

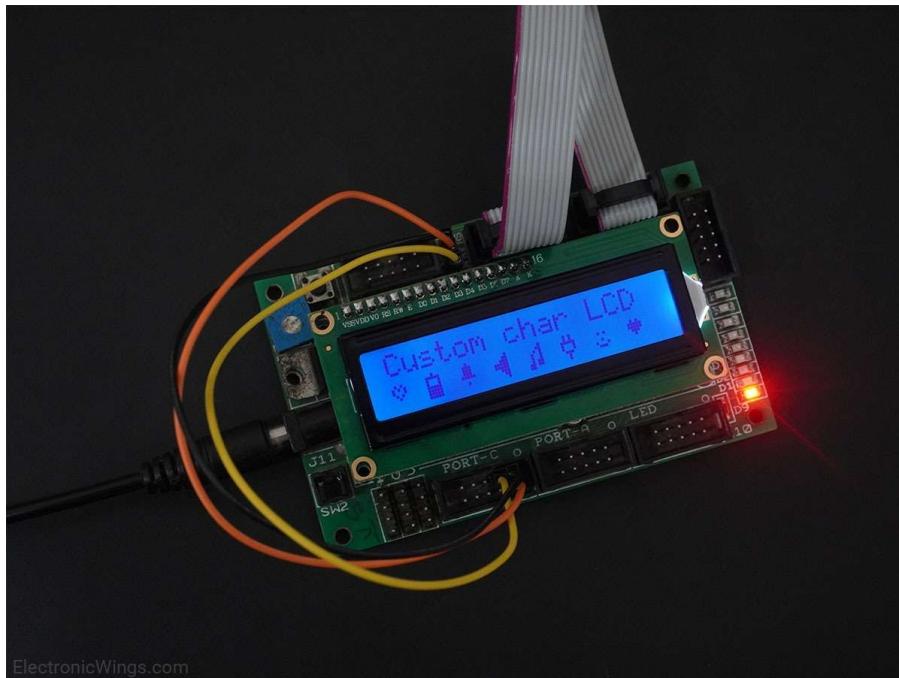
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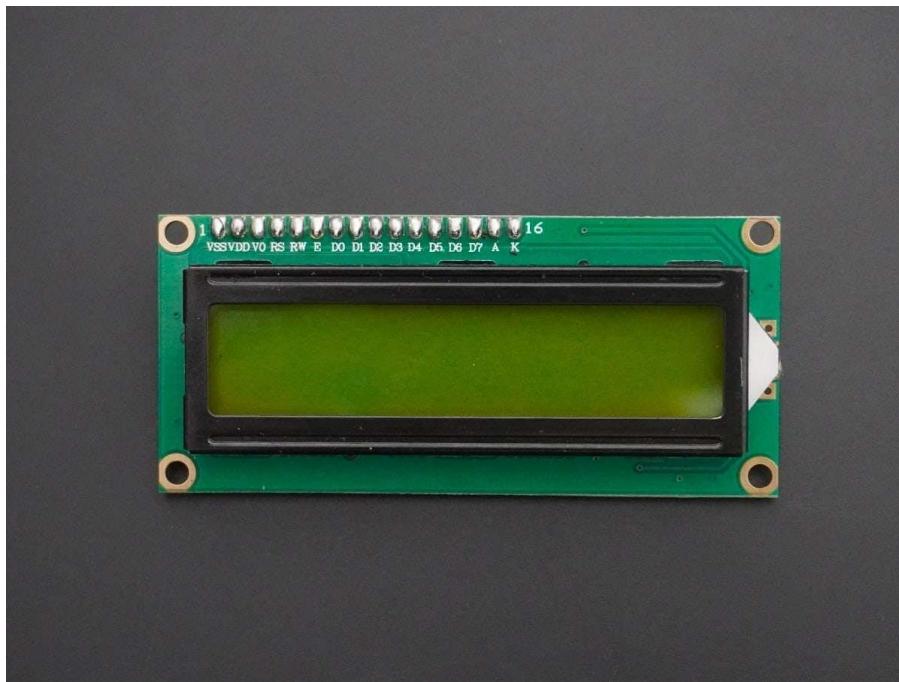
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LCD16x2 custom character display using AVR ATmega16/ATmega32



Introduction



LCDs (Liquid Crystal Displays) are used for displaying status or parameters in embedded systems.



