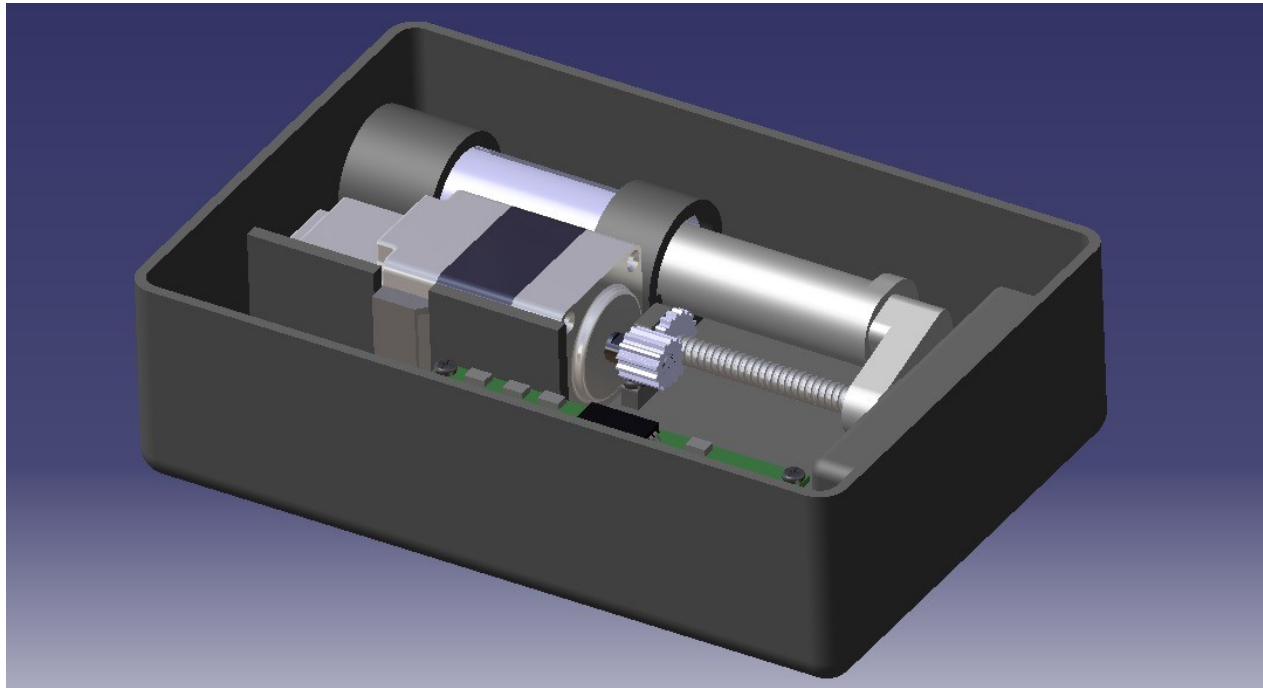
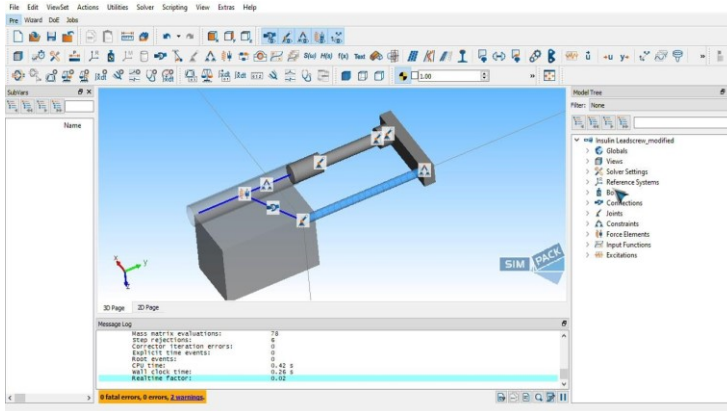


