



Camera Module Line-up

June. 2020(Rev.02)

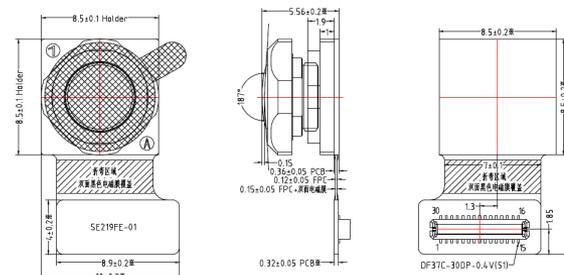
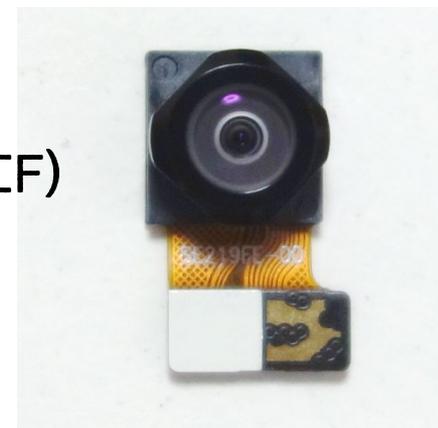
双峰エンタープライズ株式会社
Soho Enterprise Ltd.

2019年のハイライト

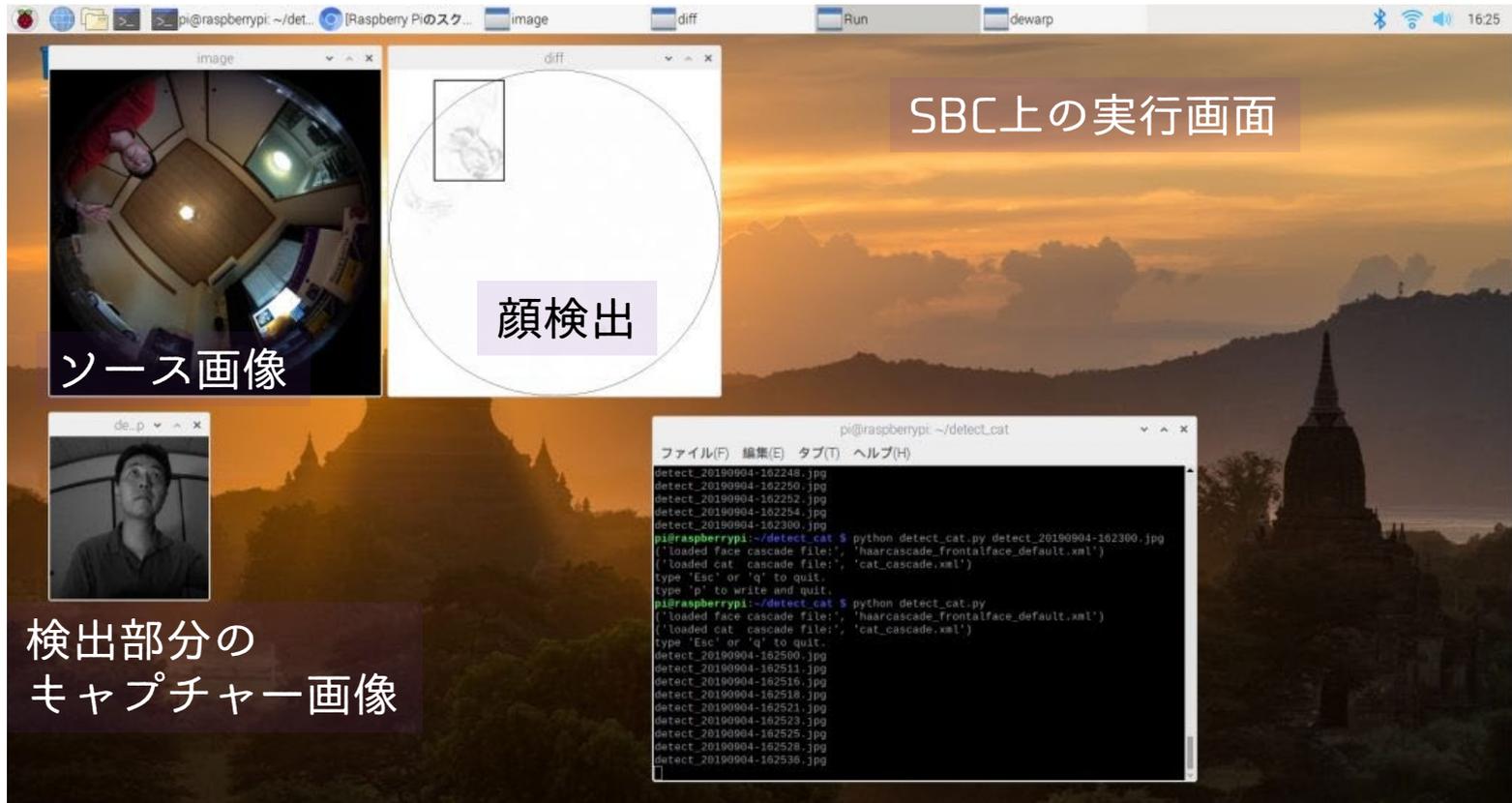
Vision System向けイメージセンサーモジュール
SE219GS-00-CB (w/ IRCF), SE219FE-01-CB (w/o IRCF)

