ASF: Release ASF-3.9

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).

8/32-bits Atmel Microcontrollers

Release ASF-3.9

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
  - SAM4S
  - SAM D20

Supported Tools

- Atmel Studio 6.1 using GCC compiler - Visit www.atmel.com/atmelstudio -:

  - ARM version 4.6.1
  - 32-bit AVR version 4.4.3 (AVR_32_bit_GNU_Toolchain_3.3.1_304)
  - 8-bit AVR version 4.5.1 (AVR_8_bit_GNU_Toolchain_3.3.1_444)
- 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 6.40
- WinAVR version 20100110

Note:

- Atmel Studio 6.0 version is not supported since ASF3.6 extension.
- IAR EWAVR32 requires updated header files for the UC3 A3 and UC3 A3xS, UC3C C revision C, UC3 L series (unzip the avr32/utils/header_files/avr32-headers.zip under /Embedded Workbench x.x/avr32/inc/). WinAVR requires updated header files (refer toxmega/utils/header_files/readme.txt).
- SAM4L support for IAR requires the add-on installer EWARM_6.40_SAM4L_addon_vx.x.zip from www.atmel.com/tools/SAM4L-EK.aspx
- 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.

Documentation

- ASF getting started and reference manual: http://www.atmel.com/asf/.
- ASF on-line documentation: http://asf.atmel.com/.
- Atmel Studio 6 installer (includes ASF): www.atmel.com/atmelstudio
- Atmel Studio 6 videos: http://www.atmel.com/microsite/atmel_studio6/videos.aspx
- 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 AVRFreaks® (AVR users) at http://www.avrfreaks.net/index.php?name=PNphpBB2&file=viewforum&f=21.
- ASF forum on AT91® (SAM users) at http://www.at91.com.

New and Noteworthy

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 (GFX_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, DACC,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, ACIFC, PEVC, USB device composite, USB host, picoUART, ABDACB, FREQM, ADCIFE, GLOC, FatFS,
- SAM4E new drivers: FPU, SPI, DMA, USB HID, TC, AT25 flash, WDT, EBI SMC, RTT, CAN, RTC, GPBR, SUPC, PDC, USART, GMAC, PWM
- megaRF, megaRFR2 new drivers: USART, STDIO, 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: Atmega256RFR2 Xplained Pro, ZigBit ATmegaRFR2, ZigBit ATRF233 XMEGA, ZigBit ATRF212B XMEGA, USB stick with ZigBit ATRF233 XMEGA, USB stick with ZigBit ATRF212B XMEGA, SAM4L Xplained Pro with ZigBit ATmegaRFR2, 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, switchs, 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 DSPlib 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-3535:** SAM4E - SAM4E-EK Application Demo Integration.

Add SAM4E-EK Web/DSP Demo
Added folder:
sam/applications/sam4e_ek_demo

- **Issue #ASFP-3645:** SPI Driver for megaRF.

Added and Modified files:
\mega\drivers\spi\spi_megarf.c
\mega\drivers\spi\spi_megarf.h
\mega\drivers\spi\example\spi_slave_example.c
\mega\drivers\spi\example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\mega\drivers\spi\example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\mega\drivers\spi\example\atmega128rfa1_stk600-rc128x_rfx\conf_spi_slave_example.h
\mega\drivers\spi\example\atmega128rfa1_stk600-rc128x_rfx\conf_usart_spi.h
\mega\drivers\spi\example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_board.h
\mega\drivers\spi\example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_clock.h
\mega\drivers\spi\example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_spi_slave_example.h
\mega\drivers\spi\example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_usart_spi.h
\mega\drivers\spi\unit_tests\unit_tests.c
\mega\drivers\spi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\mega\drivers\spi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\mega\drivers\spi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_test.h
\mega\drivers\spi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_usart_serial.h
\common\services\spi\spi_master.h
\common\services\spi\usart_spi.h
\common\services\spi\megarf_spi\spi_master.c
\common\services\spi\megarf_spi\spi_master.h
\common\services\spi\megarf_spi\module_config\conf_spi_master.h
\common\services\spi\megarf_usart_spi\usart_spi.c
\common\services\spi\megarf_usart_spi\usart_spi.h
\common\services\spi\megarf_usart_spi\module_config\conf_usart_spi.h
\common\services\spi\master_example\spi_master_example.c
\common\services\spi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\common\services\spi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\common\services\spi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_spi_master.h
\common\services\spi\master_example\atmega128rfa1_stk600-rc128x_rfx
\conf_spi_master_example.h
\common\services\spi\usart_spi_master_example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\common\services\spi\usart_spi_master_example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\common\services\spi\usart_spi_master_example\atmega128rfa1_stk600-rc128x_rfx\conf_usart_spi.h
\common\services\spi\usart_spi_master_example\atmega128rfa1_stk600-rc128x_rfx
\conf_usart_spi_master_example.h

- **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-3788:** Add acknowledge polling function to AT24C driver.

