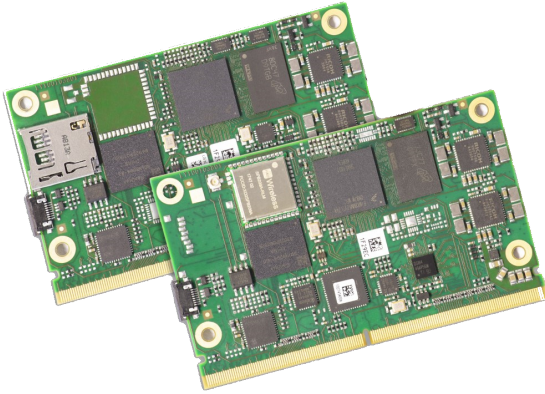




## MSC SM2S-IMX8MINI

NXP<sup>®</sup> i.MX 8M Mini Arm<sup>®</sup>  
Cortex<sup>®</sup>-A53



 82 x 50 mm

 2-5 W

 -40 +85



## Description

The MSC SM2S-IMX8MINI module features NXP's i.MX 8M Mini 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-IMX8MINI offers single-, dual- or quad-core Arm Cortex-A53 processors in combination with the Arm Cortex-M4 real-time processor and GC NanoUltra multimedia 2D/3D GPU. It provides fast LPDDR4 memory, up to 64GB eMMC Flash memory, Gigabit Ethernet, PCI Express, USB 2.0, an on-board Wireless Module as well as an extensive set of interfaces for embedded applications.

The module is compliant with the new SMARC 2.0 standard, allowing easy integration with SMARC baseboards. For evaluation and design-in of the SM2S-IMX8MINI module, MSC provides a development platform and a starter kit. Support for Linux is available (Android support on request).

## Highlights

- Single, Dual or Quad core Arm Cortex-A53 Applications Processor up to 1.8GHz
- Arm Cortex-M4 Real Time Processor at 400MHz
- Vivante GC NanoUltra 2D/3D Graphics Processor
- 1080p60 H.265 decode, 1080p60 H.264 encode (VPU not available on "Mini Lite")
- Up to 4GB LPDDR4 SDRAM
- Up to 64GB eMMC Flash
- Dual-channel LVDS / MIPI-DSI x4 (optional)
- MIPI CSI-2 Camera Interface
- PCI Express x1 Gen. 2
- 4x USB 2.0 Host interface
- 1x USB 2.0 Host/Device interface
- Up to 2x Gigabit Ethernet
- Wireless Module (optional)
- Micro SD Card Socket (optional)
- MMC/SD/SDIO interface
- 2x CAN interface (optional)
- 2x I2S Audio Interface
- UART, SPI, I2C
- SMARC 2.0 Compliant

## Technical Data - MSC SM2S-IMX8MINI

<b>Technology</b>	Arm
<b>Formfactor</b>	SMARC Short Size
<b>CPU</b>	<p>NXP i.MX 8M Mini Arm Cortex-A53 Applications Processor</p> <ul style="list-style-type: none"> <li>- i.MX 8M Mini Solo, single-core, 1.6 - 1.8GHz</li> <li>- i.MX 8M Mini Dual, dual-core, 1.6 - 1.8GHz</li> <li>- i.MX 8M Mini Quad, quad-core, 1.6 - 1.8GHz</li> <li>- i.MX 8M Mini SoloLite, single-core, 1.6 - 1.8GHz</li> <li>- i.MX 8M Mini DualLite, dual-core, 1.6 - 1.8GHz</li> <li>- i.MX 8M Mini QuadLite, quad-core, 1.6 - 1.8GHz</li> </ul> <p>Arm Cortex-M4 Real Time Processor at 400MHz</p>
<b>Chipset</b>	SOC
<b>RAM</b>	Up to 4GB 3000MT/s LPDDR4 SDRAM, soldered
<b>Flash</b>	Up to 64GB eMMC Flash QSPI NOR Flash (optional)
<b>Storage Interfaces</b>	1x MMC/SD/SDIO 1x Micro SD Card Socket (optional)
<b>USB</b>	1x USB 2.0 Host/Client, 4x USB 2.0 Host or 1x USB 2.0 Host/Client, 1x USB 2.0 Host (optional)
<b>Serial Interfaces</b>	2x UART with 2-wire hand shake 2x UART w/o hand shake
<b>Bus Interfaces</b>	<p>1x PCI Express x1 Gen.2 lanes*</p> <p>4x I2C up to 400 Kbit/s</p> <p>2x CAN 2.0B (optional)**</p> <p>2x SPI (with two chip selects)</p> <p>* Please refer to section "Network Interfaces"</p> <p>** CAN and SPI are mutual exclusive</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</p> <p>Video Processing Unit (not available on "Mini Lite") with hardware support for 1080p60 HEVC H.265, VP9, H.264, VP8 decode 1080p60 H.264, VP8 encode</p>
<b>Display Interfaces</b>	Dual-channel LVDS interface, 18 or 24 bit (up to 1920x1080); also usable as one single-channel LVDS interface (up to 1366x768) or MIPI-DSI Display Interface, 4 lanes, up to 1920x1080 @ 60fps (optional)
<b>Network Interface</b>	<p>1x 10/100/1000BASE-T Ethernet</p> <p>1x 10/100/1000BASE-T Ethernet (Intel i210, optional, PCI Express x1 is not available if this option is selected)</p> <p>HD Wireless Module SPB209A with 802.11ac / Bluetooth 5.0, soldered (optional)</p>

