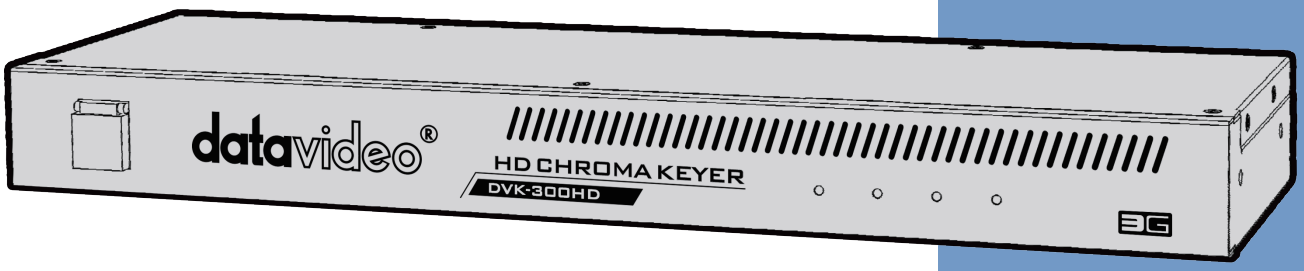
datavideo



HD/SD CHROMAKEY
DVK-300HD

Instruction manual

www.datavideo.com

Table of Contents

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's 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

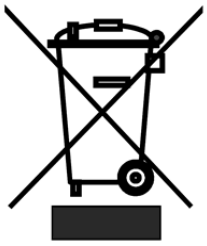
Standard Warranty

- Datavideo equipment are 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 beings 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.
- 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.
- Cables and batteries 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 are qualified 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, Camera module, PCIe Card 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.

1. Product Overview

Our chroma key solution ensures a high quality keying effect in the case of both green and blue backdrops. The key supports all popular video formats: 3 Gb/s, HD and SD. Multiple languages are also supported such as English, Traditional Chinese, Simplified Chinese, Polish, French, Spanish and Portuguese.

The device supports two keying modes, Chroma Key and Luma Key.

Chroma Key Mode - This function enables the DVK-300HD to be used for chroma keying. Camera input is fed with object on a green or blue backdrop. Background is generated by PC or any other media sources.

Luma Key Mode - This function enables the DVK-300HD to be used for luminance-based keying. Camera input is fed with object on a black or white backdrop. Background is generated by PC or any other media sources.

1.1 Algorithm – Strength of our solution

The principal component of the key is a unique algorithm that has been developed and improved by our company for several years now. This long-term optimization of the algorithm allows us to offer you a combination of a very good picture quality and an exceptional speed of operation.

1.2 Setting Key Parameters – It has never been so easy

The setting of keying parameters in advanced keying equipment is a complex task. Our solution uses a ground-breaking method of setting parameters that involves six simple steps, through which the user is led by a setup wizard. Using this, even a relatively inexperienced user will be able to set optimum key parameters, and the end result will be impressive. The key makes setting fast and simple as the user can just follow the steps listed below.

1. Selection of the keying colour and setting of the key mask
2. Correction of edges and sharpness of objects
3. Removal of keying colour remains (**Despill**)
4. Additional quality-boosting correction
5. Limitation of the mask area
6. Matching of the object to the conditions of the virtual background

In order to achieve perfect keying quality, the scene must be sufficiently lit and the camera signal has to be of a good quality. Full capabilities can be fully utilized for high resolution formats – HD or 3G, but very good results can also be obtained for low resolution SD signals.

2. Features

- Chrominance keyer
- Matte control
- Key noise reduction
- Tolerance correction
- Spill correction
- Edge correction
- Setup Wizard to guide the new user step by step
- Post correction – correction of picture parameters, i.e. brightness, contrast, saturation, ambient colour and intensity, applied to foreground after keying process
- Video inputs (SD, HD, and 3G)
  - Background Inputs: SDI and DVI-I (DVI / VGA); for VGA input, to achieve the best quality, VGA resolution must be as close as possible to output resolution
  - Camera Inputs (foreground): SDI and HDMI
- Video outputs (SD, HD, and 3G)
  - Output will be of the same resolution as the camera input
  - Main Output 1 (2xSDI) – Foreground on background or matte view
  - Main Output 2 (HDMI) – Foreground on background or matte view
- Garbage mask
  - Used to reduce the mask size by cutting it (in all of the possible directions: left, right, up, down)
- Hardware
  - LAN: DHCP and True Static modes for remote access from PC
  - RS 232: point-to-point remote access from PC
  - Signal LEDs: detects signal and input format
  - RESET: restores all settings to factory default

3. Functions

3.1 Front Panel

Power Switch

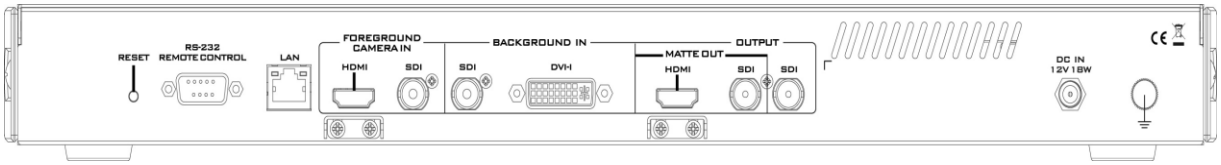
Switches DVK-300HD On/Off

Input Source Indicators

CAMERA IN – Camera Source Input Indicators (SDI / HDMI)

BACKGROUND IN – Background Input Indicators (SDI / DVI)

3.2 Rear Panel

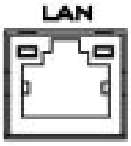


RESET

The reset button restores factory default settings.

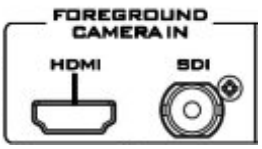
RS-232

RS-232 for direct connection to the PC for remote access (Please see the RS-232 Control Protocol section for details) and firmware upgrade.



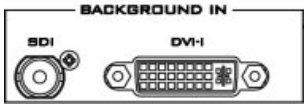
LAN

10/100Mbps Ethernet Network interface for remote access from the PC.
This port connects the DVK-300HD to Laptop or PC so that the user will be able to configure the device using the utility software.



FOREGROUND CAMERA IN

Receives HDMI & SDI input signal from your HDMI or SDI equipped camera or device.



BACKGROUND IN

Receives SDI & DVI-I input signal from your SDI or DVI-I equipped camera or device.

OUTPUT

HDMI & SDI output ports (MATTE OUT is for previewing black & white level chroma key effect).

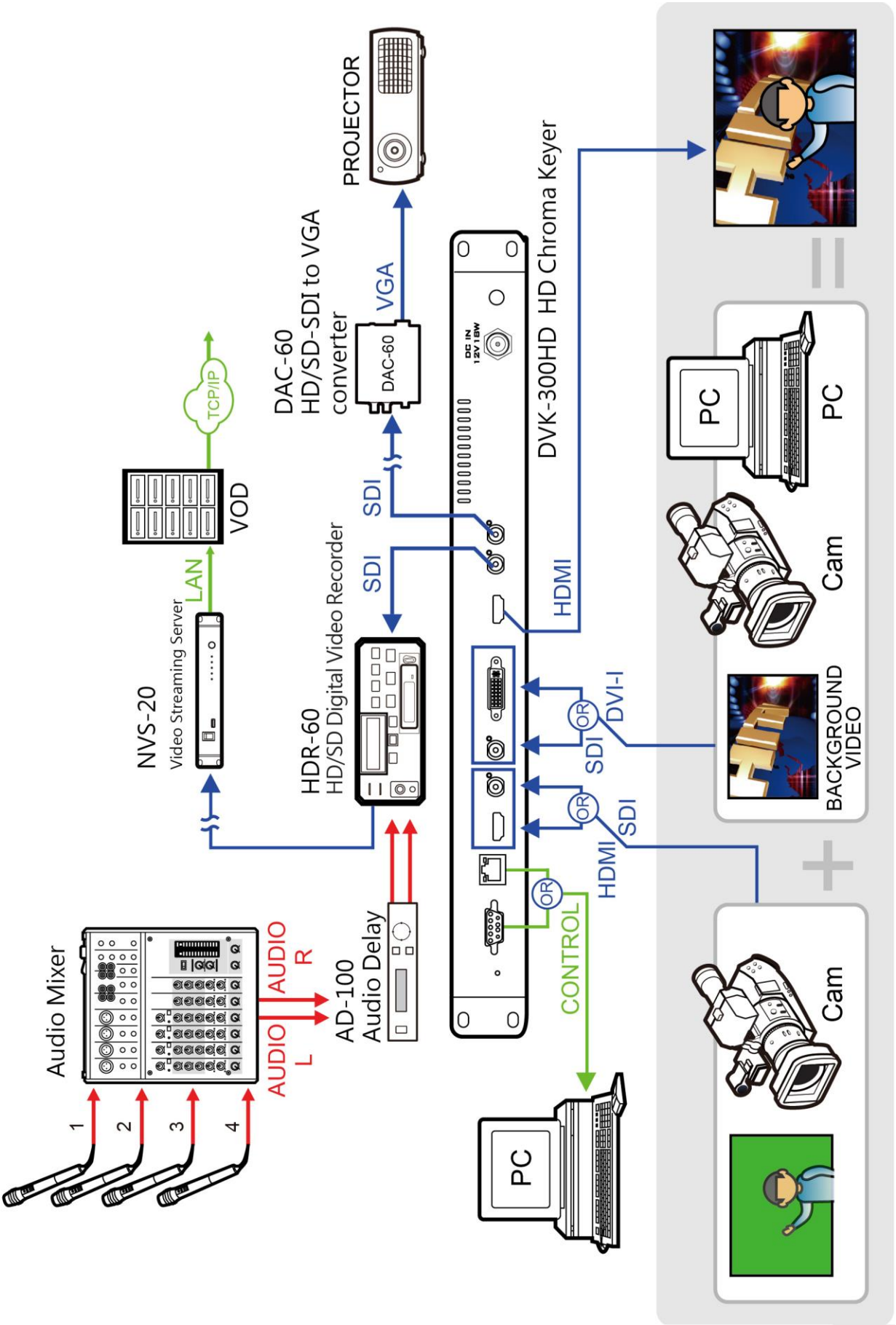
SDI output

SDI output port is for program output.

