Request DS28E40 Security User's Guide

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DS28E40 Evaluation Kit

Evaluates: DS28E40

General Description

The DS28E40 evaluation system (EV system) provides the hardware and software necessary to evaluate the features of the DS28E40. The EV system consists of five DS28E40ATB/VY+ devices in a 10-pin TDFN package, a DS9121ATB+ evaluation TDFN socket board, 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 the 64-bit and 32-bit versions. It provides a handy user interface to exercise the features of the DS28E40.

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

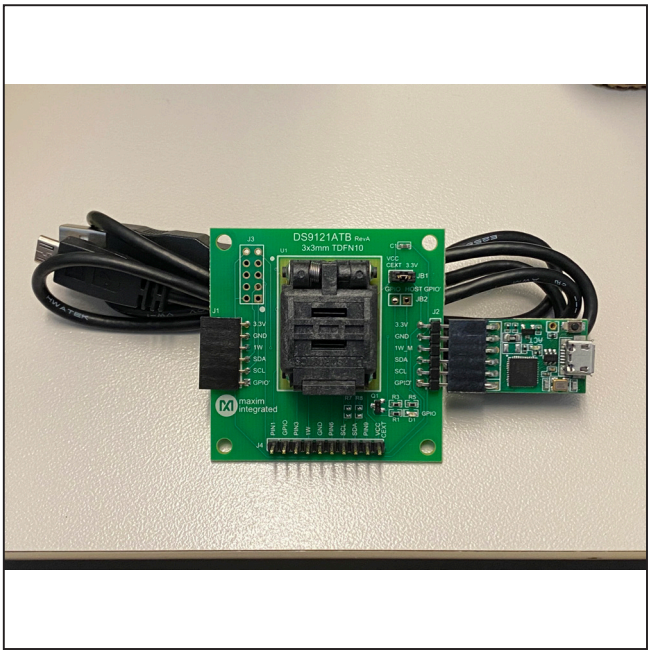
Features

- Demonstrates the Features of the DS28E40 DeepCover® Secure Authenticator
- 1-Wire Communication Is Logged to Aid Firmware Designers' Understanding of the DS28E40
- 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 for Both 64-Bit and 32-Bit Versions
- 3.3V ±3% 1-Wire Operating Voltage
- Convenient On-Board Test Points, TDFN Socket
- Evaluation Software Available by Request

EV Kit Contents

QTY	DESCRIPTION
5	DS28E40ATB/VY+ DeepCover Secure Authenticator (10 TDFN)
1	DS9121ATB+ Socket Board (10 TDFN)
1	DS9481P-300# USB-to-I²C/1-Wire
1	USB Type-A to Micro-USB Type-B Cable

DS28E40 EV System



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Windows is a registered trademark of Microsoft Corporation.

319-100586; Rev 2; 3/21

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Quick Start

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

Required Equipment

- DS9481P-300# USB-to-I2C/1-Wire adapter (included)
- DS9121ATB+ socket board (included)
- DS28E40ATB/VY+ (five devices 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 DS28E40 EV kit software (light version) or request full DS28E40 EV kit developer 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.

Hardware Setup and Driver Installation Quick Start

The following steps were performed on a Windows 10 PC to set up the DS28E40 EV kit hardware/software:

1) Obtain and unpack the **DS28C40_DS28E40_Evaluation_Kit_Lite_Version_Setup** file or the latest version.
2) In a file viewer (Figure 1), double click on the **DS28C40_DS28E40_Evaluation_Kit_Lite_Version_Setup_V2** file to begin the installation.
3) The setup wizard opens; click **Next** as shown in Figure 2.

