

Installation and Operation Manual

UltraScope

Blackmagicdesign 



Mac OS X™

Windows™

October 2014



Welcome to Blackmagic UltraScope!

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.

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 Blackmagic UltraScope, you get 6 wonderful scopes that let you see all aspects of your video signals while you edit, color correct and perform quality control checks on your broadcast masters!

Now with new Pocket UltraScope you get the incredible features of UltraScope with a USB 3.0 connection so you can take it anywhere, making it perfect for location shoots! Pocket UltraScope is incredibly easy and fast to install, simply connect the USB 3.0 cable into your compatible computer and an SDI cable to your deck or camera and away you go!

This instruction manual should contain all the information you'll need for installing your Blackmagic UltraScope, although it's always a good idea to ask a technical assistant for help if you have not installed hardware cards into computers before. We think it should take you approximately 10 minutes to complete installation. As Blackmagic UltraScope uses your computer's 3D acceleration, you will need a compatible graphics card. More information on compatible graphics and computer systems can be found at www.blackmagicdesign.com/support/

Before you install UltraScope, please check our website at www.blackmagicdesign.com and click the support page to download the latest updates to this manual and the UltraScope software. Lastly, please register your UltraScope when downloading software updates. We would love to keep you updated on new software updates and new features for your UltraScope.

We are constantly working on new features and improvements, so we would love to hear from you!

Grant Petty
CEO Blackmagic Design

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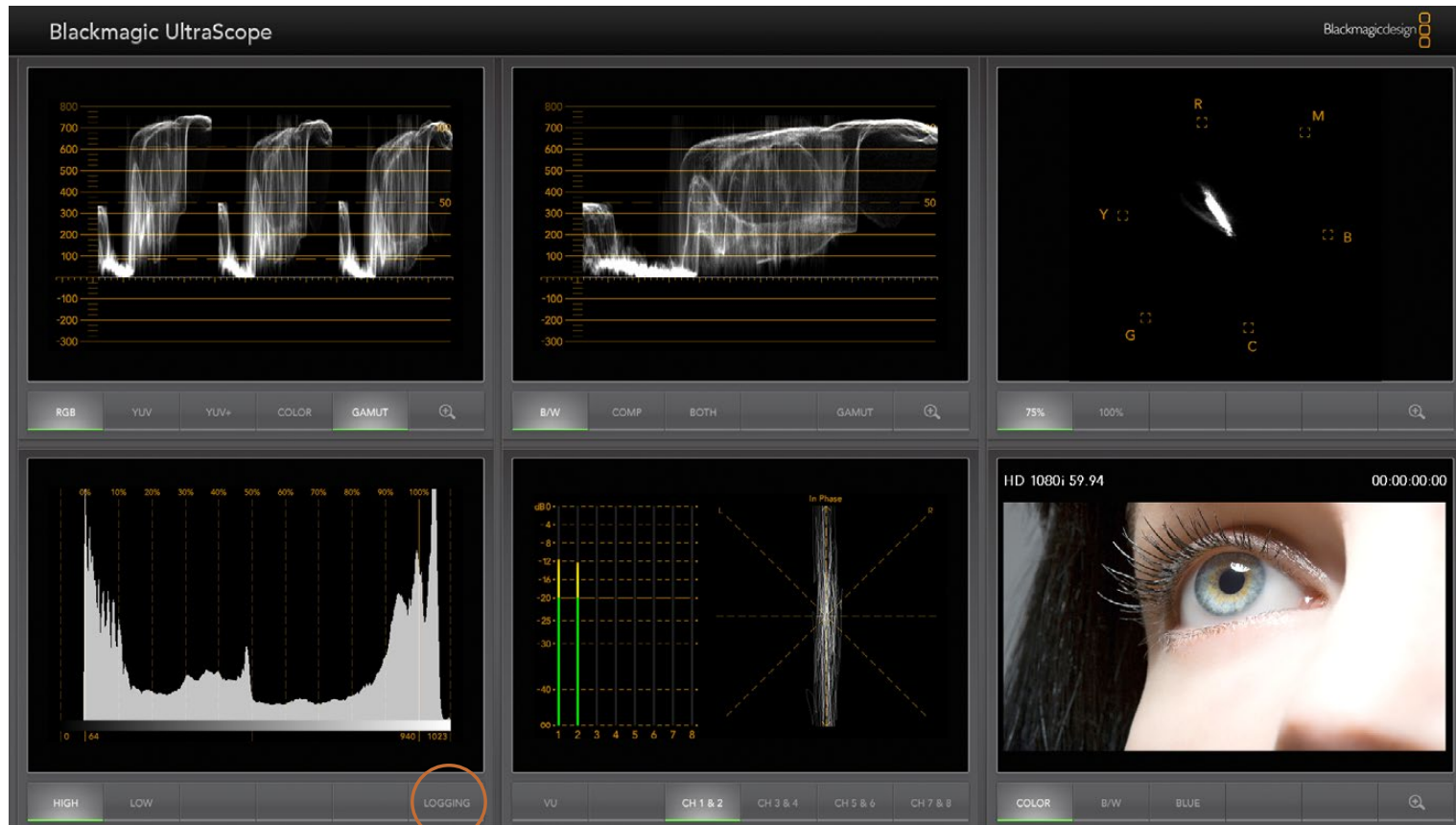
4 Welcome

Blackmagic UltraScope Interface

1. Parade Display

2. Waveform Display

3. Vectorscope Display



4. Histogram Display

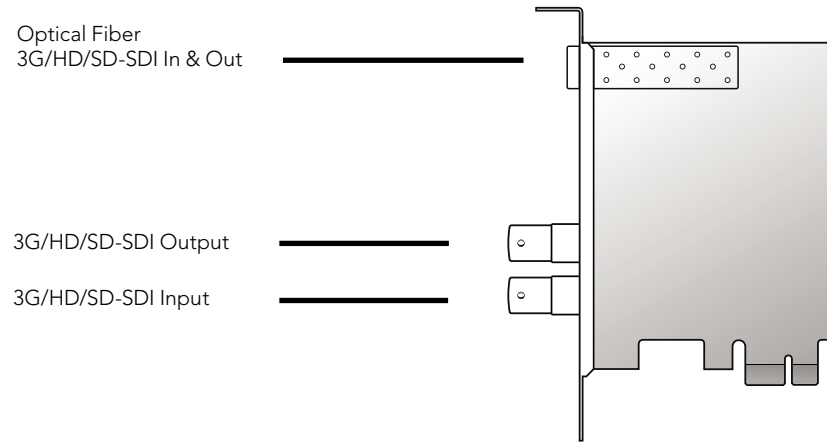
6. Audio Metering Display

7. Picture Display

5. Error Logging

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Blackmagic UltraScope



Pocket UltraScope



6 Getting Started

Installation Requirements for Windows

The Blackmagic UltraScope software interface requires a computer display with a minimum resolution of 1280 x 800 pixels to view two scopes simultaneously. Blackmagic Design recommends viewing all 6 scopes simultaneously by using a computer display resolution of 1920 x 1200 or 1920 x 1080 pixels.

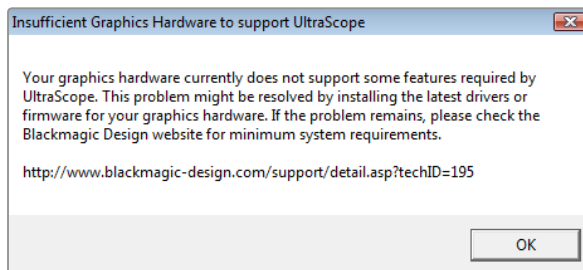
Blackmagic UltraScope includes the UltraScope hardware and a software package which consists of the Blackmagic UltraScope application and driver. It does not matter in which order the hardware and software are installed.

Pocket UltraScope hardware connects via USB 3.0. Older computers only have USB 2.0 ports and it is essential that Pocket UltraScope directly connects to a dedicated USB 3.0 port.

