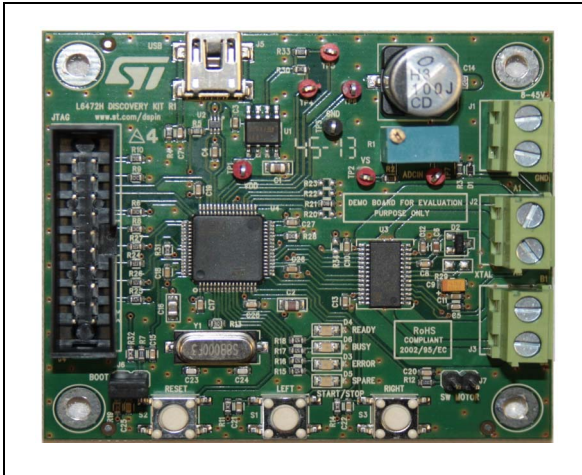# EVAL6472H-DISC

dSPIN™ Discovery: development tool to explore dSPIN™ (L6472) motor driver

Data brief

Description

The dSPIN™ Discovery is a low cost development tool to explore the dSPIN™ (L6472) motor driver.

An ideal starter-kit for both beginners and experienced users, it is autonomous and can be used with a software interface or with a custom firmware thanks to the embedded microcontroller.

Through the available GUI the user can easily set the full configuration of application parameters.

"Plug and Play" tool it offers high motor control flexibility thanks to the wide operating voltage range from 8 V to 45 V and the current capability up to 3 $A_{r.m.s}$. It is equipped with LED indicators for specific ready, busy, error warning.

Features

- STMicroelectronics® patented advanced current control
- Fully autonomous solution embedding an STM32™ MCU and the L6470H stepper motor driver
- Compatible with SPIN family evaluation software
- Wide voltage range from 8 V to 45 V
- High phase current up to 3 $A_{r.m.s}$
- Footprint for external resonator or crystal
- Switch motor input control
- Keys start/left - stop/right - reset
- Ready, busy, error LED indicators
- Spare LED indicators for specific design
- Adjustable supply voltage compensation
- Up to 1/16 microstepping

