MIPI CAMERAS

Copy

IMX296 MIPI Cameras

This documents are for CAM-IMX296Mono-GS,CAM-IMX296Color-GS

1 Hardware Description

IMX296 Color Version ↗

IMX296 Mono Version ↗

- Support Raspberry Pi OS Driver directly
- Support external Trigger And stobe, we reserve pins no need to solder;
- Support mono version and color version imx296

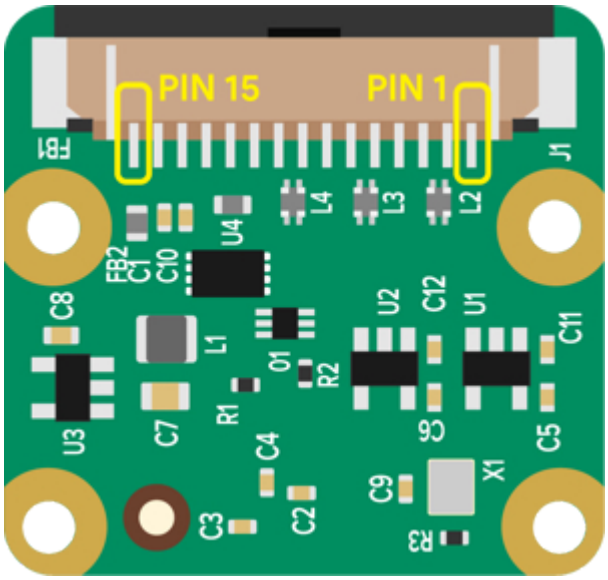
IMX296 Camera Module

2 Hardware UserManual

PDF
1MB

CAM-IMX296 HW Manual V1.7.pdf
pdf

2-1 Pins Out Table

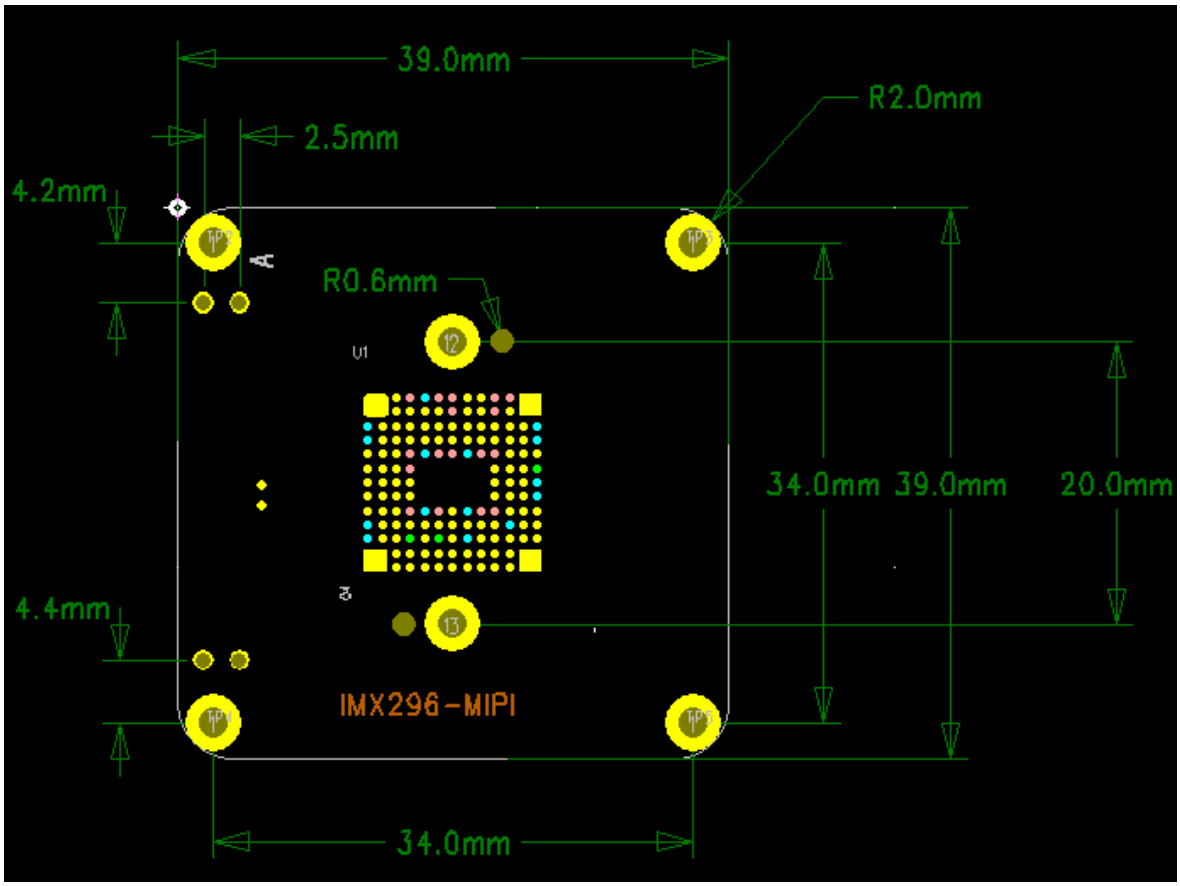


Raspberry Pi Camera Pinout (15-Pin)

Pin #	Name	Description
1	GND	Ground
2	CAM_D0_N	MIPI Data Lane 0 Negative
3	CAM_D0_P	MIPI Data Lane 0 Positive
4	GND	Ground
5	CAM_D1_N	MIPI Data Lane 1 Negative
6	CAM_D1_P	MIPI Data Lane 1 Positive
7	GND	Ground
8	CAM_CK_N	MIPI Clock Lane Negative
9	CAM_CK_P	MIPI Clock Lane Positive
10	GND	Ground
11	CAM_IO0	Power Enable
12	CAM_IO1	LED Indicator
13	CAM_SCL	I2C SCL
14	CAM_SDA	I2C SDA
15	CAM_3V3	3.3V Power Input

