19-1438; Rev 2; 3/01

MAXIM

MAX886/MAX888 Evaluation Systems

Evaluate: MAX886/MAX888

General Description

The MAX886 and MAX888 evaluation systems (EV systems) consist of either a MAX886 or MAX888 evaluation board and a companion Maxim SMBus™ interface board. The MAX886/MAX888 EV systems are assembled and tested PC boards that demonstrate the MAX886/MAX888 power-management ICs.

The Maxim SMBus Interface Board (MAXSMBUS) allows an IBM-compatible PC to use its parallel port to emulate an Intel System Management Bus (SMBus) interface. The 2-wire serial interface of the MAX886/MAX888 is I²C™/SMBus compatible. Windows 3.1/95/98® software provides a user-friendly interface to exercise the features of the MAX886 and MAX888. The program is menu-driven and offers a graphic interface with control buttons.

Order the MAX886EVSYS for complete IBM PC-based evaluation of the MAX886. Order the MAX888EVSYS for complete IBM PC-based evaluation of the MAX888.

Features

- ♦ **Complete Power System for Portable Cellular Telephones**
- ♦ **1.8mm Height Solution**
- ♦ **Pushbutton On/Off Control**
- ♦ **I²C/SMBus Compatible**
- ♦ **Easy-to-Use Menu-Driven Software**
- ♦ **Assembled and Tested Surface-Mount Board**

Ordering Information

PART	INTERFACE TYPE	PIN-PACKAGE
MAX886EVSYS	Windows Software	32 TQFP
MAX888EVSYS	Windows Software	32 TQFP

Note: *The MAX886_8 software can only be used with the complete evaluation systems MAX886EVSYS/MAX888EVSYS, which includes the MAXSMBUS interface board and either the MAX886EV board or the MAX888EV board.*

MAX886/MAX888 EV Board Component List

DESIGNATION	QTY	DESCRIPTION
C1, C4	2	0.1µF, X7R, 50V ceramic capacitors
C2	1	10µF, X5R, 6.3V ceramic capacitor (MAX886) Taiyo Yuden JMK316BJ106ML Murata GRM42-6X5R106K6.3
		10µF, 16V tantalum capacitor (MAX888) Sprague 595D106X0016B
C3	1	10µF, 25V, Y5V ceramic capacitor (MAX886) Taiyo Yuden TMK325F106ZH
		10µF, 16V tantalum capacitor (MAX888) Sprague 595D106X0016B
C5, C9, C12	3	1µF, X7R, 10V ceramic capacitors Taiyo Yuden LMK212BJ105MG Murata GRM40X7R105K016
C6, C8	2	0.22µF, X7R, 25V ceramic capacitors
C7	1	10µF, X5R, 6.3V ceramic capacitor Taiyo Yuden JMK316BJ106ML Murata GRM42-6X5R106K6.3
C13	1	10µF, 25V, Y5V ceramic capacitor (MAX886) Taiyo Yuden TMK325F106ZH
		Not installed (MAX888)
C10, C11	2	2.2µF, X5R, 10V ceramic capacitors Taiyo Yuden LMK212BJ225MG
D1	1	Schottky diode Fairchild MBR0520L Motorola MBR0520L Nihon EP05Q03L
J1	1	2 × 10 right-angle female receptacle
JU1	1	3-pin jumper
JU2	0	Not installed
L1	1	10µH inductor Coiltronics TP1-100
R1	1	619kΩ 1% resistor
R2	1	562kΩ 1% resistor
R3	1	47.5kΩ 1% resistor
R4	1	200kΩ 5% resistor
R5	1	10kΩ 5% resistor
SW1, SW2	2	Switch, momentary, normal open
U1	1	MAX886ECJ or MAX888ECJ

SMBus is a trademark of Intel Corp. Windows is a registered trademark of Microsoft Corp. I²C is a trademark of Philips Corp.

MAX886/MAX888 Evaluation Systems

MAX886EVSYS Component List

PART	QTY	DESCRIPTION
MAX886 EV Board	1	MAX886 Evaluation Board
MAXSMBUS	1	SMBus Interface Board

MAX888EVSYS Component List

PART	QTY	DESCRIPTION
MAX888 EV Board	1	MAX888 Evaluation Board
MAXSMBUS	1	SMBus Interface Board

Component Suppliers

SUPPLIER	PHONE	FAX
Coiltronics	516-241-7876	516-241-9539
Fairchild	408-822-2000	408-822-2102
Motorola	303-675-2140	303-675-2150
Murata	814-237-1431	814-238-0490
Nihon	805-867-2555	805-867-2698
Sprague	603-224-1976	603-224-1430
Taiyo Yuden	408-573-4150	408-573-4159

Note: *Please indicate that you are using the MAX886 or MAX888 when contacting the manufacturers.*

