# REVIEW OF GSM BASED MULTISOURCE POWER SUPPLY WITH NO BREAK TECHNIQUE

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## ABSTRACT

*We are well aware that, the demand of electricity is going on increasing day by day. So as the demand is increasing, ultimately, problems like load shading came across. Due to that sudden power off, costly equipment may get damage, or a computer having data base may lose its valuable data. Many times we provide an alternate power source which will turn on automatically when first one is off. But imagine that, what will happen if second source does not have sufficient backup. So instead of rely on only two power source, we preferred multi power source. So as an electronics engineer, we develop a system, which will surely work on this issue. Our system's title is "GSM based multisource power supply with no break techniques". Our System consist of four different power sources e.g. solar, mains, generator, Inverter. Here sources is according to priority. Also solar is a renewable energy source. Suppose due to some problem, if ongoing source is get fail then the other source will comes in working without producing a glitch at output. The switching between sources is controlled by microcontroller AT 89C52.Anather important feature is that, a user can switch between supplies using his mobile phone. For that a GSM module is connected to microcontroller. The communication between microcontroller AT 89C52 and GSM module is controlled by serial communication protocol i.e. RS 232 standard. Thus by sending AT command from mobile to system and system to mobile, we can communicate and control the switching of supply.*

**Keyword:** - *alternative power supply, No break techniques, communication protocol, AT command, GSM*

## 1. INTRODUCTION:

We are well aware that many of the electronic equipment works on DC supply. For their smooth operation the supply must be uninterrupted or continuously and noise free. If supply is interrupted during ON condition of equipment, then circuit may get damage and equipment may get failure, so avoid such a thing we can use UPS. But problem with UPS is that, it is having only one source and if accidently that source is stopped then again the same problem of failure can be occur. So here, the idea comes in mind that if a design a system which will having two or more sources and will continuously provide a supply to equipment with any one source continuously. If unfortunately the ongoing source in interrupted then other source come in working and start to providing a supply .This will avoid the problem of interruption of supply and cause a system to work smoothly.

Additionally we have implemented a switching via a wireless media i.e. with GSM modem .where the user can make a switching from remote location with the help of his mobile handset .it will also give feedback of status of current running sources .Thus it will be more reliable and convenient to user to operate multi power supply. The developed system has capability to Protect against frequent power cut. Provide adequate power during power interruption and "ride-through" time to convert to backup supply Refine the quality of the power as it reaches your equipment Include a backup source for long-term outages, such as inverter or generator. We Get limit the particular source of power and load connects to the supply if you want and supply priority.

## 2. LITERATURE REVIEW:

According to Shahaji Dhudate (2016,) there is requirement for an alternate arrangement of power supply. When a source, say mains interrupt the supply automatically shifts to next priority source generator and so on. LEDs can be used to show that which source is used to provide the supply [1] we made use of GSM technology, which helps in operating the system from the different places. This GSM technology is the latest technology, which is use to collect the information about the different sources either the switch is ON or OFF and load is ON or OFF. In this system, we made use of Microcontroller89c52 which has many advance features than 8051 microcontroller family [1]
According to Amuzuvi, C. K. and Addo, E. (2015) A Microcontroller-Based Automatic Transfer Switching System (MBATSS), which eliminates challenges of a manual changeover system. A voltage sensing circuit, a Hall Effect current sensor, relays, LEDs and an LCD were all coordinated using a 89c52 microcontroller. A system was developed for the firmware and the microcontroller programmed using Keil microvisoion programming software [2] This paper reports on the design of system an efficient microcontroller-based ATS making use of relays, voltage and current sensing circuitry, a display unit and an alarm unit in order to reduce the circuit's power consumption, operate fast, reduce component count and considerably reduce cost. [2]
In the paper of KESHINRO K. K1 (2016) They reports on the design of an efficient microcontroller-based ATS making use of relays, voltage and current sensing circuitry, a display unit and the alarm unit in order to reduce circuit's power consumption, operate fast, reduce component count and considerably reduce the cost.[3] .Thus for literature review we referred some of above paper which gives some idea to us, which will definitely helpful to us another some papers references are very helpful and give some knowledge for us.

## 3. METHODOLOGY USED:

The system uses four different power sources. Out of four, one source will provide power to load. When ongoing source will fail, then other source come in role, and continuing its working. Here the Take place. The mechanism of switching is important, because it should be uninterrupted. So here we discuss a commonly used switching mechanism.