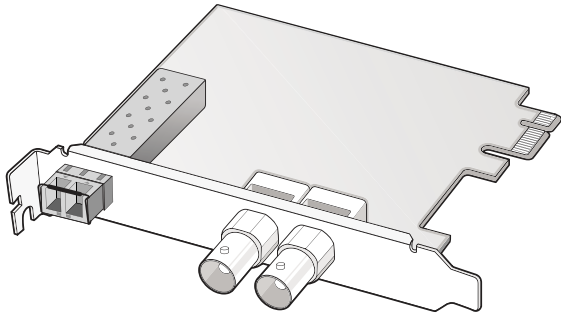
Blackmagic UltraScope hardware is a x1 lane PCI Express card and should work in any x1, x4, x8 or x16 lane PCI Express slot. Blackmagic UltraScope works in PCI Express and PCI Express 2.0 slots.

A x16 lane PCI Express 2.0 slot is required for the graphics card in your computer. The latest list of compatible graphics cards can be found in the support pages at www.blackmagicdesign.com. Full frame-rate HD monitoring of all 6 scopes requires either an Nvidia GeForce 9800 GT or faster, or an ATI Radeon 4670 or faster graphics card. Suitable graphics cards can be purchased for less than US\$100. More expensive graphics cards are no guarantee of compatibility. It is essential to check the list of compatible graphics cards before buying a graphics card for use with Blackmagic UltraScope. If you launch the Blackmagic UltraScope application with an incompatible graphics card installed, you may encounter an error message similar to that pictured on this page. The solution is to replace the graphics card with a compatible graphics card.

Please see the support pages at www.blackmagicdesign.com for a comprehensive list of the latest, minimum system requirements for Mac OS X and Windows.



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Blackmagic UltraScope PCI Express card

Installing the UltraScope card in your Windows PC

Blackmagic UltraScope installs into your computer in just the same way as any regular PCI Express card. However the fiber optic module must be temporarily removed from the card before attempting to install the card in a PCI Express slot. This is because the location of the protruding fiber optic module makes it awkward to install the card in the PCI ports of many computer cases. Temporarily removing the fiber optic module overcomes this obstacle to installation.

Remove the power plug from the back of your computer. This is a safety precaution before opening your computer. Ensure that you are statically discharged by using an antistatic strap.

Remove the side cover of your computer to gain access to the PCIe slots.

Remove the metal port access cover and screw from the back of your computer.

Remove your UltraScope PCIe card from the protective static bag making sure you don't touch the gold connectors on the base of the card. These precautions should be taken when handling any PCI card.

Step 1. Remove the protective cap from the LC connector port of the fiber optic module. Don't throw it away as the protective cap will be needed to prevent dust if the LC connector port is exposed when no fiber optic cables are connected.

Pull the wire tab outward to an angle of 90° to release the SFP module latch.

Step 2. Grip the main portion of the SFP module, between your thumb and forefinger, and pull it from the SFP module port. Do not pull the wire tab as it might break and prevent the SFP module from being removed.

Step 3. Install Blackmagic UltraScope in a suitable PCI Express slot in your computer, ensure that it clicks firmly into place and secure the card with a screw.

Step 4. Replace the SFP module and push the wire tab back to its original position. If you are not ready to connect fiber optic cables to the LC connector port, replace the protective cap.

The procedure for installing a graphics card is similar to the above.

Now replace the side cover of your computer. Reconnect the power and start up the computer.

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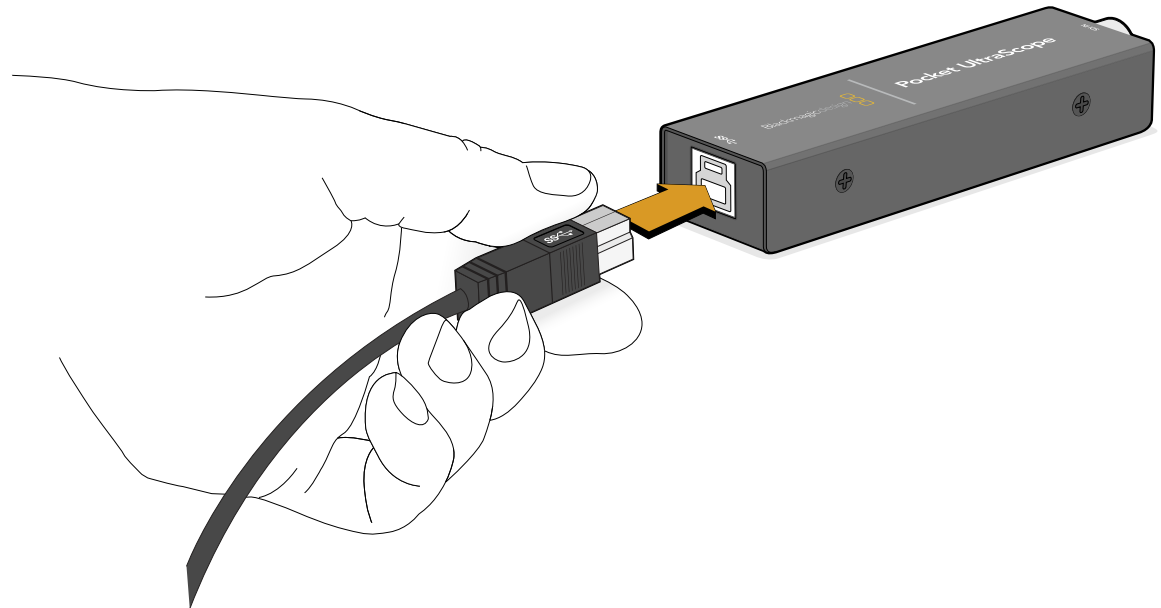
Connecting Pocket UltraScope to your Windows PC

Before using Pocket UltraScope, it's a good idea to run the latest USB 3.0 drivers and firmware for your USB 3.0 equipped motherboard. These updates can be found on the websites of motherboard and computer manufacturers as well as via third party driver websites.

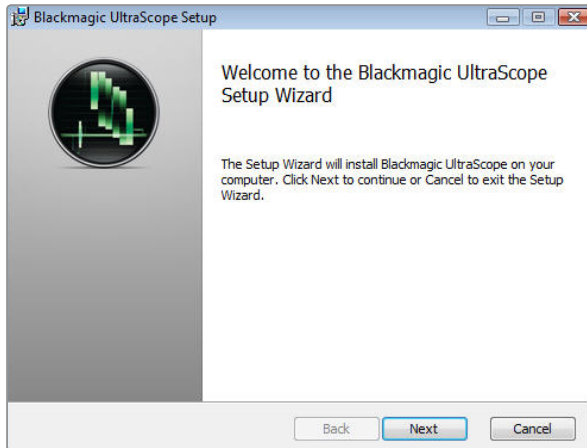
Step 1: Use the included SuperSpeed USB 3.0 cable to connect Pocket UltraScope directly to a dedicated USB 3.0 port on your compatible computer.

Step 2: If Pocket UltraScope software has previously been installed and offers to update the firmware, click **Update** to run the update. When the firmware update is finished, follow the onscreen prompt to restart the computer.

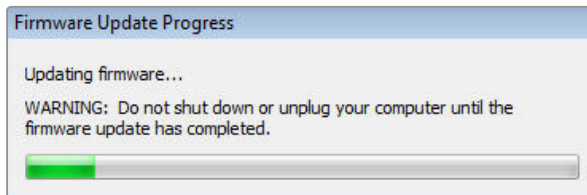
Pocket UltraScope is now ready for use. You can connect an SDI cable to Pocket UltraScope at any time. The connection diagrams toward the end of this manual show how to connect Pocket UltraScope to various kinds of video equipment.



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UltraScope Setup Wizard.



Installing the Software for Windows

Contents

The Blackmagic UltraScope software installer will install the following components for you:

- Blackmagic UltraScope drivers
- Blackmagic UltraScope application

Blackmagic UltraScope Software

- Step 1.** The CD supplied with Blackmagic UltraScope contains the UltraScope software. Before you install, ensure you have the very latest driver. Visit www.blackmagicdesign.com/support
- Step 2.** Open the "Blackmagic UltraScope Installer" folder and run the "Blackmagic UltraScope Installer" application.
- Step 3.** Near the end of the software installation process, the software will check the UltraScope hardware to see what firmware the card contains. If the firmware version does not match the software version, UltraScope will offer to update the firmware. This is automatic and all you need to do is click Update to start the update. After the firmware has updated, click the Finish button to exit the setup wizard.
- Step 4.** Finally, click Yes to restart your computer and to enable the new software driver.