あのIMX219が(x, y)投影サイズそのままにFoV=187°の
魚眼カメラになりました。

しかも厚みは6mm以下。狭い場所に仕込むことができます。
従来製品(対角76°)に対し圧倒的な情報量の画像取得が可能です。



魚眼カメラ応用事例：detect_cat（アプリSW配布中。）

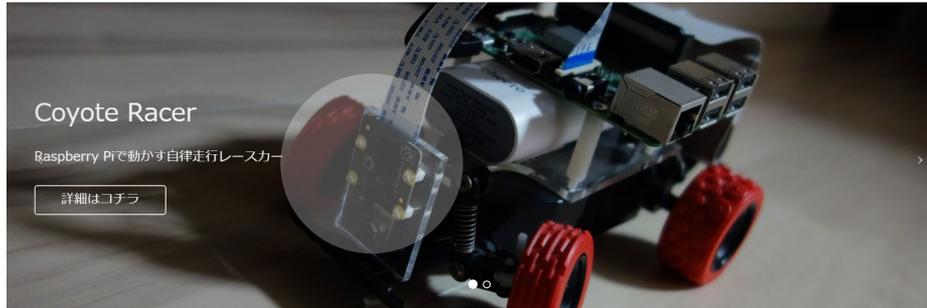


Vision Processing適用事例

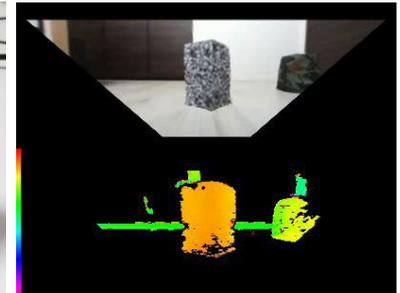
認識系アプリ



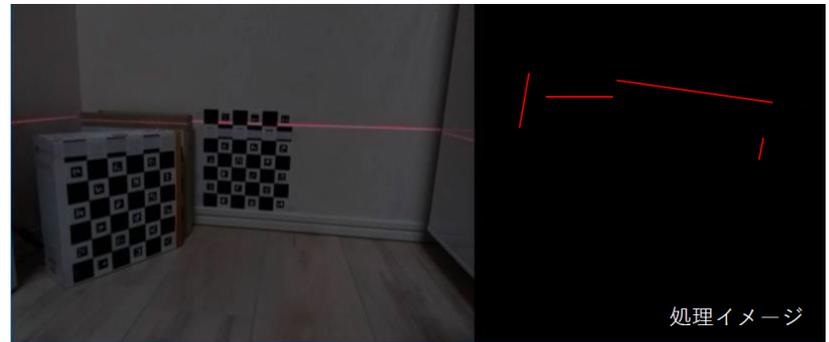
Coyote Racer



測距系アプリ



超広角応用ステレオ測距



ラインレーザー+単眼ステレオ測距
120° 広角レーザーとの組み合わせ
(展示有)

CQ出版社 Interface
2020年3月号に特集記事掲載→

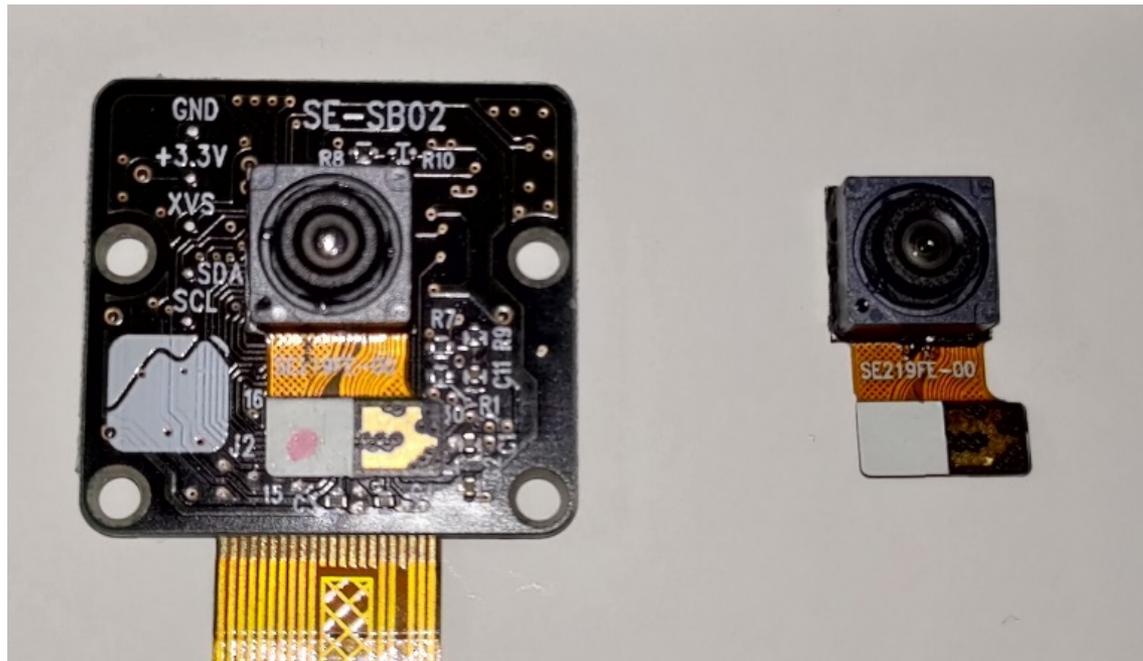


サンプル出荷中

FoV=120° 固定フォーカスカメラ

SE219FFW-00-CB (w/ IRCF), SE219FFW-01-CB (w/o IRCF)

