Atmel QTouch Library

Peripheral Touch Controller

RELEASE NOTES

Introduction

Atmel QTouch Library makes it simple for developers to embed capacitive-touch button, slider, wheel functionality into general-purpose Atmel SMART ARM and AVR® microcontroller applications. QTouch Library for Peripheral Touch Controller can be used for touch sensor pin configuration, acquisition parameter setting as well as periodic sensor data capture and receive touch status updates. This document provides detailed information on QTouch Library release updates.

Table of Contents

Release 5.9 July 2016

Installer builds

GCC

- QTouch Composer Studio extension 5.9.116
- QTouch Library Studio extension 5.9.211
- Dependencies
    - Atmel Studio 7.0.1006 or later versions
    - ASF - 3.30.1 or later versions
    - Atmel Kits – 7.0.70 or later versions
    - EDBG version – 3.19 or later versions

IAR

- QTouch Library IAR Installer build 5.9.211
- Dependencies
    - IAR Embedded Workbench 7.50.1.10273
    - IAR Embedded Workbench for Atmel AVR 6.70.1
    - ASF - 3.29

General Library

Library version 5.0.8

Bug Fixes/Improvements

- The touch acquisition may fail and stop working. This issue has been fixed in the library.
- Possible to miss ADC EOC sampling when waking up from sleep. This issue has been fixed in Atmega324PB library and Atmega328PB library.
- High power consumption issue due to sync_config function has been fixed in the library.
- User board low power project creation for SAM L21 device uses generic low power id instead of Sensor 0.
- User board SAM D10/D11 non-ASF project templates are modified to match with the power numbers of ASF based projects.
- Example projects using RC8MHz as reference clock for DFLL clock source is pre-scaled to 32KHz as recommended.

Safety Library

No Updates in the Safety Library.

Bug Fixes/Improvements

- The touch acquisition may fail and stop working.The work around has been updated in the Safety user guide.
- SAMD20 Safety Example Project Update: All Example projects including GCC/IAR Robustness Projects for SAMD20 using RC8MHz as reference clock for DFLL clock source is pre-scaled to 32KHz as recommended.

Surface Library

No Updates in the Surface Library.

Bug Fixes/Improvements

- SAMD20 Surface Example Project Update: All Example projects including GCC/IAR QT6/QT2 Projects for SAMD20 using RC8MHz as reference clock for DFLL clock source is pre-scaled to 32KHz as recommended.

QTouch Composer

Feature/Usability Improvements

- Automatic switching from Embed to DGI mode is supported.
- Fixed error in writing the kit sensor parameters to project.

Release 5.9 April 2016

Installer builds

GCC

- QTouch Composer Studio extension 5.9.108
- QTouch Library Studio extension 5.9.191
- Dependencies
    - Atmel Studio 7.0.634 or later versions
    - ASF - 3.30.1 or later versions
    - Atmel Kits – 7.0.44 or later versions
    - EDBG version – 2.10 or later versions

IAR

- QTouch Library IAR Installer build 5.9.191
- Dependencies
    - IAR Embedded Workbench 7.50.1.10273
    - IAR Embedded Workbench for Atmel AVR 6.70.1
    - ASF - 3.29

General Library

Library version 5.0.7

Bug Fixes/Improvements

- Example projects have been updated such that for SAMC20/C21 RevB devices, DPLL is used as main clock and for SAMC20/C21 revC devices, OSC48MHz is used as main clock.
- Non-ASF projects for SAMD10D14AU and SAMD11D14AU devices are supported.
- Qdebug data transmission in mega projects are modified.
- Example projects using DFLL as main clock source have been updated to use scaled RC8MHz clock as reference input clock.
- OSC32K is used as reference clock for DPLL clock source in SAM C20/C21 projects.
- DEF_TOUCH_APP_ERR_HANDLER macro is introduced to enable or disable application error handler function.

Safety Library

Library Version 5.1.14

Bug Fixes/Improvements

- Example projects have been updated such that for SAMC20/C21 RevB devices, DPLL is used as main clock and for SAMC20/C21 revC devices, OSC48MHz is used as main clock.
- Example projects using DFLL as main clock source have been updated to use scaled RC8MHz clock as reference input clock.