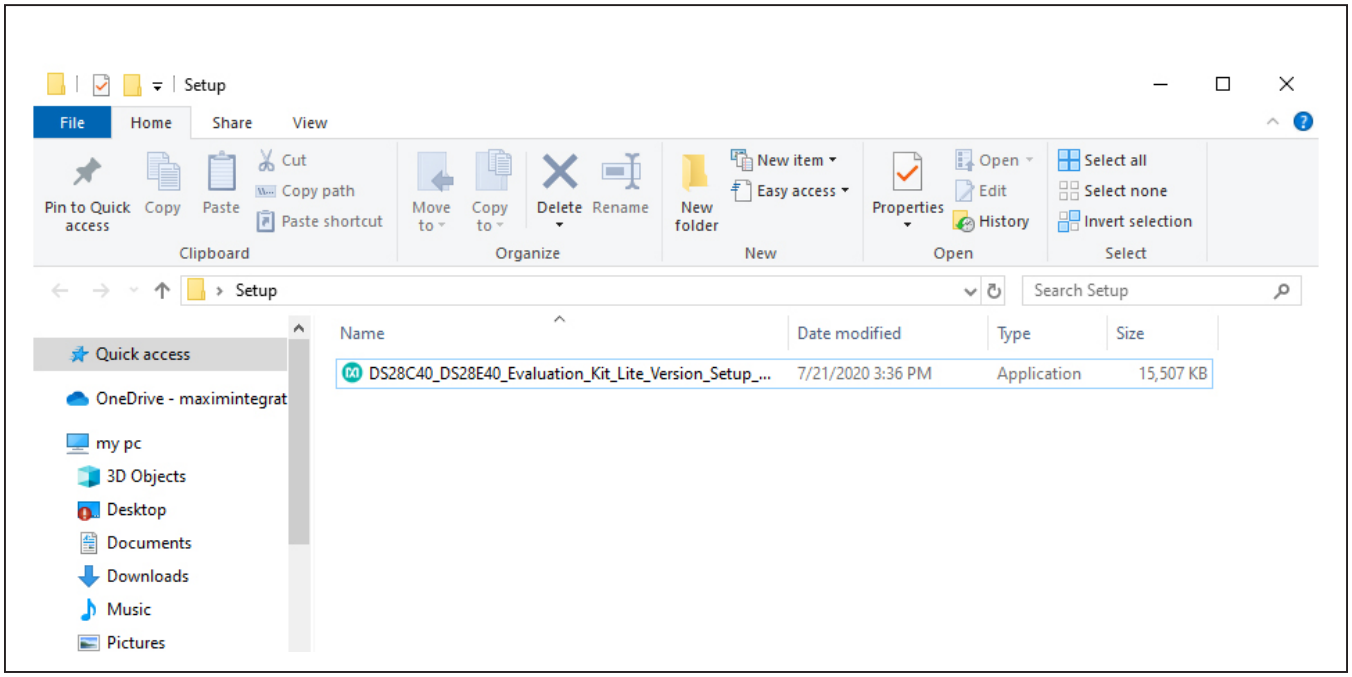


Figure 1. File Viewer

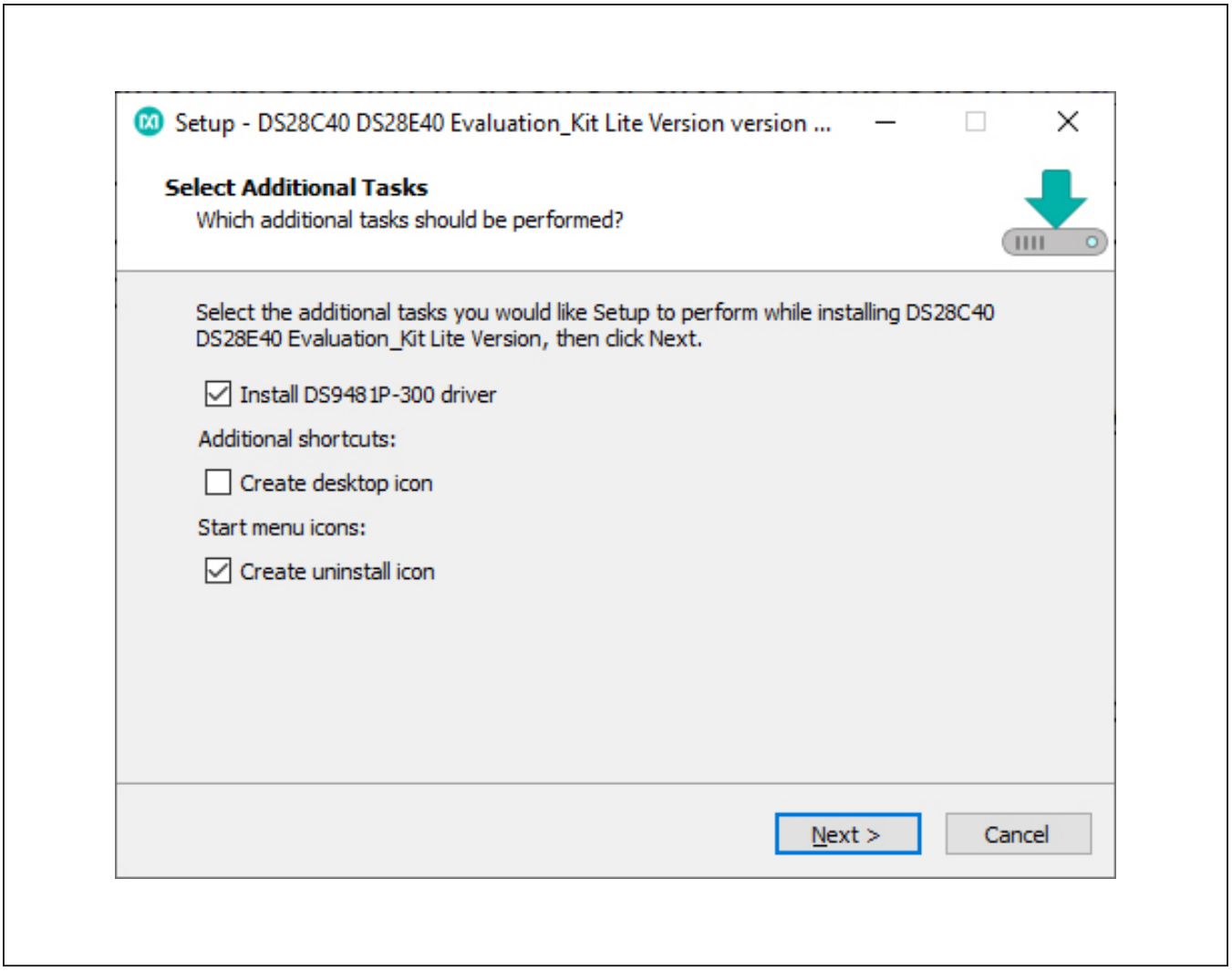


Figure 2. DS28E40 Setup Wizard

4) Follow the instructions in the wizard and click **Next** to install the EV kit software and required drivers (Figure 3 and Figure 4).

