IA611 Xplained Pro Atmel Studio 7 User Guide

External Use

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This document describes getting started with the Knowles IA611 Xplained Pro Extension Kit (PN IA611-RDI-03) and the Microchip SAM D21 development platform. The extension kit is the IA611 Reference Design for IoT designed to be used with the Microchip SAM D21 Explained Pro MCU.

Filename: IA611_Explained_Pro_Atmel_Studio_User_Guide.docx

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Chapter 1: Introduction

The Knowles **IA611 Reference Design for IoT** is based on IA611 Smart Mic. The IA611 enables ultra-low power voice and event detection including voice UI supporting keywords and voice commands and acoustic event detection. To achieve low power and compact design, it is designed to be implemented with a readily available MCU board. The implementation discussed is this guide is the **IA611 Xplained Pro** development board designed to be used with the Microchip SAM D21 Explained Pro MCU.

This document describes using the IA611 Xplained Pro development board with the SAM D21 Xplained Pro Evaluation Kit. The goal of this guide is to enable a developer to setup the hardware and detect keywords with the IA611 digital microphone with integrated DSP.

1.1 Document Scope

The IA611 Xplained Pro Atmel Studio 7 User Guide explains the structure and behavior of the IA611 Xplained Pro development board. It also covers how to setup the all the hardware and software components and describes how these components are used to meet the product goals and objectives.

1.2 Overview

The IA611 Xplained Pro is a development board for the Knowles IA61x series of Smart Microphones. VoiceQ will run on an IA611 microphone connected to a Microchip SAM D21 Xplained Pro development board.

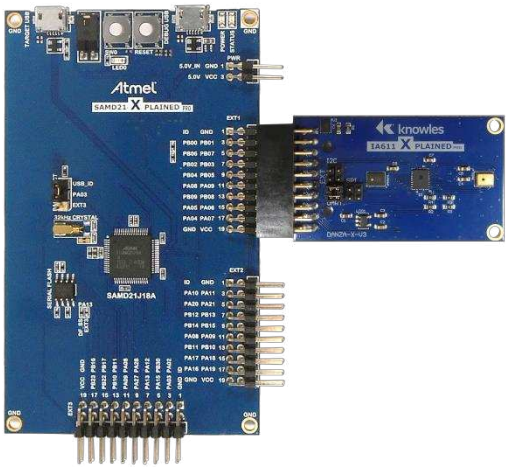

Figure 1 *IA611 Xplained Pro connected to a SAM D21 Xplained Pro Development board*

1.3 Product Overview

1.3.1 Hardware Components

The IA611 Xplained Pro Development Board contains the following hardware:

- IA611 Digital Top Port Microphone with integrated DSP
- Level Shifter to shift digital signals from the SAM D21 at 3.3V to 1.8V for the IA611 microphone.
- Knowles SPK0641HT4H-1Digital Microphone
- 1.8V LDO to power the level shifter, IA611 and SPK0641HT4H-1 microphones

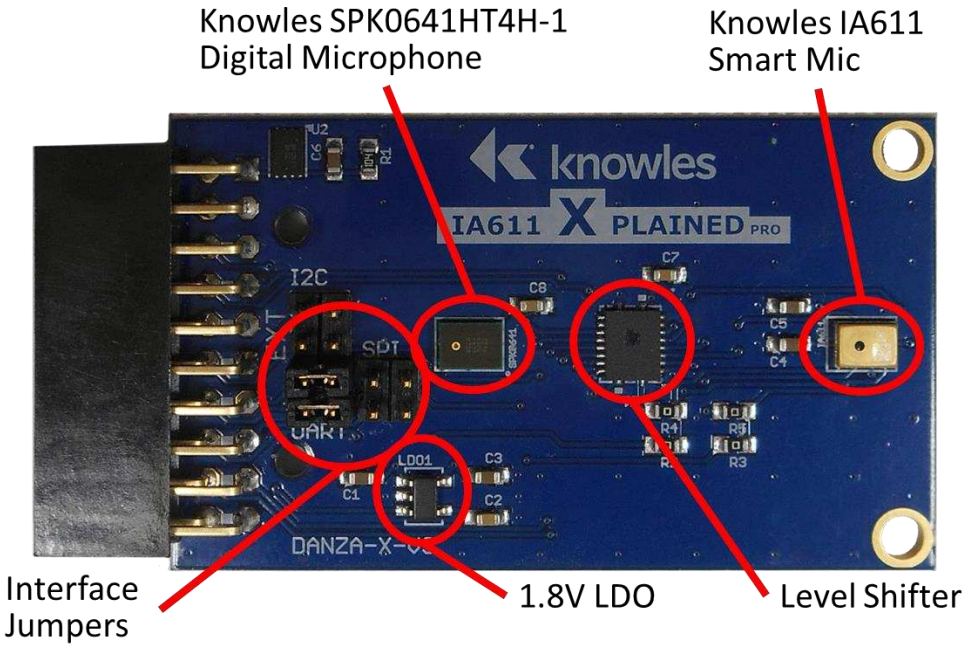

Figure 2 *IA611 Xplained Pro Development Board*

1.3.2 Software Components

The IA611 Xplained Pro Development Kit has an integrated sample software application for Atmel Studio 7 that is available from your Knowles Sales Representative.

Chapter 2: IA611 Xplained Pro Hardware Setup

The IA611 Xplained Pro development board should be plugged into connector **EXT1** of the SAM D21 development board.

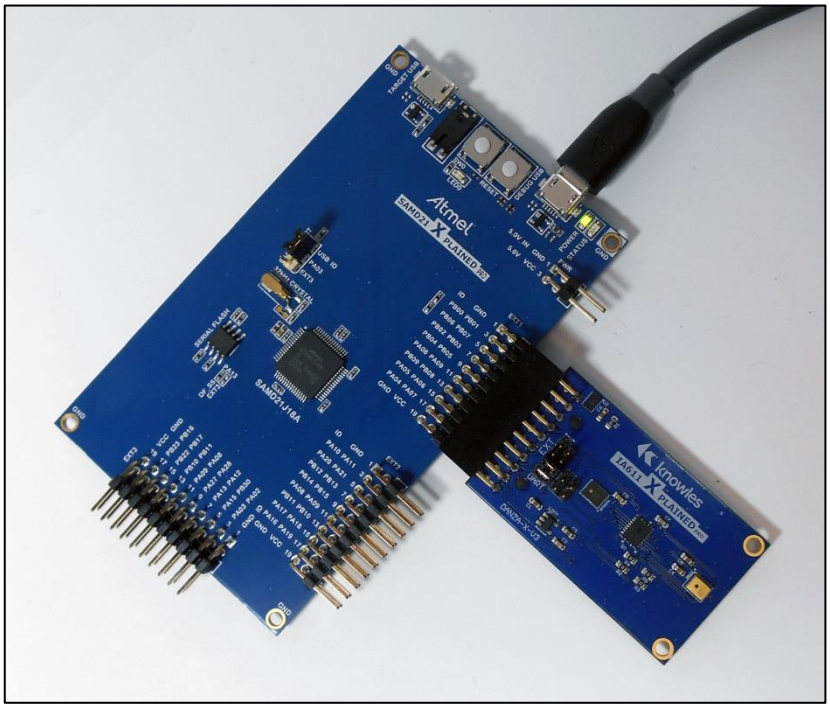

Figure 3 *IA611 Xplained Pro Plugged into EXT1 of the SAM D21 Board*

Chapter 3: IA611 Xplained Pro Software Setup

3.1 Loading the Example Project

1. Install Atmel Studio 7 from the Atmel/Microchip website: http://www.microchip.com/avr-support/atmel-studio-7
2. Extract the sample project provided by a Knowles Sales Representative.
3. Launch Atmel Studio 7 and select File->Open->Project/Solution…

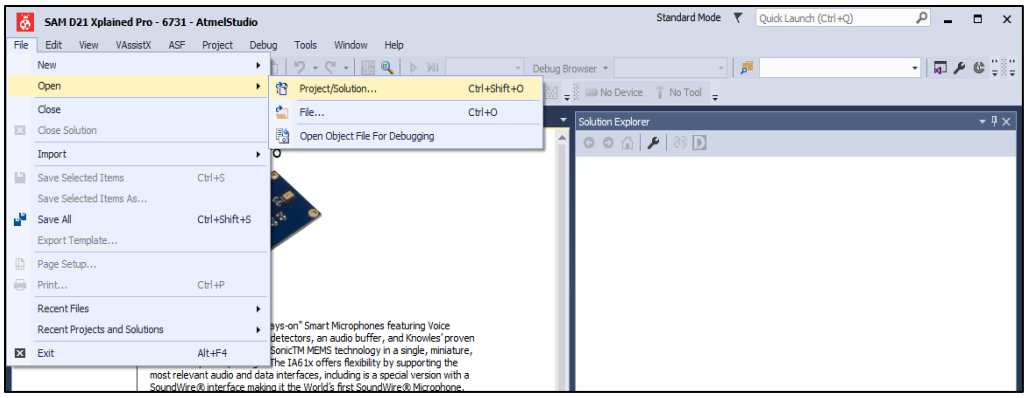

Figure 4 *Opening the sample Project*

4. Navigate to the Danza-SAMD21-sample directory from the extracted sample project.
5. Select Danza-SAMD21.atsln file and select Open

