MAX14819 Evaluation Kit

Evaluates: MAX14819/MAX14819A

General Description

The MAX14819 evaluation kit (EV kit) consists of the evaluation board and software. The EV kit is a fully assembled and tested circuit board that evaluates the MAX14819A IO-Link® dual-channel master transceiver.

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

The MAX14819 EV kit can also be used to evaluate the MAX14819.

Features

- IO-Link-Compliant Device Transceiver
- IO and SPI Interface Terminals
- Windows 7-Compatible Software
- USB-PC Connection
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Recommended Equipment

- MAX14819 EV kit (USB A-to-B cable included)
- User-supplied Windows 7 PC with a spare USB port
- 24V, 1A DC power supply*
- Multimeter/voltmeter

**L+A and L+B are each configured for a 1A (typ) current limit, so a higher load-capable power supply may be required for testing.*

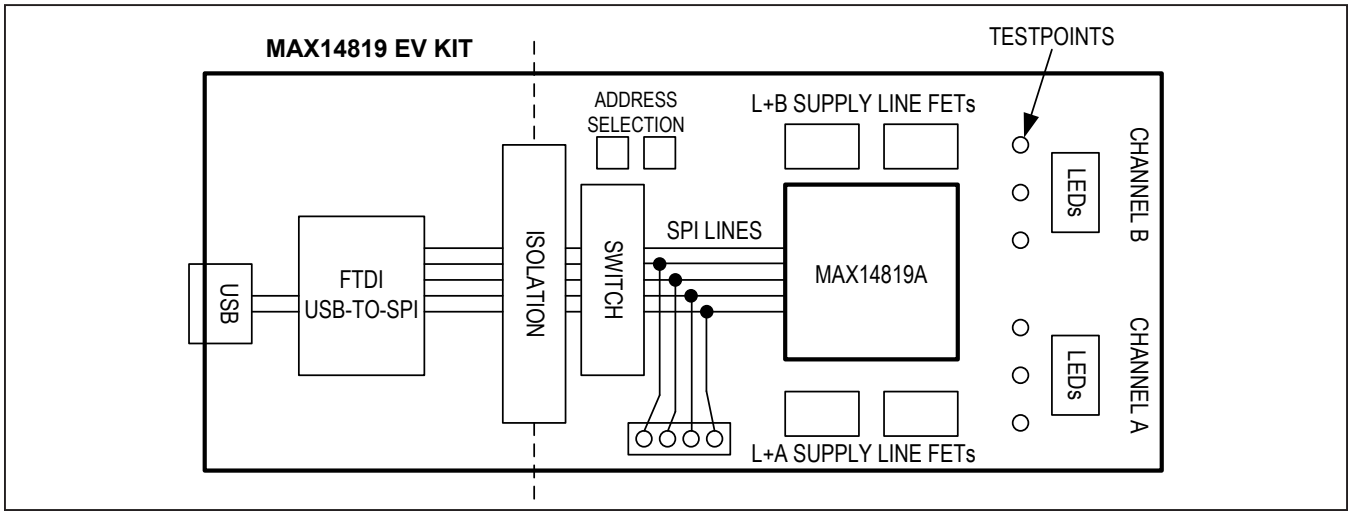
Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

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.maximintegrated.com/evkitsoftware** to download the latest version of the EV kit software, MAX14819EVKITSetupVx.xx.ZIP. Save the EV kit software to a temporary folder and uncompress the ZIP file.

MAX14819 EV Kit Block Diagram



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2) Install the EV kit software and USB driver on your computer by running the MAX14819EVKITSetupVx.xx.EXE program inside the temporary folder. The program files are copied to your PC and icons are created in the Windows **Start | Programs | Maxim Integrated** 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 multimeter to the V5 testpoint (TP22)
6) 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.
7) Start the EV kit software by opening its icon in the Windows **Start | Programs | Maxim Integrated** menu. The EV kit software main window appears, as shown in Figure 1.
8) Verify that **Status: MAX14819EVKIT A Connected** is displayed on the status bar at the bottom of the main window (Figure 1).
9) Turn on the 24V supply. Ensure that the V5 voltage (TP22) is 5V.
10) Click on the **Read All button** to read all of the registers in the device.
11) Select a register in the register table to access the bits in that register by clicking on the register name.
12) Using the Register Bit Description table that pops up, set the individual bits by selecting the required setting from the drop-down menu for each bit.
13) Press the **Write Changes** button on the GUI to write the registers that have been changed to the MAX14819.

Detailed Description of Software

Configuring the Registers

Click on a register name in the register table to access the individual bits in that register. When the register name is selected in the register table, a corresponding Register Bit Description table appears, allowing access to set individual bits. Click on the drop-down menu next to each bit in the Register Bit Description table to select the bit setting. When all of the bits are set as desired, click on the Write Changes button to write the changed bit settings to the MAX14819A over the SPI interface.

Note that full IO-Link communication is not available using the EV kit GUI. Please use the MAXREFDES145 for full IO-Link communication with the MAX14819A.

Interrupt Response ($\overline{IRQ}$)

The MAX14819A features an integrated active-low interrupt indicator pin to actively notify the controller when an interrupt or error condition occurs. Enable interrupts in the by setting the bits in the InterruptEn register.

When an interrupt is triggered, the IRQ bit in the SPI communication is set and the IRQ in the SPI Response box of the GUI turns red. On the EV kit PCB, the IRQ LED (DS6) also turns on.

Detailed Description of Hardware

The MAX14819 EV kit includes the MAX14819A dual-channel IO-Link master transceiver and the external components for evaluating the device. All logic-level I/Os and IO-Link capable I/Os are available on yellow test points.

Logic-Level Power Supply

The MAX14819A features an internal 5V linear regulator which can drive loads up to 20mA. When REGEN is unconnected, this 5V output is available on the V5 test point (TP22). Leave J13 open and close the J5 jumper to use this internal 5V regulator to power the logic level supply (VL).

To use a different logic-level voltage supply, open the J5 jumper and apply the external supply to the VL testpoint (TP23).

Selecting the Device Address

The MAX14819A includes two address pins for SPI addressing, allowing up to four devices on a single bus. Set the SPI address for the MAX14819A on the MAX14819EVKIT by setting the A1 and A0 jumpers (J11 and J12, respectively). Set the device SPI address in the GUI to the same value by selecting the corresponding address in the drop-down menu in the SPI Address box.

Using SPI Interface with an External Master Controller

The MAX14819 EV kit includes an isolated USB-to-SPI interface circuit for communication with the PC/GUI.

To use an external SPI master controller with the MAX14819A, open all of the channels on SW1, and connect an the external SPI master to the J20 header. Note that the J20 header is not isolated from the MAX14819A.

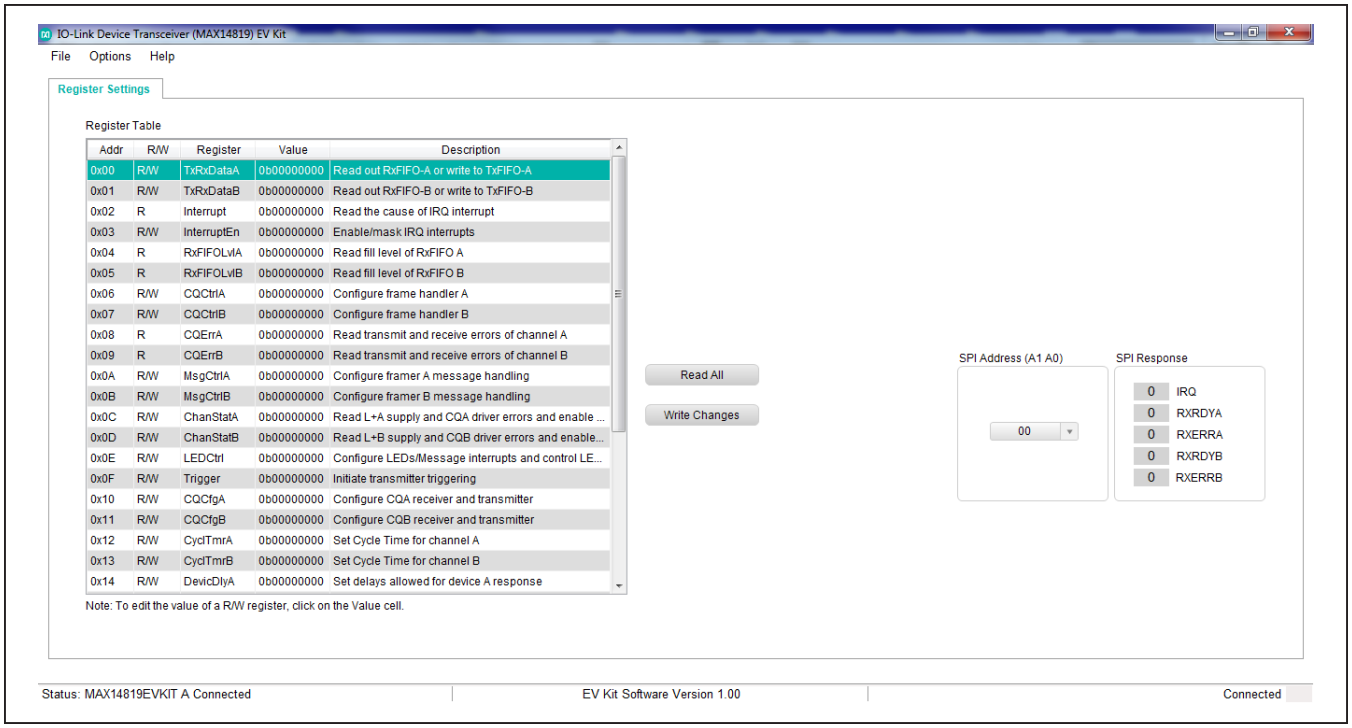


Figure 1. MAX14819 EV Kit Software, EV Kit is Connected

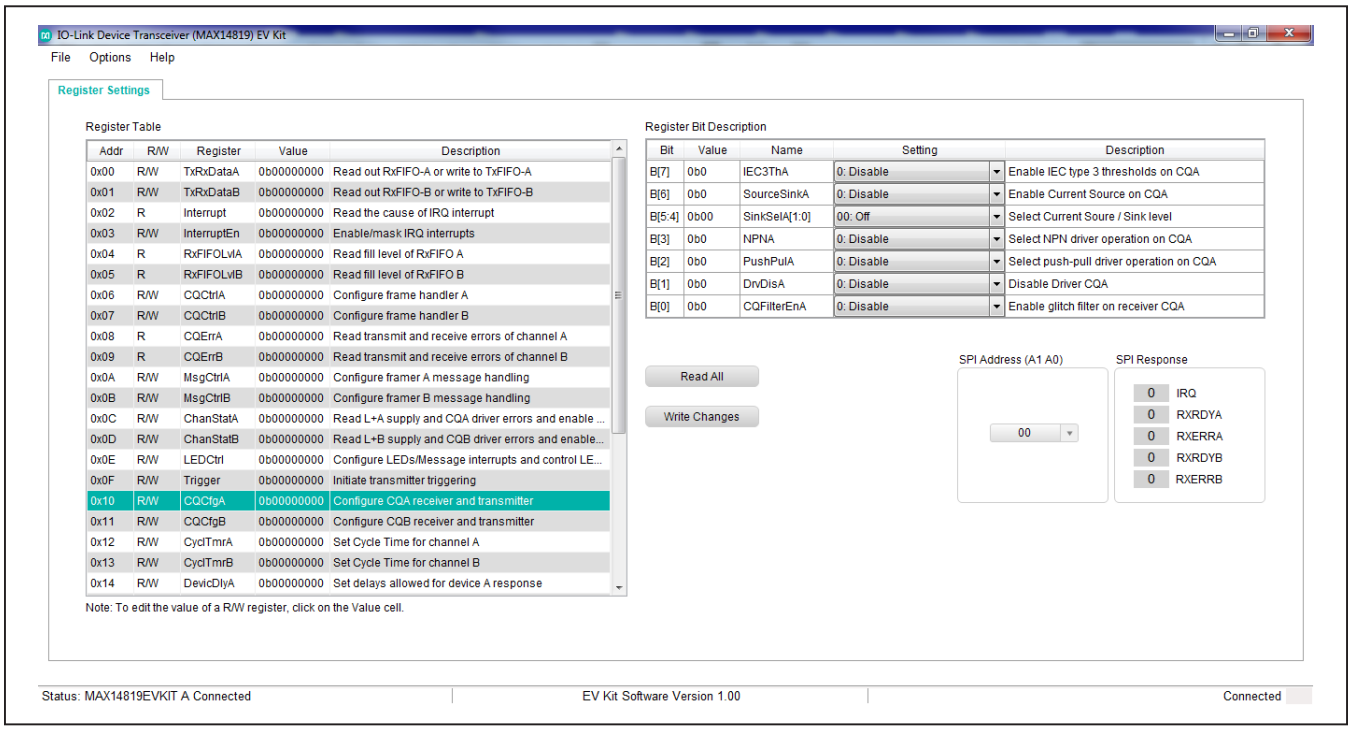


Figure 2. MAX14819 EV Kit Software, Register Bit Description Table

Table 1. Jumper Descriptions

JUMPER	SHUNT POSITON	DESCRIPTION
J5	Open	VL is powered by an external supply. Apply an external voltage to the VL test point for normal operation.
	Closed*	VL is connected to V5.
J6	Open	$\overline{IRQ}$ is not pulled to VL through an LED
	Closed*	$\overline{IRQ}$ is pulled up to VL through an LED
J7	Open	$\overline{RXRDYA}$/LD1A is not pulled to VL through an LED
	Closed*	$\overline{RXRDYA}$/LD1A is pulled up to VL through an LED
J8	Open	$\overline{RXERRA}$/LD2A is not pulled to VL through an LED
	Closed*	$\overline{RXERRA}$/LD2A is pulled up to VL through an LED
J9	Open	$\overline{RXERRB}$/LD2B is not pulled to VL through an LED
	Closed*	$\overline{RXERRB}$/LD2B is pulled up to VL through an LED
J10	Open	$\overline{RXRDYB}$/LD1B is not pulled to VL through an LED
	Closed*	$\overline{RXRDYB}$/LD1B is pulled up to VL through an LED
J11	1-2	A1 is connected to VL (high). Chip address pin A1 is 1.
	2-3*	A1 is connected to GND (low). Chip address pin A1 is 0.
J12	1-2	A0 is connected to VL (high). Chip address pin A0 is 1.
	2-3*	A0 is connected to GND (low). Chip address pin A0 is 0.
J13	Open*	REGEN is unconnected. Internal 5V regulator is enabled.
	Closed	REGEN is connected to GND. Internal 5V regulator is disabled.
J14	Open	TXENA is connected to VL (high)
	Closed*	TXENA is connected to GND (low)
J16	Open	TXENB is connected to VL (high)
	Closed*	TXENB is connected to GND (low)

**Default position.*

Ordering Information

PART	TYPE
MAX14819EVKIT#	EV Kit

#Denotes RoHS compliant.

