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Simulation for Feeder Protection with Micro-Controller in proteus

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***Abstract*—**Feeder protection is obtained & developed with input sources from both the sides. Micro controller is used for obtaining detection of fault, monitoring and isolation of the feeder. Using micro controller normal and abnormal operation with digital display of parameters is ascertained. Proteus software based PIC micro controller is used for simulation of feeder with single input, double input, over load and trip. Also isolation of the feeder is obtained. Paper suggest successful feeder control with detailed results through micro controller.

Keywords-*Feeder,Micro-controller, Proteus,software*

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I. INTRODUCTION

Present power system operation requires real time monitoring of feeder parameters and isolation at the time of short circuit faults. After micro processor, micro controller is the next line of technology used for real time operation.

Present work discusses development of model circuit for feeder protection, simulation of model circuit for normal and abnormal conditions.

II. CIRCUIT MODEL AND SIMULATION

Here we used Proteus as a simulator for realization of power as well control circuit. In this task there are mainly two tasks 1.Power circuit and 2.Control circuit. First we made Power circuit corresponding to different ratings of power system. Then we made Control circuit using 8051 microcontroller. In control circuit we interface microcontroller with ADC and LCD.ADC gets analog data(0-5V dc) and convert it to digital data bit and gives to the microcontroller the microcontroller process this data and according to requirement it perform necessary action by switching open or close the Circuit breaker through trip circuit. And display corresponding data on LCD as a indication.

In given circuit when we give 5V DC to relay coil it will connect feeder line to the source and vice versa. Here we show loads as a tapings which is present actually in distributer but as a sack of convenience we take resistance of line as zero so it will become lumped circuit. Here load is present to show normal condition. There also a short circuit link to make fault on system (middle link).Ammeter is connected in series with short circuit link to get idea of fault current

