

# アドバンテック コンピューターオンモジュール

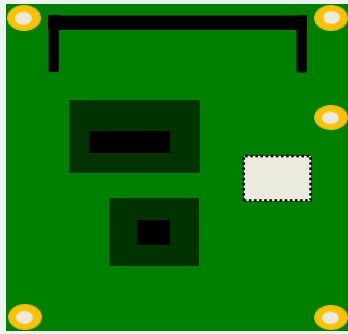
OKAMOTO

岡本無線電機  
アプリケーション部

2021年5月26日

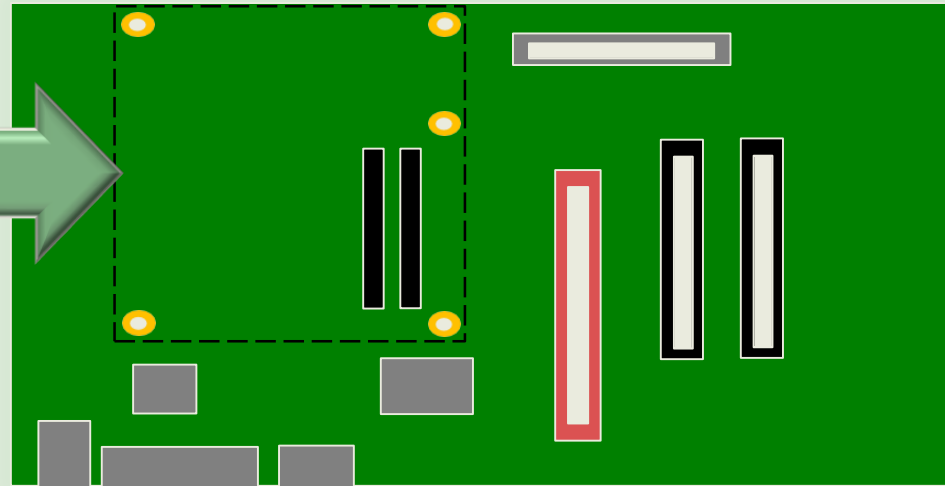
COM = Computer On Module

Traditional Single Board = CPU Module (COM) + Carrier Board



**CPU Module**

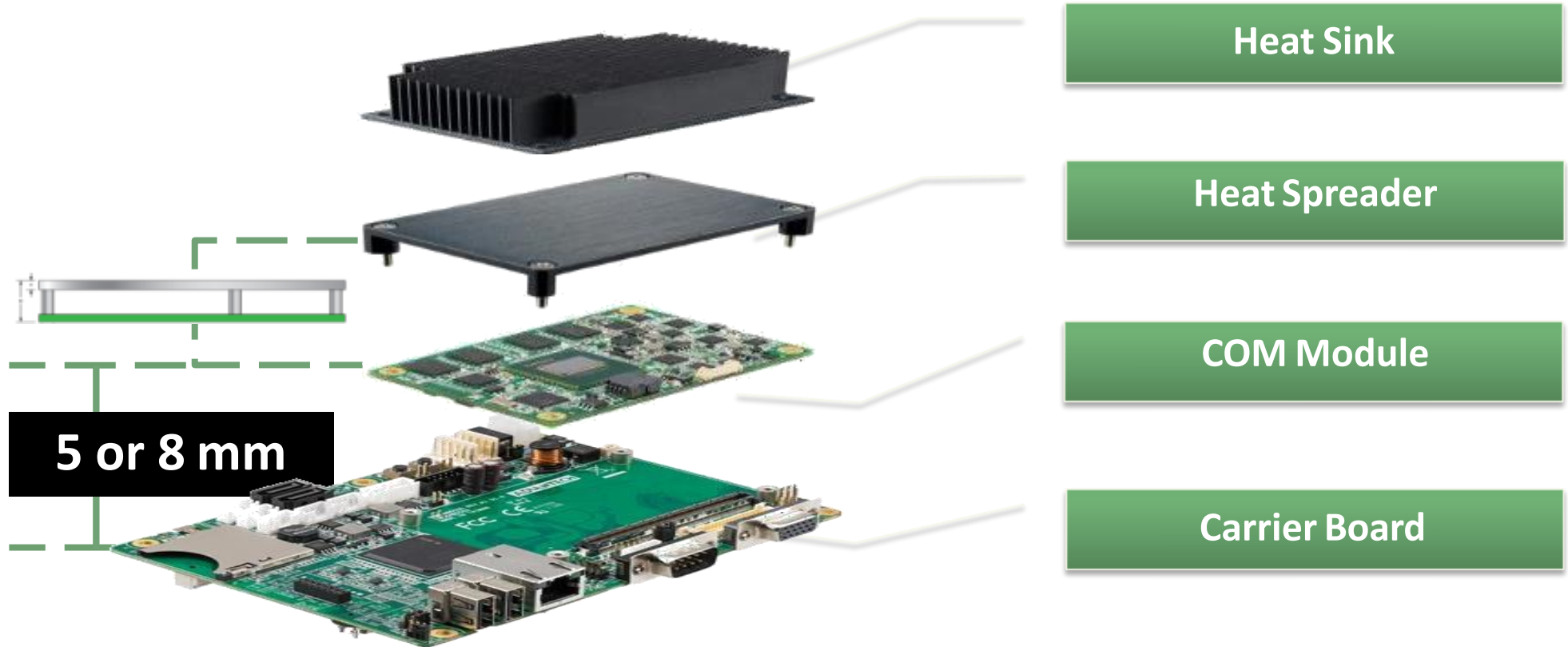
アドバンテックが設計/製造



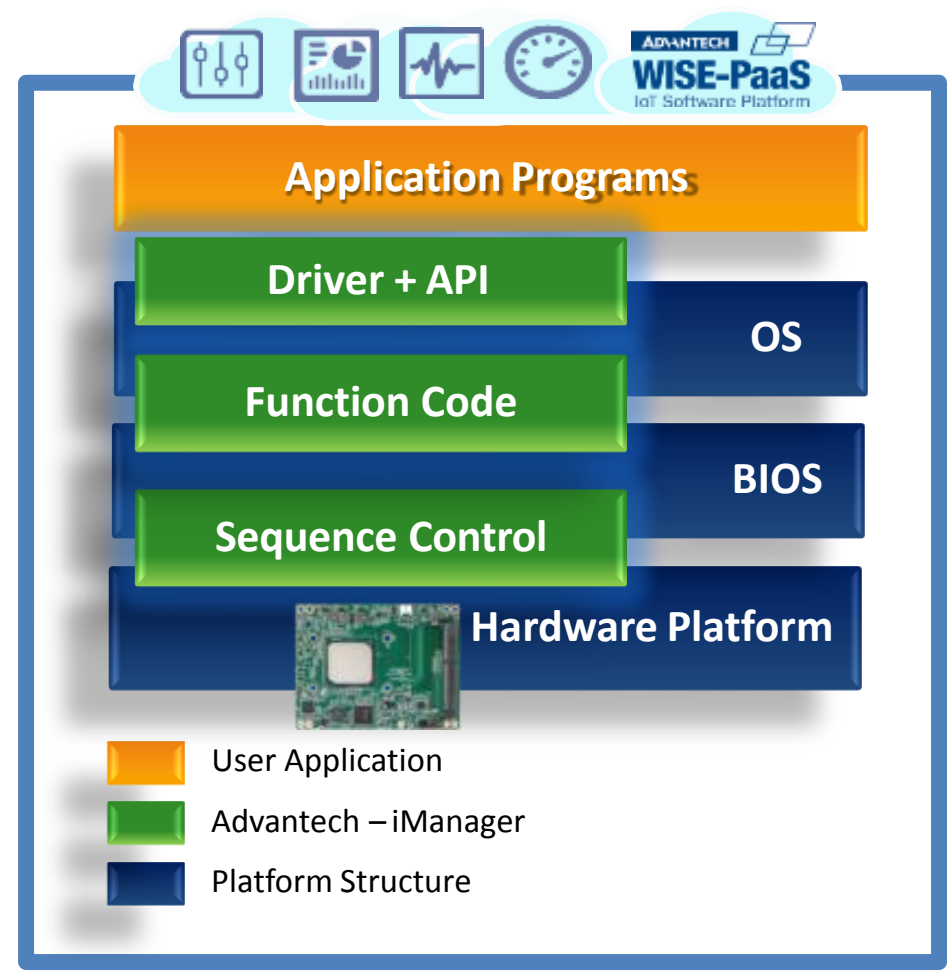
**Carrier Board**

お客様が設計

## Modularized System Structure

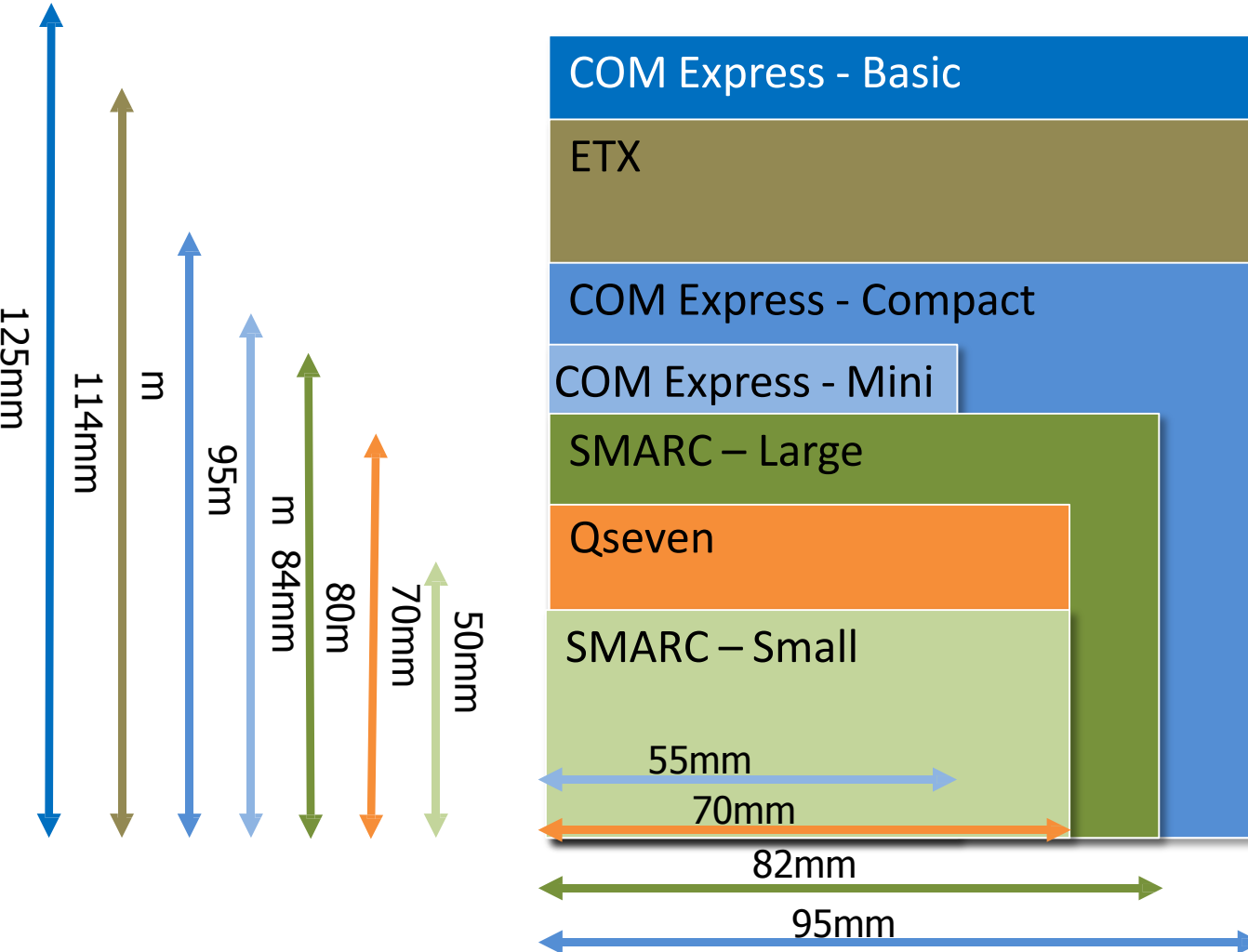


# Modularized Software Architecture



**PICMG** PICMG EAPI 1.0 complied

# Complete Offerings Per Form Factors



- COM Express – Basic**  
 SOM-5 series  
 (125mm x 95mm)
- COM Express – Compact**  
 SOM-6 series  
 (95mm x 95mm)
