Description

The IS31FL3216 is a fun light LED controller with an audio modulation mode. It can store data of 8 frames with internal RAM to play small animations automatically.

IS31FL3216 can sample the input signal to modulate the intensity of LEDs, or control 8 frames playing by internal ADC block.

The LED current of each channel can be set in 256 steps by adjusting the PWM duty cycle through an I2C interface.

Features

- Supply voltage range from 2.7V to 5.5V
- I2C interface, automatic address increment function
- Internal RAM
- Modulate LED brightness with 256 steps PWM
- Each channel can be controlled independently
- Auto Frame Play Mode with 8 frames
- 8 frames memory for animations
- Audio Frame Mode with 8 frames
- 8 of 16 outputs not used as LED drivers can be used as GPIO ports
- QFN-28 (4mm × 4mm) package

Quick Start

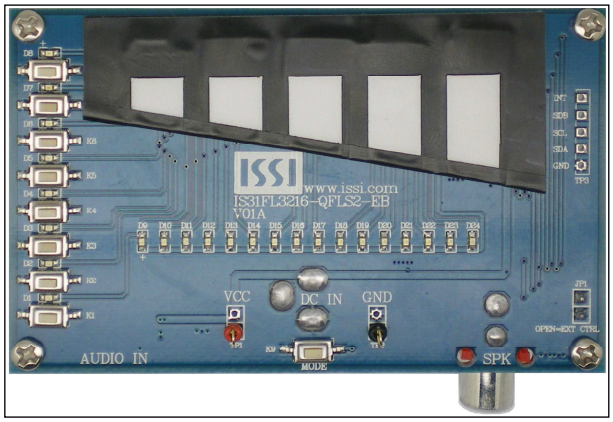

Figure 1: Photo of IS31FL3216 Evaluation Board

Recommended Equipment

- 5.0V, 2A power supply
- Audio source(i.e. MP3 player, Notebook PC, etc)
- 8Ω speaker

Absolute Maximum Ratings

- ≤ 5.5V power supply

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

Procedure

The IS31FL3216 evaluation board is fully assembled and tested. Follow the steps to operate.

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

1) Connect an 8Ω speaker to the “SPK” connector.
2) Connect the audio source to the “AUDIO IN” connector.
3) Connect the DC power to the connector (DC IN).
4) Turn on the power supply and pay attention to the supply current. If the current exceeds 1A, please check for circuit fault.
5) Turn on the audio signal.
6) Adjust the input audio signal to obtain best sound output performance

Evaluation Board Ordering Information

Part No.	IC Package
IS31FL3216-QFLS2-EB	QFN-20, Lead-free

Table1: Ordering Information

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

Evaluation Board Operation

The IS31FL3216 evaluation board has nine display modes. Press MODE button to switch configurations.

1) Music mode: blue LEDs flash from middle to two sides according to the musical strength.
2) Music mode: blue LEDs flash from left to right; more strong music, more LEDs on right side will be turned on.
3) Music mode: blue LEDs flash from right to left with 5 LEDs in one group. Stronger music will make LEDs move to left.
4) Music mode: the color bars change color according to the strength of music. Color change from Blue to Green to Red when music change from weak to strong.
5) Music mode with AGC disabled: the color bars flash left to right and right to left, longer with stronger music. Color change every 6 seconds.
6) Music mode with 6dB gain AGC: color bars flash left to right and right to left, longer with stronger music. Color change every 6 seconds.
7) Blue LEDs turn on from right to left with a tailing visual effect.
8) Blue LEDs turn on from middle to two sides.
9) Push button mode: OUT9~OUT16 as input. OUT1~OUT8 as output to driver 8 LEDs. Default is 8 LEDs all on. Press the button on the left will turn of each corresponding LED.

***Note:**

IS31FL3216 solely controls the FxLED function on the evaluation board.

Software Control

JP1 default setting is close circuit. If it is set to open, the on-board MCU will stop working. The I2C pins are set to High Impedance. External I2C signals can be connected to TP3 to control the IS31FL3216 LED driver.

Please refer to the datasheet for how to control the IS31FL3216.

