# CP2108 Evaluation Kit User's Guide

## 1. Introduction

The CP2108 is a highly integrated USB-to-Quad-UART Bridge Controller providing a simple solution for updating RS-232/RS-485 designs to USB using a minimum of components and PCB space. The CP2108 includes a USB 2.0 full-speed function controller, USB transceiver, oscillator, EEPROM, and four asynchronous serial data buses (UART) with full modem control signals in a compact 9 mm x 9 mm QFN-64 package.

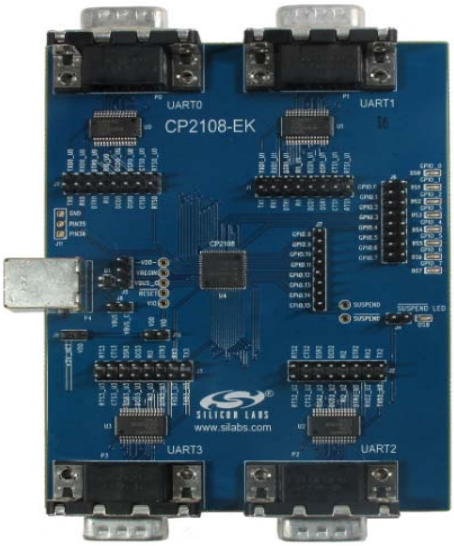


**Figure 1. CP2108 USB-to-Quad UART Bridge Controller Evaluation Board**

## 2. Kit Contents

The CP2108 Evaluation Kit contains the following items:

- CP2108 evaluation board
- Four RS232 serial cables
- USB cable
- Quick Start Guide

## 3. Software Setup

The software package for the CP2108 kit (https://www.silabs.com/products/interface/usbtouart/Pages/usb-to-uart-bridge.aspx) contains the following:

- CP210x Drivers (Side Menu Under Tools → Download VCP Drivers)
- Documentation: (Click the Documentation Tab)
  - CP2108 data sheet
  - CP2108 Evaluation Kit User's Guide (this document)

Follow the instructions in the CP210x installer to install the desired drivers on the system.

**Note:** The VCP driver installation process for Windows is a two phase process. First, the files needed for the driver installation are unpacked to a location on the computer. Then, the unpacked files are used to install the Virtual COM Port driver.

## 4. CP2108 Hardware Interface

Connect the CP2108 evaluation board to a PC as shown in Figure 2.

1. Connect one end of the USB cable to a USB Port on the PC.
2. Connect the other end of the USB cable to the USB connector on the CP2108 evaluation board.
3. Connect one end of the RS232 serial cable to one of the DB9 connectors on the CP2108 evaluation board.
4. Connect the other end of the RS232 serial cable to the target serial device.
5. To connect to additional serial devices, repeat Steps 3 and 4 using another RS232 serial cable and one of the unused DB9 connectors on the CP2108 evaluation board.

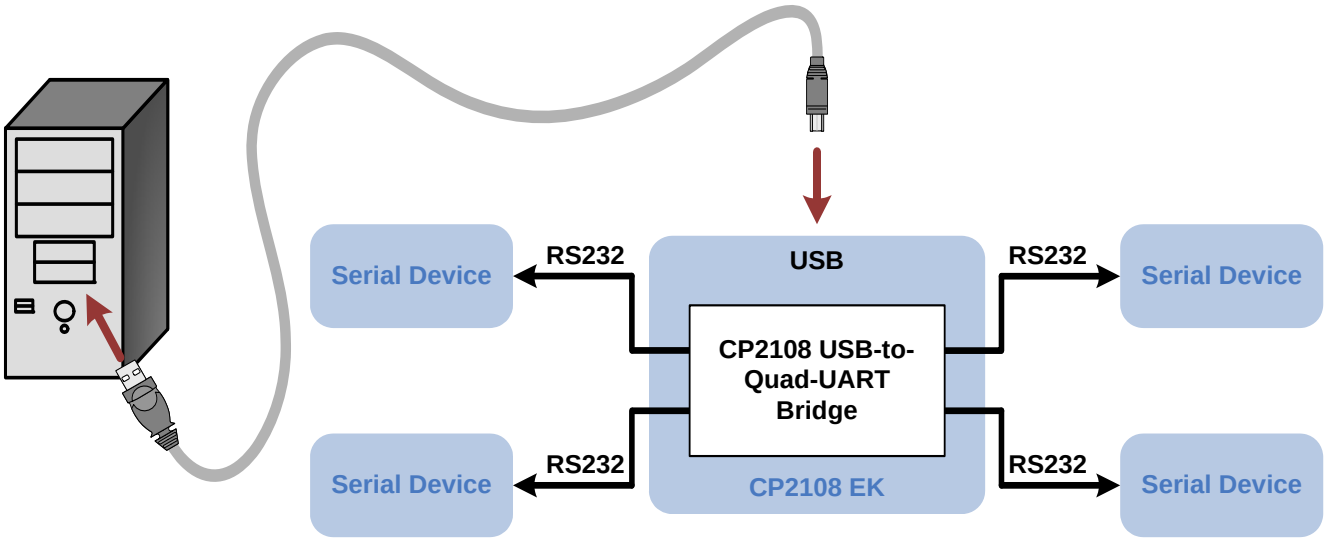


**Figure 2. Hardware Setup**

## 5. CP2108 Software Interface

The CP2108 will appear as four COM ports in the Device Manager, as shown in Figure 3. The CP2108 will always use the lowest available COM port for operation. For instance, if COM flash 1 through 6 are in use by other peripherals and applications, the CP2108 will use COM7, COM8, COM9, and COM10.

The CP2108 functions identically to a COM port from the reference point of both the host application and the serial device, and it can support serial device control requests defined in the Microsoft Win32® Communications API.

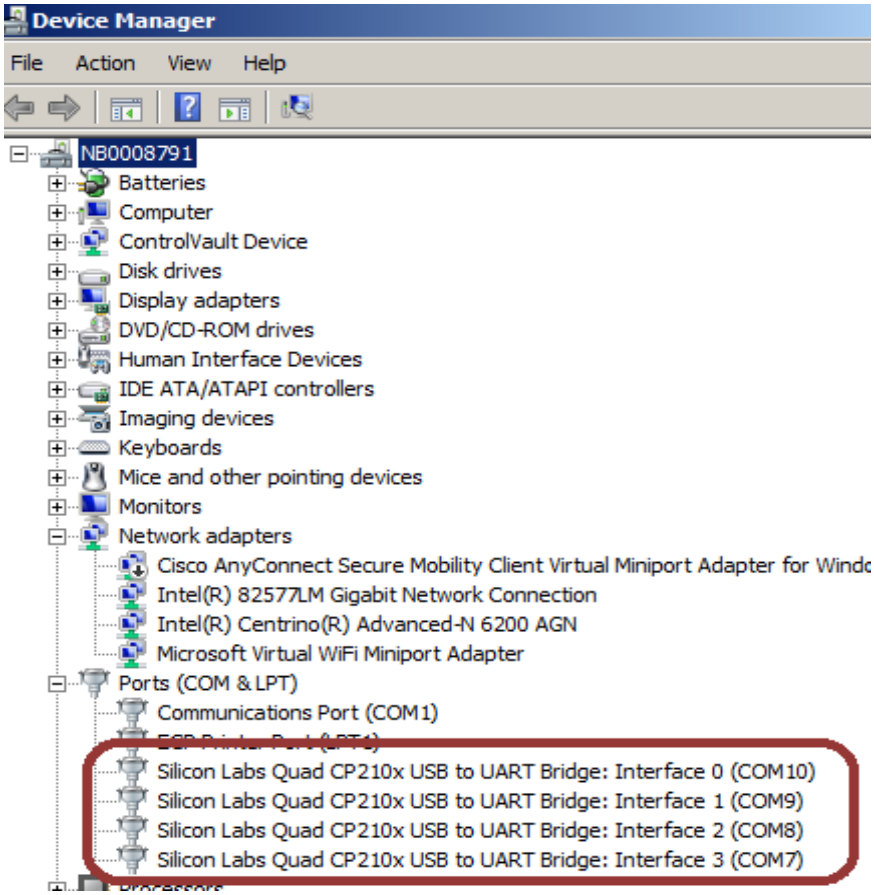


**Figure 3. CP210x in Device Manager Using the VCP Driver**

## 6. Detailed Hardware Description

The CP2108 Evaluation Kit includes an evaluation board with a CP2108 device pre-installed for evaluation and preliminary software development. Numerous input/output (I/O) connections are provided to facilitate prototyping using the evaluation board. Refer to Figure 4 for the locations of the various I/O connectors.

