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Design and Fabrication of Segment Display Architecture for Displaying Bengali and English Numerals

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ABSTRACT

Different display architectures using finite number of segments have been proposed for displaying Bengali numerals. Display architecture using 7, 8, 10, 11, 12, 18 segments have been proposed in few years. This project proposes a new 12 segment display architecture for displaying Bengali numerals from Zero '০' toNine '৯'. In this architecture, two sizes of segment are used without considering a bent segment. English numerals Zero '0' to Nine '9' also can be displayed using this architecture. The developed hardware architecture using LED and the practical view of the numerals are demonstrated in this article.

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INTRODUCTION

Electrical and electronic equipment play an important role in everyday life. In the field of electronic devices, digital system acts as a vital role. The rapid development of digital technology makes fast and easier life of human being. Bengali language is always neglected in Electronic point of view.

Now most widely used display method is segment display (Azad, 2010a). So far for representing English numerals 7 segment display is frequently used and for English Alphanumeric character 16 segment display is used (Miah, 2011). Earlier the 3×8 dot matrix system was used as a display method of Bengali numerals but it requires large numbers of dots to be manipulated there by increasing the memory storage, cost and design complexity (Azad, 2010b). Display architecture using 7, 8, 10, 11, 12, 18 (Ahmed, 2004; Arifin, 2003; Azad, 2010a; Azad, 2010b; Islam, 2008; Islam, 2006; Pathan, 2004; Saber, 2002) segments have been proposed in few years. A customized twin 7 segment display is also anticipated (Hossain, 2003). 8-segment and 7-segment display architecture for displaying Bengali numerals have been proposed earlier by using specially fabricated bent segments, which is quite costly and does not provide complete realistic view. In the proposed 12 segment display no specially fabricated bent segments are used and still maintaining the quality of the accuracy and the height of the numerals equal.

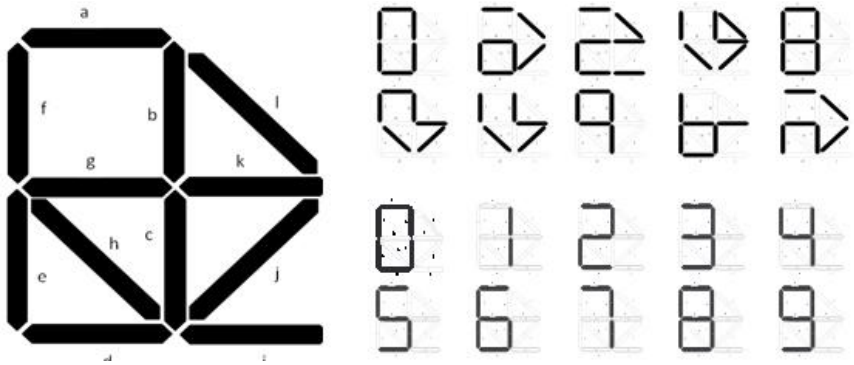

Fig. 1: The proposed 12 segment display architecture.

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Proposed 12-segment display architecture:

The proposed 12-segment display is shown in FIGURE 1. In this project LEDs are used to illuminate the segments. For a definite digit particular segment will be ON (HIGH) and the others will be OFF (LOW), so it is necessary to mark the segments which can be displayed all the Bengali numerals accurately and uniformly.

Representation of bengali and english numerals:

Table 1 shows the representation of different Bengali and English Numerals using the proposed 12 segment display.

Table 1: Representation of Bengali and English Numerals.

Digit	Bengali	Bengali Pattern	English Pattern	Digit	Bengali	Bengali Pattern	English Pattern
0	০			5	৫		
1	১			6	৬		
2	২			7	৭		
3	৩			8	৮		
4	৪			9	৯		

In TABLE 1 column Bengali Pattern shows the representation of Bengali numerals and column English Pattern shows the representation of English numerals.

The following TABLE 2 and TABLE 3 show the truth table for representation of Bengali and English numerals respectively. The proposed architecture has 12 segments marked as a,b,c,d,e,f,g,h,i,j,k,l. The truth table shows that for a definite digit which particular segments will be ON.

