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Alphanumeric Display Using LCD

Ami Kumar Parida[1], Tarun Kumar Dalapati[2], Voona Rahul[2], Trilochan Behera[2], Pogiri Binaya[2]

[1]Assistant professor, ECE department, GIETU, Gunupur, Odisha, India
[2]UG Scholar, ECE department, IETU, Gunupur, Odisha, India

Abstract - *LCDs are essential components in electronic gadgets, providing a visual interface for informational purposes. Alphanumeric LCDs display letters and numbers, useful for instrumentation panels, calculators, and digital watches. Numeric LCDs display numeric digits, commonly found in timers and digital thermometers. Liquid Crystal Display is a liquid that changes when a current is applied to it, making it suitable for use in LCD televisions. They have a slim design and flat viewing surface, but are optimized for video display. These TVs are thinner and lighter than CRTs and come in larger sizes. Alphanumeric LCDs use a matrix of addressable segments grouped into character shapes, managed by microcontrollers or specialized driver integrated circuits. Numerical LCDs display numerals 0 through 9, used in temperature displays and digital clocks. These LCDs are crucial for visual information representation in electronic devices, improving data presentation and user engagement. This project successfully completed its objectives in the Proteus simulation environment, showcasing its applicability in a variety of domains, including education, embedded system development, and prototyping.*

***Key Words*: 555 IC, Capacitor, Button, Resistor, Connecting wires, 14SEG-MPX1-CA-GRN**

1.INTRODUCTION

Alphanumeric LCDs display both letters and numbers, while numerical LCDs are designed to show numerical digits. These displays are essential for designing user-friendly interfaces and representing data in electronic devices. Alphanumeric LCDs offer a versatile way to display information since they can display both letters and numbers. Conversely, numerical LCDs are made expressly to show numerical digits. In many electronic devices, both kinds of displays are essential for designing user-friendly interfaces and representing data [1]. This exploration explores the use of numeric and alphanumeric display LCDs in Proteus, showcasing their potential for improving data visualization and user engagement. These days, the progress in the Because of this, alphanumeric displays are being used in a broad variety of household and certain domains. The journey provides information and resources to successfully integrate these displays into virtual electronic projects in Proteus, from understanding basic elements to writing code and seeing outcomes [2]. Workstation automobile accessories, general-purpose instruments Display cases and playthings are to sum up a few. Still, a limit encountered in the way they are utilized usually utilized to illustrate Latin Other languages based on Greek, such in English. This is problematic for those areas where individuals utilize different tongues. A potential solution to this issue should use specifically made bar matrix designs that work well for the particular vocabulary, such Greek, Chinese, or Arabic as has already completed. However, the price of this recently created as well as produced display modules most likely to reach the ultimate something costing more than deserved. Alternatively, you may utilize the widely accessible conventional dot matrix or bar matrix modules at all times potential. Still, in this instance among certain languages, the characteristics that emerge may not be as excellent as those emerging from specifically created and created designs for those dialects [3]. Within this document, the exhibit for the Characters in Persian have been executed utilizing commercially 16-segment LED/LCD available modules for displays that are primarily intended for exhibition Characters in English. Over the past few decades, electronic circuits' capacity to handle information has increased dramatically, improving our quality of life to a great extent [4]. The strength and velocity of information processing performed at a never-before-seen scale. The interface in this case between an individual and the CPU, or the display device plays a vital part. the sole option available until recently for all display devices, including televisions and desktop computer displays excellence. But the CRT takes up a lot of space and uses a lot of energy reasonable power (rv100W), and a significant decrease in either of These CRT characteristics are unexpected [5]. Displays with flat panels (FPOs)conserve room and, of all the gadgets that may be used, the liquid crystal Low power consumption displays (LCOs) have (r v l/l W /cm2 of exhibited region). LCOs were first introduced in the early 1970s by substituting the energy-hungry LEOs in digital calculators and watches [6].

Raj hakani published a paper based on GMS based Alphanumeric Scrolling Display System. He concluded that the paper's proposed design has been successfully tested and finalized, incorporating the functionality of each hardware component needed for development. The GSM modem receives the SMS, checks to see if the code is genuine, and then shows it on the Alphanumeric modules and the LCD. The previous SMS that was received is shown if the code is invalid. The main limitation is that there are only 60 characters available for display. The usage of expanded RAM helps get rid of these restrictions. To show the same message simultaneously in many locations, multiple display boards are also utilized [7].

