Repo : https://github.com/zayn-stu/MicroprocessorsFinal

Group members : Alhomam Al Zin - 22040102004

Final Project Report

Project Title

Polling-Based Control Panel

Project Description

This project implements a simple microcontroller-based control panel using the DMC8 microprocessor in the DEEDS Micro Computer Emulator. The system demonstrates the polling technique to monitor user inputs and control system behavior accordingly.

The control panel allows a system to be enabled or disabled using two input signals. The current system state is reflected using an output indicator (LED). The design is intentionally simple in order to clearly demonstrate how polling works in a microprocessor-based system without using interrupts or event-driven mechanisms.

System Architecture and Operation

Inputs (Input Port IA)

IA0 – Enable button: Turns the system ON

IA1 – Disable button: Turns the system OFF (has priority)

Outputs (Output Port OA)

OA0 – System ON LED: Indicates whether the system is enabled

Operation Overview

The DMC8 continuously polls the input port IA inside an infinite loop. During each iteration, the processor checks whether the Disable button (IA1) is pressed. If not, it checks whether the Enable button (IA0) is pressed. If no buttons are pressed, the system maintains its previous state.

A software state variable stored in RAM is used to latch the system state, ensuring that the output does not change unless a valid input condition occurs.

Polling Technique

Polling is implemented by repeatedly reading the input port IA using the IN instruction and testing specific bits corresponding to each button. The processor actively checks input conditions instead of waiting for external events or interrupts.

This approach is simple and predictable, but it keeps the CPU busy at all times, which is a defining characteristic of polling-based systems. The project demonstrates this behavior clearly and allows easy comparison with interrupt-based approaches discussed in the course.