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Thank you for choosing our product!
This User Manual is designed to show you how to use this product quickly and make use of all the features. Please read all directions and instructions carefully before using this product.

Declarations

FCC/Warranty

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be responsible for correcting any interference.

Guarantee and Compensation

RGBlink provides a guarantee relating to perfect manufacturing as part of the legally stipulated terms of guarantee. On receipt, the purchaser must immediately inspect all delivered goods for damage incurred during transport, as well as for material and manufacturing faults. RGBlink must be informed immediately in writing of any complaints.

The period of guarantee begins on the date of transfer of risks, in the case of special systems and software on the date of commissioning, at latest 30 days after the transfer of risks. In the event of justified notice of compliant, RGBlink can repair the fault or provide a replacement at its own discretion within an appropriate period. If this measure proves to be impossible or unsuccessful, the purchaser can demand a reduction in the purchase price or cancellation of the contract. All other claims, in particular those relating to compensation for direct or indirect damage, and also damage attributed to the operation of software as well as to other service provided by RGBlink, being a component of the system or independent service, will be deemed invalid provided the damage is not proven to be attributed to the absence of properties guaranteed in writing or due to the intent or gross negligence or part of RGBlink.

If the purchaser or a third party carries out modifications or repairs on goods delivered by RGBlink, or if the goods are handled incorrectly, in particular if the systems are commissioned operated incorrectly or if, after the transfer of risks, the goods are subject to influences not agreed upon in the contract, all guarantee claims of the purchaser will be rendered invalid. Not included in the guarantee coverage are system failures which are attributed to programs or special electronic circuitry provided by the purchaser, e.g. interfaces. Normal wear as well as normal maintenance are not subject to the guarantee provided by RGBlink either.

The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.
Operators Safety Summary

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels
There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.

Power Source
This product is intended to operate from a power source that will not apply more than 230 volts rms between the supply conductors or between both supply conductor and ground. A protective ground connection by way of grounding conductor in the power cord is essential for safe operation.

Grounding the Product
This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Use the Proper Power Cord
Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.

Use the Proper Fuse
To avoid fire hazard, use only the fuse having identical type, voltage rating, and current rating characteristics. Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres
To avoid explosion, do not operate this product in an explosive atmosphere.

Installation Safety Summary

Safety Precautions
For all product installation procedures, please observe the following important safety and handling rules to avoid damage to yourself and the equipment.
To protect users from electric shock, ensure that the chassis connects to earth via the ground wire provided in the AC power Cord.
The AC Socket-outlet should be installed near the equipment and be easily accessible.
Unpacking and Inspection

Before opening product shipping box, inspect it for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open the box, compare its contents against the packing slip. If you find any shortages, contact your sales representative. Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect the system to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

The environment in which you install your product should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.
Chapter 1 Your Product

1.1 In the Box

1 x Power Adapter

1 x USB-C to USB-C Cable

1 x USB-C to USB-A Cable
1.2 Product Overview

Mix to the max. The all-in-one mini-mx video enables accessible professional multi-source video productions with cameras, laptops and multiple audio sources.

For live presentation and streaming, do it all with ease from the unique and fully featured mini-mx..
1.2.1 Key Features

- 4K multi-channel streaming video mixer
- Quad HDMI 2.0 inputs, dual HDMI 1.3 outputs
- Dual MIC In, Dual Audio Out for monitoring
- Mix for HDMI embedded and external audio
- One-key recording. Recording capacity of hard drive is up to 2T
- Quad HDMI 2.0 inputs, dual HDMI 1.3 outputs
- Stream up to 4 platforms simultaneously over IP and 32 platforms via TAO APP
- Built-in 5.5 inch touch screen for menu operation
- Support multi-layer overlay, layer scaling and cropping
- 15 switching effect modes
- 5-direction joystick for controlling up to 4 PTZ cameras
- Save and store up to 16 scene presets. One-click for preset recall
- Control via computer and mobile phone
- Support Chroma Key
- One-key quick switch between portrait and landscape screen
1.2.2 Front Panel

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Audio Volume Controls</td>
</tr>
</tbody>
</table>
| 2 | Adjuster | • Zoom in/out when PTZ control is enabled.  
• Size adjustment for layer. |
| 3 | Layer Selection Buttons | • Indicate BG, Layer A, Layer B, CAPTION, LOGO and TEXT from left to right.  
• Layers are all closed by default with white button light. Press button to open.  
• Button in green indicates editing state; button in blue indicates PVW state.  
• To close opened layer, press button first, wait for button turns into green, then press the button again to close layer.  
• Long press to enter LAYOUT interface. |
| 4 | Channel Fader | • Control audio volume level for each channel.  
• Indicate MIC1, MIC2, Line-in, Bluetooth, PREVIEW, PROGRAM from left |
<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
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</thead>
</table>
| 6️⃣ Listen & Mute Buttons | ● **Listen Button**: Audio management for monitoring port. Button in green allows users to monitor the audio from a channel; no button light indicates monitoring function is OFF.  
● **Mute button**: Mute that channel on PGM port. When a channel is muted, the button will be illuminated red; no button light indicates the channel is ON at PGM port. |
| 7️⃣ T-Bar | PVW and PGM views can be transitioned manually by pushing the T-bar bidirectionally from the top to the bottom or from the bottom to the top. |
| 8️⃣ Page Up | Press to return to the previous page. |
| 9️⃣ Page Down | Press to enter the next page. |
| 9️⃣ Button 1~8 | ● Button 1~8 indicate 8 selections in Main Menu correspondingly with button light in white.  
● Button 1~4 can also be used as 1~4 HDMI inputs switch button. When the signal is in PGM, the button will be illuminated red; when the signal is being edited, the button will be illuminated green. |
| 10️⃣ 5-Direction Joystick | ● Set pan, tilt and zoom for PTZ camera.  
● Position adjustment for layer. |
| 11️⃣ MENU Button | ● Press to switch interface between Preview Interface, Main Interface, Preset Interface. |
| 12️⃣ ON AIR | ● Press to start or end streaming.  
● Check streaming status on LCD screen: steady red shows ON AIR, flashing red shows unstable network, unlit shows streaming is finished. |
| 13️⃣ 5.5-inch Touch Screen | For menu operation and multi-view window monitoring. |
### 1.2.3 Interface Panel

<table>
<thead>
<tr>
<th>Port/Port Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 <strong>USB-C 3.0 Stream Port</strong></td>
<td>Recognized as webcam for streaming or video conference.</td>
</tr>
</tbody>
</table>
| 2 **USB-C 3.0 Record Port** | - Insert SSD or U disk for recording.  
- Insert a U disk to import audio, video and graphic files.  
- Use with USB-C cable provided to share network with mobile phone. |
| 3 **Ethernet Port** | For web streaming, PTZ control and firmware upgrade. |
| 4 **HDMI-A (PROGRAM)** | PROGRAM output port. Default as Program Output, can set as Multi-view Preview or Test Pattern optional Output by menu. |
| 5 **HDMI-A (MULTI-VIEW)** | MULTI-VIEW output port. Default as Multi-view Preview Output, can set as Program or HDMI 1~4 optional Output by menu. |
| 6 **HDMI 1~4 Inputs** | - Connect to HDMI video sources.  
- 4K resolution and downward compatible with all resolution. |
| 7 **Locking Hole** | Use with T-lock to fix the device. |
### 1.2.4 Dimension

