
ASF: Release ASF-3.5.1

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-3.5.1**

Installation Instructions

Device Support

This release supports the following devices:

- AVR UC3 A0/A1 (revision H and later)
- AVR UC3 B (revision F and later)
- AVR UC3 A3/A4 (revision E and later)
- AVR UC3 A3xS/A4xS (revision E and later)
- AVR UC3 C (revision D and later)
- AVR UC3 D
- AVR UC3 L0 (revision D and later)
- 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
- megaAVR: ATmega2560
- megaAVR: ATmega48/88/168/328
- megaAVR: ATmega16/32
- megaAVR: ATmega169/329
- megaAVR: ATmega64/128
- megaAVR: ATmega324/644/1284
- SAM3N
- SAM3S
- SAM3U
- SAM3X
- SAM4L
- SAM4S

Supported Tools

- Atmel Studio 6 using GCC compiler:
 - 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:

- 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 Atmel Studio 6 requires the Atmel Studio 6 Service Pack 1 installed (6.0sp1 or later). Visit www.atmel.com/atmelstudio
- 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
- 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 videos: http://www.atmel.com/microsite/atmel_studio6/videos.aspx

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 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

- 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

New features added

- **Issue #ASFP-2212:** Add SAM4S-EK demo.

Files modified:

common/services/gfx/asf.xml
 common/services/gfx/gfx.h
 common/services/gfx/gfx_generic.c
 common/services/gfx/gfx_generic.h
 common/services/gfx/gfx_hx8347a_et024006dhu.h
 common/services/gfx/gfx_ili9341_sdt028atft.h
 sam/components/display/ili9325/ili9325.c
 sam/components/display/ili9325/ili9325.h
 sam/components/display/ili9325/unit_tests/unit_tests.c
 sam/drivers/pmc/pmc.c
 sam/drivers/pmc/pmc.h
 sam/drivers/pmc/sleep.h
 thirdparty/freertos/source/portable/gcc/sam/port.c
 thirdparty/qtouch/generic/sam/qtouch/common/touch_qt_config.h
 thirdparty/qtouch/generic/sam/qtouch/examples/qtouch_example.c
 thirdparty/qtouch/generic/sam/qtouch/lib/iar/libsam3n-32qt-k-8rs-iar.a
 thirdparty/qtouch/generic/sam/qtouch/lib/iar/libsam3s-32qt-k-8rs-iar.a
 thirdparty/qtouch/generic/sam/qtouch/lib/iar/libsam3u-32qt-k-8rs-iar.a
 thirdparty/qtouch/generic/sam/qtouch/lib/iar/libsam3x-32qt-k-8rs-iar.a
 thirdparty/qtouch/generic/sam/qtouch/lib/iar/libsam4s-32qt-k-8rs-iar.a

Files added:

common/services/gfx/gfx_ili9325_ftm280c34d.c
 common/services/gfx/gfx_ili9325_ftm280c34d.h

Folder added:

sam/applications/sam_toolkit_demo/

- **Issue #ASFP-2443:** Adding AVR477 RF4CE Applications (Target side and Controller Side).

Adding AVR477 Applications (Target side and Controller Side):

- RF4CE library (Target side and Controller Side) on MegaRF platform (Third Party).
- QTouch Library on MegaRF platform (third party)
- TWI driver (To access accelero)

- **Issue #ASFP-2777:** Implement an attach automatically on USB Device drivers.

By default, the attach is done automatically when Vbus is detected or during USB start for devices without Vbus monitoring. All USB examples are been modified.

Modified files:

avr32\drivers\usbb\usbb_device.c
 avr32\drivers\usbc\usbc_device.c
 common\services\usb\udc\udc.h
 common\services\usb\uhc\uhc.h
 common\utils\stdio\stdio_usb\stdio_usb.c
 common\utils\stdio\stdio_usb\stdio_usb.h
 sam\drivers\udp\udp_device.c
 sam\drivers\udphs\udphs_device.c
 sam\drivers\uotghs\uotghs_device.c

xmega\drivers\usb\usb_device.c

- **Issue #ASFP-2927:** Update WTK example 1 to support the UC3C-EK board.

Added support to the Widget Toolkit example 1 demo application for the UC3C-EK evaluation kit.

