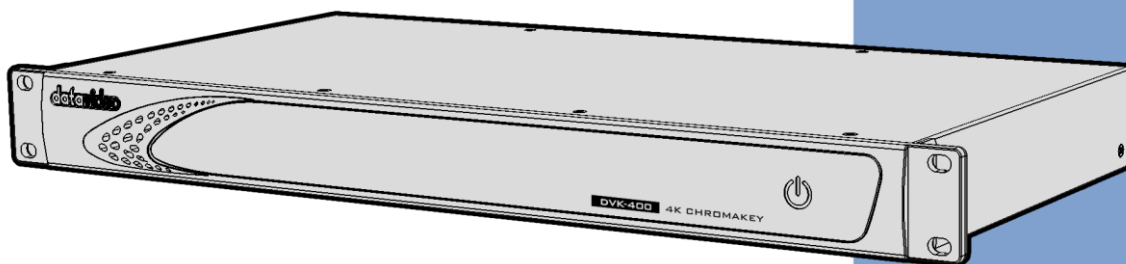


datavideo



4K CHROMAKEY

DVK-400

Instruction Manual

www.datavideo.com

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Disclaimer of Product & Services

The information offered in this instruction manual is intended as a guide only. At all times, Datavideo Technologies will try to give correct, complete and suitable information. However, Datavideo Technologies cannot exclude that some information in this manual, from time to time, may not be correct or may be incomplete. This manual may contain typing errors, omissions or incorrect information. Datavideo Technologies always recommend that you double check the information in this document for accuracy before making any purchase decision or using the product. Datavideo Technologies is not responsible for any omissions or errors, or for any subsequent loss or damage caused by using the information contained within this manual. Further advice on the content of this manual or on the product can be obtained by contacting your local Datavideo Office or dealer.

FCC Compliance Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Warnings and Precautions



1. Read all of these warnings and save them for later reference.
2. Follow all warnings and instructions marked on this unit.
3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable cart, stand, or table. The unit may fall, causing serious damage.
6. Slots and openings on the cabinet top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings on the bottom of the cabinet will be blocked. This unit should never be placed near or over a heat register or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, or otherwise stressed.
9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord rating.
10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11. Never push objects of any kind into this unit through the cabinet ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.
12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.
13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
 - a. When the power cord is damaged or frayed;
 - b. When liquid has spilled into the unit;
 - c. When the product has been exposed to rain or water;

- d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
- e. When the product has been dropped or the cabinet has been damaged;
- f. When the product exhibits a distinct change in performance, indicating a need for service.

Warranty

Standard Warranty

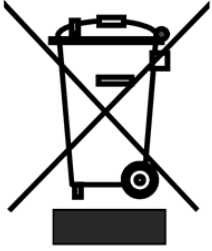
- Datavideo equipment is guaranteed against any manufacturing defects for one year from the date of purchase.
- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.
- The product warranty period begins on the purchase date. If the purchase date is unknown, the product warranty period begins on the thirtieth day after shipment from a Datavideo office.
- All non-Datavideo manufactured products (product without Datavideo logo) have only one year warranty from the date of purchase.
- Damage caused by accident, misuse, unauthorized repairs, sand, grit or water is not covered under warranty.
- Viruses and malware infections on the computer systems are not covered under warranty.
- Any errors that are caused by unauthorized third-party software installations, which are not required by our computer systems, are not covered under warranty.
- All mail or transportation costs including insurance are at the expense of the owner.
- All other claims of any nature are not covered.
- All accessories including headphones, cables, batteries, metal parts, housing, cable reel and consumable parts are not covered under warranty.
- Warranty only valid in the country or region of purchase.
- Your statutory rights are not affected.

Three Year Warranty

- All Datavideo products purchased after July 1st, 2017 qualify for a free two years extension to the standard warranty, providing the product is registered with Datavideo **within 30** days of purchase.
- Certain parts with limited lifetime expectancy such as LCD panels, DVD drives, Hard Drive, Solid State Drive, SD Card, USB Thumb Drive, Lighting, Non-PCIe Card and third party provided PC components are covered for 1 year.
- The three-year warranty must be registered on Datavideo's official website or with your local Datavideo office or one of its authorized distributors within 30 days of purchase.



Disposal



For EU Customers only - WEEE Marking

This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the shop where you purchased the product.



CE Marking is the symbol as shown on the left of this page. The letters "CE" are the abbreviation of French phrase "Conformité Européene" which literally means "European Conformity". The term initially used was "EC Mark" and it was officially replaced by "CE Marking" in the Directive 93/68/EEC in 1993. "CE Marking" is now used in all EU official documents.

Chapter 1 Product Overview

The Datavideo DVK-400 is an advanced 4K Chromakey for presenting perfect chromakey effect with its easy-to-use user interface.

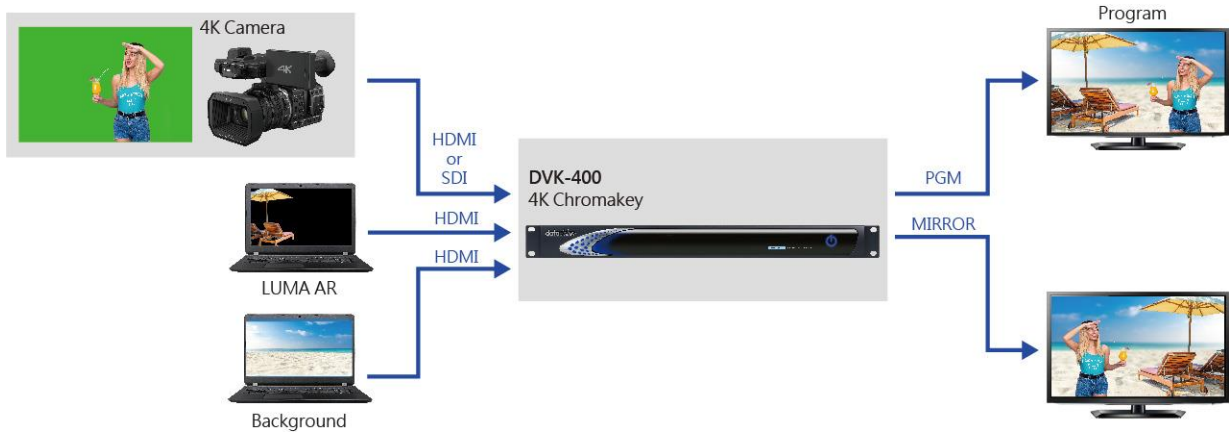
The Datavideo DVK-400 allows users to use it by connecting to the Notebook PC locally. Moreover, it can be used by connecting to the IP network remotely.

The Datavideo DVK-400 can be used in the live events applications which are based on HDMI and SDI videos. Moreover, the DVK-400 supports the video chromakey for up to 4K resolution and it also provides easy-to-use Spill Suppression and Color Enhancement features for users.

1.1 Features

- Supports 4K real-time chromakey with 4:4:4 color sampling and 10-bit color depth.
- Supports Easy Operation and Control via LAN connection to a Notebook PC.
- Supports advanced algorithm for presenting transparency, smoke, reflection and shadow in detail.
- Supports easy-to-use Spill Suppression function.
- Supports full foreground post-processing for achieving natural synthesis with background.
- Supports multiple HDMI and SDI outputs for Program and Preview with Mirror option.
- Supports User Memory Preset function.
- Supports Chromakey Noise Reduction function.
- Supports Matte Control function for adjusting the Black Level and White Level for achieving precise chromakey for eliminating the reflective color from the foreground.
- Supports Dark Enhancement/Bright Enhancement and Shadow Enhancement Functions.
- Supports post-processing for calibrating Brightness, Contrast, Saturation parameters for applying those parameters to the foreground signal after chromakey processing.
- Supports Garbage Mask with Soft edge.
- Supports Auto Chromakey function.
- Supports PGM Mirror Function.

Chapter 2 System Diagram




Chapter 3 Connection

This part will show users the way for connecting the Datavideo DVK-400 4K Chromakey. Please refer to following paragraphs for details.






3.1 Front View




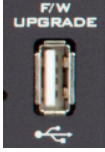




Interface	Description
	This is the power button which is located at the front panel. Please turn on the power switch which is located at the rear panel of the DVK-400 and then please press this button to turn on the power of the DVK-400.

3.2 Rear View



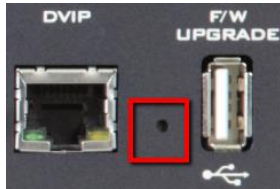
Interface	Description
	<p>FOREGROUND CAMERA</p> <p>Please connect the camera for shooting the foreground subject to this HDMI interface.</p>
	<p>BACKGROUND</p> <p>After the subject image is chromakeyed, please connect the HDMI input source which is used to be the background source to this interface.</p>
	<p>AUX</p> <p>This interface allows users to connect to the HDMI interface of the notebook PC for the Logo icon input.</p>
	<p>B.B EXT. SYNC</p> <p>When there is a B.B or a tri-level sync signal which is connected to be the input signal for the DVK-400 4K Chromakey, it can be a reference source of the video output synchronization.</p>
	<p>SDI IN/OUT</p> <p>FOREGROUND CAMERA IN</p> <p>Please connect the foreground camera for shooting the foreground subject to this SDI interface.</p> <p>LOOP THRU</p> <p>This interface can connect to an external connected monitor for looping the FOREGROUND CAMERA IN input signal directly to the external connected monitor.</p>

	<p>SDI/HDMI OUT</p> <p>PGM</p> <p>This interface can be connected to an external connected monitor for transmitting the new video which is combined by the foreground video and the new background after the foreground video is chromakeyed.</p> <p>PVW</p> <p>This interface can be connected to an external connected monitor for previewing the new image which is combined by the foreground and the new background after the original foreground video is chromakeyed.</p>
	<p>RS-232 REMOTE CONTROL</p> <p>Please connect an RS-232 to USB adapter cable from this interface to your notebook PC for controlling the DVK-400 4K Chromakey remotely.</p>
	<p>DVIP</p> <p>Please connect an RJ-45 Ethernet cable from this interface to the RJ-45 interface of your laptop for controlling the DVK-400 4K Chromakey by the DVIP protocol.</p>
	<p>F/W UPGRADE</p> <p>This interface is used for updating the firmware by connecting a USB thumb drive only.</p>
	<p>12V Power Interface</p> <p>Please connect a 12V DC power cable to this interface for supplying power for the DVK-400 4K Chromakey.</p>
	<p>DC IN 12V POWER Switch</p> <p>This is the DC IN 12V power switch of the DVK-400.</p>



Ground

When connecting this device to any other component, please make sure that it is connected via this end. Please point this end to other suitable points for proper grounding. When connected, please use this interface and please make sure to use a socket and use a wire with a cross-section of at least 1.0mm².



IP Address Reset Hole

When the DVK-400 is connected to a PC by the static IP address, if the IP address of the DVK-400 can not be scanned by users, it is possible that this DVK-400 was set in DHCP mode. To solve this issue, please press the IP RESET hole on the rear panel of the DVK-400 by a sharp object and then please wait for about 5 seconds for releasing the pressing. After that, the IP address of the DVK-400 will be resumed to factory default static IP address, 192.168.100.120. And then users can scan the DVK-400 IP address for re-connecting.

Chapter 4 Basic Setup

Before using the DVK-400 for chromakeying, it is necessary for users to set the DVK-400 up in advance. Please follow following steps for setting the basic setup of the DVK-400.

1. Please use an HDMI cable to connect from the foreground camera input source to the "FOREGROUND CAMERA" HDMI interface. If there is SDI interface only for your foreground camera, please use a SDI cable to connect the foreground camera to the "CAM IN" SDI interface on the rear panel of the DVK-400.
1. Please use an HDMI cable to connect from the foreground camera input source to the "FOREGROUND CAMERA" HDMI interface on the rear panel of the DVK-400. If there is an SDI interface only for your foreground camera, please connect the foreground camera to the "CAM IN" SDI interface on the rear panel of the DVK-400 through an SDI cable.
2. Please use an HDMI cable to connect from your background video source to the "BACKGROUND" interface on the rear panel of the DVK-400. In this example, the HDMI input source is the Notebook PC.
3. Please use an HDMI or an SDI cable to connect from the "PVW HDMI" or "PVW SDI" interface on the rear panel of the DVK-400 to the HDMI interface of an external connected monitor to be the monitor for monitoring the chromakey effect of the DVK-400.

Notes:

- If users need an external connected mirroring screen, please use an HDMI cable to connect from the "PGM HDMI" interface on the rear panel of the DVK-400 to the HDMI interface of an external connected monitor and then this monitor can be used as an external connected mirroring monitor.
- If it is needed for users to input a Logo, please use an HDMI cable to connected from the AUX interface on the rear panel of the DVK-400 to the HDMI interface of a laptop.
- If it is needed to use the DVIP protocol to control the DVK-400, please use an RJ-45 Ethernet cable to connect from the RJ-45 Ethernet interface of your laptop to the DVIP RJ-45 Ethernet interface on the rear panel of the DVK-400.
- If it is needed to use the RS-232 interface to control the DVK-400, please use a D-sub 9 pin to USB adapter cable to connect from the RS-232 REMOTE CONTROL interface on the rear panel of the DVK-400 to the USB interface of your laptop.

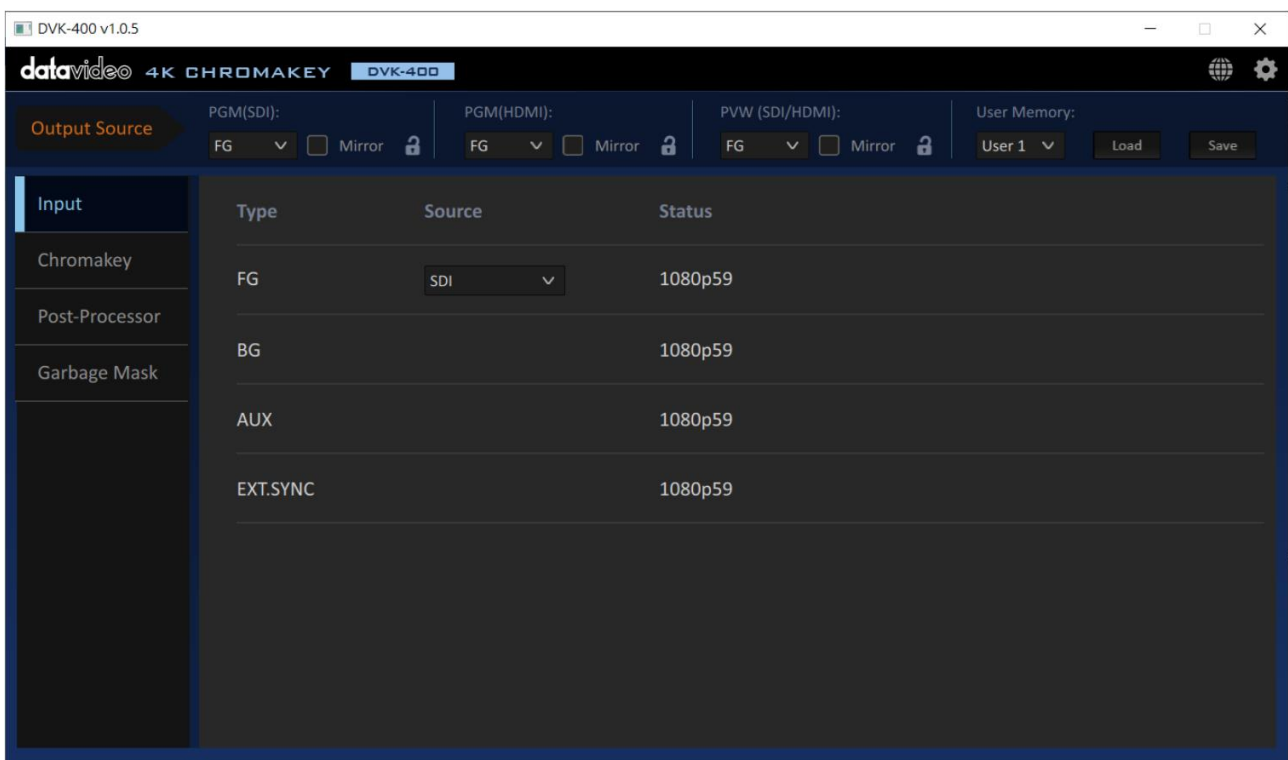
After those steps are finished, the hardware setup procedure for the DVK-400 is completed.

Chapter 5 DVK-400 4K Chromakey Control Software

5.1 How to Launch the DVK-400 4K Chromakey Control Software

Please follow following steps for launching the DVK-400 4K Chromakey control software.

1. Please download the DVK-400 4K Chromakey control software from Datavideo official website www.datavideo.com
2. Please unzip the DVK-400 4K Chromakey control software.
3. Please double-click the “DVK-400.exe” for launching the DVK-400 Chromakey control software interface which is shown as following diagram.



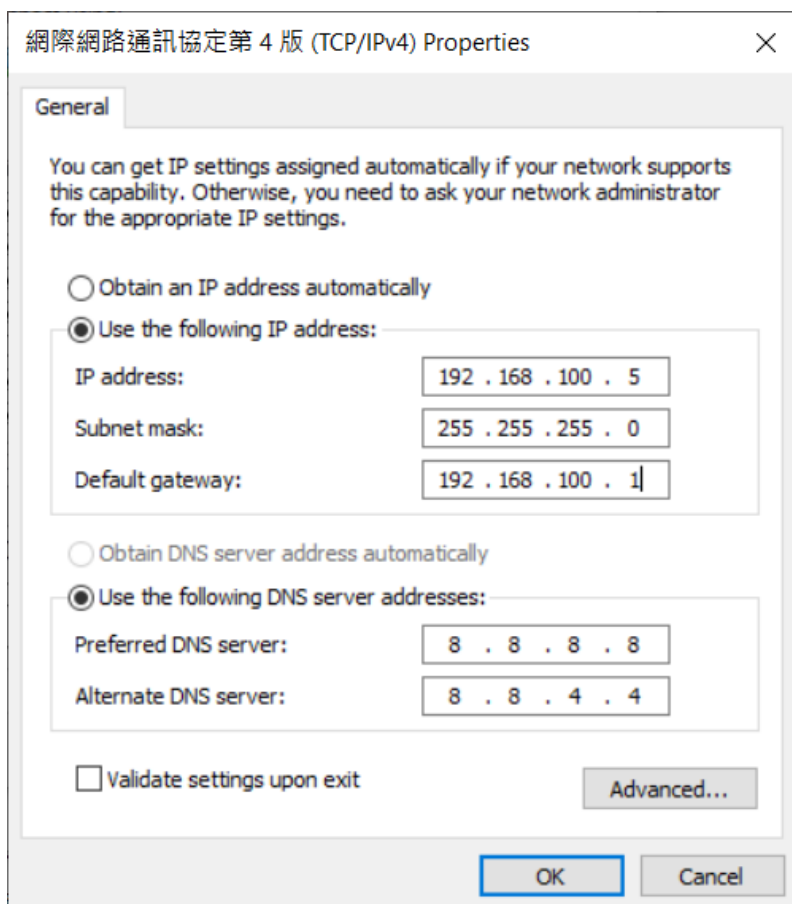
5.2 How to Set the Network Related Settings for the DVK-400 4K Chromakey

Before the operation of the DVK-400 4K Chromakey control software, it is necessary for users to set the way for controlling the DVK-400 and to connect the DVK-400 to the notebook for operating the DVK-400 4K Chromakey control software. Please follow following steps for setting the network related settings of the DVK-400.

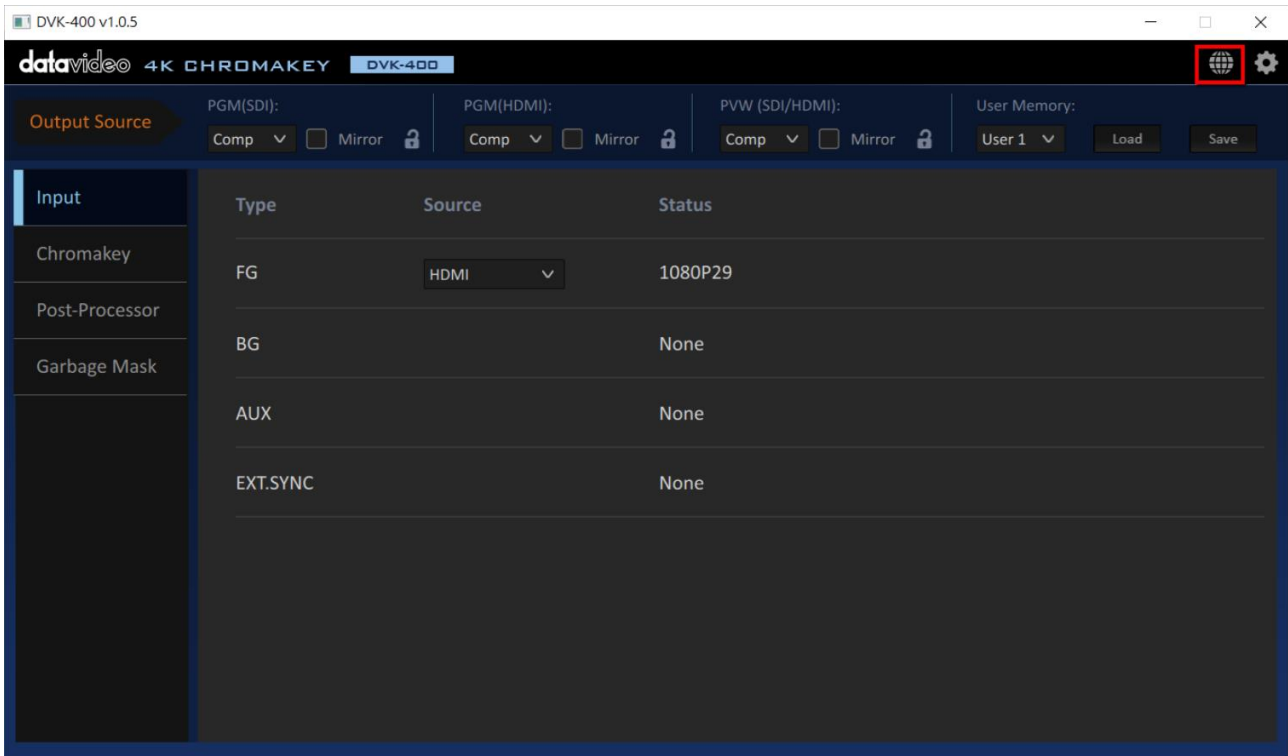
- Connect by the DVIP Protocol

1. Please make sure that there is an RJ-45 Ethernet cable connected from the RJ-45 interface of your notebook PC to the DVIP RJ-45 Ethernet interface on the rear panel of the DVK-400.

