

OTP Based Ration Distribution System Based On IOT

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ABSTRACT

This project proposes an IoT-based automated system for the fair and corruption-free distribution of essential commodities, such as rice, wheat, and sugar, to registered beneficiaries. The traditional PDS often suffers from issues like manual errors, unauthorized access, and the black-marketing of goods due to a lack of a transparent tracking mechanism. The proposed system addresses these challenges through automation, secure authentication, and real-time monitoring.

Keywords: OTP, Ration Distribution, IOT

I. INTRODUCTION

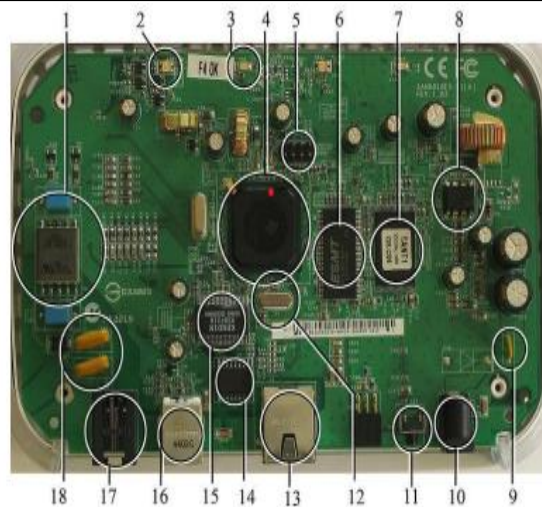
The ration distribution system is one of the largest government's economic policies in India. Its main motto is to provide food grains (sugar, wheat, rice, kerosene etc.) to the people at affordable rates. The network of the ration shops is spread all over in India to provide food security to the people. This distribution of ration is controlled and monitored by central government, along with the state government. But it has so many limitations. Most of the ration shopkeepers keep fake ration cards with them. Due to fake ration cards, the dealer receives the extra ration from higher authority and he sales it into the open market. The dealer may not provide a sufficient amount of food grains to consumers. Most of the time people are not aware of the availability of ration in ration shop. The dealer may sale ration at higher rates than recommended by the government or he may do wrong entries in register.

II. EMBEDDED SYSTEMSLCD PIN DIAGRAM

Embedded Systems: An embedded system is a computer system designed to perform one or a few dedicated functions often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts.

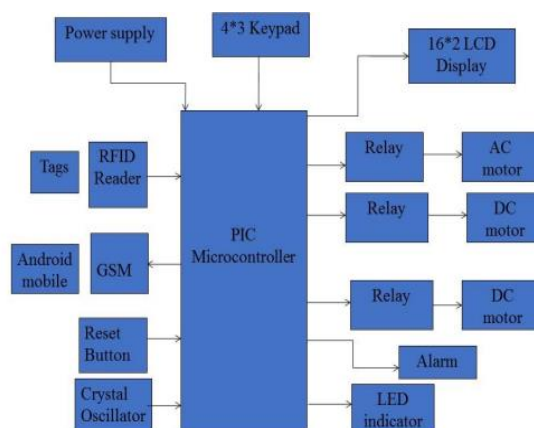
By contrast, a general-purpose computer, such as a personal computer (PC), is designed to be flexible and to meet a wide range of end-user needs. Embedded systems control many devices in common use today. Embedded systems are controlled by one or more main processing cores that are typically either microcontrollers or digital signal processors (DSP). The key characteristic, however, is being dedicated to handle a particular task, which may require very powerful processors. For example, air traffic control systems may usefully be viewed as embedded, even though they involve mainframe computers and dedicated regional and national networks between airports and radar sites. (Each radar probably includes one or more embedded systems of its own.) Since the embedded system is dedicated to specific tasks, design engineers can optimize it to reduce the size and cost of the product and increase the reliability and performance.

Some embedded systems are mass-produced, benefiting from economies of scale. Physically embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.



III. HARDWARE DESCRIPTION

In this chapter the block diagram of the project and design aspect of independent modules are considered. Block diagram.

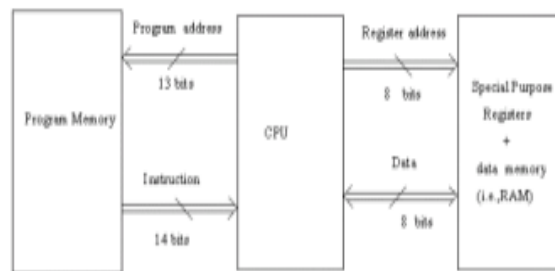


The main blocks of this project are:

- Power Supply.
- PIC Microcontroller.
- RFID reader.
- RFID tag.
- LCD display with driver
- Relays.
- Keypad.
- GSM.
- Buzzer.

IV. CPU ARCHITECTURE:

The CPU uses Harvard architecture with separate Program and Variable (data) memory interface. This facilitates instruction fetch and the operation on data/accessing of variables simultaneously. Architecture of PIC microcontroller.

