ISSN: 2250–3676

[IJESAT] INTERNATIONAL JOURNAL OF ENGINEERING SCIENCE & ADVANCED TECHNOLOGY Volume-2, Issue-6, 1711 – 1714

DESIGN OF AN INNOVATIVE SYSTEM USING MOBILE PHONE FOR MOBILE ROBOAT BASED ON CORTEX M3

S.HARIKA[1] Mr. Ch.SIVARAM[2] M.Tech

P.G Student[1], Associate Professor[2], Department Of Electronics And Communication, Audisankara College Of Engineering And Technology, Gudur, AP, India.

Abstract

In robot design controlling the movement based on the environment and position is important. Our approach allows the robot to generate a set of controls to reach a desired destination based on the previous knowledge about the environment. Here we are using to solving the problem of environment learning and position is by using Cortex M3, Every position is associated with DTMF. In our present system, mobiles are interacting the data transferring from person to instrument. So, no miss reading the signals. Here L293D controls the movement of H-bridge.

Keywords: *Mobile, Cortex, DTMF, H-Bridge, keil c.*

----------***----------

1. INTRODUCTION

The mobile robot is equal to the brain of Mobile robot, which is the physical basis to reflect the intelligence of mobile robot. Usually, Mobile robot relies on to coordinate the whole resources, in order to achieve advanced arithmetic among different module, and to realize intelligent behavior just as human beings by plan and decision. Robot is inconvenient to draw, if it is supplied with power through wire. So it is supplied with power by battery. In order to prolong the work time of robot, it must be considered the whole power dissipation of the robot. In addition to the mobile platform and the executing motor of the executing agency, , so it is much more significant to design . However, at present, the mobile robot usually uses mobile. The disadvantages are that the power dissipation is big and density of integration of system is low. So the robot must be provided with high power battery, which leads to high bulk and heavy weight.

This paper introduces a Mobile system based on embedded system. The hardware of the system is embedded processor. Its stability and reliability have been proved by lots of experiments, besides, it is also with low-power,tiny-volume, high integration density.

This is applicable for real-time applications. This also increases the event response time of the tasks. It has less footprints. The ARM Cortex-M3 is a next generation core that offers system enhancements such as modernized debug features and a higher level of support block integration. This is operating at up to a 100 MHz CPU frequency. The ARM Cortex-M3 CPU also includes an internal prefetch unit that supports speculative branches Quadrature Encoder interface, 4 general purpose timers, 6-output general purpose registers. So it is supplied with power by battery.

2. Methodology Cortex M3

The LPC17xx is an ARM Cortex-M3 based microcontroller for embedded applications requiring a high level of integration and low power dissipation. The Cortex-M3 processor, based on the ARM architecture, is intended for cost-sensitive embedded applications. This MCU incorporates an efficient interrupt controller (NVIC),when the processor is idle, it can enter sleep mode, to be awake even when an interrupt occurs.

The debug controller makes developing and testing software easier. Powerful trace features allow greater visibility into application operation.

The ARM Cortex-M3 is a next generation core that offers system enhancements such as modernized debug features and a higher level of support block integration. This is operating at up to a 100 MHz CPU frequency. The ARM Cortex-M3 CPU incorporates a 3-stage pipeline and uses Harvard architecture with separate local instruction and data buses as well as a third bus for peripherals.

The peripheral complement of the LPC17xx includes up to 512 KB of flash memory, up to 64 KB of data memory, Ethernet MAC, a USB interface that can be configured as

either Host, Device, or OTG, 8 channel general purpose DMA controller, 4 UARTs, 2 CAN channels, 2 SSP and can controllers, SPI interface, 3 I2C interfaces, 2-input plus 2-output I2S interface,8 channel 12-bit ADC, 10-bit DAC, motor control PWM, Quadrature Encoder interface, 4 general purpose timers, 6-output general purpose PWM, ultra-low power.

Features

- Operating voltage : 3.3V
- 32 bit Microcontroller
- 100 MHz clock frequency
- 3 stage pipelining
- Harvard Architecture
- 512 KB Flash
- 10/100 Mbps Ethernet
  USB 2.0 Full-speed Device

3. DTMF (DUALTONE MULTIPLE REQUENCY)

It is used for telecommunication signaling over analog telephone lines in the voice-frequency band between telephone handsets and other communications devices and the switching center. The version of DTMF that is used in push-button telephones for tone dialing is known as Touch-Tone. It was developed by Western Electric and first used by the Bell System in commerce, using that name as a registered trademark. It is also known in the UK as *MF4*.

