

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

DESCRIPTION

IS31FL3246 is comprised of 36 constant current channels each with independent PWM control, designed for driving LEDs. The output current of each channel can be set at up to 25mA (Max.)

Proprietary programmable technology is used to minimize audible noise caused by MLCC decoupling capacitors. All registers can be programmed via a high speed I2C (1MHz).

FEATURES

- 2.7V to 5.5V supply
- Pin to pin with IS31FL3236A/IS31FL3237 (QFN-44, 5mm×5mm)
- I2C with register address automatic increment
- Four selectable I2C addresses
- SDB rising edge reset I2C module
- Accurate color rendition
 - Each channel 8-bit/10-bit PWM at 32kHz/64K/128K
 - Each channel 8-bit PWM at 122Hz/244Hz/488Hz
 - 3 8-bit global current adjust for 3 color LED
- Group dimming for reduce coding for RGB
- EMI Reduction Technology
 - Spread spectrum
 - Selectable 6 Phase Delay
 - Selectable 180 degree Clock Phase
- -40°C to +125°C temperature range

QUICK START



Figure 1: Photo of IS31FL3246 Evaluation Board

RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply

ABSOLUTE MAXIMUM RATINGS

- ≤ 5.5V power supply

Caution: Do not exceed the conditions listed above, otherwise the board will be damaged.

PROCEDURE

The IS31FL3246 evaluation board is fully assembled and tested. Follow the steps listed below to verify board operation.

Caution: Do not turn on the power supply until all connections are completed.

- 1) Connect the ground terminal of the power supply to the GND and the positive terminal to the VCC. Or connect the DC power to the connector (TP1&TP4).
- 2) Turn on the power supply and pay attention to the supply current. If the current exceeds 1.2A, please check for circuit fault.
- 3) Enter the desired mode of display by toggling the MODE button.

EVALUATION BOARD OPERATION

The IS31FL3246 evaluation board has six display modes. Toggling the MODE button (K1) can switch the modes.

- 1) (Default mode) The 12 RGB LEDs in the middle of the board show a color changing light bar moving pattern.
- 2) Two groups of blue LED on above display a tailing effect move from right to left.
- 3) Two groups of blue LED on above display a tailing effect move in opposite directions.
- 4) Blue LED on above perform timer display.
- 5) Two groups of blue LED on above flash together from two sides to middle and then turn off slowly from both sides to middle.
- 6) The blue LEDs on above are put into four '8' digits and to show a twist effect.

Note: IS31FL3246 solely controls the FxLED function on the evaluation board.

ORDERING INFORMATION

| Part No. | Temperature Range | Package |
|---------------------|------------------------------|-------------------|
| IS31FL3246-QFLS4-EB | -40°C to +125°C (Industrial) | QFN-44, Lead-free |

Table 1: Ordering Information

For pricing, delivery, and ordering information, please contacts Lumissil's analog marketing team at analog@Lumissil.com or (408) 969-6600.

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

SOFTWARE SUPPORT

JP1 default setting is shorted. If it is set to open, the SDA, SCL and SDB pin are set to high impedance and the on-board MCU will be idle. External I2C and SDB signals can be connected to TP4 to control the IS31FL3246 LED driver. During external control mode, toggling the MODE button (K1) can switch the power of single blue color LED and power of RGB LED.

