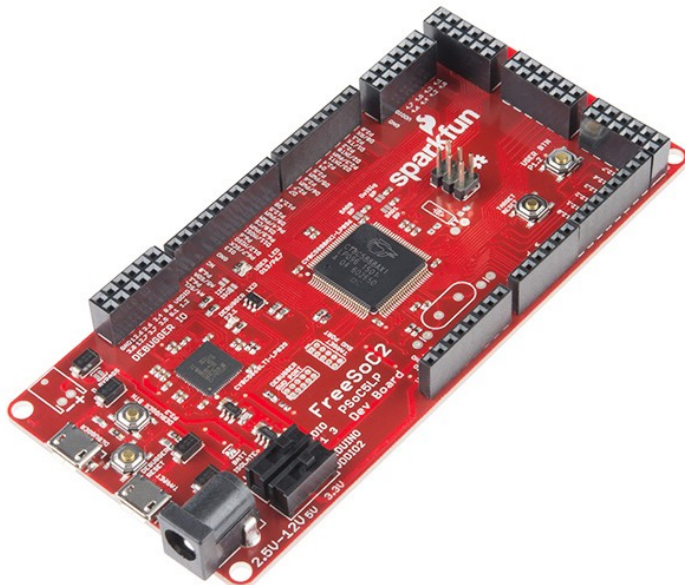




2016

Interfacing Seven Segment Display with FreeSoc2 (PSoC 5LP) using PSoC Creator



Author: Gurudatta Palankar

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.

