General Description

The MAX2830 evaluation kit (EV kit) simplifies testing of the MAX2830 receive and transmit performance in 802.11g/b applications operating in the 2.4GHz to 2.5GHz ISM band. The EV kit provides 50Ω SMA connectors for all RF and baseband inputs and outputs. Differential-to-single-ended and single-ended-to-differential line drivers are provided to convert the differential I/Q baseband inputs and outputs to single ended.

Features

- On-Board Line Driver and Voltage Reference
- 50Ω SMA Connectors on All RF and Baseband Ports
- PC Control Software Available at **www.maximintegrated.com**

Quick Start

Test Equipment Required

This section lists the recommended test equipment to verify the operation of the MAX2830. It is intended as a guide only and substitutions may be possible:

- MAX2830 EV kit
- INTF3000+ interface board
- DC supply capable of delivering +5V and 200mA of continuous current
- DC supply capable of delivering -5V and 200mA of continuous current
- DC supply capable of delivering +3.3V and 300mA of continuous current
- DC supply capable of delivering +2.85V and 200mA of continuous current
- One HP8648s or equivalent signal sources capable of generating 0dBm up to 3GHz
- 802.11b/g CW I/Q waveform generator
- HP8561E or equivalent RF spectrum analyzer with a minimum 100kHz to 3GHz frequency range
- TDS3012 or equivalent oscilloscope with 200MHz bandwidth
- PC laptop or tablet with Microsoft Windows XP®, Windows® 7, 8 OS and a USB port
- USB-A male to USB-B male cable

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Connections and Setup

This section provides step-by-step instructions for getting the EV kit up and running in all modes (see Figure 1 for EV kit connections):

1) Connect the PC to the INTF3000 interface board using the USB-A male to USB-B male cable. On INTF3000, remove jumper JU1 and connect a DC supply set to 3.3V to the V_{PULL} connector. Connect the 25-pin connector of the INTF3000 (J4) directly to the 25-pin connector on the EV kit (J18).
2) With the power supply turned off, connect a +2.85V power supply to V_{REG} (pin 1) and V_{CCAUX}, and a +3.3V power supply to V_{BAT}. Connect the power-supply ground to the header labeled GND1 or GND2.
3) With the power supply turned off, connect a +5V power supply to the +5V test point and a -5V power supply to the -5V test point. Connect the power-supply ground to the header labeled GND1 or GND2. Connect all the power-supply grounds together.
4) Make sure the jumpers are installed in their defualt positions as shown in Figure 1.
5) Turn on the +3.3V power supply, followed by the +2.85V power supply, +5V power supply, and -5V power supply.
6) Install and run the MAX2830 control software, available for download HERE.

Receive Mode

1) Set the RXTX jumper across pins 2-3 (RX) to enable the receiver and disable the transmitter. Set the ANTSEL jumper across pins 2-3 (ANT1) to connect the receiver to the ANT1 port, or pins 1-2 (ANT2) to connect the receiver to the ANT2 port.
2) Set the signal generator to accurately deliver -100dBm at 2438MHz, at the SMA port (ANT1 or ANT2) of MAX2830. Connect the output of signal generator to ANT1 or ANT2 port of MAX2830.
3) On the Registers page of the EV kit software, set the registers to the recommended settings in the MAX2830 data sheet by clicking the “Defaults” and “Send All” buttons.

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4) On the entry page, confirm that the 'Receive Mode' is set to "normal," 'Baseband Filter Mode Control' is set to "RX", and the 'RF Frequency' is tuned to 2437MHz. Maximize the RX LNA gain and RX VGA gain.
5) Connect the spectrum analyzer to either RXBBI or RXBBQ. Set the center frequency to 1MHz with a span of 500kHz. Other recommended spectrum analyzer settings are: Res BW of 1kHz and Ref Level of 10dB.
6) Turn on the RF signal source. The supply current draw should be approximately 74mA.
7) If the RF input is connected to ANT1, the output CW tone at 1MHz should be approximately -2.5dBm. If the RF input is connected to ANT2, the output CW tone at 1MHz should be approximately -4dBm.

Transmit Mode

1) Set the RXTX jumper across pins 1-2 (TX) to enable the transmitter and disable the receiver. The transmitter will automatically be connected to ANT2, irrespective of ANTSEL jumper setting.
2) Connect ANT2 port to the spectrum analyzer. Set the center frequency of spectrum analyzer to 2437MHz and span to 10MHz. Other recommended spectrum analyzer settings are: Res BW of 3kHz, Attenuation of 30dB and Ref Level of 22dB.
3) Connect a 1MHz sinusoid to TXBBI and a 1MHz sinusoid with a 90° phase shift (or a cosine) to TXBBQ. Set the input amplitude of each channel to 100mV$_{RMS}$.
4) On the Registers page of the EV kit software, set the registers to the recommended settings listed in the IC data sheet by clicking the "Defaults" and "Send All" buttons.
5 On the Entry page, make sure 'Transmitter Mode' is set to "normal", 'Baseband Filter Mode Control' is set to "TX," and the 'RF Frequency' is tuned to 2437MHz. Set the TX gain to maximum using the 'TX VGA Gain' sliding bar.
6) Enable the output of the baseband signal sources. The supply current draw should be approximately 87mA.
7) The TX output power at 2436MHz should be approximately 19dBm. The LO leakage at 2437MHz should be 0dBm and unwanted sideband at 2438MHz should be -6dBm.

Note: CW signals can be replaced by modulated 802.11g/b signals.

Layout Considerations

The EV kit can serve as a guide for board layout. Keep PCB trace lengths as short as possible to minimize parasitic inductance. Also, keep decoupling capacitors as close to the IC as possible with a direct connection to the ground plane.

Power-Supply Layout

To minimize coupling between different sections of the IC, use a star power-supply routing configuration with a large decoupling capacitor at a central V_{CC} node. The V_{CC} traces branch out from this node, each going to a separate V_{CC} node in the circuit. Place a bypass capacitor as close as possible to each supply pin. This arrangement provides local decoupling at each V_{CC} pin. Use at least one via per bypass capacitor for a low-inductance ground connection. Do not share the capacitor ground vias with any other branch.

Table 1. Jumper Functions

JUMPER	SETTING	FUNCTION
RXTX	Pins 2-3	Enable receive mode
	Pins 1-2	Enable transmit mode
ANTSEL	Pins 1-2	Connect the Rx input to ANT2
	Pins 2-3	Connect the Rx input to ANT1
TXBBBUF/RXBBBUF	Pins 1-2	Enables the buffers
	Pins 2-3	Disables the buffers
V_{REG}	Pins 1-2	Short the jumper to provide voltage to the MAX2830 from the linear regulator (U10)
V_{CCVCO}	Pins 2-3	Supply the V_{CCVCO} from V_{REG}
	Pins 1-2	Supply the V_{CCVCO} from the linear regulator (U10)

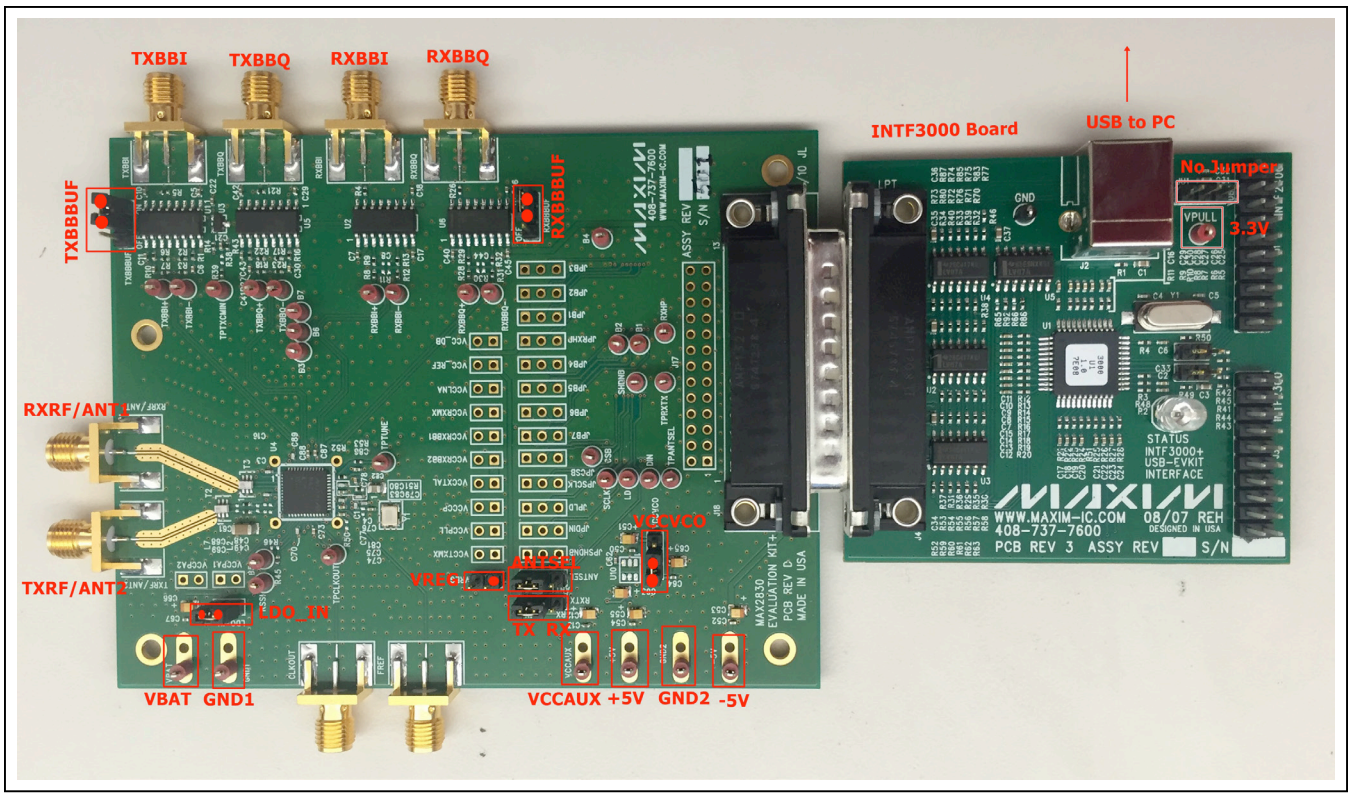

Figure 1. MAX2830 EV Kit Connections

Component Suppliers

SUPPLIER	WEBSITE
AVX Corp.	www.avx.com
Digi-Key Corp.	www.digikey.com
Johnson Components	www.johnsoncomponents.com
Murata Americas	www.murata.com
Texas Instruments Inc.	www.ti.com

Note: *Indicate that you are using the MAX2830 when contacting these component suppliers.*

Component List, PCB Layout, and Schematic

See the following links for component information, PCB layout diagrams, and schematic.

- **MAX2830 EV BOM**
- **MAX2830 EV PCB Layout**
- **MAX2830 EV Schematic**

Ordering Information

PART	TYPE
MAX2830EVKIT+	EV Kit

+Denotes a lead(Pb)-free and RoHS-compliant EV kit.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/07	Initial release	—
1	11/14	Updated *Quick Start* section	3
2	11/15	EV kit updated to reflect conversion to INTF3000 interface board/USB cable from parallel cable	1–5
3	1/16	Updated connection information for the INTF3000 interface board	1-3

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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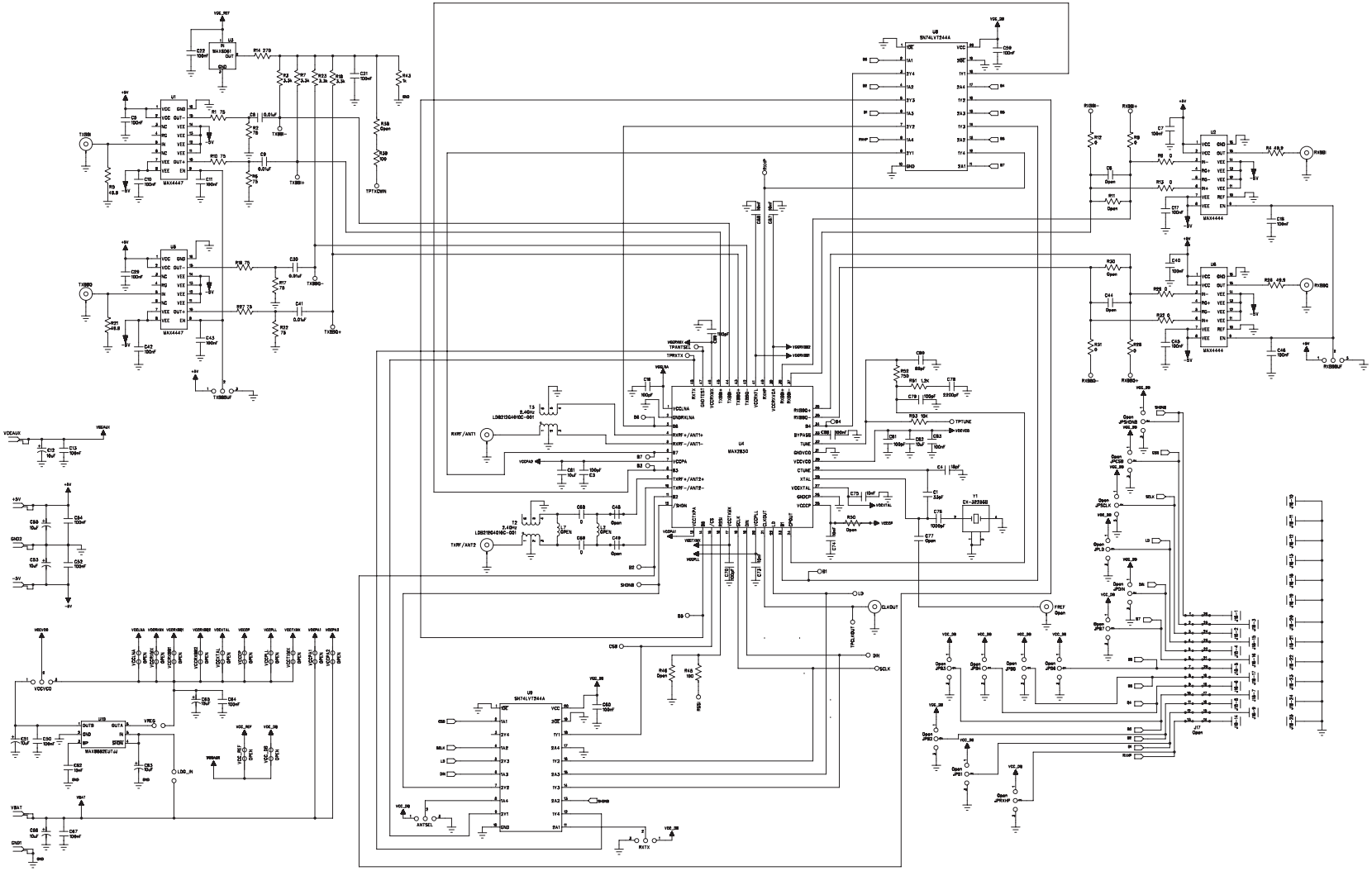
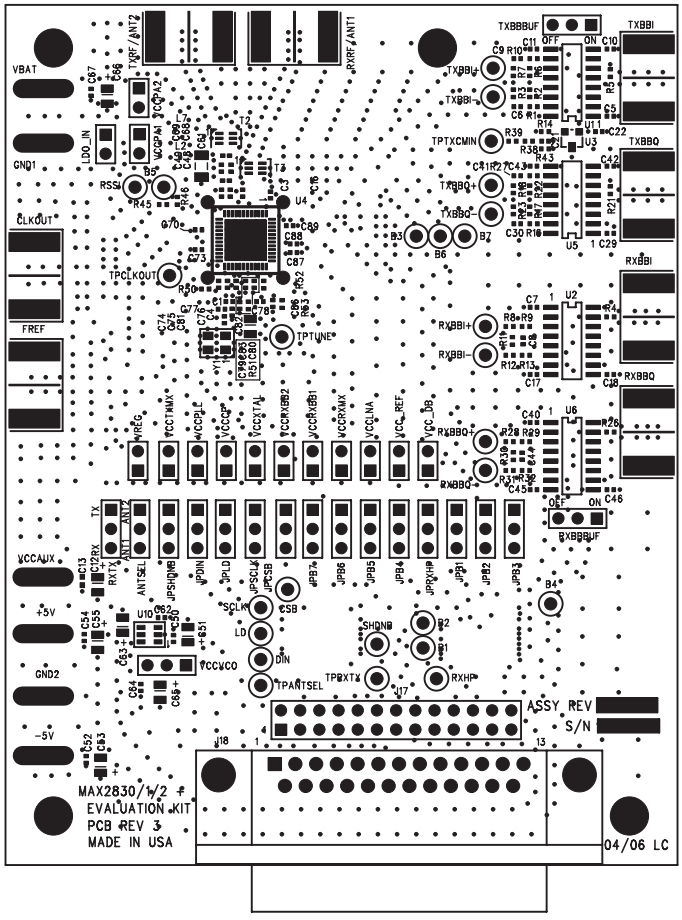
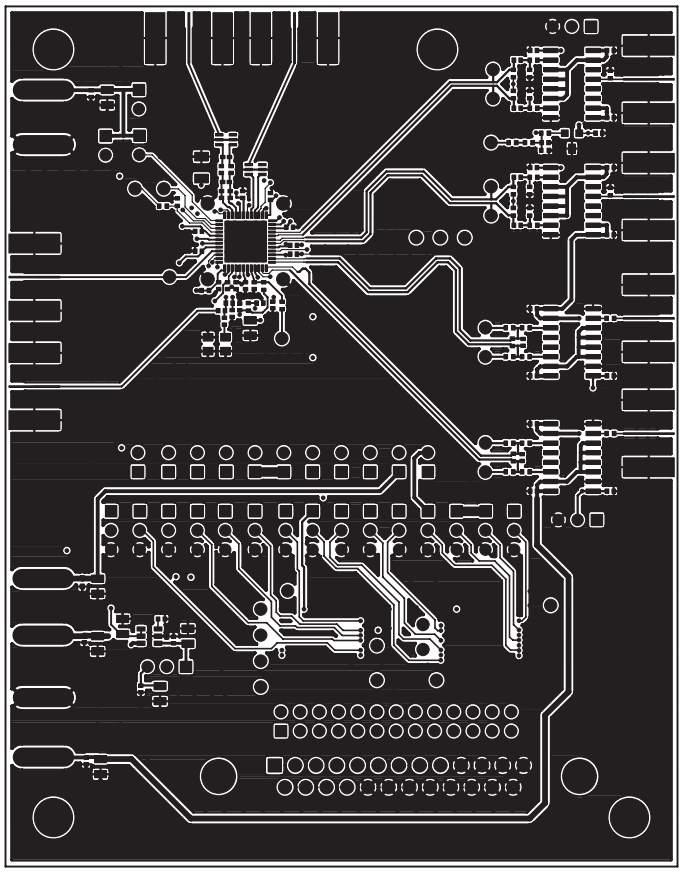
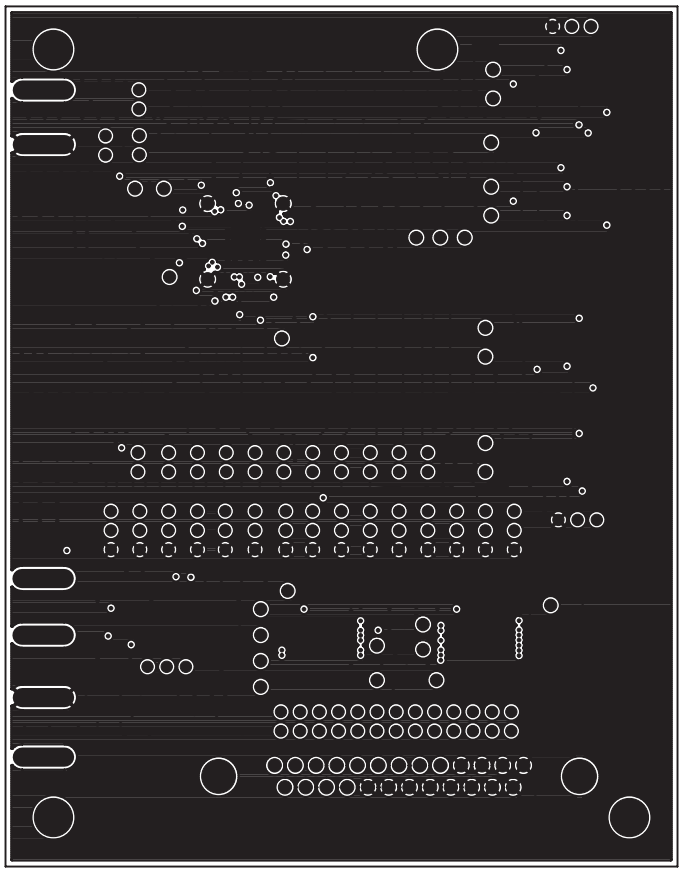
DESIGNATION	QTY	DESCRIPTION
+5V, -5V, B1–B7, CSB, DIN, GND1, GND2, LD, RSSI, RXBBI+, RXBBI-, RXBBQ+, RXBBQ-, RXHP,SCLK, SHDNB, TPANTSEL, TPCLKOUT, TPRXTX, TPTUNE, TPTXCMIN, TXBBI+ TXBBI-, TXBBQ+, TXBBQ-, VBAT, VCCAUX	33	Test points Keystone 5000
ANTSEL, RXBBBUF, RXTX, TXBBBUF, VCCVCO	5	1 x 3 headers Sullins PEC36SAAN
CLKOUT, FREF, RXBBI, RXBBQ, RXRF/ANT1, TXBBI, TXBBQ, TXRF/ANT2	8	SMA edge-mount connectors, round Johnson 142-0701-801
C1	1	33pF ±5% capacitor (0402) Murata GRM1555C1H330J
C3, C16, C70, C79, C81, C89	6	100pF ±5% capacitors (0402) Murata GRM1555C1H101J