Following is the dimension of mini-mx for your reference:

280.0mm x 222.6mm x 63.5m.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USB-C Power Port</strong></td>
<td>PD protocol, 12V, 3A.</td>
</tr>
<tr>
<td><strong>Power Switch</strong></td>
<td>Rocker switch to power on or off device.</td>
</tr>
<tr>
<td><strong>Headphone Output</strong></td>
<td>3.5mm mini-jack for listening each analog input and HDMI input.</td>
</tr>
<tr>
<td><strong>6.35mm TRS Jack</strong></td>
<td>Balanced XLR Audio Output Jack.</td>
</tr>
<tr>
<td><strong>Line-in</strong></td>
<td>Balanced 6.35mm XLR Jack to connect to mobile phone, computer or audio console.</td>
</tr>
<tr>
<td><strong>MIC in 2</strong></td>
<td>XLR/TRS NEUTRIK MIC IN Port.</td>
</tr>
<tr>
<td><strong>MIC in 1</strong></td>
<td>XLR/TRS NEUTRIK MIC IN Port with 48V Phantom Power supported.</td>
</tr>
</tbody>
</table>
| **+48V DIP Switch** | ● 48V Phantom Power supported.  
● Defaults to OFF. |

**Warning:**

Except condenser microphones that require phantom power, please **Turn Off** phantom power switch when connecting other devices.
Chapter 2 Install Your Product

2.1 Plug in Power

RGBlink mini-mx is packaged with a PD power adapter (power cable included), check the power supply standard used in your country/region before power connection.

![Connect mini-mx to power plug by the link cable](image)

**Warning:**

The Power Supply included with mini-mx is the recommended power supply to use with the device. Power supply should meet the following requirements:
1. Support PD "Fast Charge" capability;
2. Interfaces are the same as the adapter provided;
3. The power supply is rated for a minimum of 36W.

2.2 Connect HDMI Input

Users can use any camera, computer or other HDMI device as the input source of the mini-mx. mini-mx supports up to 4 sources of different formats and resolutions at the same time via 4 HDMI ports, and **4 HDMI inputs support up to 4K@60Hz**. If users are using interlaced signal, mini-mx supports de-interlace through HDMI 1 automatically. Users can see the input views on the mini-mx screen when there is active signal plug in. Connect mini-mx to a monitor with HDMI output interface to see PVW views and output resolutions.

![Connect mini-mx to power plug by the link cable](image)

**Warning:**

The HDMI cable is not included in the mini-mx package and needs to be purchased separately. Some camcorders use a mini HDMI port, you need to buy a mini HDMI-HDMI cable separately when you use these camcorders.
2.3 Connect HDMI Output

Users can use HDMI cables to connect MULTI-VIEW and PROGRAM output interfaces to a monitor with an HDMI input interface so as to check PVW and PGM views in real time.

The default output of MULTI-VIEW port is multi-screen PVW (Preview) view, so user can see the audio and video conditions of all input signal sources, check current status of each function of mini-mx and see the PVW (Preview) view.

Users can switch screen mode by pressing 【OUTPUT】 on the main menu. MULTI-VIEW supports output in multi-view, HDMI 1~4 signal source or program. PROGRAM supports output in multi-view, program and test pattern. HDMI output supports resolution setting. Select HDMI output resolution in 【OUTPUT】 interface.

2.4 Connect Microphone and External Monitoring Devices

On the right panel of mini-mx, there are five audio jacks in total. mini-mx features THREE high-quality audio input jacks on the right panel, TWO of which adopt Neutrik jacks (MIC in 1 supports 48V phantom power). The other one adopts Line-in 6.35mm TRS jack, which can be directly connect to the mobile phone, computer and console. mini-mx comes with TWO audio output jacks on the right panel. One adopts 3.5mm mini-jack, which can be directly connect to the headphone for audio monitoring. The other line PGM output jack adopts 6.35mm TRS jack, which is for connecting speakers. For laptops or mobile phones with no audio output ports, mini-mx provides a built-in Bluetooth module. Users can connect to devices with Bluetooth function to input high-quality audio signals in
real time. (More details please refer to 3.10 Settings)
In addition, the **four HDMI input ports all support embedded audio.** Turn on AFV, the audio follows the video switch to perform a soft gradual transition when video is switched.
There are 8 audio inputs in total, which can be controlled via operation board to achieve audio mixing and monitoring.
If the sound and the video are not synchronous, it is necessary to do **audio delay setting.** Users can also increase or reduce the Delay value for HDMI and MIC audios to ensure audio and video synchronization. (More details please refer to 3.8 Audio)

![Warning Image]

**Warning:**
1. Noise may occur during plugging, unplugging and audio tuning. When connecting audio output port (main output and monitor port) to the speaker, if the speaker is powered on, it may be damaged during unplugging process. Therefore, please power on speaker after connection, and power off it first before unplugging.
2. MIC 2 supports access to wireless microphone with a 3.5mm female to 6.5mm male single-track adapter. LINE supports access to wireless microphone with a 3.5mm female to 6.5mm male dual-track adapter.

**2.5 Connect USB for Streaming and Recording**
The USB port **labeled number 2** is for video capture, which allows users to capture videos to computer and the captured video content can be streamed to Facebook, YouTube, Zoom, Twitter and other streaming media platforms via a third-party Video Media Player software like OBS.
Insert a U disk to the other USB 3.0 port **labeled number 1** by USB 3.0 cable to perform recording. mini-mx supports recording streaming media content to an external USB storage device, such as U disk or SSD. The SSD storage can reach up to 2T, and the USB storage can support up to 64G. The supported format is exFAT.
Warning:
1. For U disk, please use one with USB 3.0 port.
2. For SSD, please check if it needs extra power supply.
3. OTG cable only for file transfer cannot be used for streaming.
4. For dual-channel streaming, or use UVC output/recording function at the same time, the touch screen may get sluggish or run slowly.

2.6 Connect Computer

**Web Control**: Connect computer and mini-mx with CAT6 cable.
**Record**: Insert U disk to mini-mx’s USB-C port labeled number 1
**Stream**: Connect mini-mx’s USB-C labeled number 2 and computer’s USB 3.0 port with USB 3.0 cable. (Note: the color of USB 3.0 port is blue or with SS silkscreen)

**Minimum System Requirements for macOS**
- macOS 11.0 Big Sur or later
- macOS 10.15 Catalina

**Minimum System Requirements for Windows**
- Microsoft Windows 10 64-bit

Warning:
1. The IP address of the mini-mx must be in the same LAN as the computer.
2. It is recommended to use USB-C cable provided. For streaming via mobile phone, please use standard data cable.

