**Evaluates: MAX77542 in WLP Package**

# MAX77542 Evaluation Kit

## General Description

The MAX77542 evaluation kit (EV kit) is a fully assembled and tested printed circuit board (PCB) that demonstrates the MAX77542 four-phase configurable step-down regulator. The board is equipped with test points and jumpers for testing all pins on the device. Six potentiometers allow for adjusting the SEL1/2/3/4 and CFG1/2 configuration pins at will. There are also probe sockets on critical nodes (VOUTx, LXx) for precise measurements. The board also comes with some spare inductors (L5–L12) for testing out efficiency/performance tradeoffs. The PCB is designed with Analog Devices, Inc.'s, recommended layout of the IC and external components. The IC sets default output voltages by way of R15, R17, R19, and R21 but can be changed with the potentiometers or through I$^2$C communication. Analog Devices' GUI can be used by connecting a Windows®-based PC to J1 through a USB Type-A to Micro-USB cable.

_Ordering Information_ **appears at end of data sheet.**

## Features

- Probe Sockets for High-Accuracy Measurements
- Test Points for All Features (MFIO, CE, IRQB)
  - Default Output Voltage Adjustable Via SEL1/2/3/4
  - Default MFIO Function and I$^2$C Slave ID Set Via CFG1
  - Default Peak Current Limit and FSW Set Via CFG2
- Connector for Custom I$^2$C Host

## EV Kit Contents

- The MAX77542 EV kit
- USB Type-A to Micro-USB Cable
- Windows-based GUI software is available for use with the EV kit and can be downloaded from Analog Devices website at **www.analog.com/max77542evkit** (under the **Design Resources** tab). Windows 7 or newer is required to use with the EV kit GUI software.



_Figure 1. MAX77542 Evaluation Board_

319-100989; Rev 2; 11/24

## EV Kit Specifications and Default Configuration

The MAX77542 EV kit comes with the following default settings:

- $V_{OUT1}$ = 1.0V
- $V_{OUT2}$ = 1.8V
- $V_{OUT3}$ = 3.3V
- $V_{OUT4}$ = 5.0V
- $F_{SW}$ = 1.0MHz
- Skip Mode
- Soft-Start and DVS Ramp-Up Rate = 5.0mV/µs
- Soft-Stop and DVS Ramp-Down Rate = -0.15mV/µs
- 100Ω Active Discharge Enabled (1Ω is Disabled)
  - Peak Current Limit = 5.5A
  - MFIO1-8 set to EN inputs and POK outputs
  - MFIO1: EN1
  - MFIO2: POK1
  - MFIO3: EN2
  - MFIO4: POK2
  - MFIO5: EN3
  - MFIO6: POK3
  - MFIO7: EN4
  - MFIO8: POK4
  - MAX77542BAWU+ Installed

## Quick Start

### Required Equipment

- Adjustable DC Power Supply or Applicable Battery
- Multimeter
- USB Type-A to Micro-USB Cable (optional)
- Windows-based PC with MAX77542 EV kit GUI

### Setup Overview

Figure 2 depicts a simplified block diagram of a typical EV kit setup. Attach more meters and scope probes as necessary. Figure 3 depicts a typical application circuit of the MAX77542.
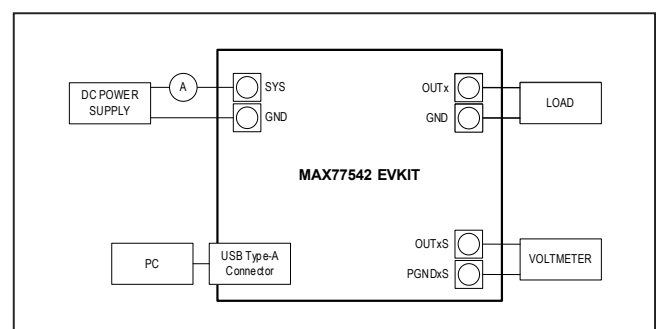


Figure 2. Simplified Setup Block Diagram

## Table 1. EV Kit Default Specifications

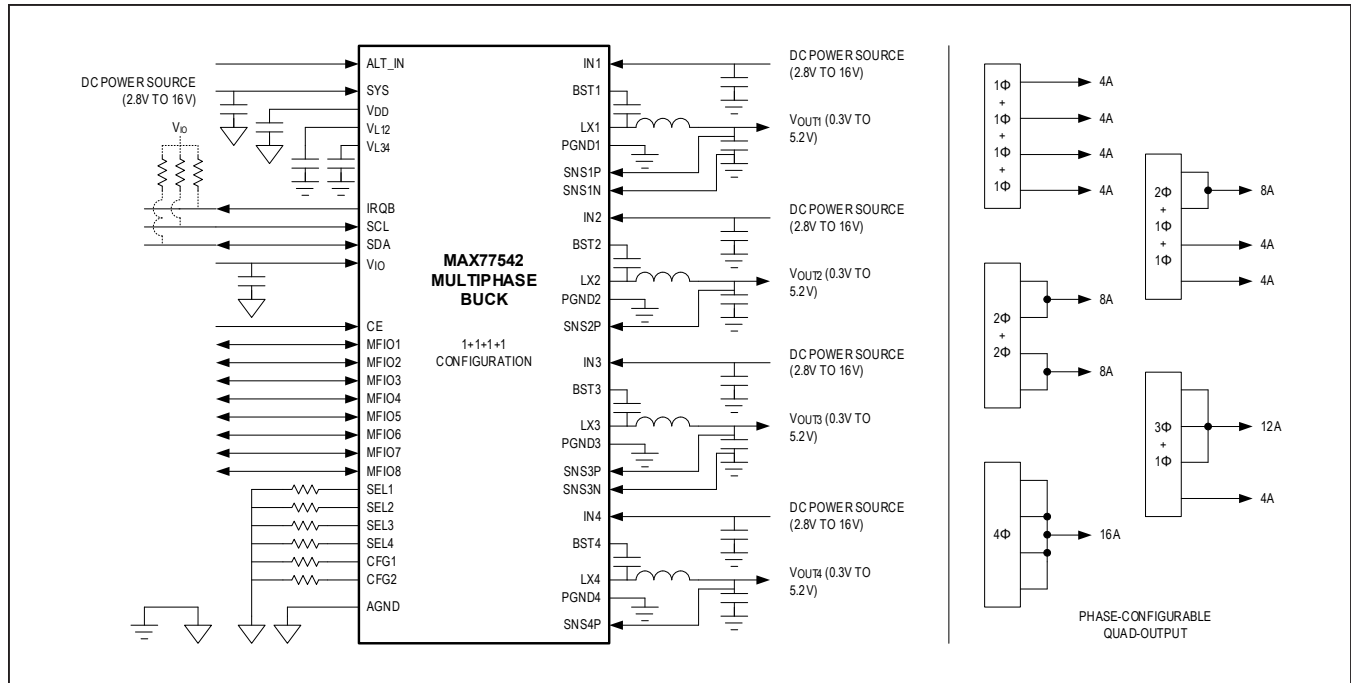| SPECIFICATIONS | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| Input Voltage | | 2.8 | | 16.0 | V |
| Output Voltage | Configurable by SEL or through I2C | 0.3 | | 5.2 | V |
| Output Current | Per Phase | 0 | | 4 | A |
| Switching Frequency | | | 1 | | MHz |
| Peak Current Limit | | | 5.5 | | A |

*Figure 3. Typical Application Circuit*

## Procedure

Follow this procedure for first time evaluation:

1) Install GUI software. Visit the product webpage at **https://www.analog.com/max77542evkit** and navigate to Design Resources to download the latest version of the EV kit software. Save the EV kit software installation file to a temporary folder and decompress the ZIP file. Run the .EXE file and follow the on-screen instructions to complete installation.

2) Ensure that the jumpers are configured as per Table 2.

3) Apply a valid voltage (like 7.6V) from a power supply to the SYS and PGND terminals of the EV Kit. Do not enable the power supply yet.

4) **Important:** Make sure that the phase configuration is correct. See the *Phase Configuration* section.

5) Connect a USB cable between your PC and J1 USB port on the EV kit.

6) Turn on the input power supply.

7) Open the GUI and click **Device** in the menu bar. Click **Connect** in the **Device** drop-down list. Wait for the device to respond, and in the **Synchronize** window, press **Connect**. The GUI takes a few seconds to read the device registers after pressing **Connect**.

8) Navigate to the **Buck 1 Configuration** tab. Drag the slide bar in **Buck Normal Output Voltage** section to change the output voltage and click **Write**.
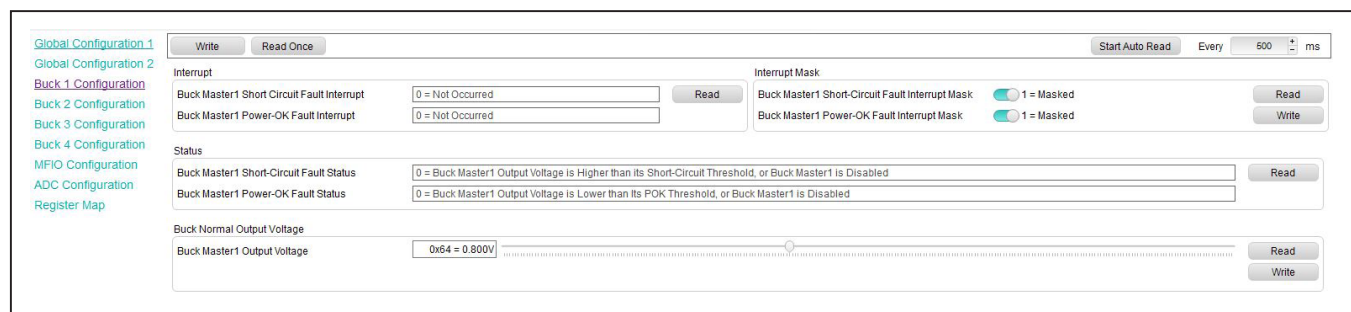
9) Navigate to the **Global Configuration 2** tab. Toggle Buck Master1 Enable Control to Enable and press **Write**.

10) Measure OUT1 with a voltmeter. It should read the voltage set in the GUI in Step 8.

11) Use the GUI to exercise the various features of the MAX77542.

This concludes the Quick Start procedure. Users are now encouraged to further explore the device and its register settings with the GUI software. For more information on the GUI, see *Detailed Description of Software* section.

