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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
- CP210x Drivers and Product Information CD-ROM. CD content includes:
  - CP210x Virtual COM Port Drivers for Windows®, Linux® and Mac®
  - USBXpress Driver Development Kit for Windows
  - Documentation:
    - CP2104 Data Sheet
    - CP2104 Evaluation Kit User's Guide
- RS232 Serial Cable
- USB Cable

### 2. Software Setup

The included CD-ROM contains the Virtual COM Port Drivers, USBXpress Driver Development Kit and additional documentation. Insert the CD-ROM into a system's CD-ROM drive. If using a Windows PC an installer will automatically launch, allowing you to install the software or read documentation by clicking buttons on the Installation Panel. If the installer does not automatically start when you insert the CD-ROM, run *autorun.exe* found in the root directory of the CD-ROM. Refer to the *ReleaseNotes CP21xx CD.txt* file on the CD-ROM for the latest information regarding versions and known problems and restrictions. If a non-Windows PC is used, manually browse to the directory on the CD-ROM that contains the software for your OS. The instructions in this document assume a Windows PC is being used. In the installation application, select the options for your kit. The sections below include more information on the software being installed.

#### 2.1. Virtual COM Port Driver Installation

Press the "Install CP21xx Tools" button on the main installation panel to access CP210x Virtual COM Port Drivers for Windows. Virtual COM Port drivers for Linux and Mac operating systems are located on the CD but are not installed automatically. See the following sections for installation instructions on your specific operating system.

##### 2.1.1. Virtual COM Port Driver Installation for Windows

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. Next, the unpacked files are used to install the Virtual COM Port driver:

1. Press the "Install CP21xx Tools" button on the main installation panel to access CP210x Virtual COM Port Drivers for Windows.
2. Choose the option for your kit.
3. Selecting the "Install CP210x Drivers" option will run an "unpacker" utility that will install files to the specified path.
4. If the "Launch the CP210x VCP Driver Installer" option was selected during the unpacking phase, the driver installer will take the files that were installed during the unpacking phase and use them for installation. If the "Launch the CP210x VCP Driver Installer" option was not selected, the driver installer can be run by browsing to the location where the files were unpacked and running *CP210xVCPInstaller.exe*. The default unpacking location is *C:\SiLabs\MCU\CP210x\Windows*.
5. To complete the installation process, connect a USB cable between the host computer and the CP210x Evaluation Board. Windows will automatically finish the driver installation. Information windows will pop up from the taskbar to show the installation progress.

6. If needed, the driver files can be uninstalled by selecting “Silicon Laboratories CP210x USB to UART Bridge (Driver Removal)” option in the “Add or Remove Programs” window.

## 2.1.2. Virtual COM Port Driver Installation for Macintosh

The Mac drivers are not automatically installed, but can be found on the CD-ROM in the *CP210xMac* directory. This directory contains Virtual COM Port drivers for OS9 and OSX. To install the Mac OSX virtual COM port driver, perform the following steps:

1. Extract the **Mac\_OSX\_VCP\_Driver.zip** file.
2. Next, run the extracted file, **SLAB\_USBtoUART Installer**.
3. To uninstall the driver, run the extracted file, **SLAB\_USBtoUART Uninstaller**.

## 2.1.3. Virtual COM Port Driver Installation for Linux

The Linux drivers are not automatically installed but can be found on the CD-ROM in the *CP210xLinux* directory. This directory contains Virtual COM Port drivers for Linux 2.6 and Linux RedHat 2.4. To install the drivers, follow the installation instructions located in the appropriate *ReleaseNotes.txt* file.

## 2.2. 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, and host interface function library (host API) provided in the form of a Windows Dynamic Link Library (DLL). See “AN169: USBXpress Programmer's Guide” for detailed information on customizing the USBXpress drivers.

### 2.2.1. USBXpress Installation for Windows

Press the “Install CP21xx Tools” button on the main installation panel to access the USBXpress Development Kit for Windows. Choose the option for your kit. Ensure that the “Install USBXpress” option is selected. The default installation directory is *C:\SiLabsMCU\USBXpress*.

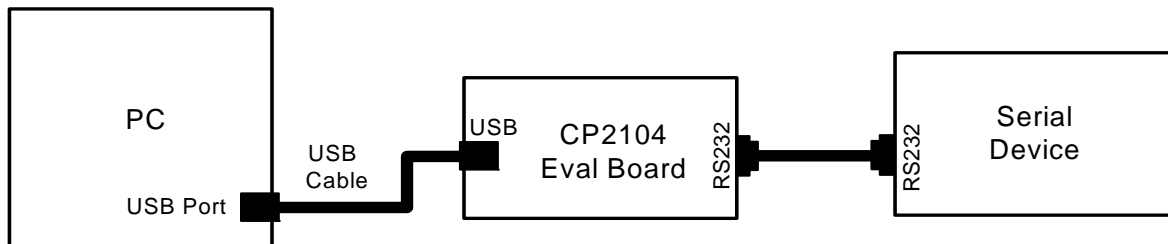
### 2.2.2. USBXpress Installation for Windows CE

The USBXpress Development Kit for Windows CE can be found on the CD-ROM in the *USBXpressWindows\_CE* directory. This directory contains a USBXpress kit for Window CE 4.2, 5.0 and 6.0. Follow the installation instructions located in the appropriate *ReleaseNotes.txt* file.

