



Atmel AVR32 Series RISC Microcontrollers

Product Overview 2011



MICROCOMPUTERS • SYSTEMS • COMPONENTS • VERTRIEBS GMBH

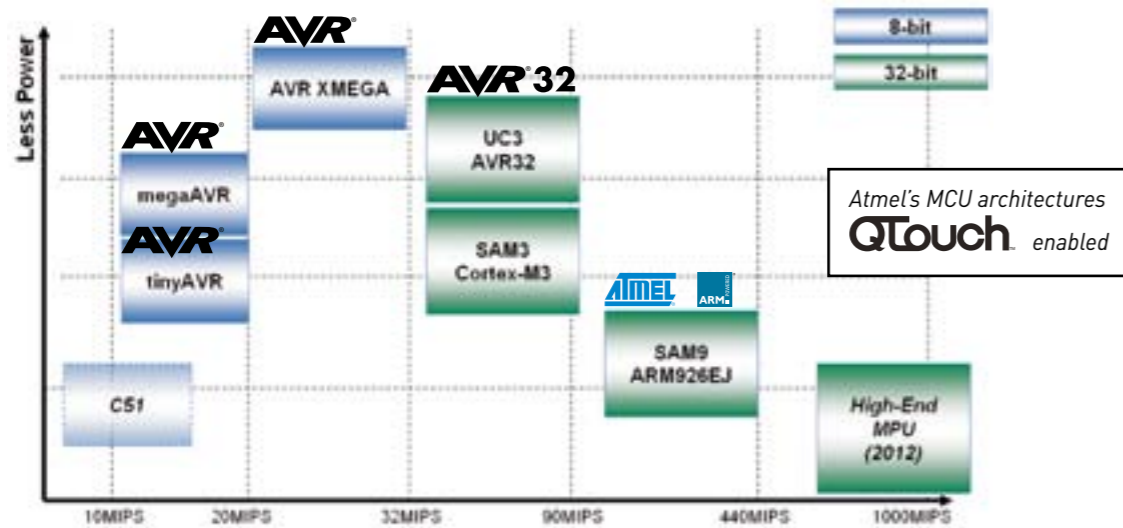
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Atmel's RISC MCU Families

Welcome to the World of Atmel's RISC microcontrollers

Join the big world of Atmel's 8-bit and 32-bit RISC MCU families!
From lowest cost **tinyAVR**, high performance **megaAVR** or new **AVR XMEGA** family, Atmel's 8-bit AVR portfolio covers devices from 16 MIPS up to 32 MIPS with pin counts from 8 up to 100 pins. Flash memories from 1K up to 256K are available.

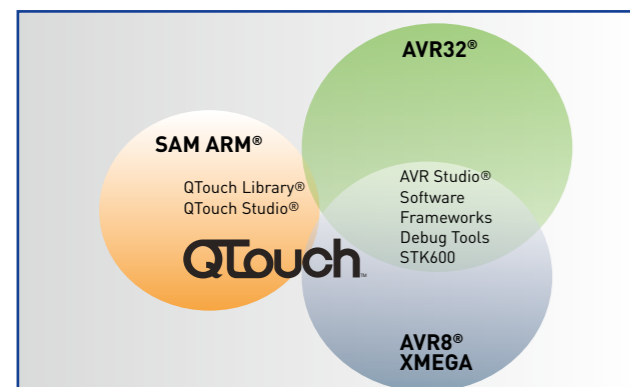


Atmel's new **AVR32 32-bit** core is introduced in **UC3** flash based derivatives. A lot of intelligent and Atmel unique technologies, like Peripheral Event System, SleepWalking™, FlashVault™, make this core the winner in performance and power consumption over all existing 32-bit technologies. Here, you will find flash based products up to 512K with a lot of communication interfaces, true 5V compatibility, FPU and first automotive 125°C specified products.

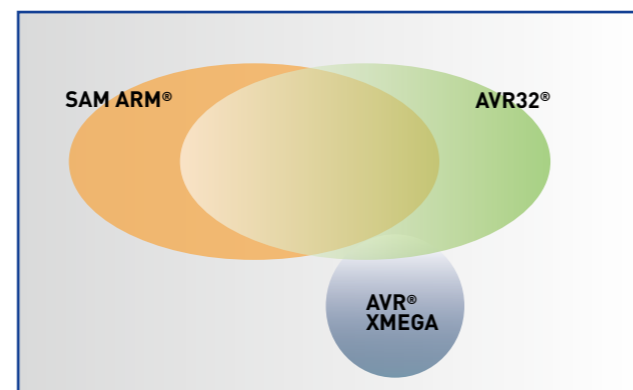
Atmel's **AT91SAM ARM-based families** cover a broad range of products from flash based **SAM7 and SAM9 MCU** products as well as **SAM9 series eMPUs** for Windows CE®, embedded Linux and soon for Android®. A rich set of communication peripherals, lots of smart implementations and different available development tools and operating systems in the market make these products very successful. In 2009 Atmel introduced first **SAM3 series Cortex™-M3** Flash families, that combine high MIPS power with low power consumption and high-speed peripherals. Meanwhile up to 5 complete Cortex™-M3 families fill the gap between best selling SAM7 families and high ended SAM9 applications and will give a pin-to-pin compatible upgrade path from SAM7S to new Cortex™-M3 SAM3S or SAM3N families.

Migration

Both AVR32 and AT91SAM ARM series use many common peripherals, enabling migration between the families much more easily, than jumping between different MCU technologies.



Common tools



Tools and QTouch®

AVR XMEGA, AVR32 and ARM products come with dedicated free of charge software frameworks, which supports drivers, USB, FAT and many example code. All AVR®, AVR32 and new AT91SAM ARM® products are supported by free Atmel's QTouch® Library.

AVR32 Family Overview

Introducing the AVR32

Traditionally chip vendors have increased processing power by making processors run faster. This is a real issue for portable devices because tuning up the clock directly increases power consumption and reduces battery life. The approach taken by Atmel with the AVR32 is to increase the amount of processing the processor can do internally and actually turn the clock frequency down.

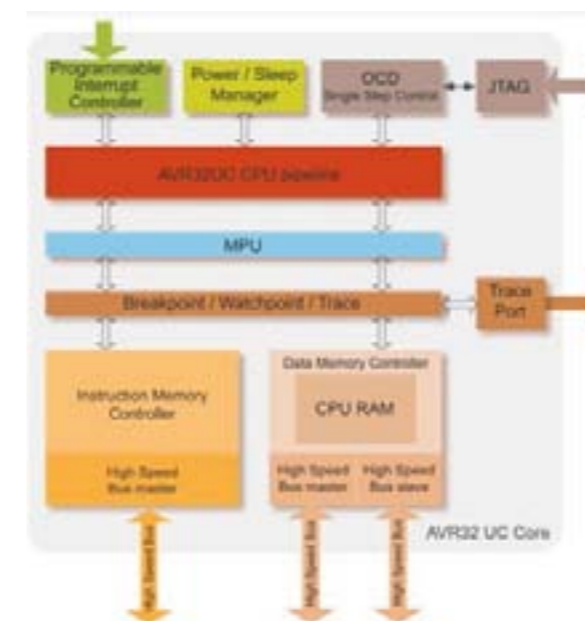


The AVR32 core architecture is optimized for highest data throughput. Most RISC architectures are wasting processor cycles for non-productive operations like load, store or moving data, for branches, for loading data which are not in the cache or waiting until a multi-cycle instruction is done. All those operations do not contribute to the execution of the application.

