International Journal of Ethics in Engineering & Management Education
Website: www.ijeee.in (ISSN: 2348-4748, Volume 1, Issue 4, April 2014)

Medicine Refrigeration For Rural and Flood Affected Areas–Fast Chilling Solar Based Dual Mode Battery Charging

[1] Mrs.ROOPA.C , [2] Jayapalreddy, [3] Prashanth.Patil, [4]Rakesh.Byakod
[1]lecturer in ECE Dept., PDA College of engineering, Gulbarga
[2, 3, 4] Students of ECE Dept., PDACE, Gulbarga

Abstract: **The current problem that is facing by the people is natural calamities .This is occurring due to many human effects like pollution, deforestation, soil erosion etc &many other effects which results in natural disaster. So in flood affected areas the medicine refrigeration in one of the difficult problem. So we in our project finding a solution to this problem. By designing a refrigerator which runs on solar energy which is a portable device**

Keywords **-peltier, CFC, ammonia, solarpanels, battery, voltage regulator.**

1. INTRODUCTION:

The main purpose of the project is to monitor and control the Refrigerator temperature by using a solar panel. This system controls the mini refrigerator which uses solar power as the power supply.

Thus, the project saves the electrical power up to the maximum extent. In today's world global warming is being increasing year by year. There are many reasons like pollution, deforestation, water contamination etc... In coming years the major problem before us is depletion of ozone layer which is caused by the release of CFC's. Some of the requirements which cause this effect are refrigerators, AC'S. In this project we are mainly focusing on a solution to control the problem we have focused on refrigerators which releases CFC's. Here we are designing a mini solar based refrigerator which is cheaper as well as eco friendly.

The circuit is programmed for on/off control. It can be implemented for several applications including air-conditioners, water-heaters, snow-melting equipments, ovens, heat-exchangers, mixers, furnaces, incubators, thermal baths and veterinary operating tables.

We developed this project, which is relatively inexpensive to sense the temperature. The temperature is read by the ADC (Analog to Digital Converter) module of the microcontroller Unit. This ADC data is processed and converted into the actual temperature reading by the microcontroller. This processed data is sent to the LCD for user display.

The objectives of the project include:

1. Usage of mini refrigerator in real-time.
2. Usage of solar energy for refrigerator system.
3. LCD display & microcontroller monitored System

2. LITERATURE SURVEY

In earlier days refrigerators were there, but there was no proper control over the temperature (dynamic control) in the sense there were no proper control mechanism that could maintain the temperature as desired , the refrigerator would just provide a cooling effect continuously this effect would not be helpful in storing the medicines and preserving them and even other perishable food items and refrigerator are run on electrical supply and cfc's, ammonia are used as coolants which effect ozone layer .

It is a general object of our project to provide a solution for the above mentioned problem by using microcontroller based temperature control mechanism, i.e., a required temperature can be set in refrigerator for preserving medicines, other stuff which are to be preserved, and design a refrigerator which would run on solar power supply and here we are using semiconductor transducer (peltier device) as coolant in place of cfc's & ammonia

3. WORKING

Solar Powered Micro controller based Refrigeration control system

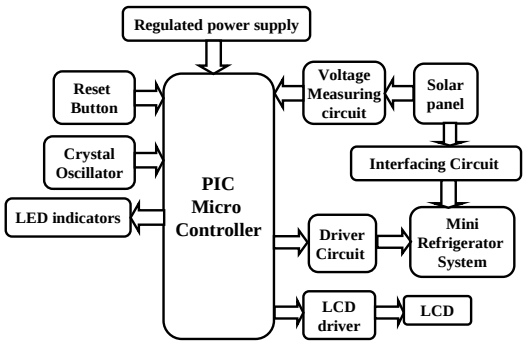


FIG 3.1: Block diagram of microcontroller based refrigerator control system

The main blocks of this project are:

1. Micro controller (16F72)
2. Reset button
3. Crystal oscillator
4. Regulated power supply (RPS)
5. LED Indicator

International Journal of Ethics in Engineering & Management Education
Website: www.ijeee.in (ISSN: 2348-4748, Volume 1, Issue 4, April 2014)

6. Solar panel
7. LCD

3.2 Micro controller:

Fig: 3.2 Microcontrollers

Introduction to Microcontrollers:

Circumstances that we find ourselves in today in the field of microcontrollers had their beginnings in the development of technology of integrated circuits. This development has made it possible to store hundreds of thousands of transistors into one chip. That was a prerequisite for production of microprocessors, and the first computers were made by adding external peripherals such as memory, input-output lines, timers and other. Further increasing of the volume of the package resulted in creation of integrated circuits. These integrated circuits contained both processor and peripherals. That is how the first chip containing a microcomputer, or what would later be known as a microcontroller came about.