DC IN

DC IN socket connects the supplied 12V PSU to the device. The connection can be secured by screwing the outer fastening ring of the DC IN plug to the socket.

4. System Diagram

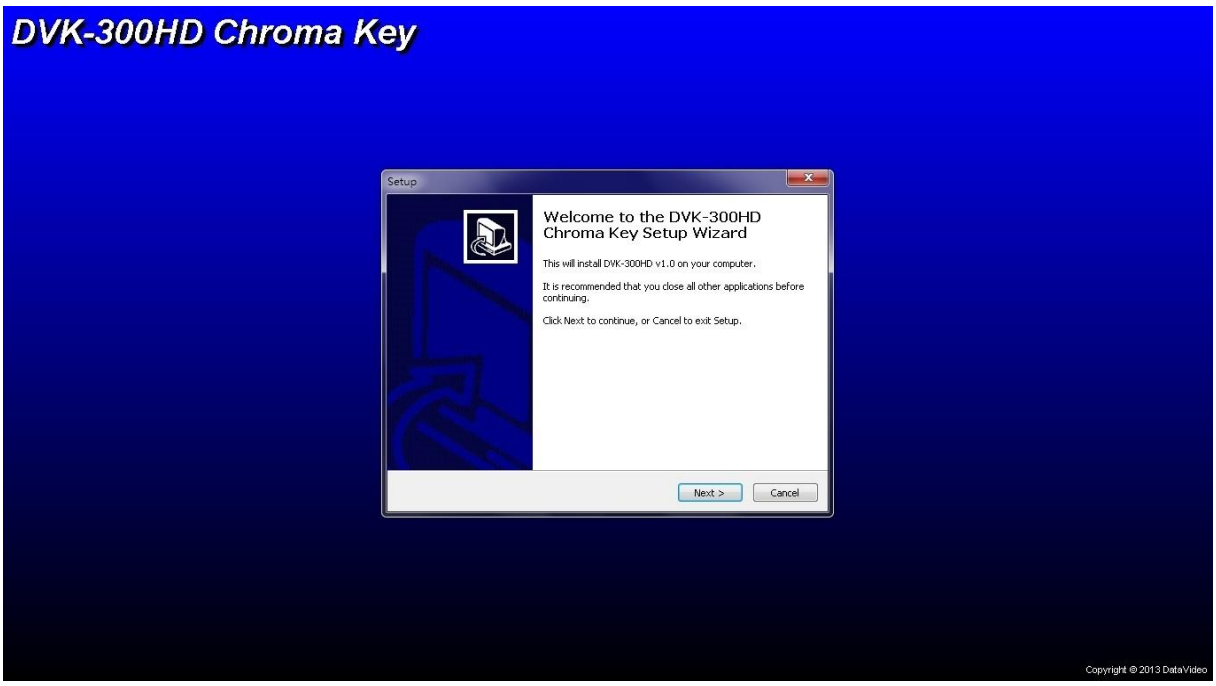


5. DVK-300HD Utility Software Installation

Connect your Laptop or PC to the DVK-300HD via Ethernet port and use the utility software to operate device functions.

Step1: Click the utility installer icon to install the DVK-300HD software.

Step 2: Follow the setup wizard to install the DVK-300HD software step by step.



Step 3: After installation is complete, double click software icon to execute the utility program.

6. The Initial Settings

For proper operation, it is necessary to perform the initial setup of network parameters. Be sure to provide reliable quality connection between the DVK-300HD and the PC on which the control application is installed, in the case of firmware upgrade in particular. Please note that all settings should be preserved during firmware upgrade.

- IP network address assigned by manufacturer: **192.168.1.10**.

- The default device name is **DataVideo ChromaKey**

1. If you are working with a single device, you can connect it directly with a network cable. PC running the application should be set to the IP address of the same subnet 192.168.1.X (e.g. 192.168.1.5) as DVK-300HD.

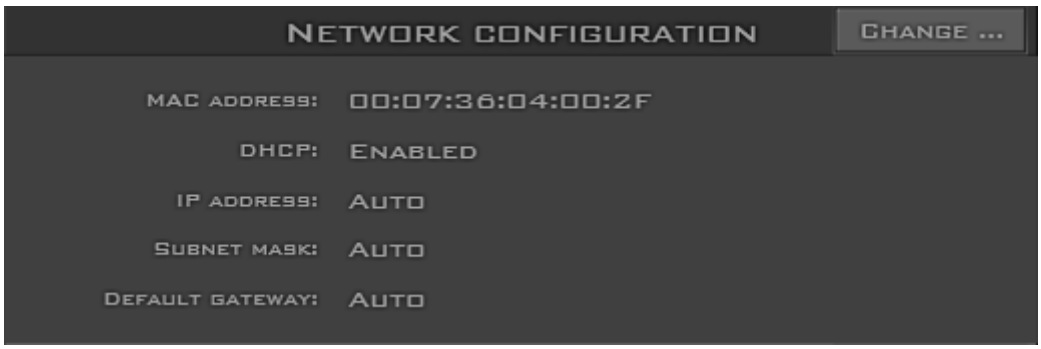
2. If you are working with multiple DVK-300HD devices, it is possible to connect each device with a network cable to the router. In this setup, the PC running the application should be configured to the same subnet as the router to which the DVK-300HD devices are connected.

6.1 Dynamic IP Address Assignment

After connecting the power and network cable, each of the devices by 30 seconds automatically attempts to retrieve the IP address of the network in accordance with the principle of dynamic IP allocation from your router. When it fails, the IP address of the device is set to the default value (192.168.1.10). In this case, check the quality of the network cable connections and repeat the procedure again by disconnecting and reconnecting the power cord to the device.

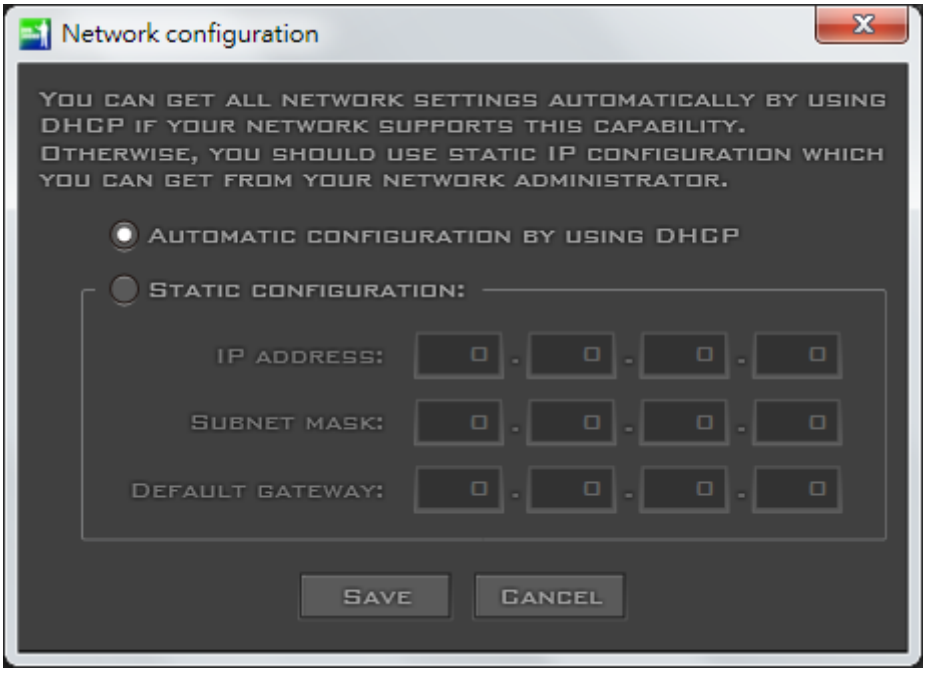
6.2 Static IP Address Assignment

- Open the DVK-300HD Chroma Key application
- Select a device from the list of available devices
- Select the Configuration button located at the bottom right of the main window
- Select the **Change** button in the Network configuration



Network Configuration

- Enter the IP address and subnet mask and click the Save button to complete the network configuration



The window for changing network parameters

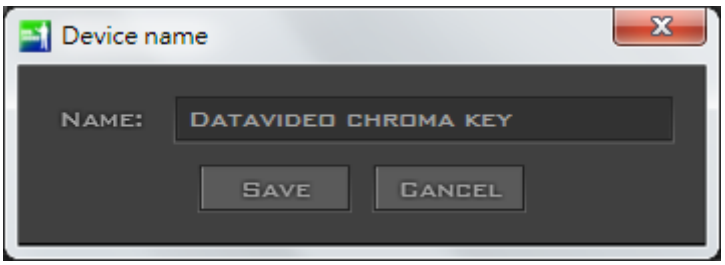
6.3 Change the Device Name

It is recommended that each time you connect the device and after assigning an IP address to the device, the following steps are carried out to change the name of the device.