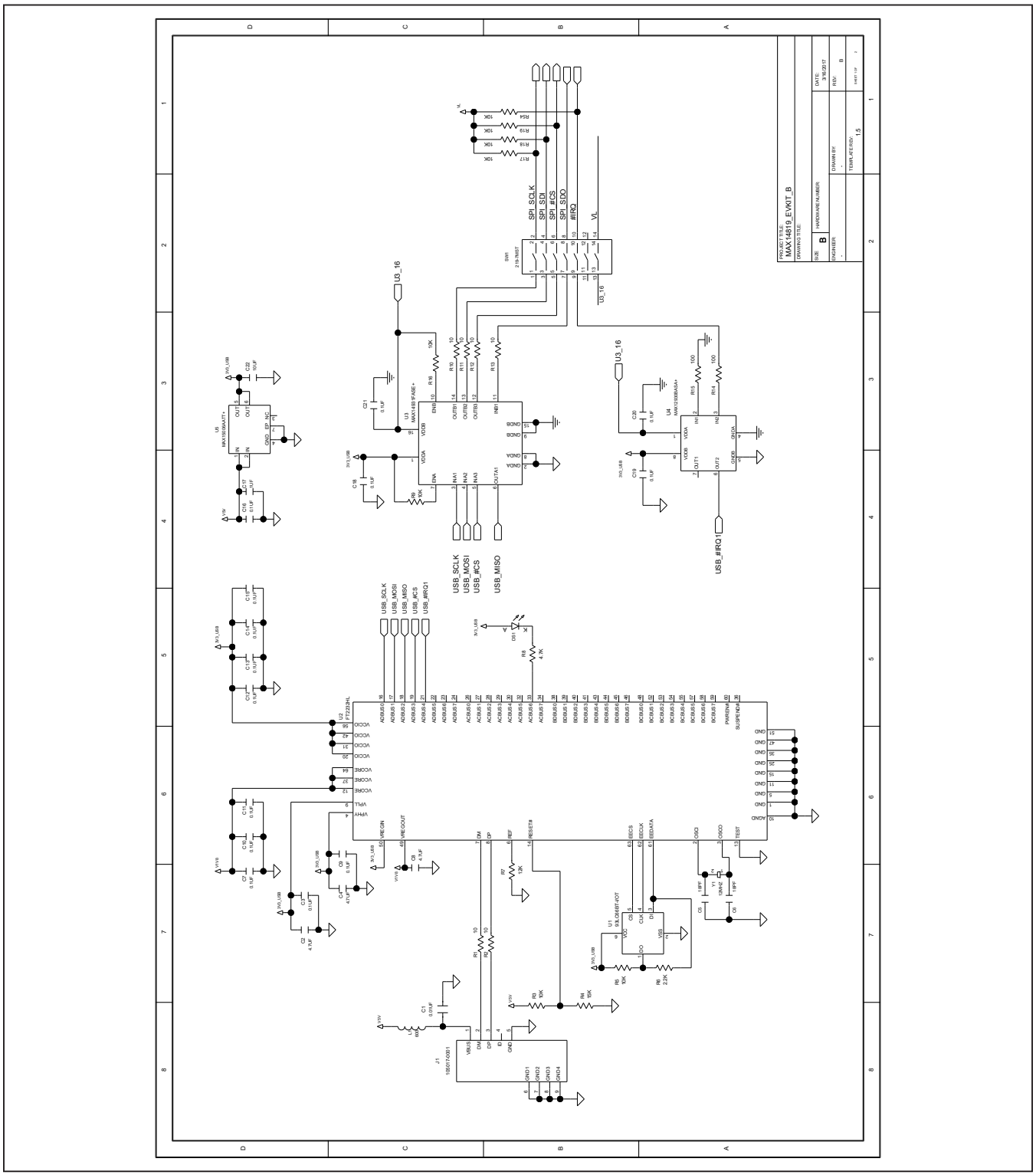
MAX14819 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1	-	1	C1005X7R1V103K050BB	TDK	0.01UF	CAP; SMT (0402); 0.01UF; 10%; 35V; X7R; CERAMIC
2	C2, C4, C8	-	3	C0603C475K8PAC;LMK107BJ475KA;CGB3B1X5R1A475K;C1608X5R1A475K080AC;CL10A475KP8NNN;C1608X5R1A475K080AE	KEMET;TAIYO YUDEN;TDK;TDK;SAMSUNG ELECTRONICS;TDK	4.7UF	CAP; SMT (0603); 4.7UF; 10%; 10V; X5R; CERAMIC
3	C3, C7, C9-C16, C18-C21	-	14	C0402C104J4RAC;GCM155R71C104JA55	KEMET;MURATA	0.1UF	CAP; SMT (0402); 0.1UF; 5%; 16V; X7R; CERAMIC
4	C5, C6	-	2	C0402C180J5GAC;GRM1555C1H180JA01;C1005C0G1H180J050BA	KEMET;MURATA;TDK	18PF	CAP; SMT (0402); 18PF; 5%; 50V; C0G; CERAMIC
5	C17	-	1	C0402C105K8PAC;CC0402KRX5R6BB105	KEMET;YAGEO	1UF	CAP; SMT (0402); 1UF; 10%; 10V; X5R; CERAMIC
6	C22	-	1	C1608X5R1A106K080AC	TDK	10UF	CAP; SMT (0603); 10UF; 10%; 10V; X5R; CERAMIC
7	C25, C27, C35	-	3	GMK107BJ105KA;C1608X5R1V105K080AB	TAIYO YUDEN;TDK	1.0UF	CAP; SMT (0603); 1.0UF; 10%; 35V; X5R; CERAMIC
8	C28, C34	-	2	C2012X7S2A105K125AB;GRJ21BC72A105KE11;GRM21BC72A105KE01	TDK;MURATA;MURATA	1UF	CAP; SMT (0805); 1UF; 10%; 100V; X7S; CERAMIC
9	C29-C32	-	4	VJ0603A271KXBCW1BC	VISHAY VITRAMON	270PF	CAP; SMT (0603); 270PF; 10%; 100V; C0G; CERAMIC
10	C33	-	1	C0603C104K8RAC	KEMET	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 10V; X7R; CERAMIC
11	C36	-	1	C5750X7S2A106M230KB	TDK	10UF	CAP; SMT (2220); 10UF; 20%; 100V; X7S; CERAMIC
12	D2, D6-D10	-	6	SMCJ48A	ST MICROELECTRONICS	48V	DIODE; TVS; SMC; VRM=48V; IPP=20A
13	D11	-	1	SM30T39AY	ST MICROELECTRONICS	38.6V	DIODE; TVS; SMC (DO-214AB); VRM=38.6V; IPP=56.3A
14	D12	-	1	SM30T33AY	ST MICROELECTRONICS	32.7V	DIODE; TVS; SMC (DO-214AB); VRM= 32.7V; IPP=66.1A