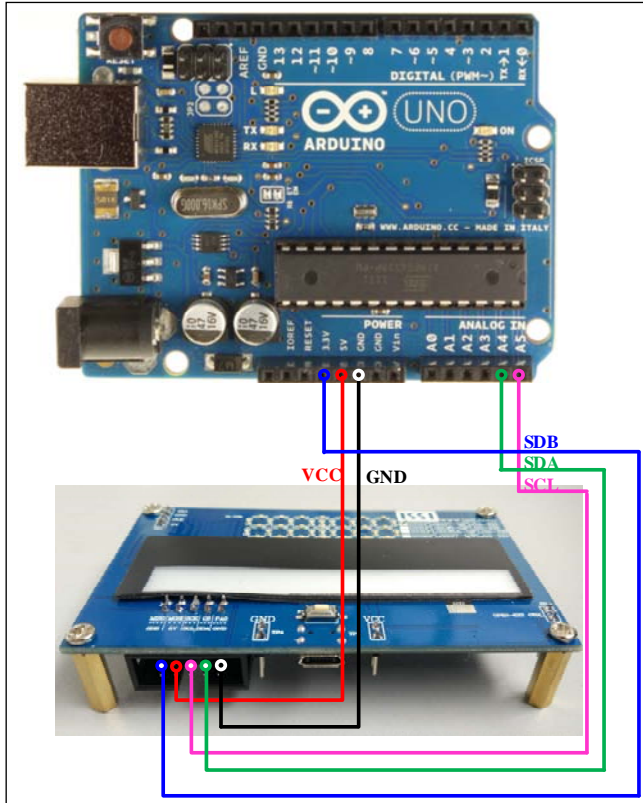


Figure 2: Photo of Arduino UNO connected to Evaluation Board

The steps listed below are an example using the Arduino for external control.

The Arduino hardware consists of an Atmel microcontroller with a bootloader allowing quick firmware updates. First download the latest Arduino Integrated Development Environment IDE (1.6.12 or greater) from www.arduino.cc/en/Main/Software. Also download the Wire.h library from www.arduino.cc/en/reference/wire and verify that pgmspace.h is in the directory ...program Files(x86)/Arduino/hardware/tools/avr/avr/include/avr/. Then download the latest Arduino IS31FL3246 test firmware (sketch) from the Lumissil website <http://www.lumissil.com/products/led-driver/fxled>.

- 1) Open JP1.
- 2) Connect the 5 pins from Arduino board to IS31FL3246 EVB:
 - a) Arduino 5V pin to IS31FL3246 EVB VCC.
 - b) Arduino GND to IS31FL3246 EVB GND.
 - c) Arduino SDA (A4) to IS31FL3246 EVB SDA.
 - d) Arduino SCL (A5) to IS31FL3246 EVB SCL.
 - e) If Arduino uses 3.3V MCU VCC, connect 3.3V to IS31FL3246 EVB SDB, if Arduino uses 5.0V MCU VCC, connect 5.0V to EVB SDB.
(Arduino UNO MCU VCC is 5V, so SDB can be 5V or 3.3V)
- 3) Use the test code in appendix II or download the test firmware (sketch) from the Lumissil website, and copy the code to Arduino IDE, compile and upload to Arduino.
- 4) Run the Arduino code for desired mode setting by Arduino code.
- 5) During external control mode, toggling the MODE button (K1) can switch the power of single color LEDs and power of RGB LEDs.

Please refer to the datasheet to get more information about IS31FL3246.

