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USER GUIDE

ZigBit USB Stick User Guide

Introduction

This user guide describes how to get started with the Atmel® ZigBit® USB sticks.

The ZigBit USB sticks is targeted for evaluating the USB features of the Atmel ZigBits, currently supporting the XMEGA® with AT86RF212B or AT86RF233 radio transceivers.

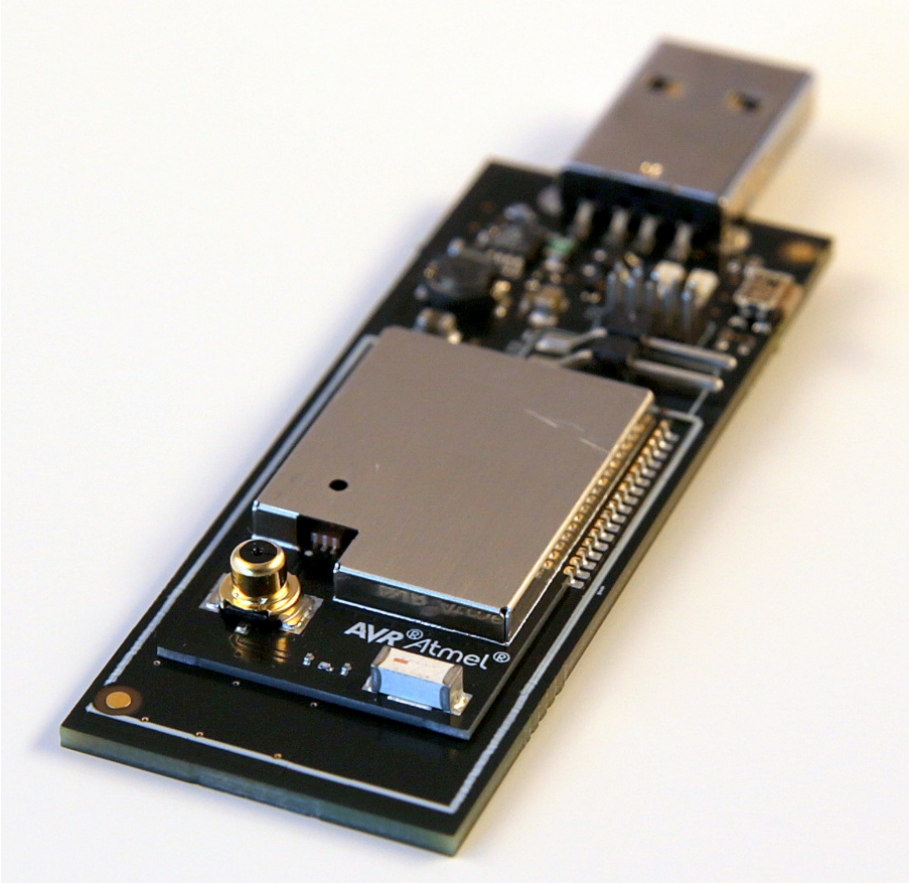


Table of Contents

1. Getting Started

1.1 Features

The ZigBit® USB sticks demonstrates the XMEGA® ZigBits USB features providing a development/prototype platform.

By using the WireShark sniffer FW the ZigBit USB stick's serve as a protocol analyzer.

1.2 Design Documentation and Related Links

The following list contains links to the most relevant documents and software for the USB sticks.

1. 2.4GHz USB stick: http://www.atmel.com/tools/ZB-X-233-USB.aspx
2. Sub GHz USB stick: http://www.atmel.com/tools/ZB-X-212B-USB.aspx
3. ZigBit: http://www.atmel.com/ZigBit

1.3 Programming

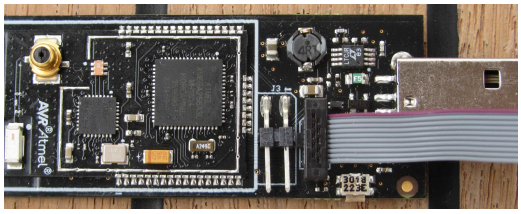
How to program the extension.

1.3.1 JTAGICE

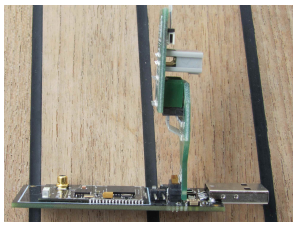
How to program using the AVR® JTAGICE mkII and JTAGICE3.

1. Connect the JTAGICE USB to the PC.
2. Connect the JTAGICE to the USB stick connector (J2) as shown on picture.
3. Go to Atmel Studio: Tools/Device Programming, and select the JTAGICE connected as Tool and click Apply.
4. Select Device = ATxmega256A3U.
5. Select "Memories" and locate the source hex or elf file and click Program.

JTAGICE3 connected to J2

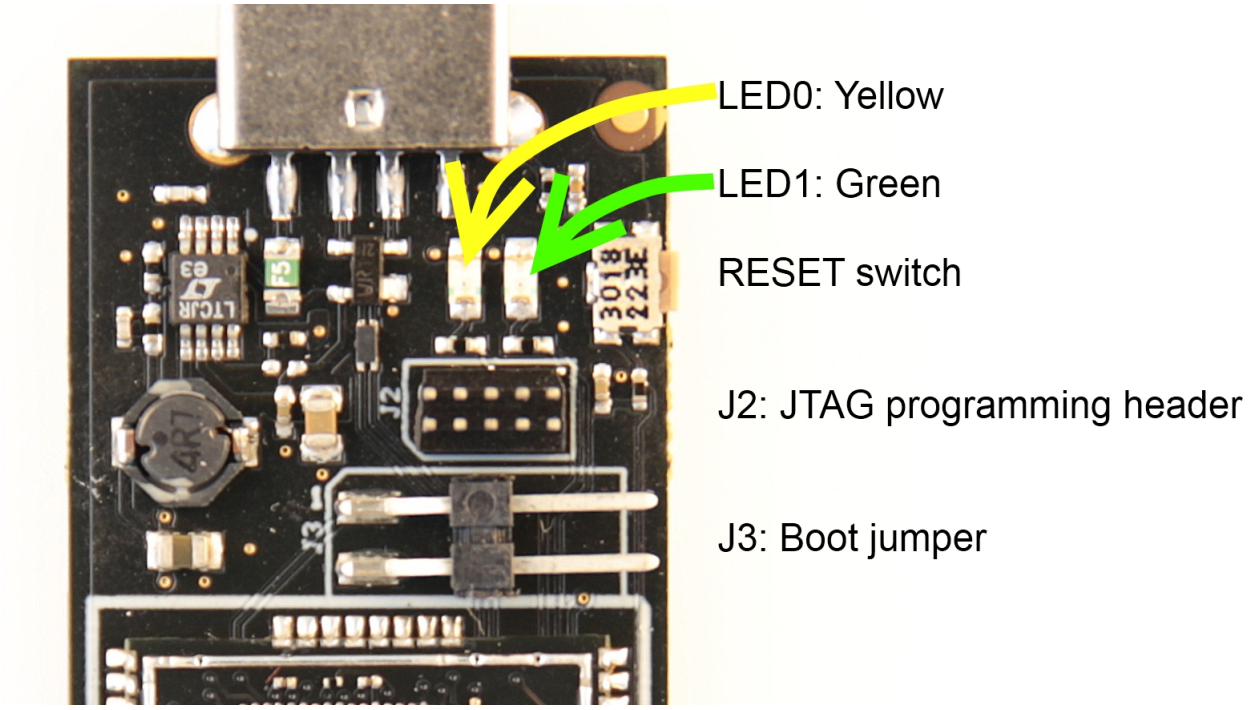


AVR JTAGICE mkII connected to J2



1.3.2 Bootloader

This section describes how to use the bootloader to program the ZigBit on the USBstick.



1. Install the Bootloader interface on the PC as described in “How to Install the "Bootloader PC tool"” on page 4.
2. Start the Bootloader PC GUI "FLIP" .
3. Insert a jumper on header J3 .

   Insert the USB stick in the PC.

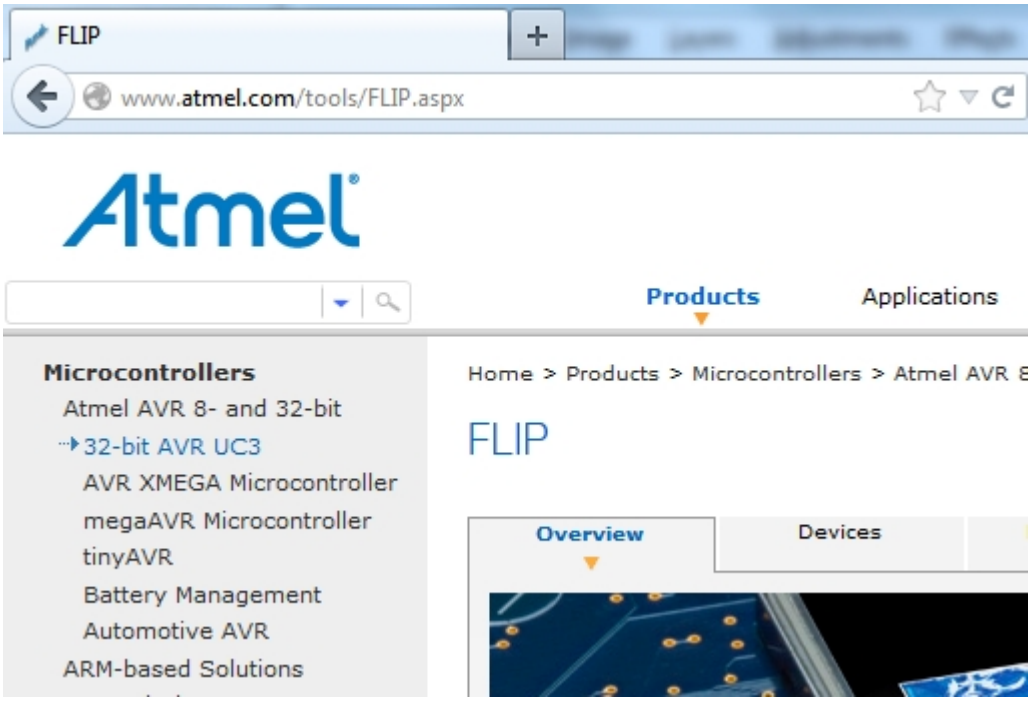
   Press the reset button.
4. Select Device = ATxmega256A3U (Device - Select).
5. Select USB communication (**Ctrl+U**).
6. Select memory area to program (Use the toggle memory button bellow the Atmel logo).
7. Select Load Hex file (**Ctrl+L**).
8. Select Programming Options.
9. Click "Run", observe status in status field .

