

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.

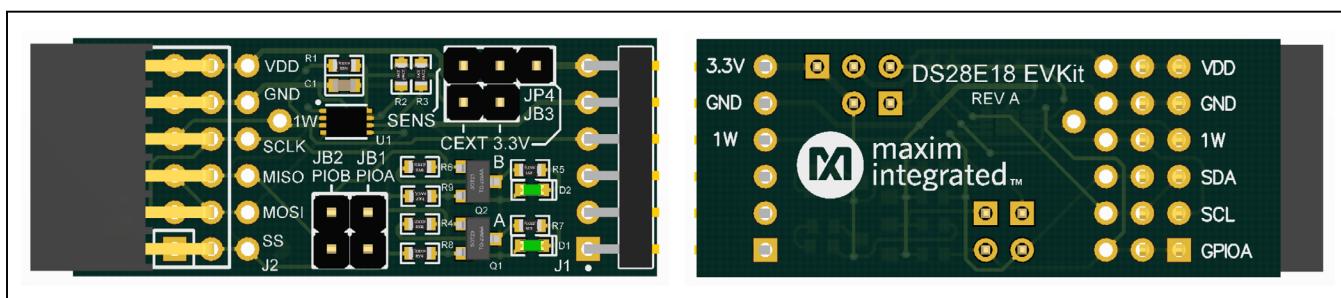


Figure 1. DS28E18 EV Kit Board

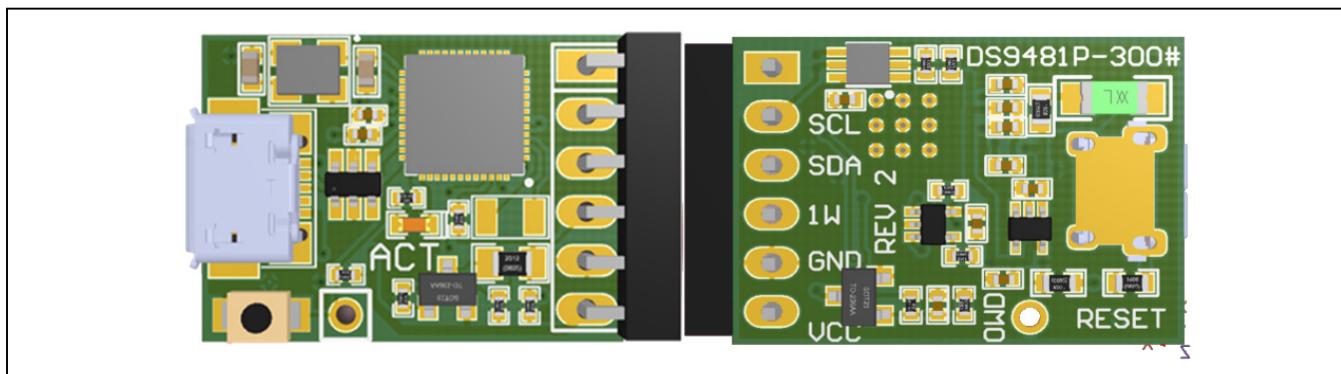


Figure 2. DS9481P-300# USB-to-1-Wire Adapter

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

Windows is a registered trademark of Microsoft Corporation.

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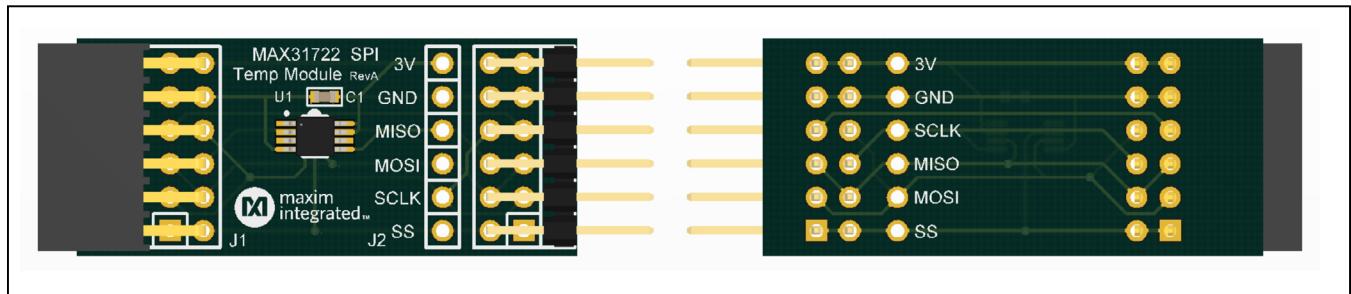


