

✓RoHS

## MEAS MS5837 XPLAINED PRO BOARD

Digital Barometric Pressure and Temperature Digital Component Sensor (DCS) Development Tools

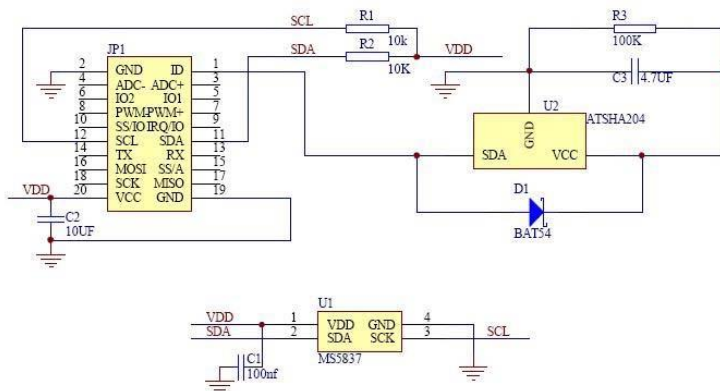
### Performance

- 0 to 30bar pressure range
- -40°C to 85°C temperature range
- Very low power consumption
- Operates from 1.5V to 3.6V
- Altitude resolution at sea level is 20 cm of air
- Fast conversion time – 0.5ms typical

### Features

- 20-pin Xplained Pro compatible connector
- I<sup>2</sup>C interface
- Xplained Pro Hardware identification Chip
- Atmel Studio 7 Project available for download
- $\mu$ C C code available for download
- 24 bits resolution for pressure
- 24 bits resolution for temperature

### Schematic



The MS5837 Xplained Pro provides the necessary hardware to interface the MS5837 digital barometric pressure and temperature sensor to any system that utilizes Xplained Pro compatible expansion ports configurable for I<sup>2</sup>C communication. The MS5837 sensor is a self-contained pressure and temperature sensor that is fully calibrated during manufacture. The sensor can operate from 1.5V to 3.6V. The sensor module includes a high-linearity pressure sensor and an ultra-low power 24 bits  $\Delta\Sigma$  ADC with internal factory-calibrated coefficients.

Refer to the MS5837 data sheet for detailed information regarding operation of the I<sup>2</sup>C:

<http://www.te.com/usa-en/product-CAT-BLPS0059.html>

### Specifications

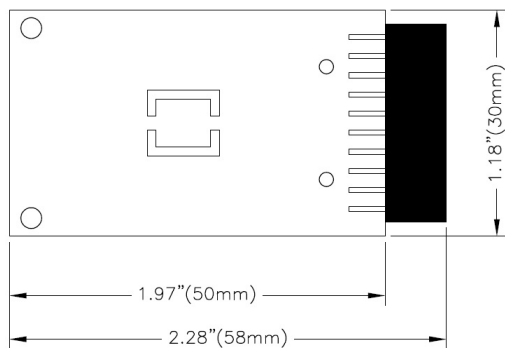
- Measures pressure from 0 to 30bar
- Measures temperature from -20°C to 85°C
- I<sup>2</sup>C communication
- Fully calibrated
- Fast response time
- Very low power consumption

## Connector Pin Assignments (I<sup>2</sup>C Communications)

### System Plug

Connector JP1					
Pin No.	Signal	Description	Pin No.	Signal	Description
1	ID	Hardware identification	11	SDA	TWI Serial Data
2	GND	Ground	12	SCL	TWI Serial Clock
3	N/C	Not Connected	13	N/C	Not Connected
4	N/C	Not Connected	14	N/C	Not Connected
5	N/C	Not Connected	15	N/C	Not Connected
6	N/C	Not Connected	16	N/C	Not Connected
7	N/C	Not Connected	17	N/C	Not Connected
8	N/C	Not Connected	18	N/C	Not Connected
9	N/C	Not Connected	19	GND	Ground
10	N/C	Not Connected	20	Vdd	Power Supply

## Dimensions (mm)



## Detailed Description

### I<sup>2</sup>C Interface

The peripheral module can interface to the host being plugged directly into an Xplained Pro extension port (configured for I<sup>2</sup>C) through connector JP1.

### External Control Signals

The IC operates as an I<sup>2</sup>C slave using the standard 2 wire I<sup>2</sup>C connection scheme. The IC is controlled either by the host (through the Xplained Pro connector). In cases where one or more of the SCL and SDA signals are driven from an external source, 10k resistors R1, R2 provide pull-up. However, this also increases the apparent load to the external driving source. If the external source is not capable of driving these loads (10k), they should be removed.

### Reference Materials

The complete software kit is available for download at: [MS5837\\_CPROJ.zip](#)

## Drivers & Software

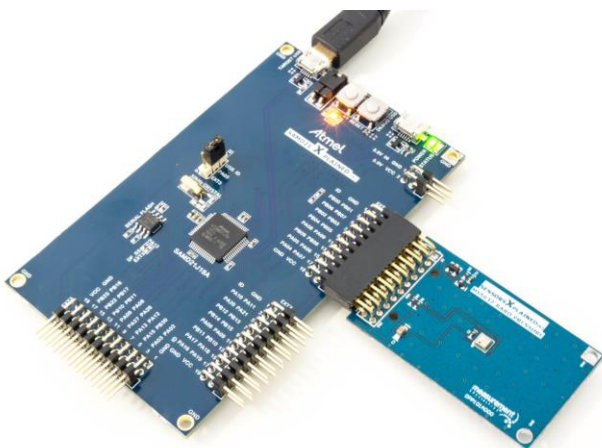
Detailed example software and drivers are available that execute directly without modification on a number of development boards that support an integrated or synthesized microprocessor. The download contains several source files intended to accelerate customer evaluation and design. The source code is written in standard ANSI C format, and all development documentation including theory/operation, register description, and function prototypes are documented in the interface file.

