Click here for production status of specific part numbers.

MAX14815 Evaluation Kit

Evaluates: MAX14815

General Description

The MAX14815 evaluation kit (EV kit) provides a proven design to evaluate the MAX14815 high-voltage, high-frequency, 5-level octal pulser.

The MAX14815 EV kit features an on-board USB to SPI interface, on-board high frequency clock generator, and synchronous trigger. The MAX14815 also includes Windows 7®, Windows 8.1®, and Windows 10® compatible software that provides a simple graphical user interface (GUI) to exercise the beamforming features of the IC, making it a complete PC-based evaluation platform.

EV Kit Contents

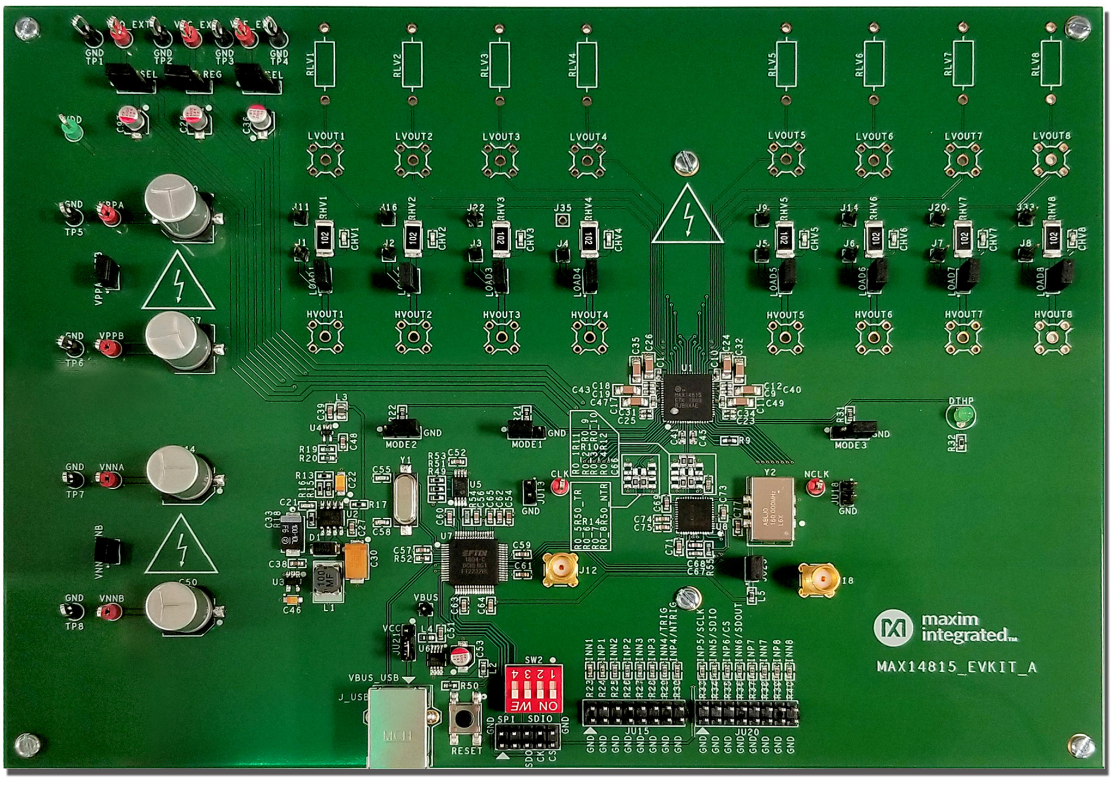
- MAX14815EVKIT# including the MAX14815ETK+
- USB Cable Type A Male to Type B Male

Benefits and Features

- Easy Evaluation of the MAX14815
- Configurable for Three-Level or Five-Level Mode
- Programmable Master Clock Frequency and Trigger
- Option for External Clock and External Trigger
- Includes 3.5mm Scope-Probe Jacks for High-Voltage Outputs
- Windows XP®, Windows 7, Windows 8.1, Windows 10-Compatible Software
- Fully Assembled and Tested
- Proven PCB Layout
- RoHS Compliant

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

MAX14815 EV Kit Photo



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319-100458; Rev 0; 10/19

MAX14815 EV Kit Files

FILE	DESCRIPTION
SetupMAX14815_EvKit_1.0.0.0.exe	Application Program

Quick Start

Required Equipment

- MAX14815 EV kit
- Type A Male to Type B Male USB Cable
- Optional custom controller board or pattern generator to drive the INN1-INN8, INP1-INP8 control signals (see the *MAX14815 IC data sheet* for more information)
- +3.3V DC, 100mA power supply (optional if the on-board LDO is used)
- 0V DC, 1A power supply
- 0V DC, 0.5A power supply (optional if the on-board LDO is used)
- +5V to +100V DC, 30mA (+100V) to 600mA (+5V) power supply
- -5V to -100V DC, -30mA (-100V) to -600mA (-5V) power supply
- Optional (for 5 levels configuration) +5V to +100V DC, 30mA (+100V) to 600mA (+5V) power supply
- Optional (for 5 levels configuration) -5V to -100V DC, -30mA (-100V) to -600mA (-5V) power supply
- Digital storage oscilloscope

It is recommended that the engineer read the MAX14815 IC data sheet prior to using the EV kit and GUI.

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 underline** refers to items from the Windows operating system.

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify MAX14815 EV kit operation:

1) Visit the **MAX14815 IC product page** and download the latest version of the EV kit software from the Design Resources tab.
2) Install the EV kit software and USB driver on your computer by running the **SetupMAX14815_EvKit_1.0.0.0.exe** program inside the temporary folder. A message box asking **Do you want to allow the following program to make changes to this computer?** may appear. If so, click **Yes**.
3) The program files are copied to your PC and icons are created in the Windows **Start | Programs** menu. At the end of the installation process, the installer will launch the installer for the FTDI Chip CDM drivers.
4) The installer includes the drivers for the hardware and software. Follow the instructions on the installer and once complete, click **Finish**. The default location of the software is in the program files directory.
5) Connect the EV kit to the PC with the USB cable. Windows should automatically recognize the device, install the driver and display a message near the **System Icon** menu indicating that the hardware is ready to use.
6) Once the hardware is ready to use, launch the EV kit software by opening its icon in the **Start | Programs** menu. The EV kit software appears as shown in Figure 1. The EV kit software will automatically connect to the EV kit hardware and lower-right status bar should indicate "**MAX14815 EV Kit Hardware Connected**". Otherwise from the **Device** menu select **Connect Hardware**. Verify that the lower-right status bar indicates the EV kit hardware is **Connected**.
7) Verify that all the shunts are in their default positions as shown in Table 1.
8) Connect the +5V DC power supply to the VCC_EXT test point.
9) Connect the -5V DC power supply to the VEE_EXT test point.
10) Connect the +3.3V DC power supply to the VIO_EXT test point.
11) Connect the +5V to +100V DC power supply to the VPPA test point.
12) Connect the -5V to -100V DC power supply to the VNNA test point.
13) If a five-level pulser configuration is used, separate external supplies are required for VPPB and VNNB. Uninstall the shunts on the VPPA_VPPB and VNNA_VNNB and connect the optional +5V to +100V DC power supply to VPPB and the optional -5V to -100V DC power supply to VNNB.
14) Enable all of the power supplies from steps 8 to 13.
15) Using the GUI, program the device and the clock generator chip in order to obtain the desired outputs. Refer to the Detailed Description of Software and Appendix 1 for more information about the GUI and instructions to generate an output pulse.
16) Connect the oscilloscope to the HVOUT1-HVOUT8 scope-probe jacks to observe the output signals from the MAX14815 IC.

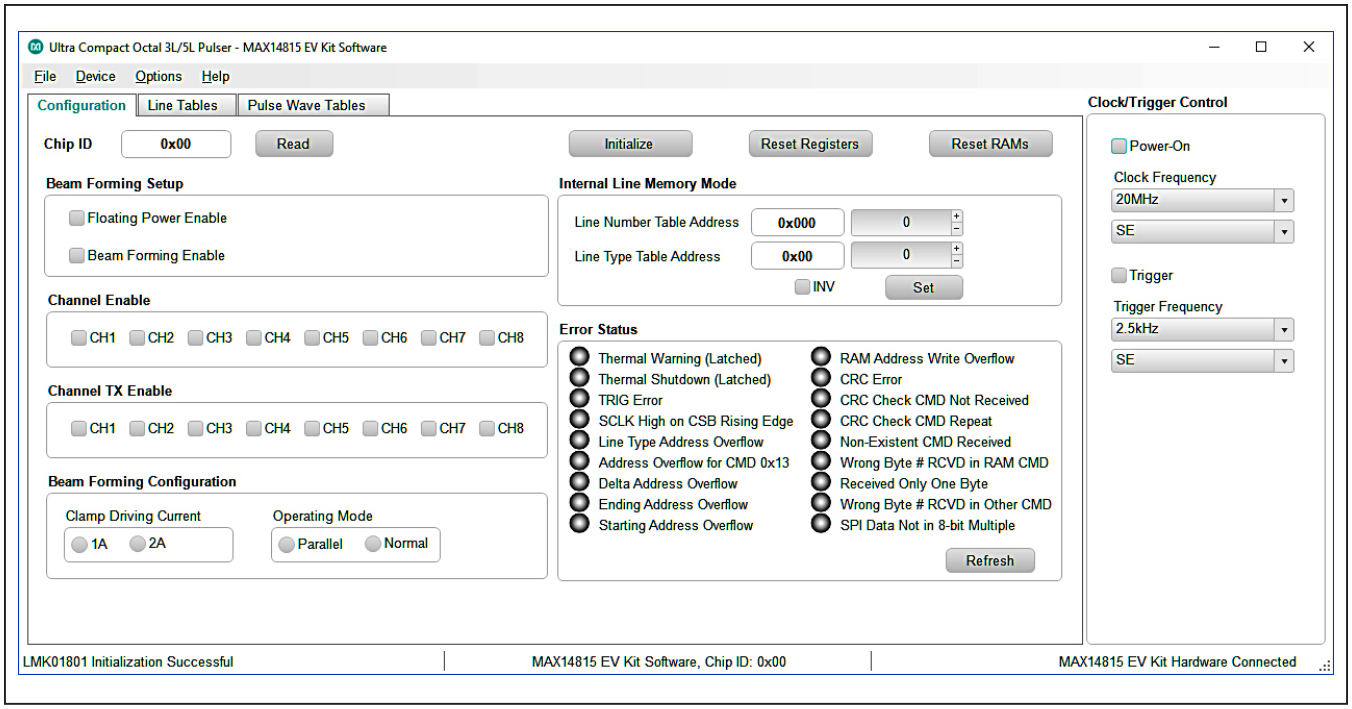


Figure 1. MAX14815 EV Kit Software Startup Window

Table 1. MAX14815 EV Kit Jumper Settings

HEADER	SHUNT POSITION	DESCRIPTION
SUPPLIES		
VCC_REG	Open*	Disables the on-board LDOs
	1-2	Enables the on-board LDOs
VEE_SEL	1-2*	VEE for the MAX14815 is externally supplied.
	2-3	VEE for the MAX14815 is supplied by the on-board regulator. (VCC_REG shunt needs to be installed in the 1–2 position)
VIO_SEL	1-2*	VIO for the MAX14815 is externally supplied.
	2-3	VIO for the MAX14815 is supplied by the on-board regulator. (VCC_REG shunt needs to be installed in the 1–2 position)
JU13	Open*	Connects CLK to GND
JU18	Open*	Connects NCLK to GND
JU21	2-3*	Starting from the 5V provided by the USB port of the PC, provides the supply to the on-board USB to SPI converter and to the on-board clock generator.
	1-2	Starting from the 5V provided to the VCC_EXT test point, provides the supply to the on-board USB to SPI converter and to the on-board clock generator.
J23	1-2*	The on-board clock generator is powered
	Open	The on-board clock generator is unpowered

Table 1. MAX14318 EV Kit Jumper Settings (continued)

HEADER	SHUNT POSITION	DESCRIPTION
VPPA-VPPB	Open	Use two independent high voltage positive supplies for VPPA and VPPB respectively (Five-level mode of operation)
	1-2*	Use a single high voltage positive supply for both VPPA and VPPB (Three-level mode of operation)
VNNA-VNNB	Open	Use two independent high voltage negative supplies for VNNA and VNNB respectively (Five-level mode of operation)
	1-2*	Use a single high voltage negative supply for both VNNA and VNNB (Three-level mode of operation)
OPERATING MODE		**Refer to Table 2 Operating Mode Descriptions**
MODE1	1-2	Connects MODE1 to GND
	2-3*	Connects MODE1 to VIO
MODE2	1-2*	Connects MODE2 to GND
	2-3	Connects MODE2 to VIO
MODE3	1-2*	Connects MODE3 to GND
	2-3	Connects MODE3 to VIO
HV OUT		
LOAD1	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT1.
	Open	No load connected
LOAD2	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT2.
	Open	No load connected
LOAD3	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT3.
	Open	No load connected
LOAD4	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT4.
	Open	No load connected
LOAD5	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT5.
	Open	No load connected
LOAD6	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT6.
	Open	No load connected
LOAD7	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT7.
	Open	No load connected
LOAD8	1-2*	Connects a 220pF capacitor in parallel with a 1kΩ resistor dummy load to OUT8.
	Open	No load connected
SW2	ON*	Close the switches to enable the on-board USB to SPI interface.
	OFF	Open all switches to disable the on-board USB to SPI interface and connect via connector SPI. Keep all the SW2 switches open in Direct Mode.
RESET		USB to SPI interface reset

**Default Position*

Detailed Description of Software

A GUI is provided to support the evaluation of the MAX14815 in Beam Forming mode. The MAX14815 EV kit GUI only supports the **Internal Line Memory mode** (refer to *MAX14815 IC data sheet* for details). If the users wish to use the External Line Memory modes, they can hardwire the external SPI signals to SPI connector.

The main window of the EV kit software contains three tabs: Configuration, Line Tables, and Pulse Wave Tables and a panel accessible from any tabs to control the master clock and trigger **Clock/Trigger Control**. The Configuration tab provides control for the IC configuration, Beam Forming Setup, Channel Enable, and Error Status. The other two tabs are used for establishing desired data patterns.

