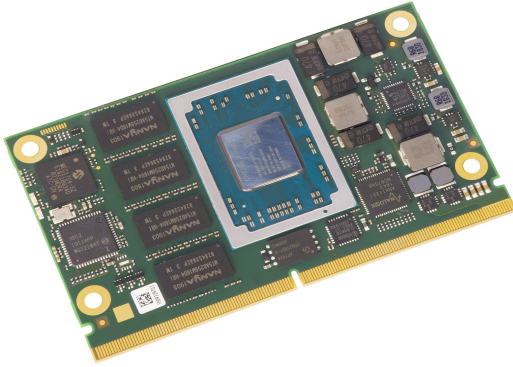


MSC SM2S-RYZ

AMD Ryzen™ Embedded V/R-Series



82 x 50 mm

6 / 15 W

-40 +85



Description

The MSC SM2S-RYZ module is the smallest embedded platform for the AMD Ryzen Embedded Low Power V1000/R1000 processor family. This versatile system-on-chip (SoC) technology combines processing, graphics and I/O functionality on a single die, allowing for outstanding compute performance in environments with constrained space, power and cooling. The configurable Thermal Design Power (TDP) ranges from low 6 W to 15 W. The integrated "Vega" graphics processor unit with three up to 1.200 MHz fast compute units stands for highest graphics performance.

The new MSC SM2S-RYZ drives up to 4 independent 4k displays and offers up to 8 GByte fast DDR4 2400MT/s memory, USB 3.0 and PCI Express Gen.3 on a power saving and cost-efficient SMARC 2.1.1 Short Size module.

Different SOCs with quad-core (8 threads) and dual-core (4 threads) processors are supported by this design. In addition to an extensive set of interfaces it features hardware based security compliant to the requirements of TCG (Trusted Computing Group) and TPM 2.0 capability.

For evaluation and design-in of the MSC SM2S-RYZ module, Avnet Embedded provides a suitable SMARC 2.1.1 development platform. A complete, ready-to-run Starterkit is also available.

Highlights

- AMD Ryzen™ Embedded V1404I, quad-core (8 threads) 2.0/3.6GHz, 15W (12-25W)
- AMD Ryzen™ Embedded R1606G, dual-core (4 threads) 2.6/3.5GHz, 15W (12-25W)
- AMD Ryzen™ Embedded R1505G, dual-core (4 threads) 2.4/3.3GHz, 15W (12-25W)
- AMD Ryzen™ Embedded R1305G, dual-core (4 threads) 1.5/2.8GHz, 8W (8-10W)
- AMD Ryzen™ Embedded R1102G, dual-core (2 threads) 1.2/2.6GHz, 6W
- Integrated AMD Vega GPU with up to 8 Compute Units
- Up to 8GB DDR4 2400MT/s SDRAM
- Up to 64GB eMMC Flash
- SATA-III interface (6Gbps)
- Dual DisplayPort++ interface
- LVDS / Embedded DisplayPort
- Dual/Triple/Quad Independent Display support up 4k resolution (SKU related)
- Up to 4x PCI Express x1 Gen. 3
- 2x USB 3.0 Host interfaces
- 4x USB 2.0 Host interfaces
- Up to 2x Gigabit Ethernet
- UART, SPI, I2C, SMBus, HD Audio
- Trusted Platform Module (optional)
- SMARC 2.1.1 compliant
- UEFI Firmware

Technical Data - MSC SM2S-RYZ

| | |
|---------------------------|--|
| Technology | x86 |
| Formfactor | SMARC™ Short Size |
| CPU | AMD Ryzen™ Embedded V1404I, quad-core (8 threads) 2.0/3.6GHz, 15W (12-25W) AMD Ryzen™ Embedded R1606G, dual-core (4 threads) 2.6/3.5GHz, 15W (12-25W) AMD Ryzen™ Embedded R1505G, dual-core (4 threads) 2.4/3.3GHz, 15W (12-25W) AMD Ryzen™ Embedded R1305G, dual-core (4 threads) 1.5/2.8GHz, 8W (8-10W) AMD Ryzen™ Embedded R1102G, dual-core (2 threads) 1.2/2.6GHz, 6W |
| Chipset | Integrated in SOC |
| RAM | Up to 8GB 2400MT/s DDR4 SDRAM |
| Flash | Up to 64GB eMMC V5.0 Flash, soldered (optional) |
| Storage Interfaces | 1x SATA-III 6Gbps |
| USB | 4x USB 2.0 Host interfaces 2x USB 3.0 Host interface |
| Serial Interfaces | 4x UART |
| Bus Interfaces | Up to 4x PCI-Express x1 Gen. 3 lanes 1x I2C Bus 1x SPI Bus 1x SMBus |
| Display Controller | AMD Vega GPU with up to 8 Compute Units - up to 1200 MHz Up to 4 independent displays supported (depending on processor variant) |
| Display Interfaces | 2 x DisplayPort++ Dual-channel LVDS / 2 x eDP 1.4 Up to 4x Digital Display Interfaces with up to 4k (3840 x 2160) resolution |
| Network Interface | Up to 2x 10/100/1000Base-T (Intel i210) |
| Audio Interface | High Definition Audio |
| Security Device | Infineon Trusted Platform Module 2.0 (optional) |
| Miscellaneous | Watchdog Timer: Initiates system reset, (programmable, 1s ... 255h) Fan Supply: PWM Speed Control for system fan on carrier board RTC battery: external System Monitoring: Voltage, Temperature, CPU Fan, System Fan |
| Feature Highlights | SMARC™ 2.1.1 compliant |