## Functions Summary



Enumerations	
enum	<b>ms5837_resolution_osr</b> { ms5837_resolution_osr_256 = 0, ms5837_resolution_osr_512, ms5837_resolution_osr_1024, ms5837_resolution_osr_2048, ms5837_resolution_osr_4096, ms5837_resolution_osr_8192 }
enum	<b>ms5837_status</b> { ms5837_status_ok, ms5837_status_no_i2c_acknowledge, ms5837_status_i2c_transfer_error, ms5837_status_crc_error }
Functions	
void	<b>ms5837_init (void)</b> Configures the SERCOM I2C master to be used with the ms5837 device.
bool	<b>ms5837_is_connected (void)</b> Check whether MS5837 device is connected.
enum ms5837_status	<b>ms5837_reset (void)</b> Reset the MS5837 device.
void	<b>ms5837_set_resolution (enum ms5837_resolution_osr)</b> Set ADC resolution.
enum ms5837_status	<b>ms5837_read_temperature_and_pressure (float *, float *)</b> Reads the temperature and pressure ADC value and compute the compensated values.

## Project Setup

This project is based on ATSAM20J18 board with TE Connectivity Xplained Pro extension board connected to EXT1 pad as shown on figure below.



## Running the Application

1. Download the MS5837 Xplained Pro example package at: [MS5837\\_CPROJ.zip](#)
2. Decompress the archive file
3. Open the .cproj project file with Atmel Studio 6
4. You will now be able to build the MS5837 example project - 
5. Finally, run the build result on your Xplained Pro Board - 

## Application Code

This section is intended to provide a basic example of functionality.

```
/**
 * \file main.c
 *
 * \brief MS5837 Pressure monitoring application file
 *
 * Copyright (c) 2014 Measurement Specialties. All rights reserved.
 */

#include <asf.h>

float temperature;
float pressure;

int main (void)
{
    enum ms5837_status status;
    float last_temperature = 0;
    float variation = 0;

    system_init();
    delay_init();

    // Configure device and enable
    ms5837_init();

    if( !ms5837_is_connected() )
        return -1;

    // Reset MS5837
    status = ms5837_reset();
    if( status != ms5837_status_ok)
        return -1;

    ms5837_set_resolution(ms5837_resolution_osr_256);

    // Monitor temperature & pressure every second
```

# MEAS MS5837 XPLAINED PRO BOARD

Digital Barometric Pressure and Temperature DCS Development Tools

```
while (1) {  
  
    status = ms5837_read_temperature_and_pressure( &temperature, &pressure);  
    if( status != ms5837_status_ok)  
        return -1;  
  
    variation += temperature - last_temperature;  
  
    // Look for significant temperature variation  
    if ( variation >= 0.5 ) {  
        // Yes, so turn LED on.  
        port_pin_set_output_level(LED_0_PIN, LED_0_ACTIVE);  
        variation = 0;  
    } else if ( variation <= -0.5 ) {  
        // No, so turn LED off.  
        port_pin_set_output_level(LED_0_PIN, LED_0_INACTIVE);  
        variation = 0;  
    }  
  
    delay_ms(1000);  
    last_temperature = temperature;  
}  
}
```

## Ordering Information

Description	Part Number
MEAS MS5837 XPLAINED PRO BOARD	DPP103A000

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions: The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

### NORTH AMERICA

Measurement Specialties, Inc.,  
a TE Connectivity Company  
Phone: +1-800-522-6752  
[customercare.hmpt@te.com](mailto:customercare.hmpt@te.com)

### EUROPE

MEAS France(Europe)  
a TE Connectivity Company  
Phone: +31 73 624 6999  
[customercare.tise@te.com](mailto:customercare.tise@te.com)

### ASIA

Measurement Specialties (China), Ltd.,  
a TE Connectivity Company  
Phone: +86-400-820-6015  
[customercare.shzn@te.com](mailto:customercare.shzn@te.com)

## TE.com/sensorsolutions

Measurement Specialties, Inc., a TE Connectivity company.

Measurement Specialties (MEAS), American Sensor Technologies (AST), TE Connectivity, TE Connectivity (logo) and EVERY CONNECTION COUNTS are trademarks. All other logos, products and/or company names referred to herein might be trademarks of their respective owners.

The information given herein, including drawings, illustrations and schematics which are intended for illustration purposes only, is believed to be reliable. However, TE Connectivity makes no warranties as to its accuracy or completeness and disclaims any liability in connection with its use. TE Connectivity's obligations shall only be as set forth in TE Connectivity's Standard Terms and Conditions of Sale for this product and in no case will TE Connectivity be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product. Users of TE Connectivity products should make their own evaluation to determine the suitability of each such product for the specific application.

© 2017 TE Connectivity Ltd. family of companies All Rights Reserved.