19-5907; Rev 0; 6/11

MAX14820 Evaluation Kit
Evaluates: MAX14820/MAX14821

General Description

The MAX14820 evaluation kit (EV kit) consists of a MAX14820 evaluation board and software. The EV kit is a fully assembled and tested circuit board that evaluates the MAX14820 and MAX14821 IO-Link® device transceivers.

The EV kit includes Windows XP®-, Windows Vista®-, and Windows® 7-compatible software that provides a graphical user interface (GUI) for exercising the features of the two devices. The EV kit is connected to a PC through a USB A-to-B cable.

Features

- **IO-Link-Compliant Device Transceiver**
- **IO and SPI™ Interface Terminals**
- **Windows XP-, Windows Vista-, and Windows 7-Compatible Software**
- **USB-PC Connection (Cable Included)**
- **Proven PCB Layout**
- **Fully Assembled and Tested**

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

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C3	3	470pF ±5%, 50V C0G ceramic capacitors (0805) Murata GRM2165C1H471J
C4	1	1µF ±10%, 50V X7R ceramic capacitor (0805) Murata GRM21BR71H105K
C6, C28, C29	3	0.1µF ±10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104K
C7, C8, C10, C15, C18–C24, C26	12	0.1µF ±10%, 16V X5R ceramic capacitors (0603) Murata GRM188R61C104K
C9	1	1µF ±10%, 16V X5R ceramic capacitor (0603) Murata GRM188R61C105K
C11	1	33nF ±10%, 16V X7R ceramic capacitor (0603) Murata GRM188R71C333K
C12, C13	2	10pF ±5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H100J
C14, C25	2	10µF ±20%, 6.3V X5R ceramic capacitors (0603) Murata GRM188R60J106M
C16, C17	2	22pF ±5%, 50V C0G ceramic capacitors (0603) Murata GRM1885C1H220J
D1–D6, D11, D12	8	Hyper-bright, low-current, green LEDs (0603)
D7, D8, D9	3	33V, 4A TVS diodes Semtech SDC36C.TCT
FB1	1	0.1Ω DCR, 30Ω at 100MHz ferrite bead Murata BLM18PG300SN1
J1	0	Not installed, 10-pin (2 x 5) JTAG header
J2	1	10-pin (2 x 5) dual-row header
J3	1	USB type-B right-angle receptacle
JU1, JU2, JU11, JU13–JU19, JU23	11	2-pin headers
JU4, JU5	2	3-pin headers
JU6–JU9	4	4-pin headers
JU10	1	20-pin (2 x 10) dual-row header
R1, R2	2	20kΩ ±5% resistors (0603)
R4, R6, R7, R10, R11, R17, R20	7	1.5kΩ ±5% resistors (0603)
R5, R14	2	10kΩ ±5% resistors (0603)

Component List (continued)

DESIGNATION	QTY	DESCRIPTION
R12	1	2.2kΩ ±5% resistor (0603)
R13	1	470Ω ±5% resistor (0603)
R15, R16	2	0Ω ±5% resistors (0603)
R18, R19	2	27Ω ±5% resistors (0603)
R23	1	1Ω ±1% resistor (2010)
TP1, TP6–TP10, TP22	7	Red multipurpose test points
TP2, TP11	2	Black multipurpose test points
TP3, TP4, TP5, TP12–TP21	13	Yellow multipurpose test points
U1	1	IO-Link device transceiver (24 TQFN-EP) Maxim MAX14820ETG+
U2	1	Microcontroller (68 QFN-EP) Maxim MAXQ2000-RAX+
U3	1	2.5V LDO regulator (5 SC70) Maxim MAX8511EXK25+
U4	1	USB-to-UART converter (32 LQFP)
U5	1	93C46 type (64k x 16) 3-wire EEPROM (8 SO)
U6	1	3.3V LDO regulator (5 SC70) Maxim MAX8511EXK33+
Y1	1	16MHz crystal Hong Kong X'tals SSM16000N1HK188F0-0
Y2	1	6MHz crystal Hong Kong X'tals SSL60000N1HK188F0-0
—	1	USB high-speed A-to-B cable
—	27	Shunts
—	1	PCB: MAX14820/14821 EVALUATION KIT

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Hong Kong X'tals Ltd.	852-35112388	www.hongkongcrystal.com
Murata Electronics North America, Inc.	770-436-1300	www.murata-northamerica.com
Semtech Corporation	805-498-2111	www.semtech.com

Note: *Indicate that you are using the MAX14820 or MAX14821 when contacting these component suppliers.*

MAX14820 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
14820.EXE	Application program
CDM20600.EXE	Installs the USB device driver
UNINST.EXE	Uninstalls the EV kit software
USB_Driver_Help_200.PDF	USB driver installation help file

Quick Start

Recommended Equipment

- MAX14820 EV kit (USB A-to-B cable included)
- User-supplied Windows XP, Windows Vista, or Windows 7 PC with a spare USB port
- 24V, 100mA DC power supply

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.

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation before exercising the full features of the device:

1) Visit **www.maxim-ic.com/evkitsoftware** to download the latest version of the EV kit software, 14820Rxx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.
2) Install the EV kit software and USB driver on your computer by running the INSTALL.EXE program inside the temporary folder. The program files are copied to your PC and icons are created in the Windows **Start | Programs** menu. During software installation, some versions of Windows may show a warning message indicating that this software is from an unknown publisher. This is not an error condition and it is safe to proceed with installation. Administrator privileges are required to install the USB device driver on Windows.
3) Verify that all the jumpers are in their default positions, as shown in Table 1.
4) Connect the 24V DC power supply on the VCC and GND connectors on the EV kit board.
5) Connect the USB cable from the PC to the EV kit board. A Windows message appears when connecting the EV kit board to the PC for the first time. Each version of Windows has a slightly different message. If you see a Windows message stating **ready to use**, then proceed to the next step. Otherwise, open the USB_Driver_Help_200.PDF document in the Windows **Start | Programs** menu to verify that the USB driver was installed successfully.
6) Start the EV kit software by opening its icon in the Windows **Start | Programs** menu. The EV kit software main window appears, as shown in Figure 1.
7) Verify that **Hardware: Connected** is displayed on the status bar at the bottom of the main window.
8) Press the **Read** or **Write** buttons on the GUI to access the device SPI registers.

Detailed Description of Software

The main window of the evaluation software (Figure 1) displays the SPI registers and the device pins that are connected to the on-board MAXQ2000 microcontroller. The user can send read or write SPI commands to the device, configure the logic levels of the device input pins, and read back the logic levels of the device output pins.

To read an SPI register or an output pin logic level, press the **Read** button.

To configure an SPI register or an input pin logic level, first click on the desired radio button(s), and then press the **Write** button.

The software also automatically monitors the presence of the wake-up pulse on the $\overline{WU}$ pin and displays the result on the GUI.

The user can also change the SPI clock speed by clicking on the desired **SPI Clock Speed** radio button.

Advanced User Interface

There are two methods for communicating with the device. The first is through the window shown in Figure 1. The second is through the **Advanced User Interface** window shown in Figure 2. The **Advanced User Interface** window becomes available by selecting the **Options | Interface (Advanced User)** menu item and allows execution of serial commands manually.

The **Advanced User Interface** window can also be used as a debug tool because it is capable of manually reading and writing to every register and logic pin of the device.

