

TRI-FOCAL CAMERA SYSTEM

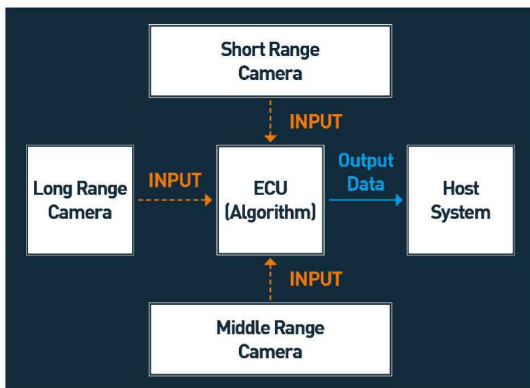


Sensing (PD, VD, TLR, TSR)

- ✓ FOV : 120° / 60° / 30°
- ✓ Detection range 120° - 60m, 60° - 100m, 30° - 150m
- ✓ PD(Pedestrian Detection), VD(Vehicle Detection)
- ✓ Lane Detection, TLR(Traffic Light Recognition), TSR(Traffic Sign Recognition)
- ✓ Forward Monitoring System for Autonomous Driving LEVEL 3



Block Diagram



Specification

Camera	Spec
Resolution	3x (1920x1080p)@60fps
Output Data	Digital LVDS
ECU	Spec
Detection range	Short(~60m), middle(~100m), long(~150m)
Target	Vehicle, Motorcycle, Pedestrian, Lanes, Traffic Sign
Information	label, confidence-score, coordinates, speed, hazard-level

IN-CABIN SYSTEM (DMS, OMS)

OMS (Occupant Monitoring System) Camera
 DMS (Driver Monitoring System) Camera
 ECU (Electronic Control Unit)



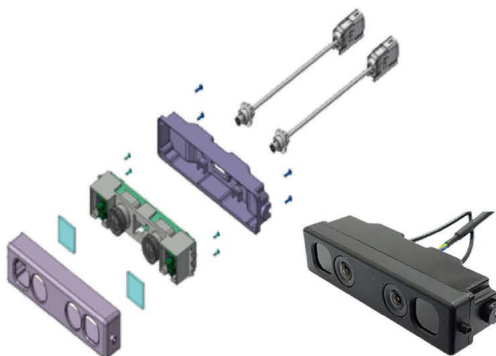
- ✔ Driver Monitoring System
- ✔ Occupant Monitoring System
- ✔ Passenger Counting



DMS (Driver Monitoring System) Camera

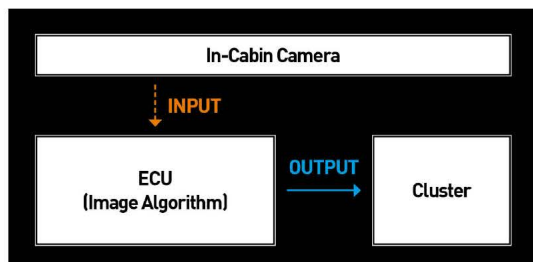


ECU System



OMS(Occupant Monitoring System) Camera

Block Diagram



Specification

Camera & ECU	Spec
Input Data	1M@30fps, 2M@30fps
Output Data	LVDS/HDMI, 1280x720@30fps
Operating Voltage	DC 9V ~ 25V
Algorithm & Vie	DMS, DNN (Deep learning Neural Network), OD (Object Detection)

SRM (SMART ROOM MIRROR) CAMERA SYSTEM

Smart Room Mirror



Back-up Camera



Right side camera



Left side camera



ECU



SRM monitoring coverage



Feature

- ✔ Camera Monitoring System : Total ECU System Solution
- ✔ Object Detection (~ 100m)
- ✔ Display applicable OLED
- ✔ FOV : 60 & 80°
- ✔ Side Mirrorless Camera

SPECIFICATION



- FHD, 60 fps, Auto grade
- Wide angle for minimizing Blind spot
- Better productivity and additional functions (pedestrian, vehicle, 2wheel vehicle detect)
- Viewing+ Sensing function

