Click here for production status of specific part numbers.

DS18B20 Evaluation System

Evaluates: DS18B20

General Description

The DS18B20 evaluation system (EV system) demonstrates the DS18B20 1-wire thermometer. The DS18B20 EV system consists of the DS18B20 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 DS18B20.

The DS18B20 EV system comes with the 8-pin µSOP DS18B20U+ installed.

Features

- 6-Pin Pmod™-Compatible Connector
- Proven PCB Layout
- Fully Assembled and Tested
- Windows XP, Windows 7/8/8.1/10-Compatible Software

Quick Start

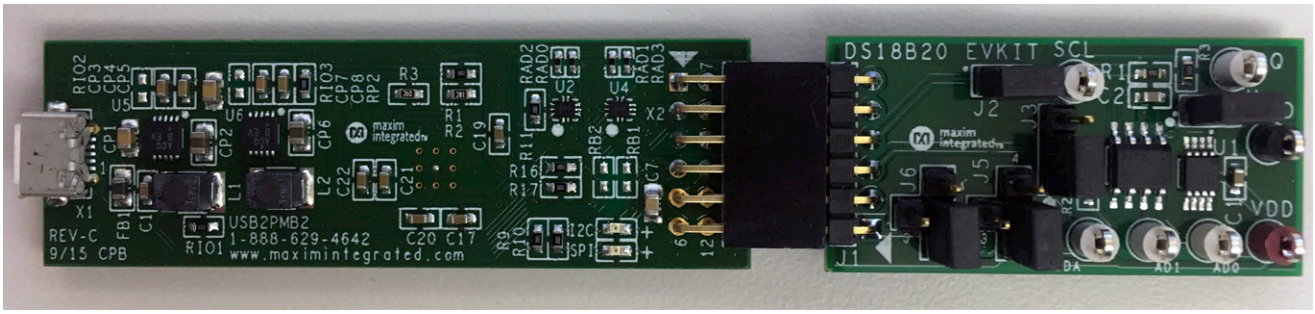
Required Equipment

- DS18B20 EV System (includes USB cable)
- Windows PC

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

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

DS18B20 EV System Photo



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Pmod is a trademark of Digilent Inc.

319-100315; Rev 0; 2/19

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Procedure

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

1. Install the DS18B20GUISetup.msi software on your computer.
2. Align the X2 connector (top row) of the USB2PMB2 with the J1 connector of the DS18B20 EV system.
3. Verify that the shunts are in the default position as shown in Table 1.
4. Connect the USB cable from the PC to the USB2PMB2 board.
5. Open the EV system GUI, DS18B20EVKit.exe (Figure 1).
6. Click the **Scan Adapters** button. Then select the option **PMODxxxxxx** (where xxxxxx is numeric) and click the **Connect** button.
7. Select the desired SCL clock frequency and click the **Set SCL** button.
8. Select an address from the **Set Address** dropdown list and click the button to the right.
9. Click the **Search** button and verify appropriate address was found.
10. Start evaluating the DS18B20 by clicking on the **Sample Continuously** button.

General Description of Software

The main window of the DS18B20 EV system software contains controls to evaluate the DS18B20 IC.

Configuration

The configuration dropdown list allows the user to select the conversion resolution. Use the Resolution drop down list to select between 9-, 10-, 11-, and 12-bits resolution. With each resolution, the user can set the desired sampling rate using the options in the **Conversion Time** dropdown list.

Address

The DS2482's I^2C slave address is determined by the logic states of the AD_ pins. The GUI allows controlling the states of the A_ pins by selecting the appropriate checkboxes and setting the appropriate bits in the control byte of the I^2C command. Make sure the shunts are installed in the 1-3 position of jumpers J5 and J6. All other shunt options on jumpers J5 and J6 would set the logic levels to low or high.

ROM

Within the **ROM Commands** groupbox, the controls include Search ROM, read ROM, match ROM, skip ROM, and alarm search.

Commands

Within the **Command** groupbox, the controls include temperature readings, write scratchpad, read scratchpad, copy scratchpad, recall E^2, and read power supply.

The **Read Scratchpad** button will update the **TH (Temperature High)**, **TL (Temperature Low)**, and **Configuration** fields. The **Copy Scratchpad** button will transfer the current data on the scratchpad to the EEPROM. The **Recall E2** button recalls the data stored on the EEPROM. Click **Read Scratchpad** to retrieve EEPROM data and the appropriate fields will update.

