Installation and Operation Manual

SmartView & SmartScope

Blackmagicdesign
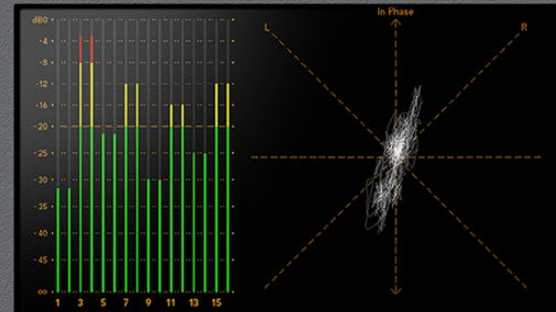
Welcome to SmartView & SmartScope

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

Video monitoring is needed everywhere in a facility. SmartView Duo provides two completely independent and beautiful 8 inch LCDs in a 3RU rack housing less than an inch thick. SmartScope Duo 4K features two independent 8" LCDs with waveform scope functionality, allowing you to monitor your video levels on the fly. SmartView HD provides an amazing 17" LCD in a 6RU rack housing less than an inch thick. All SmartView monitors support SD, HD and 2K video via 3G-SDI. SmartScope Duo 4K even supports Ultra HD 4K via 6G-SDI!

Video monitoring is designed to work straight out of the box and our free utility software provides the user with an easy and intuitive configuration tool.

This instruction manual should contain all the information you'll need on installing your SmartView or SmartScope, 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. SmartView and SmartScope are easy to install, however, there are a few slightly technical preferences you may need to set after you install it.
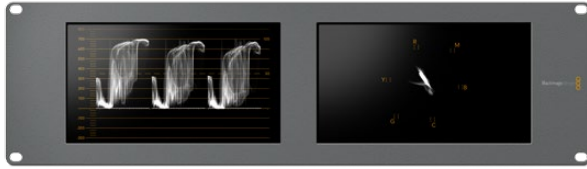
We think it should take you approximately 5 minutes to complete Installation. Please check our website at www.blackmagicdesign.com and click the support page to download the latest updates to this manual and SmartView software. Lastly, please register your unit when downloading software updates so we 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!

Grant Petty

Grant Petty
CEO Blackmagic Design

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Introducing SmartView and SmartScope

SmartView monitors are perfect for any facility which requires rack-based monitoring. To simply get up and running the only thing you need to do is plug in power and connect an SDI source!

SmartView Duo has two monitors for simultaneous display of different video signals. One can display a YUV 4:2:2 signal while the other receives RGB 4:4:4. One monitor could be showing NTSC while the other shows PAL. There are many possible combinations but it is all as simple as connecting a single SDI cable to each monitor!

SmartScope Duo 4K has all the same features as SmartView Duo plus can be used to display waveform, vectorscope and other popular scopes for monitoring video and audio levels in real time. Plus, you get full support for Ultra HD 4K!

SmartView HD is a single 17" LCD which is perfect for confidence monitoring in full resolution HD.

All SDI input connections on SmartView and SmartScope support auto detection of SD, HD or 3G-SDI including 2K video. SmartScope Duo 4K also includes auto detection of Ultra HD 4K video via 6G-SDI.

If you have a SmartScope Duo 4K, you'll also want to connect a USB cable to your Mac or Windows computer and install the SmartView Utility software so you can select the desired scopes.

If you want to remotely adjust settings for multiple SmartView and SmartScope units from one computer, you can connect them together via Ethernet. This means you won't have to run around to each unit with a computer and USB cable each time you want to adjust settings.

That's all you need to get started! Please read on for more detailed instructions on connecting SmartView and SmartScope, configuring monitor settings in the SmartView Utility and connecting to a network.

Getting Started

SmartView Duo

SmartScope Duo 4K

SmartView HD

Plugging in Video Sources

SmartView and SmartScope monitors feature regular BNC connectors to connect to SDI equipment including switchers, cameras, capture cards, decks and disk recorders.

Getting a Picture

Displaying your video is easy! Simply power the unit and connect your video source to an SDI input. Once powered and connected, your video should be immediately visible. SD, HD and 2K signals are automatically detected by the SDI input and loop through output connections. SmartScope Duo 4K also detects Ultra HD 4K.

When no video is received by the unit, the backlight turns off, saving power until the next valid signal is received.

Daisy chaining Monitors

Each SmartView and SmartScope monitor has its own independent SDI input as well as a loop through output. You can chain multiple monitors together to display the same input signal:

Step 1. Power on unit 1. Connect a video source to an SDI input. The video should immediately be visible.

Step 2. Power on unit 2. Connect an SDI cable from a loop output of unit 1 to an SDI input on unit 2.

There is no limit to the amount of units you can chain.

If you are waveform monitoring using SmartScope Duo 4K, you'll probably want to loop the Monitor 1 output to Monitor 2 so both displays use the same input signal.

Now you have video displayed, you can adjust monitor settings, or select scopes on SmartScope Duo 4K using the Blackmagic SmartView Utility.

To install on Mac OS X, drag the Blackmagic SmartView Utility to the Applications folder.
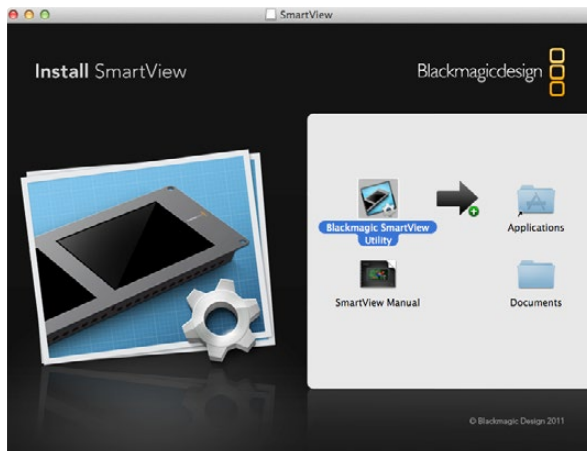
Plugging in your Computer

Configure SmartView or SmartScope monitor settings by connecting to your computer via USB 2.0 and installing the Blackmagic SmartView Utility.

The USB connection can also be used for applying internal software updates downloaded from the Blackmagic Design website. Software updates can provide new features, compatibility with new hardware and support for new formats. The Blackmagic SmartView Utility software runs on both Mac OS X and Windows computers.

Set your computer display resolution to 1280 x 800 or higher to display the Blackmagic SmartView Utility.

Installing the Blackmagic SmartView Utility

The Blackmagic SmartView Utility runs on the latest Lion and Mountain Lion versions of Mac OS X, and both 32 and 64-bit versions of Windows 7 and 8 with the latest service packs installed. Blackmagic SmartView Utility can be installed on multiple networked computers if desired.

The DVD supplied with SmartView contains the software installer, but we recommend visiting www.blackmagicdesign.com to ensure you have the latest version.

To install on Mac OS X:

Open the supplied DVD, or downloaded disk image, and drag the Blackmagic SmartView Utility to your Applications folder.

To install on Windows:

On Windows, open the supplied DVD, or downloaded zip file, and double-click on the SmartView installer. Follow the onscreen prompts to install the software.
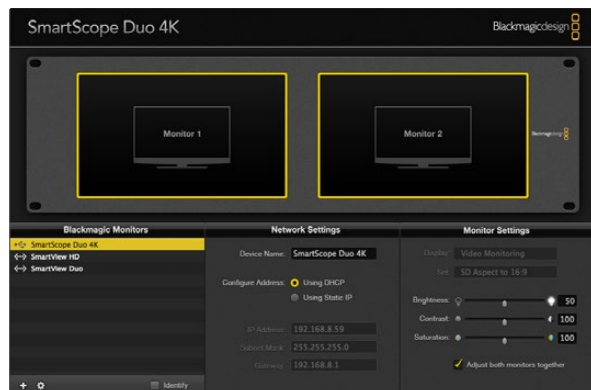
This message will appear if an internal software update is required.

The update will take about 5 minutes to complete.

The Blackmagic SmartView Utility automatically searches for any SmartView and SmartScope units connected locally with USB or over a network.

Updating the Software

Once the Blackmagic SmartView Utility is installed and launched, you may be prompted to update the internal software of your SmartView or SmartScope.

