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An Implementation towards Smart Batteries

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Abstract

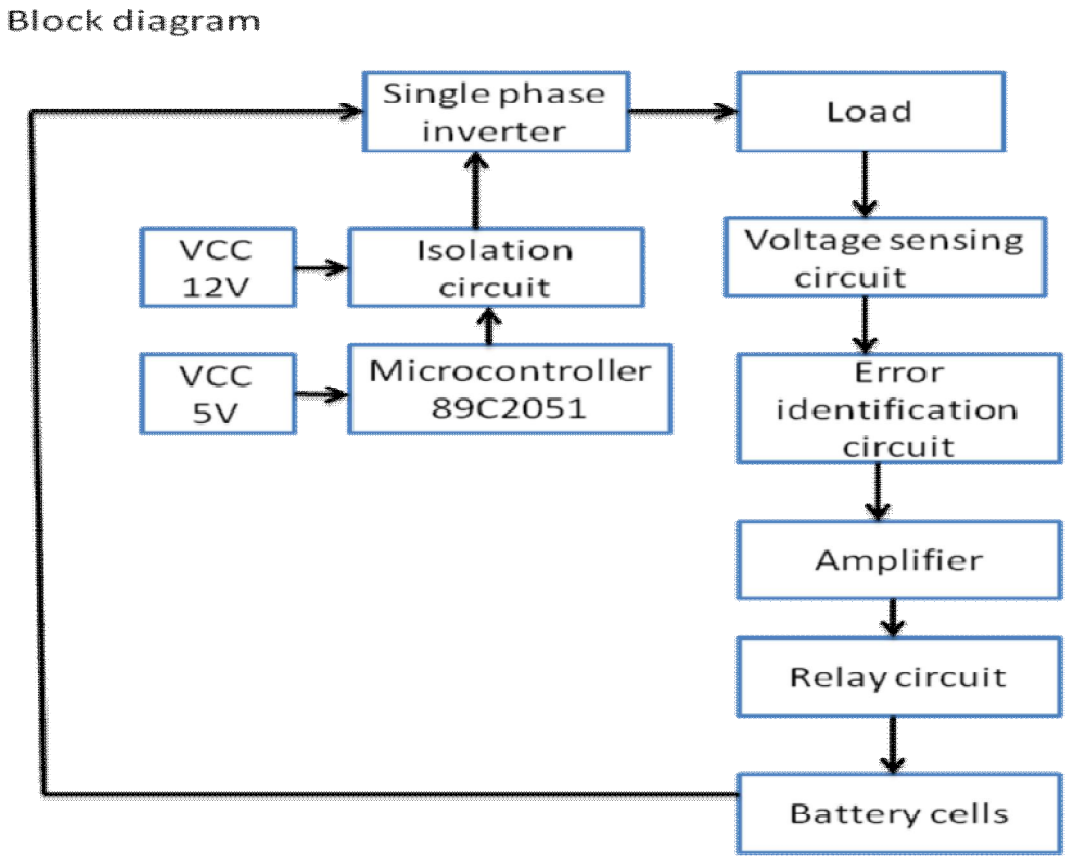
The existing battery design usually employs a fixed configuration in order to achieve the required rating for the cell.the proposed battery design employs a variable configuration according to storage demand of the cell. the proposed design is validated by simulation and experiment by a smart cell battery. this design can be applied to any type and size of battery cells.

Keywords: Multicell battery, self-healing, self-balance, self-reconfiguration

I. INTRODUCTION

This paper tells about the work of a smart battery circuit by using multicell batteries.The smart battery circuit uses the devices similar to the components used in normal UPS Circuit. A MOSFET is used with a constant voltage source. A Current Buffer is used for providing increased level of current. A Gate Driver Circuit is used for isolation of the Digital and Analog Circuit and for gatepulse Triggering. Consequently, the proposed battery system can dynamically configure itself according to the load/storage demand during operation, by self-healing and self-optimization.

II. BLOCK DIAGRAM



III. EXPLANATION

A.SMART BATTERY SYSTEM

Smart Battery System (SBS) is a specification for determining accurate battery capacity readings, usually for a portable computer as well as household devices. It allows operating systems to perform power management operations based on remaining estimated run times. In principle, any battery operated product can use SBS, but only laptop computers uses that SBS. The goal of the Smart Battery interface is to provide adequate information for power management and charge control regardless of the particular battery's chemistry.

