

## Jelly2 Series USB2.0 Industrial Digital Camera



### Introduction

Jelly2 series smart industrial cameras are mainly designed for machine vision and various image acquisition areas. The cameras are very compact, occupy a very small space, can be used on machines or solutions which have limit space. Resolution from 0.36MP to 5.0MP, speed upto 110fps, support global shutter and rolling shutter, support opto-couplers isolation GPIO, support multi-cameras work together, compact and light.

### Features

1. 0.36MP, 5.0MP resolution, total 6 models mono/color industrial digital camera;
2. USB2.0 interface, up to 480Mb/s, Plug and play, no need external power supply;
3. Provide completed API for users' secondary development, provide Demo Source Code, Support VC, VB, DELPHI, LABVIEW and other development language;
4. Support firmware upgrade on-line;
5. Support Windows XP / Vista / 7 / 8/10 32&64 bit Operation System, can customize for Linux-Ubuntu, Android Operation System;
6. CNC processed precision aluminum alloy shell, size is 29mm×29mm×30mm, net weight: 35g;
7. Board camera is available.

### Application

Jelly2 series industrial cameras are mainly designed for machine vision and various image acquisition areas. They are mainly used for following areas:

#### Medical and life sciences Area

- ❖ Microscope Imaging
- ❖ Medical diagnosis
- ❖ Gel Imaging
- ❖ Live Cell Imaging
- ❖ Ophthalmology and iris imaging

#### Industrial Area

- ❖ Electronics and semiconductor inspection

- ❖ Visual positioning(SMT/AOI/Glue dispenser)
- ❖ Surface defect detection
- ❖ 3D scanning machine
- ❖ Printing quality inspection
- ❖ Food and medicine bottles inspection
- ❖ Robot welding
- ❖ Tag OCR/OCV identification
- ❖ Robot arm visual positioning
- ❖ Industrial production line monitoring
- ❖ Vehicle wheel alignment machine
- ❖ Industrial Microscope
- ❖ Road toll and traffic monitoring
- ❖ High speed vehicle plate image capture

**Public security and investigation**

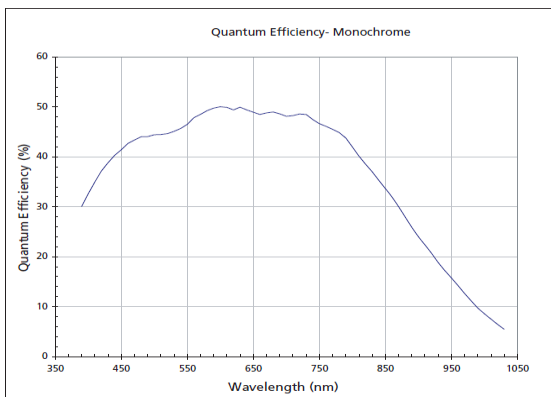
- ❖ Biometrics
- ❖ Fingerprint, palm print image capture
- ❖ Facial recognition
- ❖ License image capture
- ❖ Documents and notes image capture and identification
- ❖ Spectroscopy testing equipment