## Table 2. Default Shunt Positions and Jumper Descriptions

| JUMPER | NODE OR FUNCTION | SHUNT POSITION | FUNCTION |
|---|---|---|---|
| J1 | USB Connector (GUI) | N/A | GUI USB Connector |
| J2 | ALT_IN | 1-2* | Connects ALT_IN to GND. Leave disconnected if ALT_IN functionality is used. |
| J3 | CE | 1-2* | Connects CE to SYS (Enables internal bias) |
| | | 2-3 | Connects CE to GND (Disables internal bias) |
| J4 | SEL1 | 1-2* | Connects SEL1 to fixed 1.87kΩ resistor (1.0V$_{OUT}$ default) |
| | | 2-3 | Connects SEL1 to the potentiometer for adjustable default V$_{OUT}$ |
| J5 | SEL2 | 2-4* | Connects SEL2 to fixed 30.9kΩ resistor (1.8V$_{OUT}$ default) |
| | | 3-4 | Connects SEL2 to GND (enables multiphase operation) |
| | | 4-6 | Connects SEL2 to the potentiometer for adjustable default V$_{OUT}$ |
| J6 | SEL3 | 2-4* | Connects SEL3 to fixed 64.9kΩ resistor (3.3V$_{OUT}$ default) |
| | | 3-4 | Connects SEL3 to GND (enables multiphase operation) |
| | | 4-6 | Connects SEL3 to the potentiometer for adjustable default V$_{OUT}$ |
| J7 | SEL4 | 2-4* | Connects SEL4 to fixed 100kΩ resistor (5V$_{OUT}$ default) |
| | | 3-4 | Connects SEL4 to GND (enables multiphase operation) |
| | | 4-6 | Connects SEL4 to the potentiometer for adjustable default V$_{OUT}$ |
| J8 | CFG1 | 1-2* | Connects CFG1 to fixed 0Ω resistor (Sets MFIO default functions. Refer to the device data sheet for more information.) |
| | | 2-3 | Connects CFG1 to the potentiometer for adjustable MFIO functions |
| J9 | CFG2 | 1-2* | Connects CFG2 to fixed 0Ω resistor (Sets default Mx_ILIM and Mx_FREQ values. Refer to the device data sheet for more information.) |
| | | 2-3 | Connects CFG2 to the potentiometer for adjustable Mx_ILIM and Mx_FREQ |
| J10 | MFIO1 | 1-2 | MFIO1 pulled up to VIO through 10kΩ resistor |
| | | 2-3* | MFIO1 tied to GND |
| | | N/A | MFIO1 left disconnected (Hi-Z) |
| J11 | MFIO2 | 1-2* | MFIO2 pulled up to VIO through 10kΩ resistor |
| | | 2-3 | MFIO2 tied to GND |
| | | N/A | MFIO2 left disconnected (Hi-Z) |
| J12 | MFIO3 | 1-2 | MFIO3 pulled up to VIO through 10kΩ resistor |
| | | 2-3* | MFIO3 tied to GND |
| | | N/A | MFIO3 left disconnected (Hi-Z) |

## Table 2. Default Shunt Positions and Jumper Descriptions (continued)

| JUMPER | NODE OR FUNCTION | SHUNT POSITION | FUNCTION |
|---|---|---|---|
| J13 | MFIO4 | 1-2* | MFIO4 pulled up to VIO through 10kΩ resistor |
| | | 2-3 | MFIO4 tied to GND |
| | | N/A | MFIO4 left disconnected (Hi-Z) |
| J14 | MFIO5 | 1-2 | MFIO5 pulled up to VIO through 10kΩ resistor |
| | | 2-3* | MFIO5 tied to GND |
| | | N/A | MFIO5 left disconnected (Hi-Z) |
| J15 | MFIO6 | 1-2* | MFIO6 pulled up to VIO through 10kΩ resistor |
| | | 2-3 | MFIO6 tied to GND |
| | | N/A | MFIO6 left disconnected (Hi-Z) |
| J16 | MFIO7 | 1-2 | MFIO7 pulled up to VIO through 10kΩ resistor |
| | | 2-3* | MFIO7 tied to GND |
| | | N/A | MFIO7 left disconnected (Hi-Z) |
| J17 | MFIO8 | 1-2* | MFIO8 pulled up to VIO through 10kΩ resistor |
| | | 2-3 | MFIO8 tied to GND |
| | | N/A | MFIO8 left disconnected (Hi-Z) |
| J18 | I$^2$C Header for External I$^2$C Bus | N/A | Test points for I$^2$C signals to be connected to an external I$^2$C Bus |
| J19 | VIN_LDO | 1-2* | VIO LDO powered from VUSB |
| | | 2-3 | VIO LDO powered from VIO_PI (External I$^2$C Bus) |
| J20 | VIO Level | 1-2 | VIO is set to 1.2V |
| | | 2-3* | VIO is set to 1.8V |

*Default position.*

## EV Kit Hardware

### GUI Interface

The MAX77542EVKIT# can be connected to the GUI by connecting a USB cable to J1 on the EV kit.

### External I2C Bus

To use a different I2C host, disconnect the USB cable and attach I2C wires to J18 on the EV kit. Move the jumper on J19 to position 2-3. The J19 jumper sets the input of the LDO that provides VIO to either the USB input voltage or the voltage applied to VIO on J18. Jumper J18 is the input to a level shifter rather than an input to the actual pins on the IC.

### Phase Configuration

The SEL2, SEL3, and SEL4 are used to set the phase configuration of the MAX77542. R48, R49, R50, and R57 are used to connect the outputs together for multiphase configuration. The default configuration is four outputs (1φ + 1φ + 1φ + 1φ). See Table 3 to configure the MAX77542 according to the correct phase configuration.

### Buck Feedback Configuration

Buck feedback configuration is specific to the selected phase configuration. Each of the four bucks have their own feedback inputs (SNSxP and SNSxN for Buck 1 and Buck 3; SNSxP alone for Buck 2 and Buck 4). Only the master feedback pins need to connect to the output voltage to ensure regulation (see Table 4). Unused or slave feedback pins can connect to the output voltage during evaluation at no consequence.

For example, a 2φ + 2φ configuration creates Buck 1 (using L1 and L2) and Buck 3 (using L3 and L4). Buck 1's feedback is SNS1P and SNS1N. Buck 3's feedback is SNS3P and SNS3N. In this example, Buck 2 and Buck 4 are not configured as stand-alone channels. Therefore, SNS2P and SNS4P are do not care but can connect to their corresponding multiphase outputs with no consequence.

Each inductor under a single buck's control must be the same value. Refer to the device data sheet for recommendations on which inductor to use for each output voltage range.

## Table 3. Phase Configuration Truth Table for Local Sensing

| PHASE CONFIGURATION | SEL2 | SEL3 | SEL4 | R48 | R49 | R50 | R57 |
|---|---|---|---|---|---|---|---|
| 4 Outputs (1φ + 1φ + 1φ + 1φ) | >200Ω | >200Ω | >200Ω | Open | Open | Open | Open |
| 3 Outputs (2φ + 1φ + 1φ) | 0Ω | >200Ω | >200Ω | 0Ω | Open | Open | Open |
| 2 Outputs (2φ + 2φ) | 0Ω | >200Ω | 0Ω | 0Ω | Open | 0Ω | Open |
| 2 Outputs (3φ + 1φ) | 0Ω | 0Ω | >200Ω | 0Ω | Open | Open | 0Ω |
| 1 Output (4φ) | 0Ω | 0Ω | 0Ω | 0Ω | 0Ω | 0Ω | 0Ω |

## Table 4. Buck Output Naming Convention and Feedback

| PHASE CONFIGURATION | NAMING CONVENTION AND PHASES USED | FEEDBACK INPUTS |
|---|---|---|
| 4 Outputs (1φ + 1φ + 1φ + 1φ) | Buck 1 (1φ) uses L1 | SNS1P, SNS1N |
| | Buck 2 (1φ) uses L2 | SNS2P |
| | Buck 3 (1φ) uses L3 | SNS3P, SNS3N |
| | Buck 4 (1φ) uses L4 | SNS4P |
| 3 Outputs (2φ + 1φ + 1φ) | Buck 1 (2φ) uses L1, L2 | SNS1P, SNS1N |
| | Buck 3 (1φ) uses L3 | SNS3P, SNS3N |
| | Buck 4 (1φ) uses L4 | SNS4P |
| 2 Outputs (2φ + 2φ) | Buck 1 (2φ) uses L1, L2 | SNS1P, SNS1N |
| | Buck 3 (2φ) uses L3, L4 | SNS3P, SNS3N |
| 2 Outputs (3φ + 1φ) | Buck 1 (3φ) uses L1, L2, L3 | SNS1P, SNS1N |
| | Buck 3 (1φ) uses L3 | SNS4P |
| 1 Output (4φ) | Buck 1 (4φ) uses ALL (L1, L2, L3, L4) | SNS1P, SNS1N |

## Buck Feedback Sense Location

The EV kit uses additional 0Ω resistors to modify the feedback routing between the IC and the output voltage sense location. In general, single-phase configurations should take feedback close to the corresponding output capacitor as close to the IC as possible (this is the default EV kit configuration). However, the MAX77542 supports remote sensing in addition to local sensing. The EV kit includes a LOAD plane for testing remote sensing on the EV kit. Table 5 describes which resistors to install depending on whether local or remote sensing is being evaluated.

Buck 1, Buck 2, Buck 3, and Buck 4 can be connected to the remote LOAD plane by installing R45, R44, R46, and R47, respectively. These resistors are for the high current connections.

## Change Default Setup with RSEL1/RSEL2/RSEL3/RSEL4/CFG1/CFG2

Note that the MAX77542 EV kit is default configured for four output, single-phase operation, with VOUT1 set to 1.0V, VOUT2 set to 1.8V, VOUT3 set to 3.3V, and VOUT4 set to 5.0V (by way of R15, R17, R19, and R21). The CFG1 sets MFIO1-8 to EN_M1, POK_M1, EN_M2, POK_M2, EN_M3, POK_M3, EN_M4, and POK_M4 through R23. CFG2 sets Mx_ILIM to 5.5A and Mx_FREQ to 1.0MHz through R25. To evaluate other default configurations (for different voltages/ranges upon first powerup),

change the resistance at SEL1/2/3/4 and CFG1/2 with the potentiometers or R15, R17, R19, R21, R23, and R25. Refer to the device data sheet for more information.

## Alternative Low-Voltage Input (ALT_IN) Functionality

The ALT_IN pin can be accessed through Jumper J2. When ALT_IN functionality is unused, either install a jumper on J2 to tie ALT_IN to GND or leave J2 open to leave ALT_IN disconnected. To power ALT_IN using one of the buck outputs or another alternative power source, use a wire to tie pin 1 of J2 or the ALT_IN test point to the desired power source. Refer to the device data sheet for more information on the operation of the ALT_IN pin.

## Test Points and Critical Node Measurement (VOUT and LX)

The EV kit comes with test points where sockets can be soldered onto the board for measuring the critical nodes VOUT1-4 and LX1-4. Use these probe sockets to eliminate as much noise as possible when measuring the critical nodes. To ensure best results, use a very short ground wire from the ground sleeve of the scope probe to the GND side of the probe test point, and use the bare tip of the probe directly to the signal side of the probe socket. Following these guidelines give the most accurate results when measuring parameters like output voltage ripple, switching waveforms, and load transient response.