Configuration Tab

The **Configuration** tab provides an interface for selecting and configuring the IC from a functional perspective, see Figure 3.

In order to prepare the MAX14815 to output a pattern, use this sequence:

- Press the button **Reset RAMs** to clear the Pulse Wave Table, Line Number Table, and Line Type Table.
- Press the button **Reset Registers** to clear the content of any registers and possible errors.
- Press the button **Initialize** to pre-fill the Configuration tab with default values.
- Since all the channels are enabled, verify if you want to use all of them by checking/unchecking the corresponding **Channel Enable** checkboxes and **Channel TX Enable** checkboxes.
- Configure the **Internal Line Memory mode** using the **Line Number Table Address**, the **Line Type Table Address** and the **INV** checkbox. Then press **Set** button. This corresponds to the “Set New Line 1” command in the *MAX14815 IC data sheet* register map. If you are not experienced with EV kit, do not change the default values.
  - The **Line Number Table** address is the address of the line containing the delay, the Pulse Wave Table address, etc.
  - The **Line Type Table** address is the address of the lines containing the global parameters like the cycles number, pulse duration, current of the pulser, etc.
  - The **INV** checkbox selects the phase of output pattern (in-phase or out-of-phase).
- Clicking **Refresh** will update the **Error Status** flags; red is an error and green is good. Please refer to the *MAX14815 IC data sheet* for a detailed explanation of each possible flags.

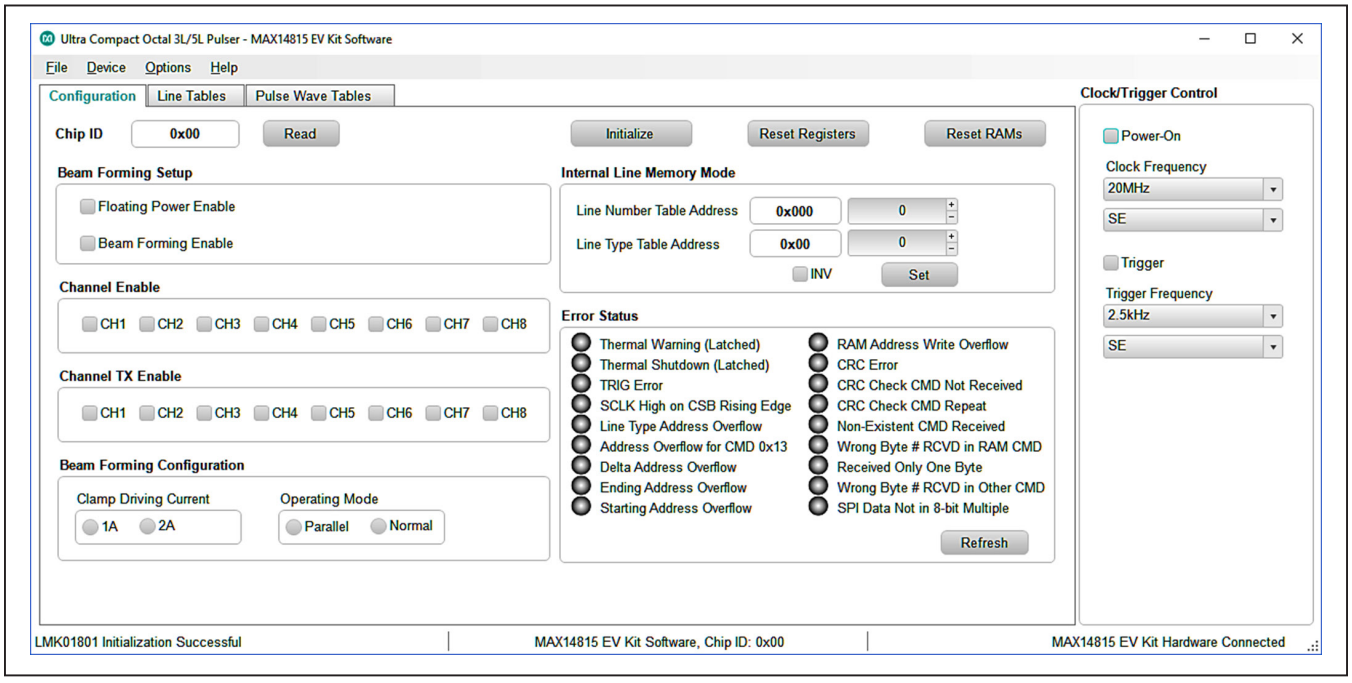


Figure 2. Main MAX14913 EV Kit Software Window

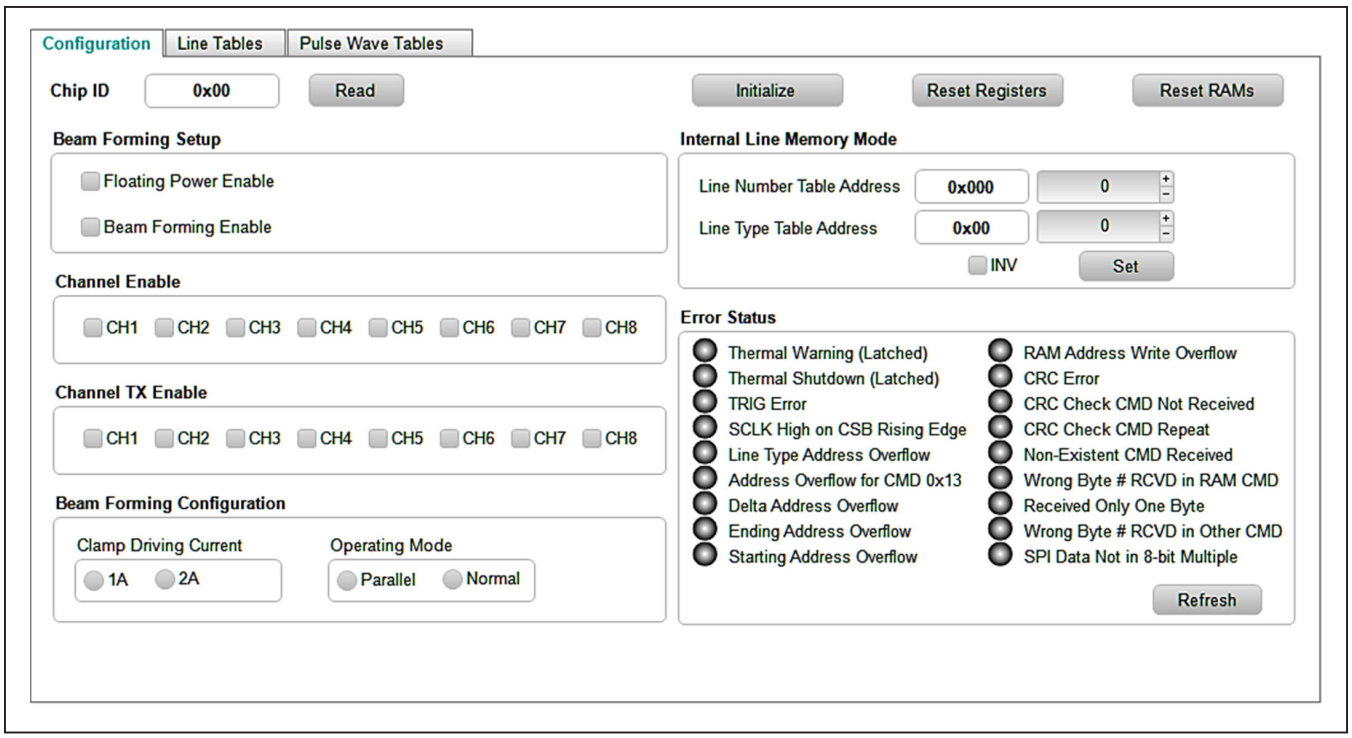


Figure 3. MAX14815 EV Kit Software - Configuration Tab

Line Tables Tab

The **Line Tables** tab allows the software to set the Line Type Tables and Line Number Tables, see Figure 4. Line Type Tables will configure the cycles number, pulse duration, driving current of the pulser, etc., for all the channels. The Line Number Tables will configure the channel delay, the address of the pattern in the Pulse Wave Tables, etc., for each individual channel.

In order to prepare the MAX14815 to output a pattern, use this sequence:

- Go to the **Line Type Table**. It is a global register that affects all the channels, see Figure 5. It contains 128 addresses, from 0 to 127.
- Use the **Address(Hex)** of the **Line Type Table** to select the address to be written. If you are not experienced with the EV kit, do not change the default values.
- To choose how many times to repeat the pattern, fill the **Cycles** number. Zero (0) means one cycle.
- To choose how many clock periods each pulse has to last, fill the **Pulse Width** number. Zero (0) means the pulse will last for a single period of clock. For example, to have a 5MHz pattern generated from a 20MHz master clock, if the **Pulse Wave Table** is **VPP**, **VNN**, and **EOP**, the **Pulse Width** has to be 1.
- Program the **Current** list to set the desired pulser current.
- Check the **CWD** checkbox to have a continuous pattern or uncheck it to have a finite pattern. ***Please double check the VPP_ and VNN_ supply voltages when enabling the CWD function: VPP and VNN must be set at low voltages (less than +/-8V)! Using higher voltages in CWD mode will damage the device.***
- Press the **Write** button to update the pulser memory.

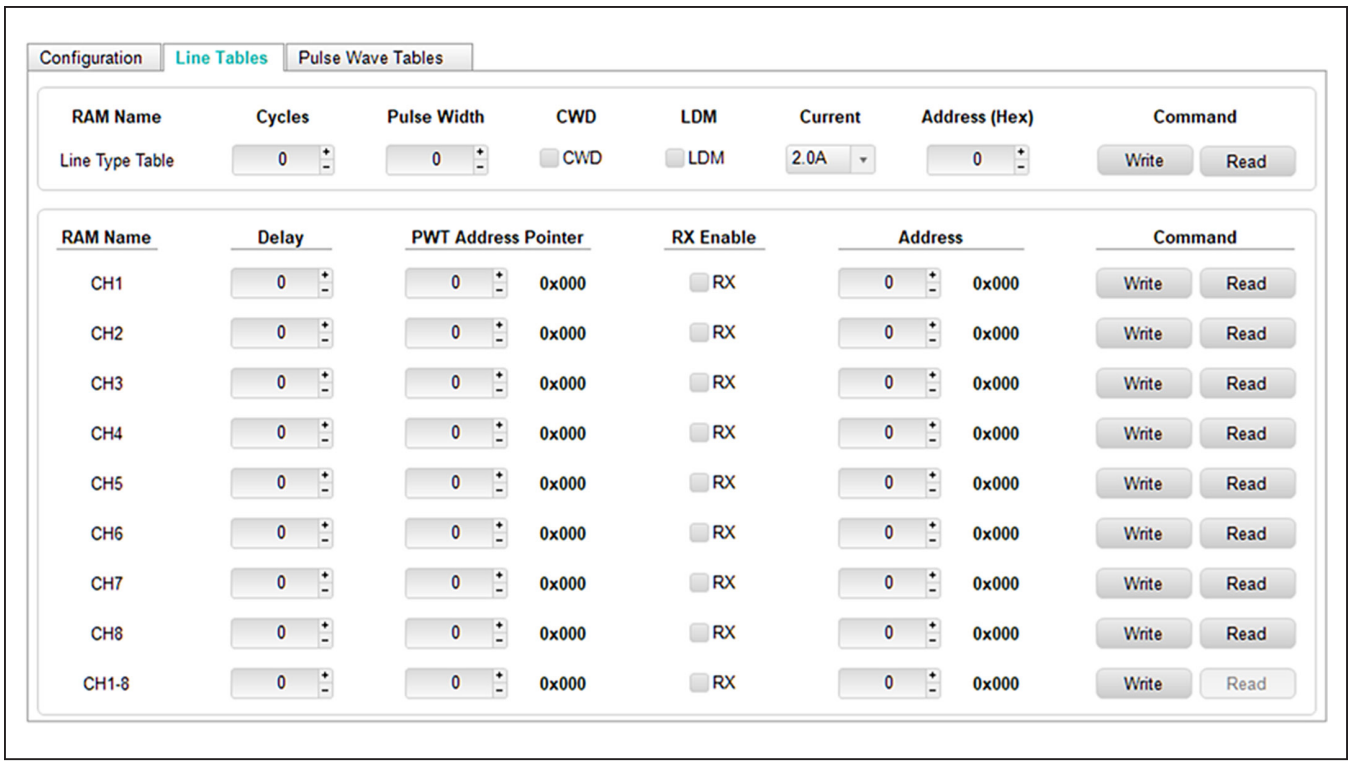


Figure 4. MAX14815 EV Kit Software - Line Tables Tab

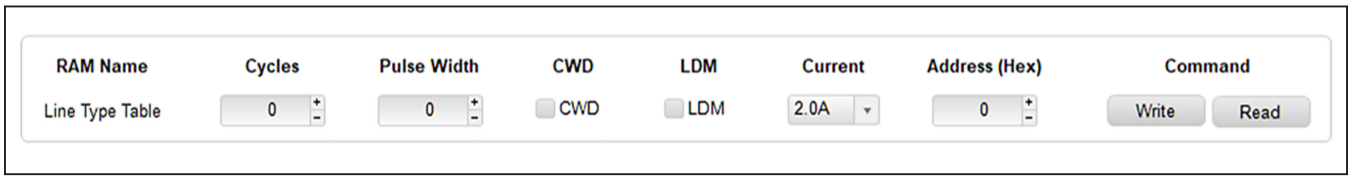


Figure 5. Line Type Table

In the **Line Tables** tab, you can also change the parameters in **Line Number Table** for each channel, see Figure 6. Follow the example for channel 1 below to program the Line Number Table.

- Use the **Address** of the **Line Number Table** to select the address to be written. It contains 1536 addresses, from 0 to 1535. If you are not experienced with the EV kit, do not change the default values.
- To choose the delay of this channel in number of clock periods, fill the **Delay** number. Zero (0) means delay will be set by the fixed internal latency only (refer to the *MAX14815 IC data sheet* for details).
- To select the address of the pattern in the **Pulse Wave Table** to be used, fill the **Pulse Wave Table Address Pointer** number (see *Pulse Wave Tables Tab*).
- Check **RX** checkbox If the channel goes into receive mode after the pattern transmission.

