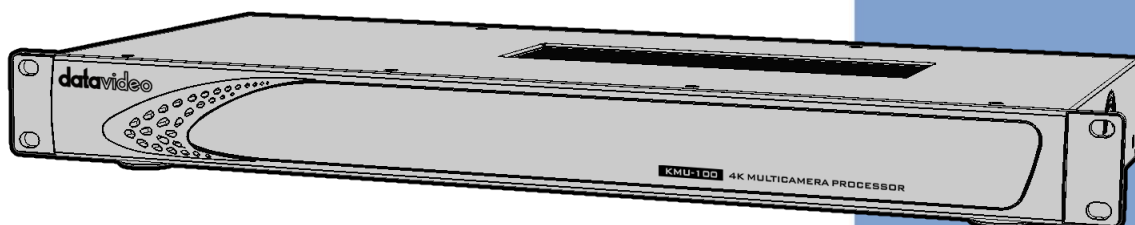


# datavideo



2-CHANNEL 4K MULTICAMERA  
PROCESSOR  
KMU-100 & KMU-100+  
**Instruction Manual**

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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***

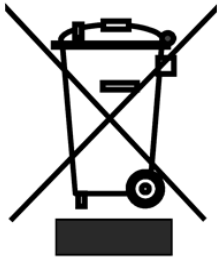
- Datavideo equipment are guaranteed against any manufacturing defects for one year from the date of purchase.
- The original purchase invoice or other documentary evidence should be supplied at the time of any request for repair under warranty.
- The product warranty period begins on the purchase date. 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, 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**

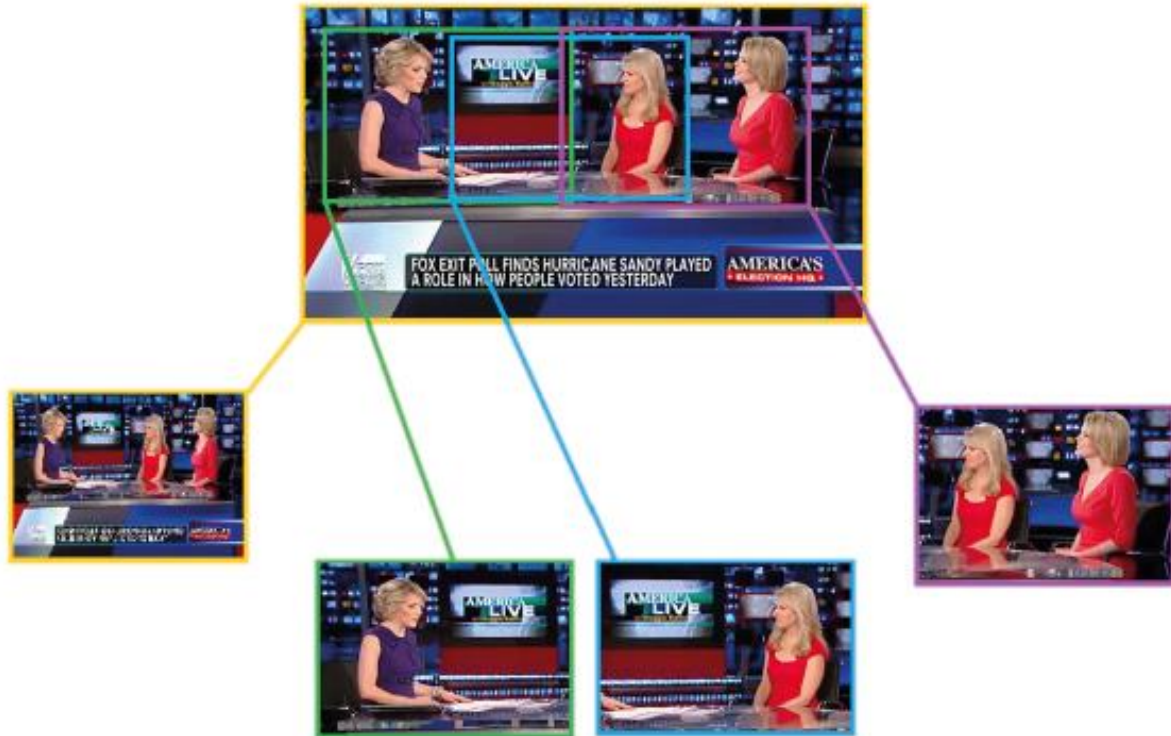
This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic 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. Introduction

KMU-100 is an advanced video converter allowing conversion of UHD input signals into 4 different streams with resolution up to Full HD. Each device has two UHD inputs which work simultaneously and interchangeably.



You can define 4 output windows (Frame 1/2/3/4/) for each UHD source signal. The resolution of the Frame 1 window can be up to 3860x2160, while Frames 2, 3 and 4 support resolution of up to 1920x1080 pixels. Every frame window can be animated. Animation is created by defining the Start and End positions of the frame window, along with their motion mode (single, loop, ping-pong). The frame window can change its size while it is animated, featuring the virtual digital zoom.

## 1.1 Functions and Features

The **KMU-100** is an advanced video converter that allows processing and conversion of **UHD signals** with the resolution of 3840x2160 (**12G SDI** or **HDMI 2.0**) into four or eight different high-quality streams at resolutions up to **Full HD**.

The KMU-100 offers the user two independent conversion channels. The device allows simultaneous and parallel processing of two **UHD** signal sources (**3840x2160**). The input signals are converted into **8 3G SDI outputs**, which can be additionally synchronized to a **Genlock** input.

This solution is ideal for professionals who deal with production and broadcasting of video materials adopting a variety of sources and signal types. It is a perfect solution for various program scenes and live coverage of events.



In addition, the **KMU-100 converter** is really easy to use. The device comes with a complete software package, and the control over all of its functions and parameters is exercised on a LAN connected computer on which the application is installed. The device portability due to its small size, a user-friendly interface, and the **DV Link platform** will give the user a very pleasant experience with the **KMU-100**.

## 1.2 KMU-100 Operations

**KMU-100** is able to simultaneously convert signals from two video inputs with resolutions up to **UHD (3840x2160)** into eight different output video streams. It supports a variety of video formats and allows the connection of **SDI and HDMI** signal sources including **12G SDI** and **HDMI 2.0** technologies.

As many as **8 channels** of output signals can be generated. Each channel outputs an active area of the input signals defined by the user. To define these areas, a software application is installed on a computer which is connected to the **KMU-100** via a LAN interface.

The definition of the area, which will determine the output content, is nothing more than a simple positioning of a frame rectangle in the MultiViewer preview for a given channel. Each of the frame rectangles is marked with a different border color. For one of the frames you can scale the signal from full **4K** resolution to **Full HD**, and there is also up and down scaling (**zoom**) possible for all other outputs. The output area (position of each frame rectangle) may be a function of a variable, which means the output can be in constant motion. For each frame rectangle, there are simple animations available. The user just needs to select one of the available **Motion** modes. The start and end positions of the frame rectangle as well as all other related settings are configured on a user friendly interface of the application software installed.

The areas defined by the frame rectangles create **8 SDI outputs (2 x 4 or 1 x 8)**.

Two **multiviewer (HDMI)** outputs are used for preview and device configuration.

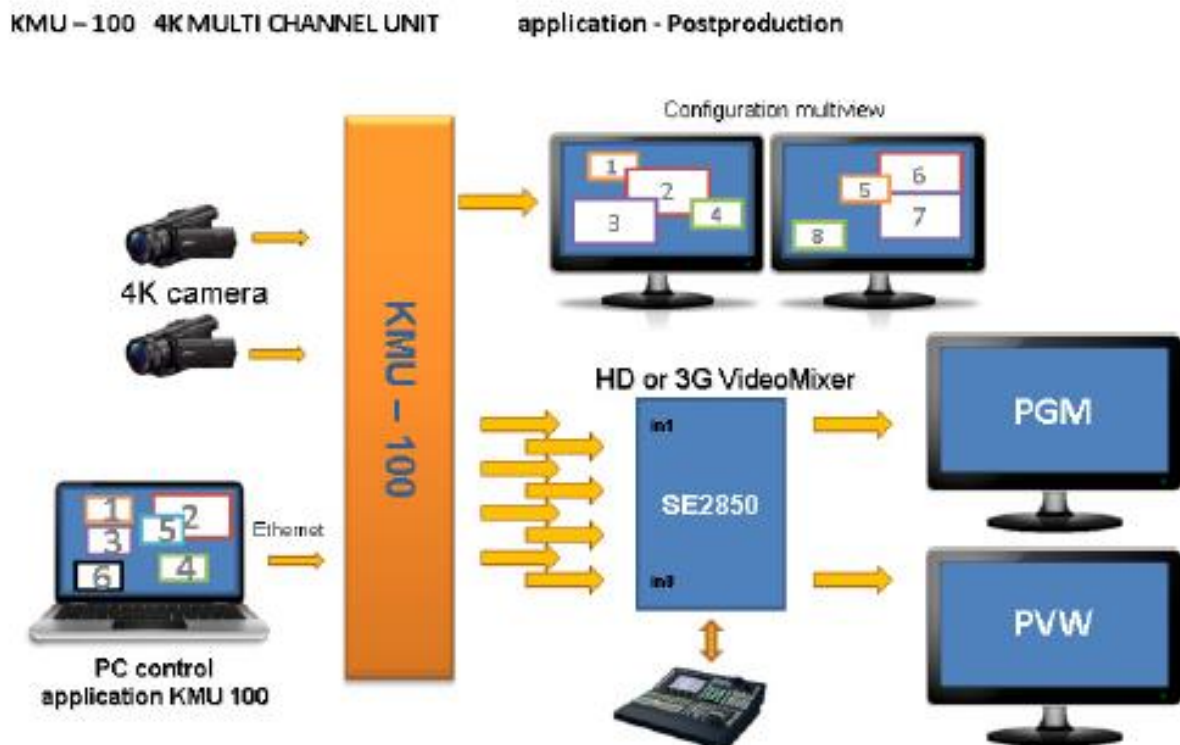
The **KMU-100** can be used in different various applications for multiple purposes as this device is capable of generating a variety of effects that will satisfy every professional engaged in production, TV broadcast and event live coverage with the use of audiovisual materials.

## 2. Product Applications

The **KMU-100** is basically a bridge interfacing **4K** technologies with current video systems solutions. This device has a very wide range of applications in virtually every area where the high quality image viewing is required such as sporting events, industrial automation, visual effects used during all kinds of live events or in postproduction.

You can find several applications shown in the diagrams below. These are examples of possible uses of our device.

### 2.1 Video Production and Postproduction



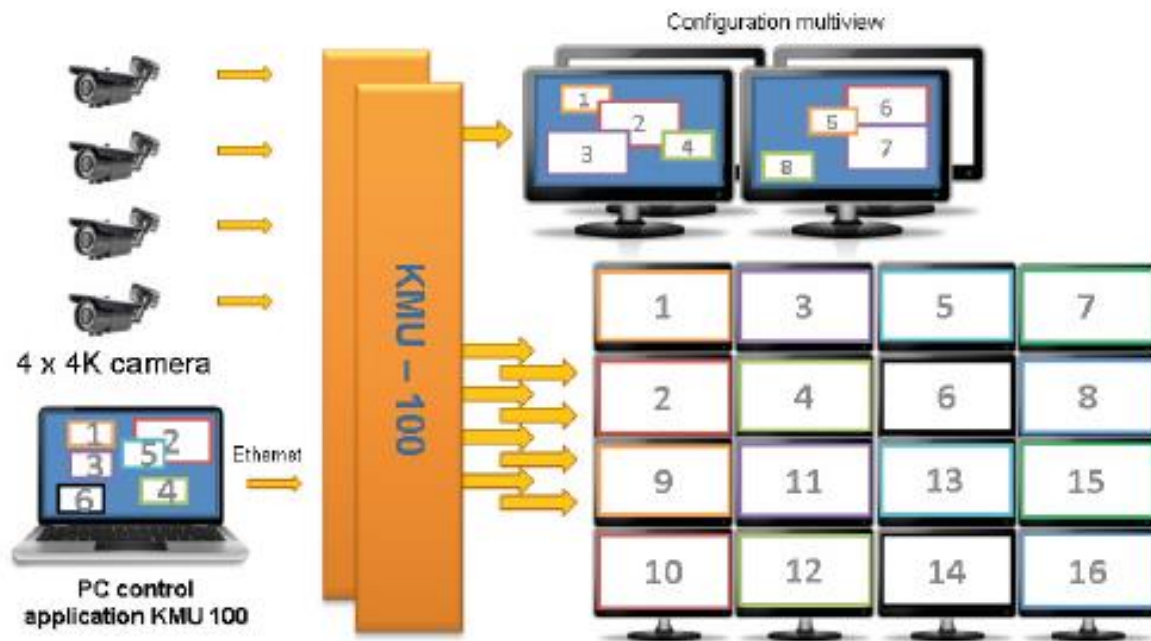
The **KMU-100** capabilities are perfect for video postproduction compared to other similar products on the market. The video material is recorded with one or two video cameras at **4k** resolution.

With the **KMU-100**, you can not only change the composition, but also the shots. The end result will resemble the use of several cameras. With the switcher connected, the transitions between the output images will then be smooth and natural. At the same time, this solution allows the material to be realized by a single camera operator, thus reducing the production cost while keeping the resulting material at a high quality and **Full HD** resolution. The final effect will be as if it were realized by several operators.

## 2.2 High Quality Security Systems

KMU – 100 4K MULTI CHANNEL UNIT

application - 8K Hi security system



The **KMU-100** is an invaluable tool in creating a top-notch security system. It allows you to receive **3G HD** outputs from a single **4K** camera.

As the **KMU-100** processes the signal in real time, you obtain the effect of **8 high-quality mobile video cameras** but without their actual movement.

In this way, the converter provides new opportunities and possibilities to cut down the costs by reducing the number of video cameras and the cables used, and at the same time increases precision and quality in capturing all important details.

### 3. Connection to the KMU-100 – DV Link

A platform that unites all!

The **DV Link** platform is a very simple and useful software developed for configuration, diagnostics and control of multiple devices (for example four **KMU-100** converters) communicating through a common **DVIP** protocol.

A camera operator or operators can easily change the functions of each of the visible devices or a group by triggering the pre-defined presets, without the need to use the main **KMU-100** management application. **DV Link** application thus allows quick reconfiguration of the equipment for a specific task.

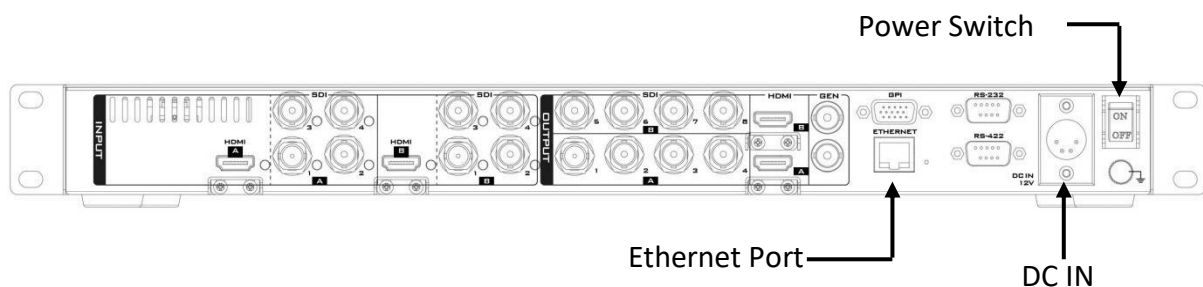
The **DV Link** platform connects multiple devices to control them on a single application.

We invite all the **KMU-100** users to download the **DV Link** application for free.

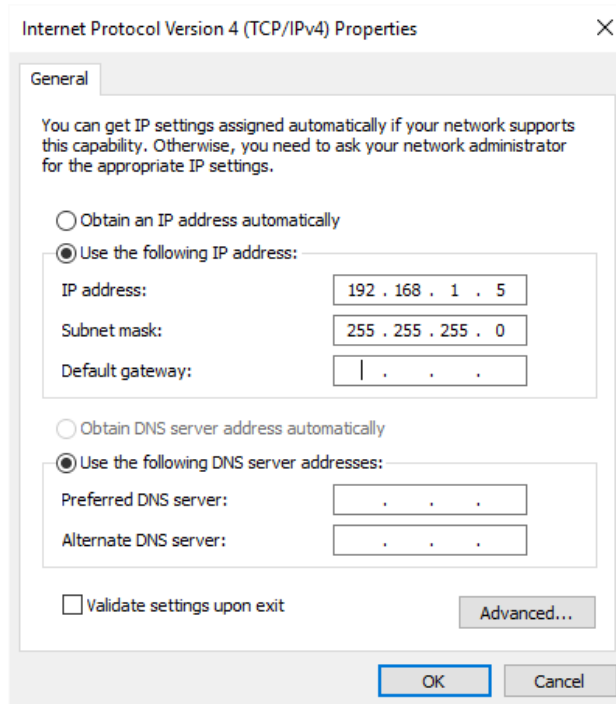
The technical specifications, manual and the download link can be found on the product page.

#### 3.1 Hardware Connection

Prior to the use of the KMU-100, you must first set up the hardware system and configure the IP settings between the PC and the KMU-100. The subsections below will guide you through the connection process step by step.



1. First of all, connect the DC 12V power to the KMU-100 device.
2. Turn ON the power switch to enter the device into standby mode.
3. Connect the PC to the KMU-100 device via an Ethernet cable.
4. Lightly touch the power switch button on the front panel for 2-3 seconds to switch ON the KMU-100 device.
5. The default IP address of the KMU-100 device is 192.168.1.10.
6. The PC IP address and the subnet mask are respectively configured to 192.168.1.5 and 255.255.255.0.



7. After the network connection is configured, you can then start the DV Link application to establish the connection between the KMU-100 and the PC.

### 3.2 Launching DV Link Application

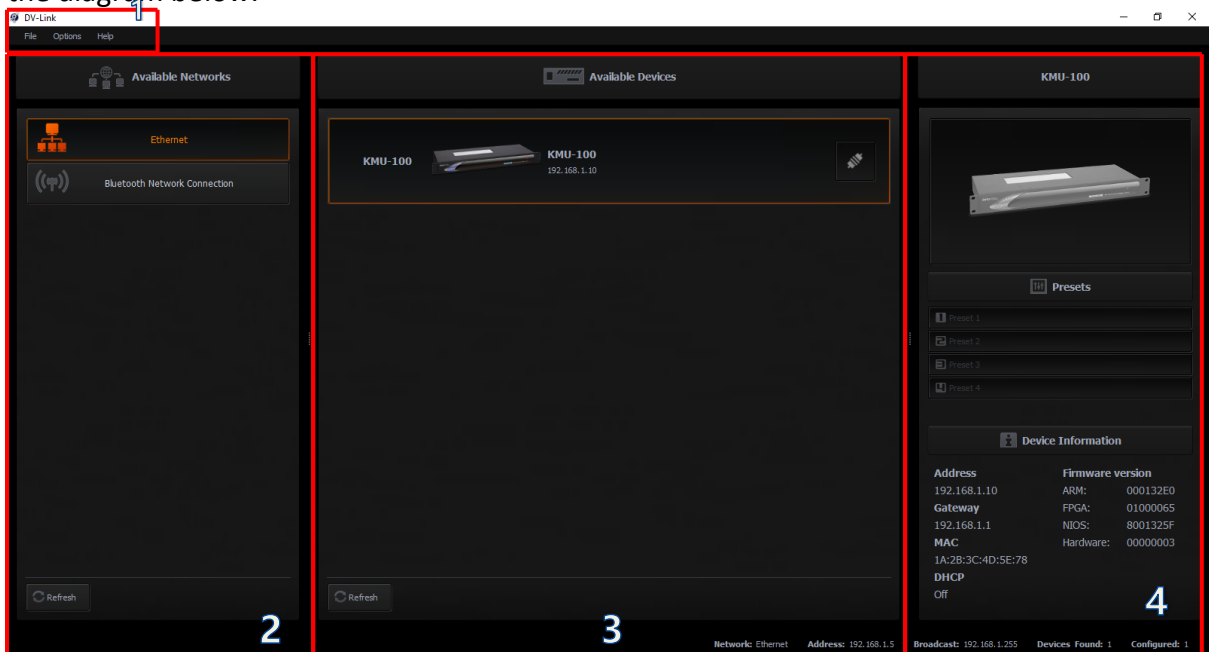


After the **DV Link** application is downloaded and installed on your computer, simply click the **DV Link** desktop icon to open the application.

While **DV Link** application is loading, a screen with a progress bar at the bottom will be displayed as shown in the diagram below.



After the **DV Link** application is loaded, you can see the **DV Link start screen** as shown in the diagram below.

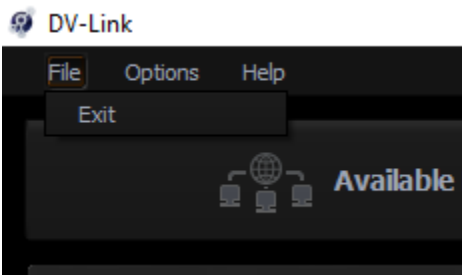


The **DV Link** application window can be divided into 4 areas listed as follows:

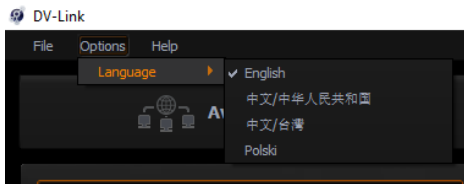
1. **Tool Bar**
2. **Available Networks**
3. **Available Devices**
4. Single device **Control Area (KMU-100)**

### Tool Bar

A **Tool Bar** is located at the upper left corner of the screen where you will be able to find three main options, **File**, **Options** and **Help**.



