



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 4.295

(Volume 4, Issue 1)

Available online at www.ijariit.com.

Secured Transaction Online Processing System Using ZIGBEE Wireless Network

Rajeshwar Goud Jangampally¹
St. Martin's Engineering College,
Hyderabad, Telangana

P. Ramesh²
MLR Institute of Technology, Hyderabad,
Telangana

ABSTRACT

Data security in non-fiscal cash registers and non-fiscal printers is minimal. However, data security in fiscal cash registers and fiscal printers is also not satisfactory. This paper describes turnover control devices based on GPRS terminals for sending data from fiscal electronic cash registers and fiscal printers to the server of Tax Administration^[1] in order to prevent tax evasion, diversion of original goods from the distribution system and infiltration of counterfeited or original goods into the distribution system without payment of customs, tax and excise duties. The comparison with ordinary fiscal cash registers and non-fiscal cash registers is also provided.

Keywords: Micro Controller, RFID Reader, LPC2148 Board, Pc, GPRS Modem, Zigbee Wireless Network.

1. INTRODUCTION

There are many reasons for turnover control from the point of view of many governments, starting from the obvious to very sophisticated ones, such as improved filling of the budget and increased tax collection, excise duty collection, customs duties collection, as well as the efficiency of tax and trade inspectors. There is also a need for an automatic accounting of tax duties and the prevention of tax evasion, tax fraud, the sale of excise goods without paid excise duties in regular distribution channels, the diversion of original goods from regular distribution channels, unfair competition, and protection of consumers. The main reason for turnover control from the point of view of taxpayers is assistance to taxpayers during selling, business activities, order planning, etc. There are also possibilities of sending: data about the

summary turnover of articles and list of sold articles to a server, computer or a mobile phone of a taxpayer.

The article database can be also remotely updated (price adjusting, adding new articles, deleting of old articles, etc...). There is also a possibility of additional earnings of a taxpayer by refilling SIM cards of prepaid mobile phones, paying LOTO^[2] combinations, paying instant lottery, showing marketing messages on an additional display, etc. An electronic fiscal cash register (FR)^[3] is a standalone device with two displays and keyboard. A fiscal printer is connected to a personal computer (PC) or a point-of-sale system (POS) and usually has only one display (for buyer)

2. THE HARDWARE SYSTEM

Microcontroller section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7 TDMI, the ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display ^[4] (LCD) is a flat panel display, an electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset

words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

3. DESIGN OF PROPOSED HARDWARE SYSTEM

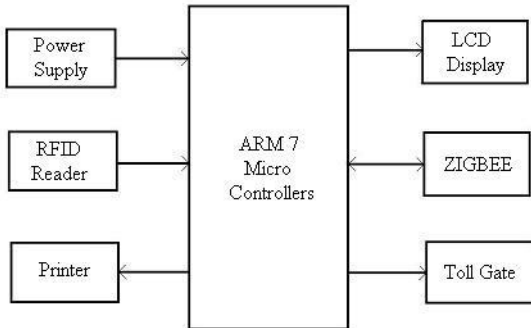


Fig.1. Block Diagram of Input Module

Here in this project, every vehicle will be having a unique identification number i.e. an RFID tag attached to the vehicle. The tag contains the details about the vehicle like name, number, type of vehicle, license, RC book details etc. At toll gate, we have an RFID module, which will read the RFID tag of the vehicle passing in that way. By using the card we can pay the tax on the vehicle. The card will be placed in front of the card reader and the card is checked for validation and sufficient balance then the concerned amount will be reduced from the card and then the gate will be opened and the vehicle will be allowed.

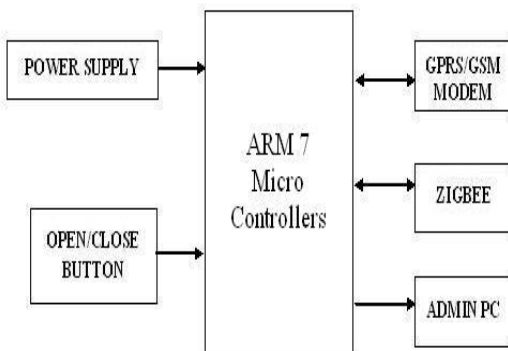


Fig.2. Block Diagram of Output Module

The details of the vehicle are displayed on LCD and also payment printed copy is provided to the vehicle driven by the printer. All this information from transmitter section is transmitted to the receiver section by using Zigbee transceiver. The received information from transmitter section is given to microcontroller. The information is stored and displayed on PC. Then the official data has been uploaded to server internet by using GPRS terminal.

