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## CP2104 EVALUATION KIT USER'S GUIDE

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### 1. Kit Contents

The CP2104 Evaluation Kit contains the following items:

- CP2104 Evaluation Board
- RS232 Serial Cable
- USB Cable
- DVD
- Quick Start Guide

### 2. Relevant Documentation

Application notes can be found on the Interface Application Notes page for all fixed-function devices: [www.silabs.com/interface-appnotes](http://www.silabs.com/interface-appnotes).

- **AN721: CP210x/CP211x Device Customization Guide** — Customize the VID, PID, serial number, and other parameters stored in the CP2104 one-time programmable ROM.
- **AN197: Serial Communications Guide for CP210x** — Programming guide for using the Virtual COM Port (VCP) drivers.
- **AN169: USBXpress Programmer's Guide** — Programming guide for using the USBXpress drivers.
- **AN220: C8051F32x and CP210x USB Driver Customization** — VCP or USBXpress driver customization tool.
- **AN223: Port Configuration and GPIO for CP210x** — Programming guide and DLL for runtime control of the CP2104 GPIO pins.
- **AN571: CP210x Virtual COM Port Interface** — USB interface details for CP210x devices.

### 3. Software Setup

The Software Development Kit (SDK) for the CP2104 kit is included on the kit DVD. The latest version of this installer can also be downloaded from the [www.silabs.com/interface-software](http://www.silabs.com/interface-software) website. This package includes:

- **Device Customization Utility (AN721)**
- **Documentation** — data sheet, application notes, user's guide, quick start guide, etc.
- **CP210x Virtual COM Port (VCP) Drivers**
- **Software** — Driver Customization Utility (AN220) and programming examples

The Windows installer should launch automatically after inserting the DVD. For Mac and Linux, browse to the appropriate directory on the DVD to install the software package. Follow the instructions to install the SDK and drivers to the system.

#### 3.1. USBXpress Driver Development Kit

The Silicon Laboratories USBXpress® Development Kit provides a complete host software solution for interfacing to CP210x devices. No USB protocol or host device driver expertise is required. Instead, a simple, high-level Application Program Interface (API) for the host software is used to provide complete USB connectivity. The USBXpress Development Kit includes Windows device drivers, Windows device driver installer, host interface function library (host API) provided in the form of a Windows Dynamic Link Library (DLL). See Application Note AN169, "USBXpress Programmer's Guide" for detailed information on using the USBXpress drivers.

The USBXpress drivers are available here: [www.silabs.com/usbxpress](http://www.silabs.com/usbxpress).

Click the USBXpress Development Kit link in the Download for Windows 2000/XP/Server 2003/Vista/Win7 section to download the USBXpress drivers. Run the installer and follow the steps to install the software to the desired

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location. The default installation directory is *C:\SiLabs\MCU\USBXpress\_SDK*.

Further installation instructions for the WinCE drivers can be found in the *ReadMe.txt* file contained inside the driver package.

## 4. CP2104 Hardware Interface

The evaluation board is connected to a PC as shown in Figure 1.

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 CP2104 evaluation board.
3. Connect one end of the RS232 serial cable to the DB-9 connector on the CP2104 evaluation board.
4. Connect the other end of the RS232 serial cable to the target serial device.

