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TIME-BASED POWER DISTRIBUTION IN RURAL AND URBAN AREAS UNDER CONDITIONS OF POWER SHORTAGE

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Abstract: *In our project, we will use a device known as an RTC, which stands for Real Time Clock. This gives information on the day, month, year, and hour that the machines are turned ON and OFF. The RTC has a communication link with the microcontroller through which it receives information, including time and other data, and manages device switching. Via a serial synchronous interface called I2C, the microcontroller communicates with the RTC. The lights are turned on and off accordingly. A microcontroller and the electronics it uses make up the control unit. The RTC is used in this project to determine the day and night timings, and lights are switched in accordance with those findings. The project's hardware consists of a power supply, microcontroller, RTC, and light. When the predetermined times are reached, the microcontroller will use that predetermined window of time to control the devices and the machine.*

Index Terms - Arduino UNO, 4X3keypad, 2X16 I2C LCD display, Relay, Loads

I. INTRODUCTION

The expansion of distributed generation (DG) with inverter interfaces that is grid-connected in Australian distribution networks (DNs) has recently been a contentious topic in the power industry. Grid-connected DG has several benefits, including encouraging the use of renewable energy sources, enhancing fault ride-through, lowering DN losses, and prolonging utility infrastructure investments. Yet, grid-connected DG can also provide a number of potential issues. In particular, protective mal-operation and power quality issues like over-voltage (OV) may occur [1], [2], [3]. Instances of OV at the point of common coupling (PCC) of DG units have been noted by utilities, and as a result, restrictions on the maximum size of a DG installation have been put in place [4]. When there is a substantial short circuit impedance between the DG unit and the closest upstream voltage controlled point, OV occurrences typically happen in networks with low local load. DG units that are grid-connected don't precisely control voltage. The output real power is typically regulated by DG units at unity power factor, and the resulting frequency and voltage are line-commutated [5], [6]. Numerous writers have looked into potential OV preventive strategies in DNs with a strong DG presence. Part II will examine these techniques. In order to maximise their return, a client wants to emit as much energy as feasible. Yet, the loss of equipment life if a maximum power output leads to an OV situation is typically more expensive than the additional income made during the low load condition phase. Many studies have examined the use of reactive power absorption to reduce the voltage rise while still enabling maximum apparent power output in order to satisfy both the technical and economic requirements of DG connection [1], [7]. The enhanced control strategies necessary to enable DNs to operate as intended when a high DG penetration is present also depend on the robustness of inverter control. Finally, the decoupling of the dynamic response of the energy resource from the grid is crucial for integration of the DN with the stochastic character of renewable energy supplies. However, more modern ideas like the Micro-grid concept call for quick load following via droop management during deliberate islanding operation, which

is best accomplished by using an inverter interface. Automatic systems today have less manual tasks, are flexible, reliable, and accurate. Because of this desire, automated control mechanisms are preferred in all fields. Automated systems are performing well, particularly in the sector of electronics. Automation can refer to processes that require less human involvement. Controlling the machine is the major objective of our project, "TIME BASED POWER DISTRIBUTION SYSTEM IN URBAN/RURAL AREAS UNDER POWER SHORTAGE CONDITIONS." By automating it, this enables us to do the operation effectively without the need for human intervention. We can also prevent needless energy waste by turning it off when it's appropriate. This project's microcontroller serves as its major element and is constructed around it. Automatic systems today have less manual tasks, are flexible, reliable, and accurate. Because of this desire, automated control mechanisms are preferred in all fields. Automated systems are performing well, particularly in the sector of electronics. Automation can refer to processes that require less human involvement. Controlling the machine is the major objective of our project, "TIME BASED POWER DISTRIBUTION SYSTEM IN URBAN/RURAL AREAS UNDER POWER SHORTAGE CONDITIONS." By automating it, this enables us to do the operation effectively without the need for human intervention. We can also prevent needless energy waste by turning it off when it's appropriate. This project's microcontroller serves as its major element and is constructed around it.

