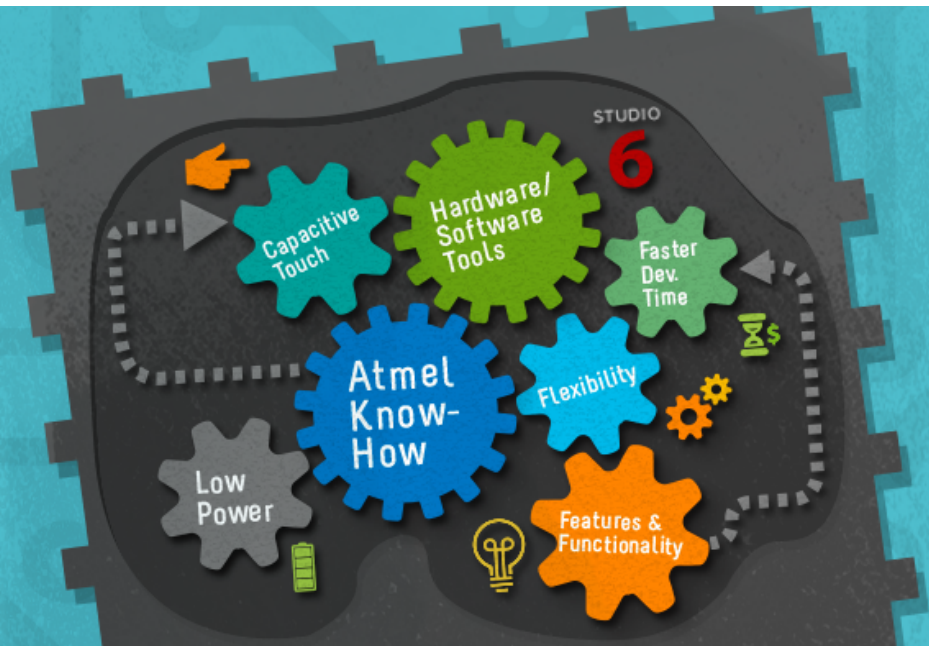




Think Beyond  
the Core



# Atmel SAM D20 Series

ARM Cortex-M0+ based Flash Microcontrollers

The Atmel® SAM D20 ARM® Cortex®-M0+ based series leverages two decades of microcontroller (MCU) experience. It builds on the success of our popular Atmel AVR® MCUs and ARM-based devices. The Atmel SAM D20 series delivers a powerful combination of proven technologies—such as our peripheral event system—as well as the latest Atmel innovations, including capacitive touch support for buttons, sliders, wheels and proximity. This truly differentiated general-purpose microcontroller is a perfect fit for many low-power, cost-sensitive industrial and consumer applications.

## Key Benefits

### High Performance

- 48MHz operation
- 2.14 CoreMark/MHz
- Single-cycle IO access
- 8-channel event system

### Low Power

- <150µA/MHz
- <3µA RAM retention and RTC
- Internal and external oscillators
- On-the-fly clock switching and prescaling

### Strong peripheral set

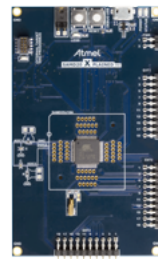
- Up to six serial communication modules (SERCOM) configurable as UART/USART, SPI or I<sup>2</sup>C
- Up to eight 16-bit Timer/Counters
- Peripheral Touch Controller that supports buttons, sliders, wheels, proximity with up to 256 channels
- Real Time Clock (RTC) and Calendar with leap year correction and 1ppm calibration
- 12-bit 350ksp/s ADC and 10-bit DAC

### World-class tools

- SAM D20 Xplained Pro starter kit – \$39
- Atmel Studio with compiler support – Free
- Atmel Software Framework – Free
- Low-level drivers and stacks – Free
- Simulator free first three months

## ARM Cortex-M0+ Processor

The most energy-efficient ARM processor yet, the Cortex-M0+ builds on the Cortex-M0 processor—retaining its full instruction set and tool compatibility—while further reducing energy consumption and increasing performance. The SAM D20 ARM Cortex-M0+ based microcontroller operates at 48MHz and features a two-stage pipeline, single-cycle I/O access, single-cycle 32x32 multiplier, event system, and a fast and flexible interrupt controller. Highly efficient, the Atmel SAM D20 reaches 2.14 CoreMark/MHz – 0.93 DMIPS/MHz.



