MAX2880 Evaluation Kit

General Description

The MAX2880 evaluation kit (EV kit) facilitates the evaluation of the MAX2880 wide-band phase-locked loop (PLL). It is a fully assembled and tested frequency synthesizer consisting of the IC, 5840MHz to 6040MHz external VCO, 50MHz TCXO, passive-loop filter, and low-dropout regulators.

A software application, running on a PC with Windows XP® or later Windows® operating system, simplifies the control of the IC in various operating modes and features.

EV Kit Contents

The EV kit package contains the following:

- EV kit board
- Maxim INTF-3000-to-USB interface board
- 20-pin ribbon cable for connecting EV kit to INTF-3000 board

The content of this document includes:

- Brief test procedure to verify functionality
- Description of the EV kit circuit and circuit schematic
- List of EV kit components and artwork for each PCB layer

Features

- Easy Evaluation of the MAX2880
- All Critical Peripheral Components Included
- PC-Based Control Software
- Proven PCB Layout
- Fully Assembled and Tested

Quick Start

Required Equipment

- +6.0V power supply, capable of delivering 150mA
- USB cable, type A to type B
- Windows PC
- Signal source analyzer or spectrum analyzer
- Power cables and an SMA-terminated, 50Ω RF cable
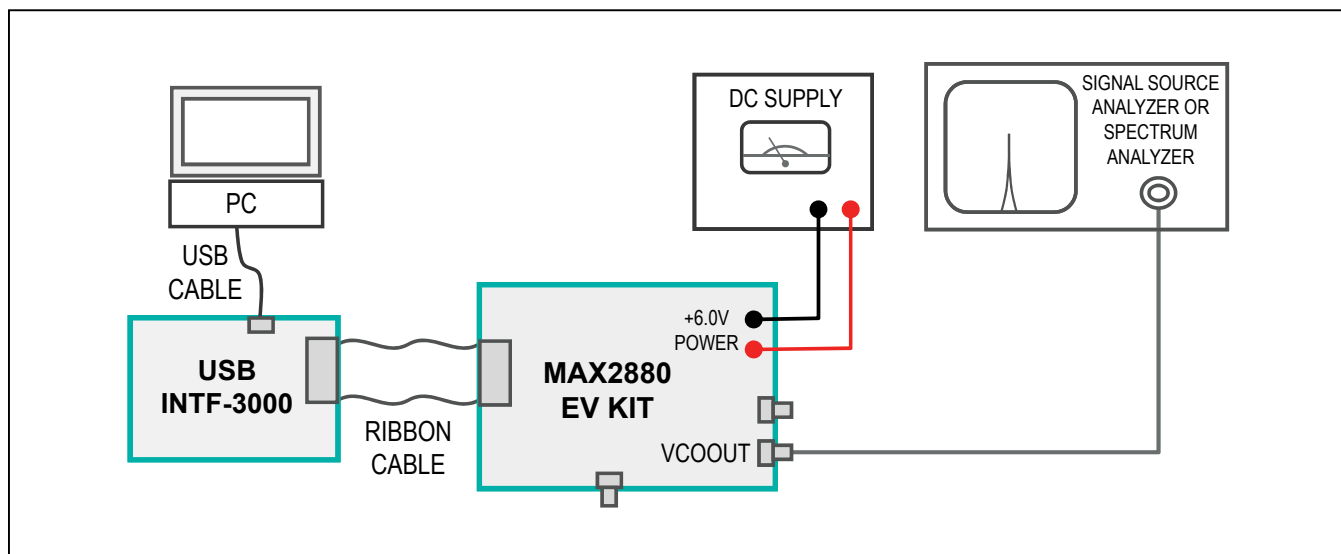
Ordering Information appears at end of data sheet.

Figure 1. EV Kit Setup Block Diagram

Windows and Windows XP are registered trademarks and registered service marks of Microsoft Corporation.

Procedure

Follow the steps below to verify board operation:

1) Verify that all jumpers are in their default positions, as shown in Figure 2.

2) Connect the 20-pin cable between the INTF-3000 board and the EV kit; verify the pin 1-1 connections, as shown in Figure 2.

3) Connect the USB cable from the PC to the INTF-3000 board.