1.3.2.1 How to Install the "Bootloader PC tool"

How to install the Bootloader PC GUI tool,

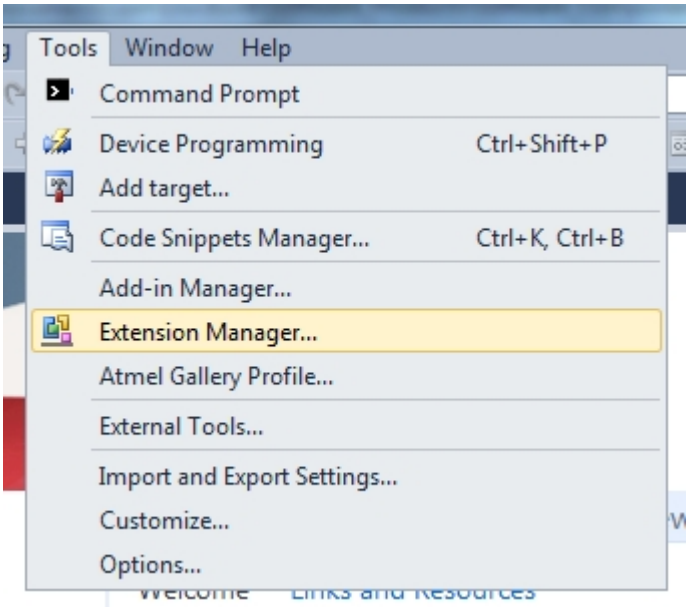
1. Download the Flip "in system programming tool" installer from http://www.atmel.com/tools/FLIP.aspx[1]

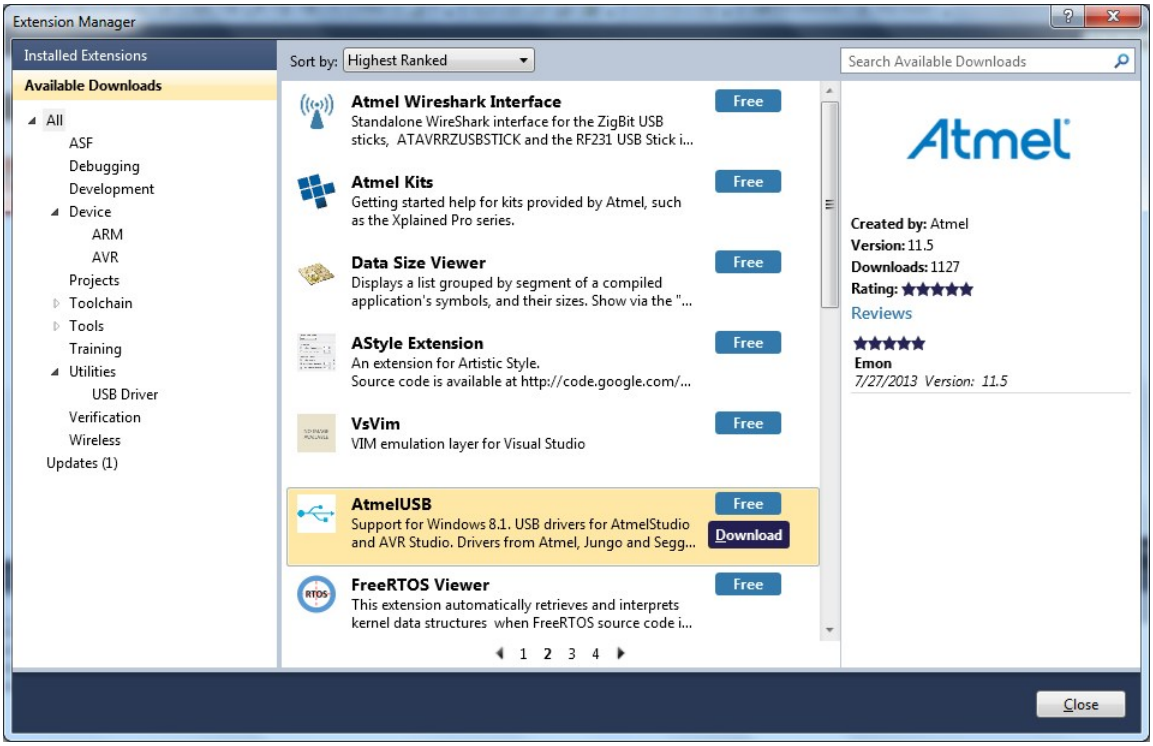
[1] http://www.atmel.com/tools/FLIP.aspx



2. Run the Flip Installer .

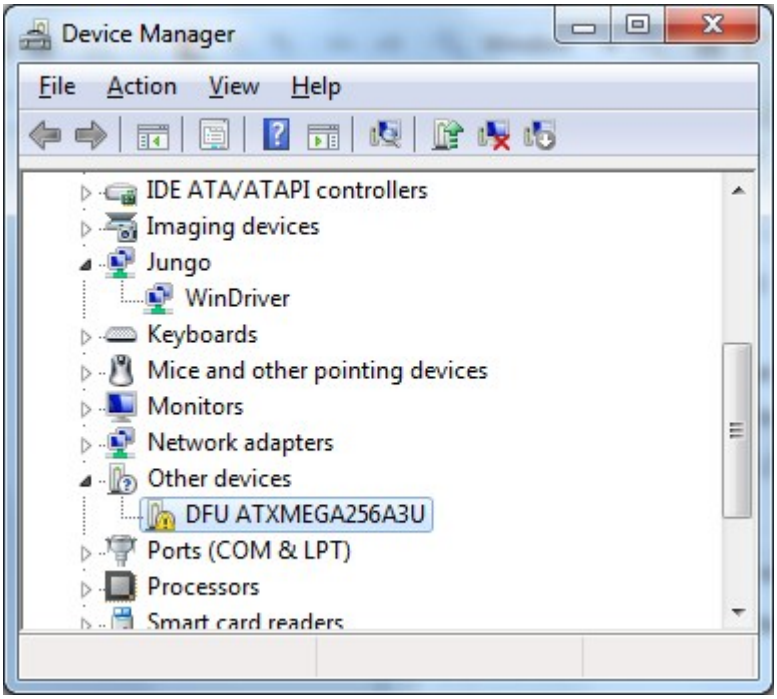
3. Download the Atmel USB extension and run the installer.

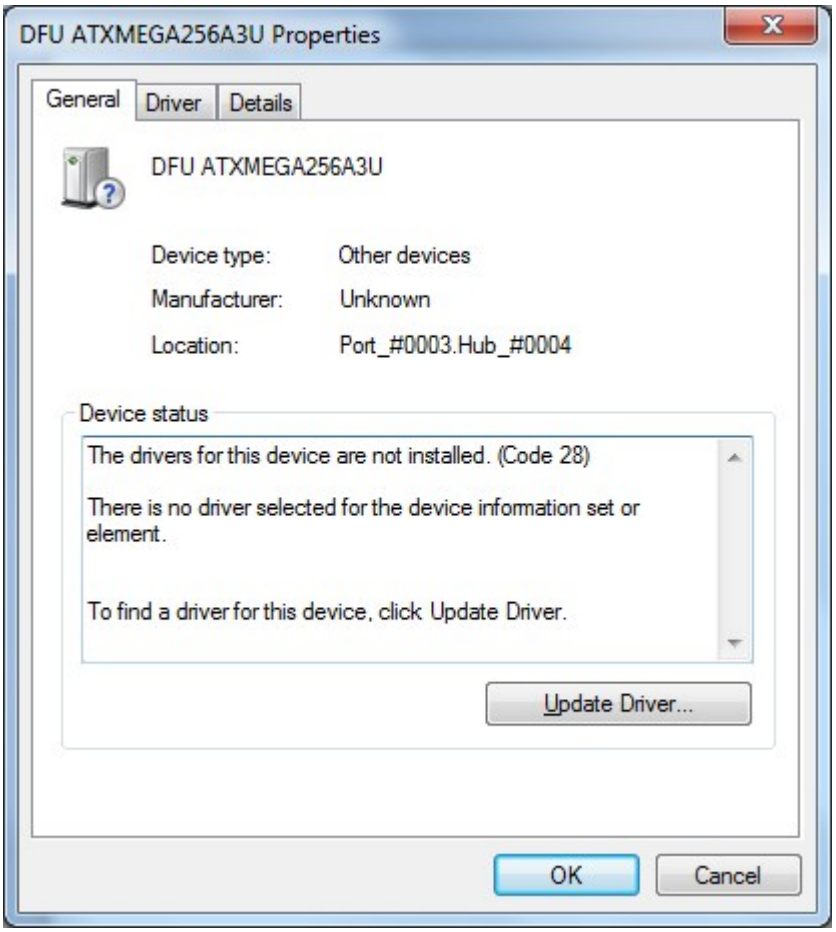




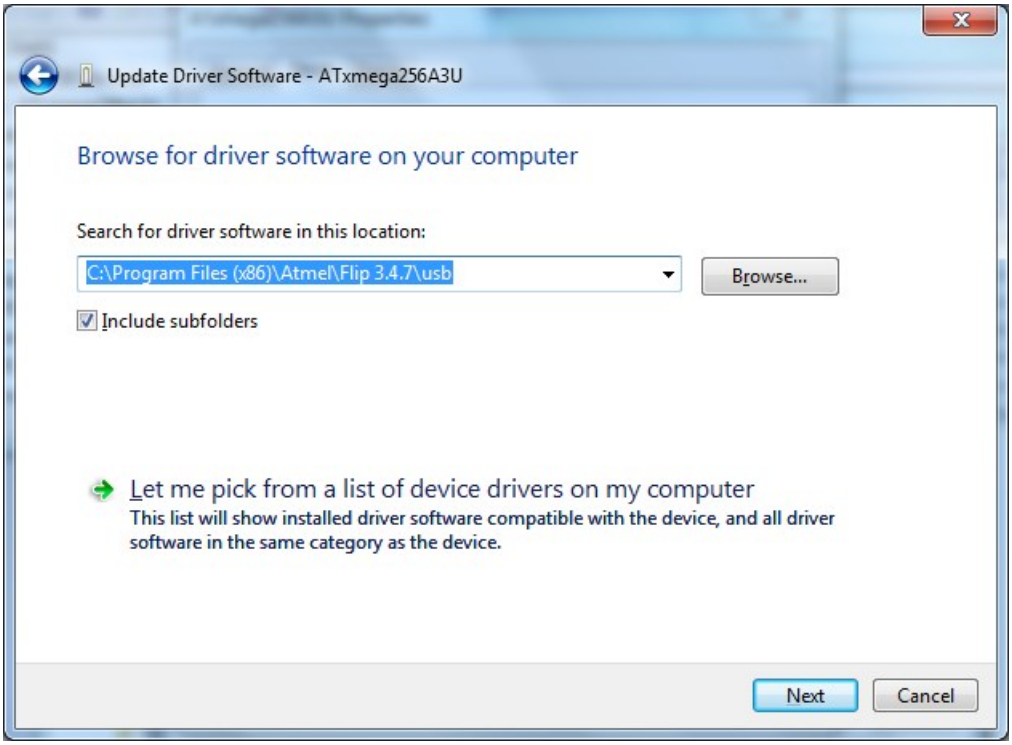
4. Start Flip - if the USBstick is not recognized continue with step 5.

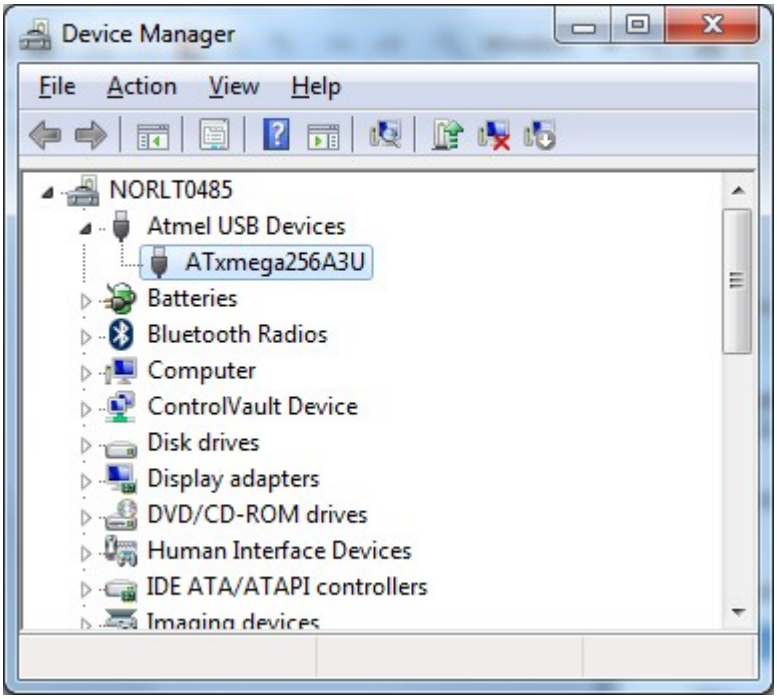
5. Update the USB DFU driver.





Clik the Update Driver button and select "Browse my computer-..."

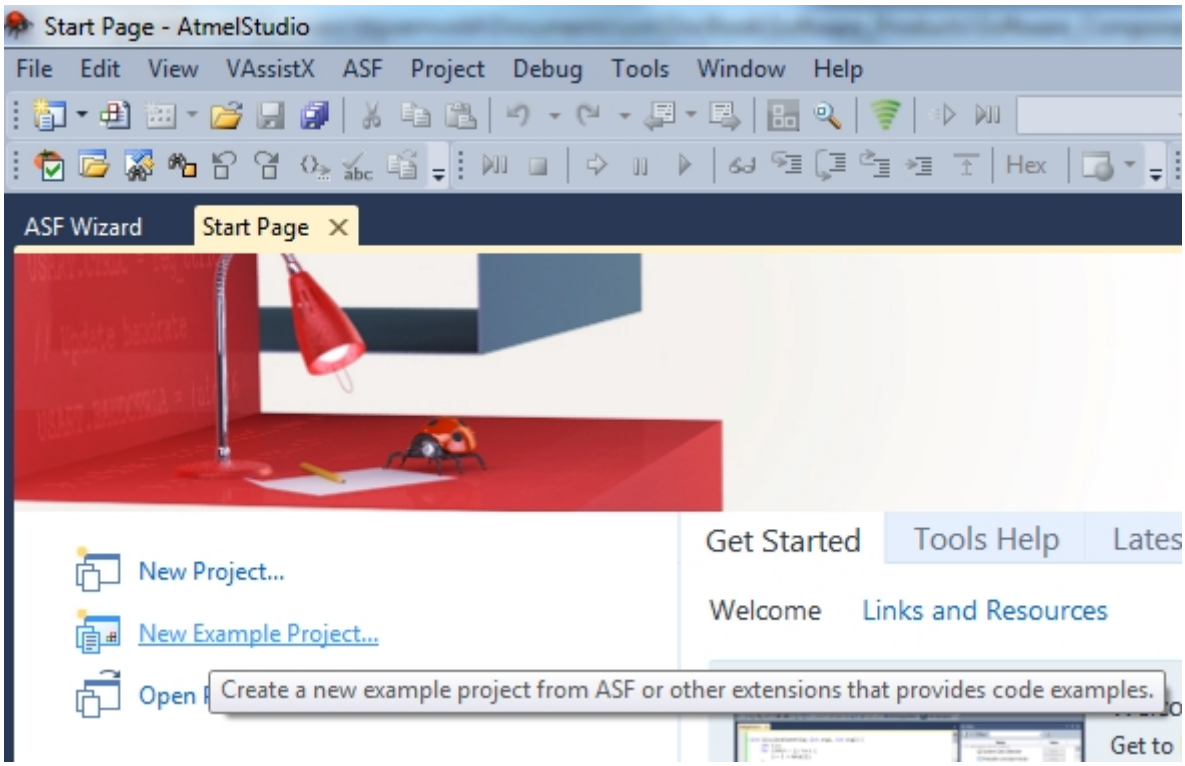


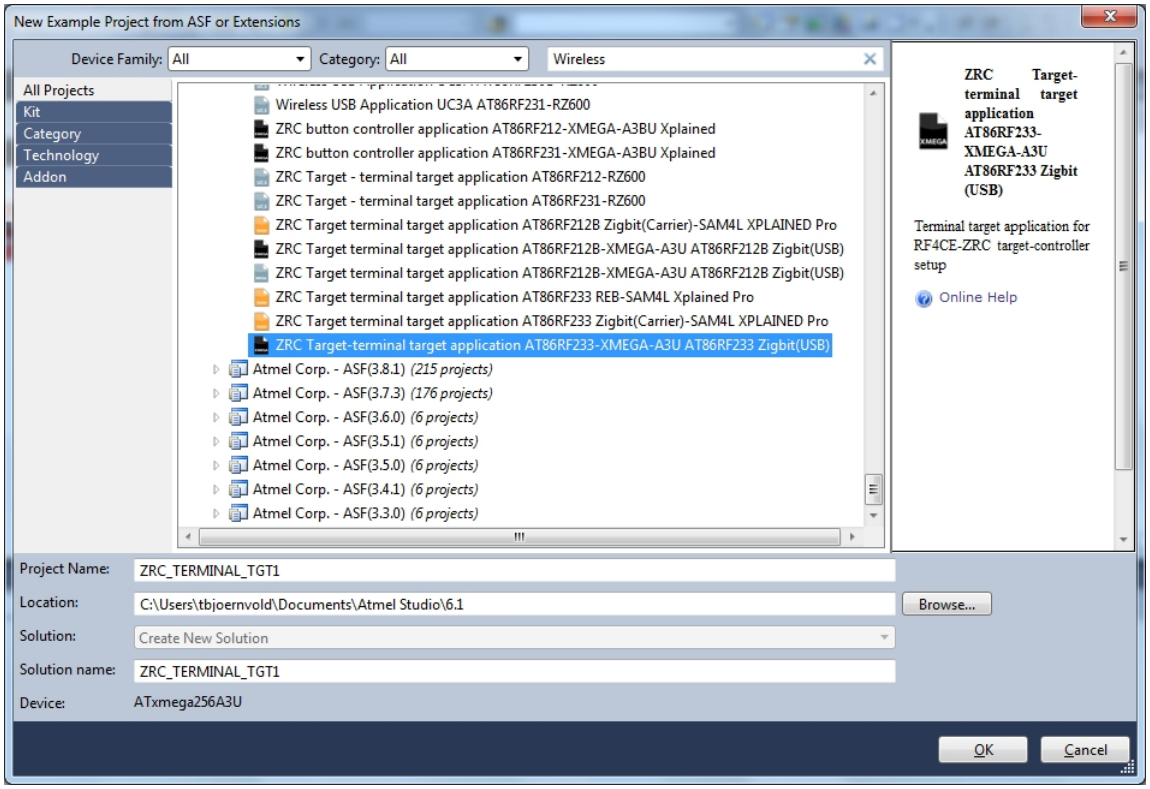


1.4 Available Example Code

ASF contains a number of Wireless example projects with source code - use Wireless as key word and select from the list.

