

# MAXQ3210 Evaluation Kit

**Evaluates: MAXQ3210**

## General Description

The MAXQ3210 evaluation kit (EV kit) is a proven platform to conveniently evaluate the capabilities of the MAXQ3210 voltage regulator microcontroller. The kit contains the MAXQ3210 with pins brought out to headers, JTAG programming interface, 9V battery clip, piezoelectric horn, and pushbuttons and LEDs to control and display board operation. With the included power supply, software, serial-to-JTAG interface board, and an RS-232 cable connected to a personal computer, the kit provides a completely functional system ideal for evaluating the capabilities of the MAXQ3210.

## Evaluation Kit Contents

- ◆ MAXQ3210 EV Kit Board with Processor and 3.57MHz Crystal Installed
- ◆ Serial-to-JTAG Interface Board and JTAG Cable
- ◆ MAXQ3210 Evaluation Kit CD-ROM

## Ordering Information

PART	DESCRIPTION
MAXQ3210-KIT	Evaluation Kit for MAXQ3210

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## Features

- ◆ Easily Loads Code Using Bootstrap Loader and Serial-to-JTAG Interface Board
- ◆ JTAG Interface Provides In-Application Debugging Features
  - Step-by-Step Execution Tracing
  - Breakpointing by Code Address, Data Memory Address, or Register Access
  - Data Memory View and Edit
- ◆ 9V Battery Clip for Use with MAXQ3210 Voltage Regulator
- ◆ Piezoelectric Horn with Optional Volume Adjustment Jumpers
- ◆ Evaluation Kit Board can be Powered Directly Over JTAG Interface
- ◆ Processor Clock can be run from Crystal or RC Oscillator Circuit
- ◆ Direct LED Drive from Port Pin P0.7
- ◆ 32-Step Digital Potentiometer for Experimenting with On-Board Comparator
- ◆ Pushbutton Switches for Reset and Interrupt Generation
- ◆ Prototyping Area Including +5V Rail and Ground
- ◆ Test/Expansion Header Includes All Device GPIO and Piezoelectric Driver Pins
- ◆ Board Schematics Included to Provide a Convenient Reference Design