- COM Express – Mini**  
 SOM-7 series  
 (84mm x 55mm)
- ETX**  
 SOM-4 series  
 (114mm x 95mm)
- Qseven**  
 SOM-3 series  
 (70mm x 70mm)
- SMARC – Large**  
 SOM-2 series  
 (82mm x 80mm)
- SMARC – Small**  
 SOM-2 series  
 (82mm x 50mm)

# Why COM?



**80% Done in SOM**  
Processor and general interface technology done in System on Module

**Your Own Solution Board**  
20% Flexible Design for Perfect Fit  
Flexible customer solution board resources and design focus on application know-how and core competence

**Time to Market**



**Lower Assembly Cost**

**Module**

**Project**


**Chassis**



**Lower Upgrade Cost**

**Module A**      **Module B**

**Carrier Board**



**Key Benefit 2**

**Focused Resource Allocation**

**Shorten Development Schedule & Lower Development Cost**

**Resources Focused on Key Vertical Technology**



**Core Knowledge Security**

**Core** knowledge is secured at clients site.



# 1.3 New Models - SOM-5871

## (AMD V1000)

Medical

Thermal Solutions

Design in Expert

New Models



### Super Performance

- **46%** better multi-threaded performance
- **3X** better GPU performance (VEGA core integrated in CPU)
- **4** 4K display

### Saving Cost

- Save 1 external graphic card cost
- Promotion program on going

### Solid Quality & Service

- Optimized thermal solution
- Solid quality & design in quality commitment



Performance compared to Intel i7 Kabylake U

# 1.3 New Models – SOM-5899/R (Intel Coffeelake H/Refresh)

Medical

Thermal Solutions

Design in Expert

New Models



## Ultimate CPU Performance

- **6** Core Processor, Computing Power Optimization

## 3 SODIMM Up to 96GB DDR4 Memory

- DDR4 2666, up to 96GB to enable Multi-Core Perf.

## Safer with on board security chipset

- Default: Ship with on-board TPM 2.0 chipset

## Flexible PCIe Config. & High Speed I/O

- PEG x16 Gen 3 (8GT/s) & 8 PClex1 for PCIe x1, x4, x8 configuration device
- 4 USB 3.1 Gen 2 (10Gbps)

## -40C ~ 85C up to 45W Support

- High Performance 45W Designed for Extreme Environments
- Thermal solution: QFCS (Default: Ship with heatspreader)