Figure 3. MAX31722 PMOD Board

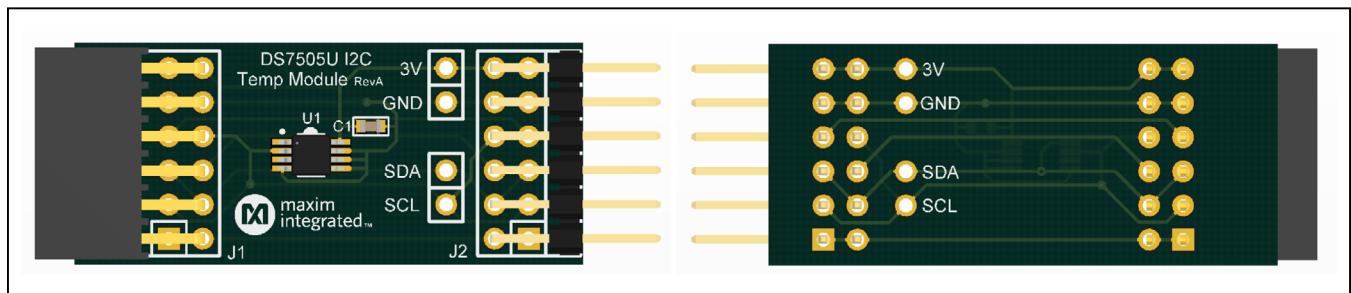


Figure 4. DS7505 PMOD Board

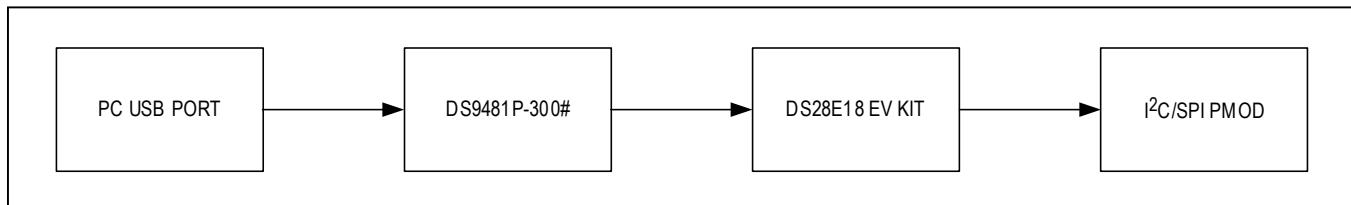


Figure 5. Typical Setup

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](#)).