The DTMF keypad is laid out in a 4×4 matrix, with each row representing a low frequency, and each column representing a high frequency. Pressing a single key (such as '1') will send a sinusoidal tone for each of the two frequencies (697 and 1209 hertz (Hz)). The original keypads had levers inside, so each button activated two contacts.

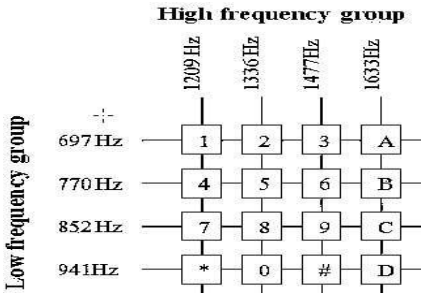

Fig1:DTMF Keypad

How does it work:

When you press the buttons on the keypad, a connection is made that generates two tones at the same time. A "Row" tone and a "Column" tone. These two tones identify the key you pressed to any equipment you are controlling. If the keypad is on your phone, the telephone company's "Central Office" equipment knows what numbers you are dialing by these tones, and will switch your call accordingly. If you are using a DTMF keypad to remotely control equipment, the tones can identify what unit you want to control, as well as which unique function you want it to perform.

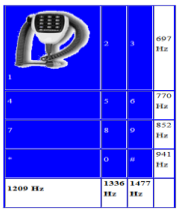

Fig2: Telephone

When you press the digit 1 on the keypad, you generate the tones 1209 Hz and 697 Hz. pressing the digit 2 will generate the tones 1336 Hz and 697 Hz.

Sure, the tone 697 is the same for both digits, but it take two tones to make a digit and the decoding equipment knows the difference between the 1209 Hz that would complete the digit 1, and a 1336 Hz that completes a digit 2. The extra codes are very useful in preventing standard telephone codes from being used to control remote devices, and can give you override status when used correctly in a two-way radio system.

Mark and Space:

Mark and Space refer to the duration a DTMF tone is produced, as well as the duration of the silence between individual digits.

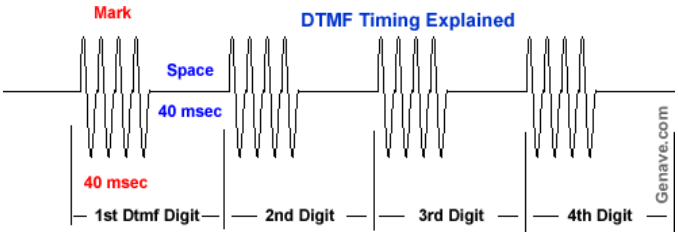

Fig3: DTMF Timing waveforms

4. L293D IC

L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

5. L293D TO CONTROL H-BRIDGE.

Current starts flowing through the motor which energizes the motor in (let's say) the forward direction and the motor shaft starts spinning. If Q2 and Q3 are turned on, the reverse will happen, the motor gets energized in the reverse direction, and the shaft will start spinning backwards. In a bridge, you should never ever close both Q1 and Q2 (or Q3 and Q4) at the same time.

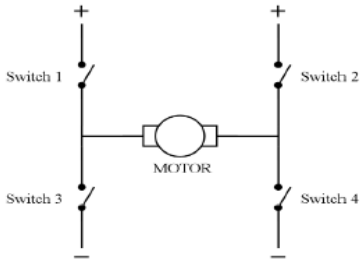

Fig4: H-Bridge Topology

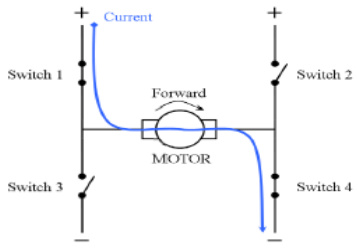

Fig5:H-Bridge Topology forward direction

If it is desired to turn the motor on in the reverse direction, switches 2 and 3 must be closed to power the motor. Figure below is the H-Bridge driving the motor in the reverse direction.