- Open the DVK-300HD Chroma Key application
- Select a device from the list of available devices.
- Select the **Configuration** button located at the bottom right of the main window
- Select the **Change** button in the Device info

Section setting the device name

- Set the device name and accept the setting via the Save button

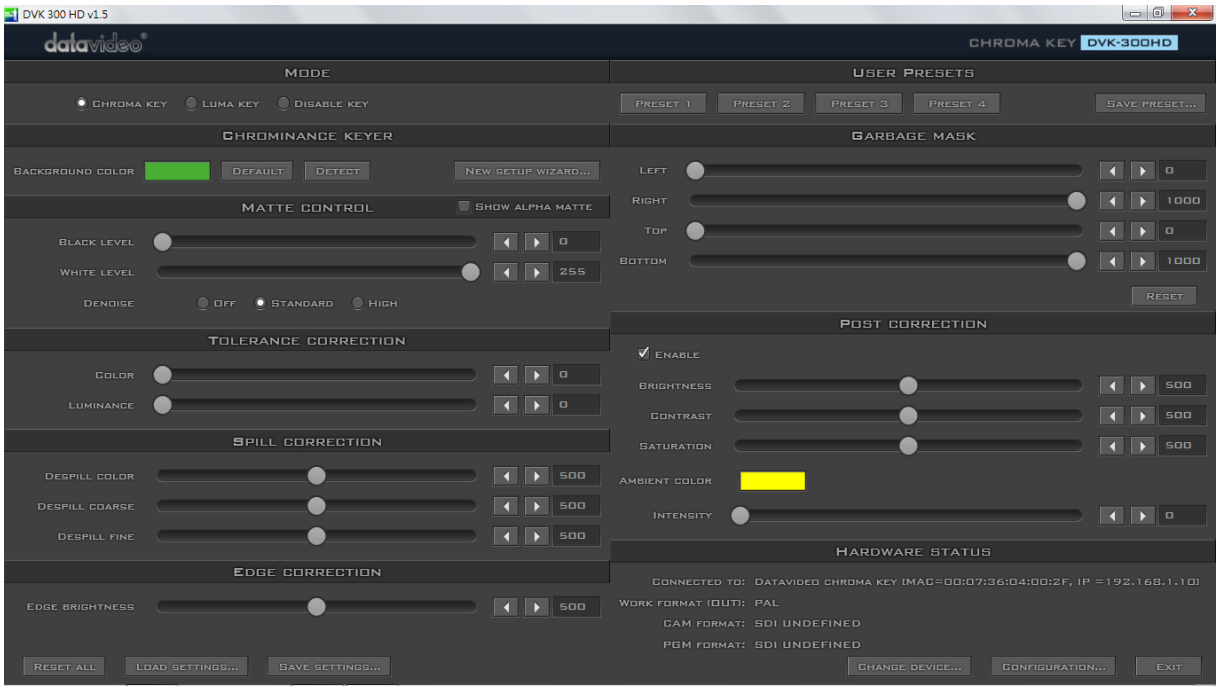


The window for changing the name of the device

6.4 Auto Setting Save Function

An important feature in the firmware version 2.3 and the utility program version 1.3 or later is to allow the device to automatically save the last change of settings by the user after 15 seconds of every settings change. However, if the utility program is closed or the device is shut down within 15 seconds of the last change, the last settings will be lost.

7. DVK-300HD Utility User Interface

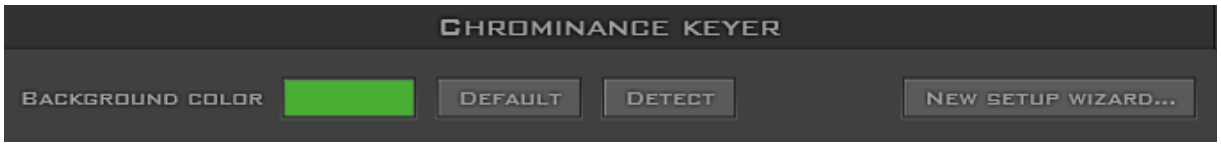


7.1 Keying Colour Selection and Key Mask Setting

The first step is to select the mode of operation in the Mode section – the Chroma key button.

The Mode section

Next, the colour to be keyed out should be selected. This setting depends on the keying background used. There are two possibilities: green or blue. The choice is made by clicking on **Background color** in the **Chrominance keyer** section.

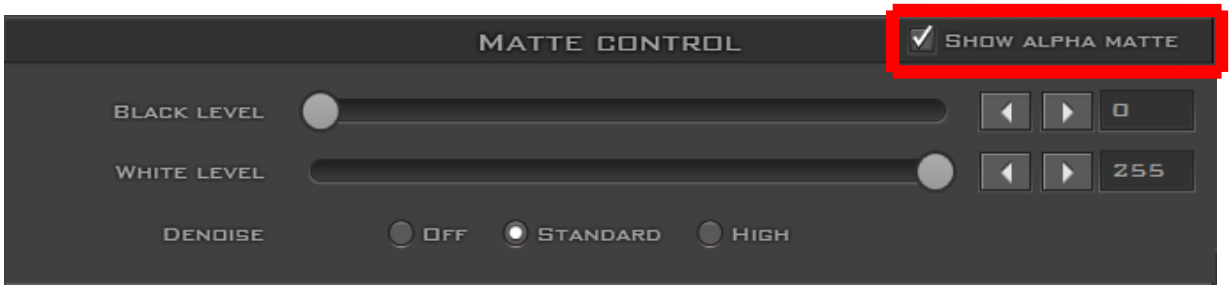


The Background color function

If the colour of the keyed out background is not uniform, the user can make use of the Detect button, which will calculate the background's RGB parameters using the automated average. If the parameters cannot be accessed, the user will be notified about it via a message window, after which the colour will be reset to default. The Default button is used to select the default colour.

7.2 Show Alpha Matte Function

The next step is preliminary keying setting. This is done with the **Show alpha matte** function, which – after a checkbox is checked – will show a matte view for which colours closer to white are non-transparent and those closer to black are transparent.



Show alpha matte function

The Show alpha matte view

The intended result is to make the mask background colour as close to perfect black as possible. In order to do that the **Black level** slider should be moved until black is distributed as evenly as possible on the mask background.

The Black level slider

A view after a Black level adjustment

If the slider is moved to the extremes, the other objects will lose their properties and become non-transparent; this is why the function should be applied sparingly so that small differences are still discernible in the distribution of the black background.

The successive step is to obtain a uniform distribution of white on objects which will remain fully non-transparent. This uneven distribution may arise from the fact that the colours of the object may have colour components close to the keying colour. In this case an adjustment can be made using the function known as **White level**.

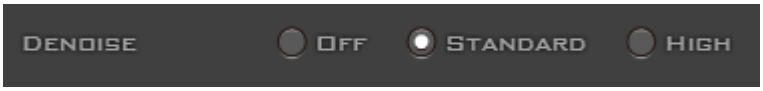
The White level slider

By moving the slider from the maximum value to the left, you can obtain a perfect distribution of white on a given object.

A view after a White level adjustment

In many cases, the option **White level** will be used in conjunction with the option **Black level** in order to obtain the most possible effective settings of the black background, with no losses on white objects and vice versa.

Picture from a camera will always contain some noise; the DVK 300 enables automatic correction of interference by means of the **Denoise** option, which has two settings: standard and high.



The Denoise buttons

7.3 Correction of Object Edges and Sharpness

As seen in the view after a White level adjustment, an extension of the range by means of the **White level** function usually results in the restoration of a uniformly black surface to slight grays.

In this case, in order to adjust the grayness, two further functions from the **Tolerance correction** section are needed. The first one is called **Color** and its use leads to the restoration to a uniform black structure of the background.

The Color slider

The other one, **Luminance**, improves the structure of the uniform colour of the white mask.

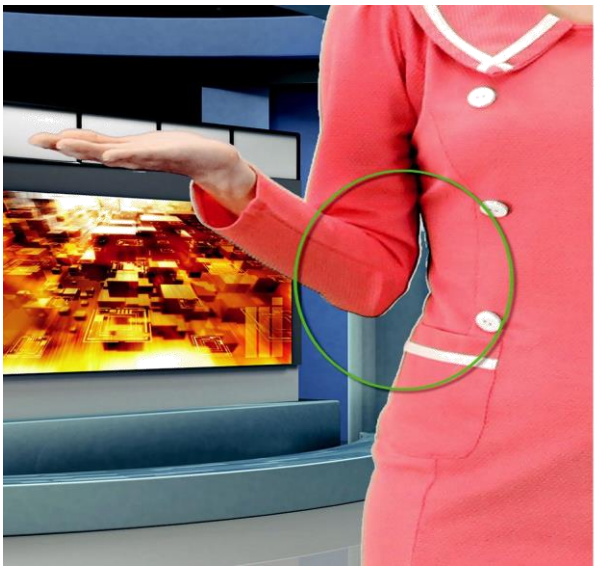
The Luminance slider

It improves in particular the visibility of an object in the case of a significant difference in luminance between the background and the object. This means that semi-transparent objects, e.g. a glass or glasses, become more distinct. A view 'before' and 'after' an adjustment is presented in the two pictures below.

A view before a Luminance adjustment

A view after a Luminance adjustment

The **Color** function is also used to bring about another effect. Once the option **Show alpha matte** is switched off and the real picture is restored, it is possible to eliminate unnatural outlines. This can be done by improving the border value between the keyed colour and the object.



A view before a Color adjustment

A view after a Color adjustment

7.4 Removal of Keying Colour Remains (Despill)

Once the correct mask is set, the functions in the **Spill correction** section will eliminate the reflection of the colour of the keyed background in the object.

Impact of the background colour on the object – a view before a Despill correction

Despill color and **Despill coarse** belong to the functions for the preliminary elimination of unwanted colours, and are based on the RGB space.

The Despill color/Despill coarse slider section

Once the **Despill color** slider is moved to position 0 (the left-hand side), the algorithm will automatically remove the green colour component if this is the keyed colour (similarly – blue if the background is blue). Once the **Despill color** slider is moved to position 1000 (the right-hand side), however, the algorithm will automatically add the red colour and the blue colour (if the keyed colour is green) or red and green (if the background is blue).

The **value** of the algorithm is controlled by means of the **Despill coarse** function.

If the keyed background is green, after a certain threshold of the **Despill coarse** function is crossed, the green component is entirely eliminated from the object in the RGB (red, green, blue) space, which results in the transition of colours into the purple (magenta) area.

A view after the green component has been eliminated

Another function enables a more accurate adjustment of the above problem. The use of the **Despill fine** function eliminates the keyed background colour from the object, but this time on the basis of the chrominance components.

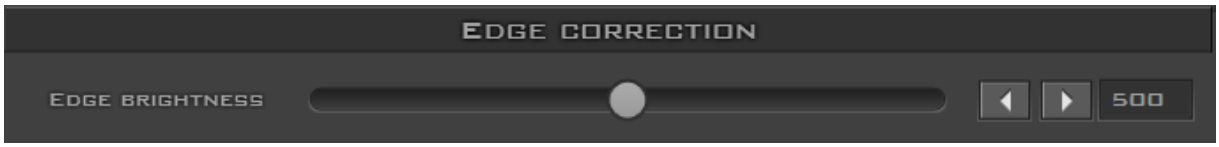
The Despill fine slider

After the application of **Despill coarse**, which is used for preliminary correction, more accurate adjustments can be made, and so the **Despill fine** settings may not have any significant impact on the algorithm if **Despill coarse** is set to high.

