
ASF: Release ASF-3.7

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-3.7

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

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 is not supported by 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.

Note: DataFlash®, QT™, QTouch®, STK® are Atmel trademarks: www2.atmel.com/About/trademark_usage.aspx.

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

ASF3.7 (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-2464:** TWI driver implementation for MegaRF in ASF.

```

\mega\drivers\twi\twi_megarf.c
\mega\drivers\twi\twi_megarf.h
\mega\drivers\twi\master_example\twim_example.c
\mega\drivers\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\mega\drivers\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\mega\drivers\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_twi.h
\mega\drivers\twi\master_example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_clock.h
\mega\drivers\twi\master_example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_twi.h
\mega\drivers\twi\master_example\atmega256rfr2_atmega256rfr2_xplained_pro\conf_board.h
\mega\drivers\twi\slave_example\twis_example.c
\mega\drivers\twi\slave_example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\mega\drivers\twi\slave_example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\mega\drivers\twi\slave_example\atmega128rfa1_stk600-rc128x_rfx\conf_twi.h
\mega\drivers\twi\unit_tests\unit_tests.c
\mega\drivers\twi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\mega\drivers\twi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_twi.h
\mega\drivers\twi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\mega\drivers\twi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_test.h
\mega\drivers\twi\unit_tests\atmega128rfa1_stk600-rc128x_rfx\conf_usart_serial.h
\mega\drivers\twi\unit_tests\atmega256rfr2_atmega256rfr2_xplained_pro\conf_clock.h
\mega\drivers\twi\unit_tests\atmega256rfr2_atmega256rfr2_xplained_pro\conf_twi.h
\mega\drivers\twi\unit_tests\atmega256rfr2_atmega256rfr2_xplained_pro\conf_board.h
\mega\drivers\twi\unit_tests\atmega256rfr2_atmega256rfr2_xplained_pro\conf_test.h
\mega\drivers\twi\unit_tests\atmega256rfr2_atmega256rfr2_xplained_pro\conf_usart.serial.h
\common\services\twi\megarf_twi\twi_master.h
\common\services\twi\megarf_twi\twi_slave.h
\common\services\twi\twi_master.h
\common\services\twi\twi_slave.h
\common\services\twi\master_example\twi_master_example.c
\common\services\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h
\common\services\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h
\common\services\twi\master_example\atmega128rfa1_stk600-rc128x_rfx\conf_twi.h

```

- **Issue #ASFP-2534:** Add TC4/5 XMEGA module drivers for XMEGA E.

Now TC45 Driver is available through ASF Wizard.

Modified files:

```

xmega\drivers\tc45\tc45.c
xmega\drivers\tc45\tc45.h

```

- **Issue #ASFP-2663:** Add SAM4S-EK2 demo.

Add sam4s-ek2 demo, the same functional components as sam4s-ek demo.

Files modified:

```

sam/applications/sam_toolkit_demo/bitmaps.h
sam/applications/sam_toolkit_demo/resources/disk/sam_toolkit_demo_sdcard_resources.zip
sam/applications/sam_toolkit_demo/widget_scr_settings_time.c

```

Folder added:

sam/applications/sam_toolkit_demo/sam4sd32c_sam4s_ek2

- **Issue #ASFP-2707:** Interrupt based UART with circular buffer.

Implements a simple UART to fill a circular buffer using an interrupt. APIs are provided to enqueue and dequeue data to/from this circular buffer.

Added folder:

sam/applications/sam_circular_buffer/

- **Issue #ASFP-2722:** Update XMEGA TWI drivers to support XMEGA E new features (FM+, bridge mode).

Updated XMEGA TWI drivers to support XMEGA E new features: Fast Mode + and Bridge modes.

Updated xmega/drivers/twi/twi_common.h

Added xmega/drivers/twi/unit_tests2 directory

- **Issue #ASFP-2724:** Create XMEGA E EDMA drivers.

Adding XMEGA EDMA support for XMEGA E. Added drivers, examples and unit tests.

Added files: /xmega/drivers/edma/

- **Issue #ASFP-2725:** Update XMEGA ADC drivers to support XMEGA E new features.

Updated XMEGA ADC driver to support new features of XMEGA E ADC.

Added six new examples and one unit-test for XMEGA E ADC.

Modified File:

xmega/drivers/adc/adc.h

Added Folders:

xmega/drivers/adc/xmega_e\ (XMEGA E specific driver implementation)

xmega/drivers/adc/example1\ (XMEGA E ADC internal temperature sensor example)

xmega/drivers/adc/example4\ (XMEGA E ADC hardware calibration example)

xmega/drivers/adc/example5\ (XMEGA E ADC hardware calibration with DAC example)

xmega/drivers/adc/example6\ (XMEGA E ADC hardware averaging example)

xmega/drivers/adc/example7\ (XMEGA E ADC hardware oversampling example)

xmega/drivers/adc/example8\ (XMEGA E ADC hardware averaging and calibration with DAC example)

xmega/drivers/adc/unit-test2\ (XMEGA E ADC hardware averaging and calibration unit test)

- **Issue #ASFP-2767:** Add ioport service examples for SAM3X.

Add ioport service examples for SAM3X.

Files modified:

common/services/ioport/example1/ioport_example1.c

common/services/ioport/example2/ioport_example2.c

common/services/ioport/example3/ioport_example3.c

Folders added:

common/services/ioport/example1/sam3x8h_sam3x_ek

common/services/ioport/example2/sam3x8h_sam3x_ek

common/services/ioport/example3/sam3x8h_sam3x_ek.

- **Issue #ASFP-2770:** SAM4L - Add remaining USB host examples.

Add more 4L USB host examples and fix SAM USBC Host driver.

Files modified:

common/services/usb/class/cdc/host/example/uart_sam.c

sam/drivers/usbc/usbc_host.c

Folders added:

```

common/services/usb/class/cdc/host/example/sam4lc4c_sam4l_ek
common/services/usb/class/composite/host/example2/sam4lc4c_sam4l_ek
common/services/usb/class/msc/host/example2/sam4lc4c_sam4l_ek
common/services/usb/class/vendor/host/example/sam4lc4c_sam4l_ek

```

- **Issue #ASFP-2805:** Add PicoUART support for SAM4L.

Add PicoUART support for SAM4L:

Folder added:

sam/drivers/picouart.

- **Issue #ASFP-2847:** Add USBC host driver for SAM4L.

Add USBC USB host driver for SAM4L device.

Files added:

sam/drivers/usbc/usbc_host.c

sam/drivers/usbc/usbc_host.h

- **Issue #ASFP-2848:** Add USB HID host mouse example for SAM4L_EK board.

Add USB HID mouse host example for SAM4L_EK board.

Folder added:

common\services\usb\class\hid\host\mouse\example\sam4lc4c_sam4l_ek\

- **Issue #ASFP-2849:** Add USB host unit-tests for SAM4L_EK board.

