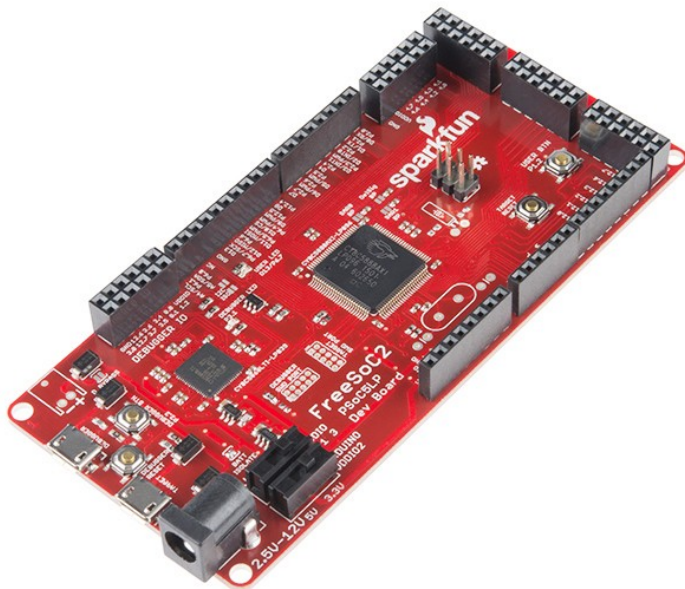# 2016

Counter with FreeSoc2 (PSoC 5LP) using PSoC Creator

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Version: 1.0

Introduction:

The FreeSoC2 micro-controller based on the PSoC 5LP (Programmable System on a Chip) brings together features of the programmable devices and micro-controller-type systems on chips into one package. By placing a programmable fabric between the peripherals and the pins, the FreeSoC2 allows any function to be routed to any pin! Moreover, the on-board PSoC includes a number of programmable blocks which allow the user to define arbitrary digital and analog circuits for their specific application. To get the most out of the device, you will need to use the PSoC Creator IDE.
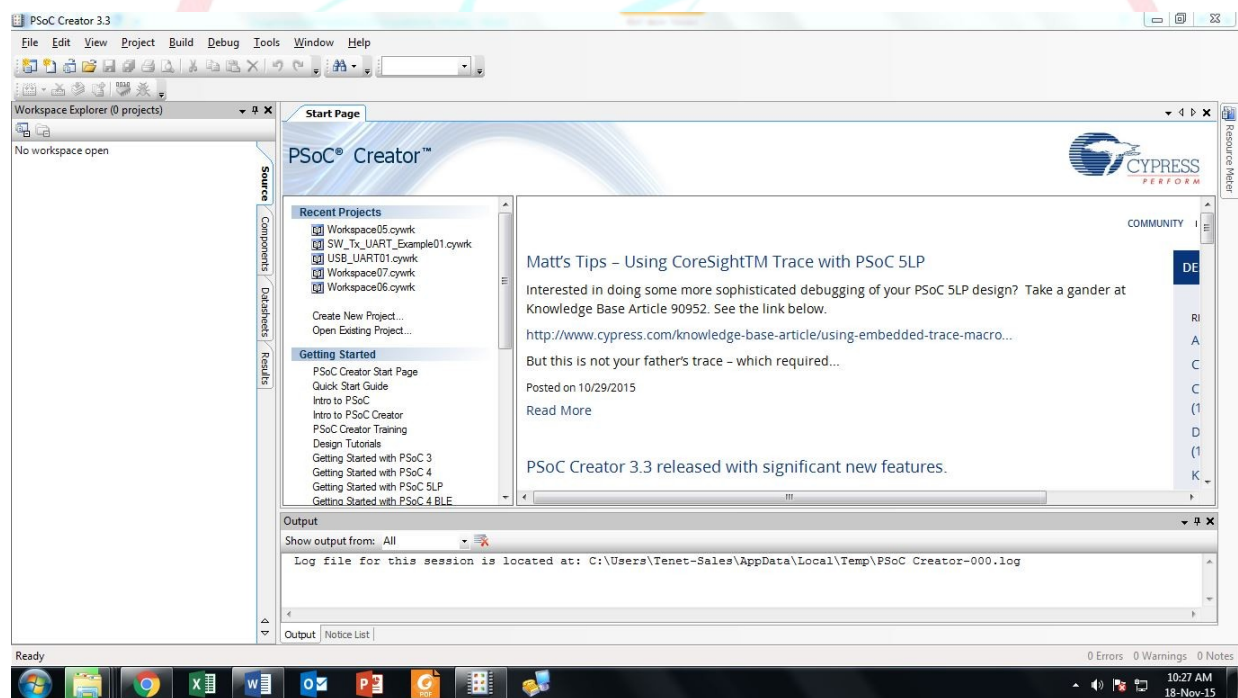
Step 1: Open PSOC creator IDE.

