

## AUTOMATIC ENERGY METER READING SYSTEM USING GSM TECHNOLOGY

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**Abstract-** Traditional meter reading for electricity consumption and billing in Bangladesh is done by human operators from houses to houses and from building to building. This requires huge number of operators and long working hour to achieve complete area data reading and billing. Human operator billing is prone to reading error and as sometimes the houses' electricity meter is placed in a location which is not easily accessible. Moreover there is possibility of corruption and thus actual reading may not reach to the consumer. So we have designed an automatic GSM based energy meter reading system for the consumer which helps them to know the reading of energy meter sitting in a room using their mobile phones.

**Keywords:** Energy Meter Reading, GSM Technology

### 1. INTRODUCTION

The conventional electromechanical meters are being replaced by new electronic meters to improve accuracy in meter reading. Still, BANGLADESH power sector faces a serious problem of revenue collection for the actual electric energy supplied owing to energy thefts and network losses. One of the prime reason in the traditional billing system which is inaccurate many times, slow, costly, and lack of flexibility as well as reliability. So, many times the consumers are to receive unexpected bills. As thousands of electronic meters are already being used in our houses, offices and industries we are not proposing any new meter right now but an automatic meter reading system (AMR) which will minimize the problems of the billing systems of electronic energy meters. Previously in many AMR system additional hardware have been used for taking the reading of the meter [1][2] but here we have simply used LED blink of digital meter for measuring KWh and communicating with GSM modem. We have developed a miniature module which will take reading from the digital energy meters and this module is also responsible for transmission of data using GSM technology to the provider end via SMS.

The rest of the paper is organized as follows. We will briefly discuss the whole system in section 2 and we will draw the implementation and output of the system in Section 3. Finally we will conclude the paper in Section 4.

### 2. THE SYSTEM DESIGN AND OPERATION

Every electronic energy meter provided with an indicator LED. The purpose of using this LED is to give indication that meter is working properly. This LED has a relationship with the output of the meter. For every 1600 blink of LED is equivalent to 1 Kwh energy consumption. We use this indicator LED to determine the amount of energy consumed. We use LDR to convert the

light intensity of the indicating LED into a digital signal. The LDR is a light sensitive device whose resistance depends on the amount of light falling on it. We use LM-358 to convert the voltage of the indicating LED into an input signal. The LM158 series consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. In the non-inverting configuration, when the input is higher than a certain chosen threshold, the output is high. When the input is below a different (lower) chosen threshold, the output is low, and when the input is between the two levels, the output retains its value. This dual threshold action is called hysteresis and implies that it possesses memory. For every blink, microcontroller receive a signal. For every 1600 input signal, microcontroller increases the value of energy consumption by 1 KWh. Thus reading of energy meter is transferred to the microcontroller. We use timer-0 function of the microcontroller to count time. After receiving an input signal microcontroller send this value of energy consumed using modem to the receiving terminal. Thus without interrupting internal circuit diagram of energy meter we can read the value of energy consumed and send it to the desired location. The block diagram of the entire system is shown in Figure 1 and the circuit diagram of the system is shown in Figure 2.

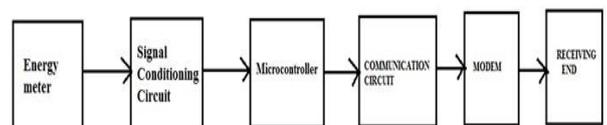


Fig 1: Block diagram of the entire system

The algorithm used for the system is given below step by step.

STEP 1: Start  
 STEP 2: get input (as: count,sms)  
 STEP 3: increment occur by 1value  
 STEP 4: Is,the value divided by 16? ifyes,then it goes to next step or back to step3  
 STEP 5: energy value increased by 0.01  
 STEP 6: Is there any incoming sms?  
 STEP 7: if no,then memory save the data  
 STEP 8: if yes,then then data send to receiving terminal.  
 STEP 9: End.

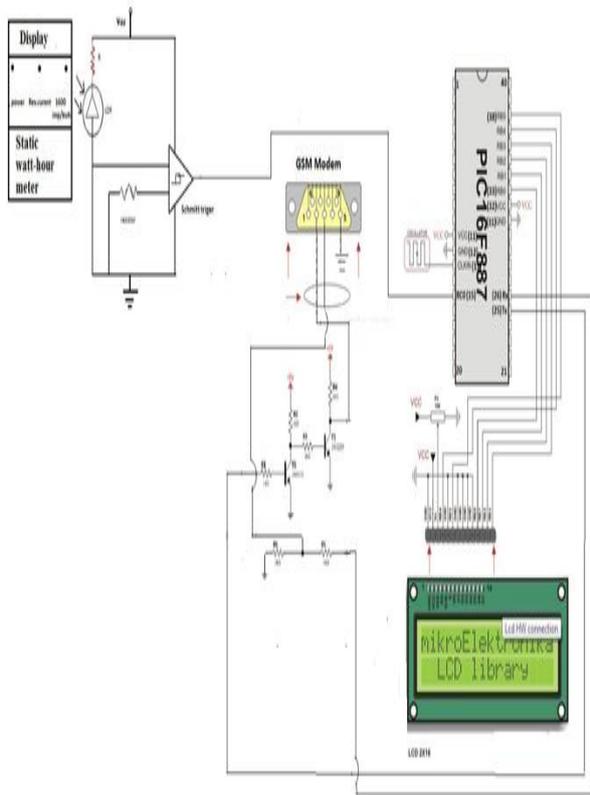


Fig 2: Circuit diagram of the system

### 3. IMPLEMENTATION AND OUTPUT

The whole implementation of the system is shown in Figure 3.



Fig 3: Whole Implementation of the system

The output of the receiving device is shown in Figure 4.

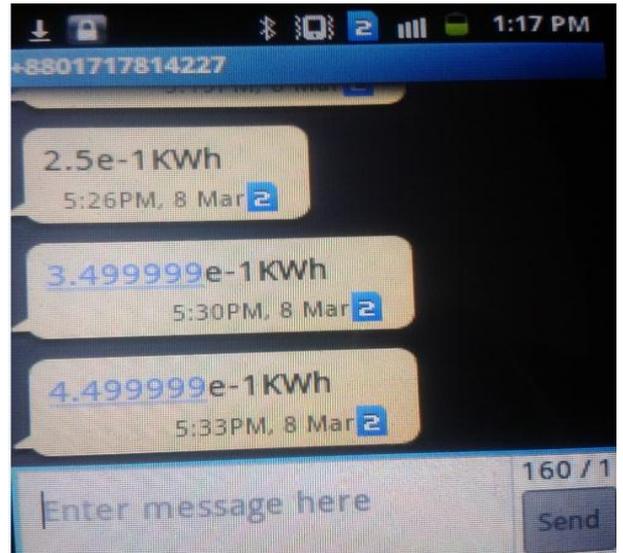


Fig 4: Output of the receiving(mobile) device

### 4. CONCLUSOIN

The idea of automatic meter reading of electronic energy meter was undertaken. We successfully transmit the value of energy consumed to the mobile phone. The need of human operator is eliminated. The basic principle of the project is very simple and can be commercially use.

### 5. REFERENCES

- [1]. Shoeb S. Sheikh, *et al.*, "Design and Implementation of Wireless Automatic Meter Reading System," *International Journal of Engineering Science and Technology*, Vol. 3, No. 3, pp. 2329-2334, March 2011.
- [2]. Bharath, P.; Ananth, N.; Vijetha, S.; Prakash, K.V.J.; "Wireless Automated Digital Energy Meter" in *Sustainable Energy Technologies*, ICSET 2008.