4) With its output disabled, set the DC power supply to +6.0V. Connect the DC power supply (with a compliance limit of 150mA) to the banana plugs labeled VSUPPLY and GNDSUPPLY.

5) Connect an RF cable from the VCOOUT SMA connector to a signal analyzer or spectrum analyzer.

6) Visit **www.maximintegrated.com**, search for MAX2880EVK, and download the latest EK kit software installation file. Run the installation file.

7) Turn on the DC power supply to power on the EV kit board.

8) Run MAX2880.exe to launch the EV kit GUI (Figure 3). In the lower right corner, verify that the **USB Online** box is green.

9) In the EV kit GUI, click on **Defaults** and then **Send All** button. In the lower right corner, verify that the **PLL Lock** indicator is green

10) Use a signal analyzer to verify the performance of the EV kit. Under the default setting, the user should expect to see similar output as the TOC07 plot in the *Typical Operating Characteristics* section in the MAX2880 IC data sheet.

11) The user can also open two more preload register settings (fractional low-noise mode and fractional low-spur mode) from the **Settings - Load** menu, then hit the **Send All** button.

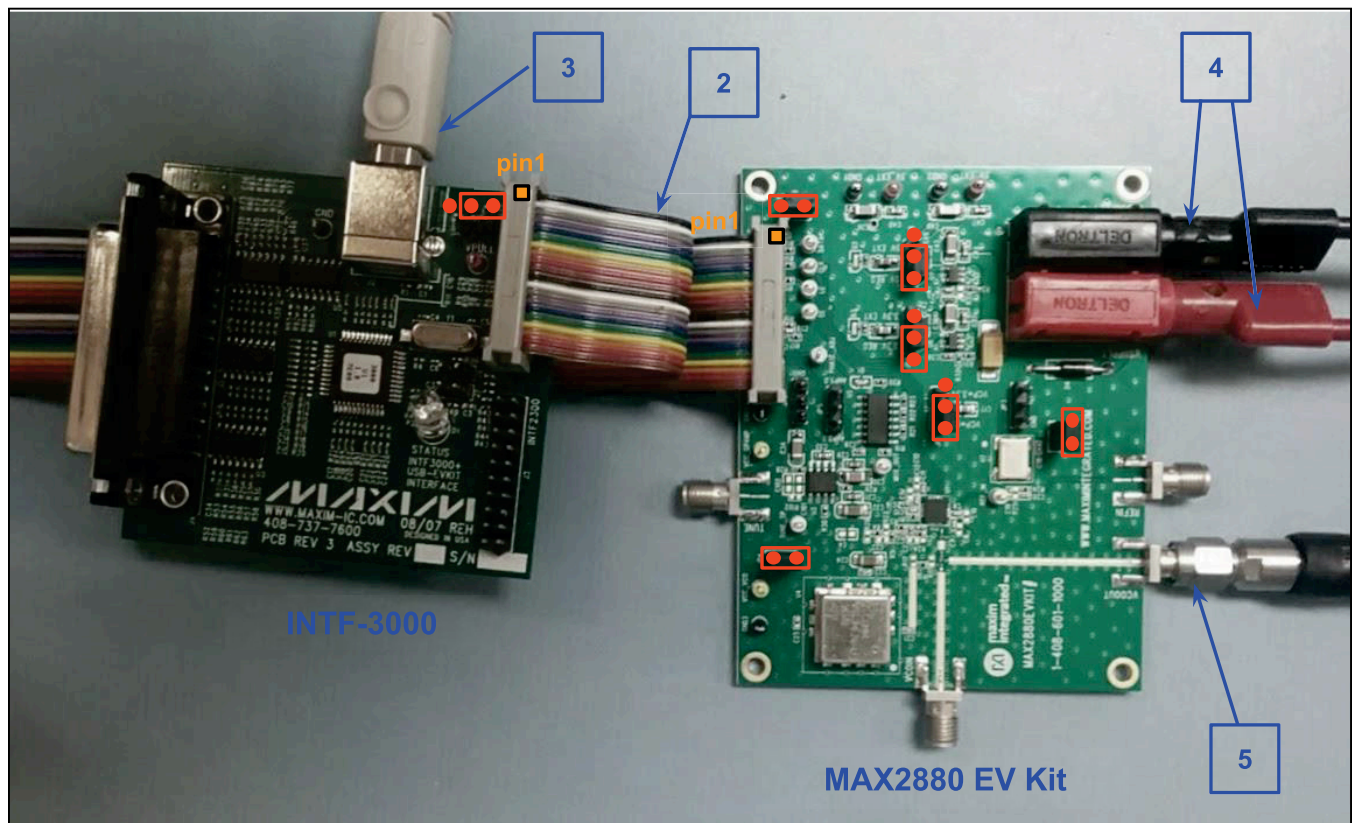12) To input a new output frequency, update the **fVco** edit box and then hit Enter on the keyboard.