**File** – Click **Exit** to quit the application;



**Options** – this option contains the following sub-options:

**Language** – allows you to select the language of the application.

- **English**
- **Chinese / PRC**
- **Chinese / Taiwan**
- **Polski**



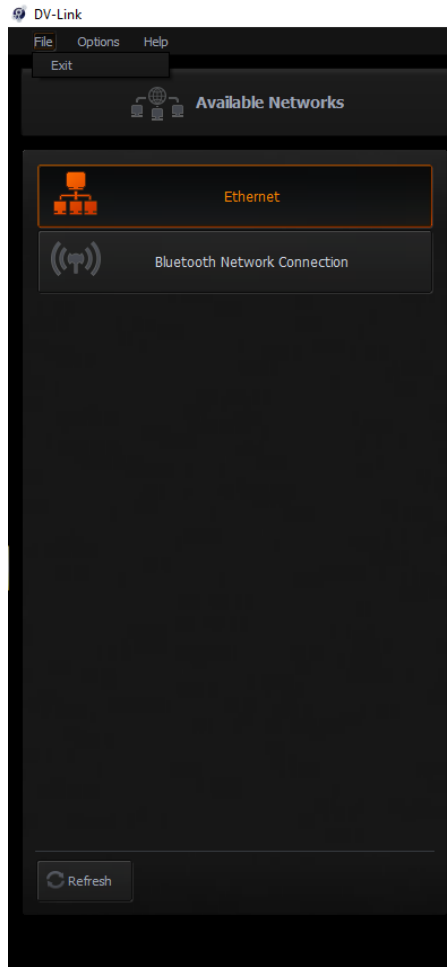
**Help** – this option contains the following sub-options:

**About** – End User License Agreement (EULA), Version.

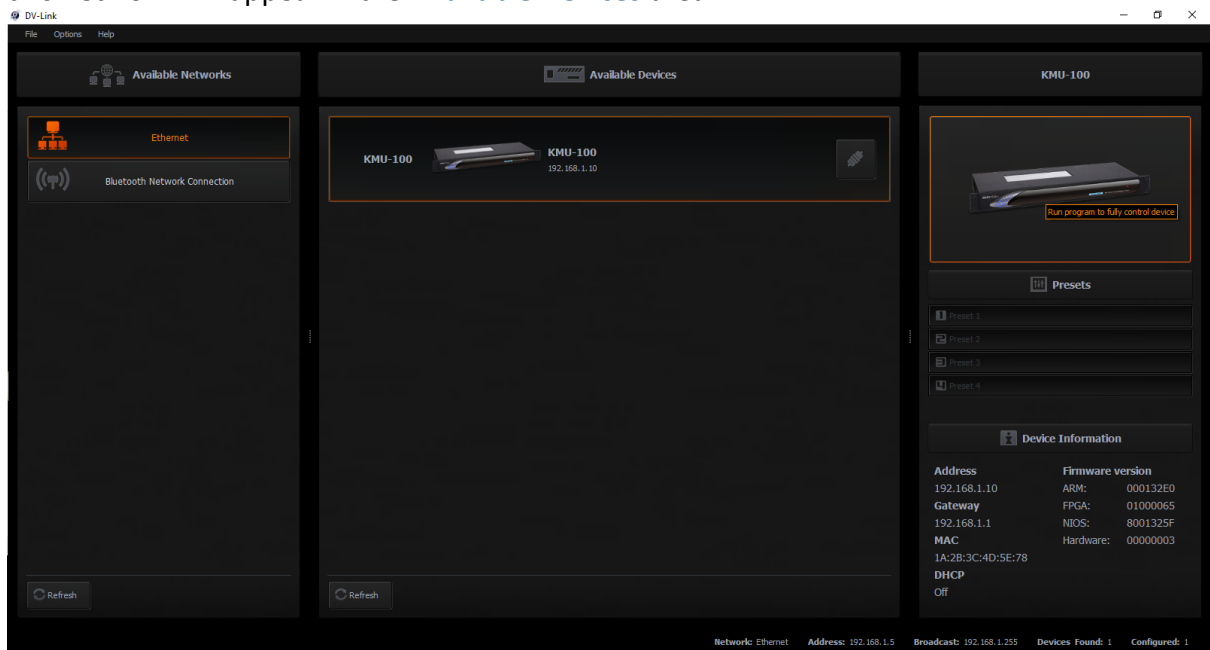
**QR Code** – Provides the link to the KMU-100 product page.

## Available Networks area

In this area, the available networks are displayed as shown in the diagram below.

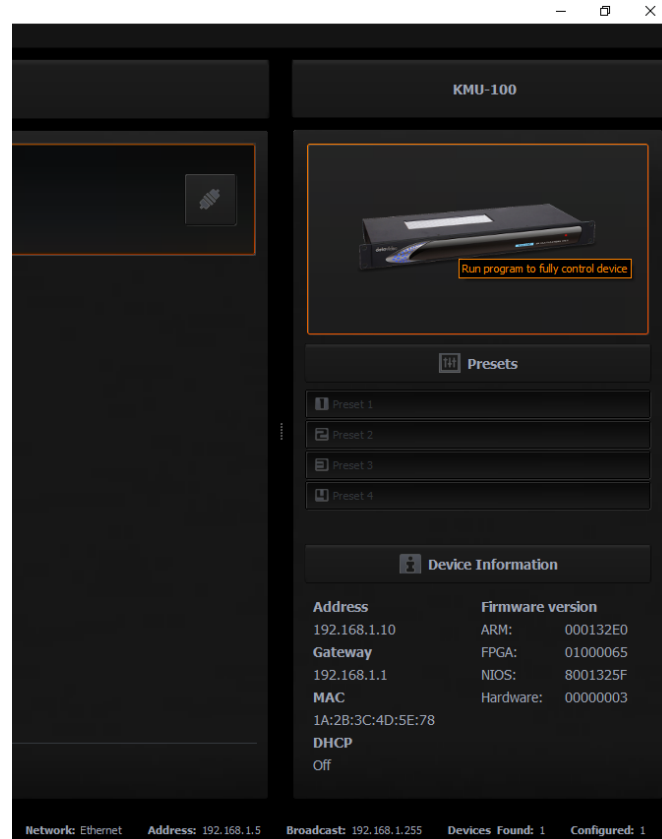


After moving the cursor over and clicking on a given network icon, the available devices in this network will appear in the **Available Devices** area.





For the selected **KMU-100** device, you can load the presets with user settings from one of **four Preset slots**. You can double click the **KMU-100** device icon in the **control area** (the rightmost KMU-100 column) to open the **KMU-100 Control Interface** as shown in the diagram below.



The network settings are shown on the bottom of the rightmost column which is shown as above-mentioned diagram.

Users can load one of your default settings to the selected KMU-100 device by one of the four Preset keys.

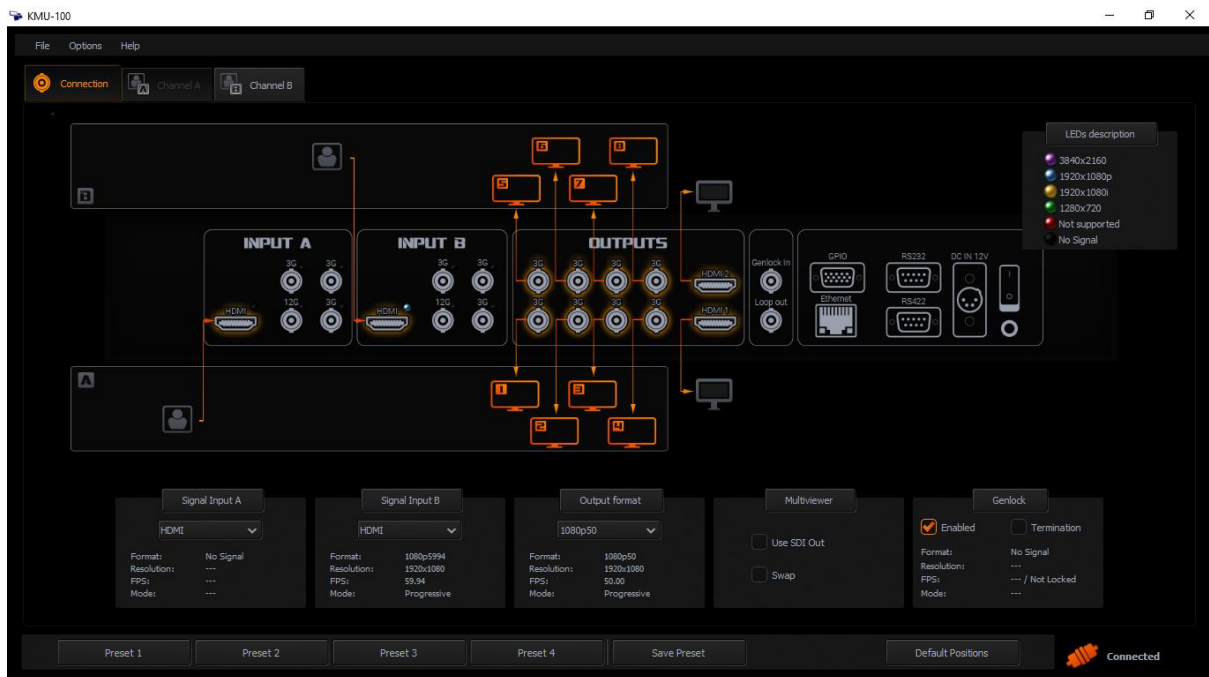
Generally speaking, users can find all KMU-100 devices within the same network area by the DV Link software. After the devices are connected, users can load the Preset settings and then they can prepare to control the KMU-100 by opening the KMU-100 application software.

## 4. Control Application

The Control Application allows you to configure the device and saves presets in the device internal memory. While the **KMU-100** control application is loading, a screen with a progress bar at the bottom will be displayed.



### 4.1 App Window Descriptions: Connection Tab

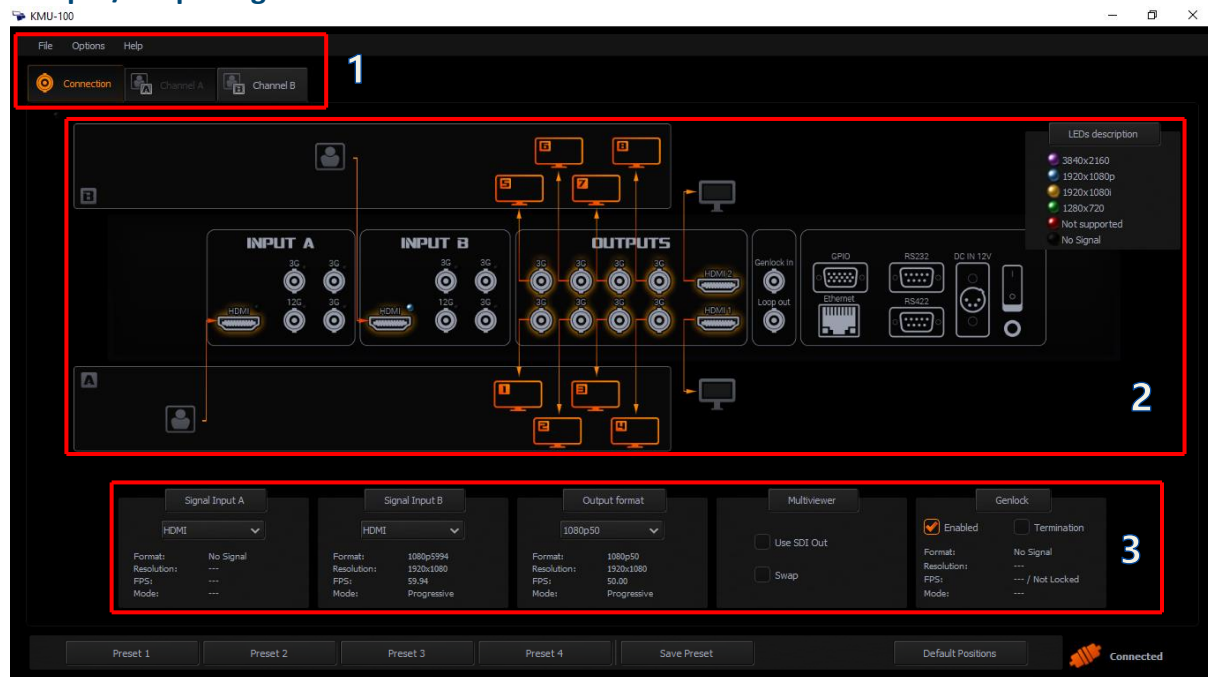


The Connection tab allows you to define input signals connected to **Channel A** and **Channel B**. It is also possible to use the signal from **Input A** to process in **Channel B**, and vice versa, i.e. processing of **Input B** in **Channel A**.

After clicking the Connection tab, you will see a diagram with visualization of necessary cable connections.

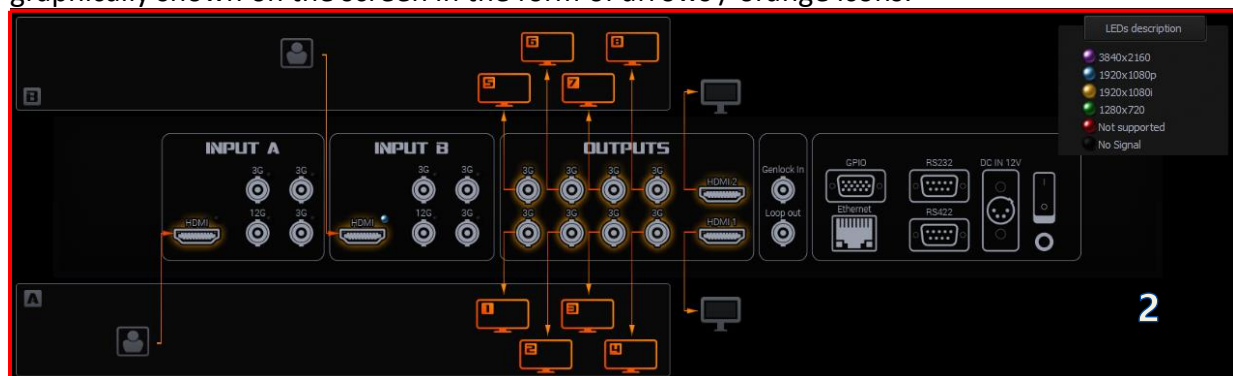
The **Connection screen** window can be divided into 3 areas as shown in the diagram below.

1. **Menu area**
2. **Connection Graphics area**
3. **Input/Output Signals area**



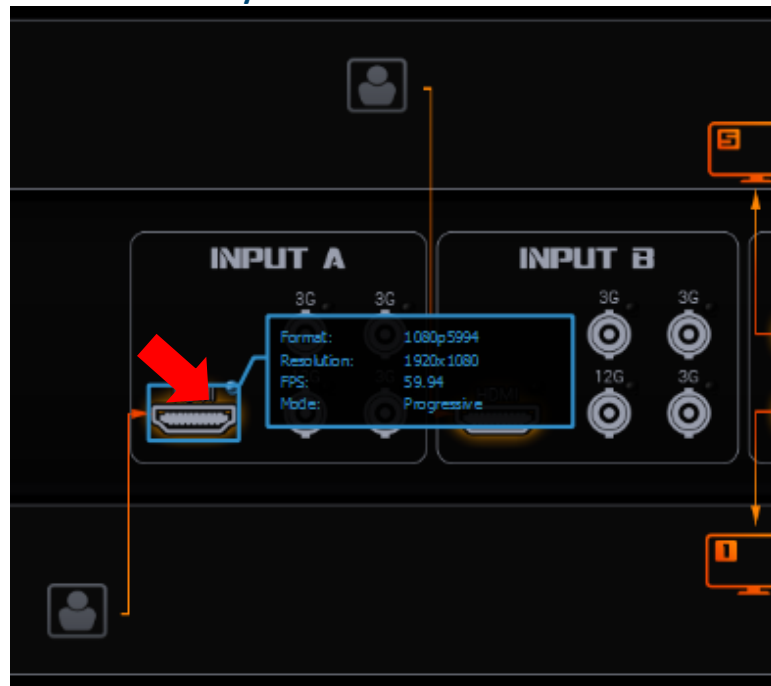
1. **Menu area** – When the **Connection** tab turns orange, it indicates that you are working on this particular screen. Pressing the **Channel A** or **Channel B** tabs will switch your display from **Connection** mode to **Channel A** or **Channel B** setting (processing) mode. Detailed explanations of the **Menu area** is in later parts of the manual.

2. **Connection Graphics area** – The Connection Graphics Area is basically a graphical visualization of the rear panel of the **KMU-100** device with all its available **inputs and outputs**. The active status and the introduced changes to the inputs and outputs are graphically shown on the screen in the form of arrows / orange icons.

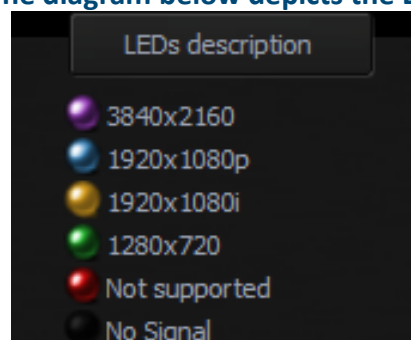


In fact, the active **inputs / outputs** on the rear panel of the **KMU-100** device are indicated by glowing **LEDs** at each **input / output port**. Color of the diode represents the signal resolution. The LED lights up when a signal is detected at the input.

You can see the **screenshot of the KMU-100 rear panel** as shown in the diagram below. **One of the LED locations is indicated by a red arrow.**



The **LED** colors indicating current signal format are displayed on the screen in the top right corner of the **graphics area**. **The diagram below depicts the LEDs description.**

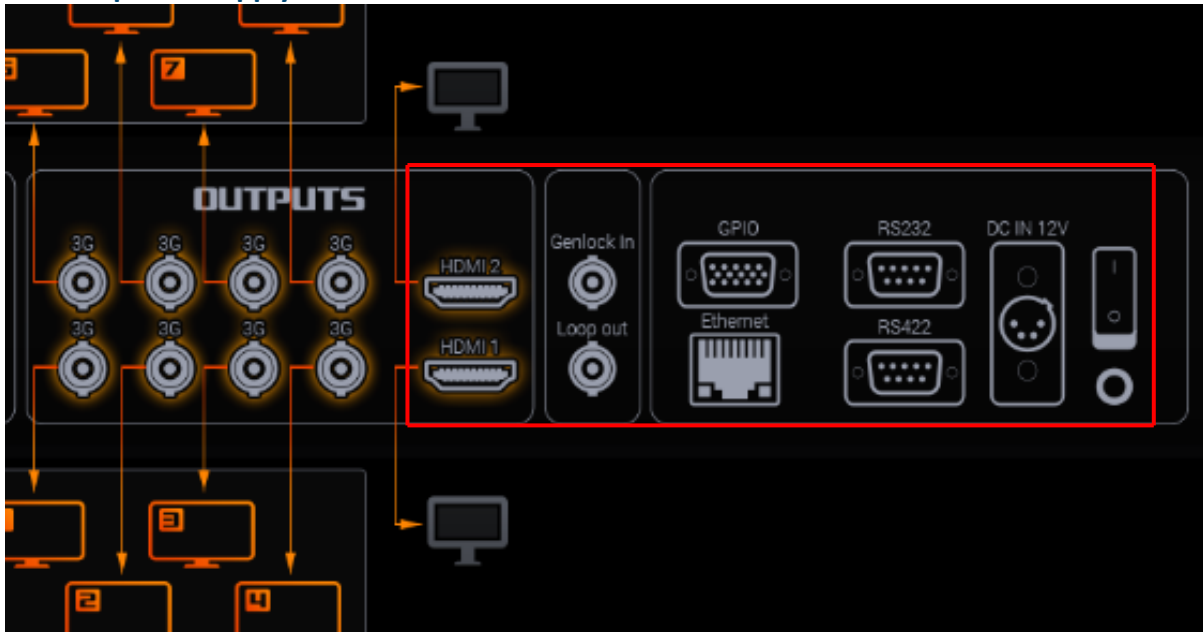


When you move the cursor over the **input port icon**, a preview of the detected format is displayed in a nearby window. In this window, properties such as **Format**, **Resolution**, **FPS** and **Mode** are displayed as illustrated in the diagram above.

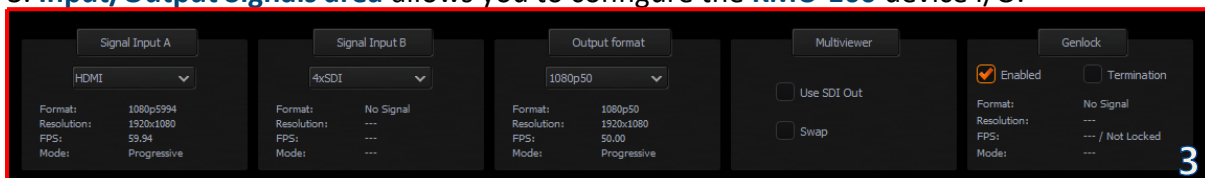
The other ports shown in the **Connection Graphics Area** are listed as follows:

- **Port: 2 x HDMI Video Output (HDMI type A) supporting 1080p60-**
  - **For KMU-100:** Those two ports allow users to connect to two monitors to show the Multiview screens of the Channel A and Channel B.
  - **For KMU-100+:** Those two ports allow user to connect to two monitors to show the Multiview screen (HDMI Output B) and PROGRAM screen (HDMI Output A).
- **Port: Sync Input (Genlock)** allows the specification of the reference signal for synchronization of output channels.
- **Port: Ethernet RJ45** for control, configuration and firmware updates.

- **Port: RS-422** –
  - **For KMU-100:** It allows users to connect the RMC-185 KMU Controller to control the KMU-100. It allows users to control the KMU-100 by the VISCA Protocol.
  - **For KMU-100+:** It allows users to connect the RMC-185+ KMU Controller to control the KMU-100+. Moreover, it allows users to control the KMU-100+ by the VISCA Protocol.
- **Port: RS-232** input is currently unused.
- **DC power supply socket.**

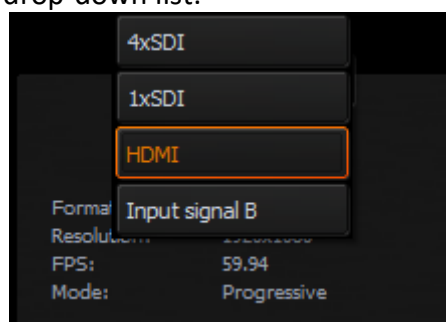


3. **Input/Output Signals area** allows you to configure the **KMU-100** device I/O.



### Input Signal Configuration

You can select an input signal option from the **Signal Input A** drop-down list as shown below as well as the **Signal Input B** drop-down list.

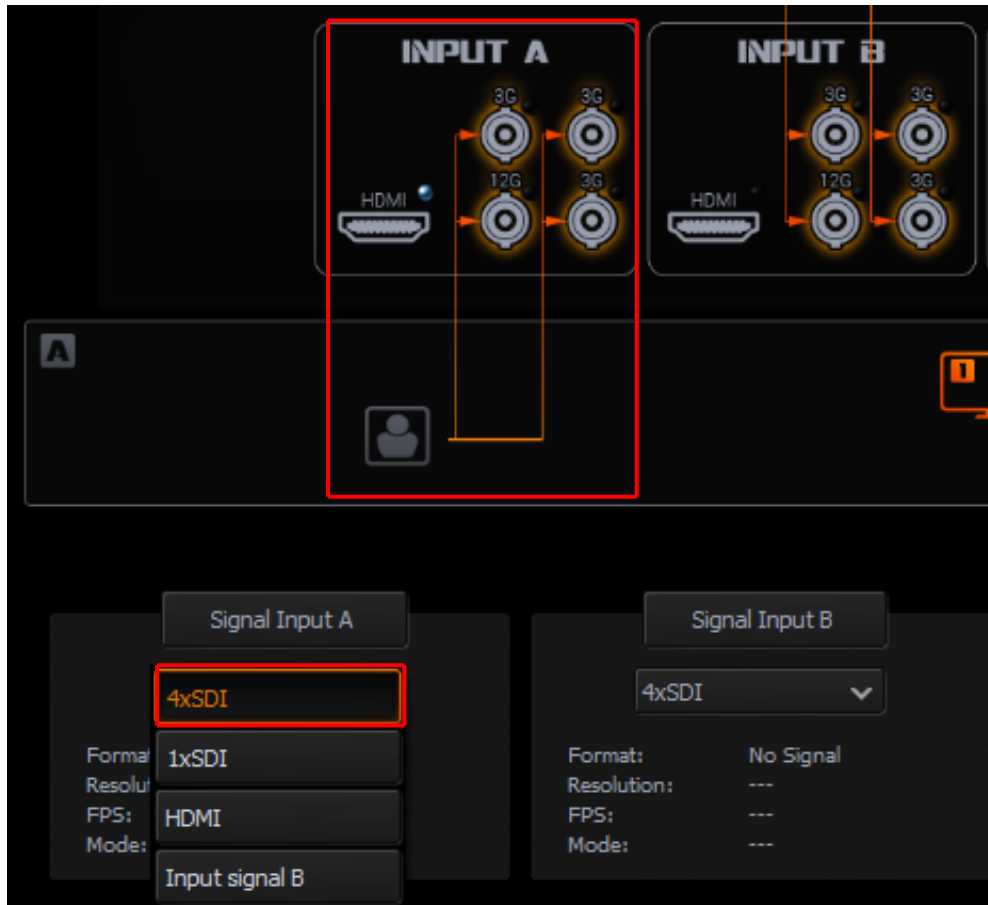


There are 4 input signal options in the **Signal Input A** drop-down list:

- **4x SDI**
- **1x SDI**

- HDMI
- Input Signal B

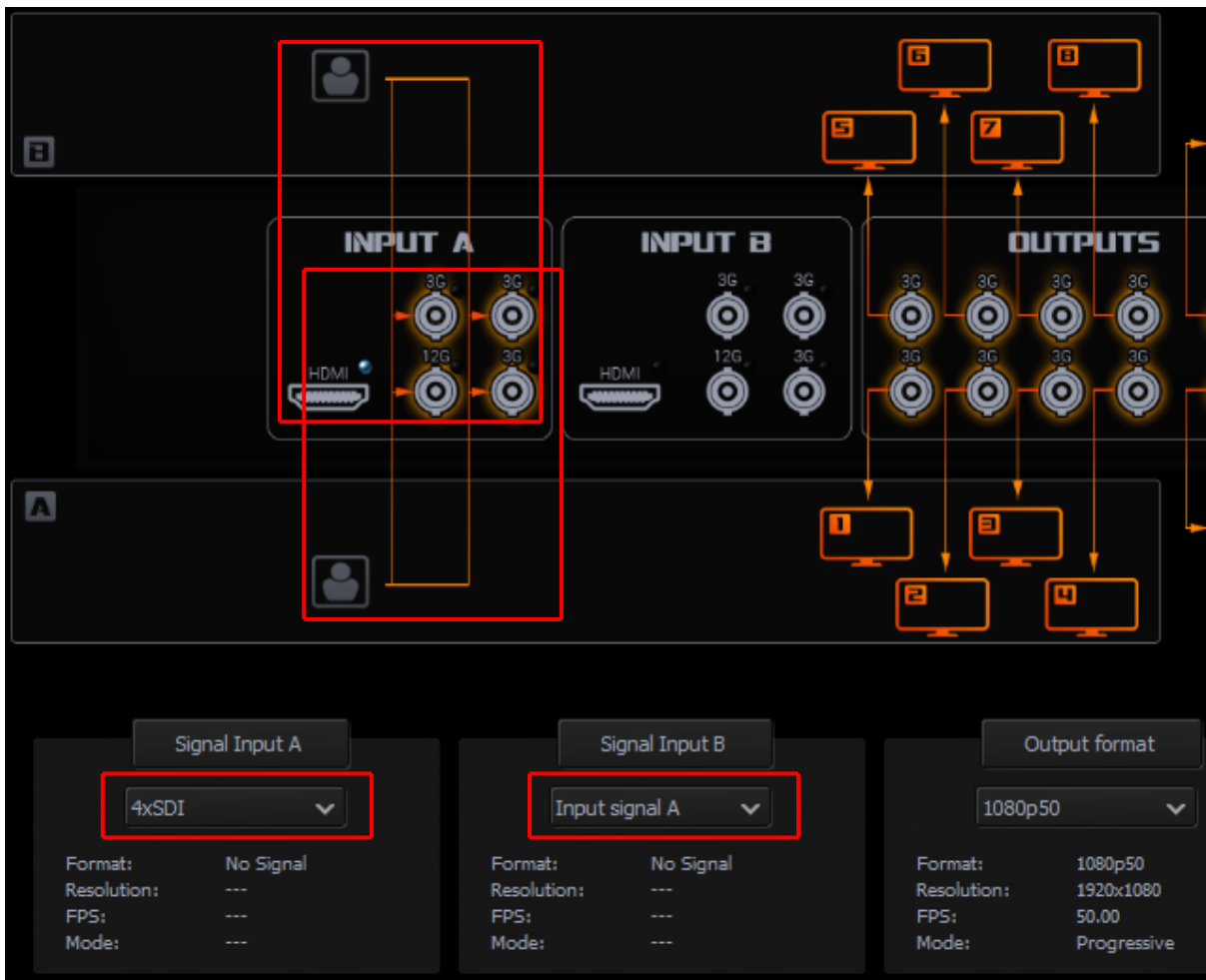
When you select the **4xSDI** option, the four SDI ports in the Input A area will then be highlighted by four orange arrows as illustrated in the diagram below.



After configuring **Signal Input A**, you can do the same with **Signal Input B**. There are **4 options in the Signal Input B drop-down list**:

- **4x SDI**
- **1x SDI**
- **HDMI**
- **Input Signal A**

When there is no input source for the Input B, users can copy the signal source of the Input A to the Input B. Please select “Input Signal A” option from the Signal Input B drop-down menu.



Users can double the number of frame windows on the same image for copying the signal source of the Input A to the Input B. For example, 8 frame windows instead of 4.

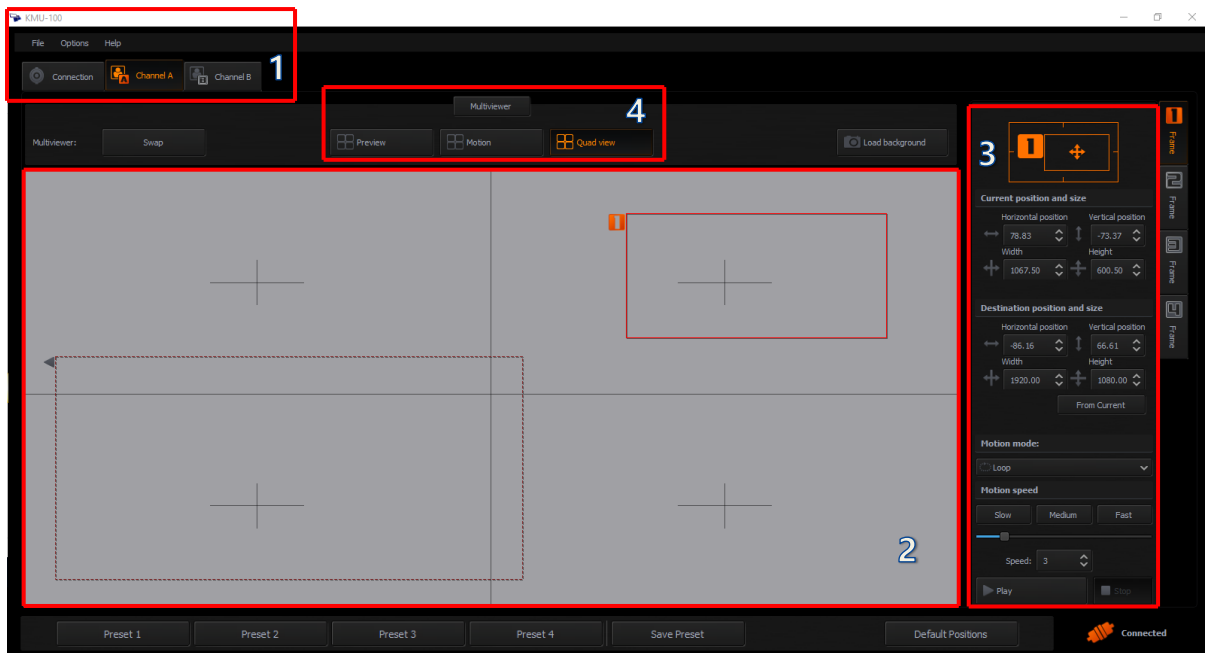
### Output Signal Configuration

There are several output signal format options in the **Output Format** drop-down list. The available formats are:

- SD PAL/NTSC
- SD 16:9 PAL/NTSC
- 720p 50/59.94/60
- 1080i 50/59.94/60
- 1080p 25/29.97/30
- 1080p 50/59.94/60

## 4.2 App Window Descriptions: Channel A and Channel B

### Channel A (Channel B is the same as the Channel A)



The **Channel A** and **Channel B** tabs are used for defining the way the input signal is divided into 4 different outputs. It is done by placing 4 different **frame windows (1, 2, 3 and 4)**. Content of the area bordered by each frame rectangle will be sent to a corresponding output channel.

The **Channel A (B)** screen window can be divided into 4 areas as illustrated in the diagram below:

1. **Menu Area**
2. **Central Work Area**
3. **Frame 1, 2, 3 and 4 Setting (Control) Area**
4. **Multiviewer – Preview on the Monitor**

#### Menu Area

**Channel A (B)** tab turns orange, indicating that the work is being done on this screen window. Clicking the **Channel B** tab will switch to the **Channel B** screen window.

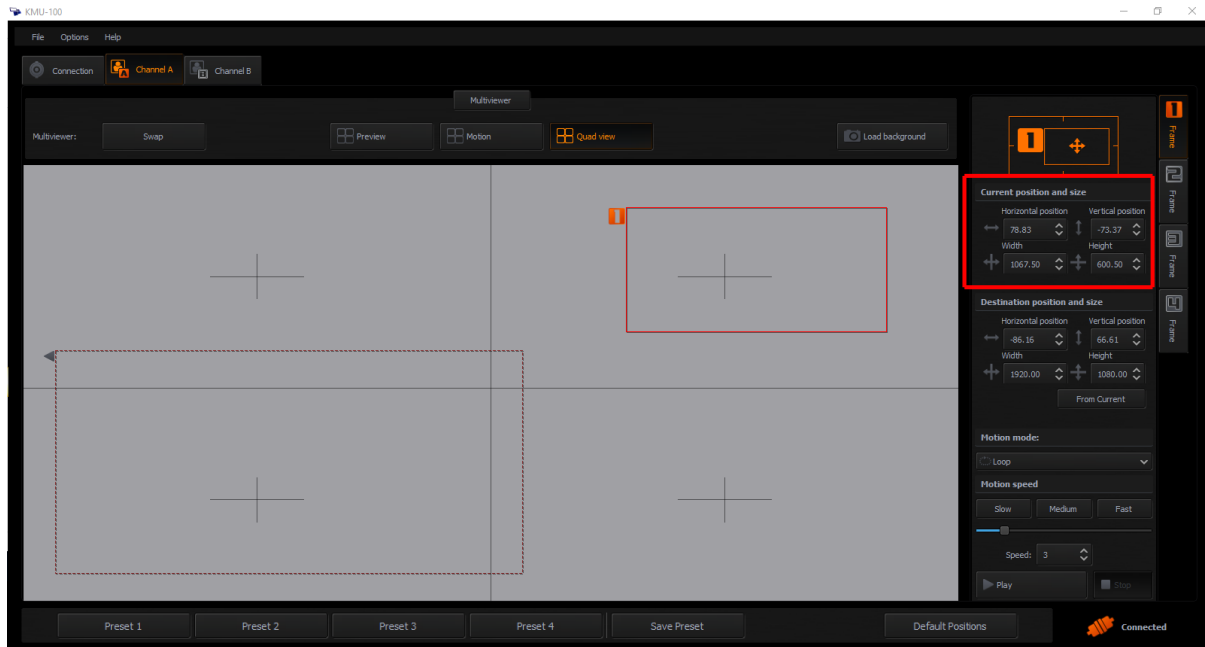
#### Central Work Area

In this area, the frame windows are defined and sent to the corresponding outputs.

To improve UI clarity, every output is configured in a separate tab, **Frames 1/2/3/4**. **Frame window size and position** can be set with mouse clicks (**on central work area**) or by entering the exact **size/position values** in the **Frame Setting Area** on the right of the **Channel A (B)** screen window.



**Frame Window Size** – This can be configured on the **central work area** by clicking on any corner or edge of the frame window with the mouse cursor. The window proportions are always retained as the rectangle is in **16:9** aspect ratio. Size of **Frame Window 1** is unrestricted as you can configure it up to the input format, **even 4K**. See the diagram below (current position and size).



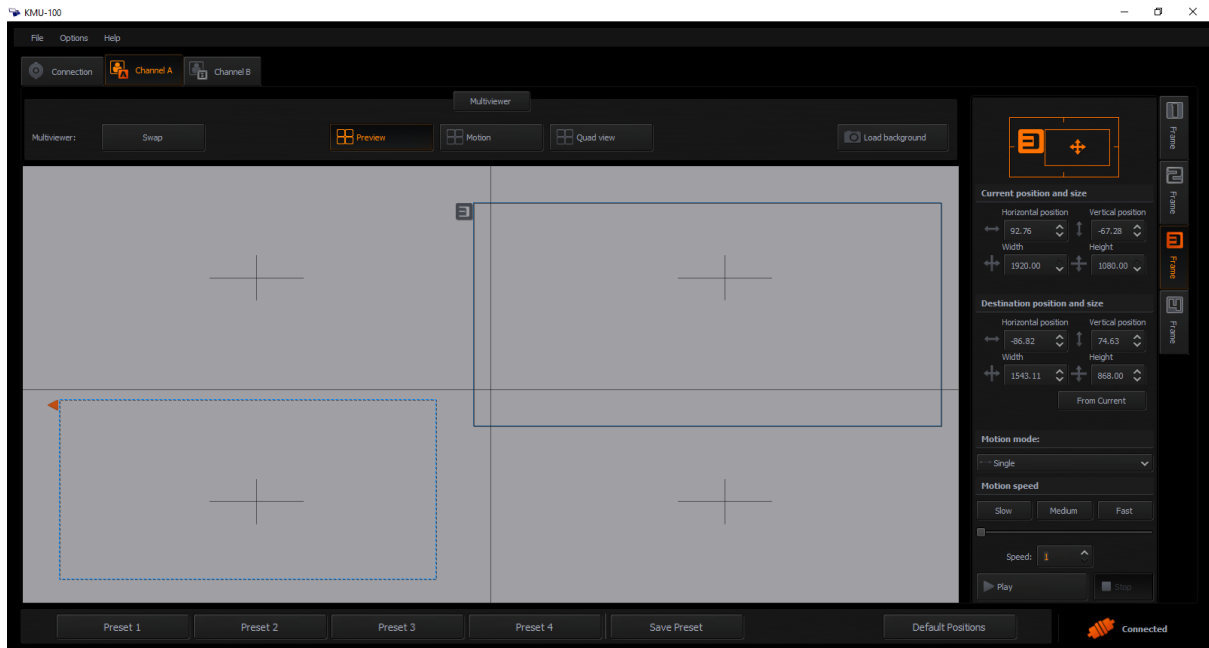
**Frame Windows 2, 3 and 4** support resolution up to **1080p** and the application restricts them from extending further.

A double click on the edited window will switch it to the max available size and the second double click will restore it to its previous size. Aspect ratio is defined by the output resolution and automatically applied to frame window definition.

**You can set a graphical background for the gray workspace of the Central Work Area, and the graphical background should help you better position the frame windows.**

### **Frame 1, 2, 3 and 4 Setting (Control) Area**

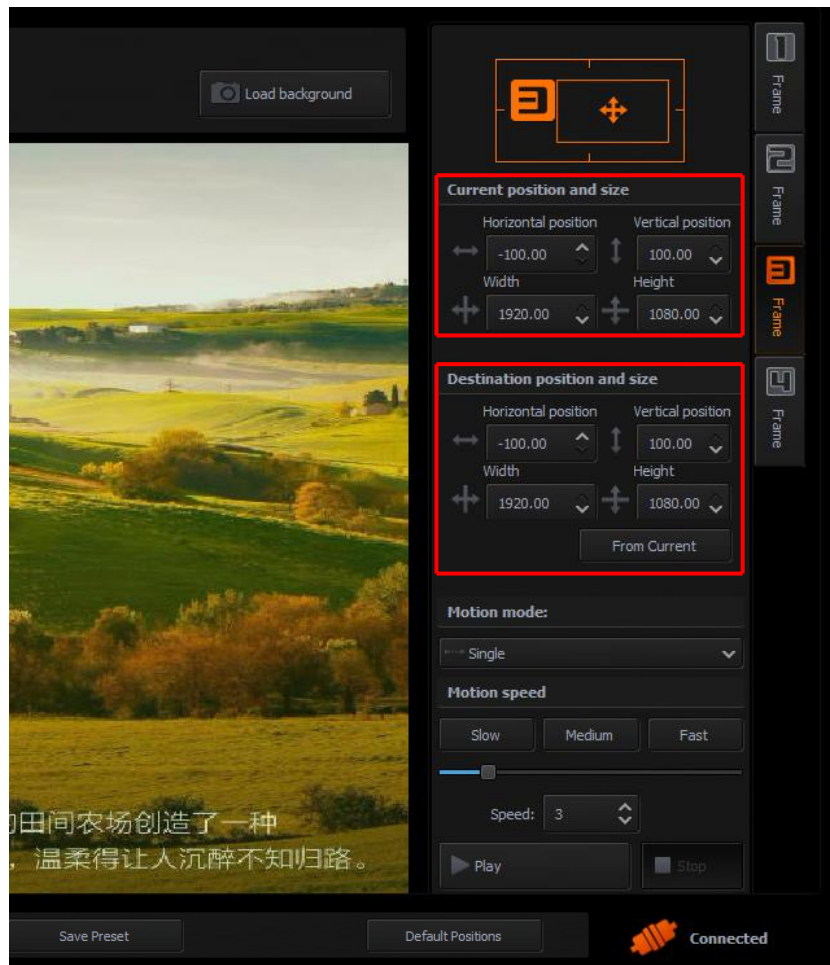
**Frame Window selection** – Click the appropriate **Frame 1, 2, 3 or 4** tab on the rightmost side of the work space to start configuring selected **Frame Window**. The selected **Frame** is indicated by an orange tab **as shown in the diagram below**.



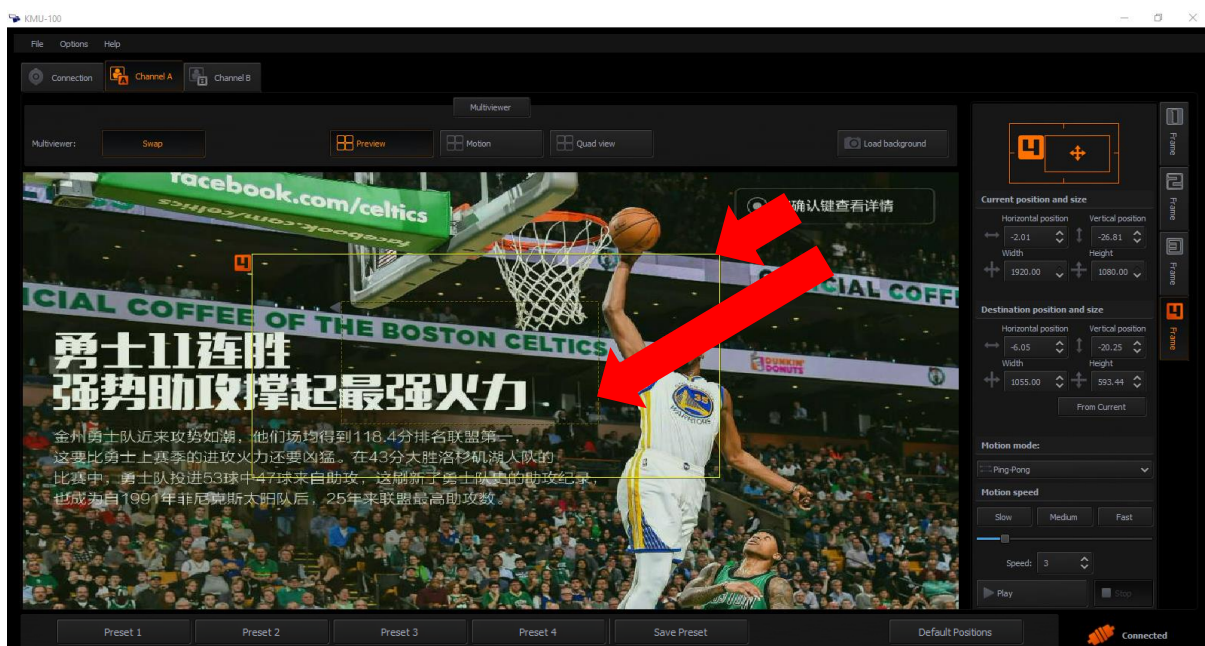
So far we've covered **frame windows 1, 2, 3 and 4** defined as **fixed (stationary)** in their **Start** positions. However, every **frame window can be animated**.

