Evaluates: DS28E18

DS28E18 Evaluation System

General Description

The DS28E18 evaluation system (EV system) provides the special hardware and software system to exercise the features of the DS28E18 1-Wire®-to-I2C/SPI bridge with command sequencer IC. The EV system consists of a DS28E18 EV kit board, a DS7505 peripheral module board, a MAX31722 peripheral module board, and a DS9481P-300# USB-to-1-Wire adapter for PC connectivity. The EV kit is compatible with Windows® operating systems.

EV System Contents

- DS28E18 EV kit board (Figure 1)
- DS9481P-300# USB-to-1-Wire adapter
- MAX31722 PMOD board
- DS7505 PMOD board

Features

- Driver Support for Windows 10/8/7
- Fully Compliant with USB 2.0 Specification
- USB Powered with No External Power Supply Required
- Extended SPI/I2C Peripheral Module Connector for Rapid Prototyping of SPI/I2C Slaves

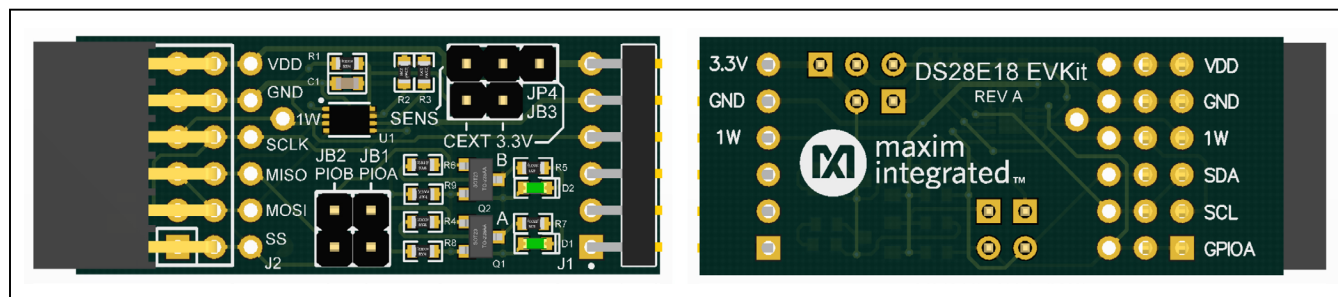*Ordering Information* **appears at end of data sheet.**
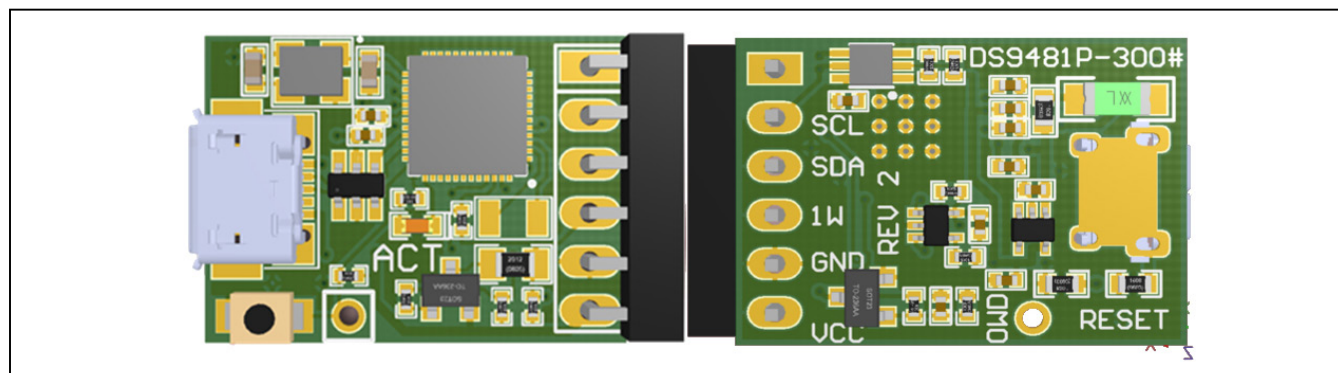

Figure 1. DS28E18 EV Kit Board

Figure 2. DS9481P-300# USB-to-1-Wire Adapter

1-Wire is a registered trademark of Maxim Integrated Products, Inc.
Windows is a registered trademark of Microsoft Corporation.