PANORAMIC VIEW



PARKING VIEW

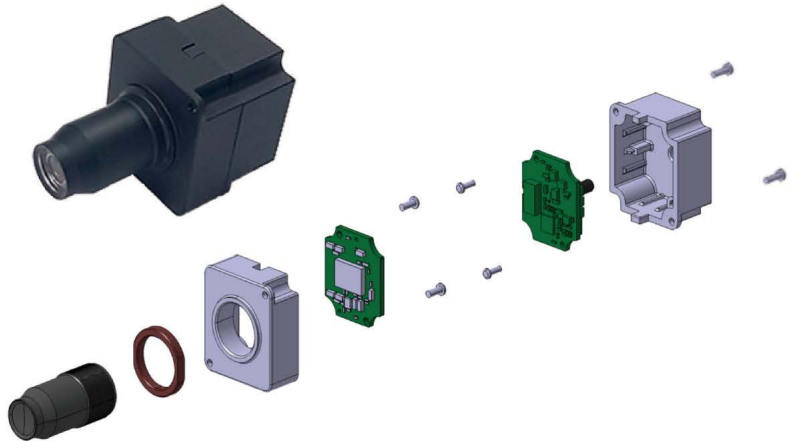


AUTOMOTIVE HIGH RESOLUTION(7.4MP/8.0MP) CAMERA

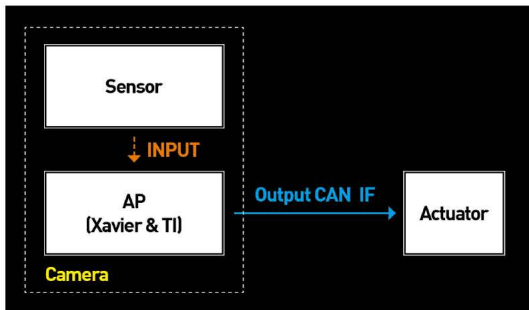


Sensing (PD, VD, TLR, TSR)

- ✓ High resolution 7.4M / 8.0Mpixels
- ✓ Long distance object classification
- ✓ Detection of Unidentified small object on the road