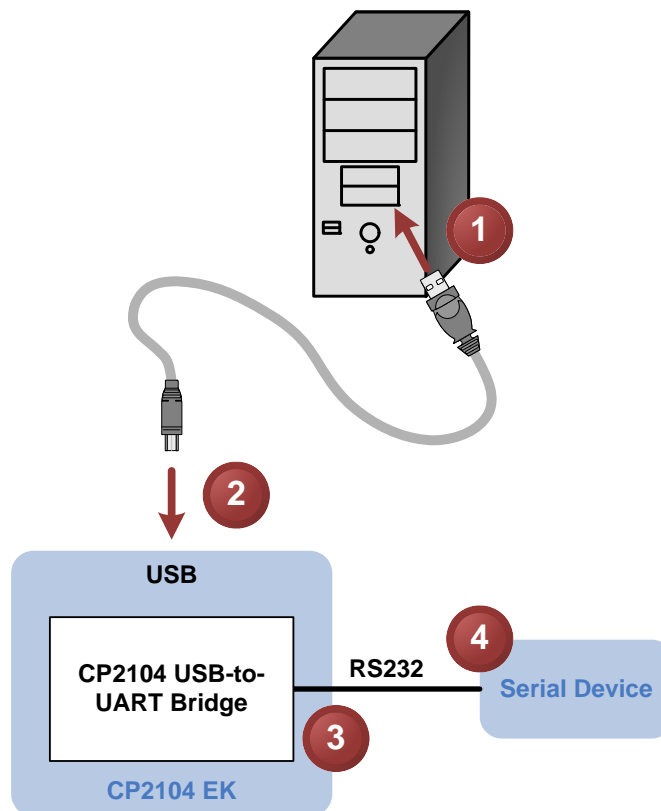


Figure 1. Hardware Setup

## 5. CP2104 Software Interface

If the Virtual COM Port drivers are used, the CP2104 will appear as a COM port in the Device Manager, as shown in Figure 2. The CP2104 will always use the lowest available COM port for operation. For instance, if COM ports 1 and 2 are in use by other peripherals and applications, the CP2104 will use COM 3.

The CP2104 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<sup>®</sup> Communications API. Examples for how to communicate with the device as a serial COM port are included in AN197 on the [www.silabs.com/interface-appnotes](http://www.silabs.com/interface-appnotes) page or in the SDK.

If the USBXpress drivers are used, the CP2104 will appear as a USB USBXpress device as shown in Figure 2. Examples for how to communicate with the device using the USBXpress interface are included in AN169 on the [www.silabs.com/interface-appnotes](http://www.silabs.com/interface-appnotes) page.

