

Jelly3 Series USB3.0 Industrial Digital Cameras



Introduction

Jelly3 series USB 3.0 industrial digital cameras adopt the latest USB3.0 technology, the speed is much faster than USB2.0 digital cameras, the resolution ranges from 1.2MP to 14.0MP. These cameras have high sensitivity, high dynamic range, hardware frame buffer and high-speed features. Jelly3 series digital cameras can be widely used in machine vision and a variety of image acquisition areas.

Features

1. Micro USB3.0 High-speed interface, Bandwidth is 5Gb/s, plug and play, no need external power supply;
2. With 32M built-in hardware frame buffer, make sure no frame lost, support more cameras work together;
3. Support GPIO opto-isolated external trigger, External trigger delay setting does not affect the acquisition frame rate;
4. Provide completed API for users' secondary development, support VC, VB and other development language;
5. Support Windows XP, Win7, Win8, Win10, 32&64 bit operation systems, driver for Linux-Ubuntu & Android Operation System can be customized;
6. Precision aluminum alloy shell, small size 29×29×30mm, weight 45g.
7. 3m USB3.0 cable comes with fix screws.



8. Support C-mount interface and customize lens interface.

Applications

Jelly3 series USB3.0 industrial cameras are mainly designed for machine vision and various high speed image acquisition areas. They can be used for Gel imaging, License image capture, Medical diagnosis, Microscopy imaging, Notes image capture, Industrial production line image capture, Fingerprint & palmprint image capture, Desktop image, High speed vehicle license plate capture, Outdoor Monitoring, iris capture and etc..

Specification

(1) Cameras with Sony Sensor

Model	MU3S40M/C (SGYYO)	MU3S210M/C (SRYYO)	MU3S230M/C (SGYYO)	MU3S231M/C (SGYYO)	MU3S321M/C (SGYYO)	MU3S500M/C (SGYYO)	MU3S640M/C (SRYYO)	MU3S1200M/C (SRYYO)
Color/Mono	Mono/color	Mono/color	Mono/color	Mono/color	Mono/color	Mono/color	Mono/color	Mono/color
Sensor Type	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Sensor Model	Sony IMX287	SonyIMX290	Sony IMX174	Sony IMX249	Sony IMX265	Sony IMX264	Sony IMX178	Sony IMX226
Shutter	Global	Rolling	Global	Global	Global	Global	Rolling	Rolling
Sensor Size	1/2.9 inch	1/2.8 inch	1/1.2 inch	1/1.2 inch	1/1.8 inch	2/3 inch	1/1.8 inch	1/1.7 inch
Pixel Size	6.3×6.3μm	2.9×2.9um	5.86×5.86μm	5.86×5.86μm	3.45×3.45um	3.45×3.45um	2.4×2.4um	1.85×1.85um
Max Resolution	728×544	1944 × 1096	1936 × 1216	1936 × 1216	2048×1536	2464 × 2056	3096 × 2080	4072 × 3046
Frame Rate	328fps	60fps	80fps	40fps	60fps	35fps	30fps	14fps
Point Frequency	96MHz	96MHz	96MHz	96MHz	96MHz	96MHz	96MHz	96MHz
ADC Accuracy	12 bit	12 bit	12 bit	12 bit	12 bit	12 bit	12 bit	12 bit
SNR	47dB	50dB	45dB	45.2dB	40dB	40dB	50dB	45dB
Dynamic Range	74dB	75dB	73dB	72dB	70dB	70dB	70dB	70dB
Scan Mode	Progressive Scan							
Image Output	Micro USB3.0, Bandwidth 5Gb/s							
Power Supply	USB3.0 Power Supply, 300~500mA@5V							
Frame Buffer	32M Bit							
Input/Output	Opto-isolated GPIO, 1 channel external trigger input, 1 channel flash output, 1 channel 5V power supply input / output							
Main Function	Image display, image capture (bmp, jpg, tiff), video capture(compressor is optional)							
Programmable Control	Preview and capture AOI, SKIP/Binning mode, Contrast, Brightness, Saturation, Gamma, Gain, Exposure, Bad pixel remove, Focus Evaluation, User-defined serial Number(0-255), Hardware LUT(lookup table), Hardware CCM (Color Correction)							
White Balance	Auto / Manual							
Exposure	Auto / Manual							
Image Format	Support 8bit, 24bit, 32bit Image Preview and Capture, Save as "Jpeg", "Bmp", "Tiff" format							
Driver Support	ActiveX, Twain, DirectShow, VFW							
Operation System	Support Windows XP/7/8/10 32&64 bit Operation System (Linux and Android Operation System custom development)							

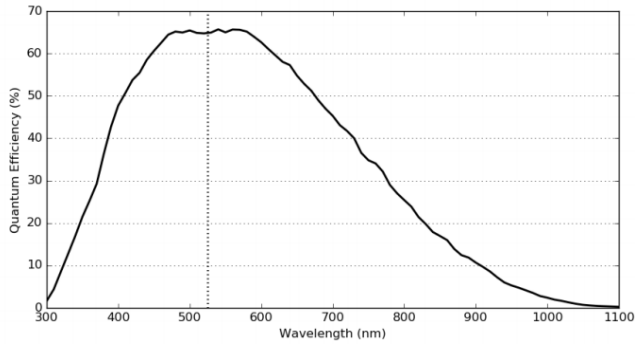
SDK	Support VC, VB, C#, DELPHI developing language, support LABVIEW, OPENCV, HALCON, MIL Software
Lens Port	C-mount(CS/M12 is optional)
Working Temperature	0°C~60°C
Storage Temperature	-30°C~70°C
Camera Dimension	29mm(height)×29mm(width)×30mm(length)
Camera Weight	45g(High-precision CNC aluminum alloy shell)
Accessories	Color cameras come with IR cut filter(mono camera does not have filter), 3m USB cable with fix screws, 6-pin Hirose GPIO connector, 1 CD with software and SDK.