CAD MODEL



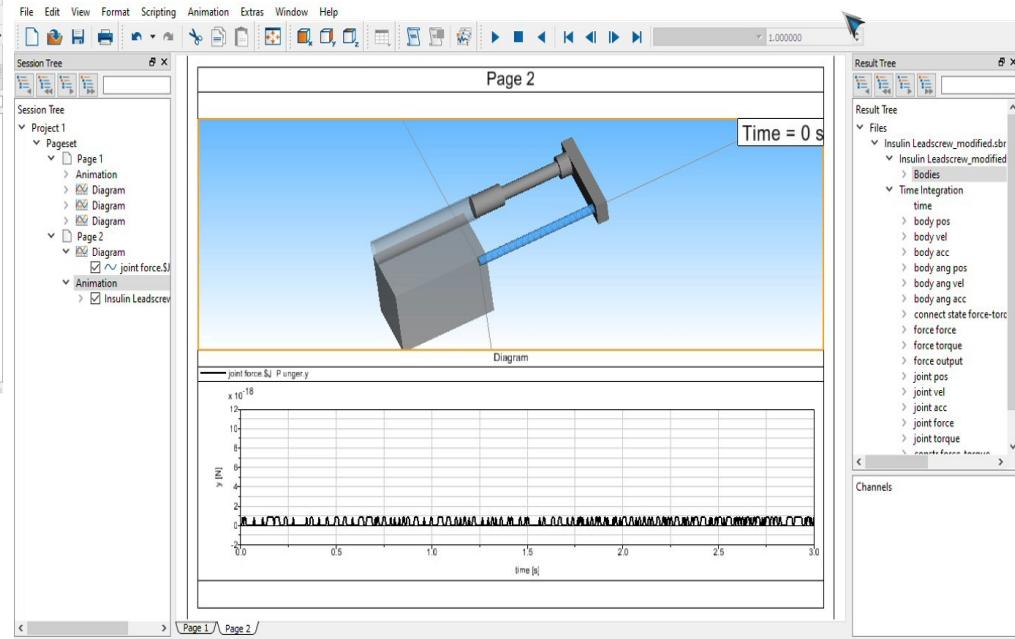
MOTION SIMULATION - SCENARIOS



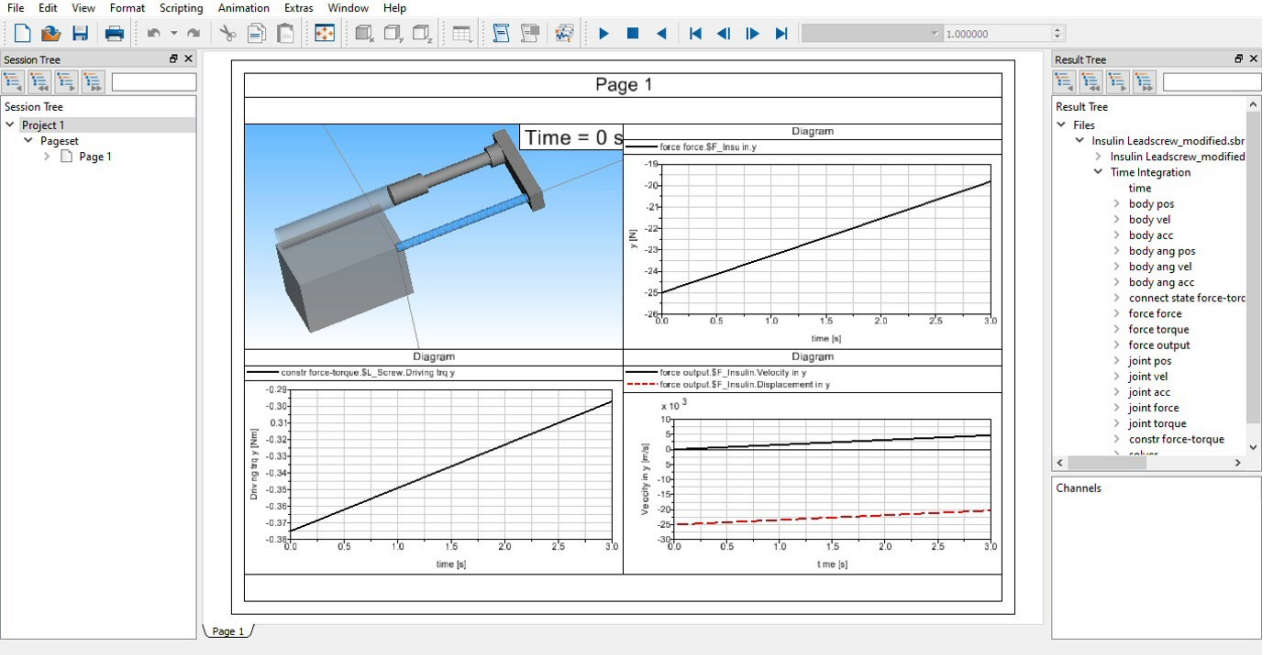
Pitch length of Lead Screw= 0.25 mm

Scenarios Created

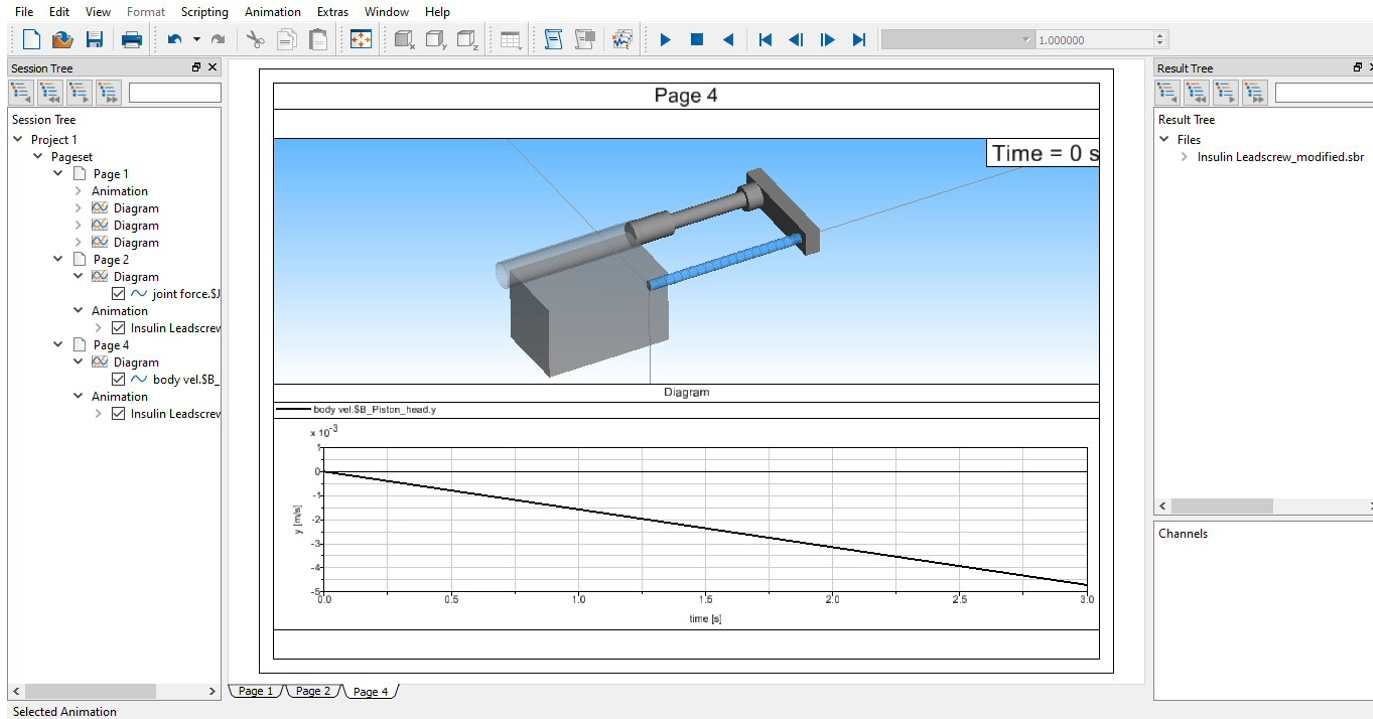
- Rotation & Translation
- Joint force on plunger



