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## CP2105 EVALUATION KIT USER'S GUIDE

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### 1. Kit Contents

The CP2105 Evaluation Kit contains the following items:

- CP2105 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 CP2105 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 CP2105 GPIO pins.
- **AN571: CP210x Virtual COM Port Interface** — USB interface details for CP210x devices.

### 3. Software Setup

The Software Development Kit (SDK) for the CP2105 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/usbexpress](http://www.silabs.com/usbexpress).

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

# CP2105-EK

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. CP2105 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 CP2105 evaluation board.
3. Connect one end of the RS232 serial cable to the DB-9 connector on the CP2105 evaluation board.
4. Connect the other end of the RS232 serial cable to the target serial device.
5. (Optional) Connect the second RS232 serial cable to the second DB-9 connector on the CP2105 evaluation board.
6. (Optional) Connect the other end of the second RS232 serial cable to the second target serial device.

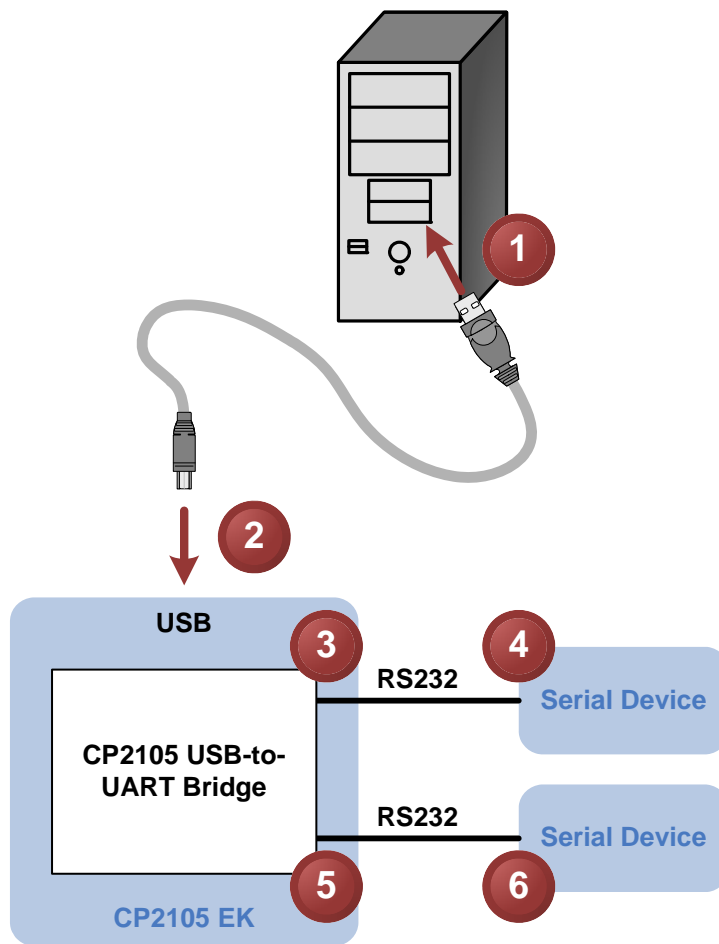


Figure 1. Hardware Setup

## 5. CP2105 Software Interface

If the Virtual COM Port drivers are used, the CP2105 will appear as two COM ports in the Device Manager, as shown in Figure 2. The CP2105 will always use the lowest available COM ports for operation. For instance, if COM ports 1 and 2 are in use by other peripherals and applications, the CP2105 will use COM 3 and COM 4.

The CP2105 functions identically to two COM ports from the reference point of both the host application and the serial devices, 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 two serial COM ports 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 CP2105 will appear as two USB USBXpress devices 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.

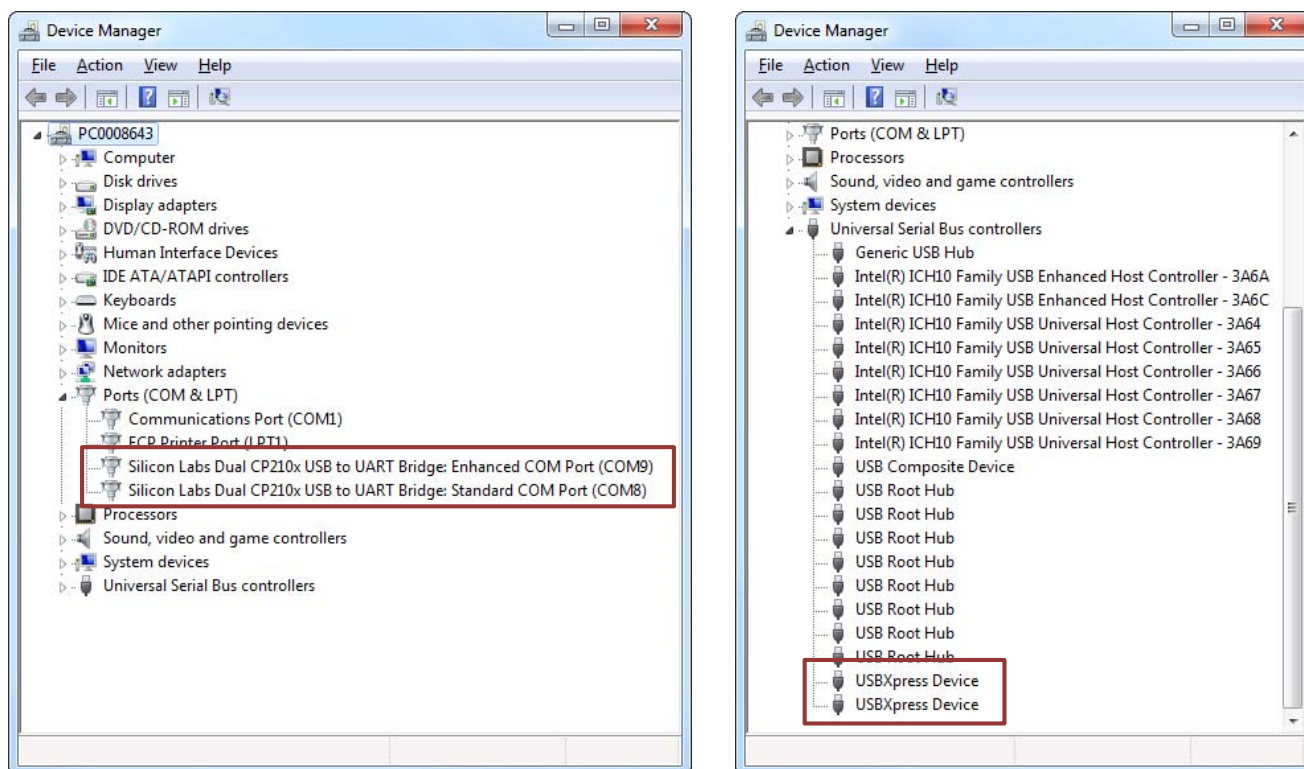


Figure 2. CP2105 in Device Manager

## 6. Target Board

The CP2105 Evaluation Kit includes an evaluation board with a CP2105 device preinstalled 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 Standard RS232 interface
- P3 DB9 connector for Enhanced RS232 interface
- J1 Enhanced UART signal access connector
- J2, J3 GPIO access connector
- J4 Power connector
- J6 Standard UART signal access connector
- J7, J8 SUSPEND LED source connector
- DSS–DS4 Green GPIO LEDs
- DS5 Red SUSPEND indicator LED

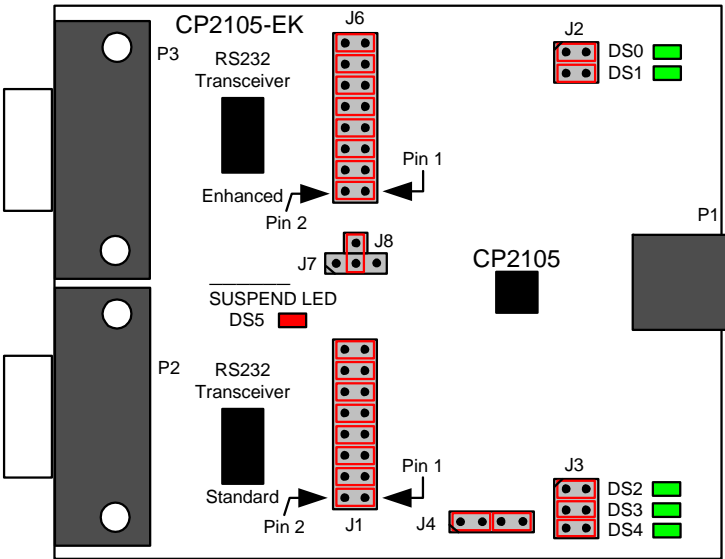


Figure 3. CP2105 Evaluation Board with Default Shorting Blocks Installed

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

Connectors J2 and J3 are provided to allow access to the GPIO pins on the CP2105 when in GPIO mode. Place shorting blocks on J2 and J3 to connect the GPIO pins to the five green LEDs DS0–DS4. These LEDs can be used to indicate active communications through the CP2105. Table 1 shows the LED corresponding to each header position. When using the CP2105 in Modem mode, the shorting blocks on J2 and J3 should be removed.

Table 1. J2 and J3 LED Locations

LED	Pins
DS0	J2[1:2]
DS1	J2[3:4]
DS2	J3[1:2]
DS3	J3[3:4]
DS4	J3[5:6]

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

A Universal Serial Bus (USB) connector (P1) is provided to facilitate connections to the USB interface on the CP2105. 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)

## 6.3. UART Signals (P2, P3, J1, J6)

Two RS232 transceiver circuits and DB-9 connectors (P2, P3) are provided on the evaluation board to connect the CP2105 virtual serial ports to external serial devices. See Table 3 for the RS232 P2 and P3 pin descriptions. The J2 and J6 connectors are provided to facilitate direct access to the CP2105's UART signals. Shorting blocks on J1 are required to connect the Standard UART signals to P2, and the shorting blocks on J6 are required to connect the Enhanced UART signals to P3. See Table 4 for J1 and J6 pin descriptions.

**Table 3. RS232 Pin Descriptions**

Pin	Signal	CP2105 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, J6 Pin Descriptions**

Pins	Signal	CP2105 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 functions of the pins.

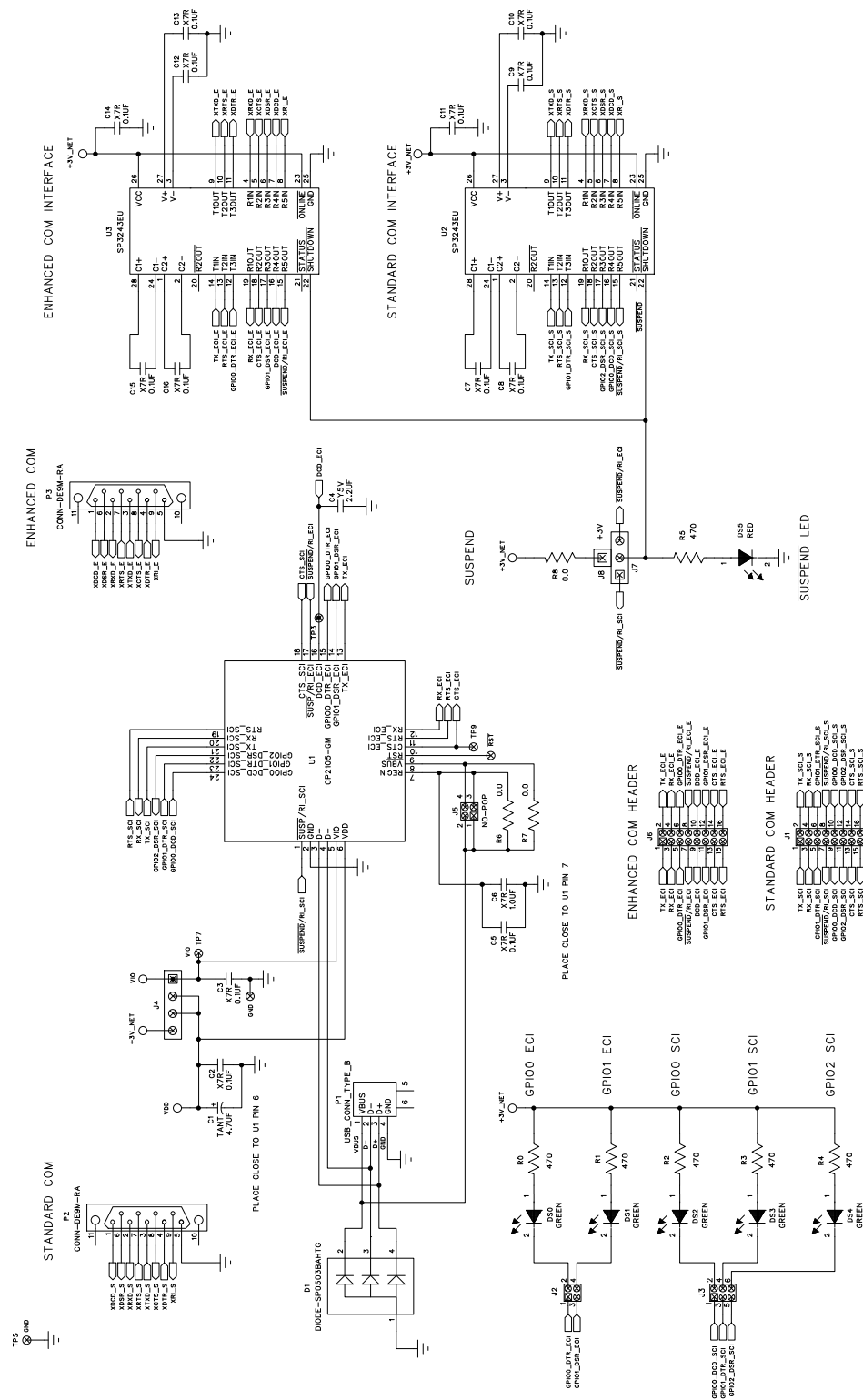
- Pins 1–2 connect CP2105 VIO input (Pin 5) to CP2105 VDD (Pin 6). Remove the shorting block to power VIO from an external source.
- Pins 3–4 connect the main +3 V net to the CP2105 VDD (Pin 6). The main +3 V net powers the other components (five green LEDs and RS-232 Sipex Part) on the board.

## 6.5. SUSPEND LED Source Selector(J7, J8)

These headers (J7, J8) are included on the evaluation board to provide several options for the SUSPEND LED source. The following describes the function of each pin:

- J7[1:2] connects CP2105 Standard UART SUSPEND output (Pin 1) to the SUSPEND LED.
- J7[2:3] connects CP2105 Enhanced UART SUSPEND output (Pin 17) to the SUSPEND LED.
- J7[2]:J8[1] connects the main +3 V net to the SUSPEND LED. This will cause the SUSPEND LED to act as a power LED.

## 7. Schematic



### Figure 4. CP2105 Evaluation Board Schematic

## DOCUMENT CHANGE LIST

### Revision 0.1 to Revision 0.2

- Updated Windows installation instructions for VCP drivers.
- Updated Windows installation instructions for USBXpress drivers.

### Revision 0.2 to Revision 0.3

- Updated Figure 3 with shorting blocks installed.

### Revision 0.3 to Revision 0.4

- Updated "Figure 2. CP2105 in Device Manager" on page 3.

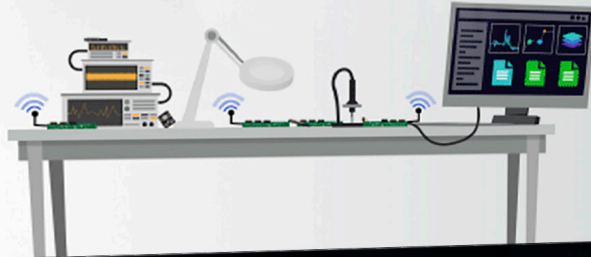
### Revision 0.4 to Revision 0.5

- 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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