想定適用例：広角3D動画、顔認識、ドアホン、見守り監視、自律移動ロボットのセンシングなど



Vision System向けイメージセンサーモジュール SE219AF-00-CB (w/ IRCF), SE219AF-01-CB (w/o IRCF)

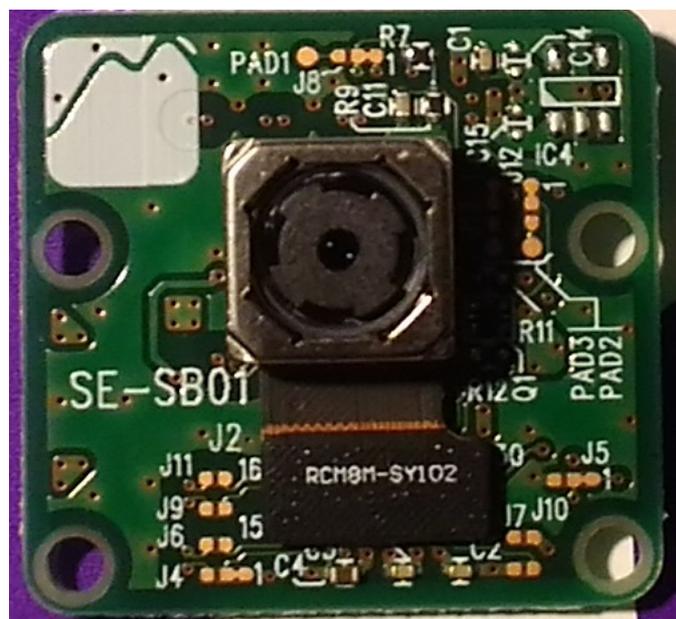
想定適用例：AR/VRゴーグル用カメラ、スマートグラス、ウェアラブルカメラ

FoV=76°、待望のフォーカスドライバ内蔵のIMX219カメラモジュール
3cm～無限遠(要調整)でフォーカス合わせが可能。

シャープなイメージのマクロ撮影において特に性能を発揮

Tinker BoardのカメラドライバーにAF機能実装検討中

FoV=120°品のカスタム製造応談



サンプル出荷中

FoV=160° 魚眼カメラ

SE219FE160-00-CB (w/ IRCF), SE219FE160-01-CB (w/o IRCF)

想定適用例：広角3D動画、ドアホン、見守り監視、自律移動ロボットのセンシングなど。



Soho Enterprise Ltd.

Fish-Eye lens nodule w/ 8Mpix CIS for Single Board Computers

■SE219FE160-00/01

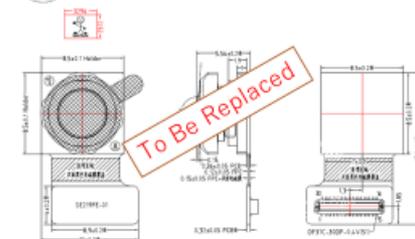
■Ultra Wide View Angle: FoV -160° ± TBD*
Suitable for wide angle image recognition usage in AIoT area.

■Adopted the most mature image sensor for SBC.
Sony IMX219PQH5-C

■w/ IRCF(-00), w/o IRCF(-01) modules are available

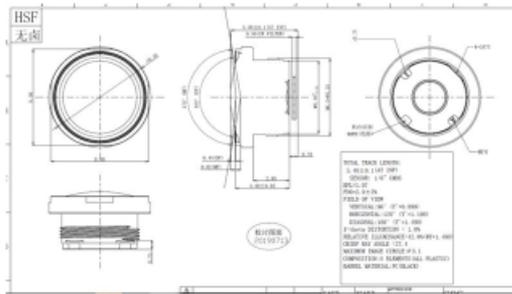
■Extensivity:
FFC connector for MIPI CSI-2 4 lane connection for faster fps.

(HSF)



Pin Assignment

Pin No.	Pin Name	No.	Pin Name
1	NC	15	DGND
2	NC	17	MIP-DIN
3	DIGDLYV	18	MIP-DSP
4	DIGDLYV	19	DGND
5	Sensor-PWDN	20	MIP-DIN
6	DGND	21	MIP-DSP
7	VCLUP	22	DGND
8	DGND	23	MIP-DIN
9	ASND	24	MIP-DSP
10	AVDDLV	25	DGND
11	SPDLYV	26	MIP-CLIP
12	DGND	27	MIP-CLIP
13	MIP-DSP	28	DGND
14	MIP-DIN	29	SCL1LV
18	DGND	30	SCL1LV



IMX219
D=4.6mm

Imaging area & Image circle

■Assumed application cases

- Look down monitoring with few blind spots
- VR Stereo Vision
- Wide vision for Robots, AI speaker, any others
- Monitoring wildlife ecology, harm to agriculture
- Home-use video monitoring & recording

