IS31FL3732 IC DESCRIPTION

The IS31FL3732 is a compact LED driver for 144 single LEDs. The device can be programmed via an I2C compatible interface. Additionally each of the 144 LEDs can be dimmed individually with 8-bit allowing 256 steps of linear dimming.

To reduce CPU usage up to 8 frames can be stored with individual time delays between frames to play small animations automatically. LED frames can be modulated with audio signal.

IS31FL3732 IC FEATURES

- Supply voltage range from 2.7V to 5.5V
- 8 frames memory for animations
- Picture mode and animation mode
- Auto intensity breathing during the switching of different frames
- LED frames displayed can be modulated with audio signal intensity
- LED light intensity can be modulated with audio signal intensity
- QFN-40 (5mm × 5mm) package

QUICK START

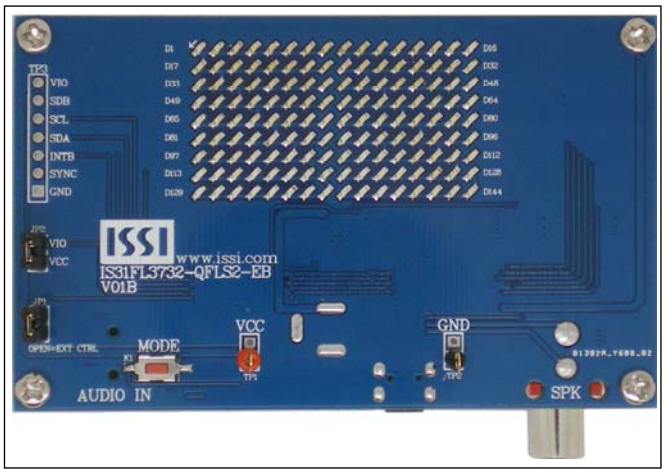

Figure 1: Photo of IS31FL3732 Evaluation Board

RECOMMENDED EQUIPMENT

- 5.0V, 2A power supply
  (Board supply voltage should be 4.5V~5.5V)
- Audio source, 3.5mm input jack
  (i.e. MP3 player, Notebook PC, etc)
- 8Ω speaker (on board or external)

ABSOLUTE MAXIMUM RATINGS

- ≤ 5.5V power supply

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

PROCEDURE

The IS31FL3732 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 an 8Ω speaker to the "SPK" connector. (If an on board speaker is not provided).
2) Connect the audio source to the "AUDIO IN" connector.
3) Connect the DC power to the connector (DC IN) or connect the power input to micro-USB jack (CON4). It is recommended to use a 5V/2A USB power source if you use the audio amplifier on the board.
   Caution: Only one supply can be on at one time otherwise risk damage to power supply.
4) Turn on/connect to the power supply.
5) Turn on the audio signal.
6) Adjust the audio source volume level for optimum evaluation board performance in equalizer mode 7.

ORDERING INFORMATION

Part No.	Temperature Range	Package
IS31FL3732-QFLS2-EB	-40°C to +85°C (Industrial)	QFN-40, Lead-free

Table 1: Ordering Information

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

EVALUATION BOARD OPERATION

The IS31FL3732 evaluation board comes preprogrammed with eight animation display sequences. Press the MODE button (K1) to cycle between the following animation sequences:

1) Firework animation
2) Lighting animation
3) Power-on animation
4) Water drop animation
5) Static graphics breathe dimming effect
6) Triangular music bar effect: more triangular music bars are displayed with stronger music.
7) Equalizer bar effect: EQ bars move up and down with music.
8) Multiple graphics display: different graphics change with music rhythm.

Note: IS31FL3732 solely controls the FxLED function on the evaluation board.

SOFTWARE CONTROL

JP1 default setting is closed (short). If it is set to open, the on-board MCU will set its I2C pins to High Impedance (open-drain). With JP1 open, the evaluation board can be driven by external I2C signals connected to TP3 to control the IS31FL3732 LED driver.