II. PROPOSED SYSTEM

This project is designed around a microcontroller which forms the heart of the project. In our project we are going to make use of a device called RTC which stands for Real Time Clock. This provides the details such as day month year date and time according to which the machines are made ON and OFF. The RTC is interfaced with microcontroller to communicate and hence to get the information such as time etc. and controls the switching of devices. The microcontroller communicates with RTC through a serial protocol called I2C.And accordingly the lights are made ON and OFF. The control unit consists of a microcontroller with its associated circuitry. When the time allocated is reached, the microcontroller will use that predetermined time period to control the devices and the machine.

BLOCK DIAGRAM:

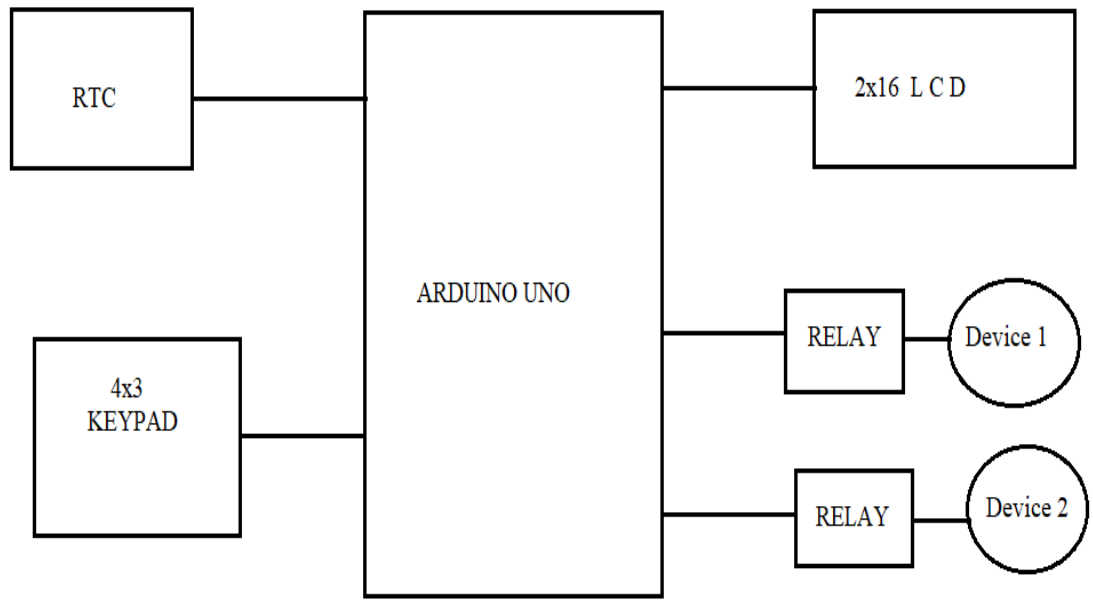

Fig 1: BLOCK DIAGRAM

The following figure shows the diagram of the time based power distribution in rural/urban areas in power shortage conditions here RTC is used for time keeping purposes and LCD is used to display the parameters, to set the time to distribute the power we are using 4X3keypad is used, all of them are interfaced and the code is uploaded to the arduinouno board, relays are used as electromagnetic switches to turn ON/OFF the loads when the given conditions are met.

