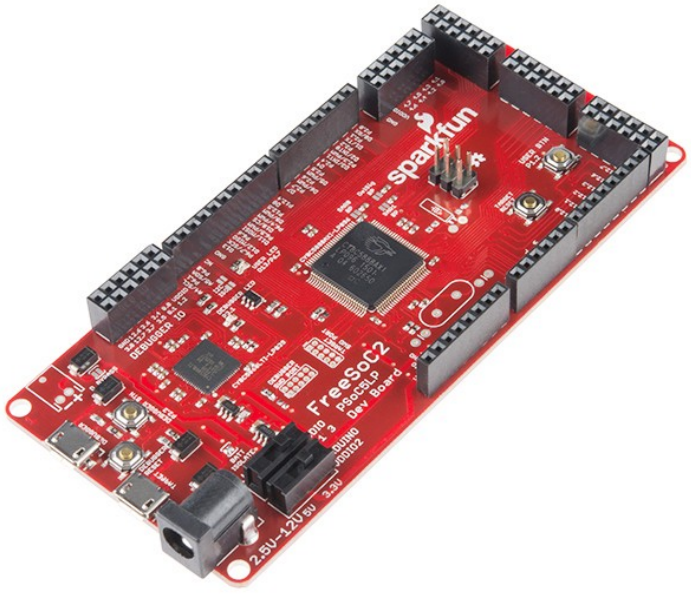
TENET TECHNETRONICS

2016

Character LCD Custom Fonts with FreeSoc2 (PSoC 5LP) and 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.

