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AVR and ARM Based Speaking System For Deaf and Dumb

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ABSTRACT: With advancement of technology things are becoming simpler and easier for us. Automatic system [1] are being preferred over manual system. This proposed system is a microcontroller[2] based system designed to make it convenient for the deaf and dumb to call for help. In this paper Arduino nano boards, NRF transceiver, AT mega 328, GSM module based interacting system is presented. System discussed is microcontroller based[3]. The Nordic nRF2401 integrates a computer 2.4GHZ RF transceivers, RF synthesizers and a base band logic including the enhanced shock burst hardware protocol accelerator supporting a high-speed SPI interface for the application of controller.

KEYWORDS: Arduino nano boards, NRF transceivers, GSM module, AT mega 328, Deaf and dumb.

I. INTRODUCTION

This paper is aimed mainly for social purpose. Through this paper we are trying to make a system which will make the communication easier and simpler for deaf and dumb to call for a help. Deaf people make use of sign language[4] to make understand what they are trying to say but it is impossible to understand by hearing people. So, we have tried to make a simple and cheap system through which deaf and dumb could convey their message to hearing people. For that we are making use of two arduino nano bands one for deaf and dumb and other for hearing people and STM32[5] based central display unit. Both these arduino nano[6] bands and STM32 based central display unit contain [8]NRF2401 transceiver which helps in wireless communication. This research paper analyses the data from NRF2401 transceiver for used in wireless[7] transmitting and receiving of signals which will be transmitted from deaf and dumb arduino nano band and will be displayed on the lcd screen which is fitted in central display unit.

II. METHODOLOGY

Block diagram of system is given in Fig.1. System consists of following components

- A. NRF2401+
- B. Arduino nano deaf and dumb band
- C. Arduino nano for hearing people
- D. STM32 based central display unit
- E. Switch
- F. Buzzer
- G. Lcd display

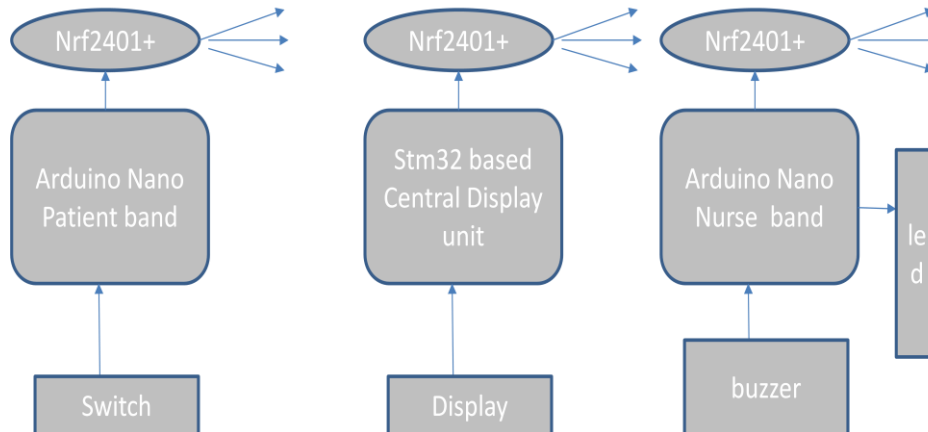


Figure 1: Block diagram of system

III. SYSTEM DESCRIPTION

A. NRF2401+

NRF2401 is a single-chip radio transceiver for the world wide 2.4 - 2.5 GHz ISM band. The transceiver consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator and a modulator. Output power and frequency channels are easily programmable by use of the 3-wire serial interface. Current consumption is very low, only 10.5mA at an output power of -5dBm and 18mA in receive mode. Built-in Power Down modes makes power saving easily realizable.

B. Arduino nano band

Arduino nano , an 8bit microcontroller has been used in this paper in two wearable bands ,each to be worn by the patient and his attendant.

C. STM 32 Based Central Display Unit

It is a family of 32 bit microcontroller integrated circuit. Each microcontroller consists of the processor core, static RAM memory, flash memory, debugging interface. Maximum CPU clock rate -400 to 400 MHz. Minimum feature size 1MB to 2MB.

D. Buzzer

The buzzer used in the project can operate from a voltage between 3 to 28V and draws only 4mA of current at 12V.

E. LCD Display

The LCD is used to display numbers, characters and graphics. It relieves the CPU of the task of refreshing and also eases the programming for characters and graphics. In this paper LCD indicates which patient has been calling as well as he required help needed is displayed as well on pressing the required switch on their wearable band.

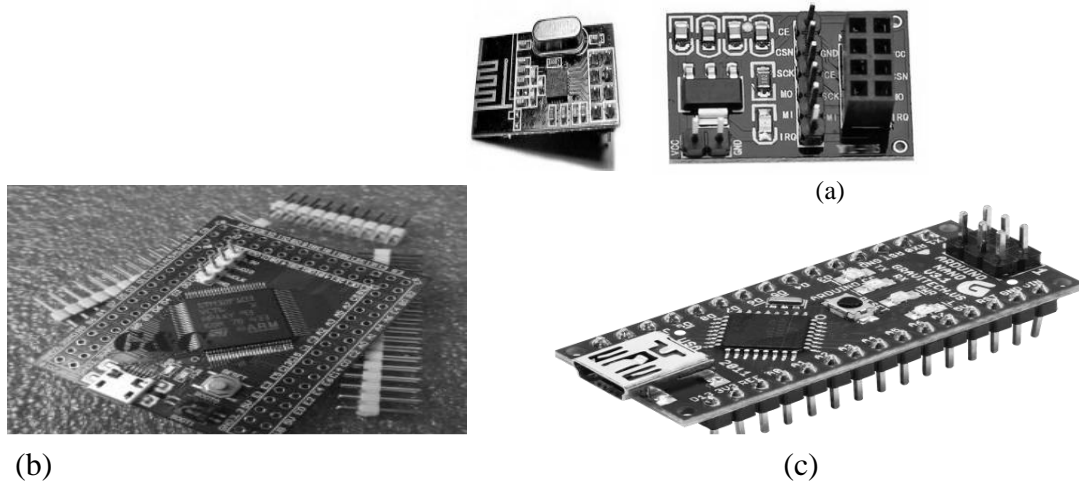


Figure 2: Components used : (a) NRF2401+ , (b) ARDUINO NANO BAND ,
(c) STM 32 CPU

IV. CONCLUSION

This research paper describes the design and working of a system used by the deaf and mute person to call his attendant for aid. The system consists of two wearable wrist bands each to be worn by the patient and his attendant. The patient band contains three switches which are to be pressed according to the respective needs of the patient. The attendant band consists of a buzzer which would beep as soon as the patient presses the switch on his band. Also another module which has to be kept on the attendant's desk contains a buzzer and a LCD display, displaying the name of the patient calling and the respective requirement, therefore making it easier for the attendant tending to the deaf and mute person.

V. FUTURE SCOPE

There can be a lot of future enhancements associated to this research work, which includes:

- A. Designing of wireless transceiver system for "Microcontroller and Sensors Based Gesture Vocalizer".
- B. GPRS along with the GSM module can be used with this system for more convenience.
- C. This system can be combined with the IOT concept for more effective operability.
- D. This concept can be used in robot controlled systems.

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