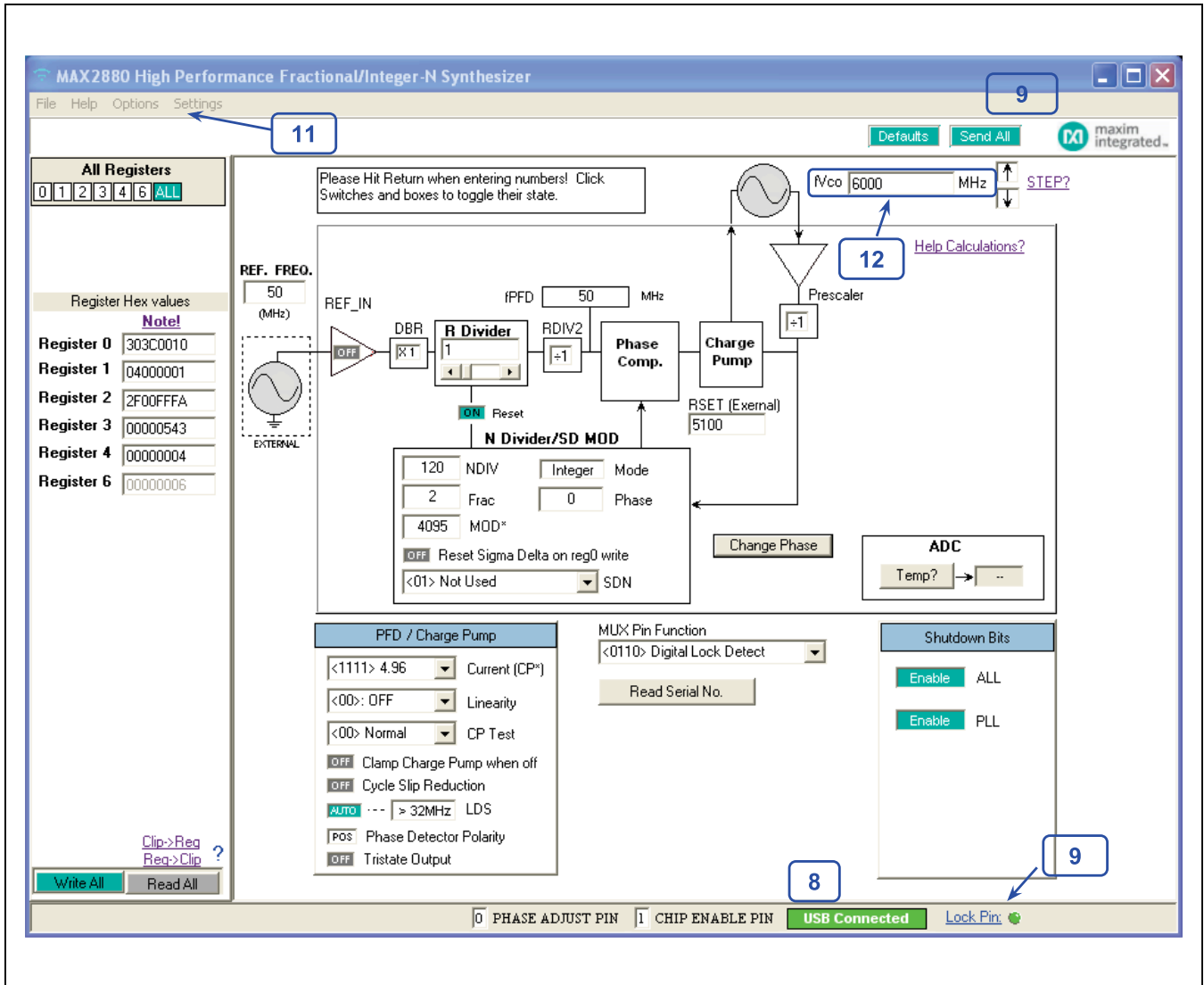*Figure 2. Hardware Setup and Default Jumper Pposition*

