



MAX11835 Evaluation System

General Description

The MAX11835 evaluation system (EV system) demonstrates a complete solution to drive single and multilayer piezo actuators to create haptic feedback for products featuring touch interfaces. The MAX11835 efficiently generates any type of user-programmable waveforms including sine, trapezoidal, square, and pulse to drive the piezo loads to create custom haptic sensation. The low-power device directly interfaces with an application processor/host controller through an I²C interface and integrates various blocks including a boost regulator, pattern storage memory, and waveform generator in one package, thus providing a complete haptic feedback controller solution.

The EV system is a multiboard system that includes a MAXQ2000 USB touch interface board (UTIB) and a MAX11835 daughter board.

Note: The CD-ROM included with the EV kit contains a User's Guide that provides information about the graphical user interface (GUI).

Note: The MAX11835 is not a touch-screen controller and the touch panel is only provided for haptic feedback purposes, with the 4-wire flex connector left unconnected.

Features

- ◆ Convenient USB Interface
- ◆ Touch Panel with Piezo Actuator Mounted for Haptic Feedback
- ◆ Analog Tracking-Mode Capability
- ◆ Easy-to-Use Windows® Graphical User Interface (GUI) Allows Register Programming for Various Haptic Waveforms
- ◆ All Components Mounted on a Plexiglass Base for Ease of Handling
- ◆ Single-Supply Operation through the USB
- ◆ Option for External Power Supply for the Boost Regulator
- ◆ Separate User's Guide Available for the Graphical User Interface

Ordering Information

PART	TYPE	PC INTERFACE	INTERFACE TYPE
MAX11835TEVS+	EV System	USB	Windows

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

EV System Contents List

QTY	DESCRIPTION
1	CD-ROM containing a USB driver, quick guide, GUI software for Windows XP®, and PCB schematic and layout files
1	USB touch interface board (MAXQ2000 UTIB board)
1	Haptic actuator controller daughter board (MAX11835) with a connector to plug in to the UTIB board
1	Piezo driver MAX11835 daughter board with a connector to plug in to the UTIB2 board (included with the haptic versions only)
1	Fujitsu 3.5in touch panel (Fujitsu 817-T010-1401-T670) with piezos mounted under them for haptic feedback purpose only
2	CUI piezos (Cui Inc. CFT-44TW100-0.6A1-70C) for haptic feedback
1	Mini USB cable

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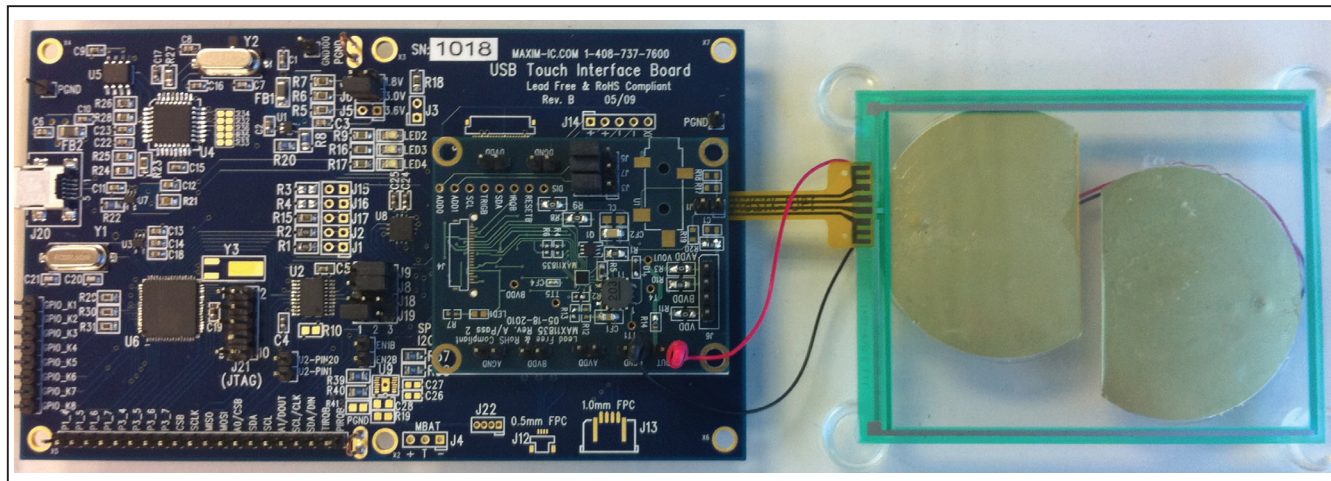


Figure 1. MAX11835 EV System

Component Lists

MAXQ2000 UTIB Board

DESIGNATION	QTY	DESCRIPTION
C1, C2, C11, C13	4	1 μ F -20/+80%, 16V ceramic capacitors (0603) Murata GRM188F51C105ZA01D
C3, C6, C12, C14	4	10 μ F $\pm$ 20%, 6.3V ceramic capacitors (0603) Murata GRM188R60J106ME47D
C4, C5, C9, C10, C15–C19, C23, C24, C25, C27	13	0.1 μ F -20/+80%, 16V ceramic capacitors (0603) Murata GRM188F51C104ZA01D
C7, C8	2	22pF $\pm$ 5%, 50V ceramic capacitors (0603) Murata GRM1885C1H220JA01D
C20, C21	2	10pF $\pm$ 5%, 50V ceramic capacitors (0603) Murata GRM1885C1H100JA01D
C22	1	33nF $\pm$ 10%, 16V ceramic capacitor (0603) Murata GRM188R71C333KA01D
C26	1	4.7 μ F -20/+80%, 10V ceramic capacitor (0603) Murata GRM188F51A475ZE20D

DESIGNATION	QTY	DESCRIPTION
C28	1	10 μ F $\pm$ 20%, 10V ceramic capacitor (0805) Murata GRM219R61A106KE44D
EN1B, EN2B, U2-PIN1, U2-PIN20	4	2-pin headers, 100 mil
FB1, FB2	2	100 μ H $\pm$ 10% ferrite beads (1206) TDK FL3215T-101K
J1, J2, J3, J5, J6, J7, J15, J16, J17	9	2-pin headers, 100 mil Sullins PBC02SABN
J4, J8, J9, J18, J19	5	3-pin headers, 100 mil Sullins PBC03SABN
J10	1	21-pin female connector Hirose DF9-21S-1V(32)
J20	1	5-position USB-mini connector Hirose UX60-MB-5ST
J21	1	10-pin JTAG header, 100 mil Sullins PBC05DAAN
LED2, LED3, LED4	3	RGB SMD LEDs (0805) Lite-On LTST-C171KYKT
R1–R4	4	4.7k Ω $\pm$ 5% resistors (0805) Vishay CRCW08054K70JNEA