Installation Requirements for Mac OS X

The Blackmagic UltraScope products include the Blackmagic UltraScope hardware card, the Pocket UltraScope, and a software package which consists of the Blackmagic UltraScope utility and driver. It does not matter in which order the hardware and software are installed.

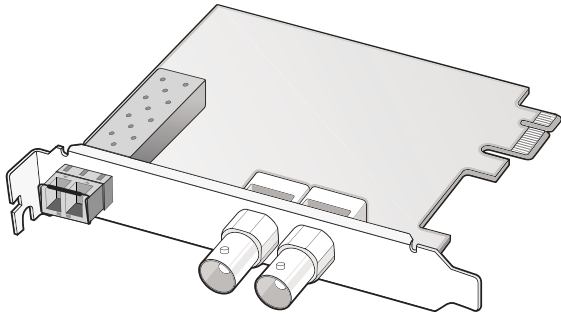
Blackmagic Pocket UltraScope connects to your Mac via USB 3.0. The Blackmagic UltraScope hardware is a x1 lane PCI Express card and should work in any PCI Express slot in a Mac Pro. Both hardware products are supplied with the UltraScope software utility and driver.

A x16 lane PCI Express 2.0 slot is required for the graphics card in your computer. The latest list of compatible graphics cards can be found in the support pages at www.blackmagicdesign.com. Full frame-rate HD monitoring of all 6 scopes requires an EVGA GeForce GTX 285 or faster graphics card. This card can be purchased for around US\$450. More expensive graphics cards are no guarantee of compatibility. It is essential to check the list of compatible graphics cards before buying a graphics card for use with Blackmagic UltraScope. The standard graphics card included with a Mac Pro will need to be replaced with a known compatible card to support all 6 scopes.

The Blackmagic UltraScope software interface requires a computer display with a minimum resolution of 1280 x 800 pixels to view two scopes simultaneously. Blackmagic Design recommends viewing all 6 scopes simultaneously by using a computer display resolution of 1920 x 1200 or 1920 x 1080 pixels. Refer to page 13 to see how to change your display resolution. If your Mac cannot display 1920x1200 pixels, UltraScope can be displayed using "2-up" view.

Please visit the Blackmagic Design support center at www.blackmagicdesign.com/support for a comprehensive list of the latest minimum system requirements for Mac OS X and Windows.

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Blackmagic UltraScope PCI Express card

Installing the UltraScope card in your Mac Pro

Blackmagic UltraScope installs in to your computer in just the same way as any regular PCI Express card. However the fiber optic module must be temporarily removed from the card before attempting to install the card in a PCI Express slot. This is because the location of the protruding fiber optic module makes it awkward to install the card in the PCI ports of many computer cases. Temporarily removing the fiber optic module overcomes this obstacle to installation. The fiber optic module is a standard SFP transceiver module which includes an LC connector port for attaching fiber optic cables. While other kinds of optical connectors exist, the SMPTE standard for Optical Fiber SDI specifies that LC type optical fiber connectors be used and this makes it easy for all compliant optical equipment to connect together.

Remove the power plug from the back of your computer. This is a safety precaution before opening your computer. Ensure that you are statically discharged by using an antistatic strap.

Remove the side cover of your computer to gain access to the PCIe slots.

Remove the metal port access cover and screw from the back of your computer.

Remove your UltraScope PCIe card from the protective static bag making sure you don't touch the gold connectors on the base of the card. These precautions should be taken when handling any PCI card.

Step 1. Remove the protective cap from the LC connector port of the fiber optic module. Don't throw it away as the protective cap will be needed to prevent dust if the LC connector port is exposed when no fiber optic cables are connected.

Pull the wire tab outward to an angle of 90° to release the SFP module latch.

Step 2. Grip the main portion of the SFP module, between your thumb and forefinger, and pull it from the SFP module port. Do not pull the wire tab as it might break and prevent the SFP module from being removed.

Step 3. Install Blackmagic UltraScope in a suitable PCI Express slot in your computer, ensure that it clicks firmly into place and secure the card with a screw.

Step 4. Replace the SFP module and push the wire tab back to its original position.

If you are not ready to connect fiber optic cables to the LC connector port, replace the protective cap.

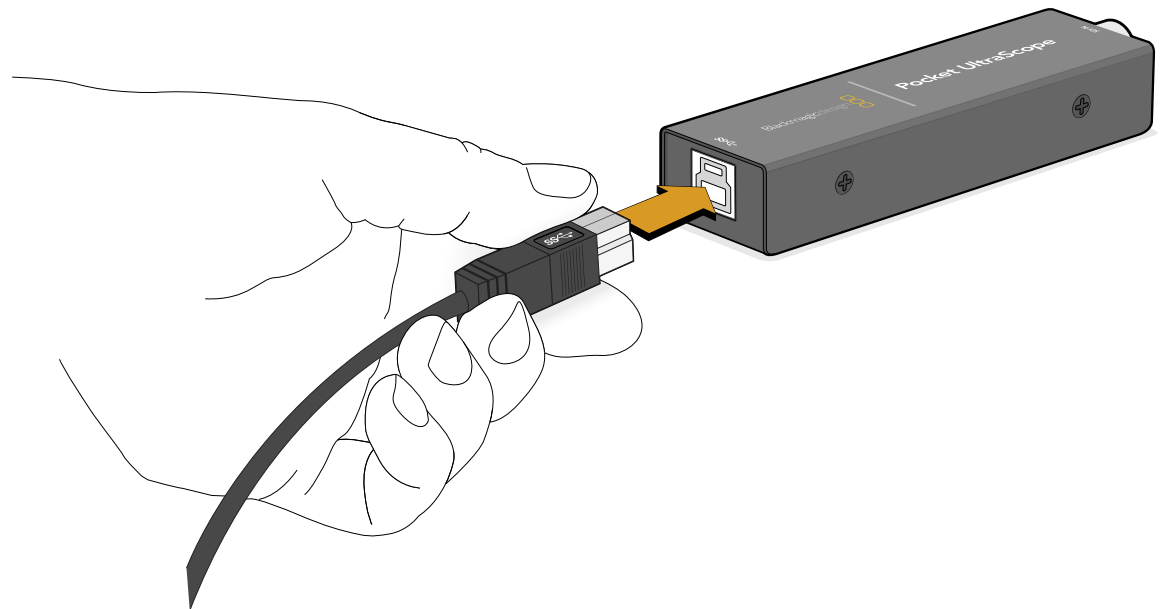
The procedure for installing a graphics card is similar to the above.

Now replace the side cover of your computer. Reconnect the power and start up the computer.

Connecting Pocket UltraScope to your Mac

- Step 1:** Use the included SuperSpeed USB 3.0 cable to connect Pocket UltraScope directly to a dedicated USB 3.0 port on your compatible computer.
- Step 2:** If Pocket UltraScope software has previously been installed and offers to update the firmware, click Update to run the update. When the firmware update is finished, follow the onscreen prompt to restart the computer.

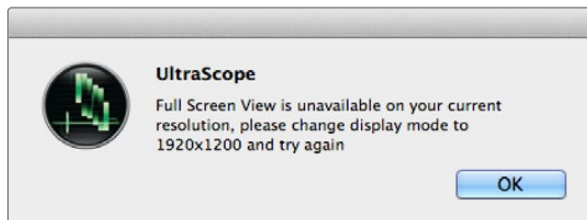
Pocket UltraScope is now ready for use. You can connect an SDI cable to Pocket UltraScope at any time. The connection diagrams toward the end of this manual show how to connect Pocket UltraScope to various kinds of video equipment.



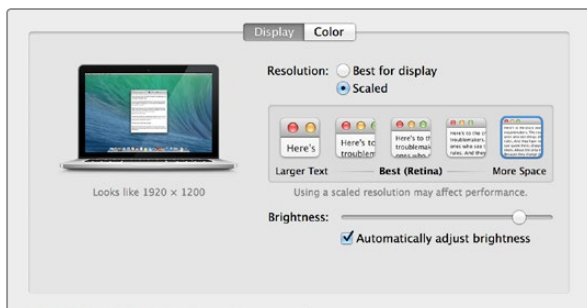
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Mac OS X installation: Follow install prompts.