4. BOARD HARDWARE RESOURCES FEATURES

PC

Keyboards on an OEM basis to leading global PC manufacturers for use in desktop and notebook PCs and also supplies for retail keyboard OEMs.

Features

- Internal Sourcing of almost all of the main Parts
- Efficient Production System

Almost all components - frame, key switches and membrane sheet - other than connectors and cord are manufactured in-house, giving Minebea an un-matched advantage in terms of quality, supply capabilities, cost-competitiveness and speed of delivery. Especially, these products capitalize on Minebea's ultra-precision machining technology of components [5].

Plant in China which supplies the global market employs the Minebea's vertically integrated manufacturing system, whereby all process, from machining components to final assembly is conducted in-house.

5. DIFFERENT MODULES

RFID

Many types of RFID exist, but at the highest level, we can divide RFID devices into two classes active and passive.

Active tags require a power source i.e., they are either connected to a powered infrastructure or use energy stored in an integrated battery. In the latter case, a tag's lifetime is limited by the stored energy, balanced against the number of reading operations the device must undergo. However, batteries make the cost, size, and lifetime of active tags impractical for the retail trade.

Passive RFID is of interest because the tags don't require batteries or maintenance. The tags also have an indefinite operational life and are small enough to fit into a practical adhesive label. A passive tag consists of three parts: an antenna, a semiconductor chip attached to the antenna and some form of encapsulation. The tag reader is responsible for powering and communicating with a tag. The tag antenna captures the energy and transfers the tag's ID (the tag's chip coordinates this process). The encapsulation maintains the tag's integrity and protects the antenna and chip from environmental conditions or reagents.

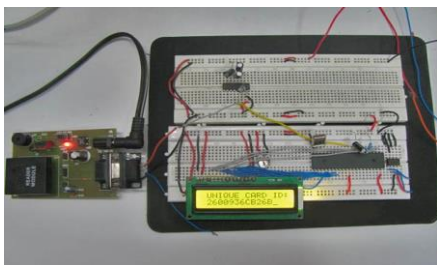


Fig 3. RFID Interface with Microcontroller

ZIGBEE

ZIGBEE is a specification for a suite of high-level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for Low-Rate Wireless Personal Area Networks (LR-WPANs), such as wireless light switches with lamps, electrical meters with in-home-displays, consumer electronics equipment via short-range radio needing low rates of data transfer. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking.



Fig 4. Zigbee Development Module

ZigBee is a low-cost, low-power, wireless mesh networking standard. First, the low cost allows the technology to be widely deployed in wireless control and monitoring applications. Second, the low power-usage allows longer life with smaller batteries. Third, the mesh networking provides high reliability and more extensive range. It is not capable of powerline networking through other elements of the Open HAN standards suite promoted by open AMI and z deal with communications co-extant with AC power outlets. In other words, ZigBee is intended not to support powerline networking but to interface with it at least for smart meeting and smart appliances purposes. Utilities, e.g. Penn Energy, have declared the intent to require them to interoperate again via the open HAN standards.

GPRS

GPRS is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications(GSM). GPRS was originally standardized by European Telecommunications Standards Institute (ETSI) in response to the earlier CDPD and i-mode packet-switched cellular technologies. It is now maintained by the 3rd Generation Partnership Project (3GPP). GPRS usage is typically charged based on the volume of data transferred, contrasting with circuit switched data, which is usually billed per minute

of connection time. Usage above the bundle cap is either charged per megabyte or disallowed.

GPRS is a best-effort service, implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection. In 2G systems, GPRS provides data rates of 56–114 kbit/second. ^[6]2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and third (3G) generations of mobile telephony.^[4] It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels in, for example, the GSM system. GPRS is integrated into GSM Release 97 and newer releases.

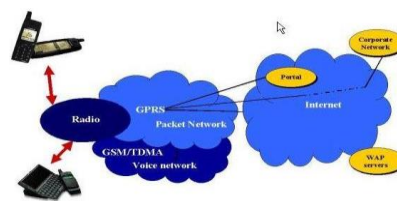


Fig 5. Working principle of GPRS

6. STATISTICS AND RESULTS

The described forms of misuse in the table cannot be detected without removing the service seal, opening the fiscal register, comparing the fiscal register with the certified model kept at the competent government institution and detailed inspection by experts, which causes additional expenses and requires additional time^[7]. However, some cases of misuse can be undetected even by experts, such as a replacement of electronic components, in case the markings of the original and forged electronic components are identical, or differ in a small number of characters, or are even removed. In addition to that, various complicated formats of electronic and printed data decelerate an audit or make it impossible.

Table.1 Possibility of Misuse ^[8]

JM = Journal memory JT = Journal tape X = Yes - = Non important 0 = No	Type of an electronic device for turnover control					
	Fiscal register with GPRS terminal		Fiscal register		Non-fiscal register with the external fiscal module	
	JM	JT	JM	JT	JM	JT
Not registering turnover (by cashier)	X		X		X	
Printing of misleading non-fiscal receipts	X		X		X	
Non-authorized change of the program	X		X		X	
Installation of additional programs	0		0		X	
Change and clear of data	0		0		X	
Fiscal memory access	X		X		X	
Journal memory access	X	0	X	0	X	0
Destruction of journal tape	0	X	0	X	0	X
Printing of counterfeited journal tape	0	X	0	X	0	X
Destruction of daily reports	-		X		X	
Printing of counterfeited daily reports on 2 nd printer	-		X		X	
Removal of the service seal	X		X		0	
Removal of the program seal	X		X		0	
Removal of the fiscal seal	X		X		0	

7. CONCLUSION

The official data of The Republic of Serbia show that the implementation of fiscal registers with external GPRS terminals has increased the relevant tax collection between 20% and 30% depending on a year, while grey economy spread has decreased by 30%^[9]. The However, some cases of misuse can be undetected even by experts, such as a replacement of electronic components, in case the markings of the original and forged electronic components are identical, or differ in a small number of characters, or are even removed.

8. REFERENCES

- [1] Combating VAT fraud in the EU, the way forward, International VAT association, March 2007.
- [2] Report on EU customs enforcement of intellectual property rights, European Commission, Taxation and Customs Union, Brussels, 2008.
- [3] What makes fiscal consolidations last? A survival analysis of budget cuts in Europe, Public Choice, March 2008, Volume 134, Springer US.
- [4] Liquid Crystal Display (LCD) Supplied by Highly Integrated Dual-Side Dual-Output with Only Two Flying Capacitors, Circuits, and Systems, IEEE.
- [5] Stopping the carousel: missing trader fraud in the EU, House of Lords, European Union Committee, 20th, Report of session 2006-07.

- [6] Communication from the commission to the council, the European Parliament and the European economic and social
- [7] Summary of community customs activities on counterfeit and piracy, results at the European border - 2006, European Commission, Taxation and Customs Union, Brussels, 2008

AUTHORS

1. J. Rajeshwar Goud was born in Telangana, India, in 1983. He received B.Tech. degree in Electronics and Communication Engineering from Jawaharlal Nehru Technological University, Hyderabad, Telangana, India, and the M.E. degree in Microwave and Radar Engineering from Osmania University, Hyderabad, Telangana, India. He awarded UGC-NET Lectureship from University Grand Commission in 2013. He is currently working toward the Ph.D. degree in the Department of Electronics and Communication Engineering, Jawaharlal Nehru Technological University, Kakinada, Andhra Pradesh, India.

Since 2008, he has been working as an Assistant Professor in the Department of Electronics and Communication Engineering, St. Martin's Engineering College, Hyderabad, Telangana, India. His current research interest in planar antennas.

2. P.Ramesh working as an Assistant Professor in the Department of Electronics and Communication Engineering, MLR Institute of Technology Hyderabad, Telangana, India.