You can also write the same value to a specific address for all channels simultaneously using the Line Number Table CH1-8, see Figure 7.

Pulse Wave Tables Tab

The **Pulse Wave Tables** tab allows using the software to write a desired pattern to different Pulse Wave Table channels, see Figure 8.

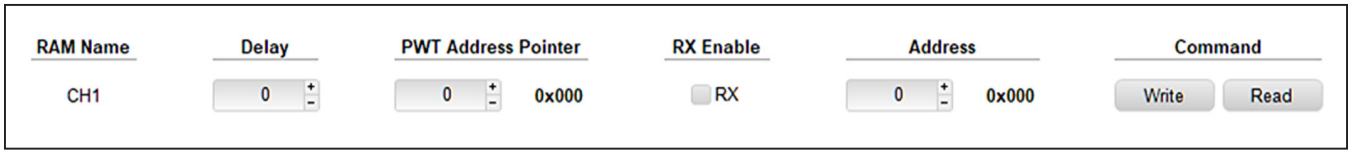


Figure 6. Line Number Table CH1

Figure 7. Line Number Table CH1-8

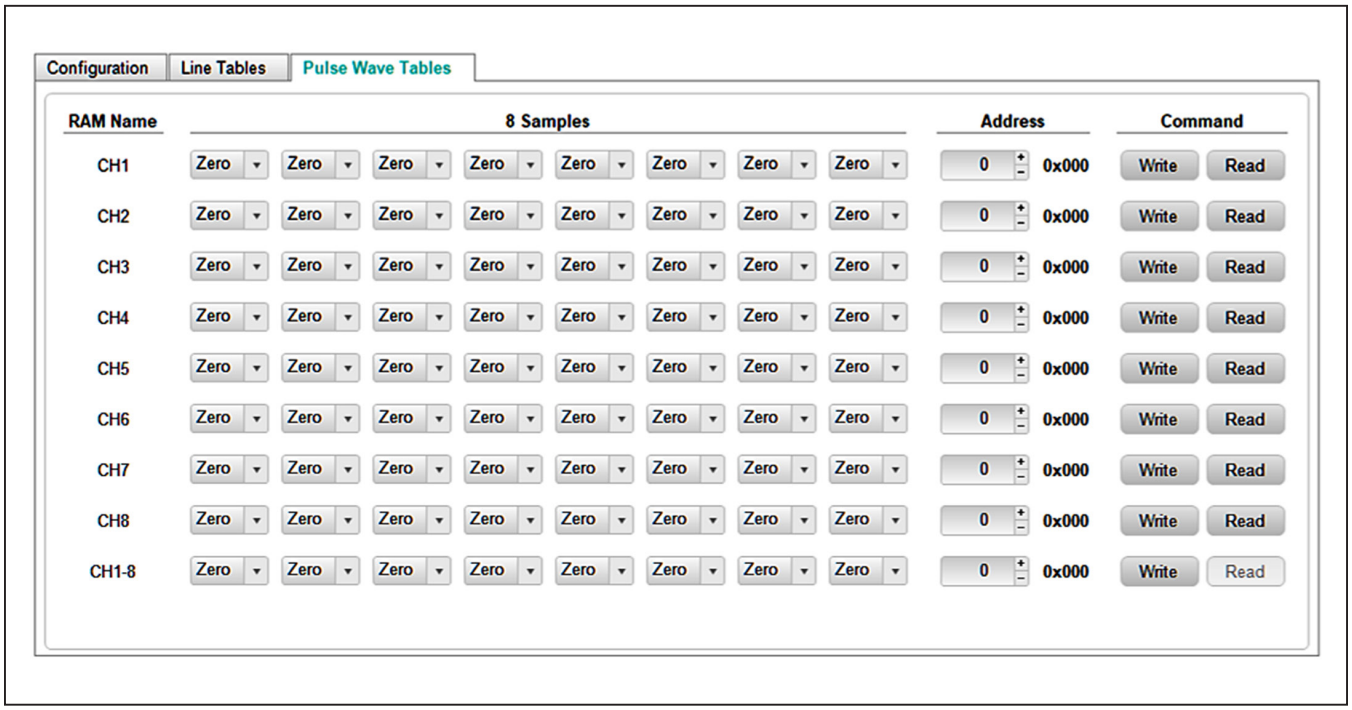


Figure 8. MAX14815 EV Kit Software - Pulse Wave Tables Tab

For example, in 3 Level Beam Forming mode, in order to create a VPP, VNN, ZERO and EOP pattern on Channel 1, use this sequence:

- Use the **Address(Hex)** of the **Pulse Wave Table** to select the address to be written. It contains 1024 addresses, from 0 to 1023. If you are not experienced with EV kit, do not change the default values.
- To select the patterns of the pulser, use the drop-down menus to fill the first four fields with **VPP**, **VNN**, **ZERO**, and **EOP** and press the **Write** button, see Figure 9.
- It is mandatory to finish all sequences with an **EOP** (End of Pattern); otherwise, the pulser will not be able to know where to stop.
- If needed, create other patterns for the remaining channels using the same technique with the values from drop-down menus.
- The **Pulse Wave Table CH1-8** is useful to program all channels simultaneously with the same pattern, see Figure 10. In this example, the pattern **VPP**, **VNN**, **ZERO**, and **EOP** will be written to the address 0 of all channels when pressing the **Write** button.

Clock/Trigger Control

The on-board high-speed clock and trigger generator can be programmed through EV kit software **Clock/Trigger Control** box. After MAX14815 is successfully configured, enable clock and trigger frequency to start Beam Forming mode operation.

To enable on-board clock and trigger frequency, use this sequence:

- Select the appropriate **Clock Frequency** and **output format** from the drop-down menus.
- Select the appropriate **Trigger Frequency** and **output format** that will determine the pulse repetition frequency (PRF) of the pattern.
- Check the **Power-On** checkbox.
- Check the **Trigger** checkbox.
- This will start the trigger and the pulser will fire the programmed pattern at the desired device frequency and pulse repetition frequency (PRF).
- To stop the pattern uncheck the **Trigger** checkbox.

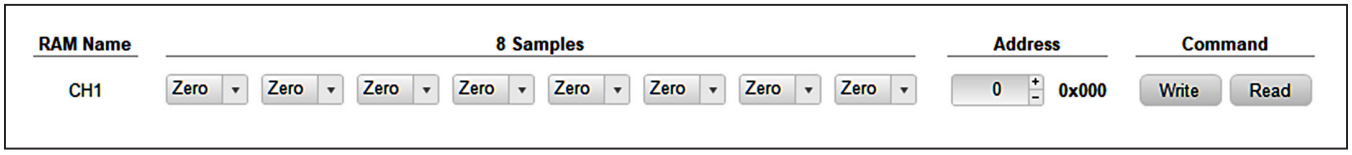


Figure 9. Pulse Wave Table CH1

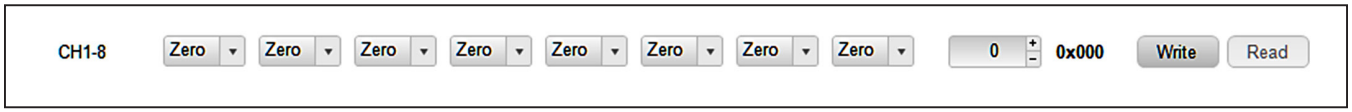


Figure 10. Pulse Wave Table CH1-8

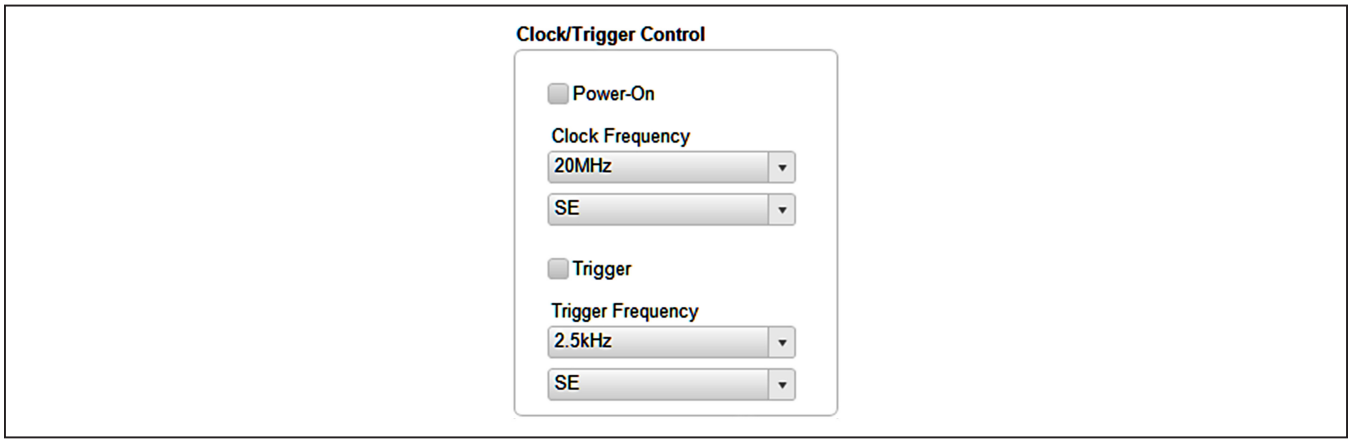


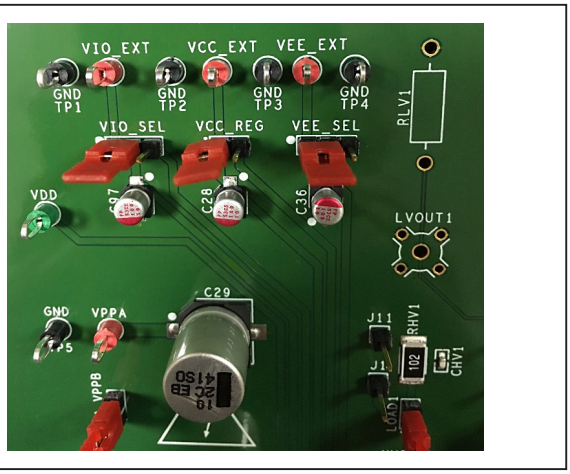
Figure 11. MAX14815 EV Kit Software—Clock/Trigger Control

Detailed Description of Hardware

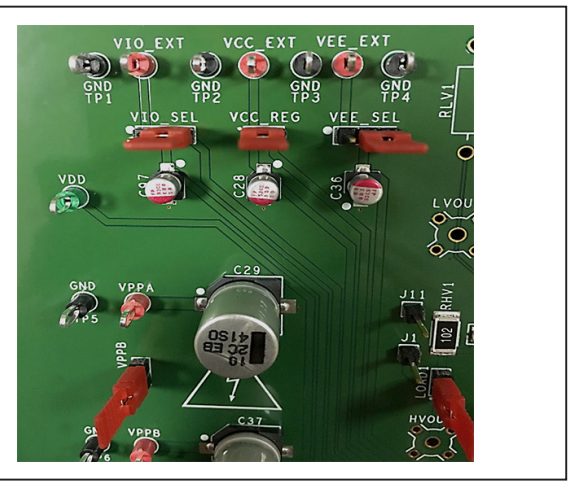
The MAX14815 EV kit provides a proven layout for the IC and it provides an on-board USB to SPI interface, a high-speed clock and trigger in order to be able to evaluate the innovative Beam Forming feature with the simple use of a PC.

Power Supplies

The EV kit has the option to be powered entirely from external supplies or using on-board LDOs to generate low voltage supplies. At default, it is configured for external supplies, so VCC_EXT, VEE_EXT, and VIO_EXT are to be provided. To enable the LDOs, install the shunt on VCC_REG and move the shunts on jumpers VIO_SEL and VEE_SEL to position 2-3. In this case, only VCC_EXT is needed.



Default Configuration



LDOs Enabled

If common voltage supplies are used for VPPA and VPPB, VNNA and VNNB, two fully independent high-voltage supplies (VNNA and VPPA) have to be provided from external power supplies by the use of the VNNA and VPPA test points, respectively. If separate supplies are used for VNNA and VNNB, VPPA and VPPB, four fully independent high-voltage supplies have to be provided from external power supplies by the use of the VNNA, VNNB, VPPA, and VPPB test points, respectively. In this case, remove the shunts VPPA_VPPB and VNNA_VNNB.

Programmable High-Speed Clock Generator and Trigger for Beam Forming Mode Evaluation

The EV kit has an on-board high-speed clock generator programmable through the GUI. This generator will also produce the trigger signal synchronous with the clock. The frequency of the trigger (PRF) will be programmed the same way as the clock by using the GUI. It is also possible to block the trigger in a low or high state. This will be useful when the pulser is configured in CW mode: a high state of the trigger will start the CW sequence; meanwhile a low state will stop it.

The FTDI chip receives the USB commands from the GUI and converts to µ-wire/SPI signals for on-board clock generator configuration.

A single-ended clock can also be provided to the MAX14815 externally through the female SMA connectors J12 and J18 or the headers JU13 and JU18. It can be probed at the CLK socket (provided, not installed). To use these connectors, disconnect the on-board clock signal by removing the 0Ω resistors R0_2 and R0_3 and installing the 0Ω resistors R0_1 and R0_4.

In a similar way, a single-ended or differential trigger can be provided to the MAX14815 externally through pins 14 and 16 of header JU15. It can be probed at the TRIG test point. To use these connectors, disconnect the on-board trigger by removing the 0Ω resistors R0_6 and R0_7 and installing the 0Ω resistors R0_5 and R07.

Operating Modes

The operating modes are set by MODE1, MODE2, and MODE3 inputs. These inputs can be manually configured by the shunt positions on headers MODE1, MODE2, and MODE3 as described in Table 2.

To use the innovative Beam Forming feature, MODE1 must be high while MODE2 and MODE3 are both low. All the features of the pulser can be programmed via SPI port. Please read the *MAX14815 IC data sheet* to learn how to use this operating mode.

Depending on the logic combination of the INNx, INPx input pin, the pulser operates either from VPPA, VNNA or from VPPB, VNNB with up to 2A driving current.

High-Voltage Outputs

The high-voltage outputs can be observed on the oscilloscope using HVOUT1–HVOUT8 scope-probe jacks. The high-voltage scope-probe jacks are not installed but the pads are present on the PCB and components are included.