III. SCHEMATIC DIAGRAM:

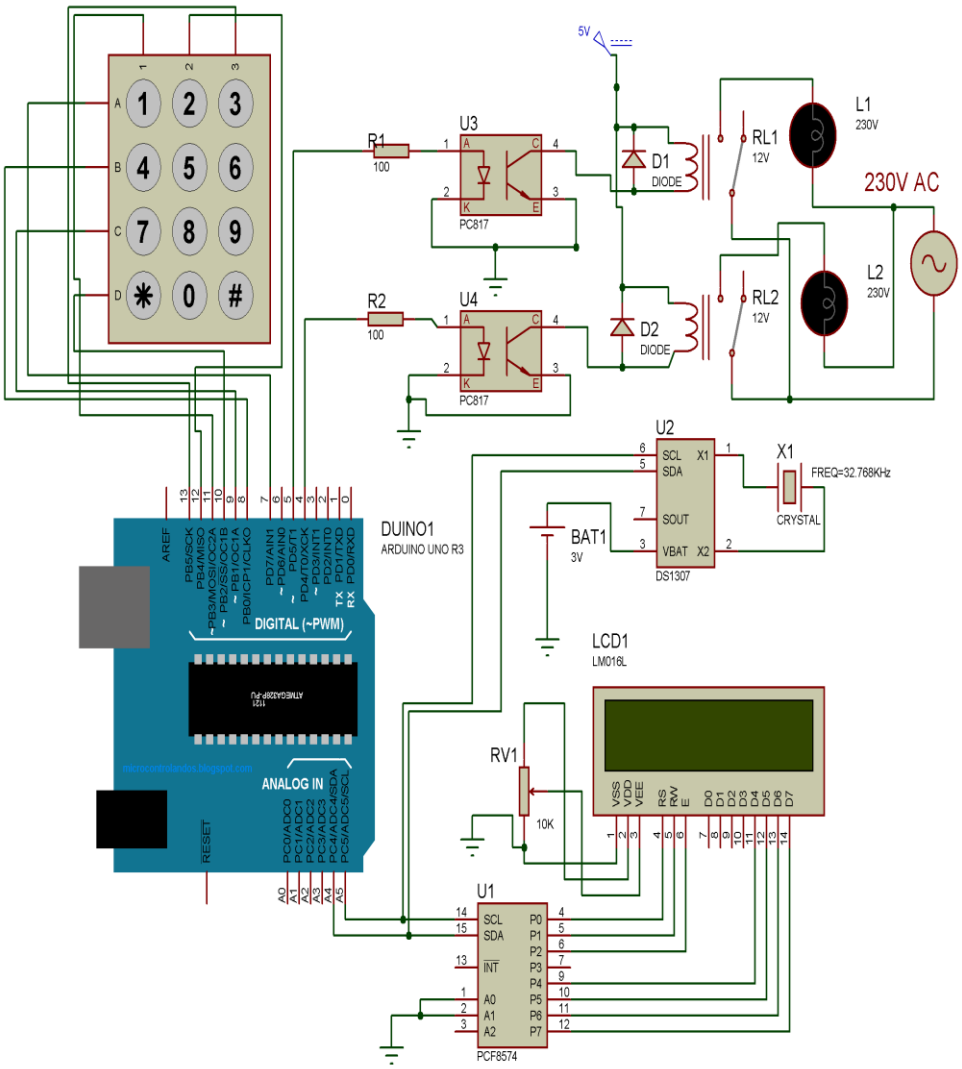

Fig 2: Schematic representation of the working model

IV. FLOW CHART

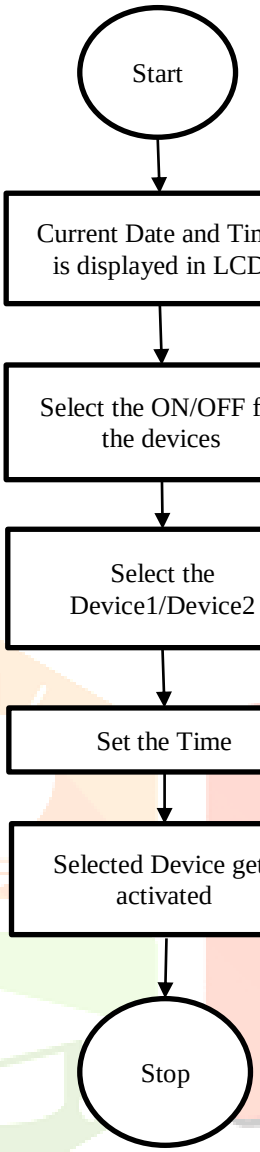

Fig 3: Flow chart of the proposed system

V. CONCLUSION

It is crucial to have efficient power distribution in both urban and rural locations. It ensures that the staff's safety, boosts reliability, eliminates energy waste, maximize efficiency, ensures proper power distribution, uses less energy overall, and takes less time. Particularly in the sector of electronics, automated systems perform well due to their flexibility and manual operations.