Author J.P. Dakin and R.G.W. Brown in year 2017 concluded that among the most popular optoelectronic technologies, liquid crystal displays have developed into a crucial component of communication devices and frequently serve as an enabling technology. Numerous adjustments have been necessary for this success in order to satisfy the demands of ever-increasing complexity and performance. In fact, the foundation of liquid crystal devices' success is their adaptability. The fundamentals of liquid crystal physics and device construction will be covered first, followed by a review of the various modes used in commercial displays for both mainstream and niche markets, and a synopsis of the key complementary technologies [8]. Thomas S. Tullis from Houston, Texas concluded that alphanumeric display formatting, with a primary emphasis on displays created by computers. There are two main topics covered: display design guidelines and empirical display research. Display formats are characterized by four factors: layout complexity, grouping, overall density, and local density. Two distinct display formats are used to test the proposed objective measurement techniques for these attributes. The findings imply that these metrics might serve as the foundation for an impartial assessment of a display without the need to gather performance information [9]. F. Farzin-nia and M.S. Beg Loughborough University of Technology from U.K. concluded that A plan has been put up to enable the display of the modern Persian alphabet, numbers, and a few chosen symbols using commercially available 16-segment alphanumeric display modules. There are more realization details provided along with a 64-word ASCII character set [10]. MD Mustafa Mansoor & Jasmy Machaiah from B.M.S college of engineering at Bangalore told that for alphanumeric displays with low multiplexing values and low supply voltage needs, the Binary Addressing Technique (BAT) is perfect. The RO-TN-132 liquid's electro-optic response agrees with the given values. Engineers may benefit from the MAX PLUSII software, and EPLDs are very flexible devices. Waveforms created with the Waveform Editor of MAX PLUSII for the EPM7128 controller chip were effective in developing the "Scrolling Alphanumeric LCD" [11].

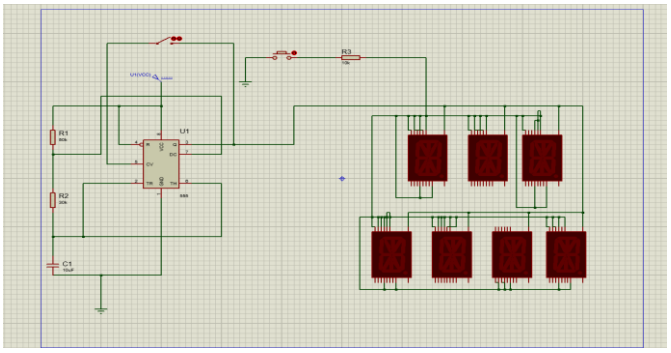
2. PARAMETERS:

SL No.	Components	Range	Quantity
1	Resistor	50k,30k,10k	3
2	Capacitor	10uF	1
3	Button	-	1
4	555 IC	-	1
5	14SEG-MPX1-CA-GRN	-	As per required
6	Switch	-	1

(Table -1)

3. DESIGN:

We have used proteus 8 for our circuit simulation and completed the circuit as shown in below.



(Fig-1: Simulation Diagram)

Simulating a microcontroller interfaced with an LCD module is necessary to create an Alphabetic and Numeric Display LCD project in Proteus.

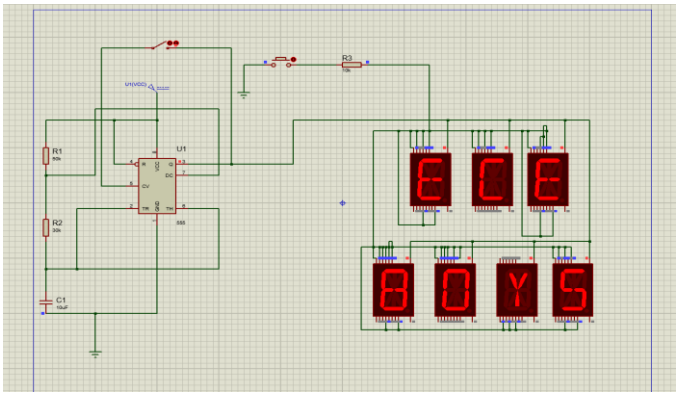
First, choose a Proteus-compatible microcontroller (such as an Arduino). Add the LCD module, microcontroller, and other required parts in your Proteus schematic. These components are available in the Proteus component collection. Attach the LCD module to the microcontroller's pins. Connecting data lines, control lines, and sometimes the contrast control to change the display contrast are usually required. You may simulate the project after your hardware configuration and code are complete. Using your code and input, Proteus will show you how the LCD shows characters. In order to verify that the LCD accurately displays the required alphabetic and numeric characters, you can test various input scenarios.