## Hardware and Software Tools

Prototype your designs with the Atmel SAM D20 Xplained Pro which has embedded programmer/debugger. If you want to use a standalone programmer/debugger, the Atmel SAM-ICE™ emulator fully supports the SAM D20. Atmel Studio and the Atmel Software Framework support SAM D20 products, providing an easy-to-use and low-cost development platform to reduce your time to market.

## Low Power

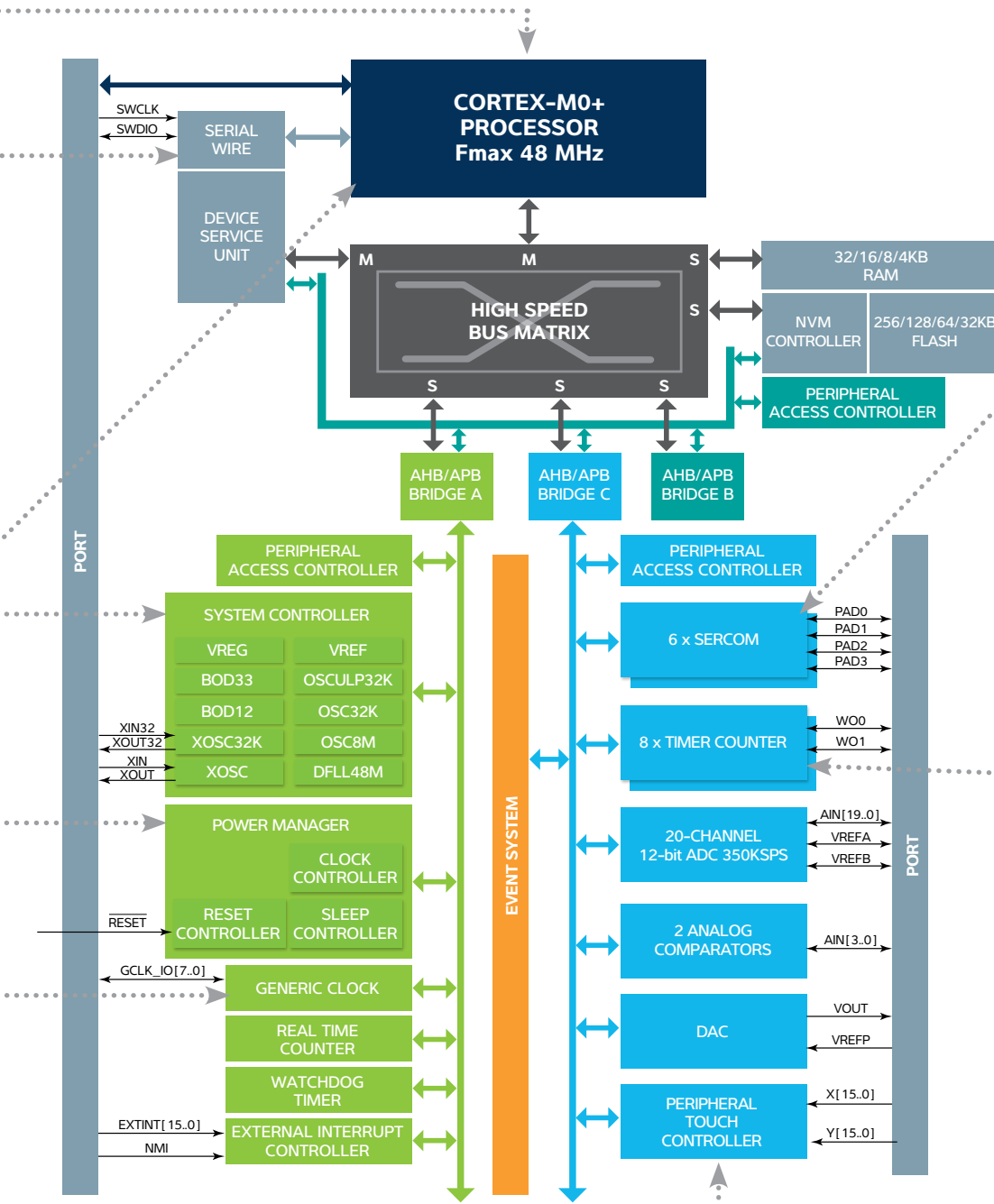
The SAM D20 series implements a wide range of features to drive down power consumption, including low-power oscillators, clock gating and prescaling, Atmel SleepWalking technology and a proprietary low-power process. This enables 150µA/MHz in active mode and <3µA with full RAM retention and RTC running in sleep mode.

