Smart Battery Management

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Abstract – *The battery fuel status indicator is a common feature of the battery supported handheld devices The battery fuel measurement is achieved by measuring the discharging and charging currents in real time. The discharging current is the current coming out from the battery and the charging current is the current flowing into the battery. The fuel used (mAH) and the fuel remaining (mAH) are calculated by tracking the discharging and charging currents over time. The fuel used is the total discharged current over time and the remaining fuel is simply the subtraction of the fuel used from the fully charged fuel. In the Smart Battery we convert the analog display charging to in the percentage format. By using relay we achieve the cell by cell charging of battery. As one cell of battery is fully charged then the automatically the charging process will be turn off and when the battery cell is discharge the process of battery charging get started.*

Key Words: **1. Voltage Sensor, 2. Current Sensor, 3. Relay, 4.MPLAB X IDE software, 5. Embedded C**

1. INTRODUCTION:

Smart Battery Management is the accomplish by + measuring the battery parameters like the voltage and current in the charging and discharging processes of battery of cell .The life of battery is increased using Battery management system also the efficiency is improve. The battery is the important feature of the electrical vehicle. The increase the efficiency of battery with the help of relay controlling process of charging and discharging process of battery cell. In the modern era battery plays a very important role in every application. So battery management is must need feature. The level of electrical vehicle battery is shown in the percentage with the help of 16*2 LCD display. The conversion of analog of EV charging to convert in the digital format is like in percentage for the inform to how much charging is remaining in our electrical vehicle batteries.

2. NEED

- Battery management system needs to be enhanced in order to provide a better performance.
- Battery monitoring system is also part of BMS that is required in order to monitor operational system, performance and battery life such as charge and discharge process.
- The relay through we monitoring and controlling the battery charging cell.
- The BMS also needs to provides protection when charging and discharging, it disconnects when the battery is fully charged with the connection of relay.

Objectives of Project:

- Protect the cells or the battery from damage
- Prolong the life of the battery
- Cell protection system
- Digital display of all parameters

3. DESCRIPTION OF THE PROJECT

In this design the hardware components that we use are:

- Microcontroller PIC18F4520
- Battery
- LCD 16x2

- Rela
- Power supply
- Temperature Sensor
- Buzzer
- Solar panel

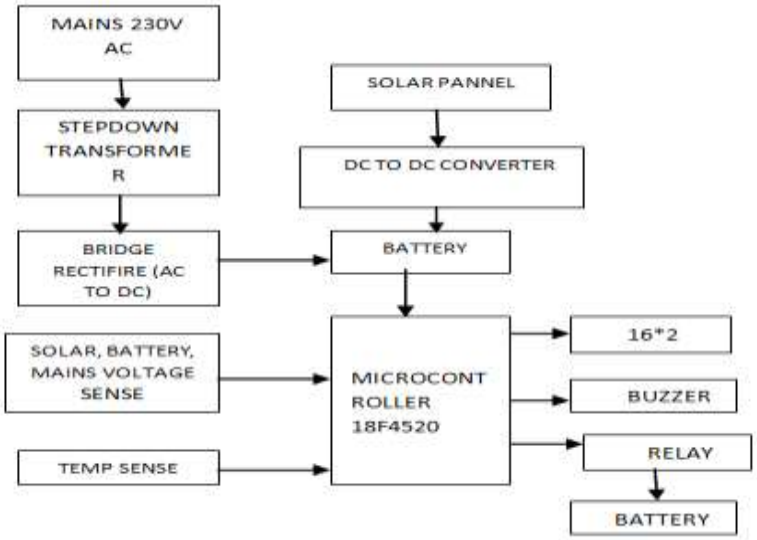


Fig: system block diagram

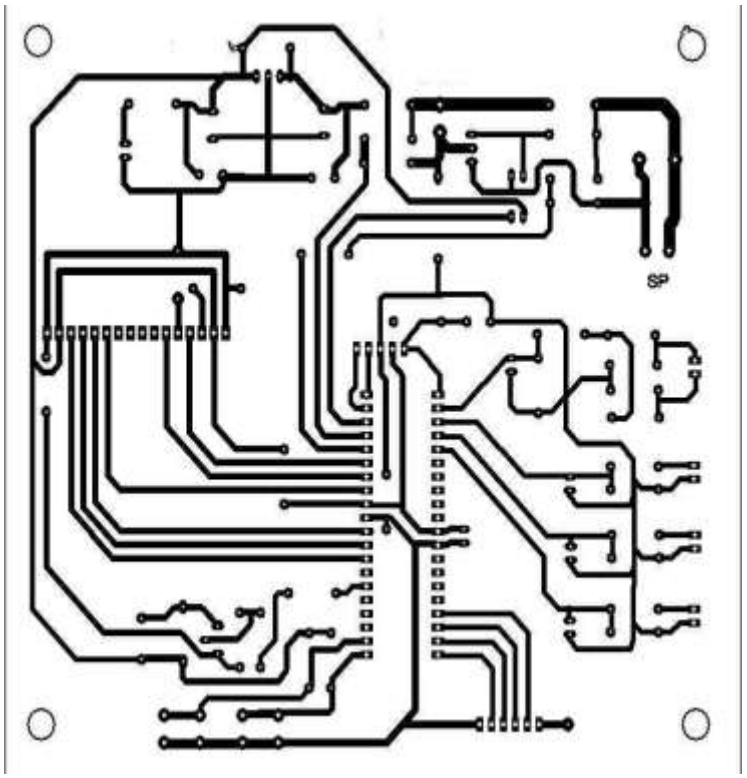
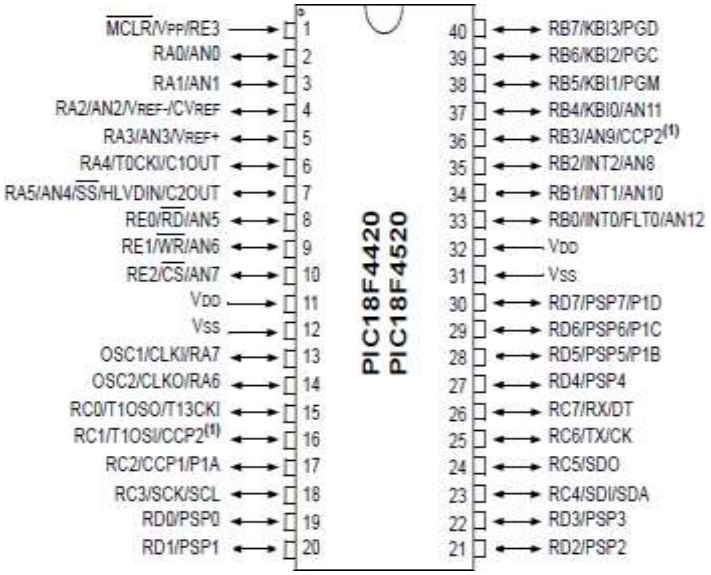


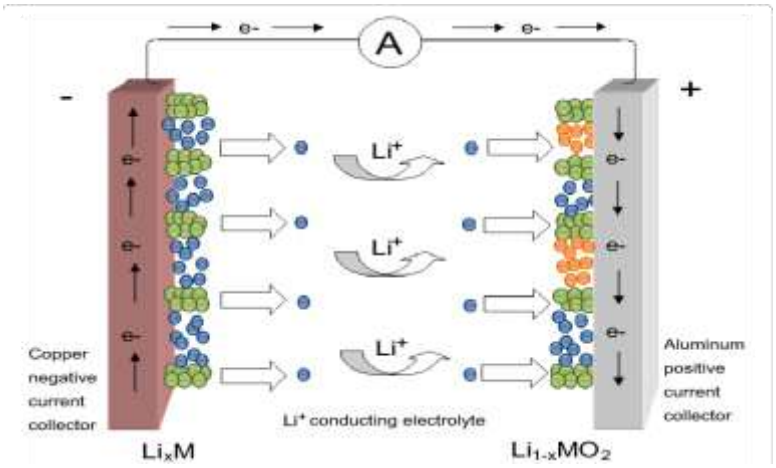
Figure: Circuit Diagram of System



Features:

- 40 pin IC with 44TQFP pins
- 20 Interrupt sources
- 256 EEPROM
- Parallel communication
- Operating frequency 40Hz DC
- 73 Instructions 83 with Extended instruction set enable.

Battery:



Charging of lithium-ion battery

The battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into electrical power, such type of battery is called a lead acid battery. The lead acid battery is most commonly used in the power stations and substations because it has higher cell voltage and lower cost. The container and the plates are the main part of the lead acid battery.

LCD 16x2

Features:

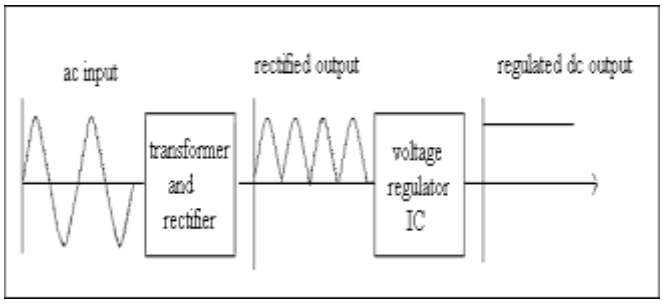
This is a high quality 16 character by 2 line intelligent display module, with back lighting, Works with almost any microcontroller. This is a popular 16x2 LCD display. It is based on the hd44870 display controller hence it is easy to interface with most micro controllers. It works of 5v and has a green back light.

Relay:

Features:

- Low-noise analog signal path
- Device bandwidth is set via the new FILTER pin
- 80 kHz bandwidth
- Small footprint
- nearly zero magnetic hysteresis

Power supply:



All electronic circuits use DC power supply of adequate voltage for their operation. To obtain this DC voltage from 230V AC mains, we need to use a 'rectifier'. The rectified DC voltage is 'pulsating' in nature. The power supply, which provides a constant output voltage irrespective of everything is called, regulated power supply. So we have to design a regulated power supply using series voltage regulator IC 7805.

Temperature sensor:

LM35 measure temperature with an electrical output comparative to the temperature. This sensor generates a high output voltage than thermocouples and may not need that the output voltage is amplified. The LM35 has an output voltage that is proportional to the Celsius temperature. The scale factor is .01V/℃.

Buzzer:

Features:

- Sealed- Yes
- operating power: 3-6V DC / 25mA
- No electrical noise
- extremely compact

Solar pannel:

Features:

- Maximum power 10W
- Size of pannel 340*280*22mm
- Number of cells 36
- Weight per piece (kg) 1.5
- PV junction box
- Anodized Aluminum alloy frame

4. Conclusion:

Many battery models do not simulate of the discharging behaviour of actual batteries. The load is removed from the battery when the batteries are nearly fully discharged, the voltage of the battery will increase; when the load is connected to the battery, and the current resumes, the voltage of the battery will drop to the nominal value. Such discharging behaviour should be simulated in future battery models. In addition, the performance of battery models could be further improved. To improve BMS hardware systems, a method could be created to allow the BMS to communicate with vehicle controllers and other sub-systems in the vehicle, such as the motor controller. In addition, a protection device could be added to the system to switch off the battery pack when it operates out of its SOA. Furthermore, the cell-balancing function could be improved. A BMS could then be developed for use in electric vehicles.

5. REFERENCES

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