power card, power off and disconnect all connected power supplies before removing the power card.

If you have only partially populated your Universal Videohub 72 with interface cards, you might be able to power it with a single 150W power supply and preferably use a second power supply for failover redundancy. If you choose this option:

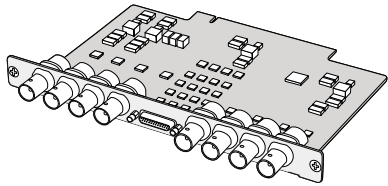
- Step 1:** Temporarily disconnect the second power supply and then check the Power Overload light on the crosspoint card after installing any cards.
- Step 2:** If the Power Overload light illuminates, you will have to add a 150W brick power supply or remove some cards to ensure that all cards are receiving power.
- Step 3:** Reconnect the second power supply when you have finished checking the Power Overload light.

For peace of mind, we recommend connecting and powering the three power supplies at all times to ensure sufficient power, and power redundancy, with all card combinations.

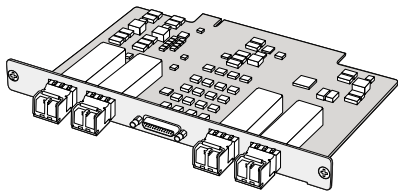
If you need to remove or replace a 150W Power Supply while Universal Videohub 72 is still running, power off the brick while being careful to avoid switching off power to the remaining power supplies. Unplug the IEC cord and then unscrew and disconnect the power supply from the Universal Videohub 450W Power Card.

Congratulations! Your Universal Videohub 72 is now ready to start routing video!

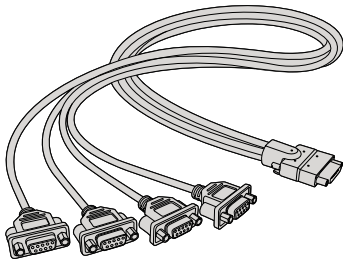
42 Using Videohub Routers



Universal Videohub SDI Interface card



Universal Videohub Optical Interface card



Universal Videohub Deck Control Cable

SDI Interface Card

SDI interface cards feature 4 SDI inputs, 4 SDI outputs and a connector for a Universal Videohub Deck Control Cable. All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI outputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Universal Videohub. SDI interface cards are designed to be installed while Videohub is running and become active immediately. They do not require Videohub to be power cycled. You will need a number 01 and a number 02 size Pozidriv screwdriver to install the various cards.

There are two models of SDI interface cards that can be used with Universal Videohub:

- Universal Videohub SDI Interface card with BNC connectors.
- Universal Videohub Optical Interface card has standard SFP transceiver modules with 1310 nm laser drivers and receivers. Each module includes an LC connector port to be used with single-mode optical fiber cables.

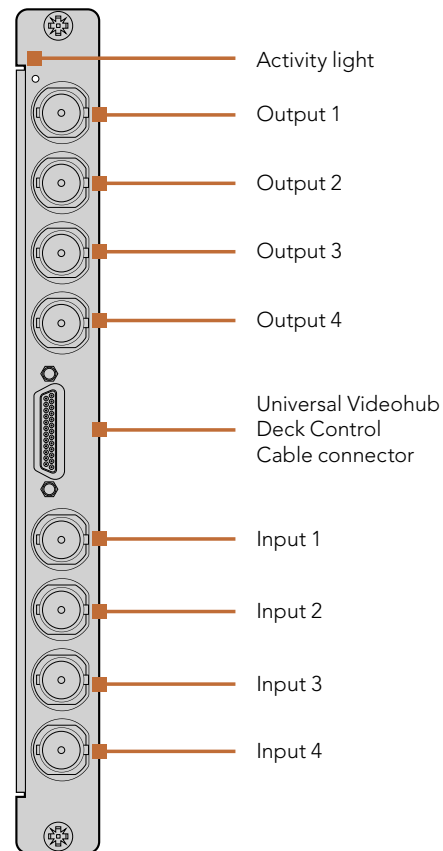
Universal Videohub Deck Control Cable

This cable features a single serial port at one end, for connection to both types of SDI interface cards, and four RS-422 deck control ports at the other end.

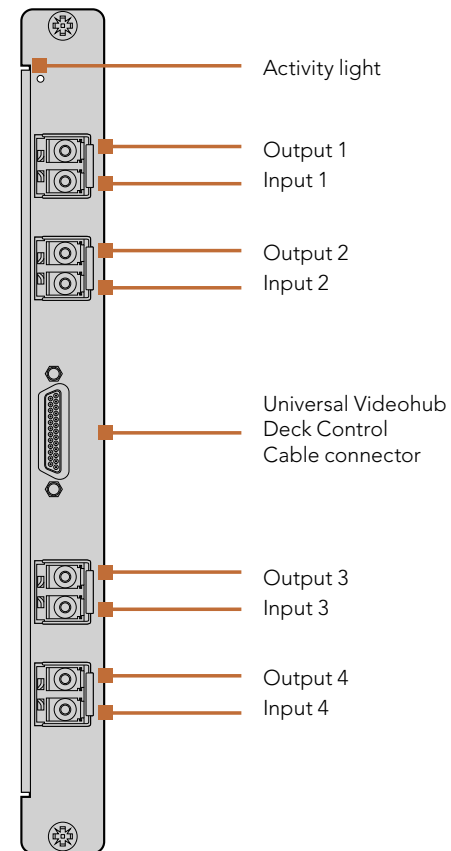
43 Using Videohub Routers

Universal Videohub Interface Cards

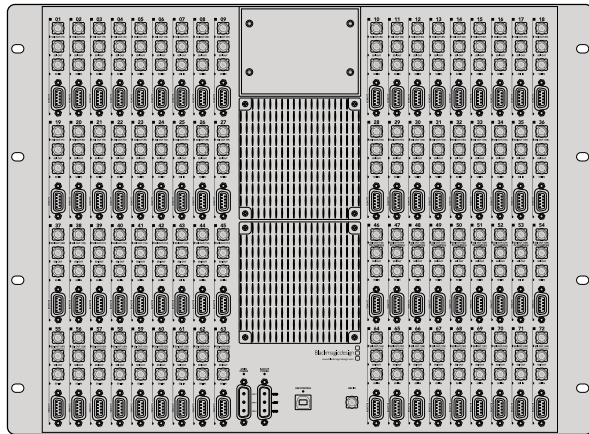
**Universal Videohub
SDI Interface**



**Universal Videohub
Optical Interface**



44 Using Videohub Routers



Broadcast Videohub

Broadcast Videohub is perfect for large facilities. It features 72 SDI inputs, 144 SDI outputs, 72 bidirectional RS-422 deck control ports, reference input, redundant power supplies and powerful Videohub routing control software for Mac OS X and Windows.

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI inputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Broadcast Videohub.

Remote router control is performed via USB 2.0 and then shared over an IP network in much the same way as USB printer sharing. Prior to connecting any devices to Broadcast Videohub, you must nominate a computer to be the Videohub “Server” and to perform Videohub sharing via USB. You can use almost any computer for the Videohub Server, such as an editing workstation, and you don’t need a dedicated or powerful computer for this task. However the Videohub Server computer must remain powered on at all times so that Videohub settings can be modified. You will need to provide a standard USB 2.0 type A-B male cable to connect Broadcast Videohub to the server computer.

The same USB cable can be used for applying occasional internal software updates. Videohub Setup will prompt you if an update is required. The utility runs on the Videohub Server computer and uses the USB 2.0 connection to update your Videohub.

Third party router controllers can control Broadcast Videohub via Ethernet for router crosspoint switching. The Videohub Ethernet protocol is documented in the Developer Information section of this manual.

Broadcast Videohub is 8 rack units high and less than 3 inches deep, including power connector and cable. You will need to leave enough space in your equipment rack to install the Broadcast Videohub hardware. You can rack-mount Broadcast Videohub facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment.

The Broadcast Videohub requires one power supply but includes two so continued operation is ensured if one happens to fail. The included power supplies are universal power supplies for use in all countries. You will need to provide a standard IEC cord with a C13 connector for each power supply. We recommend connecting and powering the two power supplies at all times, which means two mains power sockets will be required. A third power socket will be required if you decide to use a dedicated server computer.

If you need to learn how to integrate your router into an existing network, turn to page 7.

45 Using Videohub Routers



Studio Videohub

Studio Videohub is perfect for smaller workgroups. It features 16 SDI inputs, 32 SDI outputs, 16 bidirectional RS-422 deck control ports, reference input, a universal power supply and powerful Videohub routing control software for Mac OS X and Windows.

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI inputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Studio Videohub.

Remote router control is performed via USB 2.0 and then shared over an IP network in much the same way as USB printer sharing. Prior to connecting any devices to Studio Videohub, you must nominate a computer to be the Videohub “Server” and to perform Videohub sharing via USB. You can use almost any computer for the Videohub Server, such as an editing workstation, and you don’t need a dedicated or powerful computer for this task. However the Videohub Server computer must remain powered on at all times so that Videohub settings can be modified. You will need to provide a standard USB 2.0 type A-B male cable to connect Studio Videohub to the server computer.

The same USB cable can be used for applying occasional internal software updates. Videohub Setup will prompt you if an update is required. The utility runs on the Videohub Server computer and uses the USB 2.0 connection to update your Videohub.

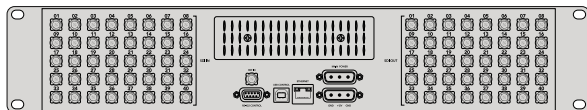
Third party router controllers can control Studio Videohub via Ethernet for router crosspoint switching. The Videohub Ethernet protocol is documented in the Developer Information section of this manual.

Studio Videohub is 2 rack units high and less than an inch thick. You will need to leave enough space in your equipment rack to install the Studio Videohub hardware. You can rack-mount Studio Videohub facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment. If you don’t have a rack, then you can leave it in a safe place on the floor!

The Studio Videohub includes a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector and a mains power socket. A second power socket will be required if you decide to use a dedicated server computer.

If you need to learn how to integrate your router into an existing network, turn to page 7.

46 Using Videohub Routers



Compact Videohub

Compact Videohub is a small router and is perfect when you need a bigger router in a small size, such as in creative post facilities and broadcast trucks. It features 40 SDI inputs, 40 SDI outputs, reference input, redundant power supply connections and powerful Videohub routing control software.

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI inputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Compact Videohub.

Remote router control is performed via 10/100Base-T Ethernet, serial or USB 2.0 and then shared over an IP network in much the same way as USB printer sharing. If router control is performed via Ethernet, the integrated "Videohub Server" is used and you need only provide an Ethernet cable to connect Compact Videohub to your Ethernet network switch.

If router control is performed via USB 2.0, you must nominate a computer to be the "Videohub Server" and to perform Videohub sharing via USB. You can use almost any computer for the Videohub Server and you don't need a dedicated or powerful computer for this task. However the Videohub Server computer must remain powered on at all times so that Videohub settings can be modified. You will need to provide a standard USB 2.0 type A-B male cable to connect Compact Videohub to the server computer.

The same USB cable can be used for applying occasional internal software updates. Videohub Setup will prompt you if an update is required. The utility runs on the Videohub Server computer and uses the USB 2.0 connection to update your Videohub.

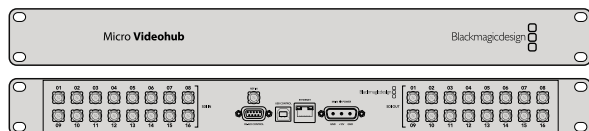
Third party router controllers can control Compact Videohub via Ethernet, or as an RS-422 slave device, for router crosspoint switching. The Videohub Ethernet protocol, RS-422 protocol and RS-422 pinout diagram are documented in the Developer Information section of this manual.

Compact Videohub is 2 rack units high and less than an inch thick. You will need to leave enough space in your equipment rack to install the Compact Videohub hardware. You can rack-mount Compact Videohub facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment. If you don't have a rack, then you can leave it in a safe place on the floor!

The Compact Videohub includes one universal power supply for use in all countries. A second power supply can be purchased to ensure continued operation should one fail. You will need to provide a standard IEC cord with a C13 connector for each power supply. We recommend connecting and powering two power supplies at all times, which means two mains power sockets will be required. A third power socket will be required if you decide to use a dedicated server computer.

If you need to learn how to integrate your router into an existing network, turn to page 7.

