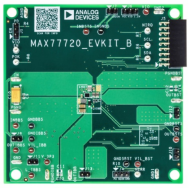


ANALOG DEVICES MAX77720 Evaluation Kit User Manual

Contents

ANALOG DEVICES MAX77720 Evaluation Kit

General Description

- The MAX77720 evaluation kit (EV kit) allows for easy experimentation with various MAX77720 features, including a dual output, DC-DC converter that generates an adjustable positive and an adjustable negative output, a nERR pin, and an I2C interface. Windows®-based software provides a user-friendly graphical interface as well as a detailed register-based interface to exercise the features of the MAX77720.
- Windows-based graphical user interface (GUI) software is available for use with the EV kit and can be downloaded from the Analog Devices website at **https://www.analog.com/max77720evkit**. Windows 7 or newer Windows operating system is required to use the EV kit software.

Features and Benefits

- Easy to Use
- GUI-Driven I2C Interface
- Assembled and Fully Tested
- 3.3V, 1.8V, 1.2VIO Compatible
- On-Board Electronic Loads
- Steady-state, Transient, and Random Modes

MAX77720 EV Kit Files

FILE	DESCRIPTION
MAX77720.exe	Installs EV kit files onto the computer

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

- MAX77720 EV kit
- MAX77720 EV kit GUI
- Windows-based PC
- Power supply
- Ammeter
- Digital multimeters
- USB Type-A to Micro-USB cable
- MAXUSB_INTERFACE# for I2C serial interface

Procedure
The EV kit is fully assembled and tested. The EV kit software can be run without the hardware attached. Make sure the PC is connected to the internet throughout the process so that the USB driver can be automatically installed. Use twisted wires of appropriate gauge (20 AWG) that are as short as possible to connect the load and power sources.

1. Install the GUI software. Visit the product webpage at: **https://www.analog.com/max77720evkit** and download the latest version of the EV kit software.
2. Install EV kit shunts according to Table 1.
3. Connect the MAXUSB_INTERFACE# board to the MAX77720 EV kit through the EV kit's MAXUSB_INTERFACE# connector (J5).
4. Connect a Micro-USB cable between the MAXUSB_INTERFACE# board and a Windows-based PC.
5. Apply a 3.6V supply (set for a 100mA current limit) through an ammeter (set for a 10mA range) across the IN and PGND terminals of the EV kit. Turn on the power supply.
   Open the MAX77720 GUI and select Device → Connect in the upper-left corner. Wait for a CONNECTED DEVICE LIST window to pop up, then press the Connect button.
6. Confirm on the ammeter that the quiescent current is approximately 750µA. Then using the DVM, confirm that the BST voltage is outputting the set voltage through feedback resistors and the IBB is outputting the set voltage through I2C.