If you receive the above message, follow the steps at the bottom right of this page to change your display resolution.



In your display settings, choose "Scaled" from the resolution options and then select "More Space".

Installing the Software for Mac OS X

Contents

The Blackmagic UltraScope software installer will install the following components for you:

- Blackmagic UltraScope drivers
- Blackmagic UltraScope application

Blackmagic UltraScope Software

- Step 1.** The CD supplied with Blackmagic UltraScope contains the UltraScope software. Before you install, ensure you have the very latest driver. Visit www.blackmagicdesign.com/support
- Step 2.** Open the "Blackmagic UltraScope Installer" folder and launch the "Blackmagic UltraScope Installer" application.
- Step 3.** Click Continue, Agree and Install buttons and the software will be installed on your system.
- Step 4.** Now restart your machine to enable the new software drivers.

Automatic Firmware Updating

After your computer has restarted, the software will check the UltraScope hardware to see what firmware the card contains. If the firmware version does not match the software version, UltraScope will offer to update the firmware. This is automatic and all you need to do is click **Update** to start the update. After the firmware has updated, restart your Mac to complete the process.

Setting the Display Resolution for Mac OS X

When launching the UltraScope software and your screen resolution is less than 1920x1200 pixels, the '2-up' view will appear with the following message: "Full Screen View is unavailable on your current resolution, please change the display mode to 1920x1200 and try again."

You can click OK to stay with '2-up' view, or you can increase your display resolution if your Mac is compatible with larger displays.

To change your screen resolution:

- Step 1.** From Mac OS X, select System Preferences, then select Displays.
- Step 2.** Choose "Scaled" from the resolution options and then select the "More Space" setting.
- Step 3.** Quit System Preferences and restart the UltraScope software.
- Step 4.** From within UltraScope, select View>Full Screen to enter the full screen view and display six scopes simultaneously.

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Blackmagic UltraScope

The Blackmagic UltraScope card features:

- 1x SDI input, with BNC connector
- 1x SDI loopthrough output, with BNC connector
- 1x Optical Fiber SDI input, with LC optical fiber connector
- 1x Optical Fiber SDI loopthrough output, with LC optical fiber connector

The choice of input can be selected in the Picture Display of the Blackmagic UltraScope software.

Any signal received by an UltraScope input is looped through to both outputs which means that UltraScope can be used for inline waveform monitoring. Any adjustments made to the video source can immediately be seen with Blackmagic UltraScope and looped through to a destination such as a video router, deck or monitor.

Pocket UltraScope

Pocket UltraScope features:

- 1x SDI input, with BNC connector
- 1x USB 3.0 port

Any adjustments made to the video source can immediately be seen with Blackmagic UltraScope.

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Full Screen view



2-Up view

Understanding Blackmagic UltraScope Views

Blackmagic UltraScope has two different views available depending on your workflow needs and screen resolution. You have the choice of viewing six displays in “Full Screen” view, or for more compact viewing, choose any 2 displays in “2-up” view.

The display view can be selected from the **View** menu.

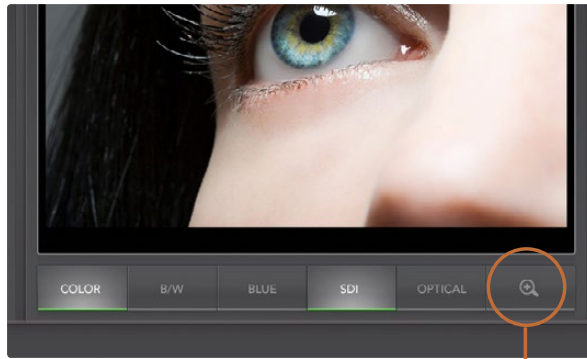
Choose **Full Screen** to enter “Full Screen” view. If this option is unchecked, “2-up” view will be displayed. You can quickly switch between Full Screen view and 2-up view by using the hotkey CTRL-F on Windows or CMD-F on Mac OS X.

In “2-up” view, select the desired left and right scopes by opening the **View** menu or by right-clicking anywhere in the UltraScope window. Make your selections from the **Left View** and **Right View** menu options. If you attempt to choose the same scopes for both the **Left View** and **Right View**, the existing scopes will swap sides.

Screen Resolution Requirements for Display Views

- Full Screen view: 1920 x 1200 pixels or 1920 x 1080 pixels. If your monitor doesn't support these resolutions, then Full Screen view will not be available.
- 2-up view: minimum resolution of 1280 x 800 pixels.

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Zoom button

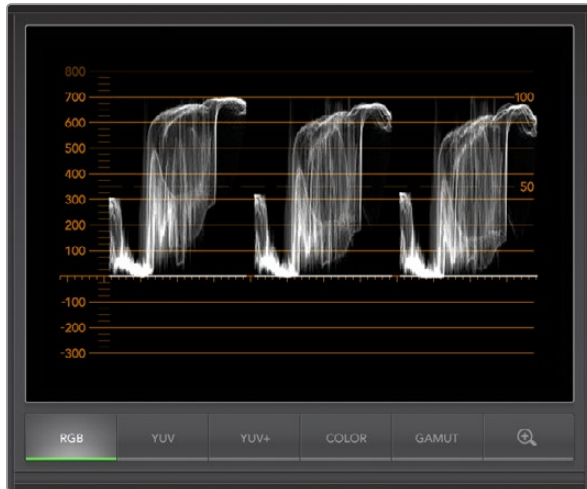
Zoom Function

Blackmagic UltraScope allows you to zoom in on various displays for a more detailed analysis. This helpful function will also pan and zoom the graticules for each display in high resolution.

The zoom function is available in the Parade, Waveform, Vectorscope and Picture displays.

To zoom in, simply click  on the bottom right of each respective display. Now you will be able to view the display in finer detail. Drag the mouse within the display area to pan around the zoomed display. Clicking  again, will return the display back to its normal view.

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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

1. Parade Display

Parade Display is perfect for color-correction, checking for illegal colors and checking levels.

When color-correcting, press the RGB button to display the full height of each color channel as red, green and blue. Monitoring the levels of each red, green and blue color channel makes color-correction straightforward and it is easy to view color balance in the blacks, mids and whites of the video signal. 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 often important when color-correcting to make sure you're not clipping the video levels. Make sure the video is full level but not clipped. You can turn on the GAMUT function, and any illegal levels will be highlighted in bright red, so they are easy to see. Instructions for setting gamut limits can be found in the Error Logging Display section of this manual. If you want to increase the video level, then 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. Blackmagic UltraScope lets you see illegal levels whenever they occur.

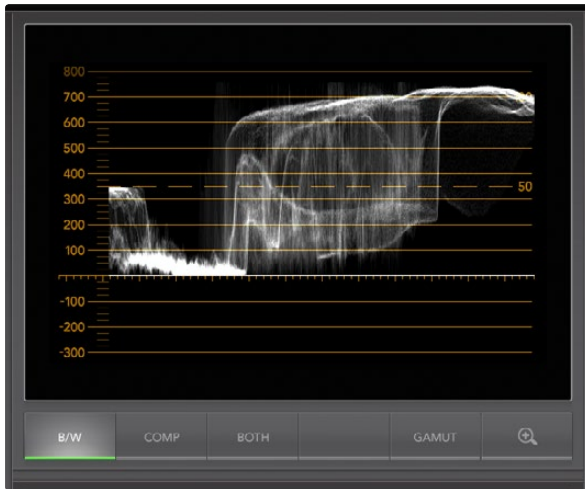
Illegal video can also happen in blacks as well as whites. In some color-correction systems, black levels can be lowered to below the black point of 0%. The levels will be shown as bright red if this falls below the lower gamut limit and the GAMUT warning mode is enabled. If you observe illegal black 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.

It's a constant adjustment process, when color-correcting, to attain the best looking images without generating illegal levels!

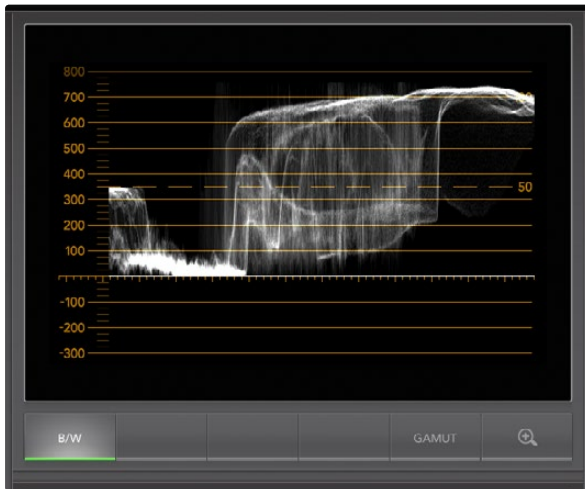
To check levels, simply press the YUV or YUV+ button.

The COLOR setting switches the RGB display to color rather than traditional black and white. When the COLOR setting is used with the YUV or YUV+ display, luma (brightness) remains white, B-Y (difference between blue and luma) appears blue and R-Y (difference between red and luma) appears red. The COLOR setting is not a professional setting and should usually be switched off, especially when showing video to clients.

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Waveform Display on Windows can show Luminance, Composite or Both views.



Waveform Display on Mac OS X always shows Luminance view.

2. Waveform Display

The Waveform Display is similar to traditional composite waveform monitors seen in many broadcast studios. On Mac OS X, the Waveform Display always shows the luminance view and the B/W button is permanently selected. On Windows, select B/W for the luminance only view, COMP for the composite only view, and BOTH for the twin luminance and composite view.

Select B/W for the luminance view which provides a digitally encoded waveform similar to traditional luminance waveform monitors. The luminance view is very useful when adjusting luma (brightness) levels in an image. Turn on the GAMUT function, and any illegal luma levels will be highlighted in bright red, so they are easy to see. Instructions for setting luma limits can be found in the Error Logging Display section of this manual. Traditional luminance waveform monitors only supported composite analog standard definition video. However UltraScope's luminance 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!

For Windows users, the composite view is exciting because it's a fully digitally encoded composite waveform view and similar to a traditional waveform monitor. This provides a much easier way to align to test signals, such as color bars, because you can use the composite waveform exactly the same way as it has always been used. Composite view also works in high definition, so you have a consistent and traditional way to adjust video even when working in high definition!

When BOTH view is selected on a Windows PC, the composite and luminance waveforms display side by side in a twin view. This is incredibly useful when adjusting video levels or color correcting. It's impossible for a vectorscope to show which objects in the video have color because a vectorscope just shows what colors are in the whole image and not which objects have color. When color correcting, you often need to look for specific parts of the image, remove the color and produce a neutral state. This is because the composite waveform is the same as the luminance signal but with chroma added.

Choosing this twin view makes it easy to identify similar items in the luminance and composite waveforms, and if more blur or chroma is observed in the composite area, the item has color. If some part of the video image is neutral gray, then it should look the same on both waveforms because no chroma will be present. With the twin view, you can look around the waveform and see the levels of color or chroma of various objects. As you color correct, the composite waveform will display more or less chroma in the video signal. Now you can see if specific objects in the video image are color or black and white. You can make technical and creative decisions using the Waveform Display.

When the Waveform display is zoomed in, you can toggle between COMP and B/W, and view the same region of an image in the zoomed display.

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3. Vectorscope Display

The Vectorscope Display uses a vector view to show the colors in a video signal. You can see color bar video levels by using the color boxes in the graticule. All you need to do is select 75% or 100% color bars, depending on the standard of color bar test signals used in your facility!

Some people think you can use a vectorscope to check for illegal levels. However this is not correct and the Parade Display should be used, and set to RGB, 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 to check for illegal colors.

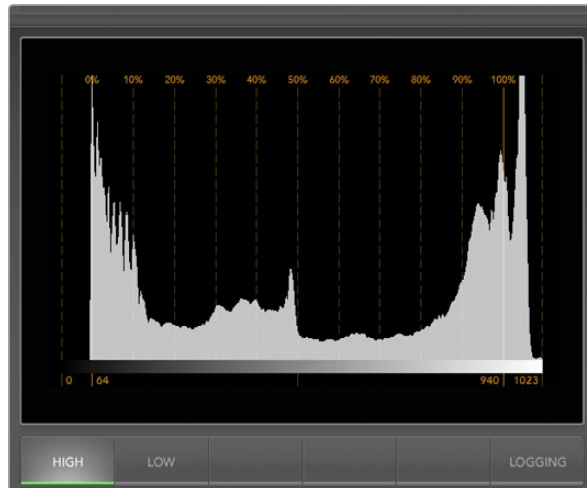
Vectorscope Display is the best tool for checking color levels from older, analog videotape where you need to adjust chroma levels. Just play back the color-bar segment of the videotape, and then adjust the chroma and hue settings, to set the colors of the video within the square boxes in the graticule.

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 vector scope, 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 Vectorscope Display.

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4. 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.

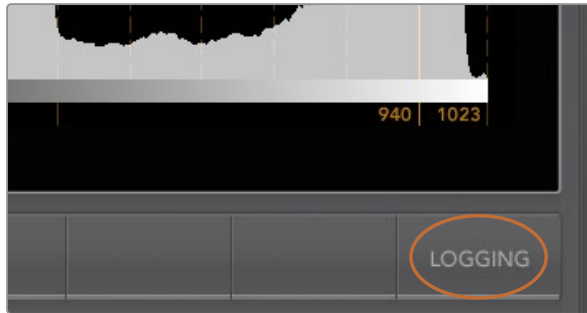
Black video is shown on the left of the display, and whites are shown on the right. All video should usually be found between the 0% and 100% intervals of the Histogram Display. Your video is being clipped if it moves below 0% or above 100%. Video clipping can be really bad, when you're on a shoot, as 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.

The HIGH and LOW buttons simply control how bright the histogram appears on your computer display. If you find the white area of the histogram is too bright in a dark studio, choose LOW for a more comfortable brightness level.

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From the Histogram Display, select the Logging button to switch to the Error Logging Display.

A screenshot of the Error Logging Display. It shows a table with columns for START TC, END TC, DUR, DESCRIPTION, VALUE, and START TIME. The table contains various error entries such as 'Red Over', 'Blue Under', 'Blue Over', 'Luma Over', 'Audio Level 1', 'Audio Level 2', 'Video Signal Loss', and 'Video Format Change'. Below the table, there are two buttons: 'STOP' and 'HISTOGRAM'.

START TC	END TC	DUR	DESCRIPTION	VALUE	START TIME
00:00:10:09	00:00:18:09	11.32	Red Over	114 IRE	14:41:36.30
00:00:18:09	00:00:18:09	11.32	Blue Under	-7 IRE	14:41:36.38
00:00:18:09	00:00:18:09	11.32	Blue Over	115 IRE	14:41:36.30
00:00:18:09	00:00:18:09	11.32	Luma Over	109 IRE	14:41:36.38
00:00:18:09	00:00:18:20	0.64	Audio Level 1	0 dBFS	14:41:36.30
00:00:18:09	00:00:18:28	0.61	Audio Level 2	0 dBFS	14:41:36.38
00:00:19:10	00:00:19:28	0.62	Audio Level 1	-2 dBFS	14:41:37.13
00:00:19:10	00:00:19:28	0.62	Audio Level 2	1 dBFS	14:41:37.13
00:00:19:28	00:00:20:10	0.58	Audio Level 1	0 dBFS	14:41:37.83
00:00:19:28	00:00:20:10	0.81	Audio Level 2	0 dBFS	14:41:37.83
00:00:20:10	00:00:21:10	0.92	Audio Level 1	0 dBFS	14:41:38.45
00:00:20:10	00:00:21:10	0.66	Audio Level 2	0 dBFS	14:41:38.72
00:00:21:10	00:00:22:06	0.62	Audio Level 1	0 dBFS	14:41:39.45
00:00:21:10	00:00:22:06	0.62	Audio Level 2	0 dBFS	14:41:39.45
00:00:00:00	00:00:00:00	0.73	Video Signal Loss		14:41:47.89
00:00:00:00	00:00:00:00	0.23	Video Format Change	HD1080p60	14:41:49.20
00:00:00:00	00:00:00:00	2.09	Video Signal Loss		14:41:59.00
00:00:00:00	00:00:00:00	1.04	Video Format Change	HD1080/59.94	14:42:00.26
00:00:00:00	00:00:00:00	0.00	Red Over	114 IRE	14:42:01.09
00:00:00:00	00:00:00:00	0.00	Blue Under	-6 IRE	14:42:01.09
00:00:00:00	00:00:00:00	0.00	Blue Over	112 IRE	14:42:01.09
00:00:00:00	00:00:00:00	0.00	Luma Over	109 IRE	14:42:01.09

