

Interfacing Seven Segment Display with MSP430 MCU

- **Engr.Shahzada Fahim Jan**

7-segment Display.

- The *7-segment display*, also written as “seven segment display”, consists of seven LEDs (hence its name) arranged in a rectangular fashion as shown.
- Each of the seven LEDs is called a segment because when illuminated the segment forms part of a numerical digit to be displayed.

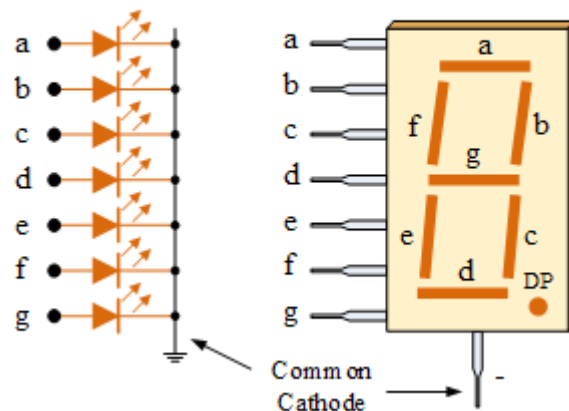


7-segment Display

two types of LED 7-segment display called: Common Cathode (CC) and Common Anode (CA).

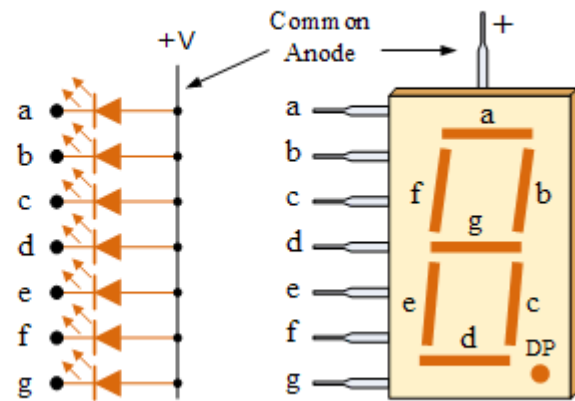
- **1. The Common Cathode (CC)** – In the common cathode display, all the cathode connections of the LED segments are joined together to logic “0” or ground. The individual segments are illuminated by application of a “HIGH”, or logic “1” signal via a current limiting resistor to forward bias the individual Anode terminals (a-g).

Common Cathode Configuration

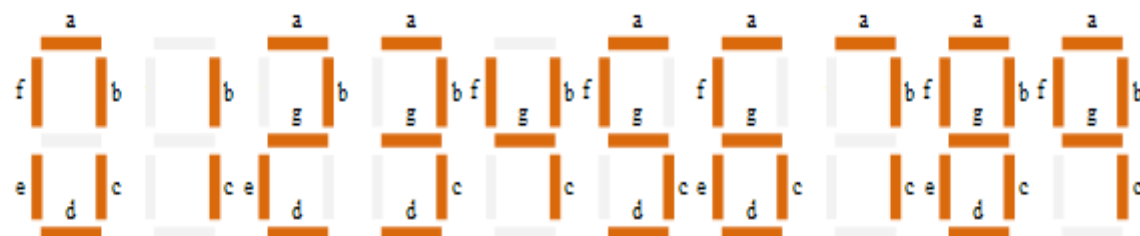


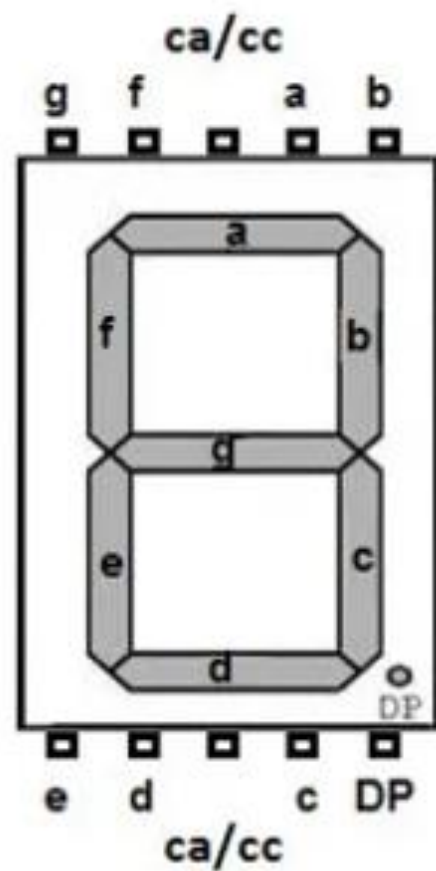
- **2. The Common Anode (CA)** – In the common anode display, all the anode connections of the LED segments are joined together to logic “1”. The individual segments are illuminated by applying a ground, logic “0” or “LOW” signal via a suitable current limiting resistor to the Cathode of the particular segment (a-g).

