

# **RFID Based Smart Blood Stock System Using Sensors**

Kavitha.K<sup>1</sup>, Deepika.S<sup>2</sup>, Lekha sree.S<sup>3</sup>, Nithya.R<sup>4</sup>

UG Students, Department of Electronics and Communication Engineering, JNN Institute of Engineering, Chennai,  
India<sup>123</sup>

Assistant Professor, Department of Electronics and Communication Engineering, JNN Institute of Engineering,  
Chennai, India<sup>4</sup>

**ABSTRACT:** The blood banks receive blood through blood donor directly in hospital or in some awareness camp. Thus, blood is taken to the hospital and keeps it in a maintained air tight bag and maintains a temperature in which the blood is preserved and later if required use that blood. Even the blood maintained there is possible of blood to get some virus in case of unmaintained temperature. In this project two sensors are used to check whether the stored blood is well enough to use for patient. The temperature and moisture sensor is used to find the temperature and moisture content inside the bag the data will be stored in EEPROM. By using RFID we can check the status of the blood in which the full details are stored and also we can find the blood in the rack. Meanwhile, the details are updated in the server.

**KEYWORDS:** RFID Reader, Temperature and Moisture sensor, EEPROM, PIC16F877X.

## **I. INTRODUCTION**

RFID technology is gaining strong support from business for various applications such as supply chain management, access control, air line luggage management, etc. Due to the cost consideration, it is still not a replacement for the traditional item-level Base-code. From a business perspective, RFID technology can be beneficially utilized to improve operational efficiency in domains such as inventory taking, warehouse picking, and verifying order numbering.

A complete UHF radio-frequency identification (RFID)-based system capable of localizing individual blood bags inside storage cabinet drawers is presented. It was developed to demonstrate the improvement possibility of current blood stock management systems and as the submission to the 2014 IEEE AP-S Student Design Contest: Antennas for RFID Application. The system is composed of a cabinet model, a transceiver unit, and a PC with the controlling software. A new implementation of pseudo localization principle is used to localize the blood bags that are equipped with dedicated passive tags designed to be resilient to blood proximity and small size. The detector antennas are placed at the drawers bottoms and additional passive tags are utilized to identify individual locations in each drawer. The transceiver unit is made from off-the-shelf commercial electronic boards and wirelessly controlled by software run on the PC. The entire system is small, transportable, battery powered, and low cost.

## **II. EXISTING SYSTEM**

The blood banks receive blood through blood donor directly in hospital or in some awareness camp. Thus, blood is taken to the hospital and keep it in a maintained air tight bag and maintain a temperature in which the blood is preserved and later if required use that blood. Even the blood maintained there is possible of blood to get some virus in case of unmaintained temperature.

## **III. PROPOSED SYSTEM**

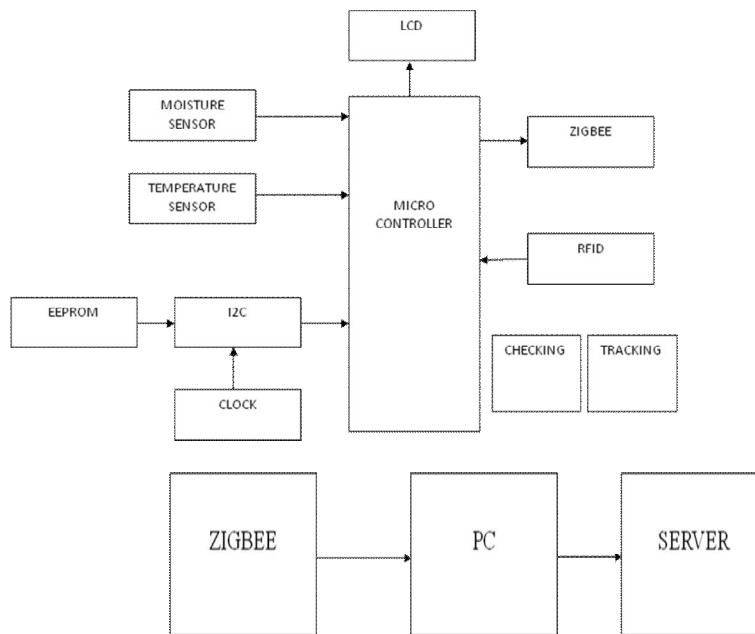
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### POWER SUPPLY UNIT

A power supply provides a constant output regardless of voltage variations. "Fixed" three-terminal linear regulators are commonly available to generate fixed voltages of plus 3 V, and plus or minus 5 V, 9 V, 12 V, or 15 V when the load is less than about 7 amperes.

The "78xx" series (7805, 7812, etc.) regulate positive voltages while the "79xx" series (7905, 7912, etc.) regulate negative voltages. Often, the last two digits of the device number are the output voltage: ex. a 7805 is a +5 V regulator, while a 7915 is a -15 V regulator. The 78xx series ICs can supply up to 1.5 Amperes depending on the model.

Features:

1. Output Current up to 1A
2. Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24
3. Thermal Overload Protection
4. Short Circuit Protection

### TEMPERATURE SENSOR INTRODUCTION

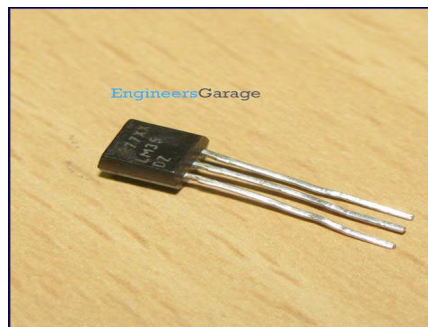


Fig : Temperature sensor

The measurement of temperature is one of the fundamental requirements for environmental control, as well as certain chemical, electrical and mechanical controls. Many different types of temperature sensors are commercially

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available, and the type of temperature sensor that will be used in any particular application will depend on several factors. For example, cost, space constraints, durability, and accuracy of the temperature sensor are all considerations that typically need to be taken into account.

Various types of temperature sensors are known including liquid-in-glass (LIG) thermometers, bimetallic thermometers, resistance thermometers, thermocouples, and radiometers. Depending upon the temperature to be measured, the required accuracy of the measurement, and other factors such as durability or cost, one type of temperature sensor may be preferable over another.

Some temperature sensors provide a wide range of temperature measurement, whereas other temperature sensors may only provide temperature information for a small temperature range. In addition to the temperature range sensed, the sensitivity and the accuracy of temperature sensors may also vary widely. Additionally, some temperature sensors work at high voltages while others only work at low voltages.

There're many types of devices that can be employed as temperature sensors. They include integrated circuits (ICs), pyrometers, resistance temperature detectors (RTDs), thermistors, thermocouples, electromechanical & volume (EMV).

LM35 is a precision IC temperature sensor with its output proportional to the temperature (in °C). The sensor circuitry is sealed and therefore it is not subjected to oxidation and other processes. With LM35, temperature can be measured more accurately than with a thermistor. It also possess low self heating and does not cause more than 0.1 °C temperature rise in still air.

The operating temperature range is from -55°C to 150°C. The output voltage varies by 10mV in response to every °C rise/fall in ambient temperature, *i.e.*, its scale factor is 0.01V/°C.

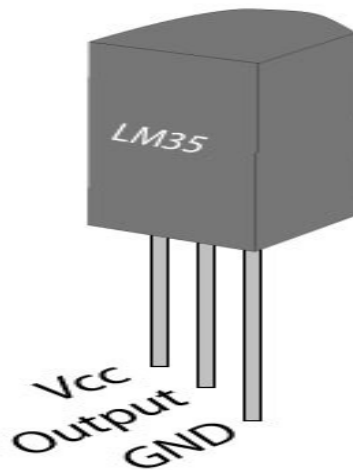
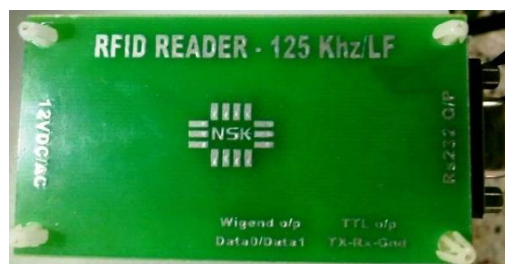


Fig: Pin diagram of temperature sensor

Radio Frequency Identification (RFID)



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Fig:2.5a RFID Reader

### Asset Tracking :

It's no surprise that asset tracking is one of the most common uses of RFID. Companies can put RFID tags on assets that are lost or stolen often, that are underutilized or that are just hard to locate at the time they are needed. Just about every type of RFID system is used for asset management. NYK Logistics, a third-party logistics provider based in Secaucus, N.J., needed to track containers at its Long Beach, Calif., distribution center. It chose a real-time locating system that uses active RFID beacons to locate container to within 10 feet. Manufacturing: RFID has been used in manufacturing plants for more than a decade. It's used to track parts and work in process and to reduce defects, increase throughput and manage the production of different versions of the same product.

### Supply Chain Management :

RFID technology has been used in closed loop supply chains or to automate parts of the supply chain within a company's control for years.

As standards emerge, companies are increasingly turning to RFID to track Shipments among supply chain partners.

### Retailing :

Retailers such as Best Buy, Metro, Target, Tesco and Wal-Mart are in the forefront of RFID adoption. These retailers are currently focused on improving supply chain efficiency and making sure product is on the shelf when customers want to buy it.

### Payment Systems :

RFID is all the rage in the supply chain world, but the technology is also catching on as a convenient payment mechanism. One of the most popular uses of RFID today is to pay for road tolls without stopping. These active systems have caught on in many countries, and quick service restaurants are experimenting with using the same active RFID tags to pay for meals at drive.

### Security and Access Control:

RFID has long been used as an electronic key to control who has access to office buildings or areas within office buildings. The first access control systems used low-frequency RFID tags. Recently, vendors have introduced 13.56 MHz systems that offer longer read range.

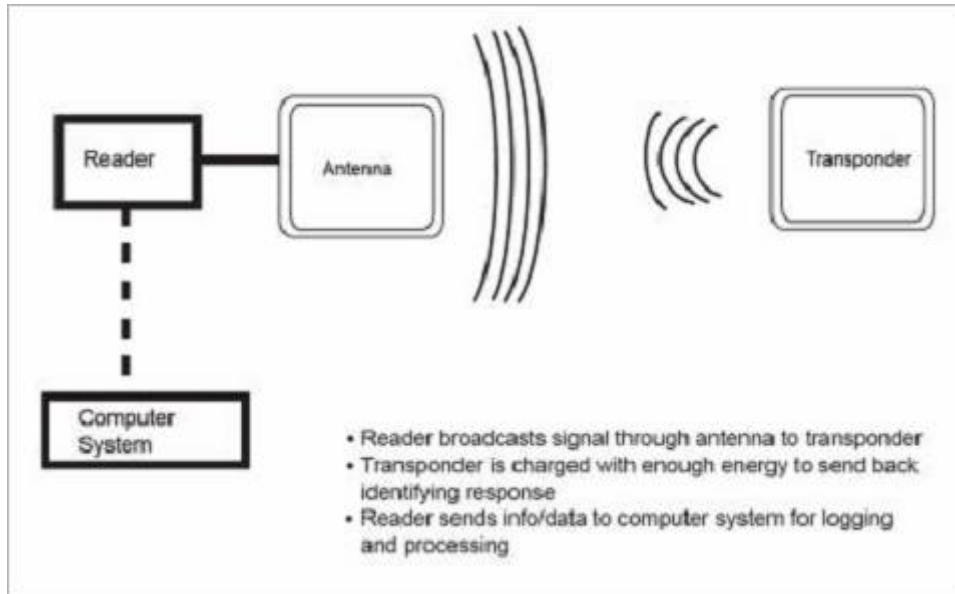
The advantage of RFID is it is convenient (an employee can hold up a badge to unlock a door, rather than looking for a key or swiping a magnetic stripe card) and because there is no contact between the card and reader, there is less wear and tear, and therefore less maintenance.

As RFID technology evolves and becomes less expensive and more robust, it's likely that companies and RFID vendors will develop many new applications to solve common and unique business problems.

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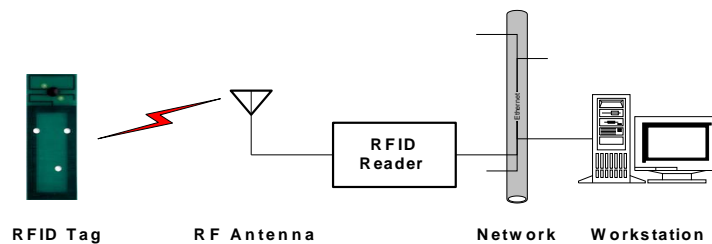


Frequency:

The frequency bands are divided into three:

Low	Frequency	(LF)	–	100-500	KHz.
High	Frequency	(HF)	–	13.56	MHz.
Ultra High Frequency (UHF) – 850 MHz – 5.8 GHz .					

RFID system components:



### ZIGBEE

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for Low-Rate Wireless Personal Area Networks (LR-WPANs), such as wireless light switches with lamps, electrical meters with in-home-displays, consumer electronics equipment via short-range radio needing low rates of data transfer.

The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking.

ZigBee is a low-cost, low-power, wireless mesh networking standard. First, the low cost allows the technology to be widely deployed in wireless control and monitoring applications. Second, the low power-usage allows longer life with smaller batteries. Third, the mesh networking provides high reliability and more extensive range.

It is not capable of powerline networking though other elements of the Open HAN standards suite promoted by open AMI and Utility AMI deal with communications co-extant with AC power outlets. In other words, ZigBee is



intended not to support powerline networking but to interface with it at least for smart metering and smart appliance purposes.

ZigBee coordinator (ZC):

The most capable device, the coordinator forms the root of the network tree and might bridge to other networks. There is exactly one ZigBee coordinator in each network since it is the device that started the network originally. It is able to store information about the network, including acting as the Trust Center & repository for security keys.

ZigBee Router (ZR):

As well as running an application function, a router can act as an intermediate router, passing on data from other devices.

ZigBee End Device (ZED):

Contains just enough functionality to talk to the parent node (either the coordinator or a router); it cannot relay data from other devices. This relationship allows the node to be asleep a significant amount of the time thereby giving long battery life. A ZED requires the least amount of memory, and therefore can be less expensive to manufacture than a ZR or ZC.

LCD DISPLAY

Liquid Crystals

We learned in school that there are three common states of matter: solid, liquid or gaseous. So, do liquid crystals act closer like solids or liquids or something else? It turns out that liquid crystals are closer to a liquid state than a solid. It takes a fair amount of heat to change a suitable substance from a solid into a liquid crystal, and it only takes a little more heat to turn that some liquid crystal into a real liquid. This explains why liquid crystals are very sensitive to temperature and why they are used to make thermometers and mood rings. It also explains why a laptop computer display may act funny in cold weather or during a hot day at beach!

Types

Most liquid crystal molecules are rod-shaped and are broadly categorized as either thermo tropic or lyotropic. Thermo tropic liquid crystals will react to changes in temperature or in some cases, pressure. The reaction of lyotropic liquid crystals, which are in manufacture of soaps and detergents, depends on the type of solvent they are mixed with. Thermo tropic liquid crystals are either isotropic or nematic. The key difference is that the molecules in isotropic liquid crystal substances are random in their arrangement, while nematics have a definite order or pattern.

