Global Journal of researches in engineering
Electrical and electronics engineering
Volume 12 Issue 2 Version 1.0 February 2012
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4596 & Print ISSN: 0975-5861

Application Based Analysis and Design Using Microcontroller

By Ashutosh Tripathi
Amity University Rajasthan, Jaipur

Abstract - Now day's automation systems are very common to each and every field of human life. Humans want to lead a leisure full life. The theme work of this paper is also based on this idea. The idea is to automate the appliances using a normal mobile phone system. These paper fistly commands a system which governs a system which gives the command to appliances to either switch on or off. The system works on some common day's technologies which are mobile networking using GSM or CDMA, Duel Tone Multiple Frequency and basic encoding and decoding techniques. In this project we try to give the same prototype for this type of trains. We are using microcontroller 89c51 as CPU. And secondly the motion of the train is controlled by the stepper motor, for displaying the message in the train we are using intelligent LCD display of two lines. The train is designed for three stations, named as A, B and C. The stoppage time for every station is 3sec and time to travel from one station to another is 6sec, there is a LCD display for showing various messages in the train for passengers. There are indicators, which are used to show the train direction i.e. UP path and DOWN path .before stopping at the station, the train blows the buzzer. it also includes an emergency brakes system due to which the train stops as soon as the brakes are applied and resumes journey when he emergency situation is over.

GJRE-F Classification: FOR Code: 090602

Strictly as per the compliance and regulations of:

Application Based Analysis and Design Using Microcontroller

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Abstract - Now day's automation systems are very common to each and every field of human life. Humans want to lead a leisure full life. The theme work of this paper is also based on this idea. The idea is to automate the appliances using a normal mobile phone system. These paper fistly commands a system which governs a system which gives the command to appliances to either switch on or off. The system works on some common day's technologies which are mobile networking using GSM or CDMA, Duel Tone Multiple Frequency and basic encoding and decoding techniques. In this project we try to give the same prototype for this type of trains. We are using microcontroller 89c51 as CPU. And secondly the motion of the train is controlled by the stepper motor, for displaying the message in the train we are using intelligent LCD display of two lines. The train is designed for three stations, named as A, B and C. The stoppage time for every station is 3sec and time to travel from one station to another is 6sec, there is a LCD display for showing various messages in the train for passengers. There are indicators, which are used to show the train direction i.e. UP path and DOWN path .before stopping at the station, the train blows the buzzer. it also includes an emergency brakes system due to which the train stops as soon as the brakes are applied and resumes journey when he emergency situation is over.

I. Introduction

In the paper two mobiles are employed one at user side which is carried by the user and second at the receiver part. At receiver part the mobiles DTMF output is fed thought the ear phone jack to the receiver circuit. When the DTMF tone is fed to the receiver circuit It converts the analog DTMF signal to digital output and this digital output is fed to the Microcontroller 892051. In Microcontroller a specific code is written to process the details of the digital output from the decoder chip MT8870. For every input from MT8870 there is a specific command is written in the Microcontroller 892051 and corresponding to the input code makes one of the output pin of Microcontroller 892051 high which commands the relay driver IC chip ULN2803. As according to the input from Microcontroller 892051 the relay makes only one of the output pin high among all.fig (I) describes the circuit of the designed system. Basically a receiver which used to:

1) Receive DTMF tone send by the Transmitter Mobile
2) Analog DTMF tone to Digital data generator
3) Microprocessor Unit (AT892051)
4) Relay driver IC (ULN2803)

Circuit Diagram:

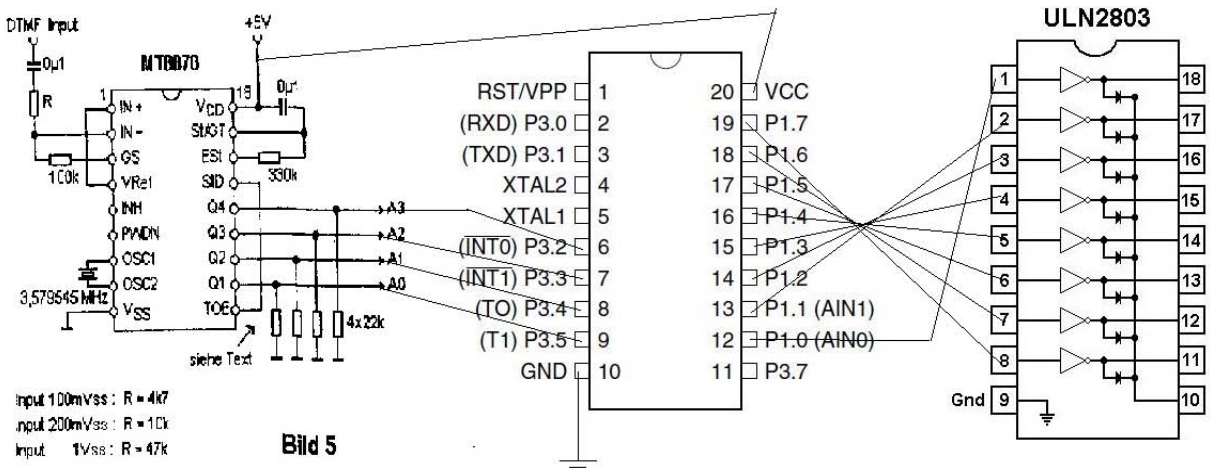

Fig I : Circuit diagram of Mobile Automation circuit

Author : Department of Electronics and Communication, Amity School of Engineering and Technology, Amity University Rajasthan, Jaipur-302002. Email : ashu20034@gmail.com

II. Working

Before starting with Motorola IC MT8870 it should be configured properly. Power supply is connected on +5v on pin 18 and ground on pin 9. The DTMF input is supplied to the pin 3 through a resistance of 100k so that a proper amount of current is drawn to the pin 3 for operating the IC. Crystal oscillator of frequency 3.57MHz is deployed between pin 7 and pin 8. Output is taken from pin 11, 12, 13, 14 through pull up resistors.

III. Microcontroller 89C51

The use of microcontroller ensures the reliability of the system. Before starting with the working of Microcontroller 892051 it should be configured properly. Pin 20 is connected with Vcc and Pin 10 with Ground. An oscillator of 11.0592 MHz is deployed between the pin 4 and pin 5. Input from the MT8870 is fed to the pin 6, 7, 8, 9 which are general purpose input/output pins. These pins are also considered as Port 3, so while programming the controller programmer consider input Port as P3 here. And output is taken from general purpose input/output Port 1. The out put is a 8 bit output so that it can control the eight pins of relay driver IC.

The Microcontroller code according to the input of MT8870 is given as:

Coding of motion of the train is controlled by the stepper motor, for displaying the message in the train we are using intelligent LCD display of two lines.

The coding of the metro train prototype is given in the assembly language. The Programmer main routines are the routines for running of stepper motor in forward

Direction and in reverse direction. The routines for this purpose are Stepper f and stepper b. The routines display and command are used in conjunction with LCD display. Program for a stepper having connected at p2 (from p2.0 to p2.3) & to show

```
Message on the LCD
data e q u  p1
busy e q u p1.7
r s e q u p3.5
r w e q u p3.4
en e q u p3.3
B z r e q u p0.2
led f e q u  p0.0
led b e q u  p0.1

org 400h
show0: db 'Welcome To All','0'
show1: db 'Current Station','0'
show2: db 'Next Station','0'
show3: db 'A','0'
show4: db 'B,'0'
Show5: db 'C','0'
org 0000h
a j m p main
org 0003h
test: m o v c,p3.2
j n c halt
set b bz r
r e t i
halt:
c l r b z r ;till zero blow on the b z r
a j m p test
main:
mo v ie,#00h
set b ea
set b ex0
here:
mo v p2,#00h
a call I n i
m o v dptr,#show0
a call read
c l r led f ;p1.0
a call delay

m o v a,#01h
a call command; Now make memory clear
cursor home
m o v dptr,#show1
a call read

set b ex0 ;##############
mo v a,#0c0h
a call command
m o v dptr,#show3
a call read
a call delay ;Stopage1 time 3 sec A
a call delay
c l r b z r
a call delay
 m o v a,#01h
a call command
m o v dptr,#show2
```

```
a call read
m o v a,#0c0h
a call command
m o v dptr,#show4
a call read
set b b z r
a call delay10
a call stepper f
m o v a,#01h
a call command
m o v dptr,#show1
a call read
m o v a,#0c0h
a call command
m o v dptr,#show4
a call read
a call delay ;Stopage2 time 3 sec shsar
a call delay
c l r b z r
a call delay

mo v a,#01h
a call command
mo v dptr,#show2 ;display ne
a call read
mo v  a,#0c0h
a call command
m o v dptr,#show5
a call read
set b b z r
a call delay10
a call stepper f

m o v a,#01h
a call command
mo v dptr,#show1
a call read
mo v a,#0c0h
a call command
m o v dptr,#show5
a call read
a call delay ;Stopage2 time 3 sec B
a call delay
c l r b z r
a call delay

set b  led f ; p1.0 ;off led at
p1.0 for forward journey
c l r led b ; p1.1 ; 0n Led
for back ward journey

m o v a,#01h
a call command
m o v dptr,#show2 ;display ne s h a r
a call read
mo v a,#0c0h
a call command
mo v dptr,#show4
a call read
set b bzr
a call delay10
a call stepper b

mo v a,#01h
a call command
mo v dptr,#show1
a call read
mo v a,#0c0h
a call command
mo v dptr,#show4
a call read
a call delay ;Stopage2 time 3 sec shsar
acall delay
clr bzr
acall delay

m o v a,#01h
a call command
mo v dptr,#show2 ;display ne roor
a call read
mo v a,#0c0h
a call command
mo v dptr,#show3
a call read
set b b z r
a call delay10
a call stepper b

mo v a,#01h
a call command
mo v dptr,#show1
```

```
a call read
mo v a,#0c0h
a call command
mo v dptr,#show3
a call read
set b led b ;p1.1
l j m p here
;routine for stepper motor
Delay Routine ;one sec delay
delay:
push acc
push 00h
push 01h
push p0
push p1
mo v r0,#0eh
loop r:
mo v a,#0ffh
loop b:
mo v b,#0ffh
loop a: d  j n z b, loop a
d j n z 0e0h,loopb
d j n z r0,loopr
pop p1
pop p0
pop 01h
pop 00h
pop acc
ret

;d l ay stepper
delays:
push acc
push 00h
push 01h
push p0
push p1

m o  v a,#0ffh
loopa1: mo v b,#0fh
loopb1: d j n z b,loopb1
d j n z 0e0h,loopa1
pop p1
pop p0
pop 01h
pop 00h
pop acc
ret

delay10:
mo v tmod,#01h
mo v tcon,#00h
mo v tl0,#0f0h
mo v th0,#0f8h
set b tr0
no: j n b tf0,no
c l r tr0
c l r tf0
ret
;=============== Routine to read data
from prog mem

read:
n e x: c l r a
mo v c  a ,@ a + d p  t r
c j ne a,#'0',aga
s j mp down
a g a: a call display
inc d p t r
 s j m p next
down:
ret
;================ stepper routine

stepper f:
push acc
push p1
mo v a,#88h
mo v r1 ,#04h
loop1: mo v r0,#0e0h
loop: mo v p2,a
a call delays
r r a
d j n z r0,loop
d j  n z r1,loop1
pop p1
```

```
pop acc
ret

stepper b:
push acc
push p1
mo v a,#88h
mo v r1,#04h
loop12:
mo v r0,#0e0h
loop0: mo v p2,a
a call delays
r l a
d j n z r0,loop0
d j n z r1,loop12
pop p1
pop acc
ret
;************************************
*********************
;LCD strobe subroutines

I n i: mo v a,#38h
a call command
mo v a,#38h
a call command
mo v a,#38h
a call command
mo v a,#38h
a call command
mo v a,#0eh
a call command
mo v a,#06h
a call command
mo v a,#01h
a call command
mo v a,#80h
a call command
ret

command:
a call ready
mo v d a t a ,a
c l r   r s
c l r r w
set b en
c l r en
ret

display:
a call ready
mo v d a t a ,a
set b r s
c l r r w
set b en
c l r en
ret

ready:
c l r en
mo v data,#0ffh
c l r r s
set b r w
wait: c l r en
set b en
j b  b u s y, wait
c l r en
Ret

End
```