Figure 1-1. NewProjectASF.jpg





2. Performance Analyzer

2.1 Introduction

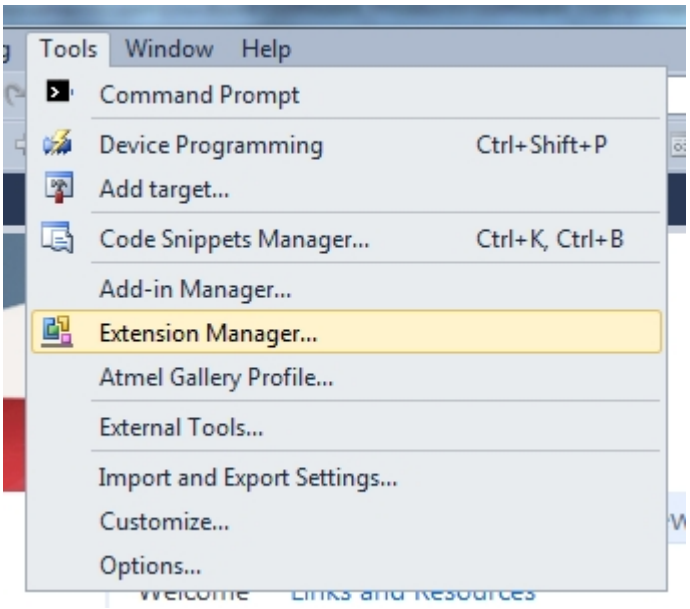
The Performance Analyzer FW together with the GUI in Atmel Studio Wireless Composer Extension provides a number of basic functional RF tests.

A quick start guide and general help is provided in Wireless Composer once started.

2.2 Program Installation

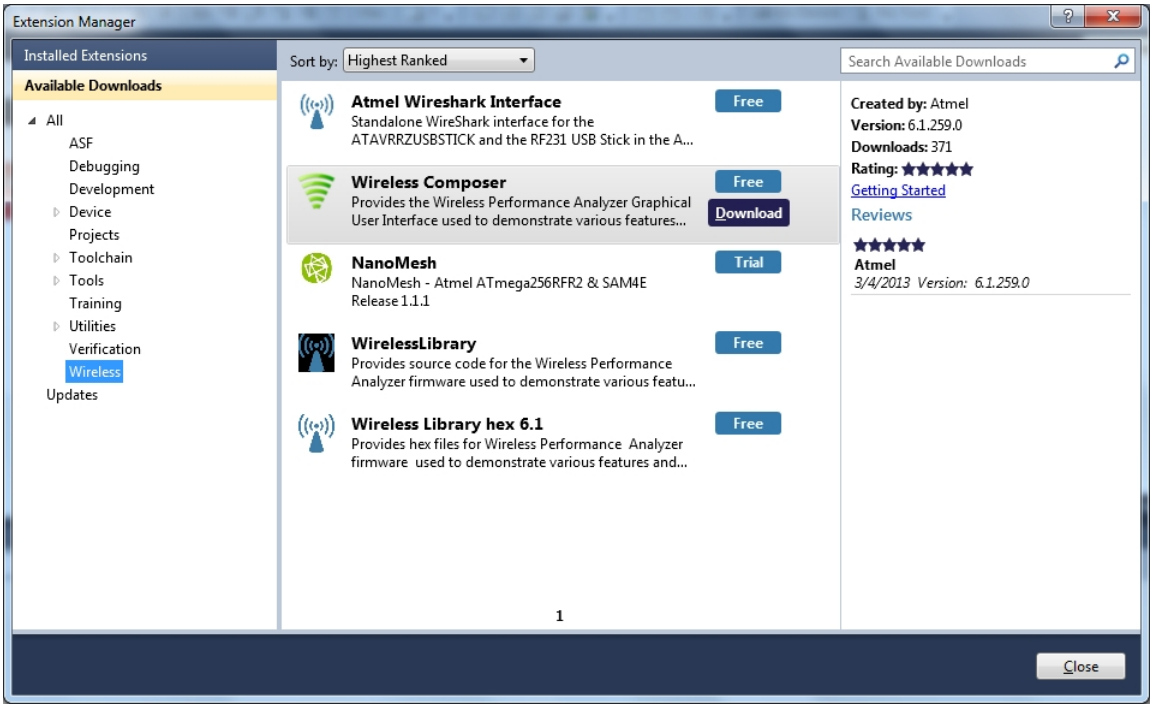
How to install necessary SW.

1. Install Atmel Studio[1].
2. Once Studio is installed and started use the Tools - Extension Manager to install the Wireless Composer.



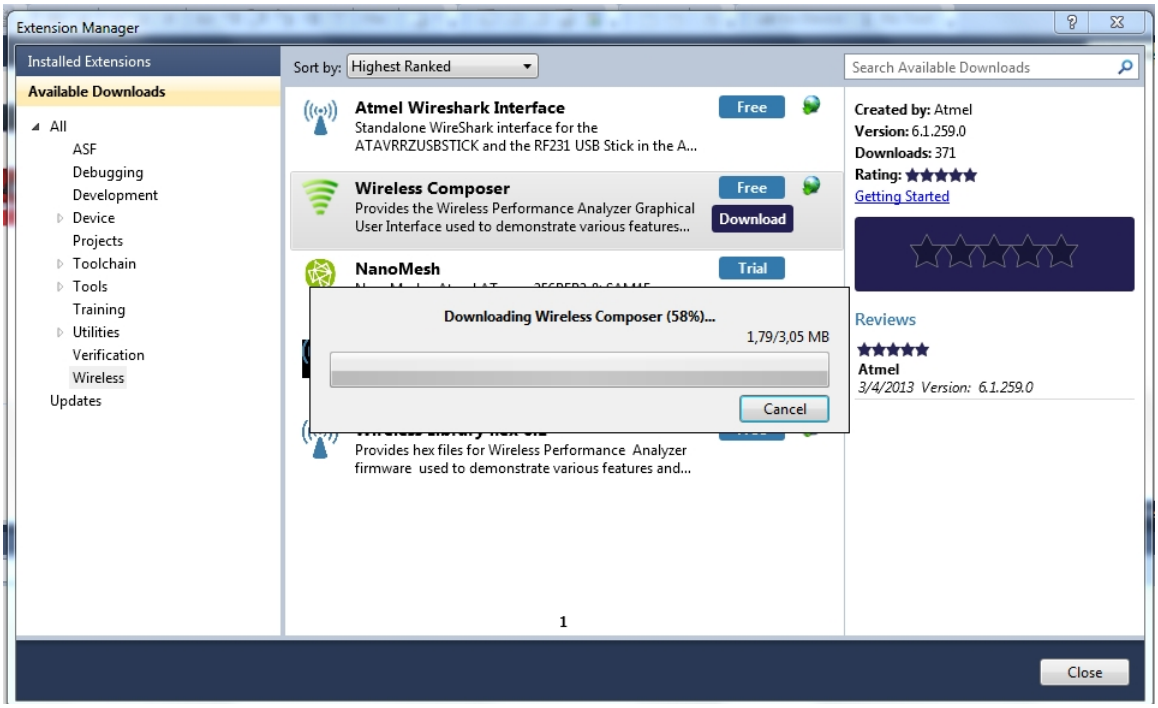
Select Wireless and Wireless Composer.

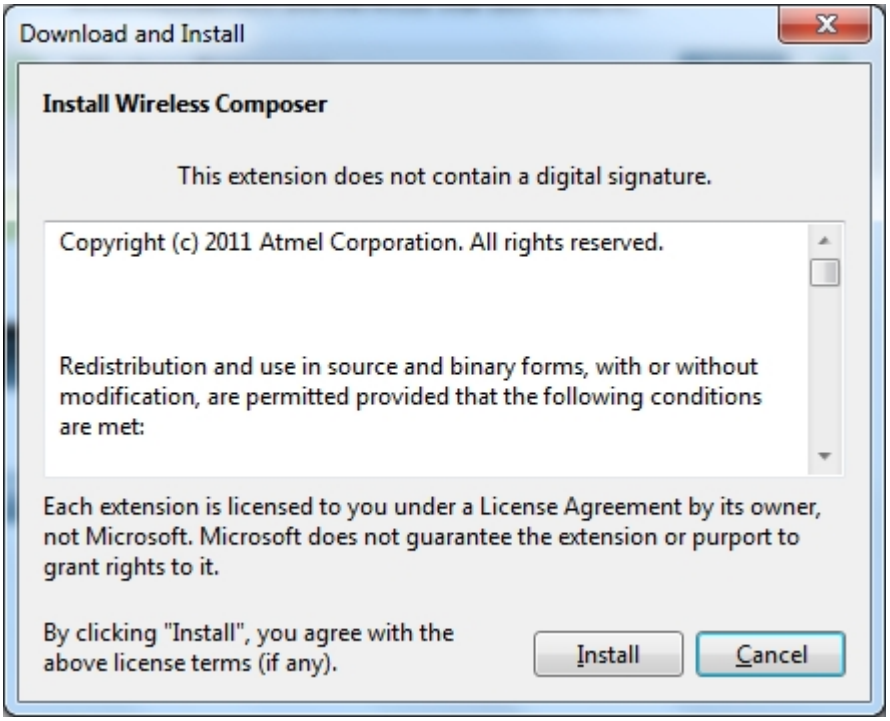
[1] http://www.atmel.com/tools/atmelstudio.aspx



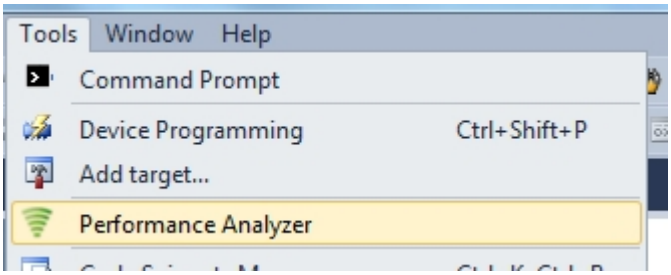
Log in to Atmel Gallery.

Click download again and download starts.





