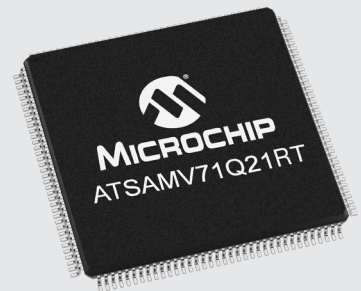


SAMV71Q21RT ARM Microcontroller

Summary

The SAM V71Q21RT is a radiation tolerant microcontroller (MCU) providing the best combination of connectivity interfaces along with highest processing levels. The SAM V71Q21RT is designed for enhanced radiation performances, extreme temperature and high reliability in aerospace application. It take the advantage of the powerful M7 core coupled with high bandwidth communication interfaces as CAN FD and Ethernet TSN.



Key Features

Core

- ARM® Cortex®-M7 running up to 300 MHz, delivering 600 Dmips
- 16 Kbytes of ICache and 16 Kbytes of DCache with Error Code Correction (ECC)
- Single- and double-precision hardware Floating Point Unit (FPU)
- Memory Protection Unit (MPU) with 16 zones
- DSP Instructions, Thumb®-2 Instruction Set
- Embedded Trace Module (ETM) with instruction trace stream, including Trace Port interface Unit (TPIU)

Memory

- 2048 Kbytes embedded Flash with unique identifier and user signature for user-defined data
- 384 Kbytes embedded Multi-port SRAM
- Tightly Coupled Memory (TCM) interface with four configurations (disabled, 2 x 32 Kbytes, 2 x 64 Kbytes, 2 x 128 Kbytes)
- 16 Kbytes ROM with embedded Bootloader routines (UART0, USB) and IAP routines
- 16-bit Static Memory Controller (SMC) with support for SRAM, PSRAM, LCD module, NOR and NAND Flash with on-the-fly scrambling
- 16-bit SDRAM Controller (SDRAMC) interfacing up to 256 MB and with on-the-fly scrambling

System

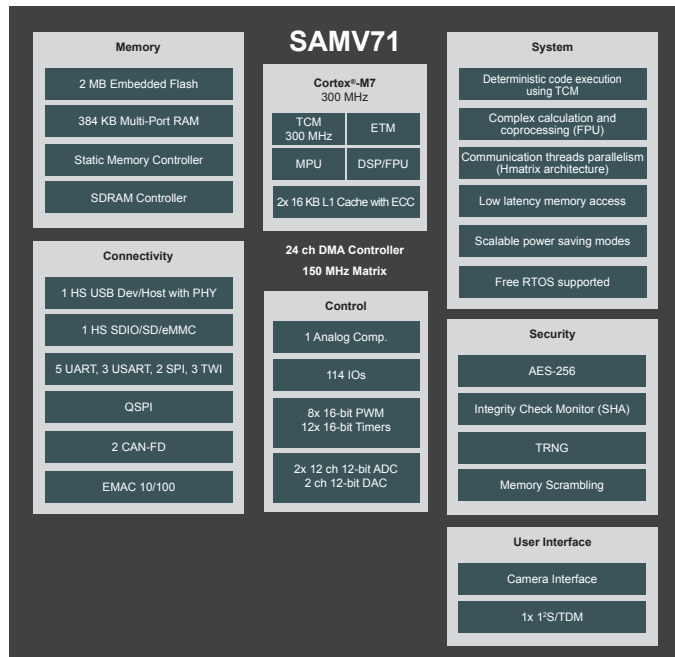
- Embedded voltage regulator for single-supply operation
- Power-on-Reset (POR), Brown-out Detector (BOD) and Dual Watchdog for safe operation
- Quartz or ceramic resonator oscillators: 3 to 20 MHz main oscillator with failure detection, 12 MHz or 16 MHz needed for USB operations. Optional low-power 32.768 kHz for RTC or device clock
- RTC with Gregorian calendar mode, waveform generation in low-power modes
- RTC counter calibration circuitry compensates for 32.768 kHz crystal frequency variations
- 32-bit low-power Real-time Timer (RTT)
- High-precision Main RC oscillator with 12 MHz default frequency for device startup. In-application trimming access for frequency adjustment. 8/12 MHz are factory-trimmed.
- 32.768 kHz crystal oscillator or Slow RC oscillator as source of low-power mode device clock (SLCK)
- One 500 MHz PLL for system clock, one 480 MHz PLL for USB high-speed operations
- Temperature Sensor
- One dual-port 24-channel central DMA Controller (XDMAC)

Space Environment

- Full Wafer lot traceability
- 144-Lead hermetic ceramic package
- Space grade screening and qualification
- Total ionizing dose: dose at least 20 Krad, QML and ESCC
- Heavy ions and Protons test
- Single Event latch-up LET > 62 Mev
- SEU full characterization at SEU full characterization for all functional block
- Estimated SER: 1 event every 1400 days (Core measure on LEO)

Other Aerospace Application

- Full Wafer lot traceability
- 144-Lead plastic package
- Extended temperature range -55°C/125°C
- QML-N/AQEC/AEC-Q100 equivalent
- Unitary burn-in and temperature cycling (opt.)
- Neutrons Latch-up immune
- SEU full characterization



System Performances

- Deterministic code execution using TCM
- Complex calculation and coprocessing (FPU)
- Communication threads parallelism (Hmatrix architecture)
- Low latency memories access
- Scalable power saving modes
- Operating system free RTOS supported



Ongoing Port: RTEMS and Xstratum

SAMV71Q21RT Tools Guide

SAM V71 Xplained Ultra	Atmel-ICE Full Kit
The SAMV71 Xplained Ultra evaluation kit is ideal for evaluating and prototyping with the SAMV71Q21RT.	Atmel-ICE is a powerful development tool for debugging and programming ARM® Cortex®-M based SAM and AVR microcontrollers with on-chip debug capability.
SAMV71 Xplained Ultra	ATSAMV71-XULT
Atmel-ICE Full Kit	ATATMEL-ICE

Product Selection Guide

Part Number	Speed (MHz)	Power Supply	Package	Flow
SAMV71Q21RT-DHB-E	300	3.0–3.6V	144-pin CQFP	Engineering Sample
SAMV71Q21RT-DHB-MQ	300	3.0–3.6V	144-pin CQFP	QML-Q Equivalent
SAMV71Q21RT-DHB-SV	300	3.0–3.6V	144-pin CQFP	QML-V Equivalent
SAMV71Q21RT-H8X	300	3.0–3.6V	144-pin LQFP	High reliability

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