

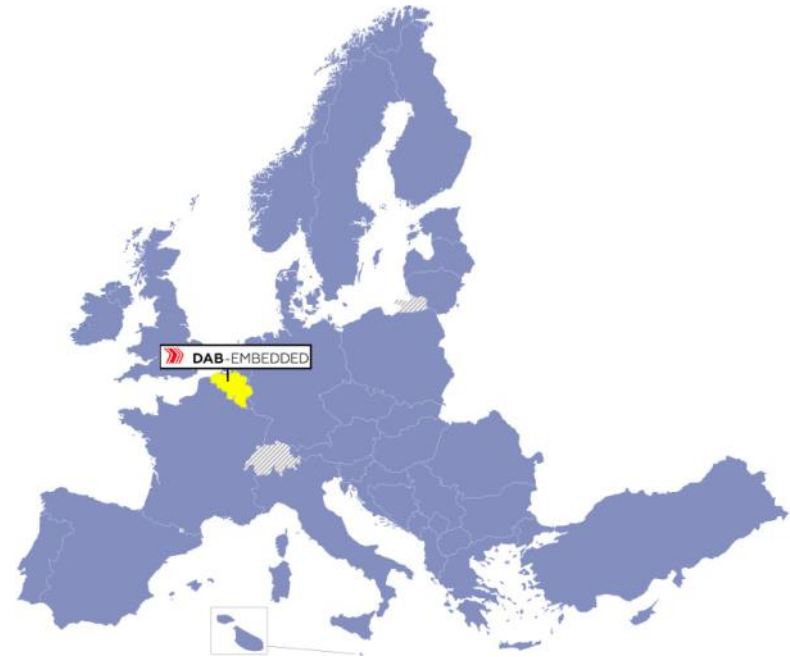


IMAGE VISION PORTFOLIO



ABOUT

- ✓ 10 years of company history (since 2014)
- ✓ Location: Bornem, Belgium
- ✓ More than 100 projects done



STRONG PARTNERSHIP WITH VIDEO CHIP VENDORS



CAMERA MODULE SUPPLIER



CUSTOMERS



SONY



LONG STORY - SHORT

DAB-Embedded BV has experience with integration of next image sensors:

- Linear CMOS/CCD sensors (Hamamatsu)
- Event based sensors EVS (Sony)
- Monochrome and Color (Bayer) sensors with YUV, COMP8, RAW10 output formats
 - With SLVS-EC, MIPI CSI-2, LVDS, parallel interfaces
 - From brands: Sony, OnSemi, Omnivision, Gpixel and others
- 3D Time of Flight sensors (Sony)

We have experience with:

- Autoexposure algorithms (HF and PD)
- IQ tuning (on/off chip lens shadow correction LSC, black level compensation BLC, bad pixel masking, Gamma correction, CCM, CFA configuration, AWB configuration, CLM)
- RA8/RAW10/RAW12/RAW14 conversion to YUV/RGB/RGB-IR using GPU OpenCL plugin and ARM SIMD/OpenMP plugin
- Building Gstreamer pipeline with color conversion (on ISP), compression using hardware codecs, such as H.264,H.265 and making network streaming interface (RTSP) and making a video overlay application on top of camera video streaming.
- Preparation of video/imaging data for post processing using Machine Learning / Deep learning algorithms and computer vision algorithms. Building full image processing pipeline including computer vision pipeline.
- Building DSP, OpenCL and SIMD processing module.