## Table 5. Multiphase Buck Feedback Recommended Routing

| BUCK | LOCAL SENSING | | REMOTE SENSING | |
|---|---|---|---|---|
| | SNSxP | SNSxN | SNSxP | SNSxN |
| Buck 1 (1φ, 2φ, 3φ, 4φ) | R5 | R6 | R38 | R42 |
| Buck 2 (1φ) | R8 | N/A | R39 | N/A |
| Buck 3 (1φ, 2φ) | R10 | R11 | R40 | R43 |
| Buck 4 (1φ) | R13 | N/A | R41 | N/A |

## Table 6. Test Point Selection for Measurement

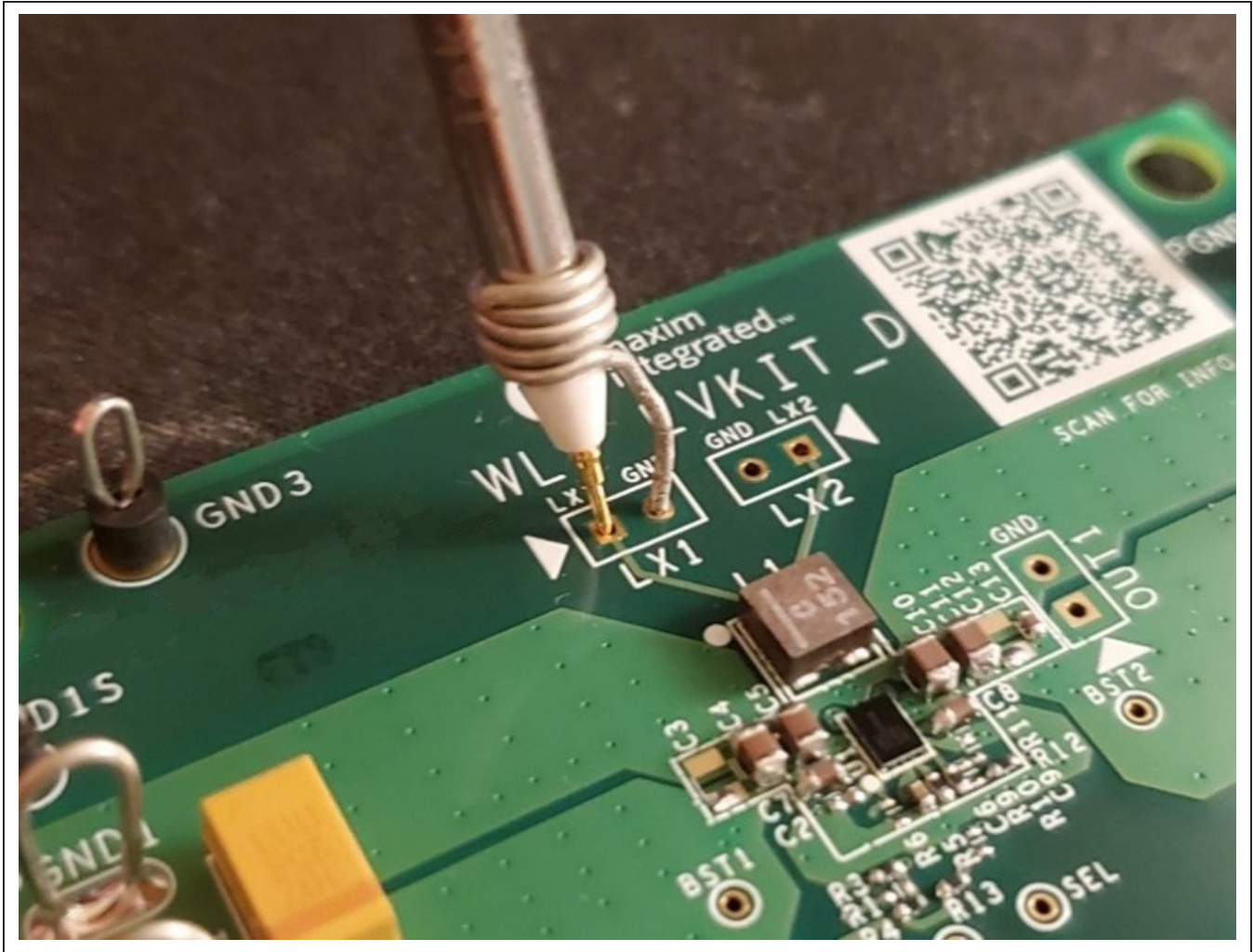| LOAD TRANSIENT, OUTPUT RIPPLE | EEFICIENCY, LOAD REGULATION, LINE REGULATION, VOUT ACCURACY | | SWITCHING NODE |
|---|---|---|---|
| | OUTPUT VOLTAGE | INPUT VOLTAGE | LX1-4 |
| OUT-1-4 SOCKET | OUTxS, PGNDxS | INxS, PGNDxS | LX1-4 SOCKET |

*Figure 4. Example of Probing Sensitive Node*

## Detailed Description of Software

The GUI software allows for quick, easy, and thorough evaluation of the MAX77542. The GUI drives I$^2$C communication with the EV kit. Every control in the GUI corresponds directly to a register within the MAX77542. Refer to the *Register Map* section of the MAX77542 IC data sheet for a complete description of the registers. See Figure 5 for a screenshot of the GUI upon first opening.

### Installation

Visit the product webpage at **https://www.analog.com/max77542evkit** and navigate to Design Resources to download the latest version of the EV kit software. Save the EV kit software installation file to a temporary folder and decompress the ZIP file. Run the .EXE installer and follow the on-screen instructions to complete the installation.

### Windows Driver

After plugging in the MAX77542EVKIT# to the PC with a Micro-USB cable for the first time, wait about 30 seconds for Windows to automatically install the necessary drivers.

### Connecting GUI

After opening the GUI, click **Device** in the upper left corner of the GUI window. Click **Connect** in the drop-down menu.
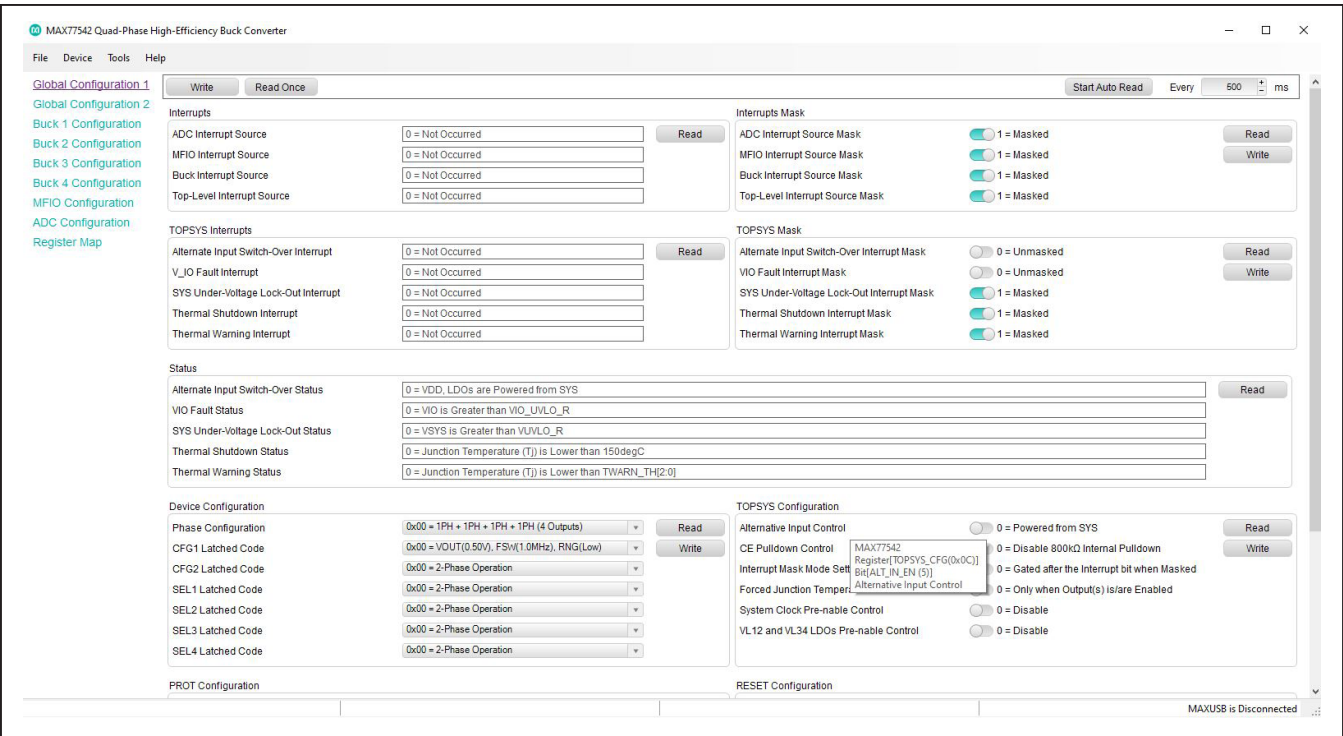
*Figure 5. MAX77542 Evaluation Kit GUI Top-Level Interface (Before Connecting)*

The **Device Synchronization** menu opens (Figure 6) once the MAX77542 IC responds (voltages on SYS pin, $V_{IO}$ pin, and CE pin must be valid on the MAX77542 IC for it to respond). The $I^2C$ address shown is the MAX77542 IC's 7-bit slave address. The address shown changes depending on the EV kit's CFG1 configuration. Click **Connect and Read**. The text at the bottom right of the GUI window changes from *MAXUSB_INTERFACE# is Disconnected* to *MAXUSB_INTERFACE# is Connected*.

## Global Configuration Tabs

The GUI has two tabs for global configuration of the bucks (**Global Configuration 1** and **Global Configuration 2**). Global Configuration 1 displays high-level information about the IC such as the interrupts, interrupt masks, status bits, and device configuration. Figure 7 shows a snapshot of the **Global Configuration 1** tab.

