

32-bit Automotive MCUs

SAM D20, SAM L10/L11, SAM DA1, SAM D21, SAM C21, SAM D51/E5x, SAM V7x and PIC32MZ EF

Automotive Applications from Capacitive Touch to Infotainment

The 32-bit automotive MCUs offer a broad portfolio ranging from entry level to high-performance devices. These MCUs offer a wide range of connectivity options including LIN, CAN FD, Ethernet-AVB, MediaLB[®] and high-speed USB.

Key features range from low power, moisture-tolerant touch, high-performance analog, cryptography, motor control and DSP processing to a broad Arm[®] based portfolio.

Microchip offers a comprehensive set of development tools ranging from IDEs, compilers and development kits as well as supporting all the major third party tools. In addition, automotive specific software such as AutoSAR, Ethernet-AVB, LIN and CAN is supported to offer complete solutions for automotive applications.

SAM D2x

The SAM D2x is an entry level Arm Cortex[®]-M0+ family with up to 256 KB Flash and 32 KB of SRAM and an integrated Peripheral Touch Controller (PTC) and LIN. The SAM D2x is ideal for many different applications ranging from general purpose to touch applications.

SAM L10/L11

The SAM L10/L11 is an entry level Arm Cortex-M23 with up to 64 KB Flash and 16 KB with an enhanced PTC, low power, LIN and hardware cryptography. The SAM L10/L11 is ideal for applications that require extremely-low power as well as moisture tolerant touch.

SAM DA1

The SAM DA1 was the first entry level Arm Cortex-M0+ with up to 64 KB Flash and 16 KB as well as on-board RWW Flash for EEPROM emulation. Both an integrated PTC as well as LIN is included which can address touch applications as well as general purpose applications.

SAM C20/C21

The SAM C20/C21 in an Entry Level 5V Arm Cortex-M0+ with up to 256 KB of Flash and 32 KB of SRAM as well as RWW Flash for EEPROM emulation. In addition to LIN and the PTC, the SAM C20/C21 adds dual ISO CAN FD and is ideal for harsh applications such as body electronics or where CAN connectivity is needed.

PIC32MM

The PIC32MM is an entry level microAptiv[™] family with up to 256 KB of Flash with ECC as well as small package options. The PIC32MM is ideal for LIN-connected applications for in-cabin or body electronics.

SAM D51/E5x

The SAM D51/E5x in a mid-range Arm Cortex-M4F with up to 1 MB of Flash and 256 KB of SRAM. With the wide range of connectivity options including LIN, CAN FD, USB and Ethernet the SAM D51/E5x family can be used in many applications from in-cabin to general purpose.

PIC32MZ EF

The PIC32MZ EF is a high-performance MIPS M-Class device with up to 2 MB of Flash and 512 KB of SRAM. With high-performance Analog as well as a wide range of connectivity including LIN, CAN, Ethernet and USB the PIC32MZ EF is ideal for many applications including DSP processing type applications.

SAM V7x

The SAM V7x is a high-performance Arm Cortex-M7 device with up to 2 MB of Flash and 384 KB of SRAM. With wide range of connectivity including LIN, CAN FD, Ethernet-AVB and USB the SAM V7x is ideal for many applications ranging from smart antennas to infotainment.

Device Selector Guide

Product Family	Core	Max. Operation Freq. (MHz)	Program Flash Memory (KB)	RAM (KB)	Pin Count	AEC-Q100 Grade	Development Kit	Automotive Connectivity/Applications										
								Capacitive Touch	CAN 2.0B	ISO CAN FD	Ethernet-AVB	Ethernet	USB	LIN	Entry Level Graphics	DSP/Audio Processing	INICnet™ via MediaLB	INICnet via SPI, I ² C, and USB
SAM V71	Cortex®-M7	300	512–2048	256–384	64–144	Grade 2	ATSAMV71-XULT	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
SAM V70	Cortex-M7	300	512–1024	256–384	64–144	Grade 2	ATSAMV71-XULT		✓	✓			✓	✓		✓	✓	✓
PIC32MZ EF	M-Class	252	512–2048	128–512	64–144	Grade 1	DM320007		✓			✓	✓	✓		✓		✓
SAM E5x	Cortex-M4F	100	256–1024	128–256	64–128	Grade 1	ATSAME54-XPRO	✓	✓	✓		✓	✓	✓		✓		✓
SAM D51	Cortex-M4F	100	256–1024	128–256	64–128	Grade 1	ATSAME54-XPRO	✓					✓	✓		✓		✓
SAM C21	Cortex-M0+	48	32–256	4–32	32–100	Grade 1	ATSAMC21-XPRO	✓	✓	✓				✓				
SAM DA1	Cortex-M0+	48	16–64	4–8	32–64	Grade 2	ATSAMDA1-XPRO	✓					✓	✓				
SAM D21	Cortex-M0+	32	32–256	4–32	32–64	Grade 1	ATSAMD21-XPRO	✓					✓	✓				
SAMD20	Cortex-M0+	32	16–64	2–8	32–64	Grade 1	ATSAMD20-XPRO	✓						✓				
SAM L10/L11	Cortex-M23	32	16–64	4–16	24/32	Grade 1	ATSAML11-XPRO	✓						✓				
PIC32MM	microAptiv™	25	16–64	4–8	20–36	Grade 1	DM320101							✓	✓			

Applications

- Automotive amplifiers
- Smart antennas
- Head units
- Fingerprint sensors
- Door handle sensors
- Acoustic Vehicle Alerting Systems (AVAS)
- Motor control
- ADAS
- Body electronics
- In-cabin capacitive touch controls

Ecosystem

MPLAB® Harmony: Is a flexible, abstracted, fully integrated embedded software development framework.

<https://www.microchip.com/mplab/mplab-harmony/mplab-harmony-v3>

Atmel Studio: Is an Integrated Development Environment (IDE) for developing and debugging:

<https://www.microchip.com/mplab/avr-support/atmel-studio-7>

Atmel Start: An innovative online tool for intuitive, graphical configuration of embedded software projects for Microchip's Flash MCUs: <https://start.atmel.com/>

Software Stacks

LIN: Third-party LIN software stack by ihr GmbH www.ihr.de/ihr/

Ethernet AVB: Third-party Ethernet AVB Stack by Harman for the SAM V71 MCU

www.services.harman.com/Industries/automotive-connected-car

AutoSAR

Elektrobit: www.elektrobit.com/products/ecu/technologies/autosar/

Vector: www.vector.com/int/en/products/products-a-z/embedded-components/microsar/

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