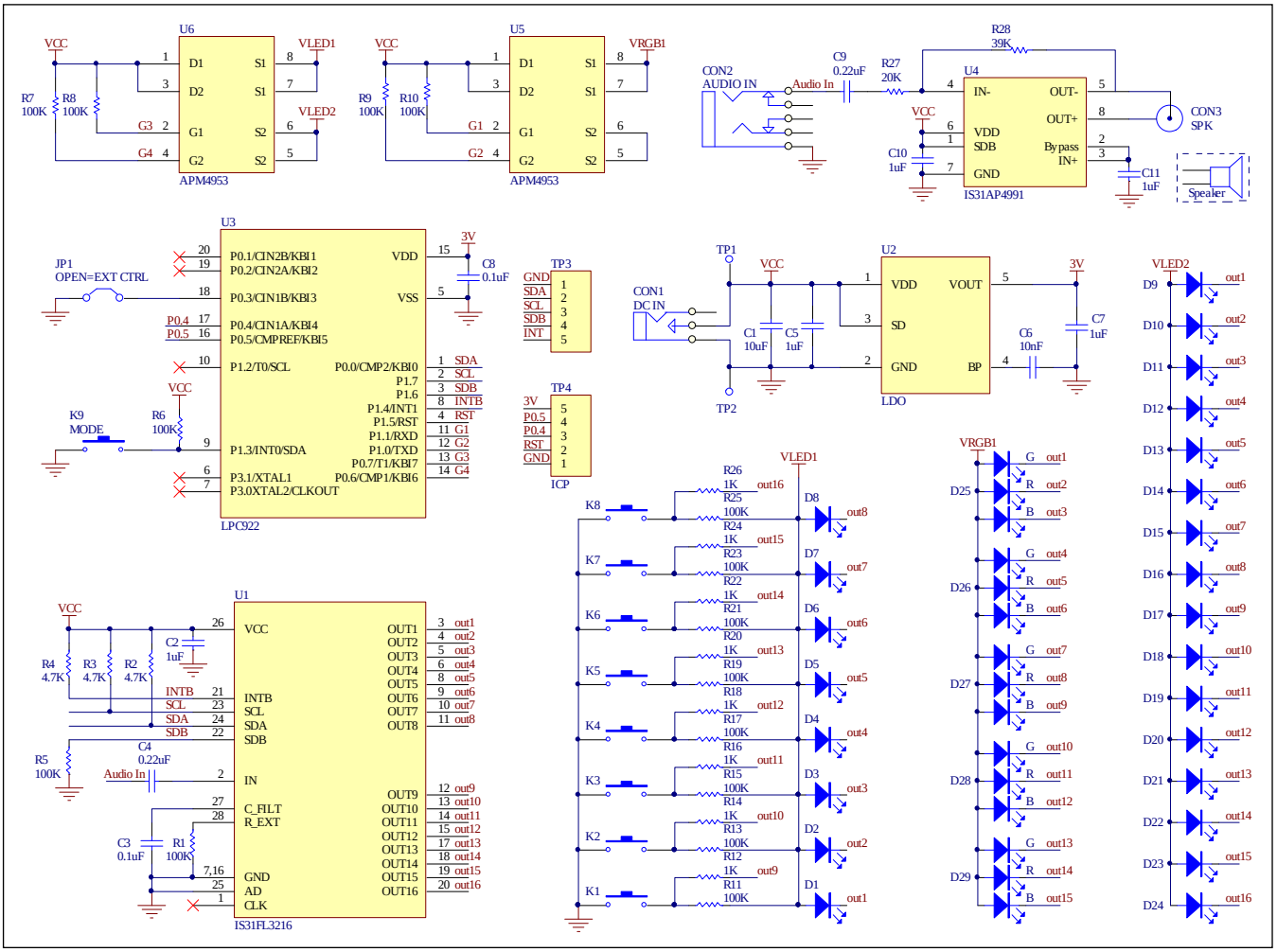

Figure 2:IS31FL3216 Application Schematic

Bill of Materials

Name	Symbol	Description	Qty	Supplier	Part No.
LED Driver	U1	16CH FxLED Driver	1	ISSI	IS31FL3216
LDO	U2	Low-dropout Regulator	1	PAM	PAM3101
MCU	U3	Microcontroller	1	NXP	LPC922
Audio Amplifier	U4	Class-AB Audio Amplifier	1	ISSI	IS31AP4991
PMOS	U5,U6	Dual PMOS	2	ANPEC	APM4953
Diodes	D1~D24	Diode, LED Blue, SMD	24	Everlight	19-217/BHC-ZL 1M2RY/3T
Diodes	D25~D29	Diode, LED RGB, SMD	5	Everlight	99-235/RGBC/T R8
Resistors	R1,R5~R11	RES,100k,1/16W,±5%,SMD	8		
Resistors	R2~R4	RES,4.7k,1/16W,±5%,SMD	3		
Resistors	R12,R14,R16,R18	RES,1k,1/16W,±5%,SMD	4		
Resistors	R13,R15,R17,R19	RES,100k,1/16W,±5%,SMD	4		
Resistors	R20,R22,R24,R26	RES,1k,1/16W,±5%,SMD	4		
Resistors	R21,R23,R25	RES,100k,1/16W,±5%,SMD	3		
Capacitor	C1	CAP,10µF,16V,±20%,SMD	1		
Capacitors	C3,C8	CAP, 0.1µF,16V,±20%,SMD	2		
Capacitors	C2,C5,C7,C10, C11	CAP,1µF,16V,±20%,SMD	5		
Capacitor	C6	CAP,10nF,16V,±20%,SMD	1		
Capacitors	C4,C9	CAP, 0.22µF,16V,±20%,SMD	2		
Buttons	K1~K8	Button SMD	8		

Table 2: Bill of Materials, refer to Figure 2 above.

