Click <u>here</u> to ask about the production status of specific part numbers.

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 DS28E40G/V+ devices in a 10-pin TDFN package, a DS9121CQ 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.

EV Kit Contents

QTY	DESCRIPTION
5	DS28E40G/V+ DeepCover Secure Authenticator (10 TDFN)
1	DS9121CQ+ Socket Board (10 TDFN)
1	DS9481P-300# USB-to-I ² C/1-Wire
1	USB Type-A to Micro-USB Type-B Cable

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

DS28E40 EV System



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



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)
- DS9121CQ+ socket board (included)
- DS28E40G/V+ (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:

- Obtain and unpack the <u>DS28C40_DS28E40_Evalu-</u> <u>ation_Kit_Lite_Version_Setup_V2_0_0</u> file or the latest version.
- In a file viewer (Figure 1), double click on the DS28C40_DS28E40_Evaluation_Kit_Lite_Version_Setup_V2_0_0 file to begin the installation.
- The setup wizard opens; click <u>Next</u> as shown in <u>Figure 2</u>.

	cut Move Copy to * Copy Organize	New New folder New	Properties Copen Properties Copen Properties Copen C	Select all Select none Invert selection Select Sector	
← → ∽ ↑ → Setup ∧ Nan	^		ح ک	Search Setun	-
▲ Nan	^			search setup	م
 Quick access OneDrive - maximintegrat my pc 	me DS28C40_DS28E40_Evaluation_Kit_Lite_V	ersion_Setup 7/21/2020	dified Type 0 3:36 PM Appl	Size	
 3D Objects Desktop Documents Downloads 					

Figure 1. File Viewer

Evaluates: DS28E40

Ø	Setup - DS28C40 DS28E40 Evaluation_Kit Lite Version version 🛛 🛛 🗙
5	elect Additional Tasks
	Which additional tasks should be performed?
	Select the additional tasks you would like Setup to perform while installing DS28C40 DS28E40 Evaluation_Kit Lite Version, then click Next.
	Install DS9481P-300 driver
	Additional shortcuts:
	Create desktop icon
	Start menu icons:
	Create uninstall icon
	Next > Cancel

Figure 2. DS28E40 Setup Wizard

Evaluates: DS28E40

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



Figure 3. DS9481P-300# Driver Installation

Completing the De Installation Wizar	evice Driver d
The device driver installation wi software for your hardware devi the software you currently have	zard did not update any of your ces because it was not better than installed.
Driver Name	Status Ready to use

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 DS9121CQ+ socket board by doing the following:
 - a. Open the socket and insert a DS28E40G/V+ 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 DS9121CQ 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

Evaluates: DS28E40



Figure 7. DS9481P-300# and DS9121CQ

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.

File Edit Settings Help	
Generic Commands ECDSA Functions HUNC SUA 350 Functions	Back Next Info Run Generic Commands
H™AC 3HA-236 Functions	Generic Device Function Commands
	The commands used in this section provide basic device functionality. More complex commands that require multiple steps or setup are used in different sections.
	1. Read Device. Returns the device ROM ID and MAN ID 2. Write MemoryWrite memory page (no protection) 3. Read Memory Read memory page (no protection) 4. Set Block ProtectionSet block protection for specified block. Each block for the user memory contains 2 pages. 5. Get Block ProtectionSet block protection for specified block. Each block for the user memory contains 2 pages.
	6. Read RNGCommand used to read random data from the device.
	· · · · · · · · · · · · · · · · · · ·
Searching for DS9481P Adapter Adapter not Found. Simulation Only Searching for DS9481P Adapter DS9481 version >1.0 found on port ////COM39	
¢	

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 \rightarrow Debug Info is enabled. See <u>Table 1</u> 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.

Evaluates: DS28E40

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** \rightarrow **Adapter Port** \rightarrow **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	ТҮРЕ
DS28E40EVKIT#	EV Kit

#Denotes RoHS compliant.

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 4x3MM TDFN SOCKET BOARD DS9121CQ+
Pack-Out	1	DS9481P-300 EVAL KIT# DS9481P-300#
Pack-Out	1	1W/I2C 4X3MM TDFN SOCKET BOARD DS9121CQ+
DS9121CQ+ PCB	1	PCB+, DS9121CQ+
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, 4X3MM, CLAMSHELL 10QH50A14030-D
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 Bill of Materials

Evaluates: DS28E40

DS28E40 EV Kit Schematic



Evaluates: DS28E40

Revision History

REVISION	REVISION	DESCRIPTION	PAGES
NUMBER	DATE		CHANGED
0	8/20	Release for intro	—

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at https://www.maximintegrated.com/en/storefront.html.

Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time.