

41 Series Video Screen Development Guide

This application is used for the new 41 series video screens (MV200). For the development of old 41 series video screens (MV100), please refer to the "41 Series Video Screen Manual V2.5".

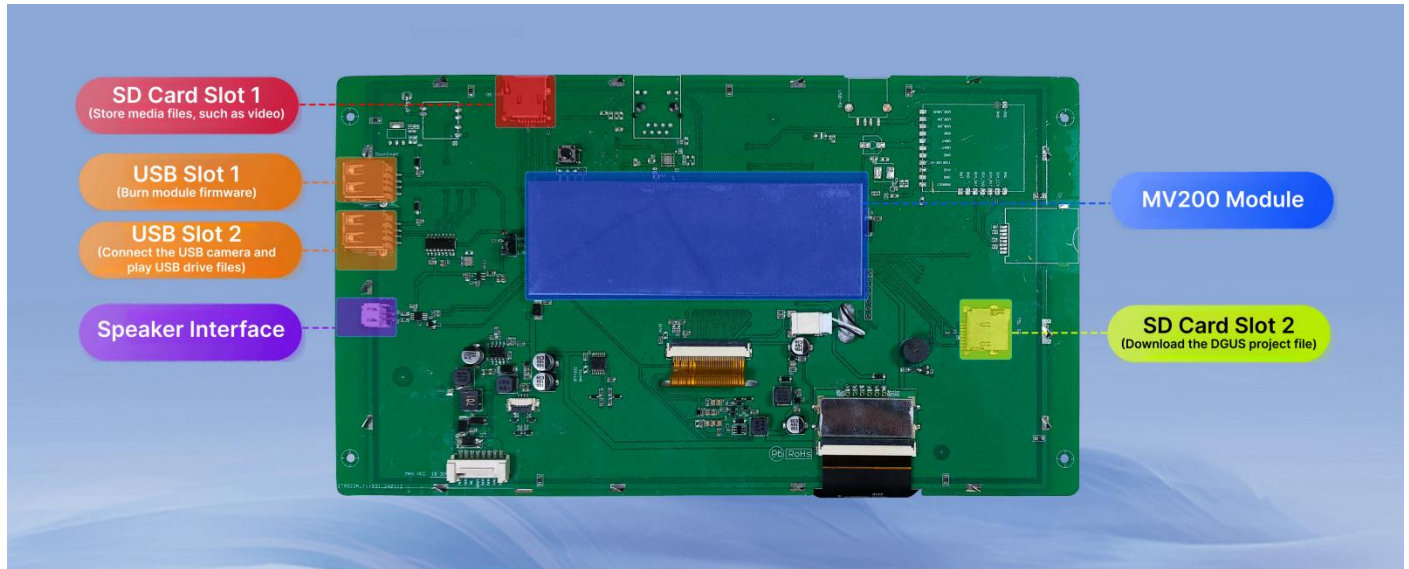
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1. Product Overview

1.1 Application Introduction

41 series video screen is the multimedia application product with the MV200 module as the core driver board. In the MV200 module, T5L ASIC serves as the main control chip. On the basis of running standard DGUS software, it can achieve smooth high-definition video playback function..



Hardware interface diagram

1.2 Product Features

- (1) Supports 2K high-definition screen display,with a maximum resolution of 1920*1080.
- (2) Reserved network camera interface circuit,and supports connecting to web cameras through Ethernet, 4G, or WIFI.
- (3) Supports image, audio, and video playback, and saving camera screenshots; Support customized camera screen MP4 recording function.
- (4) Supports remote software updates and video storage, simplifying maintenance and data management.

2. Data Communication Protocol

2.1 Universal Function Address

Some functional addresses of 41 series video screen (MV200) are the same as those of 41 series video screen (MV100). For details, see the following table.

