



HANDS FREE TOKEN DISPENSER

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ABSTRACT: Hands Free Token Dispenser which prints token number along with date and time without touching the device. It dispenses token automatically when user keep hand in front of sensor between a predetermined distance. This device can be operated either by placing hand in front of the sensor or by pressing the button manually.

KEYWORDS: token, hands-free, covid, printer

I. INTRODUCTION

Ever since the outbreak of Covid-19 pandemic, everybody in the world has become more conscious about maintaining social distance. All have resorted to various methods to crowd management at places such as shops, offices etc. But it is still proving difficult for hospitals to streamline non-Covid patient consultations. Taking a queue, so we developed a hands-free dispenser. The hands-free concept works with the help of sensors and dispenses tokens automatically when a person approaches the machine and extends his or her hand without touching it. The product has been designed to avoid crowding especially in a time when social distancing is unusual standard. Besides this, it also prevents chances of contracting the infection, The dispenser prints the token number along with date and time. Here we have two methods to operate this machine. User can place his/her hand in front of the sensor or they can operate it through pressing the button manually. The device is equipped with RTC (Real Time Clock) module which resets the token number automatically and has an in-built battery which can give backup of up to two hours in case of a power failure. Also, this device uses a small thermal printer for clear readable tokens at a low cost. The first in the world has been installed in the Oncology Department of the Government Medical College, Thrissur, and now it's being effectively used to manage patients and bystanders in the hospital. Oncology department has been attending to more than 100 patients every day who crowd around the counter for consultations. In the wake of covid-19 pandemic, the hands-free token dispenser has proved crucial for many, especially for patients. And this device is more essential for managing crowd with low cost. There are some other crowd management tools available such as

virtual queue mobile application etc. But those tools cannot be affordable for small organizations.

II. WORKING

Amid the corona virus pandemic, health experts have been emphasising on the importance of keeping the hands germ-free, to ensuring this we have to avoid touching any surface on outside. In this machine we have a thermal printer to print tokens sequentially. The printing process has already programmed using embedded C. For this we use a Robotbanao T9-NHXR-186H Uno R3 Atmega328p. This Atmega32p is works in the operating voltage of 5. Its output pin has connected with RS232 thermal printer. The data for the token sheet is already kept in the program. For getting the time and date we use a Robocraze DS3231 AT24C32 HC Precision RTC(real time clock) module which is operated by 3.3 to 5 volt. Once the program has triggered the printer will start working, it will print the token sequentially.



Fig No 1 Hands free token dispenser

We use two methods for triggering the program one is a pushbutton switch and another one is IR Proximity Sensor. It has inbuilt battery which can give backup upto 2 hours in case of a power failure.

A. Components used

- RS232 THERMAL PRINTER which produces a printed image by selectively heating coated thermo chromic paper
- IR Proximity Sensor, three pin burg male header for easy interface. It comes with an easy to use digital output pin 5.2.5mm diameter hole for easy mounting. It is 6.5V operated.
- Robocraze DS3231 AT24C32 HC Precision RTC. Used to take the real-time clock value.
- Robotbanao T9-NHXR-186H Uno R3 Atmega328p, PWM. Digital I/O Pins .6 Analog pins.
- ABENIC DC 12V 2A (24W) 4800mAh Super Rechargeable Li-ion Lithium Battery
- AC to DC adapter , 12V 1A Power Adapter, AC Input 100-240 V

III. COMPONENT WORKING

A. RS232 Thermal Printer

Send data to it serially and the printer will print it. Doesn't required any complex coding or hardware. This printer has both TTL as well as RS232 interface. The printer can interface with a aurdino / microcontroller, using 5V-9V/12V it capable to print text characters, barcodes images, graphics. Which has Low-noise direct thermal printing method. Uses operating Voltage S Volts 2 amps it can can support Max.39MM (diameter) paper roll. This printer has RS-232C/TTL Interface:



Fig.2 Thermal printer

B. T9-NHXR -186H Uno R3 Atmega328p

This Uno board is a microcontroller based on the ATmega328.



Fig. 3 Uno R3 Atmega328p

UNO R3 of 14 digital i/o pins, 6 pins used as pulse width modulation outputs, USB connection, sixteen MHz ceramic resonator, an ICSP header, six analogue inputs and a power jack and a reset button.

C. IR Proximity Sensor

IR proximity sensor is used to detect the presence of nearby objects without any physical contact/touch. This sensor LED emits an electromagnetic field or a beam of electromagnetic radiation. Then it's looks for changes in the field or return signals.

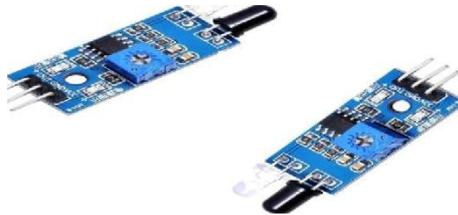


Fig.4 IR Proximity sensor

D. AT24C32 HC Precision RTC

Real time clocks (RTC), used to get realtime clock. This real time clock (RTC) IC has 8 pins and using an I2C interface. This low-power DS1307 can store clock/calendar with 56 bytes of battery backup using SRAM. The realtime clock module provides the exact time such as seconds, minutes, hours, day, date, month and year



Fig.5 RTC module

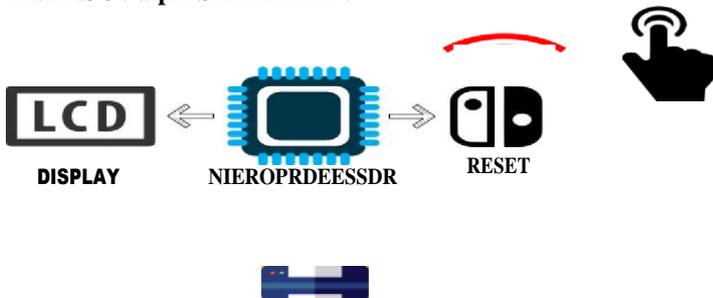
IV. INTEGRATION

T9-NHXR-186H Uno R3 Atmega328p has 14 output pins works with 5 volt DC. We made a trigger program with the help of embedded C. This program has a loop for printing the image and its initially set to zero. The zero setting function will called by the RTC time, Whenever the time reaches 00:00 the function will get called and the token count will set to zero. The printing function will be called two ways. One is from the IR sensor, We can set the threshold distance on the IR sensor by manually. This print function be operated either by placing hand in front of the sensor or by pressing the

button manually.

We use 12V adapter for power supply also it has a 2 A rechargeable battery which can hold upto 2 hours. Also this can hold the overcharging voltage. We can plug this all time even if the battery is full. We use a form board to make the entire case of the machine and place an aluminium rod inside the case for making the machine more strong. There is refresh button which set the token number to zero whenever we need a reset.

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THERIDAL POINTER

Fig. 6 Integration diagram

V. CONCLUSION

In this covid19 outbreak this would be an essential product for crowd management. Token is the needed one in hospitals, banks, other government and non government organization. So this would be best solution to them making it touch less. There is another option available for crowd management is virtual queue using mobile application, but making an application is much expensive. Also the number of smartphone users in India was estimated to reach over 760 million in 2021. Still 2.24 billion are not using smartphone and rural villagers have more difficulty to use these virtual queue concept. So this would be a best solution for crowd management.

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