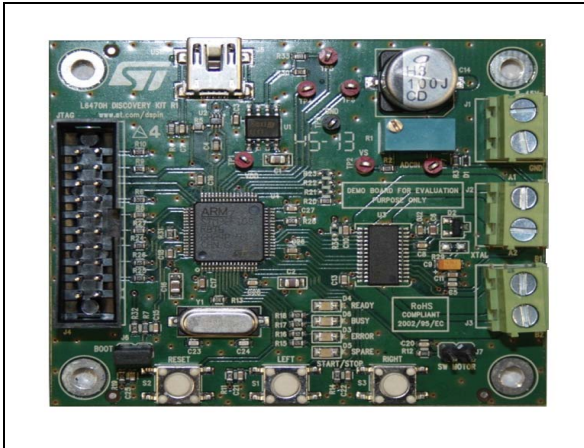

dSPIN™ Discovery: development tool to explore dSPIN™ (L6470) motor driver

Data brief

**Features**

- Voltage mode driving featuring extreme smoothness
- Up to 1/128 microstepping
- 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 optimized 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

Description

The dSPIN™ Discovery is a low cost development tool to explore the dSPIN™ (L6470) 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.

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 1/128 microstepping |
| Operating temperature | -25 to 125 °C |

Figure 1. Jumper and connector locations

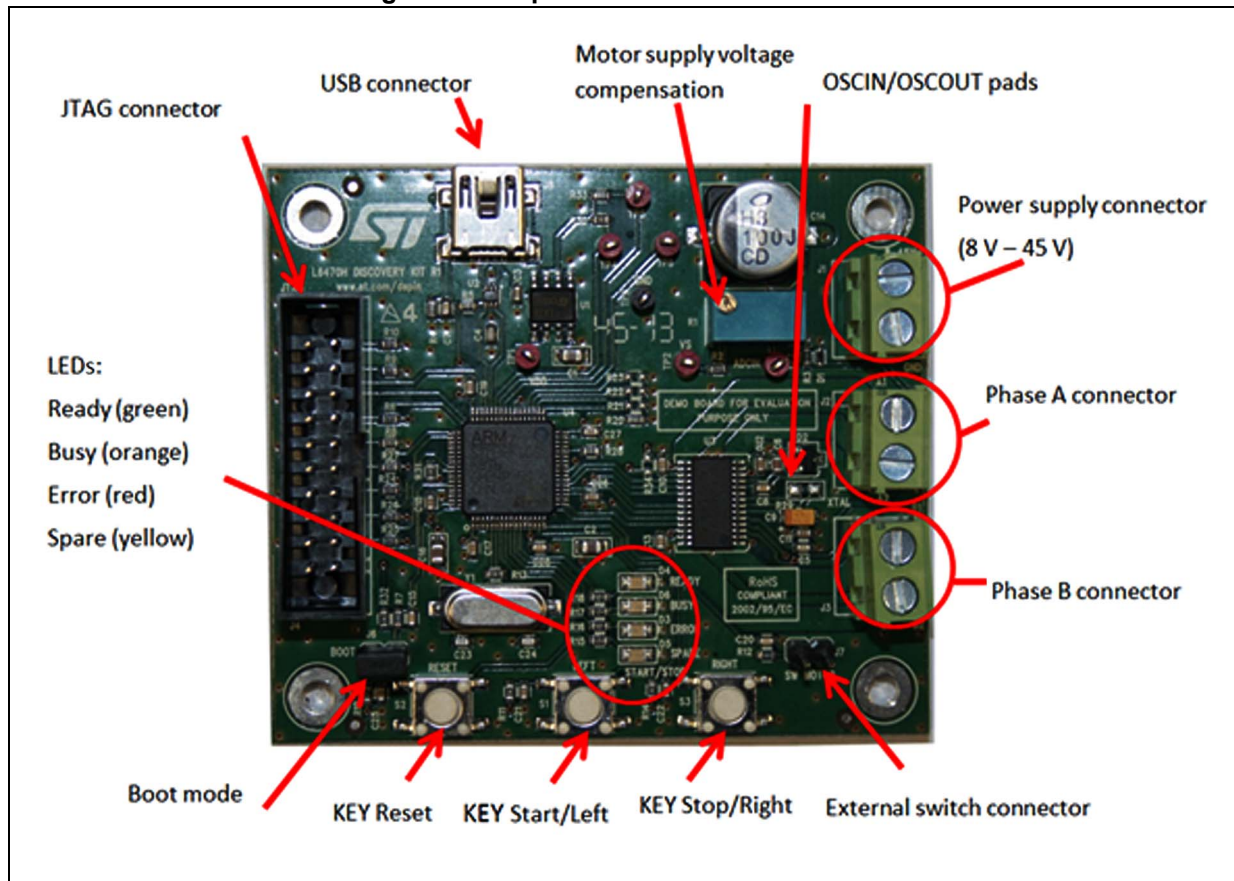


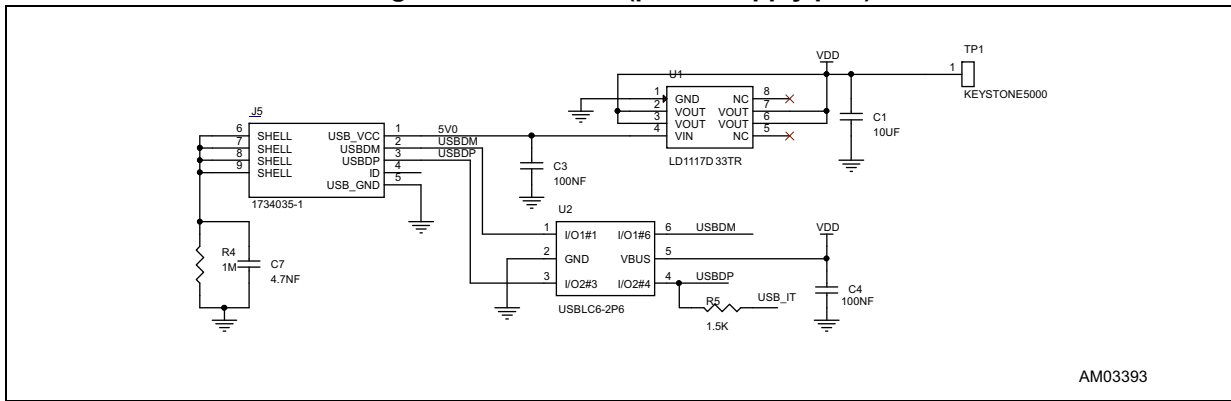
Table 2. Jumpers and connectors

| 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)

