
ASF: Release ASF-3.22

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-3.22

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
 - SAM4C
 - SAM4CM
 - SAM4CP
 - SAM4E
 - SAM4L
 - SAM4L8
 - SAM4N
 - SAM4S

- SAM D10
- SAM D11
- SAM D20
- SAM D21
- SAM G51
- SAM G53
- SAM G54
- SAM G55
- SAM L21
- SAM R21

Supported Tools

- Atmel Studio 6.2 using GCC compiler - Visit www.atmel.com/atmelstudio -:
 - Atmel ARM GNU Toolchain - 4.7.4.217
 - Atmel AVR (32 bit) GNU Toolchain - 3.4.2.435
 - Atmel AVR (8 bit) GNU Toolchain - 3.4.3.1072
- 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 7.10
- 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`).
- 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.
- SAMG55 support for IAR EWARM requires an add on.
- SAMD21 B&L series and SAMD21G17AU/SAMD21G17AU/SAMD21E15BU/SAMD21E16BU devices support for Atmel Studio 6 requires the related Part Pack.

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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

Release ASF3.22 (Mar 2015)

- SAMD21 B&L series support in drivers, service and thirdparty.
- SAMD21G17AU/SAMD21G18AU/SAMD21E15BU/SAMD21E16BU devices support
- SAML21 fix and maintenance
- SAMD10-Xmini board support
- SAMW25 and WINC1500 support

Release ASF3.21 (Dec 2014)

- SAM L21 device family and SAML21-XPRO support : added drivers support for Clock ,AES, CCL, OPAMP, TRNG, RWW, HSDAC, AC, ADC, BOD, DAC, DMA, Event, EXTINT, I2S, NVM, PAC, PORT, RTC, SERCOM, TC, TCC, USB, WDT,added services support for EEPROM, USB host/device, gfx_mono, delay, ctrl_access, added components support for serial_flash, at30ts75, ssd1306, added Thirdparty support for CMSIS, FreeRTOS, FATFS
- SAM G55 device family and SAMG55-XPRO support : USB OHCI host stack support, Full set of drivers support of adc, chipid, cmcc, crccu, efc, flexcom,gpbr, i2sc, matrix, mem2mem, pdc, pdm, pio, pmc, rstc, rtc, rtt, spi, supc, tc, twi, udp, uhp, usart, wdt, added applications of xplained_pro_user_application, getting-started, sam_low_power, starter_kit_bootloader_demo, added services support for flash_efc, clock, delay, ioport, serial, sleepmgr, spi, twi, usb, added components support for ssd1306, at30tse75x, sd_mmc, added Thirdparty support for CMSIS DSP lib, FreeRTOS.
- Performance Analyzer Firmware : Support for Remote Node Configuration Feature

Release ASF3.20 (Oct 2014)

- SAMD1x family ASF Quick Start documentation
- USB Stack Quick Start documentation updates
- SAMD11 USB MSC/TCC examples
- SAMD1x 32 bit TC support
- AVR2025MAC,LWMesh support for SAMD21-XPRO, SAMR21 IAR support for AVR2025/AVR2102

Release ASF3.19 (Aug 2014)

- SAM D10, SAM D11 device family and SAMD11-XPRO support
- USB quick start documentation
- SAM4 ASF drivers quick start documentation
- PLC and PRIME support to SAM4C/SAM4CP16/SAM4CMP/SAM4CMS kits
- LwIP RAW HTTP example with AJAX support
- SAM D21 DMAC Demo Application - Data Logger
- Add Xmega A1U-XPRO board support to ASF

Release ASF3.18.1 (Jul 2014)

- PRIME stack support for SAM4C family

Release ASF3.18 (Jun 2014)

- SAM4CM32 new device support

- SAM4C32E USB support
- SAM4C IPC support
- FreeRTOS 8.0.1 support
- OLED support for SAM4L-XPRO
- Demo for TWI information interface of EDBG
- Device series maintain of SAMD20/D21/R21

Release ASF3.17 (May 2014)

- SAM R21: added support for SAM R21 device series and SAMR21-XPRO support; added drivers support for AC, ADC, BOD, DMA, EVENTS, EXTINT, NVM, PAC, PORT, RTC, SERCOM(SPI, USART, I2C), System(clock, interrupt, pinmux), TC, TCC, USB, WDT, serial_flash, ssd1306, virtual_mem, sdmmc; added services support for delay, gfx_mono, ctrl_access, USB device (CDC, Composite, HID, MSC, PHDC, Vendor); added third party support for CMSIS, FATFS, freertos, added applications support for getting-started, i2c_slave_bootloader, led_toggle, sleepwalking_adc, tictactoe, xosc32k_failure_detector.
- SAM G54: added support for SAMG54 device series; added drivers support for adc, chipid, i2sc, pdm, pmc, rstc, spi, supc, twi, twihs, uart, usart; added services support for clock, freertos peripheral control, ioport, sleep manager, twi; added third party support for CMSIS, freertos.
- SAM4CM: Add SAM4CM device series and SAM4CMP-DB/SAM4CMS-DB support; added drivers support for AES, ADC, CHIPID, SMC, EFC, GPBR, ICM, MATRIX, PDC, PIO, PMC, PWM, RSTC, RTC, RTT, SLCD, SPI, SUPC, TC, TRNG, TWI, UART, USART, WDT; added services support for clock, delay, ioport, serial, sleepmgr, spi, storage/ctrl_access, twi, flash_efc, smart_card; added component support for serial_flash, eeprom, at30ts75, added third party support for CMSIS, freertos, FATFS.
- SLCD-XPRO: added example for SAM4L-XPRO
- SAM D21: added USB MSC bootloader
- SAM4CP: added support for SAM4CP16B and ATPL230; added ATPL230AMB board (SAM4S + ATPL230) support; added service support for PLC; added third party support for Prime Phy Layer.
- 802.15.4 MAC: added device support for SAM R21/D21, SAM4S and SAM4E.
- Performance Analyzer Application: added device support for SAM R21/D21, SAM4S and SAM4E; componentization of Performance Analyzer.
- RF4Control: added device support for SAM R21; added Joystick Demo Application for ZID; added Sleep support in Single button ctrl application.
- LWMesh: added device support for SAM R21/D21, SAM4S and SAM4E; added EDDemo and Peer2Peer support, SecurityMode0(HW Security) support, identify commands feature support for WSNDemo application; componentization of WSNDemo app.

Release ASF3.16 (Apr 2014)

- SAM4C: Add CMCC driver support
- SAM D21: Add additional drivers and examples (USB device class support: composite/HID/PDHC, SD/MMC support, getting started and i2c slave applications)
- Add lwIP 1.4.1 and Ethernet Xplained Pro extension support for SAM D20

Release ASF3.15 (Feb 2014)

- SAM D21: added support for SAM D21 device series and SAMD21-XPRO support; added drivers support for AC, ADC, BOD, DAC, DMA, EVENTS, EXTINT, I2S, NVM, PAC, PORT, RTC, SERCOM(SPI, USART, I2C), System(clock, interrupt, pinmux), TC, TCC, USB, WDT, serial_flash, at30ts75, ssd1306, virtual_mem ; added services support for eeprom, delay, gfx_mono, ctrl_access, USB host (HID, CDC, MSC, Vendor, composite), USB device (HID, CDC, MSC, Vendor); added third party support for CMSIS, freertos, added applications support for dac_sound_player, led_toggle, osc8_calib, sleepwalking_adc, tictactoe, xosc32k_failure_detector.

- SAM4CP: added SAM4CP device series support.
- SAM4E-XPRO: added SAM4E-XPRO kit support with examples.
- LWMesh Stack: supported MCU SAMD20, SAM4L, MegaRF, XmegaA3; supported Transceivers: AT86RF212, AT86RF212B, AT86RF231, AT86RF233, ATMEGARFA1, ATMEGARFR2.
- ZID Stack: supported MCU Family : MegaRF, XmegaA3U; Supported Transceivers : AT86RF233, ATMEGARFR2.

Release ASF3.14 (Dec 2013)

- SAMG: added support for SAMG51 and SAMG53 device series and SAMG53-XPRO support; added drivers support for adc, chipid, efc, gpbr, i2sc, matrix, mem2mem, pdc, pdm, pio, pmc, rtc, rt, spi, supc, tc, twi, twihs, uart, usart, wdt; added services support for clock, delay, ioport, serial, sleep manager, flash_efc, twi; added third party support for CMSIS, freertos, added applications support for getting-started and low-power.
- SAM4C: added SAM4C32 device series support.
- SAM4E: added SAM4ExC device series support.
- IEEE 802.15.4 MAC GTS feature support for SAM D20.
- Note: SAMG projects require a part support package for Atmel Studio 6.1

