Click here to ask an associate for production status of specific part numbers.

Evaluates: MAX77985/MAX77986 (A/B)

MAX77985/MAX77986 Evaluation Kits

General Description

The MAX77985/MAX77986 evaluation kit (EV kit) is a fully assembled and tested printed circuit board (PCB) that demonstrates the MAX77985A/MAX77985B/MAX77986A/MAX77986B single-cell lithium-ion battery charger.

The MAX7798XX series of IC is for 1S Li+ battery applications and can operate with a 4.7V to 19V input voltage with a maximum charging current of 3.5/5.5A. The IC offers a reverse boost as well as fully integrated low power loss switches to provide a small solution size and high efficiency. The EV kit demonstrates the performance of the IC and provides the convenience of evaluating full USB Type-C® PD solutions with the MAX77958 USB Type-C PD controller. This combination allows fast charging of the battery through the USB Type-C port as well as reverse powering the USB Type-C port with battery OTG mode.

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 I^2C port on the IC. Windows®-based graphical user interface (GUI) software provides a user-friendly interface to exercise the features of the IC.

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

Features

- High-Efficiency Single-Cell Switching Charger
  - Up to 5.5A Charging with MAX77986
  - 92% Buck Efficiency at 4A, 12V Input
- +28V Absolute Maximum Input Voltage Rating
- 4.7V to 19V Input Operating Voltage Range
- Reverse Boost with Programmable Output Voltage Options up to 12V
- Charge Status Output for LED
- Push-Button Input for Exiting from Ship Mode
- External Discharge FET Enable Output
- Dedicated Input for Suspend Mode (SUSPND)
- Spread Spectrum for Noise Sensitive Applications
- Programmable Unplug Detection for 9V and 15V Source
- USB Type-C Standalone Controller Support Customizable Firmware
- USB Type-C Version 1.3 and PD 3.0 Compliant
- Sink/Source/DRP Port Support
- PPS Sink Support
- Fast Role Swap Initial Sink Support
- Integrated VCONN Switch with OCP
- Support Try.Snk
- Support BC1.2 Legacy Charger Detection

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

319-100957; Rev 1; 10/22

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Quick Start

Follow this procedure to familiarize yourself with the EV kit.

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

Required Equipment

- MAX77985/MAX77986 evaluation package
  - MAX77985/MAX77986EVKIT# Board
  - USB Micro-B cable
  - MAX77985/MAX77986 EV kit software (GUI)
- USB Type-C or PD travel adapter (TA)
- USB Type-C cable
- Power supply
- Battery simulator or real 1-cell Li-ion battery
- Multi-meters
- Windows-based PC
- Oscilloscope to monitor CC pin or other signals

Procedure

The EV kits are fully assembled and tested. Follow the steps below to install the EV kit software, make the required hardware connections, and start the operation of the kit. The EV kit software can be run without attached hardware. Note that after communication is established, the IC must still be configured correctly for the desired operation mode. Make sure the PC is connected to the internet throughout the process so that the USB driver can be automatically installed.

1) Visit **www.maximintegrated.com/products/MAX77985_MAX77986** under the *Design Resources* tab to download the latest version of the MAX77985/MAX77986 EV kit GUI software. Save the software to a temporary folder and unpack the zip file.
2) Install the EV kit software on your computer by running the **MAX77985_MAX77986GUISetupX.X.X.exe** program inside the temporary folder. The program files are copied, and icons are created in the Windows **Start** menu. The software requires the .NET Framework 4.5 or later. If you are connected to the Internet, Windows automatically updates the .NET framework as needed.
3) The EV kit software launches automatically after installation, or it can be launched by clicking on its icon in the Windows **Start** menu.
4) Make jumper connections based on the *Default Connection* section from Table 1. Change it later when evaluating more features. For the SW1 on the EV kit, set the switch location to the RIGHT so that the MAX77985/MAX77986 I^2C lines are connected directly to the MAXUSB communication interface. Later you can switch it to the LEFT so that the MAX77985/MAX77986 I^2C lines are connected to the MAX77958 I^2C master.
5) Make connections to the EV kit board following guidance as shown in Figure 1. The two main inputs to apply are the battery and the charging adaptor. For quick start evaluation, it is suggested to use a 5V power supply at the CHGIN input and a battery voltage greater than 3.6V at the BATT input. The optional voltmeter and ammeter location for testing charger efficiency is indicated in Figure 1. When set up properly with both CHGIN = 5V and BATT = 3.8V input, the SYS voltage is regulated above VBATT by default.
6) Connect the EV kit to a USB port on the PC using a USB Micro-B cable.
7) Open the GUI software and click **Device > Connect**. A window pops up showing that a slave address corresponding to MAX7798xx and MAX77958 has been found. If not, check the connection.
8) Start evaluating the part with the GUI software. Unlock the write protection and adjust the charger mode, the charging input current limit, and the charging current to start evaluating the basic charger features as described in the *Configurations 0-13 Tabs* section. Play with the charger mode and other register settings to evaluate the smart power path and more features. Remove the CHGIN input and use the real travel adaptor to evaluate charging the battery through the USB Type-C port.

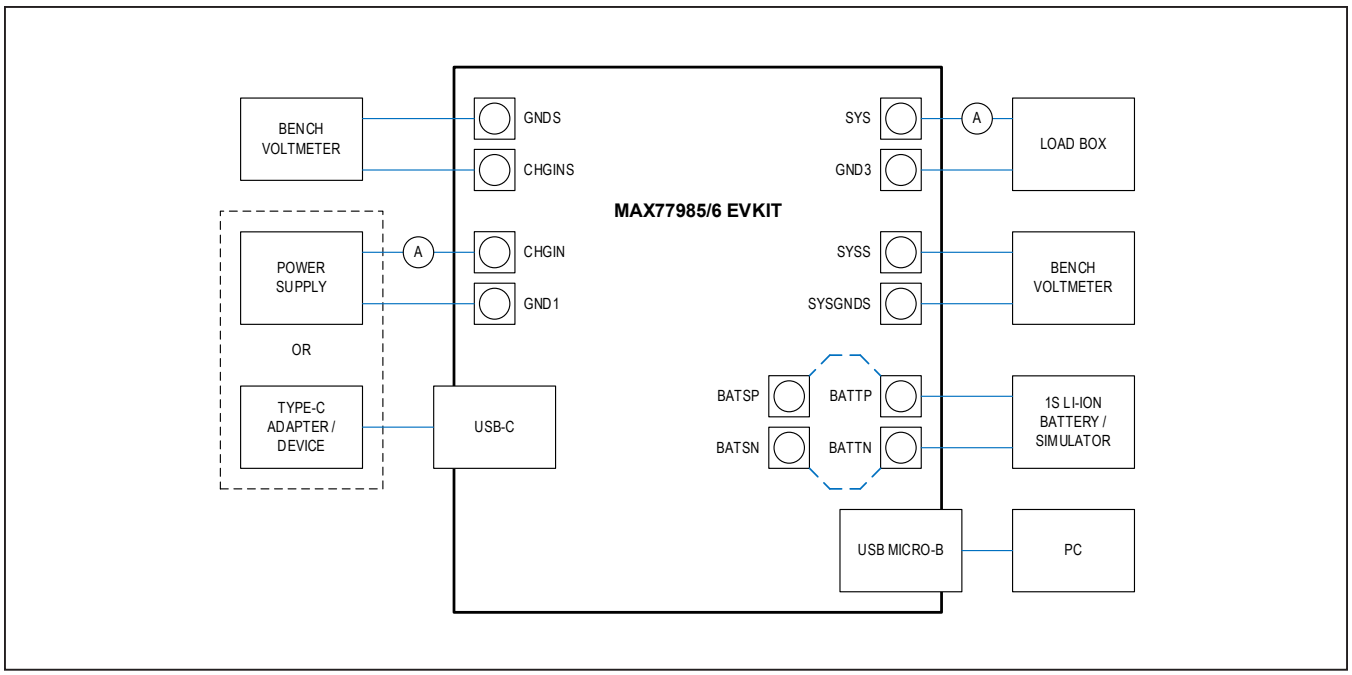


Figure 1. MAX7798xx EV Kit Board Connections. The power supply and the USB Type-C adaptor can NOT be applied at the same time.

Table 1. Jumper Connection and Switch Setting Guide

JUMPER	DEFAULT CONNECTION	FEATURE
J20	1-2: Closed 3-4: Open 5-6: Open 7-8: Open	Open: No additional capacitor added on SYS. Bridge N jumpers (N can be 1, 2, 3, 4): Add N x 100µF capacitor on SYS. **1-2: Additional 1x100µF capacitor.** 3-4: Additional 1x100µF capacitor. 5-6: Additional 1x100µF capacitor. 7-8: Additional 1x100µF capacitor.
J21	Closed	Open: Disconnect BATTSP from BATTN. Allows BATTSP pin to remote sense at battery positive terminal. **Closed: BATTSP sense point is directly at the BATTP input terminal on the EV kit.**
J22	Closed	Open: Disconnect BATTSN from BATTN. Allows BATTSN pin to remote sense at battery negative terminal. **Closed: BATTSN sense point is directly at the BATTN input terminal on the EV kit.**
J23	Open	**Open: Disable external BATT to SYS FET circuit.** Closed: Enable the external BATT to SYS FET path to further reduce the BATT to SYS on resistance. Need to connect J18 and J29.
J36	Closed	Open: No additional capacitor added on BATT. **Closed: 220µF capacitor added on BATT.**

Table 1. Jumper Connection and Switch Setting Guide (continued)

JUMPER	DEFAULT CONNECTION	FEATURE
J5	1-2 (ROOM): Closed 3-4 (NTC): Open 5-6 (POT): Open 7-8 (ENTH): Closed	All Open: Disable thermistor. Only 7-8 Closed: Enable thermistor function, connect pin 1 to the thermistor from the battery pack to measure temperature directly at the battery. **1-2, 7-8 Closed: Enable thermistor function, a fixed 10kΩ pullup and pulldown simulate a constant room temperature.** 3-4, 7-8 Closed: Enable thermistor with temperature measurement from an NTC resistor installed on EV kit. 5-6, 7-8 Closed: Enable thermistor with temperature measurement simulated with a potentiometer R43. Any other configuration: Do not configure.
J18	1-2	**1-2: Enable QBEXT pin as $\overline{\text{PGOOD}}$.** 2-3: Connect 100kΩ pullup for the external BATT to SYS FET circuit. Need to connect J23 and J29.
J29	Open	**Open: Disable external BATT to SYS FET circuit.** Close: Connect QBEXT pin to control external BATT to SYS FET circuit. Need to connect J23 and J18.
J37	Open	**Open: Default operation.** Closed: Force disconnect QBATT.
J13	Open	**Open: Default operation.** Closed: Force SUSPEND = 1 to the charger.
J17	Open	**Open: STAT pin LED indicator is disabled.** Closed: STAT pin LED indicator is enabled.
J7	2-3	Open: Do not configure. 1-2: VIO powered through EXTVIO with 1.8V external power supply. **2-3: VIO powered by USB Micro-B port connected to PC.**
J9	Closed	Open: MAX77958 V_{CONN} is not powered. **Closed: MAX77958 V_{CONN} is powered by SYS.**
J3	Closed	Open: MAX77958 is not connected to VBUS. **Closed: MAX77958 is connected to VBUS.**
J16	Closed	Open: MAX77958 is not powered by SYS. **Closed: MAX77958 is powered by SYS.**
J4	Open	**Open: MAX77958 GPIO4 is not connected to MAX77985/MAX77986 IRQB.** Closed: MAX77958 GPIO4 is connected to MAX77985/MAX77986 IRQB. Also, connect 1-2 on J15 for pullup.
J15	Open	**Open: MAX77985/6 IRQB is not connected.** Close 1-2: MAX77985/6 connects to 100kΩ pullup to VIO. Close 3-4: IRQB LED indicator is enabled.
J30	Open	**Open: MAX77958 slave address configured by J31, J32.** Closed: MAX77958 slave address is selected to be 0b0100110. Do not connect J31 and J32.