Figure 3. MAX31722 PMOD Board
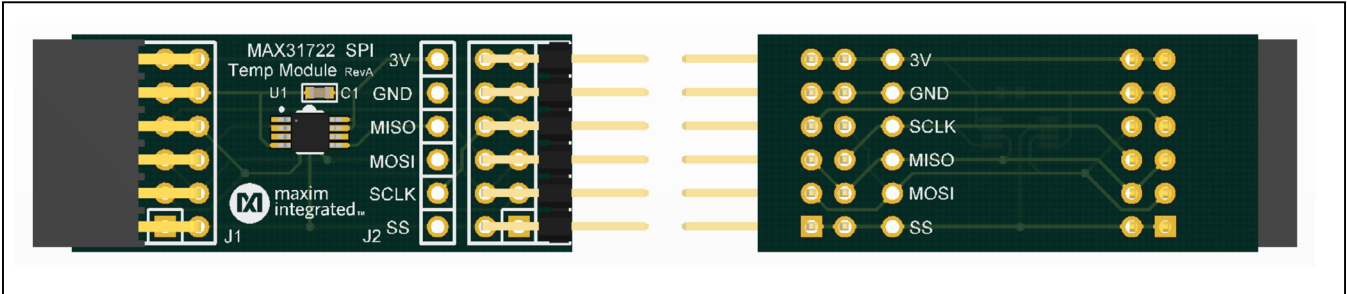

Figure 4. DS7505 PMOD Board
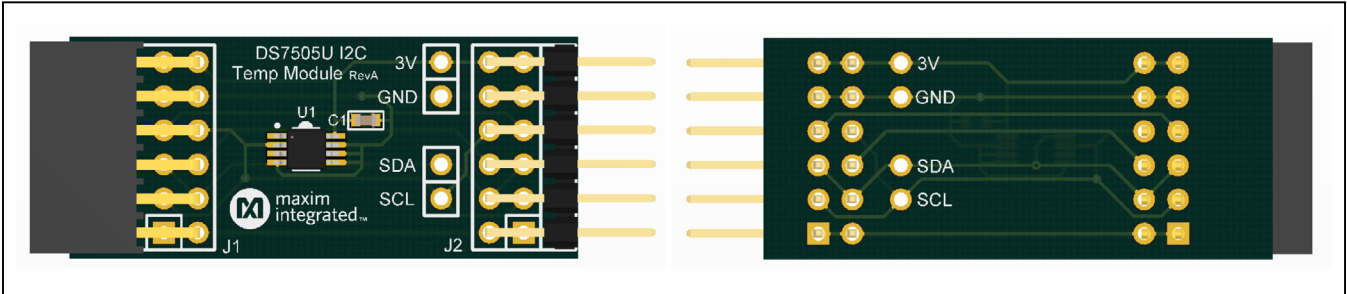

Figure 5. Typical Setup
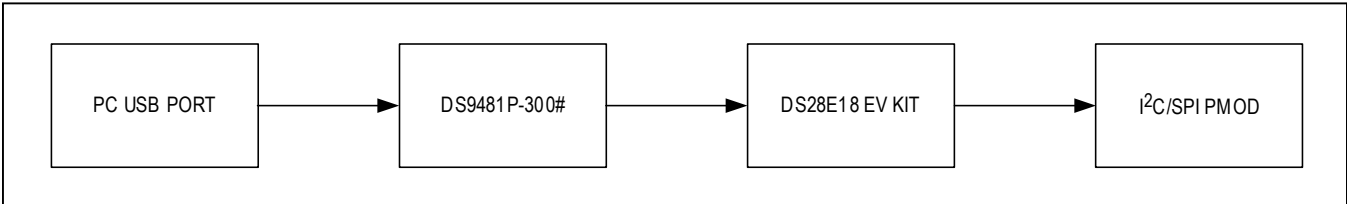
DS28E18 EV Kit Files

FILE	DESCRIPTION
DS28E18 EV Kit	EV kit software

Quick Start

Required Equipment

- DS28E18 EV kit (included)
- DS9481P-300# USB-to-1-Wire adapter (included)
- PC with a Windows 10/8/7 (32-bit or 64-bit) operating system and a spare USB 2.0 or higher port
- Download and install the latest **1-Wire Drivers**
- DS28E18 EV kit software

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 DS9481P-300# drivers as shown in Figure 7, Figure 8, and Figure 9.

2) Attach the DS9481P-300# adapter to the DS28E18 EV kit (Figure 6).

3) Obtain the latest version of the DS28E18 EV kit software.

4) Unzip and save the EV kit software to a known location.

5) Open the **DeviceDriver** folder.

6) Right-click on **install.bat** and then choose **Run as administrator** (Figure 7).

7) A command window opens with a prompt asking to install the device driver (Figure 8). Click **Install**.

8) Open the folder where the DS28E18 EV kit software was extracted and double-click the **Setup.exe** file.

9) Plug the USB cable to the DS9481P-300# adapter.

10) Insert the DS9481P-300# into a spare USB port on the PC.

11) The device will automatically search for and install the driver (Figure 9).

12) To start the evaluation software, ensure that the DS9481P-300# has been properly installed and the DS28E18 board and DS9481P-300# adapter are connected.

Run the DS28E18 EV kit software: **Start→ Programs → Maxim Integrated → DS28E18EV Kit**

13) If the DS9481P-300# is not detected or connected to the USB port, the software displays an error message (Figure 11). Close the program window, reconnect the DS9481P-300# adapter, and restart the program again.

14) Once properly installed, the initial screen graphical user interface (GUI) should appear (Figure 12).
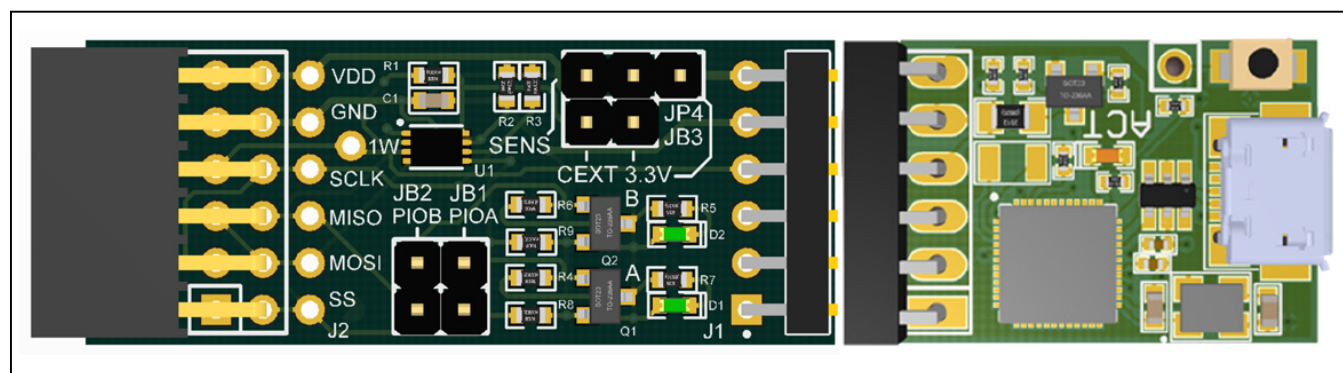