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Board description

Table 1. Electrical specifications

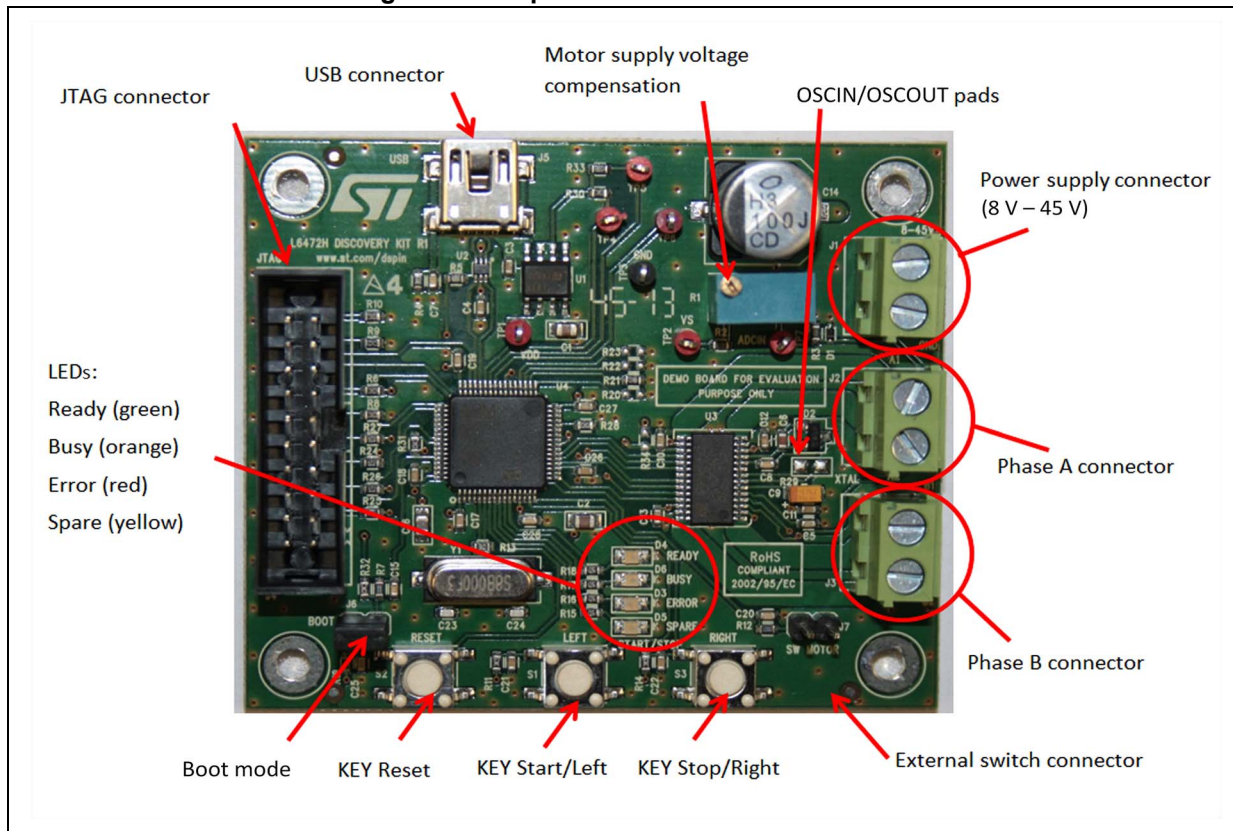| Parameter	Value
Supply voltage (V_S)	8 to 45 V
Maximum output current (each phase)	3 $A_{r.m.s}$
Logic supply voltage (V_{REG})	3 V (internal supply)
Logic interface voltage (V_{DD})	3.3 V (internal supply)
Low level logic inputs voltage	0 V
High level logic input voltage	V_{DD}
Stepping	Up to 1/16 microstepping
Operating temperature	-25 to 125 °C

Figure 1. Jumper and connector locations

Table 2. Jumpers and connectors

Name	Function
J1	Motor supply voltage
J2	Bridge B output
J3	Bridge A output
J4	Debug JTAG function
J5	USB function
J6	Boot mode
J7	External switch input
R29	OSCIN and OUSCOUT pins
TP1	V_{DD} - logic supply voltage
TP2	V_S - motor supply voltage
TP3	GND - ground test point
TP4	UART RX - debug test point
TP5	UART TX - debug test point
TP6	UART CK - debug test point
TP7	Motor voltage compensation test point

Table 3. JTAG connector pinout (J4)

Name	Type	Function
1-2	Supply	EXT_VDD
3	Digital I/O	External RESET
5	Digital I/O	INPUT (TDI)
7	Digital I/O	Mode select (TMS)
9	Digital I/O	Clock (TCK)
13	Digital I/O	OUTPUT (TDO)
15	Digital I/O	Internal RESET
11 - 17 - 19	Digital I/O	Pull down
4 - 6 - 8 - 10 - 12 - 14 - 16 - 18 - 20	Ground	Ground

Figure 2. Schematic (microcontroller control part)