| | |
|--------------------------|---|
| Firmware | AMI Aptio UEFI |
| OS Support | Windows 10, Windows 10 IoT Linux, Yocto EAPI (HW Programming Interface) |
| Power Requirement | +5V +/-5% |
| Environment | Temperature Range: 0° ... 70°C (operating) -40° ... 85°C (storage) -40° ... 85°C (operating industrial, only with V1404I CPU) Humidity: 5 ... 95% (operating, non-condensing) 5 ... 95% (storage, non-condensing) |
| Dimensions | 82 x 50 mm |
| Certificates | UL / CE |
| Cooling | Heatspreader Heatsink |
| Carrier | MSC SM2-MB-EP1 |

Order Reference - MSC SM2S-RYZ

| Order Number | Description | Reference | Cat |
|--------------|--|---|-----|
| 87402 | SMARC 2.1.1 short size module with AMD Ryzen V1404I (2.0/3.6 GHz), Quad-Core, 15W, 8GB 2400MT/s DDR4, 32 GB eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, 2x DP++, LVDS Graphics, industrial temperature -40...+85°C | MSC SM2S-RYZ-V1404I-35N0200I PCBFTX | PV |
| 87404 | SMARC 2.1.1 short size module with AMD Ryzen V1404I (2.0/3.6 GHz), Quad-Core, 15W, 8GB 2400MT/s DDR4, no eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, 2x DP++, LVDS Graphics, industrial temperature -40...+85°C | MSC SM2S-RYZ-V1404I-3NN0200I PCBFTX | PV |
| 87400 | SMARC 2.1.1 short size module with AMD Ryzen V1404I (2.0/3.6 GHz), Quad-Core, 15W, 4GB 2400MT/s DDR4, no eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, TPM, 2x DP++, 2x eDP Graphics, industrial temperature -40...+85°C | MSC SM2S-RYZ-V1404I-2NN0401I PCBFTX | PV |
| 87394 | SMARC 2.1.1 short size module with AMD Ryzen R1102G (1.2/ 2.6GHz), Dual-Core, 6W, 4GB 2400MT/s DDR4, 32GB eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, 1x DP++, eDP Graphics, standard temp. 0°C -70°C | MSC SM2S-RYZ-R1102G-25N0100C PCBFTX | PV |
| 87396 | SMARC 2.1.1 short size module with AMD Ryzen R1102G (1.2/ 2.6GHz), Dual-Core, 6W, 4GB 2400MT/s DDR4, 32GB eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, 1x DP++, LVDS Graphics, standard temp. 0°C -70°C | MSC SM2S-RYZ-R1102G-25N0200C PCBFTX | PV |
| 87398 | SMARC 2.1.1 short size module with AMD Ryzen R1102G (1.2/ 2.6GHz), Dual-Core, 6W, 8GB 2400MT/s DDR4, no eMMC, 1x GbE LAN, 2x USB 3.0 Host, 4x USB 2.0 Host, 1x DP++, LVDS Graphics, standard temp. 0°C -70°C | MSC SM2S-RYZ-R1102G-3NN0200C PCBFTX | PV |

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 |
| 85087 | SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 3x RS232, 1x RS485, 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 3.0/DisplayPort Type C , 1x USB 2.0 Type A, 1x USB 2.0 internal, 1x USB 2.0 Host/Device, 2x SPI, I ² C, 12 GPIO on FC, 1x DisplayPort++ , LVDS/eDP/DSI on JILI30 connector, SD Card Slot, regulated backlight supply, HD Audio with amplifier, system fan connector, camera connector, RTC battery. Industrial temperature range -40..+85°C, x86 full version | MSC SM2S-MB-EP5-001 PCBFTX |
| 83979 | SMARC 2.x compatible embedded platform (146 x 80mm), 12V input voltage, 3x RS232, 1x RS485, dual RJ45 LAN with LED, 1x M.2 2280 Key M slot , 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 DisplayPort++ , LVDS/eDP/DSI on JILI30 connector, regulated backlight supply, RTC battery, Industrial temperature range -40..+85°C, x86 slim version | MSC SM2S-MB-EP5-003 PCBFTX |
| Cooling Options | | |
| 84348 | Passive Heatsink for SM2S-RYZ 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-RYZ-01 HSI-001 |
| 84350 | Heatspreader for SM2S-RYZ module, consisting of a single-piece aluminum plane and thermal pad for contact to the processor, with 2.7mm through-hole standoffs | MSC SM2S-RYZ-01 HSP-001 |