Release ASF3.13 (Nov 2013)

- IEEE 802.15.4 MAC Support Addition for Atmega2564RFR2 Device
- SAM D20: various bug fixes for EEPROM, DFLL, ADC, DAC, SERCOM
- Note: SAM4C projects require a part support package for Atmel Studio 6.1
- Note: Removed ASF versions ASF-3.3.0, ASF-3.4.0, ASF-3.5.0 and ASF-3.5.1 in order to improve performance in Atmel Studio. DO NOT upgrade to this ASF release if you are using the removed versions and need the ASF Wizard. If you do upgrade, you will have to upgrade your project to a newer ASF version in order for the ASF Wizard to work.

Release ASF3.12 (Oct 2013)

- SAM4C: added support for new device series and SAM4C Evaluation kit; added drivers support for aes, adc, chipid, smc, efc, gpbr, icm, matrix, pdc, pio, pmc, pwm, rstc, rtc, rt, slcdc, spi, supc, tc, trng, twi, uart, usart, wdt; added services support for clock, ioport, serial, sleep manager, flash_efc, twi; added component support for serial_flash, eeprom, at30ts75 and c42364a_slcdc; added third party support for CMSIS, freertos and fatfs, added applications support for getting-started and low-power.
- SAM4S: added support for SAM4S4 and SAM4S2.
- SAM D20: maintenance and improvements to API.
- Note: SAM4C projects require a part support package for Atmel Studio 6.1

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

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 (GFX_mono, Delay, Dataflash, FreeRTOS)
- Added SAM D20 applications (DAC sound player, SPI/I2C bootloader, Led toggle and OSC8 calibration, FreeRTOS demo)

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.

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

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 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.

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-4922:** Adding EPD display to ASF.

Added folders:

- thirdparty\epd

Modified files:

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- **Issue #ASFP-5051:** SAM0 - Improve readability of led_toggle example.

Improve LED toggle application.

Files modified:

sam0\applications\led_toggle\led_toggle.c

Files removed:

sam0\applications\led_toggle\samd11_xplained_pro\conf_example.h

sam0\applications\led_toggle\samd11_xplained_pro\conf_extint.h

sam0\applications\led_toggle\samd20_xplained_pro\conf_example.h

sam0\applications\led_toggle\samd20_xplained_pro\conf_extint.h

sam0\applications\led_toggle\samd21_xplained_pro\conf_example.h

sam0\applications\led_toggle\samd21_xplained_pro\conf_extint.h

sam0\applications\led_toggle\samr21_xplained_pro\conf_example.h

sam0\applications\led_toggle\samr21_xplained_pro\conf_extint.h

sam0\applications\led_toggle\saml21_xplained_pro\conf_example.h

sam0\applications\led_toggle\saml21_xplained_pro\conf_extint.h

- **Issue #ASFP-5076:** Adding support for the WINC1500 in the ASF.

Added SAMW25 board support.

Added WINC1500 WiFi support for SAMD21, SAMW25, SAM4S and SAMG53.

Added firmware update project v18.0.3 for WINC1500.

- **Issue #ASFP-5092:** Typo in documentation in adc callback driver for SAMD devices.

Modified files:

\asfp_master\sam0\drivers\adc\adc_sam_\adc_callback.c

\asfp_master\sam0\drivers\adc\adc_sam_d_r\adc_callback.c

- **Issue #ASFP-5099:** sam0 spi example need improvement.

modified files:

- sam0/drivers/sercom/spi/quick_start_master/qs_spi_master_basic.c

- sam0/drivers/sercom/spi/quick_start_master/qs_spi_master_basic.h

- sam0/drivers/sercom/spi/quick_start_slave/qs_spi_slave_basic.c

- sam0/drivers/sercom/spi/quick_start_slave/qs_spi_slave_basic.h

- sam0/drivers/sercom/spi/quick_start_slave_callback/qs_spi_slave_callback.c

- sam0/drivers/sercom/spi/quick_start_slave_callback/qs_spi_slave_callback.h

- sam0/drivers/sercom/spi/spi_interrupt.c

- **Issue #ASFP-5107:** SAMD1X - Update document when ready for publish.

Files modified:

\sam0\services\EEPROM\emulator\main_array\EEPROM.h

- **Issue #ASFP-5108:** EEPROM Emulation examples for SAM D21 should use BOD33DET interrupt.

