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GENERAL DESCRIPTION

The DS9090K provides the HW and SW necessary to evaluate and operate 1-Wire[®] products in an easy-to-use PC environment. All 1-Wire EEPROM, EPROM, and ROM devices are supported, along with 1-Wire switches and counter devices. With the proper hardware (*see note below), memory contents can be read or written, switches toggled, and counters counted for device evaluation purposes or to support end product development activity. Kit operation requires a host PC and the SW defaults to a Win32 platform (Windows[®] XP, 2000, ME, 98SE). Other operating systems are supported through a Java[™] API, see details under *Software Installation*.

EVALUATION KIT CONTENTS

- 1 pc. 1-Wire Device evaluation board
- 1 pc. RJ-11 male to RJ-11 male cable, 7ft
- 1 pc. DS9490R 1-Wire USB adapter w/RJ-11
- 1 pc. DS2401 64-Bit Silicon Serial Number, TO-92 package
- 1 pc. DS2405P 1-Wire Addressable Switch, TSOC package
- 1 pc. DS2406P 1-Wire Dual Addressable Switch Plus 1kb EPROM Memory, TSOC package
- 1 pc. DS2413P 1-Wire Dual Channel Addressable Switch, TSOC package
- 1 pc. DS2423P 4k-bit 1-Wire RAM with Counter, TSOC package
- 1 pc. DS2431 1024-Bit 1-Wire EEPROM, TO-92 package
- 1 pc. DS2432P 1k-Bit Protected 1-Wire EEPROM with SHA-1 Secure Authentication TSOC package
- 1 pc. DS2433 4k-Bit 1-Wire EEPROM, PR-35 package
- 1 pc. DS28E04S-100 4096-Bit Addressable 1-Wire EEPROM with PIO (on eval board)
- 1 pc. Package of 11 2-pin shunts for jumpering

**EPROM devices, such as the DS2502, DS2506, etc., will need a different adapter, the 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 (see adapter's datasheet for details). The EPROM devices are available to be sampled (up to quantity 2).*



ORDERING INFORMATION

Part Number: DS9090K

EQUIPMENT NEEDED

1. IBM compatible PC running Windows XP, 2000, ME, or 98SE
2. Spare USB port on the PC.

TYPICAL SETUP



*1-Wire is a registered trademark of Dallas Semiconductor.
Windows is a registered trademark of Microsoft Corp.
Java is a trademark of Sun Microsystems.*

Note: Some revisions of this device may incorporate deviations from published specifications known as errata. Multiple revisions of any device may be simultaneously available through various sales channels. For information about device errata, click here: www.maxim-ic.com/errata.

SETUP AND INSTALLATION

Hardware Installation

The DS9090K 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 when prompted by the installation of the software drivers (see *Software Installation* below). Connect the evaluation board to the PC with the supplied RJ-11 to RJ-11 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 pictures below showing proper chip insertion/orientation. Keep in mind that if writing to DS250x EPROM devices is desired, an alternate 1-Wire adapter, the DS9097U-E25, is necessary. It is available for purchase separately from this kit (see note above). To program DS250x EPROM devices with the DS9097U-E25, a 12V DC power adapter is required (available at most electronic supply stores). This is plugged into the 2.1mm power jack on the DS9097U-E25 adapter. See the DS9097U-E25's 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. **WARNING:** The 12-volt programming pulse that is seen on the 1-Wire bus during programming of EPROM devices will damage non-EPROM devices. Please remember to un-jumper the DS28E04's "enable" pins before writing to an EPROM device and remove any other non-EPROM device from the evaluation board.

TO-92/PR-35 Package Insertion



TSOC Package Insertion



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 on the 1-Wire bus. The second one, J2, is similar. J2 jumpers the DS28E04-100 eval circuit onto the 1-Wire bus. See the J2 enable jumper below in the DS28E04-100 eval circuit.

Header rows have also been placed on the DS9090K evaluation board to provide experimenters places to connect other devices to the board. 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 through 6). Location J4 provides 5 connections for the RJ-11 socket. Pin 1 provides 5V coming directly off of the USB port through a current limiting resistor. Pin 2 is the USB ground, pin 3 is the 1-Wire I/O pin, pin 4 is the board ground, and pin 5 is SUSO (or, "suspend") pin for the DS9490R (shows when the DS9490R is in a "sleep" state).

