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Three Phase Overhead Fault Detection and Control

Ayush Pagey¹, Ayush agrawal², Dr. Abhishek Verma³

^{1, 2} U.G. Student of EEE Dept, Bhilai Institute of Technology Durg, CSVTU, India.

³ Associate Professor of EEE Dept, Bhilai Institute of Technology Durg, CSVTU, India.

Abstract: Electricity has become the most wanted amenity for all people. Gone are the times when electricity would be solely restricted to cities. it's currently aiming to each distant elements of the planet. Thus we've currently a fancy network of installation. The transmission lines are carrying this power. These lines travel terribly long distances thus whereas carrying power, fault occurring is natural. These faults damage several very important electrical equipment's like electrical device, generator, and transmission lines. For the uninterrupted power offer, we'd like to forestall these faults the maximum amount as attainable. thus we'd like to discover faults at intervals the shortest attainable time. Microprocessors and microcontroller primarily based systems used for these fault detection are advancing chop-chop. The projected paper simulates Numerical Overcurrent relay that detects faults using microcontroller and ADC. These relays area unit a lot of reliable and have quicker response than the standard mechanical device relays and Static relays. they need augmented range of setting, high accuracy, reduced size, and lower prices, alongside several different functions, like fault event recording, auto resetting, etc. This project is regarding planning the Numerical relay wherever the fault is detected once the input value exceeds the reference value set within the relay that then offers the trip signal to the fuse.

Keywords: Relays, Radio Frequency communication, Circuit breaker, Substation, Power line fault, GSM-SMS, Fault location.

I. INTRODUCTION

Electricity has become the most sought after amenity for all of us. Gone are the days when would be only limited to cities. It is now reaching to every distant parts of the country. So we have now a complex network of power system. This power is being carried by the transmission lines. These lines travel very long distances so while carrying power, fault occurring is natural. These faults damage many vital electrical equipment's like transformer, generator, transmission lines. For the uninterrupted power supply, we need to prevent these faults as much as possible. So we need to detect faults within the shortest possible time.

II. PROBLEM IDENTIFICATION

Relay acts as a switch that's operated by a circuit of little power rating to regulate circuit of larger power rating mechanical device. Relay operates on magnetic force principle. It has a magnetic coil that is energized by electrical phenomenon to behave as a magnet. These relays which prevents faults square measure referred to as as protecting relays. these days microcontroller primarily based relays square measure gaining a lot of quality than the normal mechanical device relays and used extensively to prevent faults because of its quicker response, dependability, less cost, compact size etc. Overcurrent relay act on the principle that once the input current or voltage worth exceeds the predefined set worth then the relay works and sends a trip signal to the electrical fuse. This Project is controlling the value of relay pickup current by the assistance of Microcontroller. We have used P89V51RD2 8051 microcontroller, ADC 0808, digital display JHD162A (16x2 display) to detect faults. Fault is detected and Trip signal is generated once the input current worth is bigger than that of relay predetermined value.

III. PROPOSED METHODOLOGY

In present systems, there aren't any easy and effective techniques to alter the fault detection and site. This method is mostly dispensed manually as they get info regarding fault from the facet of users. The immediate action to be done is to modify of the facility provide. A. Fundamentals In some systems, this is often solely machine-controlled exploitation relays or ELCBs. The planned system is an Automatic power cable Fault Detector which will simply and accurately discover and find the fault occurred within the power cable. It consists of a line unit similarly as a master station. The system makes use of voltage and current transformers that area unit placed at totally different points on the road to discover the fault. Detection includes checking whether or not the road is faulty or not and if it's, then distinctive during which class this fault falls. this is often acknowledged by checking the values of current and voltage transformers. The obtained result's then transmitted to master station in order that it will incessantly monitor the standing of lines. If the road is faulty, the master pushes the road when the faulty one to open. therefore, fault occurred

at a degree on the road won't have an effect on subsequent sections of the road. the placement wherever that the fault is occurred is additionally foretold exploitation this technique.

IV. BLOCK DIAGRAM OF SYSTEM

The diagram of each post unit and main unit are individually analysed here. The block diagrams of each post and main unit area unit shown below. A typical power distribution line is battery-powered by transformers placed at sure locations. The electrical device secondary are going to be star connected so it'll have a group of 3 section lines and neutral line. every single section client get provide from a section line and a neutral line. it's necessary to notice that this arrangement is sort of advanced and is troublesome to find faults. to research the fault, here we have a tendency to use atiny low electronic equipment referred to as post unit that is mounted on numerous points within the line. Individual post unit can examine its input voltage and cargo current and using appropriate algorithmic program it finds the fault if any. The post units forever send the standing of line to main unit that is placed at the electrical device finish. Post unit additionally cuts the connection to subsequent section whenever a fault happens.