Figure 1

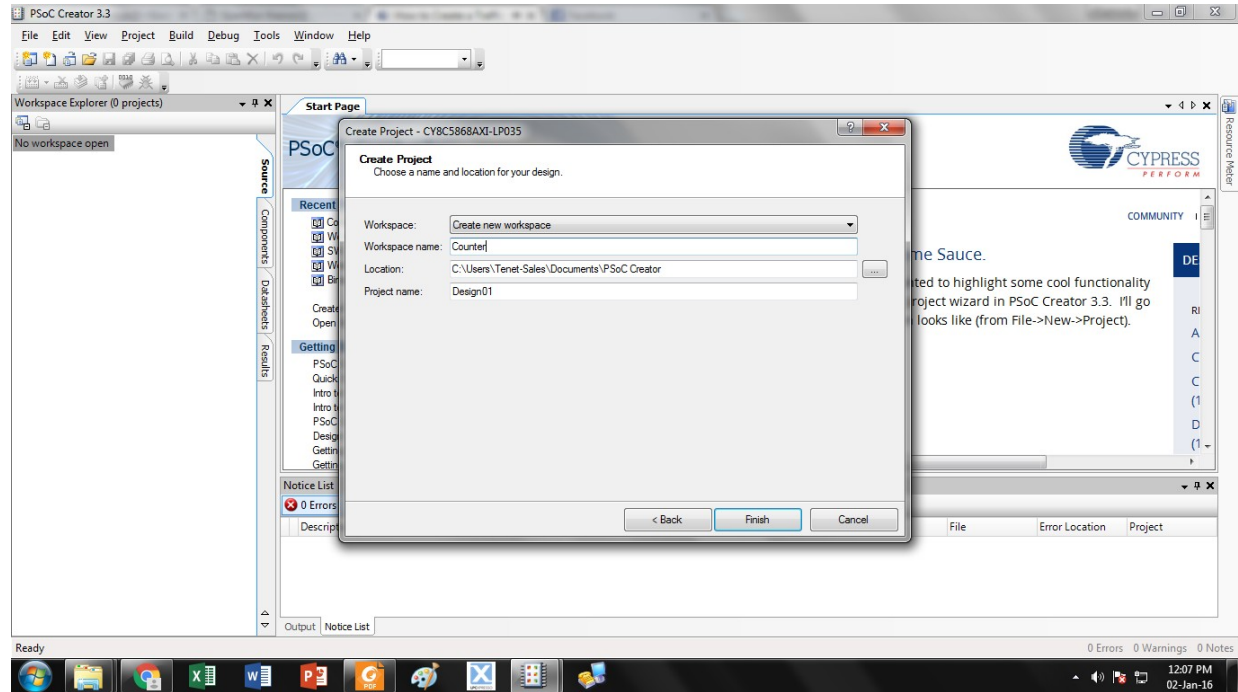## Step 2: File-> new project -> design -> PSoC 5LP design & save with desired name.

Figure 1

Step 3: Open TopDesign.cysch from workspace explorer.

Figure 2

Step 4: Search for Counter block from the Component catalog on right side of the window. Drag the Counter block onto the workspace. The default use of the Counter is to count the number of edge events on the count input.

Figure 3

Step 5: Double click on the Counter and change the name if you wish to. Configure it as 8-bit resolution, UDP implementation, period of 100 and compare value of 50 out 255 (max value)

Figure 5

Step 6: In advanced configuration, Reload counter and Interrupt on TC (Terminal Count).

