

Proposal of a New Design for Improving the Smart Electric Meter Performances

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Abstract— In the most recent stage of development of modern cities and buildings, the growing complexity and dynamism of the contexts smart buildings and industrials operate in has led to a relentless increase in the level of electricity consumption. For this reason, the discipline and practice of electric power energy consumption has taken hold more and more in very different sectors and contexts. In this context, the contribution of this paper is aimed at contributing to design of a smart meter. The entire device of the proposed smart meter is controlled by an Arduino UNO board. The suggested design consists essentially on a power supply (mains), a measuring circuit, microcontroller (Arduino board), control circuit, as well as an LCD display. In this article, firstly the design of the electronic system is discussed. Secondly the programming of the map is presented.

Regard the design of the electronic system; we proceeded to the research of the different block structures, as well as the components constituting each block..

Keywords— *Smart meter Hybrid, Arduino UNO, Current transformer, Voltage transformer, Voltage Regulator*

I. INTRODUCTION

The residential demand modeling and forecasting is a new trend of smart building and cities research. The practice shows that, when Electricity Company is not able to finish the service operation itself, it needs to purchase service capacity from other companies to complete the supply service. Now, anticipate the human behavior regarding energy consumption is find relationships with the household stock characteristics, such as appliance usage, penetration rates, building isolation and envelope parameters and finally a consumer behavior. Modeling for these problems is not easy. As a solution and alternative, there are smart meters. Smart meter technologies have given good solutions for the residential demand modeling and forecasting. The most recent methods and techniques for using smart meter data are reviewing by [1]. From a comprehensive review of the literature data analysis and reporting guidelines are suggested for studies which use smart meter data.

The problem that comes before the use of the data is that of the design of the smart meter. Seeking to improve the

performance of an intelligent meter has taken its share in the literature. The energy future demands a paradigm shift to a "participatory system" of Smart Metering, an intelligent measurement and control technique [2].

In a recent contribution [3] has designed and a wireless sensor home area network (WSHAN) with ZigBee interfaced smart meter. The developed system allows providing correct power usage and transmits data with ZigBee to PC, and it come possible to the user to monitor the power information and remotely controls the system. The role of advanced sensing systems in the smart electric grid is discussed by [4]. The authors in their contribution made possible the analyzing and the processing of voltage and current signals. Also, the contribution gives more suitable decision criteria concerning the power consumption and power quality.

Power supply systems have traditionally been characterized by the presence of many public services, heterogeneous standards, overlapping territories, and a general integration lack. The electric meter is one of the most important devices in power supply system; it measures the amount of electrical power consumed by home, business or appliance that is powered by electricity. In this purpose, this work is articulated on the functioning of the energy meter. In this article, we are interested in the study and the design of a prototype of an intelligent power meter based on two transformers as a voltage and current sensor [5].

The computer aided calculation software that has been used is called "ISIS CARRIERS"..

II. CURRENT SENSOR

To realize our circuit we started first by the realization of the current sensor, which has the electric diagram presented in Fig. 1.