AVR4201: Pressure One (ATAVRSBPR1) Hardware Users Guide

Features

- **Compatible with all Atmel® AVR® Xplain MCU boards**
- **High precision Bosch Sensortec digital pressure sensor (BMP085)**
- **Integrated temperature sensing**
- **All sensor drivers available within the Atmel AVR Software Framework**
- **Drivers include temperature compensation and altitude calculation**

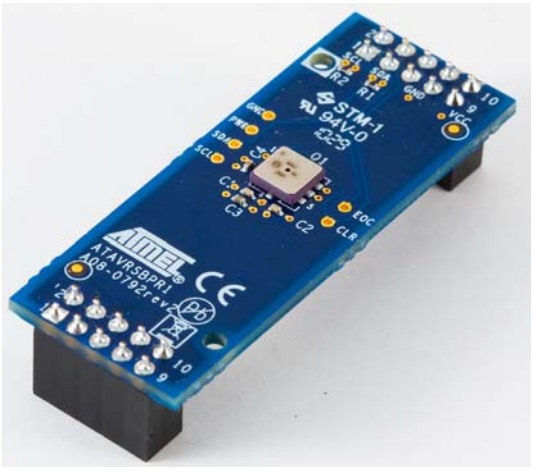
1 Introduction

The Atmel Sensors Xplained series of development boards and software are designed to be plug compatible with all Atmel Xplain MCU boards, providing a wide range of microcontroller performance depending on the application needs.

Atmel has partnered with leading suppliers of accelerometer, gyroscope, compass, pressure, and light sensors to provide a range of sensor boards that enable easy evaluation and development with a wide range of Atmel controller solutions.

To accelerate development with these sensor-based solutions, Atmel has worked with its partners to make the necessary sensor drivers available as part of the Atmel AVR Studio® development environment and the AVR Software Framework. The drivers are available directly from Atmel, and provide basic interface functionality with both raw data and calibrated engineering unit outputs integrated into a standard API.

The Atmel Pressure One Sensors Xplained development board provides access to the latest generation of precision digital barometric pressure sensors.



8-bit AVR® Microcontrollers

Application Note

Rev. 8355A-AVR-12/10

2 Related items

Application Notes

- Sensors Xplained – Quick Start Guide (AVR4015)
- Sensors Xplained – Software Users Guide (AVR4016)
- Sensors Xplained – Oscilloscope Demo Application (AVR4017)
- Sensors Xplained – Sensor Top Board Design Notes (AVR4014)

3 Description

The Atmel Pressure One Sensors Xplained development board utilizes a Bosch Sensortec digital absolute pressure sensor (BMP085) optimized for use in mobile phones, PDA's, GPS navigation devices, and outdoor equipment. The sensor is interfaced via the I^2C serial digital interface connected through a common header that is compatible with the full range of Atmel Xplain MCU boards. The BMP085 is based on piezo-resistive MEMS technology, giving high accuracy and linearity as well as long-term stability. It also integrates a temperature sensor that can be used for compensation of the sensor output.

Typical applications include:

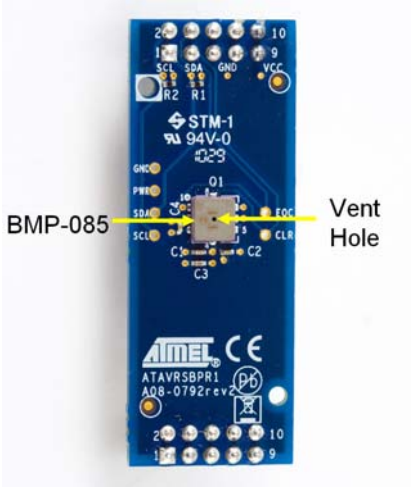
- Enhancement of GPS navigation (dead reckoning, slope detection etc.)
- Indoor and outdoor navigation
- Leisure and sports
- Weather forecast
- Altitude and vertical velocity indication (rise/sink speed)

Detailed explanation of the operation of the BMP085 can be obtained from the Bosch Sensortec component data sheet.