## 3. CP2104 Hardware Interface

Connect the CP2104 evaluation board 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 DB9 connector on the CP2104 evaluation board.
4. Connect the other end of the RS232 serial cable to the target serial device.



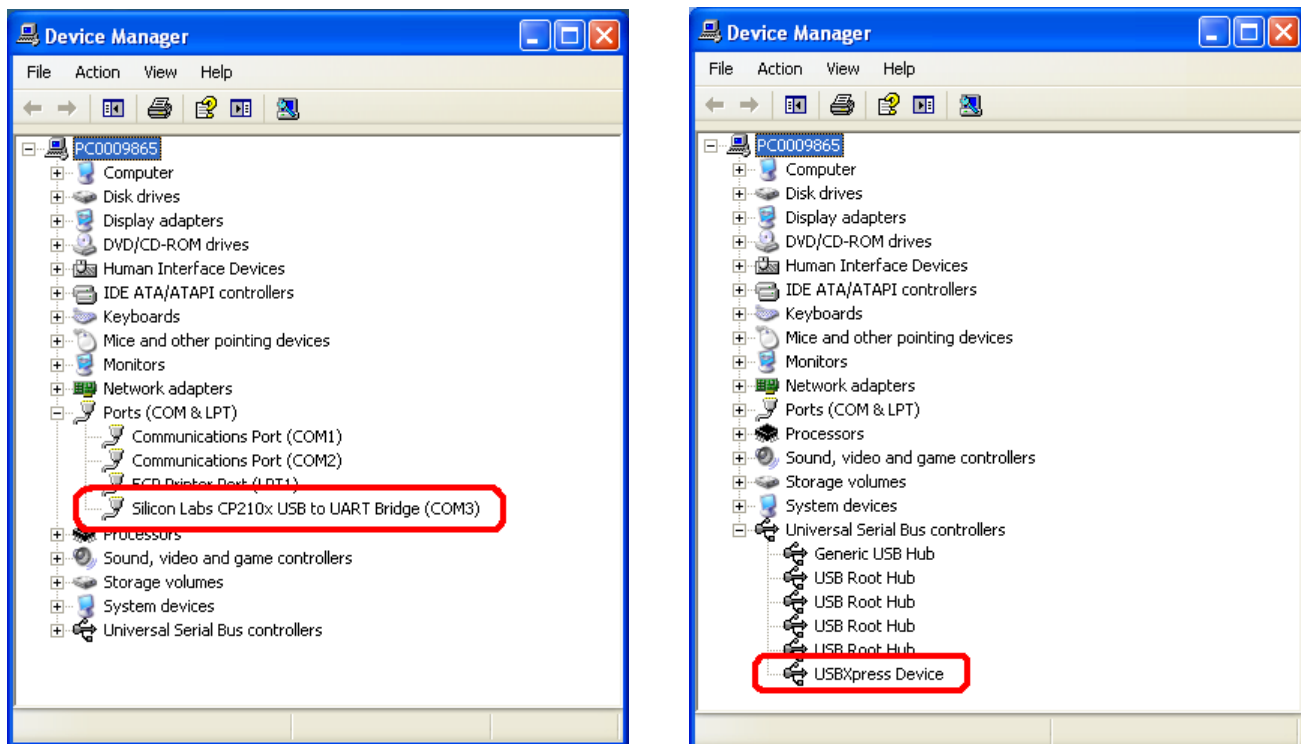
**Figure 1. Hardware Setup**

## 4. 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 through 3 are in use by other peripherals and applications, the CP2104 will use COM 4.

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.

If the USBXpress drivers are used, the CP2104 will appear as a USB USBXpress device, as shown in Figure 2.



**Figure 2. CP210x in Device Manager**

## 5. Evaluation Board

The CP2104 Evaluation Kit includes an evaluation board with a CP2104 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 3 for the locations of the various I/O connectors.

- P1                    USB connector for USB interface
- P2                    DB9 connector for RS232 interface
- J1                    UART signal access connector
- J2, J3                GPIO access connector
- J4                    Power connector
- DS0–DS3            Green GPIO LEDs
- DS4                  Red SUSPEND indicator LED

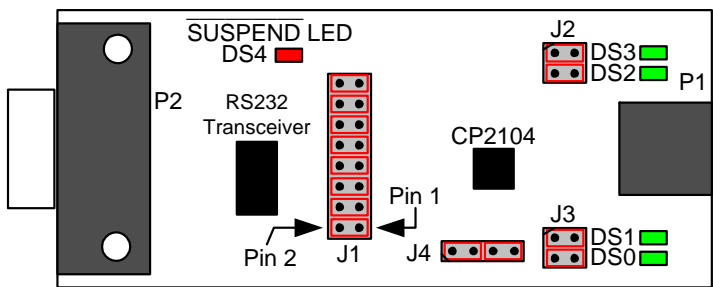


Figure 3. CP2104 Evaluation Board with Default Shorting Blocks Installed

### 5.1. LED Headers (J2, J3)

Connectors J2 and J3 are provided to allow access to the GPIO pins on the CP2104. Place shorting blocks on J2 and J3 to connect the GPIO pins to the four green LEDs DS0–DS3. These LEDs can be used to indicate active communications through the CP2104. Table 1 shows the LED corresponding to each header position.

Table 1. J2 and J3 LED Locations

LED	Pins
DS0	J3[3:4]
DS1	J3[1:2]
DS2	J2[3:4]
DS3	J2[1:2]

### 5.2. Universal Serial Bus (USB) Interface (P1)

A Universal Serial Bus (USB) connector (P1) is provided to facilitate connections to the USB interface on the CP2104. See Table 2 for the USB pin definitions.

Table 2. USB Connector Pin Descriptions

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

### 5.3. 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

### 5.4. 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.

## 6. Schematic

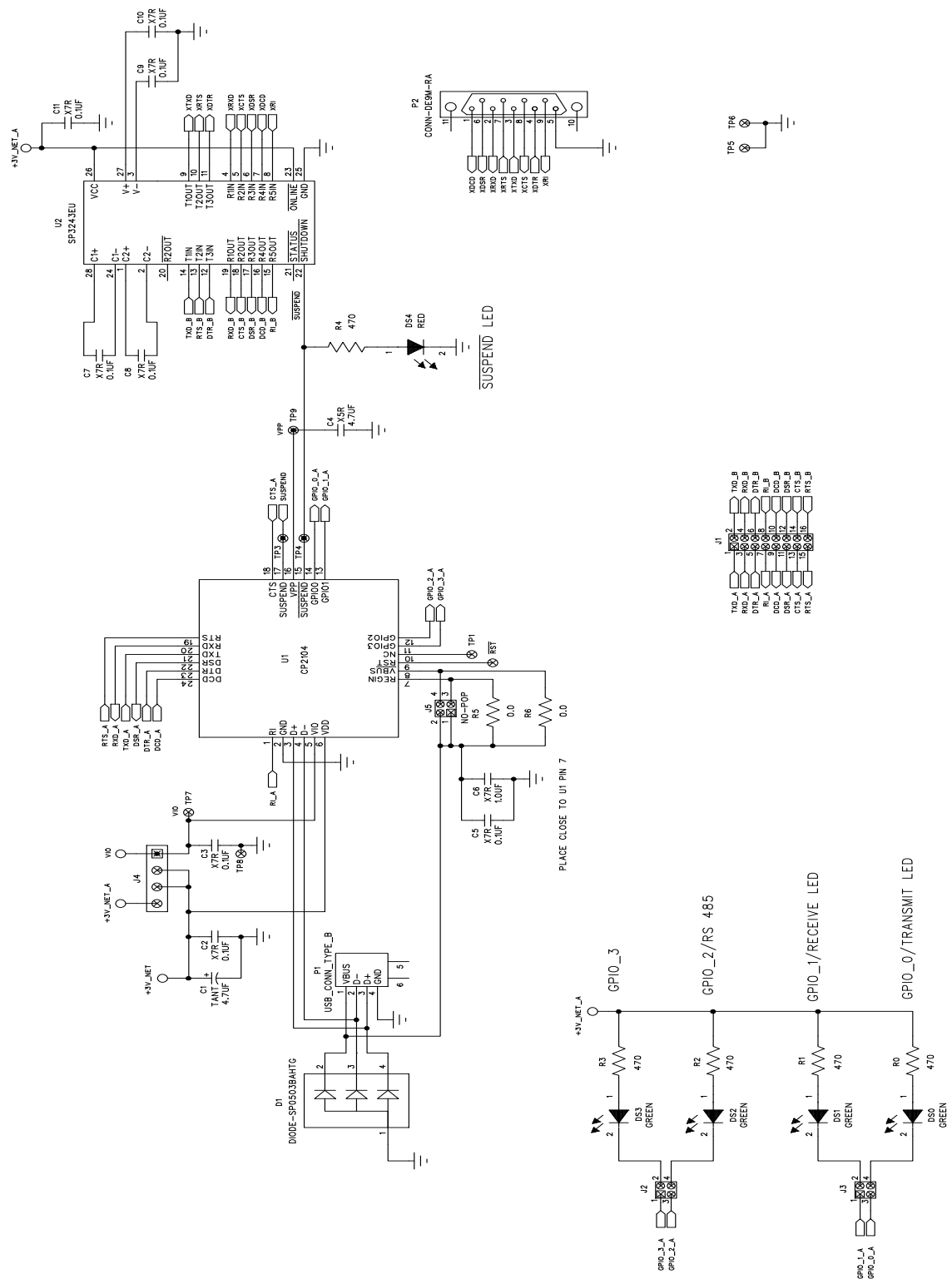


Figure 4. CP2104 Evaluation Board Schematic

## DOCUMENT CHANGE LIST

### Revision 0.1 to Revision 0.2

- Updated "5.4. 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 "6. 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 "2. Software Setup" on page 1.

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