

Project Name: USBUART_Example_Project
Programming Language: C
Associated Part Families: PSoC 3, PSoC 5
Software Version: PSoC Creator™ Beta 4.1
Related Hardware: CY8CKIT-001
Prerequisites: USBUART_Lib
Author: Dan Sweet

Project Objective

This example project demonstrates the use of a custom developed USBUART component with PSoC[®] 3 / PSoC 5.

Overview

The USBUART component uses a USB interface to emulate a COM port. This custom component is based on a standard USB component, modified to enumerate and act as a CDC USB device. High level communication functions are available on the PSoC device side and the PC communicates through a standard terminal program.

This example project demonstrates a PSoC project using a USBUART component to echo any data sent to it from a PC terminal.

Table 1. Component List

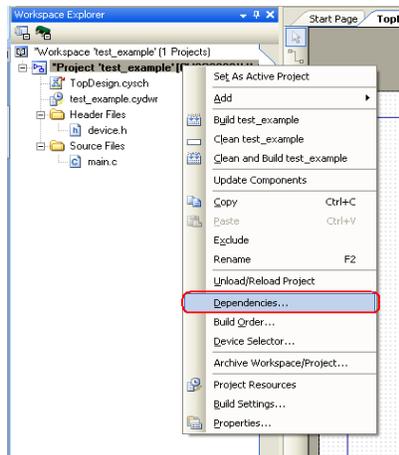
Instance Name	Component Name	Version	Component Category	Comments
USBUART_1	USBUART	1.0	Custom	VID, PID, Device Release, Mfr String and Product String are set

The USBUART component is the only component used in this example. To use this component in a project, a dependency must be set pointing to the library project containing the USBUART component. The instructions for adding this component to your own project are mentioned in the following section.

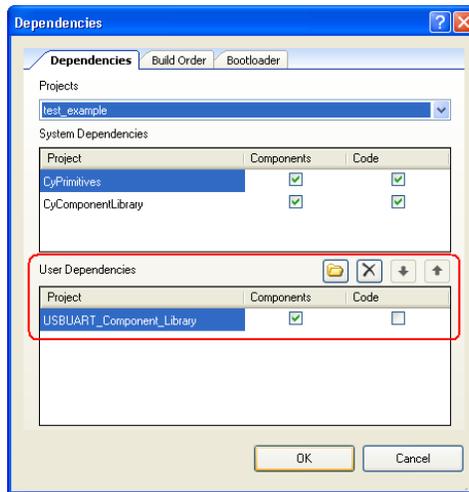
Importing a Custom Component in a Project

Follow these steps to add the USBUART component to a new project:

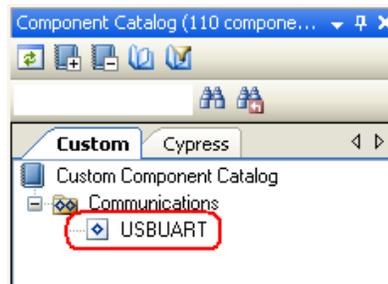
- Right click on the project name in the **Workspace Explorer** and select **Dependencies**.



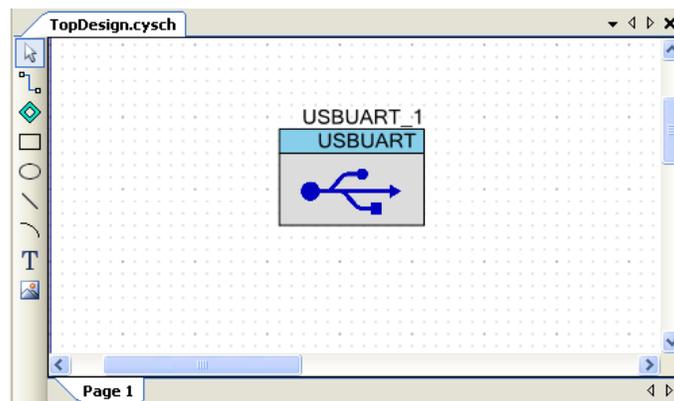
- Add a new User Dependency. Navigate to and select the *USBUART_Component_Library.cypri* file provided with the example project.
- Ensure **Components** is checked and the **Code** check box is unchecked.



