

TAO 1mini



User Manual

RGBlink[®]

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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 complains.

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.

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

Power Adapter



USB-C Cable



**Double-thread
1/4 Screw**



Storage Box



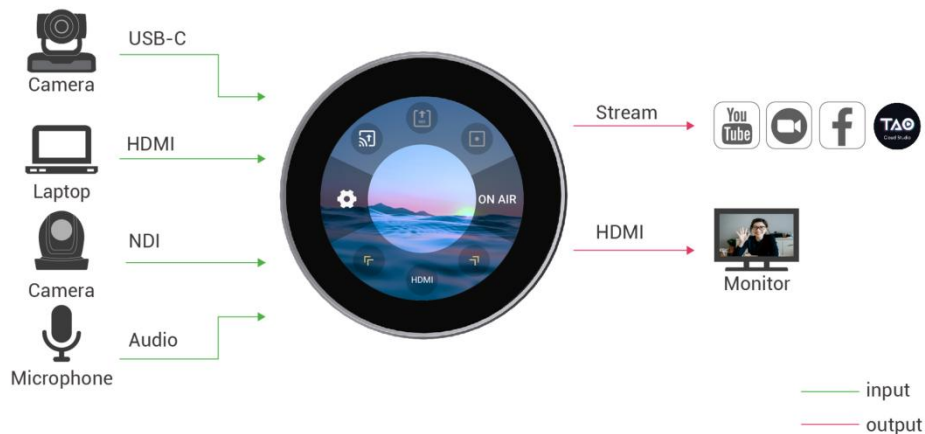
Note: The color of the accessories is subject to actual conditions.

1.2 Product Overview

TAO 1mini supports HDMI & UVC and FULL NDI gigabit Ethernet video stream codecs for encoding and decoding.

TAO 1mini features light in weight and small in appearance, which makes it easy to carry. Standard camera screw holes can be easily installed to the camera bracket.

The device has a 2.1-inch touch screen for real-time monitoring of signals and menu operations. Support U disk recording, support PoE and other functions.



1.2.1 Key Features

- Small and compact, easy to carry
- Serve as either NDI video encoder or NDI decoder
- Support multiple formats, including RTMP/RTMPS/RTSP/SRT/FULL NDI/NDI | HX3/NDI | HX2/NDI | HX
- Stream to at least 4 platforms at the same time
- Resolution up to 4K@60
- Low latency of end-to-end transmission
- Intuitive touch control, higher color and image quality
- Power from USB-C or PoE network
- Dual ¼in mounts
- LED TALLY indicators

1.2.2 Appearance



No.	Item	Description
1	Touch Screen	2.1-inch TFT touch screen for real-time monitoring of signals and menu operations.
2	1/4in Mounts	For installation.
3	TALLY Lamp	LED TALLY indicators to show device status.

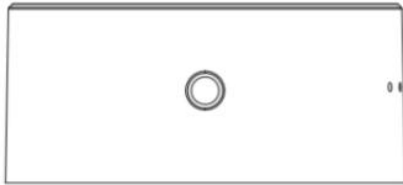
1.2.3 Connectors



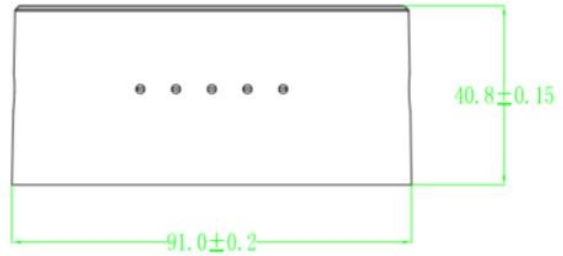
No.	Connectors	Description
1	USB-C	Connect to the power supply, support PD protocol.
2	HDMI-OUT	Connect to external monitor for real-time monitoring of inputs and outputs.
3	USB-C	For receiving video signal from your phone or others. Connect to USB camera for UVC capture. Support 5V/1A reverse power supply.
4	HDMI-IN	For receiving video signal.
5	3.5mm Audio Socket	For analog audio input and audio output monitoring.
6	USB 3.0	Connect to hard disk for recording, and storage up to 2T.
7	LAN	Gigabit network port, support PoE.

1.3 Dimension

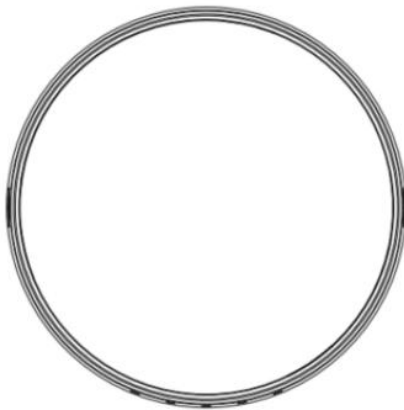
Following is the dimension of TAO 1mini for your reference: 91mm(diameter)×40.8mm(height).



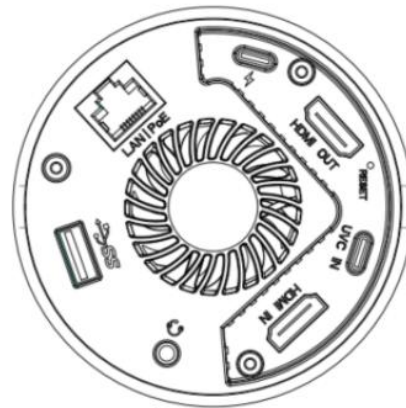
Bottom View



Right View



Front View



Rear View

Chapter 2 Install Your Product

2.1 Connect Input Signal

The camera or device with HDMI compliance can be input signal to TAO 1mini by HDMI interface. You can also connect camera with USB interface to USB-C or USB-A interface of TAO 1mini. Users can check the resolution of the input signal on the 2.1 inch touch screen when there is active signal plug in.

2.2 Connect Power Supply

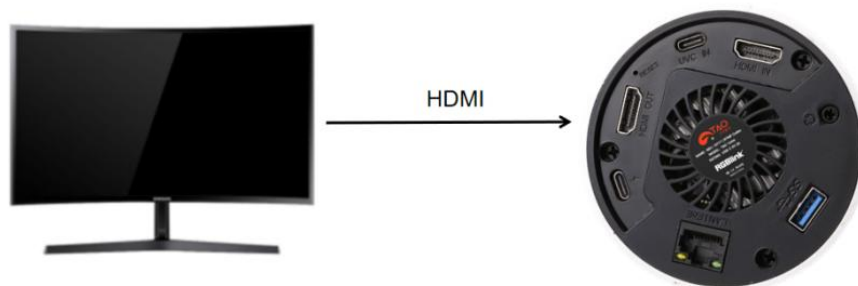
RGBlink TAO 1mini is packaged with a USB-C power link cable and a standard power adapter. When connect the power supply, please check the power supply standard used in your country/area. Besides, you can also use PoE module for power supply.



2.3 Connect HDMI Output

You can use an HDMI cable to connect TAO 1mini to a monitor with an HDMI input interface, so that you can monitor the input, output and audio display in real time.

The HDMI output resolution of TAO 1mini is up to 4K@60.



2.4 Connect Network

Connect one end of the network cable to LAN port of TAO 1mini and the other end to the switch. You can also connect directly to the network port of your computer.



2.5 Network Configuration

TAO 1mini and your computer configuration must be in the same LAN.

There are two ways to configure a network. You can turn on DHCP for automatic capture of IP address, net mask and gateway or configure IP address, net mask and gateway manually by turning off DHCP. The detailed operations are as follows.

The first way is to use DHCP to automatically obtain IP.

User should firstly ensure that the switch has access to the network. Then connect TAO 1mini and the computer to the same switch and in the same LAN.

Finally, turn on DHCP of TAO 1mini for automatic capture of IP. No configuration is needed for your computer.



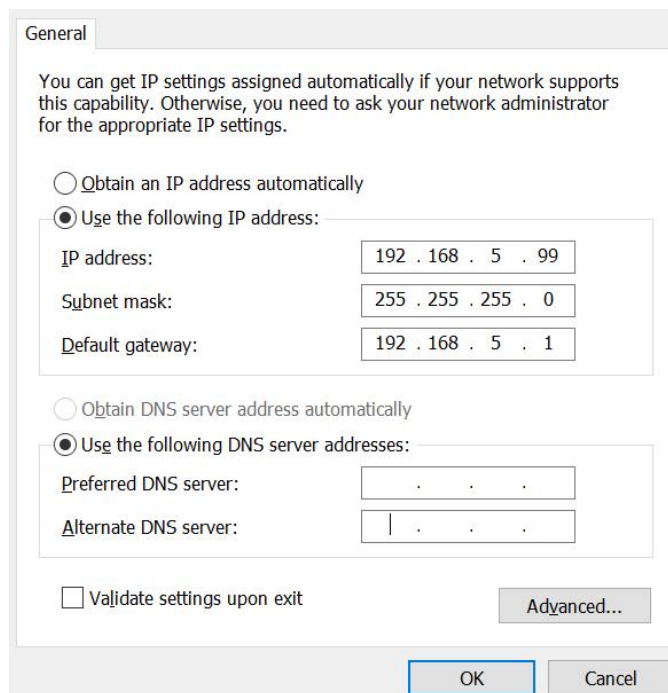
The second way is Manual Setting.

Step 1: Click Network icon in Settings for TAO 1mini network configuration. Turn off DHCP and manually configure IP address, net mask and gateway. **The default IP address is 192.168.5.100.**



Step 2: Turn off the computer's network and then configure TAO 1mini and computer to the same LAN. **Please set the IP address of the computer network port to 192.168.5.*.**

Step 3: Please click the buttons on the computer as follows: "Network and Internet Settings" > "Network and Sharing Center" > "Ethernet" > "Internet Protocol Version 4" > "Use the following IP address", then manually enter the IP address with 192.168.5.* and then click **OK** to confirm.