Quick Start

Required Equipment

Before you begin, you will need the following equipment:

- An IBM PC-compatible computer capable of running Windows 3.1/95/98
- A parallel printer port (this is a 25-pin socket on the back of the computer)
- A standard 25-pin, straight-through, male-to-female cable to connect the computer's parallel port to the Maxim SMBus interface board
- A DC power supply capable of supplying +7V to +20V at 100mA to power the SMBus board
- A DC power supply capable of supplying +2.7V to 5.5V (MAX888) or +4V to +12V (MAX886) at 1A to power the MAX886/MAX888 EV board

Procedure

1) Carefully connect the boards by aligning the 20-pin connector of the MAX886/MAX888 EV board with the 20-pin header of the MAXSMBUS interface board. Gently press them together. The two boards should be flush against each other. **Do not turn on the power supply until all connections are made.**
2) Connect a +7V to +20V DC power supply to the pads labeled POS9 and GND1 on the SMBus Interface Board.
3) Connect a +4V to +12V DC power supply to the pads labeled BATT and GND on the MAX886 board. Connect a +2.7V to +5.5V DC power supply to the pads labeled BATT and GND on the MAX888 board.
4) Make sure JU1 is set to the 1-2 position (PFM mode).
5) Connect a cable from the computer's parallel port to the SMBus interface board. Use a straight-through 25-pin female-to-male cable. To avoid damaging the EV system or your computer, do not use a 25-pin SCSI port or any other connector that is physically similar to the 25-pin parallel printer port.
6) The MAX886_8.EXE software program can be run from the floppy or hard drive. Simply use the Windows program manager to run the program. If desired, you may use the INSTALL.EXE program to copy the files and create icons for them in the Windows 3.1 Program Manager (or the Windows 95/98 Start Menu). An uninstall program is included with the software. Simply click on the UNINSTALL icon to remove the EV kit software from the hard drive.
7) Turn on both power supplies. Turn the EV board on by pressing SW1.
8) Start the MAX886_8.EXE program by opening its icon in the Program Manager (or Start Menu).
9) When the program prompts you to do so, select the correct parallel port. An auto-detect routine identifies the port to which the EV system is connected, and selects it as the default choice by highlighting it. Verify that the correct port is highlighted; then select "OK".
10) Observe as the program automatically detects the address of the MAX886 or MAX888 and starts the main program.
11) If the MAX888 EV board is being used, select the on-screen *MAX888* button.

Note: The MAX886_8.EXE software program is also used for the MAX888EVSYS.