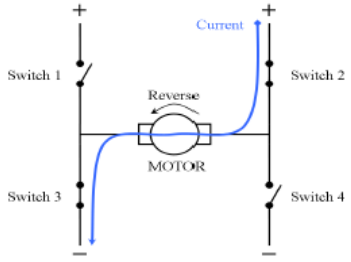

Fig6:H-Bridge Topology reverse direction

FEATURES:

- Wide supply-voltage range: 4.5V to 36V
- Separate input- logic supply
- Internal ESD protection
- Thermal shutdown
- High-Noise-Immunity input
- Functional Replacements for SGS L293 and SGS L293D
- Output current 1A per channel (600 mA for L293D)
- Peak output current 2 A per channel (1.2 A for L293D)
- Output clamp diodes for Inductive Transient Suppression(L293D

6. INFRARED SENSORS

Introduction

An infrared sensor is betterly an electronic device that emits and/or used to detect infrared radiation in order to sense some aspect of the environmental which of its surroundings. Infrared sensors can measure the heat of an object, as well as detect motion. Many of these types of sensors only measure infrared radiation, rather than emitting it, and thus are known as passive infrared (PIR) sensors.

IR detectors are little microchips with a photocell that are tuned to listen to infrared light. They are almost always used for remote control detection - every TV and DVD player has one of these in the front to listen for the IR signal from the clicker. Inside the remote control is a matching IR LED, which emits IR pulses to tell the TV to turn on, off or change channels. IR light is not visible to the human eye, which means it takes a little more work to test a setup.All objects emit some form of thermal radiation, usually in the infrared spectrum.
This radiation is invisible to our eyes, but can be detected by an infrared sensor that accepts and interprets it.In a typical infrared sensor likea motion detector, radiation enters the front and reaches the sensor itself at the center of the device.

Why Infrared Sensors

Since Infrared rays do have longer wave lengths, and most of the sunlight that earth receives has a maximum portion of IR rays, which helps in energy production . And also Infrared has numerous use ful applications like Thermography , Night – Vision Hyper- Imaging, OtherImaging, Tracking, Heating, Spectroscopy, Communication, Meteorology, Climatology, Astronomy, Art history, Biological-systems , Photobiomodulation.

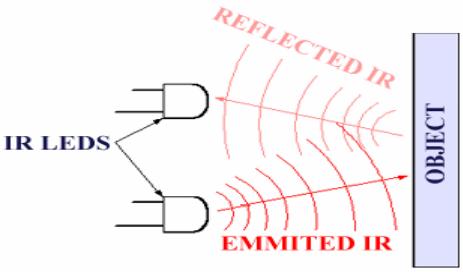

Fig7:IR Transmitter

Operating Principles

All objects above absolute-zero emit heat energy in the form of infrared radiation (infrared light). Usually infrared light is invisible to the human eye, but it can be detected by electronic devices designed for such a purpose.

The term passive in this instance refers to the fact that PIR devices do not generate or radiate any energy for detection purposes. They work entirely by detecting the energy given off by other objects.

Fig8: IR sensor

FEATURES

wide measuring range

high accuracy

large distance coefficient

quick response

LED display, clear and directed

analog signal and digital signal output simultaneously

7. SOFTWARE AND HARDWARE REQUIRED

SOFTWARE TOOLS:

- Flash Magic
- Embedded C

HARDWARE TOOLS:

- Cortex M3 platform LPC 1768 controller.
- IR sensors,
- H –Bridges, crystal Oscillators,

8. CONCLUSION & FUTURE SCOPE

Experiments have proved that the system is feasible and the result is good. It can well realize human-machine interaction, which is different from the traditional PCsystem. Although the mobile system is inferior to common computer systems in processing power and coordinating resources, the advantage is obvious, such as, low power consumption, small size, high integration, and so on.Therefore, in the field of robots in future, the system isvaluable for applicatons to some extent.

9 .FUTURE SCOPE

- It is not only applicable for automobiles but also implemented for real time applications.
- The further extension of this project can be done by placing the wireless camera which is used for capturing the surrounding objects.

REFERENCES

[1] Xu De,Zhou Wei. The perception, positioning and control of servicesMobile robot indoor. Bei jing:Science press,2008.

[2] Liu Li chang. Design andImplementation of Handheld MultimediaSystem Based on Arm Linux Qt. Electronic Technology, 2009,36(9):39-41.

[3] He jianfeng,WuWenbiao,Li Hong mu, etc. Development of Qt/Embedded Graphical interface Based on ARM920T EmbeddedLinux System. Electronic Engineer, 2007, 33(7):46-48.

[4] Blanchette J.Mark Summerfield C++ GUI programming withQt3[M].USA: prentice Hall PTR,2004.according to the subsequent tasks timely. The whole system is stable and reliable.