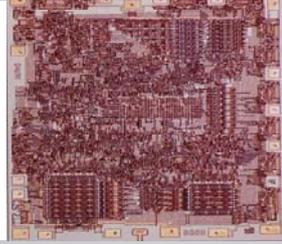
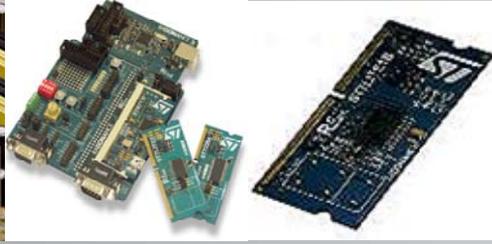


# Microprocessor Systems Lab



UET Lahore



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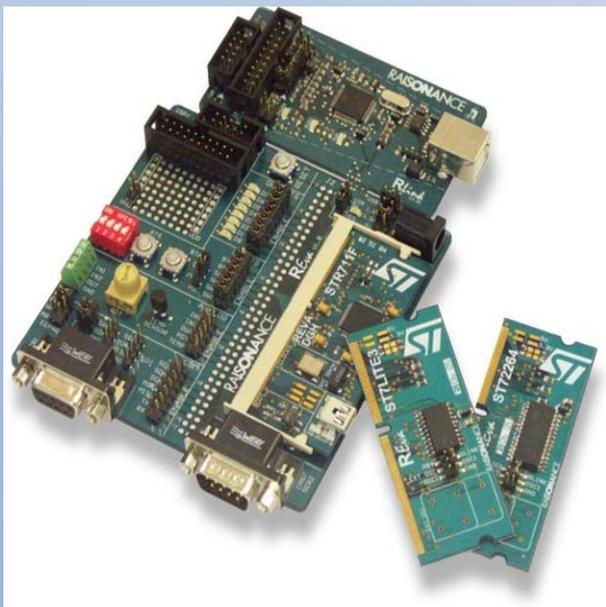




*learning by doing*

# About

Imagine a world without Microprocessors. No desktops no mobile phones. Its hard rather impossible to imagine like this. Microprocessors Systems have their importance, there use varying from desktop PCs to mobile terminals ,from home automation to industrial automation. This lab focuses on concepts and techniques for using microprocessor-based systems to gather data and control peripheral devices. Relationship between microprocessor hardware and software, including input/output operations. Experience with a microprocessor system is provided. Functional requirements are realized through software and I/O hardware design.



# Lab Outcome

Upon completion of this Lab, students will be able :

- Develop system software in C or assembly language.
- Control/use peripherals, devices, and buses.
- Program and debug microprocessor devices.
- Characterize the timing/performance behavior of interfaces.

# Objectives

Microprocessors Systems Lab provides students with hands-on experience with building, programming, testing, and debugging processors and Microcontrollers. This lab incorporates Software and hardware experiments with a Microprocessors system. Assembly language programming, simple input/output interfacing, serial parallel interfacing ,I2C and interrupt processing in Microprocessors systems.

The purpose of this Lab is to provide practical experience to the students taking the course EE351 (Microprocessor Systems). Laboratory experiments are to teach assembly language programming for 8086/8088 Architecture, 8051 Microcontrollers ,ST7 Microcontrollers. Labs also provide introduction to ARM architecture. The experiments are designed to provide a substantial and motivational lab experience. Each experiment teaches an important programming/interfacing technique.

Join Tech ARM Single board Computer



# Lab Plan

Lab is divided into four parts

## Intel 8086/8088

In this part students learn Assembly language for Intel 8086/8088 .They write assembly language programs.Assemble, Link and Run assembly source code using Masm6.11.Use CV debugger.Learn instruction set Architecture for 8086/8088.Interface this microprocessor using serial and parallel port.