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Custom characters

The control pins help to configure the LCD in command mode or data mode. They also help configures the contrast or write mode and also when to read or write.

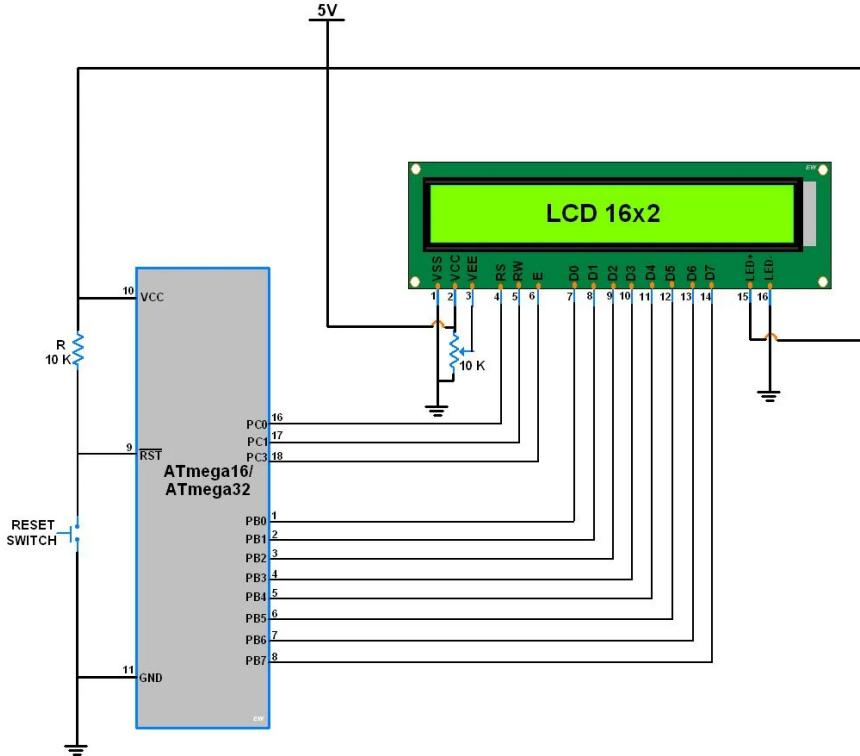
LCD 16x2 can be used in 4-bit mode or 8-bit mode depending on the requirement of the application. In order to use it, we need to send certain commands to the LCD in command mode and once the LCD is configured according to our need, we can send the required data in data mode.

For more information about LCD 16x2 and how to use it, refer to the topic LCD 16x2 display module (<http://electronicwings.com/sensors-modules/lcd-16x2-display-module>) in the sensors and modules section.