2.7 Turn on Your mini-mx

After mini-mx is connected to power supply, push the power switch on the rear panel, the device will show mini-mx logo and then enter to the operation interface.
Chapter 3 Use Your Product

After the above steps are completed, users can use mini-mx to do the following.

3.1 Preview Interface
As shown below, once powering on mini-mx, the 5.5 inch display will show mini-mx logo and then come into the preview interface. Operator can refer to the description below.

| 1 PREVIEW | ● Show PVW (Preview) monitoring screen and audio meter.  
<pre><code>        | ● Double click for full screen mode.            |
</code></pre>
<p>| 2 PROGRAM | ● Show PGM screen and audio meter.              |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
</table>
| 3 Source Selection | ● Double click for full screen mode.  
 ● View HDMI 1~4 signals and audio meter.  
 ● Tap touch screen or press Button 1~4 to switch signal. |
| 4 Media | Import pictures and other materials. |
| 5 Audio Status Monitoring | ● Monitor 3 analog audio inputs (MIC1, MIC2, Line-in) and 1 Bluetooth audio input.  
 ● Tap to quickly enter Audio Setting interface. |
| 6 Recording Status | ● Check recording duration.  
 ● Long press to enter recording setting interface. |
| 7 Streaming Status | ● Check streaming duration.  
 ● Long press to enter streaming setting interface. |

### 3.2 Main Interface

Push MENU button to enter main interface.
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>❶ PREVIEW</td>
<td>Show PVW (Preview) monitoring screen and audio meter.</td>
</tr>
</tbody>
</table>
| ❷ Layer Selection | • For item not been selected before, tap to open.  
• Icon in green indicates editing status; icon in blue indicates PVW status.  
• To close the opened item, tap it, wait for light turns into green, then tap it again to close. |
| ❸ PROGRAM | Show PGM screen and output audio meter. |
| ❹ Status Display Area | Check time, recording & streaming status, bit stream, disk capacity, recording duration. |
| ❺ Icons | Enter Main Interface, Page Up, Page Down, Enter Setting Interface. |
| ❼ Source or Preset Selection | • Use Button 1~8 for selection.  
• 4 windows in the upper for HDMI 1~4 signal monitoring, use Button 1~4 to switch signal.  
• 4 windows at the bottom for sources selection, use U disk to import sources. |
3.3 MENU

There is a 5.5” touch screen on mini-mx operation board, through which most operation can be done. Push MENU button and the LCD screen will quickly return to the main menu interface.

As shown in the figure above the UI style on the touch screen is similar to current smart phone operating interface. The first-level menu is in icon. Users can quickly enter the corresponding function management interface by tapping the corresponding icon. 8 functions are available in main menu, which includes EFFECTS, LAYOUT, PTZ, SCENE, CHROMA KEY, AUDIO, OUTPUT and SETTING.

3.4 Switch Effect Setting

Click 【EFFECTS】 or Button【1】 to enter effect setting menu. 15 transition effects in total can be selected.
3.5 Layout

Tap 【LAYOUT】 or Button 【2】 to enter layout setting interface.

**Layout Setting**

RGBlink offers 7 layout options. Enter layout interface shown as follow and choose the layout needed.

![Layout Setting Interface]

**Layer Size and Position Setting**

After layout selection is completed, use the adjuster on the front panel to adjust layer size and the joystick to quickly adjust the position for more detailed adjustment.

![Layer Size and Position Setting]

If the layout 【6】 is selected, use the adjuster to achieve a better view of the picture ratio.
Layer Cropping and Scaling

In 【LAYOUT】 interface, click option 【8】 Advanced Setting to do more specific parameter settings for layer cropping and scaling.

As shown in the figure below, settings can be done by sliding the bar or clicking ➕ ➖.

In Layer Scaling interface, users can adjust Width, Height, Horizontal Position, Vertical Position and set Zoom ratio.

In the Layer Cropping interface, Width, Height, Horizontal Position and Vertical Position can be set.

![Layer Cropping and Scaling](image)

Same as Layer Size and Position Setting, use the adjuster to adjust layer size and the joystick to quickly adjust Horizontal Position and Vertical Position.

Click Reset at the bottom of the interface to clear wrong settings so as to restore to the default values.

3.6 PTZ Control

mini-mx can control the camera’s lens moving horizontally and vertically, focus and zoom via IP VISCA protocol and save the position and zoom information for quick calling.

The PTZ preset of mini-mx not only saves the parameters of the PTZ, but also includes calling the camera, that is, when the VIEW of PTZ is loaded, the input is switched to the camera signal source at the same time.

Tap 【PTZ】 or press Button 【3】 to enter the menu.

![PTZ Control](image)
mini-mx supports simultaneous control of up to four cameras.

Please check if the port number of the controlled camera is set to 1259 (It’s recommended to use RGBlink vue PTZ camera). If the port number is not 1259, please enter the port number in PTZ Control interface.

The following operations are explained with examples of using mini-mx to control ONE camera and simultaneously control FOUR cameras.

**Example 1: mini-mx controls ONE camera.**
1) Connect mini-mx and the camera directly via an Ethernet cable.
2) Enter IP address of the camera in the following interface and then click "Confirm" to save. *(Note: The IP address of mini-mx and camera controlled should be in the same LAN.)*

![Image showing the interface for connecting mini-mx and a camera]

**Example 2: Use mini-mx and switch to control FOUR cameras.**
1) In order to check if IP address of mini-mx and the cameras are occupied, please use the ping command to analyze network connectivity.
2) Connect the switch to the computer, press the "Windows" key and the "R" key to open the "Run" dialog box. Type "cmd" and click the "OK".

![Image showing the keyboard and the Run dialog box]

3) Enter "ping + IP address", for example, "ping 192.168.5.66". If the interface shows "Destination host unreachable," it means that the IP has not been occupied.
4) Enter PTZ configuration interface below to set the camera’s IP address as 192.168.5.66, and click "Confirm".

5) Connect camera and computer to the switch and then enter "ping 192.168.5.66" in the "Run" dialog box again. Press "Enter" on the keyboard to access this IP address.

6) Connect mini-mx and camera to the switch via Ethernet cables (It is recommended to use RGBlink CAT6 cable with order code as 940-0001-00-11-0). Then use mini-mx for PTZ control.

**Warning:**

1. Make sure computer IP, mini-mx IP and the texted IP in the same LAN.
2. To ensure normal communication, it is suggested to use ping command to check IP addresses of four cameras one by one.
3. ONLY VISCA via IP protocol is supported. Protocols including NDI PTZ/CGI/HTTP/Pelco-D/Pelco-P are not supported.

7) Tap HDMI 1/HDMI 2/HDMI 3/HDMI 4 to switch camera control interface.

In addition to manual IP setting, mini-mx also supports automatic IP identification.