47 Using Videohub Routers



Micro Videohub

Micro Videohub is a tiny router and is perfect for locations where minimal space is available, such as outside broadcast trucks. It features 16 SDI inputs, 16 SDI outputs, reference input, a universal power supply and powerful Videohub routing control software for Mac OS X and Windows.

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI inputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Micro Videohub.

Remote router control is performed via 10/100Base-T Ethernet, serial or USB 2.0 and then shared over an IP network in much the same way as USB printer sharing.

If router control is performed via Ethernet, the integrated “Videohub Server” is used and you need only provide an Ethernet cable to connect Micro Videohub to your Ethernet network switch.

If router control is performed via USB 2.0, you must nominate a computer to be the “Videohub Server” and to perform Videohub sharing via USB. You can use almost any computer for the Videohub Server, such as an editing workstation, and you don’t need a dedicated or powerful computer for this task. However the Videohub Server computer must remain powered on at all times so that Videohub settings can be modified. You will need to provide a standard USB 2.0 type A-B male cable to connect Micro Videohub to the server computer.

The same USB cable can be used for applying internal software updates. Videohub Setup will prompt you if an update is required. The utility runs on the Videohub Server computer and uses the USB 2.0 connection to update your Videohub.

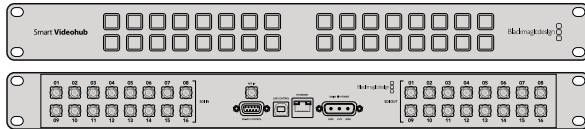
Third party router controllers can control Micro Videohub via Ethernet, or as an RS-422 slave device, for router crosspoint switching. The Videohub Ethernet protocol, RS-422 protocol and RS-422 pinout diagram are documented in the Developer Information section of this manual.

Micro Videohub is 1 rack unit high and less than an inch thick. You will need to leave enough space in your equipment rack to install the Micro Videohub hardware. You can rack-mount Micro Videohub facing forwards or reversed, or even mount it in the rear of the rack to leave space for other equipment. If you don’t have a rack, then you can leave it in a safe place on the floor!

The Micro Videohub includes a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector and a mains power socket. A second power socket will be required if you decide to use a dedicated server computer.

If you need to learn how to integrate your router into an existing network, turn to page 7.

48 Using Videohub Routers



Smart Videohub

Smart Videohub is a tiny router with a built in control panel for changing routes and is perfect for locations where minimal space is available, such as outside broadcast trucks. It features 16 SDI inputs, 16 SDI outputs, reference input, a universal power supply and powerful Videohub routing control software.

All SDI connections support auto detection of SD, HD or 3G-SDI, and reclocking on all SDI inputs. Simultaneous routing of 2K, HD, SD video and DVB-ASI are supported with Smart Videohub.

Local router control is easy and intuitive using the built in 32 pushbutton control panel, and requires no configuration and no computer. The front panel can be removed to allow insertion of labels under the buttons. All buttons can be variably backlit to ensure the labels can be easily read, even in dark rooms.

Remote router control can also be performed via 10/100Base-T Ethernet, serial or USB 2.0 and then shared over an IP network in much the same way as USB printer sharing. If router control is performed via Ethernet, the integrated "Videohub Server" is used and you need only provide an Ethernet cable to connect Smart Videohub to your Ethernet network switch.

If remote router control is performed via USB 2.0, you must nominate a computer to be the "Videohub Server" and to perform Videohub sharing via USB. You can use almost any computer for the Videohub Server and you don't need a dedicated or powerful computer for this task. However the Videohub Server computer must remain powered on at all times so that Videohub settings can be modified. You will need to provide a standard USB 2.0 type A-B male cable to connect Smart Videohub to the server computer.

The same USB cable can be used for applying internal software updates. Videohub Setup will prompt you if an update is required. The utility runs on the Videohub Server computer and uses the USB 2.0 connection to update your Videohub.

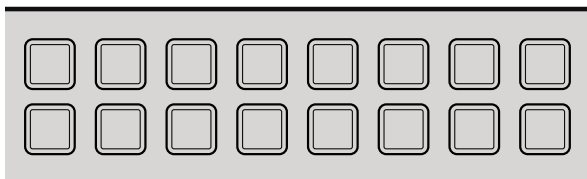
Third party router controllers can control Smart Videohub via Ethernet, or as an RS-422 slave device, for router crosspoint switching.

Smart Videohub is 1 rack unit high and just over an inch thick. You will need to leave enough space in your equipment rack to install the Smart Videohub hardware. You can rack-mount Smart Videohub at the front or at the rear of the rack to leave space for other equipment.

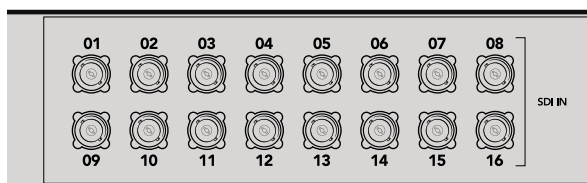
The Smart Videohub includes a universal power supply for use in all countries. You will need to provide a standard IEC cord with a C13 connector and a mains power socket. A second power socket will be required if you decide to use a dedicated server computer.

Turn the page to Using Smart Videohub's Control Panel for instructions on how to make route changes with the 32 pushbutton control panel. Alternatively, if you need to learn how to integrate your router into an existing network, turn to page 7.

49 Using Videohub Routers



The built in pushbutton control panel allows routing changes to be made without the need for a computer.



Every pushbutton on the front panel of Smart Videohub has a matching SDI input or output on the rear panel.

Using the Smart Videohub Control Panel

Smart Videohub features a built in 32 pushbutton control panel on the front of the router. Routing changes can be made without needing a computer as there is a pushbutton for each SDI input and output on Smart Videohub. Remote router control can also be used with Smart Videohub.

The pushbuttons on the left of the control panel correspond with the 16 SDI inputs and the pushbuttons on the right correspond with the 16 SDI outputs.

When power is connected to Smart Videohub, the top-left destination button will illuminate white along with its corresponding source button.

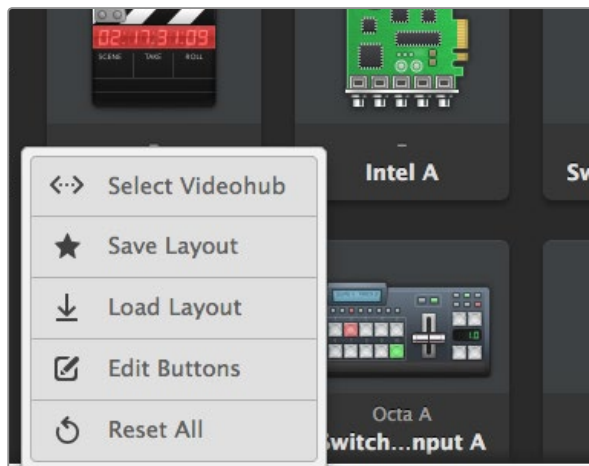
To change routes:

- Step 1.** Select a destination button and its corresponding source button will illuminate.
- Step 2.** Press the desired video source button to connect a new source to the destination. The original source button's LED will turn off and the new source button will light up. The new video source will immediately be connected and viewable on the destination device, such as an SDI monitor.
- Step 3.** To change another route, select another destination button and then select a new source button.

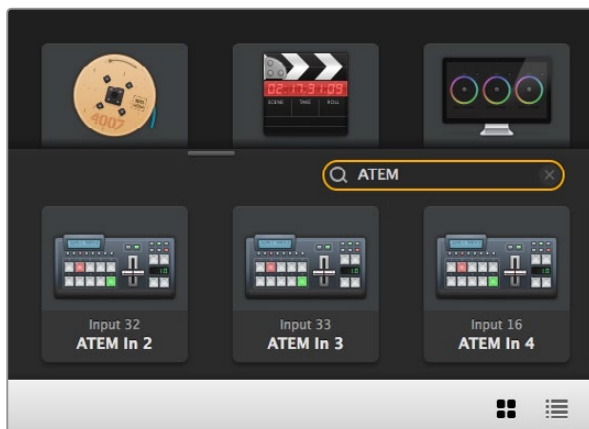
The pushbuttons on Smart Videohub directly control the integrated Videohub Server and override any existing routes, including destinations locked with Videohub software.

The illuminated pushbuttons display the last route made with the Smart Videohub control panel. However, if you select the same destination pushbutton as another remote user and they change the source to that destination, you will see the change reflected on your Smart Videohub.

50 Controlling Videohub with Software



Click on the "Select Videohub" button and then select the Videohub you wish to control.



The word "ATEM" is entered into the Destinations Search Box and the filtered results are displayed.

Blackmagic Videohub Control

Launch Videohub Control and click on Settings (the gear icon) and choose "Select Videohub" from the menu. Click on the Videohub that you wish to control. If you completed the section on customizing labels, the names you assigned will appear within the software.

If the Input, Output and Remote connections have not yet already been labeled, then the source pushbuttons will appear simply as "Input", followed by their respective numbers. Likewise, the destination pushbuttons will appear as "Output", followed by their respective numbers. These inputs and outputs correspond to the connector numbers on the Videohub.

Getting to Know the Interface

Resizing the Interface

Click and drag the bottom right hand corner to proportionally resize the interface to best fit your screen size. Alternatively, drag a window edge to resize either vertically or horizontally.

Resizing the Sources and Destinations Areas

Drag the Divider Bar up and down and use the Scroll Bars to scroll the respective areas.

Switching Views

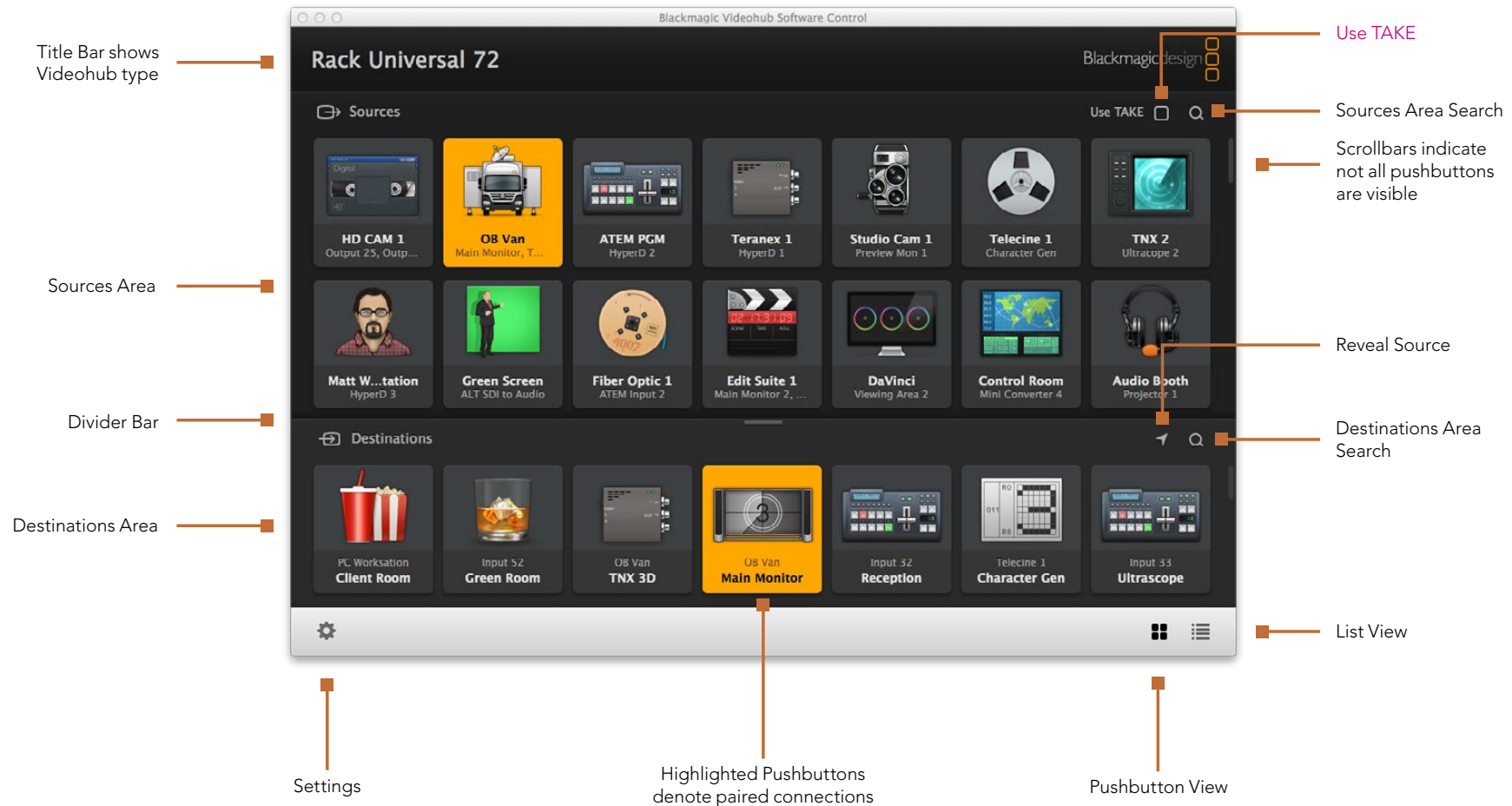
You can switch between pushbutton view and list view by clicking the icons in the bottom right corner.