To animate the **Frame Window**, all you need to do is to select the size and position of the **Start rectangle** and **Stop rectangle**. The position and the size of the Start and Stop rectangles can be defined using the mouse cursor or by entering the position coordinates in the **Frame Setting Area (Current position and size and Destination position and size)**.

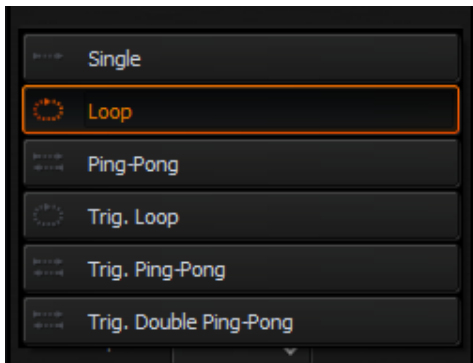
If you want to set the **final window** position exactly in the place where the **start window** is, you can simply click the **From Current** button. After the **From Current** button is clicked, you should be able to see **the Start window overlapping the Stop window** (in identical positions).



**Stop rectangle** is drawn in dash mode. In the picture below, you can see that the **Start rectangle** is indicated by a short arrow and the **Stop rectangle** is indicated by a longer arrow.



**Motion Mode** – You can select the motion mode in the **Frame Setting Area**. The available options are:



**Single** – Single movement from Start to Stop.

**Loop** – Cyclical movement, i.e. Start-Stop, Start-Stop and so on.

**Ping-Pong** – Swing cyclical movement, i.e. Start-Stop, Stop-Start, Start-Stop and so on (pendulum swing motion).

**Trig. Loop** – This can trigger cyclical movement. i.e.

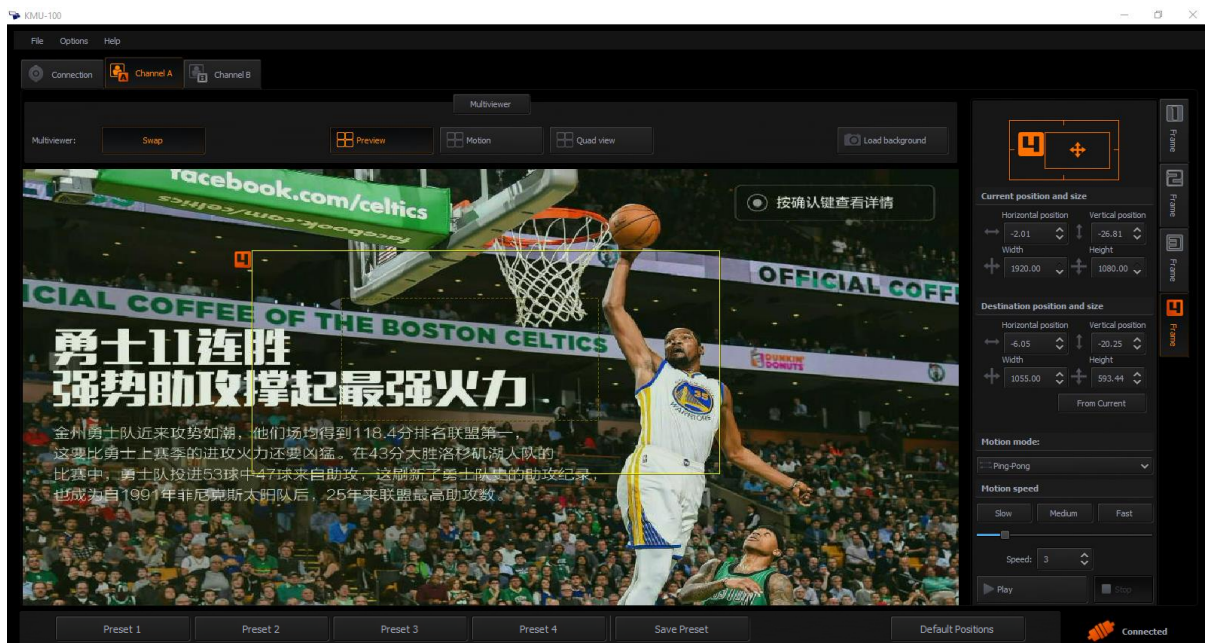
Start-Stop, Start-Stop and so on.

**Trig. Ping-Pong** – This can trigger Swing cyclical movement, i.e. Start-Stop, Stop-Start, Start-Stop and so on (pendulum swing motion).

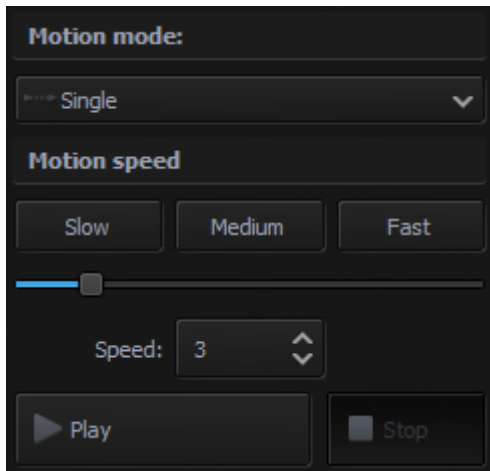
**Trig. Double Ping-Pong** – This can trigger dual Swing cyclical movement, i.e. Start-Stop, Stop-Start, Start-Stop and so on.

**Note:** You will see the animation as virtual movement of the camera shot.

In addition to changing the window position, you can define its size as well, thereby effectively realizing a **virtual zoom function**. As shown in the diagram below, the **Stop window** is much smaller size than the **Start window**.



After selection of the motion mode, you are then allowed to select one of the three speed modes (**slow**, **medium**, or **fast**) as shown in the diagram below.

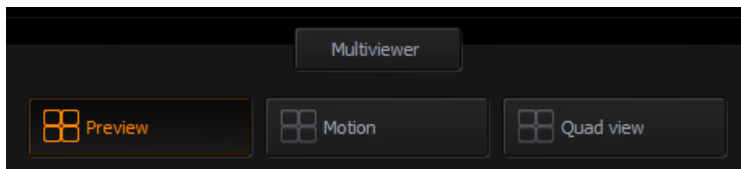


After the size and position of **start and stop windows**, **motion** type and **speed mode** are configured, you can start the animation by clicking **Play** button.

**Note:** The motion speed range is from 1-15.

### Multiviewer – Preview on the Monitor

Three Multiviewer modes including “Preview”, “Motion” and “Quad View” are shown as following diagram.



**Preview** – Four rectangles at their respective Start positions are visible on the live input. In the diagram below, frame window 1 covers the entire screen. Press the “Play” button allows the four Frames to move simultaneously.



**Motion preview**– Press one of the Frame tabs allows users to preview the “Start Position” and “End Position” by the connected external monitor. The start position and end position



of the Frame 1 are shown as following diagram. Please press the “Play” button and then users can see that the Frame moves from the start position to the end position.

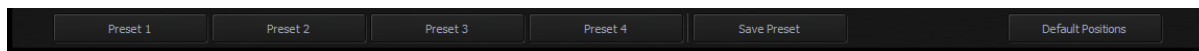


**Quad view** – In the Quad View mode, preview of contents of the four outputs is displayed on the monitor as shown in the diagram below.



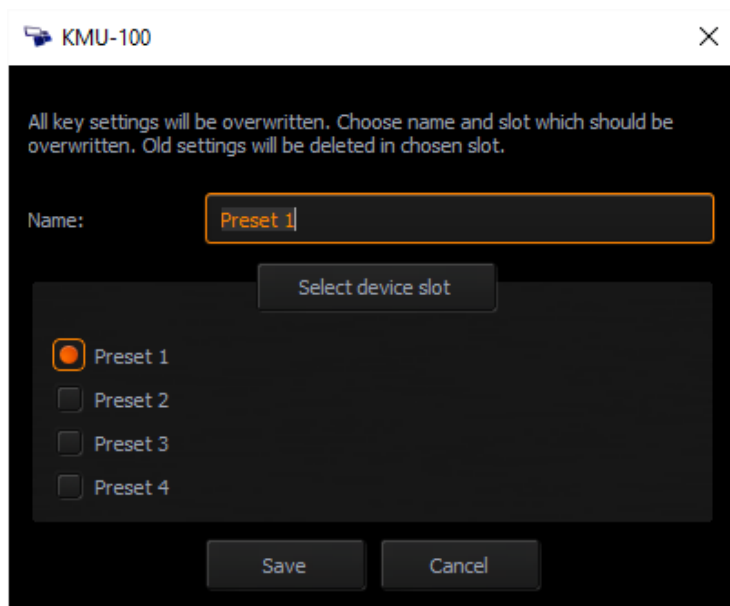
## How to Save the Preset Settings and How to Recall the Pre-saved Preset Settings

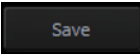
When the characters, position and motion mode are set, those parameters can be set to one of the four Preset which is located on the bottom of the window. Please press the “Default Positions” button to set those Frames to their original default positions.



Please follow following steps for saving the Preset settings.

1. Please press the “Save Preset” button to open the window for saving preset.




2. Please select the “Preset 1”, “Preset 2”, “Preset 3” or “Preset 4” on the left side of the pop-up window. After that, please press the “Save” button  for saving the current settings into the corresponding Preset.

Please follow following steps for recalling the Preset settings.

1. What you have to do is to press the “Preset 1”, “Preset 2”, “Preset 3” or “Preset 4” button on the main interface of the KMU-100 control software for adopting the corresponding Preset settings.

### 4.3 Tool Bar

There is a **Menu bar** in the top left corner of your screen. You can find three main options which are **File**, **Options**, and **Help**. The table below shows the sub-options that pop up when you click on the respective main options.

<b>File</b>	<b>Exit</b>	Quit the application
<b>Options</b>	<b>Language</b>	Select the language English Chinese/PRC Chinese/Taiwan Polski
	<b>Configuration</b>	Additional application settings Information about the device SDI 3G output type Firmware Network configuration Triggers Temperatures
<b>Help</b>	<b>About</b>	About KMU-100: End User License Agreement (EULA), Device, Version.
		A link to the KMU-100 product page.

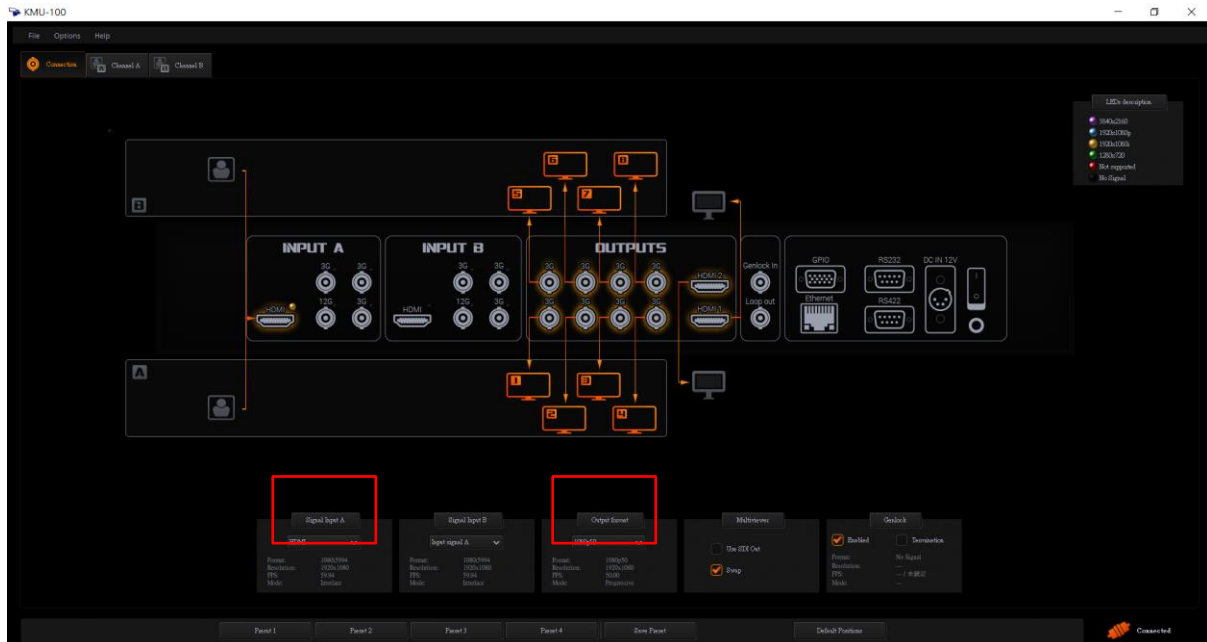


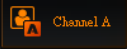
# 5. How to Operate the KMU-100

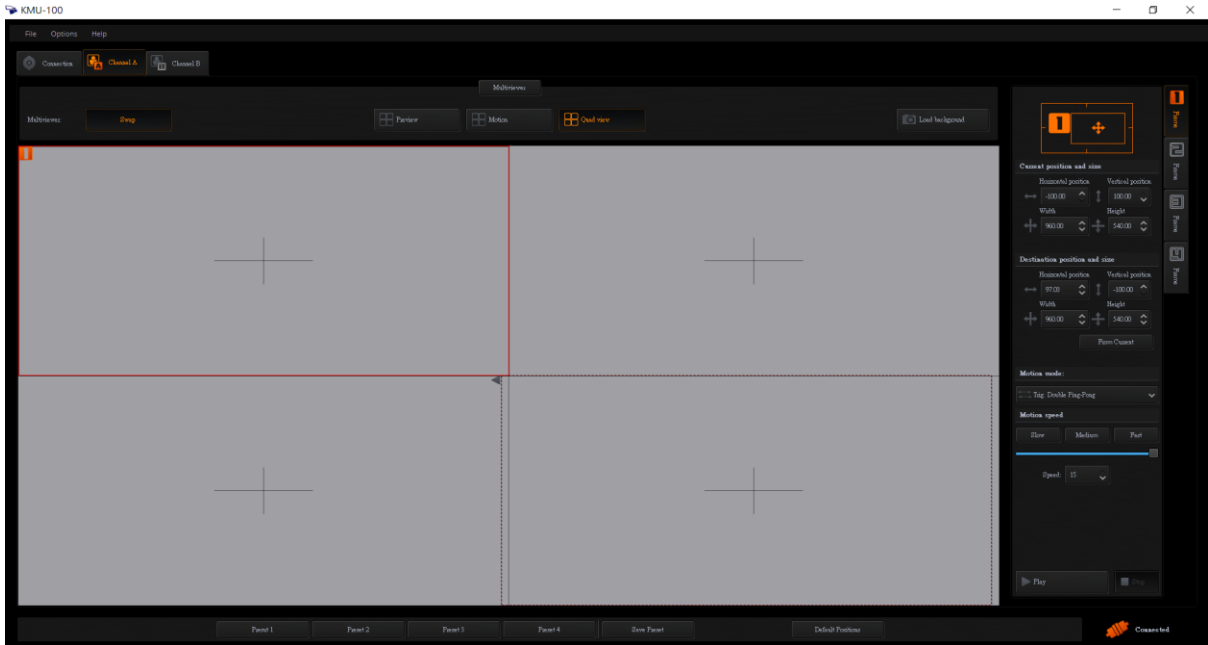
## 5.1 How to Operate the KMU-100 by the Control Software

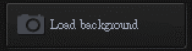
Please follow following steps for operating the KMU-100 by the KMU-100 control software.

1. Please make sure that your KMU-100 is connected successfully according to [3.1 Hardware Connection](#). Moreover, please confirm that the HDMI or SDI input source is connected successfully.
2. Please open the DV-Link and the KMU-100 control software according to [3.2 Launching DV Link Application](#).
3. After the KMU-100 control software is launched, the main interface is shown as following diagram. Please select the input source interface and the input source format from the drop-down menus which are surrounded by the red rectangulars.



4. Please click the Channel A button  to open the Channel A Input setting interface( the same way for Channel B) for showing the Channel A setting interface which is shown as following diagram.



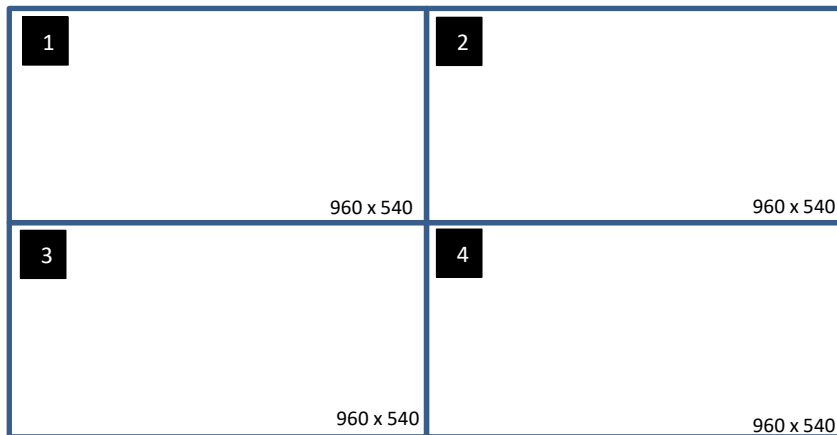
5. Please press the “Load Background”  button for loading the screen which is shot by the camera which is connected to the Channel A Input. The screen will be shown as following diagram.




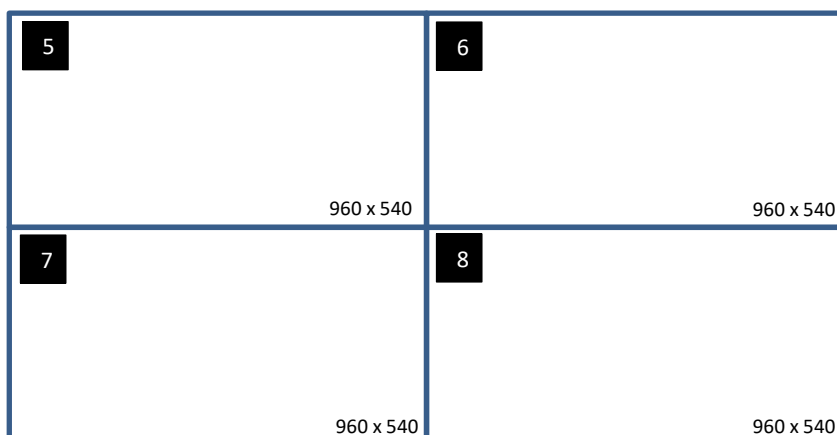
6. If the Preview/Motion/Quad view mode is selected.











- If the “Preview” button is pressed, users can see the following preview screen by the external connected monitor which is connected to the “MULTIVIEW B” HDMI interface which is located on the rear panel of the KMU-100.



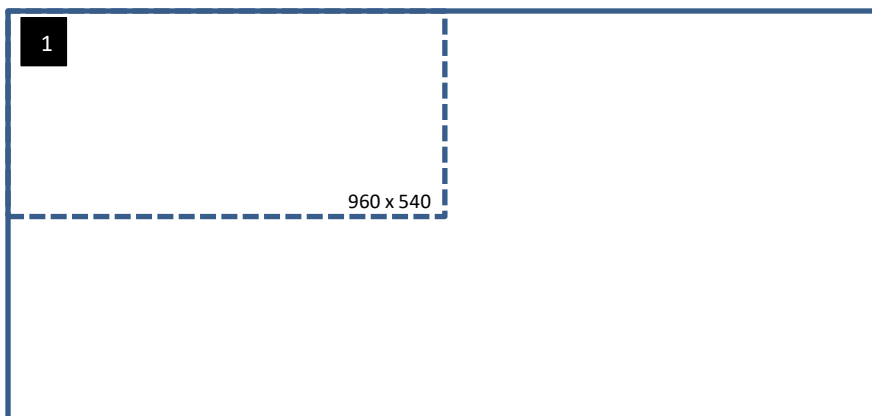
If there is an external connected monitor which is connected to the “MULTIVIEW A” HDMI interface which is located on the rear panel of the KMU-100, users can see the No. 5 to No. 8 Preview screens on the external connected monitor. However, if there is one external connected monitor only, users can press the “Swap”  button for showing the No. 5 to No. 8 Preview screens on the same external connected monitor.



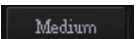




- Users can press the Frame 1  /Frame 2  /Frame 3  /Frame 4  /Frame 5  /Frame 6  /Frame 7  and Frame 8  buttons which are located on the right side of the Channel A button control interface respectively for adjusting parameters including “Horizontal Position”, “Vertical Position”, “Width” and “Height” by the setting panel. After that, the adjusted “Preview” screens will be shown on the external connected monitors.
- Please connect the SDI cable from the 8 SDI interfaces which are located on the rear panel of the KMU-100 to the external monitors, and then the 8 Preview screens will be shown on assigned external connected monitors respectively.

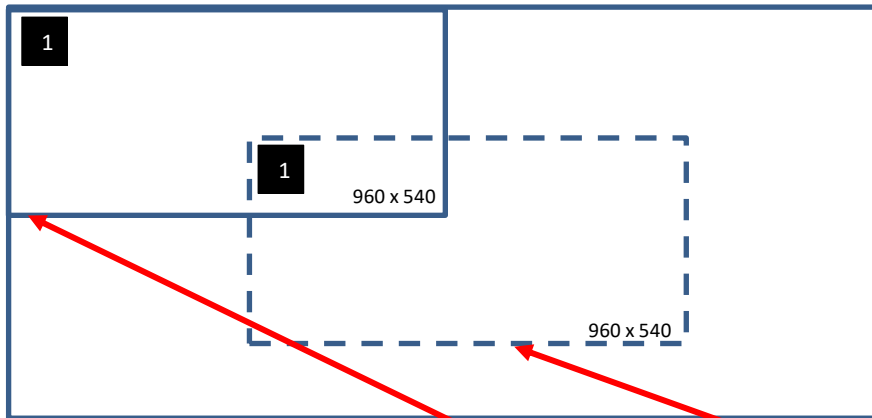
## Motion

- When users press the Channel A or Channel B button and then press the “**Motion**” button, users can see the selected Frame to be shown in dotted line from the external connected monitor.