2-2 Camera Size

2D Size Information



3D Size Information

2MB	IMX296 With CS.stp
658KB	IMX296 With M12.stp

2-3 Camera Lens

M12

448KB	ZH3019.pdf pdf

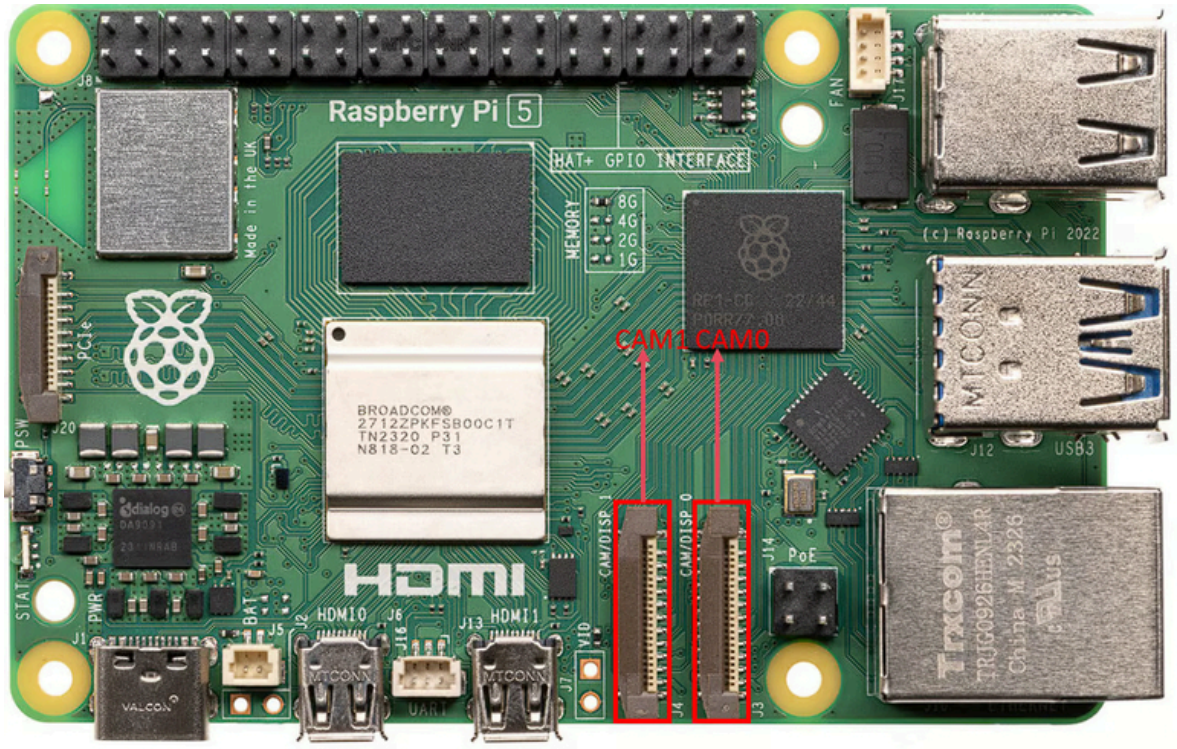
CS LENS Holder

3 Quick Start Guide

Step1, Modify config.txt

- sudo nano /boot/firmware/config.txt

Step2, Add below content to the last line



For CAM1 Interface

- dtoverlay=imx296,cam1

For CAM0 Interface

- dtoverlay=imx296,cam0

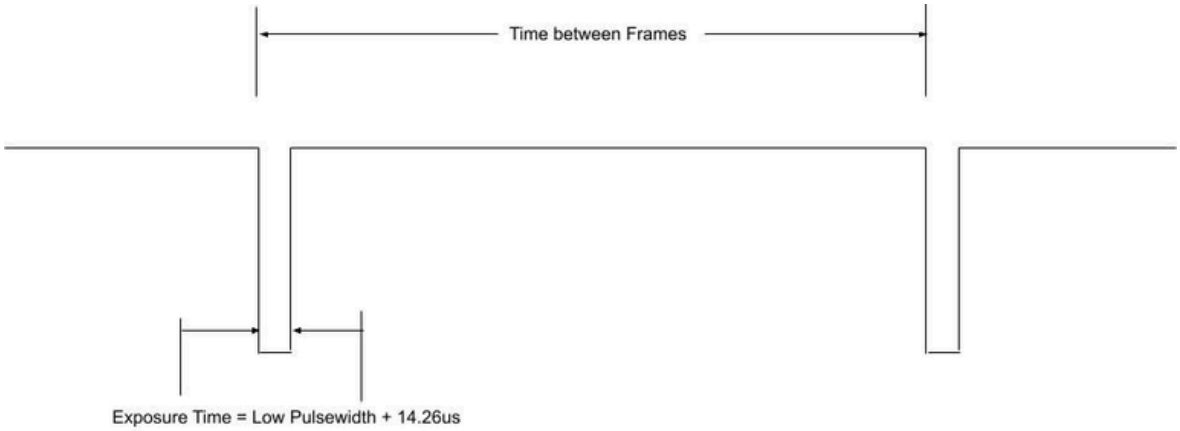
Step3, Reboot and use below command to preview

- libcamera-hello -t 0

4 External Trigger

4-1 Description

- The Global Shutter (GS) camera can be triggered externally by pulsing the external trigger (denoted on the board as XTR（Trig+）,GND(Trig-)) connection on the board. Multiple cameras can be connected to the same pulse, allowing for an alternative way to synchronise two cameras.
- The exposure time is equal to the low pulse-width time plus an additional 14.26us. i.e. a low pulse of 10000us leads to an exposure time of 10014.26us. Framerate is directly controlled by how often you pulse the pin. A PWM frequency of 30Hz will lead to a framerate of 30 frames per second.