C4	1	18pF ±5% capacitor (0402) Murata GRM1555C1H180J
C5, C7, C10, C11, C13, C17, C18, C21, C22, C29, C40, C42, C43, C45, C46, C50, C52, C54, C59, C60, C64, C67, C83, C86	24	100nF ±10% capacitors (0402) Murata GRM155R61A104K
C6, C9, C30, C41, C62, C73, C74, C75, C87, C88	10	0.01µF ±10% capacitors (0402) Murata GRM155R71C103K
C8, C44, C48, C49, C71, C72, C77	0	Not installed, capacitors
C12, C51, C53, C55, C63, C65, C66	7	10µF ±20% tantalum capacitors (R-case) AVX TAJR106M006
C61	1	10µF ±10% capacitor (1206) Murata GRM31CR60J106K
C68, C69	2	0Ω ±5% resistors (0402)
C76	1	1000pF ±10% capacitor (0402) Murata GRM155R71H102K
C78	1	2200pF ±10% capacitor (0402) Murata GRM155R71H222K
C80	1	68pF ±5% capacitor (0402) Murata GRM1555C1H680J
C82	1	10µF ±10% capacitor (0805) Murata GRM21BR60J106K
J17	0	Not installed
J18	1	DB25 right-angle male connector AMP 5747238-4
JPB1–JPB7, JPCSB, JPDIN, JPLD, JPRXHP, JPSCLK, JPSHDNB	0	Not installed
L1, L2, L7	0	Not installed
LDO_IN, VREG	2	1 x 2 headers Sullins PEC36SAAN
R1, R2, R6, R10, R16, R17, R22, R27	8	75Ω ±1% resistors (0402)
R3, R7, R18, R23	4	3.3kΩ ±5% resistors (0402)
R4, R5, R21, R26	4	49.9Ω ±1% resistors (0402)
R8, R9, R12, R13, R28, R29, R31, R32	8	0Ω Ω5% resistors (0402)
R11, R30, R38, R46, R50	0	Not installed, resistors
R14	1	270Ω ±5% resistor (0402)
R39, R45	2	100Ω ±1% resistors (0402)
R43	1	1kΩ ±1% resistor (0402)
R51	1	1.2kΩ ±5% resistor (0402)
R52	1	750Ω ±5% resistor (0402)
R53	1	10kΩ ±5% resistor (0402)
T1	0	Not installed, balun
T2, T3	2	2.4GHz RF baluns Murata LDB212G4010C-001
U1, U5	2	Line drivers (16 SO) Maxim MAX4447ESE+
U2, U6	2	Line receivers (16 SO) Maxim MAX4444ESE+

