

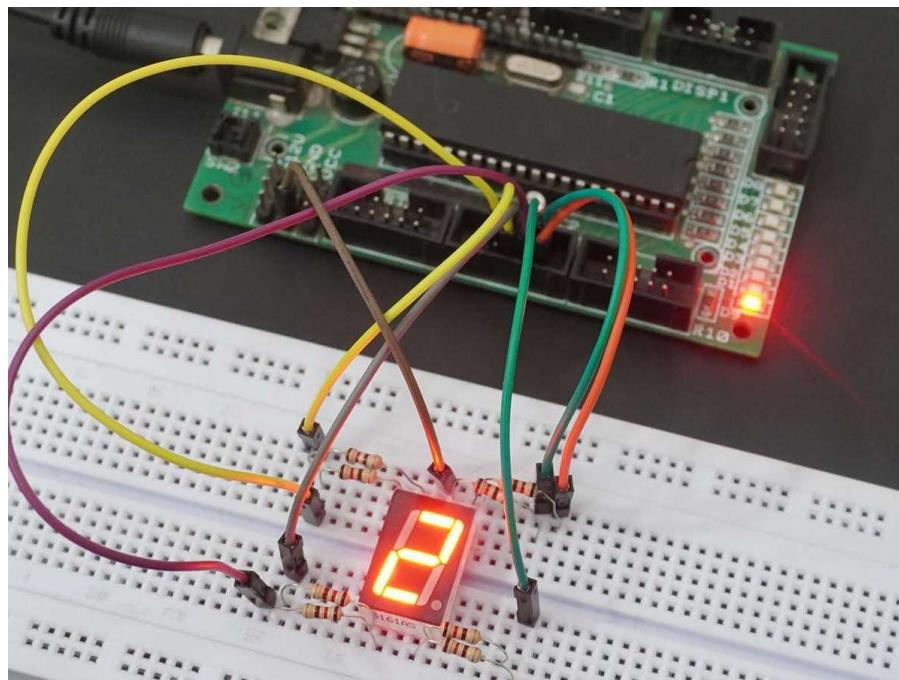
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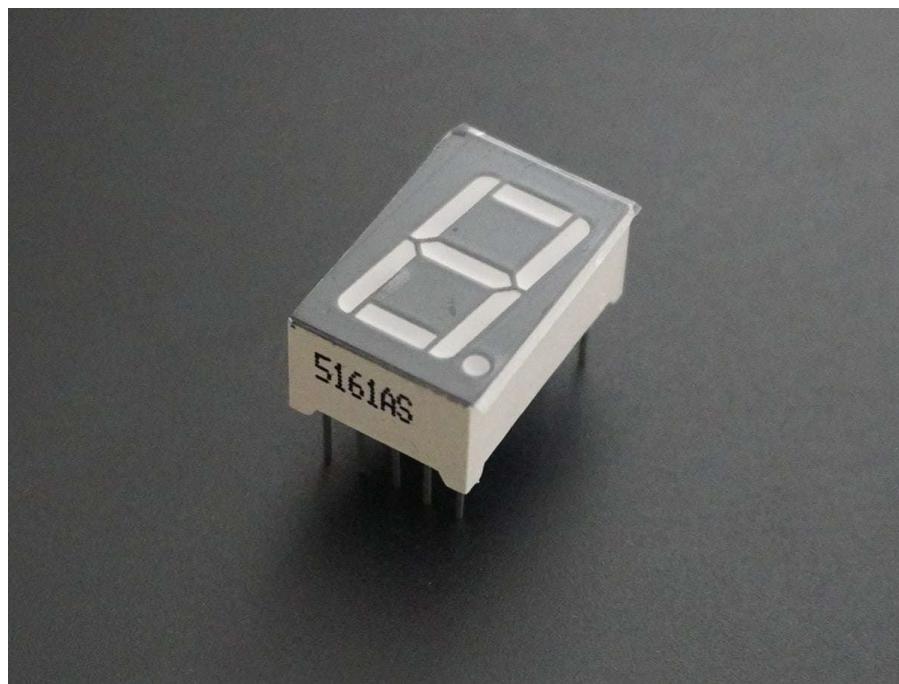
+ Project (/publish/project) BorisDmitrenko