5. Error Logging Display

Error Logging records errors in video and audio and is indispensable when reviewing video and for unattended operation. Errors may be logged for color, brightness or audio threshold levels as well as loss of video signal, change of video format or audio silence. After setting the parameters which define when an error should be logged, you can choose to start or stop error logging, save the log to a file, or clear the log. These functions can be selected from the buttons in the Error Logging Display or from the Error Logging pulldown menu.

Errors are recorded against timecode and time of day to make them easy to find. If timecode is not present, errors can be found by reviewing the time of day at which they were recorded. As computer clocks can drift, it is a good idea to inspect the Date & Time settings on your computer, and set the clock to synchronize with an Internet time server to ensure accurate time of day logging.

In Full Screen view, Histogram Display and Error Logging Display share the same area of the UltraScope interface. Select the LOGGING button, below the Histogram Display, to switch to the Error Logging Display. Select the HISTOGRAM button, below the Error Logging Display, to switch back to the Histogram Display. After quitting and reopening the UltraScope application, the last viewed display will be made visible again, i.e. either Histogram or Error Logging.

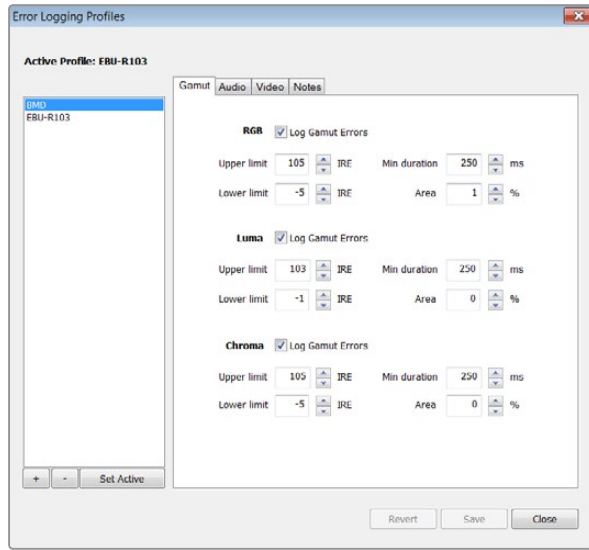
In 2-up view, Histogram Display and Error Logging Display can be viewed simultaneously and so there are no LOGGING or HISTOGRAM buttons.

When viewing the Error Logging Display for the first time, the display will initially be blank other than for some column headings. Select the START button to commence logging. In Full Screen view, you can switch back to the Histogram Display and UltraScope will continue to perform error logging until you choose to stop it.

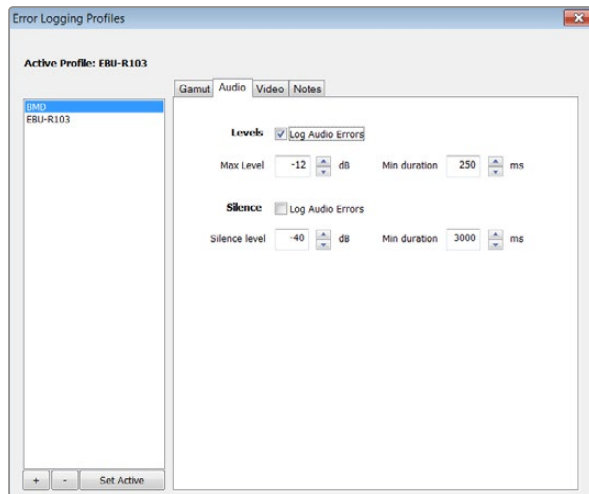
When error logging is being performed, the STOP button replaces the START button. When the STOP button has been selected, you can choose to START again and any new errors will be appended to the existing log. When error logging has been stopped, you can choose to SAVE the log to a CSV file or alternatively CLEAR the log. The SAVE and CLEAR buttons will not appear if no errors have been recorded. The CSV file can be analyzed in many applications including spreadsheet and database software.

By default, error logging is performed using the EBU-R103 standard set down by the European Broadcasting Union. This standard is popular worldwide and is commonly used as a template for making new error logging profiles.

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Gamut error tolerance settings for color and brightness



Audio error tolerance settings

How to Customize Error Logging

To customize error logging, go to the Error Logging menu and choose Profiles to open the Error Logging Profiles window. Saved profiles appear in the profile list at the left and the current, active profile appears in bold above the list.

The standard EBU-R103 profile cannot be deleted or modified and is grayed out. You can add a profile by clicking the add (+) button and typing a name for your profile. The new profile will initially contain the same parameters as the EBU-R103 profile but these can be changed as required.

Under the Gamut tab, upper and lower limits can be adjusted as a percentage of IRE units for RGB, Luma and Chroma. Set the minimum time in milliseconds (ms) for which these conditions must be sustained before being logged as errors. Set the percentage area, of pixels in error to total pixels in a frame, below which errors can be ignored. The Area setting acts like sensitivity.

Under the Audio tab, the maximum audio level can be set in decibels (dBFS) as can the audio level below which audio is regarded as silence. Set the minimum time in milliseconds (ms) for which these conditions must be sustained before being logged as errors.

Under the Video tab, loss of video signal and change of video format can be logged as errors.

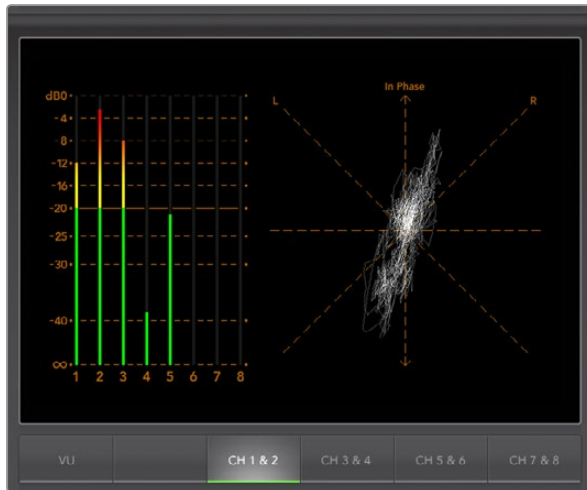
Under the Notes tab, write a brief description of the new profile to help distinguish it from other profiles.

To modify a new or existing profile, ensure it is selected and then change its parameters as desired. Press Save to save these changes or choose Revert to leave the profile unchanged.

Choosing Save saves the changes to the profile but does not determine which profile is active. To activate a profile, select it from the profile list and then choose Set Active.

You can delete a profile by selecting it in the profile list and clicking the delete (-) button.

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6. Audio Metering Display

Audio Metering Display shows you the audio levels in the embedded audio of the SDI video signal. Up to 8 channels of embedded audio are de-embedded and then displayed in either dBFS or VU format. The VU button switches between dBFS and VU audio metering standards.

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

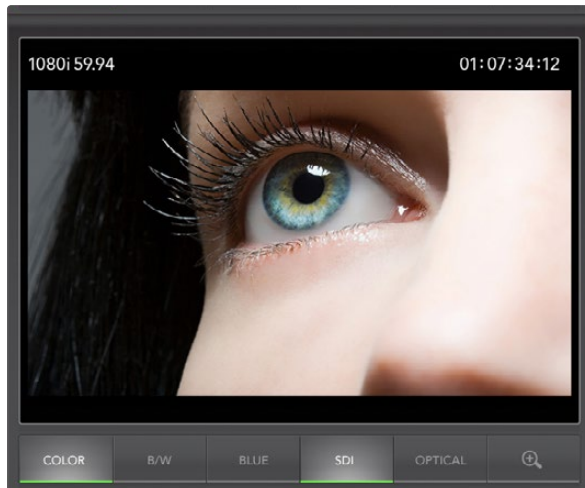
The VU meter shows average signal levels, is easy to use and very common on older equipment. VU is calibrated to the SMPTE recommendation of a 1 kHz tone test signal set to -20 dBFS.

The right hand audio scope can monitor two channels of audio, which are selected from the audio channel buttons: CH 1 & 2, CH 3 & 4, CH 5 & 6 and CH 7 & 8. 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 audio, the Audio Metering Display will puff out a little like a flower, which represents the difference between the left and right audio channels. The more stereo sound is contained in the audio track, the more circular the display will appear. If the audio contains minimal stereo content, then the display will appear more concentrated around the vertical axis.

While spoken dialog tends to appear as a vertical line, music with plenty of stereo content will 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.

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7. Picture Display

The Picture Display is a handy confidence monitor so you can see the video that is being received by Blackmagic UltraScope. The Picture Display has three settings: COLOR, B/W (black & white) and BLUE (Blue Only).

Set to COLOR or B/W depending on the needs of your facility. Black & white is popular for use in color-correction studios so clients don't get confused when seeing multiple color displays, and not understanding which color display is the correct, color-calibrated display. You may wish to select B/W so there is only a single, calibrated, color display in the room. The black & white display can also provide a useful visual reference.

Blue Only is used with color bar test signals for setting hue on playback decks. When adjusting hue, make sure all the blue bars are a constant brightness to attain the correct hue level.

Blue Only can also be used for evaluating noise levels in cameras and telecines. Blue has the least amount of signal level, in a color video signal, and so is more susceptible to noise. The BLUE setting can provide a good way to check on noise levels in a video signal.

Use the SDI and OPTICAL buttons to select whether UltraScope will receive video from the SDI input or the optical fiber SDI input. Regardless of which input is chosen, the video input will always loop through to both the SDI and optical fiber SDI outputs.

The Picture Display will also decode RP-188 HD and VITC SD timecode information, from the SDI video input signal, and display it on the right side of the display. If the timecode information is incorrect, check your deck to ensure it is outputting the correct timecode signal encoded as VITC or RP188.

It is worth noting that some standard definition broadcast decks let you "re-stripe" the timecode track independently of the VITC, which was encoded as part of the image. This meant the VITC could not be changed without copying the video down another generation. Consequently some standard definition decks had different timecode in the VITC to the normal LTC track on the SDI video output. It is always worth checking master tapes if you think the displayed timecode is incorrect.

Lastly, the video standard is displayed on the left side of the Picture Display, so you can verify the video standard, and confirm you're monitoring the correct video feed.

25 Using USB 3.0 Frequently Asked Questions



Can I use Pocket UltraScope on my Mac?

Yes, you can use a MacBook Pro 15 inch and you will need to set your screen resolution to 1920 x 1200. If you have a MacBook Pro 13 inch, you will be able to use Pocket UltraScope in a "2-up" view.

Can I use Pocket UltraScope on my Linux PC?

No, Pocket UltraScope is not supported under Linux.

Can I use a third party USB 3.0 PCIe card, in my Mac Pro, with Pocket UltraScope?

No, currently there is not a suitable USB 3.0 PCIe card that is appropriate for use with Pocket UltraScope. Instead, you can use an UltraScope PCIe card to perform waveform monitoring.

Can I use a third party USB 3.0 PCIe card, in my Windows PC, with Pocket UltraScope?

Yes. Please refer to the Blackmagic Design website:

<http://www.blackmagicdesign.com/support> for the latest support information, including supported PCIe cards with USB 3.0.

Can I use a third party USB 3.0 ExpressCard, in my Mac or Windows notebook, with Pocket UltraScope?

No, currently there is not a USB 3.0 ExpressCard with adequate bandwidth for use with Pocket UltraScope.

What happens if I plug Pocket UltraScope into a USB 2.0 slot?

Pocket UltraScope will not function as USB 2.0 does not provide enough bandwidth for uncompressed video. A USB 3.0 port is required.

If your computer does not have a suitable USB 3.0 port, but has PCI Express slots, you can use an UltraScope card on Mac OS X and Windows for waveform monitoring.

What motherboards can I use with Pocket UltraScope?

Motherboards that support Ivy Bridge chipsets are supported.

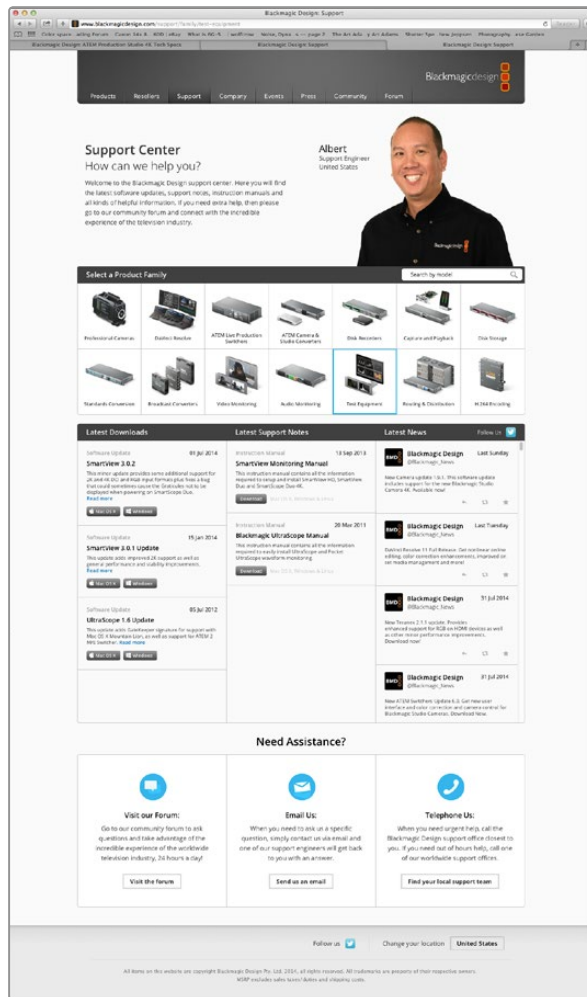
Which notebooks can I use with Pocket UltraScope?

We currently recommend the MSI GE620. We are in the process of qualifying more notebooks.

Do I need to update my USB 3.0 drivers and firmware to use Pocket UltraScope?

Yes, it is recommended to run the latest Windows USB 3.0 drivers and firmware for your motherboard.

26 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.