Using the Dynamic Search

Both the Sources and Destinations areas contain a search icon, which allows you to search for text dynamically. This is useful if you have many pushbuttons and quickly want to locate a pushbutton with a specific name. Begin by typing the name you wish to search for. As you type each letter, the pushbuttons that are displayed will be dynamically filtered.

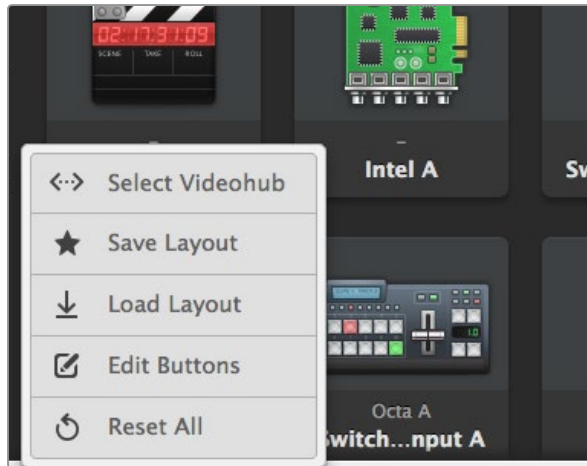
51 Controlling Videohub with Software

Blackmagic Videohub Control at a Glance

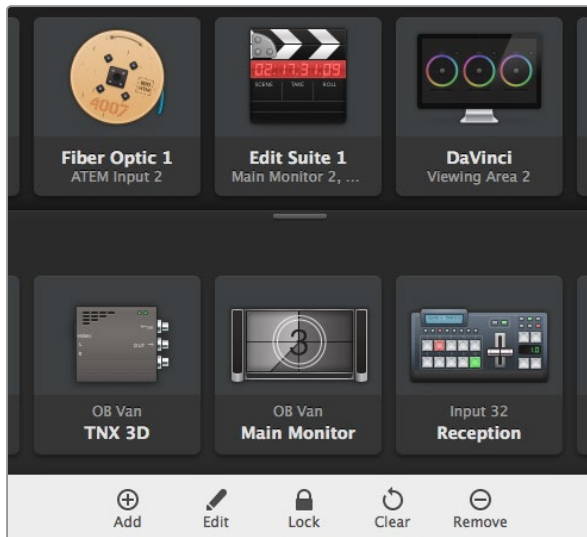


Click and drag the window edges to resize Blackmagic Videohub Control to fit your screen size. Drag the Divider Bar up or down to reveal more or less of the "Sources" and "Destinations" areas and use the Scroll Bars to scroll the areas.

52 Controlling Videohub with Software



Click the Settings button to display the above menu.



Click Edit Buttons to display the above buttons.

Settings Menu

Select Videohub

Select from a list of Videohubs that are currently connected to your network.

Save Layout

Save customized pushbutton layouts for the different environments in which you use your Videohub.

Load Layout

Load previously saved pushbutton layouts.

Edit Buttons

Displays the Edit Buttons for editing the pushbuttons.

Reset All

Displays all of the inputs and outputs of the connected Videohub and replaces customized icons with the default icon. Source, destination and deck control settings are maintained.

Edit Buttons

Add

Add a source or destination pushbutton.

Edit

Allows you to set the SDI source or destination, deck control and the icon for the selected pushbutton.

Lock and Unlock

Lock a destination to avoid accidentally changing the video source which is routed to that destination. If you click on a pushbutton that's locked, the Lock button changes into an Unlock button. Simply click the Unlock button to unlock the destination pushbutton.

Clear

Deletes source, destination and deck control settings as well as the icon for the selected pushbutton.

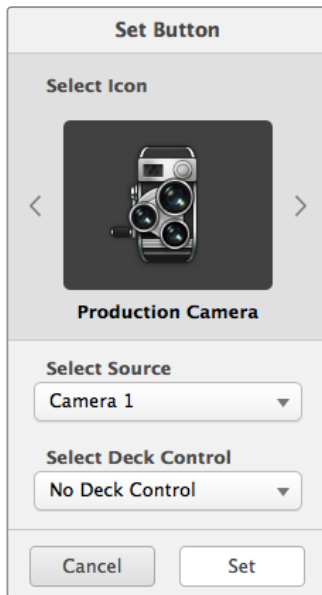
Remove

Removes the selected pushbutton.

Done

Click the Done button to exit the edit mode.

53 Controlling Videohub with Software



The Set Button window allows icon selection, source or destination selection and deck control configuration.



This destination is unlocked and is available to any Videohub user on the network. The associated video source is illuminated in the Sources panel and the source name "DaVinci" is displayed.

Using Pushbuttons

Adding Pushbuttons

Select the Settings button and then select "Edit Buttons". Click on the Add button and choose whether to add a source or destination pushbutton.

The Set Button window appears and allows you to set the SDI source or destination, RS-422 deck control and the icon for the pushbutton. In most cases, deck control is grouped with the associated SDI connections. eg: SDI Input 1 would be associated with the corresponding Remote 1.

Editing Pushbuttons

Select the Settings button, then select "Edit Buttons" and click the pushbutton you wish to edit. Click on the Edit button and modify the source or destination, deck control settings and the icon as required.

Moving Pushbuttons

Select the Settings button and then select "Edit Buttons". Click and drag the pushbutton to a new position.

Viewing and Switching Routes

Viewing Routes

In order to see which video source has been routed to a video destination, such as a monitor, press the button in the destinations panel to make the button illuminate. The associated video source button will illuminate in the sources panel, making it immediately obvious which source is connected to the monitor.

Reveal Source

If you select a destination but the source is currently positioned offscreen, clicking the Reveal Source button will scroll the Sources area to display the source pushbutton.

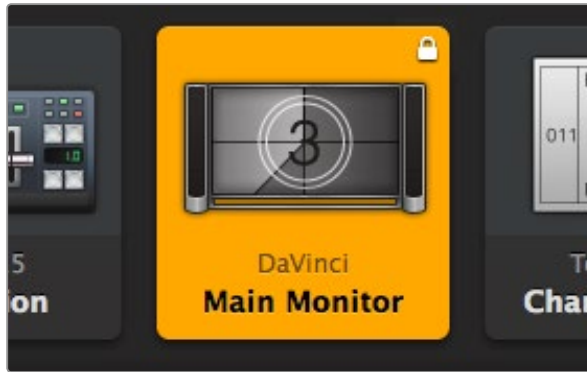
Switching Routes

In order to change the video source from a tape deck to a video camera, press a camera pushbutton in the sources panel. The camera pushbutton will illuminate be routed to the video monitor. The tape deck button will no longer be illuminated and will be disconnected from the video monitor.

Use TAKE Confirmation before Switching Routes

You may wish to enable the "Use TAKE" button to help prevent unintentional changes to video routes. Once enabled, any attempt to change a video route using a pushbutton will cause a red "TAKE" button to appear. Select the button to confirm or click the current source or destination pushbutton to cancel.

54 Controlling Videohub with Software



Locally locked destinations display a white padlock icon.



Remotely locked destinations display a black padlock icon.

Locking and Unlocking Routes

Locking a destination will avoid accidentally changing the video source which is routed to that destination. To lock a route, select the destination pushbutton and click the Lock button. A padlock icon will appear in the top-right corner of the destination pushbutton and will prevent anyone else from using the destination device until it is unlocked from your computer. Locking a destination still leaves the associated video source available for routing to multiple destinations simultaneously.

If you click on a pushbutton that's locked, the Lock button changes into an Unlock button. Simply click the Unlock button to unlock the destination pushbutton.

To simultaneously lock multiple destinations, shift click the destination pushbuttons you wish to lock and click the Lock button. If you select a mixture of locked and unlocked pushbuttons, you will have the option to Lock the unlocked pushbuttons.

Locking a route between an input and an output also locks the RS-422 deck control connection between the two devices to avoid other users accidentally seizing the deck control belonging to the video source. The RS-422 connection between the video source and video destination will remain locked until the destination pushbutton is unlocked.

A black padlock icon will appear on any destination pushbuttons which other users have locked. The video destination devices will not be available to you until the destination pushbuttons have been unlocked from the other users' computers and iPads.

If you need to unlock a route set by another user, launch Videohub Setup, select the Outputs tab and click the destination's lock icon.

55 Controlling Videohub with Software



Touchscreen Computers

The Pushbutton views are designed to be easy to use and look beautiful on a large, touchscreen display. Dedicating a touchscreen computer to the Videohub Pushbutton interface makes it incredibly easy for users to switch connections between multiple SDI devices without having to see every connected device all of the time. Using a touchscreen computer, in conjunction with Videohub Pushbutton views, provides the fastest way to switch connections which is perfect for a master control room. Touchscreen desktop and touchscreen laptop computers can be used. It is a good idea to check the resolution of your touchscreen display before deciding upon which Pushbutton view to use.

The Pushbutton interface to Videohub was introduced at the NAB 2009 trade show and displayed on HP TouchSmart IQ800 computers. This computer model had a 25" display and a resolution of 1920 x 1200 which was perfect for Full Screen Pushbutton view. Many other brands and models of touchscreen computers and displays exist and you just need to choose one that provides a resolution matching one of the Pushbutton views.

Touchscreens are perfect for rapidly selecting and routing inputs and outputs but they are cumbersome for configuring pushbuttons. The width of a human fingertip is much wider than a mouse pointer and is less accurate when tapping on menu options and small icons. For this reason, we recommend configuration of Videohub pushbuttons be performed with a mouse. Once the Videohub pushbuttons have been configured, it will be easy to use a finger to select and route, inputs and outputs, by tapping on Videohub pushbuttons.

When a computer mouse is moved to the top-right corner of any Videohub pushbutton, an *i* icon appears and clicking the icon opens the Videohub Button Setup window. By contrast, a touchscreen cannot detect a hovering finger and so the *i* icon will not be revealed. Tapping a finger in the top-right corner of any Videohub pushbutton will open the Videohub Button Setup window on a touchscreen even though the *i* icon will not have been revealed.

When a computer mouse is moved to the top of a Full Screen Pushbutton view, the Videohub menu bar will be revealed. When the mouse is moved away from the menu bar, the menu bar will hide again. As with the *i* icon, a touchscreen cannot detect a finger hovering towards the top of the display and so the Videohub menu bar will not be revealed automatically. Tapping a finger anywhere above the top row of source pushbuttons will reveal the Videohub menu bar on a touchscreen. To hide the Videohub menu bar, simply tap again in the same area.

Touchscreens work a little differently to a computer mouse but provide the fastest and easiest way to work with the Videohub Pushbutton interface and so are highly recommended. When using a touchscreen computer, we recommend enabling the Take Confirmation option to help avoid unintentional changes to video routes.

56 Controlling Videohub with Software



Apple iPad

The Videohub Pushbutton controller interface looks stunning on the high resolution Apple iPad display. Aside from looking great, it also provides the convenience of portable router control anywhere in your facility or even over the Internet via a wireless or cellular connection! If you are already familiar with the Videohub Pushbutton interface on a computer, then there is almost nothing new you need to learn and you'll only notice slight differences between computer mouse control and touchscreen control on the iPad.

Up to 40 sources and 8 destinations can be displayed in a single Videohub Pushbutton screen on the iPad. Even more sources and destinations can be displayed by flicking the iPad left or right, or tapping to the left or right of the row of dots, to move through multiple Pushbutton screens.