EV Kit Photo

EV Kit Photo

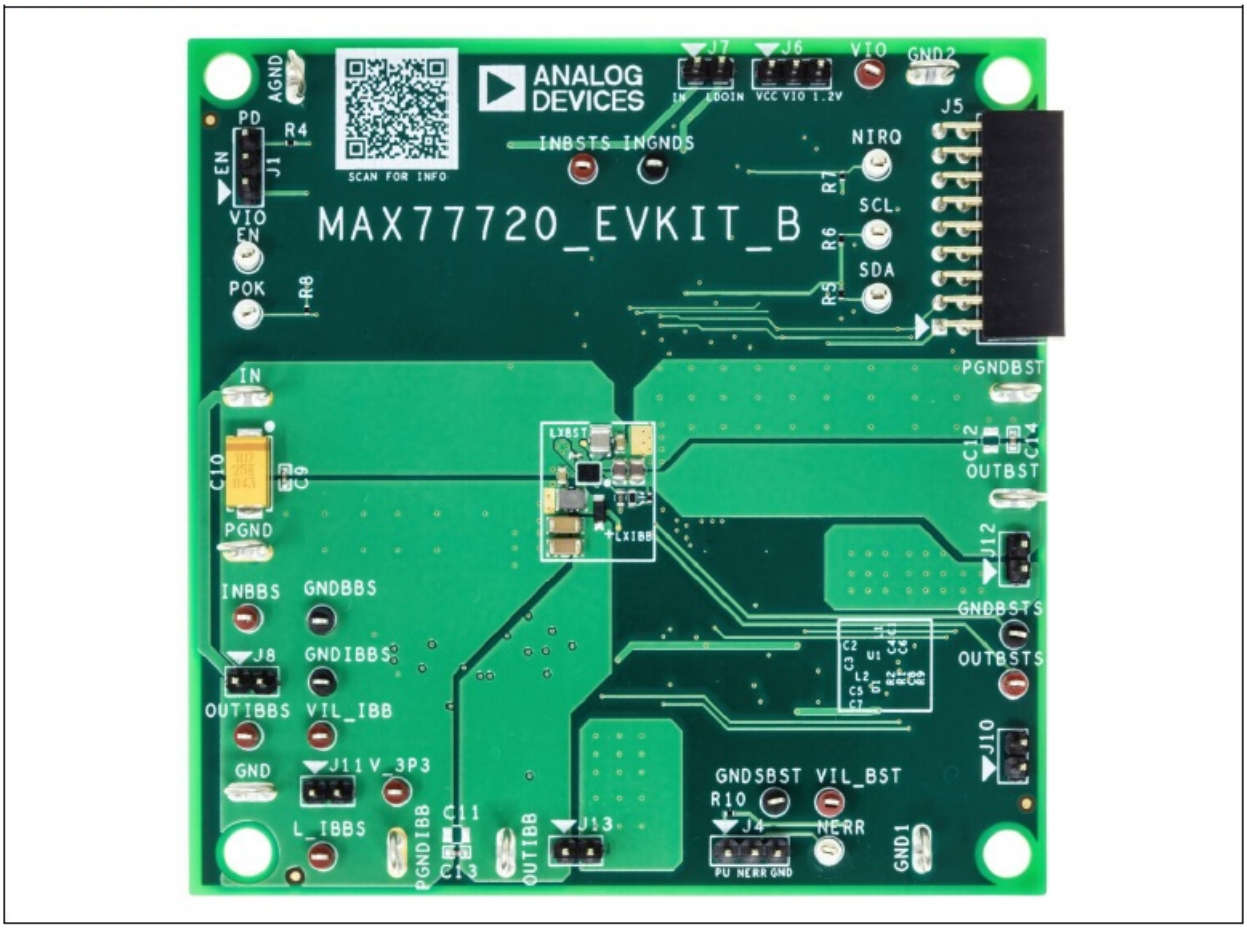


Figure 1. MAX77720 EV Kit Photo

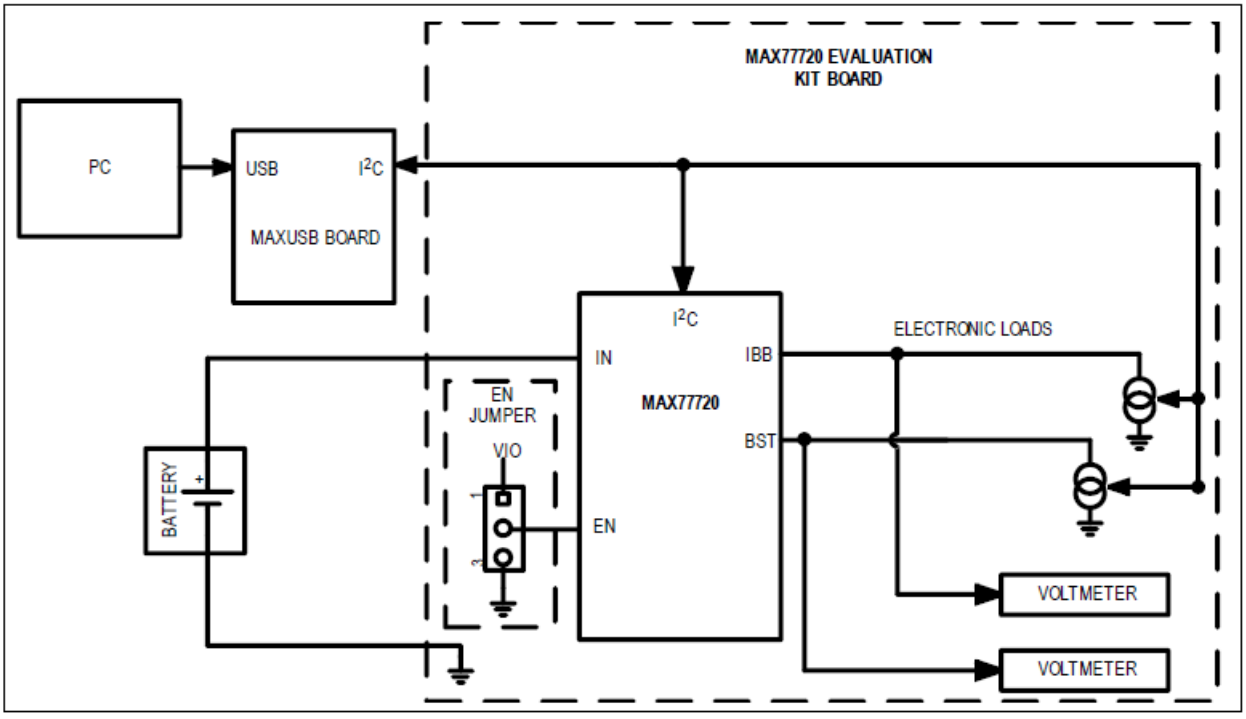


Figure 2. MAX77720 EV Kit Simplified Block Diagram

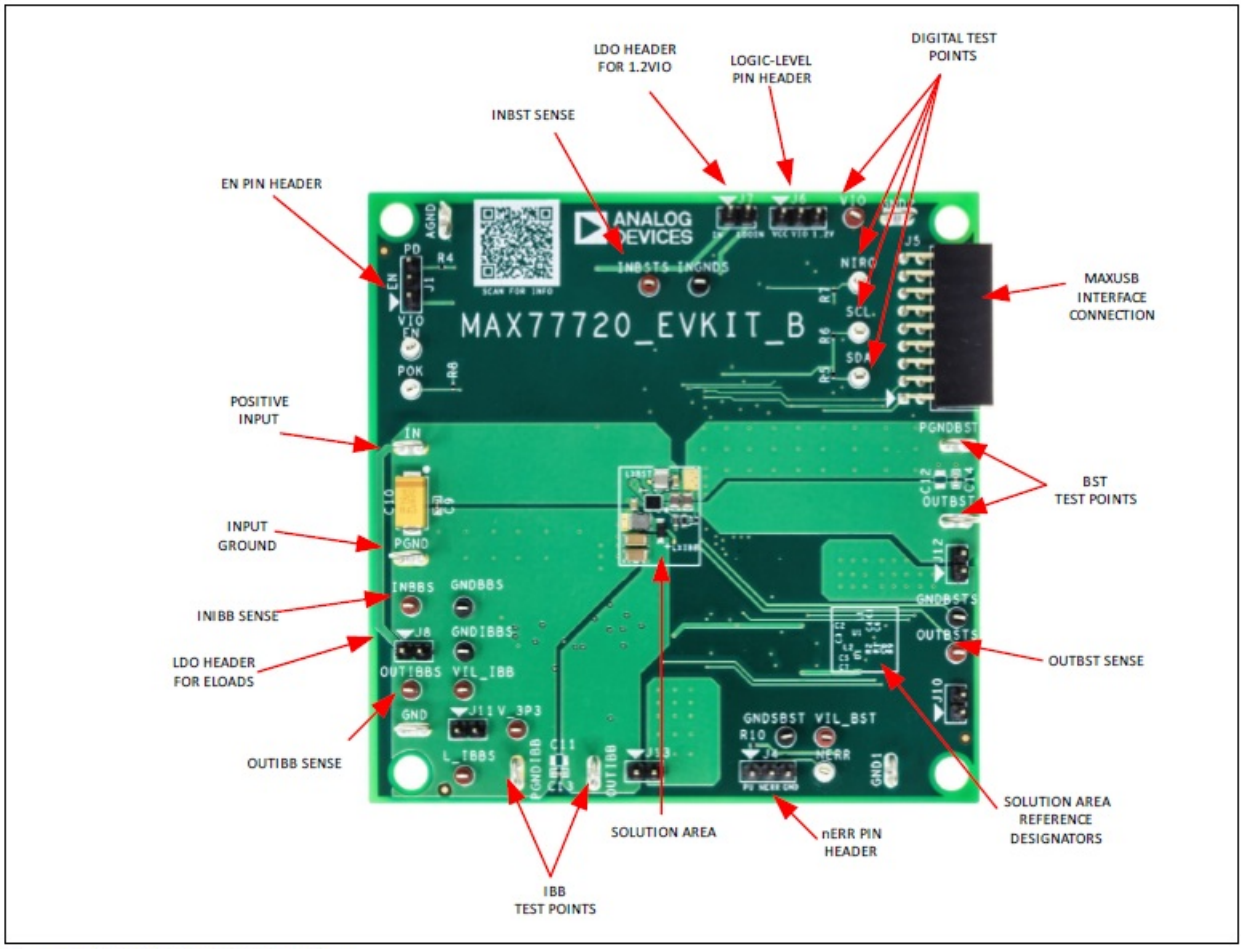


Figure 3. MAX77720 EV Kit Top View

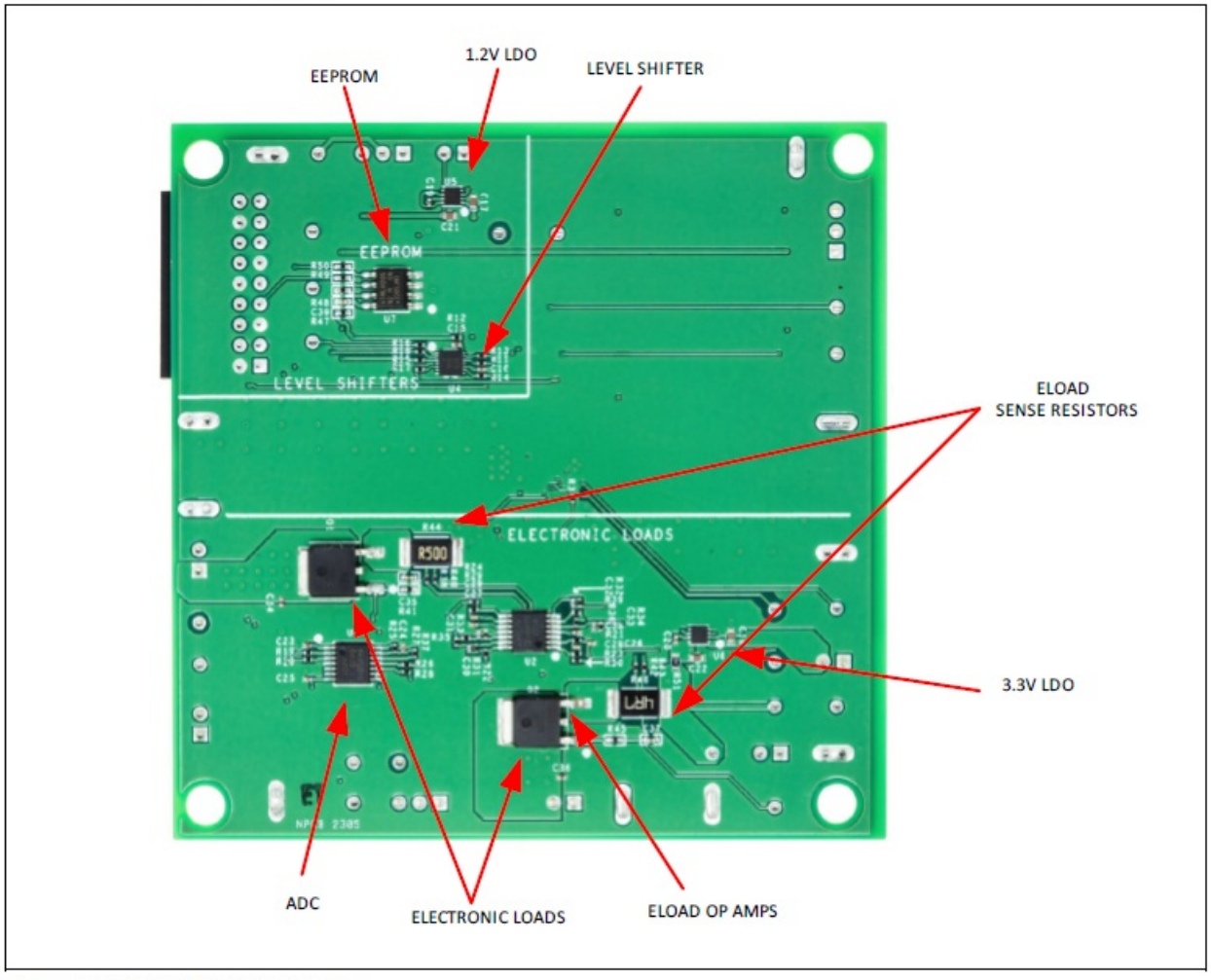


Figure 4. MAX77720 EV Kit Bottom View

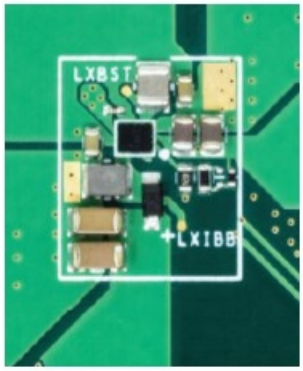


Figure 5. MAX77720 EV Kit Solution Area

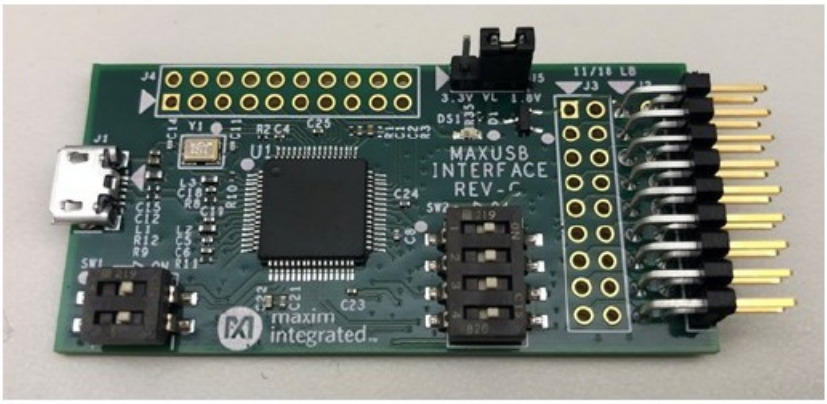


Figure 6. MAXUSB_INTERFACE# Board

Table 1. Jumper Connection Guide

REFERENCE DESIGNATOR	DEFAULT POSITION	FUNCTION
J1	1-2	1-2: Connects EN to VIO (enables the IBB and BST regulators). 2-3: Connects EN to GND (disables the IBB and BST regulators).
J4	1-2	1-2: Connects nERR to VIO (install this jumper to regulate outputs). 2-3: Connects nERR to GND (pull low to flag an error).
J11	1-2	1-2: Connects the gate of the Q2 load FET to the U2 amplifier.
J10	1-2	1-2: Connects the gate of the Q1 load FET to the U2 amplifier.
J12	1-2	1-2: Connects the OUTBST to the onboard electronic load.
J13	1-2	1-2: Connects the OUTIBB to the onboard electronic load.
J6	1-2	1-2: Connects the VIO supplied by the MAXUSB_INTERFACE# board **NOTE:** Connect the J5 Jumper on the MAXUSB_INTERFACE# board to the desired VIO voltage (either 3.3V or 1.8V only). 2-3: Connects the VIO to the 1.2V VIO supplied by the onboard LDO.
J7	1-2	1-2: Connects the IN voltage to the onboard LDO to supply a 1.2VIO.
J8	1-2	1-2: Connects the IN voltage to the onboard LDO to supply a 3.3V rail.

Detailed Description of Hardware

- This evaluation kit should be used with the following documents:
- MAX77720 IC data sheet
- MAX77720 EV kit data sheet (this document)
- These documents, or links to them, are included in the MAX77720 EV kit package. For the latest versions, visit the product page at: **https://www.analog.com/max77720evkit**.

EN Pin
The MAX77720 EV kit provides a jumper J1 to enable or disable the MAX77720. See Table 1 for J1 jumper settings.

nERR Pin
The MAX77720 EV kit provides a jumper J4 to drive the nERR pin as high or low. See Table 1 for J4 jumper settings.

Electronic Loads
The EV kit comes with an electronic load that allows the user to evaluate the boost and inverting buck-boost load current capabilities. On-board circuits set the load current through I2C (see Table 2). There are two options to exercise load transient response. In the Load Control tab, the GUI offers load transient controls. If faster rise and fall times are required, remove J11 (for IBB), or J10 (for BST) and connect a signal generator to the gate of the load MOSFET (pin 2 of the respective header). Drive the gate with a signal between 1V and 3V to apply transients to the output of the BST or IBB. Note that there is a 0.5Ω sense resistor for a 1:0.5 conversion of the load current to voltage for the BST and a 2Ω sense resistor for a 1:0.5 conversion of the load current to voltage. See the EV Kit Software section to learn how to set the load current from the GUI.