Variable space first address	Definition	Length (word)	Command type	Description
0x0500	Set the display location for videos, pictures, and cameras	8	Control	D15-D14: Feature value, 0x01 represents small image page, 0x02 represents large image. Note: If you need to use "Data transmit" control for development, you need to place the small image page on the first page and the large image page on the second page. D13-D12: Displayed X coordinate D11-D10: Displayed Y coordinate D9-D8: Displayed X coordinate plus width D7-D6: Displayed Y coordinate plus height D5-D4: 0x5AA5, represents triggering the operation once D3-D0: Reserved The coordinate modification does not take effect on the already displayed image, it applies to the display of the next image. At present, the maximum resolution of the camera only supports 800*480.
0x0508-0x050B	Reserved	4	-	Undefined
0x050C	Camera control	1	Control	D1: Camera channel number, starting from 0. D0: 1, Turn on camera; 2, Turn off camera; 3, Return and exit
0x050D	Multimedia setting	1	Control	D1: 0x01: USB drive playback 0x02: SD card playback D0: 0x00: Play video 0x01: Play audio 0xFF: Turn off the player
0x050E-0x050F	Reserved	2	-	Undefined

Variable space first address	Definition	Length (word)	Command type	Description
0x0510	Multimedia control	1	Control	D1: 0x5A, triggers the control operation once, all others are invalid D0: Control command type 0x00: Normal playback 0x01: Pause playback 0x02: Stop playback 0x03: Fast forward 0x04: Fast rewind 0x05: Reserved 0x06: Previous file 0x07: Next file 0x09: Loop playback from current file 0x0A: Close loop playback
0x0511-0x052F	Reserved	31	-	Undefined
0x0530	Picture playback	1	Control	D1: 0x5A: SD card playback; 0xA5: USB drive playback D0: 0x01: Play the first picture 0x02: Play the previous picture 0x03: Play the next picture 0x04: Play in four grid 0x05: Page up 0x06: Page down 0xFF: Turn off playback
0x0531	Reserved	1	-	Undefined
0x0532	Camera video recording	1	Control	0x5AA5, determines the recording status. If recording is in progress, stop recording; If recording is stopped, start recording. Must be used in pairs
0x0533	Reserved	1	-	Undefined
0x0534	Four grid video play selection	1	Control	0x0001: Select the first one 0x0002: Select the second one 0x0003: Select the third one 0x0004: Select the fourth one 0x00FF: Exit current playback
0x0535	Delete current file	1	Control	D1: 0x5A, triggers the operation once D0: 0x01, deletes the currently playing video, audio, or image file
0x0536	Recording status	1	Display	0x01: Recording successful 0x02: Recording in progress 0x03: Recording failed

Variable space first address	Definition	Length (word)	Command type	Description
0x0537	Rotate the playing video	1	Control	D1: 0x5A: Start a rotation D0: 0x00: Rotate 0° 0x01: Rotate 90° 0x02: Rotate 180° 0x03: Rotate 270°
0x0538	Reserved	1	Control	Undefined
0x0539-0x053D	Reserved	5	-	Undefined
0x053E	Reserved	1	Control	Undefined
0x054F	Query the total number of pictures	1	Control	0x5A01: Query the total number of pictures in the "PICTURE" directory of the SD card once. 0xA501: Query the total number of pictures in the "PICTURE" directory on the USB drive once.
0x0550-0x0551	Reserved	2	-	Undefined
0x0552	The return result of the total number of pictures	1	Display	The total number of pictures in the "PICTURE" directory
0x0553	One click intelligent screenshot	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01, takes a screenshot and save it to the SD card. Check the path in 0xE110 first, and if it is empty, save the screenshot to the root directory; If there is a path exists, the screenshot will be saved to the corresponding path. If there is an RTC, the screenshot format is 20xx-xx-xx-xx-xx-xx, in the format of year, month, day, hour, minute, and second. If there is no RTC, the screenshot format is xx_cap.jpg, and the maximum number of saved images is 99, Number from 1 after each restart..