Global Configuration 2 is used to enable and disable the buck outputs, enable and disable low power mode, and change the flexible power sequencer settings. Figure 8 shows a snapshot of the **Global Configuration 2** tab.
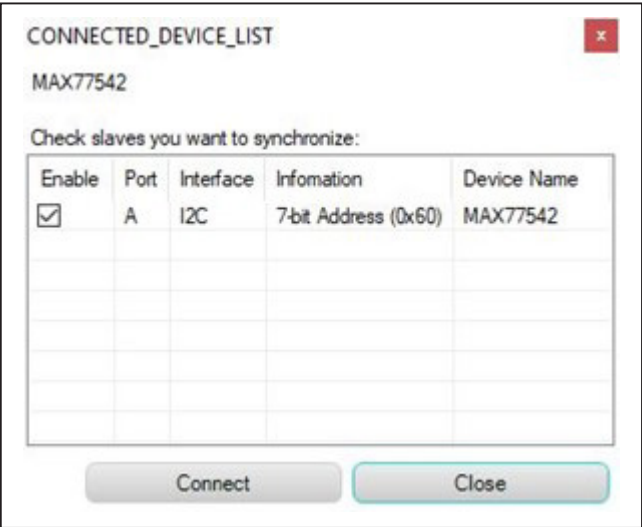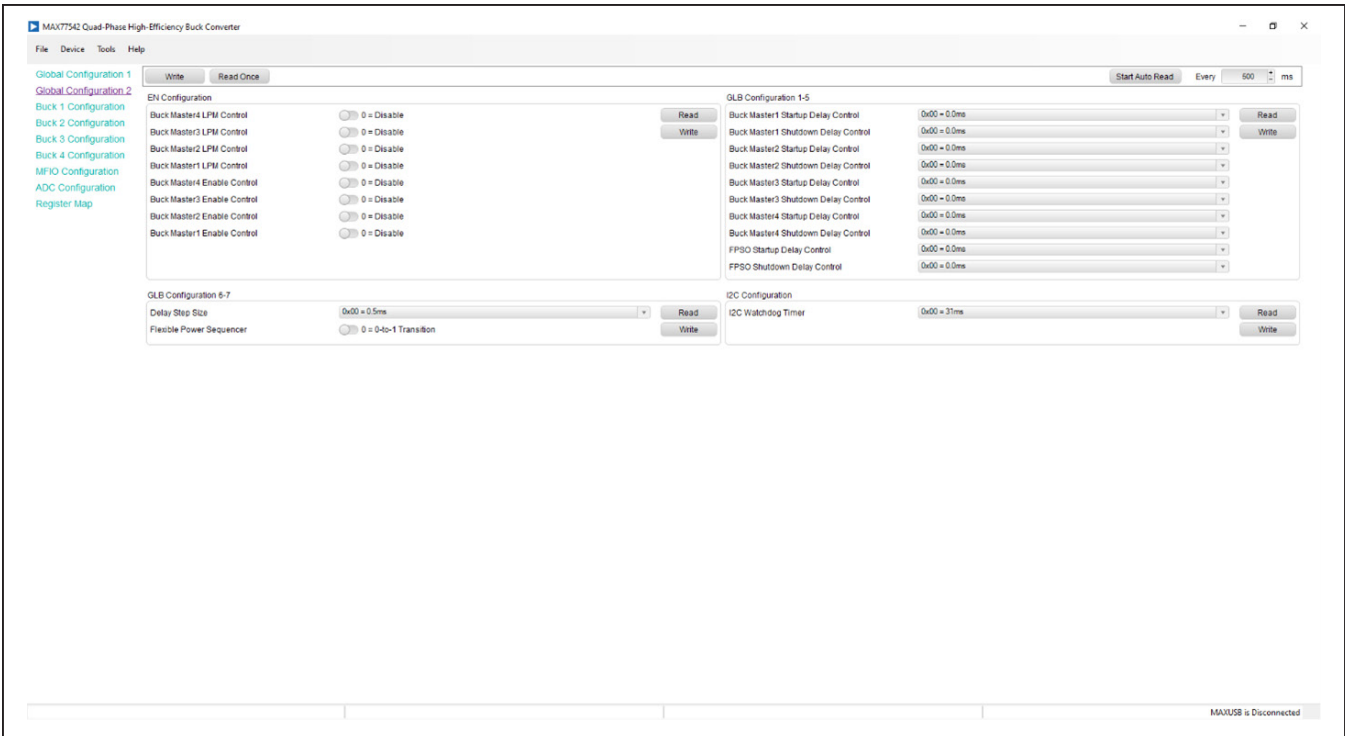


*Figure 6. Port Synchronization Menu*
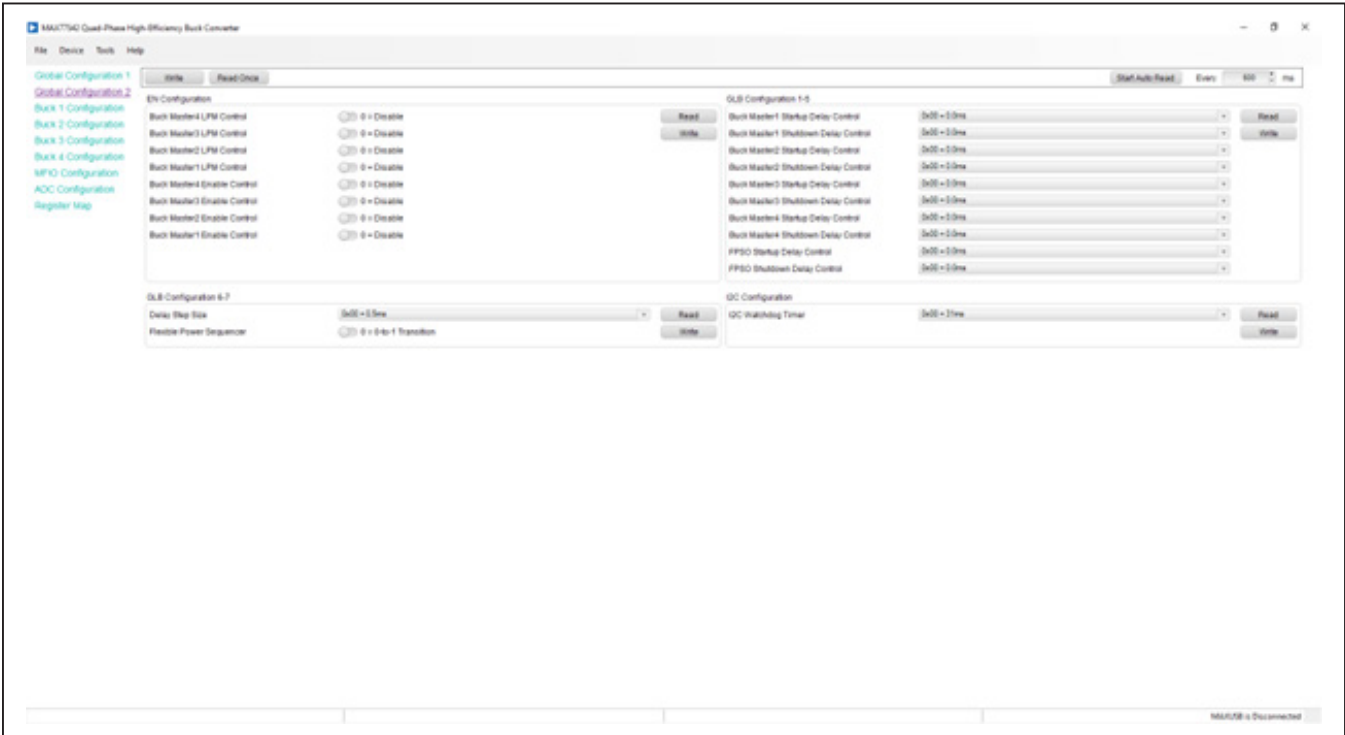
*Figure 7. Global Configuration 1 Window*



*Figure 8. Global Configuration 1 Window*

# MAX77542 Evaluation Kit

## Configuring the Regulator

The GUI has a configuration tab for each buck (Buck 1-4 Configuration). Use these to adjust the various parameters of each buck. Note that Buck 2, Buck 3, and Buck 4 Configuration is disabled when those phases are configured as slave phases in multiphase configuration.

Figure 9 shows a snapshot of the Buck 1 Configuration tab. To use the GUI, select the desired option in one of the interactable fields (button, slider, drop-down list) and press **Write** next to it. Use the *Read* command to refresh the current state of the registers.
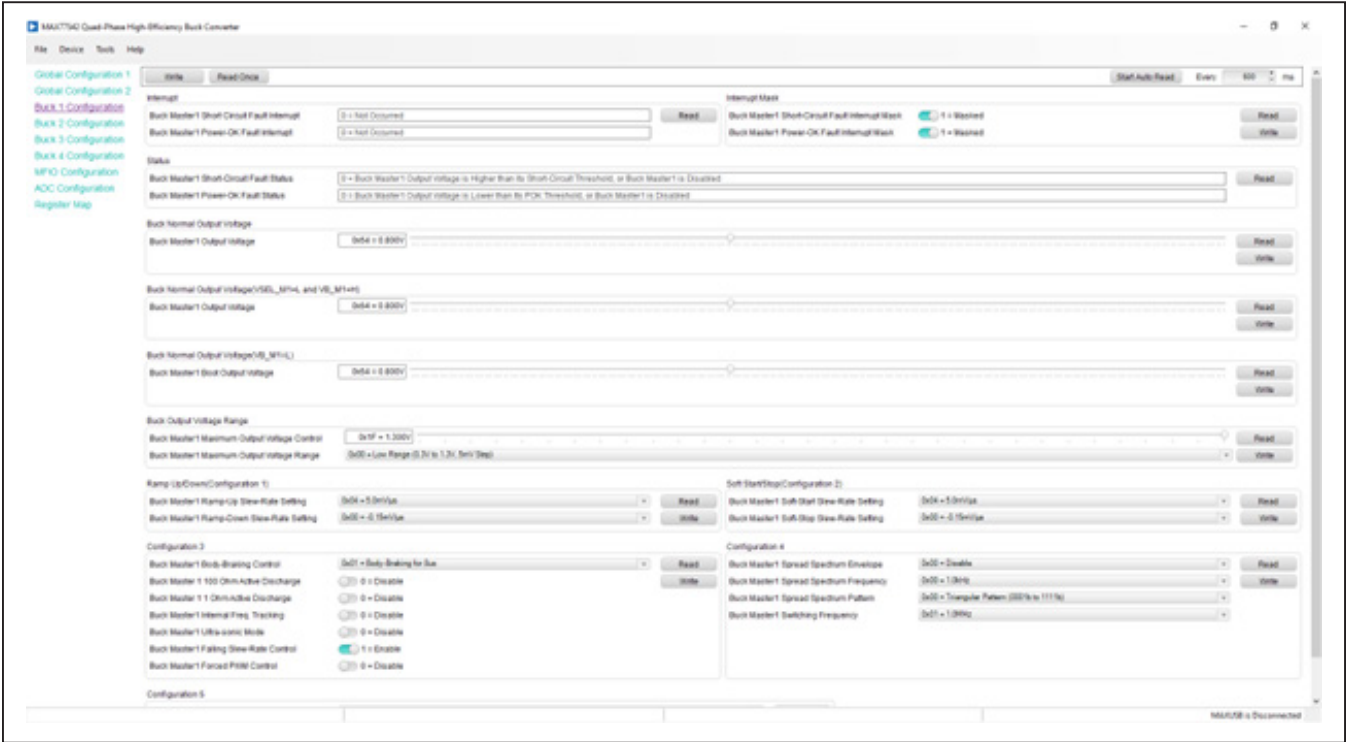