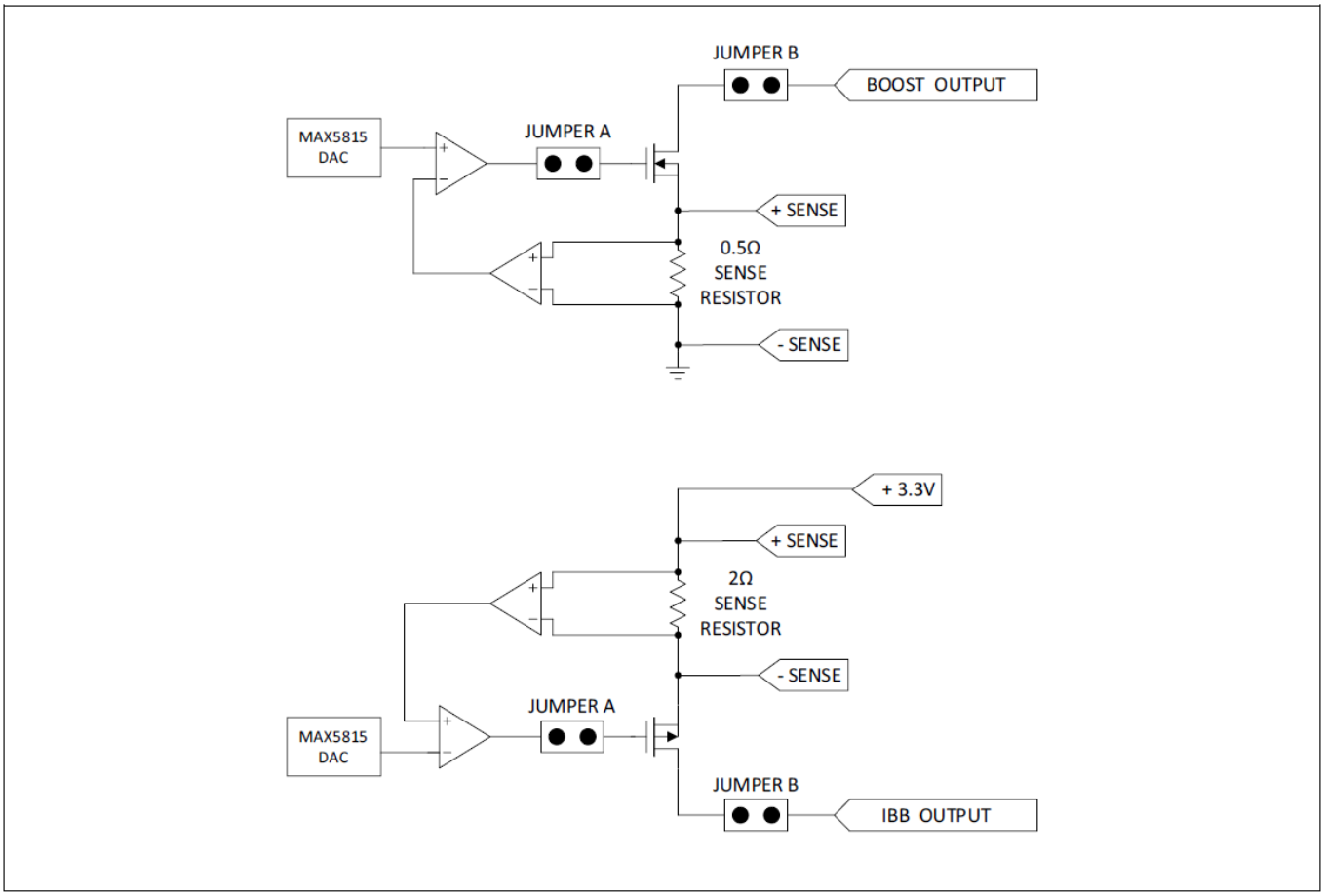


Figure 7. MAX77720 Electronic Load General Overview

Table 2. Electronic Load Jumpers and Sense Points

OUTPUT	JUMPER A	JUMPER B	SENSE
BST	J10	J12	VIL_BST GNDSBST
IBB	J11	J13	VIL_IBB L_IBBS

MAXUSB_INTERFACE#

- The MAXUSB_INTERFACE# along with the companion EV kit GUI software allows users to easily change the MAX77720's register settings with a Windows-based PC. Before connecting the MAXUSB_INTERFACE# to the EV kit's MAXUSB_INTERFACE# connector (J5), make sure the

- MAXUSB_INTERFACE# is configured with the following settings:
- SW1 and SW2 to ON position (This enables I2C mode on the MAXUSB_INTERFACE#.)
- VL jumper (J5) to 1.8V or 3.3V depending on system requirements (This sets the MAXUSB_INTERFACE#'s VIO voltage.)
- The MAXUSB_INTERFACE# also includes an onboard LDO that can supply the necessary voltage to VIO. To use the VIO supplied from the MAXUSB_INTEFACE# board, jumper J6 must be installed to position 1-2 (VCC and VIO connected).
- If the user desires to use a 1.2VIO, connect jumper J6 to position 2-3 (VCC and 1.2V) and ensure jumper J7 is installed. This provides power to the onboard 1.2V LDO to provide 1.2VIO compatibility. Additionally, a level shifter is added for users to still communicate using the
- MAXUSB_INTERFACE# through I2C.

External I2C Bus
If the user wishes to connect to the external I2C serial bus and not use the MAXUSB_INTERFACE#, unplug the MAXUSB_INTERFACE# from the EV kit's MAXUSB_INTERFACE# connector (J5). Apply an external I/O supply to the VIO pin or power the VIO pin using the onboard 1.2V rail by connecting jumper J6 to the 2-3 position. Make sure the external I2C serial bus's logic voltage level is compatible with the MAX77720's I/O logic voltage level. Refer to the MAX77720 IC data sheet for the appropriate I/O logic voltage levels. Then connect wires to the SDA, SCL, and GND pins on the EV kit to the external I2C serial bus.
Boost Output Voltage Configuration

- The boost output voltage is configured using an external resistor divider. By selecting the external resistor-divider RTOP and RBOT, the output voltage is configured to the desired value. When the output voltage is regulated, the typical voltage at the FBBST pin is 1.25V.
- Calculate the value of RTOP (from VFBBST to VOUTBST) for a desired VOUTBST at startup with the following equation:

$$R_{TOP} = R_{BOT}\ x\ \left(\frac{V_{OUTBST}}{V_{FBBST}} - 1\right)$$

Where

- VOUTBST is the desired positive output voltage.
- VFBBST is the default internal reference voltage at the FBBST pin, 1.25V (typ).

For best accuracy, set RBOT to a value smaller than 475kΩ to ensure that the current flowing through it is significantly larger than the FBBST pin bias current. The advantage of using a higher value for RTOP is the reduction of quiescent current for achieving the highest efficiency at light load currents. However, using RTOP values that are lower increases immunity against noise injection. Additionally, using one percent tolerance resistors (or better) is recommended to maintain high output voltage accuracy.

High-Temperature Testing
The MAX77720 is rated for operation under junction temperatures up to +125°C. Note that not all components on the EV kit are rated for temperatures this high. Some ceramic capacitors experience extra leakage when put under temperatures higher than they are rated for and supply current readings for the IC might be larger than expected. The MAXUSB_INTERFACE# is also not rated for +125°C. Double-check the components on the EV kit if testing at +125°C ambient or junction temperatures. Consider replacing these components if IC operation at +125°C ambient or junction temperature is an important use case.

List of components not rated for +125°C:

- C1, C3, C2 (Input Capacitors)
- C4, C6 (Output Boost Capacitors)
- C9, C16, C38, C15, C34, C36 (High Frequency Decoupling Capacitors)
- C17, C18, C21, C22 (On-Board LDO Capacitors)

Efficiency Measurement

The MAX77720 EV kit comes with sense pins for accurately measuring input voltage (INBBS, GNDBBS), output Inverting buck-boost voltage (OUTIBBS, GNDIBBS), and output boost voltage (OUTBSTS, GNDBSTS). See Figure 3 for their locations on the EV kit. For the most accurate efficiency, load regulation, and line regulation measurements, use these sense pins to measure input and output voltages.

WARNING: These sense pins are only for measuring voltages, do not connect the input supply to input sense pins, and do not connect the electronic load to output sense pins, as these sense pins are not designed to have current running through them. Doing so damages the EV kit.

Use input supply terminals (IN, PGND) and use output terminals (OUTBST, PGNDBST, OUTIBB, and PGNDIBB) for connecting to electronic load as shown in Figure 3.

General PCB Layout Guidelines

Careful printed circuit board layout is critical to achieving low-switching power losses and a clean stable operation by increasing noise immunity.

When laying out the PCB, follow these general guidelines:

- Place the inductors and output capacitors of the DC-DC converters close to the MAX77720 and keep the power loop small.
- When routing the current path of the DC-DC converters, short and wide traces should be used to reduce any EMI issues radiated from the fast switching. The trace between the LX pin and the inductor is the most critical for this.
- The ground loop for the input and output capacitor should be as small as possible.
- For multilayer PCBs, the analog ground (AGND) should be on its own plane, and the power ground (PGND) should be on its separate plane. AGND should be directly connected to the ground plane separately, to ensure a quiet ground plane for AGND and to avoid common impedance grounding.
- The feedback pins should be routed away from the LX switching node to increase noise immunity. This pin is a high-impedance input that is highly noise sensitive.
- When possible, ground planes and traces should be used to help shield the feedback signal and minimize noise and magnetic interference. For multilayer PCBs, a ground plane should be in between the high current paths and any analog or digital paths.

Example PCB Layout

Figure 8 shows an example layout of the top layer with additional digital signals beneath. For the layout and PCB layout per layer, see the MAX77720 EV kit PCB Layout section.

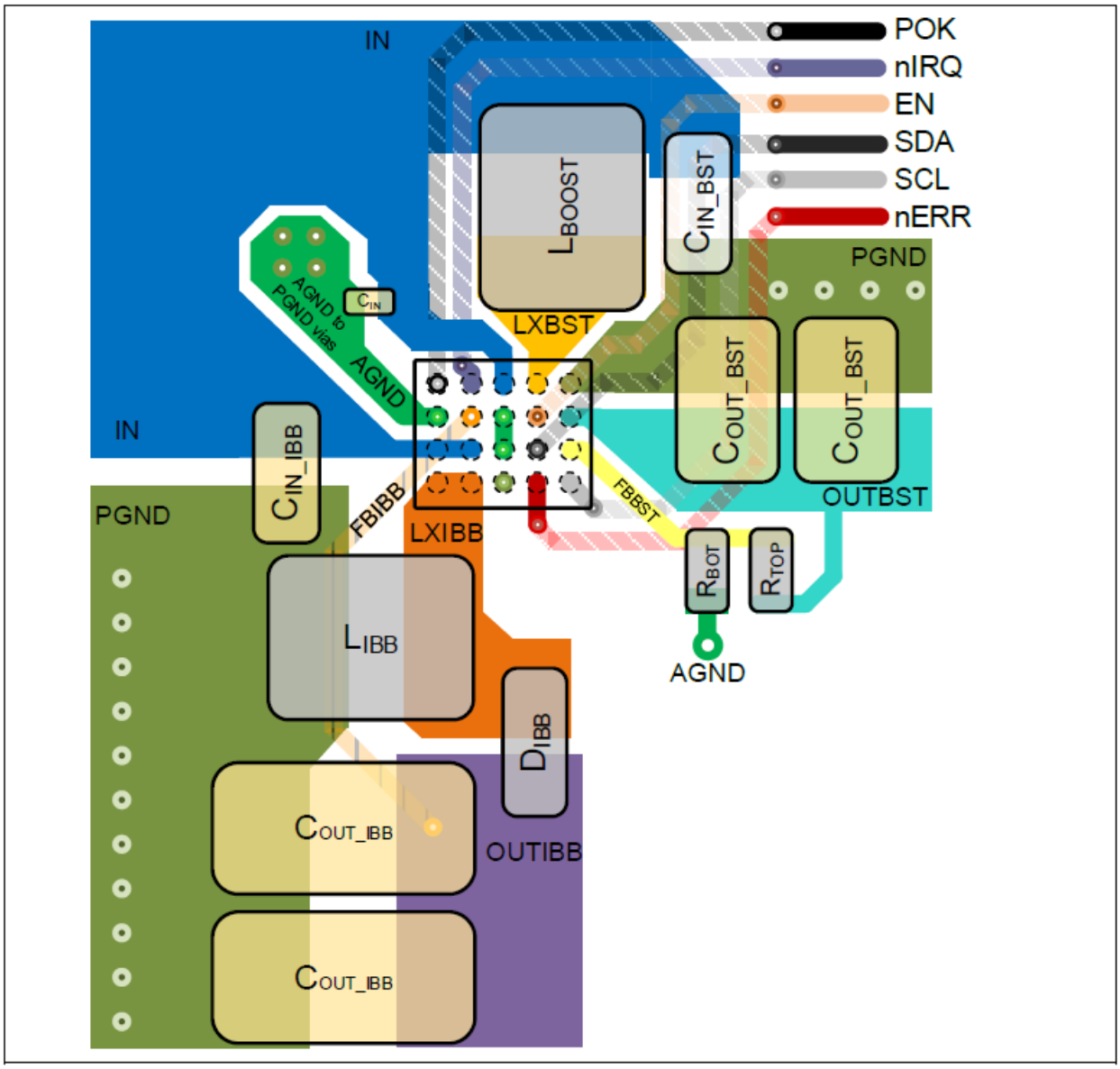


Figure 8. PCB Top-Layer and Component Placement Example

EV Kit Software

The graphical user interface (GUI) software allows for a quick, easy, and thorough evaluation of the MAX77720. The GUI, along with the MAXUSB_INTERFACE# (see Figure 6), drives I2C communication with the EV kit. Every control in the GUI corresponds directly to a register within the MAX77720. Refer to the Register Map section of the MAX77720 IC data sheet for a complete description of the registers. See Figure 9 for a screenshot of the GUI upon first opening.

