

MAX77958 Evaluation Kit with 2S Li+ 3A_{OUT} Buck-Boost Charger

Evaluates: MAX77958

General Description

The MAX77958 evaluation kit (EV kit) is a fully assembled and tested printed circuit board (PCB) that demonstrates the MAX77958 Standalone USB Type-C and Power Delivery Controller.

The EV kit enables easy evaluation of the following features:

- USB Type-C Detection/PD Communication (See [Table 1](#) for Acronyms)
 - Power Role (Sink and Source), Data Role (UFP and DFP) detection
 - PD Adapter Detection and PD Communication
 - Integrated V_{CONN} Switch with OCP
 - Power/Data Role Swap
 - PPS (with PD Adapter Supporting PPS)
 - Audio and Debug Accessory Sink/Source Mode
 - Vendor Defined Message
- BC1.2 Legacy Charger Detection: SDP, CDP, DCP and DCD Timeout
- I²C Master to Control Companion IC.
- 9 Configurable GPIOs

The EV kit contains a MAX77962 charger to demonstrate the I²C master feature of the MAX77958. The MAX77962 is a buck-boost charger for 2S Li+ battery application and is capable of 3.5V to 23V input voltage, with a maximum programmable fast charging current of 3.2A.

The MAX16904 a buck converter is installed on the EV kit to provide 5V to V_{CONN} pin. The MAX77958 uses GPIO2 to enable the buck converter when the MAX77958 is in SOURCE Power Role.

A Micro-B USB cable is included in the package to serve as the interface from a USB port on a Windows[®] PC to the slave I²C port on the MAX77958. A Windows based software provides a user-friendly interface to exercise the features of the MAX77958.

Features

- High Voltage V_{BUS} Range
- Short to V_{BUS} Protection on CC Pins
- Type-C Support and USB-PD Support
 - Mode configuration: DFP/UFP/DRP
 - Type-C rev1.3 and PD3.0 Compatible
 - Cable Orientation and Power Role Detection
 - Integrated V_{CONN} Switch with OCP
 - Support Try.Snk State
 - Support Audio
 - Support Debug Accessory Sink/Source Mode
 - FRS (Fast Role Swap) Initial Sink Support
 - PPS (Programmable Power Supply) Sink Support
- Support BC1.2 Legacy/Proprietary Charger Detection
 - Integrated D+/D- Switches
- MTP Memory for Storing Custom Configuration
- Moisture Detection and Corrosion Prevention
- Customization Script
- I²C Programmable Configuration
- I²C Master to Control External Charger or DC-DC Converter IC
- 9 Configurable GPIOs (GPIO6 for SID)
 - External SuperSpeed Mux/Detection/IRQ
 - EN/DISABLE External Power or FETs
- On-Board I²C Interface
- Windows 10 Compatible
- Proven PCB Layout
- Fully Assembled and Tested

[Ordering Information](#) appears at end of data sheet.

Windows is a registered trademark and registered service mark of Microsoft Corporation.

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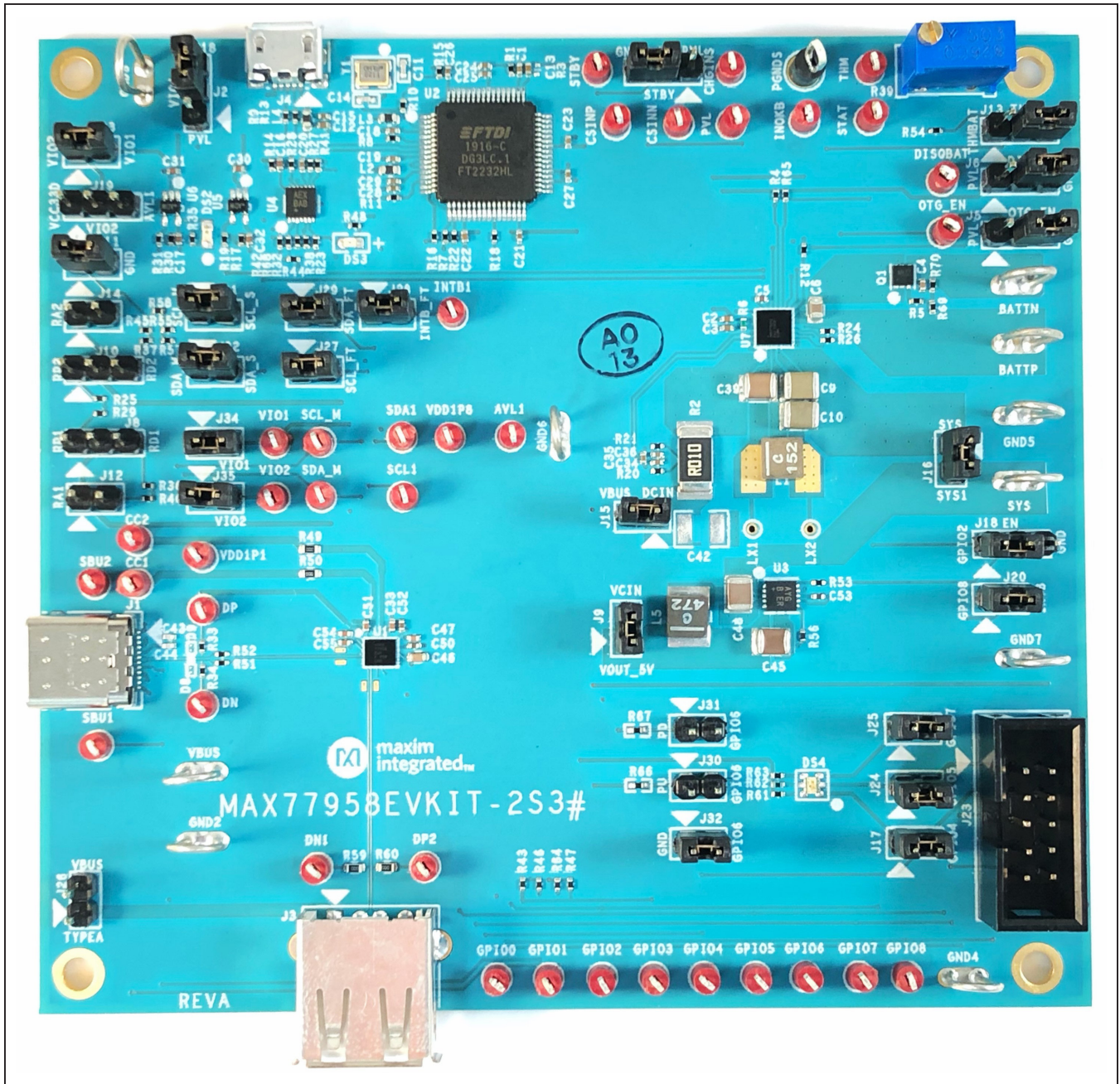


Figure 1. MAX77958 EV Kit-2S3#

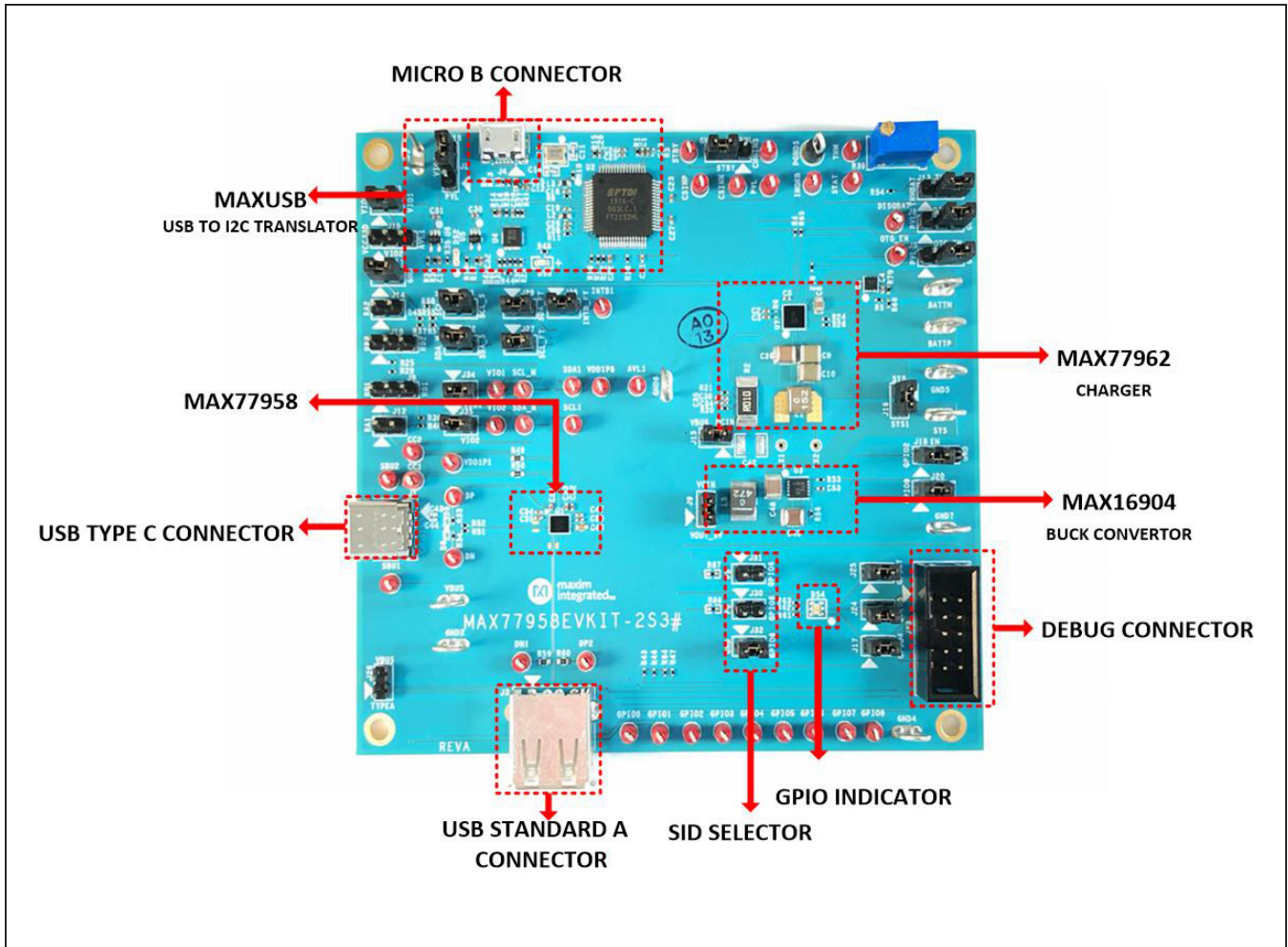


Figure 2. MAX77958 EV Kit-2S3# Top View

Quick Start

Required Equipment

- MAX77958 evaluation package
 - MAX77958EVKIT-2S3# Board
 - Micro-B USB cable
 - MAX77958 EV kit software (GUI)
- Type-C or PD travel adapter (TA)
- Power supply
- Battery simulator

- Multimeters
- Windows-based PC
- Oscilloscope to monitor CC pin or other signals

Detailed Description of Hardware

The default settings of the jumpers configure the MAX77958 in Autonomous mode to control the MAX77962 to charge a 2S Li+ battery. Review jumper settings in [Table 2](#) for other application scenarios.