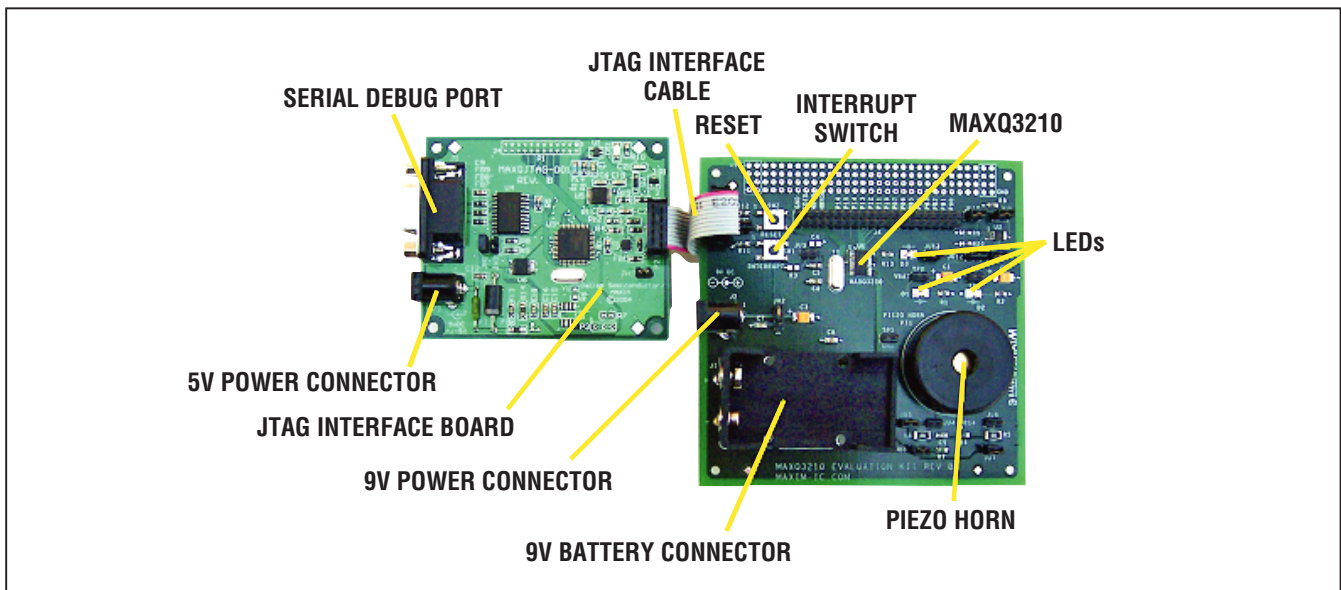


Figure 1. MAXQ3210 Evaluation Kit Setup

# MAXQ3210 Evaluation Kit

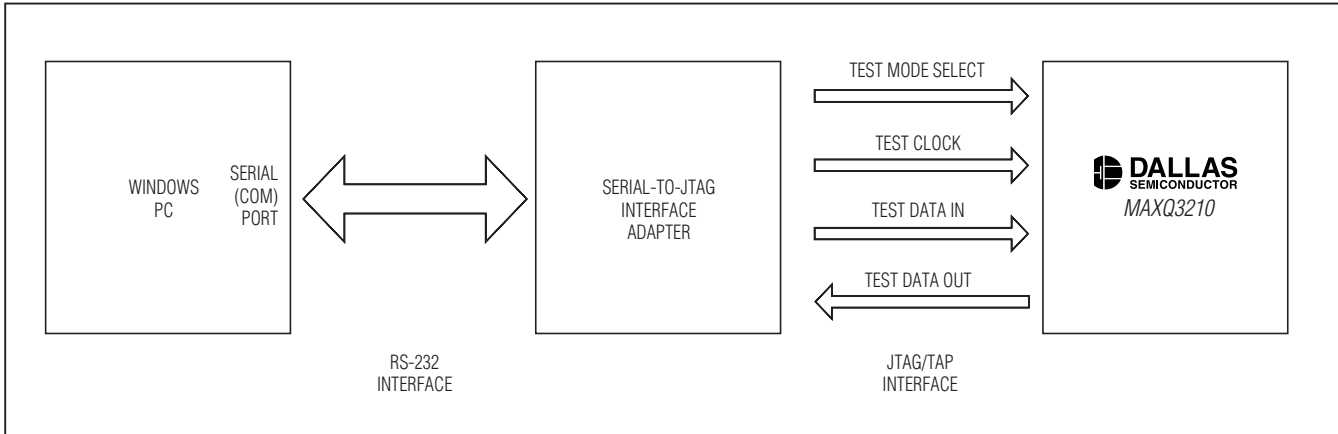


Figure 2. Serial-to-JTAG Interface

## Component List

DESIGNATION	QTY	DESCRIPTION	SUPPLIER/ PART NUMBER
C1, C2, C3	3	10 $\mu$ F, 20V tantalum capacitors	Panasonic ECS-T1DX106R
C4	1	Empty capacitor footprint (0805)	—
C5, C6	2	22pF $\pm$ 10%, 10V capacitors (0805)	Generic
C7, C8	2	100nF $\pm$ 10%, 10V capacitors (0805)	Generic
C9	1	2nF, 10V capacitor (0805)	Generic
D1, D2, D3	3	Red surface-mount LEDs	Dialight 597-3001-1xx
JU1, JU3–JU13	12	2-pin NO (1 x 2, 0.1") jumpers	3M 929834-02-02
JU2	1	3-pin NO (1 x 3, 0.1", 2 of 3) jumper	3M 929834-02-03
J1	1	9V battery clip	Keystone 1294
J2	1	DC power jack (2mm)	CUI Inc. PJ-002A
J3	1	2 x 5, 0.100" spaced header	3M 929836-02-05
J4	1	2 x 20, 0.100" spaced header	3M 929836-02-20