*Figure 9. Buck 1 Configuration Window*

## Configuring the Multifunction I/Os

The GUI has a configuration tab for the MFIOs. The tab includes the interrupt bits, interrupt mask bits, and status bits. It also includes the configuration registers for each MFIO pin to set its functionality. Figure 10 shows a snapshot of the **MFIO Configuration** tab.
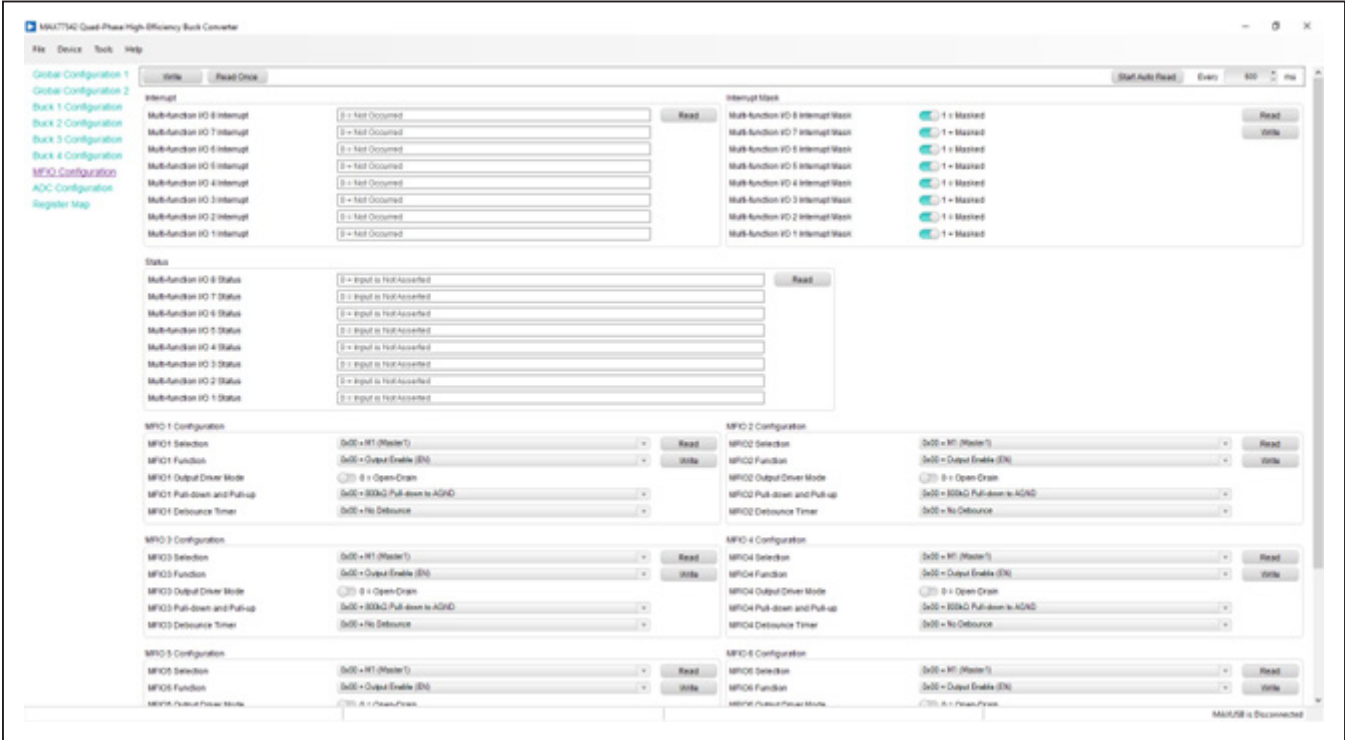


Figure 10. MFIO Configuration Window

## Configuring the ADC

The GUI has a configuration tab for the ADC. The **ADC** tab includes the interrupt bits, interrupt masks, and status bit for each ADC channel. It also includes the readback control bits, averaging control bits, measurement settings, and readback values. Figure 11 shows a snapshot of the **ADC Configuration** tab.
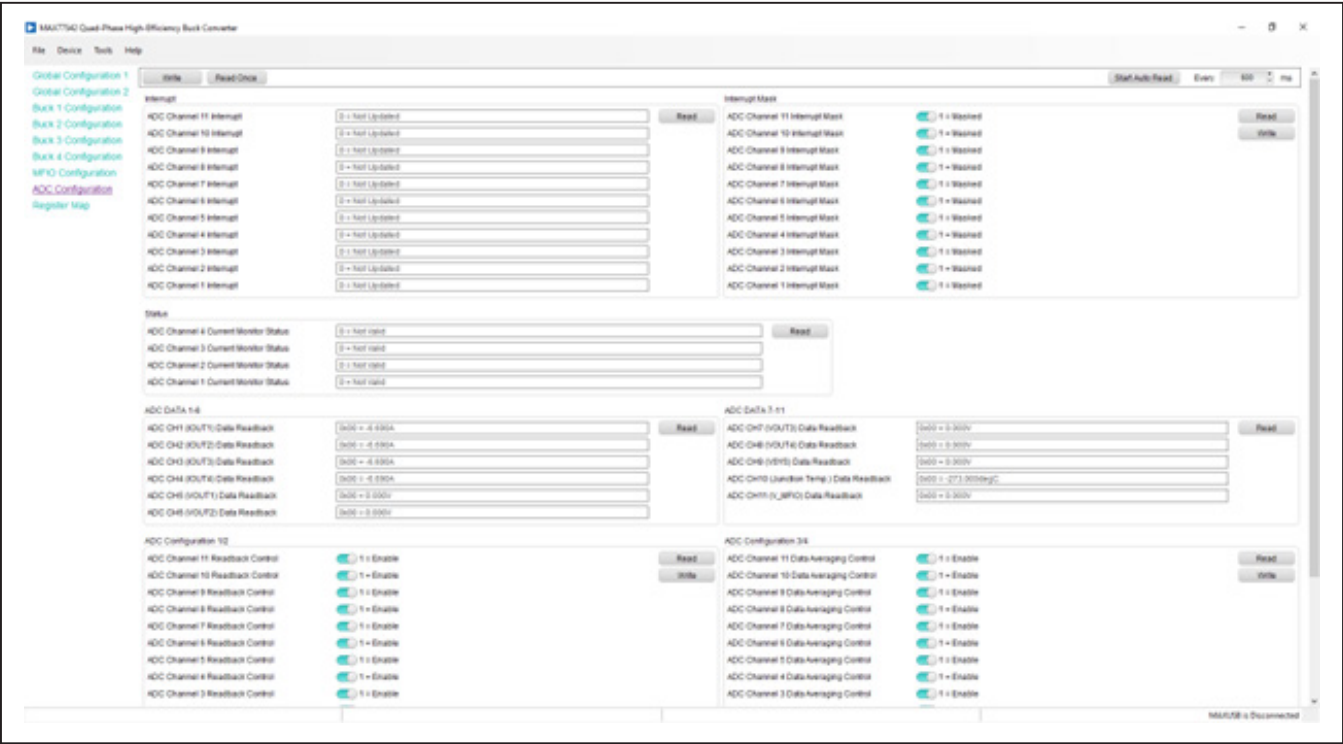


*Figure 11. ADC Configuration Window*

## PCB Layout Guidelines

Careful circuit board layout is critical to achieve low switching power losses and clean, stable operation. Refer to the *PCB Layout Guidelines* of the MAX77542 data sheet at **https://www.analog.com/max77542evkit**

## Ordering Information

| PART | TYPE |
|---|---|
| MAX77542EVKIT# | EV Kit |

*#Denotes RoHS compliance.*

## MAX77542 EV Kit Bill of Materials

| REF_DES | QTY* | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|---|---|---|---|---|---|
| C1, C4, C5 | 3 | C1005X7S1A225K050BC | TDK | 2.2µF | CAP; SMT (0402); 2.2UF; 10%; 10V; X7S; CERAMIC |
| C2 | 1 | C1005X5R1E225K050; GRM155R61E225KE11 | TDK;MURATA | 2.2µF | CAP; SMT (0402); 2.2µF; 10%; 25V; X5R; CERAMIC |
| C3, C6 | 2 | C1005X7S1A105K; GRM155C71A105KE11 | TDK;MURATA | 1µF | CAP; SMT (0402); 1µF; 10%; 10V; X7S; CERAMIC |
| C7, C16, C25, C34 | 4 | C1608X5R1E106M080AC; CL10A106MA8NRNC; GRM188R61E106MA73; ZRB18AR61E106ME01; GRT188R61E106ME13 | TDK;SAMSUNG ELECTRONICS; MURATA; MURATA;MURATA | 10µF | CAP; SMT (0603); 10µF; 20%; 25V; X5R; CERAMIC |
| C8, C17, C26, C35 | 4 | C1005X7R1C104K050BC; ATC530L104KT16; 0402YC104KAT2A; C0402X7R160-104KNE; CL05B104KO5NNNC; GRM155R71C104KA88; C1005X7R1C104K; CC0402KRX7R7BB104; EMK105B7104KV; CL05B104KO5 | TDK;AMERICAN TECHNICAL CERAMICS;AVK; VENKEL LTD.;SAMSUNG ELECTRONICS; MURATA; TDK;YAGEO PHICOMP;TAIYO YUDEN;SAMSUNG ELECTRONICS | 0.1µF | CAP; SMT (0402); 0.1µF; 10%; 16V; X7R; CERAMIC |
| C9-C14, C18-C23, C27-C32, C36-C41 | 24 | C1608X5R1A226M080AC; GRM188R61A226ME15; CL10A226MPCNUBE; CL10A226MPMNUB; GRM187R61A226ME15 | TDK;MURATA; SAMSUNG; SAMSUNG;MURATA | 22µF | CAP; SMT (0603); 22µF; 20%; 10V; X5R; CERAMIC |
| C15, C24, C33, C42, C53, C55, C58-C60, C63, C65-C67, C69-C71, C75, C80 | 18 | GRM155R71E104KE14; C1005X7R1E104K050BB; TMK105B7104KVH; CGJ2B3X7R1E104K050BB | MURATA;TDK;TAIYO YUDEN;TDK | 0.1µF | CAP; SMT (0402); 0.1µF; 10%; 25V; X7R; CERAMIC |
| C44-C47 | 4 | TMK325ABJ476MM | TAIYO YUDEN | 47µF | CAP; SMT (1210); 47µF; 20%; 25V; X5R; CERAMIC |
| L1, L2 | 2 | DFE252012F-1R0M | MURATA | 1UH | EVKIT PART - INDUCTOR; SMT (1008); METAL; 1UH; 20%; 3.3A |
| L3, L4 | 2 | XEL4020-152ME | COIL CRAFT | 1.5UH | INDUCTOR; SMT; N/A; 1.5UH; 20%; 7.5A |
| U1 | 1 | MAX77542BAWU+ | ANALOG DEVICES | MAX77542BAWU+ | EVKIT PART-IC; MAX77542BAWU+; PACKAGE OUTLINE: 21-100610; PACKAGE CODE: W602A4Z+1; WLP60 |
| COMPONENTS BELOW THIS LINE ARE OUTSIDE OF THE IMMEDIATE MAX77542 EVALUATION CIRCUIT AND SOLUTION SILKSCREEN. |||||| 
| ALT_IN, CE, CFG1, CFG2, IRQB, MFIO1-MFIO8, SCL, SDA, SEL1-SEL4, VL12, VL34 | 21 | 5002 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER; |