Variable space first address	Definition	Length (word)	Command type	Description
0x0554	"Before" code screenshot	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01-0x04: If the address E110 does not have a directory path, the screenshot will be saved under the path "Before/". If it has a directory path, the screenshot will be saved to the corresponding directory under the "Before/" 0x11-0x14: Save in "Before/" directory. Note: The folder needs to be created first, and the naming format of the screenshot should be the corresponding key value number. (For example, if the address 0xE110 stores "PICTURE/", the screenshot will be saved in the "/Before/PICTURE" directory. If there is no data stored in the address 0xE110, it will be saved in the "Before/"path.)
0x0555	"After" code screenshot	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01-0x04: If the address E110 does not have a directory path, the screenshot will be saved under the path "After/". If it has a directory path, the screenshot will be saved to the corresponding directory under the "After/" 0x11-0x14: Save in "After/" directory. Note: The folder needs to be created first, and the naming format of the screenshot should be the corresponding key value number. (For example, if the address 0xE110 stores "PICTURE/", the screenshot will be saved in the "/After/PICTURE" directory. If there is no data stored in the address 0xE110, it will be saved in the "After/"path.)

Variable space first address	Definition	Length (word)	Command type	Description
0x0556	Play "Before" code screenshot	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01-0x04: If there is not a directory path in the the address E110, play the screenshot corresponding to the key value in the path "Before/" directory. If there is a directory path, play the screenshot in the corresponding directory under "Before/". 0x05: Delete the currently playing screenshot
0x0557	Play "After" code screenshot	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01-0x04: If there is not a directory path in the the address E110, play the screenshot corresponding to the key value in the path "After/" directory. If there is a directory path, play the screenshot in the corresponding directory under "After/". 0x05: Delete the currently playing screenshot
0x0558-0x055D	Reserved	6	-	Undefined
0x055E	Query SD card or USB drive status	1	Control	0x5A: Start the operation once 0x01: Query SD card 0x02: Query USB drive
0x055F	Return the status of the SD card or USB drive	1	Display	D1: Query type 0x01: SD card 0x02: USB drive D0: Status 0x00: Not inserted 0x01: Inserted 0x02: The USB drive is full
0x0560-0x0562	Reserved	3	-	Undefined
0x0563	Clear display	1	Control	D1: 0x5A, triggers the operation once. D0: 0x01, starts clearing once. Clear all interface image or video displays.
0x0564	Reserved	1	-	Undefined

Variable space first address	Definition	Length (word)	Command type	Description
0x0565	Turn on or off the webcam	1	Control	D1: 0x5A D0: Switch status 0x00: Close 0x01: Open (needs to be used in conjunction with E190, E1A0, E140) 0x02: Customize the RTSP address to turn on the camera, which needs to be used in conjunction with E1B0.
.....
0xE110	Specify the file path	16	Input display	Enter the specified file path, and use "/" to separate multi-level menus. The default path is empty.
0xE120-0xE13F	Reserved	32	-	Undefined
0xE140	Webcam IP address	16	Input display	
0xE150-0xE18F	Reserved	64	-	Undefined
0xE190	User name	16	Input display	
0xE1A0	Password	16	Input display	
0xE1B0	RTSP address information	40	Input display	Enter in ASCII to display RTSP address information

2.2 New Function Address

The new function address for the 41 series video screen (MV200). Please refer to the table below.

Variable space first address	Definition	Length (word)	Command type	Description
0x0600	Other settings	1	Control	1. Volume control 0x000B: Increase volume 0x000C: Reduce volume 0x000A: Mute The maximum volume is 40, the minimum volume is 0, and each volume adjustment size is 1. 2. Select the file playback 0x0021: Select the first file 0x0022: Select the second file 0x0023: Select the third file 0x0024: Select the fourth file 0x0025: Select the fifth file After being selected, the file will be played, and the file name will be written to the default file display address (0x3400). 3. Page flipping control 0x0001: Page up 0x0002: Page down Display 5 results each time. 4. Full screen playback control 0x0026: Full screen playback 0x0027: Restore normal display "Restore the normal display" means return to the original page.
0x0601-0x069F	Reserved	159	-	Undefined
0x06A0	Set the display position of the four grid 1	8	Control	D15-D14: Reserved D13-D12: Displayed X coordinate D11-D10: Displayed Y coordinates D9-D8: Displayed X coordinate plus width D7-D6: Displayed Y coordinate plus height D5-D4: 0x5AA5, represents triggering the operation once D3-D0: Reserved The coordinate modification does not take effect on the already displayed image, and it only applies to the display of the next image.

