ASF: Release ASF-3.11

The Atmel® Software Framework (ASF, www.atmel.com/asf) is a compilation of embedded software for Atmel flash MCUs: megaAVR®, AVR XMEGA®, AVR UC3 and SAM devices. It has been designed to help develop and glue together the different components of a software design. It can easily integrate into an operating system (OS) or run as a stand-alone product.

The ASF is included in Atmel Studio® 6 (www.atmel.com/atmelstudio). A separate package is available for megaAVR, AVR XMEGA, AVR UC3 and SAM users for IAR™, Atmel AVR Studio 4 and AVR32 Studio on www.atmel.com/asf. Atmel Studio users do not need this package as the ASF is integrated in Atmel Studio.

This document describes the supported devices, supported tools, and changes since last ASF release (enhancements, bugs fixes and known issues).
Installation Instructions

Device Support

This release supports the following devices:

- **AVR UC3**
  - AVR UC3 A0/A1 (revision H and later)
  - AVR UC3 A3/A4 (revision E and later)
  - AVR UC3 A3xS/A4xS (revision E and later)
  - AVR UC3 B (revision F and later)
  - AVR UC3 C (revision D and later)
  - AVR UC3 D
  - AVR UC3 L
- **AVR XMEGA**
  - AVR XMEGA A1
  - AVR XMEGA A1U
  - AVR XMEGA A3
  - AVR XMEGA A3B
  - AVR XMEGA A3U
  - AVR XMEGA A3BU
  - AVR XMEGA A4U
  - AVR XMEGA A4
  - AVR XMEGA B
  - AVR XMEGA C
  - AVR XMEGA D3
  - AVR XMEGA D4
  - AVR XMEGA E
- **megaAVR**
  - ATmega1284P
  - ATmega2560
  - ATmega48/88/168/328
  - ATmega16/32
  - ATmega169/329
  - ATmega64/128
  - ATmega324/644/1284
  - ATmegaxRF
- **SAM**
  - SAM3N
  - SAM3S
  - SAM3U
  - SAM3X
  - SAM4E
  - SAM4L
  - SAM4L8
  - SAM4S
  - SAM D20
  - SAM4N
Supported Tools

- Atmel Studio 6.1SP1 using GCC compiler - Visit www.atmel.com/atmelstudio -:
  - Atmel ARM GNU Toolchain - 4.7.3.1029
  - Atmel AVR (32 bit) GNU Toolchain - 3.4.2.1002
  - Atmel AVR (8 bit) GNU Toolchain - 3.4.2.1002
- Atmel AVR32 Studio version 2.6
- Atmel AVR Studio 4.18 SP3
- IAR EWAVR32 version 3.30
- IAR EWAVR version 6.12
- IAR EWARM version 6.50
- WinAVR version 20100110

Note:

- Atmel Studio 6.0 version is not supported since ASF3.6 extension.
- SAM4E support for IAR requires the add-on installer EWARM_6.40_SAM4E_addon_vx.x.zip
- XMEGA E support for Atmel Studio 6 requires the Atmel Studio 6 Part Pack for ATxmega32E5 installed and an updated AVR GCC toolchain (3.4.0.84 or higher). Visit www.atmel.com/atmelstudio.
- SAM4N support for IAR requires the add-on installer IAR-EWARM-SAM4N-ADDON-V1.0.zip

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Documentation

- Atmel Studio 6 installer (includes ASF): www.atmel.com/atmelstudio
- Atmel Gallery: http://gallery.atmel.com/

Community Information

These forums can be used to have an open discussion about usage, development, bugs, fixes, improvements, etc.

- ASF forum on AT91® (SAM users) at http://www.at91.com.
New and Noteworthy

Release ASF3.11 (July 2013)

- SAM4N new device and SAM4N Xplained pro kit support in ASF.
- Performance Analyzer supports the kits supported in Wireless Library 1.0 Release.
- SAM4L: Add USB device PHDC example, add TWIM PDC transfer example.

