

INTELLIGENT CLIMATE ADJUSTABLE E-UNIFORM FOR SOLDIERS

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Abstract: Solar based E-Uniform gives better protection to the soldiers who are working in extreme weather conditions. Solar Panels are used to power up the internal circuitry of the E-uniform. A 12 VDC lead acid rechargeable battery is used for storing the energy. We are using conventional battery charging unit also for giving supply to the circuitry.

AT89S52 microcontroller is the heart of the circuit as it controls all the functions. A voltage sampler is interfaced with the system using ADC0808 to get the voltage generated from battery as a display on a 16X2 LCD.

The project is operated in summer mode and winter mode. By selecting the mode of operation, we are operating the H-Bridge IC such that it can drive body heater/cooler. The heater/cooler in turn will help us to provide chilling or warming effect inside the uniform which helps the soldier to bear to any kind of external environment.

The metal sensor will detect the metal like bomb and intimate the soldier with a buzzer indication. The GSM is interfaced with the microcontroller and GPS is also interfaced such that the tracking of the entire soldier is observed. And the location is messaged to the particular concern person /dept. This Uniform will make the soldier to work in any kind of environment

Keywords: -Peltier Plate, AT89S52, Solar Panel, Voltage Sampler, ADC

I. INTRODUCTION:

Soldiers are the Army's most important resource. Soldiers play a vital role to protect one's country. The term soldiers include service men and women from the Army, Air Force, Navy and Marines. They will always be the one responsible for taking and holding the duty in extreme weather conditions throughout the year. While providing security to the nation, they may face troubles in extreme hot/cold weather conditions. Both very hot and cold temperatures could be dangerous to health.

In this project we are going to design an E-Uniform which gives better protection to the soldiers who are working in extreme weather conditions. This paper gives two modes summer mode and winter mode. By selecting the mode of operation the relays drive body heater/cooler. The heater / cooler in turn will help us to provide chilling or warming effect inside the uniform which helps the soldier to bear to any kind of external environment and he can work efficiently without heat stress or cold stress

II. EXISTING SYSTEM:

Existing system applications are limited as it provides body temperature regulation only, but nothing more than that. It does not provide any means of Security, Navigation, Monitoring at a remote place.

III. BLOCKDIAGRAMOFSOLARBASEDE-UNIFORM:

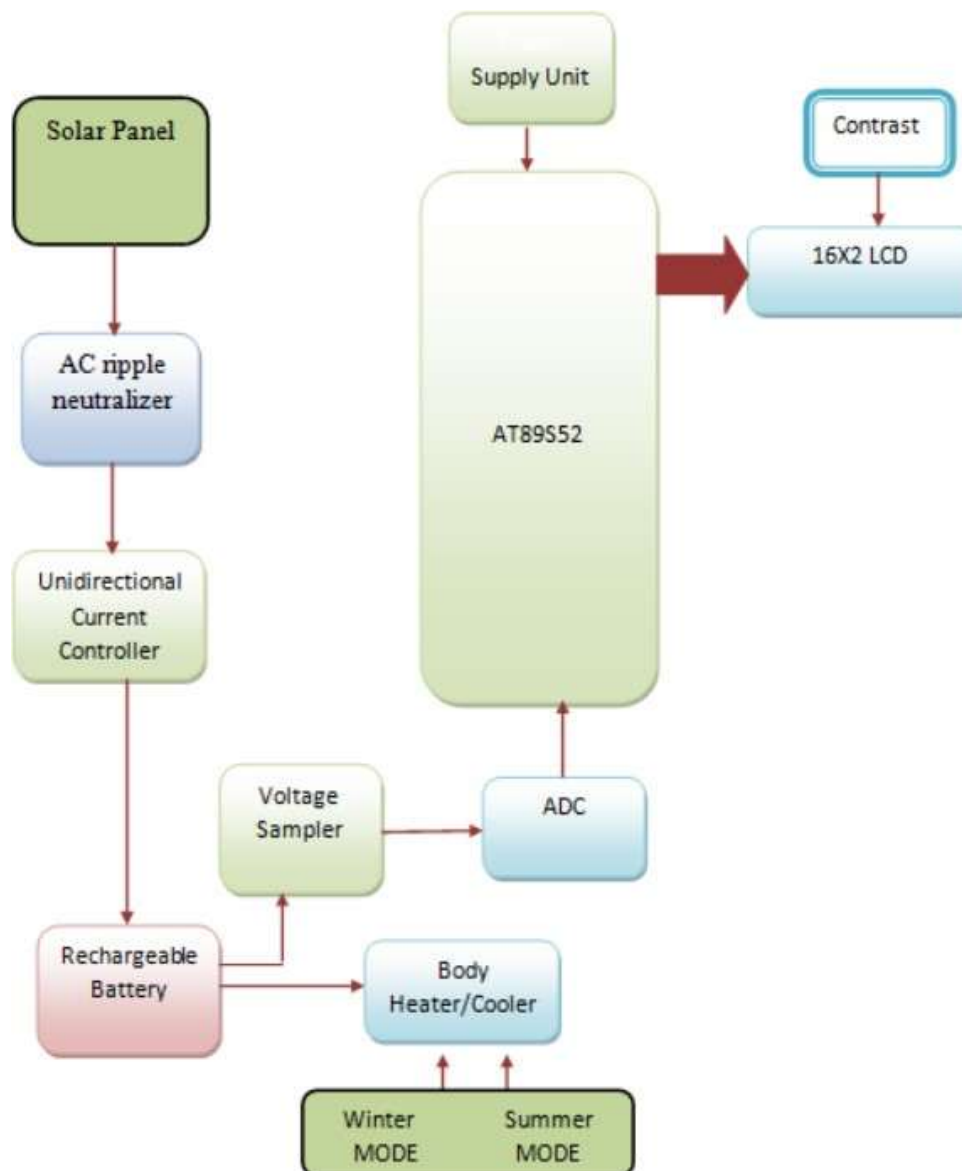


Fig.3:Block Diagram

3.1. OPERATION:

In this paper solar panels are used for charging a Lead Acid Battery (12V, 1.2 Amp hrs), a peltier thermoelectric device which when connected to battery generates cooling effect on one side and heat is dissipated on other side through heatsink. A regulator 7803 is used to drive the internal cooling fan and LED.

Here we are using Micro controller (AT89S52) allows dynamic and faster control. Liquid crystal display (LCD) makes the system user-friendly. Here we are using LCD Display for displaying the values of present and maximum voltage values which are present in the rechargeable battery.

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3.2. AT89S52MICROCONTROLLER:

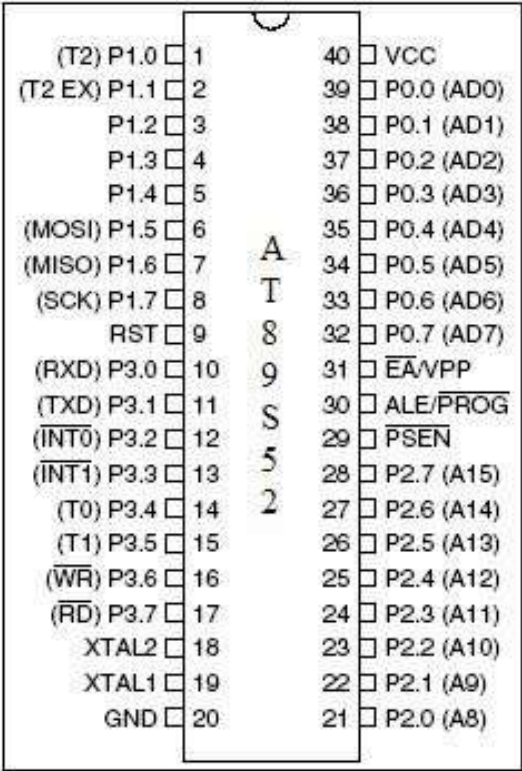


Fig.3.2: PindiagramofAT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software-selectable power saving modes.

The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

3.3. PELTIERPLATE:

The most common temperature control option for the AR rheometers is the Peltier Plate. The AR-G2, AR 2000ex and AR 1500ex Peltier plates have a temperature range of -40 to 200°C with a typical heating rate of up to 20°C/min. and a temperature accuracy of +/- 0.1°C. A PRT (platinum resistance thermometer) sensor positioned at the center of the plate ensures accurate temperature measurement and control.

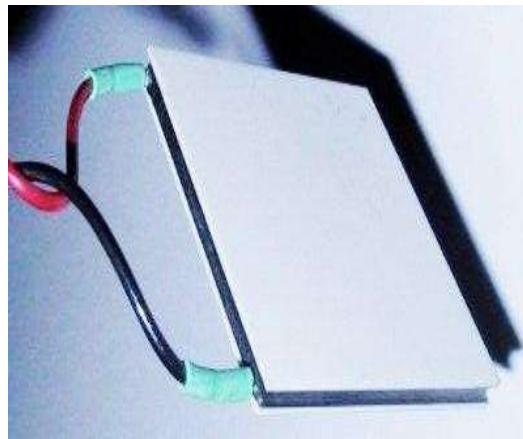


Fig.3.3:PeltierPlate

A peltier cooler is a cooler that uses a peltier element (TEC). Peltier coolers consist of the peltier element itself, and a powerful heatsink/fan combination to cool the TEC.

IV. ADVANTAGES:

- Protection from extremely low temperatures such as 0/Minus Degree in hilly regions
- In deserts where temp is high uniform will maintain cool.
- No need to handle torch lights.
- Fit and forget system
- Reliable
- Compact size
- Affordable price (Low cost)
- Low Maintenance

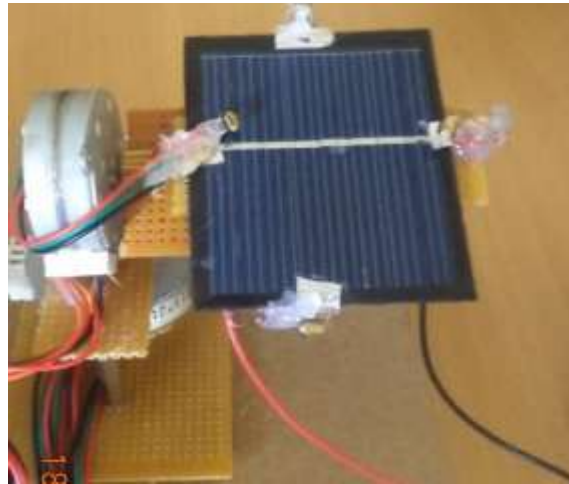
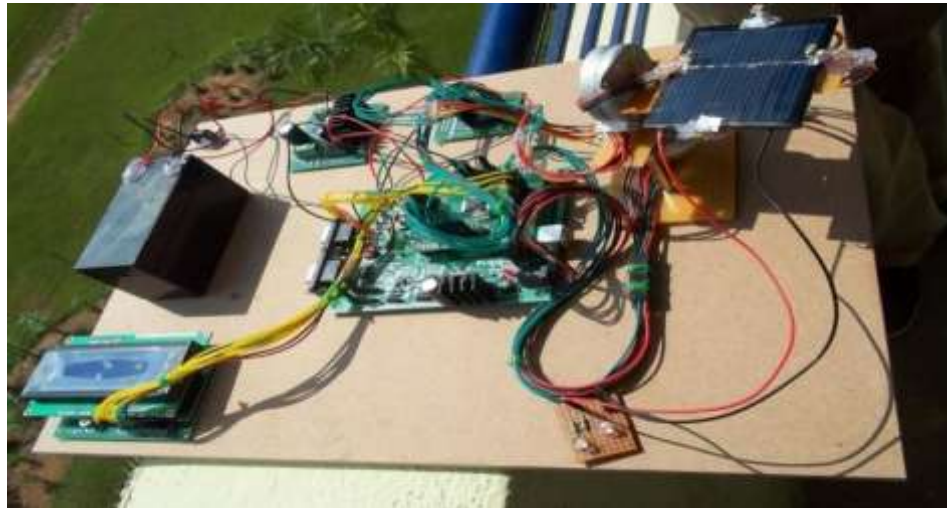
V. APPLICATIONS:

- Used in military applications.
- This uniform can be used for all the climatic applications.
- Soldiers can work in extreme climatic applications.

VI. EXPERIMENTAL RESULTS:



Fig.6.1:LiquidCrystalDisplay

**Fig.6.2:Solar Panel****Fig.6.3:Working Model**

VII. CONCLUSION:

The project “Solar based E-Uniform for soldiers who work at extreme high temperature or extreme low temperature with tracking” is successfully tested and implemented. By using this project in real time applications we can help soldiers to work even in extreme climatic applications. It is a highly durable and self-repairing solar technology, ideally suited for mobile applications.

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