MULTIPLE SENSOR CAN VEHICLE DASHBOARD USING LPC2129 (ARM7)

ABSTRACT

This project implements a CAN-based vehicle dashboard system using the LPC2129 ARM7 microcontroller. Multiple sensor nodes are integrated to monitor vehicle parameters such as fuel level, speed, and headlight status. Sensor data is transmitted over the Controller Area Network (CAN) to a central dashboard node. The system demonstrates real-time embedded communication, interrupt handling, PWM-based control, and ultrasonic sensing suitable for automotive applications.

OBJECTIVES

1. To implement multi-node communication using CAN protocol.
2. To measure vehicle fuel level using an ultrasonic sensor.
3. To control headlight automatically using LDR and external interrupt.
4. To simulate vehicle speed using PWM.
5. To display real-time vehicle parameters on an LCD dashboard.

SYSTEM OVERVIEW

The system consists of multiple sensor nodes connected via a CAN bus.
Each node transmits a specific vehicle parameter to the dashboard node.

Nodes:
- LDR Headlight Control Node
- Ultrasonic Fuel Level Node
- Speed PWM Node
- Dashboard Display Node

HARDWARE COMPONENTS

- LPC2129 ARM7 Microcontroller
- Ultrasonic Sensor
- LDR Sensor
- CAN Transceiver (MCP2551)
- 16x2 LCD Display
- Power Supply Unit

SOFTWARE TOOLS

- Embedded C
- Keil ÂµVision
- Flash Magic
- Proteus / EasyEDA

CAN COMMUNICATION

CAN communication is implemented using the CAN2 controller of LPC2129 at 125 kbps. Each sensor node uses a unique CAN ID to transmit data. The dashboard node receives and processes the messages to update the LCD display.

CAN IDs Used:

- ID 0x01 : Headlight Status
- ID 0x02 : Fuel Level
- ID 0x03 : Vehicle Speed

FUEL LEVEL MEASUREMENT

An ultrasonic sensor measures the distance between the sensor and fuel surface. The measured distance is transmitted over CAN and converted into fuel percentage at the dashboard node using predefined threshold ranges.

RESULTS

- Reliable CAN communication achieved.
- Accurate fuel level estimation.
- Real-time dashboard display.
- Interrupt-driven headlight control.

APPLICATIONS

- Automotive dashboards
- Vehicle diagnostics systems
- Industrial CAN-based monitoring systems

CONCLUSION

The project successfully demonstrates a reliable and scalable CAN-based vehicle dashboard using LPC2129. The modular design allows easy expansion and is suitable for real-world automotive embedded systems.

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