Add USB host unit-tests for SAM4L_EK board.

Folder added:

common\services\usb\uhc\unit_tests\target\sam4lc4c_sam4l_ek\

File modified:

common\services\usb\uhc\unit_tests\usb_device_generator\unit_tests.c

- **Issue #ASFP-2900:** Add megaRF USART, STDIO and Serial support.

USART driver for megaRF device

Modified files:

\mega\utils\compiler.h

\mega\drivers\cpu\mega_reset_cause.h

\common\services\serial\serail.h

\common\utils\stdio\write.c

\common\utils\stdio\read.c

\common\utils\stdio\stdio_serial\stdio_serial.h

Added Files:

\mega\drivers\usart\usart_megarf.c

\mega\drivers\usart\usart_megarf.h

\mega\drivers\usart\example\usart_example.c

\mega\drivers\usart\example\atmega128rfa1_stk600-rc128x_rfx\conf_board.h

\mega\drivers\usart\example\atmega128rfa1_stk600-rc128x_rfx\conf_clock.h

\mega\drivers\usart\example\atmega128rfa1_stk600-rc128x_rfx\conf_usart_example.h

\mega\drivers\usart\example\atmega256rfr2_xplained_pro\conf_board.h

\mega\drivers\usart\example\atmega256rfr2_xplained_pro\conf_clock.h

\mega\drivers\usart\example\atmega256rfr2_xplained_pro\conf_usart_example.h

\common\services\serial\megarf_usart\module_config\conf_usart_serial.h

\common\services\serial\megarf_usart\usart_serial.h

\common\services\serial\usart_serial_example\atmega128rfa1_stk600\conf_usart_serial.h

```
\common\services\serial\usart_serial_example\atmega128rfa1_stk600\conf_board.h
\common\services\serial\usart_serial_example\atmega128rfa1_stk600\conf_clock.h
\common\utils\stdio\stdio_serial\stdio_serial_example\atmega128rfa1_stk600\conf_board.h
\common\utils\stdio\stdio_serial\stdio_serial_example\atmega128rfa1_stk600\conf_clock.h
\common\utils\stdio\stdio_serial\stdio_serial_example\atmega128rfa1_stk600\conf_usart_serial.h
```

- **Issue #ASFP-2960:** USB Device CDC interface - Avoid blocking on `udi_cdc_read_buf()`.
In USB Device CDC implementation, a new functions `udi_cdc_multi_get_nb_received_data()` has been added.
It allows to call `udi_cdc_read_buf()` function with exact data number available and avoid a wait loop.
Modified files:
`common/services/usb/class/cdc/device/udi_cdc.c`
`common/services/usb/class/cdc/device/udi_cdc.h`
- **Issue #ASFP-2964:** Add AESA support for SAM4L.
Add AESA support for SAM4L:
Folder added:
`sam/drivers/aesa`
- **Issue #ASFP-3006:** Add SPI with PDC example for SAM.
Added Folder:
`sam/drivers/spi/spi_pdc_example/`
- **Issue #ASFP-3022:** SAM4L - Add TWIS driver.
Added SAM4L TWIS driver.
Added Folder:
`sam\drivers\twis\`
- **Issue #ASFP-3068:** Add ACIFC driver for SAM4L series.
Add ACIFC driver, example and unit tests for SAM4L series.
Added Folder:
`sam/drivers/acifc/`
Modified File:
`sam/boards/sam4l_ek/init.c`
`sam/utils/status_codes.h`
- **Issue #ASFP-3094:** Add ABDACB support for SAM4L.
Add ABDACB support for SAM4L
Folder added:
`sam/drivers/abdacb.`
Files modified:
`sam\boards\sam4l_ek\init.c`
- **Issue #ASFP-3160:** Add GLOC driver for SAM4L series.
Add GLOC support for SAM4L
Folder added:
`sam\drivers\gloc`
- **Issue #ASFP-3232:** SAM4L - Add FREQM driver.

Added Folder:
sam/drivers/freqm/

- **Issue #ASFP-3238:** SAM4L - Add IISC support.

Add IISC support for SAM4L

Folder added:

sam/drivers/iisc

File modified:

sam/utils/status_codes.h

- **Issue #ASFP-3262:** SAM - Add MCK to PCK source clock in common clock service.

Modified Files:

common\services\clock\sam3n\genclk.h

common\services\clock\sam3s\genclk.h

common\services\clock\sam3u\genclk.h

common\services\clock\sam3x\genclk.h

common\services\clock\sam4e\genclk.h

common\services\clock\sam4s\genclk.h

- **Issue #ASFP-3311:** SAM4L - Add PEVC driver .

Add PEVC driver for SAM4L.

Added folder:

sam/drivers/events

- **Issue #ASFP-3320:** SAM3X - Add DMAC usage example for USART driver.

Added Folder:

sam/drivers/usart/usart_dmac_example

- **Issue #ASFP-3330:** SAM4E - Add WDT implementation and unit test.

Files modified:

sam/boards/sam4e_ek/sam4e_ek.h

sam/drivers/wdt/example/wdt_example.c

Folders added:

sam/drivers/wdt/example/sam4e16e_sam4e_ek/

sam/drivers/wdt/unit_tests/sam4e16e_sam4e_ek/

- **Issue #ASFP-3331:** SAM4E - Add SPI driver, examples and unit test.

Add SAM4E supprt to SPI driver, examples and unit tests on SAM4E-EK.

Files modified:

sam/boards/sam4e_ek/init.c

sam/drivers/spi/spi.c

sam/drivers/spi/spi.h

folders added:

sam/drivers/spi/example/sam4e16e_sam4e_ek/

sam/drivers/spi/unit_tests/sam4e16e_sam4e_ek/

- **Issue #ASFP-3332:** SAM4E - Add DMA driver, example and unit test.

Files modified:

sam/drivers/dmac/dma.c
sam/drivers/dmac/dma.h
sam/drivers/dmac/example/dmac_example.c
sam/drivers/dmac/unit_tests/unit_tests.c
Folders added:
sam/drivers/dmac/example/sam4e16e_sam4e_ek/
sam/drivers/dmac/unit_tests/sam4e16e_sam4e_ek/

- **Issue #ASFP-3334:** Clock driver for MegaRFR2.

Added Clock driver for MegaRFR2

- **Issue #ASFP-3339:** Add support of atxmega192c3 device.

Add support of ATXMEGA192C3 Atmel device.

Modified files:

common\utils\parts.h
xmega\drivers\nvm\nvm.h

- **Issue #ASFP-3340:** SAM4E - Add PDC driver and example.

Files modified:

sam/drivers/pdc/pdc.h
sam/drivers/pdc/pdc.c

Folder added:

sam/drivers/pdc/pdc_uart_examples/sam4e16e_sam4e_ek/

- **Issue #ASFP-3352:** USB Device MSC: PREVENT ALLOW MEDIUM REMOVAL should be handled.