III. POWER CIRCUIT

Fig1.Basic power circuit representation

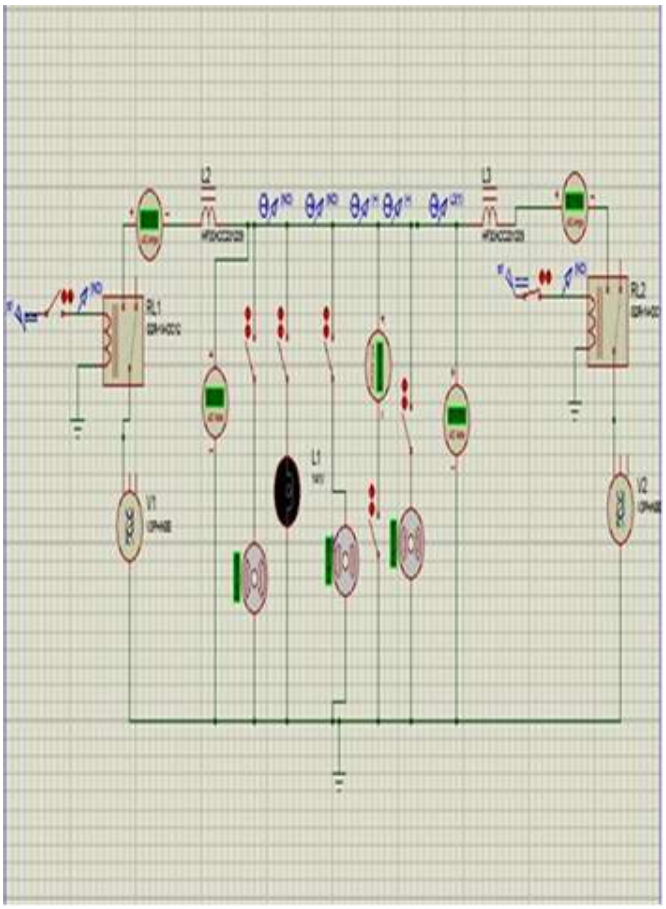


Fig 2 Actual representation

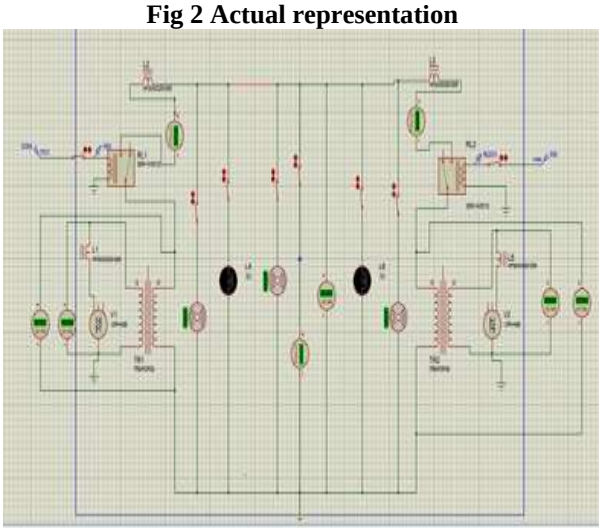


Fig 3 C.T. Current Transformer

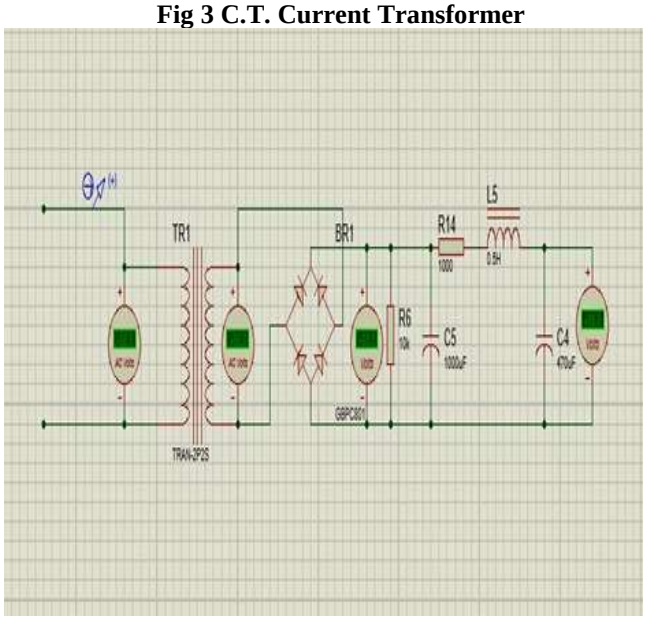


Fig 4 P.T. Potential Transformer

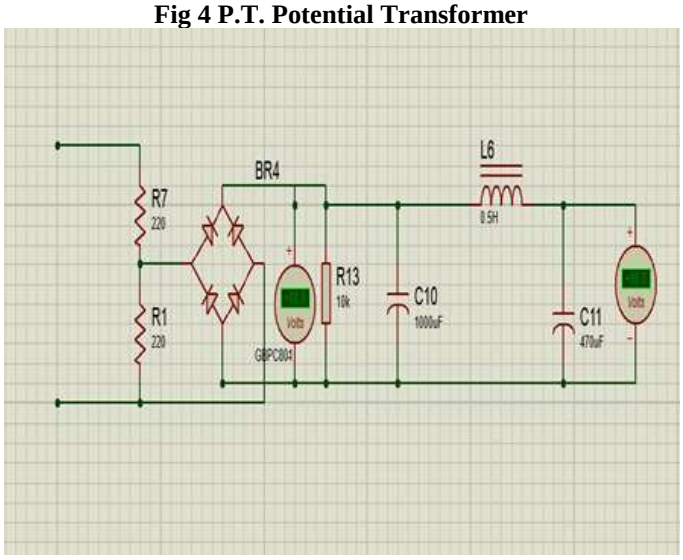