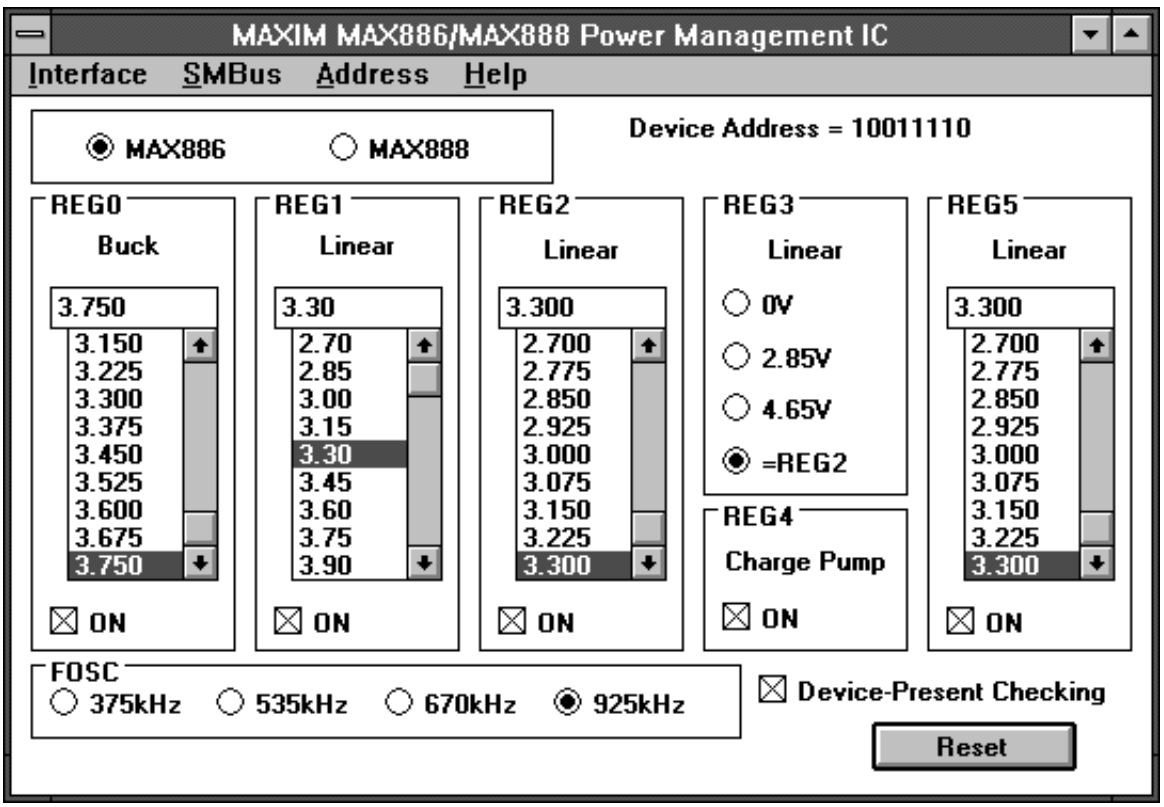

Figure 1. Main Display for MAX886/MAX888EVSYS

Detailed Description of Software

The software provides an easy-to-use, point-and-click method to exercise all of the I^2C/SMBus features of the MAX886 and MAX888. The voltages of the regulators can be easily adjusted as well as toggled on or off, and the oscillator frequency can be quickly changed.

Note: Words in bold face are user-selectable features in the software.

Main Display

The program starts up in the Power-On Reset (POR) state for the **MAX886**. The voltages displayed on the computer correspond to the output voltage of the MAX886. By selecting the on-screen **MAX888** radio button, the voltages displayed will change to correspond to the MAX888 (Figure 1). Each time the software is switched between devices, SMBus commands are sent to the EV kit to ensure that the software and EV kit are both in the POR state.

The voltages for each regulator are contained in either list boxes or appear as radio buttons. To make changes to the voltages, use the mouse or the tab and arrow keys to navigate until the selection is highlighted. The top right corner of the main display shows the address of the IC and the SMBus command sent to it.

The **Device-Present Checking** feature checks for the presence of the IC several times a second. If the device is not detected, a warning message will appear at the bottom of the main display. This feature can be disabled by unchecking the **Device-Present Checking** checkbox.

The **Reset** button will set the MAX886 or MAX888 and the software to a Power-On Reset state. If in doubt, select the reset button.

SMBus Menu

The **SMBus** menu allows individual SMBus operations to be performed, such as Send Byte. When using SMBus menu operations, uncheck **Device-Present Checking** to prevent any errors from occurring.