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# 7-Segment Display Interfacing with AVR ATmega16/ATmega32



## Overview of 7-Segment Display





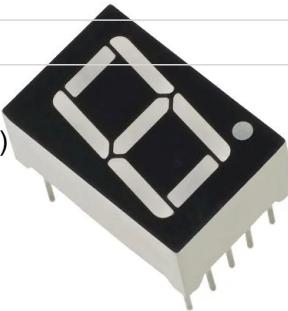
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7-Segment LED Display

7-segment displays are made up of 8 LED segments. 7 of these LED segments are in the shape of a line, whereas 1 segment is circular.

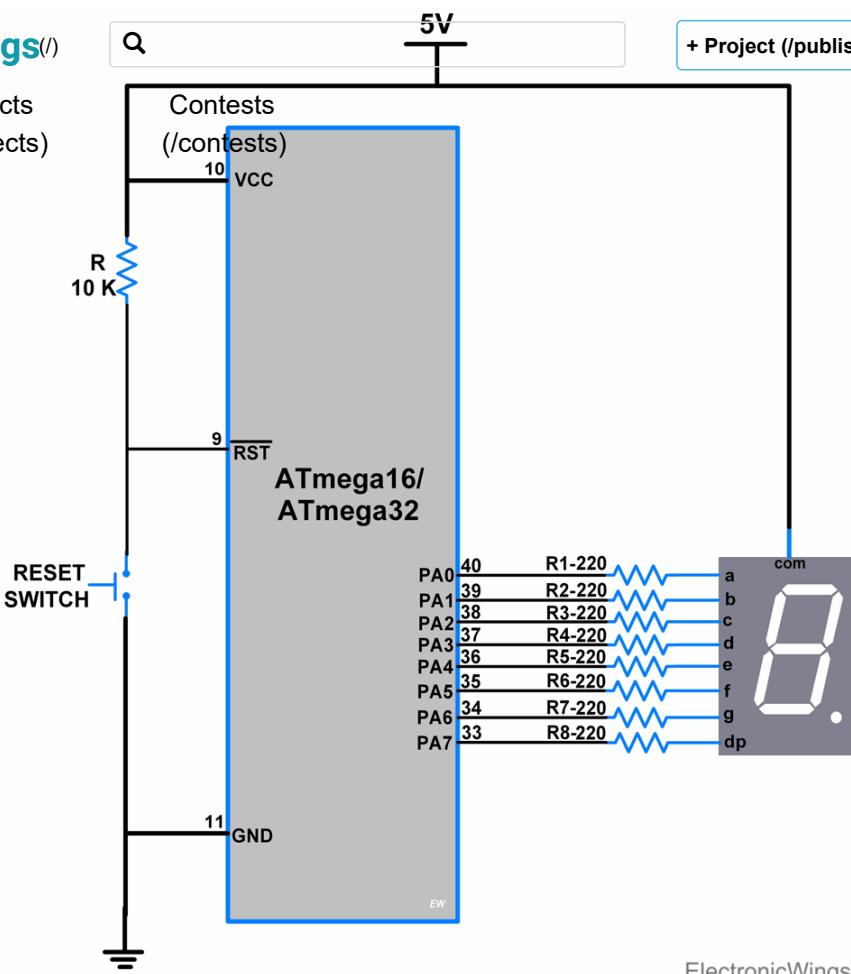
The 7 line-shaped LED segments are used for displaying numbers 0 to 9 and a few letters like A, c, d, e, F, H, L, O, P, U, etc. The circular segment is used for displaying a decimal point.

