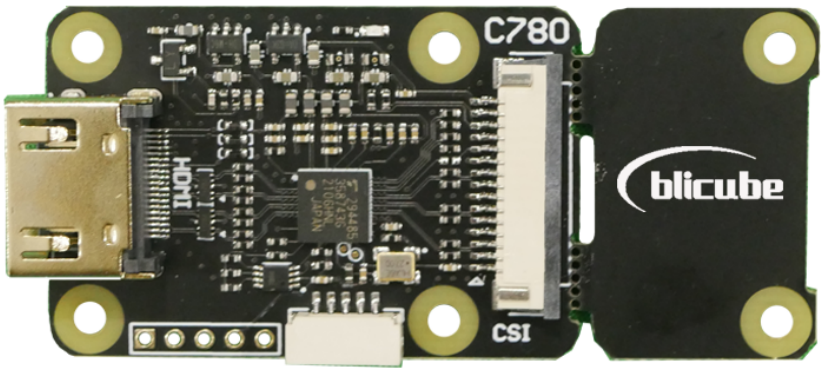
blicube Electronics

C780
HDMI to CSI-2 + I2S module
user manual



Edition

Version	date	person liable	explain
V1.0	2021April 20, 2008	Qingchuan	Initial version

About this manual

If the user uses the c780 module, it is deemed that he has automatically accepted this statement.

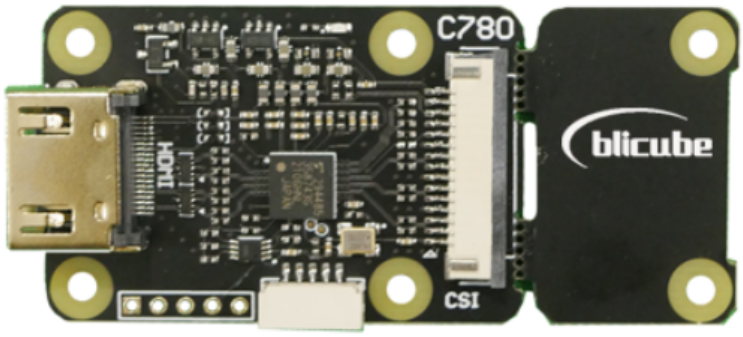
Please read this manual carefully before using c780 module. If you have any questions, please contact our technical support emailjunluster@163.com.

catalogue

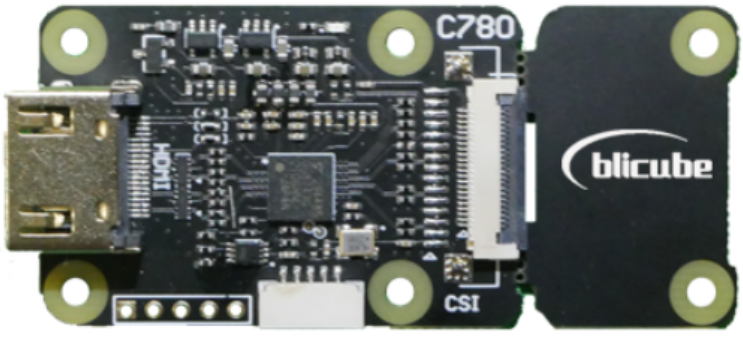
1 Module introduction

1.1 Module introduction

C780 is a module that converts HDMI signal into CSI-2 video signal and I2S audio signal. There are two versions of C780A 15pin (CSI-22 channel) and C780B 22pin (CSI-24 channel).



C780A two CSI-2 channel



C780B four CSI-2 channel

Figure 1.1 c780 physical map

1.2 Technical parameter

C780A:

HDMI input: support 1080p50fps on raspberry pi (limited by the number of CSI-2 channels);

HDMI to CSI-2 bridge chip: Toshiba tc358743xbg;

Two CSI-2 channels plus clock;

CSI-2 interface: 15 pin FPC seat, spacing 1.0 mm;

Size: 30 x 65 mm (unbroken PCB size);30 x 45 mm (PCB size after fracture);

Mounting: 6 x M2.5 mounting holes (using M2.5 screws);

Power supply: 3.3V;

Weight: 9g.

C780B:

HDMI input: support 1080p60fps on raspberry pi CM4;

HDMI to CSI-2 bridge chip: Toshiba tc358743xbg;

Four CSI-2 channels plus clock;

CSI-2 interface: 22 pin FPC seat, spacing 0.5mm;

Size: 30 x 65 mm (unbroken PCB size);30 x 45 mm (PCB size after fracture);

Mounting: 6 x M2.5 mounting holes (using M2.5 screws);

Power supply: 3.3V;

Weight: 9g.