Microprocessors&microcontrollers are widely used in embeddedsystems products. Microcontroller is a programmable device. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. The fixed amount of on-chip ROM, RAM and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical.

The microcontroller used in this project is PIC16F72. The PIC families of microcontrollers are developed by Microchip Technology Inc. Currently they are some of the most popular microcontrollers, selling over 120 million devices each year. There are basically four families of PIC microcontrollers:

PIC12CXXX 12/14-bit program word, PIC 16C5X 12-bit program word, PIC16CXXX and PIC16FXXX 14-bit program word, PIC17CXXX and PIC18CXXX 16-bit program word

The features, pin description of the microcontroller used are discussed in the following sections.

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

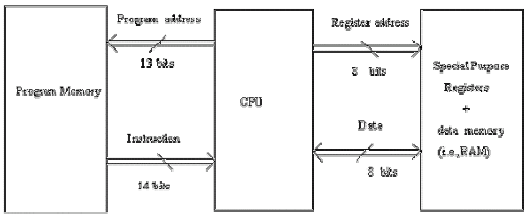


Fig.3.3.Architecture of PIC microcontroller

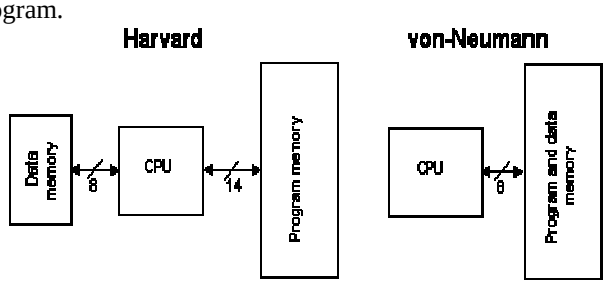
Basically, all PIC microcontrollers offer the following features:

- 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

Peripheral features:

- High sink/source current 25mA
- Timer0: 8-bit timer/counter with 8-bit prescaler can be incremented during sleep via external crystal/clock
- Timer2:8-bit timer/counter with 8-bit period register prescaler and post scalar.
- Analogue input channels
- Analogue comparators
- Additional timer circuits
- EEPROM data memory
- Flash EEPROM program memory
- External and timer interrupts
- In-circuit programming
- Internal oscillator
- USART serial interface

CENTRAL PROCESSING UNIT has a role of connective element between other blocks in the microcontroller. It coordinates the work of other blocks and executes the user program.



Harvard vs. von Neuman Block Architectures

CISC, RISC

It has already been said that PIC16F72 has RISC architecture. This term is often found in computer literature, and it needs to

International Journal of Ethics in Engineering & Management Education
Website: www.ijeee.in (ISSN: 2348-4748, Volume 1, Issue 4, April 2014)

be explained here in more detail. Harvard architecture is a newer concept than von-Neumann. It rose out of the need to speed up the work of a microcontroller. In Harvard architecture, data bus and address bus are separate. Thus a greater flow of data is possible through the central processing unit, and of course, a greater speed of work. Separating a program from data memory makes it further possible for instruction

REGULATED POWER SUPPLY:

Introduction: Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

A power supply may include a power distribution system as well as primary or secondary sources of energy such as

- Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics.
- Batteries.
- Chemical fuel cells and other forms of energy storage systems.
- Solar power.
- Generators or alternators.

Block Diagram:

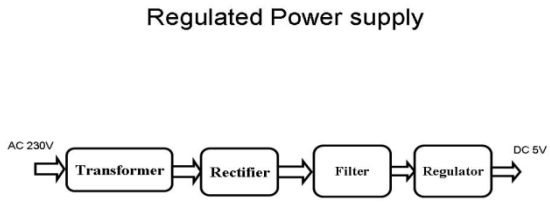


Fig 3.3.2 Regulated Power Supply

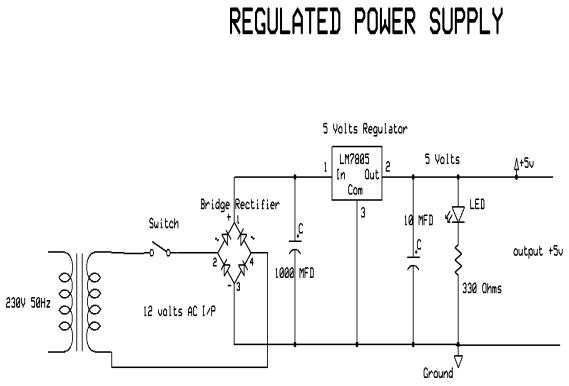


Fig 3.3.3 Circuit diagram of Regulated Power Supply with Led connection

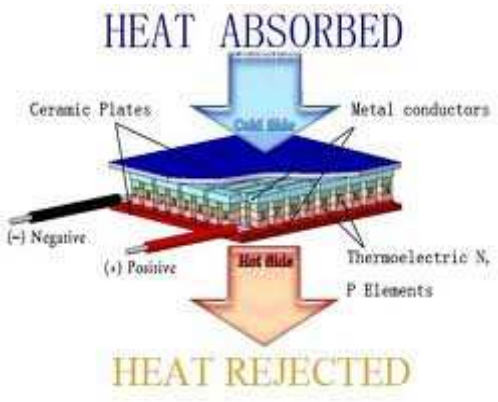
The components mainly used in above figure are

- 230V AC MAINS
- TRANSFORMER
- BRIDGE RECTIFIER(DIODES)
- CAPACITOR
- VOLTAGE REGULATOR(IC 7805)
- RESISTOR
- LED(LIGHT EMITTING DIODE)

The detailed explanation of each and every component mentioned above is as follows:

Peltier device

It is different electron densities, the semiconductors are placed thermally in parallel to each other and electrically in series. Then joined with thermally conducting plates on each side, an voltage is applied on free ends of semiconductor there is a flow of dc current across the junction causing temperature difference, the side with a cooling plate absorbs heat which is then moved to other side end where heat sink is present. A type of semiconductor made up of P and N types because they need to have



Solar Panel:

Photovoltaic Cells: Converting Photons to Electrons

The solar cells that you see on calculators and satellites are also called photovoltaic (PV) cells, which as the name implies (photo meaning "light" and voltaic meaning "electricity"), convert sunlight directly into electricity. A module is a group of cells connected electrically and packaged into a frame (more commonly known as a solar panel), which can then be grouped into larger solar arrays.

Photovoltaic cells are made of special materials called semiconductors such as silicon, which is currently used most commonly. Basically, when light strikes the cell, a certain portion of it is absorbed within the semiconductor material. This means that the energy of the absorbed light is transferred to the semiconductor. The energy knocks electrons loose, allowing them to flow freely.

PV cells also all have one or more electric field that acts to force electrons freed by light absorption to flow in a certain direction. This flow of electrons is a current, and by placing metal contacts on the top and bottom of the PV cell, we can draw that current off for external use, say, to power a

International Journal of Ethics in Engineering & Management Education
Website: www.ijeee.in (ISSN: 2348-4748, Volume 1, Issue 4, April 2014)

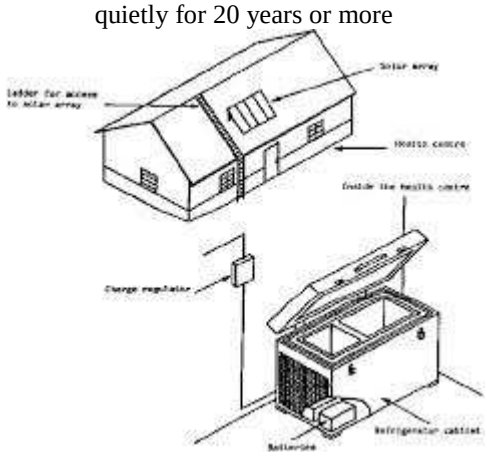
calculator. This current, together with the cell's voltage (which is a result of its built-in electric field or fields), defines the power (or wattage) that the solar cell can produce.

