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Seven Segment Display through AVR-Assembly

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Abstract—The objective of this manual is to show how to control a seven segment display through the AVR-Assembly.

1 Components

Component	Value	Quantity		
Breadboard		1		
Resistor	$\geq 220\Omega$	1		
Arduino	Uno	1		
Seven Segment	Common	1		
Display	Anode			
Jumper Wires		20		

TABLE 0

2 Controlling the Display

1. Complete Table 1 for all the digital pins using Fig. 1.

Port Pin	Digital Pin		
PD2	2		
PB5	13		

TABLE 1

2. Make connections according to Table 2.

Problem 2.1.

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Arduino function Arduino function (PCINT14/RESET) PC6E PC5 (ADC5/SCL/PCINT13) reset analog input 5 digital pin 0 (RX) (PCINT16/RXD) PD0E PC4 (ADC4/SDA/PCINT12) analog input 4 digital pin 1 (TX) (PCINT17/TXD) PD1 [PC3 (ADC3/PCINT11) analog input 3 (PCINT18/INT0) PD2E PC2 (ADC2/PCINT10) digital pin 2 analog input 2 digital pin 3 (PWM) (PCINT19/OC2B/INT1) PD3 [PC1 (ADC1/PCINT9) analog input 1 (PCINT20/XCK/T0) PD4 [PC0 (ADC0/PCINT8) digital pin 4 analog input 0 VCC GND VCCI GND GND AREF GND[analog reference (PCINT6/XTAL1/TOSC1) PB6[AVCC VCC crystal (PCINT7/XTAL2/TOSC2) PB7[PB5 (SCK/PCINT5) crystal digital pin 13 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) digital pin 7 (PCINT23/AIN1) PD7[PB2 (SS/OC1B/PCINT2) digital pin 10 (PWM) digital pin 9 (PWM) digital pin 8 (PCINTO/CLKO/ICP1) PB0[PB1 (OC1A/PCINT1) Digital Pins 11,12 & 13 are used by the ICSP header for MOSI.

Atmega168 Pin Mapping

Fig. 1

impedance loads on these pins when using the ICSP header

4 1 .	2	3	4	5	6	7	8
Arduino	PD2	PD3	PD4	PD5	PD6	PD7	PB0
Display	a	b	c	d	e	f	g
2	0	0	1	0	0	1	0

TABLE 2

Problem 2.2. The output of Problem 2.1 can be explained by Table 2 below. Complete Table 2 for all numbers between 0-9. Use this information to display the numbers from 0-9.

2.1 Arduino

The Arduino Uno has some ground pins, analog input pins A0-A3 and digital pins D1-D13 that can be used for both input as well as output. It also has two power pins that can generate 3.3V and 5V. In the following exercises, only the GND, 5V and digital pins will be used.

3 DISPLAY CONTROL THROUGH HARDWARE