

Getting started with the X-NUCLEO-IHM05A1 L6208-based bipolar stepper motor driver expansion board for STM32 Nucleo

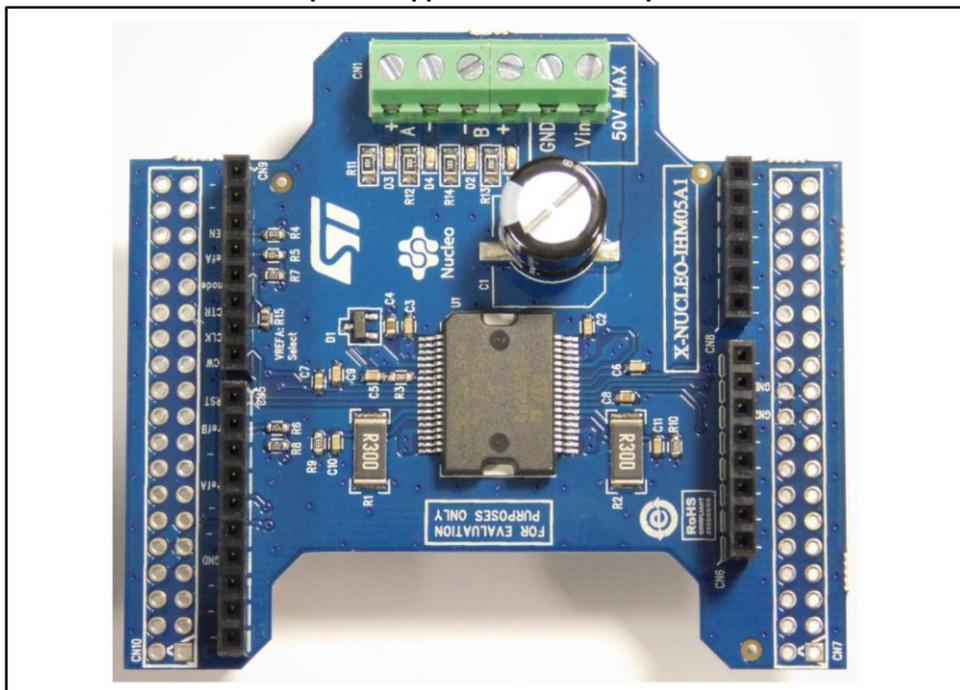
Introduction

The X-NUCLEO-IHM05A1 is a bipolar stepper motor driver expansion board based on the L6208 DMOS driver for bipolar stepper motors.

It provides an affordable and easy-to-use solution for driving bipolar stepper motors in your STM32 Nucleo project.

The X-NUCLEO-IHM05A1 is compatible with the Arduino UNO R3 connector, and supports the addition of other STM32 expansion boards with a single STM32 Nucleo board. The user can also mount the ST Morpho connector.

Figure 1: X-NUCLEO-IHM05A1 bipolar stepper motor driver expansion board based on the L6208



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1 Getting started

The X-NUCLEO-IHM05A1 expansion board for STM32 Nucleo is a bipolar stepper motor driver covering a wide range of applications. In particular, the maximum ratings of the board are the following:

- Power stage supply voltage (VS) from 8 V to 50 V
- Motor phase current up to 2.8 A r.m.s.

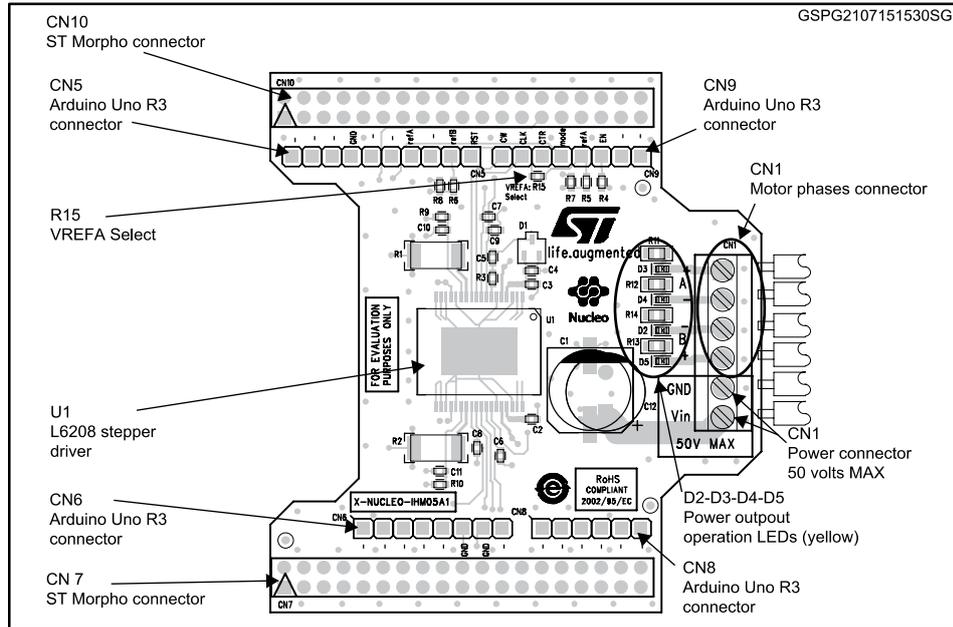
Follow this sequence to start your project with the board:

1. Check the jumper position based on your configuration (see [Section 2: "Hardware description and configuration"](#))
2. Connect the X-NUCLEO-IHM05A1 with the STM32 Nucleo board through Arduino UNO R3
3. Supply the board through the input 6 (VS) and 5 (ground) of the connector CN1
4. Develop your application using the examples provided with the firmware library, X-CUBE-SPN5

Further support material is available on the L6208 and the STM32 Nucleo web pages on www.st.com.

2 Hardware description and configuration

Figure 2: Jumper and connector position



The following table provides the detailed pinout of the Arduino UNO R3 and ST Morpho connectors.

Table 1: Arduino UNO R3 connector table

Connector	Pin ⁽¹⁾	Signal	Remarks
CN5	1	Reset L6208	
	2	VREF B	
	4	VREF A	See Section 2.1: "Board setup"
	7	Ground	
CN9	3	Enable	
	4	VREF A	See Section 2.1: "Board setup"
	5	HALF/FULL	
	6	CONTROL	
	7	CLOCK	
CN6	6	Ground	
	7	Ground	

Notes:

⁽¹⁾All non-listed pins are not connected.

Table 2: ST Morpho connector table

Connector	Pin ⁽¹⁾	Signal	Remarks
CN10	9	Ground	
	15	VREF A	See Section 2.1: "Board setup"
	19	VREF B	
	21	Reset L6208	
	23	CW/CCW	
	25	CLOCK	
	27	CONTROL	
	29	HALF/FULL	
	31	VREF A	See Section 2.1: "Board setup"
	33	Enable	
CN7	20	Ground	
	22	Ground	

Notes:

⁽¹⁾All non-listed pins are not connected.

2.1 Board setup

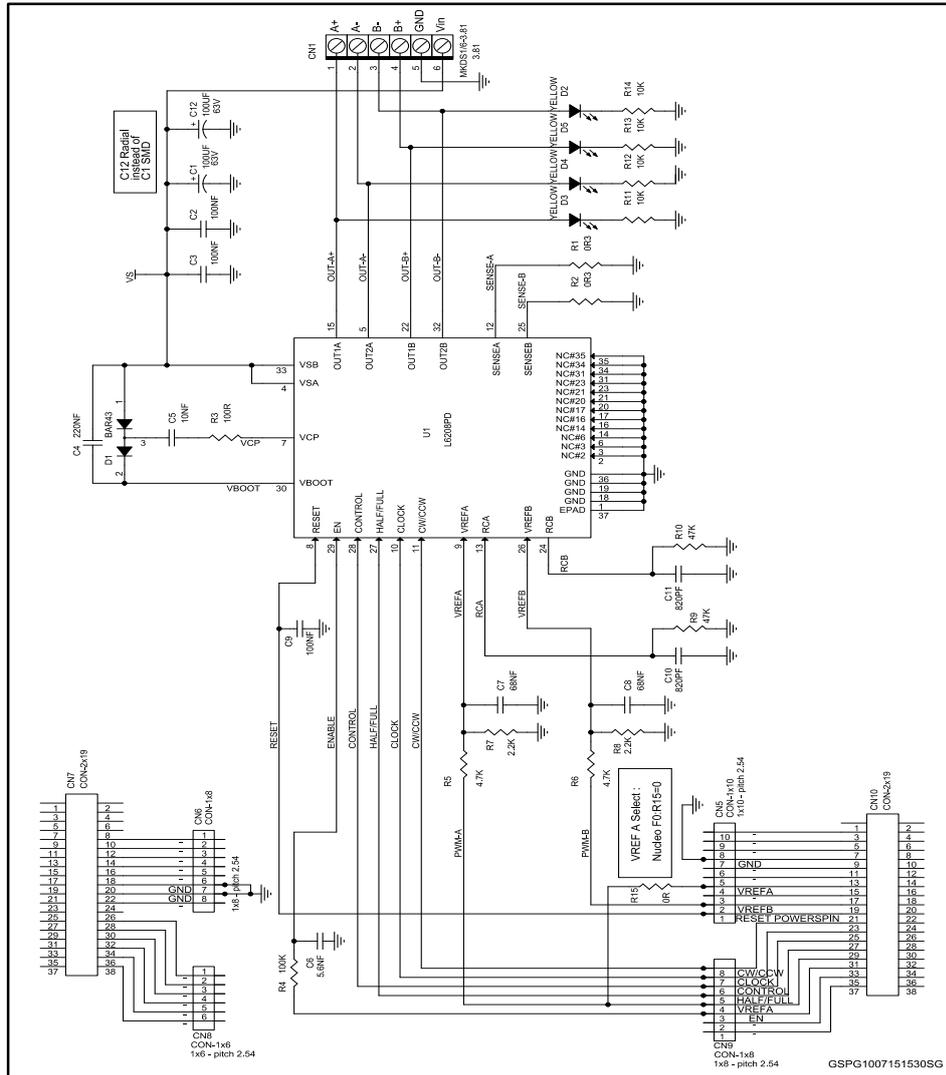
The X-NUCLEO-IHM05A1 STM32 expansion board is designed to operate with all STM32 Nucleo boards thanks to its Arduino UNO R3 connector.