15	DS1	-	1	LG L29K-G2J1-24	OSRAM	LG L29K-G2J1-24	DIODE; LED; SMT (0603); Vf=1.7V; If(test)=0.002A; -40 DEGC TO +100 DEGC
16	DS6-DS10	-	5	LTST-C150CKT	LITE-ON ELECTRONICS INC.	LTST-C150CKT	DIODE; LED; STANDARD; RED; SMT (1206); PIV=1.8V; IF=0.02A
17	J1	-	1	105017-0001	MOLEX	105017-0001	CONNECTOR; FEMALE; SMT; MICRO-USB B RECEPTACLE; RIGHT ANGLE; 5PINS
18	J5-J10, J13	-	7	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
19	J11, J12, J14, J16	-	4	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
20	L1	-	1	BLM21AG601SN1	MURATA	600	INDUCTOR; SMT (0805); FERRITE-BEAD; 600; TOL=+/-25%; 0.2A
21	MISC1	-	1	68784-0001	MOLEX	68784-0001	CONNECTOR; MALE; USB; USB A PLUG TO MICRO B PLUG CABLE ASSY; STRAIGHT; 4PINS-5PINS
22	Q1-Q3, Q5	-	4	NTTFS5116PLTAG	ON SEMICONDUCTOR	NTTFS5116PL	TRAN; POWER MOSFET; PCH; WDFN8; PD-(40W); I-(-20A); V-(-60V)
23	R1, R2, R10-R13	-	6	ERJ-2RKF10R0	PANASONIC	10	RES; SMT (0402); 10; 1%; +/-100PPM/DEGC; 0.1000W
24	R3, R9, R30, R38, R40, R56, R57	-	7	RC0603JR-0710KL	YAGEO PHYCOMP	10K	RES; SMT (0603); 10K; 5%; +/-100PPM/DEGC; 0.1000W
25	R4	-	1	CRCW060315K0FK	VISHAY DALE	15K	RES; SMT (0603); 15K; 1%; +/-100PPM/DEGC; 0.1000W
26	R5, R16-R19, R54	-	6	CRCW040210K0FK;RC0402FR-0710KL	VISHAY DALE;YAGEO PHICOMP	10K	RES; SMT (0402); 10K; 1%; +/-100PPM/DEGC; 0.0630W
27	R6	-	1	CRCW04022K20FK;RC0402FR-072K2L	VISHAY DALE;YAGEO PHICOMP	2.2K	RES; SMT (0402); 2.2K; 1%; +/-100PPM/DEGC; 0.0630W
28	R7	-	1	CRCW060312K0FK	VISHAY DALE	12K	RES; SMT (0603); 12K; 1%; +/-100PPM/DEGC; 0.1000W
29	R8	-	1	CRCW06034K70FK	VISHAY DALE	4.7K	RES; SMT (0603); 4.7K; 1%; +/-100PPM/DEGC; 0.1000W