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

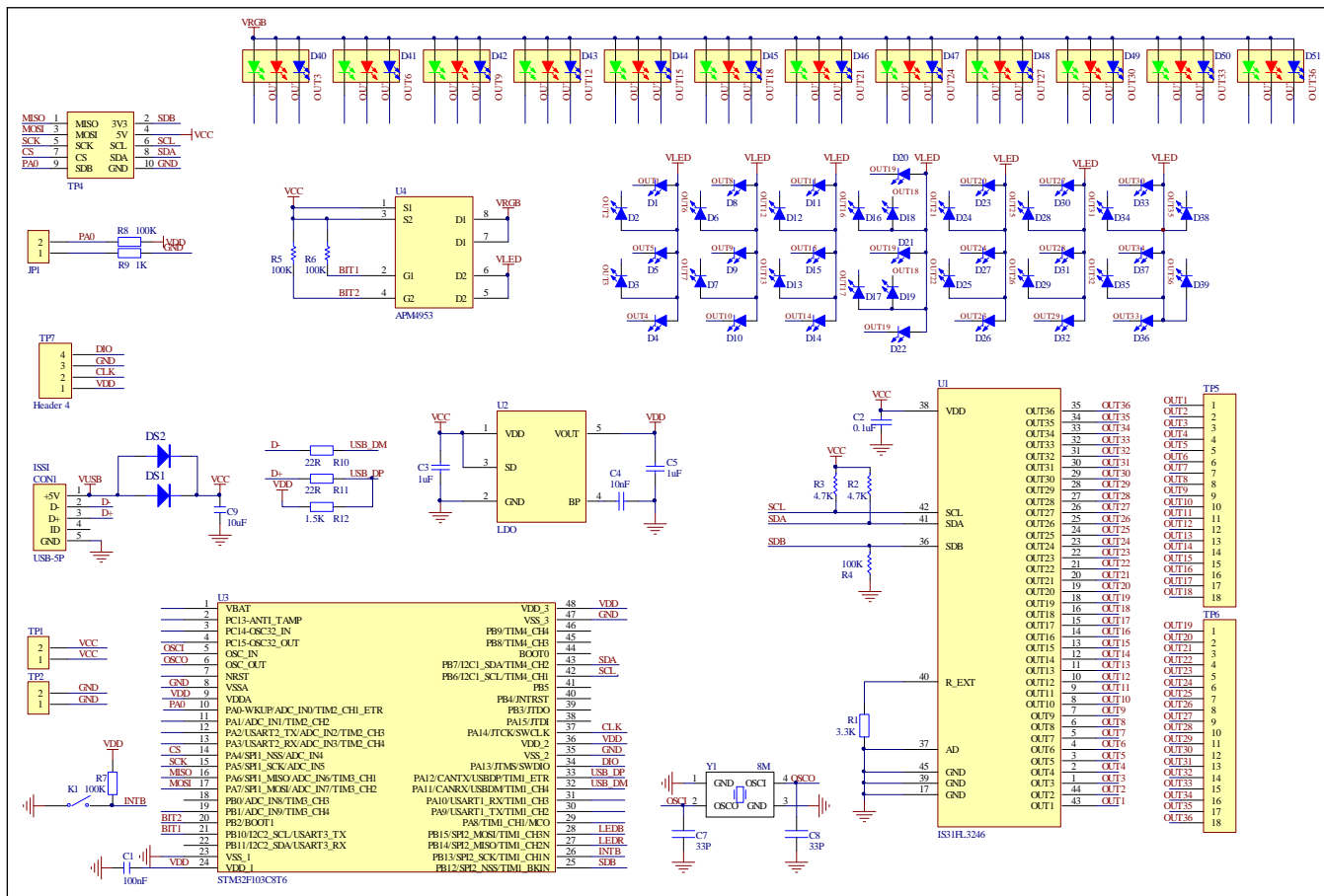


Figure 3: IS31FL3246 Application Schematic

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

BILL OF MATERIALS

| Name | Symbol | Description | Qty | Supplier | Part No. |
|------------|----------|----------------------------|-----|-----------|-----------------------|
| LED Driver | U1 | 36CH FxLED Driver | 1 | Lumissil | IS31FL3246 |
| LDO | U2 | Low-dropout Regulator | 1 | PAM | PAM3101 |
| MCU | U3 | Microcontroller | 1 | STM | STM32F103C8T6 |
| PMOS | U4 | Dual PMOS | 1 | ANPEC | APM4953 |
| Crystal | Y1 | Crystal, 8MHz | 1 | JB | HC-49S |
| LED | D1~D39 | Diode, LED Blue, SMD | 39 | Everlight | 19-217/BHC-ZL1M2RY/3T |
| LED | D40~D51 | Diode, LED RGB, SMD | 12 | Everlight | 99-235/RGBC/TR8 |
| Diode | DS1, DS2 | Diode, SMD | 2 | DIODES | DFLS240 |
| Resistor | R1 | RES, 3.3k, 1/10W, ±5%, SMD | 1 | Yageo | RC0603JR-073K3L |
| Resistor | R2~R3 | RES, 4.7k, 1/10W, ±5%, SMD | 2 | Yageo | RC0603JR-074K7L |
| Resistor | R4~R8 | RES, 100k, 1/10W, ±5%, SMD | 5 | Yageo | RC0603JR-07100KL |
| Resistor | R9 | RES, 1k, 1/10W, ±5%, SMD | 1 | Yageo | RC0603JR-071KL |
| Resistor | R10, R11 | RES, 22R, 1/10W, ±5%, SMD | 1 | Yageo | RC0603JR-0722RL |
| Resistor | R12 | RES, 1.5k, 1/10W, ±5%, SMD | 1 | Yageo | RC0603JR-071K5L |
| Capacitor | C1, C2 | CAP, 100nF, 16V, ±20%, SMD | 2 | Yageo | CC0603MRX7R7BB104 |
| Capacitor | C3, C5 | CAP, 1µF, 16V, ±10%, SMD | 2 | Yageo | AC0805KKX7R7BB105 |
| Capacitor | C4 | CAP, 10nF, 16V, ±10%, SMD | 1 | Yageo | CC0603KRX7R7BB103 |
| Capacitor | C7, C8 | CAP, 33pF, 50V, ±5%, SMD | 2 | Yageo | CQ0603JRNPO9BN360 |
| Capacitor | C9 | CAP, 10µF, 16V, ±20%, SMD | 1 | Yageo | CC0805KKX5R7BB106 |
| Button | K1 | Button SMD | 1 | | |

Bill of Materials, refer to Figure 3 above.