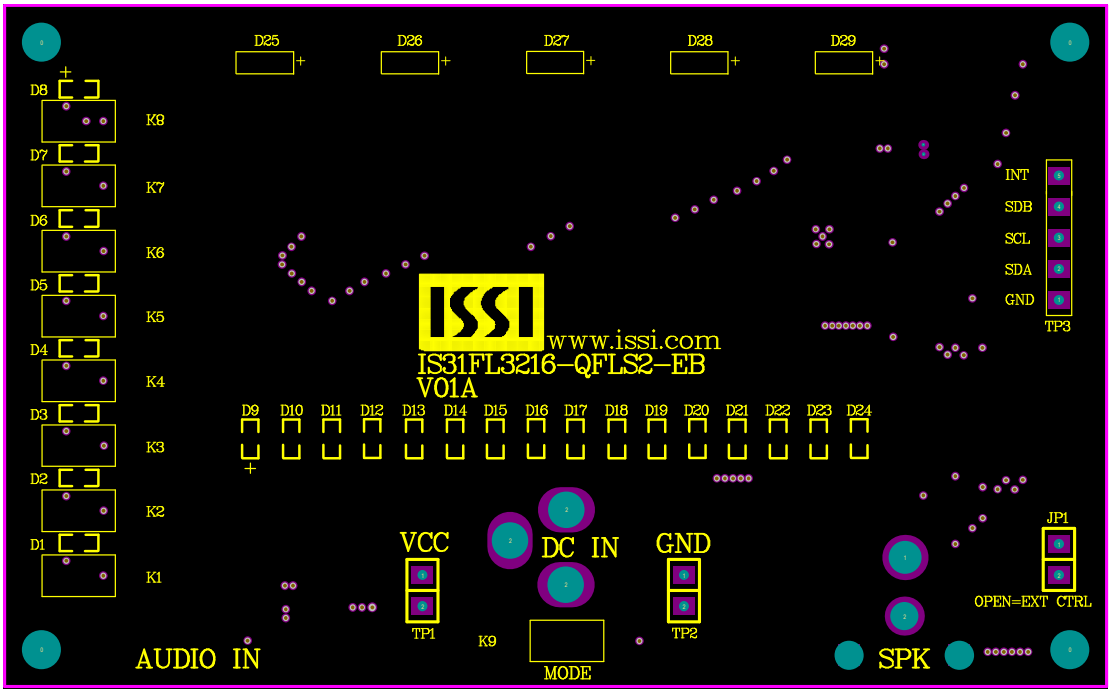

Figure 3: Board Component Placement Guide -Top Layer

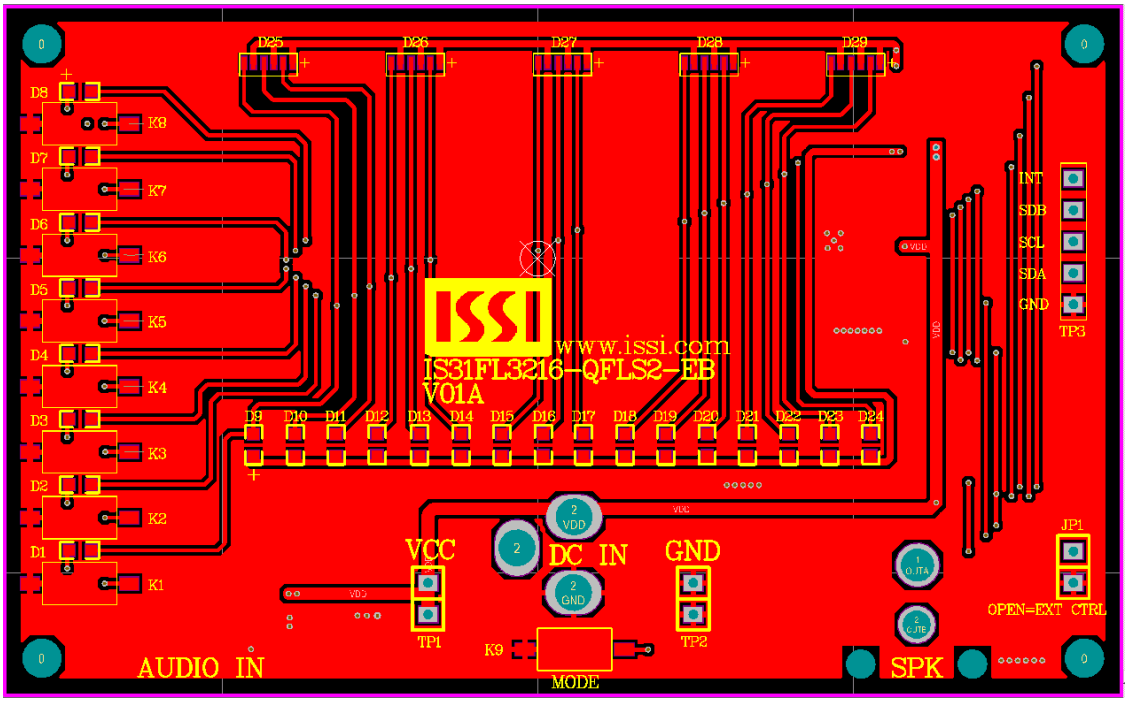

