PLC USING RENESAS CONTROLLER

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Abstract - *Throughout a development process of control system, control engineers deal with challenges like shorter development time higher quality & flexibility requirements & reusability of the control code . It has been integral part of factory automation & industrial process control for decades They control a wide part of applications from simple lighting functions to chemical processing plants. PLCs are demanded to work flawlessly for years in industrial environments that are hazardous to the electronic components that modern PLCs are made from. The aim of the application is to develop RENESAS with serial port & to increase I/O in the PLC. This paper discusses about the manufacturing of the PLC using Renesas Controller.*

Key Words: **PLC, Digital computer, Renesas controller**

1.INTRODUCTION

The basic aim of this project model is to use of PLC in low power consumption with lower cost. This project presents todays necessity for industry in automation.This paper presents experiments for students to learn and explore the various industrial applications of PLC's. The control problems in this paper are defined with respect to their applications in different industries such as automotive, steel, oil and electronics. A control system is a combination of various devices that are integrated as system, used to sense, measure, indicate and controls the process variables which in inters to the process desired automation. All the problems are solved using Ladder Logic programming on Automation. The software helps to design and explore things. The computer program used for simulation. This project consists

of design, simulating the model and stability and other analysis of proposed model. RL78 microcontrollers (MCUs) from Renesas Electronics are an advanced family of general-purpose and application-specific MCUs, combining true low power and high performance operation. So our aim is to develop the PLC using Renesas.
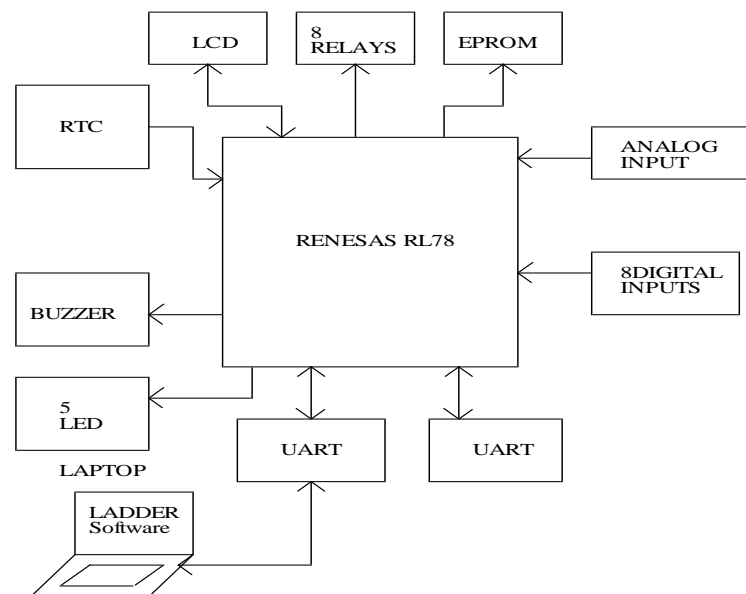
2. BLOCK DIAGRAM

Fig.1. Block diagram

2.1 BLOCK DIAGRAM DESCRIPTION

2.1.1 Renesas RL78:

RL78 microcontrollers (MCUs) from Renesas Electronics are an advanced family of general-purpose and application-specific MCUs, combining true low power and high performance operation.

2.1.2 16X2LCD:

Liquid crystal display (LCD) which has been used is 2x16 LCD. I.e. two lines each with 16 characters. The LCD has been used in 8bit mode i.e. 8 data lines are required. Other than 8 data line one RS, one RW & one enable line is also required.

2.1.3 Relays:

An electromagnetic neutral relay is the simplest, most ancient, and widespread type of relay.The SPDT relay as a way of switching between 2 circuits: when there is no voltage applied to the coil one circuit "receives" current, the other one doesn't and when the coil gets energized the opposite is happening.

2.1.4 EEPROM:

EPROM (electrically erasable programmable read-only memory) is user-modifiable read-only memory (ROM) that can be erased and reprogrammed (written to) repeatedly through the application of higher than normal electrical voltage

2.1.5 Input:

There are two type of input such as analog and digital.