The IS31FL3732 can set its I2C bus interface logic threshold based on the voltage on the VIO pin. An external V_{IO} voltage in the range of $1.8V \le V_{IO} \le V_{CC}$ can be applied after removing (open) the JP2 jumper. The board comes with JP2 default setting closed (short). If it is set to open, the user can connect an external V_{IO} voltage supply to TP3, the external V_{IO} voltage is recommended to equal to ex-IIC's high logic.

Caution: If JP2 is closed (shorted), user can't connect the user's MCU VCC to VIO directly, otherwise the user's MCU (maybe 3.3V) will connect to evaluation bard's V_{CC} (4.5V~5V) and maybe damaged.

Jumper Switch	Setting	Operation
JP1	Open	The I2C interface is set to a high impedance state for external I2C control via TP3.
	Short	The on board MCU controls the IS31FL3732.
JP2 (Note)	Open	External DC voltage in range of $1.8V \le V_{IO} \le V_{CC}$ provides I2C logic threshold.
	Short	The $V_{IO}=V_{CC}$.

Table 2: Jumper Table

Note: The V_{IO} voltage should be in the range of $1.8V \le V_{IO} \le V_{CC}$. The V_{IO} value should equal the micro's V_{OH} value. For example, if micro V_{OH}=1.8V, then the IS31FL3732 V_{IO} should be set to 1.8V.

