

TECHNOLOGY LEARNING CENTER

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Microcontroller Based Embedded Systems

Session (A)-Theory Concepts:

1. Introduction to Embedded system
2. 8051 microcontroller architecture
 - Microprocessors and Microcontrollers
 - Overview of 8051 family
3. Basic Assembly Language
 - Inside the 8051 8051
 - basic assembly instructions
 - RAM, ROM space in 8051
 - PSW, Register banks
4. I/O programing & 8051 pin diagram
5. Basic circuit development of 8051
 - 5V DC power supply design
 - Reset circuit designing
 - Crystal circuit designing
6. Basic 8051 embedded c language
7. Timers programing
 - Programing 8051 timers
 - Basic counter programing
8. Interrupt programing
9. Serial port programing
10. Introduction to keil, protues and ucflash programming



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Session (B)-Interfaces and Programing with 8051:

1. LED interface and programing with 8051

Introduction to LED

Positive logic implementation and Negative logic
implementation(single LED) with C programing

LED array connections (multiple LED's)

Dancing LED's with C programing

2. Push button interface and programing with 8051

Introduction to switches (Push buttons)

Positive logic implementation and negative logic implementation

3. 16x2 LCD interfacing with 8051

Introduction to 16x2 LCD

16x2 LCD hardware connections

Displaying own text on 16x2 LCD with C programing

LCD interfacing with push buttons in C programing

4. 4x4 keypad interface and programing with 8051

4x4 keypad and 16x2 LCD interfacing to 8051 with C programing

5. ADC interfacing

Introduction to ADC

ADC0804 basic circuit interfacing and C programing

Displaying temperature on LCD with ADC0804(hardware and software)

Basics of ADC0808



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6. Motors interfacing

6.1) DC motor

Introduction

ON/OFF control switching with C program

Rotation of motor in clock and anti-clockwise direction with C program

L293D circuit implementation

6.2) AC motor

Introduction

ON/OFF control switching with C program

AC motor driver implementation

6.3) Stepper motor

Introduction

Speed regulation C program

Rotation of stepper motor in clock and anti-clockwise direction with C program

ULN2003(or)ULN2008 circuit implementation

6.4) Servo motor

Basic concepts of servo motor

7. Relay interfacing

Introduction

Basic circuit implementation/pin configuration

ON/OFF controlling AC and DC devices with C programming

8. DTMF(Dual Tone Multiple Frequency)

DTMF MT8870/CM8870/HT9170 introduction

Basic circuit design(hardware)

DTMF implementation with 8051 C programming



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9. I2C protocol

Introduction

DS1307 RTC programing in C

10. Wireless communication with RF (Radio Frequency)

Introduction

433MHz RF wireless communication

Basic circuit diagram implementation(HT12E, HT12D)

Wireless device control through RF with C programin

Session (C)-Interfacing Sensors with 8051

1. IR sensor

Introduction

Basic circuit design

8051 C programing for IR sensor with interrupts

Ultrasonic sensor, proximity sensor basics

2. Smoke sensor

Introduction

Basic circuit design

8051 C programing for smoke sensor with interrupt

3. Fire sensor

Introduction

Basic circuit design

8051 C programing for Fire sensor with interrupts

4. Magnetic sensor

Introduction

Basic circuit design

8051 C programing for magnetic sensor with interrupts



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5. Vibration sensor

Introduction

Basic circuit design

8051 C programing for vibration sensor with interrupts

6. Color sensor

Introduction

Basic circuit implementation

Color identification with 8051 C programing

7. MEMS(Micro Electro Mechanical Systems)

Introduction

Interfacing and programing with 8051

8.Metal Detector sensor

Introduction

Basic circuit design

8051 C programing for metal detecting sensor

9. LDR(Light Dependency Resistance)

Introduction

Basic circuit design

8051 C programing for LDR

10. Fluid level sensor

Introduction

Basic circuit design

8051 C programing for fluid level sensor



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Session (D)-Module Interfacing:

1. GSM/GPRS module

Introduction

AT commands

SIM300 message sending, receiving with C programing

Device control through mobile phone with C program

2. GPS (Global Positioning System) module

Introduction

NMEA format

SIM18 – latitude and longitude grasping with C program

Position identification with C program

3. RFID module interfacing

Introduction

Netgen (or) Digikey – card access program with 8051

Card accessing application with 8051 C programing

4. Zigbee module interfacing

Introduction

Tarang (or) X-Bee modules wireless communication with

8051 C program

Wireless communication between zigbee pairs

Device control through x-bee wireless communication with 8051 C program

5. Thermal printers

Introduction

Interfacing and C programing with 8051



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