

User Guide

Rev 1.0, April 2017

Table of Contents

1	Introduction	2
2	Hardware Installation	2
2.1	Primary Camera Interface	2
2.2	Secondary Camera Interface	3
3	Device Driver Installation	4
4	Demo Code	7
4.1	Camera Settings	8
4.2	Open the Camera	8
4.3	Play the Video	8
4.4	Stop the Video	8
4.5	Take a Snapshot	8
4.6	Sensor Register Read/Write	8
4.7	RAW Mode Selection	9

1 Introduction

This user guide describes the detail operation of ArduCAM USB camera. The latest deivce driver, SDK library and examples can be downloaded from the <u>https://github.com/ArduCAM/ArduCAM_USB_Camera_Shield</u>.

2 Hardware Installation



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

2.1 Primary Camera Interface

The primary camera interface is used for 18-22 pin camera breakout board, and should align the pin 1 of the camera breakout board to the USB camera shield camera connector pin 1.



Pin No.	PIN NAME	ТҮРЕ	DESCRIPTION	
1	VCC	POWER	3.3v Power supply	
2	GND	Ground	Power ground	
3	SCL	Input	Two-Wire Serial Interface Clock	
4	SDA(SDATA)	Bi-directional	Two-Wire Serial Interface Data I/O	
5	VS(VSYNC)	Input	Active High: Frame Valid; indicates active frame	
6	HS(HREF)	Input	Active High: Line/Data Valid; indicates active pixels	
7	PCLK	Input	Pixel Clock output from sensor	
8	XCLK	Output	Vaster Clock into Sensor	
9	D7	Input	Pixel Data Output 7 (MSB)	
10	D6	Input	Pixel Data Output 6	
11	D5	Input	Pixel Data Output 5	
12	D4	Input	Pixel Data Output 4	
13	D3	Input	Pixel Data Output 3	
14	D2	Input	Pixel Data Output 2	
15	D1	Input	Pixel Data Output 1	
16	D0	Input	Pixel Data Output 0(LSB)	
17		NC		
18		NC		
19		NC		
20		NC		
21		NC		
22	Trigger(EXP)	Output	External trigger output	

Table 1 P1 Connector Pin Definition

2.2 Secondary Camera Interface

The secondary camera interface is used for camera breakout board with 30pin ribbon cable.



Pin No.	PIN NAME	ТҮРЕ	DESCRIPTION	
1	GND	Ground	Power ground	
2	FLASH	Input	Flash output control	
3	Trigger	Output	Exposure synchronization input	
4	VSYNC	Input	Active High: Frame Valid; indicates active frame	
5	HREF	Input	Active High: Line/Data Valid; indicates active pixels	
6	Dout11	Input	Pixel Data Output 11 (MSB)	
7	Dout10	Input	Pixel Data Output 10	
8	Dout9	Input	Pixel Data Output 9	
9	Dout8	Input	Pixel Data Output 8	
10	Dout7	Input	ixel Data Output 7	
11	Dout6	Input	'ixel Data Output 6	
12	Dout5	Input	Pixel Data Output 5	
13	GND	Ground	Power ground	
14	Dout4	Input	Pixel Data Output 4	
15	Dout3	Input	Pixel Data Output 3	
16	Dout2	Input	Pixel Data Output 2	
17	Dout1	Input	Pixel Data Output 1	
18	Dout0	Input	Pixel Data Output 0(LSB)	
19	XCLK	Output	Master Clock into Sensor	
20	PCLK	Input	Pixel Clock output from sensor	
21	SCL	Input	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 2 HDC1 Connector Pin Definition

The firmware update jumper should be left open when normal operation.

3 Device Driver Installation

Please download the device driver from <u>github</u>. The Windows device driver is located in Drivers folder, Windows 10 operating system can use the same driver as Win7 or Win8. In each driver folder there are x64 and x86 folders for 64bit and 32bit system respectively.

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.



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

File Action View Help Image: Second s	🚔 Device Manager		
← → □ □ □ □ □ □ □ 0 0 0 0 0 0 0 0 0 0 0 0	File Action View Help		
E DEMI-EN-PC E - I Computer		R 🛛 🔐 🙀 🕼	
 Disk drives Display adapters DVD/CD-ROM drives Floppy disk drives Floppy drive controllers Human Interface Devices Human Interface Devices Keyboards Keyboards Mice and other pointing devices Monitors Network adapters Other devices 	DEMI-EN-PC Demi-EN-PC Disk drives Display adapters Display adapters Display adapters DVD/CD-ROM drives Display disk drives Display drive drives Display drives Display drives Display drives Display drives Display drive	ers vices rollers ting devices	
Image: Second secon	Iniversal Serial E	Update Driver Software Disable Uninstall Scan for hardware changes Properties	

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 ▼ B <u>r</u> owse	
☑ 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	Cancel
Next	Cancel

Select "Show All Devices".

	-X -
🚱 🗕 Update Driver Software - Android Phone	
Select your device's type from the list below	
Select your device stype normale ist below.	
Common <u>h</u> ardware types:	
Show All Devices	
61883 Device Class	
AVC Devices	
Batteries	
Biometric Devices	
8 Bluetooth Radios	
Computer	
Disk arives	
PIDIDIA adapters	
Floppy disk drives	
Floppy drive controllers	
Am	
Next	ancel

Press the "Have Disk" button.

G	👖 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)
		Have Disk
		Next Cancel

Enter the path to the ArduCAM USB 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 2008 and

Ardu@am

based on MFC frame wrok .

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

ArduCAM_USB_CAME	RA_Demo					×
VID: 0x52CB Index:	scan					
Type: ArduCan 💌	open					
Sensor: MT9F002 -	auto-open					
Height: 3288	CTORE					
Bits: Bbit y	ston		entremas			
I2C Mode: 16, 16 🚽		190		, balanda inda		
I2CAddr: 32	shot					100
RegAddr: 12306	read			er er ei filt i s	and the second second	15
Value: 3	write					
🥅 Force Display	RAWMode (BG)	STORY			記事記書表	
[08:56:27]USB transfer [08:56:26]USB transfer [08:56:21]USB camera i:	data length err data length err nit success!					
•		and the second second				
frame capture count: 2 frame read count: 2 fra	fps	alle bas				-
riane read count. 2 rps			A DESCRIPTION OF THE OWNER.		and the second s	

4.1 Camera Settings

This USB demo software can work with different cameras provided by ArduCAM. Basically the different camera settings is predefined by the *Sensor Type* selected by the user. User also can override these settings after select a certain *Sensor Type*. All the following parameters are in decimal.

The *Width* and *Height* is to define the image size to be captured and displayed, they should exactly match the resolution output by the image sensor.

The Bits is the sensor output data bits, now ArduCAM shield only supports 8bits mode.

The *I2C Mode* select different sensor register read/write mode according to different sensor type. 8,8 means one byte address phase and one byte data phase; 8,16 means one byte address phase and two bytes data phase; and so on.

The I2CAddr is the image sensor I2C 8bit slave address, it is in decimal. For example MT9V034 sensor I2C slave address is 0x90, so we have to use 144 for it in decimal.

4.2 Open the Camera

There are two ways to open the camera.

Auto-open is useful when there is only one ArduCAM USB camera connected.

Scan then open is used when more than one ArduCAM USB camera connected. You have to scan how many cameras are on the USB bus, and select the correct one to open.

4.3 Play the Video

Click the *Play* to capture and display the video in realtime.

4.4 Stop the Video

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

4.5 Take a Snapshot

Click the Snapshot to take both BMP and RAW image to files.

4.6 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.



4.7 RAW Mode Selection

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