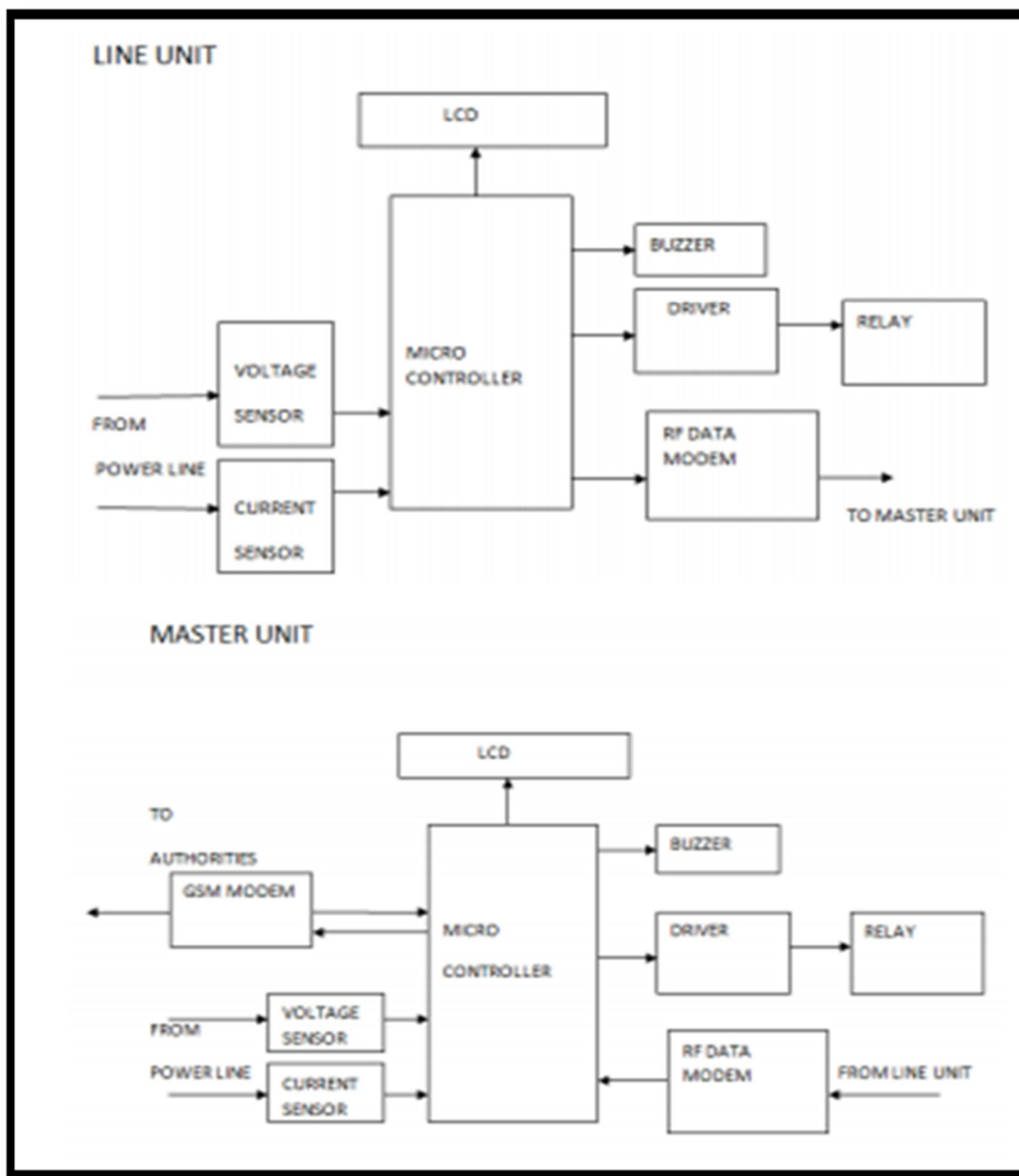


Figure:1 (a) SYSTEM DIAGRAM

V. FLOW CHART OF SYSTEM DIAGRAM

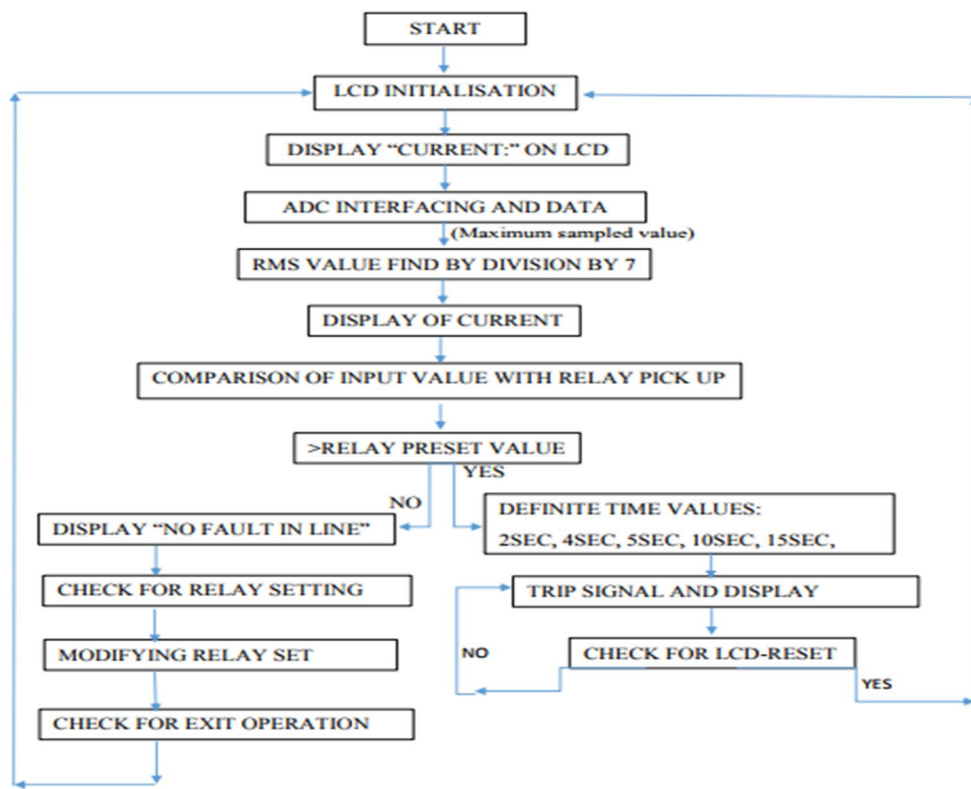


Figure:2 (a) FLOW CHART OF SYSTEM DIAGRAM

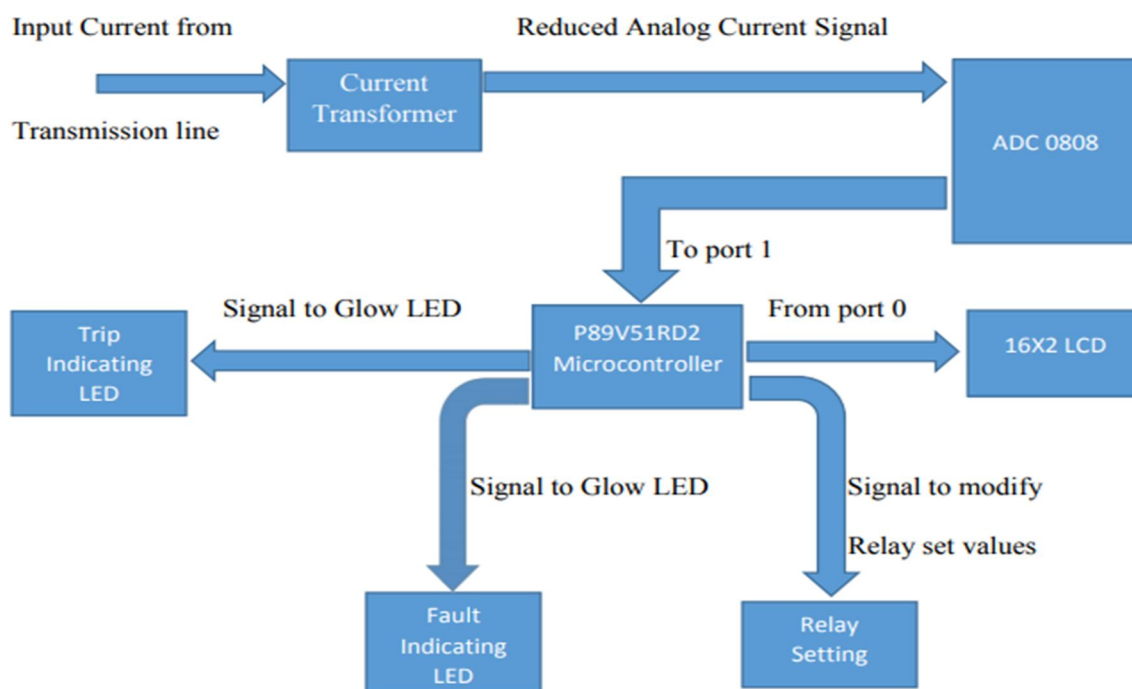


Figure:2 (b) FLOW CHART OF SYSTEM DIAGRAM

VI. RESULT AND DISCUSSION

The system designed with success for detecting and locating power cable faults caused by numerous destructing forces which can be natural or manmade. The set of current and voltage sensors connected with the post and main units facilitate in observation the line endlessly. The relay disconnects the faulty section of line from mains therefore on minimize accidents. This is often achieved with the assistance of a small controller which will manufacture control signals to chop the relay whenever a fault is discerned. All the units are named by exploitation an identification number in order that underneath which unit the fault is found may be simply known.

