Leadshine

SDM660

2 / 4 Phase Stepper Drive Module

Version 1.1

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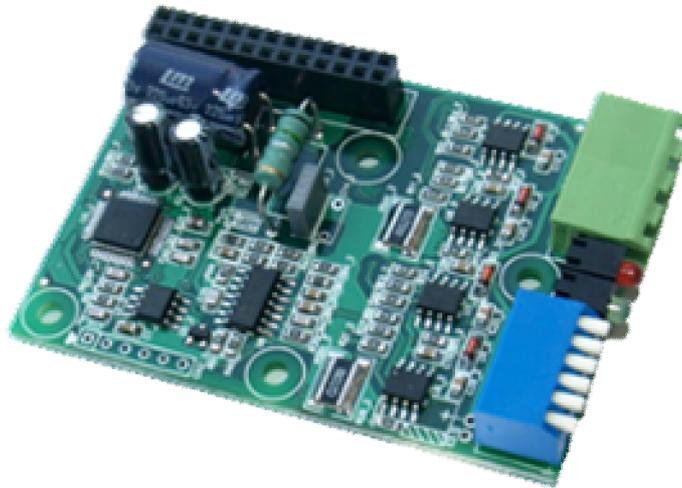
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Notice

Read the datasheet before any assembling and using. Incorrect handling of products in this manual can result in injury and damage to persons and machinery. Strictly adhere to the technical information regarding installation requirements.

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Record of Revisions

Revision	Date	Description of Release
1.0	*10/2013*	*Initial Release.*
1.1	*11/2014*	*Updated information for output current settings/table.*

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1. Features

- Specially designed to be integrated into custom OEM motion control systems
- Step & direction control
- Input voltage of 20-60VDC
- Maximum output current of 6.0Amp
- Capable of powering 2 or 4 phase NEMA 17, 23, 24, 34 stepper motors
- 8 output current settings: 1.41, 2.12, 2.83, 3.54, 3.96, 4.24, 4.95, 6.0 A **(version1.0b, it's the latest and default version for future)**, corresponding RMS current settings: 1.0, 1.5, 2.0, 2.5, 2.8, 3.0, 3.5, 4.25A
- 8 output current settings: 1.45, 2.08, 2.72, 3.37, 4.05, 4.72, 5.35, 6.0 A **(for previous version1.0a)**
- 8 micro step resolution settings of 200 – 12800 via DIP switches
- Anti resonance, high precision, extra low motor heating, low noise, smooth motor movement
- Built-in short circuit, over-current and over-voltage protection
- Compact size
- 50% auto idle current reduction

2. Description

The Leadshine SDM660 is a stepper drive module specially designed to be integrated into custom motion control systems of OEM applications. When supplied with 5VDC and 15 VDC power, the SDM660 step drive module can function as a high performance single axis stepper drive to power 2 (1.8°) or 4 (0.9°) phase stepper motors of frame sizes NEMA 17, 23, 24, and 34. It can take 20-60 VDC input voltage and output up to 6.0A current. With the simple-to-use DIP switches, a user can easily configure the output current or micro step resolution to one of the 8 preset settings, which is 1.41-6.0A and 200-12,800 (full step to 1/64 microstep).

By adopting Leadshine's advanced stepper motor control algorithm based on the latest DSP technology, the SDM660 is featured with high precision, compact size, anti resonance, excellent performance in all speed range, extra low motor heating & noise, anti resonance, smooth movement.

The SDM660 is easy to implement by taking step & direction. Due to its compact size and high flexibility to be implemented, the SDM660 is ideal for OEM customers to build their own custom motion control systems for stepper motor controls. The SDM660 is also used in Leadshine multiple axis stepper drives such as the MX3660 3-axis stepper drive and MX4660 4-axis stepper drive. When one of the stepper drive modules is broken or malfunction, a user can simply replace it with a SDM660.

3. Electrical Specifications

Parameter	Min	Typical	Max	Unit
Input Voltage	20	48	60	VDC
Output Current	1.41	-	6.0	A
Pulse Input Frequency	0	-	200	kHz
Pulse Voltage	0	5	5	VDC
Logic Signal Current	7	10	16	mA
Isolation Resistance	100	-	-	MΩ

