

# MAXQ622 Evaluation Kit

## Evaluates: MAXQ622

### General Description

The MAXQ622 evaluation kit (EV kit) provides a proven platform for conveniently evaluating the capabilities of the MAXQ622 low-power, 16-bit, RISC microcontroller with USB interface targeted for battery-powered applications. The EV kit includes the MAXQ622 EV kit board, which contains infrared (IR) transmit and receive devices, a USB Mini-B interface, headers providing access to the processor's I/O port pins, a single 5V power-supply input, and a bank of eight pushbutton switches for user input. With the included software, USB-to-JTAG adapter, and a USB cable connected to a personal computer, the EV kit provides a complete, functional system ideal for developing and debugging applications as well as evaluating the overall capabilities of the MAXQ622 RISC processor.

### EV Kit Contents

- ◆ MAXQ622 EV Kit Board
- ◆ MAXQ USB-to-JTAG/1-Wire Adapter (MAXQUSBJTAGOW-KIT)
- ◆ JTAG Interface Cable

### Features

- ◆ Easily Load and Debug Code Using Supplied USB-to-JTAG Adapter
- ◆ JTAG Interface Provides In-Application Debugging Features
  - Step-by-Step Execution Tracing
  - Breakpointing by Code Address or Data Memory Address
  - Data Memory or Register Content View and Edit
- ◆ On-Board 3.3V Voltage Regulator (Powered from 5V Input, JTAG, or USB)
- ◆ Eight User-Input Pushbutton Switches
- ◆ USB Mini-B Connector Provides Access to MAXQ622 USB Interface and Transceiver
- ◆ Prototyping Area
- ◆ Included Board Schematics Provide a Convenient Reference Design

### Ordering Information

PART	TYPE
MAXQ622-KIT#	EV Kit

#Denotes an RoHS-compliant device that may include lead(Pb), which is exempt under the RoHS requirements.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1, C3, C10, C16	4	100nF, 10V ceramic capacitors (0603)
C2, C6, C9, C11	4	1.0μF, 10V ceramic capacitors (0603)
C4, C5	2	43pF ±5%, 50V ceramic capacitors (0603) Murata GRM1885C1H430JA01D
C7, C8	2	18pF ±5%, 50V ceramic capacitors (0603) KEMET C0603C180J5GACTU
C12	1	4.7μF, 10V ceramic capacitor (0805)
C13, C14	2	2.2μF, 10V ceramic capacitors (0805)
C15	1	10nF, 10V ceramic capacitor (0603)

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19-5209; Rev 3; 9/14

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### Component List (continued)

DESIGNATION	QTY	DESCRIPTION
CN1	1	USB Mini-B connector Tyco Electronics 1734035-2
D1	1	High-power AlGaAs IR (870nm) LED Lite-On IT HSDL-4261
D2	1	PIN photodiode 60° Lite-On IT ASDL-5270-D22
D3	1	6.4V, 200W Zener diode ON Semiconductor SMF5.0AT1G
D4, D5, D6	3	1A, 200V standard recovery diodes Diodes Inc. DFLR1200-7
DS1–DS4	4	Surface-mount, 660nm, red LEDs (1206) Lumex SML-LX1206SRC-TR
DS5	1	Surface-mount, 590nm, yellow LED (1206) Lumex SML-LX1206SYC-TR
FB1	1	Surface-mount ferrite bead (1206) Laird Technologies HZ1206C202R-10
F1	1	Fast-acting 500mA PICO-SMD fuse Littelfuse, Inc. 0459.500UR
J2	1	2.5mm power jack, through-hole mount CUI Inc. PJ-102B
JH1–JH7, JH10, JH11	9	1 x 2 header pins, 0.100in spaced Sullins PEC02SAAN
JH8, JH9	2	1 x 3 header pins, 0.100in spaced Sullins PEC03SAAN
P0–P5	6	1 x 8 header pins, 0.100in spaced Sullins PEC08SAAN
P6, P8, P9	3	1 x 6 header pins, 0.100in spaced Sullins PEC06SAAN
P7	1	2 x 5 header pin (JTAG connector), 0.100in-spaced dual row Sullins PEC05DAAN

