

Solar charge controller

Abdulla Almazrouei

Dr. Mohsen Lotfalian

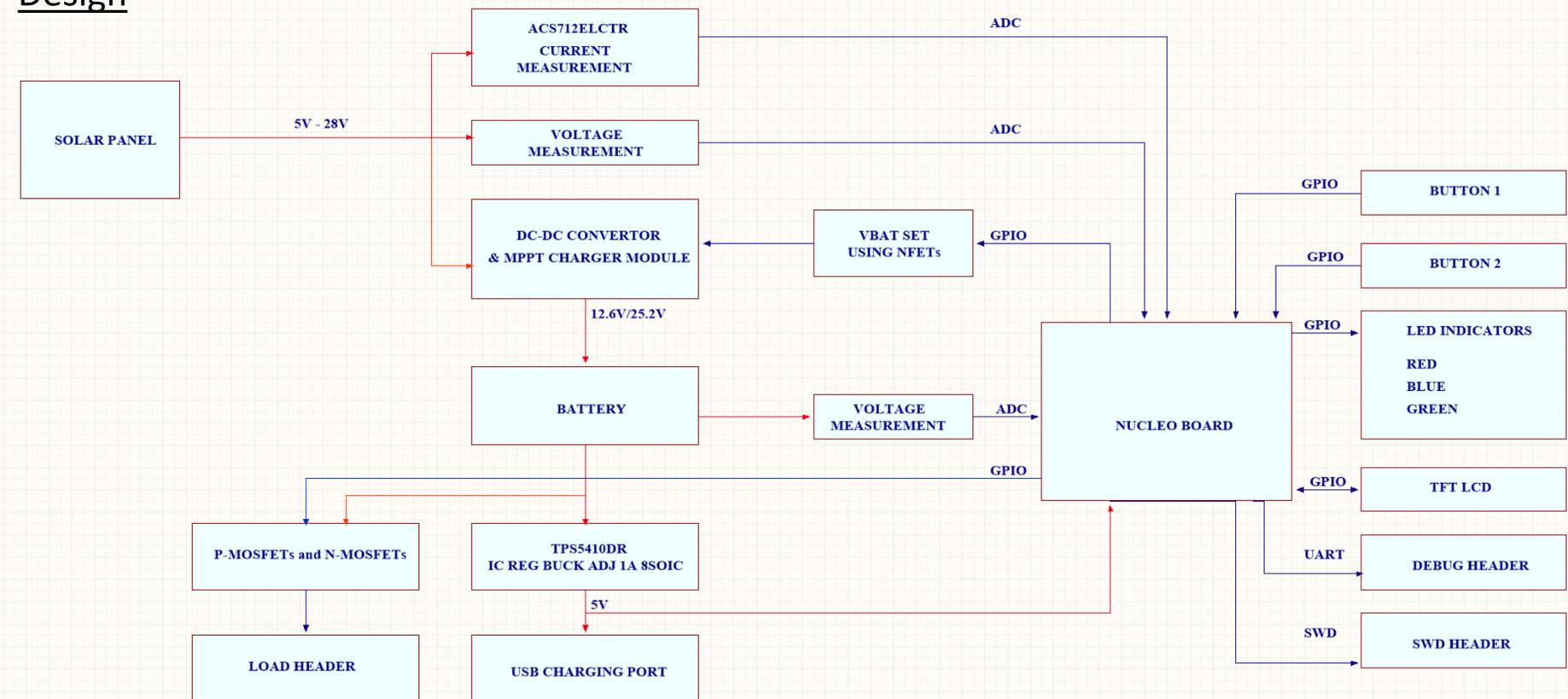
Introduction

This project is basically a voltage and current regulator to keep batteries from overcharging. It regulates the voltage and current coming from the solar panels going to the battery.

Device Function

- Based on MPPT algorithm
- LED indication for the state of charge
- TFT LCD display for displaying voltages, current, power
- Overvoltage / Lightning protection
- Reverse power flow protection
- Short circuit and over load protection
- DC load control (powered by battery)
- USB charger port 5V
- Automatic battery voltage recognition (12V/24V)

Design



Device Technical Specification

- Rated voltage: 12V
- Battery: 55AH
- Maximum load current: 10A
- Open circuit voltage = 15 -25V for 12V system and 25 - 50V for 24V system
- Solar panel power = 50W - 130W
- Battery charge current = 5A
- USB charge current: 0.5A

MPPT algorithm

The MPPT regulator performs better than the PWM solar charge regulator. The PWM charge regulator operates by making a direct connection from the solar panel to the battery, where as the MPPT charge regulator measures the voltage of the panel and converts it into the battery voltage.

Result

The designed solar charge controller follows all the requirements and works successfully.