PRODUCTS

VIDEO FRAME GRABBER

Video/Image frame grabber with next specs

- PCIe bus x4 Gen2
- 2GBytes of DDR3 RAM
- 2x 6Gbps GMSL2 ports
- 2x MIPI 4-lane CSI-2 ports
- Possible to receive RAW/YUV/RGB data
- Windows/Linux driver and SDK



VIDEO PROCESSING PLATFORM

Machine vision/AI processing platform

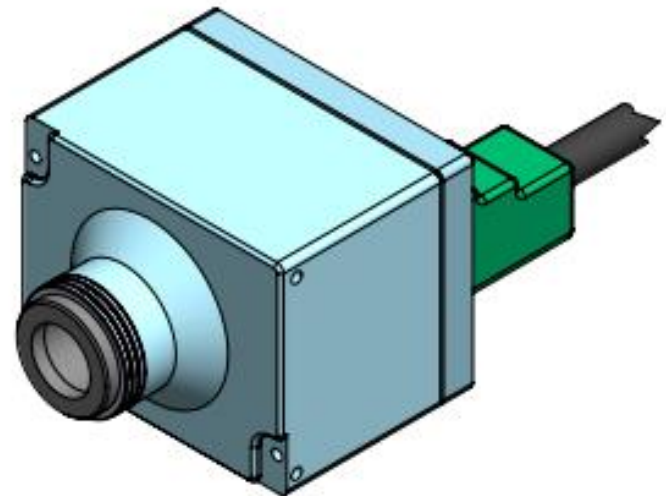
- Sony IMX462(RS)/IMX392(GS)/IMX528 (ToF)
- Integrated ISP with color calibration, lens correction and more
- With 5" TFT LCD
- WiFi/BLE
- Ethernet 100Mb
- H.265/H.264 encoder
- OpenCV hardware acceleration
- GMSL2 deserializer
- CAN 2.0 FD



GMSL2 CAMERA

GMSL2 camera head with

- 6Gbps serializer + power over the coax cable
- Hardware trigger support
- Integrated IMU (Accelerometer/Gyro/Magnetometer)
- Integrated EEPROM with calibration data
- M12 lens holder for various lens types
- IP69 protected enclosure
- Supported sensors:
 - Omnivision OV9281
 - Sony IMX178, Sony IMX183, Sony IMX226
 - Sony IMX250, Sony IMX252, Sony IMX264,
 - Sony IMX265, Sony IMX273, Sony IMX290,
 - Sony IMX296, Sony IMX297, Sony IMX327,
 - Sony IMX335, Sony IMX392, Sony IMX412,
 - Sony IMX415, Sony IMX462, Sony IMX565,
 - Sony IMX566, Sony IMX567, Sony IMX568,
 - Sony IMX900.



DESIGN EXAMPLES

SMART RETAIL CAMERA V1

Smart camera for automatic retail systems in pharmacy stores.

Designed using ultralow power processor and 8Mpix camera for making shelf pictures during work day and transfer images to the AI cloud over WiFi.

Camera fully supports GDPR rules using integrated motion sensor and making picture only when no motion in front of the camera.

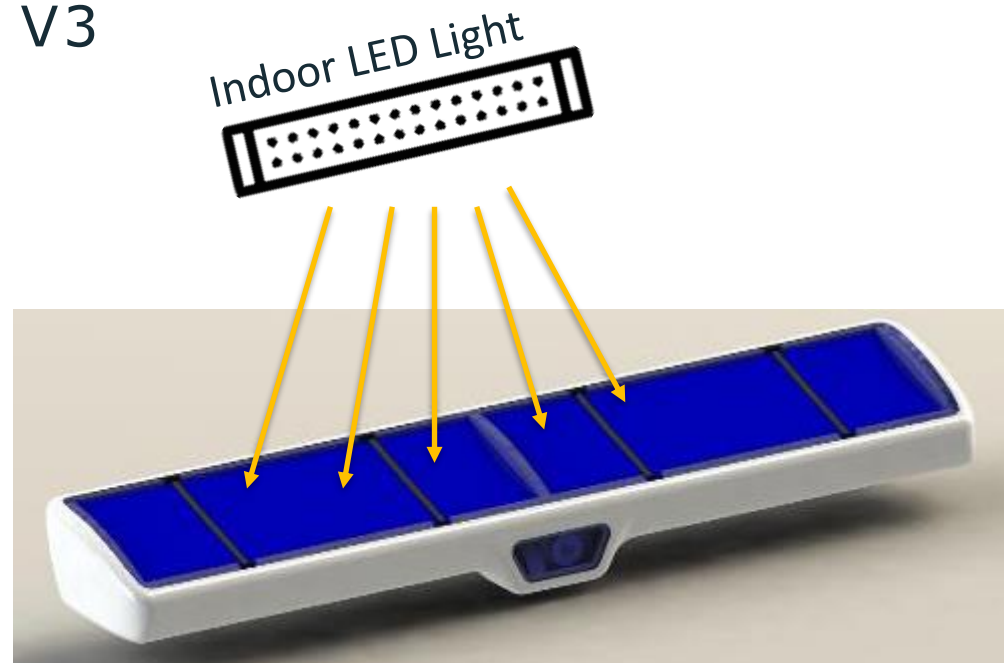


SMART RETAIL CAMERA V3

A new generation of the camera for the pharmacy stores.

This camera has unique solar battery based charging system to avoid battery charging from AC.

The camera is fully autonomous with product recognition using YOLOv5 models (AI) onboard.



8Mpix
camera

YOLOv5
models



SMART RETAIL CAMERA V3

Real installation in the shop.

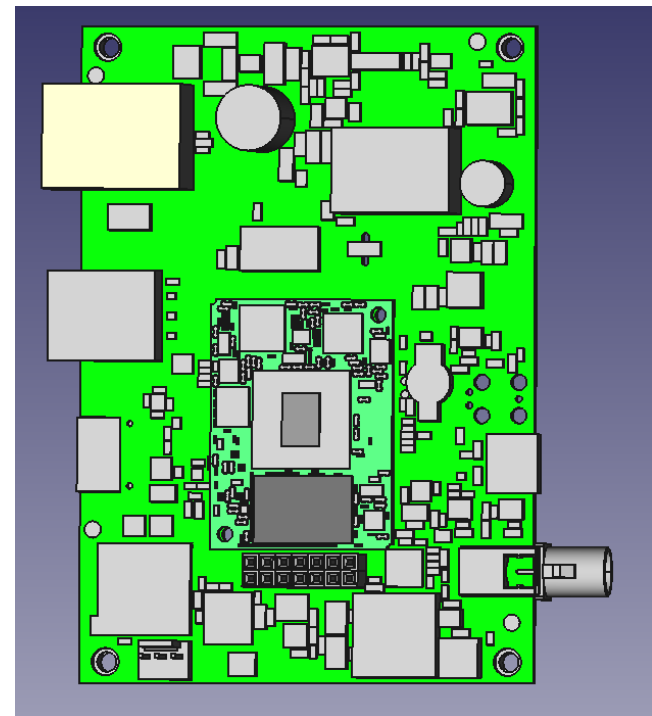
Photo from the camera:



INDUSTRIAL POE CAMERA

Industrial camera for machine vision with:

- PoE (Type 2) + 1Gbit Ethernet
- GMSL2 interface for camera head
- H.265 FullHD live stream (RTP)
- AutoFocus system
- 12Mpix JPEG snapshot
- REST API interface (camera control)
- Image processing pipeline tuning (over REST API + Python examples)
- 60 seconds retrospective buffer with Possibility to get video based on trigger (software / hardware)
- CAN bus (optional)
- WiFi (optional)



