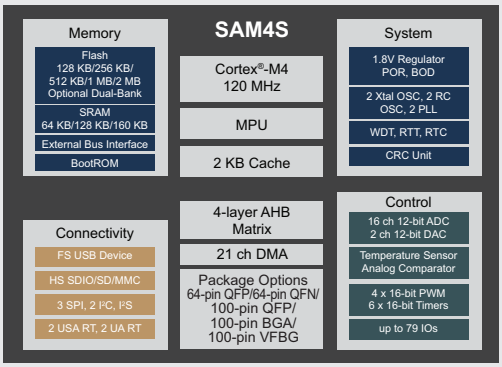
SAM4S Microcontroller Family

Scalable Performance, Memory Density and Power Efficiency

Based on the powerful ARM® Cortex®-M4 processor, the SAM4S series extends the Microchip Cortex-M-based microcontroller (MCU) portfolio to offer:

- Increased performance and power efficiency
- Higher memory densities up to 2 MB of Flash and 160 KB of SRAM
- Rich peripheral set for connectivity, system control and analog interfacing.

The SAM4S series offers pin-to-pin compatibility with SAM4N, SAM3S, SAM3N and SAM7S devices, facilitating easy migration within the portfolio.



Key Features

Improved Performance Level

Built around the ARM Cortex-M4 core, the SAM4S operates at 120 MHz and integrates the Flash read accelerator and optional cache memory to increase system performance. The SAM4S features a multi-layer bus matrix, multi-channel direct memory access (DMA) and distributed memory to support high data rate communication.

Low Power Consumption

The SAM4S series achieves 180 µA/MHz in dynamic mode and 1 µA at 1.8V in back-up mode with the Real-Time Clock (RTC) running. Offering some of the best power consumption/performance rates on the market for standby mode, the SAM4S series reaches 120 MHz operating frequency with a RAM retention mode below 25 µA.

Safety and Security

Integrated best-in-class hardware code protection:

- Prevents access to on-chip memory to protect your intellectual property
- Supports secure device reconditioning (chip erase) for reprogramming
- A unique 128-bit ID and scrambled external bus interface ensure software confidentiality while the hardware CRC checks memory integrity

Microchip QTouch® Capacitive Touch Support

The SAM4S series is touch-ready, offering native support for Microchip's market-leading QTouch technology so you can easily implement buttons, sliders and wheels in your application.

Ease of Use

Accelerate your development cycle with Atmel Studio, a seamless, easy-to-use Integrated Development Environment (IDE). Get a jump-start on your design with dedicated evaluation kits and software packages.

For rapid evaluation and code development, Microchip and industry-leading third parties provide a full range of development tools, Real-Time Operating System (RTOS), middleware and support services to reduce time to market.

Application Areas

- Consumer goods and toys
- Industrial control
- Metering
- Medical
- Test and measurement
- 802.15.4 wireless networking
- PC, cell phone and gaming peripherals

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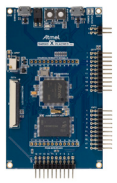
Design Tools and Ecosystem

Microchip offers a full suite of hardware tools for evaluation and prototyping with the SAM4S devices. All SAM4S evaluation tools are supported by Atmel Studio IDE and integrate QTouch library support for buttons, wheels and sliders. They are backed by a worldwide support ecosystem of industry-leading suppliers of development tools, real-time operating systems and middleware products to make your design process easier and reduce time to market.



SAM4S Xplained Pro

The Xplained Pro platform consist of a main board with multiple expansion ports plus extension boards, including OLED LCD displays, buttons, sensors and more. The board is available standalone or as part of a starter kit. The extension boards can also be purchased separately.

Evaluation Kit: ATSAM4S-XPRO

Starter Kit: ATSAM4S-XSTK

SAM4S-EK2

A full-featured board to quickly evaluate and develop code for applications running on Microchip SAM4S microcontrollers.

ATSAM4S-EK2

SAM4S Xplained

The Xplained platform is for early evaluation of the capabilities offered by the SAM4S MCU which contains QTouch button sensors, LEDs, a USB port. The Xplained expansion headers provide easy access to analog and digital I/O pins. The board is powered by the USB cable and integrates a JTAG emulator with USB interface for programming and debugging.

ATSAM4S-XPLD

SAM4S Wireless PIR Reference Design Kit

The SAM4S-WPIR-RD Reference Design Kit is based on the SAM4S16C device. Thanks to this reference design, you will be able to develop your own PIR motion detector camera.

ATSAM4S-WPIR-RD

SAM4S Ordering Information

Part Number	Flash	SRAM	Cache	Package
ATSAM4SD32CA-CFU	2 x 1 MB Dual-bank	160 KB	2 KB	100-pin VFBGA
ATSAM4SD32CA-CU				100-pin TFBGA
ATSAM4SD32CA-AU				100-pin LQFP
ATSAM4SD32BA-AU				64-pin LQFP
ATSAM4SD32BA-MU				64-pin QFN
ATSAM4SD16CA-CFU	2 x 512 KB Dual-bank	160 KB	2 KB	100-pin VFBGA
ATSAM4SD16CA-CU				100-pin TFBGA
ATSAM4SD16CA-AU				100-pin LQFP
ATSAM4SD16BA-AU				64-pin LQFP
ATSAM4SD16BA-MU				64-pin QFN
ATSAM4SA16CA-CFU	1 MB	160 KB	2 KB	100-pin VFBGA
ATSAM4SA16CA-CU				100-pin TFBGA
ATSAM4SA16CA-AU				100-pin LQFP
ATSAM4SA16BA-AU				64-pin LQFP
ATSAM4SA16BA-MU				64-pin QFN
ATSAM4S16CA-CFU	1 MB	128 KB	–	100-pin VFBGA
ATSAM4S16CA-CU				100-pin TFBGA
ATSAM4S16CA-AU				100-pin LQFP
ATSAM4S16BA-AU				64-pin LQFP
ATSAM4S16BA-MU				64-pin QFN
ATSAM4S16BA-UUR				64-pin WLCSP

Part Number	Flash	SRAM	Cache	Package
ATSAM4S8CA-CFU	512 KB	128 KB	–	100-pin VFBGA
ATSAM4S8CA-CU				100-pin TFBGA
ATSAM4S8CA-AU				100-pin LQFP
ATSAM4S8BA-AU				64-pin LQFP
ATSAM4S8BA-MU				64-pin QFN
ATSAM4S8BA-UUR				64-pin WLCSP
ATSAM4S4CA-CFU	256 KB	64 KB	–	100-pin VFBGA
ATSAM4S4CA-CU				100-pin TFBGA
ATSAM4S4CA-AU				100-pin LQFP
ATSAM4S4BA-AU				64-pin LQFP
ATSAM4S4BA-MU				64-pin QFN
ATSAM4S4BA-UUR				64-pin WLCSP
ATSAM4S4AA-AU				48-pin LQFP
ATSAM4S4AA-MU				48-pin QFN
ATSAM4S2CA-CFU	128 KB	64 KB	–	100-pin VFBGA
ATSAM4S2CA-CU				100-pin TFBGA
ATSAM4S2CA-AU				100-pin LQFP
ATSAM4S2BA-AU				64-pin LQFP
ATSAM4S2BA-MU				64-pin QFN
ATSAM4S2BA-UUR				64-pin WLCSP
ATSAM4S2AA-AU				48-pin LQFP
ATSAM4S2AA-MU				48-pin QFN

The QFP package has a –40°C to 105°C option. Also available upon request for any other package type. To order: replace the final letter 'U' by an 'N' (ex: ATSAM4S16CA-AN).

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