# Cypress USB-Serial Configuration Utility 2.0 User Guide

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Cypress Semiconductor
198 Champion Court
San Jose, CA 95134-1709
Phone (USA): 880.858.1810
Phone (Intnl): 408.943.2600
http://www.cypress.com

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# 1. Introduction

The Cypress USB-Serial Configuration Utility provides an easy-to-use graphical interface to configure manufacturing settings and options for Cypress USB-Serial devices. With this utility, you can connect to USB-Serial devices, modify the configuration settings, and program the configuration to the device.

This user guide describes the USB-Serial Configuration Utility features and how to use the utility to configure a supported device. The current version of the utility supports configuring the Cypress USB-Serial device part numbers listed in Table 1-1.

Table 1-1. Supported USB-Serial Devices

| # | Part Number | Description |
|---|---|---|
| 1 | CY7C65211-24LTXI | USB-Serial (Single Channel) |
| 4 | CY7C65211A-24LTXI | USB-Serial (Single Channel) |
| 3 | CY7C65213-32LTXI | USB-UART LP (QFN Package) |
| 4 | CY7C65213A-32LTXI | USB-UART LP (QFN Package) |
| 5 | CY7C65213-28PVXI | USB-UART LP (SSOP Package) |
| 6 | CY7C65213A-28VXI | USB-UART LP (SSOP Package) |
| 7 | CY7C65215-32LTXI | USB-Serial (Dual Channel) |
| 8 | CY7C65215A-32LTXI | USB-Serial (Dual Channel) |

## 1.1 Software Requirements

Table 1-2 lists the software prerequisites needed to run the configuration utility.

Table 1-2. Software Requirements

| # | Software | Version |
|---|---|---|
| 1. | Operating System | Microsoft Windows XP or later |
| 2. | .NET Framework | .NET Framework 3.5 SP1 or later |
| 3. | Runtime Libraries | Microsoft VC++ 2008 SP1 runtime re-distributable |

**Note 1**: Microsoft.NET framework 3.5SP1 can be downloaded and installed from Microsoft website. The link to the installable on Microsoft's website is: http://www.microsoft.com/en-us/download/details.aspx?id=22.

**Note 2**: Microsoft VC++ 2008 runtime re-distributable is packaged along with USB-Serial SDK for Windows. The re-distributable can be located under the '<sdk_install_path>\prerequisite' directory. The package can also be downloaded and installed from the Microsoft website. The link to the installable is: http://www.microsoft.com/en-us/download/details.aspx?id=11895.

# 2. Cypress USB-Serial Configuration Utility

Run *USB-Serial Configuration Utility.exe* from **Start**>**All Programs**>**Cypress**>**Cypress USB-Serial Configuration Utility** to launch the configuration utility. On start-up, the utility comes up with two active tabs— **Start Page** and **Select Target**. These tabs are always visible and you can navigate between these tabs at any time during the configuration session.

After you connect to an attached Cypress USB-Serial device (from the **Select Target** tab), the utility opens a third tab (**Device** tab) for the part number of the device selected. This tab allows you to view and configure the device settings.

**Note:** The exact name of the third tab will be the device part number. The device part numbers are listed in Table 1-1. Throughout the document, this tab will be referred to as the **Device** tab.

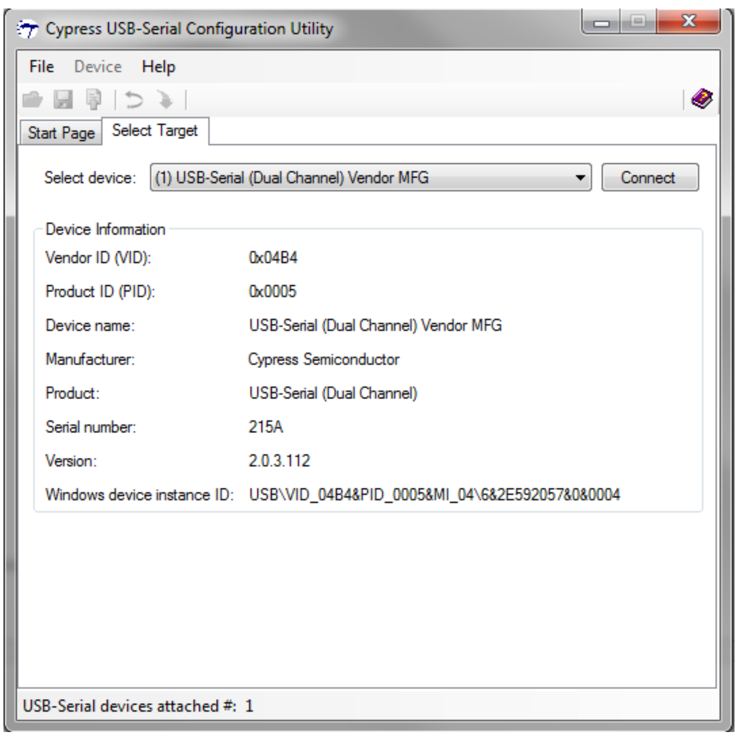
## 2.1 Start Page

This tab provides a brief description about Cypress USB-Serial products.

## 2.2 Select Target

This tab displays all the USB-Serial devices attached to the machine. Figure 2-1 shows the **Select Target** tab of the utility. The utility lists all the USB-Serial device interfaces that bind to the Cypress cyusb3.sys driver.

Figure 2-1: Select Target




### 2.2.1 Select Device

The **Select Device** drop-down list box lists all the USB-Serial devices attached to the machine. The device, which is to be configured, should be selected from this list.

### 2.2.2 Device Information

The Device Information section displays information about the currently selected device (see Table 2-1).

Table 2-1. Device Information

| # | Property | Remarks |
|---|---|---|
| 1. | Vendor ID (VID) | Vendor ID in 2-byte HEX format |
| 2. | Product ID (PID) | Product ID in 2-byte HEX format |
| 3. | Device name | Device-friendly name. This name comes from the device driver INF file |
| 4. | Manufacturer | Device manufacturer name |
| 5. | Product | Product name |
| 6. | Serial number | Device serial number |
| 7. | Version | Device firmware version |
| 8. | Windows device instance ID | Windows-assigned device instance ID |

### 2.2.3 Connect to Target

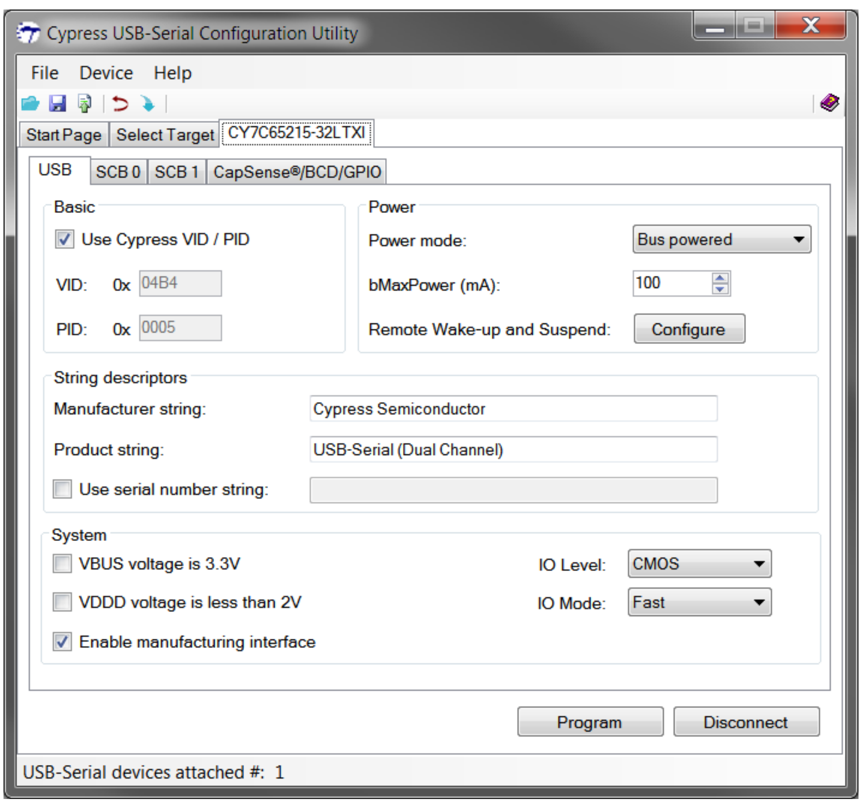
#### *2.2.3.1 Connect*

After you select the required device from the **Select Device** field, click **Connect** to establish connection with the device. On successful connection, the utility opens the **Device** tab.

## 2.3 Device Configuration

This tab allows viewing and modifying the device configuration settings. From this tab, the target device can be programmed with the modified configuration settings.

Figure 2-2: USB Configuration Settings



The following device configuration settings can be viewed and modified:

1. USB Descriptors and system-level settings
2. Serial Configuration Block (SCB)
3. CapSense®/BCD/GPIO

### 2.3.1 USB Descriptor and System Configuration

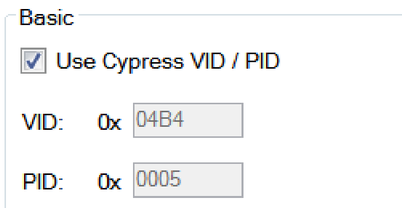
The **USB** tab (see Figure 2-2) displays some of the device USB descriptor values. The USB configuration and system settings are categorized into four groups:

1. Basic
2. Power
3. String Descriptor
4. System

#### *2.3.1.1 Basic*

The basic descriptor settings include the device Vendor ID (VID) and Product ID (PID) values. The device can be configured to either use the default Cypress-provided VID and PID combination or to use a custom VID and PID combination (see Figure 2-3).

Figure 2-3: USB - Basic Settings




##### *2.3.1.1.1 Vendor ID (VID)*

This field accepts a 2-byte hexadecimal value. This field cannot be left empty and the value cannot be zero.

##### *2.3.1.1.2 Product ID (PID)*

This field accepts a 2-byte hexadecimal value. This field cannot be left empty and the value cannot be zero.

##### *2.3.1.1.3 Use Cypress VID/PID*

Select this option to use the default Cypress VID and PID combination for the current SCB settings. When you select this option, the VID and PID fields are not editable. The major advantage of using this option is that the default drivers shipped with the product can be used directly without any modification.

Table 2-2 captures the Cypress-provided PID for USB-Serial devices based on the device configuration.

Table 2-2: Cypress USB-Serial Device PIDs

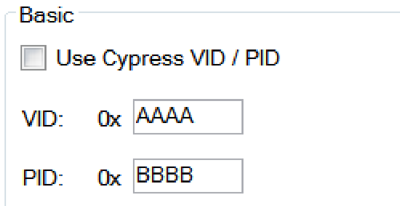
| # | Part Number | SCB 0 | | SCB 1 | | PID |
|---|---|---|---|---|---|---|
| | | Mode | Protocol | Mode | Protocol | |
| 1. | CY7C65211-24LTXI | UART | CDC | NA | NA | 0x0002 |
| | | UART/ SPI | Vendor / PHDC | NA | NA | 0x0004 |
| | | I2C | Vendor | NA | NA | 0x0004 |
| 2. | CY7C65211A-24LTXI | UART | CDC | NA | NA | 0x0002 |
| | | UART/ SPI | Vendor / PHDC / CDC | NA | NA | 0x0004 |
| | | I2C | Vendor / CDC | NA | NA | 0x0004 |
| 3. | CY7C65213-32LTXI Or CY7C65213-28PVXI Or CY7C65213A-28VXI Or CY7C65213A-32LTXI | UART | CDC | NA | NA | 0x0003 |
| | | UART | Vendor / PHDC | NA | NA | 0x0006 |
| 4. | CY7C65215-32LTXI | UART | CDC | UART | CDC | 0x0005 |
| | | UART | CDC | UART / SPI / I2C / JTAG | Vendor / PHDC | 0x0007 |
| | | UART / SPI | Vendor / PHDC | UART | CDC | 0x0009 |
| | | I2C | Vendor | UART | CDC | 0x0009 |
| | | UART / SPI | Vendor / PHDC | UART / SPI | Vendor / PHDC | 0x000A |
| | | | | I2C / JTAG | Vendor | 0x000A |
| | | I2C | Vendor | UART / SPI | Vendor / PHDC | 0x000A |
| | | | | I2C / JTAG | Vendor | 0x000A |
| 5. | CY7C65215A-32LTXI | UART | CDC | UART | CDC | 0x0005 |
| | | UART | CDC | UART / SPI / I2C | Vendor / PHDC / CDC | 0x0007 |
| | | UART / SPI | Vendor / PHDC / CDC | UART | CDC | 0x0009 |
| | | I2C | Vendor / CDC | UART | CDC | 0x0009 |
| | | UART / SPI | Vendor / PHDC / CDC | UART / SPI | Vendor / PHDC / CDC | 0x000A |
| | | | | I2C | Vendor / CDC | 0x000A |
| | | I2C | Vendor / CDC | UART / SPI | Vendor / PHDC / CDC | 0x000A |
| | | | | I2C | Vendor / CDC | 0x000A |

CDC: CDC device referred in this document is a UART device that follows USB Standard Communication Device Class Specification. And, this device binds to a Virtual COM port driver for the supported operating system.

Vendor: Vendor operational mode device doesn’t follow any USB standard class specification. They are custom or vendor USB class devices that follow custom data transfer protocol. USB to (SPI or I2C or JTAG) Bridge is always configured as Vendor Device. UART can also be a vendor device and in this mode, UART device doesn’t bind to Virtual COM port driver. Instead, the UART device will bind to cypress generic USB driver or vendor mode driver in the supported Operating System.

PHDC: Device that follow Personal Healthcare Device Class Specification is referred as PHDC devices. USB Serial Bridge supports PHDC USB to UART and PHDC USB to SPI Bridge. PHDC device binds to generic USB device driver otherwise called as vendor mode driver.

Figure 2-4: USB - Use Custom VID/PID

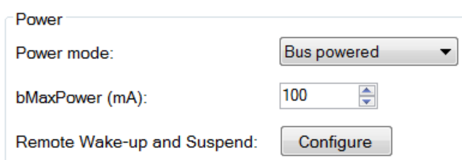



To use a custom VID and PID for your device, uncheck the ‘Use Cypress VID / PID’ option. On unchecking this option, the VID field becomes editable. Enter the required VID (other than Cypress VID [0x04B4]) and hit the <**Tab**> or <**Enter**> key to enable the PID field. Refer to the Driver Binding for USB-Serial Devices with Custom VID/PID section for binding the driver to USB-Serial devices with custom VID/PID.

### *2.3.1.2 Power Settings*

The utility allows for configuring the USB power settings of your device. Figure 2-5 shows the configurable USB power settings.

Figure 2-5: USB - Power Settings




## *2.3.1.2.1 Power Mode*

The device power mode can be set to either self-powered or bus-powered. The default value for this field is ‘Bus powered’.

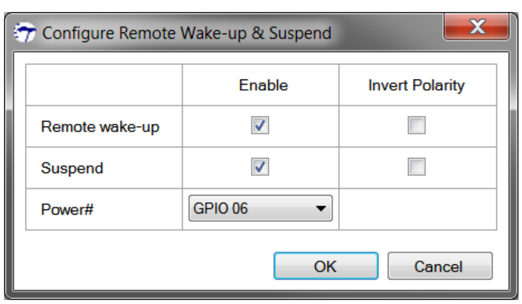
## *2.3.1.2.2 bMaxPower (mA)*

This field allows setting the maximum power the device drains from the USB bus. The value is in units of mA. The default value for this field is 100 mA. This field cannot be zero when the device power mode is set to ‘Bus Powered’. USB specification has say on the maximum current drawn from a USB port. And, hence this field can be up to 500 mA Max.

