EE 356 – PROJECT REPORT

GROUP G10

E/15/127

E/15/128

E/15/137

PROJECT TITLE : DiHAC – Digital Home Automation Controller

INTRODUCTION

Home automation means controlling of home functions and features automatically and sometimes remotely using one or more computers. An automated home is also called as a smart home. Speech based home automation uses human voice commands to operate the electrical appliances in the home. It is very useful for human beings especially for elderly and physically handicapped people. In this paper, we present the implementation details of two schemes for speech based home automation and control. The first scheme uses the Bluetooth technology for controlling of electrical appliances when we are at home. It uses a HC-05 Bluetooth module and Arduino Bluetooth controller mobile application for switching on or off the appliances. The second scheme uses GSM/GPRS technology for controlling the electrical appliances. The developed system also alerts the user about any intrusion into the house when we are away from the home. Relays and bulbs are used as load to demonstrate the working of the prototype system. Home automation system gives accessibility, comfort, energy efficiency, security by providing control and monitoring of appliances, security surveillance. There are some other main parts in this device. Real time weather indicating facility, Security permission platform, Real time messaging platform among users and Manual data configuration capability with GUI interface. Also this device has manual switching capability for reduce power consumption of the device and also there are external devices as Bluetooth Extender, Bluetooth Coder and External relay Extender to reduce DiHAC limitations.

SPECIFICATIONS

DiHAC Device

Device Name	DiHAC
Product ID	A2763881-2143
Model Name	DiHAC-X556
Operating Voltage	5 VDC
Power Input	230 VAC
Power consumption	6.5W
EEPROM	4kb
SRAM	8kb
Product lifetime	5 Years
Dimensions	200mm(L)*120mm(W)*75mm(H)
Weight	400g
SIM	Regular SIM

Bluetooth Coder

Device Name	Bluetooth Coder
Product ID	BX56-CO23
Model Name	BC-555
Operating Voltage	5 VDC
Power consumption	1.5W
EEPROM	1kb
SRAM	2kb
Amount capability	3
Product lifetime	3 Years
Dimensions	110mm(L)*58mm(W)*27mm(H)
Weight	100g

Bluetooth Extender

Device Name	Bluetooth Extender
Product ID	BX56-EX23
Model Name	BE-555
Operating Voltage	5 VDC
Power Input	230 VAC
Power consumption	1.5W
Extending distance factor	1.5
MAC	0019:10:09098B
Product lifetime	3 Years
Dimensions	80mm(L)*52mm(W)*32mm(H)
Weight	100g