DESIGNATION	QTY	DESCRIPTION
P10	1	1 x 3 header pin, 0.100in spaced Sullins PEC03SAAN
Q1	1	General-purpose small-signal npn transistor (40V, 200mA TO-92) ON Semiconductor 2N3904G
R1	1	82Ω ±5%, 1/4W SMD resistor (1206)
R2–R5, R9	5	180Ω ±5%, 1/10W SMD resistors (0603)
R6	1	3.32kΩ ±5%, 1/10W SMD resistor (0603)
R7	1	10kΩ ±5%, 1/10W SMD resistor (0603)
R8	1	2Ω ±1%, 1/10W SMD resistor (0603)
R10	1	10Ω ±1%, 1/10W SMD resistor (0603)
SW1–SW9	9	SPST normally open pushbutton switches OMRON Corp. B3FS-1000
TP1–TP15	15	Single-pin test points
U1	1	Microcontroller with infrared module and USB (64 LQFP) Maxim MAXQ622G-0000+
U2	1	+3.3V fixed-output LDO linear regulator (5 SOT23) Maxim MAX8887EZK33+
U3	1	Dual-channel high-speed ESD protector (6 SOT23) Maxim MAX3207EAUT-T
XU1	—	Socket (not populated)
Y1	1	Fundamental-mode 18pF, 12MHz crystal ECS, Inc. ECS-120-18-4VX
—	1	PCB: MAXQ622 Eval Kit, REV B

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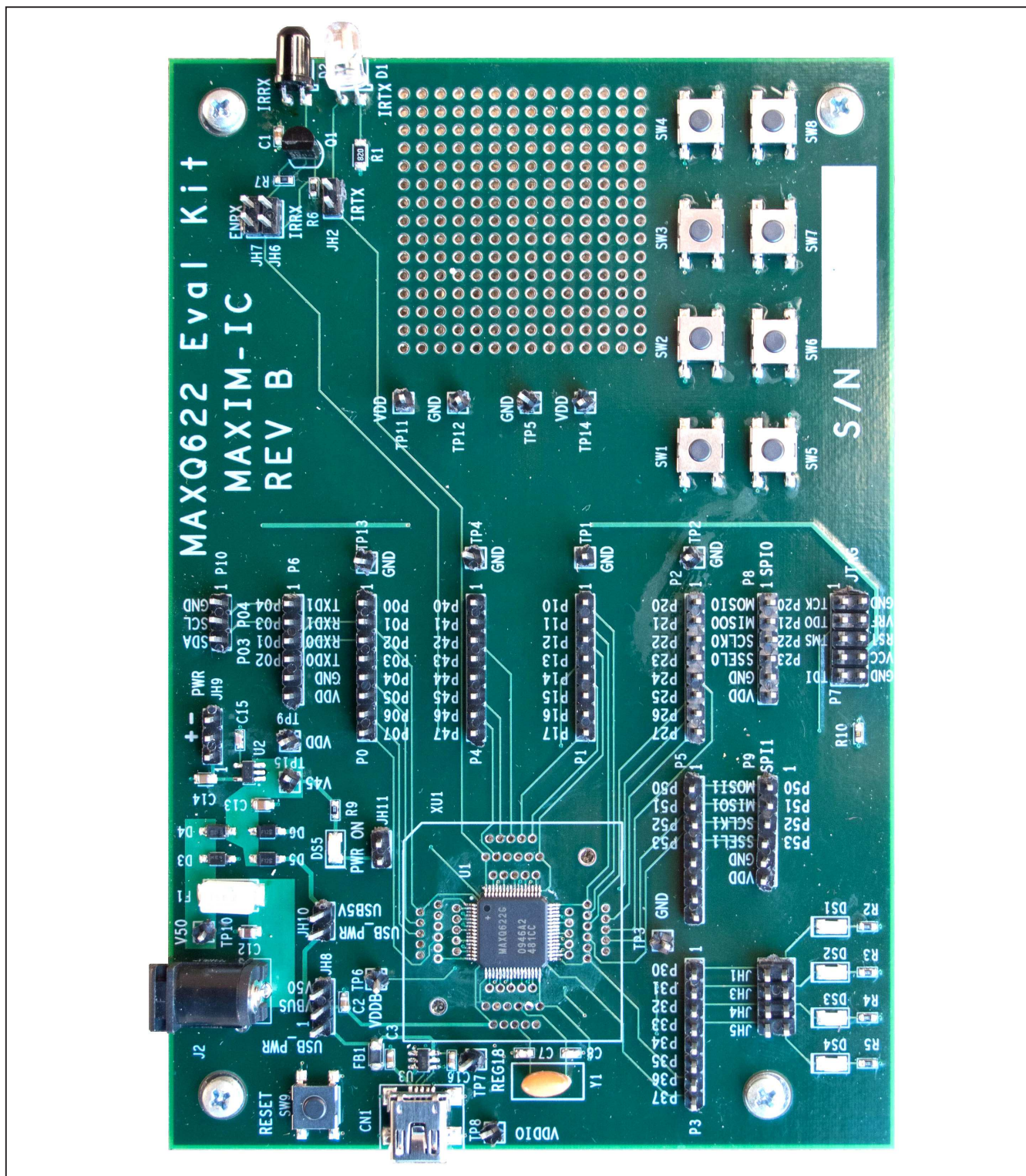


Figure 1. MAXQ622 EV Kit Board



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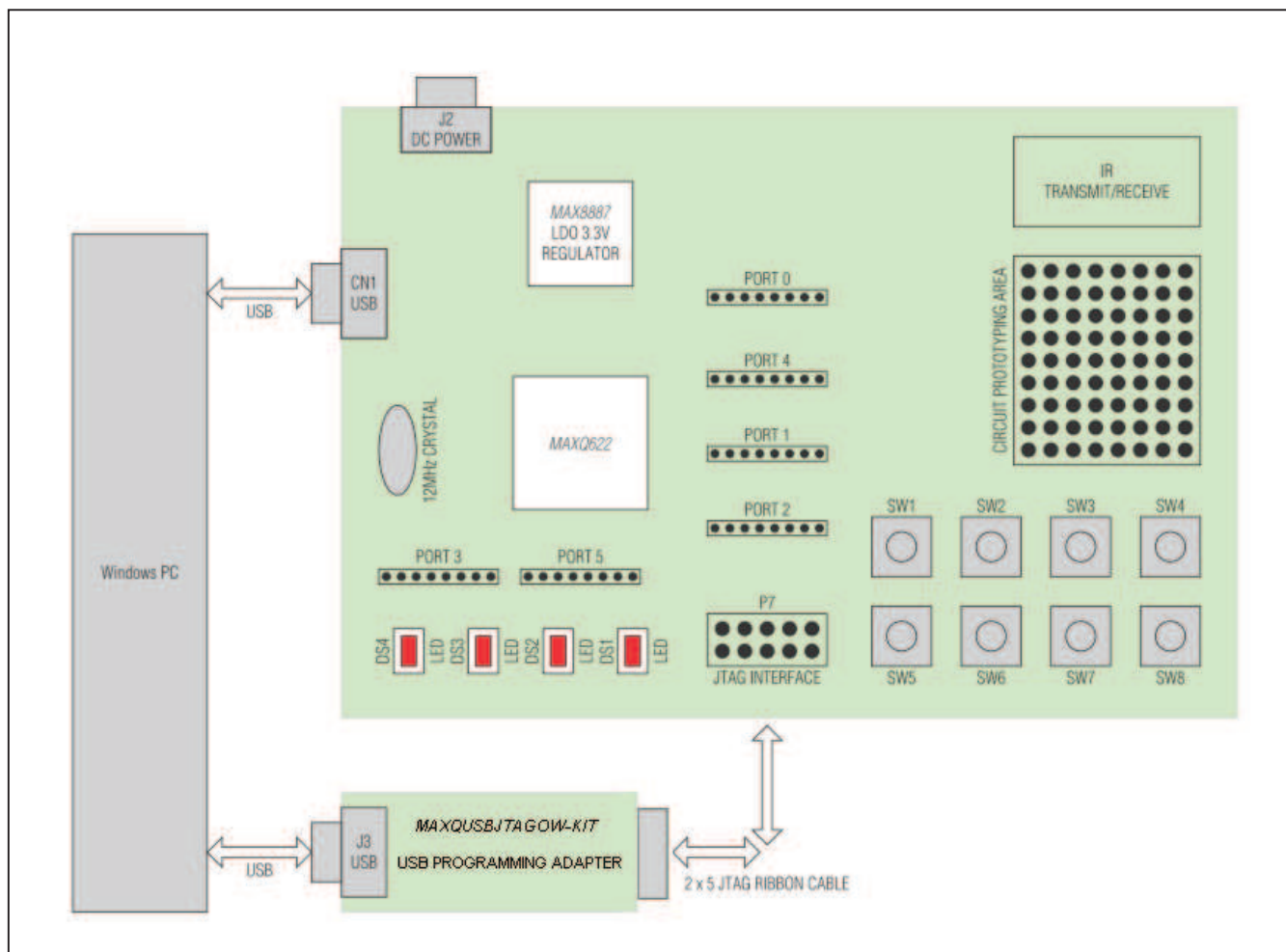


Figure 2. MAXQ622 EV Kit Board Functional Layout

### **Detailed Description of Hardware**

This EV kit must be used with the following documents:

- MAXQ612/MAXQ622 IC Data Sheet
- MAXQ612/MAXQ622 User's Guide
- MAXQ622 EV Kit Data Sheet (this document)

These documents are available online at:

[www.maximintegrated.com/MAXQ622](http://www.maximintegrated.com/MAXQ622)

The MAXQ622 EV kit is fully defined in the schematic (Figure 3). A short description of the major sections and functions of the board follows.

### **Power Supply**

The MAXQ622 EV kit can be powered directly using an external DC power supply applied to connector J2. A regulated 5V ( $\pm 5\%$ ), 300mA, center positive, 2.5mm power supply is required. The EV kit includes a regulator to supply 3.3V power to its circuitry.

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If the USB-to-JTAG interface adapter is being used, the EV kit is supplied by the USB 5V power, which is available to the USB-to-JTAG adapter.

Power can also be supplied to the MAXQ622 EV kit through the MAXQ622 microcontroller's USB interface. When a powered USB cable is plugged into CN1, connecting jumper JH10 allows the on-board +3.3V regulator to be powered directly from the USB supply.

### Infrared (IR) Interface

The MAXQ622 microcontroller provides a dedicated IR timer/counter module to simplify support for IR communication. The IR timer/counter implements two pins (IRTX and IRRX) for supporting IR transmit and receive, respectively. The IRTX output pin can be manipulated high or low using the IRTXOUT bit of the power control register (PWCN) when the IRTX function is not enabled. However, the IRTX pin has no corresponding port pin designation, so the standard port direction (PD), port output (PO), and port input (PI) control status bits are not present.