## *2.3.1.2.3 Remote Wake-up/Suspend Configuration*

Click the **Configure** button (shown in Figure 2-5) to open the Remote Wake-up & Suspend configuration editor. Figure 2-6 shows the ‘Remote Wake-up & Suspend Editor’ for CY7C65211-24LTXI and CY7C65215-32LTXI devices.

Figure 2-6: Remote Wake-up & Suspend Editor



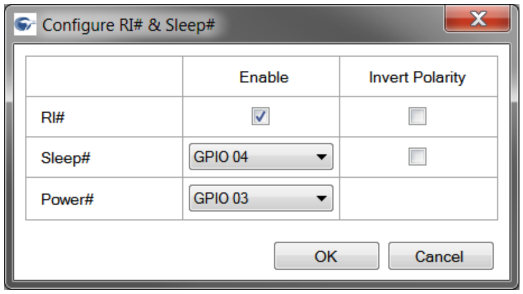

### 2.3.1.2.3.1 Remote Wake-up

Select the Remote wake-up **Enable** option to enable GPIO remote wake-up for the device. The editor also provides an option to invert the polarity of the remote wake-up GPIO line. The remote wake-up GPIO line for the device is fixed. Refer to the device datasheet for the exact remote wake-up GPIO pin.

#### 2.3.1.2.3.2 Suspend

Select the Suspend **Enable** option to enable the GPIO suspend notification for your device. The editor also provides an option to invert the polarity of the suspend line. The suspend wake-up line is fixed for CY7C65211-24LTXI and CY7C65215-32LTXI devices. Refer to the respective device datasheets for the exact suspend GPIO pin. For theCY7C65213-32LTXIor CY7C65213-28PVXI devices, the suspend GPIO is configurable. That is, one of the available GPIOs can be configured as the suspend line. Figure 2-7 shows the ‘Suspend & Remote Wake-up editor’ for the CY7C65213-32LTXI or CY7C65213-28PVXI device.

Figure 2-7: CY7C65213-32LTXI or CY7C65213-28PVXI Suspend & Remote Wake-up Editor




#### 2.3.1.2.3.3 Power#

Select a GPIO from the **Power#** drop-down list to enable power notification. To disable this option, select **Not enabled** from the drop-down list.

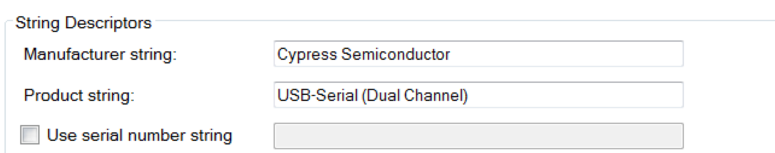
### *2.3.1.3 String Descriptors*

This utility allows configuration of the following USB string descriptors for the device:

1. Manufacturer string
2. Product string
3. Serial Number string

Figure 2-8 shows the default USB string descriptor configuration settings for the CY7C65215-32LTXI device.

Figure 2-8: USB String Descriptors




#### *2.3.1.3.1 Manufacturer string*

Enter the manufacturer string to be used for the device in this field. The text field accepts up to 32 Unicode characters.

*Default value: Cypress Semiconductor*

#### 2.3.1.3.2 Product string

Enter the product string to be used for the device in this field. The text field accepts up to 32 Unicode characters. Table 2-3 lists the default values for all the supported devices.

Table 2-3. Default Product Strings

| # | Part Number | Default value |
|---|---|---|
| 1 | CY7C65211-24LTXI | USB-Serial (Single Channel) |
| 2 | CY7C65211A-24LTXI | USB-Serial (Single Channel) |
| 3 | CY7C65213-32LTXI | USB-UART LP |
| 4 | CY7C65213A-32LTXI | USB-UART LP |
| 5 | CY7C65213-28PVXI | USB-UART LP |
| 6 | CY7C65213A-28VXI | USB-UART LP |
| 7 | CY7C65215-32LTXI | USB-Serial (Dual Channel) |
| 8 | CY7C65215A-32LTXI | USB-Serial (Dual Channel) |

#### 2.3.1.3.3 Serial number

To enter a serial number for the device, select the 'Serial Number' checkbox field. On selecting the checkbox, the serial number text box field becomes editable. Enter the required serial number for the device in this textbox field. The text field accepts up to 32 Unicode characters. If the device does not need a serial number, uncheck the checkbox.

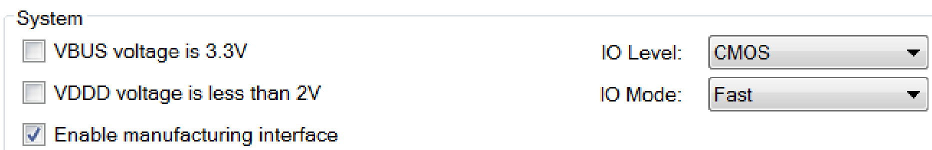
**Currently we can use only 'alpha numeric' combinations, special characters and spaces are not allowed.**

*Default value: NULL (No serial number)*

### 2.3.1.4 System settings

The utility supports configuring three other system-level settings shown in Figure 2-9.

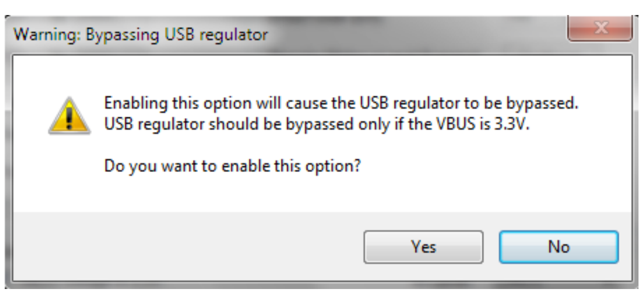
Figure 2-9: Other system settings




#### 2.3.1.4.1 VBUS Voltage is 3.3 V

This option needs to be checked if the VBUS line is supplied with 3.3 V and unchecked if the VBUS line is supplied with 5 V. Checking this option results in the USB regulator being bypassed. By default, this option is unchecked. A warning message pops up in the utility (see Figure 2-10) when this option is checked.

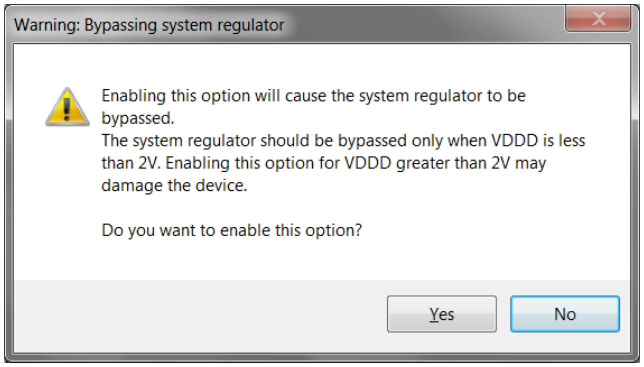
Figure 2-10: Bypass USB Regulator Warning



#### 2.3.1.4.2 VDD is less than 2 V

This option needs to be checked only if the VDD is less than 2 V. This option results in bypassing the system regulator. Bypassing the regulator and supplying more than 2 V may damage the device. Not bypassing when the VDD is less than 2 V may result in device reset. By default, this option is unchecked. A warning message pops up in the utility (see Figure 2-11) when this option is checked.

Figure 2-11: Bypass System Regulator Warning

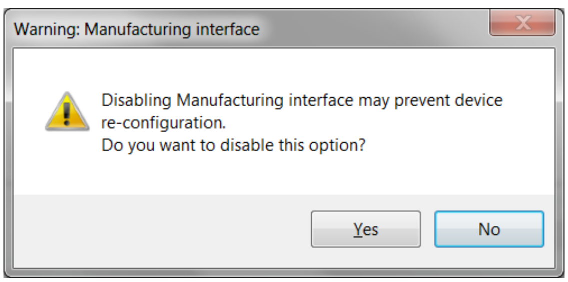



#### 2.3.1.4.3 Enable Manufacturing Interface

The utility provides an option to include an additional interface for the device. This additional interface can act as the manufacturing mode interface for re-programming the device. The manufacturing interface must bind to the Cypress Vendor Class driver (CyUsb3.sys) for the utility to connect to the device. This interface can be disabled if not required. A warning message pops up in the utility (see Figure 2-12) when this option is unchecked.

**Caution**: Disabling this interface may prevent you from re-programming the device in the future.

Figure 2-12: Disable Manufacturing Interface Warning



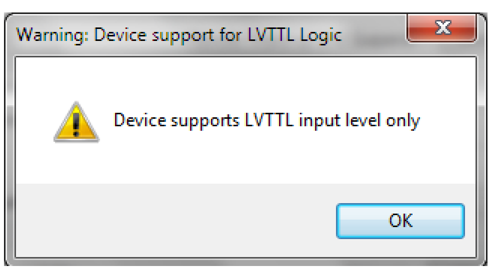

By default, this option is enabled.

#### 2.3.1.4.4 I/O Level

The device allows setting the GPIO logic to be used. The device supports logic levels CMOS and LVTTL. The default is CMOS logic. LVTTL logic supports device input level only. Changing the I/O Level to LVTTL will pop a caution message box as shown in Figure 2-12a.

**Caution:** Device Input logic supports LVTTL levels but the output level from the device is always CMOS.

Figure 2-12a: Device Support for LVTTL - Warning



##### 2.3.1.4.5 I/O Mode

The device allows slowing the GPIO edge transitions up to 5X for EMI considerations. Setting the I/O mode to slow reduces the transitions by up to 5 times. The default value is fast mode.

## 2.3.2 Serial Configuration Block (SCB) Configuration

The utility allows configuration of the following SCB parameters:

- Operation mode
- USB-SCB protocol
- Notification LED

### 2.3.2.1 SCBs in USB-Serial Devices

The number of SCBs and the available configuration options for the SCBs depend on the device part number. Table 2-4 captures the number of SCBs present in the USB-Serial device parts.

Table 2-4: Device SCB Count

| # | Part Number | SCB Count |
|---|---|---|
| 1 | CY7C65211-24LTXI | 1 |
| 2 | CY7C65211A-24LTXI | 1 |
| 3 | CY7C65213-32LTXI | 1 |
| 4 | CY7C65213A-32LTXI | 1 |
| 5 | CY7C65213A-28VXI | 1 |
| 6 | CY7C65213-28PVXI | 1 |
| 7 | CY7C65215-32LTXI | 2 |
| 8 | CY7C65215A-32LTXI | 2 |

The following sections capture the configurable options available for these devices.

#### 2.3.2.1.1 USB-Serial (Single Channel) [Part Number: CY7C65211-24LTXI and CY7C65211A-24LTXI]

The USB-Serial (Single Channel) device, as the name suggests, has only one SCB (SCB0). The SCB supports the following modes of operation:

1. UART
2. I2C (Master / Slave)
3. SPI (Master / Slave)

#### 2.3.2.1.2 USB-UART LP [Part Number: CY7C65213-32LTXI, CY7C65213-28PVXI, CY7C65213A-32LTXI and CY7C65213A-28VXI]

The USB-UART LP device, similar to the USB-Serial (Single Channel) device, has only one SCB (SCB0). The SCB in this device is pre-configured to a 8-pin UART. The device does not support other operational modes.

#### 2.3.2.1.3 USB-Serial (Dual Channel) [Part Number: CY7C65215-32LTXI and CY7C65215A-32LTXI]

The USB-Serial (Dual Channel) device has two SCBs (SCB 0 and SCB 1). Both SCB0 and SCB1 support the following operation modes:

1. UART
2. I2C (Master / Slave)
3. SPI (Master / Slave)

In addition to these operation modes, SCB1 also supports JTAG mode. If needed, SCB1 can also be disabled to free up SCB GPIOs to be used for Cypress CapSense®. Figure 2-13 and Figure 2-14 show the default configuration for SCB0 and SCB1.

Figure 2-13: SCB 0 Configuration

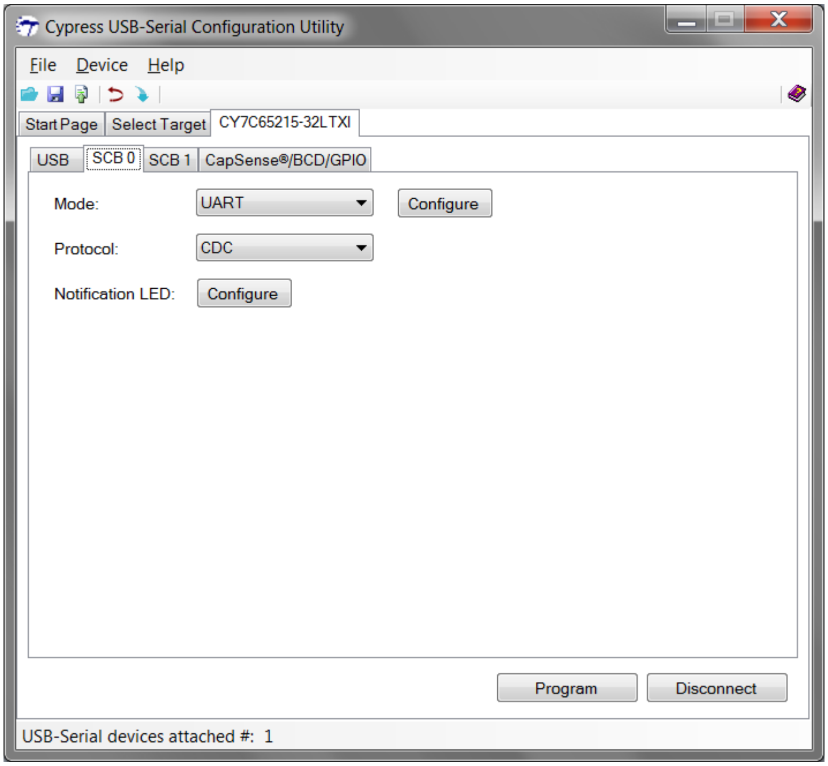
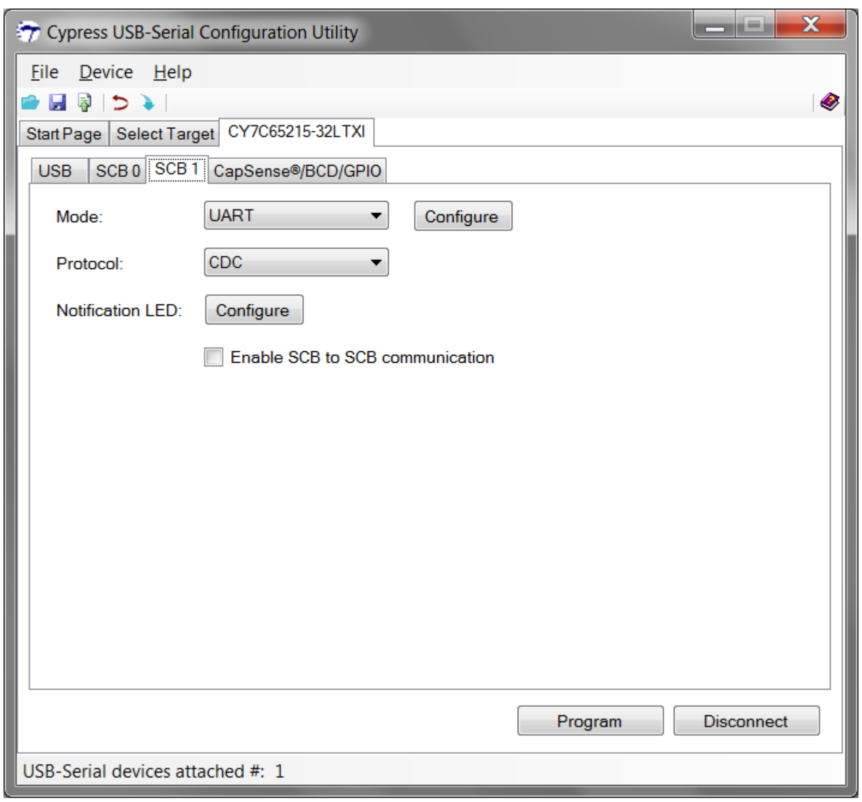



Figure 2-14: SCB 1 Configuration



### 2.3.2.2 Select SCB Operation Mode

The **Mode** drop-down combo box lists all the supported SCB operation modes. Select the required operation mode from this list. Most of these modes provide additional configuration settings. These mode-specific configurations can be edited by clicking the **Configure** button.

The following sections describe the configurable options available for each of the supported SCB modes.

### 2.3.2.3 Enable SCB-SCB Mode

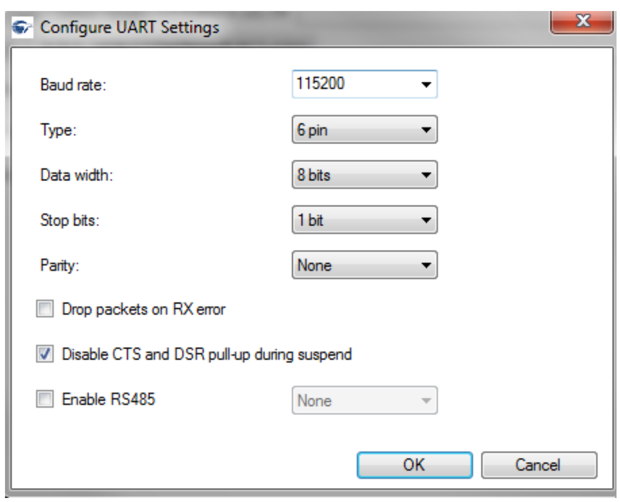
This is only valid for the USB-Serial (dual-channel) device and for firmware version 1.x. The device allows for transferring data from one SCB to another when the USB is not connected. This mode is available only in the self-powered use case where the two serial peripherals can do data transfers with each other. In this mode, only the following SCB configurations are supported:

- SPI slave to UART – When one of the SCB is acting as an SPI slave and another as UART, and the data received by the SPI slave is being transmitted over UART. In this case, the data received from the UART shall also be transmitted over the SPI slave interface.
- SPI slave to SPI slave – When both SCBs are configured as SPI slave interface, data received on one is transmitted on the other and vice versa.
- UART to SPI master – When one of the SCB is configured as UART and another as SPI master, data received by the UART interface shall be transmitted over SPI master interface. When this happens, the data received on the SPI master interface shall also be transmitted out on the UART interface.
- UART to UART – When both SCBs are configured as UART, the data received on one is transmitted on the other and vice versa.

## 2.3.2.3.1 UART Mode

Select **UART** from the **Mode** drop-down list, and then click the **Configure** button to open the UART settings editor. Figure 2-15 shows the UART configuration settings.

Figure 2-15. UART Configuration




The UART operation mode supports the following configurable settings:

1. Baud Rate
2. Type
3. Data Width
4. Stop Bits
5. Parity
6. Drop packets on RX error
7. Disable CTS, DSR and DCD pull-up / pull-down during suspend
8. Enable RS485

#### 2.3.2.3.1.1 Baud Rate

Select the required baud rate from the standard baud rates listed in the combo box or enter a custom baud rate. The UART supports a baud rate in the range 100 to 3000000.

*The default value is 115200*

#### 2.3.2.3.1.2 Type

The UART can be configured to one of the following types:

- 2-pin (2-pin UART: Only RX and TX lines)
- 4-pin (4-pin UART: RX, TX, RTS and CTS lines)
- 6-pin (6-pin UART: RX, TX, RTS, CTS, DSR and DTR lines)
- 8-pin (8-pin UART: RX, TX, RTS, CTS, DSR, DTR, DCD and RI lines)

The default value is 2-pin.

For the USB-UART LP device, the UART is pre-configured to 8-pin UART with RX, TX, RTS, CTS, DSR, DTR, DCD, and RI lines.

#### 2.3.2.3.1.3 Data Width

The UART data width can be set to one of the following two options:

- 7 bits
- 8 bits

The default value is 8 bits.

#### 2.3.2.3.1.4 Stop Bits

The number of UART stop bits can be set to one of the following options:

- 1 bit
- 2 bits

The default value is 1 bit.

#### 2.3.2.3.1.5 Parity

The UART parity can be set to one of the following options:

- None
- Odd
- Even
- Mark
- Space

The default value is None.

#### 2.3.2.3.1.6 Drop packets on RX Error

This option can be selected to drop the data packets when there is a receive error. By default, this option is unchecked.

#### 2.3.2.3.1.7 Disable CTS, DSR and DCD Pull-up/Pull-down During Suspend

In order to save power, the device disables the internal pull-up / pull-down resistors on the CTS, DSR and DCD GPIO lines during suspend state. Uncheck this option to retain the internal resistors.

#### 2.3.2.3.1.8 Enable RS485

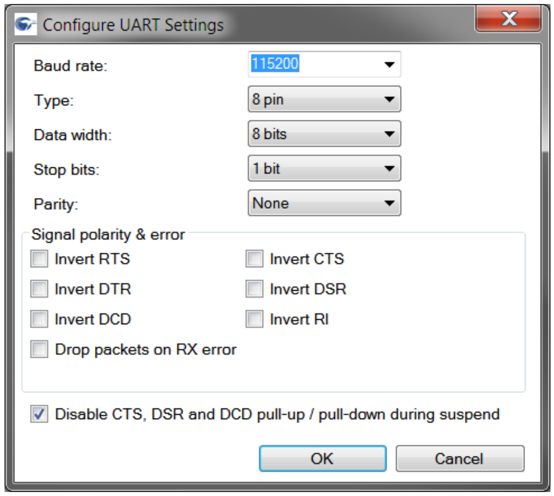
This option can be selected to enable the RS485 feature. User can configure a GPIO for this. By default, this will be disabled.

**Note**: This feature will be enabled only for the CY7C6521xA parts.

### 2.3.2.3.1.9 Invert Signal Polarity

The USB-UART LP device supports inverting the polarity of the UART signals. The polarity of all the UART lines, except the RX and TX lines, can be inverted. Figure 2-16 shows the UART configuration editor for the USB-UART LP device.

Figure 2-16: USB-UART LP UART Configuration




This feature is not available in the USB-Serial (single-channel) and USB-Serial (dual-channel) devices.

## *2.3.2.3.2 I2C Mode*

Select **I2C** from the **Mode** drop-down list, and then click the **Configure** button to open the I2C settings editor. Figure 2-17 and Figure 2-18 show the I2C Master and Slave mode configuration settings.

The I2C operation mode supports the following configurable settings:

- Frequency
- Mode
- Slave Address (Slave mode only)
- Use as wake-up source(Slave mode only)
- Enable Clock Stretching(Slave mode only)

Figure 2-17: I2C Master Configuration

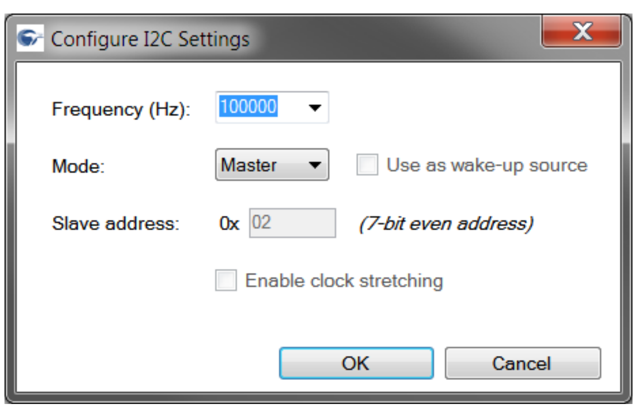
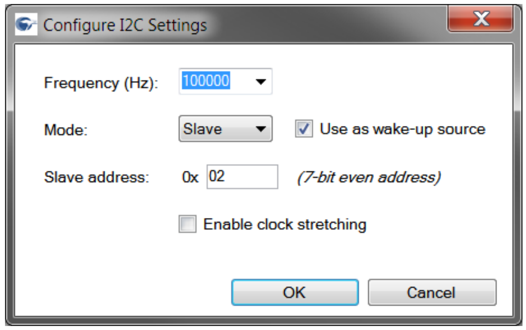


Figure 2-18. I2C Slave Configuration




### 2.3.2.3.2.1 Frequency (Hz)

Select the required frequency from the frequencies listed in the combo box or enter a custom frequency in Hz. The I2C supports frequency in the range 1000 (1 KHz) to 4,00,000 (400 KHz). In the slave mode operation, the frequency should be greater than or equal to other masters on the bus.

The default value is 100 KHz.

### 2.3.2.3.2.2 Mode

The I2C operation mode can be set to either Master or Slave. By default, the I2C is configured to operate in the master mode.

### 2.3.2.3.2.3 Slave Address

This field allows for setting the 7-bit I2C slave address in the hexadecimal format. The device supports only even numbers for the slave address. Although based on the I2C specification, the valid 7-bit address ranges from 0x08 to 0x77, the utility does not restrict you from setting any even number address in the range 0x02 to 0x7F. The address limitation is only on the slave mode operation and the master can be used to access all the 7-bit address space.

### 2.3.2.3.2.4 Use as Wake-up Source

The utility supports using I2C, configured in the slave mode, as a host remote wake-up source. Select this option to use it as a remote wake-up source.

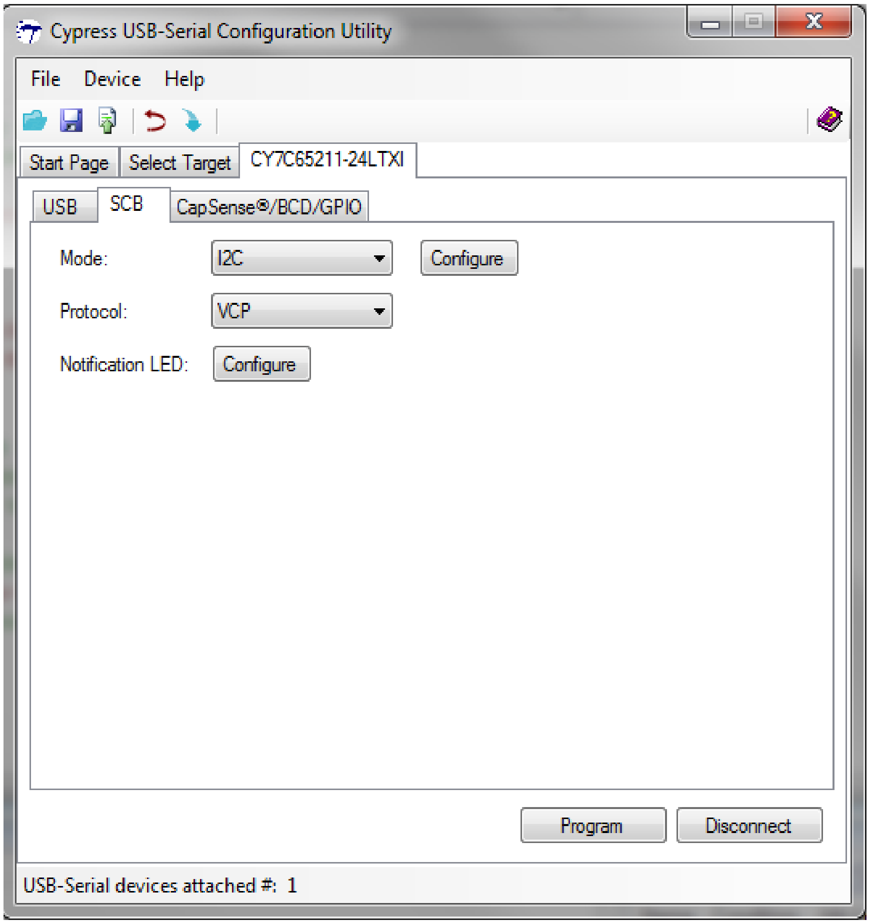
### 2.3.2.3.2.5 Enable Clock Stretching

This option allows the device to emulate flow control. When this option is set, the clock is stretched (held low) until the buffer is available.

### 2.3.2.3.2.6 VCP Mode for I2C Slave

On setting the I2C as slave, we can configure the device as VCP. This is nothing but a Vendor mode with PID 0x0033. Figure 2-19 shows the configuration settings.

Figure 2-19. I2C slave VCP Configuration



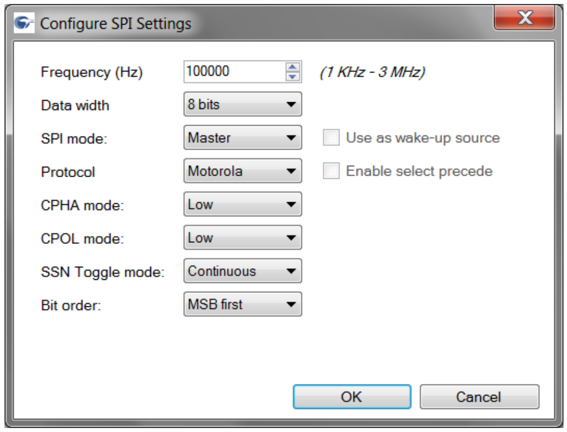

### 2.3.2.3.3 *SPI Mode*

Select **SPI** from the **Mode** drop-down list, and then click **Configure** to open the SPI settings editor. Figure 2-20 shows the SPI configuration settings.

The SPI function mode supports the following configurable settings:

- Frequency
- Data width
- Protocol
- SPI mode
- SSN Toggle mode
- Bit Order
- CPHA & CPOL mode
- Enable Select Precede
- Use as wake-up source (Slave mode only)

Figure 2-20: SPI Configuration




#### 2.3.2.3.3.1 Frequency

This field allows setting of the SPI operating frequency in Hz. The SPI mode supports operating frequencies in the range 1 KHz to 3 MHz (1000 to 3000000). In the slave mode operation, the slave should be clocked at a higher or same frequency as that of the master.

The default frequency is 1000Hz (1 KHz).

#### 2.3.2.3.3.2 Data width

The SPI data width can be set to one of the values in the drop-down list. SPI supports data width in the range 4 bits to 16 bits. By default, the data width is set to 8 bits.

#### 2.3.2.3.3.3 Protocol

SPI can be configured to operate in one of the following protocols.

- Motorola
- Texas Instruments (TI)
- National Semiconductor (NS)

Table 2-5 briefly describes each of the supported protocols.

