

## Application Note: AN-154

# IS31FL3743B PWM Frequency Options

### INTRODUCTION

The IS31FL3743B is a general purpose 18×n (n=1~11) LED Matrix programmed via 12MHz SPI interface. Each LED can be dimmed individually with 8-bit PWM data and 8-bit DC scaling data which allowing 256 steps of linear PWM dimming and 256 steps of DC current adjustable level. Additionally, each LED open state can be detected, IS31FL3743B store the open information in Open-Registers. The Open Registers allowing MCU to read out via SPI, inform MCU whether there are LEDs open or short LEDs.

The IS31FL3743B operates from 2.7V to 5.5V and features a very low shutdown and operational current. IS31FL3743B is available in UQFN-40 (5mm×5mm) package. It operates from 2.7V to 5.5V over the temperature range of -40°C to +125°C.

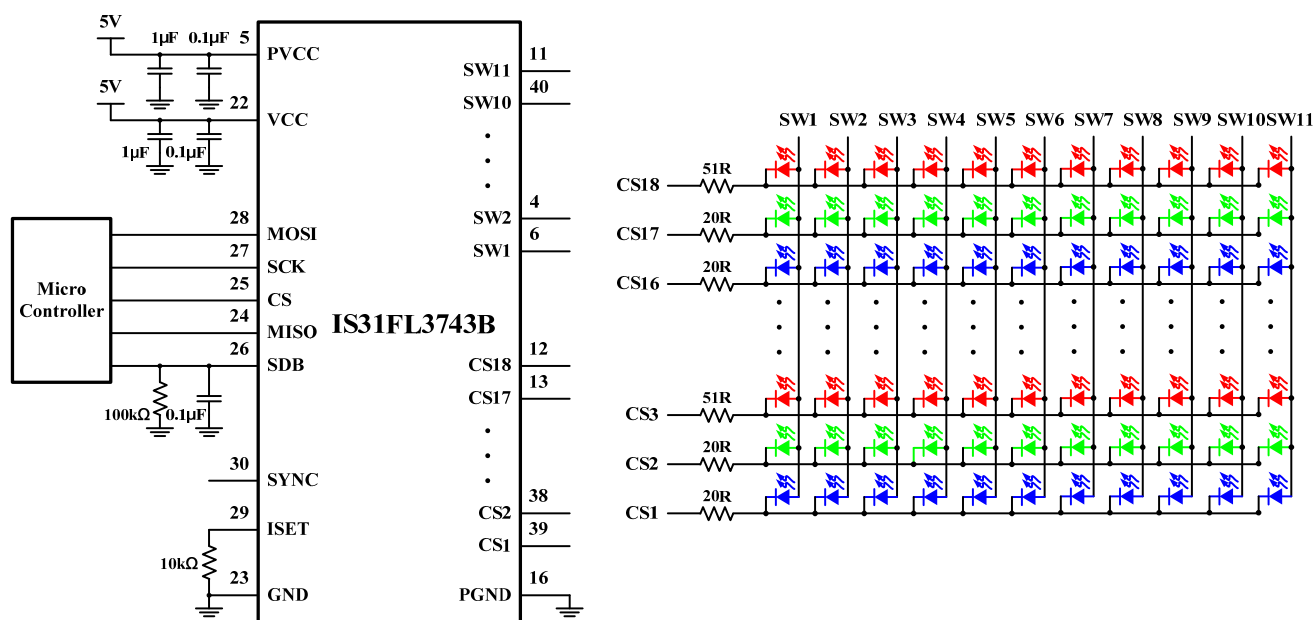


Figure 1 Typical Application Circuit of IS31FL3743B

### HOW TO CHANGE THE PWM FREQUENCY SETTING

IS31FL3743B has a PWM frequency setting register in test mode, which can set different PWM frequency through E0h/E2h register in page 2 (PG2, Page No. = 0x52).

#### E0h Test Mode Enable Register

Bit	D7:D1	D0
Name	-	TMEN
Default	0000 000	0

The Test Mode Enable Register enter or quit test mode.

If TMEN="1", the device enter test mode and user can modify E1~E2h register value.

If TMEN="0", the device will quit test mode.

**TMEN** Test Mode Enable  
0 Not in/quit test mode  
1 In test mode

#### E1h Iout Trim Register

Bit	D7:D6	D5:D4	D3:D0
Name	PWM_DC	Lookahead	Iout_trim
Default	00	00	0000

This register is for I\_OUT trim, write any value except '0x00' may change the I\_OUT value and could not recovery. It is not allowed to write any value except '0x00' into this register.

#### E2h PWM Frequency Setting Register

Bit	D7:D5	D4	D3:D0
Name	PF	SW_TEN	SW_TSEL
Default	000	0	0000

PWM Frequency Setting Register is used to set the PWM frequency.  
In order not to affect LED normal display, D4: D0 should write with '00000'.

**PF** PWM Frequency  
000/111 31.25kHz  
001 15.6kHz  
010 7.8kHz  
011 3.9kHz  
100 1.95kHz  
101 977Hz (SW1~SWn scan, n≤8)  
110 488Hz (SW1~SWn scan, n≤4)

**SW\_TEN**  
0 SW test mode disable  
1 SW test mode enable

**SW\_TEN SW Test Channel Select**  
0000 SW1 always on, other SW off  
0001 SW2 always on, other SW off  
0010 SW3 always on, other SW off  
0011 SW4 always on, other SW off  
0100 SW5 always on, other SW off  
0101 SW6 always on, other SW off  
0110 SW7 always on, other SW off  
0111 SW8 always on, other SW off  
1000 SW9 always on, other SW off  
1001 SW10 always on, other SW off  
1010 SW11 always on, other SW off  
Others Reserved

### SOFTWARE SPI COMMAND EXAMPLE

```
// void SPI_Write(u8 DeviceAddress, u8 WriteAddress, u8 SendByte)
SPI_Write (0x52,0xE0,0x01); //Enter test mode
SPI_Write (0x52,0xE2,0x20); //0x00 or 0xE0:31.25k,
                             //0x20:15.6k,
                             //0x40:7.8k,
                             //0x60: 3.9k,
                             //0x80:1.95k,
                             //0xA0: 977Hz,
                             //0xC0:488Hz.
SPI_Write (0x52,0xE0,0x00); //Quit test mode
```

### RESOURCES

Lumissil Microsystems,

IS31FL3743B 18×n (n=1~11) LED Matrix DRIVER, [https://www.lumissil.com/assets/pdf/core/IS31FL3743B\\_DS.pdf](https://www.lumissil.com/assets/pdf/core/IS31FL3743B_DS.pdf)

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