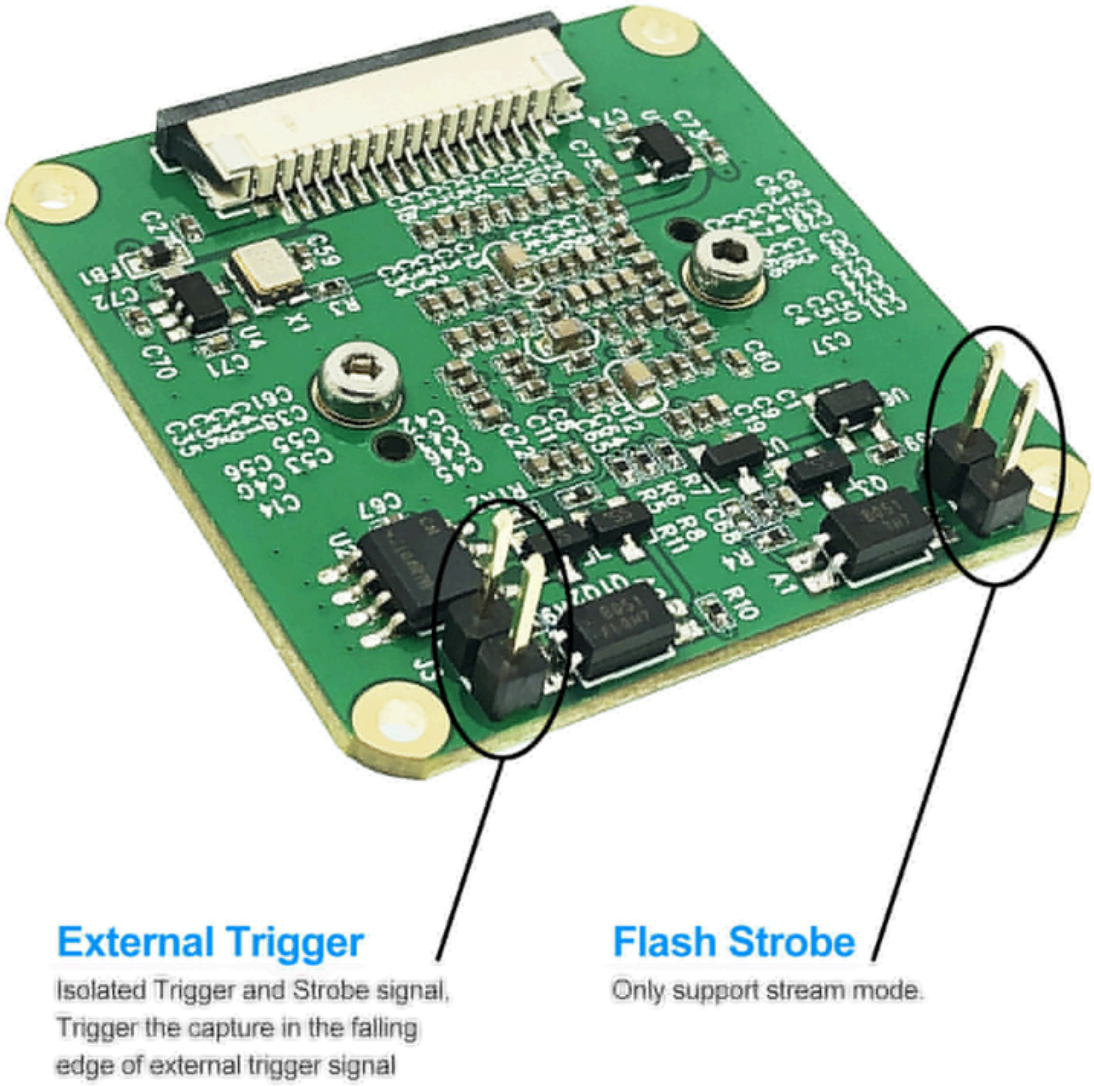


External Trigger Function

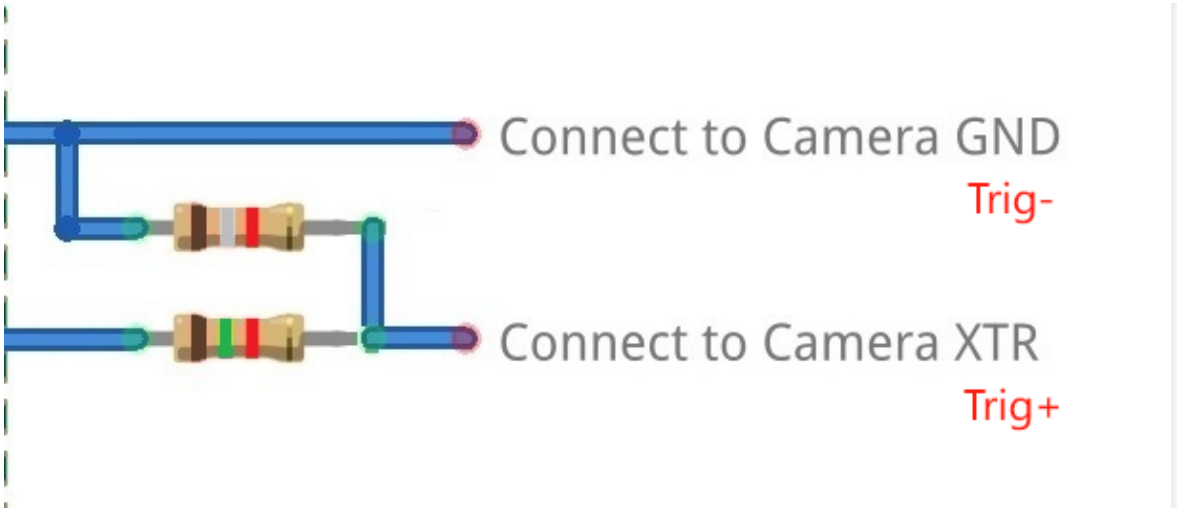
PULSE2_EN_NOR	79h (3079h)	[0]	0	Pulse2 enable in normal mode 0: disable 1: enable
PULSE2_EN_TRIG		[1]	0	Pulse2 enable in trigger mode 0: disable 1: enable
PULSE2_POL		[2]	0	Pulse2 polarity selection 0: High active 1: Low active
		[3]	0	Fixed to 1
PULSE2_UP [19:0]	7Ch (307Ch)	[7:0]	00000h	Pulse2 active period start timing setting Designated in line units from reference point
	7Dh (307Dh)	[7:0]		
	7Eh (307Eh)	[3:0]		
PULSE2_DN [19:0]	80h (3080h)	[7:0]	00000h	Pulse2 active period end timing setting Designated in line units from reference point
	81h (3081h)	[7:0]		
	82h (3082h)	[3:0]		

- How to Enable External Trigger
  - Step1, sudo su
  - Step2, echo 1 > /sys/module/imx296/parameters/trigger_mode