## Easy Migration

Made with portability in mind, these devices are code-compatible so that you can easily move between both memory densities and pinouts. Plus, the different pin options are designed to minimize PCB changes when going from one pin count to another. With the TQFP package, you can even lay out the three different packages inside each other.

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## SERCOM

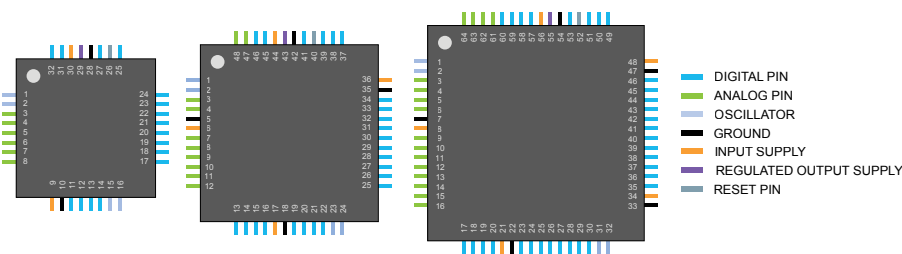
SAM D20 devices feature multiple instances of the Serial Communication Module (SERCOM). The SERCOM is configurable to operate as I<sup>2</sup>C, SPI, or USART, giving developers extended flexibility to mix serial interfaces and greater freedom in PCB layout. Each SERCOM instance can be assigned to different I/O pins through I/O multiplexing, further increasing versatility.

## Timers/Counters

SAM D20 devices include multiple instances of 16-bit Timer/Counters (TC). Each TC can be individually programmed to perform frequency and waveform generation, accurate program execution timing, and input capture with time and frequency measurement of digital signals. Each TC can be configured to operate as 2x8-bit timers, as a 16-bit timer, and two TCs can be combined to a 32-bit TC. In addition, the SAM D20 features a 32-bit RTC with full calendar and leap year support.

## Peripheral Touch Controller

An embedded peripheral touch controller (PTC) makes it easy to add capacitive touch sensing to your project with buttons, sliders, wheels and proximity. By offering superb sensitivity and noise tolerance as well as self-calibration, the PTC eliminates the need for external components and minimizes CPU overhead. The PTC supports up to 256 channels on 64-pin devices, 120 channels on 48 pin devices and 60 channels on 32 pin devices.



# SAM D 20 E 14 A - M U T

## Product Family

SAM D = General Purpose MCU

## Product Series

20=Cortex M0+ CPU, Basic Feature Set

## Pin Count

E = 32 pins  
G = 48 pins  
J = 64 pins

## Marketing Revision

A = Initial Revision

## Memory Density

14 = 16kB  
15 = 32kB  
16 = 64kB  
17 = 128kB  
18 = 256kB

## Package type

A = TQFP  
M = QFN  
U = WLCSP

## Plating material and temp grade

U = -40 — 85°C Matte Sn plating  
N = -40 — 105°C Matte Sn plating

## Package carrier

T = Tape & Reel  
No character = Tray (Default)

	32-pin SAM D20E	48-pin SAM D20G	64-pin SAM D20J
Flash	16-128KB	16-256KB	16-256KB
SRAM	2-16KB	2-32KB	2-32KB
SERCOM (I <sup>2</sup> C, USART, SPI)	4	6	6
Timer/Counter	6	6	8
PWM channels	10	12	16
12-bit 350ksps ADC	10ch	14ch	20ch
10-bit 350ksps DAC	1ch	1ch	1ch
GPIO	26	38	52
Capacitive touch channels	Up to 60	Up to 120	Up to 256



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