Description

ES-LP55231 is 9-channel I2C LED Evaluation board. ES-LP55231 is a self-contained solution for developing and deploying the nine-channel I2C LED controller. Board is designed to daisy-chain up to four LP55231s, plus three RGB LEDs (PLCC6) or four RG LEDs (PLCC4). It also features pads and 0R0 jumpers for replacing the onboard LEDs with external ones, and configuring the I2C bus.

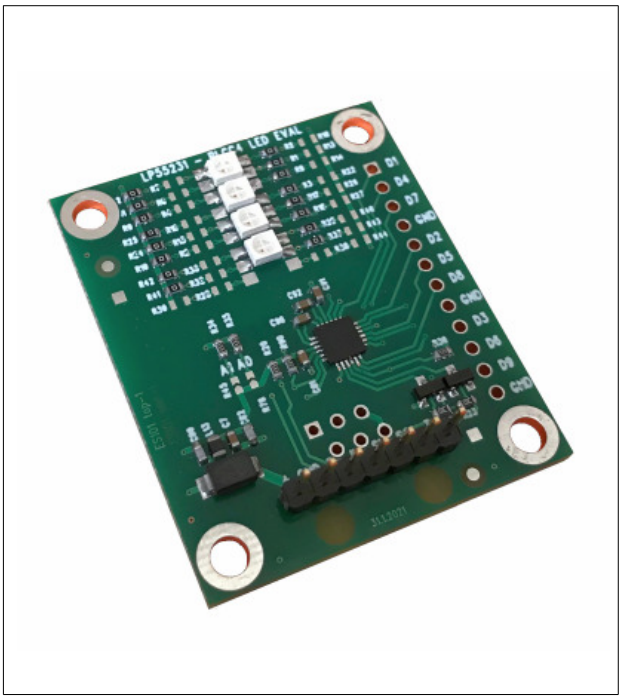
LP55231 drives the LEDs using Pulse Width Modulation (PWM), so it is well-suited for variable intensity and color-mixing applications! Driver is originally designed to be used in mobile device and automotive applications, it isn't meant to be overwhelmingly bright, and it has some unique qualities. First, there is an onboard charge-pump power supply, which allows it to drive LEDs with a forward voltage that's higher than the power supply voltage. Second, the LP55231 has an LED offload engine. This is an LED-specific microcontroller, which allows it to perform LED operations without requiring assistance from the host microcontroller. It can independently perform LED operations like chases, blinks and fades.

Operation and Communication

The ES-LP55231 supports I2C fast mode (and frequencies up to 400 kHz). The chip has 118 registers on the I2C bus, divided into several sections.

The first group of registers is used for basic control of the chip. This includes power-up and reset functionality, as well as features such as charge-pump control and onboard diagnostics that can detect open or shorted LED outputs.

Increasing in sophistication over the basics, the chip offers direct control over the LEDs. They can be turned on and off, output drive current can be set, and groups of LEDs can be controlled together using master faders.



Finally, there are the execution engines. Their register interface includes random-access memory that holds the program, and registers that control when and how they run.

Features

- ✔ wide supply voltage range (2.7 V to 5.5 V)
- ✔ I2C Interface with speeds up to 400kHz
- ✔ Arduino & Raspberry compatible
- ✔ External LEDs Supported:
  - Keyes KY-009 RGB SMD LED 5050
  - Keyes KY-016 RGB LED Module

Absolute Minimum and Maximum Ratings

Stress levels beyond those listed in Table may cause permanent damage to the device or affect the reliability of the sensor. These are stress ratings only and functional operation of the device at these conditions is not guaranteed. Ratings are only tested each at a time.

Parameter	Rating	Units
Rating Units Supply voltage VDD	−0.3 to 6	V
Max Voltage on pins (VDD excluded)	−0.3 to VDD+0.3 with 6V maximum	V
Input current on any LED pin	25.5	mA
Operating temperature range	−30 to 85	℃

Board Configuration

Config	Address (7bit)	Address (8bit) Write/Read
A1: R45=open A0: R78=open	0x32 (default)	0x64/0x65
A1: R45=open A0: R78=short	0x33	0x66/0x67
A1: R45=short A0: R78=open	0x34	0x68/0x69
A1: R45=short A0: R78=short	0x35	0x6A/0x6B

Connector Assignment

J1 (Pin Header)	J35 (RJ11 type)	Signal	Notes
1	1, 2	VCC	Supply voltage
2	5, 6	GND	Ground
3	-	EN	Enable. (pull-up 47kOhm)
4	-	INT	Interrupt for MCU; leave unconnected if not used. (pull-up 47kOhm)
5	4	SDA	Serial interface data. (pull-up 10kOhm)
6	3	SCL	Serial interface clock. (pull-up 10kOhm)
7	-	TRIG	Trigger. Connect to ground if not used. (pull-down 47kOhm)

Ordering Information

Name	Connector	Description
ES-LP55231-ES101OP1A	7-pin header	4xRG LED PLCC4 [ESLT5K63-AB-R1G4-18275]
ES-LP55231-ES101OP1B	RJ11 connector	4xRG LED PLCC4 [ESLT5K63-AB-R1G4-18275]

Mechanical Solution