

main ▾

...

Digital-electronics-2 / Labs / 06-lcd / README.md



amwellius Update README.md



1 contributor

104 lines (71 sloc) | 3.92 KB

...

Lab 6: Samuel Košík

Link to my Digital-electronics-2 GitHub repository:

(<https://github.com/amwellius/Digital-electronics-2>)

LCD display module

PREPARATION

LCD signal(s)	AVR pin(s)	Description
RS	PB0	Register selection signal. Selection between Instruction register (RS=0) and Data register (RS=1)
R/W	GND	Write/Read select
E	PB1	Signal Enable
D[3:0]	NOT Connected	Pins for Data
D[7:4]	PD[7:4]	Pins for Data

What is the ASCII table? What are the codes/values for uppercase letters A to z , lowercase letters a to z , and numbers 0 to 9 in this table?

=yes

Char	Decimal	Hexadecimal
A	65	0x41
B	66	0x42
Q	81	0x51
a	97	0x61
b	98	0x62
y	121	0x79
0	48	0x30
1	49	0x31
DEL	127	0x7F
>	62	0x3E

PART 3 Table

Function name	Function parameters	Description	Example
lcd_init	LCD_DISP_OFF LCD_DISP_ON LCD_DISP_ON_CURSOR LCD_DISP_ON_CURSOR_BLINK	Display off Display ON, Cursor Off Dipslay ON, Cursor ON Display ON, Cursor Flashing	lcd_init(LCD_DISP_OFF)

lcd_clear	nothing (void)	Clear display and set cursor	lcd_clear();
-----------	----------------	---------------------------------	--------------

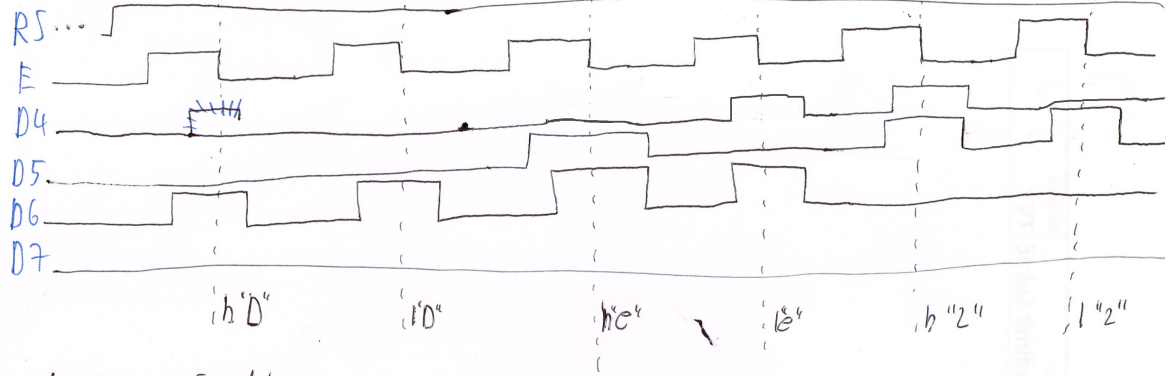
Function name	Function parameters	Description	Example
<code>lcd_gotoxy</code>	<code>uint8_t x</code> <code>uint8_t y</code>	Set cursor to specified position	<code>lcd_gotoxy(xpos, ypos)</code>
<code>lcd_putc</code>	<code>c</code>	Display character at current cursor position	<code>lcd_putc(c)</code>
<code>lcd_puts</code>	<code>s</code>	Display string without auto linefeed	<code>lcd_puts(s)</code>
<code>lcd_command</code>	<code>cmd</code>	Send LCD controller instruction command	<code>lcd_command(cmd)</code>
<code>lcd_data</code>	<code>data</code>	Send data byte to LCD controller	<code>lcd_data(data)</code>

1. In your words, describe what ASCII table is.

- ASCII = American Standard Code For Information Interchange . Tabulka, podľa ktorej sa premienajú písmena, znaky, čísla do binárnej/hexadecimálnej sústavy. Keď chceme pri kódovaní zobrazit znak, najdeme si v tabuľke jeho hodnotu a tu zadáme do kodu. Ten pri kompilovaní zistí (podľa ASCII tabuľky) o ktorý znak a ide a ten zobrazí.

