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Simulation & Realization of Feeder Protection with Micro Controller

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Abstract

Paper suggest use of micro controller for protection of feeder. Automation of feeder system using microcontroller and GSM aims to design and implement efficient and cost effective solution for replacing the manual process of power cut/load shedding from a centralized location. Paper has detailed completely principle of feeder protection by simulation in PIC microcontroller and development of hardware circuit for realization. Simulation & real circuit consist of control circuit at both end of feeder (in terms of Single circuit) which is controlling feeder switching, Auto Reclose and Wireless operation of feeder. A trip as well as overload signal is indicated by two lamps. Thus paper has successfully realized feeder protection using micro controller & associated circuitry.

Keywords: Feeder, Micro Controller, protection relay,

INTRODUCTION

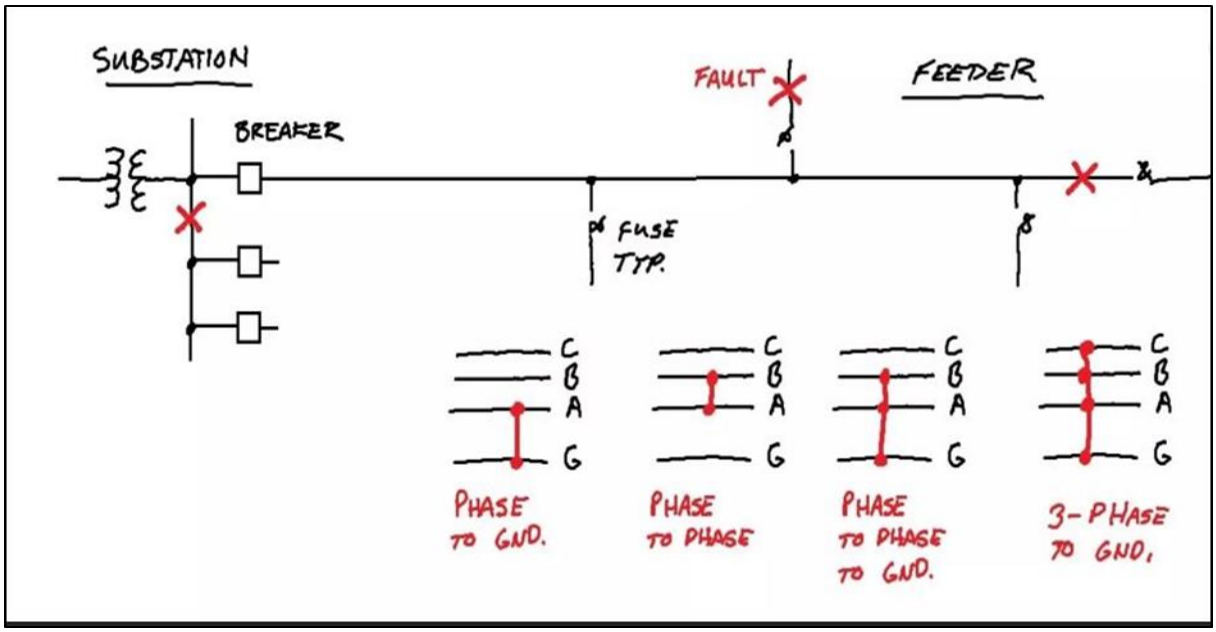
In present scenario the equipment used in electricity transmission and distribution are manual type. Feeder can be protected from the over current condition. Industrial instruments failures have many causes and one of the main causes is over load. The primary of the distribution transformer or any other transformer is designed to operate at certain specific current if that current flowing through that instrument is more than the rated current, then immediately the system may burn because of over load.

In this work for generating high current more loads are applied to the circuit, which will be tripped. To trip the circuit use is made of one relay which will be controlled through micro controller. When over load is occurred relay will trip the total circuit and buzzer will be on to indicate over load.

PROBLEM FORMULATION

Electric utilities use the term "feeder" for a distribution circuit that runs through the town.

A feeder fault is nothing more than a short circuit between one and more of the phases and usually ground or earth.



The requirement is to protect the feeder against above all types of faults.

Protection of Feeder Using Microcontroller:

With the increasing loads, voltages and short-circuit duty in distribution system, over current protection has become more important today. The ability of protection system is demanded not only for economic reason but also consumers just expect ‘reliable’

service. In a Power System Protection, the system engineer would need a device that can monitor current, voltage, frequency and in some case over power in the system. Thus a device called Protective Relay is created to serve the purpose. The protective relay is most often relay coupled with Circuit Breaker such that it can isolate the abnormal condition in the system.