Each of the 8 elements has a pin associated with it which can be driven HIGH or LOW according to the type of display and the number or alphabet to be displayed.

The common anode and common cathode types are available in a 7-segment display. Depending on which type is used, the control signal required to light up a segment in the display changes. Common anode requires a LOW signal whereas common cathode requires a HIGH signal to light up a segment.

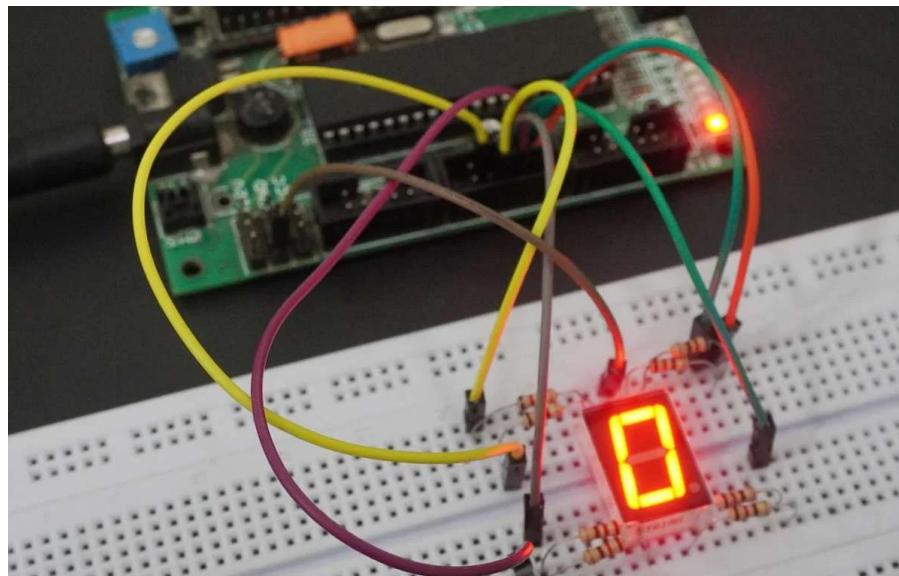
For more information about 7-segment LED display and how to use it, refer to the topic **7-segment LED Display** (<http://electronicwings.com/sensors-modules/7-segment-led-display>) in the sensors and modules section.

## Connection Diagram of 7-segment with ATmega16/32


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Interfacing 7-Segment LED Display With AVR ATmega16/ATmega32



## 7-segment Display Code for ATmega16/32



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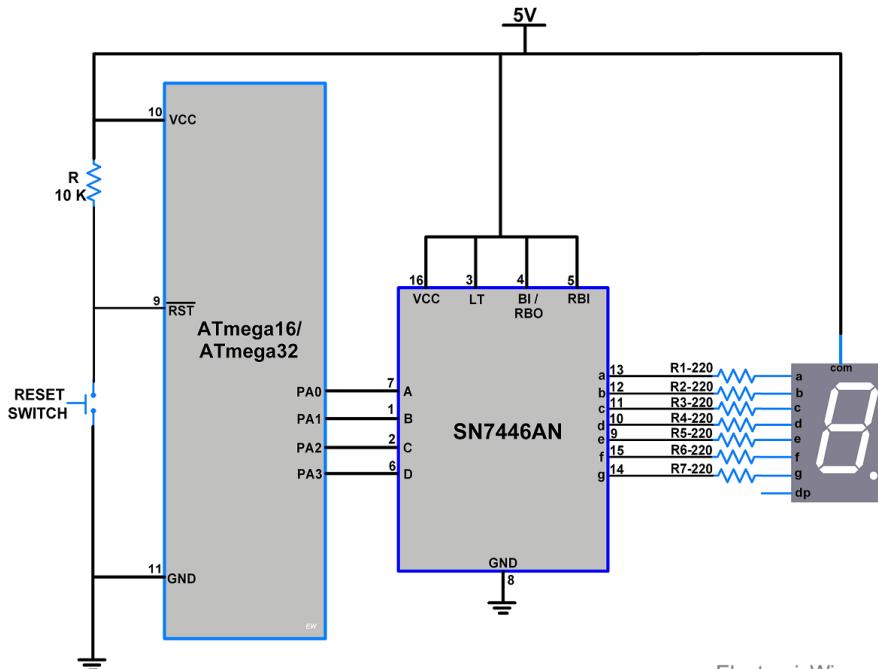
```
#define F_CPU 8000000UL
#include <avr/io.h>
#include <util/delay.h>
#define LED_Direction DDRA      /* define LED Direction */
#define LED_PORT PORTA          /* define LED port */

int main(void)
{
    LED_Direction |= 0xff;           /* define LED port direction is output */
    LED_PORT = 0xff;

    char array[]={0xC0,0xF9,0xA4,0xB0,0x99,0x92,0x82,0xF8,0x80,
                  /* write hex value for CA display */

    while(1)
    {
        for(int i=0;i<10;i++)
    }
```