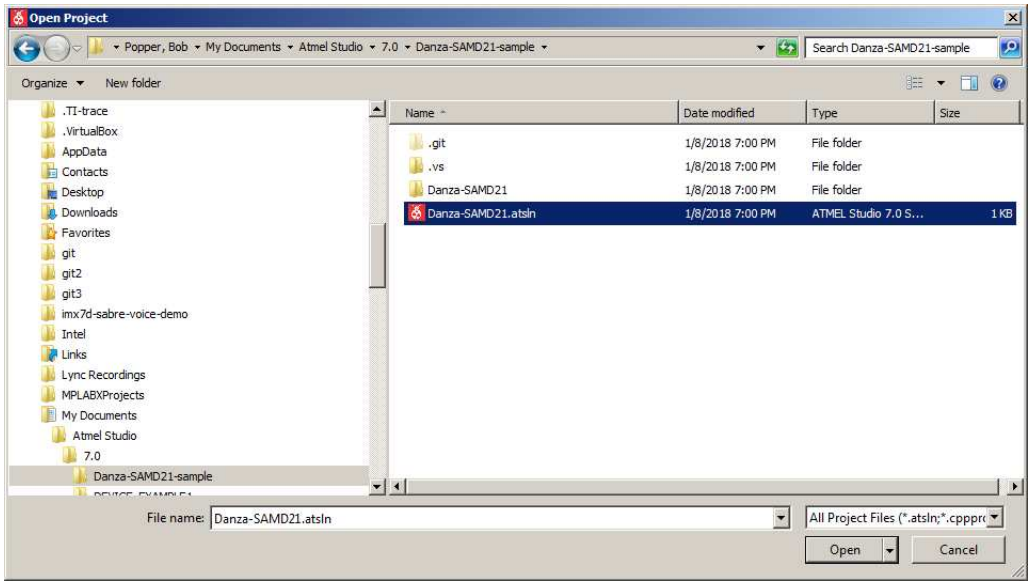

Figure 5 *Selecting the Project*

6. Select Debug->Start Debugging and Break.

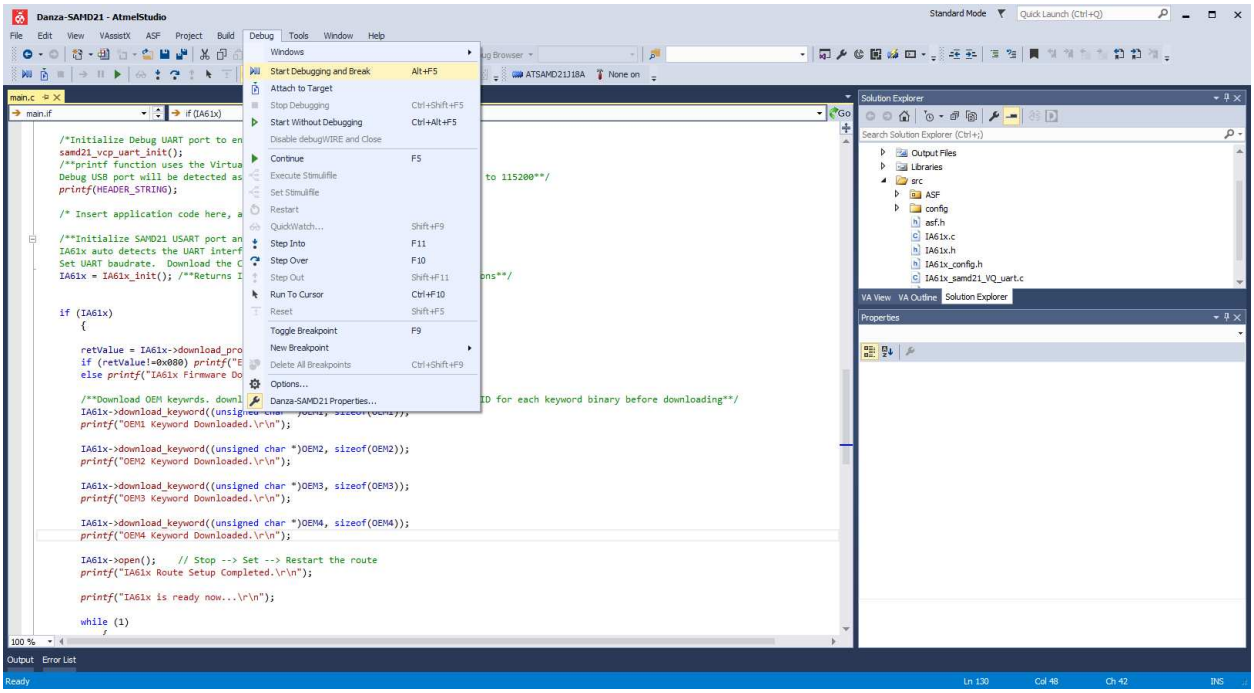

Figure 6 *Start Debugging and Break*

7. After the project builds and downloads into the SAM D21 Board, press the green triangle to run the sample.

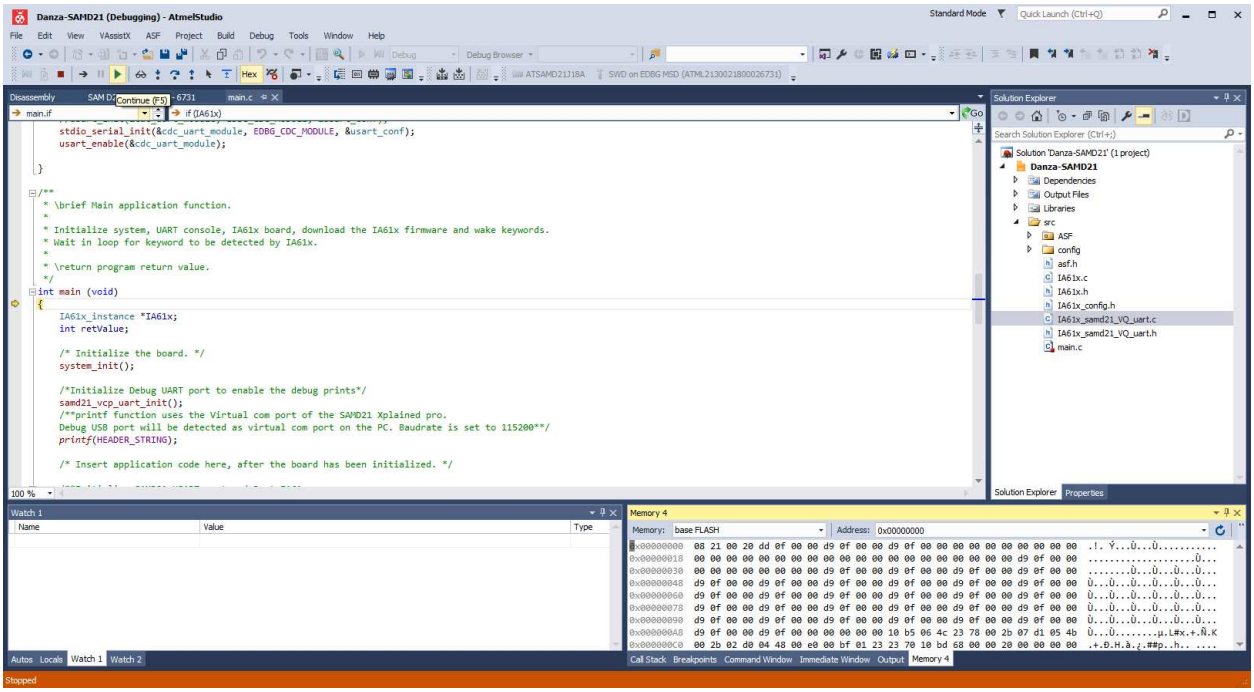

Figure 7 *Run the sample*

8. Say the wakeup keyword phrase "Hello VoiceQ" followed by one of the command phrases below and observe the state of LED0. Alternately, use a terminal program that supports DTR flow control and the settings shown to monitor the SAM D21's EDBG Virtual COM Port.

   NOTE *If the command phrase is not said within six seconds, the keyword will time out as indicated by LED0 blinking six times.*