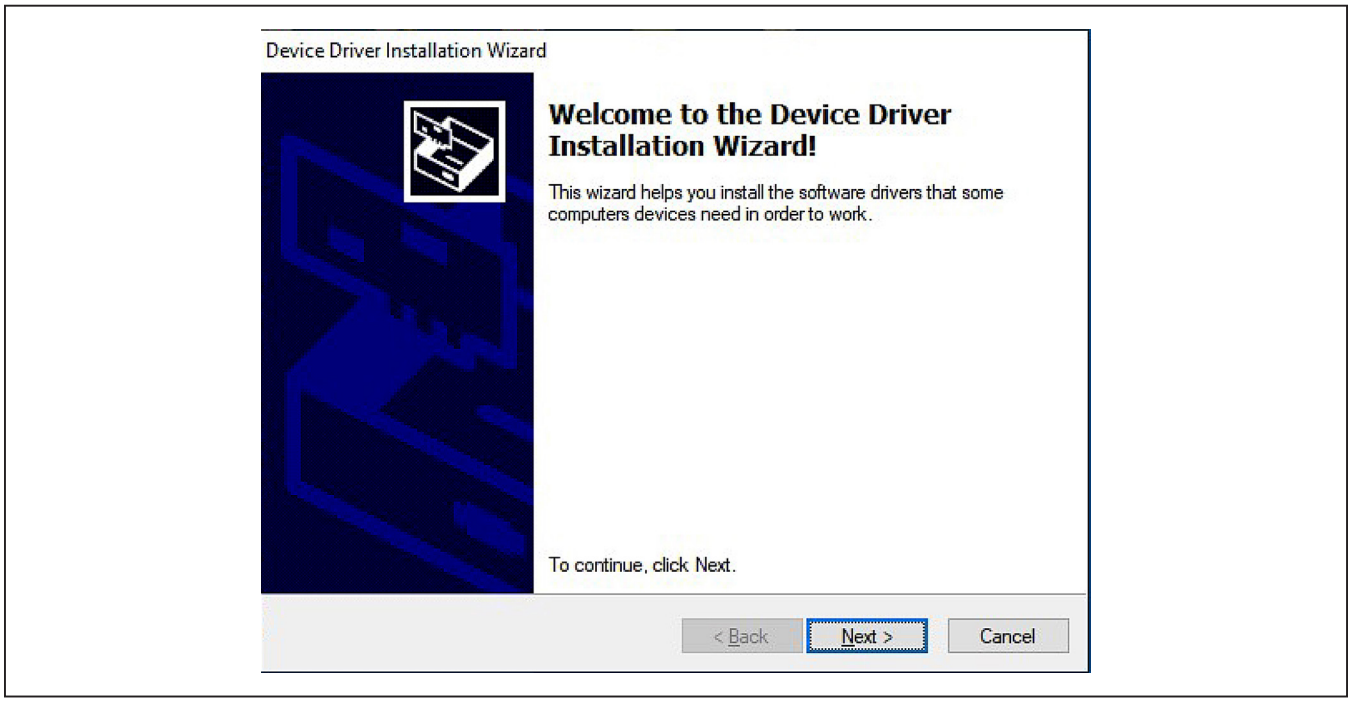


Figure 3. DS9481P-300# Driver Installation

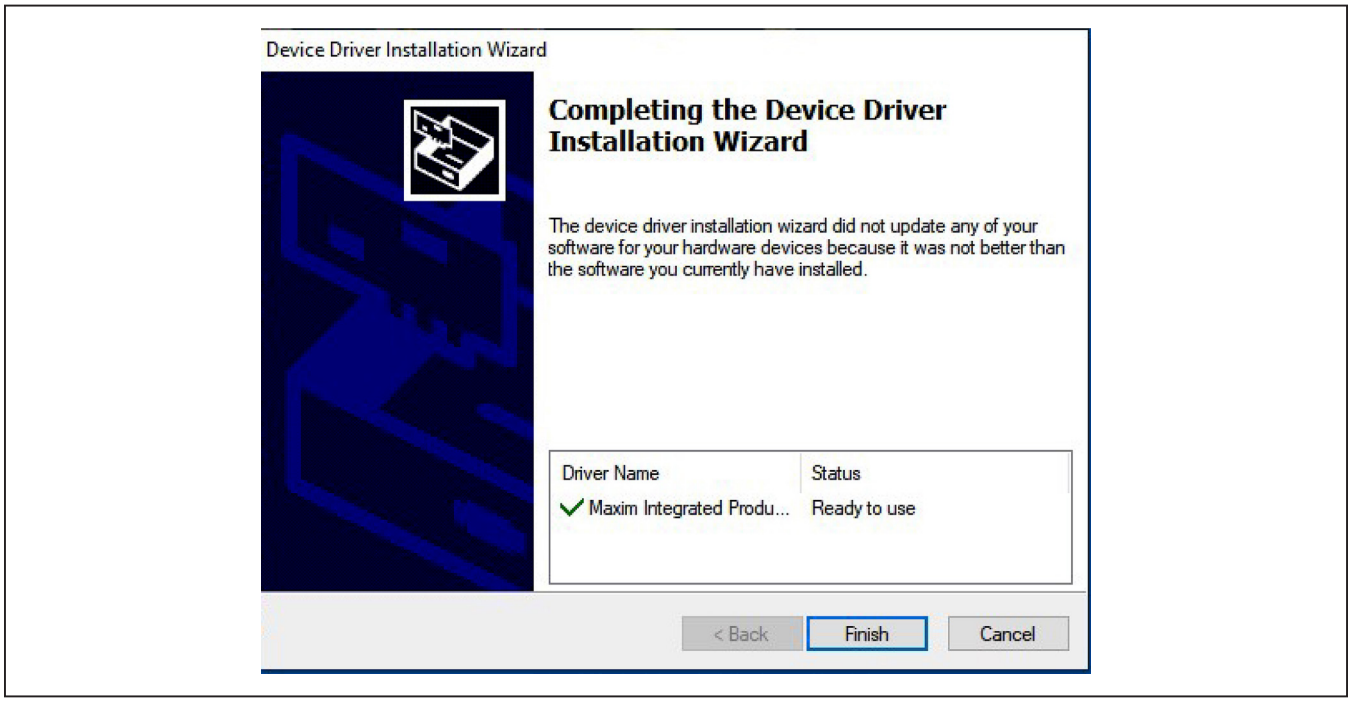


Figure 4. Finish DS9481P-300# Driver Installation

5) Wait for the Installation to complete and launch program if desired after completion (Figure 5).

