

USB Board User Manual

(V1.1)



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Document Version

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20200111	V1.0	/	DUAN
20200316	V1.1	1.Add Section 2.3.3, Other Player Introduction 2.Section 3.2, Add the notice of USB-CDC driver installation in Win10 OS	DUAN

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1 Product Overview

1.1 Product Description

USB board is used for standard infrared camera that can transfer digital video; it supports USB3.0 and serial control (USB-CDC).

1.2 Technical Specification

➤ Video Resolutions:

256*192、256*193、256*384、256*385, 50Hz (Max) ;

320*240, 60Hz (Max) ;

360*240、360*241、360*480、360*481, 60Hz (Max) ;

384*288、384*289、384*576、384*577, 50Hz (Max, plug417) ;

400*300, 50Hz (Max) ;

640*512、640*513、640*1024、640*1025, 50Hz (Max, plug617、 plug612) ;

720*480, 30Hz (Max) ;

800*600, 50Hz (Max) ;

1280*1024, 1280*1025, 25Hz (Max, plug1212).

➤ USB Serial Port

115200, n, 1

➤ External Synchronizing Signal

Support, TTL3.3V

➤ USB Interface

Type-C, USB3.0

➤ Operation Temperature

-40℃~+70℃, humidity 0%~80%RH

1.3 PC Control Software

Support ICC (Infrared Camera Controller) software, it support camera configuration and video display, the recommend version of ICC is 1.3.0 and above.

OS: support Windows 7/8/10;

Language: Chinese/English;

Baud rate of serial port: 115200.

1.4 SDK of Video Capture

Support SDK of video capture (Windows version).

2 Interface Instructions

2.1 Power Requirements

According the power consumption of infrared camera, please confirm that the output current capacity of USB3.0 host is $\geq 1.5A$ (5V).

2.2 Hardware Interface

2.2.1 Camera Interface

The interface to camera is the connector with 50 pins, XS1, DF12B(5.0)-50DP-0.5V(86), (HRS, Female). The recommended matching connector is DF12B-50DS-0.5V(86), (HRS, male). It can be directly connected with PLUG and COIN series camera. The interface includes: power output, digital video input, 232-ttl serial port, external synchronization.

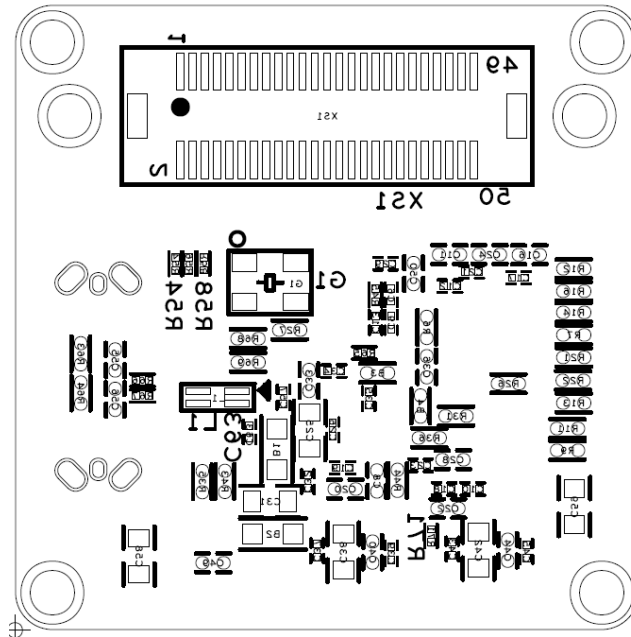


Fig.2-1 bottom silk screen

The definition of HRS 50-PIN interface is shown in Table 2-1.

Table 2-1 The definition of 50-PIN interface

S/N	Signal definition	IO direction	Level	Description
1	UART0_RXD	I	H 3.3V/L 0V	RXD of USB board
2	UART0_TXD	O	H 3.3V/L 0V	TXD of USB board
3	DIGITAL_HS	I	H 3.3V/L 0V	line synchronization
4	DIGITAL_VS	I	H 3.3V/L 0V	field synchronization
5	DGND	GND	0V	Power ground
6	DGND	GND	0V	Power ground
7	reserve	/	/	NC
8	reserve	/	/	NC
9	reserve	/	/	NC
10	reserve	/	/	NC
11	reserve	/	/	NC
12	reserve	/	/	NC
13	reserve	/	/	NC
14	reserve	/	/	NC
15	reserve	/	/	NC
16	reserve	/	/	NC
17	DGND	GND	0V	Power ground
18	DGND	GND	0V	Power ground
19	DATA_OUT15	I	H 3.3V/L 0V	Digital video signal
20	DATA_OUT13	I	H 3.3V/L 0V	Digital video signal
21	DATA_OUT14	I	H 3.3V/L 0V	Digital video signal
22	DATA_OUT12	I	H 3.3V/L 0V	Digital video signal
23	DATA_OUT11	I	H 3.3V/L 0V	Digital video signal
24	DATA_OUT10	I	H 3.3V/L 0V	Digital video signal
25	DATA_OUT9	I	H 3.3V/L 0V	Digital video signal

