Jelly6 Series USB3.1 ultra high-speed Industrial Digital Cameras

Introduction

Jelly6 series USB 3.0 ultra high-speed industrial digital cameras adopt the latest USB3.0 technology, high speed Sony sensor and 128M built-in hardware frame buffer, the speed is much faster than USB2.0 and normal USB3.0 digital cameras, the resolution range from 2.3MP to 20.0MP. These cameras have high sensitivity, high dynamic range, hardware frame buffer and high-speed features. Jelly6 series digital cameras can be widely used in machine vision and a variety of image acquisition areas.

Features

1. From 2.3MP to 20.0MP mono/color industrial digital cameras;

2. Global shutter with 164fps@2.3MP, 90fps@4.0MP, 75fps@5.0MP, rolling shutter with 15fps@20.0MP;

3. With built-in 128M hardware frame buffer, make sure no frame lost, support more cameras work together;

4. Mirco USB3.1 High-speed interface, Bandwidth is 5Gb/s, plug and play, no need external power supply;

5. Support GPIO opto-isolated external trigger, External trigger delay setting does not affect the acquisition frame rate;

6. Provide completed API SDK for users' secondary development, support VC, VB and C# development language;

7. Driver support Windows 32&64 bit operation system, drivers for Linux-Ubuntu & Android operation system can be customized;

8. CNC machining high precision aluminum alloy shell, small size 29×29×30mm, weight 45g;

9. 3m USB3.0 cable comes with fixing screws.

Application

Jelly6 series USB3.0 ultra high-speed 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..
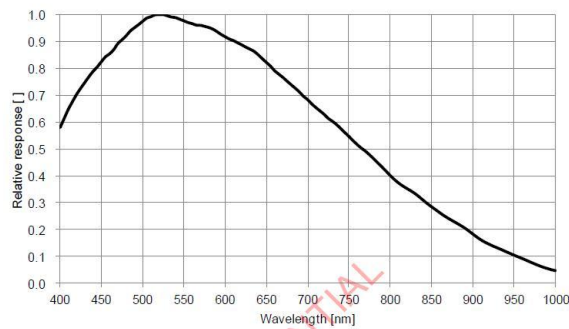
Specification

Model	MU3HI130M/C (IGYYO)	MU3HS230M/C (SGYYO)	MU3HI401M/C (IGYYO)	MU3HS500M/C (SGYYO)	MU3HS2000M/C (SRYYO)
Color/Mono	Mono/color	Mono/color	Mono/color	Mono/color	Mono/color
Sensor Type	CMOS	CMOS	CMOS	CMOS	CMOS
Sensor Model	ISG1307	Sony IMX174	ISG4006	Sony IMX250	Sony IMX183
Shutter	Global	Global	Global	Global	Rolling
Sensor Size	1/2 inch	1/1.2 inch	1 inch	2/3 inch	1 inch
Pixel Size	4.8×4.8μm	5.86×5.86μm	5.5×5.5μm	3.45×3.45μm	2.4×2.4μm
Max Resolution	1280×1024	1936×1216	2048×2048	2464×2056	5472×3648
Frame Rate	210fps	130fps	84fps	71fps	18fps
Image Output	Micro USB3.1, Bandwidth 5Gb/s				
Power Supply	USB3.1 Power Supply, 300-500mA@5V				
Frame Buffer	128MB frame buffer				
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 ROI, SKIP/Binning mode, Gain, Exposure etc.				

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	Twain, DirectShow
Operation System	Support Windows XP/7/8/10 32&64 bit Operation System (Linux and Android Operation System customize 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	54g(High-precision CNC aluminum alloy shell)
Warranty	3 years
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

MU3HS230M

MU3HS230C

MU3HI401M

MU3HI401C

Fig. 11: acA2040-55um, acA2040-120um, acA2440-35um, and acA2440-75um (From Sensor Data Sheet)

