

# GSM Based Queue Management Device for OPD

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**Abstract** – This paper presents a different way to take an appointment (token/queue number) for consultation of doctor. In this patient can register an appointment by 2 ways 1) By sending his name through short message service (SMS) of GSM in a fixed format to server mobile which will save in a database and in response server mobile will sent token number (queue number). 2) By entering patients name from a keyboard placed in hospital and take a token number (queue number) from a display unit also placed in hospital. In our system there are three units namely calling unit, display unit and entry unit. All three units are related to each other. First in entry unit, there is microcontroller interfaced with GSM module which is responsible for message passing. There is also handmade keyboard of 26 English characters which will be used to enter name of patient manually. When any message comes or when any patient enters data manually then all this data is stored in memory and current patient's name and his token number is displays on LCD which is a part of display unit. When doctor calls patient using calling unit one by one, and after check-up of each patient he will press one button to indicate other patients that their number will be in upcoming queue. There is also one button which is called as reset button. By pressing this button, all queue data will be vanished.

**Key Words:** GQMDO (GSM based Queue Management Device for OPD), DU (Display Unit), CU (Calling Unit), EU (Entry Unit), OPD (Out Patient Department), FIFO (First In First Out)

## 1. INTRODUCTION

Due to the increasing population and the rise in the infectious as well as chronic degenerative diseases, healthcare industry is growing at very fast pace. Healthcare System in India and around the world has witnessed a phenomenal growth during last three decades. The basic reason behind raising this industry is the increasing rate of population and their demand for the healthcare service. So, health care systems have been challenged in recent years to deliver services to all the patient and high quality services with limited resources without delay. Patient satisfaction and quality care are important indicators for the success of any health care enterprise. In today's hyper-competitive market, customers are faced with many different options when deciding on a specific healthcare provider. Due to the varying options, quality and service stand out as two essential elements that influence the selection process. If the quality is not met, the healthcare organizations have to

face several issues such as customer retention, value, safety, litigation, and reputation. Patient satisfaction has emerged as an increasingly important parameter in the assessment of health care quality. Waiting time is considered to be an important determinant of patient satisfaction. In Today's world when patient wants to visit to a Doctor he/she have to first register their names in OPD section and then he/she have to wait for their turn to come. This all procedure is handling by a human being. The present scenario is that at OPD a man sits outside doctor's cabin and sent patient one by one in doctors cabin for checkup and treatment, and it is expected that he should sent patient on first come first serve basis but many times due to human error or influence the criteria of first come first serve crashes and then patients will experience frustration and may feel less satisfied with the services. So in order to tackle such situation and to serve patient efficiently we have developed this device "GQMDO" for smooth functioning of OPD's without intervention of human being.

## 2. PROPOSED SYSTEM

GQMDO (GSM based Queue Management Device for OPD) is an electronic device consists of three parts display unit (LCD & Buzzer), entry unit (keypad & GSM) and calling unit (switches). DU (Display Unit) and EU (Entry Unit) will be at waiting hall and CU (Calling Unit) will be at doctor's cabin. . As a patient comes to OPD (Out Patient Department) for treatment he will enter his name through Keypad (EU) or he/she can send his/her name through SMS to server number and the name will store in database. When doctor comes to his cabin and as he press the switch (CU), patient name on FIFO (First In First Out) basis will display with buzzer (DU).

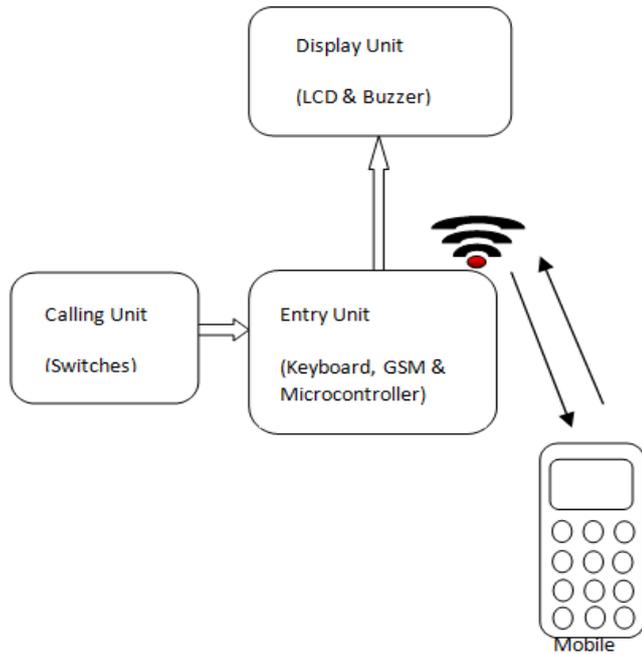


Fig -1: Block diagram of proposed system

### 3. IMPLEMENTATION

#### 3.1 Keyboard

A 5x6 matrix keypad is designed having 30 push button switches in which 26 buttons are labeled as alphabet and one button is used as enter key. This 5x6 matrix keyboard is connected to parallel port of microcontroller, rows are connected to output port and columns are connected to input ports. Whenever an alphabet key is pressed the loop will be called to detect which key is pressed and so on and after typing the complete name enter key is pressed to store name in microcontroller memory.