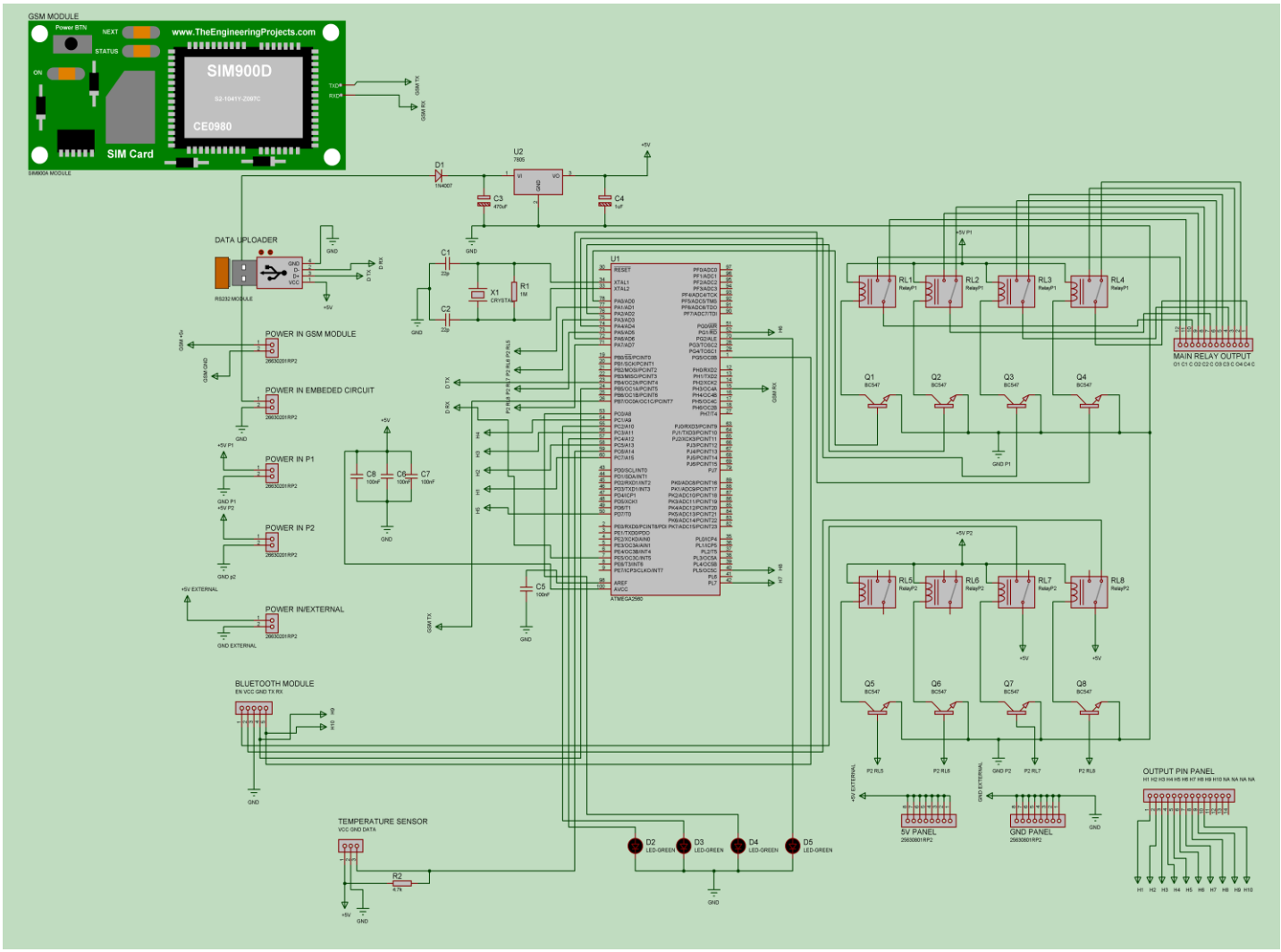
Relay Extender

Device Name	External Relay Extender
Product ID	5623-A7
Model Name	EXE-555
Operating Voltage	5 VDC
Relay power rates	10A 250VAC 15A 125VAC
Relay amount	2,4, or 8
Product lifetime	3 Years
Dimensions	66mm(L)*60mm(W)*35mm(H)
Weight	100g

