An Exposure towards an Arm Based Meter Reading System

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Abstract: *The development in wireless technology along with microcontroller leads to unwrap damaged whipped cream many problems. The wireless media made the exchange of understanding fast, guaranteed & better. In this particular paper we discuss Wireless ARM Based Automatic Meter Studying with control system (WAMRCS). This Method may be used with 32 bit ARM micro-processor for studying power consumption & communicates this data for the utility server for power human resources. Control systems contain relay circuit, useful for disconnection power when consumer doesn't pay electricity bill quickly. GPRS systems can be used as communication with utility server in 2 way communication link. Power details are useful for various causes of example bill management, for measurement of static power parameters etc.*

Keywords: Wireless technology, microcontroller, Wireless ARM Based Automatic Meter Reading with control system, Control systems

1. Introduction

Problem associates with traditional meter studying are actually elevated daily, due to various causes of example rapid rise in population, tedious location, environmental conditions etc. Though new developments of microcontroller, there are numerous enhancements in automating various industrial aspects for reducing manual efforts [1]. In traditional meter studying system through which utility usages are designed in writing by employees, there's great deal of probability of human errors. Additionally, there are challenging for utility employees to uncover unauthorized connections or malpractices moved out by consumers manually. All this may lead to insufficient revenue generation for utility company. You will find chances individuals of unavailability of customers during utility worker's visit for meter studying. In these instances, billing process will probably be pending & utility employees again require likely to consumer. Prone to each & every consumer's house & creating the financial obligations is very Labourites task & require considerable time. It may be greatly difficult in natural calamities specifically in wet season. These studies proposes an invisible ARM- based automatic meter studying & control system (WAMRCS).It uses Current & Power Transformer to determine current & current parameters of incoming electrical signal. After this, signal conditioning unit along with ARM-based embedded system (AES) may be used to compute the power parameters.
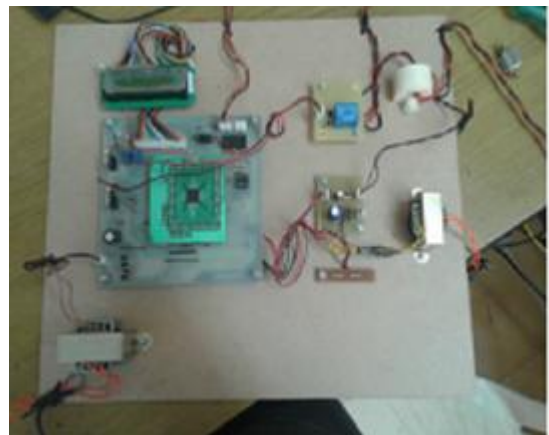

Figure: An overview of wireless automatic meter reading and control system.

2. Methodology

Communication media like GPRS, Internet are frequently available everywhere. GPRS is broadly used due to its advantages of example always on-line, high-speed transmission & charged fee in line with the volume of data sent. After considering all this GPRS advantages, it is also can be used delivering power parameters on automatic system of studying digital meter. There are numerous enhancements in automating various industrial aspects for reducing manual efforts. There's another type of clients also, that does not just continuous electricity is matter but furthermore about quality of power may also be matter. In practical meter studying system, traditional meters does not provide more particulars comparable. There has to be provision for power unstable / outage transpires with utility consumer's information to utility company for clearing the fault as quick as you can. WAMRCS System Architecture is sub -divided straight into five sub-parts via: - A. Signal Sampling Unit (SSU) B. Relay Control Unit (RCU) C. ARM - Based Embedded System (AES) D. Wireless Communication Module (WCM) E. Utility Control Centre (UCC). The main problem of calculating analogy amounts for instance current & current is solved through the use of

