M451從U盤顯示BMP文件

NuMicro® 32 位系列微控制器範例代碼介紹

文件資訊

代碼簡述	本範例代碼使用 M451 讀出 U 盤的 BMP 檔
BSP 版本	M451BSP_v3.01.003
開發平台	NuTiny-EVB-M451-LQFP100 V1.3

1 功能介紹

1.1 簡介

使用M451 TINY BOARD，應用EB I介面連接3.5寸TFT屏, 再把U盤的BMP檔讀出。

BMP格式為24 BIT，轉成RGB 565格式丟出。

2 代碼介紹

ILI9325 初始化：

```
void ILI9325_Initial(void)
{
    SET_RST;
    CLK_SysTickDelay(1000);  // Delay 1ms
    CLR_RST;
    CLK_SysTickDelay(10000); // DeLCD_CtrlWrite_ILI9325lay 10ms ,This delay time is necessary
    SET_RST;
    CLK_SysTickDelay(50000); // Delay 50 ms

    //************* Start Initial Sequence **********//

    LCD_WR_REG(0xCF);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0xC1);
    LCD_WR_DATA(0X30);
    LCD_WR_REG(0xED);
    LCD_WR_DATA(0x64);
    LCD_WR_DATA(0x03);
    LCD_WR_DATA(0X12);
    LCD_WR_DATA(0X81);
    LCD_WR_REG(0xE8);
    LCD_WR_DATA(0x85);
    LCD_WR_DATA(0x10);
    LCD_WR_DATA(0x7A);
    LCD_WR_REG(0xCB);
    LCD_WR_DATA(0x39);
    LCD_WR_DATA(0x2C);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x34);
    LCD_WR_DATA(0x02);
    LCD_WR_REG(0xF7);
    LCD_WR_DATA(0x20);
    LCD_WR_REG(0xEA);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_REG(0xC0);    //Power control
    LCD_WR_DATA(0x1B);   //VRH[5:0]
    LCD_WR_REG(0xC1);    //Power control
    LCD_WR_DATA(0x01);   //SAP[2:0];BT[3:0]
    LCD_WR_REG(0xC5);    //VCM control
    LCD_WR_DATA(0x30);   //3F
    LCD_WR_DATA(0x30);   //3C
    LCD_WR_REG(0xC7);    //VCM control2
    LCD_WR_DATA(0XB7);
    LCD_WR_REG(0x36);    // Memory Access Control
    LCD_WR_DATA(0x48);
    LCD_WR_REG(0x3A);
    LCD_WR_DATA(0x55);
    LCD_WR_REG(0xB1);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x1A);
    LCD_WR_REG(0xB6);    //Display Function Control
    LCD_WR_DATA(0x0A);
    LCD_WR_DATA(0xA2);
    LCD_WR_REG(0xF2);    //3Gamma Function Disable
    LCD_WR_DATA(0x00);
    LCD_WR_REG(0x26);    //Gamma curve selected
    LCD_WR_DATA(0x01);
    LCD_WR_REG(0xE0);    //Set Gamma
    LCD_WR_DATA(0x0F);
    LCD_WR_DATA(0x2A);
    LCD_WR_DATA(0x28);
    LCD_WR_DATA(0x08);
    LCD_WR_DATA(0x0E);
    LCD_WR_DATA(0x08);
    LCD_WR_DATA(0x54);
    LCD_WR_DATA(0XA9);
    LCD_WR_DATA(0x43);
    LCD_WR_DATA(0x0A);
    LCD_WR_DATA(0x0F);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_REG(0XE1);    //Set Gamma
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x15);
    LCD_WR_DATA(0x17);
    LCD_WR_DATA(0x07);
    LCD_WR_DATA(0x11);
    LCD_WR_DATA(0x06);
    LCD_WR_DATA(0x2B);
    LCD_WR_DATA(0x56);
    LCD_WR_DATA(0x3C);
    LCD_WR_DATA(0x05);
    LCD_WR_DATA(0x10);
    LCD_WR_DATA(0x0F);
    LCD_WR_DATA(0x3F);
    LCD_WR_DATA(0x3F);
    LCD_WR_DATA(0x0F);
    LCD_WR_REG(0x2B);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x01);
    LCD_WR_DATA(0x3f);
    LCD_WR_REG(0x2A);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0x00);
    LCD_WR_DATA(0xef);
    LCD_WR_REG(0x11);   //Exit Sleep
    CLK_SysTickDelay(120000);
    LCD_WR_REG(0x29);   //display on

    //set xy, y
    LCD_WR_REG(0x36);
    LCD_WR_DATA(0x0);

    //set x, y memory access
    LCD_WR_REG(0x2a);
    LCD_WR_DATA(0 >> 8);
    LCD_WR_DATA(0 & 0XFF);
    LCD_WR_DATA(320 >> 8);
    LCD_WR_DATA(320 & 0XFF);
    LCD_WR_REG(0x2b);
    LCD_WR_DATA(0 >> 8);
    LCD_WR_DATA(0 & 0XFF);
    LCD_WR_DATA(480 >> 8);
    LCD_WR_DATA(480 & 0XFF);
```

```
}
```