### 3.1 Transfer Switches:

Transfer switches, also known as the changeover switches. It is electrical devices designed to deliver a power to an electric load from the multiple sources. They are mainly used with generator sets in applications where loads need, if not a fully continuous, at least a steady supply of the power. The Transfer switches could be operated automatically or manually. A manual transfer switch box separates the utility supply from standby generator. Whenever there is power will fail, switching is done manually by humans and the same happens when the public utility power is restored and this is usually accompanied with the loud noise and electrical sparks. An Automatic Transfer Switch (ATS) is used with the standby systems. It includes a control circuit which senses mains voltage. When mains power is interrupted or disconnected, the control circuit starts up the generator set, disconnects the load from the utility and connects it to the generator set. Then continues to monitor the mains status. When mains power is restored, it commutes the load from generator back to the utility within a threshold time Anon. (2012a)

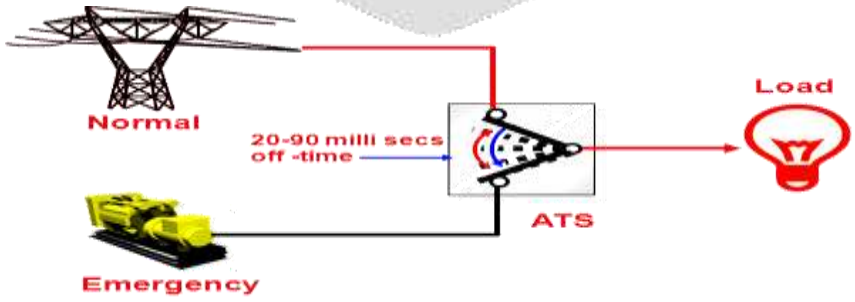


**Fig-1 ATS Transfer switch mechanism**

When the generator is disconnected, it goes through a cool-down process and automatically shuts down. Fig. 1 shows a schematic diagram of typical transfer switch. The Transfer switches could be installed between two generators, a generator and the utility supply or between alternate utility providers Anon. (2012b).