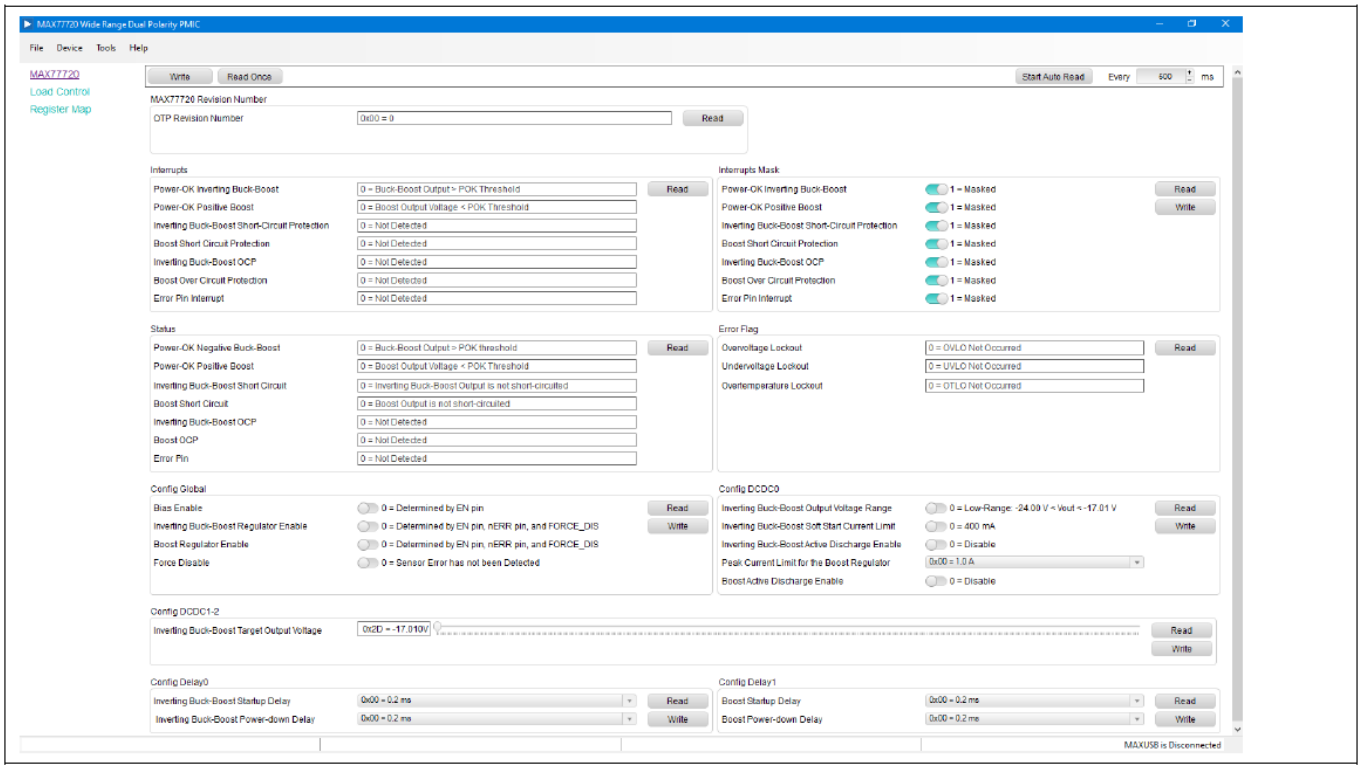


Figure 9. MAX77720 EV Kit GUI Software Configuration Tab

Installation

Visit the product webpage at **https://www.analog.com/max77720evkit** and 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 MAXUSB_INTERFACE# 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 the GUI to the MAXUSB_INTERFACE#

After opening the GUI, click Device in the upper left corner of the GUI window. Click Connect in the drop-down menu. If there are multiple MAXUSB_INTERFACE# adapters or FTDI devices connected to the PC, the Port Synchronization menu appears (Figure 10). Select the port corresponding to the MAXUSB_INTERFACE# attached to the MAX77720 EV kit and click Connect.

The Device Synchronization menu opens (Figure 11). Once the MAX77720 IC responds, voltages on the IN and VIO pins must be valid on the MAX77720 IC for it to respond. The I2C address shown is the MAX77720 IC's 7-bit slave address. The address shown changes depending on the OTP configuration. Click Connect and Read. The text at the bottom right of the GUI window changes from "MAXUSB is Disconnected" to "MAXUSB is Connected."

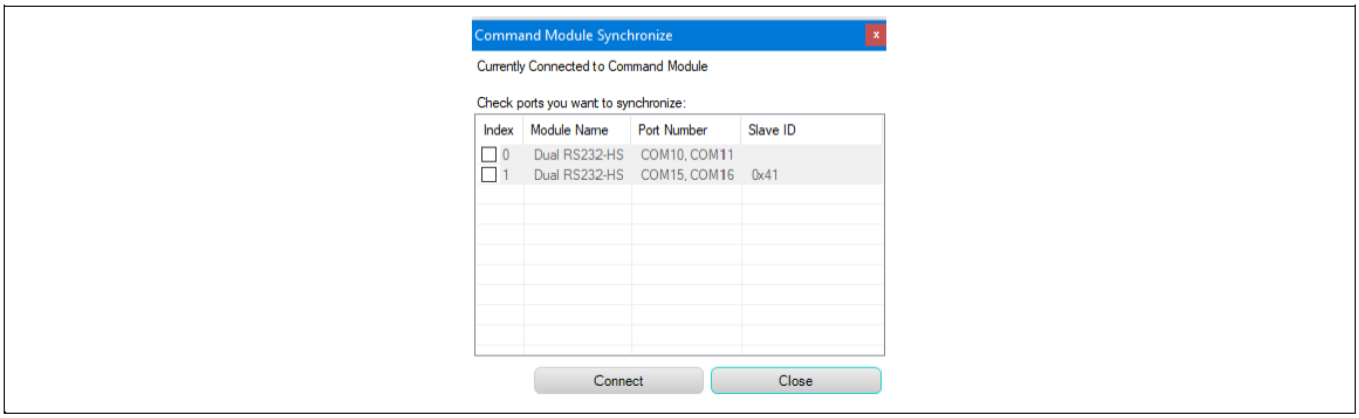


Figure 10. Port Synchronization Menu

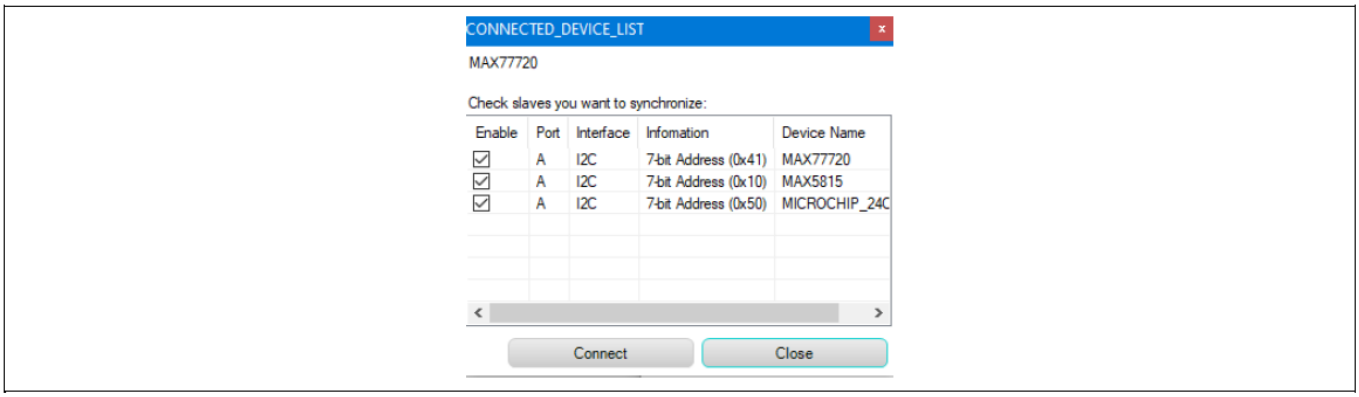


Figure 11. Device Synchronization Menu

MAX77720 Configuration

- The MAX77720 tab (Figure 9) displays information and status of the IC on the EV kit as well as all available register settings. It is divided into different sections: OTP Revision Number, Interrupts, Interrupts Mask, Status, Error Flag, Global Configuration, Boost Configuration, and
- Inverting Buck-Boost Configuration.
- Click Read Once located at the top of the GUI window to obtain all setting values currently stored on all the MAX77720's registers. After changing the settings values in the GUI software, click Write on the top of the GUI window to apply all settings to the MAX77720's registers.
- Alternatively, click Read on each setting section to obtain the setting values of that particular section currently stored on the MAX77720 registers. After changing the setting values in the GUI software, click Write in the corresponding setting section to apply the new settings for that particular section to the MAX77720 registers.
- The POK Status and Fault Interrupt Source section (Figure 12) displays the power-OK status and any fault conditions detected on the MAX77720 IC, which are stored in the INT_GLBL0 register. Periodically check the POK Status and Fault Interrupt Source section during evaluation to monitor the status of the power-OK (POK), overvoltage protection (OVLO), undervoltage protection (UVLO), output hard-short (SCP), thermal shutdown (OTLO), and overcurrent protection (OCP). Click Read to obtain the latest status from the IC.

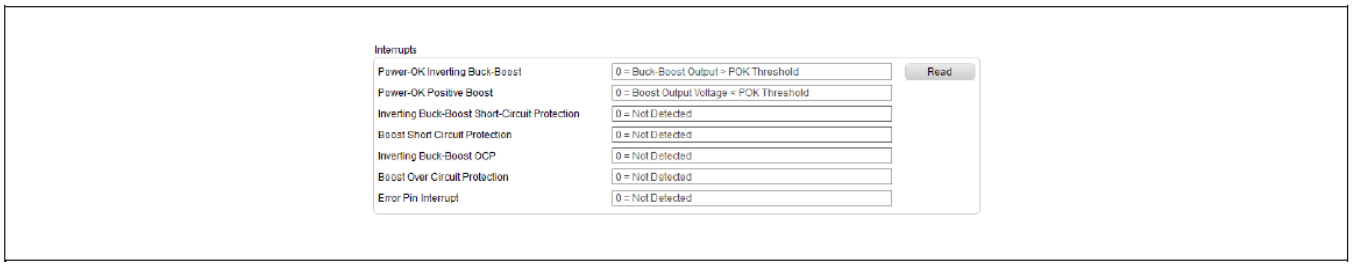


Figure 12. MAX77720 Tab—Interrupts Section

The POK Status and Fault Interrupt Masks section (Figure 13) configures the reflection of the bits in INT_GLBL to the POK and nIRQ pin, respectively. If a bit is masked, its status in the INT_GLBL register is not shown on the nIRQ pin. Refer to the Power-OK Monitor and Fault Interrupts section in the IC data sheet for more information about the operation of the POK and nIRQ pin, respectively. Click Read to obtain the setting stored on the IC, and click Write to apply new settings to the IC.