WakeUp Keyword	LED0 Blinks	Command	LED0 Blinks
Hello VoiceQ	1 time	Switch the Light	2 times
		Next Song	3 times
		Biadu-Yi Xia	4 times

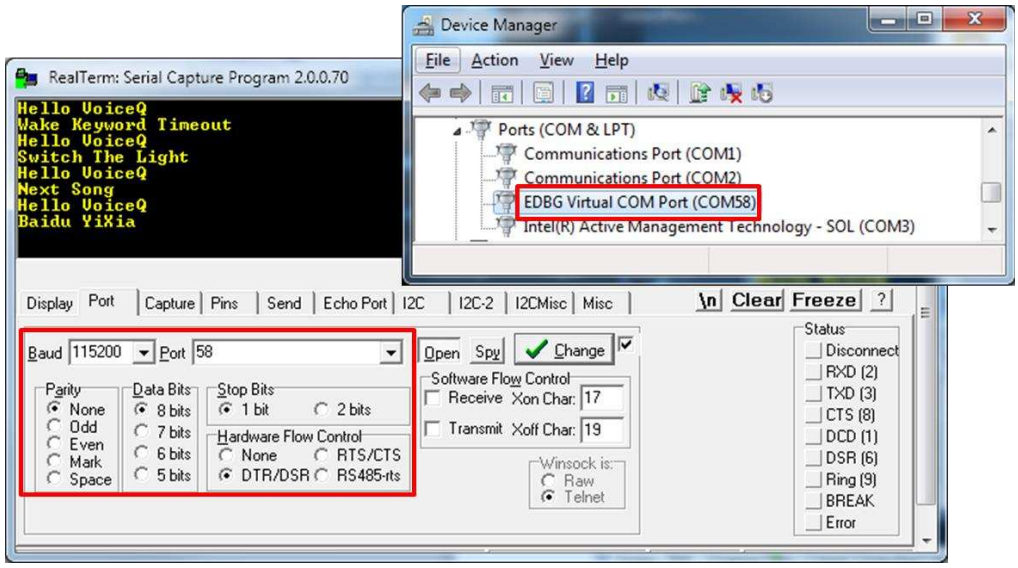

Figure 8 *Terminal Setup and Output*

9. Repeat the keyword plus command for the other command phrases.

Revision History

The following lists the changes made since the previous version of this document.

Version	Revision Date	Author(s)	Comments
1.0	1/26/2018	Popper/Cawley	Release
1.0.1	1/29/2018	Cawley	Updated keyword+ command.
1.0.2	2/20/2018	Cawley	Updated DMIC PN and graphics.
2.0	4/5/2018	Cawley	Updated for V3 board.

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