

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 board, 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
- ◆ USB-to-JTAG Board
- ◆ MAXQ622 EV Kit CD
 - Includes Evaluation Installation of IAR Embedded Workbench® for MAXQ®
 - Includes MAXQ622 IC Data Sheet, MAXQ612/ MAXQ622 User's Guide, Application Notes, and Example Programs Including Source Code
- ◆ JTAG Interface Cable

Features

- ◆ Easily Load and Debug Code Using Supplied USB-to-JTAG Board
- ◆ 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 a RoHS-compliant device that may include lead(Pb) that 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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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 pro- tector (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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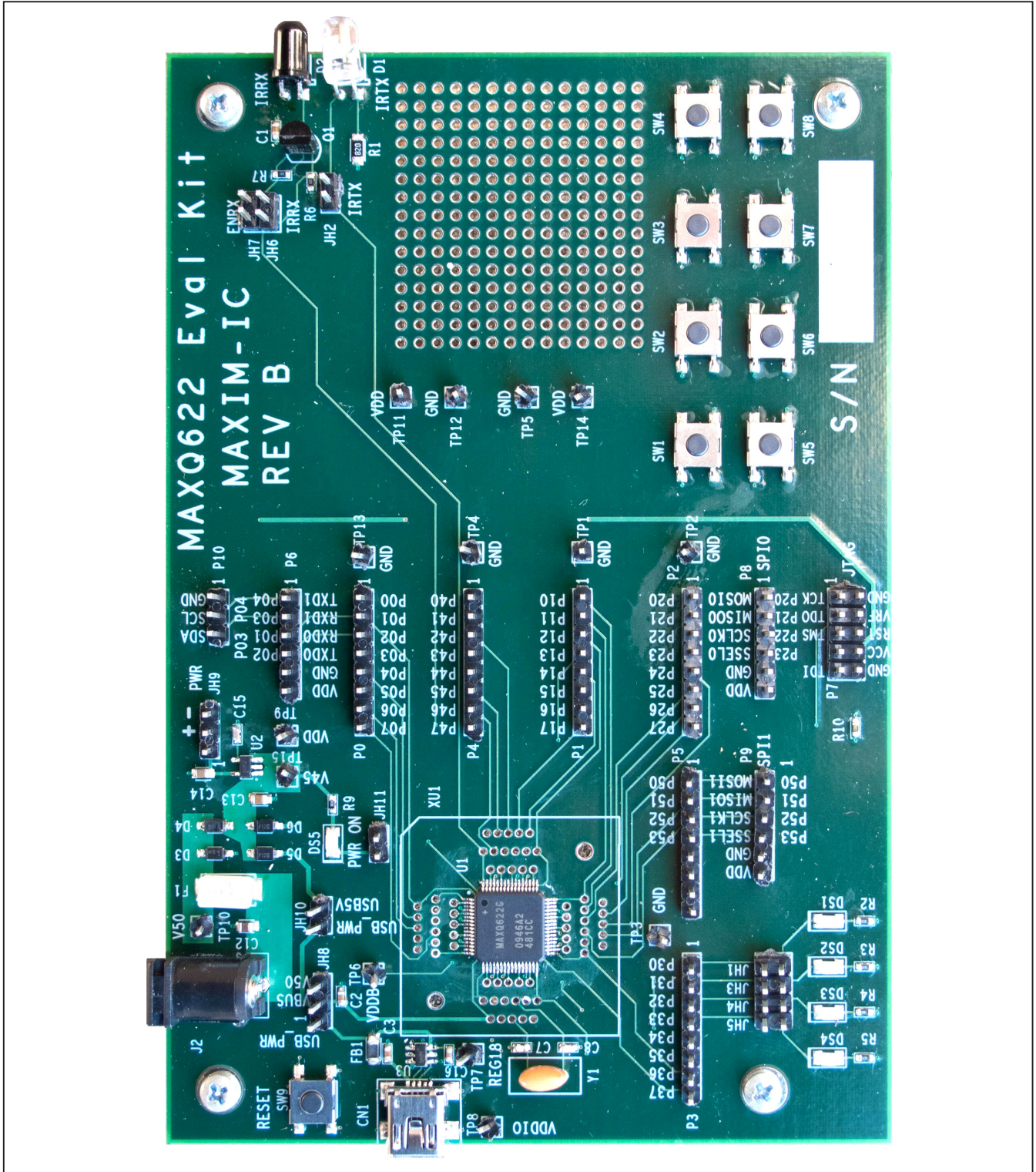


