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Research Paper

COIN OPERATED CHARGE RECHARGE MACHINE FOR PREPAID CELLULAR PHONES

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Wireless recharging becomes one of the most important problems in wireless sensor networks recently. This paper aims to construct a recharging path for mobile anchor to efficiently recharge the battery of each sensor in a given WSN. Initially, the boundary of recharging circle is analyzed such that mobile anchor can fully recharge the battery of any sensor if there charging path tangent to the boundary. Based upon their charging circle of each sensor, an initial recharging path can be constructed. Then this paper proposes a path reduction mechanism for further reducing the path length, aiming to minimizing there charging path. Performance studies show that the proposed recharging path construction mechanism outperforms the existing works in terms of length of recharging path and recharging efficiency.

Keywords: Wireless sensor networks, Wireless recharging, Optimal scheduling, Recharging path reduction

INTRODUCTION

The coin-based mobile battery charger developed in this paper is providing a unique service to the rural public where grid power is not available for partial/full daytime and a source of revenue for site providers. The coin-based mobile battery charger can be quickly and easily installed outside any business premises. The mobile phone market is a vast industry, and has spread into rural areas as an essential means of

communication. While the urban population uses more sophisticated mobiles with good power batteries lasting for several days, the rural population buys the pre owned mobile phones that require charging frequently. Many times battery becomes flat in the middle of conversation particularly at inconvenient times when access to a standard charger isn't possible. The coin-based mobile battery chargers are designed to solve this problem.

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The user has to plug the mobile phone into one of the adapters and insert a coin; the phone will then be given a micro-pulse for charging. It does not bring a mobile from 'dead' to fully charged state. The charging capacity of the mobile is designed with the help of pre defined values. It is, of course, possible to continue charging the mobile by inserting more coins. This compact and lightweight product is designed to cater for the growing number of rural mobile users worldwide. A suitable microcontroller is programmed for all the controlling applications. The source for charging is obtained from direct power grid and solar energy in case of non availability of grid power.

In most countries, voice revenue is declining as a mobile telecommunication operator's subscriber base stays static. In light of this there is a pressing need, in most telecommunication network companies, to reduce costs, increase efficiencies and maintain customers. This is so as to increase revenue. Operators often need to increase and diversify their service offerings to their customer base in order to achieve these goals. With the drastic rise of mobile data usage in both emerging markets and first world markets, and the move away from flat rate data charging, the awareness of data usage and general spend *in real time* has become more acute. Subscribers want to know how much they are using and spending in real time. It consists at very least of the following components:

- 1) Call Control – this controls the signaling messages between the underlying core switching network layers and the prepaid service.
- 2) Call flow – which controls the call flow of the prepaid call – A typical call flow would include:

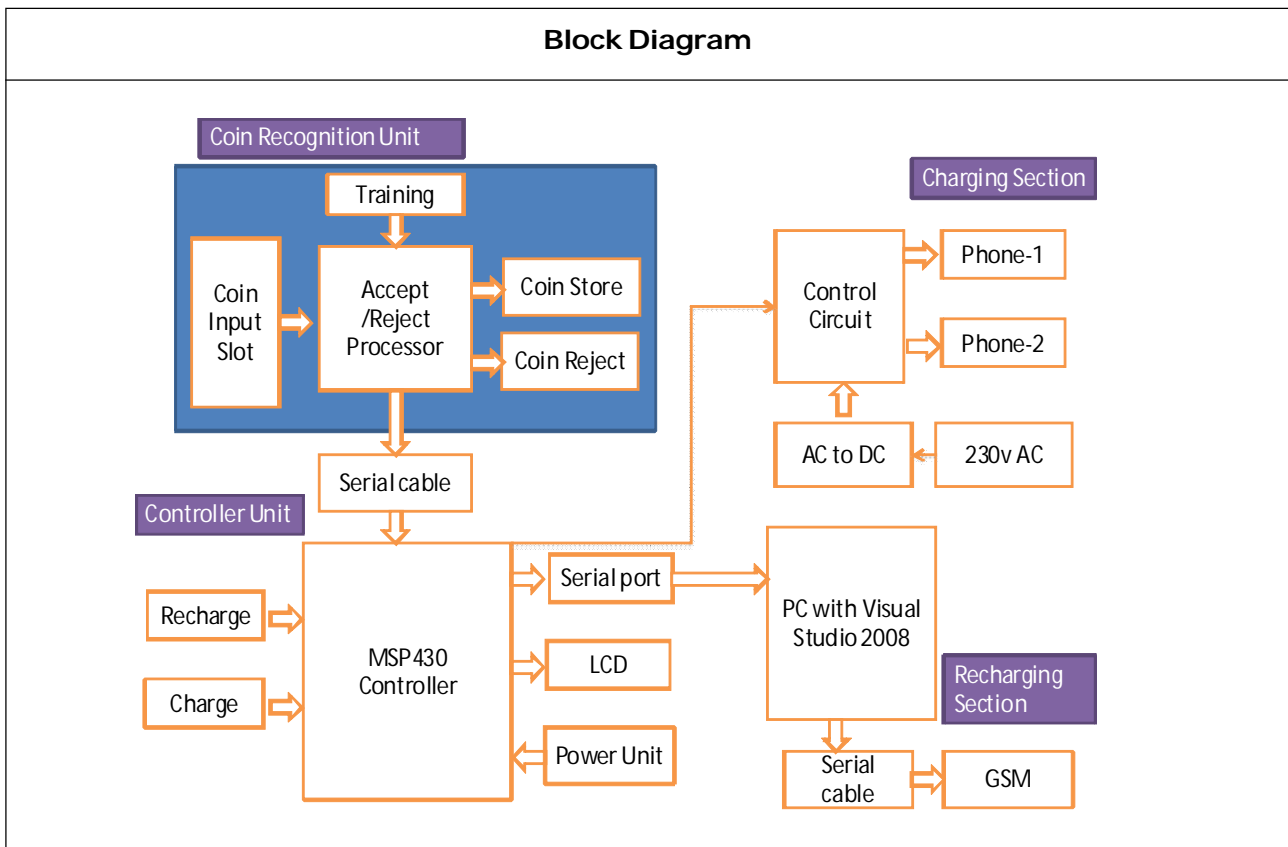
- i. When to charge the subscriber
- ii. What balance to check first
- iii. Which bundle to check depending on tariff or time of day.

An example is as follows: A subscriber calls at 8am to another subscriber on the same network – the call flow will:

- a. check the calling subscriber's tariff
- b. based on (a), check if he has free minutes available
- c. check if a promotion maybe in place during this period – for example: for every call at this time it has to credit him with one free sms, and then let the call go through as normal. 3) Rating engine – An engine that checks the rate of the call depending on various parameters and tells the call flow what the rate of charge is for that call.
- 4) Prepaid database – this is the database that contains the prepaid balance of the subscriber.
- 5) Optionally a counter/bundle management component which allows for counters (free sms, free mms, and free minutes) to be added/subtracted dynamically during a call.
- 6) Voucher management – This is the database that controls the recharge vouchers that subscribers buy and redeem for a prepaid balance which is added to their total balance.

PROPOSED DESIGN

In our project, a novel type of coin based cell phone charger has been designed. A new type of charger is designed for public people utilities. This type of charger will be very useful for the public people; many times the battery becomes flat in the middle of the conversation in particularly at



inconvenient times when access to a standard charger isn't possible. The main advantage of this charger is, power supply for the charger is determined from solar power and current supply. The coin based cell phone charger is worked according to the coding written in the MSP430 microcontroller IC. When we put a coin, the coin detector detects the coin and the input is given to the controller. The controller reads the program. At the same time the supply is given to the charger for a particular time period. The time period depends on the coding written in the controller. A multi pin charger is connected through the controller. By using the multi pin charger we may also use more than one mobile for charging. MOSFET acts as the switch in the circuit. This circuit can be placed in public places such as Bus stands, Railway stations, Hospitals, etc...

Mobile payments cater largely to the micropayments segment. Several types of mobile phone payment arrangements operate or are being considered in various countries. Mobile payments can be made through voice access, text messaging known as SMS (short messaging service) or WAP (wireless application protocol), which provides a gateway to the internet. WAP technology enables a mobile phone holder registered with this service to access his/her bank website for banking services. Two business models are in use - paying from a prepaid balance or paying later along with the mobile phone bill. Some products use the phone as an access channel through which to initiate and authenticate transactions from existing payment means such as bank accounts or payment cards. The fee structure differs from product to product. For promotional reasons,

some institutions provide internet and mobile services without charging their subscribers any fees or commission; others make use of discount rates or follow a uniform pricing policy. This project proposes a Coin Operated system for Standalone cell phone charger and recharger system. Coin operated is fully featured product with a standard voltage provisioned cables. PC Based software is implemented in Visual studio application software where the recharge takes place

Method of payment for vending machine can be described in 3 method or technique.

1. Coin operated vending machine.
2. Note operated vending machine.
3. Prepaid operated vending machine

HARDWARE DESCRIPTION

A. MSP430 Micro Controller

The openMSP430 is a 16-bit microcontroller core compatible with TI's MSP430 family (note that the extended version of the architecture, the MSP430X, isn't supported by this IP). It is based on Von Neumann architecture, with a single address space for instructions and data.

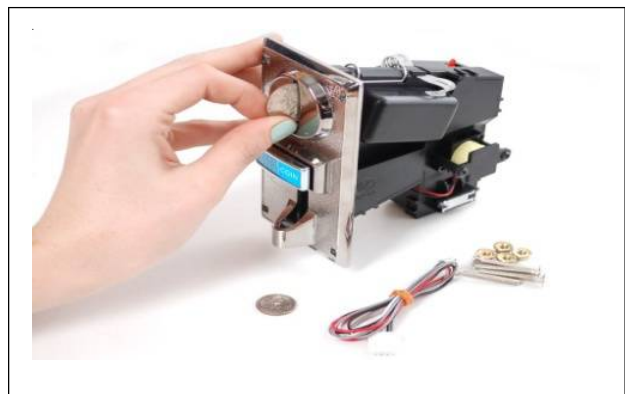
This design has been implemented to be FPGA friendly. Therefore, the core doesn't contain any clock gate and has only a single clock domain. As a consequence, the clock management block has a few limitations.

B. Coin Operated Module:



The sensors in this coin acceptor use the thickness, diameter and fall time of the coins to identify them and it's fully programmable so you're not limited to any particular type of currency. Simply use the buttons and 7-segment display on the side of the unit to select a coin profile, insert a bunch of coin samples (or the same one, over and over) then designate the value. After you've programmed the coin profiles, simply read the serial output of the coin acceptor and it will tell you the value of each coin as they're inserted. It reports these values as binary bytes and the baud rate is selectable on the unit.

This coin acceptor also has a coin reject, so your controller can tell the coin acceptor not to take any more coins, as well as a (very loud) alert beeper. All you need to get the coin acceptor working is a pocket full of change, a 12VDC supply and somewhere for the change to fall after it's accepted.



C. Driver Circuit

A relay is usually an electromechanical device that is actuated by an electrical current. The current flowing in one circuit causes the opening or closing of another circuit. Relays are like remote control switches and are used in many applications because of their relative simplicity, long life, and proven high reliability. Relays are used in a wide variety of applications throughout

industry, such as in telephone exchanges, digital computers and automation systems. Highly sophisticated relays are utilized to protect electric power systems against trouble and power blackouts as well as to regulate and control the generation and distribution of power. In the home, relays are used in refrigerators, washing machines and dishwashers, and heating and air-conditioning controls. Although relays are generally associated with electrical circuitry, there are many other types, such as pneumatic and hydraulic. Input may be electrical and output directly mechanical, or vice versa.

All relays contain a sensing unit, the electric coil, which is powered by AC or DC current. When the applied current or voltage exceeds a threshold value, the coil activates the armature, which operates either to close the open contacts or to open the closed contacts.

When a power is supplied to the coil, it generates a magnetic force that actuates the switch mechanism.

The magnetic force is, in effect, relaying the action from one circuit to another. The first circuit is called the control circuit; the second is called the load circuit.



D.GSM Module

4 Frequency GPRS/GSM Module is an ultra compact and reliable wireless module. It is a breakout board and minimum system of SIM900 Quad-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module support software power on and reset.

The GPRS is configured and controlled via its UART using simple AT commands. Just connect on the Arduino/Raspberry Pi/AVR/PIC/ARM/FPGA board, you could easy to use AT command control it. This board can be connect to PC via FT232RL or USB-to-Serial Bridge Controller. We have to use the gsm module in recharging section to send the message to the user number and amount through AT Command.



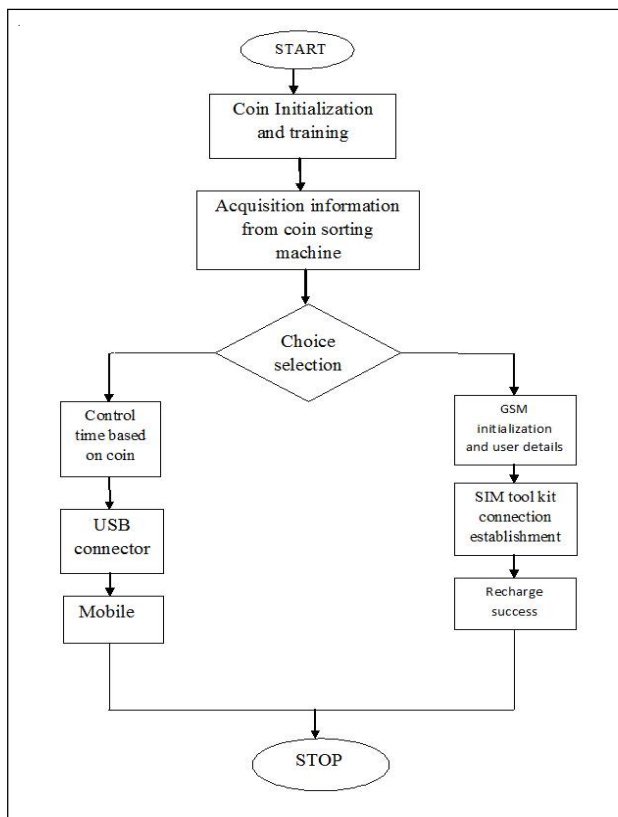
SOFTWARE IMPLEMENTATION

IAR Embedded Workbench Kickstart for MSP is a complete debugger and C/C++ compiler toolchain for building and debugging embedded applications based on MSP430 and MSP432 microcontrollers. The code size limitation of C/C++ compiler is set to 8 KB for MSP430 devices and 32KB for MSP432 devices. The Debugger is a fully integrated debugger for source and

disassembly level debugging with support for complex code and data breakpoint.

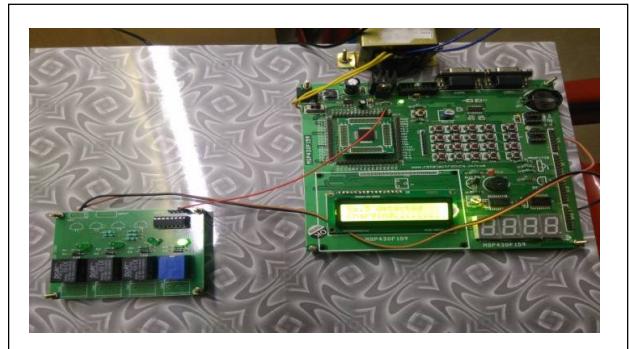
Energy Trace Technology is available as part of IAR Embedded Workbench for MSP430 microcontrollers Version 6.10.0 or higher. During debugging of an application, additional windows are available if the debug probe and the target device support Energy Trace Technology. Since then, IAR Systems has developed full-blown support for MSP430 Low-power MCUs, the TM4Cx ARM Cortex-M microcontrollers, Hercules Safety MCUs, and Wireless MCUs, as well as the Sitara ARM microprocessors. TI is a global semiconductor design and manufacturing company with 100,000+ analog ICs and embedded processors, along with software, tools and support that enable new ideas that change the way we live.

Flow Chart



RESULT

The experiments were conducted to evaluate the performance of the proposed method. The results presented in this paper had been implemented the charge and recharge machine in user friendly. We have to use the MSP430 controller to intimate the charge and recharge functioning.



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CONCLUSION

With the proposed architecture, to design coin operated based charge and recharge machine with a compact module like a user friendly manner. User friendly means this machine is placed any where such as railway junction,hospital,schools,colleges,etc.we have to used two different coins (5rs and 10rs)for charging and recharging for mobile phones.

REFERENCES

1. 3rd Generation Partnership Project (2010), 3GPP TS 32.296 V10.0.0, Online Charging

- System (OCS): Applications and *interfaces*. [Online].
2. GSMA (2011), *Africa Now the World's Second Largest Mobile Market, Reports GSMA*. Press release [Online] issued 09 November 2011, available at: <http://www.gsma.com/newsroom/africa-now-the-worlds-secondlargest-mobile-market-reports-gsma/>. Accessed 14th May 2012.
 3. GSMA (2012), *About Us*. Web Page[Online], available at: <http://www.gsma.com/aboutus/history/> (Accessed 24th July 2012)
 4. Heath M (2011), "Mobile Voice to Account for Only Half of Mobile Revenues by 2012, [Online], available at: <http://www.unwiredinsight.com/2011/mobile-voice-revenues>. Accessed 14th March 2012.
 5. Kühne R, Reimer U, Schläger M, Dressler F, Fan C, Fessi A, Klenk A and Carle G (2005), "Architecture for a Service-orientated and Convergent Charging in 3G Mobile Networks and Beyond.
 6. Sahota D (2012), The Move Towards Omni-Convergence [Online], Available at: <http://www.telecoms.com/52388/themove-towards-omni-convergence/>, accessed 12th January 2013)
 7. Telkom (2004), *Telkom Annual Report, 2004*. [Online], available at: http://telkom.investoreports.com/telkom_ar_2004/html/telkom_ar_2004_80.html. Accessed 24th July 2012
 8. Wedge G and Lancaster B (2006), *Carrier-Grade: Five Nines, the Myth and the Reality*, Pipelinepub, Vol. 3, No. 11, 2006, <http://www.pipelinepub.com>. Accessed 18th January 2013.



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