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ELECTRICAL MEASUREMENT OF MODEL DIGITAL ENERGY METER

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ABSTRACT
Here a lot of custom's are used electrical energy but not pay the bills in time. So here we avoid this problem by using this project. We can measure the power by each load and take the information through the mobile by using GSM module. After the taking alert from the situation the consumer not respond for emergency alert we can cut –off the supply to the consumer by automatically.

I.   INTRODUCTION

If any consumer did not pay the bill, the operation needs to go to their houses to disconnect the power supply. These processes are time consuming and difficult to handle. By the system, cut the supply automatically.The use of arduino (microcontroller) there are many improvements in automating various industrial aspects for reducing manual efforts.Now a day the number of Electricity consumers is increasing in great extent. It became a hard task in handling and minting the power as per the growing requirements.

1.1 Circuit Diagram:
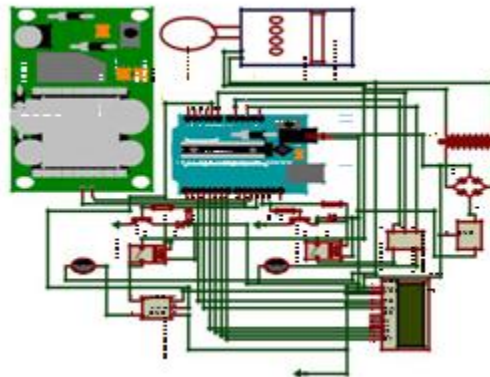
Fig: 1.1 Circuit diagram of Intelligence digital energy meter

1.2 Block Diagram Explanation:-
- Power supply
- ARUDINO Board3. LCD (Liquid Cristal Display)
- E.M (Energy meter)
- Relay
- C.S (Current sensor)
- GSM (Global System for mobile communication)
- Load

1.3 Power supply:-
Power supply is connected to the arudino board as well as LCD throw the 5v DC adoveter

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Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others

II.   ARDUINO

Arduino board pin number 0 to 13 are Digital pins, are connected to the LCD pin.

Arduino board pin number GND &Vin are the input power supply pins.

Arduino board A0 to A5 pins are analog pins. Rx/TXare the LED resister.
'L' is the indicator of Test LED 13.

Arduino board pin number 8, 9, 10 are connected to the GSM.

ARDUINO board pin number 11 'relay 1' and 12 'relay 2' are connected.
Arduino board pin number () is connected to the energy meter.

Arduino interface boardsprovide the engineers, artists, designers, hobbyists and anyonewho tinker with technology with a low-cost, easy-to-use technology to create their creative,interactive objects,useful projects etc.,A whole new breed of projects can now be built that can be controlled from a computer.

2.1 LCD (Liquid crystal display):-
LCD Pin no 1, 3, 5 & 16 are connected to the ground.

LCD Pin number is 2 & 15 are connected to the VCC (5V DC) supply.

LCD Pin number 4 &6 are connected to ARDUNIO Board pin number 2 & 3.

LCD Pin number 11, 12, 13 & 14 are connected to ARDUNIO Board pin number 4, 5, 6 & 7.

III.   ENERGY METER

Energy meter is connected to the relay pin number 1 & arduino board pin number () connected.

Energy meter is a main load indicator device. "A smart meter is an electronic device that records consumption of electrics energy in intervals of an hours or less and communicates that information at least daily back to the utility for monitoring and billing. … Unlike home energy monitors, smart meters can gather data for reporting."

3.1 Applications:
House Hold Purposes Industries Hospitals

3.2Advantages:
Installation is simple. Cost of manual maintenance is reduced. Monthly bills alert by sms. Automatically easy to connect and disconnect. System accuracy is high.

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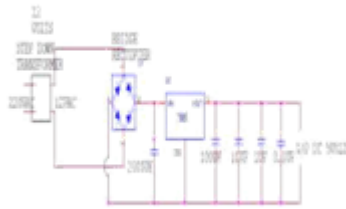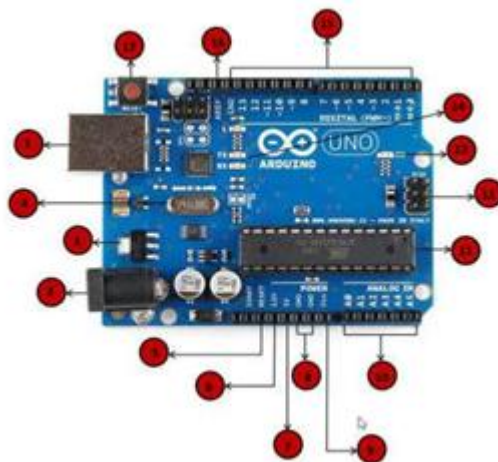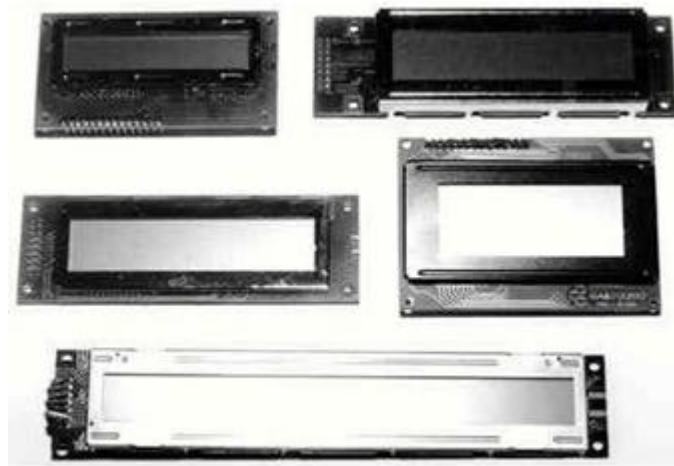
Fig3.1 Power supply on arduino