Step 1. Launch the Blackmagic SmartView Utility.

Step 2. Connect your SmartView or SmartScope to the computer via USB 2.0.

Step 3. When prompted, simply click YES. The update may take about 5 minutes to complete.

Step 4. The message: "The firmware has been successfully updated" should appear at completion of the update.

Step 5. Click OK.

If no internal software upate is required, Blackmagic SmartView Utility will open as normal.

Adjusting Monitor Settings

When launched, the Blackmagic SmartView Utility will immediately search for SmartView or SmartScope units connected via USB, or via Ethernet if connected to a network. Monitor settings can be adjusted via USB or Ethernet if connected via a network.

Blackmagic Monitors Pane

All connected monitors will be displayed in the Blackmagic Monitors pane. Click on your connected SmartView or SmartScope. Your selected monitor will be highlighted and you can now adjust its display settings.

Any SmartView or SmartScope units connected via Ethernet will be found using the Bonjour service discovery protocol and listed in the Blackmagic Monitors pane with an Ethernet network icon. For information on how to configure network settings using the Blackmagic SmartView Utility, turn to the section "Adjusting Network Settings".
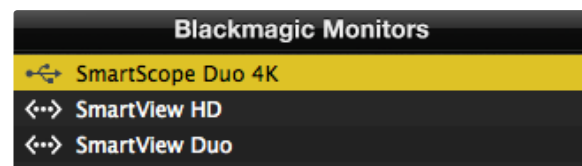
The selected SmartScope Duo 4K is connected locally via USB. The Ethernet icons next to SmartView HD and SmartView Duo show they are connected via a network.
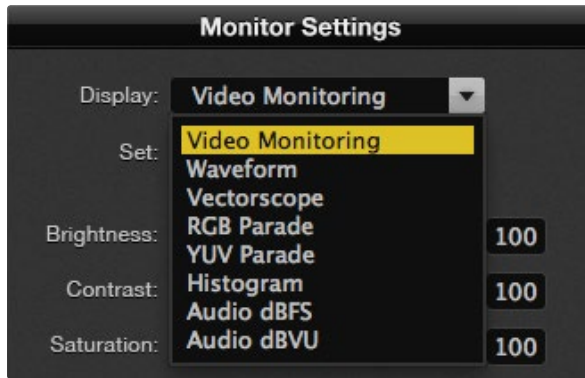
With SmartScope you can select between scopes or video monitoring from the Display drop down menu.

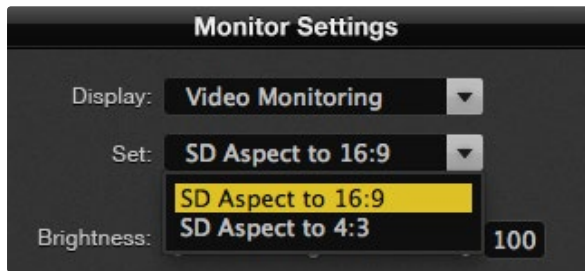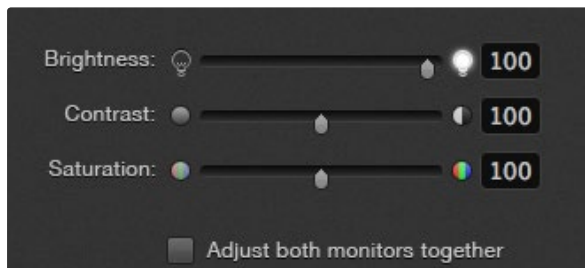Set "SD Aspect to 16:9" when viewing anamorphic standard definition video.

Drag the sliders left and right to adjust brightness, contrast and saturation settings.

Monitor Settings Pane

To adjust settings and displays for each monitor, first click on the monitor you wish to set. A yellow border will appear indicating the monitor your settings will be applied to.

Display

When using a SmartView, the Display menu is permanently set to Video Monitoring. When using a SmartScope, the Display drop down menu provides selectable scopes. Select Video Monitoring if you just want to see the video image.

Set

The Set drop down menu lets you select 4:3 or 16:9 aspect ratios for the Video Monitoring display. When SmartScope is connected, the Set drop down menu provides additional options for the selected display, including Vectorscope, Audio dBFS and Audio dBVU options.

Video Monitoring: Select to view the video image using 4:3 or 16:9 aspect ratios. When viewing widescreen anamorphic standard definition video, choose the 16:9 aspect ratio. When viewing traditional 4:3 standard definition video, choose the 4:3 aspect ratio.

Vectorscope: Select whether your input is based on 100% or 75% color bar test signals.
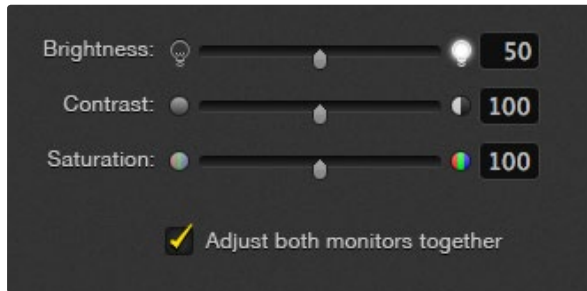
Audio dBFS: Select which pair of audio channels to monitor.

Audio dBVU: Select which pair of audio channels to monitor.

Brightness, Contrast, Saturation

When the Display menu is set to Video Monitoring, adjust the sliders to apply brightness, contrast and saturation settings.
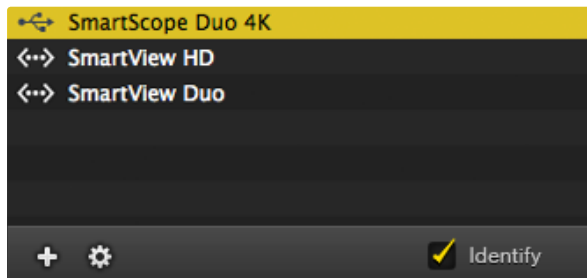
SmartView Duo and SmartScope Duo 4K monitor settings can be adjusted independently or together.

When Adjust both monitors together is selected, a yellow border will appear around both SmartView Utility monitors.

When the Identify checkbox is enabled, any monitor selected in the Blackmagic Monitors pane will have a white border activated.

Adjust Both Monitors Together

When this setting is enabled, yellow borders appear on the two SmartView Utility monitors to indicate that any adjustments to brightness, contrast and saturation will be applied to both.

Deselect this setting if you wish to make independent changes to each monitor.

Identify Monitor

When the Identify checkbox is enabled, any monitor selected in the Blackmagic Monitors pane will have a white border. If several SmartView and SmartScope units are connected via a network, this setting makes it easy to identify the selected monitor. The white border will appear on the monitor LCD and in the Blackmagic SmartView Utility interface.

If this setting is used in conjunction with the 'Adjust both monitors together' setting, the white border will be displayed on both SmartView Duo or SmartScope Duo 4K monitors.
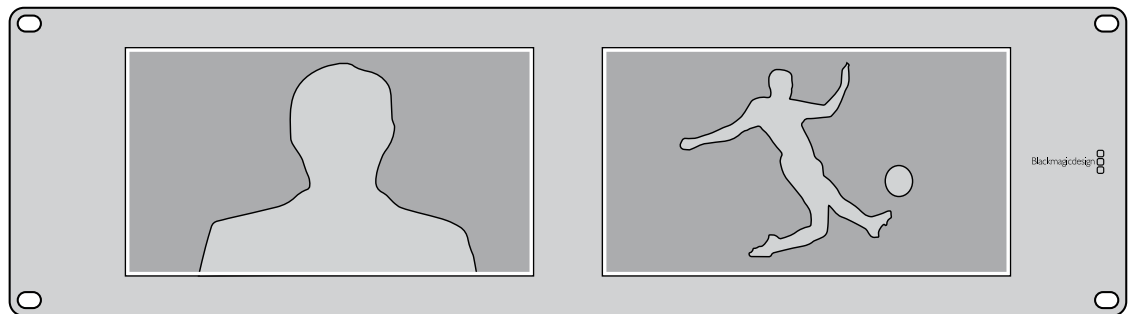
A white border will appear around the selected monitor(s) when the Identify checkbox is enabled.
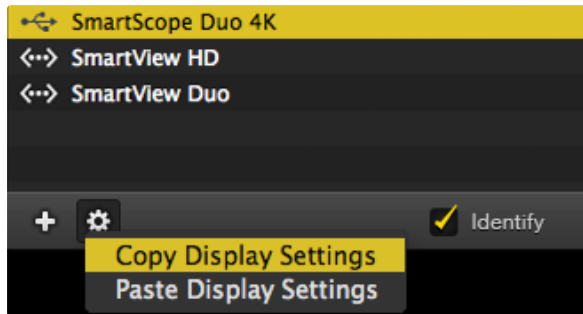
Copy and Paste Display Settings in the Blackmagic Monitors pane.