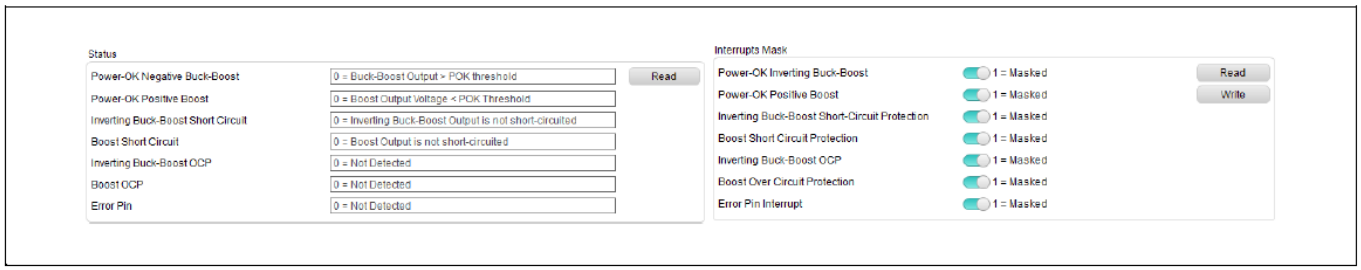


Figure 13. MAX77720 Tab—Interrupts Mask and Status Section

The Error Flag section (Figure 14) displays the IC protection status for the UVLO, OVLO, and OTLO conditions. These error flag conditions flag once it reaches outside the operating thresholds such as voltage or temperature. Refer to the Electrical Characteristics section of the IC data sheet for the specified values and hysteresis.

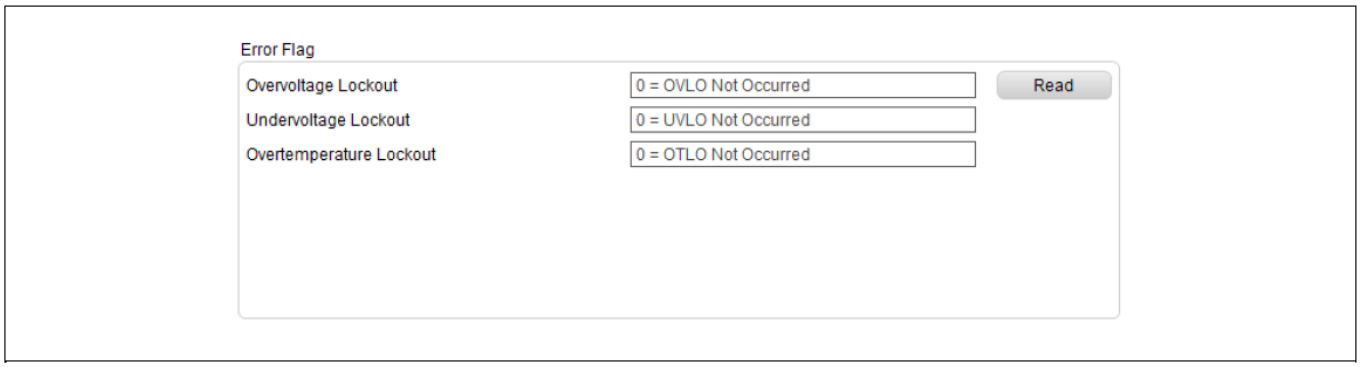


Figure 14. MAX77720 Tab—Error Flag Section

The Config Global section (Figure 15) configures the enabling and disabling of the MAX77720 regulators and their main bias. Refer to the Electrical Characteristics section of the IC data sheet for the difference in the quiescent current for these modes. Additionally, refer to the nERR Error Pin section for the functionality description of these bitfields.

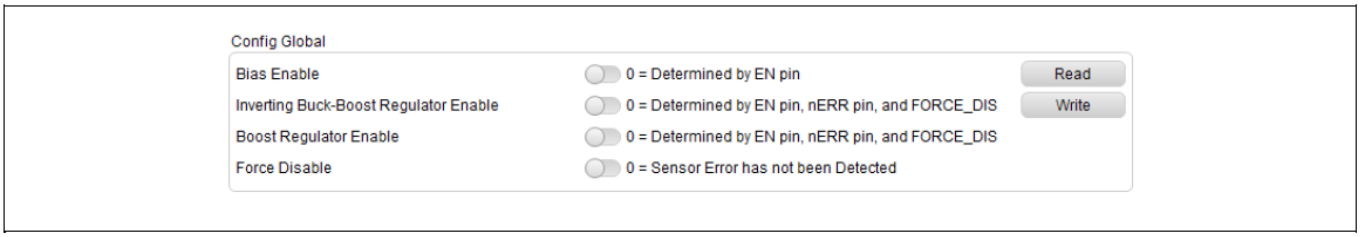


Figure 15. MAX77720 Tab—Config Global Section

The Config DCDC0 section (Figure 16) configures the inverting buck-boost and boost regulator's programmable bitfields. The user can program the inverting buck-boost's output voltage range, soft-start current limit, and active discharge, along with the boost's peak current limit and active discharge. Refer to the Detailed Description section in the IC data sheet for more information about the operation of these bitfields.

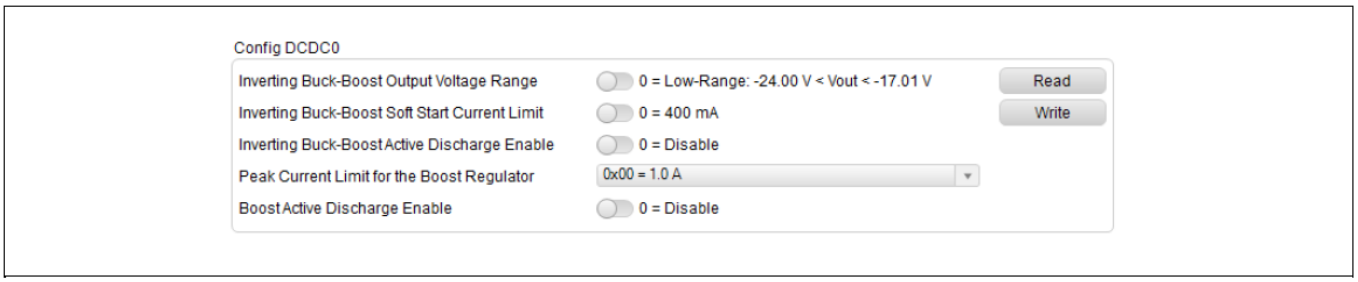


Figure 16. MAX77720 Tab—Config DCDC0

The Config DCDC1-2 section (Figure 17) configures the operation of the inverting buck-boost target output voltage. The user can program the inverting buck-boost in two ranges: -17.01V to -24V (low range) and -10.01V to -17V (high range). Refer to the Inverting Buck-Boost Converter section in the IC data sheet for more information about the operation of the inverting-buck-boost converter.

Figure 17. MAX77720 Tab—Config DCDC 1-2

The Config Delay0 and Config Delay1 section (Figure 18) configures the inverting buck-boost and boost regulator's programmable startup and power-down delays. The user can program 16 different power-up and power-down delays ranging from 0.2ms to 3.2ms. Refer to the Power-Up/Power-Down Sequence section in the IC data sheet for more information about the operation of the delays.

Figure 18. MAX77720 Tab—Delay0 and Delay1

Load Control Tab

- The Load Control tab contains controls for load current on the regulator's outputs. The GUI is capable of setting steady-state, transients, and random load currents. To set a load current, use the slider bar or text field to input a value (mA) and check the Enable box. Shuffle through the modes to exercise different load conditions. Note: for the onboard electronic loads to function, jumpers J11 and J13 must be connected to the IBB rail, and jumpers J10 and J12 must be connected to the BST rail.
- The offset and gain values are set by Analog Devices and do not need to be altered. However, in the case that the load control seems to be inaccurate, make sure the constants match (see Figure 19 and Figure 20) for the IBB and BST load control respectively.
- For the IBB load control, the electronic load is unable to load up to the maximum load capabilities that the IBB can handle. If the user wishes to add more load current, using an external electronic load or a power resistor is recommended.

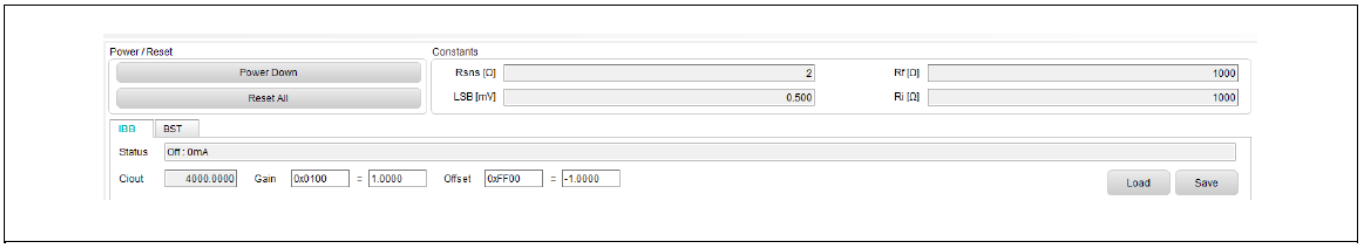


Figure 19. IBB Load Control Values

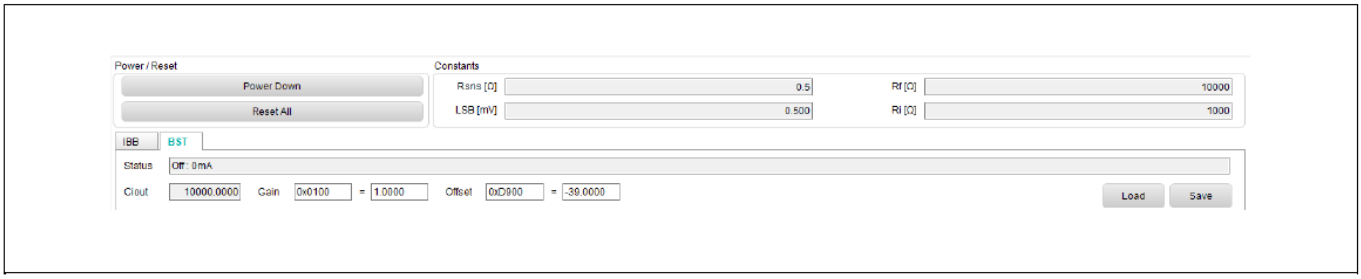


Figure 20. BST Load Control Values

Register Map

The Register Map tab provides an overview of all the MAX77720 registers and the values currently stored on them. Clicking on an individual bit shows the name and description of the specified bitfield. See Figure 21 for an example of the INTM_GLBL0.POK_IBB_M bitfield when selected.