| | |
|---|---|
| P0-3 | DB9 connectors for the RS232 interface |
| P4 | USB connector for USB interface |
| J0-3 | UART signal access connector |
| J4 | SUSPEND LED connector |
| DS8 | Red SUSPEND indicator LED |
| J5 | Board Power Selector (bus- or self-powered) |
| J6 | GPIO0-7 LED Connector |
| J7 | GPIO8-15 Rx/Tx Toggle Pins |
| J8 | VBUS Pin Connection for current measurements |
| J9 | +3V/VDD Connector Option |
| J10 | VIO/VDD Connector Option |
| J11 | NC Pins, GND |
| DS0-DS7 | Green GPIO LEDs |

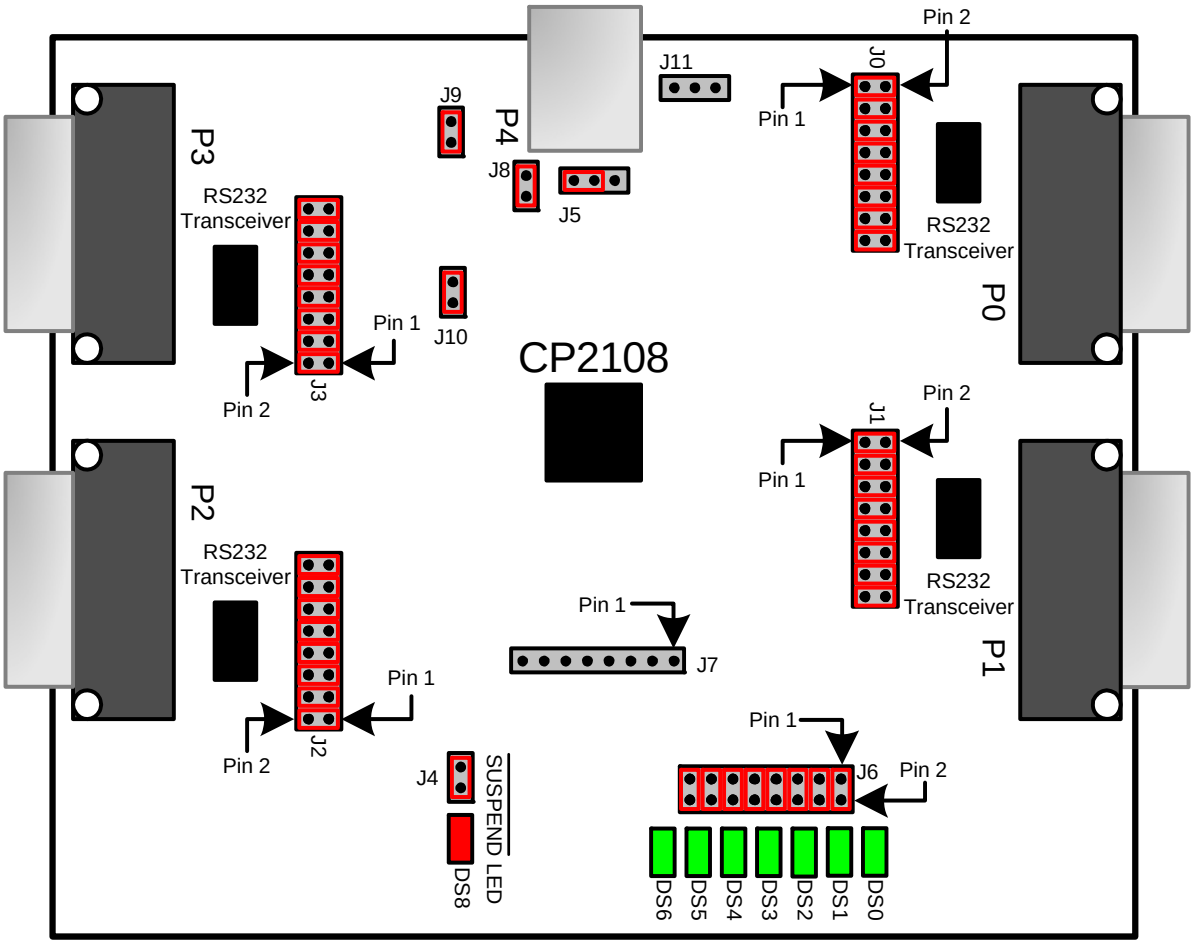


**Figure 4. CP2108 Evaluation Board with Default Shorting Blocks Installed**

## 6.1. DB9 Connector for RS232 Interface (P0-P3, J0-J3)

Four RS232 transceiver circuits and DB9 connectors (P0-3) are provided on the evaluation board to connect the CP2108 virtual serial ports to external serial devices. The headers J0-3 connect the CP2108 pins to the DB9 connectors and provide access to the RS232 signals. See Table 1 for the RS232 P0-3 pin descriptions and Table 2 for J0, J1, J2, J3 pin descriptions.