Table 1. Jumper Connection and Switch Setting Guide (continued)

JUMPER	DEFAULT CONNECTION	FEATURE
J31	Open	**Open: MAX77958 slave address configured by J30, J32.** Closed: MAX77958 slave address is selected to be 0b0100111. Do not connect J30 and J32.
J32	Closed	Open: MAX77958 slave address configured by J30, J31. **Closed: MAX77958 slave address is selected to 0b0100101 by connecting the GPIO6 to GND. Default for GUI communication. Do not connect J30 and J31.**
J33	Open	All GPIO pins of the MAX77958 at J33 are available to connect externally. Some GPIOs have reserved functionality. Refer to the *MAX77958* data sheet for details.
J34	Closed	Open: MAX77958 VIO1 is not powered. **Closed: MAX77958 VIO1 is powered.**
J35	Closed	Open: MAX77958 VIO2 is not powered. **Closed: MAX77958 VIO2 is powered.**
J8	Open	**Open: CC1 line is not connected to pullup or pulldown. Must open J8 for testing with a real USB Type-C adaptor.** Close 1-2: CC1 is connected to RP to simulate a DFP that has been connected to CC1. Close 3-4: CC1 is connected to RD to simulate a UFP that has been connected to CC1. J11 must be installed for this.
J10	Open	**Open: CC2 line is not connected to pullup or pulldown. Must open J8 for testing with a real USB Type-C adaptor.** Close 1-2: CC2 is connected to RP to simulate a DFP that has been connected to CC2. Close 3-4: CC2 is connected to RD to simulate a UFP that has been connected to CC2. J11 must be installed for this.
J12	Open	**Open: CC1 line is not connected to RA. Must open J8 for testing with a real USB Type-C adaptor.** Close 1-2: CC1 is connected to RA to simulate a cable when RA is connected. J11 must be installed for this.
J14	Open	**Open: CC2 line is not connected to RA. Must open J8 for testing with a real USB Type-C adaptor.** Close 1-2: CC2 is connected to RA to simulate a cable when RA is connected. J11 must be installed for this.
J11	Closed	Open: On-board RA and RD are not allowed. **Closed: On-board RA and RD are allowed.**
SW1	1-2	**1-2: MAX77985/MAX77986 I^2C lines are connected to the host directly.** 2-3: MAX77985/MAX77986 I^2C lines are connected to the MAX77958 I^2C master.

*Default options are in **bold**.*

Detailed Description of Software

The GUI allows for quick, easy, and thorough evaluation of the MAX7798xx and MAX77958. Every control in the GUI corresponds to a register in the MAX7798xx and MAX77958. Refer to the *Register Map* section in the MAX7798xx and MAX77958 data sheets for a complete description.

Software Installation

The MAX77986EVKIT# GUI can be downloaded from Maxim's website at **http://www.maximintegrated.com/products/MAX77985_MAX77986** (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 your PC and the EV kit for the first time, wait for Windows to automatically install the drivers for the USB to I2C Interface.

Establish Communication

When the device is powered up by CHGIN or BATT input, click **Device > Connect** to communicate to the IC. Figure 2 shows the correct detection result. Click **Read and Close** to establish the connection.

Before configuring at any tab, click **Read Once** to make sure all the displayed configurations are in sync with the IC configuration state. Alternatively, click **Start Auto Read** and set the corresponding read frequency to keep this page up to date all the time. Follow the guidance on the IC data sheet for the detailed usage of each register. When trying to write to a register with the write button, disable the **Auto Read** feature.

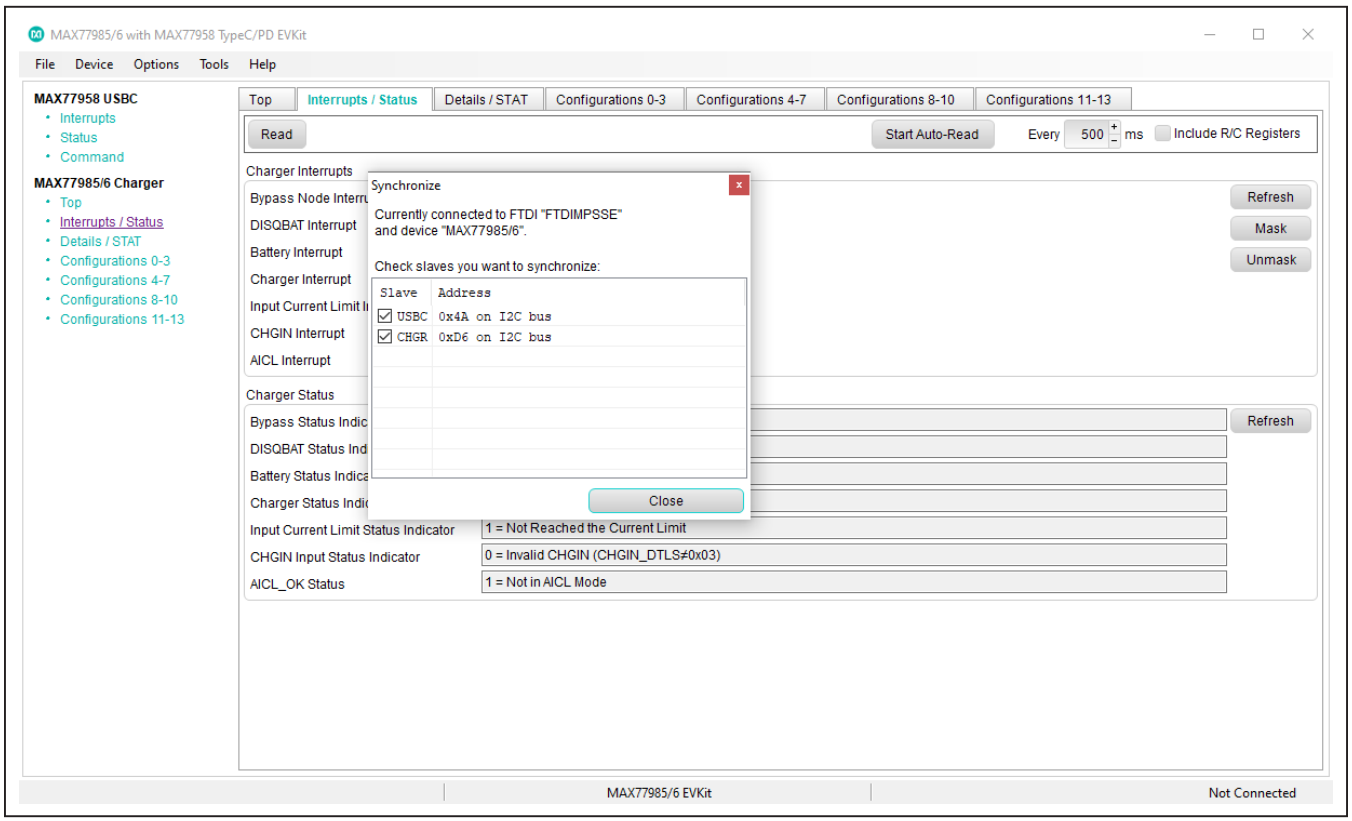


Figure 2. Device > Connect Resulting Window

Top Tab

The **Top** tab displays the top-level configuration settings for the IC. Figure 3 shows the format of the **Top** tab. Information is grouped by function, and each is detailed separately. The masked top interrupt is not reflected on the IRQB pin, while the unmasked interrupt is reflected on the IRQB pin. The *Top Status Indicator* section includes controls for the top-level settings. The software reset command is 0xA5.

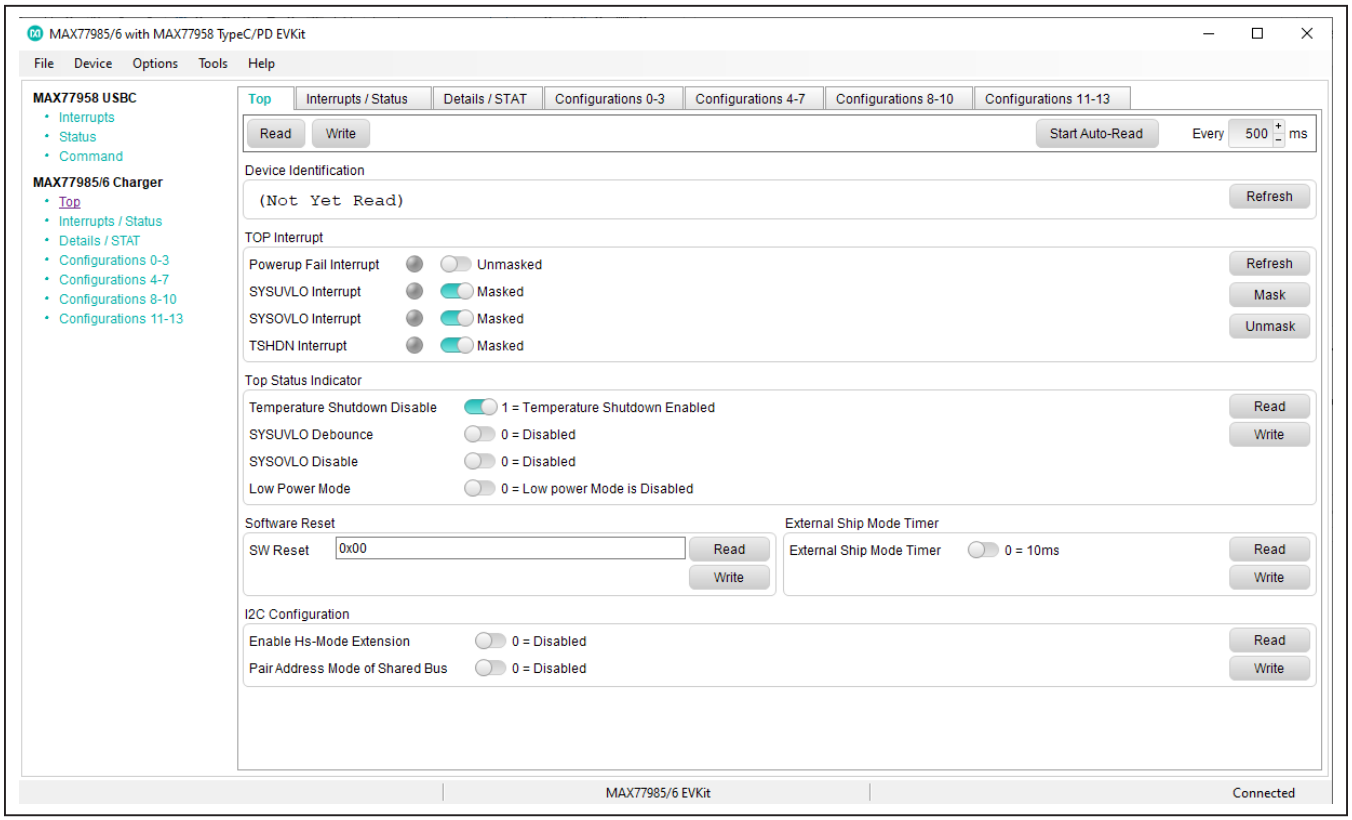


Figure 3. MAX77985/MAX77986 Top Tab

Interrupts/Status Tab

The **Interrupts/Status** tab displays the charger interrupt setting and status for the IC. Figure 4 shows the format of the **Interrupts/Status** tab. The masked charger interrupt is not reflected on the IRQB pin, while the unmasked interrupt is reflected on the IRQB pin.

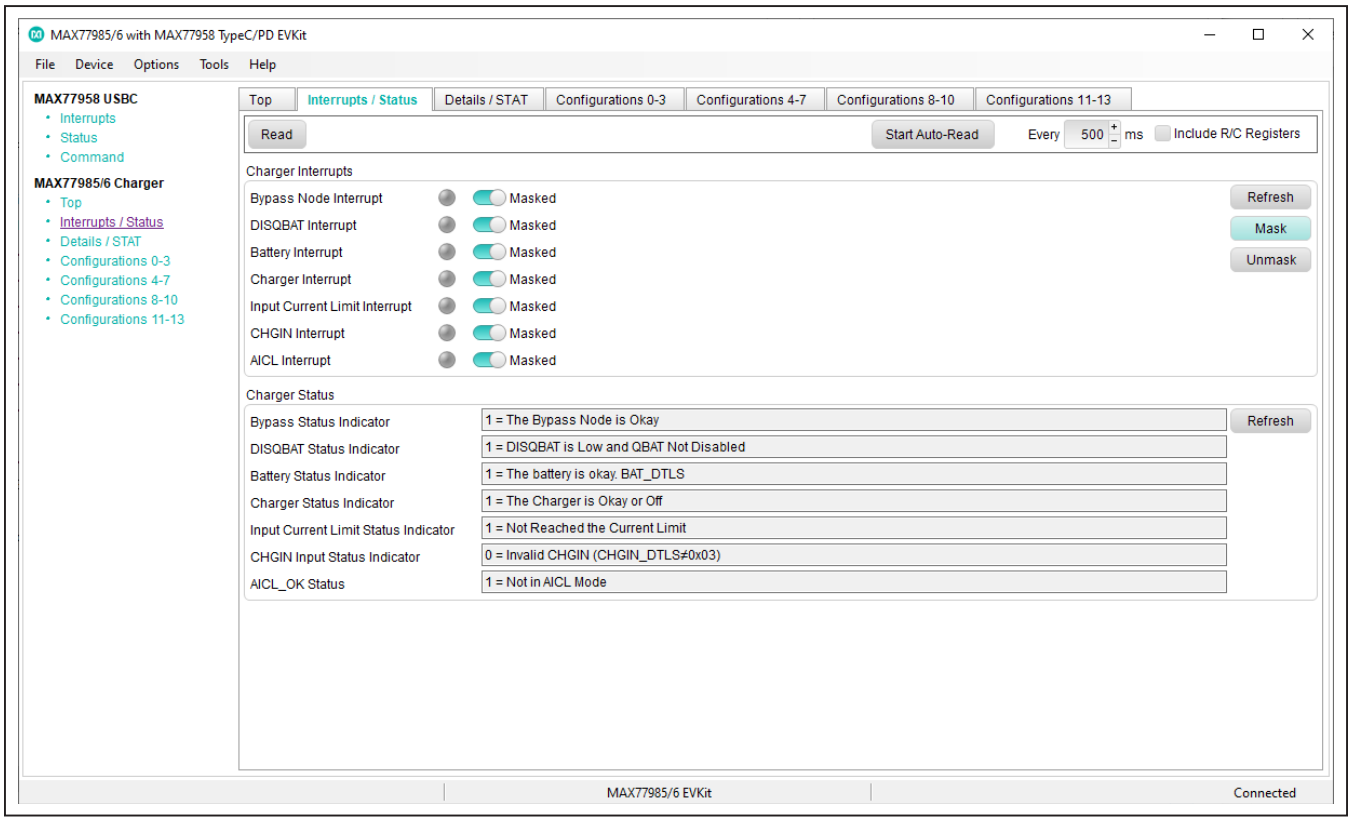


Figure 4. MAX77985/MAX77986 Interrupt and Status

Details/STAT Tab

The **Details/STAT** tab displays the charger's detailed status. Figure 5 shows the format of the **Details/STAT** tab. The detailed status of the charger helps diagnose the state of the charger operation. Also, the detailed charger status is the basis of the interrupt status. Refer to the description of the CHG_DTLS00/01/02 register in the data sheet for more details. The tab also controls the STAT LED behavior.

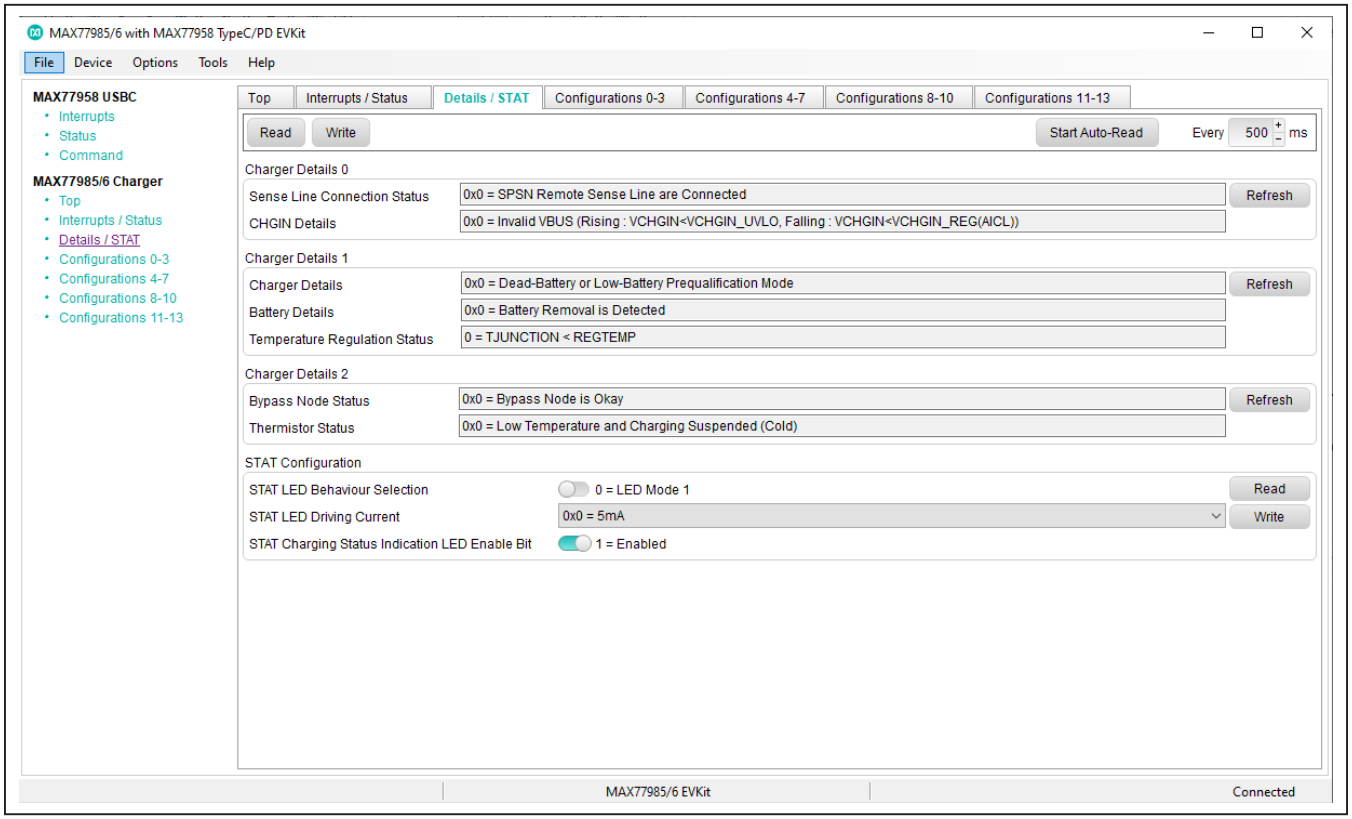


Figure 5. MAX77985/MAX77986 Details and STAT

Configurations 0-13 Tabs

The **Configurations 0-13 tabs** display the charger configuration settings corresponding to registers CHG_CFG_00-13. Figure 6 shows the format of the **Configurations 0-3** tab as an example. Notice that the Configuration 1, 2, 3, 4, and 7 registers are locked by the register Configuration 6. To unlock, set the **Charger Settings Protection** field of Configuration 6 to **Unlock 0x3** state, then click the **Write** button. Click **Read** to make sure the change is in place. After the unlock, all configuration registers can be configured. To get started charging a battery with the desired current setting, set **Chgin Input Current Limit** in Configuration 9, then set **Fast Charging Current** in Configuration 2, then set **Mode = 5** in Configuration 0 to switch from buck-only mode to charging mode.

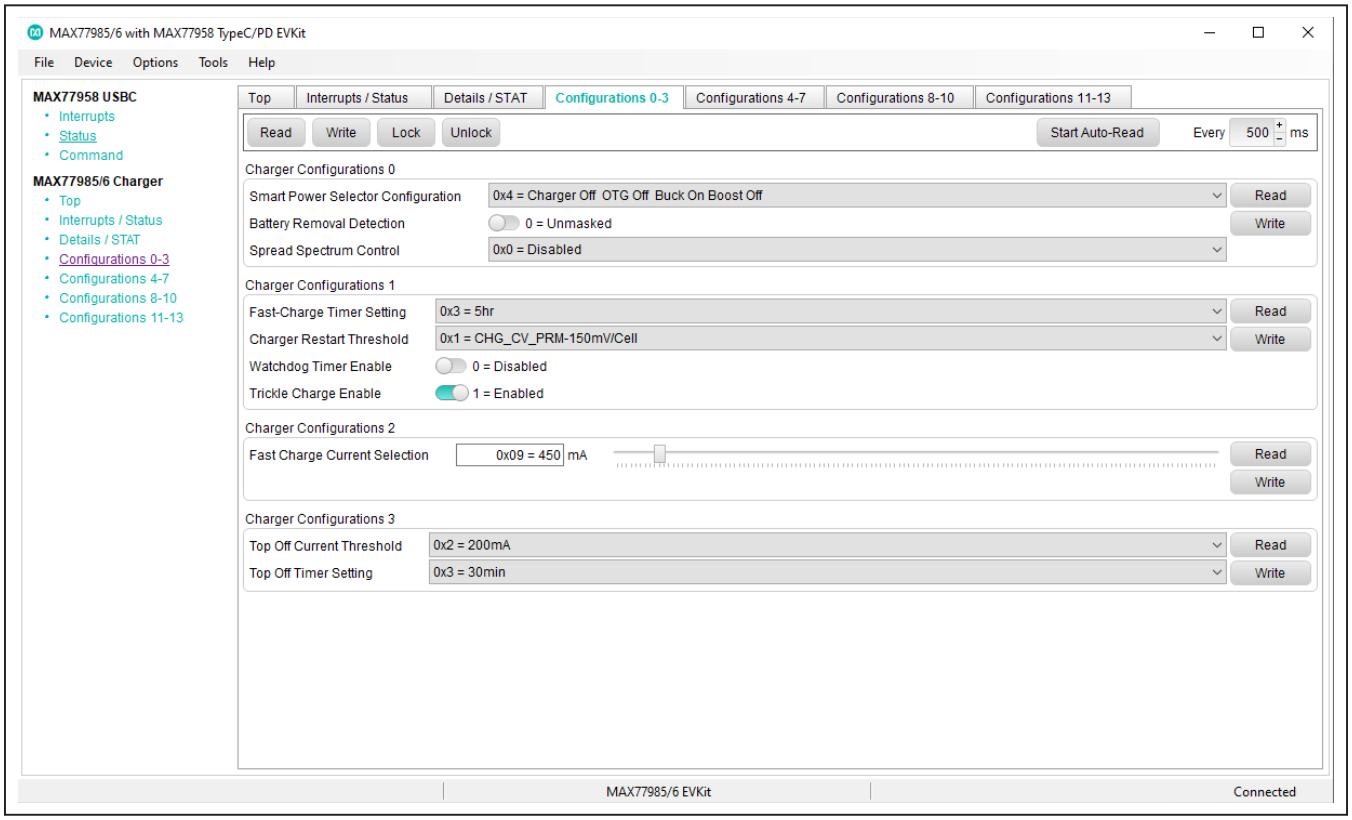


Figure 6. MAX77985/MAX77986 Configurations

Test with MAX77958 and USB Type-C Port Interface

CC Detection Test

1) Connect a USB Type-C adapter to the EV kit and see whether the MAX77958 detects SINK and configures the input current limit correctly.
2) Connect a 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 the input current limit correctly.

USB Power Delivery Test

1) Source capability request function test.
2) Connect the USB power delivery AC adapter to the EV kit.
3) Use a voltmeter to monitor the voltage on VBUS.
4) Go to **Command > Get SrcCap(0x31)**, and click on **Write** to execute the command, the MAX77958 sends this command over the CC pin to the TA, and the TA provides a list of available source capabilities.
5) Review the source capabilities and make a note of the desired PDO.
6) 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 and check the Charger Detection Status under the **BC Status** tab of the MAX77958 GUI to see if the USBC detects the correct charger type.