Solar Panel Setup:

The use of batteries requires the installation of another component called a **charge controller**. Batteries last a lot longer if they aren't overcharged or drained too much. That's what a charge controller does. Once the batteries are fully charged, the charge controller doesn't let current from the PV modules continue to flow into them. Similarly, once the batteries have been drained to a certain predetermined level, controlled by measuring battery voltage, many charge controllers will not allow more current to be drained from the batteries until they have been recharged. The use of a charge controller is essential for long battery life.

The other problem besides energy storage is that the electricity generated by your solar panels, and extracted from your batteries if you choose to use them, is not in the form that's supplied by your utility or used by the electrical appliances in your house. The electricity generated by a solar system is direct current, so you'll need an inverter to convert it into alternating current. Most large inverters will allow you to automatically control how your system works. Some PV modules, called AC modules, actually have an inverter already built into each module, eliminating the need for a large, central inverter, and simplifying wiring issues.

Throw in the mounting hardware, wiring, junction boxes, grounding equipment, over current protection, DC and AC disconnects and other accessories, and you have yourself a system. You must follow electrical codes (there's a section in the National Electrical Code just for PV), and it's highly recommended that a licensed electrician who has experience with PV systems do the installation. Once installed, a PV system requires very little maintenance (especially if no batteries are used), and will provide electricity cleanly and quietly for 20 years or more



4: SOFTWARE DESCRIPTION

This project is implemented using following software's:

- Express PCB – for designing circuit
- PIC C compiler - for compilation part
- Proteus 7 (Embedded C) – for simulation part

5: RESULTS

The project "**Solar Powered Micro controller based Refrigeration control system**" is designed such that refrigerator can be controlled automatically without any manual mechanism using solar panel, LCD display and control of refrigerator system. The system also displays the data on LCD display unit.

***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.

Future Scope:

Our project "**Solar Powered Micro controller based Refrigeration control system**" is mainly intended to monitor and control the Refrigerator temperature by using a solar panel. This project has a solar panel, LCD, mini refrigerator system, which is interfaced to the micro controller. The Micro Controller is programmed in such a way that the input from solar panel is monitored continuously and displays on LCD. The circuit is programmed for on/off control. It can be implemented for several applications including air-conditioners, water-heaters, snow-melting equipments, ovens, heat-exchangers, mixers, furnaces, incubators, thermal baths and veterinary operating tables.

This project can be extended by introducing a GSM module through which temperature can be monitored and also door opened alert through SMS and also control temperature through the mobile phone

REFERENCES

[1]. Aravind, E. C., 2011.*About Us: Genesis*[Online]Available at: http://www.aravind.org/aboutus/genesis.aspx[Accessed 15 March 2012].Aravind, E. C., 2011. *Activity Report 2010-2011*,
[2]. Madurai: Aravind Eye CareSystem.Bansal, P., 2005. Evolving Sustainably: A Longitudinal Study of CorporateSustainable Development.*Strategic Management Journal*26(3), pp. 197-218.Bhatlekar, A., 2010.
[3]. *The new cool* Mumbai: Mint.C-DAC, 2012.
[4]. *Agriculture: National Mission on Micro Irrigation (NMMI).*
[5]. [Online]Available at: http://www.indg.in/agriculture/rural-employment-schemes/national-horticulture-mission/national-mission-on-micro-irrigation-nmmi[Accessed 19 April 2012].chotuKool, 2010.
[6]. *chotuKool Journey*[Online]Available at: http://www.chotukool.in/SocialImpact/journey.html[Accessed 29 March 2012].chotuKool, 2010.
[7]. *Reach Us*[Online]Available at: http://www.chotukool.in/FeedBack.aspx[Accessed 29 March 2012].Christensen, C. M., 1997.
[8]. *The Innovator's Dilemma: When New TechnologiesCause Great Firms to Fail.*
[9]. 1st ed. Cambridge, Massachusetts: Harvard BusinessSchool Press.Colquhoun, S., 2010. upwardly mobile.
[10]. *African Decisions*,Issue 4, pp. 70-74.Gopalan, S., 2012.