

User Guide

Rev 1.0, May 2018



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1 Introduction

This user guide describes the detail operation of ArduCAM USB3 camera shield. The latest device driver, SDK library and examples can be downloaded from the https://github.com/ArduCAM/ArduCAM_USB_Camera_Shield.

2 Hardware Installation



There are two camera interface provided on the USB3 camera shield, but only one camera interface can be used at a time.

2.1 8-bit Camera Interface

The primary camera interface is used for camera breakout board with 30pin ribbon cable. The pin definition is shown in Table 1. Although the camera breakout board might has more than 8bit data bus, only the upper 8bit connected to the USB camera shield through this FPC connector.





Pin No.	PIN NAME	ТҮРЕ	DESCRIPTION
1	GND	Ground	Power ground
2	Reserved	NC	
3	Reserved	NC	
4	VSYNC	Input	Active High: Frame Valid; indicates active frame
5	HREF	Input	Active High: Line/Data Valid; indicates active pixels
6	Dout11	Input	Camera Pixel Data Input 11 (MSB)
7	Dout10	Input	Camera Pixel Data Input 10
8	Dout9	Input	Camera Pixel Data Input 9
9	Dout8	Input	Camera Pixel Data Input 8
10	Dout7	Input	Camera Pixel Data Input 7
11	Dout6	Input	Camera Pixel Data Input 6
12	Dout5	Input	Camera Pixel Data Input 5
13	GND	Ground	Power ground
14	Dout4	Input	Camera Pixel Data Input 4 (LSB)
15	Dout3	Input	Camera Pixel Data Input 3 (Unconnected)
16	Dout2	Input	Camera Pixel Data Input 2 (Unconnected)
17	Dout1	Input	Camera Pixel Data Input 1 (Unconnected)
18	Dout0	Input	Camera Pixel Data Input 0 (Unconnected)
19	Reserved	NC	
20	PCLK	Input	Pixel Clock output from Camera
21	SCL	Output	Two-Wire Serial Interface Clock
22	Sdata	Bi-directional	Two-Wire Serial Interface Data I/O
23	RST	Output	Sensor reset signal, active low
24	GND	Ground	Power ground
25	GND	Ground	Power ground
26	STANDBY	Output	Standby-mode enable pin (active HIGH)
27~30	VCC	POWER	3.3v Power supply

Table 1 8-bit Camera Interface Pin Definition	
(Connector Part Number: Hirose FH28D-30S-0.5SH(05))	

2.2 16-bit Camera Interface

The secondary camera interface is used for MIPI camera, stereo-camera or customized camera adapter boards which support up to 16bit data bus. The pin definition is shown in Table 2.



(Connector 1 art Number: That will W150-4502045)					
Pin No.	PIN NAME	TYPE	Pin No.	PIN NAME	TYPE
1	VCC3.3	POWER	2	VCC3.3	POWER
3	GND	Ground	4	GND	Ground
5	Sdata	Bi-directional	6	SCL	Input
7	Data10	Input	8	Data12	Input
9	Data11	Input	10	Data13	Input
11	Data8	Input	12	Data6	Input
13	Data3	Input	14	Data0	Input
15	RST	Output	16	Data4	Input
17	Data7	Input	18	Data9	Input
19	Reserved	NC	20	STANDBY	Output
21	Reserved	NC	22	Reserved	NC
23	Data14	Input	24	HREF	Input
25	Reserved	NC	26	VSYNC	Input
27	Reserved	NC	28	GND	Ground
29	PCLK	Input	30	GND	Ground
31	Data1	Input	32	Data5	Input
33	Reserved	NC	34	Data15	Input
35	Data2	Input	36	Reserved	NC
37	Reserved	NC	38	Reserved	NC
39	Reserved	NC	40	USB_RST	Input

Table 2 16-bit Camera Interface Pin Definition (Connector Part Number: Harwin M50-4302045)

3 Device Driver Installation

Please download the device driver from <u>github</u>. The Windows device driver is located in Drivers folder like WinXP, Win7 or Win10. In each driver folder there are x64 and x86 folders for 64bit and 32bit system respectively.

When install the driver on Windows, you might need to disable the Windows driver signature by following the two video below:

https://youtu.be/71YAIw7_-kg

https://youtu.be/gOTkrFp8oM4

Plug in the USB cable to the camera and the host PC USB port, there is notification from the lower right of the task bar. The auto installation of the driver will fail, so we have to install the USB camera driver manually.