4 Hardware layout

Figure 4-1 shows the physical arrangement of the Pressure One Sensors Xplained development board.

Figure 4-1. Hardware layout.

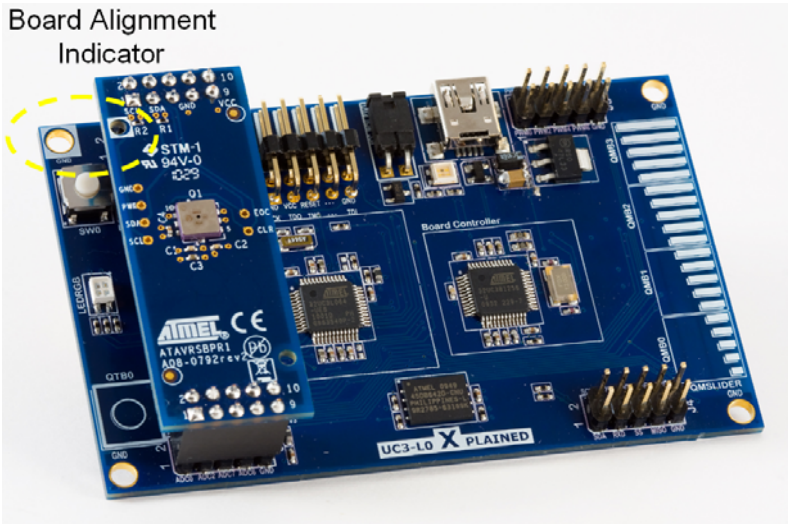


IMPORTANT — The sensor has a vent hole to allow it to sense atmospheric pressure. This must be kept unblocked at all times.

CAUTION — *Do not insert any objects into the vent hole, as this may permanently damage the sensor.*

The Inertial One Sensors Xplained development board must be attached to the correct headers on the Xplain MCU board to ensure proper operation. All the Sensors Xplained development boards attach to headers J1 and J2 on the MCU boards, and a board alignment indicator is printed on the board to provided to aid correct alignment. As an example, Figure 4-2 shows the orientation of the Pressure One Sensors Xplained development board when attached to the UC3-L0 Xplained MCU board.

Figure 4-2. Correct board attachment orientation.



5 Schematic

Figure 5-1 shows the schematic for the Atmel Pressure One Sensors Xplained development board, and Table 5-1 gives the I²C address.

NOTE

The I²C pull up resistors are included on the Pressure One Sensors Xplained board.

Figure 5-1. Pressure One schematic.

