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Three phase automatic phase changing system monitoring using Iot

L Sumith Balan, B Badhri, R Rahul Raj, P Karan Kumarj and A Raja

Abstract
Demand than a single-phase power supply in the residential and industrial sectors because a three-phase power supply provides constant power supply and is stable and constant. In a three-phase supply, there is some possibility of electrical fluctuations and phase current interruptions due to transformer failure, and in such a situation, the phase shift is possible in three-phase supply, due to which the supply does not stop and the operation is. Not affected however, manually changing the phase is a time-consuming process and also has fire protection potential. This project solves the manual phase shift problem using automatic phase shift. This project also uses the Internet of Things (IOT), which allows us to control the process of phase changes using a mobile phone or another Internet, using devices located anywhere in the world.

Keywords: ESP8266, GAS, Arduino

1. Introduction
The development of new control technologies favours the automation of the protection system. They improve the controllability of the system while maintaining the security and integrity of the infrastructure. In this regard, the production and deployment of intelligent multifunctional devices (intelligent electronic devices (IED)) are increasing. Modern reclosers include new features that improve their accuracy and thus reduce failures. However, the massive presence of fuses without smart features still speaks against its progress

2. Literature survey
M. Arun Dev, P FebinaBeevi
An automatic phase change over switch is designed primarily to disconnect load from its power source and transfer it to a standby source say generator or any other local power source like solar which is installed near our loads, in case there is a power outage. The switching process is done by one or more relay coils and this will prevent the power outages. Once the supply is restored, the load is transferred back to mains supply. The entire process is controlled by a group of relays that keeps sensing to detect that whether the main supply is available or not. This eliminates the need of manual operations and a small duration of power outage. The proposed Automatic changeover controller can switch three power sources alternately at a time. Keywords-Automatic changeover controller, Energy efficiency, Power Grid, Solar, Switching time.

Michael J. Thompson, Kamal Garg, and Milind Malichkar
San Diego Gas & Electric (SDG&E) initiated a project to add two parallel 400 MVA (+31.3° to 80.1°) phase shifting transformers (PSTs) at a 230 kV interconnection substation. California ISO (CAISO) proposed the PST project to provide flow control between SDG&E and Commission Federal de Electricity (CFE) 230 kV systems during critical N-1 or N-1-1 500 kV line contingencies. With the need to integrate renewable generation, many utilities are using PSTs to manage the grid (e.g., American Electric Power [AEP] has eight PSTs in their system). SDG&E is presently reviewing the need for additional PST projects. The authors collaborated to address the unique challenges of parallel PST protection and control for this wide-ranging PST application, including implementation of CAISO control and automatic contingency-based tap-changer runback. This paper discusses SDG&E's process to execute the project, including settings development, simulation, lab and field testing, and

in-service testing. The authors discuss oscillography analysis used during lab testing, energization, and loading to verify the overall design and programming.

AkhilJain1, Poonam Tanwar2, Srtuti Mehra3

Each system is automated to meet the latest challenges of today's environment. Automated systems are reliable, flexibility is high and accurate because less manual work, so every field needs an automatic control system. Especially in the field of electricity and electronics, automatic systems are responsible for excellent performance. Today they manually change one phase (three-phase) to another phase (single-phase) in the electric field. If one of the two phases has low voltage and you want to automatically change the phase from three-phase to single-phase. Therefore, we proposed a system to solve this problem that used wireless technology to track and change the phase. With ZIGBEE built-in automatic phase shift and monitoring, this paper maintains safety, high reliability, and is prone to many errors. The system has a transmitter and a receiver part controlled by a microcontroller. The communication between these parts is done by the ZIGBEE transmitter and receiver part. The current monitored phase is displayed on the computer. If one of the two phases has low voltage and you want to automatically change the phase from three-phase to single-phase.

3.1 Existing systems

1. Phase Shift can be controlled physically by manually switches only.
2. It cannot be monitor in this method

3.2 Existing system disadvantages

User has to switch on/off the appliances manually.

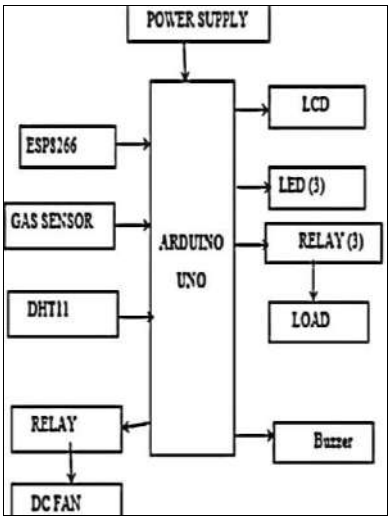
4.1 Proposed System

1. Phase Shift can be controlled by full automated in this method.
2. As the devices are connected by IOT, the working of the appliances can be monitored and controlled

4.2 Proposed system

Disadvantages

1. Switching on/off of appliances can be done through IOT.
2. Regular monitoring of the appliances through IOT.



5. Block diagram

6. Embedded systems

An embedded system is a system that consists of hardware, application software, and a real-time operating system. It can be a small standalone system or a large combined system.

