Engineering college of Aarhus

Spring 2014

GeoDude
ITAMS project report

Student 1:	Studienr: 10734	First name: Johnny	Second name: Kristensen
Student 2:	Studienr: 20093625	First name: Nicolai	Second name: Glud

March 6, 2014

Contents

Introduction 1

1.1 Introduction

This report is made in the curse ITAMS on Engineering Collage of Aarhus. It is made by Nicolai Glud and Johnny Kristensen and describes the project outlined by the group.

1.2 What is Geocaching?

Geocaching is a modern form of treasure hunt. The goal of geocaching is to find hidden "caches" which other people have hidden. Data and puzzles about the caches can be found on a website og via. various apps to phones, tablets and pc's. Normally some GPS coordinates are given and from that you have to find the "cache".
The following cite is from www.geocaching.com:
"Geocaching is a real-world, outdoor treasure hunting game using GPS-enabled devices. Participants navigate to a specific set of GPS coordinates and then attempt to find the geocache (container) hidden at that location."

1.3 Full featured system

The full featured system is meant to be a fully blown geocaching dedicated device. We imagine features like being able to plot the route you were just on, via your PC at home, to code several caches in so the system automatically can point to the nearest cache.

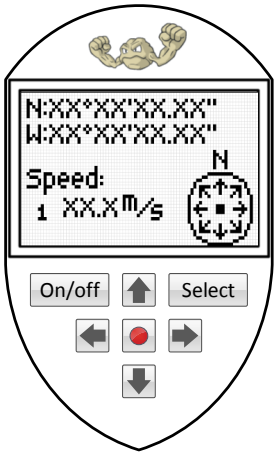

Figure 1.1. Geodude handheld device

1.4 Project description

1.5 Referenced documentation

1.6 Glossary & abbreviations

1.7 Introduction

GeoDude is a project with geocaching in mind. The project is developed in respect to the course ITAMS. Geocaching is a type of treasure hunt where you look for caches with a set of coordinates. By making a handheld

unit that can get coordinates and your heading we seek to
create a device useful for modern day treasure hunters.

1.8 Project description

Er det ikke det der står i Introduction? Skal det flyttes eller hvad?

1.9 Project boundaries

Although the

1.10 Datasheets

The following datasheets have been used for the following components:
Magnetometer: HMC6352.pdf
Screen: Nokia5110.pdf
GPS module: RGM-2000_user_manual.pdf

The datasheets can be found in appendix.

1.11 Glossary & abbreviations

Term/abbreviation	Definition

System architecture 2

The system architecture is explained in the following chapter.

2.1 System description

The system can be split up to 4 subsystem: The magnetometer, the screen, the GPS module and the CPU. Together they form a system with a screen that reports your geographical location and the way you are heading.

2.2 System boundary

2.3 System block diagram

The General system can be by the following block definition diagram:

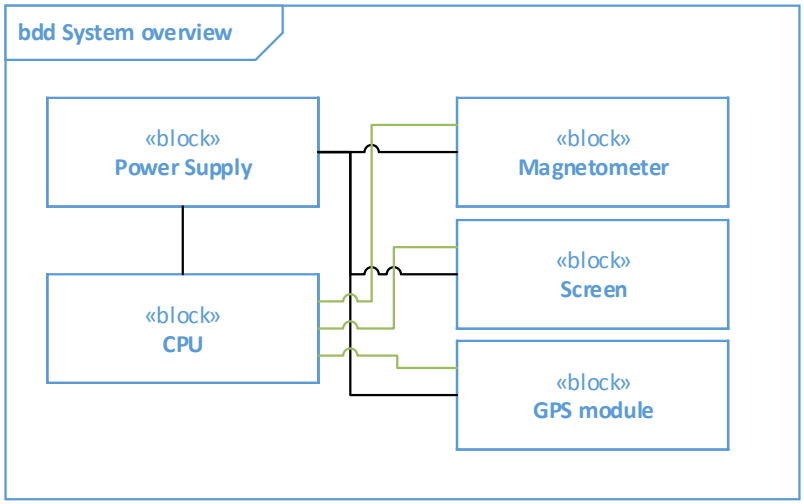

Figure 2.1. Internal Block Diagram of the system

2.4 System interfaces

Logic levels are written as 0 - 5 V.

The magnetometer:

PIN	Description	Levels
SCL	I2C Clock line	0 - 5 V
SDA	I2C Data line	0 - 5 V
VCC	Supply	5 V
GND	Ground	Ground

The screen:

PIN	Description	Levels
CLK	SPI Clock line	0 - 5 V
DIN	Data in (or MOSI)	0 - 5 V
VCC	Supply	3 V
GND	Ground	Ground
D/C	Data or Command	0 - 5 V
CS	Chip Select	0 - 5 V
RST	Reset	0 - 5 V
LED	Background light on display	3 V

The gps:

PIN	Description	Levels
TX	UART transfer data	0 - 5 V
VCC	Supply	5 V
GND	Ground	Ground

With the units boundaries define we can assign them to the CPU.

2.5 Extensions

Technical considerations 3

The following chapter contains our technical considerations and choices along with advantages and disadvantages for the possible alternative solutions.

3.1 Technical considerations and choices

One of the first technical considerations we made was to add the magnetometer to the project. We decided that while it is nice to know where you are by GPS location, it is useless without knowing which direction you are going.

The system was supposed to have some sort of input where you could write the location where you wanted to go and then the system would point you to the location. This feature would also measure your speed towards the location and a possible time of arrival. This feature was scrapped because of the inability to bring a keyboard or likewise into the field (It would be unhandy).

3.2 Possible alternative solutions

3.3 Extension

A possible extension could be the ability to extract data from your walk or run that has been recorded by the system. This could be done by connecting the system to a computer with USB or RS232.

Another possible extension could be to enter a route on your computer and then upload it to the system.

Acquired knowledge 4

The following chapter contains information about how we acquired the knowledge necessary to do the project work.

4.1 Magnetometer

Hest

4.2 GPS module

The knowledge about pin assignments for the GPS module, RGM-2000, comes from the website: `http://www.tobias-schlegel.de/?page_id=51&lang=en`.
The communication settings were found in the User Manual (RGM-2000_user_manual.pdf which can be found in appendix):

Baud rate	: 4800
Data bit	: 8
Parity	: None
Stop bit	: 1
Flow control	: None

To understand the format output from the GPS module, NMEA-0183, we consulted the wikipedia site as well as observing on Tx in RealTerm (terminal software).

4.3 Screen

henning

Test results 5

In this chapter we present the most important test results.

5.1 Unit tests

Hehe

5.2 Full system test

:D

Conclusion 6

We conclude on a successful project.

References 7

7.1 Appendix

Code:

Datasheets: