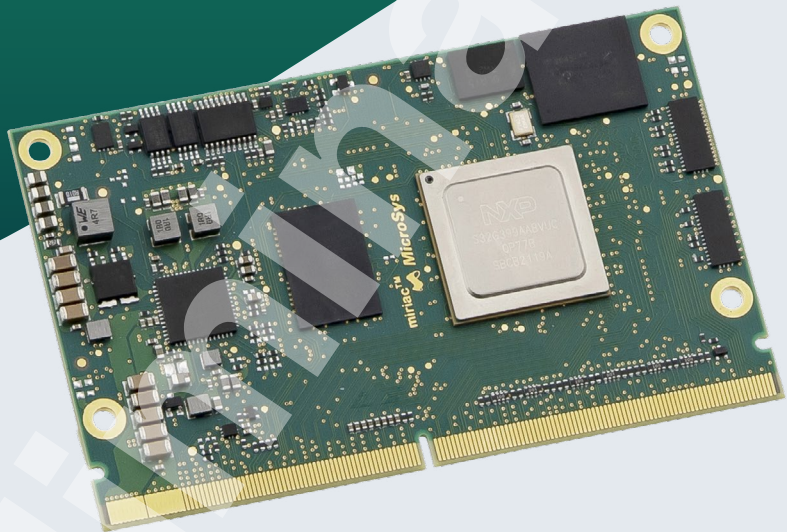Arm® Architecture

miriac® MPX-S32G399A

MicroSys' 2nd Gen of System-on-Modules for vehicle networks based on the NXP® S32G399A processor

System-On-Modules at a glance

- 8 Arm® Cortex®-A53 cores and 4 Arm® Cortex®-M7 cores including lockstep support

- Comprehensive connectivity including 18x CAN FD + dedicated protocol engine, furthermore FlexRay, Lin, SPI, Ethernet with TSN, PCI express®, USB and I²C

- Hardware Security Engine for secure boot and accelerated security services

GOLD PARTNER
NXP

Product Description

Since the MPX-S32G399A System-on-Modules offer multiple native CAN interfaces as well as comprehensive FlexRay, LIN and Ethernet support target markets can be found in real-time connected vehicles, mobile machinery and automotive test and measurement equipment. Further application areas include data loggers, edge gateways and fail-safe programmable logic controllers (PLCs).

Specifications

CPU	
Architecture	Arm® Cortex®-A53
Processor	NXP® S32G399A CPU: 8 Arm® Cortex®-A53 64-bit cores, 4 Arm® Cortex®-M7 dual-core lockstep pairs
DRAM	4 GB 32-bit soldered LPDDR4 RAM at 3200 MT/s

Memory	
Flash	64 MB QSPI Flash
Flash Card	Interface for external SD-card multiplexed with eMMC
Boot Flash	Boot select: XSPI, eMMC or external SD card
eMMC	Up to 32 GB

Ethernet	
RGMII	3x
SGMII	3x 2.5 Gbs

High Speed IO	
SerDes lanes	4x
ULPI-USB	1x
PCIe	Yes

IO	
Flex SPI	4x
UART	2x
CAN FD	18x
FlexRay	2x
LIN	4x
I²C	4x
analog inputs (ADCs)	12x
GPIOs	Yes
JTAG Debug Interface	Yes
Aurora Interface	Yes

Security / Safety	
Security	Hardware Security Engine (HSE) for secure boot and accelerated security services
Safety	• Advanced functional safety hardware and software for ASIL D systems
	• Optional: AEC-Q100 up to Grade 2 (-40 °C to 105°C)

Operating Condition	
Power Supply Voltage	Single +12 V DC power input (+6 V to +36 V)
Optional Power Supply Voltage:	Single DC power input (+6 V to +36 V)
Power Management	Yes
RTC	RV-3028-C7
Temperature	0 °C to 70 °C
opt. Temperature	-40 °C to 85 °C

Specifications

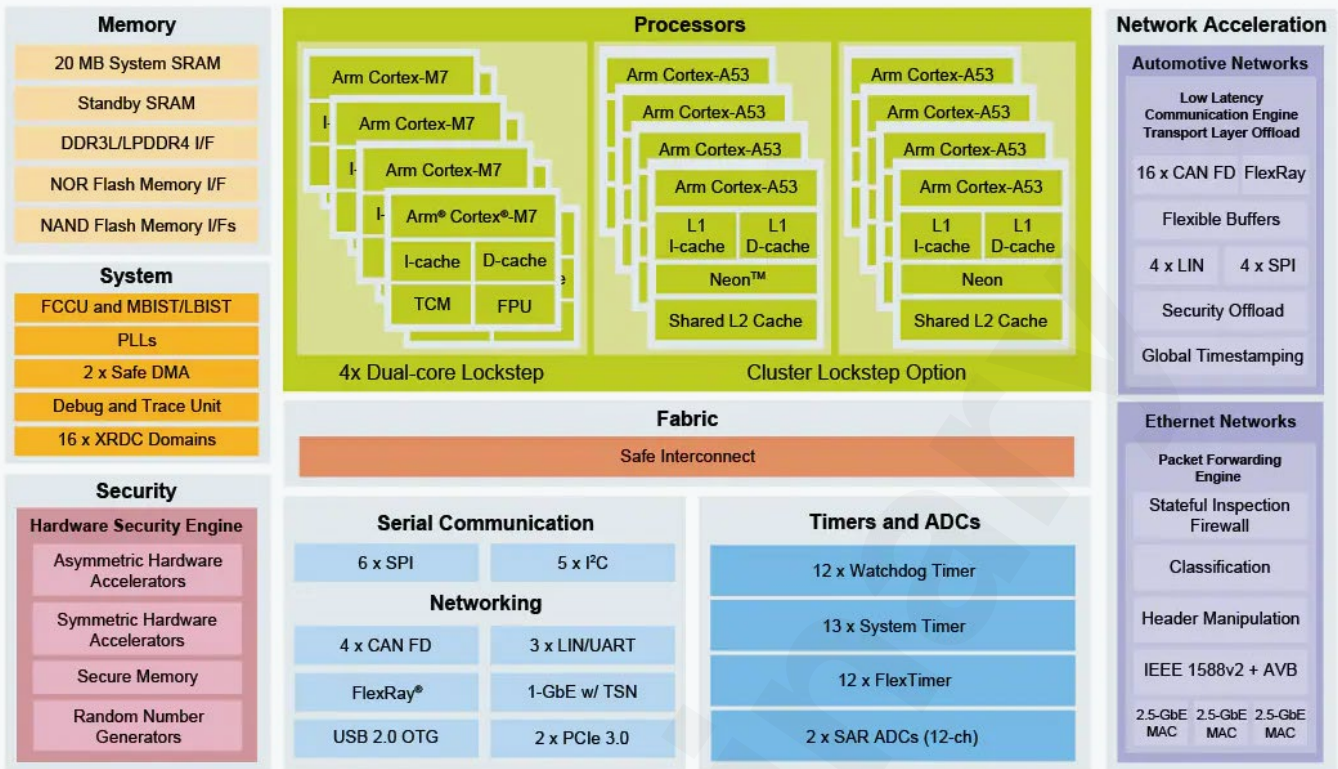| Mechanical		3
Dimensions	82 mm x 50 mm	
Connector Type	MXM3.0	