Microcontroller have lots of features to interface protective relay, GSM, lcd. So that we can resolve fault condition within the prescribed time. The basic electrical quantities which are likely to change during abnormal conditions are current, voltage and phase angle. Microcontroller senses one or more of these quantities to detect abnormal conditions on a feeder line. With the slight modification in the program helps to realise it as different relays varying from instantaneous to inverse time relays.
Simulation Circuit for Feeder Protection

MODEL COMPONENT DESCRIPTION

C.T.(Current Transformer):

Fig 1: CT

Product Specification

Sku	**EL.CU.294543**
Type	**tape wound, low tension, ring type**
Ratio	**30/5**
Rating	**2.5va**
accuracy class	**5**

I To V Converter

Fig 2: I TO V converter

ADC (Analog to Digital Converter):
ADC 0808 has eight multiplexed channel
NE 555 for generating frequency of 648 KHz with around 50% duty cycle

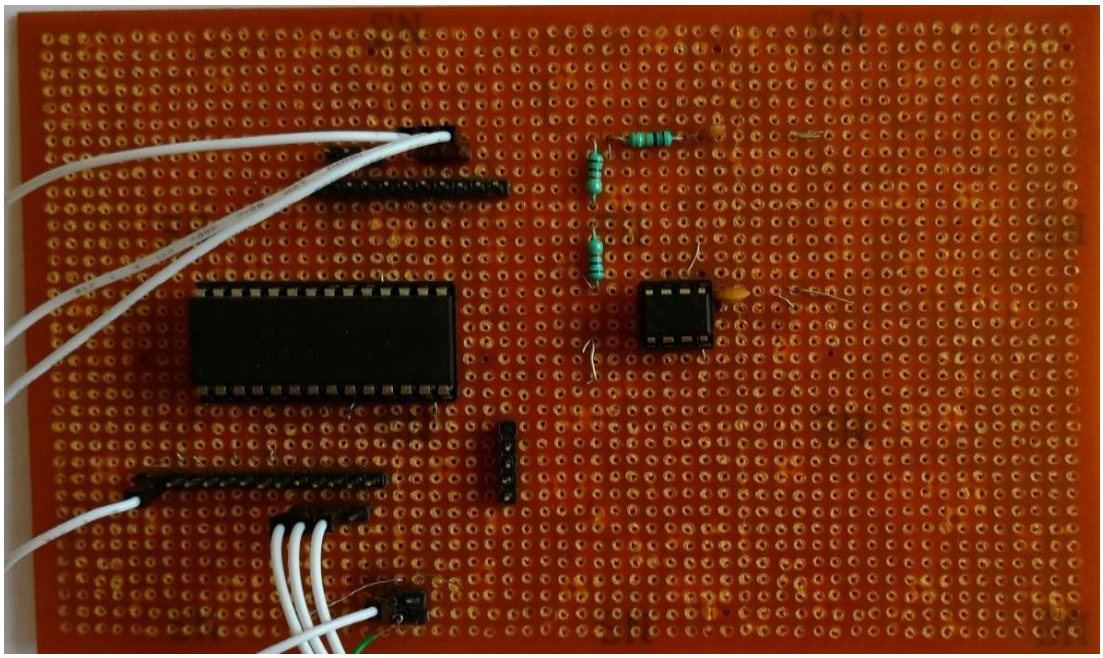


Fig. 3: ADC 0808 with NE 555 IC

Precision Rectifier:
Precision rectifier using IC OP07
Range 2.886V to 6.92V

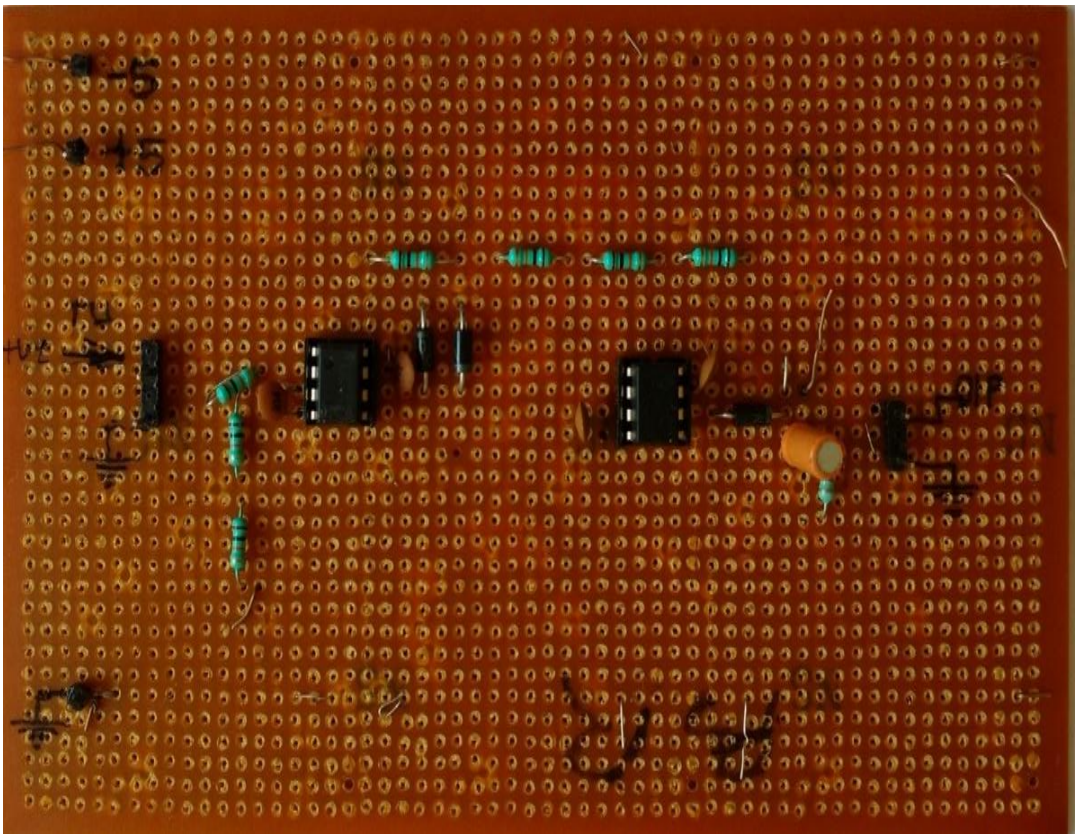


Fig. 4: Precision Rectifier

AT89S52:
Features

- Compatible with MCS®-51 Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-bit Timer/Counters
- Eight Interrupt Sources
- Power-off Flag
- Fast Programming Time
- Flexible ISP Programming (Byte and Page Mode)
- Green (Pb/Halide-free) Packaging Opt.