Model Name/CPU/Cores	LLC	CPU TDP	RAM	CPU Mark	3D Graphic Mark	Memory Mark
SOM-5894/Haswell/i7-4700EQ; 2.4GHz; 4C	6MB	47W	16GB	7,356	559	1,625
SOM-5897/SKL H/i7-6820EQ; 2.8 GHz; 4C	8MB	45W	32GB	9,396	977	2,712
SOM-5897/SKL H/i7-6822EQ; 2.0 GHz; 4C	8MB	25W	32GB	7,475	976	2,365
SOM-5898/KBL H/i7-7820EQ; 3.0GHz; 4C	8MB	45W	32GB	9,848	1,118	2,784
SOM-5899/CFL H/i7-8850H; 2.6 GHz; <b>6C</b>	9MB	45W	48GB	<b>14,301</b>	1,341	<b>3,083</b>
SOM-5899/CFL R H/i7-9850HE; 2.7 GHz; <b>6C</b>	9MB	45W	48GB	<b>14,517</b>	1,389	<b>3,017</b>
SOM-5871VC-H3A1; V1807B; 3.35 Ghz; 4C	2MB	54W	32GB	9,855	2,460	1,695
SOM-5871VC-H2A1; V1756B; 3.25 GHz; 4C	2MB	45W	32GB	9,247	2,109	1,666
SOM-5871VC-U0A1; V1605B; 2 GHz; 4C	2MB	15W	32GB	8,924	1,938	1,642

Enabling an Intelligent Planet

ADVANTECH

# 1.3 New Models – SOM-6882 (Intel Whiskey Lake U)

Medical

Thermal Solutions

Design in Expert

New Models



COMe Compact  
R3.0, Type 6

## Super CPU Performance

- **4** Core Processor, Computing Power Optimization

## 2 SODIMM Up to 64GB DDR4 Memory

- DDR4 2400, up to 64GB to enable Multi-Core Perf.

## On-Board Storage & TPM Chipset

- Optional on-board eMMC, up to 64GB
- Default: Ship with on-board TPM 2.0 chipset

## Flexible PCIe Config. & High Speed I/O

- 8 PCIe x1 (Gen3) for PCIe x1, x4, x8 configuration device
- 4 USB 3.1 Gen 2
- Up to 3 SATA

## -40C ~ 85C up to 15W Support

- High Performance 15W Designed for Extreme Environments
- Default: Ship with heatspreader

Model Name/CPU/Cores	RAM	CPU Mark	3D Graphic Mark	Memory Mark
SOM-6894C7-S7A1E; i7-4650U; 1.7GHz; 2C	16GB	3,250	636	1,476
SOM-6896C7-U2A1E; i7-5650U; 2.2GHz; 2C	16GB	4,780	745	2,262
SOM-6897C7-U6A1E; i7-6600U; 2.6GHz; 2C	16GB	5,040	1,037	2,410
SOM-6898C7-U8A1E; i7-7600U; 2.8GHz; 2C	32GB	6,085	1,235	2,902
SOM-6882C7-S7A1; i7-8665UE; 1.7GHz; <b>4C</b>	32GB	<b>10,325</b>	1,364	2,986

↑ 70%

Enabling an Intelligent Planet

ADVANTECH

# Application Focused Solution for Industry 4.0



- **SOM-6868:** Intel® Braswell platform Pentium®/Celeron® N3000 Series and Atom™ SoC
- Supports 5 PCIex1, 4 USB3.0, 8 USB2.0
- Rich display interface : LVDS/eDP, HDMI/DP



- **SOM-6867:** Intel Baytrail platform Atom/Celeron Processor E3800
- Dual DDR3L-1333/1066 SODIMM sockets up to 8 GB
- Supports VGA, LVDS, HDMI/DVI/DisplayPort
- Support 3 PCIe x1, 8 USB2.0, USB3.0, 2 SATAII, LPC, SMBus, I2C

## Industry/Applications

Controller for robotic arm (Sweden, China)

## Challenge/Request

Need the following support 5 PCIe & fast boot from a tiny COM module.

## Winning factors

- **SOM-6868** can support up to 5 PCIe with **PCIe bridge**
- Customized BIOS to make **core boot in 3 seconds**
- Prompt technical support
- Well **organized quality plan & VIP quality control process** implemented

## Industry/Applications

AGV (France, China)

## Challenge/Request

- Must get the systems time to market & pass the strict field test in a very limited time.

## Winning factors

- Local FAE **reviewed customer's circuit and found the design issue on customer's carrier board** and fix the issue quickly.
- Good quality from **SOM-6867** (Baytrail) helped customer passed all demanding field testing.

