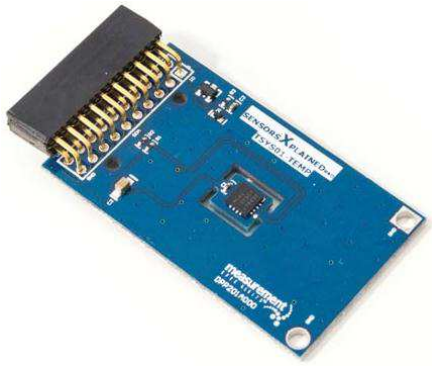


MEAS TEMPERATURE SYSTEM SENSOR (TSYS01) XPLAINED PRO BOARD

Digital Temperature
Digital Component Sensor (DCS) Development Tools

The Temperature System Sensor (TSYS01) Xplained Pro provides the necessary hardware to interface the TSYS01 digital temperature sensor to any system that utilizes Xplained Pro compatible expansion ports configurable for I²C communication. The TSYS01 sensor is a self-contained temperature sensor that is fully calibrated during manufacture. The sensor can operate from 2.2V to 3.6V. The TSYS01 has a low power stand-by mode for power-sensitive applications.

Refer to the TSYS01 data sheet for detailed information regarding operation of the IC:

http://www.te.com/usa-en/product-G-NICO-018.html

Performance

- -5°C to 50°C accuracy: 0.1°C
- -40°C to 125°C accuracy: 0.5°C
- Very low power consumption
- Operates from 2.2V to 3.6V
- time constant – 4 second typical in air
- Fast conversion time – 8.22ms typical

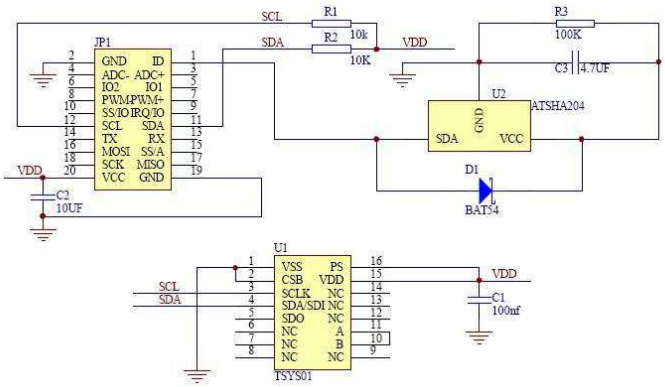
Features

- 20-pin Xplained Pro compatible connector
- I²C interface
- Xplained Pro hardware identification chip
- Atmel Studio 6 Project available for download
- µC C code available for download
- 24/16 bit resolution for temperature
- Parameters stored on chip

Specifications

- Measures temperature from -40°C to 125°C
- I²C communication
- Fully calibrated
- Fast response time
- Very low power consumption

Schematic

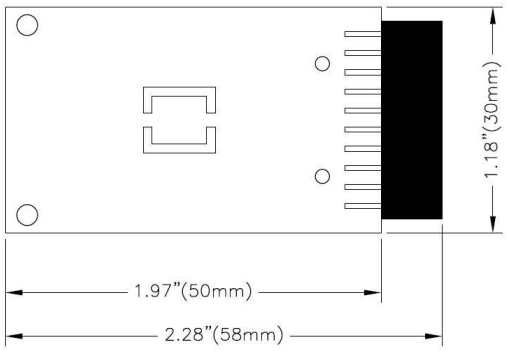


Connector Pin Assignments (I^2C Communications)

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^2C Interface

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

External Control Signals

The IC operates as an I^2C slave using the standard 2 wire I^2C 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: Link to TSYS01_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	

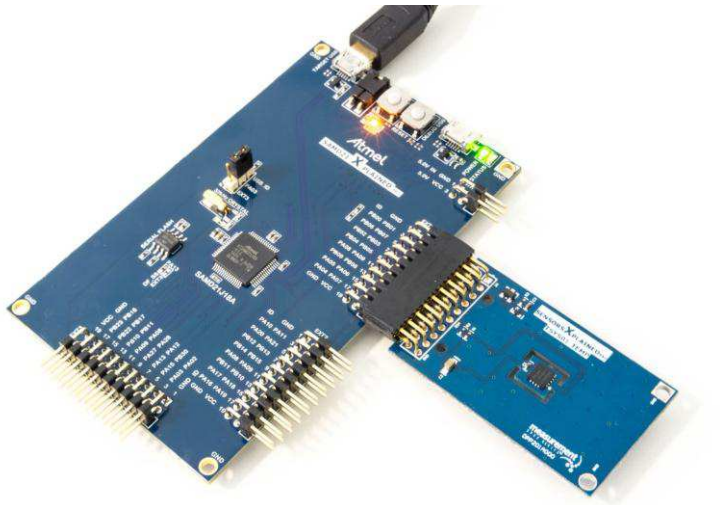
enum	**tsys01_address** {
	tsys01_i2c_address_csb_1,
	tsys01_i2c_address_csb_0
	}

enum	**tsys01_status** {
	tsys01_status_ok, **tsys01_status_no_i2c_acknowledge**,
	tsys01_status_i2c_transfer_error, **tsys01_status_crc_error**
	}

Functions	
void	**tsys01_init** (void)
	Configures the SERCOM I2C master to be used with the tsys01 device.
void	**tsys01_set_address** (enum tsys01_address address)
	Configures TSYS01 I2C address to be used depending on HW configuration.
bool	**tsys01_is_connected** (void)
	Check whether TSYS01 device is connected.
enum tsys01_status	**tsys01_reset** (void)
	Reset the TSYS01 device.
enum tsys01_status	**tsys01_read_temperature** (float *)
	Reads the temperature ADC value and compute the degree Celsius one.
Enumerations	
enum	**tsys01_address { tsys01_i2c_address_csb_0, tsys01_i2c_address_csb_1 }**
enum	**tsys01_status { tsys01_status_ok, tsys01_status_i2c_transfer_error }**

Project Setup

This project is based on ATSAMD20J18 board with Measurement Specialties Xplained Pro extension board connected to EXT1 pad as shown on figure below.



Running the Application

1. Download the TSYS01 Xplained Pro example package on TE Website
2. Decompress the archive file
3. Open the .cproj project file with Atmel Studio 6
4. You will now be able to build the TSYS01 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 TSYS01 temperature monitoring application file
 *
 * Copyright (c) 2014 Measurement Specialties. All rights reserved.
 *
 */

#include <asf.h>

float temperature;

int main (void)
{
	enum tsys01_status status;
	float last_temperature = 0;
	float variation = 0;

	system_init();
	delay_init();

	// Configure device and enable
	tsys01_init();

	// Set address
	tsys01_set_address(tsys01_i2c_address_csb_0);

	if( !tsys01_is_connected() )
		return -1;

	// Reset TSYS01
	status = tsys01_reset();
	if( status != tsys01_status_ok)
		return -1;

	// Monitor temperature every 500ms
```

```
        while (1) {
                status = tsys01_read_temperature(&temperature);
                if( status != tsys01_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(500);
                last_temperature = temperature;
        }
}
```

Ordering Information

Description	Part Number
MEAS TSYS01 XPLAINED PRO BOARD	DPP201A000

te.com/sensorsolutions

PRODUCT SHEET

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单击下面可查看定价，库存，交付和生命周期等信息

>>TE Connectivity(泰科)