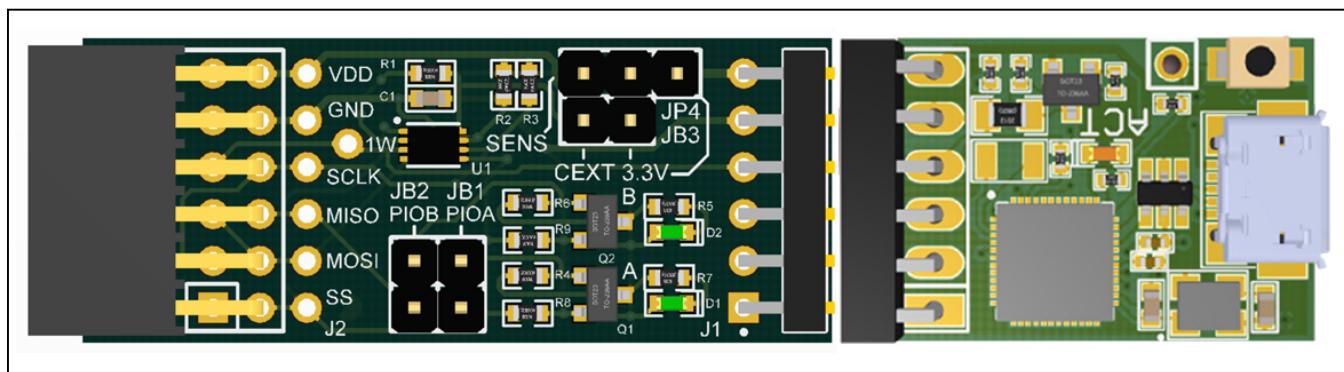


Figure 6. DS9481P-300 Attached with DS28E18 EV Kit Board

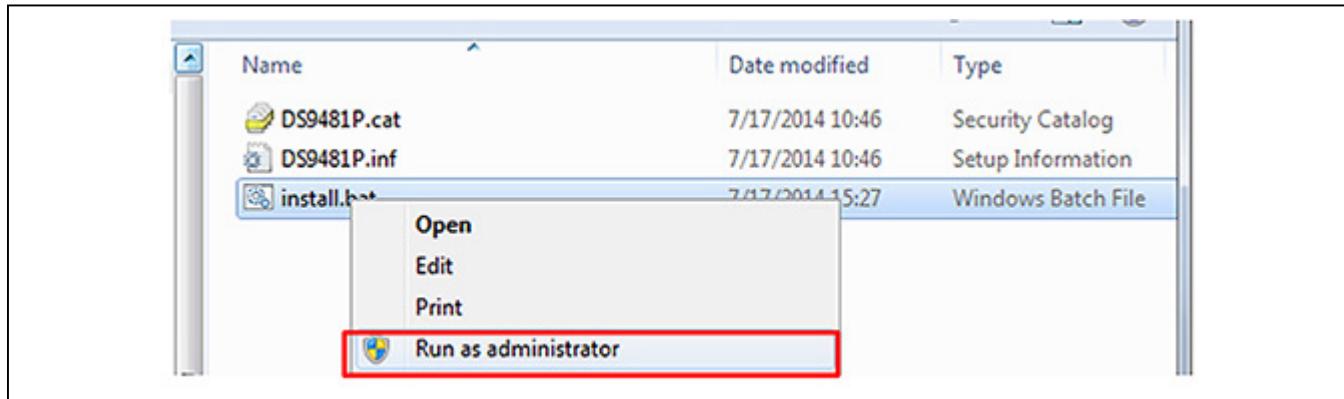


Figure 7. Device Driver Installation

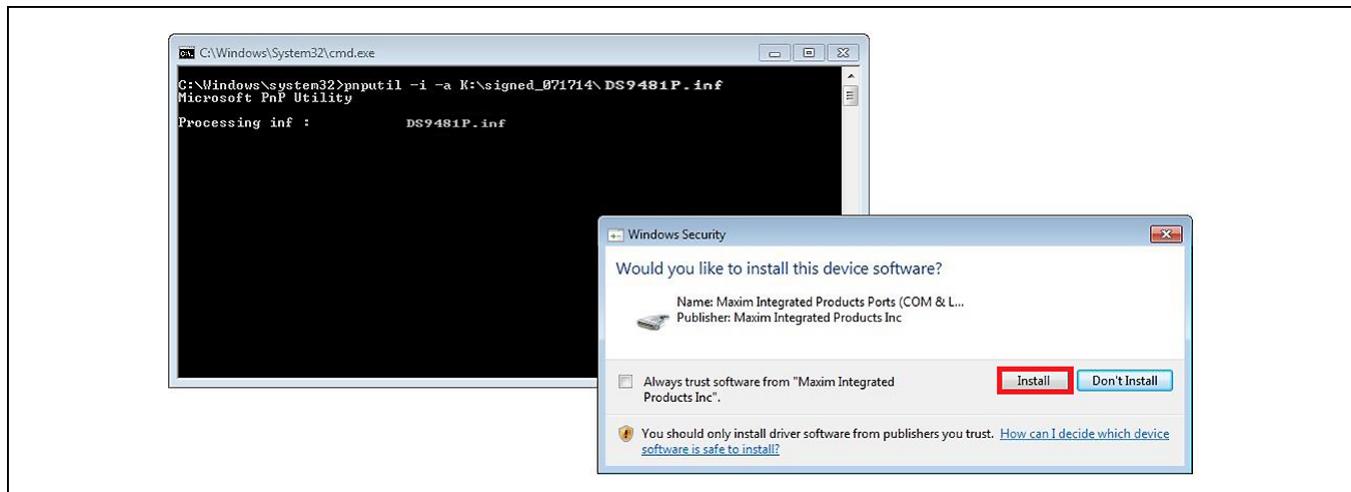


Figure 8. Device Driver (Install Device Software)

