MEMORANDUM

## Use of AT91SAM7XC512B as Alternate to AT91SAM7X512B

This document describes the differences between the AT91SAM7X(C)512B family with the intent of assisting users in using the AT91SAM7XC512B as an alternate to the AT91SAM7X512B devices.

The AT91SAM7XC512B is functionally and mechanically equivalent to the AT91SAM7X512B with the addition of AES/TDES crypto processors (see block diagram below).

*AES/TDES available on AT91SAM7XC only.

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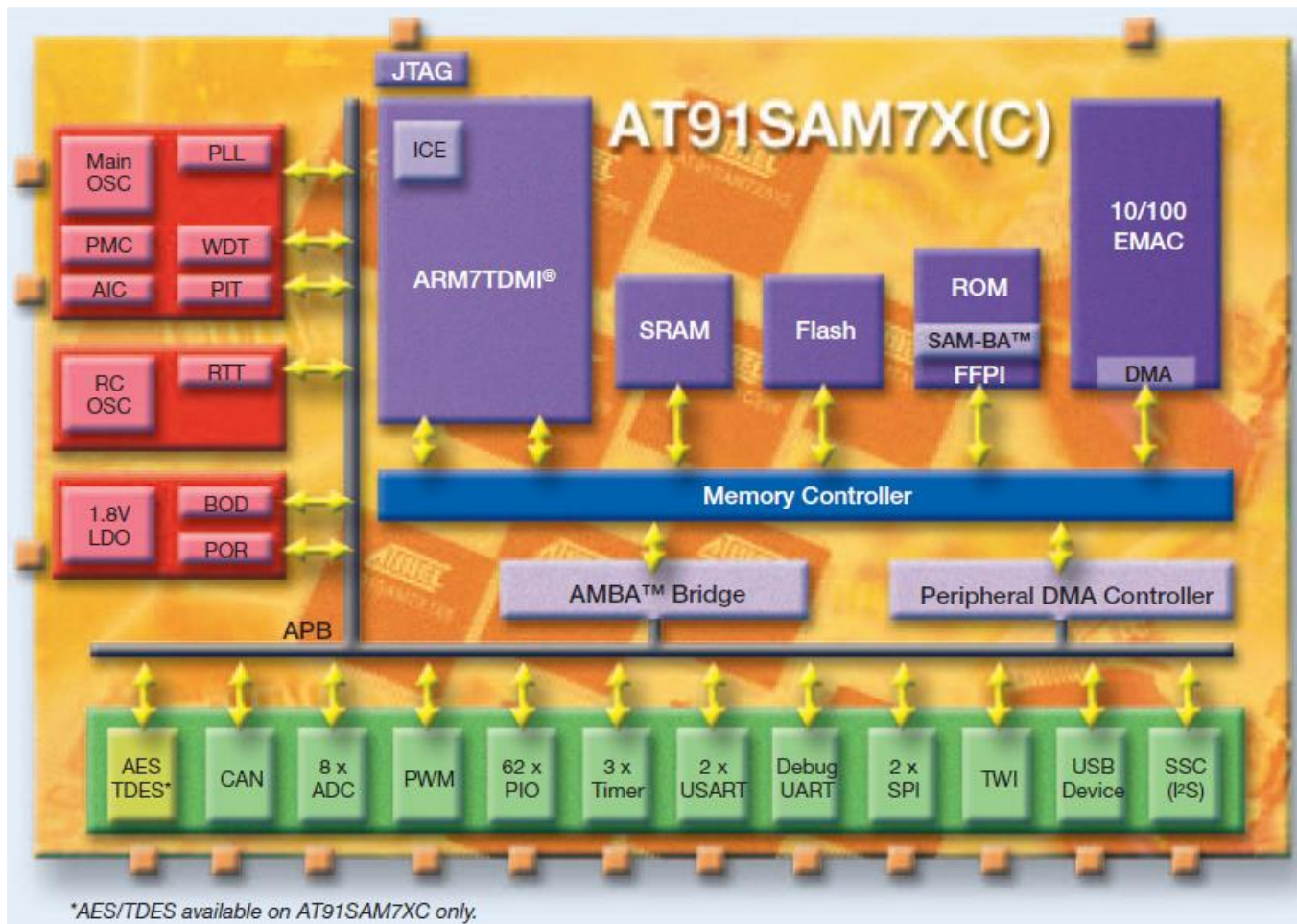
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The AT91SAM7X(C)512B family are both sourced from the same wafer mask set. This design has a mask level option to enable/disable the crypto processor. This enabling is performed with a ROM setting selected during wafer manufacturing. Devices with the crypto processor enabled are identified with 'C' in the part name and a different Chip ID as describe below.

The values of the Chip ID for these options are:

Device	Chip ID (Hex)	Chip ID (Binary)
AT91SAM7X512B	0x275C 0A41	0 010 0111 0101 1100 0000 1010 010 00001
AT91SAM7XC512B	0x271C 0A41	0 010 0111 0001 1100 0000 1010 010 00001

The options are differentiated by the "Architecture Identifier" of the Chip ID value.

Debug Unit Chip ID Register

REGISTER	REGISTER NAME	VALUE	DEFINITION
EXT	Extension Flag	0	No extended Chip ID
NVPTYP	Nonvolatile Program Memory Type	010	Embedded Flash Memory
ARCH	Architecture Identifier	0111 0101 0111 0001 ⬆	AT91SAM7Xxx Series AT91SAM7XCxx Series
SRAMSIZ	Internal SRAM Size	1100	128K bytes
NVPSIZ2	2nd Nonvolatile Memory Size	0000	None
NVPSIZ	Nonvolatile Memory Size	1010	512K bytes
EPROC	Embedded Processor	010	ARM7TDMI
VERSION	Device Version	00001	Version 1

The datasheets for each device are available on Microchip's website and show the features, registers and pin-outs of each device are functionally compatible except for the addition of the AES and TDES peripherals. On the AT91SAM7XC512B devices, these peripherals must be initialized before use, so if the user code does not configure these peripherals, the device will function similarly to the non-crypto version.

The datasheets can be found at the following links:

Atmel_32-bit-ARM7TDMI-Flash-Microcontroller_SAM7X512-256-128_Datasheet.pdf (microchip.com)

Atmel | SMART SAM7XC512 SAM7XC256 SAM7XC128 Datasheet (microchip.com)

To utilize the AT91SAM7XC512B device as a replacement to the non-crypto AT91SAM7X512B device, the following considerations need to be made by the user.

1. **Programming Tools**
   a. The user must select the AT91SAM7XC512B device since the programmer checks the Chip ID and will only proceed if the Chip ID matches this part number selection
2. **Boundary Scan BSD File**
   a. The user must replace the AT91SAM7X512B BSD file with one for the crypto option.
   b. These files can be found on Microchip's website at the following locations:
      i. **https://ww1.microchip.com/downloads/en/DeviceDoc/SAM7X512_LQFP100_BSD.zip**

      ii. **https://ww1.microchip.com/downloads/en/DeviceDoc/SAM7XC512_LQFP100_BSD.zip**
3. **Export Classification**
   a. The export classification will change slightly due to the crypto function as described in the table below.
   b. Both versions are NLR "No License Required"

Export Control Data Summary

Part Number	(HTS-US)	(HTS-EU)	Classification	(CCATS)	(USELS)	(ECL)	(CJ)
AT91SAM7X512B-AU	8542.31.0001	85423190	3A991.a.2	N/A	NLR	N/A	EAR
AT91SAM7XC512B	8542.31.0001	85423190	5A992.c	N/A	NLR	5.2 Note 3	EAR