26	DATA_OUT8	I	H 3.3V/L 0V	Digital video signal
27	DGND	GND	H 3.3V/L 0V	Digital video signal
28	DGND	GND	H 3.3V/L 0V	Digital video signal
29	DATA_OUT7	I	H 3.3V/L 0V	Digital video signal
30	DATA_OUT6	I	H 3.3V/L 0V	Digital video signal
31	DATA_OUT5	I	H 3.3V/L 0V	Digital video signal
32	DATA_OUT4	I	H 3.3V/L 0V	Digital video signal
33	DATA_OUT3	I	H 3.3V/L 0V	Digital video signal
34	DATA_OUT2	I	H 3.3V/L 0V	Digital video signal
35	DATA_OUT1	I	H 3.3V/L 0V	Digital video signal
36	DATA_OUT0	I	H 3.3V/L 0V	Digital video signal
37	DGND	GND	0V	Power ground
38	DGND	GND	0V	Power ground
39	DATA_OUT_CLK	I	0V	Clock signal
40	EXT_SYNC	I/O	0V	External synchronizing signal
41	DGND	GND	0V	Power ground
42	DGND	GND	0V	Power ground
43	reserve	/	/	NC
44	reserve	/	/	NC
45	DGND	GND	0V	Power ground
46	reserve	/	/	NC
47	DGND	GND	0V	Power ground
48	POWER_OUT	POWER-OUT	5V	Power output
49	DGND	GND	0V	Power ground
50	POWER_OUT	POWER-OUT	5V	Power output

Note: The signal direction “0” stands for the output, “I” stands for the input and “NC” stands for suspend.

2.2.2 External Synchronizing Interface

The interface of external synchronizing signal is the connector with 2 pins, XS3, DF57H-2P-1.2V(21). The recommended matching connector is DF57H-2S-1.2C.

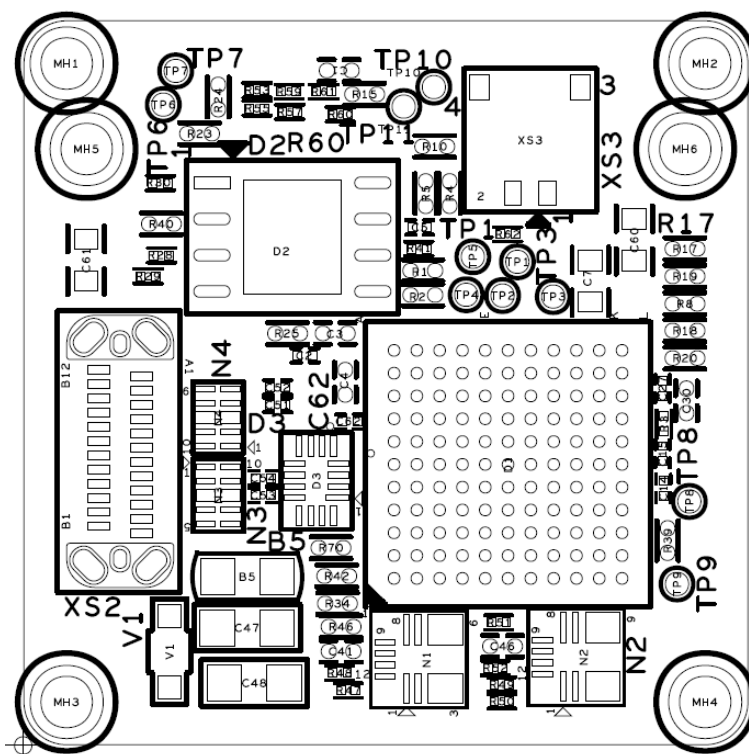


Fig.2-2 top silk screen

Table 2-2 The definition of 2-PIN interface

S/N	Signal definition	IO direction	Level	Description
1	DGND	GND	0V	Ground
2	EXT_SYNC	I/O	H 3.3V/L 0V	external synchronizing signal

EXT_SYNC is only used when external synchronization is required, it is not necessary for other application. EXT_SYNC support input mode and output mode. The function of external synchronization must be turned off when the pin is not used; if the function of external synchronization turned on, the pin must be connected with 10KΩ resistance and pulled down to GND. For the timing requirements of the

external synchronous signal, please refer to the user manual of the infrared camera.

2.3 Digital Video

2.3.1 Timing Requirement of Digital Video

The timing requirement is shown in Fig.2-3, 16bit parallel interface, the format of data is shown below.

