Journal of Research in Science, Technology, Engineering and Management (JoRSTEM)
ISSN: 2456-0197

Effective Load Sharing of Distribution Transformer using GSM

V. Manogna Reddy[1], Dr. D. Raja Reddy[2], Mrs. Y. Sudha Reddy[3] and Mr. A. V. Sudhakara Reddy[4]

[1] Final Year B.Tech, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College (A), India.

[2] Associate Professor, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College (A). India.

[3] Assistant Professor, Department of Electrical and Electronics Engineering, Malla Reddy Engineering College (A). India.

[4] Associate Professor, Department of Electrical and Electronics Engineering, C.B.I.T, Proddatur, Andhra Pradesh, India.

E-Mail: yelmareddy.sudha@gmail.com

Abstract— ***In a symmetric three-phase power supply system, three conductors each carry an alternating current of the same frequency and voltage amplitude relative to a common reference but with a phase difference of one third the period. The common reference is usually connected to ground and often to a current-carrying conductor called the neutral. Due to the phase difference, the voltage on any conductor reaches its peak at one third of a cycle after one of the other conductors and one third of a cycle before the remaining conductor. This phase delay gives constant power transfer to a balanced linear load. It also makes it possible to produce a rotating magnetic field in an electric motor and generate other phase arrangements using transformers. The symmetric three-phase systems described here are simply referred to as three-phase systems because, although it is possible to design and implement asymmetric three-phase power systems (i.e., with unequal voltages or phase shifts), they are not used in practice because they lack the most important advantages of symmetric systems.***

Keywords— Conductor , Balanced Transformer

I. INTRODUCTION

In a three-phase system feeding a balanced and linear load, the sum of the instantaneous currents of the three conductors is zero. In other words, the current in each conductor is equal in magnitude to the sum of the currents in the other two, but with the opposite sign. The return path for the current in any phase conductor is the other two phase conductors load balancing, load matching, or daily peak demand reserve refers to the use of various techniques by electrical power stations to store excess electrical power during low demand periods for release as demand rises.

Nearly 99 per cent of the processors manufactured end up in embedded systems. The embedded system market is one of the highest growth areas as these systems are used in very market segment- consumer electronics, office automation, industrial automation, biomedical engineering, wireless communication, data communication, telecommunications, transportation, military and so on.

II. HARDWARE IMPLEMENTATION OF THE PROJECT

This chapter briefly explains about the Hardware Implementation of the project. It discusses the design and working of the design with the help of block diagram and circuit diagram and explanation of circuit diagram in detail. It explains the features, timer programming, serial communication, interrupts of atmega328 microcontroller. It also explains the various modules used in this project.

III. PROJECT DESIGN

The implementation of the project design can be divided in two parts.

- Hardware implementation
- Firmware implementation

Hardware implementation deals in drawing the schematic on the plane paper according to the application, testing the schematic design over the breadboard using the various IC's to find if the design meets the objective, carrying out the PCB layout of the schematic tested on breadboard, finally preparing the board and testing the designed hardware. The project design and principle are explained in this chapter using the block diagram and circuit diagram. The block diagram discusses about the required components of the design and working condition is explained using circuit diagram and system wiring diagram.

IV. INTRODUCTION OF MICROCONTROLLER

Based on the Processor side Embedded Systems is mainly divided into 3 types

1. Micro Processor : - are for general purpose eg: our personal computer

2. Micro Controller:- are for specific applications, because of cheaper cost we will go for these

3. DSP (Digital Signal Processor):- are for high and sensitive application purpose

A. Microcontroller Versus Microprocessor

A system designer using a general-purpose microprocessor such as the Pentium or the 68040 must add RAM, ROM, I/O ports, and timers externally to make them functional. Although the addition of external RAM, ROM, and I/O ports makes these systems bulkier and much more expensive, they have the advantage of versatility such that the designer can decide on the amount of RAM, ROM and I/O ports needed to fit the task at hand. A Microcontroller has a CPU (a microprocessor) in addition to a fixed amount of RAM, ROM, I/O ports, and a timer all on a single chip. In other words, the processor, the RAM, ROM, I/O ports and the timer are all embedded together on one chip; therefore, the designer cannot add any external memory, I/O ports, or timer to it. The fixed amount of on-chip ROM, RAM, and number of I/O ports in Microcontrollers makes them ideal for many applications in which cost and space are critical.

