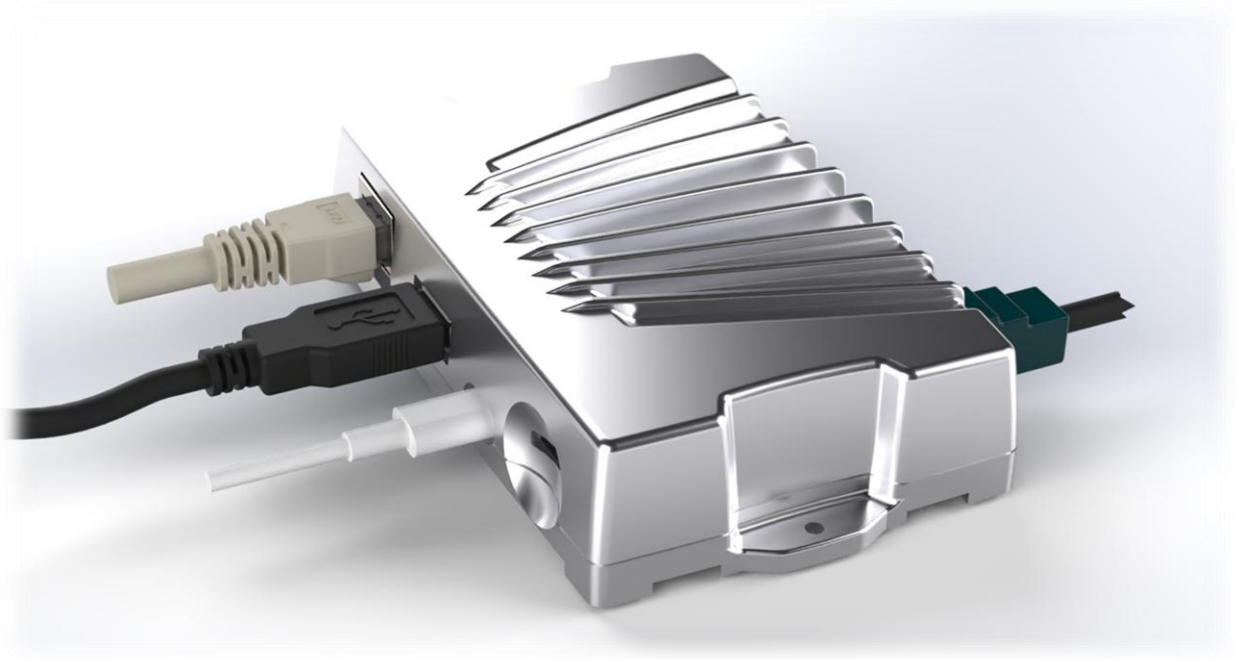
Specification

Edge video processing platform

“AquaEdge”



Version	Name	Date
1.1	DAB-Embedded	18.11.2024
1.2	DAB-Embedded	24.02.2025

Table of Contents

1. General information

This document covers camera specifications for the edge video processing platform “AquaEdge” based on NXP i.MX8Mplus, i.MX93 or i.MX95.

This product can be integrated with 23 types of vision cameras (Global/Rolling shutter, from VGA up to 12Mpix resolution).

The product is powered by PoE with a maximum power consumption of 15 W.

The platform is based on Linux OS and contains a Yocto-based file system with all necessary components for the development own video processing platform or using our standard package including video ISP (image vision processor) drivers, Gstreamer component for video streaming, Web-server and RestAPI interface.

The hardware of the vision system based on 2 SoM module options.

Option 1: with NXP i.MX8MPlus processor:

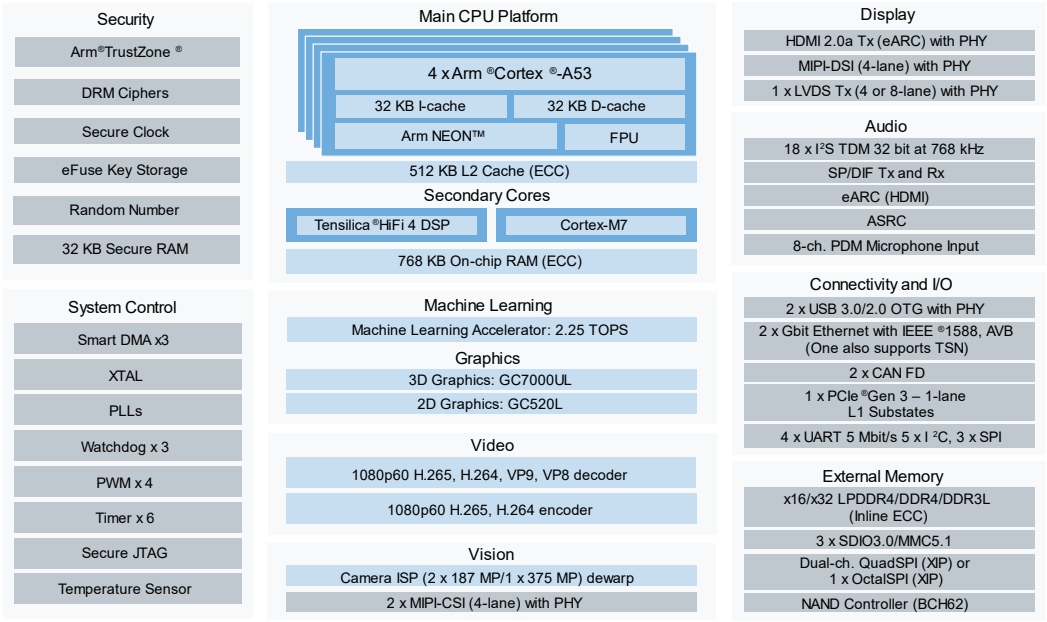


Figure 1: NXP i.MX8 MPlus processor structure

Option 2: with NXP i.MX93 processor:

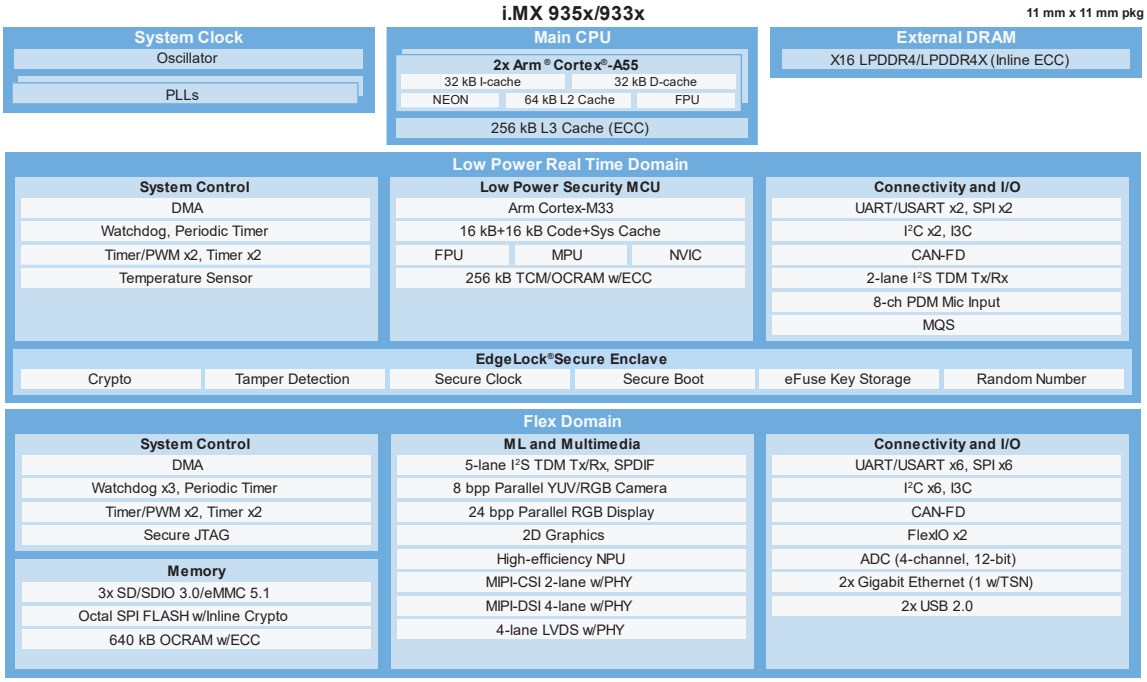


Figure 2: NXP i.MX93 processor structure

Option 3: with NXP i.MX95 processor:

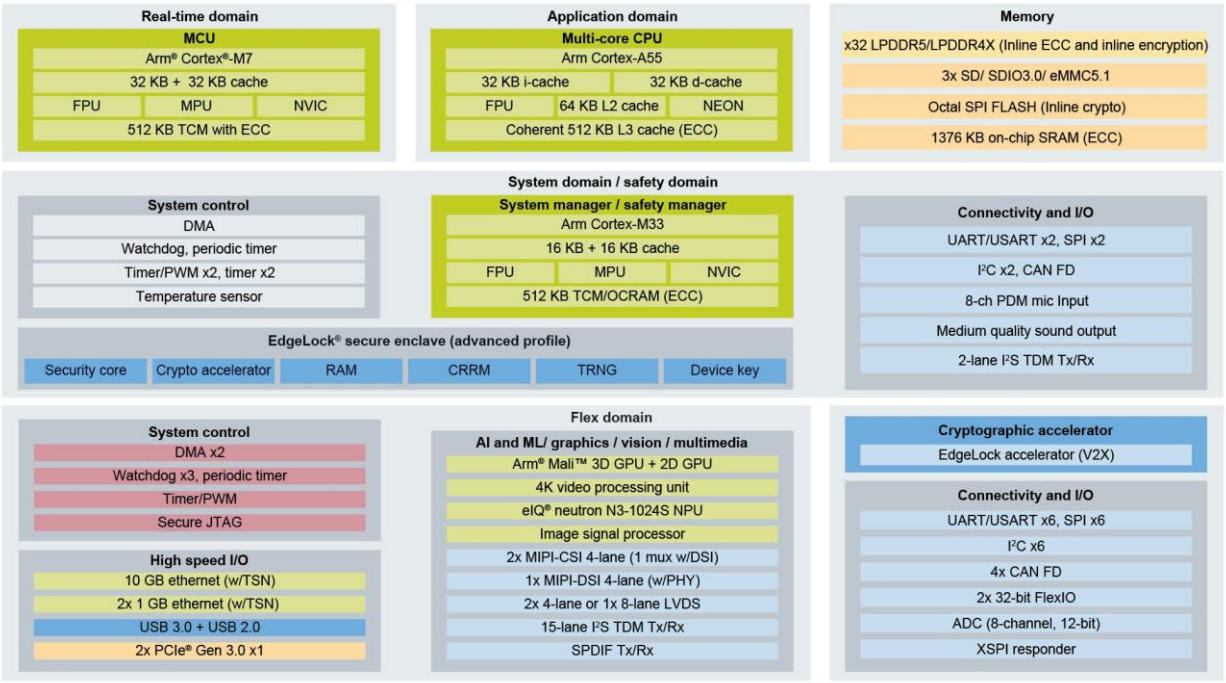


Figure 3: NXP i.MX95 processor structure

Image vision system made for object optical analysis, video broadcasting, AI possibility using internal NPU hardware block (Google AI models are possible to run, ONNX) and Barcode/QR code recognition.

2. General hardware description

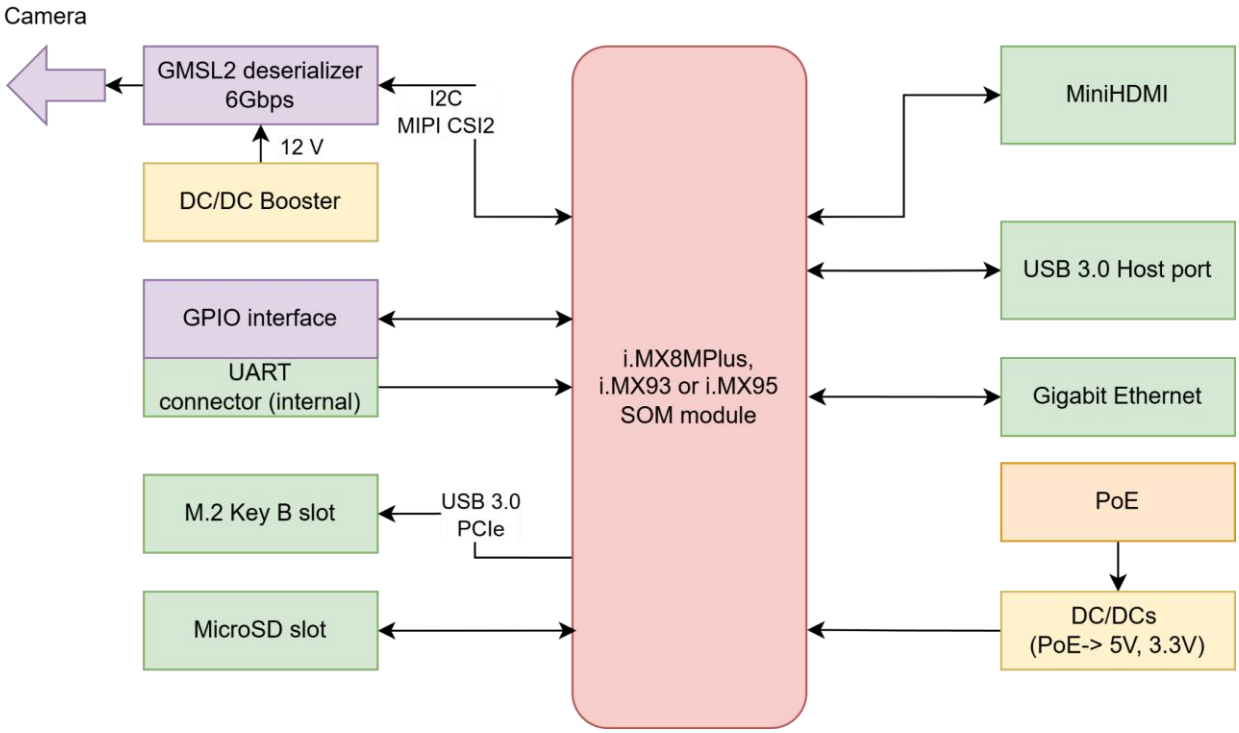


Figure 4: Baseboard block diagram

The baseboard will have the following blocks:

- UART connector for access to Linux console (3.3V TTL);
- Gigabit Ethernet port with PoE functionality (15W max) and IEEE 1588 PTP option (software);
- miniHDMI 2.0 port (up to 4K support);
- USB 3.0 Host port (1A max);
- MicroSD slot (UHS-I support);
- M.2 slot (Key B) with USB 3.0 and PCIe Gen 3 x1 (only with IMX8MP, IMX95);
- GPIO for external triggers (optional);
- CAN 2.0 B / FD (optional, without onboard transceiver);
- Camera port (Fakra-Z connector, GMSL2 based camera, MIPI CSI-2, 4 lanes, I2C bus);
- WiFi 802.11ax, BLE 5.3 for i.MX95 option,
  (or WiFi 802.11ac, BLE 5.3 for i.MX93 option).

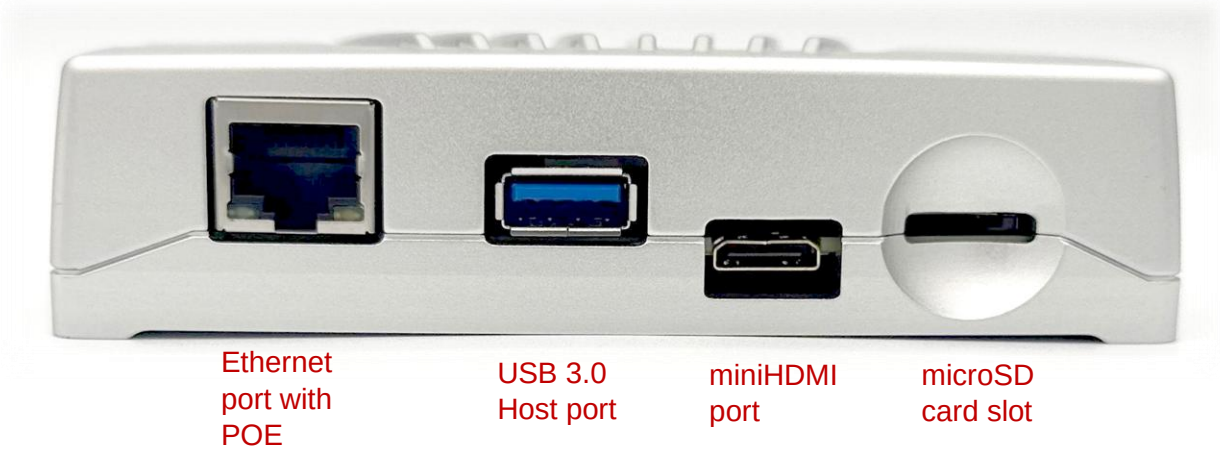


Figure 5: Front side drawing

Figure 6: Back side drawing

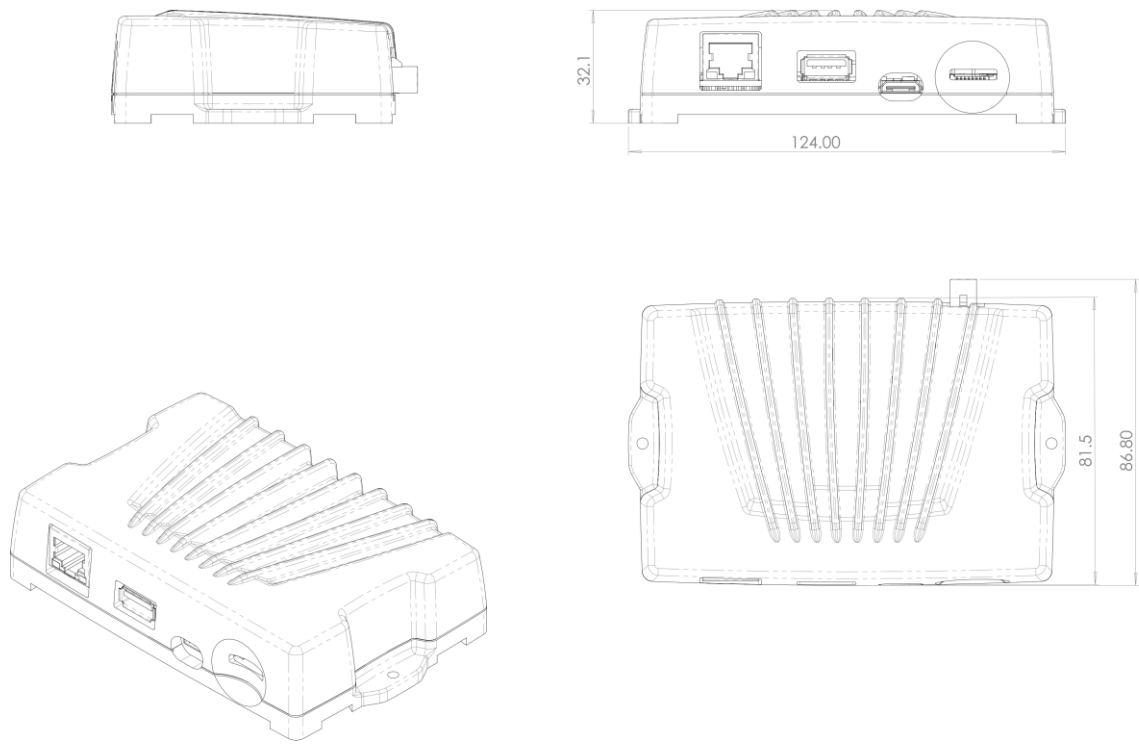


Figure 7: Mechanical drawing

System summary:

Item	Details
PCB dimensions	100.0 x 70.0 mm
Aluminum enclosure dimensions	124.0 x 86.8 mm
Board power consumption	15W max
PoE	PoE+, Type 2 accepted
Extension port voltage level	3.3V, TTL
CPU	NXP i.MX8MPLUS, 1.8GHz, Quad-core NXP i.MX93, 1.7GHz, Dual-core NXP i.MX95, 2GHz, 6-Cores
RAM	2GB (up to 8GB LPDDR4 for i.MX8MPlus) (up to 2GB LPDDR4 for i.MX93) (up to 16GB LPDDR5 for i.MX95)
Flash	16GB (up to 64GB eMMC for i.MX8MPlus) (up to 64GB eMMC for i.MX93) (up to 128GB eMMC for i.MX95)
Image sensor supported	See full table Drivers available for: Sony IMX462 with HDR (FullHD), Sony IMX900 with HDR (3MP), Sony IMX412 with HDR (12MP).
Weight	350g (IMX8MPLUS version)
Certification	CE, FCC

Full list of capable sensors:

Module	Mega-pixel	FPS	Pixel size	Sensor size	CMOS Sensor	Color	Resolution	Shutter
Sony IMX178	6.3	60	2.4 µm	1/1.8"	SONY Starvis	monochrome	3072 x 2048	Global Reset Shutter
Sony IMX183	20.2	24	2.4 µm	1"	SONY Exmor R	monochrome	5496 x 3672	Global Reset Shutter
Sony IMX183	20.2	24	2.4 µm	1"	SONY Exmor R	color	5496 x 3672	Global Reset Shutter
Sony IMX226	12.4	44	1.85 µm	1/1.7"	SONY Starvis	monochrome	4072 x 3046	Global Reset Shutter
Sony IMX226	12.4	44	1.85 µm	1/1.7"	SONY Starvis	color	4072 x 3046	Global Reset Shutter
Sony IMX250	5.1	130	3.45 µm	2/3"	SONY Pregius	monochrome	2464 x 2056	Global Shutter
Sony IMX250	5.1	130	3.45 µm	2/3"	SONY Pregius	color	2464 x 2056	Global Shutter
Sony IMX252	3.2	160	3.45 µm	1/1.8"	SONY Pregius	monochrome	2064 x 1544	Global Shutter
Sony IMX252	3.2	160	3.45 µm	1/1.8"	SONY Pregius	color	2064 x 1544	Global Shutter
Sony IMX264	5.1	30	3.45 µm	2/3"	SONY Pregius	monochrome	2464 x 2056	Global Shutter
Sony IMX264	5.1	30	3.45 µm	2/3"	SONY Pregius	color	2464 x 2056	Global Shutter
Sony IMX265	3.2	50	3.45 µm	1/1.8"	SONY Pregius	monochrome	2064 x 1544	Global Shutter
Sony IMX265	3.2	50	3.45 µm	1/1.8"	SONY Pregius	color	2064 x 1544	Global Shutter
Sony IMX273	1.6	225	3.45 µm	1/2.9"	SONY Pregius	monochrome	1456 x 1088	Global Shutter
Sony IMX273	1.6	225	3.45 µm	1/2.9"	SONY Pregius	color	1456 x 1088	Global Shutter
Sony IMX290	2.1	120	2.9 µm	1/2.8"	SONY Starvis	monochrome	1920 x 1080	Rolling Shutter
Sony IMX296	1.6	60	2.9 µm	1/2.8"	SONY Starvis	monochrome	1920 x 1080	Rolling Shutter
Sony IMX296	1.6	60	3.45 µm	1/2.9"	SONY Pregius	color	1440 x 1080	Global Shutter
Sony IMX297	0.4	120	6.9 µm	1/2.9"	SONY Pregius	monochrome	728 x 544	Global Shutter
Sony IMX327	2.1	60	2.9 µm	1/2.8"	SONY Starvis	color	1920 x 1080	Rolling Shutter
Sony IMX335	5	60	2.0 µm	1/2.8"	SONY Starvis	monochrome	2592 x 1944	Rolling Shutter
Sony IMX335	5	60	2.0 µm	1/2.8"	SONY Starvis	color	2592 x 1944	Rolling Shutter
Sony IMX392	2.3	200	3.45 µm	1/2.3"	SONY Pregius	monochrome	1920 x 1200	Global Shutter
Sony IMX392	2.3	200	3.45 µm	1/2.3"	SONY Pregius	color	1920 x 1200	Global Shutter
Sony IMX412	12.3	40	1.55 µm	1/2.3"	SONY Starvis	color	4056 x 3040	Rolling Shutter
Sony IMX415	8.3	60	1.45 µm	1/2.8"	SONY Starvis	monochrome	3840 x 2160	Rolling Shutter
Sony IMX415	8.3	60	1.45 µm	1/2.8"	SONY Starvis	color	3840 x 2160	Rolling Shutter
Sony IMX462	2.1	120	2.9 µm	1/2.8"	SONY Starvis	color	1920 x 1080	Rolling Shutter
Sony IMX565	12	42	2.74 µm	1/1.1"	SONY Pregius S	monochrome+color	4096 x 3000	Global Shutter
Sony IMX566	8.1	62	2.74 µm	1/1.1"	SONY Pregius S	color	2856 x 2848	Global Shutter
Sony IMX567	5.1	96	2.74 µm	1/1.8"	SONY Pregius S	monochrome+color	2472 x 2064	Global Shutter
Sony IMX568	5.1	96	2.74 µm	1/1.8"	SONY Pregius S	monochrome	2472 x 2064	Global Shutter
Sony IMX568	5.1	96	2.74 µm	1/1.8"	SONY Pregius S	color	2472 x 2064	Global Shutter
Sony IMX900	3.2	100	2.25 µm	1/3.1"	SONY Starvis	monochrome	2048x1536	Global Shutter
Sony IMX900	3.2	100	2.25 µm	1/3.1"	SONY Starvis	color	2048x1536	Global Shutter
Sony OV7251	0.3	120	3.0 µm	1/7.5"	Omnivision	monochrome	640 x 480	Global Shutter
Sony OV9281	1	120	3.0 µm	1/4"	Omnivision	monochrome	1280 x 800	Global Shutter