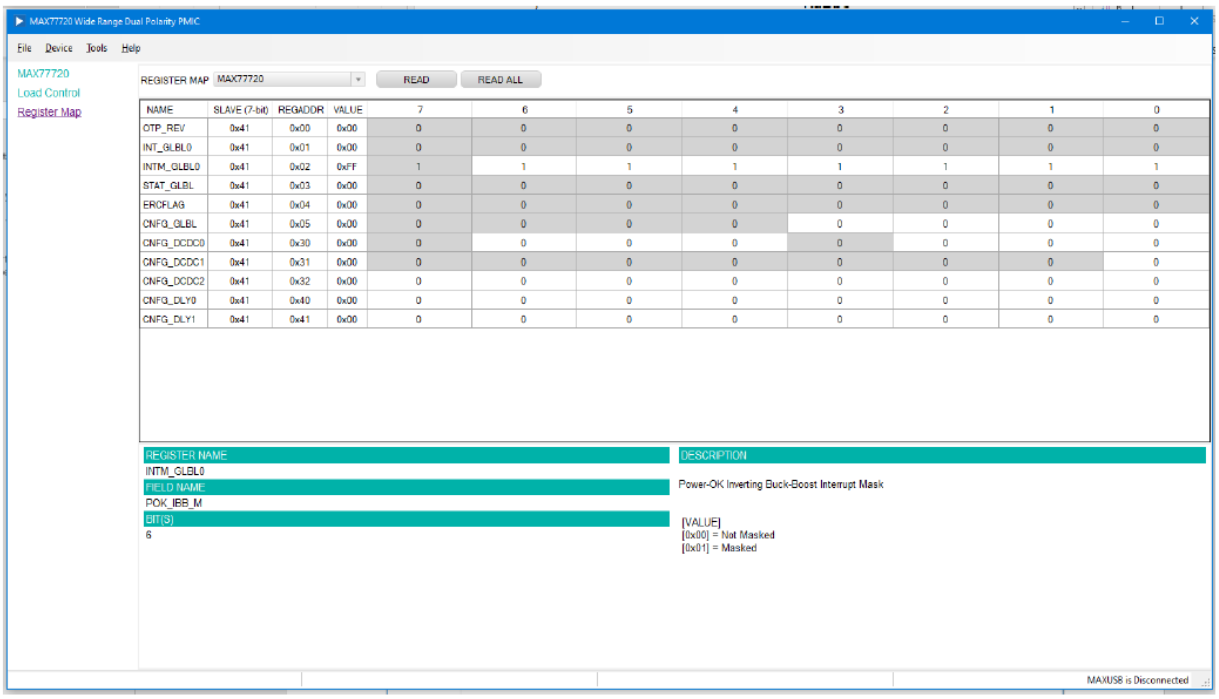


Figure 21. EV Kit GUI Software Register Map Tab

Ordering Information

PART	TYPE
MAX77720EVKIT#	EV Kit

MAX77720 EV Kit Bill of Materials

PART	QTY	MFG PART #	MANUFACTURE R	VALUE	DESCRIPTION
AGND, GND, GND1, GND2, IN, OUTBST, OUTIBB, PGND, PGNDBST, PGNDIBB	10	9020 BUSS	WEICO WIRE	MAXIMPAD	CAP; SMT (0603); 22UF; 20%; 10V; X5R; CERAMIC
C1, C3	2	C1608X5R1A226M080AC; GRM188R61A226ME 15; CL10A226MPCNUBE; CL10A226MPMNUB; GRM187R61A226ME 15	TDK; MURATA; SAMSUNG; SAMSUNG; MURATA	22UF	CAP; SMT (0201); 1UF; 20%; 6.3V; X5R; CERAMIC

Evaluates: MAX77720

C2	1	GRM033R60J105MEA2;C0603X5R0J105M 030;CL03A105MQ3C SN	MURATA; TDK; SAMSUNG	1UF	CAP; SMT (0805); 10UF; 10%; 35V; X6S; CERAMIC
C4, C6	2	GRM21BC8YA106KE1 1	MURATA	10UF	CAP; SMT (1206); 10UF; 10%; 50V; X7T; CERAMIC
C5, C7	2	GRM31CD71H106KE11	MURATA	10UF	CAP; SMT (0402); 0.1UF; 10%; 16V; X5R; CERAMIC
C9, C16, C38	3	GRM155R61C104KA8 8	MURATA	0.1UF	CAP; SMT (7343); 100UF; 20%; 16V; TANTALUM
C10	1	16TQC100MYF	PANASONIC	100UF	CAP; SMT (0402); 0.1UF; 10%; 50V; X7R; CERAMIC

C13, C14	2	C1005X7R1H104K050 BB; GRM155R71H104KE1 4; C1005X7R1H104K050 BE; UMK105B7104KV-FR; 04025C104KAT2A	TDK; MURATA; TDK; TAIYO YUDEN; AVX	0.1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 6.3V; TOL=20%; MODEL=C SERIES; TG=-55 DEGC TO +85 DEGC; TC=X5R ; FORMFACTOR
C15	1	ANY	ANY	1UF	CAP; SMT (0603); 4.7UF; 10%; 10V; X5R; CERAMIC
C17, C18, C21, C22	4	C0603C475K8PAC; LMK107BJ475KA; CGB3B1X5R1A475K; C1608X5R1A475K080 AC; CL10A475KP8NNN; C1608X5R1A475K080 AE	KEMET; TAIYO YUDEN; TDK; TDK; SAMSUNG ELECTRONICS; TDK	4.7UF	CAP; SMT (0402); 0.01UF; 10%; 50V; X7R; CERAMIC
C19, C20, C35, C37	4	C0402C103K5RAC; GRM155R71H103KA88; C1005X7R1H103K050 BE; CL05B103KB5NNN; UMK105B7103KV	KEMET; MURATA; TDK; SAMSUNG ELECTRONIC; TAIYO YUDEN	0.01UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 25V; TOL=10%; MODEL=C SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R; FORMFACTOR
C23-C25	3	ANY	ANY	0.1UF	CAP; SMT (0402); 4700PF; 5%; 50V; X7R; CERAMIC
C26, C27	2	C0402C472J5RAC	KEMET	4700PF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.01UF; 10V; TOL=10%; MODEL=C0402C SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R
C28, C29	2	ANY	ANY	0.01UF	CAP; SMT (0402); 1000PF; 5%; 50V; X7R; CERAMIC

C30-C33	4	GRM155R71H102JA0 1; GCM155R71H102JA37	MURATA; MURATA	1000PF	CAP; SMT (0402); 1UF; 10%; 35 V; X5R; CERAMIC
C34, C36	2	C1005X5R1V105K050 BC	TDK	1UF	CAP; SMT (0402); 0.1UF; 10%; 25V; X7R; CERAMIC
C39	1	GRM155R71E104KE1 4;	MURATA; TDK; TAIYO YUDEN;	0.1UF	DIODE; SCH; SMT (PMDE); PIV =60V; IF=2A

		C1005X7R1E104K050 BB; TMK105B7104KVH; CGJ2B3X7R1E104K050BB	TDK		
D1	1	RB068VWM-60	ROHM SEMICONDUCTOR	RB068VWM-60	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;
EN, NERR, NIRQ, POK, SCL, SDA	6	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
GNDBBS, GNDBSTS, GNDIBBS, GNDSBST, INGNDS	5	5001	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;

INBBS, IN BSTS, L_I BBS, OUT BSTS, OU TIBBS, VI L_BST, VI L_IBB, VI O, V_3P3	9	5000	KEYSTONE	N/A	CONNECTOR; THROUGH HOL E; TSW SERIES; SINGLE ROW ; STRAIGHT; 3PINS
J1, J4, J6	3	TSW-103-07-T-S	SAMTEC	TSW-103-07- T-S	CONNECTOR; FEMALE; THRO UGH HOLE; PPP SERIES; RIGH T ANGLE; 18PINS
J5	1	PPPC092LJBN-RC	SULLINS ELE CTRONICS CO RP	PPPC092LJB N- RC	CONNECTOR; THROUGH HOL E; TSW SERIES; SINGLE ROW ; STRAIGHT; 2PINS; -55 DEGC TO +105 DEGC
J7, J8, J10- J13	6	TSW-102-07-T-S	SAMTEC	TSW-102-07- T-S	INDUCTOR; SMT (1008); SHIEL DED; 8.2UH; 20%; 1.3A
L1	1	DFE252012F-8R2M	MURATA	8.2UH	INDUCTOR; SMT (1008); SHIEL DED; 3.3UH; 20%; 1.7A;
L2	1	LSANB2520MKT3R3 M	TAIYO YUDEN	3.3UH	MACHINE FABRICATED; ROUN D- THRU HOLE SPACER; NO T HREAD; M3.5; 5/8IN; NYLON
MH1-MH4	4	9032	KEYSTONE	9032	CABLE; MALE; USB; USB2.0 MI CRO CONNECTION CABLE; U SB B MICRO MALE TO USB A MALE; 2000 MILLIMETERS; 5PINS-4PINS
MISC1	1	AK67421-2	ASSMANN	AK67421-2	TRAN; N-CHANNEL POWER M OSFET; NCH; TO-252AA; PD- (50W); I-(15A); V-(100V)

Q1	1	TSM900N10CP ROG	TAIWAN SEMICONDUCT OR	TSM900N10CP ROG	TRAN; P-CHANNEL MOSFET; PCH; TO-252AA; PD-(75W); I-(-45A); V-(-30V)

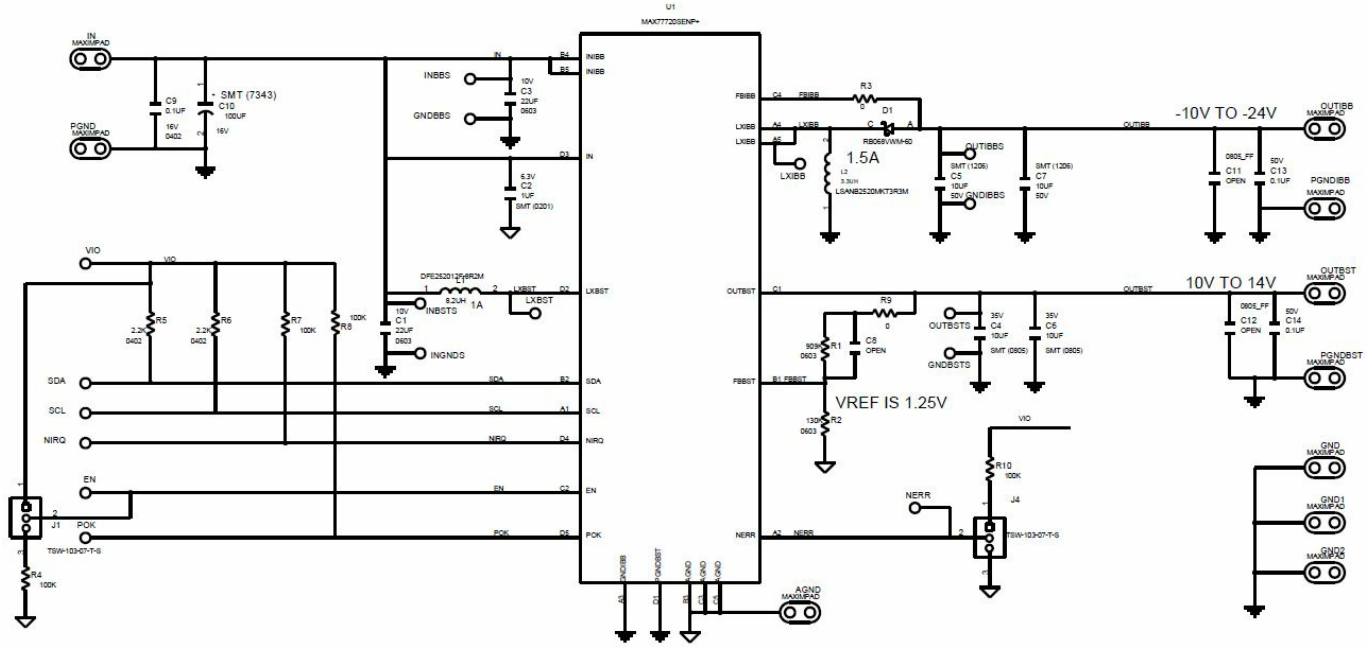
Q2	1	MCU45P03A	MICRO COMMERCIAL COMPONENTS	MCU45P03A	RES; SMT (0603); 909K; 1%; +/-100PPM/DEGK; 0.1000W
R1	1	CRCW0603909KFK	VISHAY DALE	909K	RES; SMT (0603); 130K; 0.50%; +/-25PPM/DEGC; 0.0630W
R2	1	RR0816P-134-D	SUSUMU CO LTD.	130K	RESISTOR; 0402; 0 OHM; 1%; 100PPM; 0.0625W; THICK FILM; FORMFACTOR
R3, R9, R11-R18, R26, R28	12	ANY	ANY	0	RESISTOR; 0402; 100K; 1%; 100PPM; 0.0625W; THICK FILM; FORMFACTOR
R4, R7, R8, R10, R25, R27	6	ANY	ANY	100K	RES; SMT (0402); 2.2K; 1%; +/-100PPM/DEGC; 0.0630W
R5, R6	2	RC0402FR-072K2L	YAGEO	2.2K	RES; SMT (0402); 20K; 1%; +/-100PPM/DEGC; 0.0630W
R19, R20	2	CRCW040220K0FK	VISHAY DALE	20K	RES; SMT (0402); 680; 1%; +/-100PPM/DEGC; 0.0630W
R21, R22	2	RC0402FR-07680RL	YAGEO	680	RES; SMT (0402); 100; 1%; +/-100PPM/DEGC; 0.0630W
R23, R24	2	9C04021A1000FL; RC0402FR-07100RL	PANASONIC; YAGEO PHYCOMP	100	RES; SMT (0402); 10; 1%; +/- 200PPM/DEGC; 0.0630W