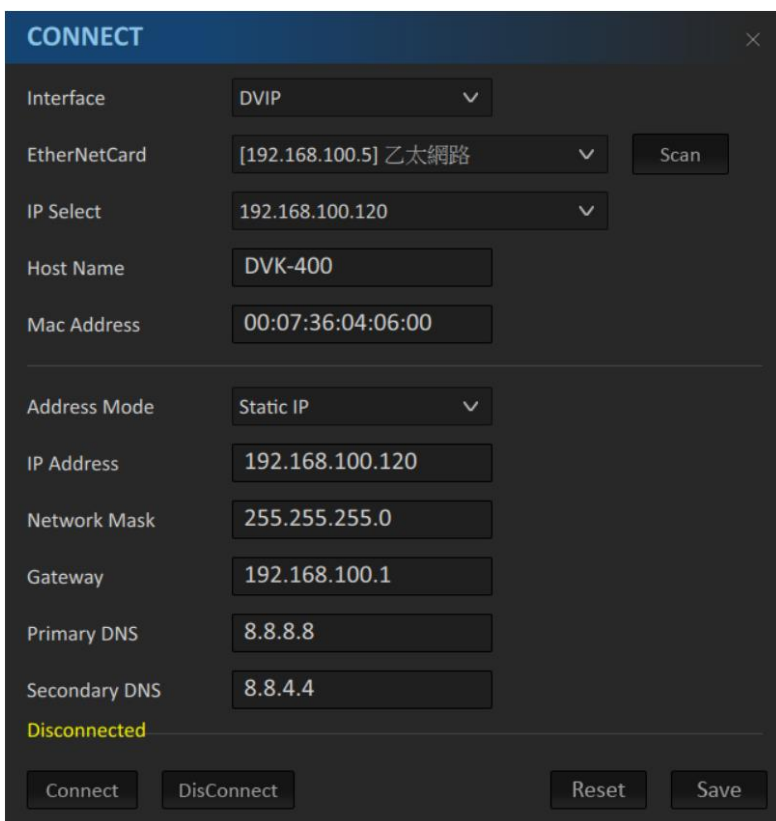
2. The default static IP address of the DVK-400 is 192.168.100.120. If the DVK-400 is connected to your notebook PC by the Ethernet cable directly, please set the network setting of your notebook PC in static IP mode in advance. Moreover, please set the static IP address of your notebook PC in the same Local Area Network (LAN) with the DVK-400 which is shown as following example.



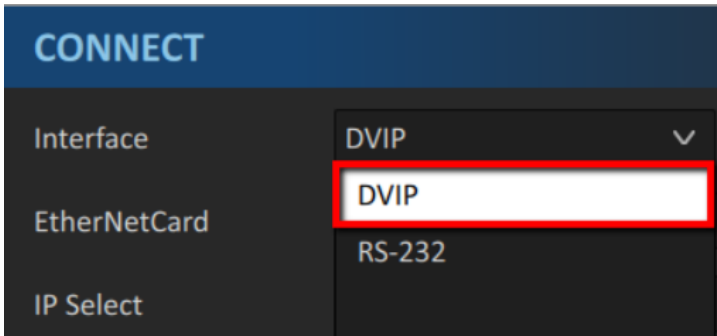
3. Please click the “Globe” icon which is located on the top-right side of the interface.



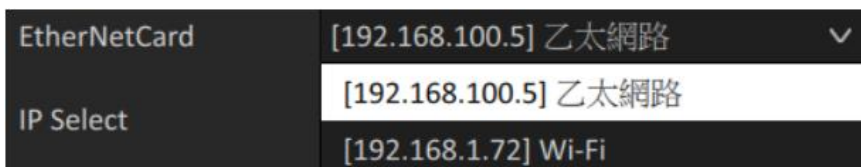
4. The CONNECT control interface will be shown.



5. Please select DVIP from the “Interface” drop-down menu.

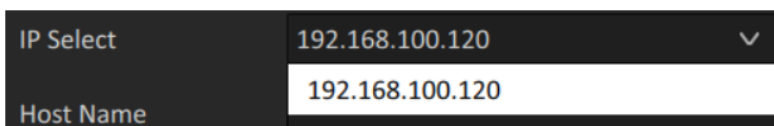


6. The Ethernet Card which is found by the PC will be shown on the EtherNetCard option. Please select the Ethernet Card which is used to connect to the DVK-400 from the drop-down menu.



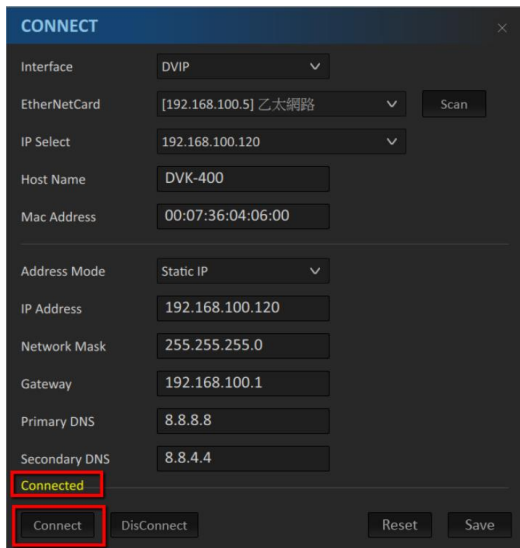
7. When the DVK-400 is used for the first time, please remember to press the “Scan” button which is located on the right side of the “EtherNetCard” option for the App to search IP addresses of all connected DVK-400s within the same Local Area Network (LAN). In the searching process, the word “Scanning” will be shown on the bottom-left side of the CONNECT dialogue box.

8. Please select the IP address of the DVK-400 that you want to connect from the IP Select option. After that, the messages including the Host Name=DVK-400, Mac Address, Address Mode, IP Address will be shown.



9. Please press the “Connect” button and then please wait until the word “Connected” is shown in yellow for showing that the DVK-400 and the control software are connected successfully.

Note: When the “Connect” button is pressed and the connection is established, the CONNECT dialogue box will be closed automatically.

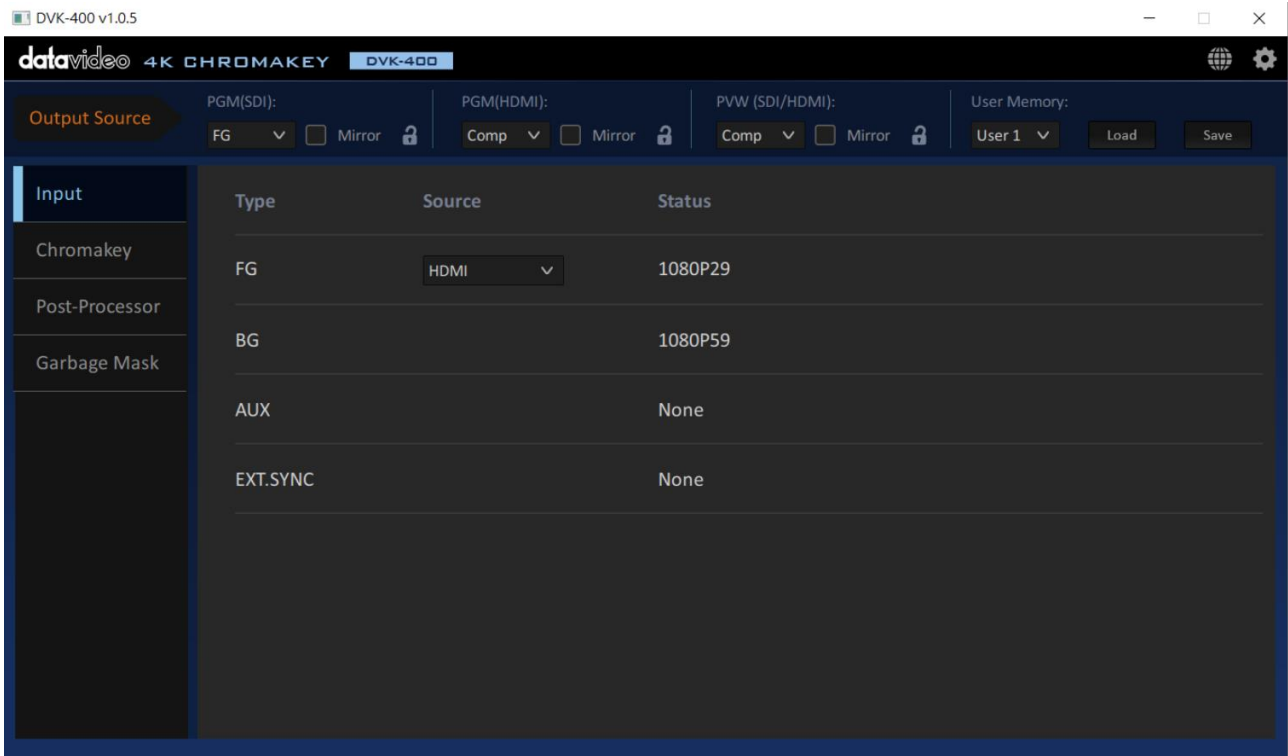


Note: If the Address Mode is needed to be modified to be Static IP/DHCP settings or the IP address of the Static IP is needed to be modified, please press the “Save” button. After the “Saving” message disappears, the message “DVK-400 is configured. Please scan to refresh” will be shown. Users need to turn off and then turn on the power of the DVK-400. After the DVK-400 control software interface is shown, please press the Scan button again to select the right IP address from the IP Select option again for taking effect the modification.

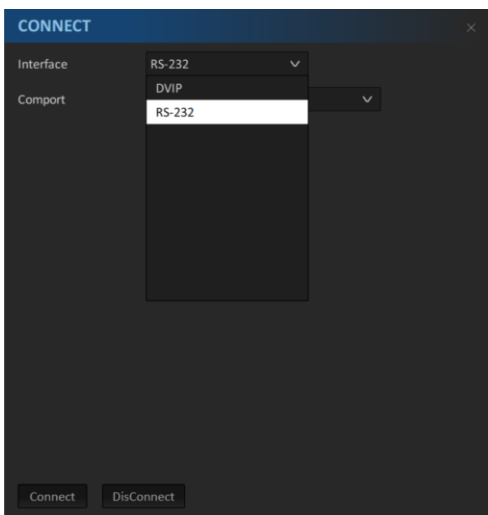
- Connect by the RS-232 Interface

Please follow following steps for connecting the DVK-400 to the notebook PC by the RS-232 interface.

1. Please connect the RS-232 cable between the PC and the DVK-400. After that, please launch the latest version of the DVK-400 control App.