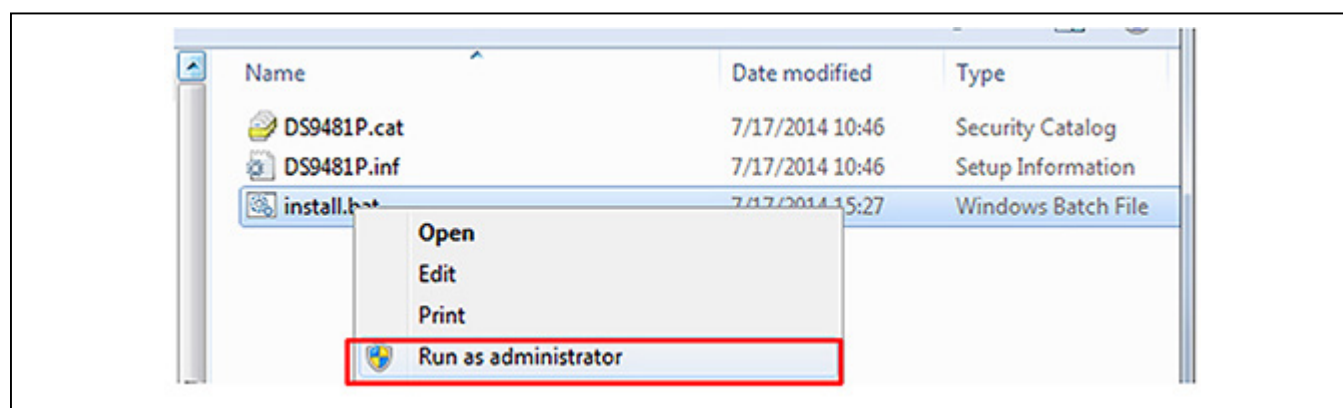*Figure 6. DS9481P-300 Attached with DS28E18 EV Kit Board*