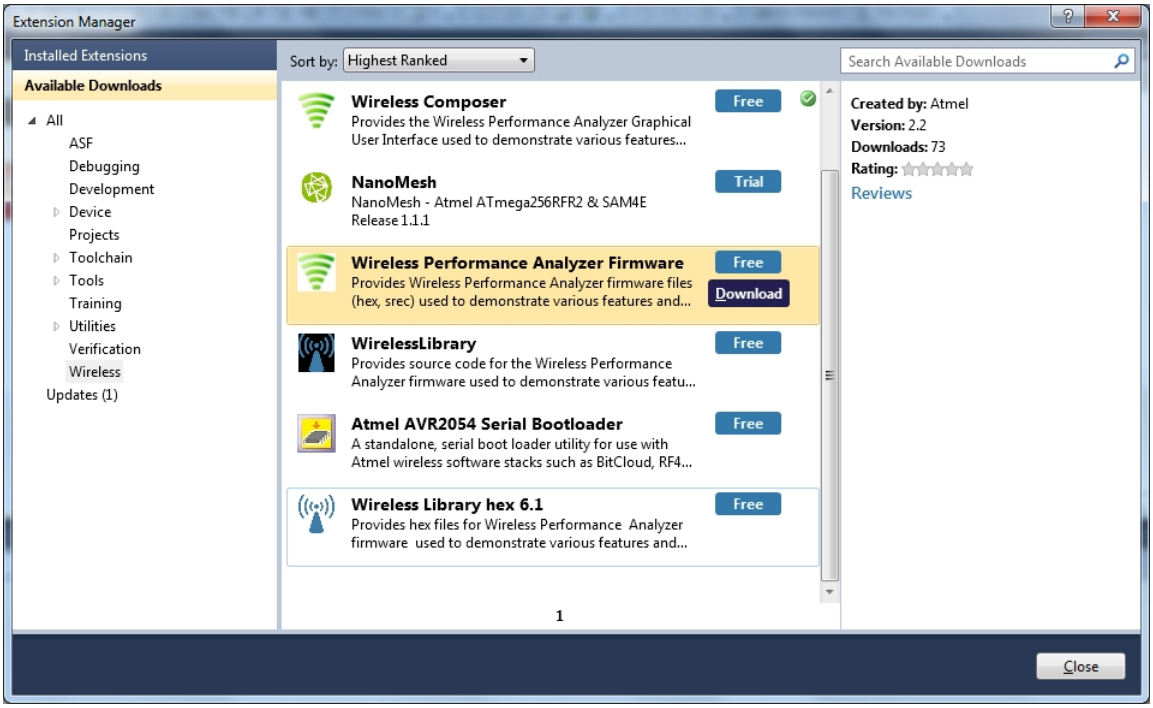
Restart Atmel Studio, allow help to make changes and the Performance Analyzer GUI is available in the Tools menu.



3. If not already preprogrammed - program the node with the Performance Analyzer FW available in the "Wireless Performance Analyzer Firmware extension" or from source code provided in ASF.

   If using an Wireless board with a µC embedded, the Performance Analyzer FW has to be programmed using the Bootloader or JTAGICE.

   If using a extension board which do not have a µC embedded, the Performance Analyzer FW has to be programmed on the Xplained Pro board using the EBDG from Atmel Studio.



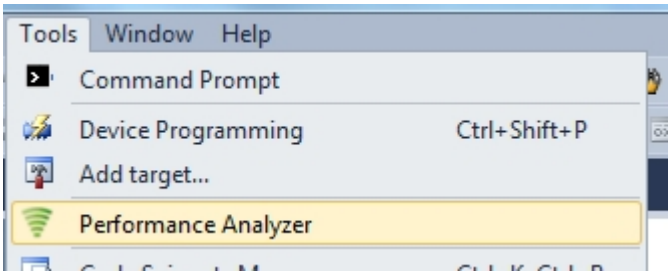
2.3 Program Use

How to get started.

1. Connect the Wireless board assembly, with the Performance Analyzer FW programmed, to the PC USB connector and power on, a COM port should now be available for the kit.

2. Power on any other wireless node assemblies of similar frequency, running the Performance Analyzer FW, and use it as a reference.

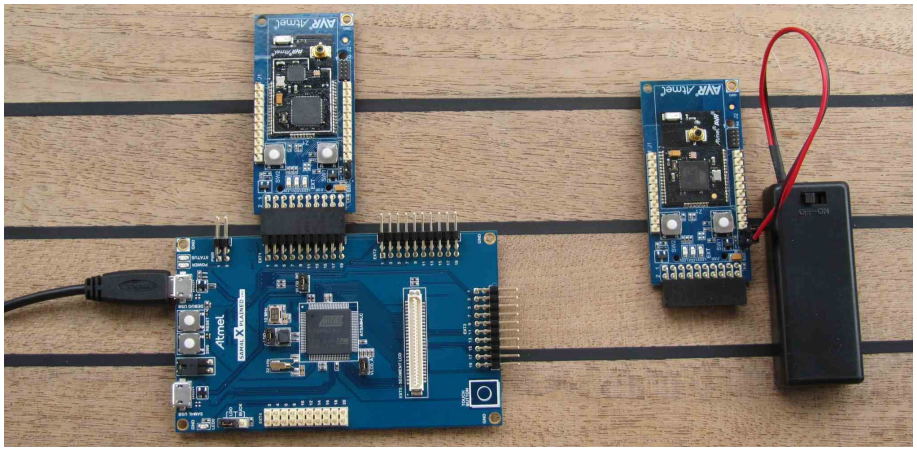
3. Start Performance Analyzer GUI, connect to the kit via the COM port and follow the quick start guide.



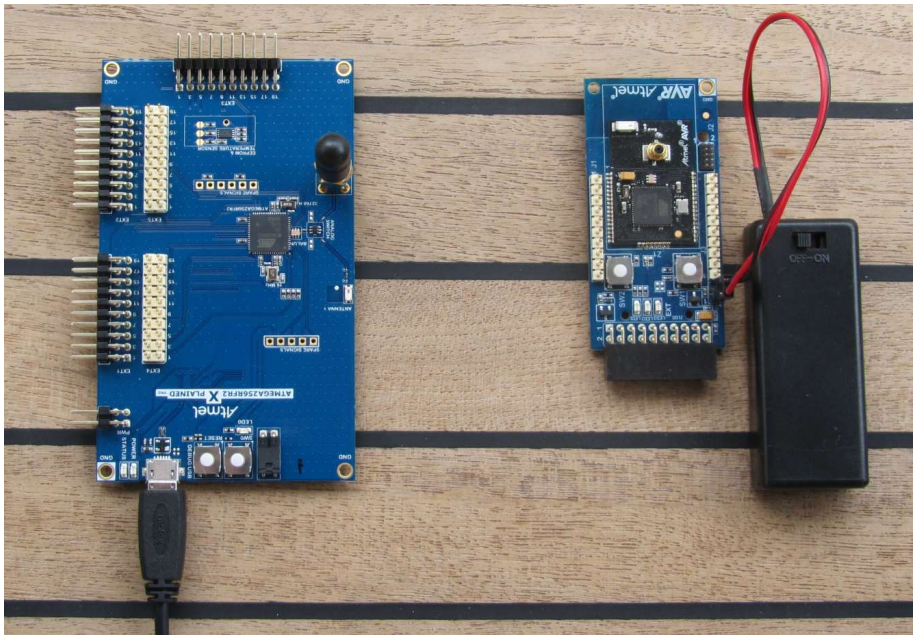
2.4 Typical Wireless Nodes

Typical board assembly.

The Atmel SAM4L Xplained Pro Evaluation Kit with Wireless Extension and remote node consisting of a Wireless extension board and a battery pack.



The Atmel ATmega256RFR2 Xplained Pro Evaluation Kit and remote node consisting of a Wireless extension board and a battery pack.



3. WireShark

3.1 Introduction

Wireshark is a free and open-source packet analyzer. It is used for network troubleshooting, analysis, software and communications protocol development.

Atmel provides an interface enabling use of WireShark GUI to monitor wireless communication using Atmel RF USB sticks.

Go to the WireShark home page[1] to learn the detail on how to use WireShark.

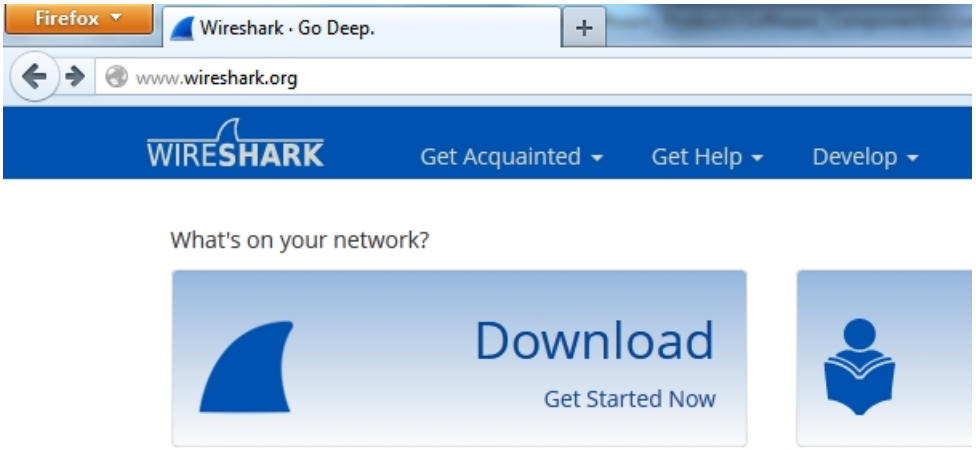
3.2 Program Installation

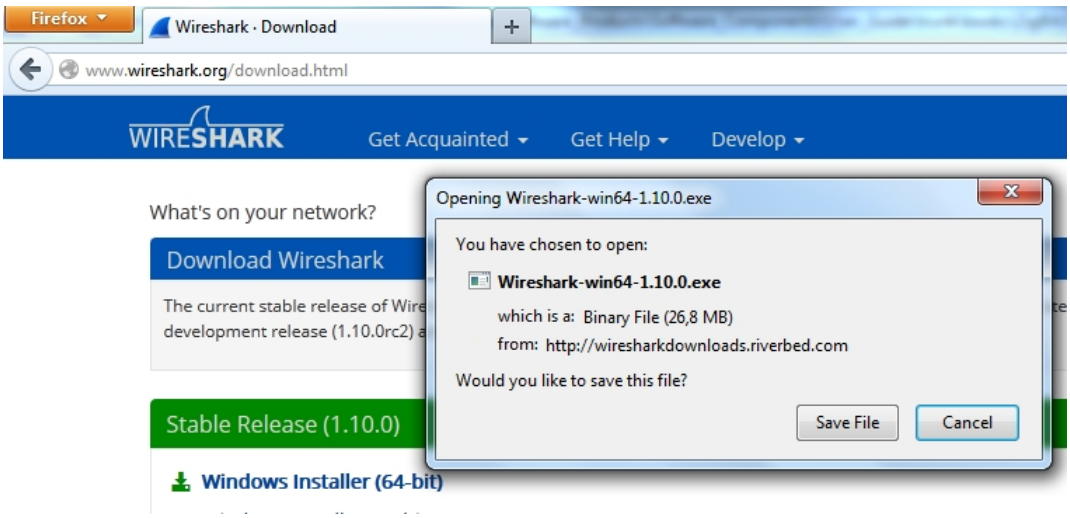
How to install necessary SW and FW.

