Atmel Software Package

The Atmel Softpack can be found on GitHub.

Version 2.12 - 2018-02

New drivers/examples

- Add support for SAMA5D2 PTC EK board (examples listed in softpack.md).
- Add ppt/ptc examples for sama5d2-ptc-ek.

Fixes

- Fix IAR memcpy compatibility issue for QSPI memory copy.
- Fix the matrix configuration for SAMA5D3, also update the flash loader for this fix.
- Fix USB VBus detection for AIC1526-1 on SAMA5D3-EK board.
- Fix the TWI transfer mode change bug.
- Fix the bitfields definition for ACT8945A register SYS.

Enhancements

- Update IAR default debugger driver to JLINK.
- Add IAR information center support.
- Rework QSPI applet for flash-loaders.
- Update nandflash examples by checking the validity of the parameters.
- Update some documents for softpack.
- Optimize DMA reset process by disabling interrupts before desabling the channels.

Version 2.11 - 2017-11

New drivers/examples

- Add SDRAM support for SAM9XX5.
- Add example "secumod", "low_power_mode" for SAMA5D27 SOM1 EK board.
- Add more ethernet examples and audio examples for SAME70 XPLAINED and SAMV71 XPLAINED.

Fixes

- Fix misplaced buffer allocation for example "adc".
- Fix PIO schmitt settings for SAM9XX5, SAMA5D3, SAMA5D4 and SAMV71.
- Fix the sector number for QSPI flash m25p05, m25p10.
- Fix qspi_xip example for SAMA5D27 SOM1 EK board.

Enhancements

- Fully configurate the matrix for SAMA5D2 and SAMA5D4.
- Align the memory allocation for target "DDRAM" for SAMV71 examples.

Version 2.10 - 2017-10

Fixes

- Fix build issues with new SPI-NOR driver on IAR.
- Disable SFDP on SST26 memories (non-uniform erase map is not yet supported.)
- Fix SPI-NOR driver to return an error code when no memory is detected.
- Fix build issue with generic targets when the device has QSPI.
- Enable interrupts for all GMAC queues.
- Several fixes to high level ADC driver (adcd) and ADC example.
- Fix NAND issue: 8-bit bus width was broken
- Fix NAND applet displaying invalid warning about ECC requirements

Version 2.9 - 2017-09

New drivers/examples

- Add support for SAMA5D27 SOM1 EK board (examples listed in softpack.md).

- Add more drivers/examples for SAME70 XPLAINED, SAMV71 XPLAINED boards.
- Add support for SST26VF032B, S25FL064P QSPI flash memory.
- Add USBHS support for USB examples of Cortex-M7 MCUs.
- Add support for newer QSPI peripheral.
- Add SFDP for serial flash memories.

Enhancements

- Enhance support for at24 series memories by adjusting the timings.
- Improve the DDR settings for higher performance.
- Re-factor drivers for CAN/MCAN.
- Improve the video stream for USB video devices.
- Add write-protection support for SD/MMC.
- Update the pin definitions for FLEXCOM.
- Rework the drivers for NAND flash memories.
- Upgrade the applets for SAM-BA.
- Update USB drivers/examples for compliance tests in USB20CV.
- Update the flash loaders.
- Update drivers for SPI NOR flash memories.

Fixes

- Fix TDES transfers in DMA mode.
- Fix timings for DDRAM.
- Fix RTC assert conditions.
- Fix the IRQ for Cortex-M7 MCUs while running examples in DDRAM using GCC.
- Fix DMA unstable issue caused by the loop field in the configuration not initialized before be used.
- Fix bootstrap halt issue while running examples in DDRAM using GCC.
- Fix SAM-BA applets support for >4G eMMC.

Version 2.8 - 2017-01

New drivers/examples

- Add preliminary support for SAME70/S70/V70/V71 Cortex-M7 MCUs: support for running from SRAM and flash, few drivers and examples supported (see softpack.md).
- Add generic API for IRQ handling. All drivers updated to use this new API.
- Add generic DMA API: simplification and scatter-gather management. All drivers updated to use this new API.
- Add support for IS42S16100E SDRAM.
- Add common bus API covering SPI and I2C.
- Add high-level TC driver (supports counter, waveform and capture). All examples and drivers updated to use this new API.