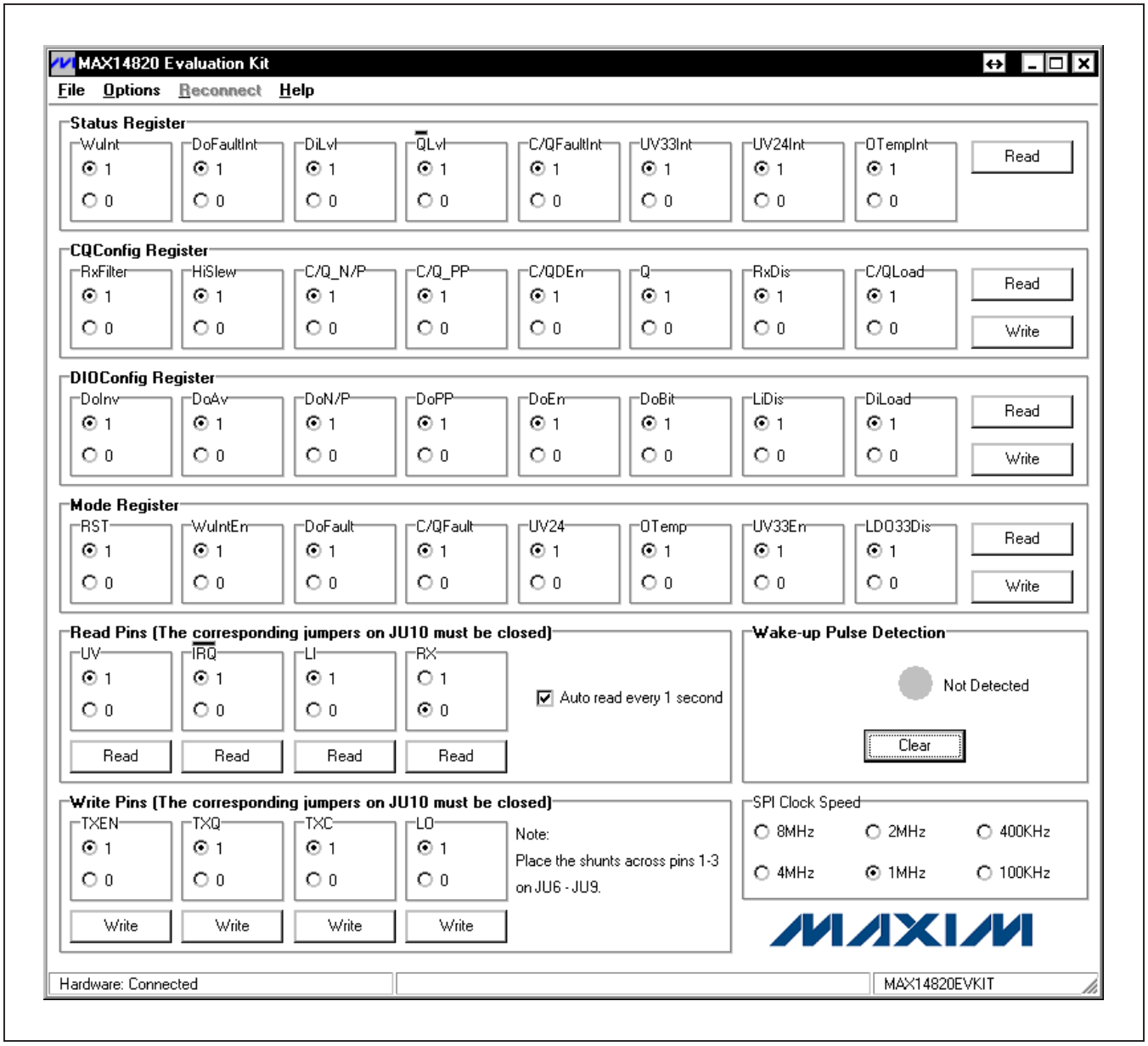

Figure 1. MAX14820 EV Kit Software Main Window

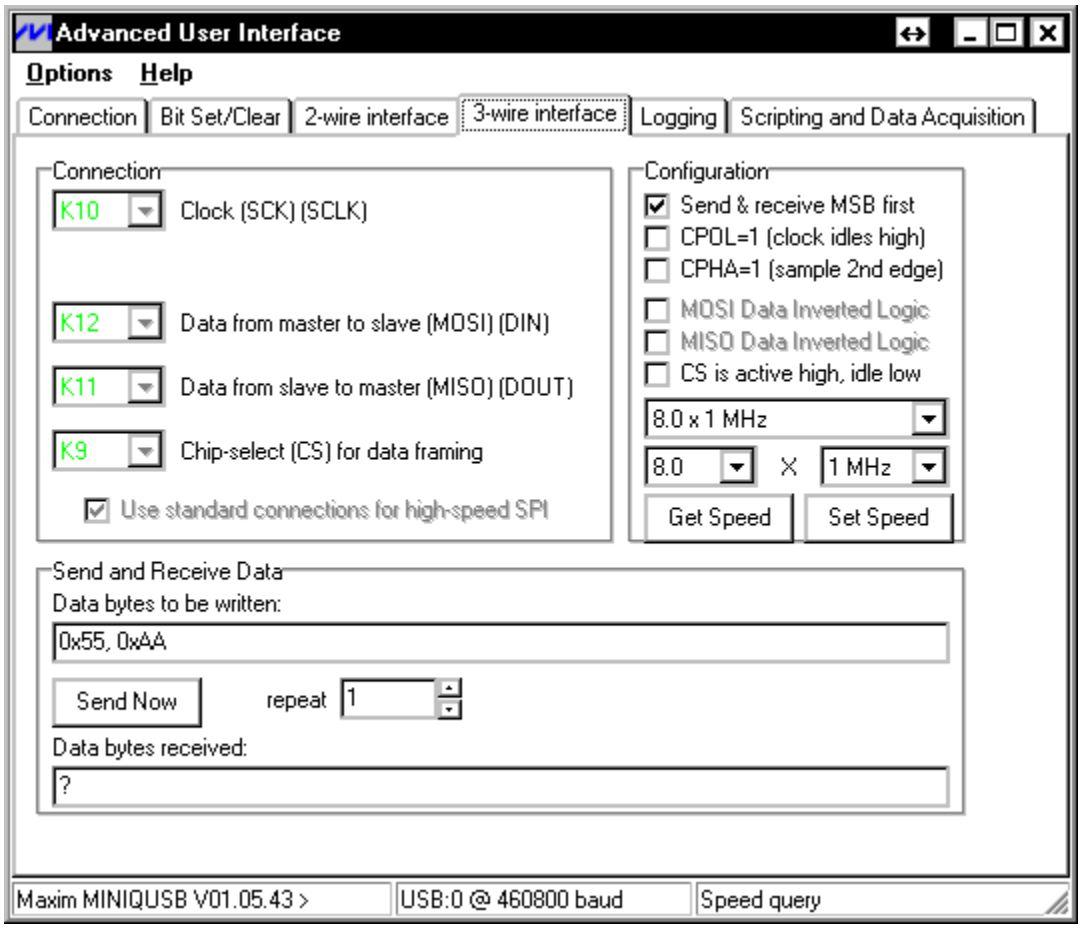

Figure 2. MAX14820 EV Kit Software Advanced User Interface Window

Detailed Description of Hardware

The MAX14820 EV kit provides a proven layout for the MAX14820/MAX14821 IO-Link device transceivers.

All the power-supply and regulator input and output pins are connected to convenient connectors for easy probing. The device logic input and output pins are also provided with convenient connectors for logic testing.

As an option, the user can also connect their own SPI controller to access the device registers.

The transceiver's C/Q, DO, and DI pins are protected by Semtech SDC36C TVS diodes.

See Table 1 for a description of all the EV kit jumper configurations.