- When users want to adjust the motion effect, please follow following steps.
  - Please make sure that the input channel (Channel A or Channel B) and Frame that you want to adjust are selected.
  - Please adjust your desired parameters including “Current position and size”, “Destination position and size”, “Horizontal position”, “Vertical position”, “Width” and “Height” to determine the “Start Point” and “End Point”. If users want to set the “End Point” to be the same as the “Start Point”, please press the “From Current”  button once.
  - Please select your desired playing mode from the “Motion mode” drop-down menu.
  - Please adjust your desired playing speed by pressing the “Slow” , “Medium” , “Fast”  buttons or by adjusting the “Speed” slider from the “Motion Speed” option.

- Finally, please press the “Play”  button and then users can see the selected screen to move from the “Start Point” to the “End Point” from the external connected monitor. If users want to stop the playing, please press the “Stop” button.



The solid rectangular represents the start point of the current selected screen.

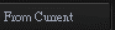
The dotted rectangular represents the end point for the movement of the current selected screen.

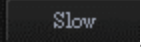

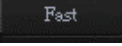

## Quad View

- When users press the “Channel A” or “Channel B” button and then press the “Quad view” button, users can see that the Frame which is shot by the camera to be shown in Quad View mode from the external connected monitor.



- When users want to adjust the motion effect, please follow following steps.
  - Please make sure that the input channel and Frame that users want to adjust are selected properly.
  - Please adjust your desired parameters including “Current position and size”, “Destination position and size”, “Horizontal position”, “Vertical position”, “Width”

and “Height” to determine the “Start Point” and “End Point”. If users want to set the “End Point” to be the same as the “Start Point”, please press the “From Current”  button once.


- Please select your desired playing mode from the “Motion mode” drop-down menu.
- Please adjust your desired playing speed by pressing the “Slow” , “Medium” , “Fast”  buttons or by adjusting the “Speed” slider from the “Motion Speed” option.
- Finally, please press the “Play”  button and then users can see the selected screen to move from the “Start Point” to the “End Point” from the external connected monitor. If users want to stop the playing, please press the “Stop” button.

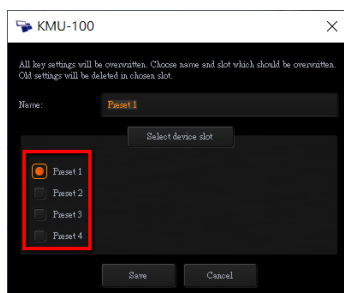
## How to Save Current Settings by Preset for Recalling Directly in the Future

The KMU-100 control software allows users to save current settings in Preset for recalling directly in the future.

Please follow following steps for saving and recalling the Preset settings.

### How to Save Current Settings in Preset

- At first, please make sure that your desired settings including “Horizontal position”, “Vertical position”, “Width” and “Height” are set in advance.
- Please press the “Save Preset”  button.
- Please select your desired Preset slot from the Preset 1 to Preset 4 which are located on the left side.




- Please press the “Save” button  and then the current settings will be saved as Preset.

### How to recall the Pre-saved Preset Settings

- Please press the Preset 1 to Preset 4 buttons for recalling the pre-saved Preset.

## About Default Position Button

Users can press the Default Positions  button for setting the “Current position and size”, “Destination position and size”, “Horizontal position”, “Vertical position”, “Width” and “Height” parameters back to the factory default values.

## 5.2 How to Use the RMC-185 to Control the KMU-100

The KMU-100 can be controlled by not only the KMU-100 control software but also the RMC-185 KMU controller.

Please follow following steps for controlling the KMU-100 by the RMC-185 KMU controller.

### 5.2.1 How to connect the RMC-185 KMU controller and KMU-100 4K multi-camera processor

Please pay attention that you have to connect the RMC-185 and KMU-100 system together. Please follow following steps for connecting the KMU1-100 and the RMC-185. (Take two external connected video sources as an example).

**The KMU-100 is made by installing the KMU-100 V134E7 firmware plus the RMC-185 KMU controller with the V1.006 firmware.**

1. Please connect two external connected video source (e.g. 4K camera or HDMI video source) to the HDMI INPUT A and HDMI INPUT B interface which are located on the rear panel of the KMU-100.
2. Please use two HDMI cables to connect the two external connected monitors to the MULTIVIEW OUTPUT B and MULTIVIEW OUTPUT A interfaces which are located on the rear panel of the KMU-100. The MULTIVIEW OUTPUT B interface is located on the upper side for outputting the Multiview preview screens of the Frame5, Frame6, Frame 7 and Frame 8. The Multiview OUTPUT A interface is located on the lower side for outputting the Multiview preview screens for the Frame 1, Frame 2, Frame 3 and Frame 4.
3. Please use an RJ-45 to RS-422 adapter cable to connect from the KMU REMOTE RJ-45 interface which is located on the rear panel of the RMC-185 to the RS-422 interface which is located on the rear panel of the KMU-100.
4. Please use an RJ-45 Ethernet cable to connect from the RJ-45 Ethernet interface which is located on the rear panel of the KMU-100 to the RJ-45 Ethernet interface of your laptop.
5. Please use 8 SDI cables to connect from the SDI OUTPUT1 to SDI OUTPUT8 interfaces to 8 SDI Input interfaces of the switcher to be the video input sources of the switcher. Moreover, users can connect the KMU-100 to 8 external connected monitors to be their video input sources.
6. Until this step, users can prepare to control the KMU-100 by the RMC-185. For the detailed introduction of the RMC-185 KMU controller, please refer to following paragraphs.

## 6. Introduction of the RMC-185 Controller

The RMC-185 is a cost effective physical controller designed specifically for control of the KMU-100 4K Multi-Camera Processor. The RMC-185 interfaces with the KMU-100 via an RS-422 interface.

The RMC-185 panel style design allows easy control of the KMU-100 with the hard keys giving the user quick access to main functions of the KMU-100. In addition, you can also use the joystick to move the selected frame view.

### 6.1 Notices for Device Setup

The RMC-185 is designed to control the KMU-100. Therefore, before pairing the RMC-185 with the KMU-100, the user should first ensure that the two devices are installed of the two pieces of firmware as listed below:

- KMU-100: V134E7
- RMC-185: V1.006

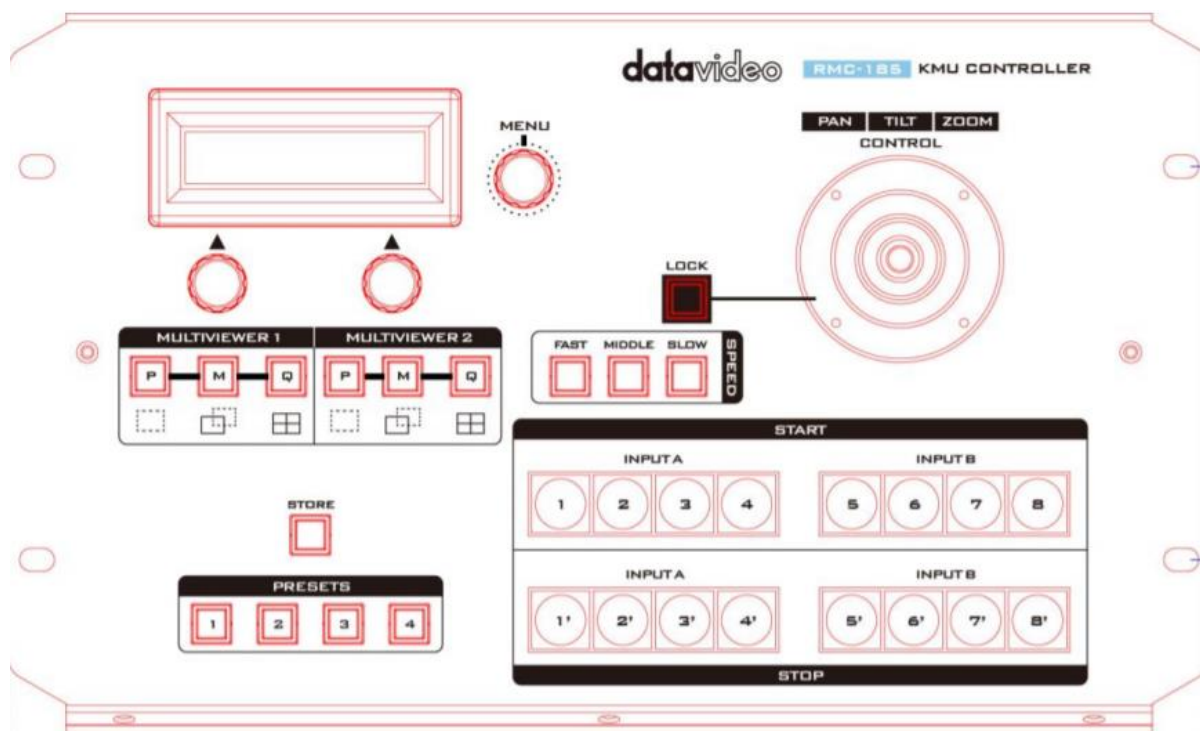
After the devices have been successfully upgraded to their corresponding firmware, connect the power to the RMC-185 through a power cable. After that, the RMC-185 (RJ-45) is connected to the KMU-100 (DSub) using an RJ-45-to-DSub cable. Finally, turn ON the RMC-185+ device switch to start manipulating your KMU-100+.

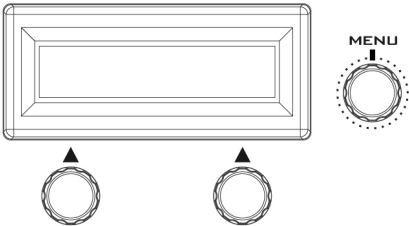
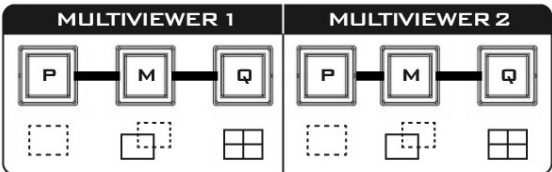
**Note: The communication protocol between the two devices is RS-422.**



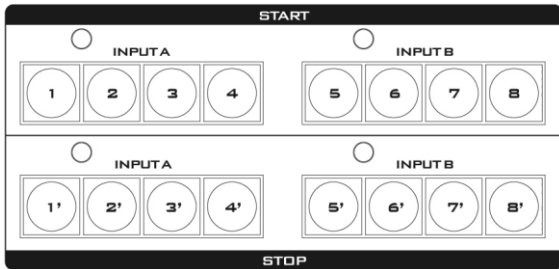
## 6.2 Connections and Controls of the RMC-185

### 6.2.1 Front Panel-Keyboard



	<p><b>LCD Display</b></p> <p>The RMC-185 status or the setup menu options are displayed on the LCD panel.</p> <p><b>Menu Control Dials</b></p> <p>The RMC-185 configuration menu can be entered and browsed using these dials. Push to select a specific item and rotate to browse the selected menu option.</p>				
	<p><b>Multiviewer Mode Select</b></p> <table border="1"> <tr> <td data-bbox="815 1646 938 1825"><b>P</b></td> <td data-bbox="938 1646 1473 1825"> <p><b>Preview</b></p> <p>Press to display current position of the selected frame.</p> </td> </tr> <tr> <td data-bbox="815 1825 938 2022"><b>M</b></td> <td data-bbox="938 1825 1473 2022"> <p><b>Motion</b></p> <p>Press to display motion of the selected frame (playback of the motion from</p> </td> </tr> </table>	<b>P</b>	<p><b>Preview</b></p> <p>Press to display current position of the selected frame.</p>	<b>M</b>	<p><b>Motion</b></p> <p>Press to display motion of the selected frame (playback of the motion from</p>
<b>P</b>	<p><b>Preview</b></p> <p>Press to display current position of the selected frame.</p>				
<b>M</b>	<p><b>Motion</b></p> <p>Press to display motion of the selected frame (playback of the motion from</p>				

		<b>Start</b> position to <b>End</b> position).
	<b>Q</b>	<b>Quad View</b> Simultaneous display of all four frames.

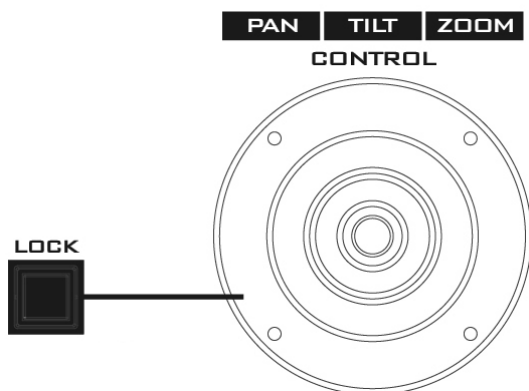


### Frame selection buttons (Top row)

Press one button (1-8) to select an active frame. After selecting an active frame, you can press the same button to switch between Start and End positions.

### Motion operation buttons (Bottom row)

Press one button to start motion of an active frame and the second button press pauses motion. Long pressing the same button for about 2 seconds will stop motion. Button LED flashes while the motion is in progress. When the motion is stopped, the button LED will stop flashing and turn to constant lit.



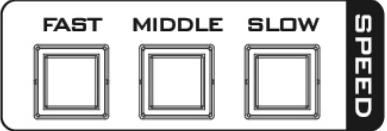
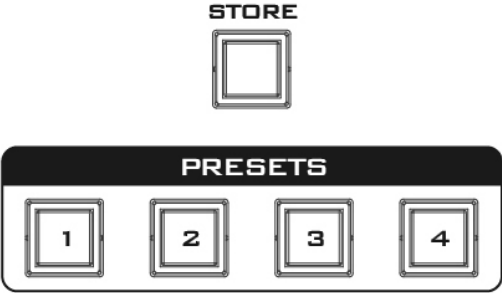
### PTZ Joystick Control

**Note:** Before attempting to use the joystick to PAN, TILT or ZOOM a selected frame, first make sure the LOCK button is not enabled.

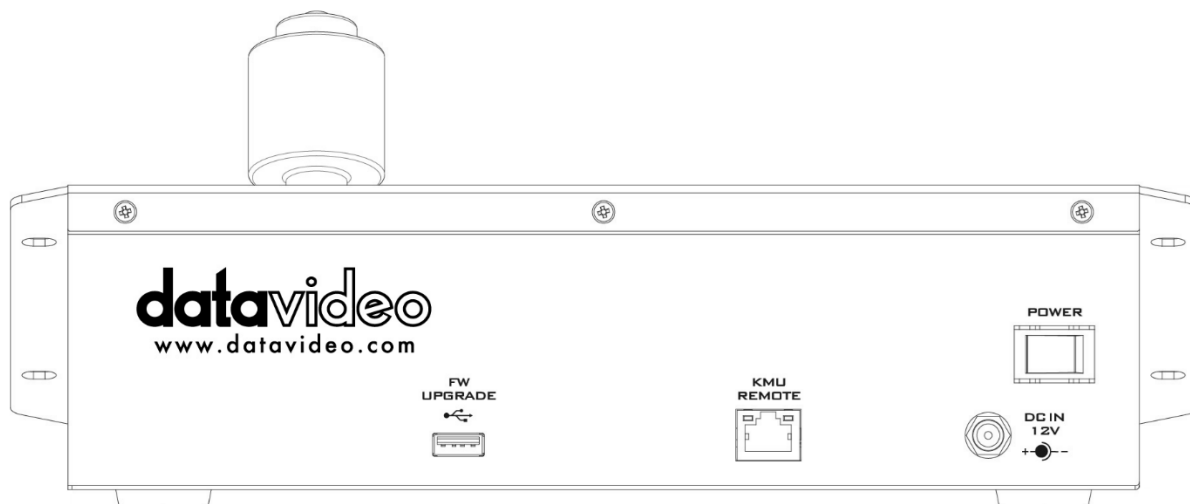
**PAN** – Move the joystick left or right to pan the selected frame from left to right or vice versa.

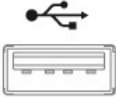
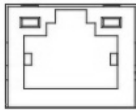

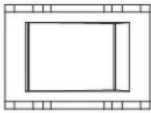
**TILT** – Move the joystick up or down to tilt the selected frame up or down.

**ZOOM** – Twist the joystick clockwise (to the right) or anti-clockwise (to the left) to have the selected frame zoom in or out.

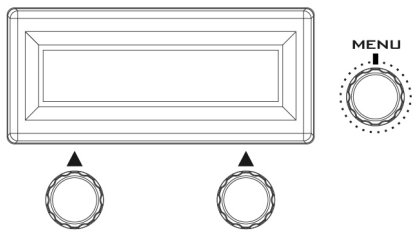
	<p><b>LOCK Button</b></p> <p>When enabled, the joystick will be in the lock state. To resume its functional status, simply press the button once to unlock the joystick.</p>
	<p><b>Speed</b></p> <p>The speed at which the selected frame moves can be chosen by pressing one of the three speed buttons.</p>
	<p><b>STORE</b></p> <p>Pressing this button enters the RMC-185 into <b>STORE MODE</b>. When activated, this allows the current device setting to be stored in a chosen Preset Button by pressing the corresponding Preset Button. Press again to exit <b>STORE MODE</b>.</p> <p><b>PRESETS</b></p> <p>The preset buttons may be used to store up to four device settings. Each button corresponds to one stored device preset. Simply press the button to recall the saved preset. Once activated, the button LED will be turned ON.</p>

## 6.2.2 Rear Panel-Connections



<p><b>FW UPGRADE</b></p> 	<p><b>Firmware Upgrade</b></p> <p>USB type A port for connection to a computer during the firmware upgrade process.</p>
<p><b>KMU REMOTE</b></p> 	<p><b>RJ-45 port to connect the KMU-100</b></p> <p>The RJ-45 ports are provided on the RMC-185 rear to connect the KMU-100. The communication protocol is <b>RS-422</b>, so use an RJ-45-to-DSub cable to connect the RMC-185 to the RS-422 port located on the KMU-100 rear panel.</p>
<p><b>DC IN 12V</b></p> 	<p><b>DC In Socket</b></p> <p>Connect the supplied 12V 0.5A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.</p>
<p><b>POWER</b></p> 	<p><b>Power On/Off Switch</b></p> <p>Switches the device ON / OFF.</p>

### 6.2.3 RMC-185 Menu Setup

	<p><b>Press the MENU button to enter the MENU.</b> The RMC-185 status or the setup menu options are displayed on the LCD panel.</p> <p>Press the dial to select a particular option and rotate the dial to browse through the option items.</p>
---	---

<b>FN1</b>	Exit	
<b>FN2</b>	Input A Source	1 x SDI 4 x SDI HDMI Clone
<b>FN3</b>	Input B Source	1 x SDI 4 x SDI HDMI Clone
<b>FN4</b>	Output Format	PAL NTSC PAL 16:9 NTSC 16:9 720p50 720p59.94 720p60 1080p25 1080p29.97 1080p30 1080i50

		1080i59.94 1080i60 1080p50 1080p59.94 1080p60	
<b>FN5</b>	Genlock Set	Genlock	Enable
			Disable
		Termination	Enable
			Disable
<b>FN6</b>	Genlock Status	Ref	Present
			Loose
			Lock
			Unlock
		Format	Detected video format
			Up to 1080p60
<b>FN7</b>	SDI 3G Type	Type A	
		Type B	
<b>FN8</b>	Multi. Swap	ON	
		OFF	
<b>FN9</b>	Multi. SDI	ON	
		OFF	
<b>FN10</b>	Trigger Set	Motion No.	1 – 8
		Trigger Level	Low
			High
<b>FN11</b>	KMU-100 Ver.	FPGA / HARDWARE / NIOS / ARM	

<b>FN12</b>	KMU-100 Temp	FPGA Temperature
		PCB Board Temperature
<b>FN13</b>	Firmware Ver.	RMC-185 Firmware Version

### **FN1. Exits the MENU (EXIT)**

Exits the setup menu mode.

### **FN2. Input A Source Assignment (Input A Source)**

In this option, you may select a source for input A image processing. The available interfaces are:

- 1xSDI – SDI video interface up to 12G (SD is not supported)
- 4xSDI – quad SDI video
- HDMI – HDMI 2.0
- Clone – Input B as a source

### **FN3. Input B Source Assignment (Input B Source)**

In this option, you may select a source for input B image processing. The available interfaces are:

- 1xSDI – SDI video interface up to 12G (SD is not supported)
- 4xSDI – quad SDI video
- HDMI – HDMI 2.0
- Clone – Input A as a source

### **FN4. Output Format Selection (Output Format)**

There are many video output formats available for selection. The available video output formats are listed as follows:

- PAL
- NTSC
- PAL 16:9
- NTSC 16:9
- 720p50
- 720p59.94
- 720p60
- 1080p25
- 1080p29.97
- 1080p30
- 1080i50
- 1080i59.94
- 1080i60
- 1080p50
- 1080p59.94
- 1080p60

### **FN5. Genlock Setting (Genlock Set)**

This option enables/disables the genlock functionality and turns ON/OFF internal 75 Ohm termination.

### **FN6. Genlock Status Display (Genlock Status)**

Display current genlock status by returning values detected from sync signal.

### **FN7. Selection of SDI 3G Type (SDI 3G Type)**

Enabling of 3G-SDI signal type on output ports (available modes are Type A and Type B).

### **FN8. HDMI Multiviewer Swap (Multi. Swap)**

If **Multi. Swap** is set to ON, the multiviewer contents of the KMU-100 HDMI outputs will be swapped.

### **FN9. SDI 4 Multiviewer (Multi. SDI)**

If **Multi.SDI** is set to ON, the 4<sup>th</sup> SDI output of every output channel on the KMU-100 works as a multiviewer output.

### **FN10. External Motion Trigger Setting (Trigger Set)**

In this option, you will be able to configure the external motion trigger method. Motion 1-8 can be controlled by an external device using the level trigger method. You can either set the trigger method to low level trigger or high level trigger.

### **FN11. KMU-100 Firmware Version Display (KMU-100 Ver.)**

Upon entering the **KMU-100 Ver.** Option, the KMU-100 firmware version will be displayed.

### **FN12. Display of KMU-100 FPGA and PCB Board Temperatures (KMU-100 Temp)**

In the **KMU-100 Temp** option, you will be able to check measured temperatures of the KMU-100 FPGA and PCB boards.

### **FN13. RMC-185 Firmware Version Display (Firmware Ver.)**

Upon entering the **Firmware Ver.** option, the RMC-185 firmware version will be displayed.