DESIGNATION	QTY	DESCRIPTION	SUPPLIER/ PART NUMBER
PT1	1	Piezoelectric horn (high volume)	CUI Inc. CEP-1172
R1	1	1.2k $\Omega$ , 1/8W resistor (0805)	Generic
R2	1	510 $\Omega$ , 1/8W resistor (0805)	Generic
R3	1	Empty resistor footprint (0805)	—
R4, R5	2	1k $\Omega$ , 1/2W resistors (2010)	Generic
R6	1	68k $\Omega$ , 1/8W resistor (0805)	Generic
R7	1	470k $\Omega$ , 1/8W resistor (0805)	Generic
R8, R9, R10	3	10k $\Omega$ , 1/8W resistors (0805)	Generic
R11, R12, R13	3	1k $\Omega$ , 1/8W resistors (0805)	Generic
R14	1	30k $\Omega$ , 1/8W resistor (0805)	Generic
SW1, SW2	2	SPST-NO momentary pushbutton	Omron B3FS-1000
TP1, TP2, TP3	3	1 x 2 (0.100" spaced) test points	3M 929834-02-02

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## Component List (continued)

DESIGNATION	QTY	DESCRIPTION	SUPPLIER/ PART NUMBER
U1	1	MAXQ3210 voltage regulator microcontroller	MAXQ3210-EJX
U2	1	MAX5160 digital potentiometer	MAX5160LEUA
Y1	1	3.5795MHz crystal	Citizen HC49US3.5795 45MABJ

## Detailed Description

This evaluation kit must be used with the following documents:

- MAXQ3210 Data Sheet ([www.maxim-ic.com/MAXQ3210](http://www.maxim-ic.com/MAXQ3210))
- MAXQ Family User's Guide ([www.maxim-ic.com/MAXQUG](http://www.maxim-ic.com/MAXQUG))
- MAXQ Family User's Guide: MAXQ3210/MAX3212 Supplement ([www.maxim-ic.com/MAXQ32xxSUP](http://www.maxim-ic.com/MAXQ32xxSUP))

The MAXQ3210 EV kit board is fully defined in the schematics provided in the EV kit CD-ROM. However, a short description of the major components and connectors of the boards follows.

### Power Supplies

There are three ways to set up power supplies when using the MAXQ3210 EV kit. The two boards that require power supplies are the MAXQ3210 EV kit board and the serial-to-JTAG interface board.

#### Running Both Boards from Separate Power Supplies

To run each of the boards from its own power supply, connect supplies as follows.

- Connect a 5V,  $\pm 5\%$  regulated DC wall supply (center post positive) to the J2 power plug of the serial-to-JTAG interface board.

- Connect a 9V,  $\pm 5\%$  regulated DC wall supply (center post positive) to the J2 power plug of the MAXQ3210 EV kit board, **OR** insert a 9V battery into clip J1 of the MAXQ3210 EV kit board.
- Connect a jumper across pins 1 and 2 of jumper JU2 on the MAXQ3210 EV kit board.

**Note: When using two power supplies in this manner, the JU1 jumper on the MAXQ3210 EV kit board must be DISCONNECTED.**

#### Running Both Boards from a Single Power Supply

If the serial-to-JTAG interface board is being used, a single power supply can be used to power both boards as follows.

- Connect a 5V,  $\pm 5\%$  regulated DC wall supply (center post positive) to the J2 power plug of the serial-to-JTAG interface board.
- Connect the JH3 jumper on the serial-to-JTAG interface board.
- Connect the JU1 jumper on the MAXQ3210 EV kit board.
- Connect a jumper across pins 2 and 3 of JU2 on the MAXQ3210 EV kit board.

**Note: Do not connect a power supply to the J1 plug on the MAXQ3210 EV kit when powering the boards in this manner.**

#### Running the MAXQ3210 EV Kit Board from a Single Power Supply

If the MAXQ3210 has already been programmed using the JTAG interface, it is possible to disconnect the serial-to-JTAG board and power up the MAXQ3210 EV kit board on its own. This simply executes the previously loaded firmware, with no possibility of in-application load or debugging.