**4. BLOCK DIAGRAM:**

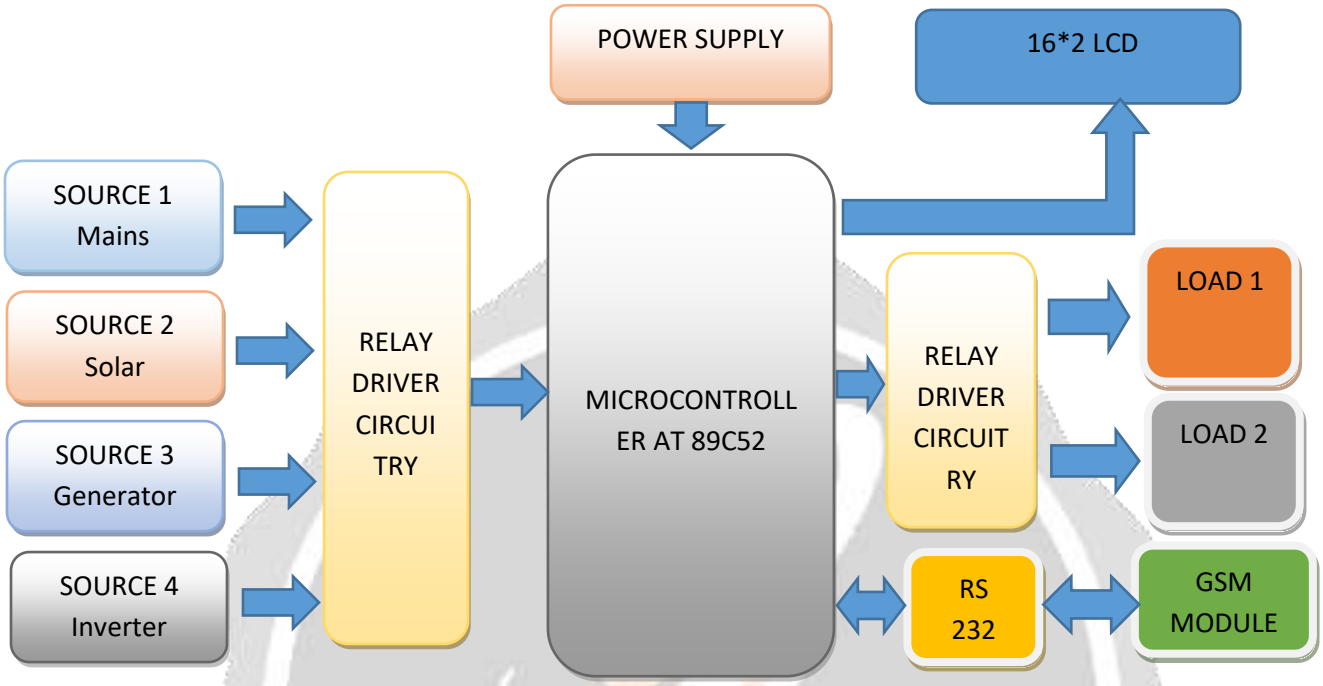


**Fig2-Block diagram of proposed system**

**4.2 WORKING OF BLOCK DIAGRAM:**

Fig shows the block diagram of proposed system. It consist of four multiple sources .i.e solar, mains, generator, and inverter as an input section of microcontroller. Sources is connected to microcontroller through relay driver circuitry, which will drive the relay. Here the relay is used for switching purpose. Whenever the ongoing source is turn off, relay do the switching to next one source. Microcontroller is main controlling unit of the system. Now the switching of load can also be controlled via microcontroller 89c52. For switching purpose, we have used another relay driver circuitry for switching of multiple load. The microcontroller runs the relay driver circuitry which ultimately drives the multiple load. GSM module is connected to microcontroller via RS-232 communication standard GSM module is connected for wireless switching from remote location. User can control load and the sources via mobile phone.

## 4.3 HARDWARE DETAILS:

### 4.3.1 MICROCONTROLLER (89C52):

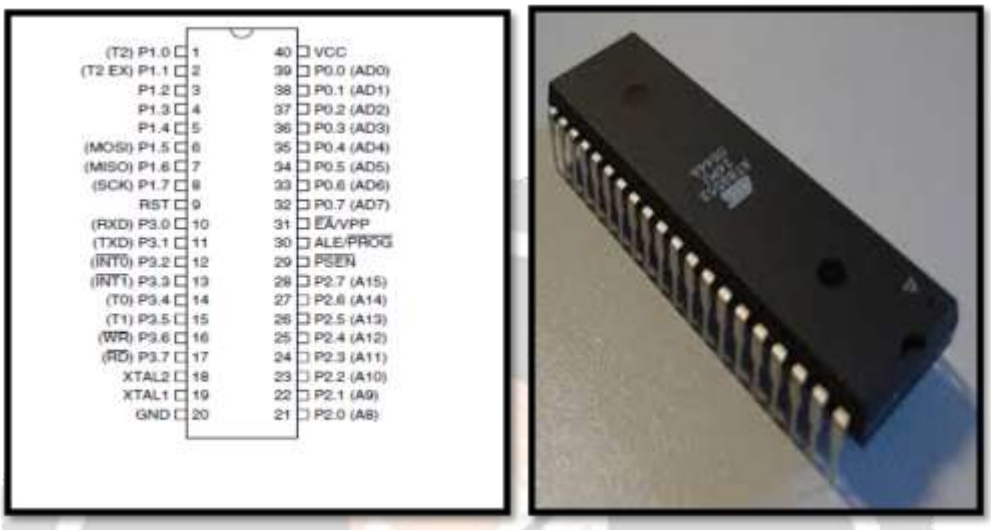


**Fig3- Pin Diagram of Microcontroller**

The Microcontroller is the heart of this project. Many controllers are available in market, but as per the requirement of system we select microcontroller AT 89C52. AT89C52 has an endurance of 1000 Write/Erase cycles which means it can be erased and programmed to a maximum of 1000 times here, we listed an important features which we considered while designing the system.

1) Support Serial communication protocol
2) 256*8 Internal RAM
3) 32 bit Programmable I/O lines.
4) 8KB ROM

### 4.3.2 Liquid Crystal Display (LCD 16x2):

Many sizes are available in market. As far as our message size is concern, we requires a 16* 2 LCD. A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

Its features are:-

i) To display numbers, characters & graphics.
ii) Ease of programming for characters & graphics.

**4.3.3 RS-232:**

For interfacing of GSM module to microcontroller, we use a serial communication protocol which is RS-232.