2. (Hand-drawn) picture of time signals between ATmega328P and LCD keypad shield (HD44780 driver) when transmitting three character data 'De2'.

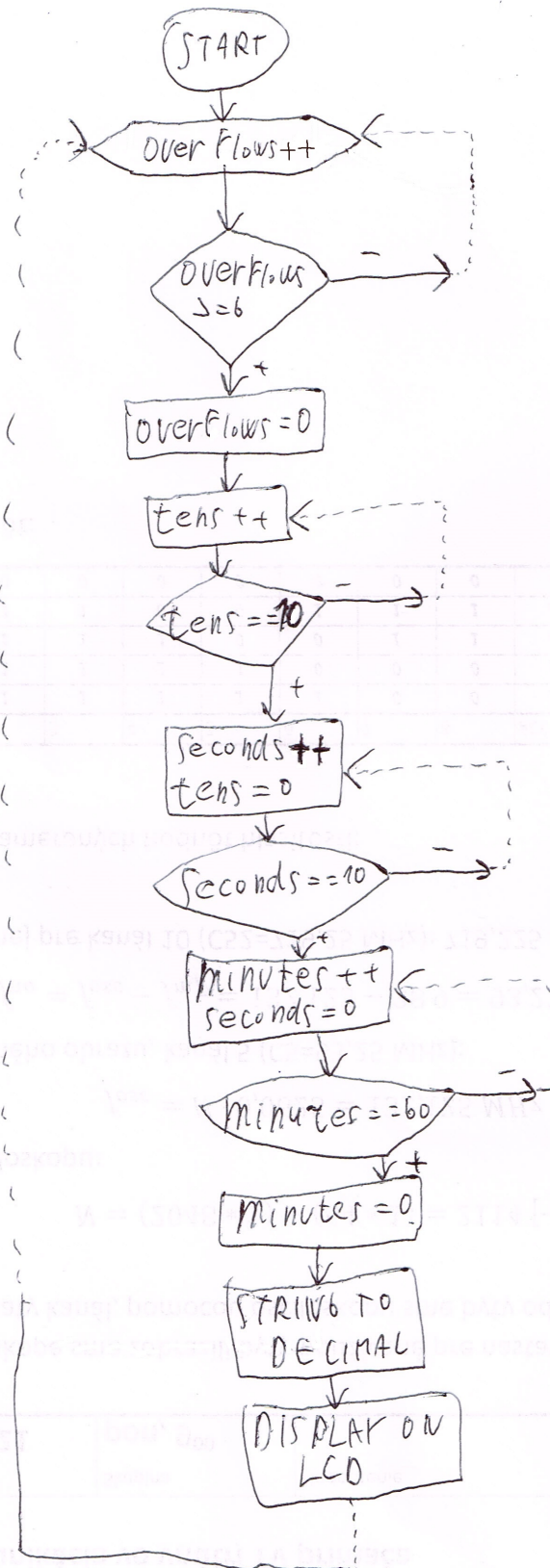
7-0-PR6



h = higher four data
l = lower four data

Stopwatch

1. Flowchart figure for `TIMER2_OVF_vect` interrupt service routine which overflows every 16 ms but it updates the stopwatch LCD approximately every 100 ms (6 x 16 ms = 100 ms). Display tenths of a second and seconds minutes:seconds.tenths . Let the stopwatch counts from 00:00.0 to 59:59.9 and then starts again. The image can be drawn on a computer or by hand. Use clear descriptions of the individual steps of the algorithms.



Custom characters

1. Code listing with syntax highlighting of two custom character definition:

```
uint8_t customChar2[8] = {
    0b11111,
    0b10010,
    0b10100,
```

```

    0b11000,
    0b10100,
    0b10010,
    0b10001,
    0b11111
};

uint8_t customChar1[8] = {
    0b10011,
    0b10111,
    0b11011,
    0b11000,
    0b01000,
    0b10111,
    0b11001,
    0b00011
};

```

Kitchen alarm

Consider a kitchen alarm with an LCD, one LED and three push buttons: start, +1 minute, -1 minute. Use the +1/-1 minute buttons to increment/decrement the timer value. After pressing the Start button, the countdown starts. The countdown value is shown on the display in the form of mm.ss (minutes.seconds). At the end of the countdown, the LED will start blinking.

1. Scheme of kitchen alarm; do not forget the supply voltage. The image can be drawn on a computer or by hand. Always name all components and their values.

