19-4771; Rev 1; 10/98

MAXIM

MAX769 Evaluation Kit

Evaluates: MAX769

General Description

The MAX769 evaluation kit (EV kit) provides a platform for evaluating the features of the MAX769. The MAX769 converts a 2-cell or 3-cell, 1.5V to 5.5V battery voltage to four separate output voltages. The main output voltage at OUT is digitally controlled from 1.8V to 4.9V in 100mV steps by a 3-wire SPI™ serial interface. OUT provides up to 80mA. The other outputs (REG1, REG2, and REG3) are low-noise linear-regulator outputs. The MAX769 contains numerous other features for two-way paging and other low-power wireless designs. Consult the MAX769 data sheet for details. The MAX769 EV kit is a fully assembled and tested surface-mount circuit board.

The MAX847 is similar to the MAX769 except that it contains a boost DC-DC converter (for 1-cell inputs) rather than a buck-boost converter (for 2-cell or 3-cell inputs). To evaluate the MAX847, please order the MAX847EVKIT.

Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX769EVKIT	0°C to +70°C	28 QSOP

Features

- **1.5V to 5.5V (buck-boost) Input Voltage**
- **1.8V to 4.9V Digitally Adjustable Output Voltage**
- **Up to 80mA Total Output Current**
- **Three Low-Noise Voltage Regulators**
- **Charger for Small NiCd, NiMH, Lithium Battery, or Storage Capacitor**
- **270kHz Switching Frequency**
- **15µA Idle Mode™ Current**
- **Digitally Controlled 1.8Ω Switches for Vibrators, Beepers, and Other Low-Power Wireless Designs**
- **Reset and Low-Battery Outputs**
- **Surface-Mount Components**
- **Fully Assembled and Tested**

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2	2	47µF, 16V low-ESR tantalum caps Sprague 593D476X0016E2W or AVX TPSD476M016R0150
C3, C8, C10, C12, C13, C15, C16	7	0.1µF ceramic capacitors
C4	1	22nF ceramic capacitor
C5, C9, C14	3	1µF ceramic capacitors
C6, C7	2	10µF, 10V tantalum capacitors Sprague 595D106X0010A2T
C11	1	1000pF ceramic capacitor
D1	0	0.5A, 20V Schottky diode (optional) Motorola MBR0520L
R1	1	15kΩ, 5% resistor
R2, R3, R6, R8, R11, R13, R18, R22	8	1kΩ, 5% resistors
R4, R7, R9, R10, R17, R19, R20, R23	8	100kΩ, 5% resistors

DESIGNATION	QTY	DESCRIPTION
R5	1	100kΩ, 5% resistor
R12	1	390kΩ, 5% resistor
R15	1	1MΩ, 5% resistor
R14, R16	2	620kΩ, 5% resistors
R21	1	10kΩ, 5% resistor
L1	1	68µH inductor Sumida CD54-680
U1	1	MAX769EEI
JU1–JU10	10	2-pin headers
JU11	1	3-pin header
JU12	1	4-pin header
J1	1	6-pin header
J2	1	25-pin, female, right-angle connector
SW1–SW4	4	Slide switches Mouser 10SP001
LED1	1	Green light-emitting diode
None	1	MAX847/MAX769 PC board
None	1	MAX769 data sheet

Idle Mode is a trademark of Maxim Integrated Products.
SPI is a trademark of Motorola Corp.

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	803-946-0690	803-626-3123
CoilCraft	708-639-6400	708-639-1469
Coiltronics	561-241-7876	561-241-9339
Dale-Vishay	402-564-3131	402-563-6418
Motorola	602-303-5454	602-994-6430
Sprague	603-224-1961	603-224-1430
Sumida	708-956-0666	708-956-0702
Vishay/Vitramon	203-268-6261	203-452-5670

Note: *Please indicate that you are using the MAX769 when contacting these component suppliers.*

Quick Start

The MAX769 EV kit is fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed.**

1) Check the positions of jumpers JU1–JU12. See Table 2 and the MAX769 data sheet for details. Jumper connections for the MAX847 and MAX769 are not the same.
2) Check the positions of switches SW1–SW4. SW1–SW3 should be high (closest to the top edge of the evaluation board). When testing the MAX769, SW4 is not used and should be disconnected by leaving JU12-1 open.
3) Connect a +3V supply voltage to the BATT pad. The power-supply ground connects to the GND pad.
4) Connect a voltmeter and load, if any, to the OUT pad. Note that the MAX769 is designed to start in the low-power (COAST) mode—it cannot supply full load until RUN mode is set after start-up (by the serial interface).
5) Turn on the input power supply and verify that the output voltage is 3.0V. This is the MAX769's starting OUT voltage. Other voltages can then be programmed via the serial interface (see MAX769 data sheet).

Manual Programming

The MAX769 is designed to be controlled by a serial interface; however, slide-switches SW1–SW4 and LED1 are provided on the EV kit to assist in "bench-top" evaluation (Table 1). See the MAX769 data sheet for descriptions of the programmable features and for more information on serial programming.

To manually program data into the device, start with SW1, SW2, and SW3 high. Then sequence through the following steps:

1) Set SW3 ($\overline{CS}$) low.
2) Set the first desired data input bit with SW2.
3) Toggle the serial clock down and up with SW1. Data is loaded on the SCL rising edge.
4) Repeat steps 2 and 3 for each of the next seven input data bits (for a total of eight bits).
5) Set SW3 high.

Connectors

The MAX769 evaluation board contains provisions for two types of connectors for serial-interface connections. One is a 6-pin single in-line header (J1) that contains only serial-interface connections. The other is a DB-25 pad footprint (J2) that has serial connections along with other IC pin connections. Pin/pad connections are outlined in Tables 3 and 4.

Table 1. Switch and LED Functions

SWITCH/ LED	FUNCTION	COMMENTS
SW1	Manual Serial Clock Input (SCL)	**Logic-high level** is with switch pushed toward top of board. **Logic-low level** is with switch pushed toward switch label "SW1," "SW2," etc.
SW2	Manual Serial Data Input (SDI)	
SW3	Manual Chip-Select Input ($\overline{CS}$)	
SW4	This switch does not function with MAX769. SW4 is RUN/COAST selection on MAX847 only.	
LED1	Visual Data Output (SDO)	LED on is logic-high output.

Table 2. Jumper Selection

JUMPER NUMBER	MAX769 DEFAULT POSITION	COMMENTS
JU1	On	JU1 should be inserted if no external synchronous clock is used. If an external synchronous clock is applied, then JU1 should be removed.
JU2	On	With JU2 inserted, the low battery input (LBI, $\overline{LBO}$) is set to trip at 1V. With JU2 removed, LBI is set for 0.6V. **JU2 should be removed when making no-load operating current measurements** to prevent R12 and R14 from adding to the measured current.
JU3	On	With JU3 inserted, the reset input (RSIN, $\overline{RSO}$) is set to trip at 1.6V. With JU3 removed, RSIN is set for 0.6V. **JU3 should be removed when making no-load operating current measurements** to prevent R15 and R16 from adding to the measured current.
JU4	On	JU4 connects a 100kΩ pull-up resistor (R17) from REG1 to the open-drain $\overline{RSO}$ output. JU4 can be removed if $\overline{RSO}$ is not used or if a different pull-up resistor is used.
JU5	On	JU5 connects a 100kΩ pull-up resistor (R10) from REG1 to the open-drain $\overline{LBO}$ output. JU5 can be removed if $\overline{LBO}$ is not used or if a different pull-up resistor is used.
JU6	On	JU6 connects an LED (LED1) to the serial data output (SDO). LED1 gives a visual indication of serial output data when manually programming the IC with SW1, SW2, and SW3. JU6 should be removed when using a µP-controlled interface, since the LED will not be visible at digital clock speeds. **JU6 should also be removed when making operating or quiescent-current measurements**.
JU7	On	JU7 connects SW1 to the serial clock input (SCL) (used to clock-in serial programming data). Insert JU7 when programming the IC manually with SW1, SW2, and SW3. **Remove JU7 when using a digital serial interface at connector J1 or J2.**
JU8	On	JU8 connects SW2 to the serial data input (SDI) (used to set serial programming data). Insert JU8 when programming the IC manually with SW1, SW2, and SW3. **Remove JU7 when using a digital serial interface at connector J1 or J2.**
JU9	On	JU9 connects SW3 to the chip-select input ($\overline{CS}$) (used to activate the serial interface). Insert JU9 when programming the IC manually with SW1, SW2, and SW3. **Remove JU9 when using a digital serial interface at connector J1 or J2.**
JU10	Off	Remove JU10 when a MAX769 is used. JU10 connects SW4 to the RUN input (MAX847 only).
JU11	JU11-1, JU11-2	JU11 has three pins to connect the REG2 input (REG2IN) to either REG1 (jumper J11-1 to J11-2) or OUT (jumper J11-2 to J11-3).
JU12	JU12-2, JU12-3, JU12-1 (N.C.), JU12-4 (N.C.)	JU12 has four pins. When the MAX769 is used, connect only jumper JU12-2 to JU12-3, leaving JU12-1 and JU12-4 open. When a MAX847 is inserted, connect jumper JU12-1 to JU12-2 and jumper JU12-3 to JU12-4.