Fig 5 Relay Driver Circuit

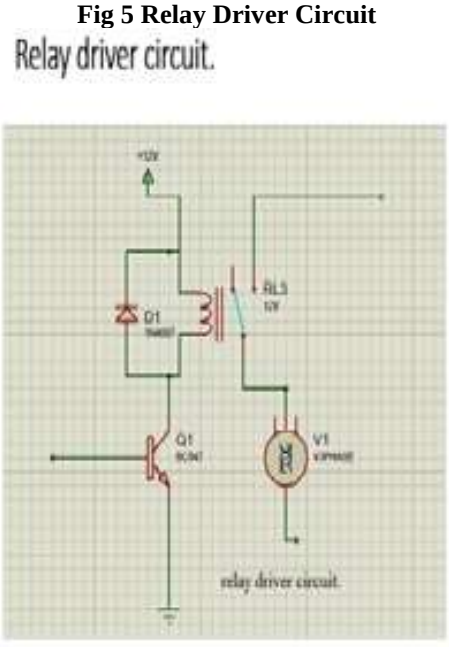


Fig 6 To measure power factor use following circuit

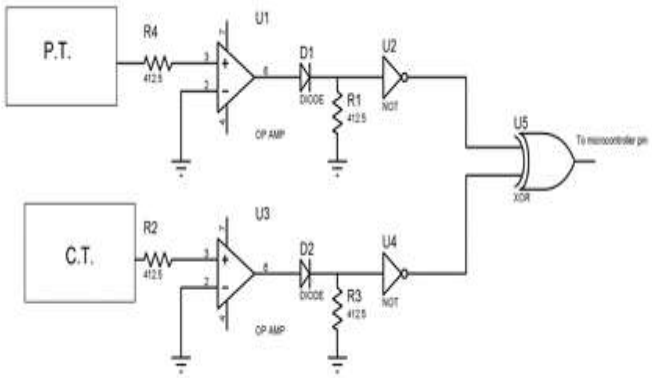
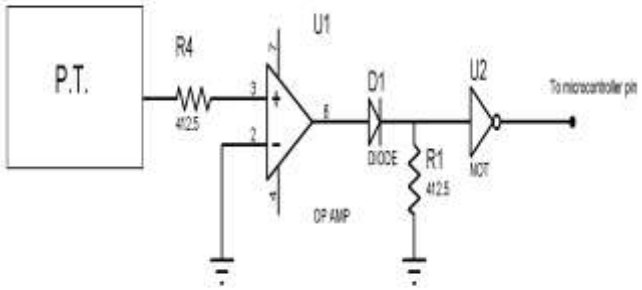


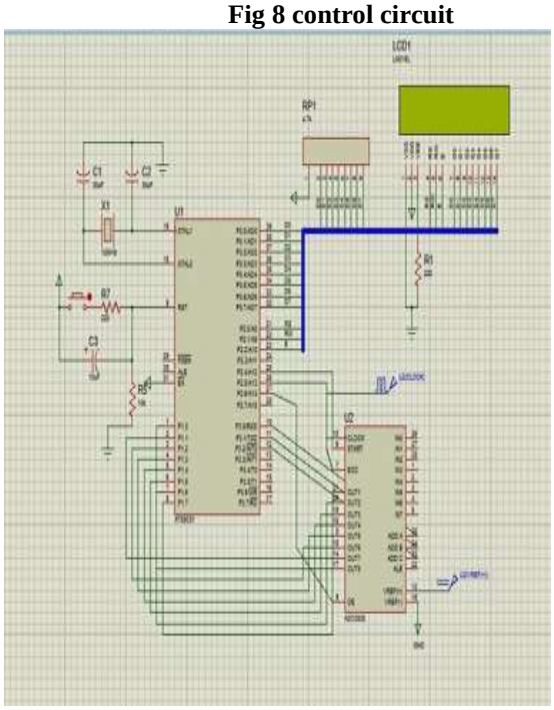
Fig7 For frequency use following circuit