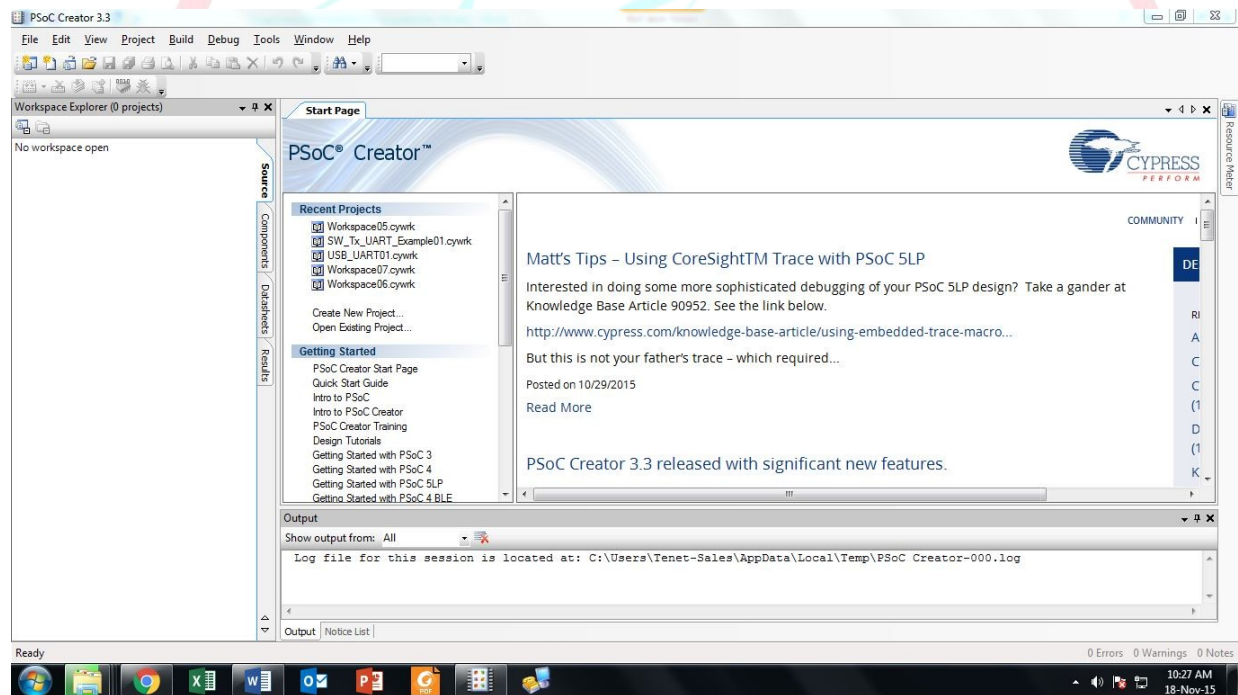


Figure 1

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

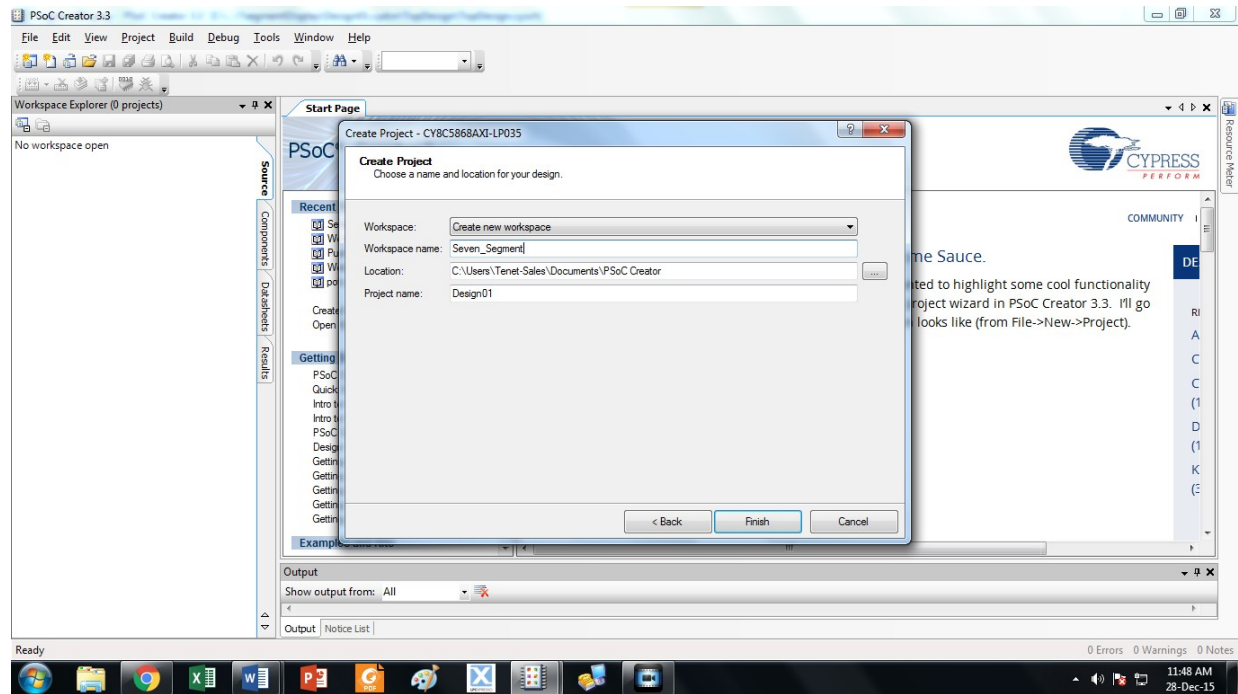


Figure 1

Step 3: Open TopDesign.cysch from workspace explorer.

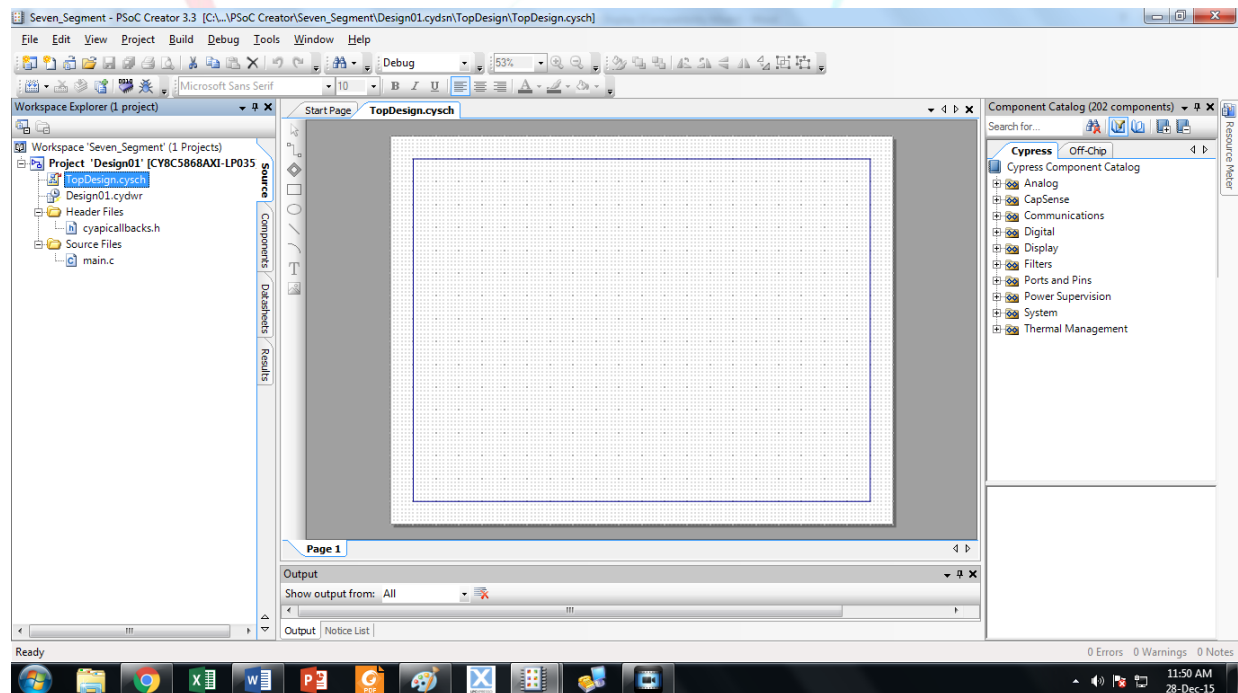


Figure 2

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

Step 4: We use a Control Register when the firmware needs to interact with a digital system. Search for Control Register block from the Component catalog on right side of the window. Drag the Control Register onto the workspace

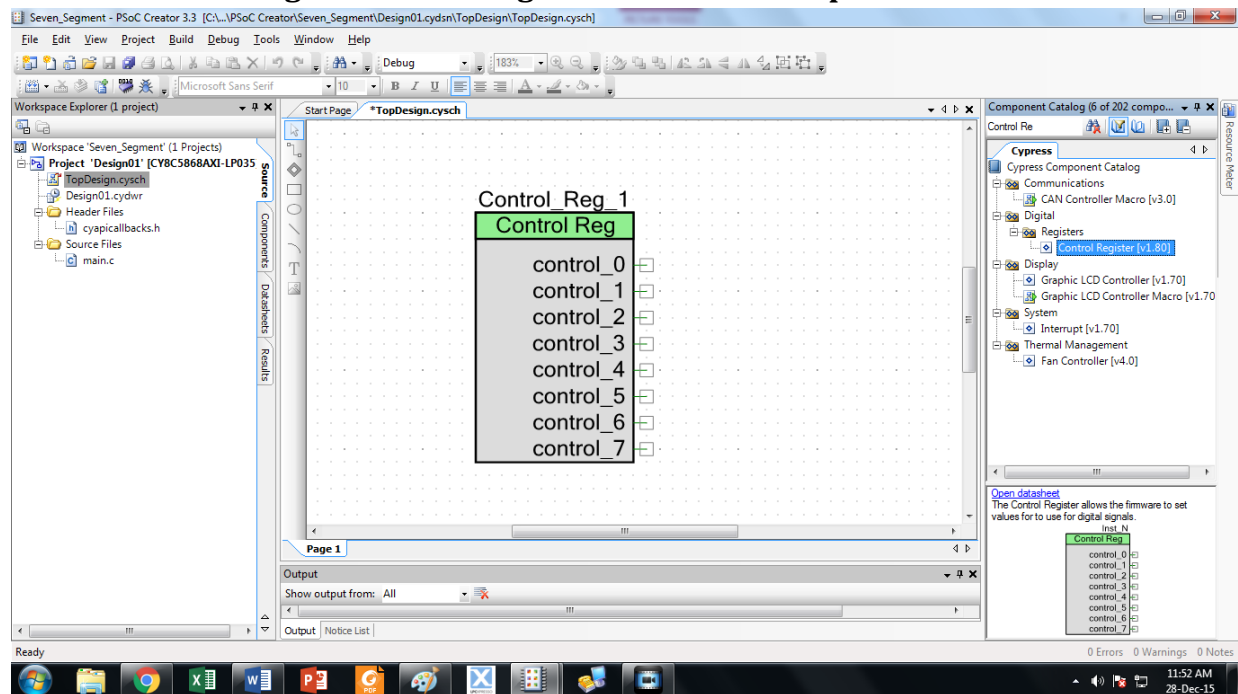


Figure 3

Step 5: Double click on the Control Register and change the name if you wish to. Configure it to 7 outputs.

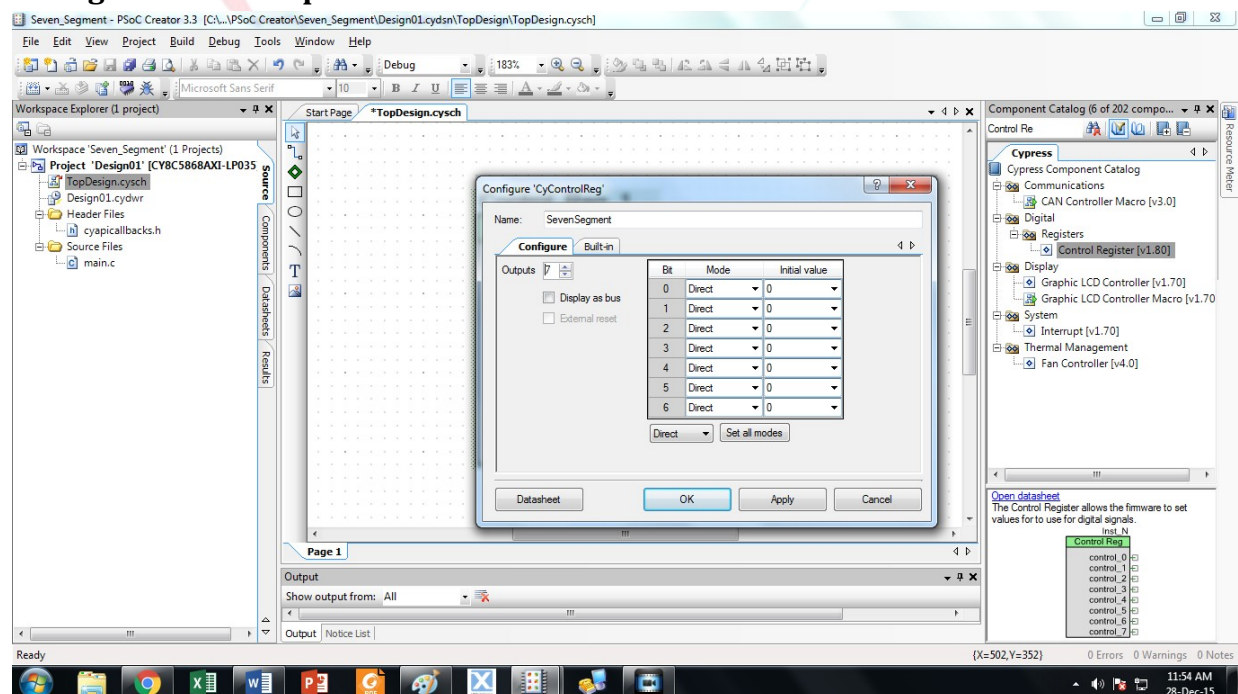


Figure 5

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

Step 6: Connect all the wires as shown using Wire Tool.