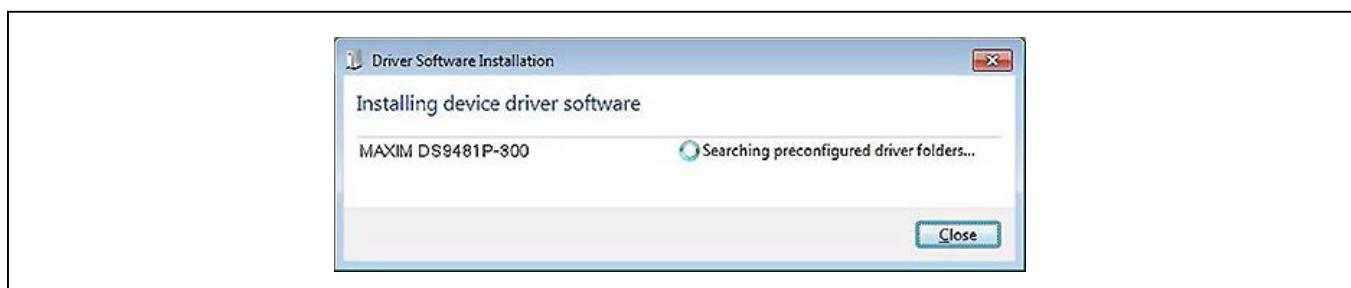


Figure 9. Device Driver Successfully Installed

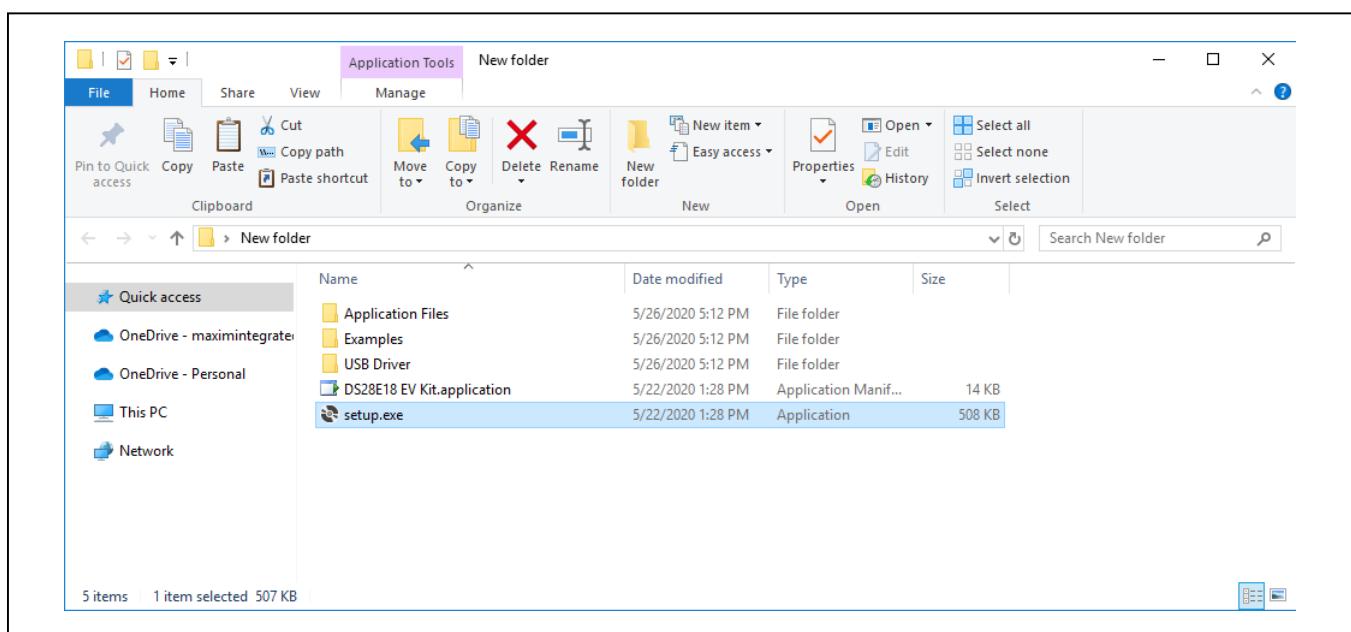


Figure 10. Opening the DS28E18 Evaluation Program Setup

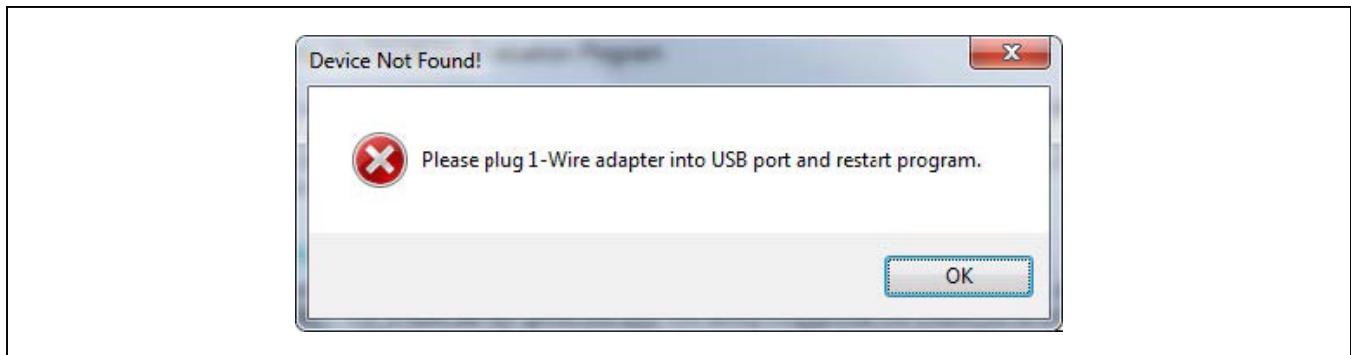


Figure 11. DS9481P-300# Error Message

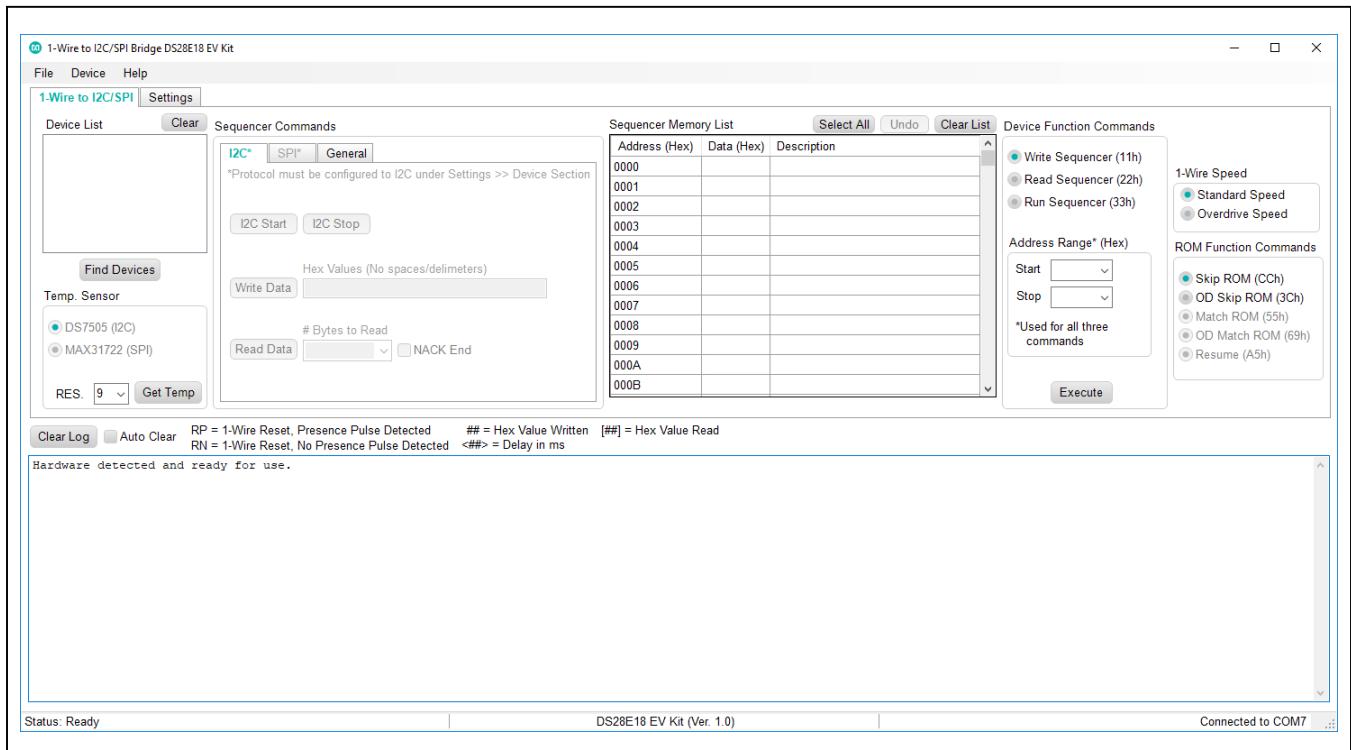


Figure 12. DS28E18 EV Kit Software Initial Screen GUI