Impact of the background on the object – a view after a Despill correction

7.5 Additional Correction to Improve Quality

The **Edge brightness** function is used to correct semi-transparent areas (e.g. hair ends that need to be darkened or brightened) in order to make an object look natural.



The Edge brightness slider

A view before an Edge brightness adjustment

A view after an Edge brightness adjustment

7.6 Limitation of the Mask Area

Garbage mask is used to reduce the mask size by cutting it (in all of the possible directions: left, right, up, down).

The Garbage mask section

This function is used if the view of the keyed background is not large enough to fill in the entire object shot.

A view from the camera area

By cutting the remaining elements by means of the sliders **Left, Right, Top, Bottom**, it is possible to place the object within the area of the keyed background.

A view after a Garbage mask correction with the keying algorithm switched off

After enabling the chroma keying function, the following effect is obtained.

A view after the Garbage mask correction with the keying algorithm switched on

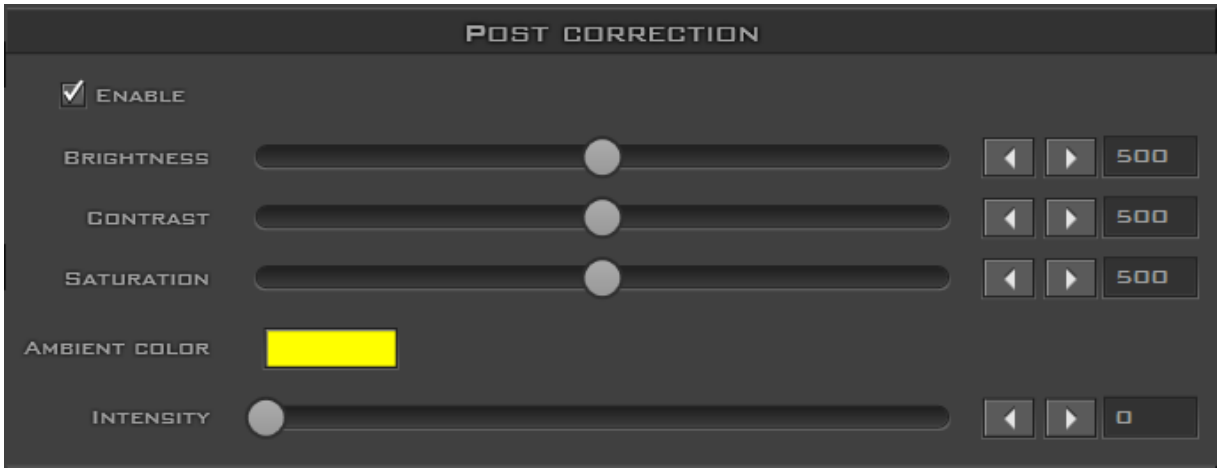
Comments: It should be kept in mind that in this case the object may only move within the area of the cut off mask – otherwise the object will disappear.

Furthermore, if the Garbage mask sliders are used, it is possible to check whether the previous settings were correct and whether they had any influence on the final look of the virtual background.

By moving for instance the Left slider within its full range, no noise, colour shifts or changes in the background grayness should be visible.

7.7 Post Correction

This function matches the object to the conditions of the virtual background. The following functions are used for post-correction of the object and have no effect on its virtual background.



Post Correction section

Enable – this enables the post-correction options to be switched on or off.

Brightness – this enables additional colour brightness to be introduced into the picture.

Contrast – this enables the contrast between colours to be increased.

Saturation – this enables colour saturation to be boosted.

Ambient Color – this enables an ambient component to be introduced into the picture.

Intensity – this enables the ambient colour intensity to be set.

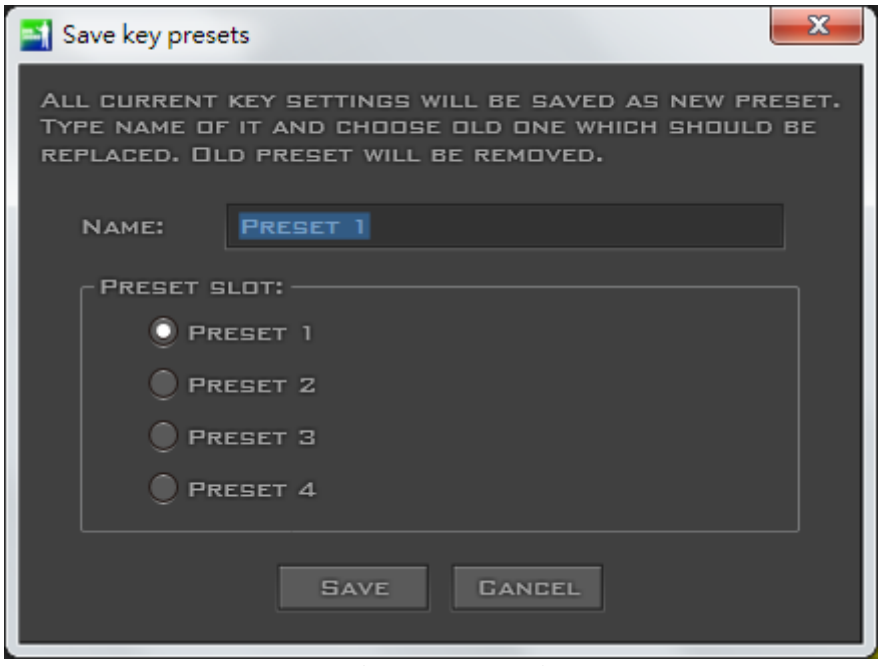
The post correction function is usually used to match an object to a background. This is possible by switching on an additional component of the dominating colour already in the virtual picture. For example, if an object in a studio is shown against a background of a sunny beach, then the yellow colour is added to match the object to the beach (the dominating colour of sand or the sun will be an impact on the object). In simple words, the post correction function will match the object to the existing environment condition.

7.8 User Presets

User Presets section

Preset Name
These are four buttons enabling slider settings to be loaded from data recorded in the device. Each button has a name that can be modified when a given setting (preset) is saved.

Save Preset
This function activates the OS (e.g. Windows) used to save the current settings of the sliders. It operates as one of the presets saved in the device.



Save key presets window

7.9 Hardware Status

This section displays software information, network information, and video formats.

Hardware Status section

Connected to
This option is used to show the name of the device with which **Key control** cooperates.

Work format
This is the output format of the camera.

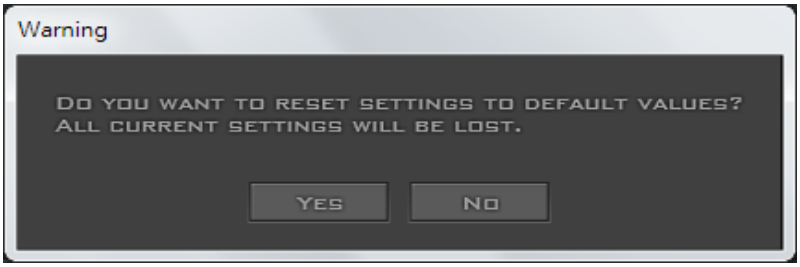
Cam format
This is the input format of the camera.

BKG format
This is the input format of the background.

7.10 Main Window Functions

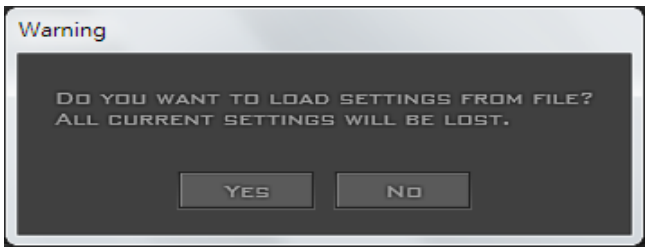
Main Window Functions section

Reset all
This function enables the sliders to be moved to their default positions.



Reset Warning

Load setting
This function enables slider settings to be loaded from file.



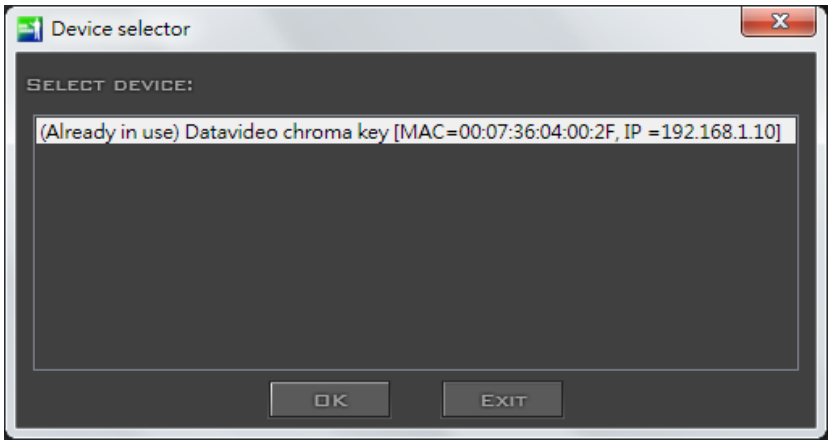
Load Setting Warning

Save setting
This function enables the current slider settings to be saved to file.

7.11 Change Device

This function enables activation of the device selection window on the basis of the device's name, MAC address or allocated IP network address.