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Component Lists (continued)

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DESIGNATION	QTY	DESCRIPTION
R5	1	196k Ω $\pm$ 5% resistor (0805) Vishay CRCW0805196KJNEA
R6	1	590k Ω $\pm$ 5% resistor (0805) Vishay CRCW0805590KJNEA
R7	1	61.9k Ω $\pm$ 1% resistor (0805) Vishay CRCW080561K9FKEA
R8, R20, R22, R37–R40	7	100k Ω $\pm$ 5% resistors (0805) Vishay CRCW0805100KJNEA
R9, R16, R17	3	215 Ω resistors (0805) Vishay CRCW0805215RJNEA
R10, R19, R32–R36	0	Not installed, resistors
R11–R14	4	0 Ω SMD resistors (0805)
R15, R18	2	51k Ω $\pm$ 5% resistors (0805) Vishay CRCW080551KJNEA
R21	1	169k Ω $\pm$ 5% resistor (0805) Vishay CRCW0805169KJNEA
R23, R24	2	27 Ω $\pm$ 5% resistors (0805) Vishay CRCW080527R0JNEA
R25	1	1.5k Ω $\pm$ 5% resistor (0805) Vishay CRCW08051K50JNEA
R26	1	2.2k Ω $\pm$ 5% resistor (0805) Vishay CRCW08052K20JNEA
R27	1	470 Ω resistor (0805) Vishay CRCW0805470RJNEA
R28	1	10k Ω $\pm$ 5% resistor (0805) Vishay CRCW080510K0JNEA
R29, R30, R31	3	3.3k Ω $\pm$ 5% resistors (0805) Panasonic ERA-S27J332V
R41	1	23.7k Ω $\pm$ 1% resistor (0805) Vishay CRCW080523K2FKEA

DESIGNATION	QTY	DESCRIPTION
U1, U7	2	Adjustable LDO linear regulators (5 SC70) Maxim MAX8512EXK-T
U2	1	Octal-level translator (20 TSSOP) Maxim MAX3001EEUP
U3	1	Fixed 2.5V LDO linear regulator (5 SC70) Maxim MAX8511EXK25-T
U4	1	UART, 7mm x 7mm (32 TQFP) FTDI FT232BL
U5	1	2kB EEPROM (8 SO) Atmel AT93C46A
U6	1	16-bit microcontroller (68 QFN-EP*) Maxim MAXQ2000-RAX
U8	1	Quad-level translators (12 TQFN-EP*) Maxim MAX3395EETC+
U9	1	Li+ linear battery charger (14 TDFN) Maxim MAX8856ETD+
Y1	1	16MHz crystal (HCM49) ECS ECS-160-20-5PDN-TR
Y2	1	6MHz crystal (HCM49) ECS ECS-60-20-5G3XDS-TR
Y3	0	Not installed, crystal
—	1	PCB: USB Touch Interface Board

*EP = Exposed pad.

MAX11835 Daughter Board

DESIGNATION	QTY	DESCRIPTION
ADD0, ADD1, DIS, IRQB, RESETB, SCL, SDA, TRIGB	0	Not installed, test points
CF1	1	10 μ F X54 ceramic capacitor (0805) Murata GRM21BF50J106ZE01L

DESIGNATION	QTY	DESCRIPTION
CF2	1	47nF, 200V ceramic capacitor (0805) KEMET C0805C473K2RACTU
CF3, CF4	2	1 μ F, 10V X5R ceramic capacitors (0402) KEMET C0402C475MPACTU

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Component Lists (continued)

DESIGNATION	QTY	DESCRIPTION
CL	0	Not installed, SMD ceramic capacitor (0805)
C1	0	Not installed, capacitor
D1	1	200V diode
J1	1	2-pin headers, 0.1in pitch
J2	1	21-position male connector Hirose DF9-21P-1V(32)
J3, J5, J7	3	3-pin headers, 100 mil Sullins PBC03SABN
J4	0	Not installed, 20-position connector
J6	1	4-pin header, 0.1in pitch
LED1	1	Red SMD LED (1.6mm x 0.8mm)
Q1	1	n-channel MOSFET (hex DIP) PD = 1W, ID = 0.6A, VDSS = 200V, VGS = Q20V, VSD = 2V, RDS(ON) = 1 Ω
R1	1	2M Ω $\pm$ 1%, 250V resistor (0805)
R2	1	27k Ω SMD resistor (0402)

DESIGNATION	QTY	DESCRIPTION
R3, R8, R9, R11, R20	5	0 Ω SMD resistors (0805)
R4, R6	2	4.7k Ω SMD resistors (0402)
R5	1	20 Ω SMD resistor (0603)
R7	1	220 Ω SMD resistor (0402)
R10	1	1 Ω SMD resistor (0805)
R12	0	Not installed, SMD resistor (0402)
R13	1	0 Ω SMD resistor (0402)
R14	1	4.99k Ω resistor (0603)
R17, R18	2	49.9 Ω SMD resistors (0402)
R19	0	Not installed, resistor
T1	1	Boost transformer
T4, TT1, TT5, VOUT	0	Not installed, test points
U1	0	Not installed, haptic piezo controller (25 WLP) Maxim MAX11835EWA+
X1–X4	4	Empty holes
—	1	PCB: MAX11835

Table 1. UTIB Ports

PORT	DESCRIPTION
J10	Daughter card connector for I ² C-controlled devices (includes 1.8V/3.3V/3.6V supplies and reset line)
J20	USB port provides power to the EV system and communication to a PC
J21	JTAG port for programming the MAXQ2000

Table 2. UTIB Default Jumper Settings

JUMPER	SHUNT POSITION	STATUS	DESCRIPTION
J5	1-2	Short	If J5 and J6 are open, 3.6V supply to the daughter board
J6	1-2	Closed	3V supply to the daughter board
J7	1-2	User's preference	If closed, 1.8V supply to the daughter board
J8	2-3	Closed	I ² C communication
J9	2-3	Closed	I ² C communication
J18	—	Open	—
J19	1-2	Closed	USB power

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Table 3. Jumper Settings for the MAX11835 Daughter Board

JUMPER	SHUNT POSITION	STATUS	DESCRIPTION
J1	—	Open	Pin 2: AIN to MAX11835
J3	2-3	Closed	Pins 2-3: Default to playback from the device memory Pins 1-2: Analog tracking mode
J5	2-3	Closed	ADD0 slave address pin (pin 1, DVDD; pin 3, GND)
J7	2-3	Closed	ADD1 slave address pin (pin 1, DVDD; pin 3, GND)
J6	BVDD-VDD	Closed	Power supply to BVDD and AVDD; if needed to provide power from external voltage source, leave the jumper open and apply voltage to BVDD