Software / Additional	
Software Support	■ Linux ■ VxWorks (on request) ■ Others (on request)
Additional	■ All I/O pins available on 314-pin edge connecto ■ Low Latency Communication Engine (LLCE) for vehicle networks acceleration ■ Packet Forwarding Engine (PFE) for Ethernet networks acceleration ■ Dev Kit available for immediate start, includes power supply, cables. Linux on SD card

General note:

Our standard product versions offer what we consider to be the optimum configuration in terms of performance, price, usage and TDP. The product features lists specify the maximum range of functions per interface. However, not all interfaces or functions are always available in parallel. Flexible SERDES multiplexing is one of the reasons for this. In addition, we provide multiple memory expansion options and are also happy to accommodate specific customer wishes. So do not hesitate to contact us directly to discuss your desired configuration.

Block diagram

Memory
- 20 MB System SRAM
- Standby SRAM
- DDR3L/LPDDR4 I/F
- NOR Flash Memory I/F
- NAND Flash Memory I/Fs

System
- FCCU and MBIST/LBIST
- PLLs
- 2 x Safe DMA
- Debug and Trace Unit
- 16 x XRDC Domains

Security
- Hardware Security Engine
- Asymmetric Hardware Accelerators
- Symmetric Hardware Accelerators
- Secure Memory
- Random Number Generators

Processors

4x Dual-core Lockstep
- Arm Cortex-M7
- Arm Cortex-M7
- Arm Cortex-M7
- Arm® Cortex®-M7
  - I-cache | D-cache
  - TCM | FPU

Cluster Lockstep Option
- Arm Cortex-A53
- Arm Cortex-A53
- Arm Cortex-A53
- Arm Cortex-A53
  - L1 I-cache | L1 D-cache
  - Neon™
  - Shared L2 Cache

- Arm Cortex-A53
- Arm Cortex-A53
- Arm Cortex-A53
- Arm Cortex-A53
  - L1 I-cache | L1 D-cache
  - Neon
  - Shared L2 Cache

Fabric
- Safe Interconnect

Serial Communication
- 6 x SPI
- 5 x I²C

Networking
- 4 x CAN FD
- 3 x LIN/UART
- FlexRay®
- 1-GbE w/ TSN
- USB 2.0 OTG
- 2 x PCIe 3.0

Timers and ADCs
- 12 x Watchdog Timer
- 13 x System Timer
- 12 x FlexTimer
- 2 x SAR ADCs (12-ch)

Network Acceleration

Automotive Networks
- Low Latency Communication Engine Transport Layer Offload
- 16 x CAN FD FlexRay
- Flexible Buffers
- 4 x LIN | 4 x SPI
- Security Offload
- Global Timestamping

Ethernet Networks
- Packet Forwarding Engine
- Stateful Inspection Firewall
- Classification
- Header Manipulation
- IEEE 1588v2 + AVB
- 2.5-GbE MAC | 2.5-GbE MAC | 2.5-GbE MAC

Order Information

Name	Code	Description	Status
Development Kit basic for miriac® MPX-S32G399A	TBD	8 Arm® Cortex®-A53, 1.3 GHz, 4 GB LPDDR4 w ECC, 64 MB NOR Flash, 16 GB eMMC, 0 °C to 70 °C, w/o SEC	coming 2023
miriac® MPX-S32G399A	TBD	8 Arm® Cortex®-A53, 1.3 GHz, 4 GB LPDDR4 w ECC, 64 MB NOR Flash, 16 GB eMMC, 0 °C to 70 °C, w/o SEC	coming 2023

Related Products

Name	Code	Description	Status
miriac® MPX-S32G274A	858102	Vehicle gateway platform with massive native CAN support	active
miriac® SBC-S32G274A	859011	NXP® S32G399A processor based SBCs for vehicle network computing	active
miriac® AIP-S32G274A	859013	High-performance embedded AI platforms	active
miriac® SBC-S32G399A	TBD	NXP® S32G399A processor based SBCs for vehicle network computing	coming 2023
miriac® AIP-S32G399A	TBD	High-performance embedded AI platforms	coming 2023

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