Figure 4: Board PCB Layout- Top Layer

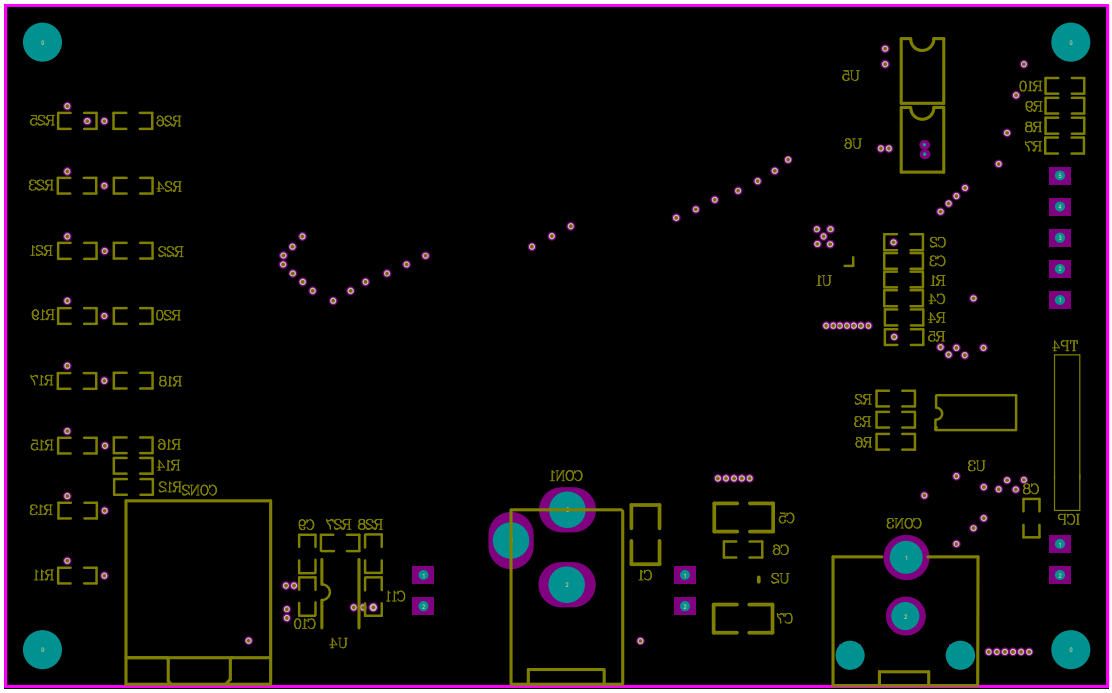

Figure 5: Board Component Placement Guide -Bottom Layer

