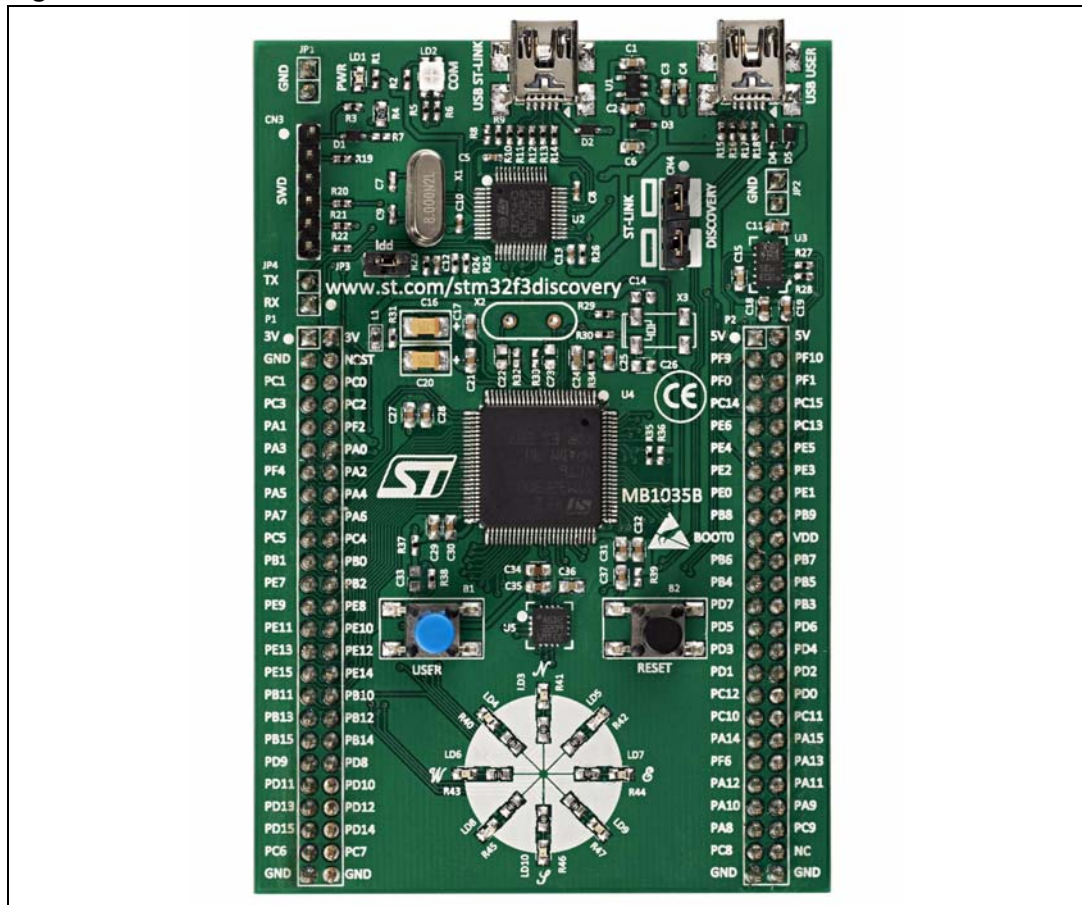


## STM32F3DISCOVERY Discovery kit for STM32F303xx microcontrollers

### Introduction

The STM32F3DISCOVERY is designed to help you explore the features of the STM32 F3 32-bit ARM® Cortex™-M4 mixed-signal MCU, and develop your applications. It is based on an STM32F303VCT6 and includes an ST-LINK/V2 embedded debug tool interface, Gyroscope ST MEMS, E-compass with accelerometer ST MEMS, LEDs, pushbuttons and a USB mini-B connector.

**Figure 1. STM32F3DISCOVERY**



**Table 1. Applicable tools**

Type	Part number
Evaluation tools	STM32F3DISCOVERY

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# 1 Conventions

[Table 2](#) provides the definition of some conventions used in the present document.

**Table 2. 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 STM32F3DISCOVERY is a low-cost and easy-to-use development kit to quickly evaluate and start development with an STM32 F3 series microcontroller. Before installing and using the product, please accept the Evaluation Product License Agreement from [www.st.com/stm32f3discovery](http://www.st.com/stm32f3discovery). For more information on the STM32F3DISCOVERY and for demonstration software, visit [www.st.com/stm32f3discovery](http://www.st.com/stm32f3discovery).

### 2.1 Getting started

Follow the sequence below to configure the STM32F3DISCOVERY board and launch the DISCOVER application:

1. Check the jumper positions on the board, JP3 on, CN4 on (DISCOVERY selected).
2. Connect the STM32F3DISCOVERY board to a PC with a USB cable type A to mini-B through the USB ST-LINK or USB USER connector to power the board. The red LEDs LD1 (PWR) and LD2 (COM) light up.
3. The eight LED indicators blink sequentially.
4. Press the USER button to enable the MEMS gyroscope sensor.
5. Observe how the blinking of the LEDs indicates the gyroscope movements.
6. Press the USER button again to enable the MEMS e-compass sensor.
7. Keep the board in a horizontal position. One of the eight LEDs lights up to indicate the direction of the north.
8. Tilt the board and the eight LEDs blink again
9. To examine or modify the Discover project related to this demo, visit [www.st.com/stm32f3discovery](http://www.st.com/stm32f3discovery) and follow the tutorial. Discover the STM32F303xx MCU features, download and execute programs proposed in the list of projects.
10. Develop your own application using the 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 STM32F3DISCOVERY

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

### 2.4 Order code

To order the STM32F303xx Discovery kit, use the order code STM32F3DISCOVERY.

### 3 Features

The STM32F3DISCOVERY offers the following features.

- STM32F303VCT6 microcontroller featuring 256 KB of Flash memory, 48 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 the USB bus or from an external 3 V or 5 V supply voltage.
- External application power supply: 3 V and 5 V.
- L3GD20, ST MEMS motion sensor, 3-axis digital output gyroscope.
- LSM303DLHC, ST MEMS system-in-package featuring a 3D digital linear acceleration sensor and a 3D digital magnetic sensor.
- Ten LEDs:
  - LD1 (red) for 3.3 V power-on.
  - LD2 (red/green) for USB communication.
  - Eight user LEDs, LD3/10 (red), LD4/9 (blue), LD5/8 (orange) and LD6/7 (green).
- Two pushbuttons (user and reset).
- USB USER with Mini-B connector.
- Extension header for LQFP100 I/Os for quick connection to prototyping board and easy probing.

A large number of free ready-to-run application firmware examples are available at [www.st.com/stm32f3discovery](http://www.st.com/stm32f3discovery) to support quick evaluation and development.

## 4 Hardware and layout

The STM32F3DISCOVERY is designed around the STM32F303VCT6 microcontroller in a 100-pin LQFP package.

*Figure 2* illustrates the connections between the STM32F303VCT6 and its peripherals (ST-LINK/V2, pushbutton, LED, USB, Gyroscope ST MEMS, E-compass with accelerometer ST MEMS, and connectors).

*Figure 2* and *Figure 3* help you to locate these features on the STM32F3DISCOVERY.