Pin Configurations

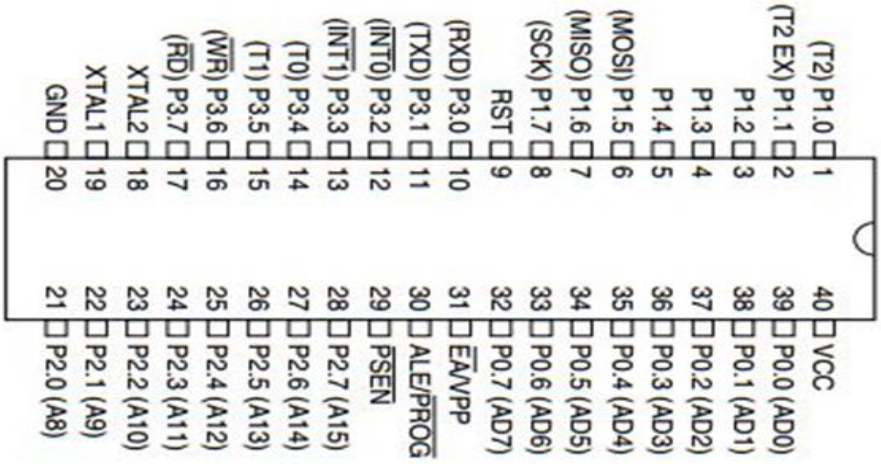
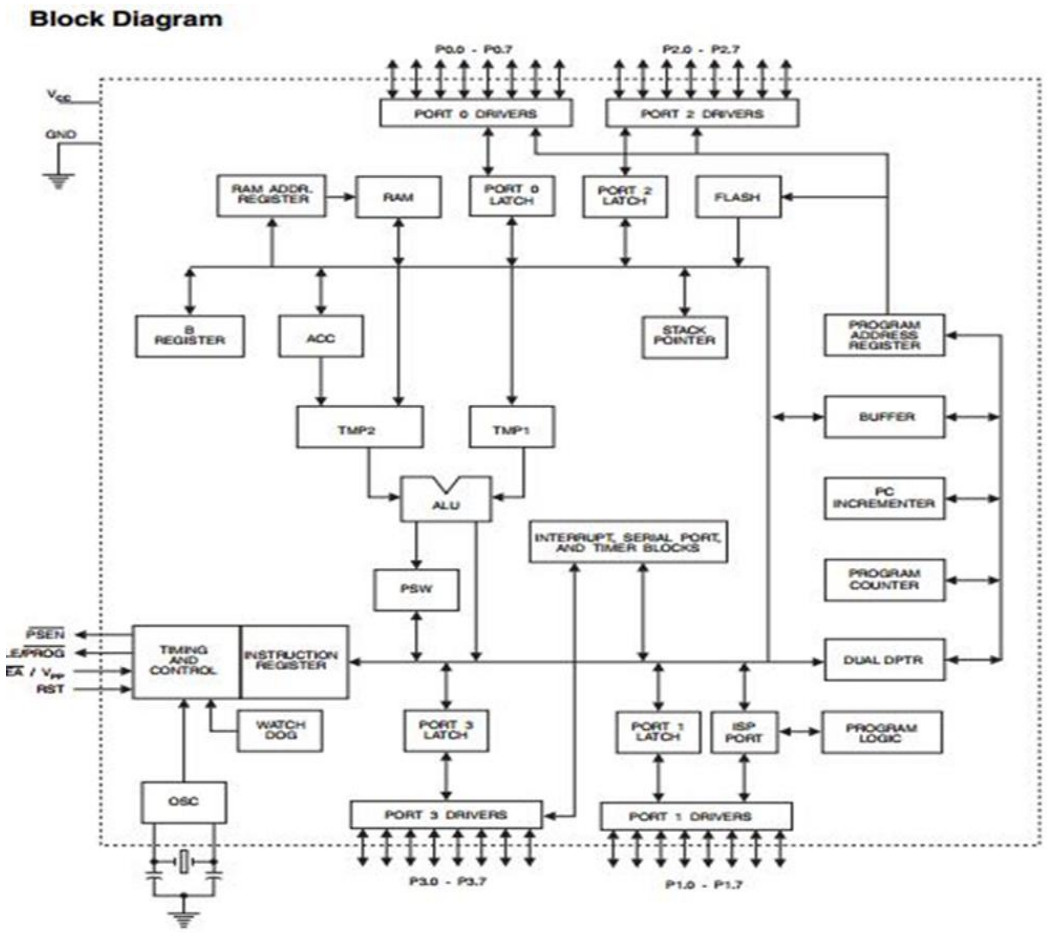