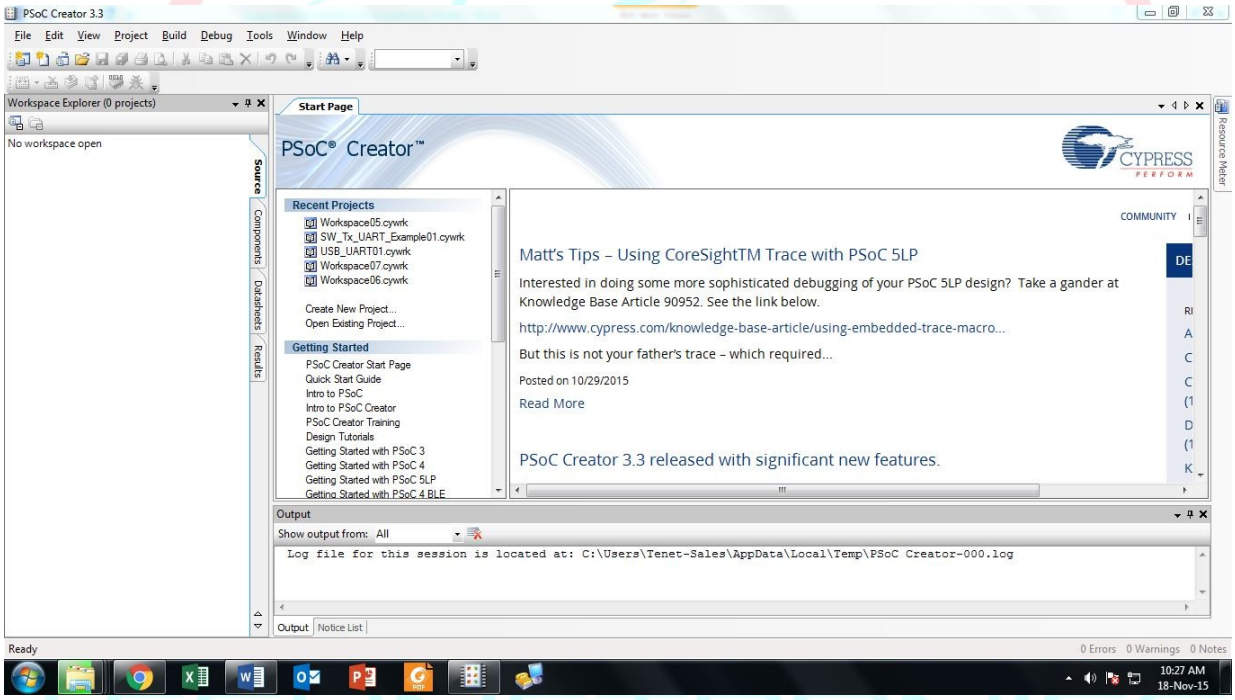

Figure 1

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

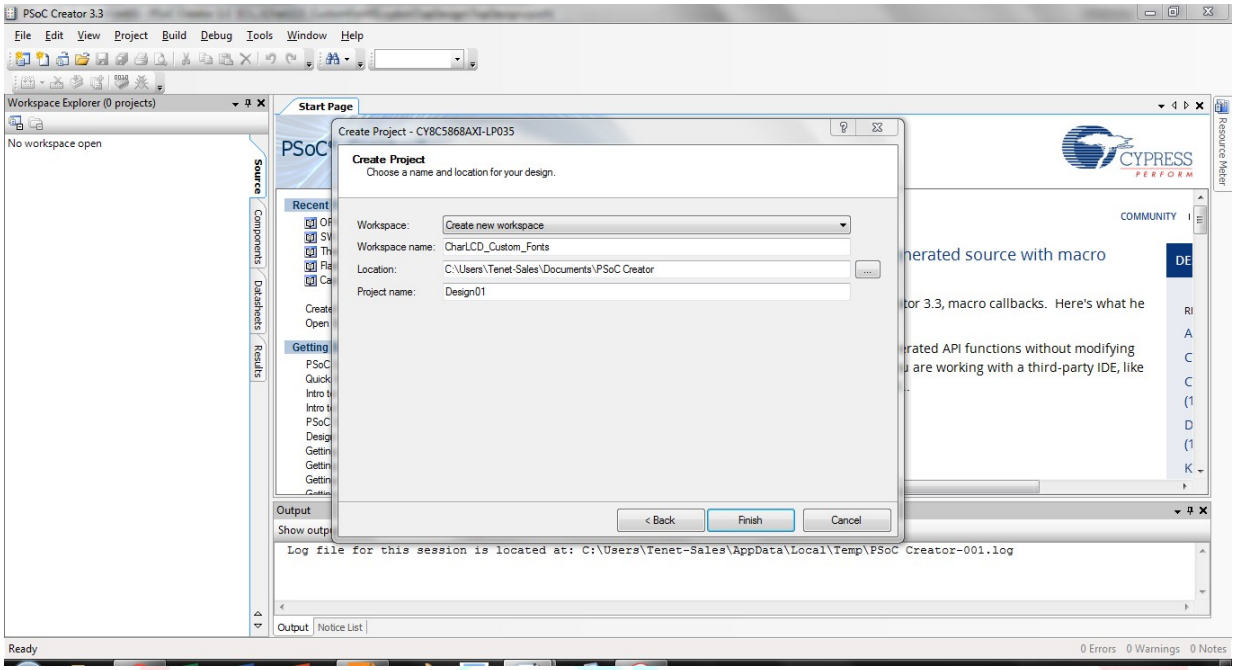

Figure 1

Step 3: Open TopDesign.cysch from workspace explorer.

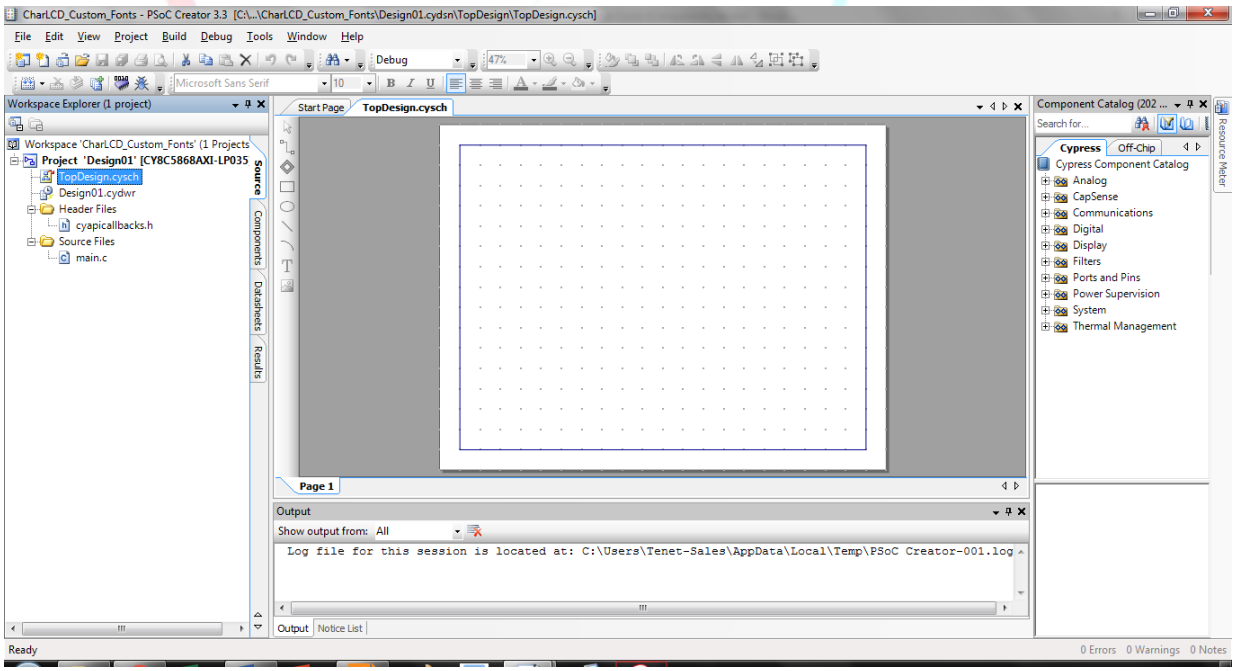

Figure 2

Step 4: Select a Character LCD block from Component catalog on right side of the window. Drag the Character LCD block onto the workspace.