Y16: Y16[15:0], Y16[15:0], etc

YUV422: YCb[15:0], YCr[15:0], YCb[15:0], YCr[15:0], etc

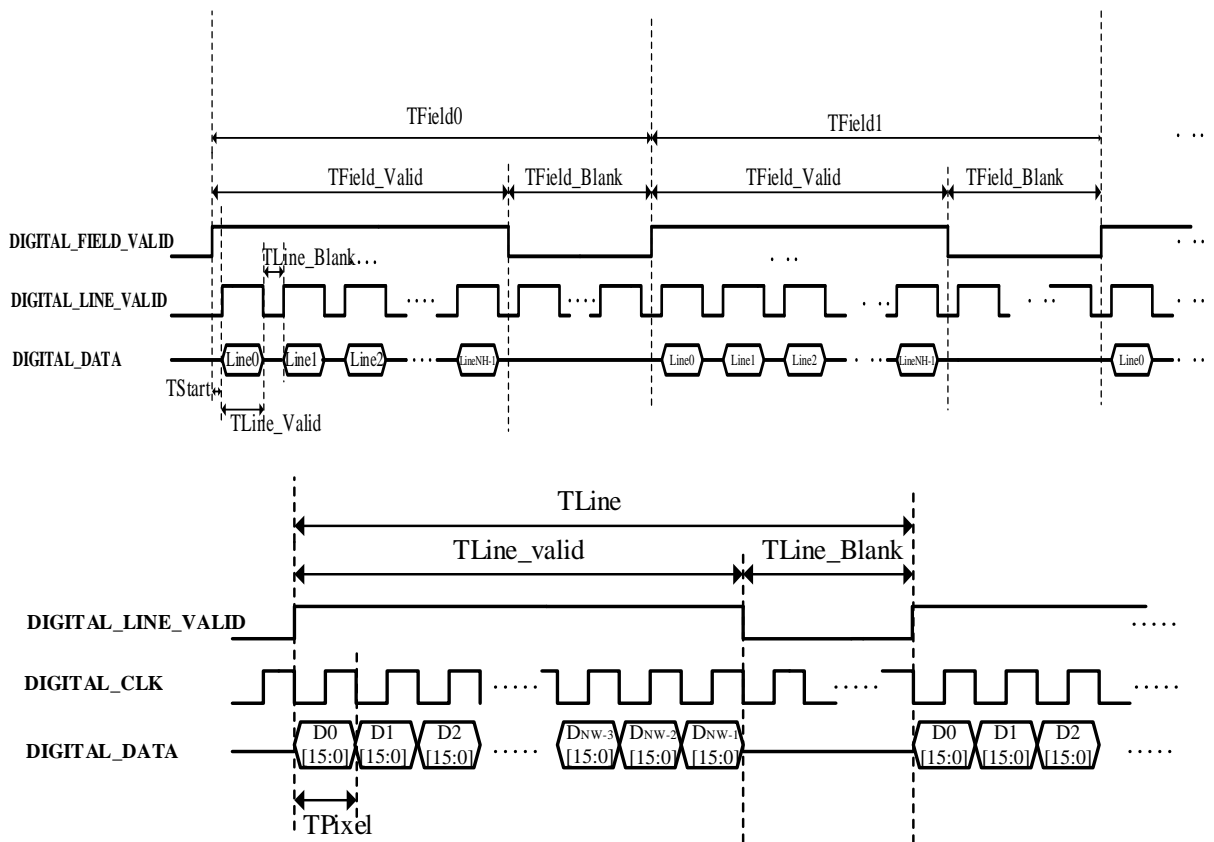


Fig.2-3 timing of digital port

2.3.2 Camera Configuration and Video Play

In order to match the timing requirements of the USB board, taking the PLUG617 camera as an example, the digital port of camera should be configured as shown in Table 2-3 and Fig. 2-4, other camera should be configured according to the timing chart.

Table 2-3 the digital port configuration of camera

	Configuration	Description
Digital Type	CMOS	
CMOS Interface	CMOS16	
Clock Phase	Negedge	Falling edge
CMOS Content	Support Y16+YUV, Y16, YUV, and parameter line	The resolution is determined by the content of digital port, taking the PLUG617 as an example, resolutions are shown below Y16 or YUV: 640*512; Y16 or YUV + paraLine: 640*513; Y16+YUV: 640*1024; Y16+YUV+paraLine: 640*1025.



Fig. 2-4 digital port configuration of camera

Select the image capture button (shown in Fig.2-4) to open the video display window.



Fig.2-5 video display window in ICC software

2.3.3 Other Player Introduction

Since the USB board supports UVC protocol, video can be played not only by ICC software, but also by a third-party player which supports UVC.

Note. The Y16 data cannot be played by third-party player, so the configurations of camera are the same with ICC except CMOS content.

Take **Potplayer** as an example to introduce the steps of video play:

1. Open the player, move the mouse over the player, right-click, and then select “**Open**” and “**Device Settings**” in the options, as shown in Fig.2-6.
2. Select “**Device**” and “**Format**” on the menu. Take Plug617 as an example, the format is “**YUY2 640x512 25**”, which represents data source, resolution and frame rate, as shown in Fig.2-7.
3. Select “**Open Device**” to play video after all settings finished.