The initial Pushbutton interface

Upon launching the Videohub app on your iPad for the first time, all pushbuttons initially show the generic BNC connector icon, which you can then replace from a selection of icons. If the connections have not yet been labeled, then the source pushbuttons will appear as Input 1 to Input 40 and the destination pushbuttons will appear as Output 1 to Output 8.

If the connections have already been labeled, their names will appear under each of the respective pushbuttons in place of the connector numbers.

Configuring Videohub Pushbuttons on the iPad

Configuring Videohub Pushbuttons on the iPad is easy. Press and hold any Videohub pushbutton to open the Videohub Button Setup window. This window allows you to set the SDI input or output connection, RS-422 deck control and the icon for the pushbutton.

The Clear button will delete all settings for the pushbutton. In most cases, deck control is grouped with the associated SDI connections, meaning an SDI connection named Input 1 would usually be associated with the corresponding Remote 1.

The bottom-right source button is reserved by the Videohub app itself and cannot be configured.

If a destination pushbutton is connected to a source that does not appear in the sources panel, the source will automatically appear in the bottom-right pushbutton of the sources panel.

When configuring pushbuttons, only select a deck control connection for those devices that have RS-422 deck control. It makes no sense to assign a deck control connection to a video monitor or camera.

While all icons are available to any pushbutton, it doesn't make sense to choose the icon of a video monitor or transmitter for a source pushbutton unless the source device happens to have a loop-through output.



The Videohub Button Setup window allows you to set the SDI input or output connection, RS-422 deck control and the icon for the pushbutton.

57 Controlling Videohub with Software



In order to see which video source has been routed to a video destination, tap a destination button and the associated video source button will illuminate.



A yellow padlock icon will appear in the top-left corner of the destination pushbutton and will prevent anyone else from using the destination device until it is unlocked from your iPad. A gray padlock icon will appear on any destination pushbuttons that other users have locked.

You may choose to show a particular source or destination pushbutton several times within the one Pushbutton screen or on multiple Pushbutton screens. If a destination pushbutton is routed from a source that appears multiple times in the Sources panel, selecting the destination pushbutton will illuminate all instances of the source pushbutton, regardless of how deck control has been configured for each source pushbutton. Similarly if multiple instances of an output pushbutton appear in the Destinations panel, they will illuminate together when any one has been selected.

Viewing and Changing Routes

In order to see which video source has been routed to a particular destination, such as a monitor, press the monitor's pushbutton in the destinations panel. The monitor button and the associated video source button will simultaneously illuminate, making it immediately obvious which video source is connected to the video monitor, e.g., a HyperDeck Studio Pro.

In order to change the video source from a HyperDeck Studio Pro to a video camera, press a camera pushbutton in the sources panel to immediately illuminate the camera pushbutton and route video to the video monitor. The HyperDeck Studio Pro pushbutton will no longer be illuminated and will be disconnected from the video monitor.

Locking and Unlocking Routes

Locking a destination avoids accidental changes of the video source being routed to that destination. To lock a route between an input and an output, double-tap the destination pushbutton. A yellow padlock icon will appear in the top-left corner of the destination pushbutton and will prevent anyone else from using the destination device until it is unlocked from your iPad. Double-tap the destination pushbutton again to unlock. Locking a destination still leaves the associated video source available for routing to multiple destinations simultaneously.

Locking a route between an input and an output also locks the RS-422 deck control connection between the two devices. This is to avoid other users accidentally seizing the deck control belonging to the video source. The RS-422 connection between the video source and video destination will remain locked until the destination pushbutton is unlocked.

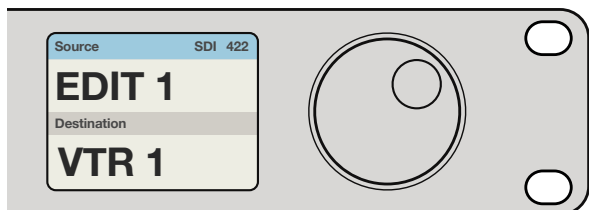
A gray padlock icon will appear on any destination pushbuttons that other users have locked. The video destination devices will not be available to you until the destination pushbuttons have been unlocked from the other users' computers and iPads.

If you encounter a gray padlock icon and do not know who locked the video device you can override the lock using the Videohub software on a Mac OS X or Windows computer. When a route is unlocked, the padlock icon will disappear.

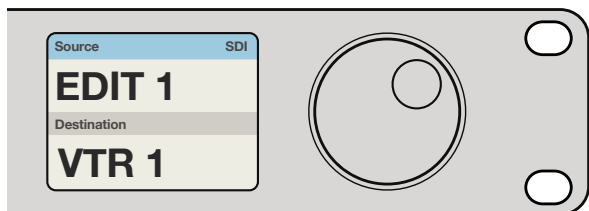
58 Controlling Videohub with Hardware



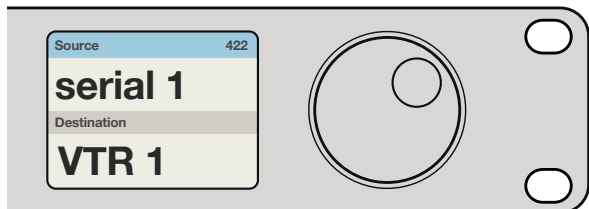
Front panel showing a new source has been selected.



Choose the SDI 422 routing level if you only want to see SDI video equipment with RS-422 deck control. In this example, the capture card (Edit 1) and the deck (VTR 1) are listed because they both have SDI and RS-422 ports.



Choose the SDI routing level if you want to see all SDI video equipment. In this example, the capture card (Edit 1) and the deck (VTR 1) are listed because they both have SDI ports.



Choose the 422 routing level if you want to see all equipment with RS-422 remote deck control, including equipment with mismatched labels and also remote controllers. In this example, the capture card (Edit 1) has a mismatched label for its remote port (serial 1) and is only listed when the routing level is set to 422.

About Routing Levels

If your Videohub does not feature RS-422 remote deck control, Videohub Master Control will always show "SDI" on its LCD and you don't need to read anything more about routing levels.

If your Videohub does include RS-422 remote deck control ports, you can use the LEVEL button on Videohub Master Control to reduce the list of sources and destinations by routing level.

Start by pressing the DEST button. Now press the LEVEL button to cycle through the routing levels:

SDI 422 - Choose this routing level to reduce the list of video equipment to devices with matching labels for their remote and SDI ports. This level is commonly used with SDI capture cards and VTR decks but cannot be used with cameras and monitors as they do not have RS-422 remote ports.

SDI - Lists all SDI sources and destinations. Choose this routing level if you want to see all SDI video equipment, i.e., cameras, monitors, capture cards and VTR decks, regardless of RS-422 connections.

422 - Choose this routing level if you want to reduce the list of video equipment to all devices with RS-422 deck control. This will list sources and destinations by the names of their RS-422 remote ports, regardless of whether there are any associated SDI ports and regardless of whether any associated SDI ports have matching labels or not. This level is commonly used with SDI capture cards and VTR decks but also lists remote control panels and servers used to control decks.

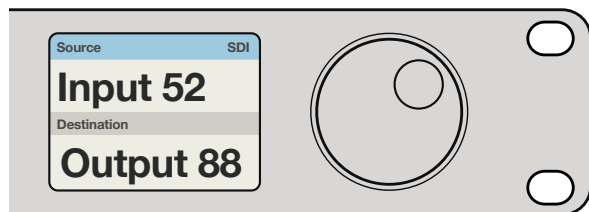
How to Select Sources and Destinations

Videohub Master Control provides several ways to select and switch your destinations and sources quickly, depending upon whether you have customized the port labels on your Videohub router or if you just want to enter port numbers directly.

Videohub Master Control works in the same conceptual way as any other router control. These are the basic steps you will take, regardless of your method for selecting devices.

- Step 1.** Press the DEST button to display a destination on the LCD. Use the pushbuttons and/or the scroll wheel to find the desired destination.
- Step 2.** Press SRC and use the buttons and/or the scroll wheel to change the source connected to the destination.
- Step 3.** Press TAKE to confirm the route change.

59 Controlling Videohub with Hardware

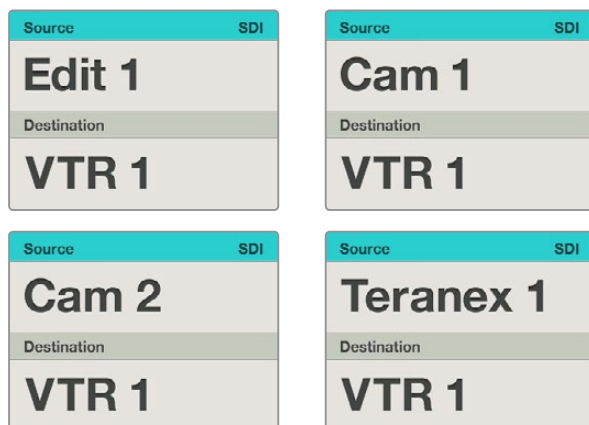


If you've chosen to keep the default labels for all Videohub SDI and remote ports, you can simply type the port numbers to make a routing change. In this example, press DEST and then type the port number 88. Then press SRC and type the port number 52. Press TAKE to confirm the route change.

How to select devices by typing the Videohub port numbers

If you've chosen to keep the default labels for all Videohub SDI and remote ports, you can simply type the port numbers to make a routing change. This method is fast but requires that you remember port numbers or have devised a system for knowing what equipment is connected to each Videohub port.

- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If your Videohub router has RS-422 remote control, press the LEVEL button until you have set the appropriate routing level for your equipment. Otherwise you can skip this step.
- Step 3.** Type in the destination port number using the numeric pushbuttons. Each button will flash gold once as you press it. The destination will be displayed on the LCD. If you make a mistake, press the white CLEAR button and retype the port number.
- Step 4.** Press the SRC button. The source field will be highlighted blue on the LCD.
- Step 5.** Type in the source port number using the numeric pushbuttons. Each button will flash white once as you press it. The source will be displayed on the LCD. If you make a mistake, press the white CLEAR button and retype the port number.
- Step 6.** The TAKE button will flash red, awaiting your confirmation of the route change. Press TAKE and the route will change immediately. Otherwise, press CLEAR and no route change will take place. Videohub Master Control returns to its idle state with the latest route displayed on the LCD.



In this example, the scroll wheel is being used to list all sources that can be routed to the destination VTR 1, based upon the SDI routing level. When the scroll wheel is rotated, the names of source equipment are progressively displayed to make it very easy to find the desired video source.

How to select devices with the scroll wheel

Regardless of whether or not you've customized the Videohub port labels, you can always use the scroll wheel to browse through a list of sources and destinations. This is the slowest method but is useful if you want to see the list of all available equipment and ports.

- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If your Videohub router has RS-422 remote control, press the LEVEL button until you have set the appropriate routing level for your equipment. Otherwise you can skip this step.
- Step 3.** Scroll the wheel forwards or backwards until the desired destination is found. The destination will be displayed on the LCD.
- Step 4.** Press the SRC button so it lights white. The source field will be highlighted blue on the LCD.
- Step 5.** Scroll the wheel until the desired source is found. The source will be displayed on the LCD.
- Step 6.** The TAKE button will flash red, awaiting your confirmation of the route change. Press TAKE and the route will change immediately. Or press CLEAR and no route change will take place. Videohub Master Control returns to its idle state with the latest route displayed on the LCD.

60 Controlling Videohub with Hardware



In this example, a customized Cam button has been selected so only cameras will be listed as sources, on the LCD, when the scroll wheel is rotated. This provides a fast way to find a video source because you only have to scroll through a short list of equipment.

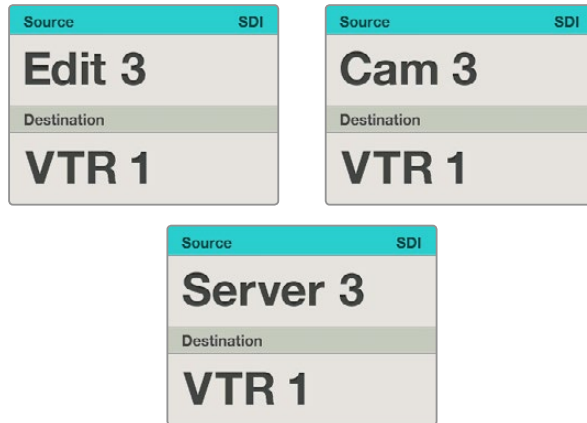
How to select devices using the customizable buttons and scroll wheel

If you have customized the Videohub port labels, you can use the customizable buttons and scroll wheel together to find a short list of sources and destinations. This method is fast and intuitive because you only have to scroll through a short list of equipment and you don't have to remember any port numbers. This method is very helpful if you label types of equipment together by name, e.g., VTR, Cam and Mon.

- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If your Videohub router has RS-422 remote control, press the LEVEL button until you have set the appropriate routing level for your equipment. Otherwise you can skip this step.
- Step 3.** Press a button you have customized for a type of destination equipment, e.g., VTR. The button should light up gold.
- Step 4.** Scroll the wheel forwards or backwards until the desired destination is found. In this example, the destination VTR will be displayed on the LCD. If you make a mistake, press the white CLEAR button and scroll until the correct destination is displayed.
- Step 5.** Press the SRC button. The source field will be highlighted blue on the LCD.
- Step 6.** Press a button you have customized for a type of source equipment, e.g., a capture card. The button should light up white.
- Step 7.** Scroll the wheel forwards or backwards until the desired source is found. In this example, the source capture card will be displayed on the LCD. If you make a mistake, press the white CLEAR button and scroll until the correct destination is displayed.
- Step 8.** The TAKE button will flash red, awaiting your confirmation of the route change. Press TAKE and the route will change immediately. Otherwise, press CLEAR and no route change will take place. Videohub Master Control will then return to its idle state with the latest route displayed on the LCD.

If any button you have customized for either a source or destination flashes but does not stay lit, Videohub Master Control is preventing you from selecting the button because the equipment type has not been labeled as a source or destination device or does not match the current routing level. For example, cameras should not usually be set as destination devices, monitors should not be set as source devices and won't match the RS-422 routing level. Refer back to Creating Button Labels in Setting Up Videohub Master Control for steps on how to change this.

61 Controlling Videohub with Hardware



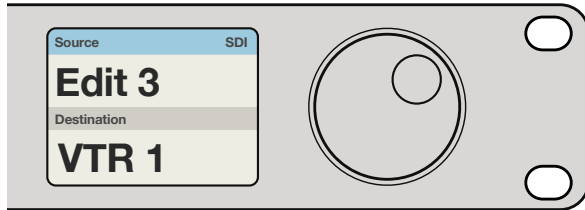
In this example, the numeric button "3" has been selected so only video sources with a "3" in their label will be listed, on the LCD, when the scroll wheel is rotated. This provides a fast way to find a video source because you only have to scroll through a short list of equipment based upon a group number, e.g. only list the equipment in Studio 3.

How to select devices using the numeric buttons and scroll wheel

If you have customized the Videohub port labels with numbers, you can use the numeric buttons and scroll wheel together to find a short list of sources and destinations. This method is fast and intuitive because you only have to scroll through a short list of equipment and you don't have to remember any port numbers. This method is very helpful if you label groups of equipment together by numbers, perhaps to represent locations. For example, all the equipment in Studio 3 could be labeled VTR3, Edit 3, Cam 3A, Cam 3B, Mon 3A and Mon 3B etc.

- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If your Videohub router has RS-422 remote control, press the LEVEL button until you have set the appropriate routing level for your equipment. Otherwise you can skip this step.
- Step 3.** Using the numeric pushbuttons, type the destination number, e.g., 3 for Studio 3. Each numeric button will flash gold as you press it.
- Step 4.** Scroll the wheel forwards or backwards until the desired destination is found. In this example, any of VTR 3, Edit 3, Mon 3A or Mon 3B could be displayed on the LCD. If you make a mistake, press the white CLEAR button and scroll until the correct destination is displayed.
- Step 5.** Press the SRC button. The source field will be highlighted blue on the LCD.
- Step 6.** Using the numeric pushbuttons, type the source number, e.g., 3 for Studio 3. Each numeric button will flash white as you press it.
- Step 7.** Scroll the wheel forwards or backwards until the desired source is found. In this example, any of VTR 3, Edit 3, Cam 3A or Cam 3B could be displayed on the LCD. If you make a mistake, press the white CLEAR button and scroll until the correct destination is displayed.
- Step 8.** The TAKE button will flash red, awaiting your confirmation of the route change. Press TAKE and the route will change immediately. Otherwise, press CLEAR and no route change will take place. Videohub Master Control will then return to its idle state with the latest route displayed on the LCD.

62 Controlling Videohub with Hardware



If you know that you want Edit 3 as the source, and VTR 1 as the destination, you can select the route directly without any scrolling being necessary. In this example, press DEST, press the customized VTR button and then press 1. VTR 1 will be shown in the destination field. Now press SRC, press the customized Edit button and then press 3. "Edit 3" will be shown in the source field. Finally, press TAKE to confirm the route change.

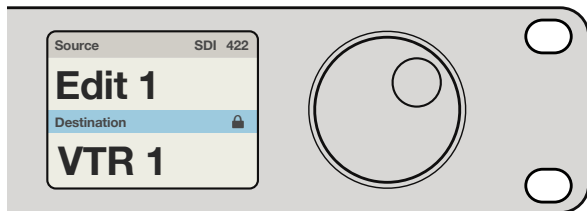
How to select devices using the customizable and numeric buttons together

If you have customized the Videohub port labels with names and numbers, you can use the customizable buttons and numeric buttons together to directly select sources and destinations. This method is very fast and intuitive because you don't have to scroll through a list of equipment and you only have to remember how many of each type of equipment you have, e.g., two VTRs and four monitors. This method is very helpful if you label types of equipment by name and number, e.g., VTR 01, VTR 02, Cam 01, Cam 02, Cam 03, Mon 01, Mon 02, Mon 03 and Mon 04.

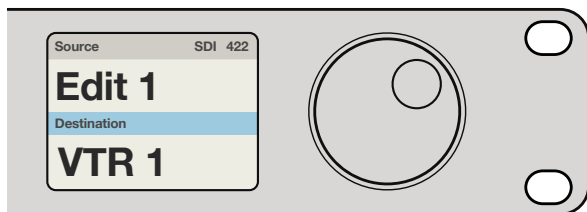
- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If your Videohub router has RS-422 remote control, press the LEVEL button until you have set the appropriate routing level for your equipment. Otherwise you can skip this step.
- Step 3.** Press a button you have customized for a type of destination equipment, e.g., VTR. The button should light gold.
- Step 4.** Type in the destination equipment number using the numeric pushbuttons, e.g., 07 for VTR 07. Each numeric button will flash gold as you press it.
- Step 5.** Press the SRC button. The source field will be highlighted blue on the LCD.
- Step 6.** Press a button you have customized for a type of source equipment, e.g., a capture card. The button should light white.
- Step 7.** Type in the source equipment number using the numeric pushbuttons, e.g., 03 for the capture card Edit 03. Each numeric button will flash white as you press it.
- Step 8.** The TAKE button will flash red, awaiting your confirmation of the route change. Press TAKE and the route will change immediately. Otherwise, press CLEAR and no route change will take place. Videohub Master Control will then return to its idle state with the latest route displayed on the LCD.

If any button you have customized for either a source or destination flashes but does not stay lit, Videohub Master Control is preventing you from selecting the button because the equipment type has not been labeled as a source or destination device or does not match the current routing level. For example, cameras should not usually be set as destination devices, monitors should not be set as source devices and won't match the RS-422 routing level. Refer back to Creating Button Labels in Setting Up Videohub Master Control for steps on how to change this.

63 Controlling Videohub with Hardware



The destination field shows a lock icon if the destination is locked.



The lock icon disappears from the destination field when the destination is unlocked.

Locking and Unlocking Routes

Videohub Master Control can lock and unlock any route on your Videohub. In contrast to Videohub Smart Control, Videohub Master Control can also unlock any destinations locked by other people using their computer, iPad or Videohub Smart Control.

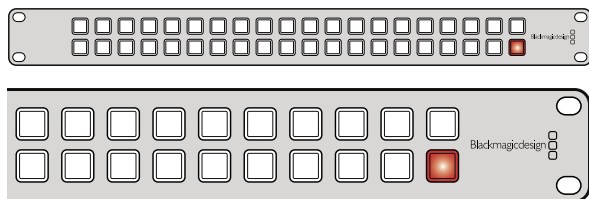
To lock a destination using Videohub Master Control:

- Step 1.** Set the destination and source using whichever method you prefer. Once the route has been set, Videohub Master Control will return to its idle state.
- Step 2.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 3.** If the desired route is not already displayed on the LCD, use the pushbuttons and/or scroll wheel to find the destination to be locked.
- Step 4.** Press and hold the gold DEST button until a lock icon appears in the destination field of the LCD.
- Step 5.** Press DEST again to return Videohub Master Control to its idle state and the destination field will revert to gray.

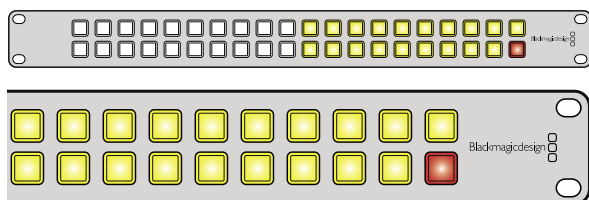
To unlock a destination using Videohub Master Control:

- Step 1.** Press the DEST button. The destination field will be highlighted blue on the LCD.
- Step 2.** If the desired route is not already displayed on the LCD, use the pushbuttons and/or scroll wheel to find the destination to be unlocked. The destination field will show a lock icon for the locked destination.
- Step 3.** Press and hold the gold DEST button until the lock icon disappears from the destination field of the LCD.
- Step 4.** Press DEST again to return Videohub Master Control to its idle state and the destination field will revert to gray.

64 Controlling Videohub with Hardware



Videohub Smart Control configured as a Cut-Bus controller and with a Take button.



Videohub Smart Control configured as an XY controller and with a Take button.

Using Videohub Smart Control as a Cut-Bus Controller

If Videohub Smart Control has been configured as a Cut-Bus controller, the destination device has already been chosen and you only need to choose a video source.

- Step 1.** Select a white video source button. The button will light up to distinguish it from the other sources. The video source will immediately connect and be viewable on the destination device.
- Step 2.** If the Take button has been enabled, the new source button and the Take button will flash. The route change will only take place when you confirm by pressing the Take button.

Using Videohub Smart Control as an XY Controller

If Videohub Smart Control has been configured as an XY controller, destination buttons light up gold and source buttons light up white. When working with multiple destinations, always select a destination button before selecting a source button.

To change routes:

- Step 1.** Select a gold destination button and it will light up brightly to distinguish itself from the other destination buttons. If a video source has previously been connected to this destination, its button will light up white.
- Step 2.** To connect a new source to the destination, press the desired video source button. The video source will immediately be connected and viewable on the destination device. The new source button will be brightly lit and the previous source button will dim to normal. To change another route, select another destination button and then select a new source button.
- Step 3.** If the Take button has been enabled, the new source button and the Take button will flash. The route change will only take place when you confirm by pressing the Take button.

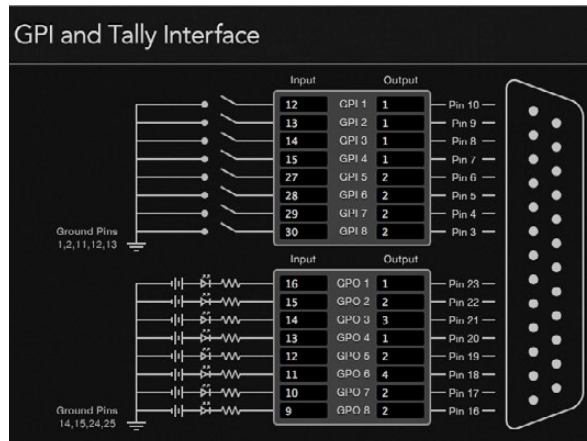
Locking and Unlocking Routes

To lock a destination, press and hold the desired destination button until it turns blue. The corresponding source button will illuminate. If you attempt to change sources for a locked destination, the destination button will flash blue. To unlock a destination, press and hold the button until it returns to the standard gold color.