Low-Voltage Outputs

The low-voltage outputs can be observed on the oscilloscope using LVOUT1–LVOUT8 or scope-probe jacks. The low-voltage output scope-probe jacks are not installed but the pads are present on the PCB and components are included.

Table 2. Operating Modes

MODE 3	MODE2	MODE1	MODE NAME	DESCRIPTION
0	0	0	Shutdown	Shutdown Mode. Power is minimized, and transmission and reception are disabled.
0	0	1	Beamforming Mode	5 Level Transmission. Internal Beamforming mode. In this Mode the device is programmed through SPI. Embedded digital resources are used to support in-chip beamforming. Operating Modes can be programmed using SPI. Refer to the Beamforming Paragraph in the MAX14815 IC data sheet for further information.
0	1	0	Direct Mode HB1	In this Mode the MAX14815 operates in Direct Mode and the Half Bridge 1 (HB1) operating from VPPA and VNNA is enabled with 2A current setting.
0	1	1	Direct Mode HB2 - 2A	In this Mode the MAX14815 operates in Direct Mode and the Half Bridge 2 (HB2) operating from VPPB and VNNB is enabled with 2A current setting.
1	0	0	Direct Mode HB2 - 1A	In this Mode the MAX14815 operates in Direct Mode and the Half Bridge 2 (HB2) operating from VPPB and VNNB is enabled with 1A current setting.
1	0	1	Direct Mode HB2 - 0.5A	In this Mode the MAX14815 operates in Direct Mode and the Half Bridge 2 (HB2) operating from VPPB and VNNB is enabled with 0.5A current setting.
1	1	0	Direct Mode Low Drop	In this Mode the MAX14815 operates in Direct Mode and the Half Bridge 2 (HB2) operating from VPPB and VNNB is enabled with 0.5A current setting. An active switch is enabled to shunt the grass clipping diodes and improve transmit efficiency. Use this Mode for CWD transmit.
1	1	1	Direct Mode Parallel	In this Mode the MAX14815 operates in Direct Mode and both the Half Bridge 1 (HB1) and Half Bridge 2 (HB2) are enabled and operate in parallel. The pulser can transmit 3 Levels bursts with 4A driving current. This Mode is recommended for Elastography because of the better transmit efficiency and thermal characteristics.

Ordering Information

PART	TYPE
MAX14815EVKIT#	EV KIT

#Denotes RoHS compliant.

The MAX14815EVKIT# includes the MAX14815ETK+ in a 68-pin TQFN.

MAX14815 EV Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1, C9-C12, C17-C19, C23, C25, C31, C34, C41, C45	—	14	C0402X5R100-105KNE; GRM155R61A105KE15	VENKEL LTD.; MURATA	1µF	CAPACITOR; SMT (0402); CERAMIC CHIP; 1µF; 10V; TOL = 10%; MODEL=; TG=-55°C TO +85°C; TC = X5R
2	C21	—	1	C0603C0G500-820JNE; GRM1885C1H820JA01	VENKEL LTD.; MURATA	82PF	CAPACITOR; SMT (0603); CERAMIC CHIP; 82PF; 50V; TOL = 5%; MODEL=; TG = -55°C TO +125°C; TC = C0G
3	C22	—	1	TPSA106M010R0900; T491A106M010AT	AVX;KEMET	10µF	CAPACITOR; SMT (3216); TANTALUM CHIP; 10µF; 10V; TOL = 20%
4	C24, C26, C32, C35, C40, C43, C47, C49	—	8	CGA5L3X7T2E224K160AA	TDK	0.22µF	CAPACITOR; SMT (1206); CERAMIC CHIP; 0.22µF; 250V; TOL = 10%; TG = -55°C TO +125°C; TC = X7T AUTO
5	C27, C38, C39, C48, C51, C69, C77	—	7	0603ZC105KAT2A	AVX	1µF	CAP; SMT (0603); 1µF; 10%; 10V; X7R; CERAMIC CHIP
6	C28, C36, C53, C97	—	4	RFS1A100MCN1GB	NICHICON	10µF	CAPACITOR; SMT (CASE_B); ALUMINUM-ELECTROLYTIC; 10µF; 10V; TOL = 20%; MODEL =; TG = -55°C TO +105°C
7	C29, C37, C44, C50	—	4	EEV-EB2C100Q	PANASONIC	10µF	CAPACITOR; SMT (CASE_G); ALUMINUM-ELECTROLYTIC; 10µF; 160V; TOL = 20%; MODEL = EEV SERIES; TG = -40°C TO +105°C
8	C30	—	1	B45197A2476K409	KEMET	47µF	CAPACITOR; SMT (7343); TANTALUM CHIP; 47µF; 10V; TOL = 10%; MODEL = B45197A SERIES; TG = -55°C TO +125°C
9	C33	—	1	593D107X0010D	VISHAY SPRAGUE	100µF	CAPACITOR; SMT (7343); TANTALUM CHIP; 100µF; 10V; TOL = 20%; MODEL = 593D SERIES; TG = -55°C TO +125°C
10	C46	—	1	TAJR105K010RNJ	AVX	1µF	CAPACITOR; SMT (2012); TANTALUM CHIP; 1µF; 10V; TOL = 10%
11	C52, C56, C57, C59-C68, C70-C76	—	20	C0603C104K9RAC; GRM188R70J104KA01	KEMET;MURATA	0.1µF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1µF; 6.3V; TOL = 10%; MODEL =; TG = -55°C TO +125°C; TC = X7R;
12	C54	—	1	GRT188R60J475KE01	MURATA	4.7µF	CAPACITOR; SMT (0603); CERAMIC CHIP; 4.7µF; 6.3V; TOL = 10%; TG = -55°C TO +85°C; TC = X5R; AUTO
13	C55, C58	—	2	GRM39C0G220J50V; GRM1885C1H220J; C1608C0G1H220J080AA	MURATA; MURATA;TDK	22PF	CAPACITOR; SMT (0603); CERAMIC CHIP; 22PF; 50V; TOL = 5%; MODEL =; TG = -55°C TO +125°C; TC = C0G
14	CHV1-CHV8	—	8	C0603C221K1GAC	KEMET	220PF	CAPACITOR; SMT (0603); CERAMIC CHIP; 220PF; 100V; TOL = 10%; MODEL = C0G; TG = -55°C TO +125°C; TC = +
15	CLK, NCLK, VCC_EXT, VEE_EXT, VIO_EXT, VNNA, VNNB, VPPA, VPPB	—	9	5010	N/A	5010	TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE ;
16	D1	—	1	SS12	FAIRCHILD SEMICONDUCTOR	SS12	DIODE; SCH; SMT (DO-214AC); V = 20V; I = 1.0A
17	DTHP	—	1	SSL-LX3044GD	LUMEX OPTOCOMPONENTS INC	LX3044GD	GREEN LIGHT EMITTING DIODE
18	J1-J9, J11, J14, J16, J20, J22, J33, J35, VBUS	—	17	PBC01SAAN	SULLINS ELECTRONICS CORP	PBC01SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 1PIN
19	J12, J18	—	2	1-1478979-0	TE CONNECTIVITY	1-1478979-0	CONNECTOR; FEMALE; THROUGH HOLE; SMA STRAIGHT PCB SOCKET RECEPTACLE; STRAIGHT; 5PINS
20	JU13, JU18, JU23, LOAD1-LOAD8, VCC_REG, VNNA_VNNB, VPPA_VPPB	—	14	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65°C TO +125°C

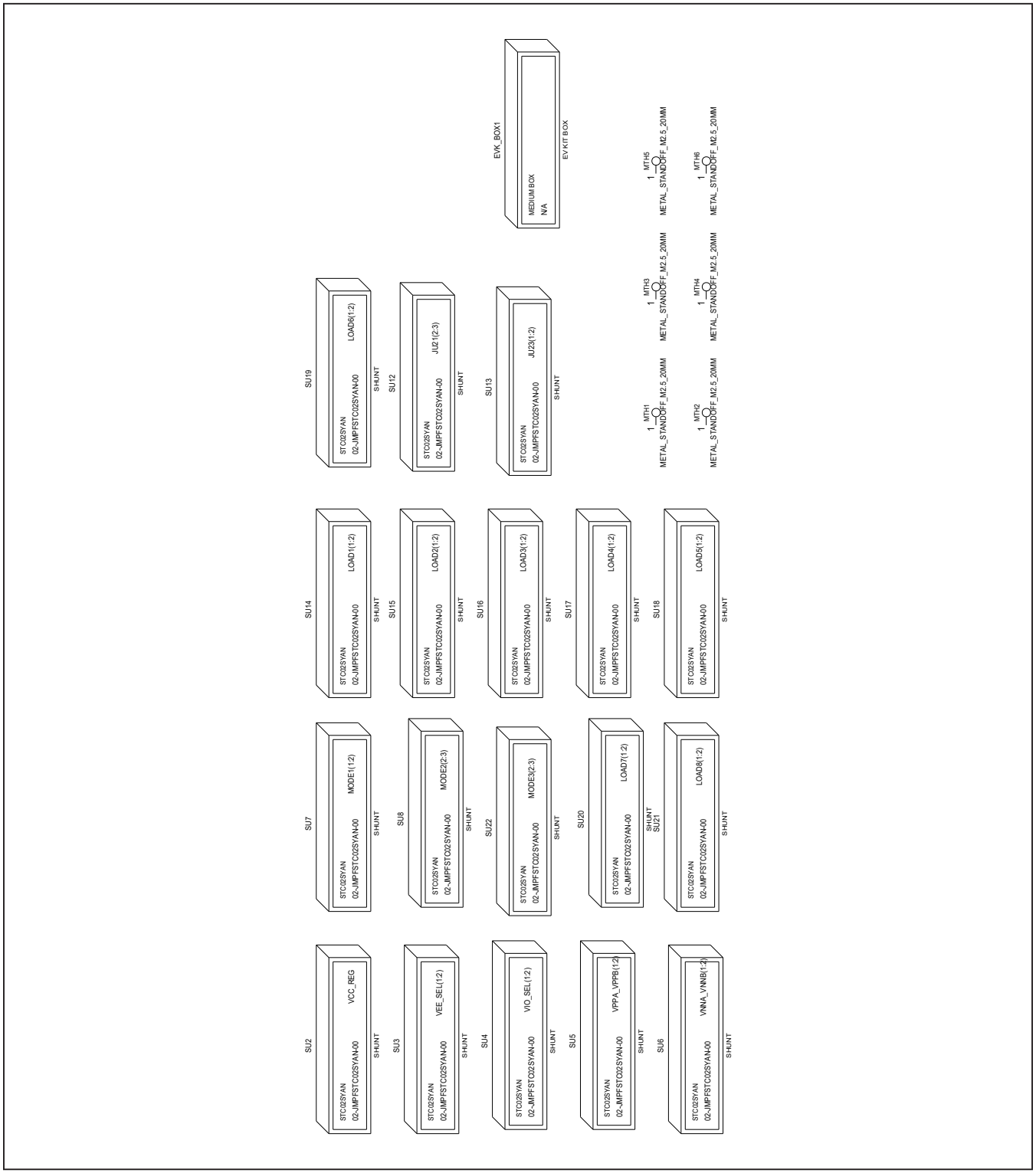
MAX14815 EV Bill of Materials (continued)

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
21	JU15, JU20	—	2	PEC08DAAN	SULLINS ELECTRONICS CORP.	PEC08DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 16PINS; -65°C TO +125°C
22	JU21, MODE1-MODE3, VEE_SEL, VIO_SEL	—	6	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65°C TO +125°C
23	J_USB	—	1	67068-9000	MOLEX	67068-9000	CONNECTOR; FEMALE; THROUGH HOLE; USB B-TYPE CONNECTOR WHITE; RIGHT ANGLE; 4PINS
24	L1	—	1	CR54NP-100MC	SUMIDA	10UH	INDUCTOR; SMT; MAGNETICALLY SHIELDED FERRITE BOBBIN CORE; 10µH; TOL = ±20%; 1.44A
25	L2, L4, L5	—	3	BLM18SG331TN1	MURATA	330	INDUCTOR; SMT (0603); FERRITE-BEAD; 330; TOL = ±25%; 1.5A
26	L3	—	1	742792040	WURTH ELECTRONICS INC.	600	INDUCTOR; SMT (0805); FERRITE-BEAD; 600; TOL = ±25%; 2A; -55°C TO +125°C
27	R0_2, R0_3, R0_6, R0_7, R0_9, R0_10	—	6	ANY	ANY	0	RESISTOR; 0805; 0Ω; JUMPER; 0.125W; THICK FILM; FORMFACTOR
28	R9, R55	—	2	CRCW0603100RFK; ERJ-3EKF1000; RC0603FR-07100RL	VISHAY DALE; PANASONIC	100	RESISTOR; 0603; 100Ω; 1%; 100PPM; 0.10W; THICK FILM
29	R13, R17, R49, R51, R53	—	5	CRCW060310K0FK; ERJ-3EKF1002	VISHAY DALE; PANASONIC	10K	RESISTOR; 0603; 10K; 1%; 100PPM; 0.10W; THICK FILM
30	R15	—	1	ERJ-3EKF1303	PANASONIC	130K	RESISTOR; 0603; 130KΩ; 1%; 100PPM; 0.10W; THICK FILM
31	R16	—	1	CRCW0603300KFK	VISHAY DALE	300K	RESISTOR, 0603, 300KΩ, 1%, 100PPM, 0.1W, THICK FILM
32	R18	—	1	CRCW060347K0FK	VISHAY DALE	47K	RESISTOR; 0603; 47K; 1%; 100PPM; 0.10W; THICK FILM
33	R19	—	1	ERJ-3EKF1693; CRCW0603169KFK	PANASONIC;VISHAY	169K	RESISTOR; 0603; 169KΩ; 1%; 100PPM; 0.10W; THICK FILM
34	R20	—	1	ERA-3AEB104; AT0603BRD07100KL	PANASONIC;YAGEO	100K	RESISTOR; 0603; 100KΩ; 0.1%; 25PPM; 0.1W; THIN FILM
35	R21, R22, R31	—	3	CRCW06030000Z0	VISHAY DALE	0	RESISTOR; 0603; 0Ω; 0%; JUMPER; 0.1W; THICK FILM
36	R23-R30, R33-R40	—	16	MCR03EZPFX2002; ERJ-3EKF2002; CR0603-FX-2002ELF; CRCW060320K0FK	ROHM;PANASONIC; BOURNS;VISHAY DALE	20K	RESISTOR; 0603; 20KΩ; 1%; 100PPM; 0.10W; THICK FILM
37	R32	—	1	CRCW0603560RFK	VISHAY DALE	560	RESISTOR, 0603, 560Ω, 1%, 100PPM, 0.10W, THICK FILM
38	R50	—	1	CR0603-FX-1001ELF	BOURNS	1K	RESISTOR; 0603; 1KΩ; 1%; 100PPM; 0.10W; THICK FILM
39	R52	—	1	ERA-3YEB113V	PANASONIC	11K	RESISTOR; 0603; 11KΩ; 0.1%; 25PPM; 0.10W; METAL FILM ;
40	R54	—	1	ERA-3YEB202V	PANASONIC	2K	RESISTOR; 0603; 2KΩ; 0.1%; 25PPM; 0.10W; THICK FILM
41	RESET	—	1	FSM4JSMA	TE CONNECTIVITY	FSM4JSMA	SWITCH; SPST; SMT; 12V; 0.05A;FSMJSMA SERIES; TACTILE SWITCH; RCOIL = 0.1Ω; RINSULATION = 1GΩ
42	RHV1-RHV8	—	8	ERJ-1TYJ102	PANASONIC	1K	RESISTOR; 2512; 1KΩ; 5%; 100PPM; 1.0W; THICK FILM
43	RLV1-RLV8	—	8	ANY	ANY	TBD	PACKAGE OUTLINE CFM1 RESISTOR THROUGH HOLE WITH HOLE DIAMETER RECEPTACLE 0555
44	SPI	—	1	961210-6404-AR	3M	961210-6404-AR	CONNECTOR; THROUGH HOLE; PIN STRIP HEADER; STRAIGHT; 10PINS