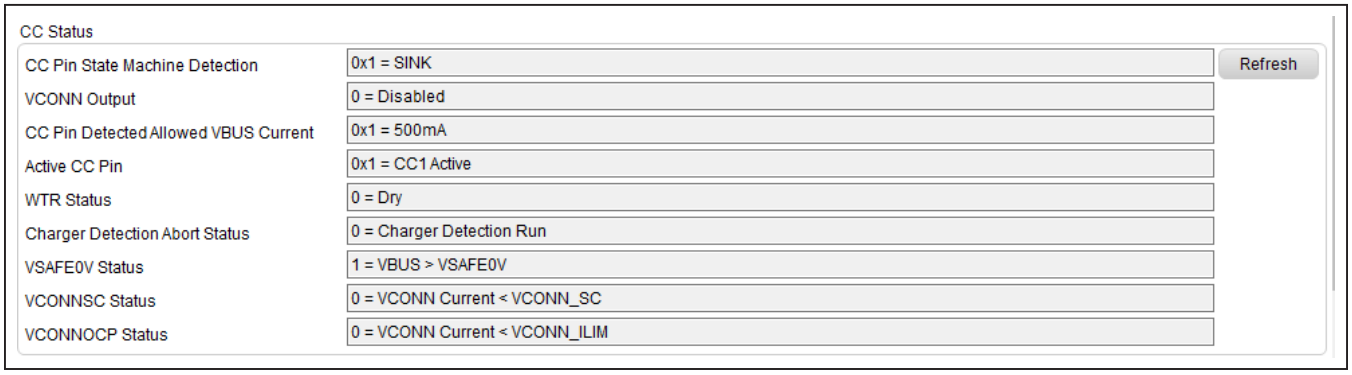


Figure 7. CC Status after Connecting the USB Type-C Connector of EV Kit to a Travel Adapter (TA).

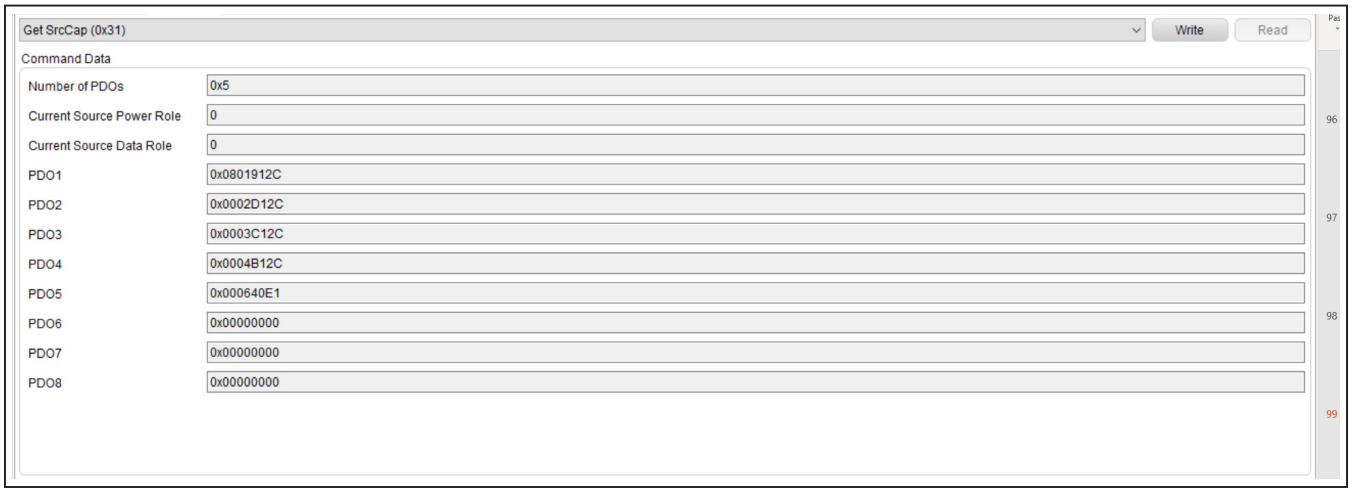


Figure 8. Get Source Capability (Get SrcCap) Under the Command Section

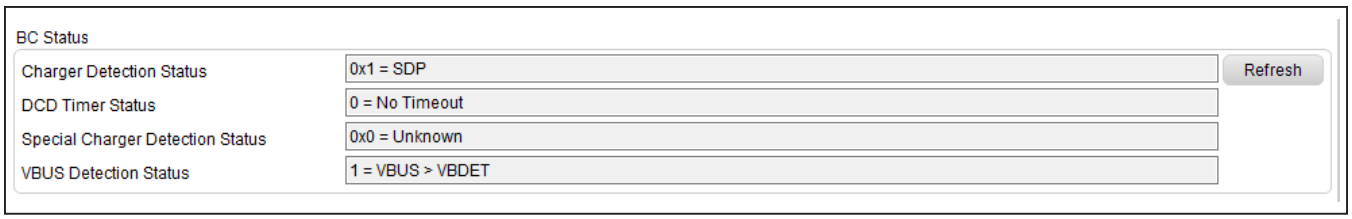


Figure 9. BC Status after Connecting the USB Type-C Connector of EV Kit to SDP

Detailed Description of Firmware for MAX77958

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

MAX77958 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 USB device detection is completed.

1) Follow the initial test setup to connect the GUI with the MAX77985/MAX77986 EV kit.
2) Connect 3.8V to BATT, do not disconnect the EV kit from the PC during the customization script block update.

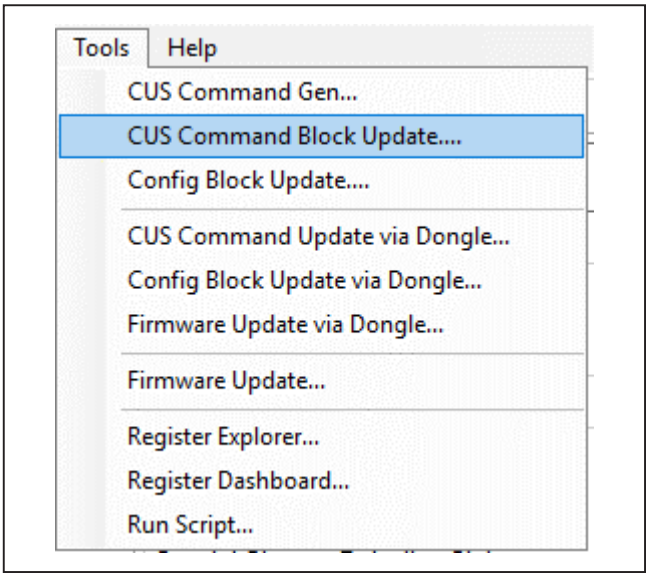


Figure 10. MAX77985/MAX77986 EV Kit GUI Customization Script Block Update

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 11 shows the customization script update process complete.

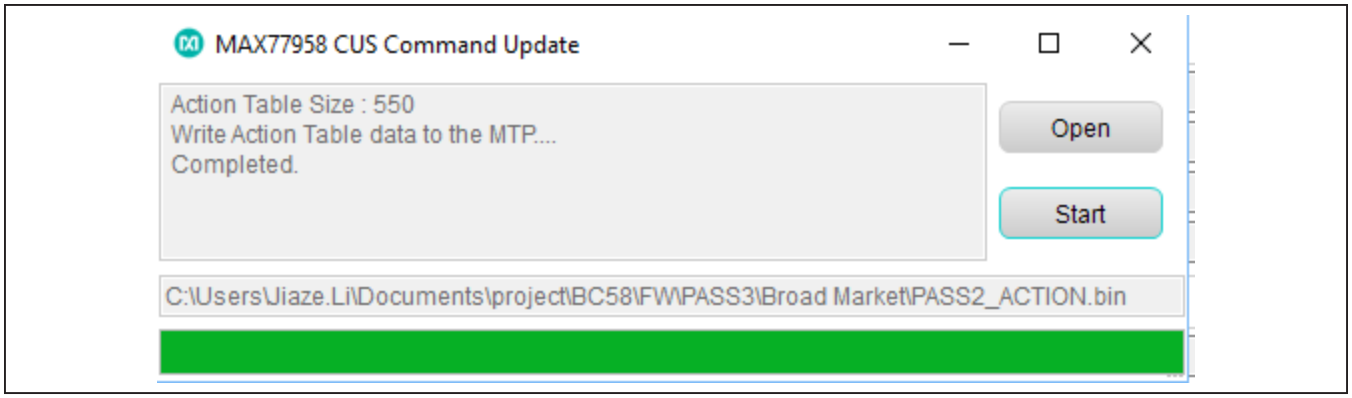


Figure 11. Customization Script Update Process Complete

Core Firmware Update

1) Follow the initial test setup to connect the GUI with the MAX77985/MAX77986 EV kit.
2) Connect 3.8V to BATT and 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 13 shows the firmware update process complete.

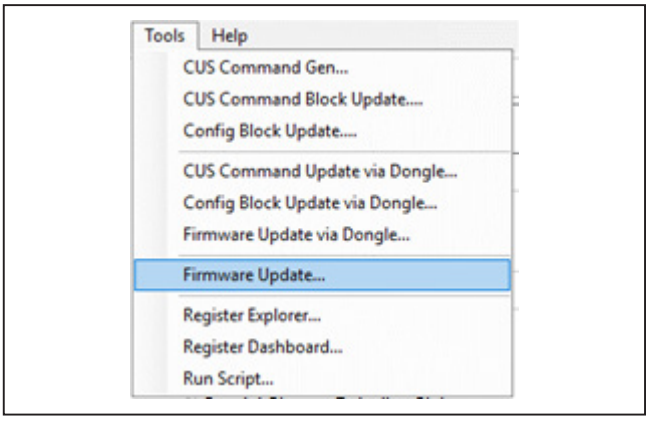


Figure 12. MAX77985/MAX77986 EV Kit GUI Firmware Update

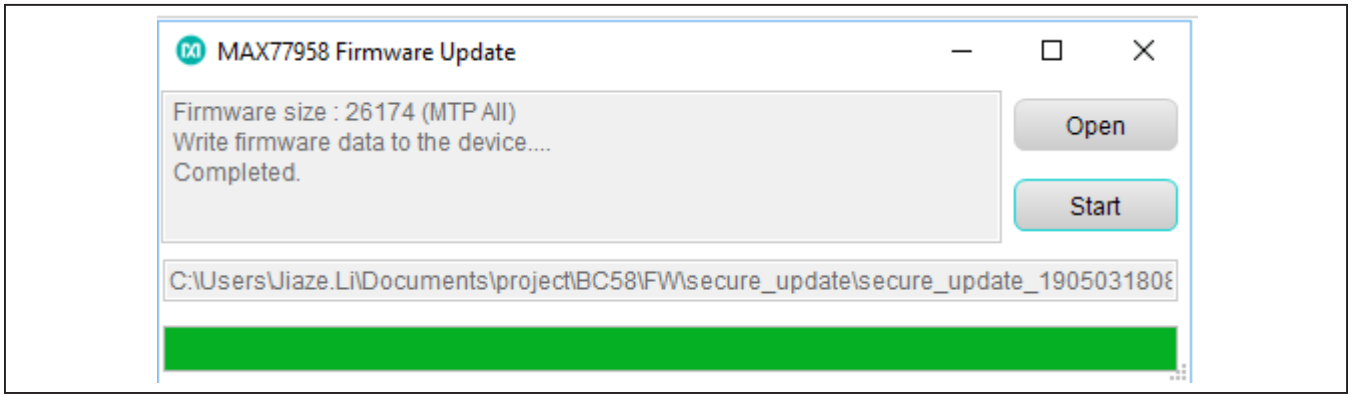


Figure 13. Firmware Update Process Complete

Script Automation

A Python-based script system is embedded in the GUI software to allow automating or configuring multiple registers sequentially with ease. To evaluate through Python-based commands, click **Tools > Run Script File**. A **Script** window pops up, as shown in Figure 14. The first tab consists of a script editor and an embedded Python Terminal Interface. The second tab provides the Python I/O console. The **Help** button provides a coding tutorial for this script window. Click the **Run** button to execute the script. The script feature helps with testing out a sequence of the configuration automatically.