Power transformer (PT) & Current Transformer (CT). The analogy amount of current additionally to current round the primary side of transformer is proportionally altered round the secondary via power Transformer (PT) & Current Transformer (CT).Burden resistor may be used along with CT for setting the most well-liked current within the CT's Secondary Side. Along with Power Transformer (PT), Current divider may be used to reduce the current to limits of ARM operating current range. Finally filter may be used to prevent any elf in Electricity signal, before passing this to ADC of ARM Controller. ARM - Based Embedded System (AES) this can be heart in the system. Conventional power measure instruments can't give needed particulars about power quality. To have the ability to calculate Root Mean Square price of current and current, power factor, real power, reactive power and apparent power, it's appropriate to utilize micro-processor to produce digital studying meter. There's numerous micro-processor based digital power meters are available in laboratory & in market. They're basically bulky in proportions & getting limited capabilities. Match facing this, ARM- based system occupies small space. Furthermore, it supports most broadly used communication techniques. These studies adopt LPC2148 ARM Processor for AES System. ARM based embedded method is getting simple functioning rival their counterparts [2]. So software applications development could be accomplished in popular C Language. To date as ARM based method is concern; it's broadly found in quantity of network equipment's, for instance mobile phone and PDA, and become popular and cheaper. It's also making nick 10 bit ADC of successive approximation type. In this particular each analogy input features a separate register to avoid interrupt handling & it's getting global start command for converters. The Wireless Communication Module (WCM) in WAMRCS could be the method is mainly comprised of different subsystem for instance - central monitoring station and GSM network. Central monitoring station consists of GSM modem. The wireless remote communication between ARM Based Embedded System (AES) station and Utility Control Centre (UCC) is finished with the GSM network. The GSM Module found in project uses GSM network that gives GPRS data communications along with GSM services & mobile internet access. It is also integrated via standard RS-232 connects useful for information processing & data exchange between various AES systems through wireless communication module (WCM). UCC can be found in Utility Company. It's getting Pc (PC) utilized like a control server along with needed programs & storage media (generally hard disk drive). UCC will read & collect power parameters form AES via communication network. For Simulation purpose, we utilize a Visual Fundamental (VB) Graphical user interface (GUI). VISUAL Fundamental 6 is definitely an advanced programming language which developed in the last DOS version referred to as Fundamental. Among many versions of Visual Fundamental available on the market, the most used one but nonetheless broadly utilized by plenty of VB designers is Visual Fundamental 6. With Visual Fundamental 6, you could make any program for instance inventory management system, password cracker, investment calculator, video slot, reverse, star war, tic tack feet plus much more. Relay Control Unit includes Positive relay, breaker control circuit & breaker [3]. This is an stifling device useful for fault

interruption & load switching Relay Control Unit may be used to switching off the electrical energy when the signal from AES because deadline is finished. Electricity will resume instantly using protective relay wired in series with breaker control circuit, and so the breaker may be controlled. Utility Control Centre (UCC) is connected with AES through GSM Module in WCM. It'll obtain the billing Models from ARM Based Embedded System. & UCC send the command signal to AES if Customer is neglecting to give the bill in deadline to reduce in the power line to customer.

3. An Overview of Proposed System

The wireless media, along with microcontroller or micro-processor leads to digital implementation which then causes rapid use of items for instance personal computers & telecommunication items. These studies proposes an invisible ARM- based automatic meter studying & control system (WAMRCS).It uses Current & Power Transformer to determine current & current parameters of incoming electrical signal. After this, signal conditioning unit along with ARM-based embedded system (AES) may be used to compute the power parameters. These calculated power parameters is going to be shipped to Utility company server through wireless communication way of example GPRS. Also data or signal from utility company server is received through wireless communication module to ARM based embedded system. The developing tool in the program type of central monitoring station is Visual Fundamental as well as the software includes the controlling interface and initialization program of monitoring centre, the program of accepting and delivering short messages, human resources and safeguarding program [4]. Most likely probably the most of important of people could be the serial communication involving the central monitoring centre servers and GSM wireless communications module SIM900. The functions of AES software are dimensions acquisition, relay control, and tamper recognition, AES setup, power parameters computation and database management. The AES software runs beneath the Real-time Operation system. Round the part of WAMRCS software, the embedded system uses RTX as operating-system core. Developer could use c-language to program software making it executive file on pc forehand. His executive file will probably be loaded into micro-processor of embedded system through RS-232 from PC and runs under RTX operating-system. This program design tasks in the central monitoring station include delivering instructions to remote monitoring stations (by way of short message), accepting the monitoring data within the remote monitoring stations (by way of short message), store and deal with database. Adopting VB to produce this program of central monitoring station has several advantages. Top features of RTX Operating-system: Royalty-free, deterministic RTOS with source code. Flexible Scheduling: round-robin, pre-emptive, and collaborative. The Recommended method is examined rather than conventional meter & accomplished great outcomes ARM-Based Embedded System (AES) is interfaced with GSM Module, Signal Conditioning unit & Relay Control Unit. For demonstration purpose, 100 Watt bulb may be used just like a load to check out our physiques [5]. The bulb is related to load & Signal conditioning unit that is frequently used to