AM03395

Figure 3. Schematic (motion control part)
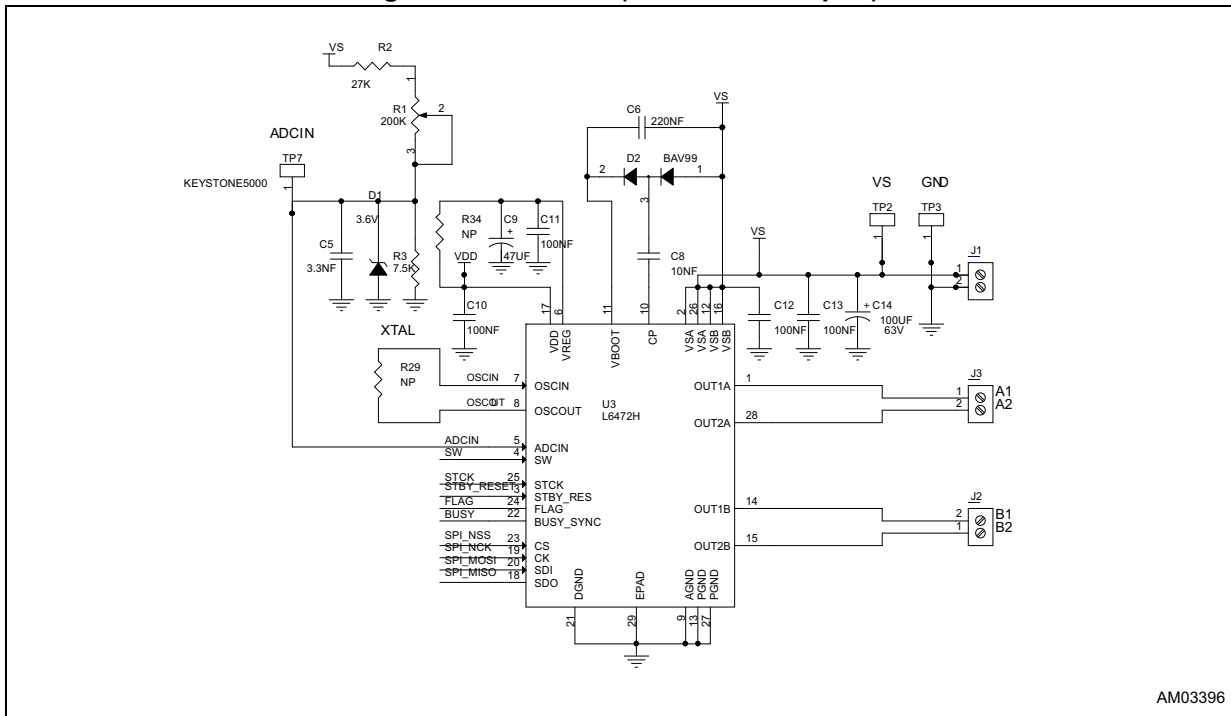
AM03396

Table 4. Bill of material

Item	Quantity	Reference	Value	Package
C1, C16	2	Cap. cer. 10 µF 10 V X7R 0805	10 µF	0805
C2	1	Cap. cer. 1 µF 10 V X7R 0805	1 µF	0805
C3, C4, C10 - C13, C17 - C19, C21, C22, C25 - C27	14	Cap. cer. 100 nF 50 V X7R 0603	100 nF	0603
C5	1	Cap. cer. 3.3 nF 50 V X7R 0603	3.3 nF	0603
C6	1	Cap. cer. 220 nF 35 V X7R 0603	220 nF	0603
C7	1	Cap. cer. 4.7 nF 50 V X7R 0603	4.7 nF	0603
C8, C15, C20, C28	4	Cap. cer. 10 nF 50 V X7R 0603	10 nF	0603
C9	1	Cap. tant. 47 µF 6.3 V 10% PACK-A	47 µF	3216
C14	1	Cap. elect.100 µF 63 V	100 µF	CAPES-R10HXX
C23, C24	2	Cap. cer. 20 pF 50 V COG 0603	20 pF	0603
D1	1	Zener regulator	3.6 V	SOD 523
D2	1	Double diode high speed switching diode	BAV99	SOT23
D3	1	LED red - 0805 -2 mcd - 621 nm	Red	0805
D4	1	LED green - 0805 - 6 mcd - 569 nm	Green	0805
D5	1	LED yellow - 0805 -6 mcd - 588 nm	Yellow	0805
D6	1	LED orange - 0805 -2 mcd - 602 nm	Orange	0805
FIX1 - FIX4	4	Hole		-
J1 - J3	3	Screw connector 2 poles MKDSN 1.5 / 2 - 5.08	MKDSN1.5 / 2 - 5.08	MKDSN1.5 / 2 - 5.08
J4	1	JTAG CON-FLAT-10 x 2 - 180 M	CON-FLAT-10 x 2 - 180 M	CON-FLAT-10 x 2 -180 M
J5	1	USB_B_MINI_AMP_1734035-1	CN-USB	CMS mini-USB
J6, J7	2	JUMP254P-M-2	Open	Strip 2 x 2.54
MIRE1 - MIRE3	3	OPTICAL_TARGET	OPTICAL_TARGET	Diam. 1 mn
R1	1	Trimmer 200 KΩ	200 KΩ	Trimm. 100 x 50 x 110
R2	1	27 KΩ 5% 1/10 W	27 KΩ	0603
R3	1	Res. 7.5 KΩ 5% 1/10 W 0603 SMD	7.5 KΩ	0603
R4, R13	2	Res. 1 MΩ 1/10 W 5% 0603 SMD	1 MΩ	0603