MU3HS500M

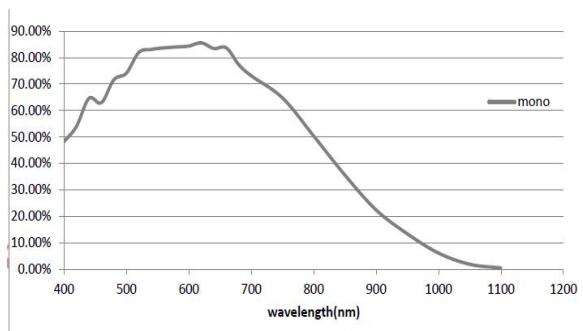MU3HS500C

Spectral Sensitivity Characteristics

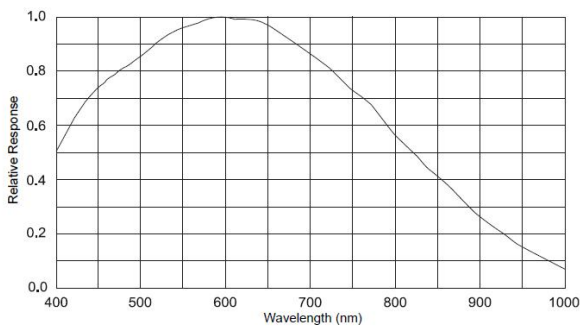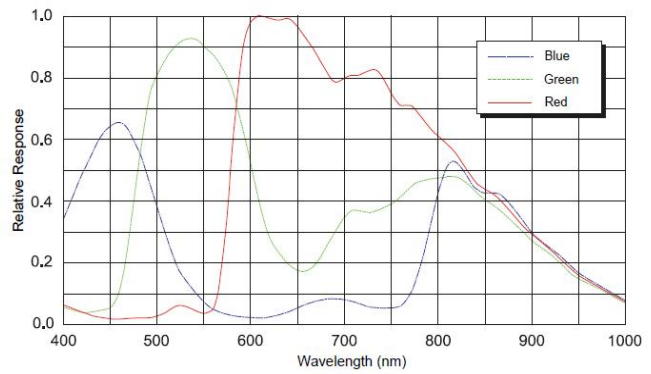