Folders added:

common/services/wtk/example1_widgets/at32uc3c0512c_uc3c_ek

Files added:

common/services/wtk/example1_widgets/at32uc3a3256_uc3_a3_xplained/atmel_logo_small.h
 common/services/wtk/example1_widgets/at32uc3a3256_uc3_a3_xplained/touch_interface.c
 common/services/wtk/example1_widgets/at32uc3l064_uc3_l0_xplained/atmel_logo_small.h
 common/services/wtk/example1_widgets/at32uc3l064_uc3_l0_xplained/touch_interface.c
 common/services/wtk/example1_widgets/atxmega128a1_xmega_a1_xplained/atmel_logo_small.h
 common/services/wtk/example1_widgets/atxmega128a1_xmega_a1_xplained/touch_interface.c
 common/services/wtk/example1_widgets/atxmega128b1_xmega_b1_xplained/atmel_logo_small.h
 common/services/wtk/example1_widgets/atxmega128b1_xmega_b1_xplained/touch_interface.c
 common/services/wtk/example1_widgets/atxmega256a3bu_xmega_a3bu_xplained/
 atmel_logo_small.h
 common/services/wtk/example1_widgets/atxmega256a3bu_xmega_a3bu_xplained/touch_interface.c
 common/services/wtk/example1_widgets/sam4s16c_sam4s_xplained/atmel_logo_small.h
 common/services/wtk/example1_widgets/sam4s16c_sam4s_xplained/touch_interface.c
 common/services/wtk/example1_widgets/touch_interface.h
 File deleted:
 common/services/wtk/example1_widgets/atmel_logo_small.h
 Files modified:
 common/services/gfx/gfx_text.c
 common/services/gfx/tools/create_image.py
 common/services/wtk/example1_widgets/example1.c

- **Issue #ASFP-3008:** Add XMEGA-C3 Xplained Touch support .

The Touch library support is done for XMEGA-C3 Xplained support.

Modified files:

thirdparty\qtouch\generic\avr8\qtouch\examples\example_qt_qt600\QDebugSettings.h

Moved file:

thirdparty\qtouch\generic\avr8\qtouch\examples
 \example_qt_qt600\atxmega128a1_qt600\main_xm128a1.c
 (from thirdparty\qtouch\generic\avr8\qtouch\examples\example_qt_qt600\main_xm128a1.c)

Added files:

thirdparty\qtouch\generic\avr8\qtouch\examples\example_qt_qt600\xmega_c3_xplained\app_touch.c
 thirdparty\qtouch\generic\avr8\qtouch\examples\example_qt_qt600\xmega_c3_xplained\main.c
 thirdparty\qtouch\generic\avr8\qtouch\examples\example_qt_qt600\xmega_c3_xplained\app_touch.h

- **Issue #ASFP-3009:** Add SSD1306 OLED Controller support.

The SSD1306 OLED Controller support and GFX support are available for all devices in ASF.

The XMEGA-C3 Xplained board uses it and examples has been added.

Added folder:

common\components\display\ssd1306\
 common\services\gfx_mono\example1\xmega_c3_xplained\
 common\services\gfx_mono\example1\xmega_c3_xplained\

Added files:

common\services\gfx_mono\gfx_mono_ug_2832hsweg04.c

common\services\gfx_mono\gfx_mono_ug_2832hsweg04.h

Modified files:

common\services\gfx_mono\example1\example1.c

common\services\gfx_mono\example_sysfont\example_sysfont.c

common\services\gfx_mono\gfx_mono.h

common\services\gfx_mono\tools\bitmap.py (update to support more bitmap file)

- **Issue #ASFP-3016:** Add SD/MMC/SDIO examples for XMEGA-C3 Xplained board.

Add SD/MMC/SDIO examples for XMEGA-C3 Xplained board.

Folders added:

common\components\memory\sd_mmc\example1\xmega_c3_xplained\

common\components\memory\sd_mmc\example2\xmega_c3_xplained\

- **Issue #ASFP-3029:** Add XMEGA-E5 Xplained board support.

The XMEGA-E5 Xplained board is available in Atmel Studio.