Surface Library

Library Version 1.0.3

Feature additions

There are no updates in the surface library for this release

Release 5.9 February 2016

Installer builds

GCC

- QTouch Composer Studio extension 5.9.108
- QTouch Library Studio extension 5.9.178
- Dependencies
    - Atmel Studio 7.0.634
    - ASF - 3.30.1
    - Atmel Kits – 7.0.44
    - EDBG version – 2.10

IAR

- QTouch Library IAR Installer build 5.9.178
- Dependencies
    - IAR Embedded Workbench 7.50.1.10273
    - IAR Embedded Workbench for Atmel AVR 6.70.1
    - ASF - 3.29

General Library

Library version 5.0.7

Feature additions

- Library and device support has been added for ATmega324PB.
- Device support has been extended to SAMD10D14AU, SAMD11D14AU and SAMR21E19A variants.

Bug fixes done

- For SAMC devices, main clock source has been changed from DPLL to OSC48M.
- For SAM L22 projects, the system performance level is changed when MCU frequency is above 8 MHz instead of 12MHz.
- SAM L21/L22 example projects are configured in PL0 with Main Regulator (Buck) configured to run in standby sleep to cater the bug in LP Regulator.

Safety Library

Library version 5.1.14 for SAMC20 device is added for this Release

Feature additions

- Library and device support has been added for SAMC20 device variants.
- Low power Feature has been added for Safety Library version 5.1.14
- Moisture Quick Re-burst Enable/Disable has been added.
- SAMC20 Robustness Example Project added for both IAR and GCC.

Surface Library

Library Version 1.0.3

Feature additions

- There are no updates in the surface library for this release.

Example projects for Atmel Kits

GCC & IAR

- **SAM D20**
  - SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
  - SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
  - SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application with Lump-Low Power configuration
  - SAM D20 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
  - SAM D20 QTouch Robustness Demo Moisture Example Application (self + mutual) example application
  - SAM D20 Xplained Pro and QT2 Xplained Pro Touch Surface example application
  - SAM D20 Xplained Pro and QT6 Xplained Pro Touch Surface example application
  - SAM D20 QTouch Safety Robustness Demo
- **SAM D21**
  - SAM D21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM D21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
- **SAM D11**
  - SAM D11 Xplained Pro Self Capacitance example application
- **SAM D10**
  - SAM D10 Xplained Mini Self Capacitance example application
- **SAM DA1**
  - SAM DA1 Xplained Pro and QT4 Xplained Pro Self Capacitance example application
- **SAM C21**
  - SAM C21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM C21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
  - SAM C21 Xplained Pro Self Capacitance example application(on-board sensor)
  - SAM C21 Xplained Pro and QT5 Xplained Pro Mutual Capacitance example application
- **SAM C20**
  - SAM C20 QTouch Robustness Demo Moisture Example Application
  - SAM C20 QTouch Safety Robustness Demo

- **SAM L21**
  - SAM L21 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
- **SAM L22**
  - SAM L22 Xplained Pro and Touch Segment LCD Xplained Pro Mutual Capacitance example application
- **MEGA 328PB**
  - ATmega328PB Xplained Mini Self Capacitance example application
- **MEGA 324PB**
  - ATmega324PB Xplained Pro and QT5 Xplained Pro Mutual Capacitance example application

Device Support

QTouch library for PTC supports the following devices.