## Connection Diagram of 7-segment using Driver IC SN7446AN with ATmega16/32



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Interfacing 7-Segment LED Display With ATmega16/ATmega32 Using SN7446AN  
Driver IC

## 7-segment LED Display Code using driver IC SN7446AN for ATmega16/32



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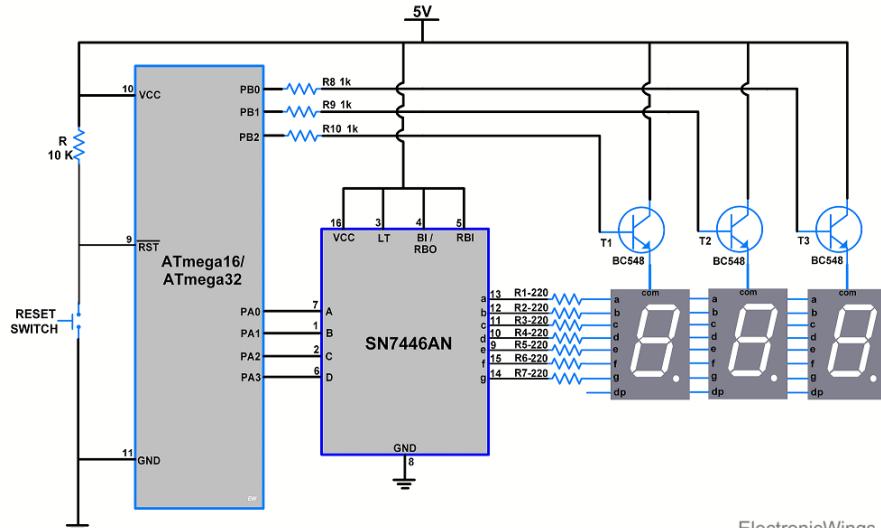
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\* ATmega16\_BCD\_to\_7\_Segment.c  
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<http://www.electronicwings.com>  
\*/

```
#define F_CPU 8000000UL
#include <avr/io.h>
#include <util/delay.h>
#define LED_direction DDRA      /* define LED Direction */
#define LED_PORT PORTA          /* define LED PORT */

int main(void)
{
    LED_direction |= 0xff;           /* define LED port direction is output */
    LED_PORT = 0xff;
    char array[]={0,1,2,3,4,5,6,7,8,9};   /* write BCD value for CA display
    while(1)
    {
        for(int i=0;i<10;i++)
        {
            T1 = BC548;
            T2 = BC548;
            T3 = BC548;
        }
    }
}
```

## 7-segment Display Multiplexing Connection With ATmega16/32



ElectronicWings.com

Interfacing Three 7-Segment LED Displays With ATmega16/ATmega32 Using SN7446AN Driver IC And Multiplexing

- We can connect more than one display by using the Multiplexing method. In this method, at a time one display is driven by the controller and the rest are OFF. It keeps switching the displays using transistors. Due to the persistence of vision, it appears as a normal display.