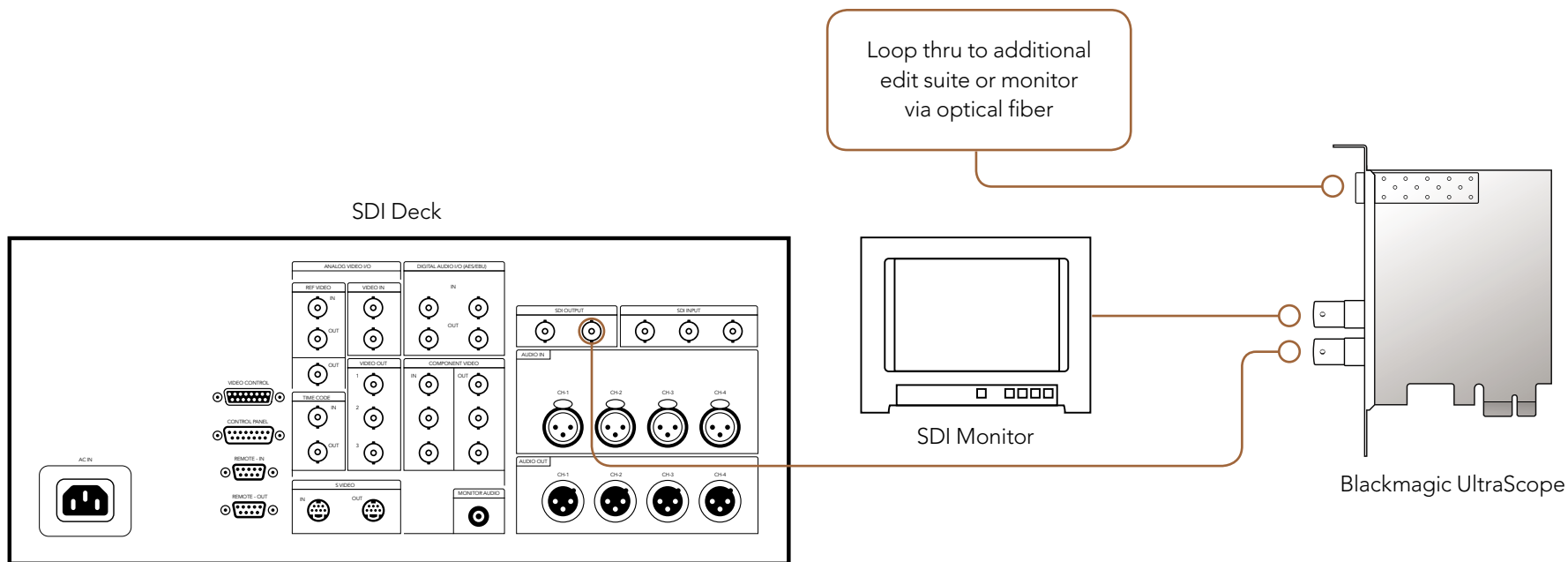
Please provide us with as much information as possible regarding your technical problem and system specifications so that we may try to respond to your problem as quickly as possible.

27 Connection Diagrams

Connecting UltraScope to an SDI digital deck

This example shows how to connect Blackmagic UltraScope to the SDI output of a digital deck for waveform monitoring of 4:2:2 HD video.

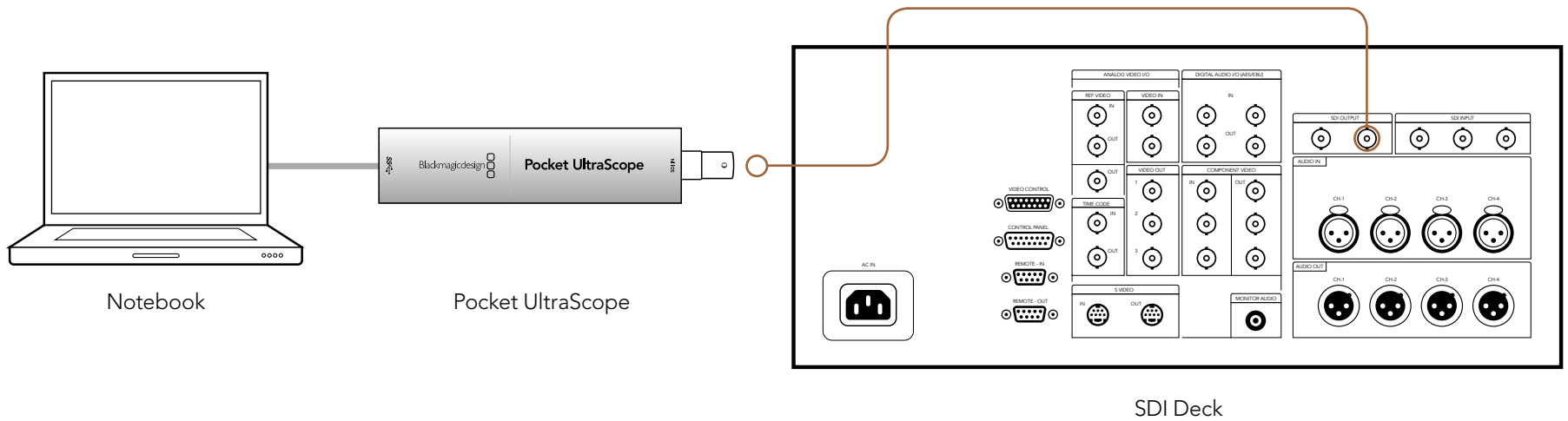
The loop through SDI output can be connected to an edit suite or an SDI monitor. Optical Fiber input and output is also provided for running SDI signals over large distances of up to 25 km or 82000 feet in HD, or 45 km or 147000 feet in SD.



28 Connection Diagrams

Connecting Pocket UltraScope to an SDI digital deck

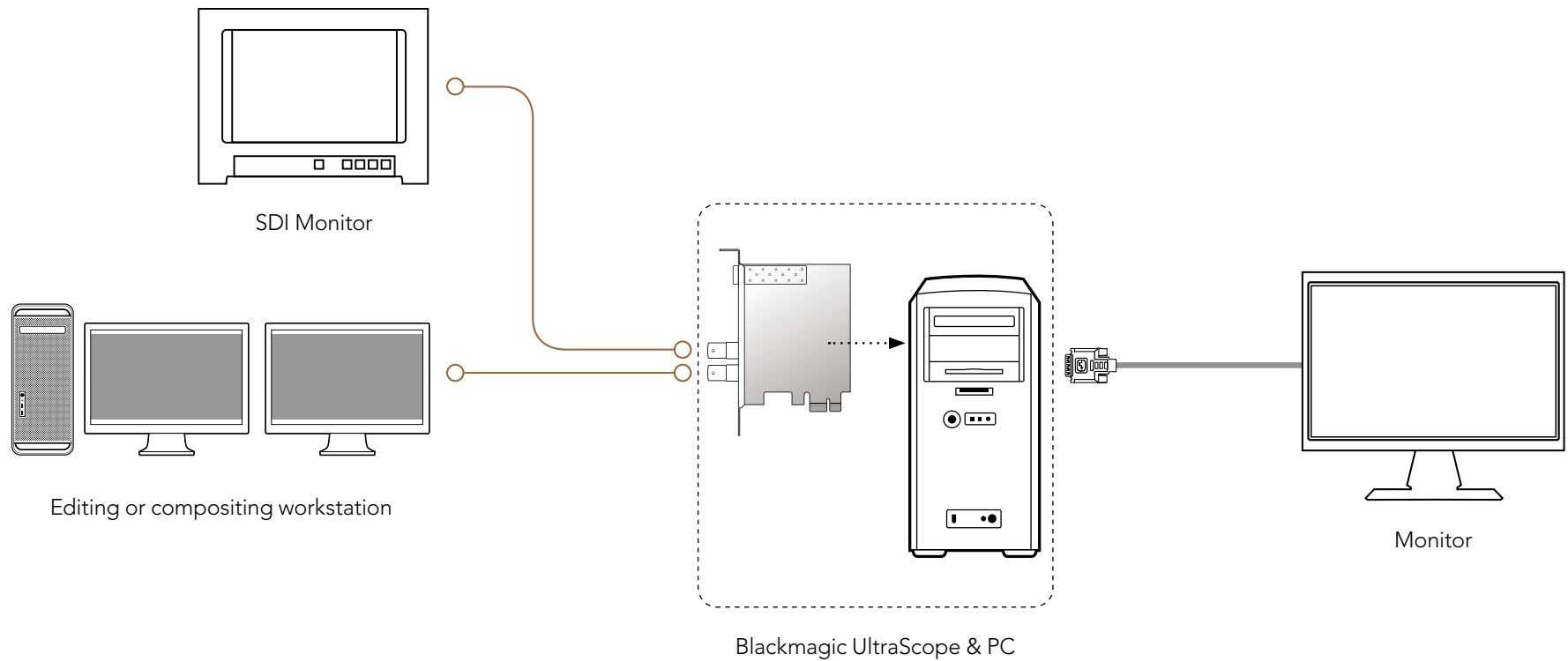
This example shows how to connect Pocket UltraScope to the SDI output of a digital deck for waveform monitoring of 4:2:2 HD video.



29 Connection Diagrams

Connecting to a color grading system or NLE

This example shows Blackmagic UltraScope connected to a color grading system or NLE with an SDI output for realtime waveform monitoring during the grading or editing session.



3 Year Limited Warranty

Blackmagic Design warrants that this product 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. 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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