(2) Cameras with other Sensors

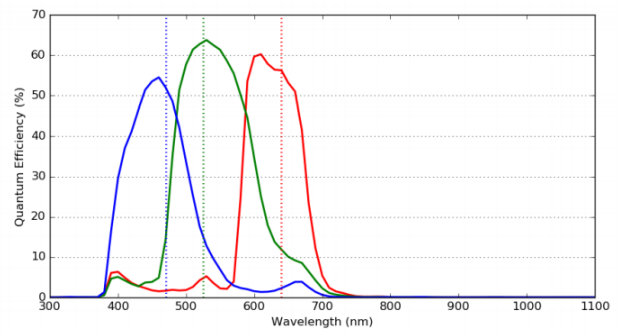
Model	MU3C120M/C (MGYYO)	MU3E130M/C (EGYYO)	MU3I130M/C (IGYYO)	MU3E200M/C (EGYYO)	MU3C500M/C (MRYYO)	MU3C1400M/C (MRYYO)
Color/Mono	Mono/Color	Mono/Color	Mono/Color	Mono/Color	Mono/Color	Mono/Color
Sensor Type	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
Sensor Model	Aptina AR0134	E2V EV76C560	ISG1307	E2V EV76C570	Aptina MT9P031	Aptina MT9F002
Shutter	Global	Global	Global	Global	Rolling	Rolling
Sensor Size	1/3 inch	1/1.8 inch	1/2 inch	1/1.8 inch	1/2.5 inch	1/2.3 inch
Pixel Size	3.75×3.75μm	5.3×5.3μm	4.8×4.8μm	4.5×4.5μm	2.2×2.2um	1.4×1.4um
Max Resolution	1280 × 960	1280 × 1024	1280 × 1024	1600 × 1200	2592 × 1944	4608 × 3288
Frame Rate	60fps	60fps	150fps	60fps	14fps	12fps
Point Frequency	96MHz	96MHz	96MHz	96MHz	96MHz	96MHz
ADC Accuracy	12 bit	10 bit	10 bit	10 bit	12 bit	12 bit
SNR	38dB	41dB	41dB	39dB	38.1dB	36.5dB
Dynamic Range	64dB	62dB	60dB	52dB	70.1dB	65.3dB
Scan Mode	Progressive Scan					
Image Output	Micro USB3.0, Bandwidth 5Gb/s					
Power Supply	USB3.0 Power Supply, 300~500mA@5V					
Frame Buffer	32M Bit					
Input/Output	Opto-isolated GPIO, 1 channel external trigger input, 1 channel flash output, 1 channel 5V power supply input / output					
Main Function	Image display, image capture (bmp, jpg, tiff), video capture(compressor is optional)					
Programmable Control	Preview and capture AOI, SKIP/Binning mode, Contrast, Brightness, Saturation, Gamma, Gain, Exposure, Bad pixel remove, Focus Evaluation, User-defined serial Number(0-255), Hardware LUT(lookup table), Hardware CCM (Color Correction)					
White Balance	Auto / Manual					
Exposure	Auto / Manual					
Image Format	Support 8bit, 24bit, 32bit Image Preview and Capture, Save as "Jpeg", "Bmp", "Tiff" format					
Driver Support	ActiveX, Twain, DirectShow, VFW					
Operation System	Support Windows XP/7/8/10 32&64 bit Operation System (Linux and Android Operation System custom development)					
SDK	Support VC, VB, C#, DELPHI developing language, support LABVIEW, OPENCV, HALCON, MIL Software					
Lens Port	C-mount					
Working Temperature	0°C~60°C					

Storage Temperature	-30°C~70°C
Camera Dimension	29mm(height)×29mm(width)×30mm(length)
Camera Weight	45g(High-precision CNC aluminum alloy shell)
Accessories	Color cameras come with IR cut filter(mono camera does not have filter), 3m USB cable with fix screws, 6-pin Hirose GPIO connector, 1 CD with software and SDK.