MAX886/MAX888 Evaluation Systems

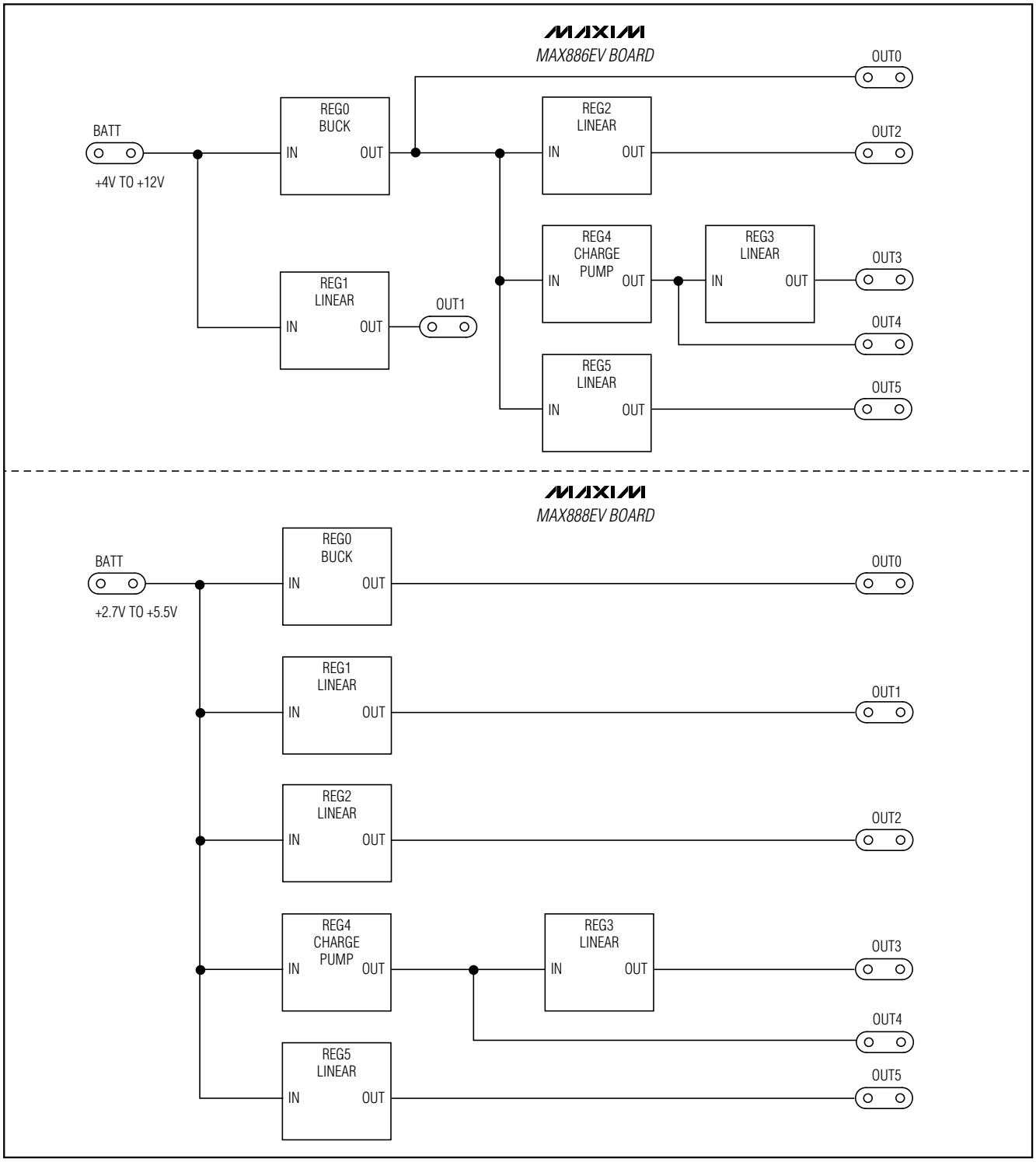

Figure 2. Regulator Connection Diagram

The SMBus dialog boxes accept numeric data in binary, decimal, or hexadecimal. Hexadecimal numbers should be prefixed by $ or 0x. Binary numbers must be exactly eight bits.

Detailed Description of Hardware

The MAX886/MAX888 EV boards provide a proven PC board layout to facilitate evaluation of the MAX886/MAX888. The boards require appropriate timing signals to operate. These signals may be generated by using the Maxim SMBus interface board and the MAX886_8.EXE software program.

The MAX886/MAX888 ICs have six voltage regulators. REG0 is a DC-DC step-down converter. REG1, REG2, REG3, and REG5 are linear regulators. REG4 is a regulated charge pump.

The difference between the MAX886 and MAX888 EV boards is the connection of the inputs of the regulators. Figure 2 shows block diagrams of the regulator connections.

For more details on the 2-wire interface board, refer to the MAXSMBus data sheet included with each EV system.

Jumper Settings

The 3-pin header JU1 selects synchronization mode. Table 1 lists the selectable jumper options.

To avoid RF interference with sensitive IF and data acquisition circuits, a sync pad is provided on the board for synchronization to an external clock. Connect SYNC to GND to enable PFM operation, which places the MAX886/MAX888 in PFM mode at light loads. PFM operation improves efficiency and reduces quiescent current. Connect SYNC to CVL to enable forced PWM operation. PWM operation reduces noise in sensitive communications applications. Refer to the MAX886/MAX888 data sheet for more information.

Component Selection vs. Frequency

Use the component values shown in Table 2 to obtain relatively constant output ripple and stabilizing performance vs. frequency settings. The MAX886 and MAX888 EV boards come configured for 925kHz operation.

Table 1. JU1 Shunt Settings for Sync

JUMPER	SHUNT POSITION	FUNCTION
JU1	Open	Drive SYNC pad with external clock.
	1-2	SYNC = low (GND). DC-DC converter in PFM mode.
	2-3	SYNC = high (CVL). DC-DC converter in PWM mode.

Table 2. Component Values

REG0		REG4		
f_{OSC} (kHz)	C2 (µF)	L1 (µH)	C8 (µF)	C7 (µF)
925	10	10	0.22	10
670	15	15	0.33	15
535	22	22	0.47	22
375	33	33	1	33