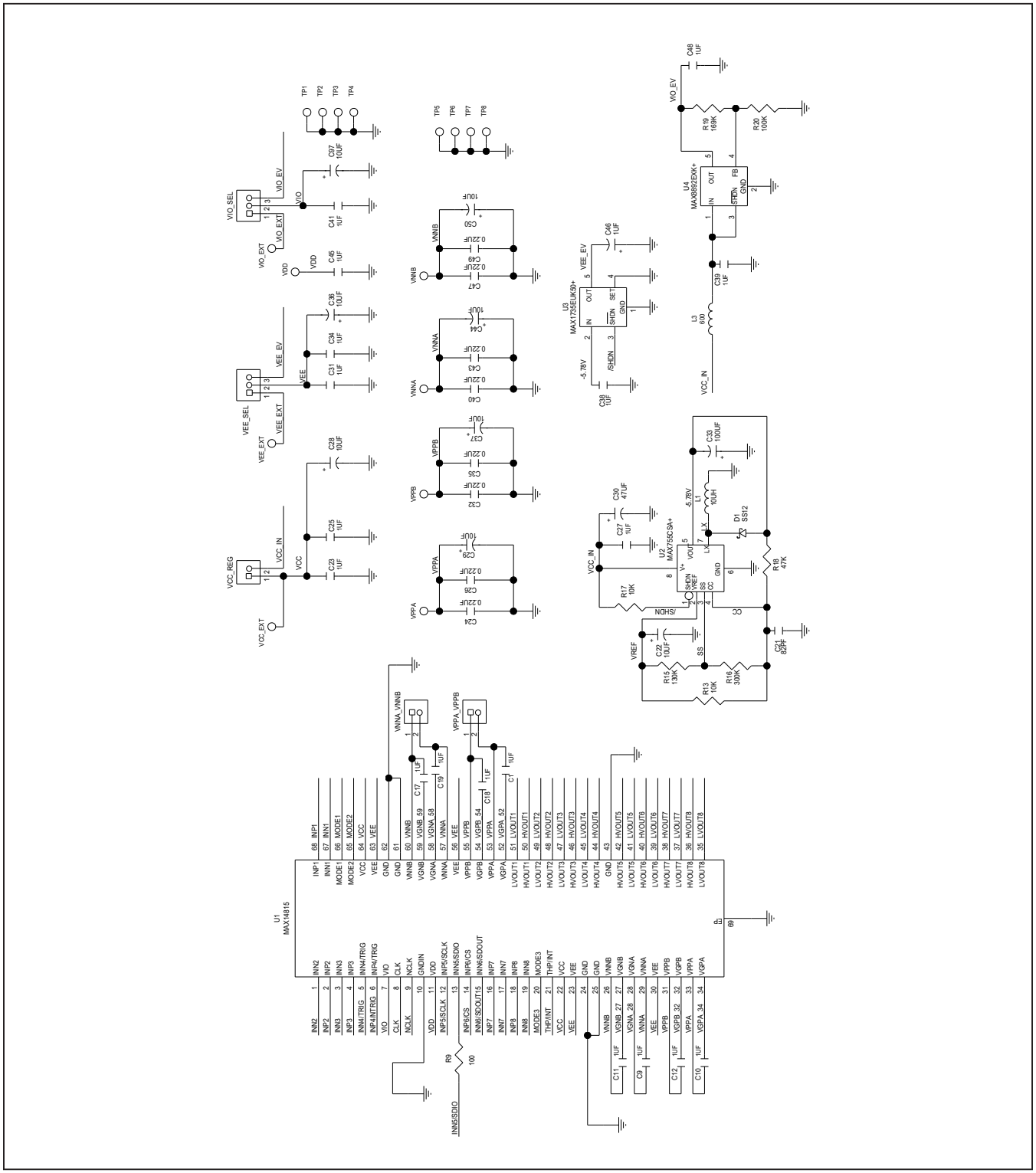
MAX14815 EV Bill of Materials (continued)

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
45	SU2-SU8, SU12-SU22	—	18	STC02SYAN	SULLINS ELECTRONICS CORP.	STC02SYAN	TEST POINT; JUMPER; STR; TOTAL LENGTH = 0.256IN; BLACK; INSULATION = PBT CONTACT = PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL;
46	SW2	—	1	DBS 3104	KNITTER-SWITCH	DBS 3104	SWITCH; SPST; THROUGH HOLE; 24V; 0.025A; DBS 3100 SERIES; DUAL-IN-LINE SWITCH; RCOIL = <0.05Ω; RINSULATION => 100MΩ; KNITTER-SWITCH
47	TP1-TP8	—	8	5011	N/A	5011	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE = 0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
48	U1	—	1	MAX14815	MAXIM	MAX14815	EVKIT PART - IC; XMTR; OCTAL 5 LEVELS HV ULTRASOUND TRANSMITTER WITH BEAMFORMING; NO. OF LEADS-(68); QFN 10X10
49	U2	—	1	MAX755CSA+	MAXIM	MAX755CSA+	IC; VREG; -5V/ADJUSTABLE; NEGATIVE-OUTPUT; INVERTING; CURRENT-MODE PWM REGULATOR; NSOIC8 150MIL
50	U3	—	1	MAX1735EUK50+	MAXIM	MAX1735EUK50+	IC; VREG; NEGATIVE-OUTPUT LOW-DROPOUT LINEAR REGULATOR; SOT23-5
51	U4	—	1	MAX8892EXK+	MAXIM INTEGRATED	MAX8892EXK+	IC; VREG; HIGH PSRR; LOW DROP-OUT LINEAR REGULATOR; SC70-5
52	U5	—	1	93LC46B-I/ST	MICROCHIP	93LC46B-I/ST	IC; EPROM; 16 BIT; 1K 2.5V MICROWIRE SERIAL EEPROM; TSSOP8 3X4.4
53	U6	—	1	MAX1806EUA33+	MAXIM	MAX1806EUA33+	IC; VREG; LOW-VOLTAGE LINEAR REGULATOR; UMAX8-EP
54	U7	—	1	FT2232HL	FUTURE TECHNOLOGY DEVICES INTL LTD.	FT2232HL	IC; MMRY; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64
55	U8	—	1	LMK01801BISQE/NOPB	TEXAS INSTRUMENTS	LMK01801BISQE/ NOPB	IC; CLK; LMK01801 DUAL CLOCK DIVIDER BUFFER; WQFN48-EP 7X7
56	VDD	—	1	5126	N/A	5126	TEST POINT; PIN DIA = 0.125IN; TOTAL LENGTH = 0.445IN; BOARD HOLE = 0.063IN; GREEN; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
57	Y1	—	1	ABLS2-12.000MHZ-D4Y-T	ABRACON	12MHZ	CRYSTAL; SMT ; 18PF; 12MHZ; ; ±30PPM
58	Y2	—	1	ABLJO-160.000MHZ	ABRACON	ABLJO-160.000MHZ	OSCILLATOR; SMT 14.3 X 8.7 X 5.5mm; 15PF; 160MHZ; ±25PPM
59	PCB	—	1	MAX14815	MAXIM	PCB	PCB:MAX14815
60	MTH1-MTH6	DNI	6	24427	GENERIC PART	N/A	STANDOFF; FEMALE-THREADED; HEX; M2.5; 20MM; ALUMINUM
61	MTH1-MTH6	DNI	6	29301	GENERIC PART	N/A	MACHINE SCREW; SLOTTED; PAN; M2.5; 6MM; STEEL; ZINC PLATE
62	HVOUT1-HVOUT8	DNI	8	131-5031-00	TEKTRONIX	131-5031-00	CONNECTOR; WIREMOUNT; 3 GHZ 20X LOW CAPACITANCE PROBE; STRAIGHT; 5PINS
63	LVOUT1-LVOUT8	DNP	0	131-5031-00	TEKTRONIX	131-5031-00	CONNECTOR; WIREMOUNT; 3 GHZ 20X LOW CAPACITANCE PROBE; STRAIGHT; 5PINS
64	R0_1, R0_4, R0_5, R0_8, R10-R12, R14, R50_NTR, R50_TR	DNP	0	N/A	N/A	OPEN	RESISTOR; 0805; OPEN; FORMFACTOR
TOTAL			249				