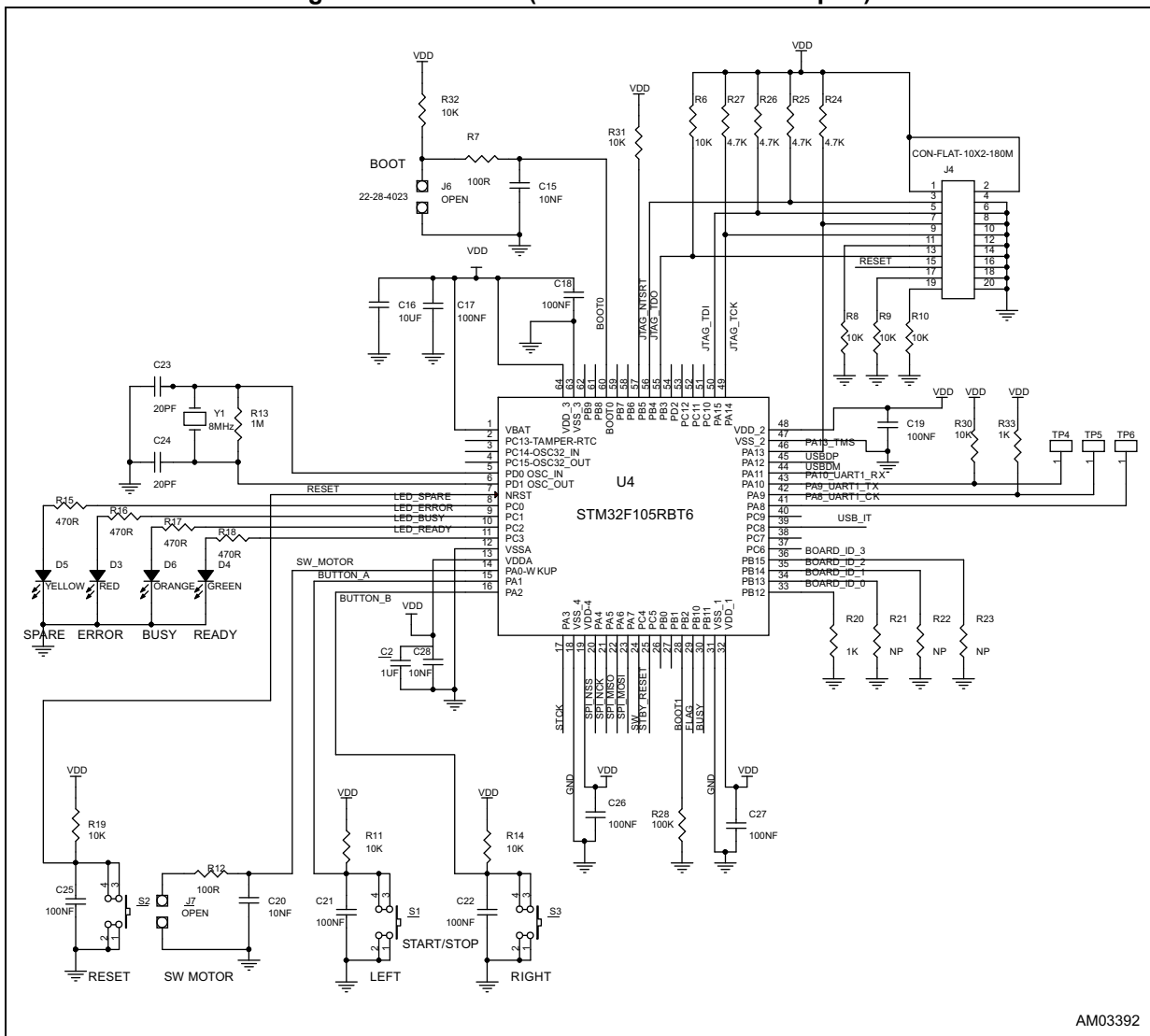
| Name | Type | Function |
|---|-------------|-------------------|
| 1 - 2 | Supply | EXT_VDD |
| 3 | Digital I/O | External RESET |
| 5 | Digital I/O | INPUT (TDI) |
| 7 | Digital I/O | Mode select (TMS) |
| 9 | Digital I/O | Clock (TCK) |
| 13 | Digital I/O | OUTPUT (TDO) |
| 15 | Digital I/O | Internal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

Figure 2. Schematic (power supply part)



AM03393

Figure 3. Schematic (microcontroller control part)



AM03392

Table 4. Bill of material (continued)

| Item | Quantity | Reference | Value | Package |
|-----------------------------------|----------|--|---------------------------|---------------------------|
| FIX1 - FIX4 | 4 | Hole | 3 mn | - |
| 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 K Ω | 200 K Ω | Trimm. 100 x 50 x 110 |
| R2 | 1 | 27 K Ω 5% 1/10 W | 27 K Ω | 0603 |
| R3 | 1 | Res. 7.5 K Ω 5% 1/10 W 0603 SMD | 7.5 K Ω | 0603 |
| R4, R13 | 2 | Res. 1 M Ω 1/10 W 5% 0603 SMD | 1 M Ω | 0603 |
| R5 | 1 | Res. 1.5 K Ω 1/10 W 5% 0603 SMD | 1.5 K Ω | 0603 |
| R6, R8 - R11, R14, R19, R30 - R32 | 10 | Res. 10 K Ω 5% 1/10 W 0603 SMD | 10 K Ω | 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, R33 | 2 | Res. 1 K Ω 5% 1/10 W 0603 SMD | 1 K Ω | 0603 |
| R21 - R23, R34 | 4 | Res. NP 0603 | NP | 0603 |
| R24 - R27 | 4 | Res. 4.7 K Ω 5% 1/10 W 0603 SMD | 4.7 K Ω | 0603 |
| R28 | 1 | Res. 100 K Ω 5% 1/10 W 0603 SMD | 100 K Ω | 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 | L6470H | 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 5. Layout (silk screen)