Optional Tools

For I²C-communication debugging, more tools are available at **Options > CMOD Advanced UI**. With the proper test set-up procedure described in this document, these tools do not need to be used to evaluate the MAX77985/MAX77986. However, other slave devices can be tested with the I²C debugging tools and the GUI software when connected to the MAX77985/MAX77986 with the SDA and SCL pins. If successful, you can automate multiple slave devices through the script window.

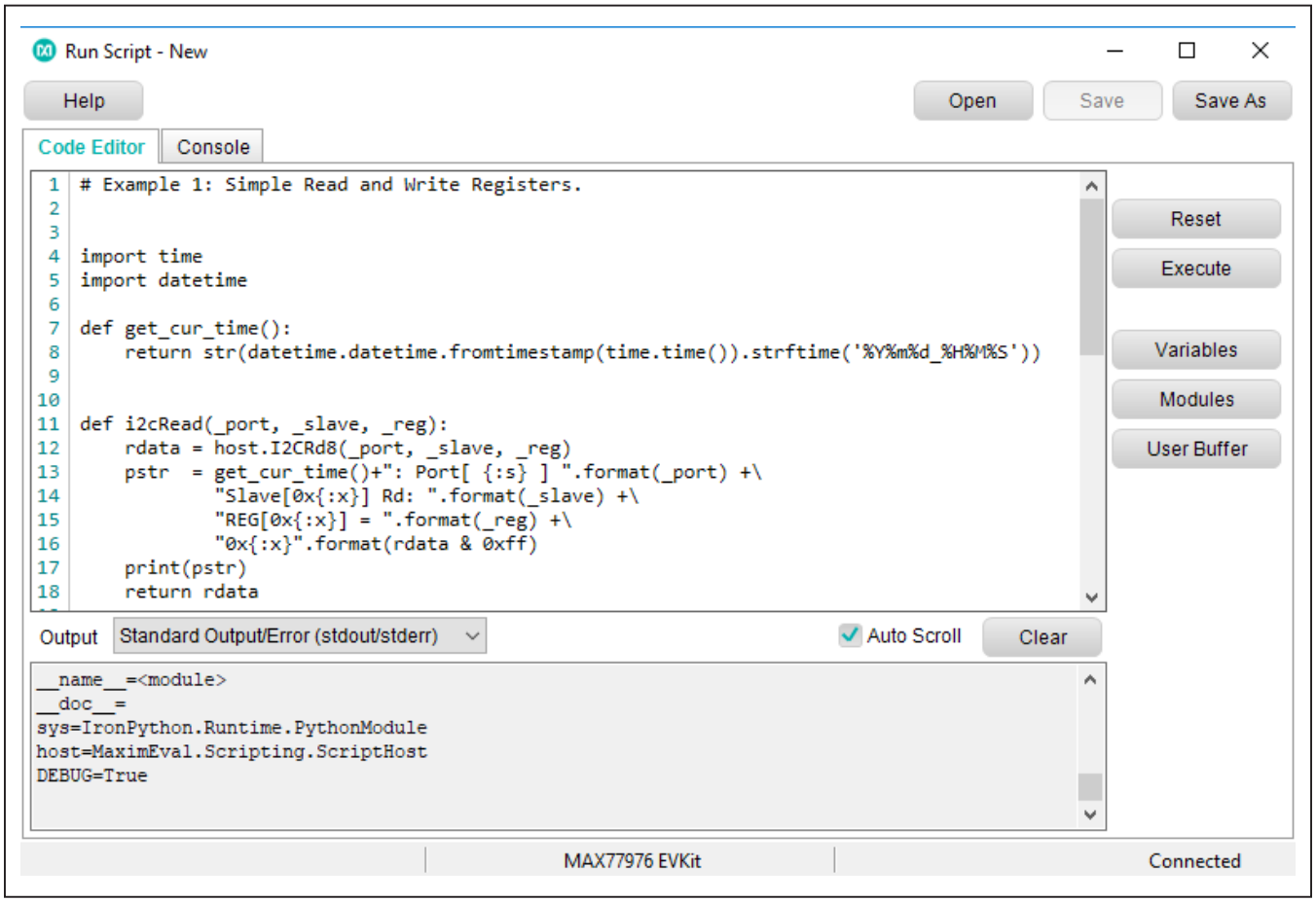


Figure 14. MAX77985/MAX77986 Script Window

Table 2. USB Acronym

ACRONYM	DESCRIPTION
BC1.2	Battery Charging 1.2
CC	Configuration Channel
CDP	Charging Downstream Port
DCP	Dedicated Charging Port
DFP	Downstream Facing Port
MAXUSB	USB to I^2C translator
MTP	Multiple Time Programmable
OVP	Over Voltage Protection
PD	Power Delivery
PDO	Power Data Object
PPS	Programmable Power Supply
SDP	Standard Downstream Port
UFP	Upstream Facing Port
VDM	Vendor Defined Message

Ordering Information

PART	EVALUATES	TYPE
MAX77985AEVKIT#	MAX77985A, MAX77958	EV Kit
MAX77985BEVKIT#	MAX77985B, MAX77958	EV Kit
MAX77986AEVKIT#	MAX77986A, MAX77958	EV Kit
MAX77986BEVKIT#	MAX77986B, MAX77958	EV Kit

#Denotes RoHS compliant.

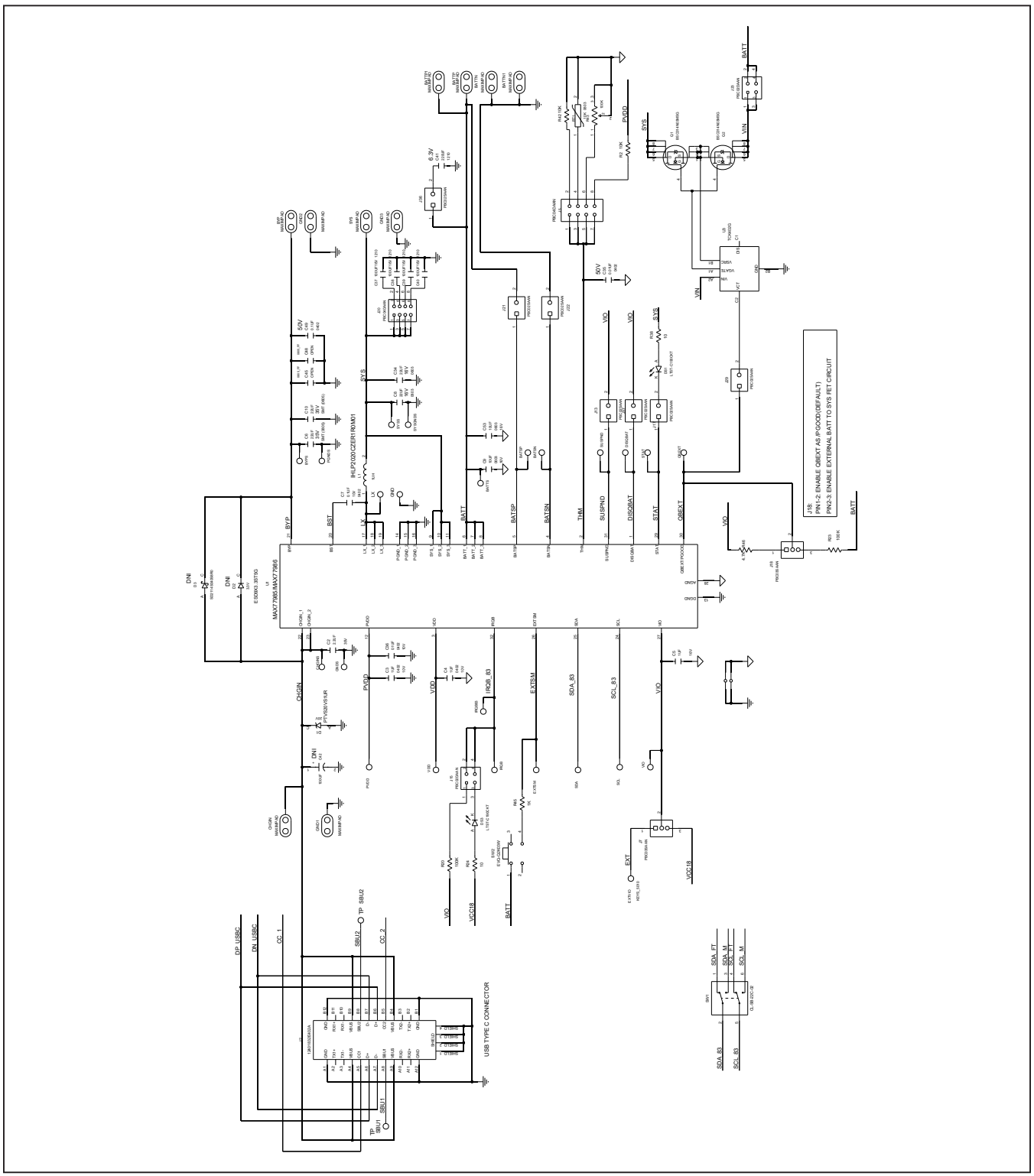
MAX77985/MAX77986 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	AVL1, BATSN, BATSP, BATTS, BYPS, CC1, CC2, CHGINS, DN, DN1, DP, DP2, INTB1, SBU1, SBU2, SCL1, SDA1, SYS1, SYSS, VDD1P1, VDD1P8, VIO, VIO1, VIO2	-	24	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;
2	BATTN, BATTN1, BATTP, BATTP1, BYP, CHGIN, GND1-GND5, GND7, SYS	-	13	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
3	C1, C15, C18-C21, C23-C29, C36	-	14	GRM155R71A104JA01	MURATA	0.1UF	CAP; SMT (0402); 0.1UF; 5%; 10V; X7R; CERAMIC
4	C2	-	1	C1608X5R1V225K080AC; GRM188R6YA225KA12	TDK;MURATA	2.2UF	CAP; SMT (0603); 2.2UF; 10%; 35V; X5R; CERAMIC
5	C3, C4, C16, C17, C30-C32	-	7	C0402C105K8PAC; CC0402KRX5R6BB105	KEMET;YAGEO	1UF	CAP; SMT (0402); 1UF; 10%; 10V; X5R; CERAMIC
6	C5, C33, C50, C54, C55	-	5	CL05A105KO5NNN	SAMSUNG	1UF	CAP; SMT (0402); 1UF; 10%; 16V; X5R; CERAMIC
7	C6, C10	-	2	C2012X5R1V226M125AC	TDK	22UF	CAP; SMT (0805); 22UF; 20%; 35V; X5R; CERAMIC
8	C7, C49	-	2	C1005X7R1H104K050BB; GRM155R71H104KE14; C1005X7R1H104K050BE; UMK105B7104KV-FR	TDK;MURATA;TDK; TAIYO YUDEN	0.1UF	CAP; SMT (0402); 0.1UF; 10%; 50V; X7R; CERAMIC
9	C8, C34	-	2	CL10A226MO7JZNC	SAMSUNG ELECTRONICS	22UF	CAP; SMT (0603); 22UF; 20%; 16V; X5R; CERAMIC
10	C9, C53	-	2	GRM188R61C106MA73	MURATA	10UF	CAP; SMT (0603); 10UF; 20%; 16V; X5R; CERAMIC
11	C11, C14, C43, C44	-	4	C0402C0G500270JNP; GRM1555C1H270JA01	VENKEL LTD.;MURATA	27PF	CAP; SMT (0402); 27PF; 5%; 50V; C0G; CERAMIC
12	C12, C13, C22	-	3	ZRB15XR61A475ME01; CL05A475MP5NRN; GRM155R61A475MEAA; C1005X5R1A475M050BC	MURATA;SAMSUNG; MURATA;TDK	4.7UF	CAP; SMT (0402); 4.7UF; 20%; 10V; X5R; CERAMIC
13	C35	-	1	C0402C103K5RAC; GRM155R71H103KA88; C1005X7R1H103K050BE; CL05B103KB5NNN; UMK105B7103KV	KEMET;MURATA;TDK; SAMSUNG ELECTRONIC; TAIYO YUDEN	0.01UF	CAP; SMT (0402); 0.01UF; 10%; 50V; X7R; CERAMIC
14	C37-C40	-	4	EMK325ABJ107MM	TAIYO YUDEN	100UF	CAP; SMT (1210); 100UF; 20%; 16V; X5R; CERAMIC
15	C41	-	1	GRM32ER60J227ME05	MURATA	220UF	CAP; SMT (1210); 220UF; 20%; 6.3V; X5R; CERAMIC
16	C46	-	1	GRM188R71A225KE15; CL10B225KP8NNN; C1608X7R1A225K080AC; C0603C225K8RAC	MURATA;SAMSUNG; TDK;KEMET	2.2UF	CAP; SMT (0603); 2.2UF; 10%; 10V; X7R; CERAMIC
17	C47, C51	-	2	ANY	ANY	1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 6.3V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R;
18	C52	-	1	C1005X5R1V105K050BC	TDK	1UF	CAP; SMT (0402); 1UF; 10%; 35V; X5R; CERAMIC
19	D1	-	1	PTVS20VS1UR	NEXPERIA	20V	DIODE; TVS; SMT (SOD-123W); VRM=20V; IPP=12.3A
20	D2	DNP	0	ESD9X3.3ST5G	ON SEMICONDUCTOR	3.3V	DIODE; TVS; SMT (SOD-923); VRM=3.3V; IPP=9.8A
21	D3	DNP	0	SD2114S040S8R0	AVX	SD2114S040S8R0	DIODE; SCH; SMB (DO-214AA); PIV=40V; IF=8A
22	D8, D9	-	2	PESD4V0W1BSF	NEXPERIA	4V	EVKIT PART-DIODE; TVS; SMT (SOD962-2); VRM=+/-4V; IPP=N/A
23	DISQBAT, EXTSM, IRQB, IRQB83, QBEXT, SCL, SDA, STAT, SUSPND	-	9	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
24	DS1-DS3	-	3	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
25	EXTVIO, PVDD, VDD	-	3	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;
26	GNDS, PGNDS, SYSGNDS	-	3	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;
27	J1	-	1	10118193-0001LF	FCI CONNECT	10118193-0001LF	CONNECTOR; FEMALE; SMT; MICRO USB B TYPE RECEPTACLE; RIGHT ANGLE; 5PINS
28	J2	-	1	12401832E402A	AMPHENOL	12401832E402A	CONNECTOR; FEMALE; SMT; USB TYPE C CONNECTOR; RIGHT ANGLE; DUAL ROW; 24PINS
29	J3, J4, J9, J11, J12, J14, J16, J30-J32, J34, J35	-	12	TSW-102-07-T-S	SAMTEC	TSW-102-07-T-S	CONNECTOR; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 2PINS; -55 DEGC TO +105 DEGC
30	J5, J20	-	2	PBC04DAAN	SULLINS ELECTRONICS CORP.	PBC04DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 8PINS; -65 DEGC TO +125 DEGC
31	J7, J8, J10, J18	-	4	PBC03SAAN	SULLINS	PBC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC
32	J13, J17, J21, J22, J29, J36, J37	-	7	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS
33	J15, J23	-	2	PBC02DAAN	SULLINS ELECTRONIC CORP.	PBC02DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 4PINS
34	J33	-	1	PBC09SAAN	SULLINS ELECTRONICS CORP	PBC09SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 9PINS; -65 DEGC TO +125 DEGC
35	L1	-	1	IHLP2020CZER1R0M01	VISHAY DALE	1UH	INDUCTOR; SMT; SHIELDED; 1UH; TOL=+/-20%; 9.2A
36	L2-L4	-	3	BLM18AG601SN1	MURATA	600	INDUCTOR; SMT (0603); FERRITE-BEAD; 600; TOL=+/-; 0.5A
37	MH1-MH4	-	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
38	MISC1	-	1	AK67421-1-R	ASSMANN	AK67421-1-R	CONNECTOR; MALE; USB; USB2.0 MICRO CONNECTION CABLE; USB B MICRO MALE TO USB A MALE; STRAIGHT; 5PINS-4PINS