Figure 7. Device Driver Installation
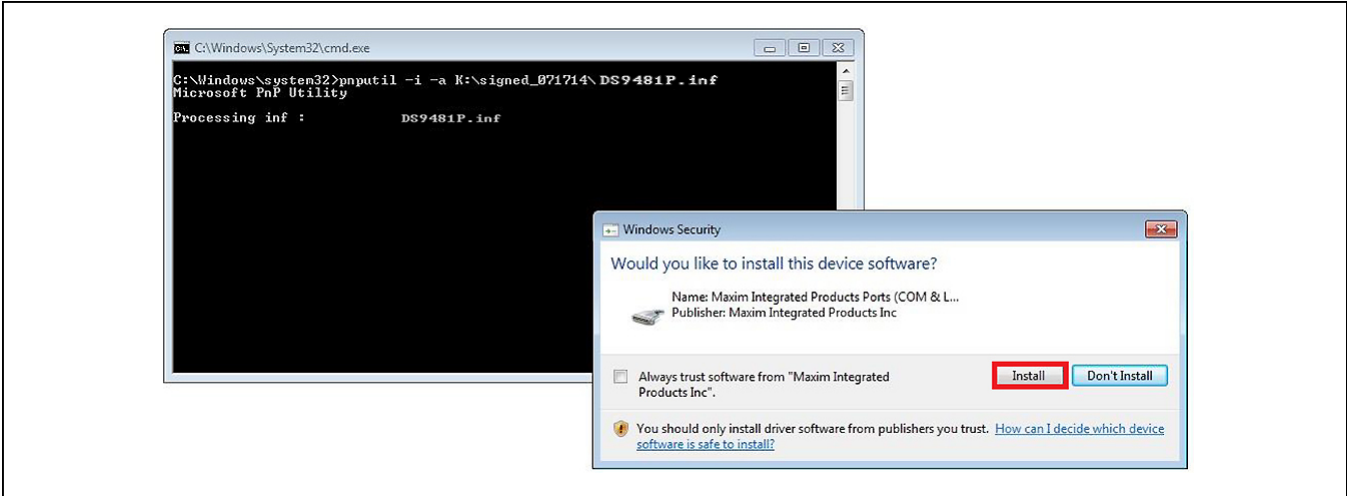
Figure 8. Device Driver (Install Device Software)
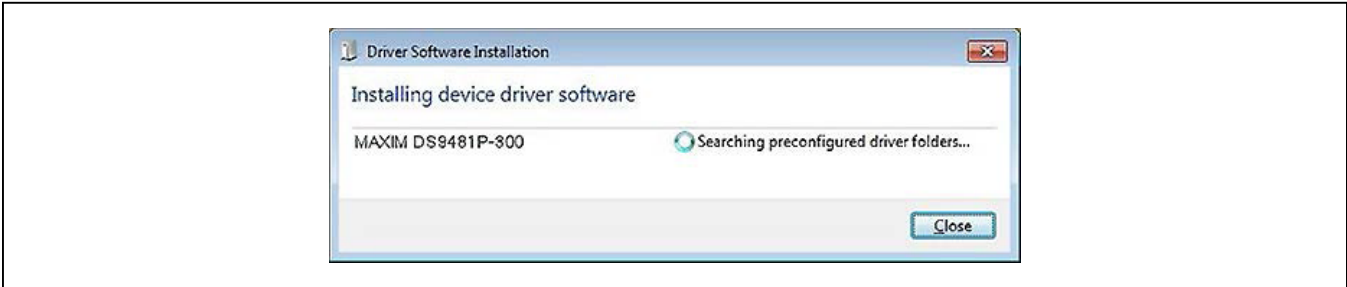
Figure 9. Device Driver Successfully Installed
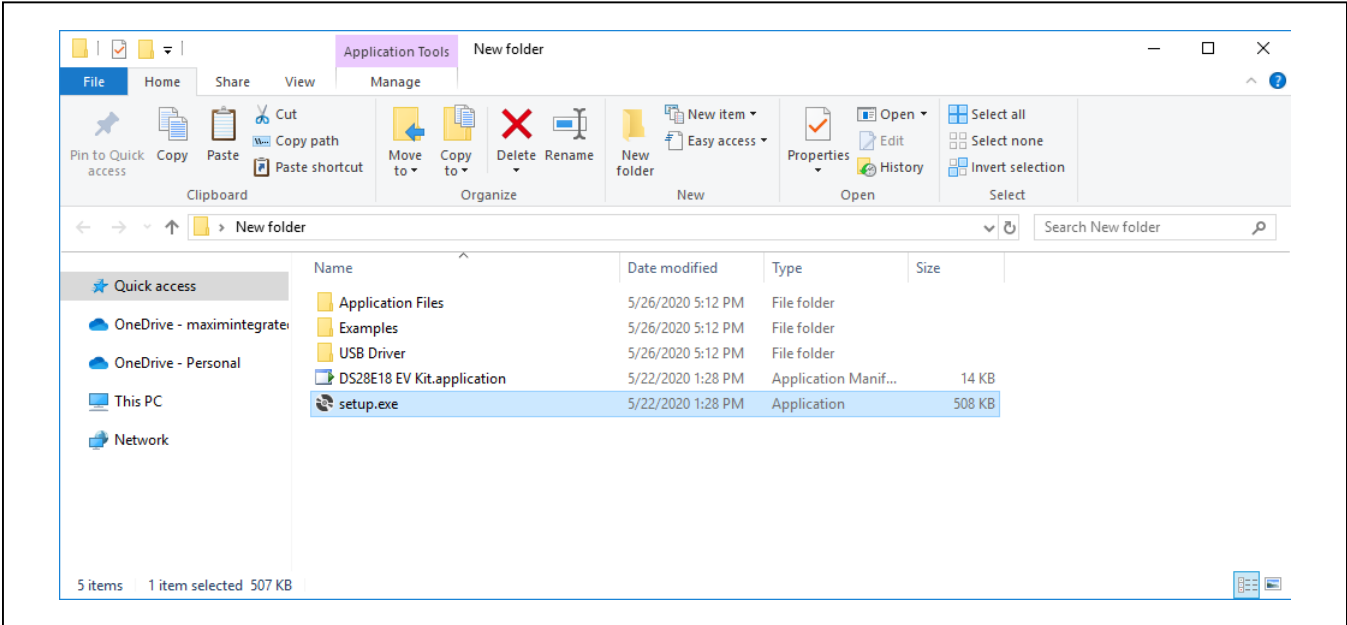
Figure 10. Opening the DS28E18 Evaluation Program Setup

Figure 11. DS9481P-300# Error Message
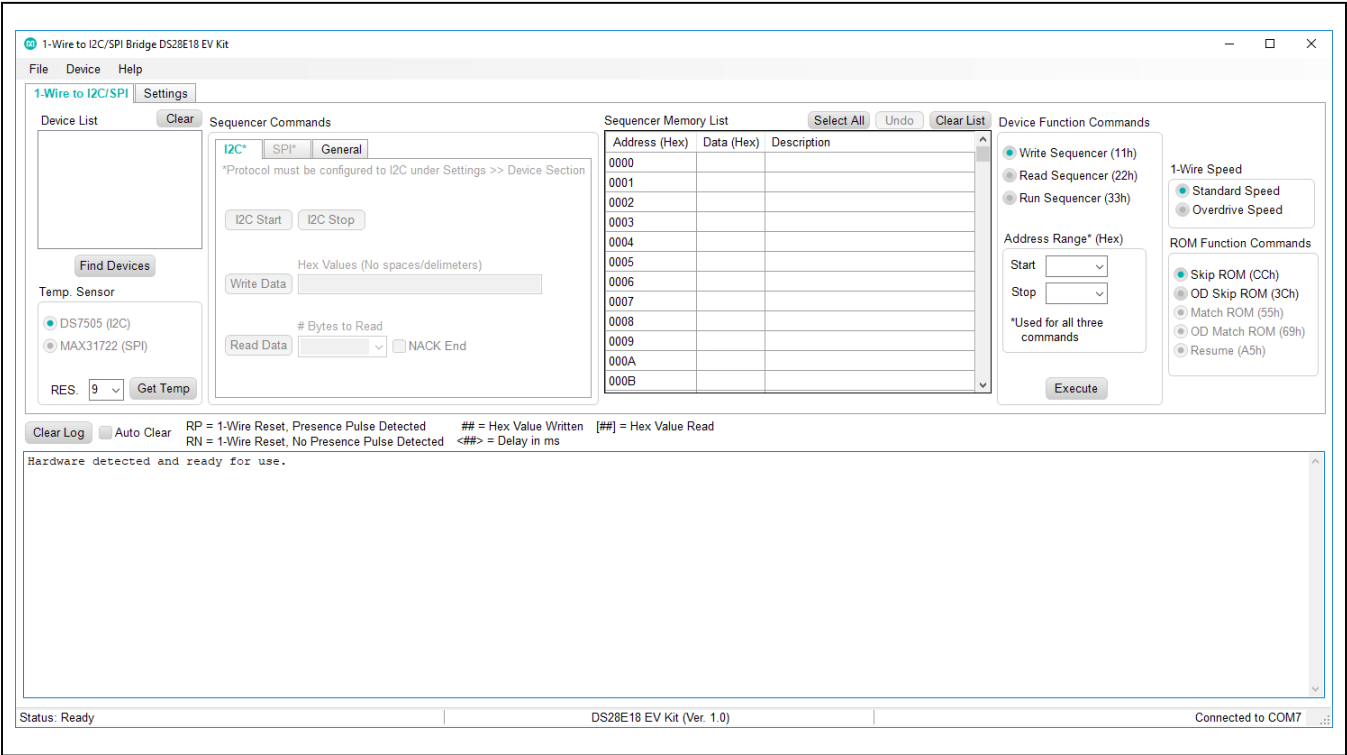
Figure 12. DS28E18 EV Kit Software Initial Screen GUI

Detailed Description of Software

The DS28E18 evaluation program user interface (Figure 12) has two tabs: **1-Wire to I2C/SPI** and **Settings**. The **1-Wire to I2C/SPI** tab is the main tool to evaluate specific functions of the DS28E18. The **Settings** tab (Figure 13) provides control over the device's general and GPIO configurations.

Figure 13. DS28E18 EV Kit Software, Settings Tab

1-Wire to I2C/SPI Tab

The DS28E18 EV kit board provides a peripheral module connector designed for attaching either an I^{2}C or SPI slave. To help communicate with attached slave devices, the **1-Wire to I2C/SPI** tab provides the following controls: **Find Devices**, **Sequencer Commands**, **Sequencer Memory List**, **Device Function Commands**, and **Get Temp**. See Table 1 for more details on each control.

Settings Tab

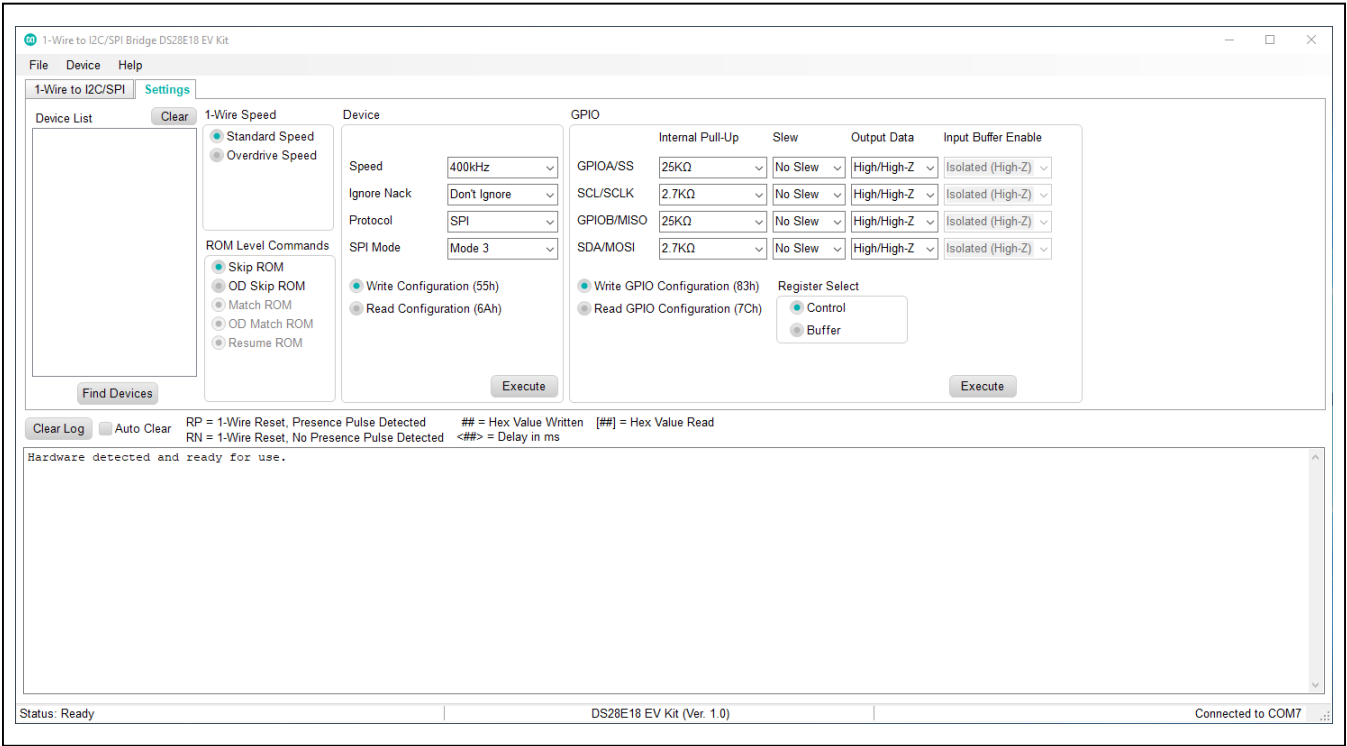The **Settings** tab provides the necessary controls for configuring the devices' general and GPIO settings. See Table 2 for more details on each control.