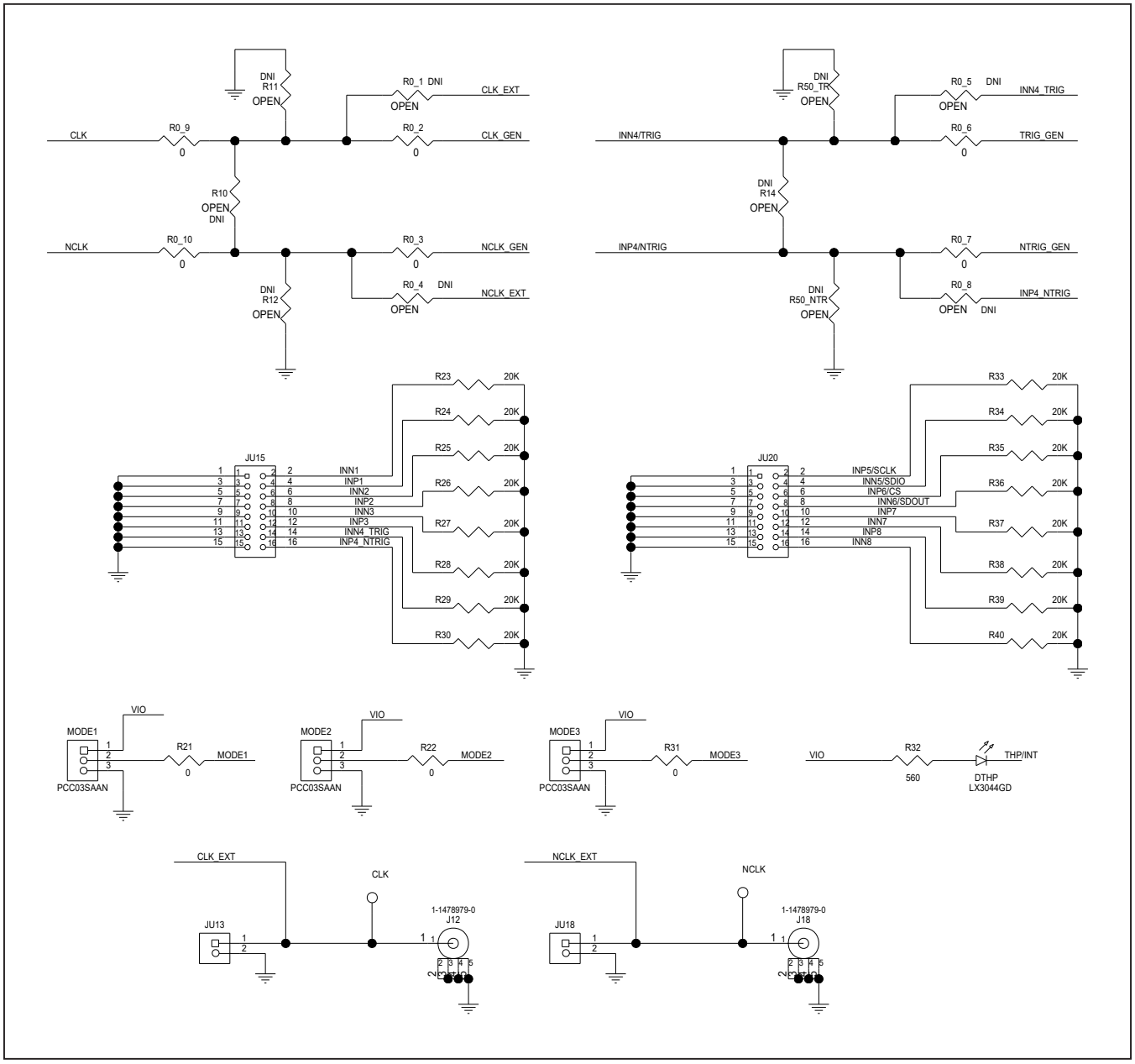
MAX14815 EV Schematic Diagram



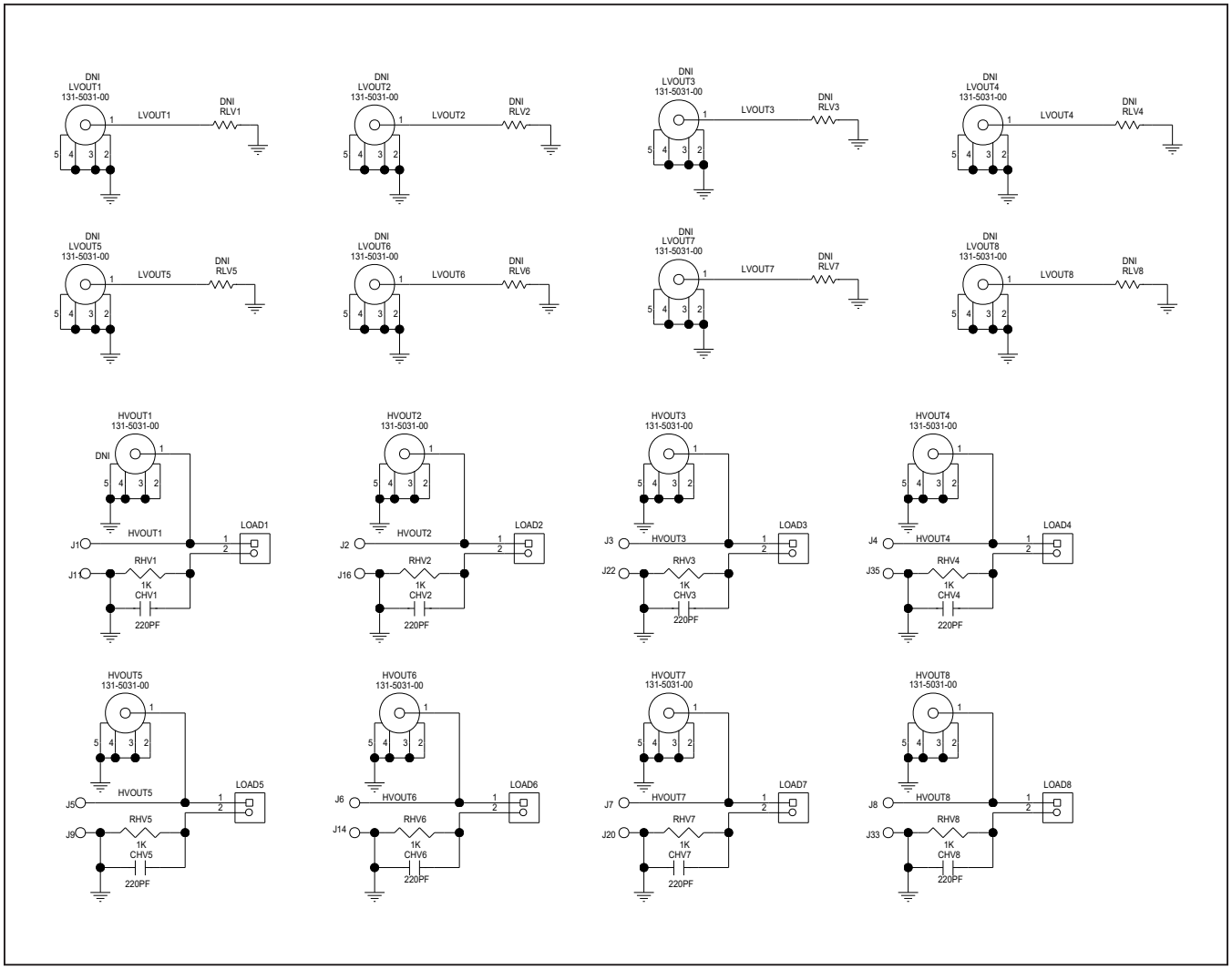
MAX14815 EV Schematic Diagram (continued)



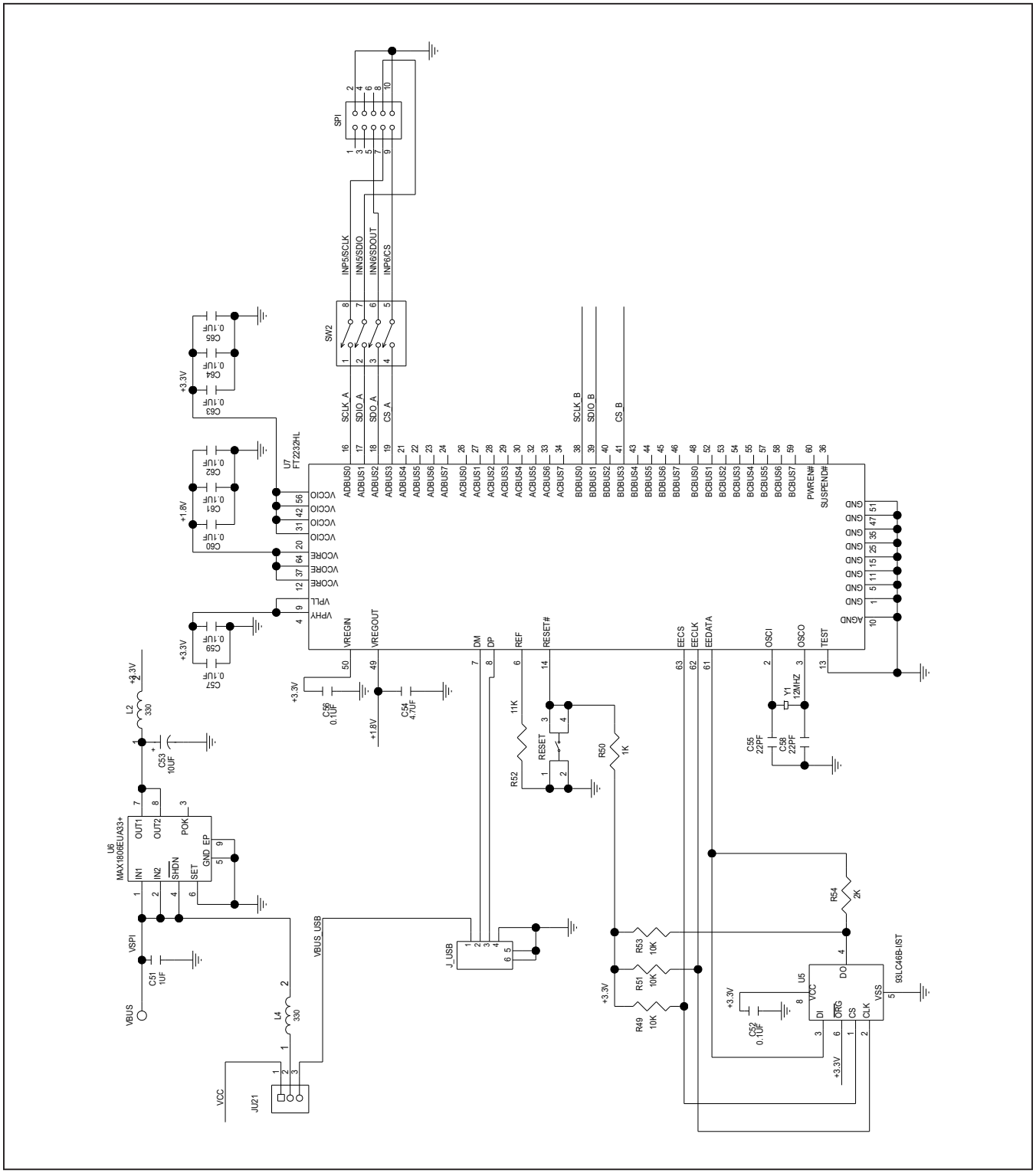
MAX14815 EV Schematic Diagram (continued)



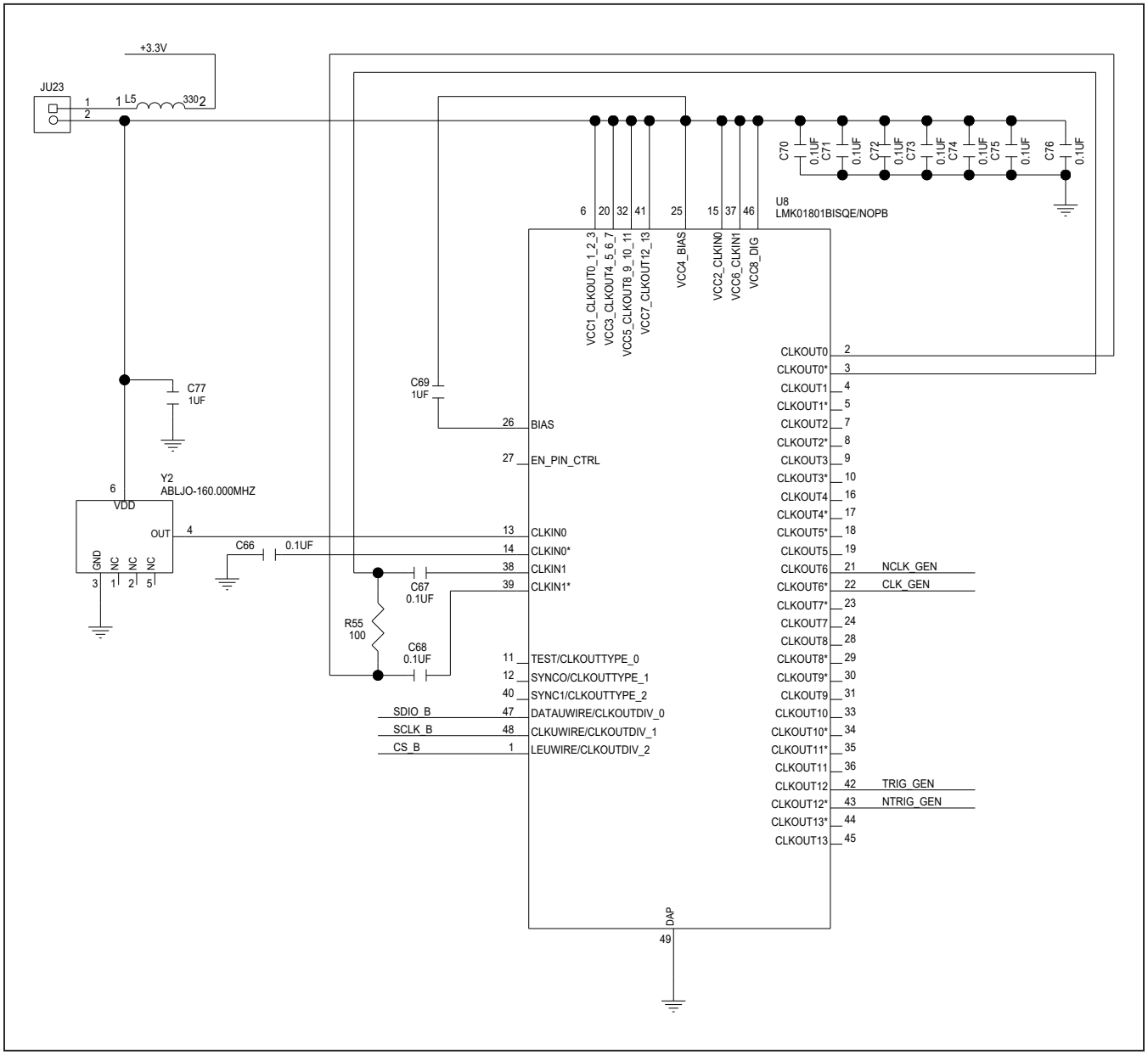
MAX14815 EV Schematic Diagram (continued)



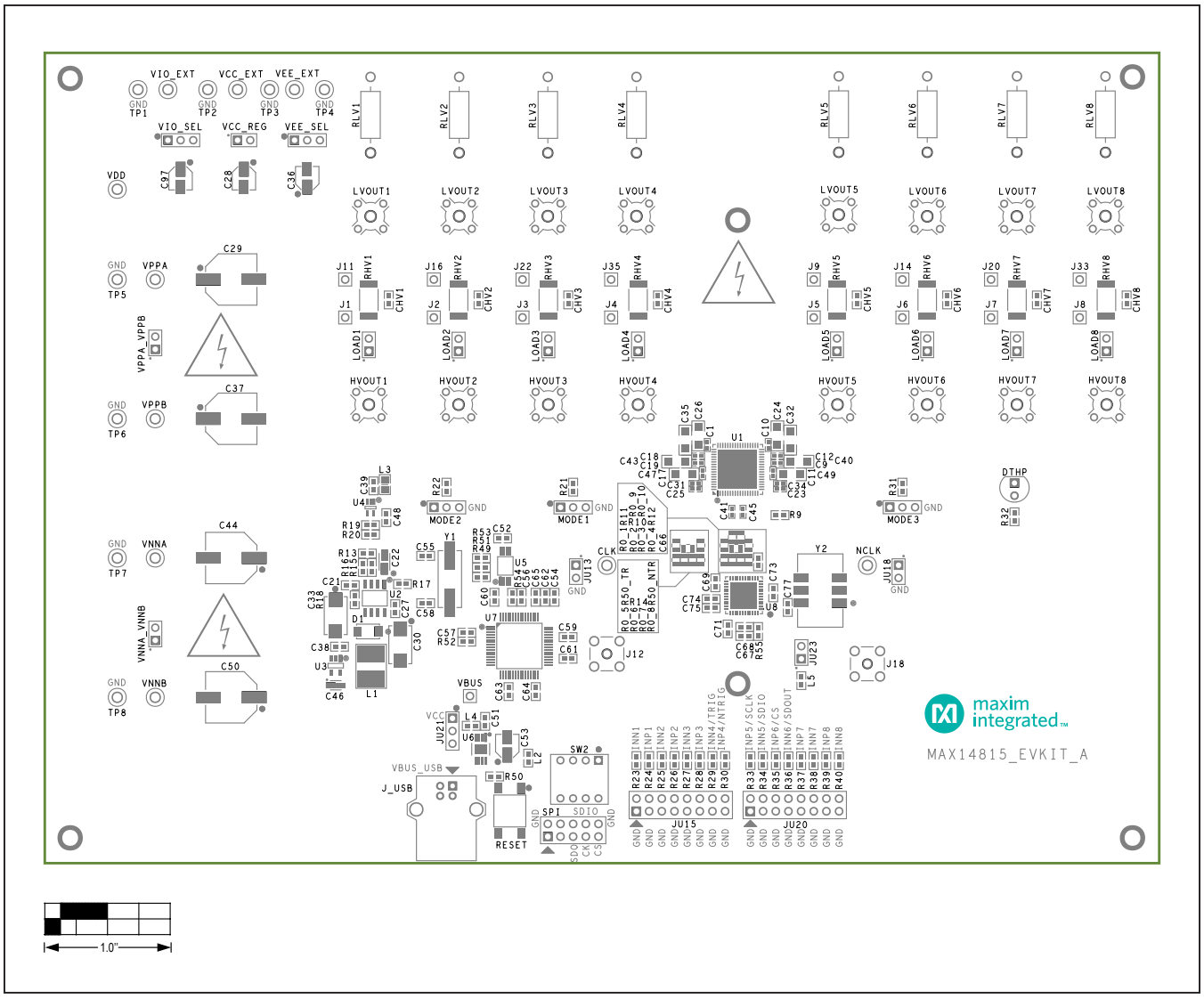
MAX14815 EV Schematic Diagram (continued)