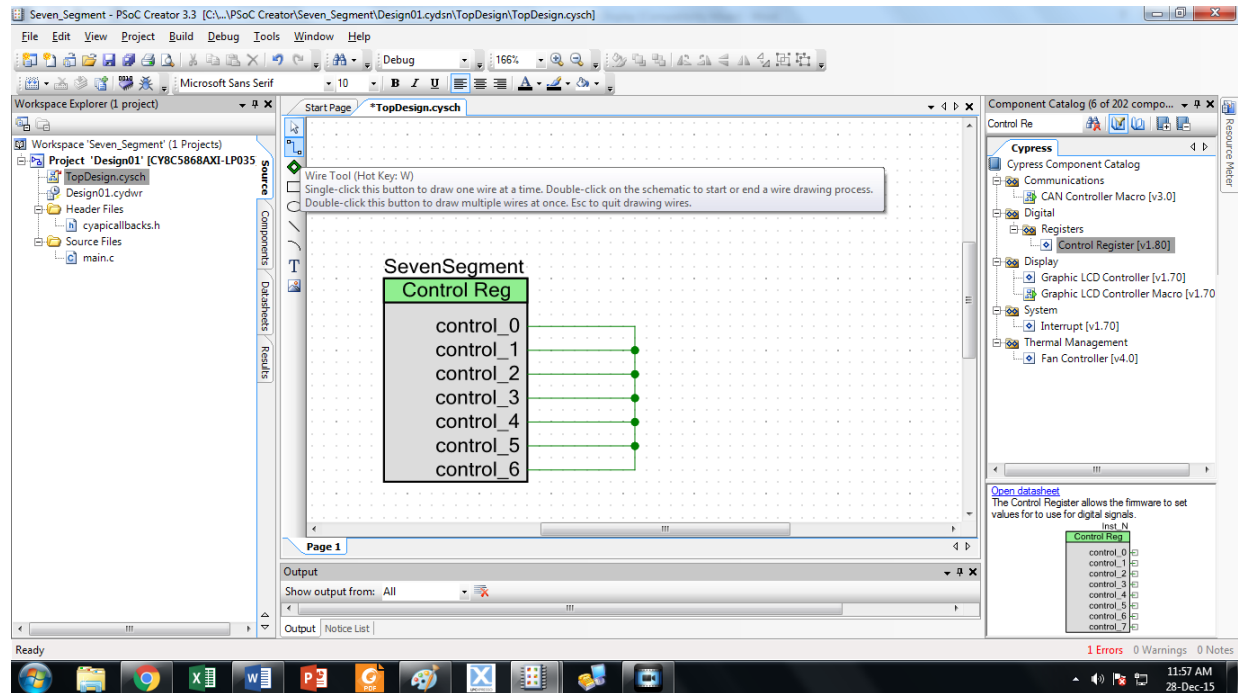


Figure 6

Step 7: Configure each Control Register output lines as shown. But make sure not to name them. Only change the index values.

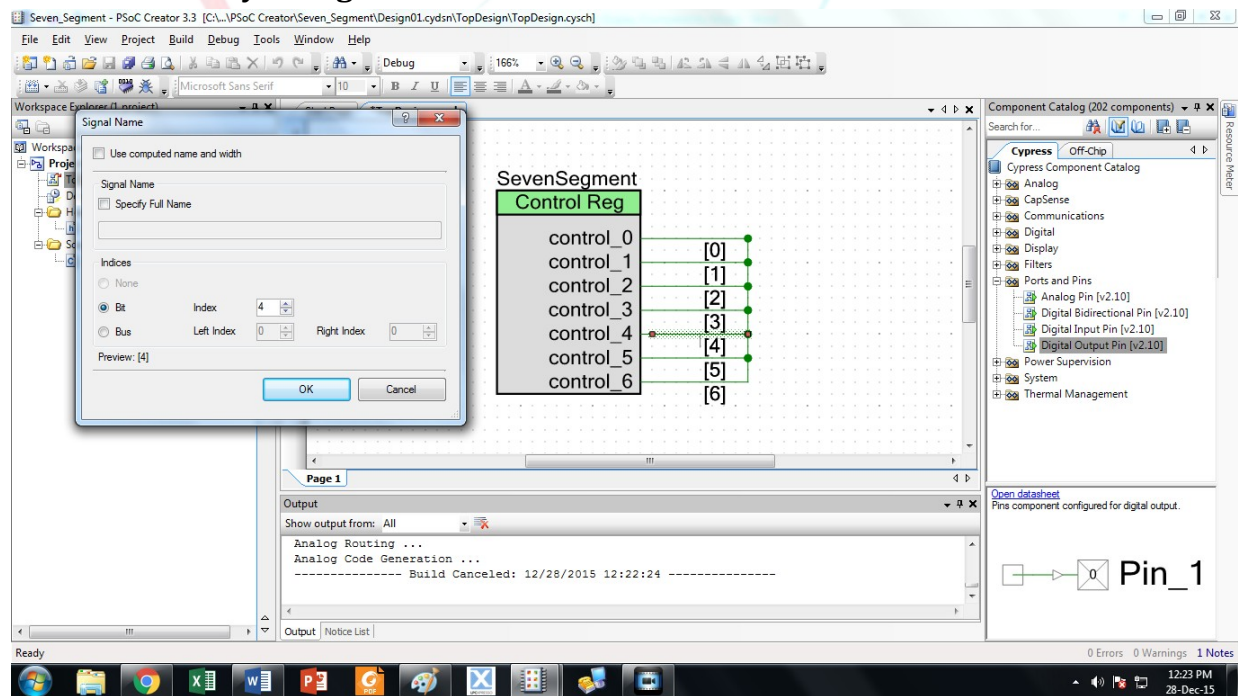


Figure 7

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

Step 8: Connect a wire using Wire Tool (Hot Key - W). Double click on it and configure it as bus as shown.