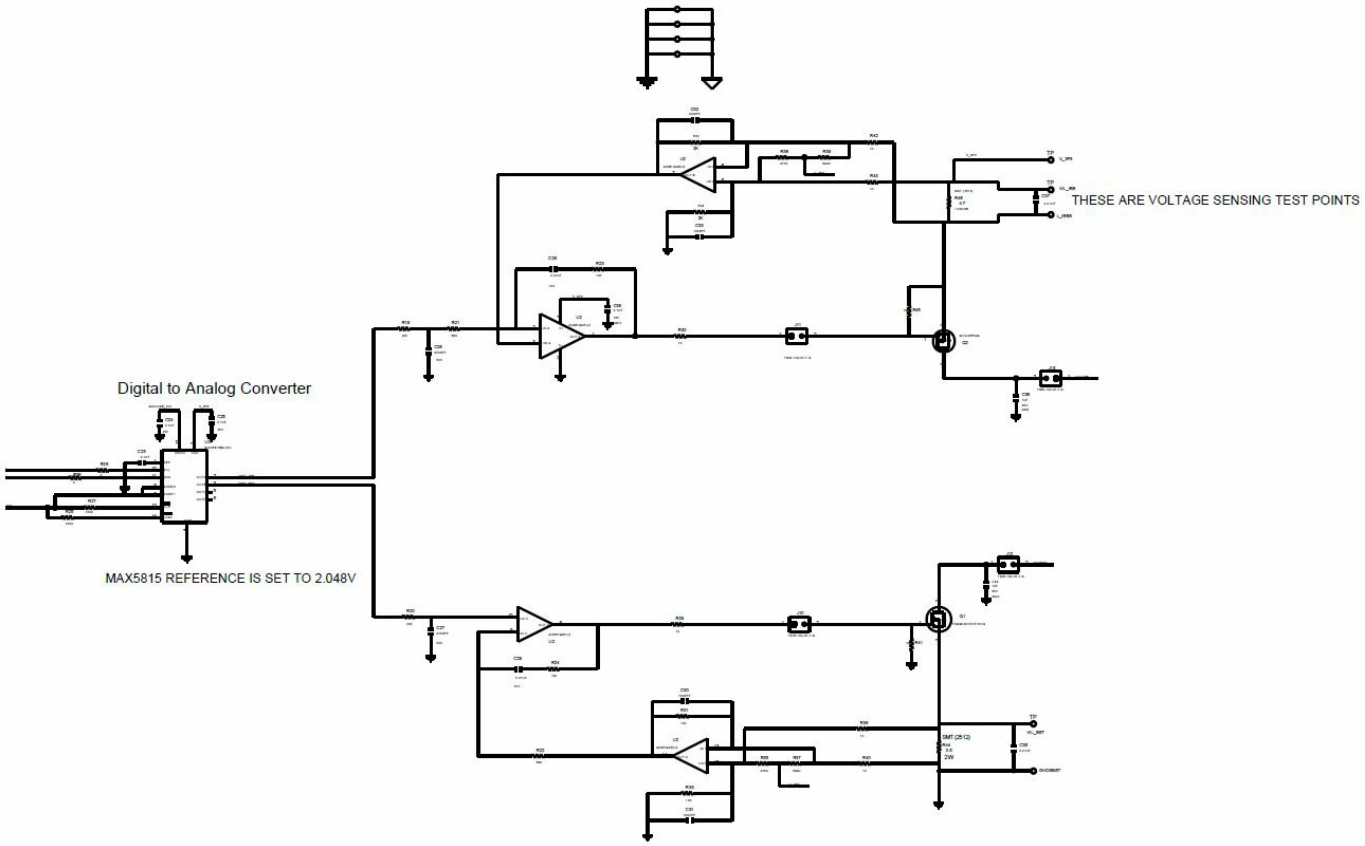
R29, R30	2	RC0402FR-0710RL	YAGEO PHYCOMP	10	RES; SMT (0402); 10K; 5%; +/-200PPM/DEGC; 0.0630W
R31, R33	2	CR0402-JW-103GLF	BOURNS	10K	RES; SMT (0402); 2K; 0.10%; +/- 25PPM/DEGC; 0.0630W
R32, R34	2	ERA-2AEB202	PANASONIC	2K	RES; SMT (0402); 470K; 1%; +/-100PPM/DEGC; 0.0630W
R35, R36	2	ERJ-2RKF4703	PANASONIC	470K	RES; SMT (0402); 649K; 1%; +/-100PPM/DEGC; 0.0630W
R37, R39	2	CRCW0402649KFK	VISHAY DALE	649K	RESISTOR; 0402; 1K; 1%; 100PPM; 0.0625W; THICK FILM; FORMFACTOR
R38, R40, R42, R43	4	ANY	ANY	1K	RES; SMT (0402); 1M; 1%; +/- 100PPM/DEGC; 0.0630W
R41, R45	2	CRCW04021M00FK	VISHAY DALE	1M	RES; SMT (2512); 0.5; 1%; +/- 100PPM/DEGC; 2W
R44	1	LRC-LR2512LF-01-R500-F	TT ELECTRONICS	0.5	RES; SMT (2512); 4.7; 5%; JUMPER; 1.0000W
R46	1	CR2512-J/-4R7ELF	BOURNS	4.7	RES; SMT (0402); 0; JUMPER; JUMPER; 0.1000W
R47-R50	4	ERJ-2GE0R00	PANASONIC	0	RES; SMT (0603); 0; 5%; JUMPER; 0.1000W

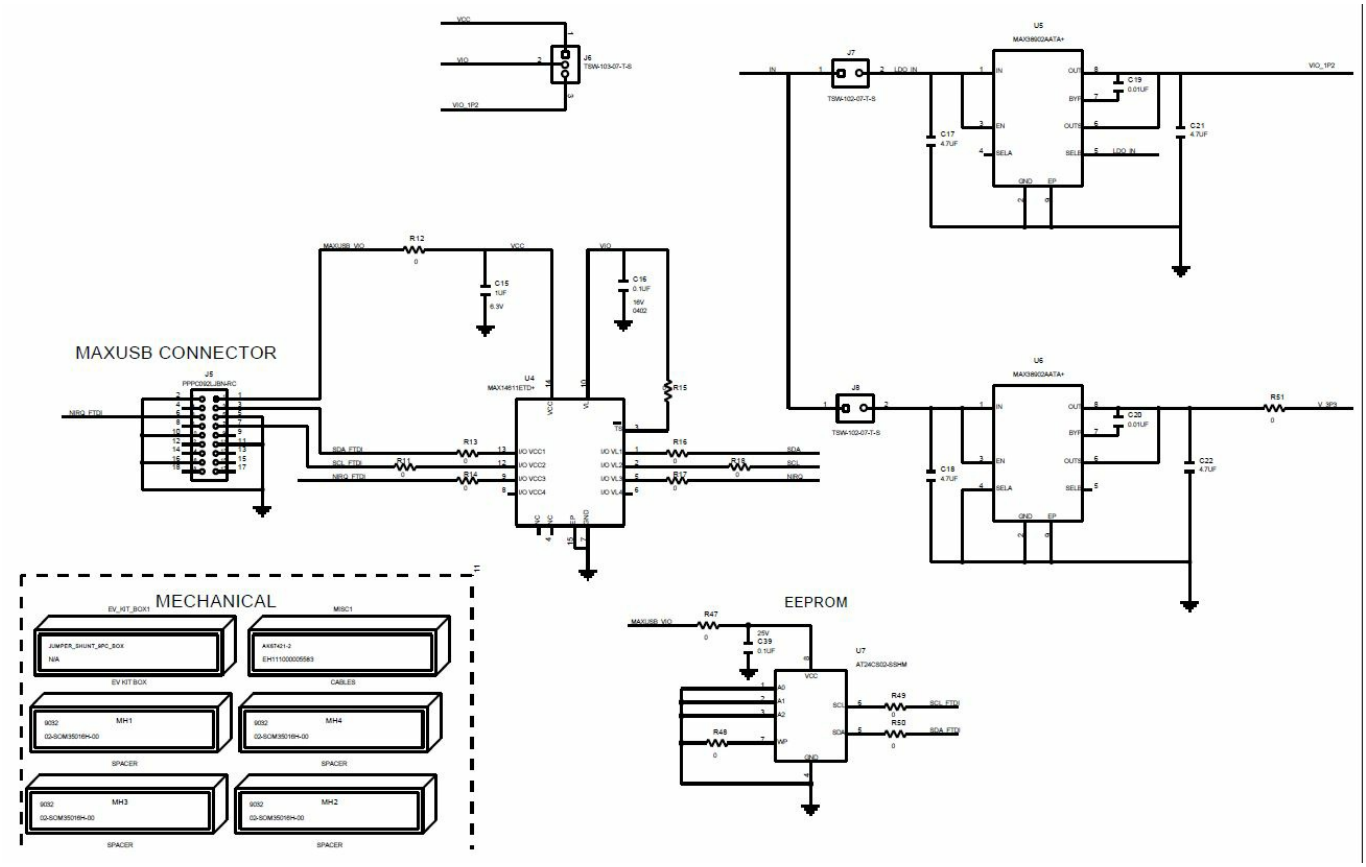
R51	1	RC1608J000CS; CR 0603-J/-000ELF; RC 0603JR-070RL	SAMSUNG EL ECTRONICS; BOURNS; YAGEO PH	0	IC; CONV; WIDE OUTPUT VOL TAGE RANGE DUAL POLARITY PMIC; WLP20
U1	1	MAX77720SENP+	ANALOG DEVI CES	MAX77720SE NP+	IC; OPAMP; LOW COST MICR OPOWER; LOW NOISE CMOS RAIL-TO-RAIL; INPUT/OUTPUT OPERATIONAL AMPLIFIERS; TSSOP14
U2	1	AD8619ARUZ	ANALOG DEVI CES	AD8619ARUZ	IC; DAC; ULTRA-SMALL; QUAD - CHANNEL; 12-BIT BUFFERED

					OUTPUT DACS WITH INTERNAL REFERENCE AND I2C INTERFACE; TSSOP14
U3	1	MAX5815BAUD+	MAXIM	MAX5815BAUD+	IC; TRANS; QUAD BIDIRECTIONAL LOW-VOLTAGE LOGIC LEVEL TRANSLATOR; TDFN14-EP
U4	1	MAX14611ETD+	MAXIM	MAX14611ETD+	IC; REG; LOW NOISE 500 MILLIAMPERE LDO LINEAR REGULATOR; TDFN8-EP
U5, U6	2	MAX38902AATA+	MAXIM	MAX38902AATA+	IC; EPROM; I2C-COMPATIBLE TWO-WIRE SERIAL EEPROM; 150MIL; NSOIC8
U7	1	AT24CS02-SSHM	MICROCHIP	AT24CS02- SSHM	PCB:MAX77720
PCB	1	MAX77720	MAXIM	PCB	CONNECTOR; FEMALE; MINI SHUNT; 0.100IN CC; OPEN TOP; JUMPER; STRAIGHT; 2PINS
EV_KIT_BOX1	9	NPC02SXON-RC	SULLINS ELECTRONICS CORP.		CAPACITOR; SMT (0805); OPEN; FORMFACTOR
C11, C12	0	N/A	N/A	OPEN	CAPACITOR; SMT (0402); OPEN; FORMFACTOR
C8	0	N/A	N/A	OPEN	CAP; SMT (0603); 22UF; 20%; 10V; X5R; CERAMIC