**Figure 2. Hardware block diagram**

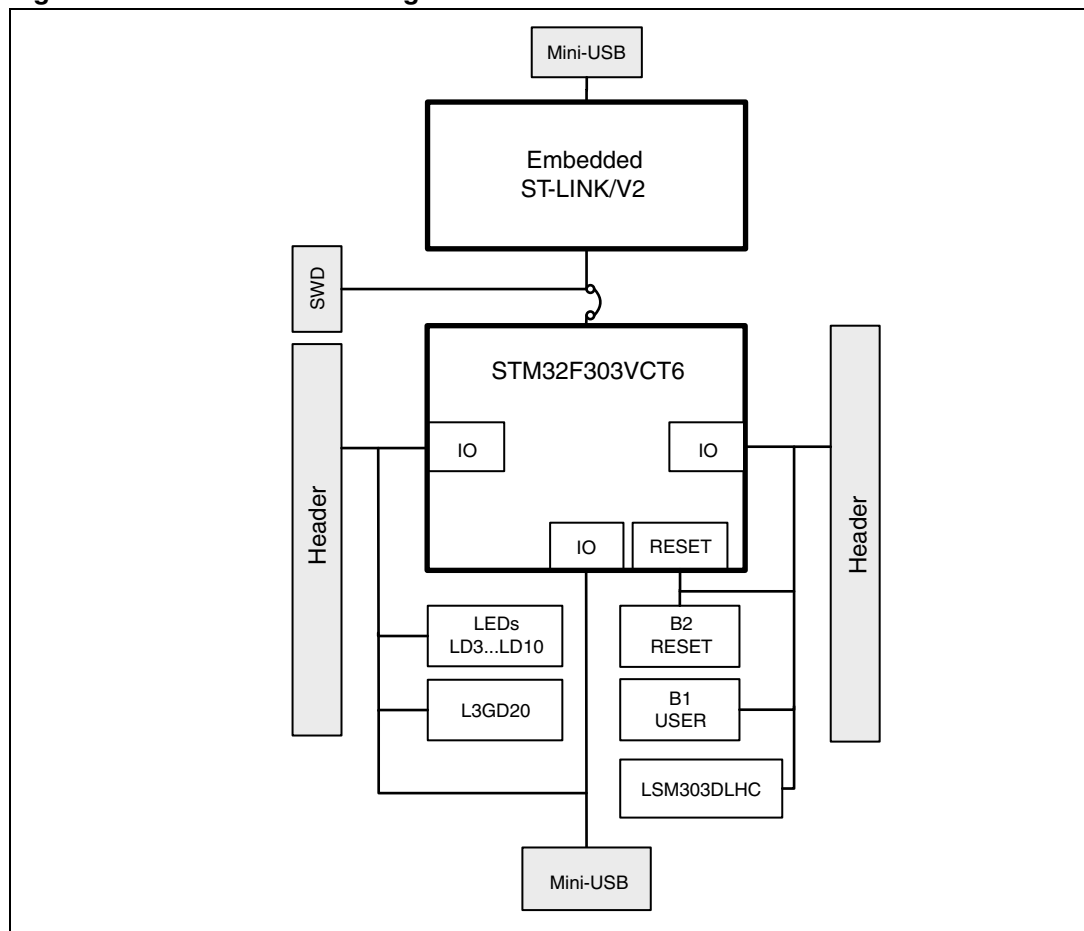
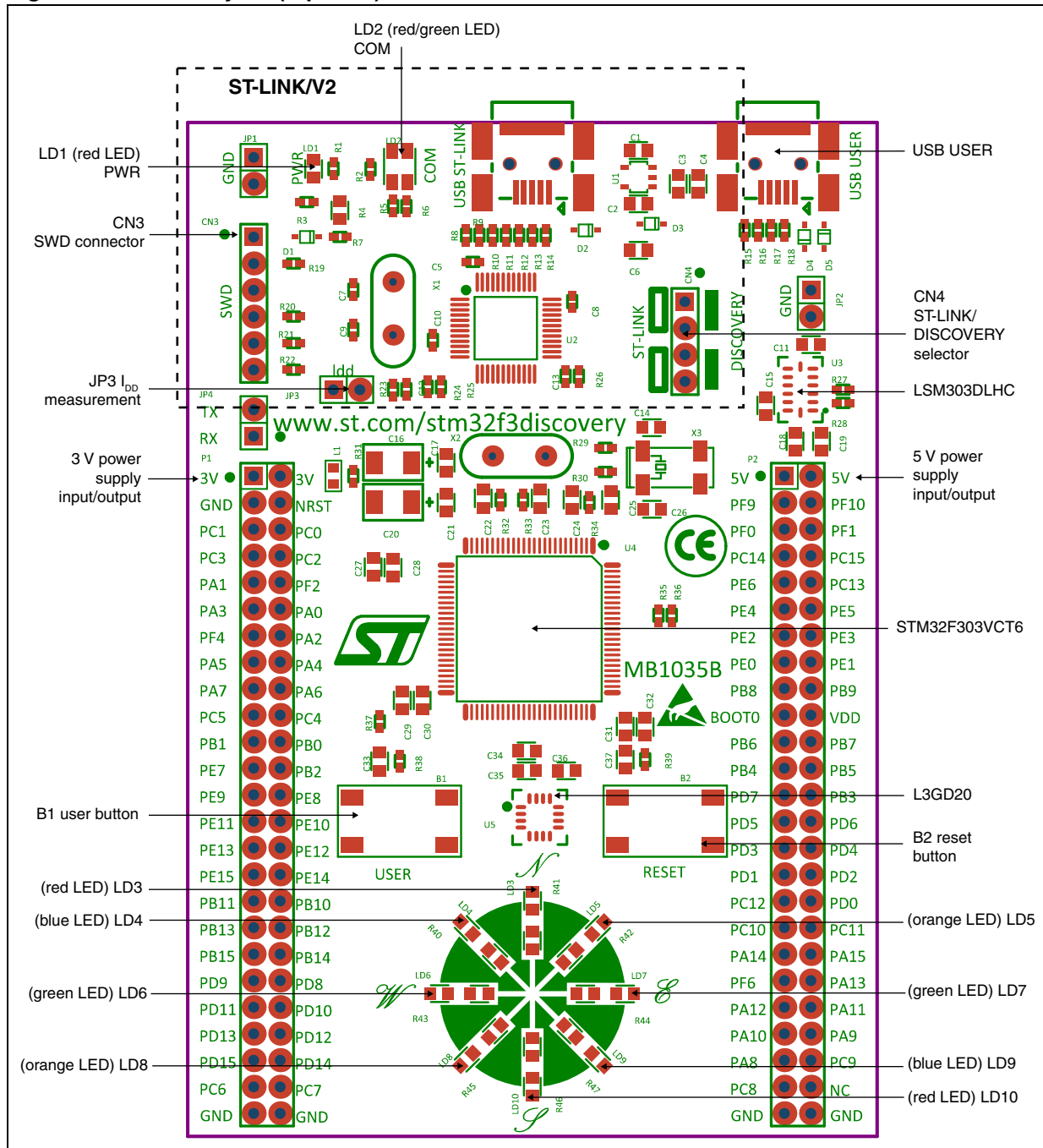


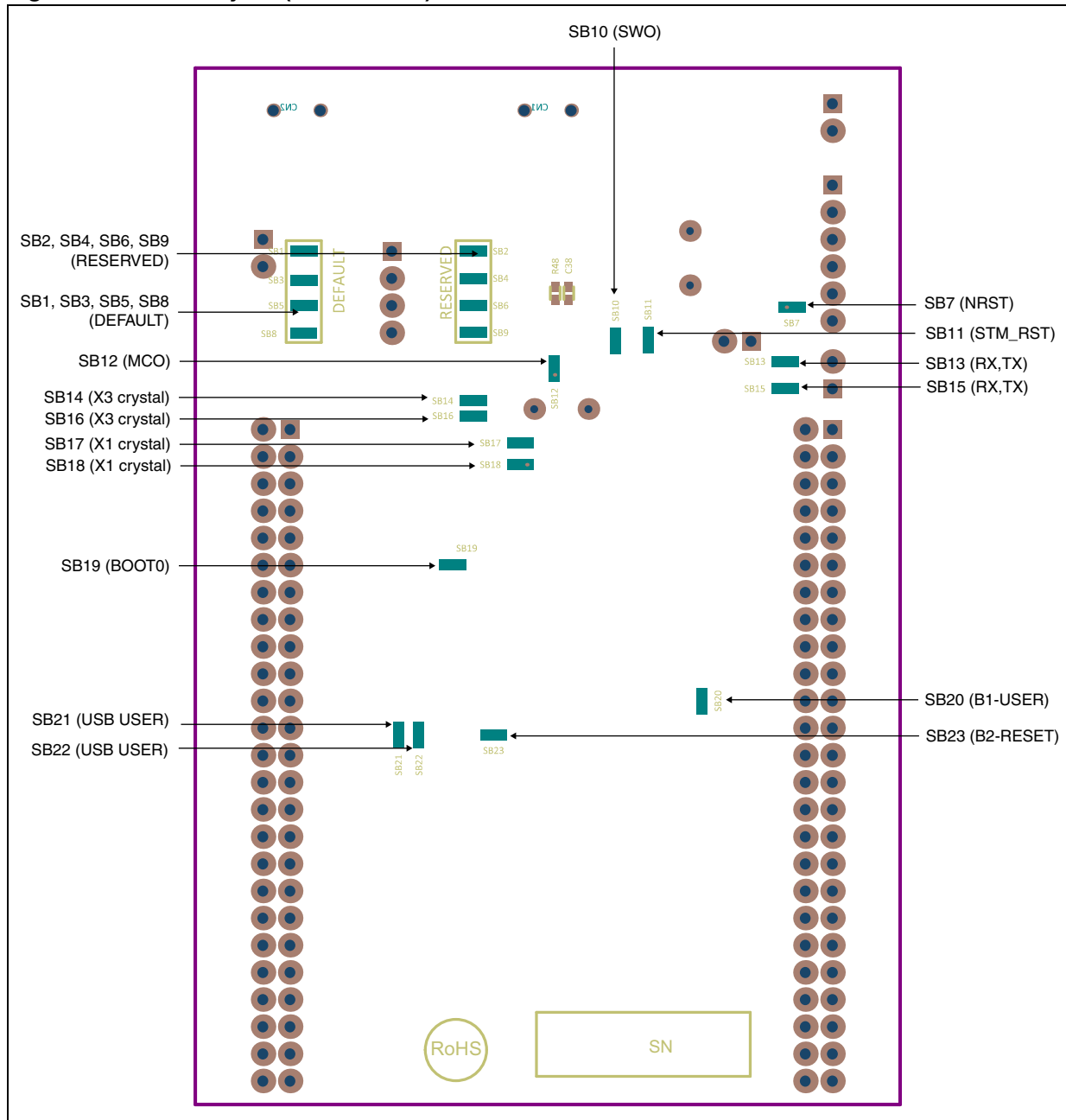


Figure 3. Board layout (top view)



Note: Pin 1 of CN3, CN4, JP3, JP4, P1 and P2 connectors are identified by a square.