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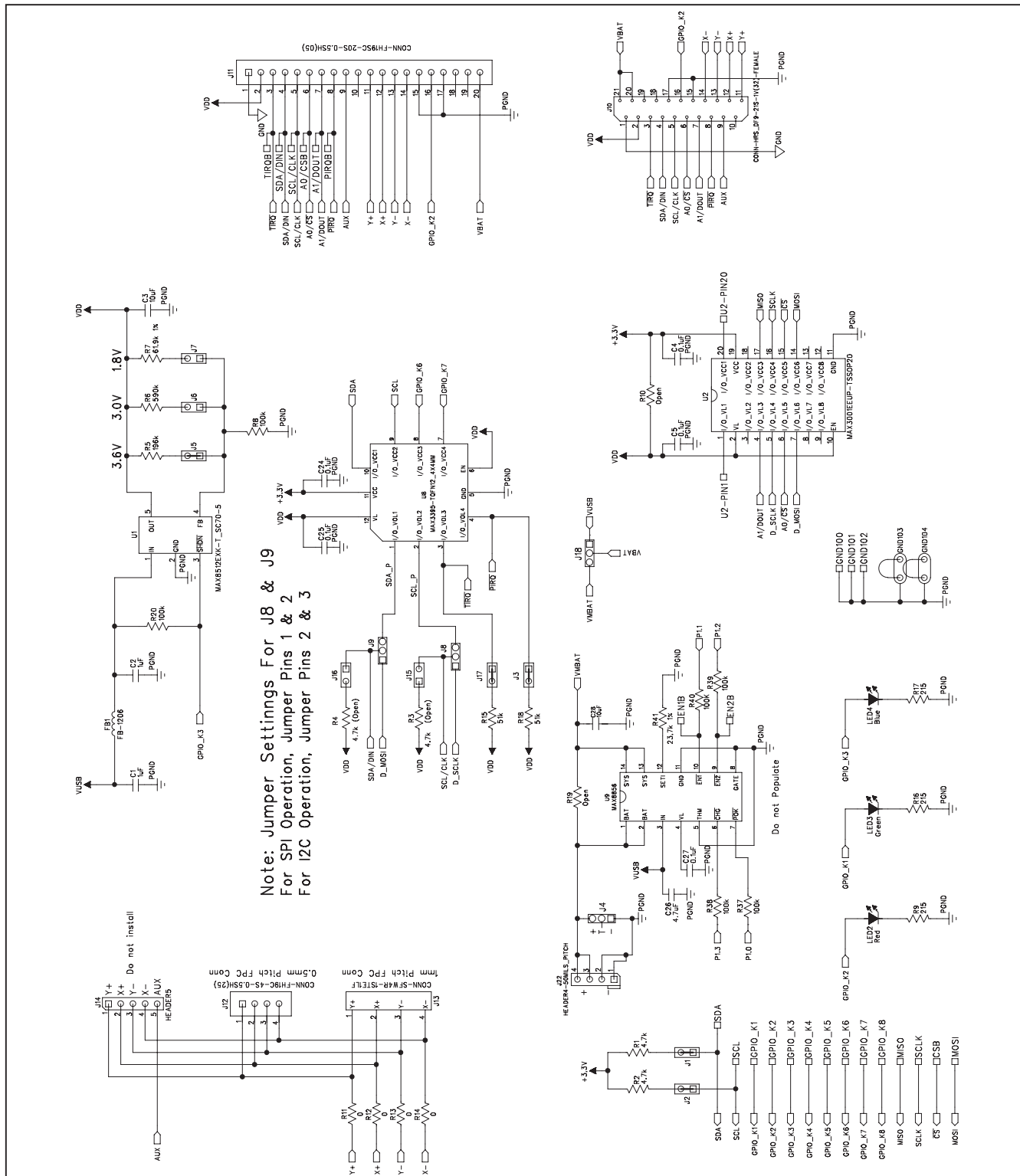
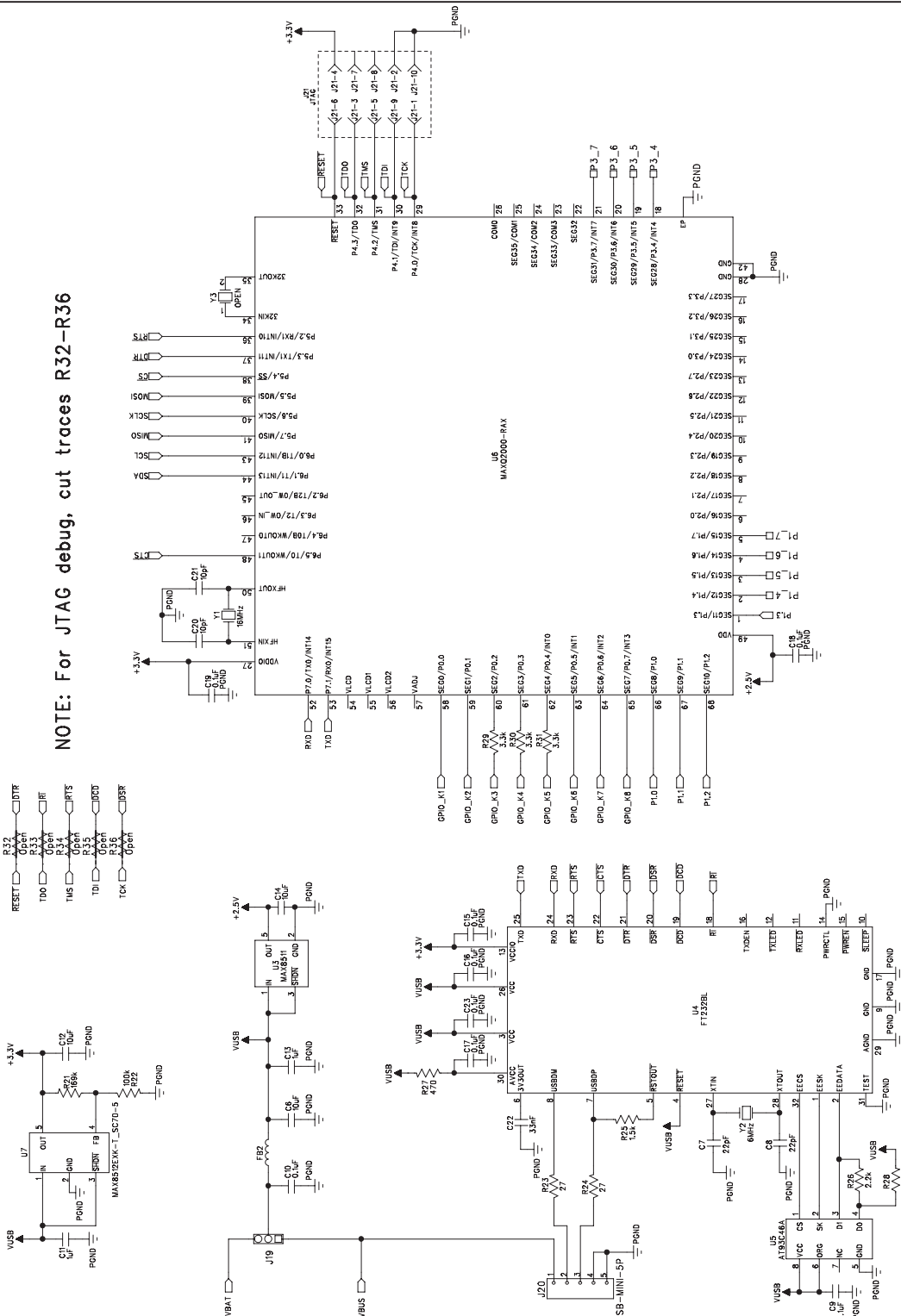


Figure 2a. UTIB Schematic—Main (Sheet 1 of 2)

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Evaluates: MAX11835



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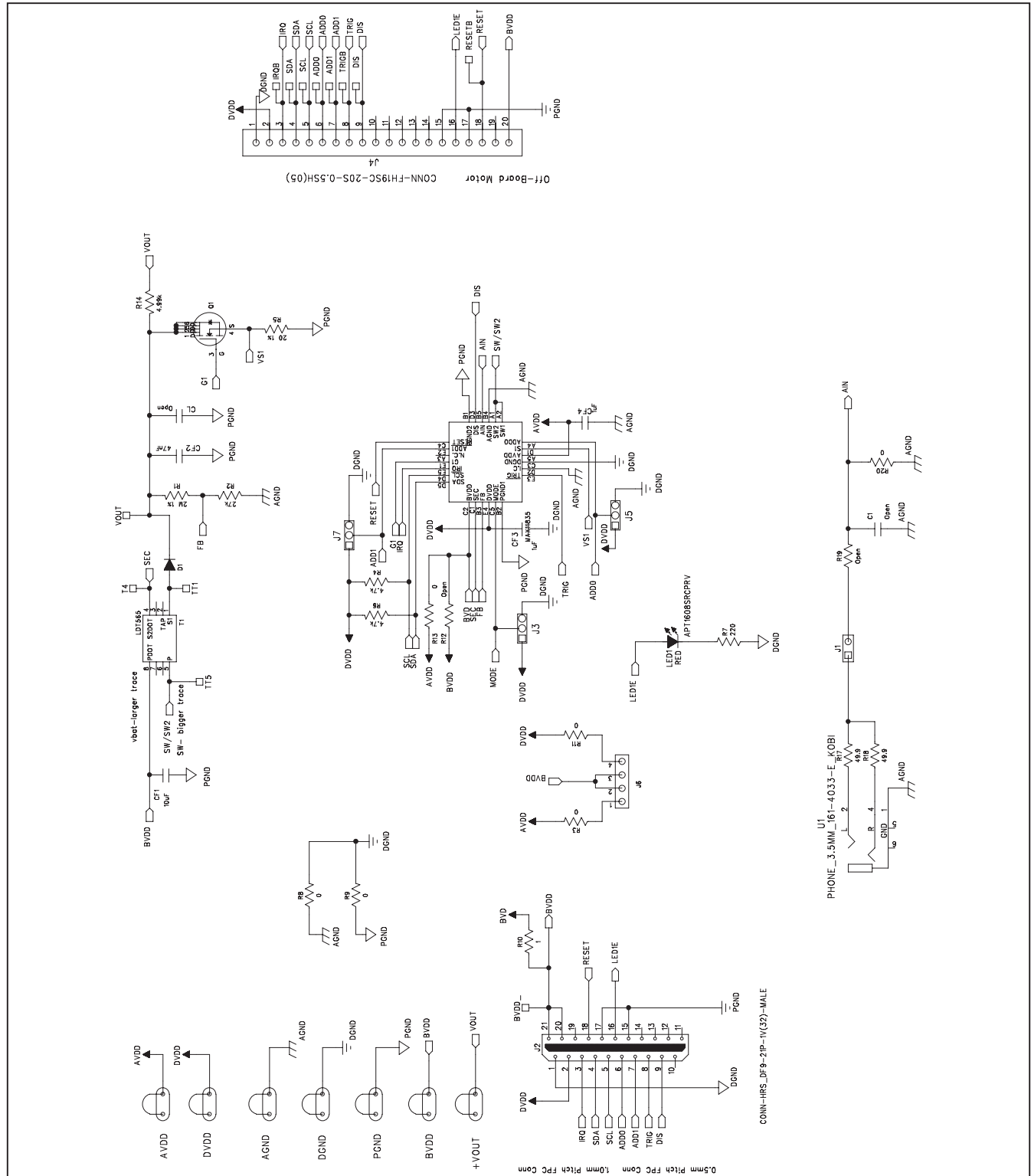