Table 2-5. SPI Supported Protocols

| # | Mode | Description |
|---|---|---|
| 1. | Motorola | In Master mode,<br>1. When not transmitting data (SELECT line is inactive), SCLK is stable at CPOL<br>2. When there is no data to transmit (TX FIFO is empty), SELECT line is inactive<br>In Slave mode,<br>1. When not selected, SCLK is ignored (SCLK can be either stable or clocking) |
| 2. | TI (supports only mode 1) | In Master mode,<br>1. When not transmitting data, SCLK is stable at ‘0’<br>2. When there is no data to transmit (TX FIFO is empty), SELECT line is inactive<br>In Slave mode,<br>1. When not selected, SCLK is ignored (SCLK can be either stable or clocking) |
| 3. | NS (supports only mode 0) | In Master mode,<br>1. When not transmitting data, SCLK is stable at ‘0’<br>2. When there is no data to transmit (TX FIFO is empty), SELECT line is inactive<br>In Slave mode,<br>1. When not selected, SCLK is ignored (SCLK can be either stable or clocking) |

The default mode is Motorola.

#### 2.3.2.3.3.4 SPI Mode

The SPI can be configured to operate as either master or slave. By default, the operating mode is set to Master.

#### 2.3.2.3.3.5 SSN Toggle Mode

The SSN toggle mode can be configured to either Frame or Continuous. Table 2-6 describes these options.

Table 2-6. SSN Toggle Modes

| # | Toggle Mode | Description |
|---|---|---|
| 1. | Frame | Individual data frame transfers are always separated by slave de-selection. Independent of the availability of TX FIFO data frames, data frames are sent out with slave de-selection. |
| 2. | Continuous | Individual data frame transfers are not necessarily separated by slave de-selection (as indicated by the SELECT line). If the TX FIFO has multiple data frames, data frames are sent out without slave de-selection. |

This field is used for master mode configuration. The Slave mode supports both continuous and frame mode data transfers.

*The default value is Continuous.*

#### 2.3.2.3.3.6 Bit Order

You can set the SPI data transfer bit order to one of the following options:

- LSB first
- MSB first

*The default value is MSB first.*

#### 2.3.2.3.3.7 CPHA and CPOL Modes

CPHA stands for Clock Phase and CPOL stands for Clock Polarity. You can set the CPOL and CPHA values to either **Low** or **High** from the drop-down list. Table 2-7 describes the clock polarity values.

Table 2-7. SPI CPOL Values

| # | CPOL | Description |
|---|---|---|
| 1. | Low | SCLK is ‘0’ when not transmitting data |
| 2. | High | SCLK is ‘1’ (high) when not transmitting data |

The CPHA and CPOL fields combine to form the four modes supported by the Motorola protocol. Table 2-8 captures the four Motorola modes:

Table 2-8. SPI Motorola Modes

| # | Mode | CPOL | CPHA | Description |
|---|---|---|---|---|
| 1. | Mode 0 | Low | Low | Data is captured on the rising edge of SCLK and data is propagated on the falling edge of SCLK |
| 2. | Mode 1 | Low | High | Data is captured on the falling edge of SCLK and data is propagate on the rising edge of SCLK |
| 3. | Mode 2 | High | Low | Data is captured on the falling edge of SCLK and data is propagated on the rising edge of SCLK |
| 4. | Mode 3 | High | High | Data is captured on the rising edge of SCLK and data is propagated in the falling edge of SCLK |

The CPHA and CPOL fields are available only when the SPI protocol is set to Motorola. By default, the CPOL and CPHA values are set to Low.

#### 2.3.2.3.3.8 Enable Select Precede

This field is available only when the SPI protocol is set to the Texas Instruments (TI) mode. Table 2-9 describes the behavior when this field is enabled or disabled.

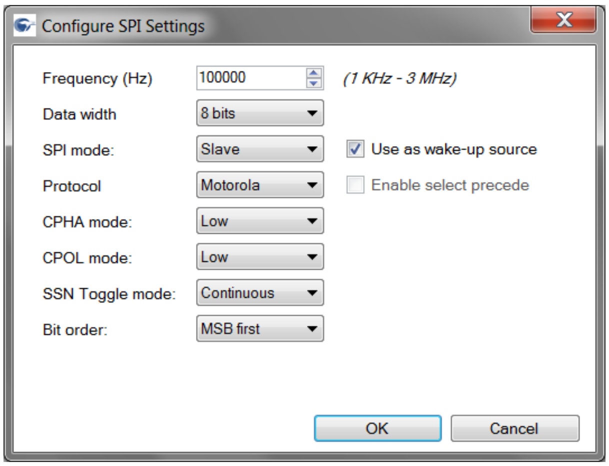
Table 2-9. SPI Select Precede

| # | Options | Description |
|---|---|---|
| 1. | Enabled (checked) | Data frame start indication pulse on the SELECT line precedes the transfer of the first data frame bit |
| 2. | Disabled (unchecked) | Data frame start indication pulse on the SELECT coincides with the transfer of the first data frame bit |

#### 2.3.2.3.3.9 Use as Wake-up Source

The device supports using the SPI slave as a host remote wake-up source. Select this option (see Figure 2-21) to use SPI as a remote wake-up source.

Figure 2-21: Use SPI as Remote Wake-Up Source




## *2.3.2.3.4 JTAG Mode*

Select **JTAG** from the **Mode** drop-down list to configure SCB to operate as JTAG. This mode has pre-configured, but not configurable, settings.

**Note**: CY7C65215A does not support JTAG Mode.

### *2.3.2.4 USB-SCB Protocol*

After selecting the SCB operation mode, select the USB-SCB protocol. Each mode supports a fixed set of protocols. The **Protocol** drop-down box lists all the supported protocols.

Table 2-10 provides the protocols supported by each of the SCB operation modes.

Table 2-10. USB-SCB Protocols

| # | Modes | Supported Protocols |
|---|---|---|
| 1. | Disabled | Disabled |
| 2. | UART | CDC, PHDC, Vendor |
| 3. | I2C | Vendor, CDC, VCP |
| 4, | SPI | PHDC, Vendor, CDC |
| 5. | JTAG | Vendor |

### 2.3.2.5 Configure SCB Activity Notification

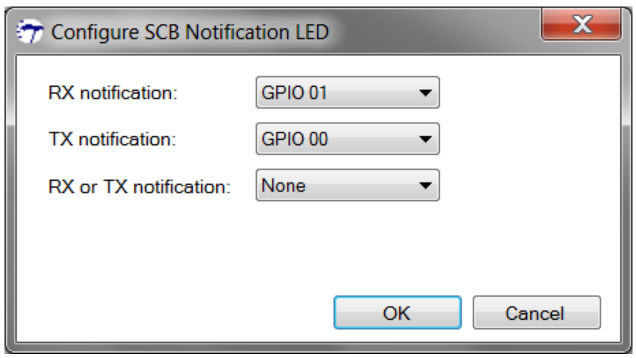
The USB-Serial devices support three types of notification

1. Drive a GPIO on USB transmit
2. Drive a GPIO on USB receive
3. Drive a GPIO on both USB transmit and receive (SCB: TX&RX LED)

The device can simultaneously support all three notifications. Therefore, for a particular SCB, the device can be configured for more than one notification.

Figure 2-22 shows the SCB notification configuration editor. To enable a notification, select a GPIO from the respective **GPIO** drop-down list. To disable a notification, select **None** from the drop-down list.

Figure 2-22: Notify SCB Activity Configuration Editor




The device supports individual notification for each of the SCBs in the device. Notification can be configured for either one of the SCBs or both the SCBs or none.

## 2.3.3 Device GPIOs

USB-Serial devices have a pool of configurable GPIOs. The number of GPIOs varies from one device part to another. Refer to the device datasheet to get the available GPIO count for your device.

Each SCB uses GPIOs from this GPIO pool. The number of required GPIOs varies from one SCB configuration to another. Refer to the device datasheet for more information on what GPIOs are used for your SCB configuration.

After the required GPIOs are consumed for the SCB configuration, the device may still be left with some unused / free GPIOs in the device GPIO pool. These free GPIOs can be used for other features supported by the device.

**Note**: The device datasheet maps the GPIO numbers to the corresponding device physical pin.

## 2.3.4 CapSense®/BCD/GPIO Configuration

The **CapSense®/BCD/GPIO** tab allows configuration of the system-level settings of the device. The following settings can be configured

1. Cypress CapSense®
2. GPIO Drive Modes
3. Battery Charging Detect (BCD)

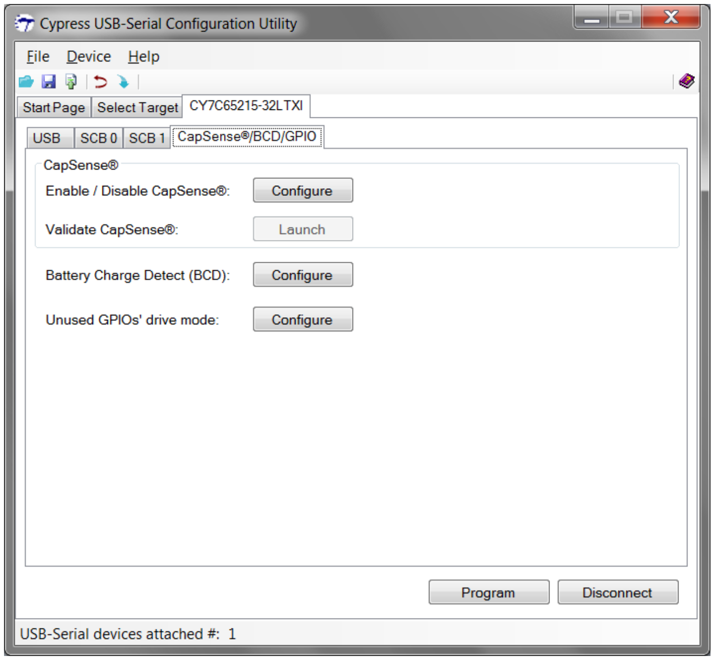
### 2.3.4.1 Cypress CapSense®

Capacitance sensing systems can be used in many applications in place of conventional buttons, switches, and other controls, even in applications that are exposed to rain or water. Such applications include automotive, outdoor equipment, ATMs, public access systems, portable devices such as cell phones and PDAs, and kitchen and bathroom applications.

To understand the basics of capacitive touch sensing and to learn the key design considerations and layout best practices, read the document, Getting Started with CapSense.

USB-Serial (Single Channel) and USB-Serial (Dual Channel) devices support up to eight CapSense buttons depending on the free GPIOs. The device supports only single-button detection. The CapSense output is indicated over binary coded output GPIO lines. LED based indication (ON/OFF) is also provided as output. The **CapSense®/BCD/GPIO** tab of the utility allows configuration of CapSense in the device.

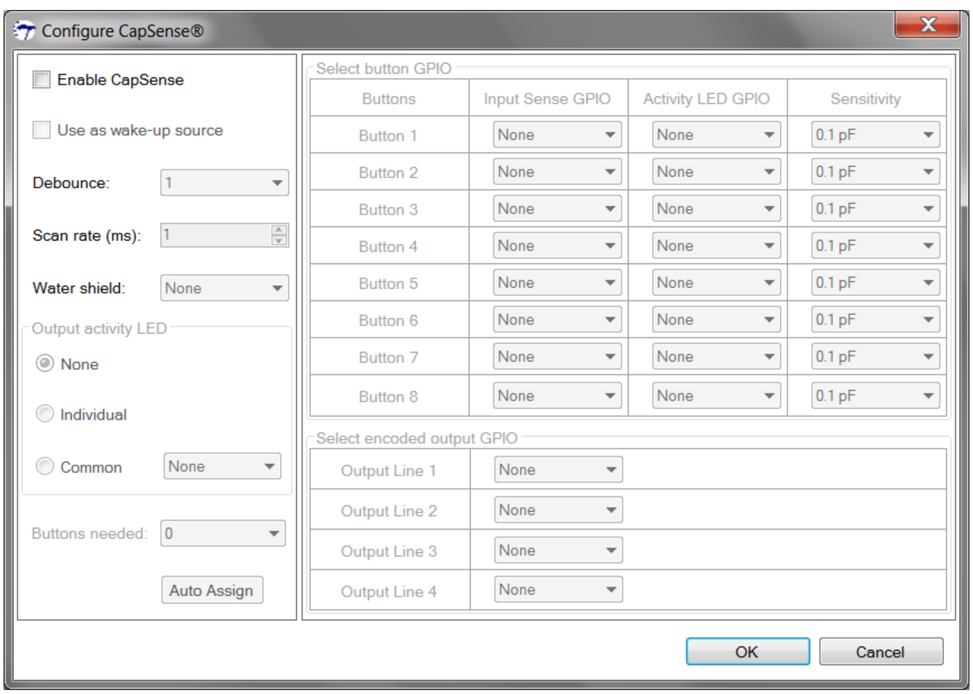
Figure 2-23: CapSense Configuration & Validation




### 2.3.4.1.1 CapSense Configuration

To configure CapSense on the device, click the CapSense **Configure** button to launch the CapSense Configuration editor (see Figure 2-24).

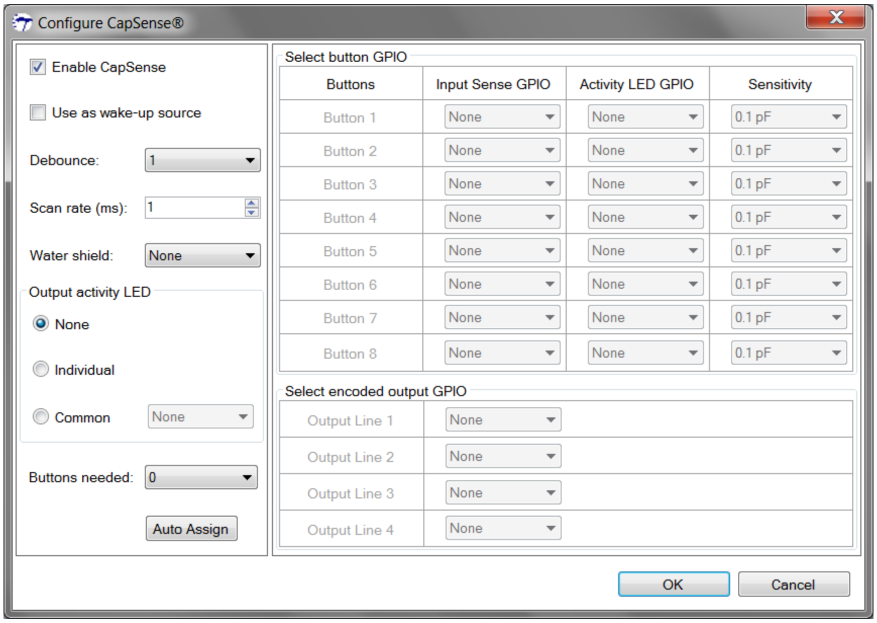
Figure 2-24: CapSense Configuration Editor



### 2.3.4.1.1.1 Enable CapSense

To enable CapSense in the device, select **Enable** from the **CapSense** drop-down list. This enables the CapSense block in the device and other configuration options in the editor (see Figure 2-25).

Figure 2-25: Enable CapSense




### 2.3.4.1.1.2 Debounce

The Debounce value defines the number of scan cycles that a button needs to be in pressed state for the device to detect and report the button press status. For example, if the debounce value is set to two, the device reports a button press status only when it detects the button press for two continuous scan cycles.

Debounce ensures that a high-frequency, high-amplitude noise does not cause false detection of a pressed button. The debounce value can be set to any value between 1 and 5. By default, the debounce value is set to ‘1’.

### 2.3.4.1.1.3 Scan Rate

The scan rate is the delay (in ms) between two button scans. For example, if the device has three CapSense buttons and the scan rate is set to 2 ms, each button will be scanned once in every 6 ms.