FORCE, TORQUE FOR PLUNGER AGAINST INSULIN MEDIUM



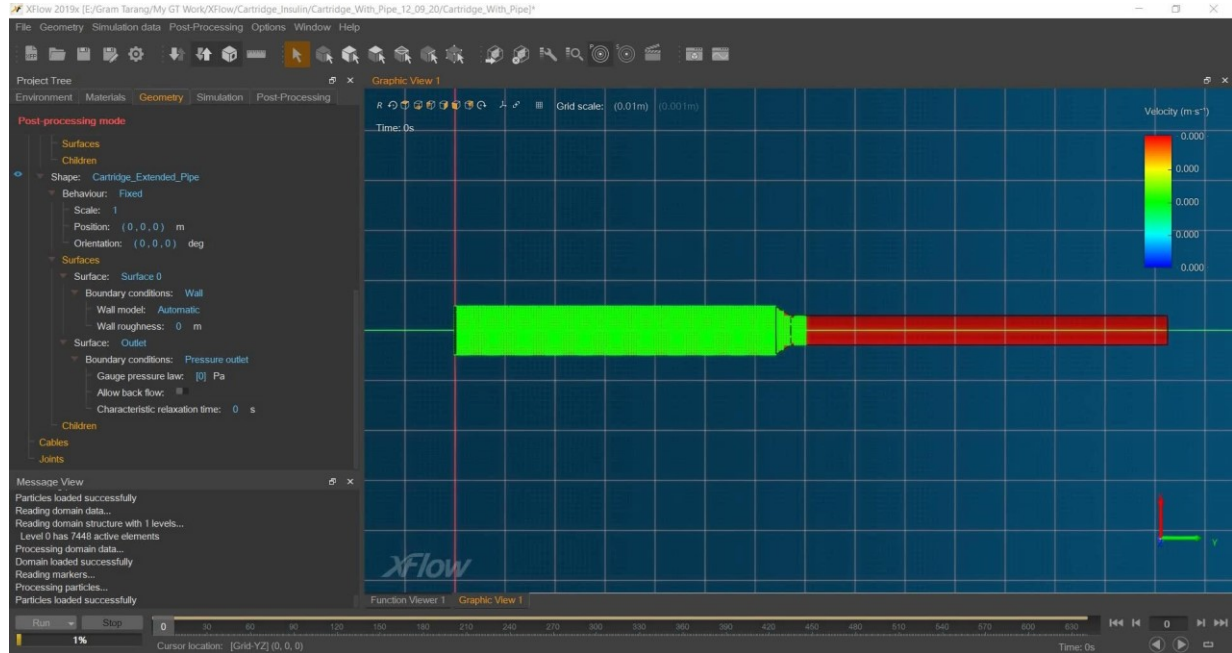
PISTON VELOCITY



CFD ANALYSIS FOR VELOCITY INTERACTION



Fluid Medium used:
Molecular weight = 5814 g/mol
density = 1090 kg/m³
operating temperature = 291.261 K
Viscosity = 0.003
Thermal conductivity = 0.58 W/m.K
Specific heat capacity = 3617 J/Kg.K



Menu Creation on Character LCD






Home Screen



Pump Buttons



How to use the Buttons

Button	Description
	Increases or decreases the value of a flashing item. Scrolls up or down the items in a list.
	Accepts a selected menu item or activates a selected setting.
	<ul style="list-style-type: none">• Returns to previous screen or exits the menu.• Backs out of unintentional menu selections if the ACT button has not been pressed yet.
	<ul style="list-style-type: none">• Press simultaneously with  to turn on backlight when in the menus.• Use as a Shift button by pressing it in combination with another button to access certain features.

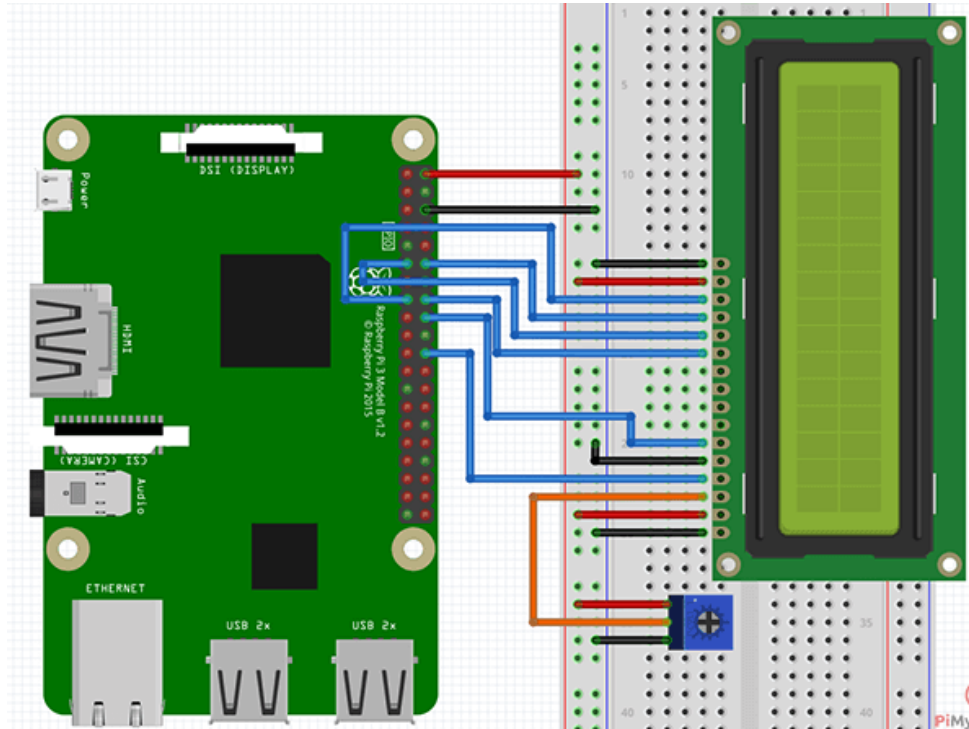
Character LCD(Electrical Characteristics)

Item	Symbol	Condit.	Min	Typ	Max	Unit
Supply Voltage for LCD	VDD-VO	Ta=0°C, Ta=25°C, Ta=50°C		4.5		V
Input High Voltage	VIH		2.2		VDD	V
Input Low Voltage	VIL		0.3		0.6	V
Output High Voltage	VOH		2.4			V
Output Low Voltage	VOL				0.4	V
Supply Current	IDD	VDD=5V		2.5	4.0	mA

Character LCD (Mechanical Properties)

Item	Dimensions	Unit
LCD Size	98 x 60	mm
Viewing Area	77 x 25	mm
Dot Size	0.55 x 0.55	mm
Dot Pitch	0.60 x 0.60	mm
Character Size	2.95 x 4.75	mm
Character Pitch	3.55 x 5.35	mm
LCD Thickness	8.8	mm