Table 1. Jumper Descriptions

JUMPER	SHUNT POSITION	DESCRIPTION
J2	Not installed	Disconnects J1-4 from SCL of the DS2482. External 1-wire option only.
	Installed*	Connects J1-4 to SCL of the DS2482. External I^2C option only.
J3	1-2*	Connects J1-3 to SDA pin of the DS2482. External I^2C option only.
	1-3	Connects J1-3 to DQ pin of the DS18B20. External 1-wire option only.
J4	Not installed*	Disconnects IO pin of the DS2482 from DQ pin of the DS18B20. External 1-wire option only.
	Installed	Connects IO pin of the DS2482 to DQ pin of the DS18B20. External I^2C option only.
J5	1-2	Connects AD0 address pin of the DS2482 to V_{DD}.
	1-3*	Controls AD0 address pin of the DS2482 through GUI.
	1-4	Connects AD0 address pin of the DS2482 to GND.
J6	1-2	Connects AD1 address pin of the DS2482 to V_{DD}.
	1-3*	Controls AD1 address pin of the DS2482 through GUI.
	1-4	Connects AD1 address pin of the DS2482 to GND.

**Default Position*

Temperature

The hexadecimal code and the converted temperature are displayed within the **Temperature** groupbox.

General Description of Hardware

The DS18B20 EV system demonstrates the DS18B20, high-precision digital thermometer and thermostat. The USB2PMB2 module and the EV system complete the system. The DS2482 acts as the 1-Wire master for the DS18B20 and as an I²C slave for the USB2PMB2.

User-Supplied I²C and I/O

To evaluate the EV system with a user-supplied I²C bus, the connector J1 is a Pmod-compatible connector. If the master does not have a Pmod-compatible connector, then make connection directly to the SCL, SDA, AD0, and AD1 test points. Make sure the return ground is the same as the DS2482. Please refer to Table 1 for jumper position.

User-Supplied 1-Wire

To evaluate the EV system with a user-supplied 1-wire bus, the connector J1 is a Pmod-compatible connector. If the master does not have a Pmod-compatible connector, then make connection directly to the DQ test points. Make sure the return ground is the same as the DS18B20. Please refer to Table 1 for jumper position.

User-Supplied V_{DD}

The DS18B20 and DS2482 are powered through USB by default when a Pmod -compatible master module is connected to the J1 connector of the EV system. If a user-supplied V_{DD} is used, a Pmod master module is not allowed on the J1 connector. In this case, apply a voltage between +2.7V and +5.5V at the V_{DD} test point.