Figure 4. Board layout (bottom view)



Note: If SB12 is ON, SB17 must be OFF and R33 removed to provide the clock source from MCO correctly.

## 4.1 STM32F303VCT6 microcontroller

This ARM™Cortex-M4 32-bit MCU with FPU has 256 KB Flash, 48 KB SRAM, 4 ADCs, two DAC channels, seven comparators, four PGAs, 13 timers, 2.0-3.6 V operation.

**Figure 5. STM32F303VCT6 package**



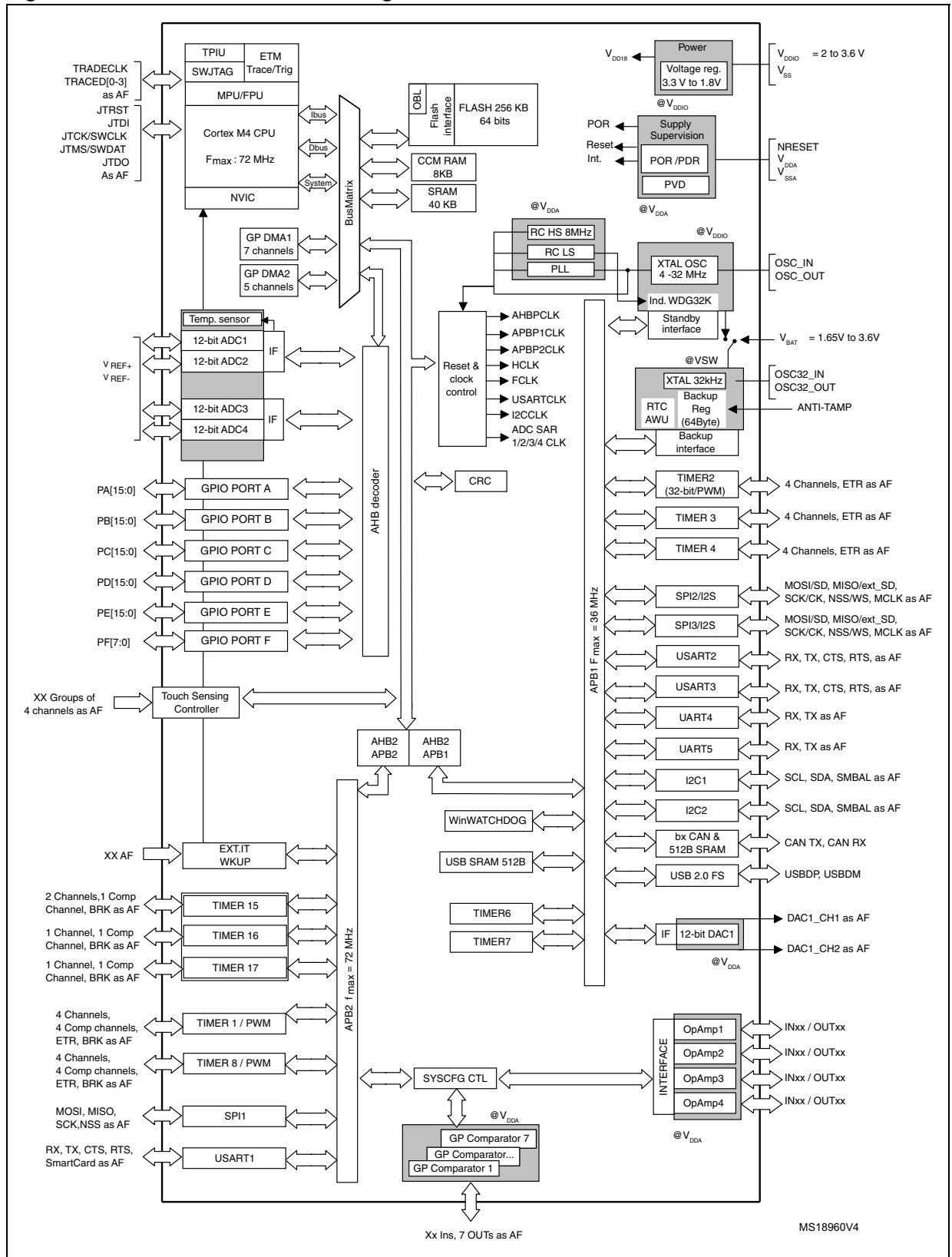
This device provides the following benefits.

- 72 MHz/62 DMIPS (from Flash) or 94 DMIPS (from CCM-SRAM) Cortex-M4 with single cycle DSP MAC and floating point unit:
  - 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.
- Real-time performance:
  - CCM-SRAM (core coupled memory): 8 Kbytes of SRAM mapped to the instruction bus; critical routines loaded in the 8-Kbyte CCM at startup can be completed at full speed with zero wait states, achieving 94 Dhrystone MIPS and CoreMark score 155 at 72 MHz.
  - SRAM and CCM-SRAM with parity bit
  - 32-bit AHB bus matrix
  - DMA controllers
  - Memory protection unit (MPU).

More performance for critical routines with zero-wait state execution from safe CCM-SRAM.
- Outstanding power efficiency:
  - Stop mode down to 5.7  $\mu$ A typ
  - RTC <2  $\mu$ A typ in VBAT mode
  - 2.0 to 3.6 V or 1.8 V +/-8% power supply range
  - Flexibility to reduce power consumption for applications requiring advanced analog peripherals and low-power modes.
  - Running at low voltage or on a rechargeable battery.

- Maximum integration:
  - Up to 256 Kbytes of on-chip Flash memory, 48 Kbytes of SRAM, reset circuit, internal RCs, PLLs, more features in space-constrained applications.
- Superior and innovative peripherals:
  - Analog: 4x 12-bit ADC 5 MSPS reaching 18 MSPS in interleaved mode, fast comparators (50 ns), programmable gain amplifiers (4 gains, 1% accuracy). 12-bit DACs.
  - Up to 13 timers: one 32-bit (TIM2) and 12 16-bit timers, running up to 144 MHz (TIM1,8) or 72 MHz.
  - Audio: simplex or full duplex I<sup>2</sup>S interfaces.
  - Up to 12 communication interfaces including 5x USART (9 Mbit/s), 3x SPIs/2x I<sup>2</sup>Ss (18 Mbit/s), 2x I<sup>2</sup>C (1 MHz fast mode plus), CAN (1 Mbit/s), USB full speed.
  - Cyclic redundancy check (CRC).
  - Capacitive touch-sensing (24 keys).
  - Full set of integration features on chip resulting in simplified board designs and fewer external components.
  - BOM cost reduced.
- Pin compatibility and same API for peripherals as F1 series:
  - More than 350 Cortex-M based compatible STM32 devices.
  - More than 70 Cortex-M4 based compatible STM32 devices.
  - Digital signal processing (DSP) capability at a competitive price.

Figure 6. STM32F303VCT6 block diagram



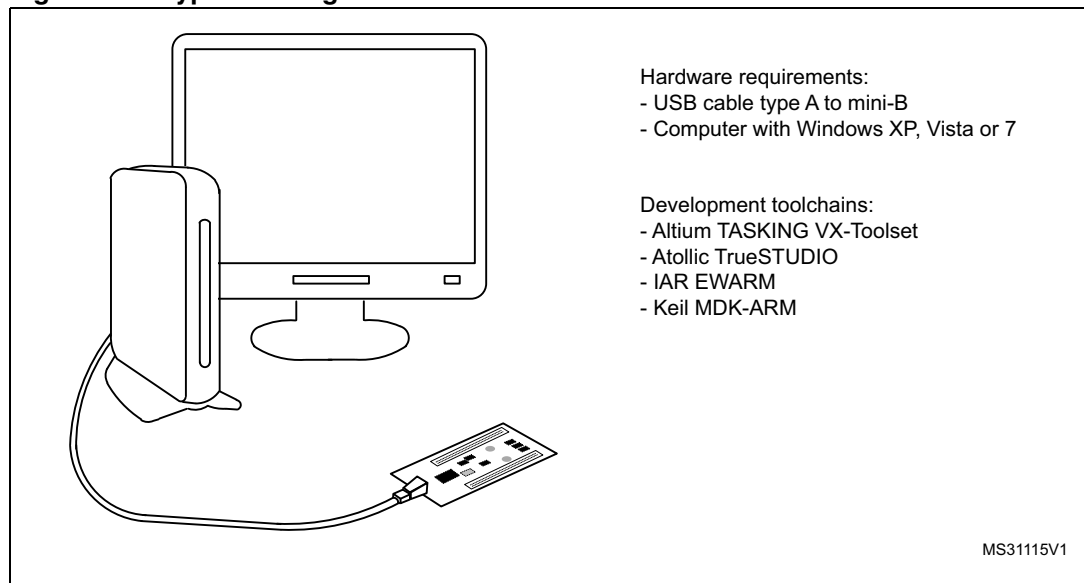
## 4.2 Embedded ST-LINK/V2

The ST-LINK/V2 programming and debugging tool is integrated on the STM32F3DISCOVERY. The embedded ST-LINK/V2 can be used in two different ways according to the jumper states ([Table 3](#)).