Table 1. Acronyms

| | |
|------------------|------------------------------------|
| BC1.2 | Battery Charging 1.2 |
| CC | Configuration Channel |
| CDP | Charging Downstream Port |
| DCP | Dedicated Charging Port |
| DFP | Downstream Facing Port |
| EV kit | Evaluation kit |
| GPIO | General Purpose Input/Output |
| GUI | Graphical User Interface |
| I ² C | Inter Integrated Circuit |
| IC | Integrated Circuit |
| MAXUSB | USB to I ² C translator |
| MTP | Multiple Time Programmable |
| OVP | Over Voltage Protection |
| PCB | Printed Circuit Board |
| PD | Power Delivery |
| PDO | Power Data Object |
| PPS | Programmable Power Supply |
| SDP | Standard Downstream Port |
| UFP | Upstream Facing Port |
| USB | Universal Serial Bus |
| VDM | Vendor Defined Message |

Table 2. Jumper Descriptions and Default Positions

| DESCRIPTION | JUMPER NUMBER | DEFAULT POSITION | FUNCTION |
|--------------------------|---------------|---|---|
| VIO1 and VIO2 Connection | J2 | Short 2-3 | 1-2 VIO1 is powered by the charger's PVL |
| | | | 2-3 VIO1 is powered by the VCC1P8 LDO from the MAXUSB |
| | J19 | Open | 1-2 VIO2 is powered by the VCC3P3 LDO from the MAXUSB |
| | | | 2-3 VIO2 is powered by the AVL of the MAX77958 |
| | J33 | Short 1-2 | Open: VIO2 depends on the J19 |
| | | | Short: connect VIO1 with VIO2 |
| J34 | Short 1-2 | Open to disconnect VIO1 from the MAX77958 | |
| J35 | Short 1-2 | Open to disconnect VIO2 from the MAX77958 | |

Table 2. Jumper Descriptions and Default Positions (continued)

| DESCRIPTION | JUMPER NUMBER | DEFAULT POSITION | FUNCTION |
|---|---------------|--------------------|--|
| USB Type-C Detection Test when no USB Type-C cable is connected | J11 | Short 1-2 | USB Type-C test, Rd and Ra connection to GND |
| | J8 | Open | USB Type-C CC1 RP/RD connection |
| | | | 1-2 connects RP to CC1 |
| | | | 2-3 connects RD to CC1 |
| | J10 | Open | USB Type-C CC2 RP/RD connection |
| | | | 1-2 connects RP to CC2 |
| | | | 2-3 connects RD to CC2 |
| J12 | Open | Connects RA to CC1 | |
| J14 | Open | Connects RA to CC2 | |
| V _{CONN} Boost Enable | J9 | Short 1-2 | Connects 5V buck converter to V _{CONN} |
| | J18 | Short 1-2 | Connects GPIO2 to the EN pin of the 5V buck converter to VCIN |
| V _{BUS} from USB Type A Connector | J26 | Open | USB Type-A connection to V _{BUS} |
| LED Indicator | J17 | Short 1-2 | GPIO4 indicator LED connection |
| | J24 | Short 1-2 | GPIO5 indicator LED connection |
| | J25 | Short 1-2 | GPIO7 indicator LED connection |
| I ² C _Master to MAX66961 from MAX77958 | J20 | Short 1-2 | I ² C _Master Interrupt input from the MAX77962 |
| | J21 | Short 1-2 | I ² C _Master SCL to MAX77962 from the MAX77958 |
| | J22 | Short 1-2 | I ² C _Master SDA to MAX77962 from the MAX77958 |
| I ² C _Slave to MAX-USB | J29 | Short 1-2 | I ² C _Slave SDA to the MAXUSB |
| | J27 | Short 1-2 | I ² C _Slave SCL to the MAXUSB |
| | J28 | Short 1-2 | I ² C _Slave INTB to the MAXUSB |
| MAX77958 Slave ID Selector, one of the Jumper from J30 to J32 must be populated | J31 | Open | Connect GPIO6 with an external 330kΩ pulldown resistor to GN; slave address = 0x4E |
| | J30 | Open | Connect GPIO6 with an external 330kΩ pullup resistor to VIO1; slave address = 0x4C |
| | J32 | Short 1-2 | Connect GPIO6 to GND; slave address = 0x4A |
| MAX77962 Charger related jumpers | J5 | Short 2-3 | Charger OTG_EN |
| | J6 | Short 2-3 | Charger DISQBAT |
| | J7 | Short 2-3 | Charger STBY |
| | J13 | Short 2-3 | Charger THMBAT |
| | J15 | Short 1-2 | Charger input power DCIN to V _{BUS} |
| | J16 | Short 1-2 | Connects charger System Voltage with USBC controller System Voltage |

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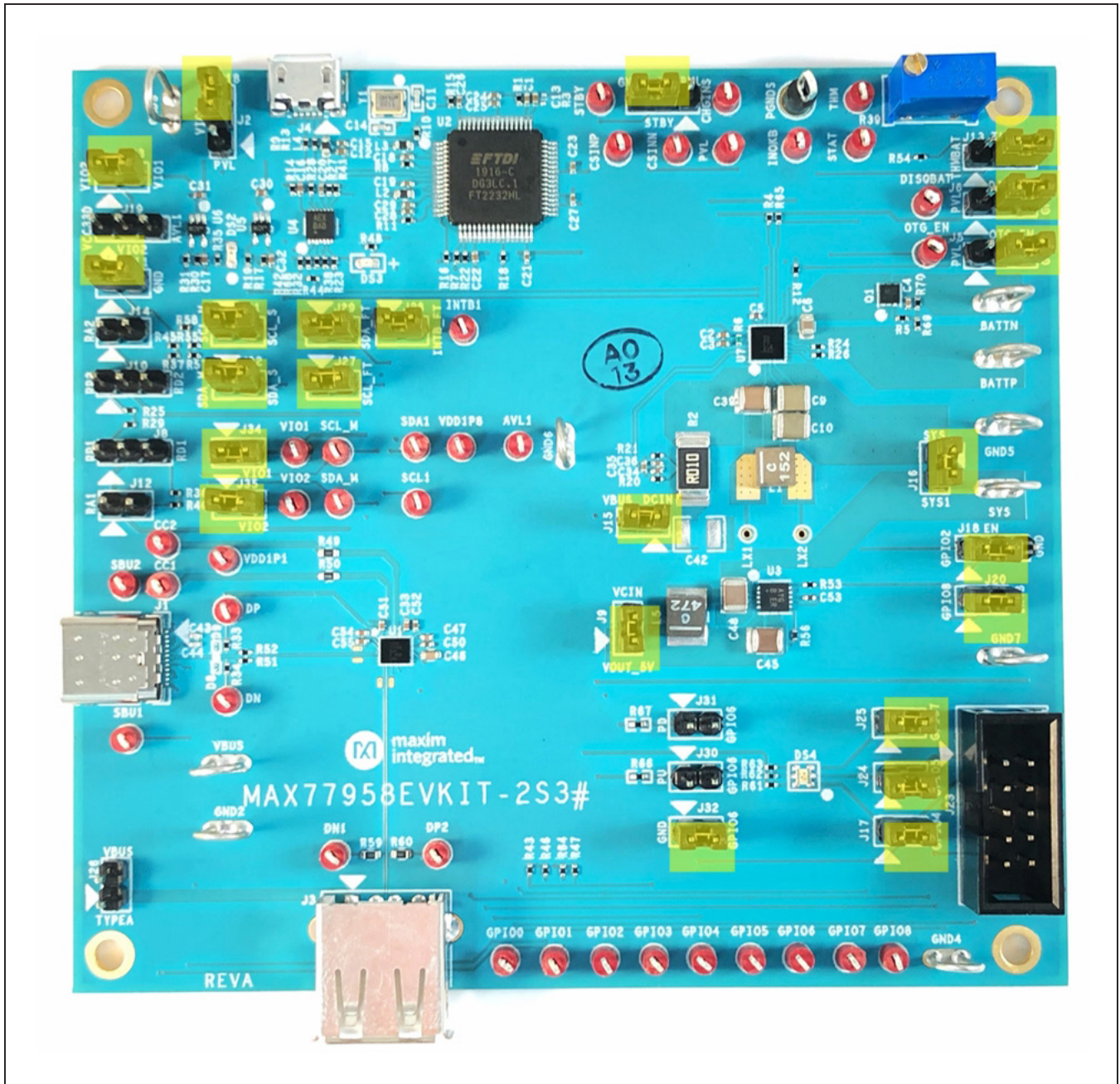


Figure 3. MAX77958 EV Kit-2S3# Top View with Default Jumpers Setup

MAX77958 Evaluation Kit with 2S Li+ 3A_{OUT} Buck-Boost Charger

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Detailed Description of Software

The GUI allows for quick, easy, and thorough evaluation of the MAX77958. Every control in the GUI corresponds to a register in the MAX77958. Refer to the Register Map Section in the MAX77958 data sheet for a complete description.

Installation

The MAX77958EVKIT-2S3 GUI can be downloaded from Maxim's website at <http://www.maximintegrated.com/products/MAX77958> (under the Design Resources tab).

Save the EV kit software to a temporary folder and decompress the ZIP file. Run the .EXE file and follow the on-screen instructions to complete the installation.

Windows Driver

After connecting the Micro-USB cable between a PC and the EV kit for the first time, wait for Windows to automatically install the drivers for the USB to I²C Interface.