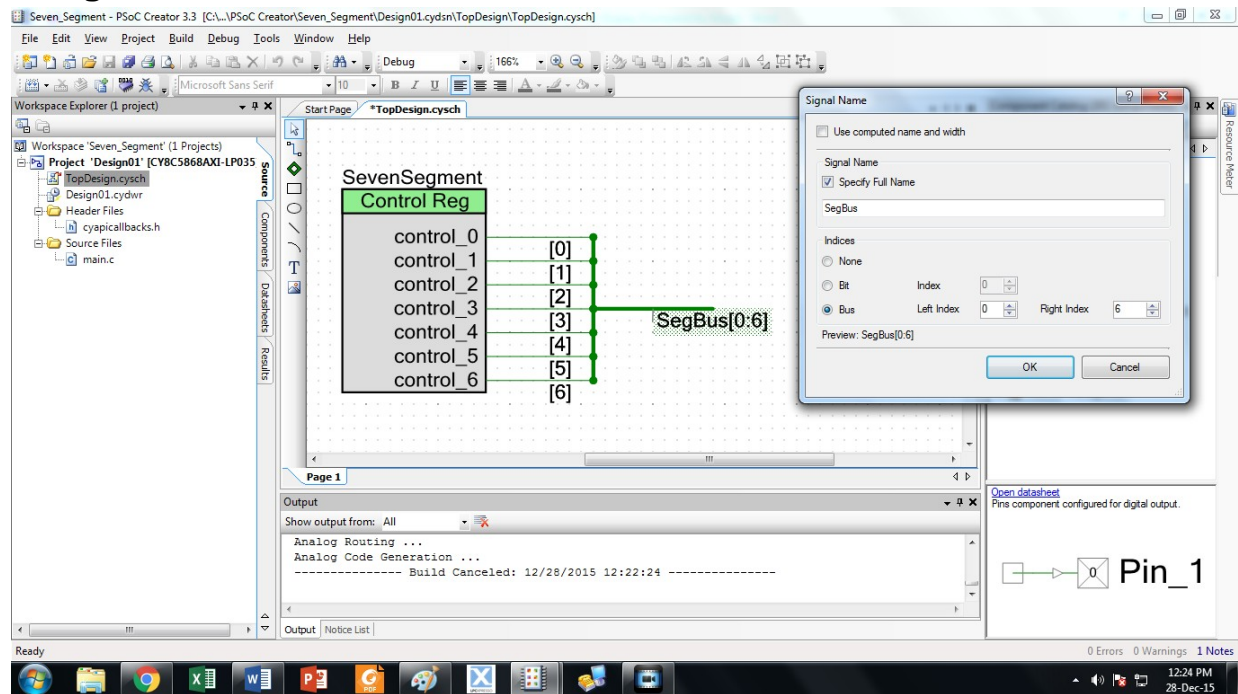


Figure 8

Step 9: Drag a Digital output pin from Component Catalog from the right side of the window and configure it as bus of 7 pins.

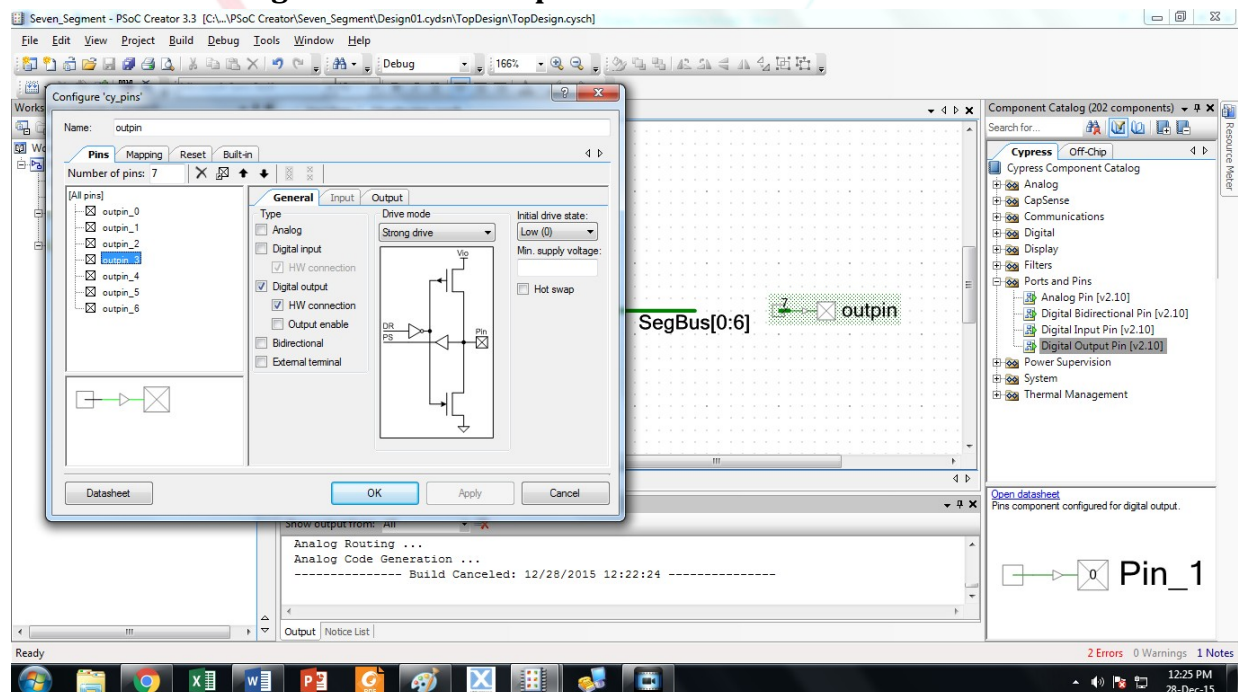


Figure 9

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

Step 10: 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.