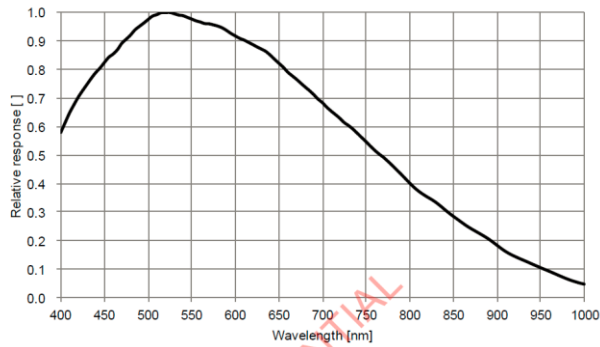
Spectral Response Curve



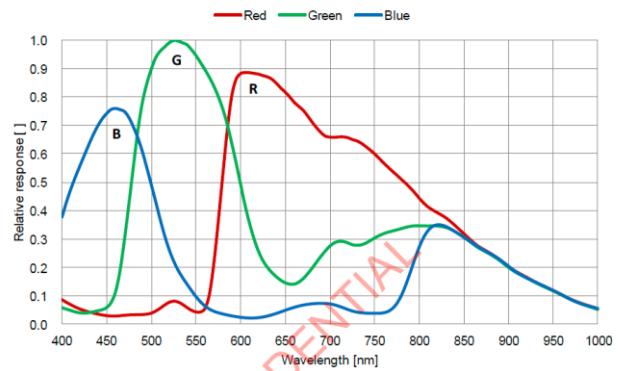
MU3S40M(SGYO)



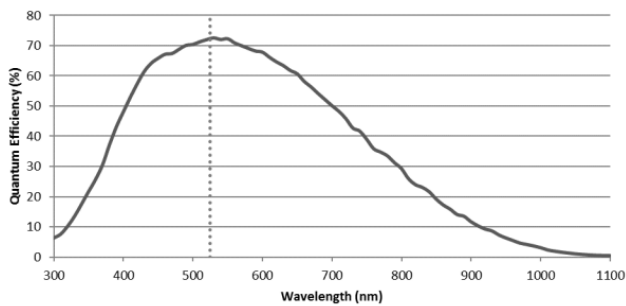
MU3S40C(SGYO)



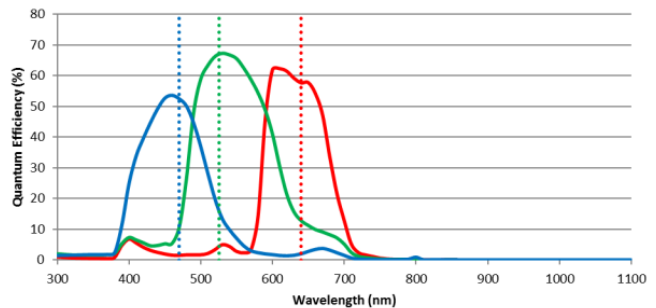
MU3S230/231M(SGYO)



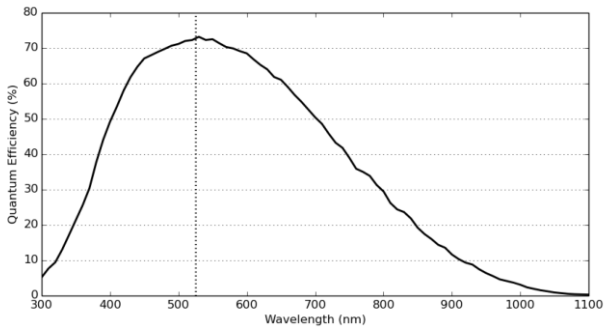
MU3S230/231C(SGYO)



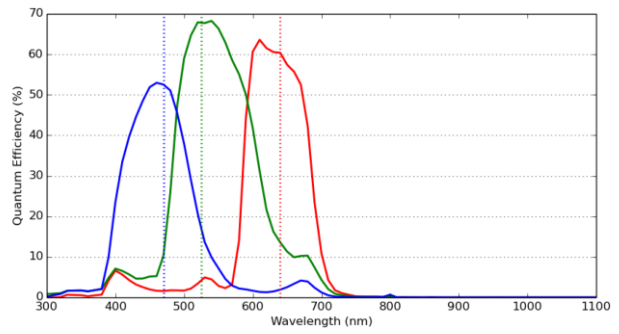
MU3S321M(SGYO)



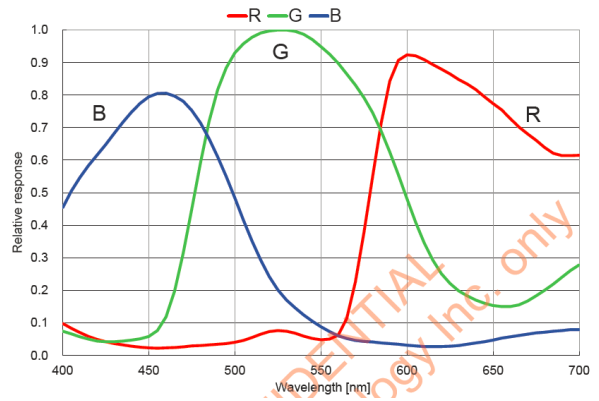
MU3S321C(SGYO)



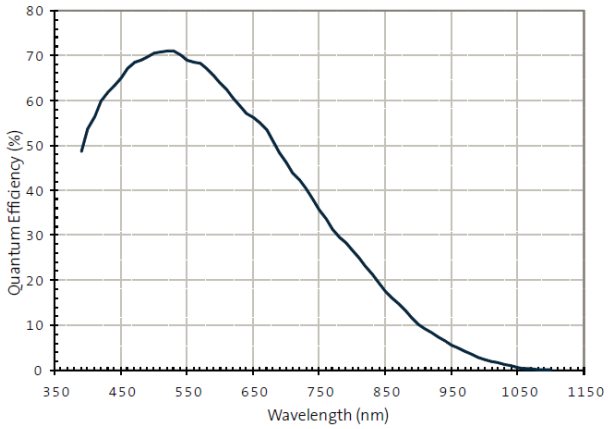
MU3S500M(SGYO)