- Program/debug the MCU on board,
- Program/debug an MCU in an external application board using a cable connected to SWD connector CN3.

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**



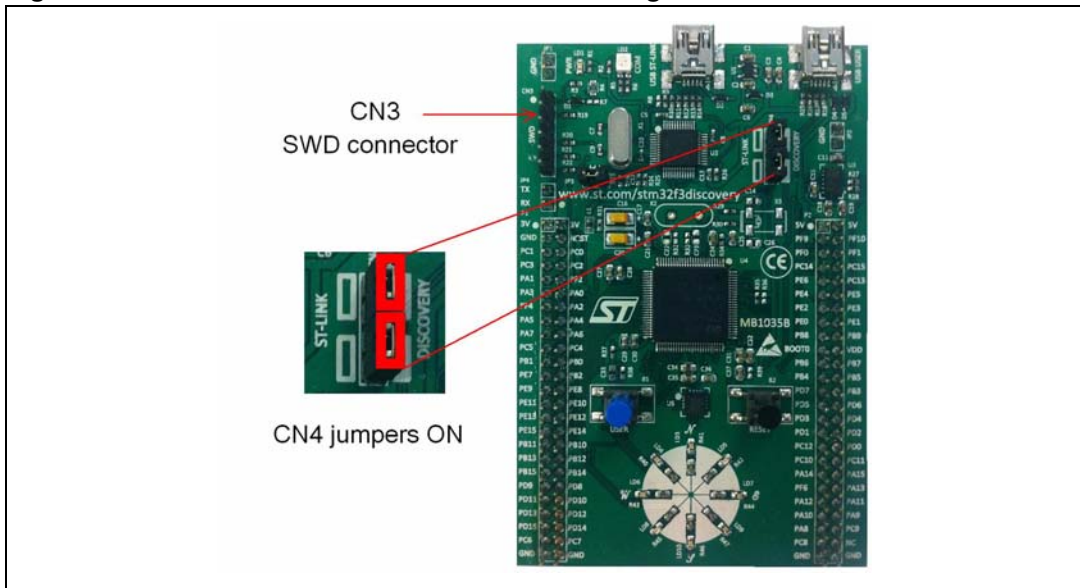
**Table 3. Jumper states**

Jumper state	Description
Both CN4 jumpers ON	ST-LINK/V2 functions enabled for on-board programming (default)
Both CN4 jumpers OFF	ST-LINK/V2 functions enabled for application through external CN3 connector (SWD supported)

### 4.2.1 Using ST-LINK/V2 to program/debug the STM32F303VCT6 on board

To program the STM32F303VCT6 MCU on the board, simply plug in the two jumpers on CN4, as shown in [Figure 8](#) in red, but do not use the CN3 connector as that could disturb communication with the STM32F303VCT6 of the STM32F3DISCOVERY.

Figure 8. STM32F3DISCOVERY connections image



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

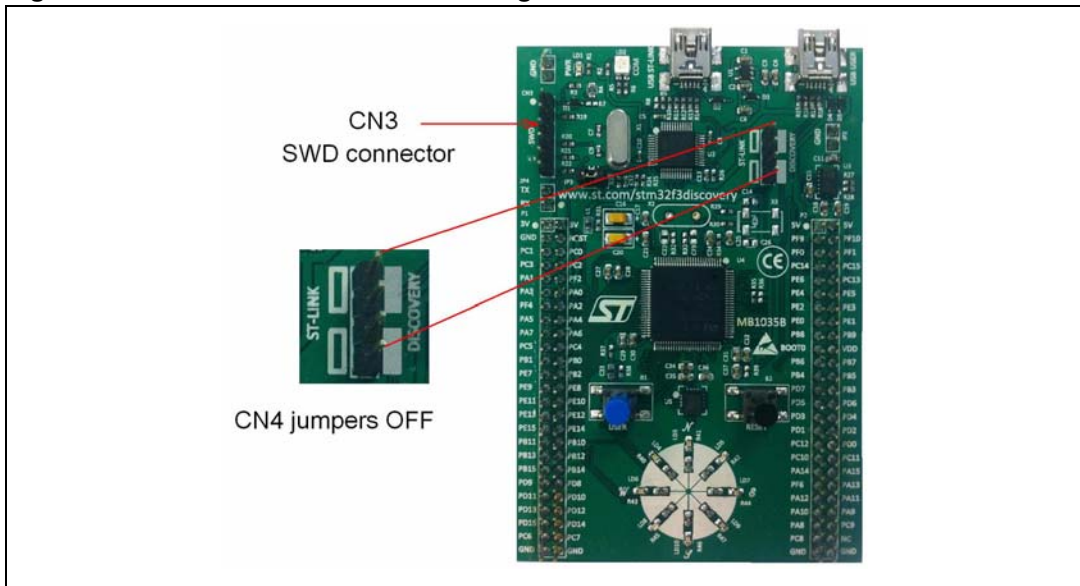
It is very easy to use the ST-LINK/V2 to program the STM32 on an external application. Simply remove the two jumpers from CN4 as shown in [Figure 9](#), and connect your application to the CN3 debug connector according to [Table 4](#).

*Note:* SB7 must be OFF if you use the CN3 pin 5 in your external application.

Table 4. Debug connector CN3 (SWD)

Pin	CN3	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/V2 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 5 V power supply.

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

- 5 V and 3 V can be used as output power supplies when another application board is connected to pins P1 and P2. In this case, the 5 V and 3 V pins deliver a 5 V or 3 V power supply and power consumption must be lower than 100 mA.
- 5 V and 3 V can also be used as input power supplies, for example when the USB connectors are not connected to the PC. In this case, the STM32F3DISCOVERY 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.

*Note:* The board can be also powered through the USB USER connector and is protected by D4 and D5 diodes when both USBs are connected (in which case, the 5 V power is around 4.4 volts).

### 4.4 LEDs

- LD1 PWR: red LED indicates that the board is powered.
- LD2 COM: LD2 default status is red. LD2 turns to green to indicate that communications are in progress between the PC and the ST-LINK/V2.
- User LD3: red LED is a user LED connected to the I/O PE9 of the STM32F303VCT6.
- User LD4: blue LED is a user LED connected to the I/O PE8 of the STM32F303VCT6.
- User LD5: orange LED is a user LED connected to the I/O PE10 of the STM32F303VCT6.
- User LD6: green LED is a user LED connected to the I/O PE15 of the STM32F303VCT6.
- User LD7: green LED is a user LED connected to the I/O PE11 of the STM32F303VCT6.
- User LD8: orange LED is a user LED connected to the I/O PE14 of the STM32F303VCT6.
- User LD9: blue LED is a user LED connected to the I/O PE12 of the STM32F303VCT6.
- User LD10: red LED is a user LED connected to the I/O PE13 of the STM32F303VCT6.

### 4.5 Pushbuttons

- B1 USER: user and wake-up button connected to the I/O PA0 of the STM32F303VCT6.
- B2 RESET: pushbutton connected to NRST is used to RESET the STM32F303VCT6.

## 4.6 USB device supported

The STM32F303VCT6 MCU is also used to drive the second USB mini-B connector (USB USER) which allows the board to be used as a USB Device. The STM32F3DISCOVERY can then act as a USB joystick, mouse, or other similar device. If both USBs are connected, diodes D4 and D5 protect the board and use the power from the USB ST-LINK.

The board can be powered through this USB USER connector, then LED1 PWR lights, LED2 COM blinks and it can run an application in standalone mode.

## 4.7 E-compass/accelerometer MEMS (ST MEMS LSM303DLHC)

The LSM303DLHC is an ultra-compact low-power system-in-package featuring a 3D digital linear acceleration sensor and a 3D digital magnetic sensor. It includes a sensing element and an IC interface able to provide the measured acceleration to the external world through I2C serial interface.

The LSM303DLHC has dynamically user-selectable full scales of  $\pm 2g/\pm 8g$  and is capable of measuring acceleration, and a magnetic field full scale from  $\pm 1.3g$  to  $8.1g$  with an output data rate of 100 Hz or 400 Hz.

The STM32F303VCT6 MCU controls this motion sensor through the I2C interface.

## 4.8 Gyroscope MEMS (ST MEMS L3GD20)

The L3GD20 is an ultra-compact, low-power, three-axis angular rate sensor. It includes a sensing element and an IC interface able to provide the measured angular rate to the external world through the I2C/SPI serial interface.