Figure 1. MAXQ622 EV Kit Board

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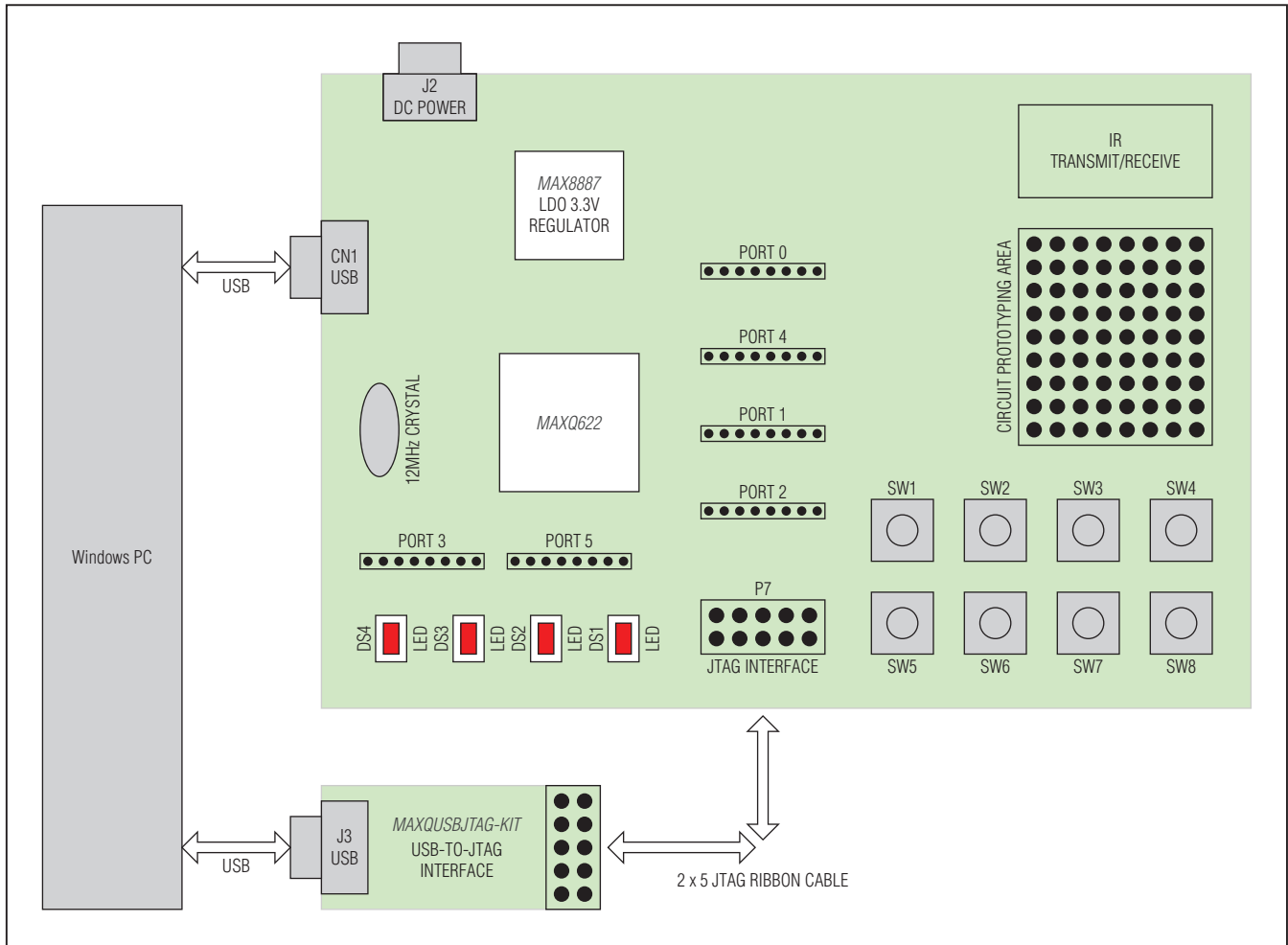


Figure 2. MAXQ622 EV Kit Board Functional Layout

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 included with the CD and available online at 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 board is being used, the EV kit is supplied by the USB 5V power, which is available to the USB-to-JTAG board.