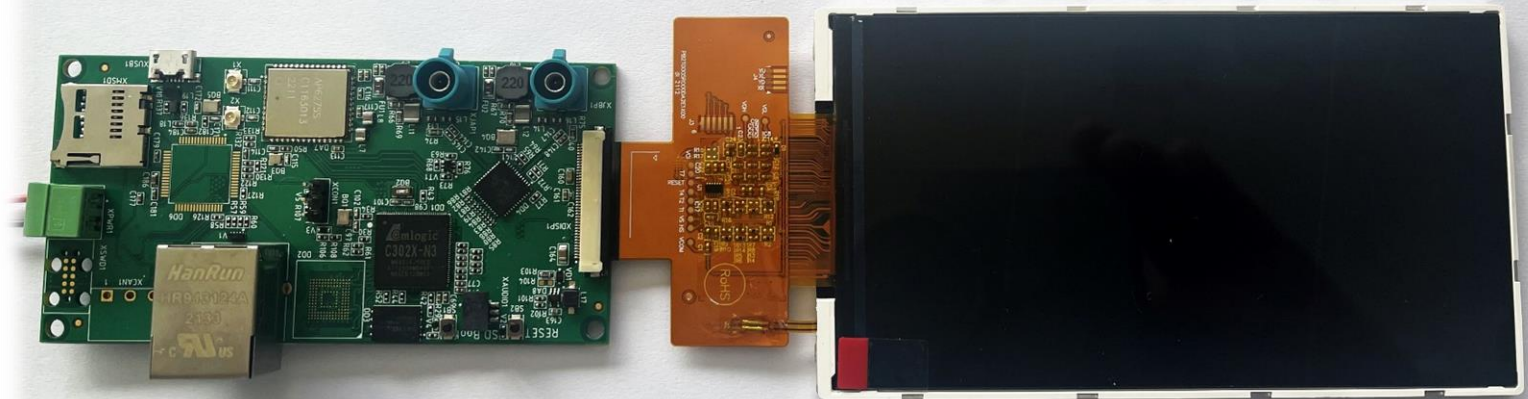
9x digital zoom

 TensorFlow Lite

BIKE DISPLAY

Bike display (Digital mirror) with:

- LCD display
- GMSL2 interface for Sony IMX462 camera (rear view).



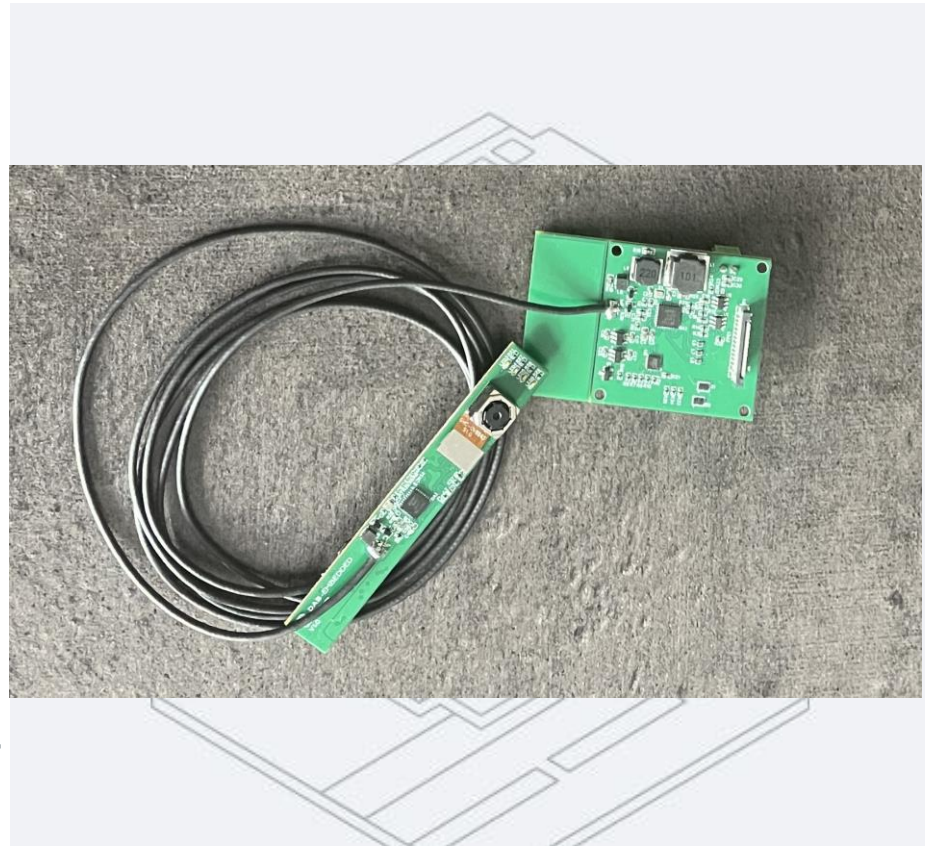
DENTAL CAMERA

Customer – dental tools supplier

8Mpix color dental camera with Autofocus, head light (LEDs) and GMSL2 interface (3Gbps).

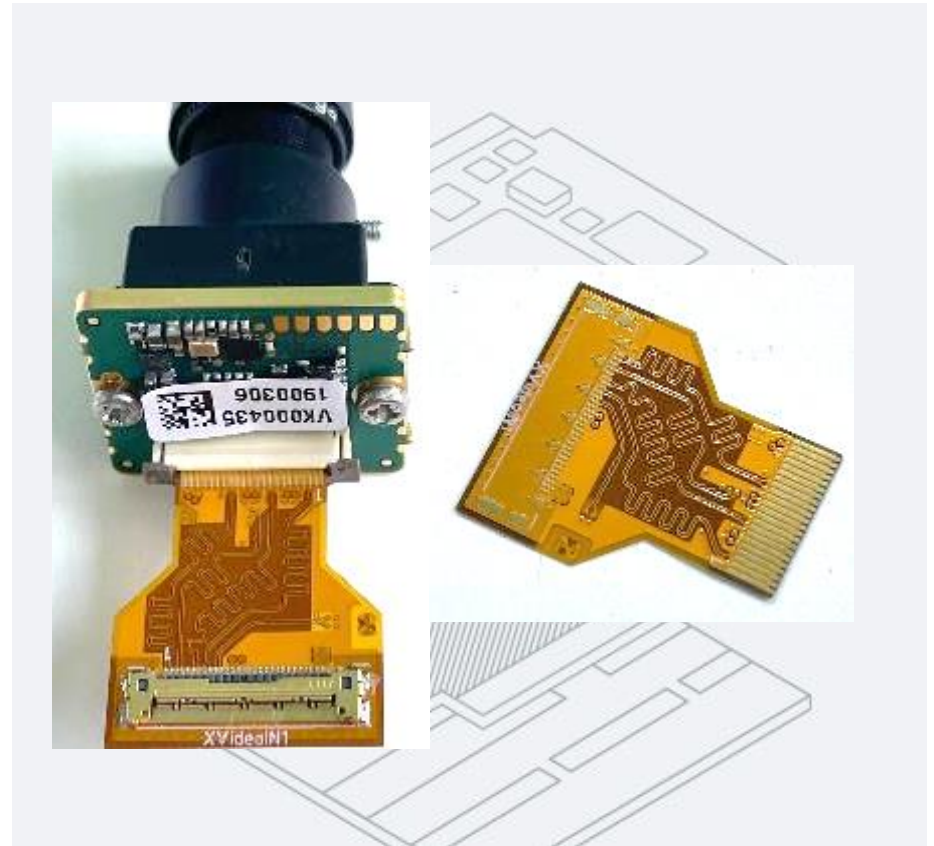
Solution based on GMSL2 technology and using Ingenic T40XP image processor for video streaming.

Solution able to stream 4K@25fps video and high-resolution JPEG files over a WiFi network to a medical PC or Tablet.



I-PEX CABLE DESIGN FOR THE CAMERA MODULE

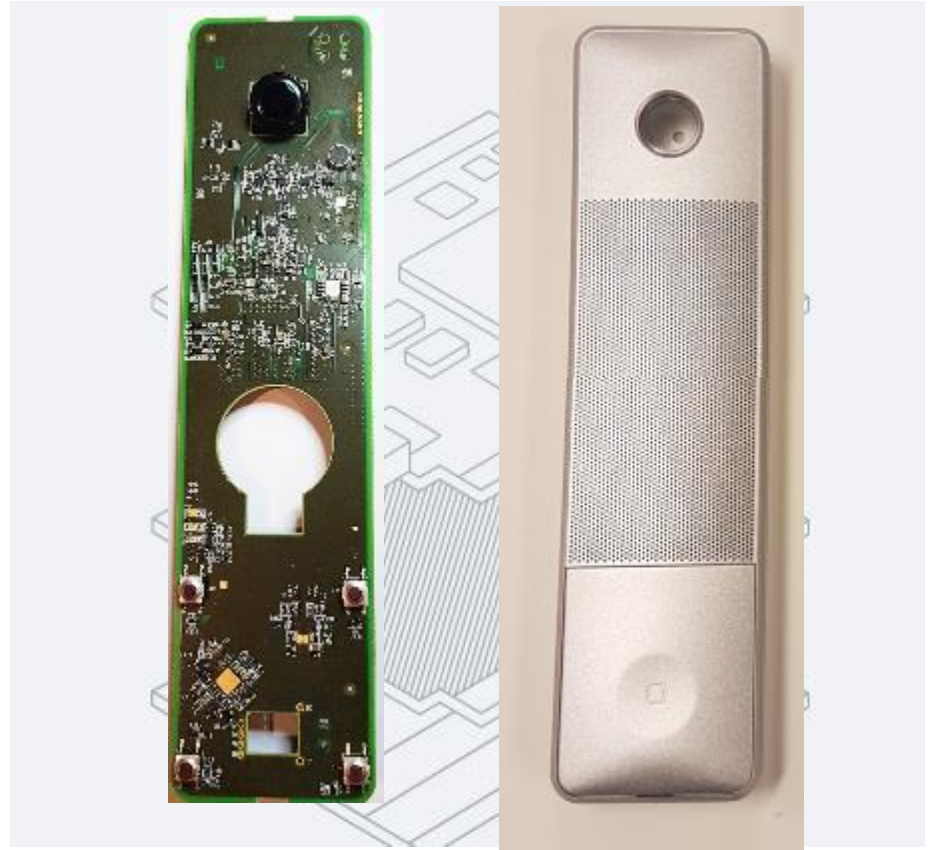
I-Pex cable adapter designed for Vision Components MIPI camera module for connection with Intel Atom and NXP IMX8 platforms.



DOORBELL (HOME AUTOMATION)

Board equipped with:

- 5Mpix camera (RGB-IR)
- IR illumination
- Active microphone
- Speaker
- LED indication
- PLC communication system
- CPU with integrated video codecs



CUSTOM IR CAMERA

Customer – silicon vendor of IR-based sensors.

NVidia TX2- based hardware design requested with LVDS to MIPI converter.

Used:

Lattice FPGA CrossLink
(MIPI -> LVDS converter)

Software:

JetPack (Custom driver added).
Gstreamer-based video pipeline



8 AND 13 MPIX CAMERA MODULE

Module itself 8,5x8,5mm:

- With AutoFocus system
 - Full RGB (Bayer)
 - MIPI CSI2 bus, RAW8 or RAW10
- 52° DFoV and F.no=1.6, No lens distortion
(possible to change FoV)

Drivers for:

- NXP IMX6 and IMX8
- Texas Instruments AM64, AM62, Jacinto (Automotive)
- Amlogic C308X
- Ingenic T40XP



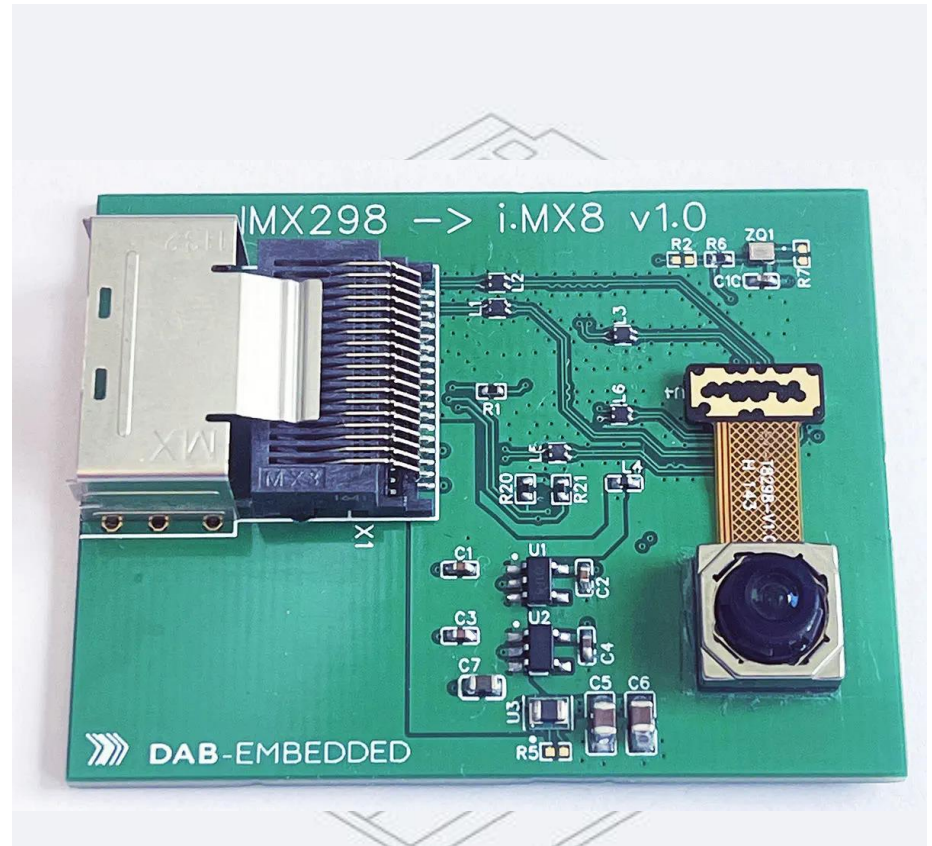
16MPIX CAMERA MODULE

Module itself 18x18mm:

- With AutoFocus system
- Full RGB (Bayer)
- MIPI CSI2 bus, RAW8 or RAW10
- 117° DFoV and F.no=2.25, No lens distortion
(possible to change FoV)

Drivers for:

- NXP IMX6 and IMX8
- Texas Instruments AM64, AM62, Jacinto (Automotive)
- Ingenic T40XP
- Amlogic C308X



64MPIX CAMERA MODULE

Module 19x19mm:

- With AutoFocus system
- Full RGB (Bayer)
- MIPI CSI2 bus, RAW8 or RAW10
- 410 FPS @ 720p

79.8° DFoV and F.no=1.89,
No lens distortion
(possible to change FoV)

Drivers for:

- NXP IMX6 and IMX8
- Texas Instruments AM64, AM62A, Jacinto (Automotive)



SUPPORTING VARIOUS RANGE OF SENSORS

DAB-Embedded has stock of various range of sensors:

- Sony IMX219 (8Mpix) + AF
- Sony IMX179 (13Mpix) + AF
- Sony IMX298 (16Mpix) + AF
- Sony IMX686 (64Mpix) + AF
- Sony IMX528 (ToF VGA)
- Omnivision OV8865 + AF
- Omnivision OV13850 + AF
- OnSemi AR1335 (13MPix) + AF
- Samsung S5KHMXP03 (108Mpix + AF)
- Sony IMX226C
- Sony IMX412

+ Linux drivers for all sensors in a list





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