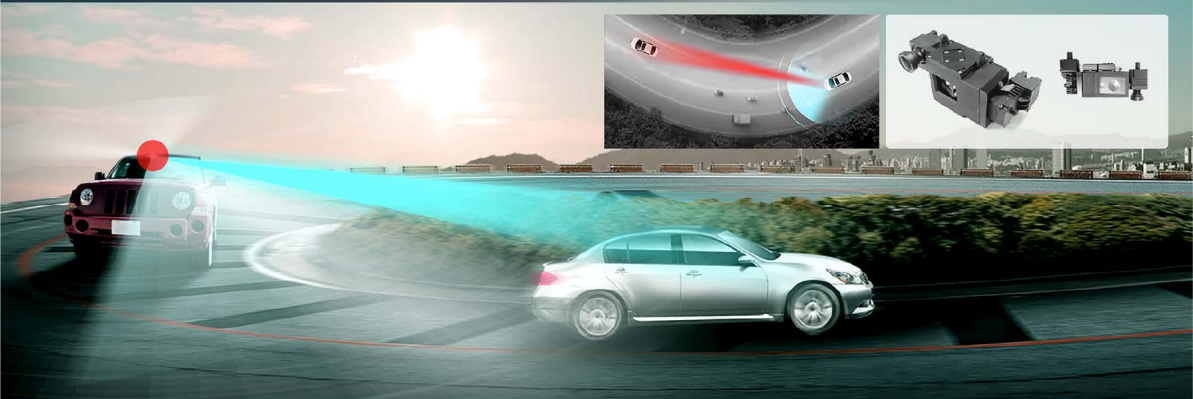
Block Diagram



Specification

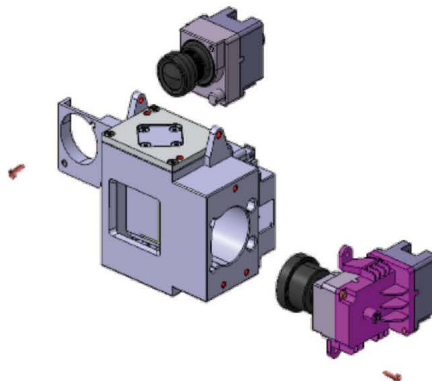
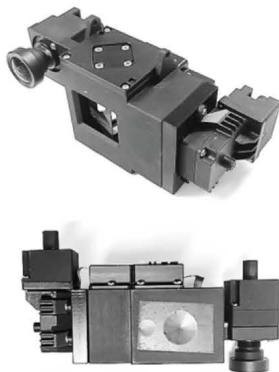
Item	Spec
Input Voltage	DC 9 V ~ 25 V
FOV	120°
Image Sensor	CIS
Image Pixel Resolution	7.4M / 8.0M [3840*1960 / 3840*2160]
Operating Temperature	-30°C ~ 105°C

7.4M DUAL SCANNING CAMERA (SCAN BY ACTUATOR)

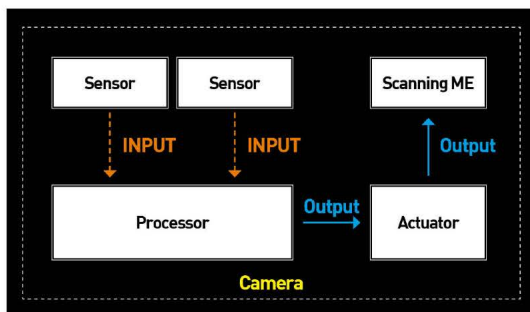


Mimicking the human vision

- ✔ High resolution at the center of the Fovea
- ✔ Lower resolution at the peripheral vision
- ✔ Stereoscopic depth perception
- ✔ Quick scan through eyeball movements
- ✔ Vision-based Classification
- ✔ Event and scenario-based acquisition



Block Diagram



Specification

Camera	Spec
Input Voltage	[DC7V±0.5V ~DC24V±0.5V]
Power Dissipation	200~300mA
FOV	Wide, Narrow
Image Pixel Resolution	7.4M Pixel
Operating Temperature	-30°C ~ 105°C

MULTI-INTERFACE (SVM 360°, AHD, LVDS, Ethernet camera)

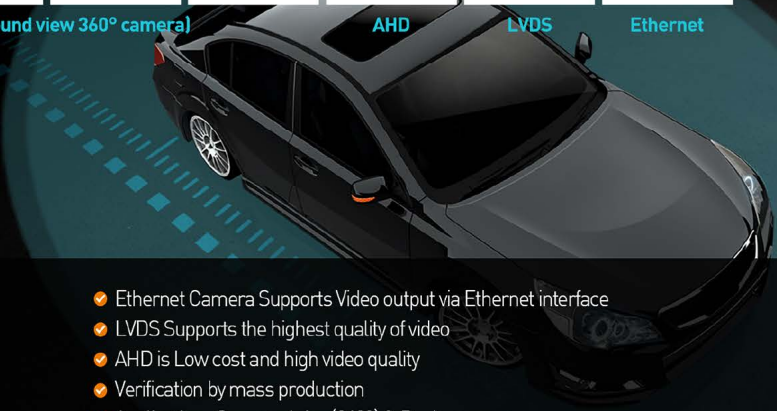


SVM (Surround view 360° camera)