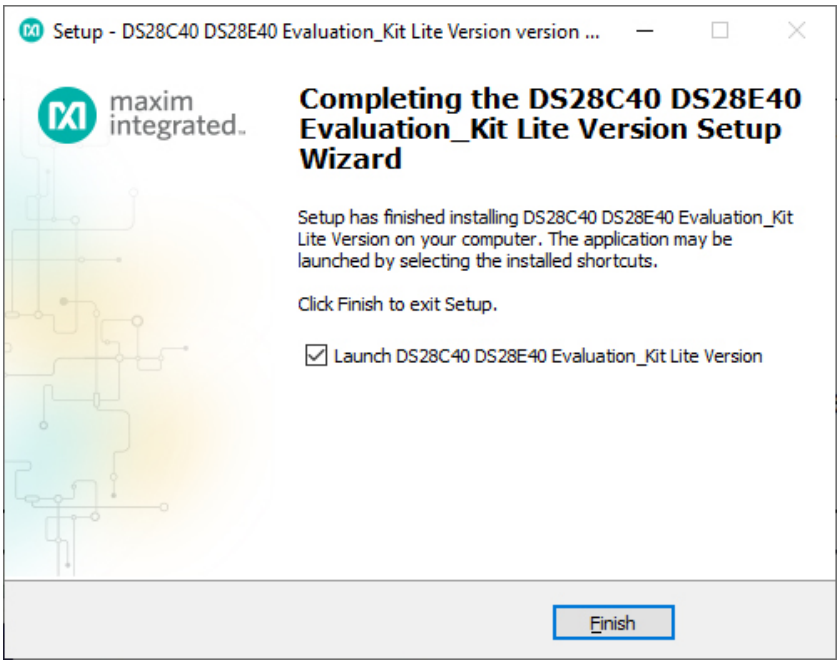


Figure 5. Run Software After Installation

6) Plug the DS9481P-300# into the PC with the DS9121ATB+ socket board by doing the following:

   a. Open the socket and insert a DS28E40ATB/VY+ as shown in Figure 6.

      Note: The plus (+) on the package must be aligned with the top of the marker in the socket. The pin 1 indicator is denoted on the PCB as a white dot and is located on the top side of the socket's marking.

   b. Close the burn-in socket.

   c. Connect the DS9121ATB J2 6-pin male plug into the DS9481P-300# 6-pin female socket per Figure 7.

   d. Using a USB Type-A to Micro-USB Type-B cable, plug the DS28E40 EV kit into the PC.