Fig: 3.2 Arduino board

3.4 Hardware specification:-
- •   Microcontroller: ATmega328
- •   Operating Voltage: 5V
- •   Input Voltage(recommended):7-12V
- •   Input Voltage (limits): 6-20V
- •   Digital I/O Pins: 14 (of which 6 provide PWM output)
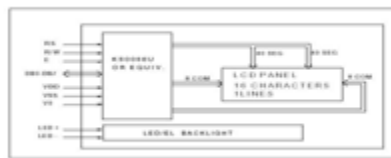- •   Analog Input Pins: 6

3.5 Arduino board explanation:

IV.   LCD (LIQUID CRYSTAL DISPLAY) SIZES

Even limited to character based modules, there is still a wide variety of shapes and sizes available. Line lengths of 8, 16,20,24,32 and 40 characters are all standard, in one, two and four line versions.(as shown in fig 3.6)
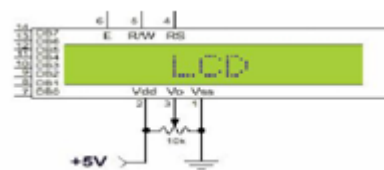
4.1Electrical block diagram:

Fig. 4.1 Electrical block diagram for LCD

4.2PIN description:
Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections). (as shown in fig 3.9)

*Fig. 4.2 Pin diagram of 1*16 lines LCD*

Fig. 4.3 Digital energy meter
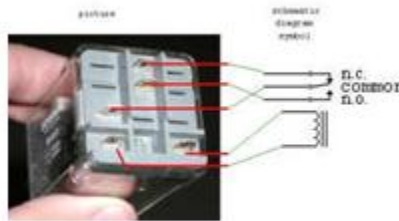
Fig. 4.4 smart energy meter

V.   RELAY

Fig: 5.1 relay

Fig: 5.2 Relay construction

5.1 Electrical Current Sensor:-

Fig:5.3 Electrical current sensor

The Allegro ACS75x family of current sensors provides economical and precise solutions for current sensing in industrial, automotive, commercial, and communications systems. The device package allows for easy implementation by the customer. Typical applications include motor control, load detection and management, power supplies, and overcurrent fault protection
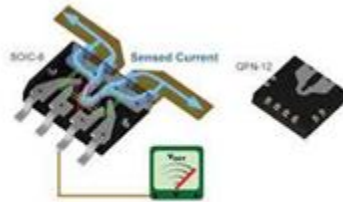
Fig: 5.4(a) Operation of sensor

VI.   GSM (GLOBAL SYSTEM FOR MOBILE)

Communications

GSM (Global System for Mobile communications) is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Some countries in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated.
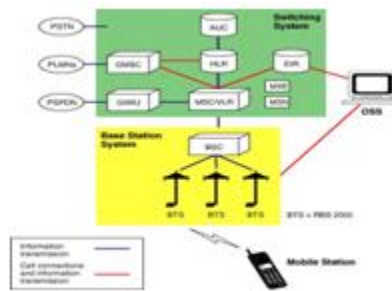

Fig: 6.1 GSM Network

6.1Our project kit:-

Fig:-6.2 Project kit of Intelligence digital energy meter

Fig:-6.3 System is normal On condition

Fig: 6.4 Load 1 is measure the current in the display

Fig:-6.5 Load 2 is measure the current in the display

Fig:-6.6 Alert message on overload through the mobile

Fig:-6.7Automatic cut off power

VII.   CONCLUSION

This research project demonstrates the concept and implementation of automatic trip control system for energy management using ardunio controller and GSM. It mainly focused on industrial purpose. The similar idea can beimplemented for domestic areas for avoiding the illegal usage of electricity. This paper is aimed at reducing theheavy power and revenue losses that occur due to power theft by the customers. By this design it can be concludedthat power theft can be effectively curbed by detecting where the power theft occurs and informing the authorities.Also an automatic circuit breaker may be integrated to the unit so as to remotely cut off the power supply to the house or consumer who tries to indulge in power theft.

VIII.   FUTURESCOPE

Though many have tried implementing a country wide AMRS, it is still an unreachable goal, many factors like cost, feasibility and mainly the need to replace the existing system have hindered its development. At least in near future, the cost involved in the building of this system could be minimized by using more efficient technology implemented worldwide

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