3.2.1 WireShark Installation

How to install the WireShark analyzer.

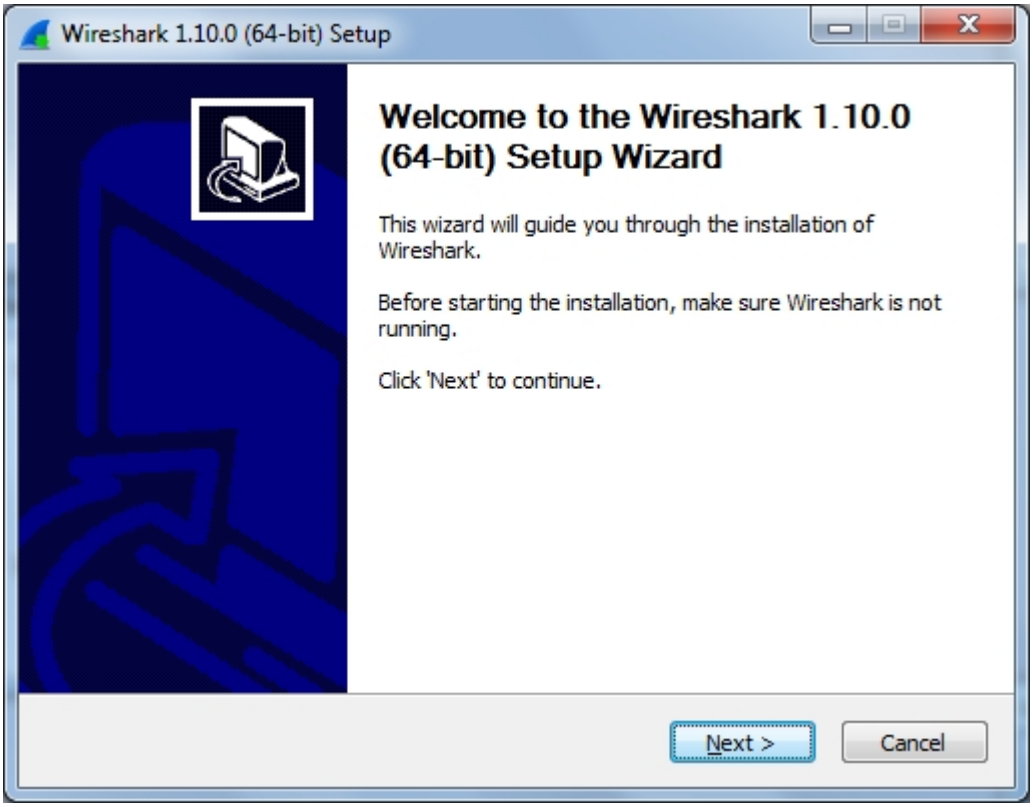
1. Go to the WireShark home page[2] and download the WireShark installer.





2. Locate the downloaded installer and install WireShark.

[1] http://www.wireshark.org
[2] http://www.wireshark.org

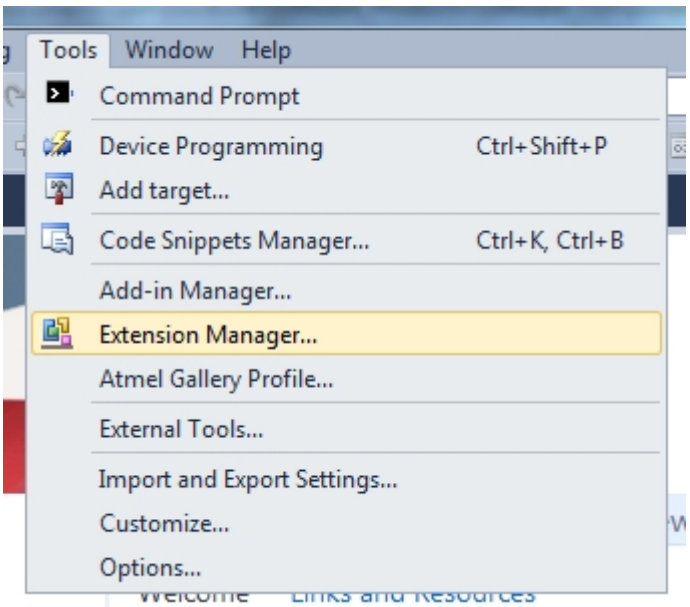


3.2.2 Sniffer Interface Installation

How to install the WireShark sniffer interface, connecting the WireShark GUI and the sniffer FW running on the USB stick.

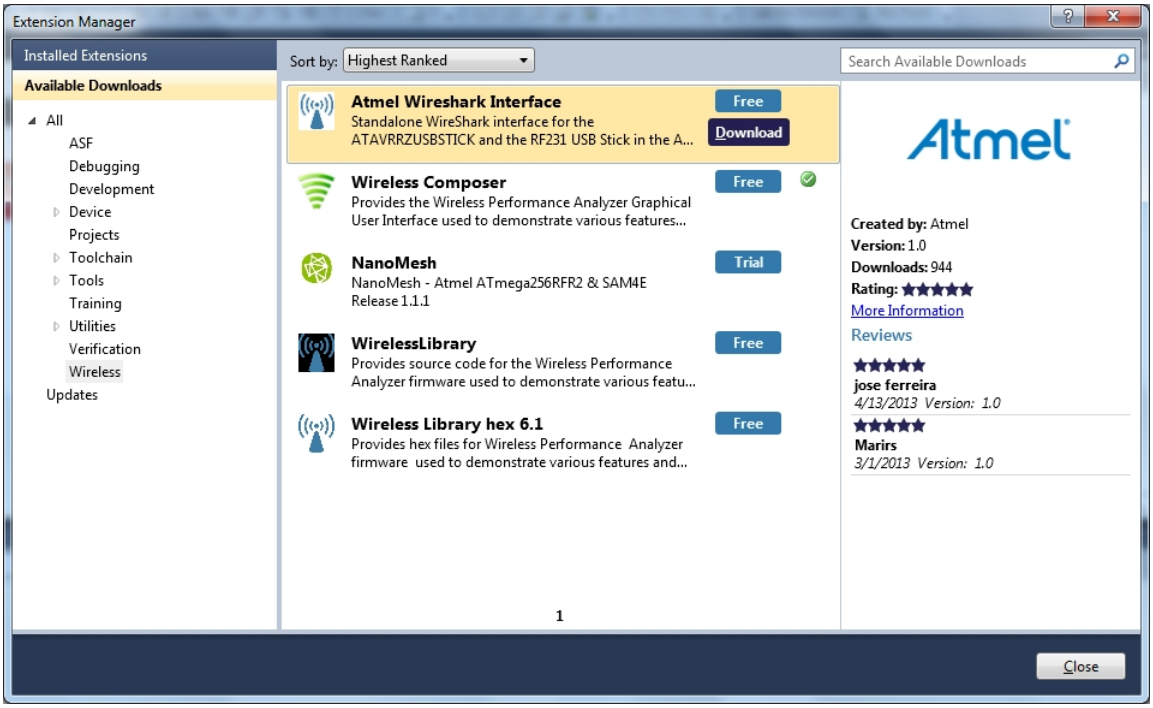
The sniffer interface program can be downloaded from Atmel Gallery.

1. Install Atmel Studio[3].
2. Once Studio is installed and started use the Extension Manager to download the Atmel WireShark Interface installer.



3. Select Wireless and Atmel WireShark Interface.

[3] http://www.wireshark.orghttp//www.atmel.com/tools/atmelstudio.aspx



4. Log in to Atmel Gallery if not already logged in.
5. Click download again and download starts.
6. You have now downloaded the Atmel WireShark installer, AtmelWiresharkFirmwareSetup.msi, run the installer.
7. You now have the "Wireshark Sniffer" user interface in the Start Menu - All Programs - Atmel folder and the sniffer firmware files located in C:/Program Files (x86)/Atmel/AtmelWiresharkFirmware/

3.2.3 Sniffer FW Installation

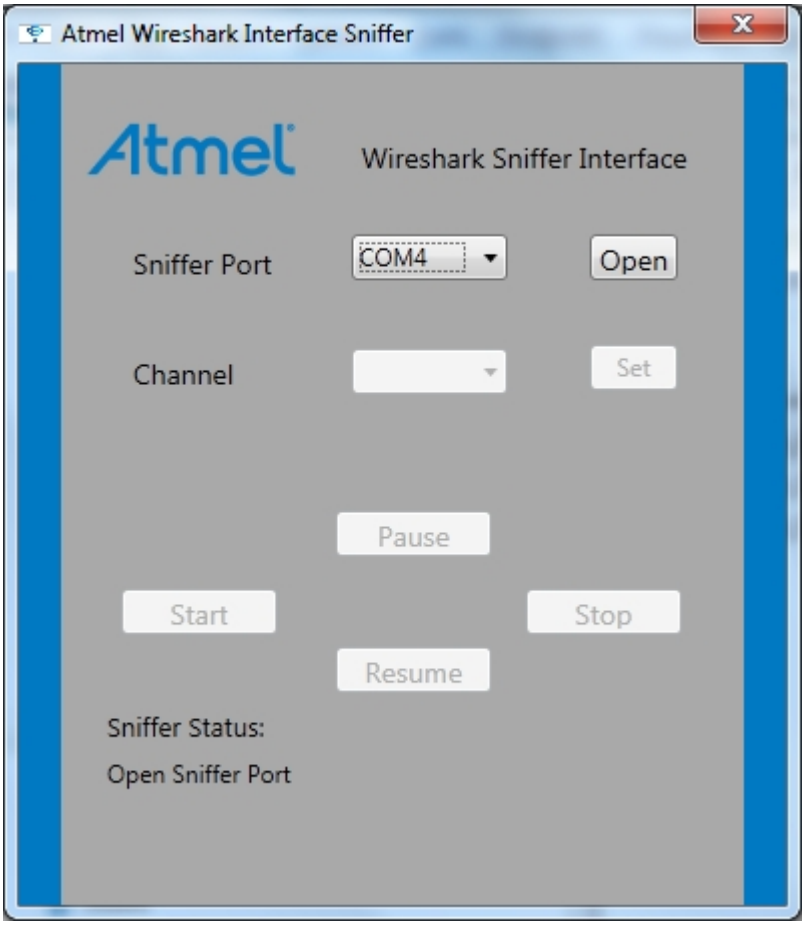
How to install the WireShark sniffer FW.