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Go to Start->Settings->Control-Panel-><u>Device Manager</u>, right click the unknown device and select "Update Driver Software".

🚔 Device Manager 📃 🗖	X
File Action View Help	
Image: Second	
🖅 🖶 Universal Serial E Properties	
Launches the Update Driver Software Wizard fo	

Select the "Browse my compute for driver software"

	Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.
•	B <u>r</u> owse my computer for driver software Locate and install driver software manually.

Select "Let me pick from a list of device drivers on my computer".

	×
🚱 🧕 Update Driver Software - Android Phone	
Browse for driver software on your computer	
Search for driver software in this location:	
C:\Users\Virtual\Documents Browse	
✓ Include subfolders	
Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver software in the same category as the device.	
Next Can	cel

Select "Show All Devices".

	— ×
🕒 🗕 Update Driver Software - Android Phone	
•	
Select your device's type from the list below.	
Common <u>h</u> ardware types:	
Show All Devices	
🟺 61883 Device Class	=
AVC Devices	-
atteries	
Biometric Devices	
🚯 Bluetooth Radios	
[툪 Computer	
Disk drives	
Note: The second	
BVD/CD-ROM drives	
Floppy disk drives	
E Floppy drive controllers	-
N	lext Cancel

Press the "Have Disk" button.

0	👖 Upd	late Driver Software - Android Phone
	Select	the device driver you want to install for this hardware.
	1	Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.
	(Retrie	ving a list of all devices)
		<u>H</u> ave Disk
		Next Cancel

Enter the path to the ArduCAM USB3 driver, where you save the downloaded file from github.



Confirm the installation of the driver by pressing "Yes".

Confirm the installation again by pressing "Install".



You will successfully install the driver like this.

🕞 🔒 Update Driver Software - Levelogger	X
Windows has successfully updated your driver software	
Windows has finished installing the driver software for this device:	
ArduCAM USB Driver	
	Close

4 Demo Code

The demo code is provided in source code form to help user to understand the operation the ArduCAM USB camera and SDK library. It is created with Microsoft Visual Studio 2013 and

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based on MFC frame work.

The Windows demo code is located in ../Winodws/USBTest folder and the release executable software is located in ../ Winodws/USBTest/USBTest.exe.



4.1 Scan Cameras

Click the scan button, the drop down list will show all supported cameras with serial number, user can select one of them to open.

4.2 Load the Camera Settings

There are several preset of the camera settings in the *Config* folder, select one of the corresponding camera setting from the drop list and click load to load the setting. The camera type, width, height, bits, format, I2CAddr, I2CMode will be loaded with the correct values.

4.3 Open the Camera

Click *Open* to open the camera selected from the camera drop list.

4.4 Play the Video

Click the *Play* to capture and display the video in real-time.

4.5 Stop the Video

Click the *Stop* button to stop the video capture and display.

4.6 Take a Snapshot

Click the *Shot* to take BMP image to files.

4.7 Sensor Register Read/Write

This is very useful to access the sensor register in order to adjust the sensor settings on the fly. For example you want to manually change the exposure settings you can input the exposure register address and value then click write, you can video how the brightness changes from the video.

4.8 RAW Mode Selection

There are four combination of the RAW format **R-G**, **G-R**, **B-G**, **G-B**. It is predefined for tested camera, you can also changes the mode match your target sensor RAW display order.

4.9 Camera Control

4.9.1 Fit to Window

To fit the captured image to the GUI windows size. If this is unchecked, user can use mouse scroll wheel to zoom in and out the real-time video, or drag the mouse cursor to move



the video position.

4.9.2 Force Display

Force display is useful to debug the problem by force displaying the wrong video data which is mismatch with the camera preset values.

4.9.3 IRcut

It can be used to manual control extra motorized IRCUT filter for both daylight and night vision.

4.9.4 Frame Rate Information

The frame rate information show the capture frame rate and GUI display frame rate. These two values might be mismatched, due to the performance of the demo GUI software and computer hardware.

4.10 Image Save Options

There are several options for saving image files and format. The *Display* option doesn't save any file just real-time display the video from the camera. The *Save Data* option is used to save the continuous images in the same format as the camera output like RAW, RGB, YUV or JPEG. The Save Image option is used to save the BMP images. The *Save Video* options is used to save the AVI format video. Except the *Display* option, when checking other options, the video is not updated on the display region.

4.11 Stereo Display Options

This options are only available when using stereo camera adapter board. The *SideBySide* option displays the video in left and right order. The *UpsideDown* option displays the video up and down order.

