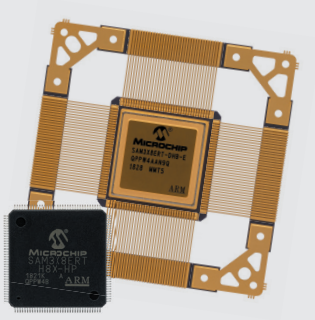
SAM 3X8E Hirel Arm® Microcontroller for Aerospace

Summary

The SAM 3X8E Hirel is a radiation tolerant and extended temperature generic microcontroller (MCU) providing the a good compromise between connectivity interfaces, mixed analog functions like ADC/DAC and processing capabilities. It takes the advantage of the widely deployed and robust M3 Arm® core coupled with high bandwidth communication interfaces as dual CAN and Ethernet 10/100.

The SAM 3X8E Hirel is designed for enhanced radiation performances, extreme temperature and high reliability in aerospace application. With internal Dual Bank SRAM/Flash and external memories controller with ECC, SAMEX8E enables many possibilities to secure data integrity and fault management.



Key Features

Core

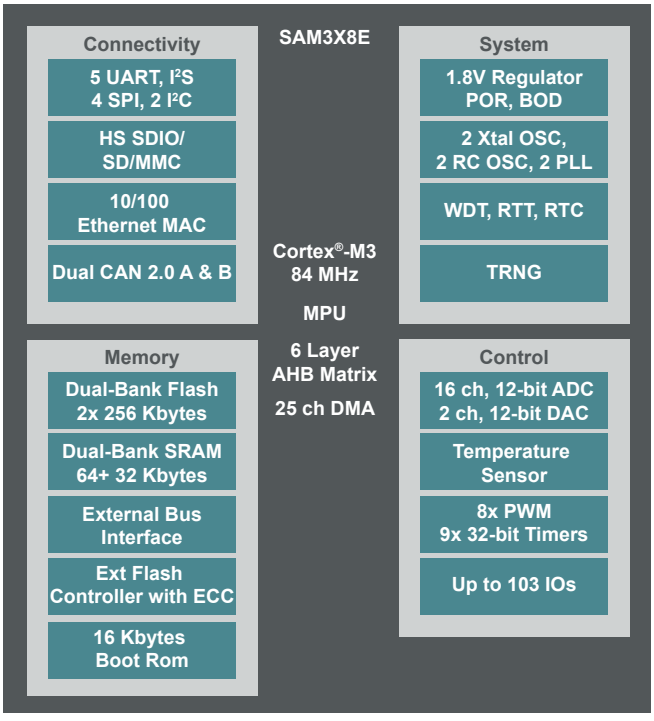
- Arm Cortex®-M3 rev 2.0 running up to 84 MHz, delivering 105 DMips
- Thumb®-2 instruction set, three-stage pipeline
- Hardware divide, single cycle 32-bit multiply
- Enhanced system debug with extensive breakpoint and trace capabilities

Memory

- 512 Kbytes in dual bank of 256 Kbytes embedded Flash
- 64 + 32 Kbytes of SRAM memories in dual bank
- 16 Kbytes ROM with embedded bootloader routines (UART, USB) and IAP routines
- Static Memory Controller (SMC): SRAM, NOR, NAND support Nand Flash controller with 4 Kbyte RAM buffer and ECC

System

- Embedded voltage regulator for single supply operation
- Power-on-Reset (POR), Brown-out Detector (BOD) and Watchdog for safe reset
- Quartz or ceramic resonator oscillators: 3 to 20 MHz main and optional low power 32.768 kHz for RTC or device clock
- High precision 8/12 MHz factory trimmed internal RC oscillator with 4 MHz default frequency for fast device startup
- Slow clock internal RC oscillator as permanent clock for device clock in low-power mode
- 3.0V to 3.6V/84 MHz operating voltage and speed grade
- Temperature: –40°C to +105°C
- One PLL for device clock and one dedicated PLL for USB 2.0 high-speed mini host/device
- Up to 17 peripheral DMA (PDC) channels and 6-channel central DMA plus dedicated DMA for Ethernet MAC
- Low-power modes



