

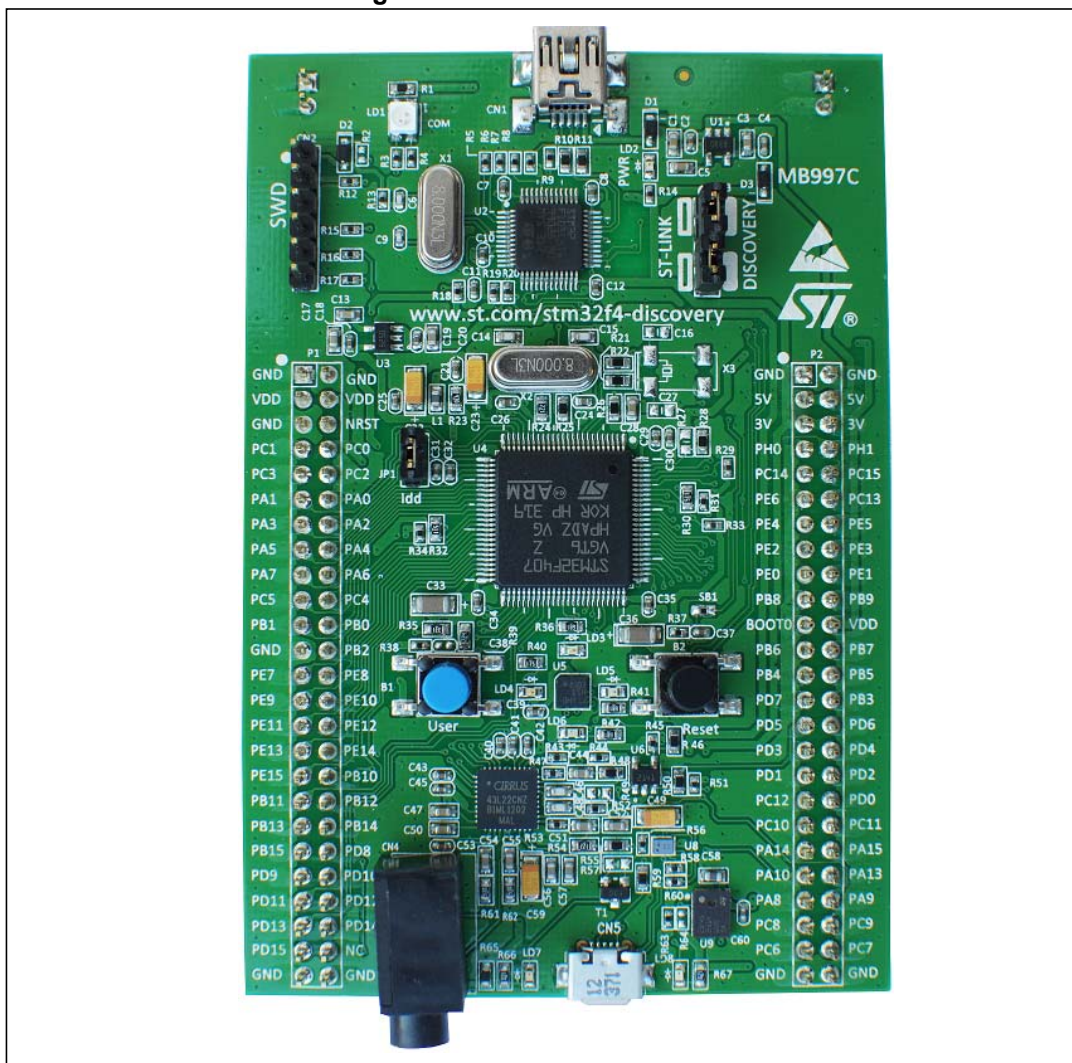
### Discovery kit for STM32F407/417 lines

## Introduction

The STM32F4DISCOVERY helps you to discover the STM32F407 & STM32F417 lines' high-performance features and to develop your applications.

It is based on an STM32F407VGT6 and includes an ST-LINK/V2 embedded debug tool interface, ST MEMS digital accelerometer, ST MEMS digital microphone, audio DAC with integrated class D speaker driver, LEDs, pushbuttons and a USB OTG micro-AB connector.

Figure 1. STM32F4DISCOVERY



1. Picture not contractual

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# 1 Conventions

*Table 1* provides the definition of some conventions used in the present document.

**Table 1. ON/OFF conventions**

| Convention            | Definition                       |
|-----------------------|----------------------------------|
| Jumper JP1 ON         | Jumper fitted                    |
| Jumper JP1 OFF        | Jumper not fitted                |
| Solder bridge SBx ON  | SBx connections closed by solder |
| Solder bridge SBx OFF | SBx connections left open        |

## 2 Quick start

The STM32F4DISCOVERY is a low-cost and easy-to-use development kit to quickly evaluate and start a development with an STM32F4 high-performance microcontroller.

Before installing and using the product, please accept the Evaluation Product License Agreement from [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery).

For more information on the STM32F4DISCOVERY and for demonstration software, visit [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery).

### 2.1 Getting started

Follow the sequence below to configure the STM32F4DISCOVERY board and launch the DISCOVER application:

1. Check jumper position on the board, JP1 on, CN3 on (DISCOVERY selected).
2. Connect the STM32F4DISCOVERY board to a PC with a USB cable 'type A to mini-B' through USB connector CN1 to power the board. Red LED LD2 (PWR) then lights up.
3. Four LEDs between B1 and B2 buttons are blinking.
4. Press user button B1 to enable the ST MEMS sensor, move the board and observe the four LEDs blinking according to the motion direction and speed. (If you connect a second USB cable 'type A to micro-B' between PC and CN5 connector then the board is recognized as standard mouse and its motion will also control the PC cursor).
5. To study or modify the DISCOVER project related to this demo, visit [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery) and follow the tutorial.
6. Discover the STM32F4 features, download and execute programs proposed in the list of projects.
7. Develop your own application using available examples.

### 2.2 System requirements

- Windows PC (XP, Vista, 7)
- USB type A to Mini-B USB cable

### 2.3 Development toolchain supporting the STM32F4DISCOVERY

- Altium, TASKING™ VX-Toolset
- Atollic TrueSTUDIO®
- IAR Embedded Workbench® for ARM (EWARM)
- Keil™, MDK-ARM

### 2.4 Order code

To order the STM32F4 high-performance discovery board, use the order code STM32F4DISCOVERY.

### 3 Features

The STM32F4DISCOVERY offers the following features:

- STM32F407VGT6 microcontroller featuring 1 MB of Flash memory, 192 KB of RAM in an LQFP100 package
- On-board ST-LINK/V2 with selection mode switch to use the kit as a standalone ST-LINK/V2 (with SWD connector for programming and debugging)
- Board power supply: through USB bus or from an external 5V supply voltage
- External application power supply: 3V and 5V
- LIS302DL or LIS3DSH, ST MEMS motion sensor, 3-axis digital output accelerometer
- MP45DT02, ST MEMS audio sensor, omnidirectional digital microphone
- CS43L22, audio DAC with integrated class D speaker driver
- Eight LEDs:
  - LD1 (red/green) for USB communication
  - LD2 (red) for 3.3V power on
  - Four user LEDs, LD3 (orange), LD4 (green), LD5 (red) and LD6 (blue)
  - 2 USB OTG LEDs LD7 (green) VBus and LD8 (red) over-current
- Two pushbuttons (user and reset)
- USB OTG with micro-AB connector
- Extension header for LQFP100 I/Os for quick connection to prototyping board and easy probing

## 4 Hardware and layout

The STM32F4DISCOVERY is designed around the STM32F407VGT6 microcontroller in a 100-pin LQFP package.

*Figure 2* illustrates the connections between the STM32F407VGT6 and its peripherals (ST-LINK/V2, pushbutton, LED, Audio DAC, USB, ST MEMS accelerometer, ST MEMS microphone, and connectors).

*Figure 3* and *Figure 4* help you to locate these features on the STM32F4DISCOVERY.

**Figure 2. Hardware block diagram**

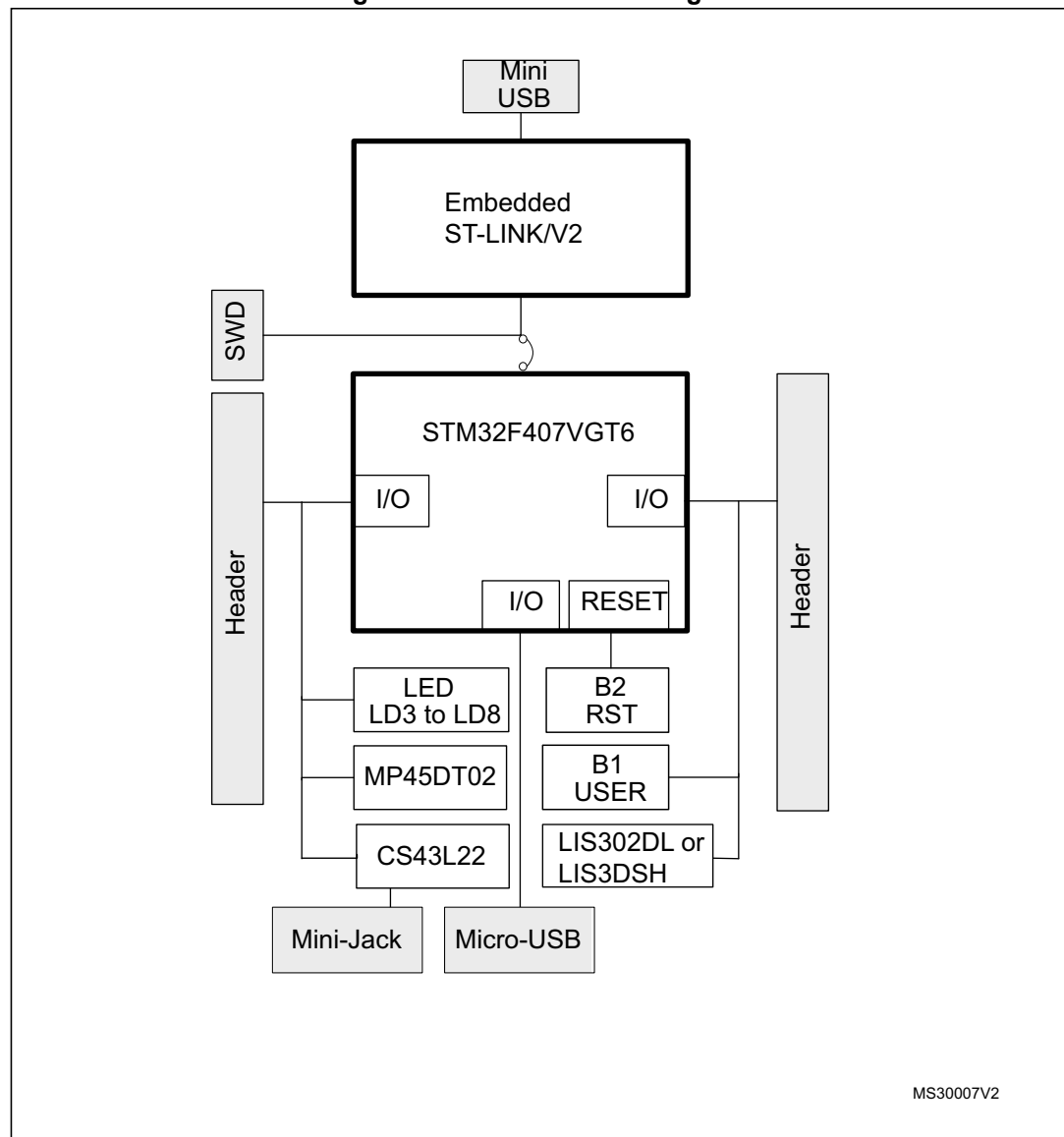
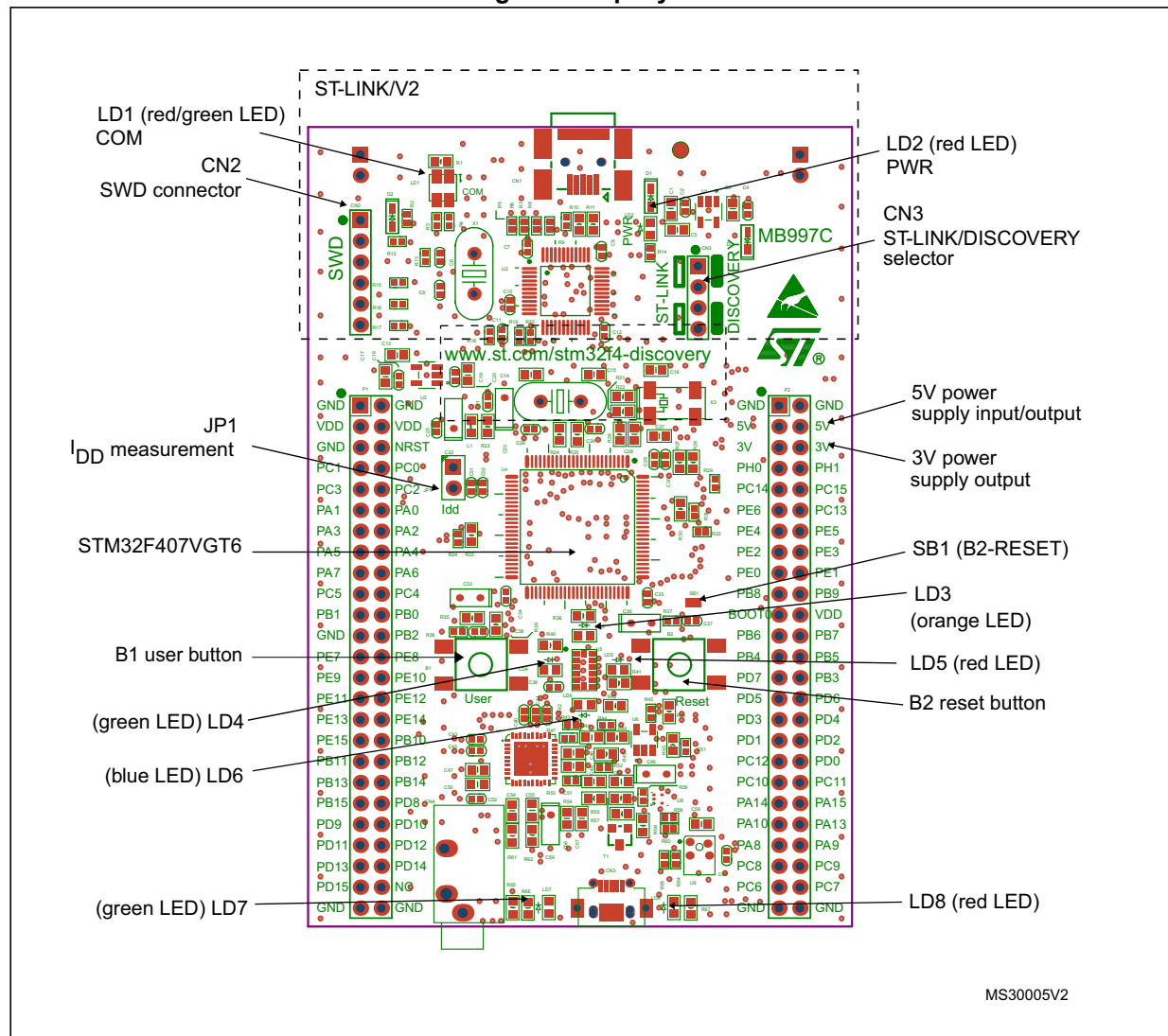


