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HARDWARE IMPLEMENTATION OF THE TOKEN DISPLAY SYSTEM USING MICROCONTROLLER

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ABSTRACT

At the present scenario, all people are always in a hurry because no one has sufficient time in this fast life. Therefore, people does not waste their time and also not compromise with their safety in many places like, banking, restaurant, cinema, etc. Where all of them are always facing the queue system or change sequence and also nowadays there are many diseases that spread during the public attachment and while holding and touching or by gathering Like covid-19, swine flu, etc. So to encountered this inconvenience and maintain social distancing at the public places, there are many solutions to enhance the speed and safety of human society. So by this paper, it is trying to express a microcontroller-dependent efficient and intelligent token number display system to reduce the problem as mentioned above. The system which we have used is displaying two-digit numbers from 0 to 99 which used to display 1 set and one set at customers and display. Hence by applying this system, the consumers don't worry about their chance and no wastage of time by waiting in a queue. They have to appear when the token number is displayed on the large screen at the store. The whole process contains two portions display unit and the Processing Unit. Every set of the display unit contains seven segment based two display units which get fed from the push button. The kit on which the software designed and applied is 8051 microcontroller.

1. Introduction

Nowadays we see that the whole world is affected by covid-19. The disease commonly spread by the touching or coming in the Contact of an infected person and many of the places like public dealing offices, restaurant, Bank, doctor clinics, airports and other such like that where the customers have to

wait in a Queue or in a group that digital token display system are very beneficial and ideal. Mostly in the hospitals and banks, there is always a long and unsafe queue that is there but forcefully customers have to stand there until they get their chance. Through this module, we can offer customers to get free from the queue and when the token number gets blank on the display they have to appear at a fixed time.

The queue service is a very normal service which we all have to follow at public places all of us is strictly have to follow the system if he or she is children or an aged person the queue should be followed and those people followed many problems like they are not able to stand for a long period, children are suffering by their height and by the crowd also, many dirty-minded people teased girls during the queue, and many of them break the serial number and convert situation very noisy.

Smart token concept is used many research papers with different means [1-4]. In [5], the serial communication based technology (RS232 protocol) is used for the bank token system. For this, GPRS should be connected with system. In [6], smart queue supervisory method is used with GSM Technology. The PIC microcontroller based controlling system is used in this paper [7].But the clients have to constantly see the display for the own number, which becomes exhausting. For the token system, PCMCIA based smart card is used in this research work [8, 9].

Therefore to avoid these situations, we are designed a minor and a very beneficial project. In this research process, there is also introduce a counter number along with the token number, which is served at the counter and the consumers get better service. Our suggested prototype can be reduced this problem. This model is able to show any three-digit numbers between 0 to 999 and its new function that it also speaks the number. The clarity of the voice is going very clear so everyone gets to listen to it carefully and clearly.

Using Token Display System, people have to wait in line for their turn. It is made by using 8051 microcontrollers which are coded by Keil software. In this paper, we made two token display systems. One is a fully automatic token display system, and the other one is controlled by push buttons and here we used a switch using a transistor relay circuit which gives control to one circuit at a time.

2. General System Overview

In this prototype of the project, the token system consumes a microcontroller as a controlling unit full stop for counters, there is a total of 10 switches are used and there is one switch that assigns the token to the customer. Whenever the consumer applies for the token the specific token number gets showed on the table which is free. When there is a service fulfilled at any of the counters then the counter operator has to push the switches at the counter which gets free and after that next available token number gets shown on the counter of service. All information gathered by the system and announced

through the speaker for this all specifications system need 8051 microcontrollers directly by accessing the message in the controller memory in the type of binary LCD which is used to display the token number with an applicable counter number.

By the system the whole process service speed and Enhance as well as with safety and comfort also there is a small Windows-based application also get provided by this method we get input from the desktop keyboard to press the button and send it to the display to appearing at the LCD display. There is also a possibility to increase or decrease the token number serial wise from the present number.

The whole system of the token display is consisting of the eight blocks which shown in the given diagram consisting elements are;- Key button, AVR microcontroller, voltage amplifier (LM741), display unit, sound module, digital to analog converter IC (DAC0800), 5-volt power supply. The 8-bit Timer descriptions of all the elements are given as shown in Fig. 1.

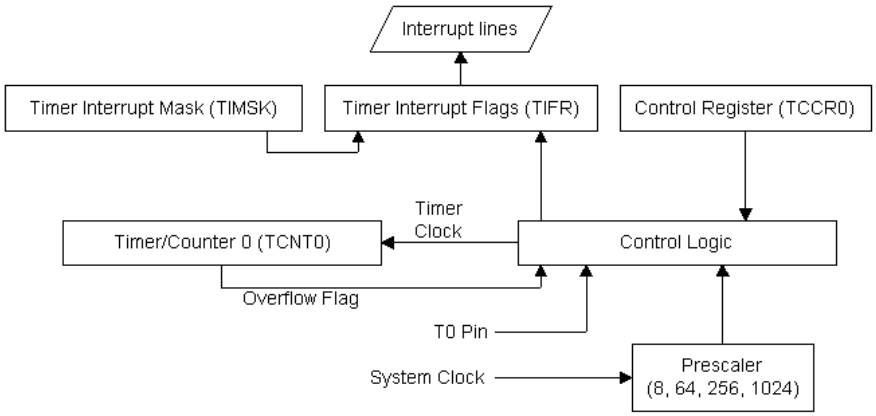


Figure 1 Two 8-bit Timer/Counters with Separate Prescalers and Compare Modes

2.1 Microcontroller (AT MEGA 128)

The microcontroller (AT MEGA 128) is very commonly used and it is well liked microcontroller also which is mainly used in the motorized, factory appliances and customer appliances. In this project, the segment which is used is the seven-segment display. It required a dual set of the seven-segment display. The first display is the operating display and another display is the consumer display. The total segments in each of the sets are three-seven each and every segment display contains LED and their total seven-segment. This segment display is present in the two types of the module first is “common cathode” and the other is “common anode” .in this project the “common 6 cathode” display type is used. To control the seven-segment display system the CMOS 4026 B is used and its main feature is that there are only two pins are used for the control display operation.

2.2 Sound system/ audio module

The audio dependent module generally contains a pack of a speaker. The main function of this audio module is to announce the token number. The amplification of the analog signal is done by the IC LM741 Filter.

2.3 Power supply

The genuine function of the prototype circuit continuously required the 5-volt dc supply. So the whole procedure requires a continuous and constant DC power supply of 5 volts like display, microcontroller, etc.

3. Procedure

The language which is used for the programming of the microcontroller is very primary. The compiler used in this is ABR BASCOM. The pin settings are shown in Fig. 2. There are some variables in the controlling unit by which the functioning of the module is handled. The variables are:- (M, K, N,D ,T,L).

