

# LOW POWER DATA TRANSMISSION USING INDUCTIVE COUPLING

PROJECT GUIDE: Ms S.REETHI

## STUDENTS

PRADEEP RAJ.K.C      21907106068

PRADHEEP.J.V      21907106069

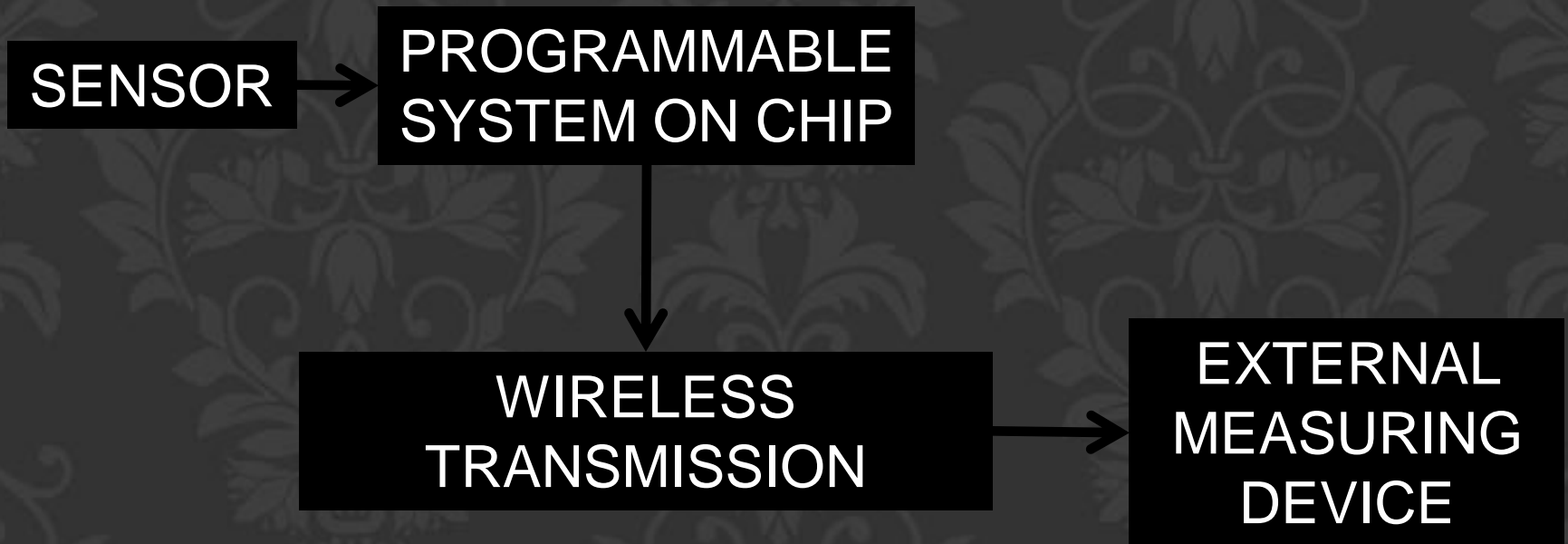
PRASANTH.K      21907106071

DEPT. OF ECE

# OBJECTIVE

- To use wireless induction transmission technique for transmitting the measured temperature by a sensor using programmable system on chip.