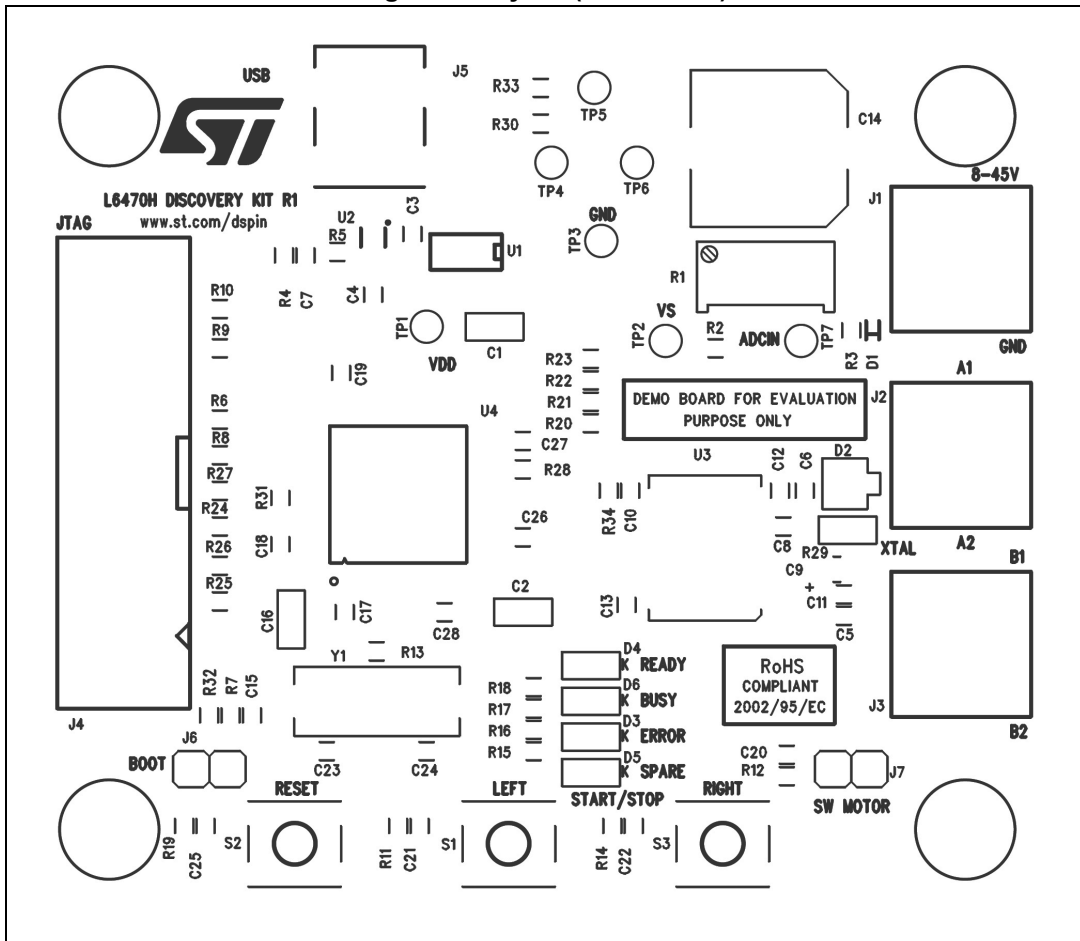


Figure 6. Layout (top layer)