SE Camera Board Series Product Brochure

SE Camera Board Series Product Brochure

Key Specifications		SE219FE-00/01-CB		
Image Sensor	Manufacturer	Sony	Back-side illuminated CMOS image sensor	
	Pixel size	1.12um x 1.12um		
	Active Image Area	3280 x 2464 8Mpix		
	Optical Size	Type 1/4 Diagonal 4.60mm		
	Operation Temperature	-20~80°C Function guarantee -20~80°C Performance guarantee		
Module	Storage Temperature	-30~80°C		
	Configuration	Type 1/6, 5P		
	FoV	160° ±(TBD)*		
	F No.	2.0 ±5%		
	Focus range	30cm ~ Infinity, Adjusted at 60cm when shipped (TBD)		
	Connector	30pin	Compatible w/ Raspi Camera v2.1 module	
	Size	8.5mm*8.5mm*TBDmm	Lens Holder size. Same (x, y) size to Raspi module	
	Weight	0.4g(Tentative)		
	Power Supply	Analog	2.8V ± 0.2V	
		Digital	1.2V ± 0.12V	
	IO	1.8V ± 0.18V		
Size	25mm*24mm	Almost same size and compatible position for screw holes with RaspberryPi camera v2.1.		
Connector	1.0mm pitch 15pin	For Tinker board, RaspberryPi		
	0.5mm pitch 22pin	RaspberryPi0, Raspi compute module, etc.		
Board (option)	I/O Format	Support MIPI CSI-2 2lane and 4 lane		
	Output	Maximum speed	Full size: 30fps, FHD: 60fps, 720P: 180fps (MIPI 4 lane mode)	
Power Supply	3.3V ± 0.3V		Generate Analog 2.8V by on-board LDO	
			Generate Digital 1.2V by on-board DD-converter.	
			Generate Analog 1.8V by on-board LDO	
			Generate AF 2.8V by on-board optional LDO	

Why are the SE camera boards suitable for AIoT vision processing applications?

1. **Good image quality**
The SE camera series uses a high-quality Sony image sensors of better SNR.
2. **Ready to use on tinker board and other SBCs**
Camera drivers are ready. Easy to customize for PoC prototyping
3. **Variety of Options**
Wide variety of options for resolution, global shutter, wide FoV lens, focus driver, etc.
4. **Low Latency, RAW image**
Suitable for real-time autonomous control system
5. **Affordable for everyone**
Pricing that individuals can purchase from a single item in line with the corporate philosophy of *helping to create open innovation.*

■Further information:

<https://soho-enterprise.com/>
<https://www.visionproc.org/index.php>



2018年製品、量産出荷中

Vision System向けイメージセンサーモジュール第一弾
SE397GS-00/01-CB, SE397GSW-00-CB
 High speed global shutter camera

画素ピッチ：3.45um (IMX219は1.12um)で高感度
 すなわち高速シャッターがきれる。
 動被写体を、ボケ、歪みを少なく撮影できる！
 FoV=90° および180° 品、
 90° 品はIRCF 有/無 選択可能

SE397GS-01-CB



FoV 90° NoIR

SE397GSW-00-CB



Diagonal 2.799 mm (Type 1/6.4) 0.32 Mega-Pixel (VGA) CMOS Image Sensor with Square Pixel for B/W Cameras

IMX397CLN-C

Pregius

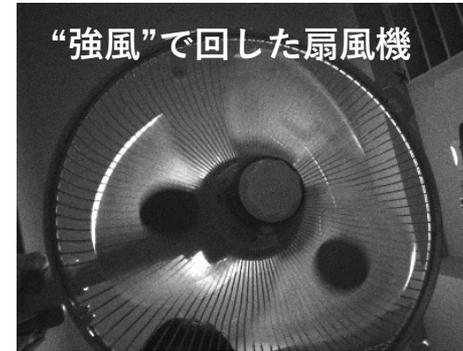
Description

IMX397CLN-C is a diagonal 2.799 mm (Type1/6.4) 0.32 Mega-pixel CMOS active pixel type image sensor with a square pixel array. By introducing Global Shutter technology with low PLS (Parasitic Light Sensitivity), high sensitivity and low noise, motion blur is suppressed. It equips an electronic shutter with variable integration time. It operates with three power supply voltages: analog 2.8 V, digital 1.2 V and 1.8 V for input / output interface and achieves low power consumption.

(Application: FA Cameras, Sensing)

Features

- ◆ CSI-2 serial data output (DPHY ver1.1 compliant)
- ◆ 2-wire serial communication circuit
- ◆ 10-bit A/D converter
- ◆ CDS / PGA (digital 24dB, analog 18dB)
- ◆ Automatic optical black clamp circuit
- ◆ Variable-speed electronic shutter (1H units)
- ◆ Independent flipping and mirroring
- ◆ Pixel binning readout and H / V sub-sampling function
- ◆ Dual sensor synchronization operation
- ◆ Trigger (Internal & External)



Rolling Shutter



Motion Blur

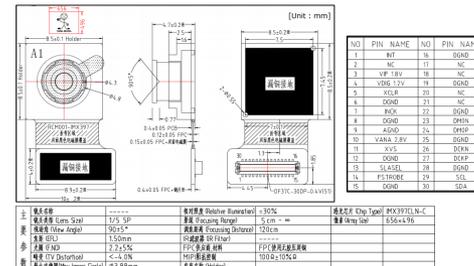


Global Shutter



<https://www.teledynedalsa.com/en/learn/knowledge-center/global-shutter-imaging/>