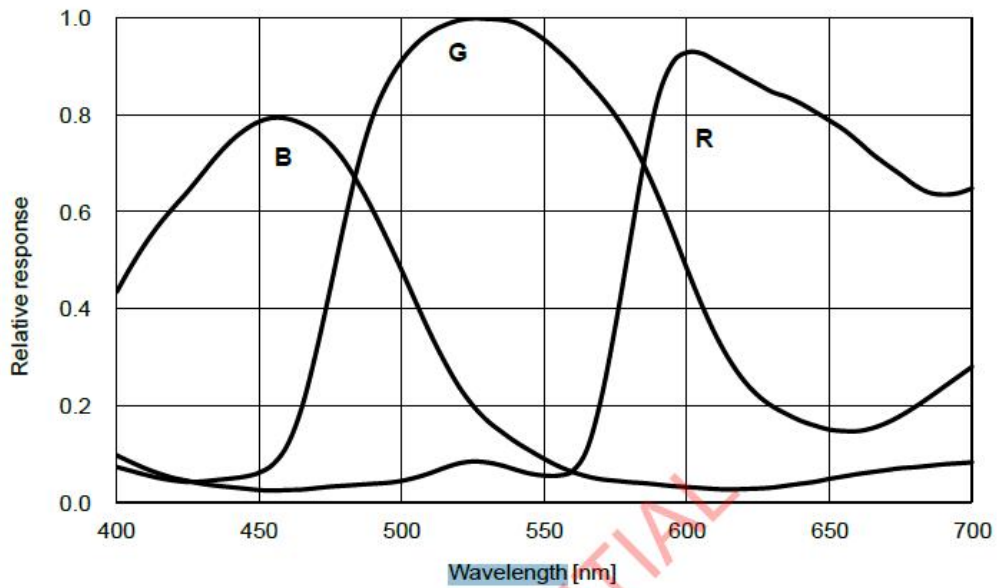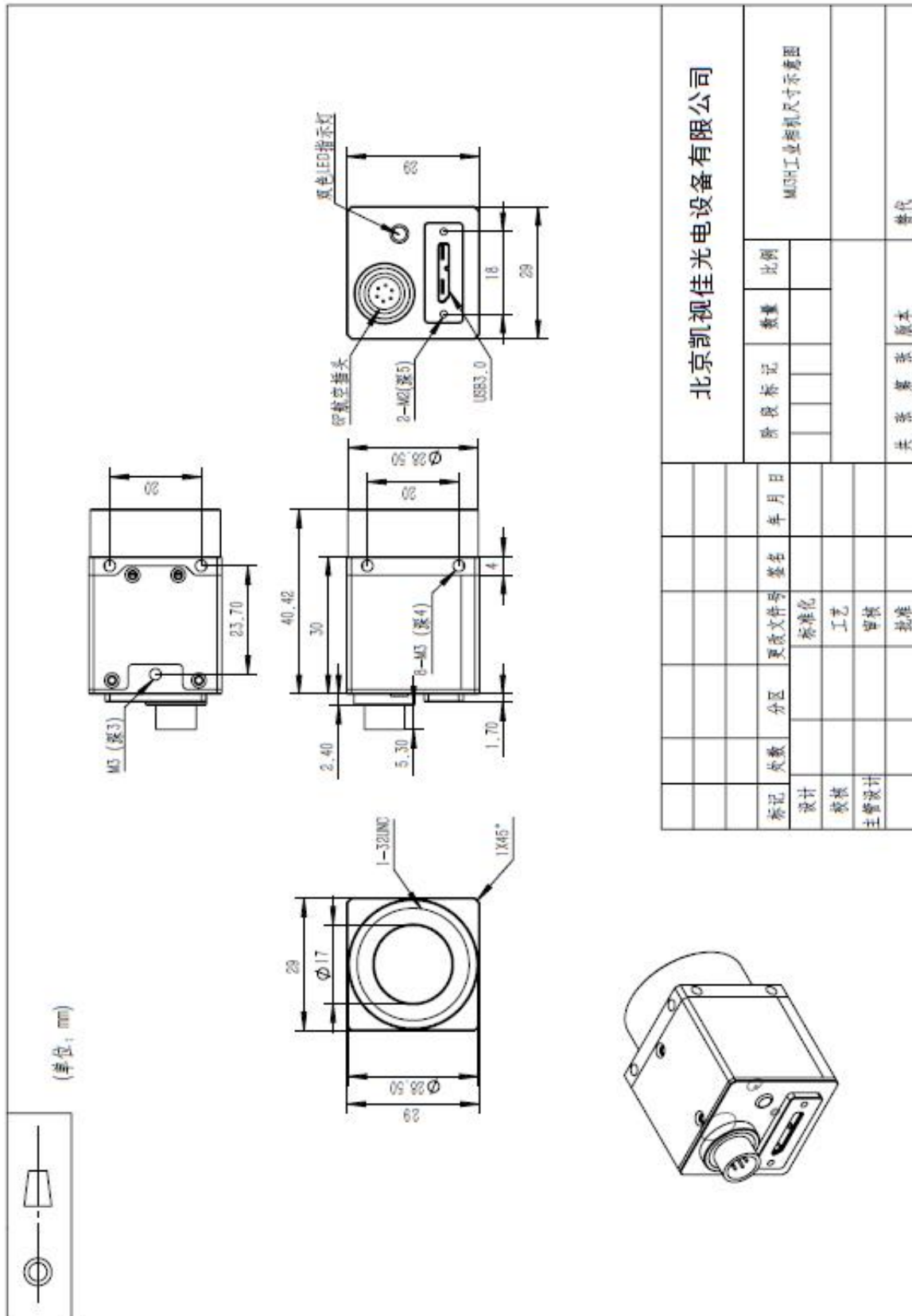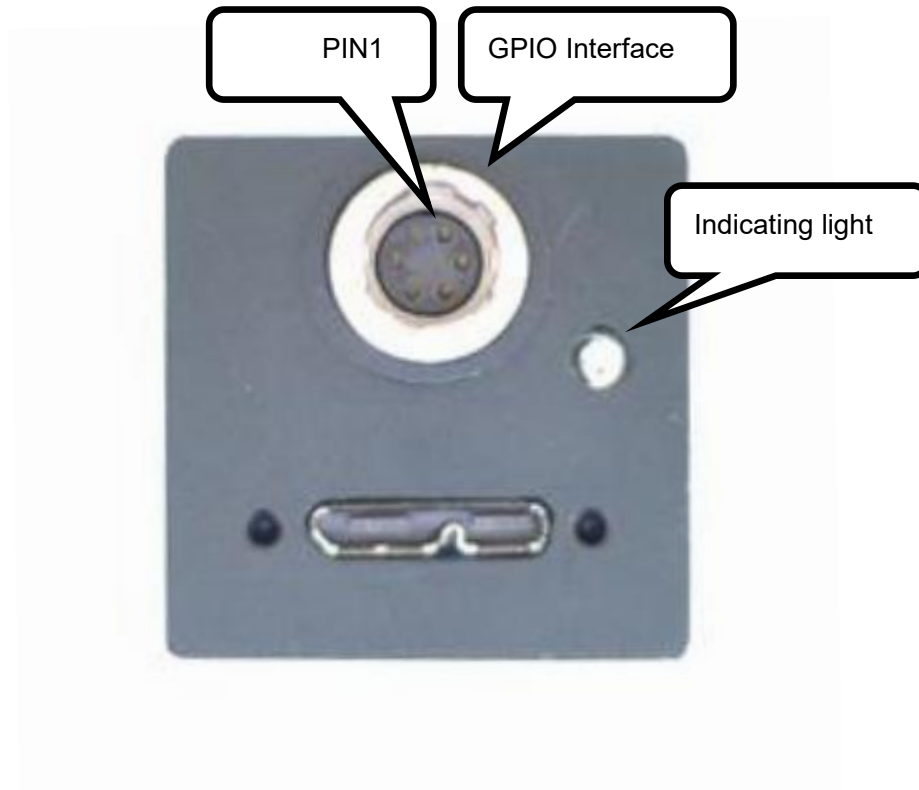(excludes lens characteristics and light source characteristics)