GENERAL LIBRARY									
SAM D21	**SAM D20**	**SAM C21**	**SAM C20**	**SAM L21**	**SAM L22**	**SAM DA1**	**SAM R21**	**SAM D10/D11**	**MEGA**
ATSAMD21J18A	ATSAMD20J18	ATSAMC21E15A	ATSAMC20E15A	ATSAML21E15B	ATSAML22G16A	ATSAMDA1E14A	ATSAMR21G16A	ATSAMD10C14A	ATmega328PB
ATSAMD21J17A	ATSAMD20J17	ATSAMC21E16A	ATSAMC20E16A	ATSAML21E16B	ATSAML22G17A	ATSAMDA1E15A	ATSAMR21G17A	ATSAMD10D14AM	ATmega324PB
ATSAMD21J16A	ATSAMD20J16	ATSAMC21E17A	ATSAMC20E17A	ATSAML21E17B	ATSAML22G18A	ATSAMDA1E16A	ATSAMR21G18A	ATSAMD10D14AS	
ATSAMD21J15A	ATSAMD20J15	ATSAMC21E18A	ATSAMC20E18A	ATSAML21E18B	ATSAML22J16A	ATSAMDA1G14A	ATSAMR21E16A	ATSAMD10D14AU	
ATSAMD21G18A	ATSAMD20J14	ATSAMC21G15A	ATSAMC20G15A	ATSAML21G16B	ATSAML22J17A	ATSAMDA1G15A	ATSAMR21E17A	ATSAMD11C14A	
ATSAMD21G17A	ATSAMD20G18U	ATSAMC21G16A	ATSAMC20G16A	ATSAML21G17B	ATSAML22J18A	ATSAMDA1G16A	ATSAMR21E18A	ATSAMD11D14AM	
ATSAMD21G16A	ATSAMD20G18	ATSAMC21G17A	ATSAMC20G17A	ATSAML21G18B	ATSAML22N16A	ATSAMDA1J14A	ATSAMR21E19A	ATSAMD11D14AS	
ATSAMD21G15A	ATSAMD20G17U	ATSAMC21G18A	ATSAMC20G18A	ATSAML21J16B	ATSAML22N17A	ATSAMDA1J15A		ATSAMD11D14AU	
ATSAMD21E18A	ATSAMD20G17	ATSAMC21J16A	ATSAMC20J16A	ATSAML21J17B	ATSAML22N18A	ATSAMDA1J16A			
ATSAMD21E17A	ATSAMD20G16	ATSAMC21J17A	ATSAMC20J17A	ATSAML21J18B					
ATSAMD21E16A	ATSAMD20G15	ATSAMC21J18A	ATSAMC20J18A						
ATSAMD21E15A	ATSAMD20G14								
ATSAMD21J16B	ATSAMD20E18								
ATSAMD21J15B	ATSAMD20E17								
ATSAMD21E15B	ATSAMD20E16								
ATSAMD21E15BU	ATSAMD20E15								
ATSAMD21E16B	ATSAMD20E14								
ATSAMD21E16BU									
ATSAMD21G15B									
ATSAMD21G16B									
ATSAMD21G17AU									
ATSAMD21G18AU									

SAFETY LIBRARY			SURFACE LIBRARY	
SAM D21	**SAM D20**	**SAM C20**	**SAM D21**	**SAM D20**
ATSAMD21J18A	ATSAMD20J18	ATSAMC20E15A	ATSAMD21J18A	ATSAMD20J18
ATSAMD21J17A	ATSAMD20J17	ATSAMC20E16A	ATSAMD21J17A	ATSAMD20J17
ATSAMD21J16A	ATSAMD20J16	ATSAMC20E17A	ATSAMD21J16A	ATSAMD20J16
ATSAMD21J15A	ATSAMD20J15	ATSAMC20E18A	ATSAMD21J15A	ATSAMD20J15
ATSAMD21G18A	ATSAMD20G18U	ATSAMC20G15A	ATSAMD21G18A	ATSAMD20G18U
ATSAMD21G17A	ATSAMD20G18	ATSAMC20G16A	ATSAMD21G17A	ATSAMD20G18
ATSAMD21G16A	ATSAMD20G17U	ATSAMC20G17A	ATSAMD21G16A	ATSAMD20G17U
ATSAMD21G15A	ATSAMD20G17	ATSAMC20G18A	ATSAMD21G15A	ATSAMD20G17
ATSAMD21E18A	ATSAMD20G16	ATSAMC20J16A	ATSAMD21E18A	ATSAMD20G16
ATSAMD21E17A	ATSAMD20G15	ATSAMC20J17A	ATSAMD21E17A	ATSAMD20G15
ATSAMD21E16A	ATSAMD20E18	ATSAMC20J18A	ATSAMD21E16A	ATSAMD20E18
ATSAMD21E15A	ATSAMD20E17		ATSAMD21E15A	ATSAMD20E17
ATSAMD21J16B	ATSAMD20E16		ATSAMD21J16B	ATSAMD20E16
ATSAMD21J15B	ATSAMD20E15		ATSAMD21J15B	ATSAMD20E15
ATSAMD21E15B			ATSAMD21E15B	
ATSAMD21E15BU			ATSAMD21E15BU	
ATSAMD21E16B			ATSAMD21E16B	
ATSAMD21E16BU			ATSAMD21E16BU	
ATSAMD21G15B			ATSAMD21G15B	
ATSAMD21G16B			ATSAMD21G16B	
ATSAMD21G17AU			ATSAMD21G17AU	
ATSAMD21G18AU			ATSAMD21G18AU	

QTouch Composer

Device Support

- ATmega324PB support has been added for general library in GUI.
- SAM C20 variants have been supported for safety library in GUI.

Feature/Usability Improvements

- In BSW tuning Parameters pane, CSD value limit is modified to 250 instead of 252.
- In Advanced tuning parameters pane, options specific to SAM C20 that are not required were hidden.
- Moisture quick re-burst feature is enabled for safety.

