


MSC SM2S-IMX8PLUS

NXP™ i.MX 8M Plus ARM® Cortex™-A53



 82 x 50 mm

 2-7 W

 -40 +85



Description

The MSC SM2S-IMX8Plus module features NXP's i.MX 8M Plus processors that are based on latest 14nm FinFET technology to allow high computing and graphics performance at very low power consumption combined with a high degree of functional integration.

MSC SM2S-IMX8PLUS offers dual- or quad-core ARM Cortex-A53 processors in combination with the ARM Cortex-M7 real-time processor, GC 7000UL multimedia 2D/3D GPU and a Machine Learning Accelerator (2.3 TOPS). It provides fast LPDDR4 memory with inline ECC, up to 256GB eMMC Flash memory, 2x Gigabit Ethernet with IEEE 1588 support and one of them with TSN support, PCI Express Gen. 3, USB3.0, USB 2.0, an on-board Wireless Module (WLAN/BT), the Image Signal Processor supports 2x MIPI-CSI (4-lane), as well as an extensive set of interfaces for embedded applications.

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-IMX8PLUS module, Avnet Embedded provides a development platform and a starter kit. Multiple Operating Systems like Linux, Android 12 and Windows 10 IoT Enterprise are supported.

Highlights

- Dual or Quad core ARM Cortex-A53 Applications Processor up to 1.8GHz
- ARM Cortex-M7 Real Time Processor at 800MHz
- GC7000UL 2D/3D Graphics Processor with OpenCL and Vulkan support
- 1080p60 H.265 decode, 1080p60 H.264 encode (VPU not available on "Plus Quad Lite")
- Machine Learning Accelerator (2.3 TOPS) (NPU not available on "Plus Quad Lite")
- Hifi4 Audio DSP, operating up to 800MHz
- Image Sensor Processor (ISP) supports 12MP@30fps, 4kp45, or 2x 1080p80
- Up to 8GB LPDDR4 SDRAM with inline ECC support
- Up to 256GB eMMC 5.1 Flash
- HDMI 2.0a with up to 4k resolution
- LVDS (dual channel)/ 2x LVDS (single channel)/ MIPI-DSI x4 (optional)
- MIPI CSI-2 Camera Interface
- PCI Express x1 Gen. 3
- up to 2x USB 3.0 Host interface
- up to 3x USB 2.0 Host interface
- 1x USB 2.0/3.0 Host/Device interface
- 2x Gigabit Ethernet (IEEE 1588, 1x with TSN)
- Wireless Module (optional)
- MMC/SD/SDIO interface
- 2x CAN-FD interface
- 2x I2S Audio Interface
- UART, SPI, I2C
- SMARC 2.1.1 compliant
- Linux BSP
- Android 12 BSP
- Windows 10 IoT Enterprise BSP

Technical Data - MSC SM2S-IMX8PLUS

Technology	ARM
Formfactor	SMARC Short Size
CPU	<p>NXP i.MX 8M Plus ARM Cortex-A53 Applications Processor</p> <ul style="list-style-type: none"> - i.MX 8M Plus Quad with NPU, ISP, VPU, HIFI4, CAN, 1.8GHz, Consumer - i.MX 8M Plus Quad with ISP, VPU, CAN, 1.8GHz, Consumer - i.MX 8M Plus QuadLite with CAN, 1.8GHz, Consumer - i.MX 8M Plus Dual, with NPU, ISP, VPU, HIFI4, CAN, 1.8GHz, Consumer - i.MX 8M Plus Quad with NPU, ISP, VPU, HIFI4, CAN-FD, 1.6GHz, Industrial - i.MX 8M Plus Quad with ISP, VPU, CAN-FD, 1.6GHz, Industrial - i.MX 8M Plus QuadLite with CAN-FD, 1.6GHz, Industrial - i.MX 8M Plus Dual, with NPU, ISP, VPU, HIFI4, CAN-FD, 1.6GHz, Industrial <p>ARM Cortex-M7 Real Time Processor at 800MHz</p>
Chipset	SOC
RAM	Up to 8GB 4000MT/s LPDDR4 SDRAM, inline ECC support, soldered
Flash	Up to 256GB eMMC Flash QSPI NOR Flash 64MB (optional)
Storage Interfaces	1x MMC (up to v 5.1)/ SD/SDIO (up to v 3.0)
USB	1x USB 2.0 Host/Client, 2x USB 2.0 Host, 2x USB3.0 Host or 1x USB 3.0 Host/Client, 3x USB 2.0 Host, 1x USB3.0 Host (optional) or 1x USB 2.0 Host/Client, 1x USB 2.0 Host (optional)
Serial Interfaces	2x UART with 2-wire hand shake 2x UART w/o hand shake
Bus Interfaces	1x PCI Express x1 Gen.3 lane 5x I2C up to 320 Kbit/s 2x CAN-FD / 2.0B 2x SPI (with two chip selects)
Display Controller	<p>Vivante GC7000UL 2D/3D Graphics Processing Unit (GPU) 3D Graphics Acceleration, 2 shader, 16 GFLOPs OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan</p> <p>Video Processing Unit (not available on "Plus Quad Lite") with hardware support for 1080p60 HEVC H.265, VP9, H.264, VP8 decode 1080p60 H.264, VP8 encode</p>
Display Interfaces	dual-channel LVDS interface, 18 or 24 bit (up to 1920x1080) or 2 x single-channel LVDS interface (up to 1366x768) (optional) or MIPI-DSI Display Interface, 4 lanes, up to 1920x1200 @ 60fps (optional) or 1 x MIPI-DSI and 1 x single channel LVDS (optional) HDMI 2.0a interface, up to 3840x2160 @ 30fps
Network Interface	<p>2x 10/100/1000BASE-T Ethernet IEEE 1588 support, one with TSN support</p> <p>HD Wireless Module SPB209A with 802.11ac / Bluetooth 5.0 with PCM interface, soldered (optional)</p>

