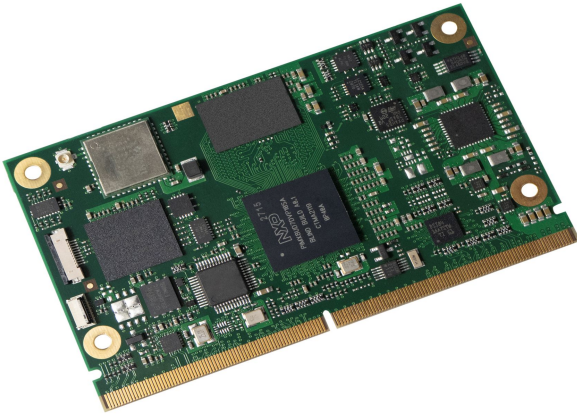




## MSC SM2S-IMX8ULP

NXP<sup>®</sup> i.MX 8ULP Arm<sup>®</sup>  
Cortex<sup>®</sup>-A35 / M33



 82 x 50 mm

 1-3 W

 -40 +85



## Description

The flexible MSC SM2S-IMX8ULP SMARC 2.1.1 module family is highly scalable and equipped with i.MX 8ULP Crossover Applications Processor that brings ultra-low power processing and advanced integrated security with EdgeLock<sup>®</sup> secure enclave to the intelligent edge. The i.MX 8ULP family features up to two Arm Cortex-A35 running at 1 GHz, an Arm Cortex-M33 core, 3D/2D Graphics Processing Units (GPUs) and a Tensilica<sup>®</sup> Hifi 4 DSP and Fusion DSP for low-power audio/voice and edge AI/ML processing.

The MSC SM2S-IMX8ULP module integrates the processor and low-power LPDDR4 memory technology, combined with up to 256GB eMMC Flash memory. Various interfaces for embedded applications such as Ethernet, USB 2.0, CAN-FD, dual-channel LVDS or MIPI DSI and MIPI CSI for connecting a camera are available. The thermal design power (TDP) of the module ranges from 1 to 3 W depending on used power mode.

The module is compliant with the new SMARC 2.1.1 standard, allowing easy integration with SMARC baseboards. For evaluation and design-in of the SM2S-IMX8ULP module, MSC provides a development platform and a starter kit. Support for Linux is available (Microsoft Azure Sphere and Android support available on request).

## Highlights

- Single or Dual core Arm Cortex-A35 Applications Processor up to 1.0GHz
- Arm Cortex-M33 Real Time Processor up to 216MHz
- Tensilica Hifi 4 DSP at 600MHz
- Tensilica Fusion DSP at 200MHz
- Vivante multimedia 2D/3D Graphics Processor
- Up to 2GB LPDDR4x SDRAM at 2400 MT/s
- Up to 256GB eMMC Flash
- Dual-channel LVDS / MIPI-DSI x4 (optional)
- MIPI CSI-2 Camera Interface
- Up to 4x USB 2.0 Host interface
- 1x USB 2.0 Host/Device interface
- 1x 10/100 Mbit Ethernet
- Wireless Module (optional)
- 1x MMC/SD/SDIO interface
- 1x CAN-FD Interface
- 2x I2S Audio Interface
- 12x GPIO
- UART, SPI, I2C
- SMARC 2.1.1 Compliant
- Optimized design for Ultra Low Power applications and high volume at low cost