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.

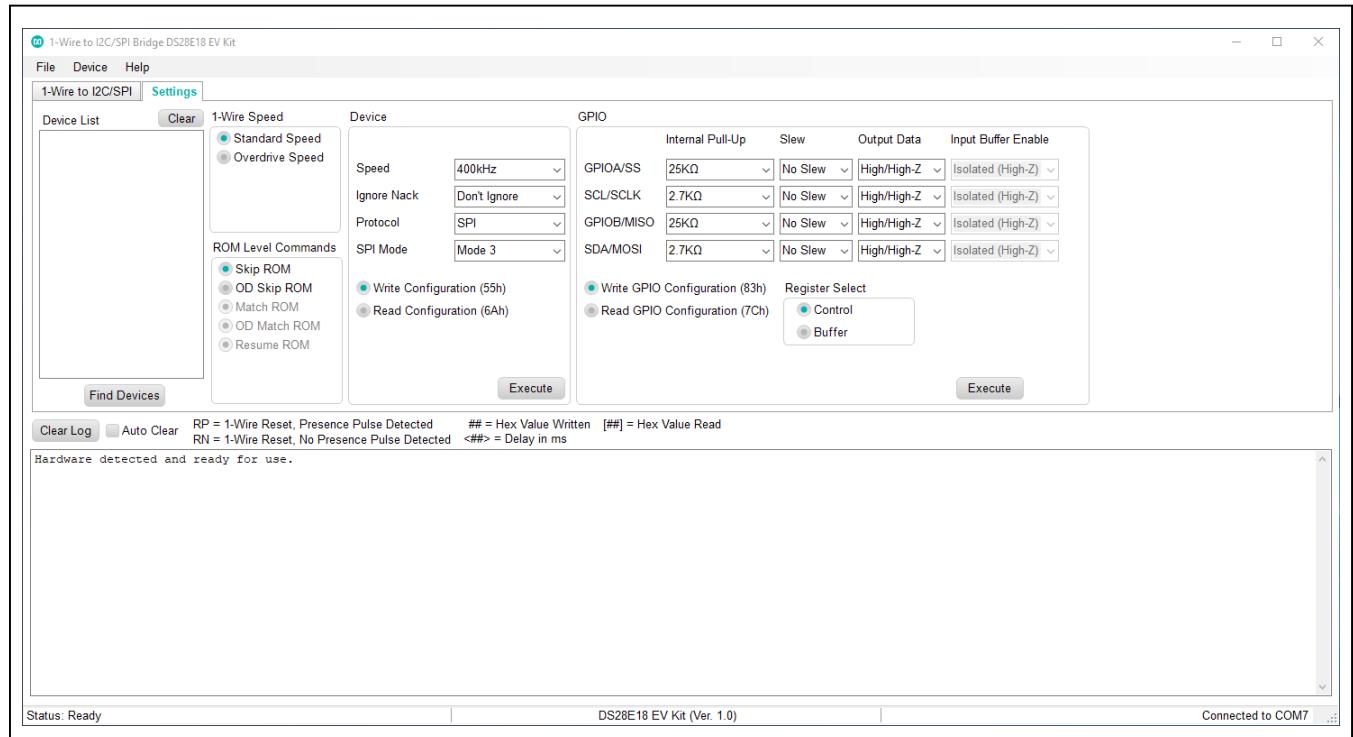


Figure 13. DS28E18 EV Kit Software, Settings Tab

1-Wire to I2C/SPI Tab

The DS28E18 EV kit board provides a peripheral module connector designed for attaching either an I2C 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.

