

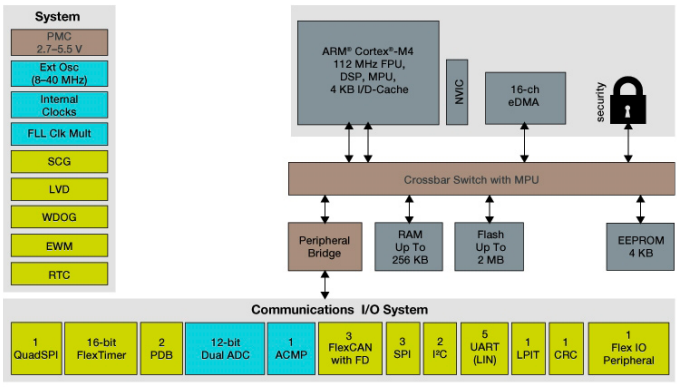
S32K

Technology Publication

S32K – Automotive ARM® Cortex® based microcontrollers

Vehicle manufacturers are in a race to change with systems evolving at speed as the market moves from motor vehicle towards mobility platform. Even relatively static body applications like pumps, doors, seats, climate control and lighting are being re-designed to enable new levels of safety, efficiency and consumer experience. NXP's S32K family of 32-bit ARM® Cortex® based automotive microcontrollers (MCUs) is the latest in a long line of AEC-Q100 qualified products to address this segment. It has big shoes to fill. Its predecessors – the 8-bit S08, 16-bit S12/S12X and 32-bit MPC5xxx MCU families – all continue in production, guaranteed by a minimum 15 year longevity commitment1. The S32K family builds on this legacy in 3 key areas providing new opportunities for end product differentiation in secure, connected vehicle edge nodes:

- scalability – compatible families with broad performance, feature and pin-count options
- integration – ARM Cortex-M cores, ISO CAN FD, robust hardware security and low power
- software – automotive-grade Software Development Kit (SDK), S32 Design Studio IDE and third party ecosystem support



The S32K1xx series is designed to address this evolution and consists of six MCU families with a broad peripheral mix covering multiple body application use cases.

Use of area efficient 90 nm Thin Film Storage (TFS) process technology enables a rich feature set – core, system, analogue, communications & timers – and cost-effective flash memory options from 128 KB to 2 MB. MCUs are specified for use in electrically harsh automotive environments and operate up to 125°C ambient temperature.

Key Features

- ARM Cortex-M0+/M4F with DSP functionality (up to 112MHz)
- ISO26262 compliance reaching ASIL B or higher
- Up to three CAN with Flexible Data rate (FD) option according to ISO/CD 11898-1
- Cryptographic Services Engine (CSEc) – SHE+ compliant
- Multiple low power modes (Best in class STOP current: 25-40µA)
- Up to 2 MB Flash on Chip & 256 kB SRAM
- 100Mbit/s Ethernet supporting Time Stamping (IEEE 1588)
- HW motor control support (BLDC/PMSM)
- FPU eDMA from 57xxx family for high-precision computing w/o SW overhead
- Quad-SPI with eXecute-In-Place
- Independent CPU and peripheral clocking
- Advanced analog front end based on dual 2Msps, 12-bit ADCs, including 16-bit average, with up to 24 channels, offset error correction and gain control
- Dual 2Msps, 12-bit DAC and analog comparator
- 16- to 176-pin package options
- Extended industrial temperature range from -40°C to 125°C
- 15 Y Lifetime

Applications

- Automotive Body Applications such as pumps, doors, seats, TPMS, Amplifier, climate control & lighting
- Challenging environmental industrial application requiring high reliable, safe and secure MCUs
  - Automation
  - Communication
  - Transportation
  - Medical



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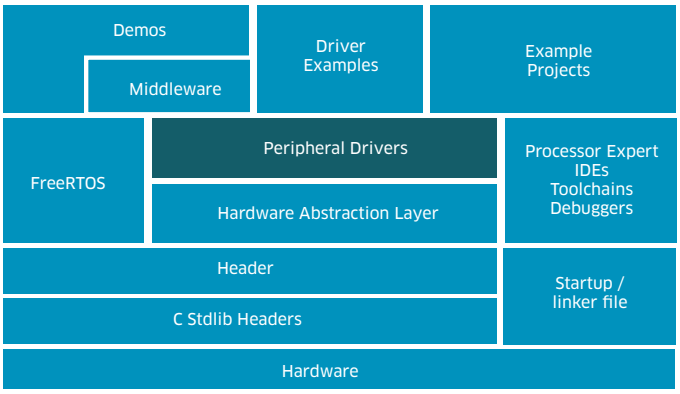
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NXP offers a range of automotive-grade development tools to speed and simplify the (increasingly challenging) automotive software development process. S32 Design Studio IDE is a free, unlimited code size IDE based on the Eclipse environment and open-source GNU compiler and debugger. A connection utility also allows compilers & debuggers from IAR Systems and other 3rd parties to be used within S32 Design Studio. Using the in-built Processor Expert tool, the MCU's peripherals and software functionality can be quickly configured. The tool then generates highly optimized embedded C-code saving a large amount of manual development effort.

For applications that don't require AUTOSAR support, a MISRA 2012 and SPICE Level 3 compliant Software Development Kit (SDK) comes pre-installed within S32 Design Studio. Also compatible with 3rd party IDEs and compilers, the SDK contains free low-level peripheral drivers, the freeRTOS operating system and application specific middleware. Drivers are created and configured using a simple drag & drop function with documented source code and numerous out-of-the-box examples included for ease-of-use.

S32K Enablement | Software



Complete software package to streamline software development

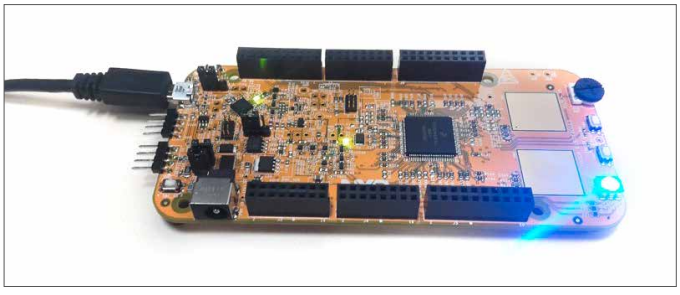
- Free, full-featured S32 Design Studio IDE
- Production grade NXP Software Development Kit (SDK)
- NXP Middleware e.g. Core Self Test, LIN Stack, Automotive Math & Motor Control Library
- Autosar 4.0 and 4.2 MCAL

Scalability

Flash	Pin Count								
	16/24	32	48	64	80	100	100 BGA	144	176
2M							S32K148	S32K148	S32K148
1M						S32K146	S32K146	S32K146	
512K				S32K144		S32K144	S32K144		
256K			S32K118	S32K142 S32K118		S32K142			
128K		S32K116	S32K116	KEAZ128	KEA128				
64K		KEAZN64 S32K114	S32K114	KEAZ(N)64	KEAZ64				
32K		KEAZN32		KEAZN32					
16K		KEAZN16		KEAZN16					
8K	KEAZN8								

Compatible families with broad performance, feature and pin-count options

S32K Enablement | Hardware Platform



Full Hardware evaluation & Development Platforms

- Low cost development board compatible with Arduino shields
- On-board debugger and system basis chip

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Complexity simplified.