1. Download the Atmel WireShark Interface installer as described in “Sniffer Interface Installation” on page 16 .
2. Program the USB stick using the bootloader or the JTAGICE as described in “Programming” on page 3. The firmware files is located in C:/Program Files (x86)/Atmel/AtmelWiresharkFirmware/

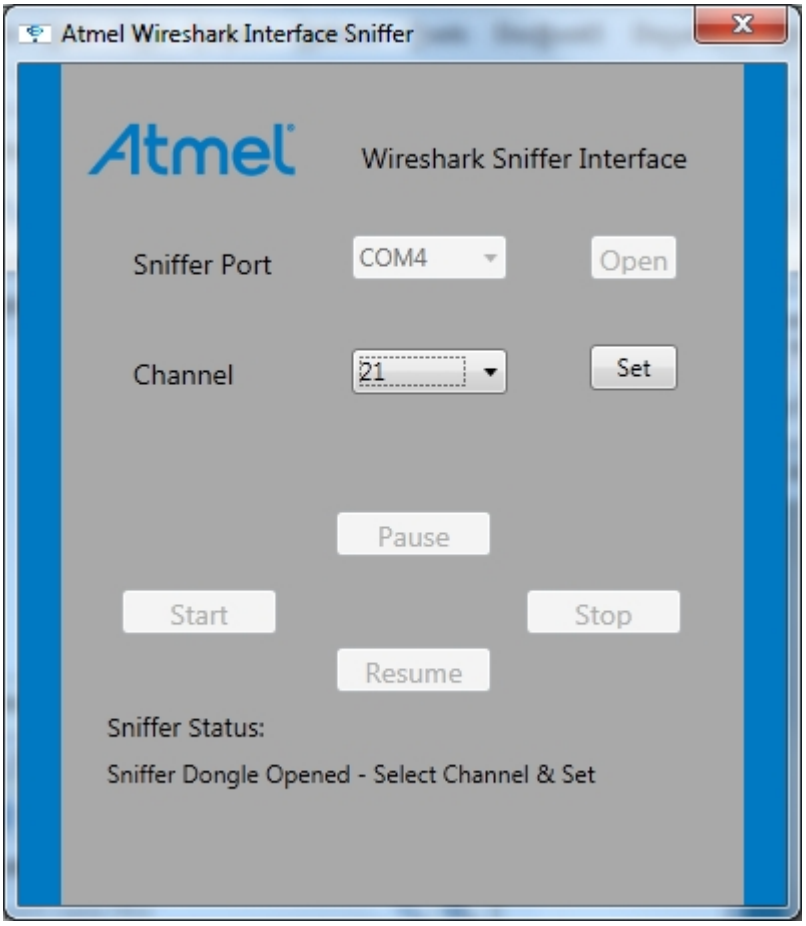
3.3 Program Use

How to get started..

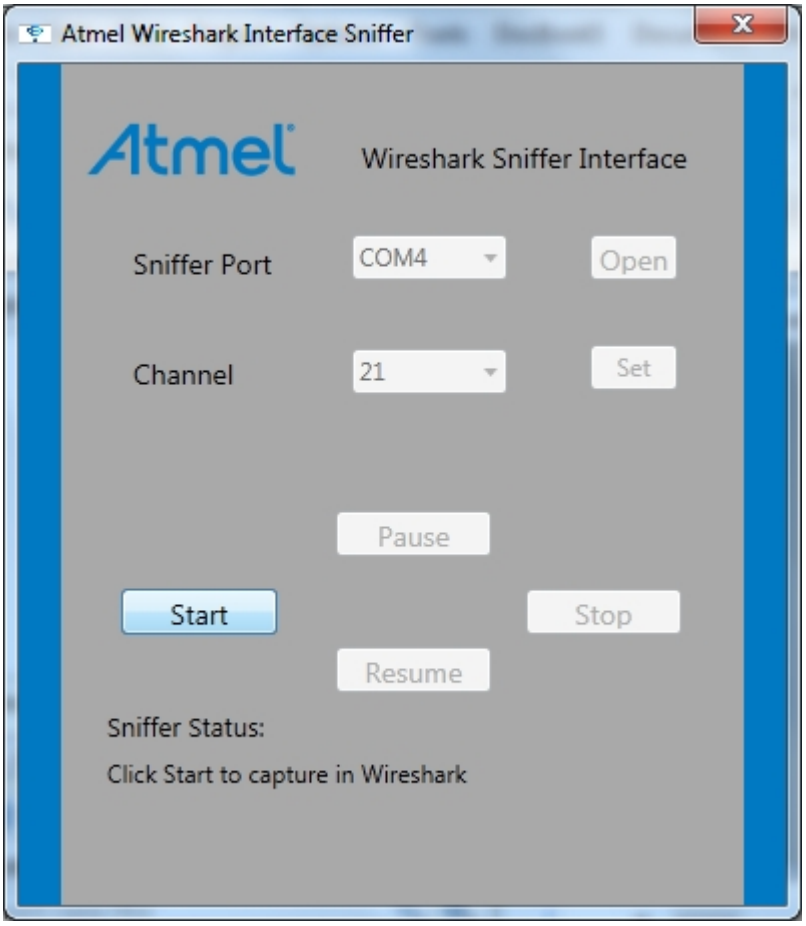
1. Insert the USB stick in the computer.
2. Start the Wireshark Interface program from the Atmel program folder
3. Select the COM port allocated to the USBstick with the sniffer FW and click Open.



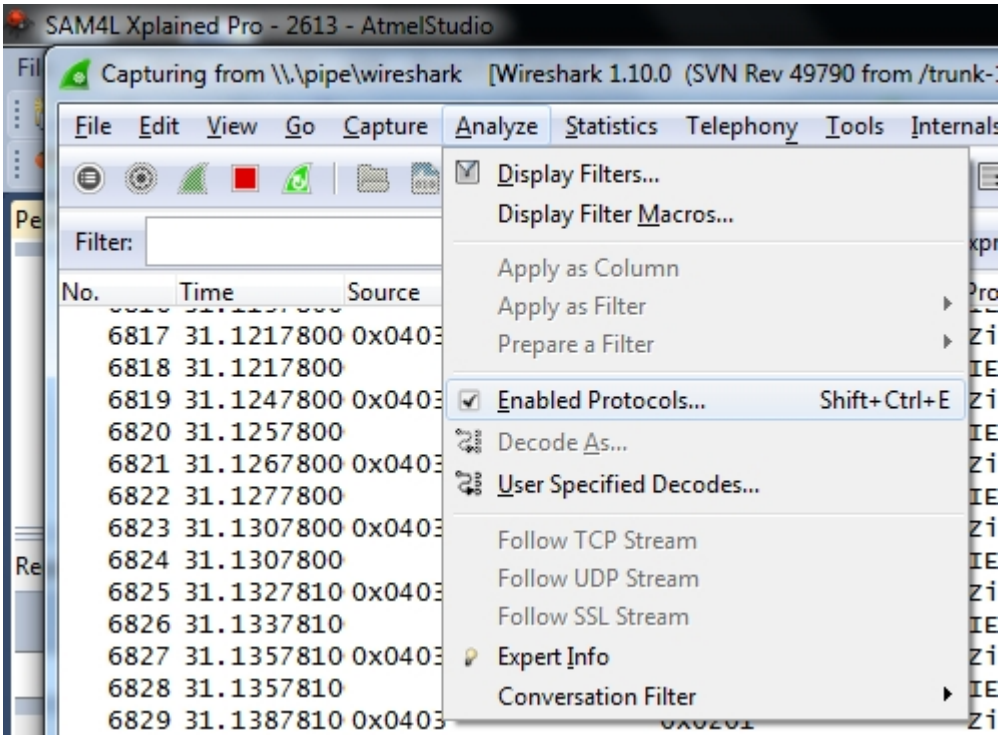
4. Select the Channel you want to monitor and click Set.