2.5 Connect Input Audio Signal and External Monitor

TAO 1mini features one 3.5mm standard audio jack which can be used for connecting audio signal. You can also use external speakers or headphones to monitor the main output audio signal in real time.

Chapter 3 Use Your Product

Once powering on TAO 1mini, the 2.1 inch display will show TAO 1mini logo and then come into the main menu. Operator can follow the operations below to use TAO 1mini.

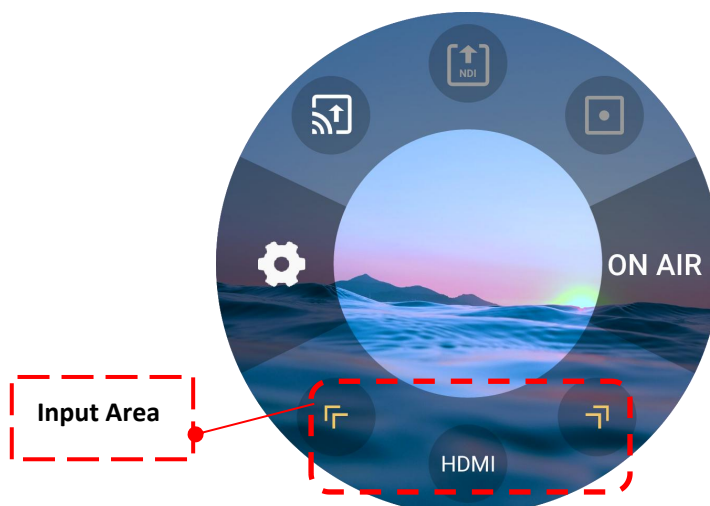
The main menu of TAO 1mini can be divided into five parts: Input Area, Output Area, Settings, ON AIR and Status Display Area.



Notice:

1. User can choose function by tapping the icon and set parameters through pressing and holding the icon.
2. User can choose different functions by tapping **Arrow Icons**.
3. NDI Encoding mode and NDI Decoding mode cannot work simultaneously.

3.1 Input Area

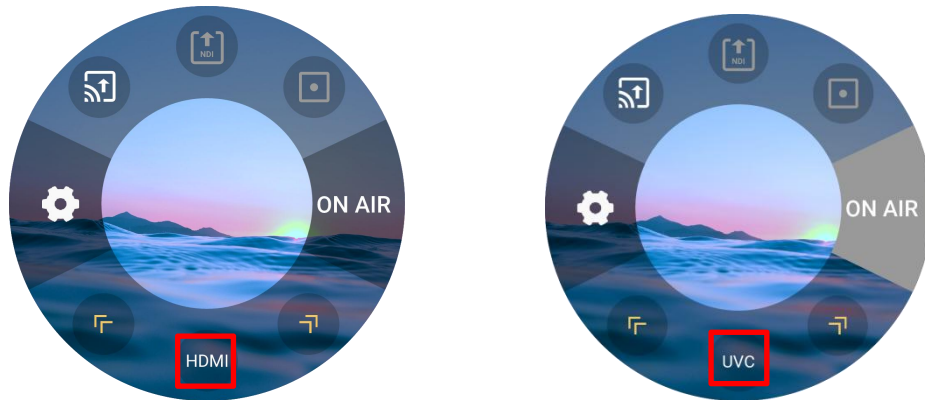


You can perform five functions in Input Area, including **HDMI Input Signal Selection, UVC Input Signal Selection, USB Player, RTMP Pull and NDI Decoding.**

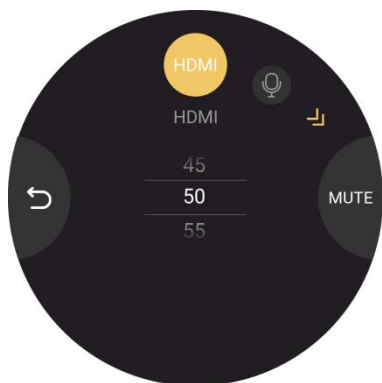
Click yellow arrows to choose function you need and then trigger this function through tapping. The icon in the middle indicates the function been selected.

3.1.1 Input Signal Selection

Click yellow arrows to choose/switch input signal. HDMI/UVC for you to choose from.



User can enter Input Signal parameter setting interface by pressing and holding the icon so as to adjust volume, shown as below.



HDMI: Choose MUTE or adjust volume. (0-100 adjustable)



UVC: Choose MUTE or adjust volume. (0-100 adjustable)

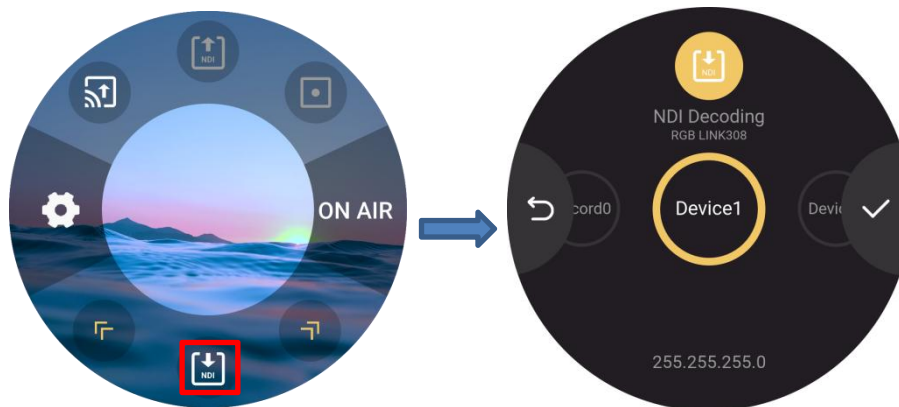



MIC IN: Choose MUTE or adjust volume. (0-100 adjustable)

3.1.2 NDI Decoding

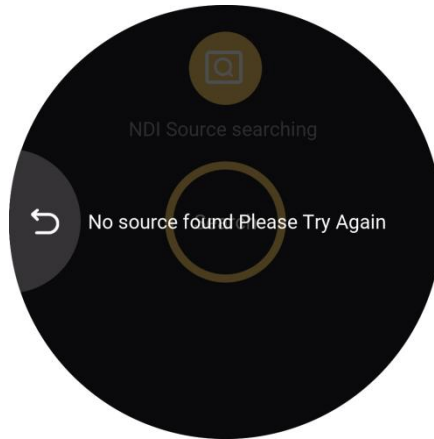
You can configure network of other device (Support NDI decoding function) and TAO 1mini to the same LAN. Then click **Search** to find the NDI sources in the same LAN.

Tap yellow arrows to select NDI Decoding icon. Press and hold the icon to enter the following interface. In the same LAN, NDI sources can be displayed in the source list through automatic discovery. Click the icon to update NDI source in real time. Click the NDI source corresponded icon , you can directly decode and output the video.



Find the NDI source to be decoded by swiping the screen and then click  to decode and output.

If no valid NDI source is founded, the screen will pop up following interface to remind users.

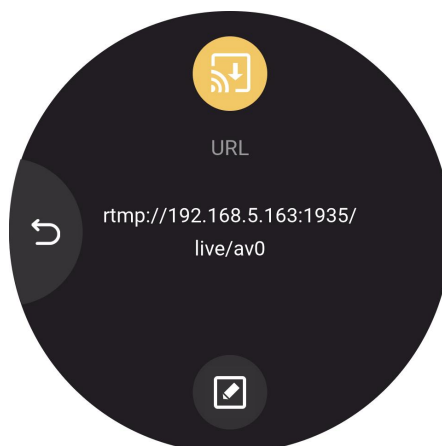


3.1.3 RTMP Pull

Tap yellow arrow to choose RTMP Pull icon so as to trigger this function.



You can turn on Bluetooth to pair TAO 1mini with your mobile phone (For more details, please refer to [3.3.4 Bluetooth](#)), so that you can import RTMP stream address via TAO APP, shown as below.

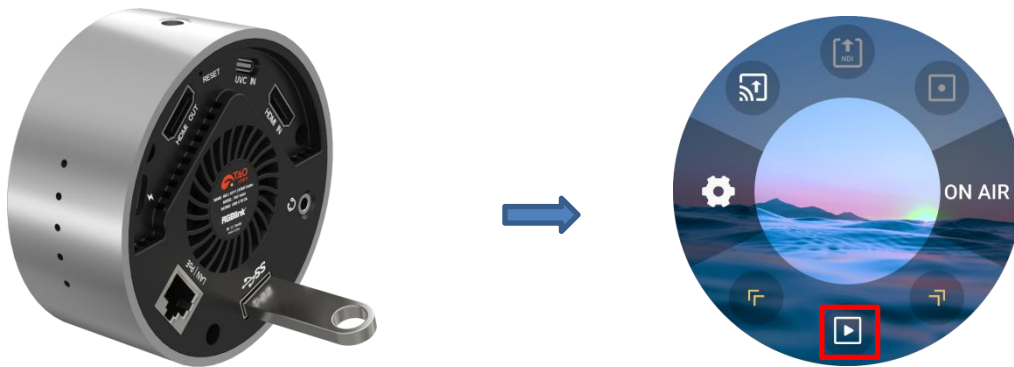


If TAO APP has not been installed in your mobile phone, please click the icon for installation and then do the above operations again.



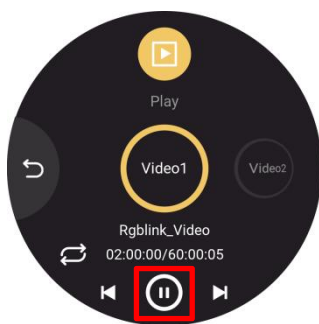
3.1.4 Play Video in U Disk

You can insert U disk to USB 3.0 port of TAO 1mini so as to play the video stored in U disk.