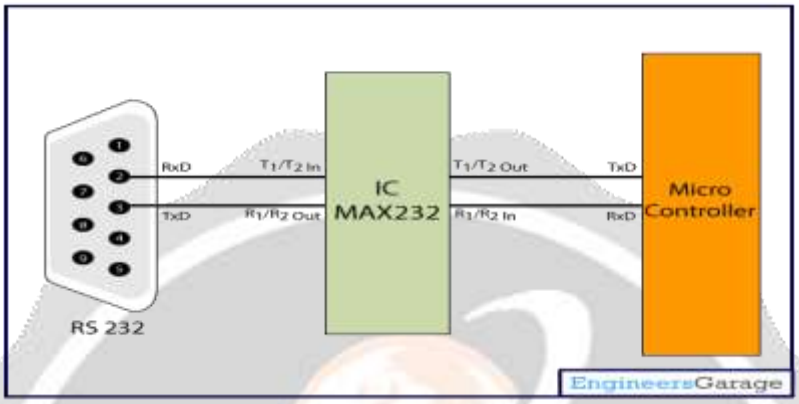


**Fig4-Interfacing of Microcontroller and RS 232**

RS 232 includes MAX 232 and DB-9 connectors. Out of that MAX 232 is used to convert TTL logic voltage levels of microcontroller 89c52 (logic 0-0v, logic1-5v) into voltage levels of RS-232 standards. MAX-232 is a dc to dc converter, which takes TTL levels, which are required for the DTE to DTE communication. RS-232 is asynchronous communication. That is the clock signal is not sent with the data. Each word is synchronized using its start bit, and the internal clock on each side, keeps tabs on the timing level. The RS-232 levels are generated internally using switching latches and capacitors of 10uf of each.

**4.3.4 GSM Module:**

The GSM Module is interface with microcontroller 89c52 through MAX 232. GSM Module have a SIM card, it sends an SMS to user, when an error introduced.

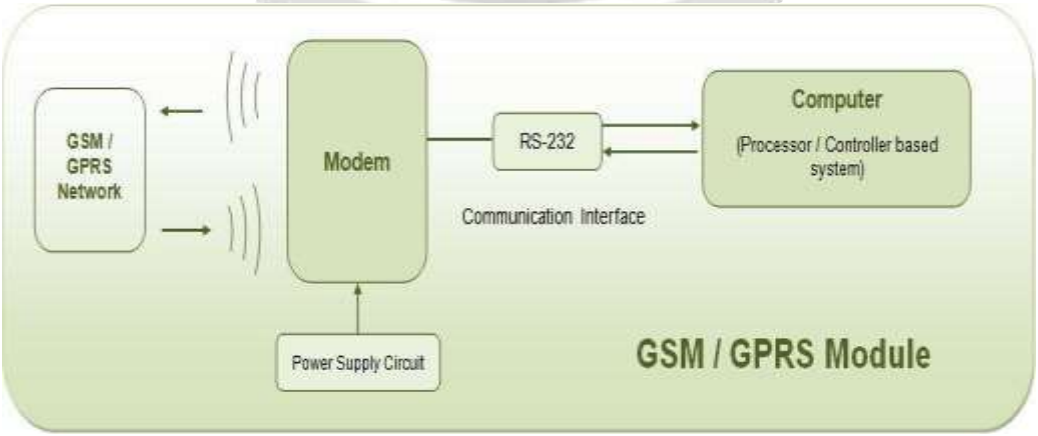

**Fig5-Interfacing to GSM modem and microcontroller**

**Table -1 Commands required for GSM module**

| Sr. No. | Command | Description |
|---|---|---|
| 1 | AT+CSMS | Select Message Service |
| 2 | AT+CSCA | Service Centre Address |
| 3 | AT+CSMP | Set Text Mode Parameters |
| 4 | AT+CSDH | Show Text Mode Parameters |
| 5 | AT+CNMI | New Message Indications to TE |
| 6 | AT+CMGR | Read Message |
| 7 | AT+CMGS | Send Message |
| 8 | AT+CMGD | Delete Message |
| 9 | AT+CMSS | Send Message from Storage |

