Automatic National Anthem Playing Unit using RTC & Microcontroller

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ABSTRACT

As all school, begins on time and if we could play automatic national anthem then it gives energy throughout a day, feels energetic whole day. As we plays it manually there should be always a person is required to turn ON/OFF media player. This manual method is hectic and it encouraged us to play it automatically. So, this motivated us to design a system where national anthem plays on predefined time after playing of national anthem it should be automatically stops the playing. So considering these parameter we designed and implemented automatic national anthem player since 2016 and till date it is working smoothly. All required material such microcontroller board, media player, speaker were purchase from local market. Media player main facility of playing again from initial as supply resumes. So, each day national anthem plays from beginning point.

Keywords- RTC, DS1307, Media Player, Microcontroller, Relay board, P89V51RD2

1 Introduction

In industrial sector working hours are 8 hrs shift timing after each 8 hours a large bell rings and this all process is automatic. In colleges, schools if national anthem player plays anthem automatically then this will energise the full day. Initially our college is operating manually a national anthem so one person were always needed to present there to operate player ON/OFF. So sometimes that person may get hesitated. This leads us to design a system where a automatically national anthem will play on 8:30:00 am will stop on 8:31:10 [hh:mm:ss] timing so that total anthem will be played. While designing a system we collected all required equipment from local market such as microcontroller board, RTC DS1307, on board 3.3 volt battery. A relay were used to operate media player. A separate audio loaded pen drive is connected to media player. External medial player with 100 decibel speaker is used. The media player has the facility of auto start from initial after power resumes. So that as todays anthem playing completes then tomorrow it begins to play from initial point. Philips microcontroller P89V51RD2 were used to read timing from RTC DS1307 and controls the relay unit. Microcontroller uses I2C communication protocol between RTC & Microcontroller unit. The DS1307 serial real-time clock (RTC) is a low power, full binary-coded decimal (BCD) clock/calendar plus 56 bytes of NV SRAM. Address and data are transferred serially through an I2 C, bidirectional bus. The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power-sense circuit that detects power failures and automatically switches to the backup supply. Timekeeping operation continues while the part operates from the backup supply.

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (6 clocks per machine

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cycle) to achieve twice the throughput at the same clock frequency. Another way to benefit from this feature is to keep the same performance by reducing the clock frequency by half, thus dramaticallyreducing the EMI. The Flash program memory supports both parallel programming and in serial In-System Programming (ISP). Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible. The P89V51RD2 is also In-Application Programmable (IAP), allowing the Flash program memory to be reconfigured even while the application is running.

2 Related Work

Alan L. Vergara et.al [1] used DS1307 serial RTC with Atmega 328 to control RTC based home appliance control. They controlled home appliances using RTC Ds1307. It reads timings, date from RTC IC and as per programming the devices were controlled. Paras Manchanda et.al [2] used ZIGBEE and microcontroller based remote appliances control. Devices were mane ON/OFF using ZIGBEE protocol. Manoj Kumar Rampalli et.al [3] did work on automatic straight light control using RTC & LDR. As per light falls on LDR its resistivity changes, analog pin of microcontroller read that value parallel it read timings from RTC according to both inputs it controls the ON/OFF straight light.
Vaibhav A. Pawar et.al [4] worked on parameters control of farm such as humidity, water content in soil, drip irrigation using microcontroller & RTC. It gets sensor data such soil moisture, air temperature, humidity according to that parameters and RTC it turn ON/OFFF drip irrigation system. Dinesh Kumar Sharma et.al [5] worked to control appliances using RTC & Microcontroller. It reads the timing from RTC & according to that it were controls the devices. Rajesh A. Megalingam et.al [6] worked on automatic college bell using RTC DS1307 & Microcontroller. Mainly it has guided us to design our system. It were reading timing, date, day also according that bell were ringing for 10 seconds through relay

3 Designed System

We designed & implemented a system with media player, Speaker, Audio loaded pen drive and microcontroller unit. External media players supply were controlled from on board relay. After getting ON external media player, media player has its initialisation time of 2 seconds, after that time anthem audio file has time length of 68 seconds. So finally after total time of 70 seconds supply of external media players supply gets cut from mains switch. Exactly on 08:30:00 am a supply to external media player were turned ON. Again exactly on 08:31:10 am timing supply to external media player were turned OFF. An audio loaded pen drive permanently connected to media player. A single audio file only loaded in pen drive. The sound is fully audible in the range of 300 meters from central location. Since last 4 years it has working in good condition.

4 Block Diagram

Figure 1 shows the block diagram of whole system. It shows interconnection of external media player, speaker, pen drive & main drive. A media player were powered ON by ac mains 230 volt. A microcontroller unit were powered ON by 5 volt power supply. 3.3 volt lithium battery is used to give

back up power supply to RTC. So that if mains supply fails still it can maintain its timings, date and years also. Philips microcontroller gives stable operations.

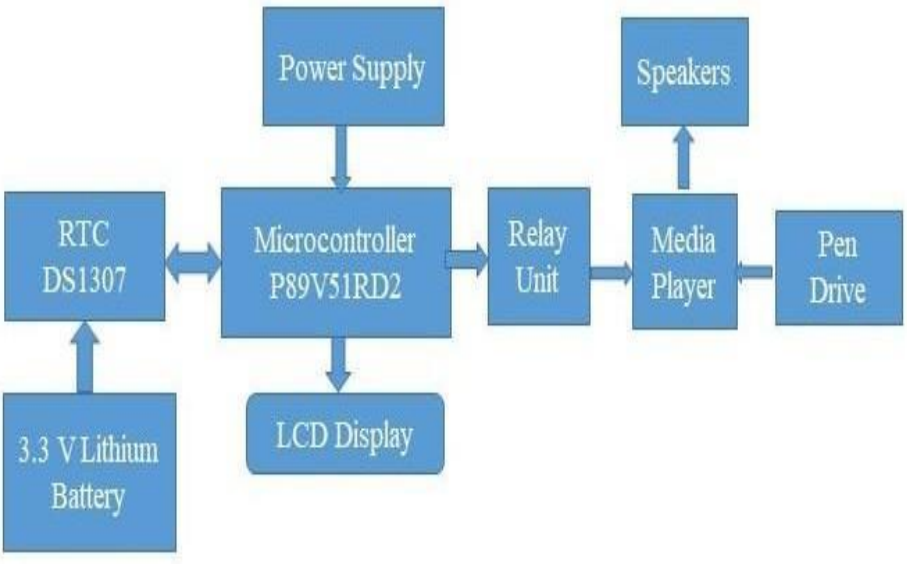

Fig.1 : *Block Diagram.*

5 Experimental set up:

Figure 2 shows the actual experimental set up where how external media player is connected to main microcontroller, how external media player is were powered ON.

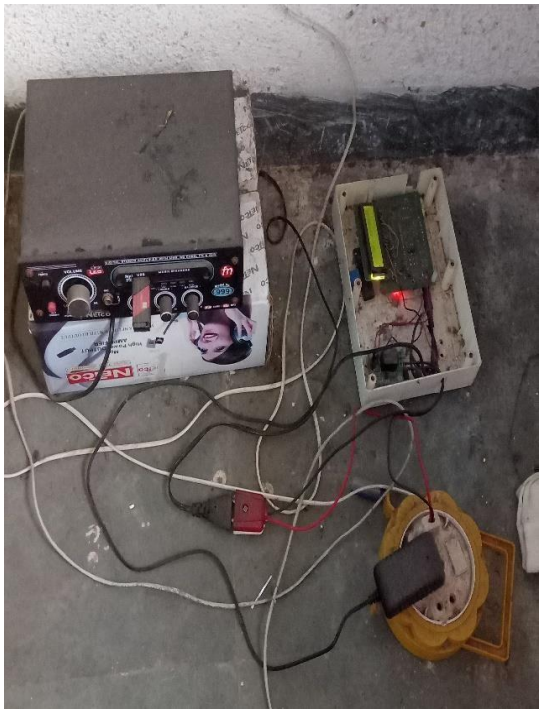

Fig.2 : *Experimental Set up*

Figure 3 shows how speakers are connected to media player. As the mains supply resumes, microcontroller initially checks with predefined times, this & date displayed on LCD display. As the times matches for predefined time it turns ON external media player through relay for exactly 70 seconds. Within this time period exactly total anthem gets played and external media player gets turned

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OFF. Both types' speakers are used unidirectional as well as Dolby speakers. Speakers are located 50 feet distance from external media player to cover maximum distance.

Fig.3 : *Speakers used*

6 Proteus Simulation

Figure 4 shows proteus simulation used for designing system and testing a code. A whole system were initially tested on proteus simulation after all check-up it were tested on hardware.