The L3GD20 has dynamically user-selectable full scales of  $\pm 250$  dps/ $\pm 500$  dps/ $\pm 2000$  dps and is capable of measuring rates.

The STM32F303VCT6 MCU controls this motion sensor through the SPI interface.

## 4.9 JP3 (Idd)

Jumper JP3, labeled Idd, allows the consumption of the STM32F303VCT6 to be measured by removing the jumper and connecting an ammeter.

- Jumper on: STM32F303VCT6 is powered (default).
- Jumper off: an ammeter must be connected to measure the STM32F303VCT6 current. If there is no ammeter, the STM32F303VCT6 is not powered.

## 4.10 OSC clock

### 4.10.1 OSC clock supply

The following information indicates all configurations for clock supply selection.

- **MCO from ST-LINK.** From MCO of the STM32F103C8T6. This frequency cannot be changed, it is fixed at 8 MHz and connected to PF0-OSC\_IN of the STM32F303VCT6. Configuration needed:
  - SB12 closed, SB17 open, R33 removed
  - SB18, R32, C22, C23, X2 = don't care
- **Oscillator on board.** From X2 crystal (not provided). For typical frequencies and its capacitors and resistors, please refer to the STM32F303VCT6 Datasheet. Configuration needed:
  - SB12, SB17, SB18 open
  - R32, R33, C22, C23, X2 soldered
- **Oscillator from external PF0.** From external oscillator through pin 5 of the P2 connector. Configuration needed:
  - SB12 open, SB17 closed, R33 removed
  - SB18, R32, C22, C23, X2 = don't care
- **No external oscillator.** From Internal oscillator HSI only. PF0 and PF1 can be used as GPIO. Configuration needed:
  - SB12 open, SB17 closed, SB18 closed, R32 removed, R33 removed
  - C22, C23, X2 = don't care

### 4.10.2 OSC 32 kHz clock supply

The following information indicates all configurations for the 32 kHz clock supply selection.

- **Oscillator on board.** From X3 Crystal (not provided). Configuration needed:
  - SB14 open, SB16 open.
  - R29, R30, C14, C26, X3 soldered.
- **Oscillator from external PC14.** From external oscillator through the pin 7 of P2 connector. Configuration needed:
  - SB14 open, R29 removed
  - SB16, R30, C14, C26, X3 = don't care
- **No external oscillator.** PC14 and PC15 can be used as GPIO. Configuration needed:
  - SB14 closed, SB16 closed, R29 removed, R30 removed.
  - C14, C26, X3 = don't care.

## 4.11 Solder bridges

**Table 5. Solder bridges**

Bridge	State <sup>(1)</sup>	Description
SB17,18 (X1 crystal) <sup>(2)</sup>	<b>OFF</b>	X1, C22, C23, R32 and R33 provide a clock. PF0, PF1 are disconnected from P2.
	ON	PF0, PF1 are connected to P2 (R32 and R33 must not be fitted).
SB1,3,5,8 (default)	<b>ON</b>	Reserved, do not modify
SB2,4,6,9 (reserved)	<b>OFF</b>	Reserved, do not modify
SB14,16 (X3 crystal)	<b>OFF</b>	X3, C14, C26, R29 and R30 deliver a 32 KHz clock. PC14, PC15 are not connected to P2.
	ON	PC14, PC15 are only connected to P2. Remove only R26, R29
SB23 (B2-RESET)	<b>ON</b>	B2 Push Button is connected to NRST of STM32F303VCT6
	OFF	B2 Push Button is not connected to NRST of STM32F303VCT6
SB20 (B1-USER)	<b>ON</b>	B1 Push Button is connected to PA0
	OFF	B1 Push Button is not connected to PA0
SB13,15 (RX,TX)	<b>OFF</b>	Reserved, do not modify
	ON	Reserved, do not modify
SB7 (NRST)	<b>ON</b>	NRST signal of connector CN3 is connected to NRST of STM32F303VCT6
	OFF	NRST signal is not connected
SB10 (SWO)	<b>ON</b>	SWO signal of connector CN3 is connected to PB3
	OFF	SWO signal is not connected
SB11 (STM_RST)	<b>OFF</b>	No incidence on NRST signal of STM32F103C8T6
	ON	NRST signal of STM32F103C8T6 is connected to GND
SB19 (BOOT0)	<b>ON</b>	BOOT0 signal of STM32F303VCT6 is at level "0" through 510 ohm pull-down
	OFF	BOOT0 signal of STM32F303VCT6 is at level "1" through 10K ohm pull-up (not provided).
SB21,22 (USB USER)	<b>OFF</b>	PA11 and PA12 are only used for USB USER and not connected to P2 to avoid noise.
	ON	PA11 and PA12 are connected to P2.
SB12 (MCO) <sup>(2)</sup>	<b>OFF</b>	MCO signal of STM32F103C8T6 is not used.
	ON	MCO clock signal from STM32F103C8T6 is connected to OSC_IN of STM32F303VCT6.

1. Default state is shown in bold.

2. If SB12 is ON, SB17 must be OFF and R33 removed to provide the clock source from the MCO correctly.

## 4.12 Extension connectors

The male headers P1 and P2 can connect the STM32F3DISCOVERY to a standard prototyping/wrapping board. STM32F303VCT6 GPI/Os are available on these connectors. P1 and P2 can also be probed by an oscilloscope, logical analyzer or voltmeter.

**Table 6. STM32F303VCT6 MCU pin description versus board function**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
BOOT0		94												19
NRST		14			RESET		NRST					5	4	
PA0	TIM2_CH1_ETR, G1_IO1, USART2_CTS, COMP1_OUT, TIM8_BKIN, TIM8_ETR	23			USER								12	
PA1	TIM2_CH2, G1_IO2, USART2_RTS, TIM15_CH1N	24											9	
PA2	TIM2_CH3, G1_IO3, USART2_TX, COMP2_OUT, TIM15_CH1, AOP1_OUT	25											14	
PA3	TIM2_CH4, G1_IO4, USART2_RX, TIM15_CH2	26											11	
PA4	TIM3_CH2, G2_IO1, SPI1_NSS, SPI3_NSS/I2S3_WS, USART2_CK	29											16	
PA5	TIM2_CH1_ETR, G2_IO2, SPI1_SCK	30		SCL/SPC									15	

**Table 6. STM32F303VCT6 MCU pin description versus board function (continued)**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PA6	TIM16_CH1, TIM3_CH1, G2_IO3, TIM8_BKIN, SPI1_MISO, TIM1_BKIN, AOP2_OUT, COMP1_OUT	31		SAO/SDO									18	
PA7	TIM17_CH1, TIM3_CH2, G2_IO4, TIM8_CH1N, SPI1_MOSI, TIM1_CH1N, COMP2_OUT	32		SDA/SDI/SDO									17	
PA8	MCO, I2C2_SMBAL, I2S2_MCK, TIM1_CH1, USART1_CK, COMP3_OUT, TIM4_ETR	67												45
PA9	G4_IO1, I2C2_SCL, I2S3_MCK, TIM1_CH2, USART1_TX, COMP5_OUT, TIM15_BKIN, TIM2_CH3	68												44
PA10	TIM17_BKIN, G4_IO2, I2C2_SDA, TIM1_CH3, USART1_RX, COMP6_OUT, TIM2_CH4, TIM8_BKIN	69												43
PA11	TIM1_CH1N, USART1_CTS, COMP1_OUT, CAN_RX, TIM4_CH1, TIM1_CH4_BKIN2, USBDM	70						DM						42

**Table 6. STM32F303VCT6 MCU pin description versus board function (continued)**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PA12	TIM16_CH1, TIM1_CH2N, USART1_RTS, COMP2_OUT, CAN_TX, TIM4_CH2, TIM1_ETR, USBDP	71						DP						41
PA13	JTMS-SWDAT, TIM16_CH1N, G4_IO3, IR-Out, USART3_CTS, TIM4_CH3	72					SWDIO					4		40
PA14	JTCK-SWCLK, G4_IO4, I2C1_SDA, TIM8_CH2, TIM1_BKIN, USART2_TX	76					SWCLK					2		37
PA15	JTDI, TIM2_CH1_ETR, TIM8_CH1, I2C1_SCL, SPI1_NSS, SPI3_NSS/I2S3_WS, USART2_RX, TIM1_BKIN	77												38
PB0	TIM3_CH3, G3_IO2, TIM8_CH2N, TIM1_CH2N	35											22	
PB1	TIM3_CH4, G3_IO3, TIM8_CH3N, TIM1_CH3N, COMP4_OUT, AOP3_OUT	36											21	
PB2	G3_IO4	37											24	
PB3	JTDO/TRACESWO, TIM2_CH2, TIM4_ETR, G5_IO1, TIM8_CH1N, SPI1_SCK, SPI3_SCK/I2S3_CK, USART2_TX, TIM3_ETR	89					SWO					6		26