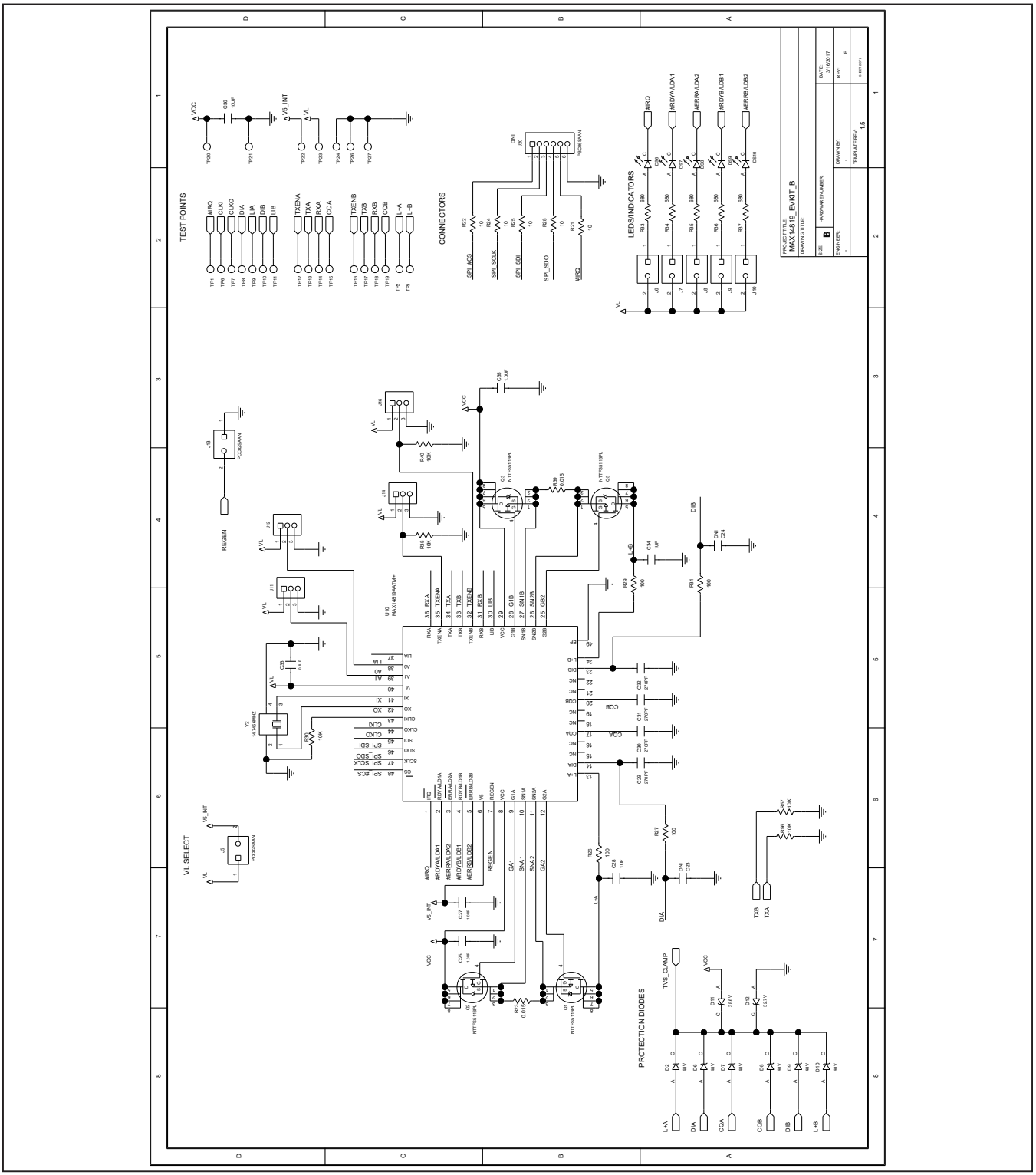
MAX14819 EV Kit Bill of Materials (continued)

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
30	R14, R15	-	2	CRCW0603100RFK;ERJ-3EKF1000;RC0603FR-07100RL	VISHAY DALE;PANASONIC	100	RES; SMT (0603); 100; 1%; +/-100PPM/DEGC; 0.1000W
31	R21, R22, R24, R25, R28	-	5	CRCW040210R0FK; 9C04021A10R0FL	VISHAY DALE;YAGEO	10	RES; SMT (0402); 10; 1%; +/-100PPM/DEGC; 0.0630W
32	R23, R39	-	2	ERJ-8CWFR015	PANASONIC	0.015	RES; SMT (1206); 0.015; 1%; +/-75PPM/DEGC; 1W
33	R26, R27, R29, R31	-	4	RC0402JR-07100RL	YAGEO PHYCOMP	100	RES; SMT (0402); 100; 5%; +/-100PPM/DEGC; 0.0630W
34	R33-R37	-	5	CRCW0603680RFK	VISHAY DALE	680	RES; SMT (0603); 680; 1%; +/-100PPM/DEGC; 0.1000W
35	SU1, SU3-SU7, SU12-SU15	-	10	STC02SYAN	SULLINS ELECTRONICS CORP.	STC02SYAN	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.256IN; BLACK; INSULATION=PBT CONTACT=PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL;
36	SW1	-	1	219-7MST	CTS	219-7MST	SWITCH; SPST; SMT; STRAIGHT; 20V; 0.1A; SURFACE MOUNT DIP SWITCH-AUTO PLACEABLE; RINSULATION=1000M OHM
37	TP1-TP3, TP6-TP19	-	17	5014	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; YELLOW; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
38	TP20, TP22, TP23	-	3	5010	KEYSTONE	N/A	TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE;
39	TP21, TP24, TP26, TP27	-	4	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
40	U1	-	1	93LC66BT-I/OT	MICROCHIP	93LC66BT-I/OT	IC; EPROM; 4K MICROWIRE SERIAL EEPROM; SOT23-6
41	U2	-	1	FT2232HL	FUTURE TECHNOLOGY DEVICES INTL LTD.	FT2232HL	IC; MMRY; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64
42	U3	-	1	MAX14931FASE+	MAXIM	MAX14931FASE+	IC; DISO; 3/1 CHANNEL; 150MBPS; DEFAULT LOW; 2.75KVRMS DIGITAL ISOLATOR; NSOIC16 150MIL;
43	U4	-	1	MAX12930BASA+	MAXIM	MAX12930BASA+	EVKIT PART - IC; DISO; 2/0 CHANNEL; 25MBPS; DEFAULT HIGH; 3.75KVRMS DIGITAL ISOLATOR; NSOIC8 ;
44	U5	-	1	MAX15006AATT+	MAXIM	MAX15006AATT+	IC; VREG; ULTRA-LOW QUIESCENT-CURRENT LINEAR REGULATOR; TDFN6-EP 3X3;
45	U10	-	1	MAX14819AATM+	MAXIM	MAX14819AATM+	IC; TXRX; DUAL IO-LINK MASTER TRANSCEIVER WITH INTEGRATED FRAMERS AND L+ SUPPLY CONTROLLERS; TQFN48-EP
46	Y1	-	1	ABM7-12.000MHZ-D2Y-T	ABRACON	12MHZ	CRYSTAL; SMT ; 18PF; 12MHZ; +/-20PPM; +/-30PPM
47	Y2	-	1	MJ-14.74560-12-30/30/4085	MERCURY ELECTONICS EUROPE	14.7456MHZ	CRYSTAL; SMT; 12PF; 14.7456MHZ; +/-30PPM;
48	PCB	-	1	MAX	MAXIM	PCB	PCB:MAX
49	C23, C24	DNP	0	C0805C474K5RAC; GCM21BR71H474K; GRM21BR71H474KA88;GCM21BR71H474KA55	KEMET;MURATA;MURATA;MURATA	0.47UF	CAP; SMT (0805); 0.47UF; 10%; 50V; X7R; CERAMIC
50	J20	DNP	0	PBC06SAAN	SULLINS ELECTRONICS CORP.	PBC06SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 6PINS; -65 DEGC TO +125 DEGC
TOTAL			150				