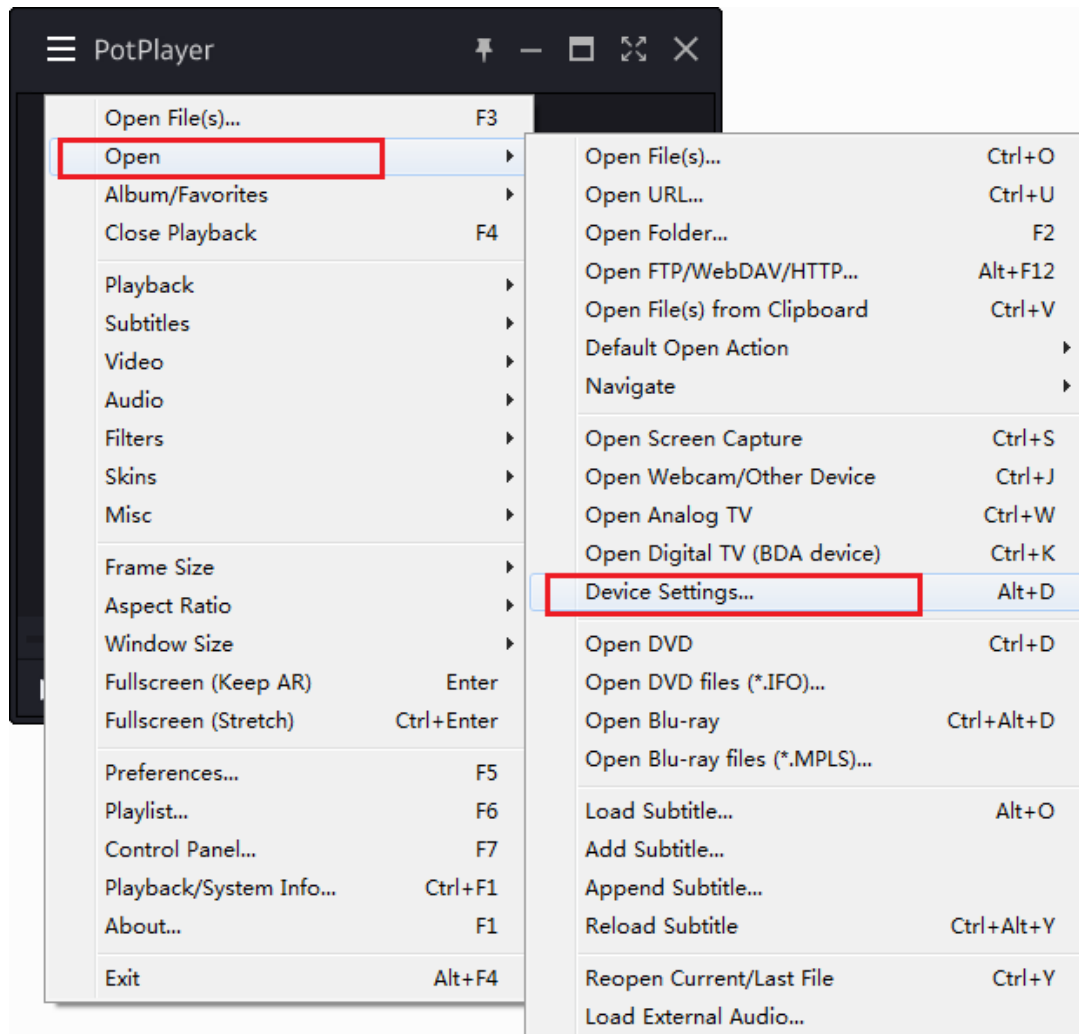


Fig.2-6 the settings of third-party player, part 1

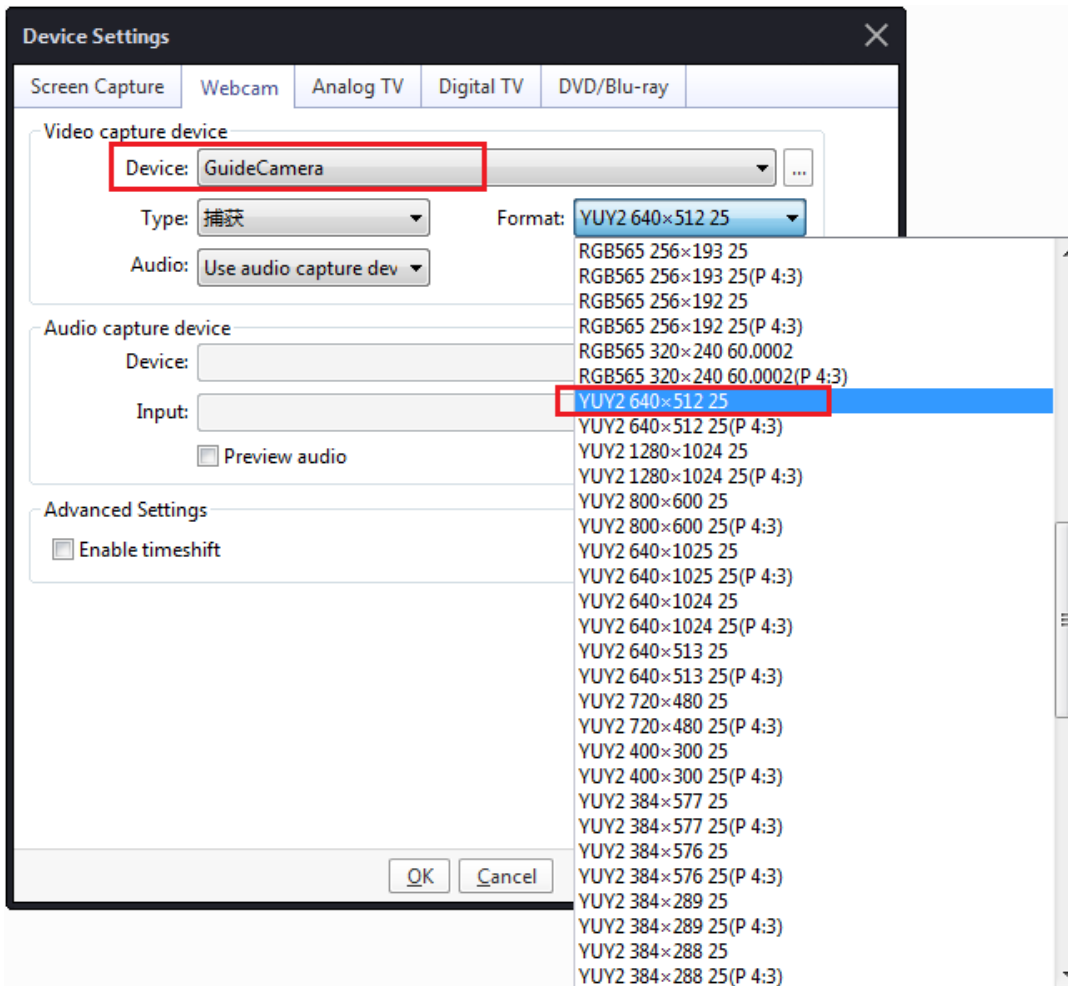


Fig.2-7 the settings of third-party player, part 2

3 Driver Installation Instructions

There are two devices that can be identified when USB board connects computer.

One of the devices is camera, device will install automatically when connected, it does not require extra driver in Windows7 and above. But user need find and install the UVC driver on other operation system.

Another device is USB serial port (USB-CDC), which is used for infrared camera configuration. The following instructions will focus on the installation steps of USB serial driver on Windows.

3.1 Camera Installation

When USB board connects the USB3.0 interface of computer, there will be a “GuideCamera” which is listed in the “Camera” group of the “Device Manager”, as shown in Fig.3-1.

If the computer connects the USB board on the first time, there will be a few seconds for automatic driver installation. Camera can not be recognized until the driver installation is finished. Video can be captured after the camera is recognized by the operation system.