B. ISOLATION CIRCUIT

Isolation circuits are specially designed circuits to isolate the POWER CIRCUIT and CONTROLLER CIRCUIT. These circuits are used to provide ground. ICs are usually used to provide this isolation.

C. FEATURES OF GATE DRIVER:

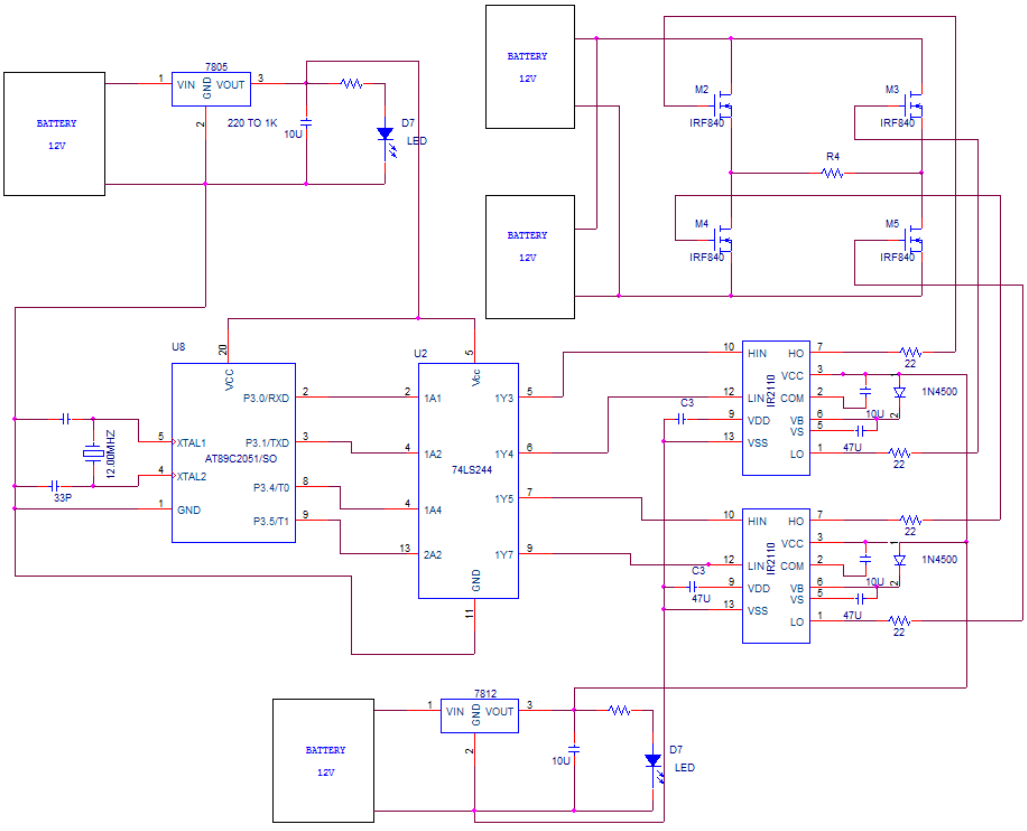
Gate drive has supply range from 10 to 20V and under voltage lockout for both channels..It has outputs in phase with inputs.

D. VOLTAGE REGULATOR:
A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level.

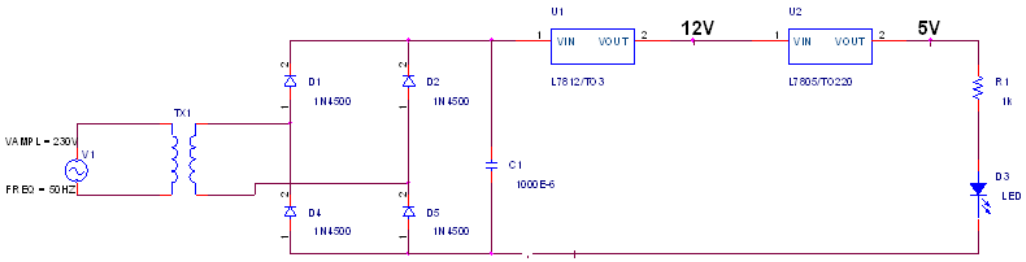
E. AT89C2051 MICROCONTROLLER:
The AT89C2051 is a low-voltage, high performance device with 2K Bytes of Flash programmable and erasable read only memory.

Features of AT89C2051:
It has supply voltage range from 2.7V to 6V and Fully Static Operation frequency from 0 Hz to 24 MHz. It has 15 Programmable I/O Lines and two 16-bit timer/counters. It has low-power idle and power-down Modes.