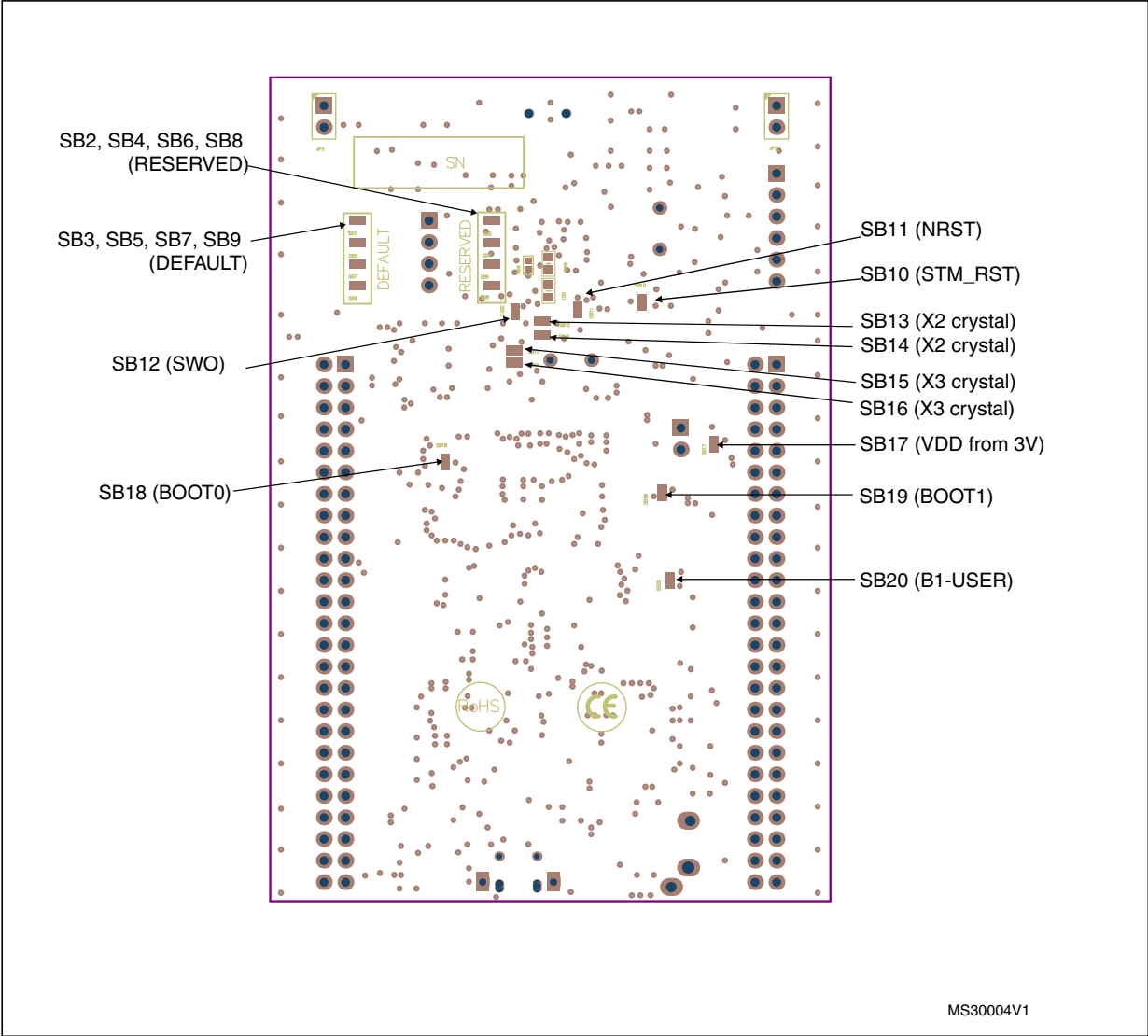


Figure 3. Top layout



Note: Pin 1 of CN2, CN3, JP1, P1 and P2 connectors are identified by a square.

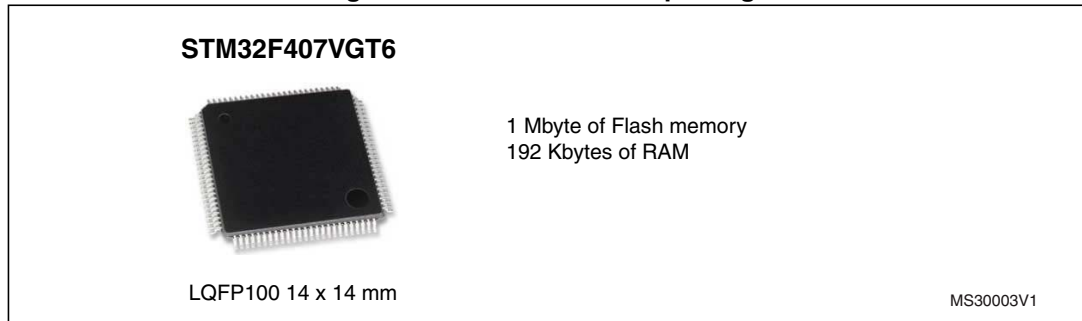
Figure 4. Bottom layout



## 4.1 STM32F407VGT6 microcontroller

This ARM Cortex-M4 32-bit MCU with FPU has 210 DMIPS, up to 1 MB Flash/192+4 KB RAM, USB OTG HS/FS, Ethernet, 17 TIMs, 3 ADCs, 15 comm. interfaces and a camera.

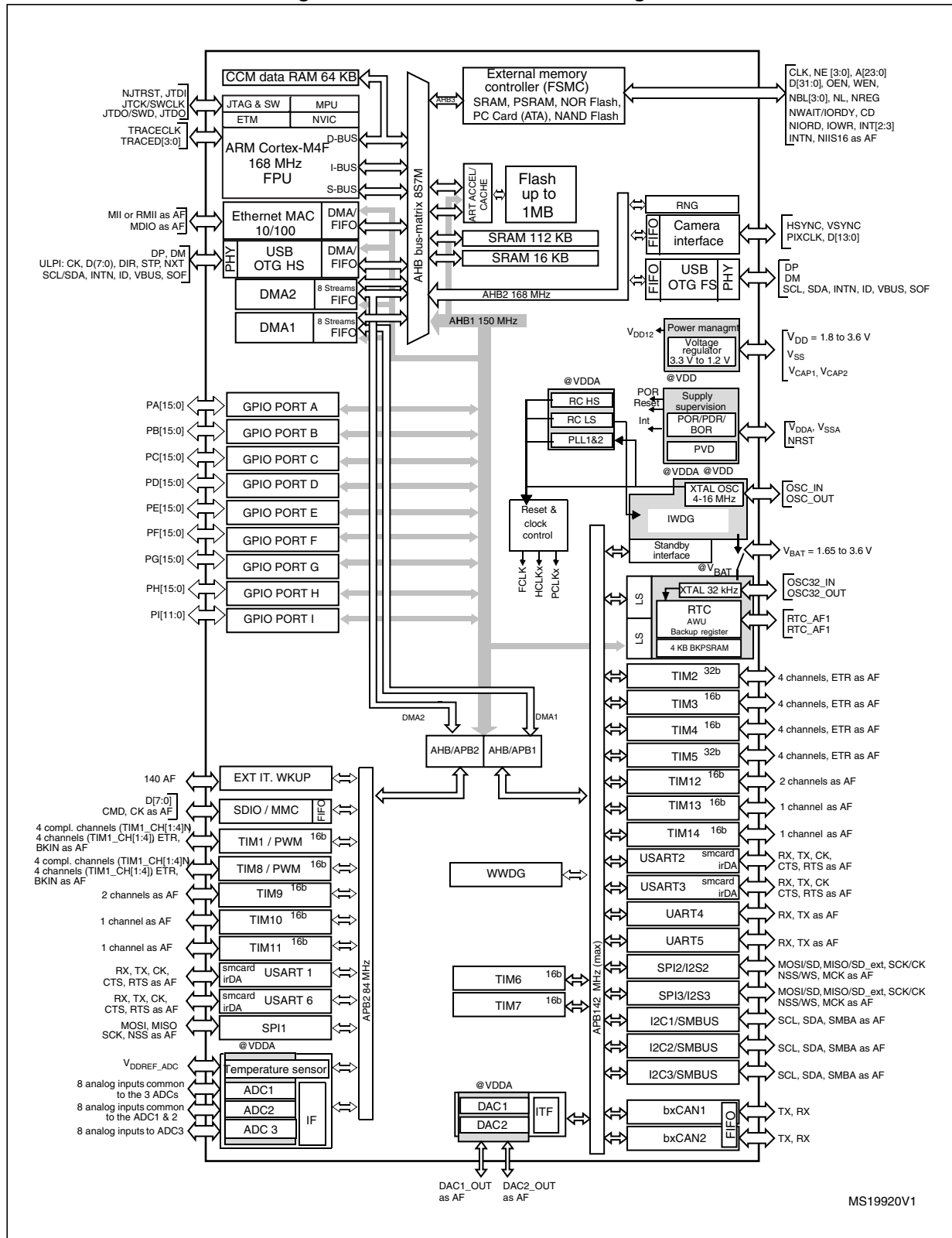
**Figure 5. STM32F407VGT6 package**



This device provides the following benefits.

- 168 MHz/210 DMIPS Cortex-M4 with single cycle DSP MAC and floating point unit providing:
  - Boosted execution of control algorithms
  - More features possible for your applications
  - Ease of use
  - Better code efficiency
  - Faster time to market
  - Elimination of scaling and saturation
  - Easier support for meta-language tools
- Designed for high performance and ultra fast data transfers; ART Accelerator, 32-bit, 7-layer AHB bus matrix with 7 masters and 8 slaves including 2 blocks of SRAM, Multi DMA controllers: 2 general purpose, 1 for USB HS, 1 for Ethernet, One SRAM block dedicated to the core, providing performance equivalent to 0-wait execution from Flash Concurrent execution and data transfers and simplified resource allocation
- Outstanding power efficiency; Ultra-low dynamic power, RTC <1  $\mu$ A typical in VBAT mode, 3.6 V down to 1.7 V VDD, Voltage regulator with power scaling capability, providing extra flexibility to reduce power consumption for applications requiring both high processing and low power performance when running at low voltage or on a rechargeable battery
- Maximum integration: Up to 1 Mbyte of on-chip Flash memory, 192 Kbytes of SRAM, reset circuit, internal RCs, PLLs, WLCSP package available, providing more features in space constrained applications
- Superior and innovative peripherals providing new possibilities to connect and communicate high speed data and more precision due to high resolution
- Extensive tools and software solutions providing a wide choice within the STM32 ecosystem to develop your applications.

Figure 6. STM32F407VGT6 block diagram



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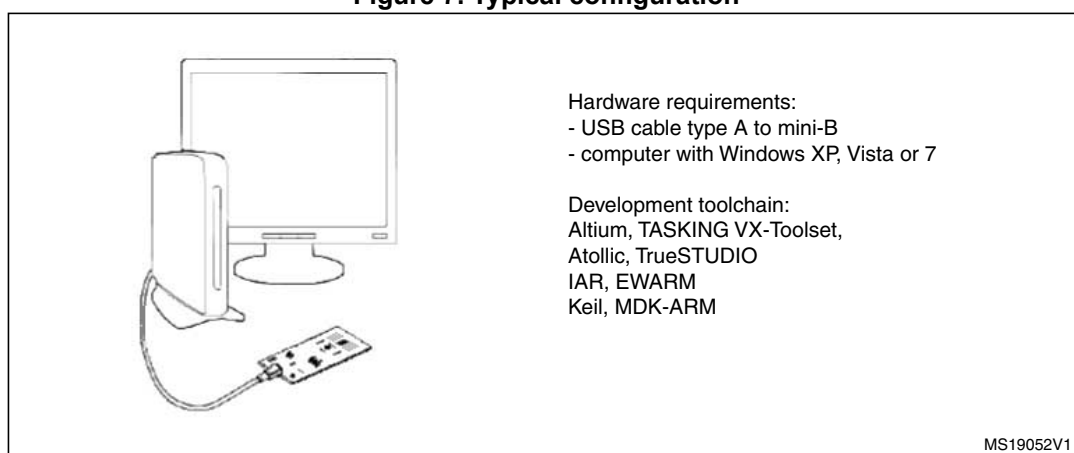
## 4.2 Embedded ST-LINK/V2

The ST-LINK/V2 programming and debugging tool is integrated on the STM32F4DISCOVERY. The embedded ST-LINK/V2 can be used in 2 different ways according to the jumper states (see [Table 2](#)):

- Program/debug the MCU on board,
- Program/debug an MCU in an external application board using a cable connected to SWD connector CN2.

The embedded ST-LINK/V2 supports only SWD for STM32 devices. For information about debugging and programming features refer to user manual UM1075 (*ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32*) which describes in detail all the ST-LINK/V2 features.

**Figure 7. Typical configuration**



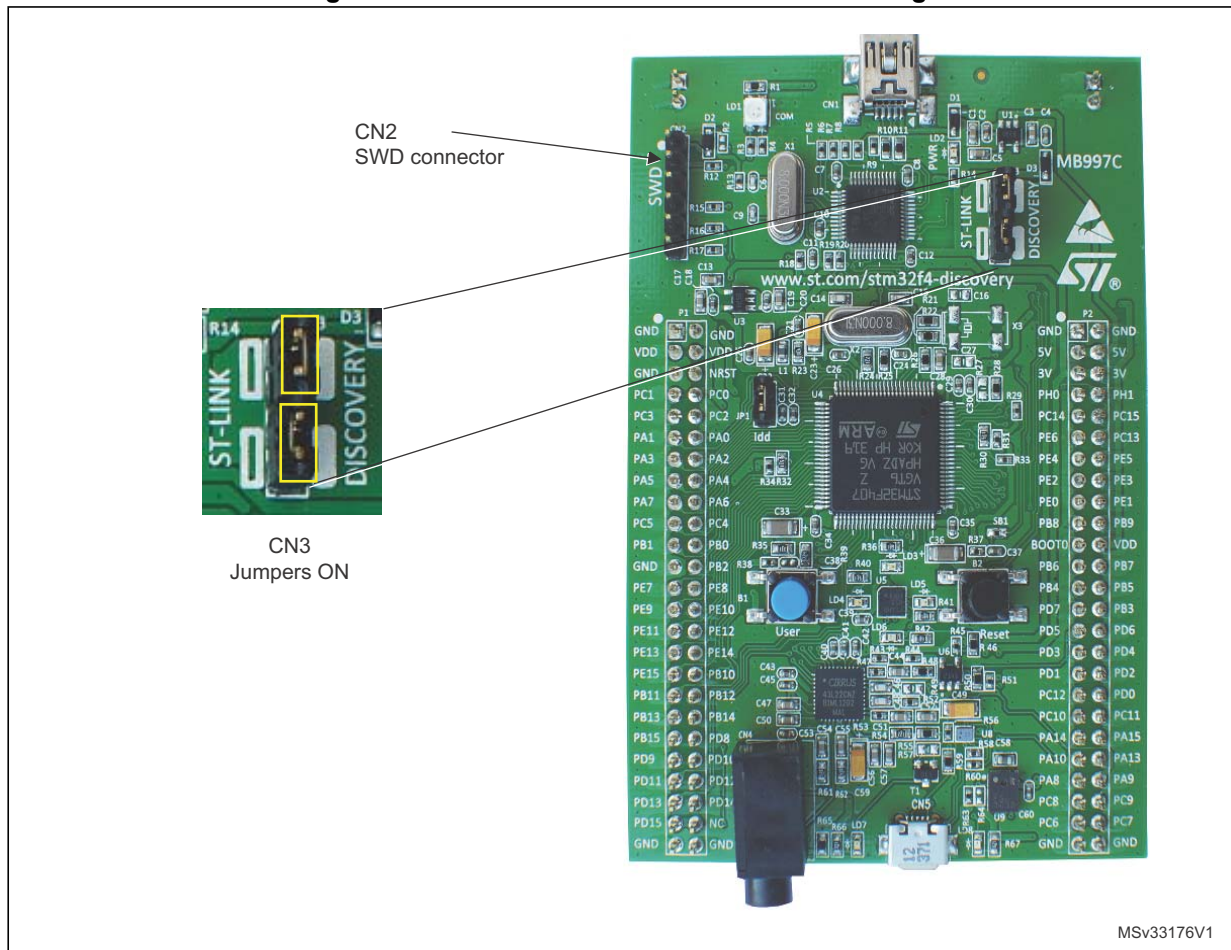
**Table 2. Jumper states**

| Jumper state         | Description   |
|----------------------|---|
| Both CN3 jumpers ON  | ST-LINK/V2 functions enabled for on board programming (default)                             |
| Both CN3 jumpers OFF | ST-LINK/V2 functions enabled for application through external CN2 connector (SWD supported) |

#### 4.2.1 Using ST-LINK/V2 to program/debug the STM32F4 on board

To program the STM32F4 on board, simply plug in the two jumpers on CN3, as shown in [Figure 8](#) in red, but do not use the CN2 connector as that could disturb communication with the STM32F407VGT6 of the STM32F4DISCOVERY.

Figure 8. STM32F4DISCOVERY connections image





### 4.2.2 Using ST-LINK/V2 to program/debug an external STM32 application

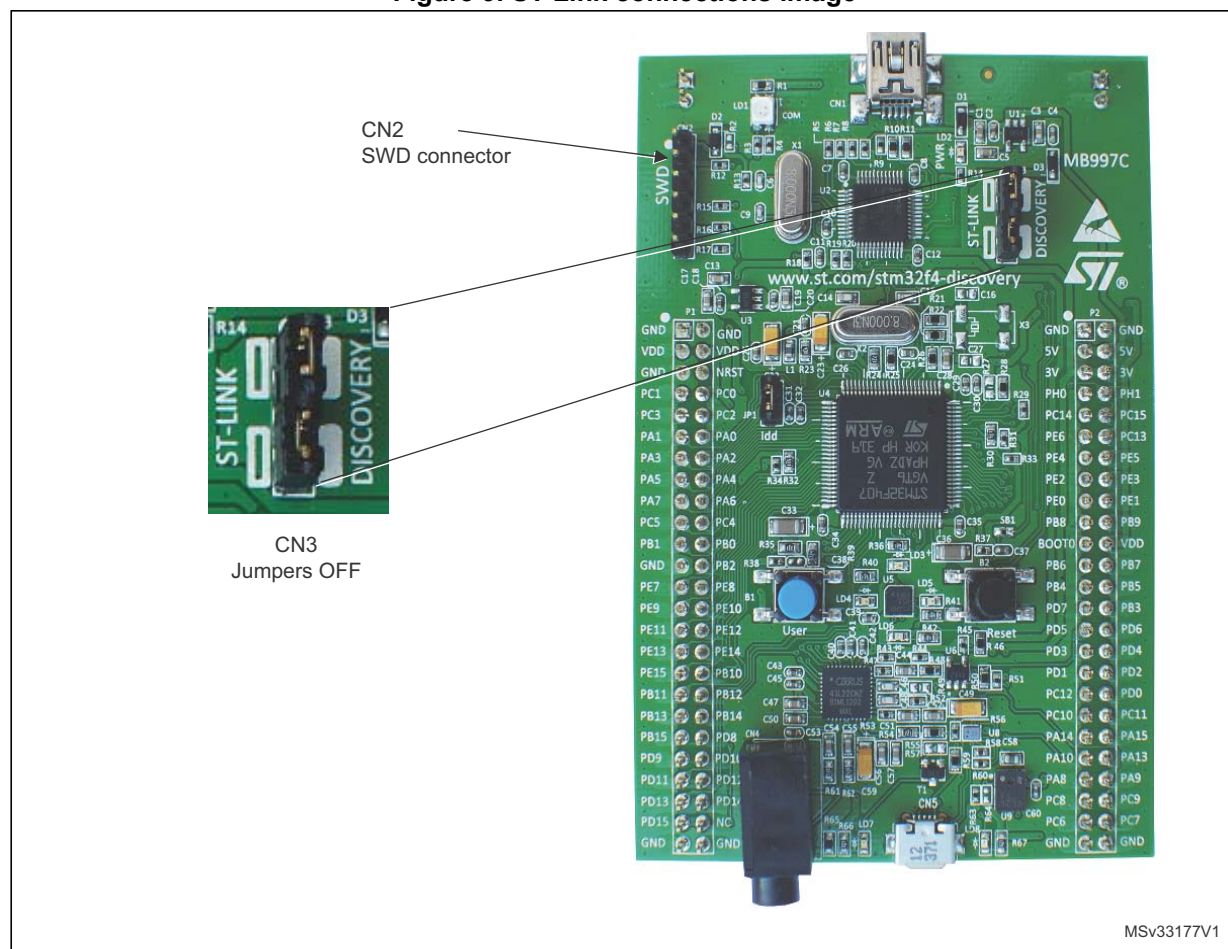
It is very easy to use the ST-LINK/V2 to program the STM32 on an external application. Simply remove the 2 jumpers from CN3 as shown in [Figure 9](#), and connect your application to the CN2 debug connector according to [Table 3](#).

**Note:** *SB11 must be OFF if you use CN2 pin 5 in your external application.*

**Table 3. Debug connector CN2 (SWD)**

| Pin | CN2        | Designation           |
|-----|------------|-----------------------|
| 1   | VDD_TARGET | VDD from application  |
| 2   | SWCLK      | SWD clock             |
| 3   | GND        | Ground                |
| 4   | SWDIO      | SWD data input/output |
| 5   | NRST       | RESET of target MCU   |
| 6   | SWO        | Reserved              |

**Figure 9. ST-Link connections image**



### 4.3 Power supply and power selection

The power supply is provided either by the host PC through the USB cable, or by an external 5V power supply.

The D1 and D2 diodes protect the 5V and 3V pins from external power supplies:

- 5V and 3V can be used as output power supplies when another application board is connected to pins P1 and P2.  
In this case, the 5V and 3V pins deliver a 5V or 3V power supply and power consumption must be lower than 100 mA.
- 5V can also be used as input power supplies e.g. when the USB connector is not connected to the PC.  
In this case, the STM32F4DISCOVERY board must be powered by a power supply unit or by auxiliary equipment complying with standard EN-60950-1: 2006+A11/2009, and must be Safety Extra Low Voltage (SELV) with limited power capability.

### 4.4 LEDs

- LD1 COM: LD1 default status is red. LD1 turns to green to indicate that communications are in progress between the PC and the ST-LINK/V2.
- LD2 PWR: red LED indicates that the board is powered.
- User LD3: orange LED is a user LED connected to the I/O PD13 of the STM32F407VGT6.
- User LD4: green LED is a user LED connected to the I/O PD12 of the STM32F407VGT6.
- User LD5: red LED is a user LED connected to the I/O PD14 of the STM32F407VGT6.
- User LD6: blue LED is a user LED connected to the I/O PD15 of the STM32F407VGT6.
- USB LD7: green LED indicates when VBUS is present on CN5 and is connected to PA9 of the STM32F407VGT6.
- USB LD8: red LED indicates an overcurrent from VBUS of CN5 and is connected to the I/O PD5 of the STM32F407VGT6.

### 4.5 Pushbuttons

- B1 USER: User and Wake-Up button connected to the I/O PA0 of the STM32F407VGT6.
- B2 RESET: Pushbutton connected to NRST is used to RESET the STM32F407VGT6.



## 4.6 On board audio capability

The STM32F4 uses an audio DAC (CS43L22) to output sounds through the audio mini jack connector.

The STM32F4 controls the audio DAC through the I2C interface and processes digital signals through I2S connection or analog input signal.

- The sound can come independently from different inputs:
  - ST MEMS microphone (MP45DT02): digital using PDM protocol or analog when using the low pass filter.
  - USB connector: from external mass storage such as a USB key, USB HDD, and so on.
  - Internal memory of the STM32F4.
- The sound can be output in different ways through audio DAC:
  - Using I2S protocol
  - Using the STM32F4 DAC to analog input AIN1x of the CS43L22
  - Using the microphone output directly via a low pass filter to analog input AIN4x of the CS43L22

## 4.7 USB OTG supported

The STM32F4 is used to drive only USB OTG full speed on this board. The USB micro-AB connector (CN5) allows the user to connect a host or device component, such as a USB key, mouse, and so on.

Two LEDs are dedicated to this module:

- LD7 (green LED) indicates when VBUS is active
- LD8 (red LED) indicates an overcurrent from connected device

## 4.8 Motion sensor (ST MEMS LIS302DL or LIS3DSH)

Two different versions of motion sensor (U5 in schematic) are available on the board depending the PCB version. The LIS302DL is present on board MB997B (PCB revision B) and the LIS3DSH is present on board MB997C (PCB rev C).

The LIS302DL or LIS3DSH are both an ultra compact low-power three-axis linear accelerometer.

It includes a sensing element and an IC interface able to provide the measured acceleration to the external world through I2C/SPI serial interface.

The LIS302DL has dynamically user selectable full scales of  $\pm 2g/\pm 8g$  and it is capable of measuring acceleration with an output rate of 100Hz to 400Hz.

The LIS3DSH has  $\pm 2g/\pm 4g/\pm 6g/\pm 8g/\pm 16g$  dynamically selectable full-scale and it is capable of measuring acceleration with an output data rate of 3.125 Hz to 1.6 kHz.

The STM32F4 controls this motion sensor through the SPI interface.

## 4.9 JP1 (Idd)

Jumper JP1, labeled Idd, allows the consumption of STM32F407VGT6 to be measured by removing the jumper and connecting an ammeter.

- Jumper on: STM32F407VGT6 is powered (default).
- Jumper off: an ammeter must be connected to measure the STM32F407VGT6 current, (if there is no ammeter, the STM32F407VGT6 is not powered).

## 4.10 OSC clock

### 4.10.1 OSC clock supply

If PH0 and PH1 are only used as GPIOs instead of as a clock, then SB13 and SB14 are closed and R24, R25 and R68 are removed.

- **MCO from ST-LINK.** From MCO of the STM32F103. This frequency cannot be changed, it is fixed at 8 MHz and connected to PH0-OSC\_IN of the STM32F407VGT6. Configuration needed:
  - SB13, SB14 OPEN
  - R25<sup>(a)</sup> removed
  - R68<sup>(a)</sup> soldered
- **Oscillator onboard.** From X2 crystal. For typical frequencies and its capacitors and resistors, please refer to the STM32F407VGT6 Datasheet. Configuration needed:
  - SB13, SB14 OPEN
  - R25<sup>(a)</sup> soldered
  - R68<sup>(a)</sup> removed
- **Oscillator from external PH0.** From external oscillator through pin 7 of the P2 connector. Configuration needed:
  - SB13 closed
  - SB14 closed
  - R25 and R68 removed

### 4.10.2 OSC 32 KHz clock supply

If PC14 and PC15 are only used as GPIOs instead of as a clock, then SB15 and SB16 are closed, and R21 and R22 are removed.

- **Oscillator onboard.** From X1 Crystal (not provided). Configuration needed:
  - SB15, SB16 OPEN
  - C16, C27, R21 and R22 soldered.
- **Oscillator from external PC14.** From external oscillator through the pin 9 of P2 connector. Configuration needed:
  - SB16 closed
  - SB15 closed
  - R21 and R22 removed

---

a. As the frequency supplied by X2 is the same as MCO (8 MHz) R25 and R68 are soldered.

## 4.11 Solder bridges

**Table 4. Solder bridges**

| Bridge                              | State <sup>(1)</sup> | Description   |
|-------------------------------------|----------------------|---|
| SB13,14 (X2 crystal) <sup>(2)</sup> | <b>OFF</b>           | X2, C14, C15, R24 and R25 provide a clock.<br>PH0, PH1 are disconnected from P2.            |
|                                     | ON                   | PH0, PH1 are connected to P2 (R24, R25 and R68 must not be fitted).                         |
| SB3,5,7,9 (Default)                 | <b>ON</b>            | Reserved, do not modify.  |
| SB2,4,6,8 (Reserved)                | <b>OFF</b>           | Reserved, do not modify.  |
| SB15,16<br>(X3 crystal)             | <b>OFF</b>           | X3, C16, C27, R21 and R22 deliver a 32 KHz clock.<br>PC14, PC15 are not connected to P2.    |
|                                     | ON                   | PC14, PC15 are only connected to P2. Remove only R21, R22                                   |
| SB1<br>(B2-RESET)                   | <b>ON</b>            | B2 pushbutton is connected to the NRST pin of the STM32F407VGT6 MCU.                        |
|                                     | OFF                  | B2 pushbutton is not connected the NRST pin of the STM32F407VGT6 MCU.                       |
| SB20<br>(B1-USER)                   | <b>ON</b>            | B1 pushbutton is connected to PA0.  |
|                                     | OFF                  | B1 pushbutton is not connected to PA0.  |
| SB17<br>(VDD powered from 3V)       | <b>OFF</b>           | VDD is not powered from 3V, depends on JP1 jumper.  |
|                                     | ON                   | VDD is permanently powered from 3V, JP1 jumper has no effect.                               |
| SB11 (NRST)                         | <b>ON</b>            | NRST signal of the CN2 connector is connected to the NRST pin of the STM32F407VGT6 MCU.     |
|                                     | OFF                  | NRST signal of the CN2 connector is not connected to the NRST pin of the STM32F407VGT6 MCU. |
| SB12 (SWO)                          | <b>ON</b>            | SWO signal of the CN2 connector is connected to PB3.  |
|                                     | OFF                  | SWO signal is not connected.  |
| SB10 (STM_RST)                      | <b>OFF</b>           | No incidence on STM32F103C8T6 (ST-LINK/V2) NRST signal.                                     |
|                                     | ON                   | STM32F103C8T6 (ST-LINK/V2) NRST signal is connected to GND.                                 |
| SB18 (BOOT0)                        | <b>ON</b>            | BOOT0 signal of the STM32F407VGT6 MCU is held low through a 510 ohm pull-down resistor.     |
|                                     | OFF                  | BOOT0 signal of the STM32F407VGT6 MCU is held high through a 10 Kohm pull-up resistor.      |
| SB19 (BOOT1)                        | <b>OFF</b>           | The BOOT1 signal of the STM32F407VGT6 MCU is held high through a 10 Kohm pull-up resistor.  |
|                                     | ON                   | The BOOT1 signal of the STM32F407VGT6 MCU is held low through a 510 ohm pull-down resistor. |

1. Default SBx state is shown in bold.

2. SB13 and SB14 are OFF to allow the user to choose between MCO and X2 crystal for clock source.

## 4.12 Extension connectors

The male headers P1 and P2 can connect the STM32F4DISCOVERY to a standard prototyping/wrapping board. STM32F407VGT6 GPI/Os are available on these connectors. P1 and P2 can also be probed by an oscilloscope, logical analyzer or voltmeter.

**Table 5. MCU pin description versus board function**

| MCU pin       |   |         | Board function |          |                     |            |     |      |     |     |          |              |     |     |    |    |
|---------------|---|---------|----------------|----------|---------------------|------------|-----|------|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions   | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD  | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| BOOT0         | VPP   | 94      | -              | -        | -                   | -          | -   | -    | -   | -   | -        | -            | -   | -   | -  | 21 |
| NRST          | -   | 14      | -              | -        | -                   | RESET      | -   | NRST | -   | -   | -        | -            | -   | 5   | 6  | -  |
| PA0-WKUP      | USART2_CTS/<br>USART4_TX/<br>ETH_MII_CRX/<br>TIM2_CH1_ETR/<br>TIM5_CH1/<br>TIM8_ETR/<br>ADC123_IN0/<br>WKUP | 23      | -              | -        | -                   | USER       | -   | -    | -   | -   | -        | -            | -   | -   | 12 | -  |
| PA1           | USART2_RTS/<br>USART4_RX/<br>ETH_RMII_REF_CLK/<br>ETH_MII_RX_CLK/<br>TIM5_CH2/<br>TIMM2_CH2/<br>ADC123_IN1  | 24      | -              | -        | -                   | -          | -   | -    | -   | -   | -        | -            | -   | -   | 11 | -  |
| PA2           | USART2_TX/<br>TIM5_CH3/<br>TIM9_CH1/<br>TIM2_CH3/<br>ETH_MDIO/<br>ADC123_IN2                                | 25      | -              | -        | -                   | -          | -   | -    | -   | -   | -        | -            | -   | -   | 14 | -  |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |   |         | Board function |          |                     |            |     |     |     |     |          |              |     |     |    |    |
|---------------|---|---------|----------------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions   | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PA3           | USART2_RX/<br>TIM5_CH4/<br>TIM9_CH2/<br>TIM2_CH4/<br>OTG_HS_ULPI_D0/<br>ETH_MII_COL/<br>ADC123_IN3          | 26      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 13 | -  |
| PA4           | SPI1_NSS/<br>SPI3_NSS/<br>USART2_CK/<br>DCMI_HSYNCR/<br>OTG_HS_SOF/<br>I2S3_WS/<br>ADC12_IN4/<br>DAC1_OUT   | 29      | LRCK/AIN1x     | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 16 | -  |
| PA5           | SPI1_SCK/<br>OTG_HS_ULPI_CK/<br>TIM2_CH1_ETR/<br>TIM8_CHIN/<br>ADC12_IN5/<br>DAC2_OUT                       | 30      | -              | -        | SCL/SPC             | -          | -   | -   | -   | -   | -        | -            | -   | -   | 15 | -  |
| PA6           | SPI1_MISO/<br>TIM8_BKIN/<br>TIM13_CH1/<br>DCMI_PIXCLK/<br>TIM3_CH1/<br>TIM1_BKIN/<br>ADC12_IN6              | 31      | -              | -        | SDO                 | -          | -   | -   | -   | -   | -        | -            | -   | -   | 18 | -  |
| PA7           | SPI1_MOSI/<br>TIM8_CH1N/<br>TIM14_CH1TIM3_CH2/<br>ETH_MII_RX_DV/<br>TIM1_CH1N/<br>RMII_CRS_DV/<br>ADC12_IN7 | 32      | -              | -        | SDA/SDI/SDO         | -          | -   | -   | -   | -   | -        | -            | -   | -   | 17 | -  |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |       |       |      |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-------|-------|------|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions  | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED   | SWD   | USB  | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PA8           | MCO1/<br>USART1_CK/<br>TIM1_CH1/<br>I2C3_SCL/<br>OTG_FS_SOF      | 67      | -              | -        | -                   | -          | -     | -     | -    | -   | -        | -            | -   | -   | -  | 43 |
| PA9           | USART1_TX/<br>TIM1_CH2/<br>I2C3_SMBA/<br>DCMI_D0/<br>OTG_FS_VBUS | 68      | -              | -        | -                   | -          | GREEN | -     | VBUS | -   | -        | -            | 1   | -   | -  | 44 |
| PA10          | USART1_RX/<br>TIM1_CH3/<br>OTG_FS_ID/<br>DCMI_D1                 | 69      | -              | -        | -                   | -          | -     | -     | ID   | -   | -        | -            | 4   | -   | -  | 41 |
| PA11          | USART1_CTS/<br>CAN1_RX/<br>TIM1_CH4/<br>OTG_FS_DM                | 70      | -              | -        | -                   | -          | -     | -     | DM   | -   | -        | -            | 2   | -   | -  | -  |
| PA12          | USART1_RTS/<br>CAN1_TX/<br>TIM1_ETR/<br>OTG_FS_DP                | 71      | -              | -        | -                   | -          | -     | -     | DP   | -   | -        | -            | 3   | -   | -  | -  |
| PA13          | JTMS-SWDIO   | 72      | -              | -        | -                   | -          | -     | SWDIO | -    | -   | -        | -            | -   | 4   | -  | 42 |
| PA14          | JTCK-SWCLK   | 76      | -              | -        | -                   | -          | -     | SWCLK | -    | -   | -        | -            | -   | 2   | -  | 39 |
| PA15          | JTDI/<br>SPI3_NSS/<br>I2S3_WS/<br>TIM2_CH1_ETR/<br>SPI1_NSS      | 77      | -              | -        | -                   | -          | -     | -     | -    | -   | -        | -            | -   | -   | -  | 40 |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |     |     |     |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions  | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PB0           | TIM3_CH3/<br>TIM8_CH2N/<br>OTG_HS_ULPI_D1/<br>ETH_MII_RXD2/<br>TIM1_CH2N/<br>ADC12_IN8                                     | 35      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 22 | -  |
| PB1           | TIM3_CH4/<br>TIM8_CH3N/<br>OTG_HS_ULPI_D2/<br>ETH_MII_RXD3/<br>OTG_HS_INTN/<br>TIM1_CH3N/<br>ADC12_IN9                     | 36      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 21 | -  |
| PB2           | -  | 37      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 24 | -  |
| PB3           | JTDO/<br>TRACESWO/<br>SPI3_SCK/<br>I2S3_CK/<br>TIM2_CH2/<br>SPI1_SCK   | 89      | -              | -        | -                   | -          | -   | SWO | -   | -   | -        | -            | -   | 6   | -  | 28 |
| PB4           | NJTRST/<br>SPI3_MISO/<br>TIM3_CH1/<br>SPI1_MISO/<br>I2S3ext_SD   | 90      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 25 |
| PB5           | I2C1_SMBA/<br>CAN2_RX/<br>OTG_HS_ULPI_D7/<br>ETH_PPS_OUT/<br>TIM3_CH2/<br>SPI1_MOSI/<br>SPI3_MOSI/<br>DCMI_D10/<br>I2S3_SD | 91      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 26 |



Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |     |     |     |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions  | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PB6           | I2C1_SCL/<br>TIM4_CH1/<br>CAN2_TX/<br>OTG_FS_INTN/<br>DCMI_D5/<br>USART1_TX                                      | 92      | SCL            | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 23 |
| PB7           | I2C1_SDA/<br>FSMC_NL/<br>DCMI_VSYNC/<br>USART1_RX/<br>TIM4_CH2   | 93      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 24 |
| PB8           | TIM4_CH3/<br>SDIO_D4/<br>TIM10_CH1/<br>DCMI_D6/<br>OTG_FS_SCL/<br>ETH_MII_TXD3/<br>I2C1_SCL/<br>CAN1_RX          | 95      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 19 |
| PB9           | SPI2_NSS/<br>I2S2_WS/<br>TIM4_CH4/<br>TIM11_CH1/<br>OTG_FS_SDA/<br>SDIO_D5/<br>DCMI_D7/<br>I2C1_SDA/<br>CAN1_TX  | 96      | SDA            | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 20 |
| PB10          | SPI2_SCK/<br>I2S2_CK/<br>I2C2_SCL/<br>USART3_TX/<br>OTG_HS_ULPI_D3/<br>ETH_MII_RX_ER/<br>OTG_HS_SCL/<br>TIM2_CH3 | 47      | -              | CLK      | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 34 | -  |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |     |     |     |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions  | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PB11          | I2C2_SDA/<br>USART3_RX/<br>OTG_HS_ULPI_D4/<br>ETH_RMII_TX_EN/<br>ETH_MII_TX_EN/<br>OTG_HS_SDA/<br>TIM2_CH4                                     | 48      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 35 | -  |
| PB12          | SPI2_NSS/<br>I2S2_WS/<br>I2C2_SMBA/<br>USART3_CK/<br>TIM1_BKIN/<br>CAN2_RX/<br>OTG_HS_ULPI_D5/<br>ETH_RMII_TXD0/<br>ETH_MII_TXD0/<br>OTG_HS_ID | 51      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 36 | -  |
| PB13          | SPI2_SCK/<br>I2S2_CK/<br>USART3_CTS/<br>TIM1_CH1N/<br>CAN2_TX/<br>OTG_HS_ULPI_D6/<br>ETH_RMII_TXD1/<br>ETH_MII_TXD1/<br>OTG_HS_VBUS            | 52      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 37 | -  |
| PB14          | SPI2_MISO/<br>TIM1_CH2N/<br>TIM12_CH1/<br>OTG_HS_DMUSART3_RTS/<br>TIM8_CH2N/<br>I2S2ext_SD   | 53      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | 38 | -  |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |   |         | Board function |            |                     |            |     |     |         |     |          |              |     |     |    |    |
|---------------|---|---------|----------------|------------|---------------------|------------|-----|-----|---------|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions   | LQFP100 | CS43L22        | MP45DT02   | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB     | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PB15          | SPI2_MOSI/<br>I2S2_SD/<br>TIM1_CH3N/<br>TIM8_CH3N/<br>TIM12_CH2/<br>OTG_HS_DP | 54      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 39 | -  |
| PC0           | OTG_HS_ULPI_STP/<br>ADC123_IN10   | 15      | -              | -          | -                   | -          | -   | -   | PowerOn | -   | -        | -            | -   | -   | 8  | -  |
| PC1           | ETH_MDC/<br>ADC123_IN11   | 16      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 7  | -  |
| PC2           | SPI2_MISO/<br>OTG_HS_ULPI_DIR/<br>TH_MII_TXD2/<br>I2S2ext_SD/<br>ADC123_IN12  | 17      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 10 | -  |
| PC3           | SPI2_MOSI/<br>I2S2_SD/<br>OTG_HS_ULPI_NXT/<br>ETH_MII_TX_CLK/<br>ADC123_IN13  | 18      | -              | DOUT/AIN4x | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 9  | -  |
| PC4           | ETH_RMII_RX_D0/<br>ETH_MII_RX_D0/<br>ADC12_IN14                               | 33      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 20 | -  |
| PC5           | ETH_RMII_RX_D1/<br>ETH_MII_RX_D1/<br>ADC12_IN15                               | 34      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | 19 | -  |
| PC6           | I2S2_MCK/<br>TIM8_CH1/<br>SDIO_D6/<br>USART6_TX/<br>DCMI_D0/<br>TIM3_CH1      | 63      | -              | -          | -                   | -          | -   | -   | -       | -   | -        | -            | -   | -   | -  | 47 |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |     |     |     |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions  | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PC7           | I2S3_MCK/<br>TIM8_CH2/<br>SDIO_D7/<br>USART6_RX/<br>DCMI_D1/<br>TIM3_CH2         | 64      | MCLK           | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 48 |
| PC8           | TIM8_CH3/<br>SDIO_D0/<br>TIM3_CH3/<br>USART6_CK/<br>DCMI_D2                      | 65      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 45 |
| PC9           | I2S_CKIN/<br>MCO2/<br>TIM8_CH4/<br>SDIO_D1/<br>I2C3_SDA/<br>DCMI_D3/<br>TIM3_CH4 | 66      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 46 |
| PC10          | SPI3_SCK/<br>I2S3_CK/<br>UART4_TX/<br>SDIO_D2/<br>DCMI_D8/<br>USART3_TX          | 78      | SCLK           | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 37 |
| PC11          | UART4_RX/<br>SPI3_MISO/<br>SDIO_D3/<br>DCMI_D4/<br>USART3_RX/<br>I2S3ext_SD      | 79      | -              | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 38 |
| PC12          | UART5_TX/<br>SDIO_CK/<br>DCMI_D9/<br>SPI3_MOSI/<br>I2S3_SD/<br>USART3_CK         | 80      | SDIN           | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | 35 |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |     |     |             |           |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|-----|-----|-------------|-----------|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions                            | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB         | OSC       | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PC13          | RTC_AF1  | 7       | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 12 |
| PC14          | OSC32_IN                                       | 8       | -              | -        | -                   | -          | -   | -   | -           | OSC32_IN  | -        | -            | -   | -   | -  | 9  |
| PC15          | OSC32_OUT                                      | 9       | -              | -        | -                   | -          | -   | -   | -           | OSC32_OUT | -        | -            | -   | -   | -  | 10 |
| PD0           | FSMC_D2/<br>CAN1_RX                            | 81      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 36 |
| PD1           | FSMC_D3/<br>CAN1_TX                            | 82      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 33 |
| PD2           | TIM3_ETR/<br>UART5_RXSDIO_CMD<br>/<br>DCMI_D11 | 83      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 34 |
| PD3           | FSMC_CLK/<br>USART2_CTS                        | 84      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 31 |
| PD4           | FSMC_NOE/<br>USART2_RTS                        | 85      | RESET          | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 32 |
| PD5           | FSMC_NWE/<br>USART2_TX                         | 86      | -              | -        | -                   | -          | RED | -   | OverCurrent | -         | -        | -            | -   | -   | -  | 29 |
| PD6           | FSMC_NWAIT/<br>USART2_RX                       | 87      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 30 |
| PD7           | USART2_CK/<br>FSMC_NE1/<br>FSMC_NCE2           | 88      | -              | -        | -                   | -          | -   | -   | -           | -         | -        | -            | -   | -   | -  | 27 |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |  |         | Board function |          |                     |            |        |     |     |     |          |              |     |     |    |    |
|---------------|--|---------|----------------|----------|---------------------|------------|--------|-----|-----|-----|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions                    | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED    | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PD8           | FSMC_D13/<br>USART3_TX                 | 55      | -              | -        | -                   | -          | -      | -   | -   | -   | -        | -            | -   | -   | 40 | -  |
| PD9           | FSMC_D14/<br>USART3_RX                 | 56      | -              | -        | -                   | -          | -      | -   | -   | -   | -        | -            | -   | -   | 41 | -  |
| PD10          | FSMC_D15/<br>USART3_CK                 | 57      | -              | -        | -                   | -          | -      | -   | -   | -   | -        | -            | -   | -   | 42 | -  |
| PD11          | FSMC_A16/<br>USART3_CTS                | 58      | -              | -        | -                   | -          | -      | -   | -   | -   | -        | -            | -   | -   | 43 | -  |
| PD12          | FSMC_A17/<br>TIM4_CH1/<br>USART3_RTS   | 59      | -              | -        | -                   | -          | GREEN  | -   | -   | -   | -        | -            | -   | -   | 44 | -  |
| PD13          | FSMC_A18/<br>TIM4_CH2                  | 60      | -              | -        | -                   | -          | ORANGE | -   | -   | -   | -        | -            | -   | -   | 45 | -  |
| PD14          | FSMC_D0/<br>TIM4_CH3                   | 61      | -              | -        | -                   | -          | RED    | -   | -   | -   | -        | -            | -   | -   | 46 | -  |
| PD15          | FSMC_D1/<br>TIM4_CH4                   | 62      | -              | -        | -                   | -          | BLUE   | -   | -   | -   | -        | -            | -   | -   | 47 | -  |
| PE0           | TIM4_ETR/<br>FSMC_NBL0/<br>DCMI_D2     | 97      | -              | -        | INT1                | -          | -      | -   | -   | -   | -        | -            | -   | -   | -  | 17 |
| PE1           | FSMC_NBL1/<br>DCMI_D3                  | 98      | -              | -        | INT2                | -          | -      | -   | -   | -   | -        | -            | -   | -   | -  | 18 |
| PE2           | TRACECLK/<br>FSMC_A23/<br>ETH_MII_TXD3 | 1       | -              | -        | -                   | -          | -      | -   | -   | -   | -        | -            | -   | -   | -  | 15 |
| PE3           | TRACED0/<br>FSMC_A19                   | 2       | -              | -        | CS_12C/SPI          | -          | -      | -   | -   | -   | -        | -            | -   | -   | -  | 16 |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |   |         | Board function |          |                     |            |     |     |     |        |          |              |     |     |    |    |
|---------------|---|---------|----------------|----------|---------------------|------------|-----|-----|-----|--------|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions                           | LQFP100 | CS43L22        | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC    | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
| PE4           | TRACED1/<br>FSMC_A20/<br>DCMI_D4              | 3       | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | -  | 13 |
| PE5           | TRACED2/<br>FSMC_A21/<br>TIM9_CH1/<br>DCMI_D6 | 4       | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | -  | 14 |
| PE6           | TRACED3/<br>FSMC_A22/<br>TIM9_CH2/<br>DCMI_D7 | 5       | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | -  | 11 |
| PE7           | FSMC_D4/<br>TIM1_ETR                          | 38      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 25 | -  |
| PE8           | FSMC_D5/<br>TIM1_CH1N                         | 39      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 26 | -  |
| PE9           | FSMC_D6/<br>TIM1_CH1                          | 40      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 27 | -  |
| PE10          | FSMC_D7/<br>TIM1_CH2N                         | 41      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 28 | -  |
| PE11          | FSMC_D8/<br>TIM1_CH2                          | 42      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 29 | -  |
| PE12          | FSMC_D9/<br>TIM1_CH3N                         | 43      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 30 | -  |
| PE13          | FSMC_D10/<br>TIM1_CH3                         | 44      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 31 | -  |
| PE14          | FSMC_D11/<br>TIM1_CH4                         | 45      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 32 | -  |
| PE15          | FSMC_D12/<br>TIM1_BKIN                        | 46      | -              | -        | -                   | -          | -   | -   | -   | -      | -        | -            | -   | -   | 33 | -  |
| PH0           | OSC_IN  | 12      | -              | -        | -                   | -          | -   | -   | -   | OSC_IN | -        | -            | -   | -   | -  | 7  |