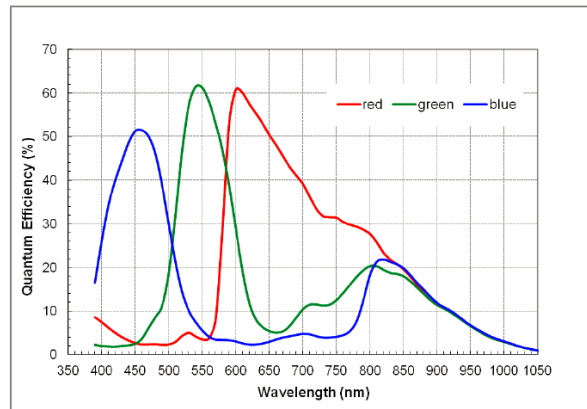
MU3S500C(SGYO)



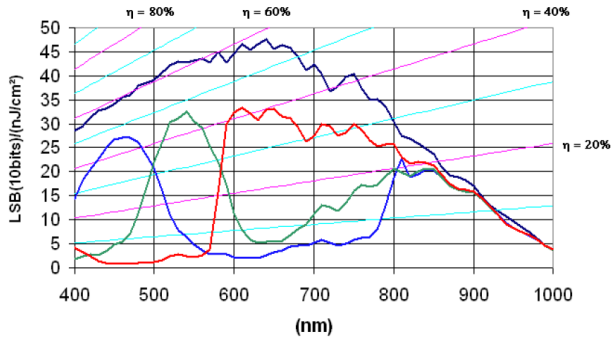
MU3S640C(SGYO)



MU3C120M(MGYO)



MU3C120C(MGYO)



MU3E130M/C(EGYYO)

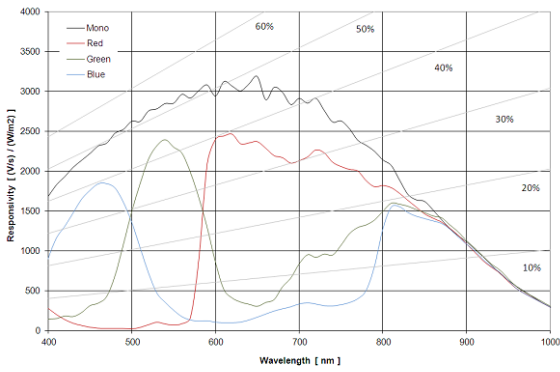
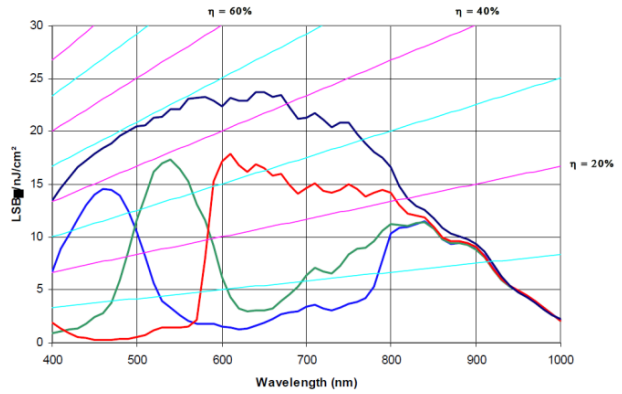
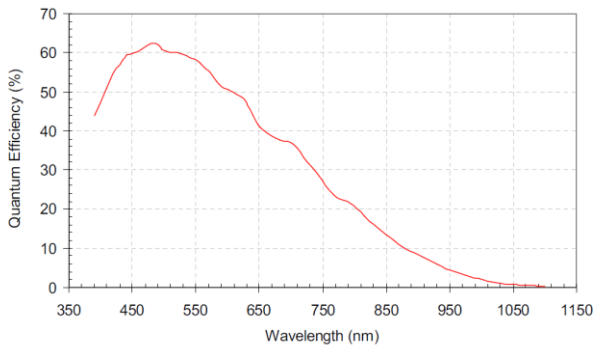


Figure 3. Spectral Response Curve for Mono and Color

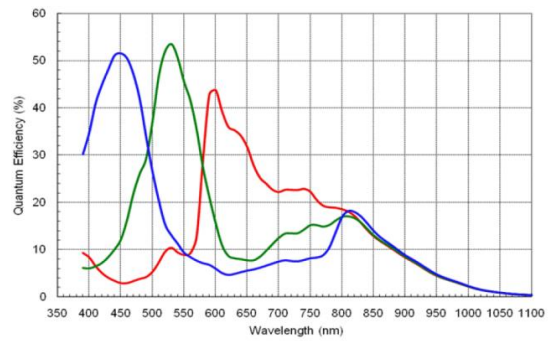
MU3I130M/C(IGYYO)