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

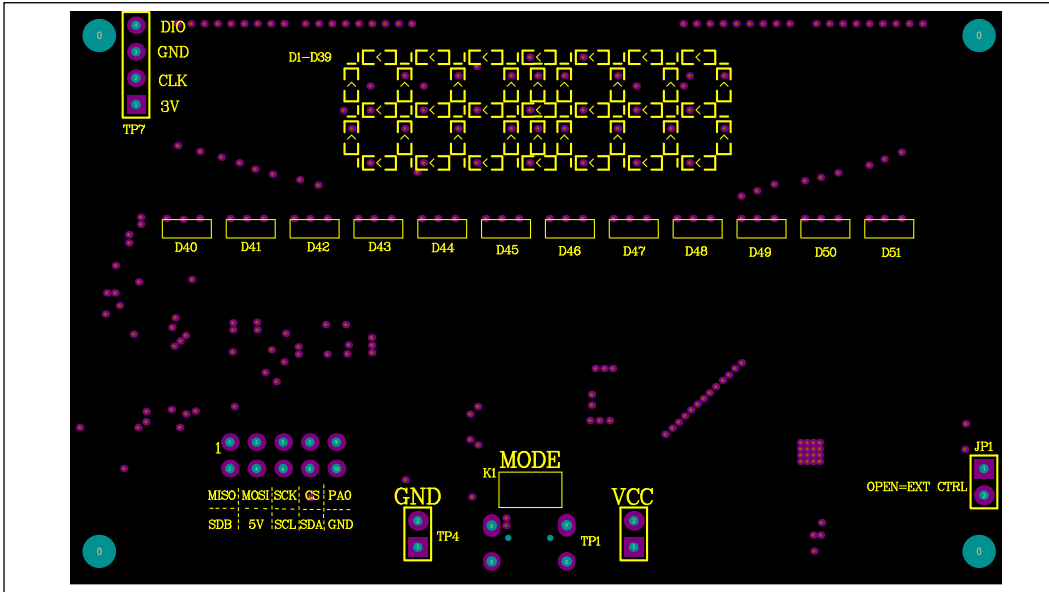


Figure 4: Board Component Placement Guide - Top Layer

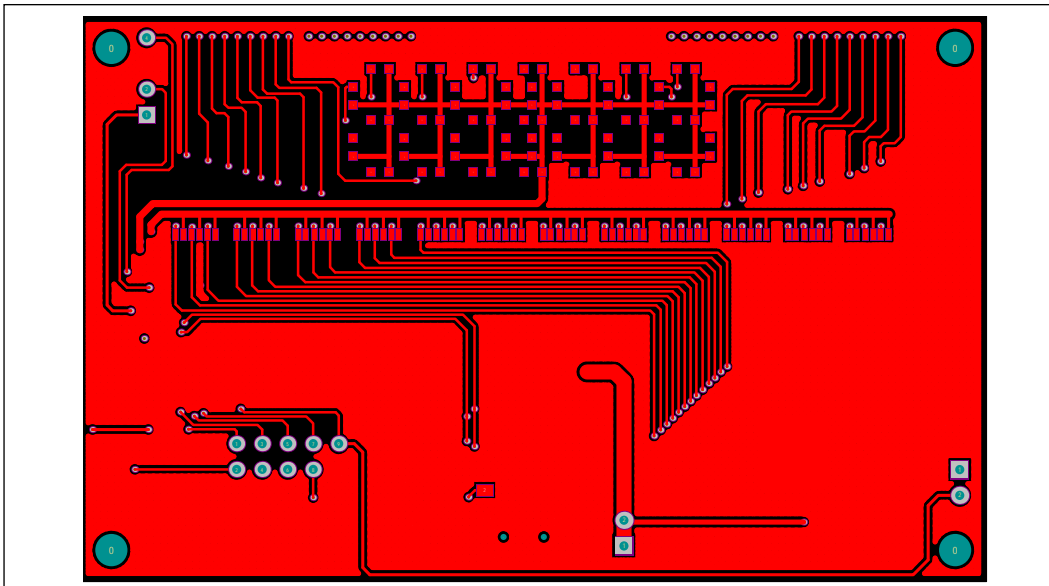


Figure 5: Board PCB Layout - Top Layer

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

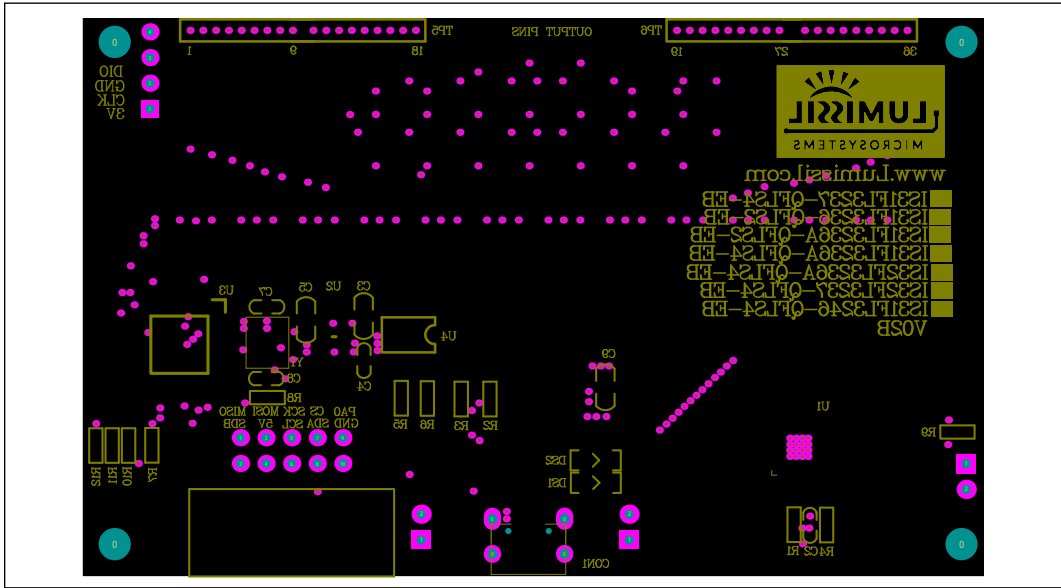


Figure 6: Board Component Placement Guide - Bottom Layer

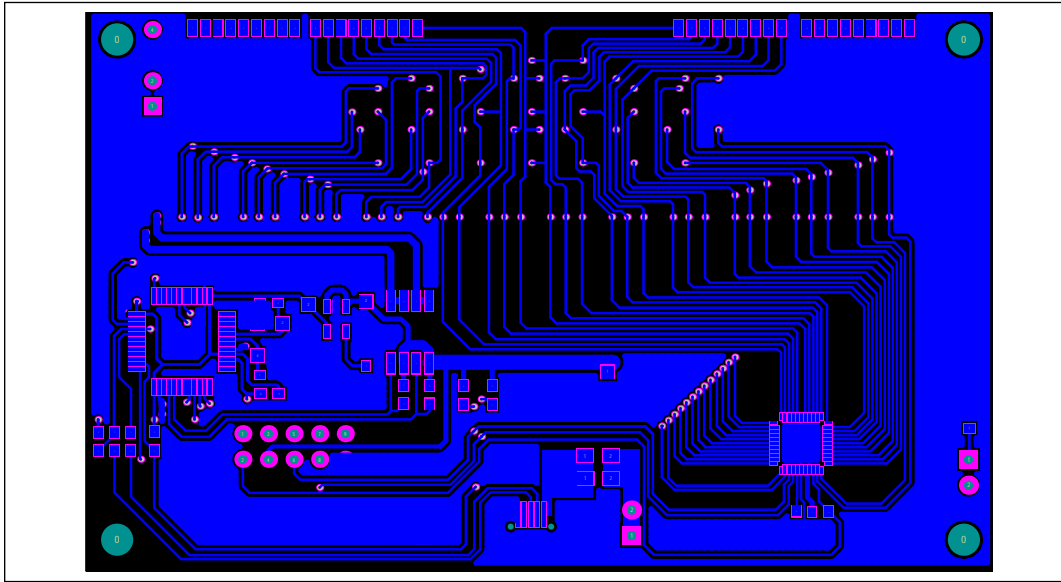


Figure 7: Board PCB Layout - Bottom Layer

Copyright © 2020 Lumissil Microsystems. All rights reserved. Lumissil Microsystems reserves the right to make changes to this specification and its products at any time without notice. Lumissil Microsystems assumes no liability arising out of the application or use of any information, products or services described herein. Customers are advised to obtain the latest version of this device specification before relying on any published information and before placing orders for products.