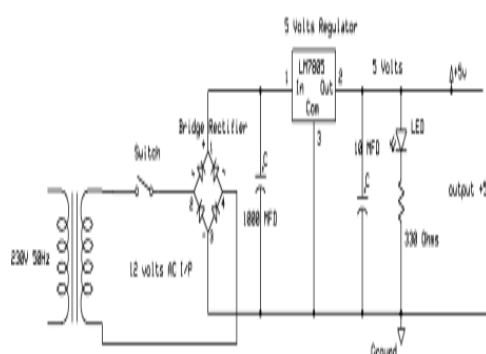


Basically, all PIC microcontrollers offer the following features:

- RISC instruction set with around 35 instructions _9 Digital I/O ports
- On-chip timer with 8-bit prescaler.
- Power-on reset
- Watchdog timer
- Power saving SLEEP mode
- Direct, indirect, and relative addressing modes
- External clock interface
- RAM data memory
- EPROM (or OTP) program memory

This is the specification for PIC16F877A from Microchip. A single microcontroller which is very brilliant and useful. Also this microcontroller is very easy to be assembled, program and also the price is very cheap. It cost less than 10 dollar . The good thing is that single unit can be purchased at that 10 dollar price. Unlike some other Integrated Circuit that must be bought at a minimum order quantity such as 1000 units or 2000 units or else you won't be able to purchase it. One unit of PIC16F877A microcontroller can be programmed and erased so many times. Some said about 10 000 times. If you are doing programming and downloading your code into the PIC 20 times a day that means you can do that for 500 days which is more than a year! The erasing time is almost unnoticeable because once new program are loaded into the PIC, the old program will automatically be erased immediately. During my time of Degree study, I did not use PIC but I use other type of microcontroller.

V. Circuit diagram of Regulated Power Supply with Led connection

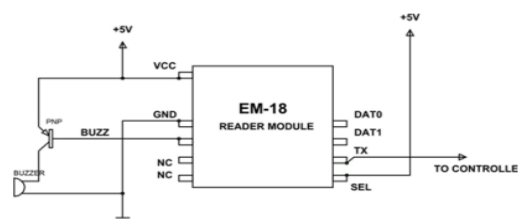


The AC source is given to the step down transformer which converts the large 230v AC source into limited 12vAC source, Rectifier which converts 12vAC to pulsating 12v DC, filter the remove the noise and then give that resulting voltage to the 7805 voltage regulator ,the output of voltage regulator is 5v is give to the microcontroller for working.

VI. EM-18 Features and Specifications

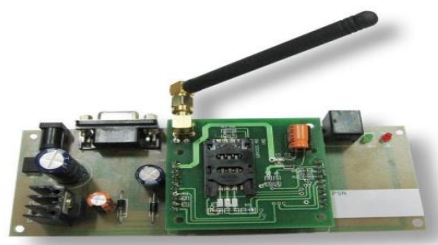
- Operating voltage of EM-18: +4.5V to +5.5V
- Current consumption: 50mA
- Can operate on LOW power
- Operating temperature: 0°C to +80°C
- Operating frequency: 125KHz
- Communication parameter: 9600bps
- Reading distance: 10cm, depending on TAG

Integrated Antenna How to Use EM-18 RFID Module EM-18 is used like any other sensor module. First we choose the mode of communication between MODULE and CONTROLLER. Next we will program the controller to receive data from module to display. Next power the system. When a tag is brought near the MODULE it reads the ID and sends the information to controller. The controller receives the information and performs action programmed by us. **Step1:** Establishing a mode of communication. EM-18 can provide output through two communication interface. One is RS232 and another is WEIGAND. The form of communication is selected by SEL pin. If SEL pin is selected HIGH then form of communication is RS232 and if SEL pin is pulled LOW then form of communication is WEIGAND. Usually the RS232 is selected because it's popular so SEL pin is pulled HIGH. **Step2:** The output of MODULE bit rate is 9600bps (bit per second). The controller should be programmed to receive information from MODULE at this rate. If bit rate of controller mismatches then the system will not work correctly.



Global System for Mobile Communication

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.



SOFTWARE DESCRIPTION This project is implemented using following software's: • Express PCB – for designing circuit

- PIC C compiler - for compilation part

Express PCB: Breadboards are great for prototyping equipment as it allows great flexibility to modify a design when needed; however the final product of a project, ideally should have a neat PCB, few cables, and survive a shake test. Not only is a proper PCB neater but it is also more durable as there are no cables which can yank