Table 3. Connector Pinouts for J1 (6-Pin Header)

J1 PIN	FUNCTION
J1-1	REG1 Output Voltage
J1-2	$\overline{CS}$
J1-3	SDI
J1-4	SCL
J1-5	SDO
J1-6	GND

Table 4. Connector Pinouts for J2 (DB-25)

J2-PIN	FUNCTION
J2-1	BATT
J2-2	REG1
J2-3	REG2
J2-4	REG3
J2-5	NICD
J2-6	$\overline{CS}$
J2-7	N.C. (MAX769 only, RUN for MAX847)
J2-8	SDO
J2-9	SDI
J2-10	N.C.
J2-11	N.C.
J2-12	N.C.
J2-13	N.C.
J2-14	N.C.
J2-15	$\overline{RSO}$
J2-16	$\overline{LBO}$
J2-17	N.C.
J2-18	SCL
J2-19	N.C.
J2-20	N.C.
J2-21	N.C.
J2-22	N.C.
J2-23	N.C.
J2-24	GND
J2-25	GND

N.C. = No Connection

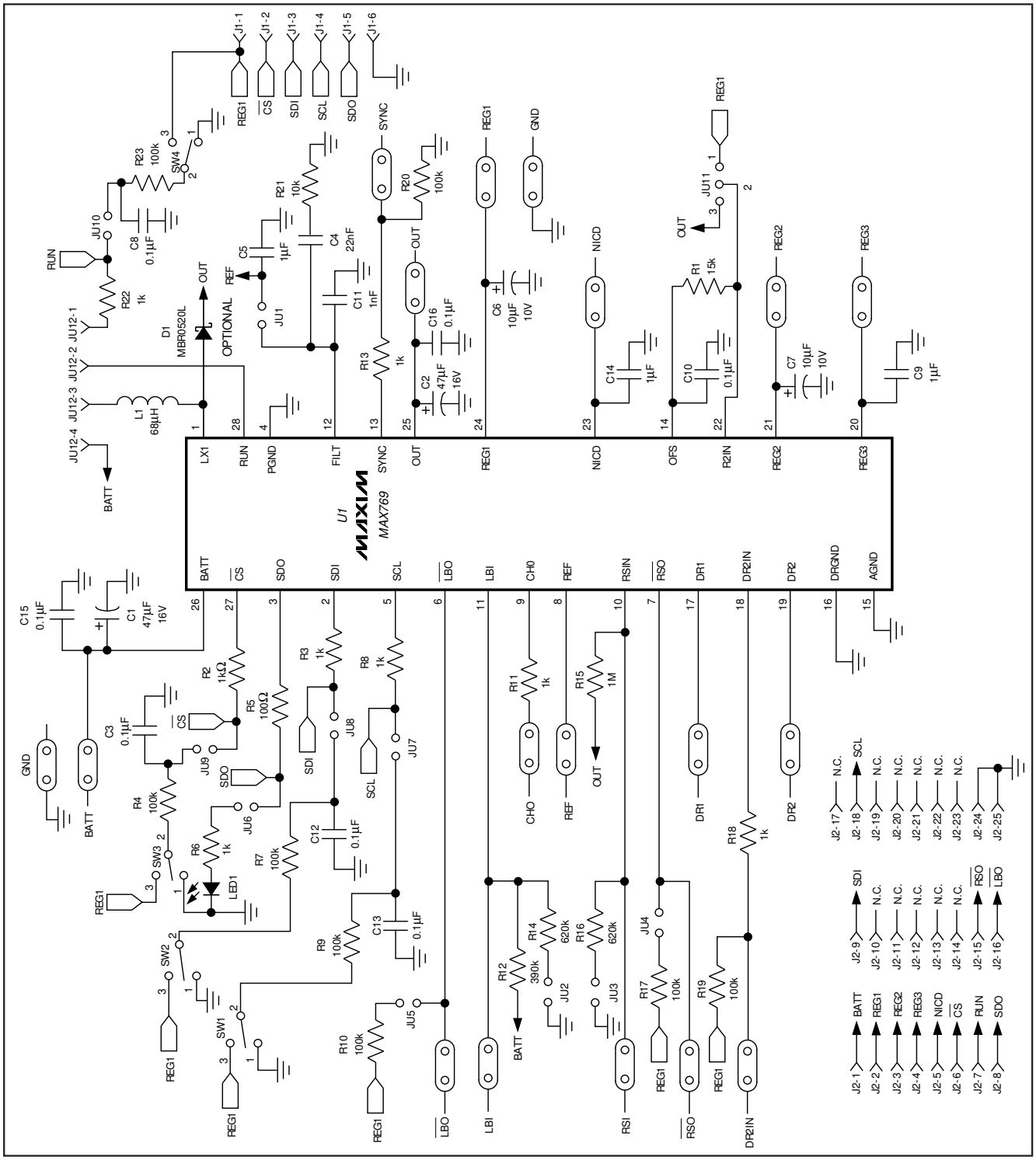

Figure 1. MAX769 EV Kit Schematic

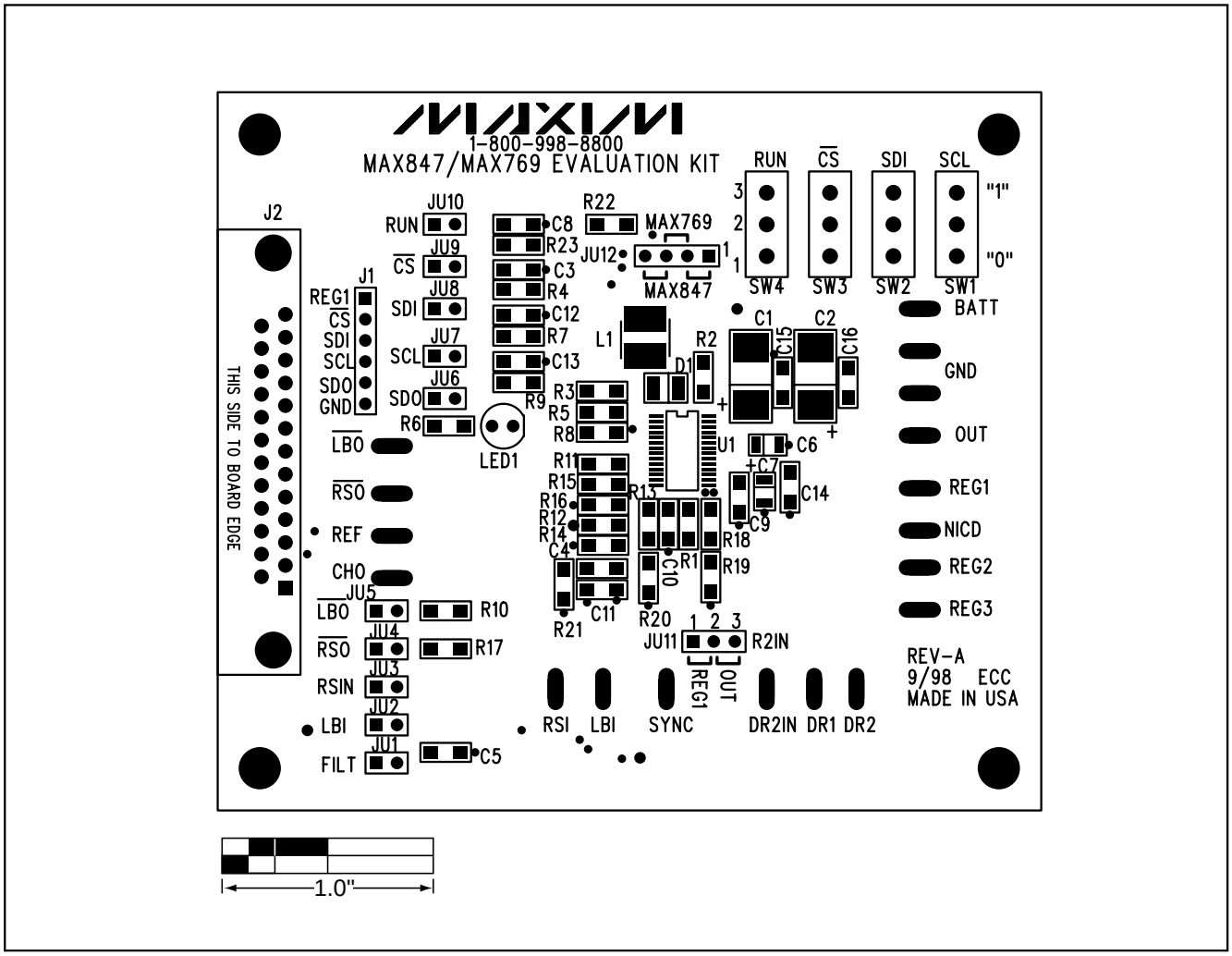