Coding of mobile networking using GSM or CDMA, Duel Tone Multiple Frequency and basic encoding and decoding techniques.

```
 1    $mod52                                                    3
0000                2    ORG 0000h      0000 A2B5          4    main: mov c,p3.5
0002 404A           5    jc label       0048 759086       44    l7: mov p1,#86h
                    6                   004B 020000       45        ljmp main
0004 A2B4           7    mov c,p3.4     004E A2B4         46    label: mov c,p3.4
```

```
0006 4022          8    jc l1
                   9
0008 A2B3         10    mov c,p3.3
000A 400E         11    jc l2
                  12
000C A2B2         13    mov c,p3.2
000E 4005         14    jc l3
                  15
0010 7590C0       16    mov p1,#0c0h
0013 80EB         17        sjmp main
                  18
0015 759080       19    l3: mov p1,#80h
0018 80E6         20        sjmp main
                  21
001A A2B2         22    l2: mov c,p3.2
001C 4006         23        jc l4
                  24
001E 759099       25        mov p1,#99h
0021 020000       26        ljmp main
                  27
0024 7590C6       28    l4: mov p1,#0c6h
0027 020000       29        ljmp main
                  30
002A A2B3         31    l1: mov c,p3.3
002C 4010         32        jc l5
002E A2B2         33        mov c,p3.2
0030 4006         34        jc l6
                  35
0032 7590A4       36        mov p1,#0a4h
0035 020000       37        ljmp main
0038 759088       38    l6: mov p1,#88h
003B 020000       39        ljmp main
003E A2B2         40    l5: mov c,p3.2
0040 4006         41        jc l7
0042 759082       42        mov p1,#82h
0045 020000       43        ljmp main
0050 4024         47        jc l8
0052 A2B3         48        mov c,p3.3
0054 4010         49        jc l9
0056 A2B2         50        mov c,p3.2
0058 4006         51        jc l10
005A 7590F9       52          mov p1,#0f9h
005D 020000       53          ljmp main
0060 759090       54    l10: mov p1,#90h
0063 020000       55        ljmp main
0066 A2B2         56    l9:  mov c,p3.2
0068 4006         57        jc l11
006A 759092       58        mov p1,#92h

006D 020000       59        ljmp main
0070 7590A1       60    l11: mov p1,#0a1h
0073 020000       61        ljmp main
0076 A2B3         62    l8: mov c,p3.3
0078 4010         63       jc l12
007A A2B2         64        mov c,p3.2
007C 4006         65       jc l13
007E 7590B0       66        mov p1,#0B0h
0081 020000       67       ljmp main
0084 759083       68    l13: mov p1,#83h
0087 020000       69        ljmp main
008A A2B2         70    l12: mov c,p3.2
008C 4006         71        jc l14
008E 7590F8       72        mov p1,#0f8h
0091 020000       73        ljmp main
0094 75908E       74    l14: mov p1,#08eh
0097 020000       75        ljmp main
                  76
                  77        end
```

IV. Results and Conclusion

The whole system is perfectly developed and tested under the laboratory. This system is very cost effective and easy to deploy in the existing systems. This system adds one more degree of comfort to the human luxury list.

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