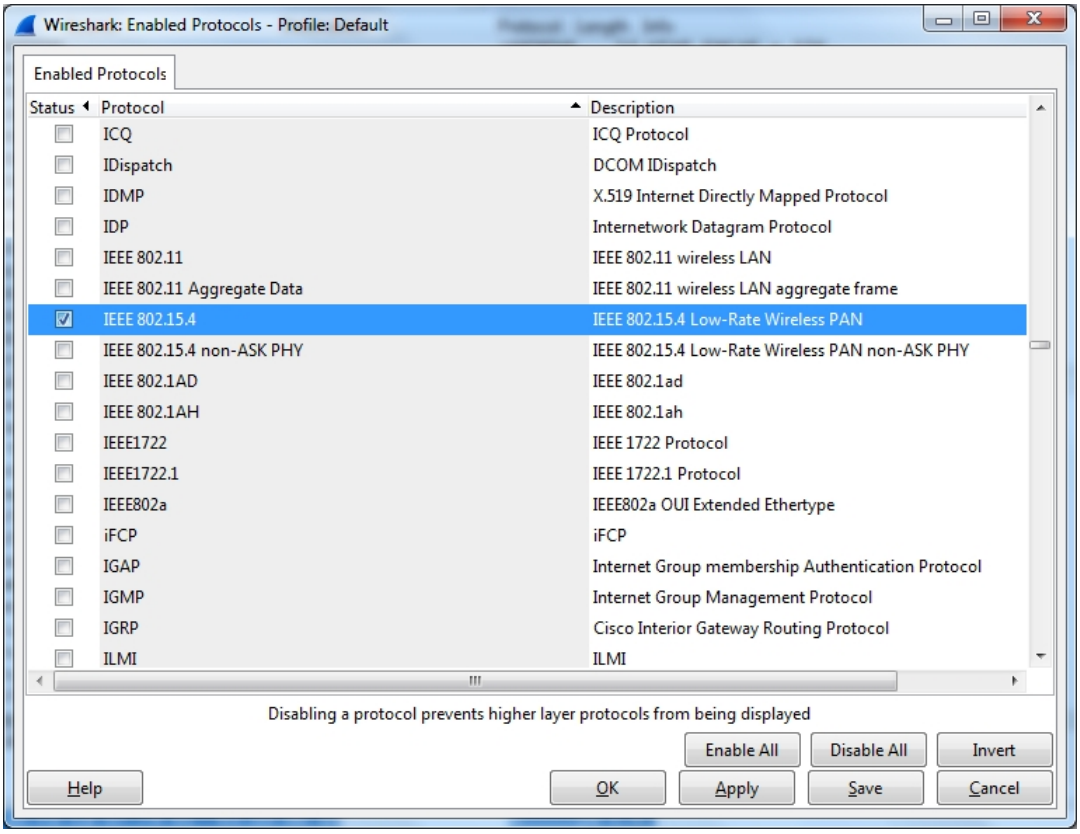
5. Click Start and WireShark is started.



6. Select the protocol to Analyze in WireShark in order to get the protocol details decoded and displayed.



Disable all and select the applicable protocol.

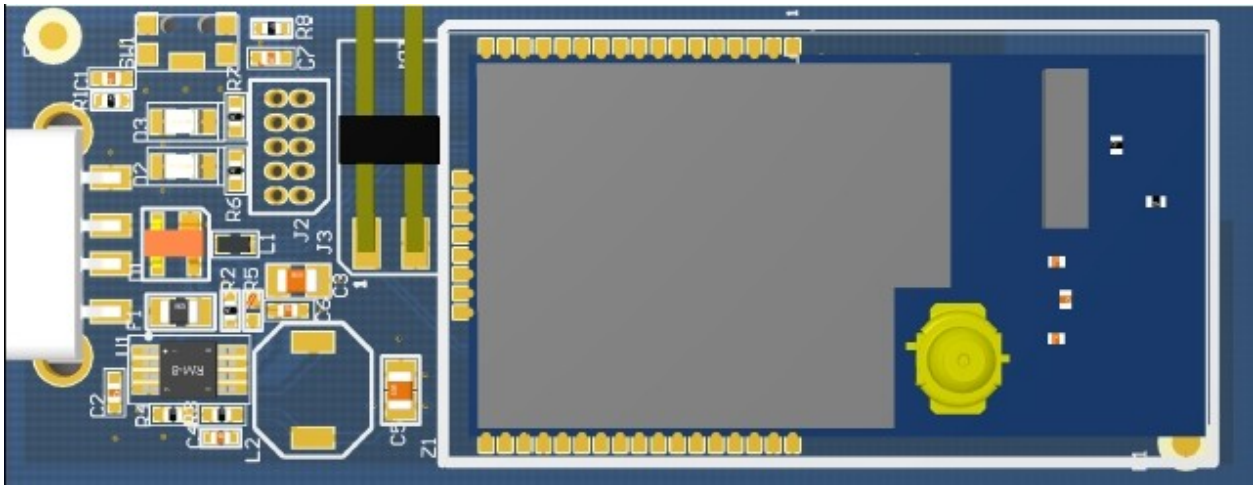


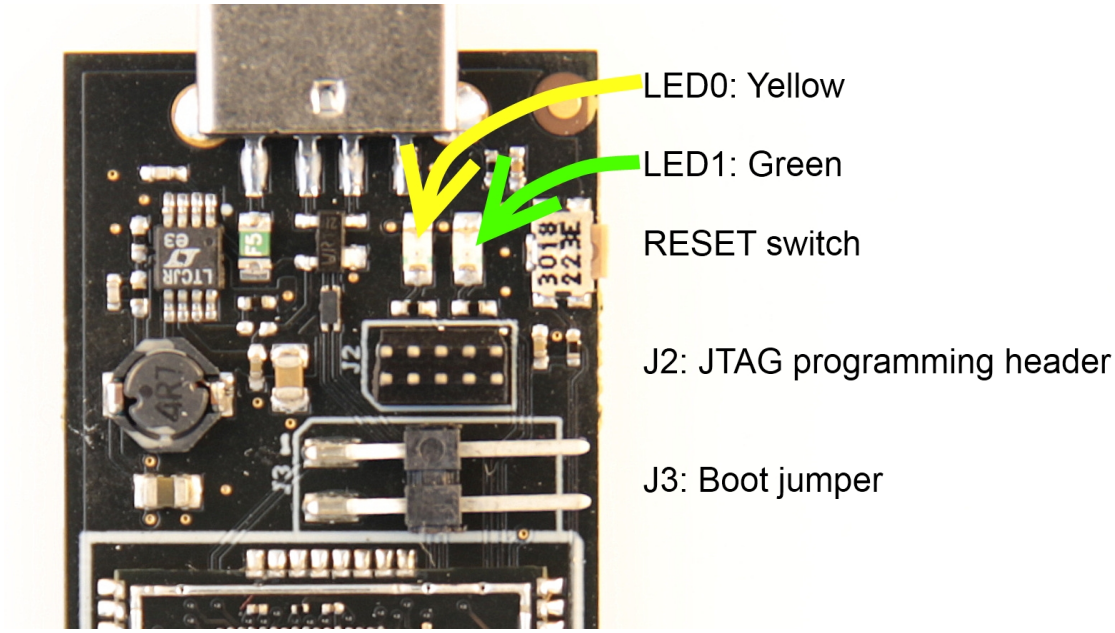
7. You can now monitor captured frames.

4. Hardware User Guide

4.1 Board Overview

Figure 4-1. Extension Assembly.jpg



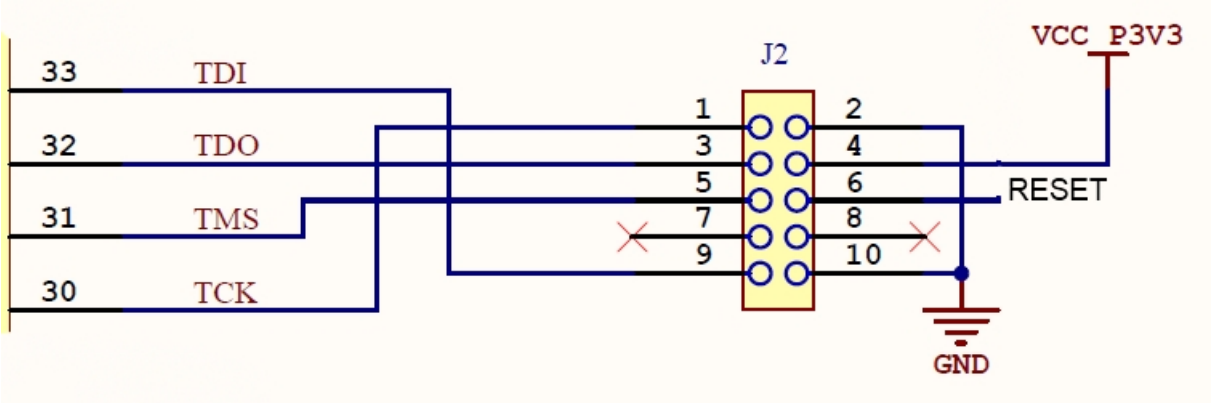


4.2 Headers and Connectors

The extension board connectors.

4.2.1 JTAG (J2)

J2 is the JTAG programming header typically used by the JTAGICE.



4.2.2 Boot Select (J3)

J3 enables the Bootloader when J3.1 connected to GND during RESET.

Insert jumper on J3 to connect J3.1 to J3.2.

Table 4-1. J5 Current measurement

J3 pin	ZigBit pin	XMEGA® pin	Function
1	38	41-PE5	Bootloader enable
2	GND	GND	GND

4.3 Board GUI

4.3.1 LED's

There are two LEDs available for use by application SW.

Table 4-2. LED's

	LED	ZigBit pin	XMEGA pin	
D2	LED0 - Yellow	10	3 - PA5	
D3	LED1 - Green	11	2 - PA4	

4.3.2 Button

There is one switch for RESET of the micro-controller.

Table 4-3. Buttons

Button	Function	ZigBit pin	XMEGA pin	
SW1	ZigBit Reset, press to reset	5	56 - RESET	

4.4 Factory Programmed Data

The ZigBit® has a preprogrammed unique MAC address - details available in the ZigBit data sheet and in “Persistence Memory” on page 24.

The USB stick comes with a Bootloader and the Performance Analyzer preprogrammed.

5. Persistence Memory

A dedicated memory space is allocated to store product specific information and called the Persistence Memory. The organization of the persistence memory is as follows:

Table 5-1. Persistence Memory

Data	Size
Structure Revision	2 bytes
MAC address	8 bytes
Board information – PCBA Name	30 bytes
Board information – PCBA Serial number	10 bytes
Board information – PCBA Atmel Part Number	8 bytes
Board information – PCBA Revision	1 byte
XTAL Calibration Value	1 byte
Reserved	7 bytes
Reserved	4 bytes
CRC	1 bytes

The MAC address stored inside the MCU is a uniquely assigned ID for each ZigBit® and owned by Atmel. User of the ZigBit application can use this unique MAC ID to address the ZigBit in end-applications. The MAC ID can be read from the ZigBit using the Performance Analyzer Application that is supplied through Atmel Studio Gallery Extension.

6. Document Revision History

Document revision	Date	Comment
42194A	10/2013	Initial document release