## 7-segment Display Multiplexing Code for ATmega16/32



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\* ATmega16\_7seg\_multiple.c  
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\*/

```
#define F_CPU 8000000UL
#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>
#include <stdio.h>

#define LED_Directions DDRA      /* define LED Direction */
#define LED_Direction DDRB      /* define LED Direction */
#define LED_PORT1 PORTA          /* define LED port */
#define LED_PORT2 PORTB          /* define LED port */

char array[]={0,1,2,3,4,5,6,7,8,9};
int k,j,i,factor;
int brightvalue=0;
```



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**ATmega 16**  
ATmega 16

X 1

([\(https://www.mouser.in/ProductDetail/Microchip-Technology-Atmel/ATMEGA16L-8PU?qs=%2Fha2pyFaduiGCJtTvs2wv8fVZbVAalLu7Iq%2FgITS0tALAx6fMenLvg%3D%3D&utm\\_source=electronicswings&utm\\_medium=display&utm\\_campaign=mouser-componentslisting&utm\\_content=0x0\)\)](https://www.mouser.in/ProductDetail/Microchip-Technology-Atmel/ATMEGA16L-8PU?qs=%2Fha2pyFaduiGCJtTvs2wv8fVZbVAalLu7Iq%2FgITS0tALAx6fMenLvg%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

Datasheet (</components/atmega-16/1/datasheet>)

**Atmega32**  
Atmega32

X 1

([\(https://www.mouser.in/ProductDetail/Microchip-Technology-Atmel/ATMEGA32-16PU?qs=aqrBurbvGdpkmjg7RWmsQ%3D%3D&utm\\_source=electronicswings&utm\\_medium=display&utm\\_campaign=mouser-componentslisting&utm\\_content=0x0\)\)](https://www.mouser.in/ProductDetail/Microchip-Technology-Atmel/ATMEGA32-16PU?qs=aqrBurbvGdpkmjg7RWmsQ%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

Datasheet (</components/atmega32/1/datasheet>)



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**Seven 7 Segment Display**  
Seven 7 Segment Display

x 1

(https://www.mouser.in/ProductDetail/Vishay-Semiconductors/TDSR0760?qs=RzxYCzJDjPUsfuLTQhx9uw%3D%3D&utm\_source=electronicswings&utm\_medium=display&utm\_campaign=mouser-componentslisting&utm\_content=0x0)

Datasheet (/components/seven-7-segment-display/1/datasheet)

**BC547 TRANSISTORS**  
BC547 TRANSISTORS

x 1

(https://www.mouser.in/ProductDetail/ON-Semiconductor-Fairchild/BC547BTA?qs=TABiY4F6Vcf01oKZdNLa0w%3D%3D&utm\_source=electronicswings&utm\_medium=display&utm\_campaign=mouser-componentslisting&utm\_content=0x0)

Datasheet (/components/bc547-transistors/1/datasheet )



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**SN7447AN BCD-To-Seven-Segment Driver**  
SN7447AN BCD-To-Seven-Segment Decoder/Driver

X 1

(https://www.mouser.in/ProductDetail/Texas Instruments/SN7447AN?qs=sGAEpiMZZMutXGIi8Ay4kMj2H7jHcXU%2FjXAGP4HDNb8%3D&utm\_source=electronicswings&utm\_medium=display&utm\_campaign=mouser-componentslisting&utm\_content=0x0)

Datasheet (/components/sn7447an-bcd-to-seven-segment-driver/1/datasheet)

## Downloads

ATmega16 7-segment Project file

Download (/api/download/platform/avr/attachment/351)

ATmega16 BCD to 7-segment Project file

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ATmega16 Multiple 7-segment Project file

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