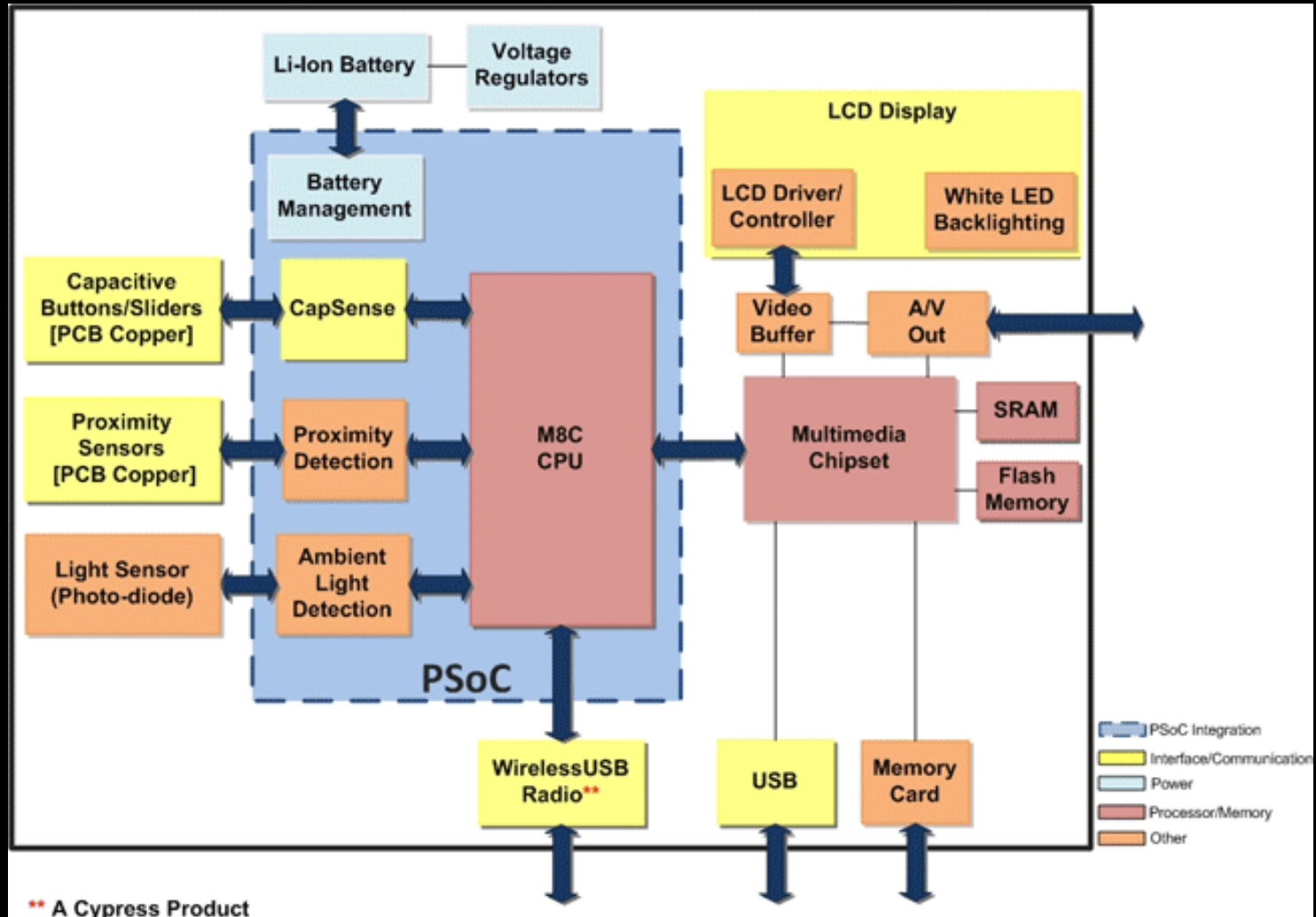
# BLOCK DIAGRAM



## FEATURES OF PSoC

- PSoC has three separate memory spaces: paged SRAM for data, [Flash memory](#) for instructions and fixed data, and I/O Registers for controlling and accessing the configurable logic blocks and functions
- PSoC resembles an [ASIC](#): blocks can be assigned a wide range of functions and interconnected on-chip.
- PSoC most closely resembles a [microcontroller](#) in usage, where code is executed to interact with the user-specified peripheral functions (called "User Modules"), GUI.