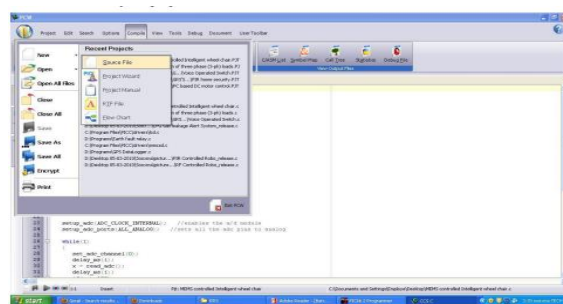
loose. Express PCB is a software tool to design PCBs specifically for manufacture by the company Express PCB (no other PCB maker accepts Express PCB files). It is very easy to use, but it does have several limitations. It can be likened to more of a toy than a professional CAD program. It has a poor part library (which we can work around) It cannot import or export files in different formats It cannot be used to make prepare boards for DIY production Express PCB has been used to design many PCBs (some layered and with surface-mount parts. Print out PCB patterns and use the toner transfer method with an Etch Resistant Pen to make boards. However, Express PCB does not have a nice print layout. Here is the procedure to design in Express PCB and clean up the patterns so they print nicely. 4.1.1 Preparing Express PCB for First Use: Express PCB comes with a less than exciting list of parts. So before any project is started head over to Audio logical and grab the additional parts by morsel, ppl, and tangent, and extract them into your Express PCB directory. At this point start the program and get ready to setup the workspace to suit your style. Click View -> Options. In this menu, setup the units for "mm" or "in" depending on how you think, and click "see through the top copper layer" at the bottom. The standard color scheme.

VII. Compilation and simulation steps:

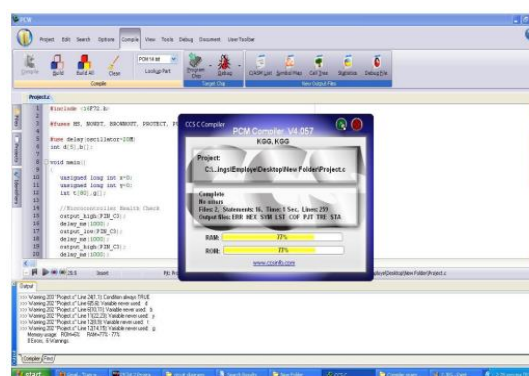
For PIC microcontroller, PIC C compiler is used for compilation.

The compilation steps are as follows:

- Open PIC C compiler.
- You will be prompted to choose a name for the new project, so create a separate folder where all the files of your project will be stored, choose a name and click save.



- Click Project, New, and something the box named 'Text1' is where your code should be written later.
- Now you have to click 'File, Save as' and choose a file name for your source code ending with the letter '.c'. You can name as 'project.c' for example and click save. Then you have to add this file to your project work.



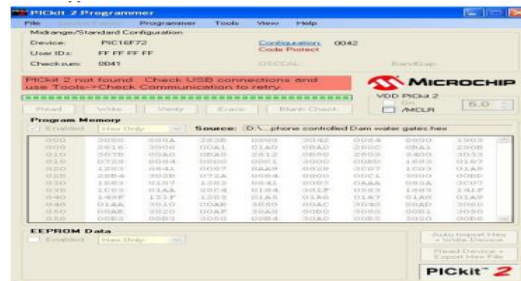
- You can then start to write the source code in the window titled 'project.c' then before testing your source code;
- you have to compile your source code, and correct eventual syntax errors.
- By clicking on compile option .hex file is generated automatically.

This is how we compile a program for checking errors and hence the compiled program is saved in the file where we initiated the program. Open Proteus 7 and click on IS1S6.

Now it displays PCB where circuit is designed using microcontroller. To design circuit components are

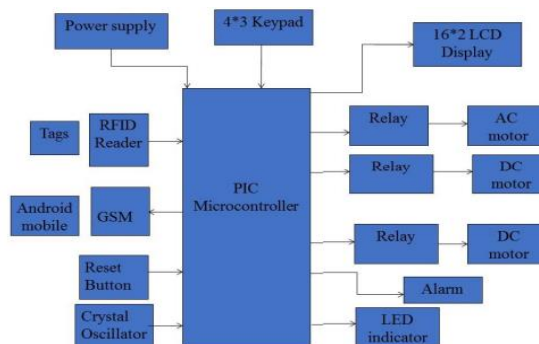
required. So click on component option. 10. Now click on letter 'p', then under that select PIC16F877A ,other components related to the project and click OK. The PIC 16F877A will be called your "Target device", which is the final destination of your source code.

Dumping steps:



VIII. PROJECT DESCRIPTION

In this chapter, schematic diagram and interfacing of PIC microcontroller with each module is considered.



ADVANTAGES:

1. Highly efficient and user-friendly design.
2. Easy to operate.
3. Low power consumption.
4. Visual alerts using LCD.
5. Audible alerts using Buzzer.
6. Man power is reduced due to automated self-service.
7. GSM based SMS and OTP alerting and intimation.
8. Due to use of RFID technology robbery of the Ration is prevented.

IX. RESULT:

The project "OTP Based Ration distribution system" was designed a ration distribution system using RFID and GSM technology.

This system works based on OTP ENTERD BY THE USER USING keypad. When the system detects unauthenticated TAG or incorrect OTP it will activate the buzzer for alerts. 7.2 Conclusion: Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

X. CONCLUSION

The conclusion of an IoT-based OTP ration distribution system is that it serves as a secure, transparent, and automated replacement for the traditional manual Public Distribution System (PDS). By utilizing OTP

authentication, RFID/biometrics, and IoT-driven, cloud-connected hardware, the system effectively mitigates fraud, ensures precise, automated, and tamper-proof distribution, and provides real-time tracking for authorities.

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