MU3H2000M/C

Dimension

Unit: mm

GPIO External Trigger interface introduction

PIN1 GPIO Interface

Indicating light

| Trigger Serial No	1	2	3	4	5	6
Cable Color	Red	Black	Yellow	White	Gray	Brown
Function Symbol	5V_IN	TRIGGER_IN	USER_GPIO	FLASH_OUT	IO_GND	GND

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.
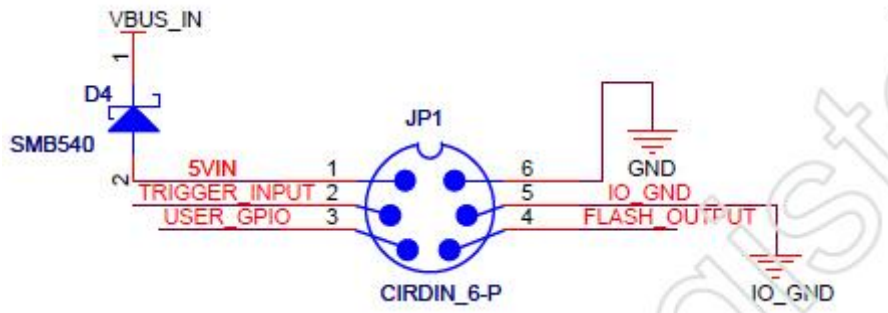
GPIO Input Interface

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.

Internal Camera Opto-isolation
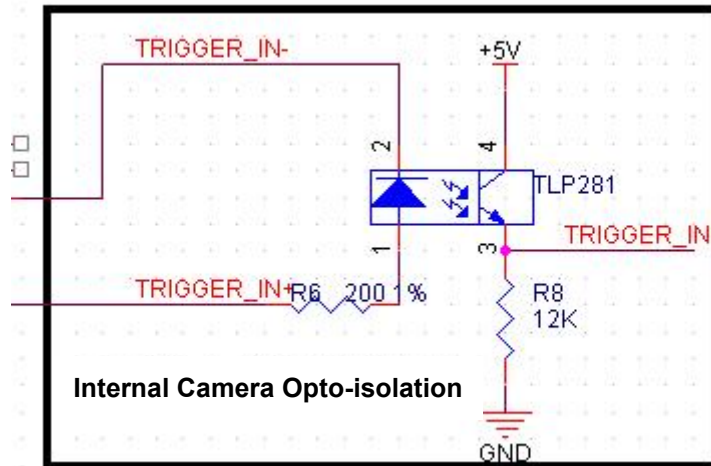
1. The camera's internal optocoupler VCC = 5V, If IF = 16mA, then the external trigger input Rising edge Delay is 2us, Falling edge Delay is 40us;

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 is 12V, need to connect external resistor in series about 1K, if the trigger source voltage is 24V, need to connect external resistor in series about 2.2K,

Limiting resistor is calculated as follows:

R = 100 x (Vin – 0.7) – R0

Vin 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.