XEXT1 pinout *:

Pin nunber	Details
1	Cortex-M7 UART RXD
2	ARM Linux UART TXD
3	Cortex-M7 UART TXD
4	ARM Linux UART RXD
5	USER_IO0
6	CAN1_RX – CAN1 bus RX
7	USER_IO1 – Trigger 1 (input)
8	CAN1_TX – CAN1 bus TX
9	USER_IO2 – Trigger 2 (input)
10	5.0V, 400mA output
11	N/A
12	3.3V, 300mA output
13	GND
14	GND

* all pins are ESD-protected

For Serial connection its possible to use TTL-232R-RPI FTDI cable.

3. General software description

Software for the image vision system should be based on i.MX Yocto Linux Project from NXP L5.15.32_2.0.0 (i.MX8MP) and LF6.6.36_2.1.0 (i.MX95). The image contains all peripheral drivers, including camera ISP calibration for selected sensors.

We are providing an SDK with a demo Gstreamer pipeline to view and record data using an integrated ISP.

By default, DHCP is on. MAC addresses are written on the label at the AquaEdge device. You can check IP addresses using DNS name “ucm-imx8m-plus”.
Running “ping -4 ucm-imx8m-plus” will get the IP address of the device.

SSH connection is available by default with login “root” and no password.

3.1. Running AI algorithms

All SoCs (IMX8MP, IMX93, IMX95) – have accelerated NPUs. All necessary information about running models using hardware-accelerated NPU is described in the NXP document “i.MX Machine Learning User's Guide” (UG10166).