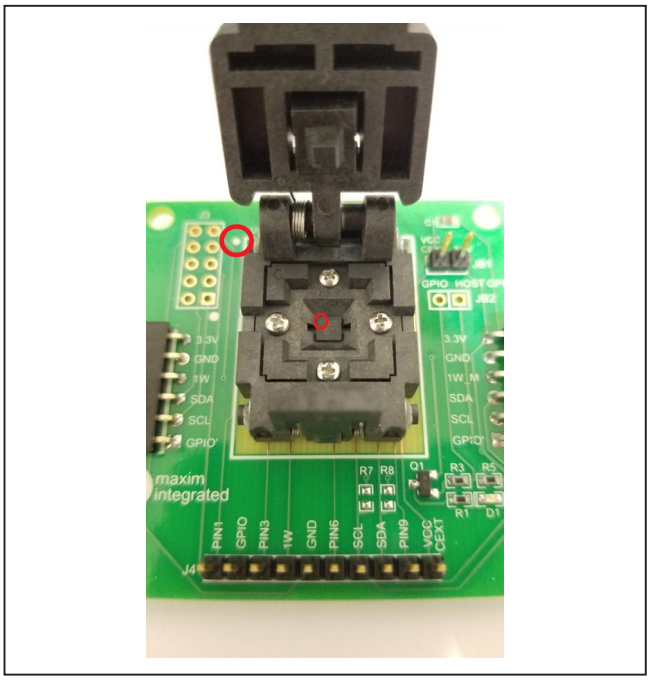


Figure 6. Orientation of the DS28E40 in the Burn-In Socket

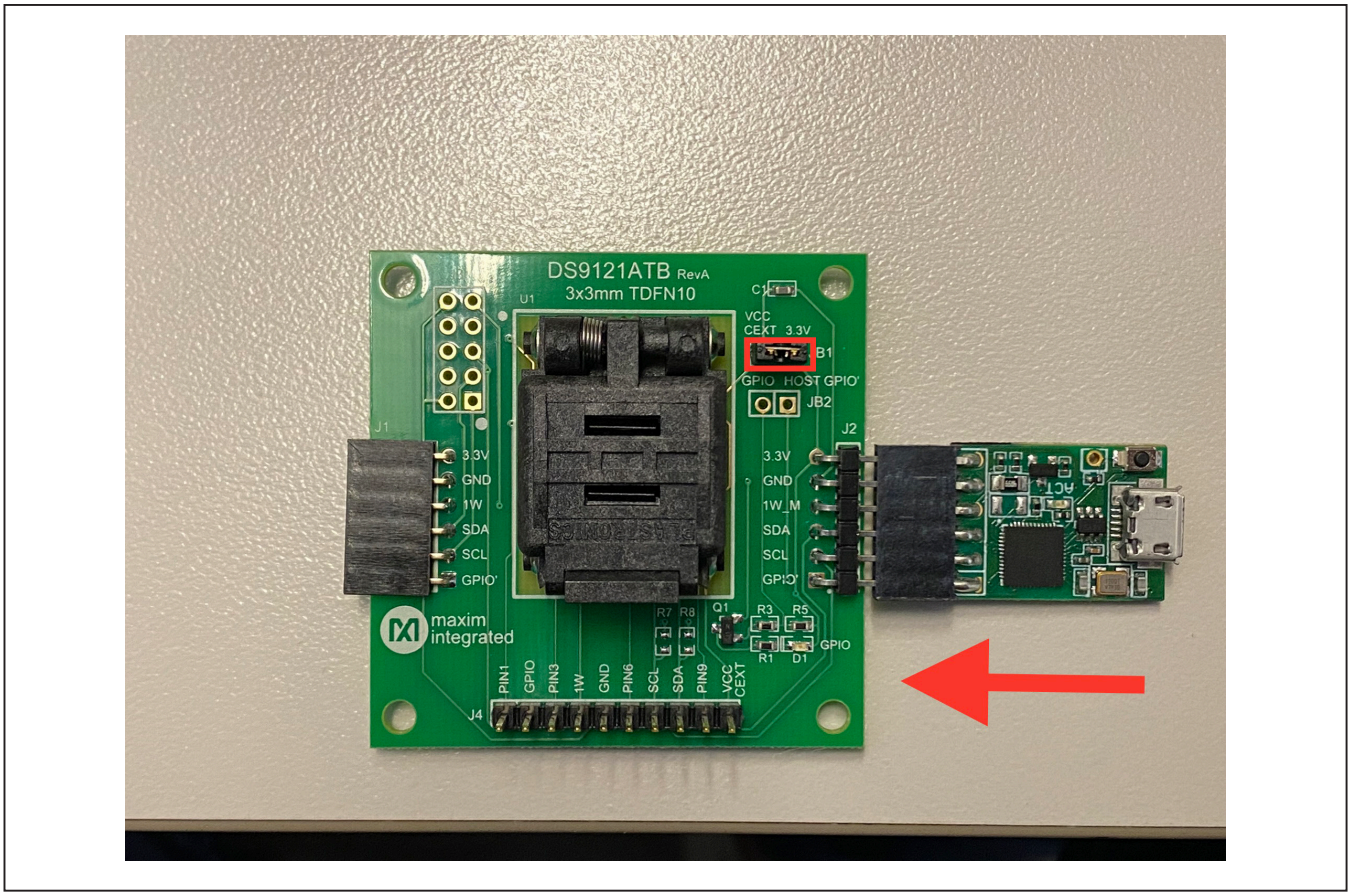


Figure 7. DS9481P-300# and DS9121ATB+

7) The DS28E40 EV kit program opens and automatically connects to the COM port. This can be verified in the lower right corner of the window, as shown in Figure 8.

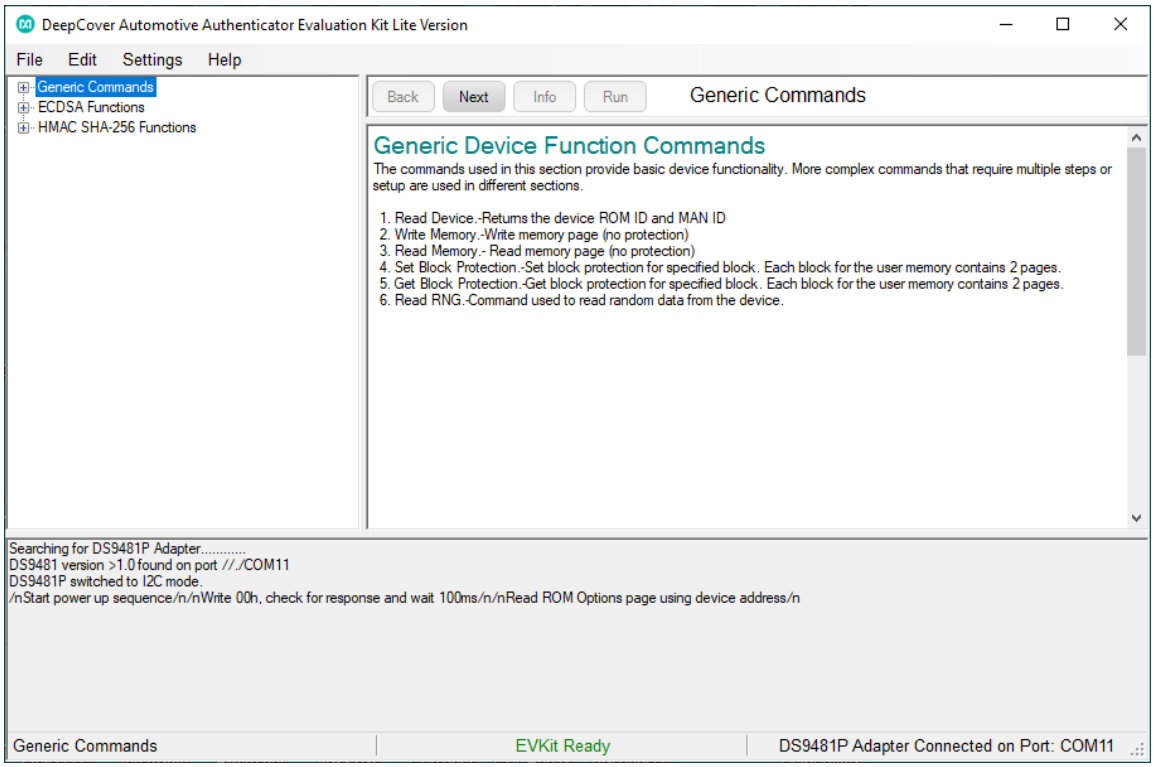


Figure 8. DS28E40 EV Kit Program (Default View Upon Opening)

EV Kit Supported Functions

The DS28E40 EV kit program is designed as a usage example. The GUI optionally displays all the device command sequence transactions as well as SHA and ECDSA computations when Settings→Debug Info is enabled. See Table 1 for descriptions of the functions in the GUI.

Table 1. GUI Setup and Usage Flows Supported

FLOW	DESCRIPTION
Generic Commands	Generic DS28E40 commands without SHA or ECDSA encryption, authentication, or protection. (e.g., Read Device, Read and Write Memory, Set and Read Protection, and RNG function)
ECDSA Functions*	Examples to set up the device for ECDSA authentication, certificate generation, and verification. Examples for ECDSA encryption, authentication, signature generation, and verification.
HMAC SHA-256 Functions*	Examples provided to set up the device for HMAC authentication and verification and for HMAC encryption, authentication, and the SHA-256 generator.
AES Bulk Decrypt*	Examples to execute the DS28E40 AES bulk decrypt feature.

**Available only in the full EV kit version.*

Navigating

The DS28E40 EV Kit Lite program GUI is divided into four sections as follows:

- **Menu Bar**: Provides access to settings, configuration, hardware selection, and other features and information used to support the software operations.
- **Functions Panel**: Gives access to the device demonstration sequences.
- **Command Panel**: Allows sequence output, configuration, and command execution.
- **Log:** Provides information for command execution and software operation.