Character LCD Pir



PIN NO	Symbol	Fuction
1	VSS	GND
2	VDD	+5V
3	V0	Contrast adjustment
4	RS	H/L Register select signal
5	R/W	H/L Read/Write signal
6	E	H/L Enable signal
7	DB0	H/L Data bus line
8	DB1	H/L Data bus line
9	DB2	H/L Data bus line
10	DB3	H/L Data bus line
11	DB4	H/L Data bus line
12	DB5	H/L Data bus line
13	DB6	H/L Data bus line
14	DB7	H/L Data bus line
15	A	+4.2V for LED
16	K	Power supply for BKL(0V)

Interface Pin Connection

Pin No	Symbol	Level	Function
1	Vss		GND(0V)
2	Vdd		Vcc(+5V±5%)
3	Vo		Contrast Adjust
4	RS	H/L	Register Select
5	R/W	H/L	Read/Write
6	E	H/L	Enable Signal
7	DB0	H/L	Data Bit 0
8	DB1	H/L	Data Bit 1
9	DB2	H/L	Data Bit 2
10	DB3	H/L	Data Bit 3
11	DB4	H/L	Data Bit 4
12	DB5	H/L	Data Bit 5
13	DB6	H/L	Data Bit 6
14	DB7	H/L	Data Bit 7
15	NC		Not Connected
16	NC		Not Connected

Display Character Address Code

Display Position	1	2	3	4	5	6	7	8	9	10
DD RAM Address - Row 1	80	81	82	83	84	85	86	87	88	89
DD RAM Address - Row 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9
DD RAM Address - Row 3	94	95	96	97	98	99	9A	9B	9C	9D
DD RAM Address - Row 4	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD

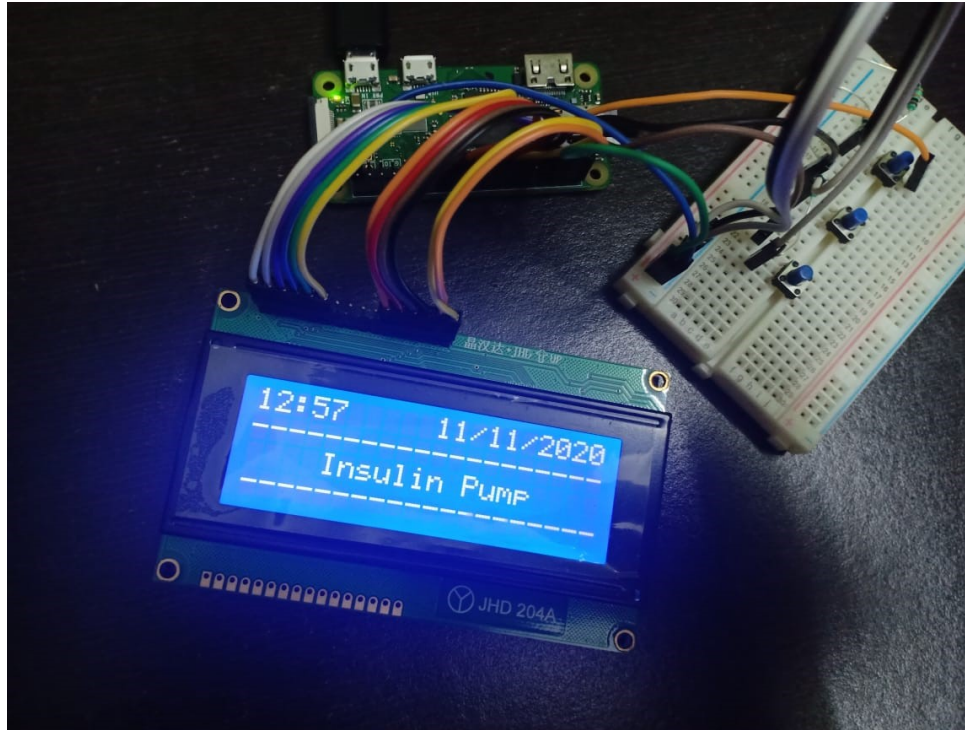
Display Position	11	12	13	14	15	16	17	18	19	20
DD RAM Address - Row 1	8A	8B	8C	8D	8E	8F	90	91	92	93
DD RAM Address - Row 2	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
DD RAM Address - Row 3	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
DD RAM Address - Row 4	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7