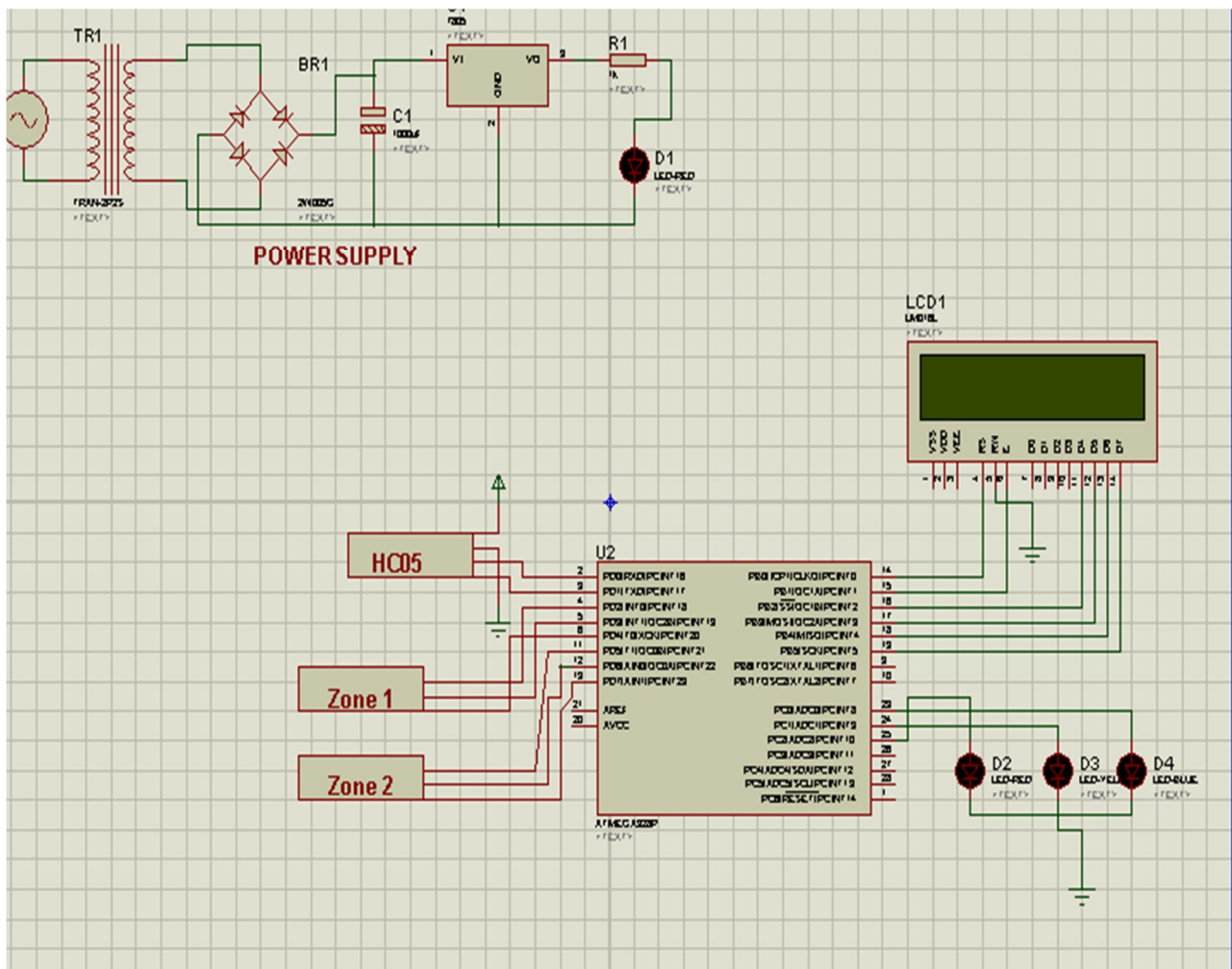
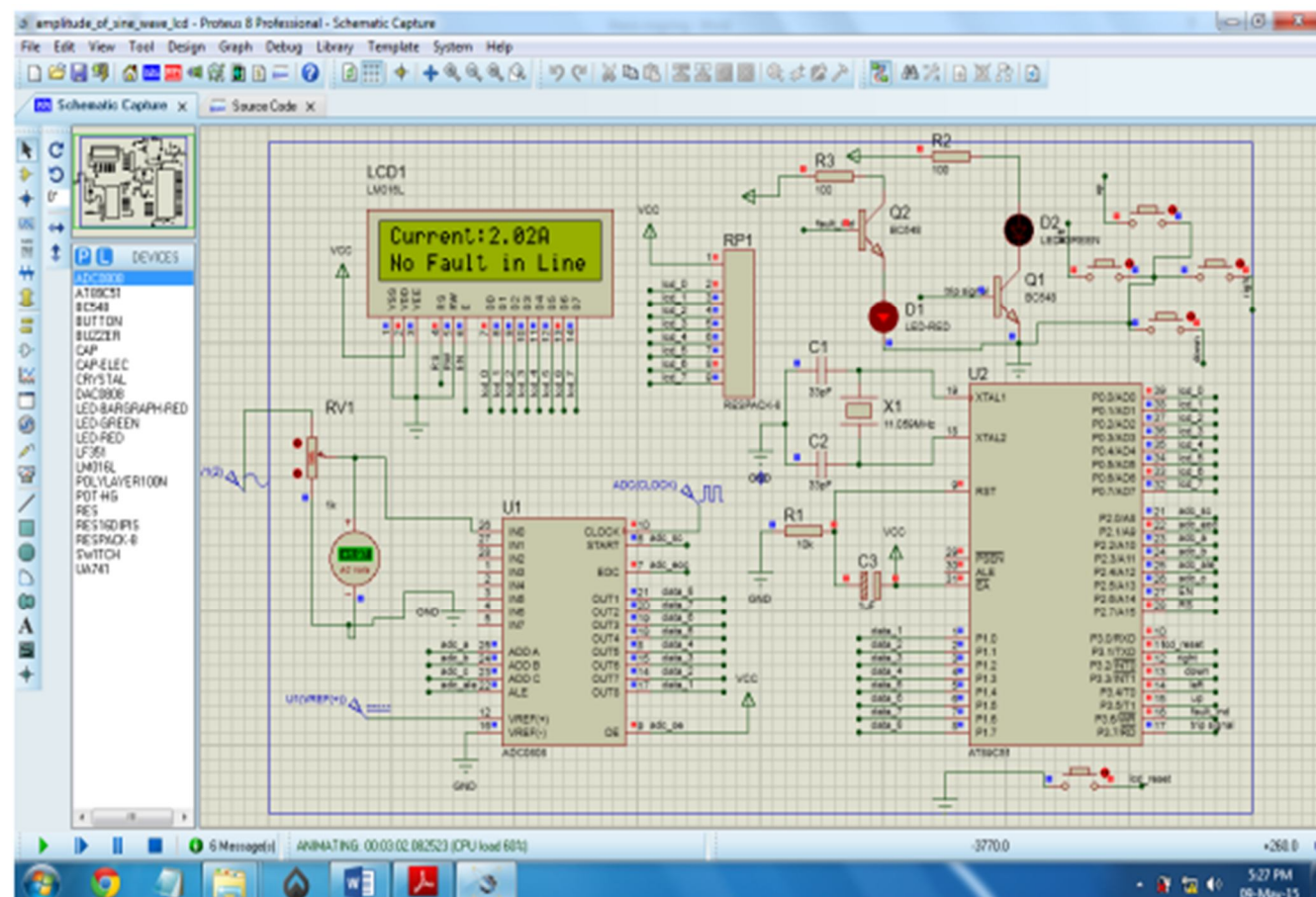
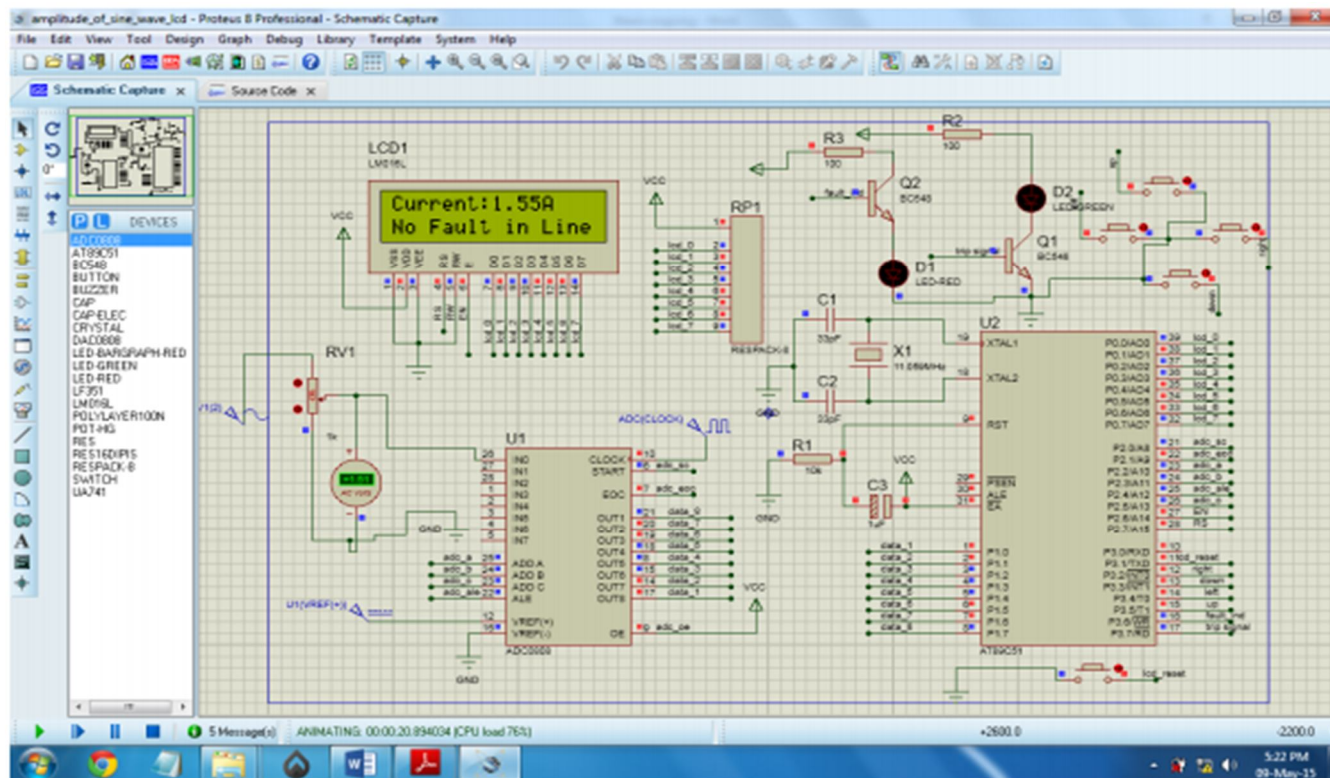


Figure:3 (a) MICROCONTROLLER BASED DIAGRAM

VII. CONCLUSION AND FUTURE SCOPE

The motivation behind this project was difficulties because of faults detection and location in power distribution lines. Power lines in our country area unit subjected to faults as a result of numerous forces and its terribly tough to spot and maintain it in brief interval of your time. this might cause several electrically iatrogenic accidents and thence should be prevented. This project finds an answer for this downside by implanting a group of units on numerous points on power distribution line and activity the fast values endlessly. The fault will simply be detected, known and placed mistreatment this arrangement. this method will facilitate the authorities to take care of the facility line simply and might avoid line fault iatrogenic accidents up to a limit. The performance of this method may be improved by substitution the RF electronic equipment by advanced ZigBee technology. we will use star panels for powering the individual units rather than batteries. within the case of systems containing sizable amount of post units, the affiliation between every post unit to main unit may be replaced by connecting post unit serially and so to main unit. this can scale back complexness and range of connections. Simulations are done in Proteus 8. 0 and the program code is written in KEIL vision Software Platform.





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