Enhancements

- Fixed system time counting. Less interrupts triggered now and micro-second precision.
- Reorganized source files in drivers/ directory.
- Changed build output directory: now ./build//.
- IAR entry point is now configurable from Makefiles.
- Rename CONFIG_SOC_xxx to CONFIG_CHIP for actual device name.
- Move CPU core drivers to a new arch/ directory.
- Group common code from target//board_support to target/common: CLASSD, ISC, ISI, LCD, PDMIC, QSPI, SSC, timer.
- Group common chip code to target/common/chip_common.{c,h}: get_xxx_addr_from_id and get_xxx_id_from_addr functions.
- Reworked l1/l2 cache API.
- Upgrade LWIP to 2.0.0. Add HTTP and iperf server examples.
- Audio device driver now handles DMA setup.
- Reuse allocated DMA channels in all drivers instead of reallocating them on each transfer.
- Change several drivers to return errno values.
- Improve SHA driver and implement message padding
- Renamed several peripherals: PWM to PWM0, CLASSD to CLASSD0, PDMIC to PDMIC0, TWIHSx to TWIx.
- Renamed Flexcom devices: now FLEXUSARTx, FLEXTWIx and FLEXSPIx.
- Merge SAMA5D2 headers: now single header for all SAMA5D2x devices.
- Handle variation between SAMA5D3 devices.

Fixes

- Fix ClassD stereo playing in polling mode.
- Fix AES CFB transfer size.
- Add support for missing group E to PIO3 driver.
- Fix xdmac_enable_channels/xdmac_disable_channels to support more than 8 channels.
- Fix inversion of slow clock frequency between internal RC and external crystal.

Version 2.7 - 2016-12

New drivers/examples

- Added IRQ abstraction (irq/irq.h) with support for interrupt sharing.
- Added CAN bus abstraction, with support for both MCAN (SAMA5D2) and CAN (SAM9XX5, SAMA5D3).
- Added QT1070 driver
- Added adcd driver: handle configuration and DMA transfer on its own
- Added iscd driver: handle configuration and DMA transfer on its own
- Added isid driver: handle configuration and DMA transfer on its own

Enhancements

- Some board initialization was made common between all targets (SPI, TWI, ISI, Ethernet).
- Reworked directory hierarchy for drivers (work in progress, this effort will continue on the next release).
- Compilation of several drivers is now conditional. This improves the build time for building programs that do not use all drivers.
- Improved pmc_configure_peripheral function. GCK and peripheral divisor can now be configured in a single call.
- Added support for KSZ9021 and KSZ9031 PHY.
- Added support for UTC mode and Persian calendar to RTC driver
- Removed direct TC usingthe DDRAM initialization, use new functions from timer driver instead.

- Added utils/errno.h with POSIX error codes. Used in QSPI and AT25 drivers, will be used in more drivers in later releases.
- SAMA5D3-EK support updated to support boards revision D or later. Older revisions are not supported anymore.

Fixes

- Fixed pin definitions for GMAC MII and RMII modes on SAMA5D3
- Reduced default stack size in linker scripts to 1KB
- Fixed twi_eeprom example to have a working slave implementation on all targets.
- Fixed internal RC / external oscillator clock frequency inversion in PMC

Version 2.6.1 - 2016-11

Fixes

- Fixed an issue with timer on SAMA5D2. Timer would run too fast on cold reset.

Version 2.6 - 2016-11

New drivers/examples

- Added shad driver: handle configuration and DMA transfer on its own
- Added tdesd driver: handle configuration and DMA transfer on its own
- Added aesd driver: handle configuration and DMA transfer on its own
- Added AD1934 driver and audio_device support
- Added usb_audio_multi_channels example
- Added usart_rs485 example

Enhancements

- Use a TC instead of the PIT (fix sdmmc reuse of timer to get precise timing)
- Add sleep(), mlseep(), usleep(): use the default system time counter
- Video sensor auto-detection
- Rework DMA examples to behave the same

- DMA driver handles linked list dynamically using a static pool of elements
- Reworked component headers for all supported devices to ease comparison

Fixes

- Fixed an hardware bug in the protect mode of the AIC/SAIC
- Renamed variables named 'protected'
- Fix the spi_slave broken after the development of spi-bus

Version 2.5.1 - 2016-09

Enhancements

- Improved twi_eeprom example to include a slave device emulating an AT24C02.