Copy/Paste Display Settings

If you have already set up one SmartView unit with monitor settings you would like to apply to others, you can copy and paste those settings to other units in the Blackmagic Monitors pane. Relevant SmartScope settings can be copied and pasted to a SmartView unit.

To copy and paste display settings:

Step 1.   Click on the unit in the Blackmagic Monitors pane from which you want to copy settings.

Step 2.   Go to the `Device` menu, or click the action button (gear icon) and choose `Copy Display Settings (Ctrl-C, Cmd-C)`

Step 3.   Now click on the unit you wish to paste settings to.

Step 4.   Go to the `Device` menu, or click the action button (gear icon) and choose `Paste Display Settings (Ctrl-V, Cmd-V)`

Copying and pasting display settings can also be done when connected via Ethernet.

What is Blackmagic SmartScope?

Previously, broadcast quality television and post production scopes were incredibly expensive custom solutions that only let you see one scope at a time on a tiny screen! Some scopes look ugly and don't really look good in front of your client.

With SmartScope Duo 4K you get the addition of waveform monitors which allow you to see any aspect of your video signal on your dual monitors in real time. Any adjustments made to the input signal in the Blackmagic SmartView Utility can immediately be seen on SmartScope Duo 4K! Furthermore, each input signal can be sent to either monitor via the SDI loop out, meaning you can use the right hand monitor to display the scope for the signal going into the left hand monitor.

The scopes displayed by SmartScope Duo 4K are selected in the Blackmagic SmartView Utility software. Select your scopes from the Display drop down menu in the Monitor Settings pane.

The following pages explain how each scope display is used, so you get a deeper understanding of how each type of display can help you.
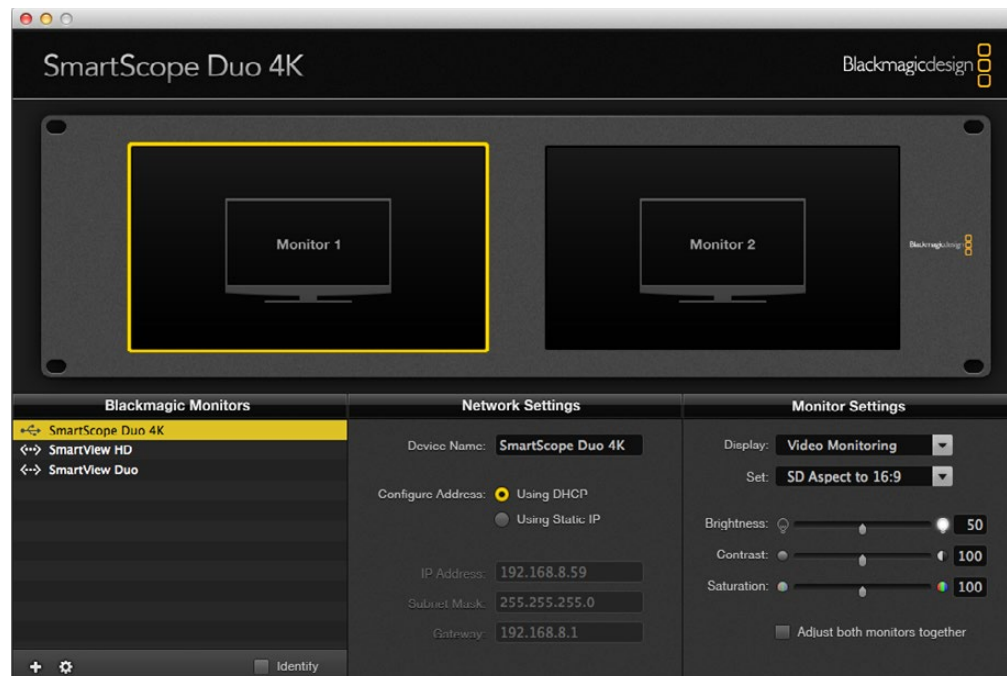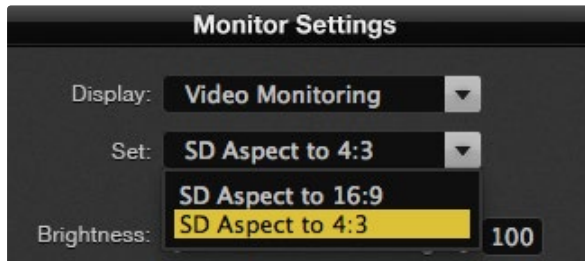
Set standard definition to display in 16:9 or 4:3 aspect ratios.
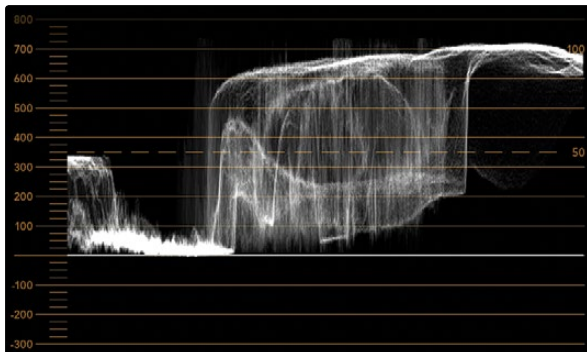
Waveform Display showing Luminance values

Waveform Display has no additional settings.

Video Monitoring Display

The Video Monitoring display is a handy confidence monitor so you can see the video that is being received by SmartScope.

If your input signal is SD, you can select between displaying it in either 4:3 pillarbox or 16:9 from the Set drop down menu. Any changes made to the Brightness, Contrast or Saturation can be immediately seen in this view. Note that changing these settings only affects the monitor, not the video signal, so the scopes will not be affected by any saturation or brightness changes.

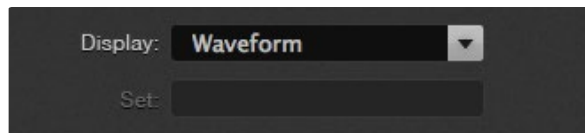It can often be handy to set one monitor as Video Monitoring and another as your scope view. To do this, use a short cable to connect the SDI loop out from Monitor 1 to the SDI in of Monitor 2.

Waveform Display

The Waveform Display provides a digitally encoded waveform similar to traditional luminance waveform monitors, which is used to monitor and adjust the luma (brightness) levels of your video signal.

Traditional luminance waveform monitors only supported composite analog standard definition video. However SmartScope's waveform view works in high definition as well as standard definition, so you have a consistent and easy way to adjust luma levels even when monitoring high definition digital video formats!

Select Waveform from the Display dropdown menu. You will want to make sure the blacks in your waveform do not drop below 0% and the whites do not exceed 100% as this means you are getting illegal luma values.

The waveform monitor is a graphical representation of the image, showing luma values in the same position relative to those within the frame. For example, if part of your sky is overexposed you will see it in the same position on the waveform display as it appears in the frame.