## MAX77542 EV Kit Bill of Materials (continued)

| REF_DES | QTY* | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|---|---|---|---|---|---|
| C50-C52 | 3 | ANY | ANY | 10µF | CAPACITOR; SMT (0603); CERAMIC CHIP; 10µF; 16V; TOL=20%; MODEL=GRM SERIES; TG=-55 DEGC TO +85 DEGC; TC=X5R; FORMFACTOR |
| C54, C61, C64 | 3 | C1005X5R1A475K050 | TDK | 4.7µF | CAP; SMT (0402); 4.7µF; 10%; 10V; X5R; CERAMIC |
| C56, C57 | 2 | C0402C0G500270JNP; GRM1555C1H270JA01 | VENKEL LTD.;MURATA | 27PF | CAP; SMT (0402); 27PF; 5%; 50V; C0G; CERAMIC |
| C72-C74, C79 | 4 | C0402C105K8PAC; CC0402KRX5R6BB105 | KEMET;YAGEO | 1µF | CAP; SMT (0402); 1µF; 10%; 10V; X5R; CERAMIC |
| C76, C78 | 2 | ZRB15XR61A475ME01; CL05A475MP5NRN; GRM155R61A475MEAA; C1005X5R1A475M050BC | MURATA;SAMSUNG; MURATA;TDK | 4.7µF | CAP; SMT (0402); 4.7µF; 20%; 10V; X5R; CERAMIC |
| C77 | 1 | C0402C103K5RAC; GRM155R71H103KA88; C1005X7R1H103K050BE; CL05B103KB5NNN; UMK105B7103KV | KEMET;MURATA;TDK; SAMSUNG ELECTRONIC;TAIYO YUDEN | 0.01µF | CAP; SMT (0402); 0.01µF; 10%; 50V; X7R; CERAMIC |
| DS1, DS2 | 2 | LTST-C190CKT | LITE-ON ELECTRONICS INC. | LTST-C190CKT | DIODE; LED; STANDARD; RED; SMT (0603); PIV=5.0V; IF=0.04A; -55 DEGC TO +85 DEGC |
| GND, PGND7 | 2 | 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; |
| IN1-IN4, LOAD1, LOAD2, OUT1-OUT4, PGND, PGND1-PGND6, SYS | 18 | 9020 BUSS | WEICO WIRE | MAXIMPAD | EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG |
| IN1S-IN4S, LOADSP, OUT1S-OUT4S, VDD, VIO | 11 | 5000 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; |
| J1 | 1 | 10118193-0001LF | FCI CONNECT | 10118193-0001LF | CONNECTOR; FEMALE; SMT; MICRO USB B TYPE RECEPTACLE; RIGHT ANGLE; 5PINS |
| J2 | 1 | PBC02SAAN | SULLINS ELECTRONICS CORP. | PBC02SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS |
| J3, J4, J8-J17, J19, J20 | 14 | TSW-103-07-T-S | SAMTEC | TSW-103-07-T-S | CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 3PINS |

## MAX77542 EV Kit Bill of Materials (continued)

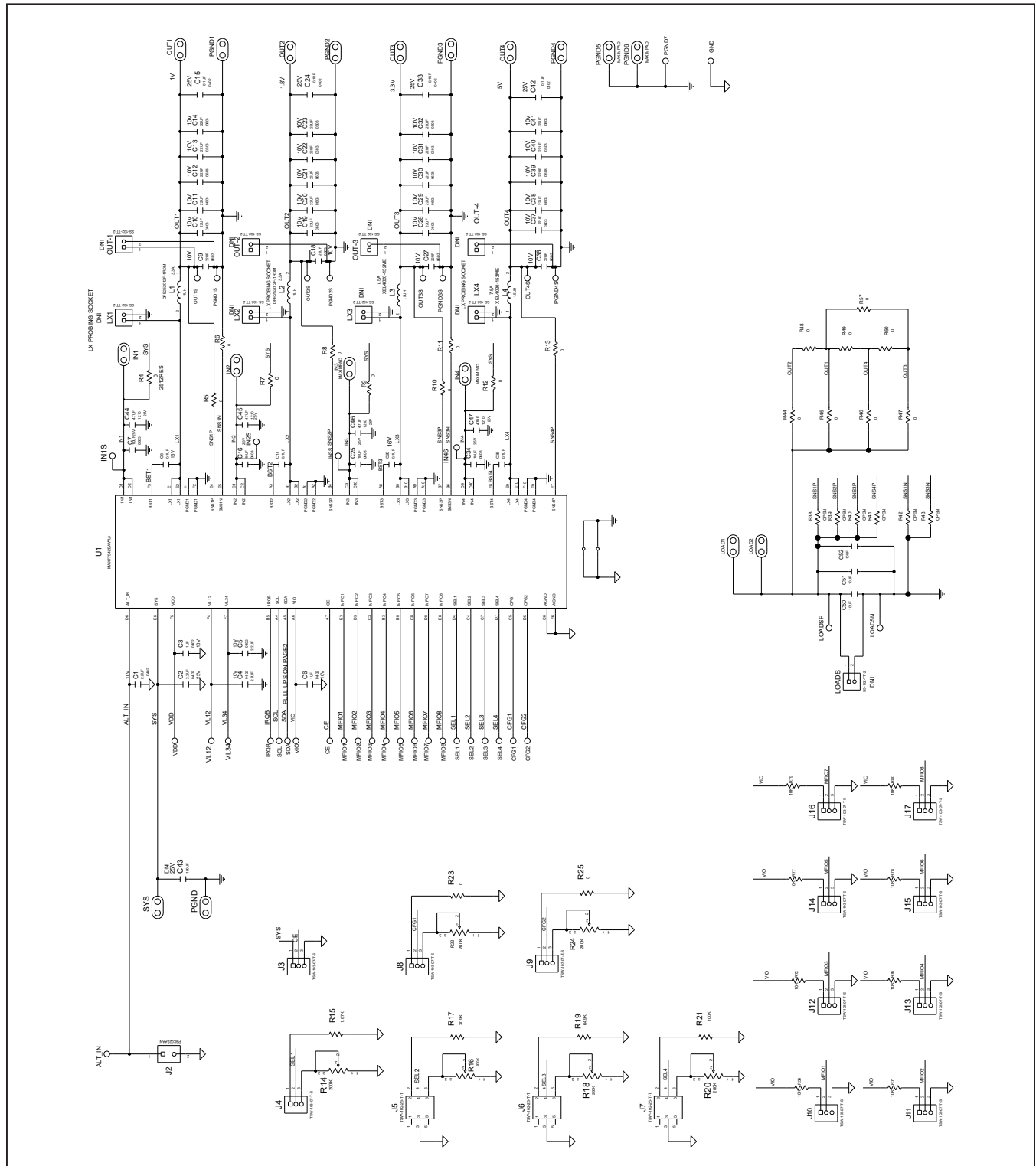| REF_DES | QTY* | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|---|---|---|---|---|---|
| J5-J7 | 5 | TSW-102-26-T-T | SAMTEC | TSW-102-26-T-T | CONNECTOR; THROUGH HOLE; TSW SERIES; TRIPLE ROW; STRAIGHT; 6PINS |
| J18 | 1 | PBC05SAAN | SULLINS ELECTRONICS CORP. | PBC05SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 5PINS; -65 DEGC TO +125 DEGC |
| L9, L10 | 2 | DFE252012F-1R0M | MURATA | 1UH | EVKIT PART - INDUCTOR; SMT (1008); METAL; 1UH; 20%; 3.3A |
| L11, L12 | 2 | XEL4020-152ME | COIL CRAFT | 1.5UH | INDUCTOR; SMT; N/A; 1.5UH; 20%; 7.5A |
| L5-L8 | 4 | DFE252012F-R47M | MURATA | 0.47UH | EVKIT PART - INDUCTOR; SMT (1008); METAL; 0.47UH; 20%; 4.9A |
| L13-L15 | 3 | BLM18AG601SN1 | MURATA | 600 | INDUCTOR; SMT (0603); FERRITE-BEAD; 600; TOL=+/-; 0.5A |
| LOADSN, PGND1S-PGND4S | 5 | 5001 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; |
| MH1-MH4 | 4 | 9032 | KEYSTONE | 9032 | MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON |
| R1, R58, R71, R72, R76-R80 | 9 | RC0402FR-0710KL; CR0402-FX-1002GLF | YAGEO;BOURNS | 10K | RES; SMT (0402); 10K; 1%; +/-100PPM/DEGC; 0.0630W |
| R2, R3, R61, R62 | 4 | ERJ-2GEJ472 | PANASONIC | 4.7K | RES; SMT (0402); 4.7K; 5%; +/-200PPM/DEGC; 0.1000W |
| R4, R7, R9, R12, R44-R50, R57, R67-R70 | 14 | RC0402JR-070RL; CR0402-16W-000RJT | YAGEO PHYCOMP;VENKEL LTD. | 0 | RES; SMT (0402); 0; 5%; JUMPER; 0.0630W |
| R5, R6, R8, R10, R11, R13, R23, R25, R29, R56, R59, R66, R73, R75 | 14 | RC0402JR-070RL; CR0402-16W-000RJT | YAGEO PHYCOMP;VENKEL LTD. | 0 | RES; SMT (0402); 0; 5%; JUMPER; 0.0630W |
| R14, R16, R18, R20, R22, R24 | 6 | 3296Y-1-204LF | BOURNS | 200K | RESISTOR; THROUGH HOLE-RADIAL LEAD; 3296 SERIES; 200K OHM; 10%; 100PPM; 0.5W |
| R15 | 1 | ERJ-2RKF1871 | PANASONIC | 1.87K | RES; SMT (0402); 1.87K; 1%; +/-100PPM/DEGC; 0.1000W |
| R17 | 1 | CRCW040230K9FK | VISHAY DALE | 30.9K | RES; SMT (0402); 30.9K; 1%; +/-100PPM/DEGC; 0.0630W |
| R19 | 1 | CRCW040264K9FK; RC0402FR-0764K9L | VISHAY;YAGEO | 64.9K | RES; SMT (0402); 64.9K; 1%; +/-100PPM/DEGK; 0.0630W |
| R21, R64 | 2 | CRCW0402100KFK; RC0402FR-07100KL | VISHAY;YAGEO | 100K | RES; SMT (0402); 100K; 1%; +/-100PPM/DEGC; 0.0630W |

