Summer Training on Programmable SOC (PSoC)Embedded Systems 2010

(Hardware/Software used during the training are from Cypress Semiconductors, USA)

Scope Hands on experiments and guided projects on using Programmable System on Chip Embedded Systems.

Audience

Undergraduate CSE, ECE, IT EE, EEE, Instrumentation and Mechanical Engineering Students completing their sophomore and junior years of studies

Schedule

Batch 1: June 2nd - June 28th, 2010 (Four Weeks)
Batch 2: June 14th – July 9th, 2010 (Four Weeks)
*****According to the completion of BPUT Examination
Number of seats: 100 per batch (Maximum). Each batch will have 25 teams

Resources

SoC Kits	Part #	Qty.	Software
PSoC3 FTK	CY8CKIT-003	60	PSoC Creator 1.0
PSoC1 Eval1	CY3210-PSoCEval1	60	PSoC Designer 5.0
PRoC	CY3653	10	PSoC Designer 5.0
PSoC1 FTK	CY3270	5	PSoC Designer 5.0
PSoC Eval USB	CY3214	2	PSoC Designer 5.0
PSoC3 Development Kit	CY8CKIT-001	4	PSoC Creator 1.0

Course Description

Programmable System on Chip architecture, design tools for system developments using PSoC1 and PSoC3, programming of input/output analog/digital components on chip, basic interfaces with sensors and actuators, experiment with wireless sensors, controller design, team based projects,

Tentative outline of Experiments

Sl. No.	Experiment Title	Experiment Summary	Concept	Kit/Tool Used	Additional Resources Required	Reference
1	LED Control	LED Blink with Software Timer, Push Button LED	CPU & General Purpose I/O	PSoC1	-	DaveLab1
2	LCD Display	Display Data on LCD, Scrolling LCD, Bar Graph Display	CPU & Digital Output	PSoC1	-	AN2116
3	ADC, Analog Multiplexer → LCD	Acquire multiple (Analog) Inputs, display on LCD	Analog Input	PSoC1	-	Aaron Ref.

Sl. No.	Experiment Title	Experiment Summary	Concept	Kit/Tool Used	Additional Resources Required	Reference
4	ADC→UART (Tx)	Acquiring Inputs and transmitting to Computer	Analog Input	PSoC1	RS-232 Cables	Rajesh Ref.
5	UART (Rx)→DAC	Produce Analog Voltages based on Computer Input	Analog Output	PSoC1	RS-232 Cables	
6	Pulse Width Modulation & Global Outputs	1. Operation of PWM UM. 2. Clock Synchronization 3. Generating Complex Waveform 4. Using CPU to Control Pulse Width	CPU & Digital Output	PSoC1	Oscilloscope	Dave Lab3
7	Programmable Sine Wave Generator		Analog Output	PSoC1	Oscilloscope	Dave Lab 7D
8	PWM Motor Control		Analog Output	PSoC1	Motor, H-Bridge	
9	Thermistor Temperature Sensing	PSoC3 FTK Example	Analog Input Processing	PSoC3 FTK		Dave Lab10
10	Proximity Sensor & Capacitive Sensing	PSoC3 FTK Example	Analog Input Processing	PSoC3 FTK		

Mini-Project (guided implementation)

1. Analog Accelerometer Interfacing & Threshold Detection – Day 1
2. Wireless Transmission – Day 2
3. PWM Motor Control – Day 3

Training Calendar

Batch 1	Color Code
Batch 2	Color Code

June 2010

	Day	Day	Day	Day	Day	Day
	1	2	3	4	5	6
		Expt. 1	Expt. 2	Expt. 3	Expt. 4	
7	8	9	10	11	12	13
Expt. 5	Expt. 6	Expt. 7	Expt. 8	Expt. 9	Expt. 10	
14	15	16	17	18	19	20
MiniProject-1	MiniProject-2	MiniProject-3	Project	Project	Project	
Expt. 1	Expt. 2	Expt. 3	Expt. 4	Expt. 5	Expt. 6	
21	22	23	24	25	26	27
Project	Project	Project	Project	Project	Demonstration I	
Expt. 7	Expt. 8	Expt. 9	Expt. 10	MiniProject-1	MiniProject-2	
28	29	30				
Demonstration II						
MiniProject-3	Project	Project				

July 2010

			Day	Day	Day	Day
			1	2	3	4
			Project	Project	Project	
5	6	7	8	9	10	11
Project	Project	Project	Demonstration I	Demonstration II		
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Some Sample Projects (More choices available)

Team based projects will be undertaken by trainees in competitive environment. These projects will be completed in one week duration which includes various phases like design, development, and testing. Students will present their project through oral and demonstration. There will be prizes for several categories. Some of the sample projects are outlined as follows.