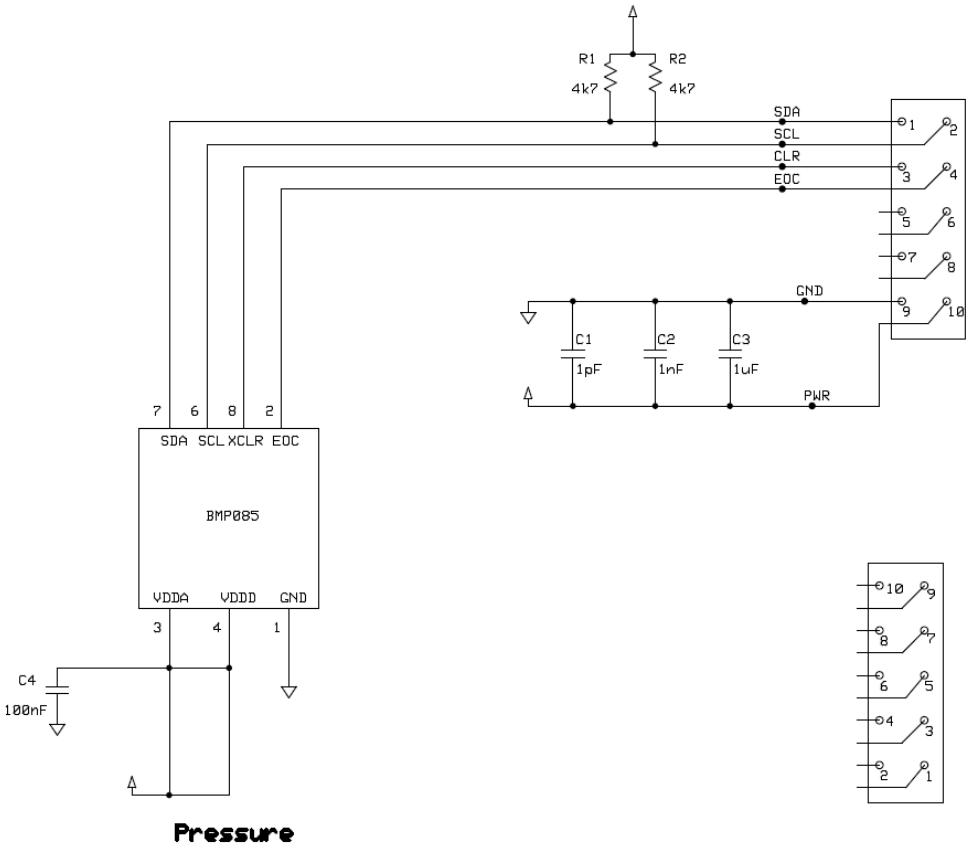


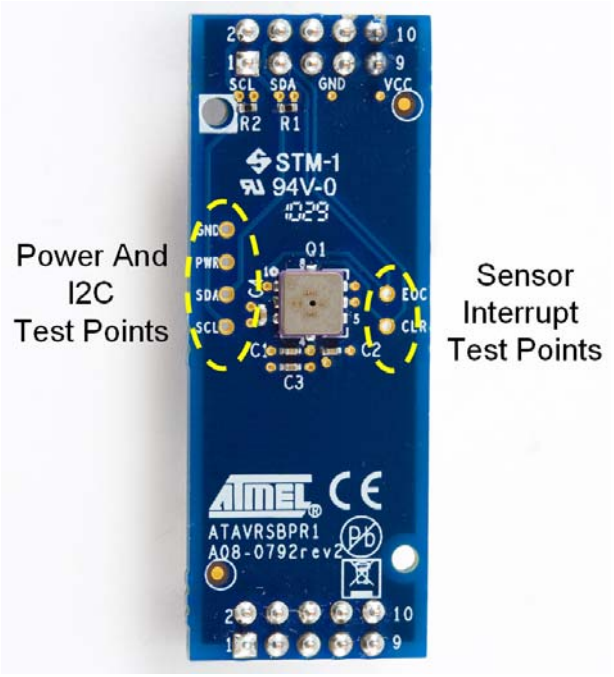
Table 5-1. Sensor I²C addresses.

Sensor	I²C address
BMP085	0x77

5.1 Circuit test points

A number of test points are available for use with an oscilloscope to investigate the functioning of the sensor. The locations of the test points are indicated on the schematic, and Figure 5-2 shows the physical locations of the test points on the board.

Figure 5-2. Locations of test points.



IMPORTANT — THE SDA, SCL, GND, AND VCC MARKS NEAR THE UPPER HEADER ARE FOR TEST POINTS USED IN THE MANUFACTURING PROCESS AND DO NOT REFER TO THE PINS ON THE HEADER.

6 EVALUATION BOARD/KIT IMPORTANT NOTICE

This evaluation board/kit is intended for use for **FURTHER ENGINEERING, DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY.** It is not a finished product, and may not (yet) comply with some or any technical or legal requirements that are applicable to finished products, including, without limitation, directives regarding electromagnetic compatibility, recycling (WEEE), FCC, CE, or UL (except as may be otherwise noted on the board/kit). Atmel supplied this board/kit "AS IS," without any warranties, with all faults, at the buyer's and further users' sole risk. The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies Atmel from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge and any other technical or legal concerns.

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