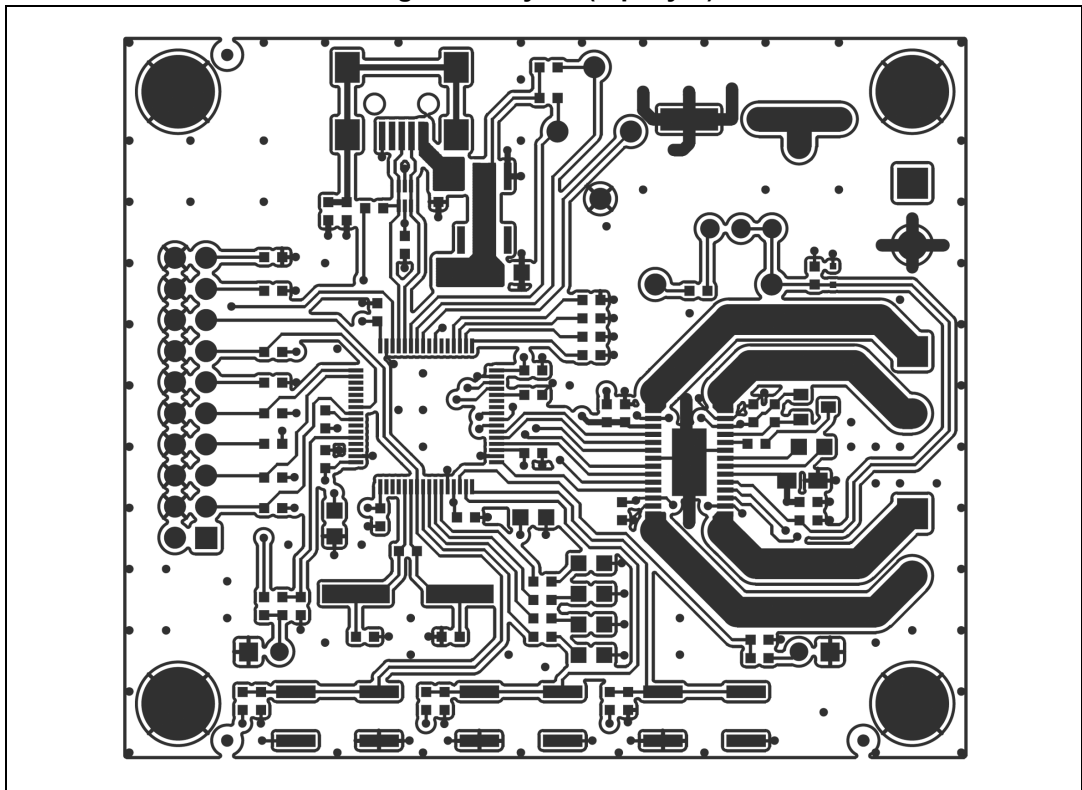
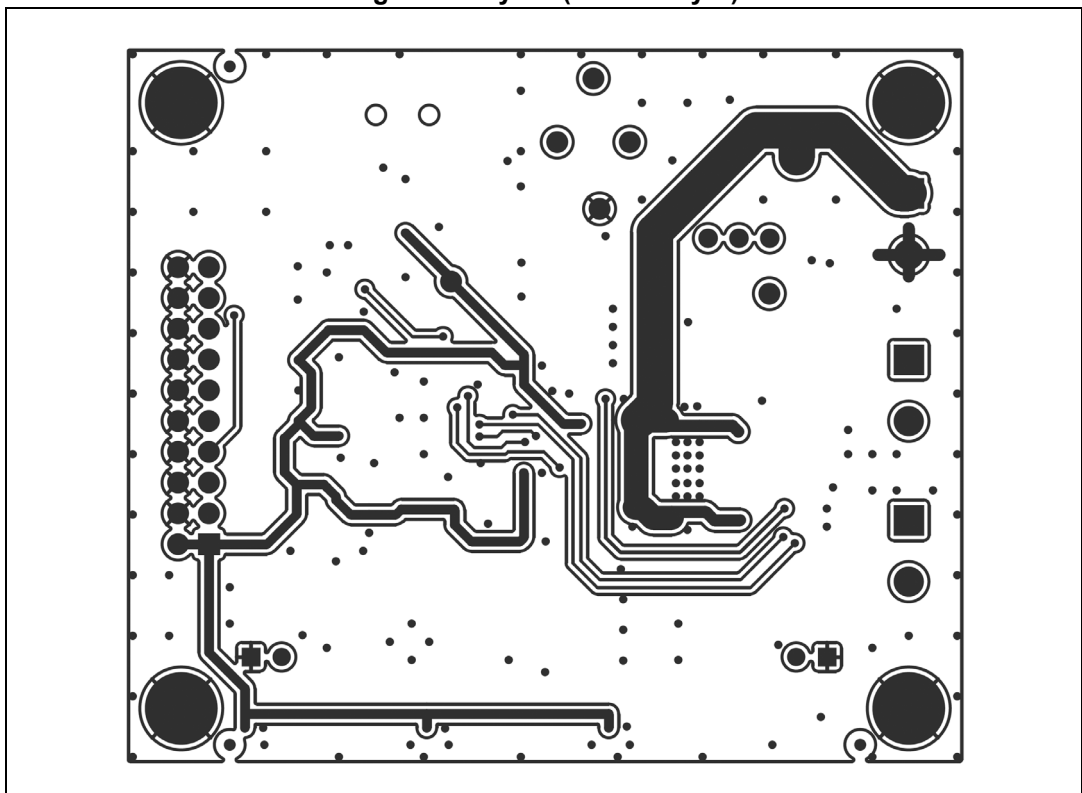


Figure 7. Layout (bottom layer)



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-Jan2014 | 3 | Updated main title on page 1 (replaced “dSPIN™ Discovery L6470” by “dSPIN™ Discovery: development tool to explore dSPIN™ (L6470) 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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