## Saving Cost

Development cost  
Product maintain cost  
Material maintain cost  
Stock cost

## Quality Control

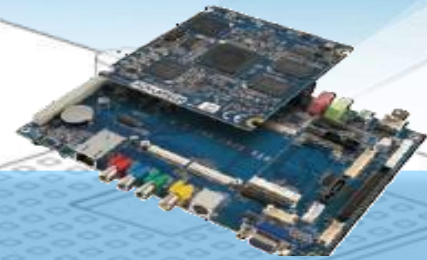
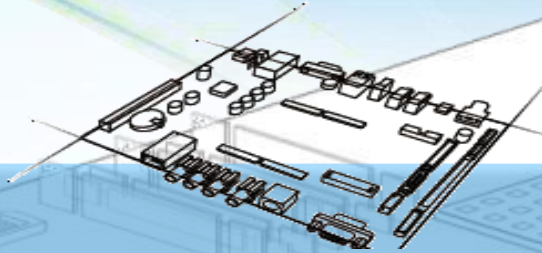
Signal & power test  
Certification test  
Reliability test

## Time to Market

Prototype delivery  
in 50 days

## Global Support

Local technical support  
Local RMA support



**Planning**

**Design**

**Integration**

**Validation**

# SOM-DTOS VIP Service

## Case Study – Ultrasound 超音波診断装置

iManager



EMC  
Shielding



Number one ultrasound maker requests the “Joint Design Manufacture (JDM)” service for their next generation/machines.

### • Solution

### Challenge

- LOM module + carrier board + FPGA board.
- Kick off 3 projects at the same time.
  - Integrated TPM, EC & BIOS security.
  - Specifically design in PCB-H/W and mechanical for EMI filter.
- Co-design: FPGA by customer & x86 by Advantech.
  - Fully customized reliability test.
- Noise isolation.

**Ultra Reliable** machine passed  
**Power ON/OFF 10,000 times @ Humidity 85% test.**

## Case Study – X-Ray Scanner X線検査装置

A famous company in Germany which provides solutions for threat & contraband detection in airport needs the ODM service.

- **Challenge**

- Confidential design in carrier board.
- Required for H/W design support.
- Certification is a must.

- **Solution**

- Customized CPU module.
- Collaborative R&D w/ customer. Co-design carrier board in Linkou campus.
- Get CE/FCC and UL report in Linkou.
- Production in Linkou.



**One Stop Shopping!**

Run design, verification, production **in one place.**

# Arm-based Computing Platform Solutions

## Accelerating Your Arm Project Development

The Newest Arm Platform

Full Coverage of Form Factor

Ready-to-Use Software Package

Completed Eco-System



# Next Generation of Arm Platform – i.MX8

**ARMv8 64-bit**

- A72
- A35
- A53
- M4

**Ultra HD 4K**

H.265

**Comprehensive Software Services**

- Multi OS support
- Longevity BSP
- AIM-Linux & AIM-Android

**Reliable H/W Design-in Service**

- Various core module offerings
- Carrier board reference and consult
- Lifetime support

**Trusty Peripherals Integration**

- Industrial touch panel
- Wi-Fi, BT and cellular module
- Storage module

**USB3.0**

**SATA3.0**

**PCIe3.0**

**ROM-7720 Qseven 2.1 (i.MX8QM)**  
Highest Performance for AI & Machine Vision Applications

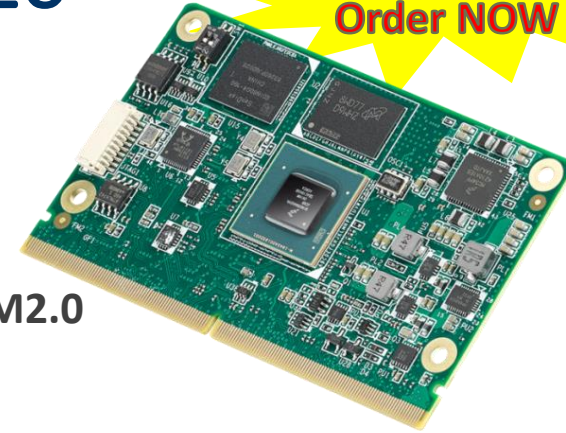
**ROM-5720 SMARC 2.0 (i.MX8M)**  
4K Industrial Graphic Performance for Multimedia Applications