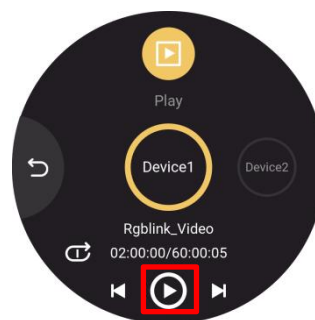


Click yellow arrow to select Player icon, then press and hold the icon to enter the following interface.

In this interface, you can choose different videos by wiping the screen left and right.



Click to pause.



Click to play.

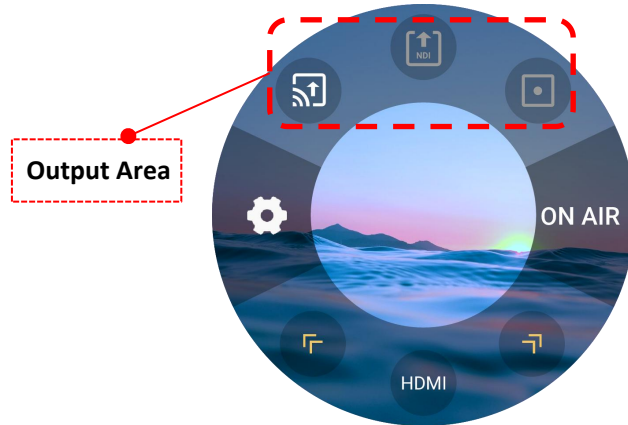
In Player interface, you can view video name(Here is Rgblink_Video), video duration and video playback progress.

User can click  to switch video-playing mode.

Icon Description:

 : Random Play;  : List Circulation;  : Single Play.


3.2 Output Area

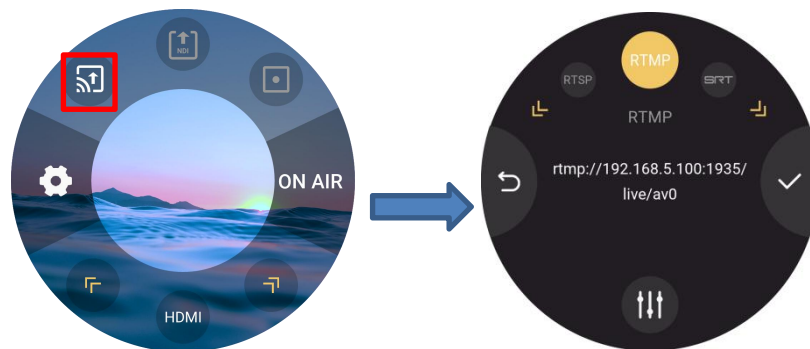


You can perform three functions in Output Area, including **RTMP Push, NDI Encoding and Video Recording.**


3.2.1 RTMP Push

Press and hold RTMP Push icon in Output Area.

User can check RTSP/RTMP/SRT stream address and click  icon to confirm your selection.



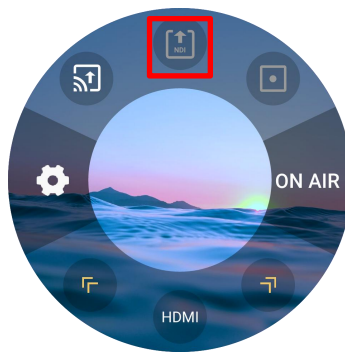
User can modify IP address of TAO 1mini in Network Settings and then RTSP/RTMP/SRT stream address will follow IP modification.

Resolution, Bitrate and Display Mode can be set by clicking , shown as below.



3.2.2 NDI Encoding


TAO 1mini supports NDI 5.0 decoding and can transmit data in H.264/H.265/RGBA/YUV442 format. In NDI network, TAO 1mini can convert video data from other channels (such as IP video streaming, HDMI, etc.) into NDI format and send it to the receiver. Press and hold NDI Encoding icon to enter the interface.

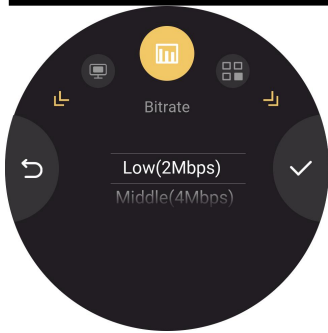



User can choose encoding format (NDI | HX by default) and then do other parameter settings.




Resolution: the input video resolution.

Up to 3840x2160p60. Choose resolution by swiping the screen up and down. Click  to confirm.




Bitrate: Bit rate shows the real-time encoding bit rate. Choose bitrate by swiping the screen up and down. Click  to



Encoding Format: FULL NDI, NDI|HX, NDI|HX2, NDI|HX3 available, NDI|HX by default. Click  to confirm.



Compression Format: H.264 and H.265 compression format for user to select. Click  to confirm.

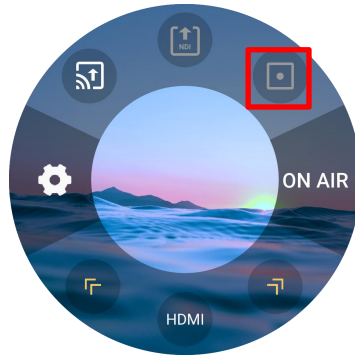


Channel Name: Cannot be edited. HX indicates format of NDI encoding, 100 indicates the last segment of IP address. Users can revise channel name via software.

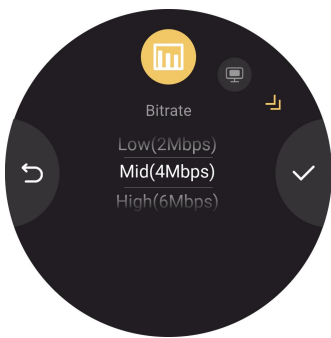
Notice: When setting the NDI encoding resolution to 4K, the screen may turn to black, but TAO 1mini functions normally.


3.2.3 USB Recording

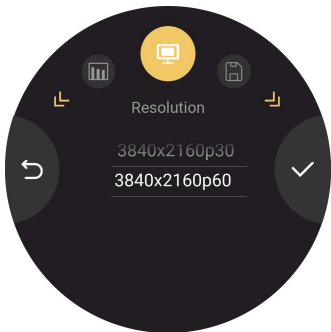
Plug USB hard drive to TAO 1mini USB port and then TAO 1mini can work as a recorder. The storage of USB disk is up to 2T. Press and hold USB Recording icon to do the following settings.




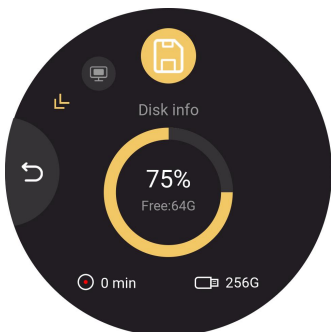
Users can set resolution, bitrate and check disk info.



Bitrate: Up to 64Mbps. Choose bitrate by swiping the screen up and down. Click  to confirm.



Resolution: Up to 3840x2160p60. Choose resolution by swiping the screen up and down. Click  to confirm.

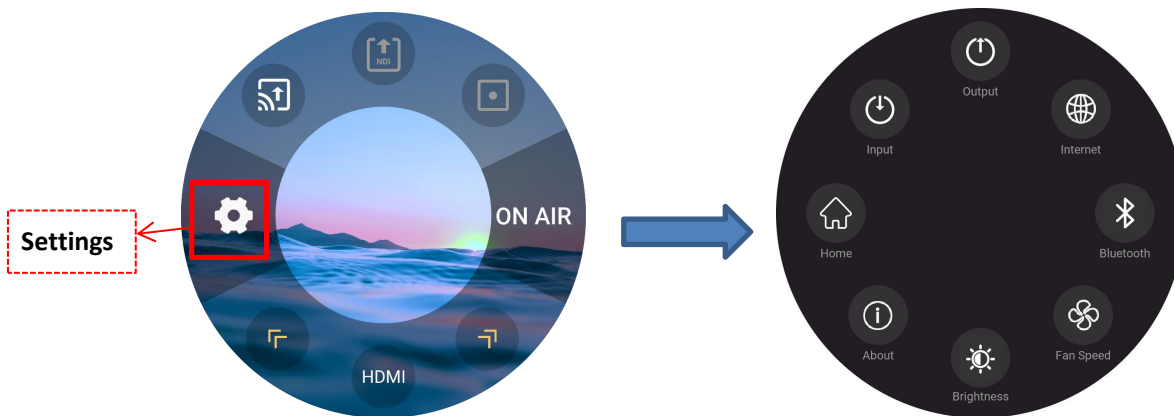


Disk info: Check disk capacity and remaining recording time.

You can return to the main menu to check the recording status, shown as below.




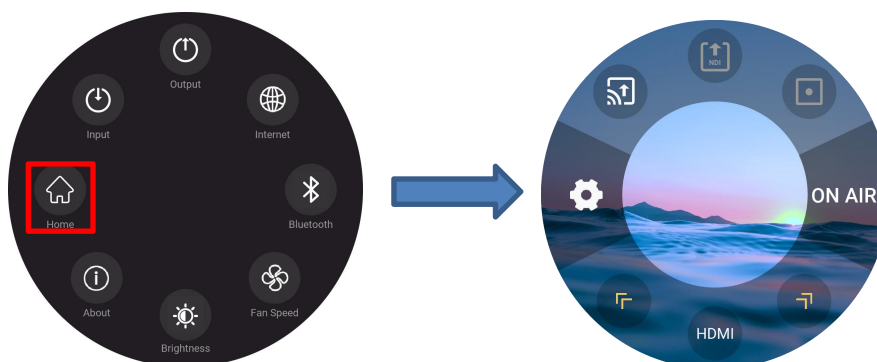
3.3 Settings




The left area of the interface is the Settings Area, where users can perform eight functions, such as **HOME, INPUT, OUTPUT, INTERNET, BLUETOOTH, FAN SPEED, BRIGHTNESS** and **ABOUT**.