Lumissil Microsystems does not recommend the use of any of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of the life support system or to significantly affect its safety or effectiveness. Products are not authorized for use in such applications unless Lumissil Microsystems receives written assurance to its satisfaction, that:

- a.) the risk of injury or damage has been minimized;
- b.) the user assume all such risks; and
- c.) potential liability of Lumissil Microsystems is adequately protected under the circumstances

36 CHANNELS LED DRIVER EVALUATION BOARD GUIDE

REVISION HISTORY

| Revision | Detail Information | Data |
|----------|--------------------|------------|
| A | Initial Release | 2020.04.04 |

APPENDIX II: IS31FL3246 Arduino Test Code V01A

```
#include<Wire.h>
#include<avr/pgmspace.h>
#define Addr_GND 0x60
//7 bit format is 0x3F

byte PWM_Gamma64[64]=
{
  0x00,0x01,0x02,0x03,0x04,0x05,0x06,0x07,
  0x08,0x09,0x0b,0x0d,0x0f,0x11,0x13,0x16,
  0x1a,0x1c,0x1d,0x1f,0x22,0x25,0x28,0x2e,
  0x34,0x38,0x3c,0x40,0x44,0x48,0x4b,0x4f,
  0x55,0x5a,0x5f,0x64,0x69,0x6d,0x72,0x77,
  0x7d,0x80,0x88,0x8d,0x94,0x9a,0xa0,0xa7,
  0xac,0xb0,0xb9,0xbf,0xc6,0xcb,0xcf,0xd6,
  0xe1,0xe9,0xed,0xf1,0xf6,0xfa,0xfe,0xff
};

void setup() {
  // put your setup code here, to run once:
  Wire.begin();
  Wire.setClock(400000); //I2C 400kHz
  // pinMode(4,OUTPUT); //SDB
  // digitalWrite(4,HIGH); //SDB_HIGH
  Init_FL3246();
}

void loop() {
  // put your main code here, to run repeatedly:
  IS31FL3246_mode1(); //breath mode
}

void IS_IIC_WriteByte(uint8_t Dev_Add,uint8_t Reg_Add,uint8_t Reg_Dat)
{
  Wire.beginTransmission(Dev_Add/2);
  Wire.write(Reg_Add); // sends regaddress
  Wire.write(Reg_Dat); // sends regaddress
  Wire.endTransmission(); // stop transmitting
}

void Init_FL3246(void)
{
  uint8_t i = 0;
  for(i=0x49;i<=0x6C;i++)
  {
    IS_IIC_WriteByte(Addr_GND,i,0x80); //turn on all LED
  }

  for(i=0x01;i<=0x48;i++)
  {
    IS_IIC_WriteByte(Addr_GND,i,0x00); //write all HPWM set 0x00
  }

  IS_IIC_WriteByte(Addr_GND,0x6D,0x00); //update PWM & congtrol registers
  IS_IIC_WriteByte(Addr_GND,0x6E,0xFF); //Global current
  IS_IIC_WriteByte(Addr_GND,0x6F,0xFF); //Global current
  IS_IIC_WriteByte(Addr_GND,0x70,0xFF); //Global current
  IS_IIC_WriteByte(Addr_GND,0x00,0x01); //normal operation and set 32k HFPS & 120 LFPS 8bit
  // write 0x11, set 64k HFPS & 240 LFPS 8bit
  // write 0x31, set 128k HFPS & 480 LFPS 8bit
  // write 0x03, set 32k HFPS & 120 LFPS 10bit
}

void IS31FL3246_mode1(void) //white LED
{
  int8_t i = 0;
  int8_t j = 0;

  for(i=1;i<=24;i+=2) //R LED running
  {
    IS_IIC_WriteByte(Addr_GND,(i*3),0xFF); //set HPWM_L
    IS_IIC_WriteByte(Addr_GND,0x6D,0x00); //update PWM & congtrol registers
  }
}
```