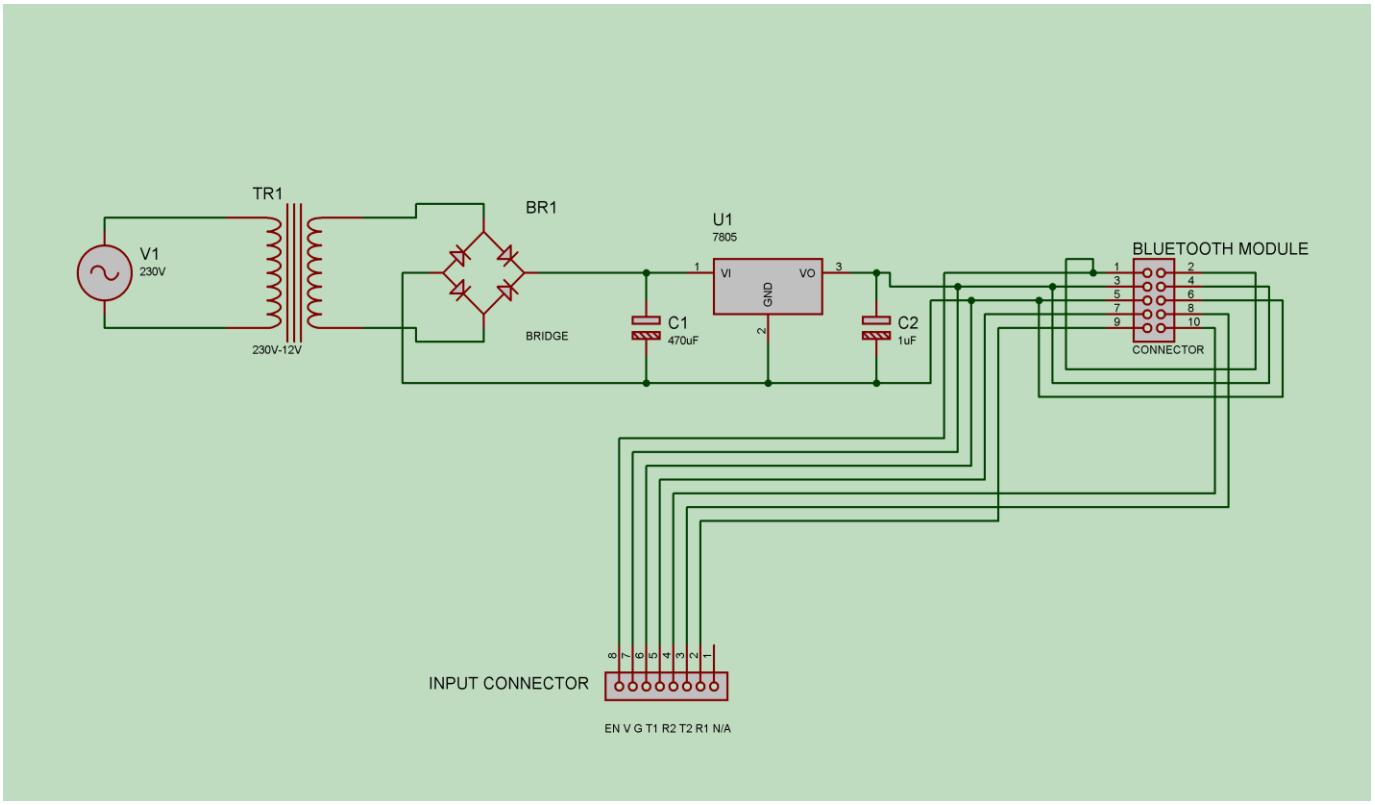
Device Package including external devices

CIRCUIT DIAGRAM

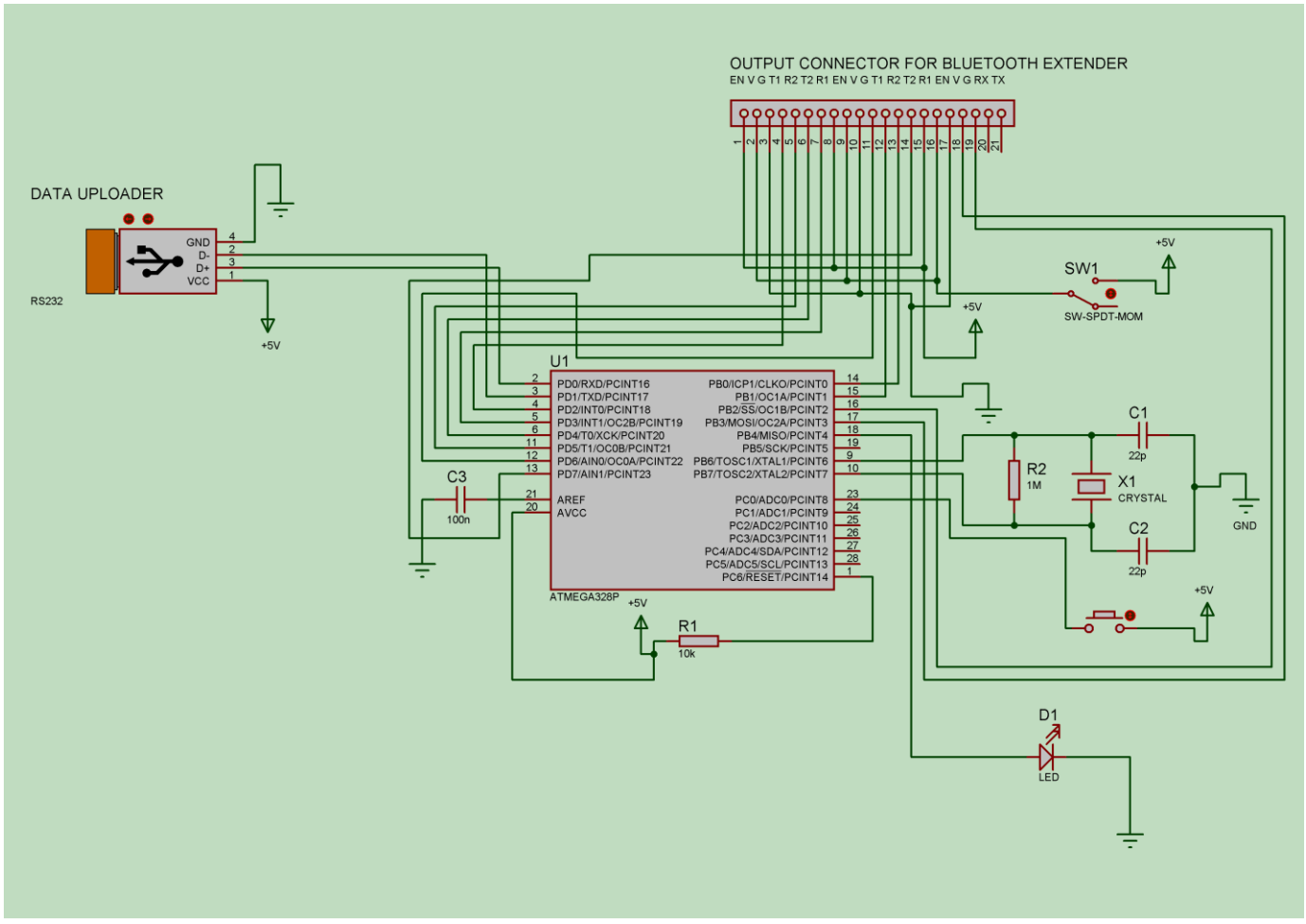
The schematic diagram of the devices are given below.