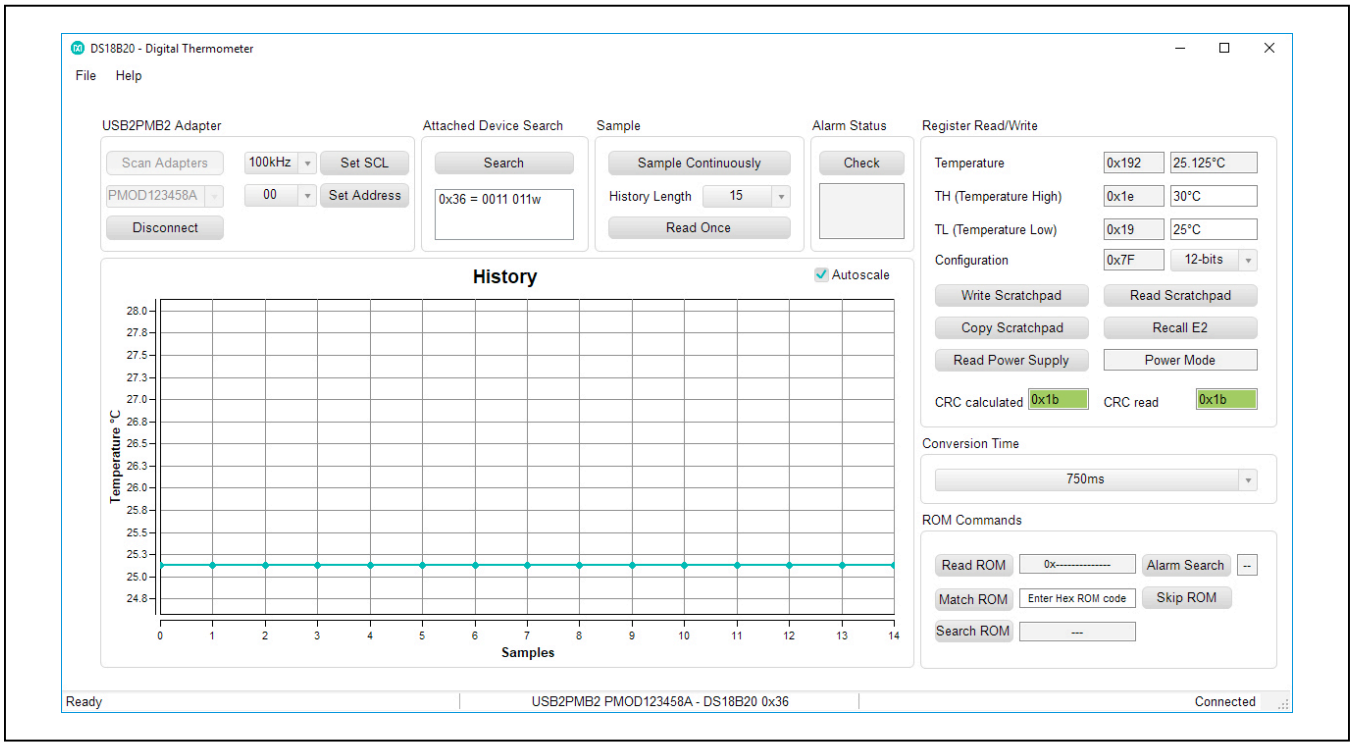


Figure 1. DS18B20 EV System Main Window

Ordering Information

PART	TYPE
DS18B20EVSYS1#	EV System
DS18B20EVKIT#	EV Kit
USB2PMB2#	Adapter Board

#Denotes RoHS compliant.