The project provides versatility for a range of applications by supporting both numeric and alphanumeric display LCDs. The interface is user-friendly. The integration and control of these displays is made possible through an easy-to-use and simple interface within Proteus. With a broad character set that includes letters, numbers, and symbols, alphanumeric displays may represent a variety of texts and data. Applications involving predominantly numerical data might benefit from the accurate depiction of numerical digits provided by numerical displays. Users are able to customize and manage the displays to display certain data or messages, providing flexibility to meet various project requirements. Through the initiative, people may communicate with the LCDs in real time, sending commands and data and seeing the results shown right away. The incorporation of well-known microcontrollers (like Arduino and PIC) demonstrates the control of these displays in practical uses. In order to assist users in their own programming endeavors, sample code snippets that demonstrate how to drive and manage the displays are included. The goal of the LCD simulations is accuracy; they closely resemble the behavior of real panels, down to the power and reaction time

requirements. The project serves as a teaching tool by offering insights into LCD technology and guidelines for using LCD screens in electronic circuits.

4.RESULT ANALYSIS:

The Alphabetic and Numeric Display LCD project accomplishes its goals with success, providing realistic and useful LCD simulations with an emphasis on teaching. For individuals wishing to explore and learn about different display technologies in a virtual setting, it is an invaluable tool. It is advantageous for learning and practical application when users have firsthand experience with managing, configuring, and interacting with alphanumeric and numeric display LCDs.



(Fig-2: Simulation Output)

5.CONCLUSION:

The LCD project for an alphabetic and numeric display in the Proteus simulation has been completed successfully. This project has successfully shown that it is possible to use Proteus to create and simulate a basic alphabetic and numeric display system. It offers a starting point for upcoming advancements in LCD interface and embedded systems.

In conclusion, this project effectively met its goals in the Proteus simulation environment, demonstrating its potential for practical uses in a range of fields, such as education, embedded system development, and prototyping.

REFERENCES:

1. D.W. Smith, in PIC in Practice (Second Edition), 2008
2. Simonson, T., Gaillard, T., Mignon, D., Busch, M. S. A., Lopes, A., Amara, N., Polydorides, S., Sedano, A., Druart, K., & Archontis, G. (2013). Computational protein design: The proteus software and selected applications. *Journal of Computational Chemistry*, *34*(28), 2472–2484. https://doi.org/10.1002/jcc.23418
3. Jie, Z. (2007). Proteus-based design and simulation of Chinese character dot matrix in SCM. *Jingdezhen Comprehensive College Journal*.
4. Wikipedia contributors. (2023, September 14). *Sixteen-segment display*. Wikipedia.
5. The Editors of Encyclopedia Britannica. (2023, October 25). *Critical race theory (CRT) | Definition, Principles, & Facts*. Encyclopedia Britannica.
6. Zhang, Z., You, Z., & Chu, D. (2014). Fundamentals of phase-only liquid crystal on silicon (LCOS) devices. *Light-Science & Applications*, *3*(10), e213.
7. GSM Based Alphanumeric Scrolling Display System by Author Raj Hakani.
8. J.P. Dakin and R.G.W. Brown, (2017) Handbook of Optoelectronics, CRC Press.
9. Thomas S. Tullis,' Bell Laboratories, Whippany, New Jersey, and Rice University, Houston, Texas.
10. Alphanumeric Persian characters using standard 16-segment displays Article in IEEE Transactions on Consumer Electronics · November 1989 by F. Farzin-nias and M.S. Beg.
11. Scrolling Alphanumeric LCD by MD Mustafa Mansoor & Jasmy Machaiah from B.M.S college of engineering at Bangalore.
12. M.S Beg and W. Ahmad 'A New Bar Matrix Alphanumeric CRT Display for Arabic', IEEE Trans. Consumer Electronics, Nov.1987, Vol. CE-33, pp.594-598.
13. K.T. Lau, 'Segmented Chinese Numeric Display', IEEE Trans. Consumer Electronics, Nov.1987, Vol. CE-33, pp.599-602.
14. Information presented visually. Revised edition of Human engineering guide to equipment design, edited by H. P. Van Cott and R. G. Kinkade. U.S. Government Printing Office, Washington, DC, 1972.
15. Bonsiepe, G. Quantifying order in typographic design: A methodology. 1968, 2, 203–220, Journal of Typographic Research.
16. Nature, 1970, 226, 177–178; Bouma, H. Interaction effects in parafoveal letter recognition.
17. Brown, B., and Monk, T. H. The effect of local target surround and whole background constraint on visual search times. *Human Factors*, 1975, 17, 81–88.

18. Burns, D. A dual-task analysis of detection accuracy for the case of high target-distractor similarity: Further evidence for independent processing. *Perception & Psychophysics*, 1979, 25, 185–196.

19. Cakir, A., Hart, D. J., and Stewart, T. F. M. *Visual display terminals: A manual covering ergonomics, workplace design, health and safety, task organization*. England: Wiley, 1980.

20. Callan, J. R., Curran, L. E., and Lane, J. L. *Visual search times for Navy tactical information displays (Report NPRDC-TR-77-32)*. San Diego, CA: Navy Personal Research and Development Centre, 1977. (NTIS No. AD A040 543)