Improve handler for USB device MSC PREVENT ALLOW MEDIUM REMOVAL.

Feature required to unplugged safely a U-disk on MAC OS platform.

File modified:

common/services/usb/class/msc/device/udi_msc.c.

- **Issue #ASFP-3353:** USB Device MSC: START STOP UNIT should be handled.

Update USB device MSC START STOP UNIT handler.

Feature required to unplugged safely a U-disk on MAC OS platform.

File modified:

common/services/usb/class/msc/device/udi_msc.c.

- **Issue #ASFP-3354:** SAM4E - Add TC driver and example.

Folder added:

sam/drivers/tc/tc_capture_waveform_example/sam4e16e_sam4e_ek/

File modified:

sam/drivers/tc/tc_capture_waveform_example/tc_capture_waveform_example.c

- **Issue #ASFP-3355:** Common components NF: nand_flash_mem.o should not be in the lib.

Move out the nand_flash_mem.c from the lib.

Files modified:

common/components/memory/nand_flash/nand_flash_ebi/example2/nand_flash_ecc_sw_example.c
common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/gcc/lib_nand_flash_cortexm3.a
common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/gcc/lib_nand_flash_cortexm4.a
common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/iar/lib_nand_flash_cortexm3.a

common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/iar/lib_nand_flash_cortexm4.a
 common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/nand_flash_translation.h
 common/components/memory/nand_flash/nand_flash_ebi/nand_flash_model.c
 common/components/memory/nand_flash/nand_flash_ebi/nand_flash_raw_nfc.c
 common/components/memory/nand_flash/nand_flash_ebi/nand_flash_raw_smc.c
 common/components/memory/nand_flash/nand_flash_ebi/unit_tests/unit_tests.c
 common/services/storage/ecc_hamming/ecc-sw.c
 sam/utils/linker_scripts/sam3u/sam3u4/gcc/flash.ld
 sam/utils/linker_scripts/sam3u/sam3u4/iar/flash.icf
 thirdparty/fatfs/unit_tests/sam4s16c_sam4s_ek/conf_access.h
 thirdparty/fatfs/unit_tests/sam4sd32c_sam4s_ek2/conf_access.h
 Files deleted:
 common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/iar/lib_nand_flash_cortexm3_3u.a
 common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/gcc/lib_nand_flash_cortexm3_3u.a
 File added:
 common/components/memory/nand_flash/nand_flash_ebi/ftl_lib/nand_flash_mem.c

- Issue #ASFP-3356:** Common storage: API mem_unload should be added to control_access.
 Add mem_unload() to storage control access to handle medium ejection.
 SD/MMC component has been updated to support it.
 Files modified:
 common/components/memory/sd_mmc/sd_mmc_mem.c,
 common/components/memory/sd_mmc/sd_mmc_mem.h,
 common/services/storage/ctrl_access/ctrl_access.c,
 common/services/storage/ctrl_access/ctrl_access.h,
 common/services/storage/ctrl_access/module_config/conf_access.h.
- Issue #ASFP-3361:** USB Device MSC: mem_removal should be checked in INQUIRY to setup RMB bit.
 Update USB device MSC INQUIRY handler.
 Feature required to unplugged safely a U-disk on MAC OS platform.
 File modified:
 common/services/usb/class/msc/device/udi_msc.c.
- Issue #ASFP-3362:** SAM4E - Add USART examples.
 Added SAM4E support to USART driver and examples.
 Files modified:
 sam/boards/sam4e_ek/init.c
 sam/boards/sam4e_ek/sam4e_ek.h
 sam/drivers/usart/usart_serial_example/usart_serial_example_pdc.c
 Folders added:
 sam/drivers/usart/usart_hard_handshaking_example/sam4e16e_sam4e_ek/
 sam/drivers/usart/usart_irda_example/sam4e16e_sam4e_ek/
 sam/drivers/usart/usart_rs485_example/sam4e16e_sam4e_ek/
 sam/drivers/usart/usart_iso7816_example/sam4e16e_sam4e_ek/
 sam/drivers/usart/usart_serial_example/sam4e16e_sam4e_ek/
 sam/drivers/usart/usart_synchronous_example/sam4e16e_sam4e_ek/
- Issue #ASFP-3368:** SAM4E - Add GMAC driver.
 SAM4E - Add GMAC driver and PHY component
 Folder added:

sam/drivers/gmac
sam/components/ethernet_phy/ksz8051mnl

- **Issue #ASFP-3371:** GPIO driver for megaRFR2.

Added ioport driver for MegaRFR2

- **Issue #ASFP-3384:** SAM4E - Add CAN driver, unit test, example.

Add SAM4E CAN support.

Folders added:

sam/drivers/can/unit_tests/sam4e16e_sam4e_ek/
sam/components/can/can_example/sam4e16e_sam4e_ek/

Files modified:

sam/drivers/can/unit_tests/unit_tests.c
sam/drivers/can/can.h
sam/drivers/can/can.c
sam/components/can/sn65hvd234.c
sam/components/can/can_example/can_example.c
sam/boards/sam4e_ek/sam4e_ek.h
sam/boards/sam4e_ek/init.c

- **Issue #ASFP-3385:** SAM4E - Add common SD/MMC card stack support.

Add SD/MMC support for SAM4E.

Files modified:

sam\drivers\hsmci\hsmci.c
sam\boards\sam4e_ek\init.c
common\components\memory\sd_mmc\sd_mmc_spi.c

Folders added:

common\components\memory\sd_mmc\example1\sam4e16e_sam4e_ek
common\components\memory\sd_mmc\example2\sam4e16e_sam4e_ek
common\components\memory\sd_mmc\unit_tests\sam4e16e_sam4e_ek

- **Issue #ASFP-3398:** Clean-up and Bug Fix in board monitor for SAM4L-EK.

Modified files:

sam\applications\sam4l_qtouch_demo\ui.c
sam\boards\sam4l_ek\board_monitor.c
sam\boards\sam4l_ek\board_monitor.h

- **Issue #ASFP-3403:** SAM4E - Add USB HID device support.

Add USB HID device examples and unit-tests.

Folders added:

common\services\usb\class\hid\device\generic\example\sam4e16e_sam4e_ek
common\services\usb\class\hid\device\kbd\example\sam4e16e_sam4e_ek
common\services\usb\class\hid\device\mouse\unit_tests\sam4e16e_sam4e_ek
common\services\usb\class\hid\device\kbd\unit_tests\sam4e16e_sam4e_ek

- **Issue #ASFP-3404:** SAM4E - Add USB CDC device support.

Add USB CDC device examples and unit-tests.

Folders added:

common\services\usb\class\cdc\device\example\sam4e16e_sam4e_ek

common\services\usb\class\cdc\device\example2\sam4e16e_sam4e_ek
common\services\usb\class\cdc\device\unit_tests\sam4e16e_sam4e_ek

- **Issue #ASFP-3413:** Add a Assert on alignment of endpoint configuration table from XMEGA USB Driver.