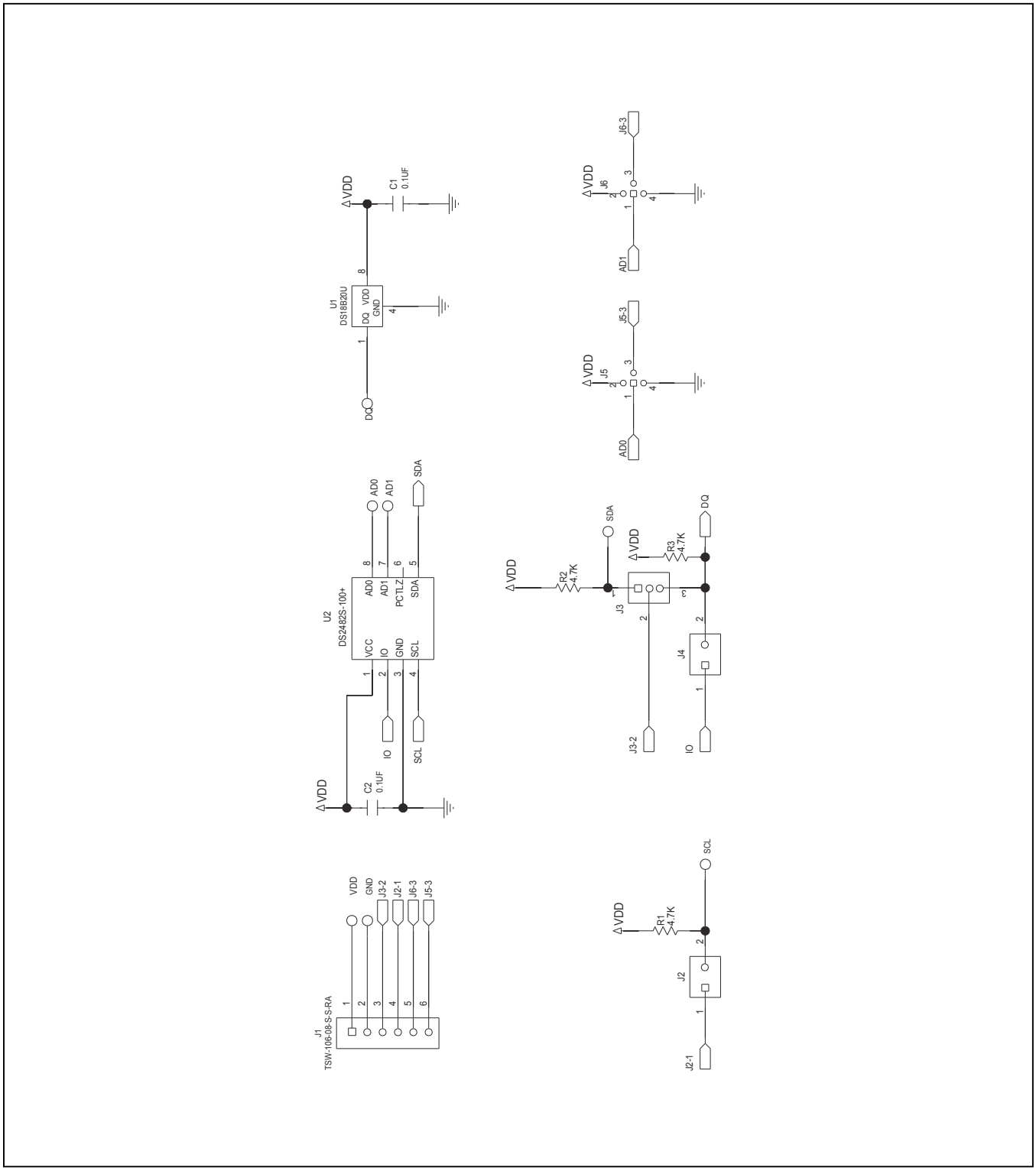
DS18B20 EV System Bill of Materials

ITEM	QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	5	DQ, AD0, AD1, SCL, SDA	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
2	2	C1, C2	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	1	GND	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
4	1	J1	TSW-106-08-S-S-RA	SAMTEC	TSW-106-08-S-S-RA	CONNECTOR; MALE; THROUGH HOLE; 0.025 INCH SQUARE POST HEADER; RIGHT ANGLE; 6PINS
5	2	J2, J4	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
6	1	J3	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
7	2	J5, J6	PEC04SAAN	SULLINS ELECTRONICS CORP.	PEC04SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 4PINS
8	3	R1-R3	CRCW06034K70FK	VISHAY DALE	4.7K	RESISTOR; 0603; 4.7K; 1%; 100PPM; 0.10W; THICK FILM
9	5	SU1-SU5	STC02SYAN	SULLINS ELECTRONICS CORP.	STC02SYAN	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.256IN; BLACK; INSULATION=PBT CONTACT=PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL
10	1	U1	DS18B20U	MAXIM	DS18B20U	IC; DTHM; PROGRAMMABLE RESOLUTION 1-WIRE DIGITAL THERMOMETER; USOP8
11	1	U2	DS2482S-100+	MAXIM	DS2482S-100+	IC; INFC; SINGLE-CHANNEL 1-WIRE MASTER; NSOIC8
12	1	VDD	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; RECOMMENDED FOR BOARD THICKNESS=0.062IN
13	1		EPCBDS18B20	MAXDS18B20	MAXIM	PCB
TOTAL	26					

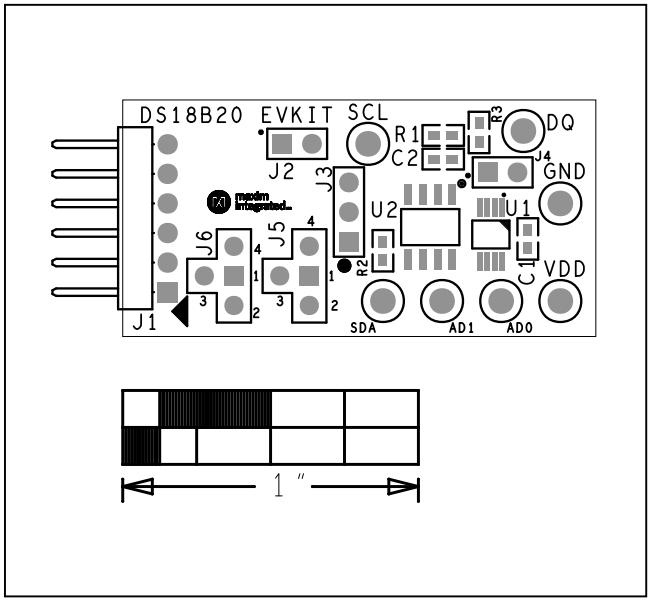
PACKOUT (These are purchased parts but not assembled on PCB and will be shipped with PCB)

ITEM	QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	1	PACKOUT	88-00711-SML	N/A	?	BOX;SMALL BROWN 9 3/16X7X1 1/4 - PACKOUT
2	1	PACKOUT	87-02162-00	N/A	?	ESD BAG;BAG;STATIC SHIELD ZIP 4inX6in;W/ESD LOGO - PACKOUT
3	1	PACKOUT	85-MAXKIT-PNK	N/A	?	PINK FOAM;FOAM;ANTI-STATIC PE 12inX12inX5MM - PACKOUT
4	1	PACKOUT	EVINSERT	N/A	?	WEB INSTRUCTIONS FOR MAXIM DATA SHEET
5	1	PACKOUT	85-84003-006	N/A	?	LABEL(EV KIT BOX) - PACKOUT
TOTAL	5					

