

CHAPTER 1

INTRODUCTION

1.1 Overview

Nowadays electronic gadgets are widely use due to the growth of new technology. Most electronic gadgets use dry cell as their main energy source; this is due to its small size, efficiencies and recharge ability. Recharge the battery can save cost and reduce the thrown of old battery which can effect the environment. Temperatures do affect the battery since battery is electrochemical devices that convert chemical energy into electrical energy. As full charge is reached the amount of energy used in the endothermic reaction decrease and the amount dissipated in heat increase (making the cell get hot).

Connecting a device creates a current and the electrons flow through the device to the positive side. At the same time, an electrochemical reaction takes place inside the batteries to replenish the electrons. The effect is a chemical process that creates electrical energy. Once the battery nears a full charge, excess charge current becomes heat. Small at first, the heat begins to accumulate in the mass of the battery side. As the heat accumulates, temperature of the battery begins to rise. Current through the battery begins to double for every degree C, thus more power is dissipated in the battery which means more heat is generated, as a result more current flows which produce more heat.

The essence of good charging is to be able to detect when the reconstitution of the active chemicals is complete and to stop the charging process before any damage is done while at all times maintaining the cell temperature within its safe limits. Detecting this cut off point and terminating the charge is critical in preserving battery life. In the simplest of chargers this is when a predetermined upper voltage limit, often called the termination voltage has been reached. This is particularly important with fast chargers where the danger of overcharging is greater.

The charger has ability to turn off when the battery is fully charged, this is due to voltage drop at resistor 10ohm. Its then drive the transistor PNP and finally energize the 12V relay to cut off the circuit. The charging voltage can be varied using 1K ohm potentiometer to maximum voltage 6.67V. Here I use PIC 16F877A to read the temperature from thermistor and display the temperature on LCD. In order to maintain the battery's temperature, 12V cooling fan is use. The cooling fan is set to start rotate when the temperatures reach 31 degree Celsius.

1.2 Objectives

The main objective of the project is:

- i. To charge four units at 1.25V NiCd cell from no charge condition to full charge. The charge is determined by connect the battery to the load such as 12V motor, if the motor is not running or slow, then the battery is said to have low charge or no charge as well and otherwise.
- ii. To display the temperature of the batteries being charge on the LCD.
- iii. To turn on the 12V cooling fan when temperature of the battery reach 31°C and above (the value can be adjusted due to ambient room temperature).

The important part of this project is to drive the 12V cooling fan when battery's temperatures reach 31 °C. Here driver circuit is implemented in order to drive the fan.

1.3 Scope of project

The scope of the project is to develop the power supply circuit that reduce the 240V AC to 9V AC and then convert to DC using bridge rectifier. Secondly is to charging the 4 unit NiCd AA cells from no charge condition to full charge. And the third part is to measure the temperature of the battery and display on LCD. The last part is to drive the cooling fan when temperatures of the battery reach 31 °C and above.