S9090 Evaluation Kit

Evaluates: 1-Wire EEPROM, EPROM, and ROM Devices

General Description

The DS9090 evaluation kit (EV kit) provides the hardware and software necessary to evaluate and operate 1-Wire® products in an easy-to-use PC environment. All 1-Wire EEPROM, EPROM, and ROM devices are readable with the DS9090 EV kit. All 1-Wire devices with memory or PIO/switches can be written with the DS9090 EV kit except 1-Wire EPROM devices*. In this way, the engineer can evaluate 1-Wire chips for potential design purposes or support end-product development activity. EV kit operation requires a host PC. Demonstration software consists of the OneWireViewer (a Java™ program). For 32-bit and 64-bit Windows® operating systems, the OneWireViewer comes as part of the 1-Wire drivers install package. For other operating systems, refer to the online version of the OneWireViewer.

**EPROM devices, such as the DS2502 and DS2506, require a different adapter (DS9097U-E25) to perform an EPROM write. This adapter can be purchased separately and requires a +12V power supply and a 25-pin to 9-pin serial port adapter (refer to the adapter's data sheet for details). 1-Wire EPROM devices are available for sampling (up to a quantity of two).*

Features

- **Proven PCB Layout**
- **Complete Evaluation System**
- **Convenient On-Board Test Points**
- **Fully Assembled and Tested**
- **Easy Setup with USB Adapter**
- **Free Download of 1-Wire Drivers and OneWireViewer Demonstration Software**
- **Compatible with Other 1-Wire Devices Purchased Separately (DS2411, DS2432, DS28E01, DS2502, DS2505, DS2405, and DS2406)**

Ordering Information

PART	TYPE
DS9090K#	EV kit

#Denotes a RoHS-compliant device that may include lead(Pb) that is exempt under the RoHS requirements.

Contents List

QTY	DESCRIPTION
1	64-bit silicon serial number (3 TO92) Maxim DS2401+
1	1-Wire, dual-addressable switch plus 1Kb EPROM memory (6 TSOC) Maxim DS2406P+
1	1-Wire dual-channel addressable switch (6 TSOC) Maxim DS2413P+
1	20Kb 1-Wire EEPROM (3 TO92) Maxim DS28EC20+
1	1024-bit 1-Wire EEPROM (3 TO92) Maxim DS2431+
1	4Kb 1-Wire EEPROM (3 PR-35) Maxim DS2433+
1	1-Wire USB adapter with RJ11 Maxim DS9490R#
11	2-pin shunts for jumpering
1	RJ11 male to RJ11 male cable, 7ft
1	4096-bit addressable 1-Wire EEPROM with PIO (on EV kit) Maxim DS28E04S-100+
1	EV Kit PCB: 1-Wire Device Evaluation Board with components

Component List

DESIGNATION	QTY	DESCRIPTION
J1	1	TO92, PR35 header Mill-Max 801-93-036-10-012, 3-pin segment of 36-pin socket strip (or RoHS equivalent)
J2	1	2-pin jumper post
J3	1	6-pin header
J4	1	5-pin header
J5	1	2-pin jumper post
JB1	1	22-pin dual-row header post
R1	1	RoHS-compliant surface-mount resistor (1206)
RJ1	1	6-pin RJ11 right-angle AMP 520250-3 socket (or RoHS-compliant equivalent) CONN, RJ11 JACK PCB-RA 6POS 6CON
U1	1	8-pin hot-swap socket ENPLAS TESCO OTS-8(16)-1.27-03 TSSOP8 Socket (87-77008-005)
U2	1	4096-Bit Addressable 1-Wire EEPROM with PIO Maxim DS28E04S-100 chip
—	1	PCB: 1-Wire Device Evaluation Board

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Java is a trademark of Sun Microsystems.
Windows is a registered trademark of Microsoft Corp.

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maximintegrated.com.