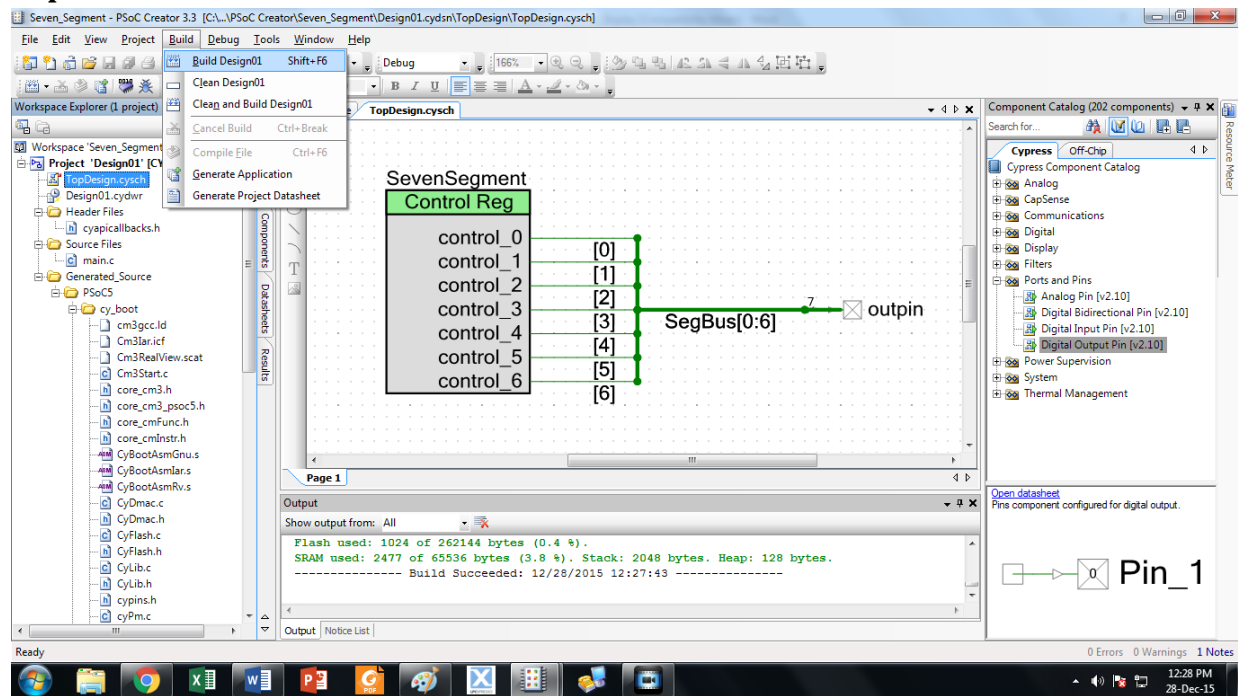


Figure 10

Step 11: Now click on main.c file and write the code and build it.