VI. RESULT

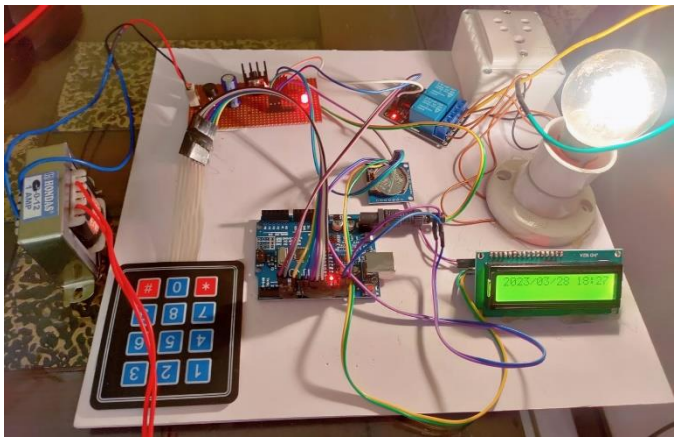

Fig : Output

VII. ADVANTAGES

- Less intervention of Human
- Easy to use
- High Accuracy
- High Reliability

VIII. APPLICATIONS

- Domestic Appliances
- Agricultural Sectors
- Industrial Machines

REFERENCES

[1] "Overvoltage mitigation within distribution networks with a high renewable distributed generation penetration," IEEE International Energy Conference (ENERGYCON), may 2014. Joel Kennedy, Phil Ciufo, and Ashish Agalgaonkar.

[2] Mariam Asif Rishadastagir, "Using a DVR to improve power quality," IJRDET, vol. 2, issue 5, may 2014.

[3] Aman Ganesh, Rathna Dahiya, and G. K. Singh, "Development of Simplified STATCOM Method for Voltage Control and Power Quality Improvement," IEEE International Conference on Power Electronics, Drives and Energy Systems (PEDES), December 2016. PQIdevices Voltage Sag/swell Selective harmonic compensation and PF correction for harmonics Loss reduction, P compensation, and load balancing Passive Compensation Filters

synthetic filters individual power sources Power converters International Journal for Current Trends in Science and Technology, Spring DGs 174.

[4] IJSRET, ISSN 22278-0882, vol. 3, issue 1, April 2014.AnkitaMishra and ArtiBhandakkar,"Power Quality Improvement of Distribution System by Optimal Placement and Size of DGs Using Particle Swarm Optimization."

[5] "A New and more effective Operating Technique for Grid-Connected PV System Considering Voltage Control in Distribution System," by G. C. Pyo, H. W. Kang, and S. I. Moon. Conversion and Distribution of Electrical Energy in the 21st Century, IEEE Power and Energy Society General Conference Century, July 2008, ISSN:1932-5517.

[6] J. Krata , T. K. Saha, "Real-Time Coordinated Voltage Support with Battery Energy Storage in a Distribution Grid Equipped with Medium-Scale PV Generation," IEEE Transactions on Smart Grid, April 2018, ISSN: 1949-3053.

[7] Zdenk Müller, Ghaeth Fandi, and Ibrahim Ahmad IEEE 19th International Scientific Conference on Electric Power Engineering (EPE), ISSN: 2376-5631, June 2018. "Improvement of voltage profile and mitigation of power losses in case of breakdowns employing DG units."

[8] A Switching Hybrid Filter -DVS/Green Plug for Smart Grid Nonlinear Load, Foad H. Gandoman and AdelcM. Sharaf, IEEE International Conference on Smart Energy Grid Engineering (SEGE), 2015.