AVR32 UC3 Core Features

The UC3 Core is a 32-bit RISC Core with DSP instructions and was introduced in 2006. The core delivers up to 1.3 Dhrystone MIPS/MHz, running from on-chip Flash, outperforming the ARM7TDMI™ core by a factor of two for the same code density. Although comparable to ARM® Cortex™-M3 in gate counts, Atmel's AVR32 UC3 core is the only 32-bit RISC core in this size range to include single-cycle DSP instructions and to deliver higher performance together with a better code size.

The AVR32 UC3 core is the first core in the industry to integrate single-cycle read/write SRAM with a direct interface to the CPU that bypasses the system bus to achieve faster execution, cycle determinism and lower power consumption. A high-speed bus (HSB) slave interface access allows DMA controllers or other HSB masters to write to or read data directly from the closely coupled SRAM. Arbitration is performed if the CPU and a high speed slave request access simultaneously. The priority scheme is programmable to suit different applications.



The AVR32 UC3 core has a three-stage pipeline. The instruction fetch stage has been specially designed to optimize instruction fetch from on-chip Flash memory. The pipeline stage prefetches one 32-bit or two 16-bit instructions every clock cycle into an internal instruction buffer. The buffer ensures that the pipeline completely prevents pipeline stalls during sequential program execution. Execution from on-chip Flash can be sustained at the maximum CPU clock frequency without the CPU having to stall waiting for instructions from the Flash. The second stage decodes instructions and generates necessary signals for instruction execution. The third stage is made of three execution sub-units: the ALU, multiplication, and load/store units. The ALU performs arithmetical and logical operations, including hardware division. The multiply unit executes the numerous multiply and multiply-and-accumulate (MAC) operations available from the instruction set architecture (ISA), and the load/store unit performs single cycle memory accesses to SRAM or accesses on the high speed bus (HSB). There are no data hazards in the UC core so the register files can be updated during the same clock cycle as the instruction is executed. This makes assembly programming simpler compared to deeper pipelines as no code scheduling is needed.

Floating Point Unit

In UC3C Atmel introduced a IEEE 754-1985 compliant Floating Point Unit (FPU). Applications like Robotics, high-end Motion Control and Audio Algorithms will benefit from this feature. This single precision unit is compatible with popular libraries and toolchains.

AVR32 Family Overview

DSP Instructions

The AVR32 UC core multiply-accumulate unit executes, in a single cycle, a plethora of multiply and multiply-and-accumulate instructions on standard and fractional numbers, with and without saturation and rounding. Multiply or MAC results can be 32-, 48- or 64-bit wide; 48- and 64-bit results are placed in two registers. DSP instructions also include many add and subtract instructions as well as data formatting instructions such as data shift with saturation and rounding.

Fast Event Handling

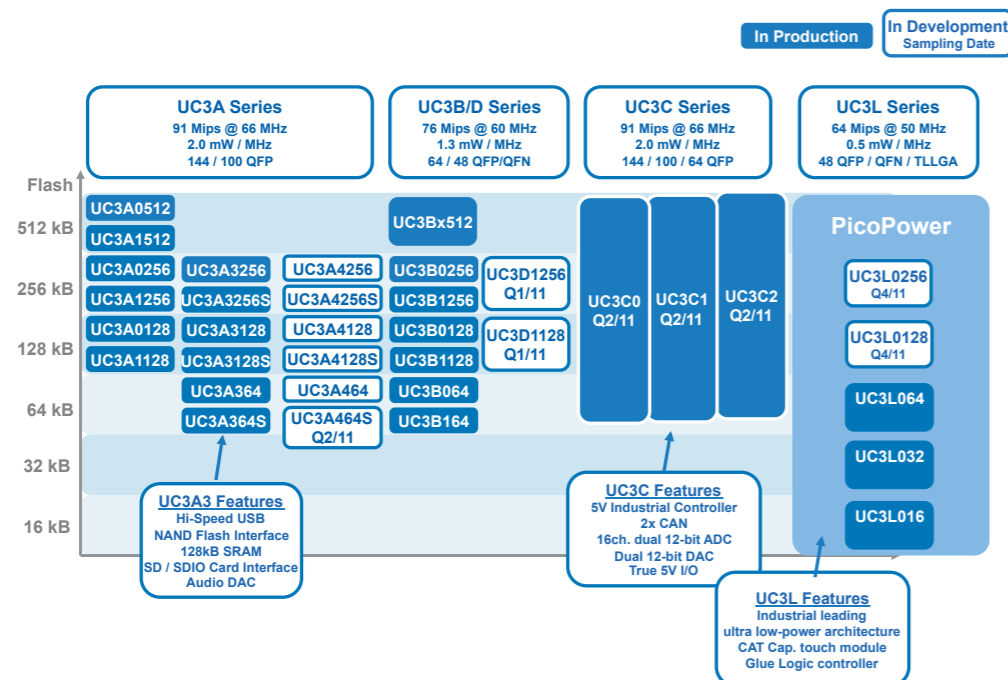
The AVR32 UC core event handling system support events like non-maskable interrupt (NMI), exceptions (illegal opcode, bus error), and four interrupt priority levels. Events have different priority levels. Pending events of a higher priority class can preempt ongoing events of lower priority. Upon event detection, the status register and program counter of the current context, plus six general purpose registers, are automatically stored to stack. The first instruction from the event handler is executed within 12 clock cycles, from an auto vectored handler address. To contain interrupt latency, multicyle instructions can be aborted by pending interrupts so maximum interrupt latency is limited to 16 clock cycles maximum.

Peripheral Event System, Capacitive Touch and FlashVault™

Well known from Atmel's AVR® XMEGA family, the AT32UC3 **Event System** provides a connection between on-chip peripherals to off-load the CPU, saves power consumption and provides a 100% deterministic response to external and internal events. A hardware Capacitive Touch peripheral **CAT** enables real low-power sleep modes by maintaining key wakeup capabilities is introduced as well. **FlashVault™** protects your confidential software libraries by partially locking the on-chip flash. Code will execute as normal, but can not be read, copied or debugged.

UC3 Family Roadmap

The UC3 family is an optimized version of the AVR32 Core for real-time systems and will be equipped with embedded flash. It optimally fits into application where highest performance at low power consumption is needed and also PCB space is less available. The UC3 Core implements a high efficient DSP instruction set and speed up signal processing applications significantly. The UC3 family is planned to be automotive AEC-Q100 as well.



