



---

## AT03975: Getting Started with SAM L21

---

### APPLICATION NOTE

### Description

---

This application note aims at getting started with the Atmel® SAM L21 ARM® Cortex®-M0+ based microcontroller.

### Features

---

- Getting started with Atmel® SAM L21 microcontrollers and tools
- Atmel SAM D20 Xplained PRO and Atmel Studio 6.2 getting started

## Table of Contents

---

Description.....	1
Features.....	1
1. Get the Device Datasheet.....	3
2. Get the SAM L21 Xplained Pro Evaluation Kit.....	4
3. Get the Tools.....	5
3.1. Get Atmel Studio 6.2.....	5
3.2. Get IAR Embedded Workbench for ARM.....	5
3.3. Get Atmel Software Framework (ASF).....	5
4. Atmel Studio 6.2 Users Getting Started.....	6
5. What's Next.....	8
6. Revision History.....	9

## 1. Get the Device Datasheet

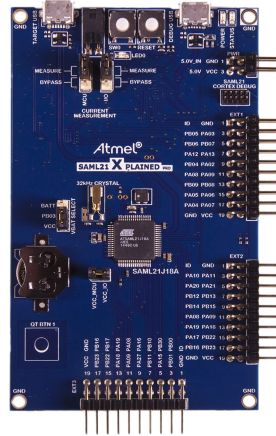
Web page: [SAM L series](#)

Document/file: Atmel SAM L21 Datasheet (summary, complete)(.pdf)

- Select the required device (i.e. ATSAML21J18A) and get the latest datasheet (.pdf file). There are two versions:
  - Complete version (includes all peripheral descriptions and electrical characteristics)
  - Summary version

## 2. Get the SAM L21 Xplained Pro Evaluation Kit

Figure 2-1 SAM L21 Xplained Pro kit



Web page: [SAM L21 Xplained Pro](#)

Get the kit: [Atmel Store](#)

Document/file:

- SAM L21 Xplained Pro User Guide application note (.pdf)

**Key features:**

- SAML21J18A microcontroller
- One mechanical reset button
- One mechanical programmable button
- One QTouch<sup>®</sup> button
- One yellow user LED
- Backup battery
- 32.768kHz crystal
- USB interface, device and reduced host mode
- Three Xplained Pro extension headers
- Embedded Debugger
  - Auto-ID for board identification in Atmel Studio
  - One yellow status LED
  - One green board power LED
  - Symbolic debug of complex data types including scope information
  - Programming and debugging, including power measurements
  - Data Gateway Interface: SPI, I<sup>2</sup>C, four GPIOs
  - Virtual COM port (CDC)
- Embedded current measurement circuitry, with [Atmel Data Visualizer](#) support for data visualization
- USB powered
- Supported with application examples in Atmel Software Framework

The SAM L21 Xplained Pro User Guide application note covers how to power the kit, the detailed information on board components, extension interface and the hardware guide.

### 3. Get the Tools

Atmel Studio 6.2, which uses GCC compiler, is the preferred IDE to get started with SAM L21. Atmel Software Framework supports the IAR™ compiler and the ASF standalone package can be used to get example projects for SAM L21 in the IAR IDE.

#### 3.1. Get Atmel Studio 6.2

**Web page:** [Atmel Studio](#)

**Document/file:**

- Atmel Studio 6.2 sp2 Installer - Full (.exe)

Atmel Studio 6.2 sp2 or later is the preferred IDE for developing and debugging firmware for SAM L21.

#### 3.2. Get IAR Embedded Workbench for ARM

**Web page:** [IAR Embedded Workbench® for ARM®](#)

**Document/file:** IAR installer for ARM

##### 3.2.1. Get SAM L21 Xplained Pro Embedded Debugger Software(Segger J-link)

**Web page:** [Segger J-link](#)

**Document/file:** J-Link software

This software is required to use SAM L21 Xplained Pro embedded debugger with IAR IDE.

#### 3.3. Get Atmel Software Framework (ASF)

**Web page:** [Atmel Software Framework](#)

**Document/file:**

- ASF update for Atmel Studio (.vsix)
- ASF standalone package for GCC makefile and IAR users (.zip)
- ASF Getting started (.pdf)
- ASF Reference manual (.pdf)

ASF online documentation for available APIs and examples can be found at [Atmel Software Framework Documentation](#).

## 4. Atmel Studio 6.2 Users Getting Started

### Prerequisites:

- Atmel Studio 6.2 SP2 or above installed
- ASF version 3.21 or later (comes with Atmel Studio 6.2 SP2)
- The SAM L21 Xplained Pro board connected to Atmel Studio 6.2 through the embedded debugger USB connector. The kit will be powered by the USB.