Add BOD33DEC early warning for eeprom example.

File modified:

sam0\services\eeeprom\emulator\main_array\quick_start\qs_emulator_basic.c
 sam0\services\eeeprom\emulator\main_array\quick_start\qs_emulator_basic.h
 sam0\services\eeeprom\emulator\rwwee_array\quick_start\qs_emulator_basic.c
 sam0\services\eeeprom\emulator\rwwee_array\quick_start\qs_emulator_basic.h

- **Issue #ASFP-5113:** Add samd21 rtc unit_test case.

Add rtc unit_test case for sam0 to give us more confidence on the rtc driver quality.

Folder added:

sam0/drivers/rtc/unit_test_calendar
 sam0/drivers/rtc/unit_test_count

- **Issue #ASFP-5114:** Add samd21 dac unit_test case.

Add dac unit_test case for sam0 to guarantee the dac driver quality.

Folder added:

sam0/drivers/dac/unit_test

- **Issue #ASFP-5115:** Add sam0 bod unit_test case.

Add bod unit_test case for sam0 to give us more confidence on the bod driver quality.

Folder added:

sam0/drivers/bod/unit_test

- **Issue #ASFP-5116:** Add sam0 I2C unit_test case.

Add I2C unit_test case for sam0 to guarantee the i2c driver quality and give us more confidence.

Folder added:

sam0/drivers/sercom/i2c/slave_for_unit_test/
 sam0/drivers/sercom/i2c/unit_test/

- **Issue #ASFP-5121:** SAMD21 - Add SAMD21 B&L Series Support in ASF.

* Added SAMD21 B&L series support in ASF drivers, service and thirdparty.

* Added RWW EEPROM service support for SAMD21 B&L series.

* Added second AC support for SAMD21 L series.

- **Issue #ASFP-5131:** SAM - USART unit test case improvement.

Add unit_tests case for sam usart.

Folders/files modified:

sam/boards/samg55_xplained_pro/board_init.c
 sam/boards/samg55_xplained_pro/samg55_xplained_pro.h
 sam/drivers/usart/unit_tests/samg55j19_samg_xplained_pro/conf_board.h
 sam/drivers/usart/unit_tests/samg55j19_samg_xplained_pro/conf_clock.h
 sam/drivers/usart/unit_tests/samg55j19_samg_xplained_pro/conf_sleepmgr.h
 sam/drivers/usart/unit_tests/samg55j19_samg_xplained_pro/conf_test.h
 sam/drivers/usart/unit_tests/samg55j19_samg_xplained_pro/conf_uart_serial.h
 sam/drivers/usart/unit_tests/unit_tests.c

- **Issue #ASFP-5140:** Add device support for SAMD21G17AU and SAMD21G18AU.

Files added:

sam0\utils\cmsis\samd21\include\pio\samd21g18au.h
sam0\utils\cmsis\samd21\include\samd21g18au.h
sam0\utils\linker_scripts\samd21\gcc\samd21g18au_flash.ld
sam0\utils\linker_scripts\samd21\gcc\samd21g18au_sram.ld

Files modified:

common\utils\parts.h
sam0\utils\cmsis\samd21\include\samd21.h

- **Issue #ASFP-5143:** Update support link comment style and remove it in third part folder.
Update support link comment style and remove it from third part.

- **Issue #ASFP-5152:** SAML21Add more examples for L21 and fix some bugs.

Update:

- * Add dac_sound_player example
- * Fix pin setting for saml21 in tcc example
- * Fix typos in sam0/drivers/system/power/power_sam_l/power.h
- * Fix SAML21 clock driver to overwrite calibration values of register OSC32KCTRL
- * Add some features for SAML21
- ** RTC : Clock Read Synchronization Disable Bit Busy
- ** SUPC: Low Power Efficiency bit
- ** TC :Generate DMA triggers command
- ** TCC : DMA triggers command

- **Issue #ASFP-5158:** Add device support for SAMD21E15BU and SAMD21E16BU.

Add device support for SAMD21E15BU and SAMD21E16BU.