- Connect a 9V,  $\pm 5\%$  regulated DC wall supply (center post positive) to the J2 power plug of the MAXQ3210 EV kit board, **OR** insert a 9V battery into clip J1 of the MAXQ3210 EV kit board.
- Connect a jumper across pins 1 and 2 of JU2 on the MAXQ3210 EV kit board.

The power pins for the MAXQ3210 EV kit are connected to the on-board power supplies by jumpers as shown in Table 1.

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**Table 1. Power-Supply Jumper Settings**

JUMPER	SETTING	EFFECT
JU1	(No jumper)	REGOUT is not connected to JTAG 5V. (Drive from internal regulator or bench supply.)
JU1	Pins 1 and 2 connected	REGOUT is connected to the 5V supply from the JTAG board.
JU2	(No jumper)	The power supply at J2 is not used.
JU2	Pins 1 and 2 connected	The J2 power supply (which should be 9V) is connected to the VBAT pin. This configuration should only be used with the J1 battery clip empty.
JU2	Pins 2 and 3 connected	The J2 power supply (which should be 5V) is connected to the REGOUT pin. When using this configuration, the JU1 jumper must be disconnected and the J1 battery clip must be empty.

\* Refer to the MAXQ3210 data sheet for the allowable range of supply at REGOUT.

### Additional Hardware Features

Most of the additional hardware on the MAXQ3210 EV kit, such as the piezoelectric horn, LED and digital potentiometer, can be enabled or disabled by setting or removing jumpers. Disabling unused hardware frees up the associated port pins for other uses.

### Using the RC Oscillator Clock Option

To run the MAXQ3210 EV kit using the RC oscillator, remove the crystal at Y1, close jumper JU3, and populate R3 and C4 with appropriate components. (Refer to the MAXQ3210 data sheet for appropriate resistor and capacitor values for a given frequency.)

Because the XT/RC bit in the CKCN register is set to 1 (selecting crystal mode) upon power-up, the MAXQ3210 will always come out of power-up and attempt to run from an external crystal. If the RC circuit option is populated instead, the crystal oscillator does not start, and the MAXQ3210 continues running on the internal ring oscillator (approximately 8kHz) until the loaded program firmware sets the XT/RC bit to 0. If the MAXQ3210 is not loaded, it continues running from the internal ring indefinitely, which means it is running too slowly to communicate using the standard JTAG firmware.

**Table 2. Other Jumper Settings**

JUMPER	WHEN OPEN	WHEN CLOSED
JU3	No effect.	The RC oscillator circuit may be used to drive the MAXQ3210 clock. To use this feature, Y1 must be empty, and R3 and C4 must be populated with appropriate components.
JU5, JU7, JU8	The piezoelectric horn is disabled.	The piezoelectric horn is enabled.
JU4, JU6	The piezoelectric horn operates at reduced volume.	The piezoelectric horn operates at full volume.
JU9	No effect.	Port pin P0.0 is connected to pin CS of the MAX5160 digital potentiometer.
JU10	No effect.	Port pin P1.5 is connected to pin INC of the MAX5160 digital potentiometer.
JU11	No effect.	Port pin P0.5 (comparator input) is connected to the wiper pin of the MAX5160.
JU12	No effect.	Port pin P1.6 is connected to pin U/D of the MAX5160 digital potentiometer.
JU13	No effect.	Port pin P0.7 (LED drive) is connected to the red LED D3.

If this occurs, you can communicate with the slow-running MAXQ3210 by loading the **jtag\_1kHz.hex** file (provided on the EV kit CD-ROM) into the serial-to-JTAG board and then using MTK or MAX-IDE as usual. Note that this version performs the master erase, loading, and debug operations much more slowly than usual due to the reduced communications speed, so as soon as you have loaded program firmware into the MAXQ3210 that sets the XT/RC bit to 0 upon startup, you can reload the normal serial-to-JTAG board firmware to go back to normal tools operation.