### Work flow:

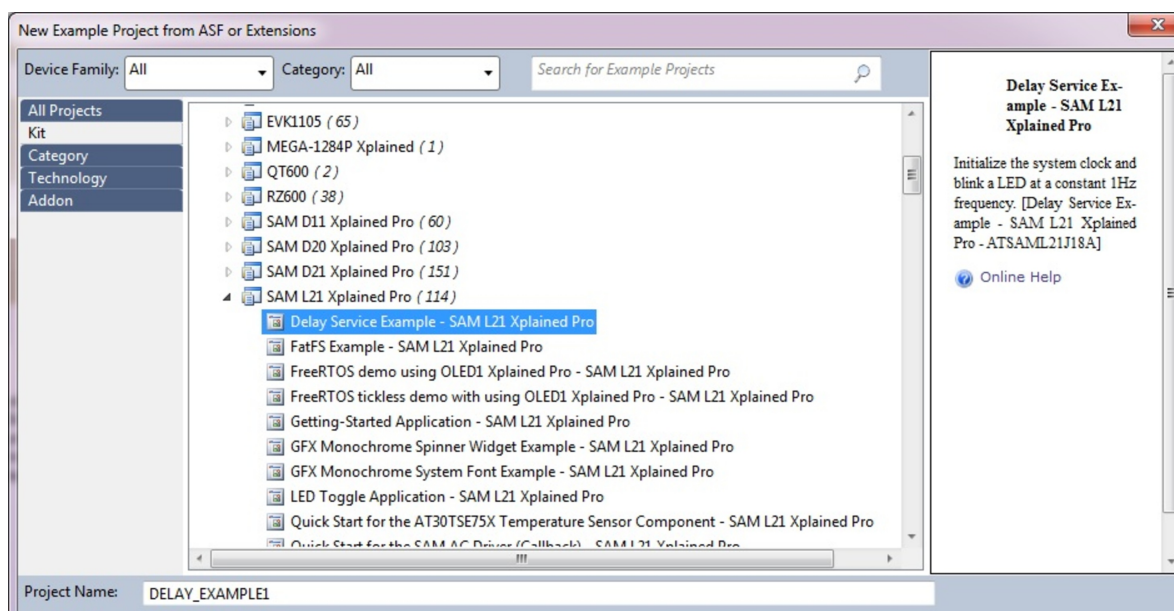
- Launch Atmel Studio 6.2
- The page shown in [Figure 4-1 SAM L21 Xplained Pro Page in Atmel Studio](#) on page 6 will appear when the SAM L21 Xplained Pro board is connected to Atmel Studio 6.2

**Figure 4-1 SAM L21 Xplained Pro Page in Atmel Studio**



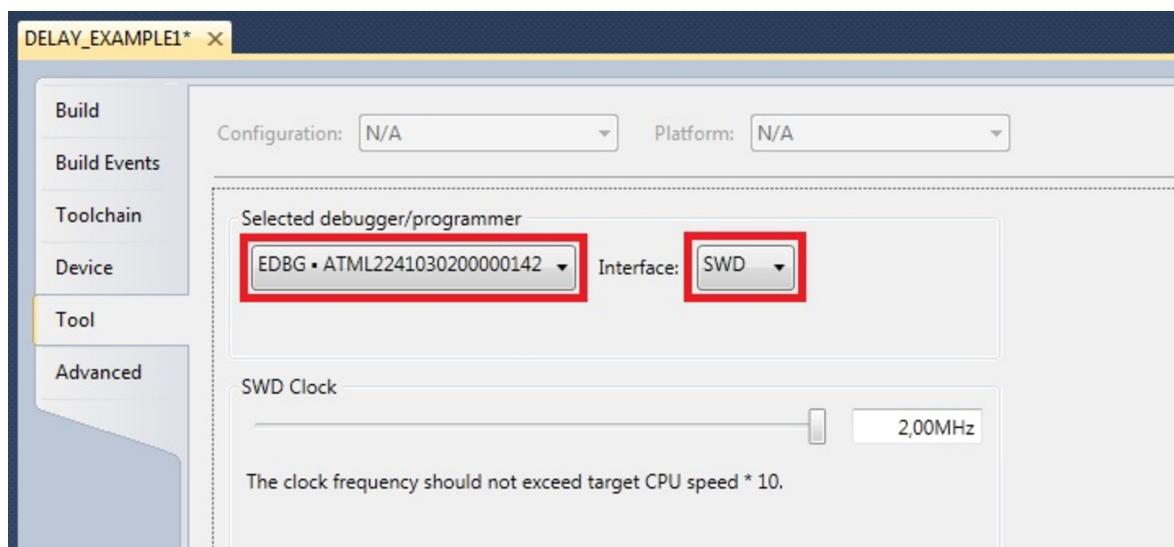
- Open ASF examples by clicking "New Example Project..."
- Select one of the examples (e.g. "Delay Service Example", see [Figure 4-2 New Example Project for SAM L21](#) on page 7), press OK and accept the license agreement. Then the project will be created and opened.

