DS1631 Evaluation System

# Evaluates: DS1631

General Description

The DS1631 evaluation system (EV system) demonstrates the DS1631 high-precision digital thermometer and thermostat. The DS1631 EV system consists of the DS1631 evaluation kit (EV kit) and the USB2PMB2 adapter board. Windows XP® and Windows® 7/8/8.1/10-compatible software provides a user-friendly interface that demonstrates the features of the DS1631.

The DS1631 EV kit comes with the 8-pin μMAX DS1631AU+ installed.

Features

- 2 x 6-Pin Pmod™ Compatible Connector (I^{2}C)
- Proven PCB Layout
- Fully Assembled and Tested
- Windows XP, Windows 7/8/8.1/10 Compatible Software

EV System Photo
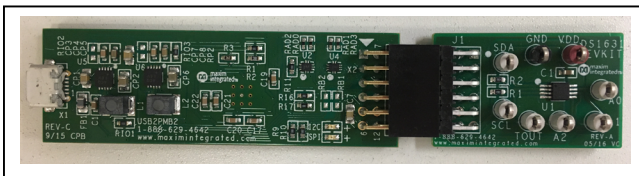
Quick Start

Required Equipment

- DS1631 EV system (USB cable included)
- Windows PC
- Voltmeter

Note: *In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.*

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Install the DS1631GUISetup.msi software on your computer.
2) Align the X2 connector of the USB2PMB2 with the J1 connector of the DS1631 EV kit.
3) Connect the voltmeter between the TOUT and GND test points.
4) Connect the USB cable from the PC to the X1 connector of the USB2PMB2 board.
5) Open the EV kit GUI, DS1631EVKit.exe (Figure 1).
6) Click the **Scan Adapters** button. Then select the option **PMODxxxxxx** (where xxxxxx is numeric) and click the **Connect** button.
7) Start evaluating the DS1631 by clicking the **Sample Continuously** button.

*Ordering Information **appears at end of data sheet.***

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Pmod is a trademark of Digilent Inc.

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General Description of Software

The main window of the DS1631 EV kit software contains controls to evaluate the DS1631 IC.

Configuration

The **Configuration** groupbox allows control of various DS1631 options such as conversion resolution and time, TOUT polarity, and conversion mode. It also provides information about conversion status, EEPROM activity, and thermostat activity. Select the appropriate controls to enable each feature.

Resolution

Use the **Conversion Resolution** drop-down list to select between 9, 10, 11, and 12-bit resolution. The **Conversion Time** dropdown list allows the user to adjusts the sampling rate for each resolution.

TOUT Polarity

Check the **TOUT Polarity** dropdown list for active-high or active-low TOUT.

Conversion Mode

The **Conversion Mode** dropdown list allows the user to select between continuous and one-shot conversions.

Address

The DS1631's slave address is determined by the logic state of the A_ pins. The GUI allows controlling the states of the A_ pins by selecting the appropriate item within the dropdown list and setting the appropriate bits in the control byte of the I^2C command.

Temperature

The hexadecimal code and the converted temperature are displayed within the **Register Read/Write** groupbox.
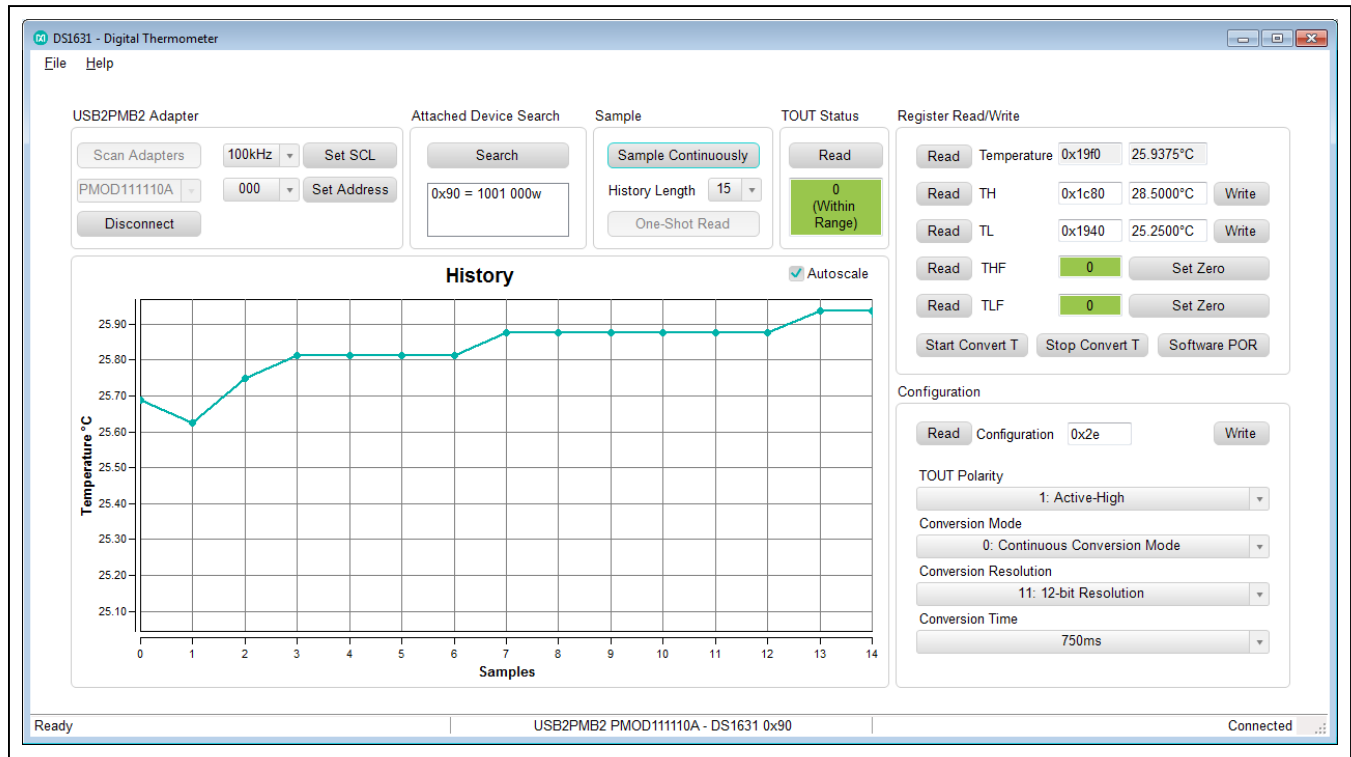

Figure 1. DS1631 EV Kit Main Window

Register Read/Write

Within the **Register Read/Write** groupbox, the user can start and stop conversions, read temperature, access high and low temperature thresholds, and software POR. Press the **Start Convert T** button when the desired configuration is set. Press the **Stop Convert T** button during continuous conversion mode. The **Read Temperature** button reads the last converted value in the 2-byte temperature register. For the temperature thresholds, enter in the 2-byte value in hexadecimal or °C within the **TH** and **TL** edit boxes. When the desired values are entered, click the corresponding **Write** button to the right. Click the **Sample Continuously** button or **One-Shot Read** button. Observe the temperature on the **History** plot.

Temperature Flags

A green **THF** indicator displays when a measured temperature has not exceeded the value stored in the TH register since power-up. A red **THF** indicator displays when a measured temperature has been higher than the value stored in the TH register.

A green **TLF** indicator displays when a measured temperature has not been lower than the value stored in the TL register since power-up. A red **TLF** indicator displays when a measured temperature has been lower than the value stored in the TL register.

General Description of Hardware

The DS1631 EV system demonstrates the DS1631, high-precision digital thermometer and thermostat. The USB2PMB2 module and the EV kit completes the system. The USB2PMB2 act as the master and generates all the I^2C and I/O communication.