A Assert() checks the alignment of the endpoint configuration table in case of compiler does not manage correctly the alignment.

Modified file:

xmega\drivers\usb\usb_device.c

- **Issue #ASFP-3417:** Interrupt driver for MegaRFR2 in ASF.

Added external interrupt driver for MegaRFR2

modified files:

ext_int_example1.c

- **Issue #ASFP-3426:** SAM4E - Add USB MSC device support.

Add MSC example and unit-tests for SAM4E.

Folders added:

common/services/usb/class/msc/device/example/sam4e16e_sam4e_ek

common/services/usb/class/msc/device/unit_tests/sam4e16e_sam4e_ek

- **Issue #ASFP-3427:** SAM4E - Add USB PHDC device support.

Add USB PHDC device example for SAM4E.

Folder added:

common/services/usb/class/phdc/device/example/sam4e16e_sam4e_ek

- **Issue #ASFP-3428:** SAM4E - Add USB Vendor device support.

Add SAM4E USB Vendor device support.

Files modified:

common\services\usb\class\vendor\device\udi_vendor_conf.h

Folder added:

common\services\usb\class\vendor\device\example\sam4e16e_sam4e_ek

- **Issue #ASFP-3434:** SAM4E - Add TWI support in ASF.

Add TWI support for SAM4E in ASF.

Files modified:

sam/boards/sam4e_ek/init.c

sam/drivers/twi/twi.h

sam/drivers/twi/twi.c

sam/drivers/twi/twi_slave_example/twi_slave_example.c

common/services/twi/twi_master.h

common/services/twi/twi_slave.h

Folder added:

sam/drivers/twi/twi_slave_example/sam4e16e_sam4e_ek

- **Issue #ASFP-3435:** SAM4E - Add PWM support in ASF.

SAM4E - Add PWM support

Files modified:

sam/boards/sam4e_ek/sam4e_ek.h

sam/drivers/pwm/pwm.h

sam/drivers/pwm/pwm.c
sam/drivers/pwm/pwm_led_example/pwm_led_example.c
sam/drivers/pwm/pwm_sync_example/pwm_sync_example.c
sam/drivers/pwm/unit_tests/unit_tests.c
Folder added:
sam/drivers/pwm/pwm_led_example/sam4e16e_sam4e_ek
sam/drivers/pwm/pwm_sync_example/sam4e16e_sam4e_ek
sam/drivers/pwm/unit_tests/sam4e16e_sam4e_ek

- **Issue #ASFP-3436:** SAM4E - Add RTT support in ASF.

Add RTT example for SAM4E.

Folder added:

sam/drivers/rtt/example/sam4e16e_sam4e_ek

- **Issue #ASFP-3437:** SAM4E - Add RTC support in ASF.

Add RTC example for SAM4E.

Folder added:

sam/drivers/rtc/example/sam4e16e_sam4e_ek

- **Issue #ASFP-3442:** SAM4E - Add SUPC support in ASF.

Add SUPC example for SAM4E.

Folder add:

sam/drivers/supc/unit_tests/sam4e16e_sam4e_ek

- **Issue #ASFP-3448:** SAM4E - Add GPBR support in ASF.

Add GPBR example for SAM4E.

Folder added:

sam/drivers/gpbr/unit_tests/sam4e16e_sam4e_ek

File modified:

sam/drivers/gpbr/unit_tests/unit_tests.c

- **Issue #ASFP-3449:** SAM4E - Add RSTC support in ASF.

SAM4E - Add RSTC support.

Files modified:

sam/drivers/rstc/unit_tests/unit_tests.c

Folder added:

sam/drivers/rstc/unit_tests/sam4e16e_sam4e_ek

- **Issue #ASFP-3451:** SAM4E - Add EBI (SMC) support in ASF.

Add EBI (SMC) support for SAM4E.

Modify files:

sam\drivers\ebi\smc\smc.c

sam\drivers\ebi\smc\smc.h

- **Issue #ASFP-3459:** Add USB Dual role (device and host) HID mouse example for SAM4L_EK board.

Add USB Dual role (device and host) HID mouse example for SAM4L_EK board.

Added folder:

common\services\usb\class\hid\dual\mouse\example\sam4lc4c_sam4l_ek\

- **Issue #ASFP-3461:** Add Demo application for XMEGA-E5 Xplained board.

The Atmel XMEGA-E5 Xplained evaluation kit demo software is created to showcase the Atmel AVR ATxmega32E5 device.

The demo samples the available light sensor connected on ADC and sent the values through OLED display and UART.

The application note associated is the AN-2657.

Added folder:

xmega\applications\xmega_e5_xplained_demo\xmega_e5_xplained\

- **Issue #ASFP-3481:** Unit Test for megaRF USART driver.

Files Added:

mega/drivers/usart/unit_tests/atmega128rfa1_stk600-rc128x_rfx/conf_board.h

mega/drivers/usart/unit_tests/atmega128rfa1_stk600-rc128x_rfx/conf_clock.h

mega/drivers/usart/unit_tests/atmega128rfa1_stk600-rc128x_rfx/conf_test.h

mega/drivers/usart/unit_tests/atmega128rfa1_stk600-rc128x_rfx/conf_usart_serial.h

mega/drivers/usart/unit_tests/atmega256rfr2_atmega256rfr2_xplained_pro/conf_board.h

mega/drivers/usart/unit_tests/atmega256rfr2_atmega256rfr2_xplained_pro/conf_clock.h

mega/drivers/usart/unit_tests/atmega256rfr2_atmega256rfr2_xplained_pro/conf_test.h

mega/drivers/usart/unit_tests/atmega256rfr2_atmega256rfr2_xplained_pro/conf_usart_serial.h

mega/drivers/usart/unit_tests/unit_tests.c

- **Issue #ASFP-3517:** SAM4S - Update instruction guide for toolkit demo.

Update toolkit demo user instructions.

- **Issue #ASFP-3520:** Add kit image for ATMEGA256RFR2 Xplained PRO .

Modified files:

asf/toolchain/avrstudio5.py

Added Files:

templates/avrstudio5_images/kits/ATMEGA256RFR2-Xplained-Pro.png

- **Issue #ASFP-3522:** USB Device CDC improvement to reduce CPU load.

The USB Device CDC uses the USB SOF interrupt to manage the data flux/control.

Currently, the CDC device send a ZLP (Zero Length Packet) each SOF (1ms) if no data transfer is requested. This generate a CPU overhead on device and host side.

Thus, the aim of this improvement is to reduce the send of ZLP each 100ms.

Modified file:

common/services/usb/class/cdc/device/udi_cdc.c

- **Issue #ASFP-3526:** SAM4L: For SAM homogeneity over toolchain defines usage, remove any use of the `__ATSAM4Lxxxx__` defines naming.