Table 5. MCU pin description versus board function (continued)

| MCU pin       |                     |    | Board function |         |          |                     |            |     |     |     |         |          |              |     |     |    |    |
|---------------|---------------------|----|----------------|---------|----------|---------------------|------------|-----|-----|-----|---------|----------|--------------|-----|-----|----|----|
| Main function | Alternate functions |    | LQFP100        | CS43L22 | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC     | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |
|               |                     |    |                |         |          |                     |            |     |     |     |         |          |              |     |     |    |    |
| PH1           | OSC_OUT             | 13 | -              | -       | -        | -                   | -          | -   | -   | -   | OSC_OUT | -        | -            | -   | -   | -  | 8  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | 5V           | -   | -   | -  | 3  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | 5V           | -   | -   | -  | 4  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | 3V           | -   | -   | -  | 5  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | 3V           | -   | -   | -  | 6  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | VDD          | -   | -   | 3  | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | VDD          | -   | -   | 4  | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | VDD          | -   | -   | -  | 22 |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | GND | GND | -       | -        | GND          | 5   | 3   | 1  | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | 2  | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | 5  | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | 23 | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | 49 | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | 50 | -  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | -  | 1  |
| -             | -                   | -  | -              | -       | -        | -                   | -          | -   | -   | -   | -       | -        | GND          | -   | -   | -  | 2  |

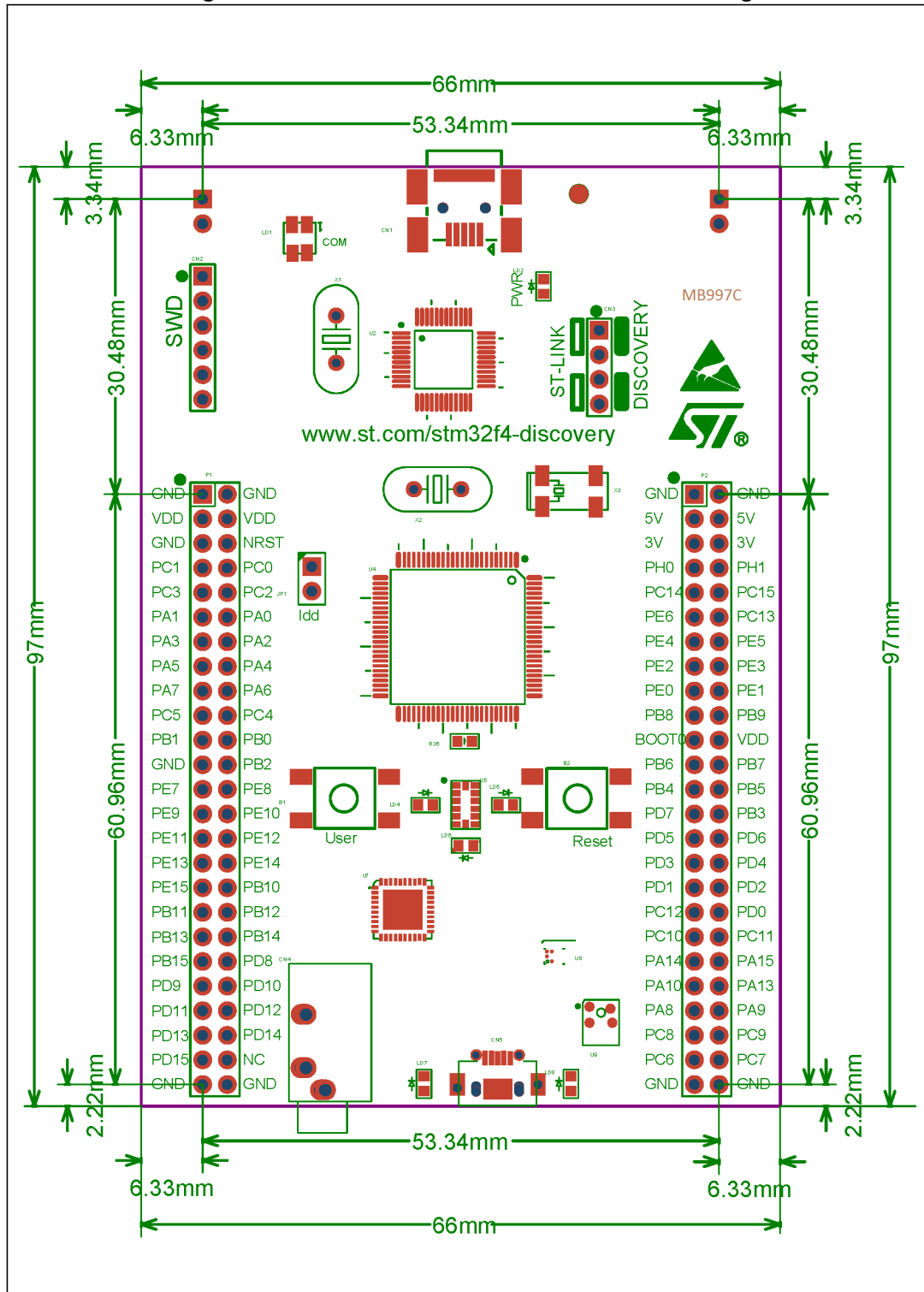


Table 5. MCU pin description versus board function (continued)

| MCU pin       |                     | Board function |         |          |                     |            |     |     |     |     |          |              |     |     |    |    |  |
|---------------|---------------------|----------------|---------|----------|---------------------|------------|-----|-----|-----|-----|----------|--------------|-----|-----|----|----|--|
| Main function | Alternate functions | LQFP100        | CS43L22 | MP45DT02 | LIS302DL or LIS3DSH | Pushbutton | LED | SWD | USB | OSC | Free I/O | Power supply | CN5 | CN2 | P1 | P2 |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | GND          | -   | -   | -  | 49 |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | GND          | -   | -   | -  | 50 |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |
|               |                     | -              | -       | -        | -                   | -          | -   | -   | -   | -   | -        | -            | -   | -   | -  | -  |  |