DS28E04-100 Eval 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 picture below). This jumpers the DS28E04-100 onto the 1-Wire bus, thus allowing the 1-Wire software to communicate with the device. Please note the row of header pins at the bottom of the circuit, several of which are jumperable. The pins labeled A0–A6 correspond to the 7 address input of the chip are jumperable and allow the experimenter to modify a portion of the 1-Wire network address of the part. Other pins available are V_{CC} , POL, and the PIO pins, P0 and P1. V_{CC} can be jumpered in from the board. The state of the POL pin determines how the PIO channels power up. For examples, 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.



Software Installation

Install the latest 1-Wire Drivers package (<http://www.ibutton.com/software/tmex/>). These drivers require a Win32 platform such as Windows XP, 2000, ME, or 98SE. Please remove the DS9490R from the USB port before starting the installation. The installation program will prompt the user to insert the DS9490R when it is appropriate to do so. Once inserted, please wait for the operating system to prompt you about installing the DS9490R device with the "Add Hardware" wizard before continuing. The last step of the install is to select a default 1-Wire network adapter. Choose the DS9490 tab and the USB port number correlating to that being used (usually 1). This also can be chosen after installation by running the "Default 1-Wire Net" program that gets installed with the drivers. If problems are encountered during installation, please see White Paper 6: "1-Wire Drivers Installation Guide for Windows". Specifically, see "APPENDIX A: 1-WIRE USB ADAPTER (DS9490) INSTALLATION HELP." The white paper can be downloaded here: http://www.maxim-ic.com/appnotes.cfm/appnote_number/1740.

Download and install a small patch to the 1-Wire Drivers. It patches Version 4.00 of the 1-Wire Drivers to Version 4.01. When prompted, click the "Repair" button. This patch enables DS28E04-100 functionality. It can be downloaded here:

http://files.dalsemi.com/auto_id/licensed/install_1_wire_drivers_patch11182005.msp.

Next, install the OneWireViewer Java demo. Click on "Start->Programs->1-Wire Drivers". Then click on the OneWireViewer icon. This will bring up a webpage with information on how to install the OneWireViewer.

After installing the OneWireViewer, please run it. Once running, the 64-bit ROM ID values of all 1-Wire chips inserted into the eval board should be displayed on your PC in the Viewer. Select the address of the desired chip.

The OneWireViewer will then make other tabs available that contain functionality to exercise the chip (i.e., read and write data, files, exercise PIO pins, etc.).

KIT OPERATION

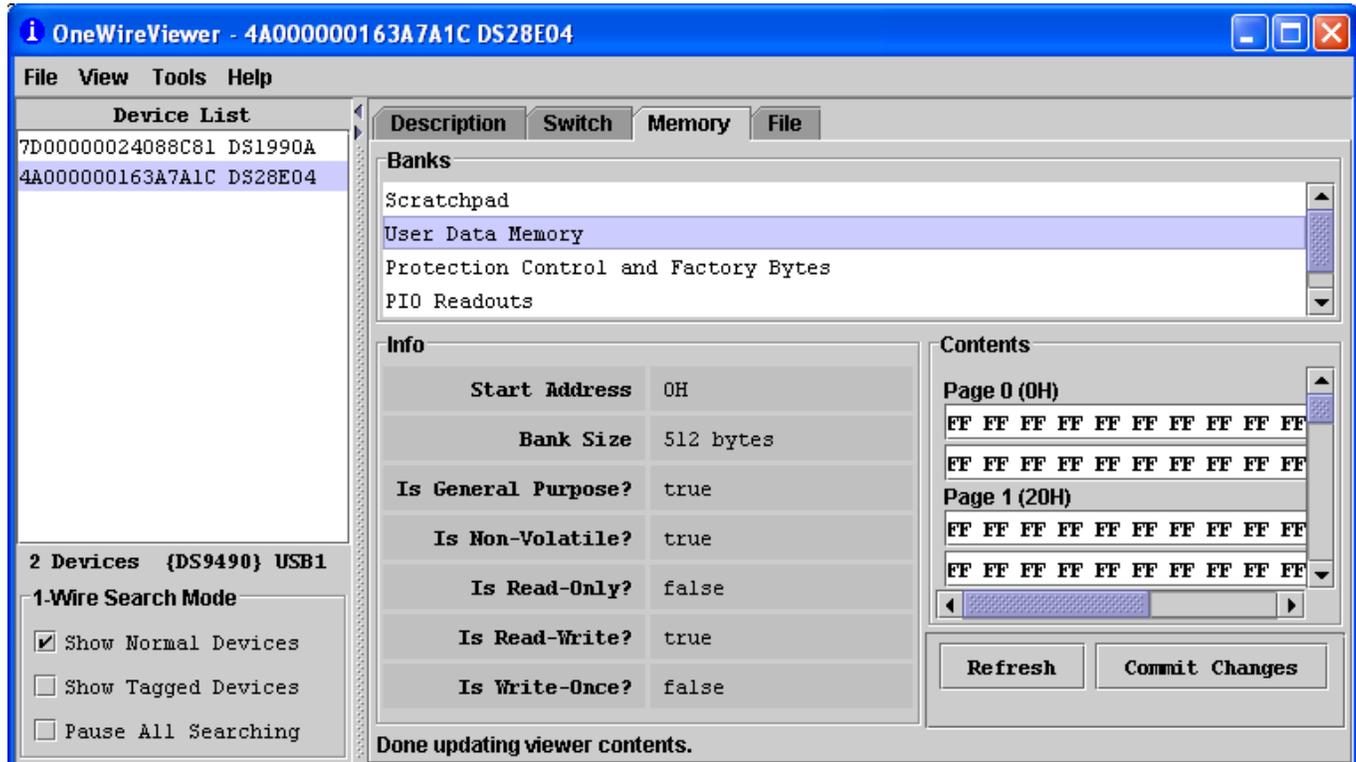
Connect the evaluation board to the PC, making sure it contains the 1-Wire memory device of choice properly oriented and inserted. Make sure the appropriate "enable" pins have been jumpered for the TSOC and/or the DS28E04-100 eval circuit. See "Hardware Installation" above for help.