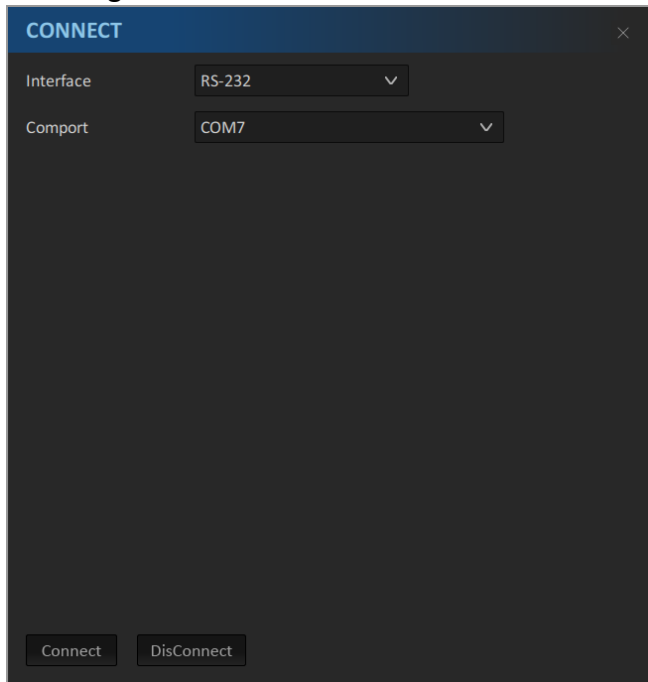


2. Please click the Globe icon which is located on the top-right side. After that, please select RS-232 from the Interface drop-down menu.



3. The "Comport" option will show the COM port list which is detected by the system. Please select the connected COM port from the drop-down menu.

4. Please press the “Connect” button for connecting and then please wait until the CONNECT dialogue box is closed.



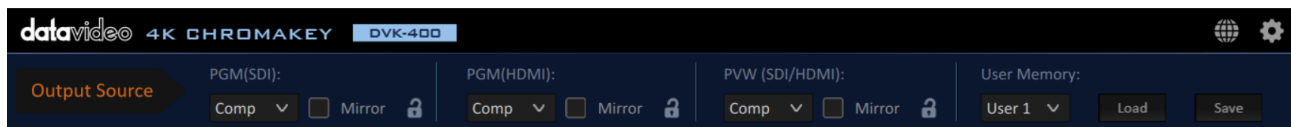
Note:

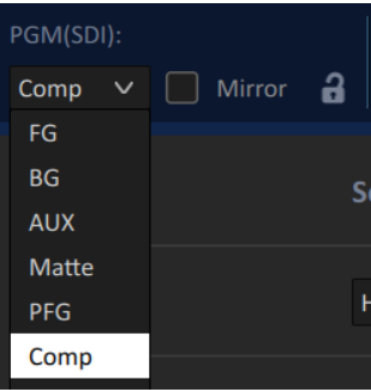


1. If the RS-232 to USB adapter cable is used by users, please make sure that this cable is connected properly before opening the DVK-400 control App for seeing the COM port in the Comport list. Please select the right COM port and then press the “Connect” button. If the connection is failed, the CONNECT dialogue box will not be closed and there is an error message that will be shown on the bottom-right corner of the App. Users need to check whether the connection is correct or not and to check that whether the RS-232 interface is occupied by other software or not.

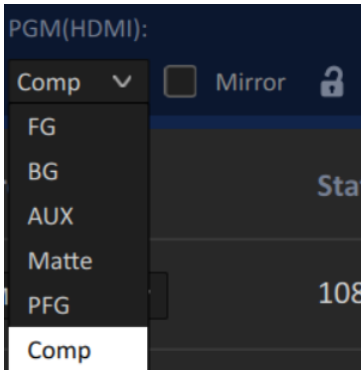
5.3 Introduction of the DVK-400 4K Chromakey Control Software Interface

Please see following paragraphs for the introduction of the DVK-400 4K Chromakey Control Software interface.

- **Output Source:** The main interface of the Output Source option is shown as following diagram.



Option	Description
	<p>PGM(SDI)</p> <p>The PGM (SDI) drop-down menu allows users to select what kind of output source must be used for the PGM SDI interface if the PGM SDI interface is connected. Those output sources can be divided into following categories.</p> <ul style="list-style-type: none"> ● FG: This option allows users to output the FOREGROUND CAMERA video source. ● BG: This option allows users to output the BACKGROUND video source. ● AUX: This option allows users to output the video source from the AUX interface. ● Matte: This is the FG Black and White MATTE. Full Black=Remove, Full White=Solid, Gray=translucent ● PFG: The PFG is the Processed-Foreground. The background color of the foreground image will become gray or will be color reproduced. ● Comp: This is the FOREGROUND+BACKGROUND composite picture. <p>*If the “Mirror”  Mirror is checked, the output source will be mirroring in left and right reversal.</p> <p>*If users click the lock icon  and then the output source can not be changed.</p>




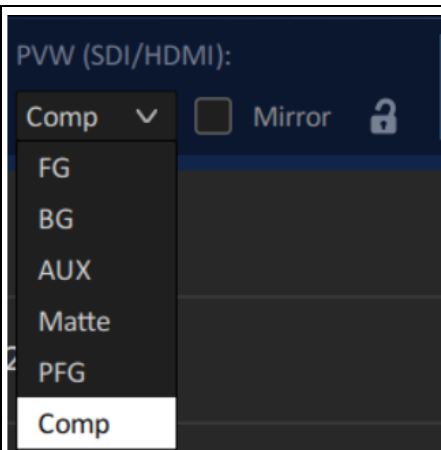
PGM(HDMI)

The PGM(HDMI) drop-down menu allows users to select what kind of output source must be used for the PGM HDMI interface if the PGM HDMI interface is connected. Those output sources can be divided into following categories.

- FG: This option allows users to output the FOREGROUND CAMERA video source.
- BG: This option allows users to output the BACKGROUND video source.
- AUX: This option allows users to output the video source from the AUX interface.
- Matte: This is the FG Black and White MATTE. Full Black=Remove, Full White=Solid, Gray=translucent
- PFG: The PFG is the Processed-Foreground. The background color of the foreground image will become gray or will be color reproduced.
- Comp: This is the FOREGROUND+BACKGROUND composite picture.

*If the “Mirror” Mirror is checked, the output source will be mirroring in left and right reversal.

*If users click the lock icon  and then the output source can not be changed.



PVW(SDI/HDMI)

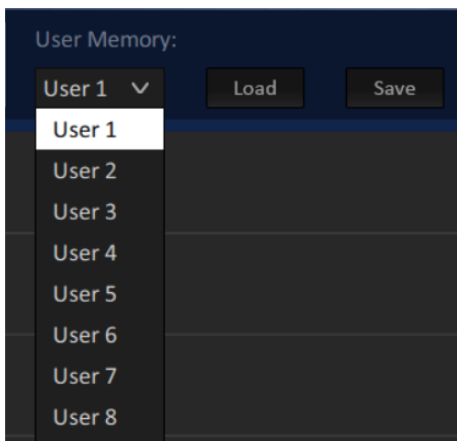
The PVW(SDI/HDMI) drop-down menu allows users to select what kind of output source must be used for the PVW SDI or PVW HDMI interface. Those output sources can be divided into following categories.

- FG: This option allows users to output the FOREGROUND CAMERA video source.
- BG: This option allows users to output the BACKGROUND video source.
- AUX: This option allows users to output the video source from the AUX interface.
- Matte: FG This is the FG Black and White MATTE. Full Black=Remove, Full White=Solid, Gray=translucent
- PFG: The PFG is the Processed-Foreground. The background color of the foreground image will become gray or will be color reproduced.
- Comp: This is the FOREGROUND+BACKGROUND composite picture.

*If the “Mirror” Mirror is checked, the output source will be mirroring in left and right reversal.

*If users click the lock icon and then the output source can not be changed.

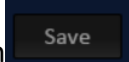
* When sampling the screen color automatically or manually, the PVW screen will show the FG screen temporarily. Moreover, the sampling cursor (+) will be shown. After the color sampling is finished, it will switch back to the PVW screen.




User Memory

This User Memory function allows users to store current settings and then users can recall those settings in the future. There are 8 settings including User 1 to User 8 for users to store their desired settings.

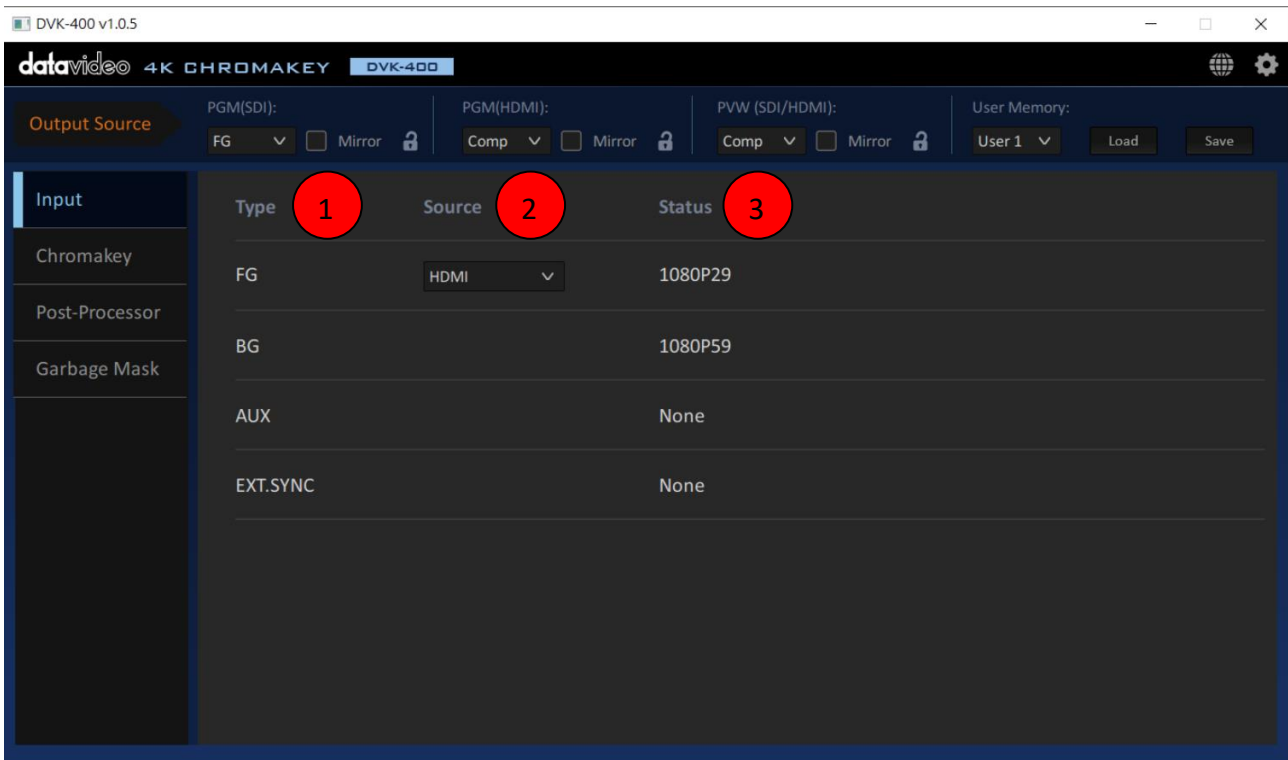
If users want to store current settings

- Please modify different setting respectively. After that, please select User 1 to User 8 and then please press the "Save" button . Please wait until the word "Setting completed" is shown and then it means the saving is finished.

If users want to load pre-saved settings.

- Please select the User number for your pre-saved settings. After that, please press the "Load" button . Please wait until the word "Setting completed" is shown and then it means that the loading is finished.

- **Input option:** The main interface of the Input option is shown as following diagram.