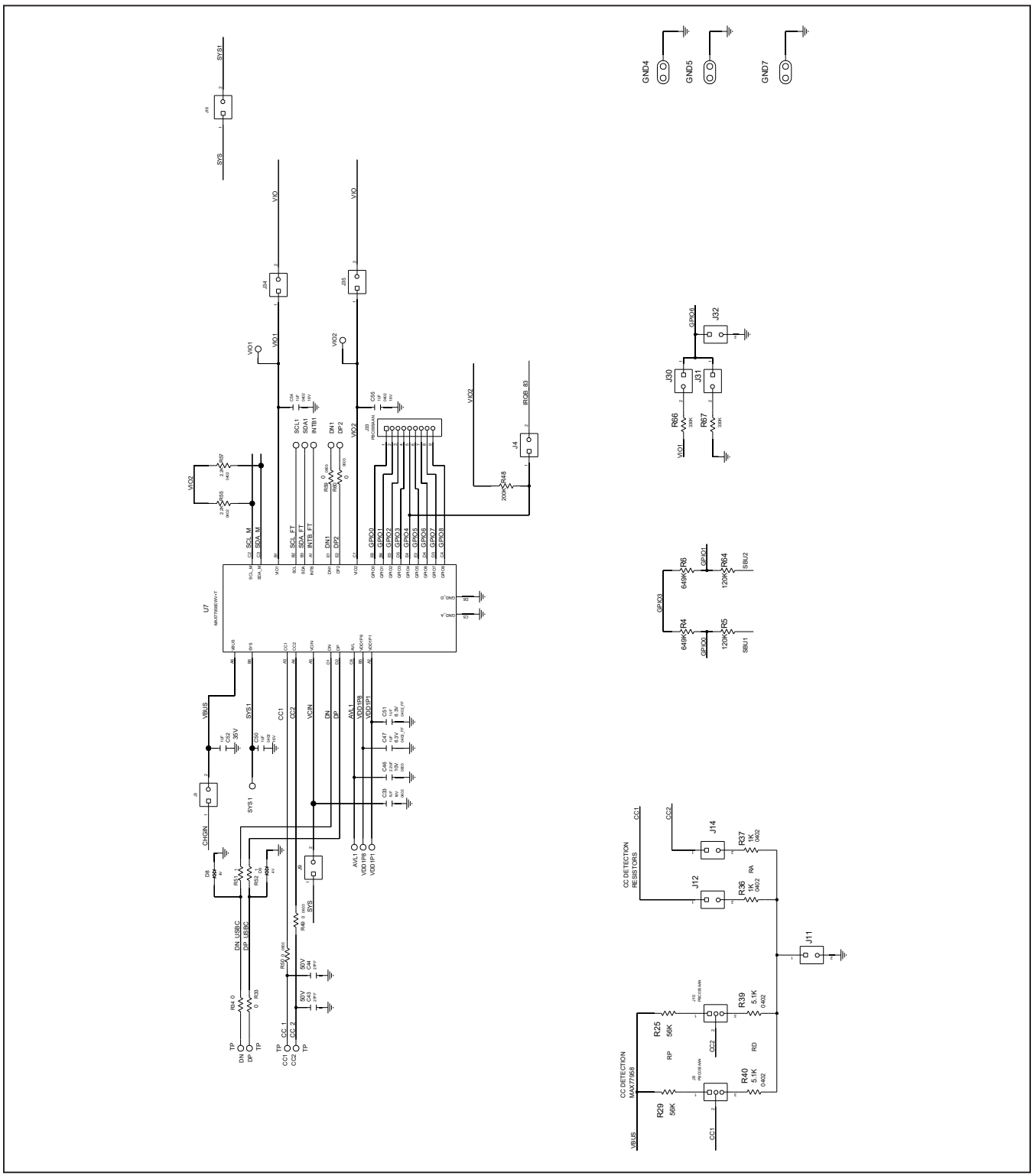
MAX77985/MAX77986 EV Kit Bill of Materials (continued)