IV. CONTROL CIRCUIT

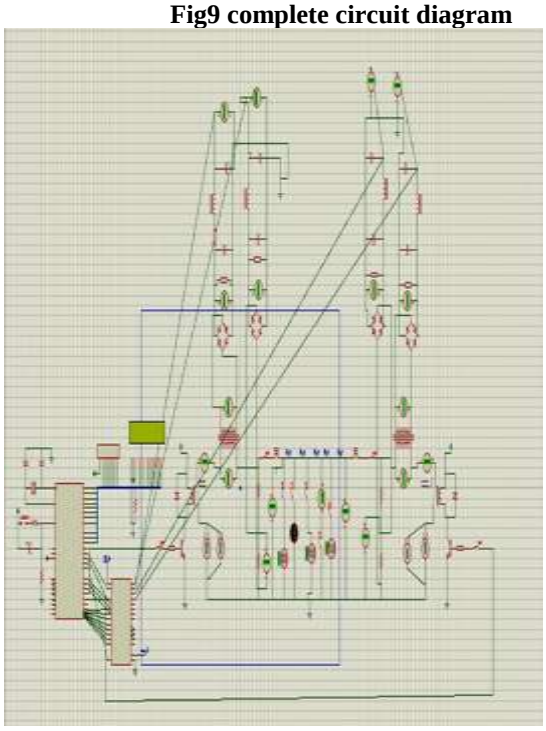
Control circuit controls the operation of power circuit. Here we give control of power circuit (switching) to the control circuit. It consist of 8051 microcontroller, ADC and LCD By programming we can provide various kind of protection.

Fig 8 control circuit



V. COMPLETE CIRCUIT DIAGRAM

Fig9 complete circuit diagram



VI. CIRCUIT MODEL COMPONENTS

COMPONENTS USED IN SIMULATION

- Power source
- 12v Dc
- 100v rms (50 Hz)
- 2 Relay(coil resistance=240ohm,trigerring voltage 12v)
- Inductor(10Mh-20mohm)
- Transformer
- voltmeter(Ac)
- ammeter(Ac)
- Loads
  - Lamps(240ohm,100v)
  - Motor
    - Nominal voltage(100v)
    - Coil resistance(12ohm)
    - Coil inductance(100mH)
    - Zero load rpm(1000)
- Simple transformer
- Bridge circuit
- Voltmeter (ac,dc)
- Resistor(220ohm,1kohm,9.75k ohm,)
- Capacitor(1000uF,470uF)
- Inductors(0.5H)
- ADC0808
- LCD(LM016L)
- Resistor pack (for pull up 4.7k)
- Resistor(220ohm,10k ohm)
- Capacitor(30Pf,10pf)
- AT89S52 microcontroller
- Crystal oscillator(11.0592 Mhz)
- Push buttons

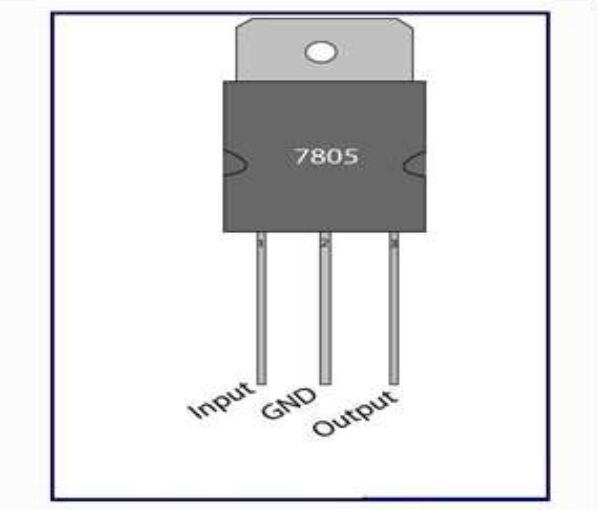
AT89S52:
Features
• Compatible with MCS®-51 Products
• 8K Bytes of In-System Programmable (ISP) Flash Memory
• 4.0V to 5.5V Operating Range
• Fully Static Operation: 0 Hz to 33 MHz
• Three-level Program Memory Lock
• 256 x 8-bit Internal RAM
• 32 Programmable I/O Lines
• Three 16-bit Timer/Counters
• Eight Interrupt Sources
• Power-off Flag
• Fast Programming Time
• Flexible ISP Programming (Byte and Page Mode)
• Green (Pb/Halide-free) Packaging Opt.