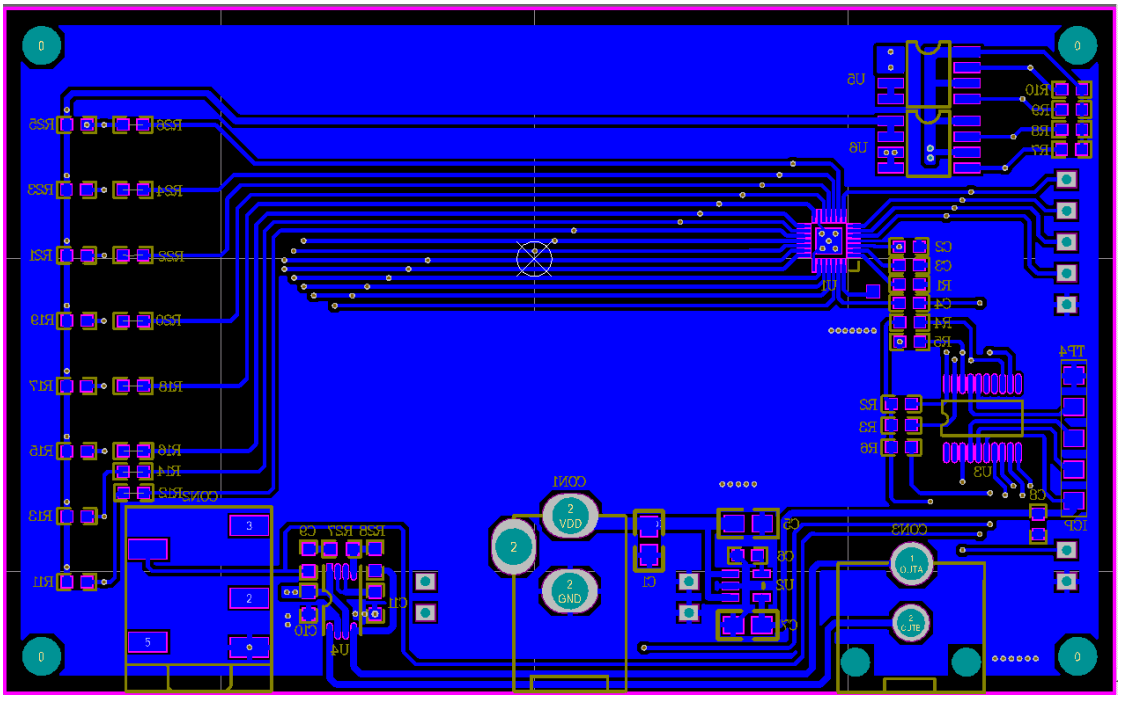

Figure 6: Board PCB Layout-Bottom Layer

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