**4.3.5 GSM Features:-**

- E-GSM 900/1800 MHz with GSM Phase 2 / 2+
- Output Power Class 4 (2W) at GSM 900 MHz and Class 1 (1W) at GSM 1800 MHz
- Control via using AT commands (ITU, GSM, GPRS and the manufacturer supplementary)
- Supply Voltage Range: 3.4 V - 4.2 V, nominal: 3.8 V
- Power consumption: Idle mode: <3.5 mA, speech mode: 250 mA (average)
- Dimensions (mm): 6 x 43.9 x 43.9 and weight (g): 20 (including shielding)

**4.3.6 GSM Interfaces:-**

- Power supply nominal 3,8 Volt
- 7 general purposes I/O ports and serial bi-directional bus on CMOS 2,8 V
- Internal / External SIM 3 / 5V
- Analog audio for the microphone, speaker and hands free set
- RS232 on CMOS 2,8 V (One RS232 (2,8V) with flow control (RX, TX, CTS, RTS, CTS, DTR, DSR, DCD, RI), baud rate is 300 - 115.200 bps, autobauding 1200 - 57.600 bps

- 50 Ohm antenna connector (900 and 1800 MHz)

**4.3.7 Power Supply:-**

When working with the electronics, you always need one basic thing: Power. In every electronic circuit power supply is required. The proper working of each and every component, the exact amount of voltage and current to be supplied to it. If the power exceed its limit, it can be fatal. A power supply is an electronic device who supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another form and, as a result, power supplies are sometimes referred to as electric power converters. Some power supplies are discrete, stand-alone devices, whereas others are built into larger devices along with their different loads. Examples of the latter include power supplies found in desktop computers and consumer electronics devices and equipment. Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others. Below is the circuit diagram of the power supply which gives output of 5V, as only that much is required for the microcontroller. Its circuit diagram and designing calculation are given below.

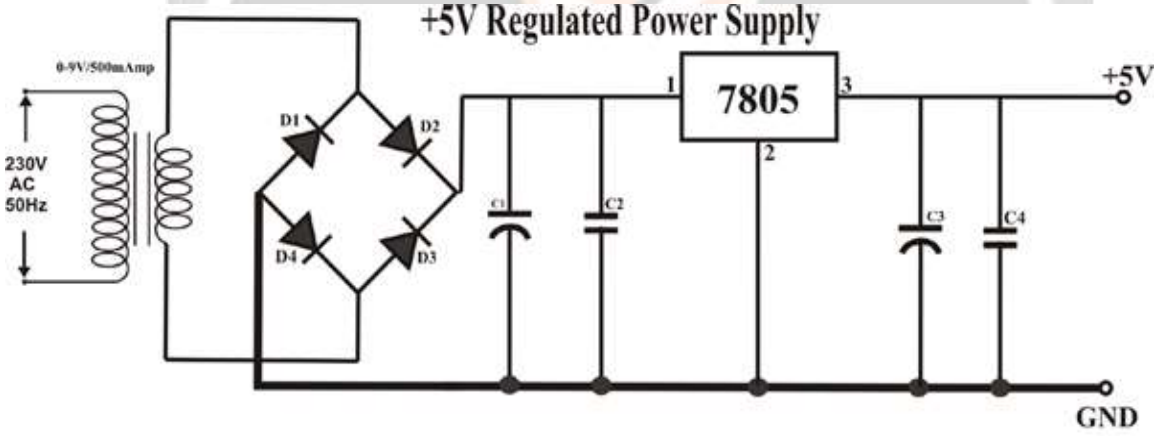


**Fig6-Power supply circuit**

The +5 volt power supply is based on commercial 7805 voltage regulator IC. This IC contains all the circuitry needed to accept any input voltage from 8 to 18 volts and produce steady +5 volt output, accurate within 5% (0.25 volt). It also contains current-limiting circuitry and the thermal overload protection, so that the IC won't be damaged in case of the excessive load current; it will reduce its output voltage instead of it.

The advantage of the bridge rectifier is you don’t need a center tap on the secondary of the transformer. A further but significant advantage is the ripple frequency at the output is twice the line frequency (i.e. 50Hz) and makes filtering somewhat easier.

The use of capacitor c1, c2, c3 and c4 is to make the signal ripple free. The two capacitor used before the regulator is to make the ac signal ripple free and then later which we are using is for safety, if incase there is a ripple left after regulating, then c3 and c4 will be remove it.

## 5. CONCLUSIONS

Hence we are developing a system of multisource power supply which will provide smooth and continuous uninterrupted supply to the equipment which ultimately prevents the equipment from damage.

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