B. Block Diagram of the Project

The block diagram of the design is as shown in Fig 3.1. It consists of power supply unit, atmega328p controller,finger print sensor module,dc motor. Brief description about blck diagram as given below.

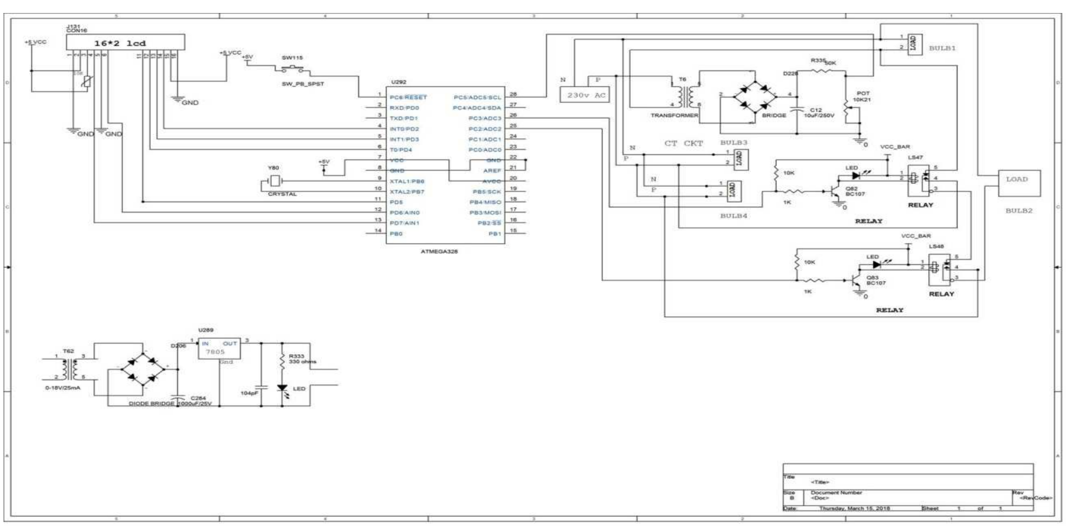

Fig: 3.1 Block diagram of proposed system

C. Power Supply

The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

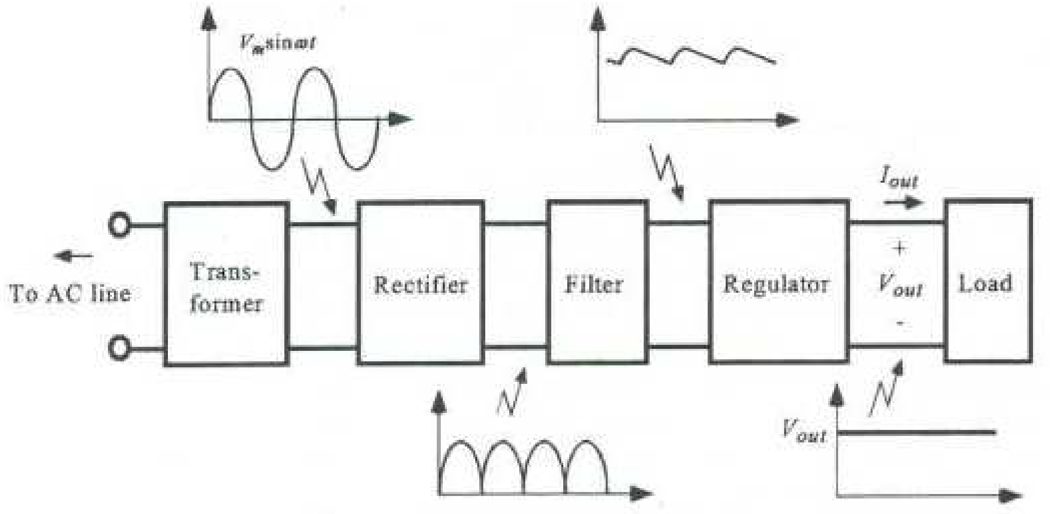

Fig: 3.2 Power supply

D. Transformer:

Usually, DC voltages are required to operate various electronic equipment and these voltages are 5V, 9V or 12V. But these voltages cannot be obtained directly. Thus the a.c input available at the mains supply i.e., 230V is to be brought down to the required voltage level. This is done by a transformer. Thus, a step down transformer is employed to decrease the voltage to a required level.