1. Gesture Controlled Toy Car using PSoC3 and Artaflex Radio – CY8CKIT-003 & Artaflex Modules
2. Joystick Controlled Toy Car using PSoC1 and Artaflex Radio – CY3210 & Artaflex Modules
3. RFID Attendance Register System
4. Comprehensive Online Weather Monitoring Station
   - Rainfall, Humidity, Temperature, Wind
5. Several open ended projects are to be proposed by students.

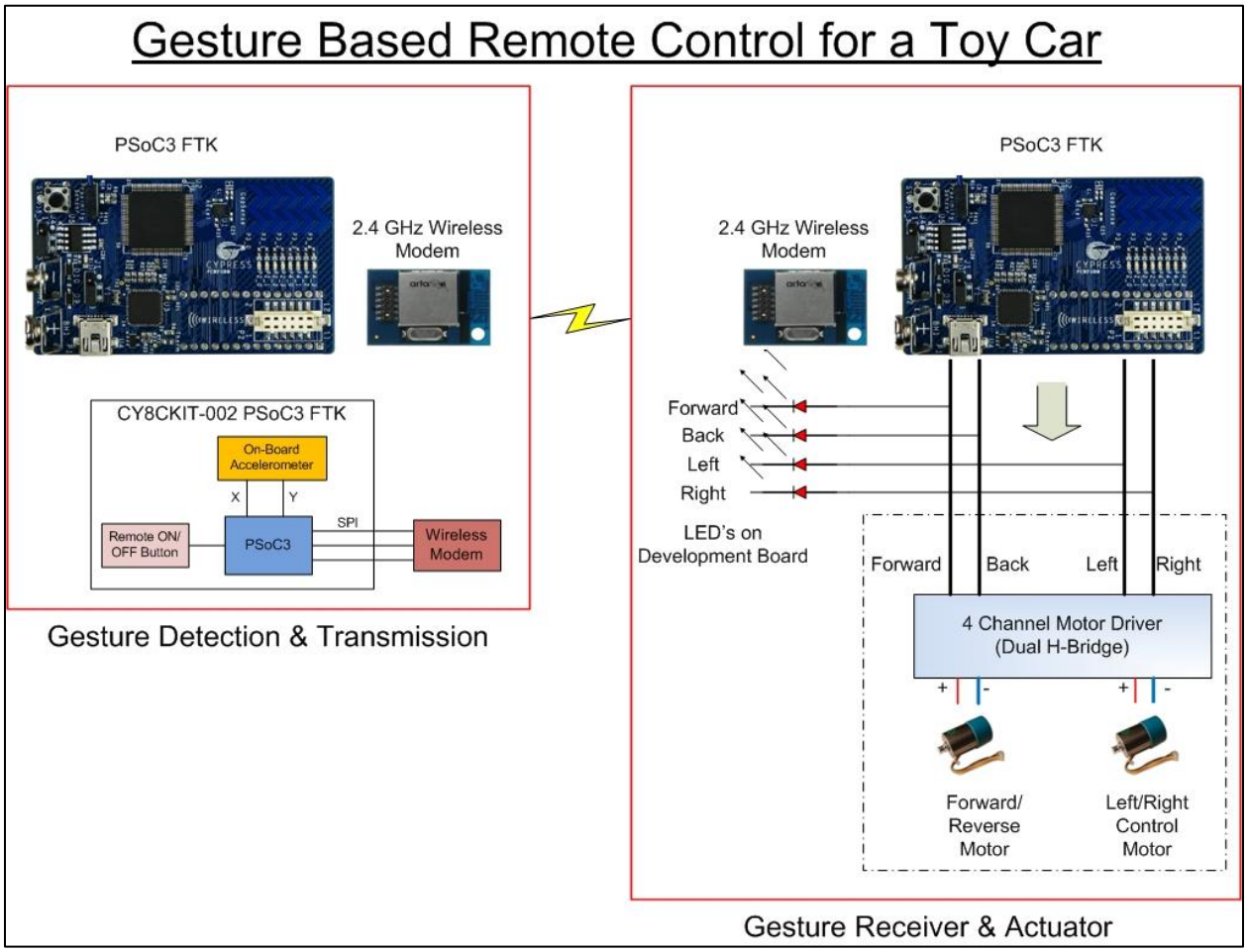