MAX886/MAX888 Evaluation Systems

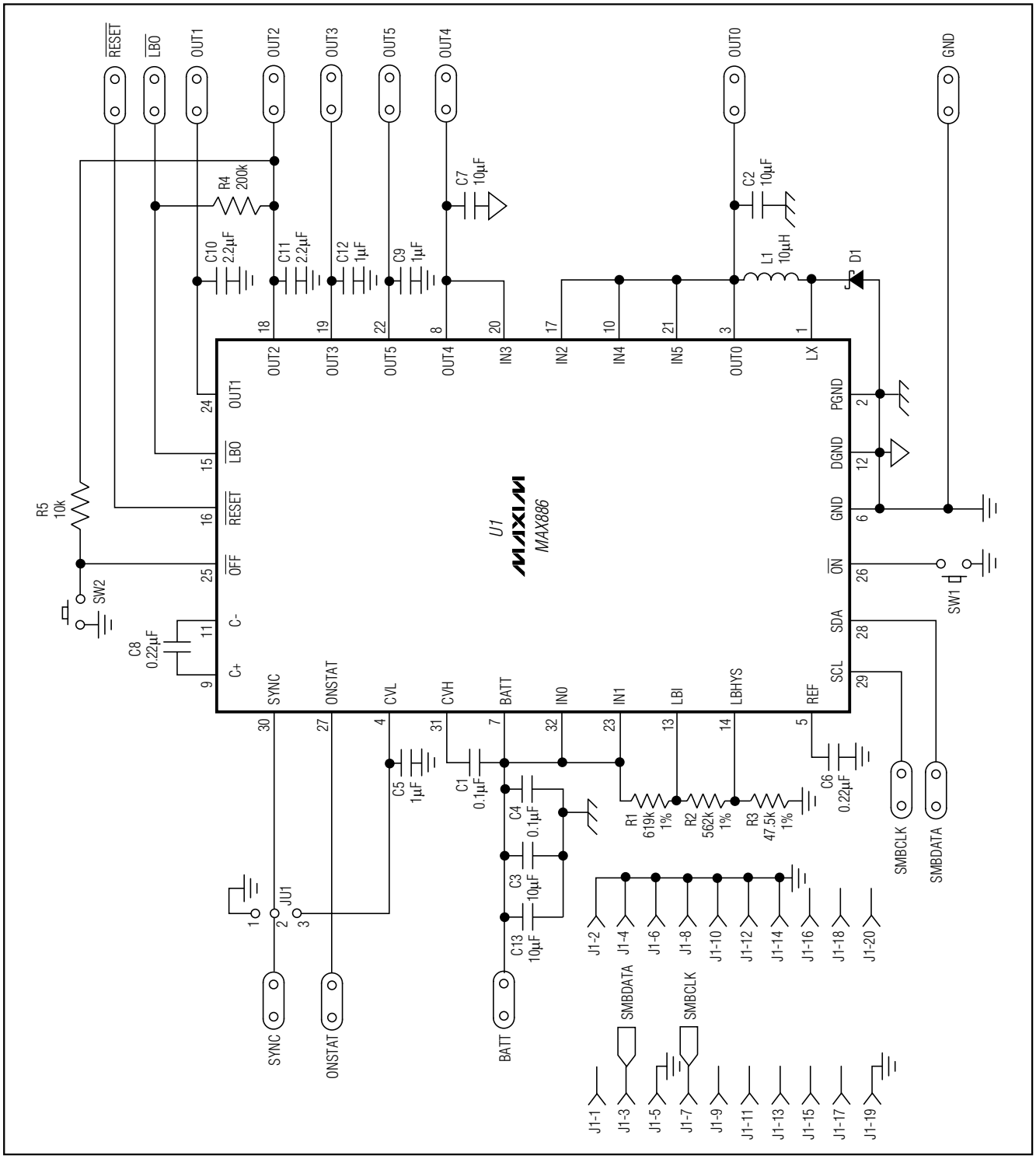

Figure 3. MAX886 EV Board Schematic

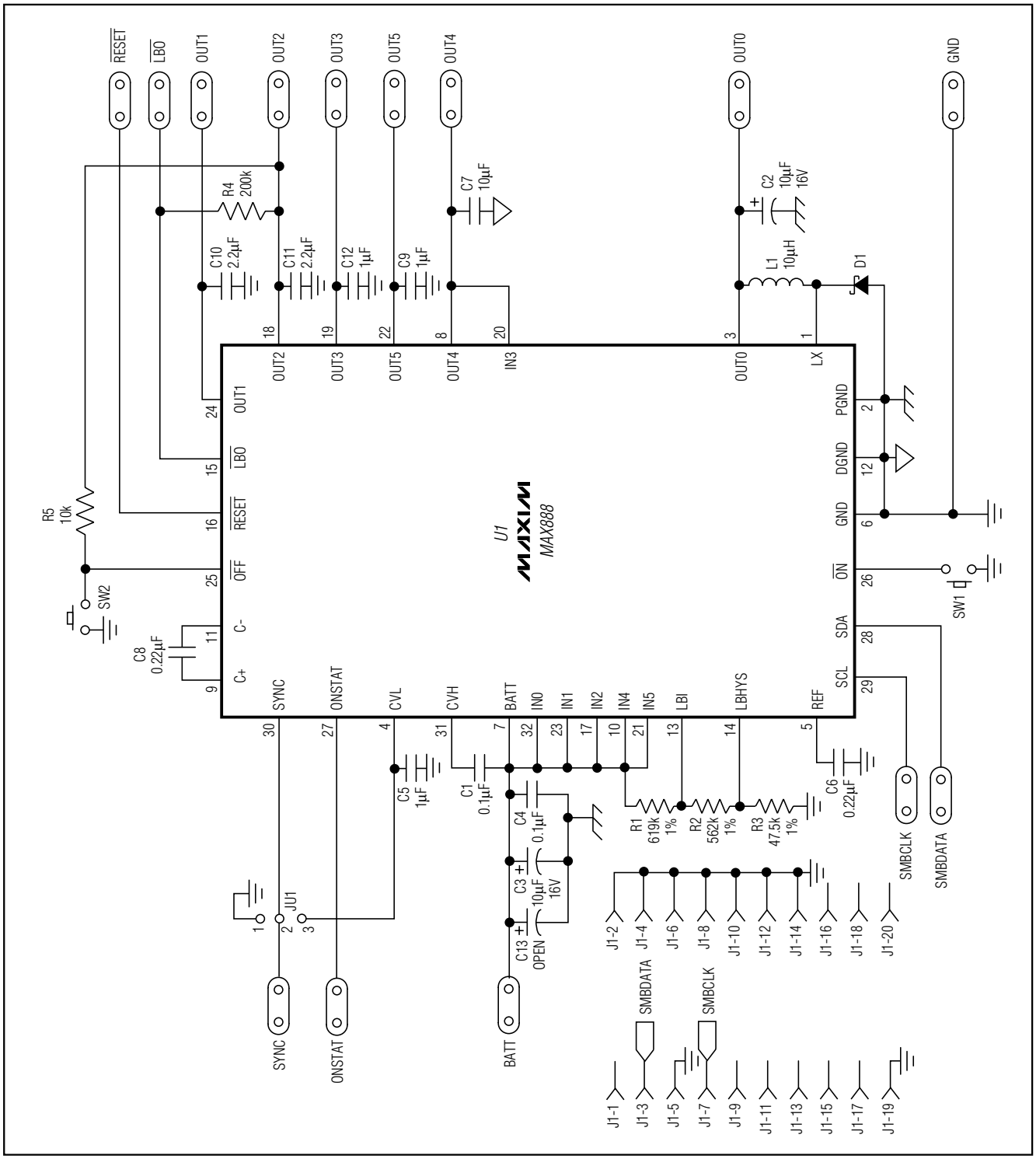

Figure 4. MAX888 EV Board Schematic