1.3 Compatible system

C780A supports raspberry pi zero, 3a, 3b, 3b +, 4b, CM3 and CM4;

The C780B supports raspberry pi CM3 and CM4.

2 Installation and Connection

2.1 installation

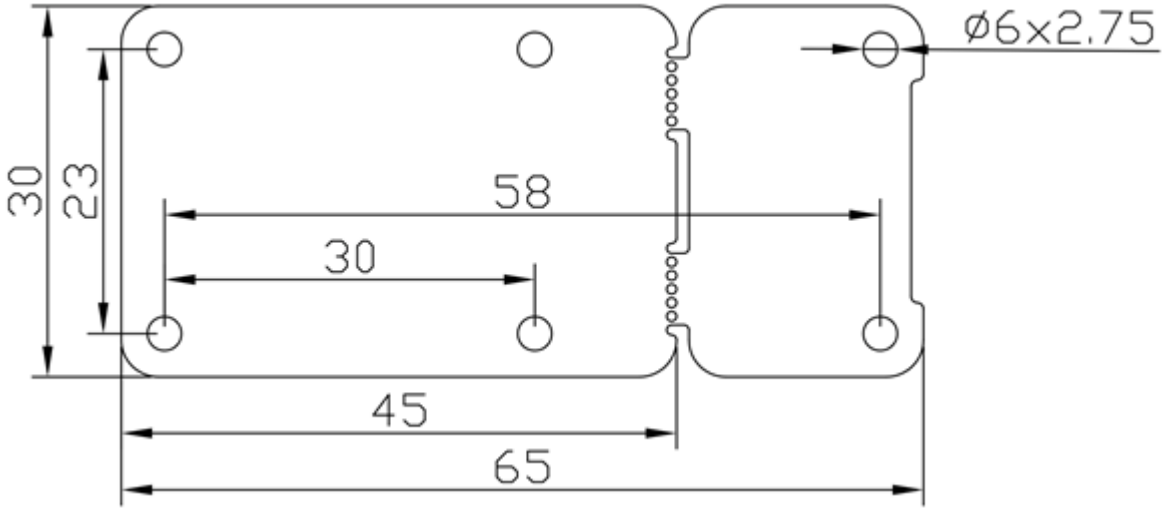


Figure 2.1 installation dimensions of C780

Figure 2.2 installation of C780A on raspberry pi zero

The size of C780 is shown in Fig. 2.1, with 6 mounting holes of 2.75mm in diameter, suitable for M2.5 screws.As shown in Figure 2.2, users can directly fix the module on the raspberry pi zero.

C780 adopts a breakable design, and the hole spacing before breaking can be perfectly installed with most series of raspberry pi, as shown in Figure 2.2.

C780 has no installation direction requirement.

2.2 Interface definition

The top view of C780A is shown in Figure 2.3. The interfaces include standard HDMI interface, fpc15p (1.0 mm spacing) CSI-2 video interface and gh1.25-5p audio interface.

The top view of C780B is shown in Figure 2.4. The interfaces include standard HDMI interface, fpc22p (0.5mm spacing) CSI-2 video interface and gh1.25-5p audio interface.