DiHAC Device Schematic diagram



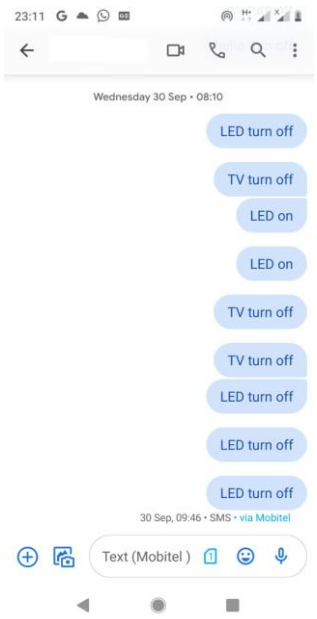
Bluetooth Extender Schematic Diagram



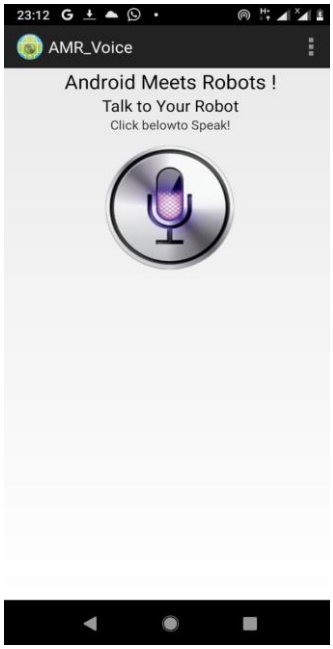
Bluetooth Coder Schematic Diagram

OPERATION

This device can be used to control or automate home electrical appliances like lights, fans, television, radio etc… When this device is mounted in the house, through a mobile application, we can control the devices through voice commands. Also through GSM technology, the controlling part can be done through a message sent with the command, to the sim that is in the device. Likewise, this device can be used in two ways, voice and message commands. As well as this device can give an emergency alert to your phone in case of a fire, since the device itself detects it using a temperature sensor.