Table 1. 1-Wire to I2C/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 be used between I2C and SPI controls. To select between I2C 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 Evaluation System

Evaluates: DS28E18

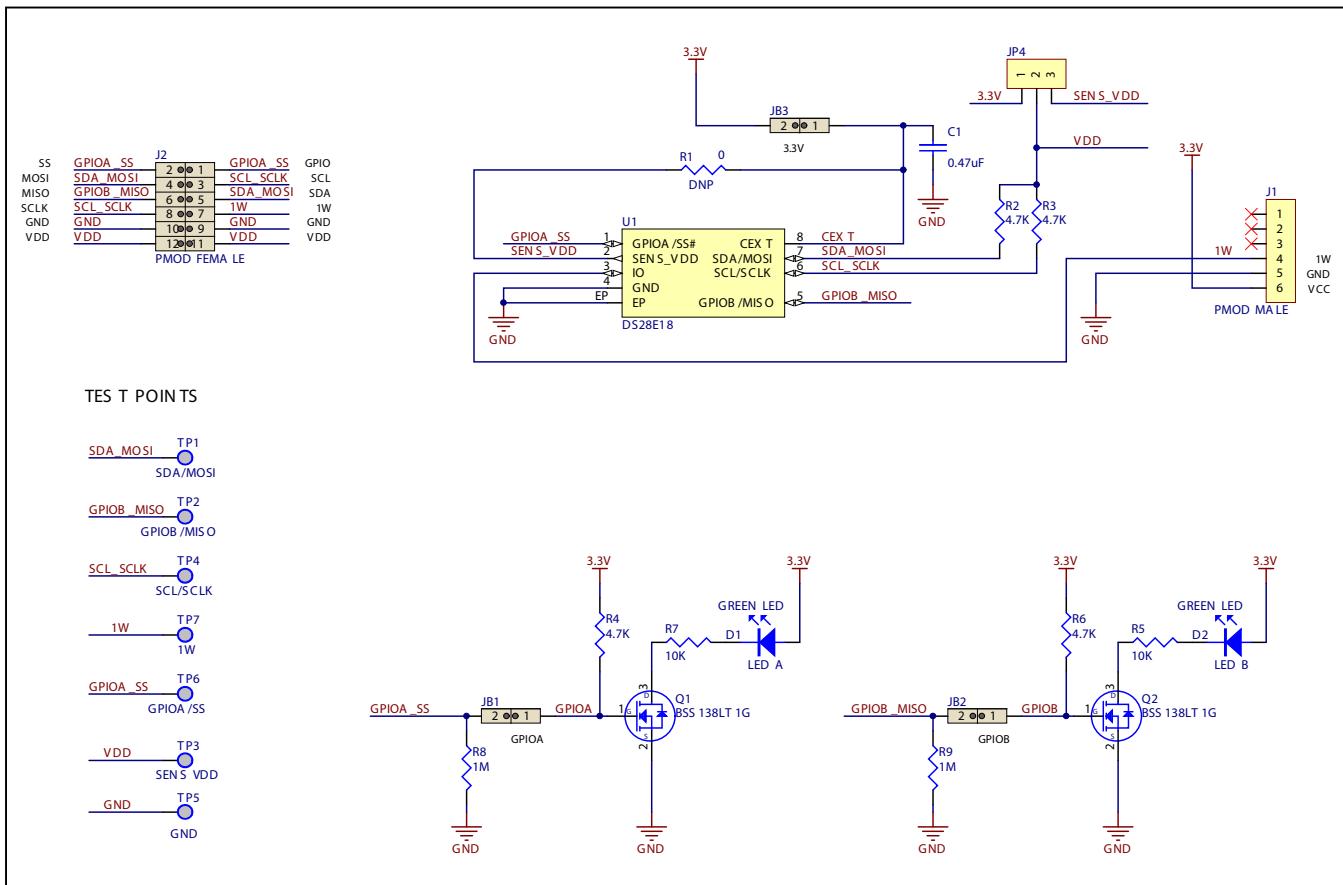
DS28E18 EV Kit Bill of Materials

| DS28E185VKT Board | | Comment | Description | Designator | Part Number | Manufacturer Name | Notes | Vendor | Vendor Part Number | Datasheet | URL |
|-------------------|---------------|---|-------------|----------------|-------------------|---------------------------------|---------------------|----------|--------------------|---|-----|
| 1 | PCB | DS28E185VKT PCB | | | ??? | | | | | | |
| 1 | PMOD Male | CONN HEADER-100 SINGL R/A 6POS | | J1 | PS256SSBAN | Sullins Connector Solutions | 0.100" Tall | Digi-Key | S1111E-36-ND | http://www.sullinscorp.com/catalog77_PAGE108-109_100_MALE_HDR.pdf | |
| 3 | JUMPERBLOCK 1 | CONN HEADER-100 VERT 2POS 2.54MM | | J81..J82..J83 | PC0225AN | Sullins Connector Solutions | | Digi-Key | S1012E-02-ND | http://www.digikey.com/product-detail/en/sullins-connector-solutions/PC0225AN/102E-02-ND#V95155 | |
| 2 | 10K | RES SMD 1K OHM 1% 110W 0603 | | R8..R7 | ES9-SEKF4702V | Panasonic Electronic Components | Spool 1017 | Digi-Key | P10-06KTRH-N | http://industrial.panasonic.com/cgi/vcr_302.cgi?E#P%23+AA0A0001+ERJSEKF4702V+7WMM | |
| 4 | 4.7K | RES SMD 4.7K OHM 1% 110W 0603 | | R2..R3..R4..R6 | ES9-SEKF471V | Panasonic Electronic Components | | Digi-Key | P4-709HCT-N | http://industrial.panasonic.com/cgi/vcr_302.cgi?E#P%23+AA0A0002+ERJSEKF471V+7WMM | |
| 2 | 1M | RES SMD 1M OHM 1% 110W 0603 | | R8..R9 | ES9-SEKF104V | Panasonic Electronic Components | | Digi-Key | P1-009HTR-N | http://industrial.panasonic.com/cgi/vcr_302.cgi?E#P%23+AA0A0003+ERJSEKF104V+7WMM | |
| 2 | 85S138LT1G | MOSFET N-CH 50V 0.11W 50mA SOT-323 | | Q1..Q2 | 85S138LT1G | ON SEMICONDUCTOR | Vgth(Max)15.5V@1mA | Digi-Key | BSS138LT1G-SC07D | http://www.onsemi.com/pub/Collateral/BSS138LT1G-SC07D_PDF | |