look for the typical real power information. This test is transported out and power consumption is calculated. Through the test, current & power parameters are read for specified time interval to produce the total amount. So

through the use of recommended system, a lot of the problem connected while using conventional systems is taken away.
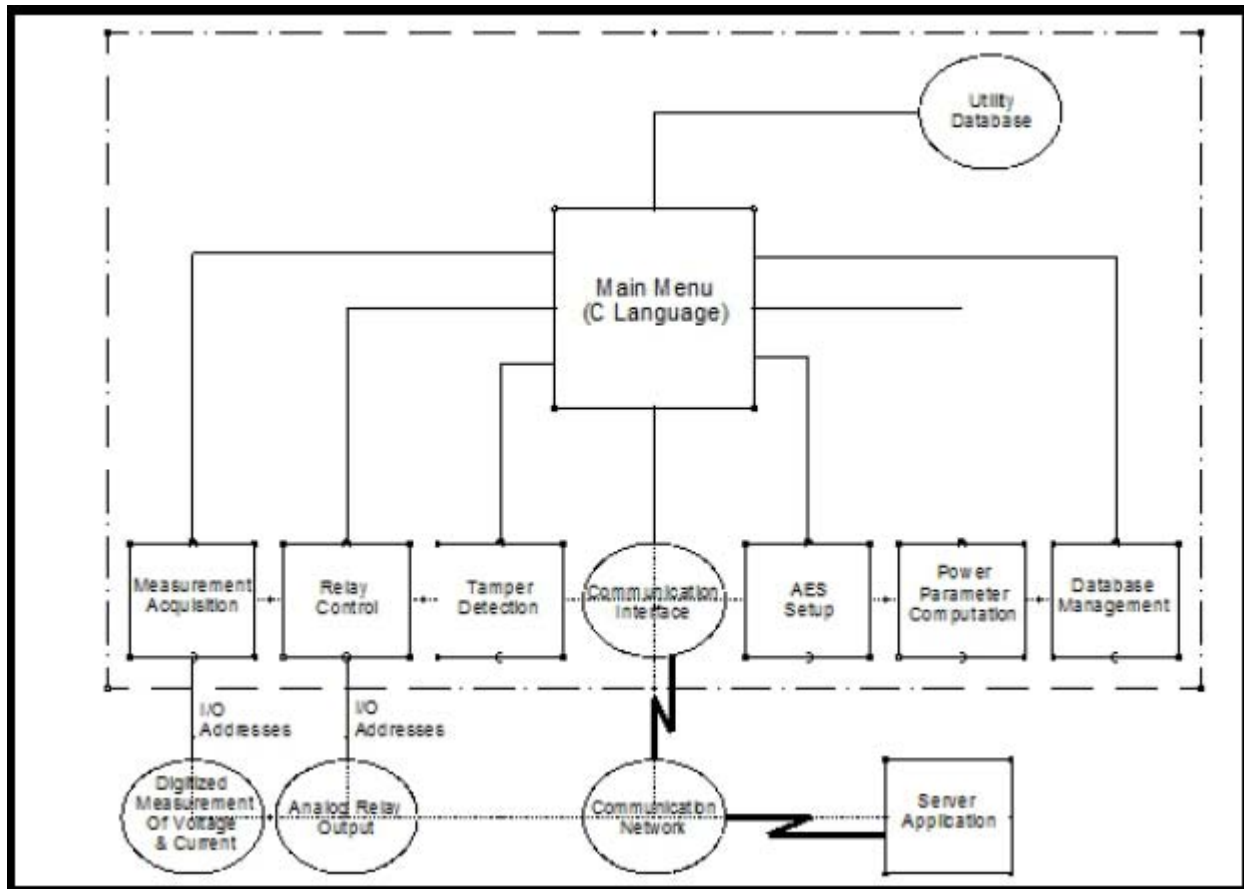

Figure: An overview of system software design

4. Conclusion

These studies propose an invisible ARM- based automatic meter studying & control system (WAMRCS). Using this embedded system along with GSM module, provide automation for electrical distribution system. Additionally for this, it provides better precision in meter studying, better charge of distribution & management. It uses Current & Power Transformer to determine current & current parameters of incoming electrical signal. After this, signal conditioning unit along with ARM-based embedded system (AES) may be used to compute the power parameters. Same system might be broadened for multipurpose like water & gas.

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