

Critical Monitoring of Uninterruptible Power Supply using Gsmmodule

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Abstract—In applications, such as medical intensive care system, chemical plant process, high power rating machinery in industry, safety monitors or a major computer installation, where even a temporary loss of supply could have severe consequences, there is need to provide an uninterruptible power supply (UPS) system which can maintain supply under all conditions.

The function of UPS is to provide an interrupted free supply of power to the AC load which cannot be directly fed from DC source and DC is required to be converted into AC.

There are many faults in UPS that should be recognized soon and should be informed to the operator. In such conditions GSM module will be helpful to operator to know about the flaws occurred and operator can take corrective measures as soon as possible

1. INTRODUCTION

The circuitry problem occurs in the power and electronic field. This is huge problem now a day some time the site man can't take action as quick as required as well as security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. So this is combined system for security and UPS alerting.

Now a day there is evolution of automation in the power electronics field. Here our project is some kind of part of automation which is automatically indicates to the site person that some fault occurred in the UPS module and you have to pay attention to that fault.

When UPS panel are put in running condition for testing the UPS, it takes about 8 to 10 hours. At time when any problem occurs like over temperature or UPS under voltage, ups panel will be off. When UPS panel put in test one engineer has to care about it's not being off. In this project, when UPS panel are put in testing, at that time if any fault occurs or any unauthorized person enters in test bench area than engineer who is on duty will get a call on his mobile phone i.e. engineer can go there and solve the problem.

Our project is not only alert the site person about the UPS fault but also provide security to the restricted area where testing equipment placed called **Test Bench**.

2. INDUSTRIAL UPS

Industrial UPS is a acronym for Industrial Uninterruptible Power Supply. It is used in industry for providing high quality backup power. UPS system are specifically designed to provide secure power to mission critical loads in Refineries, Petrochemicals, Power Generation, Steel and Process Industries as well as for critical data processing application.

Rectifier

- Converts the AC mains to regulated DC power.
- Supplies DC power to the Inverter
- Charges the Battery when mains is present

Inverter

- Converts DC into Frequency & Voltage controlled AC supply

Battery (separate module)

- Stores energy while mains supply is present.
- Delivers energy (DC supply) to the Inverter when mains supply is absent.

Static Switch

- A bi-directional, solid-state transfers switch.
- Normally connects the Inverter output to the load
- Automatically transfers the load to an Alternate supply if Inverter fails or overloads.
- Automatically re-transfers the load from the Alternate supply to the Inverter, once the Inverter is healthy or the overload condition has ceased.

3. DEALING WITH THE FAULTS

Table 1: Causes and Dealing with faults

FAULT	POSSIBLE CAUSE	ACTIONS
Inverter Undervoltage	1. The inverter output is Overloaded & Alt supply is not available for transfer. 2. Calibration error.	1. Remove excess load. 2. Measure actual value with a multi meter & if found to be in specified limits - Call For service support.
Over temperature trip	1.Coolingfan failure. 2. Excess load. 3.Ambient temperature above specified limits.	1. Reduce load & try to start the unit - if unsuccessful -Call For service support.
Over Current trip	1.When more amperage is put across an electrical wire or circuit. 2.Circuit overloads caused due to corroded wire.	1.By reducing over load across wire. 2. Use wire of high quality with regular maintenance

4. BLOCK DIAGRAM

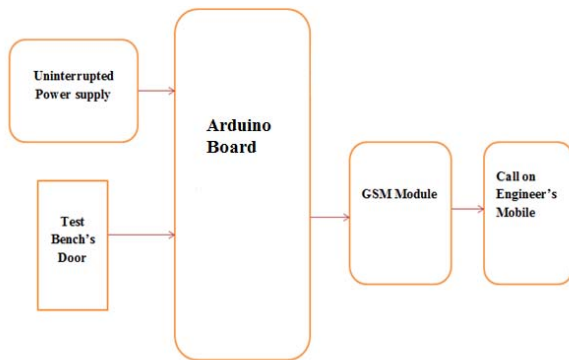


Fig. 1: Block Diagram of Project

5. ARDUINO

An arduino is ATMEG328 micro-controller based with 8 bit. In arduino board 14 are digital pins and 6 are analog pins. Arduino works with 5V linear regulator power supply.

In our project A0,A2 and A4 pins are used for temperature,voltage and current respectively.Pin 10 and 11 are used as read and write to interface with GSM module.