Files added:

sam0\utils\cmsis\samd21\include\pio\samd21e15bu.h
sam0\utils\cmsis\samd21\include\pio\samd21e16bu.h
sam0\utils\cmsis\samd21\include\samd21e15bu.h
sam0\utils\cmsis\samd21\include\samd21e16bu.h
sam0\utils\linker_scripts\samd21\gcc\samd21e15bu_flash.ld
sam0\utils\linker_scripts\samd21\gcc\samd21e15bu_sram.ld
sam0\utils\linker_scripts\samd21\gcc\samd21e16bu_flash.ld
sam0\utils\linker_scripts\samd21\gcc\samd21e16bu_sram.ld
sam0\utils\linker_scripts\samd21\iar\samd21e15bu_flash.icf
sam0\utils\linker_scripts\samd21\iar\samd21e15bu_sram.icf
sam0\utils\linker_scripts\samd21\iar\samd21e16bu_flash.icf
sam0\utils\linker_scripts\samd21\iar\samd21e16bu_sram.icf

Files modified:

common\utils\parts.h
sam0\drivers\nvm\nvm.h
sam0\utils\cmsis\samd21\include\samd21.h

- **Issue #ASFP-5170:** Add ATSAMD10-XMINI board support in ASF.

Added folders:

- common2/applications/xplained_mini_user_application
- sam0/boards/samd10_xplained_mini

Modified files:

- common2/applications/user_application/main.c
- common2/applications/xplained_pro_user_application/main.c

- common/applications/user_application/main.c
- common/applications/xplained_pro_user_application/main.c
- common/boards/board.h
- sam0/boards/samd11_xplained_pro/samd11_xplained_pro.h
- common2/components/display/ssd1306/module_config/conf_ssd1306.h
- common2/components/memory/sd_mmc/module_config_spi/conf_sd_mmc.h
- sam0/components/ethernet_phy/ksz8851snl/module_config/conf_eth.h
- sam0/components/sensor/at30tse75x/module_config/conf_at30tse75x.h

- **Issue #ASFP-5190:** SAML21 - Remove performance level 1 in system driver.

Remove performance level 1 support for SAML21.

Modified files:

sam0\drivers\system\power\power_sam_l\power.h
sam0\drivers\system\clock\clock_samd21_r21\clock.c

Notable bugs fixed

- **Issue #ASFP-4347:** Document fix about failed links from Jenkins "html-test" job.

Files Modified:

common\components\memory\eeeprom\at30tse75x\at30tse75x.c
common\services\twi\twihs_master.h
common\services\usb\class\vendor\device\udi_vendor.h
thirdparty\qtouch\devspecific\sam0\samd\include\touch_api_SAMD.h
common\services\usb\class\vendor\device\udi_vendor.h

- **Issue #ASFP-4415:** SAM D20 Header file updates.

modified files:

- sam0/drivers/nvm/nvm.c
- sam0/drivers/system/clock/clock_samd20/clock.c
- sam0/utis/cmsis/samd20/include folder
- sam0/utis/cmsis/samd20/source folder
- sam0/utis/linker_scripts/samd20/gcc folder
- sam0/utis/linker_scripts/samd20/iar folder

- **Issue #ASFP-4417:** D21 clock driver does not setup GCLK channel for DPLL.

Modified files:

\sam0\drivers\system\clock\clock_samd10_d11\clock.c
\sam0\drivers\system\clock\clock_samd10_d11\module_config\conf_clocks.h
\sam0\drivers\system\clock\clock_samd21_r21\clock.c
\sam0\drivers\system\clock\clock_samd21_r21\module_config\conf_clocks.h
\sam0\drivers\system\clock\clock_saml21\clock.c
\sam0\drivers\system\clock\clock_saml21\module_config\conf_clocks.h
\common2\applications\user_application\user_board\config_samd10_d11\conf_clocks.h
\common2\applications\user_application\user_board\config_samd21\conf_clocks.h
\common2\applications\user_application\user_board\config_saml21\conf_clocks.h
\common2\applications\user_application\user_board\config_samr21\conf_clocks.h
\common2\applications\xplained_pro_user_application\samd11d14a_samd11_xplained_pro\config\conf_clocks.h
\common2\applications\xplained_pro_user_application\samd21j18a_samd21_xplained_pro\config\conf_clocks.h

```
\common2\applications\xplained_pro_user_application\saml21j18a_saml21_xplained_pro\config  
\conf_clocks.h  
\common2\applications\xplained_pro_user_application\samr21g18a_samr21_xplained_pro\config  
\conf_clocks.h
```

And other conf_clocks.h in related examples

- **Issue #ASFP-4622:** Arduino(SAM3X): UART doesn't work in all examples.