Rev 4; 8/09

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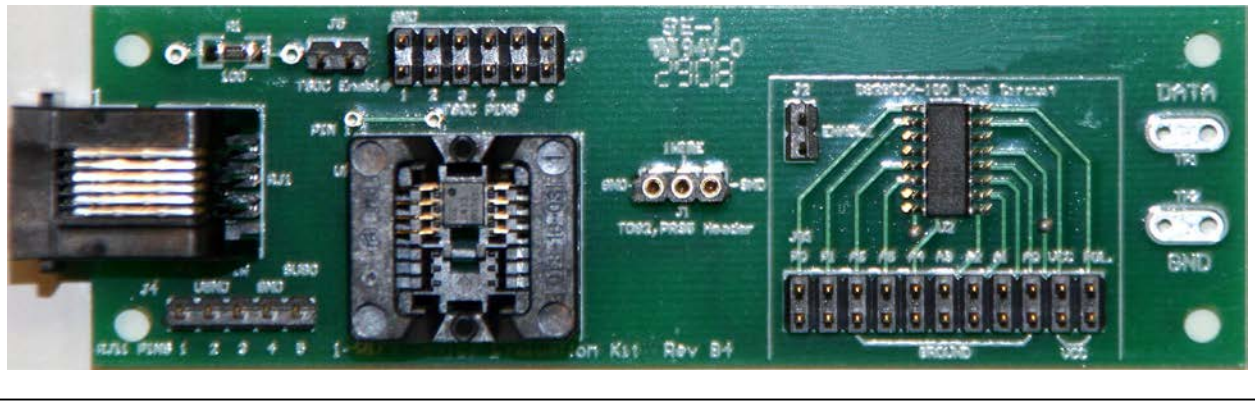


Figure 1. DS9090 EV Kit Board Layout

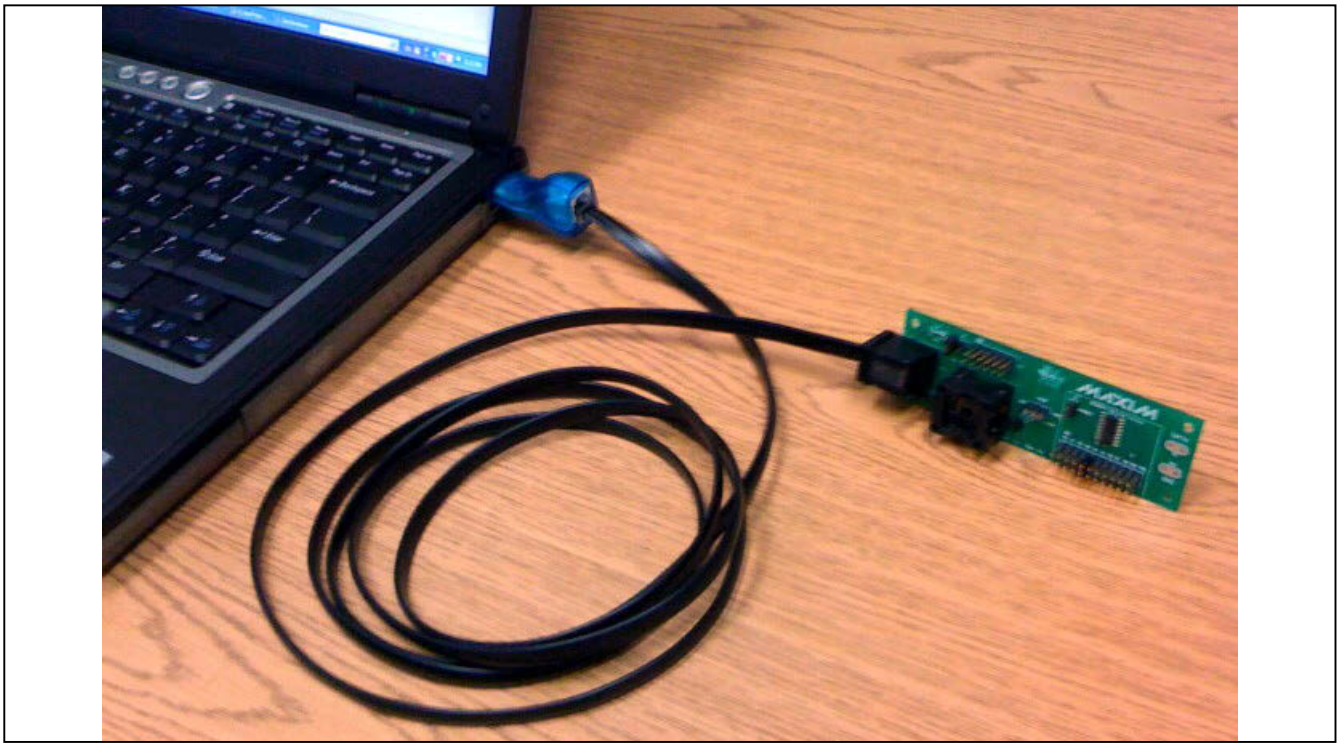


Figure 2. Typical Setup

Hardware Setup

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.