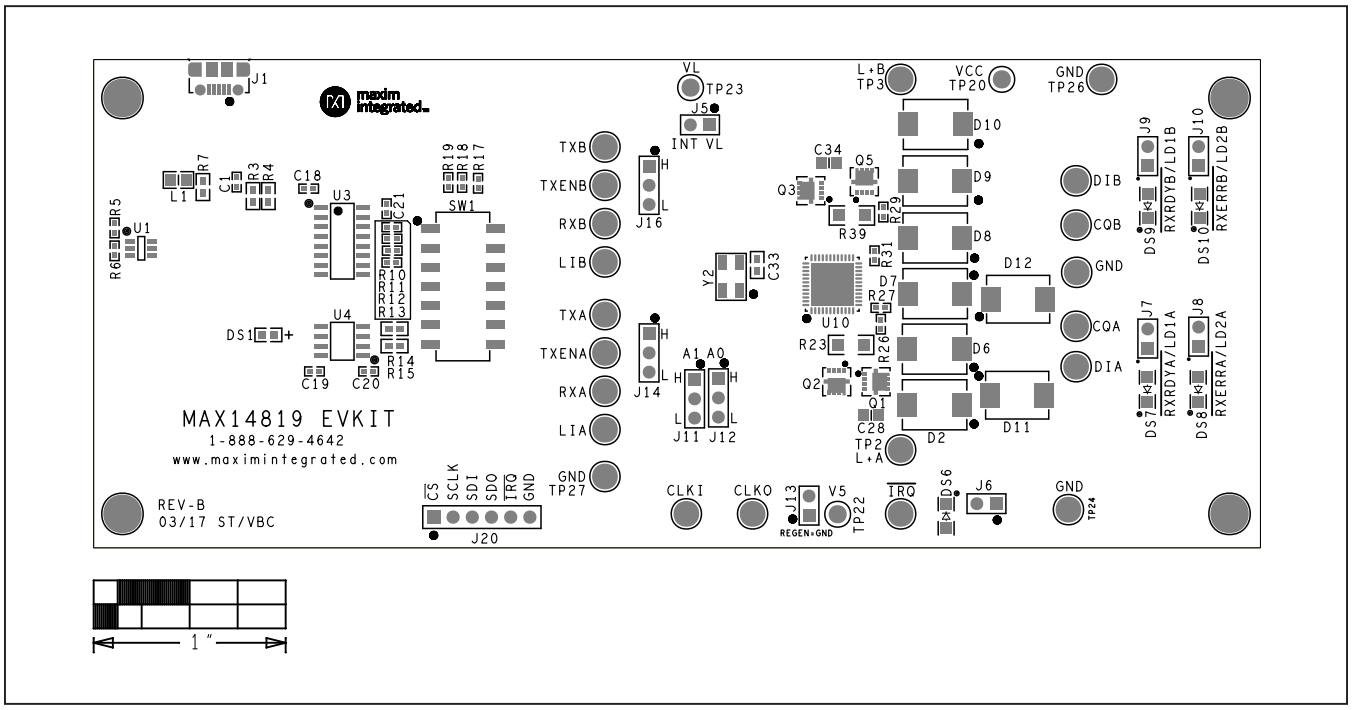
MAX14819 EV Kit Schematic



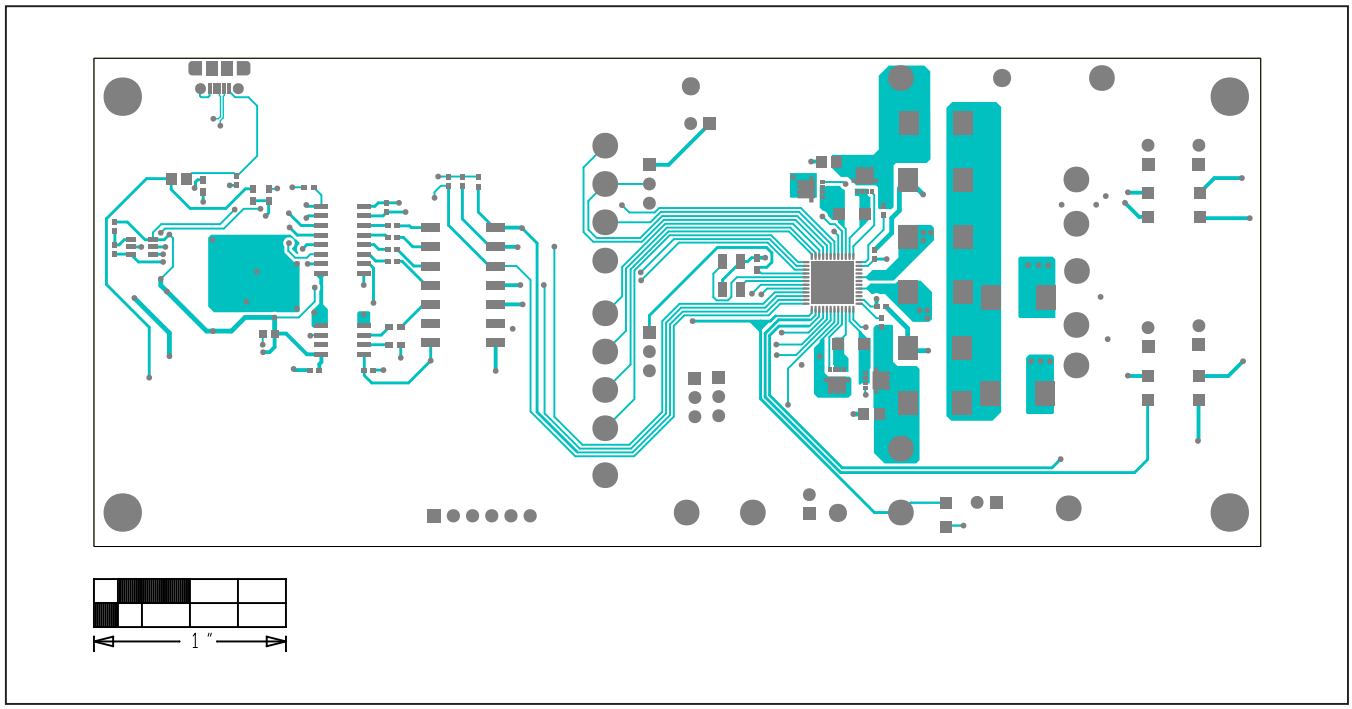
MAX14819 EV Kit Schematic (continued)