Variable space first address	Definition	Length (word)	Command type	Description
0x06A8	Set the display position of the four grid 2	8	Control	D15-D14: Reserved D13-D12: Displayed X coordinate D11-D10: Displayed Y coordinates D9-D8: Displayed X coordinate plus width D7-D6: Displayed Y coordinate plus height D5-D4: 0x5AA5 represents triggering the operation once D3-D0: Reserved The coordinate modification does not take effect on the already displayed image ,and it only applies to the display of the next image.
0x06B0	Set the display position of the four grid 3	8	Control	D15-D14: Reserved D13-D12: Displayed X coordinate D11-D10: Displayed Y coordinates D9-D8: Displayed X coordinate plus width D7-D6: Displayed Y coordinate plus height D5-D4: 0x5AA5 represents triggering the operation once D3-D0: Reserved The coordinate modification does not take effect on the already displayed image ,and it only applies to the display of the next image.
0x06B8	Set the display position of the four grid 4	8	Control	D15-D14: Reserved D13-D12: Displayed X coordinate D11-D10: Displayed Y coordinates D9-D8: Displayed X coordinate plus width D7-D6: Displayed Y coordinate plus height D5-D4: 0x5AA5 represents triggering the operation once D3-D0: Reserved The coordinate modification does not take effect on the already displayed image ,and it only applies to the display of the next image.
0x06B9-0x06CF	Reserved	23	-	Undefined
0x06D0	Current volume	1	Display	The maximum volume is 40, and the minimum volume is 0.
0x06D1	Play status	1	Display	-
0x06D2	Reserved	1	Reserved	Undefined

Variable space first address	Definition	Length (word)	Command type	Description
0x06D3	Current playback status	1	Display	D1: 0x00 D0: 0x01: Playing 0x03: End of playback 0x04: Pause playback 0x05: Stop playing
0x06D4	Encoding quality setting	1	Operate	D1: 0x5A, start once D0: 0x00~0x64, encoding quality setting Note: This only applies to image playback, video playback, and camera display
.....
0x3400	Current playback file name	16	Display	-

3. Serial Port Communication Description

3.1 Serial Port Setting

The serial port baud rate is set to 115200bps (which can be set by modifying the CFG configuration file), and the communication mode is 8N1, which means there are 8 data points, 1 stop bit, and no checksum bit.

3.2 Communication Data Frame

Address	0x00	0x02	0x03	0x04
Definition	0x5AA5	LEN	CMD	DATA_Pack
Description	Frame header	Subsequent data length, including command and data length	0x82/0x83	Data

3.3 Interface Command Description

Command	Data	Description	Response
0x82	Variable space first address (0x0000-0xFFFF)+written data	Write data to variable space at the specified address	None
0x83	Variable space first address (0x0000-0xFFFF)+read data in byte length (0x01-0x7D)	Read the specified length data from the address specified in the variable space	Variable space first address+variable data in word length+read variable data

3.4 Application Instance

(1). Stop playing

Sending the serial command to the system variable address 0x0510 can stop video playback.

82 command: 5A A5 05 82 0510 5A02

Command meaning: Frame header Command length 82 (write variable space) System variable address
Command content

(2). Query USB drive status

Firstly, send the serial command to the the system variable address 0x055E to read the SD card/USB drive status, and the returned result will be saved in 0x055F; Then read the variable values in 0x055F.