**Figure 4-2 New Example Project for SAM L21**



- Open project properties ("Project->Properties" or shortcut "ALT+F7")
- In Tool view, see [Figure 4-3 Debugger and Interface for SAM L21](#) on page 7, set "Selected debugger/programmer" to XPRO-EDBG and "Interface" to SWD

**Figure 4-3 Debugger and Interface for SAM L21**



- Build the project ("Build->Build Solution" or shortcut "F7")
- Load the code into SAM L21 Xplained Pro and start debugging ("Debug->Start debugging and break" or shortcut "ALT+F5")
- The application is programmed and the debugger breaks in main
- Run the code ("Debug->Continue" or shortcut "F5")

## 5. What's Next

For further information on related Atmel products and IDE, refer to the links below:

- Atmel Studio videos: [http://www.atmel.com/microsite/atmel\\_studio6/default.aspx](http://www.atmel.com/microsite/atmel_studio6/default.aspx)
- Atmel Studio help: "Help-> View Help" (CTRL+F1)
- ASF Getting Started: <http://www.atmel.com/tools/AVRSOFTWAREFRAMEWORK.aspx>
- ASF Reference Manual: <http://www.atmel.com/tools/AVRSOFTWAREFRAMEWORK.aspx>
- ASF online documentation: <http://asf.atmel.com>
- More technical documentation concerning various products: <http://www.atmel.com/webdoc/>



## 6. Revision History

Doc. Rev.	Date	Comments
42410A	02/2015	Initial document release.



**Atmel Corporation**    1600 Technology Drive, San Jose, CA 95110 USA    **T:** (+1)(408) 441.0311    **F:** (+1)(408) 436.4200    |    **www.atmel.com**

© 2015 Atmel Corporation. / Rev.: Atmel-42410A-Getting-Started-with-SAML21\_AT03975\_Application Note-02/2015

Atmel®, Atmel logo and combinations thereof, Enabling Unlimited Possibilities®, QTouch®, and others are registered trademarks or trademarks of Atmel Corporation in U.S. and other countries. ARM®, Cortex® and others are registered trademarks of ARM Ltd. Other terms and product names may be trademarks of others.

**DISCLAIMER:** The information in this document is provided in connection with Atmel products. No license, express or implied, by estoppel or otherwise, to any intellectual property right is granted by this document or in connection with the sale of Atmel products. EXCEPT AS SET FORTH IN THE ATMEL TERMS AND CONDITIONS OF SALES LOCATED ON THE ATMEL WEBSITE, ATMEL ASSUMES NO LIABILITY WHATSOEVER AND DISCLAIMS ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY RELATING TO ITS PRODUCTS INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS AND PROFITS, BUSINESS INTERRUPTION, OR LOSS OF INFORMATION) ARISING OUT OF THE USE OR INABILITY TO USE THIS DOCUMENT, EVEN IF ATMEL HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Atmel makes no representations or warranties with respect to the accuracy or completeness of the contents of this document and reserves the right to make changes to specifications and products descriptions at any time without notice. Atmel does not make any commitment to update the information contained herein. Unless specifically provided otherwise, Atmel products are not suitable for, and shall not be used in, automotive applications. Atmel products are not intended, authorized, or warranted for use as components in applications intended to support or sustain life.

**SAFETY-CRITICAL, MILITARY, AND AUTOMOTIVE APPLICATIONS DISCLAIMER:** Atmel products are not designed for and will not be used in connection with any applications where the failure of such products would reasonably be expected to result in significant personal injury or death ("Safety-Critical Applications") without an Atmel officer's specific written consent. Safety-Critical Applications include, without limitation, life support devices and systems, equipment or systems for the operation of nuclear facilities and weapons systems. Atmel products are not designed nor intended for use in military or aerospace applications or environments unless specifically designated by Atmel as military-grade. Atmel products are not designed nor intended for use in automotive applications unless specifically designated by Atmel as automotive-grade.