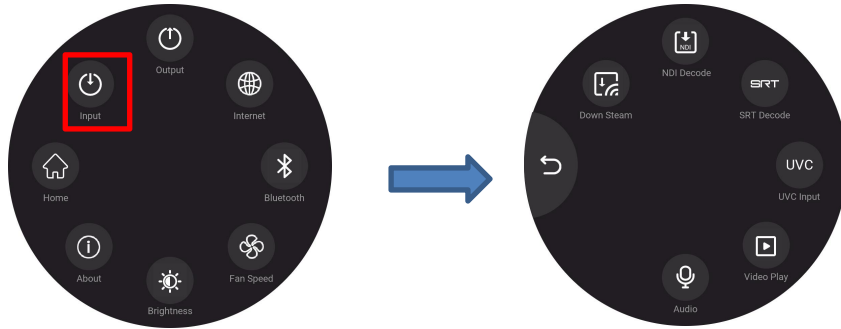
3.3.1 Home


Click  to return to the main interface of TAO 1mini.



3.3.2 Input Settings

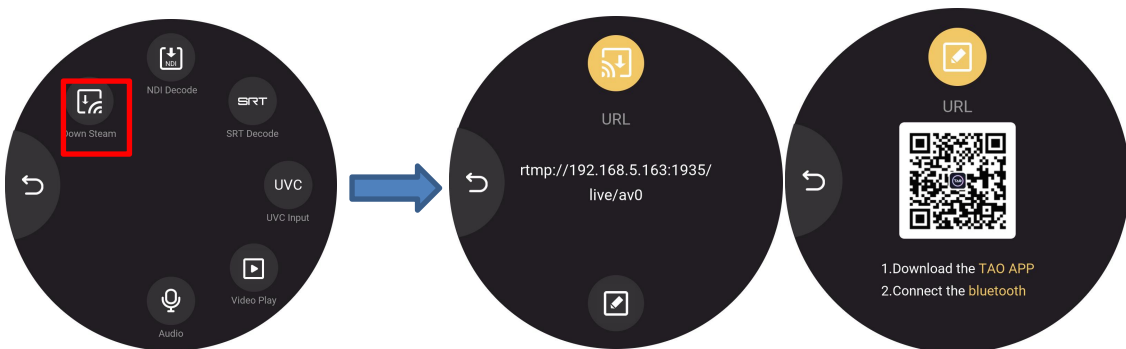
Click  to enter **Input Settings** page. You can operate five functions, including **RTMP Pull**, **NDI Decoding**, **UVC Input Settings**, **Video Playing** and **Audio Settings**.



Notice: Click  to return to the previous interface.

3.3.2.1 RTMP Pull

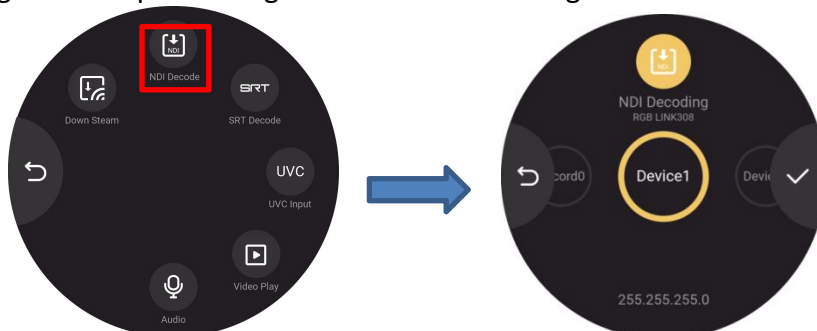
Click RTMP Pull icon in Input Settings. You can perform RTMP Pull function with TAO APP, shown as below.



For more details, please refer to [3.1.3 RTMP Pull](#).

3.3.2.2 NDI Decoding

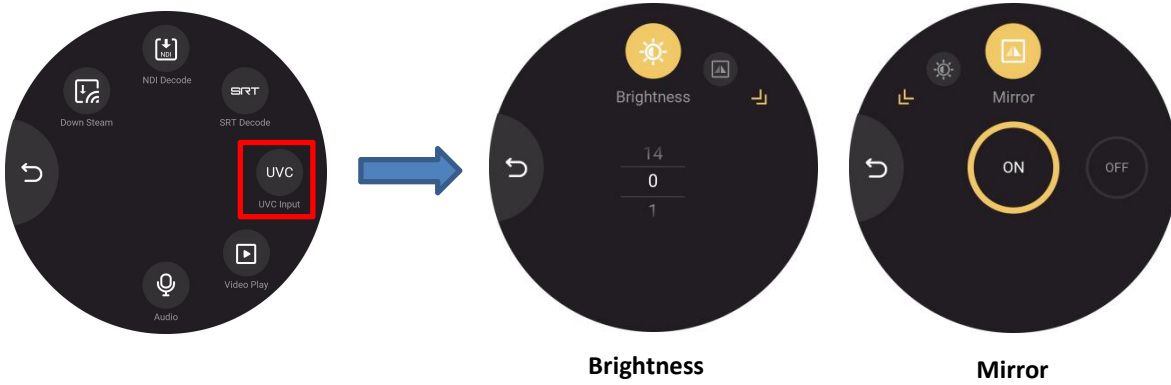
Click NDI Decoding icon in Input Settings to enter the following interface.



For more details, please refer to [3.1.2 NDI Decoding](#).

3.3.2.3 UVC Input Settings

Click UVC icon in Input Settings to enter the following interface.

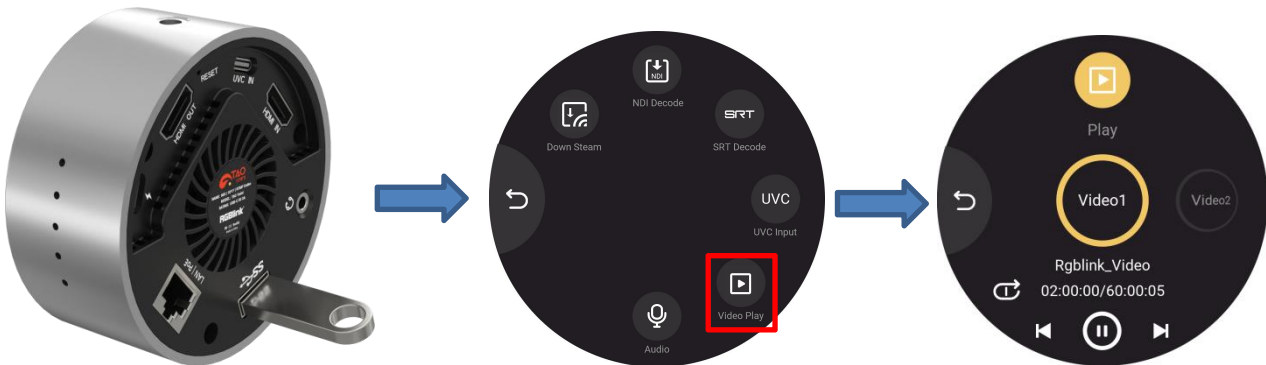


In this interface, user can adjust Brightness or turn on/off Mirror mode.

3.3.2.4 Play the Video

TAO 1mini can serve as a player.

Click Player icon in Input Settings to enter the following interface.

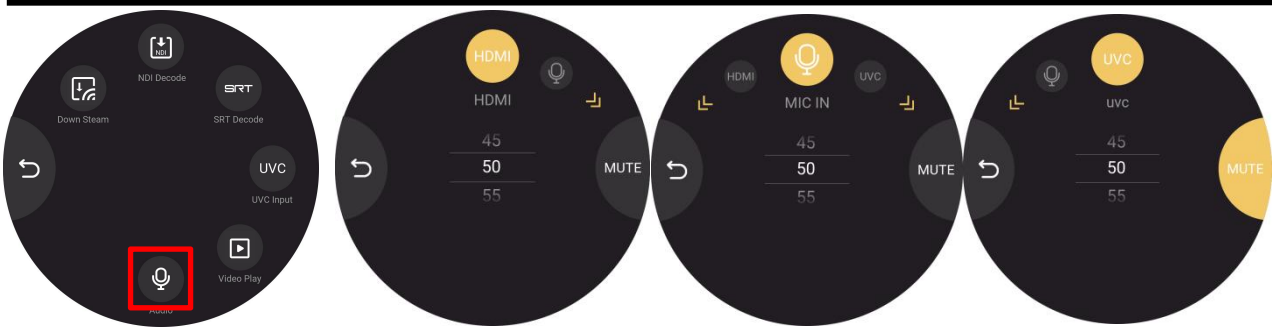


You can view video name, check video duration, video playback progress and switch video-playing mode.


For more details, please refer to [3.1.4 Play Video in U Disk](#).