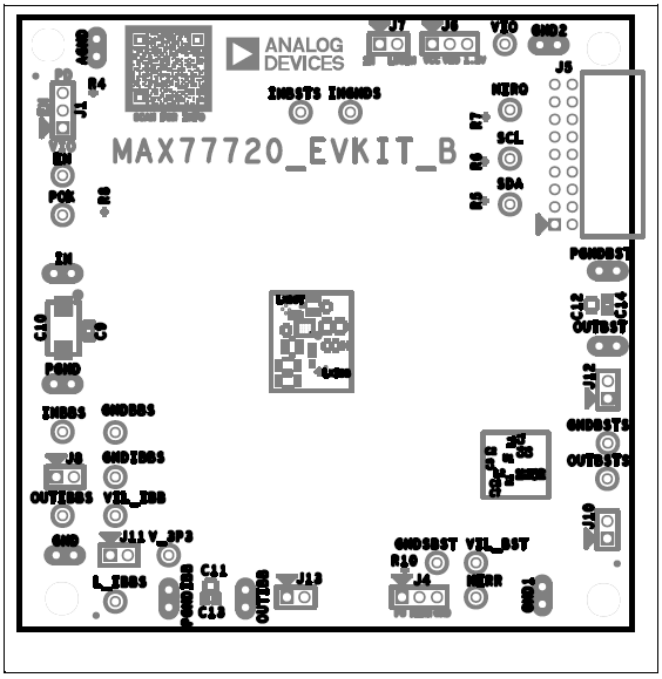
MAX77720 EV Kit Schematic


U1
MAX77720SENP+
IN
MAXIMPAD
PGND
MAXIMPAD
SMT (7343)
C9
0.1UF
C10
100UF
INBBS
GNDBBS
C3
22UF
0603
C2
1UF
SMT (0201)
INBB
IN
LXBST
INBSTS
1A
INGNDS
C1
22UF
0603
VIO
R5
2.2K
0402
R6
2.2K
0402
R7
100K
R8
100K
SDA
SCL
NIRQ
EN
POK
J1
TSW-103-07-T-S
R4
100K
FBIBB
LXIBB
R3
0
D1
RB068VWM-60
1.5A
L2
3.3UH
LSANB2520MKT3R3M
LXIBB
OUTIBBS
SMT (1206)
C5
10UF
50V
GNDIBBS
SMT (1206)
C7
10UF
50V
OUTIBB
-10V TO -24V
0805_FF
C11
OPEN
50V
C13
0.1UF
OUTIBB
MAXIMPAD
PGNDIBB
MAXIMPAD
OUTBST
R9
0
OUTBSTS
35V
C4
10UF
SMT (0805)
GNDBSTS
35V
C6
10UF
SMT (0805)
OUTBST
10V TO 14V
0805_FF
C12
OPEN
50V
C14
0.1UF
OUTBST
MAXIMPAD
PGNDBST
MAXIMPAD
FBBST
R1
909
0603
C8
OPEN
VREF IS 1.25V
R2
130K
0603
VIO
R10
100K
NERR
J4
TSW-103-07-T-S
GND
MAXIMPAD
GND1
MAXIMPAD
GND2
MAXIMPAD
AGND
MAXIMPAD

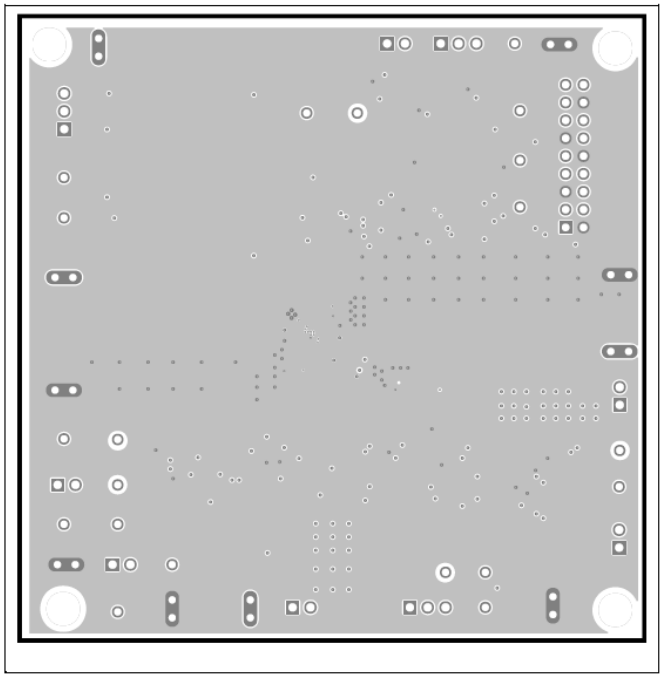

THESE ARE VOLTAGE SENSING TEST POINTS
Digital to Analog Converter
MAX5815 REFERENCE IS SET TO 2.048V



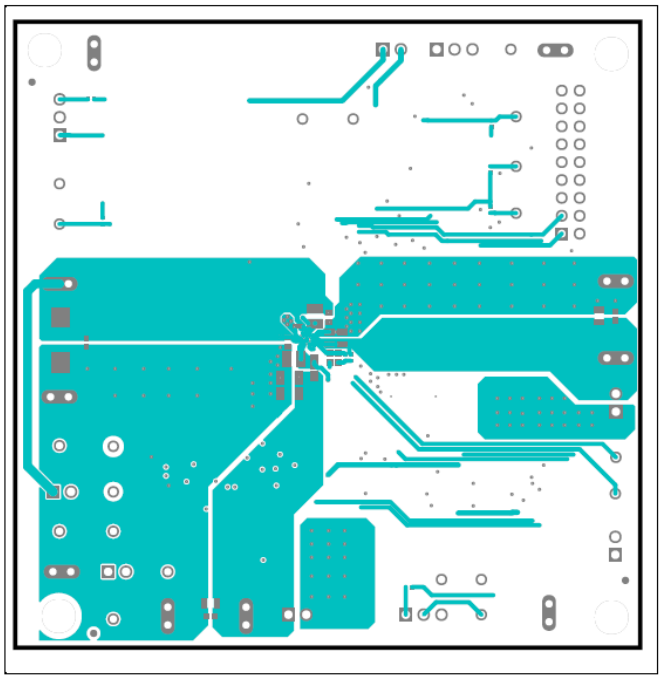
MAX77720 EV Kit PCB Layout



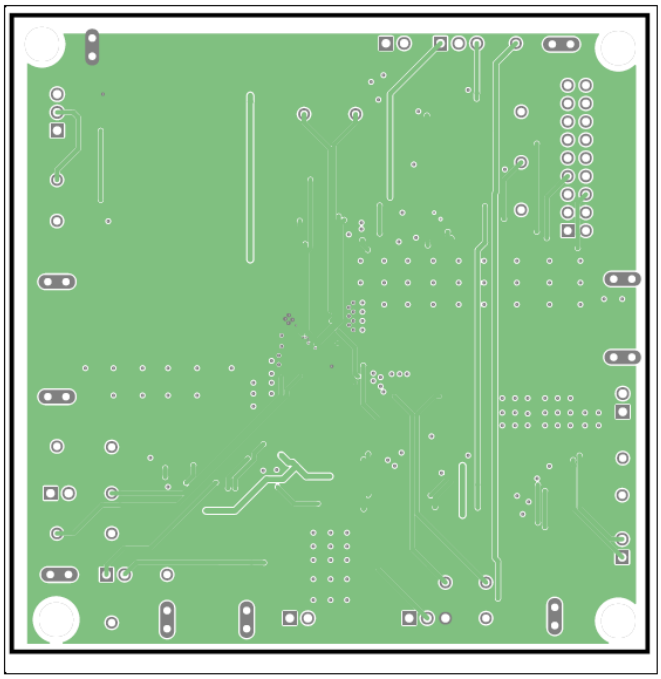
MAX77720 EV Kit Component Placement Guide—Top Silkscreen



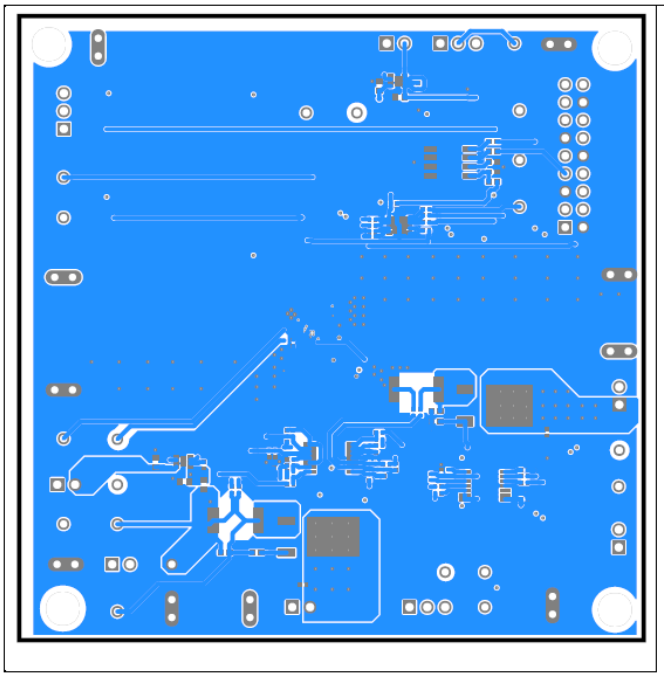
MAX77720 EV Kit PCB Layout—Layer 2



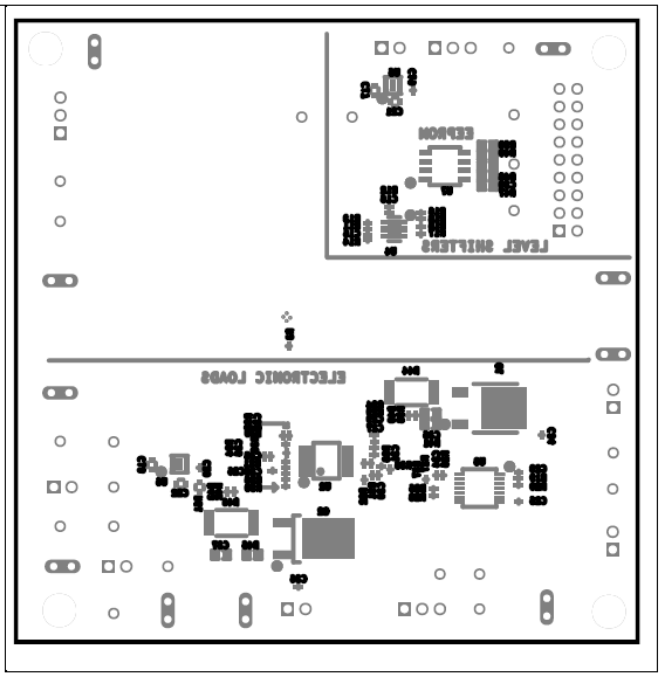
MAX77720 EV Kit PCB Layout—Top



MAX77720 EV Kit PCB Layout—Layer 3



MAX77720 EV Kit PCB Layout—Bottom



MAX77720 EV Kit Component Placement Guide—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/23	Initial release	—

www.analog.com.

Documents / Resources

	ANALOG DEVICES MAX77720 Evaluation Kit [pdf] User Manual MAX77720 Evaluation Kit, MAX77720, Evaluation Kit, Kit

References

- Mixed-signal and digital signal processing ICs | Analog Devices
- MAX77720EVKIT Evaluation Board | Analog Devices