Fix `__ATSAM4Lxxxx__` to `__SAM4Lxxxx__` for SAM4L device to harmonize with other SAM devices.

Modified files:

- common/utils/part.h

- sam/utils/cmsis/sam4l/include/sam4l.h

- **Issue #ASFP-3533:** Add medium unload support for existing memories access interface.

Add medium unload/load support for AT45DBX, Nand Flash and Virtual memory access.

Files modified:

common\components\memory\data_flash\at45dbx\at45dbx_mem.c

common\components\memory\data_flash\at45dbx\at45dbx_mem.h
common\components\memory\nand_flash\nand_flash_ebi\ftl_lib\nand_flash_mem.c
common\components\memory\nand_flash\nand_flash_ebi\ftl_lib\nand_flash_mem.h
common\components\memory\virtual_mem\virtual_mem.c
common\components\memory\virtual_mem\virtual_mem.h

- **Issue #ASFP-3545:** Add FatFS support for SAM4L.

Add FatFS support for SAM4L.

File modified:

thirdparty\fatfs\fatfs-port-r0.09\diskio.c

File added:

thirdparty\fatfs\fatfs-port-r0.09\sam\fattime_ast.c

File renamed:

thirdparty\fatfs\fatfs-port-r0.09\sam\fattime_rtc.c

- **Issue #ASFP-3564:** In USB Device CDC interface, add a callback to notify empty TX buffer.

Some applications need to know when the TX buffer is empty.

Thus, a callback has been added and it can be defined through UDI_CDC_TX_EMPTY_NOTIFY

define in conf_usb.h file.

Also, the udi_cdc_multi_get_free_tx_buffer() function has been added to know how many free space is available in CDC TX buffer.

Modified files:

common/services/usb/class/cdc/device/udi_cdc.c

common/services/usb/class/cdc/device/udi_cdc.h

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/example3/conf_usb.h

common/services/usb/class/cdc/device/unit_tests/conf_usb.h

common/services/usb/class/composite/device/example2/conf_usb.h

common/services/usb/class/composite/device/example4/conf_usb.h

common/utils/stdio/stdio_usb/stdio_usb_example/conf_usb.h

- **Issue #ASFP-3605:** Add TC4/5 XMEGA E examples for STK600 and XMEGA E5-Xplained boards.

About TC45 drivers, 7 examples has been added on STK600 XMEGA E5 and XMEGA E5-Xplained boards.

Modified files:

xmega/boards/stk600/rc032x/init.c

Added folders:

xmega/drivers/tc45/example1/

xmega/drivers/tc45/example1/atxmega32e5_stk600-rc032x/

xmega/drivers/tc45/example1/atxmega32e5_xmega_e5_xplained/

xmega/drivers/tc45/example2/

xmega/drivers/tc45/example2/atxmega32e5_stk600-rc032x/

xmega/drivers/tc45/example2/atxmega32e5_xmega_e5_xplained/

xmega/drivers/tc45/example3/

xmega/drivers/tc45/example3/atxmega32e5_stk600-rc032x/

xmega/drivers/tc45/example4/

xmega/drivers/tc45/example4/atxmega32e5_stk600-rc032x/

xmega/drivers/tc45/example5/

xmega/drivers/tc45/example5/atxmega32e5_stk600-rc032x/

Notable bugs fixed

- Issue #ASFP-2185:** SAM3X UOTGHS driver should use WAIT mode for suspend.
 Adjust UOTGHS driver, to save more power in USB suspend mode.
 Files modified:
 sam/drivers/uotghs/uotghs_device.c
 sam/drivers/uotghs/uotghs_host.c
 sam/drivers/uotghs/uotghs_host.h
 sam/drivers/uotghs/uotghs_otg.h.
- Issue #ASFP-2380:** SAM ISR may happen before clocks restore from wait mode.
 Add wait mode wakeup clocks restore wait.
 Files modified:
 sam/drivers/udphs/udphs_device.c
 sam/drivers/uotghs/uotghs_device.c
 sam/drivers/uotghs/uotghs_host.c
 sam/drivers/uotghs/uotghs_otg.h
 sam/drivers/pmc/sleep.c
 sam/drivers/pmc/sleep.h
 common/services/usb/class/hid/dual/mouse/example/sam3x8h_sam3x_ek/ui.c
 common/services/usb/class/hid/host/mouse/example/sam3x8h_sam3x_ek/ui.c
- Issue #ASFP-2384:** In SAM3X HID dual/host example, RESUME button should not be initialized in ui_init.
 Remove button initialize in ui_init, it should be initialized when host/device is suspended.
 Modified files:
 common/services/usb/class/hid/dual/mouse/example/sam3x8h_sam3x_ek/ui.c
 common/services/usb/class/hid/host/mouse/example/sam3x8h_sam3x_ek/ui.c.
- Issue #ASFP-2409:** On first initialization of the USB UOTGHS host driver, interrupts without statuses are generated.
 Now ignores the first UHD interrupt without any status change.
 Files modified:
 sam\drivers\uotghs\uotghs_host.c
 sam\drivers\uotghs\uotghs_host.h.
- Issue #ASFP-2697:** USB Device stack should support setup requests for endpoint recipients.
 Add the support of "setup requests for endpoint recipients" in USB Device stack.
 For example, these requests are used by Audio Class for bRequest SET_CUR, SET_MIN, SET_MAX_, SET_RES.
 Modified file:
 common/services/usb/udc/udc.c
- Issue #ASFP-2749:** Add XMEGA Quadrature Decoder Driver.
 Add for all XMEGAs, the QDec driver which use Event system and Timer counter hardware interfaces.
 Add QDec drivers:
 xmega\drivers\qdec\qdec.c/.h
 Add QDec example on "XMEGA E5 Xplained" board:
 xmega\drivers\qdec\example1\qdec_example1.c
 xmega\drivers\qdec\example1\atxmega32e5_xmega_e5_xplained\
 Add QDec examples on "XMEGA E5 Xplained" and "XMEGA B1 Xplained" boards:

```

xmega\drivers\qdec\example2\generator_qenc.c
xmega\drivers\qdec\example2\generator_qenc.h
xmega\drivers\qdec\example2\qdec_example2.c
xmega\drivers\qdec\example2\atxmega32e5_xmega_e5_xplained\
xmega\drivers\qdec\example2\atxmega128b1_xmega_b1_xplained\
Add QDec unit-tests on "XMEGA E5 Xplained" and "XMEGA B1 Xplained" boards:
xmega\drivers\qdec\unit_tests\unit_tests.c
xmega\drivers\qdec\unit_tests\atxmega128b1_xmega_b1_xplained\
xmega\drivers\qdec\unit_tests\atxmega32e5_xmega_e5_xplained\

