

**Y. Polischuk**

*Research supervisor: S.S. Zhukovsky, Candidate of Pedagogical Sciences,*

*Associate Professor*

*Zhytomyr Ivan Franko State University*

*Language tutor: L.P. Serdiichuk*

## ALGORITHM TO PRINT THE DIGITS ON THE SEVEN-SEGMENT DISPLAY

When we look at our watch, we have no idea how many processes take place within it. This article shows the work of a seven-segment display.

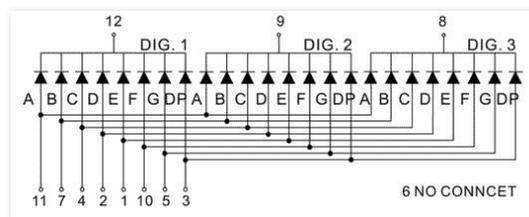
The seven-segment displays are very common in modern technology if you want to display numerical information. For example they are used to watches, washing machines, calculators and many other devices.



Image 1 shows a four digit seven-segment indicator. Each category has seven LEDs which illuminate the appropriate segments. Unlike graphic displays indicators are cheaper to manufacture and they reduce the cost of a device.

Image 2

LED indicators are of two types: common anode and common cathode ones Image 2 shows a diagram of a three bit indicator with common cathode in which the anodes of the segments are connected in parallel, that is, having 11 conductors, we can control 24 LEDs of the indicator.



Different numbers are highlighted in different places, due to frame advance withdrawal, that is, the elimination of individual discharges during a certain period of time and due to the fact that the human eye is not able to notice the changes when you upgrade more than 24 frames per second. It is also possible to control the brightness of each segment – the segment which will glow the most part of the period of illumination will seem visually brighter. To save information of one segment, 1 byte (7

	dp	G	F	E	D	C	B	A	
	7	6	5	4	3	2	1	0	h
0	0	0	0	0	0	0	0	0	3F
1		0	0	0	0	1	1	0	6
2		1	0	1	1	0	1	1	5B
3		1	0	0	1	1	1	1	4F
4		1	1	0	0	1	1	0	66
5		1	1	0	1	1	0	1	6D
6		1	1	1	1	1	0	1	7D
7		0	0	0	0	1	1	1	7
8		1	1	1	1	1	1	1	7F
9		1	1	0	1	1	1	1	6F

segments +1 dot) is enough.

The figure bellow an example how to output the integer number on the indicator with common cathode using micro controller Atmega 8 and the software code written in the Basic programming language in a IDE Bascom AVR.

```
$regfile = "m8def.dat"
$crystal = 8000000
Dim Dig(10) as Byte ' Array of digits
Dig(1) = &b00111111 ' Zero digit
Dig(2) = &b00000110
Dig(3) = &b01011011
Dig(4) = &b01001111
Dig(5) = &b01100110
Dig(6) = &b01101101
Dig(7) = &b01111101
Dig(8) = &b00000111
Dig(9) = &b01111111
Dig(10) = &b01101111
Dim Num as Integer
Num = 2017 ' Our displayed number
Do ' the entrance to the cycle
  Portb = &b01111111 ' performance on the first rank
  Portd = Dig((Num/1000)+1)
  Waitms 5 ' The minimum delay is imperceptible to the eye
  1000mc/(24frames*4rank)=10ms
  Portb = &b10111111 ' performance on the second rank
  Portd = Dig(((Num Mod 1000)/100)+1)
  Waitms 5
  Portb = &b11011111 ' performance on the third rank
  Portd = Dig(((Num Mod 100)/10)+1)
  Waitms 5
  Portb = &b11101111 ' performance on the fourth rank
  Portd = Dig((Num Mod 10)+1)
  Waitms 5
Loop
```

So, a seven-segment indicator displays the integer number on the screen. Sample code in one of the programming language has been shown.

Our further research will be devoted to the study of CNC plotter.

## **LITERATURE**

1. Гринчишин Я.Т. Алгоритмы и программы на Бейсике: Учеб пособие – М.: Просвещение, 1988.– 160 с.