16 x 2 LCD DISPLAY

A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

A 16x2 LCD means it is an ALTRONIC alphanumeric 16 character, 2 line dot matrix liquid crystal display. It has 96 inbuilt ASCII characters as well as 92 special letters and 8 custom characters, which can be displayed on the screen. It has 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers namely Command and Data.

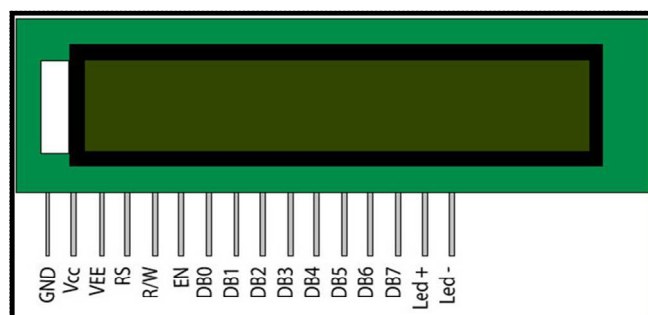


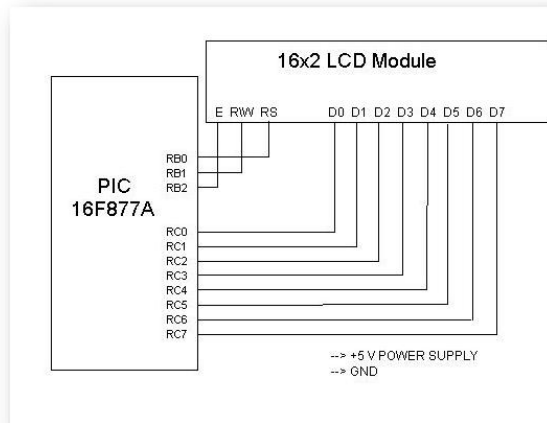
Fig: 2.7a Pin diagram of LCD

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### 2.7.3 INTERFACING WITH LCD DISPLAY

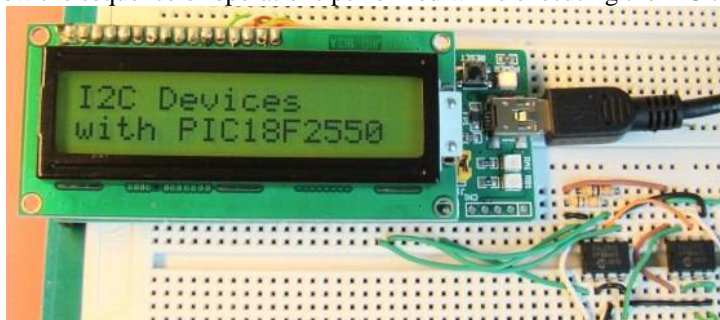


#### Programming Steps

- Before sending Data to be Displayed to the LCD, it should be prepared to hold that particular value.
- For this certain initializations are to be done as per the Instructions.
  - Move Value 0X38, 3 times.( Applied max 3 times due to rise time factor)
  - Move Value 0X06, 1 time.
  - Move Value 0X0F, 1 time.
  - After each initializations command function and delay should be called.
  - Then after initialisation move data to the LCD.
  - Call the data function and delay.

#### Output

The following pictures show the sequence of operations performed while executing the I2C test software.



Start up message



Testing EEPROM1

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## IV.CONCLUSION

Hereby we would like to conclude that our project, “**RFID based smart blood stock system using sensors**” is very useful in storing and maintaining blood in a good compact condition. Where here we are using humidity and temperature sensors to monitor the conditions of the blood.

In case of any changes those details gets stored in a EEPROM, where it is a temporary storage and we can easily change it when it is necessary. There if any blood goes beyond the expiry date it gets deleted from the list. This system quite easy transportable.

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