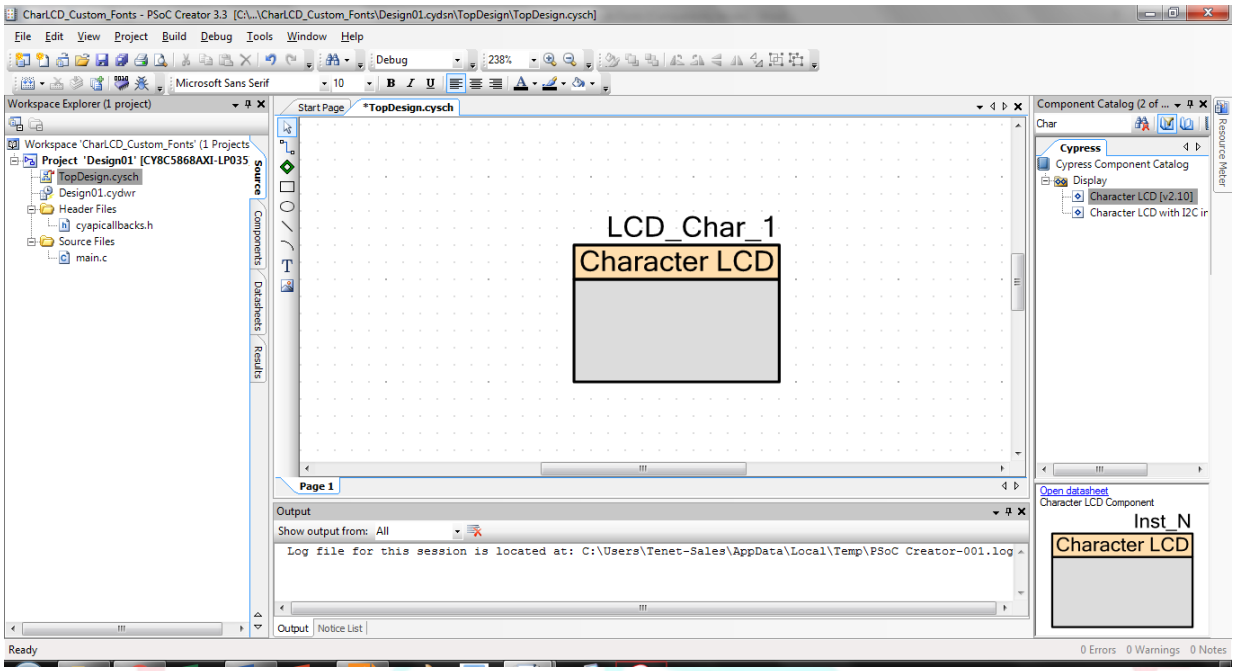

Figure 3

Step 5: Double click on the Character LCD block and change the name if you wish to. Click on User Defined LCD custom character set.