1. If use network cable to directly connect to the device, mini-mx can only control one camera and only the IP address of this camera can be captured.
2. If devices are connected to same LAN, mini-mx can search IP address of all cameras in the LAN.

Click 📰 icon to select the IP address of the camera to be controlled through the drop-down box.
Use adjuster on the front panel or tap icon to adjust zoom and focus. Automatic adjustment can be achieved by clicking **Auto**.

Use joystick to adjust position of camera.

As shown in the figure below, the number displayed indicates the rotation speed of the camera. Use the joystick or tap number to adjust speed. 13, 10, 7, 4, 1 is optional.

Click icon to clear wrong settings so as to restore the set parameters to the default values.
3.7 Scenes

mini-mx save presets to Scene in real time. If users want to quickly load current preset next time, just save it to corresponding View. The Scene will save all the currently set parameters including Layout, Chroma Key Setting, PTZ Presets, therefore when user needs to load a preset, push corresponding Scene for quick calling.

(1) After setting the effect, tap 【SCENE】 or press Button 【4】 or click in the main menu to quickly enter following interface for preset calling or saving.

(2) mini-mx allows user to save 16 presets in total to the corresponding View 1~16. Click to return to previous page or enter next page. Click to form a static picture of the current PREVIEW scene and save it. Click to delete.

(3) Tap the View needed for direct loading.

(4) If you want the modified preset to be loaded from the Scene, you need to re-save it to the current Scene or a new Scene. Please repeat the above save operation.

3.8 Chroma Key

mini-mx supports matting, the Chroma Key in the menu, removing the pure color background and overlaying it on another signal to realize the application of virtual reality. Matting can be done on
software or simple settings and adjustments can be made on the Chroma Key in the menu.

(1) Tap 【CHROMA KEY】 or push Button 【5】 to enter the setting menu.

(2) Users can choose on or off to enable or disable the function (off by default). Select the background color which is default in green to be removed and make adjustments according to application.

(3) Similar to layout, the size, position and cropping of the layer can be set.

(4) After the Chroma Key is set, the parameters can be saved directly on the device. Next time when the device is on no matter on the software or the touch screen itself, users can directly load the preset.

(5) After loading the Chroma Key preset, use the joystick to adjust layer position and adjust the size through the adjuster on the front panel, all the re-adjusted settings will be saved to the current Scene in real time.

3.9 Audio

mini-mx supports mixed output of multiple channels, and also allows user to check volume meter and set audio delay.
Tap 【AUDIO】 or push Button 【6】 to enter the audio setting interface.
As shown in the figure below, the audio setting interface is divided into nine parts. Please refer to the following table for operation.
### Input Audio Meters
- Indicate MIC 1, MIC 2, Line-in, Bluetooth, HDMI 1, HDMI 2, HDMI 3, HDMI 4.
- Use channel fader or white virtual slider to adjust volume.
- 1~4 HDMI inputs support embedded audio adjustment via control knob on front panel.
- MIC 1, MIC 2, Line-in, Bluetooth support audio adjustment via channel fader on front panel.

### Analog Input Monitoring Switch
- Default to OFF.
- Press to turn on with green button light.

### Mute Buttons
- Press to turn on/off. Light in green: OFF; light in red: ON.
- Mute analog input, the channel is muted only on PGM out.
- Mute HDMI input, the HDMI channel is muted on PGM out; users can also monitor audio if there is HDMI input in the PVW out.
- Mute PVW out, audio cannot be captured in PVW out.
- Mute PGM out, audio cannot be captured in PGM out.

### AFV
- Set AFV for any HDMI embedded audio so the audio switches with the video source to PVW and PGM automatically.

### Page Up/Down
- Click page up/down icon to enter different pages for more audio clip selection.

### Audio Clips
- Audio clip storage and playback area.
3.10 Video Output

Tap 【OUTPUT】 or push Button 【7】 to set parameters for video output.

**Multi-view**

Click Multi-view to set parameters.

Default to be Multi-view preview, which can be switched to Program or 1~4 HDMI inputs for various applications.

Users can return to main interface to check input source preview on the touch screen.
Program
Click **Program** to set parameters.

Default to be Program, which can be changed to multi-view Preview or Test Pattern.

Resolution
Click **Format** to choose output resolution.

Stream
Tap **Stream** in **OUTPUT** menu to enter streaming configuration interface. 
**Please ensure normal network configuration by referring to 3.11 IP.**

Prepare a USB disk to import streaming address and do as the steps below.
1. Create a new TXT file first, and paste the Streaming URL and Streaming Key (the format must be: rtmp://YOUR STREAM URL/YOUR STREAM KEY), and save the TXT file to USB as rtmp.ini.(Newline is required to add multiple streaming addresses)
2. Connect the USB disk to mini-mx's USB port.

As shown in the figure below, users can view the imported streaming address and streaming status. All addresses are in gray by default, which indicates un-selected state. Click to select the required stream address. Address in green filling bank indicates selected status.

mini-mx supports streaming up to 4 platforms at the same time. Turn on Stream switch on this interface or push ON AIR button on the front panel to start streaming.
Delay and Code Rate can be set as needed.

**Record**

The mini-mx supports recording streaming media content to an external SSD or USB storage through the USB 3.0 interface. The SSD storage can reach up to 2T, and the USB storage can support up to 64G. The supported formats is exFAT. The recorded video will be sectioned after storage up to 4G with each section lasting about 60min.

Before recording, format the SSD or U-disk first. The steps of format as below:
1. Connect the SSD or U-disk to your computer;
2. Open “my computer”;
3. Right-click your computer and select “format”;
4. Set the file system to exFAT and the size of allocation unit to 128kb;
5. Select “quick format” and start.

Then insert the SSD or USB storage into the USB 3.0 recording port.

**Warning:**

If the SSD could not be recognized when inserting into mini-mx, then use a dual USB cable to power the SSD.

Tap **Record** in 【OUTPUT】 menu to enter recording configuration interface. If no USB disk is inserted, the interface displays as follows:
If the SSD or USB disk is inserted, it can be captured automatically by mini-mx with the capacity and remaining minutes display.

mini-mx supports settings of recording quality and format. Click recording switch to start/stop recording.

The window in the left allows users to view the recording status, including disk info and remaining time for recording.

### 3.11 Setting

Tap 【SETTING】 or push Button 【8】 to enter system setting interface.

As shown in the figure below, 6 functions are available, including Fan, System, Bluetooth, Language, T-Bar Calibration and Screen Brightness.
**Fan**

Tap **Fan** in **SETTING** menu for fan speed adjustment.

![Fan Setting Menu]

In the fan control interface, four levels of fan speed for users to choose from. Tap **Auto** to achieve automatic adjustment of the fan speed.

**System**

Tap **System** in **SETTING** menu to enter the interface below.

![System Setting Menu]

**About**

Click **About** to check information about mini-mx. As shown in the figure below, users can view Device Name and SN serial number. Click Device Version to check current version and upgrade mini-mx.

![About Interface]
Date & Time

Click **Date & Time** to set time displayed in mini-mx.
If the device is connected to the network, turn on automatic setting switch to synchronize the time.