Required Equipment

- IBM-compatible PC running Windows Vista®, Windows XP® SP2, Windows 2003, or Windows 2008
- Spare USB port on the PC

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Figure 3. TO92/PR35 Package Insertion

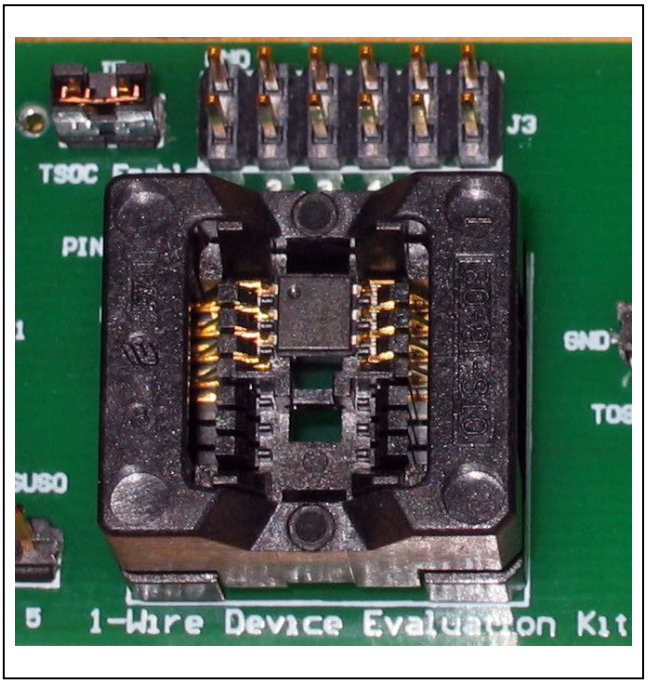


Figure 4. TSOC Package Insertion

Hardware Installation

The DS9090 EV kit comes standard with a USB-to-1-Wire adapter (DS9490R). It is advisable to connect the USB end of the adapter to a free USB port after the installation of the software drivers is completed (see the *Software Installation* section). Connect the evaluation board to the PC with the supplied RJ11-to-RJ11 cable. One end of the cable should be plugged into the evaluation board and the other end into the DS9490R.

Insert the 1-Wire chip of interest into one of the evaluation board sockets. See Figures 3 and 4 showing proper chip insertion/orientation. Keep in mind that if writing to DS250_ EPROM devices is desired, an alternate 1-Wire adapter (DS9097U-E25) is necessary. It is available for purchase separately from this kit. To program DS250_ EPROM devices with the DS9097U-E25, a +12V DC power adapter is required (available at most electronic supply stores). This is plugged into the power jack on the DS9097U-E25 adapter. Refer to the DS9097U-E25 data sheet for power-supply specifications, recommended power-supply models, and the polarity requirements of the 2.1mm power jack. Note that non-EPROM devices cannot be inserted in the evaluation board when programming EPROM devices. **Caution:** The +12V programming pulse that is seen on the 1-Wire bus during programming of EPROM devices damages non-EPROM devices. Remove any non-EPROM device from the evaluation board before attempting an EPROM write operation. This includes removing the J2 “Enable” jumper to isolate the DS28E04 from the +12V programming pulse.

Enable Pins and Header Rows

Enable pins and header rows are located on the board in various locations. Two locations are specified as enable pins and are jumperable. The first one (J5) enables the TSOC socket so that the 1-Wire chip residing in the socket can be communicated with through the 1-Wire bus. The second one (J2) is similar. J2 jumpers the DS28E04-100 evaluation circuit onto the 1-Wire bus. Figure 5 shows the J2 enable jumper in the DS28E04-100 evaluation circuit.