Massage platform



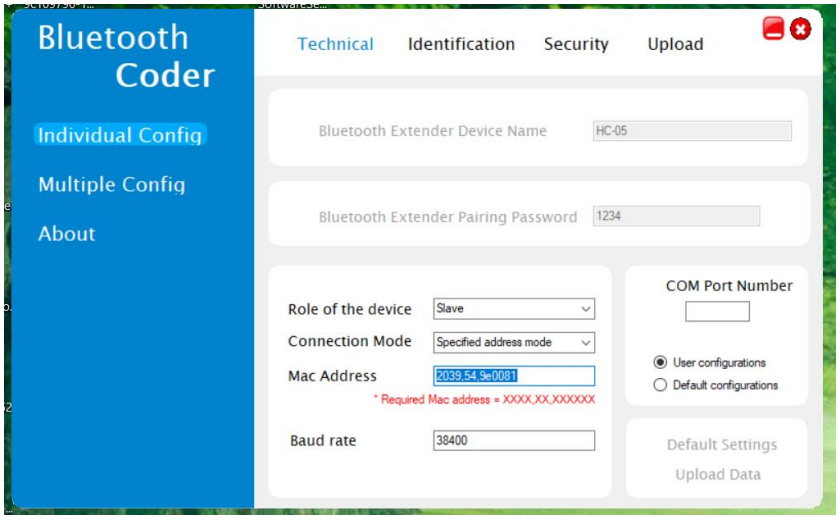
Voice command platform

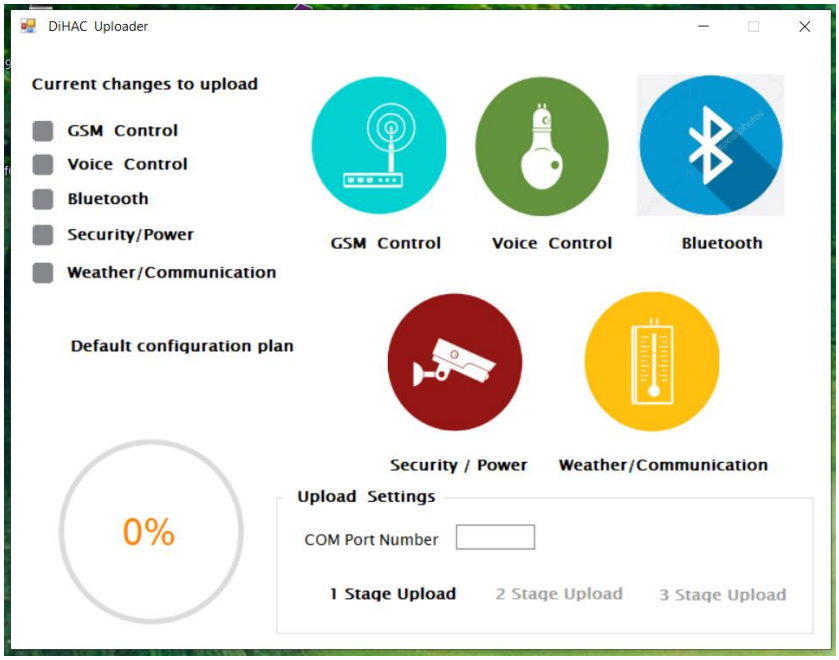
Also there are two PC Software for configure the DiHAC device configurations and Bluetooth Extender configurations as user's wish . These software can be configured DiHAC device for different operating modes. Through the software provided, 5 telephone numbers can be added as a cluster and those 5 people can control the devices as mentioned above. From those 5 people, one person can be named as the major and he can give access to anyone. We have designed this in order to provide use in any country in the world. Only thing that the user in another country have to do is, selecting the country code and adding the phone numbers of the users. Through the software, various measurements can be taken like the temperature and so on.