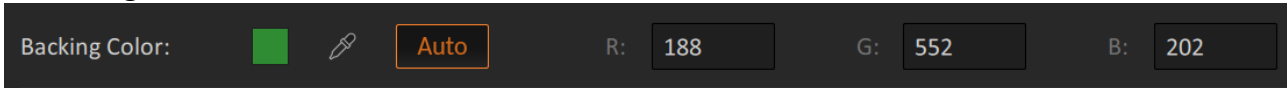


- 1. Type:** This option lists DVK-400's input interfaces including FG/BG/AUX interface and EXT.SYNC interface.
- 2. Source:** After the DVK-400 is connected successfully by the DVIP or RS-232 protocol, this option will show the type of the connected Foreground interface such as SDI or HDMI.
- 3. Status:** After the DVK-400 is connected successfully, this option will show the resolution of connected foreground camera or background. If the AUX or EXT.SYNC interface is connected, this option will also show the status of those interfaces.


- **ChromaKey Option:** The main interface of Chromakey is shown as following diagram.




1. Backing Color:



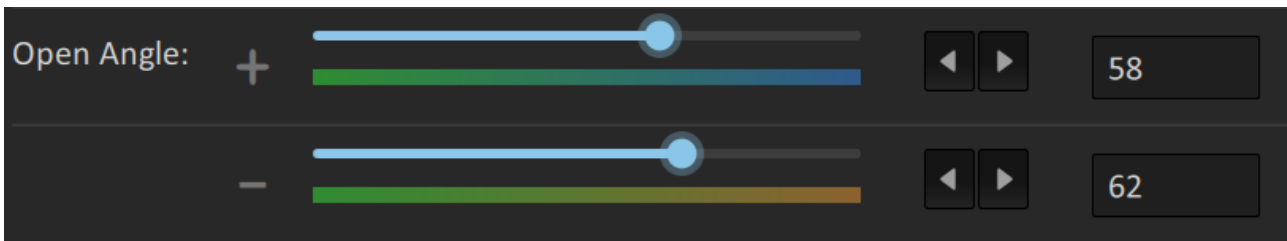
This option provides Auto color sampling (dropper) and manual color sampling for users. Generally speaking, the Auto color sampling is sufficient for users.


Auto: Please press the “Auto” button  and then users will see that the FG is shown on the PVW OUT for about 2 seconds. Moreover, users will see that the “+” is shown and moved on the screen for color sampling. It will calculate the screen color (Green Screen, Blue Screen or others) and then it will reset all parameters on the Chromakey page to default values automatically.

Manual: Please click the dropper icon  for users to select the color of the green screen or blue screen which is located behind the foreground subject. At this time, the “Pick Back Color” background color selection window will be shown. When the mouse cursor is moved, there is a “+” that will appear to move with the cursor. The screen will switch to Foreground PVW OUT screen for users to see the “+” character. Please move the “+” to the reference color area and then please click the mouse once. After that, please press “Auto” to confirm the selected screen color. At this time, it will reset all parameters on the Chromakey page to default values. If the “OK” button is pressed by users, only the screen color will be changed and other parameters will not be changed.

Note: If the Saturation or Brightness of the green/blue is lower than 20%, it is possible that the “Auto” automatic color sampling will be failed and users can not see the color change from the screen. In order to solve this issue, users need to improve the lighting and the camera settings.


2. Open Angle:



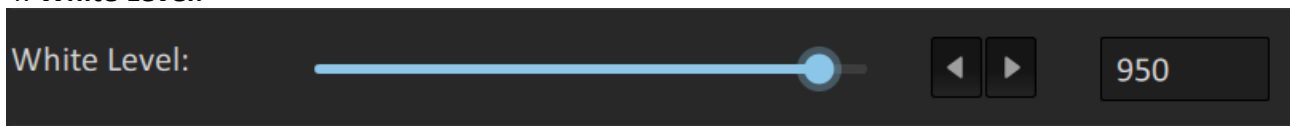
This “Open Angle” option allows users to set a certain degree of the color range in the color wheel to be the chromakey range. (Generally speaking, the default +/-60 is sufficient for users. Only when there are yellow/green objects become translucent, then users need to decrease the degree range to modify those yellow/green objects to solid. Users can adjust the value of the “Open Angle” option by sliders or left-arrow & right-arrow buttons .


3. Black Level:



Please slide the Black Level slider to the right side or press the right-arrow button to increase the black level for eliminating the uneven situation in the composite screen. If the PVW OUT is switched to Matte output, users can see that there are more areas which are eliminated and become black. Users can use the slider or the left-arrow or right-arrow button  to adjust the value of the Black Level option.


4. White Level:



If the green/blue is reflected on the object, it can make more transparent objects to become translucent or to become more solid. (Generally speaking, the best Black Level should be 100~400. If the Cleanliness is too high, it will decrease the detail of the composite screen. It is recommended to improve the lighting of the environment. The White Level must be higher than the Black Level. The best difference is that the White Level value must be 300 higher than the Black Level for achieving more natural effect. Users can adjust the value for the White Level option by using the left arrow or the right arrow button . If the PVW OUT is switched to Matte, users can see that more areas become solid and the color is changed to white.


5. Dark Enhancement:



Please press the switch  which is located next to the Dark Enhancement option to launch the Dark Enhancement function.


6. Dark Level



(Default Level = 200). If the Dark Level is increased, the black object or hair will become more apparent. Users can use the slider of the left-arrow or the right-arrow button  for adjusting the value of the Dark Level option.


7. Bright Enhancement:



Please press the switch  which is next to the Bright Enhancement to launch the Bright Enhancement function.


8. Bright Level:



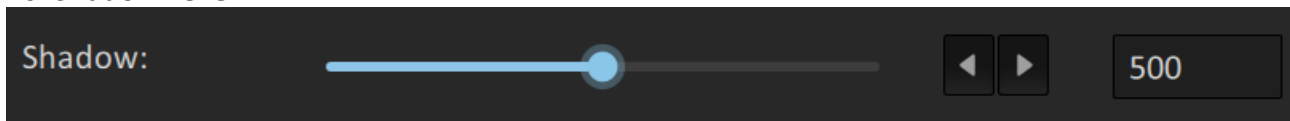
Bright Level: (default Level=200). If the Bright Level is increased, the transparent object, glass or smoke will become more apparent. Users can adjust the value of the Bright Level option by using the left-arrow or right arrow button .


9. Shadow Enhancement:



Please press the switch  which is located next to the Shadow Enhancement to launch the Shadow Enhancement function.

10. Shadow Level:



In special situation, users can use shadow for creating shadow on the ground or to restore the fine black hair. (If users don't need this function, please shut down this function). Users can use the left-arrow or the right-arrow button  to adjust the value of the Shadow Level.


11. Spill Suppression:

- **Default:** The Spill Suppression option of the DVK-400 provides users three default Spill Suppression level including "Spill Low", "Spill Mid" and "Spill High". Users can push one button for applying their desired Spill Suppression setting.

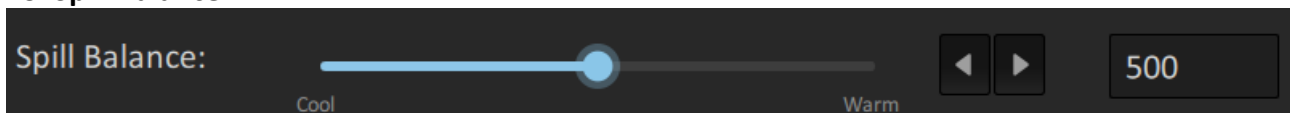



12. Spill Suppression:



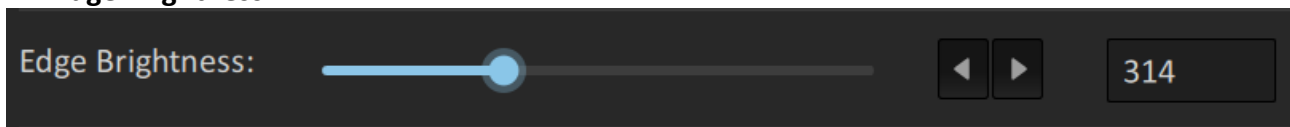
The Spill Suppression option is used to restore the reflective green or blue. If the Spill Suppression is increased, it can restore the reflective green or blue for the subject. Generally speaking, the suitable Spill Suppression range is from 400 to 700. (The default value is 500). Users can use the slider, the left-arrow or the right arrow button  to adjust the value of the Spill Suppression option.


13. Spill Balance:



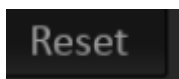
If the Spill Balance value is increased, the skin tone will be biased towards warm colors. If the Spill Balance value is decreased, the skin tone will be biased towards cool colors. The suitable Spill Balance value is 500. Users can use the slider, the left-arrow button or the right-arrow button  to adjust the value of the Spill Balance option.

14. Edge Brightness:



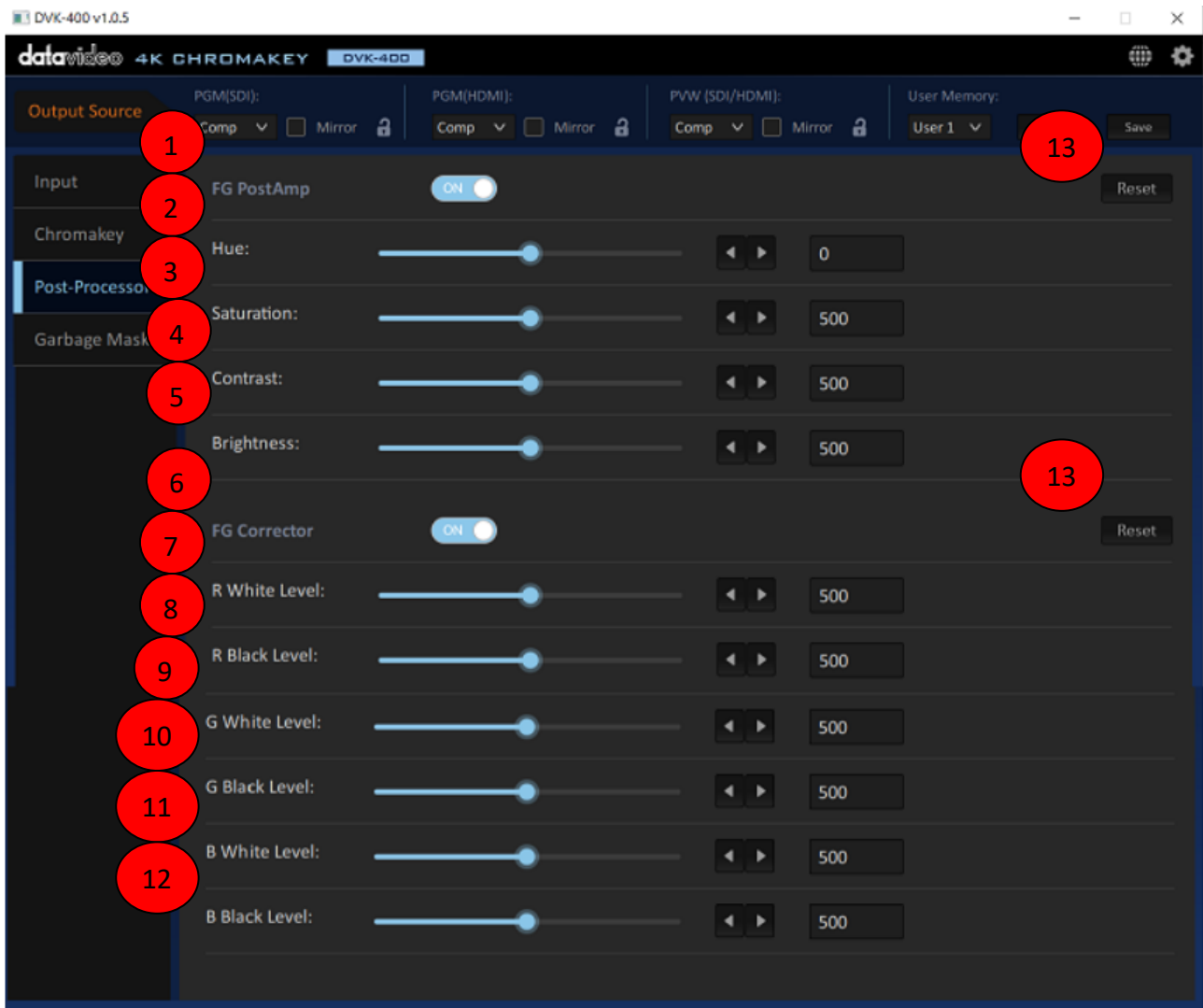
Users can adjust the Edge Brightness for making the Edge Brightness to be closer to the background color. If the Edge Brightness value is too low, it will make the black edge to become darker. Users can use the slider, the left-arrow button or the right-arrow button  to adjust the value of the Edge Brightness option.