Figure 3. MAX2880 EV Kit GUI

Detailed Description of Hardware

The MAX2880 EV kit is a complete frequency synthesizer consisting of the MAX2880 PLL, on-board 6000MHz VCO, 50MHz TCXO frequency reference, and 3rd-order passive-loop filter. The EV kit is configured with a narrow-band, high-performance 6000MHz VCO to demonstrate the IC performance across the 5840MHz to 6040MHz frequency range.

The EV kit input and output interfaces use standard 50Ω SMA connectors. The board also includes the necessary peripheral components and functions needed to power, monitor, and control the IC, including linear power regulators, LED indicators, and SPI bus.

To simplify the test setup, the EV kit is configured to operate from a single 5.5V to 6.5V power supply. The 5.5V to 6.5V input voltage range is governed by the chosen on-board LDOs (U6 and U7) and not by the IC. The EV kit can be reconfigured to bypass the on-board LDOs and run off separate 3V and 5V supplies.

The EV kit can be modified to evaluate the IC at operating frequencies ranging from 250MHz up to 12.4GHz using an external VCO. This topic is addressed in a dedicated application note. Contact the factory for details.

Component List

DESIGNATION	QTY	DESCRIPTION
3V_EXT, 5V_EXT	2	Small red test points Keystone 5000
C1, C16, C18–C20, C27, C28, C38, C45	9	0.01µF ±10%, 50V X7R ceramic capacitors (0402) Murata GRM155R71H103K
C2	1	0.1µF ±10%, 50V X7R ceramic capacitor (0402) Murata GRM155R71H104K
C3	1	1000pF ±5%, 50V C0G ceramic capacitor (0402) Murata GRM1555C1H102J
C4, C101, C102	0	Not installed, ceramic capacitors (0603)
C5, C6	2	100pF ±5%, 25V C0G ceramic capacitors (0201) Murata GRM0335C1E101J
C7, C9, C11, C13, C15, C21, C23, C26	8	100pF ±5%, 50V C0G ceramic capacitors (0402) Murata GRM1555C1H101J
C8, C10, C12, C14, C22, C25	0	Not installed, ceramic capacitors (0402)
C17, C41, C48	3	1µF ±10%, 50V X7R ceramic capacitors (0805) Murata GRM21BR71H105K
C24, C30, C32, C34, C39, C46	6	4.7µF ±10%, 50V X7R ceramic capacitors (1206) Murata GRM31CR71H475K
C29, C31, C33, C37, C40, C42, C44, C47, C49	9	0.1µF ±10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104K

DESIGNATION	QTY	DESCRIPTION
C35	1	10µF tantalum capacitor (C case) AVX TPSC106K016R
C36, C43	2	10µF ±10%, 25V X7R ceramic capacitors (1206) Murata GRM31CR71E106K
CE, CLK, DATA, LE, MUX_OUT, PHASE_ADJ, REF_IN, TUNE_TP	8	Small white test points Keystone 5002
D1–D3	3	Green LEDs (0603) LT L29S-P2R1-25-Z
D4	1	Generic axial-lead diode 1N4001
GND1–GND4	4	Small black test points Keystone 5001
GNDSUPPLY	1	Black banana plug Deltron 571-0100-01
J1	1	20-pin male header (2 x 10), 0.100in spacing Sullins PEC36DAAN
JP1, JP3, JP5–JP8	6	3-pin male headers (1 x 3), 0.100in spacing Sullins PEC36SAAN
JP2, JP4, JP9	3	2-pin male headers (1 x 2), 0.100in spacing Sullins PEC36SAAN
R1, R21, R22	3	5.11kΩ ±1% resistors (0402)
R2A, R18	2	100Ω ±1% resistors (0402)