82 command: 5A A5 05 82 055E 5A02

Command meaning: Frame header Command length 82 (write variable space) System variable address
Command content

83 command: 5A A5 04 83 055F 01

Command meaning: Frame header Command length 83 (read variable space) System variable address Read
1-word length data

Returned command: 5A A5 06 83 055F 01 0201

Command meaning: Frame header Command length 83 (read variable space) System variable address Return
1-word length data 0201 represents that the USB drive has been inserted

4. Instructions for Using Web Camera

4.1 View camera IP address

(1) Before obtaining the camera IP, please confirm that the local area network is available.

You can use the ping command on the Windows terminal to verify: win+R, open 'Run' → enter 'cmd' and press enter → enter 'ping 192.168.1.1'. The result shown in Figure 4.1 indicates that the local area network is normally available.

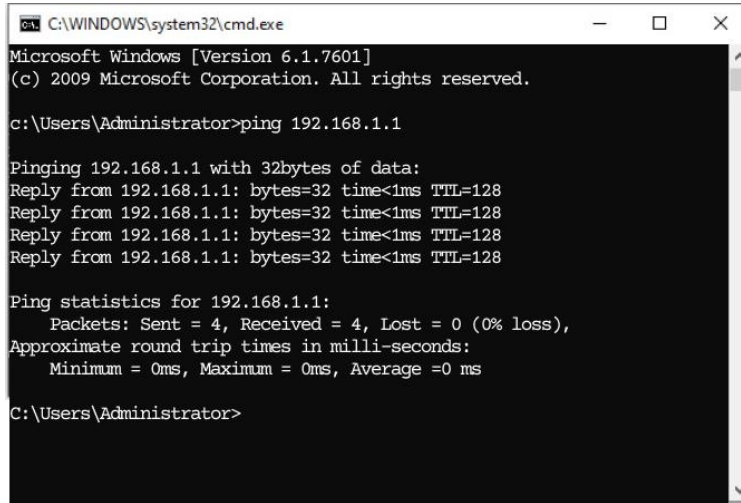


Figure 4.1

(2) As shown in Figure 4.2, when wired connection, please connect the PC, web camera, and 41W screen to the same LAN through a router. WLAN connection can refer to Part 5 of this guide, "2. How to connect to the WIFI network?". If the web camera is used for the first time, Please register and activate it according to the method provided by the supplier.

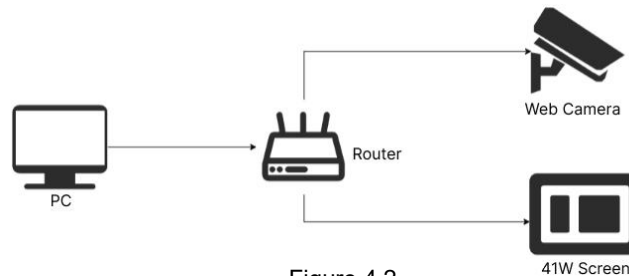


Figure 4.2

(3) Power the web camera and 41W video screen, and view the camera IP information through software on the PC. Through the supplier's supporting software to view the IP address of the camera, such as Hikvision's SADP, Dahua's Config Tool, SmartPSS Plus.

Taking Hikvision as an example, the camera IP can be viewed through SADP software (the download webpage can be found by searching for "SADP" on browser).

Open the SADP software and click the "Refresh" button in the upper right corner to view the IP address of the online device(Figure 4.3). If the device cannot be found, please check if the IP is available first. If using WLAN connection, please confirm that the network bandwidth is 2.4G.

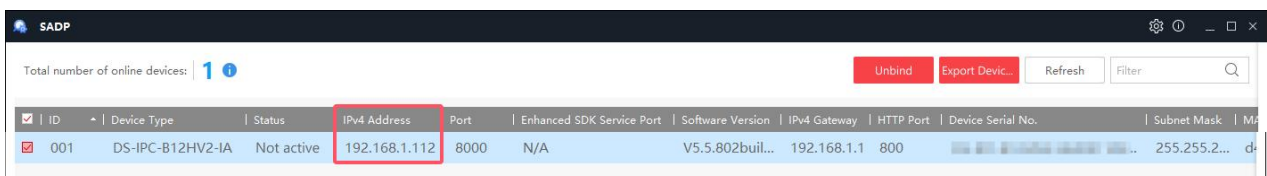


Figure 4.3

4.2 Camera Parameter Settings

After connecting the web camera and computer through the local area network, the camera can be configured.