USB jack is used to load the program directly to the controller and power led specifies that the arduino working properly or not.

6. GSM MODULE

Global System for Mobile with SIM quad900 with configured baud rate from 9600-11500 through AT commands.

Read and text pins are used to interface with arduino.12V adapter is to power GSM module. To communicate with controller different AT commands for eg. GPRS i.e. used to send message.

7. SENSORS

In this project two sensors i.e. temperature sensor and current sensor are used.

- Temperature Sensor(LM35)

The LM35 is linearly output voltage device linearly proportional with centigrade temperature. It is 3 pin device with output, ground and Vcc.

The operating range of LM35 is -55°C to 150°C.The scale factor is 10mV/°C.

- Hall Sensor (ACS712)

The ACS712 is low noise analog signal path output current device. It has 66mV/A output sensitivity.It has 3 pin mainly Output,Ground and Vcc.

8. FLOW CHAT OF PROJECT

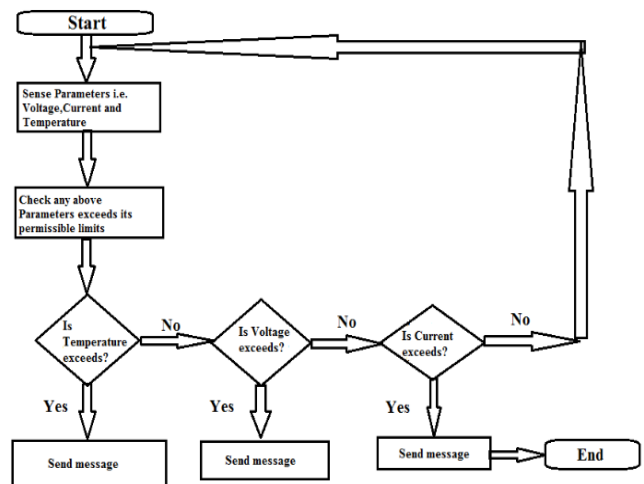


Fig. 2: Flow chat of project

9. HARDWARE MODULE

In this paper arduino microcontroller is interfaced with GSM module by using AT commands message is send to allotted number.



Fig. 3: Working Hardware Module

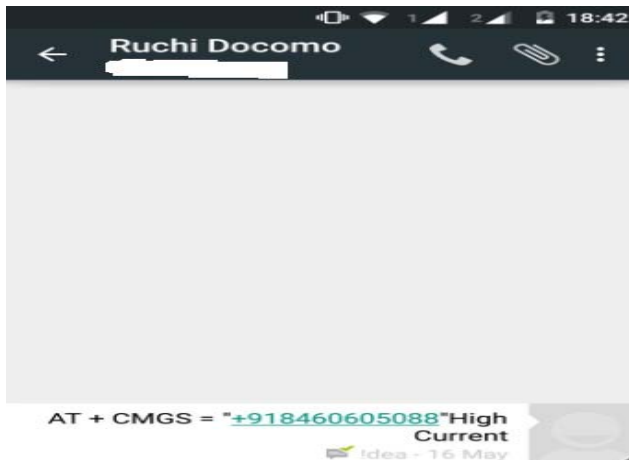


Fig. 4: Message of fault

10. CONCLUSION AND FUTURE SCOPE

From this paper we concluded that UPS used to provide interrupt free power supply in sensitive areas such as medical intensive care system, chemical plant process, and high power rating machinery in industry, safety monitors or a major computer installation.

Also faults occurs in UPS such as inverter under voltage ,over Temperature Trip ;to monitor such kind of faults we use GSM Module Interfacing Arduino, where Arduino is board consists of an Atmel 8-bit AVR microcontroller with complementary components that facilitate programming and incorporation into other circuits.

And thus from our project one can monitor any cause in unbalance of voltage, current and temperature in UPS through **Mobile Text Message** and this would be very much beneficial from security point of view of men and machine.

By expanding this project we can solve some of problems like temperature high by switch on cooling fan. In case we are providing this system to customer a directive call with the option of 'Service call' can link the call to the customer service center of the company then it will be helpful to the client in critical situation. In future we can expand our project up to 10 alarms. If you need to turn pumps, lights etc. on remotely or need to remotely monitor equipment alarms then this project is for you. The system can be operated with MMS for security with some additional hardware like camera. This system can be used for home automation too with desired changes in the program and by some additional hardware like alarm.

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