Release ASF3.10 (July 2013)

- SAM4L8 new device and SAM4L/SAM4L8 Xplained pro kit support in ASF, with all existing drivers, services, third parties from SAM4L4.
- Feature Enhancement in Performance Analyzer v2.1 firmware to support Wireless Composer-2.0
- SAM D20: maintenance and improvements to API

Previous release ASF3.9 (June 2013)

- Added SAM D20 Drivers (AC, ADC, BOD, DAC, Events, External Interrupts, NVM, PAC, PORT, RTC, SERCOM USART/SPI/I2C, TC and WDT).
- Added SAM D20 Services (GXU, mono, Delay, Dataflash, FreeRTOS)
- Added SAM D20 applications (DAC sound player, SPI/I2C bootloader, Led toggle and OSC8 calibration, FreeRTOS demo)

Previous release ASF3.8 (April 2013)

- mega128RFA1 new drivers: MAC symbol counter and TWI.
- SAM4E: USB stack, lwIP demo, new drivers (AFE, DAC, MATRIX, ACC, CHIPID, USART, PIO, AFEC), QTouch library, low power and getting started demo, FreeRTOS demo.

Previous release ASF3.7 (Feb 2013)

- SAM4L new drivers: AESA, IISC, ACICF, PEVC, USB device composite, USB host, picoUART, ABDACB, FReOM, ADCIFE, GLOC, FatFS,
- SAM4E new drivers: FPU, SPI, DMA, USB HID, TC, AT25 flash, WDT, EBI SMC, RTT, CAN, RTC, GPBR, SUPC, PDC, UART, GMAC, PWM
- megaRF, megaRF2 new drivers: UART, STUDIO, clock, interrupt, TWI
- XMEGA E new drivers: XCL, EDMA, QDEC. New ADC demo for XMEGA-E5 Xplained board
- SAM4S and SAM4L Xplained Pro demo: low power and sleep modes
- Added supports Performance analyzer application for Xplained Pro Boards compatible with Wireless Analyzer in Atmel Studio. Supports MAC demo applications for Beacon, No Beacon and No Beacon Sleep Application. Supports RF4CE demo applications for Button controller, Single button controller and Terminal target. Platforms supported are: Atmega256RF2 Xplained Pro, ZigBit ATmegaRF2, ZigBit ATRF233 XMEGA, ZigBit ATRF212B XMEGA, USB stick with ZigBit ATRF233 XMEGA, USB stick with ZigBit ATRF212B XMEGA, SAM4L Xplained Pro with ZigBit ATmegaRF2, SAM4L Xplained Pro with ZigBit ATRF233 XMEGA, SAM4L Xplained Pro with ZigBit ATRF212B XMEGA, XMEGA-A3BU Xplained, RZ600

Previous release ASF3.6 (Internal, Jan 2013)

- Added SAM4E support: WDT, TC, EEFC, PMC, clock, ioport, CMSIS, stdio, PIO, Flash, interrupt
- Added XMEGA C3 Xplained demos: LED, switches, QTouch, OLED, USB, SD card
- Added megaRF drivers: interrupt, adc
• Added SAM4L drivers: GPIO for event and interrupt, Watchdog, USB Host HID class, HMATRIX, CRCCU, CMSIS DSP lib examples, FreeRTOS demo, Getting Started, IISC, improved TWIM with sleep manager support.
• Added SAM4S-EK2 demo (same as SAM4S-EK)
• Added examples for XMEGA-E5 Xplained board: XCL, USART
• USB Device PHDC class is now compliant with the USB command verified tool 2.0 v1.4.9.2.