## MAX77542 EV Kit Bill of Materials (continued)

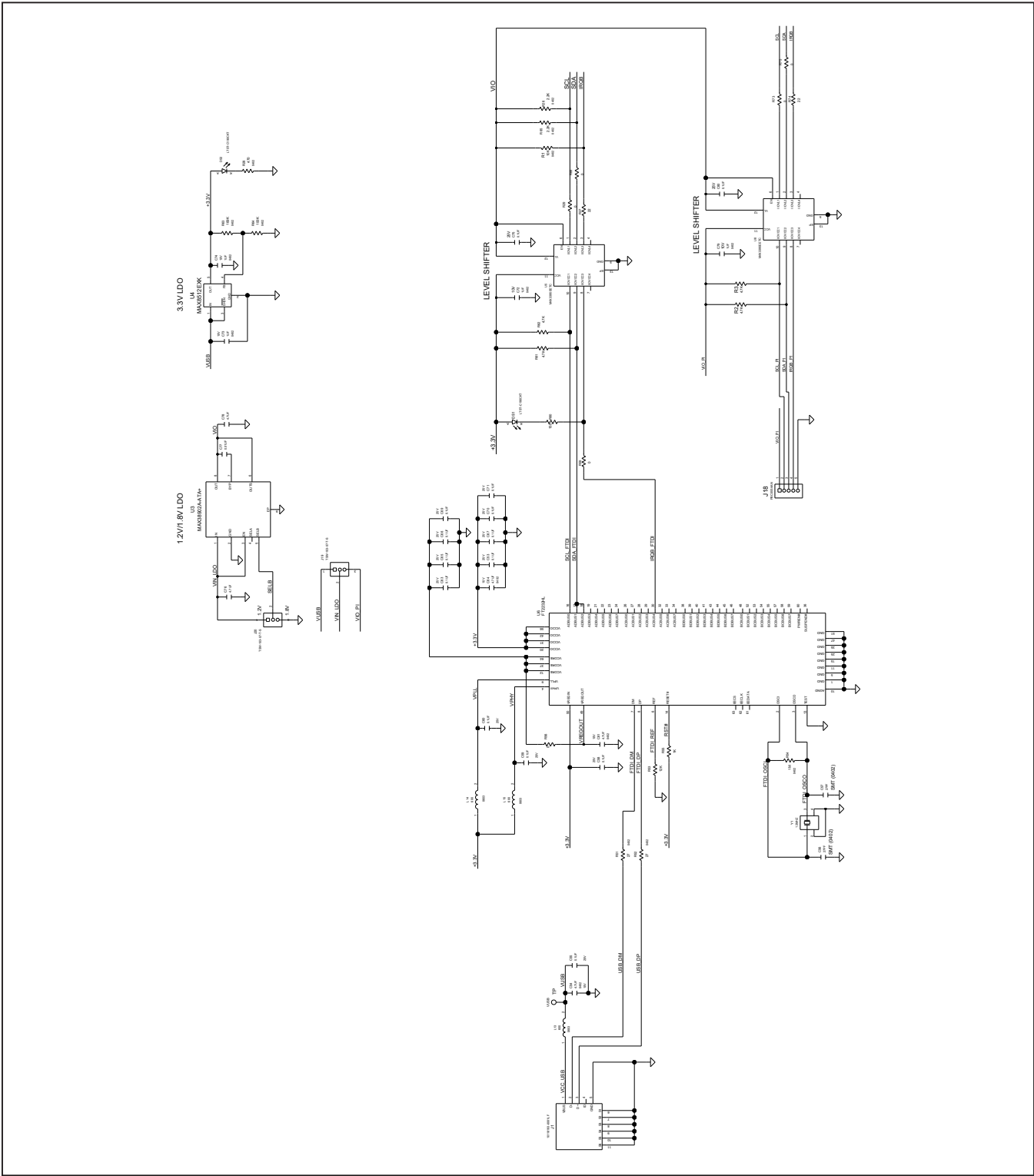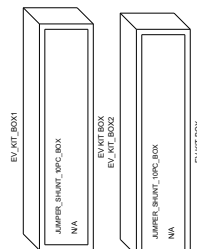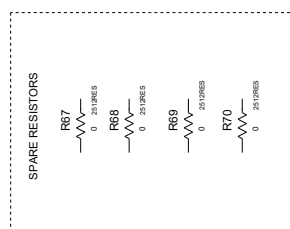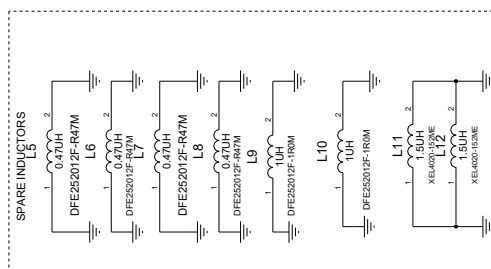| REF_DES | QTY* | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|---|---|---|---|---|---|
| R26, R65 | 2 | RC0402FR-072K2L | YAGEO | 2.2K | RES; SMT (0402); 2.2K; 1%; +/-100PPM/DEGC; 0.0630W |
| R27, R74 | 2 | RC0402FR-0722RL | YAGEO PHYCOMP | 22 | RES; SMT (0402); 22; 1%; +/-100PPM/DEGC; 0.0630W |
| R28 | 1 | CRCW0402470RFK | VISHAY DALE | 470 | RES; SMT (0402); 470; 1%; +/-100PPM/DEGC; 0.0630W |
| R51, R52 | 2 | RC0402FR-0727RL | YAGEO | 27 | RES; SMT (0402); 27; 1%; +/-100PPM/DEGC; 0.0630W |
| R53 | 1 | ERJ-2RKF1202 | PANASONIC | 12K | RES; SMT (0402); 12K; 1%; +/-100PPM/DEGC; 0.1000W |
| R54 | 1 | CRCW04021M00FK | VISHAY DALE | 1M | RES; SMT (0402); 1M; 1%; +/-100PPM/DEGC; 0.0630W |
| R55 | 1 | ERJ-2RKF1001 | PANASONIC | 1K | RES; SMT (0402); 1K; 1%; +/-100PPM/DEGC; 0.1000W |
| R60 | 1 | RC0402FR-07150RL | YAGEO | 150 | RES; SMT (0402); 150; 1%; +/-100PPM/DEGC; 0.0630W |
| R63 | 1 | CRCW0402169KFK | VISHAY DALE | 169K | RES; SMT (0402); 169K; 1%; +/-100PPM/DEGK; 0.0630W |
| U3 | 1 | MAX38902A-ATA+ | MAXIM | MAX38902A-ATA+ | EVKIT PART - IC; MAX38902A-ATA+; PACKAGE OUTLINE DEVICE: 21-0168; PACKAGE CODE XXXX |
| U4 | 1 | MAX8512EXK+ | MAXIM | MAX3395EETC | IC; TRANS; 15KV ESD-PROTECTED HIGH-DRIVE CURRENT QUAD-LEVEL TRANSLATOR WITH SPEED-UP CIRCUITRY; TQFN12 4X4 |
| U5, U8 | 2 | MAX3395EETC+ | MAXIM | MAX3395EETC | IC; TRANS; 15KV ESD-PROTECTED HIGH-DRIVE CURRENT QUAD-LEVEL TRANSLATOR WITH SPEED-UP CIRCUITRY; TQFN12 4X4 |
| U6 | 1 | FT2232HL | FUTURE TECHNOLOGY DEVICES INTL LTD. | FT2232HL | IC; MMRY; DUAL HIGH-SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64 |
| VUSB | 1 | 5010 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL; |
| Y1 | 1 | 7M-12.000MAAJ | TXC CORPORATION | 12MHZ | CRYSTAL; SMT; 12MHZ; 18PF; TOL = +/-30PPM; STABILITY = +/-30PPM |

## MAX77542 EV Kit Schematic

## MAX77542 EV Kit Schematic (continued)
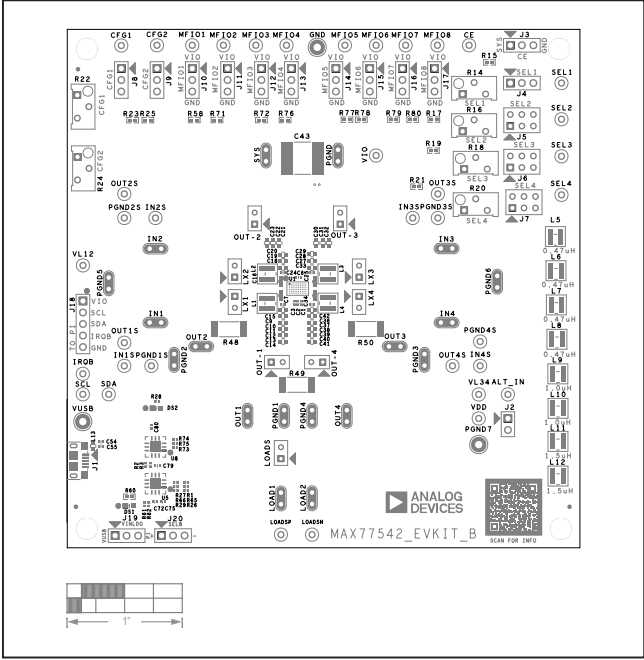
## MAX77542 EV Kit Schematic (continued)



SPARE INDUCTORS

| L5 | 0.47UH | DFE252012F-R47M |
| L6 | 0.47UH | DFE252012F-R47M |
| L7 | 0.47UH | DFE252012F-R47M |
| L8 | 0.47UH | DFE252012F-R47M |
| L9 | 1UH | DFE252012F-1R0M |
| L10 | 1UH | DFE252012F-1R0M |
| L11 | 1.5UH | XEL4020-152ME |
| L12 | 1.5UH | XEL4020-152ME |

SPARE RESISTORS

R67  0  2512RES
R68  0  2512RES
R69  0  2512RES
R70  0  2512RES

EV_KIT_BOX1
JUMPER_SHUNT_10PC_BOX
N/A

EV KIT BOX
EV_KIT_BOX2
JUMPER_SHUNT_10PC_BOX
N/A

EV KIT BOX

MECHANICAL

STAND OFF

MH1
9032
02-SOM35016H-00
SPACER

MH3
9032
02-SOM55016H-00
SPACER

MH4
9032
02-SOM35016H-00
SPACER

MH2
9032
02-SOM55016H-00
SPACER
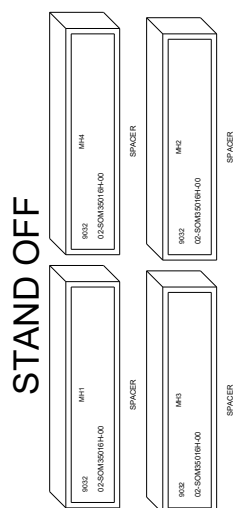
## MAX77542 EV Kit PCB Layout