If the device is not connected to the network, users can set the time manually.

**IP Setting**

Click **IP** to configure IP address or use network share function of mobile phone.

**IP Address**

**IP Setting:** There are two ways to acquire the IP: Dynamic (IP configured by router) and Static (set IP freely by yourself).
Dynamic: Connecting mini-mx with a router with DHCP features. Turn on DHCP of mini-mx and the router, then mini-mx will capture an IP address automatically.

Static: Turn off DHCP to manually set IP address. Click Confirm to save.

Netmask: Set the Netmask. The default setting is 255.255.255.0.
Gateway: Set the Gateway according to the IP address.

Network Share
NET: Turn on NET to stream by using the hotspot of mobile phone.

1. For iOS system, please do as follows:
1) Connect mobile phone and USB port of mini-mx (with number 1 silkscreen) via a standard power cord.

2) Click “Settings” > Select “Personal Hotspot” > Enter “WLAN Password” > Turn on “Allow Others to Join”.

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3) As shown in figures below, if the status changes from "Not Discoverable" to "Connection", it means that the mini-mx and the phone have achieved network sharing.

2. For Android system, please do as follows:
   1) Connect mobile phone and USB port labeled number 1 via a standard power cord.

   2) Click “Settings” > Select “Mobile network” > “Personal hotspot” > “Other sharing mode” > Turn on “Share phone network via USB”.
Note:
1. Turn Off NET when using local network for streaming.
2. The user interface may vary according to mobile phone types, please refer to the actual use.

Auto PVW

Click Auto PVW. Tap ✔️ ➤ to turn on the function.

Or trigger this function and set interval. As shown in the figure below, if user sets time to 15s, the screen will automatically return to the preview interface.

Mode

Click Mode to select T-Bar PVW Mode or CUT Mode.

mini-mx defaults to T-Bar Mode. Users can also switch to CUT Mode by using Button 1~4 on the operation board to switch 4 HDMI inputs. The Button 1~4 corresponds to 4 HDMI inputs.
For some important occasions, users might need to preview and preset the next scene to ensure the accuracy and stability of the screen. mini-mx provides T-Bar PVW mode to allow switch after editing and confirmation.

When PVW Mode is enabled, all operation could be checked on PVW window. Slide T-Bar to switch between PVW and PGM.

Switch time can be customized by sliding the time bar.

**Warning:**

Only PVW mode supports time setting. Switch time of CUT mode defaults to 0.5s.

**Factory Reset**

Tap Reset to check current version of mini-mx and perform factory reset.

![Factory Reset Image]

**Bluetooth**

Tap Bluetooth in 【SETTING】 menu to enter the following interface.

![Bluetooth Image]

Bluetooth defaults to ON. Turn on Bluetooth on mini-mx and mobile phone to make mini-mx be recognized.
After successful connection of mini-mx and mobile phone, the interface will display the connected phones. Then play music via Bluetooth.

In addition to above settings, users can also set Chinese, English or German as the interface language.

mini-mx also supports setting T-Bar calibration and the overall brightness of LCD screen.
## Chapter 4 Ordering Codes

### 4.1 Product Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>230-0004-01-0</td>
<td>mini-mx</td>
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## 5.1 Specification

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<th>Input</th>
<th>HDMI 4K</th>
<th>4×HDMI-A</th>
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<tbody>
<tr>
<td></td>
<td>Output</td>
<td>HDMI 2K</td>
<td>1×HDMI-A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB (Stream)</td>
<td>1×USB-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USB (Record)</td>
<td>1×USB-C</td>
</tr>
<tr>
<td>Audio</td>
<td>In</td>
<td>2×6.35mm XLR/6.35mm TRS Jack</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1×6.35mm TRS Jack</td>
<td></td>
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<tr>
<td></td>
<td>Out</td>
<td>1×6.35mm TRS Jack</td>
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<td></td>
<td></td>
<td>1×3.5mm mini-Jack</td>
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<tr>
<td>Communication</td>
<td>LAN</td>
<td>1×RJ45</td>
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<tr>
<td>Power</td>
<td></td>
<td>1×USB-C</td>
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### Performance

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<tr>
<th>Input Resolutions</th>
<th>SMPTE</th>
<th>VESA</th>
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<tr>
<td></td>
<td>720p@50/60</td>
<td>1080i@50</td>
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<td>1080p@23.98/24.97/50/59.94/60</td>
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<tr>
<td></td>
<td>1024×768@60</td>
<td>1280×720@60</td>
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<tr>
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<td>1280×800@60</td>
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<td>1366×768@60</td>
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<td>1600×1200@60</td>
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<td>1920×1080@60</td>
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<td>1920×1200@60</td>
<td>3840×2160@60</td>
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<tr>
<td></td>
<td>4096×2160@60</td>
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<table>
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<tr>
<th>Output Resolutions</th>
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<th>VESA</th>
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<td>1080p@24/25/30/50/60</td>
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<tr>
<td></td>
<td>1024×768@60</td>
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<td></td>
<td>1280×1024@60</td>
<td>1360×768@60</td>
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<tr>
<td></td>
<td>1600×1200@60</td>
<td>1920×1080@60</td>
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</table>

### Video

<table>
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<th>Video Formats</th>
<th>HDMI 2.0</th>
<th>HDCP 2.2</th>
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</thead>
<tbody>
<tr>
<td>Color Space</td>
<td>RGB 8bit</td>
<td></td>
</tr>
<tr>
<td>Video Sampling</td>
<td>4:4:4 YUV</td>
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</tr>
<tr>
<td>Video Latency</td>
<td>&lt;4 frames</td>
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### Audio

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<tr>
<th>Audio Format</th>
<th>HDMI Linear PCM, 24 bits/48 kHz, 2 ch</th>
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<tbody>
<tr>
<td></td>
<td>USB Linear PCM, 16 bits/48 kHz, 2 ch</td>
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<tr>
<td>Line In Delay</td>
<td>up to 8 frames</td>
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</table>

### Record/Storage

<table>
<thead>
<tr>
<th>Record Formats</th>
<th>MP4</th>
<th>WAV</th>
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</thead>
<tbody>
<tr>
<td>Disk Formats</td>
<td>FAT32(≤32 GB)</td>
<td>exFAT(64GB~2T)</td>
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</tbody>
</table>

### Supported Standards

<table>
<thead>
<tr>
<th>HDMI</th>
<th>2.0</th>
</tr>
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<tbody>
<tr>
<td>USB</td>
<td>3.0</td>
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### Power

<table>
<thead>
<tr>
<th>Compatibility</th>
<th>USB Power Delivery (PD) 3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported Cables</td>
<td>Certified USB PD Aware</td>
</tr>
</tbody>
</table>
5.2 FAQ

1. Fail to power on mini-mx?
A: Please check whether the power supply is connected first, and use it correctly according to the power supply standard of your country/region. If still failed to power on mini-mx, please check whether the power cord is damaged. Please contact us if the device is damaged during transportation..