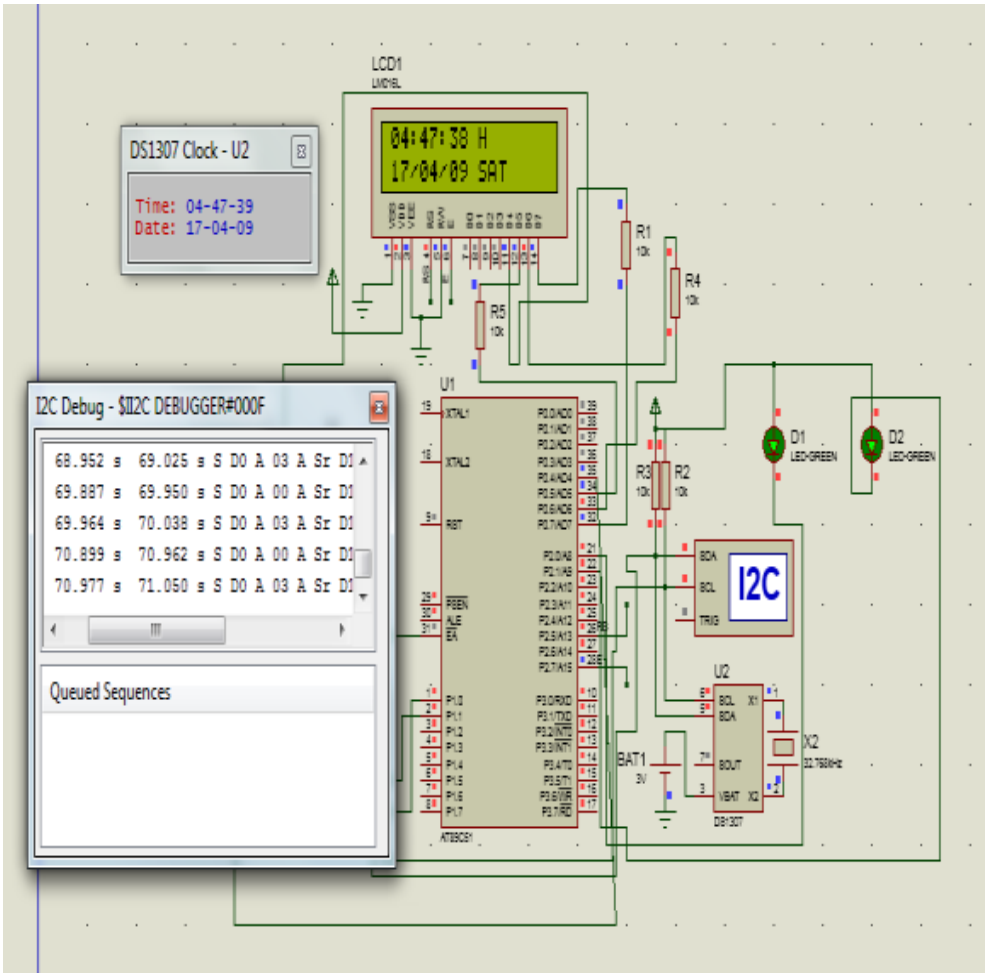

Fig.4: *Proteus simulation*

Sample Program code:

```
/* Name      : main.c
 *  Purpose : National Anthem.
 * Author : Lambe S.M.
 * Date     : 06-11-15
 * Website :
 *  Revision : None
 */#include "Includes.h"

//      Main
function
void main()
{
        write = 0;
        //P2^0 = '0';
        write = 0;
        write1 = 0;
        InitLCD();        //    Initialize
        LCD InitI2C();  //    Initialize
        i2c pins


         //Set initial time
//Set_DS1307_RTC_Time(02, 13, 25, 00);          // Set time in 24 hr mode

        // Set initial date
 //Set_DS1307_RTC_Date(14, 07, 19, Sunday);    // Set 02-11-2012 @ Friday

        while(1)
        {
                //      Display     RTC     time     on     first     line     of     LCD
                DisplayTimeToLCD(Get_DS1307_RTC_Time());


                //      Display     RTC     date     on     second     line     of     LCD
                DisplayDateOnLCD(Get_DS1307_RTC_Date());

                delay(65000);     // Roughly about 1 second delay
        }
}
```

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7 Conclusion

A dedicated 2 months of all hard work we designed & implemented a total system of automatic national anthem player unit. Since last 4 years it were working in a good condition. No single case were gone wrong. Everything still working smoothly. It can be converted to RTC based device ON/OFF control also. Still date a lithium battery is also in good working condition.

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