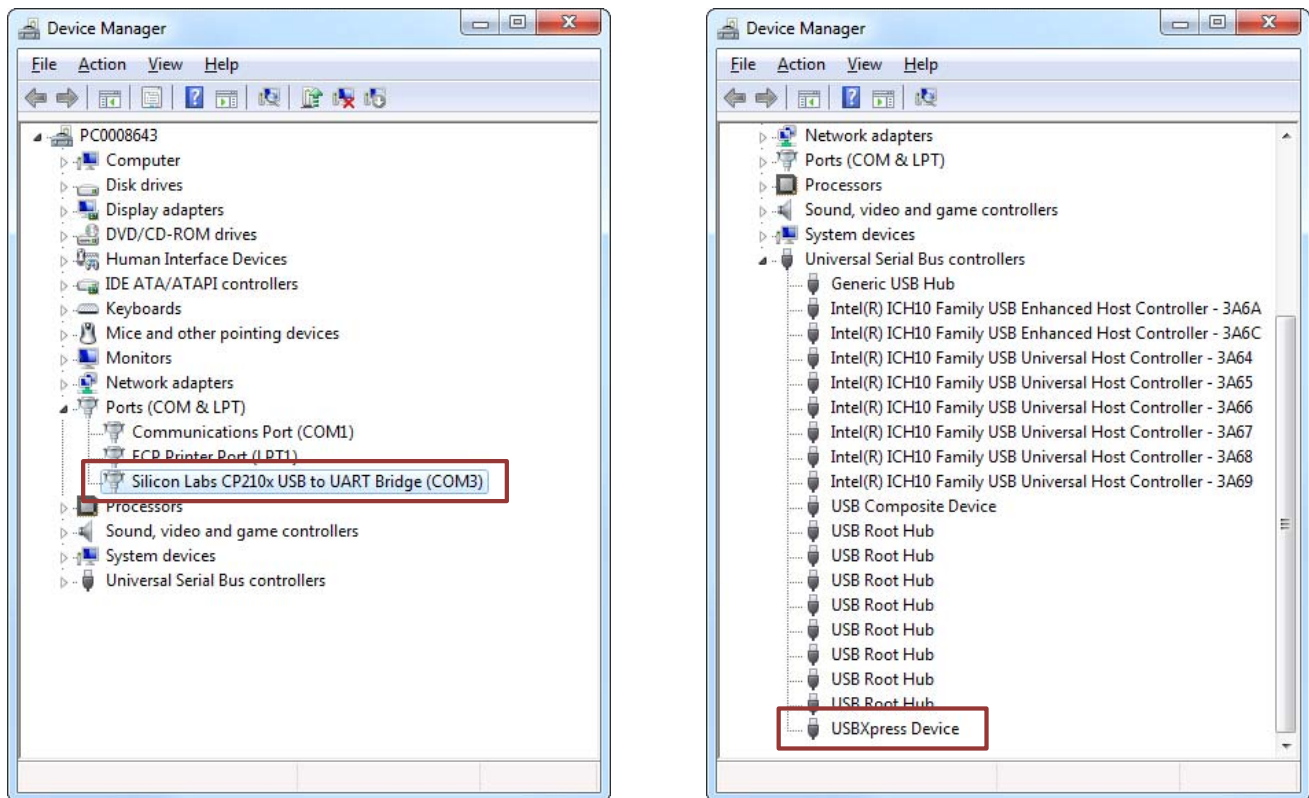


Figure 2. CP2104 in Device Manager



### 6.3. UART Signals (P2, J1)

An RS232 transceiver circuit and DB9 connector (P2) are provided on the evaluation board to connect the CP2104 virtual serial port to external serial devices. See Table 3 for the RS232 P2 pin descriptions. The J1 connector is provided to facilitate direct access to the CP2104's UART signals. Shorting blocks on J1 are required to connect the UART signals to P2. See Table 4 for J1 pin descriptions.

**Table 3. RS232 Pin Descriptions**

Pin	Signal	CP2104 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 4. J1 Pin Descriptions**

Pins	Signal	CP2104 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

### 6.4. Power Connector (J4)

This header (J4) is included on the evaluation board to provide several power options. The following describes the function of each pin:

- Pins 1–2: Connects CP2104 VIO input (Pin 5) to CP2104 VDD (Pin 6). Remove the shorting block to power VIO from an external source.
- Pins 3–4: Connects the main +3 V net to the CP2104 VDD (Pin 6). The main +3 V net powers the other components (four green LEDs and RS232 Sipex Part) on the evaluation board.