2. If there is a power supply problem with the mini-mx.
A: Please try to change the power adapter (support 36W).

3. mini-mx upgrade notes.
A: Please connect U disk with standard OTG cable for upgrade. If the upgrade file cannot be recognized, please check whether its in .img format; If the file still cannot be recognized, please replace the OTG cable or contact us..

4. mini-mx cannot control PTZ.
A: Please make sure that the IP address of mini-mx and PTZ are in the same network segment. For example, the IP address of PTZ is 192.168.5.163. Please also set the IP address of mini-mx to 192.168.5.X (2~254 except163 Outside), confirm on mini XPOSE whether the Visca port number in the PTZ settings is the corresponding port number, for example, the Visca port number of the PTZ of RGBlink is 1259.

5. mini-mx USB 3.0 RECORD cannot recognize U disk.
A: Please format the U disk (exFAT, FAT32).

6. mini-mx USB 3.0 WEBCAM cannot be recognized/recognized without picture(black picture).
A: Please confirm whether the computer configuration meets the following conditions, if not, please select one of the following methods 6.1)-6.5) for testing:
Windows:
CPU:i5 and above
Memory: 8 GB or more
Operating System: Windows 10 64 bit processor or above
Graphics: Support Direct X9 128M or above (open AERO effect)
Hard disk space: Above 16G (primary partitions, NTFS format)
Connector: USB 3.0 or type c
Others: do not run multiple video capture or editing software simultaneously

MAC:
CPU: i5 and above
Connector: USB 3.0 or type c
Operating System: macOS 11.0 Big Sur or later macOS 10.15 Catalina
Others: do not run multiple video capture or editing software simultaneously

6.1) Or use typeC to USB3.0 hub to connect the computer and mini-mx
6.2) Or use USB software->ProcessControl_1.0.0.2 to improve performance of computer (in the attachment)
6.3) Lower the output resolution
6.4) Unplug and plug the USB3.0 cable and re-enter the streaming software.
6.5) Change the USB2.0 cable to do streaming (note that the picture quality is lower than the USB3.0 cable, and the USB2.0 cable is not recommended to use the PVW output)

7. Does mini-mx support HDCP?
A: The HDMI input supports the HDCP protocol, HDMI input 1 port supports HDCP2.X, the other input ports support HDCP1.X, and the output does not support HDCP protocol encryption

8. mini-mx HDMI input what kind of YUV.
A: mini-mx supports 4:4:4, not supports 4:2:0.

9. When mini-mx input is i format signal will be half-screened or cut with the P format signal, the height of the P format will be cut.
A: At present, the latest program can automatically determine the i/P signal source and automatically adjust the cropping value.

10. Can mini-mx control PTZ of Pelco protocol?
A: Currently, the PTZ controlling this protocol is not supported, mini-mx supports to control Visca protocol PTZ.

5.3 Upgrade

Tool: USB disk (copy the firmware to the root directory of USB disk)

Approaches for upgrade guideline:
1) Website
https://rgblink-web.azurewebsites.net/productsinfo.aspx?id=252
2) Dropbox
https://www.dropbox.com/scl/fo/h8vbhed05btgwrhuqrg/h?dl=0&rlkey=00qqa2wmtqeq0987m5ulev9uxc

⚠️ Warning:

1. Do not power off during the upgrade process, otherwise mini-mx may be unable to enter the system after booting.

2. If the version is V1.0.27 and before, please upgrade the old version to V1.0.27 before upgrading the new version.

3. For firmware version after V1.0.29, a factory reset is required after first successful upgrade.

Steps:

1. Copy upgrade package to root directory of USB disk.

   ![MINI-MX_PACKAGE_RELEASE_V1.0.36_230621](MINI-MX_PACKAGE_RELEASE_V1.0.36_230621)

2. Power on the device and connect USB disk to USB-C port (with number 1 silkscreen) by an OTG cable.

3. Tap 【System】 in 【Setting】 menu to enter the interface below.

4. Tap 【Device Version】 to check current system version and upgrade file version imported via USB disk; tap 【Upgrade】 to upgrade mini-mx:
5. The upgrade interface is shown in the figure below. Please DO NOT power off the device during upgrade. Please perform factory reset after upgrade is completed.

Version Amendment Description:

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Amended content</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023.06.29</td>
<td>V 1.0.36</td>
<td><strong>1. Optimization</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1) UVC output screen mosaic problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) UVC output hot plug recognition problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Bluetooth audio confusion problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Back to the PVW interface screen freeze problem</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5) Audio read logic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6) PTZ control delay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7) Save IP address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8) Streaming on foreign platforms, official accounts</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2. New</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1) Layer A switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2) Automatic rebooting after factory reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3) Synchronization for signal source indicators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4) Synchronization for scene indicators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5) Synchronization for recording and streaming indicators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6) Add options for PVW input source</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7) White virtual slider</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8) Real-time IP address display</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9) Background and LOGO</td>
</tr>
</tbody>
</table>
5.4 Terms & Definitions

● **RCA**: Connector used primarily in consumer AV equipment for both audio and video. The RCA connector was developed by the Radio Corporation of America.

● **BNC**: Stands for Bayonet Neill-Concelman. A cable connector used extensively in television (named for its inventors). A cylindrical bayonet connector that operates with a twist-locking motion.

● **CVBS**: CVBS or Composite video, is an analog video signal without audio. Most commonly CVBS is used for transmission of standard definition signals. In consumer applications the connector is typically RCA type, while in professional applications the connector is BNC type.

● **YPbPr**: Used to describe the colour space for progressive-scan. Otherwise known as component video.

● **VGA**: Video Graphics Array. VGA is an analog signal typically used on earlier computers. The signal is non-interlaced in modes 1, 2, and 3 and interlaced when using in mode.

● **DVI**: Digital Visual Interface. The digital video connectivity standard that was developed by DDWG (Digital Display Work Group). This connection standard offers two different connectors: one with 24 pins that handles digital video signals only, and one with 29 pins that handles both digital and analog video.

● **SDI**: Serial Digital Interface. Standard definition video is carried on this 270 Mbps data transfer rate. Video pixels are characterized with a 10-bit depth and 4:2:2 color quantization. Ancillary data is included on this interface and typically includes audio or other metadata. Up to sixteen audio channels can be transmitted. Audio is organised into blocks of 4 stereo pairs. Connector is BNC.

● **HD-SDI**: High-definition serial digital interface (HD-SDI), is standardized in SMPTE 292M this provides a nominal data rate of 1.485 Gbit/s.

● **3G-SDI**: Standardized in SMPTE 424M, consists of a single 2.970 Gbit/s serial link that allows replacing dual link HD-SDI.

● **6G-SDI**: Standardized in SMPTE ST-2081 released in 2015, 6Gbit/s bitrate and able to support 2160p@30.

● **12G-SDI**: Standardized in SMPTE ST-2082 released in 2015, 12Gbit/s bitrate and able to support 2160p@60.