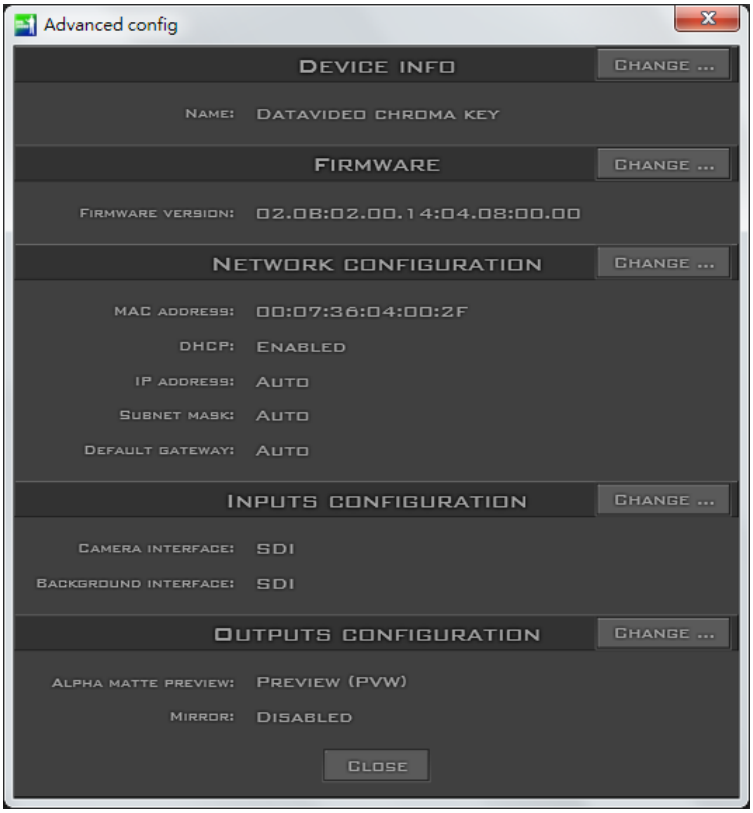
Change Device button



The Device Selector window

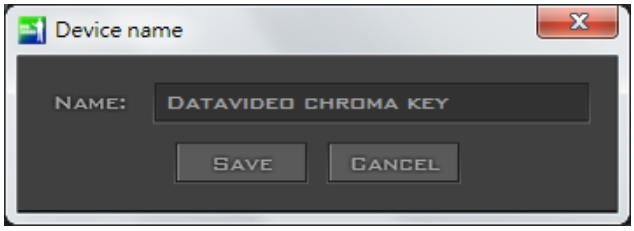
7.12 Configuration

This function opens the device configuration window.



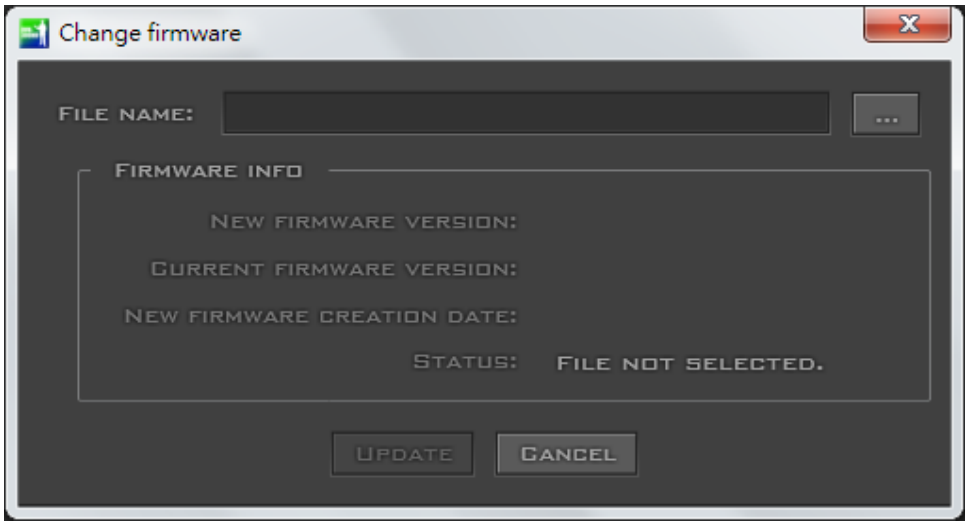
The device configuration settings window

Device info – this option enables the device name to be entered.



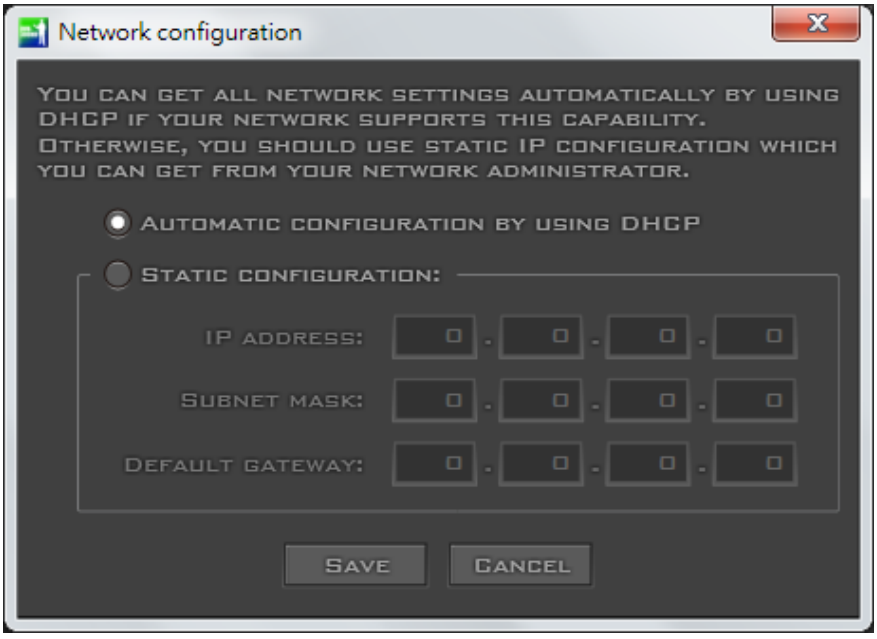
Device name window

Firmware – it shows the firmware version and click the change button to start the firmware upgrade wizard.



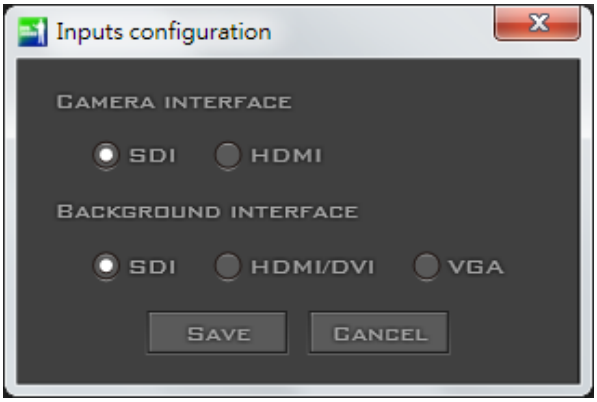
Change firmware window

Network configuration – this option enables network settings to be configured.



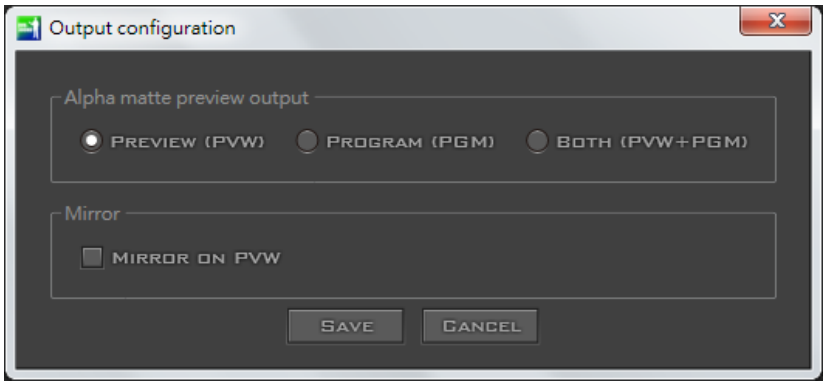
Network configuration window

Inputs configuration – this option enables the interface type to be set for the camera input and the background.



Input configuration window

Outputs configuration – this option allows the user to select the logical output on which the MATTE is visible.



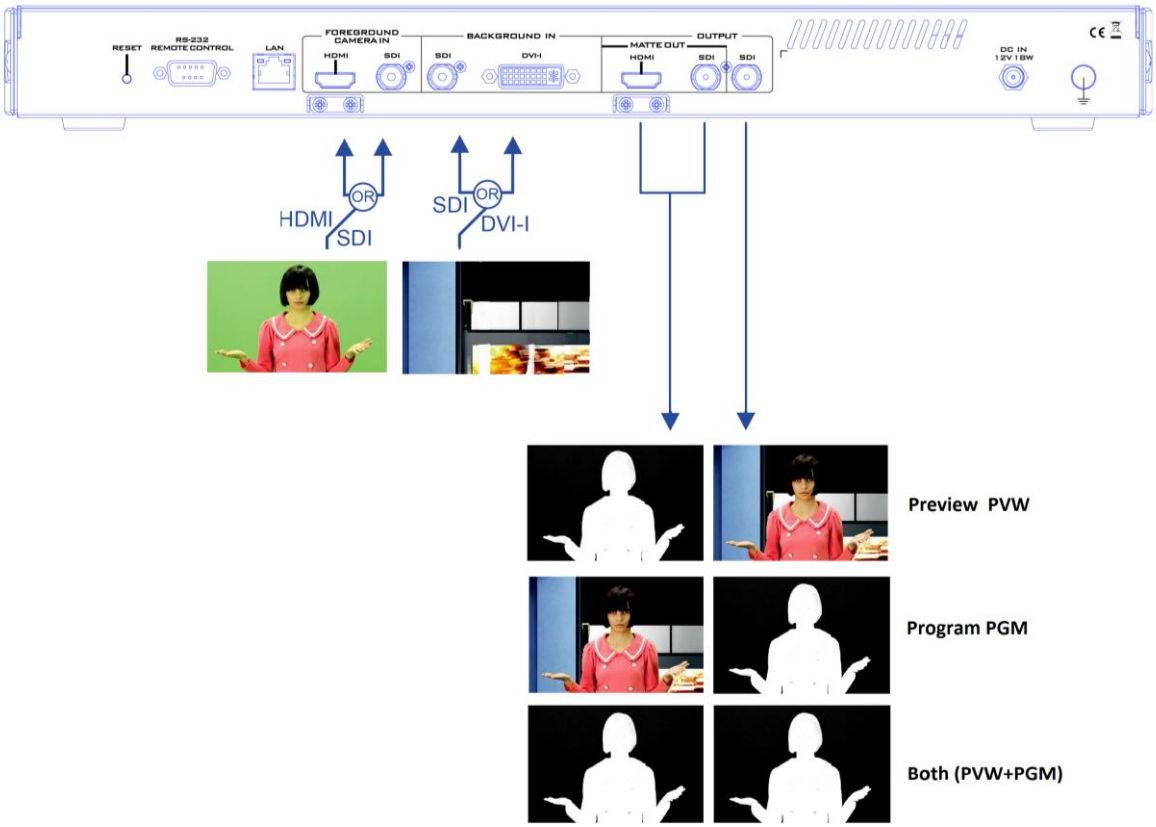
Output Configuration window

As illustrated in the diagram below,

PVW output only: HDMI or SDI

PGM output only: SDI

PVW and PGM: HDMI or SDI/SDI



Please note that in order to switch the output on which the MATTE view is shown, SHOW ALPHA MATTE mode must be selected in the main window of the application.