Component List (continued)

DESIGNATION	QTY	DESCRIPTION
R2B, R11, R12, R25–R27, R32, R35, R102	0	Not installed, resistors (0402)
R3	1	47.5Ω ±1% resistor (0402)
R7–R9	3	16.9Ω ±1% resistors (0201)
R4, R5, R10, R24	4	0Ω ±1% resistors (0402)
R6	1	49.9Ω ±1% resistor (0201)
R13–R16, R19, R20, R28–R30, R33, R36	11	1kΩ ±5% resistors (0402)
R17, R23, R31, R34	4	10kΩ ±5% resistors (0402)
REFIN, TUNE, VCOIN, VCOOUT	4	PCB edge-mount SMA RF connectors Johnson 142-0741-856
U1	1	High-performance PLL (20 TQFN-EP*) Maxim MAX2880ETP+

DESIGNATION	QTY	DESCRIPTION
U2	1	TCXO Connor Winfield CWX823-050.0M
U3	0	Maxim MAX9632ASA+
U4	1	5840MHz to 6040MHz VCO (0.5V to 4.5V tuning) ZCOMM V940ME28-LF
U5	1	Hex buffer/driver TI SN74LV07ADR
U6	1	3.3V regulator (5 SOT23) Maxim MAX8867EUK33+
U7	1	5.0V regulator (5 SOT23) Maxim: MAX8867EUK50+
VCC_OPAMP, VCC_VCO	2	Small yellow test points Keystone 5004
VSUPPLY	1	Red banana plug Deltron 571-0500-01
—	1	PCB: MAX2880 EVKIT#

EP = Exposed pad.

Component Suppliers

SUPPLIER	WEBSITE
AVX Corporation	www.avxcorp.com
Fair-Rite Products Corp.	www.fair-rite.com
Murata Americas	www.murataamericas.com
Texas Instruments Inc.	www.ti.com
Z-Communications	www.zcomm.com
Connor-Winfield	www.conwin.com

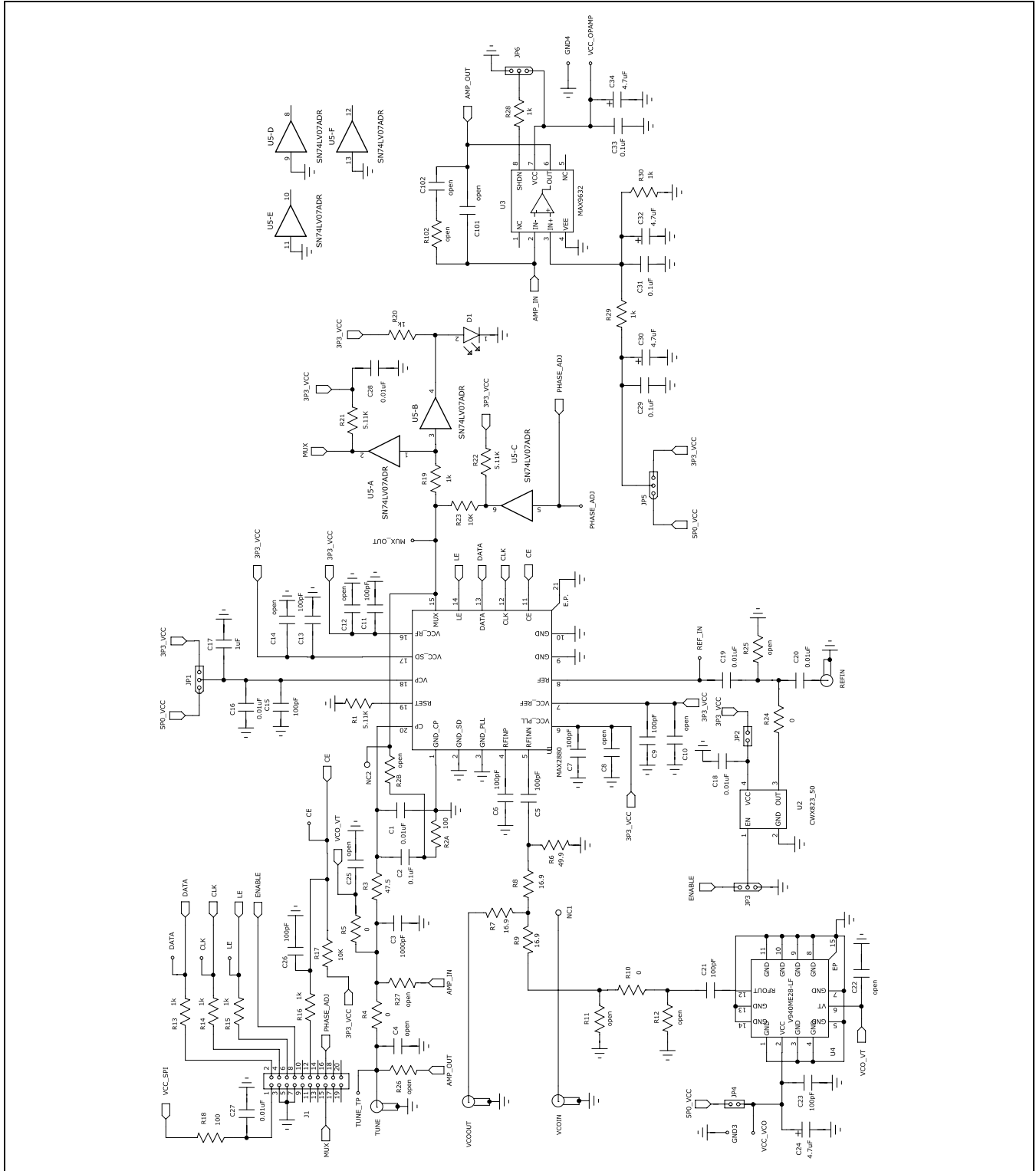**Note:** *Indicate that you are using the MAX2880 when contacting these component suppliers.*

