UPS Battery monitoring system over GSM for high availability systems (banking/finance/medical etc)

The purpose of this project is to monitor and control the corporate UPS system's battery remotely using GSM technology. UPS Battery monitoring is very important for banking, finance, defense and medical based organizations. This project mainly consists of a battery monitoring and controlling system, GSM communication module, and Voltage display and alarm system.

The presented idea is very useful for Electronic equipment system that runs on battery based power supply. By employing this system the user can monitor and control the UPS system 24x7. The typical applications includes High availability servers back up power supply monitoring system for Banking, Finance, IT and security systems.

This system consists of microcontroller based monitoring system with ADC module that converts the analog voltage into the digital value. The raw voltage is converted the human readable value by the microcontroller. Microcontroller continuously monitors the voltage and if the voltage drops below the set value then this system alerts the local user with buzzer and also the remote personal through GSM in the form of SMS message and shifts to other UPS system.

If we want to change the existed battery (Incase failure) with another battery just we have to send the SMS to GSM Modem connected. Whenever the GSM Modem receives SMS message to change the battery connection it gives instruction to Microcontroller. The Microcontroller simply connects the new battery and disconnects the existing battery using Relay based control circuit. This makes sure that the power supply is un-interrupted and also increases the battery life by avoiding the over discharge.

This system also supports turning ON/OFF the UPS system remotely by sending appropriate SMS message based commands. For this the user has to send the password along with the command for switching ON/OFF the system.

Features of this project:

1. Remote monitoring and controlling of battery system.

2. Changing the connection of batteries using Relay.

3. Can be operated from anywhere in the world.

4. Low power consumption for control systems.

5. Reliable for industrial and domestic needs.

6. Automatic alerts to user.

The project focuses on the following areas:

1. Characteristics of GSM modem.

2. High voltage device controlling.

3. Interfacing Electromagnetic Relay with relay driver circuit.

4. Embedded C programming.

5. Hardware and PCB design.

6. Serial Communication with GSM modem.

**The major building blocks of this project are:**

1. Regulated Power Supply.

2. Microcontroller.

3. GSM modem.

4. Buzzer with driver.

5. Crystal oscillator.

6. Reset.

7. LED Indicators.

8. Relay with relay driver circuit.

Software's used:

1. PIC-C compiler for Embedded C programming.
2. PIC kit 2 programmer for dumping code into Micro controller.
3. Express SCH for Circuit design.
4. Proteus for hardware simulation.

Regulated Power Supply:

Step down transformer → Rectifier → Filters → Regulator → 5v DC
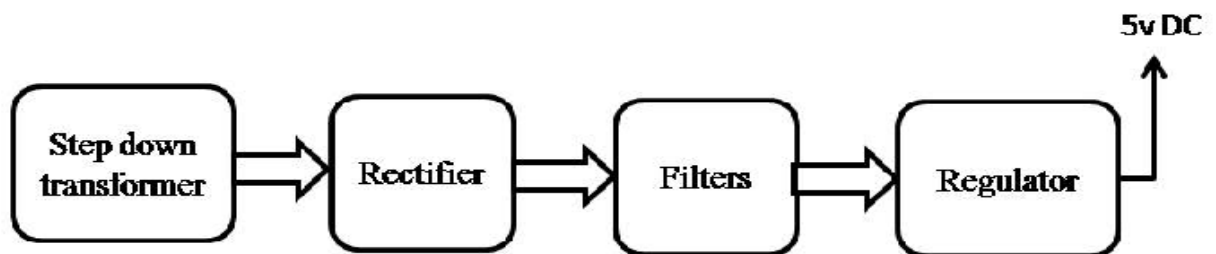
Block diagram:

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Regulated power supply

GSM modem ↔ RS 232 interfacing ↔ Micro controller → Relay driver → Relay

Micro controller → LCD driver → LCD

Reset → Micro controller → Buzzer driver → Buzzer

Crystal Oscillator → Micro controller → LED indicators