IMX397 Camera Lens Module





Global Shutter Camera Board w/ VGA CIS for Single Board Computers

SE397GS-00/01-CB



Adopted Sony Global Shutter Image Sensor Sony IMX397CLN-C high sensitivity GS CIS

Wide View Angle: FoV(D) -90° ±5° Suitable for wide angle image recognition usage in AIoT area

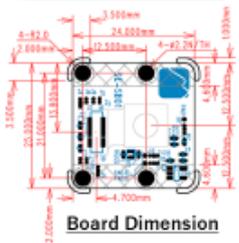
High Speed Operation Up to 240fps

Camera Driver for "tinker board" is available. Tinker board & RaspberryPi in RAW capture mode

Extensivity: Synchronization by XVS (GPIO)

w/ IRCF(-00), w/o IRCF(-01) modules are available

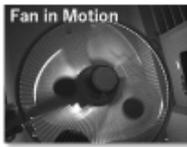
Ultra-Wide-Angle Option: FoV(D)-180° (Tentative)



Board Dimension



Ultra Wide Lens Option



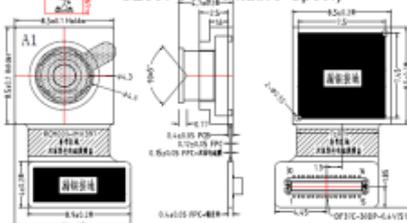
Fan in Motion

Assumed application cases

- Machine vision for the object in fast motion
Vision analysis in sports training
Biometrics
Measurement device to adjust the mechanical timing
Stereo depth measurement in motion
Motion capture for gesture control in VR game
Motion capture for computer graphic animation



Global Shutter Camera Module SE397GS (Tentative Spec.)



Same (x, y) form factor & compatible pin assignment w/ Raspberry Camera V2.1

Table with 4 columns: NO, PIN NAME, NO, PIN NAME. Lists pin assignments for the camera module.

Table with 4 columns: NO, ITEM, UNIT, VALUE, NO, ITEM, UNIT, VALUE, NO, ITEM, UNIT, VALUE. Lists component specifications.

Ver. 1.2.0

Key Specifications SE397GS-CB table with columns for Image sensor, Lens, Module, Board and rows for Manufacturer, Product Code, Pixel size, Active Image Area, Optical Size, Operation Temperature, Storage Temperature, Lens configuration, FoV, F No., Focus range, Connector, Size, Weight, Power Supply, Size, Connector, I/O Format, Output, Power Supply.

Why are the SE camera boards suitable for AIoT vision processing applications?

- 1. Good image quality
2. Ready to use on tinker board and other SBCs
3. Variety of Options
4. Low Latency, RAW image
5. Affordable for everyone

Further Information: https://soho-enterprise.com/ https://www.visionproc.org/index.php



Ver. 1.2.0

Fish-Eye lens module w/ 1.3Mpix Global Shutter CIS for SBCs

SE132GSFE160-00/01

Ultra Wide View Angle: FoV = 160° ± (TBD)*

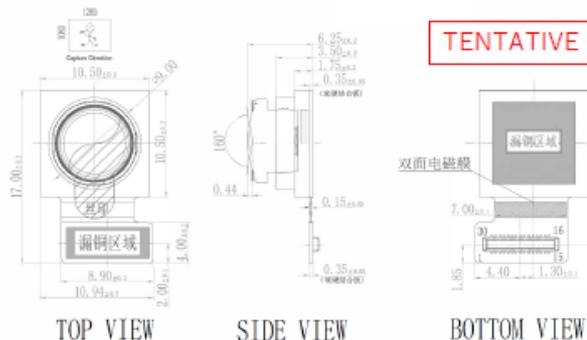
Suitable for wide angle image recognition usage in AIoT area.

Adopted the best in class global shutter CMOS image sensor of BSI. Smartsens SC132GS

w/ IRCF(-00), w/o IRCF(-01) modules are available
Customized Band Path Filters are also available

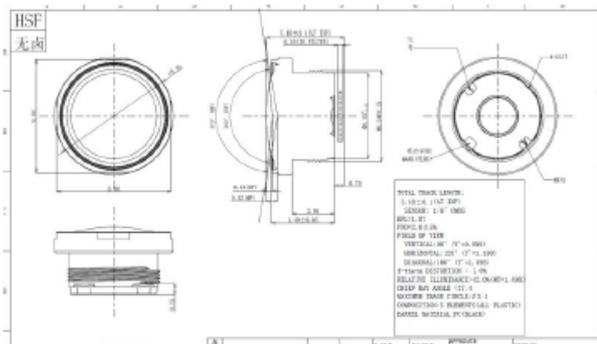
Extensivity:

MIPI CSI-2 4 lane connection for faster fps.



