Politecnico di Milano - Department of Electronics, Information and Bioengineering

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HCSR04 Miosix driver

[Coding Project]

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1 Introduction

This project is about the creation of a *Miosix* driver for the ultrasonic distance sensor HCSR04 using hardware timers.

1.1 Problem statement

The sensor HCSR04 is one of most used ultrasonic distance sensor in DIY project due to its low retail price. Moreover it has features that make it a good alternative for simple projects, some of its characteristics are:

- 0,02m-4m range;
- 0.3 cm resolution;
- quiescent current <2mA;
- working current 15mA.

The aim of this project is to develop a driver for *Miosix* operating system to allow developers to interface easily with this sensor.

1.2 Summary of the work

2 Design and implementation

2.1 How the sensor HCSR04 works

The sensor has 4 pins:

- VCC: 5V Supply;
- TRIGGER: Trigger Pulse Input;
- ECHO: Echo Pulse Output;
- GND: 0V Ground.

Figure 1: HCSR04 sensor

The basic principle of work consist of these steps:

1. Drive high level signal to TRIGGER pin for at least 10us;
2. The module sends eight sound burst at 40 kHz and detect whether there is a pulse signal back;
3. The module drive the ECHO pin to high level signal for as much microseconds as the time the sound wave has traveled.

3 Experimental evaluation

3.1 Experimental setup

3.1.1 Hardware setup

3.1.2 Software setup

3.2 Tests

3.3 Results

4 Conclusions and Future Works

References

[1] John C Mathes and Dwight W Stevenson. Designing technical reports: Writing for audiences in organizations. 1976.

[2] Carolyn R Miller. A humanistic rationale for technical writing. *College English*, 40(6):610–617, 1979.