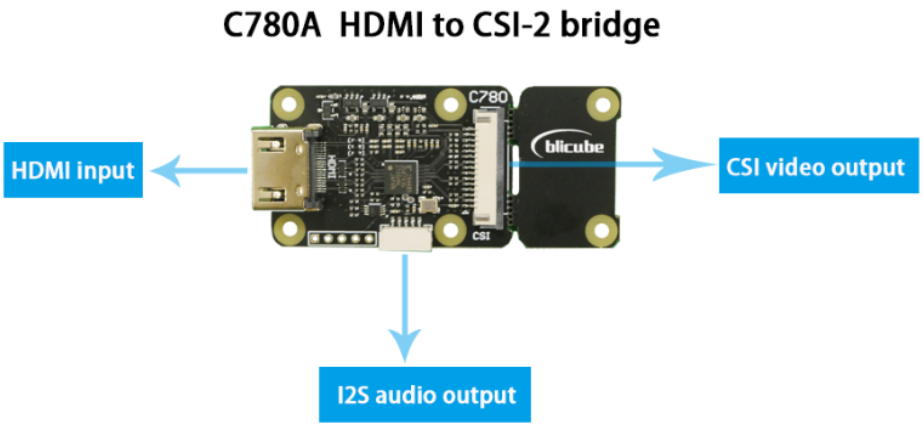


Figure 2.3 top view of C780A

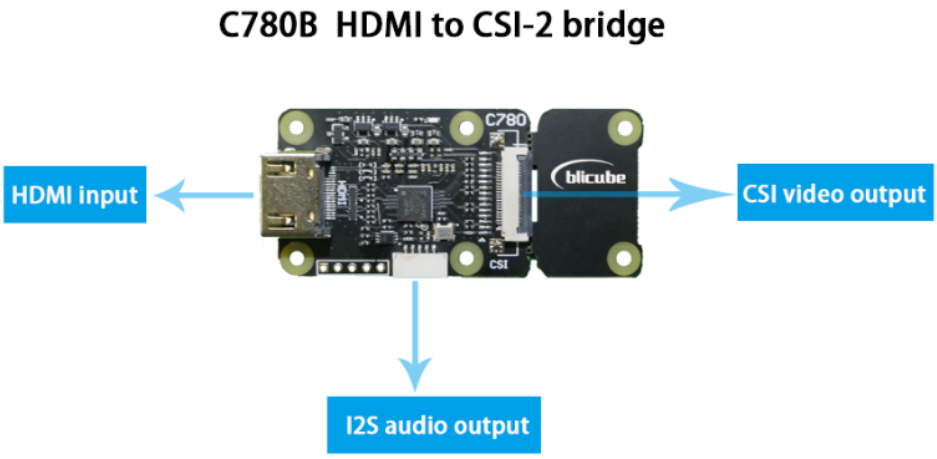


Figure 2.4 top view of C780B

The interfaces of C780A and C780B are shown in Figure 2.5, in which J2 fpc15p is the CSI-2 interface definition of C780A, J3 fpc22p is the CSI-2 interface definition of C780B, J4 header 5x1 is the other pin interface, and J5 gh1.25-5p is the I2S audio interface.

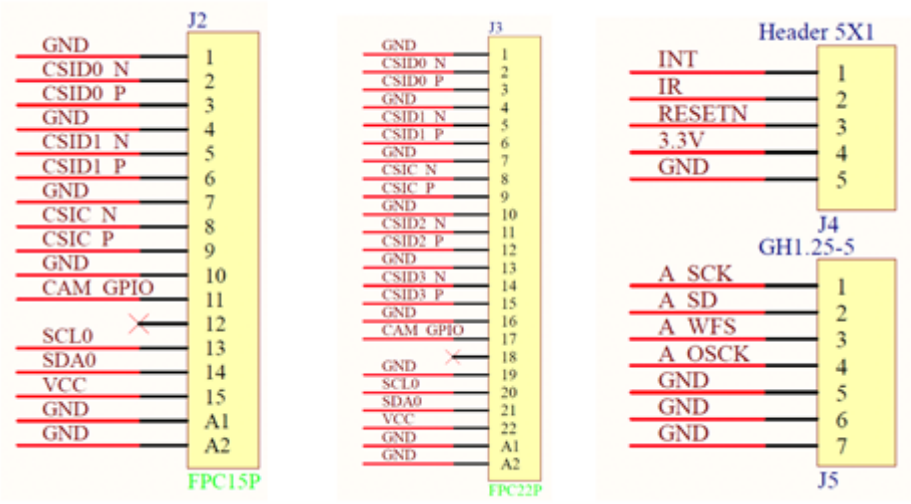


Figure 2.5 c780 interface definition

2.3 Wiring reference

As shown in Figure 2.6 and figure 2.7, they are the wiring diagrams of C780A and C780B respectively, and the wiring of audio part is shown in Figure 2.8.

Figure 2.6 example of C780A + rpi3

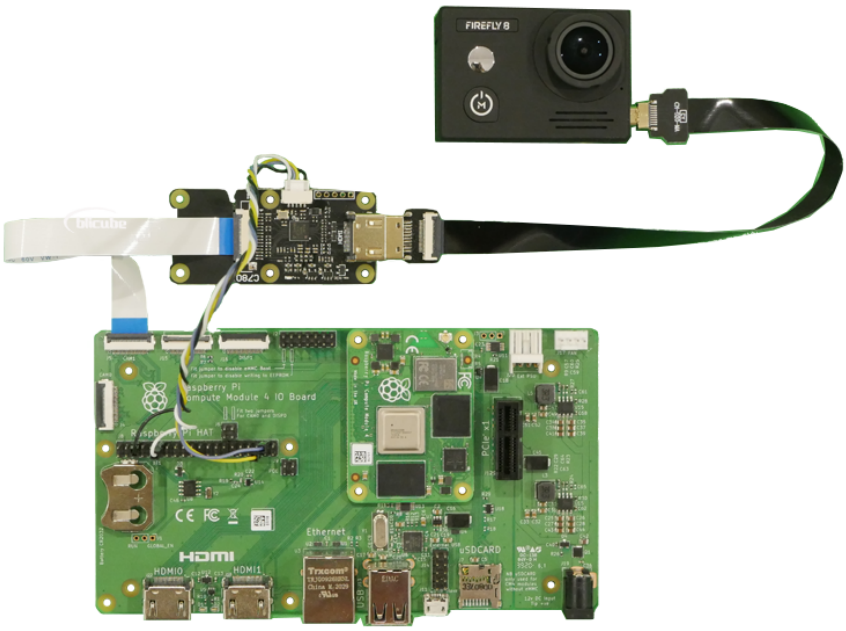


Figure 2.7 example of C780B + RPI CM4

GND	OSCK	WFS	SD	SCK
PIN 06	NC	PIN 35	PIN 38	PIN 12

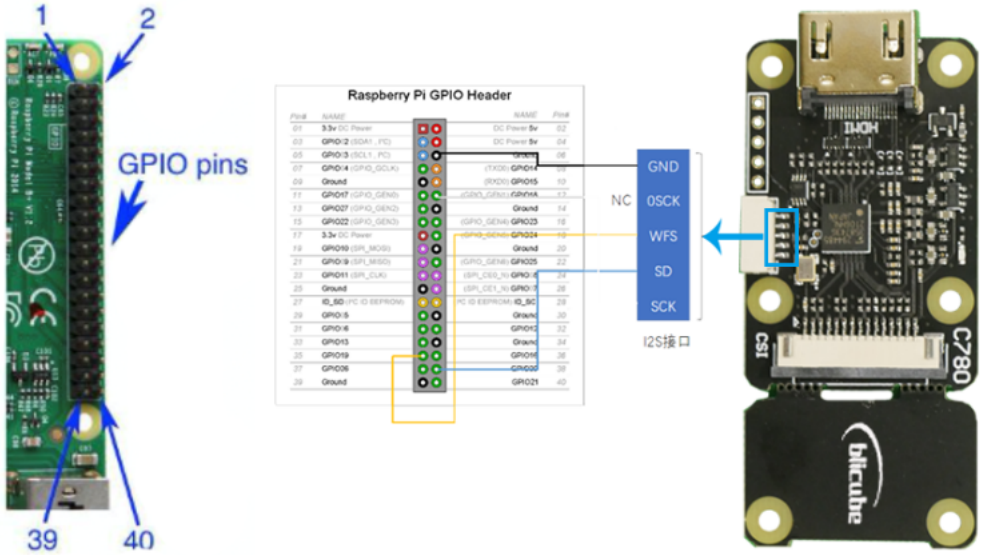


Figure 2.8 I2S wiring diagram

3 Using demo for raspberry pi

The driver C780A and C780B depend on raspberry pi kernel driver. The following instructions are applicable to kernel 5.4 or higher. You can use uname - A to view the corresponding version on the terminal.The following instructions are mainly for reference: https://www.raspberrypi.org/forums/viewtopic.php?f=38&t=281972

3.1 Using raspistill to call camera quickly

3.1 the method in this section is applicable to the fast test of C780A only using video. It is worth noting that the compatibility of raspistill and tc358743xbg is not particularly good. Users with problems can refer to the usage methods in 3.2 & 3.3.

1、After connecting all the cables, power on the raspberry pi. The c780 indicator light is normally on and the green light is on. After opening the raspberry pi terminal, enter the following command.

```
ls /dev
```