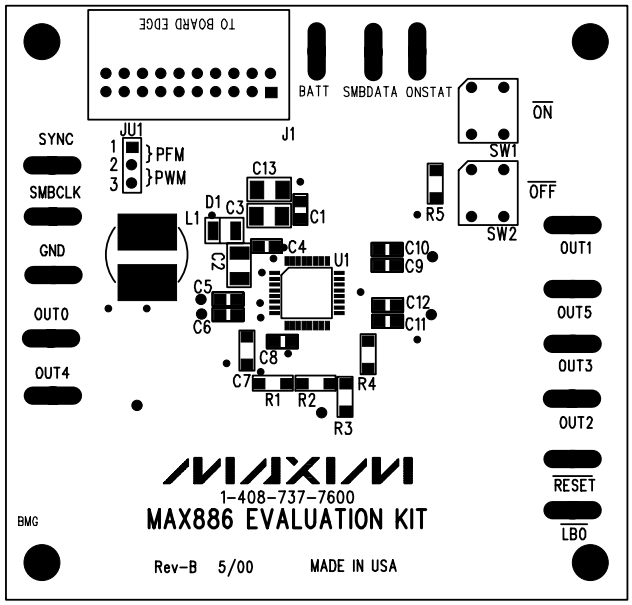

Figure 5. MAX886 EV Board Component Placement Guide—Component Side

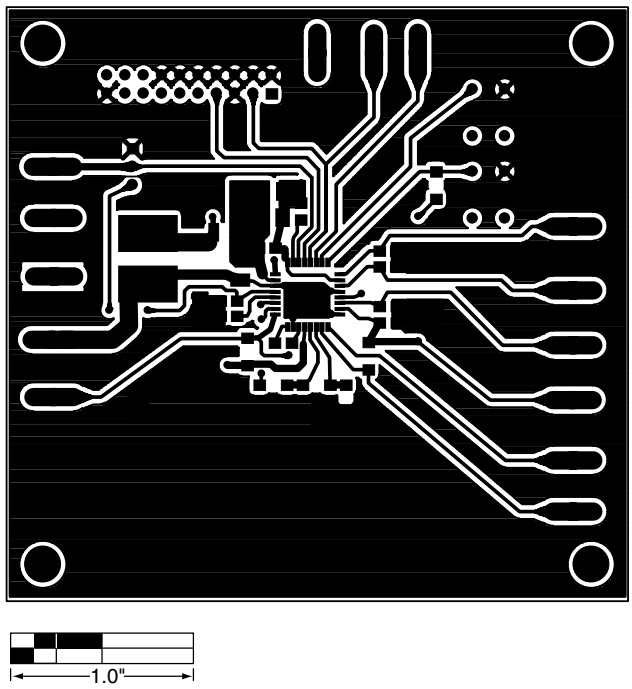

Figure 6. MAX886 EV Board PC Layout—Component Side