Depending on your footage, your waveform will look different. If you are monitoring video which is high contrast, you might not see any values in the mid grays. The picture on the left shows a waveform for an evenly exposed image with a dark patch on the bottom left and brighter values from the centre of the frame out to the right.
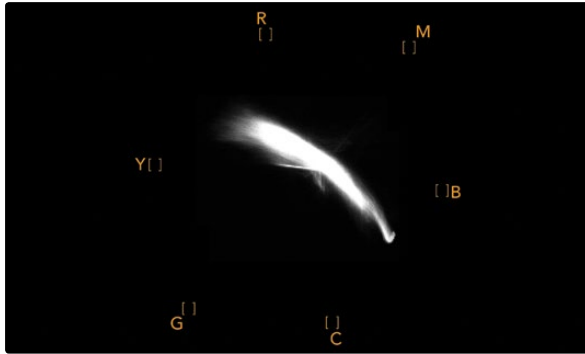
Vectorscope Display showing the "fleshtone line".
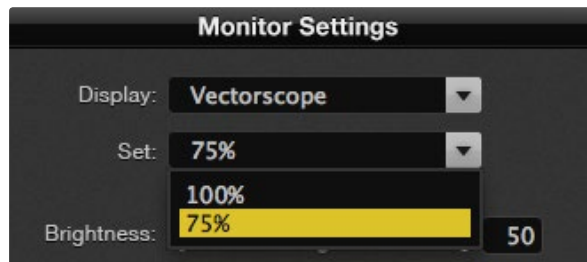
Set your Vectorscope to 100% or 75% color bar test signals.

Vectorscope Display

The Vectorscope Display uses a vector view to show the colors in a video signal. Depending on the standard of color bar test signals used in your facility, select either 100% or 75% from the Set drop down menu.

Some people think you can use a vectorscope to check for illegal levels, however this is not correct. The Parade RGB display should be used for checking for illegal colors. The reason you cannot use a vectorscope to check for illegal levels is that both chroma and luminance values are required. For example, colors near the white or black points in video cannot be as saturated as the much stronger colors, which can be used in the mid-grays. Because Vectorscope Display only shows colors, and not luminance values, it cannot be used solely to check for illegal colors.

Vectorscope Display is the best tool for checking color levels from older, analog videotape where you need to adjust chroma levels. Just play back the color bar segment of the videotape, and then adjust the chroma and hue settings to set the colors of the video within the square boxes in the graticule.

Vectorscope Display is also perfect for color grading, as you can easily see if your video is correctly white balanced or if there is a color tint. If your video has a color tint, the Vectorscope display will drift off center, and you might see two center dots. Normally the blanking in the video signal will create a dot in the center of the vectorscope, and this is because the blanking in the video is black video without any color. Blanking provides a useful reference point to help recognize areas of black video without any color information.

If your video has a color tint, you should see the blacks move off color and off center. The degree of shift represents the amount of color tint in your video and you can see the shift in both the white and black details of your video. This makes Vectorscope Display valuable for removing color tint and regaining correct white balance.

Vectorscope Display lets you push colors in your video to the limits, without accidentally adding unwanted color tints to blacks and whites. While color balance can be monitored on both the RGB Parade display and Vectorscope Display, color balance issues will often be easier to see in the Vectorscope Display.

When color correcting footage of skin tone, particularly faces, you will want to keep your warm color saturation along a line at approximately 10 o'clock on the vectorscope. This is known as the "fleshtone line" and is based on the color of blood beneath the skin's surface. The fleshtone line is therefore applicable to all skin pigmentations and is the best way to ensure the skin tones of your talent look natural.
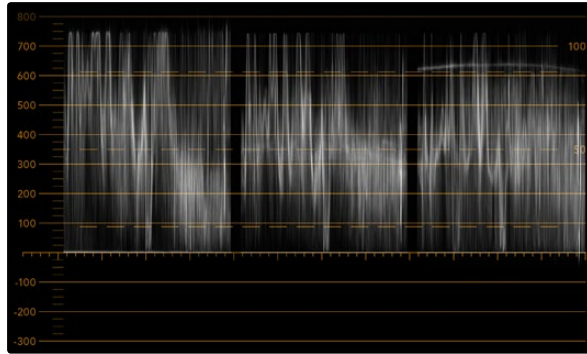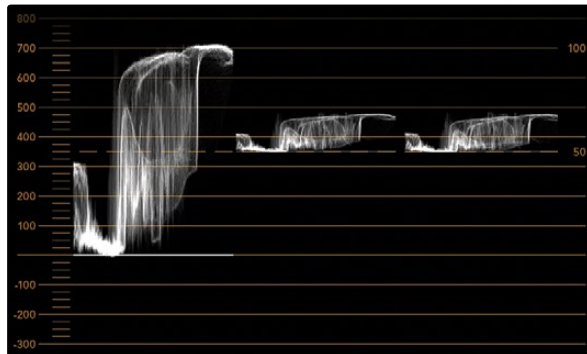
RGB Parade view.

YUV Parade view.

Select between RGB Parade and YUV Parade from the Display drop down menu.

Parade Display

RGB and YUV Parade displays are perfect for color correction, checking for illegal colors and checking levels.

When color correcting, select RGB Parade from the Display drop down menu. RGB Parade view displays the full height of the individual red, green and blue color channels. Monitoring the levels of each color channel makes color correction straightforward and it is also easy to view color balance in the blacks, mids and whites of the video signal. RGB Parade display enables you to identify details common to the red, green and blue channels, making it simple to color balance and remove unwanted color tints.

It's important when color correcting to make sure the video levels are full but not clipped. If you want to increase the video level, make sure it doesn't go above upper RGB limit or you will encounter illegal levels. Some equipment won't let you generate illegal 100% RGB levels, however other equipment will. SmartScope Duo 4K lets you see illegal levels whenever they occur.

Illegal video can also happen in the black and white levels. In some color correction systems, black levels can be lowered to below the black point of 0%. If you observe illegal black levels, just add some "lift" or gain to eliminate them but check the 100% graticule level to make sure the whole video signal has not lifted and generated illegal colors in the whites.

To check YUV levels, select YUV Parade from the Display drop down menu. This view is useful because the luma (brightness) values are separated from the chroma (color) values, which is the format of video signals for television broadcast. The left waveform shows the luma information and the second and third waveforms show the chroma information. YUV Parade view is useful for calibrating a video signal's chroma values to a color bar test pattern, so that colors are represented accurately and the signal being broadcast will be displayable by television sets.

Color correcting is a constant adjustment process to attain the best looking images without generating illegal levels!
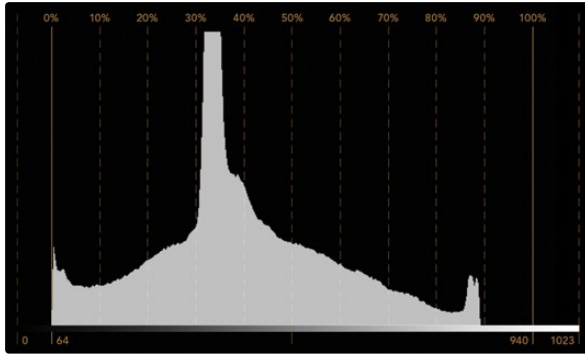
Color Correction Terminology
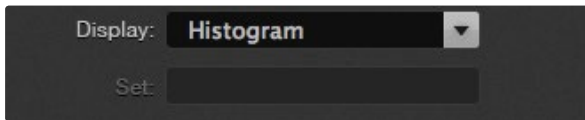
Blacks – black levels in the video signal

Mids – mid-gray levels in the video signal

Whites – white levels in the video signal

Histogram Display showing distribution of whites to blacks.

Histogram Display has no additional settings.

Histogram Display

Histogram Display is most familiar to graphic designers and camera operators. Histogram Display shows the distribution of white to black information and lets you monitor how close the detail is to being clipped off in the whites or blacks of the video. Histogram Display also lets you see the effects of gamma changes in the video.

Black video is shown on the left of the display, and whites are shown on the right. All video should usually be found between the 0% and 100% intervals of the Histogram Display. Your video is being clipped if it moves below 0% or above 100%. Video clipping can be really bad when you're on a shoot, as detail in the blacks and whites must be preserved if you subsequently want to perform color-correction in a controlled environment. When shooting, keep the video above the black clip, and below the white clip, so you can have more freedom later to adjust colors without whites and blacks appearing flat and lacking in detail.

When color-correcting, you might decide to clip your video, and in which case Histogram Display will show the effect of clipping the video, and how much it is being clipped. You can even use gamma to create a similar look, with less clipping, while retaining more detail.