Connection and Detecting Hardware

The DS9481P-300# adapter is connected automatically upon software initialization. The adapter can be attached and detected by software later by selecting the adapter connection under **Settings→Adapter Port→Connect**.

The DS28E40 EV Kit Lite requires device selection for correct operation and hardware interface. Select the DS28E40 to start the hardware interface by selecting **Settings→Select Device→DS28E40**.

Ordering Information

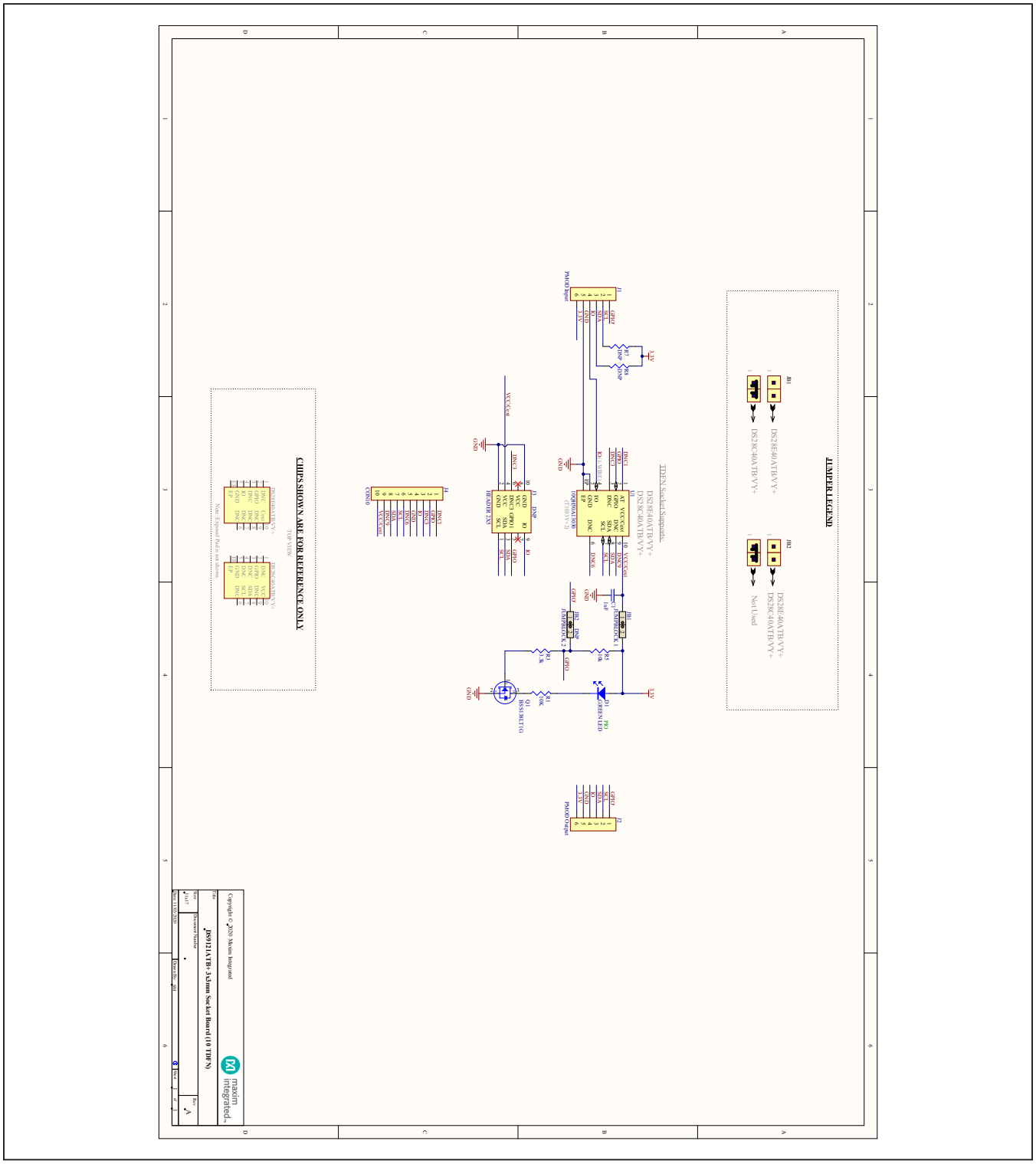
PART	TYPE
DS28E40EVKIT#	EV Kit

#Denotes RoHS compliant.