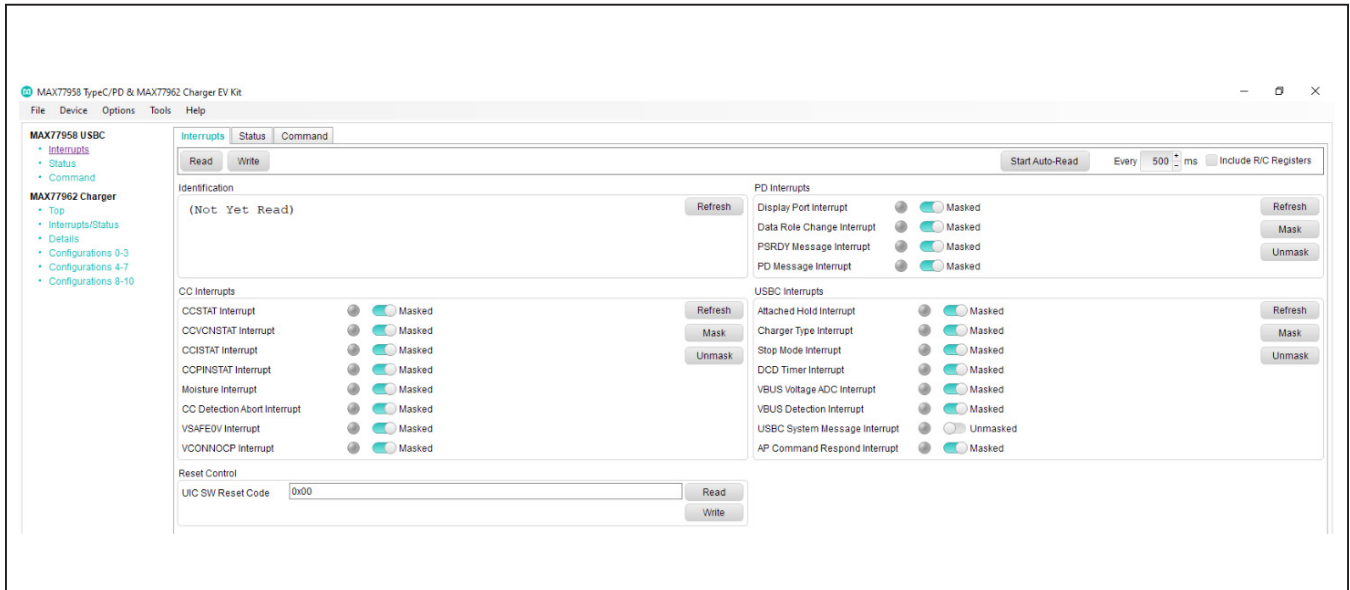


Figure 4. MAX77958 Evaluation Kit Software

Test Procedure

The EV kit is fully assembled and tested. Use the following steps to verify board operation.

Autonomous Mode 2S Application

SINK Mode

When the MAX77958 is configured as the SINK, the MAX77958 enables the charger mode of the MAX77962 and set the input current limit of the MAX77962 according to the USB Type-C and BC1.2 detection result.

- 1) Connect the battery simulator between BATT_P and BATT_N, adjust the voltage to 7V and turn it on.
- 2) Connect USB Type-C AC adapter into the EV kit.
- 3) Observe the current reading from the battery simulator, the default fast charging current should be 450mA.

SOURCE Mode

When the MAX77958 is configured as the SOURCE, the MAX77962 automatically switches to reverse-buck mode, and supplies 5.1V to V_{BUS}.

- 1) Connect the battery simulator between BATT_P and BATT_N, adjust the voltage to 7V and turn it on.
- 2) Make sure no USB Type-C cable is connected.
- 3) Short Pin1-2 of J11 and short Pin2-3 of J8 to connect a 5.1kΩ R_d to CC1.
- 4) Monitor the voltage of V_{BUS} and check whether it equals 5.1V.

Initial test setup

- 1) Do not turn on the DC power supplies until all connections are made.
- 2) Confirm all jumpers are at their default positions as indicated in [Table 2](#).
- 3) Connect a Micro-B USB cable from the computer's USB port to the MAX77958 EV kit.
- 4) Connect the DC power supply to the loop labeled SYS and GND.
- 5) Adjust the DC power supply to 7V and turn it on.
- 6) Follow the description of software covered in page 7 to install the MAX77958EVKIT-2S3.EXE software program.
- 7) Open the MAX77958 GUI and go to the **Device** drop-down menu, and press the **Connect** button in the drop-down list.
- 8) Wait for the device to respond and click on the **Read** and **Close** button to continue.
- 9) The EV kit and GUI are now ready for use.

CC Detection Test

- 1) Connect USB Type-C adapter into the EV kit and see whether the MAX77958 detects **SINK** and configures input current limit correctly.
- 2) Connect USB Type-C cable from a Type-C dual role port (Source Preferred) device to see whether the MAX77958 detects **CC Pin State Machine Detection** and configures input current limit correctly.

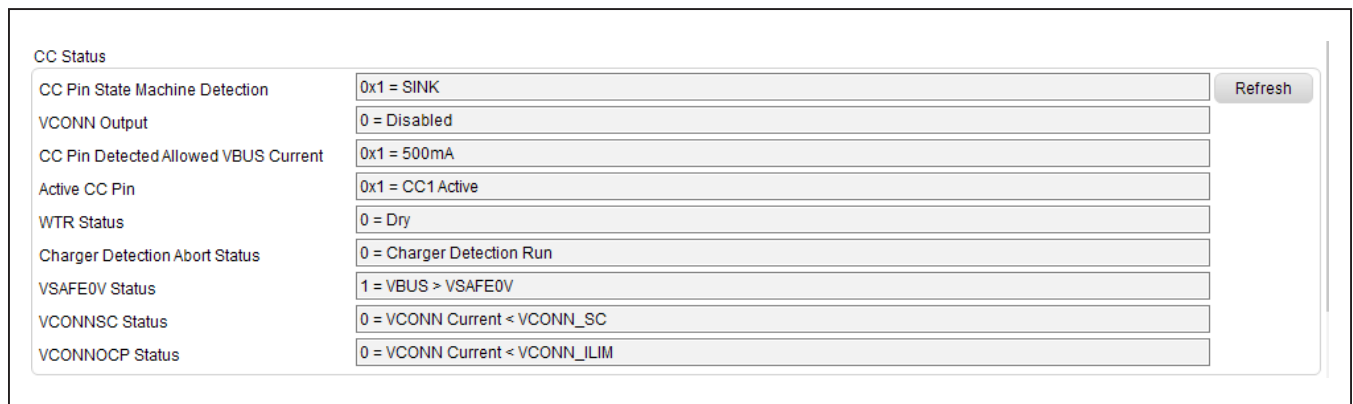


Figure 5. CC Status After Connecting the USB Type-C Connector of EV Kit to a Travel Adapter (TA)

USB Power Delivery Test

Source capability request function test.

- 1) Connect USB Power delivery AC Adapter into the EV kit.
- 2) Use a voltmeter to monitor the voltage on V_{BUS}.
- 3) Go to Command > **Get SrcCap (0x31)**, click on **Write** button execute the command, the MAX77958 sends this command over the CC pin to the TA, the TA provides a list of available source capabilities.
- 4) Review the source capabilities and make a note of the desired PDO.

- 5) Go to **SrcCap Request (0x32)**, set the value of the PDO and press the **Write** button to change the BUS voltage.

BC1.2 Charger Type Detection

- 1) Plug in the USB Type A to Type-C cable from a BC1.2 adapter or other legacy port, check the **Charger Detection Status** under the status tab of the MAX77958 GUI, to see if the USBC detects the correct charger type.

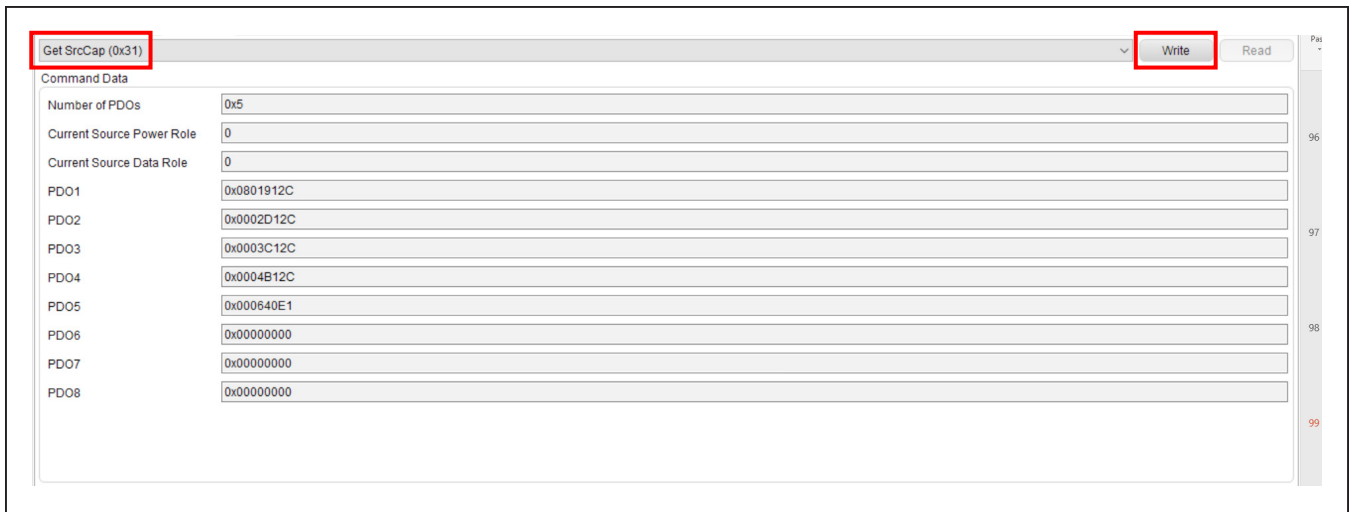


Figure 6. Get Source Capability (Get SrcCap) under Command Section

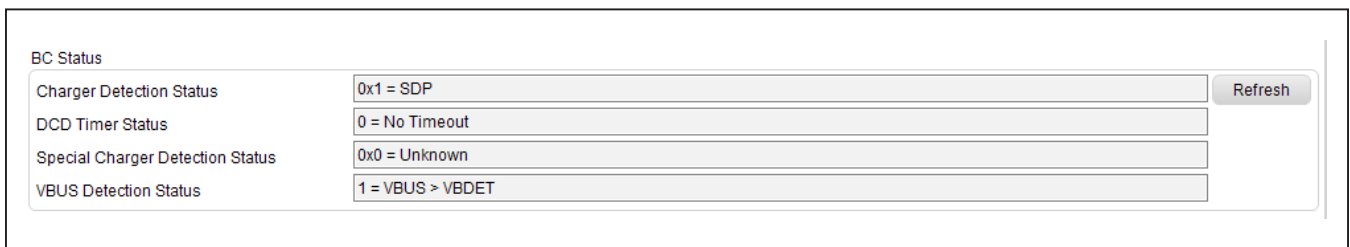


Figure 7. BC Status After Connecting the USB Type-C Connector of EV Kit to SDP

I²C Master Test

The MAX77962 buck-boost charger IC is installed on the EV kit and communicates with the MAX77958 through the master I²C interface. When the MAX77958 is configured as the source, the MAX77962 automatically switches to reverse-buck mode, and supplies 5.1V to V_{BUS}.

- 1) Disconnect Type-C cable.
- 2) Connect 7V power supply to BATT+.
- 3) Connect the pin 2-3 of Jumper 10, to attach the Rd to the CC2.
- 4) Check the **CC Status** in GUI, the MAX77958 should be in **SOURCE** mode.
- 5) MAX77962 is under the OTG mode, the measured V_{BUS} voltage should equal to 5.1V.

Detailed Description of Firmware

The firmware of the MAX77958 consists of two main parts: the core firmware and customization script.