**Table 6. STM32F303VCT6 MCU pin description versus board function (continued)**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PB4	NJTRST, TIM16_CH1, TIM3_CH1, G5_IO2, TIM8_CH2N, SPI1_MISO, SPI3_MISO/I2S3_DIN, USART2_RX, TIM17_BKIN	90												23
PB5	TIM16_BKIN, TIM3_CH2, TIM8_CH3N, I2C1_SMBAL, SPI1_MOSI, SPI3_MOSI/I2S3_DO UT, USART2_CK, TIM17_CH1	91												24
PB6	TIM16_CH1N, TIM4_CH1, G5_IO3, I2C1_SCL, TIM8_CH1, TIM8_ETR_BKIN2, USART1_TX	92	SCL											21
PB7	TIM17_CH1N, TIM4_CH2, G5_IO4, I2C1_SDA, TIM8_BKIN, USART1_RX, TIM3_CH4	93	SDA											22
PB8	TIM16_CH1, TIM4_CH3, SYNCH, I2C1_SCL, COMP1_OUT, CAN_RX, TIM8_CH2, TIM1_BKIN	95												17
PB9	TIM17_CH1, TIM4_CH4, I2C1_SDA, IR-OUT, CAN_TX, TIM8_CH3	96												18
PB10	TIM2_CH3, SYNCH, USART3_TX	47											34	
PB11	TIM2_CH4, G6_IO1, USART3_RX, COMP2_OUT	48											33	



**Table 6. STM32F303VCT6 MCU pin description versus board function (continued)**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PB12	G6_IO2, I2C2_SMBAL, SPI2_NSS/I2S2_WS, TIM1_BKIN, USART3_CK, AOP4_OUT	51											36	
PB13	G6_IO3, SPI2_SCK/I2S2_CK, TIM1_CH1N, USART3_CTS	52											35	
PB14	TIM15_CH1, G6_IO4, SPI2_MISO/I2S2_DIN, TIM1_CH2N, USART3_RTS	53											38	
PB15	TIM15_CH2, TIM15_CH1N, TIM1_CH3N, SPI2_MOSI/ I2S2_DOUT	54											37	
PC0		15											6	
PC1		16											5	
PC2	COMP7_OUT	17											8	
PC3	TIM1_BKIN2	18											7	
PC4	USART1_TX	33											20	
PC5	G3_IO1, USART1_RX	34											19	
PC6	TIM3_CH1, TIM8_CH1, I2S2_MCK, COMP6_OUT	63											47	
PC7	TIM3_CH2, TIM8_CH2, I2S3_MCK, COMP5_OUT	64											48	
PC8	TIM3_CH3, TIM8_CH3, COMP3_OUT	65												47

**Table 6. STM32F303VCT6 MCU pin description versus board function (continued)**

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PC9	TIM3_CH4, TIM8_CH4_BKIN2, COMP3_OUT	66												46
PC10	TIM8_CH1N, UART4_TX, SPI3_SCK/I2S3_CK, USART3_TX	78												35
PC11	TIM8_CH2N, UART4_RX, SPI3_MISO/I2S3_DIN, USART3_RX	79												36
PC12	TIM8_CH3N, UART5_TX, SPI3_MOSI/ I2S3_DOUT, USART3_CK	80												33
PC13	TIM1_CH1N	7												10
PC14	OSC32_IN	8							OSC32_IN					7
PC15	OSC32_OUT	9							OSC32_OUT					8
PD0	CAN_RX	81												34
PD1	TIM8_CH4_BKIN2, CAN_TX	82												31
PD2	TIM3_ETR, TIM8_BKIN, UART5_RX	83												32
PD3	TIM2_CH1_ETR, USART2_CTS	84												29
PD4	TIM2_CH2, USART2_RTS	85												30
PD5	USRT2_TX	86												27

Table 6. STM32F303VCT6 MCU pin description versus board function (continued)

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PD6	TIM2_CH4, USART2_RX	87												28
PD7	TIM2_CH3, USART2_CK	88												25
PD8	USART3_TX	55											40	
PD9	USART3_RX	56											39	
PD10	USART3_CK	57											42	
PD11	USART3_CTS	58											41	
PD12	TIM4_CH1, G8_IO1, USART3_RTS	59											44	
PD13	TIM4_CH2, G8_IO2	60											43	
PD14	TIM4_CH3, G8_IO3	61											46	
PD15	TIM4_CH4, G8_IO4, SPI2_NSS	62											45	
PE0	TIM4_ETR, TIM16_CH1, USART1_TX	97		INT1										15
PE1	TIM17_CH1, USART1_RX	98		DRDY/INT2										16
PE2	TRACECK, TIM3_CH1, G7_IO1	1	DRDY											13
PE3	TRACED0, TIM3_CH2, G7_IO2	2		CS_I2C/SPI										14
PE4	TRACED1, TIM3_CH3, G7_IO3	3	INT1											11
PE5	TRACED2, TIM3_CH4, G7_IO4	4	INT2											12
PE6	TRACED3	5												9
PE7	TIM1_ETR	38											23	

Table 6. STM32F303VCT6 MCU pin description versus board function (continued)

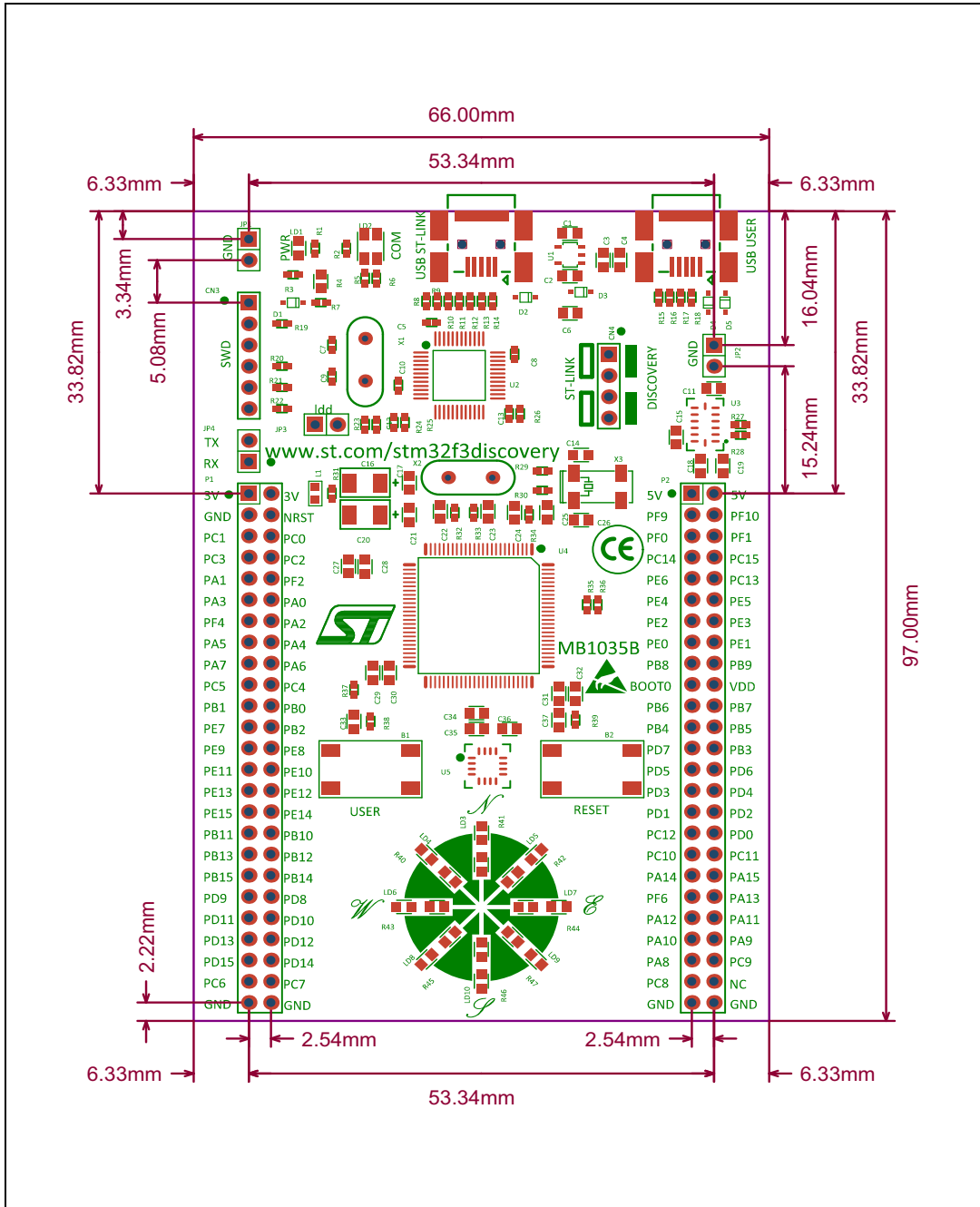
MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
PE8	TIM1_CH1N	39				LD4/ BLUE							26	
PE9	TIM1_CH1	40				LD3/ RED							25	
PE10	TIM1_CH2N	41				LD5/ ORANGE							28	
PE11	TIM1_CH2	42				LD7/ GREEN							27	
PE12	TIM1_CH3N	43				LD9/ BLUE							30	
PE13	TIM1_CH3	44				LD10/ RED							29	
PE14	TIM1_CH4_BKIN2	45				LD8/ ORANGE							32	
PE15	TIM1_BKIN, USART3_RX	46				LD6/ GREEN							31	
PF0	OSC_IN, I2C2_SDA, TIM1_CH3N	12							OSC_IN					5
PF1	OSC_OUT, I2C2_SCL	13							OSC_OUT					6
PF2		19											10	
PF4	COMP1_OUT	27											13	
PF6	TIM4_CH4, I2C2_SCL, USART3_RTS	73												39
PF9	TIM15_CH1, SPI2_SCK	10												3
PF10	TIM15_CH2, SPI2_SCK	11												4