Arduino Due (SAM3X), fix usart not work issue, enable PA08/09 internal pullup.

modify files:

sam/boards/arduino_due_x/arduino_due_x.h

- **Issue #ASFP-4780:** Modify flash write sequence of SAM D startup files.

Changed NVM Manual Write (NVMCTRL->CTRLB.bit.MANW) default config value to enable, write command must be invoked by CMD register, avoid invalid NVM write risk.

Modified Files:

```
sam0/applications/i2c_slave_bootloader/i2c_slave_bootloader.c  
sam0/applications/spi_master_bootloader/spi_master_bootloader.c  
sam0/applications/spi_slave_bootloader/asf.xml  
sam0/applications/spi_slave_bootloader/samd20_xplained_pro/asf.xml  
sam0/applications/spi_slave_bootloader/samd20_xplained_pro/conf_bootloader.h  
sam0/applications/spi_slave_bootloader/spi_slave_bootloader.c  
sam0/applications/usb_msc_bootloader/bootloader/main.c  
sam0/applications/usb_msc_bootloader/firmware_generator/asf.xml  
sam0/drivers/nvm/nvm.c  
sam0/drivers/nvm/nvm.h  
sam0/drivers/nvm/quick_start_basic/qs_nvm_basic.c  
sam0/drivers/nvm/quick_start_basic/qs_nvm_basic.h  
sam0/drivers/nvm/unit_test/unit_test.c  
sam0/utis/cmsis/samd10/source/gcc/startup_samd10.c  
sam0/utis/cmsis/samd10/source/iar/startup_samd10.c  
sam0/utis/cmsis/samd11/source/gcc/startup_samd11.c  
sam0/utis/cmsis/samd11/source/iar/startup_samd11.c  
sam0/utis/cmsis/samd20/source/gcc/startup_samd20.c  
sam0/utis/cmsis/samd20/source/iar/startup_samd20.c  
sam0/utis/cmsis/samd21/source/gcc/startup_samd21.c  
sam0/utis/cmsis/samd21/source/iar/startup_samd21.c  
sam0/utis/cmsis/saml21/source/gcc/startup_saml21.c  
sam0/utis/cmsis/saml21/source/iar/startup_saml21.c  
sam0/utis/cmsis/samr21/source/gcc/startup_samr21.c  
sam0/utis/cmsis/samr21/source/iar/startup_samr21.c  
thirdparty/wireless/avr2025_mac/source/pal/common/drivers/nvm/sam0/sam_nvm.c
```

- **Issue #ASFP-4795:** Correct the USB CSR register access in udp_device.h.

Correct the USB CSR register access:

File modified:

sam/drivers/udp/udp_device.h

- **Issue #ASFP-4882:** Error in "ADC Interface Example " example for SAM4L-EK and XPRO kits.

modified files:

- sam/drivers/adcife/adcife_example/adcife_example.c

- sam/drivers/adcife/adcife_wm_example/adcife_wm_example.c
- sam/drivers/adcife/unit_tests/unit_tests.c
- sam/drivers/adcife/adcife.h

- **Issue #ASFP-5017:** No configuration option for GCLK generator 8 in SAM D21 and R21.
Have modified conf_clock.h in all SAMR21 and SAMD21 relative folders.

- **Issue #ASFP-5042:** sam0 driver xxx_is_syncing function explanation is wrong.

Modified files:

- sam0/drivers/i2s/i2s.h
- sam0/drivers/rtc/rtc_sam_d_r/rtc_calendar.c
- sam0/drivers/wdt/wdt.h

- **Issue #ASFP-5053:** SAM4E: HSMCI speed calculate issue.

Fix SAM4E HSMCI CLKDIV and timeout issues

Modified Files:

sam/drivers/hsmci/hsmci.c

- **Issue #ASFP-5060:** Add SAMD20 I2C slave errata.

Add SAMD20 (Revision D) I2C slave errata 13574 workaround

Modified files:

sam0/drivers/sercom/i2c/i2c_samd20/i2c_slave.c
sam0/drivers/sercom/i2c/i2c_samd20/i2c_slave_interrupt.c
sam0/drivers/sercom/i2c/i2c_slave.h

- **Issue #ASFP-5063:** SAM0usart_write_buffer_job called inside both interrupt and main context.

Add critical section protect in the usart_read_job(), usart_write_job(), usart_read_buffer_job(), usart_write_buffer_job() functions.