Instruction	Code										Description	Execution Time (max) (when f_{cp} or f_{osc} is 270 kHz)	
	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0			
Clear display	0	0	0	0	0	0	0	0	0	1	Clears entire display and sets DDRAM address 0 in address counter.		
Return home	0	0	0	0	0	0	0	0	0	1	—	Sets DDRAM address 0 in address counter. Also returns display from being shifted to original position. DDRAM contents remain unchanged.	1.52 ms
Entry mode set	0	0	0	0	0	0	0	1	I/D	S	Sets cursor move direction and specifies display shift. These operations are performed during data write and read.	37 μ s	
Display on/off control	0	0	0	0	0	0	1	D	C	B	Sets entire display (D) on/off, cursor on/off (C), and blinking of cursor position character (B).	37 μ s	
Cursor or display shift	0	0	0	0	0	1	S/C	R/L	—	—	Moves cursor and shifts display without changing DDRAM contents.	37 μ s	
Function set	0	0	0	0	1	DL	N	F	—	—	Sets interface data length (DL), number of display lines (N), and character font (F).	37 μ s	
Set CGRAM address	0	0	0	1	ACG	ACG	ACG	ACG	ACG	ACG	Sets CGRAM address. CGRAM data is sent and received after this setting.	37 μ s	
Set DDRAM address	0	0	1	ADD	ADD	ADD	ADD	ADD	ADD	ADD	Sets DDRAM address. DDRAM data is sent and received after this setting.	37 μ s	
Read busy flag & address	0	1	BF	AC	AC	AC	AC	AC	AC	AC	Reads busy flag (BF) indicating internal operation is being performed and reads address counter contents.	0 μ s	

Commands for the LCD

- I/D = 1: Increment
- I/D = 0: Decrement
- S = 1: Accompanies display shift
- S/C = 1: Display shift
- S/C = 0: Cursor move
- R/L = 1: Shift to the right
- R/L = 0: Shift to the left
- DL = 1: 8 bits, DL = 0: 4 bits
- N = 1: 2 lines, N = 0: 1 line
- F = 1: 5 \times 10 dots, F = 0: 5 \times 8 dots
- BF = 1: Internally operating
- BF = 0: Instructions acceptable