**Table 1. RS232 Connector (P0-3) Pin Descriptions**

| Pin | Signal | CP2108 Direction | Description |
|---|---|---|---|
| 1 | DCD | Input | Data Carrier Detect |
| 2 | RXD | Input | Receive Data |
| 3 | TXD | Output | Transmit Data |
| 4 | DTR | Output | Data Terminal Ready |
| 5 | GND | | Ground |
| 6 | DSR | Input | Data Set Ready |
| 7 | RTS | Output | Request to Send |
| 8 | CTS | Input | Clear to Send |
| 9 | RI | Input | Ring Indicator |

**Table 2. RS232 Header (J0-3) Pin Descriptions**

| Pins | Signal | CP2108 Direction | Description |
|---|---|---|---|
| 1-2 | TXD | Output | Transmit Data |
| 3-4 | RXD | Input | Receive Data |
| 5-6 | DTR | Output | Data Terminal Ready |
| 7-8 | RI | Input | Ring Indicator |
| 9-10 | DCD | Input | Data Carrier Detect |
| 11-12 | DSR | Input | Data Set Ready |
| 13-14 | CTS | Input | Clear to Send |
| 15-16 | RTS | Output | Request to Send |

## 6.2. Board Power Selector (J5)

This header (J5) provides bus- or self-powered options for the CP2108 device.

- Pins 1-2 connect USB connector VBUS (P4) to the VREGIN pin on the CP2108 and puts the device in bus powered mode. The voltage regulator output appears on the VDD pin (pin 3).
- Pins 2-3 connect the CP2108 VREGIN to the CP2108 VDD pin and puts the device in self-powered mode. This bypasses the voltage regulator. A voltage of 1.8 to 3.6 V power must be supplied to the VDD pin.

## 6.3. Power Connectors (J9, J10)

The J9 and J10 headers are included on the evaluation board to provide several power options.

- J9 connects the main +3 V net to the CP2108 VDD pin. The VDD pin is the output of the on-chip regulator. The main +3 V net powers the other components (green LEDs and RS-232 transceivers) on the board. It can be disconnected using J9 for current measurement purposes.
- J10 connects the CP2108 VIO input to the CP2108 VDD pin. Remove the shorting block to power VIO from an external source.

## 6.4. VBUS Connector (J8)

The VBUS connector J8 connects the VBUS pin on the USB connector (P4) to the CP2108 VBUS pin. If the jumper is removed and a multimeter is inserted, the power consumption can be measured.

## 6.5. GPIO.0-7 LED Header (J6)

Place shorting blocks on J6 to connect the GPIO.0–7 pins to the eight green LEDs (DS0-DS7). These LEDs can be used to indicate active communications through the CP2108. Table 3 shows the LED corresponding to each header position. When using the CP2108 in modem mode, the shorting blocks on J6 should be removed.

**Table 3. J6 LED Locations**

| LED | J6 Pins |
|---|---|
| DS0 | 1-2 |
| DS1 | 3-4 |
| DS2 | 5-6 |
| DS3 | 7-8 |
| DS4 | 9-10 |
| DS5 | 11-12 |
| DS6 | 13-14 |
| DS7 | 15-16 |

## 6.6. GPIO.8-15 Header (J7)

The J7 header allows access to the GPIO.8-15 pins on the CP2108. These GPIO pins may be connected to the LEDs using J6 or used for alternate functions described in the CP2108 data sheet.

## 6.7. Universal Serial Bus (USB) Interface (P4)

A Universal Serial Bus (USB) connector (P4) is provided to facilitate connections to the USB interface on the CP2108. See Table 4 for the USB pin definitions.

**Table 4. USB Connector Pin Descriptions**

| Pin # | Description |
|---|---|
| 1 | VBUS |
| 2 | D- |
| 3 | D+ |
| 4 | GND (Ground) |

## 6.8. $\overline{\text{SUSPEND}}$ LED Header (J4)

The J4 header enables the DS8 LED on the $\overline{\text{SUSPEND}}$ output pin on the CP2108.