Run the OneWireViewer. If you have any difficulty, see the "Troubleshooting Guide" at the bottom of this page. Another helpful resource is the OneWireViewer User's Guide. It can be downloaded from the following link: http://www.maxim-ic.com/appnotes.cfm/appnote_number/3358.

The OneWireViewer contains a "Device List" window located on the left-hand side of the main screen. It shows a list of the different 1-Wire devices it finds connected to the DS9490R. The 1-Wire device type inserted into the socket or header of the eval board should be shown in "Device List" window along with the 64-bit ROM ID lasered into the device. The screenshot below 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.

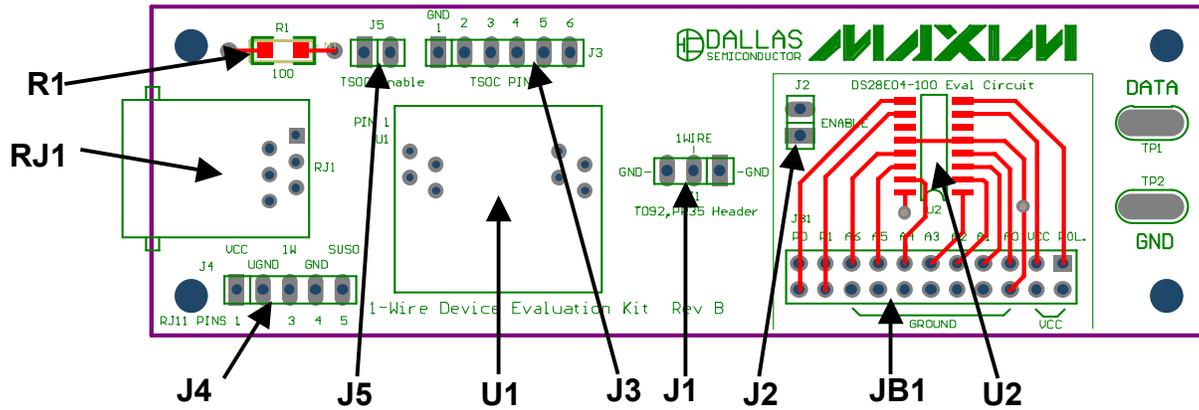
Exercise the 1-Wire device. Once the 1-Wire device has been selected, the right-hand side of the main OneWireViewer screen will be populated with different tabs. There will be at least three tabs for each device contained in the DS9090K kit: Description, Memory, and File. A fourth tab labeled "Switch" will also be available on those parts containing switches. Click on the "Memory" tab. It will bring up the "Memory Viewer" shown in the screenshot below. You will have 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 on "Refresh" will re-read the contents of the 1-Wire memory. For "Files", you can write files to the device's memory. To do this, you will need to "Format the Device" first, and then you can create/read/write/delete files and directories. As to the 1-Wire switch, you will be able to toggle a switch's state, sense its state, and clear its activity. If you need further instructions on how to use the many features of the OneWireViewer, please download the above-mentioned OneWireViewer User's Guide.