Fixes

- Fixed build issue for the following examples: usart_irda, usb_mass_storage, xdmac
- Fixed issue with ISC drivers resetting ISC_CFA_CTRL instead of ISC_CC_CTRL in function isc_cc_enabled.
- Fixed timeout handling in USART driver
- Rebuilt getting-started binary included in qspi_xip example
- Disable build of eth_lwip and eth_uip examples for SRAM variant, they do not fit anymore

Version 2.5 - 2016-09

New drivers/examples

- Added support for Microchip SST26 memories
- Added support for DM9161AEP ethernet PHY
- Added driver for wm8731 audio codec

Enhancements

- Improved support for sam9xx5 targets in most drivers and examples
- Added IAR support for sam9xx5-ek targets
- Major SPI driver rework: better support for DMA/ASYNC modes and FIFOs.
- Added a new SPI Bus API
- Major USART driver rework: support for FIFOs, ASYNC mode and full-duplex.
- Added interrupt support for HSMCI and SDMMC drivers
- Major AT24 driver rework: driver now supports all AT24 variants
- SAM-BA applets now use DMA where possible (SDMMC, NAND, QSPI/SPI Flash)

Fixes

- Fixed issue with linker files that caused oversized binaries
- Fixed issue that was causing non-bootable QSPI XIP binaries
- Fixed automatic selection of ECC correctability value based on ONFI tables in SAM-BA NAND applet

Version 2.4 - 2016-08

New drivers/examples

- Added initial support for SAM9 5 series chips (SAM9G15, SAM9G25, SAM9G35, SAM9X25 and SAM9X35.) The chip family is called "sam9xx5" in the softpack and the targets are "sam9g15-ek", "sam9g25-ek", "sam9g35-ek", "sam9x25-ek" and "sam9x35-ek". Supported examples include: getting-started, smc_nandflash_mlc, smc_nandflash_slc and test-pio.
- Added SAM-BA applet support for SAM9 5 series chips (SPI serialflash, NAND).

Changes

- Remove untested QT1070 driver for now. Will be added again later with proper validation.
- TWI driver interface changed to correctly support all modes (polling/interrupt/dma, with/without FIFOs.) Also added scatter-gather to TWI API.
- HSMC driver split into several smaller drivers for each peripheral part (SMC, NFC, PMECC, PMERRLOC)

Enhancements

- Add DMA support to QSPI driver
- Enable caching of QSPI region when running in XIP mode
- Removed all use of board-specific constants from drivers
- Several clean-ups in drivers using TWI
- HSMCI support on SAMA5D3
- NAND Flash examples validated for SAMA5D3
- Added support for N25Q512A

Version 2.3.1 - 2016-07

Fixes

- Fix build of generic targets (used for SAM-BA applets)

Version 2.3 - 2016-07

New drivers/examples

- New EMAC driver for SAMA5D3
- New ETH driver to support both EMAC and GMAC driver
- New DMA driver which provides a generic DMA API to handle XDMAC and DMAC
- New IS31FL3728 LED driver (ATQT6 XPRO SURFACE extension board)

Changes

- Rename AIC driver from iac.c to aic5.c
- Rename usart_xdma to usart_dma
- Port drivers to use the newly generic DMA API

Enhancements

- Improve uvc_driver, usb_uvc_isi, and usb_uvc_isc example to support multiple buffering
- Add ISI support for SAMA5D3
- Add LCD support for SAMA5D3
- Add support for MT47H64M16 DDR2 DDRAM
- Reworked DDRAM driver to prepare for inclusion of older SAM devices and use TC instead of PIT for initialization delays
- Improve L2CC driver and cache maintainance operation
- Add Ultra High Speed mode to SDMMC driver
- Add support for SAMA5D3 for several examples
- Implemented AE/AWB for ISC example
- Fix PWM issues with fault mode
- Update QSPI driver to handle >16MB memories without switching to 4-byte addressing mode

