Software User Guide

SmartSonic2 programming guide

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1 INTRODUCTION

This document explains how to program the SmartSonic2 board with an Ultrasonic software. The SmartSonic2 board is designed to help customers evaluating the possibilities offered by the TDK Invensense Ultrasonic Time of Flight sensors, using one of the provided application examples.

1.1. REQUIRED EQUIPMENT

- SmartSonic2 evaluation board
- Ultrasonic ToF EVK daughter board
- One Micro-USB cable

1.2. REQUIRED SOFTWARE PACKAGES

- **invn.chirpmicro.smartsonic2.<application>-example.*X_X_X*.zip** including:
  - The application source files
  - Chirp SonicLib sensor API and driver files.
  - Sensor firmware image files
  - Board support package files for Chirp SmartSonic2 board
  - MPLAB X project files to build the application
- MPLAB X integrated development environment – download from Microchip.com

2 INSTALLATION / PREPARATION

- Download Arm 32-bit GNU Toolchain: GCC Compilers for AVR® and Arm®-Based MCUs and MPUs | Microchip Technology (minimum version: 6.3.1)
- Download and install a version of MPLAB X IDE (minimum version: 6.05) and add the Arm 32-bit GNU Toolchain directory to Tools → Options->Embedded → Build Tools (specify toolchain *bin* directory).
- Download and install (unzip) an Ultrasonic application to a project directory of your choice.

Warning : MPLAB X IDE doesn't handle path greater than 260 characters, to avoid weird build error, unzip archive to the smaller possible path.

- Connect the Ultrasound ToF EVK daughterboard to the SmartSonic2 board.
- Using flat flex cables, attach off-board sensor(s) to the connectors on the daughterboard (as required by the application).
  - Connectors J3, J4, J8 and J9 are for icux0201 sensors
  - Connectors J11, J12, J13 and J14 are for chx01 sensors

- Connect the SmartSonic2 board EDBG port to a Windows PC with the USB cable.

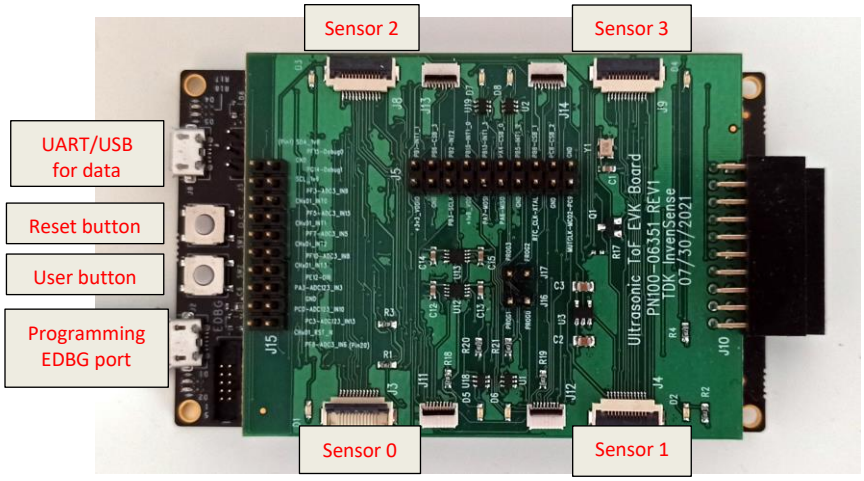

Figure 1. SmartSonic2 with Ultrasound ToF EVK Daughter Board

- Open Windows Device Manager, open the Ports (COM & LPT) list, and identify the COM port number assigned to the SmartSonic2 board. There will be one port associated with the SmartSonic2 board: "EDBG".
  - The EDBG port is used to connect to the on-board debugger and is programming the board as well as to display output from the program when it runs.

3 BUILDING A SMARTSONIC APPLICATION

- Open MPLAB X
- Open the Ultrasonic project:
  - Open **File** menu
  - Select **File > Open Project**
  - Select the **project/mplabx/smartsonic2-icux0201-<application>-example directory**.
  - Click **Open Project**.
- Check project dependencies:
  - In project dashboard, check minimum versions of packs are:
    - CMSIS : 5.8.0
    - SAMG_DFP : 3.7.83

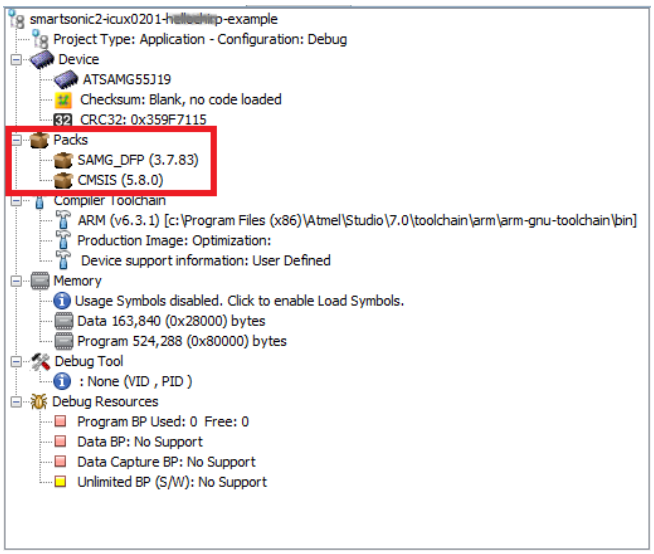

Figure 2. Check packs versions

- Build the project:
    - Select the *Release* configuration (or any other build configuration, as described in the application documentation).
    - Select **Production > Build Project**

4 PROGRAMMING THE SMARTSONIC2 BOARD

- Connect the SmartSonic2 board to a Windows PC with EDBG USB cable.
- MPLAB X should automatically detect the device.