Fig 5: Pin Diagram



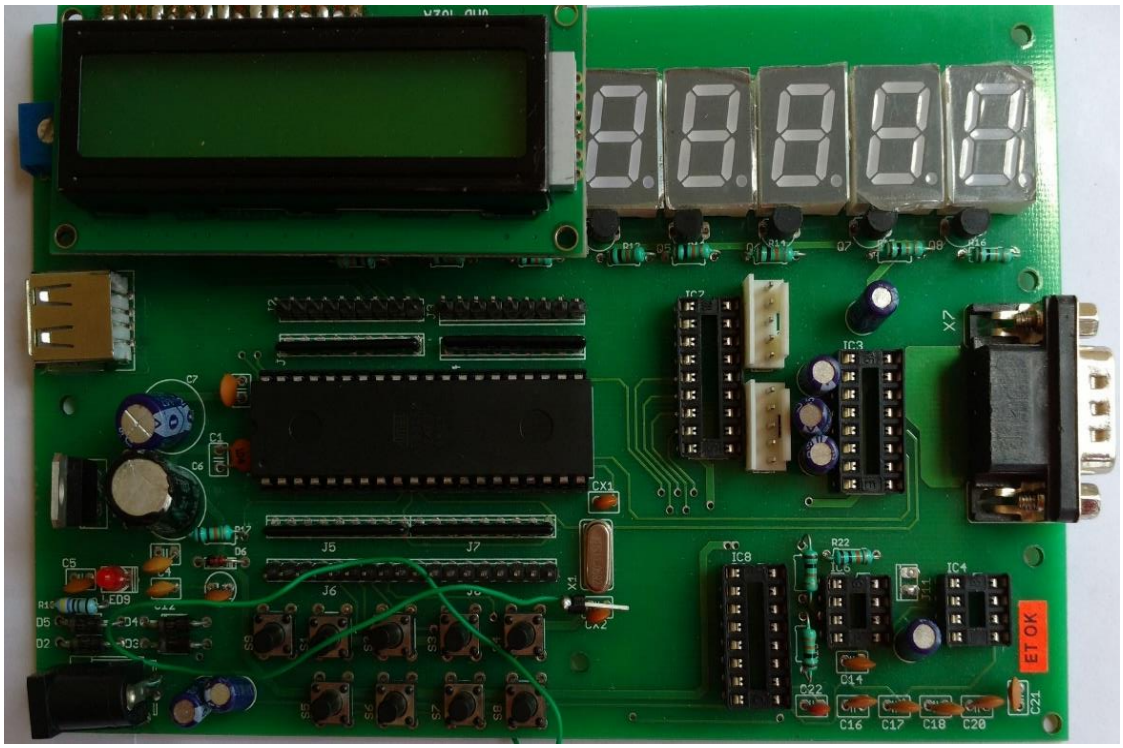


Fig 6 : Complete Hardware Circuit

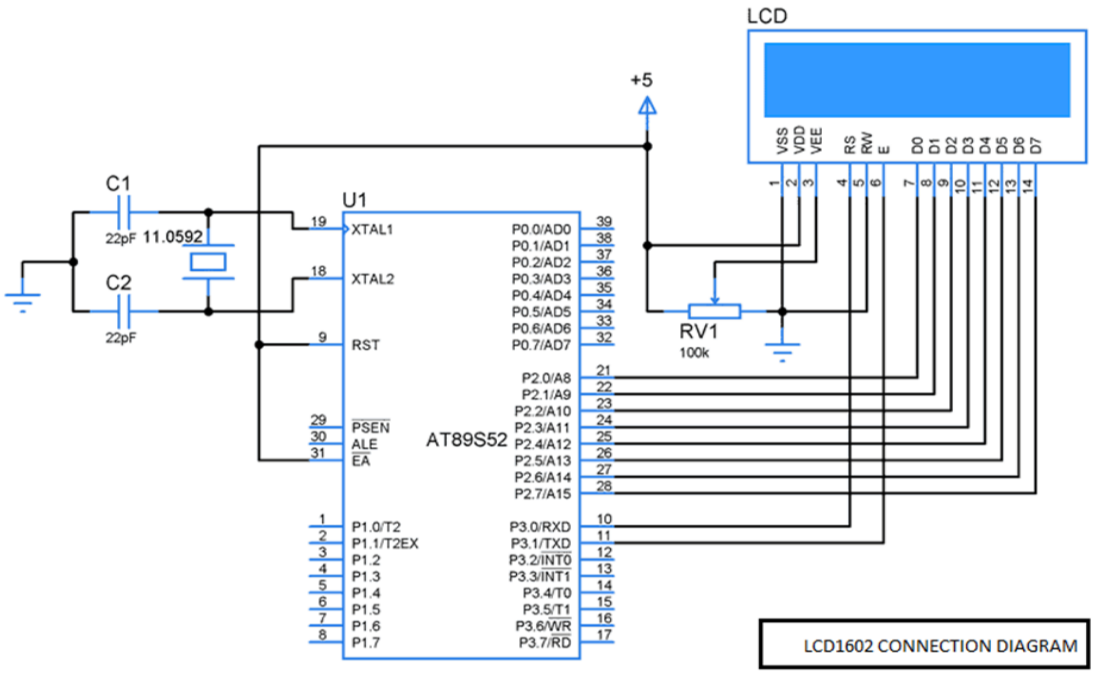


Fig 7: Connection Diagram of LCD1602 TO AT89S52

Real Time Results Feeder ON :