You cannot really use Histogram Display to check for illegal levels although you can use it to see illegal blacks and whites. Histogram Display does not show colors and so the histogram might appear to show legal levels, even though your video may contain illegal colors. Again, RGB Parade Display provides the best way to watch out for illegal levels as it shows them in both the color and luminance elements of the video signal.
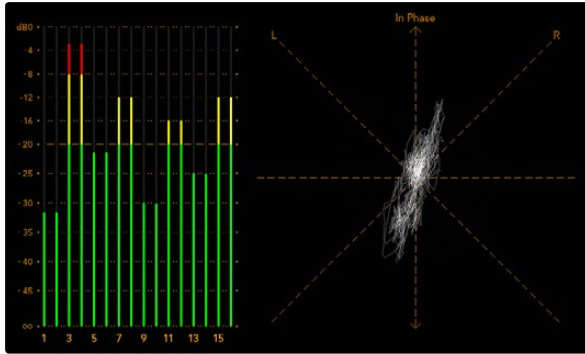
Audio Metering Display showing peak levels and audio balance.
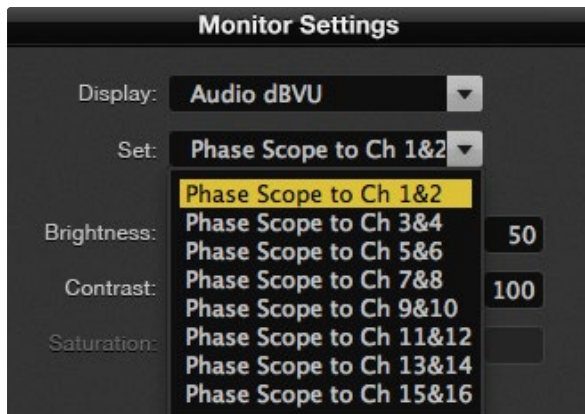
Select audio channels from the Set drop down menu.

Audio Metering Display

The Audio Metering Displays show you the audio levels in the embedded audio of the SDI video signal. Up to 16 channels of embedded audio are de-embedded and then displayed in either dBVU or dBFS format.

The VU meter shows average signal levels, is easy to use and very common on older equipment. VU is calibrated to the SMPTE recommendation of a 1 kHz tone test signal set to -20 dBFS.

dBFS is essentially a meter of the overall digital audio signal and is common on modern digital equipment.

The right hand audio scope can monitor two channels of audio, which can be selected from the Set drop down menu. e.g., CH 1 & 2, CH 3 & 4, etc. The audio scope presents audio in an X-Y view so you can see audio balance issues, out of phase conditions and whether an audio track is mono or stereo. Mono audio should appear as a single vertical "in phase" line. If the line is horizontal, then your audio is "out of phase" and could cancel out (i.e., loss of audio) when received by downstream equipment. Audio phase is one of the most common audio faults in large facilities, where cables can be incorrectly connected.

When monitoring stereo signals, the line of the right hand audio scope fans out to represent the difference between the left and right audio channels. The more stereo sound contained in the audio track, the more circular the line will appear. If the audio contains minimal stereo content, then the scope will appear more concentrated around the vertical axis.

Dialog audio tends to appear as a vertical line, whereas music with plenty of stereo content will cause the scope to puff out. This is because mono audio is L+R, and will display on the vertical axis, whereas stereo content is L-R, and will display on the horizontal axis to show the stereo difference.
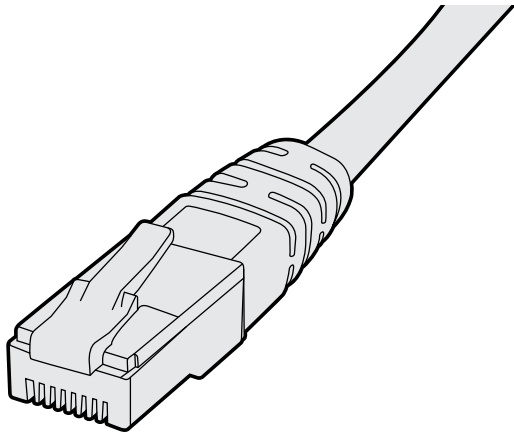
Ethernet Connector.

By connecting SmartView or SmartScope to a network, you can adjust monitor settings for multiple units remotely.

While SmartView and SmartScope monitors display video without needing any configuration, any network settings need to be configured prior to deployment. Network configuration can only be performed using a direct USB 2.0 connection to a computer.

Direct Ethernet

Remote monitor configuration can be performed via a direct Ethernet connection to your computer. No network switch is required in this configuration, which is great if you need to install and set up quickly. Additional units can be daisy-chained together using the active loop-through Ethernet OUT port on each unit. Power must be supplied to all units in the chain.

If you want to connect several units without using IP addresses from your existing studio network, or if you don't have an existing network, simply connect them directly to the Ethernet port on your computer. This is also a fast way to connect SmartView and SmartScope units via Ethernet as you don't need to run any cables back to a network switch.

Ethernet Network Switch

If you want to connect several units to your studio's network, you only need to connect one SmartView or SmartScope to the network switch and the rest can be daisy-chained to each other using the active loop-through Ethernet OUT port on each unit so only a single port on your switch is used. This way you won't have to run multiple cables back to a network switch. Power must be supplied to all units for daisy-chaining to work.

Connecting to a network switch allows any computer on the network to change a unit's settings. Any Mac or Windows laptop computer can also change settings via a WiFi connection if your network includes a wireless access point.

You will need to carry out the following steps to connect SmartView or SmartScope to a local area IP based network.

Step 1. Securely connect and switch on the power supply included with your unit.

Step 2. Connect the unit to a network switch, or directly to a computer, with a standard RJ45 Ethernet cable.

Direct Ethernet Connection Diagram

You can connect the Ethernet port of a computer directly to a unit without needing a network switch. Additional units can be daisy-chained to each other so you don't have to run multiple cables back to a network switch. Power must be supplied to all units.
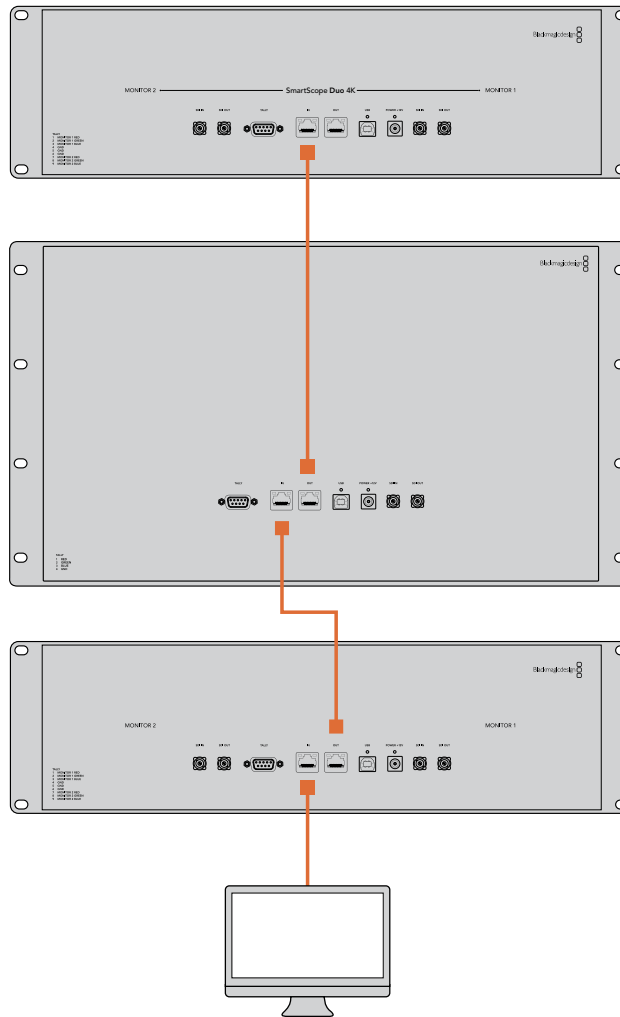
Ethernet Network Switch Connection Diagram

If you want to connect several units to your studio's existing network, you only need to connect one unit to the network switch. The rest can be daisy-chained to each other so you don't have to run multiple cables back to a network switch. Power must be supplied to all units.