● **U-SDI**: Technology for transmitting large-volume 8K signals over a single cable. A signal interface called the ultra high definition signal/data interface (U-SDI) for transmitting 4K and 8K signals using a single optical cable. The interface was standardized as the SMPTE ST 2036-4.

● **HDMI**: High Definition Multimedia Interface: An interface used for the transmission of uncompressed high definition video, up to 8 channels of audio, and control signals, over a single cable.

● **HDMI 1.3**: Released on June 22 2006, and increased the maximum TMDS clock to 340 MHz (10.2 Gbit/s). Support
resolution 1920 × 1080 at 120 Hz or 2560 × 1440 at 60 Hz. It added support for 10 bpc, 12 bpc, and 16 bpc color depth (30, 36, and 48 bit/px), called deep color.

- **HDMI 1.4**: Released on June 5, 2009, added support for 4096 × 2160 at 24 Hz, 3840 × 2160 at 24, 25, and 30 Hz, and 1920 × 1080 at 120 Hz. Compared to HDMI 1.3, 3 more features added which are HDMI Ethernet Channel (HEC), audio return channel (ARC), 3D Over HDMI, a new Micro HDMI Connector, an expanded set of color spaces.

- **HDMI 2.0**: Released on September 4, 2013 increases the maximum bandwidth to 18.0 Gbit/s. Other features of HDMI 2.0 include up to 32 audio channels, up to 1536 kHz audio sample frequency, the HE-AAC and DRA audio standards, improved 3D capability, and additional CEC functions.

- **HDMI 2.0a**: Was released on April 8, 2015, and added support for High Dynamic Range (HDR) video with static metadata.

- **HDMI 2.0b**: Was released March, 2016, support for HDR Video transport and extends the static metadata signaling to include Hybrid Log-Gamma (HLG).

- **HDMI 2.1**: Released on November 28, 2017. It adds support for higher resolutions and higher refresh rates, Dynamic HDR including 4K 120 Hz and 8K 120 Hz.

- **DisplayPort**: A VESA standard interface primarily for video, but also for audio, USB and other data. DisplayPort (or DP) is backwards compatible with HDMI, DVI and VGA.

- **DP 1.1**: Was ratified on 2 April 2007, and version 1.1a was ratified on 11 January 2008. DisplayPort 1.1 allow a maximum bandwidth of 10.8 Gbit/s (8.64 Gbit/s data rate) over a standard 4-lane main link, enough to support 1920×1080@60Hz

- **DP 1.2**: Introduced on 7 January 2010, effective bandwidth to 17.28 Gbit/s support increased resolutions, higher refresh rates, and greater color depth, maximum resolution 3840 × 2160@60Hz

- **DP 1.4**: Publish on 1 Mar, 2016.overall transmission bandwidth 32.4 Gbit/s,DisplayPort 1.4 adds support for Display Stream Compression 1.2 (DSC), DSC is a “visually lossless” encoding technique with up to a 3:1 compression ratio. Using DSC with HBR3 transmission rates, DisplayPort 1.4 can support 8K UHD (7680 × 4320) at 60 Hz or 4K UHD (3840 × 2160) at 120 Hz with 30 bit/px RGB color and HDR. 4K at 60 Hz 30 bit/px RGB/HDR can be achieved without the need for DSC.

- **Multi-mode Fiber**: Fibers that support many propagation paths or transverse modes are called multi-mode fibers, generally have a wider core diameter and are used for short-distance communication links and for applications where high power must be transmitted.

- **Single-mode Fiber**: Fiber that support a single mode are called single-mode fibers. Single-mode fibers are used for most communication links longer than 1,000 meters (3,300 ft).

- **SFP**: Small form-factor pluggable, is a compact, hot-pluggable network interface module used for both telecommunication and data communications applications.

- **Optical Fiber Connector**: Terminates the end of an optical fiber, and enables quicker connection and disconnection than splicing. The connectors mechanically couple and align the cores of fibers so light can pass. 4 most common types
of optical fiber connectors are SC, FC, LC, ST.

- **SC**: (Subscriber Connector), also known as the square connector was also created by the Japanese company – Nippon Telegraph and Telephone. SC is a push-pull coupling type of connector and has a 2.5mm diameter. Nowadays, it is used mostly in single mode fiber optic patch cords, analog, GBIC, and CATV. SC is one of the most popular options, as its simplicity in design comes along with great durability and affordable prices.

- **LC**: (Lucent Connector) is a small factor connector (uses only a 1.25mm ferrule diameter) that has a snap coupling mechanism. Because of its small dimensions, it is the perfect fit for high-density connections, XFP, SFP, and SFP+ transceivers.

- **FC**: (Ferrule Connector) is a screw type connector with a 2.5mm ferrule. FC is a round shaped threaded fiber optic connector, mostly used on Datacom, telecom, measurement equipment, single-mode laser.

- **ST**: (Straight Tip) was invented by AT&T and uses a bayonet mount along with a long spring-loaded ferrule to support the fiber.

- **USB**: Universal Serial Bus is a standard that was developed in the mid-1990s that defines cables, connectors and communication protocols. This technology is designed to allow a connection, communication and power supply for peripheral devices and computers.

  - **USB 1.1**: Full–Bandwidth USB, specification was the first release to be widely adopted by the consumer market. This specification allowed for a maximum bandwidth of 12Mbps.

  - **USB 2.0**: or Hi–Speed USB, specification made many improvements over USB 1.1. The main improvement was an increase in bandwidth to a maximum of 480Mbps.

  - **USB 3.2**: Super Speed USB with 3 varieties of 3.2 Gen 1 (original name USB 3.0), 3.2 Gen 2 (original name USB 3.1), 3.2 Gen 2x2 (original name USB 3.2) with speed up to 5Gbps, 10Gbps, 20Gbps respectively.

USB version and connectors figure:

<table>
<thead>
<tr>
<th></th>
<th>Type A</th>
<th>Type B</th>
<th>Mini A</th>
<th>Mini B</th>
<th>Micro A</th>
<th>Micro B</th>
<th>Type C</th>
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</thead>
<tbody>
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- **NTSC**: The colour video standard used in North America and some other parts of the world created by the National Television Standards Committee in the 1950s. NTSC utilizes an interlaced video signals.
**PAL**: Phase Alternate Line. A television standard in which the phase of the colour carrier is alternated from line to line. It takes four full images (8 fields) for the colour-to-horizontal images (8 fields) for the colour-to-horizontal phase relationship to return to the reference point. This alternation helps cancel out phase errors. For this reason, the hue control is not needed on a PAL TV set. PAL is widely used in Western Europe, Australia, Africa, the Middle East, and Micronesia. PAL uses 625-line, 50-field (25 fps) composite colour transmission system.

**SMPTE**: Society of Motion image and Television Engineers. A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video and television standards.

**VESA**: Video Electronics Standards Association. An organization facilitating computer graphics through standards.

**HDCP**: High-bandwidth Digital Content Protection (HDCP) was developed by Intel Corporation and is in wide use for protection of video during transmission between devices.