Table 2: Segment selections for Bengali Numerals.

	Segments											
Case	a	b	c	d	e	f	g	h	i	j	k	l
0‘**০**’	1	1	1	1	1	1	0	0	0	0	0	0
1’**১**‘	1	0	1	1	1	0	1	0	0	1	0	1
2’ **২**‘	1	0	0	1	1	0	1	0	1	0	1	1
3’ **৩**‘	0	1	0	0	0	1	0	1	0	1	1	1
4’ **৪**’	1	1	1	1	1	1	1	0	0	0	0	0
5’ **৫**‘	1	1	0	0	0	1	0	1	0	1	1	0
6’ **৬**‘	0	1	0	0	0	1	0	1	0	1	1	0
7’ **৭**‘	1	1	1	0	0	1	1	0	0	0	0	0
8’ **৮**‘	0	0	1	1	1	1	1	0	0	0	1	0
9’ **৯**‘	1	0	1	0	1	0	1	0	0	1	0	1

Table 3: Segment selections for English Numerals

	Segments											
Case	a	b	c	d	e	f	g	h	i	j	k	l
0	1	1	1	1	1	1	0	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0	0	0
2	1	1	0	1	1	0	1	0	0	0	0	0
3	1	1	1	1	0	0	1	0	0	0	0	0
4	0	1	1	0	0	1	1	0	0	0	0	0
5	1	0	1	1	0	1	1	0	0	0	0	0
6	1	0	1	1	1	1	1	0	0	0	0	0
7	1	1	1	0	0	0	0	0	0	0	0	0
8	1	1	1	1	1	1	1	0	0	0	0	0
9	1	1	1	1	0	1	1	0	0	0	0	0

Hardware representation of the proposed architecture:

LEDs have been used for making hardware of the display. There have six LEDs in parallel in a segment for nine segments and in others three segment have eight LEDs in parallel in a segment. The LEDs are red color indicator LED.

The following FIGURE 2 shows the representation of different Bengali Numerals using proposed 12 segment display in hardware. The first portion of FIGURE 2 represents the hardware architecture. The remaining portion of the FIGURE 2 characterizes the Bengali numerals output from 0 to 9. The display is controlled by a counter circuit. Consecutively by pressing the push switch of counter lead to be increased the number and exhibit in the proposed implemented hardware system.

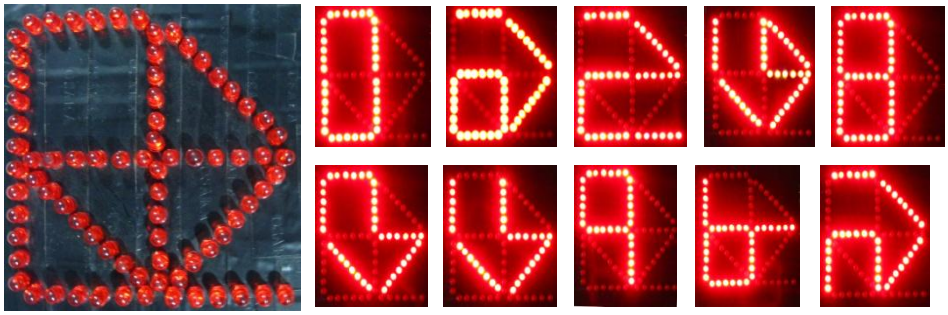

Fig. 2: Hardware representation of the proposed display.

Conclusion:

In this article, the proposed 12-sgment display architecture exhibit Bengali Numerals uniformly and accurately and there have no bent segment, which is quit costly and hard to formulate. This architecture contains unequal segment. So different values of resistor are connected in each segment in series, which makes equal intensity of each segment but the process is complex. For avoiding this complexity equal segment display architecture should be designed and developed. The developed hardware tested under real time environment. So we expect that the implemented model may be consisted as a ideal display method for both Bengali and English numerals.

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