15. Reset:




Please press this Reset button for resetting related options.


- **Post Processor:** The main interface of the Post Processor is shown as following diagram.



1. FG PostAmp:


FG PostAmp: Please press the  to launch the FG PostAmp function.

2. Hue: This option is used for the adjustment of the Hue for the foreground screen. Users can use the slider, the left-arrow button or the right-arrow button  to adjust the value of the Hue option.


3. Saturation: This option is used for the adjustment of the Saturation for the foreground screen. Users can use slider, the left-arrow button or the right-arrow button  to adjust the value for the Saturation option.

4. Contrast: This option is used for the adjusting of the Contrast for the foreground screen.


5. Brightness: This option is used for adjusting the Brightness of the foreground screen.

6. **FG Corrector:** This option is used for RGB color calibration. Please click the  to launch the FG Corrector function.


7. **R White Level:** This option is used for Red White Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the value of the R White Level option.

8. **R Black Level:** This option is used for Red Black Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the R Black Level option.

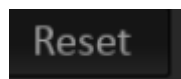
9. **G White Level:** This option is used for Green White Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the value of the G White Level.

10: **G Black Level:** This option is used for Green Black Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the value of the G Black Level.

11. **B White Level:** This option is used for Blue White Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the value of the B White Level.

12. **B Black Level:** This option is used for Blue Black Level calibration. Users can use the slider, the left-arrow button and the right-arrow button  to adjust the value of the B Black Level.


13. **Reset:**



Press this Reset button for resetting the related options.

- **Garbage Mask Option:** The main interface of the Garbage Mask is shown as following diagram.



1. **Windows:** Please press the  button to turn on/turn off the foreground matte display range.


2. **Left:** This option allows users to adjust the left-side matte, the higher the value is, the more the left-side edge of the foreground screen will be cropped.

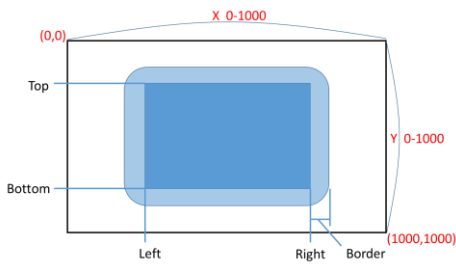
3. **Right:** This option allows users to adjust the right-side matte, the higher the value is, the fewer the right-side edge of the foreground screen will be cropped.

4. **Top:** This option allows users to adjust the top-side matte, the higher the value is, the more the top-side edge of the foreground screen will be cropped.

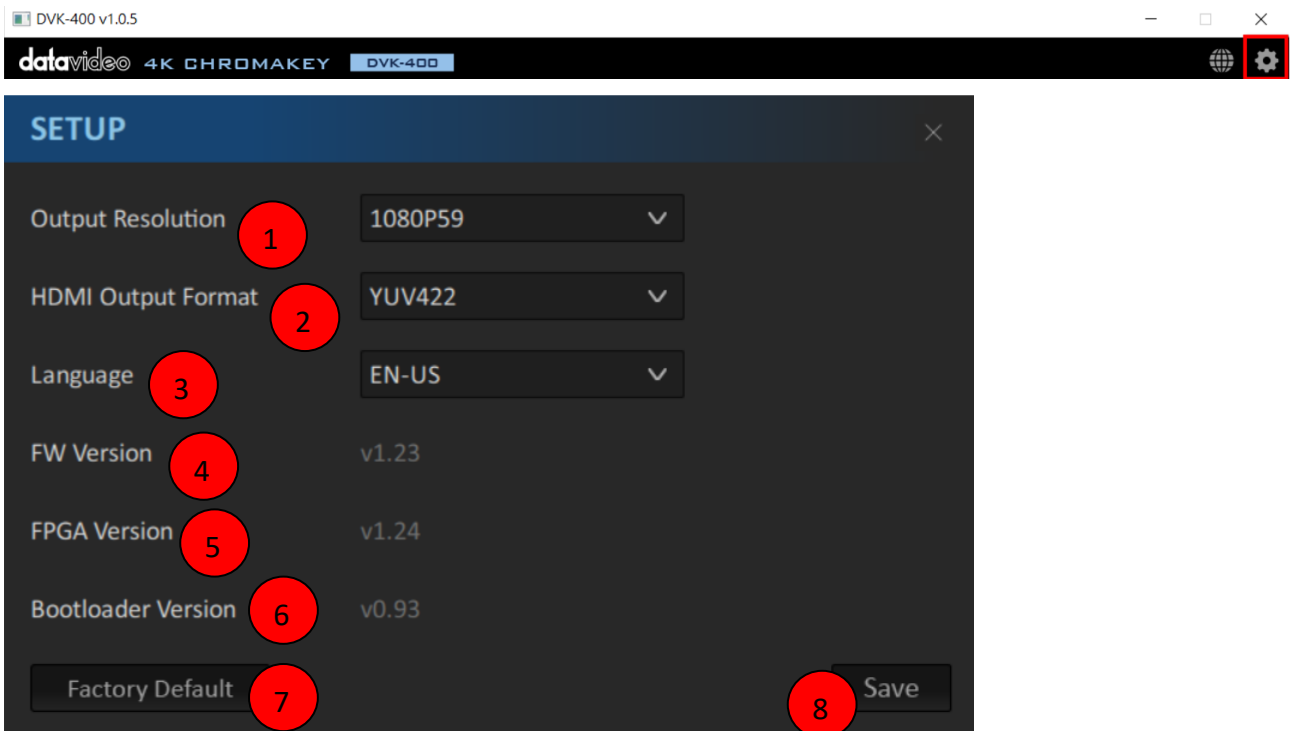
5. **Bottom:** This option allows users to adjust the bottom side matte, the higher the value is, the fewer the bottom-side edge of the foreground screen will be cropped. .

6. **Border:** When the Border value becomes higher, the rectangular area will be expanded to create a Rounded gradient soft edges from 0 to 100 degrees.

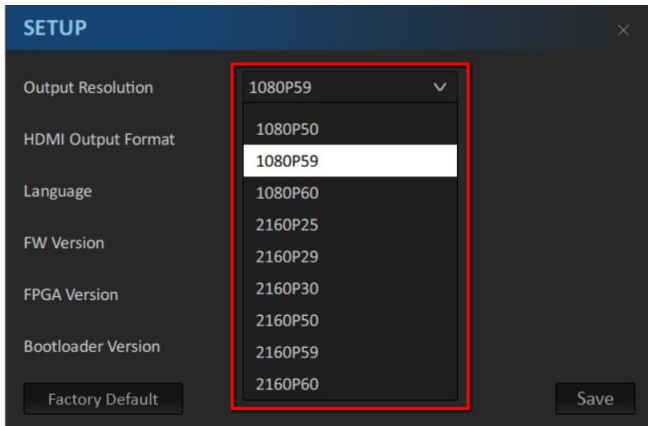
7. **Invert:** Please press the  button to turn on/turn off the invert function. If the Invert button is set to open and then the related cropping of the Garbage Mask will be done in reversal direction.



- Setup: The main interface of the Setup option is shown as following diagram. Please open the main interface of the Setup option from following diagram.

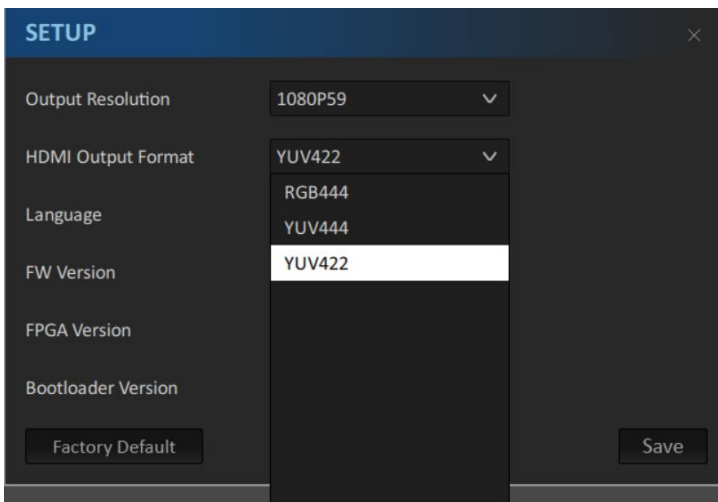


1. Output Resolution: After the DVK-400 is connected, please set the output resolution to be as the same as the resolution of the foreground camera from this Output Resolution drop-down menu.



Note: After the “Output Resolution” in the SETUP option is set, please press the “Save” button for SETUP option and then those formats will become effective.

2. HDMI Output Format: This drop-down menu allows users to select many HDMI output formats including RGB444, YUV444 and YUV442. After the “HDMI Output Format” is set, please remember to press the “Save” button and then the new setting will take effect.



3. Language: The DVK-400 provides three Language options for users including English, Traditional Chinese and Simplified Chinese. After the “Language” option is set, please remember to press the “Save” button and then the new setting will take effect.
4. FW Version: Users can know the motherboard firmware version of the DVK-400 from this option.
5. FPGA Version: Users can know the FPGA Version of the DVK-400 from this option.
6. Bootloader Version: Users can know the Bootloader version of the DVK-400 from this option.
7. Factory Default: Users can press this button to set those settings to Factory Default values.

8. Save: This is the “Save” button. For the options including “Output Resolution”, “HDMI Output Format” and “Language”, users need to press the “Save” button after each option is set for taking effect those options.

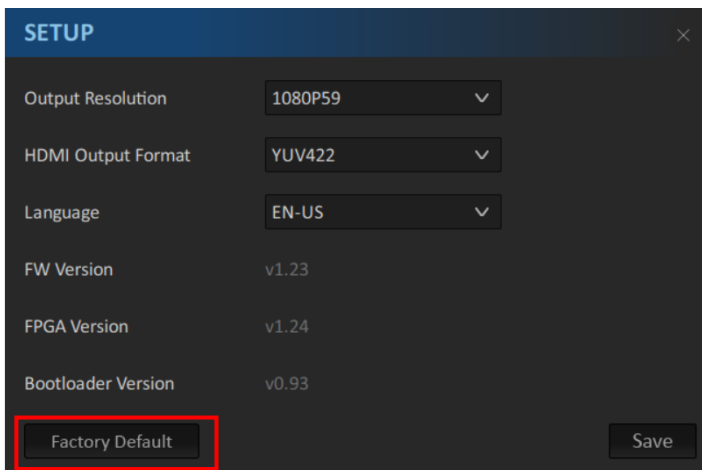
5.4 How to Reset the DVK-400 to Factory Default Settings

Please follow following steps for reset the DVK-400 to Factory Default Settings.