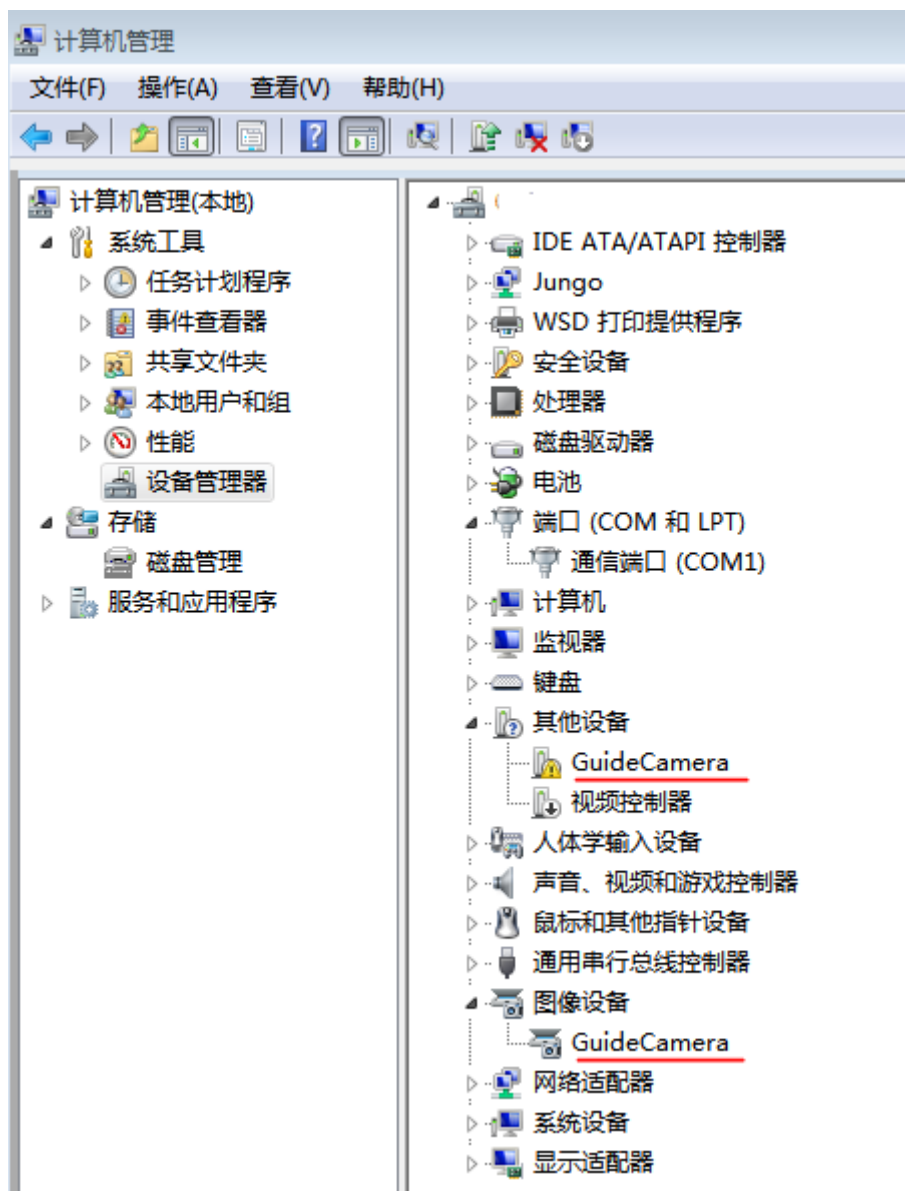


Fig.3-1 devices that are recognized in Windows

3.2 USB Serial Port Installation

The following steps are the installation instructions of USB serial port driver. If users do not need USB serial port to control the infrared camera, please ignore these steps.

1. Take windows 7x64 system as an example, open the “Other Device” group in “Device Manager”, and an unknown device that called GuideCamera will be listed, as shown in Figure 3-1. This device is a USB to serial device, which needs to install drivers.

Note: Although the USB serial port device can be identified automatically in Windows 10 system, but it may not work before installing the driver. It is recommended to install this driver in safe mode of Windows 10 system.

2. Open the device driver files, and select the corresponding driver according to the operating system version of the computer, as shown in Figure 3-2.