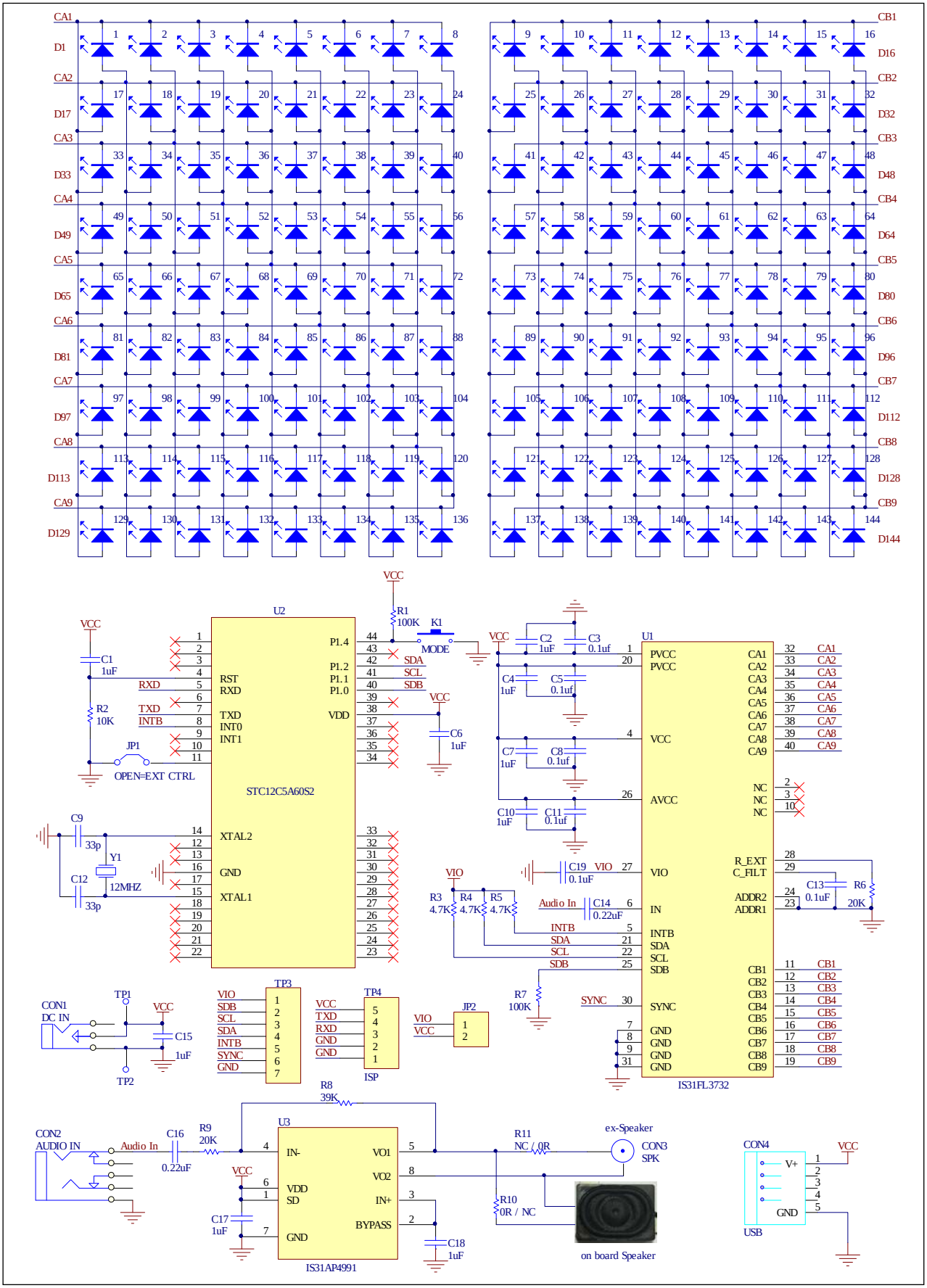

Figure 2: IS31FL3732 Application Schematic

BILL OF MATERIALS

Name	Symbol	Description	Qty	Supplier	Part No.
LED Driver	U1	Matrix LED Driver	1	ISSI	IS31FL3732
MCU	U2	Microcontroller	1	STC	STC12C5A60S2
Audio Amplifier	U3	Class- AB Audio Amplifier	1	ISSI	IS31AP4991
Diode	D1~D144	Diode, LED Blue, SMD	144	Everlight	9-217/BHC-ZL1M2RY/3T
Crystal	Y1	Crystal,12MHz,HC-49S	1		
Resistor	R6,R9	RES,20k,1/16W,±5%,SMD	2	Yageo	RC0603JR-0720KL
Resistor	R10,R11	RES,0R,1/16W,±5%,SMD or NC	2	Yageo	RC0603JR-00000L
Resistor	R3,R4,R5	RES,4.7k,1/16W,±5%,SMD	3	Yageo	RC0603JR-074K7L
Resistor	R1,R7	RES,100k,1/16W,±5%,SMD	2	Yageo	RC0603JR-07100KL
Resistor	R2	RES,10k,1/16W,±5%,SMD	1	Yageo	RC0603JR-0710KL
Resistor	R8	RES,39k,1/16W,±5%,SMD	1	Yageo	RC0603JR-0739KL
Capacitor	C1,C2,C4,C6, C7,C10,C15, C17,C18	CAP,1μF,16V,±20%,SMD	9	Yageo	CC0603KKX7R9BB105
Capacitor	C9,C12	CAP,33pF,16V, ±20%,SMD	2	Yageo	CC0603KKX7R9BB330
Capacitor	C3,C5,C8, C11,C13,C19	CAP,0.1μF,16V,±20%,SMD	6	Yageo	CC0603KKX7R9BB104
Capacitor	C14,C16	CAP,0.22μF,16V,±20%, SMD	2	Yageo	CC0603KKX7R9BB224
Onboard Speaker (If provided)	SPK1	8Ω speaker, if provided, R10=0Ω and R11=Null, if not provided, R10=Null and R11=0Ω	1		
Button	K1	Button SMD	1		
Jumper	JP1,JP2		2		
Power Connecter	CON1	Evaluation board VCC supply	1		
Audio Connector	CON2	3.5mm Audio Input	1		
RCA Connector	CON3	Ext-speaker	1		
USB	CON4	Evaluation board VCC supply	1		

Bill of Materials, refer to Figure 2 above.

