THE DATASHEET OF

DS28E16EVKIT#

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DS28E16 Evaluation Kit

Evaluates: DS28E16 and DS2477

General Description

The DS28E16 evaluation kit (EV kit) provides the hardware and software necessary to exercise the features of the DS28E16. The EV system consists of five DS28E16 and DS2477 devices in a 6-pin TDFN package, two DS9121BQ+ evaluation TDFN socket boards, and a DS9481P-300# USB-to-I2C/1-Wire® adapter. The evaluation software runs under Windows® 10, Windows 8, and Windows 7 operating systems, both 64-bit and 32-bit versions. It provides a handy user interface to exercise the features of the DS28E16.

Features

- Demonstrates the Features of the DS28E16 DeepCover® SHA-3 1-Wire Authenticator
- Logs 1-Wire/I2C Communication to Aid Firmware Designer's Understanding of the DS28E16
- 1-Wire/I2C USB Adapter Creates a Virtual COM Port on Any PC
- Fully Compliant with USB Specification v2.0
- Software Runs on Windows 10, Windows 8, and Windows 7
- Convenient On-Board Test Points and TDFN Socket

Quick Start

Required Equipment

This section includes a list of recommended equipment and instructions on how to set up the Windows-based PC for the evaluation software.

- DS9481P-300# USB to 1-Wire/I2C adapter (included)
- DS9121BQ+ TDFN socket board (two included)
- DS28E16Q+ (five included)
- DS2477Q+ (five included)
- USB Type A to Micro-USB Type B cable (included)
- PC with a Windows 10, Windows 8, or Windows 7 operating system (64 bit or 32 bit) and a spare USB 2.0 or higher port
- Download DS28E16 Evaluation Kit Light Version software or request full DS28E16 Evaluation Kit software.

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

EV Kit Contents

QTY	DESCRIPTION
5	DS28E16 DeepCover SHA-3 1-Wire Authenticator (6-pin TDFN)
5	DS2477Q+ DeepCover SHA-3 Coprocessor (6-pin TDFN)
2	DS9121BQ+ Socket Board (6-pin TDFN)
1	DS9481P-300# USB to 1-Wire/I2C Adapter
1	USB Type-A to Micro-USB Type-B Cable

319-100338; Rev 0; 3/19

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Procedure

The following steps were performed on a Windows 10 PC to set up the DS28E16 EV kit hardware/software:

1) Obtain the **DS28E16_Evaluation_Kit_Setup_V1.0.0.exe** file or the latest version.
2) In a file viewer double click on **DS28E16_Evaluation_Kit_Setup_V1.0.0.exe** to begin the installation.
3) Complete all steps of the interactive installation wizard. The software opens by default when the installation is complete.
4) Open the first DS9121BQ+ socket, insert a DS28E16 into the cavity per the same orientation shown in Figure 1, and close the burn-in socket.
5) Configure the first DS9121BQ+ socket board for DS28E16 by setting jumper JB5 per Figure 2.
6) Open the second DS9121BQ+ socket, insert a DS2477 into the cavity per the same orientation shown in Figure 1, and close the burn-in socket.
7) Configure the second DS9121BQ+ socket board for DS2477 by setting jumpers JB1, JB3, and JB4 per Figure 3.
8) For select flows in the software that use the DS2477 coprocessor, connect both DS9121BQ+ boards to the DS9481P-300# as shown in Figure 3. For all other flow, connect only the first DS9121BQ+ board containing a DS28E16 to the DS9481P-300# as shown in Figure 2.
9) Connect the DS9481P-300# to the PC using a USB Type-A to Micro-USB Type-B cable.
10) Select a flow from the top-left panel in the program and click on the **Run** button to start the demo as shown in Figure 4. More information about the available flows is available in Table 1.