Fig.3-2 driver selection

3. Take the Win7 64bit system as an example, open the x64 folder, as shown in Figure 3-3, and double-click dpinst.exe.

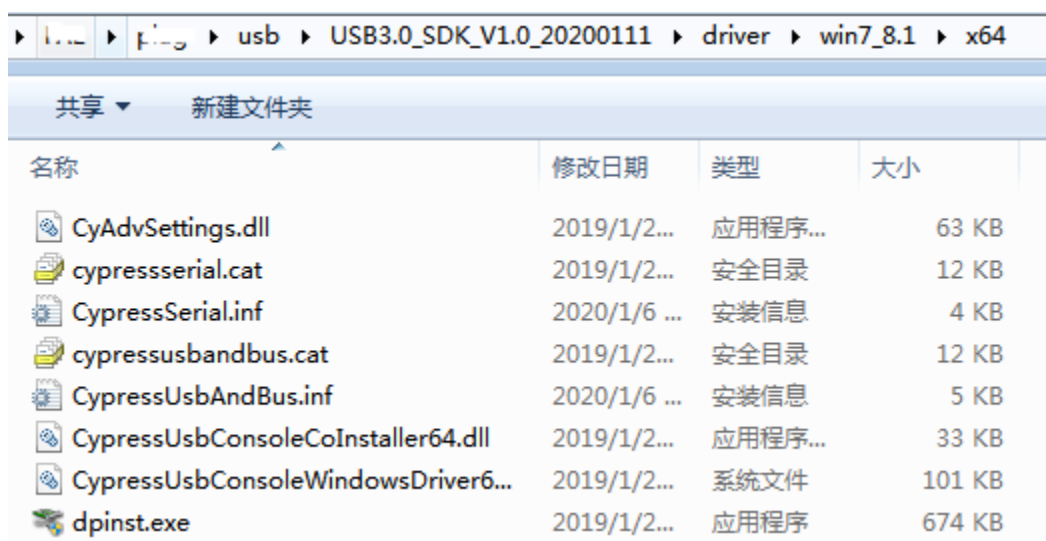


Fig.3-3 driver installation

4. As shown in Figure 3-4, in the installation wizard, click “Next” .

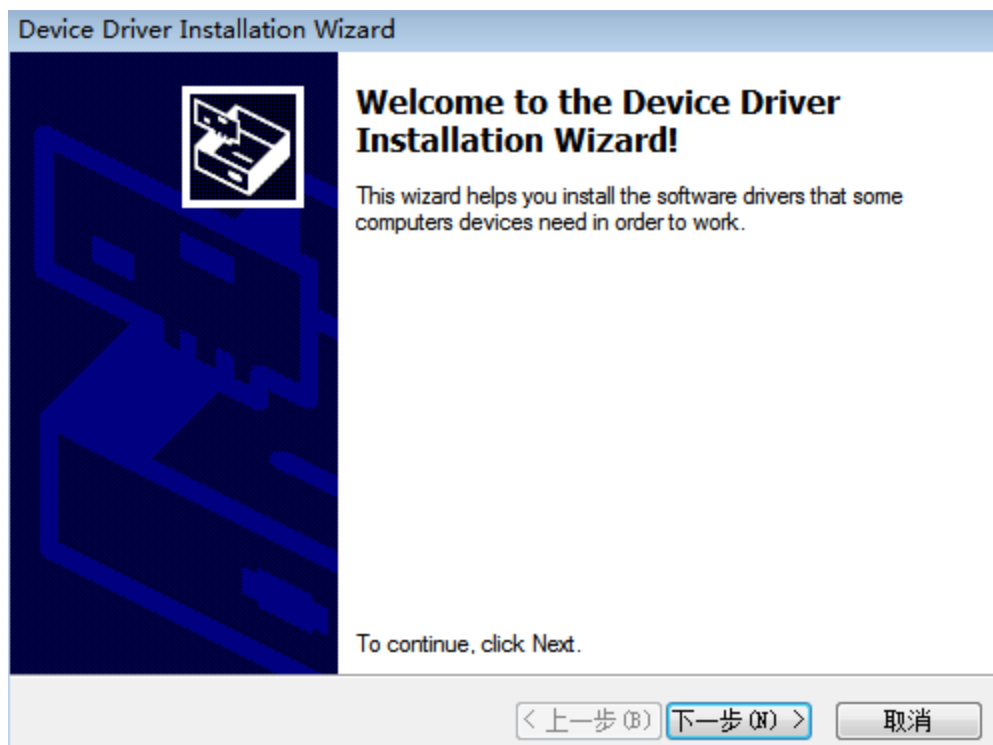


Fig.3-4 driver installation wizard

5. As shown in Figure 3-5, select “always install this device driver” in the Windows Security page that emerged.