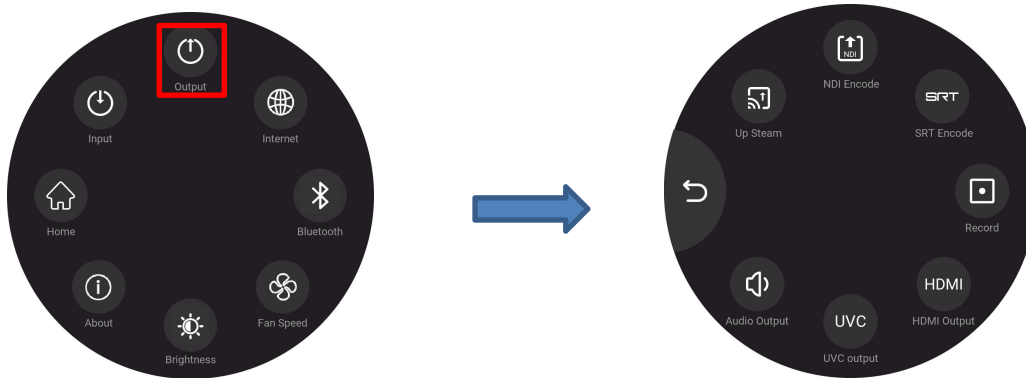
3.3.2.5 Audio


Click Audio icon in Input Settings to enter the following interface to adjust volume of HDMI/UVC input signal and microphone.



3.3.3 Output Settings

Click  to enter **Output Settings** page. You can perform six functions, including **RTMP Push**, **NDI Encoding**, **USB Recording**, **HDMI Output Settings**, **UVC Output Settings** and **Audio Settings**.



Notice: Click  to return to the previous interface.

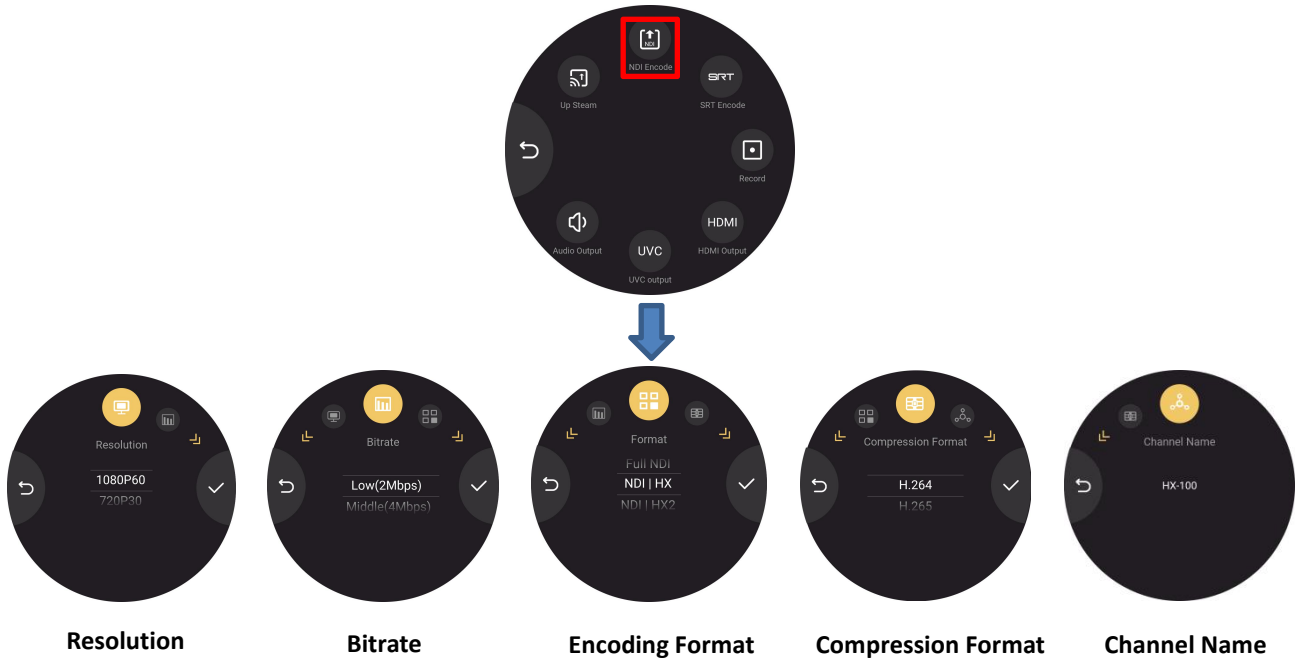
3.3.3.1 RTMP Push

Click RTMP Push icon in Output Settings. You can achieve RTMP Push and for more details, please refer to [3.2.1 RTMP Push](#).



3.3.3.2 NDI Encoding

Click NDI Encoding icon in Output Settings to enter the parameter setting interface. Then click yellow arrows for selection.



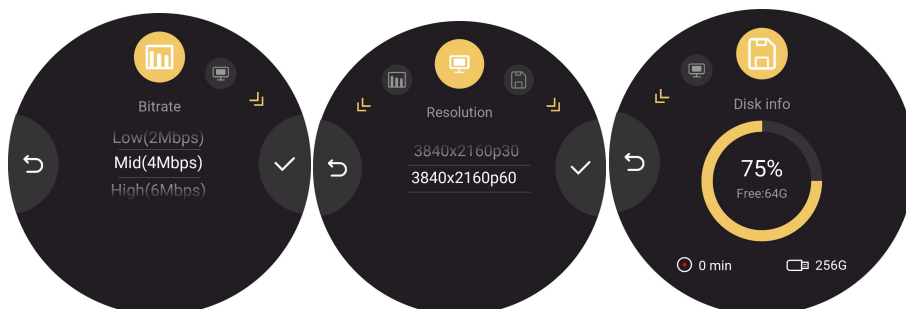
Users can set resolution, bitrate, encoding format, compression format and check the channel name. For more details, please refer to [3.2.2 NDI Encoding](#).

3.3.3.3 USB Recording

Click Recording icon in Output Settings to do the following settings.

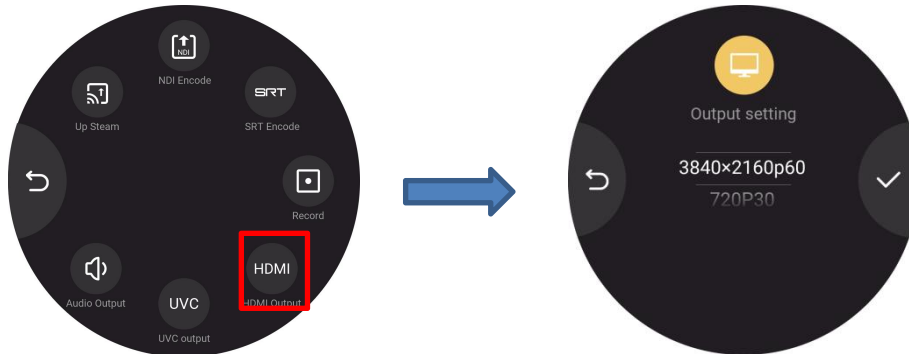



Users can set bitrate, resolution and check disk info.



3.3.3.4 HDMI Output Settings

Click HDMI icon in Output Settings to enter the parameter setting interface.




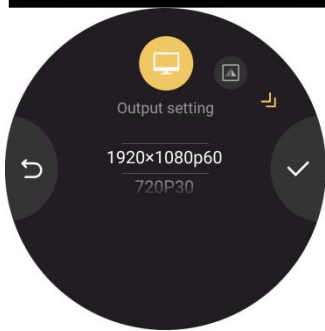
You can set HDMI output resolution by swiping the screen up and down. The resolution is up to 3840x2160p60. After setting, click  to confirm.


3.3.3.5 UVC Output Setting

Click UVC icon in Output Settings to enter the parameter setting interface.



You can choose output resolution by swiping the screen and then click  to confirm. Tap the yellow arrow and you can also set mirror mode and display mode.




Output Setting: Up to 1080p60. Choose resolution by swiping the screen up and down. Click  to confirm.



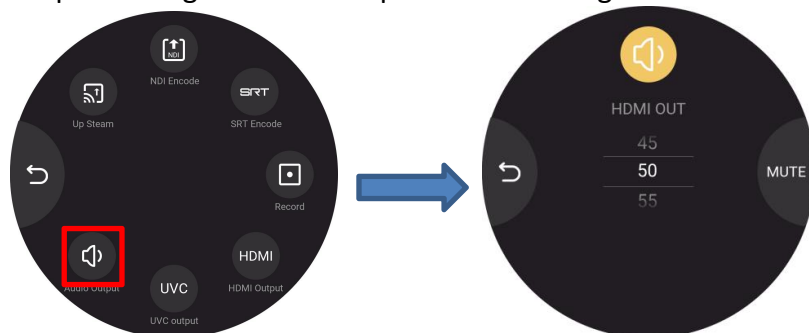
Mirror: Turn on/off mirror mode by swiping the screen left and right.



Display Mode: Vertical mode and landscape mode optional. Click  to confirm.

3.3.3.6 Audio Setting

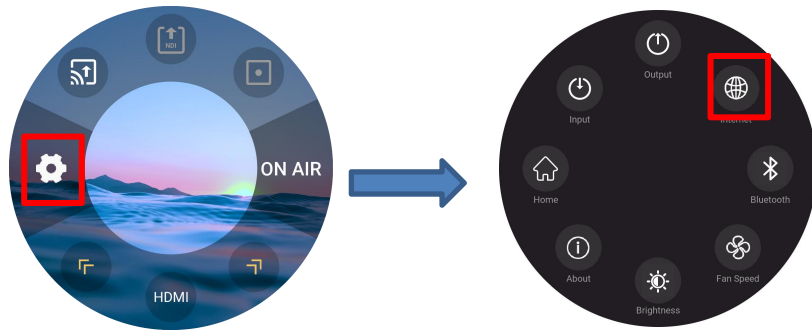
Click Audio icon in Output Settings to enter the parameter setting interface.



You can set HDMI output volume (0-100 adjustable) by swiping the screen up and down or choose MUTE mode.

3.3.4 Network

Click Network icon to do the following settings. Tap yellow arrow for function selection.