Work Done on Menu Creation

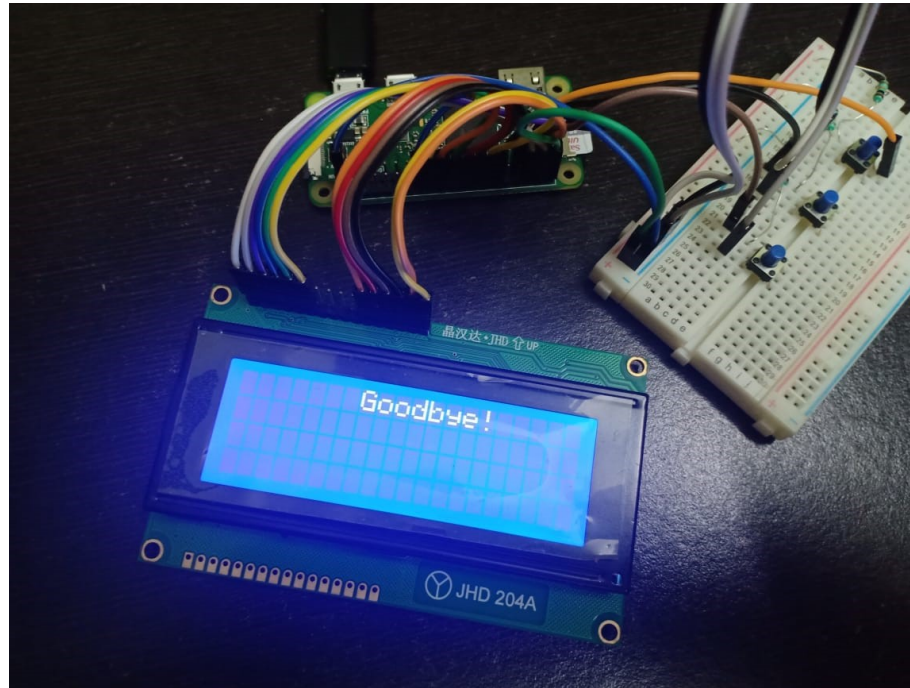


Home Screen

Main Menu Screen

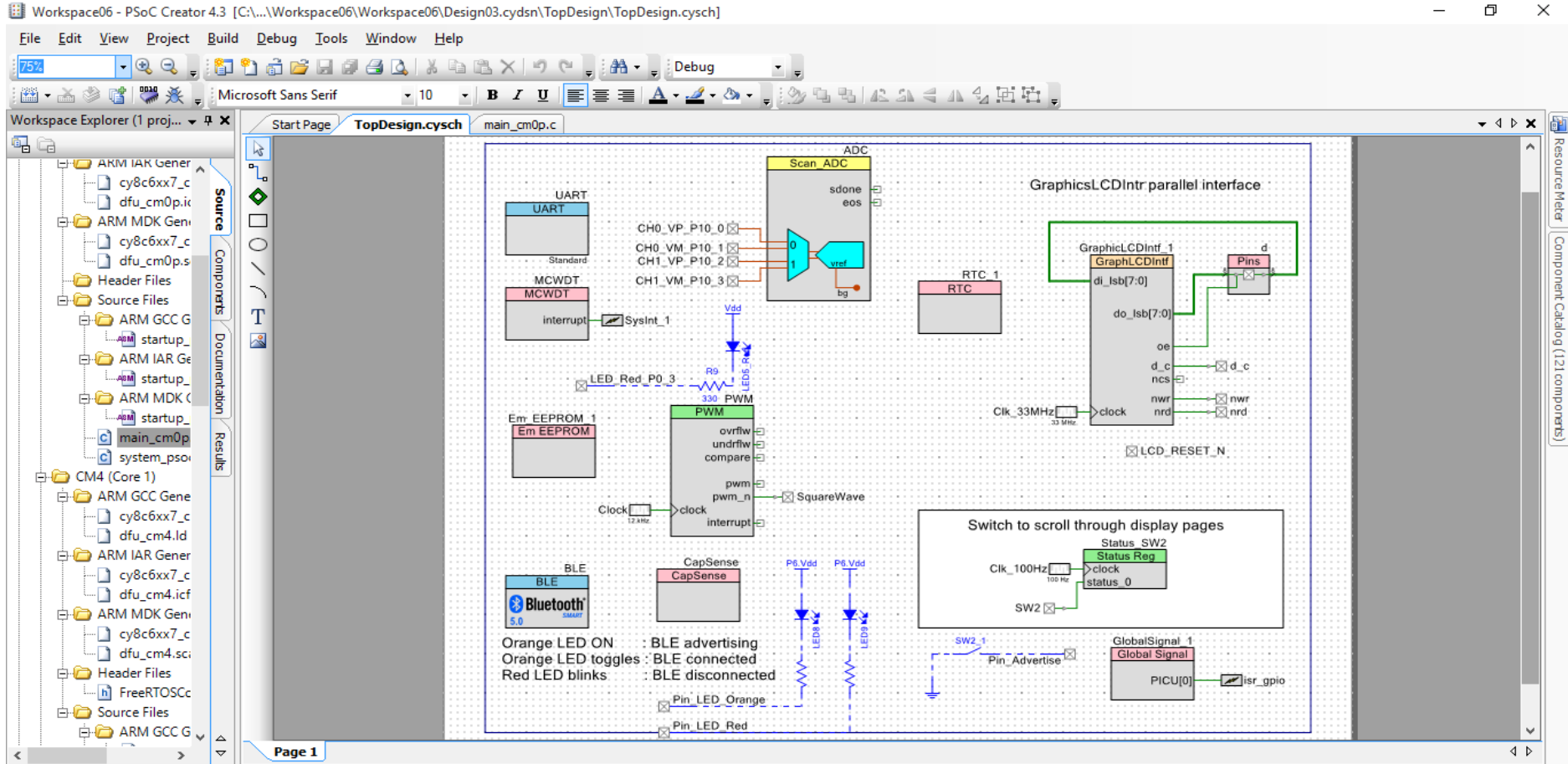


Closing



PSoC Implementation of Insulin Pump

Insulin Pump



Code Snapshot

Workspace06 - PSoC Creator 4.3 [C:\Users\admin\Desktop\Workspace06\Workspace06\Design03.cydsn\main_cm0p.c]

File Edit View Project Build Debug Tools Window Help

Debug

Workspace Explorer (1 proj...)

Start Page TopDesign.cysch main_cm0p.c

```
1  /*  
2  *  
3  * Copyright YOUR COMPANY, THE YEAR  
4  * All Rights Reserved  
5  * UNPUBLISHED, LICENSED SOFTWARE.  
6  *  
7  * CONFIDENTIAL AND PROPRIETARY INFORMATION  
8  * WHICH IS THE PROPERTY OF your company.  
9  *  
10 *  
11 */  
12 #include "project.h"  
13 #include "GUI.h"  
14 #include "stdlib.h"  
15 /*#include "bitmaps.h"*/  
16 #include <stdio.h>  
17 #include "sar/cy_sar.h"  
18 #include "sysanalog/cy_sysanalog.h"  
19 #include "mcwdt/cy_mcwdt.h"  
20 #include "sysclk/cy_sysclk.h"  
21 /* Number of demo pages */  
22 #define NUMBER_OF_DEMO_PAGES 9  
23  
24 /* Function prototypes */  
25 void ShowTextModes (void);  
26 void ShowTextColors (void);  
27 void ShowFontSizesNormal (void);  
28 void ShowFontSizesBold (void);  
29 void ShowColorBar (void);  
30 void Show2DGraphics1 (void);  
31 void Show2DGraphics2 (void);  
32 void ShowConcentricCircles (void);  
33 void ShowBitmap (void);
```

Output

Show output from: All

```
The link step is up to date, no work needs to b  
The compile step is up to date, no work needs t  
The link step is up to date, no work needs to b  
----- Build Succeeded: 10/31/2020 12:  
----- Build Started: 10/31/2020 12:11  
The code generation step is up to date.
```

Output

Workspace06 - PSoC Creator 4.3 [C:\...\Workspace06\Workspace06\Design03.cydsn\TopDesign\TopDesign.cysch]

File Edit View Project Build Debug Tools Window Help

75% Microsoft Sans Serif 10 B I U

Workspace Explorer (1 proj...)