Fixes

- Fixes in PWM driver and example
- Fixes in mutex implementation
- Fix SSC0 pin definition for SAMA5D4
- Fix MMU configuration for QSPI
- Several fixes for audio device driver and examples
- Fixed mutex use in TWID and SPID drivers
- Fix NANDFlash examples for SAMA5D4-EK
- Fix VGA subsample for OV2643

Version 2.2 - 2016-06

New drivers/examples

- New HSMCI driver for SAMA5D4.
- New audio_recorder example.
- Add QSPI XIP IAR flashloader for sama5d2-xplained board.
- Initial support for SAMA5D3 SOC family in the softpack (DMA is not yet supported.)

- Add DMAC driver for SAMA5D3
- Add DMAC example to demonstrte the DMAC features

Changes

- Introduce board_init() function called at startup before main() to initialize the board. It simplifies the examples a lot and allow common initialization for each board.
- Rename the XDMA configuration fields to match the datasheet names.
- Add new section in SRAM and DDRAM to hold only aligned variable on cache line size. It allows to use cache maintance functions over those variables without risking to flush/clean variables located in the same cache line.

Enhancements

- Add support for views view0, view2 and view3 in the XDMA example.
- Improve audio_device driver to support also record feature over PDMIC, and SSC.
- sdmmc_sdcard is fully supported for the SAMA5D4 SOC family.
- Add volume control in audio examples.
- SAM-BA applets can now compile with IAR.
- Improve the libsdmmc.
- Caching is enabled on the QSPI memory region.
- Rework clock API and PCK clocks

Fixes

- Fix a bug in pmc_configure_gck that was causing initialization problems on some boards.
- Fix cache alignement issues all over the examples.
- Fix a bug in USB Device Unhalt function.
- Fix PIO3 bugs.
- Fix ADC example to also work with TC trigger and ADTRG.
- Fix NAND ECC configuration.
- Fix image sensor OV9740 VGA configuration.

Version 2.1 - 2016-05

New drivers/examples

- New QSPI AESB example
- New USB UVC driver and example (for ISI and ISC) available for SAMA5D2 and SAMA5D4
- Function board_cfg_pmic was introduced to handle PMIC configuration

Changes

- Function prototype for board_cfg_console was changed to allow custom baudrate. Passing 0 as baudrate parameter selects default baudrate for the board.
- Introduction of audio device API to use SSC or CLASSD device to play sounds

Enhancements

- Function board_cfg_pmic has been added to remove board specific PMIC configuration from examples main.c
- Add support of AESB address space in QSPI driver
- Decrease build time by modularization of peripherals

Fixes

- Multiple fixes to remove dead assignements, dead increments, and possible null pointer dereferences
- Fix Audio PLL configuration
- Fix configuration errors for ISI image sensors
- Fix buffer alignment errors

Version 2.0 - 2016-04

New drivers/examples

- New SECUMOD driver and example for SAMA5D4

Changes

- Baudrate of console on SAMA5D2 is now 115200 (previously was 57600)
- MMU, I-Cache and D-Cache are now enabled by default in low level init
- DDRAM variant now generates bootable binaries (to be loaded by at91bootstrap)

Enhancements

- new SoC support: SAMA5D4 is now supported by the softpack
- New generic targets (sama5dX-generic) to build SAM-BA applets
- Examples prepared to support more architectures
- Unified interface for TWI driver between SAMA5D2 and SAMA5D4 and removed twi_legacy driver
- Improve independance from example to the direct use of SoC features
- New qspi0 and qspi1 variants to generate XIP-bootable binaries on QSPI
- IAR project files now include all variants which can build/run on a target
- Board support for SDMMC improved

Fixes

- Multiple fixes inside ADC example
- Fixes in XDMAC driver
- Fixes in USB Mass Storage stack
- Multiple fixes in ISI example
- Fixes in PMC driver
- Fixes in SHDWC drivers

Version 1.3 - 2016-04

New drivers/examples

- new TC Capture Waveform example
- new DDR memory tester example
- new SPI slave example
- new driver for SFC (Secure Fuse Controller)

