Application Note for Sensirion SHTC1 Xplained Pro Extension Board

Getting Started with the SHTC1 Extension Board and Demo Code

Summary

Many of today's smart phones and tablets feature processors to allow low power always-on sensor data processing. Sensirion is partnering with leading sensor hub manufacturer Atmel in their sensor hub initiative, a collaboration to bring together sensor manufacturers and companies developing fusion algorithms and create an expandable, unified platform to prototype new sensor subsystems for smart phones or wearable devices in a simple, plug-and-play fashion.

Sensirion provides a sensor wing board which is compatible with Atmel's Xplained Pro platform. This board includes the SHTC1 humidity and temperature sensor which is built for the consumer and mobile market, with its tiny $2x2x0.8mm^3$ footprint and 1.8V supply voltage. Sensirion's sensor board can be combined with any of the already available extension boards providing touch controls or display capabilities to quickly build powerful systems and start developing right away.

Required Hardware and Wiring

To run the demo code, the Atmel SAMD20 Xplained Pro Board and the Sensirion SHTC1 Xplained Extension Board are needed. The SHTC1 extension board has to be connected to SERCOM extension position 2 (EXT2) as shown in Figure 1.
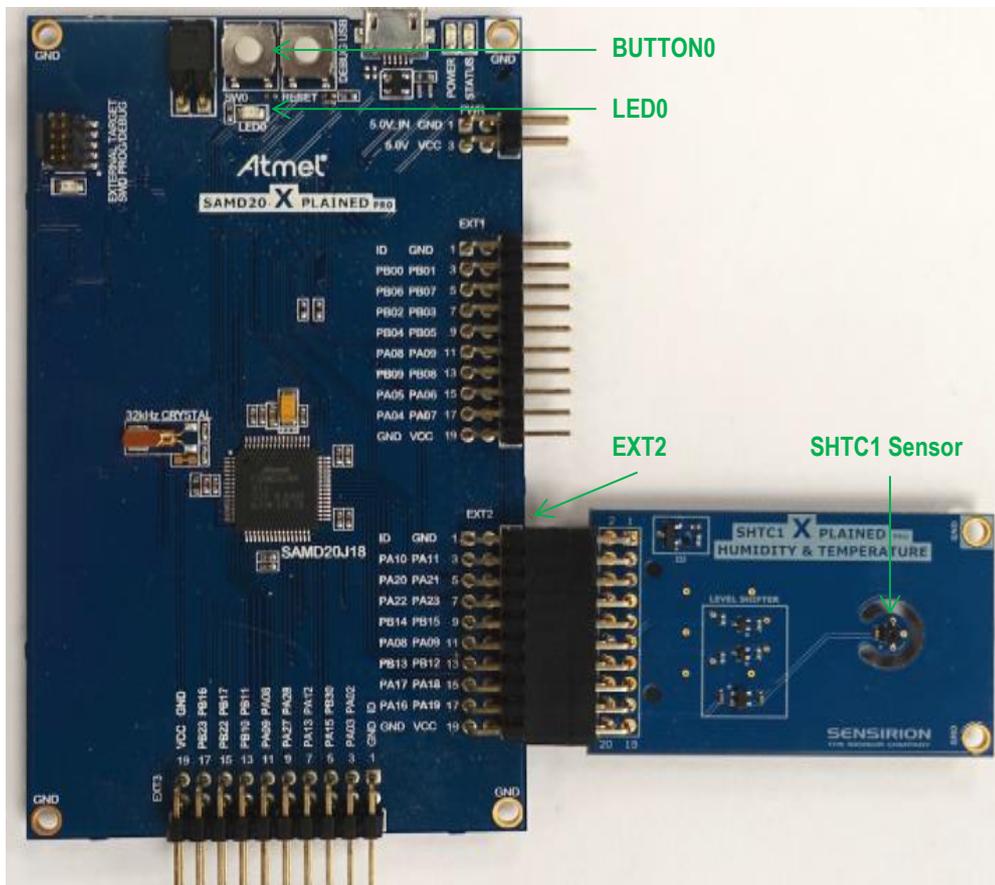

Figure 1: STHC1 Xplained Extension Board connected to Atmel SAMD20 Xplained Pro Board

Functionality of Demo Code

The provided demo code implements communication with the SHTC1 sensor over the I2C bus. Values are read in a loop and used for detection of breathing on the sensor (so called Air-Touch).

On reset/start, a reference humidity value is calculated. During operation, humidity values are read in a loop and the difference between current value and reference value is calculated. If the difference exceeds a given threshold, LED0 is turned on. BUTTON0 can be used to re-initialize the reference value.

In addition, humidity values and calculated dew point values are sent to host PC over USART. When the example from Atmel studio is running, the output can be read with any serial port terminal program (e.g., hyper-terminal or Tera term) from EDBG Virtual COM Port.

Code Structure

The code is structured as follows:

- **SHTC1 driver (shtc1.c and shtc1.h)-** Implements I2C driver for SHTC1 sensor
- **Main file (main.c) –** Contains an entry point of an example. The code in this file calls initialization routines and subsequently starts the main loop, where values from the SHTC1 sensor are read and air-touch is detected
- **Helpers (demo_tools.c and demo_tools.h)** Contains implementation of helper functions, e.g., printing messages back to the terminal (for debugging purposes) and initialization of I2C board support.

References

More information on the SHTC1 can be found at www.sensirion.com/SHTC1.

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Revision History

Date	Author	Version	Changes
07.08.2014	SDE/TPO	1	First Version
23.09.2014	CCO	1.1	Layout changes
09.10.2014	CCO/JWI	1.2	Released
24.10.2014	CCO	1.3	Minor changes