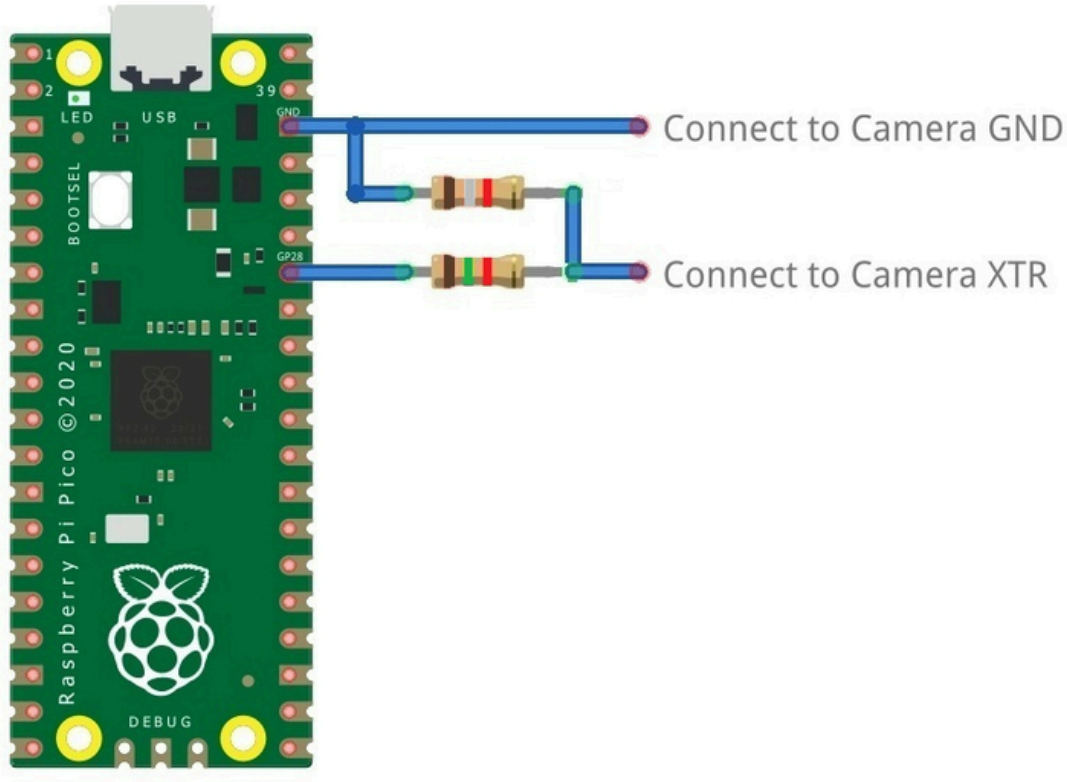
4-2 Wire Reference



IMX296 Camera Module



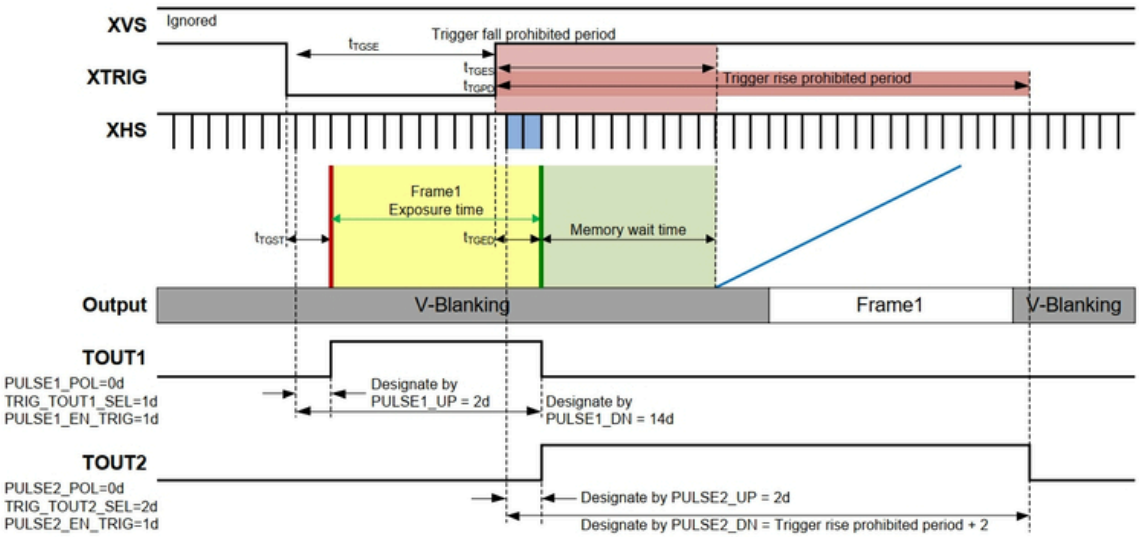
IMX296



5 Strobe Flash

5-1, Strobe Description

- Strobe output is : TOUT1 |TOUT2.
- Strobe delay can be adjust by reg PULSE1_UP .



Item	Symbol	Min.	Typ.	Max.	Unit
Integration start delay	t_{TGST}	2	—	3	H
Integration end delay	t_{TGED}	2 + t_{OFFSET}	—	3 + t_{OFFSET}	H
Pulse width	t_{TGSE}	1	—	—	H
Next trigger fall prohibited period (All-pixel, ROI, 2 × 2 Vertical FD binning mode)	t_{TGES}	7	—	—	H
Next trigger rise prohibited period (All-pixel)	t_{TGPD}	1118	—	—	H
Next trigger rise prohibited period (2 × 2 Vertical FD binning mode)		574			
Next trigger rise prohibited period (ROI)		V_{TR} *1	—	—	
Data output delay (All-pixel / ROI)	t_{TGDLY}	—	15	—	H

5-2,How TOUT1 TOUT2 Connect

Register List of Pulse Output Function

Register	Register details			Initial value	Setting value
	Chip ID	Address ( ): I2C	bit		
TOUT1SEL [1:0]	02h	26h (3026h)	[1:0]	0h	TOUT1 pin setting 0h: Low fixed 3h: Pulse output
TOUT2SEL [1:0]			[3:2]	0h	TOUT2 pin setting 0h: Low fixed 3h: Pulse output
TRIG_TOUT1_SEL [2:0]		29h (3029h)	[2:0]	0h	TOUT1 pin output selection 0h: Low fixed 1h: Pulse1 output
TRIG_TOUT2_SEL [2:0]			[6:4]	0h	TOUT2 pin output selection 0h: Low fixed 2h: Pulse2 output