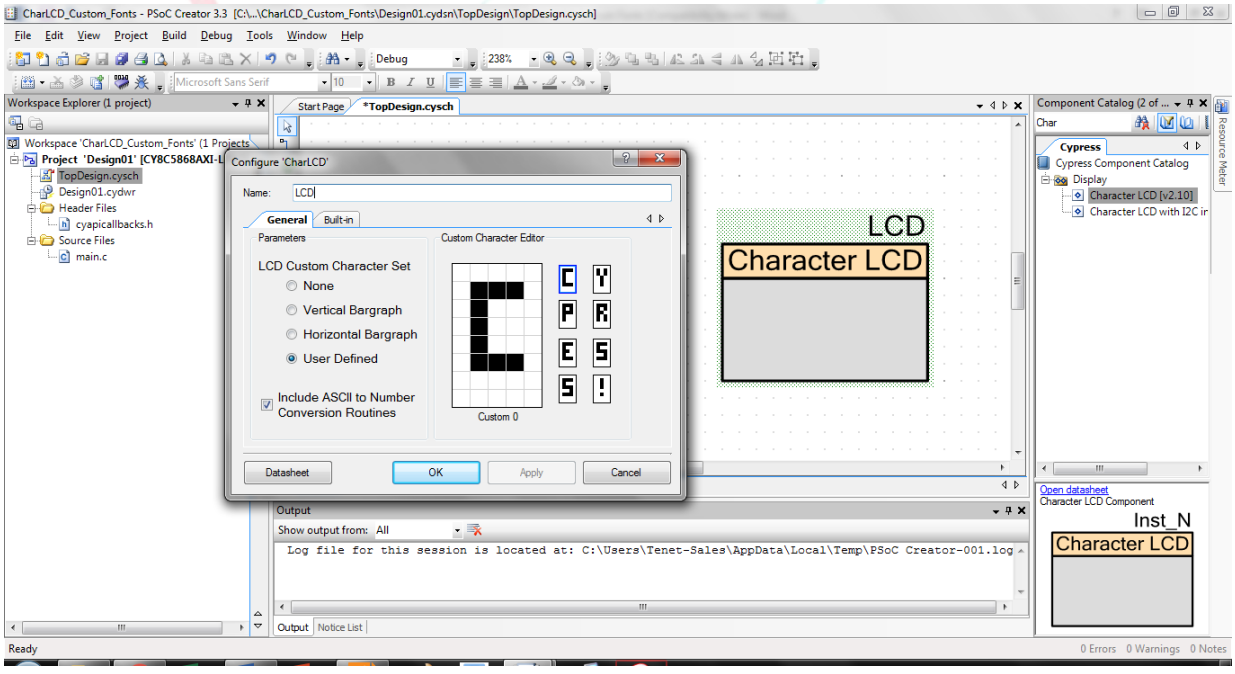

Figure 5

Step 6: The Custom Character Editor makes user-defined character sets easy to create through the use of a GUI. Each of the 8 characters can be up to 5x8 pixels, though some hardware may not display more than the top 5x7.

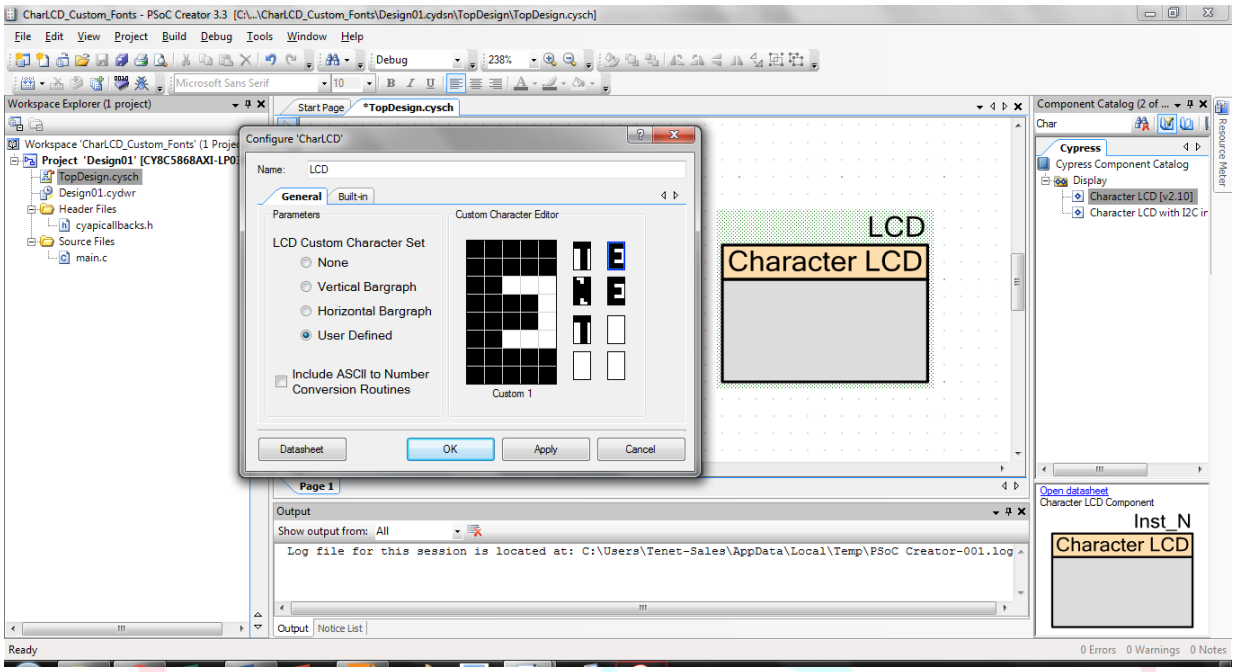

Figure 6A

To use the Custom Character Editor, select User Defined as the option for the LCD Custom Character Set. Then, click on the thumbnail of the character you want to edit. To toggle a pixel in your character, click on the chosen pixel in the enlarged character view. You may also click and drag to toggle multiple pixels. After creating a custom character set, the GUI will generate a look-up array of eight custom characters. Then the look-up array can be loaded to a LCD module.
Figure 6B shows a custom character encoded into an 8-byte custom character lookup array row.