初始化 USB Host Mass Storage：

```
int  USBH_MassInit(void)
{
    int i = 0;

    g_umas = NULL;

    for(i = 0; i < UMAS_MAX_DEV; i++)
        _umac_alloc_mark[i] = 0;
    /* register the driver, return -1 if error */
    if(USBH_RegisterDriver(&_UsbMassStorageDriver) < 0)
        return -1;
    return 0;
}
```

在 main 中讀出 U 盤的 BMP 檔：

```
while (1)
{
     LCD_SetCursor(0, p);
     LCD_WR_REG(0x2c);
     res = f_read(&file1, Buff, 320 * 3, &s1);

     for (i = 0; i < s1; i = i + 3)
     {
          b = Buff[i] >> 3;
          g = Buff[i + 1] >> 2;
          r = Buff[i + 2] >> 3;
          color = b | (g << 5) + (r << (5 + 6));
          LCD_WR_DATA(color);
     }

     p--;

     if (res || s1 == 0)
          break;
}
```

3 軟體與硬體環境

- **軟體環境**
  - BSP 版本
    - M451BSP_v3.01.003
  - IDE 版本
    - Keil uVersion5.25
- **硬體環境**
  - 電路元件
    - NuTiny-EVB-M451
    - ILI9325
  - 示意圖

VDD	↔	VDD
EBI（PA0-PA7）	↔	AD（0-7）
EBI（PC0-PC7）	↔	AD（8-15）
EBI（PD12）	↔	ADR16
EBI（PD2）	↔	nWR
EBI（PD7）	↔	nRD
EBI（PD8）	↔	nCS0
GND	↔	GND
M451		ILI9325

4 目錄資訊

🗁 EC_M451_Display_BMP_File_From_USB_Disk_V1.00			
	🗁 Library		Sample code header and source files
		🗁 CMSIS	Cortex® Microcontroller Software Interface Standard (CMSIS) by Arm® Corp.
		🗁 Device	CMSIS compliant device header file
		🗁 StdDriver	All peripheral driver header and source files
		🗁 UsbHostLib	USB host library source code
	🗁 SampleCode		
		🗁 ExampleCode	Source file of example code
	🗁 ThirdParty		
		🗁 FatFs	A generic FAT file system module for small embedded systems. Its official website is: http://elm-chan.org/fsw/ff/00index_e.html.

5 如何執行範例程式

1. 根據目錄資訊章節進入 ExampleCode 路徑中的 KEIL 資料夾，雙擊 Display_BMP_File_From_USB_Disk.uvproj。
2. 進入編譯模式介面
   a. 編譯
   b. 下載代碼至記憶體
   c. 進入 / 離開除錯模式
3. 進入除錯模式介面
   a. 執行代碼

6 修訂紀錄

Date	Revision	Description
Jul.24, 2019	1.00	1. 初始發布.

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