```

- **Issue #ASFP-2763:** Design and Implementation of MAC Demo application on AVR2025 in ASF.
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:
 1. Atmega256RFR2 Xplained Pro
 2. ZigBit ATmegaRFR2
 3. ZigBit ATRF233 Xmega
 4. ZigBit ATRF212B Xmega
 5. USB stick with ZigBit ATRF233 Xmega
 6. USB stick with ZigBit ATRF212B Xmega
 7. SAM4L Xplained Pro with ZigBit ATmegaRFR2
 8. SAM4L Xplained Pro with ZigBit ATRF233 Xmega
 9. SAM4L Xplained Pro with ZigBit ATRF212B Xmega
 10. Xmega-A3BU Xplained
 11. RZ600
- **Issue #ASFP-2804:** Add ADCIFE driver for SAM4L series.
Added folder:
sam\drivers\adcife
- **Issue #ASFP-2892:** In SAM WDT unit_tests, WDT status should be cleared before interrupt enabled.
Improve WDT unit-tests. Modified file: sam\drivers\wdt\unit_tests\unit_tests.c.
- **Issue #ASFP-3103:** XMEGA NVM driver is wrong for ATxmega8E5 and ATxmega16E5.
Fixed ATxmega8E5 and ATxmega16E5 flash page size in NVM drivers.
Modified file: xmega/drivers/nvm/nvm.h.
- **Issue #ASFP-3110:** XMEGA TC45 drivers: Fixed several functions.
Fixed TC45 functions:
tc45_set_stop(), tc45_set_direction(), tc45_period_buffer_is_valid(), tc45_lock_update_buffers(),
tc45_unlock_update_buffers(), tc45_enable_cc_channels(), tc45_disable_cc_channels().
Also, fixed compilation warning on XMEGA TC/TC45 drivers.
Modified files:
xmega/drivers/tc45/tc45.c
xmega/drivers/tc45/tc45.h
xmega/drivers/tc/tc.h
- **Issue #ASFP-3133:** Add USB vendor device example for SAM4L.

Add USB vendor device example for SAM4L.

Folder added:

common\services\usb\class\vendor\device\example\sam4lc4c_sam4l_ek.

- **Issue #ASFP-3134:** Add USB composite device example1 (HID+MSC) for SAM4L.

Add USB composite device HID mouse and MSC example.

Folder added:

common\services\usb\class\composite\device\example1\sam4lc4c_sam4l_ek\.

- **Issue #ASFP-3136:** Add USB composite device example3 (HID+MSC) for SAM4L.

Add USB composite HID keyboard and MSC device example.

Folder added:

common\services\usb\class\composite\device\example3\sam4lc4c_sam4l_ek.

- **Issue #ASFP-3137:** Add USB composite device example4 (CDC + MSC) for SAM4L.

Add USB composite CDC serial and MSC device example for SAM4L.

File modified:

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

Folder added:

common\services\usb\class\composite\device\example4\sam4lc4c_sam4l_ek\

- **Issue #ASFP-3206:** Add Temperature, potmeter and light sensors in XMEGA-B1 Xplained board init.c.

Add potentiometer, temperature and light sensors in XMEGA-B1 Xplained board init.c.

Modified files:

common/applications/user_application/atxmega128b1_xmega_b1_xplained/conf_board.h

xmega/applications/xmega_b1_xplained_demo/xmega_b1_xplained/conf_board.h

xmega/boards/xmega_b1_xplained/init.c

- **Issue #ASFP-3227:** SAM UDP driver - Fix UDP_CSR register access.

The UDP_CSR access has been fixed in UDP driver.

This improve the robustness of USB behavior.

Modified file:

sam/drivers/udp/udp_device.h

- **Issue #ASFP-3243:** Remove EPA4/EPA32 usages and comments EPA8/EPA16 usages.

Remove EPA4/EPA32 usages and comments EPA8/EPA16 usages according to updated errata of SAM4S.

modified files:

common/drivers/nvm/example/sam4s16c_sam4s_ek/conf_nvm_example.h

common/drivers/nvm/sam/sam_nvm.c

sam/applications/sam_toolkit_demo/demo_parameters.c

sam/drivers/crcu/crcu_example/crcu_example_efc.c

sam/drivers/gpbr/unit_tests/unit_tests.c

sam/services/flash_efc/flash_efc.h

sam/service/flash_efc/flash_program_example/sam4s16c_sam4s_ek/conf_example.h

sam/service/flash_efc/flash_program_example/sam4s16c_sam4s_xplained/conf_example.h

sam/service/flash_efc/flash_program_example/sam4sd32c_sam4s_ek2/conf_example.h

- **Issue #ASFP-3263:** SAM4L - Max EP number check not correct in USBC device driver.

Fix USB max endpoint number check for SAM USBC device driver.

File modified:

sam\drivers\usbc\usbc_device.c

- **Issue #ASFP-3278:** Add specific conf_clock.h file for XMEGA devices without USB interface.

Updated default conf_clock.h for XMEGA devices without USB module.

- **Issue #ASFP-3321:** SAM3X: USART3 is not embedded on 100-pin packages (SAM3X4C, SAM3X8C...) leading to compilation errors in projects.

Modified Files:

sam\drivers\twi\twi.c

sam\drivers\usart\usart.c

- **Issue #ASFP-3322:** USART0 has wrongly defined sck pin Peripheral .

The ASF has the USART0 sck pin from the sam3s/4s defined as a member of PIO_PERIPH_A, This should be PIO_PERIPH_B.

Modified files:

sam/boards/sam3s_ek/sam3s_ek.h

sam/boards/sam3s_ek2/sam3s_ek2.h

sam/boards/sam4s_ek/sam4s_ek.h

sam/boards/sam4s_ek2/sam4s_ek2.h

sam/boards/sam4s_xplained/sam4s_xplained.h

- **Issue #ASFP-3323:** assert fails in flash_is_locked() because of non-continuous flash memory.

On the SAM3U4, there are 2 flash banks, but their memory addresses are not continuous.

Modified file:

sam/services/flash_efc/flash_efc.c

sam/services/flash_efc/unit_tests/sam3x8e_arduino_due_x/conf_test.h

sam/services/flash_efc/unit_tests/sam3x8h_sam3x_ek/conf_test.h

- **Issue #ASFP-3333:** SAM4E - Add common SPI service support.

Added SAM4E supprt to common SPI service and master example on SAM4E-EK.

file added:

common/services/spi/master_example/spi_master_example_sam.c

file deleted:

common/services/spi/master_example/spi_master_example_sam3.c

folder added:

common/services/spi/master_example/sam4e16e_sam4e_ek/

- **Issue #ASFP-3338:** SAM4L AST: few fixes needed.

Improved AST module implementation, mainly on coding style.