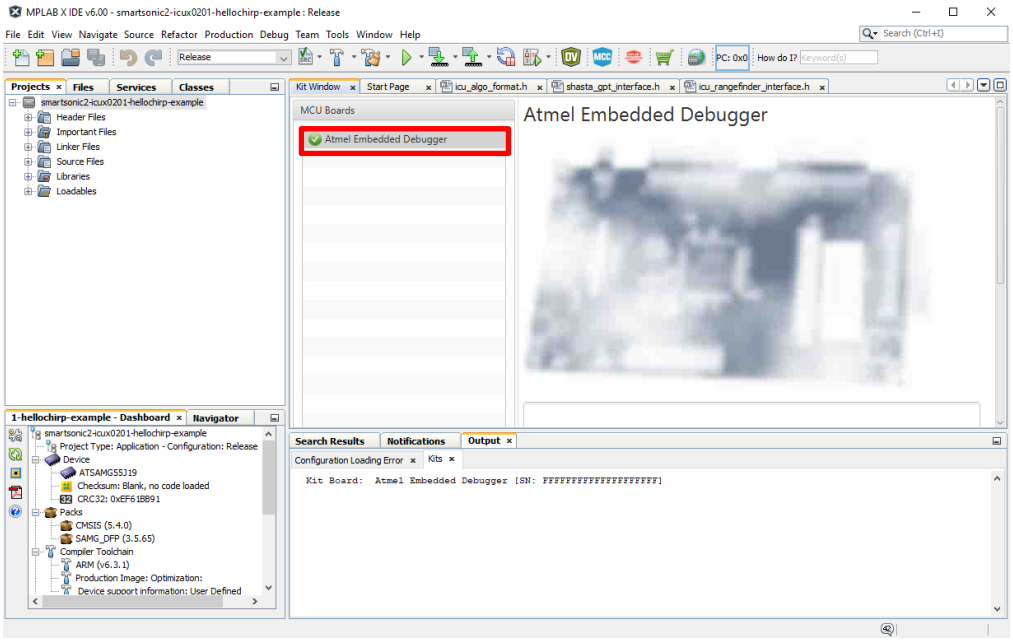

Figure 3. EDBG device detected

- Enable EDBG programming by checking Tools → Options → Embedded → Exclude device checks for kits.
- Click on the **Make and Program Device** button and select the EDBG tool and click **OK**:

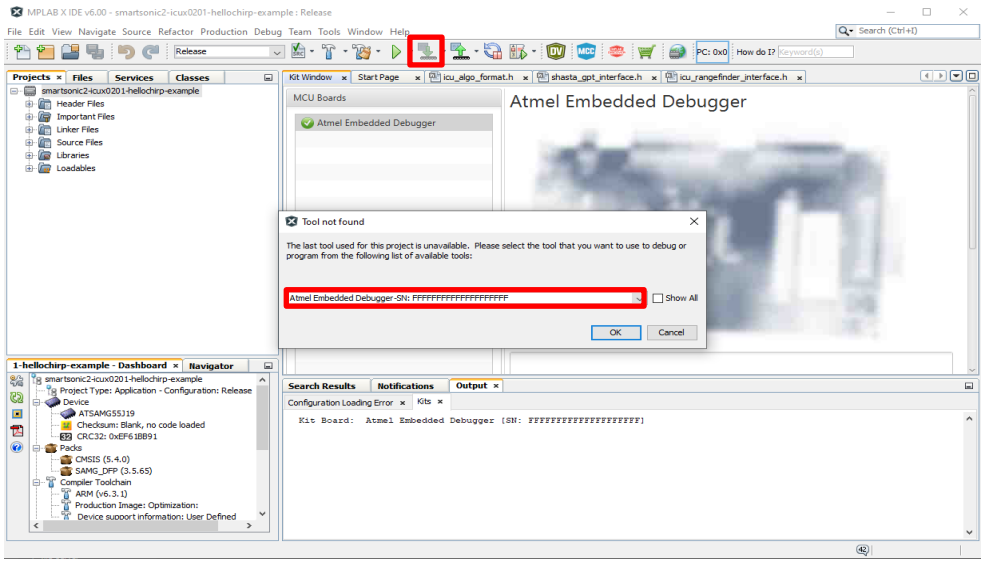

Figure 4. Select EDBG tool

- The project is compiled and flashed into the device memory .

5 REVISION HISTORY

Revision Date	Revision	Description
11/30/2022	1.0	Initial version.
01/18/2023	1.1	Detail toolchain installation and edb programming
05/24/2023	1.2	Add warning on path length