IV.CIRCUIT DIAGRAM



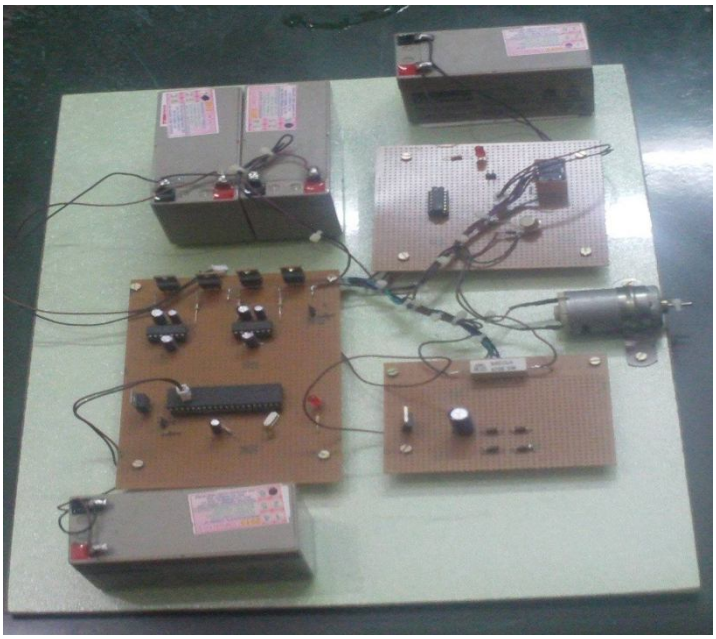
V. POWER SUPPLY CIRCUIT



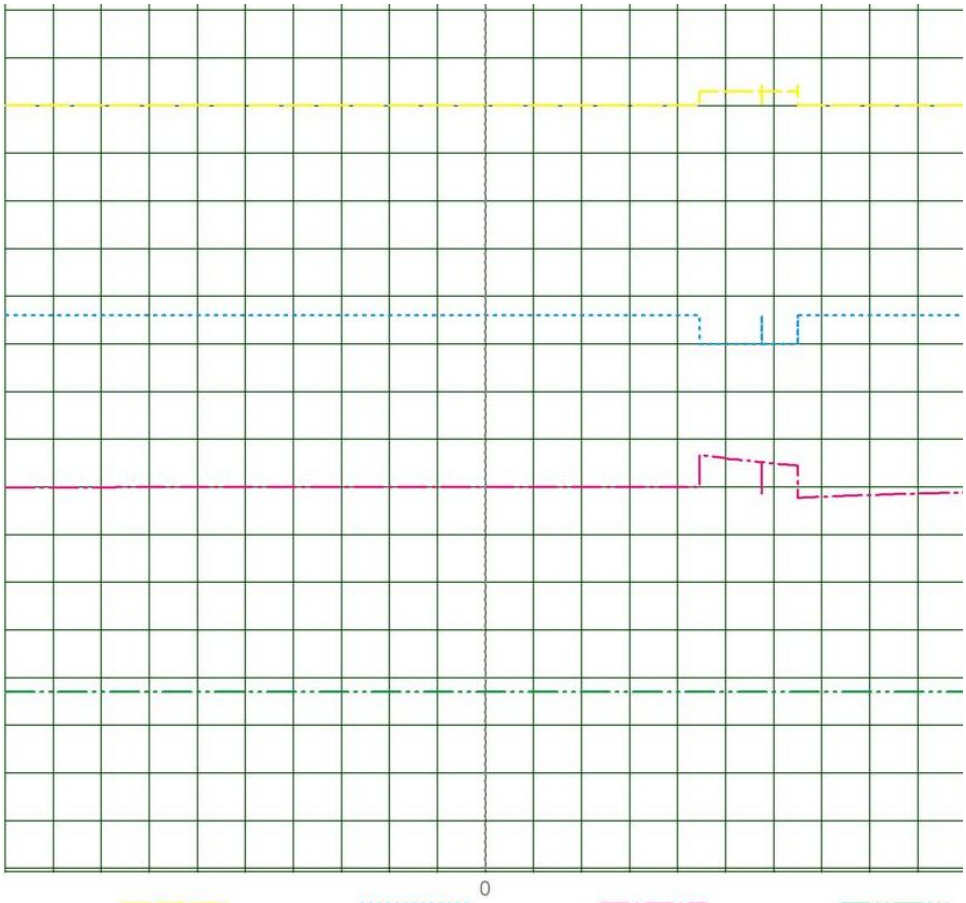
The working and power Supply of the circuit diagram are explained as follows:

A step-down transformer (230/15) V is used to give input supply to the power circuit. The 15V AC input is rectified into 15V pulsating DC with the help of full bridge rectifier circuit and the ripples in the pulsating DC are removed and pure DC is obtained by using a capacitor filter. The positive terminal of the capacitor is connected to the input pin of the 7812 regulator. An output voltage of 12V obtained from the output pin of 7812 is fed as the supply to the pulse amplifier. Output voltage of 5V obtained from the output pin of 7805 is fed as the supply to the micro controller and LED is connected in series with the resistor to indicate that the power is ON.

VI. EXPERIMENTAL RESULTS



CRO OUTPUT FOR TRIGERRING PULSE OF -11V

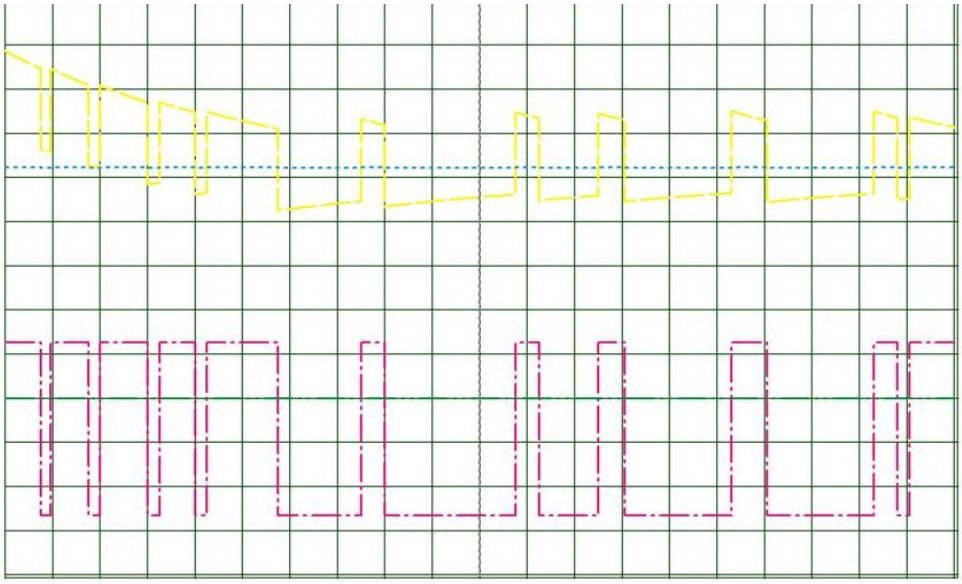


	Channel A	Channel B	Channel C	Channel D
V/Div	1.00 V	5.00 V	5.00 V	2.00 V
Offset	12.00 V	10.00 V	-20.00 V	-25.20 V
Invert	Normal	Normal	Normal	Normal
Coupling	DC	DC	AC	DC

	Horizontal
Source	Trace
Position	2.00 S
S/Div	200.00 mS

	Trigger
Source	Channel A
Level	-11.80 V
Coupling	DC
Edge	Rising
Mode	Auto

CRO OUTPUT FOR TRIGERRING PULSE OF -4.00V



	Channel A	Channel B	Channel C	Channel D
V/Div	200.00 mV	20.00 V	100.00 mV	20.00 V
Offset	-400.00 mV	-32.00 V	-200.00 mV	-240.00 V
Invert	Normal	Normal	Normal	Normal
Coupling	AC	AC	AC	AC

	Horizontal		Trigger
Source	Trace	Source	Channel A
Position	2.00 S	Level	-4.00 V
S/Div	200.00 mS	Coupling	DC
		Edge	Rising
		Mode	Auto

VII.CONCLUSION

This paper has presented a novel study about smart cell batteries and its usage.overall efficiency achieved by using this batteries were high and optimization, reliability achieved by these batteries were also good.The features such as healing from failure and protection from overloads were also excellent.

VIII. REFERENCES

[1] H. Qian, J. Zhang, J.-S. Lai, andW. Yu, “A high- efficiency grid-tie batteryenergy storage system, ” IEEE Trans. Power Electron.
[2] http://ieeexplore.ieee.org.
[3] IEEE Trans.EnergyConversions