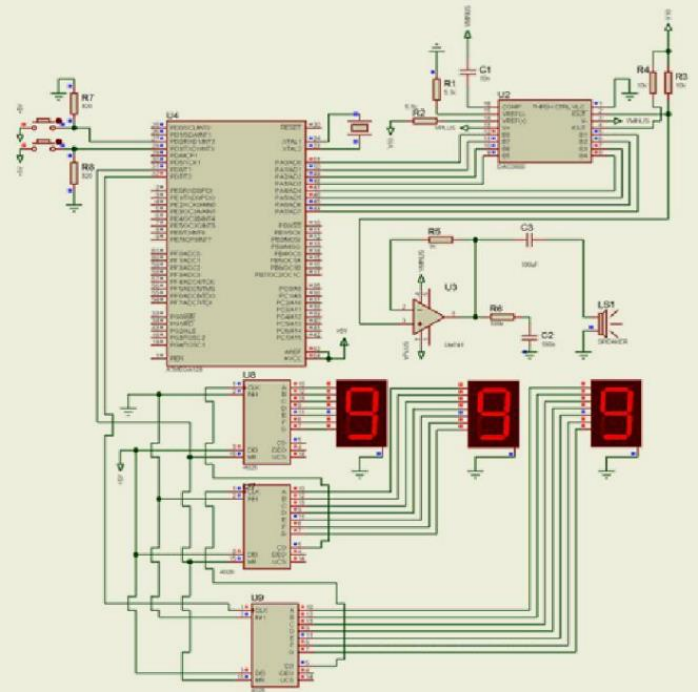


Figure 2. Interfacing of seven segments

The first value K denotes the value of the counter. This variable gets incremented when the pin PD2 is high. The pulse is given to the pin PD6 which is attached to the clock pin 4026. For every pulse Integrated circuit raises the decimal number in the display system. After, each and every rise in the values of K will be examined. If the values get exceeded and go up to the value of 1000 then it will automatically be assigned to zero. And for input which was less than the limit of 1000 then the number is converted into a three-digit number example:- if K equals to 3 then the number is 003. the first, second, and third digit get stored at the variables M, N, and L respectively. The program is get initiated by the D=1, so at initial, the value of the am gets proceed to T. After that T is get checked. After that, all process the unit which we get from the then proceeds to the data array of the

pot A. There's a break for a very less time period after every increment. The value of the D is checking regularly every time that it is 3 or not.

```
#include<stdio.h
>
#include<reg51.
h>
sbit sw0=P1^0;
sbit sw1=P1^1;
sbit sw2=P1^2;
sbit sw3=P1^3;
sbit sw4=P1^4;
sbit sw5=P1^5;
sbit sw6=P1^6;
sbit sw7=P1^7;
sbit sw8=P0^0;
sbit sw9=P0^1;
void delay(void);
unsigned int k=0;
unsigned int l=0;
unsigned int
m=0;
unsigned int n=0;
unsigned int o=0;
unsigned int p=0;
unsigned int q=0;
unsigned int r=0;
unsigned int s=0;
unsigned int t=0;
 unsigned char
array[10]={0x3f,
0x06,0x5b,0x4f,0
x66,0x6d,0x7d,0
x07,0x7f,0x6f};
void main()
 {
   sw0=0x00;
   sw1=0x00;
   sw2=0x00;
   sw3=0x00;
   sw4=0x00;
   sw5=0x00;
   sw6=0x00;
   sw7=0x00;
   sw8=0x00;
   sw9=0x00;
  while(1)
   {
 if(sw0==1)
    {
      P2=array[k];
       delay();
       P3=0x00;
       delay();
       k++;
       }
      if(sw1==1)
      {
       P3=0x06;
       delay();
       P2=array[l];
       delay();
       l++;
      }
       if(sw2==1)
       {
        P3=0x5b;
        delay();

P2=array[m];
        delay();
        m++;
       }
        if(sw3==1)
       {
        P3=0x4f;
        delay();
        P2=array[n];
        delay();
        n++;
       }
       if(sw4==1)
       {
        P3=0x66;
        delay();
        P2=array[o];
        delay();
          o++;
       }
       if(sw5==1)
       {
        P3=0x6d;
        delay();
        P2=array[p];
        delay();
        p++;

       }
       if(sw6==1)
       {
        P3=0x7d;
        delay();
        P2=array[q];
        delay();
        q++;
       }
       if(sw7==1)
       {
        P3=0x07;
        delay();
        P2=array[r];
        delay();
        r++;
       }
       if(sw8==1)
       {
        P3=0x7f;
        delay();
        P2=array[s];
        delay();
        s++;
       }
       if(sw9==1)
       {
        P3=0x6f;
        delay();
        P2=array[t];
        delay();

        t++;
       }
     }
   }

void delay(void)
 {
    unsigned int
s,k;

for(s=0;s<400;s+
+)
    {

for(k=0;k<200;k+
+);
    }
   }
```

Figure 3. KEIL programming for the microcontroller

4. Hardware Implementation with System Programming

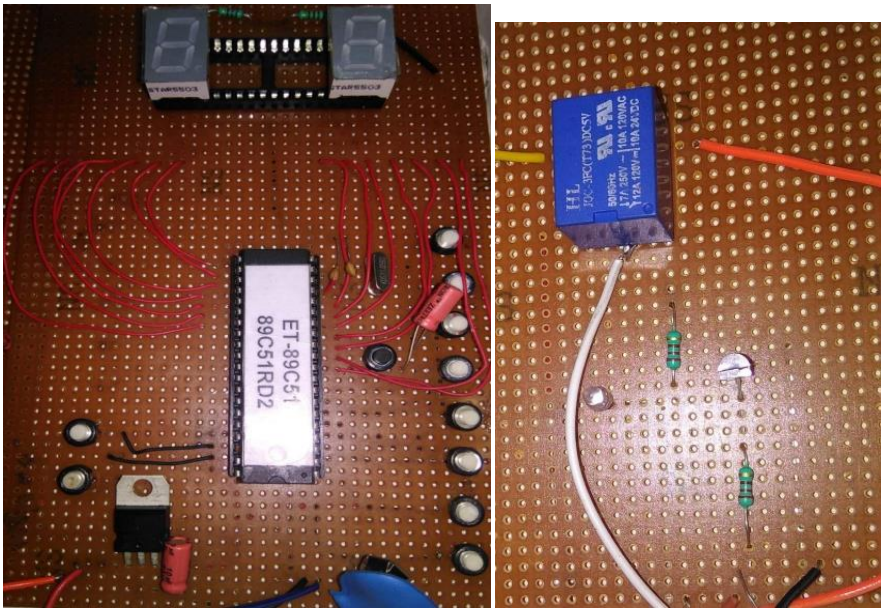
Automatic token display system is prepared in two parts. First is programming for the microcontroller. Second is hardware installation with the help of different components.

4.1 KEIL Program for a Token Display System

KEIL programming is used in the microcontroller as shown in Fig. 3.

4.2 Hardware Design

In the hardware designing, the following components are used such as Microcontroller(8051), Voltage regulator, segment, LED light, Relay, Transistor, Resister, Capacitor, Crystal oscillator, Ceremic capacitor, Push button, Software (KEIL). Figs. 4 to 5 show the complete prototype hardware.



(a)Token system using switch (b) Switching circuit

Figure 4. Hardware Components

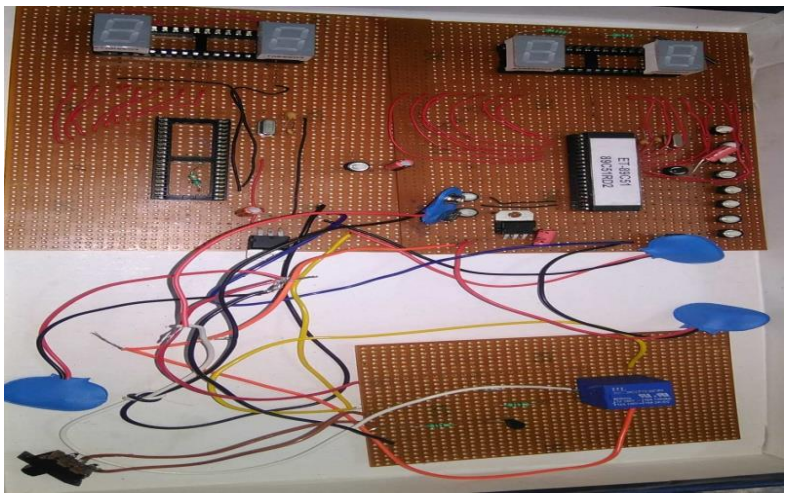


Figure 5. Hardware of automatic token display system

5. Conclusion

This proposed system is a small step towards easing out the life. In this paper, there are 3 PCB circuits, one for token display system by switching and another one for the automatic token display system. By using the third circuit, automatic switching is done of the previous two circuits. In this process, our circuit of a token display by switching is properly in working condition. Here both programs are working properly at simulation. And in the paper, the automatic switching circuit is also working properly. A small windows based application software will be supplied in the future. Just type the required number in the window using the PC keyboard and press the Send button to display the numbers in the LCD display. Hence finally, we can say that this project, guarantees a very thorough synchronization between machine and the man.

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