**HDBaseT**: A video standard for the transmission of uncompressed video (HDMI signals) and related features using Cat 5e/Cat6 cabling infrastructure.

**ST2110**: A SMPTE developed standard, ST2110 describes how to send digital video over and IP networks. Video is transmitted uncompressed with audio and other data in a separate streams. SMPTE2110 is intended principally for broadcast production and distribution facilities where quality and flexibility are more important.

**SDVoE**: Software Defined Video over Ethernet (SDVoE) is a method for transmission, distribution and management AV signals using a TCP/IP Ethernet infrastructure for transport with low latency. SDVoE is commonly used in integration applications.

**Dante AV**: The Dante protocol was developed for and widely adopted in audio systems for the transmission of uncompressed digital audio on IP based networks. The more recent Dante AV specification includes support for digital video.

**NDI**: Network Device Interface (NDI) is a software standard developed by NewTek to enable video-compatible products to communicate, deliver, and receive broadcast quality video in a high quality, low latency manner that is frame-accurate and suitable for switching in a live production environment over TCP (UDP) Ethernet based networks. NDI is commonly found in broadcast applications.

**RTMP**: Real-Time Messaging Protocol (RTMP) was initially a proprietary protocol developed by Macromedia (now Adobe) for streaming audio, video and data over the Internet, between a Flash player and a server.

**RTSP**: The Real Time Streaming Protocol (RTSP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points.

**MPEG**: Moving Picture Experts Group is a working group formed from ISO and IEC developing standards that allow
audio/video digital compression and Transmission.

**H.264:** Also known as AVC (Advanced Video Coding) or MPEG-4i is a common video compression standard. H.264 was standardized by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC JTC1 Moving Picture Experts Group (MPEG).

**H.265:** Also known as HEVC (High Efficiency Video Coding) H.265 is the successor to the widely used H.264/AVC digital video coding standard. Developed under the auspices of ITU, resolutions up to 8192x4320 may be compressed.

**API:** An Application Programming Interface (API) provides a predefined function which allows access capabilities and features or routines via a software or hardware, without accessing source code or understanding the details of inner working mechanism. An API call may execute a function and/or provide data feedback/report.

**DMX512:** The communication standard developed by USITT for entertainment and digital lighting systems. The wide adoption of the Digital Multiplex (DMX) protocol has seen the protocol used for a wide range of other devices including video controllers. DMX512 is delivered over cable of 2 twisted pairs with 5pin XLR cables for connection.

**ArtNet:** An ethernet protocol based on TCP/IP protocol stack, mainly used in entertainment/events applications. Built on the DMX512 data format, ArtNet enables multiple “universes” of DMX512 to be transmitted using ethernet networks for transport.

**MIDI:** MIDI is the abbreviation of Musical Instrument Digital Interface. As the name indicates the protocol was developed for communication between electronic musical instruments and latterly computers. MIDI instructions are triggers or commands sent over twisted pair cables, typically using 5pin DIN connectors.

**OSC:** The principle of Open Sound Control (OSC) protocol is for networking sound synthesizers, computers, and multimedia devices for musical performance or show control. As with XML and JSON, the OSC protocol allows sharing data. OSC is transported via UDP packets between devices connected on an Ethernet.

**Brightness:** Usually refers to the amount or intensity of video light produced on a screen without regard to colour. Sometimes called black level.

**Contrast Ratio:** The ratio of the high light output level divided by the low light output level. In theory, the contrast ratio of the television system should be at least 100:1, if not 300:1. In reality, there are several limitations. Well-controlled viewing conditions should yield a practical contrast ratio of 30:1 to 50:1.

**Colour Temperature:** The colour quality, expressed in degrees Kelvin (K), of a light source. The higher the colour temperature, the bluer the light. The lower the temperature, the redder the light. Benchmark colour temperature for the A/V industry include 5000°K, 6500°K, and 9000°K.

**Saturation:** Chroma, Chroma gain. The intensity of the colour, or the extent to which a given colour in any image is free from white. The less white in a colour, the truer the colour or the greater its saturation. Saturation is the amount of pigment in a colour, and not the intensity.
● Gamma: The light output of a CRT is not linear with respect to the voltage input. The difference between what you should have and what is actually output is known as gamma.

● Frame: In interlaced video, a frame is one complete image. A video frame is made up of two fields, or two sets of interlaced lines. In a film, a frame is one still image of a series that makes up a motion image.

● Genlock: Allows synchronisation of otherwise video devices. A signal generator provides a signal pulses which connected devices can reference. Also see Black Burst and Color Burst.

● Blackburst: The video waveform without the video elements. It includes the vertical sync, horizontal sync, and the Chroma burst information. Blackburst is used to synchronize video equipment to align the video output.

● Colour Burst: In colour TV systems, a burst of subcarrier frequency located on the back part of the composite video signal. This serves as a colour synchronizing signal to establish a frequency and phase reference for the Chroma signal. Colour burst is 3.58 MHz for NTSC and 4.43 MHz for PAL.

● Colour Bars: A standard test pattern of several basic colours (white, yellow, cyan, green, magenta, red, blue, and black) as a reference for system alignment and testing. In NTSC video, the most commonly used colour bars are the SMPTE standard colour bars. In PAL video, the most commonly used colour bars are eight full field bars. On computer monitors the most commonly used colour bars are two rows of reversed colour bars.

● Seamless Switching: A feature found on many video switchers. This feature causes the switcher to wait until the vertical interval to switch. This avoids a glitch (temporary scrambling) which often is seen when switching between sources.

● Scaling: A conversion of a video or computer graphic signal from a starting resolution to a new resolution. Scaling from one resolution to another is typically done to optimize the signal for input to an image processor, transmission path or to improve its quality when presented on a particular display.

● PIP: Picture-In-Picture. A small image within a larger image created by scaling down one of image to make it smaller. Other forms of PIP displays include Picture-By-Picture (PBP) and Picture-Within-Picture (PWP), which are commonly used with 16:9 aspect display devices. PBP and PWP image formats require a separate scaler for each video window.

● HDR: is a high dynamic range (HDR) technique used in imaging and photography to reproduce a greater dynamic range of luminosity than what is possible with standard digital imaging or photographic techniques. The aim is to present a similar range of luminance to that experienced through the human visual system.

● UHD: Standing for Ultra High Definition and comprising 4K and 8K television standards with a 16:9 ratio, UHD follows the 2K HDTV standard. A UHD 4K display has a physical resolution of 3840x2160 which is four times the area and twice both the width and height of a HDTV/FullHD (1920x1080) video signal.

● EDID: Extended Display Identification Data. EDID is a data structure used to communicate video display information, including native resolution and vertical interval refresh rate requirements, to a source device. The source device will then output the provided EDID data, ensuring proper video image quality.
5.5 Revision History

The table below lists the changes to the User Manual.

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Chapter 6 Support

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