| 1 | 0.47uF | 0.47uF 10V 10% Ceramic Capacitor X7R 0603 (1608 Metric) | | C1 | C0953CAT47K4RACUT | Kemet | | Digi-Key | 359-4322-ND | http://www.kemet.com/datasheets/C0953CAT47K4RACUT | |
| 2 | GREEN LED | LED INGAN GREEN 0.083 SMD | | DL1..DL2 | 598-8051-10F | Delight | LED A, LED B | Digi-Key | 350-2036-1ND | http://media.digikey.com/pdf/Data%20Sheet/Delight%20PDFs/598_Series_0653_Pdf.pdf | |
| 1 | DS28E18 | 1-Wire Slave 2-Wire 24CSP8 Master Bridge | | U1 | | Maxim Integrated | | | | http://www.maximintegrated.com/en/design/technical-documents/data-sheets/DS28E18.pdf | |
| 1 | JUMPER | HDR.BRKWR, 100 3PDS VERT 3.15" | | JP4 | 9-14627-6 | Tyco Electronics | Cut to 1x3 sections | | | http://documents.tycoelectronics.com/documents/data-sheets/HDR.BRKWR.pdf | |
| 1 | PMOD Female | CONN PORT 120P S 0.1 TIN PCB R/A | | J2 | SSW-106-02-T-DRA | SainSmart Inc. | | | | http://saudidoc.com/printable.com/1xmcxx-xx-xx-xx-xx-mit.pdf | |

| DS7505 Module Board | | Comment | Description | Designator | Part Number | Manufacturer Name | Vendor | Vendor Part Number | Notes | Datasheet URL |
|---------------------|-------------|-----------------------------------|-------------|------------|---------------------|-----------------------------|----------|--------------------|-------|---|
| 1 | PCB | DS7505 Module Board PCB | | 777 | | | | | | |
| 1 | 0.1uf | CAP 0.1uF 25V 0603 | | C1 | C1608XTR1E104K060A | TDK Corporation | Digi-Key | 445-1316-1-ND | | http://www.tdk.com/pdf/general_B11.pdf |
| 1 | PMOD FEMALE | CONN RPCT 12POS 0.1 TIN PCB R/A | | J1 | SSW-106-02-D7-D-R/A | Samtec Inc. | Digi-Key | SAM10026-ND | | http://sudocdocs.samtec.com/print/sam10026-1xx-xx-xx-xx-xx-xx-milt.pdf |
| 1 | PMOD MALE | CONN RPCT 12POS 0.1 TIN PCB R/A | | J2 | PRPC0626BAN-M71RC | Sullins Connector Solutions | Digi-Key | S2111EC06-ND | | https://datasheets.pdf.s3.amazonaws.com/11639.pdf |
| 1 | DS7505 | Digital Thermometer and Thermoast | | U1 | DS7505U | Maxim Integrated | | | | https://datasheets.mouser.com/en/0/DS7505.pdf |