Figure 3. MAX11835 Daughter Board Schematic

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Evaluates: MAX11835

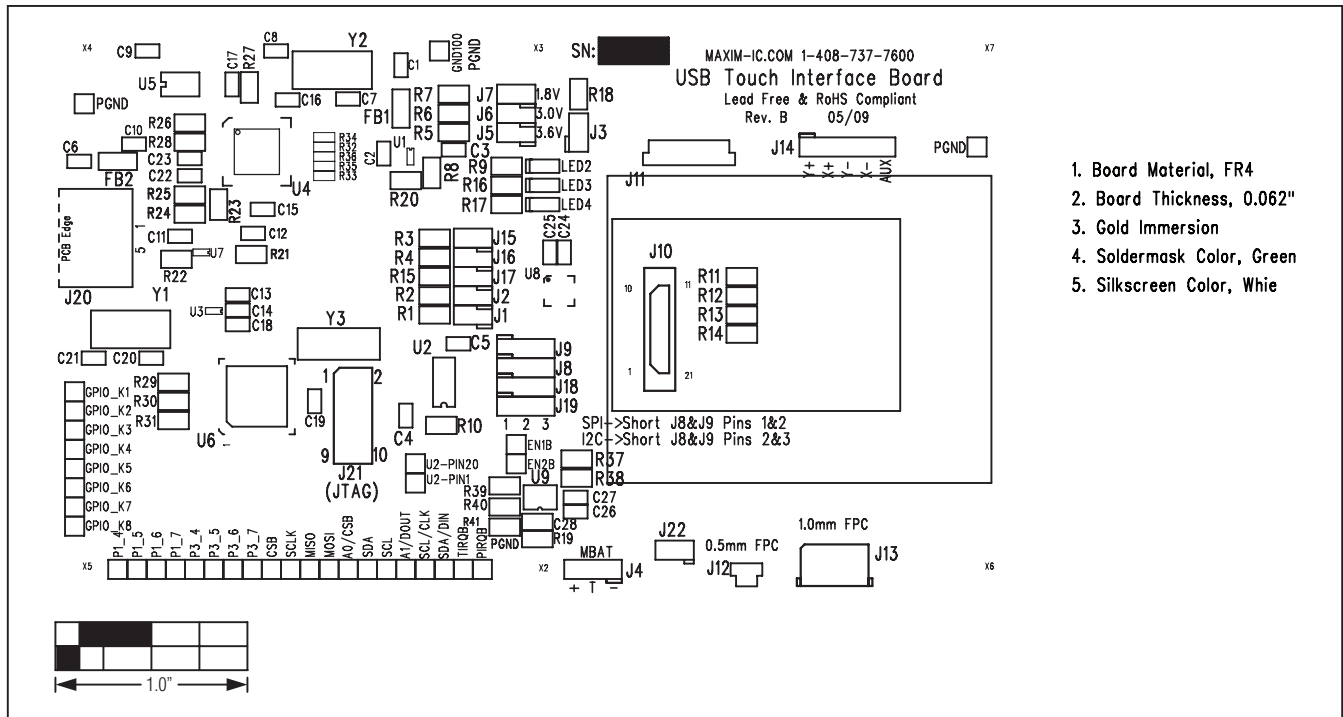


Figure 4. UTIB PCB Layout—Silkscreen

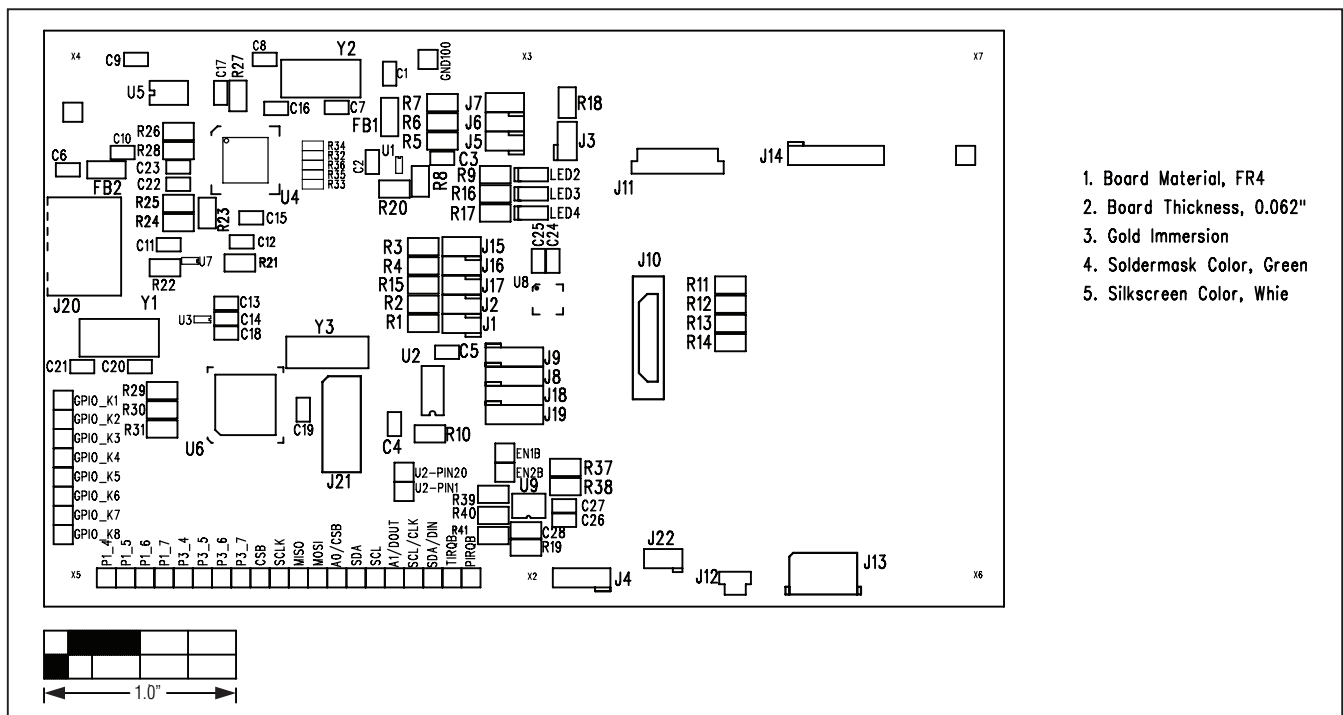


Figure 5. UTIB PCB Layout—Top Assembly

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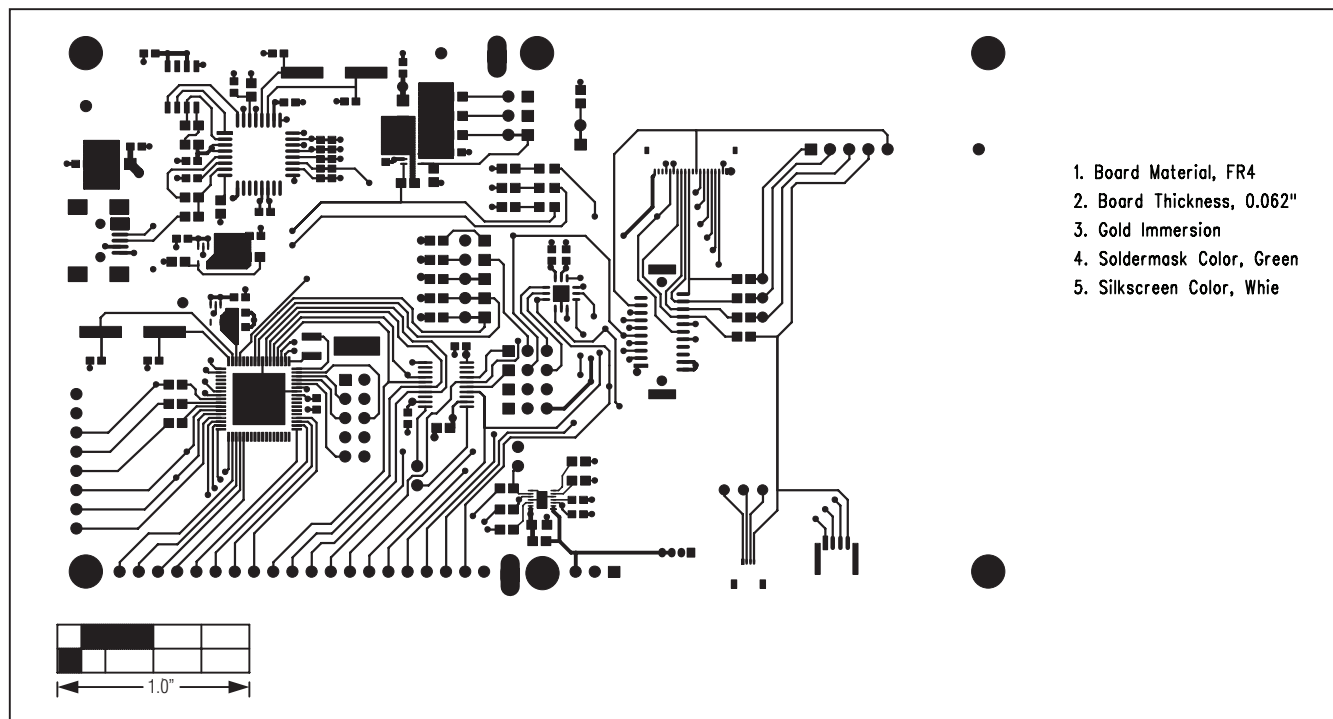


Figure 6. UTIB PCB Layout—Top Layer

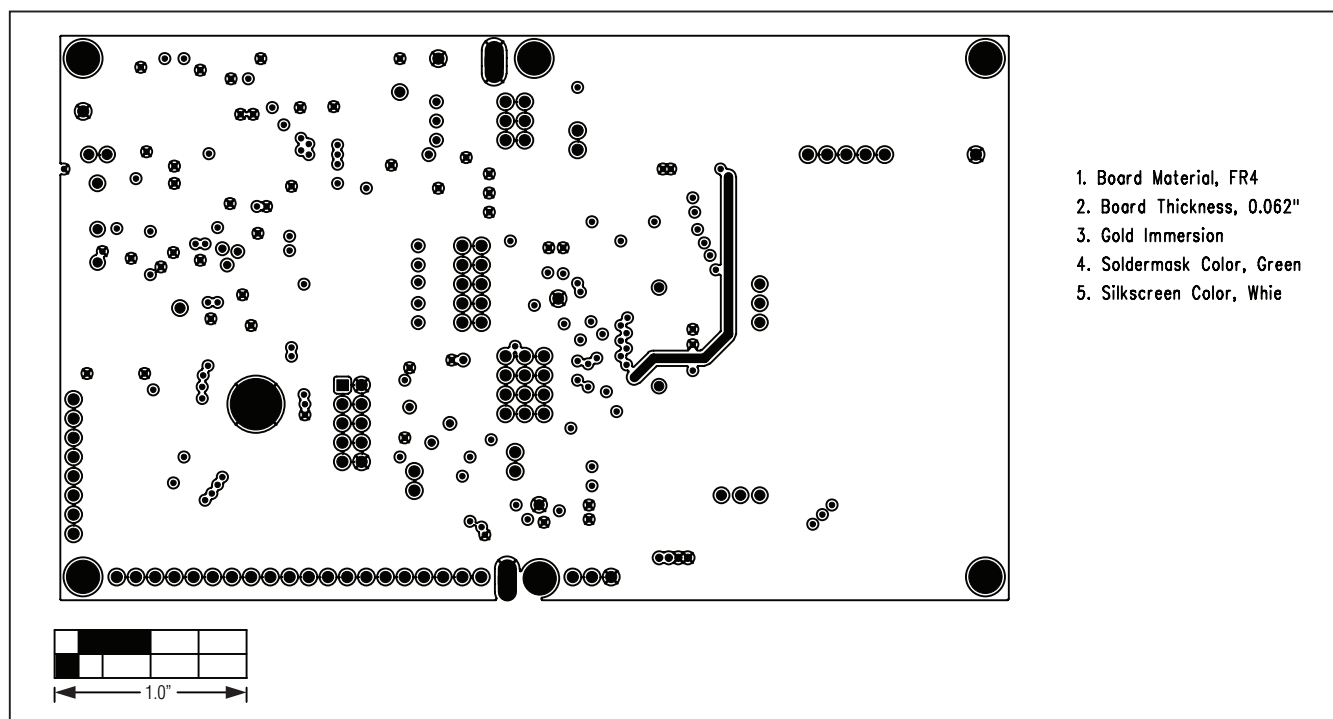


Figure 7. UTIB PCB Layout—Layer 2

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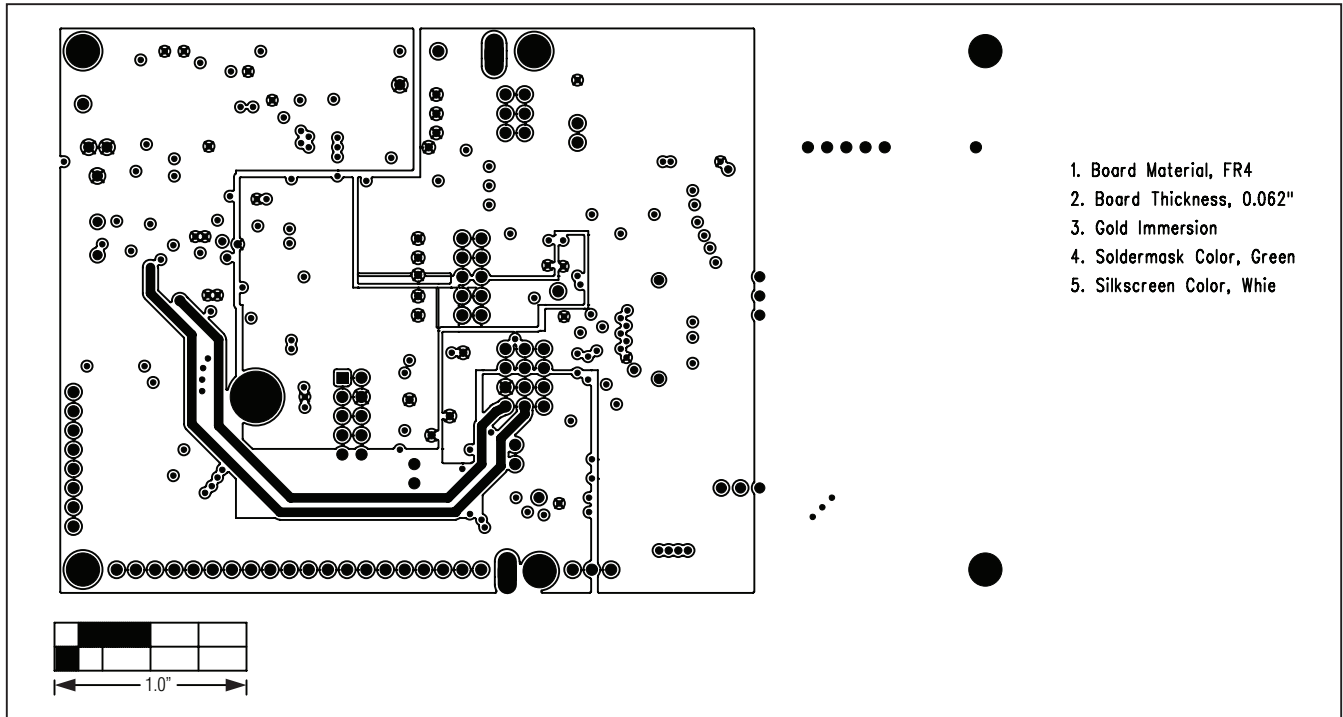


