

## Interfacing LCD with Arduino using AVR-GCC



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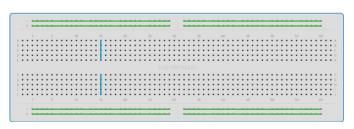


Fig. 1: Breadboard

Abstract—This manual shows how to interface an Arduino to a  $16 \times 2$  LCD display using AVR-GCC. This framework provides a useful platform for displaying the output of AVR-Assembly programs.

## 1 Components

Component	Value	Quantity
Breadboard		1
Arduino	Uno	1
LCD	16×2	1
Jumper Wires		20

TABLE I

## 2 DISPLAY NUMBER ON LCD

**Problem 1.** Plug the LCD in Fig. 2 to the breadboard.

**Problem 2.** Connect the Arduino pins to LCD pins as per Table II.

**Problem 3.** Display the number 5 on the LCD

Solution: Download the Makefile and main.c from

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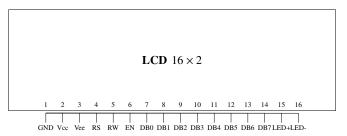


Fig. 2: LCD

TABLE II: Arduino to LCD Pin Connection.

Arduino Pins	LCD Pins	LCD Pin Label	LCD Pin Description
GND	1	GND	
5V	2	Vcc	
GND	3	Vee	Contrast
D8	4	RS	Register Select
GND	5	R/W	Read/Write
D9	6	EN	Enable
D10	11	DB4	Serial Connection
D11	12	DB5	Serial Connection
D12	13	DB6	Serial Connection
D13	14	DB7	Serial Connection
5V	15	LED+	Backlight
GND	16	LED-	Backlight

https://github.com/gadepall/EE2110 /blob/master/lcd/codes/Makefile https://github.com/gadepall/EE2110 /blob/master/lcd/codes/main.c

## Atmega168 Pin Mapping Arduino function Arduino function (PCINT14/RESET) PC6[ PC5 (ADC5/SCL/PCINT13) analog input 5 digital pin 0 (RX) PC4 (ADC4/SDA/PCINT12) (PCINT16/RXD) PD0E analog input 4 (PCINT17/TXD) PD1 PC3 (ADC3/PCINT11) digital pin 1 (TX) analog input 3 PC2 (ADC2/PCINT10) (PCINT18/INT0) PD2E analog input 2 digital pin 2 digital pin 3 (PWM) (PCINT19/OC2B/INT1) PD3 [ TPC1 (ADC1/PCINT9) analog input 1 (PCINT20/XCK/T0) PD4E PC0 (ADC0/PCINT8) digital pin 4 analog input 0 VCC VCCI GND GND GND GNDE AREF analog reference (PCINT6/XTAL1/TOSC1) PB6[ crystal TAVCC VCC (PCINT7/XTAL2/TOSC2) PB7 [ T PB5 (SCK/PCINT5) digital pin 13 crystal digital pin 5 (PWM) (PCINT21/OC0B/T1) PD5 PB4 (MISO/PCINT4) digital pin 12 digital pin 6 (PWM) (PCINT22/OC0A/AIN0) PD6 PB3 (MOSI/OC2A/PCINT3) digital pin 11(PWM) PB2 (SS/OC1B/PCINT2) digital pin 10 (PWM) (PCINT23/AIN1) PD7 digital pin 7 (PCINTO/CLKO/ICP1) PB0 PB1 (OC1A/PCINT1) digital pin 8 digital pin 9 (PWM) Digital Pins 11,12 & 13 are used by the ICSP header for MOSI. MISO, SCK connections (Atmega168 pins 17,18 & 19). Avoid low impedance loads on these pins when using the ICSP header.

Fig. 3: Arduino-ATMEGA328P pin map.

and execute in the terminal by typing make.

**Problem 4.** Modify the above code so that the numbers from 0 to 9 are displayed repeatedly.

**Solution:** Replace LCD\_Integer(5) by the following code.