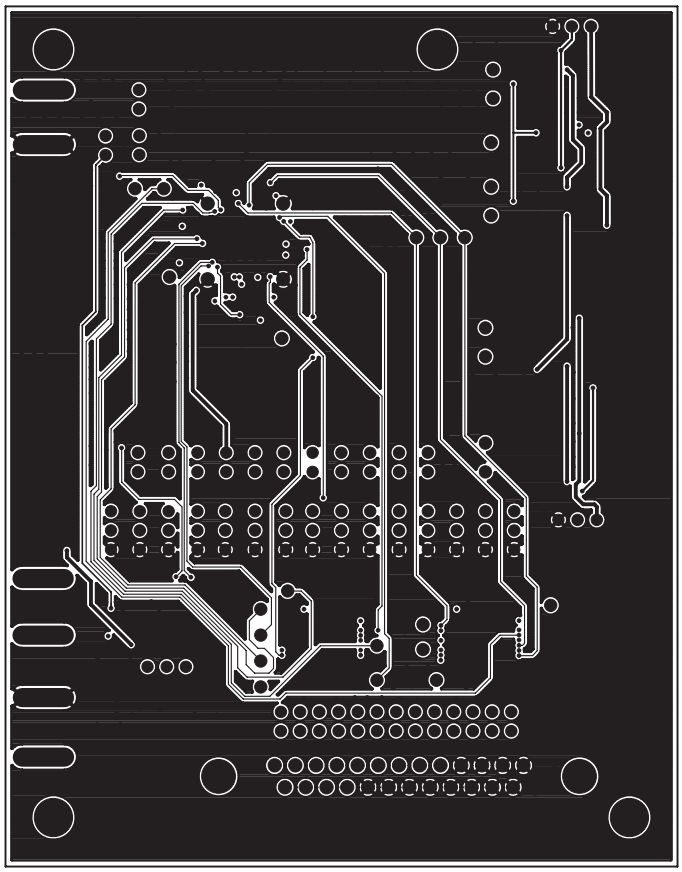
DESIGNATION	QTY	DESCRIPTION
U3	1	Low-dropout reference (3 SOT) Maxim MAX6061BEUR+
U4	1	Transceiver (48 TQFN) Maxim MAX2830ETM+
U8, U9	2	SN74LVTH244ADB TI SN74LVTH244ADBR
U10	0	Not installed, (optional) Maxim MAX8882EUTJJ+
VCCLNA, VCCPA1, VCCPA2, VCCPLL, VCCRXBB1, VCCRXBB2, VCCRXMX, VCCTXMX, VCCXTAL, VCC_DB, VCC_REF, VREG	0	Not installed
Y1	1	40MHz crystal Kyocera CX3225SB40000H0WZK21
—	6	Shunts (ANTSEL, LDO_IN, RXBBBUF, RXTX, TXBBBUF, VCCVCO) Sullins SSC02SYAN
—	1	PCB: MAX2830/1/2 EVALUATION KIT