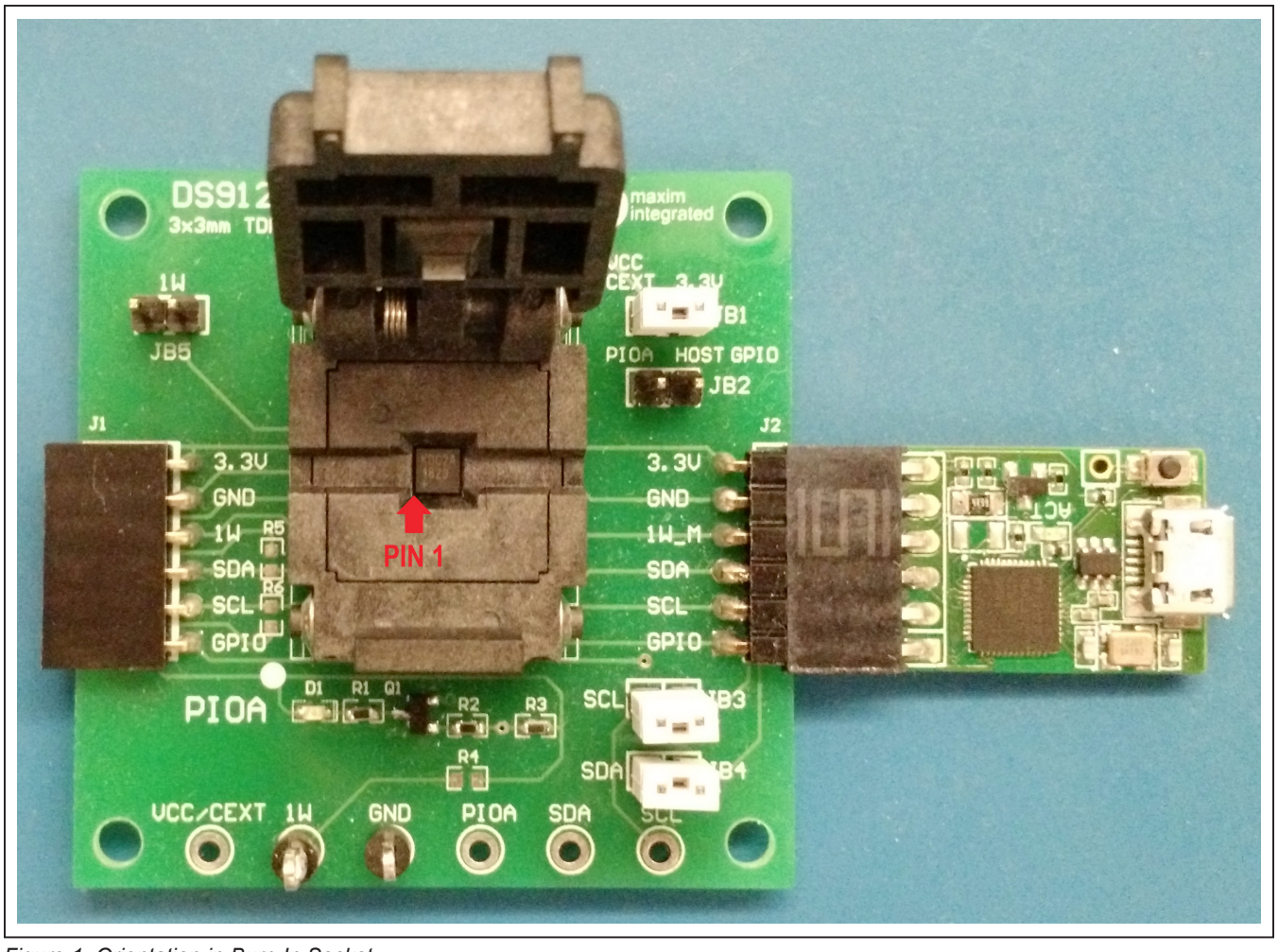


Figure 1. Orientation in Burn-In Socket

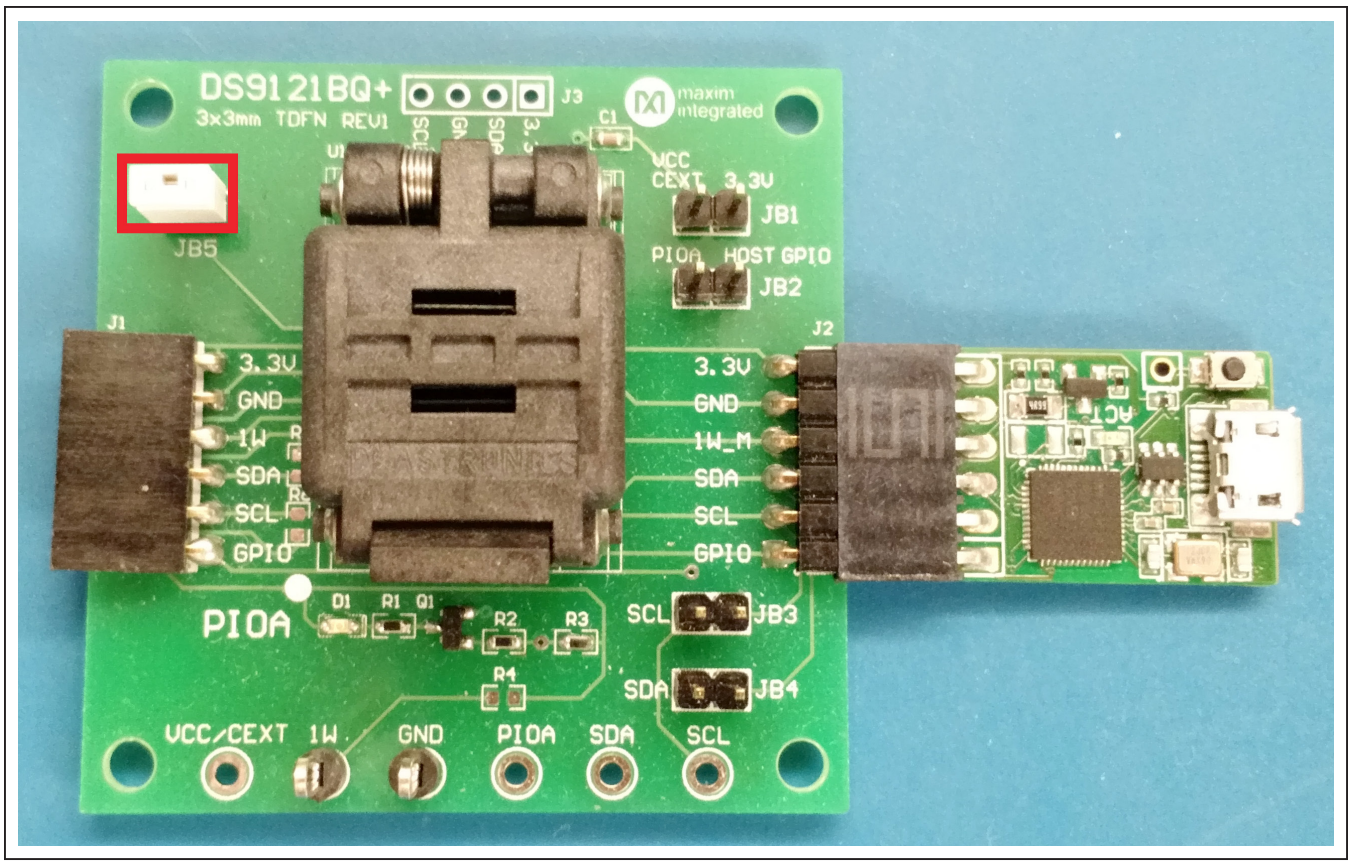


Figure 2. DS28E16 Connected to DS9481P-300#

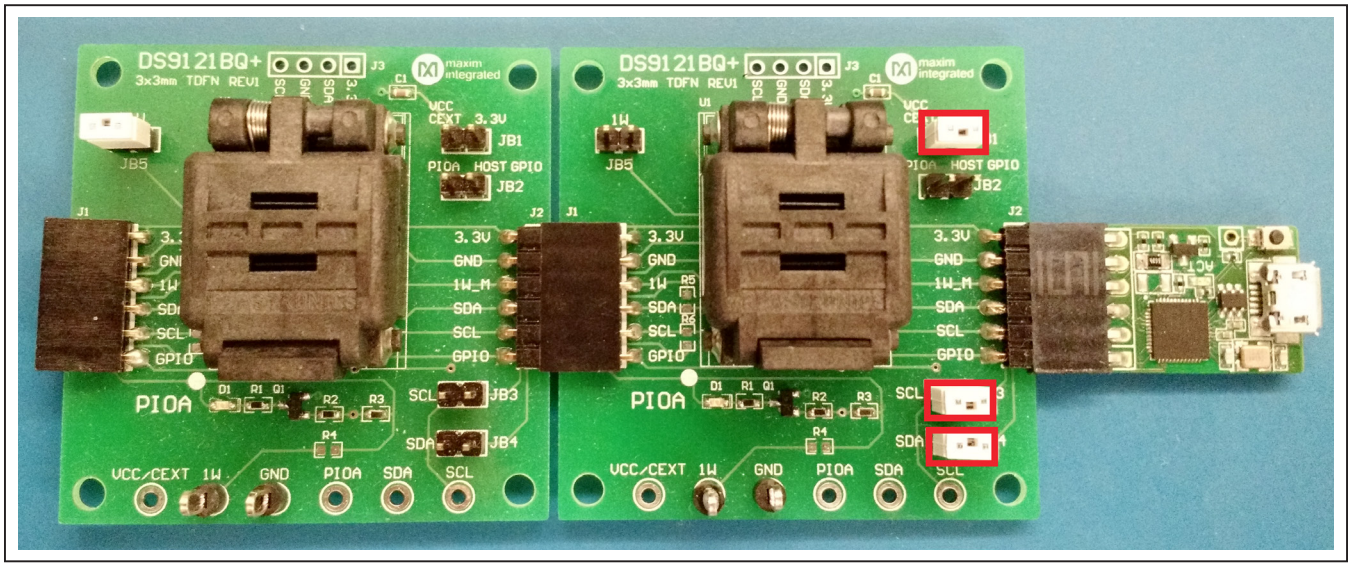


Figure 3. DS2477 Connected to DS9481P-300# and DS28E16

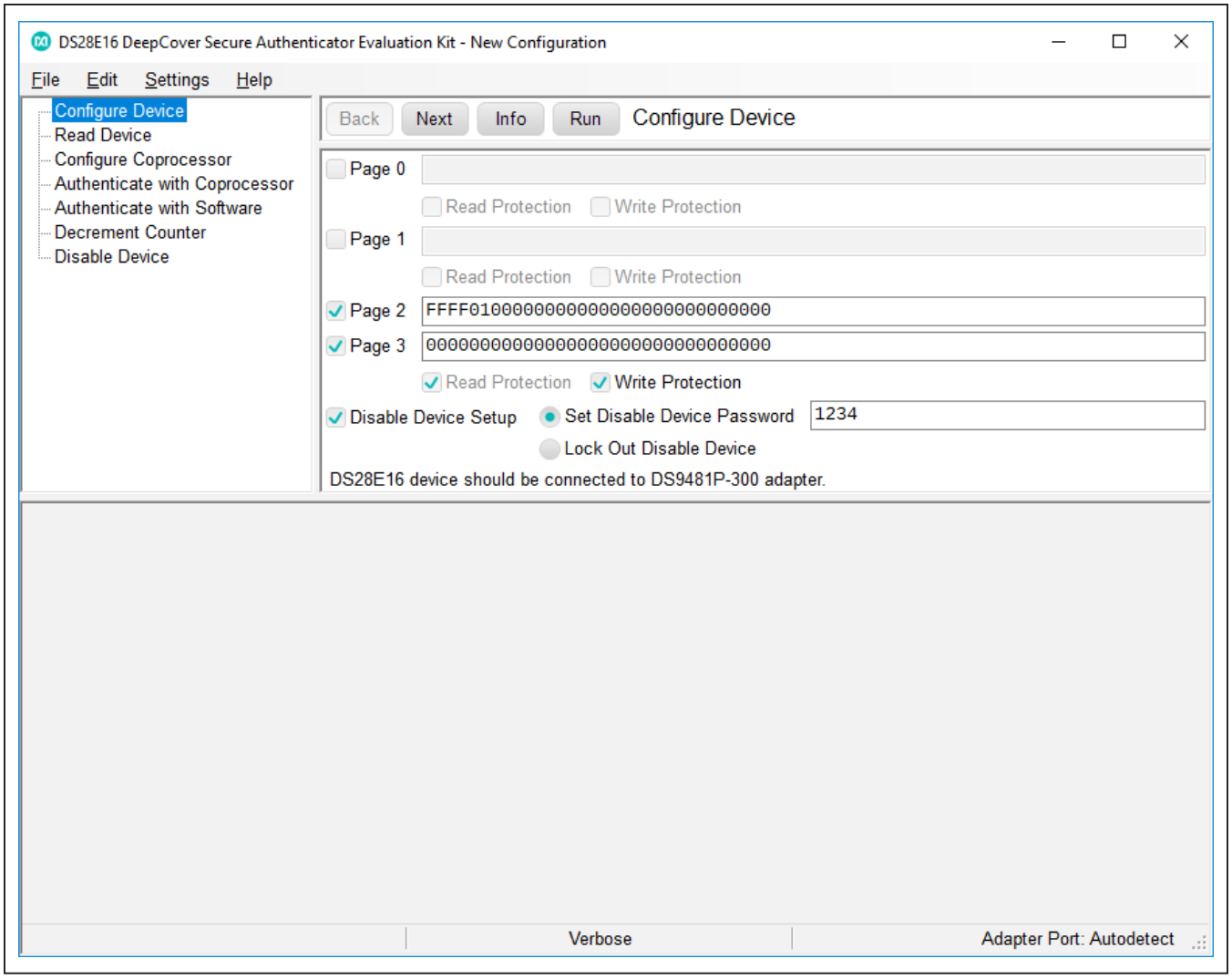


Figure 4. Main Program Screen

Table 1. Program Flows

FLOW	DESCRIPTION
Configure Device	Configure DS28E16 memory page data, memory page protections, and disable device setup.
Read Device	Read all available information from the device including memory page data, memory page protections, MAN ID, and device version.
Configure Coprocessor	Configure DS2477 coprocessor with Master Secret for the **Authenticate with Coprocessor** flow.
Authenticate with Coprocessor	Authenticate DS28E16 with DS2477 coprocessor used for cryptographic and 1-Wire operations.
Authenticate with Software	Authenticate DS28E16 with software used for cryptographic operations.
Decrement Counter	Decrement the DS28E16 counter. Page 2 must have been set in the **Configure Device** flow.
Disable Device	Permanently disable DS28E16 device. The disable device password must have been set in the **Configure Device** flow.

Table 2. 1-Wire Communication Legends

TBD	TBD
HH	Written byte
[HH]	Read byte
RP	Reset with presence pulse
RN	Reset with no presence pulse
<SP_ON>	Strong pull-up on
<SP_OFF>	Strong pull-up off
<STD>	Standard speed
<OVR>	Overdrive speed
<DELAYn>	Delay for n milliseconds