*MAX77542 EV—Silk Top*
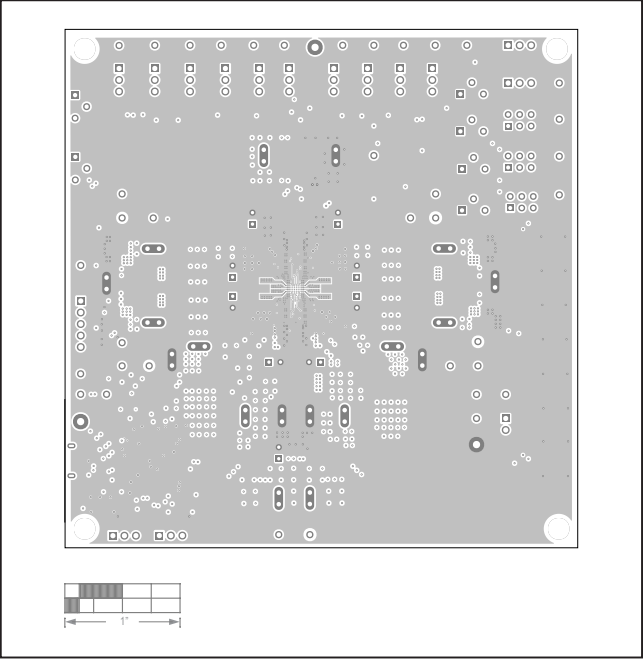


*MAX77542 EV—Internal2*
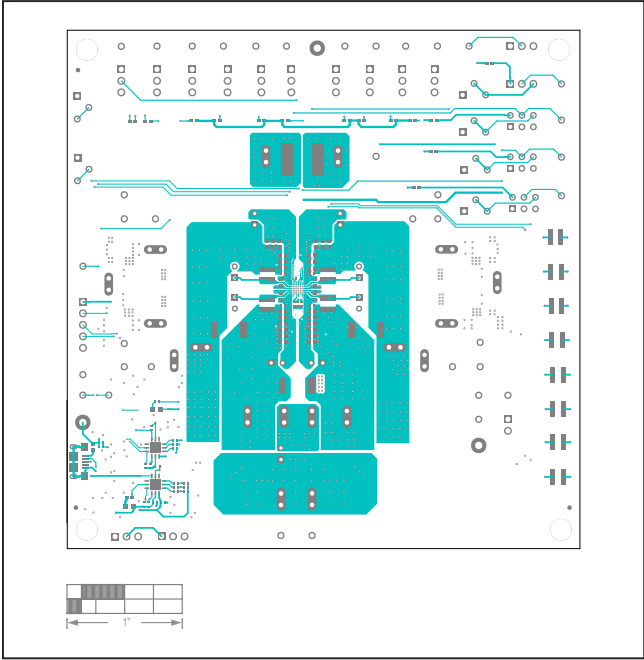


*MAX77542 EV—Top*
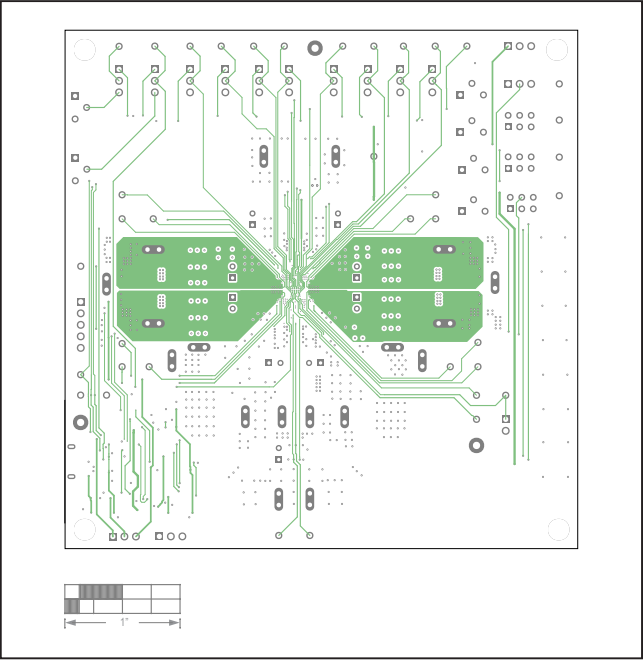


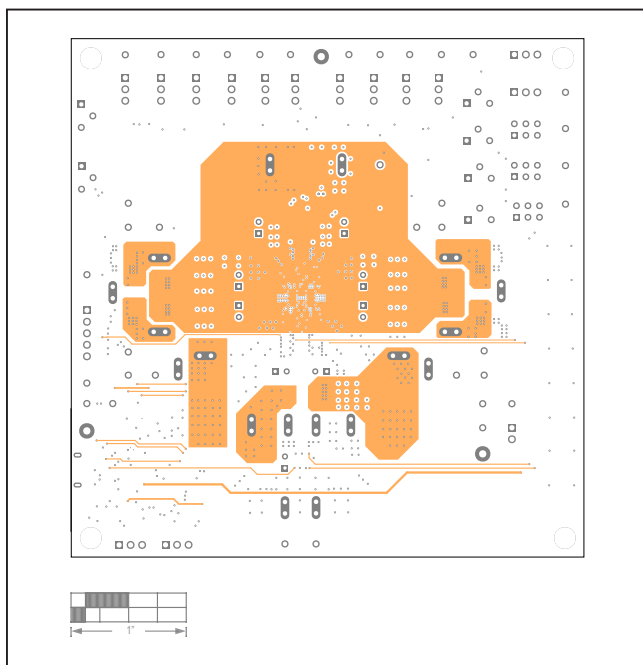*MAX77542 EV—Internal3*

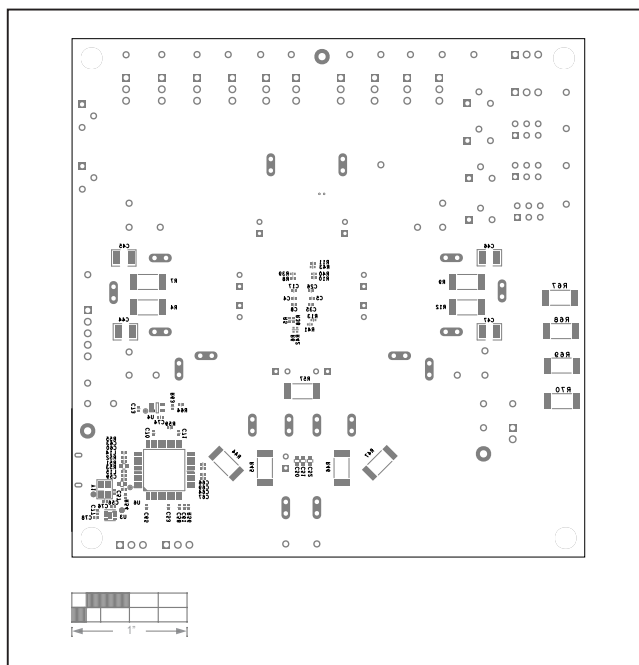## MAX77542 EV Kit PCB Layout (continued)
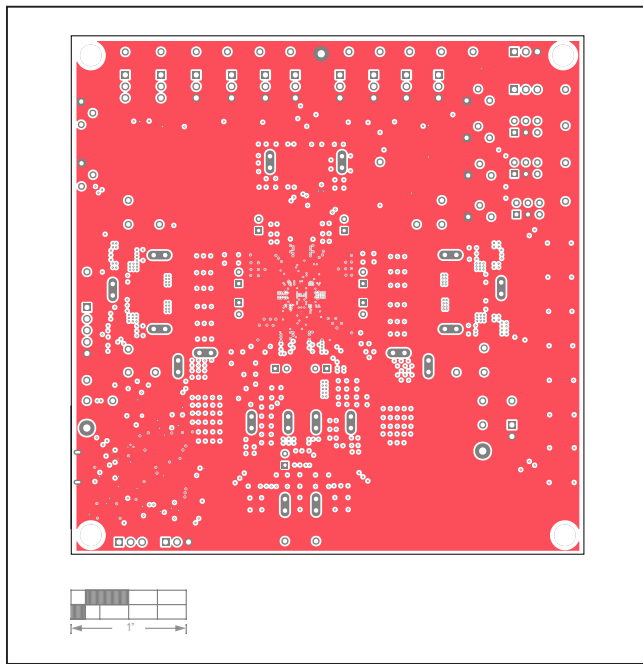


*MAX77542 EV—Internal4*
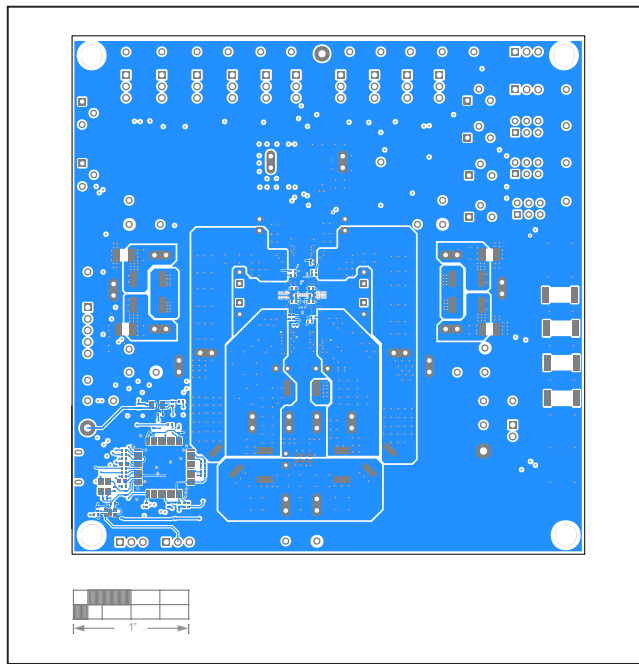


*MAX77542 EV—Bottom*



*MAX77542 EV—Internal5*



*MAX77542 EV—Silk Bottom*

## Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|---|---|---|---|
| 0 | 03/23 | Initial release | — |
| 1 | 10/24 | Update *EV Kit Specifications and Default Configuration* section, MAX77542 EV Kit Bill of Materials, and MAX77542 EV Kit Schematic | 2, 14, 18 |
| 2 | 11/24 | Update MAX77542 EV Kit Bill of Materials | 14 |

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