Figure 1: Gesture based Remote Control for a Toy Car

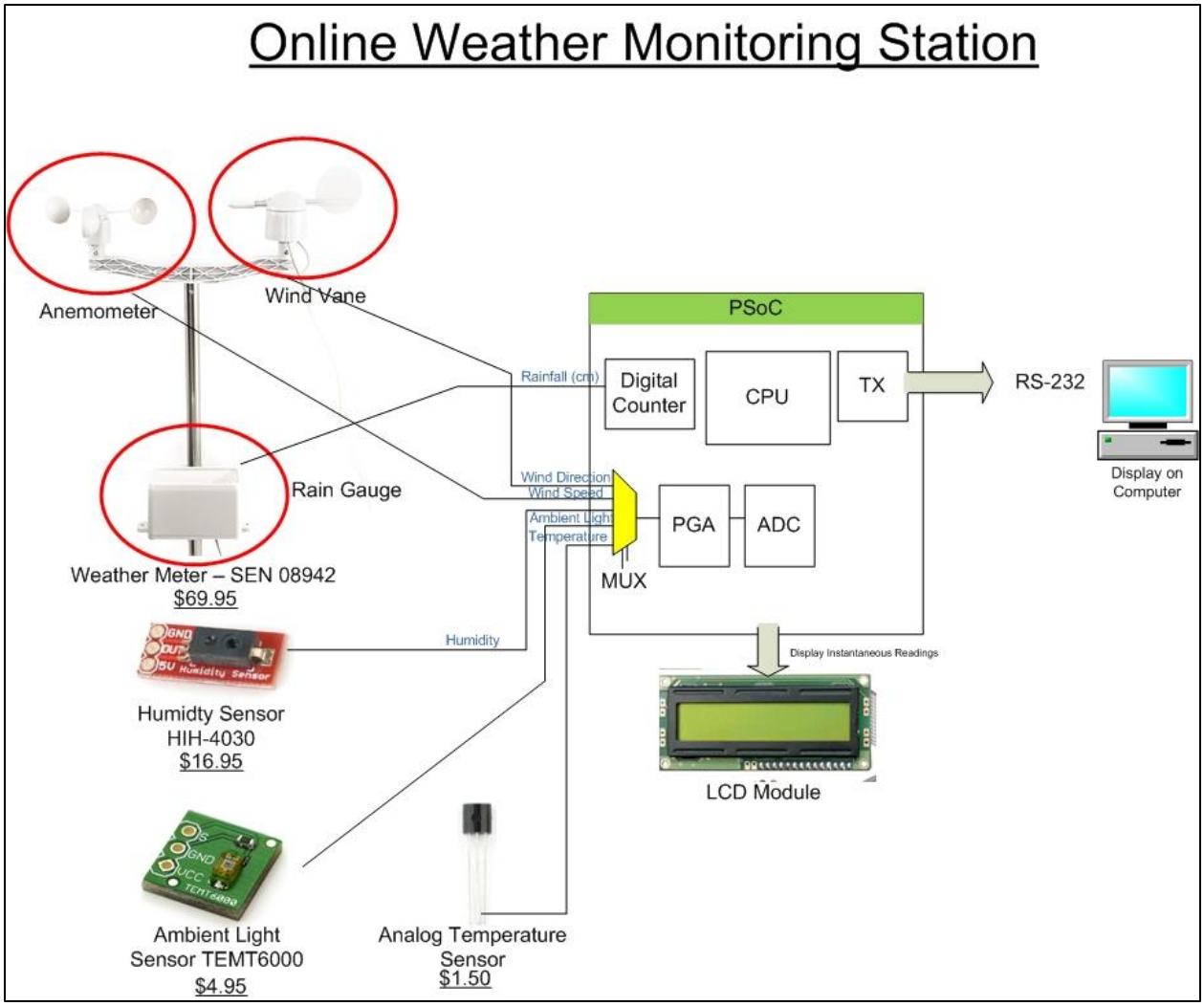

Figure 2: Online Weather Monitoring System

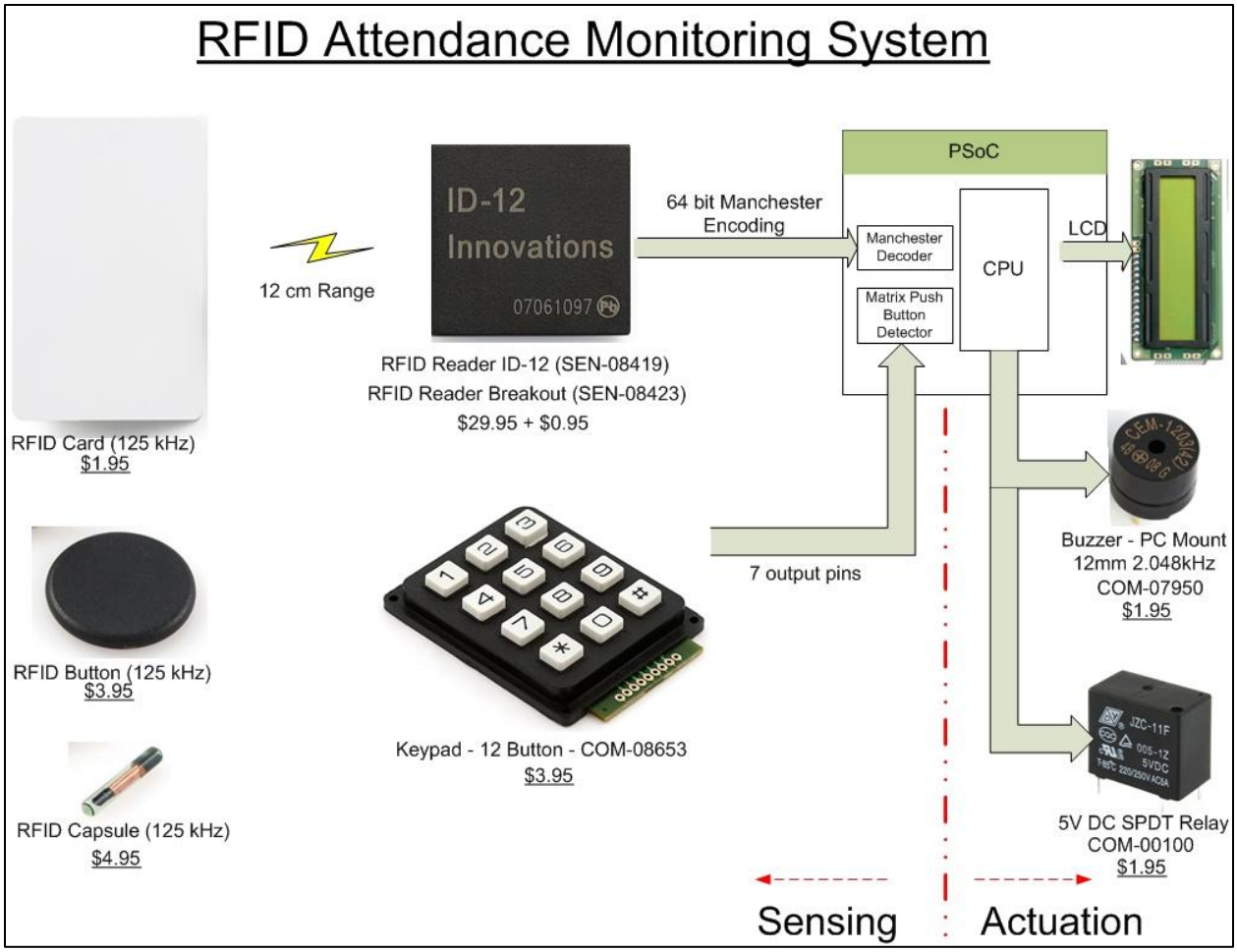

Figure 3: RFID Attendance Monitoring System