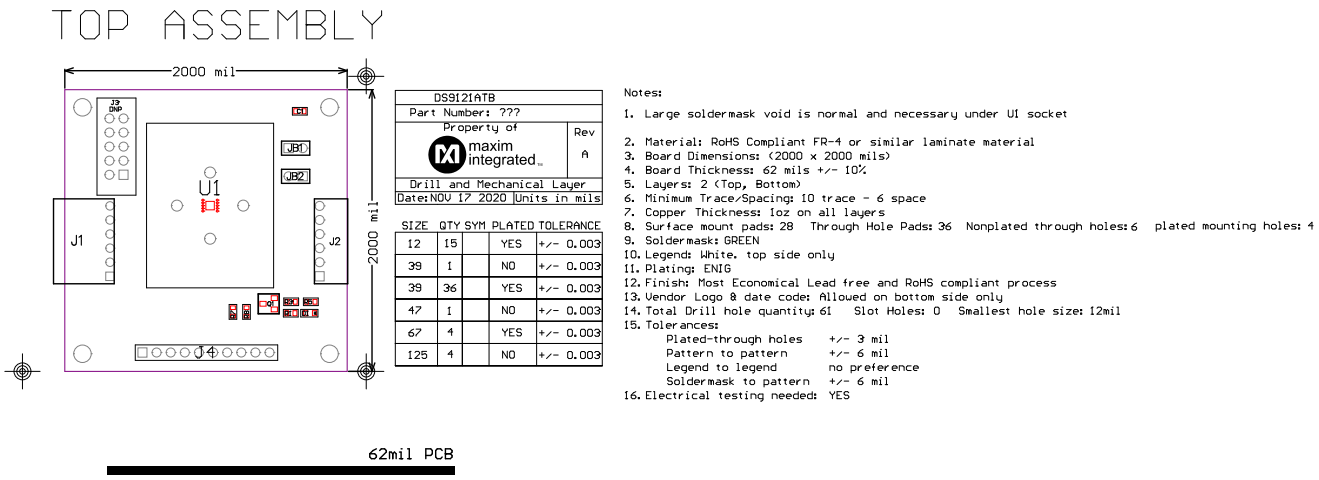
DS28E40 EV Kit Bill of Materials

DESIGNATOR	QTY	DESCRIPTION
Pack-Out	1	1-WIRE AUTHENTICATOR EV KIT DS28E40EVKIT#
Pack-Out	5	AUTOMOTIVE 1-WIRE AUTHENTICATOR
Pack-Out	1	CABLE, USB A-TO-MICRO-B CABLE (1M) 68784-0001
Pack-Out	1	1W/I2C 3x3MM TDFN SOCKET BOARD DS9121ATB+
Pack-Out	1	DS9481P-300 EVAL KIT# DS9481P-300#
DS9121ATB+ PCB	1	PCB+, DS9121ATB+
J4	1	CONN HEADER VERT 10POS 2.54MM 22284103
J2	0.01	CONN+, HEADER, 50PS, 100 SGL, R/A, AU TSW-150-08-G-S-RA
J1	1	CONN+, RCPT, 100” 6POS, R/A GOLD PPPC061LGBN-RC
U1	1	SOCKET+, IC, TDFN10, 3x3MM, CLAMSHELL 10QH50A13030
Pack-Out	1	LABEL BLANK THT-1-423 0.75 X 0.25
Pack-Out	1	BAG, STATIC SHIELDZIP4X6, W/ ESD LO
C1	1	CAP+, 1.5µF
D1	1	LED+, GREEN CLEAR, 3.2V, 20MA, 0603 598-8081-107F
JB1	0.1	HEADER 36-40 PINS (CUT TO FIT) 22-28-4363
Populate to JB1	1	SHUNT+, LP W/HANDLE 2 POS 30AU 881545-2
Q1	1	MOSFET, N-CH ENHANCEMENT BSS138LT1G
R3	1	3.3kΩ 1% RESISTOR (0603 PB FREE) ERJ-3EKF3301V
R1, R5	2	RES, 10kΩ 1% 060