Table 3. I^2C Communication Legend

TBD	TBD
HH	Written byte
[HH]	Read byte
S	Start condition
P	Stop condition

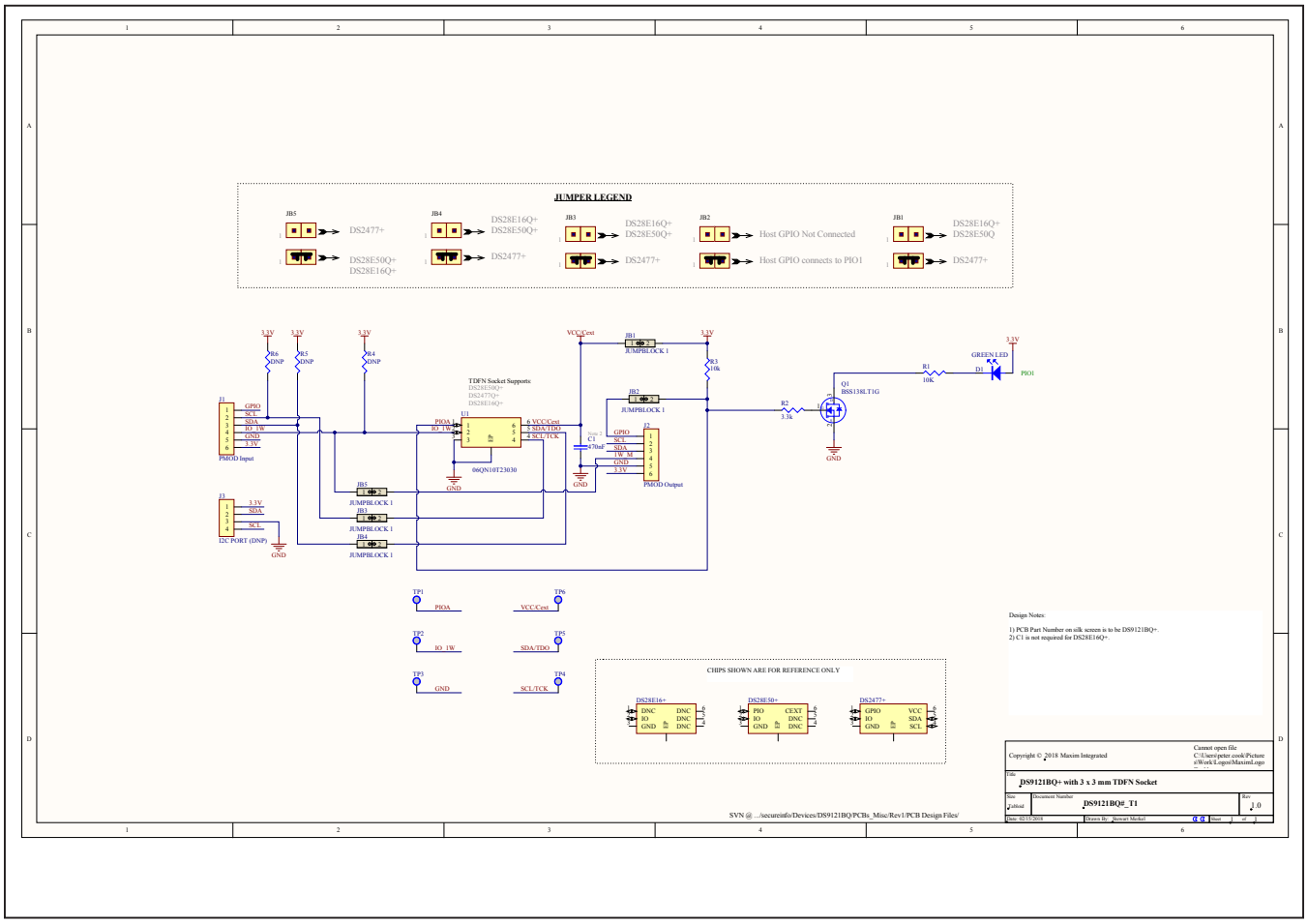
Ordering Information

PART	TYPE
DS28E16EVKIT#	EV Kit

DS28E16 EV Kit Bill of Materials

DESIGNATOR	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
J1	1	CONN FEMALE 6POS .100” R/A GOLD	Sullins Connector Solutions	PPPC061LGBN-RC
J2	1	CONN HEADER 6 POS RA 2.54	Wurth Electronics Inc.	61300611021
TP1-TP6	6	TEST POINT PC MULTI PURPOSE BLK	Keystone Electronics	5011
U1	1	SOCKET+, IC TDFN, 3MM, 3x2, CLAMSHELL	PLASTRONICS	06QN10T23030
C1	1	CAP CER 0.47UF 16V X7R 0603	KEMET	C0603C474K4RACTU
D1	1	LED GREEN CLEAR 0603 SMD	Dialight	5988081107F
JB1-JB5	5	CONN HEADER 2 POS 2.54	Wurth Electronics Inc.	61300211121
Q1	1	MOSFET N-CH 50V 200MA SOT-23	ON Semiconductor	BSS138LT1G
R1, R3	2	RES SMD 10K OHM 0.1% 1/10W 0603	Bourns Inc.	CRT0603-BY-10R0ELF
R2	1	RES SMD, 3.3K OHM, 1%, 0603	Yageo	RC0402JR-071K5L

DS28E16 EV Kit Schematic



Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/19	Initial release	—

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- Shortage Management
- Alternative Solution
- Excess Inventory Management