**ROM-5721 SMARC 2.0 (i.MX8M Mini)**  
Power Efficiency for Entry HMI & Industrial Applications

**ROM-5620 SMARC 2.0 (i.MX8X)**  
Safety Certified for Automation & Embedded Applications

# i.MX8M SMARC 2.0 Module – ROM-5720

Available For  
Order NOW



- | NXP i.MX8M Quad/Dual CPU, up to 4 x ARM® Cortex® A53+M4F , 1.5 GHz
- | 2GB LPDDR4 Memory, 16 GB eMMC NAND Flash
- | 4Kx2K H.265 video decode
- | HDMI 2.0/MIPI-DSI/Dual GbE/PCIe2.0/2USB3.0,4USB2.0,OTG/4 UART/TPM2.0
- | Yocto, Ubuntu, Android 8.0
- | AIM Linux & Android
- | 0-60 °C & -40 ~85°C

## Target Market



yocto  
PROJECT



USB3.0



Applications : Infotainment, HMI, Robotics, Medical, Transportation

# i.MX8 Qseven Computer on Module – ROM-7720

## The Advanced SoC architecture – i.MX8 Quad Max

- 2 x Arm Cortex®-A72 cores
- 4 x Arm Cortex®-A53 cores
- 2 x Cortex®-M4F cores
- 2 x GC7000XSVX GPU

## High Speed Interface for Connection

- HDMI 2.0 4Kp60 Display
- The Super-Speed USB 3.0 Support
- SATA III , GbE , PCIe

## AIM-Linux for Accelerating App development

- Unified core, driver and longevity maintenance
- Modularized Value-Added APP and SDK framework
- OpenCV framework for machine vision application

**SAMPLE AVAILABLE NOW !**



**Applications : Machine Vision, Surveillance, Medical, AI**

# i.MX8X SMARC 2.0 Module – ROM-5620

**2020,Q2**

## Feature

- NXP i.MX8QuadXPlus/ i.MX8DualXPlus
- Up to 4 x ARM® Cortex® **A35**+M4F , 1.2 GHz
- 2GB LPDDR4 Memory, 16 GB eMMC NAND Flash
- Dual channel LVDS** (can configure to **2x 4-lane MIPI-DSI**)
- Dual GbE** / PCIe3.0 / 4-lane MIPI-CSI2 / **2x CANbus**
- 1x USB3.0, 2x USB2.0 OTG / 3x UART / 1x TPM2.0
- AIM-Linux 2.0 supported based on Yocto 2.5 & Android
- 0-60 °C & -40 ~85°C

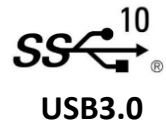


Dual Lan



Ultra-Low-Power

## Target Market



Applications : HVAC Controls, Automation, Medical

# i.MX8M Mini SMARC Module – ROM-5721

**SAMPLE AVAILABLE IN Nov,19**

## The Advanced SoC architecture – i.MX8M mini

- Up to 4 x Arm Cortex®-A53 cores
- 1 x Cortex®-M4 cores
- Vivante GC320, GC NanoUltra 3D GPU

## Various Interface for Connection

- Dual Channel LVDS, MIPI-CSI, MIPI-DSI(opt.)
- PCIe, USB 2.0, GbE, I2S
- UART, I2C, SPI, GPIO

## AIM-Linux for Accelerating App development

- Unified core, driver and longevity maintenance
- Modularized Value-Added APP and SDK framework
- Ready to Use Remote Management Utility: DeviceOn

**NXP**

**SMARC**



**Applications : Machine Vision, Medical, Video Application, HMI**



# 岡本無線電機株式会社

OKAMOTO ELECTRONICS CORPORATION

<http://www.okamotonet.co.jp/>