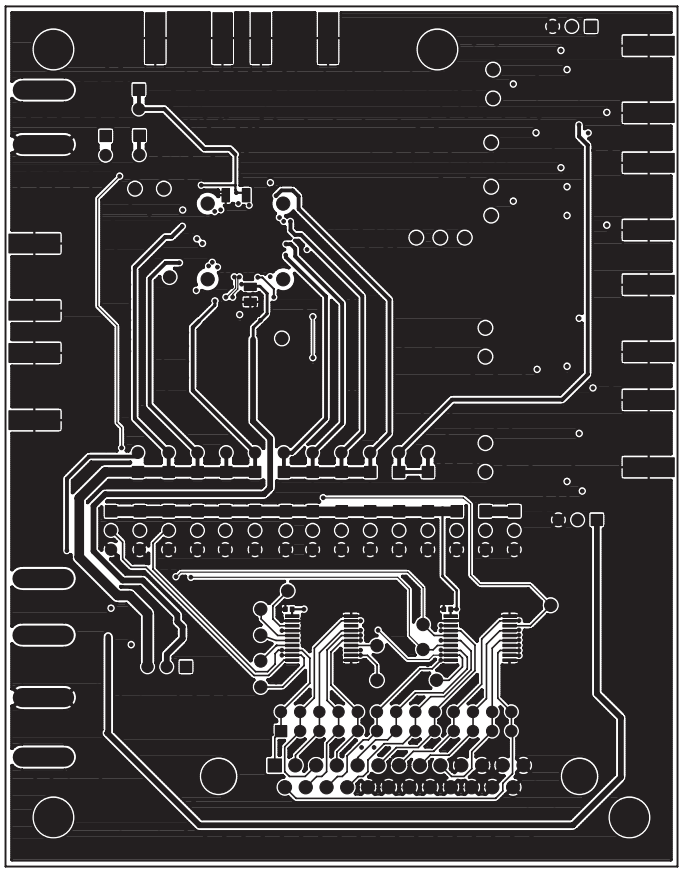



VBAT
GND1
CLKOUT
FREF
VCCAUX
+5V
GND2
-5V
TXRF/ANT2
RXRF/ANT1
LDO_IN
RSSI
TPCLKOUT
TPTUNE
TXBBUF
OFF
ON
TXBBI
TXBBI+
TXBBI-
TPTXCMIN
TXBBQ
TXBBQ+
TXBBQ-
RXBBI
RXBBI+
RXBBI-
RXBBQ
RXBBQ+
RXBBQ-
RXBBBUF
VREG
VCCTMUX
VCCPLL
VCCCP
VCCXTAL
VCCRXBB2
VCCRXBB1
VCCRXMX
VCCLNA
VCC_REF
VCC_BB
TX
RXTX
ANT1_ANT2
ANTSEL
JPSHDNB
JPDIN
JPLD
JPSCLK
JPCSB
JPB7
JPB6
JPB5
JPB4
JPRXHP
JPB1
JPB2
JPB3
SCLK
CSB
LD
DIN
TPANTSEL
TPBXTX
SHDNB
RXHP
VCCVCO
ASSY REV
S/N
MAX2830/W2 +
EVALUATION KIT
PCB REV 3
MADE IN USA
04/06 LC









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