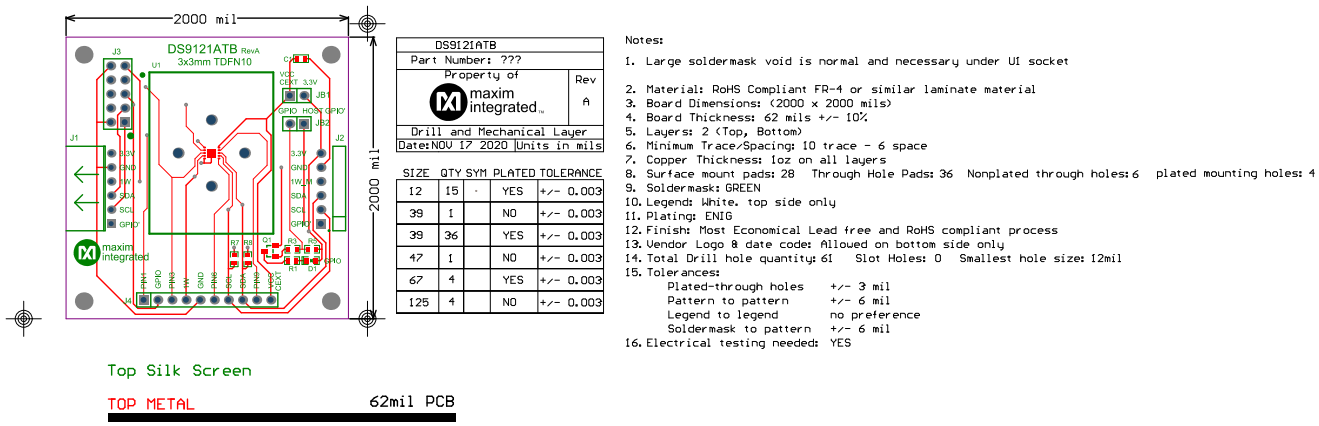
DS28E40 EV Kit Schematic



DS28E40 EV Kit PCB Layouts

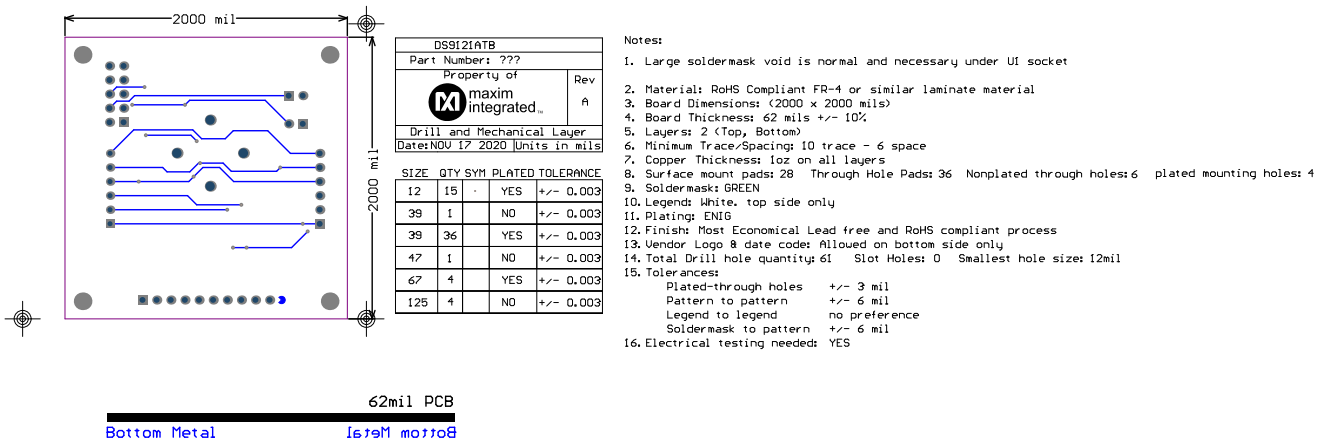


DS28E40 EV Kit PCB—Top Assembly

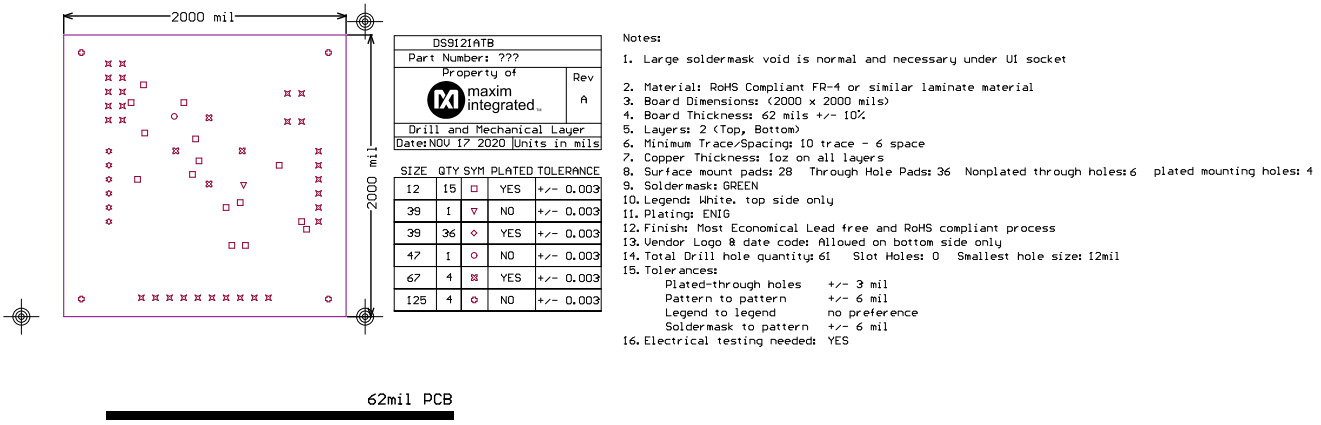


DS28E40 EV Kit PCB—Top Silkscreen

DS28E40 EV Kit PCB Layouts (continued)

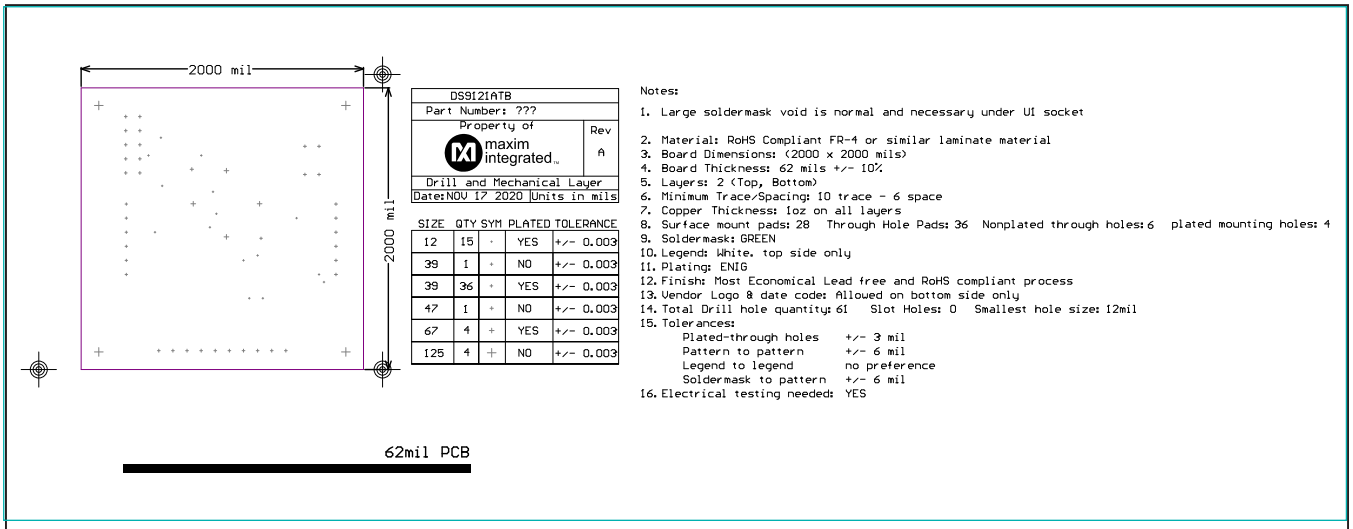


DS28E40 EV Kit PCB—Bottom Metal



DS28E40 EV Kit PCB—Drill and Mechanical

DS28E40 EV Kit PCB Layouts (continued)



DS28E40 EV Kit PCB—Bottom Layer

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/20	Release for intro	—
1	12/20	Updated part number from DS28E40G/V+ to DS28E40ATB/VY+ and DS28E40 EV Kit Schematic section	1, 2, 5, 10
2	3/21	Updated *General Description*, *EV Kit Contents*, *DS28E40 System*, *Quick Start*, *Hardware Setup and Driver Installation Quick Start*, Figure 6, Figure 7, Figure 8, *DS28E40 EV Kit Bill of Materials*, *DS28E40 EV Kit Schematic*, and added *DS28E40 EV Kit PCB Layouts*	1, 2, 5, 9–13