Ethernet

Network Switch

Client Computers
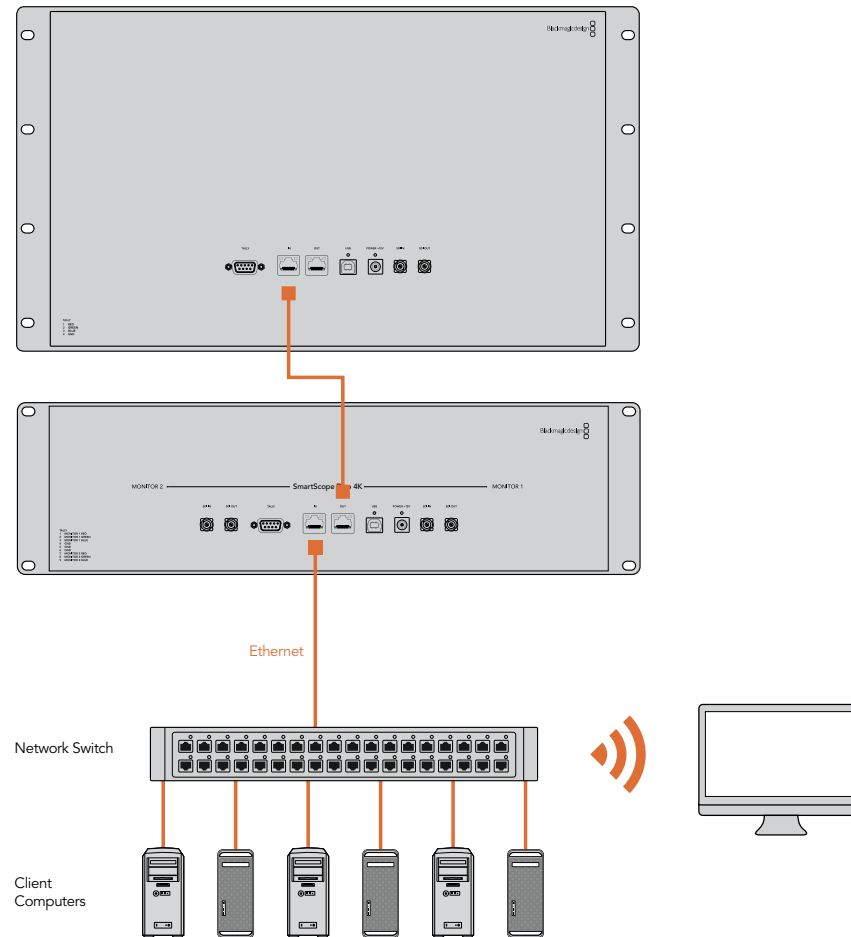
Adjusting Network Settings
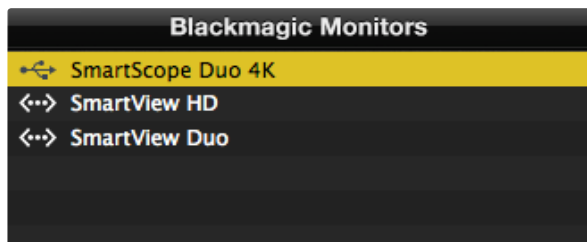
The selected SmartScope Duo 4K is connected locally via USB. The Ethernet icons next to SmartView HD and SmartView Duo units show they are connected through a network.
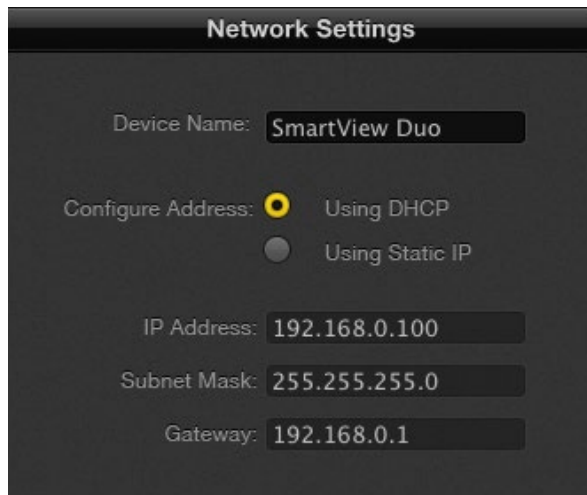
Network settings can be set to use DHCP or a Static IP address and can only be changed via USB.

Network Settings Pane

Device Name

It is a good idea to change the default device name so each SmartView or SmartScope unit is easy to identify on a network, e.g., "Field Cameras 1&2", "Multi-View Output", "2K feeds" etc.

To change the device name, select the desired SmartView or SmartScope unit from the Blackmagic Monitors pane and edit its name in the Network Settings pane. You can make changes to the device name when connected to the unit via Ethernet or USB.

If the software detects an invalid device name, the text will turn red as you are typing.

Configure Address

To make changes to the network settings, you must be connected to the unit via USB. Network settings cannot be changed via Ethernet.

By default, SmartView and SmartScope use DHCP to automatically obtain an IP address from your network.

In the absence of a DHCP server, you may wish to enable the "Internet Sharing" feature of Mac OS X, or the "Internet Connection Sharing" (ICS) feature of Windows 7 or Windows 8, to provide DHCP addresses to any directly attached units. This will avoid having to manually assign static IP addresses to each unit. You can use this feature to provide DHCP addresses even though your computer might not have an Internet connection. Internet sharing is detailed in the Mac OS X and Windows 7 Help documentation.

If DHCP cannot be used in your configuration, choose to configure the address "Using Static IP". Please ask your system administrator for a spare IP address to avoid creating an IP conflict on your network. You will need to specify a unique IP address for each SmartView and SmartScope unit as well as a common subnet mask. It is unnecessary to change the default value in the "Gateway" field unless you intend to connect your units to a network gateway such as an Internet router.

If no SmartView or SmartScope monitors are found on the network, the units might not have received IP addresses via DHCP and it will be necessary to manually configure each unit with appropriate network settings.

Step 1. Connect a SmartView or SmartScope to your computer with USB and launch the Blackmagic SmartView Utility.

Step 2. The attached unit will be automatically selected in the Blackmagic Monitors pane and will show a USB icon next to its name.

Step 3. Change all device name, network settings and monitor settings for the USB attached unit.

Step 4. Repeat these steps for any other units that have not received an IP address via DCHP.
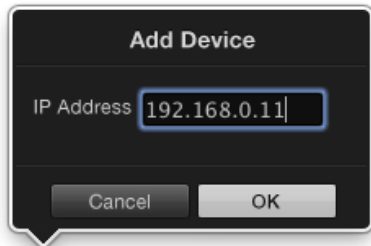
You can manually add a SmartView or SmartScope by IP address to the list of SmartView Monitors

Add Device

If you already know the IP address of a SmartView or SmartScope but it hasn't automatically appeared in the Blackmagic Monitors pane, you can add the unit manually. To do so:

Step 1.   Go to the `Device` menu and choose `Add Device` or click (+) at the bottom of the Blackmagic Monitors pane.

Step 2.   Type in the IP address of the unit and click `OK`.

Step 3.   The software will verify the presence of the unit and add it to the SmartView Monitors list.

You can use Blackmagic SmartView Utility to manually add a SmartView or SmartScope when connected via Ethernet or USB.

5 4 3 2 1

9 8 7 6
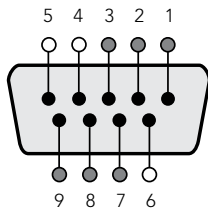
SmartView tally port

SmartView Duo and SmartScope Duo 4K Tally Pin Connections	
Pin	Function
1	Monitor 1 Red
2	Monitor 1 Green
3	Monitor 1 Blue
4	Ground
5	Ground
6	Ground
7	Monitor 2 Red
8	Monitor 2 Green
9	Monitor 2 Blue

SmartView HD Tally Pin Connections	
Pin	Function
1	Red
2	Green
3	Blue
4	Ground

Tally Port Pin Connections

It is not necessary to connect the tally port of SmartView or SmartScope and you can skip this section if you do not intend to use the tally feature.

Each SmartView Duo and SmartScope Duo 4K screen features independent tally borders in red, green or blue which can be used to indicate the status of a video signal such as on-air, preview or recording.

SmartView HD can also display a red, green or blue tally border.

The 9-pin D-sub tally port accepts contact closure signals from switchers and automation systems. Please refer to the accompanying tally pin connections diagram for information about wiring the tally port for use with your switcher or automation system.