AHD

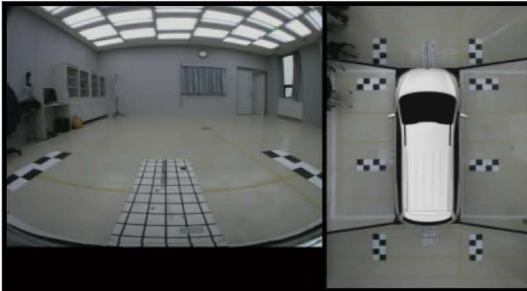
LVDS

Ethernet

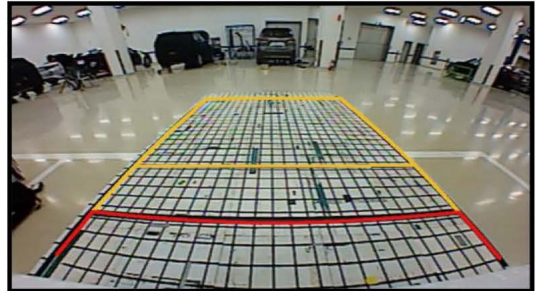


- ✔ Ethernet Camera Supports Video output via Ethernet interface
- ✔ LVDS Supports the highest quality of video
- ✔ AHD is Low cost and high video quality
- ✔ Verification by mass production
- ✔ Application : Surround view(360°) & Backup camera

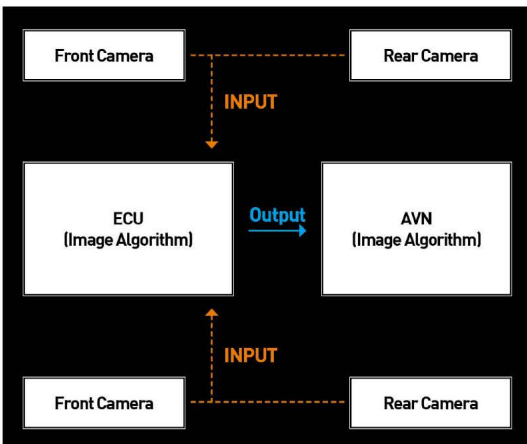
Surround View Monitor System



Surround View Monitor System



System Block Diagram



Specification

Category	Item	Specification
LVDS Camera	Fov	192°(H), 120°(V)
	Pixel Resolution	1280x724p@30fps
	Video Output	LVDS (POC)
	Approach	SVM, RVM
Ethernet Camera	Fov	192°(H), 137°(V)
	Pixel Resolution	1280x944p@30fps
	Video Output	Ethernet
	Approach	SVM, RVM
AHD Camera	Fov	192°(H)
	Pixel Resolution	1280x720p@30fps
	Video Output	AHD
	Approach	RVM

BIOMETRIC SENSING MODULE

Capacitance Fingerprint module



- ✓ Fast Recognition Speed
- ✓ High Recognition Rate (less than 0.002% error rate)
- ✓ Easy to minimize (Can be applied to various products)

Iris recognition camera module



- ✓ Optimized solution for "ALL EYE COLOR"
- ✓ Applied IR-LED & Band pass filter of 810nm wavelength range
- ✓ Running VT / IRIS camera via switching function
- ✓ High recognition rate regardless of light from indoor to outdoor

Facial recognition camera



- ✓ 3D facial recognition is to reduce error on 2D facial recognition algorithm such as difference in light, head direction expression, cosmetic face, etc.

ToF camera



- ✓ Laser illuminator : Surface emitting laser diode provides the high-speed modulated signal that lights up the target at the invisible wavelength.
- ✓ Time of Flight Pixel : The reflected light is captured and demodulated on the pixel. Several dedicated sensor areas allow to optimize the module performance to the specific sensing task.



Optical Fingerprint module

- ✓ High visibility by in-display type
- ✓ Instinctive usage (Direct touch type to OLED panel)
- ✓ Higher Resolution than capacitance type (750Dpi)
- ✓ No effect to OLED yield because module is not connected to a panel.