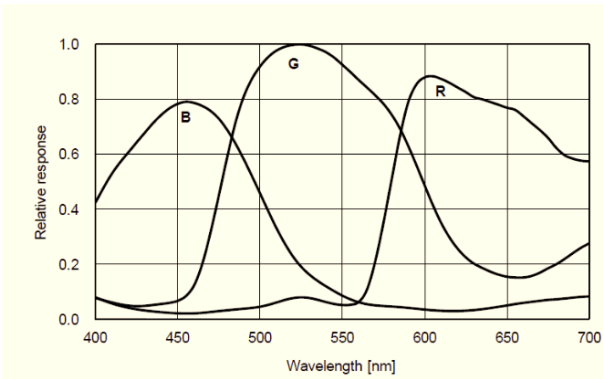
MU3E200M/C (EGYYO)



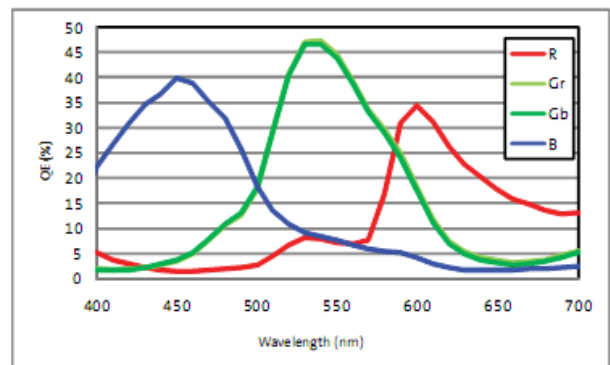
MU3C500M(MRYYO)



MU3C500C(MRYYO)



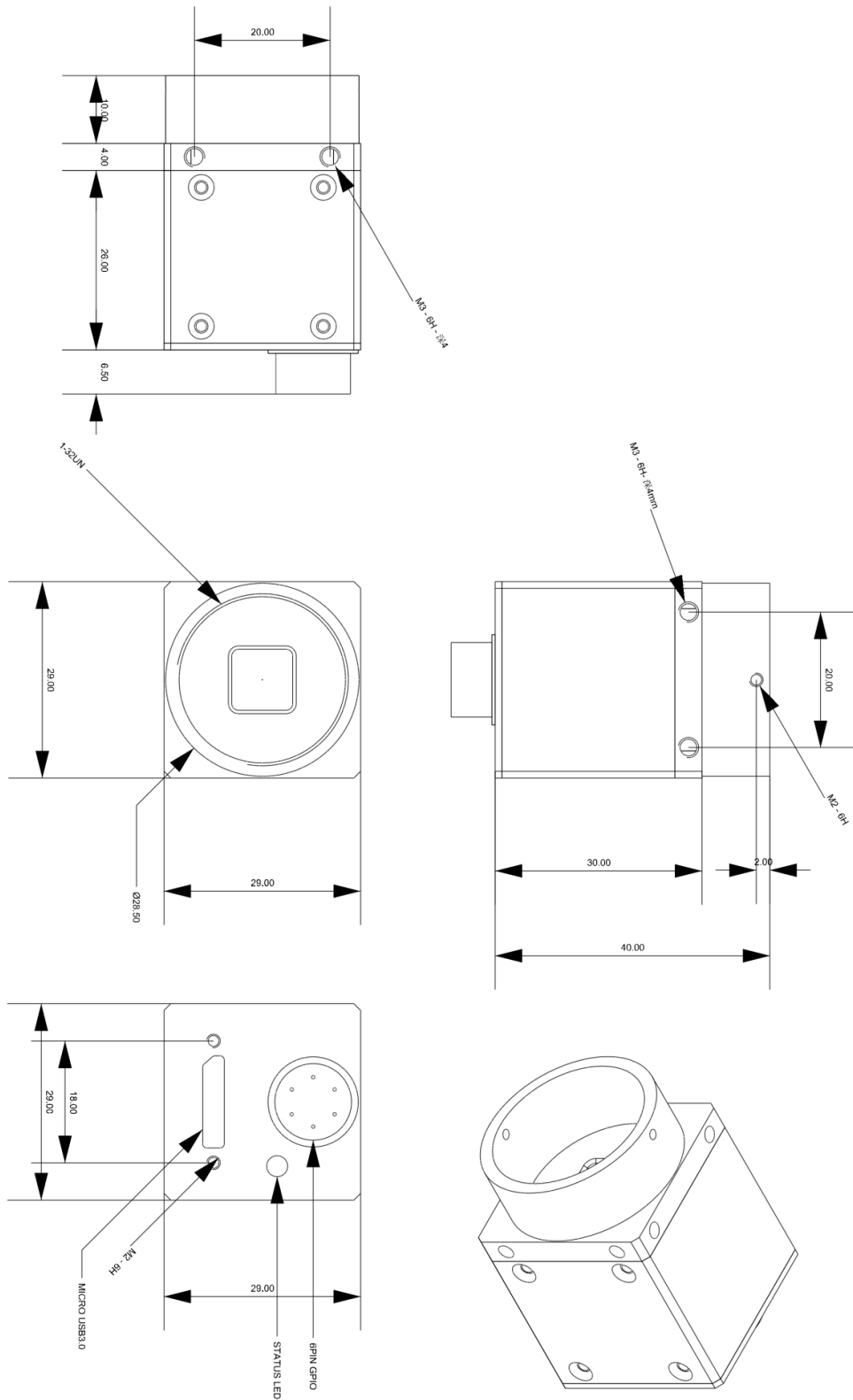
MU3S1200C(MRYYO)