Figure 8. UTIB PCB Layout—Layer 3

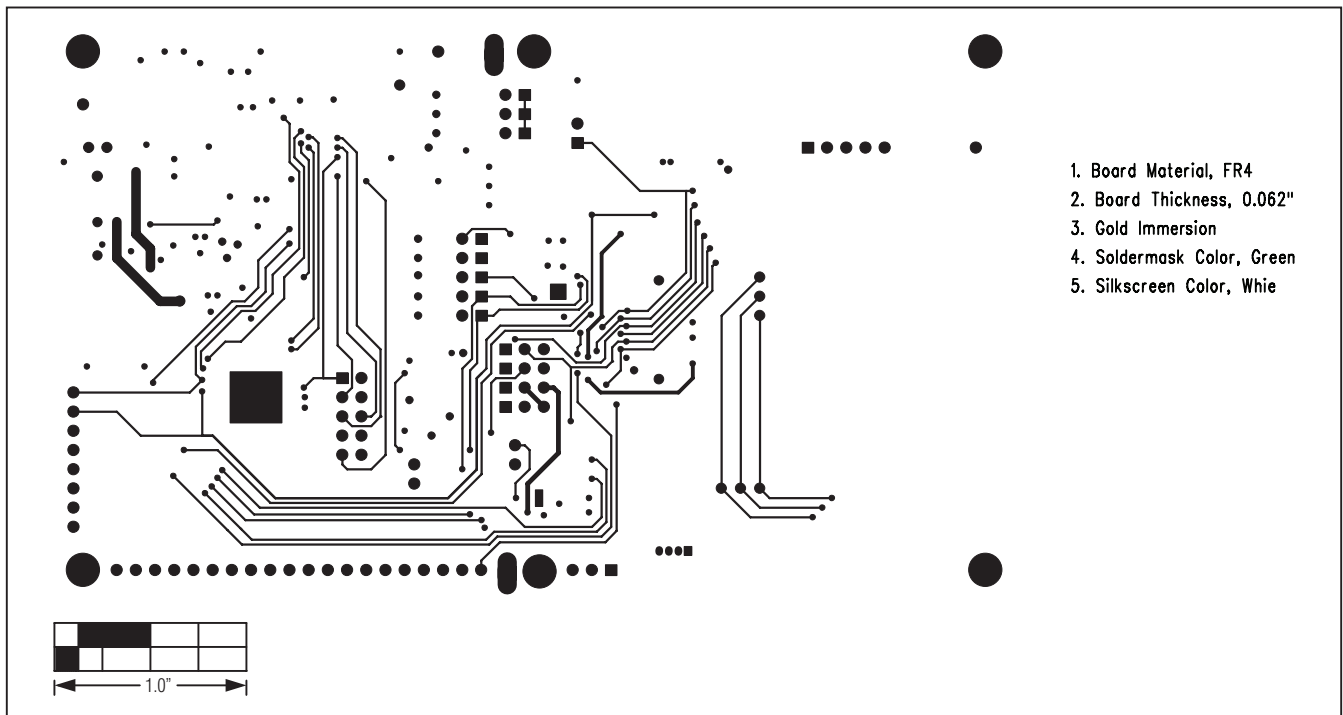
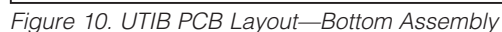


Figure 9. UTIB PCB Layout—Bottom Layer

Evaluates: MAX11835



Evaluates: MAX11835

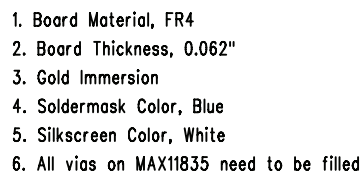


Figure 12. MAX11835 PCB Layout—Top Assembly

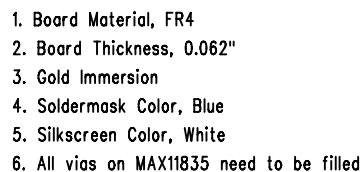
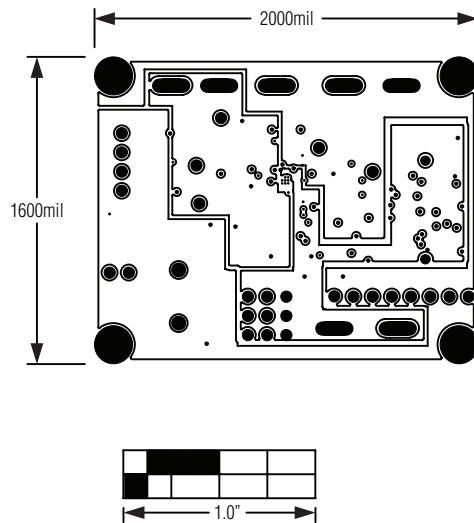


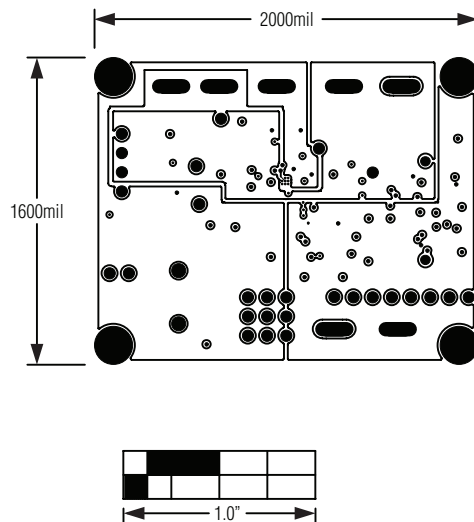
Figure 13. MAX11835 PCB Layout—Top Layer