Internal Camera Opto Output Circuit
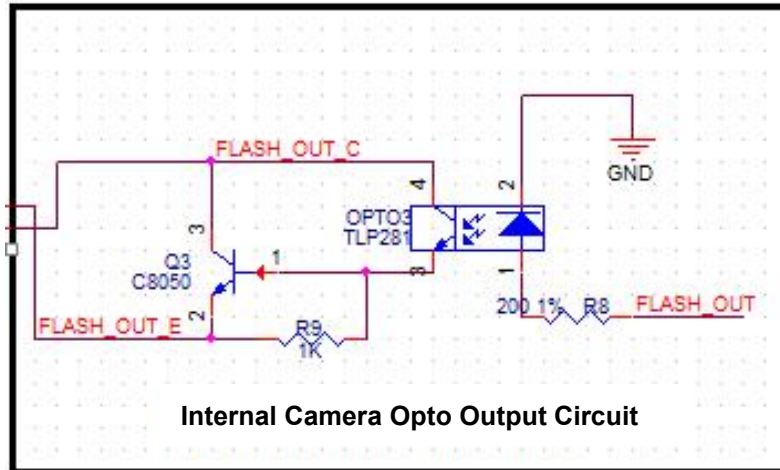
1. GPIO work as a normal IO output.
The following figure shows the ordinary connection when output interface work as normal IO output, the user needs to provide external power supply and pull-up or pull-down resistors.

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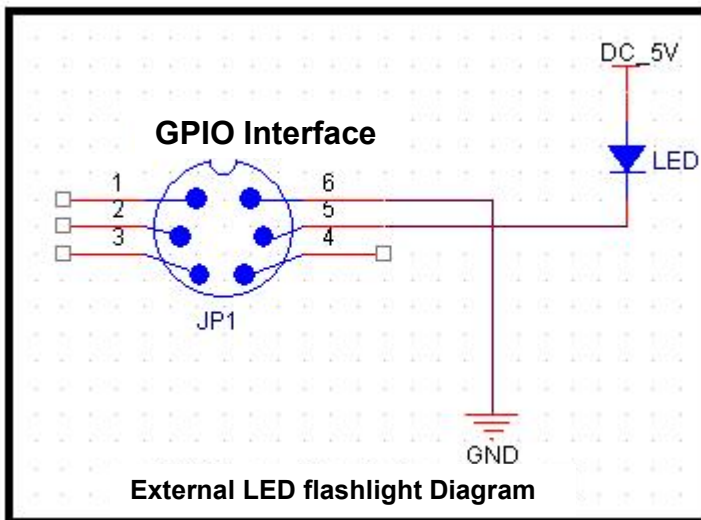
GPIO Output Connection Diagram
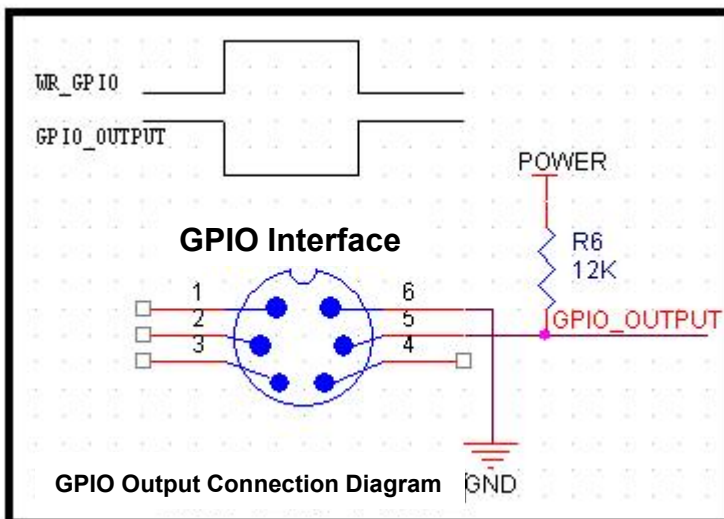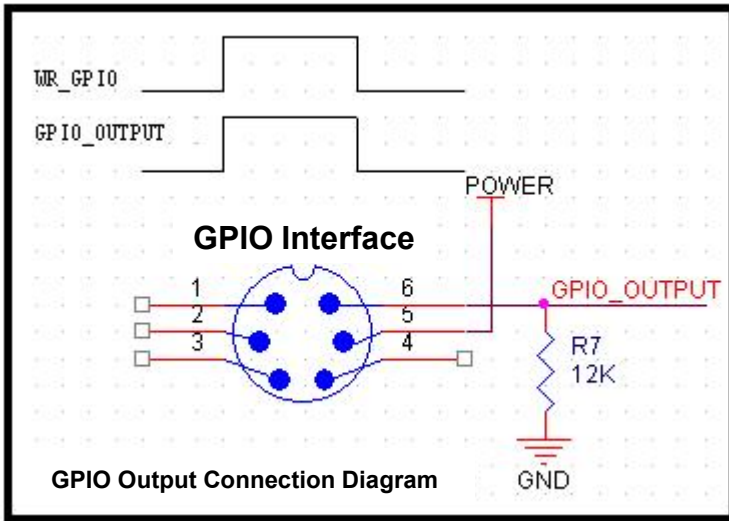
In the above figure, "POWER" is the power supply for the user, "WR_GPIO" is the output electrical level signal which is set by the user in SDK. "GPIO_OUTPUT" is the output signal, please note that the output electrical level of the 2 connections is just the opposite.