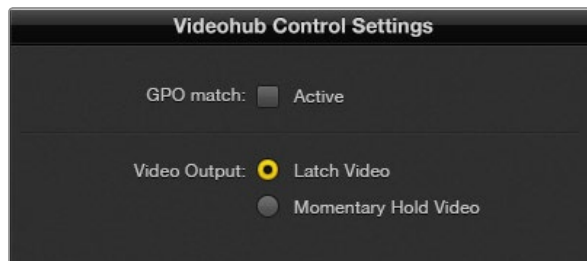
Using Macros

If you press a green macro button, it will simultaneously make the crosspoint changes you have previously configured in Videohub Hardware Panel Setup. Each button can be configured with up to 16 crosspoint routes. If you have the Take button enabled, the simultaneous change of routes will only take place when you confirm by pressing the Take button. If for any reason the macro cannot be performed, the button will flash.

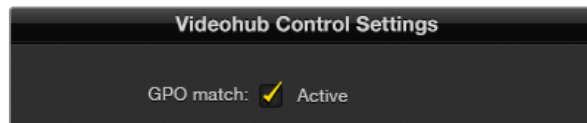
65 Controlling Videohub with Hardware



Click inside the diagram to change inputs and outputs for GPI crosspoint switching and Tally.



Select Latch Video if you want your preview to hold until another crosspoint is selected. Choose Momentary Hold Video if you want your preview to revert back to the previous crosspoint when you release the control switch.



Enable the GPO match checkbox to replicate the crosspoint configuration of your GPIs.

Configuring GPIs

The GPI and Tally Interface has 8 GPIs that provide crosspoint switching. In the example on the left, if GPI 1 detects a contact closure it will switch Input 12 on your Videohub to Output 1. This means when you switch the joystick control on your CCU, video going to Input 12 of your Videohub will be previewed on your monitor.

The crosspoints can be configured in the Videohub Hardware Panel Setup simply by clicking inside the Input and Output fields on the diagram and typing in the Input or Output number.

The Videohub Control Settings pane offers two ways to preview the output from your Videohub.

Latch Video

If you want the output to stay as selected, choose Latch Video. This means you can press the switch once on your CCU and the input from the selected crosspoint will stay on your monitor until another crosspoint is selected.

Momentary Hold Video

Select this option if you want the output to return to the previous input after you let go of the switch or joystick control on your CCU. For example, when you press and hold your switch, Input 13 might be previewed, but will return to displaying Input 12 on your monitor once you release the switch.

Configuring Tally

Tally is usually a lamp on the front of a camera to indicate that it is on air, but it's a useful visual indicator and can be used on any equipment to indicate activity and doesn't have to be used specifically with cameras.

The GPI and Tally Interface has 8 configurable GPOs, which send a tally signal to your cameras or other devices under certain crosspoint conditions. In the example on the left, GPO 1 is configured so that when Input 16 on the Videohub is routed to Output 1, GPO 1 will be activated.

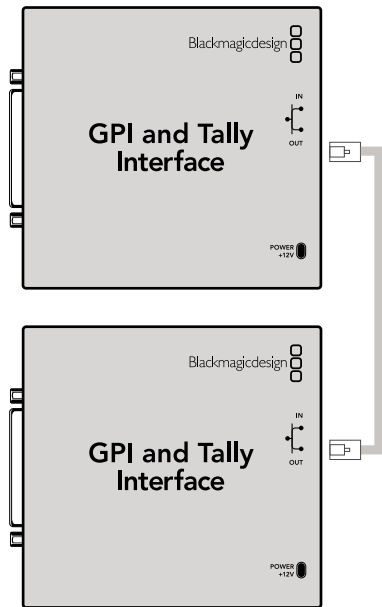
The crosspoints can be configured in Videohub Hardware Panel Setup simply by clicking inside the Input and Output fields on the diagram.

GPO Match

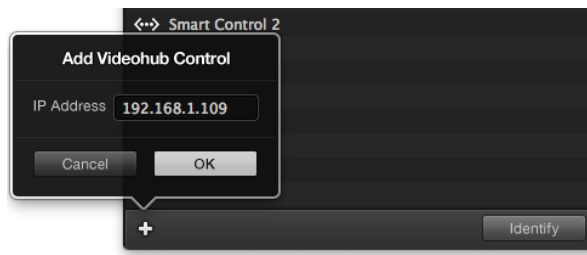
Enable the GPO match checkbox to replicate the configuration of your crosspoints from GPIs to GPOs. This can be useful if you want to see a tally light activate when changing routes for your GPIs.

When this checkbox is enabled, the GPO half of the diagram will be grayed out and cannot be edited until the GPO match checkbox is disabled.

66 Controlling Videohub with Hardware



Daisy chain multiple GPI and Tally Interfaces using ethernet. Power must be supplied to each individual unit in the chain.



Press the + (add device) button and enter the IP address of a GPI and Tally Device you want to add. Press the Identify button to activate the LED on a selected GPI and Tally Interface.

Daisy Chaining Multiple GPI and Tally Interfaces

The GPI and Tally Interface supports 8 GPIs and 8 GPOs at a time, which should be enough for most live television situations. However, if you have more than 8 cameras then you may want to daisy chain a second or third GPI and Tally Interface.

The GPI and Tally Interface has two ethernet ports so that you can connect one port to a Videohub and use the other port to link other GPI and Tally Interfaces together.

- Step 1.** Connect power to the first GPI and Tally Interface.
- Step 2.** Connect a standard RJ45 ethernet cable from your Videohub or network to the ethernet IN port on the GPI and Tally Interface.
- Step 3.** Connect power to the second GPI and Tally Interface.
- Step 4.** Connect a standard RJ45 ethernet cable from the ethernet OUT of the first GPI and Tally Interface to the ethernet IN port on the second GPI and Tally Interface.

This can be repeated for as many GPI and Tally Interfaces as you need as long as power is supplied to all units in the chain.

Sometimes it can get confusing to know which GPI and Tally Interface you are working with when you have several connected. Select the GPI and Tally Interface in the Videohub Control Panels pane and click the Identify button. The LED next to the ethernet IN port on the selected device will light up.

Adding a GPI and Tally Interface Over a Network

You may want to configure a second GPI and Tally Interface but it may be in another location and only accessible over a network. You can add it to your list manually by entering its IP address into Videohub Hardware Panel Setup.

If you do not know the IP address of the GPI and Tally Interface you want to add, connect it to a computer with USB, open Videohub Hardware Panel Setup and note down the IP address in the Network Settings tab.

If you do not have access to the unit because it is in another location, you can find it on the network using the Bonjour browser. This application will show you all the devices on your network and will give you the IP address of the GPI and Tally Interface you wish to add.

- Step 1.** Press the + (add device) button at the bottom of the Videohub Control Panels pane.
- Step 2.** Type in the IP address of the GPI and Tally Interface and press OK.
- Step 3.** The second GPI and Tally Interface will appear in the list with any other devices that are connected to the Videohub.

Getting Help

The fastest way to obtain help is to go to the Blackmagic Design online support pages and check the latest support material available for your Blackmagic Design Videohub Control.

Blackmagic Design online support pages

The latest manual, software and support notes can be found at the Blackmagic Design support center at www.blackmagicdesign.com/support.

Contacting Blackmagic Design support

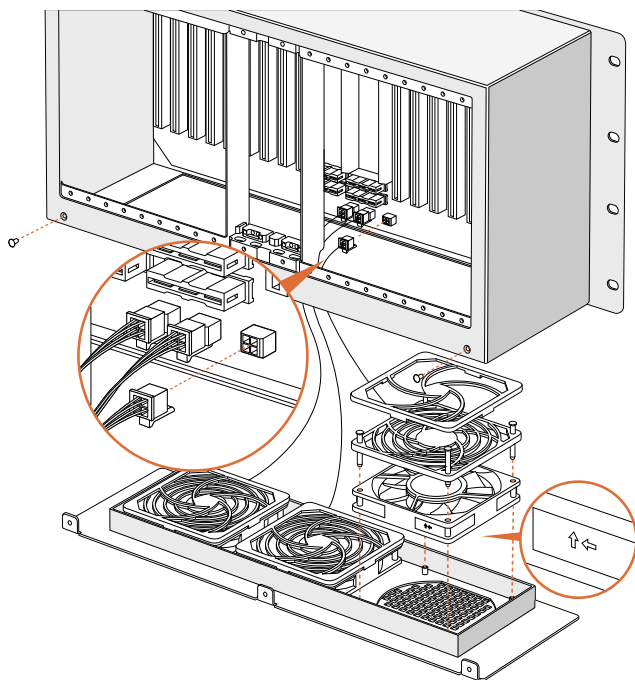
If you can't find the help you need in our support material, please use the "Send us an email" button to email a support request. Alternatively, click on the "Find your local support team" button and call your nearest Blackmagic Design support office.

Checking the version currently installed

To check which version of Videohub Control is installed on your computer, open the Blackmagic Videohub application. From the "Blackmagic Videohub" menu, select "About Videohub" and note the version number.

How to get the latest updates

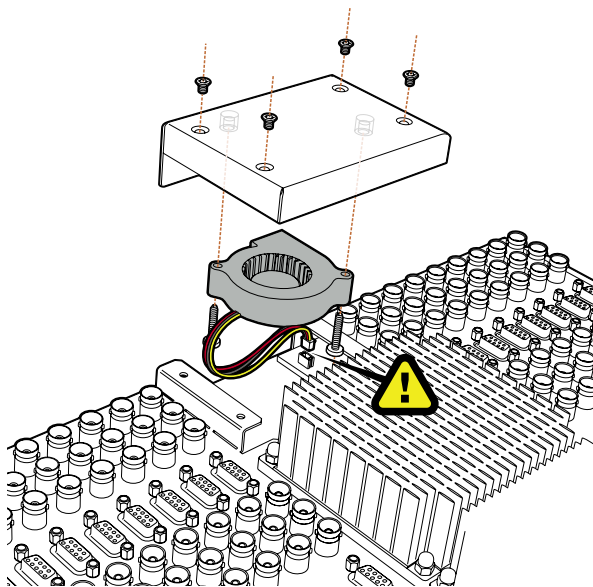
After checking the version of your Videohub Control on your computer, please visit the Blackmagic Design support center at www.blackmagicdesign.com/support to check for the latest updates. While it is usually a good idea to run the latest updates, it is a wise practice to avoid updating any software if you are in the middle of an important project.



Replacing a fan in Universal Videohub

Each fan is designed to be replaced without needing to switch off power to Videohub.

- Step 1.** Locate the fan tray at the base of the unit.
- Step 2.** Using a number 01 Phillips head screwdriver, remove the left and right screws from the fan tray.
- Step 3.** While supporting the tray, remove the center screw.
- Step 4.** Having removed all three screws, slowly allow the fan tray to swing open until you see the black plastic dust filter on top of each fan.
- Step 5.** Gently pull the tray towards you while continuing to swing it down until you feel the rear of the tray detach from the Universal Videohub chassis. Note which fan is faulty.
- Step 6.** You will see the colored power cables connected to each fan. Each fan power cable connects to the Videohub motherboard with a plastic connector. While supporting the fan tray, unplug the plastic power connectors of all three fans. The fan tray can now be fully removed.
- Step 7.** Place the fan tray on a flat surface and unclip the top of the dust-filter housing using the four clips.
- Step 8.** Remove the top of the housing and the filter. Four screws will be revealed. Remove the four screws around the faulty fan. Then remove the base of the dust filter housing and also the faulty fan.
- Step 9.** Replace the fan with a spare unit and then reinstate the base of the dust filter housing. Secure the housing and fan with the four screws and ensure the heads of the screws recess into the dust filter housing. If the screws fail to recess, flip over the housing and try again.
- Step 10.** Place the dust filter over the base of the housing and then snap on the top of the dust filter housing.
- Step 11.** Position the fan tray underneath the base of the Universal Videohub chassis and connect all three fan power cables to the motherboard. All three fans should immediately start running.
- Step 12.** Gently dock the rear of the fan tray with the Universal Videohub chassis. Swing up the front of the fan tray and simultaneously push the tray towards the Videohub motherboard until the rear of the fan tray slides into place and the front swings shut.
- Step 13.** Reinstall the three screws.



