



## ATSAM3U

### ARM Cortex™-M3 Flash MCU with High-Speed USB

The SAM3U series is the industry's first ARM Cortex™-M3 Flash Microcontroller (MCU) with embedded high-speed USB device and transceiver, making it the ideal choice for applications requiring fast and large data transfers. It is also the first Cortex-M3 device to offer dual-bank Flash with boot bank select. The SAM3U operates down to 1.6V.

The SAM3U architecture is specifically designed to sustain high data transfers rates. It includes a five-layer bus matrix as well as multiple SRAM banks and 22 DMA channels to enable simultaneous bus transfers for maximum data throughput.

#### Features

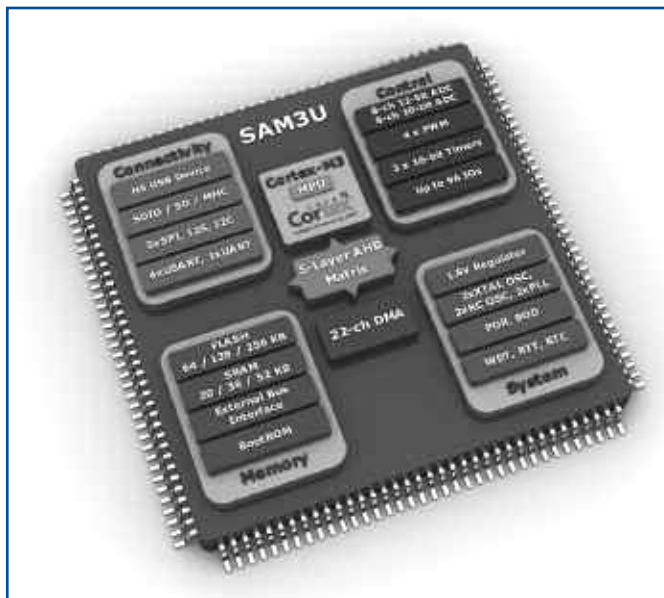
- ARM® Cortex-M3 revision 2.0 up to 96 MHz
- USB 2.0 device: 480 Mb/s, 4 KB FIFO, up to seven bidirectional endpoints, dedicated DMA and layer on the bus matrix
- 64 KB to 256 KB dual-bank Flash
- 1.62V to 3.6V operation
- Memory Protection Unit (MPU)
- 16 KB to 48 KB embedded SRAM, dual banks
- 16 KB ROM with embedded bootloader routines (UART, USB) and IAP routines
- Embedded regulator for single supply operation
- POR, BOD and Watchdog for safe reset
- Up to 17 peripheral DMA (PDC), one dedicated DMA for USB and 4-channel central DMA channels
- Up to four USARTs (ISO7816, IrDA, Flow Control, SPI, Manchester support) and one UART
- Up to two TWI (I<sup>2</sup>C), one SPI, one SSC (I<sup>2</sup>S), one HSMCI (SDIO/SD/MMC)
- 3-channel 16-bit Timer/Counter (TC)
- 4-channel 16-bit PWM (PWMC)
- 32-bit Real Time Timer (RTT) and RTC
- Static Memory Controller (SMC) with SRAM, NOR, NAND support
- NAND Flash controller with 4 KB RAM buffer and ECC
- 4-/8-channel 12-bit 1 Ms/s A/D converter with differential input mode and programmable gain
- 4-/8-channel 10-bit A/D converter
- Up to 96 I/O lines with debounce, on-die termination, programmable pull-ups

#### Applications

The SAM3U family is ideal for applications requiring high-speed transfers between USB and NAND, SDIO, or SD/MMC cards including:

- High-speed USB bridging
- PC peripherals
- Data loggers
- USB dongles

#### SAM3U Block Diagram



## SAM3U Product Selector Guide

Device	Flash (KB)	SRAM (KB)	PIOs	MMC Data Bus (bits)	USARTs	SPI	TWI	FWUP, SHDN Pins	External Bus Interface	A/D Converter	Package
SAM3U4E	2 x 128	52	96	8	4	5	2	Yes	8 or 16 bits, 4 chip selects, 24-bit address	8-ch 12-bit 8-ch 10-bit	LQFP144 BGA144
SAM3U2E	128	36	96	8	4	5	2	Yes	8 or 16 bits, 4 chip selects, 24-bit address	8-ch 12-bit 8-ch 10-bit	LQFP144 BGA144
SAM3U1E	64	20	96	8	4	5	2	Yes	8 or 16 bits, 4 chip selects, 24-bit address	8-ch 12-bit 8-ch 10-bit	LQFP144 BGA144
SAM3U4C	2 x 128	52	57	4	3	4	1	No	8 bits, 2 chip selects, 8-bit address	4-ch 12-bit 4-ch 10-bit	LQFP100 BGA100
SAM3U2C	128	36	57	4	3	4	1	No	8 bits, 2 chip selects, 8-bit address	4-ch 12-bit 4-ch 10-bit	LQFP100 BGA100
SAM3U1C	64	20	57	4	3	4	1	No	8 bits, 2 chip selects, 8-bit address	4-ch 12-bit 4-ch 10-bit	LQFP100 BGA100

Note: The SRAM size takes into account the 4 KB RAM buffer of the NAND Flash Controller (NFC) which can be used by the core if not used by the NFC.

## SAM3U Low-Power Modes

	Backup	Wait	Sleep
SUPC, 32 kHz, POR, backup registers, RTC, RTT (VDDBU region)	ON	ON	ON
Regulator	OFF SHDN=0	ON SHDN=1	ON SHDN=1
Core memories peripherals	OFF (not powered)	Powered (but not clocked)	Powered (but not clocked)
Mode entry	WFE+SLEEPDEEPbit = 1	WFE+SLEEPDEEPbit = 0 +LPM bit = 1	WFE or WFI+SLEEPDEEPbit = 0 +LPM bit = 0
Potential wake-up sources	FWUP pin WUPO-15 pins BOD alarm RTC alarm RTT alarm	Fast start-up through WUPO-15 pins RTC alarm RTT alarm USB wake-up	Any Interrupt (with WFI) WUPO-15 pins RTC alarm RTT alarm USB wake-up
Core at wake-up	Reset	Clocked back	Clocked back
PIO state while in low-power mode	Previous state saved	Previous state saved	Previous state saved
PIO state at wake-up	Input with pull-up	Unchanged	Unchanged
Consumption	2.5 $\mu$ A typical	15 $\mu$ A typical	17 $\mu$ A typical at 500 Hz
Wake-up time	300 $\mu$ s typical	<10 $\mu$ s	Depends on clock

## SAM3U Peripherals Maximum Data Rate

High Speed Peripheral	Maximum Bandwidth
USB device	425 Mb/s
External bus interface	>500 Mb/s out of 7 ns SRAM
MMC interface	384 Mb/s
SDIO/SD card	192 Mb/s
SPI	48 Mb/s

For more information, such as datasheets and app notes, visit [www.arnowac.com/arrowedge](http://www.arnowac.com/arrowedge).