## Atmel 8051

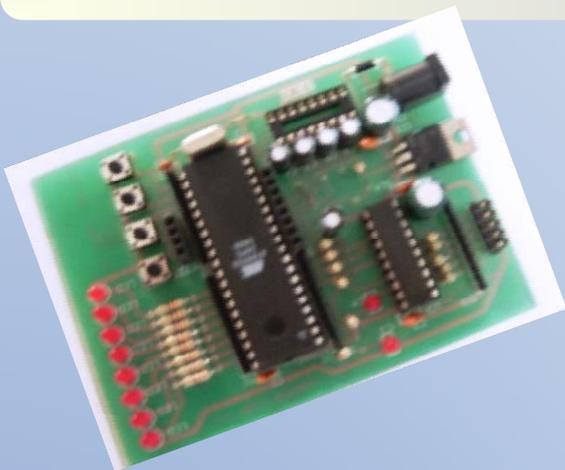
Students learn Assembly language for 8051 Architecture.C programs are written for Atmel 8051 and debugged using Keil.Use Peripherals on 8051 is taught.

## ST7Lite Microcontrollers

In this part of lab focus is made on use of peripherals i.e. ADC,SPI,SCI and I2C.

## ARM

An introduction to ARM architecture is given. Experiments are done in using JTK2440-II Single Board Computer. Students learn about ARM 920T Core



## Facilities

The microprocessor lab equipment consists of Thirty Five digital design stations that include a general purpose computer with a variety of microprocessor design software. Hardware includes 8051 microcontroller training boards,JTK2440-II Single board Computer and REva starter kits ST7Lite Microcontrollers.

## People

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## Lab Staff

Nadeem Ahmad  
Salamat Wazir

# List of Experiments

## 8086/88 Experiments :Lab Sessions 6

### Introduction to Assembly language & MASM

Write simple assembly language programs. Assemble, Link and Run assembly source code using Masm6.11. Edit and organize assembly language projects and files using PWB. Debug executable files using CV debugger to remove logical errors.

### INPUT and Output

Take input from key board using functions calls 01,02 and 08 of INT 21H. Show output on the screen using function calls 09 of INT 21H. Use the variable and constant declaration statements in assembly language.

### Segmentation & Addressing modes

Describe and use different addressing modes in the 8086 processor. Describe and use Physical Segments and Logical Segments in your programs.

### Index and Data Manipulation

Use Basic arithmetic instructions in assembly language. Use the ASCII table for manipulating input and output values. Declare and Manipulate arrays using assembly language. Learn about flags of Microprocessor

### Control Structure ,Arithmetic& Logic instructions

Jumps ,Loops, Comparison , Translation of high language control structure to Assembly language. Use logic instructions in assembly language . Use arithmetic instructions in assembly language. Use Shift and Rotate instructions in assembly language

### Stack & Procedures ,Multi-dimensional Arrays

Use PUSH and POP instructions in assembly language. Use CALL and RET instructions in assembly language .Use Arrays in assembly language .Use Multidimensional Arrays in assembly language .Use sorting and searching in Assembly language. Row Major Ordering. Column Major Ordering

### String Instruction, Memory Management, Macros

Direction Flags. Storing, Loading and Scanning Strings. Comparing Strings ,Use and define Macros Using Macro Invoking other macro. Using Macros and Procedures, Use and define Macros Using Macro Invoking other macro. Using Macros and Procedures

# List of Experiments

## 8051 Experiments :Lab Sessions 3

### 8051 basics

8051 basics .Introduction to 8051 Architecture and assembly. Use of Keil .Using Timers and peripheral ports of 8051.

### Serial Port Interfacing

Interfacing PC com port (serial) to serial port of 8051 microcontroller

### Parallel Port Interfacing

Interfacing PC parallel port to 8051 microcontroller

## ST7Lite Experiments :Lab Sessions 3

### ST7Lite basics

ST7Lite basics .Introduction to ST7 Architecture . Use of ,RIDE, Cosmic tools .introduction to ST7Lite starter kit.

### A/D Converter.SPI

Use of A/D Converter. Use of SPI

### I2C

Use of I2C

## ARm9 Experiments :Lab Sessions 2

### ST7Lite basics

JTK2440-II basics .Introduction to ARM 920TCore.