Figure 4a. MAX2880 EV Kit Schematic (Sheet 1 of 2)

Figure 4b. MAX2880 EV Kit Schematic (Sheet 2 of 2)

Figure 5. MAX2880 EV Kit Component Placement—Component Side

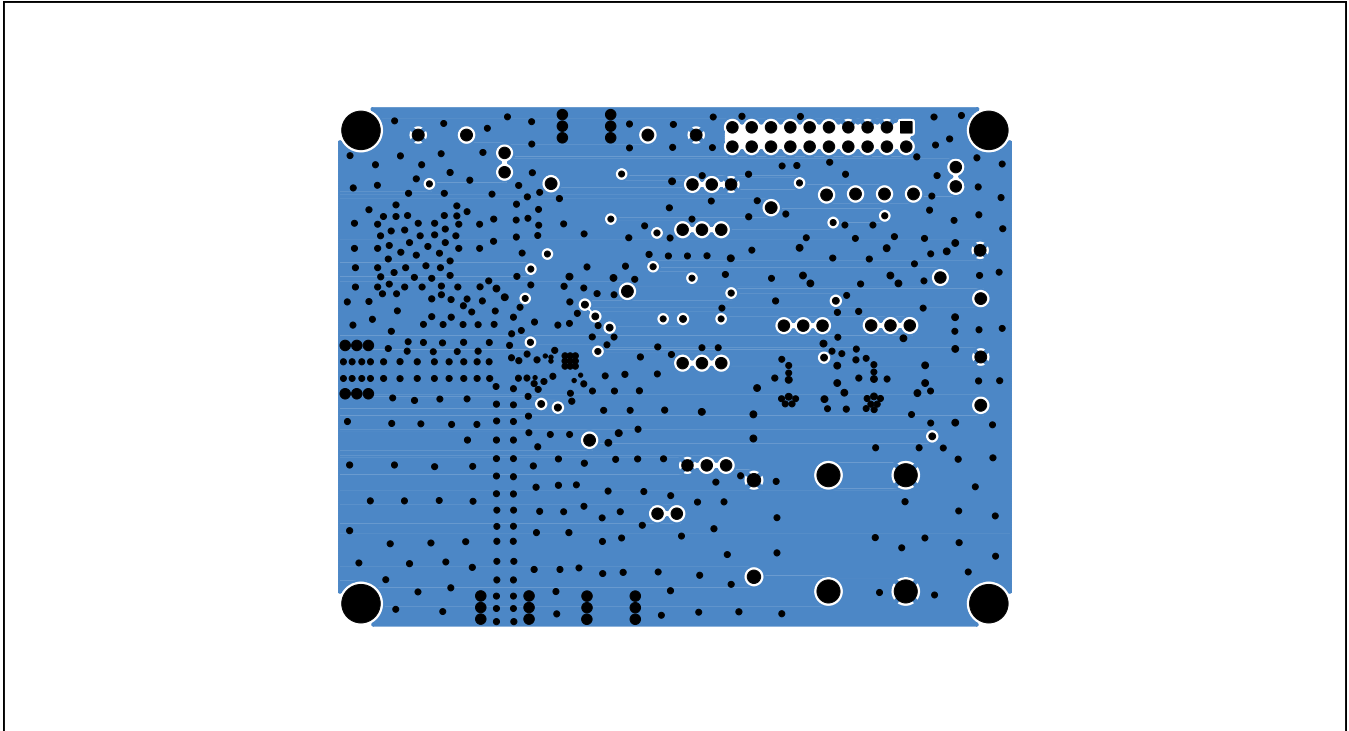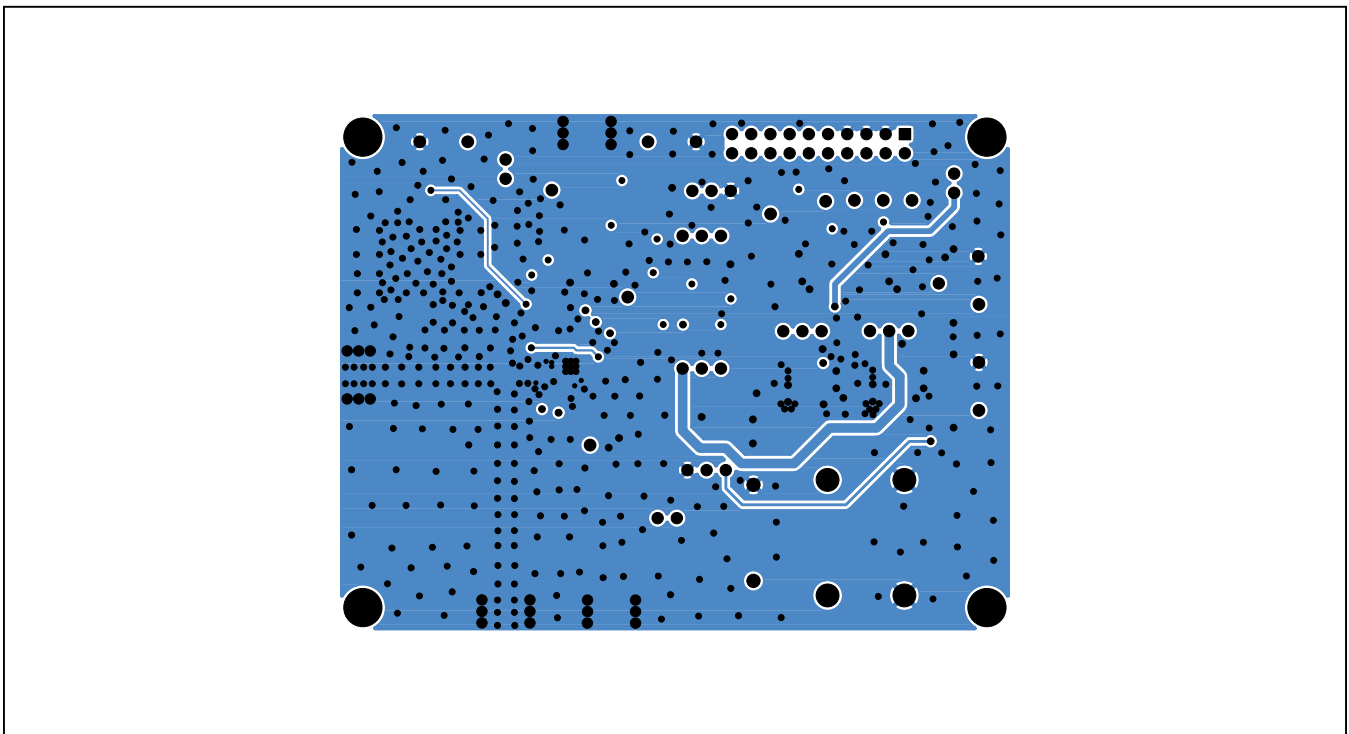Figure 6. MAX2880 EV Kit PCB Layout—Top Layer