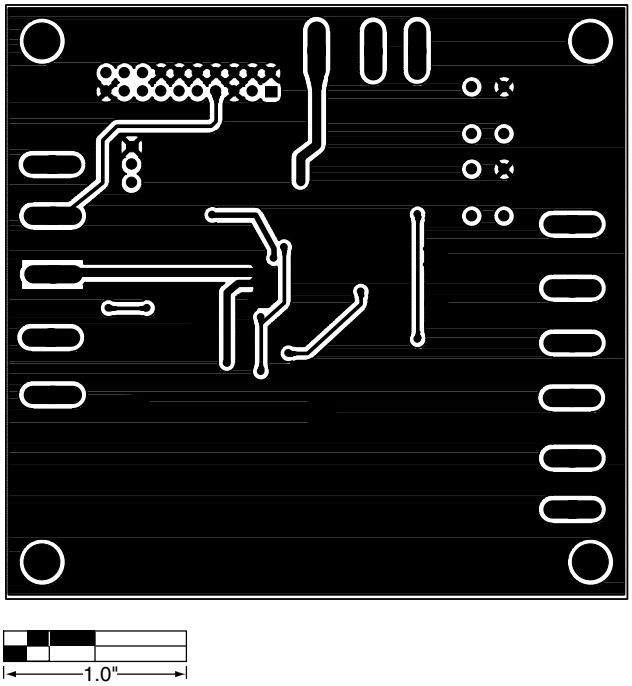

Figure 7. MAX886 EV Board PC Layout—Solder Side

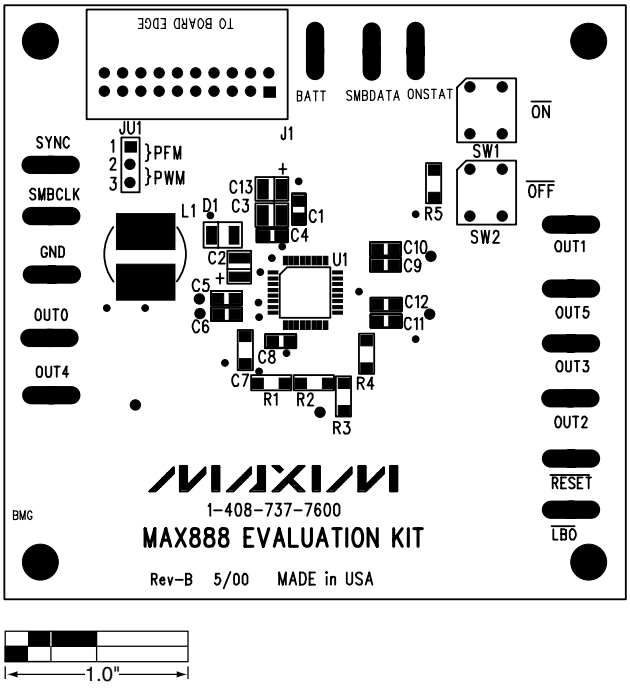

Figure 8. MAX888 EV Board Component Placement Guide—Component Side