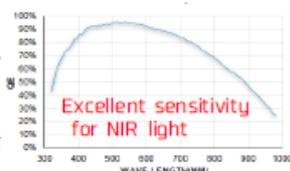
TENTATIVE

No.	PIN NAME	No.	PIN NAME
1	LED-STROBE	16	DGND
2	TRIGS	17	MIP-D2N
3	DVD01.8V	18	MIP-D2P
4	DVD01.2V	19	DGND
5	SENSOR-PCWV	20	MIP-D1N
6	DGND	21	MIP-D1P
7	MCLK	22	DGND
8	DGND	23	MIP-D0N
9	AGND	24	MIP-D0P
10	AVDD02.5V	25	DGND
11	TRIGL/FSYNC	26	MIP-CLKN
12	DGND	27	MIP-CLKP
13	MIP-D3P	28	DGND
14	MIP-D3N	29	SCL(1.8V)
15	DGND	30	SDA(1.8V)



Φ 3.1mm
SC132GS
1/4" BSI
1080x1280

Imaging area & Image circle



Assumed application cases

- Wide vision for Robots of autonomous driving
- O3D sensing with NIR structured light

Key Specifications SE132GSFE160-00/01

Image Sensor	Product Code: SC132GS	Manufacturer	Smartsens Back-side illuminated, Global Shutter
		Pixel size	2.7um x 2.7um
		Active Image Area	1080 x 1280 1.3Mpix
		Optical Size	Type 1/4 Diagonal 4.53mm
		Operation Temperature	-40~85°C Function guarantee -20~60°C Performance guarantee
		Maximum Frame Rate	120fps
Module	Lens	Configuration	Type 1/6, 5P
		FoV	160° ± (TBD)*
		F No.	2.0 ± 5%
		Focus range	30cm ~ Infinity, Adjusted at 80cm when shipped.(TBD)
	Connector	30pin	Compatible w/ Raspi Camera v2.1 module
	Size	10.5*10.5*6.3mm(TBD)	Lens Holder size. 8.5 * 8.5 * 6.3mm by COB
Power Supply	Weight	0.4g(Tentative)	
	Analog	2.5V ± 0.1V	
	Digital	1.2V ± 0.06V	
Board (option)	IO	1.8V ± 0.1V	
	Size	25mm* 24mm	Almost same size and compatible position for screw holes with RaspberryPi camera V2.1.
	Connector	1.0mm pitch 15pin	For Tinker board, RaspberryPi
		0.5mm pitch 22pin	RaspberryPi0, Raspi compute module, etc.
	Output	I/O Format	Support MIPI CSI-2 2lane and 4 lane
		Maximum speed	Full size: 120fps (MIPI 4 lane mode)
Power Supply	3.3V ± 0.3V	Generate Analog 2.8V by on-board LDO	
		Generate Digital 1.2V by on-board DD-converter.	
		Generate Analog 1.8V by on-board LDO	
		Generate AF 2.8V by on-board optional LDO	

Why are the SE camera boards suitable for AIoT vision processing applications?

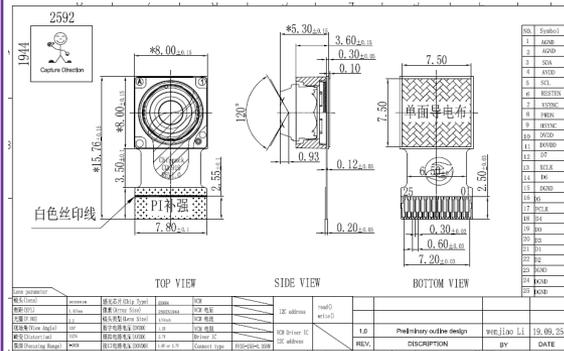
- Good image quality**
The SE camera series uses a high-quality image sensors of better SNR.
- Ready to use on tinker board and other SBCs**
Camera drivers are ready. Easy to customize for PoC prototyping
- Variety of Options**
Wide variety of options for resolution, global shutter, wide FoV lens, focus driver, etc.
- Low Latency, RAW image**
Suitable for real-time autonomous control system
- Affordable for everyone**
Pricing that individuals can purchase from a single item in line with the corporate philosophy of *helping to create open innovation.*

Further Information:

- <https://soho-enterprise.com/>
- <https://www.visionproc.org/index.php>

汎用カメラモジュールシリーズ SEI012FF-D, SEI012FFW-D

ISP内蔵型5Mpixイメージセンサーを使ったレンズモジュール。
DVPインターフェースタイプから順次発売予定



魚眼タイプ : SEI012FE-D (FoV=160° and/or 187°)
AFタイプ : SEI012AF-D(76°), SEI012AFW-D(120°)
ラインアップに追加していきます。

SE-SB02基板に接続可能なMIPI IFバージョンも開発受注可能

イメージセンサ	
センサタイプ	1/4型 CMOSイメージセンサ
有効画素数	511万画素
記録画素数	504万画素
カメラ制御	
ISO感度	ISO 40~800
シーンセレクト	12パターン
露出制御	自動、シャッター優先、ISO感度優先、長時間AEモード
測光モード	マルチパターン、中央重点、画面全体平均、スポット
露出補正	±2EV、1/3EVステップ
シャッタースピード	1/8 s (長時間AEモード) ~1/42000 s
ホワイトバランス設定	オートホワイトバランス、太陽光、曇天、蛍光灯、ランプ
フォーカス制御	オート、シングルAF、連続AF、マニュアル
画像フォーマット	
出力画像フォーマット	JPEG (4:2:2)、Y/Cb/Cr、YUV、RGB、RAW、JPEG+YUV (サムネイル)
静止画データレート	5M pixel 15 frame/s JPEG output
動画データレート	SVGA 30 frame/s YCbCr output
HDビデオ出力	1080p (1920×1030 30 frame/s)、720p (1208×720 60 frame/s) JPEG output、JPEG+YCbCr output