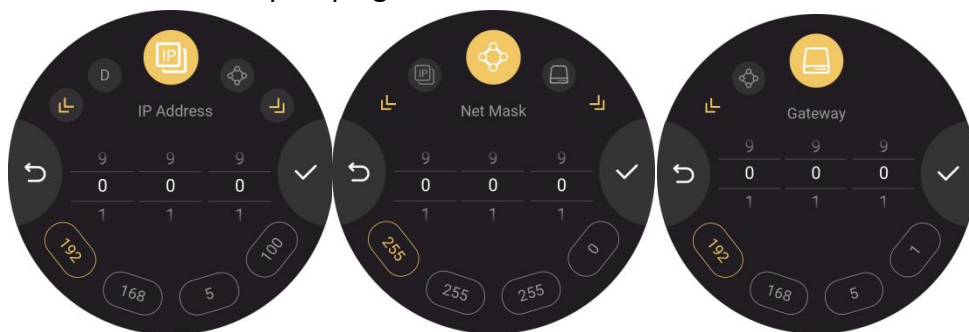
TAO 1mini supports WIFI connection. User can connect TAO APP in the mobile phone and TAO 1mini to the same WIFI so as to gain easier access to streaming via TAO APP.



TAO 1mini supports DHCP. If DHCP is turned on, TAO 1mini will automatically capture the IP address.



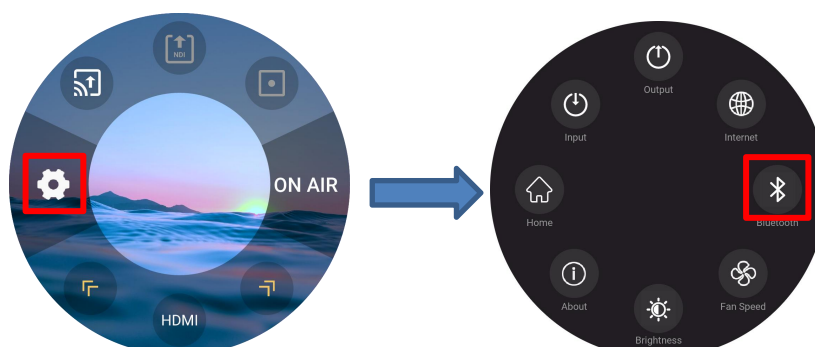
DHCP is off by default. If DHCP is turned off, users can manually set the IP address, net mask and gateway. When setting the IP Address, Net Mask and Gateway, user can click the corresponding bank below and select number by swiping the screen.



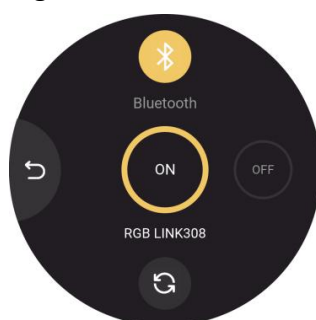
After setting, click  to confirm.

3.3.5 Bluetooth

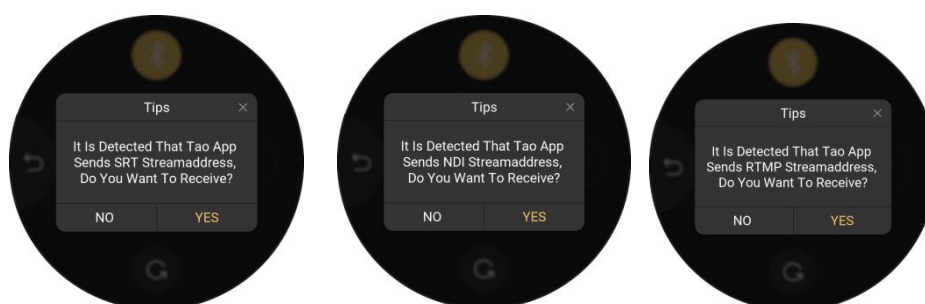
Click Bluetooth icon to do the settings.



You can turn on/off Bluetooth by swiping the screen left and right, shown as below.



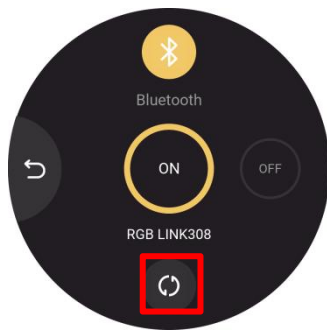
TAO 1mini can import stream-address with TAO APP. Firstly, you should pair TAO 1mini with TAO APP via Bluetooth. The following interface will pop up to remind the user whether to import a new stream address.



Click YES to receive the stream address.

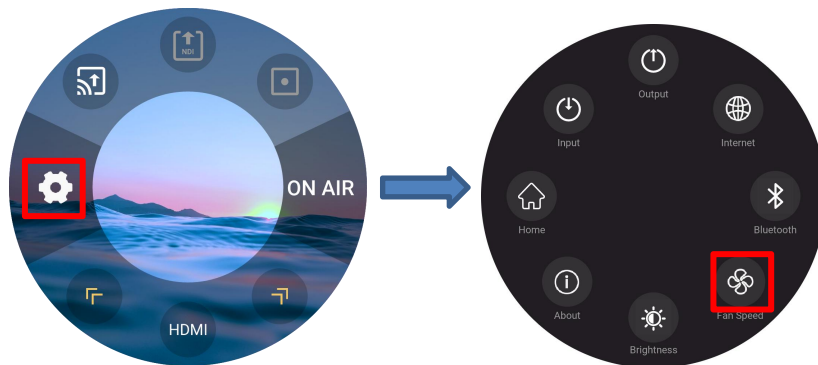
Notice: Make sure the distance between TAO 1mini and mobile phone is within 2m to ensure the stability of Bluetooth connection.

After turning on Bluetooth, you need to pair the device with TAO APP within 300s. Otherwise, you need to click refreshing icon for re-searching.



3.3.6 Fan Control

Click Fan icon for fan speed adjustment.

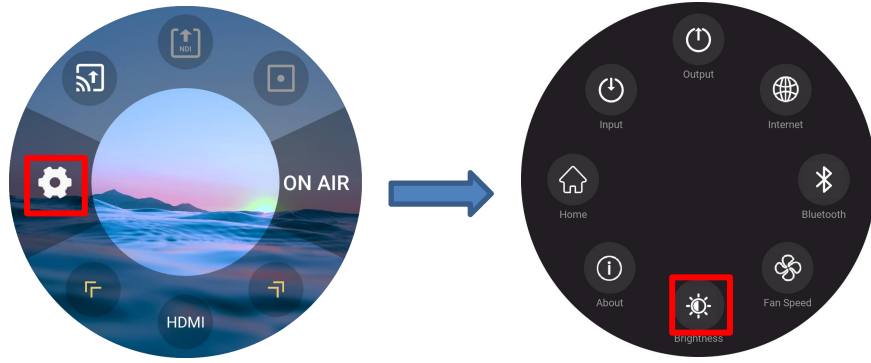


In the fan control interface, you can set the fan speed. Four gears for you to choose from, and you can also turn on **Auto** to achieve automatic adjustment of the fan speed.



3.3.7 Brightness

Click Brightness icon to enter the following interfaces.



You can set the brightness and select screen rotation.



Brightness: 0-100 adjustable.



Display Rotation: 0° / 180° adjustable.

3.3.8 About TAO 1mini

Click Information icon to enter the following interface.



User can check device information, turn on TALLY, upgrade TAO 1mini and choose factory reset.




Device Information: Show device name, Serial number and software version




TALLY: Choose to turn off TALLY control or set TALLY light color and brightness you need.



Upgrade: Choose version recognized by U disk and then click version for upgrade. After selection, click  to confirm.



Factory Reset: A message will appear to remind you of your factory reset operation. If you confirm the reset, click .

Notice: 1. Keep TAO 1mini plugged in during upgrading, shown as Image 1.
2. If no file available on the USB disk or the file can not be recognized, the interface will display "None", shown as Image 2.



Image 1

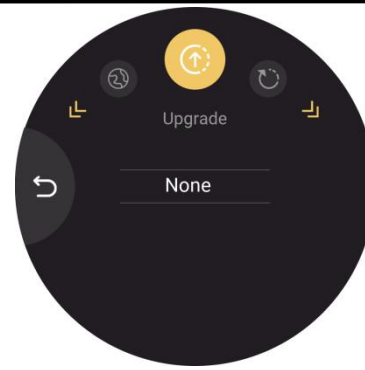
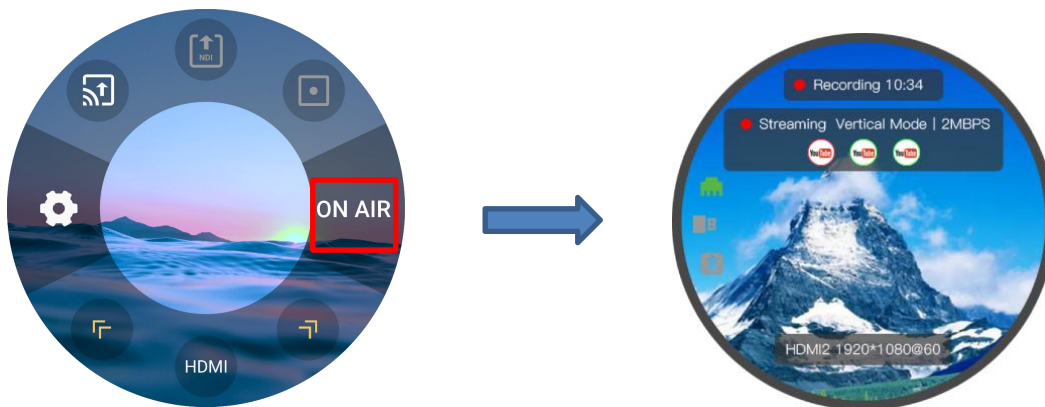


Image 2

3.4 ON AIR

Click ON AIR and TAO 1mini will start streaming. Press and hold this icon to enter streaming configuration interface.