Table 4. Bill of material (continued)

Item	Quantity	Reference	Value	Package
R5	1	Res. 1.5 KΩ 1/10 W 5% 0603 SMD	1.5 KΩ	0603
R6, R8 - R11, R14, R19, R30 - R32	10	Res. 10 KΩ 5% 1/10W 0603 SMD	10 KΩ	0603
R7, R12	2	Res. 100 Ω 5% 1/10 W	100 Ω	0603
R15 - R18	4	Res. 470 Ω 5% 1/10 W 0603	470 Ω	0603
R20, R22, R23, R34	4	Res. NP 0603	NP	0603
R21, R33	2	Res. 1 KΩ 5% 1/10 W 0603 SMD	1 KΩ	0603
R24 - R27	4	Res. 4.7 KΩ 5% 1/10 W 0603 SMD	4.7 KΩ	0603
R28	1	Res. 100 KΩ 5% 1/10 W 0603 SMD	100 KΩ	0603
R29	1	Res. NP 0805	NP	0805
S1-S3	3	Switch button SMD	EVQQ2D03W	CMS 6.5 x 6 x 3.1
TP1, TP2, TP4 - TP7	6	Test point red	Keystone - 5000	TH
TP3	1	Test point black	Keystone - 5001	TH
U1	1	IC reg. 1300 MA LN 3.3 V	LD1117D33TR	SO8
U2	1	UBSLC6-2P6 - ESD protection low capacitance	USBLC6-2P6	SOT 666
U3	1	dSPIN microstepping motor driven	L6472H	HTSSOP28
U4	1	IC, MCU, RISC, 72 MHz, 3.6 V, 32-bit, 64-pin, LQFP	STM32F105RBT6	LQFP64 10 x 10
Y1	1	Xtal 8 MHz - 30 PPM - 20 pF	8 MHz	HC49/US-SM