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
39	Q1, Q2	-	2	BSC014N03MSG	INFINEON	BSC014N03MSG	TRAN; N-CHANNEL POWER MOSFET; NCH; PG-TDSON8; PD-(139W); I-(100A); V-(30V)
40	R1, R7, R14-R16, R18, R22, R32-R34, R44	-	11	ERJ-2GE0R00	PANASONIC	0	RES; SMT (0402); 0; JUMPER; JUMPER; 0.1000W
41	R2, R42	-	2	CRCW060310K0FK; ERJ-3EKF1002; AC0603FR-0710KL; RMCF0603FT10K0	VISHAY DALE;PANASONIC; YAGEO	10K	RES; SMT (0603); 10K; 1%; +/-100PPM/DEGC; 0.1000W
42	R4, R6	-	2	ERJ-2RKF6493	PANASONIC	649K	RES; SMT (0402); 649K; 1%; +/-100PPM/DEGC; 0.1000W
43	R5, R64	-	2	ERJ-2RKF1203	PANASONIC	120K	RES; SMT (0402); 120K; 1%; +/-100PPM/DEGC; 0.1000W
44	R8	-	1	CRCW040212K0FK; MCR01MZPF1202	VISHAY DALE;ROHM SEMICONDUCTOR	12K	RES; SMT (0402); 12K; 1%; +/-100PPM/DEGC; 0.0630W
45	R9, R13	-	2	ERJ-2RKF27R0X; RC0402FR-0727RL; CRCW040227R0FK	PANASONIC;YAGEO PHICOMP;VISHAY DALE	27	RES; SMT (0402); 27; 1%; +/-100PPM/DEGC; 0.0630W
46	R10	-	1	CRCW04021M00FK	VISHAY DALE	1M	RES; SMT (0402); 1M; 1%; +/-100PPM/DEGC; 0.0630W
47	R11, R36, R37, R45	-	4	RC0402FR-071KL; MCR01MZPF1001	YAGEO;ROHM SEMICONDUCTOR	1K	RES; SMT (0402); 1K; 1%; +/-100PPM/DEGC; 0.0630W
48	R12, R21	-	2	CRCW04022K20JN	VISHAY DALE	2.2K	RES; SMT (0402); 2.2K; 5%; +/-200PPM/DEGK; 0.0630W
49	R17	-	1	CRCW04024752FK; 9C04021A4752FLHF3; CRCW040247K5FK	VISHAY DALE;YAGEO; VISHAY DALE	47.5K	RES; SMT (0402); 47.5K; 1%; +/-100PPM/DEGC; 0.0630W
50	R19, R20, R23, R31, R41	-	5	CRCW0402100KFK; RC0402FR-07100KL	VISHAY;YAGEO	100K	RES; SMT (0402); 100K; 1%; +/-100PPM/DEGC; 0.0630W
51	R24, R38	-	2	CRCW040210R0FK; 9C04021A10R0FL	VISHAY DALE;YAGEO	10	RES; SMT (0402); 10; 1%; +/-100PPM/DEGC; 0.0630W
52	R25, R29	-	2	ERJ-2RKF5602	PANASONIC	56K	RES; SMT (0402); 56K; 1%; +/-100PPM/DEGC; 0.0630W
53	R26, R48	-	2	CRCW0402200KFK; RF73H1ELTP2003	VISHAY DALE;KOA SPEER ELECTRONICS	200K	RES; SMT (0402); 200K; 1%; +/-100PPM/DEGC; 0.0630W
54	R27, R28	-	2	CRCW04024K70FK; MCR01MZPF4701	VISHAY DALE;ROHM SEMICONDUCTOR	4.7K	RES; SMT (0402); 4.7K; 1%; +/-100PPM/DEGC; 0.0630W
55	R30	-	1	CRCW0402169KFK	VISHAY DALE	169K	RES; SMT (0402); 169K; 1%; +/-100PPM/DEGK; 0.0630W
56	R35	-	1	CRCW0402470RFK	VISHAY DALE	470	RES; SMT (0402); 470; 1%; +/-100PPM/DEGC; 0.0630W
57	R39, R40	-	2	CRCW04025K10FK	VISHAY DALE	5.1K	RES; SMT (0402); 5.1K; 1%; +/-100PPM/DEGC; 0.0630W
58	R43	-	1	3296Y-1-104LF	BOURNS	100K	RESISTOR; THROUGH HOLE-RADIAL LEAD; 3296 SERIES; 100K OHM; 10%; 100PPM; 0.5W
59	R46	-	1	ERJ-2RKF4701	PANASONIC	4.7K	RES; SMT (0402); 4.7K; 1%; +/-100PPM/DEGC; 0.1000W
60	R49, R50, R59, R60	-	4	CRCW06030000Z0EAHP	VISHAY DRALORIC	0	RES; SMT (0603); 0; JUMPER; JUMPER; 0.2500W
61	R51, R52	-	2	CRCW04021R00FK	VISHAY DALE	1	RES; SMT (0402); 1; 1%; +/-100PPM/DEGC; 0.0630W
62	R55, R57	-	2	CRCW04022K20FK; RC0402FR-072K2L	VISHAY DALE; YAGEO PHICOMP	2.2K	RES; SMT (0402); 2.2K; 1%; +/-100PPM/DEGC; 0.0630W
63	R66, R67	-	2	CRCW0402330KFK	VISHAY DALE	330K	RES; SMT (0402); 330K; 1%; +/-100PPM/DEGC; 0.0630W
64	RT1	-	1	NTCG163JF103F	TDK	10K	THERMISTOR; SMT (0603); THICK FILM (NICKEL PLATED); 10K; TOL=+/-1%
65	SU3, SU5, SU7, SU9, SU11, SU16, SU18, SU32, SU34, SU35	-	10	S1100-B;SX1100-B; STC02SYAN	KYCON;KYCON; SULLINS ELECTRONICS CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT=GOLD PLATED
66	SW1	-	1	CL-SB-22C-02	COPAL ELECTRONICS INC.	CL-SB-22C-02	SWITCH; DPDT; THROUGH HOLE; 12V; 0.2A; ON-ON; RCOIL=0.05 OHM; RINSULATION=10M OHM; COPAL ELECTRONICS INC.; -40 DEGC TO +85 DEGC
67	SW2	-	1	EVQ-Q2K03W	PANASONIC	EVQ-Q2K03W	SWITCH; SPST; SMT; 15V; 0.02A; LIGHT TOUCH SWITCH; RCOIL= OHM; RINSULATION= OHM; PANASONIC
68	U1	-	1	MAX77985A/B MAX77986A/B	MAXIM	MAX77985A/B MAX77986A/B	EVKIT PART - IC; MAX77985A/B or MAX77986A/B; 19V INPUT; 5.5A 1-CELL LI+ BATTERY CHARGER WITH SMART POWER SELECTOR AND OTG FOR USBC PD; PACKAGE OUTLINE DRAWING 21-100411; LAND PATTERN DRAWING: 90-100145; PACKAGE CODE: F234A4F-1 FCQFN32
69	U2	-	1	FT2232HL	FUTURE TECHNOLOGY DEVICES INTL LTD.	FT2232HL	IC; MMRY; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64
70	U3	-	1	TCK402G	TOSHIBA	TCK402G	IC; ASW; CMOS LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC; WLCSP6
71	U4	-	1	MAX14611ETD+	MAXIM	MAX14611ETD+	IC; TRANS; QUAD BIDIRECTIONAL LOW-VOLTAGE LOGIC LEVEL TRANSLATOR; TDFN14-EP
72	U5, U6	-	2	MAX8512EXK+	MAXIM	MAX8512EXK	IC, VREG, Ultra-Low-Noise, High PSRR, Adjustable Vout, SC70-5
73	U7	-	1	MAX77958EWV+T	MAXIM	MAX77958EWV+T	EVKIT PART - IC; USB TYPE-C AND USB PD CONTROLLER; WLP30; 0.5MM PITCH; PACKAGE OUTLINE: 21-0069; PACKAGE CODE: W302A3+2
74	Y1	-	1	7M-12.000MAAJ	TXC CORPORATION	12MHZ	CRYSTAL; SMT; 12MHZ; 18PF; TOL = +/-30PPM; STABILITY = +/-30PPM
75	PCB	-	1	MAX77985986	MAXIM	PCB	PCB:MAX77985986
76	C42	DNP	0	EEE-FK1V101P	PANASONIC	100UF	CAP; SMT (CASE_F); 100UF; 20%; 35V; ALUMINUM-ELECTROLYTIC
77	C45, C48	DNP	0	N/A	N/A	OPEN	CAPACITOR; SMT (0805); OPEN; FORMFACTOR
78	R3	DNP	0	N/A	N/A	OPEN	RESISTOR; 0402; OPEN; FORMFACTOR
TOTAL			229				

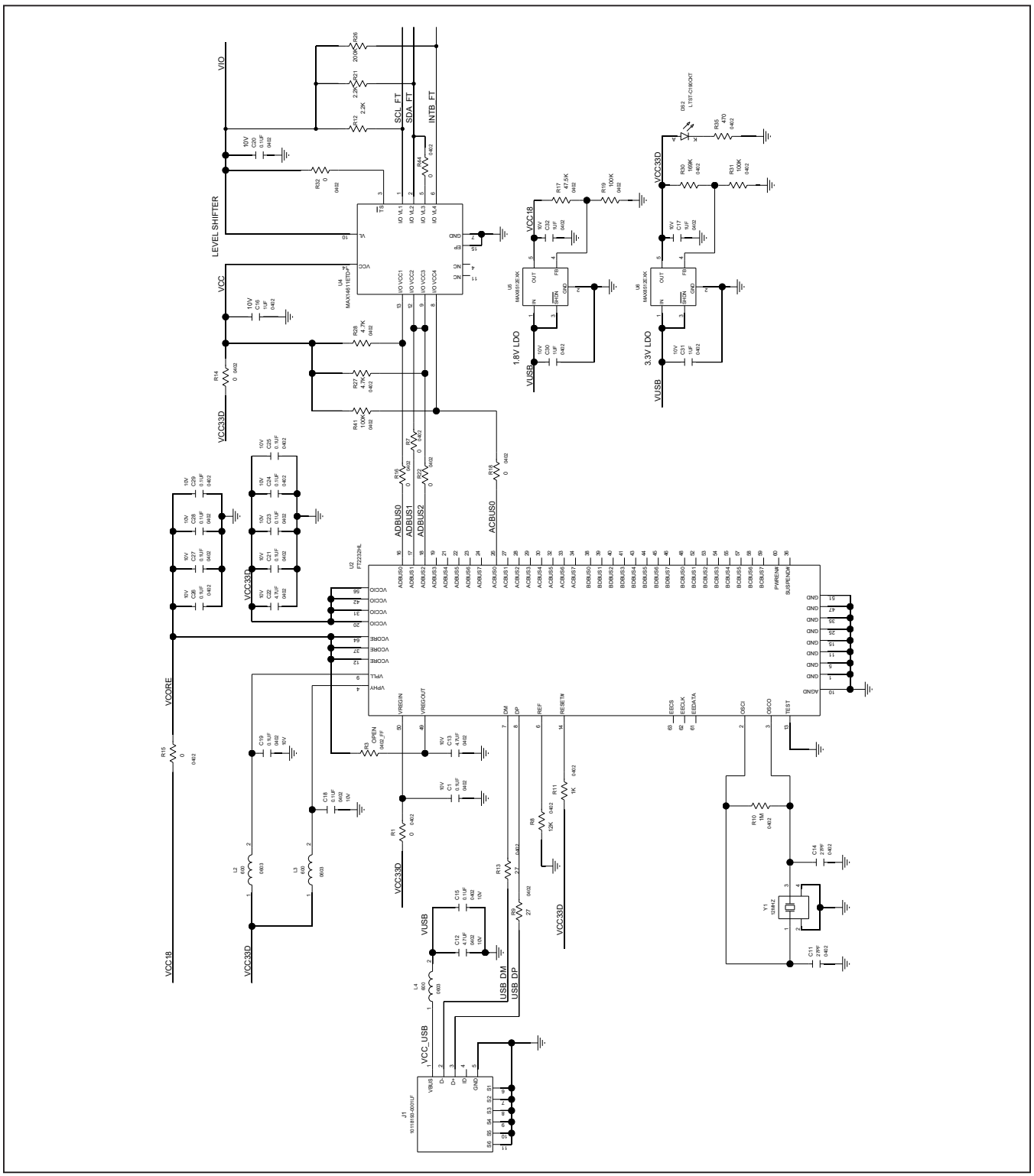
MAX77985/MAX77986 EV Kit Schematic



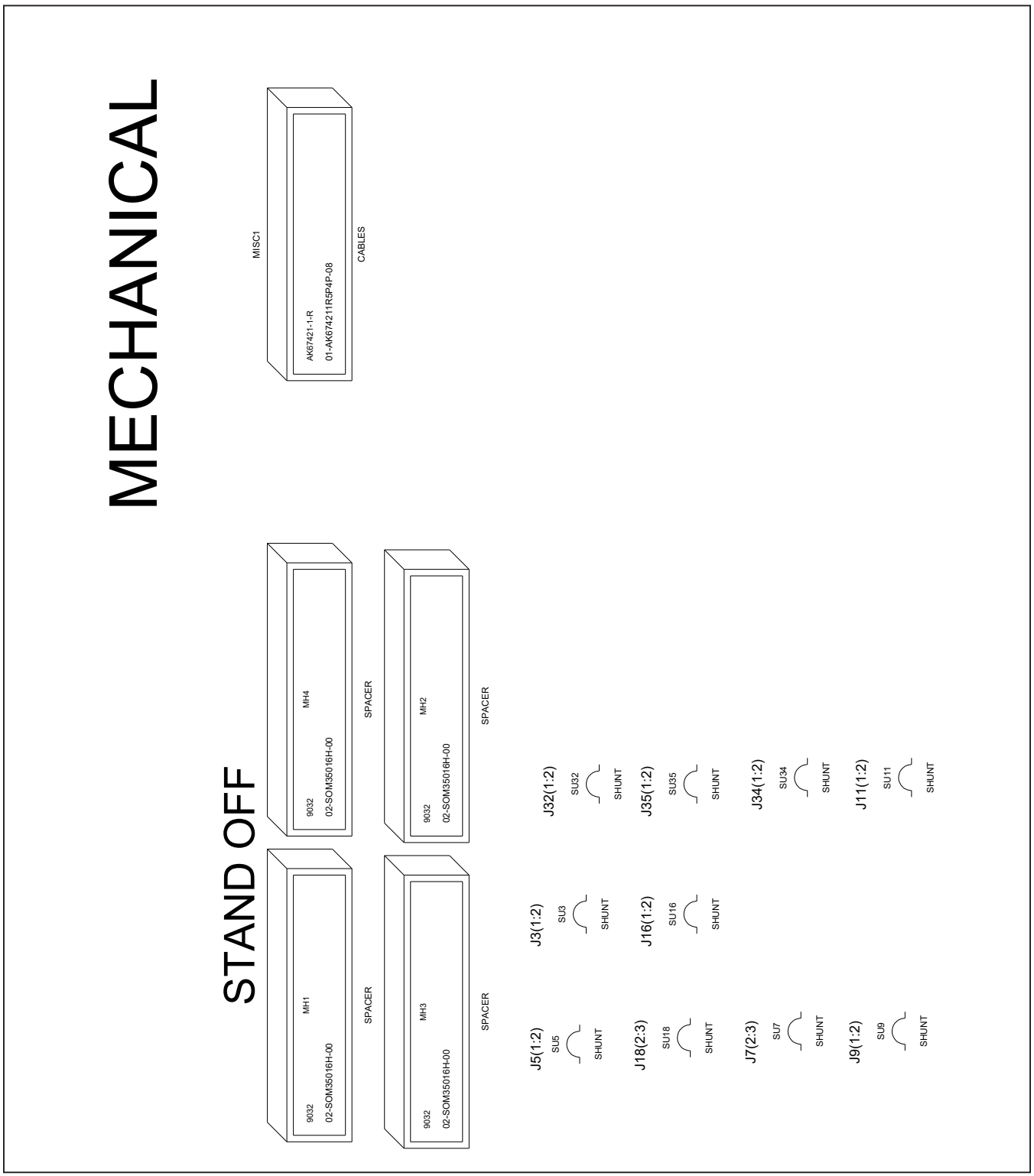
MAX77985/MAX77986 EV Kit Schematic (continued)