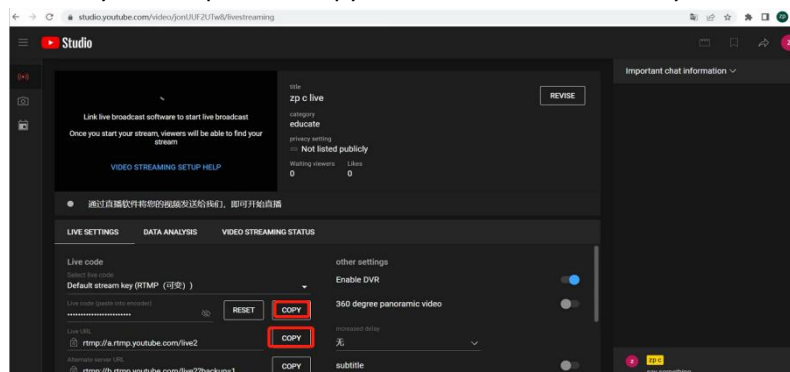


Following steps take YouTube stream as the example. There are two methods for you to choose from.

The first method is to operate RTMP Push via USB disk.

Step 1: Make sure TAO 1mini connect to the network.

Step 2: Open YouTube Studio on your computer to Copy Stream URL and Stream Key.



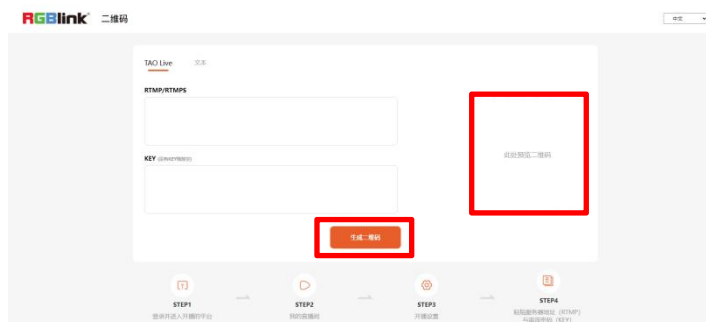
Step 3: Create a new TXT file first, and paste the Streaming URL and Streaming Key (the format must be : rtmp://:YOUR STREAM URL/YOUR STREAM KEY), and save the TXT file to USB as rtmp.ini.(Newline is required to

add multiple streaming addresses) and connect the USB disk to TAO 1mini's USB port.

Step 4: Press and hold the streaming settings, you can see the links of the platforms identified by TAO 1mini after entering the settings, select the links of the live stream platforms you need, tap Next. After everything is set, tap confirm, it'll automatically go back to the home page, then tap ON AIR.

The second method is to operate RTMP Push via TAO APP.

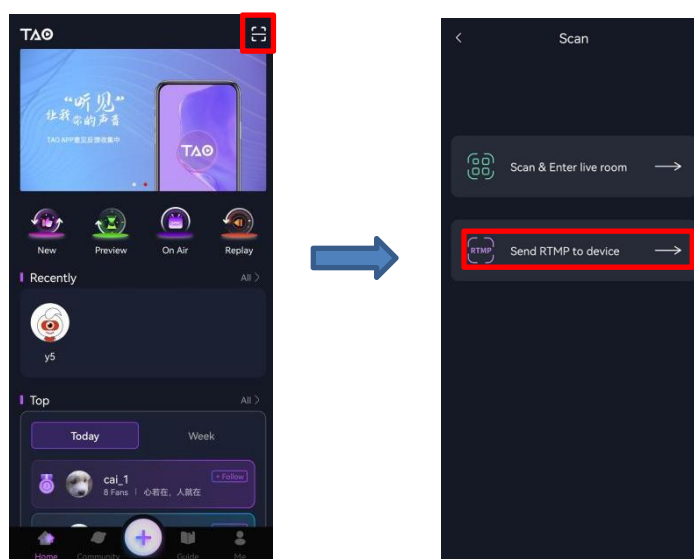
Step 1: Copy stream address and stream key to the following address (https://live.tao1.info/stream_code/index.html) to create the QR code. The created QR code will be displayed in the right.



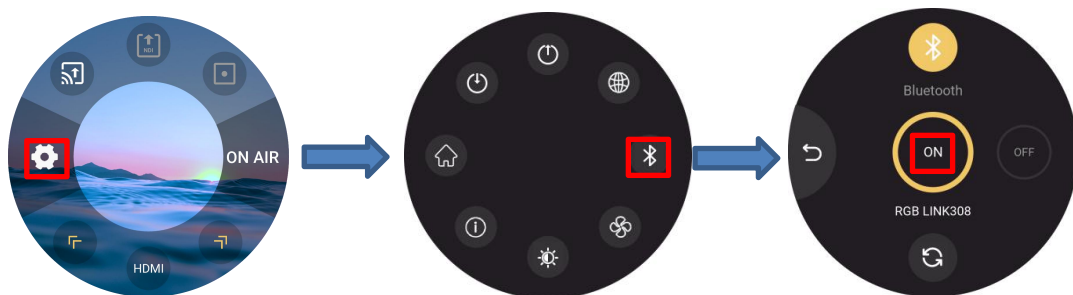
Step 2: Use your mobile phone to scan the following QR code so as to download TAO APP.



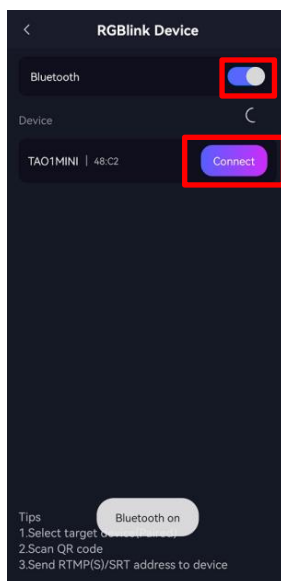
Step 3: Click TAO APP Icon to enter the homepage. Click Scan Icon in the homepage and then click Send RTMP to Device.



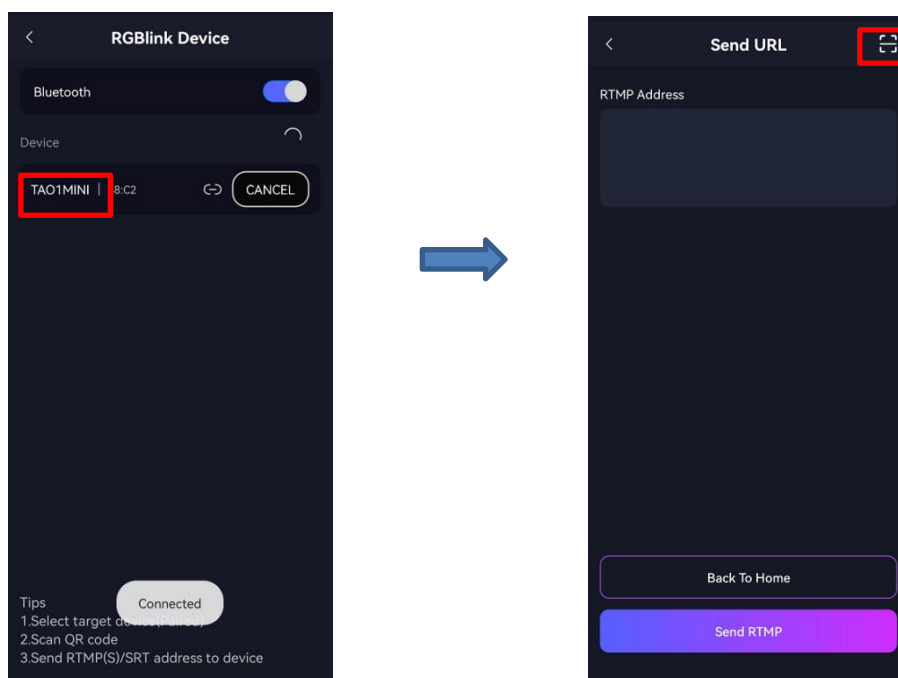
Step 4: Take following steps to turn on Bluetooth of TAO 1mini.



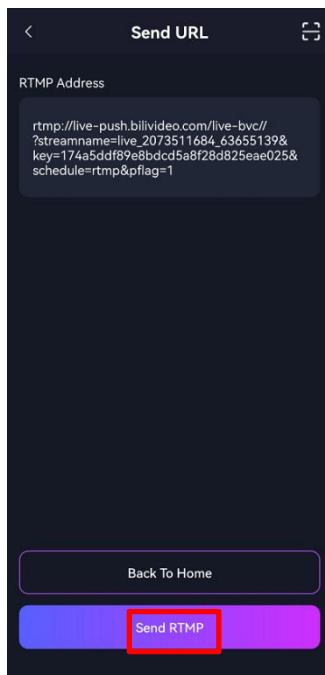
Step 5: Turn on Bluetooth of TAO APP. Then TAO 1mini will be recognized, shown as below. Click connect to pair TAO 1mini with TAO APP.



Step 6: After successful pairing, users should firstly click Device Name and then scan the QR code created in step 1.



Step 7: The RTMP address will be shown in the box, then click Send RTMP.