Mirror – Mirror function inverts the image rotation along the vertical axis (PVW out connectors, HDMI/SDI). This function is very useful for talent to see his composed preview on side monitor. Checking/Unchecking **MIRROR ON PVW** box enables/disables the mirror function. Note that mirror function introduces frame delay to the system.

7.13 Exit

Click this button to exit from the program

8. Connecting DVK-300HD to SE-2800 Switcher

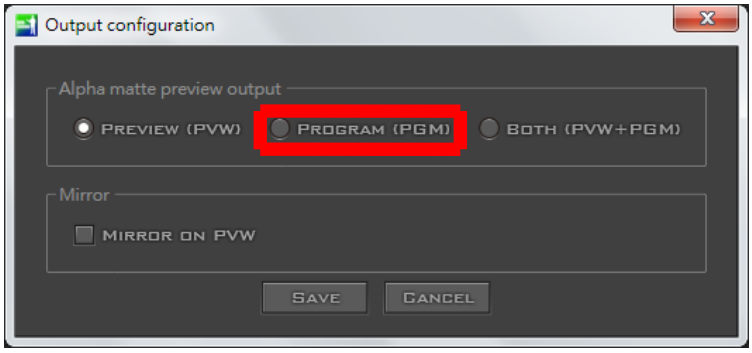
In other applications, the DVK-300HD Chroma Key, for example, can be connected to the SE-2800 Switcher for switching between different live backgrounds. Live backgrounds are captured using multiple cameras and fed into the SE-2800 switcher. Talent, in the indoor studio, stands in front of a green background, which can be keyed out using the DVK-300HD Chroma Key. The procedure of switching live backgrounds behind the talent is outlined as follows:

1. First of all, double click the DVK-300HD icon into the DVK-300HD core.

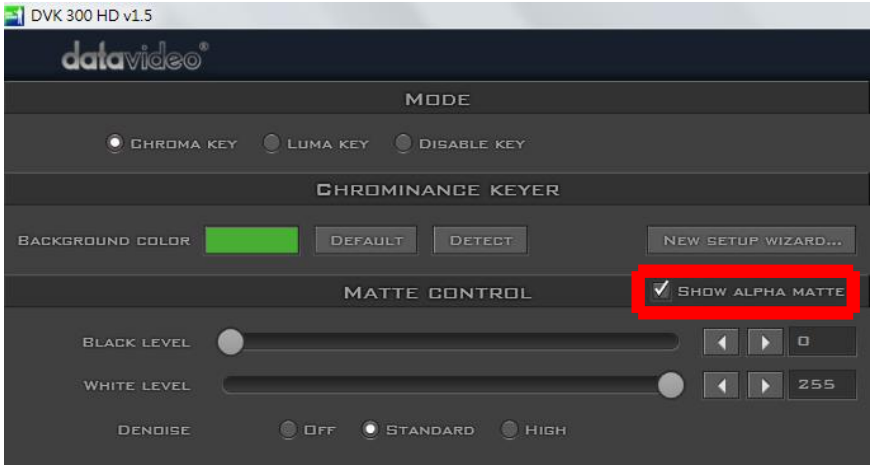
DVK-300HD
Chroma Key

2. After you have opened the DVK-300HD Utility Program, check your SW and FW versions, and make sure they are the latest versions.

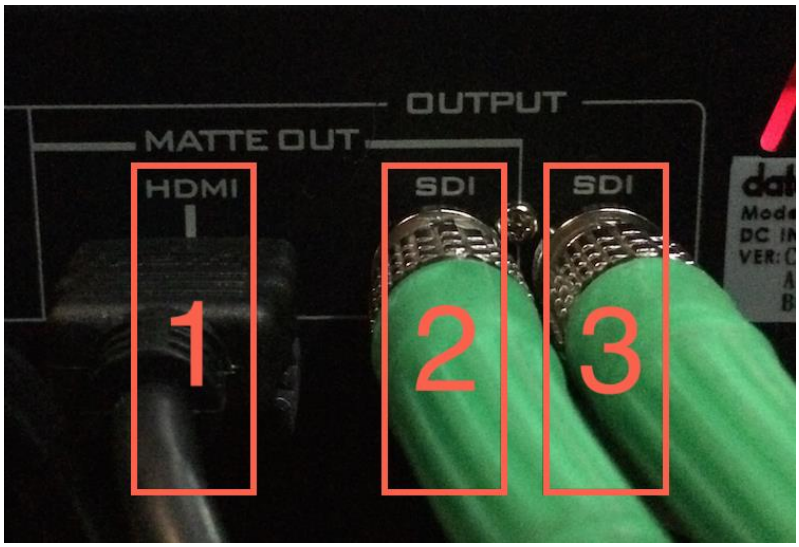
3. Click the configuration button located at the bottom right corner to open the OUTPUT CONFIGURATION window and set Alpha Matte Preview Output to PROGRAM (PGM). Close the window after that.



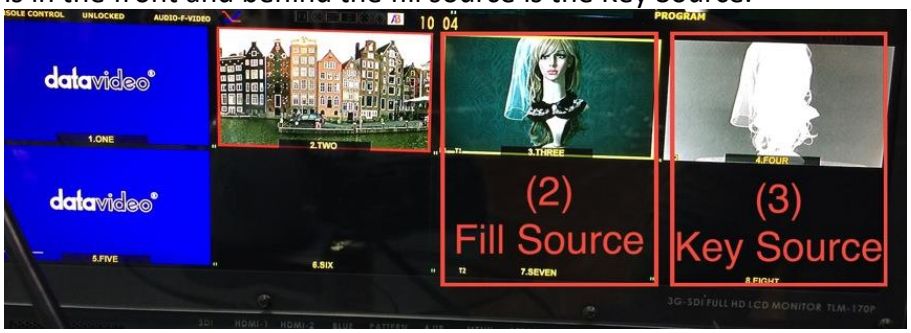
4. Check “SHOW ALPHA MATTE” in the MATTE CONTROL section.



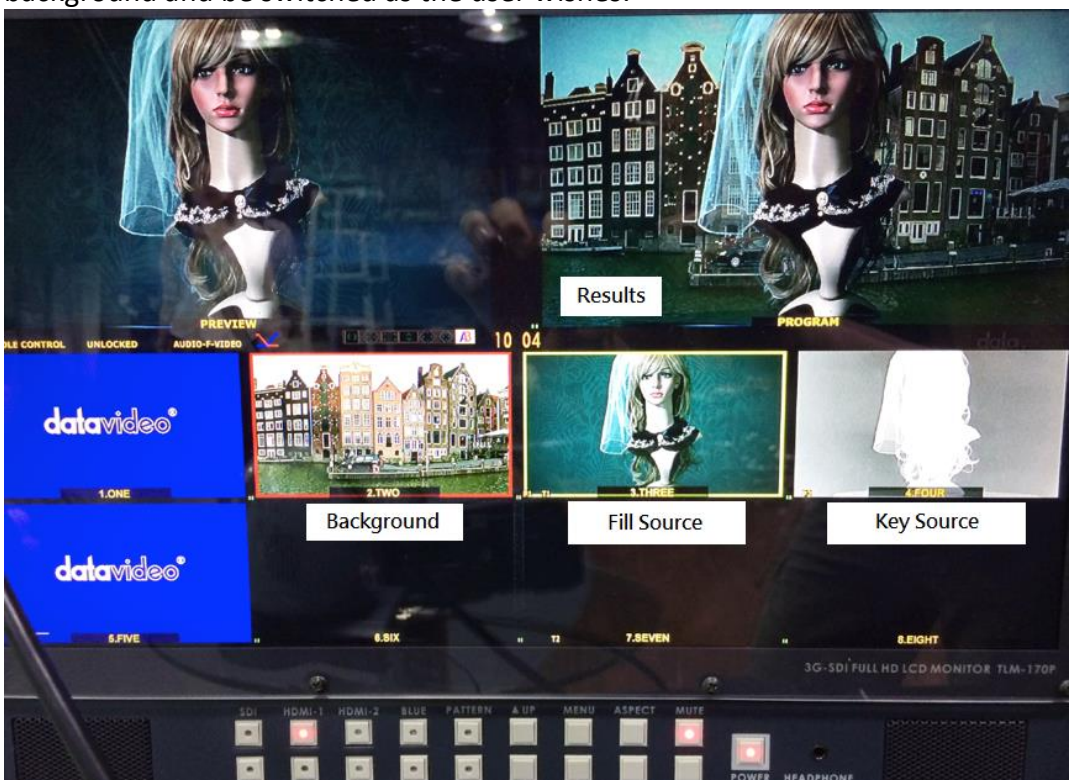
5. Physical OUTPUT ports of the DVK-300HD will be:
   a. MATTE OUT:
      HDMI Out (1): Program view output (Fill Source)
      SDI Out (2): Program view output (Fill Source)
   b. Program Out:
      SDI Out (3): MATTE output (Key Source)



6. Connect Fill Source (SDI Connector 2) and Key Source (SDI Connector 3) to the SE-2800 Switcher input ports, which must be neighboring inputs. On the output screen, Fill Source is in the front and behind the fill source is the Key Source.