Figure 7. MAX2880 EV Kit PCB Layout—2nd Layer
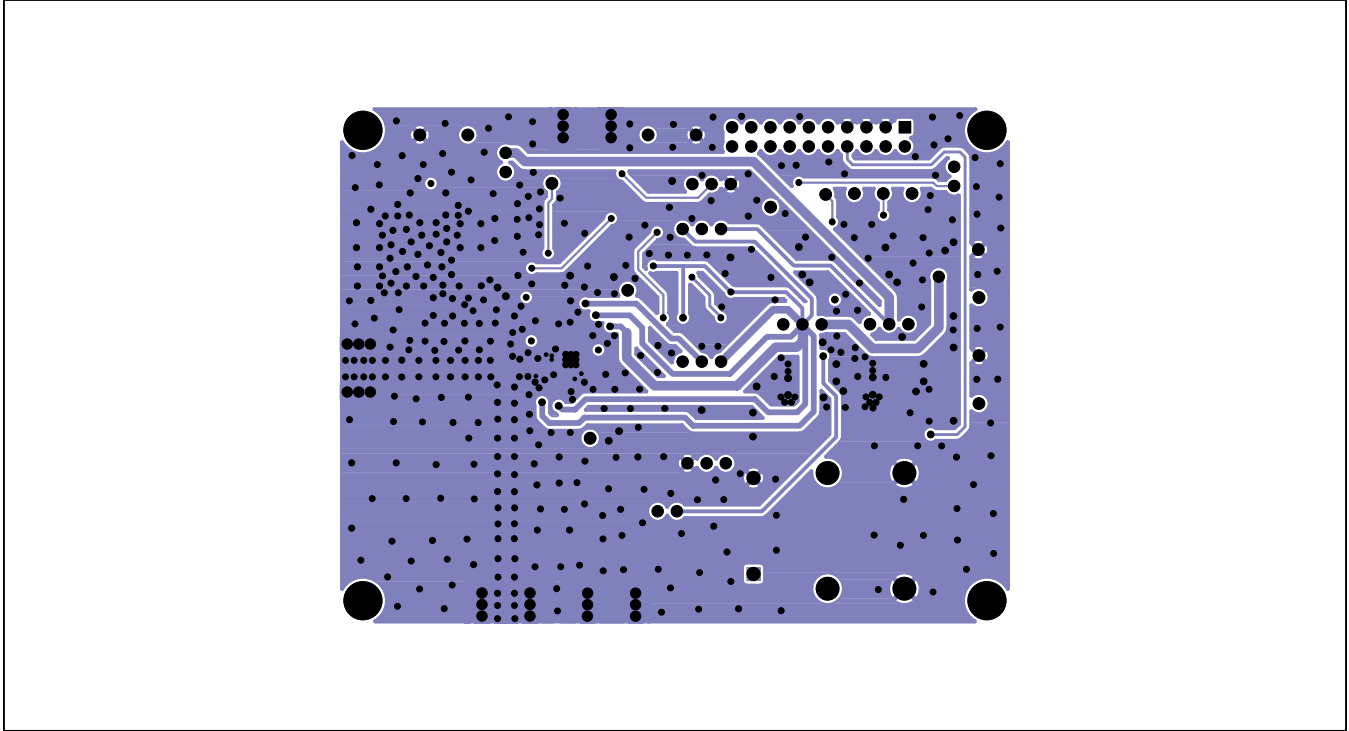

Figure 8. MAX2880 EV Kit PCB Layout—3rd Layer

Figure 9. MAX2880 EV Kit PCB Layout—Bottom Layer

Ordering Information

PART	TYPE
MAX2880EVKIT#	EV kit

#Denotes RoHS compliant.