The modified files:

sam\drivers\ast\ast.c

sam\drivers\ast\ast.h

sam\drivers\ast\example2\ast_example2.c

sam\drivers\ast\unit_tests\unit_tests.c

sam\drivers\bpm\unit_tests\unit_tests.c

sam\drivers\bpm\example\bpm_example.c

sam\applications\sam4l_qtouch_demo\event.c

sam\drivers\picouart\example1\picouart_example1.c
 sam\drivers\picouart\unit_tests\unit_tests.c

- **Issue #ASFP-3344:** Misc SAM4L modules- Fix the doxygen build issues.

Modified files:

sam\applications\sam4l_qtouch_demo\qtouch\touch.c
 sam\boards\sam4l_ek\board_monitor.h
 sam\drivers\leic\leic.h
 sam\drivers\pdca\pdca.c
 sam\drivers\pdca\pdca.h
 sam\utils\cmsis\sam4l\source\templates\system_sam4l.c

- **Issue #ASFP-3347:** Update XMEGA ADC driver to be homogeneous with XMEGA datasheet.

Update XMEGA ADC driver to be homogeneous with XMEGA datasheet.

Modified files:

xmega\drivers\adc\adc.h
 xmega\drivers\adc\xmega_aau\adc_aau.c
 xmega\drivers\adc\xmega_bcd\adc_bcd.c

- **Issue #ASFP-3348:** The adc_example.c file does not setup the timer trigger for ADC12B correctly .

Modified Files:

sam\components\sensor\mma7341\mma7341l.c
 sam\drivers\adc\adc.h
 sam\drivers\adc\adc_example\adc_example.c
 sam\drivers\adc\adc_sam3u.c
 sam\utils\cmsis\sam3u\include\component\component_adc.h

- **Issue #ASFP-3350:** SAM4L - Add PS2 Power Scaling mode support.

Add PS2 Power Scaling mode support for SAM4L. A new macro

CONFIG_FLASH_READ_MODE_HIGH_SPEED_ENABLE has been added in conf_clock.h:

- To use low power mode for flash read mode (PS0, PS1), don't define it. This is the default.
- To use high speed mode for flash read mode (PS2), define it.

Note: SAM4L Engineer Samples only support PS0 and PS1 mode.

Modified files:

common\applications\user_application\sam4l4c_sam4l_ek\conf_clock.h
 common\services\clock\sam4l\module_config\conf_clock.h
 common\services\clock\sam4l\sysclk.c
 sam\applications\getting-started\sam4l4c_sam4l_ek\conf_clock.h
 sam\drivers\bpm\bpm.h
 sam\drivers\flashcalw\flashcalw.c
 sam\drivers\flashcalw\flashcalw.h

- **Issue #ASFP-3351:** SAM4E - Add KSZ8051M PHY component driver.

SAM4E - Add PHY component

Folder added:

sam/components/ethernet_phy/ksz8051mnl

- **Issue #ASFP-3357:** SAM4E - Add AT25 serial flash example and unit tests.

Added SAM4E support to AT25 serialflash, example and unit tests on SAM4E-EK.

Files modified:

common/components/memory/serial_flash/at25dfx/example/at25dfx_example.c
common/components/memory/serial_flash/at25dfx/unit_tests/unit_tests.c
sam/boards/sam4e_ek/sam4e_ek.h

Folders added:

common/components/memory/serial_flash/at25dfx/example/sam4e16e_sam4e_ek/
common/components/memory/serial_flash/at25dfx/unit_tests/sam4e16e_sam4e_ek/

- **Issue #ASFP-3386:** SAM4L - Move bpm_sleep code block to bpm.c (from inline to extern function).

Implement bpm_sleep as extern function instead of inline function.

Files modified:

sam/drivers/bpm/bpm.c
sam/drivers/bpm/sleep.h

- **Issue #ASFP-3389:** SAM - Add VBUS management via PIO in UDD drivers.

Add VBus PIO detection to UDP and UDPHS driver.

Files modified:

sam/drivers/udp/udp_device.c
sam/drivers/udphs/udphs_device.c
sam/boards/sam3s_ek/board_config/conf_board.h
sam/boards/sam3s_ek/init.c
sam/boards/sam3s_ek/sam3s_ek.h
sam/boards/sam3s_ek2/board_config/conf_board.h
sam/boards/sam3s_ek2/init.c
sam/boards/sam3s_ek2/sam3s_ek2.h
sam/boards/sam3u_ek/board_config/conf_board.h
sam/boards/sam3u_ek/init.c
sam/boards/sam3u_ek/sam3u_ek.h
sam/boards/sam4e_ek/board_config/conf_board.h
sam/boards/sam4e_ek/init.c
sam/boards/sam4e_ek/sam4e_ek.h
sam/boards/sam4s_ek/board_config/conf_board.h
sam/boards/sam4s_ek/init.c
sam/boards/sam4s_ek/sam4s_ek.h
sam/boards/sam4s_ek2/board_config/conf_board.h
sam/boards/sam4s_ek2/init.c
sam/boards/sam4s_ek2/sam4s_ek2.h
common/services/usb/class/hid/device/mouse/unit_tests/sam3s4c_sam3s_ek/conf_board.h
common/services/usb/class/hid/device/mouse/unit_tests/sam3sd8c_sam3s_ek2/conf_board.h
common/services/usb/class/hid/device/mouse/unit_tests/sam3u4e_sam3u_ek/conf_board.h
common/services/usb/class/hid/device/mouse/unit_tests/sam4s16c_sam4s_ek/conf_board.h
common/services/usb/class/hid/device/mouse/unit_tests/sam4sd32c_sam4s_ek2/conf_board.h

- **Issue #ASFP-3393:** SAM - Add API to read TC counter value register.

Added the API to read the timer count for SAM, and also change return type from int32_t to uint32_t for below functions:

```
uint32_t tc_read_ra(Tc *p_tc, uint32_t ul_channel);  
uint32_t tc_read_rb(Tc *p_tc, uint32_t ul_channel);  
uint32_t tc_read_rc(Tc *p_tc, uint32_t ul_channel);
```

Files changed:

sam/drivers/tc/tc.c
sam/drivers/tc/tc.h

- **Issue #ASFP-3397:** Fix XMEGA ADC examples and unit-test initializations.

In ADC examples 1,2,3 and unit-test, sleepmgr_init() call has been added and pmic_init() replaced by irq_initialize_vectors().

Modified files:

xmega\drivers\adc\example1\adc_example1.c
xmega\drivers\adc\example1\adc_example1_gfx.c
xmega\drivers\adc\example2\adc_example2.c
xmega\drivers\adc\example2\adc_example2_gfx.c
xmega\drivers\adc\example3\adc_example3.c
xmega\drivers\adc\unit_tests\unit_tests.c

- **Issue #ASFP-3400:** Inappropriate choice for the TC output waveform pin and waveform capture pin for TC capture waveform example on SAM4L_EK.

Changed the waveform and capture pins for easy test, now it's pin 3 and pin 7 on J4 not pins on LCD socket.