- Click **OK** and the USBUART component now appears in a new tab in the **Component Catalog**. It is now ready to be placed on your schematic.

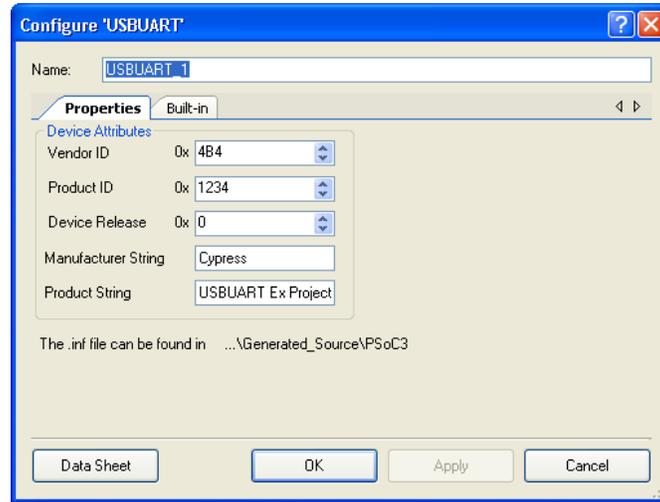


Top Design



Component Configuration

USBUART

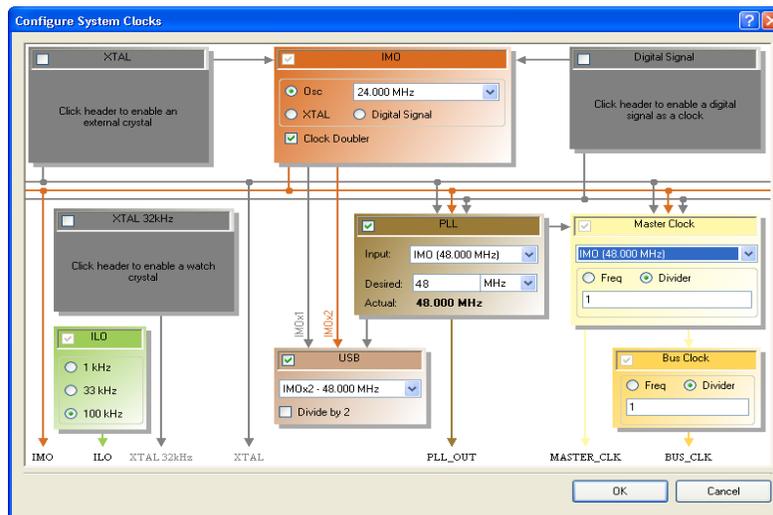


Note Each USB product must have a unique combination of Vendor ID (VID) and Product ID (PID). The default values provided here are used as an example, but a unique VID (assigned by the USB Implementers Forum) and PID must be used in a final product.

Design Wide Resources

Changes must be made in the **Clocks** tab in the design wide resources file (*.cydwr*) to use USB on the PSoC 3 device. The clocks can be configured by clicking **Edit Clock** in the **Clocks** tab. You must make the following changes.

- **IMO**: Select Osc 24.000 MHz and enable the Doubler
- **ILO**: Select 100 kHz.
- **USB**: Enable and select IMOx2 – 48.000 MHz.
- **Master Clock**: Select IMO – 48.000 MHz.



Operation

This project echoes any data sent to it through the PC COM terminal. During initialization, global interrupts are enabled and the USBUART component is started and enumerated. In the main loop, the receive buffer is checked for data. If data exists, the data is read out of the buffer and written back to the PC. After writing data to the PC, the PSoC must wait for the transmission to complete before continuing; otherwise the PSoC may send new data to the PC before it is ready. This code is shown in [Code 1](#).