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 board (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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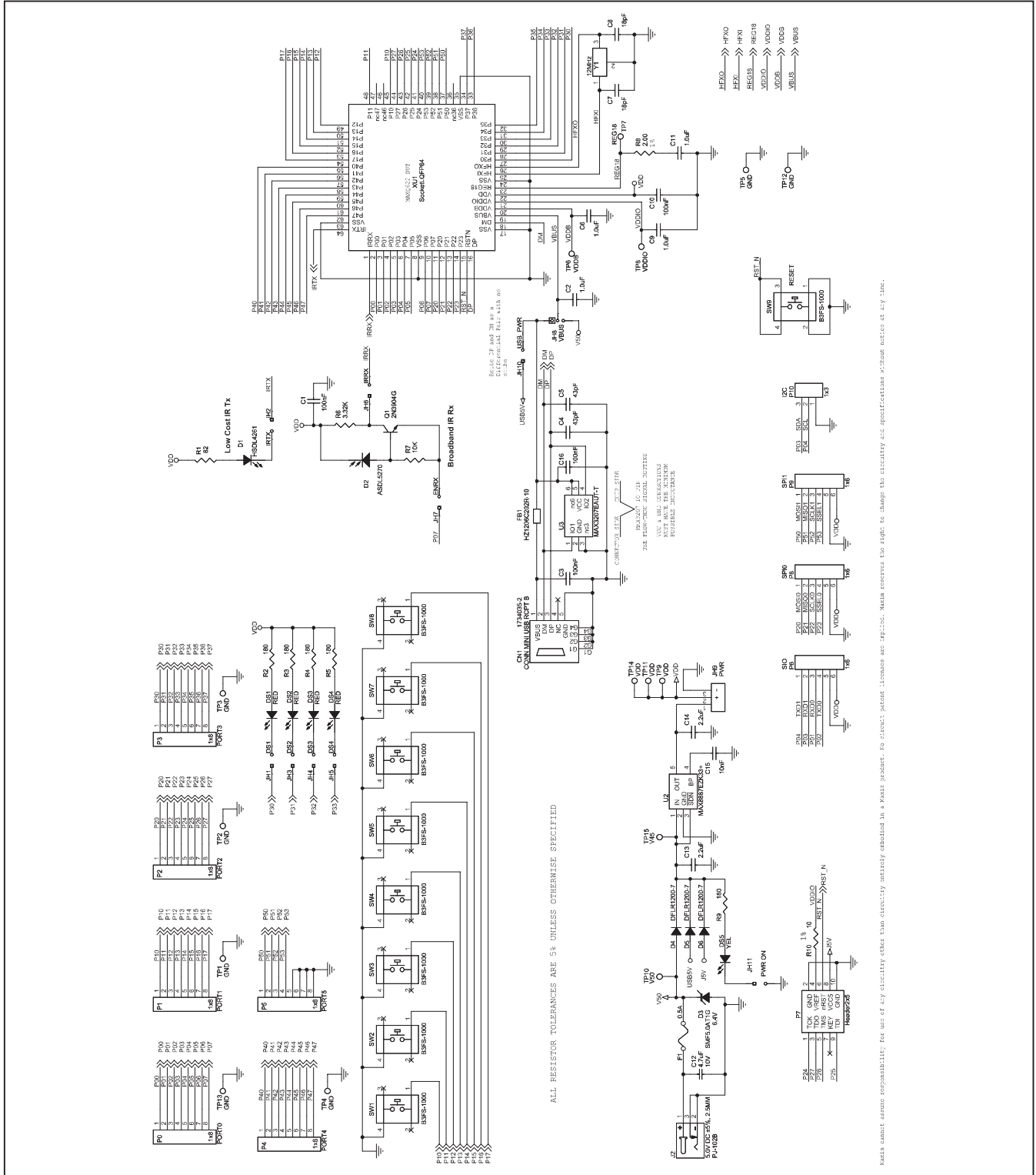