Previous release ASF3.5 (Nov 2012)

• Added XMEGA E (STK600) support, added new XCL driver demo
• Added XMEGA-C3 Xplained board support
• Added SAM4SD32 and SAM4S-EK2 support
• SD stack for SAM, UC3, XMEGA ready, with SPI and MMC interface. With file system example.
• SAM4L: added AST, EIC, USB device HID, BPM, PDCA, TC, DACC, Flashcaldw, LCDCA, C42364
• Updated CMSIS for SAM from v2.1 to 3.0
• FatFs is now available in Atmel Studio ASF wizard
• Added USB Host vendor class
• megaRF: added GPIO and clock driver
• Added new FreeRTOS specific driver for USART, SPI and TWI for SAM4S
New features added

- **Issue #ASFP-3023**: SAM4L - Add an example to show how to use PDCA to transfer data via TWIM.
  
  Folder added:
  `sam/drivers/twim/pdca_example/`
  
  Files modified:
  `sam/drivers/twim/twim.h`
  `sam/drivers/twim/twim.c`

- **Issue #ASFP-3760**: SAM3U - Add HS support for USB CDC Device examples.
  
  Files modified:
  `common/services/usb/class/cdc/device/example/conf_usb.h`
  `common/services/usb/class/cdc/device/example2/conf_usb.h`
  `common/services/usb/class/cdc/device/udi_cdc_conf.h`

- **Issue #ASFP-3770**: Add support for SAM4N.
  Add SAM4N devices and SAM4N-XPRO support in ASF. Including drivers, services, third parties, applications and unit test.
  