The core firmware is compliant with the USB Type-C 1.3 and PD 3.0 specifications. The customization script is based on application system, giving more flexibility for system design. It is based on the customization script update, which can achieve functions such as GPIO matrix control, charger configuration initialization, etc.

Future USB Type-C and PD specifications changes can be accommodated by updating the MAX77958 core firmware. See the [Core Firmware Update](#) section of this data sheet.

See the MAX77958 customization script and OPCode command guide for details about the customization script.

Customization Script Block Update

The customization script defines the application specific behavior of the MAX77958. An example is setting the input current limit of the charger when the USB device detection is completed.

- 1) Follow the initial test setup to connect the GUI with the MAX77958 EV kit.
- 2) Connect 7.0V to SYS, do not disconnect the EV kit from the PC during the **Customization Script Block Update**.
- 3) Click on **Tools** in the menu bar and then go to **CUS Command Block Update**.
- 4) Click on the **Open** button in the pop up window to load the latest customization script and then click on **Start** to activate the **Customization Script Update**.
- 5) [Figure 10](#) shows the completion of the customization script update process.

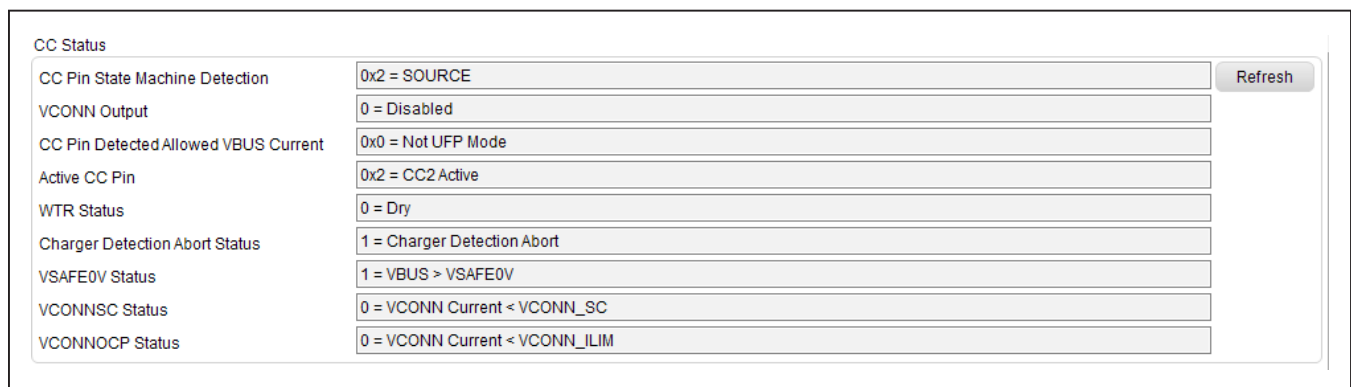


Figure 8. CC Status After Attaching Rd to CC2

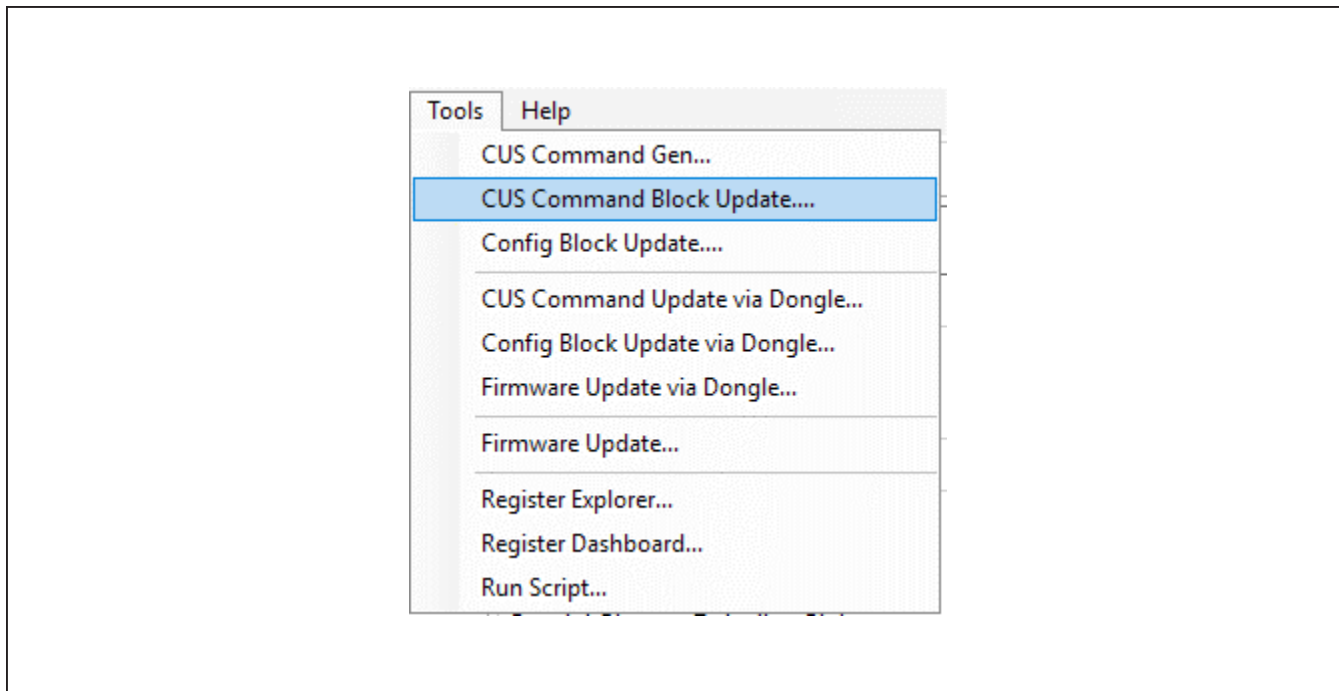


Figure 9. MAX77958 EV kit GUI Customization Script Block Update

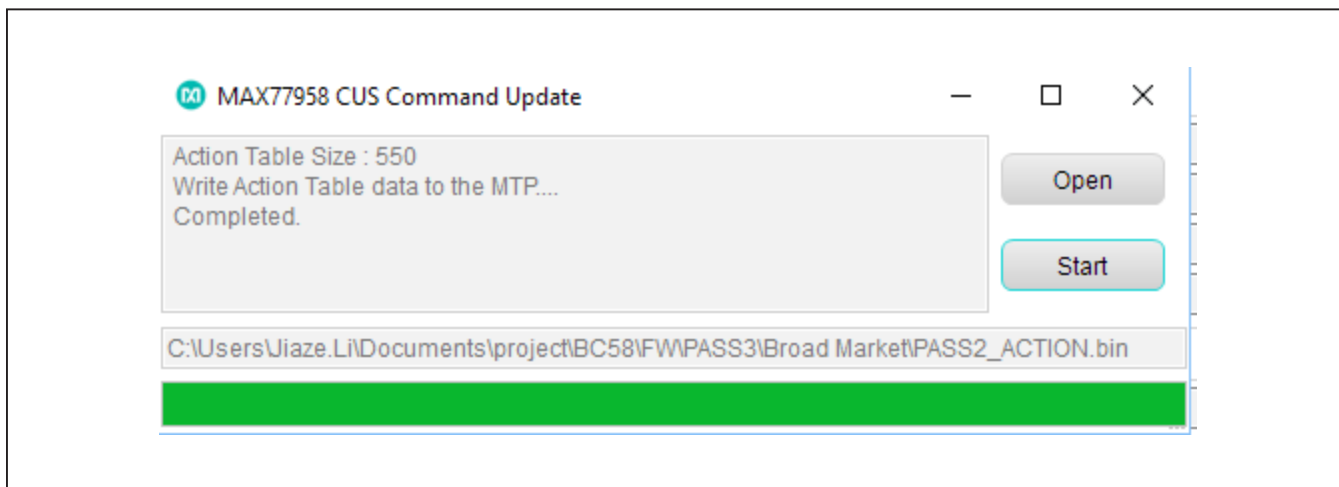


Figure 10. Customization Script Update Process Complete

Core Firmware Update

- 1) Follow the initial test setup to connect the GUI with the MAX77958 EV kit.
- 2) Connect 7.0V to SYS, do not disconnect the EV kit from the PC during the **Firmware Update**.
- 3) Click on **Tools** in the menu bar and then go to **Firmware Update**.
- 4) Click on the **Open** button in the pop up window to load the latest firmware, in the file select window click on the .bin file, and then select **Start** to activate the **Firmware Update**.
- 5) [Figure 12](#) shows the firmware update process is completed.