Header rows have also been placed on the DS9090 evaluation board, which allow other devices to be manually connected. Location J3 is one such header row. It is located just above the TSOC socket and provides electrical connections for the TSOC socket (pins 1–6). There is also an adjacent ground row for jumpering any TSOC pins to ground. Some ports such as the DS28EC20 (pin 3) or DS2413 (pins 1, 5) require additional pins to be grounded through a jumper when in a TSOC package. Location J4 provides five connections for the RJ11

socket. Pin 1 provides +5V coming directly off the USB port through a current-limiting resistor. Pin 2 is the USB ground, pin 3 is the 1-Wire IO pin, pin 4 is the board ground, and pin 5 is the SUSO ("suspend") pin for the DS9490R (displays when the DS9490R is in a "sleep" state).

DS28E04-100 Evaluation Circuit

A section of the evaluation board is dedicated to demonstrating the DS28E04-100 1-Wire chip. Before experimenting with the DS28E04-100, the circuit's enable pins (J2) must be jumpered (see Figure 5). This jumpers the DS28E04-100 onto the 1-Wire bus, allowing the 1-Wire software to communicate with the device. Note the row of header pins at the bottom of the circuit, several of which can be jumpered. The pins labeled A0–A6 correspond to the seven address inputs that can be jumpered to modify a portion of the 1-Wire network address of the device. Other pins available are V_{CC}, POL, and the PIO pins (P0 and P1). V_{CC} can be jumpered in from the board when needed. The state of the POL pin determines how the PIO channels power up. For example, if the chip has to power up with all PIO channels off, the POL pin must be connected to a logic 1. The PIO pins (P0 and P1) are also brought out to the header pins.

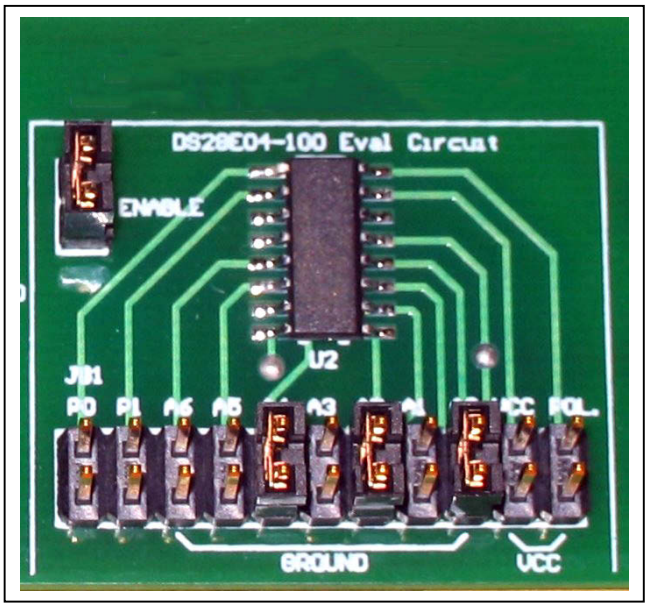


Figure 5. DS28E04-100 Evaluation Circuit

Software Installation

Install the latest 1-Wire drivers package available at **www.ibutton.com/software/tmex/**. These drivers require a 32-bit or 64-bit Windows platform, specifically Windows XP (SP2), Vista, or Windows 2008 or 2003. Remove the DS9490R from the USB port before starting the installation. Only after the installation program is completed should the DS9490R be inserted. Once inserted, wait for the operating system to complete the plug-and-play process. For Windows 2003 and XP (SP2), the OS prompts about installing the DS9490R device with the **Add Hardware** wizard before continuing. Newer operating systems complete the plug-and-play process without the wizard. During the installation process, the drivers are set up to point to the USB adapter as the default port type and port 1 (USB1) as the default port number. The default port type and number settings can be changed at any time after installation by running the **Default 1-Wire Net** program that is installed with the drivers. To do so, simply click on **Start** → **Programs** → **1-Wire Drivers xXX** (xXX stands for the OS architecture, either x86 or x64). Then click on the icon labeled **Default 1-Wire Net**. If problems are encountered during installation, refer to *White Paper 6: 1-Wire Drivers Installation Guide for Windows*, specifically the "Appendix A: 1-Wire USB Adapter (DS9490) Installation Help" section.

Next, run the **OneWireViewer** Java demo. Click on **Start** → **Programs** → **1-Wire Drivers xXX**. Then click on the **OneWireViewer** icon. This runs the OneWireViewer. If the OneWireViewer cannot find a suitable Java Runtime Environment (JRE), it prompts the user with a message to download the latest one from either www.java.com or sun.java.net. Once the OneWireViewer is running, the 64-bit ROM ID values (i.e., the 1-Wire network addresses) of all 1-Wire chips inserted into the evaluation board are displayed. Clicking on the chip's address selects the chip and starts communicating with it. The OneWireViewer then makes other tabs available that contain functionality to exercise the chip (i.e., read and write data, files, exercise PIO pins, etc.).