# PSOC-BLOCK DIAGRAM



\*\* A Cypress Product

# Psoc3 PIN DIAGRAM

Start Page TopDesign.cysch main.c Design04.cydwr

**CY8C3866AXI-040  
100-TQFP**

Pin diagram showing connections for various pins:

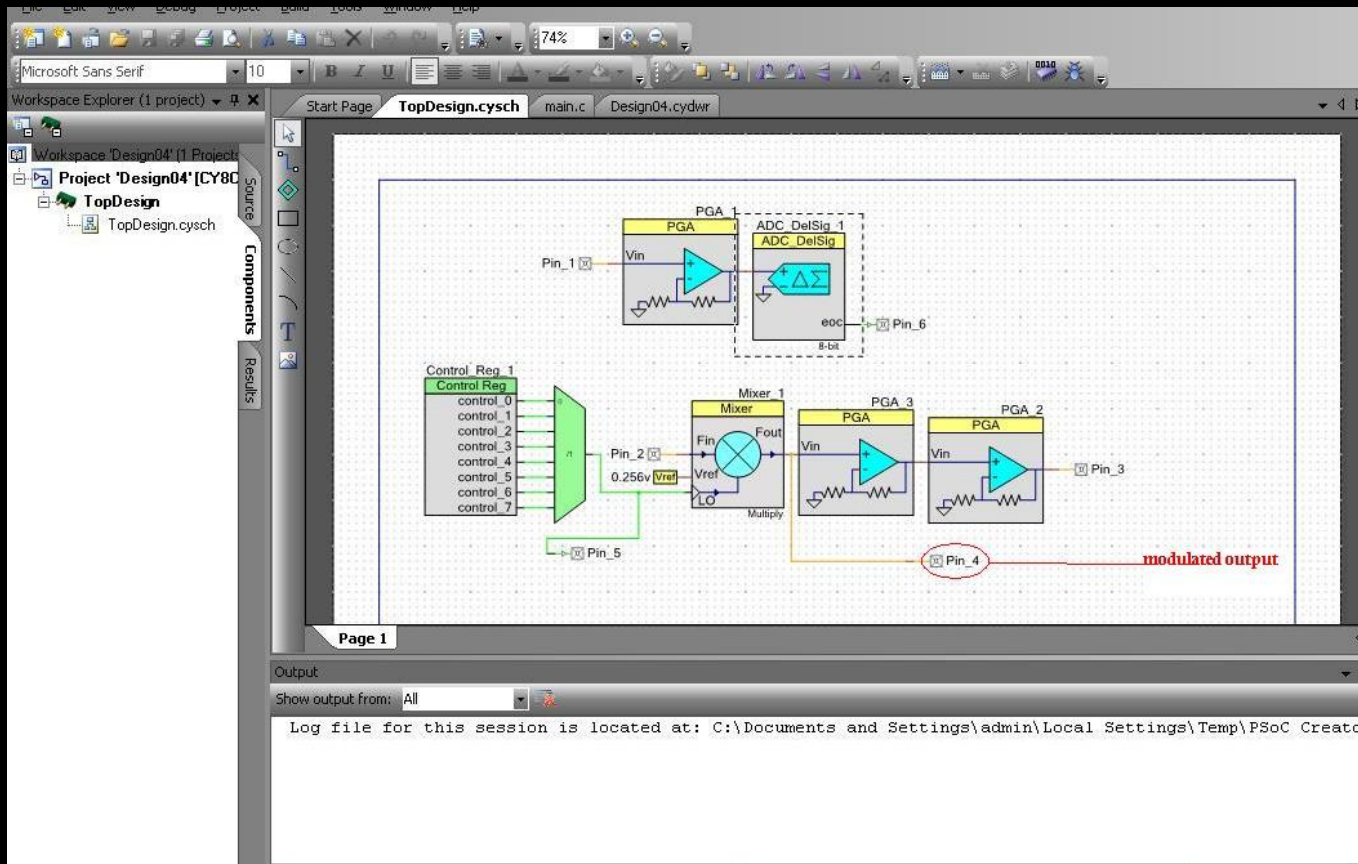
- 1 P0[0]
- 2 P0[1]
- 3 P0[2]
- 4 P1[0] (IO: SCL)
- 5 P1[1] (IO: SDA)
- 6 P0[3]
- 7 P0[4]
- 8 P0[5]
- 9 P0[6]
- 10 W0[0]
- 11 W0[1]
- 12 W0[2]
- 13 W0[3]
- 14 W0[4]
- 15 XTAL[0]
- 16 P0[7]
- 17 P0[8]
- 18 P0[9]
- 19 P0[10]
- 20 P1[2] (SWD: IO, JTAG: TRS)
- 21 P1[3] (SWD: CK, JTAG: TCK)
- 22 P1[4] (TRST)
- 23 P1[5] (SWD: SWO, JTAG: TDO)
- 24 P1[6] (JTAG: TDI)
- 25 P1[7] (JTAG: TRST)
- 26 P1[8] (IO: SDA, SWD: CK)
- 27 W0[5]
- 28 W0[6]
- 29 W0[7]
- 30 W0[8]
- 31 W0[9]
- 32 XTAL[1]
- 33 XTAL[2]
- 34 P0[11]
- 35 P0[12]
- 36 P0[13] (IO: SDA, SWD: TRST)
- 37 P0[14]
- 38 P0[15]
- 39 P0[16]
- 40 P0[17]
- 41 P0[18]
- 42 W0[10]
- 43 W0[11]
- 44 W0[12]
- 45 W0[13]
- 46 W0[14]
- 47 W0[15]
- 48 W0[16]
- 49 W0[17]
- 50 W0[18]
- 51 P0[19]
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- 94 P0[62]
- 95 P0[63]
- 96 P0[64]
- 97 P0[65]
- 98 P0[66]
- 99 P0[67]
- 100 P0[68]