## 7. How to Store Different Device Settings of the RMC-185

The RMC-185 allows you to store up to four device settings. Follow the procedure below to store the current device setting to one of the preset buttons.

To store a device setting:

1. Adjust the frame positions using the joystick.
2. Push the **STORE** button and it will turn red.

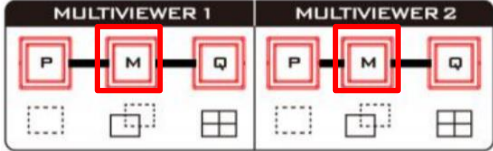
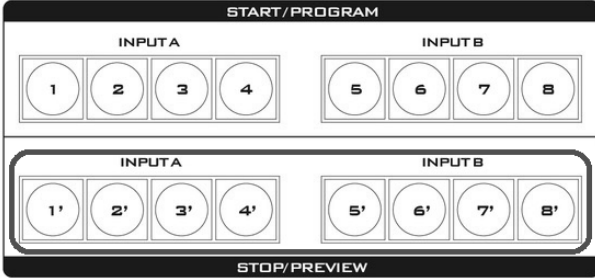
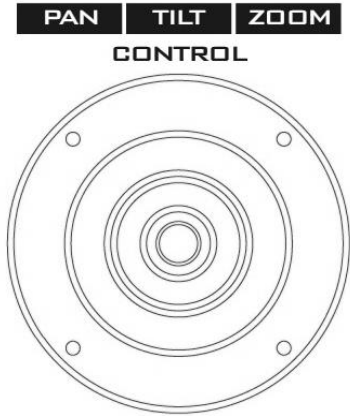
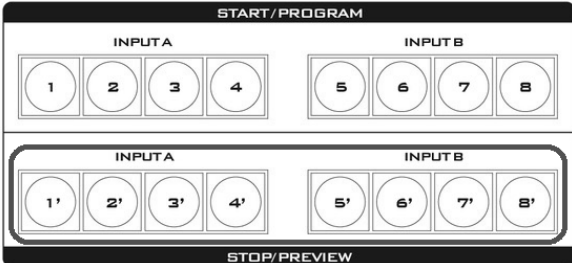


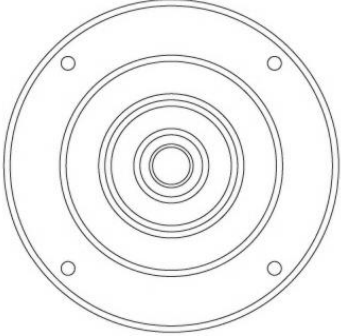

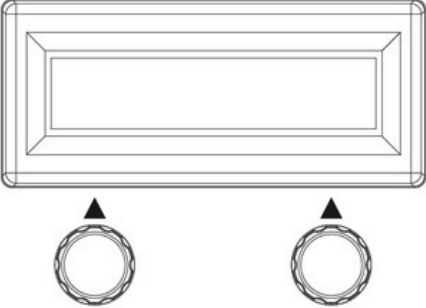
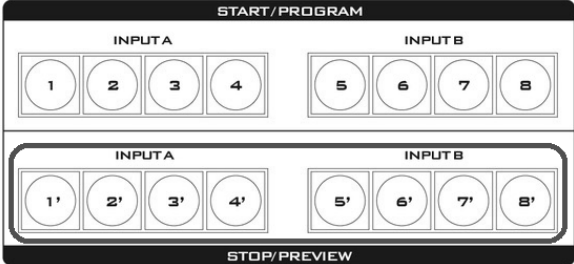
3. Press a preset button to save the current device setting.



4. The selected preset button will remain ON for 2-3 seconds and the button LED will be turned OFF after the device setting is successfully saved.

## 8. How to Set the Frame Motion Configuration of the KMU-100 by the RMC-185

	<p>1. At first, please press the “M” button which is located in the middle of the MULTIVIEW 1 or MULTIVIEW 2 button row.</p>
	<p>2. Press one of the STOP row buttons (buttons 1' to 8') to select a frame to adjust its motion setting.</p>
	<p>3. Use the joystick to zoom the frame and adjust its start position (fine border frame).</p>
	<p>4. Press the button (one of the STOP row buttons 1' to 8') selected at Step 2 again.</p>

<p style="text-align: center;"><b>PAN   TILT   ZOOM</b> <b>CONTROL</b></p> 	<p>5. Use the joystick to zoom the frame and adjust its end position (thick border frame).</p>
<p style="text-align: center;"><b>STORE</b></p> 	<p>6. Press the STORE button (constantly lit).</p>
	<p>7. Use the left knob below the LCD screen to set the Frame Motion Mode and the right knob to set the Frame Motion Speed.</p>
	<p>8. Press the button (one of the STOP row buttons 1' to 8') selected at Step 2 again to trigger the frame motion.</p>

## 9. How to Operate the KMU-100+ (Can be controlled by the RMC-185+ KMU Controller Only)

At first, please note that the **KMU-100+** can not be controlled by the **KMU-100** control software, it can be controlled by the **RMC-185+** KMU controller only.

Please follow following steps for controlling the KMU-100+ by the RMC-185+ KMU controller.

### 9.1 How to Connect the RMC-185+ KMU Controller and the KMU-100+ 2-Channel 4K Multicamera Processor

Please pay attention that before controlling the KMU-100+ by the RMC-185+ KMU controller, users need to connect the RMC-185+ to the KMU-100+ system. Please follow following steps for connecting the KMU-100+ and the RMC-185+. (Take two external connected image sources as an example in following paragraphs)

**The KMU-100+ is made by upgrading the firmware of the original KMU-100 to v.1.0.14745 plus the firmware upgrading for the original RMC-185+ KMU controller to v.1.012.**

1. Please connect two external connected video sources (such as 4K camera or HDMI video source) to the HDMI INPUT A and HDMI INPUT B interfaces which are located on the rear panel of the KMU-100+ .
2. Please use two HDMI cable to connect the two external monitors to the MULTIVIEW OUT B and the MULTIVIEW OUT A interface. The MULTIVIEW OUT B interface is located on the upper side for the MULTIVIEW PREVIEW screen output. The MULTIVIEW OUTPUT A interface is located on the lower side for the PROGRAM screen output.
3. Please use an RJ-45 to RS-422 adapter cable to connect from the KMU REMOTE RJ-45 interface which is located on the rear panel of the RMC-185+ to the RS-422 interface which is located on the rear panel of the KMU-100+.
4. Please use an RJ-45 Ethernet cable to connect the KMU-100+. Please connect from the RJ-45 Ethernet interface which is located on the rear panel of the KMU-100+ to the RJ-45 Ethernet interface of your laptop.
5. Please connect 8 SDI cables from the SDI OUTPUT 1 to SDI OUTPUT 8 interfaces which are located on the rear panel of the KMU-100+ to the 8 SDI input interfaces of the switcher to be the video input sources of the switcher. Moreover, users can connect the KMU-100+ to 8 external connected monitors to be the video input sources of those monitors.
6. Until this step, users can prepare to control the KMU-100+ by the RMC-185. For detailed introduction of the RMC-185+ KMU controller, please refer to following paragraphs.

# 10. Introduction and Operation of the RMC-185+ KMU Controller

## 10.1 Introduction of the RMC-185+ KMU Controller

The RMC-185+ is a cost effective physical controller designed specifically for control of the KMU-100+ 4K Multi-Camera Processor. The RMC-185+ interfaces with the KMU-100+ via an RS-422 interface.

The RMC-185+ panel style design allows easy control of the KMU-100+ with the hard keys giving the user quick access to main functions of the KMU-100+. In addition, you can also use the joystick to move the selected frame view.

## 10.2 RMC-185+ Features

- Remote control of up to eight selected frame views.
- Pan, Tilt and Zoom with speed control by joystick.
- Storing multiple presets for frame view settings.
- Full remote control of the KMU-100+ via RS-422 connection.
- An LCD display showing setup menu options.
- Two Multiviewer modes (Switcher and KMU modes)
- Compact design for easy installation

## 10.3 Notices for Device Setup

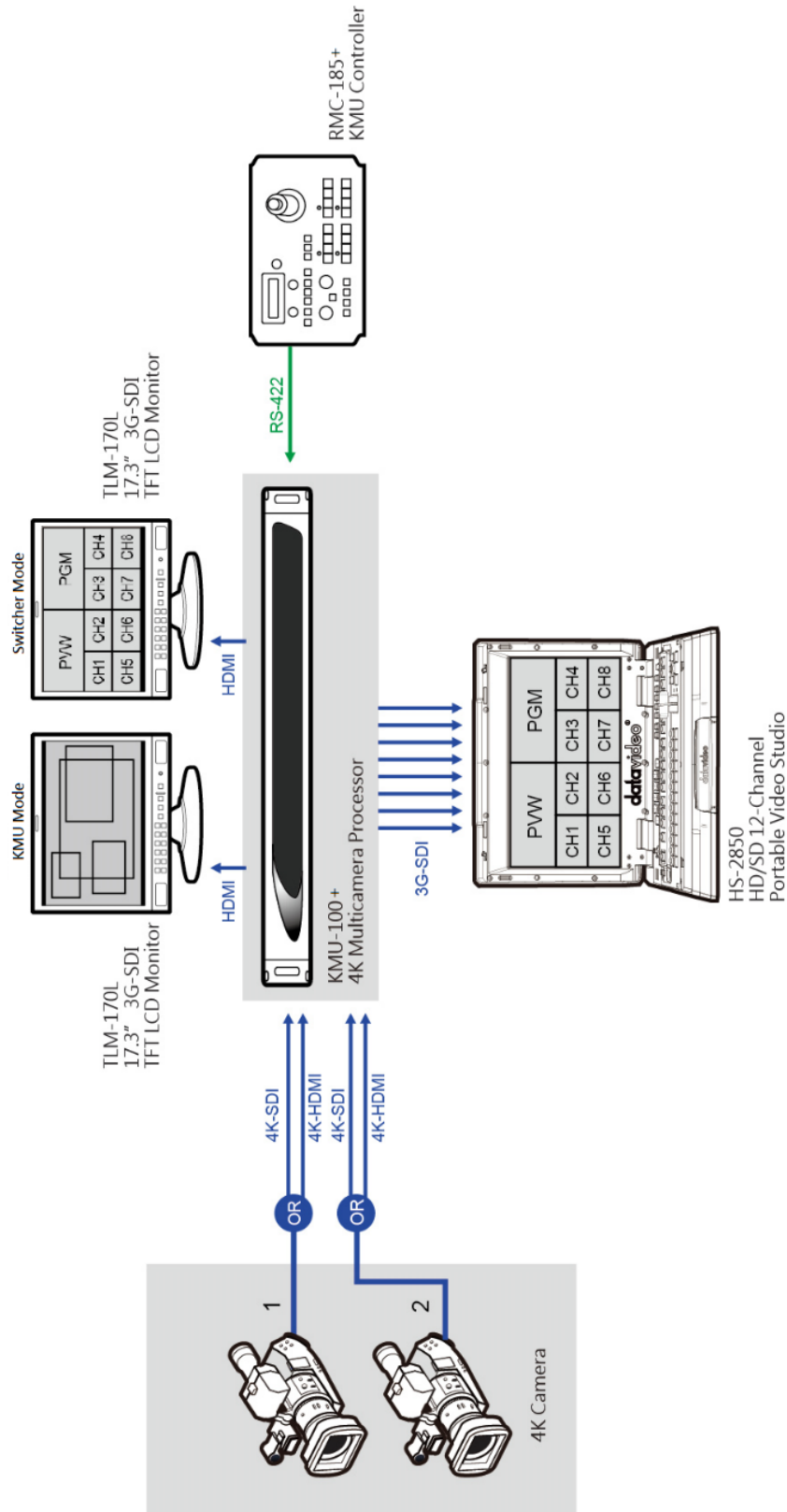
The RMC-185+ is designed to control the KMU-100+. Therefore, before pairing the RMC-185+ with the KMU-100+, the user should first ensure that the two devices are installed of the two pieces of firmware as listed below:

- KMU-100+: V1.0.14745
- RMC-185+: V1.012

After the devices have been successfully upgraded to their corresponding firmware, connect the power to the RMC-185+ through a power cable. After that, the RMC-185+ (RJ-45) is connected to the KMU-100+ (DSub) using an RJ-45-to-DSub cable. Finally, turn ON the RMC-185+ device switch to start manipulating your KMU-100+. See the system diagram below for the overall system setup.

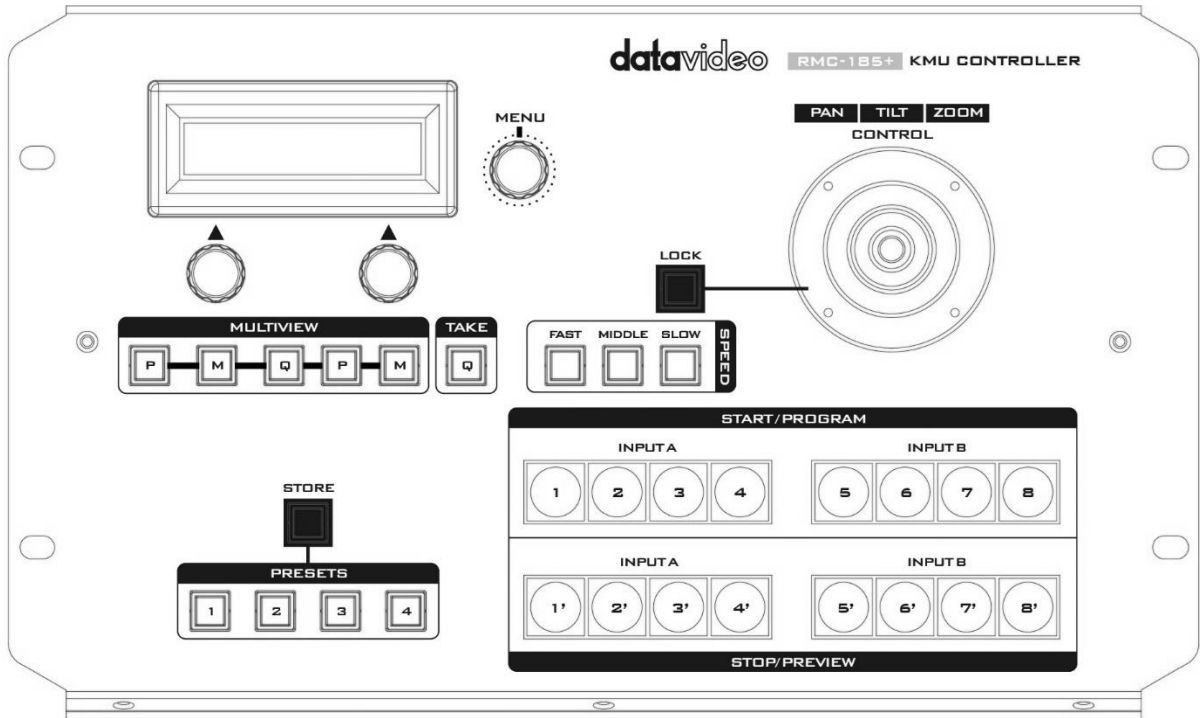
**Note: The communication protocol between the two devices is RS-422.**

# 11. System Diagram of the RMC-185+ and KMU-100+ Connection



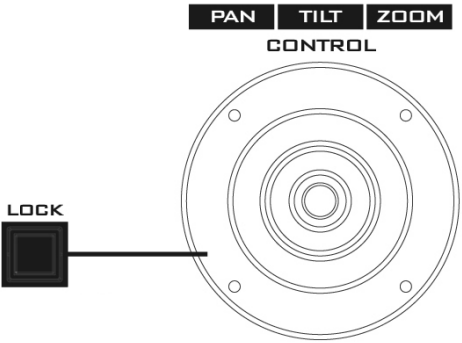
# 12. External Connections and Operations of the RMC-185+

## 12.1 Front Panel – Keyboard



	<p><b>LCD Display</b></p> <p>After the RMC-185+ is booted up, the <b>upper row of the LCD screen</b> should show “RMC-185 for KMU-100.”</p> <p>The bottom left of the LCD screen shows the frame motion mode and by rotating the knob right below, you will be able to see the available options listed as follows:</p> <ul style="list-style-type: none"> <li>• Single</li> <li>• Loop</li> <li>• PING</li> <li>• TR LOOP</li> <li>• TR PING</li> <li>• TR PING+</li> </ul> <p>Press the knob to select the mode.</p>
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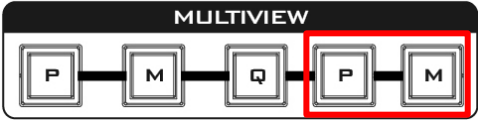
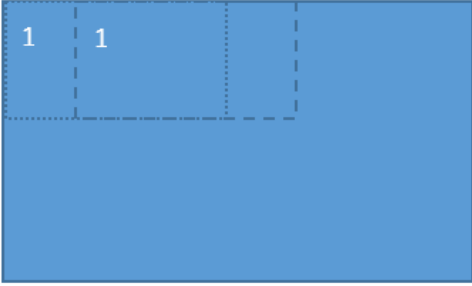

	<p>The bottom right of the LCD screen shows the frame motion speed and by rotating the knob right below, you will be able to change the speed from 1 to 15. Press the knob the set the speed.</p> <p><b>Menu Control Knob</b></p> <p>Push the <b>Menu Control Knob</b> to enter and browse the RMC-185+ configuration menu. Once in the menu, you can either push the menu knob to select a specific item or rotate to browse the selected menu option (or adjust the parameter value of the selected option).</p> <p>Certain options of the menu will require the user to use the two knobs below the LCD screen to adjust the parameter values and these values can be set by pushing the corresponding knobs.</p>
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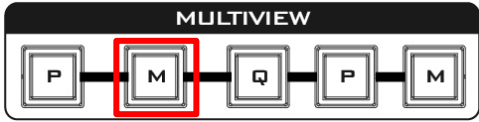
 <p>The diagram shows a circular joystick control panel with concentric rings. Above the joystick are three rectangular buttons labeled 'PAN', 'TILT', and 'ZOOM'. Below the joystick is a square button labeled 'LOCK'. A line connects the 'LOCK' button to the joystick panel.</p>	<p><b>PTZ Joystick Control</b></p> <p><b>Note:</b> Before attempting to use the joystick to PAN, TILT or ZOOM a selected frame, first make sure the LOCK button is not enabled.</p> <p><b>PAN</b> – Move the joystick left or right to pan the selected frame from left to right or vice versa.</p> <p><b>TILT</b> – Move the joystick up or down to tilt the selected frame up or down.</p> <p><b>ZOOM</b> – Twist the joystick clockwise (to the right) or anti-clockwise (to the left) to have the selected frame zoom in or out.</p> <hr/> <p><b>LOCK Button</b></p> <p>When enabled, the joystick will be in the lock state. To resume its functional status, simply press the button once to unlock the joystick.</p>
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## Multiviewer Mode Select

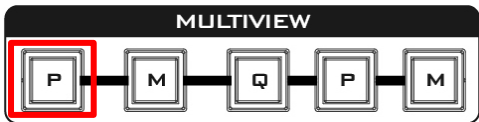
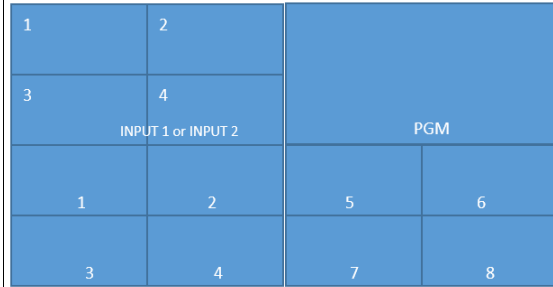
The Multiviewer buttons allow you to switch between different display modes.

	<p><b>P/M</b></p>	<p>The second rightmost P button opens the multiviewer in <b>KMU Mode</b>, thus displaying current position of the selected frame.</p> <table border="1" data-bbox="836 566 1326 824"> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>3</td> <td>4</td> </tr> </table> <p>The rightmost M button enables the Frame Motion function (playback of the motion from Start position to End position) of the selected frame in <b>KMU Mode</b>.</p> 	1	2	3	4																
1	2																					
3	4																					
	<p><b>Q</b></p>	<p>The middle Q button opens the multiviewer in <b>Switcher Mode</b> as shown in the diagram below.</p> <table border="1" data-bbox="836 1630 1385 1888"> <tr> <td>1</td> <td>2</td> <td>5</td> <td>6</td> </tr> <tr> <td>3</td> <td>4</td> <td>7</td> <td>8</td> </tr> <tr> <td colspan="2">INPUT 1</td> <td colspan="2">INPUT 2</td> </tr> <tr> <td>1</td> <td>2</td> <td>5</td> <td>6</td> </tr> <tr> <td>3</td> <td>4</td> <td>7</td> <td>8</td> </tr> </table>	1	2	5	6	3	4	7	8	INPUT 1		INPUT 2		1	2	5	6	3	4	7	8
1	2	5	6																			
3	4	7	8																			
INPUT 1		INPUT 2																				
1	2	5	6																			
3	4	7	8																			



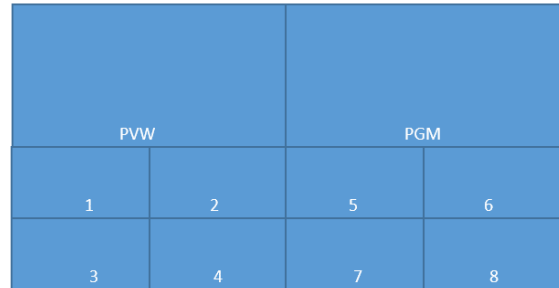
**M**

The second leftmost M button opens the multiviewer in **Switcher Mode** as shown in the diagram below.



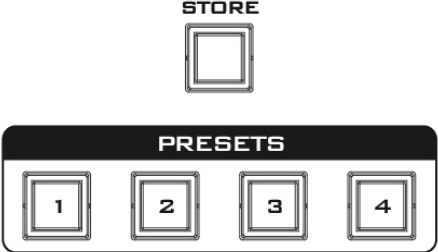
**P**

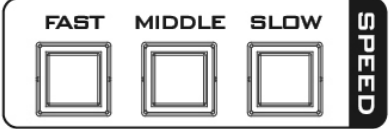
The leftmost P button opens the multiviewer in **Switcher Mode** as shown in the diagram below.