Table 1. Jumper Descriptions

JUMPER	SHUNT POSITON	DESCRIPTION
JU1	Closed*	Enables the C/Q LED indicator
	Open	Disables the C/Q LED indicator
JU2	Closed*	Enables the DO LED indicator
	Open	Disables the DO LED indicator
JU4	1-2*	Device is powered by the internal LDO
	1-3	Device is powered by external 5V connected on TP8
JU5	1-2*	Device VL is connected to LDO33
	2-3	Device VL is connected to V5
JU6	1-3*	TXEN pin is controlled by the microcontroller through the GUI
	1-2	TXEN pin is connected to VL
	1-4	TXEN pin is connected to GND
JU7	1-3*	TXQ pin is controlled by the microcontroller through the GUI
	1-2	TXQ pin is connected to VL
	1-4	TXQ pin is connected to GND
JU8	1-3*	TXC pin is controlled by the microcontroller through the GUI
	1-2	TXC pin is connected to VL
	1-4	TXC pin is connected to GND
JU9	1-3*	LO pin is controlled by the microcontroller through the GUI
	1-2	LO pin is connected to VL
	1-4	LO pin is connected to GND
JU10	Closed*	Device logic IO pins are connected to the on-board microcontroller
	Open	Device logic IO pins are disconnected from the on-board microcontroller
JU11	Closed*	Enables the $\overline{WU}$ LED indicator
	Open	Disables the $\overline{WU}$ LED indicator
JU13	Closed*	Enables the $\overline{IRQ}$ LED indicator
	Open	Disables the $\overline{IRQ}$ LED indicator
JU14	Closed*	Enables the LI LED indicator
	Open	Disables the LI LED indicator
JU15	Closed*	Enables the RX LED indicator
	Open	Disables the RX LED indicator
JU16–JU19	Closed*	Device uses the on-board SPI interface
	Open	Device uses an external SPI interface
JU23	Closed*	Device LDOIN is bypassed by the 0.1µF capacitor
	Open	Device LDOIN has no bypass capacitor