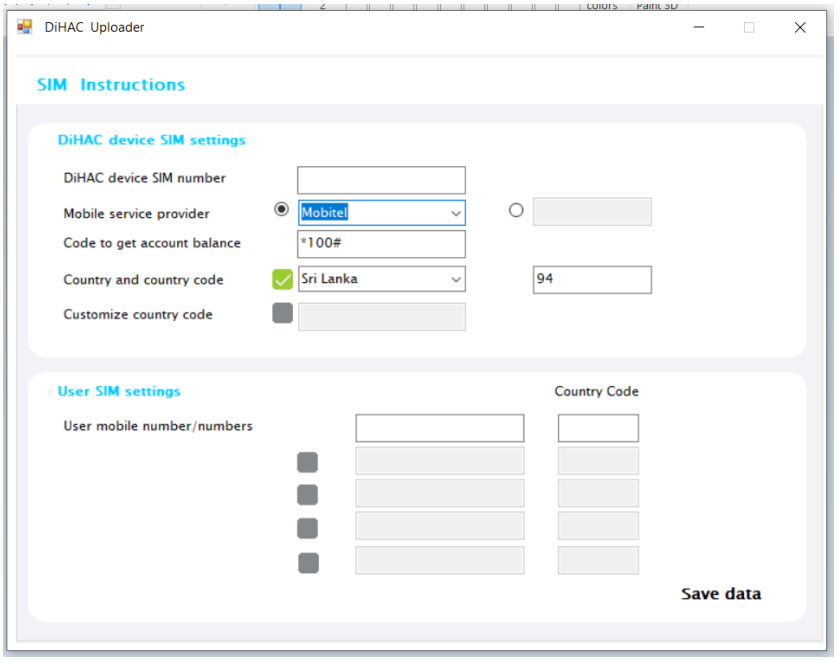
Along with the main device, a Bluetooth Coder, Bluetooth Extender and an External Relay Extender can be used to increase the span of operation. By fixing those to the main device, the range of operation can be increased. After mounting the device, the user has to power up the device and give the accessing phone numbers to the software. Then the users can use the device to automate home electrical appliances.

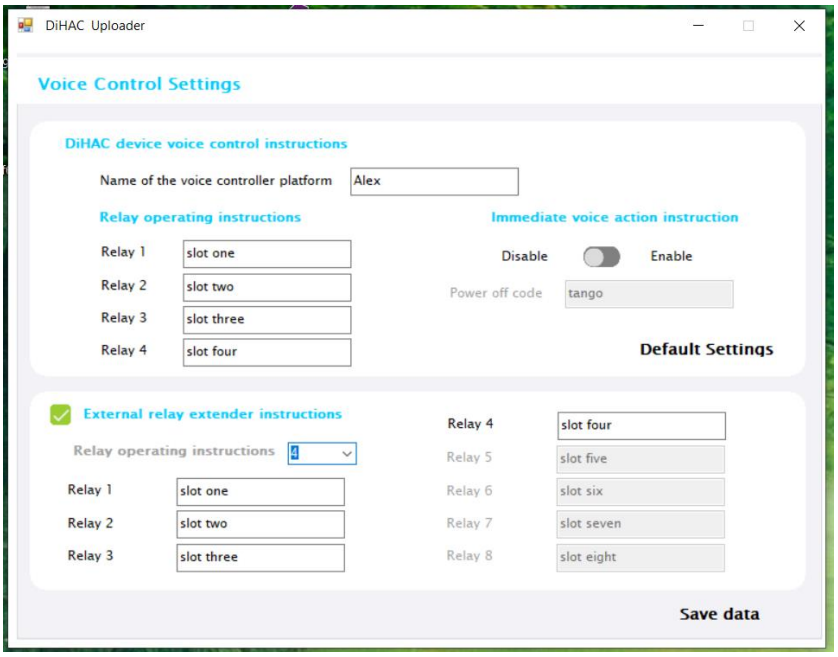
Message	Operation	Response
< Electrical item name>< Space>< on>	Turn on the electrical item	Relay on (No message response)
< Electrical item name>< Space>< turn off>	Turn off the electrical item	Relay off (No message response)
weather	Get the weather parameters	Weather parameters
< Emergency power off code>	Off all relay operations	No message response
Device Info	Get all the information of the device	Device information
Check SIM Balance	Get SIM Balance	Your available balance is Rs.60
Set num<Space><user identity><Mobile NO>	Set user numbers	Mobile NO of <User identity> if fixed.

Some of the message based command of the device









GUI interfaces of PC Softaware

Identical Power pack with manual switching capability

BUDGET

Project cost	Amount (Rs)
SIM 900A GSM module	1500.00
Main circuit	1200.00
Plastic Enclosure	500.00
GSM Antenna	100.00
Bluetooth Module	450.00
Temperature sensor	100.00
Power pack with circuit cost	550.00
Data cables	400.00
Mannuals and Warranty card	250.00
Packing	500.00
Total cost for DiHAC device	5550.00

External Device	Amount (RS)
Total cost for External devices	1500.00

Total cost for all the devices	7050.00
Project income(from group members)	7050.00