  Modified files:
  `sam/drivers/dacc/dacc.c`
  `sam/drivers/dacc/dacc.h`
  `sam/utils/header_files/io.h`
  `sam/drivers/pmc/pmc.c`
  `sam/drivers/pmc/pmc.h`
  `sam/drivers/uart/uart.c`
  `sam/drivers/pwm/pwm.c`
  `sam/drivers/pwm/unit_tests/unit_tests.c`
  `sam/drivers/dacc/dacc.c`
  `sam/drivers/dacc/dacc.h`
  `sam/drivers/dacc/sinewave_example/sinewave_example.c`
  `sam/drivers/adc/adc_sam4n.h`
  `sam/drivers/adc/adc_sam4n.c`
  `sam/drivers/spi/spi.c`
  `sam/drivers/spi/spi.h`
  `sam/drivers/spi/unit_tests/unit_tests.c`
  `sam/drivers/spi/pdc_example/spi_pdc_example.c`
  `sam/drivers/usart/usart_iso7816_example/usart_iso7816_example.c`
  `sam/drivers/supc/unit_tests/unit_tests.c`
  `sam/drivers/rstc/unit_tests/unit_tests.c`
  `sam/drivers/wdt/unit_tests/unit_tests.c`
  `sam/drivers/wdt/unit_tests/unit_tests.c`
  `sam/drivers/chipid/chipid_example/chipid_example.c`
  `sam/drivers/efc/efc.c`
  `sam/drivers/efc/efc.h`
  `sam/services/flash_efc/unit_tests/unit_tests.c`
  `sam/services/flash_efc/flash_efc.c`
  `sam/services/flash_efc/unit_tests/flash_efc.h`
  `sam/services/flash_efc/flash_program_example/flash_program_example.c`
  `sam/drivers/gpbr/unit_tests/unit_tests.c`
  `sam/drivers/matrix/matrix.c`
sam/drivers/matrix/example/matrix_example.c
sam/drivers/rtc/rtc.c
sam/drivers/rtc/rtc.h
sam/drivers/rtt/example/rtt_example.c
sam/drivers/rtt/rtt.c
sam/drivers/rtt/rtt.h
sam/drivers/twi/twi.c
sam/drivers/twi/twi_eeprom_example/twi_eeprom_example.c
sam/drivers/twi/twi_slave_example/twi_slave_example.c
sam/utils/cmsis/sam4n/include/component/component_matrix.h
sam/utils/cmsis/sam4n/source/templates/system_sam4n.c
sam/utils/cmsis/sam4n/source/templates/gcc/startup_sam4n.c
sam/utils/cmsis/sam4n/source/templates/iar/startup_sam4n.c
sam/utils/cmsis/sam4n/source/templates/system_sam4n.c
sam/utils/cmsis/sam4n/source/templates/system_sam4n.h
common/components/display/ssd1306/example/ssd1306_example.c
common/components/display/ssd1306/ssd1306.h
common/components/memory/eeprom/at30tse75x/at30tse75x.c
common/components/memory/eeprom/at30tse75x/at30tse75x.h
common/components/memory/sd_mmc/example1/example.c
common/components/memory/sd_mmc/example2/example.c
common/services/clock/genclk.h
common/services/clock/osc.h
common/services/clock/pll.h
common/services/clock/sysclk.h
common/services/iport/sam/iport_pio.h
common/services/serial/sam_uart/uart_serial.h
common/services/spi/usart_spi_master_example/usart_spi_master_example.c
common/services/twi/sam_twi/twi_slave.h
common/services/twi/twi_master.h
common/services/twi/twi_slave.h
common/services/iport/example1/iport_example1.c
common/services/iport/example2/iport_example2.c
common/services/iport/example3/iport_example3.c
common/services/gpio/gpio.h
common/services/clock/sam4n/pll.h
thirdparty/fatfs/unit_tests/unit_tests.c
thirdparty/fatfs/example/fatfs_access_example.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
thirdparty/fatfs/unit_tests/memories_initialization_sam.c
Added folders:
sam/drivers/pdc/pdc_uart_example/sam4n16c_sam4n_xplained_pro
sam/utils/cmsis/sam4n
sam/utils/linker_scripts/sam4n
sam/drivers/tc/tc_capture_waveform_example/sam4n16c_sam4n_xplained_pro
sam/drivers/pwm/unit_tests/sam4n16c_sam4n_xplained_pro
sam/drivers/dacc/sinewave_example/sam4n16c_sam4n_xplained_pro
sam/drivers/adc/adc_sam4n_example1
sam/drivers/adc/adc_sam4n_example2
sam/drivers/adc/unit_tests
sam/drivers/spi/example/sam4n16c_sam4n_xplained_pro/
• Issue #ASFP-3828: SAM4L - Add USB device PHDC example for SAM4L-EK.
  Folder added:
  common\services\usb\class\phdc\device\example\sam4lc4c_sam4l_ek\n
• Issue #ASFP-3860: Performance Analyzer Should support Kits supported in Wireless Library 1.0 Release.
  Support for the following Wireless Kits added into ASF and Performance Analyzer v2.2 Projects for the kits:
  • REB231ED-EK
  • REB232ED-EK
• REB231FE2-EK
• REB233SMAD-EK
• RF4CE-EK
• AT256RFR2-EK
• REB212BSMA-EK

• **Issue #ASFP-3928:** SAM - Adjust USB device keyboard behavior after remote wakeup.
  Files modified:
  - common\services\usb\class\composite\device\example3\sam4lc4c_sam4l_ek\ui.c
  - common\services\usb\class\composite\device\example3\sam4lc4c_sam4l_xplained_pro\ui.c
  - common\services\usb\class\composite\device\example3\sam4lc8c_sam4l8_xplained_pro\ui.c
  - common\services\usb\class\hid\device\kbd\example\sam3u4e_sam3u_ek\ui.c
  - common\services\usb\class\hid\device\kbd\example\sam4e16e_sam4e_ek\ui.c
  - common\services\usb\class\hid\device\kbd\example\sam4lc4c_sam4l_ek\ui.c
  - common\services\usb\class\hid\device\kbd\example\sam4lc4c_sam4l_xplained_pro\ui.c
  - common\services\usb\class\hid\device\kbd\example\sam4lc8c_sam4l8_xplained_pro\ui.c

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Notable bugs fixed

• **Issue #ASFP-3028:** AST Driver: interrupt handler are multiplexed then demuxed causing unnecessary latency.
  File modified:
  - sam\drivers\ast\ast.c

• **Issue #ASFP-3038:** Updated device head files for Xmega D4 break the clock driver.
  Fixed the XMEGA common clock service for newer revisions of XMEGA D silicon, which has a new control bit for an alternative 32MHz internal RC oscillator calibration reference source.
  Files changed:
  - common\services\clock\xmega\osc.h

• **Issue #ASFP-3369:** SAM3S4C ADC project - cannot work when Enable ADC power save mode.
  Files Modified:
  - sam\drivers\adc\adc_example\adc_example.c

• **Issue #ASFP-3497:** SAM driver for MMA7341L expects hardcoded pin definitions via <board.h>.
  Files Modified:
  - sam\boards\arduino_due_x\arduino_due_x.h
  - sam\boards\sam3n_ek\sam3n_ek.h
  - sam\boards\sam3s_ek\sam3s_ek.h
  - sam\boards\sam3s_ek2\sam3s_ek2.h
  - sam\boards\sam3u_ek\init.c
  - sam\boards\sam3u_ek\sam3u_ek.h
  - sam\boards\sam3x_ek\sam3x_ek.h
  - sam\boards\sam4s_ek\sam4s_ek.h
  - sam\boards\sam4s_ek2\sam4s_ek2.h
  - sam\boards\sam4s_wpir_rd\sam4s_wpir_rd.h
  - sam\boards\sam4s_xplained\sam4s_xplained.h
  - sam\components\sensor\mma7341l\example\sam3u4e_sam3u_ek\conf_mma7341l.h
  - sam\components\sensor\mma7341l\module_config\conf_mma7341l.h
  - sam\components\sensor\mma7341l\unit_tests\sam3u4e_sam3u_ek\conf_mma7341l.h

Files Deleted:
• **Issue #ASFP-3589**: SAM3XA - Flash wait state mismatch with latest datasheet.
  
  Update flash wait state according to latest datasheet.

  Modified files:
  - sam/utils/sam3x/include/sam3a4c.h
  - sam/utils/sam3x/include/sam3a8c.h
  - sam/utils/sam3x/include/sam3x4c.h
  - sam/utils/sam3x/include/sam3x4e.h
  - sam/utils/sam3x/include/sam3x8c.h
  - sam/utils/sam3x/include/sam3x8e.h
  - sam/utils/sam3x/include/sam3x8h.h
  - sam/utils/sam3x/source/templates/system_sam3x.c

• **Issue #ASFP-3714**: The write-only SUPC_CR register is read before being written.
  
  File modified:
  - sam/drivers/pmc/pmc.c

• **Issue #ASFP-3826**: SAM4L - Remote wakeup not work in USB examples on SAM4L-EK.

  Fix remote wakeup for SAM4L-EK USB examples. Files modified:
  - common/services/usb/class/composite/device/example1/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/composite/device/example1/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/composite/device/example3/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/composite/device/example3/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/hid/device/kbd/example/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/hid/device/kbd/example/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/hid/device/mouse/example/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/hid/device/mouse/example/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/composite/host/example2/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/composite/host/example2/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/hid/dual/mouse/example/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/hid/dual/mouse/example/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/hid/host/mouse/example/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/hid/host/mouse/example/sam4lc4c_sam4l_ek/ui.c
  - common/services/usb/class/msc/host/example2/sam4lc4c_sam4l_ek/conf_board.h
  - common/services/usb/class/msc/host/example2/sam4lc4c_sam4l_ek/ui.c

• **Issue #ASFP-3861**: QTouch Method Example Application - SAM3S-EK2 + AAT31xx not working.