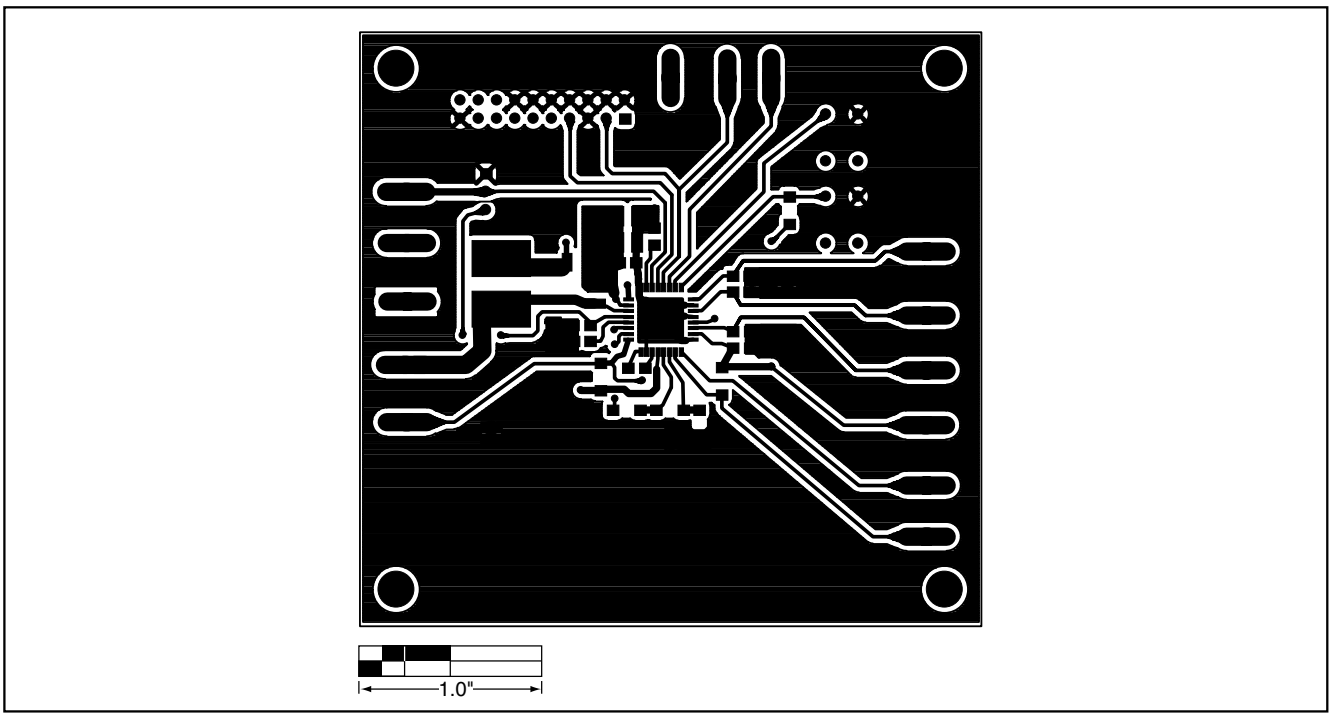

Figure 9. MAX888 EV Board PC Layout—Component Side

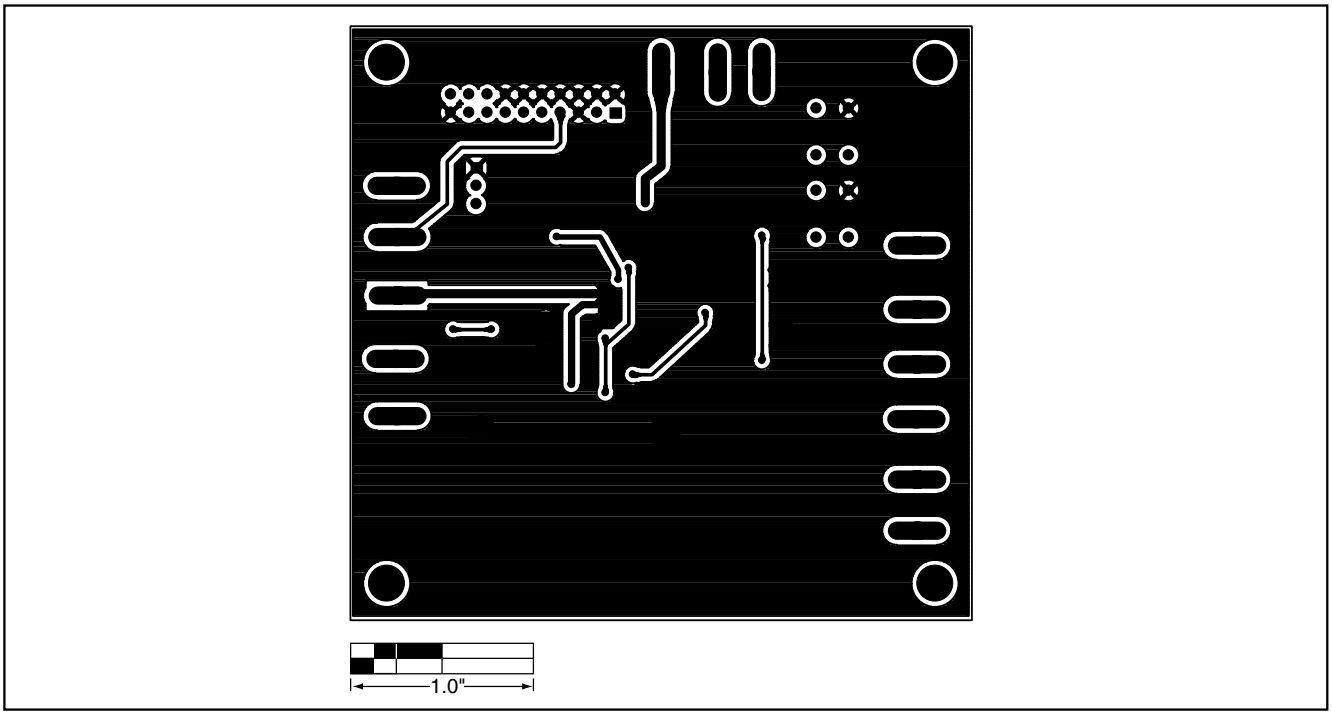

Figure 10. MAX888 EV Board PC Layout—Solder Side