- Fixed code generation logic for low power mega PTC projects.

Release 5.8 January 2016

Installer builds

GCC

- QTouch Composer Studio extension 5.8.94
- QTouch Library Studio extension 5.8.146
- Dependencies
    - Atmel Studio 7.0.634
    - ASF - 3.29.0
    - Atmel Kits – 7.0.44
    - EDBG version – 2.10

IAR

- QTouch Library IAR Installer build 5.8.146
- Dependencies
    - IAR Embedded Workbench 7.50.1.10273
    - IAR Embedded Workbench for Atmel AVR 6.70.1

General Library

Library version 5.0.7

Bug fixes done

- PTC clock is set at 8 MHz for SAML22 example and user board projects.
- Boot time pre-scaler and series resistor setting available in composer during project creation.
- SAML22 Low power user board project is modified to run the CPU in PL0 and Buck regulator is configured to run in standby sleep to facilitate low power.
- ATmega328PB user board project template is modified to support both selfcap and mutualcap configuration.
- System clock pre-scaler is changed to 1 in example project of ATmega328PB Xplained mini to set Device clock to 8MHz.
- Low power user board templates are updated to support low power mode switch to occur correctly independent of number of configured sensors.

Safety Library

Library Version 5.1.4

Feature additions

- There are no updates in the safety library for this release.

Surface Library

Library Version 1.0.3

Feature additions

- There are no updates in the surface library for this release.

QTouch Composer

Device Support

- ATmega328PB (AVR device with PTC) support has been added for general library in GUI.
- SAM L22 variants have been supported for general library in GUI.

Feature/Usability Improvements

- Filter level and Auto OS is available on a per channel basis instead of global.
- Low power support for ATmega328PB.
- GND feature is supported in GUI.
- USART support is added in Analyzer for ATmega328PB Xmini Kit.
- Support for new kit (QT5) is added.
- Atmel ICE support is added.

Release 5.8 December 2015

Installer builds

GCC

- QTouch Composer Studio extension 5.8.88
- QTouch Library Studio extension 5.8.142
- Dependencies
    - Atmel Studio 7.0.634
    - ASF - 3.29.0
    - Atmel Kits – 7.0.44
    - EDBG version – 2.10

IAR

- QTouch Library IAR Installer build 5.8.140
- Dependencies
    - IAR Embedded Workbench 7.50.1.10273

- IAR Embedded Workbench for Atmel AVR 6.70.1

General Library

Library version 5.0.7

Feature additions

- Library support for SAM L22 device variants have been added.
- Library support for AVR 8 bit device (ATMEGA328PB) support has been added.
- Filter level and auto-oversample features are available on per channel basis.
- Support for grounding the self/mutual capacitance PTC lines in between measurements has been added.

Bug fixes

- In touch_de-init API, exception caused due to pointer mishandling is fixed.
- In xxxxcap_sensor_disable API, when all the sensors were disabled, PTC was not disabled. This is fixed.

Safety Library

Library Version 5.1.4

Feature additions

- There are no updates in the safety library for this release.
- Safety example Projects have been updated with latest ASF.
- SAMD20 QTouch Safety Robustness Demo has been updated with latest ASF.

Surface Library

Library Version 1.0.3

Feature additions

- Support for SAMD21 Device Variants have been added.
- Surface Example Projects have been updated with latest ASF.
- Minor Bug fixes are done in the library and application.

Example projects for Atmel Kits

GCC & IAR

- **SAM D20**
  - SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application

- SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
- SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application with Lump-Low Power configuration
- SAM D20 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
- SAM D20 QTouch Robustness Demo Moisture Example Application (self + mutual) example application
- SAM D20 Xplained Pro and QT2 Xplained Pro Touch Surface example application
- SAM D20 Xplained Pro and QT6 Xplained Pro Touch Surface example application
- SAM D20 QTouch Safety Robustness Demo

➢ **SAM D21**
- SAM D21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
- SAM D21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application

➢ **SAM D11**
- SAM D11 Xplained Pro Self Capacitance example application

➢ **SAM D10**
- SAM D10 Xplained Mini Self Capacitance example application

➢ **SAM DA1**
- SAM DA1 Xplained Pro and QT4 Xplained Pro Self Capacitance example application

➢ **SAM C21**
- SAM C21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
- SAM C21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
- SAM C21 Xplained Pro Self Capacitance example application(on-board sensor)
- SAM C21 Xplained Pro and QT5 Xplained Pro Mutual Capacitance example application

➢ **SAM C20**
- SAM C20 QTouch Robustness Demo Moisture Example Application

➢ **SAM L21**
- SAM L21 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration

➢ **SAM L22**
- SAM L22 Xplained Pro and Touch Segment LCD Xplained Pro Mutual Capacitance example application

- **MEGA 328PB**
  - ATMEGA 328PB Xplained Mini Self Capacitance example application

Device Support

The device support has been extended to support these devices.