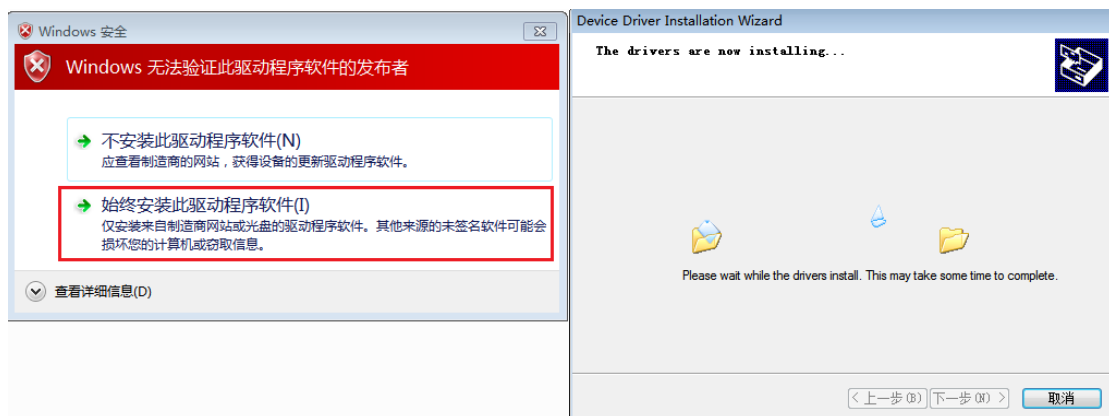


Fig.3-5 device signatures prompt

6. Click “Finish” in the emerged window when install completed, as shown in Figure 3-6.

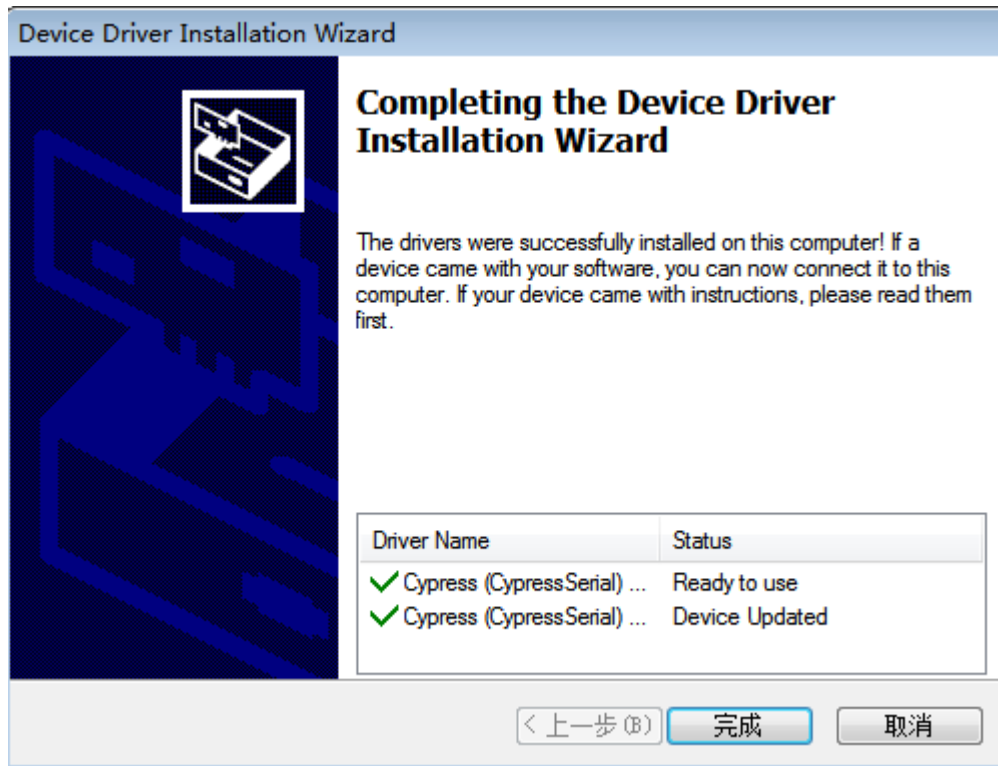


Fig.3-6 installation completion page

7. Refresh the “Device Manager”, the installed serial devices will be listed in the “Port” group, as shown in Figure 3-7.