4. Mechanical Specifications
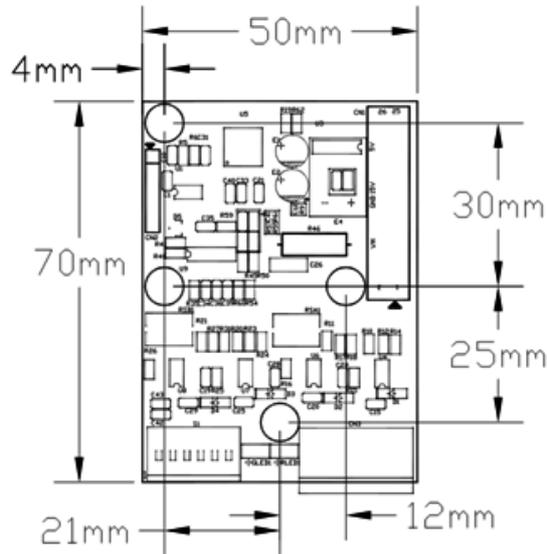
Figure 1

5. Operating Environment

Cooling	Natural cooling or forced cooling	
Operating Environment	Environment	Avoid dust, oil fog and corrosive gases
	Ambient Temperature	0 - 40 $^{\circ}$C (32 - 104 $^{\circ}$F)
	Humidity	40 - 90% RH
	Operating Temperature	70° C (158 $^{\circ}$ F) Max
Storage Temperature	-20 - 65 $^{\circ}$C (-4－149 $^{\circ}$ F)	

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6. Connectors and Pin Location
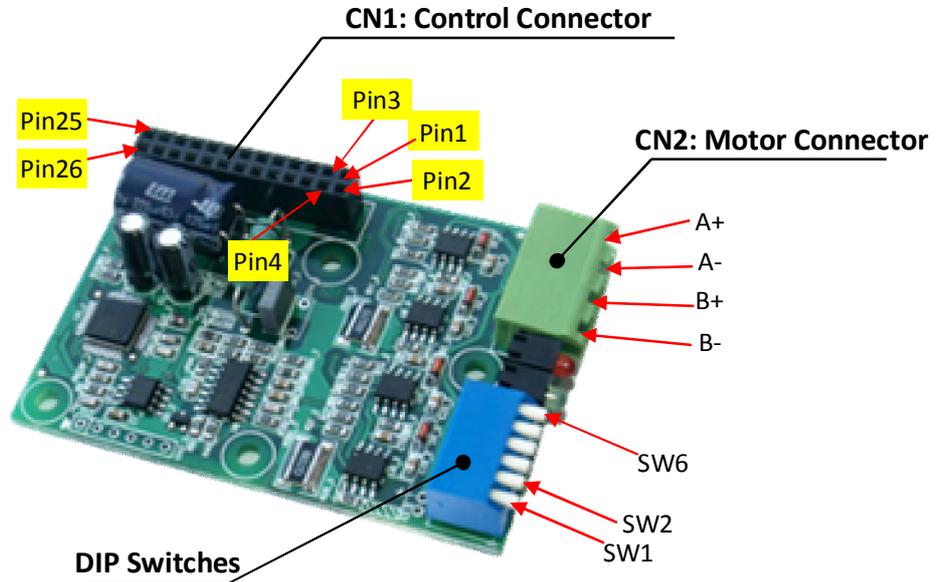
Figure 2

6.1 CN1: Control Connector

Pin	Name	I/O	Description
1	GND	-	Ground
2	GND	-	Ground
3	NC	-	No connection
4	NC	-	No connection
5	+VM	-	
6	+VM	-	
7	+VM	-	Motor power Input, 20 - 60VDC Max, 48VDC recommended
8	+VM	-	
9	NC	-	No connection
10	NC	-	No connection
11	GND	-	Ground
12	GND	-	Ground
13	GND	-	Ground
14	GND	-	Ground
15	GND	-	Ground
16	+15V	I	+15V logic power input, 200mA at the least.
17	GND	-	Ground
18	GND	-	Ground
19	GND	-	Ground

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20	SMOOTHER	I	Enable / disable step smoother. High level (2.2-3.3V): Enable，Low level(0-0.5V): disable
21	FAULT	O	Fault signal output, sink or source 4mA MAX. Low level: 0-0.5V, High level: 2.2-3.3V
22	+5V	I	+5V logic power input, 400mA at the least
23	E-STOP	I	Emergency stop, active high level. The power stage will be turned off when this input is active. Short it the GND if this function is not required. Low level: 0-0.5V, high level: 2.2-3.3V.
24	M-STOP	I	Motor stop, active low level. The motor still has holding torque when it is active. Connect it 3.3V if this function is not required. Low level: 0-0.5V, high level: 2.2-3.3V.
25	DIRECTION	I	Direction signal. Low level: 0-0.5V, high level: 2.2-3.3V. The DIR signal should be 5us ahead of the pulse signal.
26	STEP	I	Step signal. Low level: 0-0.5V, high level: 2.2-3.3V. Bandwidth: 200Khz. Minimum step width: >2.5uS.

6.2   CN2: Motor Connector

CN3-Motion Connector: Screw terminal			
Pin	Name	I/O	Description
1	A+	O	Motor phase A+
2	A-	O	Motor phase A-
3	B+	O	Motor phase B+
4	B-	O	Motor phase B-

7.   *Protection Indications*

When a SDM660 stepper drive motor functions normally, the green LED light will be green when powered on. In any case that one of the following protections is activated, the red LED will blink periodically (every 4 seconds) to indicate the error type. For each blink, the red LED light will be on for 0.2 second and then off for 0.3 second.