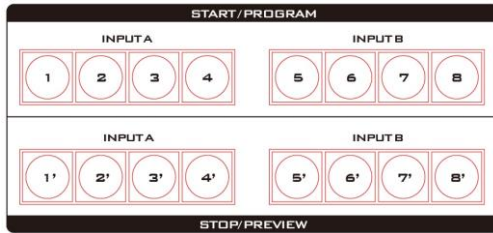


**Take**

Press this **Q** button will take the preview image to air.

 <p>The diagram shows a control panel with a 'STORE' button at the top, represented by a square with a double border. Below it is a black bar labeled 'PRESETS' containing four square buttons with double borders, numbered 1, 2, 3, and 4 from left to right.</p>	<p><b>STORE</b></p> <p>Pressing this button enters the RMC-185+ into either the <b>STORE MODE</b> or <b>Motion Setting Mode</b>.</p> <p><b>Store Mode</b></p> <p>When activated, this allows the current device setting to be stored in a chosen Preset Button by pressing the corresponding Preset Button. Press again to exit <b>STORE MODE</b>.</p> <p><b>Frame Motion Mode</b></p> <p>Press the Store button to enter the <b>Motion Setting Mode</b> (button constantly lit). See <i>Section 11 How to Use the RMC-185+ to Set the Moving Path of the KMU-100+ Frame Motion Mode</i> for details.</p> <p><b>PRESETS</b></p> <p>The preset buttons may be used to store up to four device settings. Each button corresponds to one stored device preset. Simply press the button to recall the saved preset. Once activated, the button LED will be turned ON.</p>
--	---

 <p>The diagram shows a control panel with three square buttons with double borders labeled 'FAST', 'MIDDLE', and 'SLOW' from left to right. To the right of these buttons is a vertical black bar with the word 'SPEED' written vertically in white.</p>	<p><b>Speed</b></p> <p>The speed at which the selected frame moves can be chosen by pressing one of the three speed buttons.</p>
--	--



### Frame selection buttons (Top row)

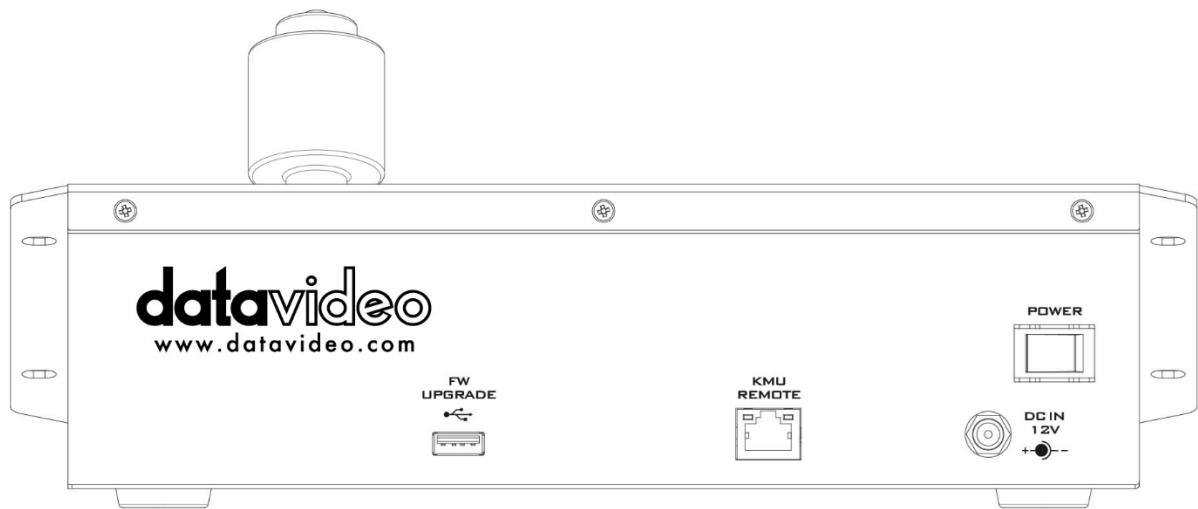
Press one button (1-8) to select an active frame. After selecting an active frame, you can press the same button to switch between Start and End positions.

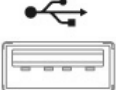
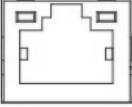

### Motion operation buttons (Bottom row)

Press one button to start motion of an active frame and the second button press pauses motion. Long pressing the same button for about 2 seconds will stop motion. Button LED flashes while the motion is in progress. When the motion is stopped, the button LED will stop flashing and turn to constant lit.

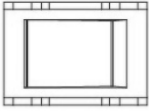
**Note:** See [Section 15](#) for Frame Motion Configuration.

## 12.2 Rear Panel - Connections



<p><b>FW UPGRADE</b></p> 	<p><b>Firmware Upgrade</b></p> <p>USB type A port for connection to a computer during the firmware upgrade process.</p>
<p><b>KMU REMOTE</b></p> 	<p><b>RJ-45 port to connect the KMU-100+</b></p> <p>The RJ-45 ports are provided on the RMC-185+ rear to connect the KMU-100+. The communication protocol is <b>RS-422</b>, so use an RJ-45-to-DSub cable to connect the RMC-185+ to the RS-422 port located on the KMU-100+ rear panel.</p>
	<p><b>DC In Socket</b></p> <p>Connect the supplied 12V 0.5A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.</p>

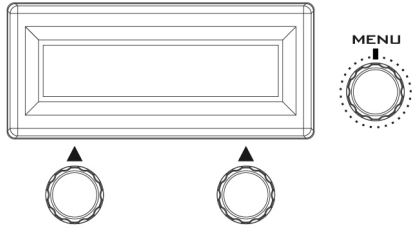
**POWER**



**Power On/Off Switch**

Switches the device ON / OFF.

## 13. RMC-185+Menu Setup

	<p>Press the <b>MENU</b> button to enter the <b>MENU</b>. The RMC-185+ status or the setup menu options are displayed on the LCD panel.</p> <p>Press the dial to select a particular option and rotate the dial to browse through the option items.</p>
---	---

<b>FN1</b>	Exit	
<b>FN2</b>	Input A Source	<ul style="list-style-type: none"> <li>1 x SDI</li> <li>4 x SDI</li> <li>HDMI</li> <li>Clone</li> </ul>
<b>FN3</b>	Input B Source	<ul style="list-style-type: none"> <li>1 x SDI</li> <li>4 x SDI</li> <li>HDMI</li> <li>Clone</li> </ul>
<b>FN4</b>	Output Format	<ul style="list-style-type: none"> <li>PAL</li> <li>NTSC</li> <li>PAL 16:9</li> <li>NTSC 16:9</li> <li>720p 50</li> <li>720p 59</li> <li>720p 60</li> <li>1080i 50</li> <li>1080i 59</li> <li>1080i 60</li> </ul>

		1080p 25	
		1080p 29	
		1080p 30	
		1080p 50	
		1080p 59	
		1080p 60	
<b>FN5</b>	Audio Output	Mix	
		Follow	
<b>FN6</b>	Genlock Set	Genlock	Enable
			Disable
		Termination	Enable
			Disable
<b>FN7</b>	Genlock Status	Ref	Present
			Loose
			Lock
			Unlock
		Format	Detected video format
			Up to 1080p60
<b>FN8</b>	SDI 3G Type	Type A	
		Type B	
<b>FN9</b>	Output Assign	1~8, PVW, PGM	
		1~8, PVW, PGM	
<b>FN10</b>	Limit	720p	
		1080p	
		None	



<b>FN11</b>	Trigger Set	Motion No.	1 – 8
		Trigger Level	Rising edge
			Falling edge
<b>FN12</b>	KMU-100+ Ver.	FPGA / HARDWARE / NIOS / ARM	
<b>FN13</b>	KMU-100+ Temp	FPGA Temperature	
		PCB Board Temperature	
<b>FN14</b>	Firmware Ver.	RMC-185+ Firmware Version	

### **FN1. Exits the MENU (EXIT)**

Exits the setup menu mode.

### **FN2. Input A Source Assignment (Input A Source)**

In this option, you may select a source for input A image processing. The available interfaces are:

- 1xSDI – SDI video interface up to 12G (SD is not supported)
- 4xSDI – quad SDI video
- HDMI – HDMI 2.0
- Clone – Input B as a source

### **FN3. Input B Source Assignment (Input B Source)**

In this option, you may select a source for input B image processing. The available interfaces are:

- 1xSDI – SDI video interface up to 12G (SD is not supported)
- 4xSDI – quad SDI video
- HDMI – HDMI 2.0
- Clone – Input A as a source

### **FN4. Output Format Selection (Output Format)**

There are many video output formats available for selection. The available video output formats are listed as follows:

- PAL
- NTSC
- PAL 16:9
- NTSC 16:9
- 720p 50
- 720p 59
- 720p 60
- 1080i 50
- 1080i 59
- 1080i 60
- 1080p 25
- 1080p 29
- 1080p 30
- 1080p 50
- 1080p 59
- 1080p 60

## **FN5. Audio Output**

If **Audio Follow** is selected, audio settings are described below:

SDI Ch 1 / 2 / 3 / 4: **Input A audio**

SDI Ch 5 / 6 / 7 / 8: **Input B audio**

**Audio Mix: Input A audio** and **Input B audio** will be simultaneously on the **HDMI OUT2 (PGM)**.

**Note:** The Audio Mix option will be available only if **Mix HDMI OUT2 (PGM)** or **SDI OUT** is set to PVW / PGM.

## **FN6. Genlock Setting (Genlock Set)**

This option enables/disables the genlock functionality and turns ON/OFF internal 75 Ohm termination.

## **FN7. Genlock Status Display (Genlock Status)**

Display current genlock status by returning values detected from sync signal.

## **FN8. Selection of SDI 3G Type (SDI 3G Type)**

Enabling of 3G-SDI signal type on output ports (available modes are Type A and Type B).

## **FN9. Output Assign**

This option sets SDI Output 1-8 to either one of 1-8, PVW and PGM.

EX: All SDI Output 1-8 can be set to PGM view.

## **FN10. Limit**

This option limits the minimum size of the motion window.

**Note:** *LIMIT is available for 4K input only.*

## **FN11. External Motion Trigger Setting (Trigger Set)**

In this option, you will be able to configure the external motion trigger method. Motion 1-8 can be controlled by an external device using the level trigger method. You can either set the trigger method to low level trigger or high level trigger.

## **FN12. KMU-100+ Firmware Version Display (KMU-100+ Ver.)**

Upon entering the **KMU-100+ Ver.** Option, the KMU-100+ firmware version will be displayed.

### **FN13. Display of KMU-100+ FPGA and PCB Board Temperatures (KMU-100+ Temp)**

In the **KMU-100+ Temp** option, you will be able to check measured temperatures of the KMU-100+ FPGA and PCB boards.

### **FN14. RMC-185+ Firmware Version Display (Firmware Ver.)**

Upon entering the **Firmware Ver.** option, the RMC-185+ firmware version will be displayed.

## 14. How to Use the RMC-185+ to Store the Preset Settings of the KMU-100

The RMC-185+ allows you to store up to four device settings. Follow the procedure below to store the current device setting to one of the preset buttons.

To store a device setting:

1. Adjust the frame positions using the joystick.
2. Push the **STORE** button and it will turn red.

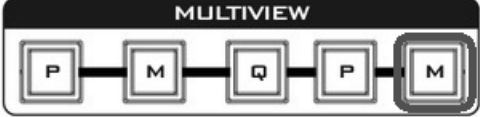
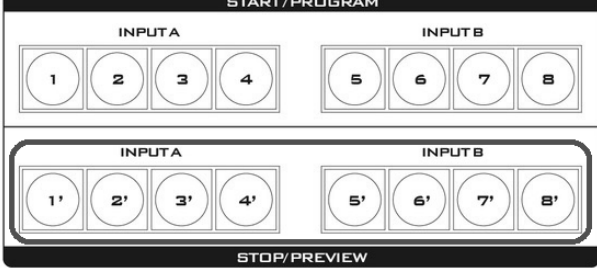
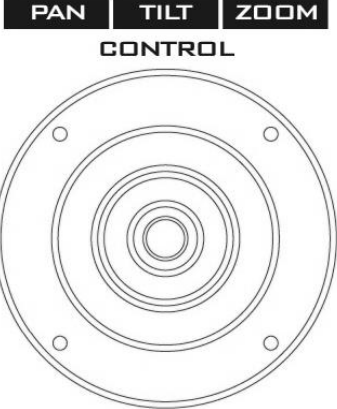
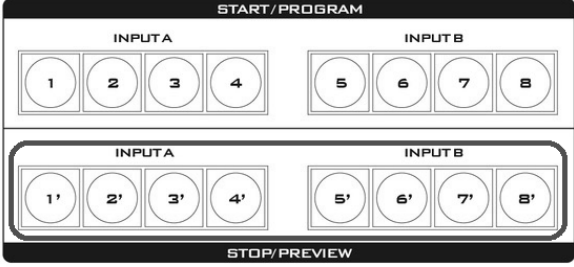


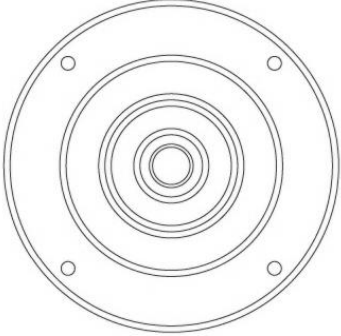

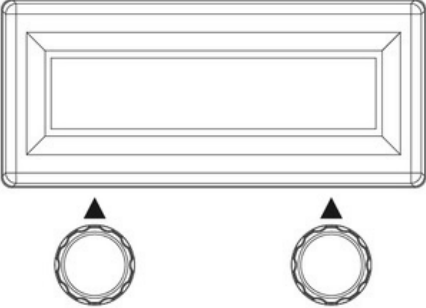
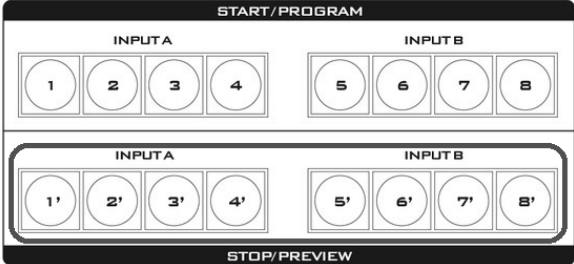
3. Press a preset button to save the current device setting.



4. The selected preset button will remain ON for 2-3 seconds and the button LED will be turned OFF after the device setting is successfully saved.

## 15. How to Set the Frame Motion Configuration of the KMU-100+ by the RMC-185+

	<ol style="list-style-type: none"> <li>1. First enable the rightmost M button of the MULTIVIEW button row.</li> </ol>
	<ol style="list-style-type: none"> <li>2. Press one of the STOP row buttons (buttons 1' to 8') to select a frame to adjust its motion setting.</li> </ol>
	<ol style="list-style-type: none"> <li>3. Use the joystick to zoom the frame and adjust its start position (fine border frame).</li> </ol>
	<ol style="list-style-type: none"> <li>4. Press the button (one of the STOP row buttons 1' to 8') selected at Step 2 again.</li> </ol>

<p style="text-align: center;"><b>PAN   TILT   ZOOM</b> <b>CONTROL</b></p> 	<p>5. Use the joystick to zoom the frame and adjust its end position (thick border frame).</p>
<p style="text-align: center;"><b>STORE</b></p> 	<p>6. Press the STORE button (constantly lit).</p>
	<p>7. Use the left knob below the LCD screen to set the Frame Motion Mode and the right knob to set the Frame Motion Speed.</p>
	<p>8. Press the button (one of the STOP row buttons 1' to 8') selected at Step 2 again to trigger the frame motion.</p>

## 16. How to Upgrade the Firmware of the KMU-100/KMU-100+

From time to time, Datavideo may release new firmware to either add new features or to fix reported bugs in the current KMU-100/KMU-100+ firmware. Customers can update the firmware themselves if they wish or they can contact their local dealer or reseller for assistance

This section describes the firmware update process and it should take ***approximately few minutes to complete***. Once started, ***the update process should not be interrupted in any way*** as this could result in a non-responsive unit.

Please follow following steps for upgrading the KMU-100/KMU-100+ firmware.

1. Please download the latest KMU-100 firmware from the Datavideo official website [www.datavideo.com](http://www.datavideo.com).
2. Please set your laptop to be within the same network area as the KMU-100/KMU-100+.
3. Please launch KMU-100's DV-Link control software.
4. Please press the "Ethernet (乙太網路)" button from the "Available Network".



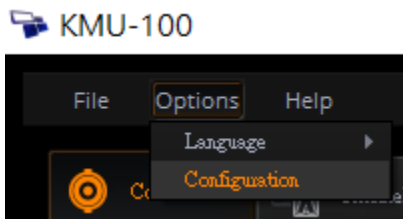
5. Please press the connect button  from "Available Devices".

6. Please press the KMU-100 icon to launch the main interface of the KMU-100 control software.

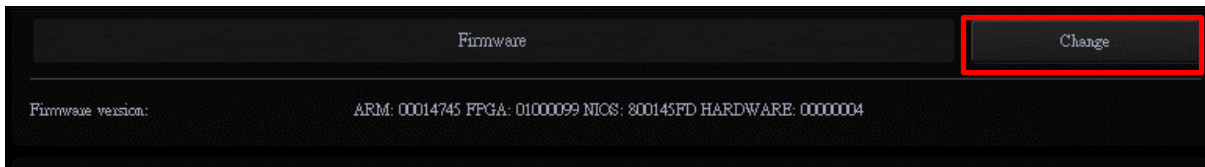




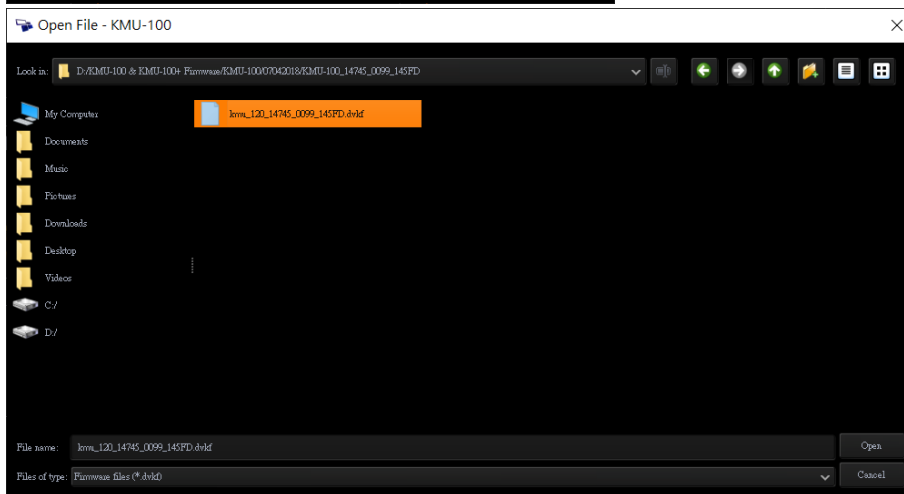
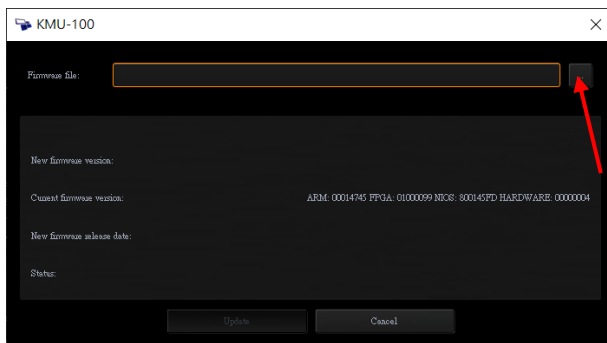
7. Please press the “Configuration” option from the “Options” drop-down menu.



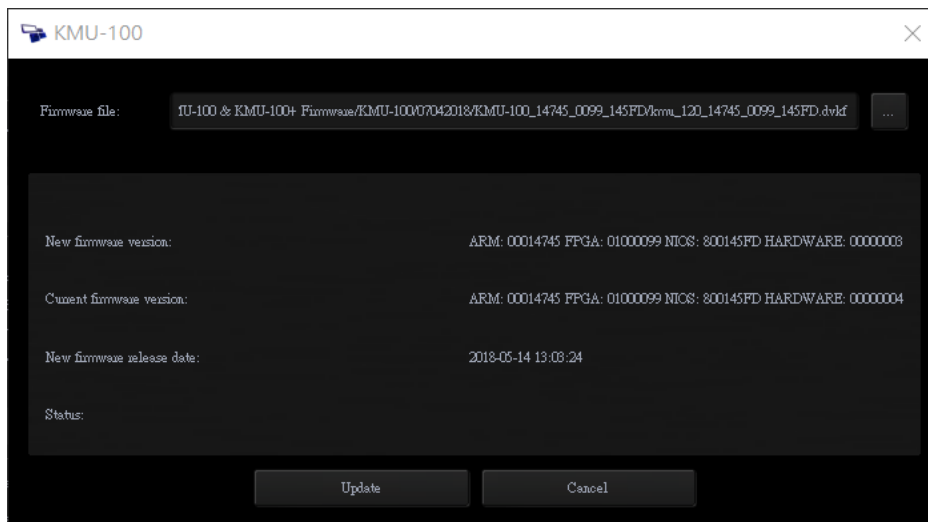
8. Please press the “Change” button which is located next to the “Firmware” from the pop-up window.



9. Please select the downloaded latest version firmware and then please press the “Open” button.



10. The “New firmware version” and “Current firmware version” will be shown and then please press the “Update” button for starting the firmware upgrading procedure.



11. Please wait until the updating progress bar to reach 100% and then the firmware upgrading procedure is completed.

## 17. How to Upgrade the Firmware of the RMC-185 & RMC-185+


From time to time, Datavideo may release new firmware to either add new features or to fix reported bugs in the current RMC-185 & RMC-185+ firmware. Customers can update the firmware themselves if they wish or they can contact their local dealer or reseller for assistance should they prefer this method.


This section describes the firmware update process and it should take ***approximately few minutes to complete***. Once started, ***the update process should not be interrupted in any way*** as this could result in a non-responsive unit.