(1) Open the browser and enter the camera IP address in the address bar, such as "192.168.1.112" (each camera is different and needs to be obtained through "4.1 View camera IP address"). Press Enter and the login interface will appear. As shown in Figure 4.4, enter the "user name" and "password" of the camera, and click [Login]. If you forget the user name and password of the camera, please contact the corresponding brand camera supplier to inquire.

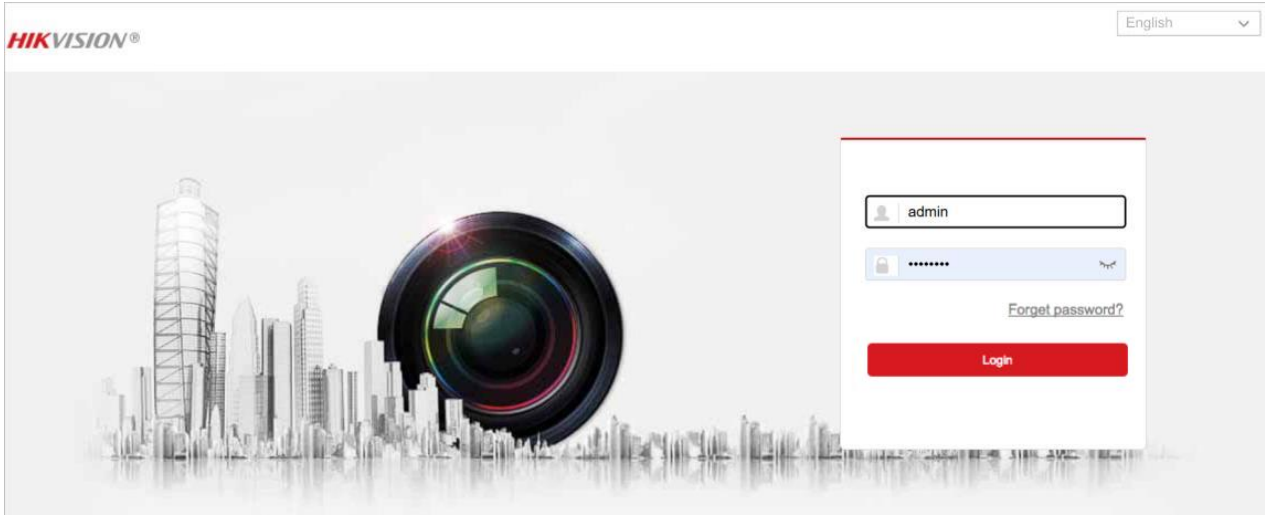


Figure 4.4

(2) After successful login, it will switch to the main interface as shown in Figure 4.5, and configure the camera in the video and audio interface. What needs to be configured. The parameters that need to be configured are as follows:

Stream type: Sub stream

Resolution: Try to choose a resolution similar to the 41W screen resolution

Video frame rate: 25FPS

Video encoding: H264

Leave the rest as default, click save to preview, and after successful preview, you can proceed with 41W screen configuration.

