

## **AN NFC TICKETING SYSTEM WITH A NEW APPROACH OF AN INVERSE READER MODE**

### **ABSTRACT**

Embedded systems are commonly found in consumer, cooking, industrial, automotive, medical, commercial and military applications. Transportation systems from flight to automobiles increasingly use embedded systems. New airplanes contain advanced avionics such as inertial guidance systems and GPS receivers that also have considerable safety requirements. Various electric motors — brushless DC motors, induction motors and DC motors — use electric/electronic motor controllers. Automobiles, electric vehicles, and hybrid vehicles increasingly use embedded systems to maximize efficiency and reduce pollution. Other automotive safety systems include anti-lock braking system (ABS), Electronic Stability Control (ESC/ESP), traction control (TCS) and automatic four-wheel drive.

The uses of embedded systems are virtually limitless, because every day new products are introduced to the market that utilizes embedded computers in novel ways. In recent years, hardware such as microprocessors, microcontrollers, and FPGA chips have become much cheaper. So when implementing a new form of control, it's wiser to just buy the generic chip and write your own custom software for it. Producing a custom-made chip to handle a particular task or set of tasks costs far more time and money. Many embedded computers even come with extensive libraries, so that "writing your own software" becomes a very trivial task indeed.

This paper presents a new approach for ticketing systems using NFC smart phones. Current systems use NFC enabled mobile phones either in card emulation or peer-to-peer mode for exchanging data and for validating tickets for instance. In practice these systems face

different barriers regarding realization and interoperability from developers and operators perspective, which prevents them to be widely rolled out. In this paper we propose a solution, where the mobile phone is in reader/writer mode and the ticketing system is in card emulation mode. The major advantage for this inverse scenario is that it can be implemented very easily by using light-weight protocols, which are compatible to existing mobile phones. This paper provides an overview about the major problems, discusses advantages and disadvantages of the new approach, and finally describes an implementation from a proof of concept realization.

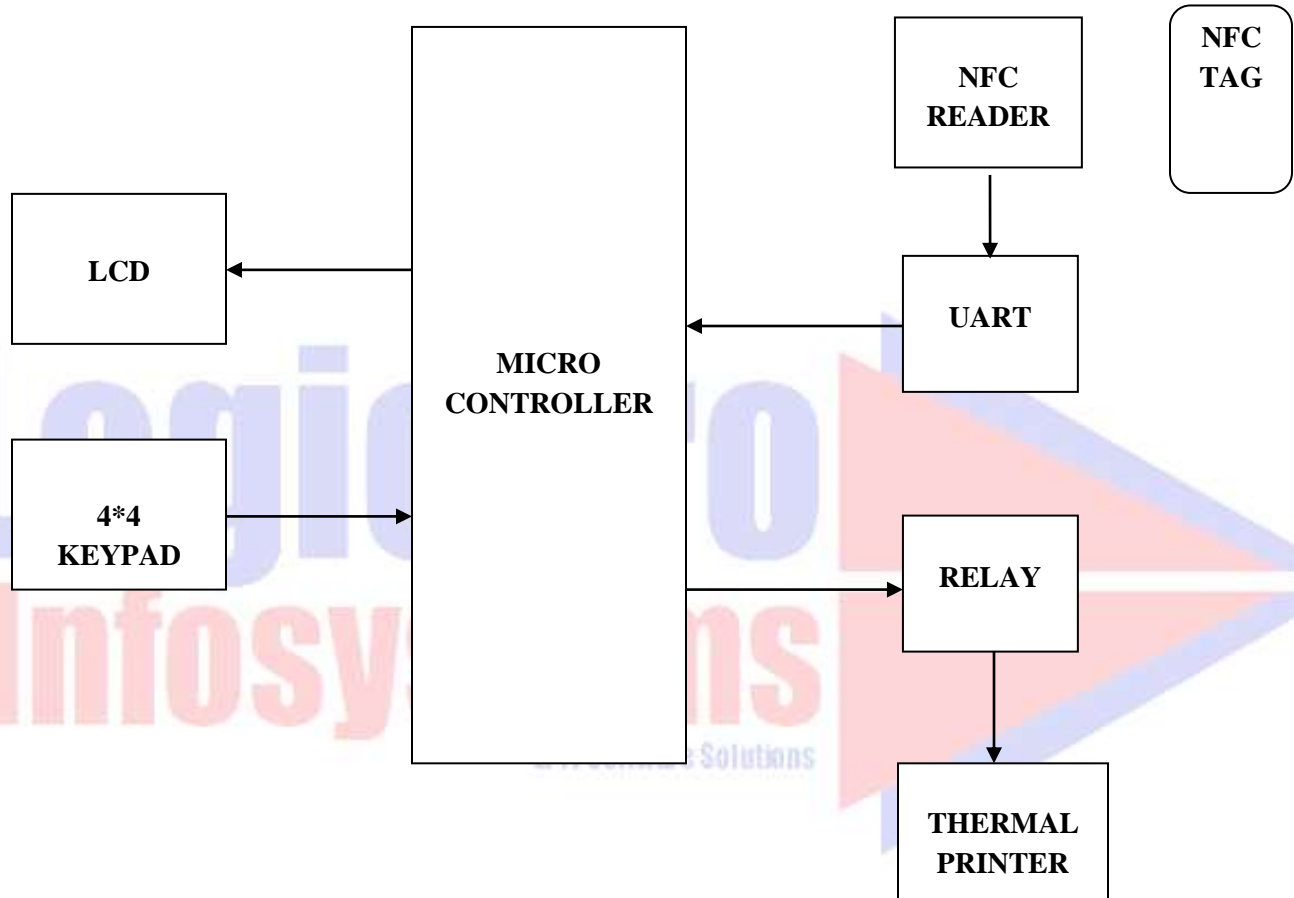
## **PROPOSED SYSTEM**

The project consists of microcontroller and NFC readers. The transmitted node consists of micro-controller and NFC reader. Initially the connection between the devices can be established by using the algorithmic steps. The transmitter node sends the encrypted message to the recipient node. The smart phone which consists of NFC module is used to encrypt the message to establish the connection. The next step is entering the ticket rate and place of destination. A printer is attached with the controller

## **ADVANTAGES**

- Most obvious benefit of near field communication and the contactless payment systems it creates is its ease of use
- No need to carry multiple credit cards or dig through your wallet for the right one
- Near field communication often creates a secure channel for communication and uses data encryption when sending sensitive information between your phone and another device, such as a card reader

## BLOCK DIAGRAM



## HARDWARE REQUIREMENTS

- MICROCONTROLLER
- NFC READER
- 4\*4 KEYPAD
- PRINTER

- LCD DISPLAY

## SOFTWARE REQUIREMENTS

- MCU COMPIERS
- PROTEUS SOFTWARE

MICROCONTROLLER may ATMEGA,8051,PIC OR Arduino

