

## LAB 2-2

# COMMUNICATE WITH 7-SEGMENT LED AND LED MATRIX

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### OBJECTIVE:

- Communicate with a 7-segment LED display.
- Communicate with a matrix LED display.

### REFERENCES:

- Lab manual chapter 4
- Atmel-2505-Setup-and-Use-of-AVR-Timers\_ApplicationNote\_AVR130.pdf

### EXPERIMENT 1:

- a) Connect one AVR port to header J34. Connect two other port pins to signals nLE0 and nLE1 on header J82. Set jumpers to power the 7-segment LED display.
- b) Use sample programs from the experiment guide to write a program that displays the numbers 0, 1, 2, and 3 on the 4 7-segment LED displays. Use Timer 0 to scan the LEDs at a scanning frequency of 50 Hz.

### EXPERIMENT 2:

- a) Connect an AVR port to a dip switch, assuming it's PORTA.
- b) Write a program to display the value of PORTA \* 9 on the 4 7-segment LED displays.
- c) Change the dip switch value and observe the results.

### EXPERIMENT 3:

- a) Connect the necessary signals to control the matrix LED display.
- b) Use the provided sample program, modify it if necessary, to display the letter 'A' on the matrix LED display. Scan the matrix LED display using a timer to create a delay with a scanning frequency of 25 Hz.
- c) Modify the program to achieve a scanning frequency of 125 Hz.

# LAB REPORT

*Class group:*

*Group:*

*Subject:*

## EXPERIMENT 1:

1. Answer the following questions:
  - a. To have a scanning frequency of 50 Hz, how long does one LED stay lit?
  - b. How do you configure the timer to achieve this delay?
2. Provide the source code with comments.

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## EXPERIMENT 2:

1. Answer the following questions:
  - a. How many bits is the value of PORTA \* 9?
  - b. How can you display each digit on the 4 7-segment LEDs?
2. Provide the source code with comments.

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## EXPERIMENT 3:

1. Answer the following questions:
  - a. How many bits is the value of PORTA \* 9?
  - b. How can you display each digit on the 4 7-segment LEDs?
2. Provide the source code with comments.

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