E. Rectifier:

The output from the transformer is fed to the rectifier. It converts A.C. into pulsating D.C. The rectifier may be a half wave or a full wave rectifier. In this project, a bridge rectifier is used because of its merits like good stability and full wave rectification.

F. Filter:

Capacitive filter is used in this project. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. Therefore a regulator is applied at the output stage.

G. Get An Arduino Board and USB Cable

You also need a standard USB cable (A plug to B plug): the kind you would connect to a USB printer, for example. (For the Arduino Nano, you'll need an A to Mini-B cable instead.)

ISSN: 2456-0197

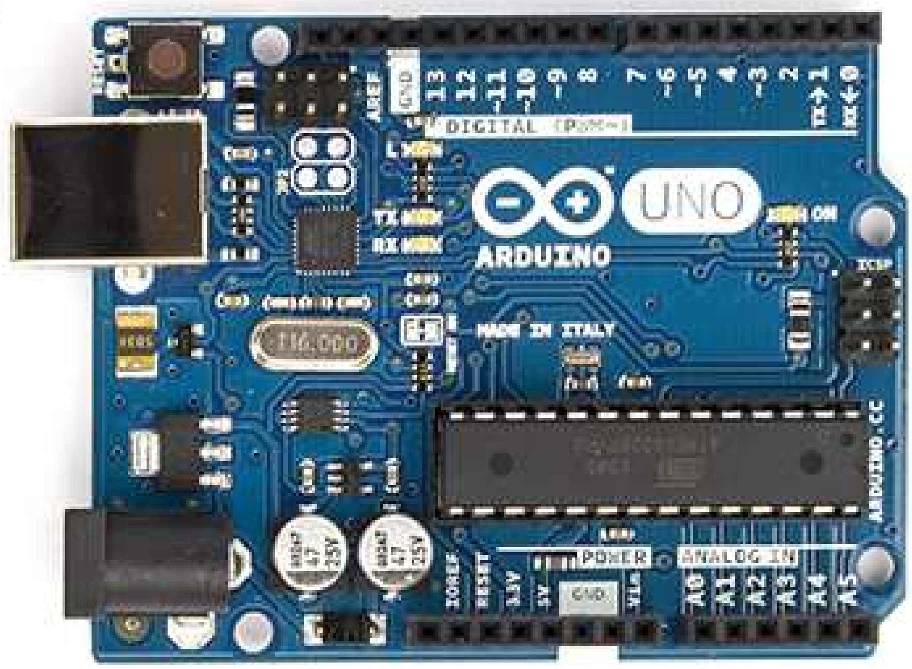

Fig: 3.3 Arduino Board

H. ADVANTAGES

- It can operate without man power
- It can be operate from remote areas
- Accurate load sharing among three phases with this
- The life of the wiring system will increase with this
- Good load balancing is obtain

I. DISADVANTAGES

- Initial cost is high because tap changing mechanism takes more cost
- The system working is depends up on the network

V. CONCLUSION

It is used to shift the load between 3 phases accordingly at the time of overload condition. Current sensors continuously measure the load on each phase and compares them with a reference value. when the current on any phase exceeds the reference value, arduino microcontroller sends an SMS (saying over load condition) to the registered mobile number. When an activating message is sent from the registered mobile the load will be shifted to other light loaded phase. When the load is shifted to other phase at overload condition, the extra load continues to run on the new phase. Unless we switch of the supply and initiate again,the extra load remains on other phase only. At home we use a number of embedded systems which include digital camera, digital diary, DVD player, electronic toys, microwave oven, remote controls for TV and air-conditioner, VCO player, video game consoles, video recorders etc. Today's high-tech car has about 20 embedded systems for transmission control, engine spark control, air-conditioning, navigation etc. Even wristwatches are now becoming embedded systems. The palmtops are powerful embedded systems using which we can carry out many general-purpose tasks such as playing games and word processing. Almost every medical equipment in the hospital is an embedded system. These equipments include diagnostic aids such as ECG, EEG, blood pressure measuring devices, X-ray scanners; equipment used in blood analysis, radiation, colonoscopy, endoscopy etc. Developments in medical electronics have paved way for more accurate diagnosis of diseases.