Our embedded system tutorial covers all embedded system topics like functions, design, processors, microcontrollers, tools, addressing modes, assembly language, interrupts, embedded c programming, LED flash, serial communication, LCD programming, keyboard programming, project implementation etc.

System

A system is a way of working, organizing, or performing one or more tasks according to a specified set of rules, programs, or plans.

Real-time calculation is a mechanism in which all units work together according to certain rules. It can also be defined as a way of working, organizing, or completing one or more tasks according to a fixed plan.

Embedded systems are systems in which software is embedded in computer hardware to create systems for different applications, specific parts of applications or products, or parts of a larger system. A embedded system is a small standalone system or a large combination system. This is a microcontroller-based control system used to perform specific operational tasks. The embedded system is a combination of three main components.

Hardware

Hardware is the physically used components that are physically connected to an embedded system. It consists of a microcontroller-based integrated circuit, a power supply, an LCD display, and more.

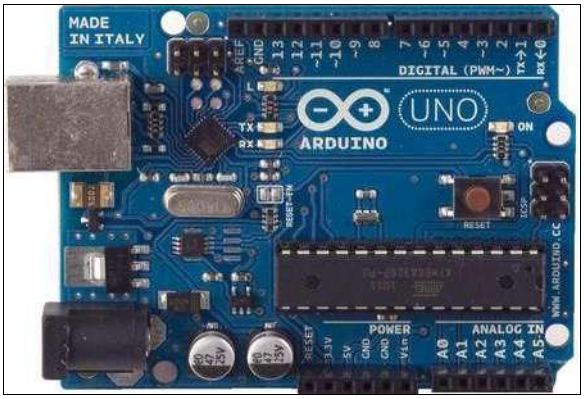
Real time operating system (RTOS)

The RTOS monitors the behaviour of the embedded system. It acts as an interface between the hardware and the application software, providing a mechanism to monitor the application software and run the processor on a schedule that controls latency effects.

7. Arduino

The Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital I/O pins (6 of which can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal, a USB connector, a power jack, an ICSP header, and a reset button. Contains everything needed to support the microcontroller. Simply plug it into your computer with a USB cable, or power it up with an AC-DC adapter or battery to get started. You can play around with UNO without worrying too much about doing something wrong. Worst case, for a few bucks you can replace the chip and start over

This is what the Arduino board looks like.



Power

The Arduino Uno board can be powered from a USB port or an external power supply. Power supply is selected automatically. The external (non-USB) power can come from either an AC-DC adapter (outlet) or a battery. The adapter can be connected by inserting the center positive 2.1mm plug into the board's power jack. The leads from the battery can be plugged into the GND and Vin headers on the POWER connector.

This board can operate from an external power supply of 6-20 volts. However, when supplied with voltages below 7V, the 5V pin he can only supply voltages below 5V, which can make the board unstable. Using more than 12V can overheat the voltage regulator and damage the board. The recommended range is 7-12 volts.

Memory

ATmega328 is 32 KB (bootloader occupies 0.5 KB). It also has 2 KB of SRAM and 1 KB of EEPROM (readable and writable using the EEPROM library). See mapping between Arduino pins and ATmega328P ports. Atmega8, 168, and 328 have the same mapping as.

Input and Output

Note that this drawing is for a chip in a DIP package. The Arduino Mini is based on a smaller physical IC package that includes two additional ADC pins not available on his Arduino implementation in the DIP package. The 1digital pins of the Uno can be used as inputs or outputs using the pin Mode (), digital Write () and digital Read () functions. They run on 5 volts. Each pin can source or receive 20mA for recommended operating conditions and has an internal 20-50k ohm pull-up resistor (disconnected by default). A maximum of

0 mA on any I/O pin should not be exceeded to avoid permanent damage to the microcontroller.

8. Future scope

Application

The main purpose of ATS is to continuously supply electrical energy from one of two power sources to a connected load circuit (electrical equipment - lights, motors, computers, etc.).

8.1 Future enhancement

For emergency power needs in small businesses using automatic transfer switch technology with generator shutdown. By changing the use of the external power supply, the range of application is expanded. 2. Industry 3. Hospital 4. bank

9. Conclusion

This project deals with solving industry-related problems. At the end of this project the following results were achieved: -

- The system is fully automated.
- When utility power returns, the system will return the load to utility power and shut down the generator.
- The system automatically switches when the voltage or current exceeds the rated value to protect the device from damage.
- The time required to switch power from one source to another is less than 0.25 seconds, which is close to the expected result.
- Automatic transfer switches that require close monitoring of power supplies.

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