UC3 Family rough Selection

- The UC3 family is named into Series A, B, C, D and L and can be roughly grouped as follows:
- AT32UC3A Series: Ethernet MAC and USB OTG, 144-pin and 100-pin packages, Automotive available
 - AT32UC3A3/A4 Series: High-Speed USB OTG, 144-/100- pin packages
 - AT32UC3B Series: Full-Speed USB OTG, Low-Power, 64-pin and 48-pin packages
 - AT32UC3C Series: Automotive with 2xCAN and USB OTG, 144/100/64-pin packages, 125°C Automotive available
 - AT32UC3L Series: CAT, Ultra-Low-Power Device (0.5mW/MHz), 48-pin packages

Family Overview AT32UC3A



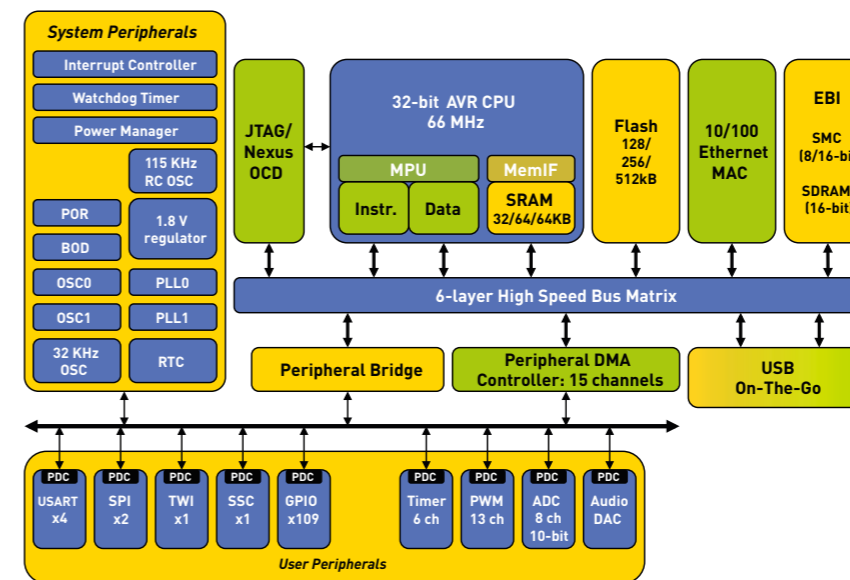
The AVR®32 UC3A Series – based on Atmel® AVR32 UC core – feature a 512K bytes Flash, an embedded 10/100 Ethernet MAC, a full-speed (12 Mbps) USB 2.0 with on-the-go (OTG) capability and an SRAM/SDRAM external bus interface.

The AT32UC3A0512 and AT32UC3A1512, the first devices available, deliver 91 Dhrystone MIPS (DMIPS) at 66 MHz and consume only 40 mA at 3.3V. The power consumption, as low as 1.65 mW/DMIPS, outperforms by a ratio of 1.7 to 4.3 other available architectures offering similar feature sets and lower processing performances. The standby power consumption of UC3A Series is just 40 micro-Amps.

The AVR32 UC core has single cycle DSP instructions that include multipliers and multiply-and-accumulate, and executes 1.3 DMIPS/MHz. The UC3A Series MCU family utilizes many of the same features Atmel developed for its SAM7 and SAM9 families of ARM-based MCUs including the peripheral DMA controller, multi-layer high speed bus architecture, Ethernet MAC, analog to digital converter and serial communication peripherals.

Atmel provides the GNU gcc C compiler, GNU gdb debugger, FreeRTOS.org real-time kernel and lwIP TCP/IP protocol stack for the UC3A Series family, free of charge. Commercial licenses from IAR® (Embedded Workbench), ExpressLogic (ThreadX®) and Micrium (uCOS/II) are also available. Atmel's AVR32 Studio and AVR JTAGICE mkII, provide the AVR32 UC with a multiplatform integrated development environment (IDE) already configured for the GNU tool chain, including support for more advanced debugging such as real-time trace.

System	
CPU	AVR32 UC3 with DSP instructions, 66MHz
MPU	Yes
Debug	JTAG, Nexus 2+ Trace
Memory	
Flash	128K/256K/512K
SRAM	32K/64K/64K
Ext. Bus.	Only on AT32UC3A0xxx in LQFP144 16-bit SDRAM/SRAM/FLASH 24-bit addressbus
Boot	Protectable Flash bootloader
Communication	
USB	1 x USB2.0 FS On-the-Go FS, LS with DMA
Ethernet	1 x MAC10/100 MII/RMII DMA
U(S)ART	4with DMA
SPI	2 with DMA
TWI (I²C)	1 (Master/Mult-master/ Slave) with DMA
SSC	1 with DMA
Timer	
16-bit	3 x with Cap/Com
RTT	1
Watchdog	1
PWM	7 x 16-bit
Analogue	
ADC	8 x 10 bit with DMA
Miscellaneous	
Oscillators	115 KHz RC, 32KHz, Quartz, 2xPLL, Clock out
System	POR, BOD, LDO
Security	Bootloader Protection, Security Bit, Lock regions
Packages	
UC3A0	LQFP/TFBA144
UC3A1	TQFP100
Evaluation Boards	
ATEVK1100 Eval Board contains 32 MB SDRAM, 8MB DataFlash, MMC/SD card socket, USARTs, USB OTG, Ethernet, LCD, AT32UC3A0512 (512KB Flash, 64KB SRAM, EBI), JTAG & NEXUS connector, expansion connectors.	



AT32UC3A Development Tools

The **AT32UC3A** is supported by **ATEVK1100** evaluation kit and **ATEVK1105 Audio reference design** and AT90JTAGICE-mkII and AVRONE! debugger. EVK1100 is pre-installed with a Panel Controller application also available in source code and support Mass-Storage Device Class a Web Server Application and much more. All source code is available through the UC3A Software Framework free of cost, included in free AVR32 Studio as well as

- Ready to use example projects
- Control Panel demonstration software
- Getting Started Application Notes
- Schematics, BOM, Gerber files

ATEVK1100 is equipped with AT32UC3A0512-ALUT (TQFP-144).

Schematics, BOM, Gerber etc. provided by Atmel.



Family Overview AT32UC3A3(S) / AT32UC3A4(S)

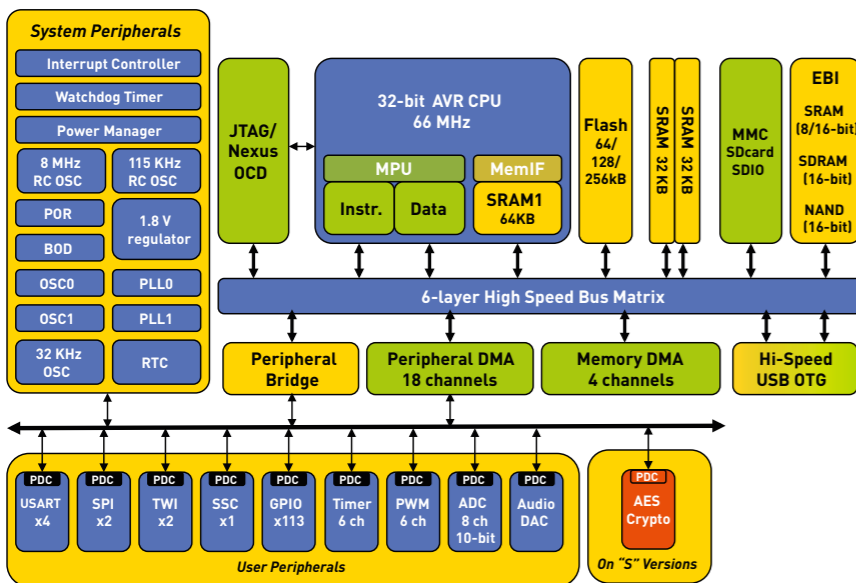
480 Mbps USB OTG
128K SRAM
Crypto Engines

The **AT32UC3A3/A4** operates at 91 DMIPS with a 66 MHz clock. It features up to 64Kbytes of SRAM directly connected to the core with single cycle access at maximum processor speed, as well as an additional 64KByte SRAM for further purposes (**iso 128K SRAM**).

The AT32UC3A3 family is designed for **audio systems** providing **High-Speed USB2.0 OTG** and a **Multimedia Card compliant interface** and optional **encryption** Standard AES. Additional an external bus interface with controllers for SDRAM and static memories expands the embedded Flash and SRAM by cost effective memory options and also do provide more system functionality.

Synchronous Serial Controllers (SSC), many USART's, Master/Slave Serial Peripheral Interfaces (SPI), two three-channel 16-bit Timer Counter (TC), a Two Wire Interface (TWI) and a 10-bit ADC are part of this implementation and are speed up by the peripheral DMA controller to reduce CPU intervention. Up to 111-Pins are controlled by the Parallel I/O Controller and do switch connection for general purpose I/O's or peripherals.

A **Stereo bitstreaming DAC** with FIR filter enable high performance audio playback capabilities. "S" versions includes engines for AES/TDES cryptography and UC3A4(S) is the 100 pin version of UC3A3(S).



AT32UC3A3 Development Tools

The **AT32UC3A3** is supported by **ATEVK1104** evaluation kit and AT90JTAGICE-mkII and AVRONE! debugger. EVK1104 is pre-installed with a DSP Library application also available in source code and support Mass-Storage Device Class and much more. All source code is available through the UC3A3 Software Framework free of cost, included in free AVR32 Studio as well as

- Ready to use example projects
- Control Panel demonstration software
- Getting Started Application Notes
- Schematics, BOM, Gerber files

ATEVK1104 is equipped with AT32UC3A3256-ALUT (TQFP-144).

System	
CPU	AVR32 UC3 with DSP instructions, 66MHz, 7 layer HS Busmatrix
MPU	Yes
Debug	JTAG, Nexus 2+ Trace
Memory	
Flash	64K/256K/512K
SRAM	64K + 2 x 32K
DMA	4 DMA + 20 PDC
Ext. Bus.	8/16-bit SDRAM/SRAM/FLASH/NAND 24-bit addressbus
Boot	Protectable DFU Flash bootloader
Communication	
USB	1 x USB2.0 HS / FS On-the-Go with DMA
Ethernet	-
U(S)ART	4 with DMA
SPI	2 with DMA
TWI (I ² C)	2 (Master/Multi-master/Slave) with DMA
SSC	1 with DMA, 4 ch surround
Timer	
16-bit	6 x with Cap/Com
RTC	1
Watchdog	1
PWM	13 + 12
Analog	
DAC	16-bit Stereo Audio DAC with filter
ADC	8 x 10 bit with DMA
Miscellaneous	
Oscillators	8 MHz/115 KHz RC, Quartz, 2xPLL, Clock out
Crypto	AES
System	POR, BOD, LDO
Security	Bootloader Protection, Security Bit, Lock regions
Packages	
UC3A3	LQFP/TBGA144
UC3A4	LQFP100
Evaluation Boards	

ATEVK1104 Eval Board contains
SDRAM, MMC/SD card socket, USARTs, USB OTG, Audio In/Outs, LCD, AT32UC3A3256 (256KB Flash, 128KB SRAM, EBI), NAND Flash, JTAG & NEXUS connector, expansion connectors.

Schematics, BOM, Gerber etc. provided by Atmel.

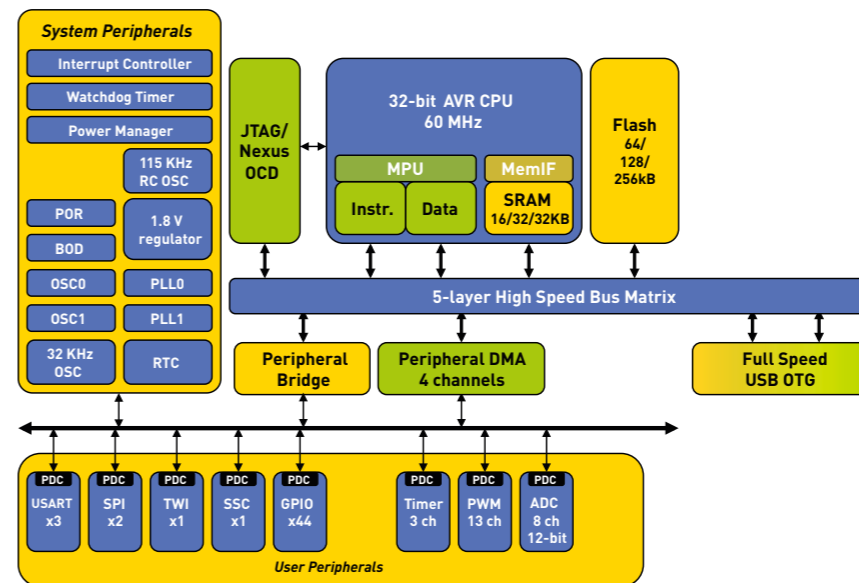
Family Overview AT32UCB

1.3mW/MHz

AVR32 UC3B devices deliver 72 Dhrystone MIPS (DMIPS) at 60 MHz and consume only 23 mA at 3.3V, including true single-cycle MACs and DSP arithmetic. With power consumption, as low as 1.3 mW/DMIPS, UC3B Series MCUs outperform by a ratio of 3 any other available architectures offering similar feature set. The standby power consumption of UC3B Series is just 30 micro-Amps using a single 3.3V power supply and below 15 micro-Amps when the dual power supply (1.8V/3.3V) is used.

The UC3B Series of microcontrollers also feature a 10-bit Analog-to-Digital converter (ADC), one serial programming interface (SPI), synchronous serial interface (SSC), I2C-compatible two-wire interface (TWI), three UARTs, three general purpose timers, seven pulse width modulators and a full set of supervisory functions. UC3B Series MCUs are available with SRAM ranging from 16K bytes to 32K bytes and Flash ranging from 64K bytes to 256K bytes

The On-The-Go (OTG) capability changes a USB device into a USB host, on-the-fly, enabling peer-to-peer communication between two USB devices. The UC3B Series' On-The-Go supports standard USB devices such as USB Flash disk, pointing devices, printers and other PC-centric devices. It also allows direct connections to the increasing number of USB-ready embedded applications.



AT32UC3B Development Tools

The **AT32UC3B** is supported by **ATEVK1101** evaluation kit and AT90JTAGICE-mkII debugger. It is pre-installed with a Panel Controller application also available in source and a PC based Java based Dialog example to provide a quick overview. All source code is available by the UC3B Software Framework free of cost. It may be downloaded via www.atmel.com/products/avr32

- Ready to use example projects
- Control Panel demonstration software
- Getting Started Application Notes
- Schematics, BOM, Gerber files
- Free Atmel tools (AVR32 Studio Integrated Development Env.)

ATEVK1101 is equipped with AT32UC3A0256-A2UT (TQFP64).

System	
CPU	AVR32 UC3 with DSP instructions, 60MHz
MPU	Yes
Debug	JTAG, Nexus 2+ Trace
Memory	
Flash	64K/128K/256K
SRAM	16K/16K/32K
Boot	Protectable Flash bootloader
Communication	
USB	1 x USB2.0 FS On-the-Go FS, LS with DMA (on UC3B1xx only)
U(S)ART	3 (2) with DMA
SPI	1 with DMA
TWI (I ² C)	1 (Master/Multi-master/Slave) with DMA
SSC	1 with DMA (on UC3B1xx only)
Timer	
16-bit	3 x with Cap/Com
RTC	1
Watchdog	1
PWM	7 x 16-bit
Analog	
ADC	8 (6) x 10 bit with DMA
Miscellaneous	
Oscillators	115 KHz RC, 32KHz, Quartz, 2xPLL, Clock out
System	POR, BOD, LDO
Security	Bootloader Protection, Security Bit, Lock regions
Package	
AT32UC3Bx-A2UT	TQFP/QFN64
Evaluation Boards	
ATEVK1101 Eval Board contains AT32UC3B0256 Light-, Temp. sensors, Accelerometer, Connectors for JTAG, Nexus, USART, USB 2.0, TWI, SPI, SD and MMC Card Reader	

Schematics, BOM, Gerber etc. provided by Atmel.

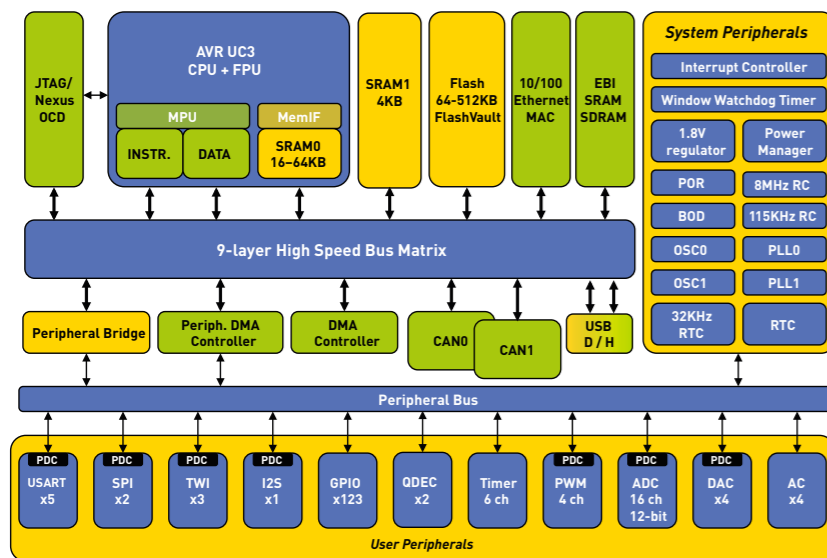
Family Overview AT32UC3C

New!

True 5V I/O
Programmable Event system
125° Automotive Versions
Floating Point Unit

The **AT32UC3C** operates at 91 DMIPS with a 66 MHz clock and is also designed for **true 5V systems**. It features up to 64K bytes of SRAM directly connected to the core and performs single cycle access at maximum processor speed. The AT32UC3C family is designed for rough systems where signal noise may be an issue as well as for application which need **CAN** communication. **Automotive versions with -40 - +125°C** range will be available. Full-Speed **USB2.0 OTG** and the **CAN A/B Channels** are connected to the high-speed Bus Matrix via DMA controller to increase system performance. Two additional **Quadrature Decoder** in hardware will ease system design and also performance. Synchronous Serial Controllers (SSC), many USART's, Master/Slave Serial Peripheral Interface (SPI), two three-channel 16-bit Timer Counter (TC) and a Two Wire Interface (TWI) are part of this implementation and are speed up by the peripheral DMA controller to reduce CPU intervention. A highly integrated analogue block is equipped with a **12-bit high-speed ADC**, a **12-bit DAC** and up to **4 Analogue Comparators**. Up to 109-Pins are controlled by the Parallel I/O Controller and provide connections for general purpose I/O's or peripherals. A **FPU** eases implementation of e.g. Vector Field orientated control algorithms.

A **Peripheral Event System** (like in AVR® XMEGA) enable direct peripheral communication via hardware busses to achieve deterministic and fast response times without any CPU load. The AT32UC3C is available in a 64/100/144-pin TQFP and 64 QFN, 100/144-pin QFN RoHS-compliant package providing all described functionality. All packages in smaller pin count will have limited functionality.





AT32UC3C Development Tools

The **AT32UC3C** is supported by **ATUC3C-EK** evaluation kit and AT90JTAGICE-mkII and AVRONE! debugger. ATUC3C-EK is pre-installed with a Panel Controller application also available in source code and support Mass-Storage Device Class and much more. All source code is available through the UC3C Software Framework free of cost, included in free AVR32 Studio as well as

- Ready to use example projects
- Control Panel demonstration software
- Getting Started Application Notes
- Schematics, BOM, Gerber files

ATUC3C-EK is equipped with AT32UC3C0512 (LQFP144).

System	
CPU	AVR32 UC3 with DSP instructions, 66MHz, 5 layer AHB Floating Point Unit (FPU)
MPU	Yes
Debug	JTAG, Nexus 2+ Trace
Memory	
Flash	64K/128K/256K/512K FlashVault™
SRAM	16K/32K/64K/64K + 4K HS RAM
DMA	Max. 18 PDC
Ext. Bus.	8/16-bit SDRAM/SRAM/FLASH 24-bit addressbus (144 Package)
Boot	Protectable DFU Flash bootloader
Communication	
Ethernet	1 x EMAC10/100
USB	1 x USB2.0 FS / LS On-the-Go with DMA
CAN	Dual CAN2.0 A,B, 16 MBoxes each
UIS/JART	4 with DMA
SPI	2 with DMA
TWI (I²C)	2 (Master/Multi-master/Slave) with DMA
SSC	1 with DMA, I²S, TDM...
Timer	
16-bit	6 x with Cap/Com
RTC	1
Watchdog	1
Quadratur Dec.	2 channel
PWM	4 x 20-bit + (2 x 6)
Analogue	
DAC	2 channel 12-bit (4 outputs)
ADC	8/16 x 12 bit with DMA, 1.5Mbps, Touch interface, TempSensor
Miscellaneous	
Oscillators	8 MHz/115 KHz RC, Quarz, 2xPLL, Clock out
System	POR, BOD, LDO, Comparators
Misc.	Event System, True 5V Output, 2 x Quadrature Decoder
Security	Bootloader Protection, Security Bit, Lock regions
Eventsystem	yes
Package	
AT32UC3C064/0128/0256/0512-xxx	LQFP144 TBGA144
AT32UC3C164/1128/1256/1512-xxx	TQFP100 TBGA100
AT32UC3C264/2128/2256/2512-xxx	TQFP64 QFN64
Evaluation Boards	
	ATUC3C-EK
	ATSTK600 STK600 RC36/38
ATUC3C-EK Eval Board contains SDRAM, USARTs, USB OTG, Audio In/Outs, QVGA LCD, CAN, LIN, QTouch buttons, AT32UC3C0512 (512 KB Flash, 64KB SRAM, EB1), JTAG & NEXUS connector, MC300 etc. expansion connectors.	

Schematics, BOM, Gerber etc. provided by Atmel.

Family Overview AT32UC3L

New!

0.8mW/MHz Ultra Low Power
Up to 36 PWM channels
Programmable Event System
Capacitive Touch Modul

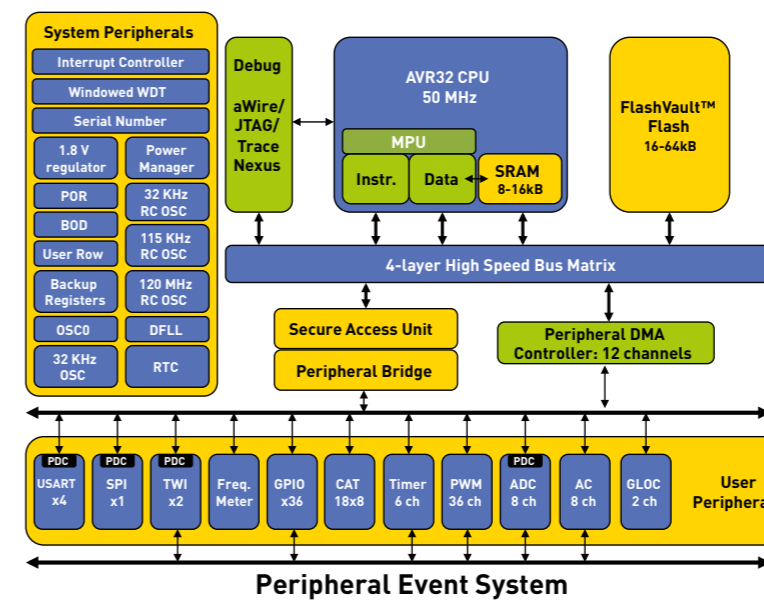
The **AT32UC3L** operates at 69 DMIPS with a 50 MHz clock. It features up to 16K bytes of SRAM directly connected to the core and performs single cycle access at maximum processor speed.

The AT32UC3L family is designed for general purpose low pin-count applications. This family is specially fabricated in a very low leakage process which results in down to **165µA/MHz (active mode) at 3.3V** and ideally fits into battery powered applications. UC3L consumes 600nA with RTC running and only 9nA in Shutdown mode. Synchronous Serial Controllers (SSC), many USART's, Master/Slave Serial Peripheral Interface (SPI), two three-channel 16-bit Timer Counter (TC), a Two Wire Interface (TWI) and a 12/10-bit ADC are part of this implementation and are speed up by the peripheral DMA controller to reduce CPU intervention.

Up to 32-Pins are controlled by the Parallel I/O Controller and provide connections for general purpose I/O's or peripherals. **32 PWM** high frequency 8-bit outputs with spread spectrum mode are available, so you can perform PWM on every I/O pin. **Integrated Hardware QTouch** gives wakeup capabilities and even lower power consumption for a large key matrix. **FlashVault** protects partially your code IP against readout and copy. In UC3L Atmel implemented a **Peripheral Event System**.

The AT32UC3L is designed for battery driven applications where ultra low-power at highest performance is needed.

The AT32UC3L is available in a 44-pin QFP/QFN/TLLGA RoHS-compliant package providing all described functionality. UC3L versions with 128K and 256K Flash are in development.





AT32UC3L Development Tools

The **AT32UC3L** is supported by **ATUC3L-EK** evaluation kit and AT90JTAGICE-mkII and AVRONE! debugger. ATUC3L-EK is pre-installed with a Panel Controller application also available in source code and much more. All source code is available through the UC3L Software Framework free of cost, included in free AVR32 Studio as well as

- Ready to use example projects
- Control Panel demonstration software
- Getting Started Application Notes
- Schematics, BOM, Gerber files

ATUC3L-EK is equipped with AT32UCL064 (QFP48).

System	
CPU	AVR32 UC3 with DSP instructions, 50MHz, 4 layer AHB matrix
MPU	Yes
Debug	1-aWire Debug, Jtag Nexus OCD
Memory	
Flash	16K/32K/64K FlashVault™
SRAM	8K/16K/16K
DMA	12 PDC
Communication	
USB	-
UIS/JART	3 with DMA
SPI	1 with DMA
TWI (I²C)	2 (Master/Multi-master/Slave) with DMA
SSC	-
Timer	
16-bit	6 x with Cap/Com
RTC	1
Watchdog	1
PWM	1 36 (586KHz, 8bit) [+ 2 x 6]
Analogue	
Comparators	8
Frequency Meter	1
ADC	6 x 10/12 bit Touch Screen Mode
Miscellaneous	
Oscillators	115 KHz RC, Quarz, DLL, Clock out
System	POR, BOD, LDO
Security	Security Bit, Lock regions
Glue Logic	2 chan 4 input → 1 out
Event System	Inter Periph. Communication
Packages	
AT32UC3L016/032/064-xx	QFP48 QFN48 TLLGA48
Evaluation Boards	
	ATSTK600
	ATUC3L-EK

Schematics, BOM, Gerber etc. provided by Atmel.

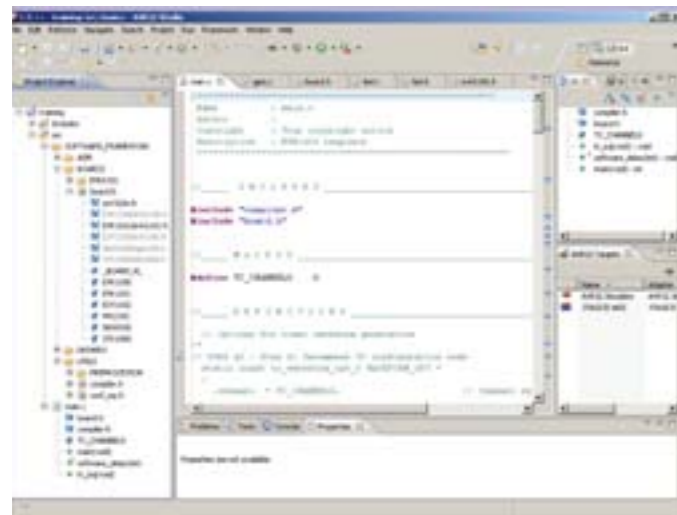
AVR32 UC3 Selection Guide

Product			Package		System Features						Memory				Timer				Communication Interfaces						I/O		Crypto		Analog & Misc.				Tools										
Family	Part	Prod. Status	Package	Pins	MHz 25°C	DMIPs (max clock)	Operat. Supply Voltage/Range	MPU/DMA/FPU	Periph. Eventsystem	Flash Size Byte	SRAM Size Byte	SDIO/SD/MMC	Ext. Bus	Ext-Bus Organisation	NAND	SDRAM	Spec. Feature	Timer	RTC	Total PWM (all timers)	Deadtime Generator	Quadr. Encoder	WDOG	UART	SSC (I ² S)	I ² C	SPI	USB Device	USB OTG	Eth. MAC	CAN	LIN	IO max.	5V tolerant	Crypto	ADC	Temp. Sensor	DAC	Analog Comp.	Touch supp.	Evaluation-Kits (Links)	Reference-Kits (Links)	Evalkits/MSK Bundles (Links)
UC3A0	AT32UC3A0512-ALUx	MP	LQFP	144	66	91	3.3V	Y/15/-	-	512K	64K	-	1	16-bit	-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100	EVK1105	EVK1100, STK600		
	AT32UC3A0512-ALTx	MP	LQFP	144	66	91	3.3V	Y/15/-	-	512K	64K	-	1		-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A0512-CTUx	MP	FBGA	144	66	91	3.3V	Y/15/-	-	512K	64K	-	1		-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A0256-ALUx	MP	LQFP	144	66	91	3.3V	Y/15/-	-	256K	64K	-	1		-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A0256-CTUx	MP	FBGA	144	66	91	3.3V	Y/15/-	-	256K	64K	-	1		-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A0128-ALUx	MP	LQFP	144	66	91	3.3V	Y/15/-	-	128K	32K	-	1		-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
UC3A1	AT32UC3A0128-CTUx	MP	FBGA	144	66	91	3.3V	Y/15/-	-	128K	32K	-	1	-	YES	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100	-	-			
UC3A3	AT32UC3A1512-Aux	MP	LQFP	100	66	91	3.3V	Y/15/-	-	512K	64K	-	1	-	-	-	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100	EVK1105	EVK1100, STK600		
	AT32UC3A1256-Aux	MP	LQFP	100	66	91	3.3V	Y/15/-	-	256K	64K	-	1	-	-	-	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A1128-Aux	MP	LQFP	100	66	91	3.3V	Y/15/-	-	128K	32K	-	1	-	-	-	-	3	1	13	-	-	YES	4	1	1	2	-	FS	-	-	109	-	-	-	2x16-bit	-	CAP(SW)	EVK1100				
	AT32UC3A3256-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3256-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3256S-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3256S-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3128-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3128-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3128S-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A3128S-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A364-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A364-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A364S-ALUx	MP	LQFP	144	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A364S-CTUx	MP	TFBGA	144	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A4256-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A4256S-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	256K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A4128-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A4128S-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	128K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A464-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	AT32UC3A464S-C1Ux	MP	VFBGA	100	66	91	3.3V	Y/12/-	-	64K	128K	YES	1	-	-	-	-	6	1	12	-	-	YES	4	1	2	1	-	HS	-	-	110	-	-	-	2x16-bit	-	CAP(SW)	EVK1104				
	UC3B0	AT32B0512-A2Ux	MP	TQFP	64	60	83	3.3V	Y/7/-	-	512K	96K	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	2x16-bit	-	CAP(SW)			ATEVK1101	EVK1101, STK600
		AT32B0512-Z2Ux	MP	QFN	64	60	83	3.3V	Y/7/-	-	512K	96K	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	16-bit	-	CAP(SW)			ATEVK1101	
		AT32B0256-A2Ux	MP	TQFP	64	60	83	3.3V	Y/7/-	-	256K	32K	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)			ATEVK1101	
AT32B0256-Z2Ux		MP	QFN	64	60	83	3.3V	Y/7/-	-	256K	32K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)	ATEVK1101			
AT32B0128-A2Ux		MP	TQFP	64	60	83	3.3V	Y/7/-	-	128K	32K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)	ATEVK1101			
AT32B0128-Z2Ux		MP	QFN	64	60	83	3.3V	Y/7/-	-	128K	32K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)	ATEVK1101			
AT32B064-A2Ux		MP	TQFP	64	60	83	3.3V	Y/7/-	-	64K	16K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)	ATEVK1101			
AT32B064-Z2Ux		MP	QFN	64	60	83	3.3V	Y/7/-	-	64K	16K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	1	1	1	-	FS	-	-	44	-	-	-	-	-	CAP(SW)	ATEVK1101			
AT32B1512-Z2Ux		MP	QFN	48	60	83	3.3V	Y/7/-	-	512K	96K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	-	1	1	FS	-	-	28	-	-	-	-	-	-	-	-			
AT32B1256-A2Ux		MP	TQFP	48	60	83	3.3V	Y/7/-	-	256K	32K	-	-	-	-	-	-	-	3+1	1	13	-	-	YES	3	-	1	1	FS	-	-	28											

AVR32 Development Tools

AVR32® Studio

AVR32 Studio is a free Integrated Development Environment (IDE) for AVR32 that enables you to write, build, deploy and debug your C/C++ and assembler code. The AVR32 Studio integrates with the AVR32 GNU Tool chain including GCC for building applications for AVR32. AVR32 Studio is build on Eclipse™ and supports Integrated Development Environment (IDE)

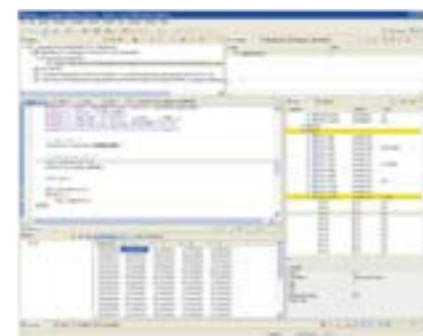
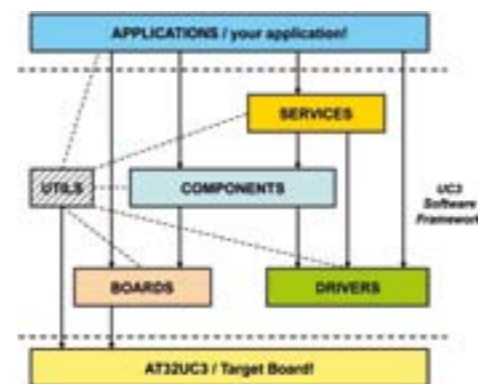
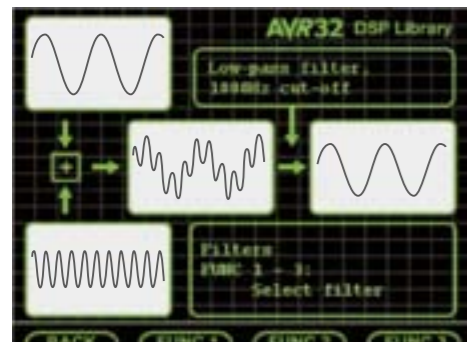


- Source code editor with syntax highlighting
- Supports for writing and debugging Linux® applications
- Debugging views (I/O and system registers, CPU registers and memory)
- Disassemble view
- Target Control
- Online help including tutorials
- Edit and transfer MCU fuse settings
- Supports AT90JTAGICE-MK2 and AVRONE! for JTAG programming and debugging

UC3 Software Framework

The UC3 Software framework provides software drivers and libraries to build any application for AVR32 UC3 devices. It has been designed to help develop and glue together the different components of a software design, and to be easily integrate able into an operating system (OS) as well as to operate in a stand-alone way.

UC3 Software Frameworks are fully integrated into AVR32



Atollic TrueSTUDIO® TrueSTUDIO® The embedded systems development tool for the next decade!

Atollic TrueSTUDIO® is the premier C/C++ development tool for embedded systems development, with its unrivalled feature-set and unprecedented integration. In addition to the state-of-the-art editor, the optimizing C/C++ compiler and multiprocessor-aware debugger, Atollic TrueSTUDIO® also includes features for team collaboration, graphical modeling and design, code review and review meetings, and much more. TrueSTUDIO® supports all AVR32 UC3 MCUs and its software frameworks as well as Atmel's SAM3 and SAM9 ARM® products.

AVR32 Development Tools

IAR Embedded Workbench for AVR32

IAR Embedded Workbench provides a suite of AVR32 development tools for embedded systems. IAR Embedded Workbench for AVR32 offers a continuous workflow, efficient code generation and ease of use.



- Integrated development environment with project management tools and editor
- Highly optimizing AVR32 compiler supporting C and C++
- Configuration files for all AVR32 devices
- AVR32 JTAGICE-mkll debugger support
- Run-time libraries
- Relocating AVR32 assembler
- Linker and librarian tools
- C-SPY debugger with AVR32 simulator and support for RTOS-aware debugging on hardware
- Ready-made code and project examples for Atmel evaluation boards
- User and reference guides, both printed and in PDF format
- Context-sensitive online help

ATJTAGICE-MK2

The ATJTAGICE-MK2 is a very well established powerful development tool for on-chip debugging for all new AVR32 UC3 devices as well as for all standard AVR32. This tool includes now the traditional JTAG interface with the same feature set as the JTAGICE and in addition the new debugWIRE™ interface. The link to your PC is realized either by RS232 or USB1.1 link. The emulator comes with the JTAG/debugWIRE™ box, a user manual, a RS232 cable and a USB cable.



AVRONE KIT

The AVR® ONE! is a powerful development tool for on-chip debugging and programming of all AVR32 and AVR XMEGA devices. In the future AVR ONE! will also support all megaAVR and tinyAVR devices with OCD. Supported debug interfaces are JTAG (IEEE 1149.1), debugWire, PDI and the Nexus (IEEE-ISTO 5001(TM)-2003) auxiliary interface for high-speed trace. Supported programming interfaces are ISP, JTAG and PDI. Interfaces with AVR32 Studio 2 and newer, and AVR Studio 4.15 and newer.

ATSTK600

The Atmel AVR STK600 evaluation board provides a complete programming and development system. All ATtiny, ATmega, Xmega and UC3 family devices are supported through different sockets and adapters available from Atmel.

- Bus connections and physical links for:
- Mini AB-USB connector
- CAN physical layer chip connected to pin header
- LIN physical layer
- RS-232 interface with level converter.



AVR32 Development Tools

ATEVK1100

The EVK1100 is an evaluation kit and development system for the AVR32 AT32UC3A microcontroller. It is equipped with a rich set of peripherals, memory, and makes it easy to try the full potential of the AVR32 devices.



- Supports the AT32UC3A
- Ethernet port
- Sensors: Light, Temperature, Potentiometer
- 4x20 Blue LCD (PWM Adjustable backlight)
- Connectors for JTAG, Nexus, USART, USB, TWI, SPI
- SD and MMC Card Reader

The EVK1100 evaluation board is pre-programmed with a Control Panel application. Its purpose is to automatically log local sensors and actuators data and events and make these available through the various connectivity channels supported by the AVR[®]32. The logs are accessible locally through USART or USB (Mass Storage class), and/or remotely through the Internet (Web server). The Control Panel is locally configurable through USART or USB (Mass Storage class) or remotely configurable through the Internet (Web server).

ATEVK1101

The EVK1101 is an evaluation kit and development system for the AVR32 AT32UC3B microcontroller. It is equipped with a rich set of peripherals, memory, and makes it easy to try the full potential of the AVR32 devices.



- Supports the AT32UC3B
- Connectors for JTAG, Nexus, USART, USB, TWI, SPI
- Light Sensor
- 3-axis Acceleration Sensor

The EVK1101 evaluation board is pre-programmed with demonstration software. Its purpose is to scan onboard sensors and actuators data and events (data acquisition through ADC channels) and make these available to a PC application (known as «AVR32 Control Panel») through a simple USB cable.

ATUC3C-EK

The ATUC3C-EK is an evaluation kit and development system for the AVR32 AT32UC3C microcontroller. It is equipped with a rich set of peripherals, memory, and makes it easy to try the full potential of the AVR32 devices.



- CAN and LIN Standalone Usage**
- Closed loop with 2x CAN Interfaces
 - Basic Communication (Transmission/ Reception)
 - Diagnostic Communication
 - Data Logging
 - Gateway CAN to CAN
 - Closed loop with 2x LIN Interfaces
 - Slave Node, Master Node
 - Gateway CAN and LIN Network

AVR32 Development Tools

The ATUC3C-EK also provides a simple interface for the power stage driver board from Atmel which supports also AVR 8-bit Mega and Tiny derivatives for motor control application.



Motor Control (ATAVRMC300 Power Stage Driver)

- Brushless Sensored Motor Control
- Optical Sensor feedback.
- PWM with fault input entry.
- Current measurement.
- Brushless Sensorless Motor Control
- Analog Comparator usage for Back-EMF measurement.
- PWM with fault input entry.
- Current measurement.
- Field Oriented Control
- Current phase observation

ATEVK1104

The EVK1104 is a reference design and development system for the AVR32 AT32UC3A3256 microcontroller from Atmel Corporation. The kit is equipped with a rich set of memories and peripherals that make the EVK1104 to a perfect evaluation platform.



- Assembled with AT32UC3A3256
- LCD TFT Display
- SDRAM Memory
- Quantum capacitive Touch System
- SD-Card Slot
- USB HS OTG connector

ATEVK1105

The EVK1105 is a reference design and development system for the AVR32 AT32UC3A0512 microcontroller from Atmel Corporation. The kit is equipped with a rich set of memories and peripherals that make the EVK1105 to a perfect audio evaluation platform.



Complete HW and SW Reference Design

- Play MP3 and WMA from a USB Mass Storage device
- Control your iPod
- Prepared for Internet radio
- Prepared for Bluetooth[®]
- Prepared for IEEE 802.15.4 / Zigbee PRO

ATUC3L-EK

The EVKUC3L-EL is an evaluation kit and development system for the Atmel 32-bit AVR AT32UC3L064 microcontroller. The kit is equipped with a rich set of peripherals making it a perfect evaluation platform.



- Supports the AT32UC3L064
- USB / battery powered
- UC3B board controller / bootloader
- Sensors: QWheel + 5 QTouch buttons
- Easy access to all MCU pins

Take a Look - We Are Close to You

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