**Default position.*

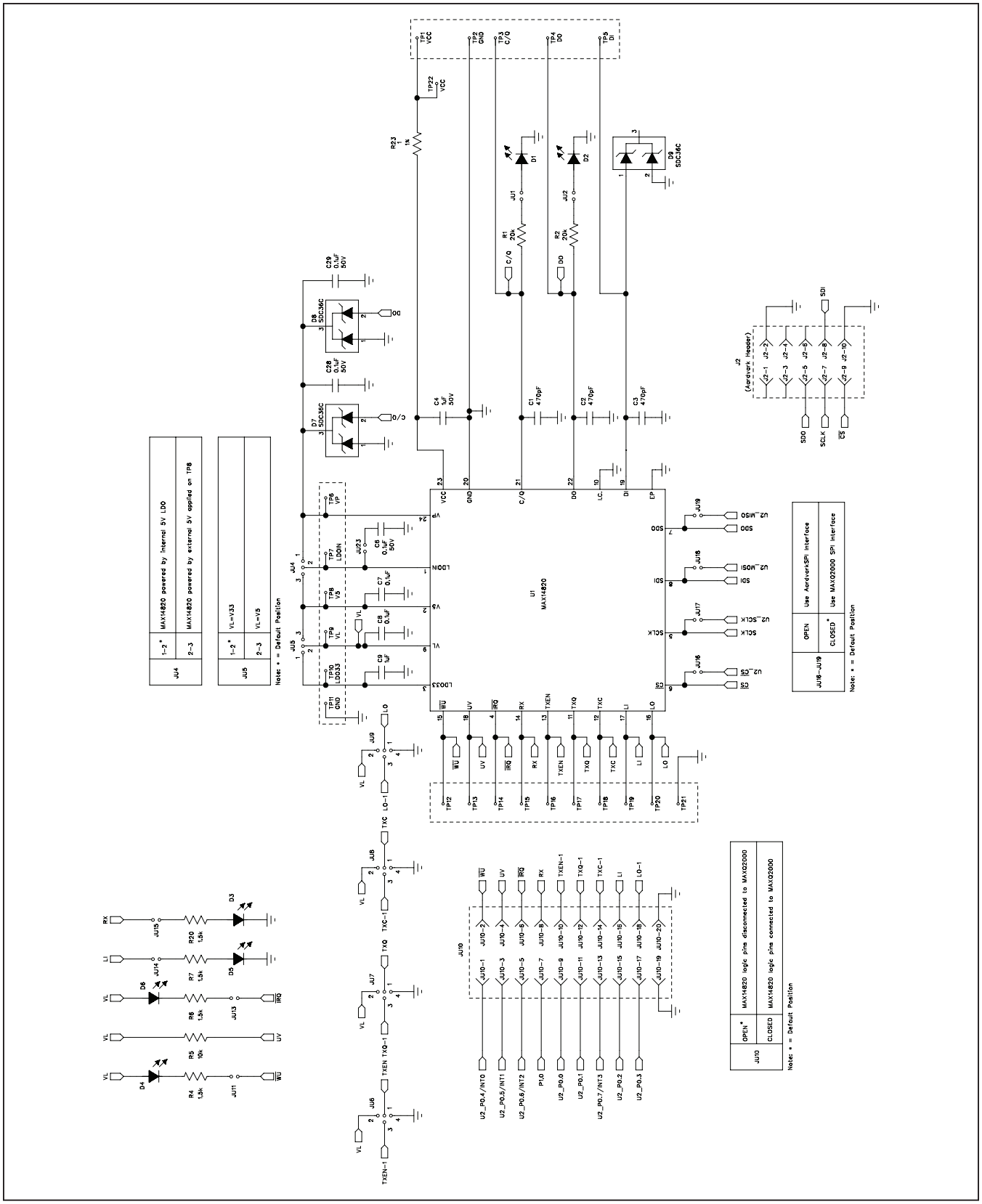

Figure 3a. MAX14820 EV Kit Schematic (Sheet 1 of 2)

