Electronic Queue Management Device for OPD

Mr.Syed Suhail Ahmed[1] Mr.Ubedur Rehman[2] Mr.Maid Santosh.C.[3]
[1,2,3]Lecturer
[1,2,3]Gramin Polytechnic, Vishnupuri, Nanded

Abstract— 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 handle 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 "EQMDO" for smooth functioning of OPD's without intervention of human being.

Key words: EQMDO (Electronic Queue Management Device for OPD), DU (Display Unit), PEU (Patient Entry Unit) ,PCU (Patient Calling Unit), OPD (Out Patient Department), FIFO (First In First Out)

I. 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.

II. PROPOSED SYSTEM

EQMDO (Electronic Queue Management Device for OPD) is an electronic device consists of three parts display unit (LCD & Buzzer), patient entry unit (keypad) and patient calling unit (switches). DU (Display Unit) and PEU (Patient Entry Unit) will be at waiting hall and PCU (Patient 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

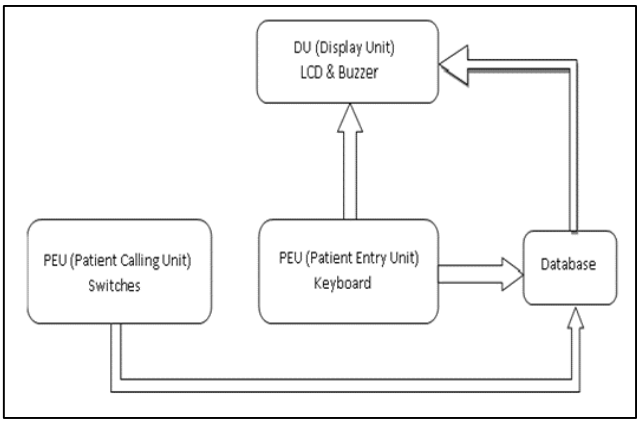

Fig. 1: Block Diagram of EQMDO

Keypad (PEU), and as patients come they enter their name and the name will store in database. When doctor comes to his cabin and as he press the switch (PCU), patient name on FIFO (First In First Out) basis will display with buzzer (DU).

III. HARDWARE & SOFTWARE

A. 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 8051 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

B. 5X6 MATRIX KEYPAD:

In Matrix keyboard the keys are organized in a matrix of rows & columns. In 5x6 matrix keyboard there are 5 rows & 6 columns. The CPU accesses both rows & columns through ports. When a key pressed, a row & column make a contact otherwise there is no contact between row & column. The rows are connected to output port of microcontroller and

column are connected to input port. When no key is pressed all the columns will output '1' as they are connected to Vcc.When a key is pressed one of the column s will have '0' because the key press provides a path to ground. To detect the key code of pressed key the microcontroller ground all rows and reads the columns. If data from columns is='111111', no key has been pressed and reading of column will continue. When any of the columns is '0' it means a key press has occurred After a key pressed is detected the microcontroller starts to find the key code of pressed key. Microcontroller grounds only one row at a time and reads the columns is data from columns is '111111' then no key is pressed in that row. Then micro controller grounds second row and reads columns again. this process continues until the row is identified. Once the row is identified then microcontroller can find the columns very easily as microcontroller knows at any time which row and column are being accessed.

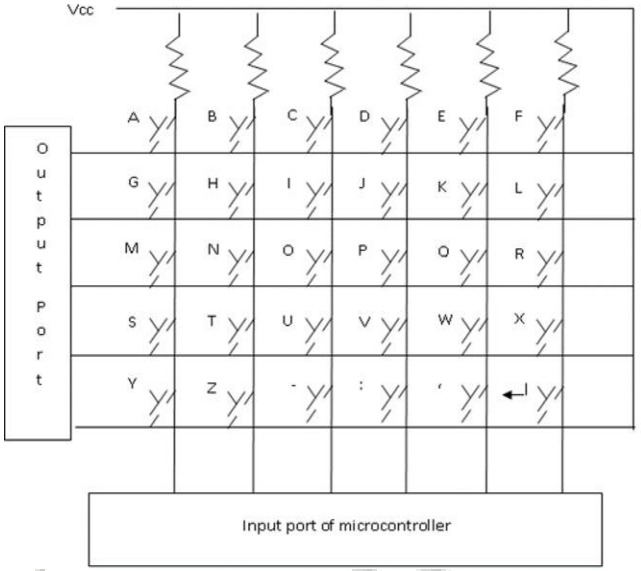

Fig. 2: 5x6 Matrix Keyboard

C. LCD (LIQUID CRYSTAL DISPLAY):

A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.It requires 5v DC supply for its operation. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. It is capable to display any character with ASCII values ranging from 0 to 255.

D. USBASP:

This simple microcontroller programmer can program most of the 89 like Atmel's AT89S51, AT89S52, AT89S53, AT89S8252, AT89S8253 including the Atmel AVR series of microcontroller , it does not support 89C series .It is a USB in-circuit programmer for Atmel AVR controllers. It simply consists of an ATMega88 or an ATMega8 and a couple of passive components. The programmer uses a firmware-only USB driver; no special USB controller is needed.

E. KEIL µvision:

The µVision IDE combines project management, run-time environment, build facilities, source code editing, and program debugging in a single powerful environment. µVision is easy-to-use and accelerates your embedded software development. µVision supports multiple screens and allows you to create individual window layouts anywhere on the visual surface. The µVision Debugger provides a single environment in which you may test, verify, and optimize your application code. The debugger includes traditional features like simple and complex breakpoints, watch windows, and execution control and provides full visibility to device peripherals.

IV. DESIGN & DEVELOPMENT

A. Software Organization:

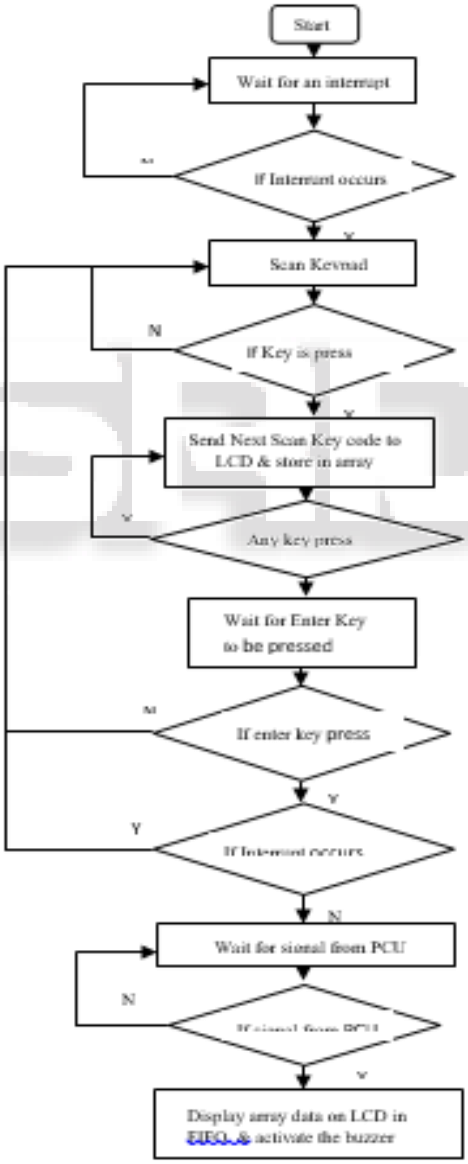

Fig. 3: Flowchart for working of EQMDO

A simple flow of the actual functioning of the device Electronic Queue Management Device for OPD'S (EQMDO) is define through the flowchart

For Patient Entry Unit (PEU) an hardware interrupt is assign for scanning keypad, a push button switch is given for the interrupt. when an interrupt occurs microcontroller

will start scanning the keypad to check which key is pressed and whenever a key is pressed microcontroller will send the ASCII value of that key to LCD and also stores its ASCII value into the array and so on and after entering complete name of a patient press enter key, and after pressing "enter" key microcontroller stop scanning the key press. for entering second patient name again when interrupt occurs microcontroller repeats the same procedure.

For Patient Calling Unit (PCU) when a signal is received from PCU microcontroller will fetch the data from the array in FIFO manner and display it on LCD and also activate the buzzer for 1 second.

B. Hardware Interfacing:

In Display Unit (DU) 16x2 LCD and 5volt buzzer is used, 8 data pins of 16x2 LCD is connected to output port of microcontroller and RS, RW and EN pin of LCD is connected to another port pins of microcontroller and these pins are also configured as output pins. Buzzer is connected to output pin of a port with use of transistor to amplify the signal.

In Patient Entry Unit (PEU) 5x6 Matrix keyboard is used, 5 rows of 5x6 matrix keyboard is connected to 5 output pins of a port and 6 columns are connected to 6 input pins of another port.

In Patient Calling Unit (PCU) Switches are used, and it is connected to input pins of the port. The Power supply section consists of the step down transformer which converts 230V ac into 12V ac. This 12V in then given to the rectifier section which converts the AC into the DC and then we the help of the regulator IC power is distributed to the different sections.

V. OVERALL DEVICE

Demo model of an Electronic Queue Management Device for OPD's (EQMDO)

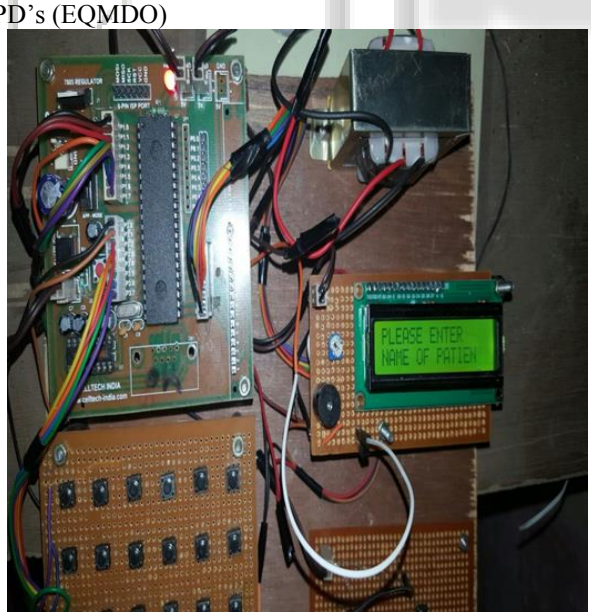

Fig. 4: Demo model of EQMDO

VI. CONCLUSION

The project Electronic Queue Management Device for OPD's (EQMDO) discussed here is successfully designed developed and tested. The system can be further modified by connecting GSM module to register patient name through SMS and get back the SMS through the device indicating patient queue number and approximate appointment time for future scope of the device.

REFERENCES

[1] Collins Jr., Donald A. "Queue management system and method" ,United States Patent 8068600.
[2] Alejandro Backer,Timothy Ross Mccune, "Electronic queuing systems and methods." WO 2012170958 A1.
[3] Samuel F. Fomundam, Jeffrey W. Herrmann, " A survey of queuing theory applications in healthcare" ISR Technical Report 2007-24.
[4] Dave.R. Eitel, Scott.E Rudki, "Improving Service Quality by Understanding Emergency Department Flow" The Journal of Emergency Medicine Volume 38, Issue 1, January 2010,Pages 70-79.
[5] Jonathan E.Helm,Shervin Ahmad Beygi,Mark P.Van Oyen, " Design and Analysis of Hospital Admission Control for Operational Effectiveness", POMS, Volume 20, Issue 3 May/June 2011 Pages 359–37