Table 6. STM32F303VCT6 MCU pin description versus board function (continued)

MCU pin			Board function											
Main function	Alternate functions	LQFP100 pin num.	LSM303DLHC	L3GD20	Pushbutton	LED	SWD	USB	OSC	Free I/O	Power supply	CN3	P1	P2
											5V			1
											5V			2
											3V		1	
											3V		2	
											VDD			20
											GND	3		
											GND		49	49
											GND		50	50

# 5 Mechanical drawing

Figure 10. STM32F3DISCOVERY mechanical drawing





# 6

# STM32F3DISCOVERY electrical schematics

### Figure 11. STM32F3DISCOVERY top level

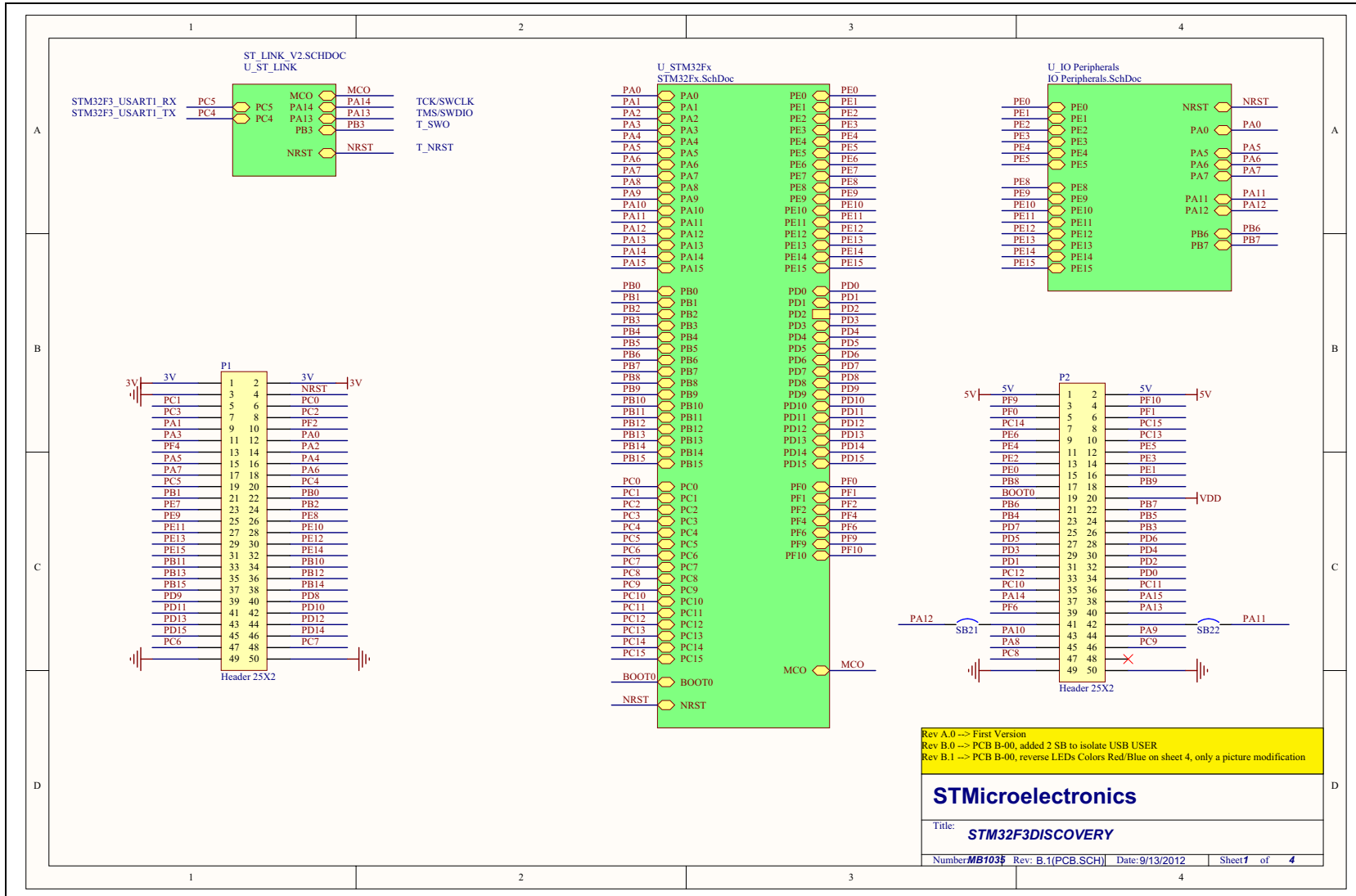




Figure 12. ST-LINK/V2 (SWD only)