User-Supplied I^2C and I/O

To evaluate the EV kit with a user-supplied I^2C bus, connect a Pmod master module to the J1 connector of the EV kit. If the master does not have a Pmod-compatible connector, then make connections directly to the SCL, SDA, A0, A1, and A2 test points. Make sure the return ground is the same as the DS1631.

User-Supplied V_{DD}

The DS1631 is powered through USB by default when a Pmod-compatible master module is connected to the J1 connector of the EV kit. For a user-supplied V_{DD}, a Pmod master module is not allowed on the J1 connector. The user will need to apply a voltage between +2.7V and +5.5V at the V_{DD} test point.

DS1631 EV System Bill of Materials

| ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	A0-A2, SCL, SDA, TOUT		6	5007	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.35IN; BOARD HOLE = 0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
2	C1		1	GCJ188R71H104KA12; GCM188R71H104K; CGA3E2X7R1H104K080AE	MURATA; TDK	0.1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R; AUTO	
3	GND		1	5006	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
4	J1		1	TSW-106-08-S-D-RA	SAMTEC	TSW-106-08-S-D-RA	CONNECTOR; THROUGH HOLE; DOUBLE ROW; RIGHT ANGLE; 12PINS;	
5	R1, R2		2	CRCW06034K70FK	VISHAY DALE	4.7K	RESISTOR; 0603; 4.7K; 1%; 100PPM; 0.10W; THICK FILM	
6	U1		1	DS1631AU+	MAXIM	DS1631AU+	IC; DTHM; HIGH-PRECISION DIGITAL THERMOMETER AND THERMOSTAT; UMAX8	
7	VDD		1	5005	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
8	PCB	-	1	MAXDS1631	MAXIM	PCB	PCB Board:DS1631 EVALUATION KIT	