Audio Interface	2x I2S Audio
Security Device	Advanced Security, Safety, and Reliability integrated in the SOC (CSU) Trusted Platform Module (TPM) 2.0 (optional)
Miscellaneous	Watchdog Timer for system reset (programmable, 1s ... 600s) RTC (optional: temperature compensated) 14x GPIO, configurable as input or output 64kbit ID EEPROM on I2C bus MIPI CSI-2 camera interface (CSI0, 2 lane) or MIPI CSI-2 camera interface (CSI2, 4 lane) MIPI CSI-2 camera interface (CSI1, 4-lane)
Feature Highlights	Neural Processing Unit (NPU) with 2.3 TOP/s Speech recognition, Image recognition
OS Support	Linux Board Support Package Android 12 Board Support Package Windows 10 IoT Enterprise LTSC 2021 BSP
Power Requirement	Power Supply +5V +/-5%, 5V Standby Power Consumption 2-7 W typ. (depending on CPU and optional features)
Environment	Temperature Range: Commercial: 0° ... 70°C (operating) -20° ... 85°C (storage) Extended: -25° ... 85°C (operating) -40° ... 85°C (storage) Industrial: -40° ... 85°C (operating) -40° ... 85°C (storage) Humidity: 5 ... 95% (operating, non-condensing) 5 ... 95% (storage, non-condensing)
Dimensions	82 x 50 mm
Certificates	UL / CE
Cooling	Heatspreader
Carrier	MSC SM2-MB-EP1, MSC SM2-MB-EP5

Order Reference - MSC SM2S-IMX8PLUS

Order Number	Description	Reference	Cat*
86950	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad Lite, Quad-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QCL-03N0700I PCBFTX	OR
85172	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 2x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-24N0600I PCBFTX	PV
86984	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-14N0700I PCBFTX	PV
85174	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, WLAN/BT, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-14N0740I PCBFTX	PV
85150	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, 2x GbE LAN, 1x PCIe, 1x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x MIPI-DSI, 1x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-03N0E10I PCBFTX	OR
86982	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 2x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, extended temperature -25°C...+85°C	MSC SM2S-IMX8PLUS-QC6-14N0600E PCBFTX	PV
86655	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 2 x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x MIPI-DSI, 1x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC6-14N0E00I PCBFTX	PV

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

Order Reference - MSC SM2S-IMX8PLUS

Order Number	Description	Reference	Cat*
95095	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 32GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (Dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, extended temperature -25°C...+85°C	MSC SM2S-IMX8PLUS-QC6-15N0700E PCBFTX	OR
95313	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 1x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x MIPI-DSI, 1x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-24N0E10I PCBFTX	OR
95281	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, TPM 2.0, WLAN/BT, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-14N0741I PCBFTX	OR
95494	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 32GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 2x LVDS (single channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-25N0600I PCBFTX	OR
97758	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 256GB eMMC Flash, 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-28N0700I PCBFTX	OR
110328	SMARC 2.1.1 module based on NXP i.MX 8M Plus Quad (with VPU, NPU, ISP), Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 64GB eMMC Flash (20,9GB in SLC Mode), 2x GbE LAN, 1x PCIe, 2x USB3.0 Host, 2x USB2.0 Host, 1x USB2.0 Host/Device, 4x UART, 2x SPI, 1x LVDS (dual channel), HDMI, 2x MIPI CSI-2 Camera input (CSI0, CSI1), 2x I ² S, 2x CAN-FD, industrial temperature -40°C...+85°C	MSC SM2S-IMX8PLUS-QC-26N2700I PCBFTX	OR

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Accessories

Order Number	Description	Reference
Carrier Options		
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 ² 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
Cooling Options		
83303	Passive Heatsink for SM2S-IMX8PLUS module, consisting of a single-piece aluminum pin cooler and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-IMX8PLUS-01 HSI-001
83302	Heatspreader for SM2S-IMX8PLUS module, consisting of a single-piece aluminum plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-IMX8PLUS-01 HSP-001
97187	Passive Heatsink for SM2S-IMX8PLUS module, consisting of a single-piece aluminum pin cooler and thermal pad for contact to the processor, with 2.7mm through-hole standoffs, extended temperature version	MSC SM2S-IMX8PLUS-02 HSI-001
88714	Heatspreader for SM2S-IMX8PLUS module, consisting of a single-piece aluminum plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs, extended temperature version	MSC SM2S-IMX8PLUS-02 HSP-001
Other Accessories		
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

Accessories

Order Number	Description	Reference
Starter Kits		
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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