Code 1 USBUART Example Code

```
uint8 Count;
uint8 Buffer[128];

void main()
{
    /* Initialization Code: */
    CYGlobalIntEnable;
    USBUART_1_Start(0, USBUART_1_3V_OPERATION);
    while(!USBUART_1_bGetConfiguration());
    USBUART_1_Init();

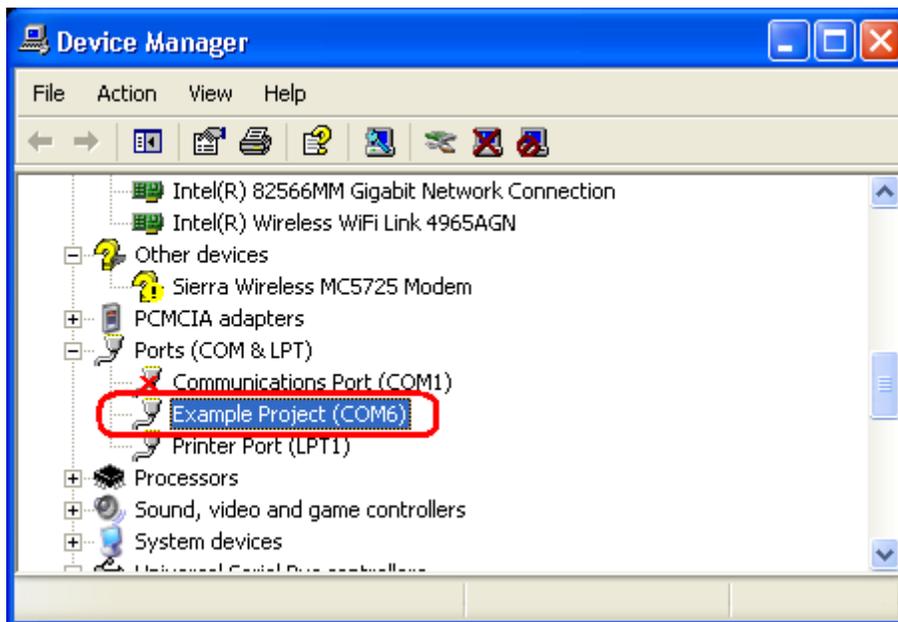
    /* Main Loop: */
    for(;;)
    {
        Count = USBUART_1_bGetRxCount();
        if(Count != 0) /* Check for input data from PC */
        {
            USBUART_1_ReadAll(Buffer);
            USBUART_1_Write(Buffer, Count); /* Echo data back to PC */
            while(!USBUART_1_bTxIsReady()) /* Wait for Tx to finish */
            {}
        }
    }
}
```

Hardware Connections

- The default jumper settings of CY8CKIT-001 that is available in [CY8CKIT-001 PSoC Development Kit Board Guide](#) can be used.
- Jumper 8 may be changed the **VBUS** location, if you wish to power the board through USB.

Output

- Build the Project and Program the chip. This project has been designed for both PSoC 3 and PSoC 5. The default device is PSoC 3 (CY8C866AXI-040). To change to another device, including PSoC 5 devices, go to **Project** → **Device Selector** and select the device. For further information see the PSoC Creator Help article Device Selector.
- Plug the USB cable into the DVK and reset the board (SW4). When you do this for the first time, Windows should prompt you with **Found New Hardware Wizard**. Direct the wizard to the `...USBUART_Example_Project\USBUART_Example_Project.cydsn\Generated_Source\PSoC 3` directory, where the `USBUART_CDC.inf` file is located. This allows the device to enumerate correctly.
- Check to see which COM port the device is mapped to in the **Device Manager**.



- Open a COM terminal (such as HyperTerminal) and select the appropriate port. The baud rate selected does not matter. Ensure that the local echo is turned OFF.
- When a connection is established, the PSoC returns any information typed in the terminal.

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