7. The SDI input connected to the Fill Source is then assigned to DSK of the SE-2800 switcher. After that, other PROGRAM sources of SE-2800 switcher can serve as the background and be switched as the user wishes.

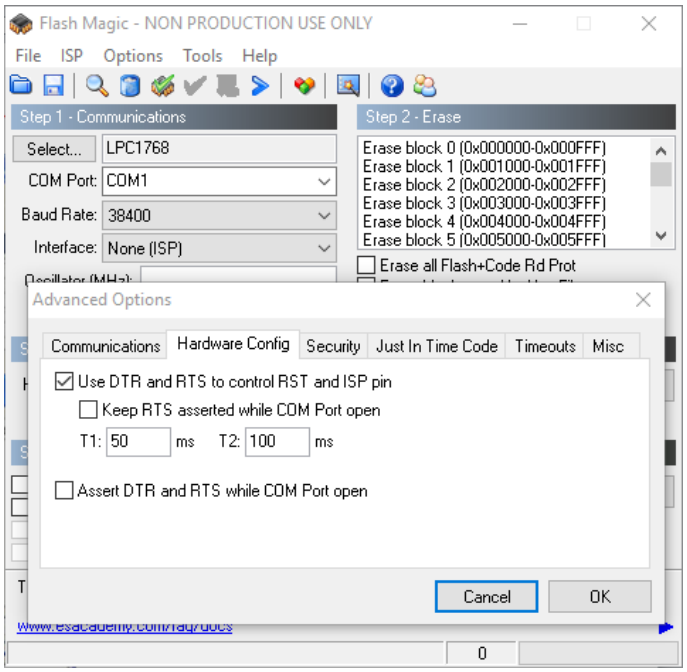


9. Firmware Update

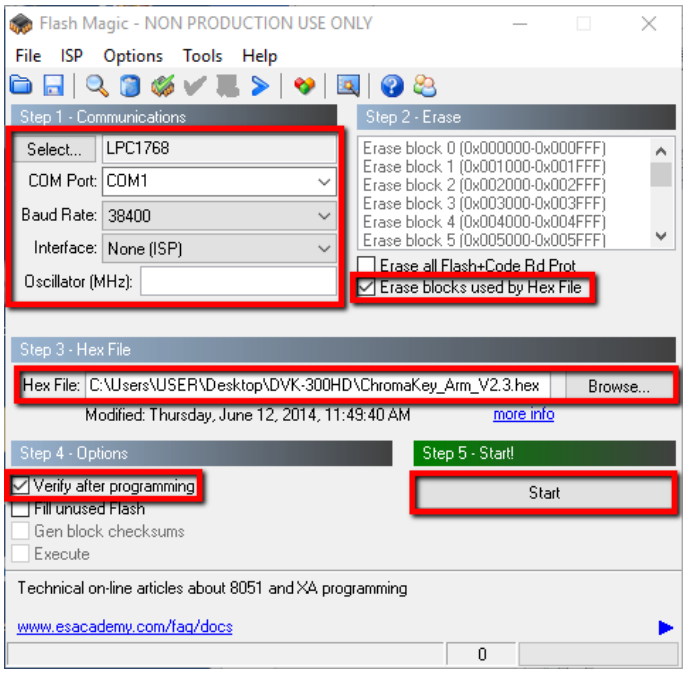
Firmware Update via RS-232 port

1. Connect the PC's RS-232 port to the RS232 port of the DVK300HD; use the standard extension cable and make sure the connectors are pin-to-pin.
2. Run NXP Flash Magic application 

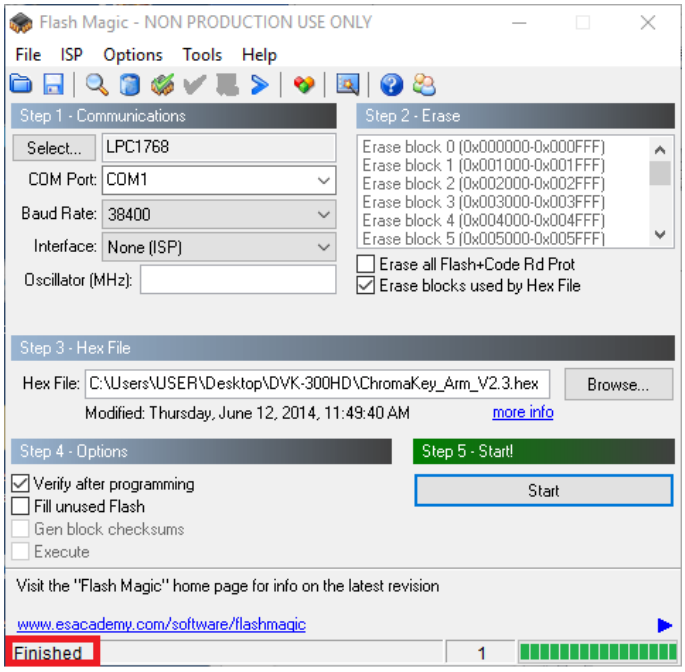
.
3. Options→ Advanced options→ Hardware Config tab→ Check the box (Use DTR and RTS to control RST and ISP pin) as shown in the diagram below.



4. Close the Advanced Options dialogue box and on the main window, select LPC1768 processor, a proper COM port, and baud rate (38400) as shown below.
5. Load the correct HEX file as shown in the diagram below.
6. Select the options "Erase blocks used by Hex File" and "Verify after programming" by checking the corresponding boxes.
7. Click Start.



8. Reboot the device when the status at the lower left-hand corner of the main window displays “Finished”.

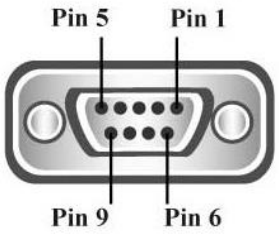


Note: The RS-232 communication interface can also be used for remote access of the DVK-300HD from the PC. Please see the next section for more information on RS-232 protocol commands.

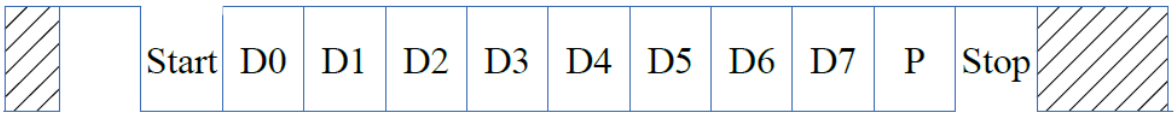
10. RS-232 Control Protocol

10.1 Hardware Specifications

Serial Port Specifications

Item	Description	
Data Rate	38,400 Baud	
Character Length	1 start bit + 8 data bits + 1 parity bit + 1 stop bit	
Parity	Odd parity	
Connector	9-Pin D-Sub **Female**	
		Pin 2: TX Pin 3: RX Pin 5: GND

Serial Data Word Descriptions



Start bit always low
Data 8 bit; LSB first
Odd Parity
Stop bit always high

Command / Message Block Structure

Sync Byte	Byte Count	Command Byte	Parameter 1	Parameter 2	…	Parameter N	Checksum

Item	Description
Sync Byte	0xAA
Byte Count	The total number of subsequent bytes in the block (from command byte to Checksum byte). Valid byte count values range from 0x01 to 0xFF
Command Code	Command Code Byte
Parameter 0 ~ 254 Byte	Parameters
Checksum	Checksum (Command + Parameter 1 + Parameter 2 + Parameter N) & 0xFF

Example:
Set ChromaKey mode
0xAA 0x04 0x10 0x01 0x01 0x12
0xAA: Sync Byte
0x04: Byte Count
0x10: Command Code = Operation Mode
0x01: Parameter 1 = Set keying mode
0x01: Parameter 2 = Chroma
0x12: Checksum = (0x10 + 0x01 + 0x01) & 0xFF

Status and Data Replies

Sync Byte	Byte Count	Response Message	Checksum

Item	Description	
Sync Byte	0xAA	
Bytes Count	The total number of subsequent bytes in the block (from command byte to Checksum byte).	
Response Message	Command Error	0x40
	Command Accepted	0x80
	Data Message	Data
Checksum	(Sum of Response Message) & 0xFF	

10.2 Command List

Operation Mode

Select between Chroma key, Luma key, or Disable processing		
Command Code	0x10	
Parameter 1	0x01	Set keying mode
	0x02	Set background color
	0x03	Background color tone detection
Parameter 2	Keying mode	
	0x01	Chroma
	0x02	Luma
	0x03	Disable
	Background color	
	0x01	Blue (chroma) / Black (luma)
	0x02	Green (chroma) / White (luma)
	Background color tone detection	
	0x00	Off – Default color
	0x01	On – Detect real color tone

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command

Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Matte Settings

Matte settings		
Command Code	0x11	
Parameter 1	0x01	Set matte Black
	0x02	Set matte White
	0x03	Set matte Cutoff
	0x04	Set matte Softness
Parameter 2	bit1 ~ bit0	Matte bit9 ~ bit8
	bit7 ~ bit2	0
Parameter 3	bit7 ~ bit0	Matte bit7 ~ bit0

Return

Item	**Sync Byte**	**Byte Count**	**Response Message**	**Checksum**	**In Response To**
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Matte Control

Matte control		
Command Code	0x12	
Parameter 1	0x01	Set matte denoise
	0x02	Show alpha matte
Parameter 2	Set matte denoise	
	0x00	denoise Off
	0x01	denoise LOW
	0x02	denoise HIGH
	Show alpha matte	
	0x00	Alpha matte view disabled
	0x01	Alpha matte view enabled

Return

Item	**Sync Byte**	**Byte Count**	**Response Message**	**Checksum**	**In Response To**
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Matte Color Tolerance

Set matte color tolerance	
Command Code	0x13

Parameter 1	matte_color bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Matte Luminance Tolerance

Set matte luma tolerance	
Command Code	0x14
Parameter 1	matte_luma bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Spill Color Correction

