USB Board User Manual

(V1.1)



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Document Version

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20200111	V1.0	/	DUAN
		1.Add Section 2.3.3, Other Player Introduction	
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		installation in Win10 OS	

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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

 $-40\,^\circ\!\mathrm{C}\,{\sim}{+}70\,^\circ\!\mathrm{C}$, humidity $0\%{\sim}80\%\mathrm{RH}$

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

4 / 18

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

S/N	Signal definition	IO direction	Level	Description
1	UART0_RXD	I	H 3.3V/L 0V	RXD of USB board
2	UART0_TXD	0	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

Table 2-1 The definition of 50-PIN interface

26	DATA_OUT8	Ι	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	Ι	H 3.3V/L 0V	Digital video signal
30	DATA_OUT6	Ι	H 3.3V/L 0V	Digital video signal
31	DATA_OUT5	Ι	H 3.3V/L 0V	Digital video signal
32	DATA_OUT4	Ι	H 3.3V/L 0V	Digital video signal
33	DATA_OUT3	Ι	H 3.3V/L 0V	Digital video signal
34	DATA_OUT2	Ι	H 3.3V/L 0V	Digital video signal
35	DATA_OUT1	Ι	H 3.3V/L 0V	Digital video signal
36	DATA_OUT0	Ι	H 3.3V/L 0V	Digital video signal
37	DGND	GND	0V	Power ground
38	DGND	GND	0V	Power ground
39	DATA_OUT_CLK	Ι	0V	Clock signal
40	EXT SYNC	1/0	0\/	External synchronizing
40		1/0	00	signal
41	DGND	GND	0V	Power ground
41 42	DGND DGND	GND GND	0V 0V	Power ground Power ground
41 42 43	DGND DGND reserve	GND GND /	0V 0V /	Power ground Power ground NC
41 42 43 44	DGND DGND reserve reserve	GND GND / /	0V 0V / /	Power ground Power ground NC NC
41 42 43 44 45	DGND DGND reserve reserve DGND	GND GND / / GND	0V 0V / / 0V	Power ground Power ground NC NC Power ground
41 42 43 44 45 46	DGND DGND reserve reserve DGND reserve	GND GND / / GND /	0V 0V / / 0V /	Power ground Power ground NC NC Power ground NC
41 42 43 44 45 46 47	DGND DGND reserve DGND reserve DGND DGND DGND	GND GND / / GND / GND	0V 0V / / 0V / 0V	Power ground Power ground NC NC Power ground NC Power ground
41 42 43 44 45 46 47 48	DGND DGND reserve DGND reserve DGND POWER_OUT	GND GND / / GND / GND POWER-OUT	0V 0V / / 0V / 0V 5V	Power ground Power ground NC NC Power ground NC Power ground Power output
41 42 43 44 45 46 47 48 49	DGND DGND reserve DGND reserve DGND POWER_OUT DGND	GND GND / / GND / GND POWER-OUT GND	0V 0V / / 0V / 0V 5V 0V	Power ground Power ground NC NC Power ground NC Power ground Power ground Power ground Power ground Power ground

Note: The signal direction "O" 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	EVT SYNC	1/0		external synchronizing
2	EXT_STIC	1/0	П 3.3 V/L UV	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 $10K\Omega$ 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.
Infrared Cam	era Controller	
👄 Model:	PLUG VIEW	Version: 1.3.0
Status Status Setting Video Advanced	 External-Syn Signal	aster On Off CMOS Content CMOS Content CMOS Content VUV422 V Frame Rate 9 25 50 MIPI/LVDS 0 On Off Timing Shoot Setting 1 © 1 min © 100 Slap MultSlap T-Slap Record

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.

Ξ		PotPlayer	Ŧ	-		
		Open File(s)	F3			
		Open	+		Open File(s)	Ctrl+O
		Album/Favorites	۱.		Open URL	Ctrl+U
		Close Playback	F4		Open Folder	F2
		Dlavback			Open FTP/WebDAV/HTTP	Alt+F12
		Subtitles			Open File(s) from Clipboard	Ctrl+V
		Video			Default Open Action	+
		Audio			Navigate	+
		Filters			Open Screen Capture	Ctrl+S
		Chine			Open Websem/Other Davise	Ctrl+1
		Miss				Chelin
		WIISC			Open Analog IV	Ctrl+W
		Frame Size	+		Open Digital TV (BDA device)	Ctri+K
		Aspect Ratio	+		Device Settings	Alt+D
		Window Size	+		Open DVD	Ctrl+D
		Fullscreen (Keep AR)	Enter		Open DVD files (*.IFO)	
		Fullscreen (Stretch)	Ctrl+Enter		Open Blu-ray	Ctrl+Alt+D
		Preferences	F5		Open Blu-ray files (*.MPLS)	
		Playlist	F6		Load Subtitle	Alt+O
		Control Panel	F7		Add Subtitle	
		Playback/System Info	Ctrl+F1		Append Subtitle	
		About	F1		Reload Subtitle	Ctrl+Alt+Y
		Exit	Alt+F4		Reopen Current/Last File	Ctrl+Y
-	_				Load External Audio	