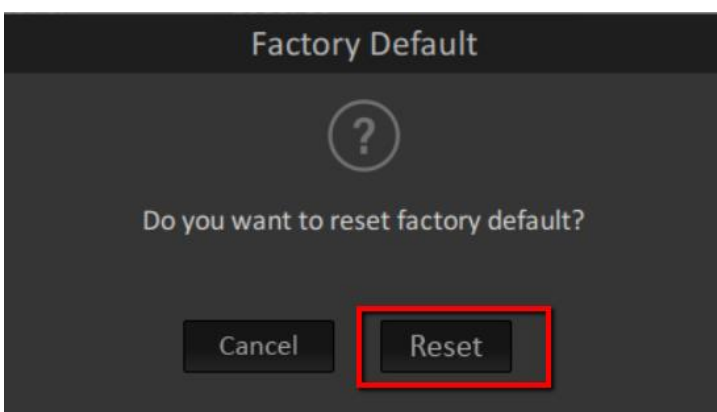
1. Please press the “Setting” icon after the DVK-400 software is launched.



2. Please press the “Factory Default” button.



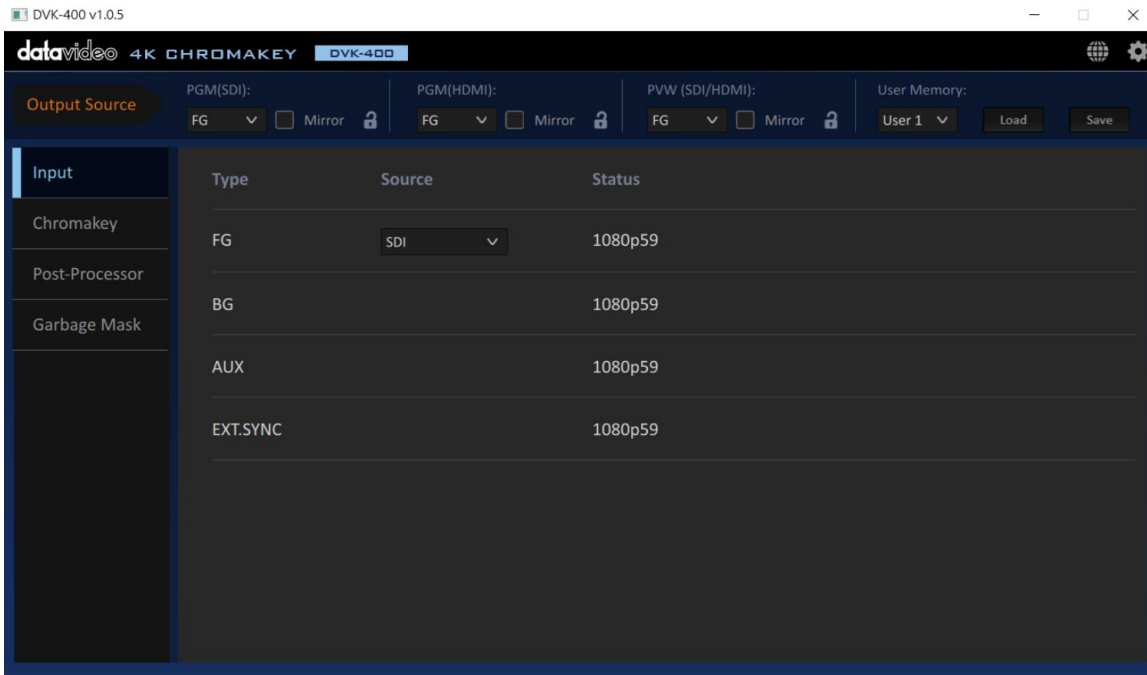
3. Please press the “Reset” button and then the DVK-400 will be reset to Factory Default Settings.



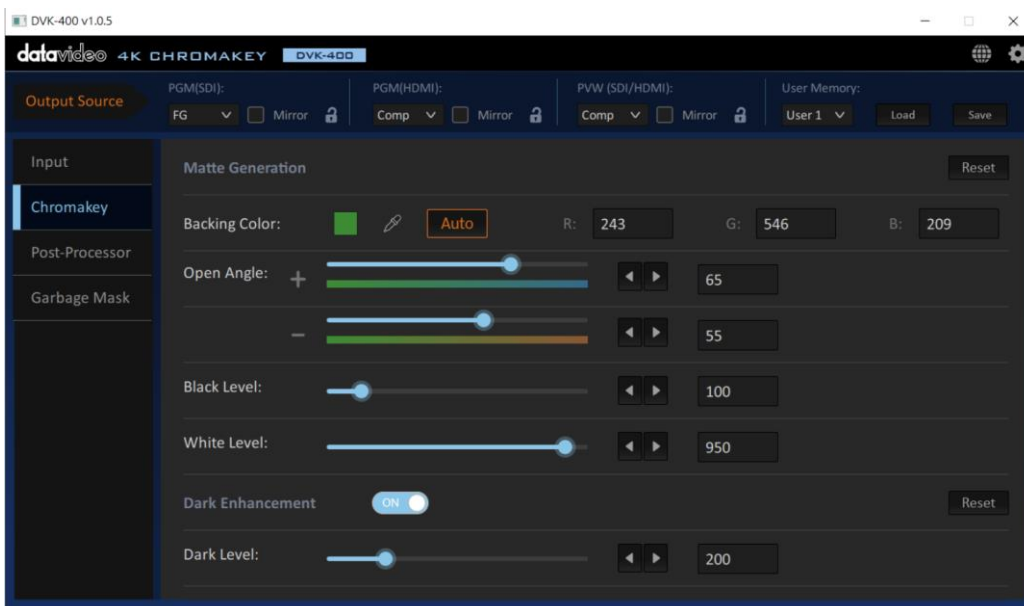
Chapter 6 How to Use the Chromakey Function for Video Chromakeying


Please follow following steps for Video Chromakeying by using the DVK-400 4K Chromakey.

1. Please make sure that the DVK-400 is connected successfully according to instructions in previous chapter. Moreover, please make sure that all network related settings are set successfully.
2. Please launch the DVK-400 control software.



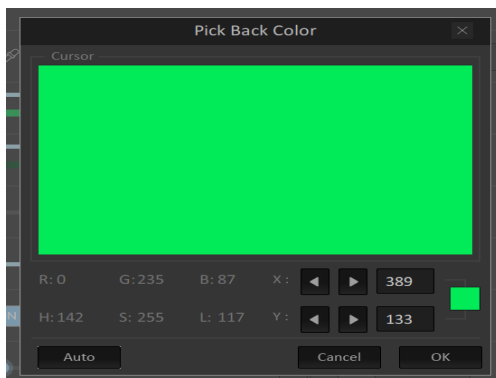
3. Please click the "Chromakey" option.



4. Please press the “Auto” icon  in the “Backing Color” option for Auto Chromakeying.

The PWM OUT screen will be switched to the Foreground screen temporarily and there is a “+” icon that will be shown and moved for 2 seconds for auto color sampling. After the screen color is calculated automatically, all parameters in the Chromakey page will be reset to factory default values and the video chromakeying will be done automatically.

5. There is a “Pick Back Color” background color sampling window that will be shown. Moreover, there is a “+” icon that will be shown when the mouse is moved. At the same time, users can see the movement of the “+” icon from the PGM OUT screen. Please move the “+” icon to the area of your desired reference color and then please click the mouse once. After that, please click the “OK” button and then the background color will be calculated automatically.



6. The video Chromakey procedure is finished until this step. If users are not satisfied about the outcome of the Auto Chromakey, please fine-tuning a variety of control parameters in the software. There are some rules of the fine-tuning which are shown as following points.

- Increase the Black Level: This can help users to eliminate the unevenly lit screen.
- Decrease the White Level: This can help users to make the object which is affected by the screen reflection to become solid.
- Increase the Dark Level: This can help users to make the dark object or the black hair to appear.
- Increase the Bright Level: This can help users to make the bright object or glass to appear.
- Increase the Shadow Level: This can help users to make shadows or the end of the black hair to appear.
- Increase the Spill Suppression: This can help to make the skin tone natural.
- Adjust the Edge Brightness: This can help users to make the edge of the object or the translucent brightness to match the background picture naturally.

6.1 Example for Video Chromakeying by the DVK-400

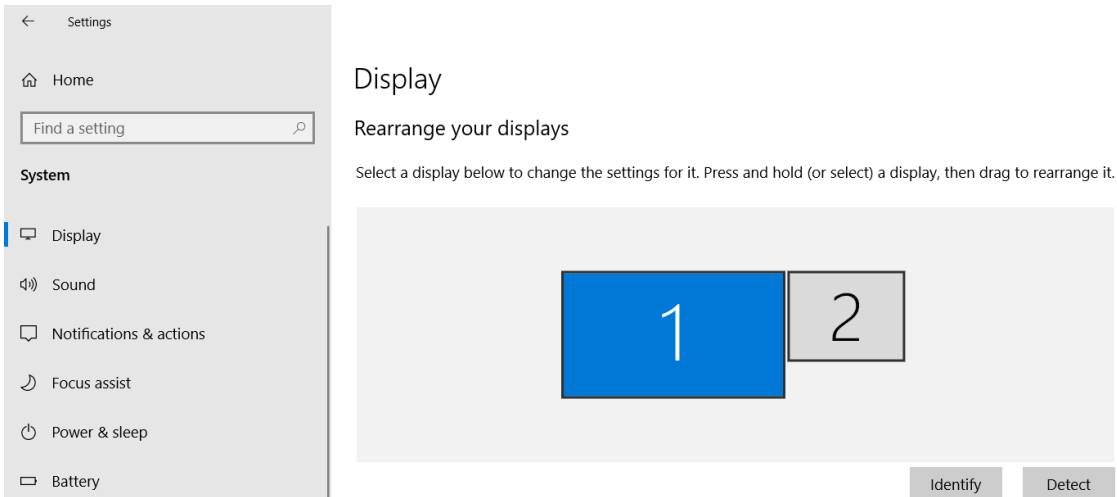
- At first, when the video is not chromakeyed, the background green mat is shown in green which is shown as following diagram.



- After the Auto Chromakey is done according to previous procedures, the screen will be shown as following diagram. The area which is shown in black is the chromakey area for the original green mat. The area which is shown in white is the solid area that will be kept after the Auto Chromakey is done.