1Mpix UVCカメラ (M12レンズタイプ)

SE9732USB

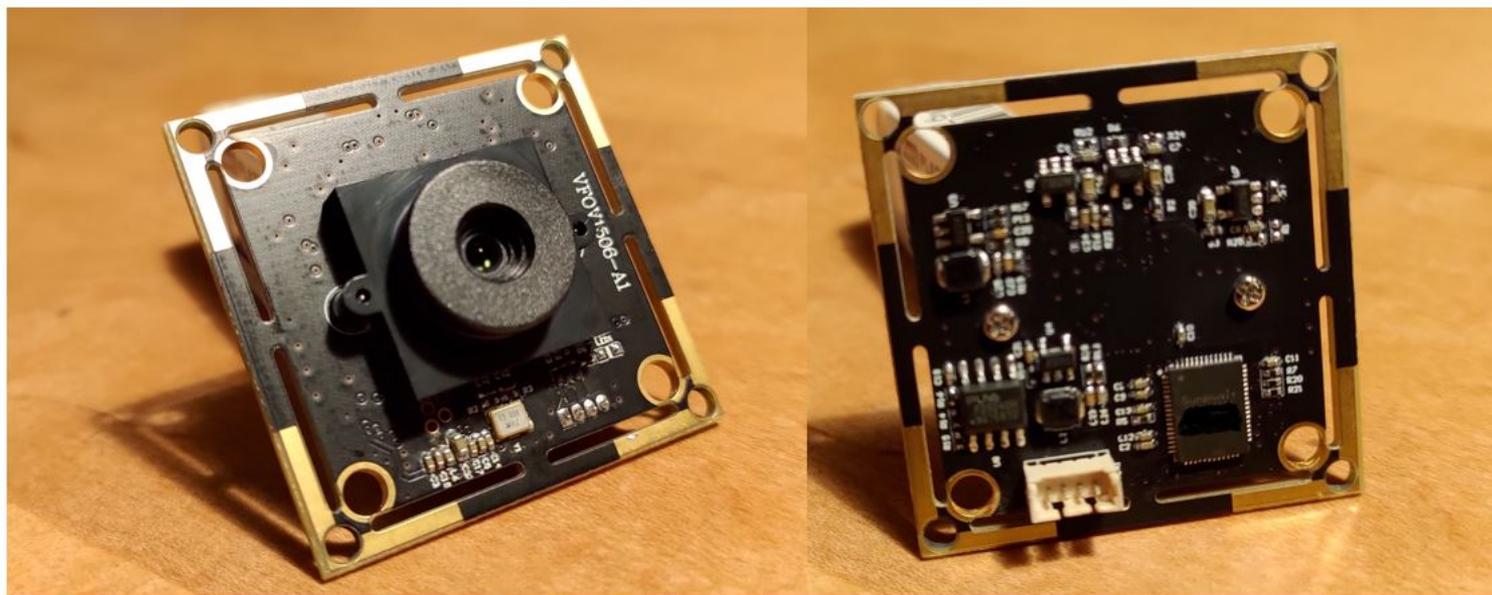
Omnivision社製イメージセンサーOV9732を採用

1/4"型、3.0um画素、1,280x720の高感度汎用UVCカメラ基板です。

カスタム光学フィルタの取り付け応談

M12マウントで様々なレンズと組み合わせが可能です。

小型モジュール化を検討中。(FoV=76°、120°、150°、160° 魚眼)



OPNOUS ToF Camera



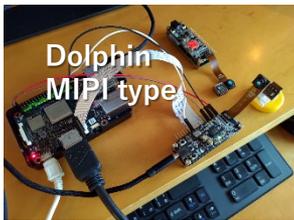
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[English](#)
[Japanese](#)
[タオバオの店舗](#)
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[ニュースセンター](#)
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[企業情報](#)

検索する製品名を入力してください:



実用に優れ、リーズナブルな価格のOPNOUS社ToF Solutionを提供



ToFシステムプラットフォーム

現在の位置です: [トップページ](#) > [製品](#) > [ToFシステムプラットフォーム](#)

Part NO	Category	Resolution	FoV	Range	IR Filter	Interface
OPNCAM8508C/197-1MA-UA	Dolphin	320x240	72x55	1m/2m	940nm	USB 3.0
OPNCAM8506A/58C-1MA-UA	Dolphin	320x40	110x10	5m	850nm	USB3.0
OPNCAM8508C/197-1MA	Dolphin	320x240	72x55	1m/2m	940nm	MIPI
OPNCAM8506A/58C-1MA	Dolphin	320x40	110x10	5m	850nm	MIPI
OPNCAM8008A/588-1MA-UA	Hawk	320*240	86x68	5m	850nm	USB 3.0
OPNCAM8008A/598-1MA-UA	Hawk	320x240	86x68	5m	940nm	USB 3.0
OPNCAM8008A/58B-1MA-UA	Hawk	320x240	110x90	5m	850nm	USB 3.0
OPNCAM8008A/59B-1MA-UA	Hawk	320x240	110x90	5m	940nm	USB 3.0
OPNCAM8008A/A92-1MA-UA	Hawk	320x240	24x18	10m	940nm	USB 3.0

Software



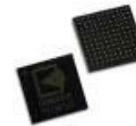
<http://www.opnous.com/jp>

距離計算ISPチップ OPN6001



FUNCTIONAL DESCRIPTION

OPN6001 is a high performance, low power, low cost application processor dedicating for ToF sensor. It is embedded with a sophisticated ToF DSP to converting the ToF raw data to easy-use distance and IR data. With a novel self-learning engine, it also automatically tunes lights and sensors to get best image in different scenarios. A 200MHz ARM Cortex-M3 processor is also integrated to handle system controlling and various applications. It can support up to 2 ToF sensors simultaneously with MIPI CSI2 interface, merge different sources and transmit the data to host AP by 12bit DVP, 4bit GSI or MIPI CSI2 interface.