**Specification**

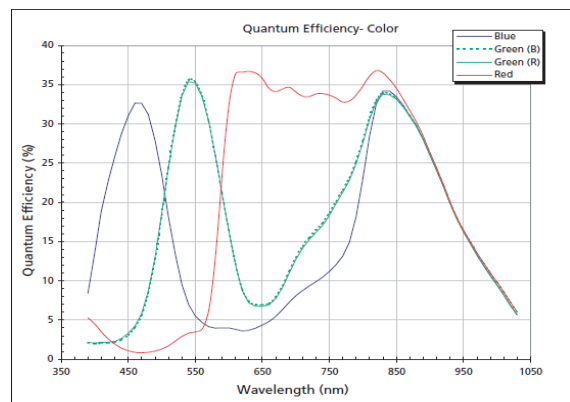
Model	MUC36M/C(MGYYO)	MUC36M/C(MRYYO)-H	MUC500M/C(MRYYO)
Sensor Model	Aptina MT9V034	Aptina MT9V034	Aptina MT9P031/006
Color	Mono/Color	Mono/Color	Mono/Color
Image Sensor	NIR Enhancing CMOS	NIR Enhancing CMOS	CMOS
Sensor Size	1/3"	1/3"	1/2.5"
Effective Pixels	0.36MP	0.36MP	5.0MP
Pixel Size	6.0μm×6.0μm	6.0μm×6.0μm	2.2μm×2.2μm
Sensitivity	4.8V/lux-sec	4.8V/lux-sec	1.4V/lux-sec
Max. Resolution	752 × 480	752 × 480	2592 × 1944
Frame Rate	60fps	110fps	9fps
Exposure Mode	Global Shutter	Global Shutter	Rolling Shutter
Dot Frequency	27MHz	27MHz	48MHz
Dynamic Range	55dB~100dB	55dB~100dB	70.1dB
Signal Noise Rate	>45dB	>45dB	38.1dB
Frame Buffer	32MB Frame buffer		
Scan Mode	Progressive Scan		
Spectral Response	400nm~1000nm		
Input & Output	Optocoupler isolation GPIO, 1 of external trigger input, 1 of flash light output, 1 of 5V input/output		
White Balance	Auto / Manual		
Exposure Control	Auto / Manual		
Main Function	Image preview, image capture(bmp, jpg, tiff), Video record(compressor is optional)		

Programmable Control	Preview FOV ROI, Capture FOV ROI, SKIP/Binning mode, Contrast, Brightness, Saturation, Gamma value, RGB color gain, exposure, dead pixels remove, focus evaluation, custom serial number (0 to 255)
Data Output	Mini USB2.0, 480Mb/s
Power Supply	USB2.0 Power Supply, 200-300mA@5V
Compatible Interface	ActiveX, Twain, DirectShow, VFW
Image Format	Support 8bit, 24bit, 32bit image preview and capture, save as Jpeg, Bmp, Tiff format
Operation System	Windows XP/VISTA/7/8/10 32&64 bit OS (can customize for Linux-Ubuntu, Android OS)
SDK	Support VC, VB, C#, DELPHI developing Language; OPENCV, LABVIEW, MIL thirty-parties' machine vision software
Lens Interface	Standard C-Mount ( CS and M12 mount are optional)
Work Temperature	0°C~60°C
Storage Temperature	-30°C~70°C
Camera Dimension	29mm×29mm×30mm((C-mount is not included))
Module Dimension	27mm×27mm×22mm
Camera Weight	35g
Accessories	Equipped with standard infrared filter(not available in mono camera), 2m USB cable with fix screws, 6-pin Hirose GPIO connector, 1 CD with software and SDK.
Box Dimension	118mm×108mm×96mm (length × width × height)