2.1.6 UART:

A UART (Universal Asynchronous Receiver/Transmitter) is the microchip with programming that controls a computer's interface to its attached serial devices. Specifically, it provides the computer with the RS-232C Data Terminal Equipment (DTE) interface so that it can "talk" to and exchange data with modems and other serial devices.

2.1.7 LED AND BUZZER:

LED and Buzzer are used for indication purpose.

3.WORKING

Input supply is taken from mains supply i.e, 230v 50 Hz which is fed to power supply section. Here AC supply is converted in to DC using full bridge formed by diode 5408 having current rating 6A. This DC supply is filtered out using filter capacitor of 1000microFarad 50V using voltage regulated IC 7812 to get pure DC supply. Renesas controller required 15 to 16 V DC supply. Renesas has maximum 12 input. Renesas has capacity of interfacing maximum 10 Relays. Here in this project 4 relays are used to connect the load. Rating of this relay is 12V 200mA. Load such as two indicator lamp, DC motor, Buzzer. Load is connected to the NO and Supply voltage to the load is given through pole. This load is operated using the Boolean expression implemented using logic gates like AND OR NOR etc.
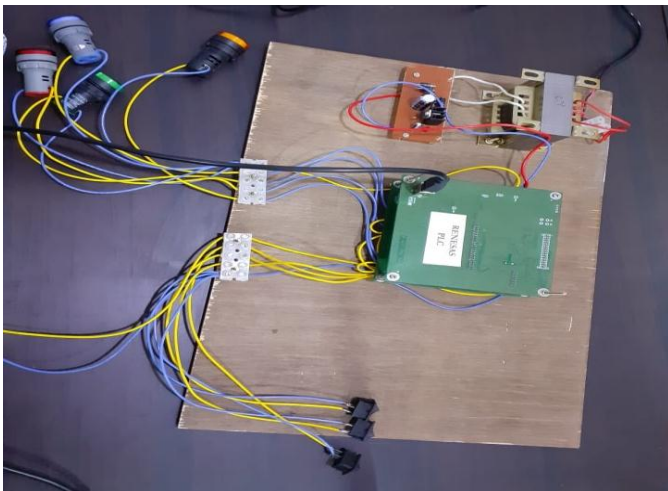
4. SOFTWARE

4.1 ORCAD:

ORCAD software is used for PCB design. Capture is used to drawn a circuit on the screen, known formally as schematic capture.
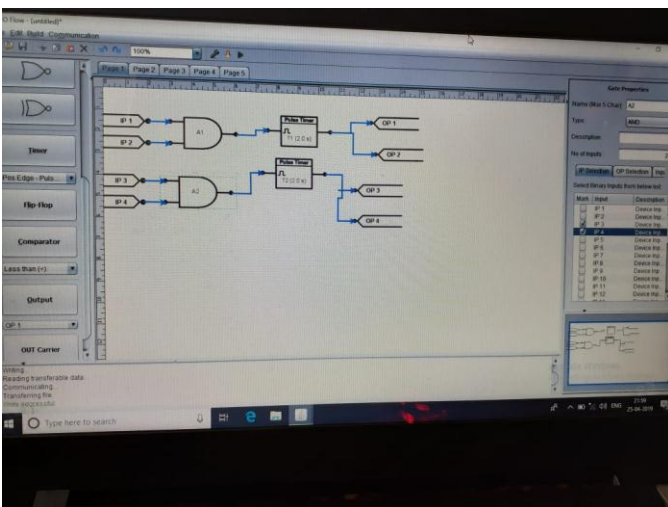
4.2 ALTIUM:

Altium Designer is a software package which allows electronic circuit designers to design, draw and simulate electronic circuit boards. Altium is a vastly complex software design suite and these notes are designed to introduce the user to the fundamental principles.

5. HARDWARE RESULT

6. SOFTWARE OUTPUT

7. CONCLUSIONS

Compared to commercially available products as a teaching point of view. It is considered that this platform has an impact in the automation where PLC is the part of system and so student can understand heart of the system. The source codes of Easy Ladder are open to student so that everyone makes their own small PLC using editing the codes. Also, the authors consider that this system is a platform on which a more powerful PLC can be developed in future. The results of the application of our approach to education have been excellent both in terms of student's motivation and knowledge.

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