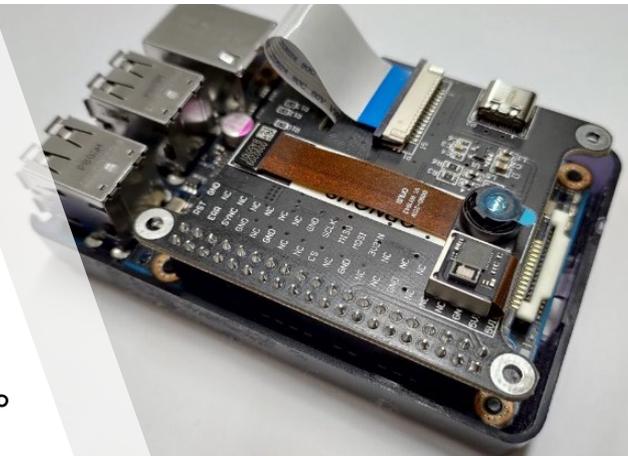
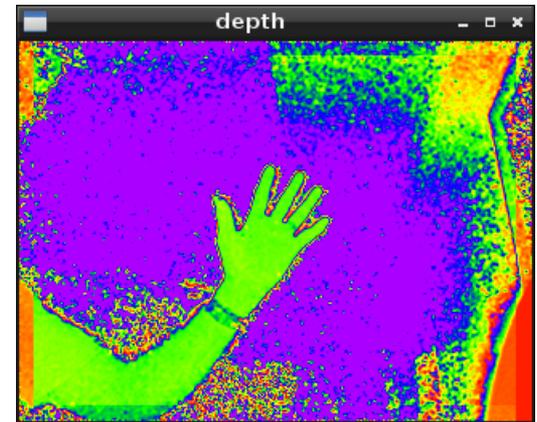


FEATURES

- Support up to 2 QVGA (320x240) ToF sensors
- Support up to 120 fps
- ToF data interface
 - Support up to 2 MIPI CSI2 Receiver @ 800Mbps (2 lane)
- Host data Interface
 - 8~12bit parallel interface with sync signal (DVP)
 - MIPI CSI2 TX interface, up to 3.2G bps max (4 lane)
 - 1~4 data line serial interface(GSI)
- 36-bit Readout Data
 - 14 bit Distance
 - 12 bit IR
 - 8 bit Ambient
 - 2 bit flag
- Real-time ISP for ToF Raw data processing and calibration
 - Region of Interest (ROI)
 - 3x3 Spatial Filter
 - Pixel calibration
 - Distance Non-linearity Correction
 - Temperature Compensation
 - FOV compensation
- Up to 200MHz ARM Cortex M3 MCU for user post processing
 - 128KB Embedded SRAM
 - CRC/ECC
 - JTAG debug interface
- SPI/I2C control interface
- Support boot from SPI flash / I2C EEPROM
- Smart Sensing Engine
 - Auto Exposure
 - HDR
- Sensor/Light Real time control thru I2C master
- 6~30MHz Crystal/Oscillator as clock source
- Clock out for sync operation
- Simple Power Supply
 - IO supply: 1.8V or 3.3V
 - Core supply: 1.1V
- Package BGA 121 pin (7 mm x 7 mm)

OPNOUS ToF Camera HAT on ASUS tinker board

- SBC対応ToFセンサーモジュール
(OPNOUS社との共同開発品)
SE-OPNM8508C-CB (仮称)
- 自律移動ロボットや自動搬送機に必要な
Depth情報を正確に取得するToFセンサーが
Tinker Boardでも手軽に使えるようになります。
- 顔認識においても3D情報が加わると飛躍的に
精度が高まります。
- 距離によるジェスチャー抽出など



Specification

Depth sensing demo is available now.

#	Parameter	Description
1	Product Name (Tentative)	SE-OPNM8508-HAT
2	ToF camera module	OPNM8508C
3	Image Sensor	OPN8008D
4	Pixel Size	15um
5	Optical Size	1/3"
6	Resolution of Depth Image	320 * 240
7	Module Head Dimension	21.00 mm * 9.50mm * 6.33mm w/ 33.00mm FPC
8	Frame Rate	10 ~ 60 fps
9	Measurement Range	0.15 ~ 5 m
10	Field of View	71.8° (H) * 56.5° (V)
11	Distortion	<2.5%
12	Illumination	940nm, 3W
13	Input Clock	27MHz
14	Power Supply	Sensor: 3.3V Single power supply, >=300mA VCSEL: 4V, >=2A
15	Power Consumption	340mW, Typ.
16	Depth Accuracy	<=1% / <=1cm @1m
17	Interface	MIPI CSI-2, 2lane