The 9-pin D port wiring description is printed on the rear of the unit showing contact closures to display red, green or blue tally borders on each independent monitor.
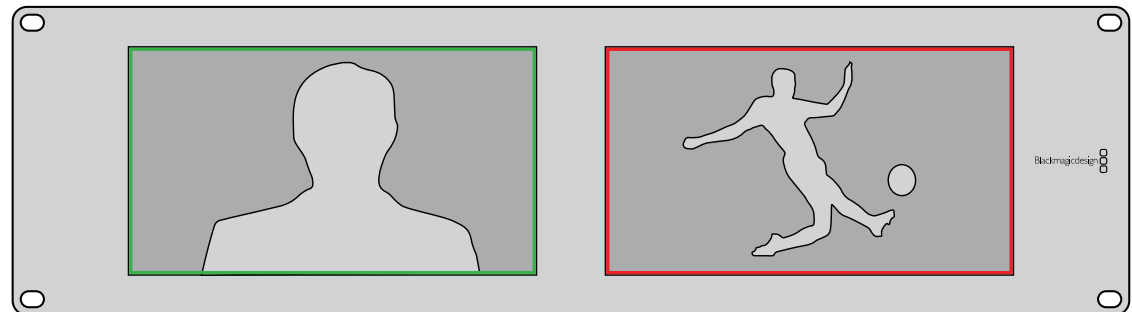
SmartView Duo showing green and red tally borders.

Optimizing the Viewing Angle

You may wish to perform a test inversion, to check the optimum viewing angle, before bolting your unit high up in a rack.
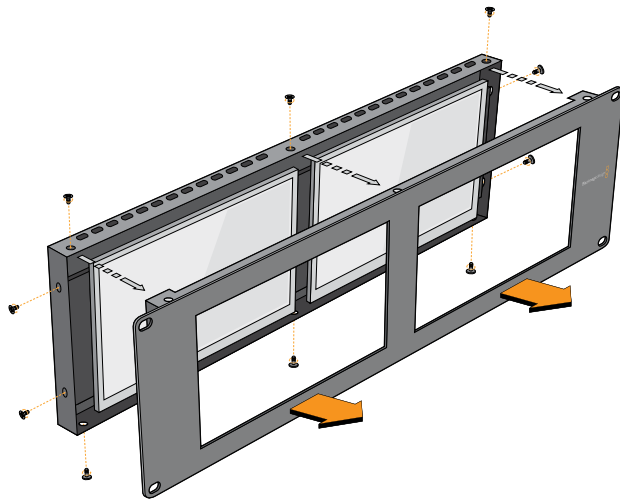
Remove all the screws to lift the front faceplate away from the rear assembly.

If SmartView or SmartScope is to be installed high up in an equipment rack, you may wish to physically invert the LCDs for the optimum viewing angle. The images on the LCDs will automatically flip to the correct orientation when they sense an inversion. A number 02 size Pozidriv screwdriver is required to disconnect and reconnect the faceplate from its rear assembly. This is a simple procedure and does not involve opening the rear assembly.

The following procedure describes how to invert the unit while keeping the Blackmagic Design logo in the correct orientation on the faceplate. A number 02 size Pozidriv screwdriver is required.

Step 1. Remove the screws from the top, bottom, left and right sides of the faceplate. SmartView Duo and SmartScope Duo 4K have 10 screws and SmartView HD has 18 screws.

Step 2. Lift the front faceplate away from the rear assembly as illustrated.

Step 3. Invert the rear assembly.

Step 4. Reinstate the faceplate on the inverted rear assembly.

Step 5. Reinstate the screws in the chassis.

Your SmartView or SmartScope is now ready to be installed high up in a rack. Once bolted into a rack, SmartView will continue to display the optimum viewing angle even if bumped, as there are no external knobs or adjustments to mishandle or to come loose.

Getting Help

There Are Four Steps To Getting Help.

Step 1.   Check out the Blackmagic Design web site www.blackmagicdesign.com and click on the "Support" page for the latest support information.

Step 2.   Call your dealer.

Your dealer will have the latest technical updates from Blackmagic Design and should be able to give you immediate assistance. We also recommend you check out the support options your dealer offers as they can arrange various support plans based on your workflow requirements.

Step 3.   The next option is to email us with your questions using the web form at

www.blackmagicdesign.com/support

Step 4.   Phone a Blackmagic Design support office. Check our web site for current support phone numbers in your area. www.blackmagicdesign.com/company.

Please provide us with as much information as possible regarding your technical problem and system specifications so that we may try to respond to your problem as quickly as possible.

Developing Custom Software Using Blackmagic Design Hardware

The Blackmagic SmartView Ethernet Protocol allows developers to remotely control Blackmagic SmartView and SmartScope hardware with their own custom software. The Blackmagic SmartView Ethernet Protocol is a text-based status and control protocol.

Downloading the Free SmartView Ethernet Protocol

The Blackmagic SmartView Ethernet Protocol is free. It is included in this SmartView & SmartScope manual and can be downloaded from http://www.blackmagicdesign.com/support/

Joining the Blackmagic Design Developer List

The Blackmagic Developer mailing list is designed for technical questions regarding technologies used by Blackmagic Design, e.g., QuickTime, Core Media, DirectShow, codecs, APIs, SDKs, etc. The free mailing list is a forum where developers can discuss ideas and problems with other developers. Any subscriber may reply and the Blackmagic Design engineers may also respond when appropriate. You can subscribe to the mailing list at: http://lists.blackmagicdesign.com/mailman/listinfo/bmd-developer

In some cases, we might request a brief outline of the software you are developing if it is not immediately obvious from your domain name that your organization develops video software. Please don't take offence as we're simply trying to keep the list free of spam and viruses as well as end-user customers asking non-development questions, employment agents or sales people trying to promote products on the list. The list is just for developers.

Contacting Blackmagic Design Developer Assistance

You can also contact us via developer@blackmagicdesign.com if you have any developer related questions or wish to ask questions off the list.

Blackmagic 2K Format – Overview

The latest Blackmagic Design products use the new 3G-SDI video, which allows twice the data rate of traditional HD-SDI video. We thought it would be a really nice idea to add 2K film support, via this new 3G-SDI technology, so we could simplify feature film workflows. With the popularity of Blackmagic Design editing systems worldwide, now thousands of people can benefit from a feature film workflow revolution.

This information includes everything product developers need to know for building native 2K SDI equipment. Of course, all Blackmagic products can be updated, so if the television industry adopts an alternative SDI-based film standard, we can add support for that too!

Frame Structure
- Transmitted at 23.98, 24 or 25 frames per second as a Progressive Segmented Frame.
- Active video is 2048 pixels wide by 1556 lines deep.
- Total lines per frame : 1650
- Active words per line are 1535. One word consists of a 10-bit sample for each of the four data streams, i.e., a total of 40 bits. See the diagram named Blackmagic 2K Format - Data Stream Format.
- Total active lines : 1556
- Total words per line : 1875 for 23.98/24Hz and 1800 for 25Hz.
- Fields per frame : 2, 825 lines each
- Active lines located on lines 16-793 (field 1) and 841-1618 (field 2).

Transport Structure
- Based on SMPTE 372M Dual Link mapping and SMPTE 425M-B support for mapping SMPTE 372M into a single 3 Gb/s link.
- Timing reference signals, line number and line CRC insertion is the same as above.
- Optional ancillary data is inserted into both virtual interfaces.
- At present, only audio data is included: as per standard HD audio insertion (SMPTE S299M) the audio data packets are carried on data stream two and audio control packets are carried on data stream one.
- During active video, 10-bit Red, Green and Blue data is sent in the following sequence:

  Data stream 1:   Green_1, Green_2, Green_3, Green_5...Green_2047

  Data stream 2:   Blue_1, Blue_2, Green_4, Blue_5...Green_2048.

  Data stream 3:   Red_1, Blue_3, Blue_4, Red_5...Blue_2048.

  Data stream 4:   Red_2, Red_3, Red_4, Red_6...Red_2048.

Developer Information

Blackmagic 2K Format – Vertical Timing Reference

This diagram shows the vertical timing details with line numbers and Field,
Vertical and Horizontal bits for the Timing Reference Signal codes.

	FIELD 1					ACTIVE					
F	1	0	0	0	0	0	0	0	0	0	0
V	1	1	1	1	1	0	0	0	0	1	1
LINE #	1650	1	2	…	14	15	16	…	792	793	…	825

	FIELD 2					ACTIVE					
F	0	1	1	1	1	1	1	1	1	1	1
V	1	1	1	1	1	0	0	0	0	1	1
LINE #	825	826	827	…	839	840	841	…	1617	1618	…	1650

Blackmagic 2K Format – Data Stream Format

This diagram shows the data stream formats around the optional ancillary data section of the horizontal line. Note that each active pixel takes up three samples.

							EAV(3FFh)	EAV(000h)	EAV(000h)	EAV(XYZh)	LN0	LN1	CRC0	CRC1				SAV(3FFh)	SAV(000h)	SAV(000h)	SAV(XYZh)				
DATA STREAM 1	G2041	G2042	G2043	G2045	G2046	G2047	EAV(3FFh)	EAV(000h)	EAV(000h)	EAV(XYZh)	LN0	LN1	CRC0	CRC1	ANC/AUDIO DATA			SAV(3FFh)	SAV(000h)	SAV(000h)	SAV(XYZh)	G1	G2	G3	G5
DATA STREAM 2	B2041	B2042	G2044	B2045	B2046	G2048	EAV(3FFh)	EAV(000h)	EAV(000h)	EAV(XYZh)	LN0	LN1	CRC0	CRC1	ANC/AUDIO DATA			SAV(3FFh)	SAV(000h)	SAV(000h)	SAV(XYZh)	B1	B2	G4	B5
DATA STREAM 3	R2041	B2043	B2044	R2045	B2047	B2048	EAV(3FFh)	EAV(000h)	EAV(000h)	EAV(XYZh)	LN0	LN1	CRC0	CRC1	040	...	040	SAV(3FFh)	SAV(000h)	SAV(000h)	SAV(XYZh)	R1	B3	B4	R5
DATA STREAM 4	R2042	R2043	R2044	R2046	R2047	R2048	EAV(3FFh)	EAV(000h)	EAV(000h)	EAV(XYZh)	LN0	LN1	CRC0	CRC1	200	...	200	SAV(3FFh)	SAV(000h)	SAV(000h)	SAV(XYZh)	R2	R3	R4	R6
WORD# 23.98/24 PsF	1870	1871	1872	1873	1874	1875	1	2	3	4	5	6	7	8	9	...	335	336	337	338	339	340	341	342	343
WORD# 25 PsF	1795	1796	1797	1798	1799	1800	1	2	3	4	5	6	7	8	9	...	260	261	262	263	264	265	266	267	268

Developer Information

Legend

↵   carriage return

...   and so on

Version 1.3 of the Blackmagic SmartView Ethernet Protocol
was released with SmartView 1.3 software.

Blackmagic SmartView Ethernet Protocol v1.3

Summary

The Blackmagic SmartView Ethernet Protocol is a text-based status and control protocol, very similar in structure to the Videohub protocol, that is accessed by connecting to TCP port 9992 on a SmartView or SmartScope device.

Upon connection, the SmartView or SmartScope device sends a complete dump of the state of the device. After the initial dump, state changes are sent asynchronously.

The device sends information in blocks which have an identifying header, followed by a colon. A block can span multiple lines and is terminated by a blank line.

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

Protocol Preamble

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

```
PROTOCOL PREAMBLE:↵
Version: 1.3 ↵
↵
```

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 SmartView or SmartScope device.

```
SMARTVIEW DEVICE:↵
Model: SmartView Duo↵
Hostname: stagefront.studio.example.com↵
Name: StageFront↵
Monitors: 2↵
Inverted: false↵
↵
```

This example shows the output for a SmartView Duo device, which has two LCDs. The INVERTED flag indicates whether the device has detected that it has been mounted in an inverted configuration to optimize LCD viewing angle.

Network Configuration

The next block shows the TCP/IP networking configuration:

```
NETWORK:↵
Dynamic IP: true↵
Static address: 192.168.2.2↵
Static netmask: 255.255.255.0↵
Static gateway: 192.168.2.1↵
Current address: 192.168.1.101↵
Current netmask: 255.255.255.0↵
Current gateway: 192.168.1.1↵
↵
```

The network settings prefixed with CURRENT show the active TCP/IP settings, and are read-only. The CURRENT settings reflect either the DHCP or Static configuration, depending on the DYNAMIC IP flag.

Changing Networking Settings

The network can be configured to use either DHCP or a static configuration. To enable DHCP:

```
NETWORK:↵
Dynamic IP: true↵
↵
```

To set a fixed IP address, supply all static parameters, thus:

```
NETWORK:↵
Dynamic IP: false↵
Static address: 192.168.2.2↵
Static netmask: 255.255.255.0↵
Static gateway: 192.168.2.1↵
↵
```

The parameters with the CURRENT prefix are read-only, and show the active configuration, regardless of the static or dynamic setting.

Changing the device name, or any network settings, will cause the IP connection to be dropped. The device will restart its networking and advertise its new name on the network.

Changing Monitor Settings

The display settings for each monitor are specified individually. One or more parameters can be modified at the same time and multiple settings can be supplied in one block.

The valid range for numeric values is 0-255. The CONTRAST and SATURATION properties are zero-centered, so the normal value is 127, such that the displayed picture is the same as the original. A value greater than 127 in either channel will cause the contrast or saturation to be increased, and similarly a value less than 127 will cause a decrease.

For example, to set the brightness to 50% and desaturate the image to Black & White:

```
MONITOR A:↵
Brightness: 127↵
Saturation: 0↵
↵
```

Displaying SD in 16:9

The following command sets standard definition video to display in 16:9:

```
MONITOR A:↵
WidescreenSD: ON↵
```

Displaying SD in 4:3

The following command sets standard definition video to display in 4:3:

```
MONITOR A:↵
WidescreenSD: OFF↵
```

Identification and Tally Settings

The Identify flag is transient, and will cause a white border to be displayed around the entire picture for a duration of 15 seconds, after which it will be reset. This feature is primarily aimed at identifying which monitor is currently being configured when it is mounted in a rack comprising multiple units. To turn on:

```
MONITOR A:↵
Identify: true↵
↵
```

The IDENTIFY border will temporarily override any other border setting in effect.

The BORDER property can be used to programmatically set the soft Tally colored borders to one of the primary colors: RED, GREEN, BLUE, WHITE or NONE. This setting can be overridden by the electrical Tally signals at the DB-9 input on the device itself. For example, to set the soft Tally to green:

```
MONITOR B:↵
Border: green↵
↵
```

The hard wired tally will always override the soft tally. The full state report will always show the current valid border.

SmartScope Settings

On SmartScope Duo 4K, each monitor can be set to display a different scope. The values for activating specific scopes are mapped as follows:

AudioDbfs
AudioDbvu
Histogram
ParadeRGB
ParadeYUV
Picture (This is the same as Video Monitor)
Vector100
Vector75
WaveformLuma

```
MONITOR A:↵
ScopeMode: Picture↵
↵
```

In the example above, Monitor A has been set as a video monitor.

Displaying SD in 16:9

To set Video Monitor mode to display standard definition video in 16:9:

```
MONITOR A:↵
ScopeMode: Picture↵
WidescreenSD: ON↵
```

Displaying SD in 4:3

To set Video Monitor mode to display standard definition video in 4:3:

```
MONITOR A:↵
ScopeMode: Picture↵
WidescreenSD: OFF↵
```

When setting one of SmartScope Duo 4K's monitors to audio metering, you can also select which channels to show. The values for selecting which audio channels are mapped in the following way:

0: Channels 1 and 2
1: Channels 3 and 4
2: Channels 5 and 6
3: Channels 7 and 8
4: Channels 9 and 10
5: Channels 11 and 12
6: Channels 13 and 14
7: Channels 15 and 16

```
MONITOR B:↵
ScopeMode: AudioDbvu↵
AudioChannel: 0↵
↵
```

In the example above, Monitor B has been selected to display Audio Metering in Dbvu with audio channels 1 and 2 selected for the phase meter.

12 Month Limited Warranty

Blackmagic Design warrants that this product 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 changes, 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.