It is also possible to run the OneWireViewer on OS platforms other than Windows, but it could require special setup and/or additional software installation. Refer to the OneWireViewer website for more information at **www.maximintegrated.com/onewireviewer**.

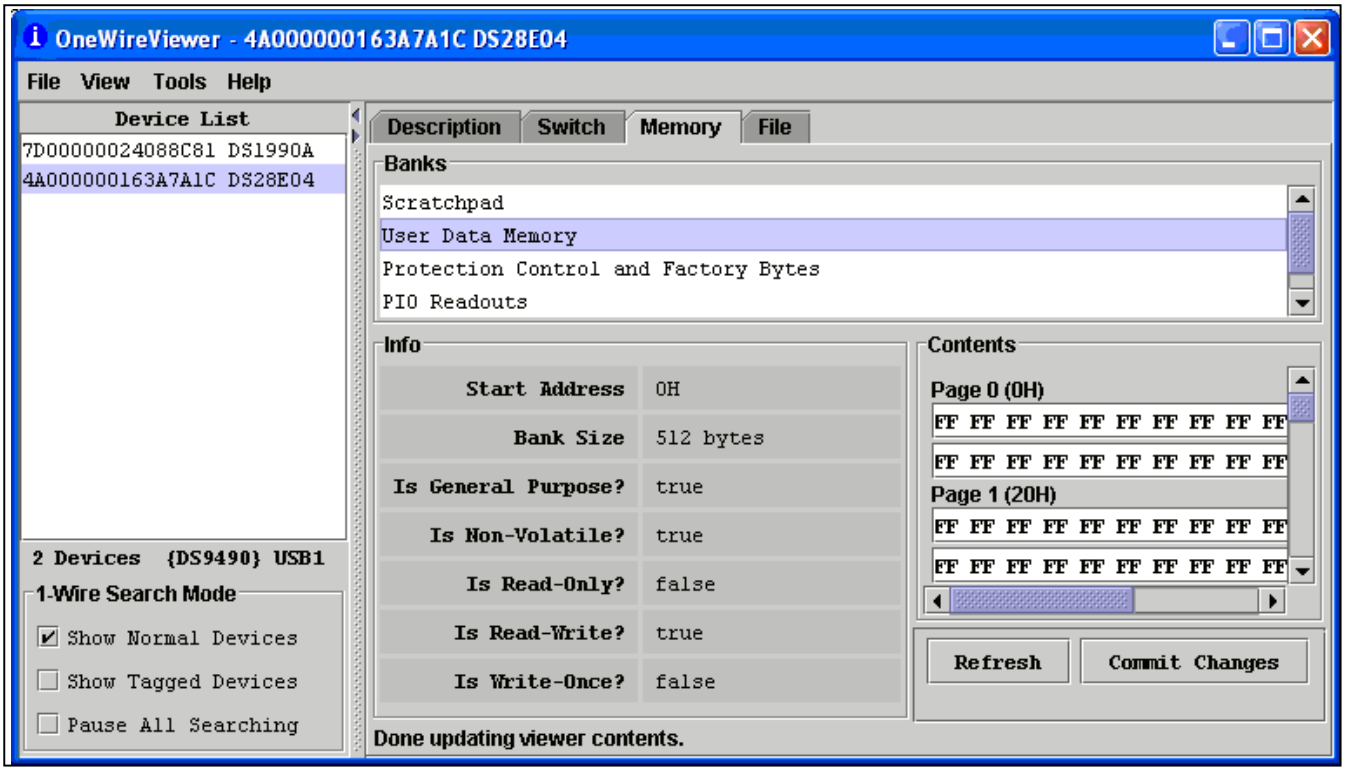


Figure 6. OneWireViewer Screen Example

DS9090 EV Kit Operation

Select the 1-Wire device to evaluate and insert it into the appropriate socket, ensuring it is properly oriented. Jumper the appropriate enable pins for the TSOC socket (J5) and/or the DS28E04-100 evaluation circuit (J2). See the *Hardware Installation* section for help. Finally, connect the evaluation board to the PC.