Custom characters on LCD16x2

Connection Diagram of LCD16x2 with ATmega16/32



Interfacing LCD 16x2 With ATmega 16/32

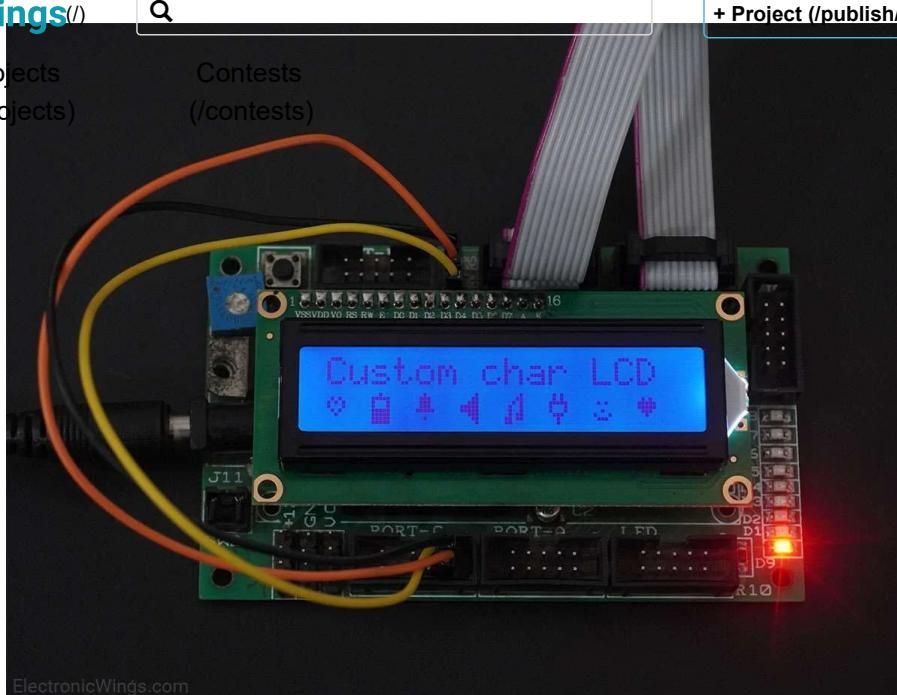


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Suppose, we decide to put "Bell" shape custom character at pattern number 1 then to store them in CGRAM following function is used.

```
void LCD_Custom_Char (unsigned char loc, unsigned char *msg)
{
    unsigned char i;
    if(loc<8)
    {
        LCD_Command (0x40 + (loc*8)); /* Command 0x40 and onwards forces
                                         the device to point CGRAM address */
        for(i=0;i<8;i++) /* Write 8 byte for generation of 1 character */
            LCD_Char(msg[i]);
    }
}
```

The above function will be used to store the custom characters in CGRAM.

Display Custom Characters on LCD16x2 Using ATmega16/32

After storing all custom characters in CGRAM, we can display it on LCD16x2.

To display custom characters, simply provide custom character number (from 0 to 7) as a data to LCD16x2.

LCD16x2 Code for ATmega16/32

Printing custom characters on lcd16x2.



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```
#define F_CPU 8000000UL      /* Define CPU Frequency e.g. here its 8MHz
#include <avr/io.h>          /* Include AVR std. library file */
#include <util/delay.h>        /* Include inbuilt defined Delay header file */

#define LCD_Data_Dir DDRB    /* Define LCD data port direction */
#define LCD_Command_Dir DDRC  /* Define LCD command port direction regis
#define LCD_Data_Port PORTB /* Define LCD data port */
#define LCD_Command_Port PORTC /* Define LCD data port */
#define RS PC0                /* Define Register Select signal pin */
#define RW PC1                /* Define Read/Write signal pin */
#define EN PC2                /* Define Enable signal pin */

void LCD_Command(unsigned char cmnd)
{
    LCD_Data_Port= cmnd;
    LCD_Command_Port &= ~(1<<RS); /* RS=0 command red. */
```

Video of LCD16x2 Custom Charactor Display using ATmega16/32

Example 2

Animation: Pacman chasing Dot



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([https://www.mouser.in?](https://www.mouser.in?utm_source=electronicswing)
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Powered By

Components Used

LCD16x2 Display
LCD16x2 Display

x 1

(https://www.mouser.com/ProductDetail/Adafruit/1447?qs=XAKIUOoRPe6ACImsjw7y7g%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)



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ATmega 16
ATmega 16

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 (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](https://www.mouser.in/components/atmega-16/1/datasheet))

Atmega32
Atmega32

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 Datasheet ([/components/atmega32/1/datasheet](https://www.mouser.in/components/atmega32/1/datasheet))





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Simulation file

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