**5**

**Figure 10. STM32F4DISCOVERY mechanical drawing**



## 6 Electrical schematics

**Figure 11. STM32F4DISCOVERY**

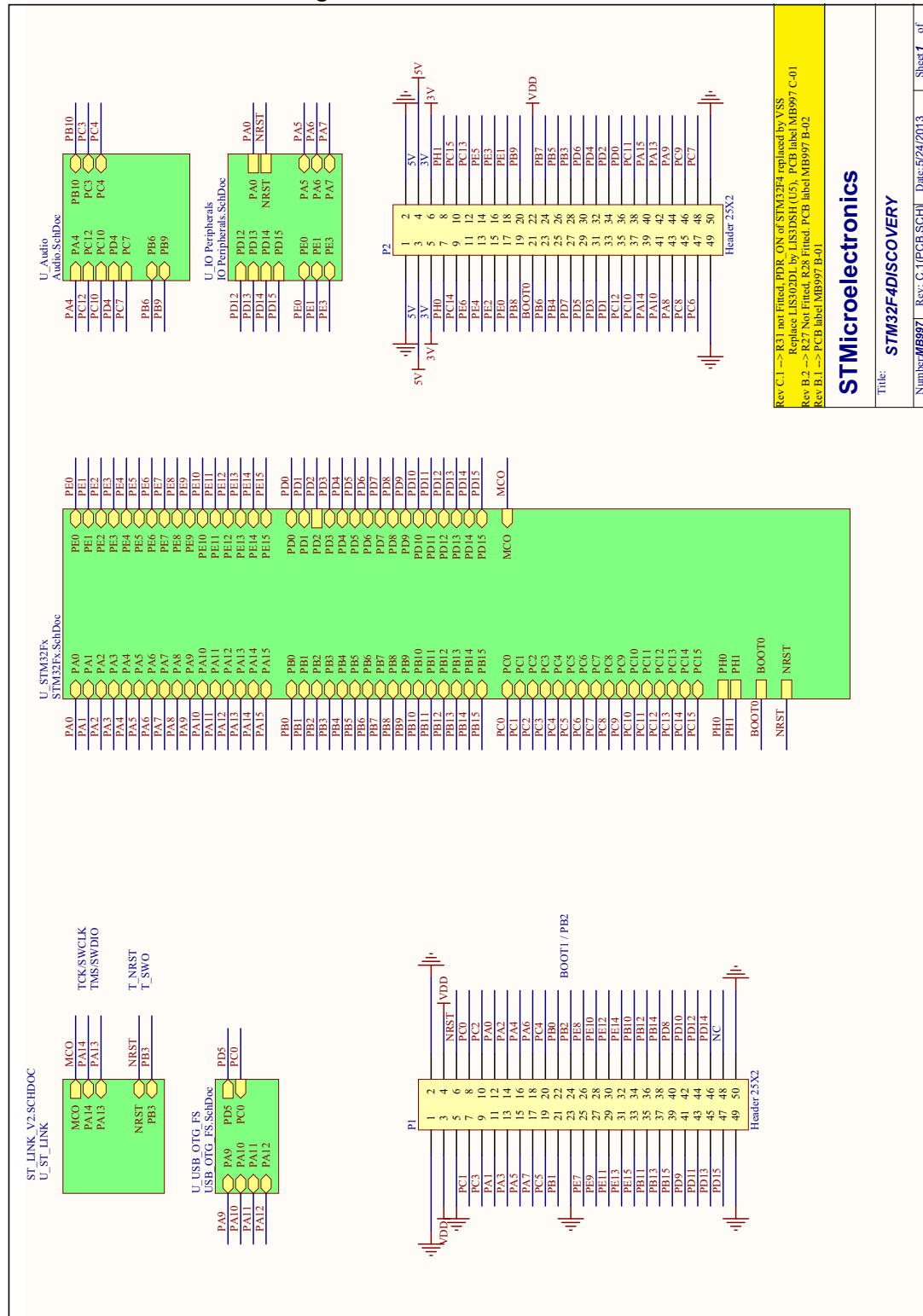
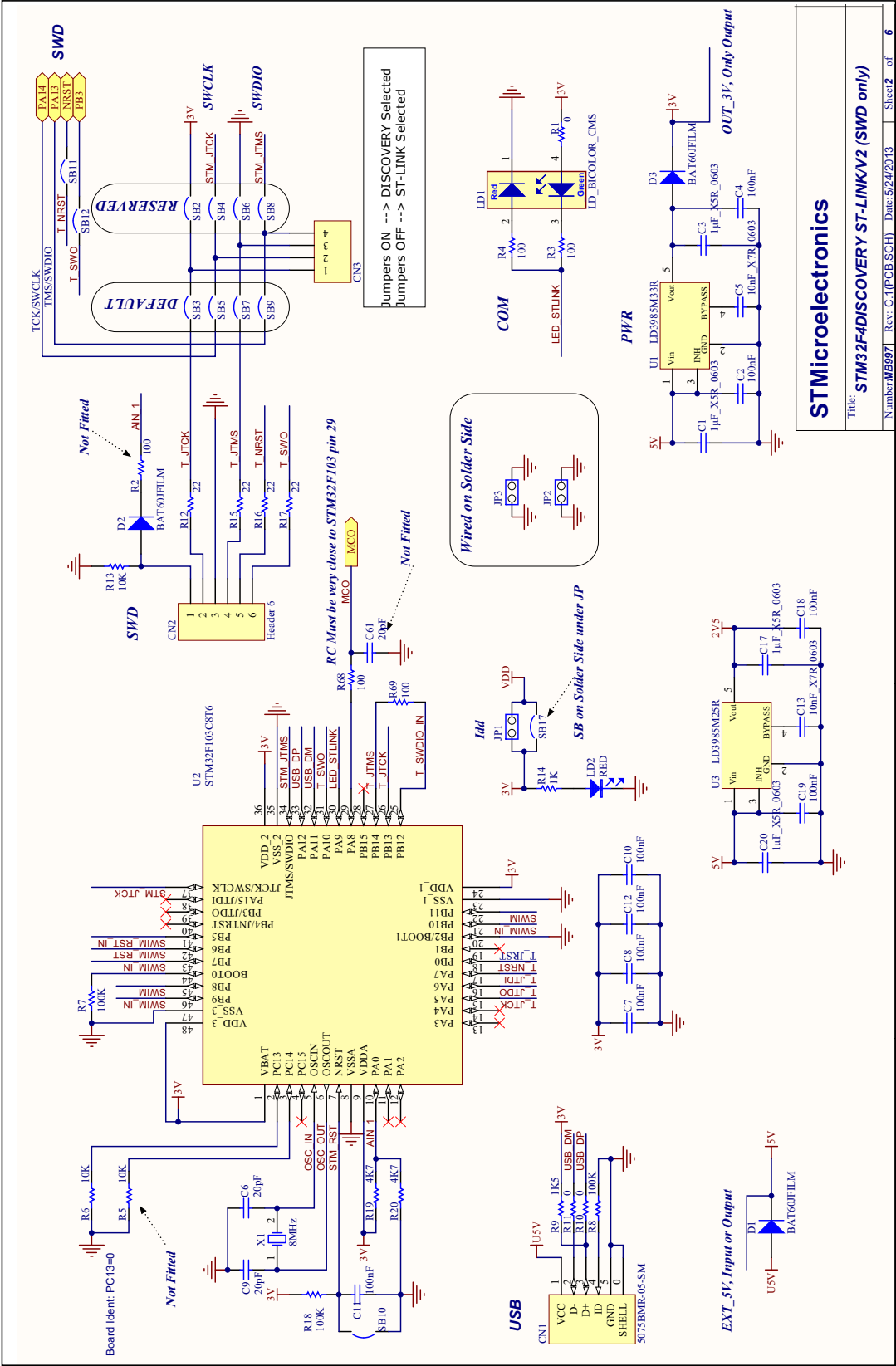


Figure 12. ST-LINK/V2 (SWD only)



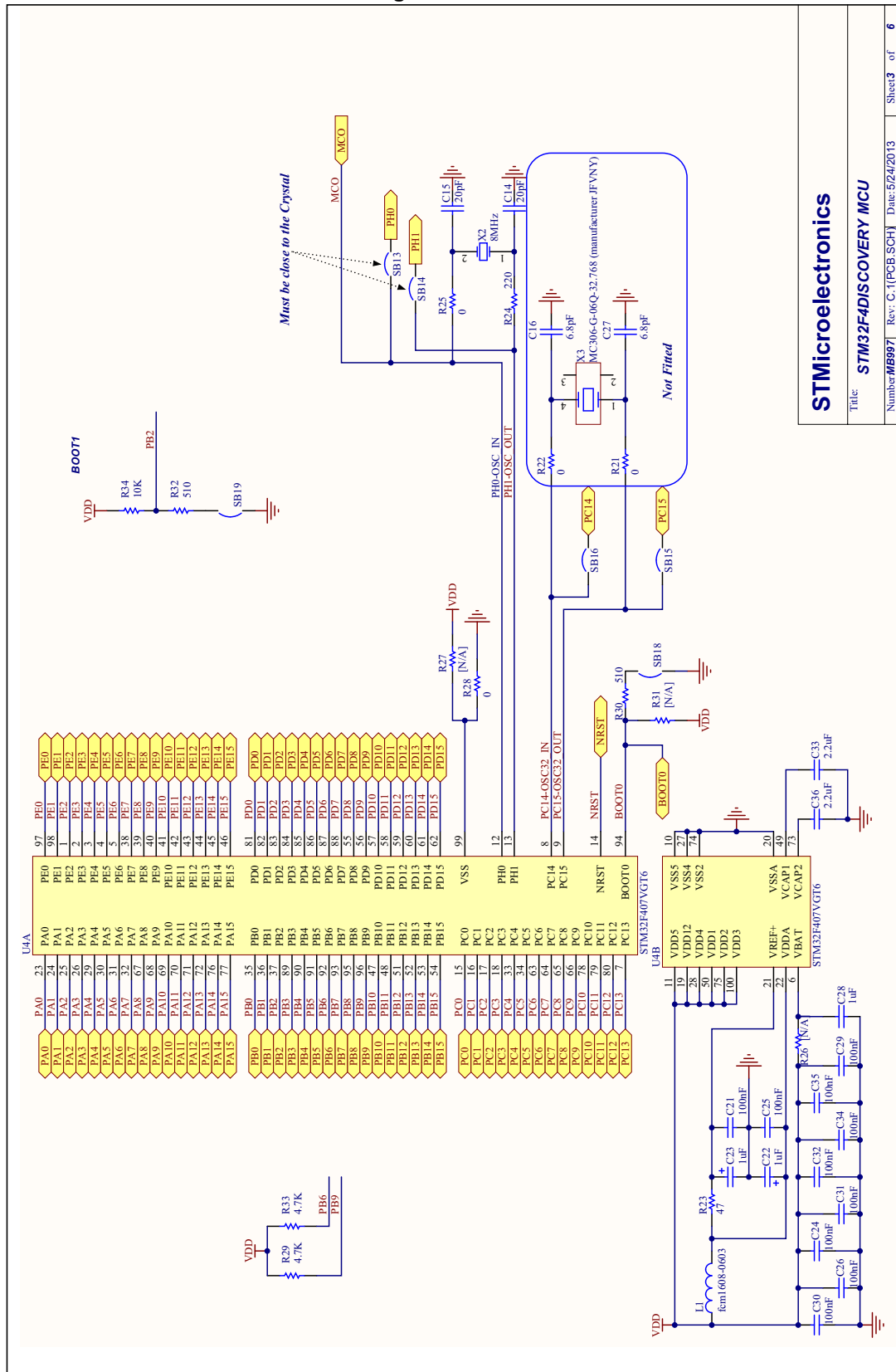
STMicroelectronics

Title: STM32F4DISCOVERY ST-LINKV2 (SWD only)