## 7. Schematic

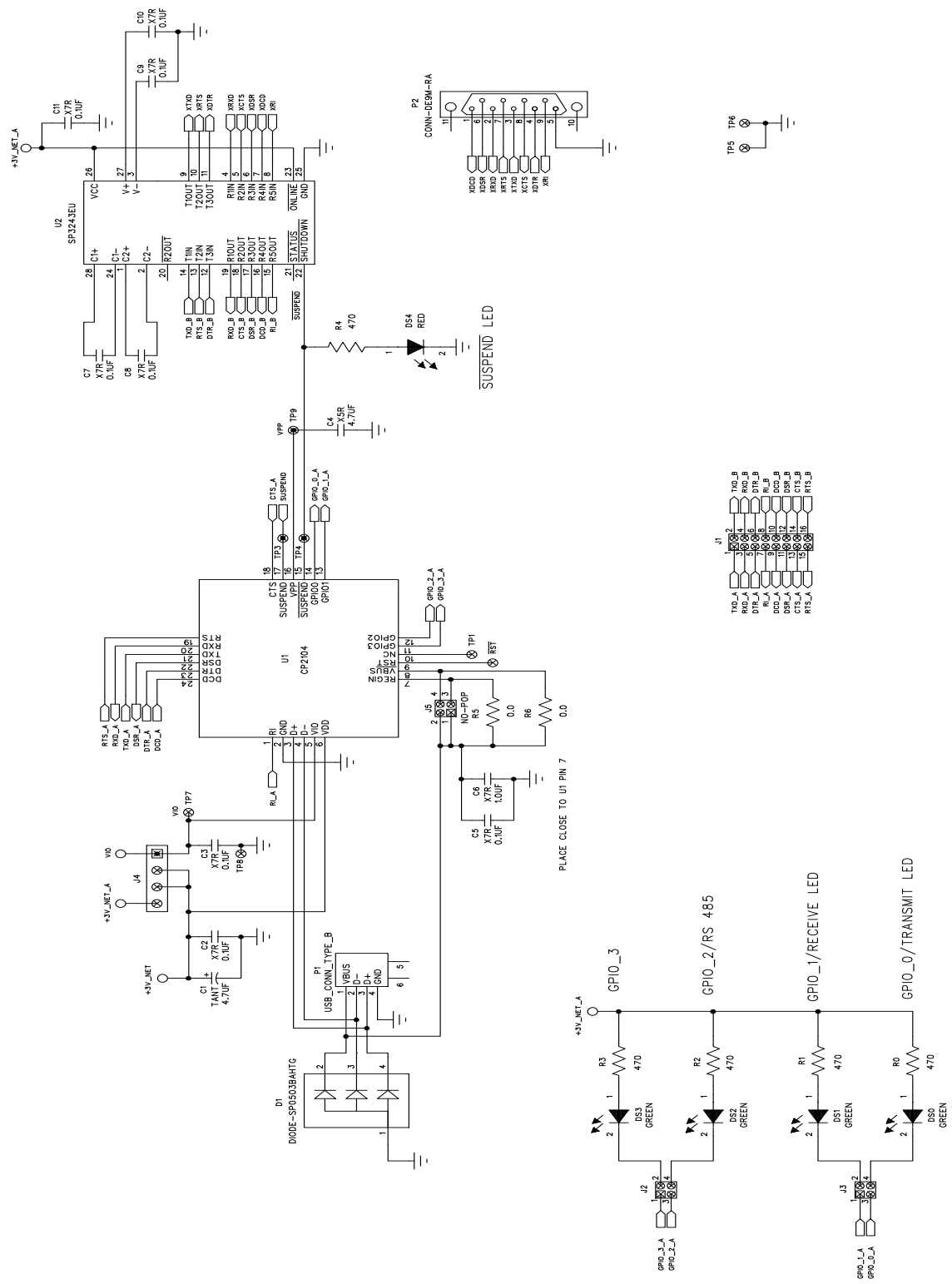


Figure 4. CP2104 Evaluation Board Schematic

## DOCUMENT CHANGE LIST

### Revision 0.1 to Revision 0.2

- Updated "6.4. Power Connector (J4)" on page 5 to reflect the updated schematic.
- Updated J4 in Figure 4, "CP2104 Evaluation Board Schematic," on page 6.

### Revision 0.2 to Revision 0.3

- Updated "7. Schematic" on page 6.

### Revision 0.3 to Revision 0.4

- Updated "2.1.1. Virtual COM Port Driver Installation for Windows" on page 1.
- Updated "2.2.1. USBXpress Installation for Windows" on page 2.
- Removed "2.2.2. USBXpress Installation for Windows 98SE" on page 2.

### Revision 0.4 to Revision 0.5

- Updated Figure 3 with shorting blocks installed.

### Revision 0.5 to Revision 0.6

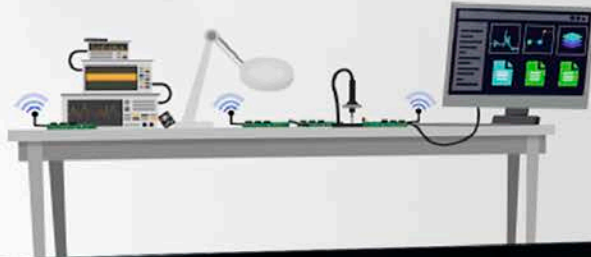
- Updated "3. Software Setup" on page 1.

### Revision 0.6 to Revision 0.7

- Updated "1. Kit Contents" to change CD-ROM to DVD.
- Added "2. Relevant Documentation".
- Updated "3. Software Setup" to point to the drivers on the website.
- Updated Figure 1 and Figure 2.

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**SILICON LABS**

Silicon Laboratories Inc.  
400 West Cesar Chavez  
Austin, TX 78701  
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