Table 1. 1-Wire to I^{2}C/SPI Controls

ELEMENT NAME (TYPE)	DESCRIPTION
Find Devices (Action button)	Triggers the Search ROM command and powers up all discovered devices after adding them to the **Device List** box. See the log for a detailed flow of the power-up sequence.
Get Temp (Action button)	Example flow for getting temperature from either the DS7505 or MAX31722 peripheral module boards included with the kit using the DS28E18. Only available after clicking **Find Devices**. To select between modules, configure the device Protocol under the **Settings** tab. See the DS7505 or MAX31722 data sheet for product specific details and sequences.
Sequencer Commands (Action buttons)	Controls used in conjunction with the **Sequencer Memory List** to build I2C/SPI sequences. Only available after clicking **Find Devices**. To avoid mixing sequences, only one tab can can be used between I2C and SPI controls. To select between I^{2}C and SPI controls, configure the device **Protocol** under the **Settings** tab.
Sequencer Memory List (Data Grid)	Table used in conjunction with the **Sequencer Commands** controls to build I2C/SPI sequences. Each sequencer command populates and updates this table with its respective command structure recognized by the DS28E18. Data displayed in this list does not reflect the actual data found in the DS28E18 memory and is just a tool used to help manipulate data with the device function commands.
Device Function Commands (Action buttons)	Controls used in conjunction with the **Sequencer Memory List** to manipulate the DS28E18 memory. Click the **Select All** button, or manually enter the desired address in **Address Range** box, to specify the location in memory to Write to or Read/Run from. Select between three different device function commands: Write Sequencer (11h) - Writes the data from the highlighted address into the actual memory address. Read Sequencer (22h) - Reads the actual data that resides in memory address highlighted. Run Sequencer: (33h) - Runs the actual data that resides in memory address highlighted. Must click the **Execute** button to perform an action.

Table 2. Settings Controls

ELEMENT NAME	DESCRIPTION
Device	Used for writing or reading the DS28E18's general configuration. Select between the Device Function Command options to specify action. Customize the desired configuration with the available drop-down boxes (only available when **Write Configuration (55h)** is selected). Must click the **Execute** button to perform an action.
GPIO	Used for writing or reading the DS28E18's GPIO Control and Buffer configuration. Select between the **Device Function Commands** and register options to specify an action. Customize the desired configuration using the available drop-down boxes (only available when **Write GPIO Configuration (83h)** is selected). Must click the **Execute** button to perform an action.

Detailed Description of Hardware

For more information on jumper configurations, see Table 3.

Table 3. Jumper Settings

JUMPER	SETTING	DETAILS
JB1	Open	Enable LED, D1 toggle control through GPIOA
	Closed	Disable LED, D1 toggle control
JB2	Open	Enable LED, D2 toggle control through GPIOB
	Closed	Disable LED, D2 toggle control
JB3	Open	DS28E18 powered through DS9481P-300 3.3V supply
	Closed	DS28E18 powered parasitically through DS9481P-300 1-Wire
JP4	Open	No power being supplied through 12-pin female connector
	3.3V and VDD	3.3V power being supplied through 12-pin female connector
	SENS and VDD	SENS_VDD power being supplied through 12-pin female connector

Ordering Information

PART	TYPE
DS28E18EVKIT#	EV system

#Denotes RoHS compliant.

DS28E18 EV Kit Bill of Materials

DS28E18EVKIT Board

Quantity	Comment	Description	Designator	Part Number	Manufacture Name	Notes	Vendor	Vendor Part Number	Datasheet URL
1	PCB	DS28E18EVKIT PCB		???					
1	PMOD MALE	CONN HEADER .100 SINGL R/A 6POS	J1	PBC36SBAN	Sullins Connector Solutions	0.100" Tail	Digi-Key	S1111E-36-ND	http://www.sullinscorp.com/catalogs77_PAGE108-109_.100_MALE_HDR.pdf
3	JUMPBLOCK 1	CONN HEADER VERT 2POS 2.54MM	JB1, JB2, JB3	PEC02SAAN	Sullins Connector Solutions		Digikey	S1012E-02-ND	https://www.digikey.com/product-detail/en/sullins-connector-solutions/PEC02SAAN/S1012E-02-ND/859155
2	10K	RES SMD 1K OHM 1% 1/10W 0603	R5, R7	ERJ-3EKF1002V	Panasonic Electronic Components	Spool 1017	Digikey	P10.0KHTR-ND	http://industrial.panasonic.com/www-cgi/jvcr13pz.cgi?E+PZ+3+AOA0002+ERJ3EKF1002V+7+WW
4	4.7K	RES SMD 4.7K OHM 1% 1/10W 0603	R2, R3, R4, R6	ERJ-3EKF4701V	Panasonic Electronic Components		Digikey	P4.70KHCT-ND	http://industrial.panasonic.com/www-cgi/jvcr13pz.cgi?E+PZ+3+AOA0002+ERJ3EKF1002V+7+WW
2	1M	RES SMD 1M OHM 1% 1/10W 0603	R8, R9	ERJ-3EKF1004V	Panasonic Electronic Components		Digikey	P1.00MHCT-ND	http://industrial.panasonic.com/www-cgi/jvcr13pz.cgi?E+PZ+3+AOA0002+ERJ3EKF1002V+7+WW
2	BSS138LT1G	MOSFET NCH 50V 200MA SOT-23	Q1, Q2	BSS138LT1G	ON SEMICONDUCTOR	Vgs(th)(Max) 1.5V@1mA	Digikey	BSS138LT1GOSCT-ND	http://www.onsemi.com/pub_link/Collateral/BSS138LT1-D.PDF
1	0.47uF	0.47µF ±10% 16V Ceramic Capacitor X7R 0603 (1608 Metric)	C1	C0603C474K4RACTU	Kemet		Digikey	399-4922-2-ND	http://www.kemet.com/datasheets/C0603C104K8RACTU
2	GREEN LED	LED INGAN GREEN CLEAR 0603 SMD	D1, D2	598-8081-107F	Dialight	LED A, LED B	Digikey	350-2036-1-ND	http://media.digikey.com/pdf/Data%20Sheets/Dialight%20PDFs/598_Series_0603_Pkg.pdf
1	DS28E18	1-Wire® Slave-to-I2C/SPI Master Bridge	U1		Maxim Integrated				
1	JUMPER	HDR,BRKWAY,.100 3POS VERT,0.318"	JP4	9-146276-0	Tyco Electronics	Cut to 1x3 sections			http://documents.tycoelectronics.com/commerce/DocumentDelivery/DDEController?Action=srchrtrv&DocNm=102972&DocType=CD&DocLang=EN
1	PMOD FEMALE	CONN RCPT 12POS 0.1 TIN PCB R/A	J2	SSW-106-02-T-D-RA	Samtec Inc.				http://suddendocs.samtec.com/prints/ssw-1xx-xx-xxx-x-xx-xxx-xx-mkt.pdf