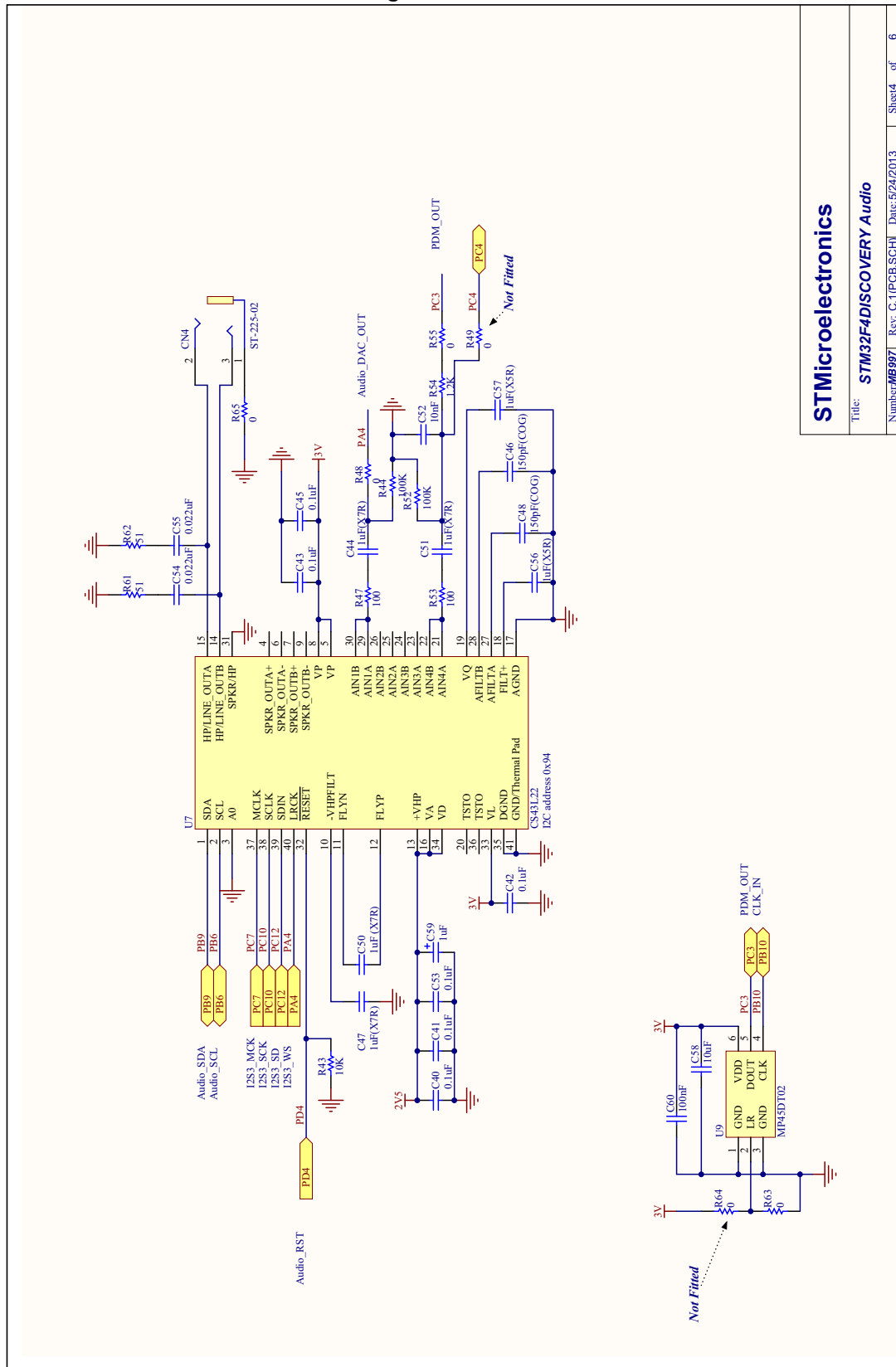
Number: MB997 Rev: C.1 (PCB SCH) Date: 5/24/2013 Sheet 2 of 6



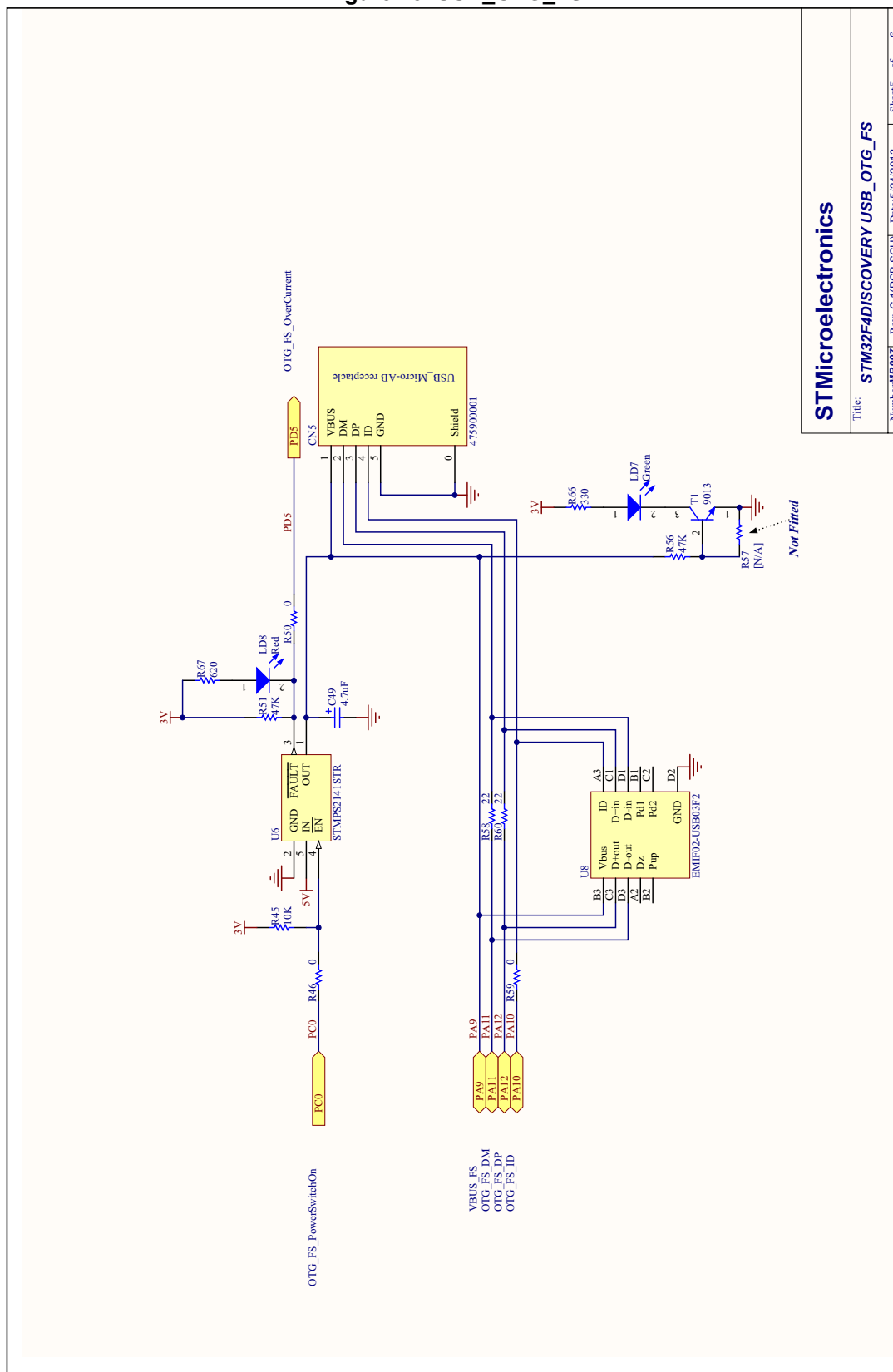
### Figure 13. MCU



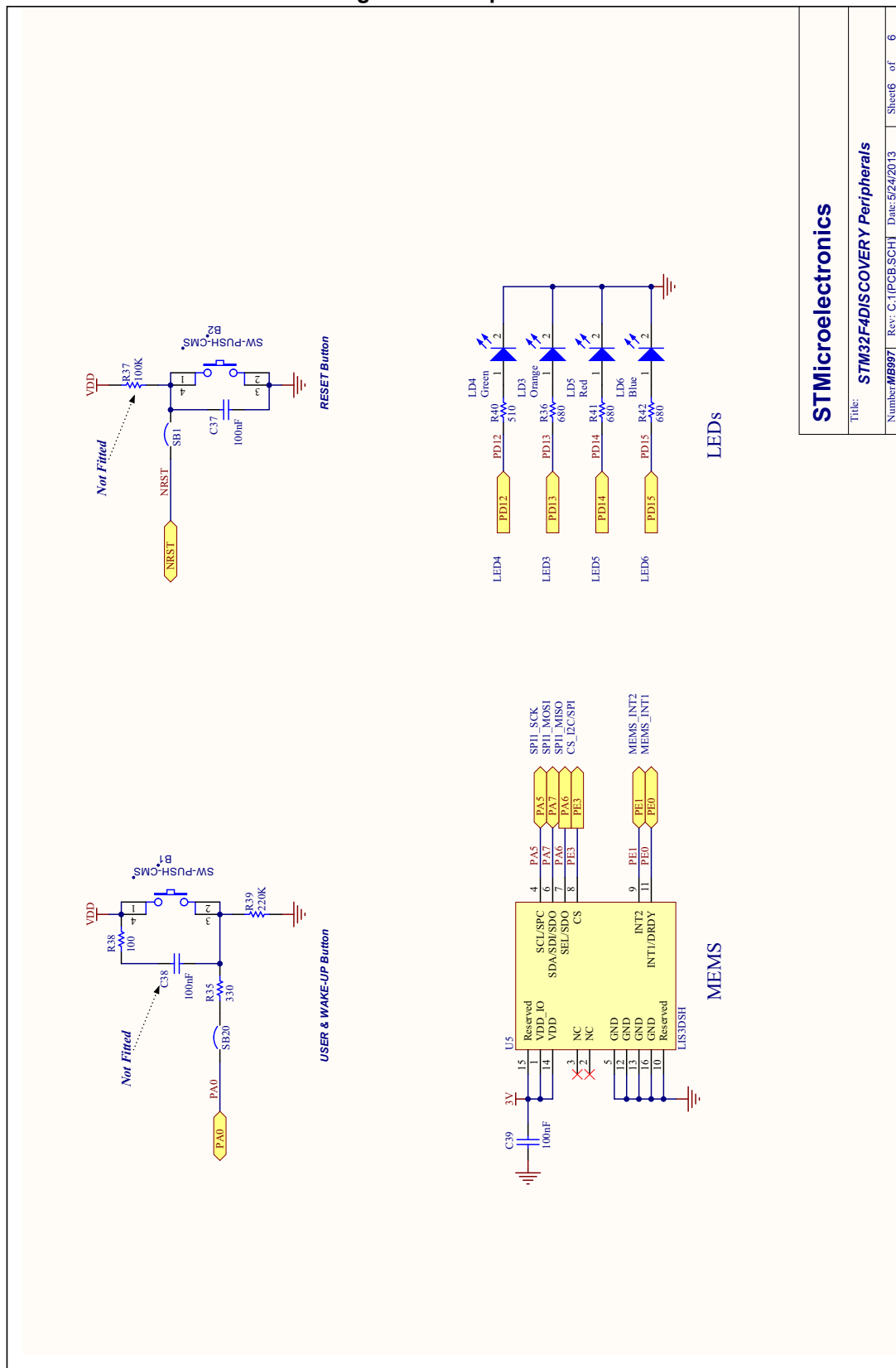
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### Figure 15. USB\_OTG\_FS



### Figure 16. Peripherals





## 7 Revision history

**Table 6. Document revision history**

| Date         | Revision | Changes  |
|--------------|----------|--|
| 27-Sept-2011 | 1        | Initial release.   |
| 30-Jan-2012  | 2        | Added <a href="#">Section 4.1: STM32F407VGT6 microcontroller</a> corrected <a href="#">Figure 3</a> MCU name, modified <a href="#">Figure 2</a> and <a href="#">Chapter 6: Electrical schematics</a> . Modified <a href="#">Table 5</a> PE2 and PE3 entries. |
| 28-Nov-2013  | 3        | Updated for board rev. C. Modified title.<br>Modified <a href="#">Section 4.8: Motion sensor (ST MEMS LIS302DL or LIS3DSH)</a><br>Updated <a href="#">Chapter 6: Electrical schematics</a>   |
| 29-Jan-2014  | 4        | Modified <a href="#">Chapter 3: Features</a> , <a href="#">Figure 2</a> , <a href="#">Chapter 4.8: Motion sensor (ST MEMS LIS302DL or LIS3DSH)</a> , <a href="#">Table 5</a> adding ST MEMS LIS302DL reference.  |

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