| MAX31722 Module Board | | MAX31723 Module Board | | | | | | | |
|-----------------------|-------------|--|---------------------------|-----------------|------------------------------|-----------|--------------------|-------|---|
| Quantity | Comment | Description | Designator | Part Number | Manufacturer Name | Vendor | Vendor Part Number | Notes | Datasheet URL |
| 1 | | PCB | MAX31723 Module Board PCB | ??? | | | | | |
| 1 | 0.1uF | CAP 0.1uF 1UF 0705 | C1 | CAP0.1uF1UF0705 | TDK Corporation | Digit-Key | 445-1316-1-ND | | http://www.tdk.com/pdf/general_B11.pdf |
| 1 | PMOD FEMALE | CONN RPCT 12POS 0.1 TIN PCB R/A | J1 | SSW-062-2-D-R/A | Samtec Inc. | Digit-Key | SAM1026-ND | | http://sudocdocs.samtec.com/print/ww1xx-xx-xx-xx-xx-xx-mit.pdf |
| 1 | PMOD MALE | CONN RPCT 12POS 0.1 TIN PCB R/A | J2 | PRC062BAN#T1RC | SulliCon Connector Solutions | Digit-Key | S2111EC-06-ND | | https://drawingsgoof.s3.amazonaws.com/11639.pdf |
| 1 | | Digital Thermometers and Thermocouples with SPI 3-Wire Interface | U1 | MAX31722MU+ | Maxim Integrated | | | | https://www.maximintegrated.com/en/products/analog/sensors-and-sensor-interface/MAX31723.html |

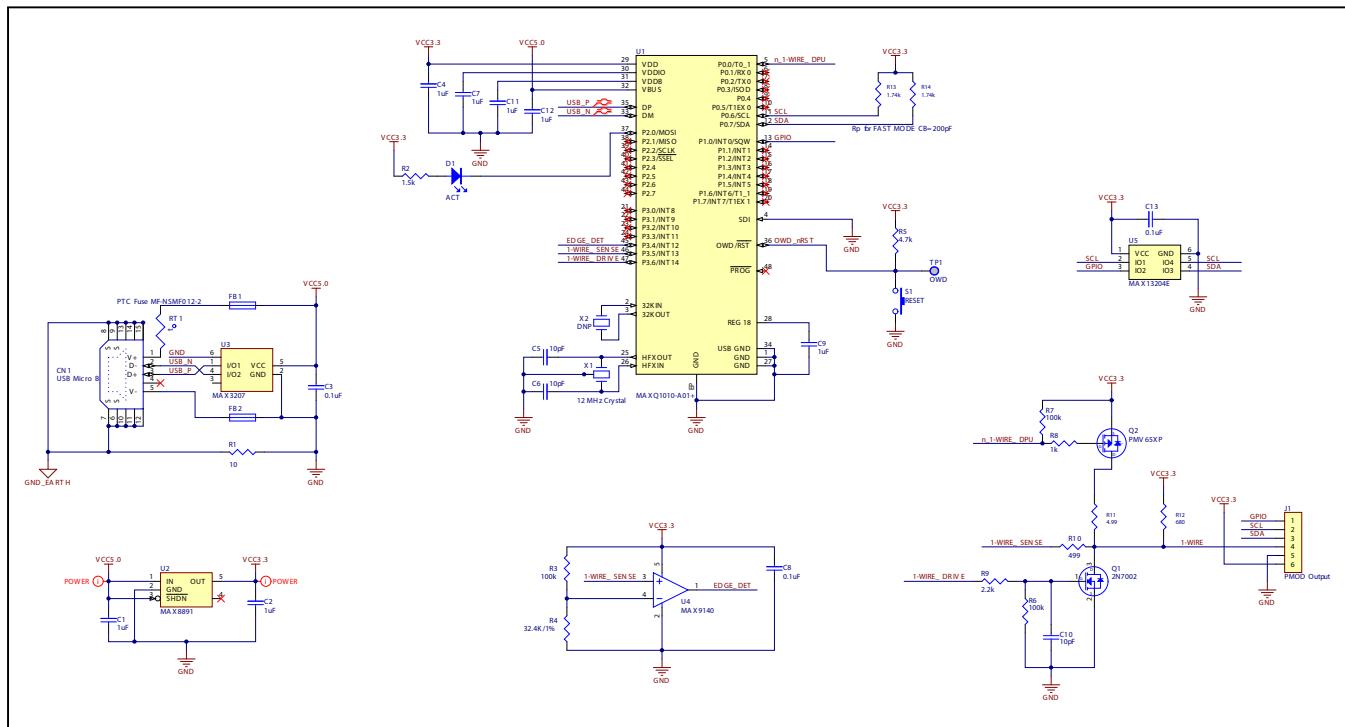
DS28E18 EV Kit Schematic



DS28E18 Evaluation System

Evaluates: DS28E18

DS9481P-300 EV Kit Schematic



Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|----------------------------|---------------|
| 0 | 6/20 | Initial release | — |
| 1 | 11/21 | Updated <i>Quick Start</i> | 2 |



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