MAX14815 EV Schematic Diagram (continued)

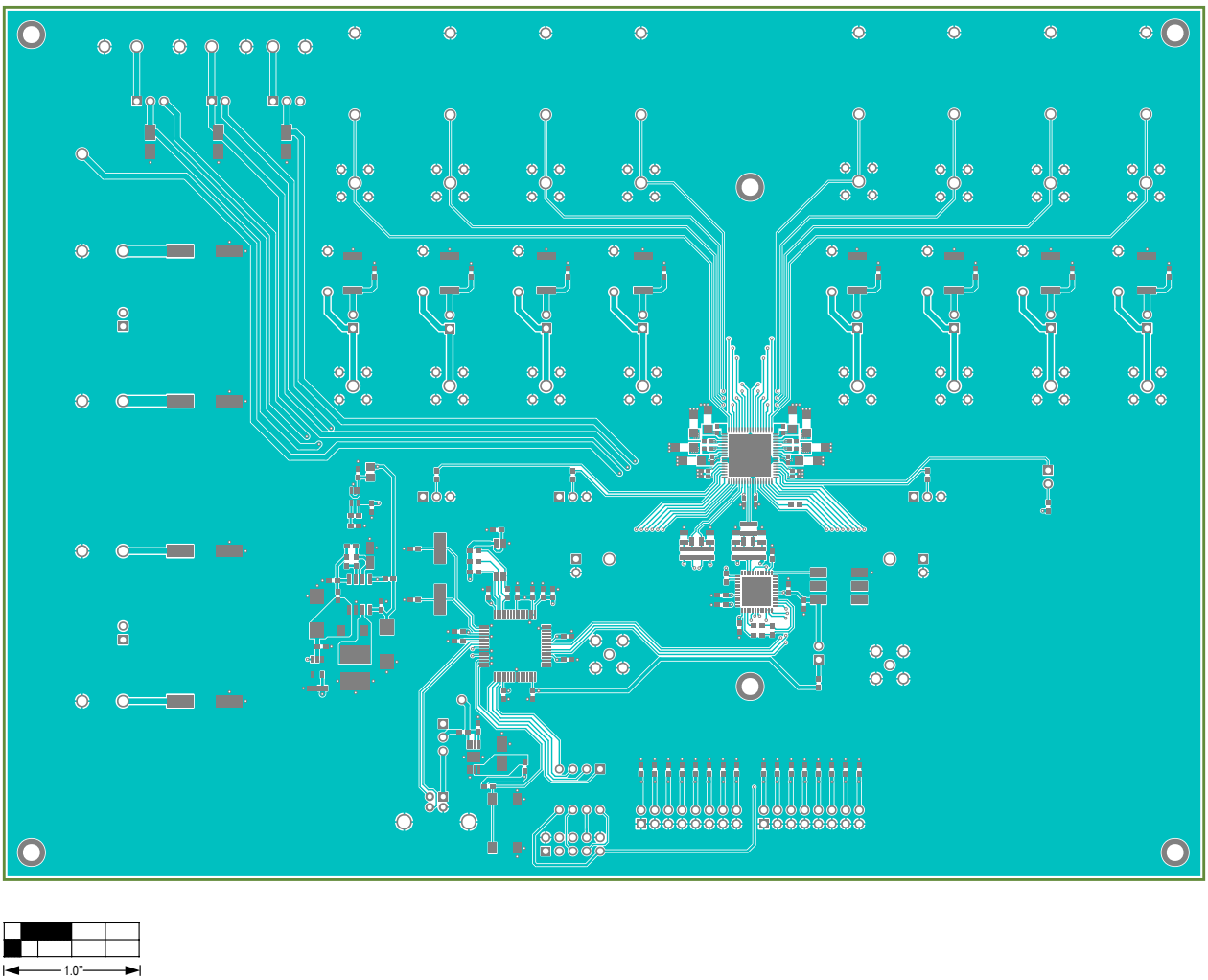


MAX14815 EV PCB Layout Diagrams



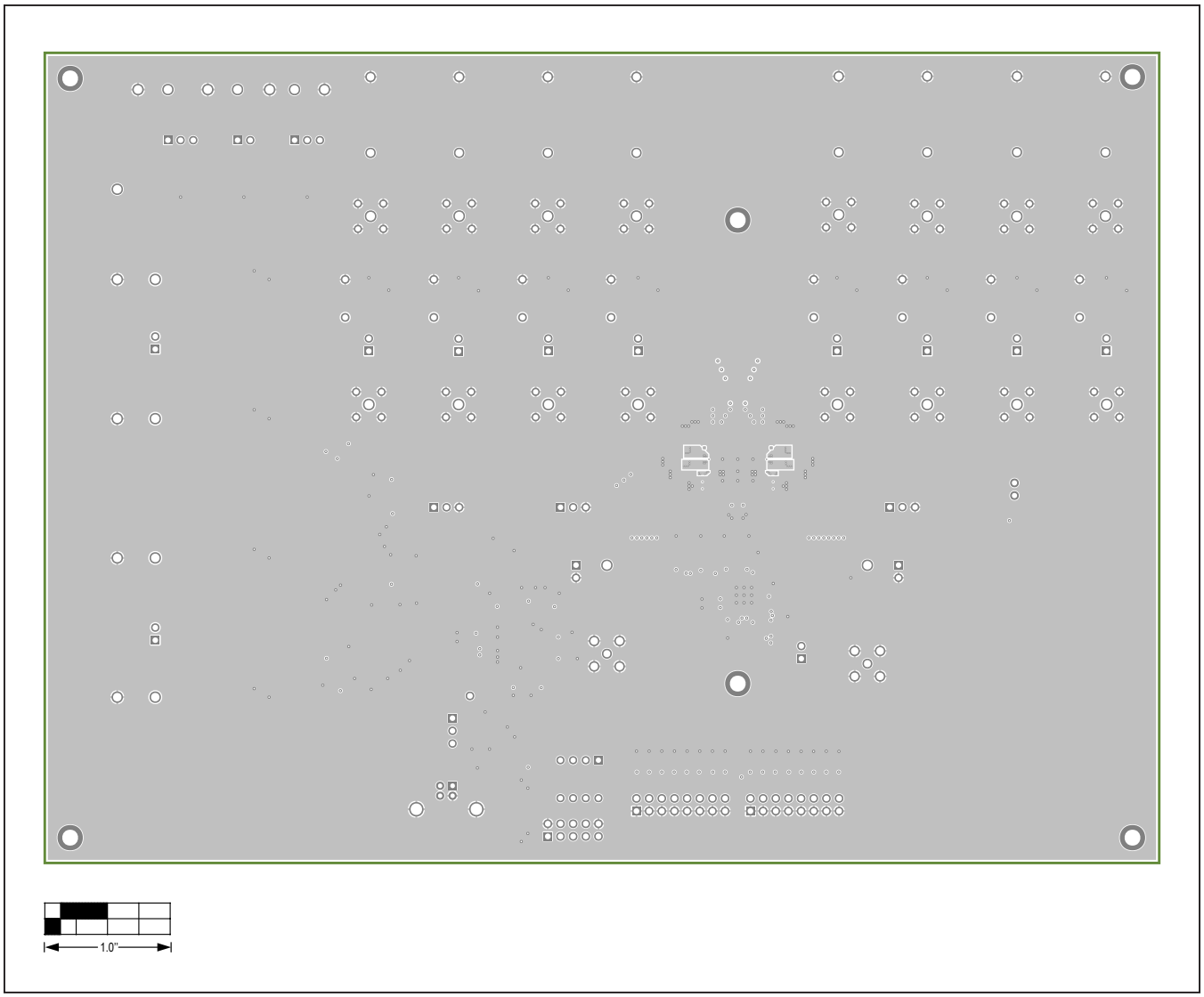
MAX14815 EV Kit Component Placement Guide—Top Silkscreen

MAX14815 EV PCB Layout Diagrams (continued)



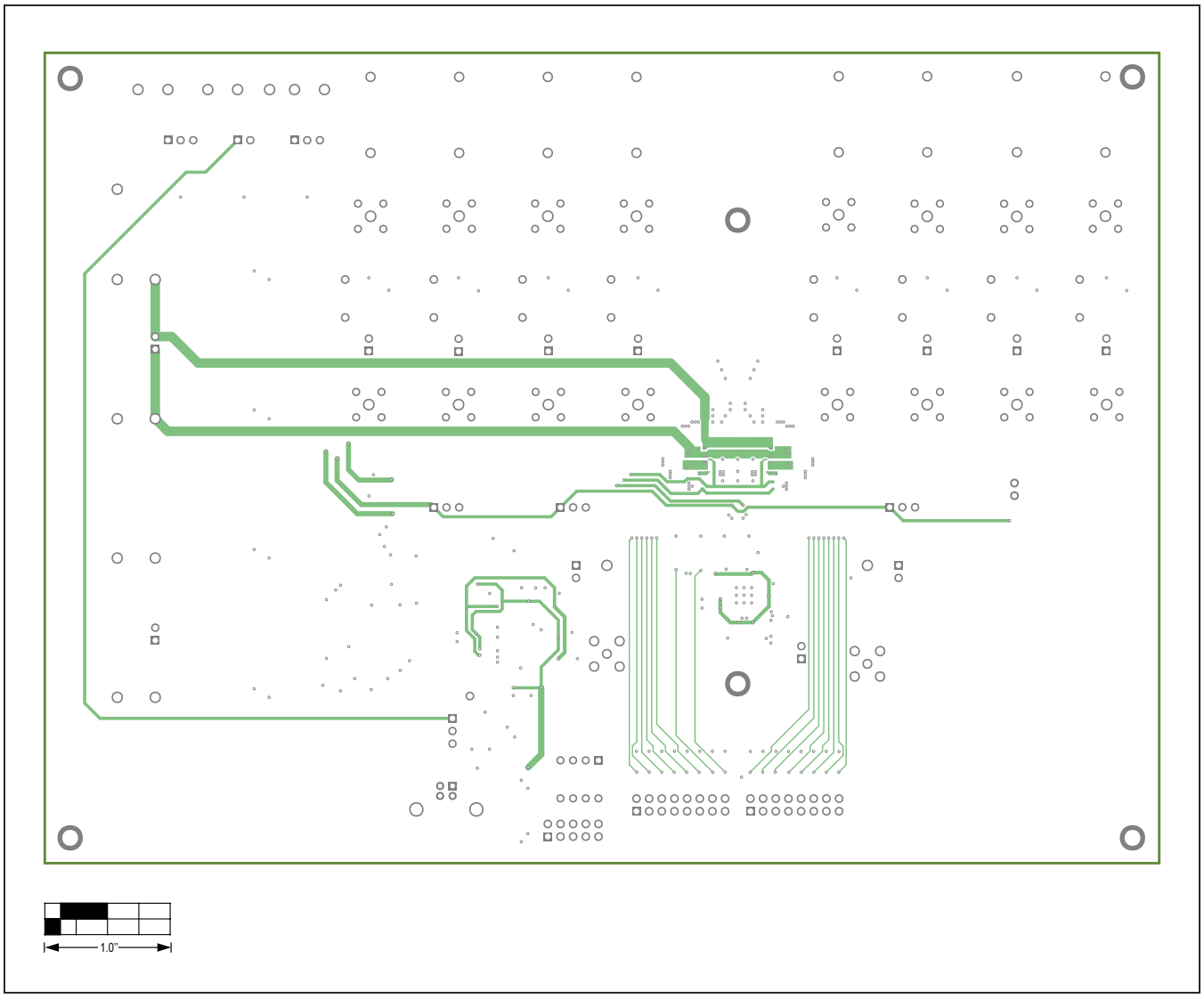
MAX14815 EV Kit Component Placement Guide—Top View

MAX14815 EV PCB Layout Diagrams (continued)