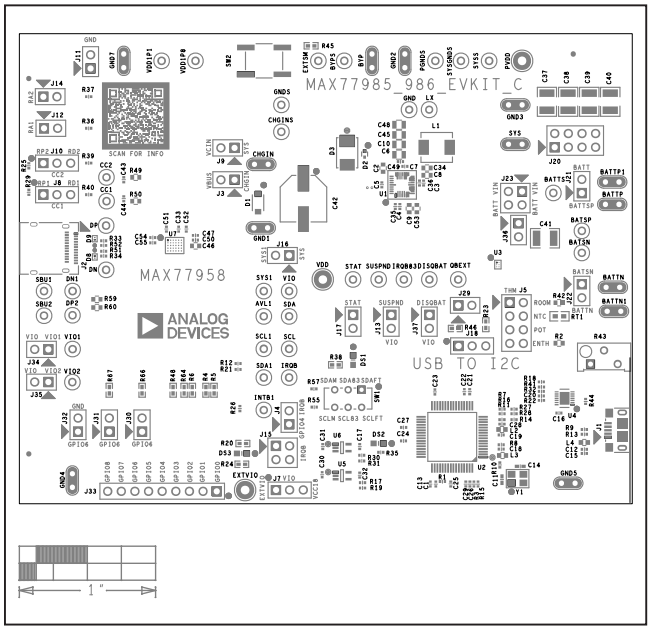
MAX77985/MAX77986 EV Kit Schematic (continued)



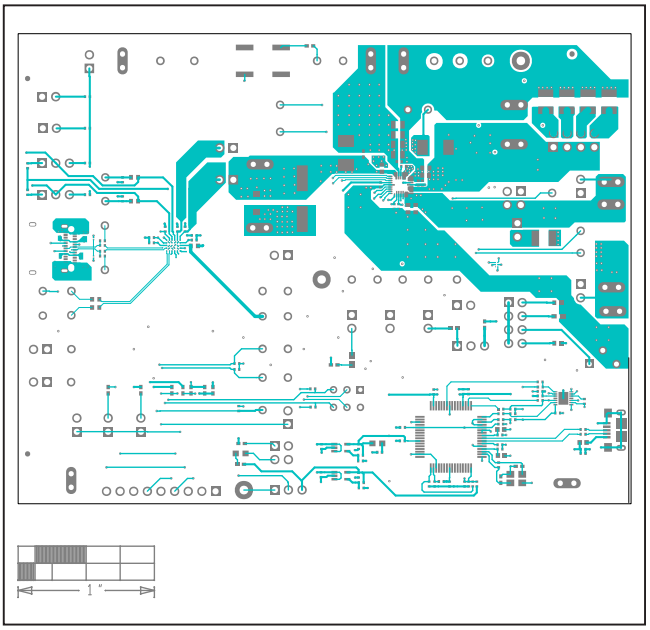
MAX77985/MAX77986 EV Kit Schematic (continued)



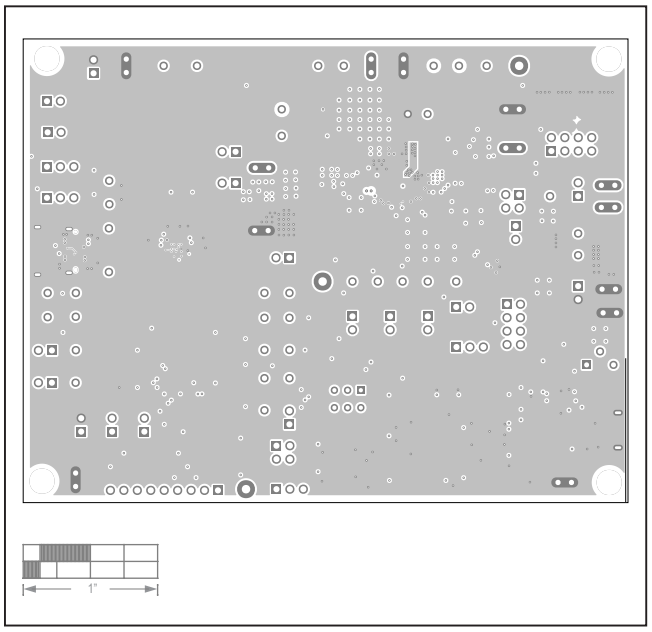
MAX77985/MAX77986 EV Kit PCB Layout



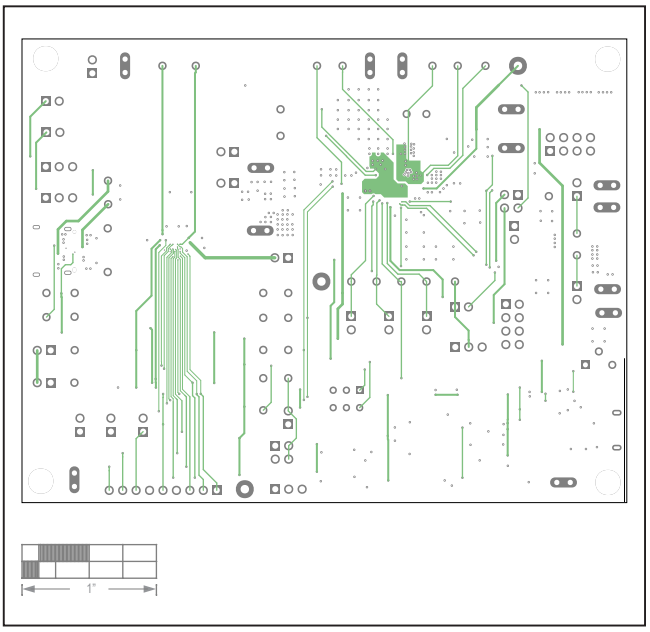
MAX77985/MAX77986 EV Kit Component Placement Guide—Top Silkscreen



MAX77985/MAX77986 EV Kit PCB Layout—Top Layer

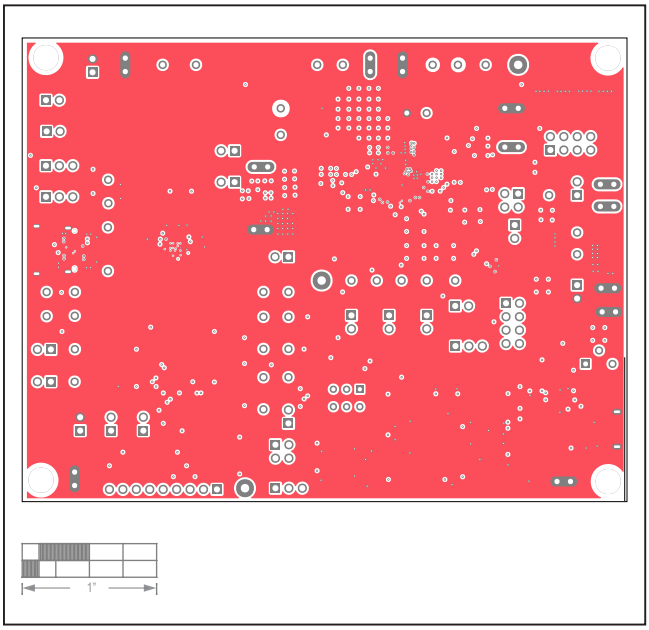


MAX77985/MAX77986 EV Kit PCB Layout—Internal Layer 2

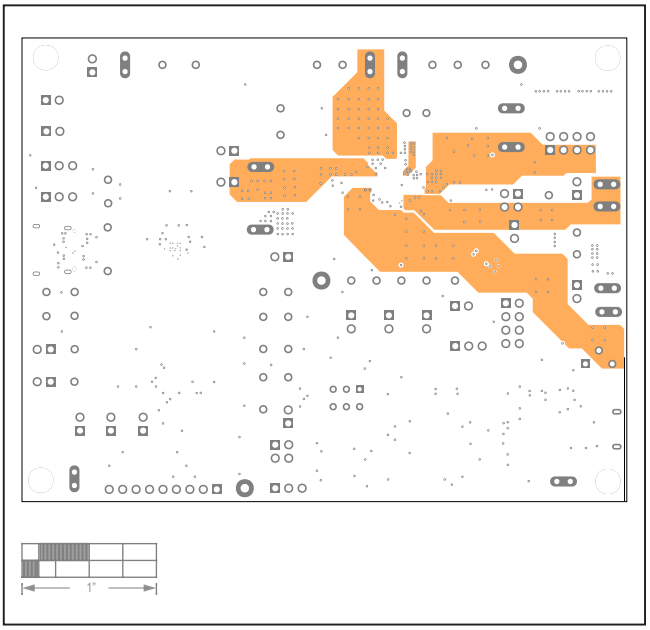


MAX77985/MAX77986 EV Kit PCB Layout—Internal Layer 3

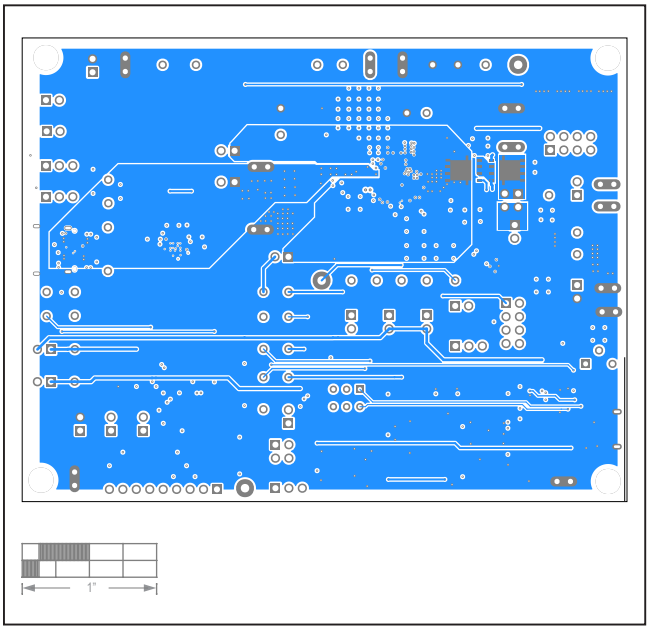
MAX77985/MAX77986 EV Kit PCB Layout



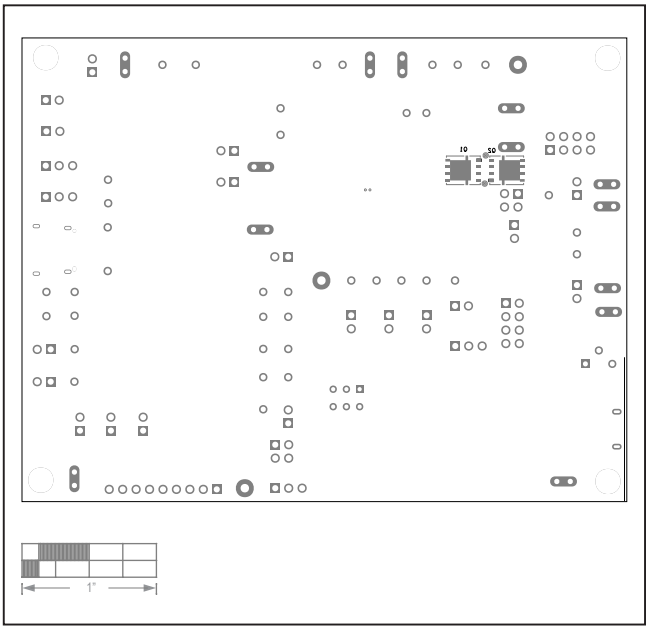
MAX77985/MAX77986 EV Kit PCB Layout—Internal Layer 4



MAX77985/MAX77986 EV Kit PCB Layout—Internal Layer 5



MAX77985/MAX77986 EV Kit PCB Layout—Bottom Layer



MAX77985/MAX77986 EV Kit Component Placement Guide—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/22	Initial release	—
1	10/22	Updated title, *MAX77985/MAX77986 EV Kit Bill of Materials, MAX77985/MAX77986 EV Kit Schematic,* and *MAX77985/MAX77986 EV Kit PCB Layout*	All

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MAX77985AEVKIT# MAX77985BEVKIT#