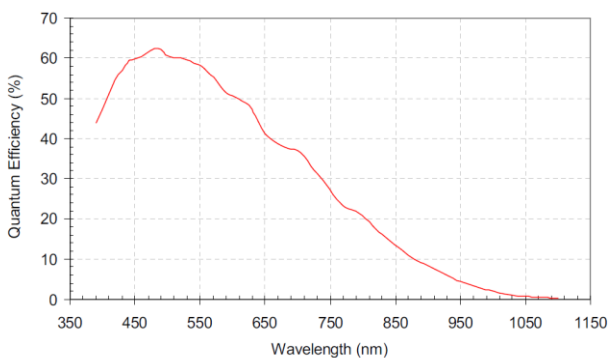
## Spectral Response Curve



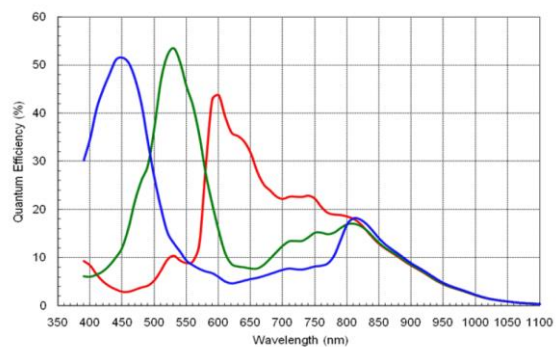
MUC36M(MGYO)/-H



MUC36C(MGYO)/-H

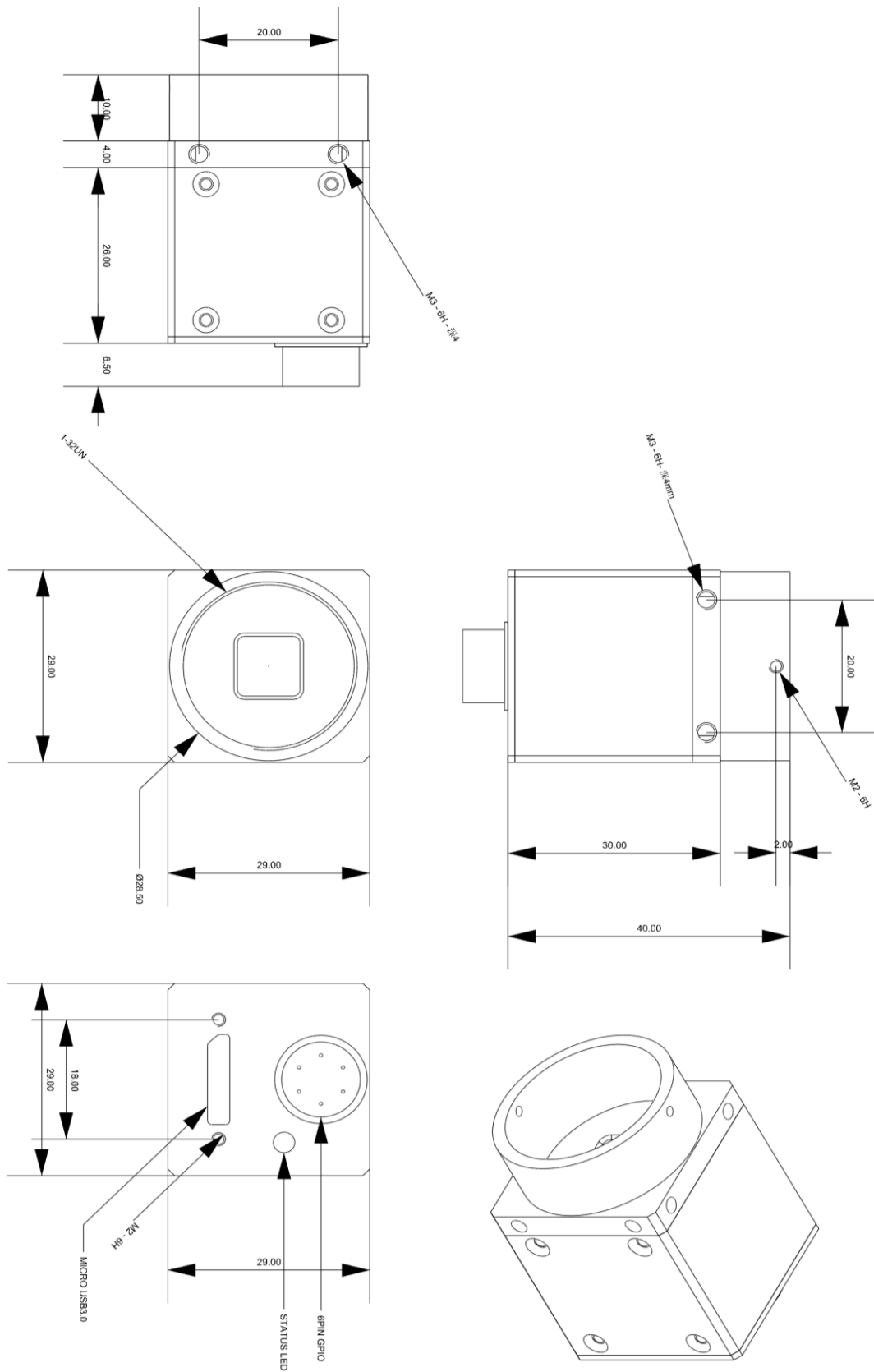


MUC500M(MRYO)