OneWireViewer Screen Example

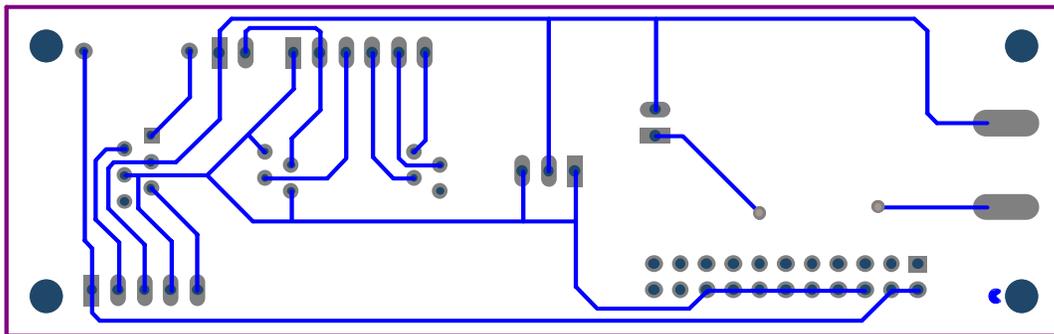


EVALUATION BOARD LAYOUT

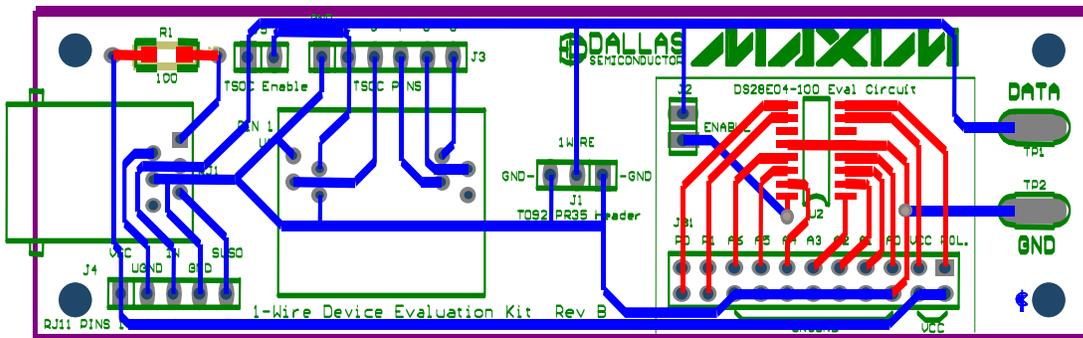
Top Layer (Side A, component side)



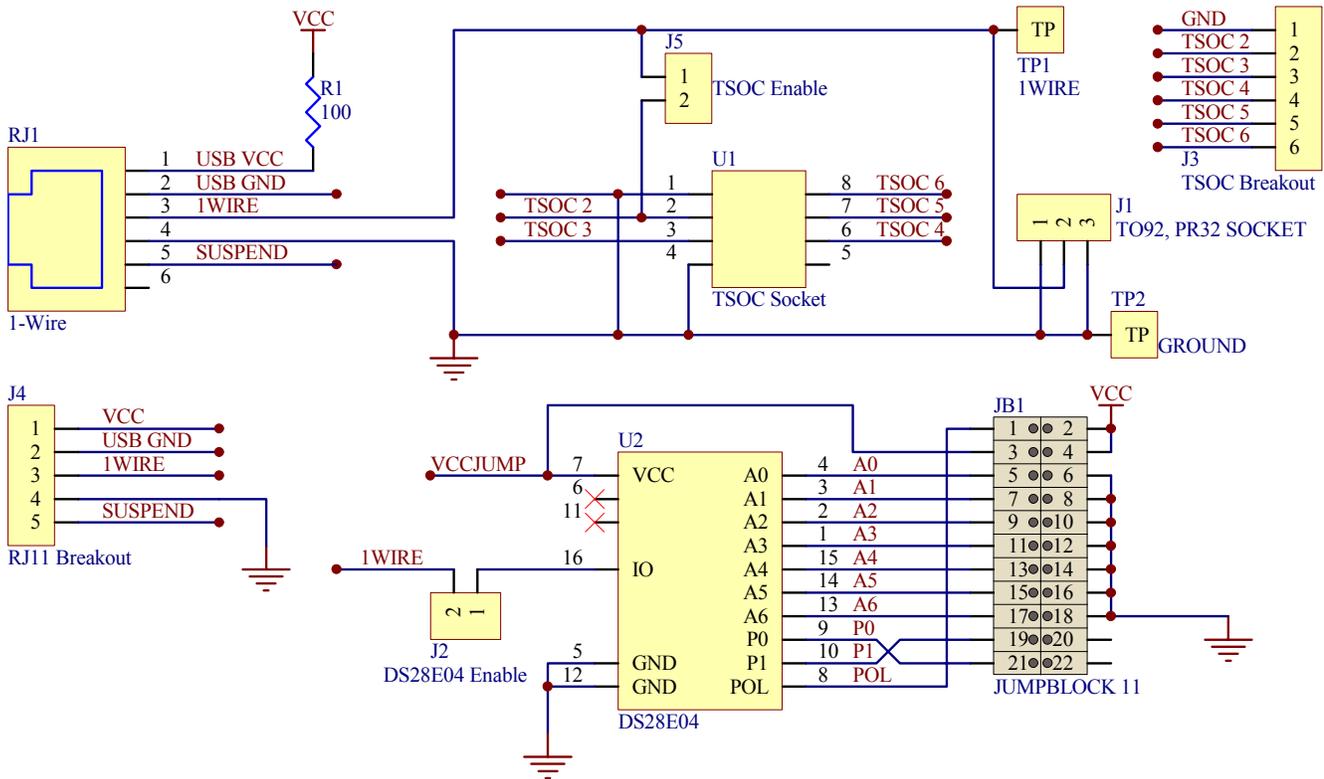
Bottom layer (Side B)