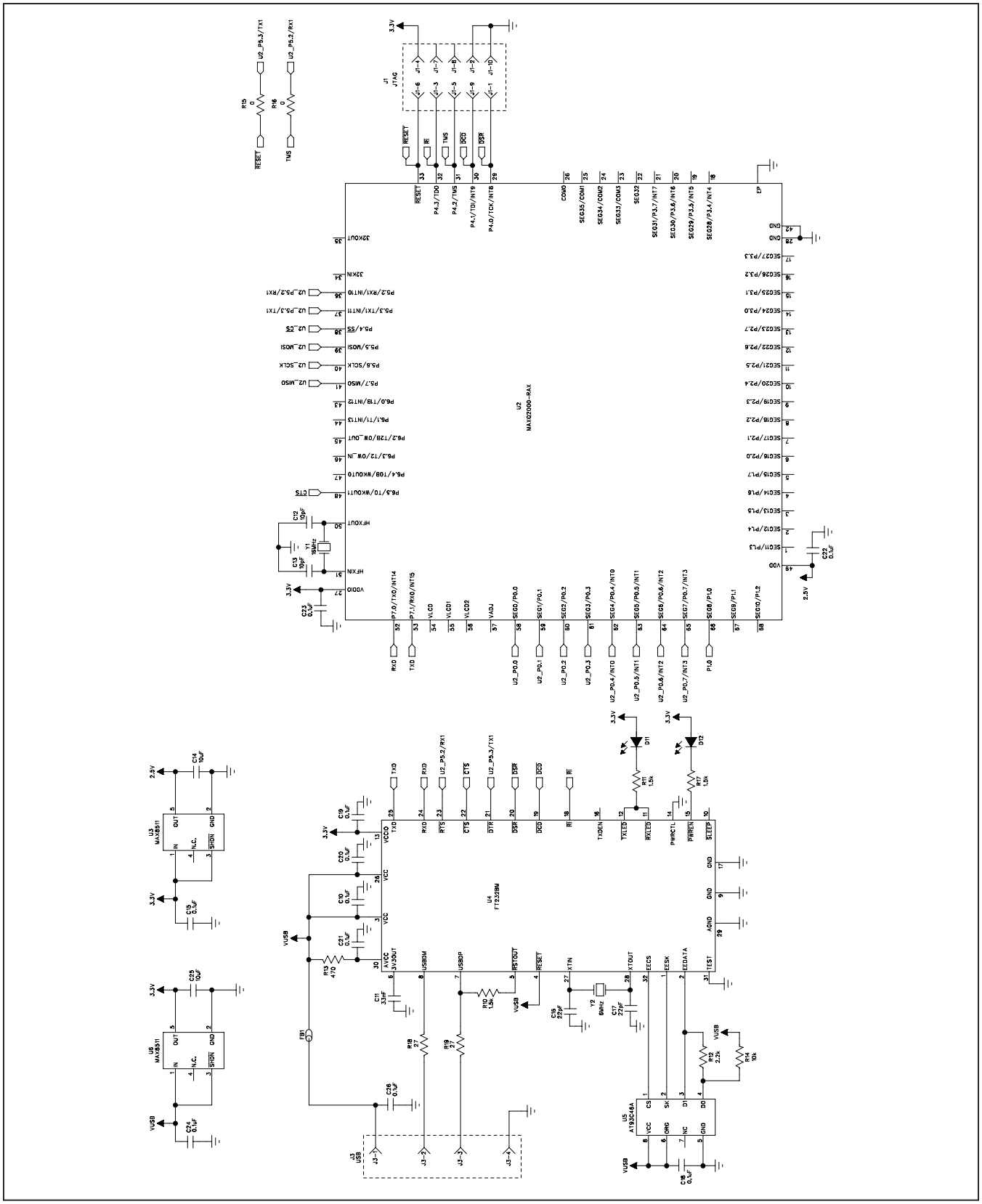

Figure 3b. MAX14820 EV Kit Schematic (Sheet 2 of 2)

