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//*****************************************************************
*******
//
// File Name            : lcd_ext.c
// Title                : LCD Utilities
// Date                 : 02/07/10
// Version              : 1.0
// Target MCU           : ATmega128 @  MHz
// Target Hardware      ;
// Author               : Ken Short
// DESCRIPTION
// The file contains two functions that make it easier for a C
// program to use the LCD display. The function clear_dsp() clears the
display
// buffer arrays. When followed by the function update_dsp(), the
// display is blanked.
//
// The function putchar() puts a single character, passed to it as an
argument,
// into the display buffer at the position corresponding to the value
of
// variable index. This putchar function replaces the standard putchar
funtion,
// so a printf statement will print to the LCD
//
// Warnings             : none
// Restrictions         : none
// Algorithms           : none
// References           : none
//
// Revision History     : Initial version
//
//
//*****************************************************************
******

#include "lcd.h"


static char index;    // index into display buffer

//*****************************************************************
**********
// Function             : void clear_dsp(void)
// Date and version     : 02/07/10, version 1.0
// Target MCU           : ATmega128
// Author               : Ken Short
// DESCRIPTION
// Clears the display buffer. Treats each 16 character array
separately.
// NOTE: update_dsp must be called after to see results
//
// Modified
//*****************************************************************
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```
void clear_dsp(void)
{
  // assuming buffers might not be contiguous
  for(char i = 0; i < 16; i++)
    dsp_buff_1[i] = ' ';

  for(char i = 0; i < 16; i++)
    dsp_buff_2[i] = ' ';

  for(char i = 0; i < 16; i++)
    dsp_buff_3[i] = ' ';

  index = 0;
}


//*****************************************************************
**********
// Function             : int putchar(int c)
// Date and version     : 02/07/10, version 1.0
// Target MCU           : ATmega128
// Author               : Ken Short
// DESCRIPTION
// This function displays a single ascii chararacter c on the lcd at
the
// position specifieb by the global variable index
// NOTE: update_dsp must be called after to see results
//
//
// Modified
//*****************************************************************
**********

int putchar(int c)
{
    if (c == '\f') {
        index = 0;
        return 0;
    }
    if (index < 16) {
        if (c == '\b') {
            if (index == 0) {
                return 0;
            } else {
                dsp_buff_1[--index] = ' ';
            }
        } else if (c == '\n' ||  c == '\r') {
            index = 16;
        } else {
            dsp_buff_1[index++] = (char)c;
        }
    } else if (index < 32) {
        if (c == '\b') {
            if (index == 16) {
                index = 15;
                dsp_buff_1[index] = ' ';
            } else {
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                dsp_buff_2[--index - 16] = ' ';
            }
        } else if (c == '\n' ||  c == '\r') {
            index = 32;
        } else {
            dsp_buff_2[index++ - 16] = (char)c;
        }
    } else if (index < 48) {
        if (c == '\b') {
            if (index == 32) {
                index = 31;
                dsp_buff_2[15] = ' ';
            } else {
                dsp_buff_3[--index - 32] = ' ';
            }
        } else if (c == '\n' ||  c == '\r') {
            index = 0;
        } else {
            dsp_buff_3[index++ - 32] = (char)c;
        }
    } else {
        index = 0;
        dsp_buff_1[index++] = (char)c;
  }

    return c;
}
```