

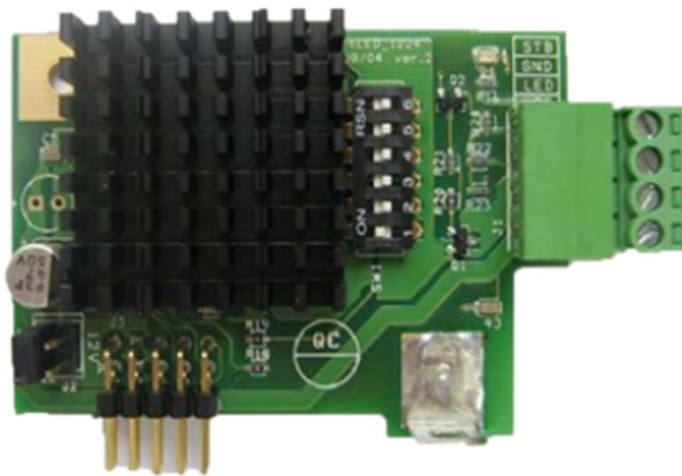


# Smart LED controller 2.0 For AOI

## Model: SmartLED-1224

User's Manual

Version: 2.2 2022-12-01



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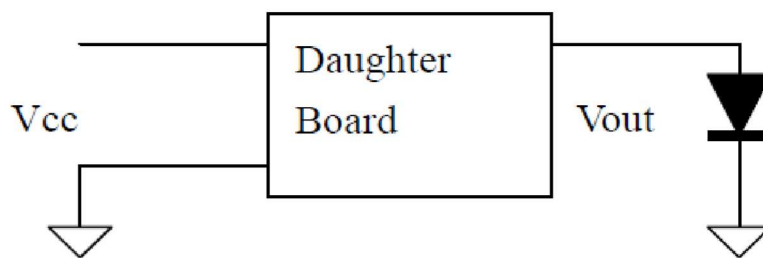
## List of contents

1. Features .....	3
2. Electrical Specification.....	4
3. Pin definition.....	5
4. Calculation of external resister to reduce voltage difference.....	7
5. High-speed flash LED using STB terminal .....	8
6. Connection of common cathode LED module .....	9



## 1. Features

- A daughter driver board for modularized SmartLED controller.
- Jumper 2 can select the voltage source to be 12V or 24V.
- DIP switch can select the maximal current from 25mA to 689mA to increase current resolution.
- When the LED current is larger than 100mA, the voltage difference at LED output terminal (Vout) and the power supply (Vcc) should not exceed 2 Volt. The method of using external resistor to comply this rule is described in Chapter 4. If the voltage difference is greater than 2 volt and the current larger than 100mA, this board may shut down due to over temperature.





## 2. Electrical Specification

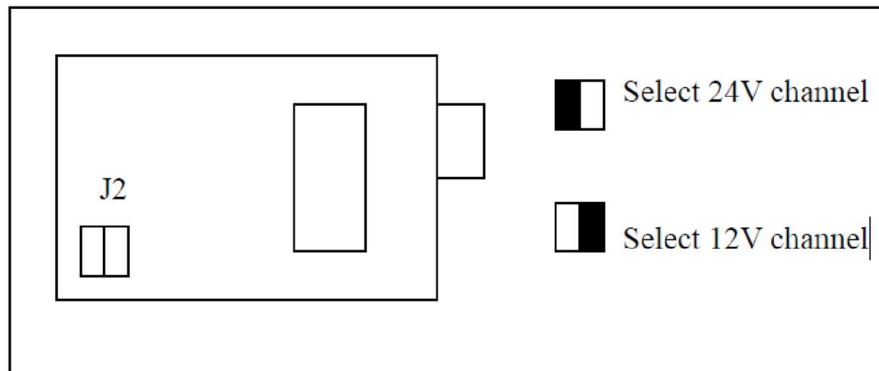
Item	Value	Unit
Supply voltage Vcc	8~30	V
Maximal output current	25~680 **	mA
Maximal output voltage @ 650 mA	Vcc-2.5	V
Maximal output voltage @ 25 mA	Vcc-1.5	V
LED connection	Common cathode	
Operation condition	0~70 °C	20~90% Humidity

\*\* : See setting of SW1 for detail.