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.

External LED flashlight Diagram

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; wire connection diagram is as follows:

Switch Trigger Mode

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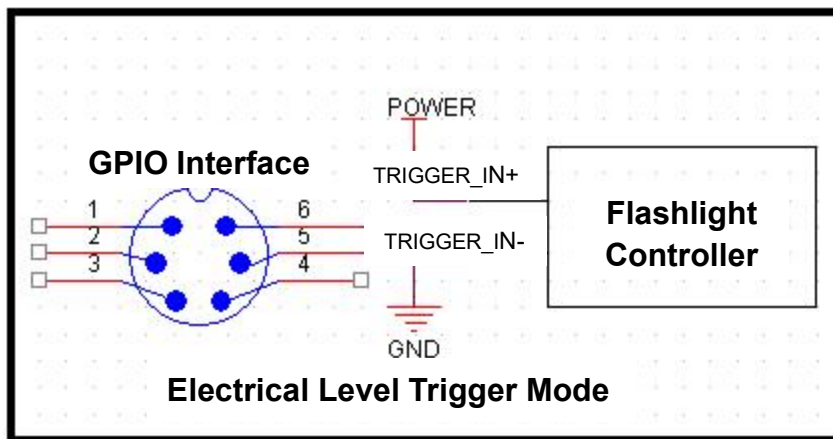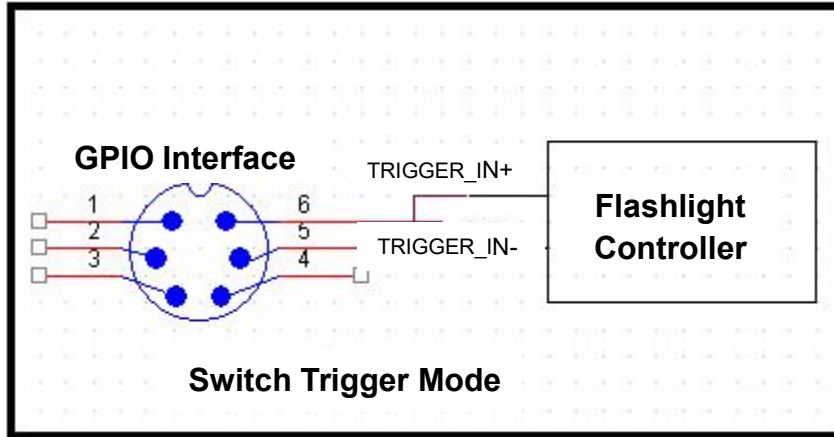
In the figure, "POWER" and "GND" are external power supply for the user, the electrical level should meet the interface requirements of flash light controller.