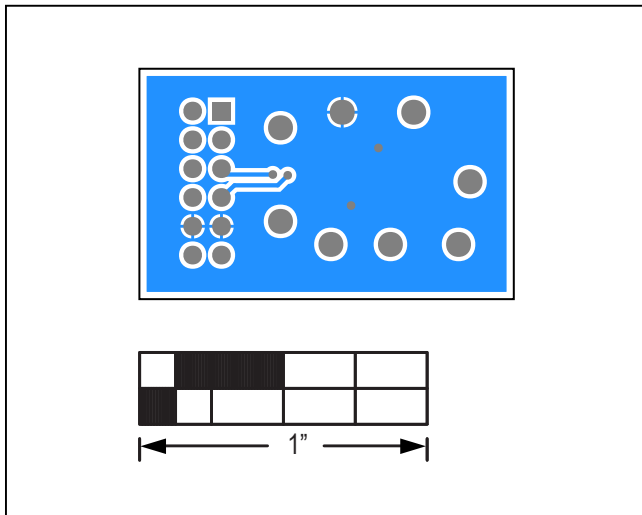## DS1631 EV System Schematic
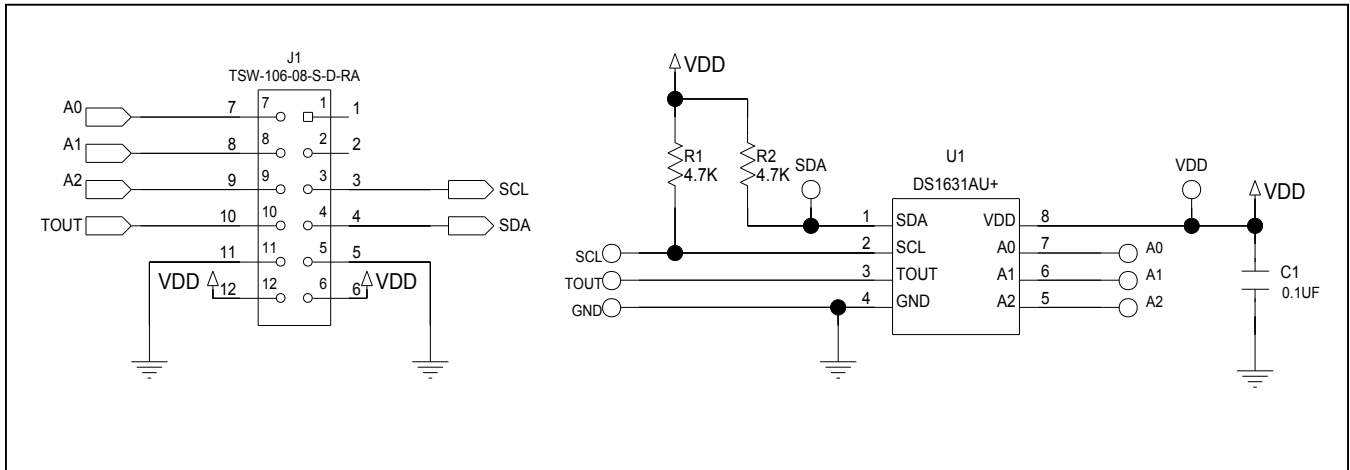
DS1631 EV System PCB Layout Diagrams
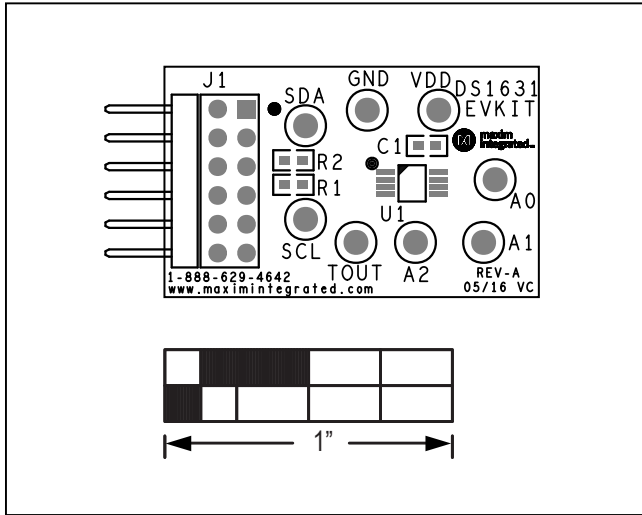
DS1631 EV System—Top Silkscreen
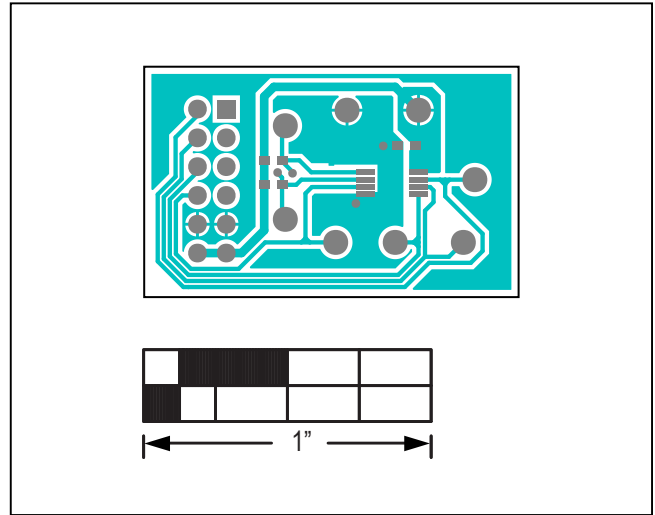
DS1631 EV System—Top

DS1631 EV System—Bottom

Ordering Information

PART	TYPE
DS1631EVSYS1#	EV System
DS1631EVKIT#	EV Kit
USB2PMB2#	Adapter Board

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/18	Initial release	—

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