Run the **OneWireViewer**. If any difficulty is encountered, see the *Troubleshooting Guide* section. Another helpful resource is Application Note 3358: *OneWireViewer User's Guide*.

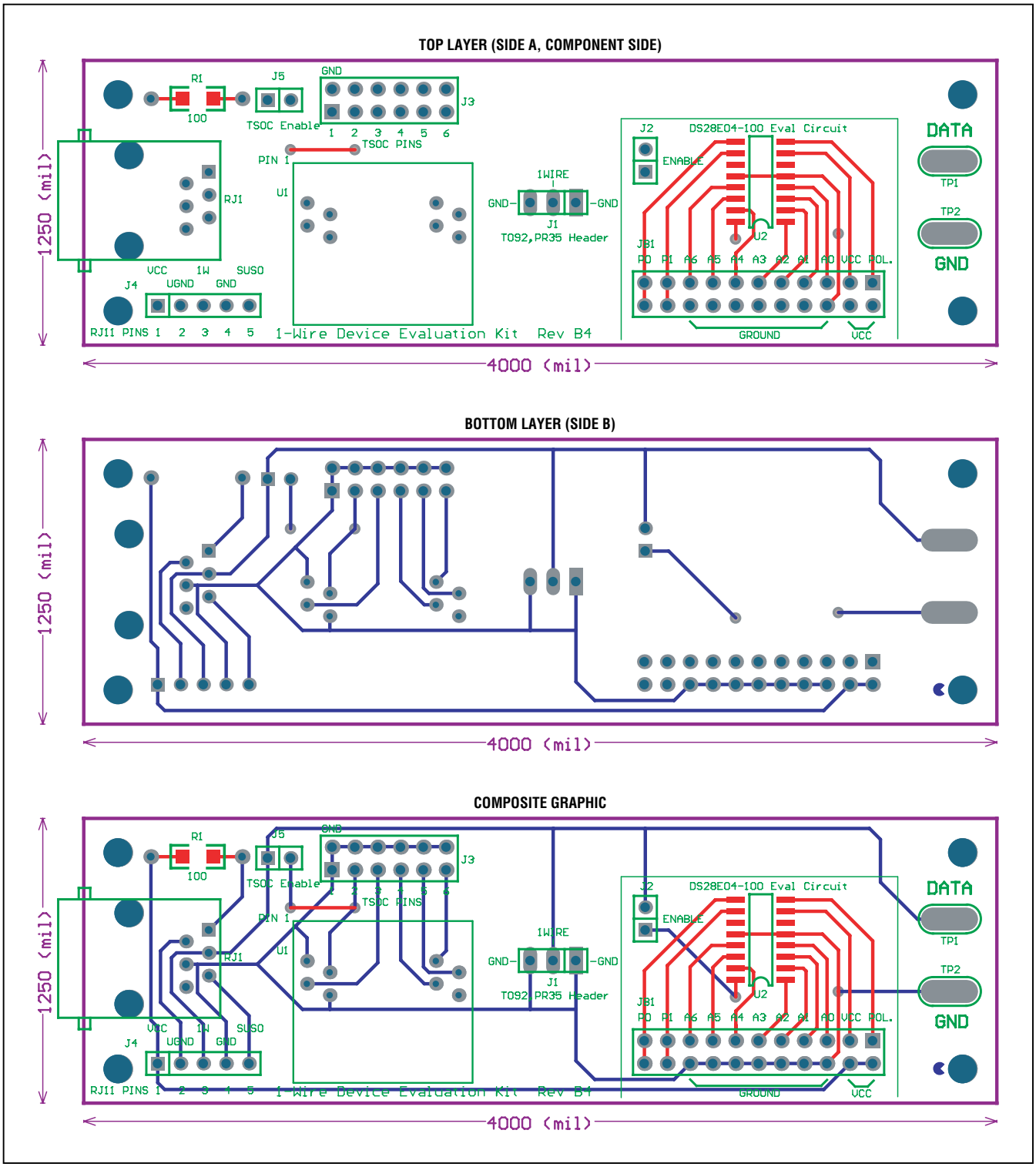
The **OneWireViewer** presents a **Device List** window located on the left-hand side of the main screen. It displays a list of the different 1-Wire devices found connected to the DS9490R. The 1-Wire device type inserted into the socket or header of the evaluation board should be shown in the **Device List** window, along with the 64-bit ROM ID lasered into the device. Figure 6 shows the DS28E04-100 in the **Device List** window, along with its 64-bit ROM ID value of **4A000000163A7A1C**. From the **Device List** window select the part by clicking on it.