Source Components Documentation Results

Start Page TopDesign.cysch main_cm0p.c

ADC
Scan ADC
sdone GraphicsLCDIntr parallel interface

Output

Show output from: All

```
The link step is up to date, no work needs to be done.  
The compile step is up to date, no work needs to be done.  
The link step is up to date, no work needs to be done.  
----- Build Succeeded: 10/31/2020 12:06:37 -----  
Build Started: 10/31/2020 12:11:38 Project: Design03, Configuration: ARM GCC  
The code generation step is up to date.  
The compile step is up to date, no work needs to be done.  
The link step is up to date, no work needs to be done.  
The compile step is up to date, no work needs to be done.  
The link step is up to date, no work needs to be done.  
----- Build Succeeded: 10/31/2020 12:11:40 -----  
Build Started: 10/31/2020 12:29:10 Project: Design03, Configuration: ARM GCC  
The code generation step is up to date.  
The compile step is up to date, no work needs to be done.  
The link step is up to date, no work needs to be done.  
The compile step is up to date, no work needs to be done.  
The link step is up to date, no work needs to be done.  
----- Build Succeeded: 10/31/2020 12:29:13 -----
```

Orange LED ON : BLE advertising
Orange LED toggles : BLE connected
Red LED blinks : BLE disconnected

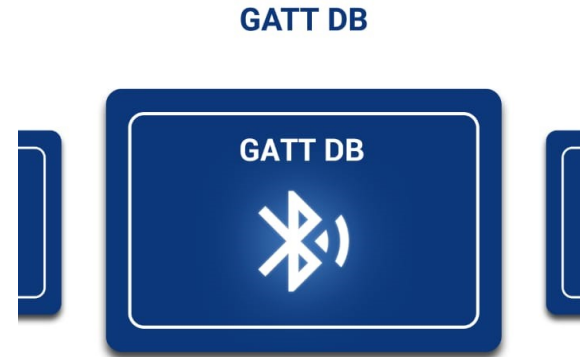
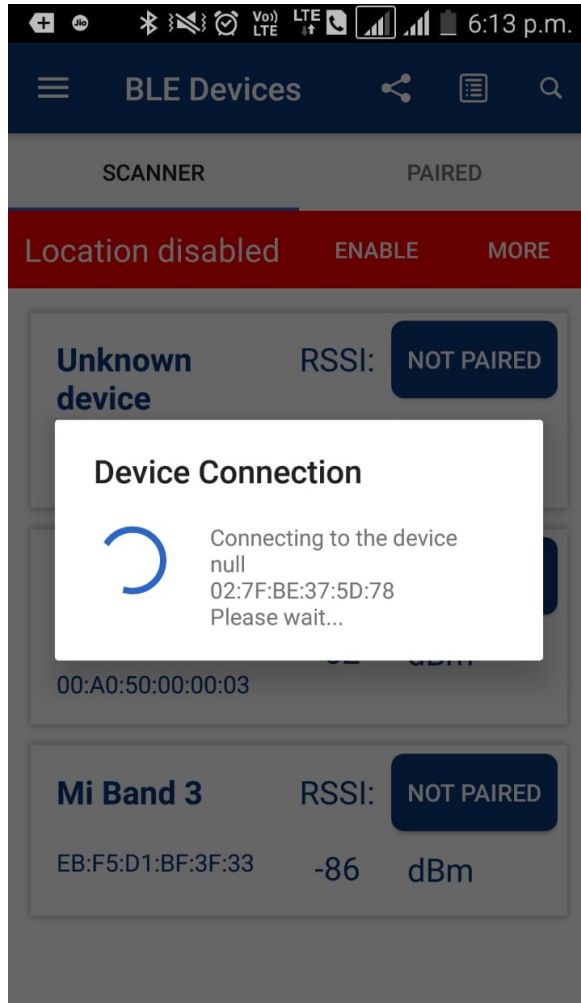
SW2 SW2.1 Pin_Advertise GlobalSignal_1 Global Signal PICU[0] isr_gpio

Page 1

0 Errors 1 Warnings 0 Notes

12:29 31-10-2020

Connection with CySmart App



Work done Till Date

- Successfully implemented and paired the device with Cysmart App for data communication using Bluetooth
- Encountered Functional Errors-Addressed
- Attempted to Integrate TFT LCD with PSoC6 Facing issues with supply voltage.

Work to be done

- Functional verification to be done.
- Battery management and communication using SPI Protocol.