GENERAL LIBRARY									
SAM D21	**SAM D20**	**SAM C21**	**SAM C20**	**SAM L21**	**SAM L22**	**SAM DA1**	**SAM R21**	**SAM D10/D11**	**MEGA**
ATSAMD21J18A	ATSAMD20J18	ATSAMC21E15A	ATSAMC20E15A	ATSAML21E15B	ATSAML22G16A	ATSAMDA1E14A	ATSAMR21G16A	ATSAMD10C14A	ATMEGA328PB
ATSAMD21J17A	ATSAMD20J17	ATSAMC21E16A	ATSAMC20E16A	ATSAML21E16B	ATSAML22G17A	ATSAMDA1E15A	ATSAMR21G17A	ATSAMD10D14AM	
ATSAMD21J16A	ATSAMD20J16	ATSAMC21E17A	ATSAMC20E17A	ATSAML21E17B	ATSAML22G18A	ATSAMDA1E16A	ATSAMR21G18A	ATSAMD10D14AS	
ATSAMD21J15A	ATSAMD20J15	ATSAMC21E18A	ATSAMC20E18A	ATSAML21E18B	ATSAML22J16A	ATSAMDA1G14A	ATSAMR21E16A	ATSAMD11C14A	
ATSAMD21G18A	ATSAMD20J14	ATSAMC21G15A	ATSAMC20G15A	ATSAML21G16B	ATSAML22J17A	ATSAMDA1G15A	ATSAMR21E17A	ATSAMD11D14AM	
ATSAMD21G17A	ATSAMD20G18U	ATSAMC21G16A	ATSAMC20G16A	ATSAML21G17B	ATSAML22J18A	ATSAMDA1G16A	ATSAMR21E18A	ATSAMD11D14AS	
ATSAMD21G16A	ATSAMD20G18	ATSAMC21G17A	ATSAMC20G17A	ATSAML21G18B	ATSAML22N16A	ATSAMDA1J14A			
ATSAMD21G15A	ATSAMD20G17U	ATSAMC21G18A	ATSAMC20G18A	ATSAML21J16B	ATSAML22N17A	ATSAMDA1J15A			
ATSAMD21E18A	ATSAMD20G17	ATSAMC21J16A	ATSAMC20J16A	ATSAML21J17B	ATSAML22N18A	ATSAMDA1J16A			
ATSAMD21E17A	ATSAMD20G16	ATSAMC21J17A	ATSAMC20J17A	ATSAML21J18B					
ATSAMD21E16A	ATSAMD20G15	ATSAMC21J18A	ATSAMC20J18A						
ATSAMD21E15A	ATSAMD20G14								
ATSAMD21J16B	ATSAMD20E18								
ATSAMD21J15B	ATSAMD20E17								
ATSAMD21E15B	ATSAMD20E16								
ATSAMD21E15BU	ATSAMD20E15								
ATSAMD21E16B	ATSAMD20E14								
ATSAMD21E16BU									
ATSAMD21G15B									
ATSAMD21G16B									
ATSAMD21G17AU									
ATSAMD21G18AU									