REFERENCES

[1] Ashna.k, "GSM BasedAutomatic Energy Meter Reading System with Instant Billing", 978 - 1 – 4673 - 5090-7/13/$31.00 ©2013 IEEE.
[2] H.G.Rodney Tan,C.H. Lee,V.H.Mok,"Automatic power meter reading using GSM network" , The 8 The International Power Engineering Conference (IPEC 2007).
[3] B Bhargava Reddy, D Sivakrishna and A V Sudhakara Reddy "Modelling and Analysis of Wind Power Generation Using PID Controller", International Journal For Scientific Research & Development (IJSRD), Vol.1, No.9, pp.2045-2049, November 2013.
[4] RajeswaranNagalingam, Tenneti Madhu, and MunagalaSuryakalavathi, "VHDL Design and Hardware realization of Hybrid Artificial Intelligence Architecture", American Journal of Applied Sciences 11 (5): 782-788, 2014, ISSN: 1546-9239.
[5] P Prasad, B Bhargava Reddy and A V Sudhakara Reddy "Power Loss Minimization in Distribution System using Network Reconfiguration with Particle Swarm Optimization", International Journal of Engineering Science & Advanced Technology (IJESAT), Vol.5, Iss.3, pp.171-178, May 2015.
[6] K.Surekha and A.V.Sudhakara Reddy "A New Control Topology for Smart Power Grids using Bi-directional Synchronous VSC", International Journal of Informative & FuturisticResearch, Vol.2, No.10, PP.3695-3704, June 2015.
[7] N.Rajeswaran, T.Prabakaran, S.Mythili, S.Prabuvenkateswaran, T.Madhu," Modeling and Power Analysis of Dual Phase Low Power Charge Pump Circuit Design", International Journal of Applied Engineering Research, ISSN 0973-4562 Vol. 10 No.20 (2015).
[8] N. Rajeswaranand C. Gokilavani, 2016. Reduction of FBM Noise in Brain MRI Images Using Wavelet Thresholding Techniques. Asian Journal of Information Technology, 15: 855-861.
[9] C.Gokilavani, N.Rajeswaran, S.Karpagaabirami, R.Sathishkumar", Noise Adaptive Fuzzy Switching Median Filters for Removing Gaussian Noise and Salt & Pepper Noise in Retinal Images", Middle-East Journal of Scientific Research 24 (2): 475-478, 2016 ISSN 1990-9233,IDOSI Publications, 2016.
[10] S.Bharathi, A.V.Sudhakara Reddy, Dr.M.Damodar Reddy, "Optimal Placement of UPFC and SVC using Moth-Flame Optimization Algorithm", International Journal of Soft Computing and Artificial Intelligence, ISSN: 2321-4046, Vol.5, No.1, pp.41-45, May2017.
[11] Kalyani S, A. V. Sudhakara Reddy and N. Vara Prasad "Optimal Placement of Capacitors in Distribution Systems for Emission Reduction Using Ant Lion Optimization Algorithm", International Journal of Current Advanced Research, Vol.7, No.11, pp.16339-16343, 2018.
[12] Y V Krishna Reddy, M. Damodar Reddy and A. V. Sudhakara Reddy "Flower Pollination Algorithm for Solving Economic Dispatch with Prohibited Operating Zones and Ramp Rate Limit Constraints", Journal of Emerging Technologies and Innovative Research (JETIR), Vol.5, Iss.10, pp.498-505, 2018.
[13] S. Sudhakara Reddy, N. Rajeswaranand V. K. V. Kesava, "Strategic Planning to Promote Engineering Projects in Community Service(EPICS) in Engineering Institutions," 2018 World Engineering Education Forum - Global Engineering Deans Council (WEEF-GEDC), Albuquerque, NM, USA, 2018, pp. 1-4.