Once the 1-Wire device has been selected, the right-hand side of the main **OneWireViewer** screen is populated with different tabs. There are at least three tabs for each device contained in the DS9090 EV kit: **Description**, **Memory**, and **File**. A fourth tab labeled **Switch** is also available on those parts containing switches. Clicking on the **Memory** tab brings up the **Memory Viewer** as shown in Figure 6. The user has the choice of reading/writing any of the memory banks listed in the **Banks** section of the **Memory Viewer**. When done editing the raw page (entering in a hexadecimal number for each byte), click the **Commit Changes** button. Clicking **Refresh** rereads the contents of the 1-Wire memory. The **File** tab allows writing files to the device's memory. To do this, the user needs to first **Format the Device**, then **Create/Read/Write/Delete** files and directories. The **Switch** tab allows reading and toggling of the PIO pin states and clearing of activity latches. Refer to Application Note 3358 for further instructions on how to use the many features of the OneWireViewer.

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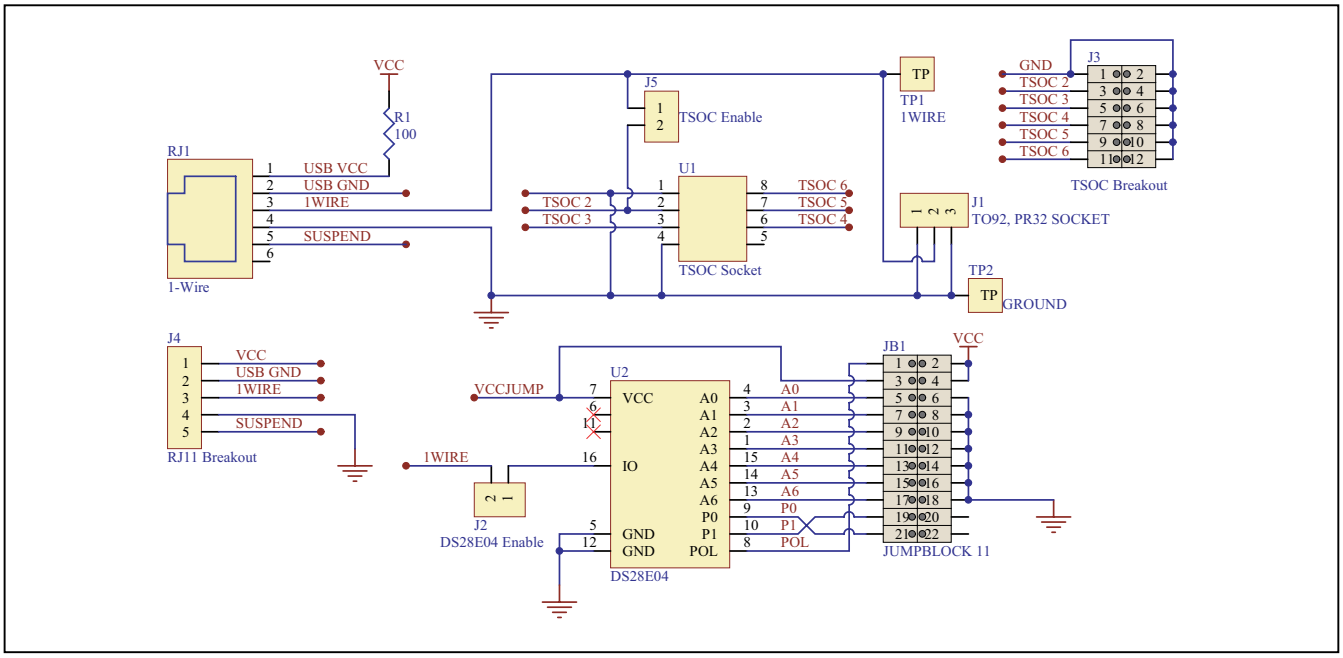
Evaluation Board Layout



S9090 Evaluation Kit

Evaluates: 1-Wire EEPROM, EPROM, and ROM Devices

Evaluation Board Schematic



Software Development Resources

Software Development Tools and Software Development Kits: www.maximintegrated.com/1-Wiresoftware