File modified:

sam0/drivers/sercom/usart/quick_start_callback/qs_usart_callback.c
sam0/drivers/sercom/usart/usart_interrupt.c
sam0/drivers/sercom/usart/usart_interrupt.h

- **Issue #ASFP-5065:** SAM common NVM nvm_write_char() with AT45DBX compile error.

modified files:

- common/drivers/nvm/sam/sam_nvm.c
- thirdparty/wireless/avr2025_mac/source/pal/common/drivers/nvm/sam/sam_nvm.c

- **Issue #ASFP-5068:** SAMD20G18 Header File has too many tc modules.

Modified files:

- sam0/drivers/tc/tc.h
- sam0/utils/cmsis/samd20/include/pio/samd20g14.h
- sam0/utils/cmsis/samd20/include/pio/samd20g15.h
- sam0/utils/cmsis/samd20/include/pio/samd20g16.h
- sam0/utils/cmsis/samd20/include/pio/samd20g17.h
- sam0/utils/cmsis/samd20/include/pio/samd20g17u.h
- sam0/utils/cmsis/samd20/include/pio/samd20g18.h
- sam0/utils/cmsis/samd20/include/pio/samd20g18u.h
- sam0/utils/cmsis/samd20/include/samd20g14.h

- sam0/utils/cmsis/samd20/include/samd20g15.h
- sam0/utils/cmsis/samd20/include/samd20g16.h
- sam0/utils/cmsis/samd20/include/samd20g17.h
- sam0/utils/cmsis/samd20/include/samd20g17u.h
- sam0/utils/cmsis/samd20/include/samd20g18.h
- sam0/utils/cmsis/samd20/include/samd20g18u.h

- **Issue #ASFP-5069:** Wrong cast causes write overflow on usart_spi_read_single() function.

modified file:

- common/services/spi/sam_usart_spi/usart_spi.c

- **Issue #ASFP-5073:** Incorrect access to Output Value Register in arch_ioport_set_port_level.

Modified file:

- common/services/ioport/sam/ioport_gpio.h

- **Issue #ASFP-5093:** Typo in USART service quick start guide.

Fix typo. in usart service.

File modified:

- common/services/serial/serial.h

- **Issue #ASFP-5094:** SAM0: usart_init() second time issue.

Add comment to descrip USART PAD alternative config

Modified files:

- sam0/drivers/sercom/usart/usart.h

- **Issue #ASFP-5097:** Typo - macro name CONF_CLOCK_DPLL_REFEREMCE_DIVIDER should be CONF_CLOCK_DPLL_REFERENCE_DIVIDER.

Fix typo CONF_CLOCK_DPLL_REFEREMCE_DIVIDER, change to CONF_CLOCK_DPLL_REFERENCE_DIVIER.

Modified Files:

453 files changed, 456 insertions(+), 456 deletions(-)

- **Issue #ASFP-5100:** BUG on function sleepmgr_lock_mode.

Modified files:

- common/services/sleepmgr/sleepmgr.h

- **Issue #ASFP-5102:** bug in i2c_slave_interrupt.c file for SAM0.

Files modified:

- sam0/drivers/sercom/i2c/i2c_samd20/i2c_slave_interrupt.c
- sam0/drivers/sercom/i2c/i2c_samd21_r21_d10_d11_l21/i2c_slave_interrupt.c

- **Issue #ASFP-5105:** sam0: rtc driver rtc_count_is_compare_match function return data type is wrong.

Files modified:

- sam0/drivers/rtc/rtc_sam_d_r/rtc_count.c
- sam0/drivers/rtc/rtc_sam_l/rtc_count.c

- **Issue #ASFP-5106:** SAMD21 - synchronization should be added before read in _adc_interrupt_handler.

Add synchronization before reading ADC result for SAM D devices and remove synchronization for SAM L devices.

Files modified:

sam0\drivers\adc\adc.h

sam0\drivers\adc\adc_sam_d_r\adc_callback.c

- **Issue #ASFP-5118:** SAM4E: Improve the test case in CAN Example.

Improve the test case in CAN example.

File modified:

sam/components/can/can_example/can_example.c

- **Issue #ASFP-5119:** SAM0: clock_config_check.h refers to conf_clock.h, should be conf_clocks.