Figure 3a. MAXQ622 EV Kit Schematic (Sheet 1 of 2)

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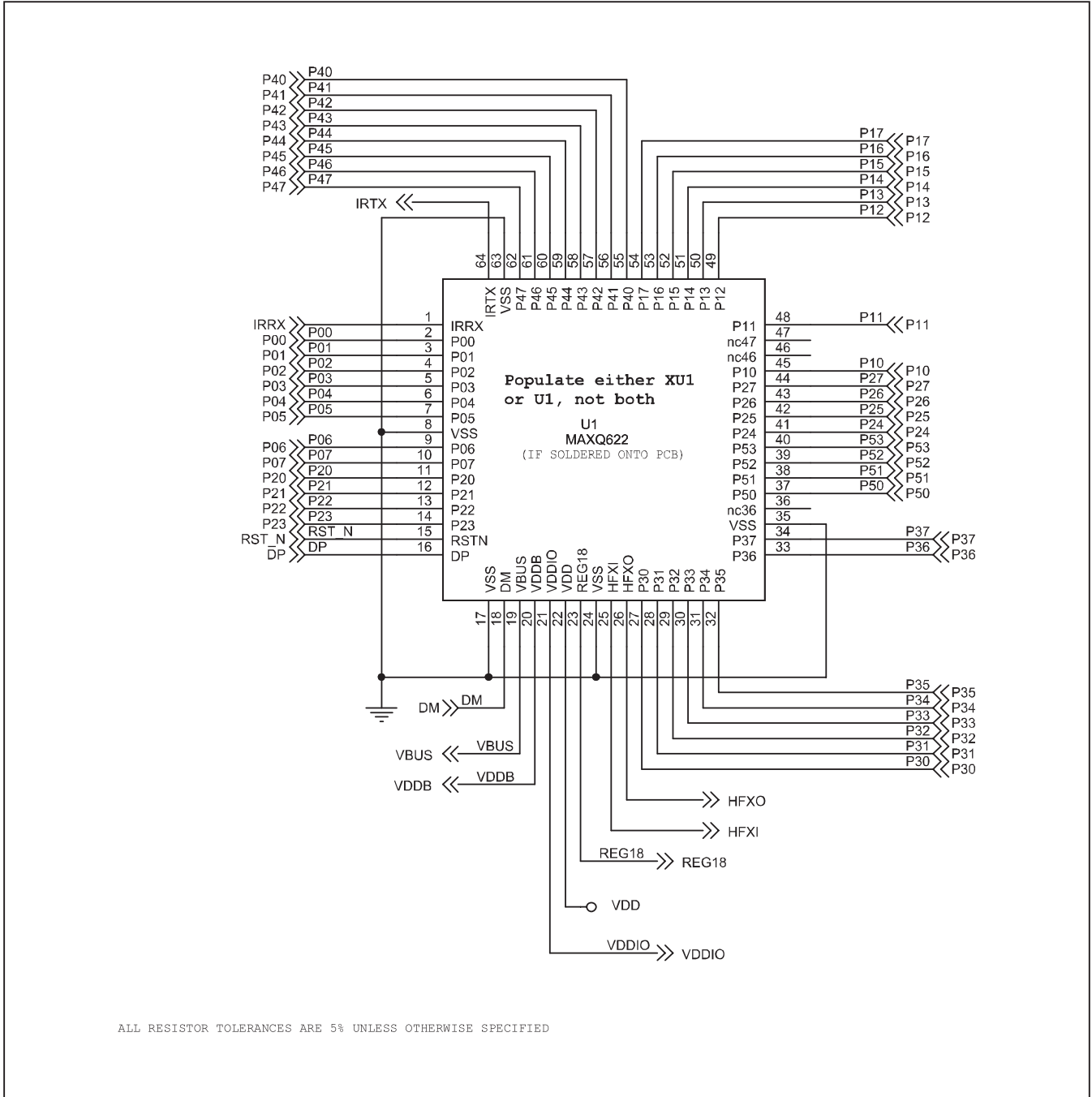


Figure 3b. MAXQ622 EV Kit Schematic—Pushbuttons (Sheet 2 of 2)

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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 |



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