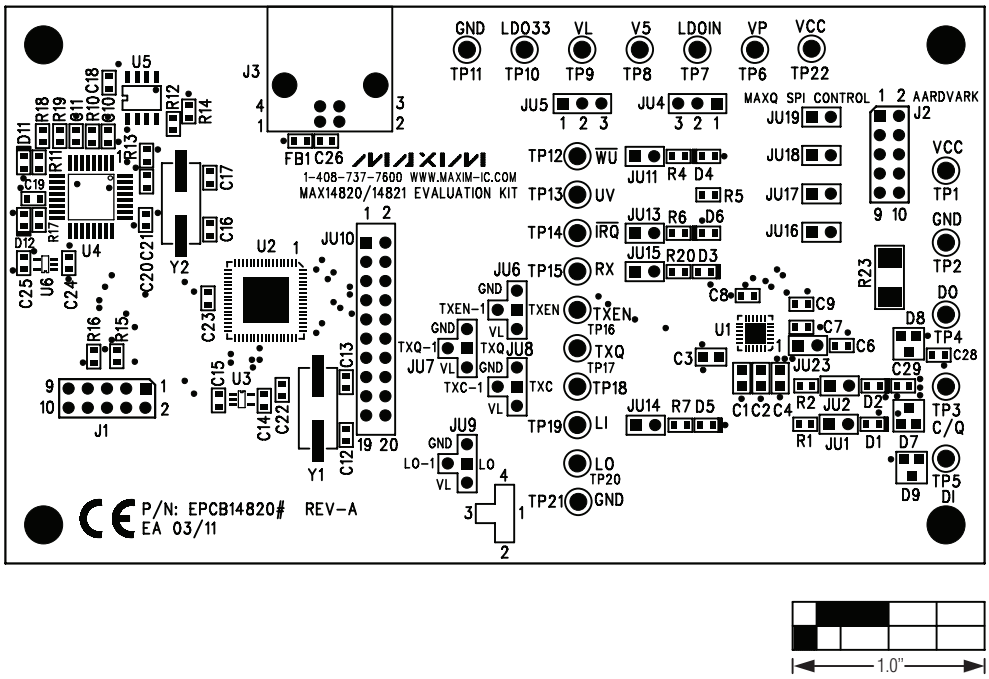

Figure 4. MAX14820 EV Kit Component Placement Guide—Component Side

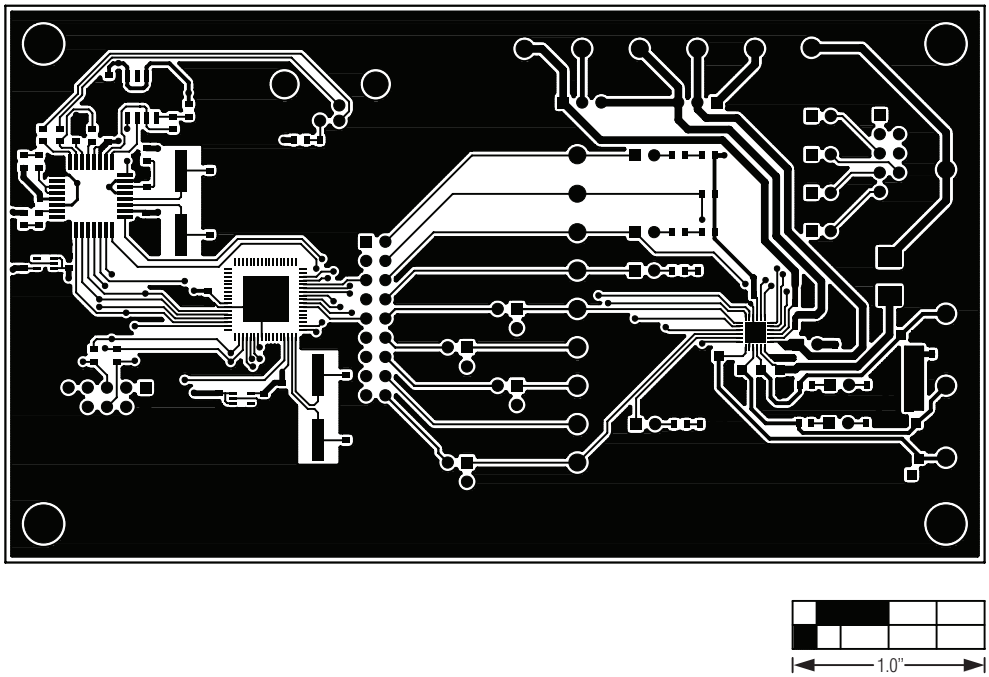

Figure 5. MAX14820 EV Kit PCB Layout—Component Side

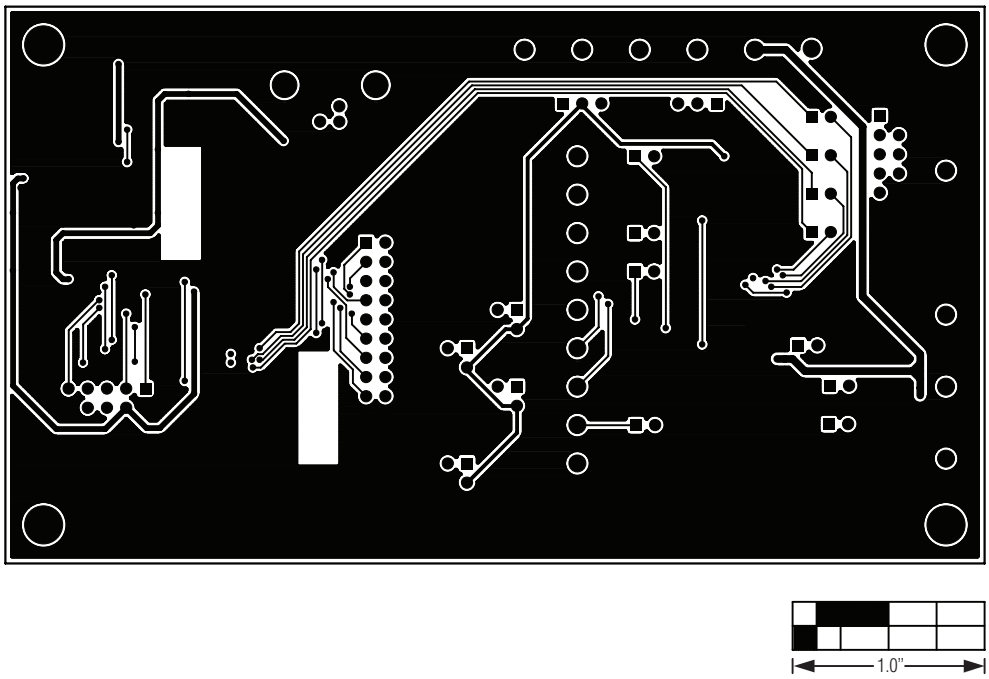

Figure 6. MAX14820 EV Kit PCB Layout—Solder Side

Ordering Information

PART	TYPE
MAX14820EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/11	Initial release	—