MICROCHIP

Peripherals

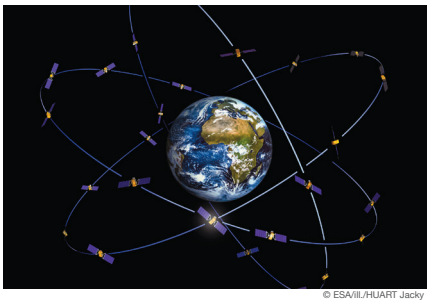
- Up to 4 USARTs (ISO7816, IrDA®, Flow Control, SPI, Manchester and LIN support) and one UART
- 2 TWI (I^2C compatible), up to 4 SPIs, 1 SSC (I^2S), 1 HSMCI (SDIO/SD/MMC) with up to 2 slots
- 9-channel 32-bit Timer Counter (TC) for capture, compare and PWM mode, quadrature decoder logic and 2-bit gray up/down counter for stepper motor
- Up to 8-channel 16-bit PWM (PWMC) with complementary output, fault input, 12-bit dead time generator counter for motor control
- 32-bit low-power Real-Time Timer (RTT) and low-power Real-Time Clock (RTC) with calendar and alarm features
- 16-channel 12-bit 1 msps ADC with differential input mode and programmable gain stage
- 2-channel 12-bit 1 msps DAC
- Ethernet MAC 10/100 (EMAC) with dedicated DMA
- 2 CAN controllers with 8, mailboxes
- True Random Number Generator (TRNG)

Space Environment

- Full wafer IoT traceability
- 144-lead hermetic ceramic package
- Space grade screening and qualification
- Total ionizing dose: up to 30 KRad (Si), QML and ESCC
- Heavy ions and Protons test
- Single Event latch-up LET> 62 MeV.cm2/mg
- SEU full characterization at 105°C for all functional blocks
- Safety application note

Other Aerospace Applications

- Full wafer lot traceability
- 144-lead plastic package
- QML-N/AQEC/AEC-Q100 equivalent
- Unitary burn-in and temperature cycling (opt.)
- Neutrons Latch-up immune (opt.)
- SEU full characterization (opt.)
- Other aerospace application



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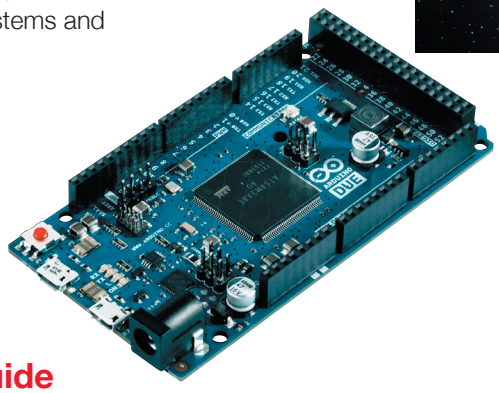
SAM3X8E Developement Tools

- Arduino Due Development Board: www.arduino.cc/
- Atmel Studio and software package: Worldwide support ecosystem of industry-leading suppliers of development tools, real-time operating systems and middleware products



Product Selection Guide

Part Number	Speed (MHz)	Version	Package	Flow
SAM 3X8ERT-DHB-E	84	Radiation Tolerant	144-pin CQFP	Ceramic Engineering Sample
SAM 3X8ERT-DHB-MQ	84	Radiation Tolerant	144-pin CQFP	Ceramic QML-Q Equivalent
SAM 3X8ERT-DHB-SV	84	Radiation Tolerant	144-pin CQFP	Ceramic QML-V Equivalent
SAM 3X8ERT-H8X-HP	84	Radiation Tolerant	144-pin LQFP	Plastic Hirel Qualified
SAM 3X8EET-H8X-HP	84	Extended Temperature	144-pin LQFP	Plastic Extended Temperature

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