**Table 1. General-Purpose LED Connections**

LED	JUMPER	PORT PIN
DS1	JH1	P3.0
DS2	JH3	P3.1
DS3	JH4	P3.2
DS4	JH5	P3.3

**Table 2. Jumper Functions**

NAME	DESCRIPTION
JH1	Connects the board's DS1 LED cathode to the MAXQ622's port pin P3.0.
JH2	Connects the board's D1 IR LED cathode to the MAXQ622's IRTX pin.
JH3	Connects the board's DS2 LED cathode to the MAXQ622's port pin P3.1.
JH4	Connects the board's DS3 LED cathode to the MAXQ622's port pin P3.2.
JH5	Connects the board's DS4 LED cathode to the MAXQ622's port pin P3.3.
JH6	Connects the IR receiver interface transistor's collector to the MAXQ622's IRRX pin.
JH7	Connects the IR receiver interface transistor's emitter (IR receiver enable) to the MAXQ622's port pin P0.7.
JH8	With pins 1 and 2 connected, powers the MAXQ622's VBUS supply from the USB VBUS supply (connected at CN1). With pins 2 and 3 connected, powers the MAXQ622's VBUS supply from the +5.0V DC supply connected at J2.
JH9	Connect pins 1 and 2 to power the MAXQ622's VDD supply from the output of the +3.3V fixed regulator. To power the MAXQ622 from a bench supply, disconnect the jumper from JH9 and connect the supply to JH9.2 (power) and JH9.3 (ground).
JH10	Connects the USB VBUS supply (from CN1) to the input to the +3.3V regulator.
JH11	When connected, the DS5 power LED lights when power is available at the input to the +3.3V regulator. When disconnected, the DS5 power LED is disabled.

The MAXQ622 EV kit includes circuitry for both receiving and transmitting IR signals. The IR source is diode D1. Its anode is connected to the board's VDD supply through an 82Ω resistor, and its cathode is connected to the MAXQ622's IRTX pin when jumper JH2 is installed. The IR receiving circuitry consists of silicon PIN photodiode (D2) and an npn bipolar transistor (Q1) with biasing resistors. The photodiode (D2) is intended for IR applications in the 700nm to 1100nm range, and the transistor is configured as a common emitter amplifier for the diode. Its collector is connected to the processor's IRRX pin (when JH6 is installed), and the emitter is connected to the processor's P0.7 (TBB1) pin when jumper JH7 is installed. This allows the processor's port pin to be used as an IR receiver-enable signal.

### General-Purpose Diodes

The MAXQ622 EV kit has four general-purpose LEDs labeled DS1, DS2, DS3, and DS4. Each anode is connected to the board's VDD through a 180Ω resistor, and each cathode is connected to a processor port 3 pin through a jumper as specified in Table 1. By setting the related port pin as an output, each LED can be illuminated by setting the port pin output register bit (PO3.n) to a logic 0.

### Jumper Functions

The MAXQ622 EV kit contains a number of jumpers to configure its operation. Table 2 shows the jumpers and their functions.

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### User Input Pushbuttons

The MAXQ622 EV kit provides eight momentary contact switches intended for user input. Each switch is connected to a separate port pin on the MAXQ622's port 1 (P1.7 to P1.0) as shown in Table 3. The other side of each switch is connected to ground. Therefore, by using the weak pullup capability of the port pins, switch closure can be detected by reading a low on the normally high corresponding port pin.

**Table 3. Switch Input Connections**

PORT PIN	SWITCH
P1.0	SW1
P1.1	SW2
P1.2	SW3
P1.3	SW4
P1.4	SW5
P1.5	SW6
P1.6	SW7
P1.7	SW8

### JTAG Interface

A USB-to-JTAG adapter (provided with the EV kit) is used to program and debug applications running on the MAXQ622 EV kit. Connect the 10-pin ribbon cable from the JTAG board's J2 connector to connector P7 on the MAXQ622 EV kit board, being careful to note the polarity. Tools such as the Microcontroller Tool Kit (MTK) and IAR Embedded Workbench have built-in support for loading applications through the JTAG interface and using all the MAXQ622 debug functionality (breakpoints, register and memory reading, etc.).