Fix typo. in clock_config_check.h

File modified:

sam0\drivers\system\clock\clock_samd10_d11\clock_config_check.h

sam0\drivers\system\clock\clock_samd20\clock_config_check.h

sam0\drivers\system\clock\clock_samd21_r21\clock_config_check.h

sam0\drivers\system\clock\clock_saml21\clock_config_check.h

- **Issue #ASFP-5122:** SAM D adc_callback_t input parameter needs to be changed.

Fix uncorrect const usage for ADC,DMA and usart modules

Files modified:

sam0\applications\sleepwalking_adc\vcc_monitor.c

sam0\applications\sercom_usart_spi_i2c_slave_demo\main.c

sam0\drivers\adc\adc_sam_d_r\adc_feature.h

sam0\drivers\adc\adc_sam_l\adc_feature.h

sam0\drivers\adc\quick_start_callback\qs_adc_callback.c

sam0\drivers\adc\unit_test\unit_test.c

sam0\drivers\aes\quick_start_dma\quick_start_dma.c

sam0\drivers\dma\dma.h

sam0\drivers\dma\quick_start\qs_dma_basic.c

sam0\drivers\sercom\i2c\quick_start_master_dma\qs_i2c_master_dma.c

sam0\drivers\sercom\spi\quick_start_dma\qs_spi_dma_use.c

sam0\drivers\sercom\spi\quick_start_master_callback\qs_spi_master_callback.c

sam0\drivers\sercom\spi\quick_start_slave_callback\qs_spi_slave_callback.c

sam0\drivers\sercom\spi\spi.h

sam0\drivers\sercom\spi\unit_test\unit_test.c

sam0\drivers\sercom\usart\quick_start_callback\qs_usart_callback.c

sam0\drivers\sercom\usart\quick_start_dma\qs_usart_dma_use.c

sam0\drivers\sercom\usart\usart.h

sam0\drivers\sercom\usart\unit_test\unit_test.c

sam0\drivers\tc\quick_start_dma\qs_tc_dma.c

common\services\usb\class\cdc\device\example\uart_samd.c

common\services\usb\class\cdc\host\example\uart_samd.c

common\services\usb\class\composite\device\example2\uart_samd.c

common\services\usb\class\composite\device\example4\uart_samd.c

- **Issue #ASFP-5123:** In ASF examples for Analog Comparator on SAM D devices, GCLK_AC_ANA should be <= 64KHz.

File modified:

\sam0\drivers\ac\ac.h

\sam0\drivers\ac\ac_sam_d_r\ac.c

```
\sam0\drivers\ac\quick_start\samd11_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start\samd20_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start\samd21_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start\samr21_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start_callback\samd11_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start_callback\samd20_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start_callback\samd21_xplained_pro\conf_clocks.h
\sam0\drivers\ac\quick_start_callback\samr21_xplained_pro\conf_clocks.h
\sam0\drivers\ac\unit_test\samd20j18_samd20_xplained_pro\conf_clocks.h
\sam0\drivers\ac\unit_test\samd21j18a_samd21_xplained_pro\conf_clocks.h
```

- **Issue #ASFP-5153:** SERCOM5 doesnot work in USART_QUICK_START_CALLBACK1 for SAMR21.

Update SAM R21 header files and linker script.

Files modified:

SAM R21 header files and linker script.

sam0/drivers/bod/bod_sam_d_r/bod_feature.h

sam0/drivers/nvm/nvm.c

sam0/drivers/system/clock/clock_samd21_r21/clock.c

thirdparty/freertos/demo/oled1_tickless_xpro_example/tickless.c

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.

- **Issue #ASFP-4502:** Some standalone ASF applications in Application Builder do not work.

The following ASF modules are not available as standalone in the "Select Drivers from the ASF" menu, but only as examples: XMEGA Sleep Manager and ADC driver, AVR UC3 USB Stack from ASF v1, ECC Hamming, TLV320AIC23B codec, FAT file system with play list support, Joystick interface (5-way), MEMORY - EBI SDRAM Controller, MEMORY - MCI - MultiMedia Card Interface, MEMORY - SD/MMC card access using MCI, MEMORY - SD/MMC card access using SPI, MEMORY - NAND Flash on EBI, MEMORY - AT45DBX DataFlash, TOUCH - AT42QT1060 QTouch 6-channel sensor, MEMS Sensors - Accelerometer LIS3L06AL, TIMING - CS2200 Clock Synthesizer, LodePNG, FreeRTOS minimal, lwIP, Micrium uC/OSII, H&D Wi-Fi SPB Firmware Download.

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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