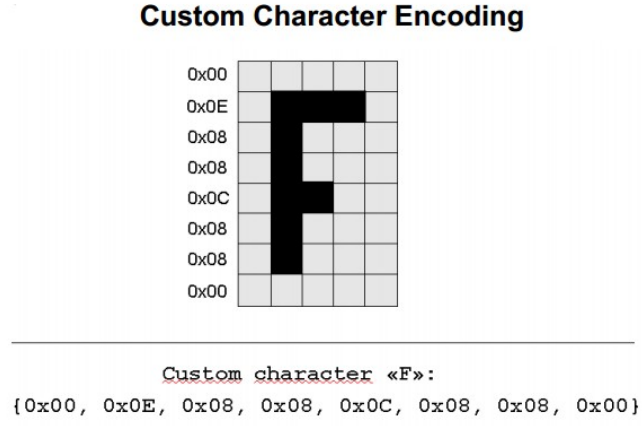

Figure 6B

Step 7: 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.

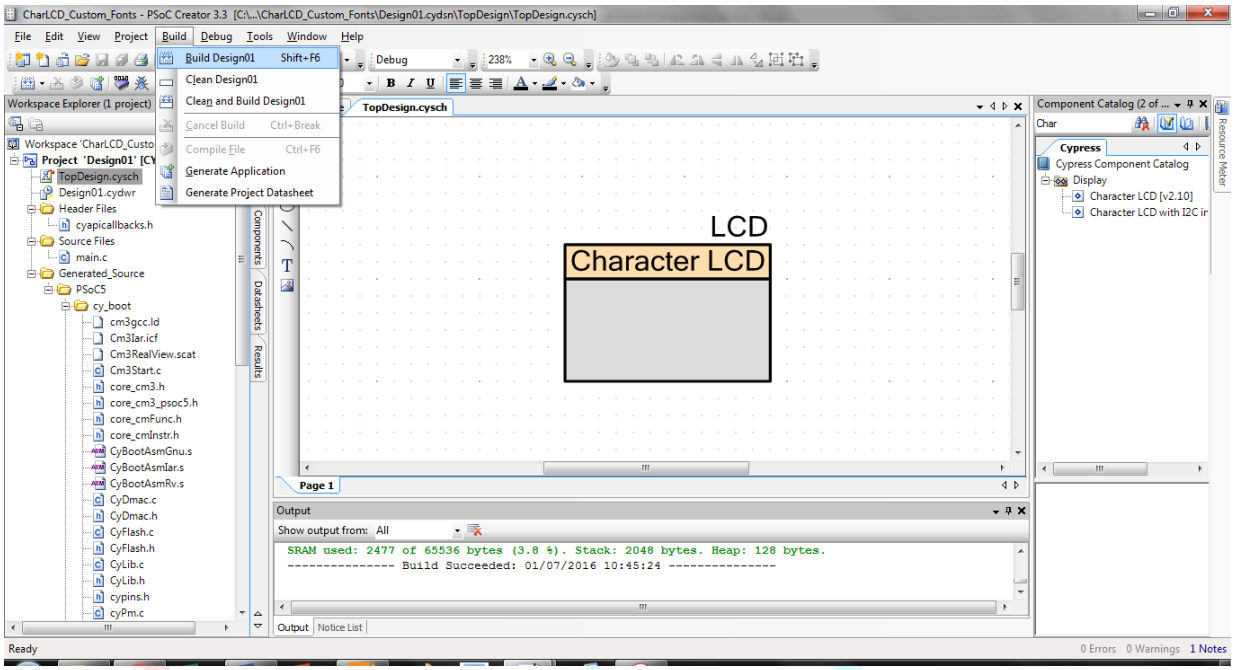

Figure 7

Step 8: Click on main.c from Workspace Explorer. Write the code and Build it.