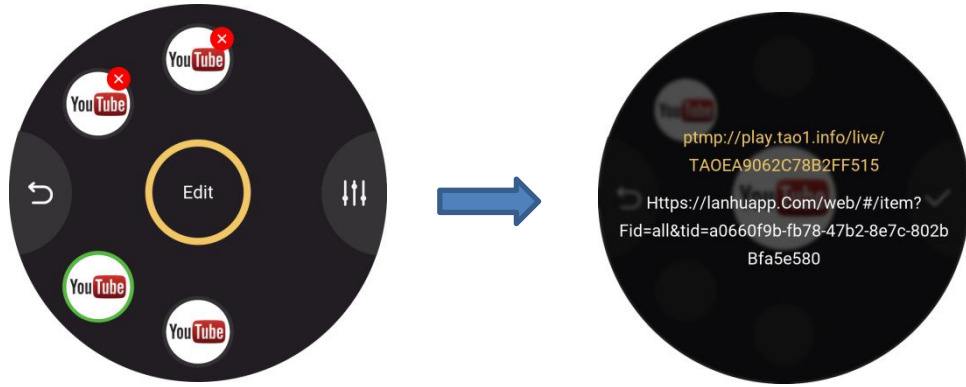
Step 8: Then TAO 1mini will pop up a message, shown as below. Click YES to receive RTMP stream address.



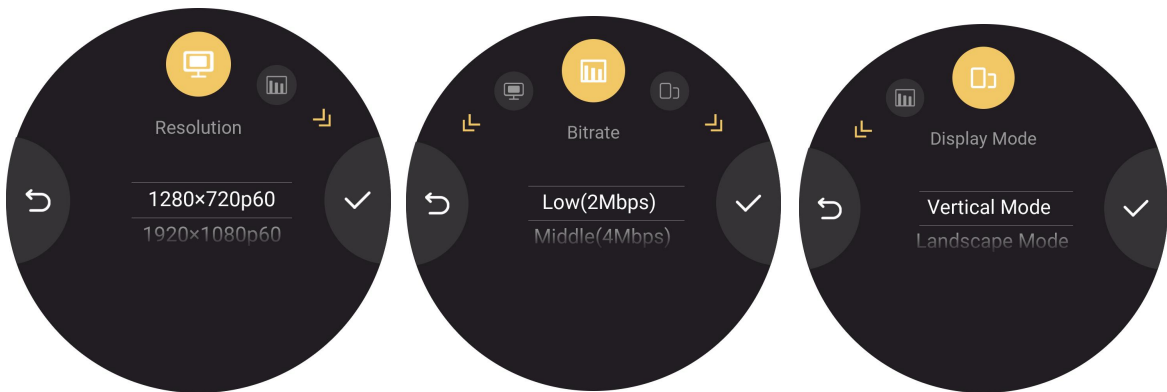
Notice:1.Make sure the distance between TAO 1mini and mobile phone is within 2m so as to ensure the stability of Bluetooth.
2.Pair TAO 1mini with TAO APP within 300s. Otherwise, you need to click refreshing icon for re-searching.

Then choose the platform you need. The saved platforms are displayed at the top of the interface, and the newly added platforms are displayed at the bottom. The green circle indicates the platform been chosen.

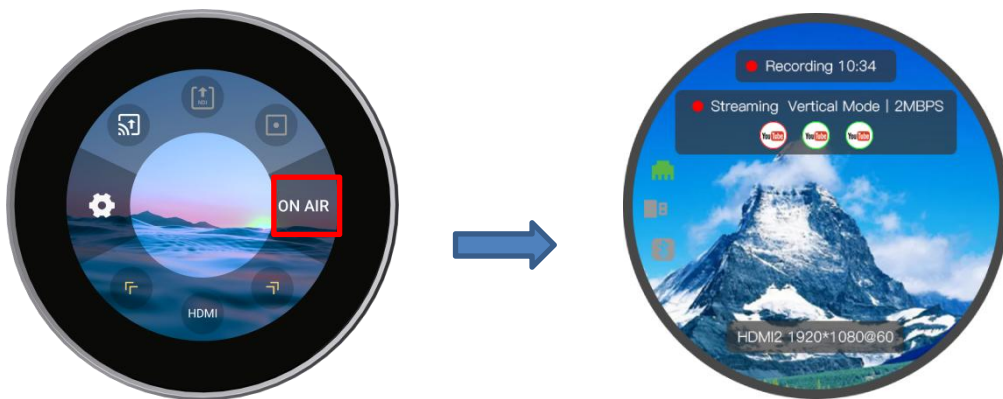
Press and hold the icon to check stream address and click **Edit** in the middle for deletion of platform.





Users can also set resolution, bitrate and display mode by clicking , shown as below.



Finally, click **ON AIR** in the main interface to stream (Support up to 4 live streaming platforms at the same time).



Notice: --Streaming, --Available but Failed in Streaming.

User can do the following operations:

1: The user can hide the setting options by clicking the blank screen. And the interface will display output information at the top and the input information at the bottom. As shown in the figure above, information such as

recording duration, streaming platform and output resolution are displayed.


2: On the basis of operation 1, user can click the screen again to hide all the information, and only the streaming picture will be displayed on the screen.

3: On the basis of operation 2, user can click the screen again to restore the setting interface.

3.5 Status Display Area

Click blank area of the homepage. The left area of interface is the Status Display Area, which displays the status of the TAO 1mini.



	no network input		no USB		Bluetooth is not connected.
	with network input		with USB		Bluetooth is connected.

Chapter 4 Ordering Codes

4.1 Product Code

410-5513-05-1

TAO 1mini

Chapter 5 Support

5.1 Contact us

www.rgblink.com



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Flight Forum Eindhoven
5657 DW

+31 (040) 202 71 83

Chapter 6 Appendix

6.1 Specification

Interface	Input	HDMI 2.0	1×HDMI-A
		UVC	1×USB-C
	Output	HDMI 2.0	1×HDMI-A
	Audio	Input	1×3.5mm Audio Jack
	Communication	LAN(PoE)	1×RJ45
		USB 3.0	1×USB-A
Power	USB-C	1×PD USB-C	
	LAN(PoE)	1×RJ45	
Performance	HDMI 2.0 input	Input resolution	720p@50/60 1080i@50/60 1080p@30/50/60 1280×720@50/60 1280×768@60 1280×1024@60 1366×768@60 1360×768@60 1600×900@60 1920×1080@50/60 3840×2160@60
		Format	YUV 4:2:2
		Bit depth	8 bit/10 bit
		Pixel format	BT.601 BT.709
		Image delay	3 frames
UVC/USB-C input	Input resolution	1024×768@60 1280×720@50/60 1280×768@60 1280×1024@60 1360×768@60 1920×1080@24/25/30/50/60	
	Decoding performance	MJPEG/YUV H.264 H.265	
Audio Input	Audio delay setting	0~160ms	
	Analog audio input	MIC/LINE	
	Maximum input level	+6dBV	
LAN	Coding performance	Support MJPEG\YUV,H.264,H.265	

		Speed mode	CBR,VBR,FIXQP,AVBR,QPMAP
		RTMP coding	Support streaming software
		Maximum output speed	125Mbps
	HDMI 2.0 output	Output resolution	720×480@30 1280×720@30 1920×1080@30/60 3840×2160@60
		Audio	Embedded audio output
Power	Mode	PoE, PD	
	Input voltage	5~12V	
	Maximum power	10W	
Working Environment	Temperature	0℃~55℃	
	Humidity	5%~85%	
Physical	Weight	Product	180g
		Packaged	780g
	Dimension	Product	91mm(diameter)×40.8mm(height)
		Packaged	215mm x 145mm x 80mm

6.2 FAQ

1. There is an operation error/equipment abnormality, and it needs to be reset. How to reset?

A: Please try to unplug the power supply, power on and then turn on the device.

2. Does TAO 1mini support encoding and decoding at the same time?

A: Cannot. TAO 1mini supports two encoding function and decoding function, but it can only work in one mode at the same time.

3. If TAO 1mini fails to record files and there is no recorded file in the U disk?

A: If you choose to stop recording, the interface will pop up a countdown prompt to remind you not to unplug the U disk. Please keep U disk plugged in, otherwise the file will be damaged. (It is recommended to use a U disk in FAT32 format, please avoid using a U disk in EXFAT format)

4. The HDMI signal cannot be recognized and there is no input source?

A: The input format does not support YUV444 format and HDCP format, please try to change the input source. (the input source supports RGB/YUV422/YUV420 format)

5.TAO 1mini may cannot collect data when plugged in and plugged in?

A: Please **DO NOT** plug or unplug the input source frequently during use.

6.Streaming function of TAO 1mini.

A: Three kinds of streaming functions are supported. The first one is to use the RTMP streaming code of YouTube for direct streaming. The second one is to use the NDI encoding function of TAO 1mini. The third one is to use local RTMP, SRT, RTSP streaming codes for local streaming. **ONLY ONE method is supported at the same time.**

7.How much is the streaming delay and external network delay of TAO 1mini?

A: : The streaming delay of TAO 1mini is approximately within 100ms, and the delay of external network depends on different networks, generally between 10-20s.

8.Will the five features of TAO 1mini, monitor, recorder, switcher, encoder, and streamer affect each other?

A: Besides Switcher, it is recommended to use only one of the other four functions of TAO 1mini. Otherwise, the output frames of LCD and HDMI will be reduced to 10-15 frames to ensure a 60-frame streaming.

9.Dose TAO 1mini supports working across network segments?

A: Yes. As long as the network bandwidth allows.

6.3 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 (orDP) 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

- **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), 3.2Gen 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:

	Type A	Type B	Mini A	Mini B	Micro-A	Micro-B	Type C
USB 2.0							
USB 3.0							
USB 3.1&3.2							

● **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 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.

SMPTTE2110 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- With-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.

6.4 Revision History

The table below lists the changes to the User Manual.

Format	Time	ECO#	Description	Principal
V1.0	2022-11-04	0000#	Release	Aster
V1.1	2023-02-16	0001#	1. Add Tally Control 2. Update User Interface 3. Add FAQ	Aster
V1.2	2024-01-22	0002#	1. Add notice in NDI Encoding	Aster

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