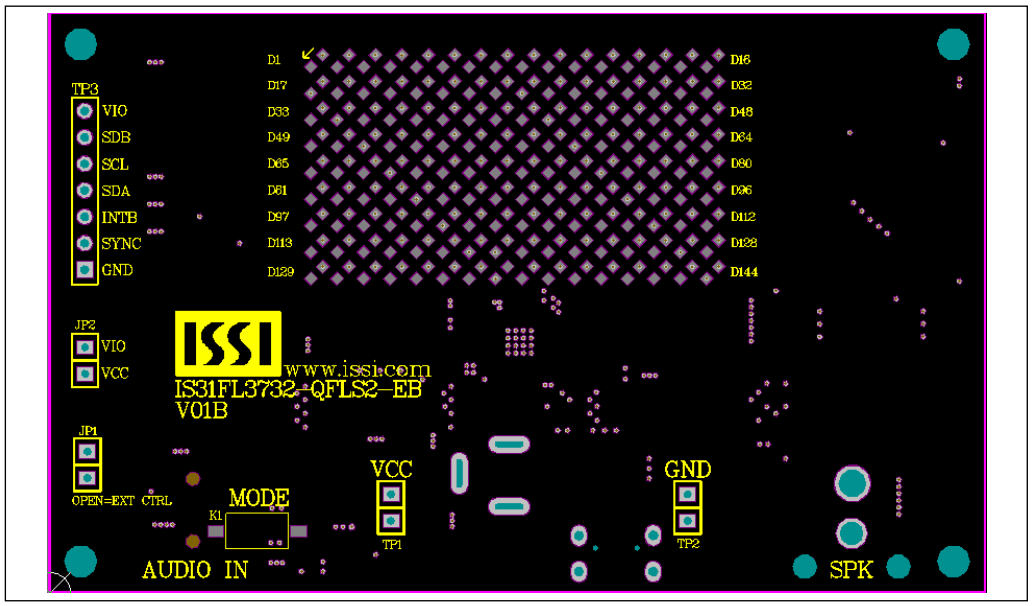

Figure 3: Board Component Placement Guide - Top Layer

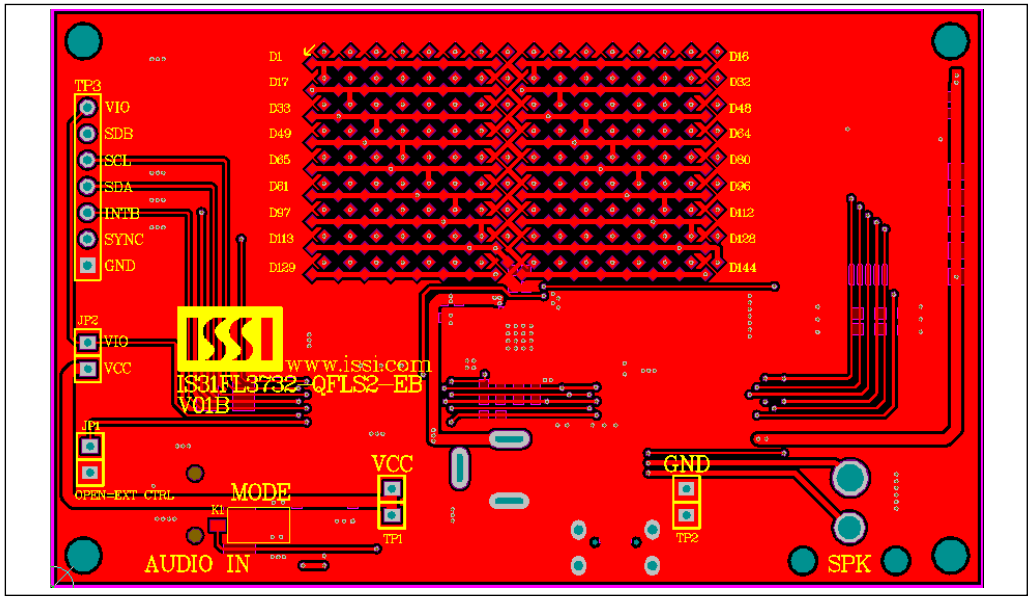

Figure 4: Board PCB Layout - Top Layer