- added definitions for SECUMOD and boot configuration registers
- new IrDA example using FLEXCOM USART
- new Security Module (SECUMOD) driver and example
- new PDMIC driver and example
- new USB examples: composite, hid, audio
- new QSPI XIP example

Changes

- the console helper (misc/console.h) is no longer initialized automatically on first use. The new board-specific function board_cfg_console must be called explicitely before any console use (including printf/traces)
- NAND API changed to be easier to use
- SAM-BA applet API has changed (most parameters are now expressed in pages instead of bytes, to support bigger memories). The new API is not compatible with SAM-BA <= 3.0
- AT25 and QSPIFLASH drivers now share a common device database.
- Functions at25_erase_block and qspiflash_erase_block now take the erase block size as parameter.

Enhancements

- Support for LPDDR2 (MT42L128M16) and LPDDR3 (EDF8164A3MA)
- Several functions added to TC driver
- Several functions added to PWM driver, existing example updated to make use of these new features
- Console helper can now be configured at runtime (serial peripheral, baudrate, pins)
- TWI eeprom example now contains a 'TWI slave' example emulating a AT24 eeprom

Fixes

- several NAND bugfixes
- GCC linker scripts: fixed stacks/heap handling
- fixed cp15_is_dcache_enabled function

- L2CC driver now configures the L2 SRAM before enabling the cache
- several fixes to QSPIFLASH driver related to Quad-mode activation (Micron, Macronix, Spansion).
- fixed QSPI MMU mapping and enabled MMU and caches in QSPI example

Version 1.2 - 2015-12

New drivers/examples

- USB Device examples and stack: CDC Serial, HID Keyboard, HID Mouse, Audio, Mass Storage and some composite examples.
- NAND flash driver and examples: supports MLC/SLC, up to 32-bit ECC.
- SDMMC/eMMC driver and example
- Low Power examples: power_consumption_pll, pmc_clock_switching, low_power_mode
- New storagemedia library to abstract storage devices (only supports RAM disk for now, but will support SDMMC/eMMC and NAND flash in later releases)

Enhancements

- Several new functions in PMC driver, notably 'pmc_set_custom_pck_mck' that allow changing easily the main clock settings.
- IAR project generator now uses defines and include directories from CFLAGS_DEFS and CFLAGS_INC mkefile variables. It also generates projects with CMSIS-DAP debugger selected and proper optimization level.

Fixes

- Fix CP15 driver to invalidate caches before enable. This fixes some lock-ups when caches were previously enabled and still contain stale data.

Version 1.1 - 2015-10

New drivers

- Class-D audio driver + example

Enhancements

- Support for ISO7816 and LIN modes to UART driver + example
- Several functions added to PMC driver, mostly UPLL and AudioPLL support
- ISC/sensors: support for new capture modes / resolutions

Fixes

- Several fixes to ADC driver and example
- Fixed MMU setup (some memory regions where not defined)

Version 1.0 - 2015-09

New drivers

- MCAN driver + example

Changes

- sama5d2-xplained target adapted for final revA board

Enhancements

- Clock initialization changed to be more reliable
- PMC driver now supports setting generated clocks on sama5d2
- Add support for new memory models to at25 driver (MX25L12835F, MX25L4005, N25Q032, S25FL127S)

Version 0.3 -- 2015-08

New drivers

- ACC driver
- ADC driver + example
- AES / TDES / SHA drivers + examples

- L2CC driver
- GMAC driver + examples (using ad-hoc / LWIP / UIP stacks)
- QT1070 driver
- SHDWC driver

Enhancements

- FPU is now enabled in GCC startup (was already enabled for IAR)
- ISC example now demonstrates Auto White Balance / Auto Exposure
- SPID/TWID/USARTD drivers now switch the Flexcom mode when appropriate
- MMU is now has a non-cacheable DDR region (used by LCD and GMAC examples)

Fixes

- RAM timings / configuration adjusted for sama5d2-xplained target
- Component headers in target/sama5d2/components updated to reflect latest datasheet updates
- PIO and TRNG callbacks now have a configurable user-defined argument