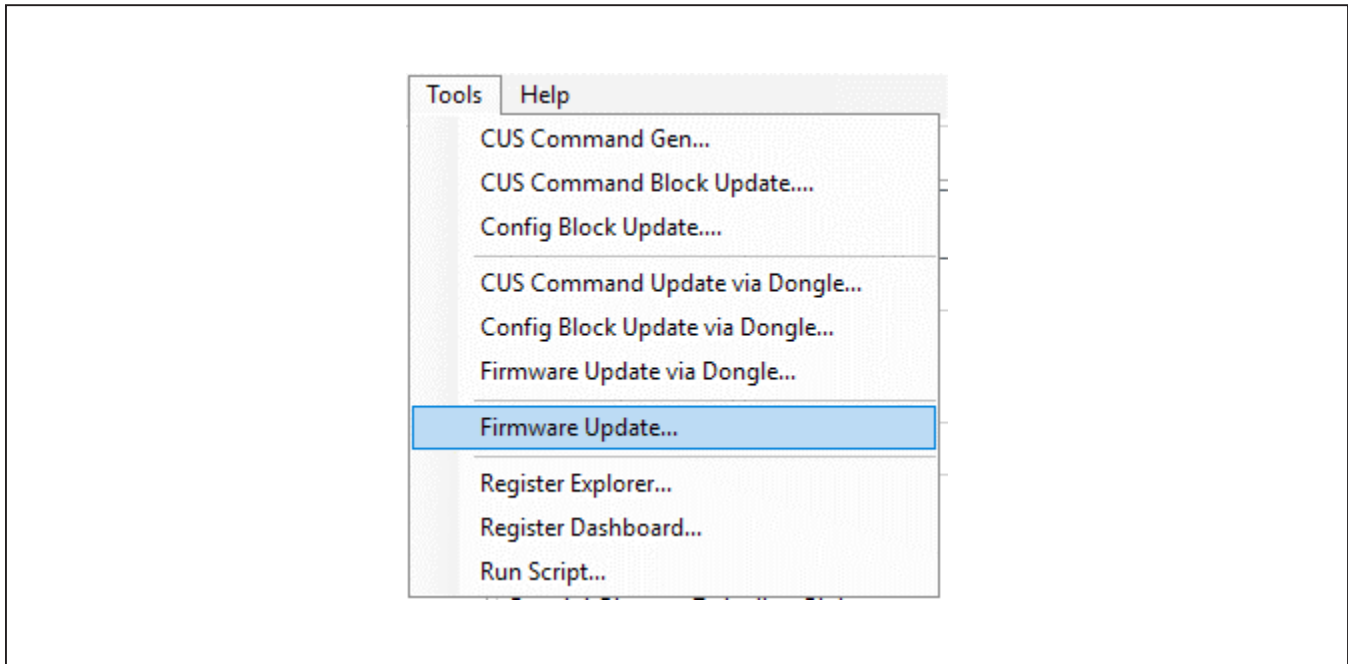


Figure 11. MAX77958 EV Kit GUI Firmware Update

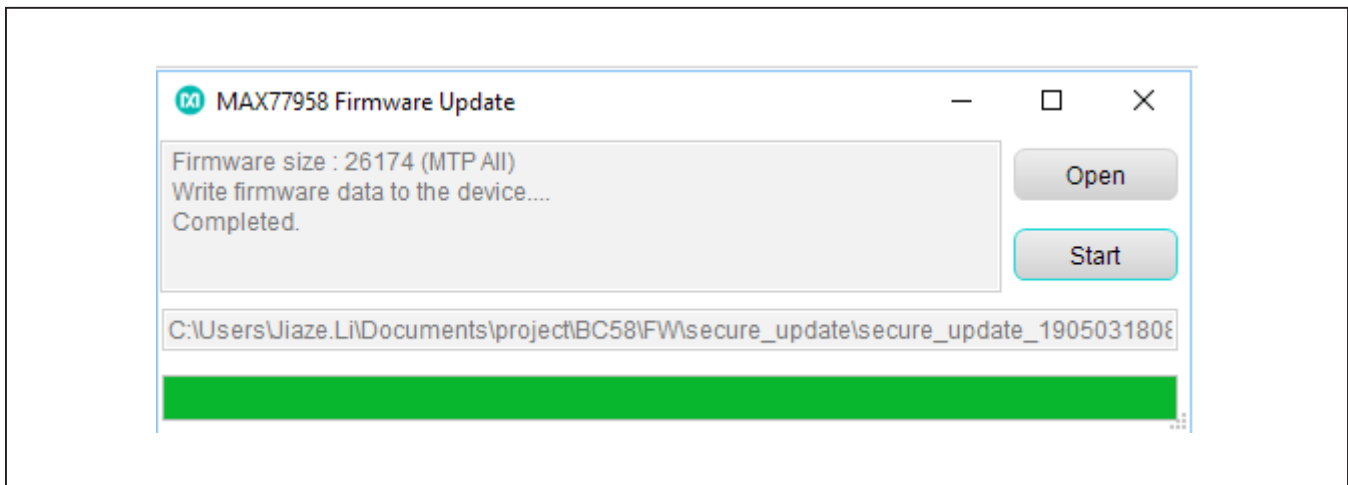


Figure 12. Firmware Update Process Complete

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Evaluates: MAX77958

Component Suppliers

| SUPPLIER | PHONE | WEBSITE |
|-------------------------------------|--------------|---|
| MURATA | 770-436-1300 | www.murata-northamerica.com |
| SAMTEC | 800-726-8329 | www.samtec.com |
| SULLINS ELECTRONICS CORP. | 760-774-0125 | www.sullinselectronics.com |
| TAIYO-YUDEN | 603-669-7587 | www.t-yuden.com |
| TDK | 847-803-6100 | https://www.tdk.com/corp/en/index.htm |
| VISHAY | 408-970-5852 | www.vishay.com |
| CYNTEC | 510-668-5167 | www.cyntec.com |
| PANASONIC | 800-344-2112 | https://na.industrial.panasonic.com/ |
| FUTURE TECHNOLOGY DEVICES INTL LTD. | 503-547-0988 | www.ftdichip.com |

Note: Indicate that you are using the MAX77958 when contacting these component suppliers.

Ordering Information

| PART NUMBER | IC | TYPE |
|--------------------|--------------|--------|
| MAX77958EVKIT-2S3# | MAX77958EWW+ | EV Kit |

#Denotes RoHS compliance.

MAX77958 Evaluation Kit with 2S
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Evaluates: MAX77958

MAX77958-2S3 EV Kit Bill of Materials

| REF_DES | QTY | MFG PART # | VALUE | DESCRIPTION |
|--|-----|--|----------|--|
| AVL1, CC1, CC2, CHGINS, CSINN, CSINP, DISQBAT, DN, DN1, DP, DP2, GPIO0-GPIO8, INOKB, INTB1, OTG_EN, PVL, SBU1, SBU2, SCL1, SCL_M, SDA1, SDA_M, STAT, STBY, THM, VDD1P1, VDD1P8, VIO1, VIO2 | 37 | 5000 | N/A | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; |
| BATTN, BATTTP, GND2-GND7, SYS, VBUS | 10 | 9020 BUSS | MAXIMPAD | EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG |
| C1, C15, C18-C21, C23-C29, C35 | 14 | GRM155R71A104JA01 | 0.1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 10V; TOL=5%; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| C2, C3, C12, C13, C22 | 5 | ZRB15XR61A475ME01; CL05A475MP5NRN; GRM155R61A475MEAA; C1005X5R1A475M050BC | 4.7UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 4.7UF; 10V; TOL=20%; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| C4 | 1 | C1005X7R1E473K050BC; GRM155R71E473K; GCM155R71E473KA55 | 0.047UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 0.047UF; 25V; TOL=10%; TG=- 55 DEGC TO +125 DEGC |
| C5 | 1 | GRM155C81E105KE11 | 1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 25V; TOL=10%; TG=-55 DEGC TO +105 DEGC; TC=X6S |
| C6 | 1 | TMK212BBJ106KG-T; CL21A106KAFN3N | 10UF | CAPACITOR; SMT (0805); CERAMIC CHIP; 10UF; 25V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| C7, C8 | 2 | GRM155R71C224KA12 | 0.22UF | CAPACITOR; SMT (0402); CERAMIC; 0.22UF; 16V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| C9, C10 | 2 | TMK325ABJ476MM | 47UF | CAP; SMT (1210); 47UF; 20%; 25V; X5R; CERAMIC CHIP |
| C11, C14, C43, C44 | 4 | C0402C0G500270JNP; GRM1555C1H270JA01 | 27PF | CAPACITOR; SMT; 0402; CERAMIC; 27pF; 50V; 5%; C0G; -55degC to + 125degC; 0 +/-30PPM/degC |
| C16, C17, C30-C32 | 5 | C0402C105K8PAC; CC0402KRX5R6BB105 | 1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R |

MAX77958-2S3 EV Kit Bill of Materials (continued)

| REF_DES | QTY | MFG PART # | VALUE | DESCRIPTION |
|----------------------------|-----|--|---------------------------|--|
| C33, C47, C51, C54, C55 | 5 | ANY | 1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 6.3V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R; |
| C34, C36 | 2 | GRM155R71H153KA12 | 0.015UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 0.015UF; 50V; TOL=10%; TG=- 55 DEGC TO +125 DEGC; TC=X7R |
| C39, C45 | 2 | GRM32ER7YA106KA12; CL32B106KLULNN | 10UF | CAPACITOR; SMT (1210); CERAMIC CHIP; 10UF; 35V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| C46 | 1 | GRM188R71A225KE15; CL10B225KP8NNN; C1608X7R1A225K080AC; C0603C225K8RAC | 2.2UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 2.2UF; 10V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| C48 | 1 | C1210C475K5RAC; GRM32ER71H475KA88; GCM32ER71H475KA55; CGA6P3X7R1H475K250AB; UMK325B7475KMHP; CNC6P1X7R1H475K250AE | 4.7UF | CAPACITOR; SMT (1210); CERAMIC CHIP; 4.7UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| C49 | 1 | TMK105BJ104KV; GRM155R61E104KA87 | 0.1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 25V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| C50, C52 | 2 | C1005X5R1V105K050BC | 1UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 35V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| C53 | 1 | ZRB157R61A225KE11; GRM155R61A225KE95; CL05A225KP5NSN | 2.2UF | CAPACITOR; SMT (0402); CERAMIC CHIP; 2.2UF; 10V; TOL=10%; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| D8, D9 | 2 | PESD4V0W1BSF | 4V | EVKIT PART-DIODE; TVS; SMT (SOD962-2); VRM=+/-4V; IPP=N/A |
| DS2 | 1 | LTST-C190CKT | LTST-C190CKT | DIODE; LED; STANDARD; RED; SMT (0603); PIV=5.0V; IF=0.04A; -55 DEGC TO +85 DEGC |
| DS3 | 1 | LTST-C190KFK | LTST-C190KFK | DIODE; LED; ULTRA BRIGHT CHIP LEAD; ORANGE; SMT (0603); VF=2V; IF=0.02A |
| DS4 | 1 | 19-337/R6GHBHC-A01/2T | 19-337/R6GHBHC- A01/2T | DIODE; LED; SMD-B; RED/GREEN/ BLUE; SMT; PIV=2V-3.3V; IF=0.02A |
| J1 | 1 | 12401832E402A | 12401832E402A | CONNECTOR; FEMALE; SMT; USB TYPE C CONNECTOR; RIGHT ANGLE; DUAL ROW; 24PINS |

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MAX77958-2S3 EV Kit Bill of Materials (continued)

| REF_DES | QTY | MFG PART # | VALUE | DESCRIPTION |
|--|-----|---|----------------------|---|
| J2, J5-J8, J10, J13, J18, J19 | 9 | PEC03SAAN | PEC03SAAN | EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC; |
| J3 | 1 | 87520-0010BLF | 87520-0010BLF | CONNECTOR; FEMALE; THROUGH HOLE; USB RECEPTACLE; RIGHT ANGLE; 4PINS |
| J4 | 1 | 10118193-0001LF | 10118193-0001LF | CONNECTOR; FEMALE; SMT; MICRO USB B TYPE RECEPTACLE; RIGHT ANGLE; 5PINS |
| J9, J11, J12, J14-J17, J20-J22, J24-J35 | 22 | TSW-102-07-T-S | TSW-102-07-T-S | CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 2PINS; -55 DEGC TO +105 DEGC |
| J23 | 1 | SBH11-PBPC-D05-ST-BK | SBH11-PBPC-D05-ST-BK | CONNECTOR; MALE; THROUGH HOLE; 0.100IN MALE SHROUDED BOX HEADER; STRAIGHT; 10PINS |
| L1 | 1 | XAL4020-152ME | 1.5UH | INDUCTOR; SMT; COMPOSITE CORE; 1.5UH; TOL=+/-20%; 5.2A |
| L2-L4 | 3 | BLM18AG601SN1 | 600 | INDUCTOR; SMT (0603); FERRITE-BEAD; 600; TOL=+/-; 0.5A |
| L5 | 1 | XFL4020-472ME | 4.7UH | INDUCTOR; SMT; METAL COMPOSITE CORE; 4.7UH; TOL=+/-20%; 5A; -40 DEGC TO +125 DEGC |
| PGNDS | 1 | 5011 | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; |
| Q1 | 1 | DMN3016LFDE | DMN3016LFDE | TRAN; NCH; U-DFN2020-6 (TYPE E); PD-(0.73W); I-(10A); V-(30V) |
| R1, R7, R14-R16, R18, R22, R24, R26, R32-R34, R44, R68 | 14 | ERJ-2GE0R00 | 0 | RESISTOR; 0402; 0 OHM; 0%; JUMPER; 0.10W; THICK FILM |
| R2 | 1 | CRA2512-FZ-R010ELF | 0.01 | RESISTOR; 2512; 0.01 OHM; 1%; 75PPM; 3.0W; THICK FILM |
| R4, R23, R58, R65 | 4 | CRCW0402200KFK; RF73H1ELTP2003 | 200K | RESISTOR; 0402; 200K; 1%; 100PPM; 0.0625W; THICK FILM |
| R5, R11, R40, R45 | 4 | CRCW04021K00FK; RC0402FR-071KL; MCR01MZPF1001 | 1K | RESISTOR; 0402; 1K; 1%; 100PPM; 0.0625W; THICK FILM |
| R6 | 1 | ERJ-2GEJ4R7 | 4.7 | RESISTOR; 0402; 4.7 OHM; 5%; 200PPM; 0.10W; THICK FILM |