Files changed:

sam/drivers/tc/tc_capture_waveform_example/sam4lc4c_sam4l_ek/conf_board.h
sam/drivers/tc/tc_capture_waveform_example/tc_capture_waveform_example.c

- **Issue #ASFP-3405:** SAM4E - Add sleepmgr.

Update sleepmgr for UDD UDP driver support.

File added:

sam\drivers\pmc\sleep.c

Files modified:

sam\drivers\pmc\sleep.h
common\services\sleepmgr\asf.xml
common\services\sleepmgr\sam\sleepmgr.h
common\services\sleepmgr\sleepmgr.h
sam\drivers\udp\udp_device.c
sam\drivers\udp\udp_device.h

- **Issue #ASFP-3407:** SAM4E - Update UDP driver.

Add SAM4E support to UDP driver.

Files modified:

sam\drivers\udp\udp_device.c
sam\drivers\udp\udp_device.h

- **Issue #ASFP-3408:** SAM4E - Update board definitions for buttons and LEDs.

Update board LED and button definitions for 4E-EK.

File modified:

sam\boards\sam4e_ek\sam4e_ek.h

- **Issue #ASFP-3410:** SAM4E - Add HID device mouse example.

Add HID device mouse example for SAM4E.

Folder added:

common\services\usb\class\hid\device\mouse\example\sam4e16e_sam4e_ek

- **Issue #ASFP-3424:** SAM - CAN Baudrate prescaler check is missing when setting baudrate register.

Fixed CAN driver baudrate prescaler checking missing problem.

Modified file:

sam/drivers/can/can.c

- **Issue #ASFP-3460:** SAM4E - Add sysclk_get_peripheral_bus_hz().

Add sysclk_get_peripheral_bus_hz() in common clock implement 4E.

File modified:

common/services/clock/sam4e/sysclk.h

- **Issue #ASFP-3472:** SAM4E - Add smart card support.

Add IOPORT support to smart card.

Files modified:

sam/services/smart_card/iso7816.h

sam/services/smart_card/iso7816.c

- **Issue #ASFP-3474:** XPRO SAM4L - Low power demo.

Adding support of SAM4L XPlained Pro to low-power demo.

- **Issue #ASFP-3475:** XPRO SAM4S - Low power demo.

Adding support of SAM4S XPlained Pro to low-power demo.

- **Issue #ASFP-3477:** SAM4S and SAM4L Xplained XPro - OLED1+IO1 demo.

Files modified:

/common/components/display/ssd1306/ssd1306.c

/common/components/display/ssd1306/ssd1306.h

/common/components/display/ssd1306/font.c

/common/components/display/ssd1306/font.h

/common/components/memory/eeeprom/at30tse75x/at30tse75x.c

/common/components/memory/eeeprom/at30tse75x/at30tse75x.h

/sam/applications/starter_kit_demo/

/sam/drivers/pio/pio_handler.c

/sam/boards/sam4s_xplained_pro/init.c

/sam/boards/sam4s_xplained_pro/sam4s_xplained_pro.h

- **Issue #ASFP-3479:** SAM4E - Add FPU support to project_generator.

Add IAR FPU support to project_generator.

Files modified:

asf/toolchain/iarewarm.py,

templates/iarewarm_v600_atsam4e16e.ewp.

- **Issue #ASFP-3485:** SAM - retval of spi_calc_baudrate_div() is not checked in spi_master.

Check return code of spi_calc_baudrate_div() in spi_master implement.

File modified:

common/services/spi/sam_spi/spi_master.c.

- **Issue #ASFP-3507:** Failure in XMEGA E XCL driver test suite.XCL 2 Inputs LUT XOR Test .

Fixed XMEGA XCL unit tests that fail when using higher compiler optimization level.

Updated /xmega/drivers/xcl/unit_tests/unit_tests.c.

- **Issue #ASFP-3514:** SAM4E - Add STDIO USB Support.
Add STDIO USB Support for SAM4E.
Folder added:
common\utils\stdio\stdio_usb\stdio_usb_example\sam4e16e_sam4e_ek\
- **Issue #ASFP-3519:** SAM - in UDP driver `Is_udd_endpoint_type_in()` should be used to check endpoint direction.
Fix UDD endpoint direction detection.
File modified:
sam\drivers\udp\udp_device.c
- **Issue #ASFP-3521:** The Atmel FatFS `diskio.c` incorrectly interchanges changes bytes and sectors.
Fix `diskio` R/W sector error.
Files Modified:
thirdparty\fatfs\fatfs-port-r0.09\diskio.c
- **Issue #ASFP-3531:** SAM4SD EFC base address calculation does not take into account the Flash Swap GPNVM bit.
File changed:
sam\services\flash_efc\flash_efc.c
sam\services\flash_efc\flash_efc.h
- **Issue #ASFP-3581:** HX8347A Display Driver fails for XMEGA targets.
Fixed an issue in the common HX8347A display driver for XMEGA targets, where the driver would lock up waiting for pending USART SPI operations to complete.
Files Changed:
common\components\display\hx8347a\hx8347a.c
- **Issue #ASFP-3585:** SAM - Confusing return value of function `flash_is_gpnvm_set()` in SAM flash services.
Files changed:
sam/services/flash_efc/flash_efc.h
sam/services/flash_efc/flash_efc.c
- **Issue #ASFP-3590:** SAM3U - Pressing USR-LEFT button cannot start/stop LED blinking in getting-started example.
File modified:
sam/applications/getting-started/main.c
- **Issue #ASFP-3591:** SD/MMC/STDIO Stack does not work with XMEGA SPI interface.
Now SD/MMC/STDIO Stack use only `x_write_packet()` functions and no `x_is_tx_ready()` functions, because `spi_is_tx_ready()` on XMEGA does not have the same behaviour that `usart_is_tx_ready()` and `spi_is_tx_ready()` from SAM/UC3.
Modified file:
common\components\memory\sd_mmc\sd_mmc_spi.c
- **Issue #ASFP-3596:** USB Device MSC examples does not work according compilation level.

Modified files:

common\services\usb\class\composite\device\example1\main.c
common\services\usb\class\composite\device\example2\main.c
common\services\usb\class\composite\device\example3\main.c
common\services\usb\class\composite\device\example4\main.c
common\services\usb\class\msc\device\example\main.c
common\services\usb\class\msc\device\example_freertos\main.c
common\services\usb\class\msc\device\unit_tests\unit_tests.c
xmega\applications\xmega_b1_xplained_demo\main.c

- **Issue #ASFP-3604:** SAM - Fix pio_handler_set_priority() to support multiple call on same PIO port and not lost previous configured interrupt on the PIO.

Save interrupt masks before setting priority.

File modified:

sam/drivers/pio/pio_handler.c

- **Issue #ASFP-3612:** Project generator error due to SAM4E USART integration.

Fixed warning while generating projects.

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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