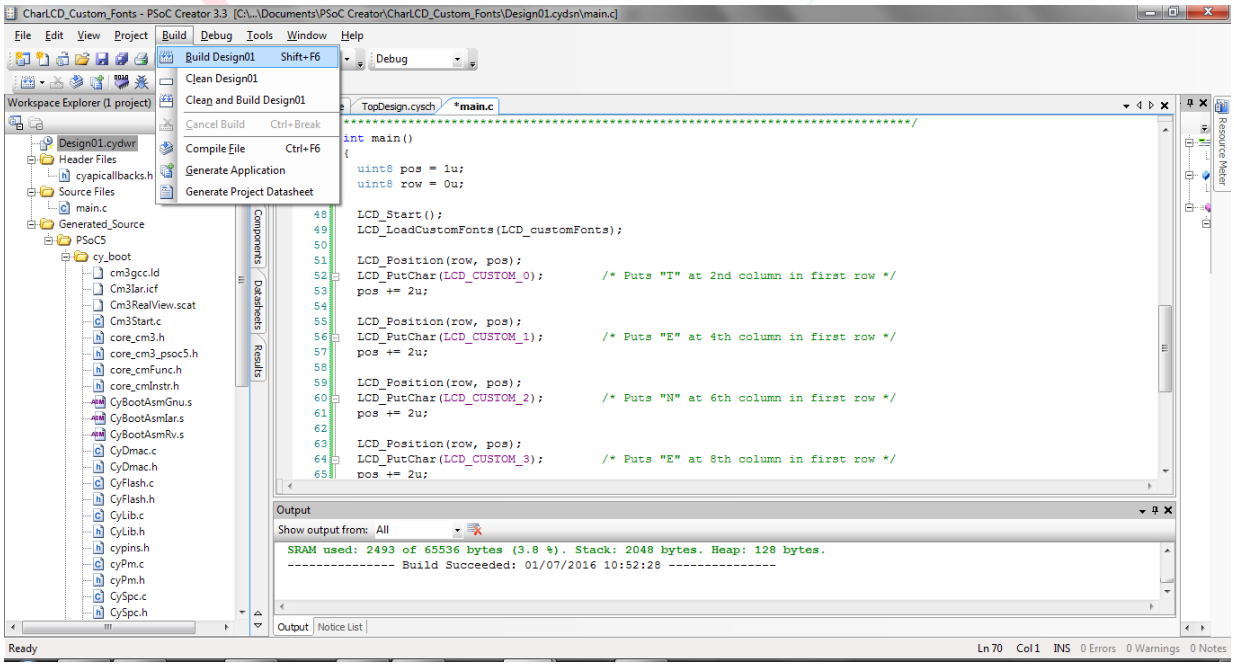

Figure 4

CODE:

```
#include <project.h>

extern uint8 const CYCODE LCD_customFonts[];

int main()
{
  uint8 pos = 1u;
  uint8 row = 0u;

  LCD_Start();
  LCD_LoadCustomFonts(LCD_customFonts);

  LCD_Position(row, pos);
  LCD_PutChar(LCD_CUSTOM_0);        /* Puts "T" at 2nd column in first row */
  pos += 2u;

  LCD_Position(row, pos);
  LCD_PutChar(LCD_CUSTOM_1);        /* Puts "E" at 4th column in first row */
  pos += 2u;

  LCD_Position(row, pos);
  LCD_PutChar(LCD_CUSTOM_2);        /* Puts "N" at 6th column in first row */
  pos += 2u;

  LCD_Position(row, pos);
  LCD_PutChar(LCD_CUSTOM_3);        /* Puts "E" at 8th column in first row */
  pos += 2u;

  LCD_Position(row, pos);
  LCD_PutChar(LCD_CUSTOM_4);       /* Puts "T" at 10th column in first row */
  pos += 2u;

  CyDelay(200u);
  LCD_Position(1u, 3u);
  LCD_PrintString("Technetronics");

  for(;;)
  {}
}
```

Step 9: Finally, double click on Design01.cydwr and assign pins to desired port and build it.

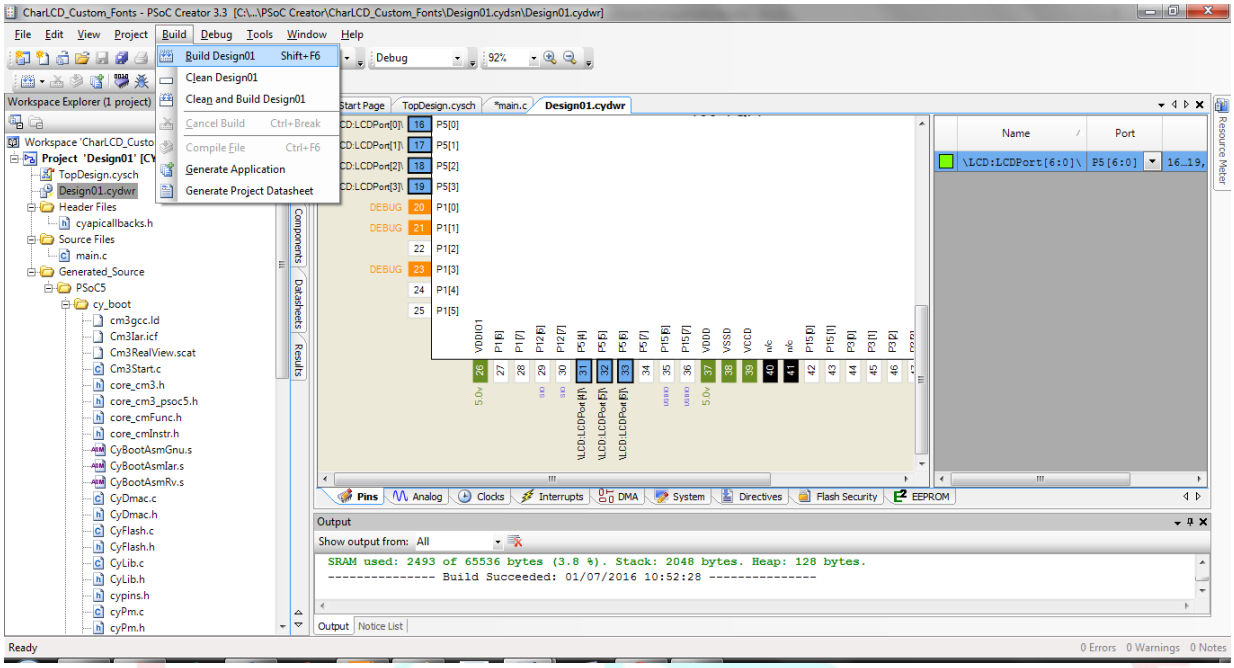

Figure 5

Step 10: If all goes well, go to Debug and click on Program.