Priority	Time(s) of Blink	Sequence wave of red LED	Description
1st	1		Over-current protection activated
2nd	2		Over-voltage protection activated
3rd	3		Emergency stop activated
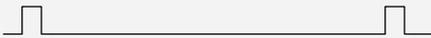
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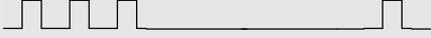
8. DIP Switch Settings

The SDM660 stepper drive module has a 6-bit DIP switch (see figure 2), where bits 1-3 are used for output current configuration and bits 4-6 are used for micro step resolution configuration.

The SDM660 has two versions. The main difference is current output, as shown below. Table 1 is for the drives with firmware V1.0b (It's the latest version or default version.), and Table 2 is for the drives with firmware V1.0a. See the following tables for their definition.

8.1. Current Setting (SW1-SW3)

For a stepper drive module (V1.0b)

Peak	RMS	SW1	SW2	SW3
1.41A	1.00A	on	on	on
2.12A	1.50A	off	on	on
2.83A	2.00A	on	off	on
3.54A	2.50A	off	off	on
3.96A	2.80A	on	on	off
4.24A	3.00A	off	on	off
4.95A	3.50A	on	off	off
6.00A	4.25A	off	off	off

Table 1   Output current settings for a stepper drive module (V1.0b)

For a stepper drive module (V1.0a)

Peak	RMS	SW1	SW2	SW3
1.45A	1.04A	on	on	on
2.08A	1.48A	off	on	on
2.72A	1.94A	on	off	on
3.37A	2.41A	off	off	on
4.05A	2.89A	on	on	off
4.72A	3.37A	off	on	off
5.35A	3.82A	on	off	off
6.00A	4.29A	off	off	off

Table 2   Output current settings for a stepper drive module (V1.0a)

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8.2. Micro Step Resolution Setting (SW4-SW6)

Steps / Rev	SW4	SW5	SW6
200	On	On	On
400	Off	On	On
800	On	Off	On
1600	Off	Off	On
2000	On	On	Off
3200	Off	On	Off
6400	On	Off	Off
12800	Off	Off	Off

Table 3   Microstep resolution setting

9. Typical Connections

When implemented properly, the SDM660 stepper drive module can be used to power 2 (1.8°) or 4 (0.9°) phase stepper motors of NEMA 17, 23, 24, and 34. The following picture illustrates a typical connection when it is used to power a 2 phase stepper motor.

Figure 3

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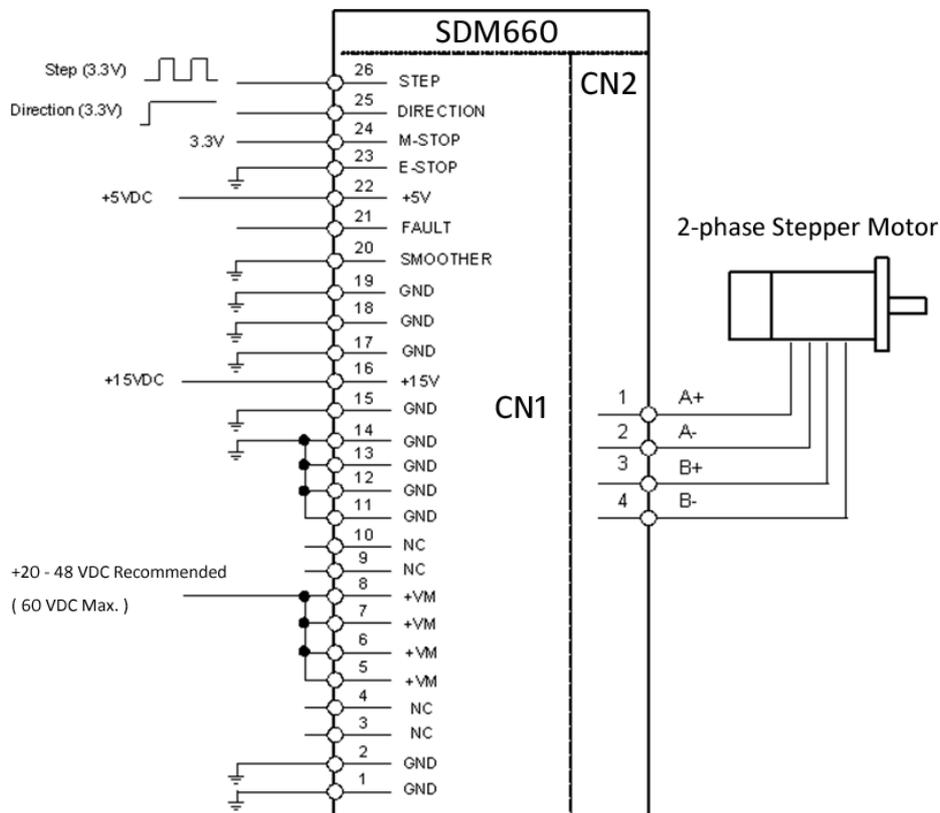Web:www.leadshine.com   Email:sales@leadshineusa.com

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