MAX77958-2S3 EV Kit Bill of Materials (continued)

| REF_DES | QTY | MFG PART # | VALUE | DESCRIPTION |
|--------------------|-----|---|-------|--|
| R8 | 1 | CRCW040212K0FK; MCR01MZPF1202 | 12K | RESISTOR, 0402, 12K OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R9, R13 | 2 | ERJ-2RKF27R0X; RC0402FR-0727RL; CRCW040227R0FK | 27 | RESISTOR, 0402, 27 OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R10 | 1 | CRCW04021M00FK | 1M | RESISTOR; 0402; 1M; 1%; 100PPM; 0.0625W; THICK FILM |
| R12, R54 | 2 | CRCW040210K0FK; RC0402FR-0710KL | 10K | RESISTOR; 0402; 10K; 1%; 100PPM; 0.0625W; THICK FILM |
| R17 | 1 | CRCW04024752FK; 9C04021A4752FLHF3; CRCW040247K5FK | 47.5K | RESISTOR; 0402; 47.5K; 1%; 100PPM; 0.0625W; THICK FILM |
| R19, R31, R41 | 3 | CRCW0402100KFK; RC0402FR-07100KL | 100K | RESISTOR; 0402; 100K; 1%; 100PPM; 0.0625W; THICK FILM |
| R20, R21 | 2 | CRCW040210R0FK; 9C04021A10R0FL | 10 | RESISTOR; 0402; 10 OHM; 1%; 100PPM; 0.0625W; THICK FILM |
| R25, R29 | 2 | ERJ-2RKF5602 | 56K | RESISTOR, 0402, 56K OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R27, R28 | 2 | CRCW04024K70FK; MCR01MZPF4701 | 4.7K | RESISTOR, 0402, 4.7K OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R30 | 1 | CRCW0402169KFK | 169K | RESISTOR; 0402; 169K OHM; 1%; 100PPM; 0.063W; THICK FILM |
| R35 | 1 | CRCW0402470RFK | 470 | RESISTOR, 0402, 470 OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R36, R37 | 2 | CRCW04025K10FK | 5.1K | RESISTOR; 0402; 5.1K; 1%; 100PPM; 0.0625W; THICK FILM |
| R38, R42, R55, R57 | 4 | CRCW04022K20FK; RC0402FR-072K2L | 2.2K | RESISTOR, 0402, 2.2K OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R39 | 1 | 3296Y-1-503LF | 50K | RESISTOR; THROUGH HOLE- RADIAL LEAD; 3296 SERIES; 50K OHM; 10%; 100PPM; 0.5W |
| R43, R47 | 2 | ERJ-2RKF6493 | 649K | RESISTOR; 0402; 649K OHM; 1%; 100PPM; 0.1W; THICK FILM |
| R46, R64 | 2 | ERJ-2RKF1203 | 120K | RESISTOR; 0402; 120K OHM; 1%; 100PPM; 0.1W; THICK FILM |
| R48 | 1 | ERJ-2GEJ132 | 1.3K | RESISTOR; 0402; 1.3K OHM; 5%; 200PPM; 0.1W; THICK FILM |
| R49, R50, R59, R60 | 4 | CRCW06030000Z0EAHP | 0 | RESISTOR; 0603; 0 OHM; 0%; JUMPER; 0.25W; THICK FILM |
| R51, R52 | 2 | CRCW04021R00FK | 1 | RESISTOR, 0402, 1 OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R53 | 1 | ERJ-2RKF3302X | 33K | RESISTOR, 0402, 33K OHM, 1%, 100PPM, 0.0625W, THICK FILM |

MAX77958 Evaluation Kit with 2S
Li+ 3A_{OUT} Buck-Boost Charger

Evaluates: MAX77958

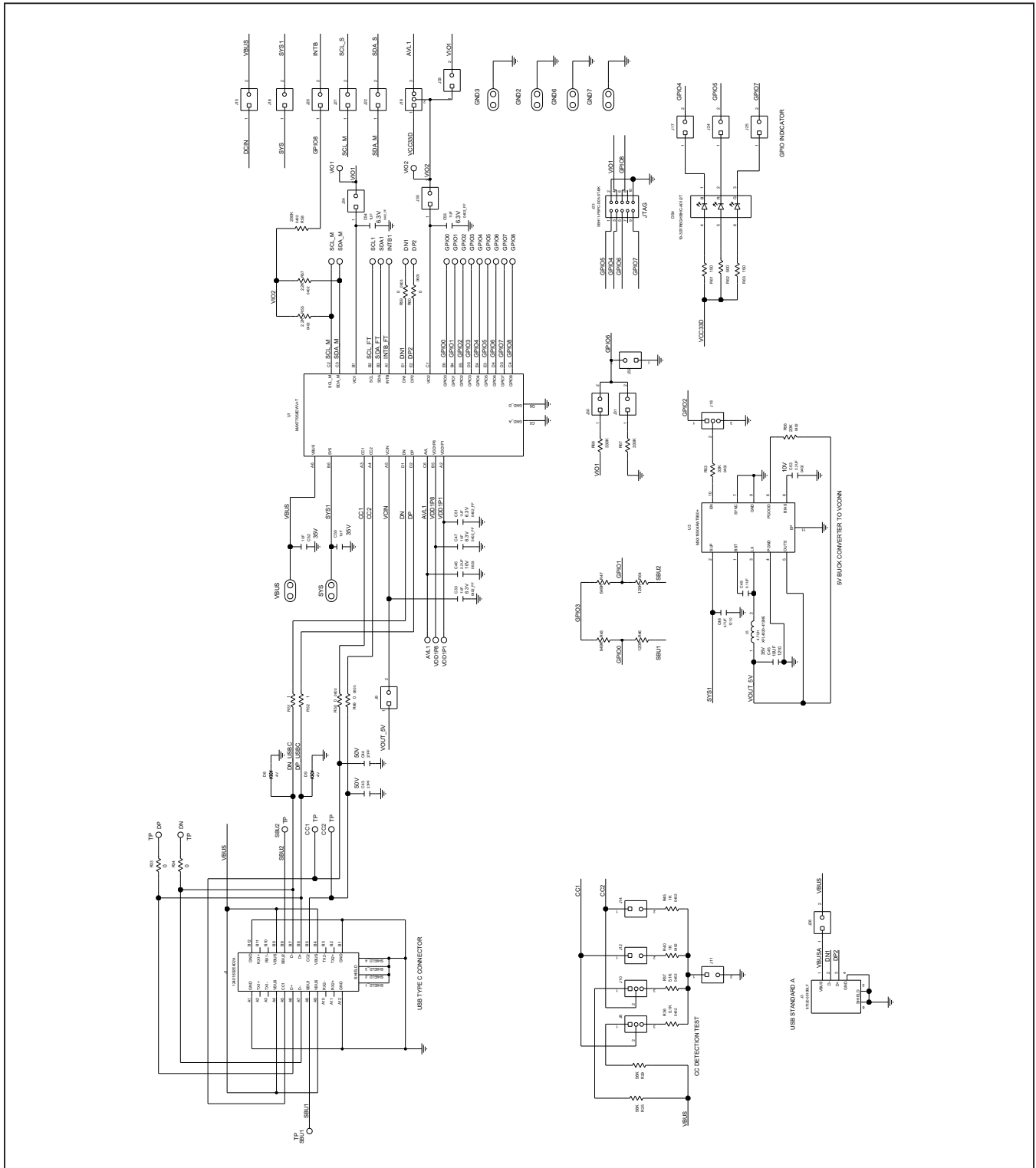
MAX77958-2S3 EV Kit Bill of Materials (continued)

| REF_DES | QTY | MFG PART # | VALUE | DESCRIPTION |
|-------------------|-----|-----------------------------------|-----------------|---|
| R56 | 1 | CRCW040220K0FK | 20K | RESISTOR; 0402; 20K OHM; 1%; 100PPM; 0.063W; THICK FILM |
| R61, R63 | 2 | CRCW0402150RFK; 9C04021A1500FL | 150 | RESISTOR; 0402; 150 OHM; 1%; 100PPM; 0.0625W; THICK FILM |
| R62 | 1 | PNM0402E5000BS | 500 | RESISTOR; 0402; 500 OHM; 0.1%; 25PPM; 0.05W; THIN FILM |
| R66, R67 | 2 | CRCW0402330KFK | 330K | RESISTOR, 0402, 330K OHM, 1%, 100PPM, 0.0625W, THICK FILM |
| R69 | 1 | ERJ-2RKF2203 | 220K | RESISTOR; 0402; 220K OHM; 1%; 100PPM; 0.1W; THICK FILM |
| R70 | 1 | ERJ-2GEJ474 | 470K | RES; SMT (0402); 470K; 5%; +/-200PPM/DEGC; 0.1W |
| U1 | 1 | MAX77958EWW+T | MAX77958EWW+T | EVKIT PART - IC; USB TYPE-C AND USB PD CONTROLLER; WLP30; 0.5MM PITCH; PACKAGE OUTLINE: 21-0069; PACKAGE CODE: W302A3+2 |
| U2 | 1 | FT2232HL | FT2232HL | IC; MMR; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64 |
| U3 | 1 | MAX16904RATB50+ | MAX16904RATB50+ | IC; CONV; 2.1MHZ HIGH-VOLTAGE; 600 MILLIAMPERE MINI-BUCK CONVERTER; TDFN10-EP |
| U4 | 1 | MAX14611ETD+ | MAX14611ETD+ | IC; TRANS; QUAD BIDIRECTIONAL LOW-VOLTAGE LOGIC LEVEL TRANSLATOR; TDFN14-EP |
| U5, U6 | 2 | MAX8512EXK+ | MAX8512EXK | IC, VREG, Ultra-Low-Noise, High PSRR, Adjustable Vout, SC70-5 |
| U7 | 1 | MAX77962EWJ12+ | MAX77962EWJ12+ | EVKIT PART -IC; MAX77962; PACKAGE OUTLINE DRAWING: 21-100355 |
| Y1 | 1 | 7M-12.000MAAJ | 12MHZ | CRYSTAL; SMT; 18PF; 12MHZ; +/-30PPM; +/-30PPM |
| PCB | 1 | MAX77958 | PCB | PCB:MAX77958 |
| R3 | 0 | N/A | OPEN | RESISTOR; 0402; OPEN; FORMFACTOR |
| C37, C38, C40-C42 | 0 | N/A | OPEN | CAPACITOR; SMT (1210); OPEN; IPC MAXIMUM LAND PATTERN |