Modified file: common\boards\board.h

Added folder: xmega\boards\xmega_e5_xplained\

- **Issue #ASFP-3058:** LCD - ST7565R Controller must use the common services.

The ST7565R driver is updated to use the common SPI device selection, the ioport services and delay services.

Modified files:

common\components\display\st7565r\example\st7565r_example.c

common\components\display\st7565r\st7565r.c

common\components\display\st7565r\st7565r.h

Notable bugs fixed

- **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-2381:** GCC may optimize 'g_interrupt_enabled' and cause problem.

Define `g_interrupt_enabled` as volatile to avoid optimization by GCC.

Modified files:

`common/utils/interrupt/interrupt_sam_nvic.c`
`common/utils/interrupt/interrupt_sam_nvic.h`

- **Issue #ASFP-2526:** FWS Number of Wait States are not correct on SAM4S based boards.

FWS Number of Wait States are not correct on SAM4S based boards.

Modified files:

`\sam\utils\cmsis\sam4s\source\templates\system_sam4s.c`

- **Issue #ASFP-2677:** After `udd_disable()` the interrupt can be not re-enabled on USBB, USBC and UOTGHS device drivers.

The interrupts are always re-enabled after `udd_disable()` now.

Modified files:

`avr32/drivers/usbb/usbb_device.c`,
`avr32/drivers/usbc/usbc_device.c`,
`sam/drivers/uotghs/uotghs_device.c`.

- **Issue #ASFP-2945:** Add background color setting for the Checkbox and Radio Button widgets.

Added support for a customisable background color to be used on Widget Toolkit check box and radio button widgets, via new configuration defines `WTK_CHECKBOX_BACKGROUND_COLOR` and `WTK_RADIOBUTTON_BACKGROUND_COLOR`.

Files Changed:

`common/applications/mxt143e_xplained_calculator_demo/conf_wtk.h`
`common/services/wtk/example1_widgets/conf_wtk.h`
`common/services/wtk/example1_widgets/widget_gui.c`
`common/services/wtk/example2_icon/conf_wtk.h`
`common/services/wtk/example3_plot/conf_wtk.h`
`common/services/wtk/module_config/conf_wtk.h`
`common/services/wtk/training/conf_wtk.h`
`common/services/wtk/wtk_check_box.c`
`common/services/wtk/wtk_radio_button.c`

- **Issue #ASFP-2946:** Clean up the UC3 resistive touch driver.

Cleaned up the UC3 resistive touch component driver, to support high software oversampling rates and to conform to modern ASF coding standards.

Files Changed:

`avr32/components/touch/resistive_touch/rtouch.c`
`avr32/components/touch/resistive_touch/rtouch.h`
`avr32/components/touch/resistive_touch/example/conf/conf_rtouch.h`

- **Issue #ASFP-3065:** Wrong IN endpoint transfer management in UC3 USBC device driver .

Fix `udd_ep_interrupt()` which sent a wrong parameter to `udd_ep_trans_done()` and could stop the endpoint transfer.

Modified file:

`avr32/drivers/usbc/usbc_device.c`

- **Issue #ASFP-3067:** Missing return statement at end of non-void function "`gpio_local_disable_pin_output_driver`".

Fixed an incorrect function return type in the function "gpio_local_disable_pin_output_driver" of the AVR32 GPIO driver, which caused warnings when used.

Files Changed:

avr32/drivers/gpio/gpio.h

- **Issue #ASFP-3095:** XMEGA USART drivers in SPI mode does not handle properly port remap.

Fixed XMEGA USART driver when used in SPI mode 0 & 3 with USART remap function. The SCK pin inverted was not correct.

Modified file: xmega/drivers/usart/usart.c.

- **Issue #ASFP-3121:** XMEGA USB CDC Examples does not set correct the low USART baud rate.

XMEGA USB CDC Examples does not set correct the low USART baud rate.

The issue has been fixed in following examples.

Modified files:

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

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

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/>.

Disclaimer and Credits

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of Atmel may not be used to endorse or promote products derived from this software without specific prior written permission.
4. This software may only be redistributed and used in connection with an Atmel microcontroller product.

THIS SOFTWARE IS PROVIDED BY ATMEL "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT ARE EXPRESSLY AND SPECIFICALLY DISCLAIMED. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.