

CS684 Documentation



CS684 – 2010 Project

Project: A hand gesture following firebird bot

The objective of this document is to help someone else run the code that is delivered as part of this project.

Project Title: A hand gesture following firebird bot

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Project Objective

The goal of our project was to build a vehicle controlled using accelerometers, mounted on a glove that wirelessly transmits data to a Firebird bot using Zigbee technology, to move in any direction. The accelerometer is mounted on a glove, such that if the users want to move forward they can lean the glove forward and backward for reverse; to turn left or right they need to tilt the glove like a plane changing its direction.

Hardware Platform

1. Firebird V ATMEGA2560
2. ZigBee modules (2)
3. Accelerometer MMA 7361LC
4. External analog accelerometer interface
5. ATMEGA8 microcontroller
6. 7805 5V voltage regulator
7. TPS7A4533 3.3V voltage regulator
8. In System Programming Feature
9. Mode control switch

Software

1. AVR Studio 4
2. AVRDUDE Programmer's notepad
3. WinAVR
4. Eagle (PCB design)
5. USBASP driver

Code Description

Code Files.

Filename	Purpose	Executes on
gesture.c	Main Program	Robot
lcd.h	LCD display functions	Robot
firebird.h	Firebird movement functions	Robot
test_uart.c	To get acceleration values and transmit them	Glove
acc_ana_ext.c	To get digital values from accelerometer	Glove

Deliverables

Filename	Contains
Bot-code	Source code of programs to be burnt on Robot. Contains documentation of the code as well.
Glove-code	Source code of programs to be burnt on the glove circuit
Documents	Contains Project related doc files.

Execution Instructions

- Preparing FireBird Bot
 1. Open Gesture project in AVR studio 4.1.
 2. Configure Project properties as follows:
 - a. Device : Atmegs2560
 - b. Frequency : 11059200
 - c. Optimization : -O0
 3. Compile the source code
 4. Connect the FireBird V bot
 5. Burn the hex file generated

- Programming Glove
 1. Connect the relimate connector in such a way that there is a common GND
 2. Install the USBASP driver on the computer
 3. Install WinAVR
 4. Use AVRDUDE Programmer's notepad to program the Glove
 - a. Open the makefile and the files that need to be compiled and burnt
 - b. Go to →Build →Make Clean →Make All→ Program

- Running the bot
 1. The 1st design
 - a. Make proper connections between Accelerometer PCB and Microcontroller PCB

- b. Connect the VCC supply from 8V-18V DC
- c. Connect the 3.3 V jumper
- d. Connect the accelerometer jumper
- e. Reset the microcontroller
- f. Reset the Zigbee
- g. Play

2. The Final Design

- a. Connect the 3.3V jumper
- b. Connect the accelerometer jumper
- c. Reset the microcontroller
- d. Reset Zigbee
- e. Play

Coding Guidelines

1. We have insured that our code is readable, reusable and commented.
2. We employed Doxygen to generate the documentation for our code.
3. We have followed the file structure and other project submission guidelines