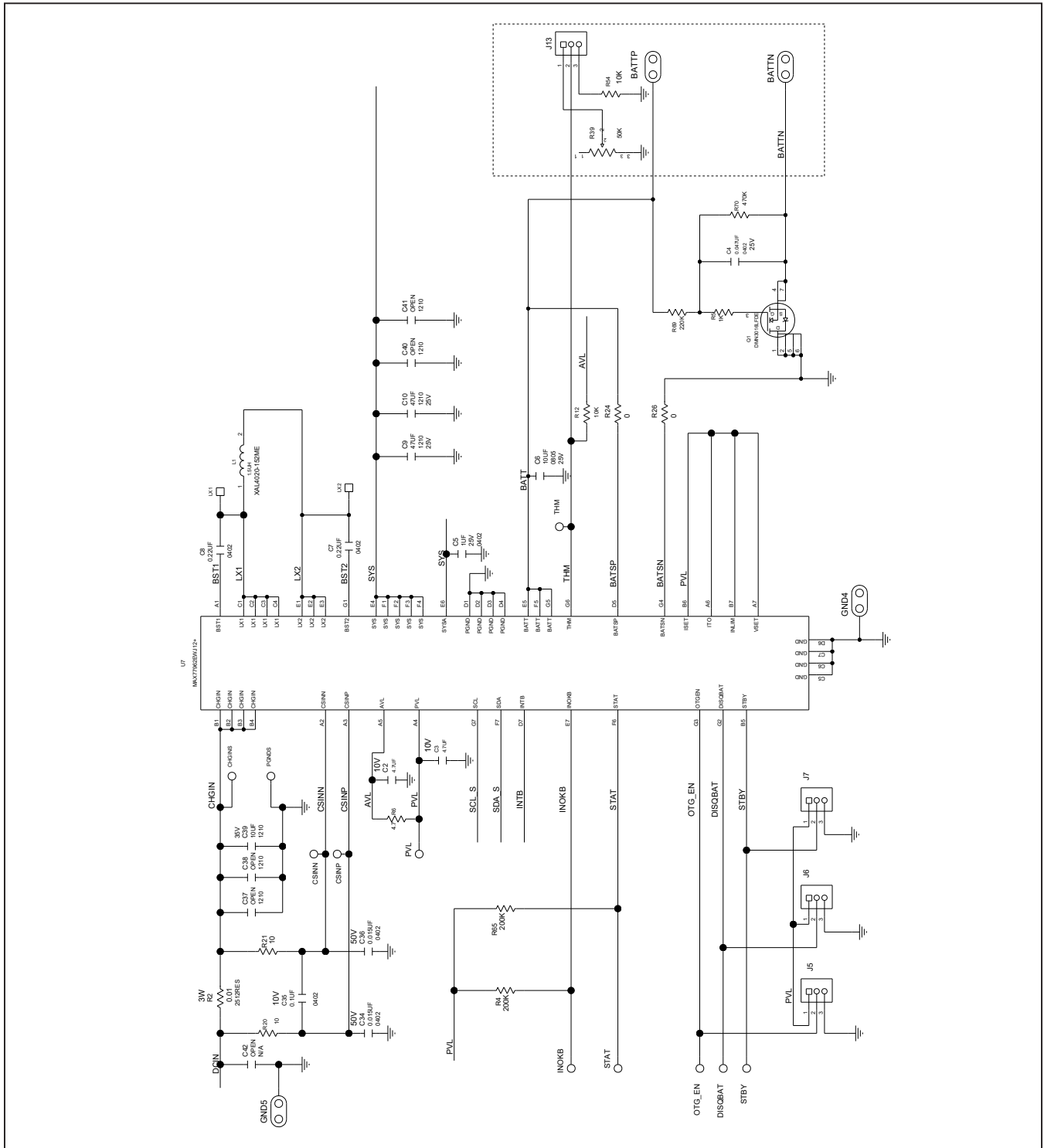
MAX77958 Evaluation Kit with 2S Li+ 3A_{OUT} Buck-Boost Charger

Evaluates: MAX77958

MAX77958-2S3 EV Kit Schematics

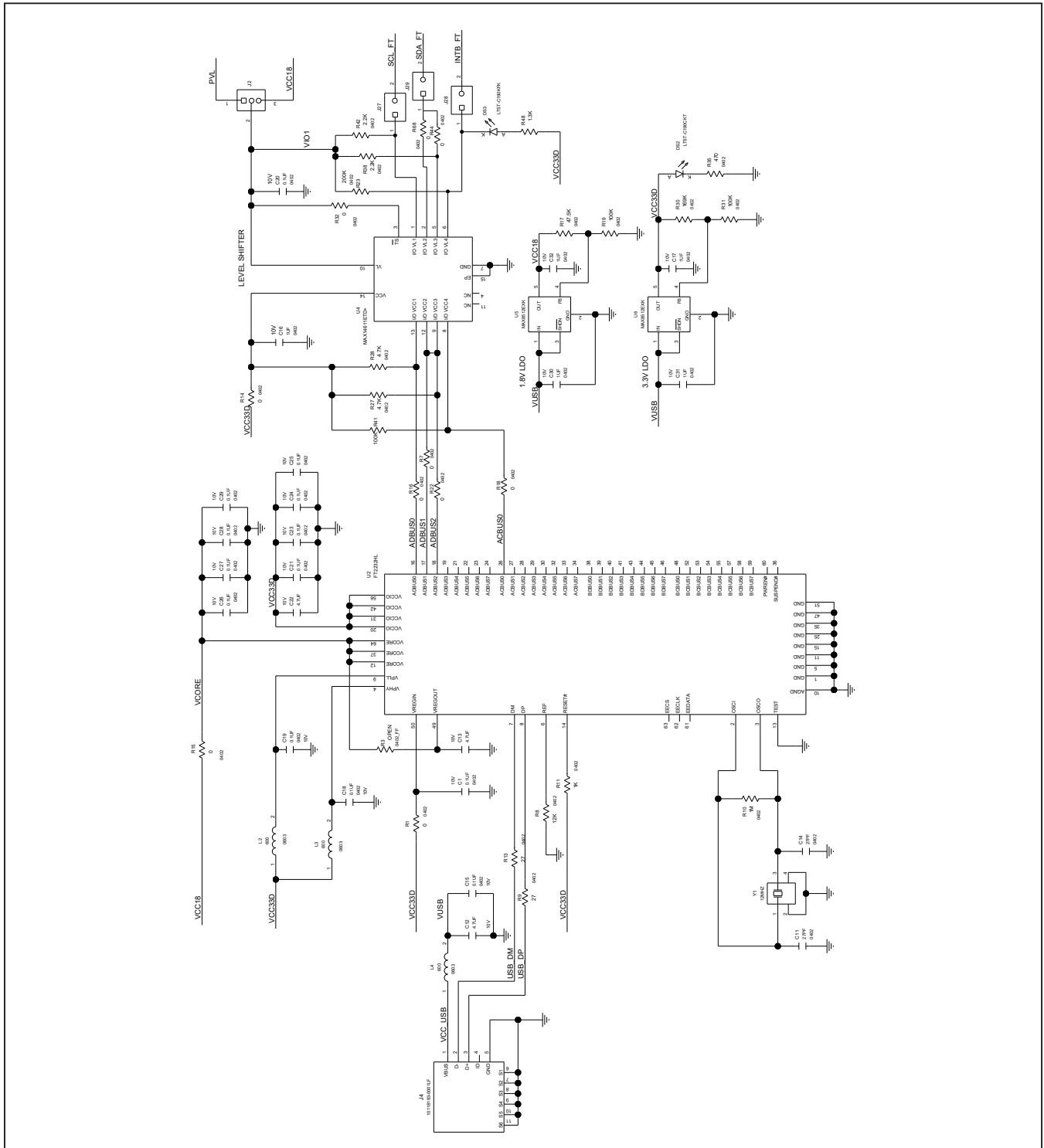


MAX77958-2S3 EV Kit Schematics (continued)



MAX77962 2-Cell Charger to Validate the I²C Master Feature

MAX77958-2S3 EV Kit Schematics (continued)

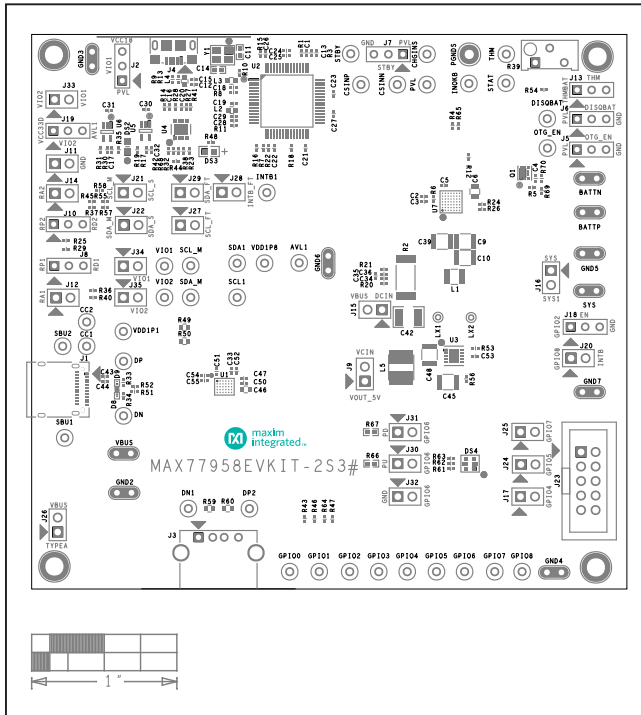


MAXUSB, USB to I2C translator

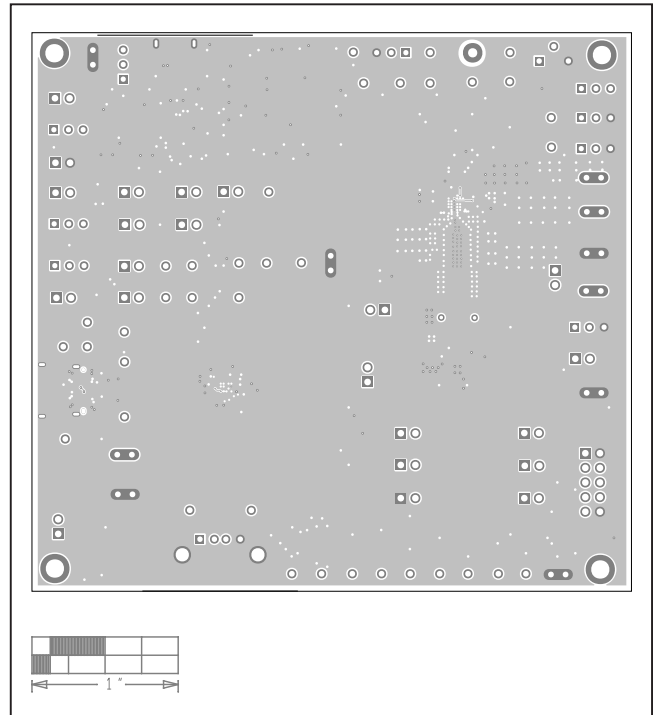
MAX77958 Evaluation Kit with 2S Li+ 3A_{OUT} Buck-Boost Charger