Output

Show output from: All

Pins
  Clocks
  Interrupts
  DMA
  System
  Directives
  Flash Security

# TRANSMITTER CIRCUIT





# TRANSMITTER

The image shows a circuit diagram of a transmitter system and a configuration window for a mixer component.

**Circuit Diagram:**

- Control Reg 1:** A register with 8 control bits (control\_0 to control\_7) connected to a multiplexer.
- PGA 1:** A Programmable Gain Amplifier with input  $V_{in}$  (Pin\_1) and feedback resistors.
- ADC DelSig 1:** An ADC with input from PGA 1 and output  $eoc$  (8-bit, Pin\_6).
- Mixer 1:** A mixer block with input  $F_{in}$  (Pin\_2), reference voltage  $V_{ref}$  (0.256v, Pin\_5), and LO input. The output is  $F_{out}$ .
- PGA 3:** A second Programmable Gain Amplifier with input from the mixer output and feedback resistors.

**Configure 'Mixer' Dialog:**

Name: Mixer\_1

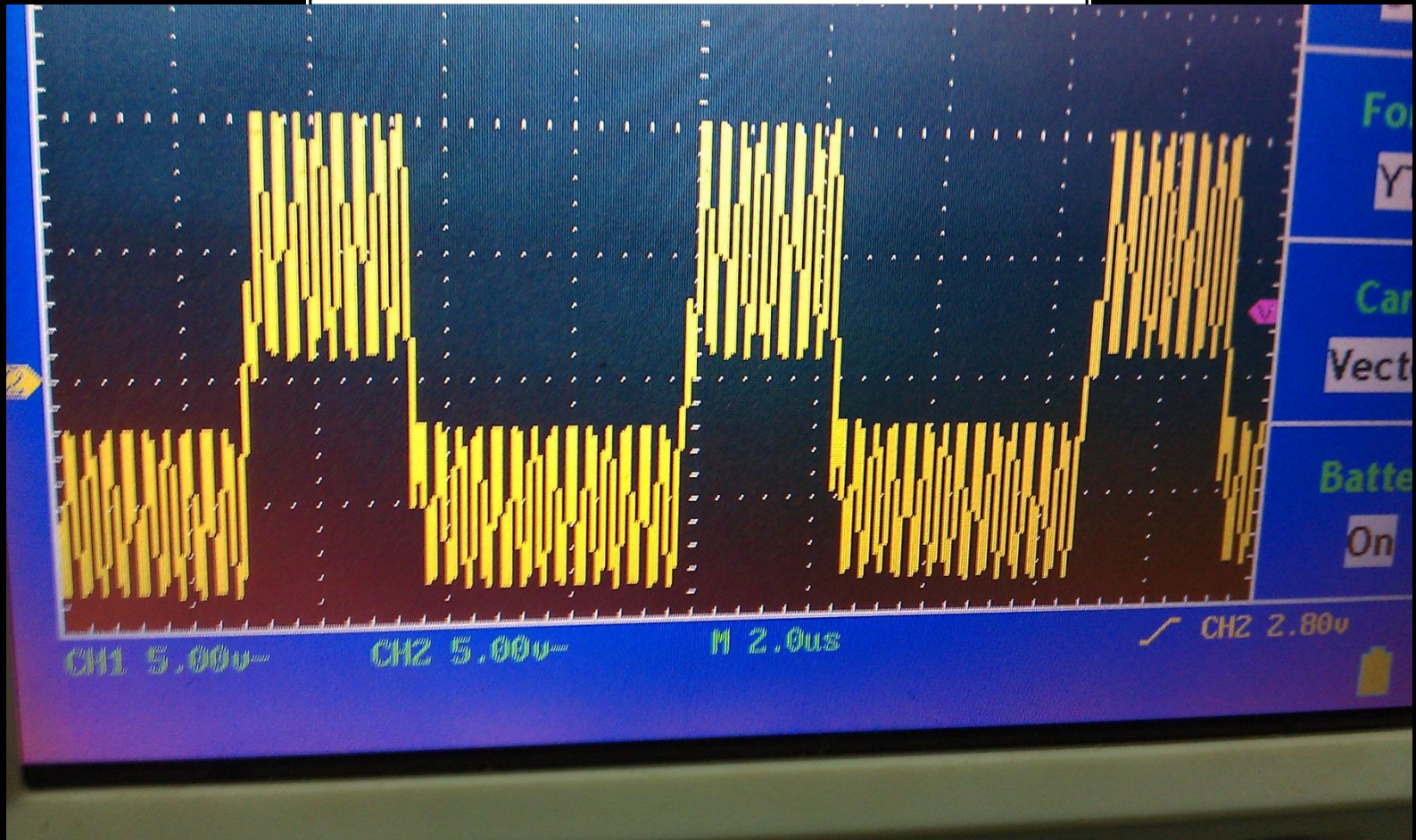
Parameter	Type	Value
LO_Freq	LO_FreqType	LO Freq 100 kHz or greater
Minimum_Vdda	MinimumVddaType	2.7 V or greater
Mixer_Type	MixerType	Multiply (Up) Mixer
Power	PowerType	Medium Power

Parameter Information:  
**Mixer\_Type:** Select Mixer type: Multiply (up mixing) or Sampling (down mixing)  
**Value:** Multiply (Up) Mixer

Buttons: Data Sheet, OK, Apply, Cancel



# TRANSMITTER OUTPUT



# RECEIVER CIRCUIT

The screenshot displays the PSoC Creator software interface. The main workspace shows a circuit diagram with the following components and connections:

- Control Reg 1:** A control register with bits control\_0 through control\_7, connected to a multiplexer.
- PGA 1:** A Programmable Gain Amplifier with input Pin\_1 and output connected to the ADC.
- ADC DelSig 1:** An 8-bit digital-to-analog converter with output eoc connected to Pin\_6.
- Mixer 1:** A mixer block with inputs Fin, Vref, and LO, and output Fout. It is connected to Pin\_2 and Pin\_5.
- PGA 3:** A Programmable Gain Amplifier with input W/in and output connected to Pin\_5.