Figure 2. MAX769 EV Kit Component Placement Guide—Component Side

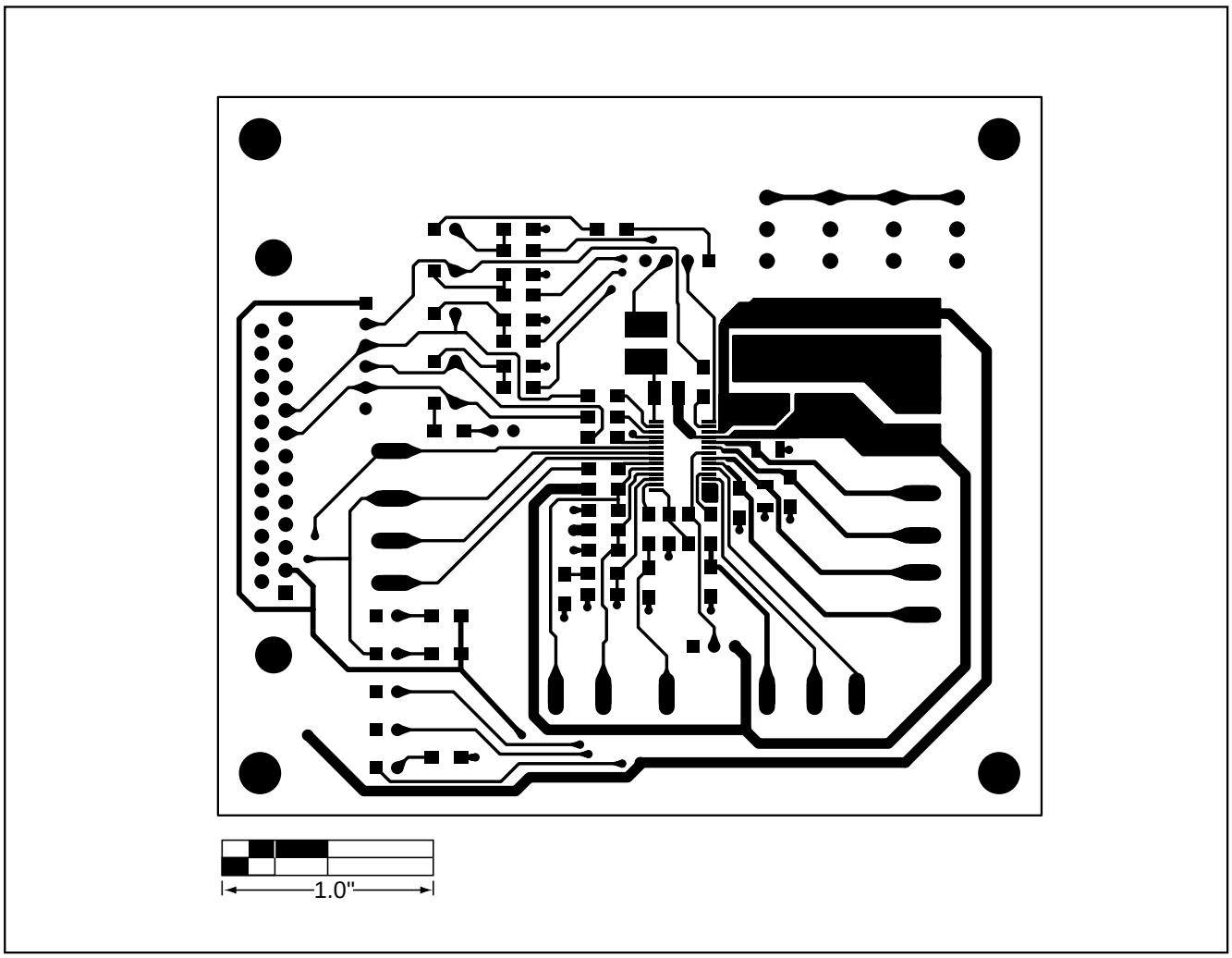

Figure 3. MAX769 EV Kit PC Board Layout—Component Side

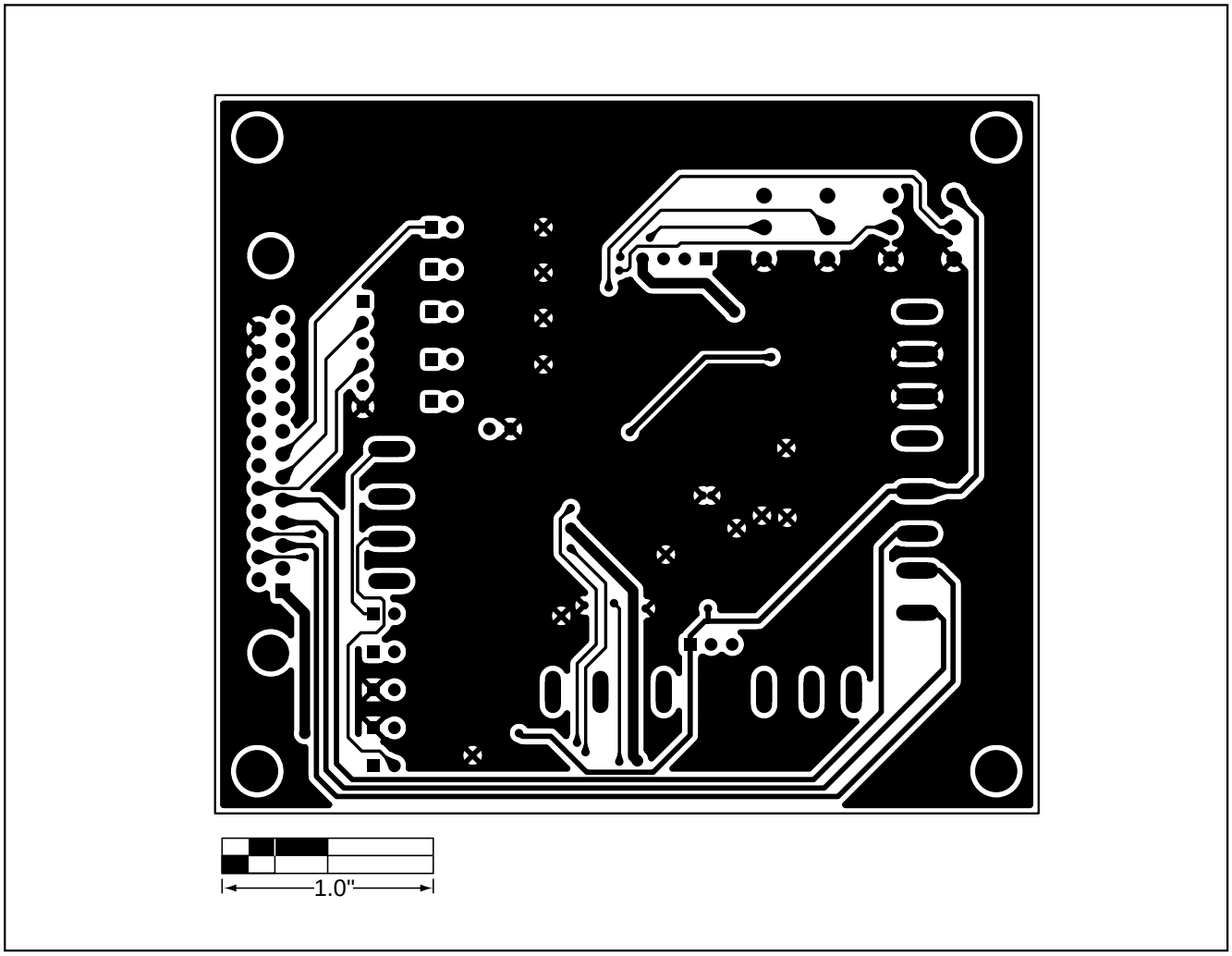

Figure 4. MAX769 EV Kit PC Board Layout—Solder Side