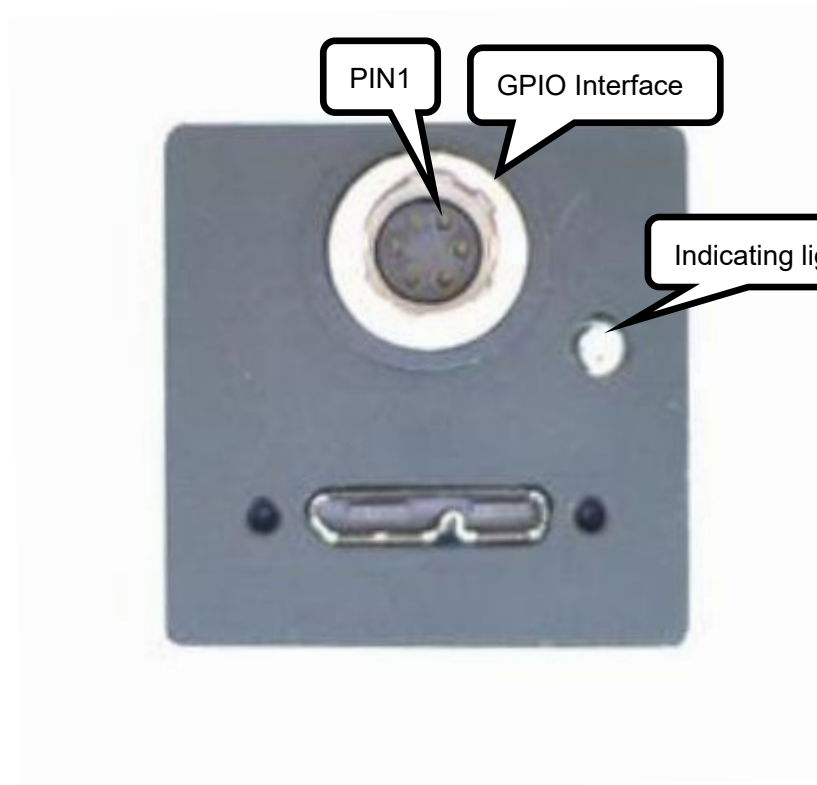
MU3C1400C(MRYYO)

Dimension

Unit: mm



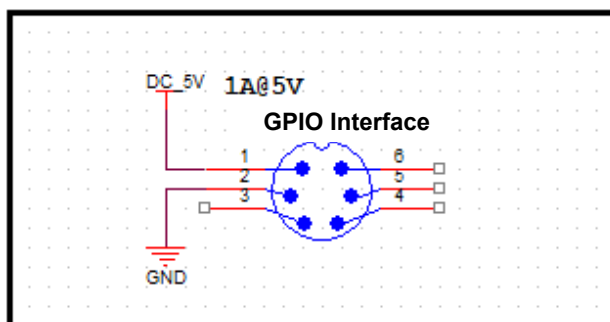
GPIO External Trigger interface introduction



Trigger Serial No	1	2	3	4	5	6
Cable Color	Red	Black	Yellow	White	Gray	Brown
Function Symbol	5V_IN	GND	TRIGGER_IN+	TRIGGER_IN-	FLASH_OUT_C	FLASH_OUT_E
Function Definition	Power Supply Input Interface		GPIO Input Interface		GPIO Output Interface	

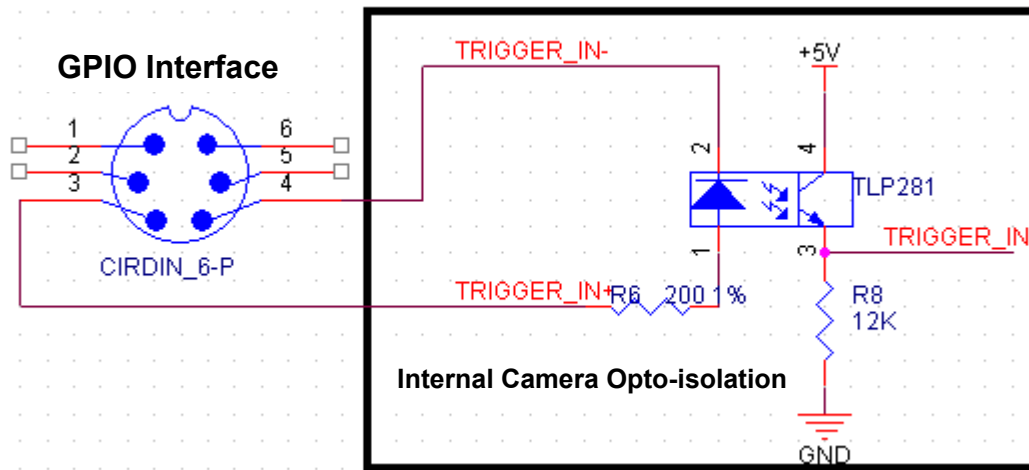
Power Supply Input Interface

The camera is powered by USB3.0 Bus Power, the power supply of USB3.0 standard should be 5V@900mA. In actual applications, sometimes the host is not insufficient for power supply, or because the USB cable is too long, or because of anti-interference requirements, users can use “5V_IN” interface of GPIO to provide power supply for the camera. To ensure stable work of the camera, power requires DC + 5V, Min. = + 4.5V, Max. = + 5.5V; the drive current > 1A.