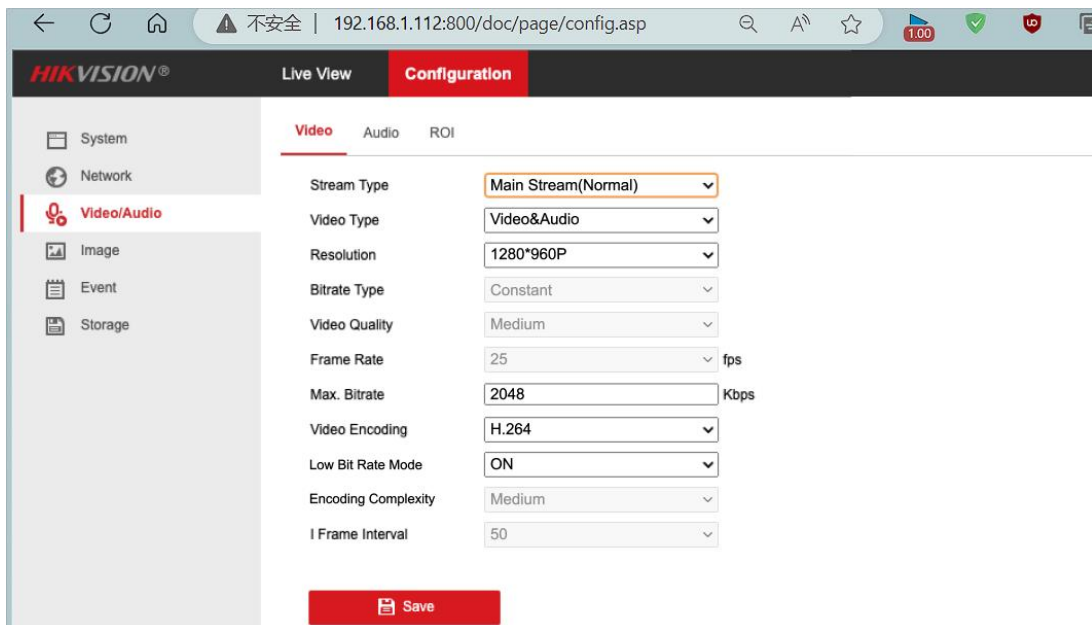


Figure 4.5

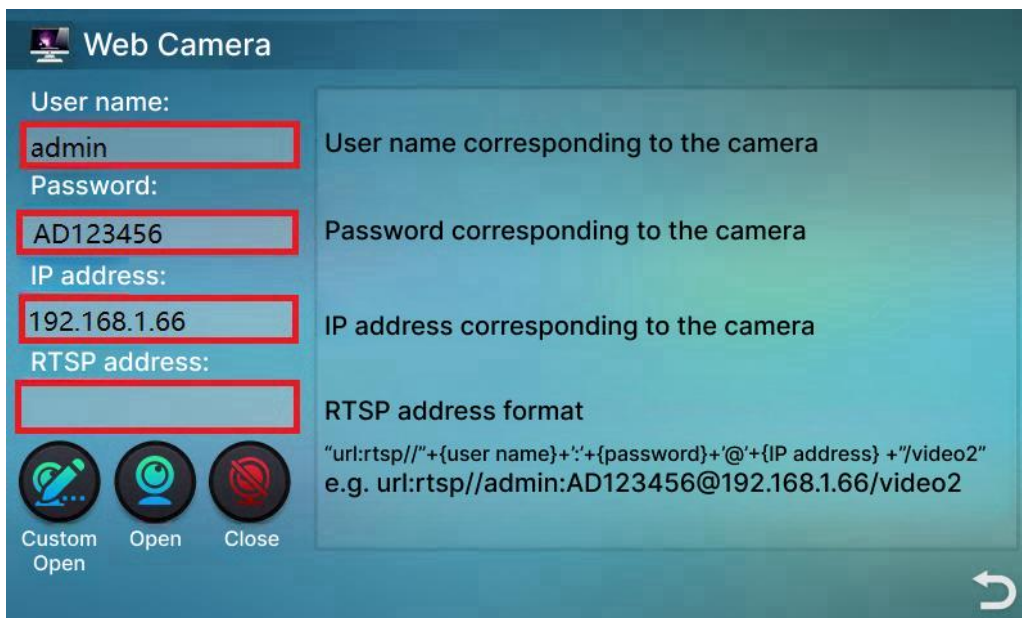
4.3 Camera Display

As shown in Figure 4.6, connect the 41W screen to the web camera through the router, and power the screen and camera separately.