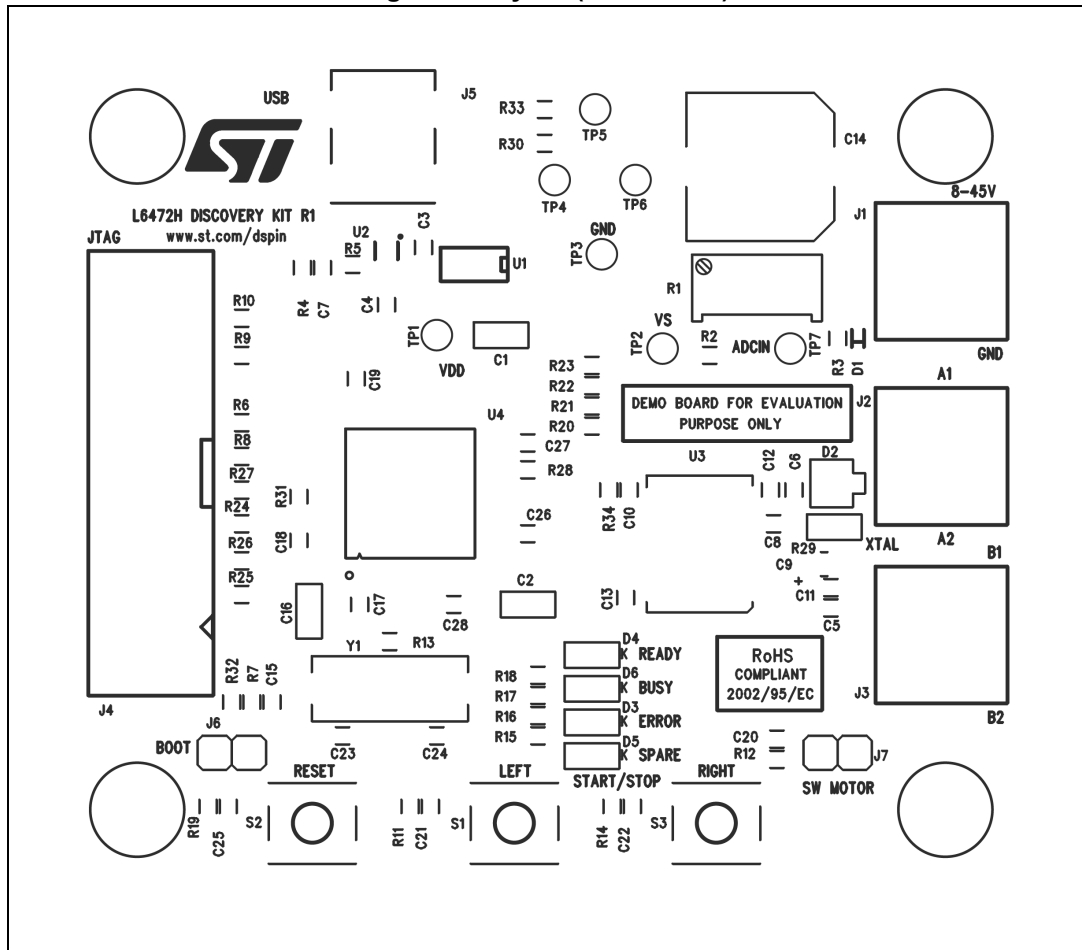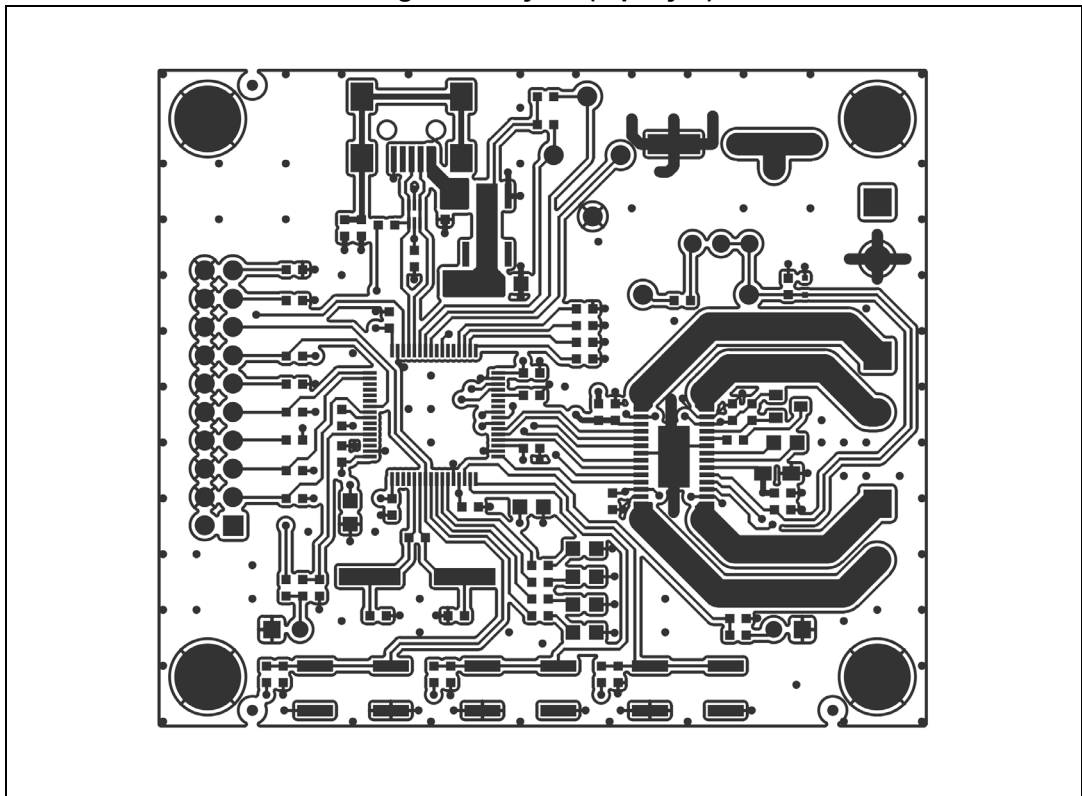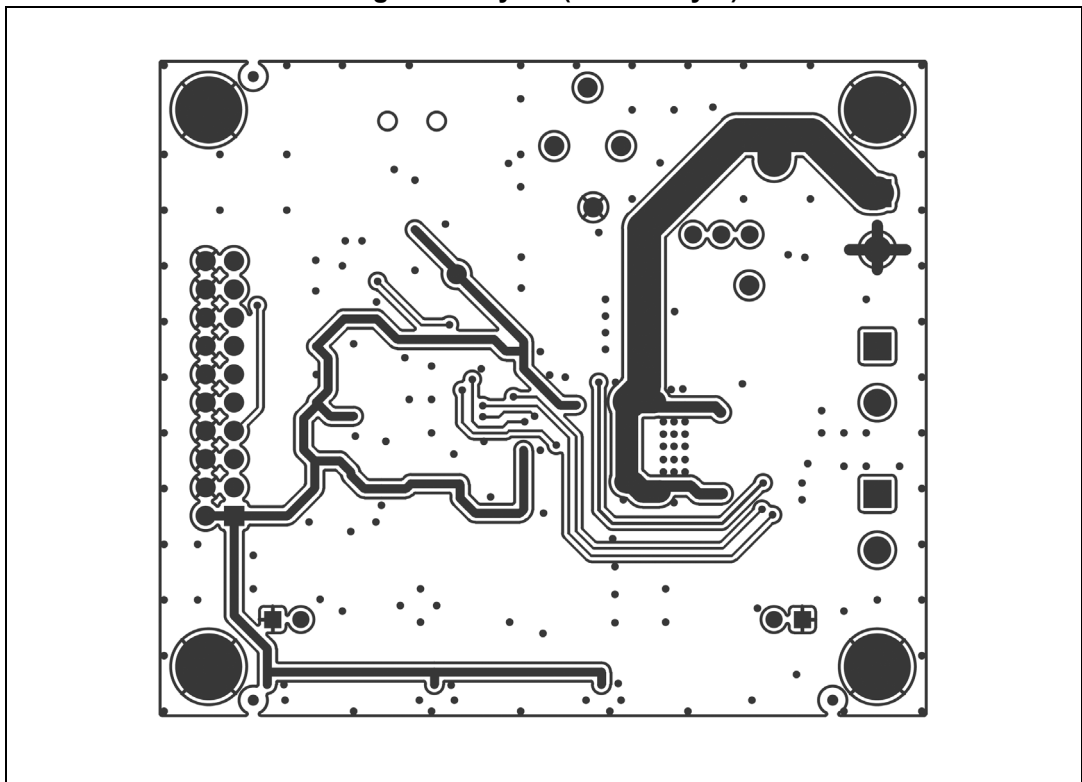**Figure 4. Layout (silk screen)**

Figure 5. Layout (top layer)

Figure 6. Layout (bottom layer)

1 Revision history

Table 5. Document revision history

Date	Revision	Changes
30-Oct-2013	1	Initial release.
29-Nov-2013	2	Updated board photography on page 1. Updated *Figure 1 on page 2* (updated board photography). Minor modifications throughout document.
17-Jan-2014	3	Updated main title on page 1 (replaced "dSPIN™ Discovery L6472" by "dSPIN™ Discovery: development tool to explore dSPIN™ (L6472) motor driver"). Updated *Section : Features on page 1* (replaced whole original *Section* by new *Features*). Updated *Section : Description on page 1* (replaced original *Section* by new *Description*). Minor modifications throughout document.

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