SAFETY LIBRARY		SURFACE LIBRARY	
SAM D21	**SAM D20**	**SAM D21**	**SAM D20**
ATSAMD21J18A	ATSAMD20J18	ATSAMD21J18A	ATSAMD20J18
ATSAMD21J17A	ATSAMD20J17	ATSAMD21J17A	ATSAMD20J17
ATSAMD21J16A	ATSAMD20J16	ATSAMD21J16A	ATSAMD20J16
ATSAMD21J15A	ATSAMD20J15	ATSAMD21J15A	ATSAMD20J15
ATSAMD21G18A	ATSAMD20G18U	ATSAMD21G18A	ATSAMD20G18U
ATSAMD21G17A	ATSAMD20G18	ATSAMD21G17A	ATSAMD20G18
ATSAMD21G16A	ATSAMD20G17U	ATSAMD21G16A	ATSAMD20G17U
ATSAMD21G15A	ATSAMD20G17	ATSAMD21G15A	ATSAMD20G17
ATSAMD21E18A	ATSAMD20G16	ATSAMD21E18A	ATSAMD20G16
ATSAMD21E17A	ATSAMD20G15	ATSAMD21E17A	ATSAMD20G15
ATSAMD21E16A	ATSAMD20E18	ATSAMD21E16A	ATSAMD20E18
ATSAMD21E15A	ATSAMD20E17	ATSAMD21E15A	ATSAMD20E17
ATSAMD21J16B	ATSAMD20E16	ATSAMD21J16B	ATSAMD20E16
ATSAMD21J15B	ATSAMD20E15	ATSAMD21J15B	ATSAMD20E15
ATSAMD21E15B		ATSAMD21E15B	
ATSAMD21E15BU		ATSAMD21E15BU	
ATSAMD21E16B		ATSAMD21E16B	
ATSAMD21E16BU		ATSAMD21E16BU	
ATSAMD21G15B		ATSAMD21G15B	
ATSAMD21G16B		ATSAMD21G16B	
ATSAMD21G17AU		ATSAMD21G17AU	
ATSAMD21G18AU		ATSAMD21G18AU	

Release 5.7 September 2015

Installer builds

GCC

- QTouch Composer Studio extension 5.7.223
- QTouch Library Studio extension 5.7.327
- Dependencies
    - Atmel Studio 6.2.1563
    - ASF - 3.26.0
    - Atmel Kits - 6.2.360
    - Device part packs
        - SAM C21, SAM C20
        - SAM DA1
        - SAM L21 REV B
    - EDBG version – 2.9

IAR

- QTouch Library IAR Installer build 5.7.325
- Dependencies
    - IAR Embedded Workbench 7.40.3.8938

General Library

Library version 5.0.6

Feature additions

- Library support for SAM C20, SAM C21, SAM L21 rev B and SAM D21 B, BU device variants have been added.
- SAM L21 rev A support has been removed.
- Moisture quick re-burst enable/disable parameter has been added.
- Charge Share Delay feature (global parameter) has been added for SAMC2X devices.
- Charge Share Delay auto-tune feature has been added for SAMC2X devices.
- Auto-OS signal stability limit parameter has been added.
- Auto-OS algorithm has been updated.

Safety Library

Library version 5.1.3

Feature additions

- Support for SAMD20 and SAMD21 Device Variants has been added. Please refer QTouch_Library_Selection_guide.xls

- **Auto Over-sample** , **Filter Level, PTC Pre-scaler** and **Resistor** selection for individual channel has been added.
- New APIs **touch_mutlcap_sensors_deinit** , **touch_selfcap_sensors_deinit** for Touch De-initialization.
- TOUCH_AUTO_OS_IN_PROGRESS & TOUCH_CC_CALIB_ERROR flags are added as acquisition status flags
- Auto Oversample status per channel has been added in touch_measure_data_t structure
- **touch_mutlcap_sensor_reenable** , **touch_selfcap_sensor_reenable** APIs are modified so that disabled sensors can be re-enabled with or without calibration
- Bug Fix related to Auto Oversample should trigger when sensor is touched is fixed.

Surface Library

Library version 1.0.1

Feature additions

- No updates are done for this release

Example projects for Atmel Kits

GCC & IAR

- **SAM D20**
  - SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
  - SAM D20 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
  - SAM D20 Xplained Pro and QT1 Xplained Pro Self Capacitance example application with Lump-Low Power configuration
  - SAM D20 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration
  - SAM D20 QTouch Robustness Demo Moisture Example Application (self + mutual) example application
- **SAM D21**
  - SAM D21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM D21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
- **SAM D11**
  - SAM D11 Xplained Pro Self Capacitance example application

- **SAM D10**
  - SAM D10 Xplained Mini Self Capacitance example application
- **SAM DA1**
  - SAM DA1 Xplained Pro and QT4 Xplained Pro Self Capacitance example application
- **SAM C21**
  - SAM C21 Xplained Pro and QT1 Xplained Pro Mutual Capacitance example application
  - SAM C21 Xplained Pro and QT1 Xplained Pro Self Capacitance example application
  - SAM C21 Xplained Pro Self Capacitance example application(on-board sensor)
- **SAM C20**
  - SAM C20 QTouch Robustness Demo Moisture Example Application
- **SAM L21**
  - SAM L21 Xplained Pro and QT3 Xplained Pro Mutual Capacitance example application with Lump-Low Power configuration