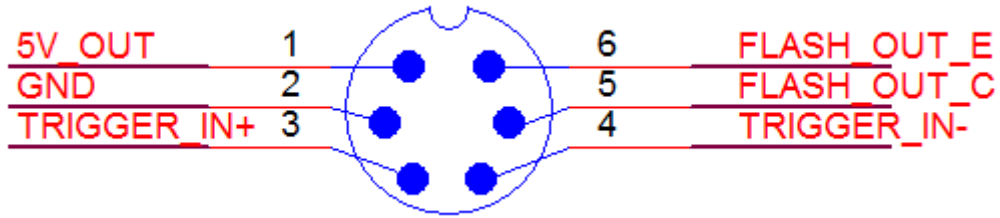


MUC500C(MRYO)

Dimension



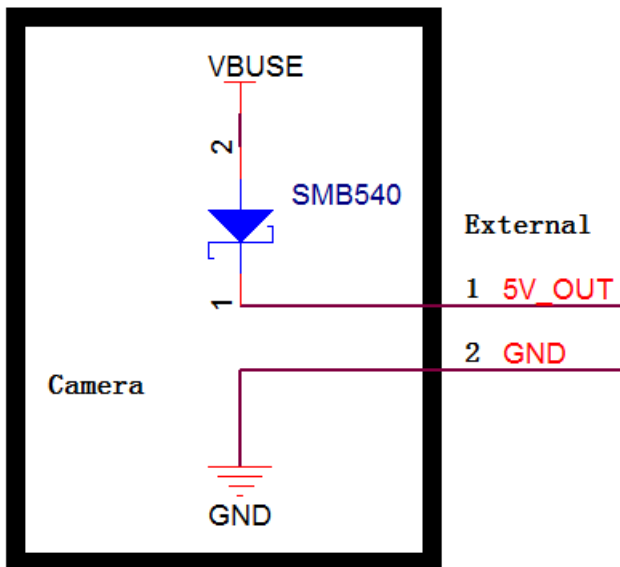
### GPIO Trigger interface introduction



Trigger Serial No	1	2	3	4	5	6
Cable Color	Red	Black	Yellow	White	Gray	Brown
Function	5V OUT/5V IN	GND	TRIGGER_IN+	TRIGGER_IN-	FLASH_OUT_C	FLASH_OUT_E

### Power Supply

The camera is powered by USB2.0 BUS POWER, the power supply is 5V@500mA, The BUS POWER provide power supply to the camera, at the same time, it provides power supply via diode SMB540, the power is about 200mA@5V.



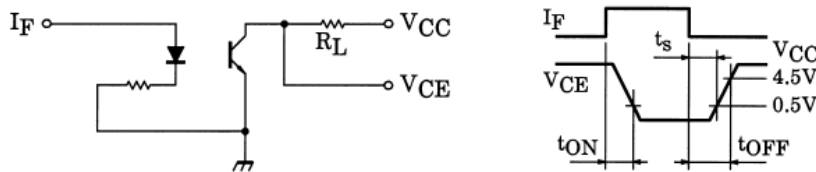
### GPIO Input Interface

The following figure is the schematic diagram of external trigger input, the inputted signal has been insulated by opto-coupler TLP281.

Switching Characteristics (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	$t_r$	$V_{CC} = 10\text{ V}, I_C = 2\text{ mA}$ $R_L = 100\Omega$	—	2	—	$\mu\text{s}$
Fall Time	$t_f$		—	3	—	
Turn-On Time	$t_{on}$		—	3	—	
Turn-Off Time	$t_{off}$		—	3	—	
Turn-On Time	$t_{ON}$	$R_L = 1.9\text{ k}\Omega$ (Fig.1) $V_{CC} = 5\text{ V}, I_F = 16\text{ mA}$	—	2	—	$\mu\text{s}$
Storage Time	$t_s$		—	25	—	
Turn-Off Time	$t_{OFF}$		—	40	—	

(Fig.1) SWITCHING TIME TEST CIRCUIT



TLP281 conversion performance

The camera's internal optocoupler  $V_{CC} = 5\text{V}$ , If  $I_F = 16\text{mA}$ , then the external trigger input Rising edge Delay is  $2\mu\text{s}$ , Falling edge Delay is  $25\mu\text{s}$ ;