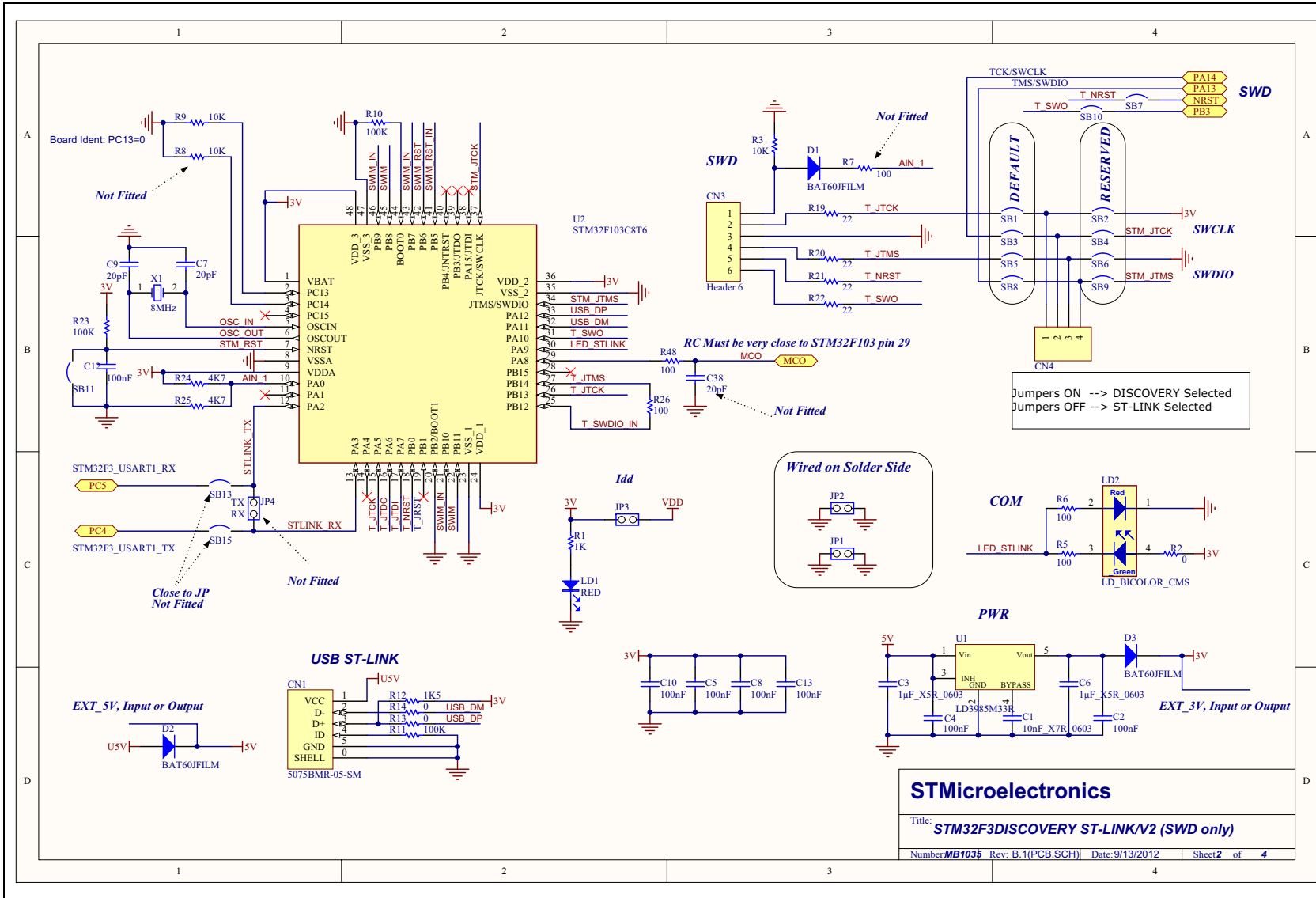


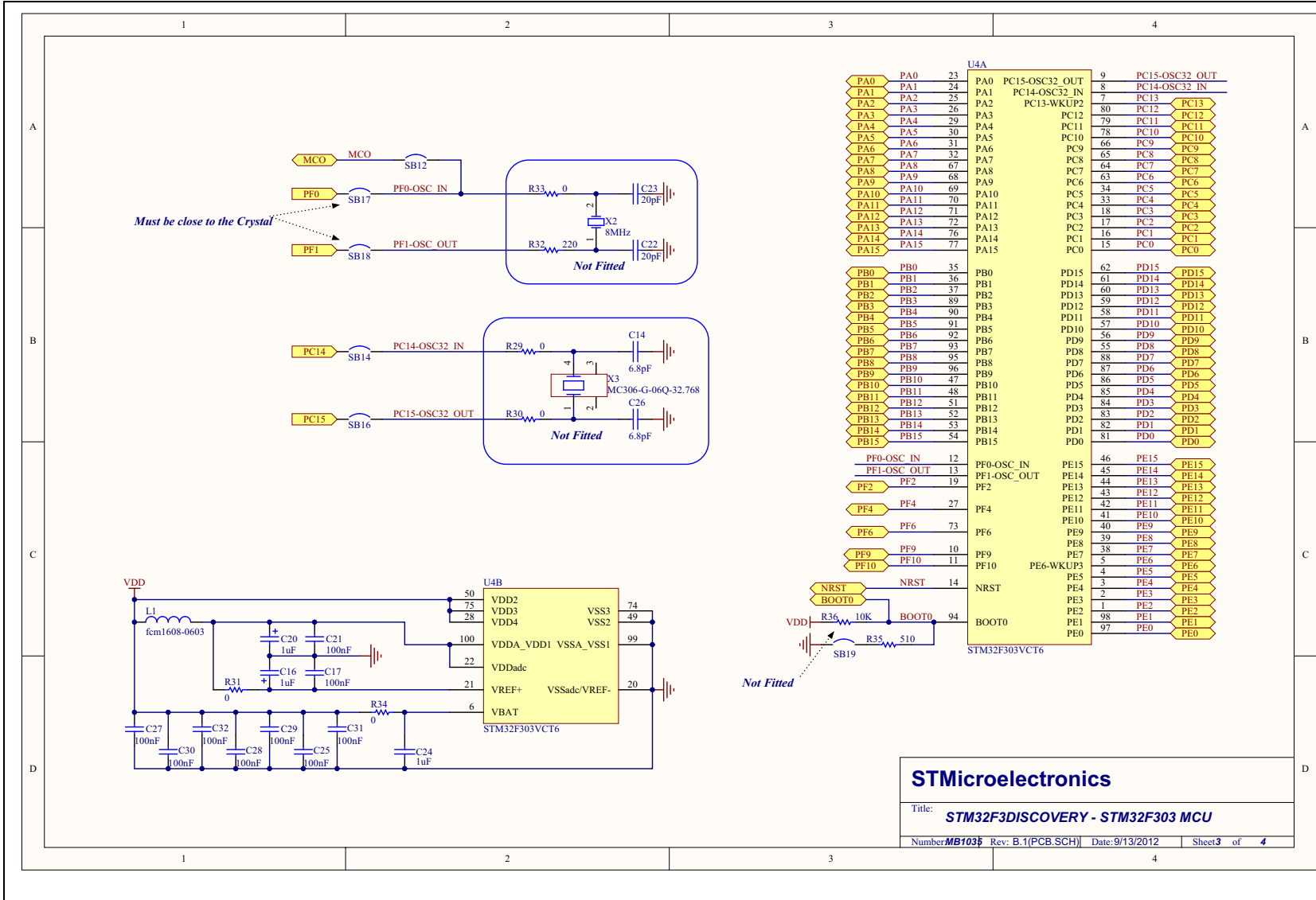




Figure 13. STM32F303VCT6 MCU

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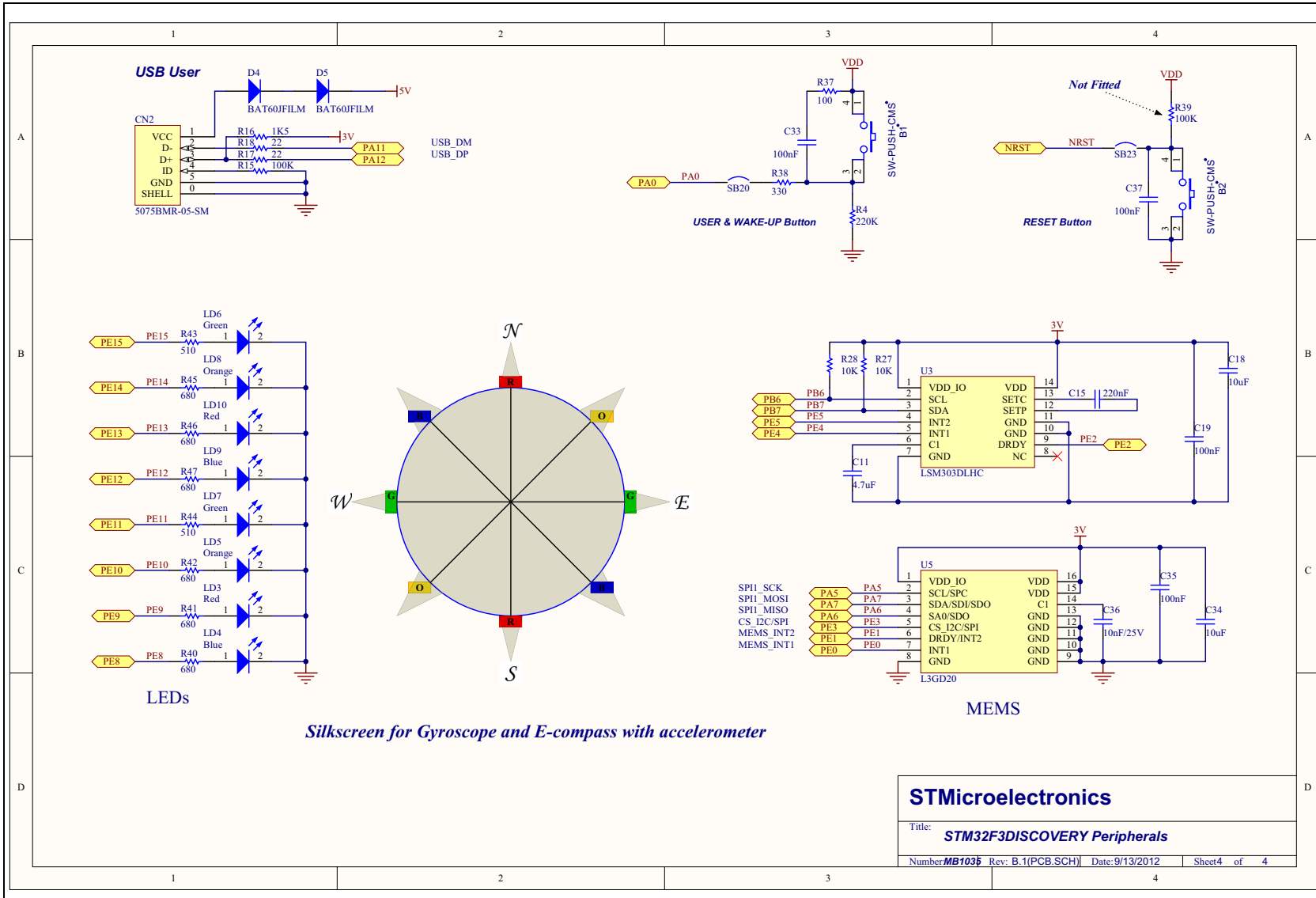
33/36



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 Title: **STM32F3DISCOVERY - STM32F303 MCU**  
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Figure 14. Peripherals



**STMicroelectronics**

Title: **STM32F3DISCOVERY Peripherals**

Number **MB1036** Rev: B.1(PCB,SCH) Date: 9/13/2012 Sheet 4 of 4

## 7 Revision history

**Table 7. Document revision history**

Date	Revision	Changes
10-Sep-2012	1	Initial release.
20-Sep-2012	2	Added <a href="#">Figure 7 on page 14</a> and updated <a href="#">Figure 14 on page 34</a>
07-Feb-2013	3	Updated <a href="#">Section 4.1: STM32F303VCT6 microcontroller</a> : removed WLCSP package, Sigma Delta ADC, CEC, updated timers and SPI/I <sup>2</sup> Ss.

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