MAX14819 EV Kit PCB Layout Diagrams

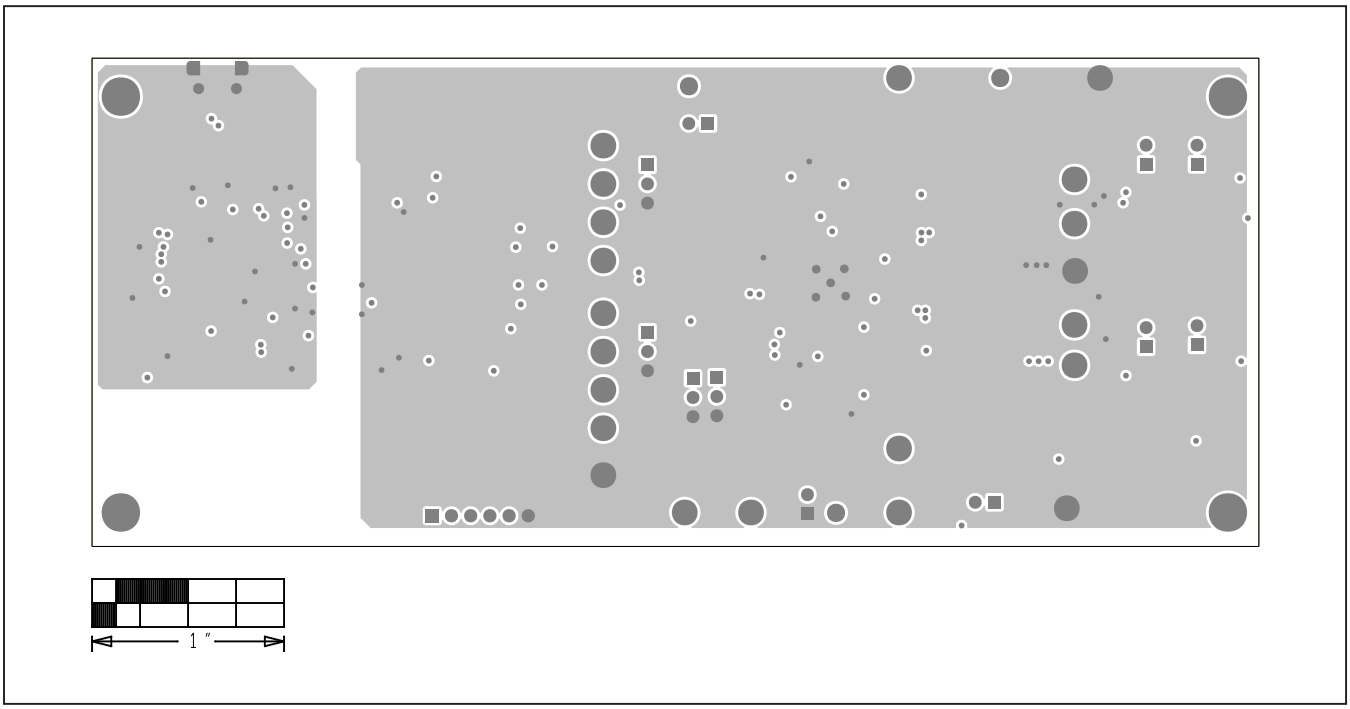


MAX14819 EV Kit PCB Layout—Top Silkscreen

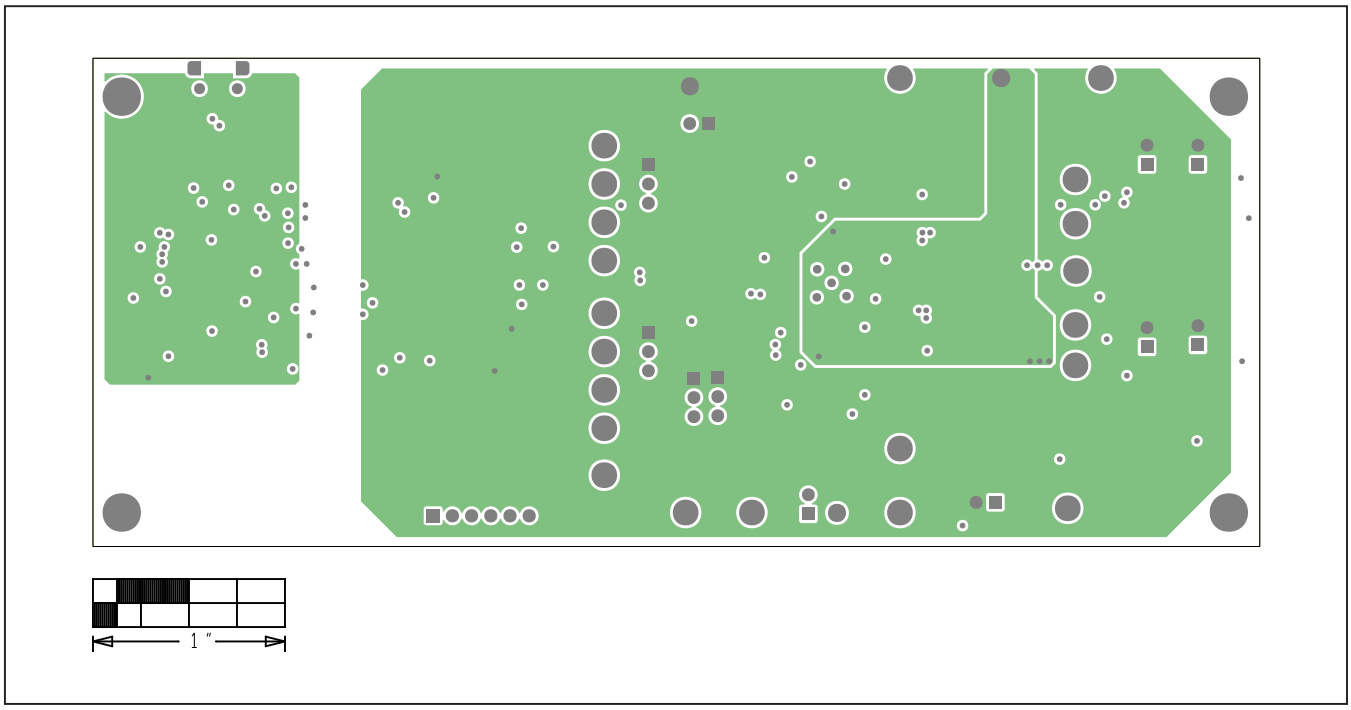


MAX14819 EV Kit PCB Layout—Top

MAX14819 EV Kit PCB Layout Diagrams (continued)