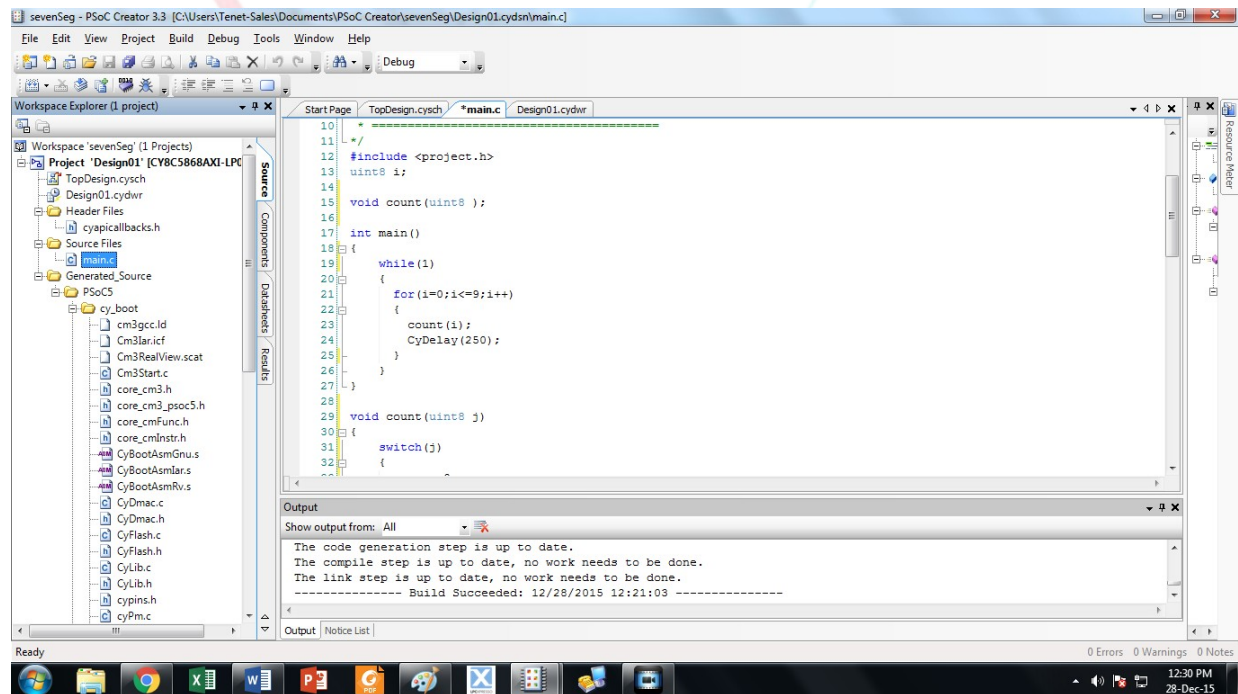


Figure 11

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

CODE:

```
#include <project.h>

void count(uint8 );
int main()
{
    uint8 i;
    while(1)
    {
        for(i=0;i<=9;i++)
        {
            count(i);
            CyDelay(250);
        }
    }
}

void count(uint8 j)
{
    switch(j)
    {
        case 0:
        {
            SevenSegment_Write(0x40); //conversion of binary to hexadecimal
            break;
        }
        case 1:
        {
            SevenSegment_Write(0x79);
            break;
        }
        case 2:
        {
            SevenSegment_Write(0x24);
            break;
        }
        case 3:
        {
            SevenSegment_Write(0x30);
            break;
        }
        case 4:
        {
            SevenSegment_Write(0x19);
            break;
        }
        case 5:
        {
            SevenSegment_Write(0x12);
        }
    }
}
```

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

```

        break;
    }
    case 6:
    {
        SevenSegment_Write(0x02);
        break;
    }
    case 7:
    {
        SevenSegment_Write(0x78);
        break;
    }
    case 8:
    {
        SevenSegment_Write(0x00);
        break;
    }
    case 9:
    {
        SevenSegment_Write(0x10);
        break;
    }
}
}

```

Step 12: Finally, double click on Design01.cydwr and assign pins to desired port.

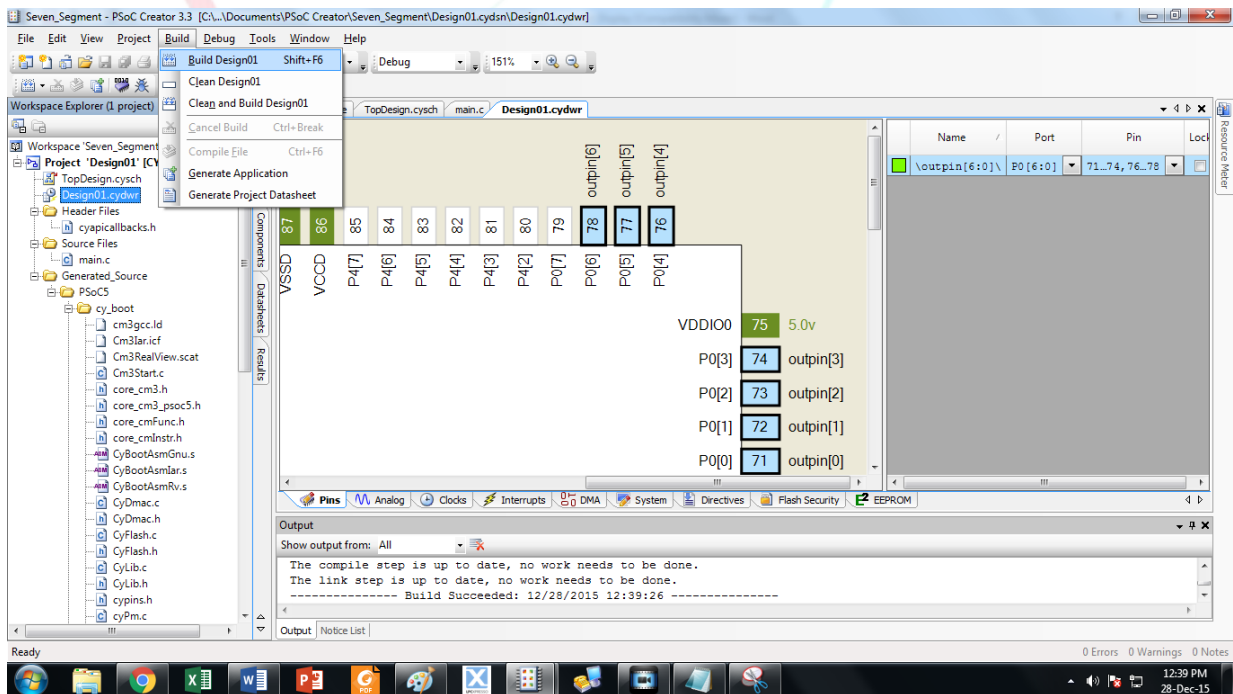


Figure 12

Step 13: If all goes well, goto to Debug and click on Program.