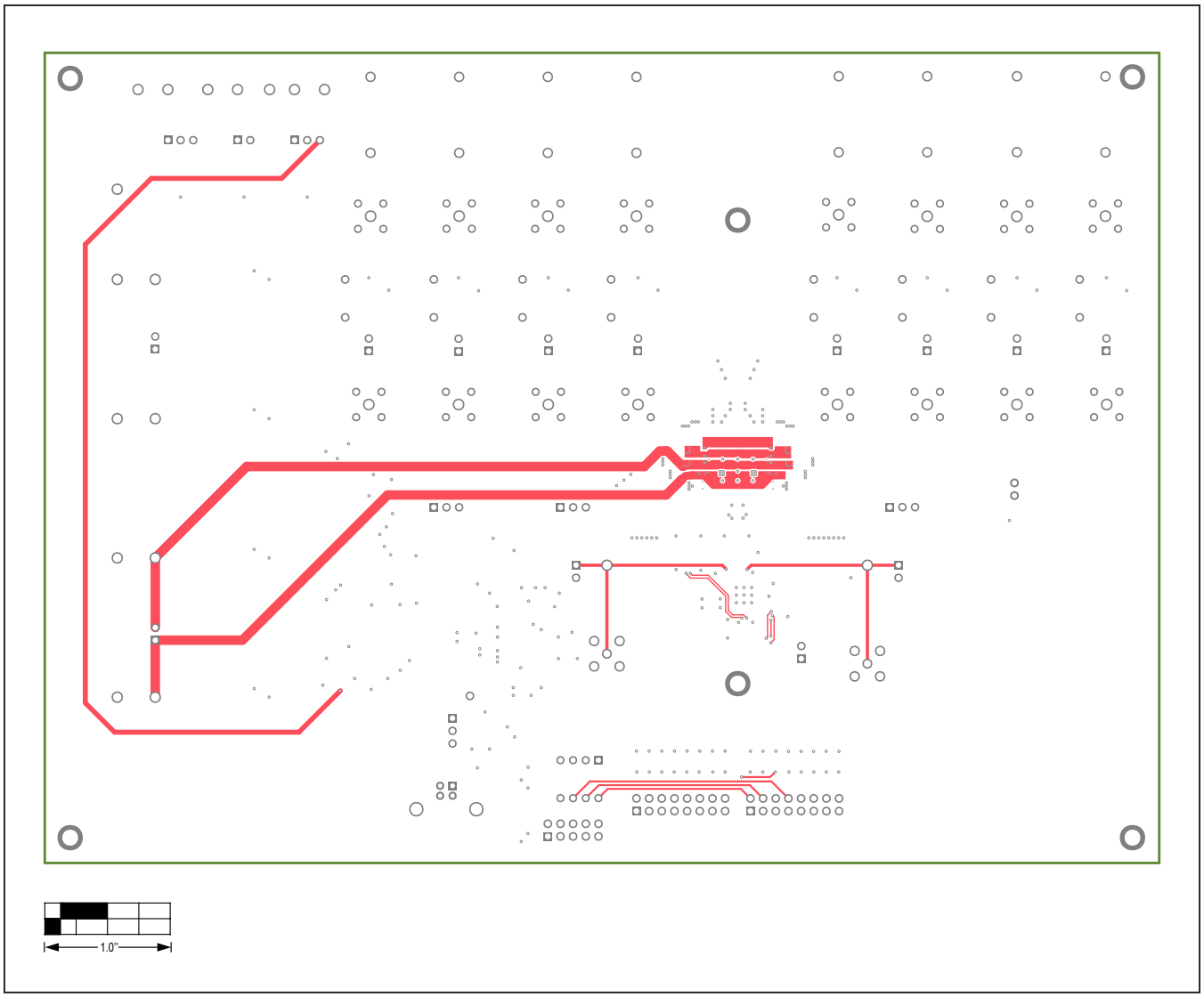
MAX14815 EV Kit Component Placement Guide—Internal 1

MAX14815 EV PCB Layout Diagrams (continued)



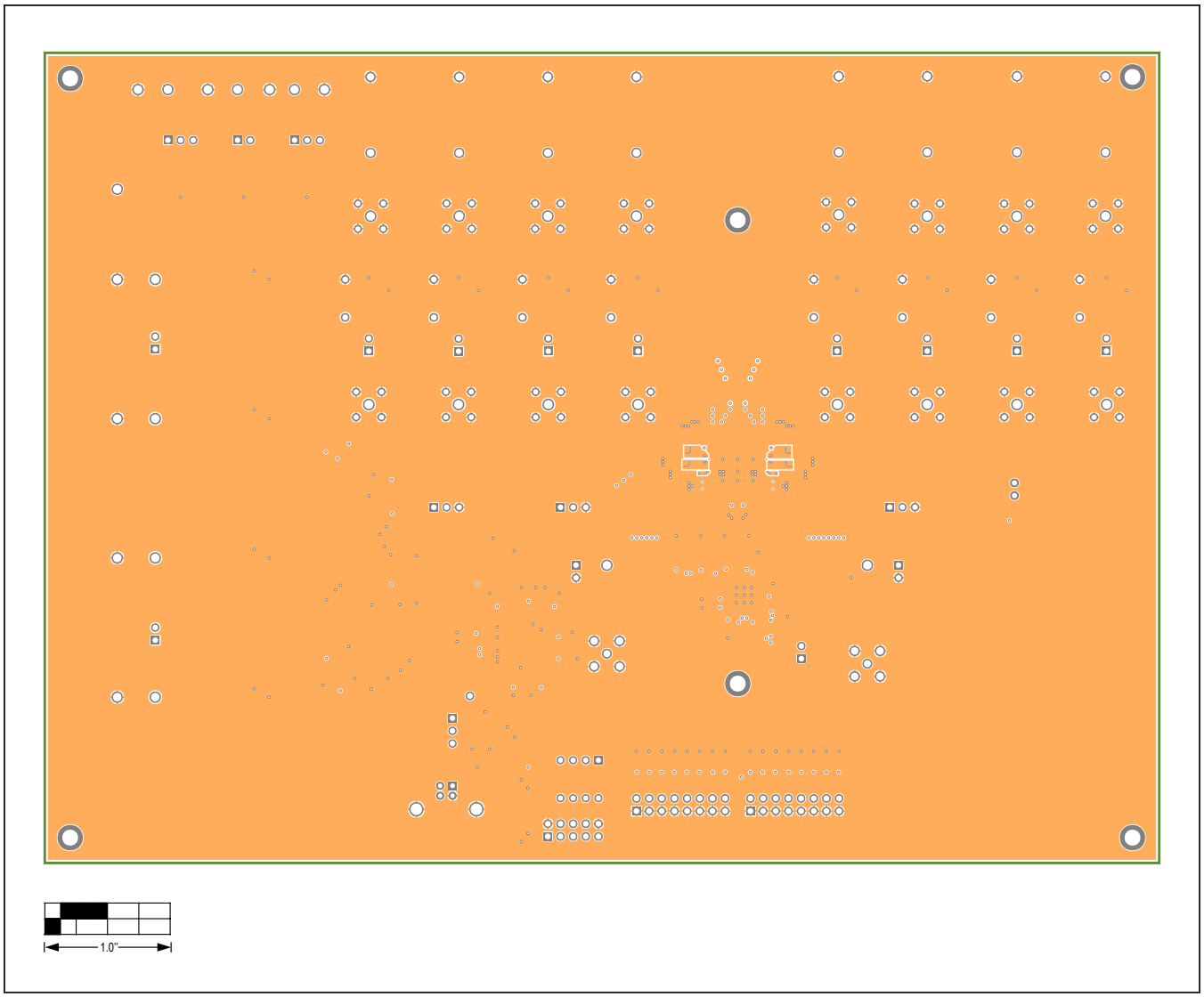
MAX14815 EV Kit Component Placement Guide—Internal 2

MAX14815 EV PCB Layout Diagrams (continued)



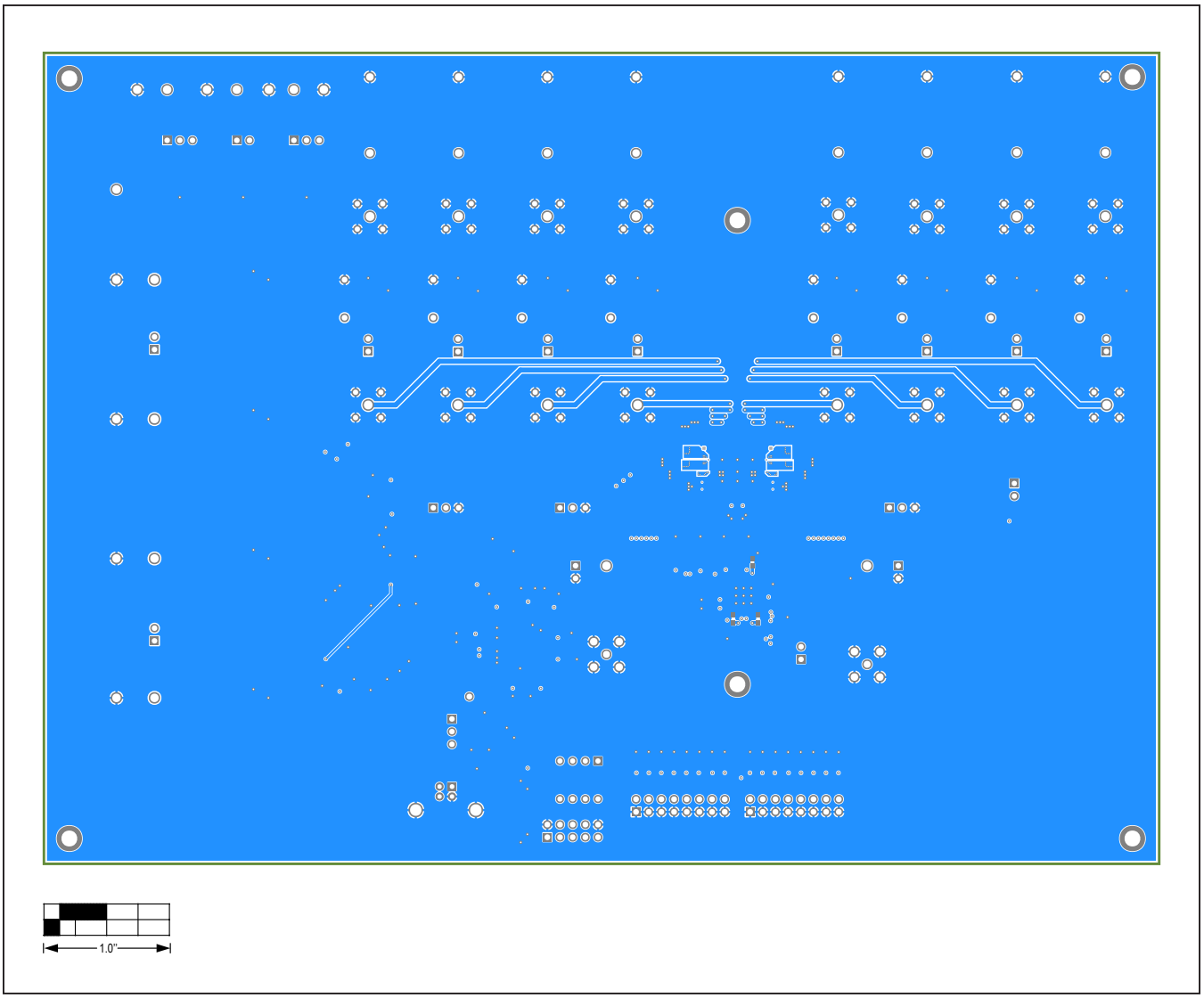
MAX14815 EV Kit Component Placement Guide—Internal 3

MAX14815 EV PCB Layout Diagrams (continued)



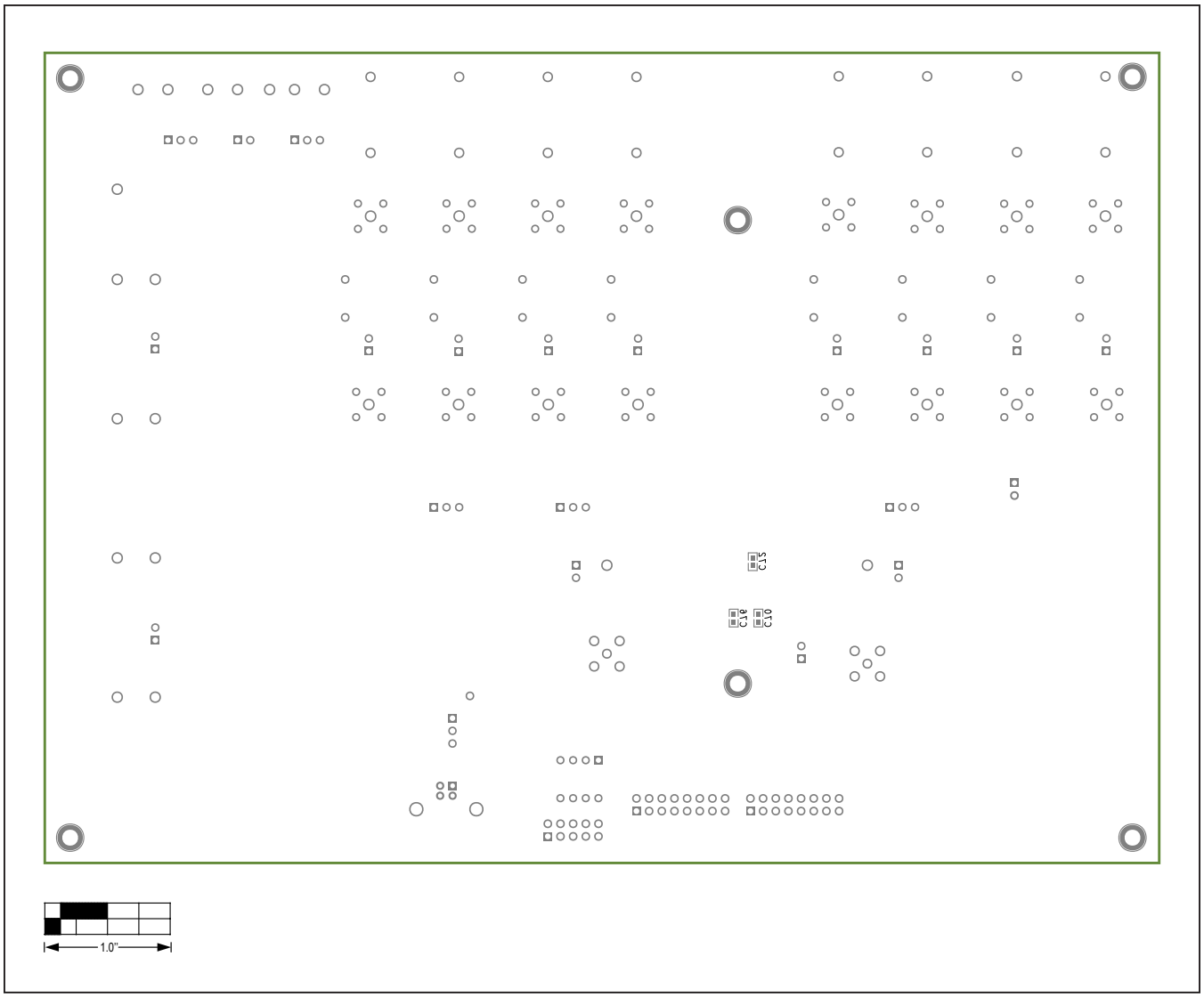
MAX14815 EV Kit Component Placement Guide—Internal 4

MAX14815 EV PCB Layout Diagrams (continued)



MAX14815 EV Kit Component Placement Guide—Bottom View

MAX14815 EV PCB Layout Diagrams (continued)



MAX14815 EV Kit Component Placement Guide—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/19	Initial release	—

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