Product Data Sheets and Application Notes: www.maximintegrated.com/1-Wire

Online Support: www.maximintegrated.com/support

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Troubleshooting Guide

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Operating system prompt giving installation error	The 1-Wire adapter's device driver did not get installed properly	Refer to *White Paper 6: 1-Wire Drivers Installation Guide for Windows*, specifically the "Appendix A: 1-Wire USB Adapter (DS9490) Installation Help" section.
Cannot communicate through 1-Wire adapter	The PC port hardware is not functioning properly	Does the port work with other applications, such as a keyboard or mouse? If not, contact the motherboard vendor for BIOS updates or new drivers.
	The 1-Wire adapter is not functioning	Try the 1-Wire adapter on another PC. If the problem persists, use a different 1-Wire adapter or order a new adapter of this type.
	The adapter type selected is not what is connected	Run the **Default 1-Wire Net** application and select the correct adapter type and/or port number
Message Figure 7	The 1-Wire adapter does not write to EPROM devices	Use the DS9097U-E25 1-Wire adapter with a regulated +12V power supply (purchased separately). Refer to the data sheet for power-supply specifications.
Software finds 1-Wire adapter, but does not read a 1-Wire device	Possible broken wire in the RJ11 cable or the USB connector of the DS9490R	Check the cable for broken wires

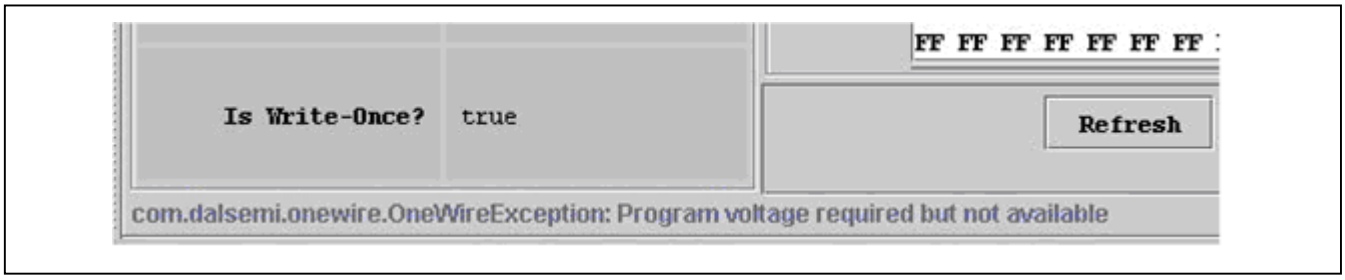


Figure 7. Error When Trying to Program an EPROM Device in OneWireViewer

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/05	Initial release.	—
1	9/06	• Changed out the serial port adapter for the DS9490R USB 1-Wire adapter. • Removed the DS2430A in favor of the DS2431. • Removed the DS250_ EPROM 1-Wire memories from the kit. The new 1-Wire adapter is capable of reading the EPROM memories, but unable to write to them. See note above on how to sample the EPROMs and how to purchase the DS9097U-E25 1-Wire adapter (recommended to perform 1-Wire EPROM writes). • Added TSOC socket breakout header pins, TSOC socket enable pins, RJ11 breakout header pins (including V_{CC} and suspend from the PC's USB port), DS28E04-100 evaluation circuit, shunts for jumpering, and several additional 1-Wire devices: DS2405, DS2406, DS2413, DS2423.	3
2	4/08	• Changed silkscreen artwork for company name. It now shows "Maxim" and shows "B3" as the revision. • Removed DS2432 from kit contents. • Removed DS2423 from kit contents. It is not recommended for new designs. • Added DS28EC20 to kit contents. • Removed legacy Microsoft operating systems from list of supported operating systems. • Revised the *Software Installation* section to include mention of 64-bit Microsoft operating systems. • Revised the *Troubleshooting Guide* section to show the latest software drivers.	1–7
3	6/08	• Changed Revision Number to "B4" • Removed the obsolete DS2405 part • Updated the text for the J3 connector • Updated the figures for PCB Bottom, PCB Top, and PCB Composite • Updated Schematic B • Updated EV kit board layout, evaluation circuit, TO92 package insertion, and TSOC package insertion	1–7
4	8/09	Created newer template-styled data sheet.	All

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