

# Software Requirements Specification

## CS101 Projects 2014

### Morse Code Decoding & Processing

#### Group CUSE

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## Introduction

This document specifies both the software as well as hardware required by our team to successfully complete the project titled “ Morse Code Decoding & Processing “. This also explains in detail morse code decoding and processing, its usage and application, and its present and future scope as a research tool for robotics. Along with this this document gives an overview of the CS101 project, its functionality and corresponding software and software requirements.

### 1.1 Definitions, Acronyms and Abbreviations

**Morse code** is a method of transmitting text information as a series of on-off tones, lights, or clicks.

Each character (letter or numeral) is represented by a unique sequence of dots and dashes. The duration of a dash is three times the duration of a dot. Each dot or dash is followed by a short silence, equal to the dot duration. The letters of a word are separated by a space equal to three dots (one dash), and the words are separated by a space equal to seven dots. The dot duration is the basic unit of time measurement in code transmission. To increase the speed of the communication, the code was designed so that the length of each character in Morse varies approximately inversely to its frequency of occurrence in English.

### 1.2 References

1.2.1 [www.eYantra.org](http://www.eYantra.org)

1.2.2 [www.newbiehack.com](http://www.newbiehack.com)

## 2 Overall Description

### *Product Perspective*

The three main components of the system are :

1. The microcontroller of the bot (ATmega2560).
2. The Morse code transmitter.
3. The microphone to receive the transmitted signal.

### *Product Functions*

This device receives the morse code from the transmitter through microphone. It processes the received data and acts accordingly.

### ***User Characteristics***

User has to transmit the commands through morse code at specified frequency and intensity, to get the required performance.

### ***Constraints***

1. To ensure desired results there should be minimal noise in the surroundings.
2. All the code shall be written in embedded C/C++.

### ***Assumptions and Dependencies***

1. All the input is in the desired range of values (specified later).

## **3 Details**

### **3.1 Functionality**

It uses various peripherals available on the given microcontroller to capture the input data, amplified to operational voltage of the microcontroller ( upto 5 volts).It decodes the sequence of data received by it and displays the corresponding decoded value on the LCD screen and also performs the required tasks.

The output through sensor is the square wave output by the external hardware having frequency equal to the morse code transmitted frequency .Bot uses Timer/Counter 1 of the microcontroller for counting the number of square pulses on the Input Pin T1 of microcontroller.

### **3.2 Supportability**

### **3.3 Design Constraints**

1. External hardware is required for the system to work.
2. Timer/Counter pin T1 is of microcontroller is reserved used for mic input . This pin must not be used for other purposes.

### **3.4 On-line User Documentation and Help System Requirements**

### **3.5 Interfaces**

#### **3.5.1 User Interfaces**

User has to transmit the morse code signals and let bot act accordingly.

User can transmit the code using any device which can emit morse code using sound waves according to the required specifications.

### **3.5.2 Hardware Interfaces**

It uses Firebird V robotics development platform by Nex Robotics. Besides the available hardware it requires a mic input hardware which provides the morse code related pulses to the bot , which are decoded by the bot.

### **3.5.3 Software Interfaces**

Software is written in C/C++ in Atmel Studio 6.2.1153 by Atmel Corp.

## **4 Quality Control**

### **Risk Management**

Following are the risks that might be faced during the project :

1. *False decoding in noisy environments.*
2. *External hardware challenges, like providing the microphone input sensibly to the microcontroller.*
3. *Bot may fail to receive valid input data.*
4. *Receiving the correct signal is difficult in real conditions.*