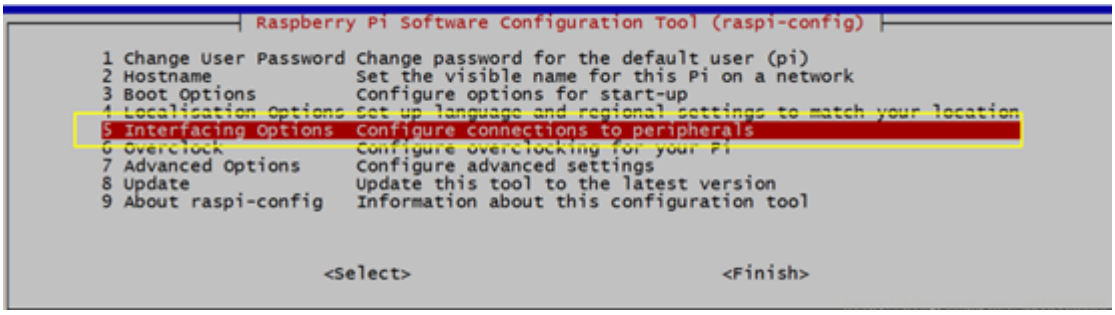
2、In the file name that pops up from the terminal, find out whether video0 appears. If it appears correctly, it means that the module has been driven successfully and works normally.Instead of looking at the configuration section below, you can go directly to the fourth section.

3、If the video0 file is not found, please try to upgrade the raspberry pi kernel by inputting the following command on the command line.

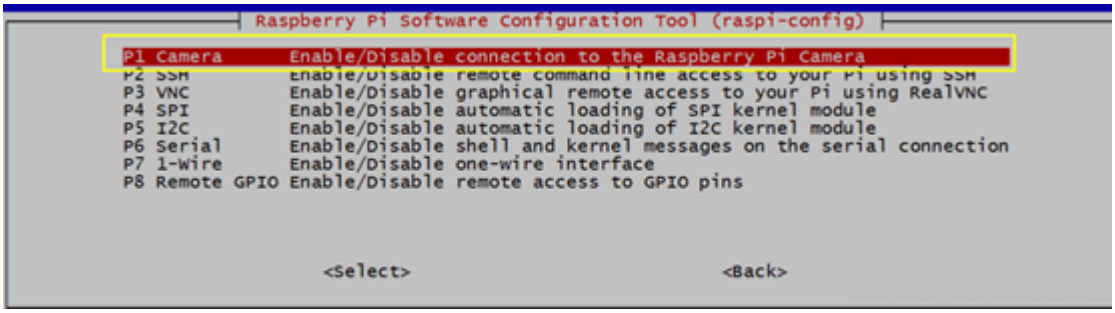
```
sudo apt-get update
sudo apt-get upgrade
```

4、Modify the configuration of raspberry pi, turn on the camera module and input it at the terminal.

```
sudo raspi-config
```



Move the cursor to the camera option and select enable.When you exit raspi config, you will be asked to restart. You can power down and restart raspberry pi.



Note: if the video0 file is not found in the / dev path after 3-4 steps, there are the following troubleshooting schemes:

a、Confirm whether the HDMI input device has a signal, and test whether the display is normal by connecting the screen;

b、Confirm whether the resolution and frame rate of HDMI input device are below the maximum input resolution and frame rate;

If there is no problem with the above two points, baidu or Google can't solve the problem according to the error report. It is recommended to download the latest official image of raspberry pi again.

5、Use raspistil to take photos

Raspistil function: run the camera at a specified time, and capture jpg images if necessary.

Format:raspistill [options]

Main image parameters and commands:

-?, --Help: help document
-w. -- width: set the image width < size > width
-h. -- height: set image height < size > height
-q. -- Quality: set JPEG quality < 0 to 100 >
-r. -- raw: add raw raw Bayer data to JPEG metadata
-o. -- output: output file name < file name >,
-l. -- Latest: link the latest complete image to the specified file < file name >
-v. -- verb: output details when running the camera
-t. -- timeout: the time delay is specified when photographing and closing. If it is not specified, the default is 5S
-e. -- encoding: encode to output the specified format file (jpg, BMP, GIF, PNG)
-TL, - timelapse: take one picture every < MS > at intervals
-k. -- keypress: press the key to trigger, press' Enter 'to take a picture, press' x' and then 'Enter' to exit
-s. - signal: signal triggered, waiting for another process signal to take a picture
-GC, - glcapture: capture GL frame buffer instead of camera image
-Set, - settings: retrieve the camera settings and write them to stdout
-CS, - camselect: select camera device < digital >, default 0

The above is just a list of some common commands. More detailed commands can be used by Baidu, Google or viewing help documents. Here are some specific examples:

#After a delay of two seconds (in milliseconds), take a picture and save it as image.jpg.raspistill -t 2000 -o image.jpg
#Take a custom size photo.raspistill -t 2000 -o image.jpg -w 640 -h 480
#Record a 5 second video clip (1080p25) using the default settings.raspivid -t 5000 -o video.h264
#Save to file a 5 second encoded camera stream image raspivid - t 5000 - O - > My_file.h264