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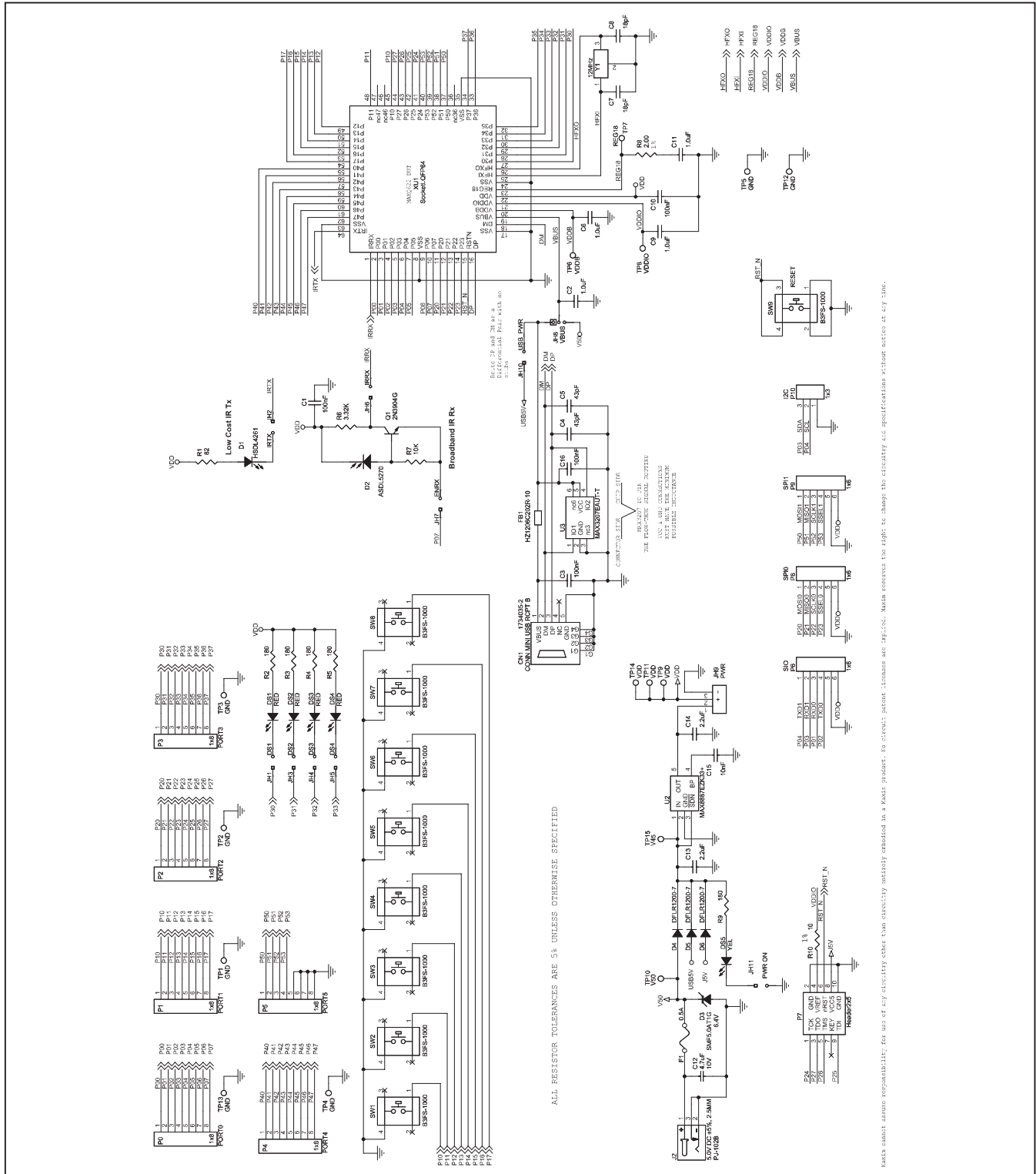
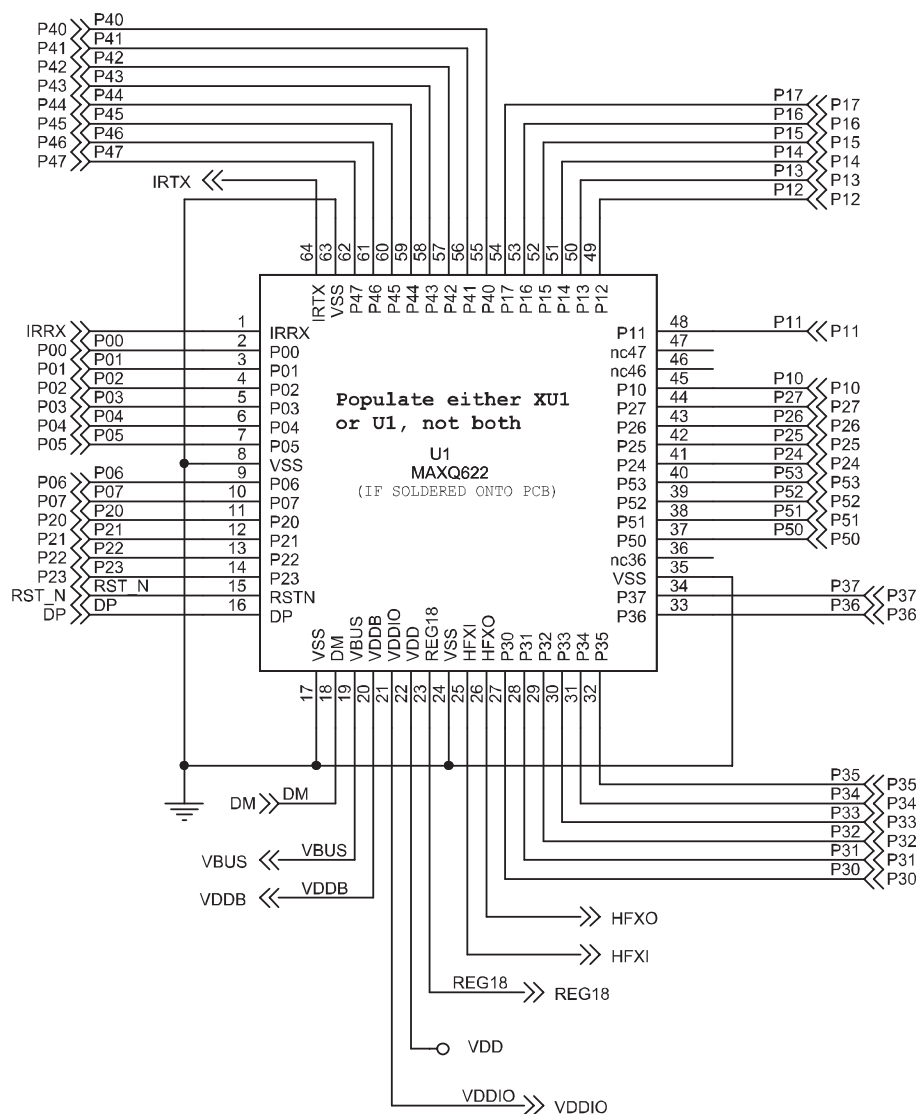


Figure 3a. MAXQ622 EV Kit Schematic (Sheet 1 of 2)

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ALL RESISTOR TOLERANCES ARE 5% UNLESS OTHERWISE SPECIFIED

Figure 3b. MAXQ622 EV Kit Schematic—Pushbuttons (Sheet 2 of 2)



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### Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/10	Initial release	—
1	5/10	Changed the part number in the <i>Ordering Information</i> table (RoHS compliant)	1
2	6/14	Removed references to CD; no longer shipping CD with EV kit package	1, 4
3	9/14	Changed references from USB-to-JTAG board to USB-to-JTAG adapter and replaced Figure 2	1, 4–6



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