The AT24CXX requires a period of write cycle to programming the memory after write operations. During this period, all inputs are disabled. Initiating acknowledge polling detects when AT24CXX can allow the read/write sequence to continue.
Files modified:
common/components/memory/eeprom/at24cxx/at24cxx.c
common/components/memory/eeprom/at24cxx/example/at24cxx_example.c
common/components/memory/eeprom/at24cxx/unit_tests/unit_tests.c

- **Issue #ASFP-3828:** SAM4L - Add USB device PHDC example for SAM4L-EK.

Folder added:
common\services\usb\class\phdc\device\example\sam4lc4c_sam4l_ek\

- **Issue #ASFP-3832:** Add SAMD20 support.

Add support for SAM D20 family microcontrollers.
Drivers: AC, ADC, BOD, DAC, Events, External Interrupts, NVM, PAC, PORT, RTC, SERCOM USART/SPI/I2C, TC and WDT
Services: GFX_mono, Delay, Dataflash, FreeRTOS
Applications: DAC sound player, SPI/I2C bootloader, Led toggle and OSC8 calibration, FreeRTOS demo

Notable bugs fixed

- **Issue #ASFP-3157:** IOPORT Library Function ioport_set_pin_mode Tramples Other Fields of PINnCTRL Register.

Fixed common IOPORT service ioport_set_pin_mode() and ioport_set_port_mode() functions resetting the pin sense mode configuration for XMEGA devices.
Files Changed:
common/services/ioport/xmega/ioport.h

- **Issue #ASFP-3550:** Add NandFlash Pins Definition for SAM4E-EK board.

Files modified:
sam\boards\sam4e_ek\init.c
sam\boards\sam4e_ek\sam4e_ek.h

- **Issue #ASFP-3663:** Add a high level function in ILI9325 module to prepare LCD for specific data transfer.

In case of image data needing to be processed while sending the data to LCD, ie B/W conversion or digital filter, the application needs to prepare the ChipOnGlass by setting the window to be updated, setting the cursor position and putting the GRAM in write mode.

- **Issue #ASFP-3682:** SAM4S and SAM4E sleep management is bad in SAM_PM_SMODE_WAIT mode.

Optimize sleep management for WAIT mode of SAM.
File modified:
sam/drivers/pmc/sleep.c

- **Issue #ASFP-3753:** Add new SAM4SP devices support to SAM utils.

Files added:

sam\utils\cmsis\sam4sp*
sam\utils\linker_scripts\sam4sp*
files modified:
common\utils\interrupt.h
common\utils\parts.h
common\utils\stdio\stdio_usb\asf.xml
sam\utils\asf.xml
sam\utils\header_files\io.h
sam\utils\linker_scripts\asf.xml

- **Issue #ASFP-3755:** Add new SAM4SP devices support to SAM drivers.

Files modified:
sam\drivers\acc\acc.c
sam\drivers\acc\acc.h
sam\drivers\acc\asf.xml
sam\drivers\adc\adc.c
sam\drivers\adc\adc.h
sam\drivers\adc\asf.xml
sam\drivers\chipid\asf.xml
sam\drivers\crccu\asf.xml
sam\drivers\crccu\crccu.h
sam\drivers\dacc\asf.xml
sam\drivers\dacc\dacc.c
sam\drivers\dacc\dacc.h
sam\drivers\efc\asf.xml
sam\drivers\efc\efc.c
sam\drivers\efc\efc.h
sam\drivers\gpbr\asf.xml
sam\drivers\matrix\asf.xml
sam\drivers\matrix\matrix.c
sam\drivers\matrix\matrix.h
sam\drivers\pdc\asf.xml
sam\drivers\pio\asf.xml
sam\drivers\pio\pio.c
sam\drivers\pio\pio.h
sam\drivers\pio\pio_handler.c
sam\drivers\pio\pio_handler.h
sam\drivers\pmc\asf.xml
sam\drivers\pmc\pmc.c
sam\drivers\pmc\pmc.h
sam\drivers\pmc\sleep.c
sam\drivers\pmc\sleep.h
sam\drivers\pwm\asf.xml
sam\drivers\pwm\pwm.c
sam\drivers\pwm\pwm.h
sam\drivers\rstc\asf.xml
sam\drivers\rtc\asf.xml
sam\drivers\rtc\rtc.c
sam\drivers\rtc\rtc.h
sam\drivers\rtt\asf.xml
sam\drivers\supc\asf.xml