Device support

The device variants support for general, safety and surface are given below:

GENERAL LIBRARY								
SAMD21	**SAMD20**	**SAMC21**	**SAMC20**	**SAML21**	**SAMDA1**	**SAMR21**	**SAMD10**	**SAMD11**
ATSAMD21J18A	ATSAMD20J18	ATSAMC21E15A	ATSAMC20E15A	ATSAML21E15B	ATSAMDA1E14A	ATSAMR21G16A	ATSAMD10C14A	ATSAMD11C14A
ATSAMD21J17A	ATSAMD20J17	ATSAMC21E16A	ATSAMC20E16A	ATSAML21E16B	ATSAMDA1E15A	ATSAMR21G17A	ATSAMD10D14AM	ATSAMD11D14AM
ATSAMD21J16A	ATSAMD20J16	ATSAMC21E17A	ATSAMC20E17A	ATSAML21E17B	ATSAMDA1E16A	ATSAMR21G18A	ATSAMD10D14AS	ATSAMD11D14AS
ATSAMD21J15A	ATSAMD20J15	ATSAMC21E18A	ATSAMC20E18A	ATSAML21E18B	ATSAMDA1G14A	ATSAMR21E16A		
ATSAMD21G18A	ATSAMD20J14	ATSAMC21G15A	ATSAMC20G15A	ATSAML21G16B	ATSAMDA1G15A	ATSAMR21E17A		
ATSAMD21G17A	ATSAMD20G18U	ATSAMC21G16A	ATSAMC20G16A	ATSAML21G17B	ATSAMDA1G16A	ATSAMR21E18A		
ATSAMD21G16A	ATSAMD20G18	ATSAMC21G17A	ATSAMC20G17A	ATSAML21G18B	ATSAMDA1J14A			
ATSAMD21G15A	ATSAMD20G17U	ATSAMC21G18A	ATSAMC20G18A	ATSAML21J16B	ATSAMDA1J15A			
ATSAMD21E18A	ATSAMD20G17	ATSAMC21J16A	ATSAMC20J16A	ATSAML21J17B	ATSAMDA1J16A			
ATSAMD21E17A	ATSAMD20G16	ATSAMC21J17A	ATSAMC20J17A	ATSAML21J18B				
ATSAMD21E16A	ATSAMD20G15	ATSAMC21J18A	ATSAMC20J18A					
ATSAMD21E15A	ATSAMD20G14							
ATSAMD21J16B	ATSAMD20E18							
ATSAMD21J15B	ATSAMD20E17							
ATSAMD21E15B	ATSAMD20E16							
ATSAMD21E15BU	ATSAMD20E15							
ATSAMD21E16B	ATSAMD20E14							
ATSAMD21E16BU								
ATSAMD21G15B								
ATSAMD21G16B								
ATSAMD21G17AU								
ATSAMD21G18AU								

SAFETY LIBRARY		SURFACE LIBRARY
SAMD20	SAMD21	SAMD20
ATSAMD21J18A	ATSAMD20J18	ATSAMD20E16
ATSAMD21J17A	ATSAMD20J17	ATSAMD20E17
ATSAMD21J16A	ATSAMD20J16	ATSAMD20E18
ATSAMD21J15A	ATSAMD20J15	ATSAMD20G16
ATSAMD21G18A	ATSAMD20G18U	ATSAMD20G17
ATSAMD21G17A	ATSAMD20G18	ATSAMD20G18
ATSAMD21G16A	ATSAMD20G17U	ATSAMD20J16
ATSAMD21G15A	ATSAMD20G17	ATSAMD20J17
ATSAMD21E18A	ATSAMD20G16	ATSAMD20J18
ATSAMD21E17A	ATSAMD20G15	
ATSAMD21E16A	ATSAMD20E18	
ATSAMD21E15A	ATSAMD20E17	
ATSAMD21J16B	ATSAMD20E16	
ATSAMD21J15B	ATSAMD20E15	
ATSAMD21E15B	ATSAMD20E15	
ATSAMD21E15BU		
ATSAMD21E16B		
ATSAMD21E16BU		
ATSAMD21G15B		
ATSAMD21G16B		
ATSAMD21G17AU		
ATSAMD21G18AU		

Release 5.6 April 2015

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.6.183.0 or later
    - QTouch Library Studio extension 5.6.233.0 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0.5

General Library

Library version 5.0.5

Feature additions

- Library support for SAMR21 device variants.
- Moisture tolerance feature addition has been done.