3.2 Driver configuration

1、edit / boot / config.txt, and add the line to the end of the file. Sudo is required.

dtoverlay=tc358743

If four CSI-2 channels are used to connect C780B to CM3 or CM4 computing module hardware, the following code should be added.

dtoverlay=tc358743,4lane=1

2、Use "dmesg | grep CMA" to check the amount of memory allocated to the CMA heap.

pi@raspberrypi:~ $ dmesg | grep cma

[0.000000] cma: Reserved 256 MiB at 0x000000001ec00000

If the report has less than 96MB of files assigned to CMA, edit / boot / config.txt and add.

dtoverlay=cma,cma-128

3、C780A and C780B all support capturing stereo audio from HDMI signal source, editing / boot / config.txt and adding the following code to create audio device.

dtoverlay=tc358743-audio

4、Restart raspberry pi.If all goes well, you should get a / dev / video0 device.Using "arecord - L" will tell you whether the sound card of tc358743 is loaded correctly.

3.3 Using GStreamer to call camera and sound

1、The driver of raspberry pi hands over all the controls to the user or the user's application. By default, EDID is not loaded on the chip, so that it can tell which resolution the HDMI source supports.If you don't have an EDID file, you can create the file edid.txt and copy the following contents to edid.txt.

```
00ffffffffffff005262888800888888
1c150103800000780aEE91A3544C9926
0F505400000001010101010101010101
010101010101011d007251d01e206e28
5500c48e2100001e8c0ad08a20e02d10
103e9600138e2100001e000000fc0054
6f73686962612d4832430a20000000FD
003b3d0f2e0f1e0a2020202020200100
020321434e041303021211012021a23c
3d3e1f2309070766030c00300080E300
7F8c0ad08a20e02d10103e9600c48e21
0000188c0ad08a20e02d10103e960013
8e210000188c0aa01451f01600267c43
00138e2100009800000000000000000
00000000000000000000000000000000
00000000000000000000000000000000
```

Then use the following command to push it to the device.

```
v4l2-ctl --set-edid=file=edid.txt --fix-edid-checksums
```

2、the driver will not automatically switch to the detected resolution, use the command to view the current input resolution.

```
v4l2-ctl --query-dv-timings
```

3、Use the following command to set the

```
v4l2-ctl --set-dv-bt-timings query
```

4,、using GStreamer to save video and sound

```
gst-launch-1.0 v4l2src io-mode=5 ! video/x-raw, format=UYVY, framerate=25/1 ! v4l2h264enc output-io-mode=4 ! video/x-h264,profile=high ! h264parse ! queue ! matroskamux name=mux ! filesink location=foo.mkv alsasrc device=hw:1 ! audio/x-raw,rate=48000,channels=2 ! audioconvert ! avenc_aac bitrate=48000 ! aacparse ! queue ! mux.
```

If the video and audio are well connected, you will get a playable video foo.kmv in the path of running the above command. If the input video source has sound, you can hear the corresponding sound.Note that the GST command version tested here is below 1.18. If your GStreamer version is 1.18 or above, you can try the following test statement.In

addition, alsasrc device = HW: 1 is the representative sound card of tc358743, which can be queried with "arecord - L".

```
gst-launch-1.0 -vvv v4l2src ! "video/x-raw,framerate=30/1,format=UYVY" ! v4l2h264enc extra-controls="controls,h264_profile=4,h264_level=13,video_bitrate=256000;" ! "video/x-h264,profile=high, level=(string)4.2" ! h264parse ! queue ! matroskamux name=mux ! filesink location=foo.mkv alsasrc device=hw:1 ! audio/x-raw,rate=48000,channels=2 ! audioconvert ! avenc_aac bitrate=48000 ! aacparse ! queue ! mux.
```

4 matters needing attention

1、C780 series HDMI interface supports hot swap, CSI-2 interface should not be hot swap;

2、C780 series can be broken. Be careful in the process of breaking. Pay attention to check the broken section after breaking. If there is burr, pay attention not to damage it.

5 C780purchase

1、purchase address

Taobao store: Beili Electronics

Purchase website

2、Delivery and packaging

Anti static bag packaging, with a c780 module, a FPC cable (15cm), an audio cable (20cm).If you need different length, please contact customer service.

Figure 4-1 actual delivery picture

3、 logistics

Our store defaults to SF mail in China, and foreign customers need to adopt appropriate logistics mode according to the actual situation.

4、About wholesale

According to the different wholesale quantity, the wholesale price is different. If you have wholesale demand, please contact customer service.