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

Device Settings						×	
Screen Capture	Webcam	Analog TV	Digital TV	DVD/Blu-ray			
Video capture d	levice						
Devic	e: GuideCam	iera			▼		
Тур	e: 捕获	•	Form	nat: YUY2 640×5	512 25 🔹		
Audie			1	RGB565 256	×193 25		A
Audio	Use audio	capture dev 🔹	J	RGB565 256	×193 25(P 4:3)		
- Audio capture	device			RGB565 256	×192 25 ×192 25(P 4:3)		
Device	er			RGB565 320	×240 60.0002		
Device	-			RGB565 320	×240 60.0002(P 4	:3)	
Inpu	t:			YUY2 640×5	12 25 12 25/D 4-2)		
	Preview	audio		YUY2 1280×	1024 25		
	- Treview	addio		YUY2 1280×	1024 25(P 4:3)		
Advanced Setti	ngs			YUY2 800×6	00 25		
Enable time	achift			YUY2 800×6	00 25(P 4:3) 025 25		
	Lanne -			YUY2 640×1	.025 25(P 4:3)		
				YUY2 640×1	.024 25		
				YUY2 640×1	.024 25(P 4:3)		E
				YUY2 640×5	13 25		
				YUY2 640×5	13 Z5(P 4:3) 80 25		
				YUY2 720×4	80 25(P 4:3)		
				YUY2 400×3	00 25		
				YUY2 400×3	00 25(P 4:3)		
				YUY2 384×5	77 25		
				YUY2 384×5	77 25(P 4:3)		
		0	K Cancel	VUV2 384×5	76 25(P 4:3)		
				YUY2 384×2	89 25		
				YUY2 384×2	89 25(P 4:3)		
				YUY2 384×2	88 25		
				YUY2 384×2	88 25(P 4:3)		-

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.

퉬 win7_8.1	2019/8/20 14:02
퉬 win10	2019/8/20 14:02
🚳 DriverInstaller.bat	2019/1/17 20:38

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.

I → µ → usb → USB3.0_SDK_V1.0_	20200111 •	driver 🕨 win	7_8.1 ▶ x64
共享 ▼ 新建文件夹			
名称	修改日期	类型	大小
CyAdvSettings.dll	2019/1/2	应用程序	63 KB
cypressserial.cat	2019/1/2	安全目录	12 KB
CypressSerial.inf	2020/1/6	安装信息	4 KB
cypressusbandbus.cat	2019/1/2	安全目录	12 KB
CypressUsbAndBus.inf	2020/1/6	安装信息	5 KB
🚳 CypressUsbConsoleCoInstaller64.dll	2019/1/2	应用程序	33 KB
🚳 CypressUsbConsoleWindowsDriver6	2019/1/2	系统文件	101 KB
💐 dpinst.exe	2019/1/2	应用程序	674 KB

Fig. 3-3 driver installation

14 / 18

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.

₩indows 安全	Device Driver Installation Wizard
Windows 无法验证此驱动程序软件的发布者	The drivers are now installing
 不安装此驱动程序软件(N) 应量看制适向的网站,获得设备的更新驱动程序软件。 始终安装此驱动程序软件(I) 仅安装用制造商网站或光曲的驱动程序软件。其他来源的未签名软件可能会 损坏您的计算机或窃取信息。 	۵ ک
	Please wait while the drivers install. This may take some time to complete.
	(〈上一步 (8)) (下一步 (8) 〉) 取消

Fig.3-5 device signatures prompt

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

Device Driver Installation Wizard				
	Completing the Device Driver Installation Wizard			
The drivers were successfully installed on this computer! If a device came with your software, you can now connect it to this computer. If your device came with instructions, please read them first.				
	Driver Name	Status		
	 ✓ Cypress (CypressSerial) ✓ Cypress (CypressSerial) 	Ready to use Device Updated		
	〈上一歩 (B)	完成 取消		

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 $\,$