Safety Library

Library version 5.0.13

Feature additions

- Suspend and resume API support added.
- SAM D20 Robustness demo additions:
    - GCC Example demo project for robustness demo board updated
    - IAR Example demo project for robustness demo board updated

Surface Library

Library version 1.0.1

Feature additions

- SAMD20J15, SAMD20G15 and SAMD20E15 device support added.
- Linearity Improvement has been done.
- Memory Optimization.
- Separate DPI for both X and Y Axis.

Release 5.5 February 2015

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.5.159.0or later
    - QTouch Library Studio extension 5.5.155.0 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0.4

General Library

Library version 5.0.4

Feature additions

- Library support for SAML21/SAMD10/SAMD11 variants.
- D11/L21 Xplained Pro example projects added.
- Low power sensor support added along with example project for SAMD20.
- Lumped Sensor configuration support added.
- PTC Suspend/Resume, deinit APIs added, re-enable PTC API modified.

Surface Library

Library version 1.0.0

Feature additions

- Surface library support for SAMD20 variants
- Supports two touches with up to 2mm edge-to edge touch separation
- Wake-up on surface touch from a standby current down to 4µA
- Supports up to 100 nodes with varying surface size.

Release 5.4 November 2014

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.4.78.0 or later
    - QTouch Library Studio extension 5.4.82.0 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0.3

General Library

Library version 5.0.3

Feature additions

- Formula based Cc calibration feature support.
- Interrupt execution mode feature addition, allows for deterministic interrupt execution time when capacitance measurement is initiated.
- Flag to indicate Auto-Oversamples shift within library.
- Flag to indicate Cc compensation cap calibration error.
- Revision number arrangement includes product classification ID to categorize General library or Safety library.
- New or missed out device variants support added to QTouch Library extension for General library - ATSAMD21J15A, ATSAMD21G15A, ATSAMD20E18

Safety Library

Library version 5.0.11

Feature additions

- Safety library support for SAMD20 variants
- FMEA Feature Addition.
- Safety Features like CRC , Double Inverse, Run Time Parameter Checks, Static RAM location support for safety library data are part of safety library.
- Quick reburst feature supported.

- Moisture tolerance support for devices by moisture grouping and multi touch grouping.
- Application Burst Again Feature.
- GCC Example demo project for robustness demo board.
- IAR Example demo project for robustness demo board.

Release 5.3 March 2014

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.3.37.0 or later
    - QTouch Library Studio extension 5.3.0.94 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0.2

General Library

Library version 5.0.2

Feature additions

- **None**

Bug fix done

- Away from touch recalibration threshold parameter cannot be configured using touch.h parameter DEF_MUTLCAP_ATCH_RECAL_DELAY or DEF_SELFCAP_ATCH_RECAL_DELAY for mutual cap/self-cap respectively

Release 5.3 February 2014

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.3.29.0 or later
    - QTouch Library Studio extension 5.3.0.83 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0.1

General Library

Library version 5.0.1

Feature additions

- Runtime sensor disable and re-enable API's added.
- Sensor calibration implemented as a non-blocking feature as compared to blocking API call in the previous version.
- Improvements done for reduced Sensor calibration time.
- Provision to manually set PTC pre-scalar and PTC series resistor.
- Option provided for the user to select Acquisition Frequency mode that allows for more tuning options under conducted or radiated noise environments.
- PTC will be shut down in between successive acquisitions to further lower power consumption.
- New update and get API's added to update and get PTC configuration parameters.
- SAMD21 device family support has been added.
- Improvements done to enable faster touch response time.

Release 5.2 September 2013

Installer builds

GCC

- Atmel Studio Extension release for GCC Compiler
    - QTouch Composer Studio extension 5.2.0.2027 or later
    - QTouch Library Studio extension 5.2.0.2077 or later

IAR

- Atmel QTouch Libraries PTC Part pack 5.0

General Library

Library version 5.0.0

Feature additions

- Self and Mutual capacitance example projects along with libraries have been added to support the ATMEL SAMD20 family of embedded microcontrollers

Revision History

Doc Rev.	Date	Comments
1	18 Sep 2015	Updated with Release 5.7 section.
2	18 Dec 2015	Updated with Release 5.8 section.
3	13 Jan 2016	Updated with Release 5.8 January release section.
4	17 Feb 2016	Updated with Release 5.9 section. Qtouch Composer section is also added.
5	1 Apr 2016	Updated with Release 5.9 April release section.
6	5 July 2016	Updated with Release 5.9 July 2016 section.

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