Replacing the fan in Broadcast Videohub or Enterprise Videohub

The Broadcast Videohub and Enterprise Videohub packages include a spare fan in case the pre-installed fan stops working or becomes noisy. Videohub will continue to work even if the fan stops running. However, a working fan will help to extend the life of the Videohub for many years and we recommend the fan be replaced if it should ever stop running.

The fan is designed to be replaced without needing to switch off power to Videohub.

- Step 1.** Remove the four screws on the fan cover and lift up the cover gently.
- Step 2.** You will see the colored power cables connecting to a plug on Videohub. Gently remove the plastic plug.
- Step 3.** Remove the two screws that attach the faulty fan to the fan cover.
- Step 4.** Replace the faulty fan with the spare fan by following this process in reverse. The spare fan should immediately start running.

Tips for Connecting SDI cables

The weight of copper-based SDI cables quickly adds up so it is advisable to use your rack to support the cables so that the full cable weight does not place undue stress on the BNC ports of your Videohub. This is particularly important with larger models of Videohub due to the weight of many SDI cables. Tying cable harnesses to the rack frame can provide support for large volumes of cabling.

It is also good practice to attach cables to the lowest BNC and optical fiber connectors first and then work upwards. This will avoid having to push lots of cables out of the way as you attach more cables in the future.

All Videohub models feature regular sized BNC ports, which make it easy to connect to other SDI equipment using regular SDI cables.

If you're connecting Videohub to SDI equipment that has miniature SDI connectors, such as DIN 1.0/2.3, we recommend using SDI cables that are terminated with a miniature connector at one end and a regular BNC at the other. Alternatively, an adapter cable can be connected to a regular SDI cable but this could prevent you from running long cables due to some loss of signal quality.

It's easy to connect and disconnect SDI cables to and from your Videohub. However as you attach more SDI cables, you might find it tricky to fit your fingers between the BNC connectors. You can use an inexpensive BNC removal tool, from third party vendors, to help make this task easy even when your Videohub has many cables connected.

Legend

↵ carriage return
... and so on

Version 2.3 of the Blackmagic Videohub Ethernet Protocol was released with Videohub 4.9.1 software.

Blackmagic Videohub Ethernet Protocol v2.3

Summary

The Blackmagic Videohub Ethernet Protocol is a text based protocol that is accessed by connecting to TCP port 9990 on a Videohub Server. Integrated Videohub Servers and Videohub Server computers are supported by the protocol.

The Videohub Server sends information in blocks which each have an identifying header in all-caps, followed by a full-colon. A block spans multiple lines and is terminated by a blank line. Each line in the protocol is terminated by a newline character.

Upon connection, the Videohub Server sends a complete dump of the state of the device. After the initial status dump, status updates are sent every time the Videohub status changes.

To be resilient to future protocol changes, clients should ignore blocks they do not recognize, up to the trailing blank line. Within existing blocks, clients should ignore lines they do not recognize.

Protocol Preamble

The first block sent by the Videohub Server is always the protocol preamble:

```
PROTOCOL PREAMBLE:↵
Version: 2.3 ↵
↵
```

The version field indicates the protocol version. When the protocol is changed in a compatible way, the minor version number will be updated. If incompatible changes are made, the major version number will be updated.

Device Information

The next block contains general information about the connected Videohub device. If a device is connected, the Videohub Server will report the attributes of the Videohub:

```
VIDEOHUB DEVICE:↵
Device present: true↵
Model name: Blackmagic Smart Videohub↵
Video inputs: 16↵
Video processing units: 0↵
Video outputs: 16↵
Video monitoring outputs: 0↵
Serial ports: 0↵
↵
```

This example is for the Smart Videohub which is a 16x16 router.

71 Developer Information

If the Videohub Server has no device connected, the block will simply be:

```
VIDEOHUB DEVICE:↵
Device present: false↵
↵
```

If a device is present, but has an incompatible firmware, the status reported will be:

```
VIDEOHUB DEVICE:↵
Device present: needs _ update↵
↵
```

In the last two situations, no further information will be sent, unless the situation is rectified.

If the Videohub Server detects a new Videohub attached, it will resend all blocks except the protocol preamble to indicate the device has changed, and allow the client to update its cache of server state.

Initial Status Dump

The next four blocks enumerate the labels assigned to the input, output, monitoring and serial ports.

Videohubs that do not have monitoring or serial ports do not send the corresponding blocks.

```
INPUT LABELS:↵
0 VTR 1↵
1 VTR 2↵
...
↵
OUTPUT LABELS:↵
0 Output feed 1↵
1 Output feed 2↵
...
↵
MONITORING OUTPUT LABELS:↵
0 Monitor feed 1↵
1 Monitor feed 2↵
...
↵
SERIAL PORT LABELS:↵
0 Deck 1↵
1 Deck 2↵
↵
```

Note: Ports are always numbered starting at zero in the protocol which matches port one on the chassis.

72 Developer Information

The next three blocks describe the routing of the output, monitoring and serial ports.

```
VIDEO OUTPUT ROUTING:↵
0 5↵
1 3↵
...
↵
VIDEO MONITORING OUTPUT ROUTING:↵
0 7↵
1 8↵
...
↵
SERIAL PORT ROUTING:↵
0 12↵
1 11↵
...
↵
```

Videohubs with processing units (only the Workgroup Videohub) send an extra routing block:

```
PROCESSING UNIT ROUTING:↵
0 5↵
1 3↵
...
↵
```

Videohubs with frame buffers (only the Workgroup Videohub) send two extra blocks:

```
FRAME LABELS:↵
0 Frame one↵
1 Frame two↵
...
↵
FRAME BUFFER ROUTING:↵
0 7↵
1 8↵
...
↵
```

73 Developer Information

The next three blocks describe the locking status of the output, monitoring and serial ports. Each port has a lock status of "O" for ports that are owned by the current client (i.e., locked from the same IP address), "L" for ports that are locked from a different client, or "U" for unlocked. Note that Videohubs that do not have monitoring ports or serial ports do not send the corresponding blocks.

```
VIDEO OUTPUT LOCKS:↵
0 U↵
1 U↵
...
↵
MONITORING OUTPUT LOCKS:↵
0 U↵
1 U↵
...
↵
SERIAL PORT LOCKS:↵
0 U↵
1 U↵
...
↵
```

Videohubs with processing units (only the Workgroup Videohub) send an extra lock block:

```
PROCESSING UNIT LOCKS:↵
0 U↵
1 U↵
...
↵
```

Videohubs with frame buffers (only the Workgroup Videohub) send an extra lock block:

```
FRAME BUFFER LOCKS:↵
0 U↵
1 U↵
...
↵
```

74 Developer Information

Videohubs with serial ports next send a block which describes the direction of each serial port. Each port has a direction of either "control" for the "In (Workstation)" setting, "slave" for "Out (Deck)", or "auto" for "Automatic".

```
SERIAL PORT DIRECTIONS:↵
0 control↵
1 slave↵
2 auto↵
...
↵
```

Videohubs with pluggable cards (only Universal Videohubs) send three more blocks that describe the hardware status of the ports. Missing video or serial ports have a status of "None"; input and output video ports will be "BNC" or "Optical" if they are present; serial ports will be "RS422" if they are present.

```
VIDEO INPUT STATUS:↵
0 BNC↵
1 BNC↵
...
↵
VIDEO OUTPUT STATUS:↵
0 BNC↵
1 BNC↵
...
↵
SERIAL PORT STATUS:↵
0 RS422↵
1 RS422↵
...
↵
```


Status Updates

When any route, label, or lock is changed on the Videohub Server by any client, the Videohub Server resends the applicable status block, containing only the items that have changed. For example, if serial port 6 has been unlocked, the following block will be sent:

```
SERIAL PORT LOCKS:↵
5 U↵
↵
```

If multiple items are changed, multiple items may be present in the update:

```
OUTPUT LABELS:↵
7 New output 8 label↵
10 New output 11 label↵
↵
```

If a card is plugged into or removed from the Universal Videohub, it will send hardware status blocks for the video inputs, video outputs, and serial ports on that card.

Requesting Changes

To update a label, lock or route, the client should send a block of the same form the Videohub Server sends when its status changes. For example, to change the route of output port 8 to input port 3, the client should send the following block:

```
VIDEO OUTPUT ROUTING:↵
7 2↵
↵
```

The block must be terminated by a blank line. On receipt of a blank line, the Videohub Server will either acknowledge the request by responding:

```
ACK↵
↵
```

or indicate that the request was not understood by responding:

```
NAK↵
↵
```

After a positive response, the client should expect to see a status update from the Videohub Server showing the status change. This is likely to be the same as the command that was sent, but if the request could not be performed, or other changes were made simultaneously by other clients, there may be more updates in the block, or more blocks. Simultaneous updates could cancel each other out, leading to a response that is different to that expected.

76 Developer Information

In the absence of simultaneous updates, the dialog expected for a simple label change is as follows:

```
OUTPUT LABELS:↵
6 new output label seven↵
↵
ACK↵
↵
OUTPUT LABELS:↵
6 new output label seven↵
↵
```

The asynchronous nature of the responses means that a client should never rely on the desired update actually occurring and must simply watch for status updates from the Videohub Server and use only these to update its local representation of the server state.

To lock a port, send an update to the port with the character "O" indicating that you wish to lock the port for example:

```
SERIAL PORT LOCKS:↵
7 O↵
↵
ACK↵
↵
SERIAL PORT LOCKS:↵
7 O↵
↵
```

To forcibly unlock a port that has been locked by another client, send an update to the port with the character "F" instead of using the usual unlock character "U". For example, to override a lock on port 7:

```
SERIAL PORT LOCKS:↵
7 F↵
↵
ACK↵
↵
SERIAL PORT LOCKS:↵
7 U↵
↵
```

Hardware status blocks can only be sent by the Videohub Server. If a client sends hardware status blocks, they will be ignored.

Requesting a Status Dump

The client may request that the Videohub Server resend the complete state of any status block by sending the header of the block, followed by a blank line. In the following example, the client requests the Videohub Server resend the output labels:

```
OUTPUT LABELS:↵
↵
ACK↵
↵
OUTPUT LABELS:↵
0 output label 1↵
1 output label 2↵
2 output label 3↵
...
↵
```

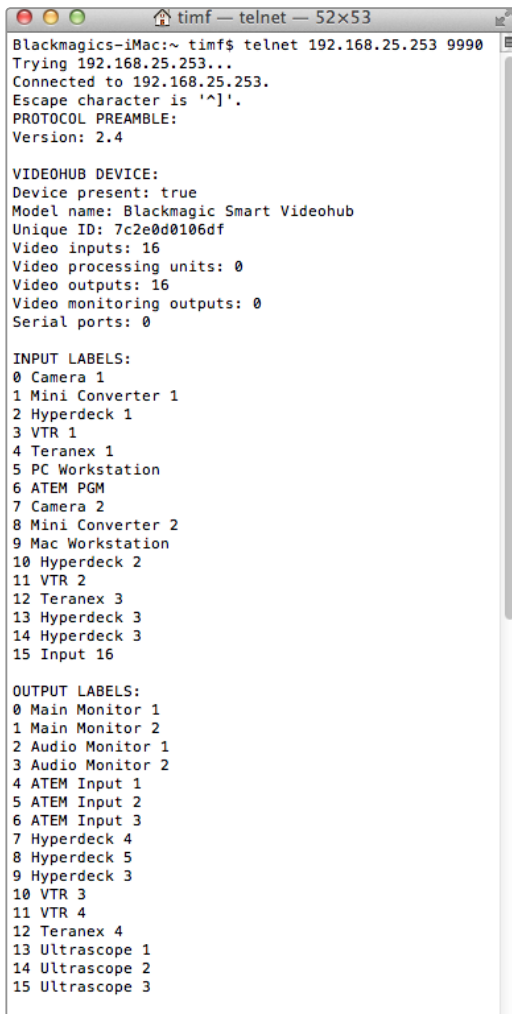
Checking the Connection

While the connection to the Videohub Server is established, a client may send a special no-operation command to check that the Videohub Server is still responding:

```
PING:↵
↵
```

If the Videohub Server is responding, it will respond with an ACK message as for any other recognized command.