GPIO Input Interface

The following figure is the schematic diagram of GPIO input, the input signal has been insulated by opto-coupler TLP281. 200 ohm resistor is in series connection inside the camera. GPIO input interface is generally used for external trigger input signal synchronization acquisition for multi-camera, It also can be used as an external signal acquisition, please refer to the instructions in SDK (software development Kit) for detailed applications.



Regarding the TLP 281 parameters, please refer to instructions manual.

1. The camera's internal optocoupler VCC = 5V, If IF = 16mA, then the external trigger input Rising edge Delay is 2us, Falling edge Delay is 40us;
2. When using "TRIGGER_IN +" as trigger source, the trigger electrical level range is +3V- + 6V.
3. If the trigger source electrical level is lower then 3V, will lead to a trigger signal loss;
4. If the trigger source electrical level is out of this range, an external current limiting resistor should be connected to make the optocoupler works around the typical current 16mA, otherwise the optocoupler will have risk of burning. If the trigger source voltage of 12V, the need for external resistors in series about 1K, if the trigger source voltage of 24V, the need for external resistors in series about 2.2K,

Limiting resistor is calculated as follows:

$$R = 100 \times (V_{in} - 0.7) - R_0$$

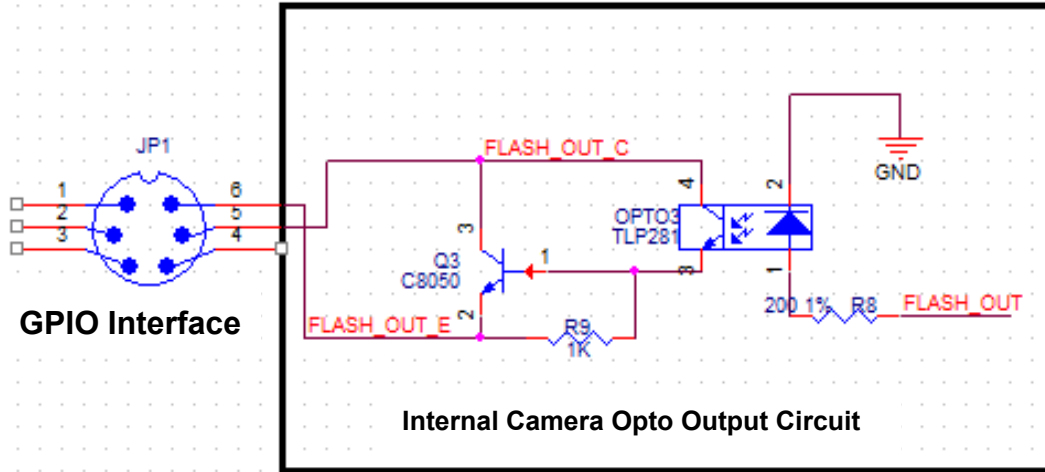
V_{in} is Trigger source electrical level

R₀ is The camera's internal series resistor 200 Ohm

R is the required external series resistor.

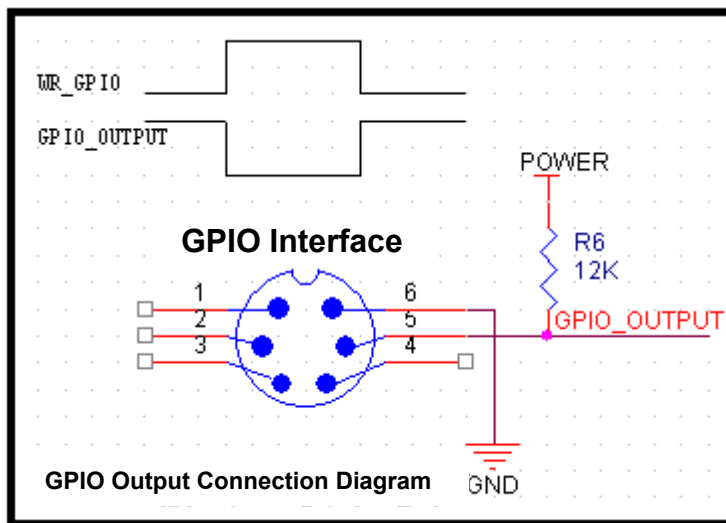
GPIO Output Interface

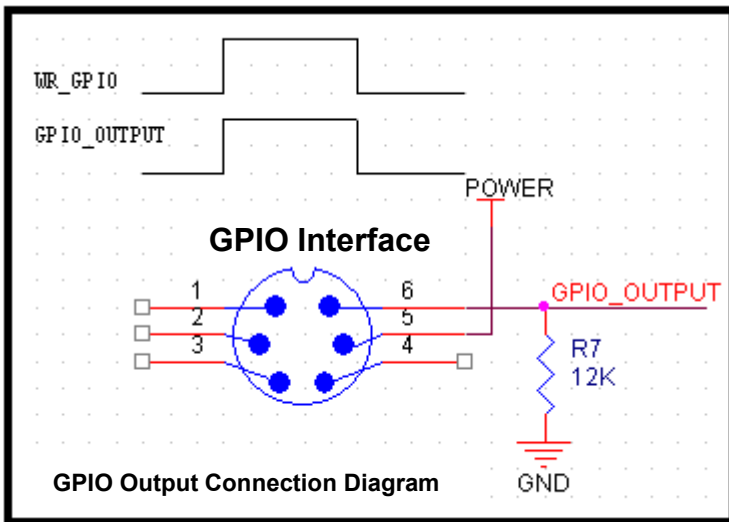
The figure below is the schematic diagram of GPIO output interface, the output signal has been isolated through the optocoupler TLP281, coupled with an NPN audion to magnify drive capability; GPIO interface is generally used to output camera flash light signals, users also can output signal through SDK.