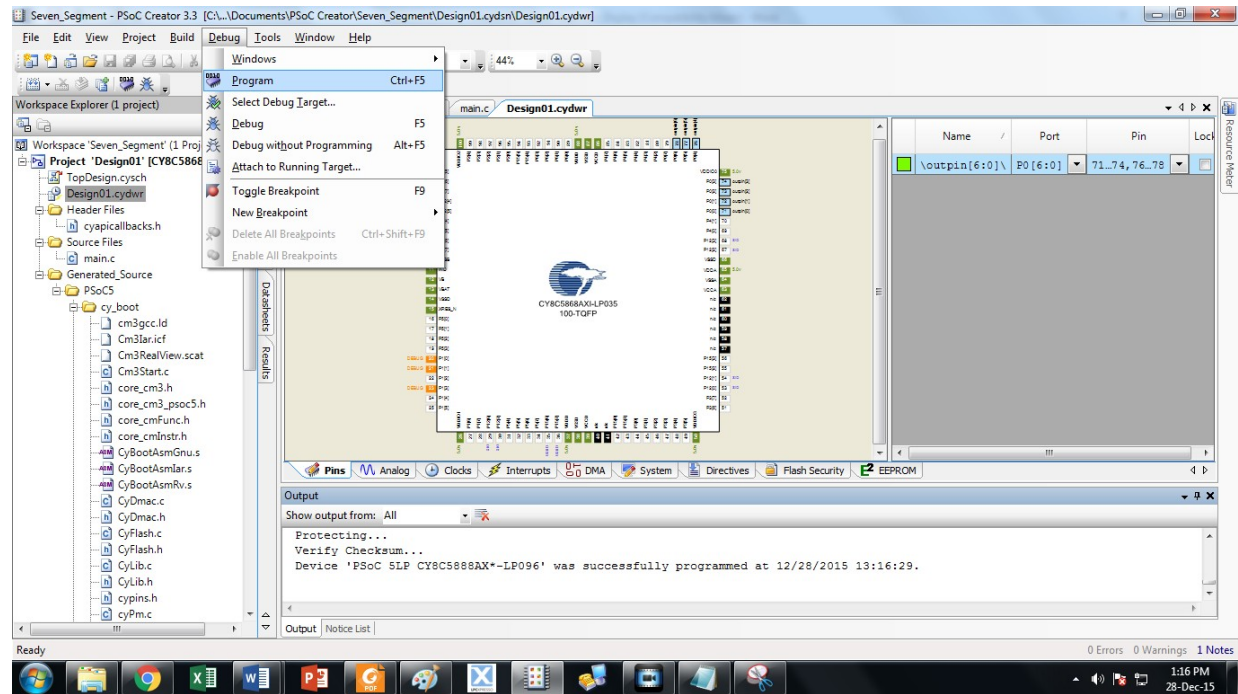


Figure 13

Circuit Explanation:

Before connection we should be aware of what common anode and common cathode means. As shown in the figure, in common anode we can turn ON a segment by driving a logic 0. And in common cathode we can turn ON a segment by driving a Logic 1. We have used common anode in this project. As you can see table below, to turn ON a specific LED we drive logic 0.

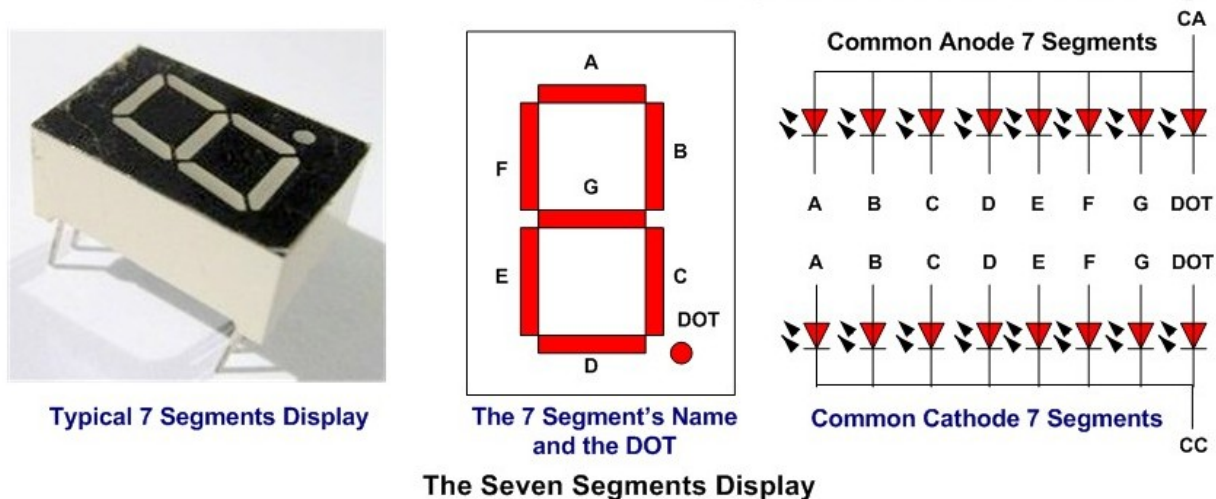


Figure 14

9/3, 2nd floor, SreeLakshmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726

The connections are as follows, the pin P0.0 corresponds to A, P0.1 corresponds to B, P0.2 corresponds to C and so on..

DISPLAY NUMBER	G (P0.0)	F (P0.1)	E (P0.2)	D (P0.3)	C (P0.4)	B (P0.5)	A (P0.6)	Hex values
0	1	0	0	0	0	0	0	0x40
1	1	1	1	1	0	0	1	0x79
2	0	1	0	0	1	0	0	0x24
3	0	1	1	0	0	0	0	0x30
4	0	0	1	1	0	0	1	0x19
5	0	0	1	0	0	1	0	0x12
6	0	0	0	0	0	1	0	0x02
7	1	1	1	1	0	0	0	0x78
8	0	0	0	0	0	0	0	0x00
9	0	0	1	0	0	0	0	0x10

Table 1

For product link:

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

For more information please visit: www.tenettech.com

For technical query please send an e-mail: info@tenettech.com

9/3, 2nd floor, SreeLaksmi Complex, opp, to Vivekananda Park, Girinagar, Bangalore - 560085,

Email: info@tenettech.com, Phone: 080 - 26722726