MICROPROCESSORS AND MICROCONTROLLERS – FINAL PROJECT REPORT

SMART PARKING LOT SYSTEM USING DMC8 MICROPROCESSOR

GitHub Repository:
https://github.com/3mrah7/dmc8-smart-parking-system

Project Description

This project presents a smart parking lot management system developed using the DMC8 microprocessor and the DEEDS simulator. The system targets real-life applications such as shopping malls (AVMs) and residential parking areas, where monitoring parking capacity is essential.

A master–slave processor architecture is employed. The master processor detects vehicle entry via a push button and maintains the total vehicle count. This information is transmitted to the slave processor, which controls output peripherals such as a 7-segment display and LED indicators to inform users about parking availability in real time.

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1. System Design

Master Unit: Reads the push button input using polling, increments the vehicle counter on each valid press, and sends the updated counter value to the slave processor.

Slave Unit: Receives the vehicle count from the master, displays the count on a 7-segment display, and controls LED indicators based on parking status.

The push button input is handled using a custom logic device called **PBSI (Push Button Sensor Interface)** to ensure stable input reading.

2. Parking Status Indication

- **Green LED:** Parking area is mostly empty (vehicle count < 5)
- **Yellow LED:** Parking area is getting crowded (5–9 vehicles)
- **Red LED (Blinking):** Parking area is completely full (10 or more vehicles)

3. Techniques Used

The polling technique is used for push button input handling. The master processor continuously monitors the input port to detect state changes accurately. Master–slave communication is implemented using input/output ports.

4. Originality of the Project

- Realistic AVM and residential parking scenario
- Master–slave processor architecture
- Multi-level LED-based parking status indication
- Blinking red LED for full parking condition

5. Conclusion

This project demonstrates a functional smart parking lot system using the DMC8 microprocessor. By applying polling, peripheral interfacing, and simple processor communication, a realistic parking management application has been successfully implemented.

Resources : DMC8 Microprocessor Reference Manual , Microprocessors and Microcontrollers Course Notes