1. GPIO work as a normal IO output.

The following figure shows the ordinary connection when output interface work as normal IO output, the user needs to provide external power supply and pull-up or pull-down resistors.

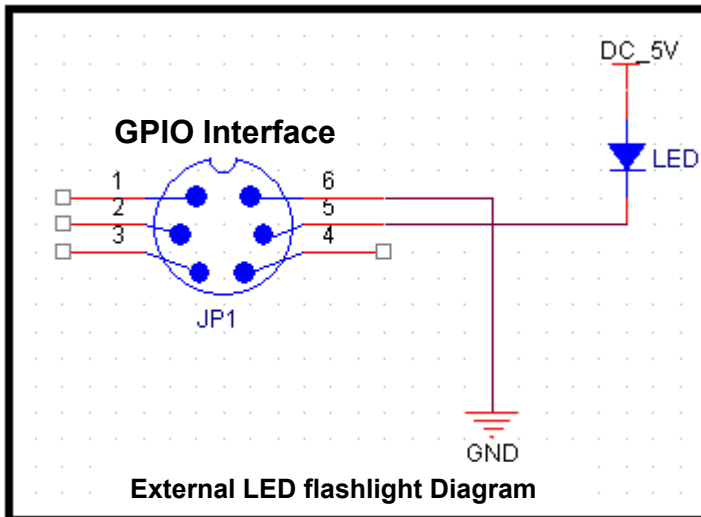




In the figure, "POWER" is the power supply for the user, "WR_GPIO" is the output electrical level signal which is set by the user in SDK. "GPIO_OUTPUT" is the output signal, please note that the output electrical level of the 2 connections is just the opposite.

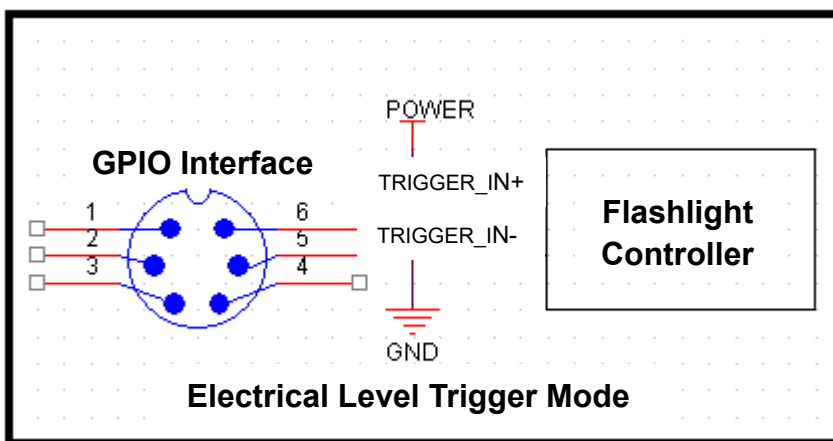
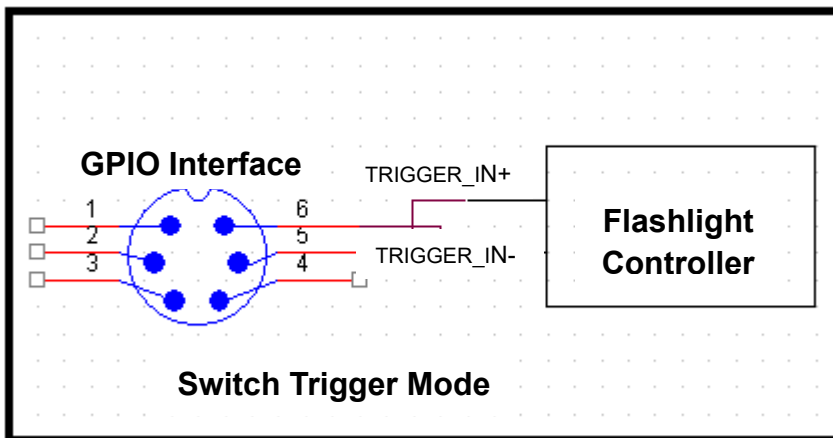
2. GPIO output to drive external load.

GPIO output interface is an open-drain output, it has certain drive capability to directly drive a small power device, as below figure, it is connected to 5V LED indicating light or low power flash lights.



3. GPIO output interface connected with flash light controller.

The flash trigger interfaces of flash light controller are generally divided into the switch trigger and electrical level trigger two kinds; wire connection diagram is as follows:



In the figure, "POWER" and "GND" are external power supply for the user, the electrical level should meet the interface requirements of flash light controller.