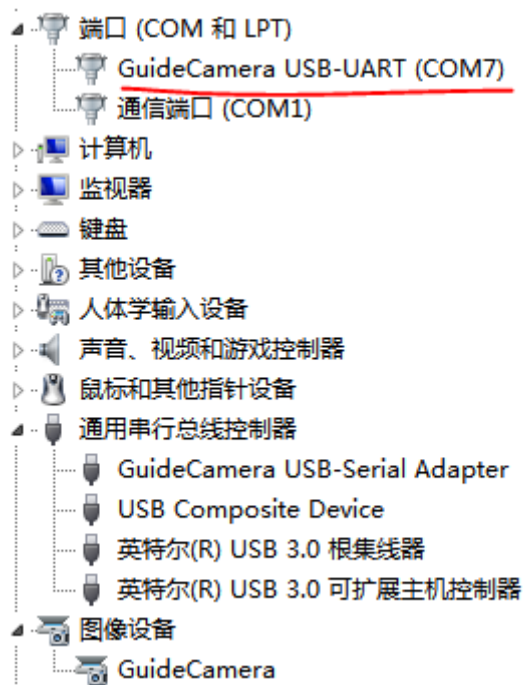


Fig.3-7 device lists in Port group

8. ICC software can be connected by the USB serial port to configure the infrared camera when the device have installed successfully.

Note. If the serial port commands are too long or too frequent, it may interrupt video transmission. Therefore, it is recommended to stop the video capture when downloading or uploading data through the USB serial port, and it is not recommended to send the serial commands continuously and quickly when video capture. If the video is stuck, it is recommended to restart ICC software and infrared camera.

4 Mechanical Interface Specification

4.1 Structure Diagram

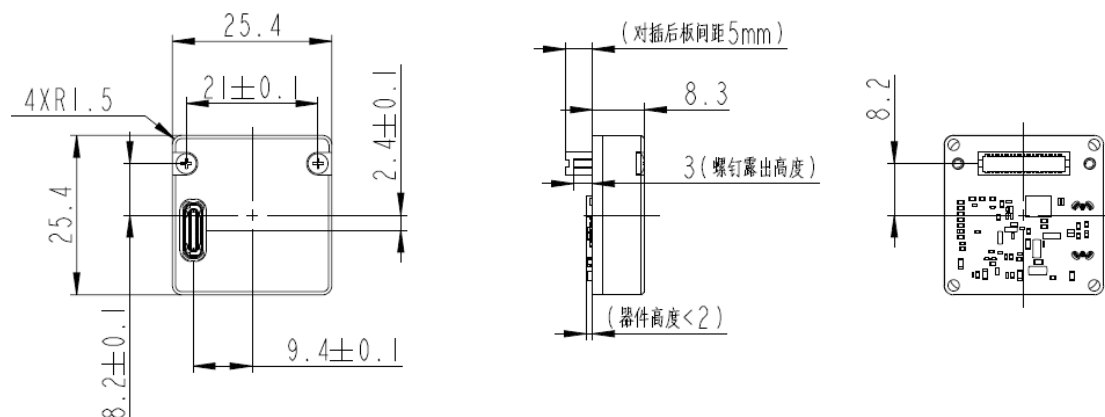


Fig. 4-1 structure diagram

4.2 Assemble Diagram

Assemble diagram of USB board is shown as Figure 4-2.

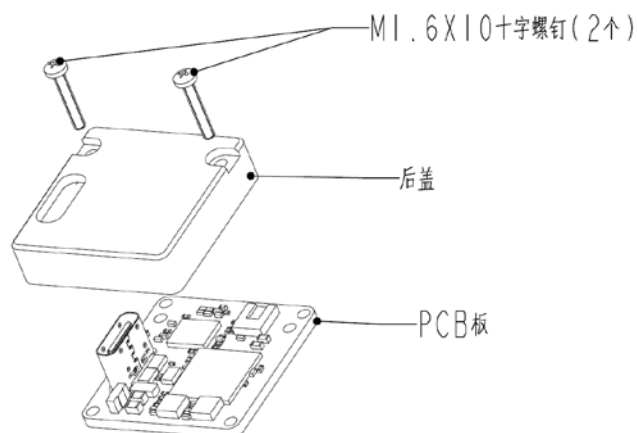


Fig. 4-2 assemble diagram

Take plug617 or plug417 as an example, the assemble diagram is shown in Figure 4-3.



Fig.4-3 assemble diagram with USB board and PLUG617