## 7. Schematic

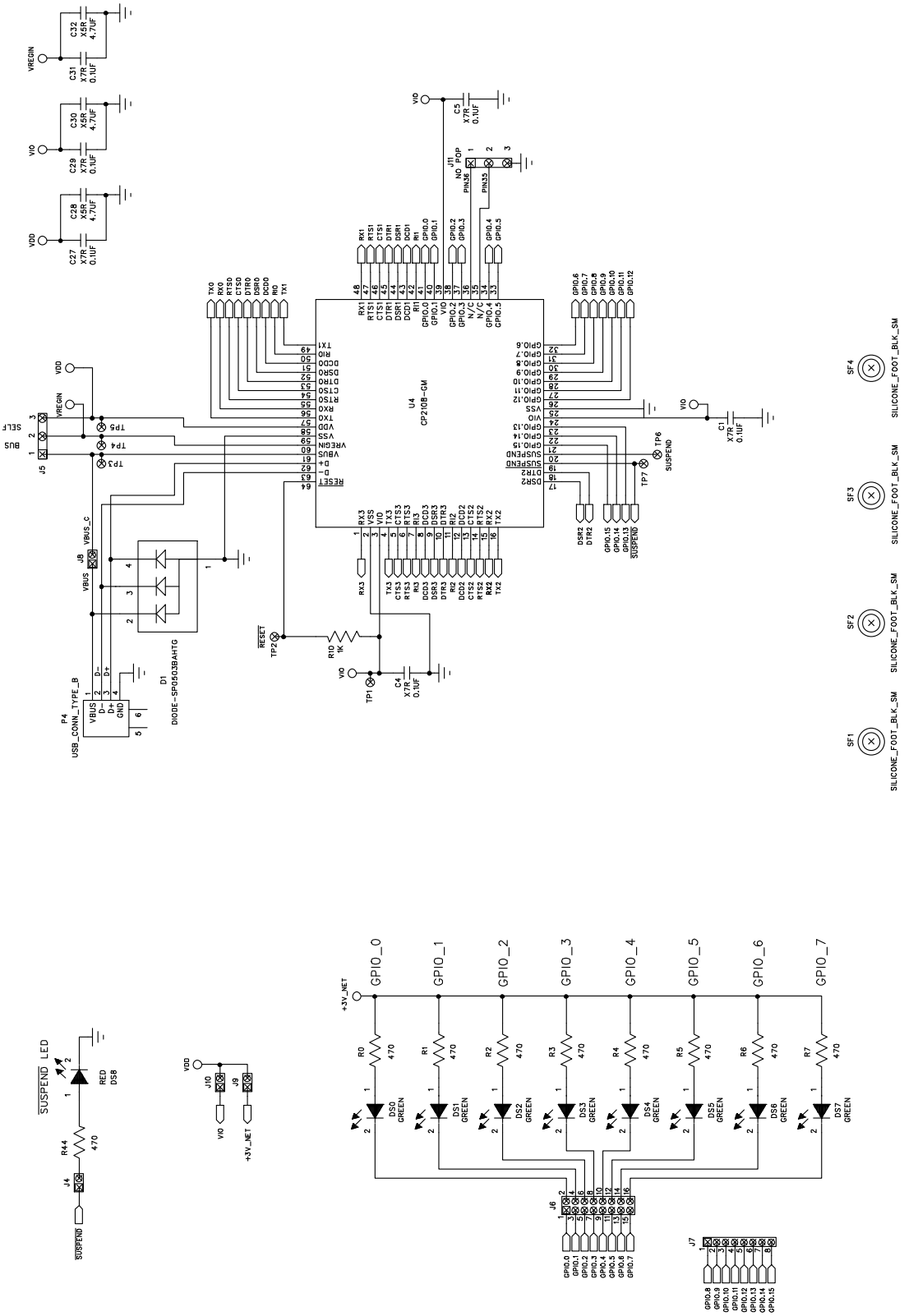

**Figure 5. CP2108 Evaluation Kit Board Schematic (1 of 2)**

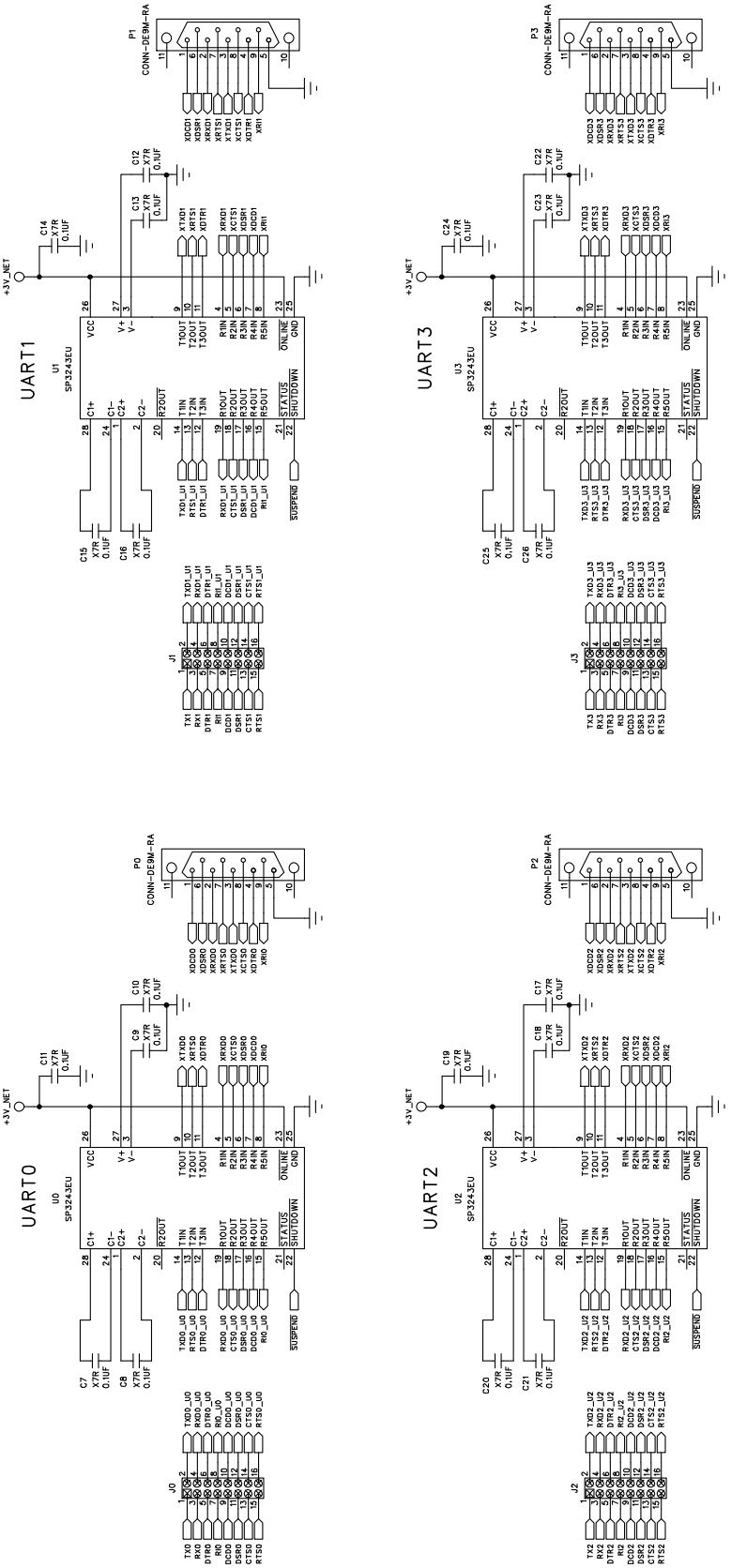


**Figure 6. CP2108 Evaluation Kit Board Schematic (2 of 2)**

## NOTES:

## CONTACT INFORMATION

Silicon Laboratories Inc.
400 West Cesar Chavez
Austin, TX 78701
Tel: 1+(512) 416-8500
Fax: 1+(512) 416-9669
Toll Free: 1+(877) 444-3032

Please visit the Silicon Labs Technical Support web page:
https://www.silabs.com/support/pages/contacttechnicalsupport.aspx
and register to submit a technical support request.

**Patent Notice**
Silicon Labs invests in research and development to help our customers differentiate in the market with innovative low-power, small size, analog-intensive mixed-signal solutions. Silicon Labs' extensive patent portfolio is a testament to our unique approach and world-class engineering team.