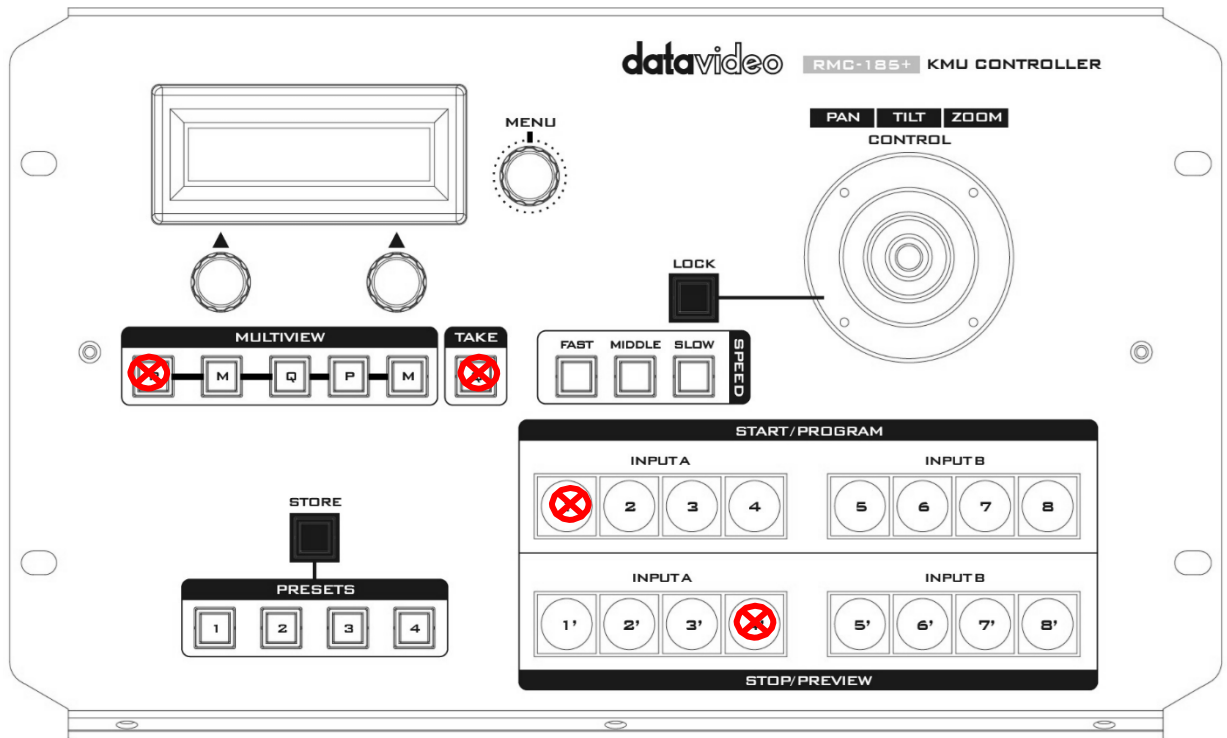
### Requirement:


- Latest firmware update files of RMC-185 or RMC-185+ (bootloader and application firmware)
- A USB A to USB A cable not longer than 2 meters
- A Windows PC with USB 2.0 ports or above

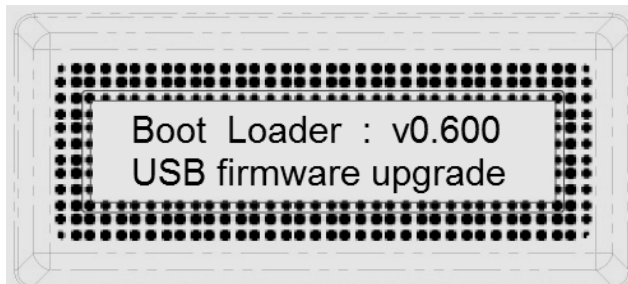
1. Power off the RMC-185 or RMC-185+ and use a USB cable (USB A to USB A) to connect

the USB firmware upgrade port  on the RMC-185 or RMC-185+ rear panel to a USB port on the PC.

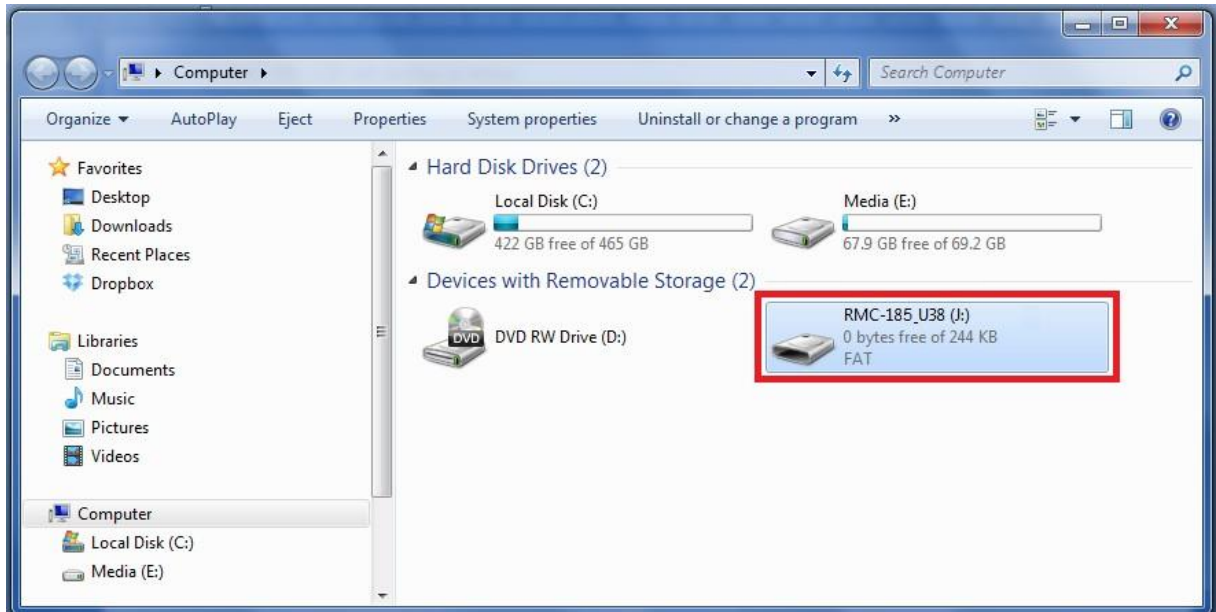
2. Press and hold the four buttons indicated with  at the same time.



3. With an assistant's help, one person switches on the RMC-185 or RMC-185+ device while another person presses and holds the buttons indicated with .
4. The user may release the buttons once the RMC-185 or RMC-185+ LCD panel displays the following information.



5. The RMC-185 or RMC-185+ device (**RMC-185+\_U38**) will appear as a removable storage device on the PC as shown below.



6. Double click the RMC-185\_U38 removable storage device and delete the “bootcode.bin” file.
7. Copy and paste the latest bootloader firmware file (bootcode.bin) into the RMC-185\_U38 removable storage device.
8. Please reboot the RMC-185 or RMC-185+ and then the firmware update procedure is finished.
9. Users can start to use the RMC-185 or RMC-185+ to control the KMU-100 or KMU-100+.

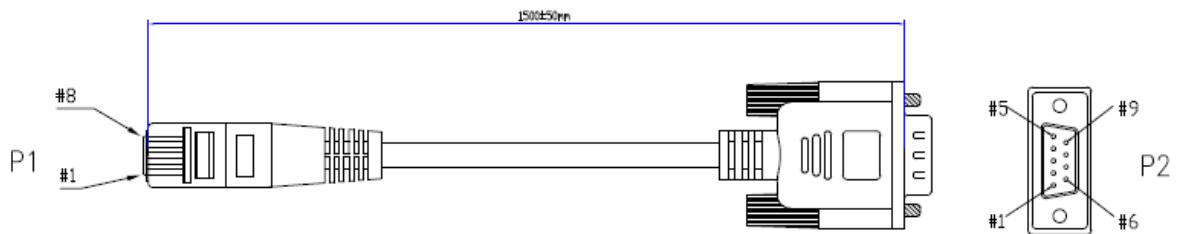
# 18. Direct Connection of the RMC-185+ KMU Controller and KMU-100+

The RMC-185 KMU Controller is designed to control the KMU-100 via the RS-422 interface using the VISCA Command Protocol.

The RMC-185 panel style design allows easy control of the KMU-100 with the hard keys giving the user quick access to main functions of the KMU-100.

## 18.1 Direct Connection to KMU-100

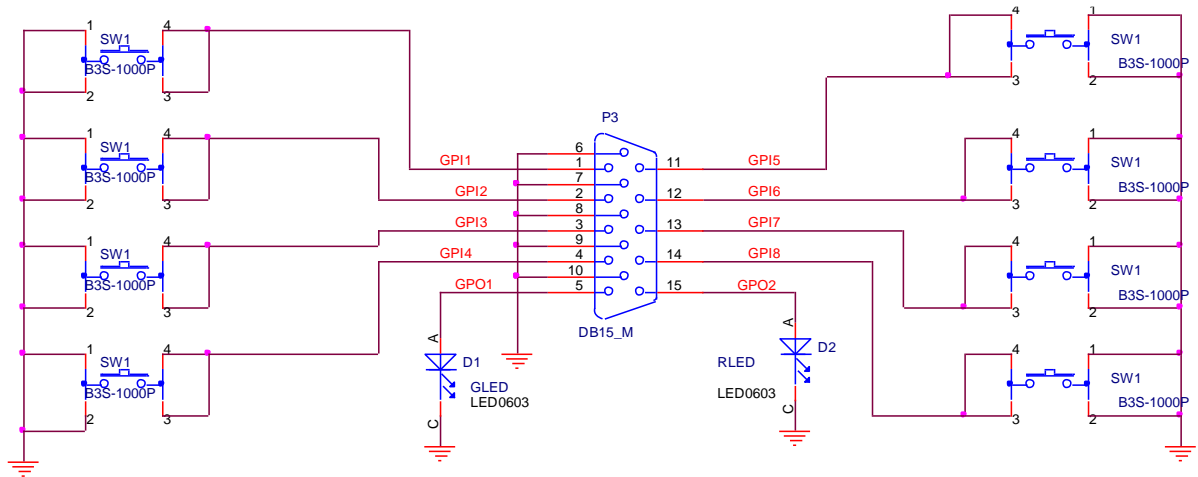
To use the RMC-185 KMU Controller to directly control the KMU-100 4K Multi-Camera Processor, connect the RS-422 port (9 PIN D-Sub) on the KMU-100's rear panel to the RJ-45 port of the RMC-185 using any RJ-45 cable. The RJ-45 to 9 PIN D-Sub cable wiring scheme is shown below.



	P1 (RJ45)		P2 (DB9M)
Green/White	1	-----	1/6/4/9/5
Green	2	-----	X
Orange/White	3	-----	8
Blue	4	-----	2
Blue/White	5	-----	7
Orange	6	-----	3
Brown/White	7	-----	X
Brown	8	-----	X

# 19. KMU-100+'s Test Fixture Circuit Diagram

There are three modes including Loop, Ping-Pong and Double Ping-Pong in KMU-100's Motion Mode. Those three modes can be triggered by connecting to the GPI interface which is located on the rear panel of the KMU-100+. Please see the test fixture circuit diagram for the GPI which is shown as following diagram.



## 20. Frequently-Asked Questions

This section describes problems that you may encounter while using the KMU-100. If you have any questions, please refer to related sections and follow all suggested solutions. If problem still exists, please contact your distributor or the service center.

### For KMU-100 & KMU-100+

No.	Problems	Solutions
1	The DV LINK APP fails to connect.	Sometimes the DV LINK APP will be disconnected.
2	The PC fails to communicate with the KMU-100	You might be using non-compliant cables which will cause signal failure after connected to the KMU-100.

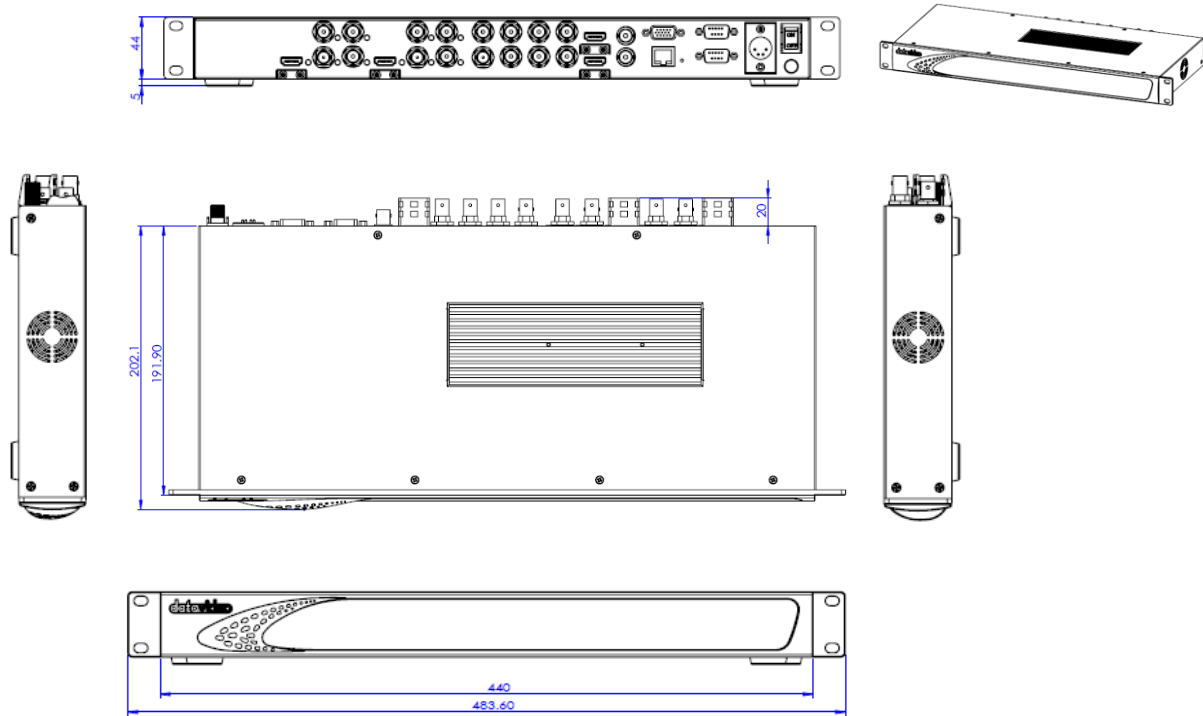
### For RMC-185 & RMC-185+

No.	Problems	Solutions
1.	What is the RJ-45 port used for?	It is used for connecting the RMC-185 or RMC-185+ to the KMU-100+. Please use an RJ-45-to-DSub cable. The DSub end should be a male connector.

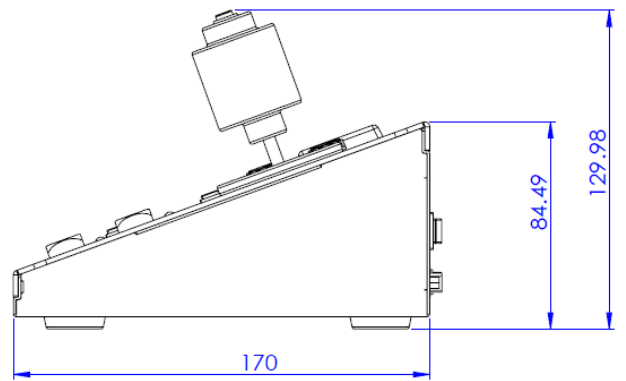
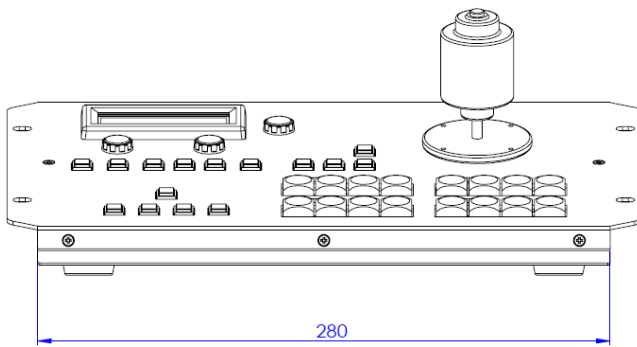
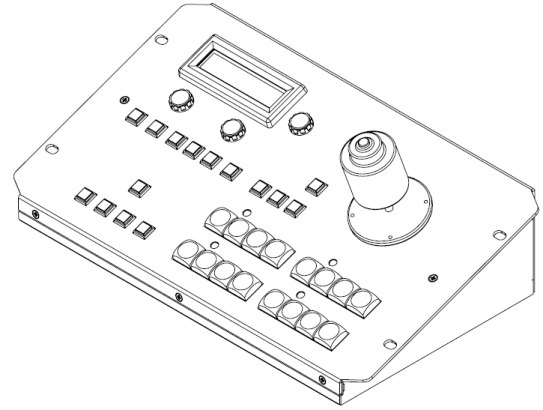
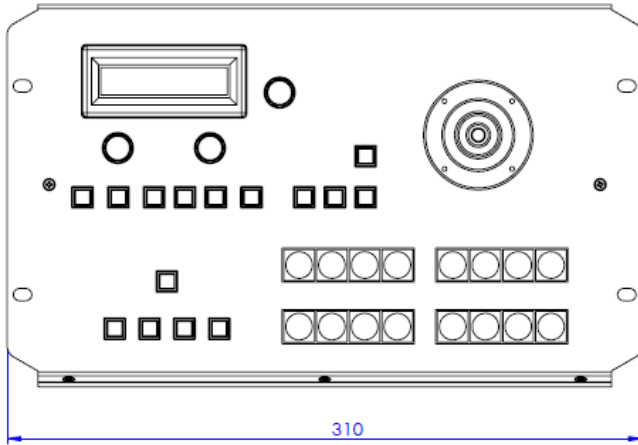


# 21. Dimensions

## KMU-100 & KMU-100+



# RMC-185 & RMC-185+



Unit: mm

## 22. Specifications

KMU-100 & KMU-100+

<b>Connections</b>	
<b>SDI Video Input</b>	2 sets of SDI Input: each set of 4x SDI 1 x 3Gb/s or 12Gb/s SD/HD/4K. Supports single link 4:2:2 3 x 3Gb/s SD/HD/4K. Supports single link, dual link, and quad link 4:2:2
	2 x (1) - 10 bit HD, 3G levels A and B, 12G UHD switchable 6 x (2,3,4) - 10 bit HD, 3G levels A and B switchable; Usable as Quad SDI; 4x3G SDI input for UHD
<b>HDMI Video Input</b>	2 x HDMI Input: Each of HDMI support for Ultra HD 4K 60p in 4:2:0/4:2:2
<b>SDI Video Output</b>	2 sets of SDI output: each set of 4x SDI 1 x 3Gb/s or 12Gb/s SD/HD/4K. Supports single link 4:2:2 3 x 3Gb/s SD/HD/4K. Supports single link, dual link, and quad link 4:2:2
	8 x – 10 bit SD, HD, 3G levels A and B switchable
<b>HDMI Multiviewer Video Output</b>	2x HDMI type A connector with support for 1080p50/59.94/60
<b>SDI Audio Input</b>	16 channels in HD, 3G HD, and UHD
<b>SDI Audio Output</b>	16 channels in HD, 3G HD, and UHD
<b>Multi Rate Support</b>	SDI connections are switchable between standard definition, high definition and UltraHD
<b>Sync Input (Genlock)</b>	Blackburst or TriSync
<b>Computer Interface</b>	The Ethernet RJ45 port is used for device control, setting and update The RS-232 x 1 input communication port is used for device setting.
<b>Software</b>	
<b>Software Control</b>	A dedicated software control utility application for changing settings via Windows 7, Windows 8, and Windows 10 is included free of charge.
<b>Power Requirement</b>	
<b>Power Supply</b>	External connected 12V / 5A Power Supply
<b>Environmental Specifications</b>	
<b>Operating Temperature</b>	5° - 50 ° C (41° to 122° F)

<b>Storage Temperature</b>	-20° - 45°C (-4° to 113°F)
<b>Relative Humidity</b>	0% - 90% non-condensing
<b>Processing-Two Independent Channels</b>	
<b>Outputs Definition</b>	Each channel has a definition of four rectangles indicating the way the input signal is divided into 4 different outputs. The content bordered by each frame window will be sent to a corresponding output.
<b>Windows Animation</b>	Animation is possible for every frame window. User selects the size and position of Start and Stop rectangles.  Motion modes available: <b>Single</b> – Single movement from Start to Stop. <b>Ping-Pong</b> – Swing cyclical movement, i.e. Start-Stop, Stop-Start, Start-Stop and so on (pendulum swing motion). <b>Loop</b> – Cyclical movement, i.e. Start-Stop, Start-Stop and so on.
<b>Multiview Output</b>	Preview of the outputs: <b>Preview</b> – Four rectangles at their respective <b>Start positions</b> are visible on the live input. <b>Motion preview</b> – The <b>Start, Current</b> and <b>Stop</b> rectangles of the selected Frame tab are visible on the live input. <b>Quad view</b> – Preview of the content of four outputs.
<b>Standards</b>	
<b>SD Format</b>	Support SD output but not support SD
<b>1.5 Gb/s HD Format</b>	720p50, 720p59.94 1080p25 1080p29.97 1080i50 1080i59.94
<b>3 Gb/s HD Format</b>	1080p50, 1080p59.94 and 1080p60 levels A and B
<b>Ultra HD Format</b>	2160p25, 2160p29.97, 2160p50, 2160p59.94
<b>SDI Compliance</b>	SMPTE 259M, SMPTE 292M, SMPTE 296M, SMPTE 372M, SMPTE 425M, SMPTE2082-1
<b>Audio Sampling</b>	Sample Rate: 48kHz and 24-bit HD, 20-bit SD
<b>Video Sampling</b>	4:2:2
<b>Color Precision</b>	10-bit
<b>Color Space</b>	REC 601, REC 709

## RMC-185 & RMC-185+

<b>RMC-185+ KMU+ Controller</b>	
<b>Firmware Update</b>	USB
<b>Power</b>	DC 12 伏 0.5A
<b>Dimensions (Width x Height x Depth)</b>	310 x 129.98 x 170 (mm)
<b>Net Weight</b>	1.5Kg
<b>Gross Weight</b>	2.0Kg
<b>Operating Temperature</b>	0°C - 50°C (32°F - 122°F)
<b>Humidity</b>	10% - 80%

## 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](http://www.datavideo.com) to access our FAQ section.



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