DS7505 Module Board

Quantity	Comment	Description	Designator	Part Number	Manufacture Name	Vendor	Vendor Part Number	Notes	Datasheet URL
1	PCB	DS7505 Module Board PCB		???					
1	0.1uF	CAP CER 0.1UF 25V X7R 0603	C1	C1608X7R1E104K080AA	TDK Corporation	Digi-Key	445-1316-1-ND		http://www.tdk.com/pdf/general_B11.pdf
1	PMOD FEMALE	CONN RCPT 12POS 0.1 TIN PCB R/A	J1	SSW-106-02-T-D-RA	Samtec Inc.	Digi-Key	SAM10026-ND		http://suddendocs.samtec.com/prints/ssw-1xx-xx-xxx-x-xx-xxx-xx-mkt.pdf
1	PMOD MALE	CONN RCPT 12POS 0.1 TIN PCB R/A	J2	PRPC006DBAN-M71RC	Sullins Connector Solutions	Digi-Key	S2111EC-06-ND		https://drawings.s3.amazonaws.com/11639.pdf
1	DS7505	Digital Thermometer and Thermostat	U1	DS7505U+	Maxim Integrated				https://datasheets.maximintegrated.com/en/ds/DS7505.pdf

MAX31722 Module Board

Quantity	Comment	Description	Designator	Part Number	Manufacture Name	Vendor	Vendor Part Number	Notes	Datasheet URL
1	PCB	MAX31723 Module Board PCB		???					
1	0.1uF	CAP CER 0.1UF 25V X7R 0603	C1	C1608X7R1E104K080AA	TDK Corporation	Digi-Key	445-1316-1-ND		http://www.tdk.com/pdf/general_B11.pdf
1	PMOD FEMALE	CONN RCPT 12POS 0.1 TIN PCB R/A	J1	SSW-106-02-T-D-RA	Samtec Inc.	Digi-Key	SAM10026-ND		http://suddendocs.samtec.com/prints/ssw-1xx-xx-xxx-x-xx-xxx-xx-mkt.pdf
1	PMOD MALE	CONN RCPT 12POS 0.1 TIN PCB R/A	J2	PRPC006DBAN-M71RC	Sullins Connector Solutions	Digi-Key	S2111EC-06-ND		https://drawings.s3.amazonaws.com/11639.pdf
1	MAX31722	Digital Thermometers and Thermostats with SPI/3-Wire Interface	U1	MAX31722MUA+	Maxim Integrated				https://www.maximintegrated.com/en/products/analog/sensors-and-sensor-interface/MAX31723.html