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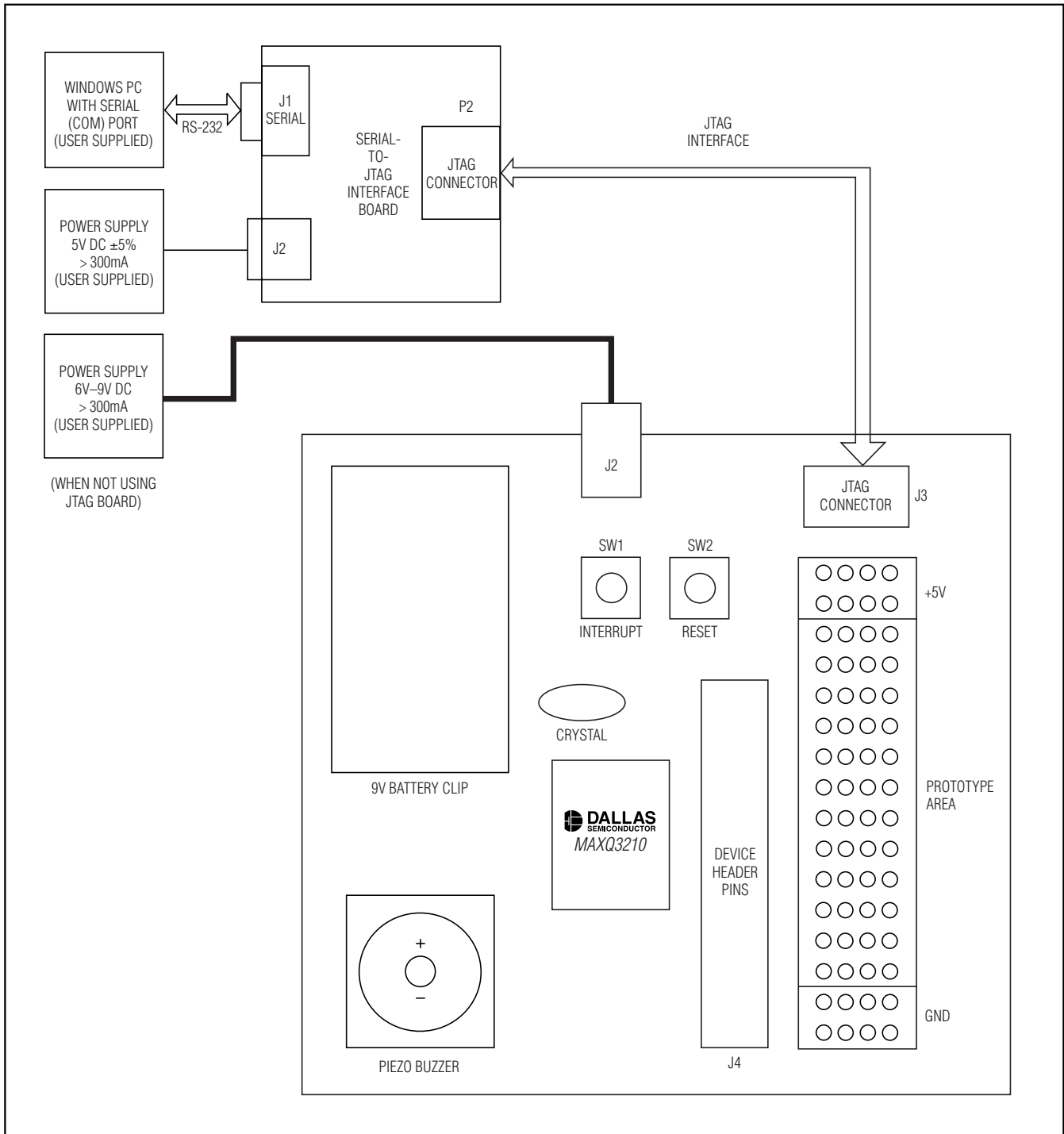