### 3. Pin definition

#### J2: jumper for voltage selection



Note : J2 is used to select the voltage source from mother board. Actually, the 12V or 24V is the name for distinguishing these two channel. You can input voltage of 8~24V to V12 or V24 terminals of mother board.

#### SW1: DIP switch for maximal current selection

Pin1	Pin2	Pin3	Pin4	Pin5	Pin6	Maximal current
1	0	0	0	0	0	25 mA
1	0	0	1	0	0	50 mA
0	1	0	0	0	0	120 mA
0	1	0	0	1	0	240 mA
0	0	1	0	0	0	195 mA
0	0	1	0	0	1	390 mA
1	1	0	0	0	0	145 mA
1	1	0	1	1	0	290 mA
1	0	1	0	0	0	215 mA
1	0	1	1	0	1	430 mA
0	1	1	0	0	0	315mA
0	1	1	0	1	1	630 mA



1	1	1	0	0	0	340 mA
1	1	1	1	1	1	680mA

Note: The setting of DIP switch must be the same as above table. Otherwise, the daughter board may be destroyed.

**J1: LED connector**

Pin No.	Name	Function
1	VCC	Voltage source input (may not be connected if the power from V12 or V24 terminal of mother board)
2	LED	Output terminal to LED (LED+)
3	GND	Return terminal from LED (LED -) / Power ground (GND)
4	STB	Strobe control input pull high to VCC through a 10K resistor.





#### **4. Calculation of external resistor to reduce voltage difference**

When the voltage difference between forward voltage of LED and the power supply voltage is too large, there is considerable power need to be dissipated by the daughter board itself. This may lead to power stage shut down due to over temperature. The method to reduce this voltage difference is to add external resistor so that part of the power may dissipate by the resistor, not only by the power stage.

An example is given as follows to show the detailed calculation.

LED: six 1Watt White ( $V_f=3V$ ) LED in series

LED forward voltage  $V_{ft}=6 \times 3V=18V$

LED current is  $I_c: 1Watt/3V = 0.33A$

Power supply voltage is  $V_{cc} = 24 V$

Resistance of the external resistor for voltage difference **2 V** can be deduced as

Resistance:

$$R=(V_{cc}-V_{ft}-2)/I_c=(24-18-2)/0.33=12 \text{ ohm}$$

Power rating of the external resistor is thus given as

$$W=I_c \times I_c \times R=0.33 \times 0.33 \times 12=1.3 \text{ Watt (You can select 2W package)}$$

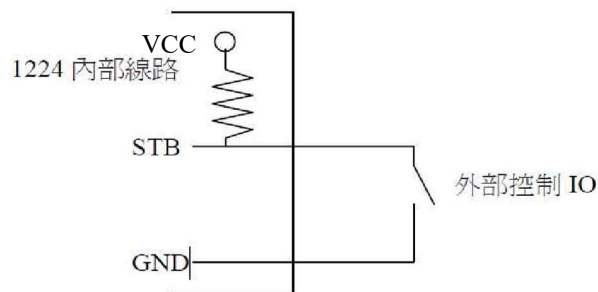


## 5.High-speed flash LED using STB terminal

The STB terminal on J1 is used to strobe the LED for high speed flashing. Use external open-collector digital output to turn ON/OFF the current output to LED.

- **Open: output current to LED**
- **Short: stop outputting current to LED**

\* : The response time is smaller than 1us of this strobe. However, some LED module has multiple series of LED which needs more time to turn ON/OFF due to high-current payload. Some experiment is necessary to determine the actual turn ON/OFF time.







## 6. Connection of common cathode LED module

When the LED module is composed of multiple series of LED branches with common cathode connection, you may use multiple daughter boards to drive the branches separately. The detailed connection is shown as follows.