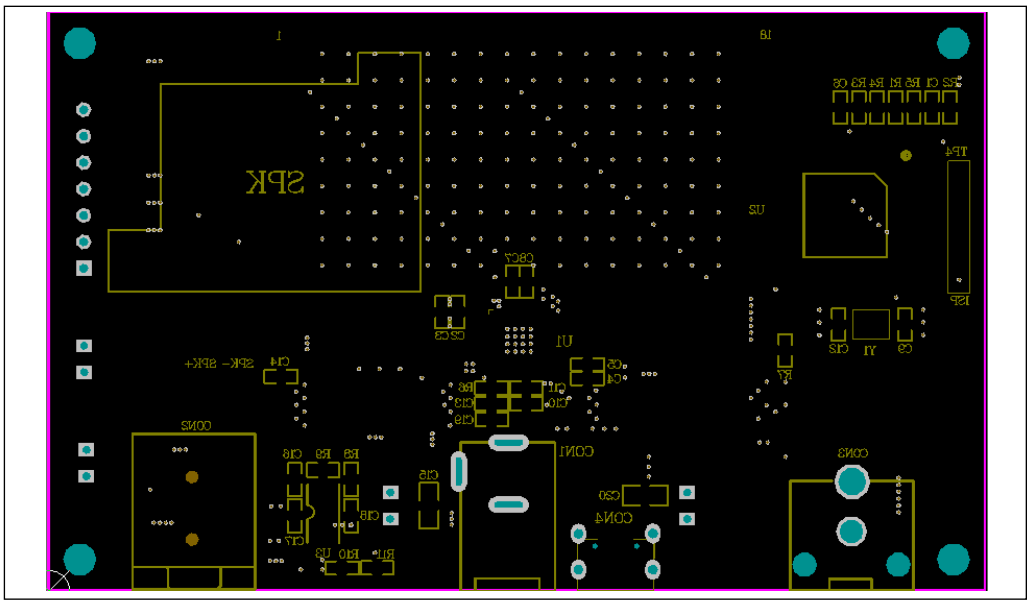

Figure 5: Board Component Placement Guide - Bottom Layer

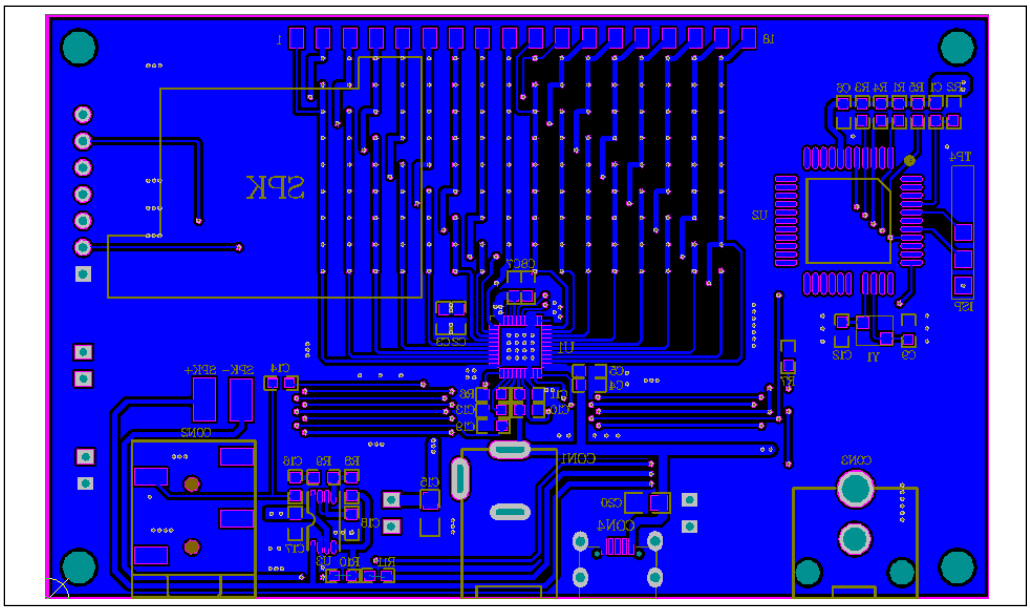

Figure 6: Board PCB Layout - Bottom Layer