Some STM32 Nucleo boards generate the VREFA reference using pin 4 of CN9 (pin 31 of CN10), while other boards use pin 4 of CN5 (pin 15 of CN10). By default, both pins are connected to the VREFA pin of the motor driver, so the board is ready to use.

If the driving STM32 Nucleo board uses pin 4 of CN9 (pin 31 of CN10) for reference generation, pin 4 of CN5 (pin 15 of CN10) can be left at user disposal by removing the 0-ohm R15 resistor.

3 Schematic diagram

Figure 3: X-NUCLEO-IHM05A1 circuit schematic



4 Bill of material

Table 3: Bill of material (part 1)

Item no.	Qty	Reference	Part / value	Voltage	Type/ technology info	Tolerance
1	1	C1	Not mounted	63 V	Aluminum	20%
2	3	C2, C3, C9	100 NF	50 V	Ceramic	15%
3	1	C4	220 NF	35 V	Ceramic	15%
4	1	C5	10 NF	50 V	Ceramic	15%
5	1	C6	5.6 NF	50 V	Ceramic	15%
6	2	C7, C8	68 NF	50 V	Ceramic	10%
7	2	C10, C11	820 PF	50 V	Ceramic	15%
8	1	C12	100 UF	63 V	Aluminum	20%
9	1	CN1	MKDS1/6-3.81		Screw connector	
10	1	CN5	CON-1x10		Header	
11	2	CN6, CN9	CON-1x8		Header	
12	2	CN7, CN10	Not mounted		Header	
13	1	CN8	CON-1x6		Header	
14	1	D1	BAR43		Diode	
15	4	D2, D5	YELLOW		LED	
16	2	R1, R2	0R3	2 W	CMS	1%
17	1	R3	100 R	1/10 W	CMS	5%
18	1	R4	100 K	1/10 W	CMS	5%
19	2	R5, R6	4.7 K	1/10 W	CMS	5%
20	2	R7, R8	2.2 K	1/10 W	CMS	5%
21	2	R9, R10	47 K	1/10 W	CMS	5%
22	4	R11, R14	10 K	1/2 W	CMS	5%
23	1	R15	0R	1/10 W	CMS	5%
24	1	U1	L6208PD		Motor driver	

Table 4: Bill of material (part 2)

Item no.	Package	Orderable part number	Notes
1	EEEFK1J101P	Panasonic	EEEFK1J101P
2	C0603		
3	C0603		
4	C0603		
5	C0603		
6	C0603		
7	C0603		
8	ECA1AHG471	Nichicon	UVR1J101MPD
9	MKDS1/6-3.81	Phoenix Contact	MKDS1/6-3.81
10	SSQ110-03	SAMTEC	SSQ-110-04-F-S
11	SSQ108-03	SAMTEC	SSQ-108-04-F-S
12	SSQ119-04D	SAMTEC	SSQ-119-04-L-D
13	SSQ106-03	SAMTEC	SSQ-106-04-F-S
14	BAR43	STMicroelectronics	BAR43SFILM
15	LEDC-0603		
16	R2512	Bourns	CRM2512-FX-R300ELF
17	R0603		
18	R0603		
19	R0603		
20	R0603		
21	R0603		
22	R0805		
23	R0603		
24	L6208PD	STMicroelectronics	L6208PD

5 Revision history

Table 5: Document revision history

Date	Revision	Changes
07-Aug-2015	1	Initial release.

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