Figure 6

Step 7: Search for Logic Low '0', Digital output pin and Interrupt from Component Catalog. Configure interrupt on RISING_EDGE as shown.
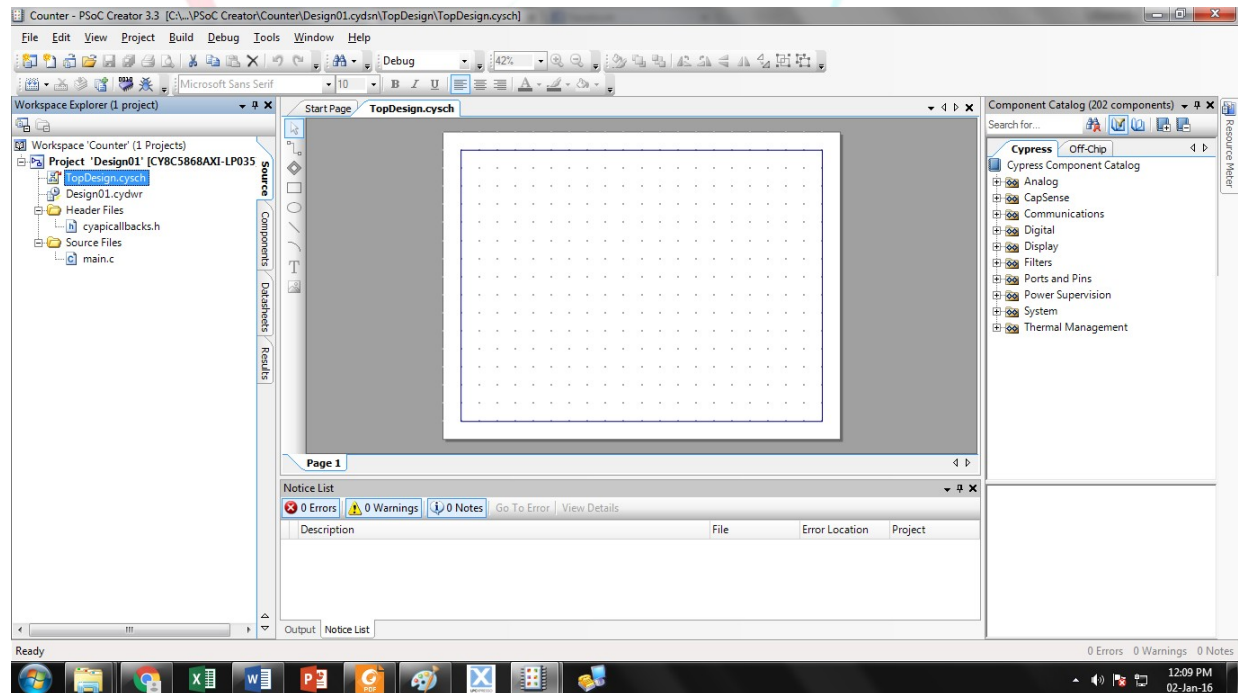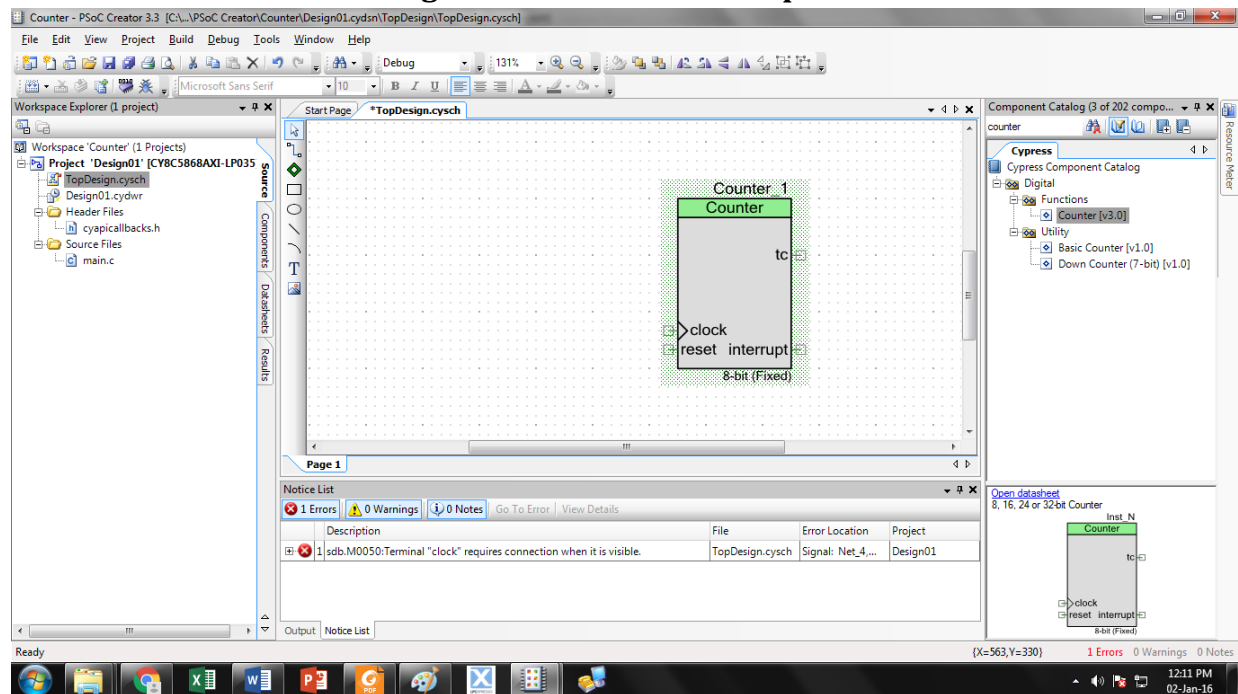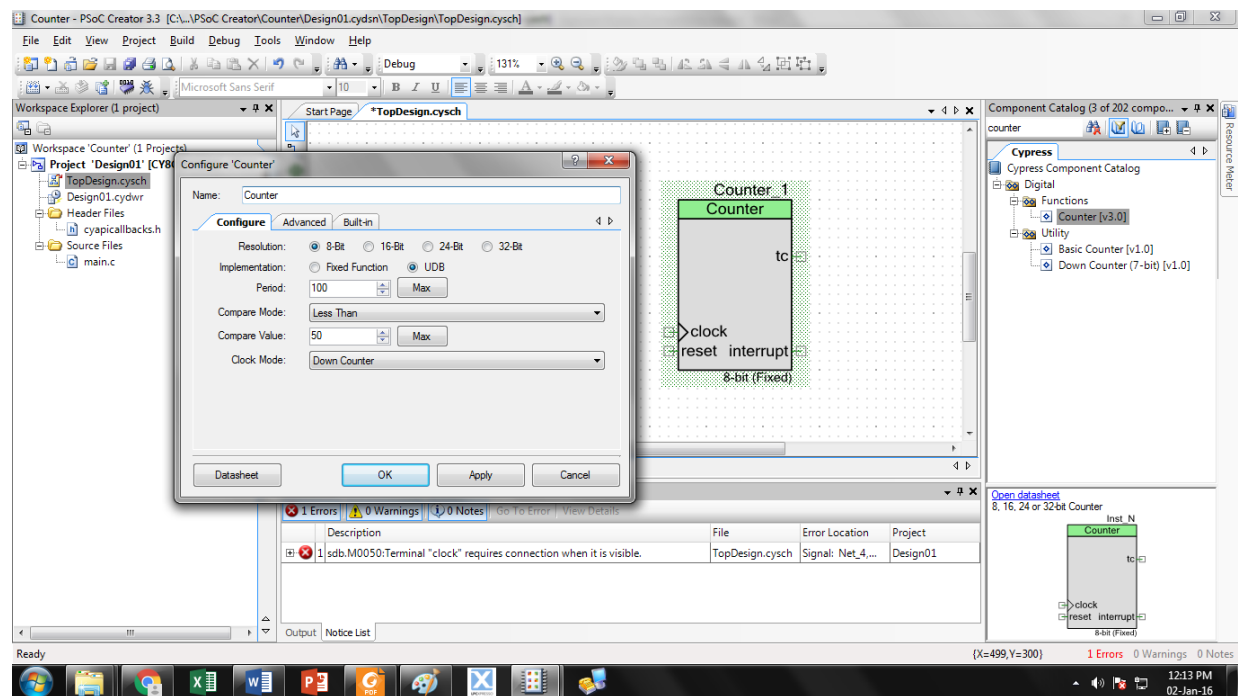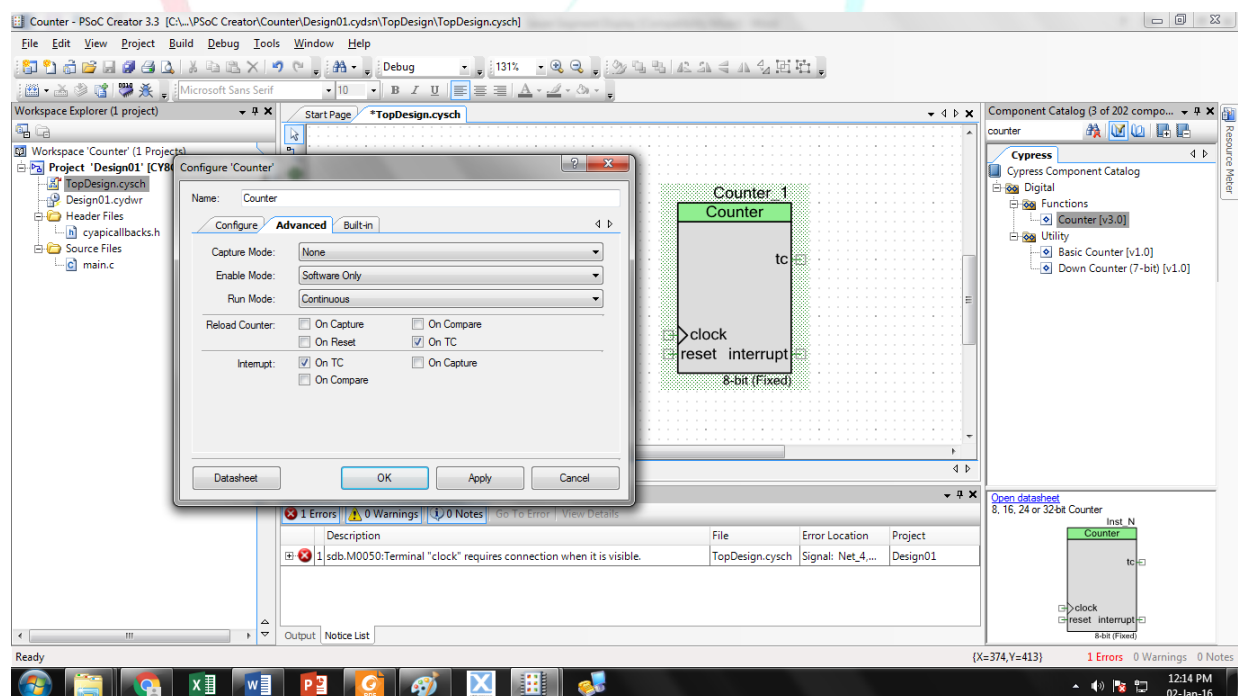
9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,
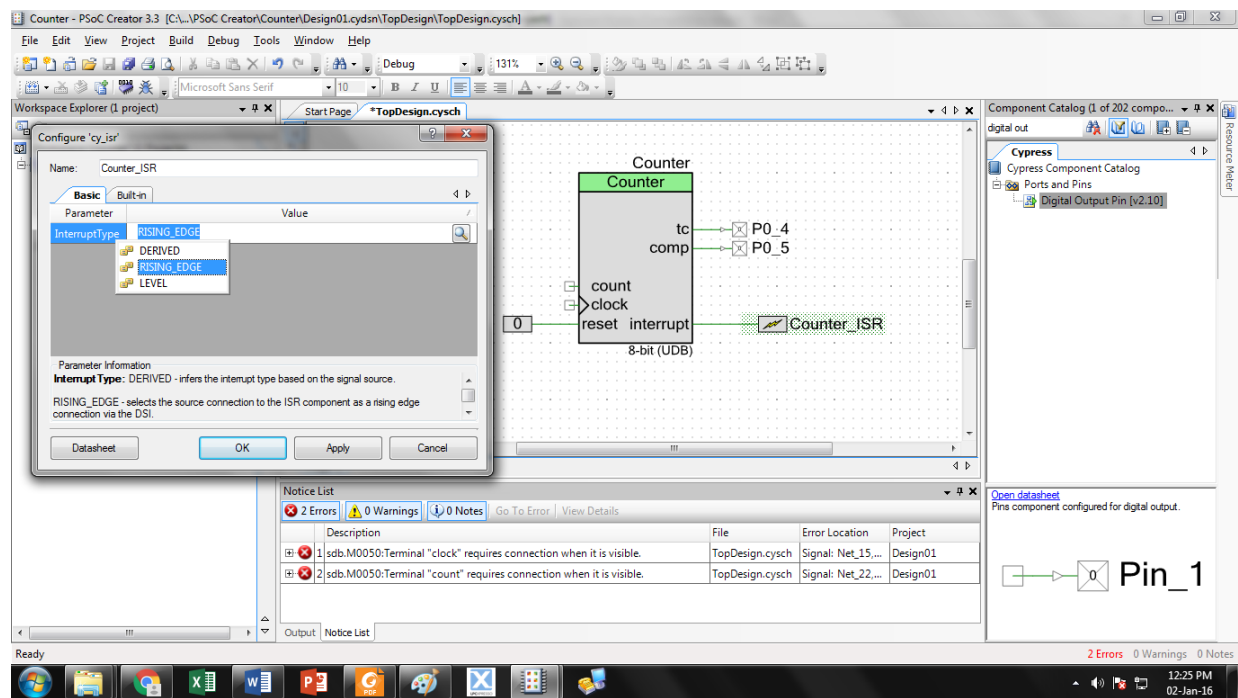
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Figure 7

Step 8: Drag Sync component and Clock from Component catalog. The Sync component resynchronizes a set of input signals to the rising edge of the clock signal.
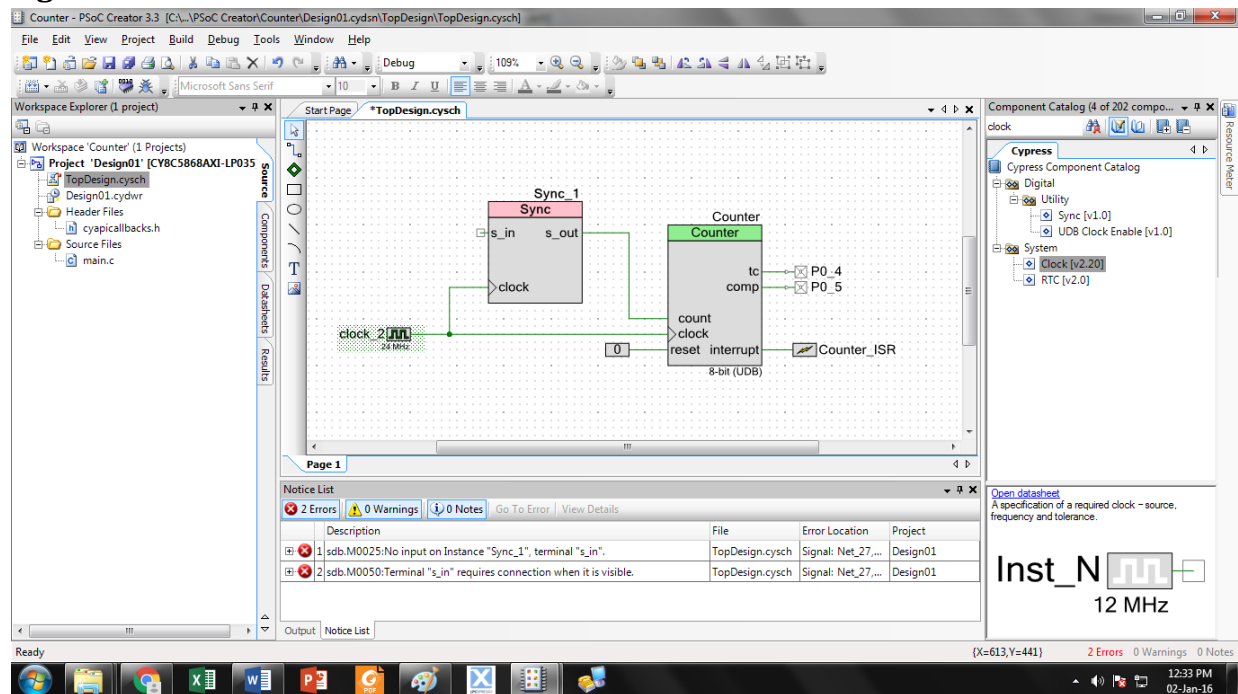

Figure 8

Step 9: Drag Toggle Flip-Flop from Component catalog onto the workspace and make the connection as shown below. Keep the default configurations.

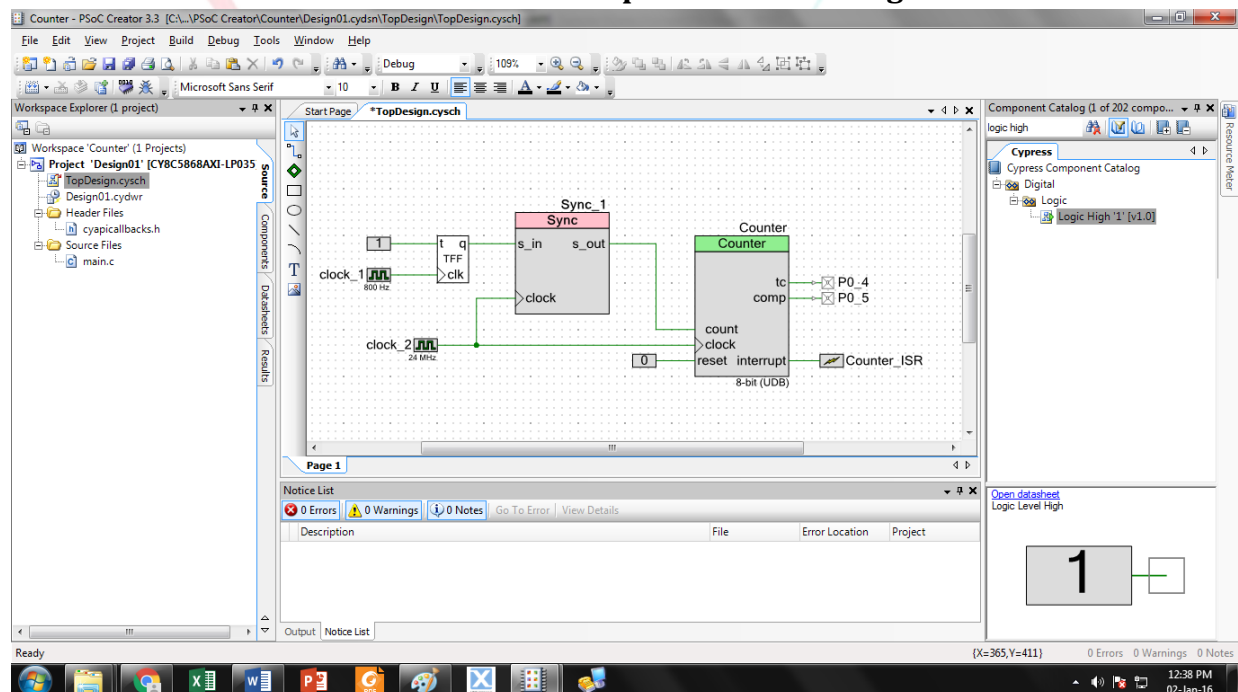**Figure 9**

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Step 10: Drag Character LCD from component catalog and configure it as shown below.
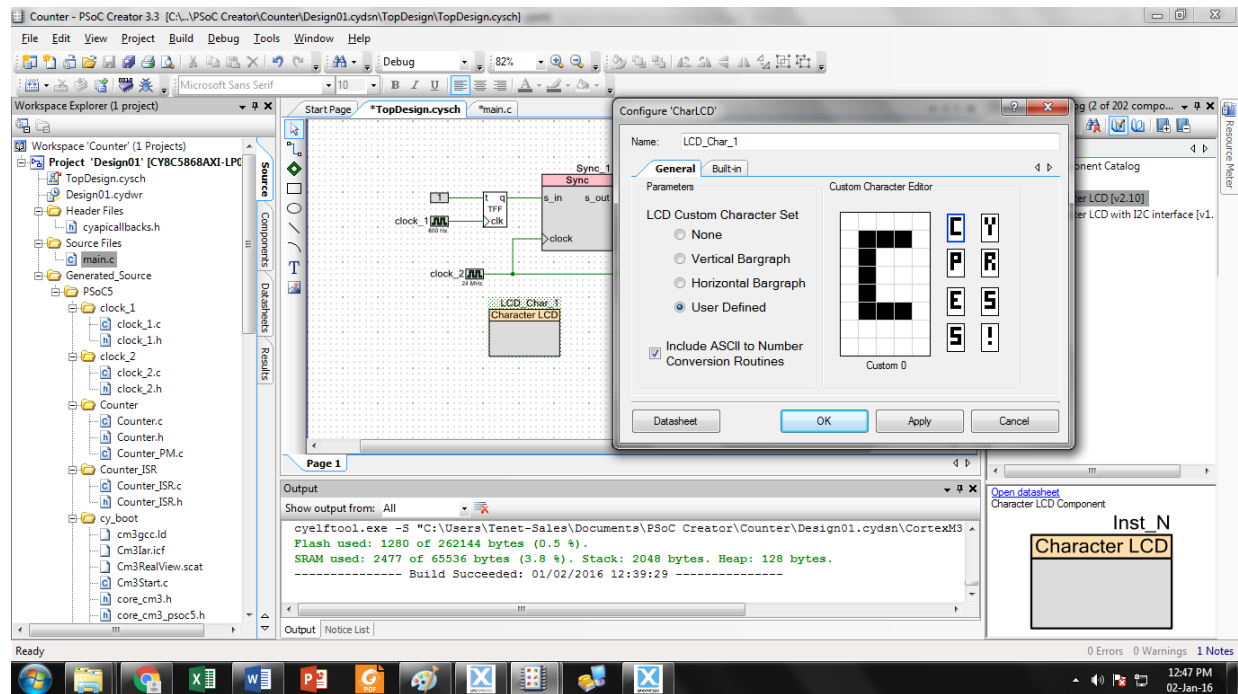

Figure 10

Step 11: After configuring build the project. As we can generate user-defined APIs which will ease us while writing code. We can see APIs generated in the Workspace Explorer on the left side of the window.
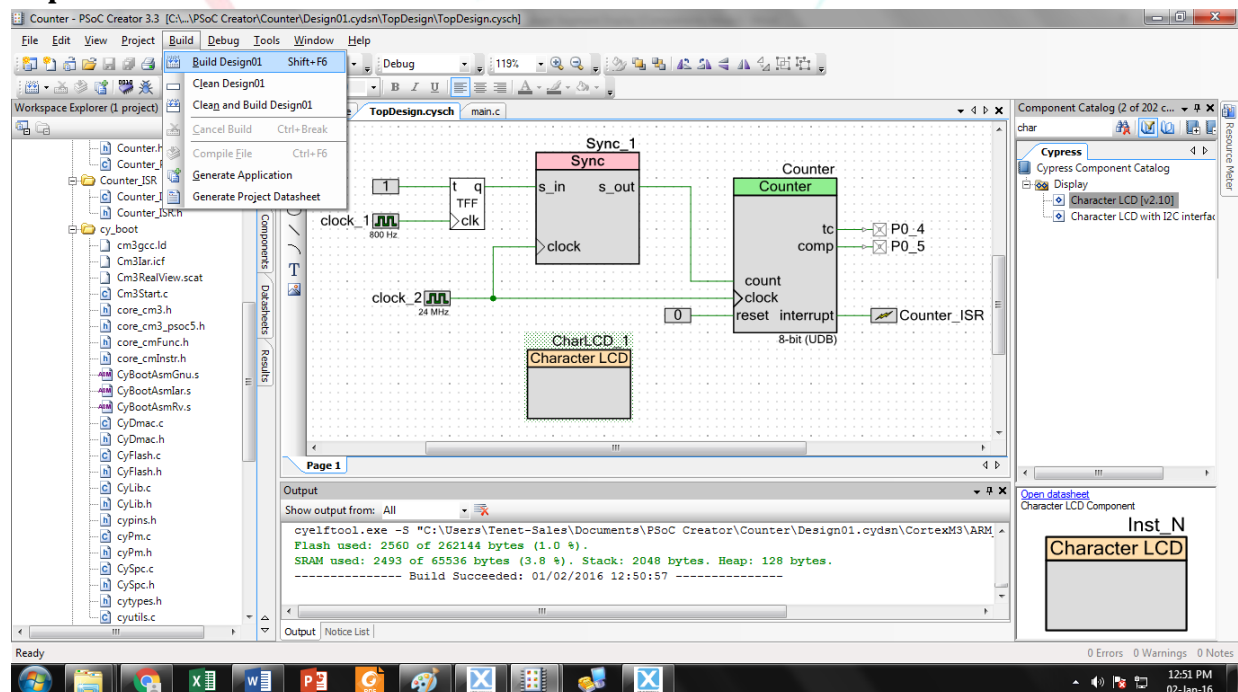

Figure 11

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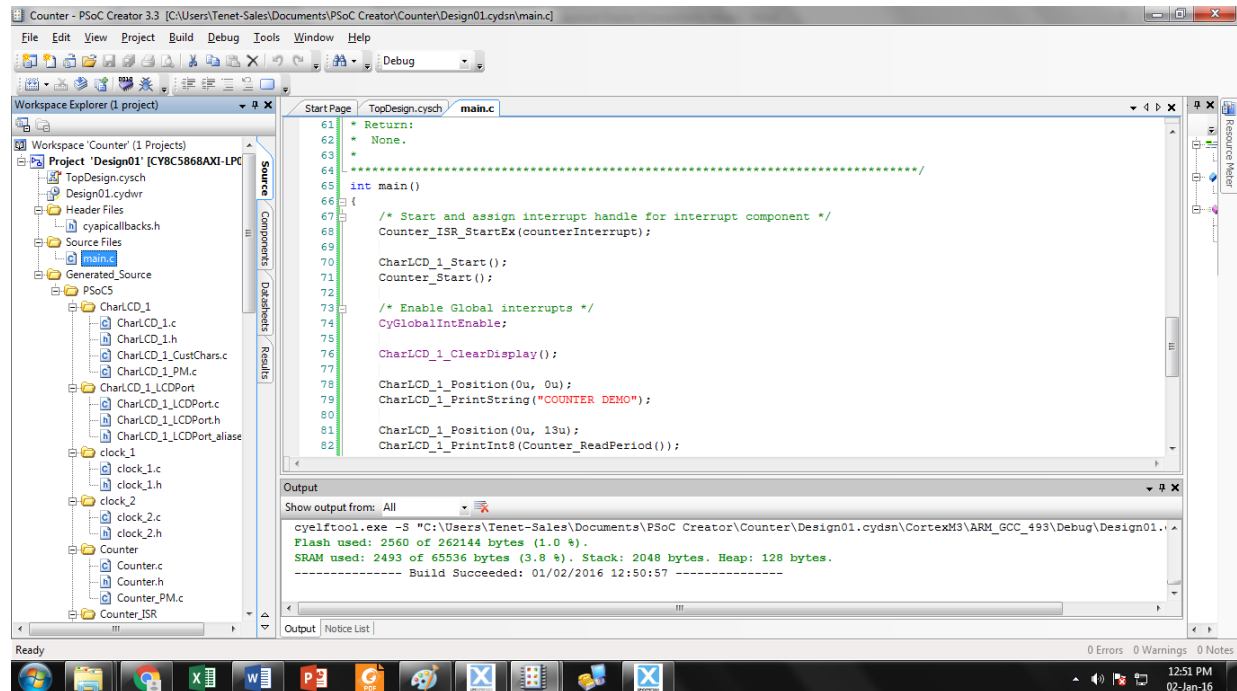**Step 12: Now click on main.c file and write the code and build it.**

Figure 12

CODE:

```
#include <project.h>
uint8 interruptCnt;

CY_ISR(counterInterrupt)
{
    /* Read Status register in order to clear the sticky Terminal Count (TC) bit
     * in the status register. Note that the function is not called, but rather
     * the status is read directly.
     */
    Counter_STATUS;

/* Increment the Counter to indicate the keep track of the number of interrupts
received */
    interruptCnt++;
}

int main()
{
    /* Start and assign interrupt handle for interrupt component */

    Counter_ISR_StartEx(counterInterrupt);

    CharLCD_1_Start();
    Counter_Start();
```

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```
    CyGlobalIntEnable;

    CharLCD_1_ClearDisplay();

    CharLCD_1_Position(0u, 0u);
    CharLCD_1_PrintString("COUNTER DEMO");

    CharLCD_1_Position(0u, 13u);
    CharLCD_1_PrintInt8(Counter_ReadPeriod());

    CharLCD_1_Position(1u, 0u);
    CharLCD_1_PrintInt8(Counter_ReadCompare());

    CharLCD_1_Position(1u, 6u);
    CharLCD_1_PrintString("IntCnt:");


    for(;;)
    {
        CharLCD_1_Position(1u, 3u);
        CharLCD_1_PrintInt8(Counter_ReadCounter());

      CharLCD_1_Position(1u, 13u);
        CharLCD_1_PrintInt8(interruptCnt);
    }
}
```
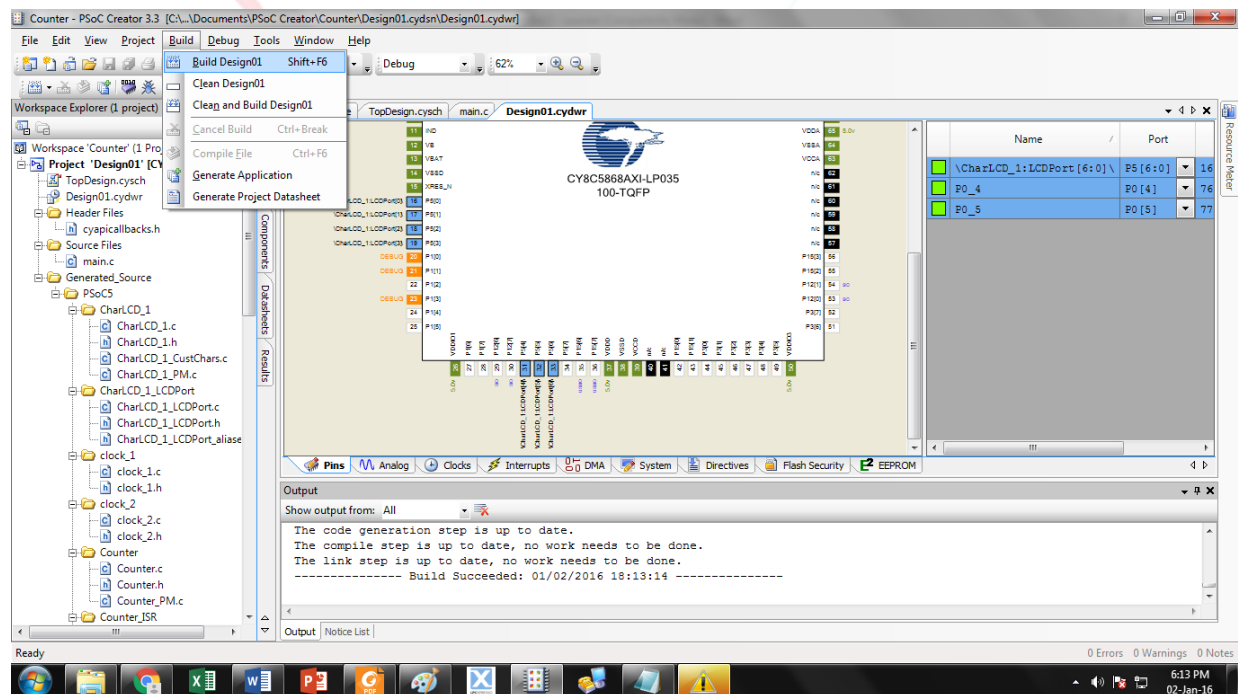
Step 13: Finally, double click on Design01.cydwr and assign pins to desired port.

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Figure 13

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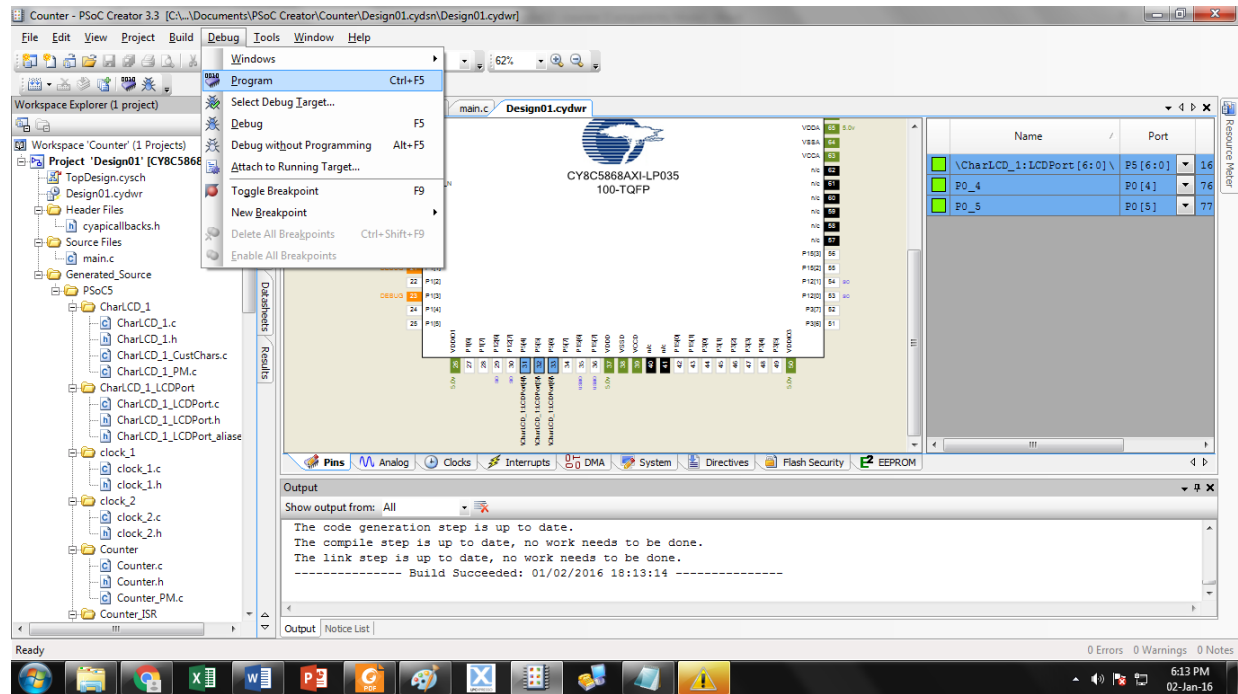## Step 14: If all goes well, go to Debug and click on Program.

Figure 14

LCD PINOUT:

1 VSS (Ground)
2 VDD (+ve)
3 VE (Contrast Voltage)
4 Register Select
5 Read/Write
6 Enable
7 Data 0
8 Data 1
9 Data 2
10 Data 3
11 Data 4
12 Data 5
13 Data 6
14 Data 7
15 Backlight Anode (+ve)
16 Backligt Cathode (Ground)

Interfacing Character LCD with FreeSoC2

LCD pin out	FreeSoC2 Pin
1	GND
2	5V
3	GND
4	P5.5
5	P5.6
6	P5.4
7	Left Open
8	Left Open
9	Left Open
10	Left Open
11	P5.0
12	P5.1
13	P5.2
14	P5.3
15	5V
16	GND

Table 1

NOTE: Use P0.4 and P0.5 pins to see output signals on the oscilloscope.

OUTPUT:

Figure 15

Figure 16

1. http://www.tenettech.com/product/7241/freesoc2-development-board-psoc5lp

2. http://www.tenettech.com/product/2442/16-x-2-character-lcd-display-with-backlight-jhd162a-green
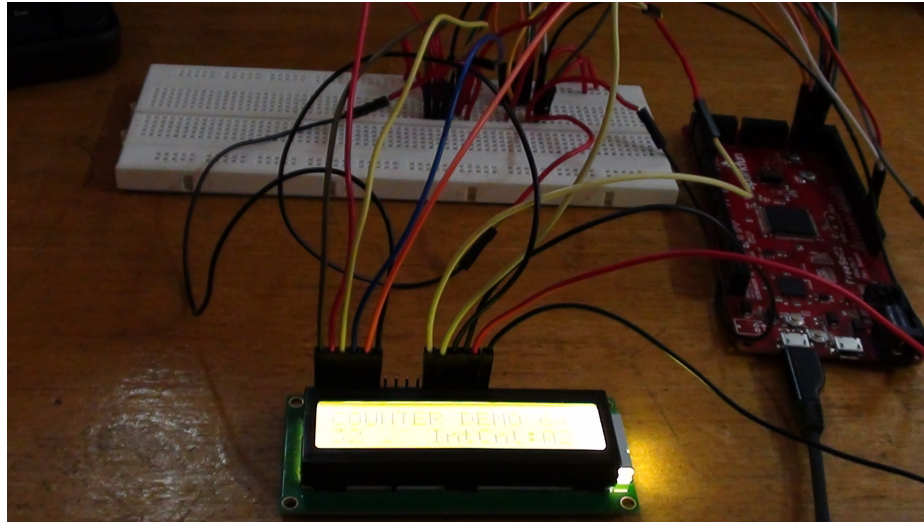
For more information please visit: www.tenettech.com

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