Spill correction		
Command Code	0x15	
Parameter 1	0x01	Set color of spill correction
	0x02	Set coarse spill correction
	0x03	Set fine spill correction
Parameter 2	bit1 ~ bit0	spill bit9 ~ bit8
	bit7 ~ bit2	0
Parameter 3	bit7 ~ bit0	spill bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Edge Correction

Edge correction		
Command Code	0x16	
Parameter 1	bit1 ~ bit0	Edge bit9 ~ bit8
	bit7 ~ bit2	0

Parameter 2	bit7 ~ bit0	Edge bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Garbage Mask

Garbage mask		
Command Code	0x17	
Parameter 1	0x01	Left garbage (must be <= Right garbage mask)
	0x02	Right garbage (must be >= Left garbage mask)
	0x03	Top garbage (must be <= Bottom garbage mask)
	0x04	Bottom garbage (must be >= Top garbage mask)
Parameter 2	bit1 ~ bit0	garbage bit9 ~ bit8
	bit7 ~ bit2	0
Parameter 3	bit7 ~ bit0	garbage bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Post Correction

Post correction		
Command Code	0x18	
Parameter 1	0x01	Post correction enable
	0x02	Post correction brightness
	0x03	Post correction contrast
	0x04	Post correction saturation
	0x05	Post correction ambient color value Red
	0x06	Post correction ambient color value Green
	0x07	Post correction ambient color value Blue
	0x08	Post correction ambient intensity
Parameter 2	Post correction enable	
	0x00	disable
	0x01	enable
	Post correction brightness	
	bit7 ~ bit0	brightness bit7 ~ bit0

	Post correction contrast	
	bit7 ~ bit0	contrast bit7 ~ bit0
	Post correction saturation	
	bit7 ~ bit0	saturation bit7 ~ bit0
	Post correction ambient color value Red	
	bit7 ~ bit0	Ambient_red bit7 ~ bit0
	Post correction ambient color value Green	
	bit7 ~ bit0	Ambient_green bit7 ~ bit0
	Post correction ambient color value Blue	
	bit7 ~ bit0	Ambient_blue bit7 ~ bit0
	Post correction ambient intensity	
	bit7 ~ bit0	Ambient_intensity bit7 ~ bit0

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Save/Load Preset

Save/Load presets		
Command Code	0x19	
Parameter 1	0x01	Save current preset
	0x02	Load preset
Parameter 2	Save current preset	
	0x01	Save to slot 1
	0x02	Save to slot 2
	0x03	Save to slot 3
	0x04	Save to slot 4
	Load preset	
	0x01	Load from slot 1
	0x02	Load from slot 2
	0x03	Load from slot 3
	0x04	Load from slot 4

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Input Configuration

Input configuration		
Command Code	0x1A	
Parameter 1	0x01	Camera input
	0x02	Background input
Parameter 2	Camera input	
	0x01	SDI
	0x02	HDMI
	Background input	
	0x01	SDI
	0x02	HDMI/DVI
	0x03	VGA

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Outputs Configuration

Outputs configuration		
Command Code	0x1B	
Parameter 1	0x01	Alpha matte visible
	0x02	PVW mirror
Parameter 2	Alpha matte visible	
	0x01	PVW only
	0x02	PGM only
	0x03	PVW + PGM
	PVW mirror	
	0x00	disable
	0x01	enable

Return

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command
Command Accepted	0xAA	0x02	0x80	0x80	Valid Write Command

Discover

Discover		
Command Code	0x1C	
Parameter 1	0x01	Password
	0x02	MAC address
	0x03	IP, port, mask
	0x11	Name
	0x12	Default name
	0x13	Version
	0x21	Preset 1 name
	0x22	Preset 2 name
	0x23	Preset 3 name
	0x24	Preset 4 name

Return Command Error

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command

Return Password

Return	
Sync Byte	0xAA
Byte Count	0x13
Byte 1	0x1C
Byte 2	0x01
Byte 3 – Byte 18	Password (padded with 0x00s to 16 bytes)
Checksum	(Byte 1 + … + Byte 16) & 0xFF

Return MAC Address

Return	
Sync Byte	0xAA
Byte Count	0x09
Byte 1	0x1C
Byte 2	0x02
Byte 3 – Byte 8	MAC address
Checksum	(Byte 1 + … + Byte 8) & 0xFF

Return IP/Port/Mask

Return	
Sync Byte	0xAA
Byte Count	0x0D
Byte 1	0x1C
Byte 2	0x03

Byte 3 – Byte 6	IP	
Byte 7 – Byte 10	Port	
Byte 11 – Byte 14	Mask	
Checksum	(Byte 1 + … + Byte 14) & 0xFF	

Return Name/Default Name

Return		
Sync Byte	0xAA	
Byte Count	length of Name/Default name + 0x03 (maximum name length is 64)	
Byte 1	0x1C	
Byte 2	0x11	Name
	0x12	Default name
Byte 3 – Byte n	Name/Default name (string without tailing \0)	
Checksum	(Byte 1 + … + Byte n) & 0xFF	

Return Version

Return	
Sync Byte	0xAA
Byte Count	0x13
Byte 1	0x1C
Byte 2	0x13
Byte 3 – Byte 6	ARM version
Byte 7 – Byte 10	FPGA version
Byte 11 – Byte 14	NIOS version
Byte 15 – Byte 18	Hardware version
Checksum	(Byte 1 + … + Byte 18) & 0xFF

Return Preset Name

Return		
Sync Byte	0xAA	
Byte Count	length of Preset name + 0x03 (maximum preset name length is 32)	
Byte 1	0x1C	
Byte 2	0x21	Preset 1 name
	0x22	Preset 2 name
	0x23	Preset 3 name
	0x24	Preset 4 name
Byte 3 – Byte n	Preset name (string without tailing \0)	
Checksum	(Byte 1 + … + Byte n) & 0xFF	

Get

Get parameter value command is modification of standard set command by adding Get flag to Command Code and skip parameter value bytes.

Get		
Command Code	0x80	
[Parameter 1]	0x??	Parameter number according to standard set command. Field is optional for commands with only one parameter.

Return Command Error

Item	Sync Byte	Byte Count	Response Message	Checksum	In Response To
Command Error	0xAA	0x02	0x40	0x40	Invalid Command

Return Command Accepted

Return		
Sync Byte	0xAA	
Byte Count	n + 1	
Byte 1	Command code	
Byte 2	Parameter 1	Parameter is optional
Byte 3	Value byte 1	Parameter value bytes (usually 1 … 3)
…	…	
Byte n	Value byte m	
Checksum	(Byte 1 + … + Byte n) & 0xFF	

Example

Get operation mode		
Command Code	0x90 (0x10 + 0x80)	
Parameter 1	0x01	Get keying mode
	0x02	Get background color
	0x03	Background color tone detection

Return Get Keying Mode

Return		
Sync Byte	0xAA	
Byte Count	0x04	
Byte 1	0x90	Command code
Byte 2	0x01	Get keying mode
Byte 3	Keying mode	
	0x01	Chroma
	0x02	Luma
	0x03	Disable
Checksum	(Byte 1 + Byte 2 + Byte 3) & 0xFF	

Return Get Background Color

Return		
Sync Byte	0xAA	
Byte Count	0x04	
Byte 1	0x90	Command code
Byte 2	0x02	Get background color
Byte 3	Background color	
	0x01	Blue (chroma) / Black (luma)
	0x02	Green (chroma) / White (luma)
Checksum	(Byte 1 + Byte 2 + Byte 3) & 0xFF	

Return Get Background Color Tone Detection – Default Color

Return		
Sync Byte	0xAA	
Byte Count	0x04	
Byte 1	0x90	Command code
Byte 2	0x03	Background color tone detection
Byte 3	0x00	Default color
Checksum	0x93	

Return Get Background Color Tone Detection – Real Color Tone Detected

Return		
Sync Byte	0xAA	
Byte Count	0x06	
Byte 1	0x90	Command code
Byte 2	0x03	Background color tone detection
Byte 3	bit7 ~ bit0	Background color Red bit7 ~ bit0
Byte 4	bit7 ~ bit0	Background color Green bit7 ~ bit0
Byte 5	bit7 ~ bit0	Background color Blue bit7 ~ bit0
Checksum	(Byte 1 + … + Byte 5) & 0xFF	

11. Specifications

Input Interface	Video Camera	1 x BNC connector, 75 Ohm up to 3 GB/s SDI input
		1 x HDMI v1.4 connector
	Video Background	1 x BNC connector, 75 Ohm up to 3 GB/s SDI input
		1 x DVI-I connector for HDMI/DVI/VGA input
Output Interface	Video PGM	1 x BNC connector, 75 Ohm for SDI output
	Video PRV	1 x BNC connector, 75 Ohm for SDI output
		1 x HDMI v1.4 connector
Signal Format	Camera Input	**SDI Formats:** 576i, 480i (SMPTE 259M-C) 1080i50, 1080i59.94,1080i60, 720p50,720p59.94, 720p60, 1080p25, 1080p30 (SMPTE 292M)1080p50, 1080p59.94,1080p60 (SMPTE 425M) **HDMI Formats:** 480i/576i/720p50/720p59.94/720p60/1080i50/1080i59.94/1080i60/1080p25/1080p30/1080p50 / 1080p59.94/1080p60
	Background Input	**SDI Formats:** 576i, 480i (SMPTE 259M-C) 1080i50, 1080i59.94,1080i60, 720p50,720p59.95, 720p60, 1080p25, 1080p30 (SMPTE 292M)1080p50, 1080p59.94,1080p60 (SMPTE 425M) **HDMI/DVI Formats:** 480i/576i/480p/576p/720p50/720p59.94/720p60/1080i50/1080i59.94/1080i60/1080p25/1080p30/1080p50 /1080p59.94/1080p60 **VGA Formats:** 800x600/1024x768/1152x864/1280x720/1280x1024/1360x768 /1400x1050/ 1440x900/1920x1080
Remote control interface		LAN / RJ-45 port for remote PC access and F/W upgrade RS-232 for direct PC access and F/W upgrade
Voltage		12V

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.

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