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1. Board Material, FR4
2. Board Thickness, 0.062"
3. Gold Immersion
4. Soldermask Color, Blue
5. Silkscreen Color, White
6. All vias on MAX11835 need to be filled

Figure 14. MAX11835 PCB Layout—Layer 2



1. Board Material, FR4
2. Board Thickness, 0.062"
3. Gold Immersion
4. Soldermask Color, Blue
5. Silkscreen Color, White
6. All vias on MAX11835 need to be filled

Figure 15. MAX11835 PCB Layout—Layer 3

MAX11835 Evaluation System

Evaluates: MAX11835

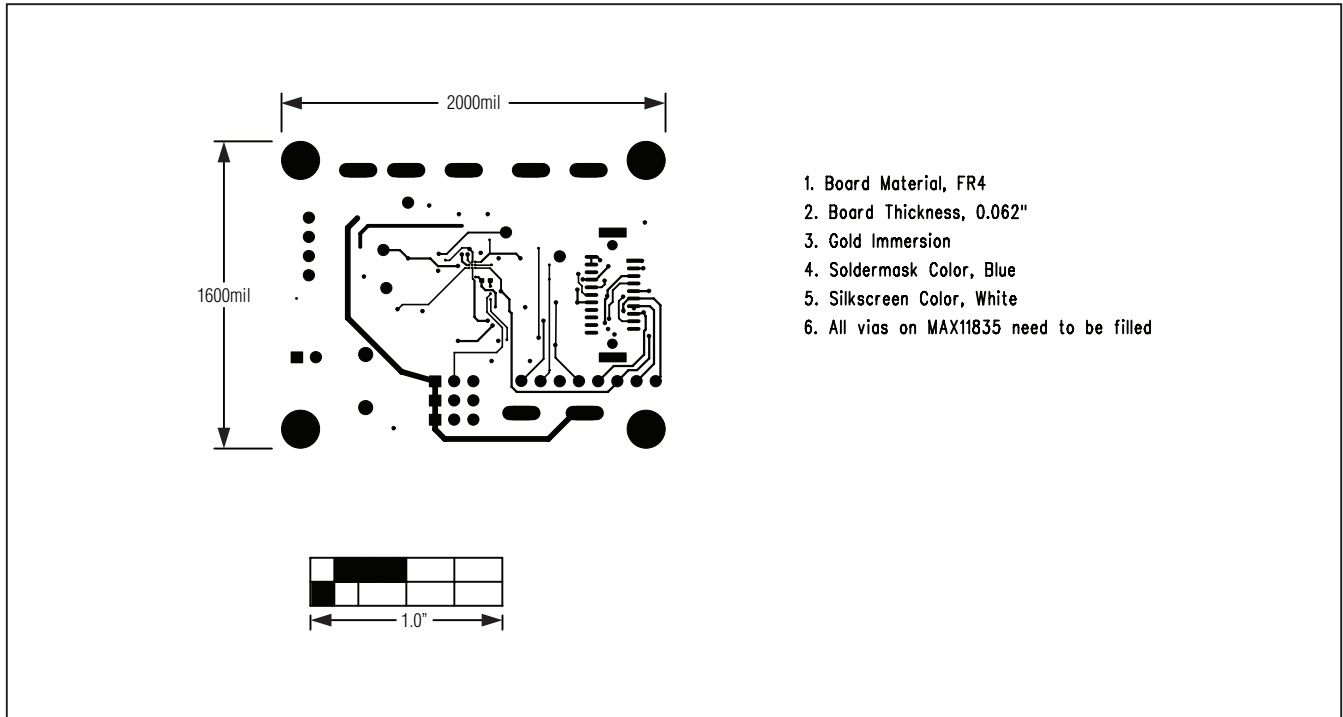


Figure 16. MAX11835 PCB Layout—Bottom Layer

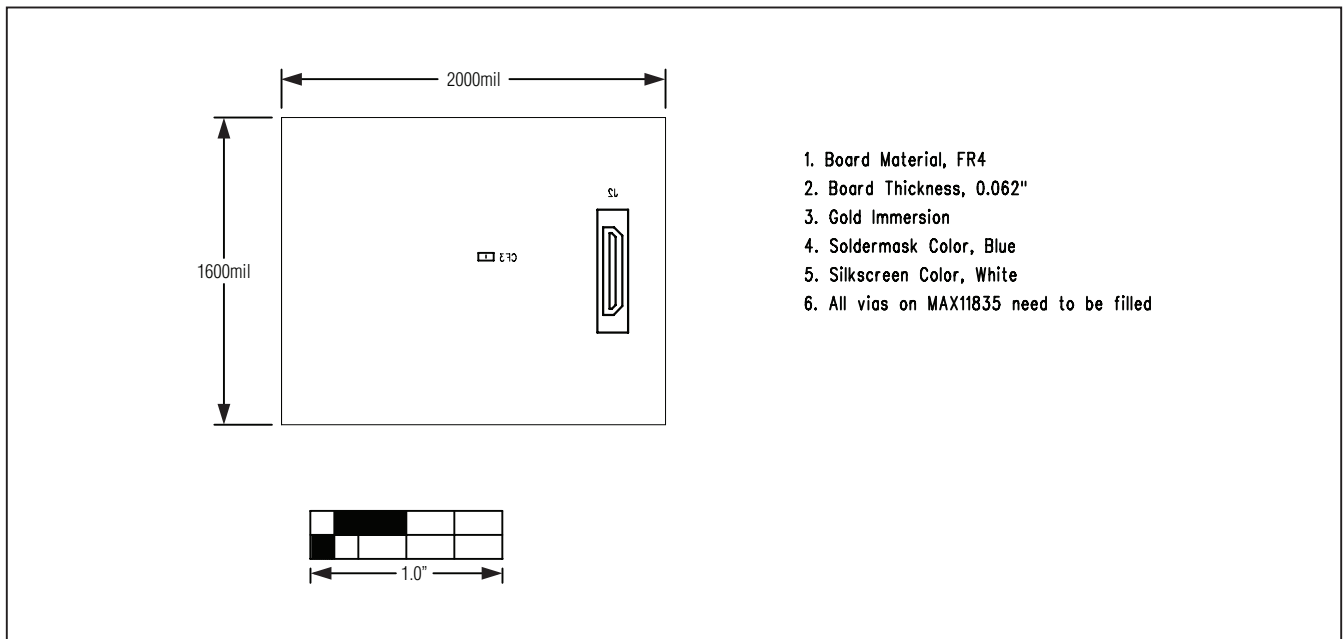


Figure 17. MAX11851 PCB Layout—Bottom Assembly

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	9/10	Initial release	—

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