DS28E18 EV Kit Schematic
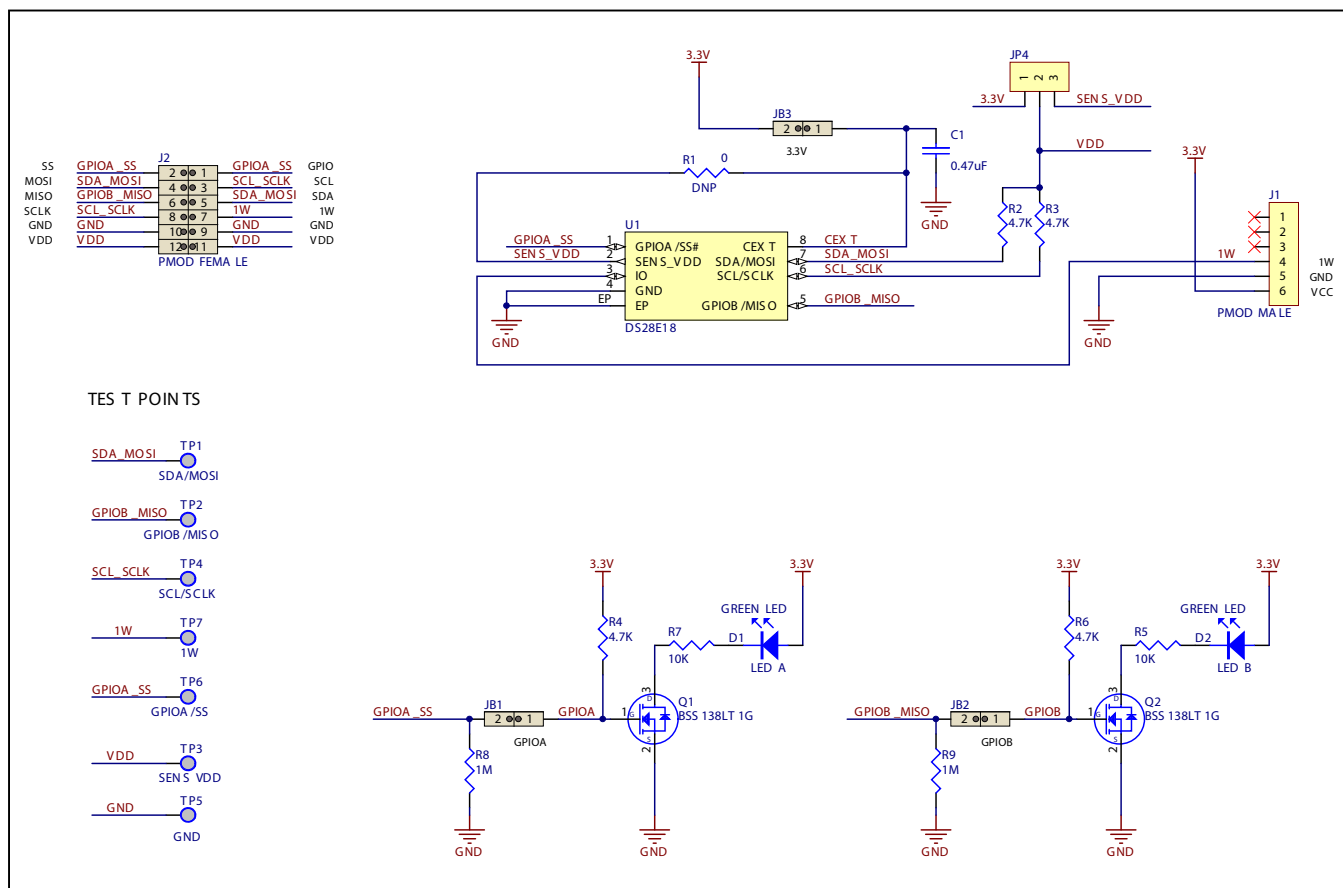
DS9481P-300 EV Kit Schematic
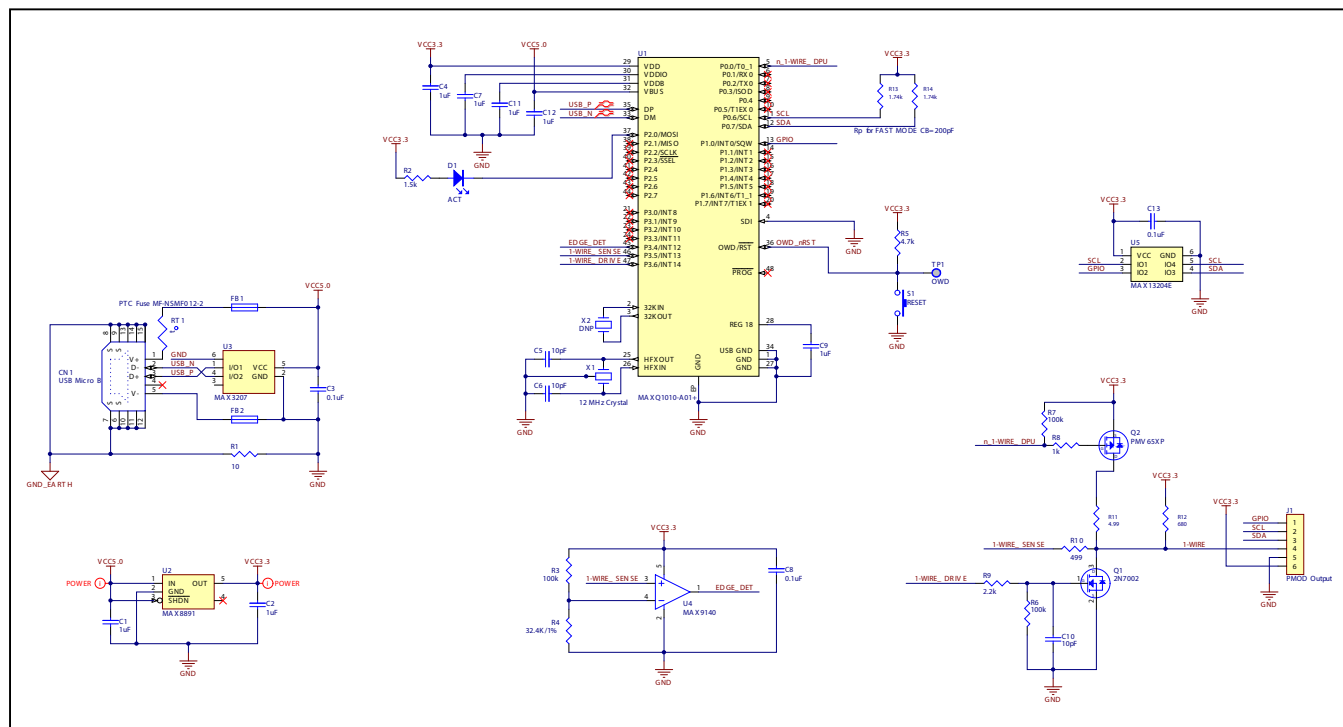
Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/20	Initial release	—
1	11/21	Updated *Quick Start*	2

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