Common Anode Configuration

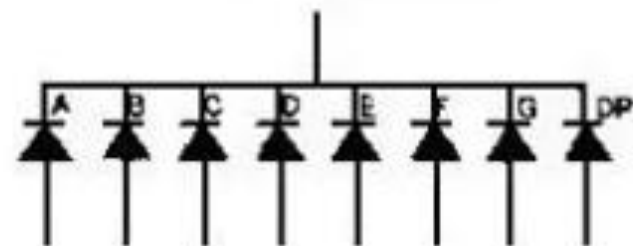


Digital Segments for all Numbers

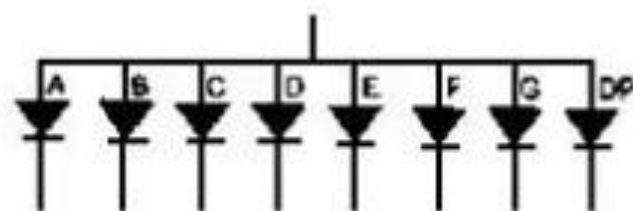




Common Cathode



Common Anode



```

#include <msp430fr4133.h>
void delay(); // Delay function declaration
int main(void) {
    WDTCTL = WDTPW | WDTHOLD; // Stop the Watchdog Timer
    PM5CTL0 &= ~LOCKLPM5;      // Disable GPIO high-impedance mode

    // Configure P1 pins as output
    P1DIR |= 0xFF; // Set P1.0 to P1.7 as outputs
    P1OUT &= ~0xFF; // Clear all P1 output pins (turn off all segments initially)

    while (1) {
        P1OUT = 0b00001010; // Display '1'          gfedc0ba
        delay();
    }
}

// Simple delay function
void delay() {
    volatile unsigned int i;
    for (i = 500000; i > 0; i--); // Arbitrary delay
}

```

```

void delay(); // Delay function declaration
int main(void) {
    WDTCTL = WDTPW | WDTHOLD; // Stop the Watchdog Timer
    PM5CTL0 &= ~LOCKLPM5;      // Disable GPIO high-impedance mode
    P1DIR |= 0xFF; // Set P1.0 to P1.7 as outputs
    P1OUT &= ~0xFF; // Clear all P1 output pins (turn off all segments initially)
    while (1) {
        // Display digits 0-9 in a loop
        P1OUT = 0b00001010; // Display '1'          gfedc0ba
        delay();
        delay();
        delay();
        P1OUT = 0b10011011; // Display '3'
        delay();
        delay();
        delay();
    }
}

// Simple delay function
void delay() {
    volatile unsigned int i;
    for (i = 500000; i > 0; i--); // Arbitrary delay
}

```



```

int main(void) {
// Configure P1 pins as output
P1DIR |= 0xFF; // Set P1.0 to P1.7 as outputs
P1OUT &= ~0xFF; // Clear all P1 output pins (turn off all segments initially)
while (1) {
    P1OUT = 0b00001010; // Display '1'          gfedc0ba
    delay();
    delay();
    delay();
    P1OUT = 0b10110011; // Display '2'
        delay();
        delay();
        delay();
    P1OUT = 0b10011011; // Display '3'
    delay();
    delay();
    delay();
    P1OUT = 0b11001010; // Display '4'
        delay();
        delay();
        delay();
    }
}

```

TASKS:

- 1) Run all the program given in the lecture
- 2) Display different digits on the Seven Segment Display
- 3) Display digits from 0 to F on Seven Segment Display
- Use Both Common Cathode and Common Anode Seven-Segment-Display