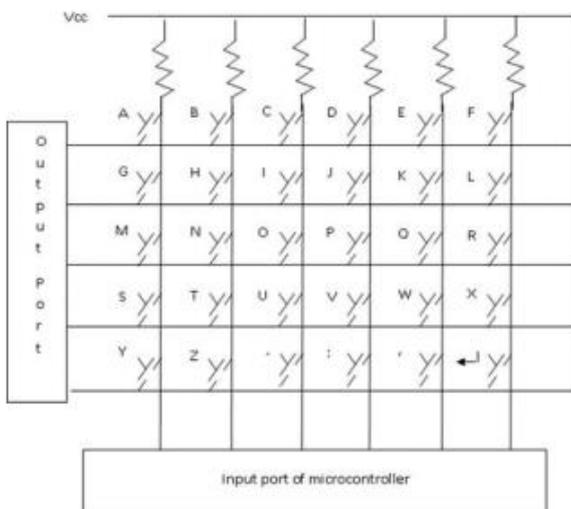


Fig -2: 5x6 Matrix Keypad

#### 3.2 GSM

GSM module is connected to serial port of microcontroller and GSM module is switched in plain text SMS input mode using AT+CMGF=1 command.

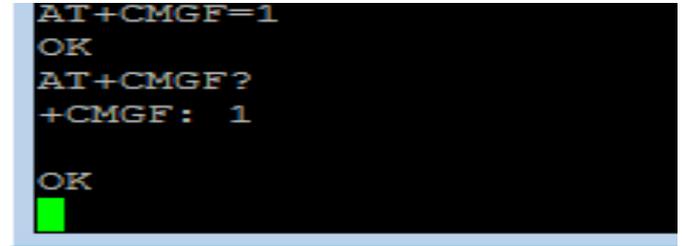


Fig -3: Setting GSM Module in SMS Mode

As a text message in predefined format is received it stored in SIM memory and in response to received message an acknowledgement message containing queue numbers is sent with AT+CMGS command. After that using AT+CMGR command message is read by microcontroller and stored in microcontroller memory and with the use of AT+CMGD command this message is deleted from SIM memory to vacant the location for next message and so on.

#### 3.3 Push Button Switch

Push button switch which will be in doctor's cabin is connected to the input parallel port pin of microcontroller. Initially the value at port pin is high, when the button is pressed by a doctor to call a patient the value at port pin goes low and microcontroller will display the data (patient name) on LCD in FIFO manner.

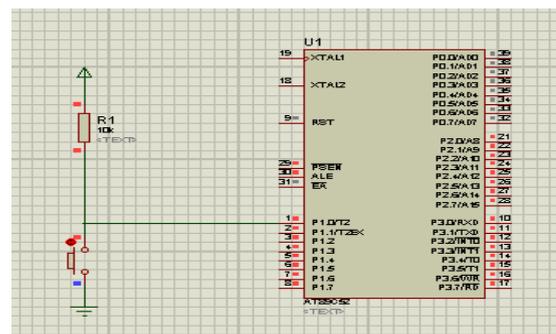


Fig -4: Interfacing switch to microcontroller

#### 3.4 LCD & Buzzer

LCD is connected to parallel port of microcontroller, data and control pins of LCD are connected to output port pins of microcontroller. Buzzer is connected to output port pin of microcontroller. When push button switch (calling unit) is pressed microcontroller will send the name of patient as FIFO manner to LCD and makes the port pin high where buzzer is connected.

### 3.5 Microcontroller AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel’s high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. A USB programmer is used to program AT89S52.

### 4. FUNCTIONING

Suppose OPD opens at 6:30 pm in night and doctor comes at 7:00 pm for consultation. So our device QMDO switches on at 6:30 pm and the queue no. of patient for appointment is shown through the table.

**Table -1:** Appointment/queue no. for patient

Time	Patient Name	Appointment	Patient Queue No./Memory Location
6:30 pm	Vijay	SMS	1
6:35 pm	Ateeq	Keyboard	2
6:40 pm	Gurdeep	SMS	3
6:45 pm	Feroz	SMS	4
6:50 pm	Madhuri	Keyboard	5
6:55 pm	Meena	keyboard	6

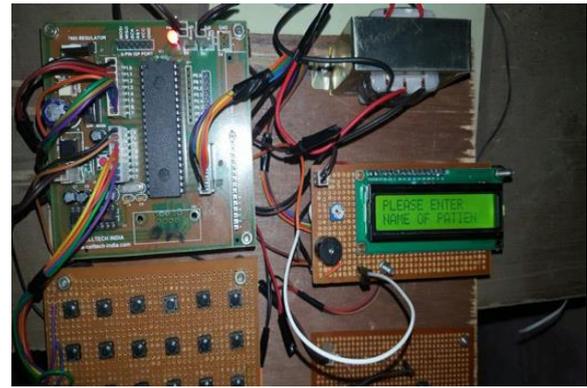
At 7:00 pm doctor comes to OPD and press push button switch connected in calling unit and the sequence of patient for consultation is shown through the table.

**Table -2:** Consultation sequence

Push button pressed	Patient for consultation
First time	Vijay
Second time	Ateeq
Third time	Gurdeep
Fourth time	Feroz
Fifth time	Madhuri
Sixth time	Meena

### 5. OVERALL DEVICE & CONCLUSION

The project GSM based Queue Management Device for OPD’s (QMDO) discussed here is successfully designed developed and tested. This device is designed by considering a hospital queue and to improve quality and services to patient without human interference. With some minor changes this device can be used where queue management is required.



**Fig -5:** Demo model of QMDO

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