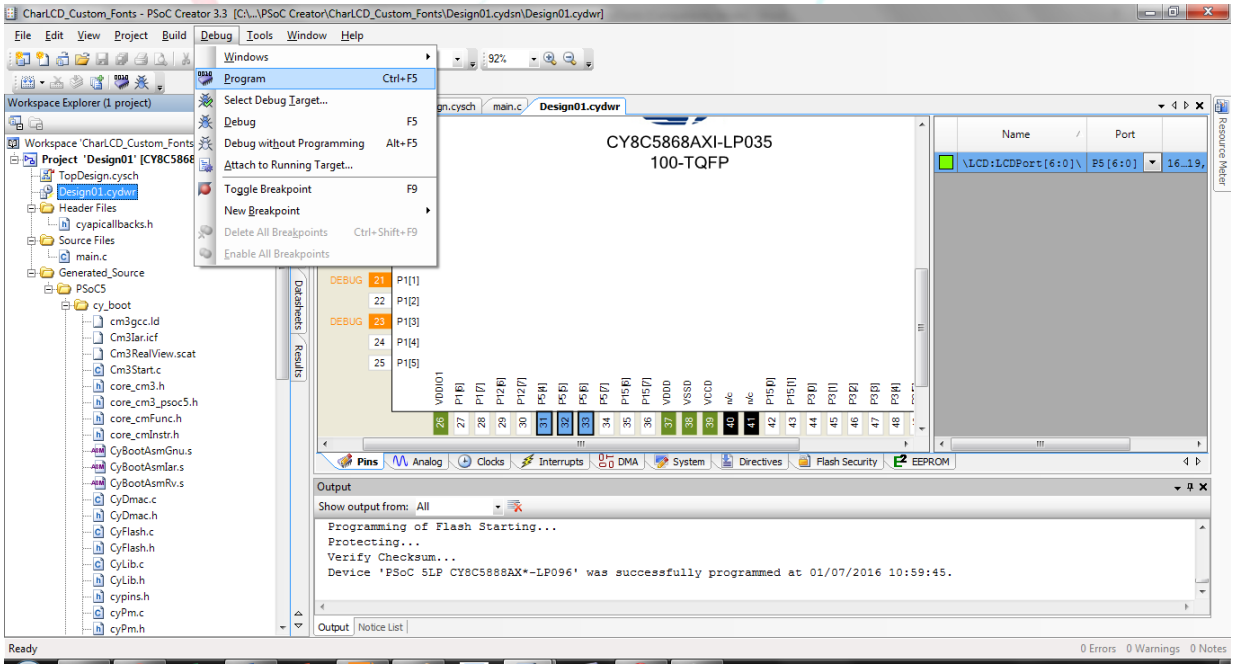

Figure 10

LCD PINOUT:

Figure 11

Interfacing Character LCD with FreeSoC2

LCD pin out	FreeSoC2 Pin
1 – VSS (GND)	GND
2 – VDD (+ve)	5V
3 – VE (contrast voltage)	GND
4 – Register Select	P5.5
5 – Read/Write	P5.6
6 - Enable	P5.4
7 – Data 0	Left Open
8 – Data 1	Left Open
9 – Data 2	Left Open

10 – Data 3	**Left Open**
11 – Data 4	**P5.0**
12 – Data 5	**P5.1**
13 – Data 6	**P5.2**
14 – Data 7	**P5.3**
15 – Backlight Anode	**5V**
16 – Backlight Cathode	**GND**

Table 1

OUTPUT:

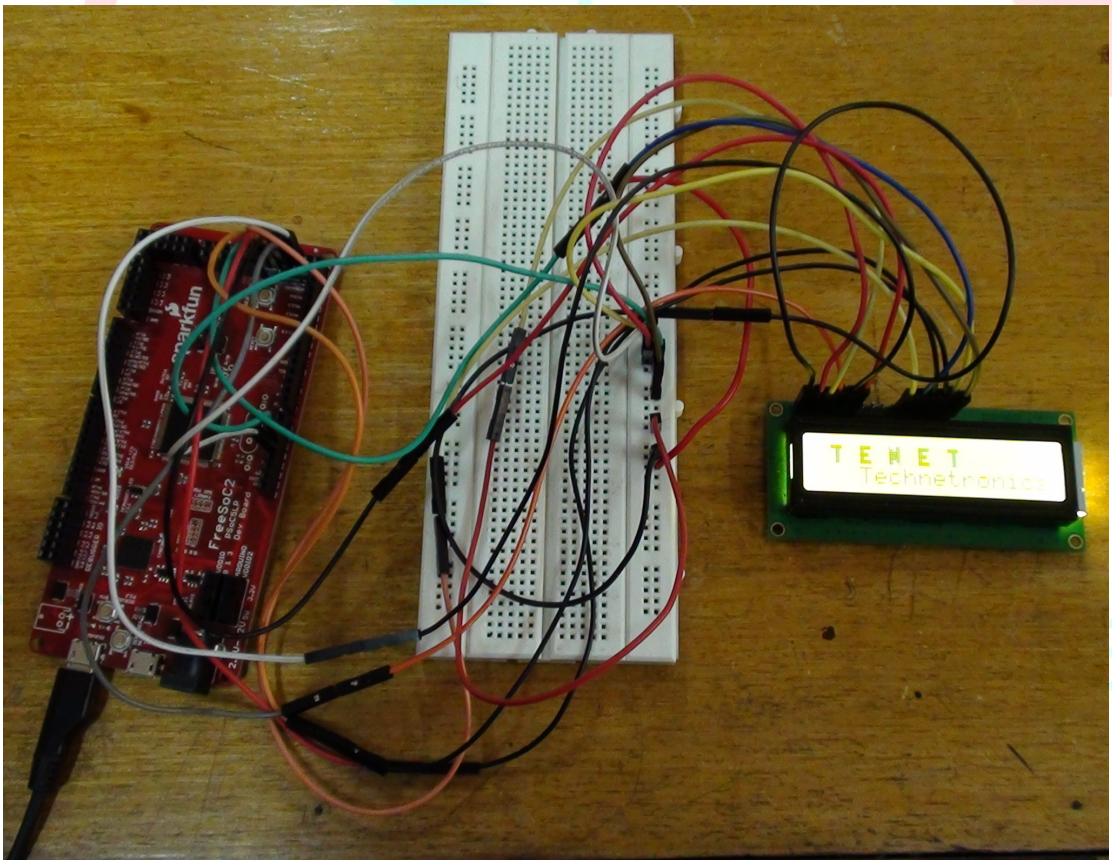

Figure 12

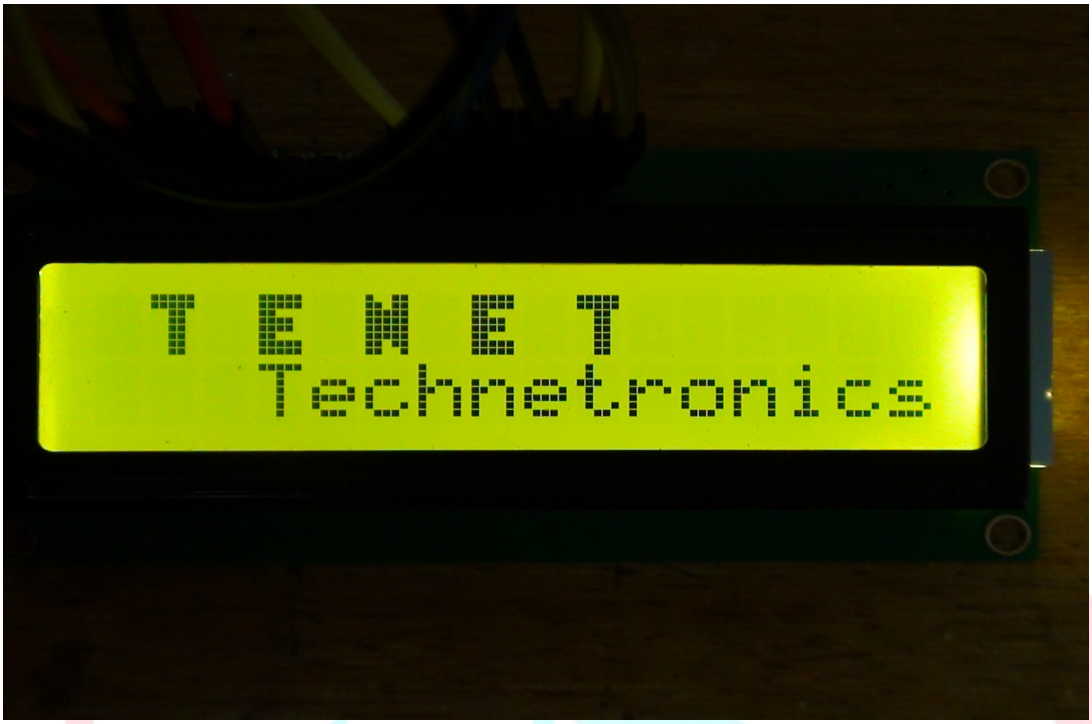

Figure 13

For product link:

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

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