78 Developer Information



```
Blackmags-iMac:~ timf$ telnet 192.168.25.253 9990
Trying 192.168.25.253...
Connected to 192.168.25.253.
Escape character is '^]'.
PROTOCOL PREAMBLE:
Version: 2.4

VIDEOHUB DEVICE:
Device present: true
Model name: Blackmagic Smart Videohub
Unique ID: 7c2e0d0106df
Video inputs: 16
Video processing units: 0
Video outputs: 16
Video monitoring outputs: 0
Serial ports: 0

INPUT LABELS:
0 Camera 1
1 Mini Converter 1
2 Hyperdeck 1
3 VTR 1
4 Teranex 1
5 PC Workstation
6 ATEM PGM
7 Camera 2
8 Mini Converter 2
9 Mac Workstation
10 Hyperdeck 2
11 VTR 2
12 Teranex 3
13 Hyperdeck 3
14 Hyperdeck 3
15 Input 16

OUTPUT LABELS:
0 Main Monitor 1
1 Main Monitor 2
2 Audio Monitor 1
3 Audio Monitor 2
4 ATEM Input 1
5 ATEM Input 2
6 ATEM Input 3
7 Hyperdeck 4
8 Hyperdeck 5
9 Hyperdeck 3
10 VTR 3
11 VTR 4
12 Teranex 4
13 Ultrascope 1
14 Ultrascope 2
15 Ultrascope 3
```

Saving and Loading Labels with Telnet in Mac OS X

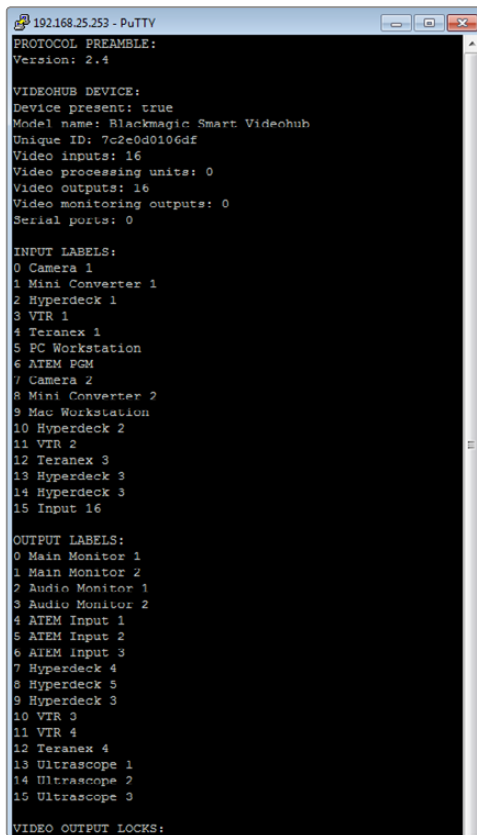
Normally you would use Blackmagic Videohub Setup to save and load labels between different Videohub routers and to backup your videohub settings. However, if for any reason you wish to use the Terminal, the instructions below let you save and load router label configurations via the Terminal.

Saving Labels

- Step 1.** Open the Terminal application which is located within the Applications > Utilities folder.
- Step 2.** Type in "telnet" and a space followed by the IP of your Videohub, then another space and "9990", which is the default port number. For example type: telnet 192.168.25.253 9990. The Protocol Preamble screen will appear.
- Step 3.** Copy the INPUT LABELS: text including the heading and paste into a word processor or simple text editor. Name this file "input labels" and save to your favorite location.
- Step 4.** Copy the OUTPUT LABELS: text including the heading and paste into a word processor or simple text editor. Name this file "output labels" and save to your favorite location.
- Step 5.** Close the telnet session by exiting the terminal window.

Loading Labels

- Step 1.** Open the Terminal application with is located within the Applications > Utilities folder.
- Step 2.** Type in "telnet" and a space followed by the IP of your Videohub, then another space and "9990", which is the default port number. For example type: telnet 192.168.25.253 9990. The Protocol Preamble screen will appear.
- Step 3.** Open the "input labels" text file in your text editing program and copy the INPUT LABELS: text.
- Step 4.** Paste this into the telnet session and press "return" twice. Telnet will respond with "ACK" and Videohub will update the input labels.
- Step 5.** Open the "output labels" text file in your text editing program and copy the OUTPUT LABELS: text.
- Step 6.** Paste this into the telnet session and press "return" twice. Telnet will respond with "ACK" and Videohub will update the output labels.
- Step 7.** Close the telnet session by exiting the terminal window.



```

192.168.25.253 - PuTTY
PROTOCOL PREAMBLE:
Version: 2.4

VIDEOHUB DEVICE:
Device present: true
Model name: Blackmagic Smart Videohub
Unique ID: 7c2e0d0106df
Video inputs: 16
Video processing units: 0
Video outputs: 16
Video monitoring outputs: 0
Serial ports: 0

INPUT LABELS:
0 Camera 1
1 Mini Converter 1
2 Hyperdeck 1
3 VTR 1
4 Teranex 1
5 PC Workstation
6 ATEM PGM
7 Camera 2
8 Mini Converter 2
9 Mac Workstation
10 Hyperdeck 2
11 VTR 2
12 Teranex 3
13 Hyperdeck 3
14 Hyperdeck 3
15 Input 16

OUTPUT LABELS:
0 Main Monitor 1
1 Main Monitor 2
2 Audio Monitor 1
3 Audio Monitor 2
4 ATEM Input 1
5 ATEM Input 2
6 ATEM Input 3
7 Hyperdeck 4
8 Hyperdeck 5
9 Hyperdeck 3
10 VTR 3
11 VTR 4
12 Teranex 4
13 Ultrascope 1
14 Ultrascope 2
15 Ultrascope 3

VIDEO OUTPUT LOCKS:

```

Saving and Loading Labels with Telnet in Windows

While you can save and load labels within Blackmagic Videohub Setup, you may also download and use PuTTY which is a free telnet client.

Setting up PuTTY

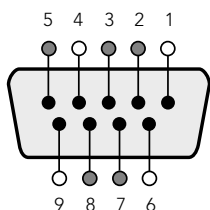
- Step 1.** Start the application and in the "Host Name" field, type the IP of your Videohub and in the "Port" field type "9990", which is the default port number.
- Step 2.** From the Connection type options select the "Telnet" radio button.
- Step 3.** Select the "Terminal" tab and tick the "Implicit CR in every LF" checkbox.
- Step 4.** Click the "Session" tab and save your session parameters by entering a name in the "Saved Sessions" field and clicking the "Save" button.

Saving Labels

- Step 1.** Double click the PuTTY icon to start the application. Select your saved session from the list and click the "Load" button followed by the "Open" button. The Protocol Preamble screen will appear.
- Step 2.** Copy the INPUT LABELS: text including the heading and paste into a word processor or simple text editor. Name this file "input labels" and save to your favorite location.
- Step 3.** Copy the OUTPUT LABELS: text including the heading and paste into a word processor or simple text editor. Name this file "output labels" and save to your favorite location.
- Step 4.** Exit the telnet session by closing the PuTTY window.

Loading Labels

- Step 1.** Double click the PuTTY icon to start the application. Select your saved session from the list and click the "Load" button followed by the "Open" button. The Protocol Preamble screen will appear.
- Step 2.** Open the "input labels" text file in your text editing program and copy the INPUT LABELS: text.
- Step 3.** Right click in the PuTTY session to paste the copied section and press "Enter" twice. PuTTY will respond with "ACK" and Videohub will update the input labels.
- Step 4.** Open the "output labels" text file in your text editing program and copy the OUTPUT LABELS: text.
- Step 5.** Right click in the PuTTY session to paste the copied section and press "Enter" twice. PuTTY will respond with "ACK" and Videohub will update the output labels.
- Step 6.** Exit the telnet session by closing the PuTTY window.



Videohub RS-422 Router Control

Pin	Function
1	Ground
2	Tx- (Data sent by router)
3	Rx+ (Data received by router)
4	Ground
5	NC (No connect)
6	Ground
7	Tx+ (Data sent by router)
8	Rx- (Data received by router)
9	Ground

Videohub RS-422 Router Control pin connections.

Videohub RS-422 Protocol

General

The RS-422 protocol can be used to control many Videohub models as RS-422 slave devices, for router crosspoint switching. This feature is available on any Videohub model with an "RS-422 Control" port.

In "Leitch Server" mode, these Videohub models implement the router (server) side of the Leitch Serial Pass-Through Protocol as specified in section 4 of Leitch document SPR-MAN revision D. In "Leitch Client" mode, the Videohub implements the controller (client) side of the Leitch terminal protocol.

This document describes the commands and parameters in the protocol that are relevant and supported by Videohub. Other commands and parameters specified in the Leitch protocol are accepted but ignored.

The RS-422 serial port is configured as 9600 N81.

The protocol is line-oriented, with a maximum length of 250 characters per command. Each command from the client should be terminated with a carriage-return (\r). Each response from the server will be terminated with a carriage-return and line-feed (\r\n).

Sources, destinations and levels are always specified in base-16, numbered from zero. Levels are always between 0 and 15 ("F"). Videohubs only have one valid level - level zero.

On connecting to the serial port, the client should send a carriage-return. The Videohub Server will respond with a > character prompt, which is not followed by a carriage-return or line-feed. Receiving the prompt indicates that a connection has been established. The same prompt will be issued after each command received by the Videohub Server.

In the following documentation, commands in orange and values in blue must be typed literally, including any spaces. In the following example of an immediate command using destination port 7 and source port 3, @ X:0/destination,source would be entered as: @ X:0/6,2

Notifications

Once connected, if status reporting is enabled, the client will receive a notification message when a route changes on the Videohub Server. The notifications take one of two forms:

S:0*destination,source* Routing change

This message indicates that the specified source port is now routed to the specified destination.

V:0*destination,source* Preset routing notification

This message indicates that the current preset includes a route from the specified source to the specified destination.

Global Commands

All pass-through commands are preceded by an @ symbol and a space.

The following client commands are supported:

@ ! disable status reporting
Status reporting is disabled by default.

@ ? enable status reporting
Status reporting is enabled.

@ Z: reset routing table

Routing is reset so that the first source is routed to all destinations.

Immediate Commands

@ X:0/*destination,source* change route

@ X:0/*destination,source/destination-2,source-2...* change multiple routes
The specified source ports are routed to the specified destinations.
Any routing changes will trigger S: notifications

@ X?0*destination* request individual route status
The source routed to a the specified destination will be returned as an S: notification.

@ S?0 request all ports route status
Each source & destination port pair will be returned as S: notifications

Salvo Commands

@ P:0/destination,source queue route change

@ P:0/destination,source/destination-2,source-2... queue multiple route changes

The specified routing changes are added to the current salvo for later execution.

@ P?0destination request individual port status in salvo

If a routing change for the specified destination port is queued, the route will be returned as

a V: notification.

@ V?0 request all ports status in salvo

Each queued routing change in the salvo is reported as a V: notification.

@ B:C clear salvo

@ B:R clear salvo

Any queued changes are discarded and the salvo is reset.

@ B:E execute salvo

Any queued changes are executed and each routing change will be returned as an S: notification.

Limited Warranty

Blackmagic Design warrants that Videohub routers will be free from defects in materials and workmanship for a period of 36 months from the date of purchase excluding connectors, cables, cooling fans, fiber optic modules, fuses, keyboards and batteries which will be free from defects in materials and workmanship for a period of 12 months from the date of purchase. Blackmagic Design warrants that Videohub Master Control and Videohub Smart Control will be free from defects in materials and workmanship for a period of 12 months from the date of purchase. If a product proves to be defective during this warranty period, Blackmagic Design, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify Blackmagic Design of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by Blackmagic Design, with shipping charges pre paid. Customer shall be responsible for paying all shipping charges, insurance, duties, taxes, and any other charges for products returned to us for any reason.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Blackmagic Design shall not be obligated to furnish service under this warranty: a) to repair damage resulting from attempts by personnel other than Blackmagic Design representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non Blackmagic Design parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product. THIS WARRANTY IS GIVEN BY BLACKMAGIC DESIGN IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. BLACKMAGIC DESIGN AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. BLACKMAGIC DESIGN'S RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER BLACKMAGIC DESIGN OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. BLACKMAGIC DESIGN IS NOT LIABLE FOR ANY ILLEGAL USE OF EQUIPMENT BY CUSTOMER. BLACKMAGIC IS NOT LIABLE FOR ANY DAMAGES RESULTING FROM USE OF THIS PRODUCT. USER OPERATES THIS PRODUCT AT OWN RISK.

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