PULSE1_EN_NOR		6Dh (306Dh)	[0]	0	Pulse1 enable in normal mode 0: disable 1: enable
PULSE1_EN_TRIG			[1]	0	Pulse1 enable in trigger mode 0: disable 1: enable
PULSE1_POL			[2]	0	Pulse1 polarity selection 0: High active 1: Low active
PULSE1_UP [19:0]		70h (3070h)	[7:0]	00000h	Pulse1 active period start timing setting Designated in line units from reference point
		71h (3071h)	[7:0]		
		72h (3072h)	[3:0]		
PULSE1_DN [19:0]		74h (3074h)	[7:0]	00000h	Pulse1 active period end timing setting Designated in line units from reference point
		75h (3075h)	[7:0]		
		76h (3076h)	[3:0]		

5-2 Strobe Setting

93KB
pi5-imx296 strobe setting-setting-libcamera.pdf
pdf

7KB
i2c-tools-arch32.zip
archive

8KB
i2c-tools-arch64.zip
archive

6 Trigger For Dual Cameras

69KB	imx296_trigger

1KB	User Guide_trigger_dual_cameras.txt

7 Official Software Manual

- https://www.raspberrypi.com/documentation/computers/camera_software ↗
- https://github.com/raspberrypi/documentation/tree/develop/documentation/asciidoc/accessories/camera ↗

8 Preset System IMAGE

This is preset system IMG for raspberry pi 5.

https://www.jianguoyun.com/p/DY_2JXYQpdSrBxj-nf4FIAA

(Password : o1drfz)

Previous
MIPI Cameras

Next
IMX290 MIPI Cameras

Last updated 1 hour ago