## Technical Data - MSC SM2S-IMX8ULP

<b>Technology</b>	Arm
<b>Formfactor</b>	SMARC Short Size
<b>CPU</b>	<p>NXP i.MX 8M Mini Arm Cortex-A35 Applications Processor</p> <ul style="list-style-type: none"> <li>- i.MX 8ULP Dual, dual-core, 800MHz - 1.0GHz</li> <li>- i.MX 8ULP Solo, single-core, 800MHz - 1.0GHz</li> <li>- i.MX 8ULP SoloLite, single-core, 800MHz - 1.0GHz</li> </ul> <p>Arm Cortex-M33F Real Time Processor at 216MHz</p> <p>Heterogeneous domain computing architecture (independent applications processor and real-time domains with a separate low-power multimedia domain)</p>
<b>Chipset</b>	SOC
<b>RAM</b>	Up to 2GB 2400MT/s LPDDR4x SDRAM, soldered, no ECC
<b>Flash</b>	<p>Up to 256GB eMMC Flash</p> <p>QSPI NAND Flash APD (optional)</p> <p>QSPI NOR Flash RTD (optional)</p>
<b>Storage Interfaces</b>	1x MMC/SD/SDIO
<b>USB</b>	<p>1x USB 2.0 Host/Client, 4x USB 2.0 Host or</p> <p>1x USB 2.0 Host/Client, 1x USB 2.0 Host (optional)</p>
<b>Serial Interfaces</b>	<p>2x UART with 2-wire hand shake</p> <p>2x UART w/o hand shake</p>
<b>Bus Interfaces</b>	<p>4x I2C up to 400 Kbit/s</p> <p>1x CAN-FD / CAN 2.0B</p> <p>2x SPI (with one chip selects)</p>
<b>Display Controller</b>	<p>Vivante GC NanoUltra 3D Graphics Processing Unit (GPU)</p> <p>3D Graphics Acceleration, 1 shader, 6.4 GFLOPS</p> <p>OpenGL ES 1.0, 2.0, 3.1, Vulkan, OpenCL 1.2</p> <p>Video Processing Unit not available</p>
<b>Display Interfaces</b>	<p>Dual-channel LVDS interface, 18 or 24 bit (up to 1920x1080); also usable as one single-channel LVDS interface (up to 1366x768) or</p> <p>MIPI-DSI Display Interface, 4 lanes, up to 1920x1080 @ 60fps (optional)</p>
<b>Network Interface</b>	<p>10/100BASE-T Ethernet</p> <p>Wireless Module with 802.11b/g/n and Bluetooth 5.0, single band 2.4GHz, soldered (optional)</p>
<b>Audio Interface</b>	<p>2x I2S Audio</p> <p>Tensilica Fusion DSP at 200MHz</p> <p>Tensilica Hifi 4 DSP at 600MHz (only available on Solo/Dual)</p>

<b>Security Device</b>	<p>Advanced Security, Safety, and Reliability integrated in the SOC</p> <p>Integrated EdgeLock secure enclave enables autonomous management of security functions, including runtime attestation, silicon root of trust, reusable certifications, trust provisioning, and fine-grain key management augmented by extensive crypto services for advanced attack resistance</p> <p>Trusted Platform Module (TPM) 2.0 (optional)</p>
<b>Miscellaneous</b>	<p>Watchdog Timer for system reset (programmable, 1s ... 600s)</p> <p>High accuracy RTC</p> <p>12x GPIO, configurable as input or output, interrupt capable 2x PWM outputs (shared functions)</p> <p>64kbit ID EEPROM on I2C bus</p> <p>MIPI CSI-2 camera interface (CSI0, 2 lane) or MIPI CSI-2 camera interface (CSI1, 2-lane)</p>
<b>Feature Highlights</b>	SMARC 2.1.1 compatible
<b>Firmware</b>	uboot
<b>OS Support</b>	<p>Linux Board Support Package</p> <p>Microsoft Azure Sphere (on request)</p> <p>Android Board Support Package (on request)</p>
<b>Power Requirement</b>	<p>Power Supply 3V - 5,25V, 5V Standby</p> <p>Power Consumption 1-3 W typ. (depending on CPU and optional features)</p> <p>Dedicated <math>\mu</math>Power management subsystem anchored by an internal NXP-built RISC-V core (more than 20 different power mode configurations across processing domains to deliver exceptional energy efficiency)</p>
<b>Environment</b>	<p>Temperature Range: 0°C ... +70°C operating commercial -40°C ... +85°C operating extended -40°C ... +85°C storage</p> <p>Humidity: 5 ... 95% (operating, non condensing) 5 ... 95% (storage, non-condensing)</p>
<b>Dimensions</b>	82 x 50 mm
<b>Certificates</b>	UL / CE
<b>Cooling</b>	Heatspreader
<b>Carrier</b>	<p>MSC SM2-MB-EP1</p> <p>MSC SM2-MB-EP5</p>