Evaluates: MAX77958

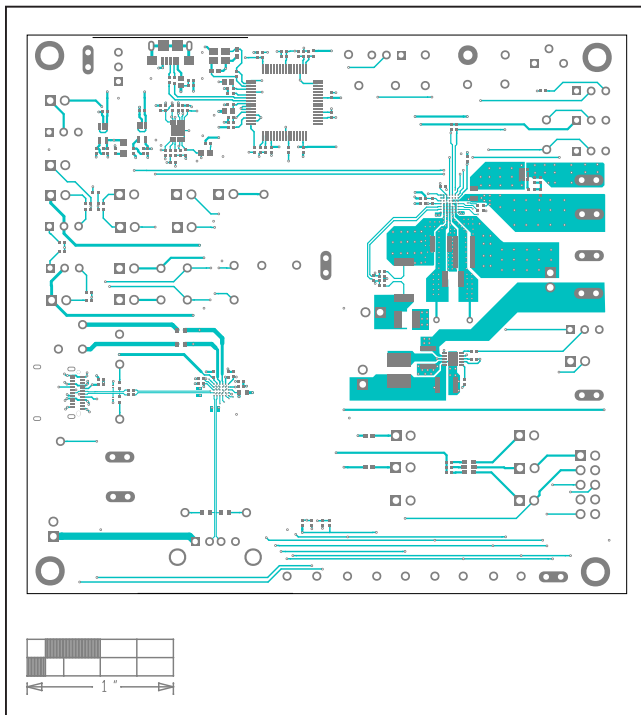
MAX77958-2S3 EV Kit PCB Layouts



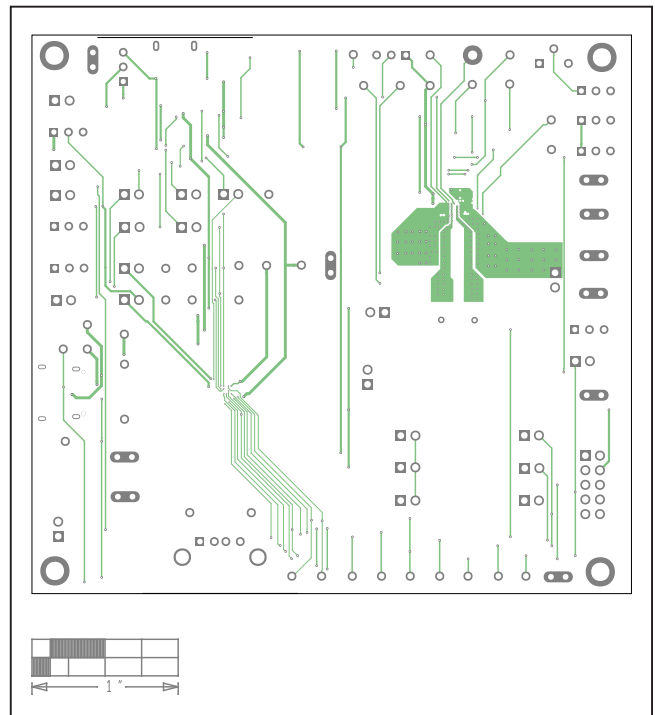
MAX77958-2S3 EV Kit PCB Layout—Silkscreen Top



MAX77958-2S3 EV Kit PCB Layout—Inner Layer 2

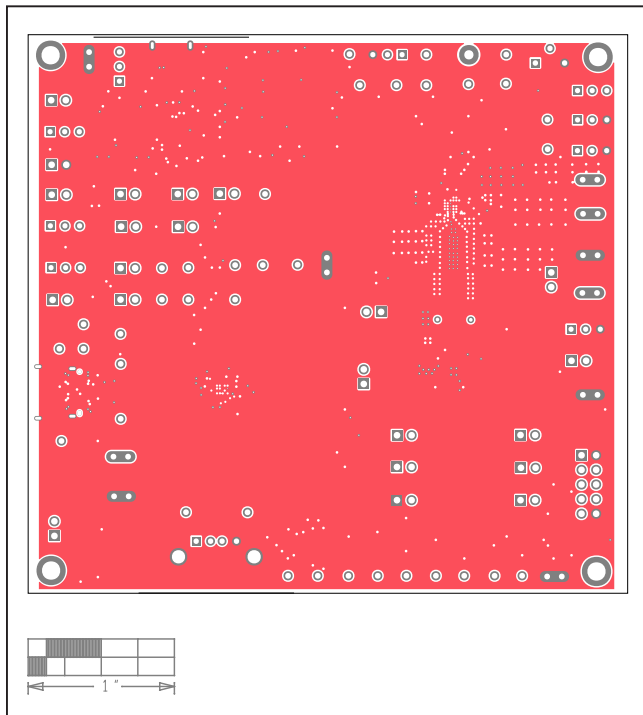


MAX77958-2S3 EV Kit PCB Layout—Top Layer

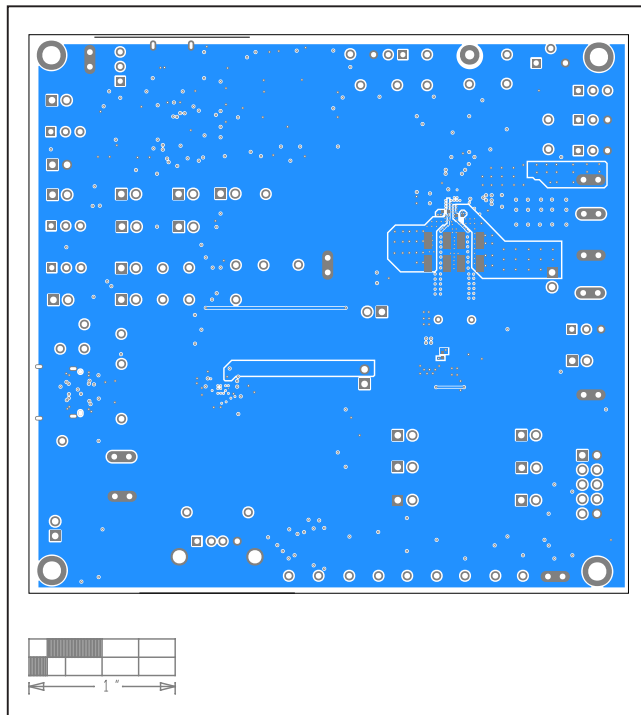


MAX77958-2S3 EV Kit PCB Layout—Inner Layer 3

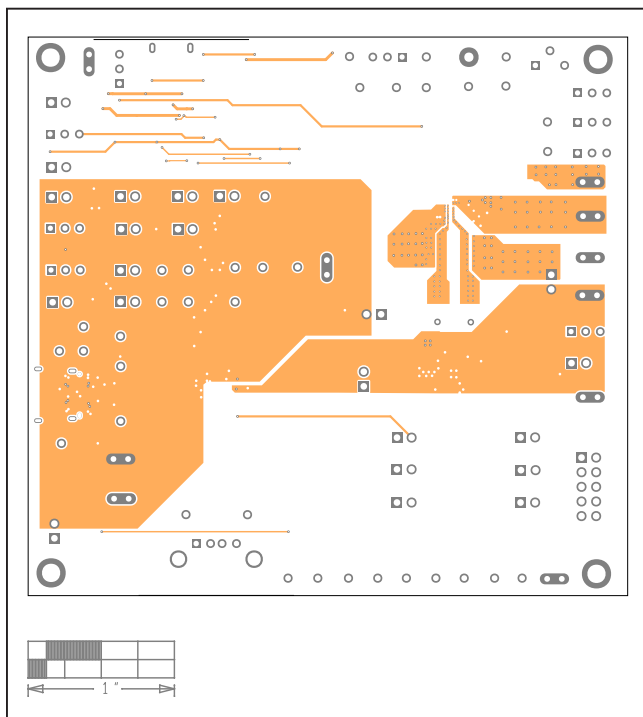
MAX77958-2S3 EV Kit PCB Layouts (continued)



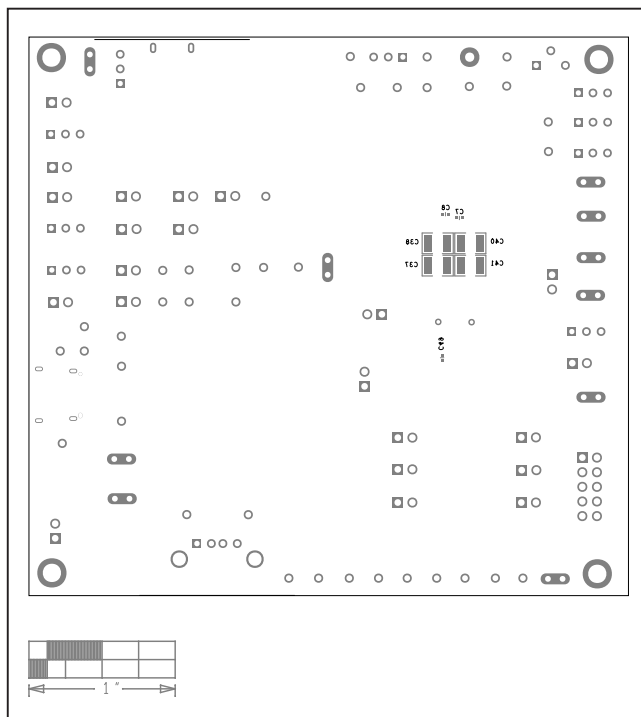
MAX77958-2S3 EV Kit PCB Layout—Inner Layer 4



MAX77958-2S3 EV Kit PCB Layout—Bottom Layer



MAX77958-2S3 EV Kit PCB Layout—Inner Layer 5



MAX77958-2S3 EV Kit PCB Layout—Silkscreen Bottom

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|--------------------|---------------|
| 0 | 4/20 | Initial release | — |
| 0.1 | | Corrected rev date | 1, 24 |

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