<b>Audio Interface</b>	2x I2S Audio
<b>Security Device</b>	Advanced Security, Safety, and Reliability integrated in the SOC Trusted Platform Module (TPM) 2.0 (optional)
<b>Miscellaneous</b>	Watchdog Timer for system reset (programmable, 1s ... 600s) Temperature compensated RTC 12x 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 (CSI1, 4-lane)
<b>OS Support</b>	Linux Board Support Package Android Board Support Package
<b>Power Requirement</b>	Power Supply +5V +/-5%, 5V Standby Power Consumption 2-5 W typ. (depending on CPU and optional features)
<b>Environment</b>	Temperature Range: 0°C ... +70°C operating commercial -40°C ... +85°C operating extended -40°C ... +85°C storage  Humidity: 5 ... 95% (operating, non condensing) 5 ... 95% (storage, non-condensing)
<b>Dimensions</b>	82 x 50 mm
<b>Certificates</b>	UL / CE
<b>Cooling</b>	Heatspreader
<b>Carrier</b>	MSC SM2-MB-EP1

## Order Reference - MSC SM2S-IMX8MINI

Order Number	Description	Reference	Cat*
79649	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, BT/WLAN, MIPI DSI, MIPI CSI-2 Camera input (CSI0); extended temperature -25...+85°C	MSC SM2S-IMX8MINI-QC-03N0840E PCBFTX	PV
83763	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 8GB eMMC Flash, 1x GbE LAN, 1x PCIe, 1x USB2.0 Host, 1x USB2.0 Host/Device, MIPI DSI, MIPI CSI-2 Camera input (CSI0); extended temperature -25...+85°C	MSC SM2S-IMX8MINI-QC-13N0810E PCBFTX	PV
78370	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 8GB eMMC Flash, micro SD Socket, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, LVDS, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-QC-13N4200I PCBFTX	PV
84512	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 8GB eMMC Flash, micro SD Socket, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, MIPI DSI, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-QC-13N4800I PCBFTX	PV
78402	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, 4MB QSPI NOR, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, 2xCAN, BT/WLAN, TPM, LVDS, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-QC-14N0261I PCBFTX	PV
91270	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 16GB eMMC Flash, no QSPI NOR, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, no CAN, BT/WLAN, TPM, MIPI DSI, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-QC-14N0841I PCBFTX	PV
90837	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 2GB LPDDR4, 64GB eMMC Flash, 1x GbE LAN, 1x PCIe, 1x USB2.0 Host, 1x USB2.0 Host/Device, MIPI DSI, MIPI CSI-2 Camera input (CSI0); extended temperature -25...+85°C	MSC SM2S-IMX8MINI-QC-16N0810E PCBFTX	PV
82204	SMARC module based on NXP i.MX 8M Mini Quad, Quad-Core Cortex-A53 processor at 1.6GHz, 4GB LPDDR4, 16GB eMMC Flash, micro SD Socket, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, LVDS, MIPI CSI-2 Camera input (CSI0); extended temperature -25...+85°C	MSC SM2S-IMX8MINI-QC-24N4200E PCBFTX	PV
83006	SMARC module based on NXP i.MX 8M Mini Dual, Dual-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, 2x GbE LAN, 4x USB2.0 Host, 1x USB2.0 Host/Device, LVDS, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-DC-03N0280I PCBFTX	PV
78368	SMARC module based on NXP i.MX 8M Mini Dual, Dual-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, micro SD Socket, 1x GbE LAN, 1x PCIe, 4x USB2.0 Host, 1x USB2.0 Host/Device, LVDS, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-DC-03N4200I PCBFTX	PV

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

## Order Reference - MSC SM2S-IMX8MINI

Order Number	Description	Reference	Cat*
78404	SMARC module based on NXP i.MX 8M Mini Solo, Single-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, micro SD Socket, 1x GbE LAN, 1x PCIe, 1x USB2.0 Host, 1x USB2.0 Host/Device, LVDS, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-SC-03N4210I PCBFTX	PV
78406	SMARC module based on NXP i.MX 8M Mini SoloLite, Single-Core Cortex-A53 processor at 1.6GHz, 1GB LPDDR4, 8GB eMMC Flash, 2x GbE LAN, 4x USB2.0 Host, 1x USB2.0 Host/Device, MIPI DSI, MIPI CSI-2 Camera input (CSI0); industrial temperature -40...+85°C	MSC SM2S-IMX8MINI-SCL-03N0880I PCBFTX	PV

\*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>Cooling Options</b>		
1151823	Heatspreader for SM2S-IMX8MINI module, consisting of a single-piece aluminum plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs	MSC SM2S-IMX8MINI-01 HSP-001
<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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