Scan rate can be set to any value between 1 ms and 100 ms. By default, the scan rate is set to 1 ms.

### 2.3.4.1.1.4 Water Shield

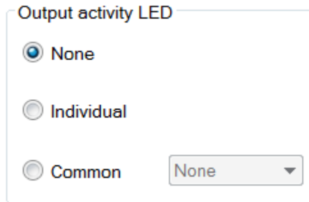
The device can be configured to suppress the influence of water on the CapSense system. Select the GPIO to be used as WaterShield I/O from the drop-down list. This GPIO will be used to compensate for the influence of water drops on the sensor at the hardware level.

### 2.3.4.1.1.5 Activity LED Selection

The device supports the following activity notifications for CapSense buttons:

1. None
2. Individual
3. Common

Figure 2-26: Activity LED




Activity LED selection affects the maximum number of CapSense buttons that can be configured. Therefore, select the required notification before selecting the required CapSense buttons.

### 2.3.4.1.1.6 None

To disable the notification for the **CapSense** button, select the **None** radio button from the Activity LED group. In this configuration, there will no LED notification for the **CapSense** button pressed state.

### 2.3.4.1.1.7 Individual

Select the **Individual** radio button to get an individual notification LED for each of the selected CapSense buttons.

### 2.3.4.1.1.8 Common

Select the **Common** radio button to get a single notification LED for all the selected CapSense buttons. When this option is selected, you can choose the GPIO to be used for notification from the drop-down list.

### 2.3.4.1.1.9 Select CapSense Buttons

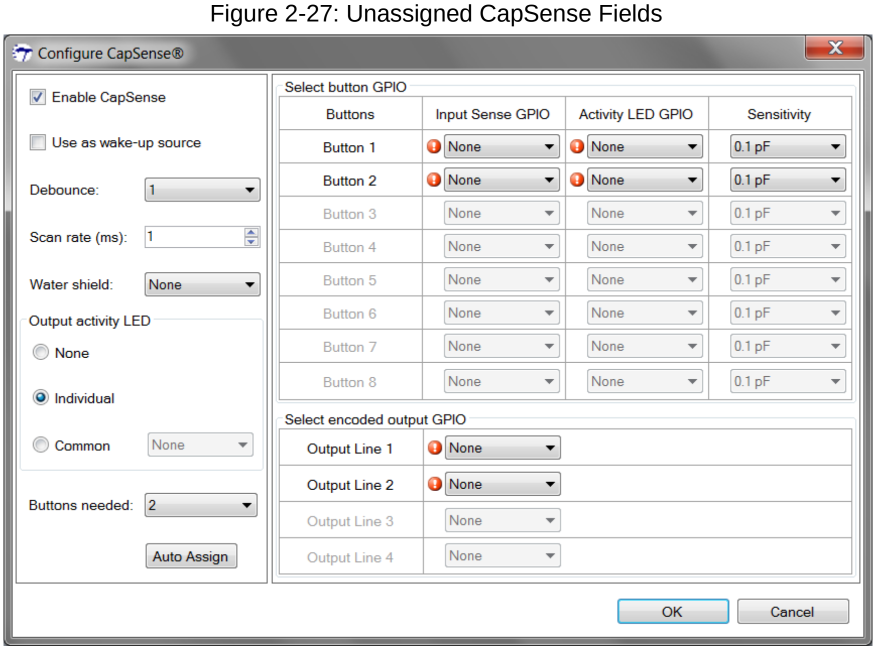
CapSense uses GPIOs from the device pool (refer to the Device GPIOs section). The number of CapSense buttons that can be selected for configuration depends on the availability of the GPIOs. The USB-Serial devices can support a maximum of eight CapSense buttons.

Select the number of CapSense buttons required from the **Buttons needed** drop-down list. After selecting the number of CapSense buttons required, configure the GPIOs to be used for sensing the CapSense buttons, activity LEDs (based on the selection made under the Activity LED Selection section), and the encoded output lines.

### 2.3.4.1.1.10 CapSense GPIO Assignment

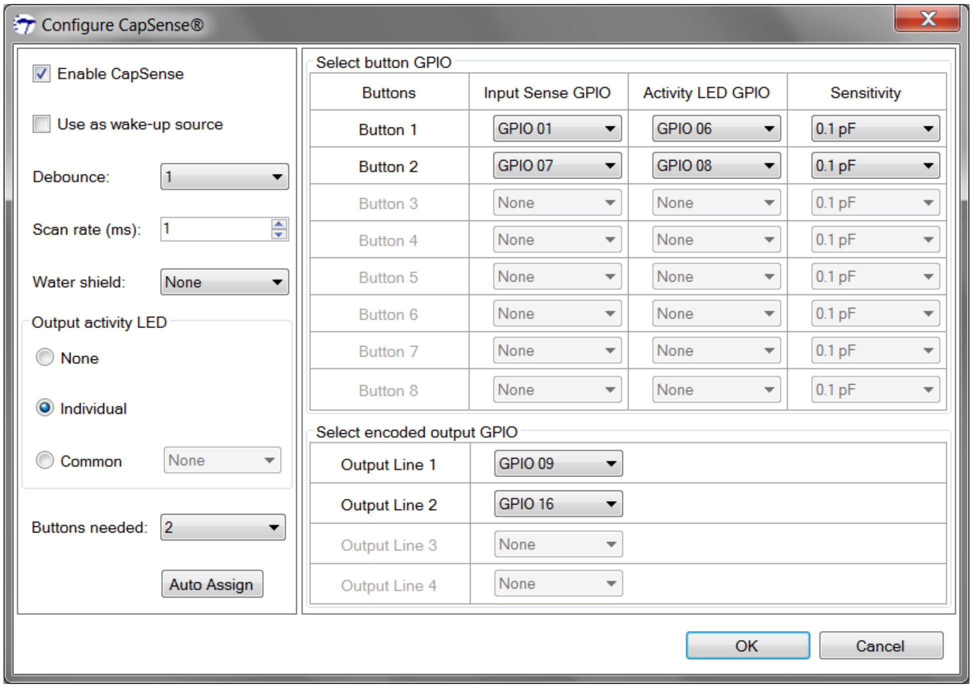
GPIOs can be either manually selected from the drop-down list or click the **Auto Assign** button to automatically assign the GPIOs. All fields which require a GPIO to be assigned are marked with an error icon as shown in Figure 2-27.

Figure 2-27: Unassigned CapSense Fields



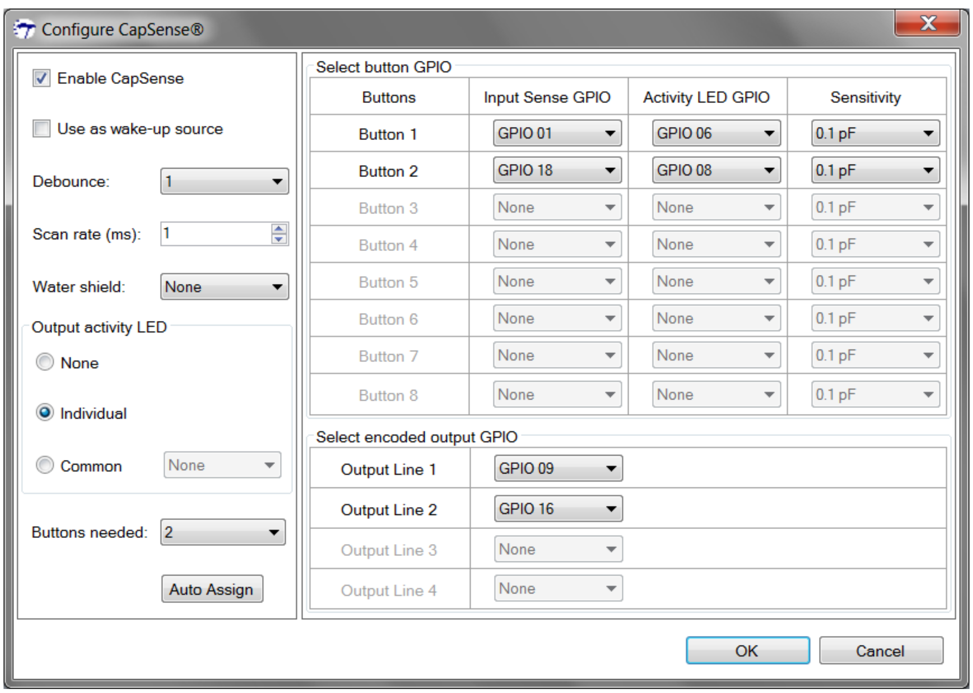
On clicking the **Auto Assign** button, the utility automatically assigns the GPIOs from the available free pool, as shown in Figure 2-28.

Figure 2-28: Auto Assign GPIOs



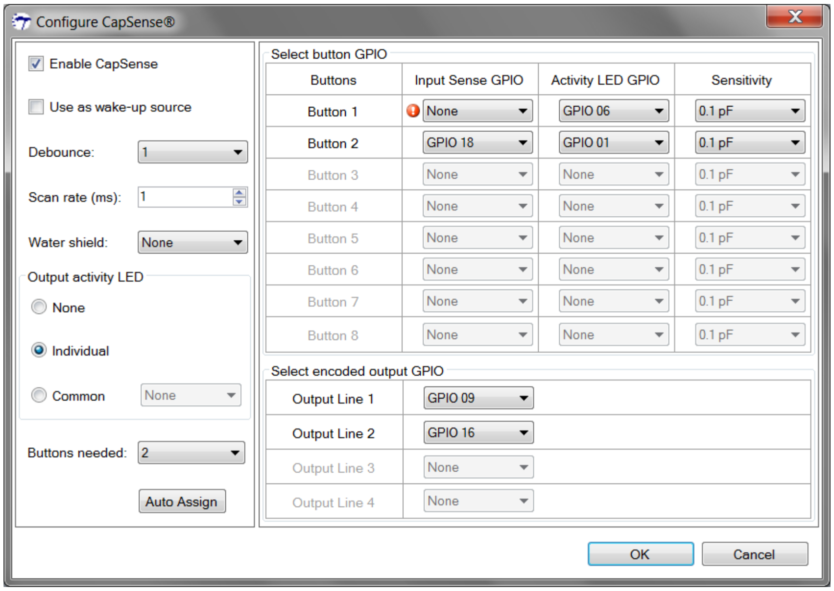

The Auto Assign feature also works with partial GPIO assignments. Select GPIOs for some of the required fields and then click **Auto Assign**. The utility will populate the remaining fields with the available GPIOs.

Figure 2-29: Modify Automatic GPIO Assignments




The utility enables modification of the auto-assigned pins. In Figure 2-29, the Input GPIO assignment for Button 2 is modified from GPIO 07 to GPIO 18.

Figure 2-30: CapSense GPIO Re-assignment




The utility also allows re-assigning an already selected GPIO for another field. In Figure 2-30, GPIO 01 is re-assigned to Button 2 Activity LED GPIO from Button 1 Input GPIO. Note the error icon next to the Button 1 Input GPIO field after re-assignment.

### 2.3.4.1.1.11 Sensitivity

The utility allows configuration of the individual button sensitivity in terms of finger capacitance. The sensitivity can be set to any value between 0.1pF and 0.4pF from the drop-down list. By default, the sensitivity of all the buttons is set to 0.1 pF.

### 2.3.4.1.1.12 Encoded output GPIO

The number of encoded output GPIO lines required, depends on the number of CapSense buttons selected. Table 2-11 captures the number of output GPIOs required for the selected CapSense buttons.

Table 2-11: Encoded Output GPIO Count

| # | # of CapSense Buttons | # of Output GPIOs Required |
|---|---|---|
| 1. | 1 | 1 |
| 2. | 2 to 3 | 2 |
| 3. | 4 to 7 | 3 |
| 4 | 8 | 4 |

The encoded GPIO lines indicate the button press status as binary coded output. For example, consider a design with three CapSense buttons B1, B2 and B3. The design would require two encoded output GPIOs O1 and O2.

Table 2-12 illustrates the mapping between the button press state and the output GPIO states.

Table 2-12: Encoded Output GPIO State

| # | CapSense Buttons Pressed | | | Output GPIOs state | |
|---|---|---|---|---|---|
| | B1 | B2 | B3 | O1 | O2 |
| 1 | NO | NO | NO | Drive 0 | Drive 0 |
| 2 | YES | NO | NO | Drive 0 | Drive 1 |
| 3 | NO | YES | NO | Drive 1 | Drive 0 |
| 4 | NO | NO | YES | Drive 1 | Drive 1 |
| 5 | YES | NO | YES | Drive 0 | Drive 1 |
| 6 | YES | YES | YES | Drive 0 | Drive 1 |

The device supports only single button detection. When multiple buttons are pressed at the same time, the lowest button number will be indicated.

### *2.3.4.1.2 CapSense Validation*

The utility allows validating the behavior of the configured CapSense buttons by plotting a graph of the CapSense parameters in real-time. Follow these steps to begin the CapSense validation:

1. Configure the CapSense from the 'CapSense Configuration Editor', as discussed in CapSense Configuration section.
2. Program the configuration (see Program Device section)
3. Reset the device for the programmed configuration to take effect
4. Connect to the device again and navigate to the **CapSense®/BCD/GPIO** sub-tab under the **Device** tab
5. Click **Launch** to launch the 'CapSense Validation' window

The utility monitors and plots the following CapSense parameters:

- **Raw Count:** Button capacitance is converted into a count value by the CapSense algorithm. The unprocessed count value is referred to as raw count. Processing of the raw count results in ON/OFF states for the button
- **Baseline:** The baseline is an estimate of the average sensor count level when the sensor is in the OFF state. The baseline provides a reference level for the ON/OFF comparison.
- **Difference Count:** Subtracting the baseline level from the raw count produces the difference count that is used in the ON/OFF decision process. The actual baseline is dynamically adjusted by the user module to compensate for environmental changes through a process called baseline update.
- **Finger Threshold:** Threshold value used by the CapSense algorithm to identify button status changes. If the difference count us increasing and exceeds the level of finger threshold, then the button state changes from OFF to ON. If the difference count is decreasing and drops below the level of finger threshold, then the button state changes from ON to OFF
- **Noise Threshold:** If the difference count is below the noise threshold, then the baseline is updated
- **Signal-to-Noise Ratio (SNR):** Ratio of difference count to noise threshold

The CapSense validation window supports two modes of validation:

- Button Specific Validation
- Parameter Specific Validation

#### 2.3.4.1.2.1 Button-Specific Validation

In this validation mode, the utility plots the CapSense parameter values for a selected button. The utility allows you to choose the button for which the utility needs to collect real-time data. To load this validation mode, select the **Button Specific Validation** option from the **Select View** drop-down list and then click **Load view**.

##### Select Button

After the utility loads the validation view, select the button for which the utility needs to collect data. By default, the first CapSense button is selected and the utility collects data for Button 1. The **Select Button** drop-down lists all the buttons configured in the device. The utility allows changing the button to view at any time during the validation process.

##### Button Status

The **Button Status**, located to the right of the validation window, indicates the current status of the selected button.

##### Select Graph

For the selected button, the utility allows selecting from three different graphs to view the CapSense parameters.

- **Raw Count Vs. Baseline:** The utility plots the raw count values against the baseline values for the selected button
- **Difference Count Vs. Finger Threshold:** Plots the difference count values for the selected button against the finger threshold
- **Signal to Noise Ratio (SNR):** Plots the SNR calculated for the selected button

The utility allows changing the graph at any time during the validation process.

#### 2.3.4.1.2.2 Parameter-Specific Validation

In this mode, the utility monitors and plots the selected CapSense parameter for all the configured buttons. You can select the CapSense parameter for which the utility needs to collect real-time data. To load this validation mode, select **Parameter Specific Validation** from the **Select View** drop-down list and then click the **Load view** button.

**Select Parameter**

After the utility loads the validation view, select the parameter to monitor from the **Select Parameter** drop-down list. The utility allows selecting one of the following CapSense parameters:

- Raw Count
- Difference Count
- SNR

**Monitor Buttons**

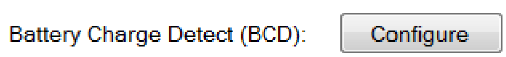
This section of the utility displays all the configured buttons in the device. For the selected parameter, the utility allows selection of the buttons to be viewed or hidden by checking or unchecking the checkbox.

### *2.3.4.2 Battery Charging Detect (BCD)*

The device supports battery charger detection based on the Battery Charging Specification, version 1.2. The device does not support ID pin-based (ACA) detection. The detection output is indicated to the external processor / PMIC through the configured GPIO lines (BCD0 and BCD1). The external processor is expected to handle GPIO signaling for configuring the power management circuitry to initiate battery charging. The charger detection is useful only when the device functions in the self-power mode where there is a battery available for the device to charge. While using BCD, the VBUS must be routed to BUS_DETECT GPIO line through resistor dividers so that the voltage on the line never exceeds 5 V. This shall be used for detecting connect / disconnect.

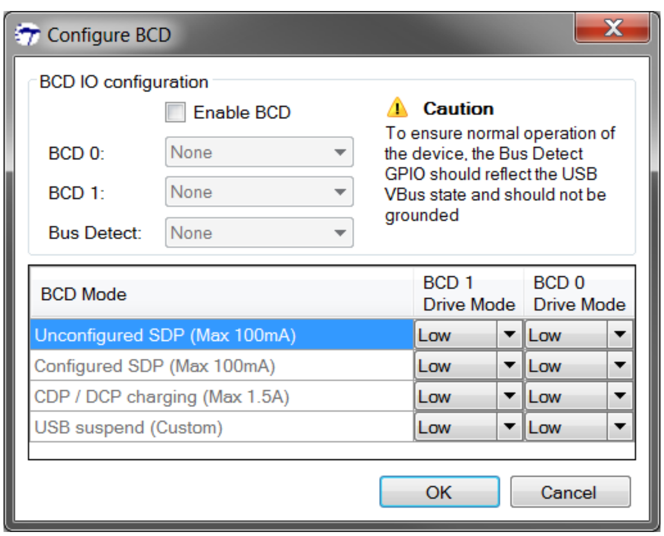
To launch the BCD configuration editor, click the BCD **Configure** button as shown in Figure 2-31.

Figure 2-31: Open BCD Configuration




The editor (shown in Figure 2-32) allows selection of GPIOs for the BCD pins and sets the BCD pin drive state for each of the different battery detection modes.

Figure 2-32: BCD Configuration Editor



#### 2.3.4.2.1 Enable BCD

Select the **Enable BCD** checkbox to enable BCD for the device.

#### 2.3.4.2.2 Assign BCD GPIOs

On enabling BCD, the ‘BCD0’, ‘BCD1’, and ‘Bus Detect’ fields become editable. BCD requires these fields to be assigned a GPIO. Select the required GPIO from the drop-down list.

#### 2.3.4.2.3 Charging Mode Indication

The utility allows configuration of the BCD0 and BCD1 line drive mode to indicate the charging state. The BCD0 and BCD1 drive state for the charging states may vary from one PMIC to another. The utility allows the flexibility to configure the BCD feature to match the PMIC used in the system.

The utility allows configuration of the following charging states:

- Unconfigured SDP state (up to 100 mA)
- Configured SDP state (up to 500 mA or whatever is set in the Current Draw field)
- DCP / CDP charging (up to 1.5 A)
- Not charging (USB bus suspended)

These four states can be represented by the BCD0 and BCD1 lines using the BCD drive mode options. If the PMIC supports only two current limits (500mA and 1.5A), then only the BCD0 line needs to be connected to the PMIC. The BCD1 line shall be ignored and shall not be connected to the PMIC. The polarity of BCD0 and BCD1 can be configured to match the PMIC settings.

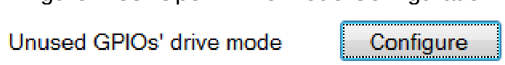
### 2.3.4.3 GPIO Drive Modes

After configuring the main features of the device, the remaining free GPIOs of the device can be configured to one of the following drive modes:

1. Drive 0 – Drives the GPIO low on startup
2. Drive 1 – Drives the GPIO high on startup
3. Input – Configures the GPIO as input on startup
4. Tristate – Configures the GPIO in tri-state on startup.

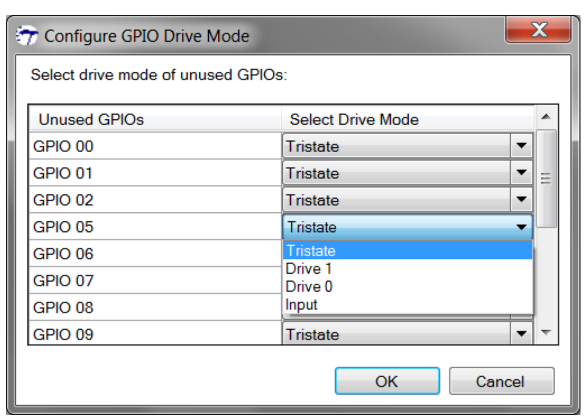
Click on the Drive Mode **Configure** button (see Figure 2-33) to open the Drive Mode configuration editor.

Figure 2-33: Open Drive Mode Configuration




The configuration editor (see Figure 2-34) lists all the remaining free GPIOs in the device. Select the drive mode for each of these GPIOs from the drop-down list. By default, the free GPIOs are configured as Tristate.

Figure 2-34: GPIO Drive Mode Editor




Refer to the device datasheet and the Cypress USB-Serial API guide on the functionalities supported by the GPIOs.

### 2.3.5 Program Device

The device configuration changes made in the utility do not update the configuration until the device is programmed with the new settings. To program the device, click **Program** at the bottom of the **Device** tab. The device can also be programmed from the **Device** menu (**Device** > **Program Device**) or by clicking the **Program Device** button ( ) in the toolbar.

### 2.3.6 Save Configuration

The utility allows saving the current device configuration settings to a configuration file. The saved configuration file can be loaded whenever required. In addition, the batch programming feature (described in Batch Program section) of the utility uses this configuration file as input.

Follow these steps to save the current settings:

1. In the File menu, click **Save** to open the **Save Configuration** dialog
2. This is a regular Windows Save dialog. Choose the location on disk to export the configuration and give a name for the configuration file
3. Click **Save** to save the configuration. The configuration file will be saved with the extension '.cyusb'

The configuration can also be saved by clicking the **Save** button ( ) on the toolbar.

### 2.3.7 Open Device Configuration

The utility allows loading the device configuration from two sources:

- Target device
- Configuration file

#### *2.3.7.1 Open Configuration from Device*

The utility allows loading the current configuration in the connected device. To do this, select ***File*** > ***Open Configuration from*** > ***Device*'**. The utility then attempts to read the configuration from the device. If successful, the device configuration settings in the Device tab are updated. On failure to correctly read the settings, the current settings in the **Device** tab will be unmodified. The configuration in the connected device can also be loaded by clicking the **Open Configuration from Device** button ( ) on the toolbar.

This option can be used to review the current configuration of the device.

#### *2.3.7.2 Open Configuration from File*

The utility allows loading a saved configuration from configuration file (refer to Save Configuration section) on disk. Follow these steps to load the configuration from disk:

1. Select **File** > **Open Configuration from** > **Disk…** to open the **Open Configuration** dialog
2. This is a regular **Windows File Open** dialog. Navigate to the location where the configuration file is stored and select the configuration file (**.cyusb*)
3. Click **Open** to load the configuration.

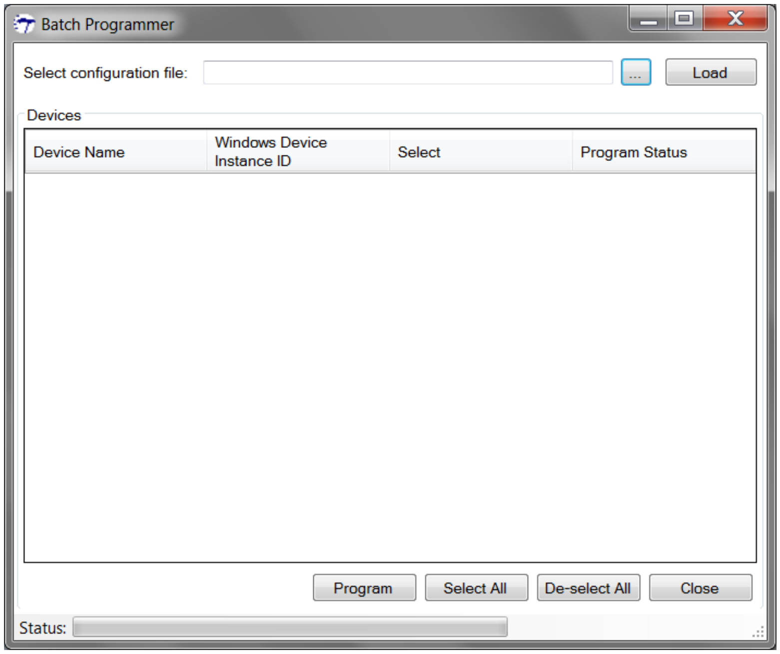
The configuration file can also be loaded by clicking the **Open Configuration from Disk** button ( ) on the toolbar.

On successful loading, the configuration settings in the **Device** tab are updated. If the configuration file is corrupted or invalid, the current configurations are unmodified.

### 2.3.8 Batch Program

When there are multiple devices to be programmed with the same configuration, the utility provides an option to program these devices in batch mode. The Batch Programmer (see Figure 2-35) allows programming one or more devices connected to the machine with the click of a button.

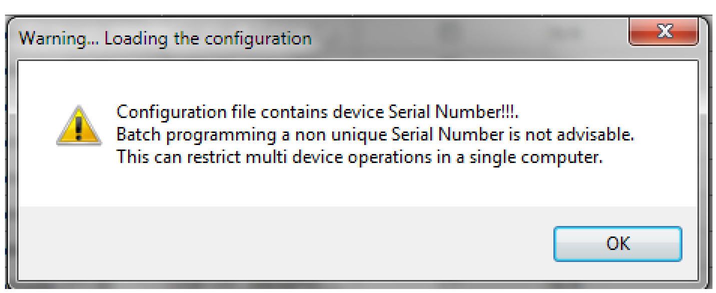
Figure 2-35: Batch Programmer




Follow these steps to program the devices in the batch mode:

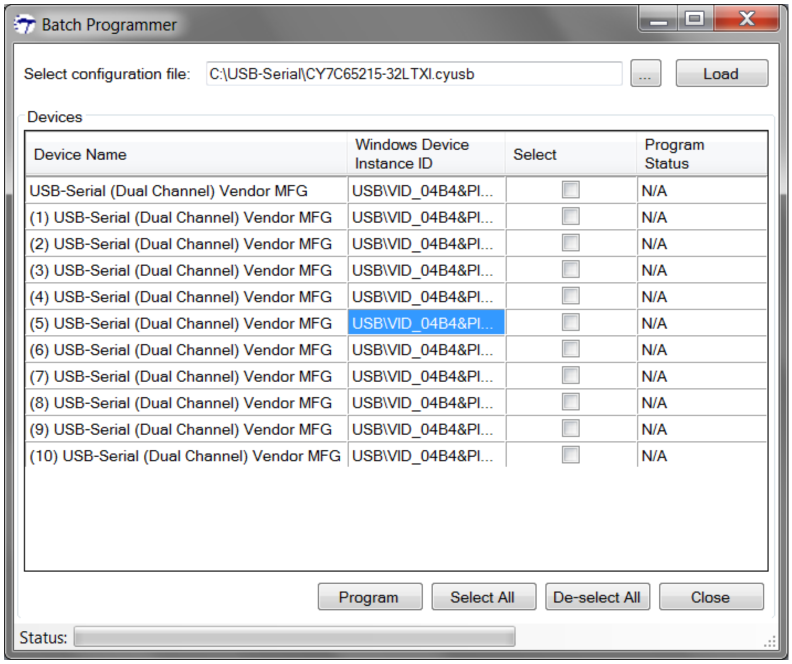
1. The Batch Programmer uses the saved configuration file. If the configuration settings are not saved yet, follow the steps mentioned in Save Configuration section.
2. After a saved configuration file is available, select **File**>**Batch Program** to launch the Batch Programmer.
3. In the Batch Programmer dialog, select the configuration file to be used for programming by clicking on the ellipses (…) button.
4. On clicking the ellipses button, the utility opens the **Open Configuration** dialog (similar to the one described in Open Configuration from File section). Select the configuration from the disk and click **Open**.
5. Click **Load** to load the configuration file.
6. In case the loaded configuration file has a serial number and this serial number presence can lead to the possibility of having multiple devices programmed with the same serial number. Default Windows Operating System does not accept multiple USB devices with same serial number in the same PC. To avoid this scenario, a warning message Box (see Figure 2-36a) is popped up to alert the user about a potential risk of programming same serial number to multiple devices. User still can use the batch programmer to program multiple devices with same serial number, provided the user understands that this isn't a usage scenario issue.

Figure 2-36a: Serial Number Presence Warning Message Box.



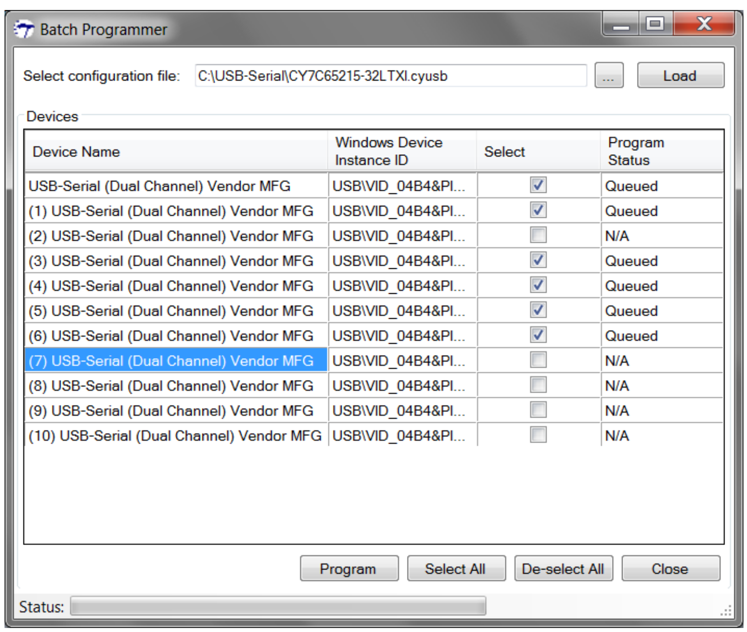

7. On successfully loading, the utility searches for the attached devices and lists the devices, which support the selected configuration, in the Devices table (see Figure 2-37). The Devices table allows viewing some of the basic details of the device such as 'Device Name' and 'Windows Device Instance ID'.

Figure 2-37: Load Configuration File




8. The utility allows selecting the devices to be programmed by checking the checkbox corresponding to the device of interest. The utility also allows selecting all the devices simultaneously by clicking the **Select All** button. All the selected devices are added to the programming queue as indicated by the **Program Status** field of the device, as shown in Figure 2-38.

Figure 2-38: Devices Queued for Programming




9. A device can be removed from the programming queue by unchecking the checkbox. To remove all the devices from the queue, click on the **De-select All** button.

10. After choosing the devices to be programmed, click **Program** to start the batch programming. The utility starts to program the devices sequentially in the order listed in the Device table. The progress bar and the Program Status field in the Device table are updated to notify the progress (see Figure 2-39).

Figure 2-39: Batch Programming In-progress

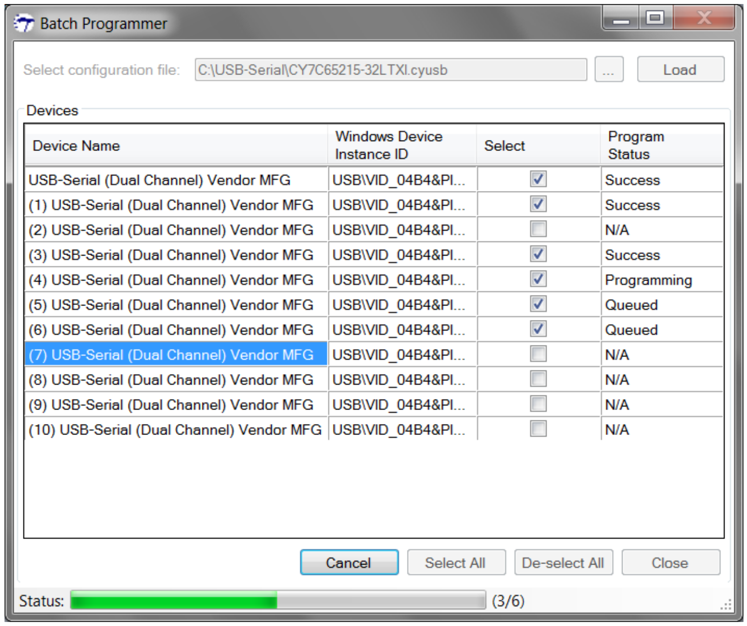
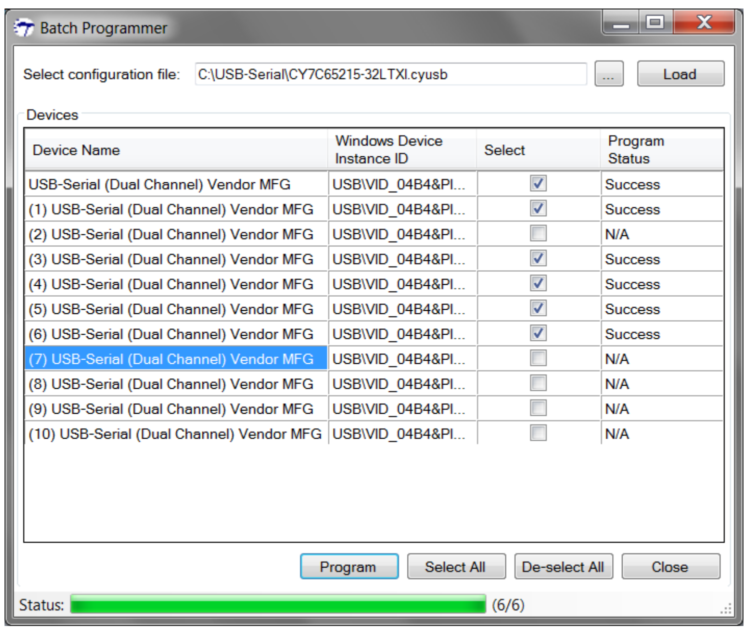
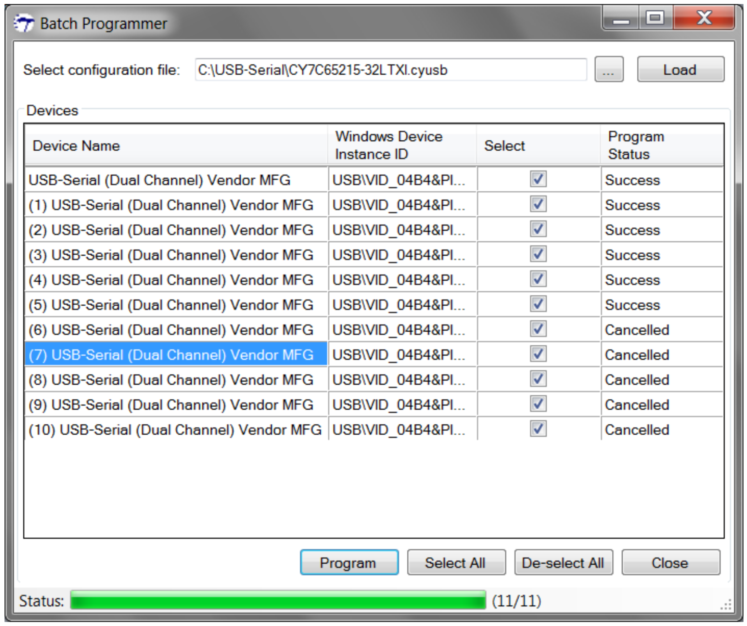



Figure 2-40: Batch Programming Completed




11. The utility allows cancelling or stopping the batch programming by clicking the **Cancel** button. The utility stops the programming process after completing the current device. The status of all devices, which were cancelled are indicated as **Cancelled** in the **Program Status** field.

Figure 2-41: Batch Programming Cancelled




12. Click **Close** to exit the Batch Programmer and return to the main utility window.

## 2.3.9 Restore Default Settings

To restore the silicon default settings in the utility, select **Restore Default Settings** from the **File** menu. The default settings for the fields are captured in the respective device datasheets.

## 2.3.10 Cycle Port

To power cycle the host port to which the device is connected, select **Cycle Port** from the **Device** menu. The device will re-enumerate after the power cycle.

## 2.3.11 Reset Device

The USB-Serial device needs to be reset after programming the configuration for the new configuration to take effect. To trigger a software reset of the device, select **Reset Device** from the **Device** menu.

## 2.3.12 Disconnect

The utility allows connecting to only one device at a time. To connect to another device that is attached to the machine, the utility needs to disconnect from the current device.

To disconnect from the connected device, click the **Disconnect** button at the bottom of the **Device** tab. The device can also be disconnected by selecting Disconnect from the 'Device' menu (***Device*** > ***Disconnect***).

# 3. Appendix

## 3.1 Driver Binding for USB-Serial Devices with Custom VID/PID

The Cypress-provided drivers, out-of-the-box, can bind to USB-Serial devices using the Cypress-provided VID/PID provided in Table 2-2. The customer can also choose to use a custom VID/PID for their USB-Serial device. In this case, customers can decide to either use the Cypress driver or the custom driver for their devices.

The following sections discuss how to use Cypress drivers for USB-Serial devices with a custom VID/PID. Using custom drivers for USB-Serial devices is outside the scope of this document.

### 3.1.1 Driver INF File Changes

The driver INF file contains the entries for all the devices supported by the driver. The operating system can bind a driver to a device only if the driver INF file contains information about the device. Therefore, to use the Cypress driver with a custom VID/PID, the driver INF file must be modified to include references to the new VID/PID.

**Note**: The Microsoft WHQL certification becomes void when INF is modified. Therefore, the customer must make sure to get the driver WHQL tested and certified from Microsoft for the new VID/PID.

#### *3.1.1.1 Modifying Cypress Generic USB 3.0 Driver INF*

The Cypress generic USB 3.0 driver (cysub3.sys) is packaged along the USB-Serial SDK and can be located on the disk at *<install_path>/driver/cyusb3/bin*, where *<install_path>* is the location where the SDK is installed.

Figure 3-1 shows the driver directory structure under the bin directory.

Figure 3-1: Cypress Generic USB 3.0 Driver Directory Structure

```
+---vista
|
+---win7
|   +---x64
|   |       cyusb3.cat
|   |       cyusb3.inf
|   |       cyusb3.sys
|   |       WdfCoInstaller01009.dll
|   |
|   \---x86
|           cyusb3.cat
|           cyusb3.inf
|           cyusb3.sys
|           WdfCoInstaller01009.dll
|
+---win8
|
+---wxp
```

Follow these steps to modify the INF file to use Cypress generic USB 3.0 driver with custom VID/PID:

1. **Open** the **cyusb3.inf** file located in the**win7\x86** directory (see Figure 3-1) in a text editor like **Notepad**.
2. Scroll down in the text editor until the section **[Device.NT]** is visible.
3. The **[Device.NT]** section contains entries for all the devices supported by the driver. Add an entry for the new device in the following format:

%VID_XXXX&PID_YYYY&MI_ZZ.DeviceDesc%=CyUsb3, USB\ VID_XXXX&PID_YYYY&MI_ZZ

Where,

XXXX – Device Vendor ID (VID) in hexadecimal

YYYY – Device Product ID (PID) in hexadecimal

ZZ – Master Interface Number in hexadecimal

4. Copy the entry created in step 3 and paste it under the sections **[Device.NTx86]** and **[Device.NTamd64]**
5. Scroll down in the text editor until the**[String]** section is visible
6. Under the **[String]**section add an entry in the following format:

VID_XXXX&PID_YYYY&MI_ZZ.DeviceDesc="<Device Friendly Name>"

Where,

XXXX – Device Vendor ID (VID) in hexadecimal

YYYY – Device Product ID (PID) in hexadecimal

ZZ – Master Interface Number in hexadecimal (refer to the Master Interface Number of USB-Serial Device Configuration section)

`<Device Friendly Name>` -- String to be used by the OS for the device in the Device Manager (as highlighted in Figure 3-2).

7. The values of XXXX, YYYY, and ZZ should match with value mentioned in step 3.

Figure 3-2: Device Friendly Name for Cypress Generic USB 3.0 Devices


8. Repeat steps 2 to 6 for all device interfaces, which needs to bind to the Cypress Generic USB 3.0 driver
9. Repeat steps 2 to 7 for all the *cyusb3.inf* files located under the `<install_path>/driver/cyusb3/bin` directory.

### 3.1.1.2 Modifying Cypress CDC Driver INF

The Cypress CDC driver (CypressUsbConsoleWindowsDriver.sys) is packaged along the USB-Serial SDK and can be located on the disk at *<install_path>/driver/cyusbserial/bin*, where *<install_path>* is the location where the SDK is installed.

Figure 3-3: Cypress CDC Driver Directory Structure

```
+---vista
|
+---win7
|   +---x64
|   |       cypressserial.cat
|   |       CypressSerial.inf
|   |       cypressusbandbus.cat
|   |       CypressUsbAndBus.inf
|   |       CypressUsbConsoleCoInstaller64.dll
|   |       CypressUsbConsoleWindowsDriver64.sys
|   |
|   \---x86
|           cypressserial.cat
|           CypressSerial.inf
|           cypressusbandbus.cat
|           CypressUsbAndBus.inf
|           CypressUsbConsoleCoInstaller.dll
|           CypressUsbConsoleWindowsDriver.sys
|
+---win8
|
+---wxp
```

Figure 3-3 shows the driver directory structure under the bin directory.

Follow these steps to modify the INF file to use the Cypress CDC driver with a custom VID/PID:

1. **Open** the **CypressUsbAndBus.inf** file located in **win7\x86** directory (as shown in Figure 3-3) in a text editor like **Notepad**.
2. Scroll down in the text editor until section **[Cypress]** is visible. For INF files under x64 directory this will be **[Cypress.NTamd64]**
3. **[Cypress]** or **[Cypress.NTamd64]** section contains entries for all the devices supported by the driver. Add an entry for the new device in the format

   *%VID_XXXX&PID_YYYY&MI_ZZ.DeviceDesc%=CypressUsb, USB\ VID_XXXX&PID_YYYY&MI_ZZ*

   Use the followingformat for the INF files under the x64 directory:

   *%VID_XXXX&PID_YYYY&MI_ZZ.DeviceDesc%=CypressUsb.NTamd64, USB\ VID_XXXX&PID_YYYY&MI_ZZ*

   Where,

   XXXX – Device Vendor ID (VID) in hexadecimal

   YYYY – Device Product ID (PID) in hexadecimal

   ZZ – Master Interface Number in hexadecimal (refer to the Master Interface Number of USB-Serial Device Configuration section)

4. Then, scroll down in the text editor until the **[String]** section is visible
5. Under the **[String]** section, add an entry in the following format:

   *VID_XXXX&PID_YYYY&MI_ZZ.DeviceDesc="<Device Friendly Name>"*

   Where,

   XXXX – Device Vendor ID (VID) in hexadecimal

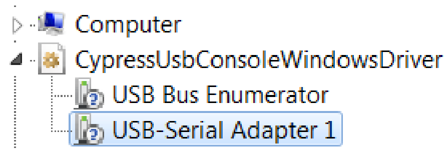
   YYYY – Device Product ID (PID) in hexadecimal

   ZZ – Master Interface Number in hexadecimal

`<Device Friendly Name>` -- String to be used by the OS for the device in the Device Manager (as highlighted in Figure 3-4).

6. The values of XXXX, YYYY, and ZZ should match with value mentioned in step 3.

Figure 3-4: Device Friendly Name for Cypress CDC Device




7. Repeat steps 2 to 5 for all device interfaces that must bind to the Cypress CDC driver
8. Repeat steps 2 to 6 for all the *CypressUsbAndBus.inf* files located under the <install_path>/driver/cyusbserial/bin directory

## 3.1.2 Master Interface Number of USB-Serial Device Configuration

Table 3-1 provides the Master Interface number (MI #) for the various USB-Serial device configuration combinations.

Table 3-1: Master Interface Numbers for USB-Serial Devices

| # | Part Number | SCB 0 | | | SCB 1 | | | MFG Interface |
|---|---|---|---|---|---|---|---|---|
| | | **Mode** | **Protocol** | **MI #** | **Mode** | **Protocol** | **MI #** | **MI #** |
| 1 | CY7C65211-24LTXI | UART | CDC | 00 | NA | NA | NA | 02 |
| | | UART/ SPI/ I2C | Vendor / PHDC | 00 | NA | NA | NA | 01 |
| 2 | CY7C65211A-24LTXI | UART | CDC | 00 | NA | NA | NA | 02 |
| | | UART/ SPI/ I2C | Vendor / PHDC / CDC | 00 | NA | NA | NA | 01 |
| 3 | CY7C65213-32LTXI Or CY7C65213-28PVXI Or CY7C65213A-28VXI Or CY7C65213A-32LTXI | UART | CDC | 00 | NA | NA | NA | 02 |
| | | UART | Vendor / PHDC | 00 | NA | NA | NA | 01 |
| 4 | CY7C65215-32LTXI | UART | CDC | 00 | UART | CDC | 02 | 04 |
| | | UART | CDC | 00 | UART / SPI / I2C / JTAG | Vendor / PHDC | 02 | 03 |
| | | UART / SPI / I2C | Vendor / PHDC | 00 | UART | CDC | 01 | 03 |
| | | UART / SPI / I2C | Vendor / PHDC | 00 | UART / SPI / I2C / JTAG | Vendor / PHDC | 01 | 02 |
| 5 | CY7C65215A-32LTXI | UART | CDC | 00 | UART | CDC | 02 | 04 |
| | | UART | CDC | 00 | UART / SPI / I2C | Vendor / PHDC / CDC | 02 | 03 |
| | | UART / SPI / I2C | Vendor / PHDC / CDC | 00 | UART | CDC | 01 | 03 |
| | | UART / SPI / I2C | Vendor / PHDC / CDC | 00 | UART / SPI / I2C | Vendor / PHDC / CDC | 01 | 02 |

## 3.2 Default Value for Various Configurable Fields

Out of the box default values for each configurable parameter is consolidated in the following table. Refer to the part specific table.

### 3.2.1 CY7C65213 / CY7C65213A

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| USB Configuration | | | |
| 1 | VID | 0x04B4 | 2-byte value VID in hex. |
| 2 | PID | See Table 2-2 | 2-byte cypress PID value in hex. |
| 3 | Power Mode | Bus Powered | Is the device Bus Powered or Self Powered? |
| 4 | bMaxPower | 100 mA | USB Specification has say on the maximum current drawn by a device. So, the value can be between 1 mA to 500 mA. |
| 5 | RI#, Sleep# and Power# | Enabled | Remote Wake up, Suspend and Power Enable. Sleep and Power Enable needs GPIO. GPIO |
| 6 | Manufacturing String | Cypress Semiconductor | 32 characters string descriptor. |
| 7 | Product String | USB-UART LP | 32 characters string descriptor. |
| 8 | Serial Number | NULL | 32 character space for Unique Serial Number. |
| 9 | Vcc voltage is 3.3 V | Disabled | Check this option to bypass the voltage regulator in the silicon. Otherwise you expect to supply 5 V to silicon Vcc. |
| 10 | VCCIO voltage less than 2.0 V | Disabled | Enable / disable the voltage regulator for VCC-IO. Enable this option only when you supply VCCIO with less than 2 volts. |
| 11 | Enable Manufacturing Interface | Enabled | This option enables additional Manufacturing Interface for device configuration downloads. |
| 12 | I/O Level | CMOS | GPIO Logic level selection (CMOS or LVTTL) |
| 13 | I/O Mode | Fast | Configures the GPIO edge transition time. Slower transition rate reduces EMI. This parameter has two static settings Fast/Slow. |
| UART Configuration (CDC Mode or Vendor Mode or PHDC Mode) | | | |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 14 | Baud Rate | 115200 Bauds | Normally, UART baud rate is driven by host software and hence this value is expected to change dynamically. This default value is the startup baud rate value for the hardware UART module. |
| 15 | Type | 8 Pins | UART type can be 2, 4, 6, or 8 pin module. Lesser the UART pin, higher the GPIO pins. |
| 16 | Data Width | 8 bits | UART data width can be 7 or 8 bits value. |
| 17 | Stop bits | 1 bit | Number of STOP bits needed to complete a UART transaction. 1bit or 2 bit are the available options. |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 18 | Parity | NONE | UART Parity bit can be NONE, ODD, EVEN, SPACE or MARK. |
| 19 | Signal Polarity & Error | Polarity Inversion and data drop on receive errors is Disabled. | Invert polarity on any of signals such as RTS, CTS, DTR, DSR, DCD and RI is disabled by default.<br>UART Rx module (receive pin) can receive errors such as Frame error, Parity error, Break errors or overrun errors. The user has the option to keep or drop the data byte associate to the error? By default, there is no data drop happens on error. |
| 20 | Disable CTS & RTS internal pull-up during suspend | Enabled | Disabling internal pull up on CTS & RTS pins will reduce current consumption during suspend state. |
| BCD and GPIOs | | | |

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| 21 | Battery Charger Detection Functionality | DISABLED | Enabling the BCD functionality needed three free GPIO. |
| 22 | GPIO 0 | TXLED | |
| | GPIO 1 | RXLED | |
| | GPIO 2 | TRISTATE | |
| | GPIO 3 | POWER# | |
| | GPIO 4 | SLEEP# | |
| | GPIO 5 | TRISTATE | |
| | GPIO 6 | TRISTATE | |
| | GPIO 7 | TRISTATE | |

### 3.2.2 CY7C65215 / CY7C65215A

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| USB Configuration | | | |
| 1 | VID | 0x04B4 | 2-byte value VID in hex. |
| 2 | PID | See Table 2-2 | 2-byte cypress PID value in hex. |
| 3 | Power Mode | Bus Powered | Is the device Bus Powered or Self Powered? |
| 4 | bMaxPower | 100 mA | USB Specification has say on the maximum current drawn by a device. So, the value can be between 1 mA to 500 mA. |
| 5 | RI# and Sleep# | Enabled. | Remote Wake up and Suspend. |
| 6 | Manufacturing String | Cypress Semiconductor | 32 characters string descriptor. |
| 7 | Product String | USB-Serial (Dual Channel) | 32 characters string descriptor. |
| 8 | Serial Number | NULL | 32 character space for Unique Serial Number. |
| 9 | Vcc voltage is 3.3 V | Disabled | Check this option to bypass the voltage regulator in the silicon. Otherwise you expect to supply 5 V to silicon Vcc. |
| 10 | VCCIO voltage less than 2.0v | Disabled | Enable / disable the voltage regulator for VCC-IO. Enable this option only when you supply VCCIO with less than 2 V. |
| 11 | Enable Manufacturing Interface | Enabled. | This option enables additional Manufacturing Interface for device configuration downloads. |
| 12 | I/O Level | CMOS | GPIO Logic level selection (CMOS or LVTTL) |
| 13 | I/O Mode | Fast | Configures the GPIO edge transition time. Slower transition rate reduces EMI. This parameter has two static settings Fast/Slow. |
| UART Configuration (CDC Mode or Vendor Mode or PHDC Mode) | | | |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 14 | Baud Rate | 115200 Bauds | Normally, UART baud rate is driven by host software and hence this value is expected to change dynamically. This default value is the startup baud rate value for the hardware UART module. |
| 15 | Type | 6 Pins | UART type can be 2, 4, or 6 module. Lesser the UART pin, higher the GPIO pins. |
| 16 | Data Width | 8 bits | UART data width can be 7 or 8 bits value. |
| 17 | Stop bits | 1 bit | Number of STOP bits needed to complete a UART transaction. 1bit or 2 bits are the available options. |

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| 18 | Parity | NONE | UART Parity bit can be NONE, ODD, EVEN, SPACE or MARK. |
| 19 | Drop Packets on RX Error | DISABLED | UART Rx module (receive pin) can receive errors such as Frame error, Parity error, Break errors or overrun errors. The user has the option to keep or drop the data byte associate to the error? By default, there is no data drop happens on error. |
| 20 | Disable CTS & RTS internal pull-up during suspend | Enabled | Disabling internal pull up on CTS & RTS pins will reduce current consumption during suspend state. |
| 21 | Enable RS485 | Disabled | To enable RS485 we need at-least one free GPIO. |
| SPI Configuration (Vendor Mode or PHDC Mode) | | | |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 22 | Frequency (Hz) | 100,000 | This default value is the startup clock frequency value for the hardware SPI module. This value can be dynamically changed from host application. |
| 23 | Data Width | 8 bits | SPI data width can be from 4 bits to 16 bits value. |
| 24 | SPI Mode | Master | Master or Slave operational mode settings. |
| 25 | Protocol | Motorola | SPI data transfer protocol definition. Motorola, TI and NS are possible options. Refer to the Protocol section for more information. |
| 26 | CPHA mode | Low | Clock Phase definitions. Refer to the CPHA and CPOL Modes section for more information. |
| 27 | CPOL Mode | Low | Clock Polarity definitions. Refer to the CPHA and CPOL Modes section for more information. |
| 28 | SSN Toggle Mode | Continuous | Data frame separation handling through slave de-selection. Refer to the SSN Toggle Mode section for more information. |
| 29 | Bit Order | MSB First | Bit ordering meant LSB first or MSB first setting. By default its MSB first. |
| I2C Configuration. (Vendor Mode) | | | |
| 30 | Frequency (Hz) | 100,000 | This default value for startup I2C clock frequency. This value can be dynamically changed from host application. |
| 31 | Mode | Master | I2C Master or I2C Slave |
| 32 | Slave Address | 0x02 | Enabled in slave mode. 7 bit even address are expected here. |
| 33 | Enable Clock Stretching | Disabled | Enabled in slave mode. This functionality will hold the clock line low till the time input buffer become available. |
| 34 | Use as wake-up source | Disabled | Enabled in slave mode. This functionality is used to wake the USB host from sleep. |
| CapSense, BCD and GPIOs | | | |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 35 | Enable / Disable CapSense | DISABLED | Based on the configuration few GPIOs are needed to enable this functionality. |
| 36 | Battery Charger Detection Functionality | DISABLED | Enabling the BCD functionality needed three free GPIO. |
| 37 | GPIO 0 | TXLED | |
| | GPIO 1 | RXLED | |
| | GPIO 6 | POWER# | |
| | GPIO 7 | TRISTATE | |
| | GPIO 16 | TRISTATE | |
| | GPIO 17 | TRISTATE | |

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| | GPIO 18 | TRISTATE | |

### 3.2.3 CY7C65211 / CY7C65211A

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| USB Configuration | | | |
| 1 | VID | 0x04B4 | 2-byte value VID in hex. |
| 2 | PID | See Table 2-2 | 2-byte cypress PID value in hex. |
| 3 | Power Mode | Bus Powered | Is the device Bus Powered or Self Powered? |
| 4 | bMaxPower | 100 mA | USB Specification has say on the maximum current drawn by a device. So, the value can be between 1 mA to 500 mA. |
| 5 | RI# and Sleep# | Enabled. | Remote Wake up and Suspend. |
| 6 | Manufacturing String | Cypress Semiconductor | 32 characters string descriptor. |
| 7 | Product String | USB-Serial (Single Channel) | 32 characters string descriptor. |
| 8 | Serial Number | NULL | 32 character space for Unique Serial Number. |
| 9 | Vcc voltage is 3.3 V | Disabled | Check this option to bypass the voltage regulator in the silicon. Otherwise you expect to supply 5 V to silicon Vcc. |
| 10 | VCCIO voltage less than 2.0 V | Disabled | Enable / disable the voltage regulator for VCC-IO. Enable this option only when you supply VCCIO with less than 2 V. |
| 11 | Enable Manufacturing Interface | Enabled | This option enables additional Manufacturing Interface for device configuration downloads. |
| 12 | I/O Level | CMOS | GPIO Logic level selection (CMOS or LVTTL) |
| 13 | I/O Mode | Fast | Configures the GPIO edge transition time. Slower transition rate reduces EMI. This parameter has two static settings Fast/Slow. |
| UART Configuration (CDC Mode or Vendor Mode or PHDC Mode) | | | |
| **Sl. No** | **Parameter** | **Default Value** | **Brief Description** |
| 14 | Baud Rate | 115200 Bauds | Normally, UART baud rate is driven by host software and hence this value is expected to change dynamically. This default value is the startup baud rate value for the hardware UART module. |
| 15 | Type | 8 Pins | UART type can be 2, 4, 6, or 8 pin module. Lesser the UART pin, higher the GPIO pins. |
| 16 | Data Width | 8 bits | UART data width can be 7 or 8 bits value. |
| 17 | Stop bits | 1 bit | Number of STOP bits needed to complete a UART transaction. 1 or 2 bits available options. |
| 18 | Parity | NONE | UART Parity bit can be NONE, ODD, EVEN, SPACE or MARK. |
| 19 | Drop Packets on RX Error | DISABLED | UART Rx module (receive pin) can receive errors such as Frame error, Parity error, Break errors or overrun errors. The user has the option to keep or drop the data byte associate to the error? By default, there is no data drop happens on error. |
| 20 | Disable CTS & RTS internal pull-up during suspend | Enabled | Disabling internal pull up on CTS & RTS pins will reduce current consumption during suspend state. |
| 21 | Enable RS485 | Disabled | To enable RS485 we need at-least one free GPIO. |
| SPI Configuration (Vendor Mode or PHDC Mode) | | | |

| Sl. No | Parameter | Default Value | Brief Description |
|---|---|---|---|
| Sl. No | Parameter | Default Value | Brief Description |
| 22 | Frequency (Hz) | 100,000 | This default value is the startup clock frequency value for the hardware SPI module. This value can be dynamically changed from host application. |
| 23 | Data Width | 8 bits | SPI data width can be from 4 bits to 16 bits value. |
| 24 | SPI Mode | Master | Master or Slave operational mode settings. |
| 25 | Protocol | Motorola | SPI data transfer protocol definition. Motorola, TI and NS are possible options. Refer to the Protocol section for more information. |
| 26 | CPHA mode | Low | Clock Phase definitions. Refer to the CPHA and CPOL Modes section for more information. |
| 27 | CPOL Mode | Low | Clock Polarity definitions. Refer to the CPHA and CPOL Modes section for more information. |
| 28 | SSN Toggle Mode | Continuous | Data frame separation handling through slave de-selection. Refer to the SSN Toggle Mode section for more information. |
| 29 | Bit Order | MSB First | Bit ordering meant LSB first or MSB first setting. By default its MSB first. |
| I2C Configuration (Vendor Mode) | | | |
| 30 | Frequency (Hz) | 100,000 | This default value for startup I2C clock frequency. This value can be dynamically changed from host application. |
| 31 | Mode | Master | I2C Master or I2C Slave |
| 32 | Slave Address | 0x02 | Enabled in slave mode. 7 bit even address are expected here. |
| 33 | Enable Clock Stretching | Disabled | Enabled in slave mode. This functionality will hold the clock line low till the time input buffer become available. |
| 34 | Use as wake-up source | Disabled | Enabled in slave mode. This functionality is used to wake the USB host from sleep. |
| CapSense, BCD and GPIOs | | | |
| Sl. No | Parameter | Default Value | Brief Description |
| 35 | Enable / Disable CapSense | DISABLED | Based on the configuration few GPIOs are needed to enable this functionality. |
| 36 | Battery Charger Detection Functionality | DISABLED | Enabling the BCD functionality needed three free GPIO. |
| 37 | GPIO 0 | TXLED | |
| | GPIO 1 | RXLED | |
| | GPIO 8 | TRISTATE | |
| | GPIO 9 | TRISTATE | |
| | GPIO 10 | TRISTATE | |
| | GPIO 11 | POWER# | |

# Revision History

## Document History

**Document Title:** Cypress USB-Serial Configuration Utility 2.0 User Guide

**Document Number:** 001-86781

| Revision | ECN | Orig. of Change | Submission Date | Description of Change |
|---|---|---|---|---|
| ** | 3944703 | BAAM | 03/26/2013 | New document |
| *A | 4103549 | BAAM | 08/23/2013 | Added new sections on CapSense and BCD configuration<br>Added a new section on batch programming<br>Restructured section 2.3 to match the configuration utility usage flow<br>Added an appendix on binding drivers to USB-Serial devices with custom VID/PID |
| *B | 4257858 | JEGA | 01/23/2014 | Added new device CY7C65213-28PVXI.<br>Added new warning message for LVTTL logic.<br>Added default value table reference for all the supported parts.<br>Format changes need to represent device classification data. |
| *C | 4822131 | MKRS | 08/06/2015 | Updated the document title.<br>Added Enable RS485.<br>Added VCP Mode for I2C Slave.<br>Update the Note in Enable RS485.<br>Updated Table 1-1, Table 2-2, Table 2-3, Table 2-4 and Table 3-1.<br>Updated Cypress USB-Serial Configuration Utility.<br>Updated Appendix.<br>Added Figure 2-15, Figure 2-16 and Figure 2-19. |
| *D | 4891105 | MKRS | 08/20/2015 | Updated Figure 2-1. |