sam\drivers\twi\asf.xml
sam\drivers\uart\asf.xml
sam\drivers\uart\uart.c
sam\drivers\udp\asf.xml
sam\drivers\udp\udp_device.c
sam\drivers\usart\usart.c
sam\drivers\usart\usart.h
sam\drivers\wdt\asf.xml

- **Issue #ASFP-3756:** Add new SAM4SP devices support to SAM services.

Files modified:
\sam\services\flash_efc\asf.xml
\sam\services\flash_efc\flash_efc.c
\sam\services\flash_efc\flash_efc.h
common\services\clock\asf.xml
common\services\gpio\asf.xml
common\services\ioport\asf.xml
common\services\serial\asf.xml
common\services\sleepmgr\asf.xml
common\services\twi\asf.xml
common\services\usb\asf.xml
common\services\usb\class\asf.xml
common\services\usb\class\cdc\asf.xml
common\services\usb\class\cdc\device\asf.xml
common\services\usb\class\composite\device\asf.xml
common\services\usb\class\hid\asf.xml
common\services\usb\class\hid\device\asf.xml
common\services\usb\class\hid\device\generic\asf.xml
common\services\usb\class\hid\device\kbd\asf.xml
common\services\usb\class\hid\device\mouse\asf.xml
common\services\usb\class\msc\asf.xml
common\services\usb\class\msc\device\asf.xml
common\services\usb\class\phdc\asf.xml
common\services\usb\class\phdc\device\asf.xml
common\services\usb\class\vendor\asf.xml
common\services\usb\class\vendor\device\asf.xml
common\services\usb\udc\asf.xml
Files added:
common\services\clock\sam4sp\genclk.h
common\services\clock\sam4sp\module_config\conf_clock.h
common\services\clock\sam4sp\osc.h
common\services\clock\sam4sp\pll.h
common\services\clock\sam4sp\sysclk.c
common\services\clock\sam4sp\sysclk.h

- **Issue #ASFP-3757:** Add new SAM4SP devices support to SAM components.

Files modified:
common\components\memory\eeprom\at24cxx\asf.xml

- **Issue #ASFP-3761:** SAM4E - Ili9341 gamma curve configuration update.

Modified files:
sam/components/display/ili93xx/ili93xx.c

- **Issue #ASFP-3776:** SAM4E - Modify AFEC Auto-calibration API.

Files Modified:
\sam\drivers\afec\afec.c
\sam\drivers\afec\afec.h
\sam\drivers\afec\example4\afec_example4.c

- **Issue #ASFP-3782:** Add touch calibration parameter configuration function in rtouch.c.

Modified files:
sam/services/resistive_touch/rtouch.c
sam/services/resistive_touch/rtouch.h

- **Issue #ASFP-3789:** Add page operations and pattern fill (erase) operation to AT24C unit tests.

File modified:
common\components\memory\eeprom\at24cxx\unit_tests\unit_tests.c

- **Issue #ASFP-3790:** SAM - The internal address setting is wrong in AT24C driver.

The MSB is to be sent at first.
File modified:
common\components\memory\eeprom\at24cxx\at24cxx.c

- **Issue #ASFP-3792:** ADC quickstart and example code error for SAM4S-XPLD .

Files Modified:
sam/drivers/adc/adc.h

- **Issue #ASFP-3793:** SAM4L drivers doc link error.

Files Modified:
sam\drivers\abdacb\abdacb.h
sam\drivers\aesa\aesa.h
sam\drivers\pdca\pdca.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-3839:** SAM4E - Update project-generator to add prefix AT to device name.

Modify SAM4E project template to use ATSAM4E instead of SAM4E.
Modified file:
templates\iarewarm_v600_atsam4e16e.ewp

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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