Figure 3. MAXQ3210 Evaluation Kit Functional Layout



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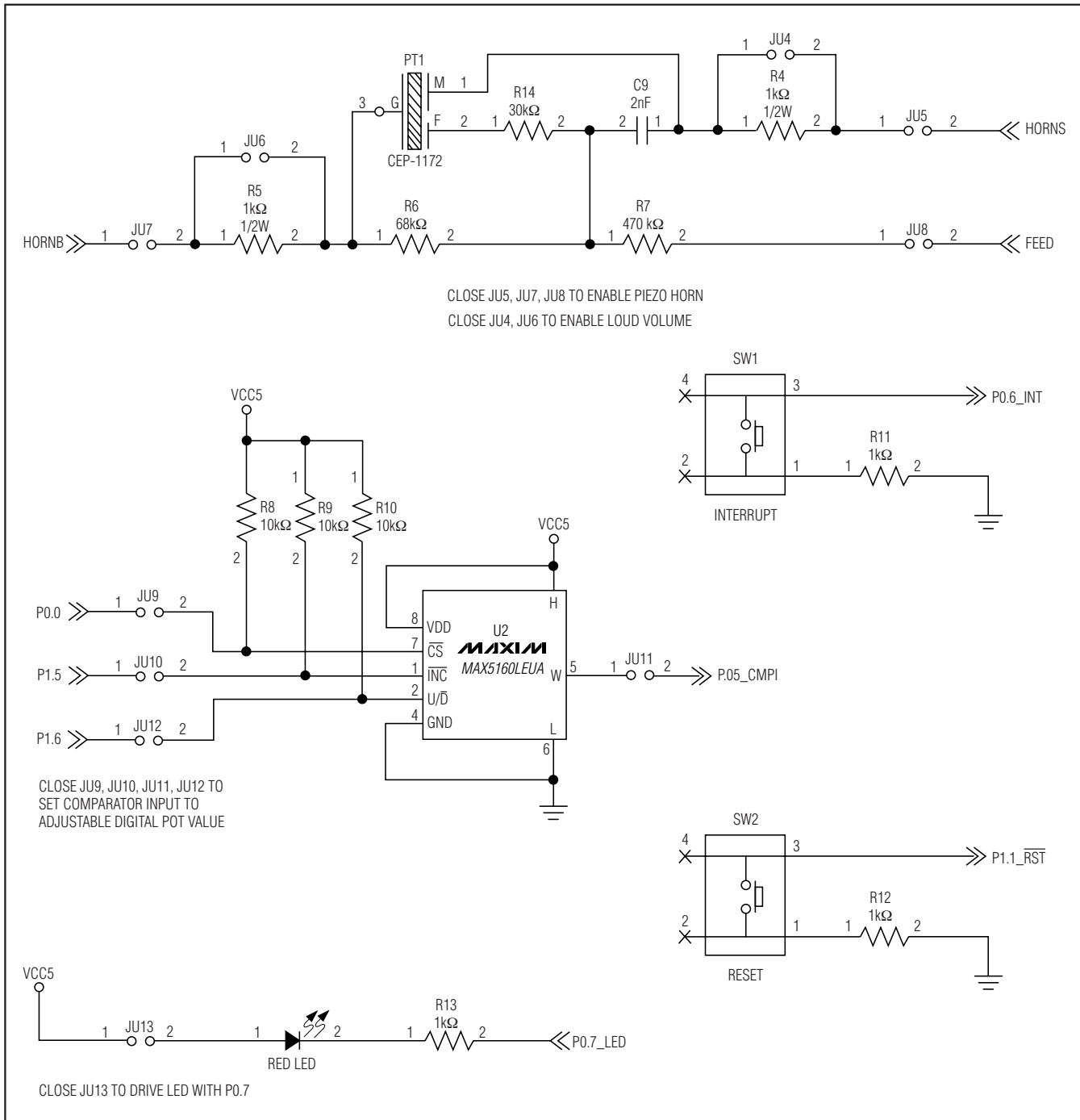


Figure 5. MAXQ3210 Evaluation Kit Demo Components Schematic

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