Composite Graphic



EVALUATION BOARD SCHEMATIC



SOFTWARE DEVELOPMENT RESOURCES

Software Development Tools & SDK's: <http://www.maxim-ic.com/products/ibutton/software/resources.cfm>

Product Data Sheets: <http://para.maxim-ic.com/1Wire.htm>

Application Notes: http://www.maxim-ic.com/appnotes10.cfm/ac_pk/1

On-line Discussion Forum: <http://discuss.dalsemi.com>

TROUBLESHOOTING GUIDE

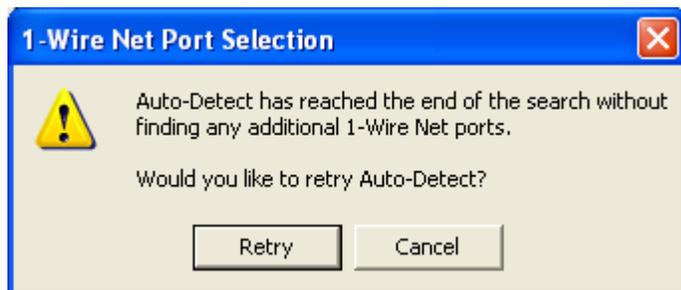
SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Message Figure A	Cause 1: The 1-Wire adapter's device driver did not get installed properly.	Please see White Paper 6 : "1-Wire Drivers Installation Guide for Windows". For the DS9490R, see "APPENDIX A: 1-WIRE USB ADAPTER (DS9490) INSTALLATION HELP."
(same as above)	Cause 2: The PC port hardware is not functioning properly.	Does the port work with other applications, such as a keyboard or mouse? If not, please contact the motherboard vendor for bios updates or new drivers.
(same as above)	Cause 3: 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.
(same as above)	Cause 4: The adapter type selected is not what is connected.	Try using the 'Auto-detect' feature of the Default 1-Wire Net application.
Message Figure B	See Cause 1 to 3 above	See above.
Message Figure C	Cause 1: 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). See Data Sheet for power-supply specifications.
Software finds 1-Wire adapter, but won't read a 1-Wire device.	A broken wire in the RJ-11 cable or the USB connector of the DS9490R.	Check the cable for broken wires.

ERRORS DURING INSTALLATION OR FROM 'DEFAULT 1-WIRE NET'

Figure A



Figure B



ERROR WHEN TRYING TO PROGRAM AN EPROM DEVICE IN ONEWIREVIEWER

Figure C



REVISION HISTORY

- Revision A: Original evaluation kit titled "1-Wire Memory Evaluation Kit": 03/19/2005
- Revision B: Upgraded evaluation kit titled "1-Wire Device Evaluation Kit": 11/21/2005
 - Changed out the serial port adapter for the DS9490R USB 1-Wire adapter.
 - Removed the DS2430A in favor of the DS2431.
 - Removed the DS250x 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, RJ-11 breakout header pins (including V_{CC} and suspend from the PC's USB port), DS28E04-100 eval circuit, shunts for jumpering, and several additional 1-Wire devices: DS2405, DS2406, DS2413, and DS2423.