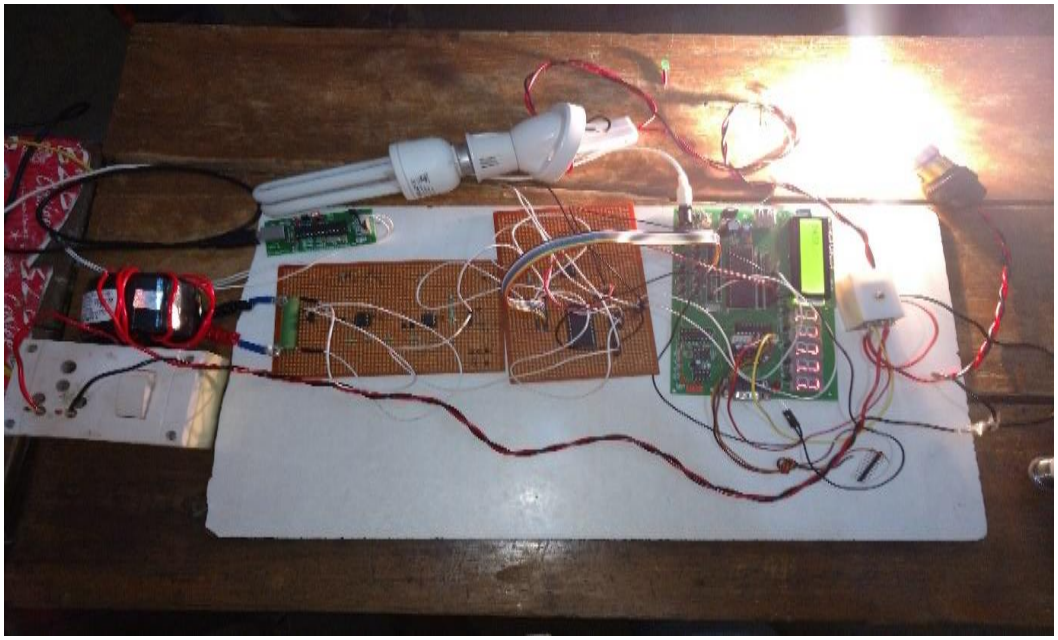


Fig 8

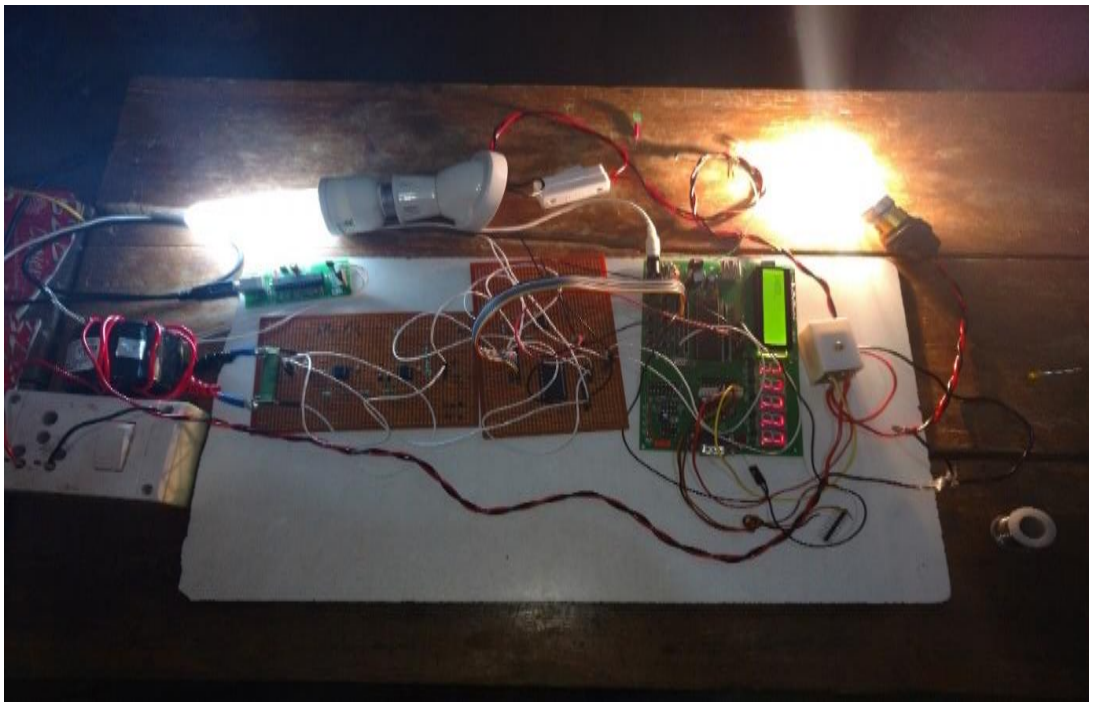


Fig 9: Feeder ON

CONCLUSION

Paper has successfully obtained feeder protection using micro controller.

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