Figure 4.6

After hearing the beep sound of the screen buzzer, it indicates that the function module has been successfully initialized. At this time, you can open the web camera interface, enter your user name and password, as well as the IP address of the camera (the parameters in Figure 4.7 are for reference only, please enter the user name and password of the camera in actual use), and click [Open]. You can also enter the RTSP address and click on [Custom Open].



Web Camera

User name: User name corresponding to the camera

Password: Password corresponding to the camera

IP address: IP address corresponding to the camera

RTSP address: RTSP address format

`"url:rtsp://{user name}:{password}@{IP address}/video2"`
e.g. `url:rtsp://admin:AD123456@192.168.1.66/video2`

Figure 4.7

5. Common Questions

1. After clicking on the control, the video list does not appear?

After powering on, the buzzer will emit a “beep” sound, indicating that the module has completed startup. At this time, functions such as video playback can be used normally.

2. How to connect to the WIFI network?

Method 1: Use Notepad to open the "wpa_supplicant.conf" file on the USB disk, fill in your written WIFI name (SSID) and password in the following format, save the file, and make sure to place it in the root directory of the USB disk. After the screen is powered on, the file parameters will be automatically read and WIFI configuration will be performed.



```
ctrl_interface=/etc/wifi/sockets
```

```
disable_scan_offload=1
```

```
update_config=1
```

```
network={
```

```
ssid="WIFI name"
```

```
psk="WIFI password"
```

```
}
```

Method 2: Manually search and connect to WIFI through the 41 series video screen interface, enter the WIFI password, and then connect to the network.

3. According to the guide, the web camera, router, and 41W screen were connected, and there were no issues with the project control settings, but the camera screen was not displayed?

This may be caused by the IP addresses of the camera and screen not being in the same network segment, usually due to misconnecting to different routers or not being in the same hotspot. The IP address of the camera can be obtained through "4.1 View camera IP address", and the IP address of the 41W screen needs to be obtained through the following methods.

(1) Establish serial communication between the 41W screen function module and the PC, as shown in the figure below. Connect TX, RX, GND to the serial port adapter, and then connect the serial port adapter to the PC.



(2) Open MobaXterm Serial Assistant, select the correct serial port number, set the Baud Rate to 921600, and click [OK]. Power on the screen and you can see the information printed by the serial port, as shown in the red box below, which is the screen IP address.

```
wlan0isexist--0
root@sun8i:/# neip----
udhcpc -----
udhcpc: ifconfig eth0 192.168.1.4 netmask 255.255.255.0 broadcast
udhcpc: setting default routers: 192.168.1.1
wait for next upgrade!
wlan0 is not exist
root@sun8i:/#
```

(3) If you don't see the IP address, you can enter the "ifconfig" in the command sending box to obtain it. As shown in the above figure, it can be seen that the IP address of the current screen is "192.168.1.4" and the subnet mask is "255.255.255.0". The IP address of the network camera obtained earlier is "192.168.1.112" and the subnet mask is "255.255.255.0". If the subnet mask is the same and the first three digits of the IP address are the same, it can be determined that these two IP addresses are in the same network segment.

```
root@sun8i:/# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:E0:99:EE:B5:70
          inet addr:192.168.1.4  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:35  errors:0  dropped:11  overruns:0  frame:0
          TX packets:5  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0  txqueuelen:1000
          RX bytes:6749 (6.5 KiB)  TX bytes:830 (830.0 B)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0  errors:0  dropped:0  overruns:0  frame:0
          TX packets:0  errors:0  dropped:0  overruns:0  carrier:0
          collisions:0  txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

root@sun8i:/#
```

6. Revision Records

Version	Revise Date	Content	Editor
1.0	2024-07-02	First Edition	Xu Ying
1.1	2024-12-09	Added instructions for using the network camera	Xu Ying

Please contact us if you have any questions about the use of this document or our products, or if you would like to know the latest information about our products:

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Thank you all for continuous support of DWIN, and your approval is the driving force of our progress!