AC Power Controller with Programmable Interface

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Abstract: The project at controlling the AC power by using the concept firing angle control of thyristors. One can enter the required percentage of power supply through a keypad. The input is provided to a microcontroller of a family that initiate the firing angle to adjust the load power. For matching the power to the required one, a TRIAC is used in series with the AC load. A display unit is used to display the power and one can go through the preferred percentage to decrease the power to the load. Here, to maintain the load power the firing angle would be change automatically. The project employs a bulb such that the entered power equals the necessary one. The above process is carried out with the help of a TRIAC in series with the AC load. It uses 8051 family microcontroller. A keypad is used to give the input to the PIC microcontroller. An LCD is used to display the information

Keywords: Microcontroller, TRIAC, Opto Coupler, Zero crossing detector, LCD Display.

1. Introduction

The project aims at controlling the AC power by using the concept of firing angle control of thyristors. one can enter the required percentage of power supply through a keypad. The input is provided to a microcontroller of 8051 family that initiate the firing angle to adjust the load power. for matching the power to the required one, a TRIAC is used in series with the AC load. A LCD screen is used to display the power percentage that is provided by the user.
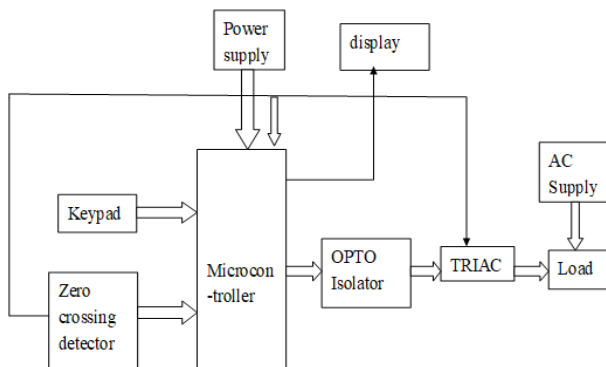
2. Block diagram

Fig. 1. AC power controller with programmable interface using microcontroller

A. Microcontroller

Full duplex UART serial channel.
8K bytes of in a system programmable.
32 programmable input output lines.
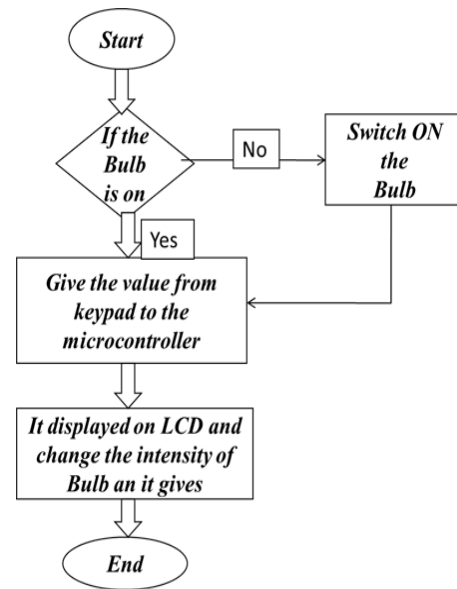256*8 bit internal RAM.

Fig. 2. Flowchart

B. Keypad

A keypad is a set of keys placed in a block which frequently bear symbols, digits and a complete set of alphabetical letters. In order to notice which key is pushed from the matrix, the row lines are to be finished low one by one and read column. A keypad is a set of buttons or keys bearing digits, symbols and/or alphabetical letters placed in order on a pad, which can be used as an efficient input device. A keypad may be purely numeric, as that found on a calculator or a digital door lock, or alphanumeric as those used on cellular phones.

C. Opto Coupler:

Opto coupler are made up of a light emitting diode, and package. There is no electrical connection between the two devices. Here, the light responsible device may be a

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-10, October-2019
www.ijresm.com | ISSN (Online): 2581-5792

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phototransistor, photodiode, or devices like thyristors, TRIAC etc.

D. TRIAC

TRIAC, from triode for alternating current, is a generic trademark for a three terminal electronic component that conducts current in either direction when triggered. Its formal name is bidirectional triode thyristor or bilateral triode thyristor.

E. LCD Display

In Ac power controller with programmable interface, the LCD display is used for displaying on the keypad through value. It is 16 pins LCD display, interfaced with microcontroller and is powered up with 5 V dc.

3. Conclusion

This work is used at controlling the AC power by using the concept of firing angle control of thyristors. With this device one can enter the required percentage of power supply through a keypad.

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