The **Configure 'Mixer'** dialog box is open, showing the following configuration:

Parameter	Type	Value
LO_Freq	LO_FreqType	LO Freq 100 kHz or greater
Minimum_Vdda	MinimumVddaType	2.7 V or greater
Mixer_Type	MixerType	Sample (Down) Mixer
Power	PowerType	Medium Power

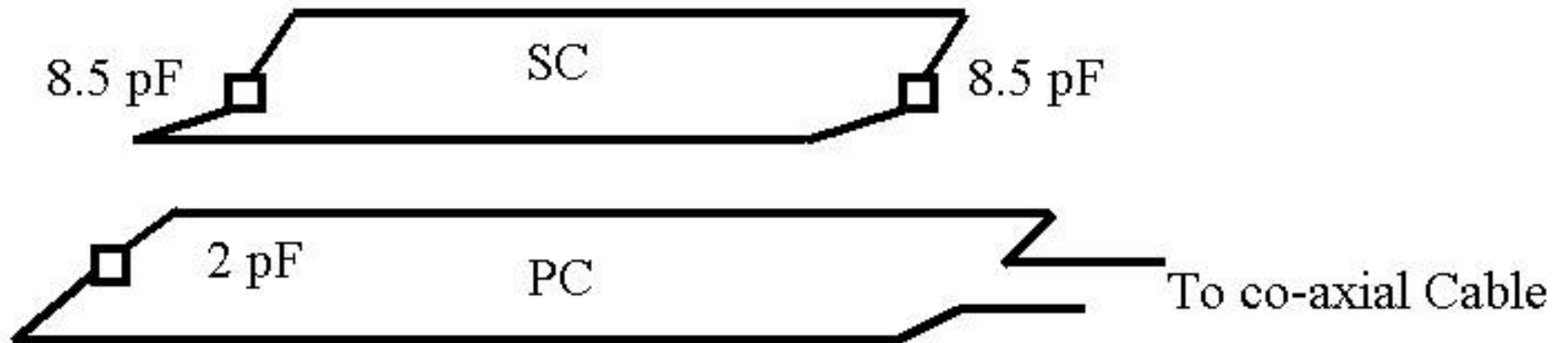
Parameter Information:  
**Mixer\_Type:** Select Mixer type: Multiply (up mixing) or Sampling (down mixing)  
**Value:** Sample (Down) Mixer

Buttons: Data Sheet, OK, Apply, Cancel

Output window text:  
Log file for this session is located at: C:\Documents and Settings\admin\Local Settings\Temp\PSoC Creator

System tray: {X=641,Y=268} 0 Errors - 1 Warnings - 0 Notes 10:36 PM

# INDUCTION CIRCUIT DIAGRAM



## ADVANTAGES

- LM35 draws only 60 micro amps from its supply.
- Possesses a low self-heating capability.
- Psoc operates at a low voltage of 1-5 volt.

## DISADVANTAGES

- Speed is less.
- Not highly efficient.

# APPLICATIONS

- USED FOR PRESSURE SENSING
- USED FOR TEMPERATURE MONITORING



# TASKS COMPLETED

## DECEMBER:

Literature survey

Identifying and Procuring the components.

## JANUARY:

Sensor prototype designing.

Learning about PsoC.

## FEBUARY:

Amplifier circuit design.

Transmitter and receiver circuit design and fabrication.



# TASK TO BE DONE

- Induction circuit for wireless transmission.
- Testing and implementation.
- Project report

# REFERENCE

Shinya Itohand Shoji Kawahito “*A Low-power Data Transmission Technique using Inductive Coupling and Its Application to Biomedical Sensor Devices*”. Research Institute of Electronics Shizuoka University, Japan

Research Institute of Electronics Shizuoka University, Japan  
“*Data Transmission Using Inductive Method In Mobile Applications*” Department of Telecommunications

MILAN VAJDÍK, IVO HERMAN, DAN KOMOSNÝ  
“*Short-range Data Transmission Using Inductive Method*”  
Department of Telecommunications

[www.cypress.com](http://www.cypress.com)

[www.utko.feec.vutbr.cz](http://www.utko.feec.vutbr.cz)

A decorative floral pattern in a dark grey color, featuring repeating motifs of leaves and scrolls, set against a dark grey background.

**THANK YOU**