  Files modified:
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam3n4c_sam3n_ek/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam3s4c_sam3s_ek/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam3s8c_sam3s_ek2/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam3x8h_sam3x_ek/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam4s16c_sam4s_ek/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam4s16c_sam4s_xplained/conf_example.h
  - thirdparty/qtouch/generic/sam/qtouch/examples/sam4sd32c_sam4s_ek2/conf_example.h

• **Issue #ASFP-3866**: adc12b_configure_timing in example code does not fall into a value consistent with datasheet.
Files modified:
sam/applications/sam_toolkit_demo/demo.c
sam/components/sensor/mma7341/mma7341.c
sam/drivers/adc/adc.c
sam/drivers/adc/adc.h
sam/drivers/adc/adc_example/adc_example.c
sam/drivers/adc/adc_temp_sensor_example/adc_temp_sensor_example.c
sam/drivers/adc/adc_threshold_wakeup_example/adc_threshold_wakeup_example.c

• Issue #ASFP-3867: ASF Example: possible error in pio definition.
Files Modified:
sam/boards/sam4s_xplained/sam4s_xplained.h

• Issue #ASFP-3883: Routine to read/write user row/fuses missing.
Added nvm_get_fuses and nvm_set_fuses for reading and writing the fuse settings in the user row.
Files modified:
sam0/drivers/nvm/nvm.c
sam0/drivers/nvm/nvm.h
sam0/drivers/nvm/quick_start_basic/qs_nvm_basic.c

• Issue #ASFP-3906: SAM D20 UART glitch.
To prevent glitches on the UART lines the SERCOM module is now configured before the pinmux setup.
File modified:
sam0/drivers/sercom/usart/usart.c

• Issue #ASFP-3911: SAM D20 System driver missing software reset function.
system_reset() will reset the complete controller except debug logic, RTC, WDT with allwayson feature set and GCLK with wrtlock feature set.
File modified:
sam0/drivers/system/system.h

Known issues

• Issue #ASFP-184: AT42QT1060 driver - use of EIC hardcoded for EVK1105 only.
AT42QT1060 component is not supported by the AT32UC3A0 and AT32UC3A1 device family.

• Issue #ASFP-198: PolarSSL needs to be updated to version 1.0.0 to solve build error.
Header file "openssl.h" from polarssl version 0.14.0 has some wrong function definition that creates build error. Update to version 0.99 will solve the issue

• Issue #ASFP-674: common/components/memory/data_flash/at45dbx is not listed for any devices in AVR Studio 5 ASF menu.
Some AT45DBX definitions are missing in board definition causing module errors when using it in AVR Studio 5 with those boards. Modified file : avr32/boards/uc3_a3_xplained/uc3_a3_xplained.h ,xmega/boards/xmega_a1_xplained/xmega_a1_xplained.h

• Issue #ASFP-881: XMEGA NVM driver does not support XMEGA A3 rev B errata.
XMEGA NVM driver does not support XMEGA A3 rev B errata.

- **Issue #ASFP-882**: Sensor library fails compilation if not using a board in the 'Xplained' series of boards.
Sensor library fails compilation if not using an board in the "Xplained" series of boards.

- **Issue #ASFP-3595**: ASF includes its own SAM header files set which is not synchronized with the latest header files from Atmel Studio 6.1 toolchain.
The Atmel Studio 6.1beta header files set for SAM devices is not backward compatible with the Atmel Studio 6.0 header files set.
ASF SAM drivers are using their own set of header files (from sam/utils/cmsis/sam*/include) and are not compatible with the Atmel Studio 6.1beta header files.
SAM drivers will be ported to the new Atmel Studio 6.1beta header files set in a later ASF release.
Contact Information

For more info about Atmel MCU visit http://www.atmel.com/products/microcontrollers/default.aspx, download application notes from the Application Notes page or contact support through the http://support.atmel.no/ site. The support site also have a Frequently Asked Questions.

ASF bug or enhancement requests can be reported in the ASF Bug Tracker at http://asf.atmel.com/bugzilla/.

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