## Order Reference - MSC SM2S-IMX8ULP

Order Number	Description	Reference	Cat*
98942	SMARC module based on NXP i.MX 8ULP Dual-Core Cortex-A35 processor at 1.0GHz, 2GB LPDDR4, 16GB eMMC Flash, 8MB QSPI NOR Flash, Ethernet (10/100Base-T), 4x USB2.0 Host, 1x USB2.0 Host/Device, 1x CAN, 4x UART, 2xSPI, BT/WLAN, TPM, LVDS, MIPI CSI-2 Camera input (CSI0); Engineering Sample - not for resale!	MSC SM2S-IMX8ULP-DC-1410261I ES2 PCBES	OR
98851	SMARC module based on NXP i.MX 8ULP Dual-Core Cortex-A35 processor at 1.0GHz, 1GB LPDDR4, 4GB eMMC Flash, 8MB QSPI NOR Flash, 1GB QSPI NAND Flash, Ethernet (10/100Base-T), 1x USB2.0 Host, 1x USB2.0 Host/Device, 1x CAN, 4x UART, 2xSPI, MIPI DSI, MIPI CSI-2 Camera input (CSI1); Engineering Sample - not for resale!	MSC SM2S-IMX8ULP-DC-0250810I ES2 PCBES	OR

\*COM products are divided in two categories, „PV“ (preferred variant) and „OR“ (on request).

## Accessories

Order Number	Description	Reference
<b>Carrier Options</b>		
68488	SMARC 2.0 Embedded Platform with PCI Express x4 slot, GbE, SATA, USB 3.0, USB 2.0, USB 2.0 OTG, RS232, CAN, SPI, eSPI, SMBus, I2C and GPIO interface, LVDS/eDP, DisplayPort and HDMI display interface, regulated backlight supply, HD/I2S audio interface, MIPI CSI-2 camera interface, mini PCI Express card slot, SD card slot, fan connector, CMOS battery, Mini-ITX form factor (170 x 170 mm), ATX power connector and single 12V/24V power jack, commercial temperature range 0..+70°C	MSC SM2-MB-EP1-001 PCBFTX
83977	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 3x RS232, 2x CAN, dual RJ45 LAN with LED (1 x LAN i210) , 1x M.2 2280 Key M slot, mPCIe slot, 1x USB 3.0 Type A, 1x USB 2.0 Type A, 1x USB 2.0 internal, 1x USB 2.0 Host/Device, 2x SPI, I <sup>2</sup> C, 8 GPIO on FC, 1x HDMI, LVDS/eDP/DSI on JILI30 connector, SD Card Slot, regulated backlight supply, I2S Audio, 1W Mono, camera connector, RTC battery. Industrial temperature range -40..+85°C, Arm full version	MSC SM2S-MB-EP5-002 PCBFTX
83981	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 2x UART, 1x RS232, 2x CAN, 1x RJ45 LAN with LED, 1x USB 2.0 Type A, 1x USB3.0 Type A, 1x USB 2.0 internal, 1x USB 2.0 Host/Device, 2x SPI, 12 GPIO on FC, 1x HDMI , SD Card Slot, LVDS/eDP/DSI on JILI30 connector, regulated backlight supply, RTC battery. Industrial temperature range -40..+85°C, Arm slim version	MSC SM2S-MB-EP5-004 PCBFTX
<b>Other Accessories</b>		
82479	Debug Console (UART) Adapter for i.MX6-based Qseven and nanoRISC modules, with 8-pin FFC cable to connect COM module to 9-pin D-Sub connector	MSC Debug Console Adapter
68948	Debug Adapter for i.MX6-based Qseven, SMARC and nanoRISC modules, with 10-pin FFC cable to connect to COM module, adapter provides headers for JTAG connection to Lauterbach and/or Goepel debuggers	MSC JTAG Adapter FFC 10-pin
<b>Starter Kits</b>		
74008	Starter Kit for MSC SMARC i.MX 8 Series modules. Includes MSC SM2-MB-EP1 Baseboard, Heatspreader/Heatsink, SD Card with USB Card Reader, Power Supply and suitable cable kit. The StarterKit does not include the MSC SM2S-IMX8 / 8M / 8MINI / 8NANO / 8PLUS module. Please order your choice of module separately.	MSC SM2-SK-IMX8-EP1-KIT001 SETPAC

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