- After that, please set your Monitor 1 as “Extend these displays”



Multiple displays

Multiple displays


Extend these displays ▼

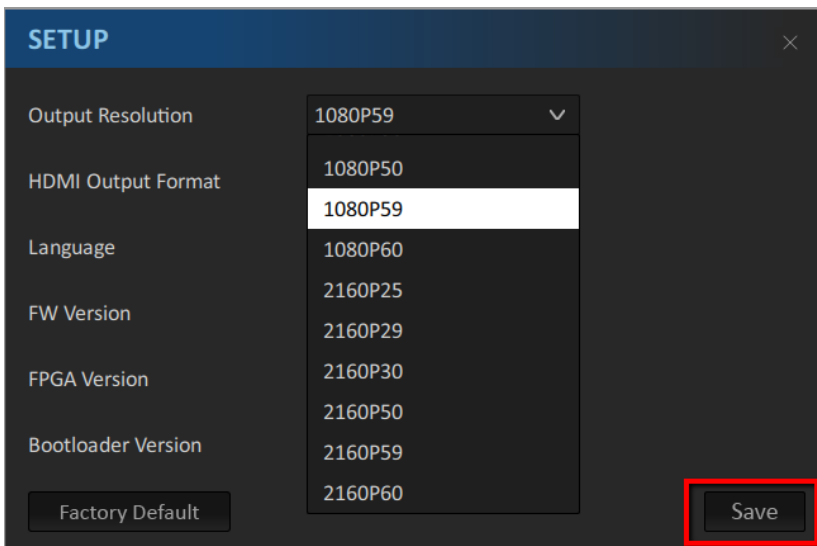
Make this my main display

[Connect to a wireless display](#)

[Advanced display settings](#)

[Graphics settings](#)

- Please press the  button within the DVK-400 software to set the resolution of your monitor 2 to be the same as the resolution of the foreground camera. After that, please press the “Save” button.



- Please prepare the background video material in advance.



- Please play the prepared background video and then please drag this video to the external connected extended monitor. After that, the final chromakey outcome will be shown as following diagram.



Chapter 7. Firmware Update

Please follow following steps for updating the DVK-400 firmware.

1. Please download the latest DVK-400 firmware from the Datavideo official website www.datavideo.com
2. Please prepare a USB thumb drive and then please unzip the downloaded firmware file to the root directory of the USB thumb drive. Please make sure that the USB thumb drive must be formatted to FAT16 or FAT32 format in advance.
3. Please unzip the downloaded firmware file to the root directory of the USB thumb drive and then you can see that there are two files including DVK400FW.bin & DVK400FP.bin.
4. Please insert the USB thumb drive into the **FW UPGRADE** interface which is located on the rear panel of the DVK-400.

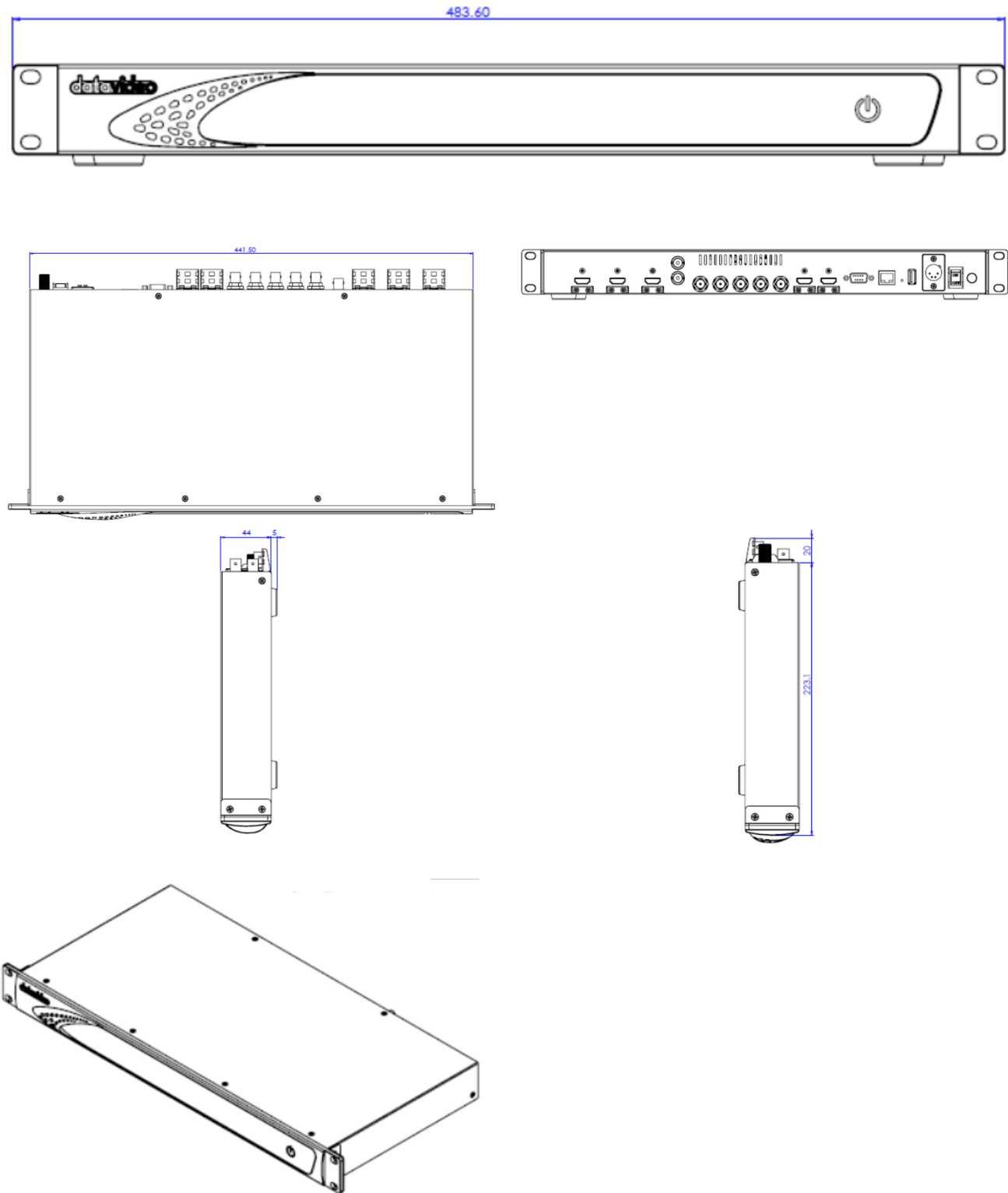


5. Please connect any SDI OUT or HDMI OUT to an external connected monitor and then please turn on the power of the DVK-400. After that, the firmware upgrading of the DVK-400 will be started automatically. It will cost for about 1 minutes and there is no picture that will be shown on the screen. If there is any LED indicator on the USB thumb drive, the LED will be blinking.
6. After the firmware update process is done, all of the HDMI or SDI output interfaces will output the 1080p 59.94 color bar which is shown as following diagram. When the color bar is shown, it means that the firmware update procedure is done and the USB thumb drive can be removed.



Note: If the firmware update procedure is failed, there is no output screen for about 1 minutes. Please connect your notebook PC to the DVK-400 by the PC DVK-400 App (by RS-232 or DVIP interface). After the connection is established, the color bar will disappear and the resolution will go back to the original resolution. Please check whether the Firmware, FPGA and Bootloader versions are updated correctly or not through the SETUP option.


Chapter 8. Dimensions



Unit: mm

Chapter 9 Frequently-Asked Questions

This section describes problems that you may encounter while using the TVS-3000. If you have questions, please refer to related sections and follow all the suggested solutions. If problem still exists, please contact your distributor or the service center.

NO.	Problems	Solutions
1	How to restore the factory default IP address of the DVK-400?	<p>When the DVK-400 is connected to the notebook PC directly by the static IP, if the IP address can not be scanned, it is possible that this DVK-400 was set in DHCP mode. To solve this issue, please press the IP RESET hole which is located on the rear panel of the DVK-400 and then please turn off and turn on the power of the DVK-400. After the IP RESET hole is pressed for about 5 seconds, please release it. And then the IP address of the DVK-400 will be restored to the factory default static IP address 192.168.100.120. At this time, users can scan the IP address for further connection.</p>
2	Why sometimes the FG Status in the Input column of the DVK-400 App can not be recognized and what is shown is “None”?	<p>Please make sure that the DVK-400 is connected correctly. If users switch to different output source and there is no change for the output, it means that there is no connection between the DVK-400 and the DVK-400 App. Please reconnect the DVK-400 and the DVK-400 App again to solve this issue.</p> <p>If the connection is established correctly, please make sure that the SDI or HDMI setting is the same as the physical connection and then the correct status can be shown.</p>
3	Why users press the  icon to sample the screen color of the FG, however, the sampling screen can not be shown on the PGM OUT?	<p>It is recommended to connect to PVW OUT when operating the DVK-400 and it will switch to foreground automatically and the cursor (+) will be shown. If users connect to PGM OUT, this function can not be used.</p>

<p>4</p>	<p>Why if users use Mac or PC to be the Background input source by connecting an HDMI cable to the DVK-400, the resolution that is detected by the DVK-400 will always be the 4K resolution (2160P60/P29)? How to solve this issue?</p>	<p>The reason for this issue is that the video source will fix the output resolution to DVK-400 supported maximum 4K resolution. Please refer to following paragraphs for solving this issue.</p> <ul style="list-style-type: none"> ● For Mac: The resolution switching function is not supported by the default function of the Mac OS. The Scaled UI will fix the output resolution at 4K resolution. (When the 1920 x 1080 resolution is selected, the output resolution will be enlarged to 4K resolution). Please install following Free App to set the resolution to 1080p by yourself. Display Menu: http://displaymenu.milchimgemuesefach.de/index.html ● For PC: Please find out whether your system has the multi-monitor resolution setting function. If the answer is No, please use a general Windows 10 Notebook PC to be the background input source for the DVK-400.
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Chapter 10. Specifications

Model Name		DVK-400
Product Name		4K Chromakey
Interface		
Inputs	Foreground Camera	1 x 12G/3G-SDI 1 x HDMI 2.0
	Background Camera	1 x HDMI 2.0
	AUX Input	1 x HDMI 1.4 (Used to input the Lumakey overlay or the external matte)
Outputs	Video Camera	1 x 12G/3G-SDI Camera loop out
	Video PGM Output	2 x 12G/3G-SDI 1 x HDMI 2.0
	PVW Output	1 x 12G/3G-SDI
	PGM Mirroring, PFG, Matte, Input	1 x HDMI 2.0
Sync Reference Signal		Input & Loop Output (Tri-Sync or Black Burst)
Control Ways		Ethernet, RS-232
Firmware Update		By USB
Power		DC IN 7~15V
Standard		
Foreground Camera Video Input Format		3840x2160p60/59.94/50/30/29.97/25 1080p 60/59.94/50/30/29.97/25 1080i 60/59.94/50
Background Video Input Format		3840x2160p60/59.94/50/30/29.97/25 1080p 60/59.94/50/30/29.97/25 1080i 60/59.94/50
Video Output Format		3840x2160p60/59.94/50/30/29.97/25 1080p 60/59.94/50/30/29.97/25 1080i 60/59.94/50
Video Process		4:4:4 10bit
Color Space		SDI: YUV 4:2:2 HDMI: RGB 4:4:4 or YVU 4:4:4/YVU 4:2:2
General		
Operating Temp.		0°C to 40°C (32°F to 104°F)
Storage Temp.		-20°C to 60°C (-4°F to 140°F)
Humidity		10% to 80% (Non-condensing)
Dimensions(mm)		483.6 x 242.8 x 44
Weight		2.7 Kg

Note

Note

Service & Support

It is our goal to make owning and using Datavideo products a satisfying experience. Our support staff is available to assist you to set up and operate your system. Contact your local office for specific support requests. Plus, please visit www.datavideo.com to access our FAQ section.



Please visit our website for latest manual update.

<https://www.datavideo.com/product/DVK-400>

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