Applications

Capacitance Fingerprint Module

- Smartphone (front, side-key, back)
- Various colors (Glossy, Matt, Engraved logo)
- Low price



Optical Fingerprint Module

- Smartphone (In-display)
- Bezel less displays
- Intuitive to the user



Automotive

- Electronic payment (Car-Pay)
- Optimized to provide user convenience
- High reliability response



Door Lock

- Application of various security products
- User convenience
- High security



Golf Range Finder(GPS)

- ✔ Easy to use
- ✔ Smallest Form-factor
- ✔ Voice recognition
- ✔ Lightest weight
- ✔ IP54 water&dust proof
- ✔ GPS, Glonass, QZSS



DashCam

✔ MD-X

- 2ch(Front 1080p / Rear 1080p)
- 3.5" TFT LCD



✔ M6

- 2ch(Front 1080p / Rear 1080p)
- WiFi : Android, iOS app



✔ CLON4000

- 2ch(Front 1080p / Rear 1080p)
- 3.5" TFT LCD
- WiFi : Android, iOS app



✔ L7 PRIME

- 2ch(Front 1080p / Rear 720p)
- 3.5" TFT LCD
- World 1st LTE Connection



✔ SNIPE

- 2ch(Front 1080p / Rear 720p)
- 3.5" TFT LCD



✔ ROBIN

- 2ch(Front 720p / Rear 720p)
- 3.5" TFT LCD



DASH CAM SPECIFICATION

Model		MD-X	M6	CLON4000
Resolution		Front: 1920x1080/Rear: 1920x1080	Front: 1920x1080/Rear: 1920x1080	Front : 1920x1080/Rear : 1920x1080
Image Sensor	Front	SOI JX-F22 1/2.7" F2.0	Sony IMX307	Sony IMX307
	Rear	SOI JX-F22 1/2.7" F2.0	Sony IMX323	SOI JX-F22
Frame Rate		30fps(Front & Rear)	30fps(Front & Rear)	30fps(Front & Rear)
View Angle		Front: 140°, Rear: 140°	Front: 126°, Rear: 126°	Front: 126°, Rear: 126°
LCD		3.5" TFT IPS LCD	N/A	3.5" TFT LCD
GPS		External Support	External Support	External Support
Memory Capacity		Micro SD Card up to 64GB	Micro SD Card up to 256GB	Micro SD Card up to 256GB
Power		DC 12V/24V, Super Cap	DC 12V/24V, Super Cap	DC 12V/24V, Super Cap
Operating Temp		-10°C ~ 60°C	-10°C ~ 60°C	-10°C ~ 60°C
Dimension(mm)		98X63X32mm	56X43X29mm	98X63X30mm
ADAS		LDWS, FCWS, FVSA	LDWS, FCWS, FVSA	LDWS, FCWS, FVSA

Model		L7 PRIME	SNIPE	ROBIN
Resolution		Front: 1920x1080/Rear: 1280x720	Front: 1920x1080/Rear: 1280x720	Front: 1280x720 / Rear : 1280x720
Image Sensor	Front	SONY STARVIS IMAGE SENSOR	2M CMOS image sensor	SOI JX-F22 1/2.7" F2.0
	Rear	1M CMOS image sensor	1M CMOS image sensor	SOI JX-F22 1/2.7" F2.0
Frame Rate		30fps(Front & Rear)	30fps(Front & Rear)	30fps(Front & Rear)
View Angle		Front: 125°, Rear: 120°	Front: 125°, Rear: 120°	Front: 140°, Rear: 140°
LCD		3.5" TFT IPS LCD	3.5" TFT LCD	3.5" TFT LCD
GPS		External Support	External Support	External Support
Memory Capacity		Micro SD Card up to 64GB	Micro SD Card up to 64GB	Micro SD Card up to 64GB
Power		DC 12V/24V, Super Cap	DC 12V/24V, Super Cap	DC 12V/24V, Super Cap
Operating Temp		-10°C ~ 60°C	-10°C ~ 60°C	-10°C ~ 60°C
Dimension(mm)		104X64X30mm	104X64X30mm	98X63X30mm
ADAS		LDWS, FCWS, FVSA	LDWS, FCWS, FVSA	LDWS, FCWS, FVSA