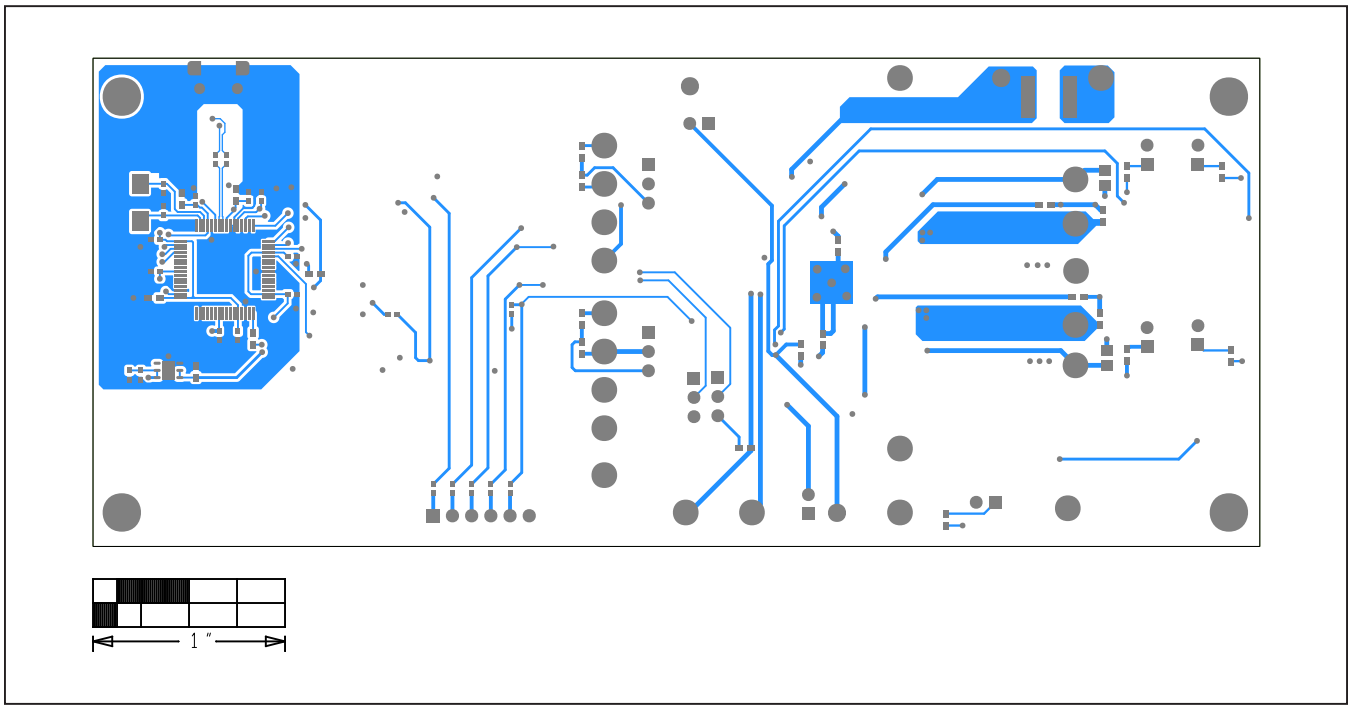


MAX14819 EV Kit—Ground

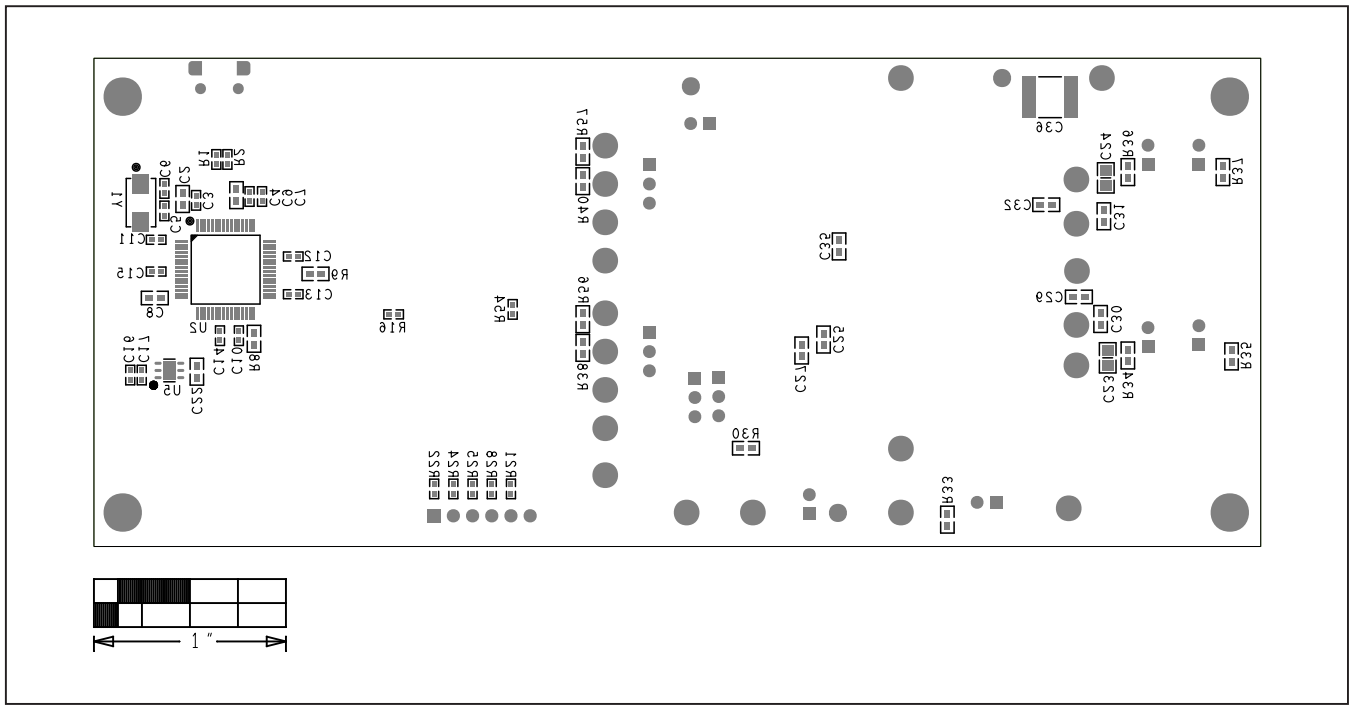


MAX14819 EV Kit—Power

MAX14819 EV Kit PCB Layout Diagrams (continued)



MAX14819 EV Kit—Bottom



MAX14819 EV Kit—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/17	Initial release	—
1	9/17	Updated schematic and bill of materials	5, 9
2	3/20	Updated title and *General Description*	1–12
3	2/21	Updated the General Description, Block Diagram, *Configuring the Registers, Interrupt Response ($\overline{IRQ}$), Detailed Description of Hardware, Logic-Level Power Supply, Selecting the Device Address, Using SPI Interface with an External Master Controller, Bill of Materials,* and *Schematics* sections	1–2, 5–8