ADC 0808:
Features:

- Easy interface to all microprocessors
- Operates ratio metrically or with 5 VDC or analog span adjusted voltage reference
- No zero or full-scale adjust required
- 8-channel multiplexer with address logic
- 0V to 5V input range with single 5V power supply
- Outputs meet TTL voltage level specifications
- Standard hermetic or melded 28-pin DIP package
- 28-pin melded chip carrier package
- ADC0808 equivalent to MM74C949
- ADC0809 equivalent to MM74C949-1

VOLTAGE REGULATOR 7805

7805 is a **voltage regulator** integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The **voltage regulator IC** maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.



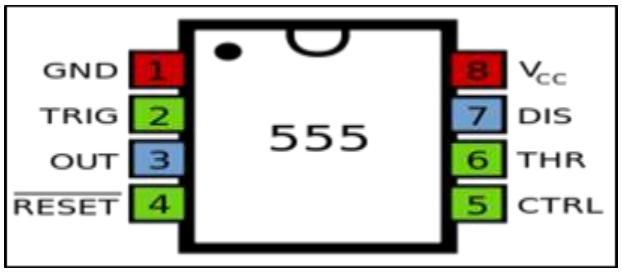
Features

• Output Current up to 1A.
• Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V.
• Thermal Overload Protection.
• Short Circuit Protection.
• Output Transistor Safe Operating Area Protection.

Pin Description:

Pin No	*Function*	*Name*
1	*Input voltage (5V-18V)*	*Input*
2	*Ground (0V)*	*Ground*
3	*Regulated output; 5V (4.8V-5.2V)*	*Output*

TIMER



Supply voltage(vcc)	4.5v to 15v
Supply current(vcc=+5v)	3 to 6 Ma
Supply current(vcc=+15v)	10 to 15 mA
Output current (maximum)	200mA
Maximum power dissipation	600mw
Power consuming	330mW@5v,225mW@15v
Operating temperature	0 to 75 *C

Formulas

- $t1 = 0.7\,(Ra + 2Rb)\,C$
- $t2 = 0.693 \times Rb \times C$
- $D = \frac{Ra+Rb}{Ra+2Rb}$
- $f = \frac{1}{t1+t2}$

T – seconds , Ra,Rb – ohms, C – Farads

VII. RESULTS OF SIMULATION

Here we took snapshot of LCD at different cases which are as follows.

Different cases:

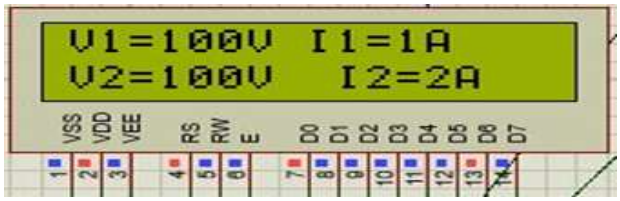
- When first substation is on without load and second substation is off
- When first substation is on with load and second substation is off.
- When both substation is on without load.
- When both substation is on with load.
- When the short circuit is occurred on the feeder.

A. When first substation is on without load and second substation is off

B. When first substation is on with load and second Sub station is off.

C. When both substation is on without load

D. When both substation is on with load.



E. When the short circuit is occurred on the feeder.

Hence trip signal can be obtained on lcd successfully.

VIII. CONCLUSION

Simulation of feeder protection using proteus software was obtained successfully.

ACKNOWLEDGMENT

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