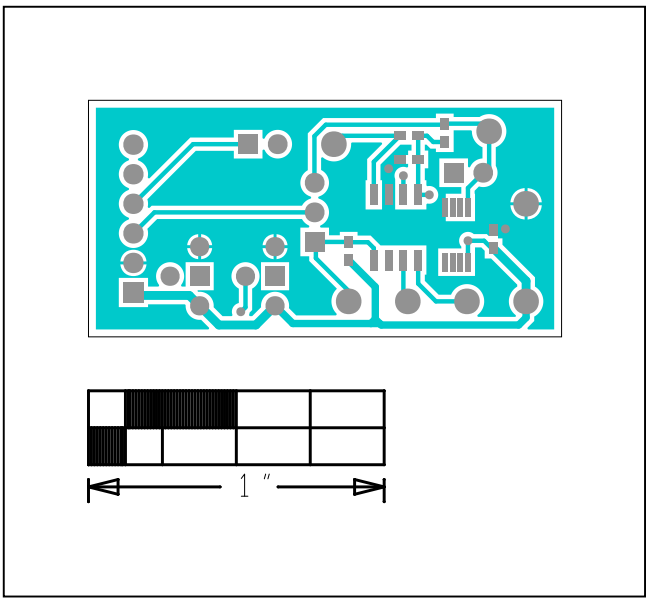
DS18B20 EV System Schematic



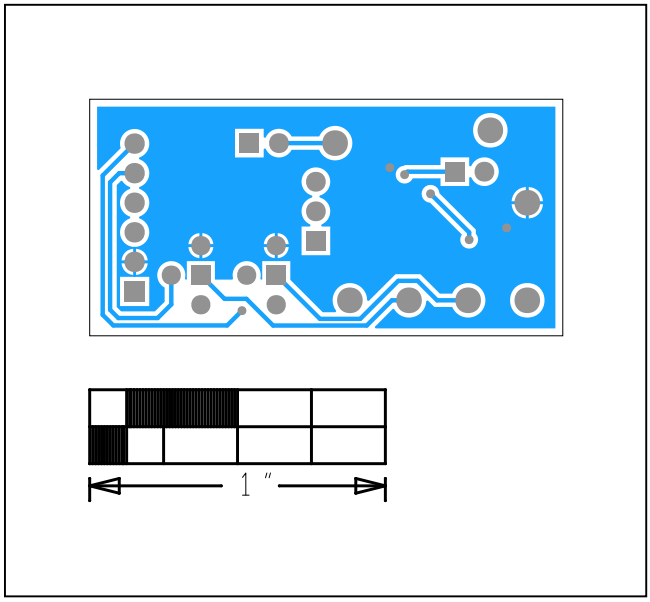
DS18B20 EV System PCB Layout



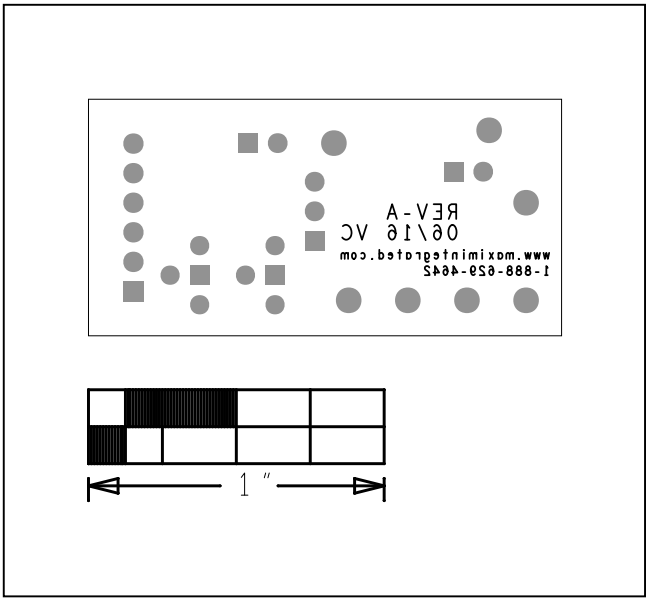
DS18B20 EV System—Top Silkscreen



DS18B20 EV System—Top



DS18B20 EV System—Bottom



DS18B20 EV System—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/19	Initial release	—

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