When using "TRIGGER\_IN +" as trigger source, the trigger electrical level range is  $0\text{V} - +5\text{V}$ . If the trigger source electrical level is out of this range, an external current limiting resistor should be connected, the optocoupler works under current of  $10\text{mA}$ . Limiting resistor is calculated as follows:

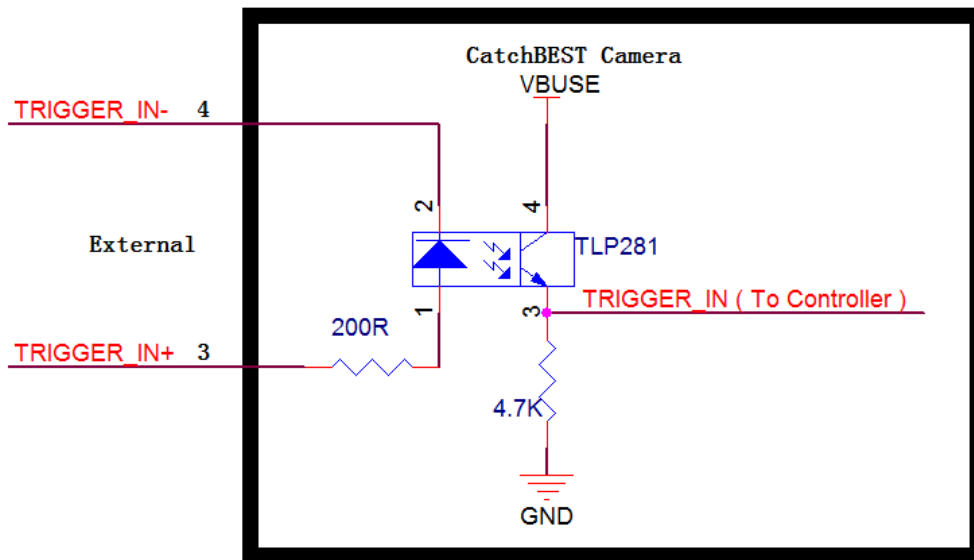
$$R = 100 \times (V_{in} - 0.7) - R_0$$

$V_{in}$  is Trigger source electrical level

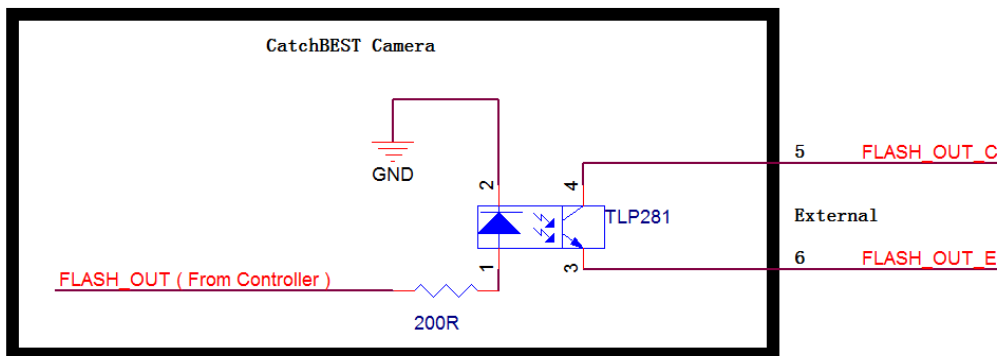
$R_0$  is The camera's internal series resistor  $200\text{ Ohm}$

$R$  is the required external series resistor.

Under normal temperatures ( $0 - +50$  degrees) , the maximum operating current of the optocoupler is  $50\text{mA}$ , standard operating current is  $10\text{mA}$ , if it exceeds the maximum allowable current, optocouplers may be burned.



**GPIO Output Interface (control flashlight)**



For some flash light which has Rising edge input (We can measure the flash light pin to determine whether there is a Rising edge input, if we have measured a pin has electrical level signal, it can be judged there is Rising edge electrical level internal the flash light, such as the K-150A models flash light, one of the synchronous trigger pin end is + 5V, and the other end is GND), you can use the connection diagram below:

