

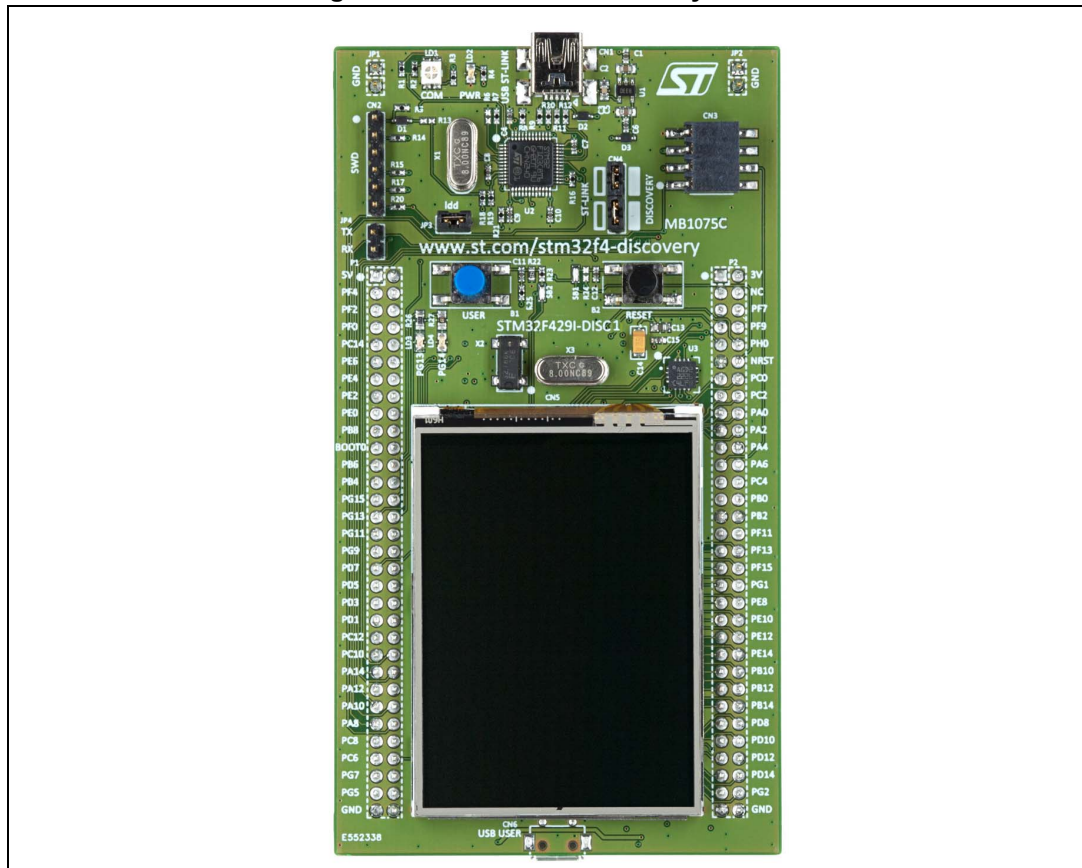
## Discovery kit with STM32F429ZI MCU

### Introduction

With the STM32F429 Discovery kit (32F429IDISCOVERY), users develop applications easily on the STM32F429 high-performance MCUs with Arm® Cortex®-M4 core. The Discovery kit includes a 2.4" QVGA TFT LCD, an external 64-Mbit SDRAM, a MEMS gyroscope, a USB OTG Micro-AB connector, LEDs, and push-buttons.

An embedded ST-LINK/V2-B debugger/programmer is included. The board comes with the STM32 comprehensive free software libraries and examples available with the STM32CubeF4 MCU Package.

Figure 1. STM32F429 Discovery board



Picture is not contractual.

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# 1 Features

- STM32F429ZIT6 Arm<sup>®(a)</sup> Cortex<sup>®</sup>-M4 core-based microcontroller with 2 Mbytes of flash memory and 256 Kbytes of RAM, in an LQFP144 package
- 2.4" QVGA TFT LCD
- USB OTG
- MEMS motion sensor 3-axis digital output gyroscope
- 64-Mbit SDRAM
- Reset and user push-buttons
- Six LEDs:
  - LD1 (red/green) for USB communication
  - LD2 (red) for 3.3 V power-on
  - Two user LEDs: LD3 (green) and LD4 (red)
  - Two USB OTG LEDs: LD5 (green)  $V_{BUS}$  and LD6 (red) OC (overcurrent)
- Board connectors:
  - USB Micro-AB
  - 2.54 mm pitch expansion
- Flexible power-supply options: ST-LINK USB VBUS, USB connector, or external sources
- Comprehensive free software libraries and examples available with the STM32Cube MCU Package
- On-board ST-LINK/V2-B debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench<sup>®</sup>, MDK-ARM, and STM32CubeIDE



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## 2 Ordering information

To order the Discovery kit with the STM32F429ZI microcontroller, refer to [Table 1](#). Additional information is available from the datasheet and reference manual of the target microcontroller.

**Table 1. Ordering information**

Order code	Board reference	Target STM32
STM32F429I-DISC1 <sup>(1)</sup>	MB1075 <sup>(2)</sup>	STM32F429ZIT6

1. STM32F429I-DISC1 with ST-LINK/V2-B replaces obsolete STM32F429I-DISCO with ST-LINK/V2.
2. Subsequently called main board in the rest of the documentation.

### 2.1 Codification

The meaning of the codification is explained in [Table 2](#).

**Table 2. Codification explanation**

32XXYYZDISCOVERY	Description	Example: 32F429IDISCOVERY
32XX	MCU series in STM32 32-bit Arm Cortex MCUs	STM32F4 series
YY	MCU product line in the series	STM32F429
Z	STM32 flash memory size: – I for 2 Mbytes	2 Mbytes
DISCOVERY	Discovery kit	Discovery kit

## 3 Development environment

### 3.1 System requirements

- Multi-OS support: Windows® 10 or 11<sup>(a)</sup>, Linux®<sup>(b)</sup> 64-bit, or macOS®<sup>(c)</sup>
- USB Type-A or USB Type-C® to Mini-B cable

### 3.2 Development toolchains

- IAR Systems - IAR Embedded Workbench®<sup>(d)</sup>
- Keil® - MDK-ARM<sup>(d)</sup>
- STMicroelectronics - STM32CubeIDE

### 3.3 Demonstration software

The demonstration software, included in the STM32Cube MCU Package corresponding to the on-board microcontroller, is preloaded in the STM32 flash memory for easy demonstration of the device peripherals in standalone mode. The latest versions of the demonstration source code and associated documentation can be downloaded from [www.st.com](http://www.st.com).

### 3.4 EDA resources

All board design resources, including schematics, EDA databases, manufacturing files, and the bill of materials, are available from the 32F429IDISCOVERY product page at [www.st.com](http://www.st.com).

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- a. Windows is a trademark of the Microsoft group of companies.
  - b. Linux® is a registered trademark of Linus Torvalds.
  - c. macOS® is a trademark of Apple Inc., registered in the U.S. and other countries and regions.
  - d. On Windows® only.

## 4 Conventions

[Table 3](#) defines some conventions used in the present document.

**Table 3. ON/OFF conventions**

Convention	Definition
Jumper JPx ON	Jumper fitted
Jumper JPx OFF	Jumper not fitted
Jumper JPx [1-2]	Jumper fitted between pin 1 and pin 2
Solder bridge SBx ON	SBx connections closed by 0 $\Omega$ resistor
Solder bridge SBx OFF	SBx connections left open
Resistor Rx ON	Resistor soldered
Resistor Rx OFF	Resistor not soldered
Capacitor Cx ON	Capacitor soldered
Capacitor Cx OFF	Capacitor not soldered

## 5 Safety recommendations

### 5.1 Targeted audience

This product targets users with at least basic electronics or embedded software development knowledge like engineers, technicians, or students.

This board is not a toy and is not suited for use by children.

### 5.2 Handling the board

This product contains a bare printed circuit board and like all products of this type, the user must be careful about the following points:

- The connection pins on the board might be sharp. Be careful when handling the board to avoid injury.
- This board contains static sensitive devices. To avoid damaging it, handle the board in an ESD-proof environment.
- While powered, do not touch the electric connections on the board with your fingers or anything conductive.
- The board operates at a voltage level that is not dangerous, but components might be damaged when shorted.
- Do not put any liquid on the board and avoid operating it close to water or at a high humidity level.
- Do not operate the board if it is dirty or dusty.
- The pins of the board are exposed and must not come into contact with a metal surface, as this can produce a short circuit and damage the board.

### 5.3 Delivery recommendations

Before the first use, inspect the board for any damage that may have occurred during shipment. Ensure that all socketed components are securely fixed in their sockets and that nothing is loose in the plastic bag.

### 5.4 Power supply

A power supply unit or auxiliary equipment complying with the EN 62368-1:2014+A11:2017 standard (or the one replacing it) and safety extralow voltage (SELV/ES1) with limited power capability (LPS/PS2) must power this equipment.

## 6 Quick start

The STM32F429 Discovery is a low-cost and easy-to-use development kit to evaluate quickly and start development with an STM32F4 microcontroller.

Before installing and using the product, accept the evaluation product license agreement from [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery).

For more information on the STM32F429 Discovery board and demonstration software, visit [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery).

### 6.1 Getting started

Follow the sequence below to configure the STM32F429 Discovery board and launch the DISCOVER application:

1. Ensure that the jumpers JP3 and CN4 are set ON (Discovery mode).
2. Connect the STM32F429 Discovery board to a PC using a USB cable Type-A/Mini-B through the USB ST-LINK connector CN1, to power the board and the LD2 (PWR) and LD1 (COM) LEDs.
3. The following applications are available on the screen:
  - Clock/Calendar and Game
  - Video Player and Image Browser (play videos and view images from the USB mass storage connected to the CN6 connector)
  - Performance monitor (watch the CPU load and run a graphical benchmark)
  - System Info
4. The demonstration software, as well as other software examples, are available at the [www.st.com/stm32f4-discovery](http://www.st.com/stm32f4-discovery) web page.
5. Develop applications starting from the examples.

# 7 Hardware layout and configuration

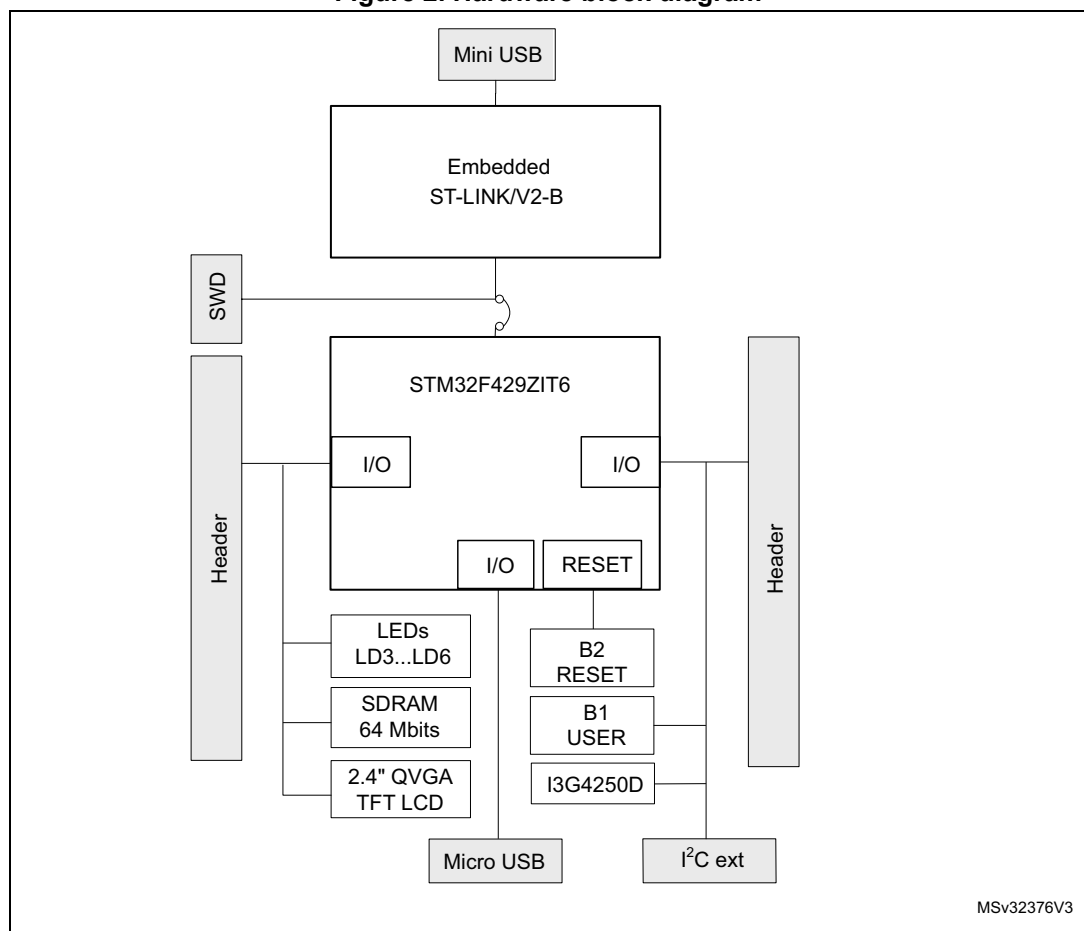
The STM32F429 Discovery board has been designed around the STM32F429ZIT6 microcontroller in a 144-pin LQFP package.

*Figure 2* illustrates the connections between the STM32F429ZIT6 and its peripherals (ST-LINK/V2-B, push-buttons, LEDs, USB OTG, MEMS gyroscope, accelerometer, magnetometer, and connectors).

*Figure 3* and *Figure 4* show the location of these features on the STM32F429 Discovery board.

*Figure 5* shows the mechanical dimensions of the STM32F429 Discovery board.

**Figure 2. Hardware block diagram**



## 7.1 STM32F429 Discovery board layout

Figure 3. Top layout

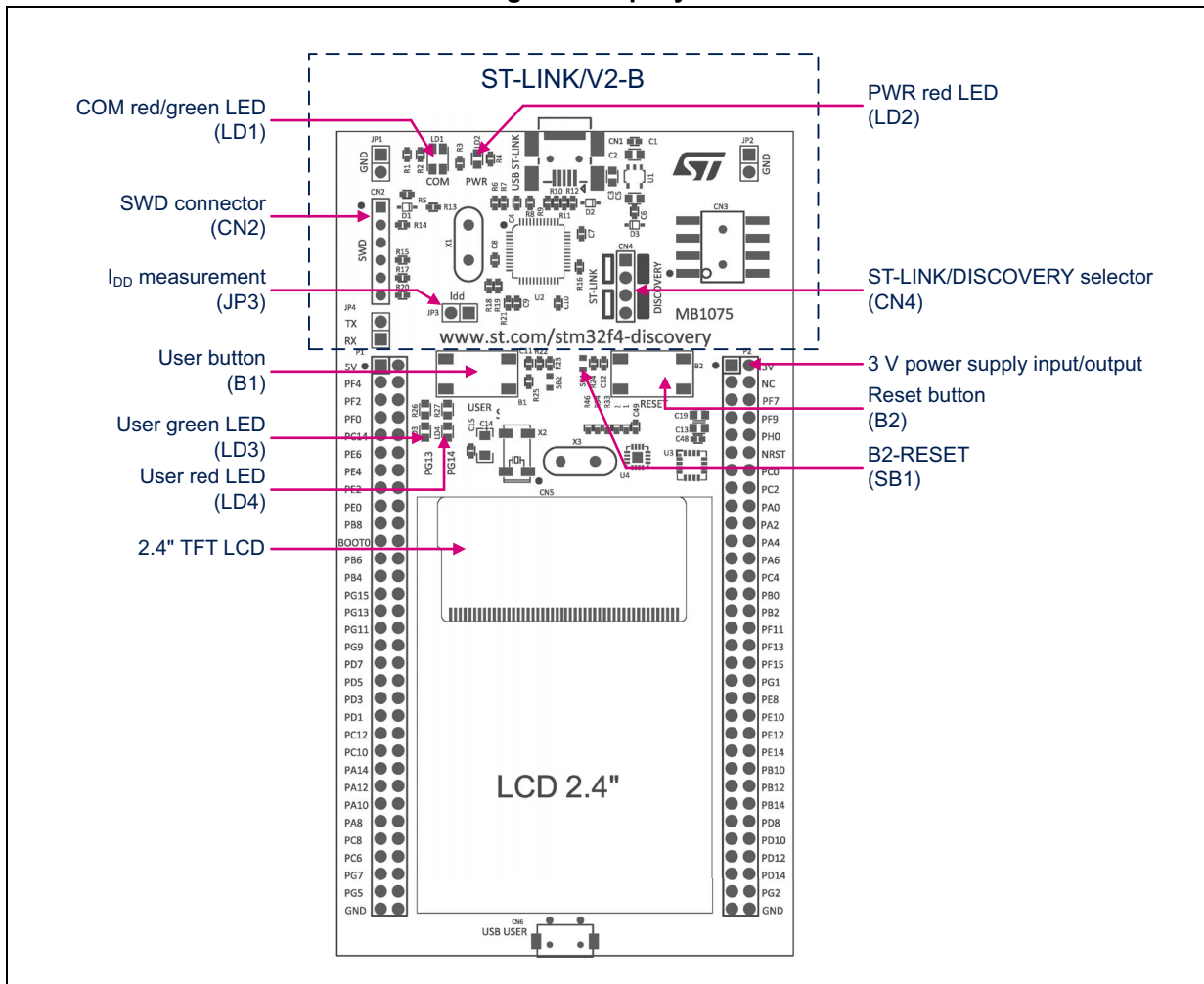
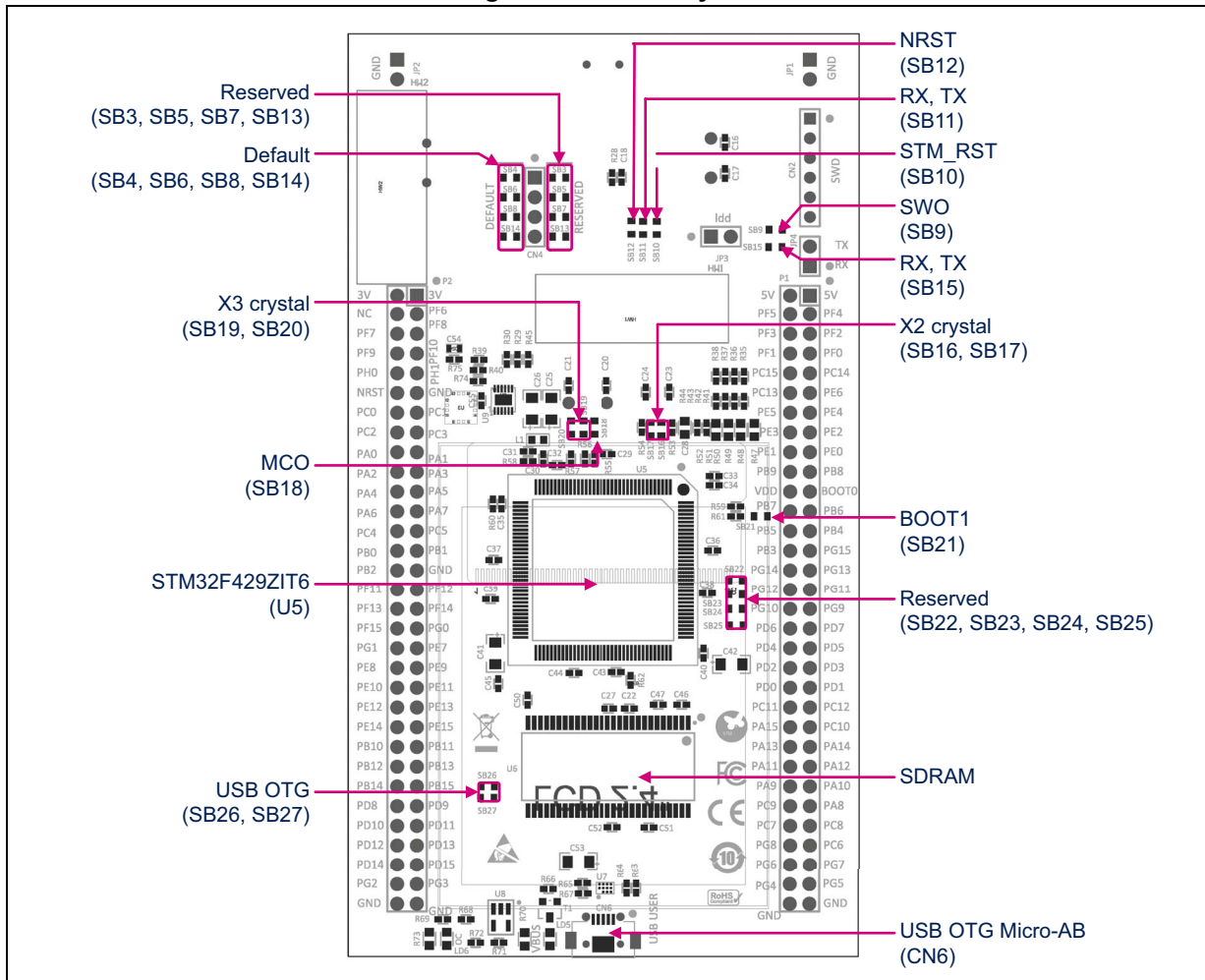
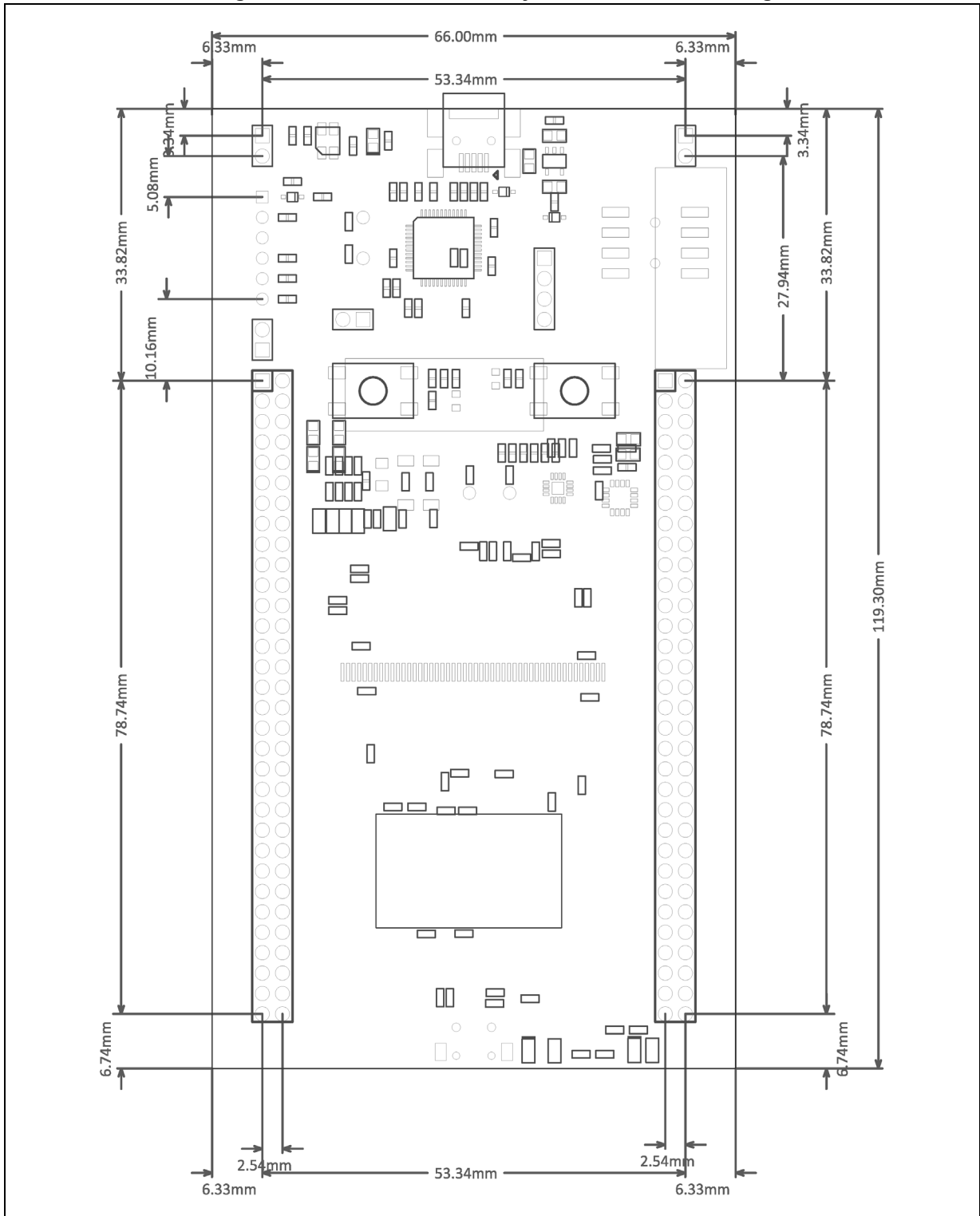


Figure 4. Bottom layout



## 7.2 Mechanical drawing

Figure 5. STM32F429 Discovery kit mechanical drawing



## 7.3 Embedded ST-LINK/V2-B

ST-LINK/V2-B on STM32F429I-DISC1 is embedded as a programming and debugging tool. ST-LINK/V2-B supports the Virtual COM port and USB mass storage features.

The embedded ST-LINK/V2-B supports only SWD for STM32 devices. For information about debugging and programming features, refer to the user manual *ST-LINK/V2 in-circuit debugger/programmer for STM8 and STM32* (UM1075), available at the [www.st.com](http://www.st.com) website, which describes in detail all the ST-LINK/V2 features.

The changes in ST-LINK/V2-B versus ST-LINK/V2 version are listed below.

New features supported on ST-LINK/V2-B are:

- Virtual COM port interface on USB
- Mass storage interface on USB

Features not supported on ST-LINK/V2-B are:

- SWIM interface
- Minimum supported application voltage limited to 3 V
- USB power management request for more than 100 mA power on USB

Known limitation:

- Activating the readout protection on the ST-LINK/V2-B target, prevents the target application from running afterward. The target readout protection must be kept disabled on the ST-LINK/V2-B boards.

There are two different ways to use the embedded ST-LINK/V2-B, depending on the jumper states, as shown in [Table 4](#):

- Programming or debugging the STM32 on board. Refer to [Section 7.3.4: Using ST-LINK/V2-B to program/debug the STM32F429ZIT6 on board](#) to program or debug the STM32F429ZIT6 on-board.
- Programming or debugging the STM32 in an external application board, using a cable connected to the SWD connector CN2. Refer to chapter [Section 7.3.5: Using ST-LINK/V2-B to program/debug an external STM32 application](#).

**Table 4. Jumper states**

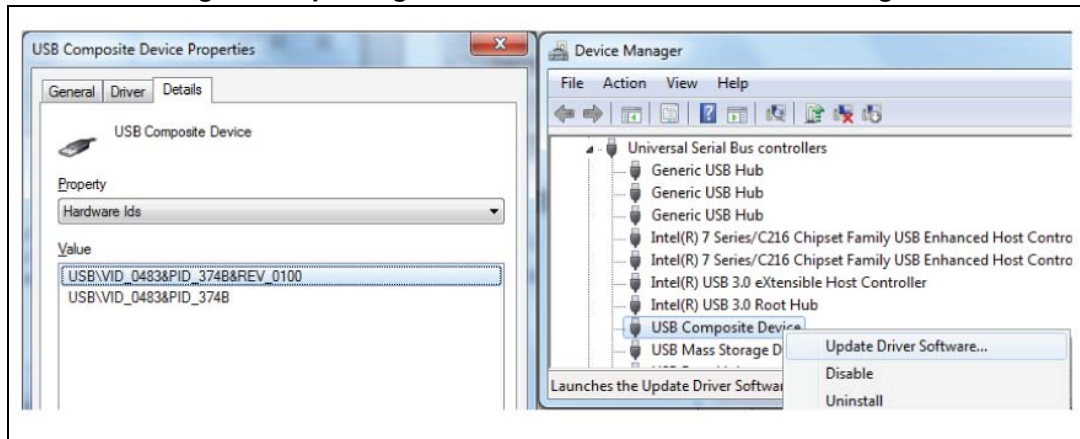
Jumper state	Description
Both CN4 jumpers ON	ST-LINK/V2-B functions enabled for on-board programming (default)
Both CN4 jumpers OFF	ST-LINK/V2-B functions enabled for application through external CN2 connector (SWD supported)

### 7.3.1 Drivers

The ST-LINK/V2-B requires a dedicated USB driver, which, for Windows® 7, 8, and 10 can be found at the [www.st.com](http://www.st.com) website. In case the STM32 Discovery is connected to the PC before the driver is installed, some Discovery interfaces might be declared as “Unknown” in the PC device manager. In this case, the user must install the driver files (see [Figure 6: Updating the list of drivers in the Device Manager](#)) and update the driver of the connected device from the device manager.

*Note:* Prefer using the “USB Composite Device” handle for a full recovery.

**Figure 6. Updating the list of drivers in the Device Manager**



### 7.3.2 ST-LINK/V2-B firmware upgrade

The ST-LINK/V2-B embeds a firmware upgrade mechanism for the in-place upgrade through the USB port. As the firmware might evolve during the lifetime of the ST-LINK/V2-B product (for example new functionalities, bug fixes, support for new microcontroller families), it is recommended to visit the [www.st.com](http://www.st.com) website, before starting to use the Discovery board and periodically, stay up-to-date with the latest firmware version.

### 7.3.3 VCP configuration

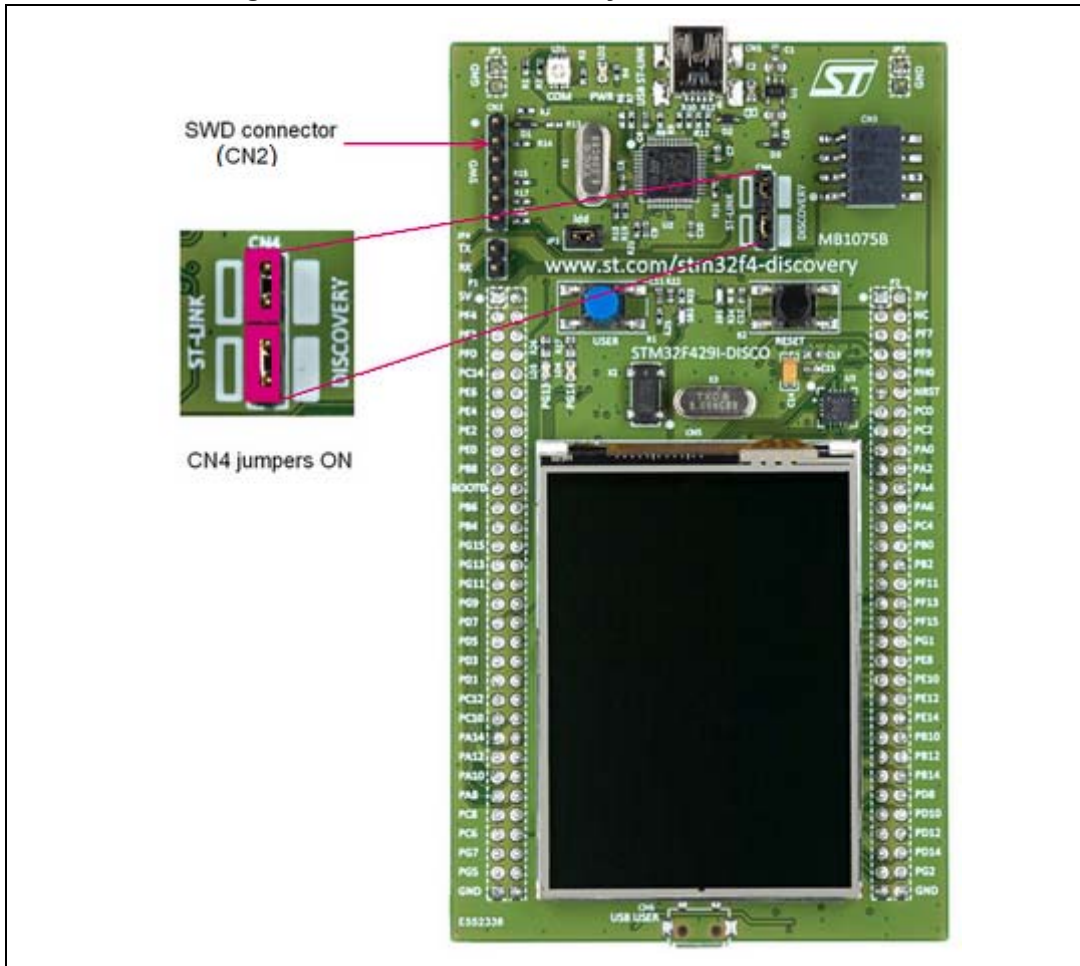
The ST-LINK/V2-B on STM32F429I-DISC1 supports Virtual COM port (VCP) on U2 pin 12 (ST-LINK\_TX) and U2 pin 13 (ST-LINK\_RX), which are connected to the STM32F429 target STM32 USART1 (PA9, PA10), thanks to the SB11 and SB15 solder bridges.

The SB11 (PA9) and SB15 (PA10) default configurations for 32F429IDISCOVERY and STM32F429I-DISC1 are given in [Table 6: Solder bridges](#).

### 7.3.4 Using ST-LINK/V2-B to program/debug the STM32F429ZIT6 on board

To program the STM32F429ZIT6 on board, plug in the two jumpers on the CN4 connector, as shown marked in red in [Figure 7](#), but do not use the CN2 connector as it might disturb the communication with the STM32F429ZIT6 of the STM32F429 Discovery board.

Figure 7. STM32F429 Discovery board connections



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

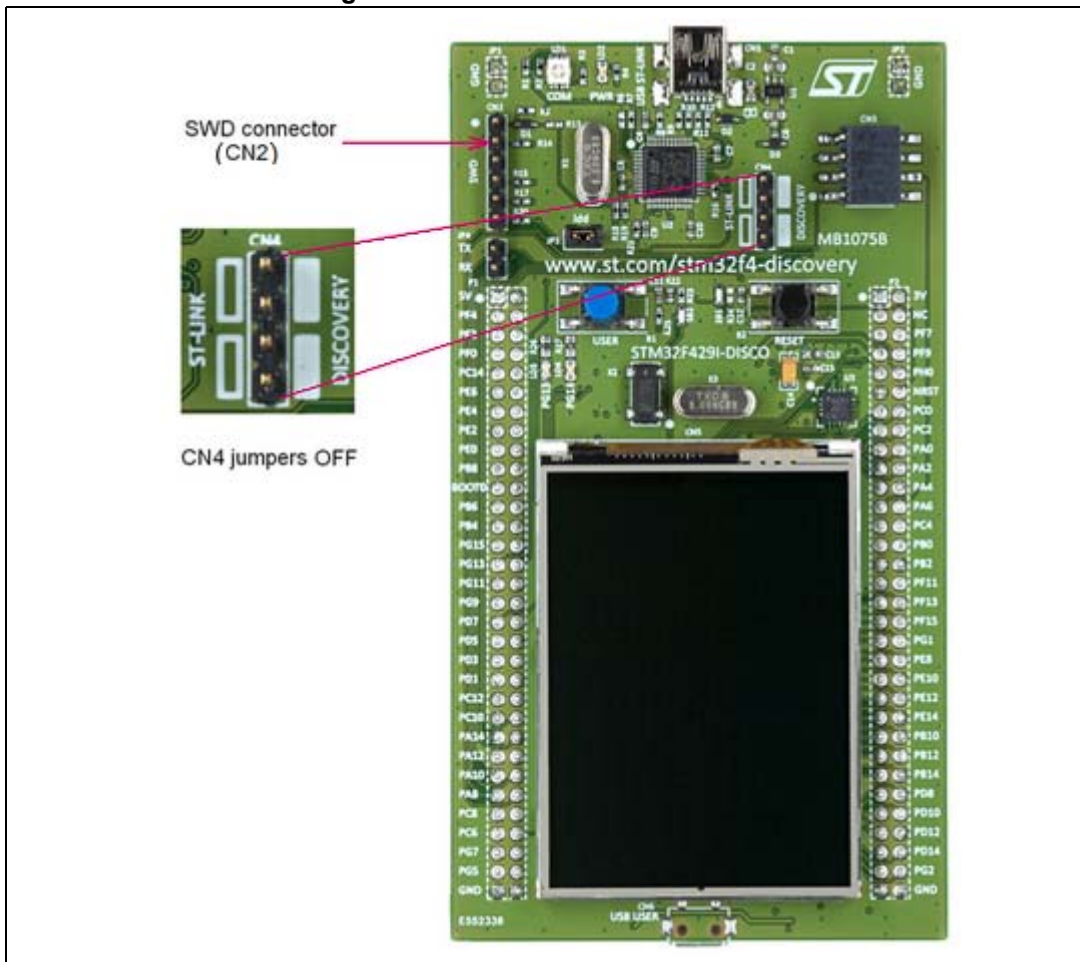
It is very easy to use the ST-LINK/V2-B to program the STM32 on an external application. Simply remove the two jumpers from CN4 as shown in [Figure 8](#) and connect the application to the CN2 debug connector according to [Table 5](#).

*Note:* SB7 must be OFF if CN2 pin 5 is used in an external application.

**Table 5. 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 STM32
6	SWO	Reserved

**Figure 8. ST-LINK/V2-B connections**



## 7.4 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 D2 and D3 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 the 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.

## 7.5 LEDs

- LD1 COM:  
The LD1 default status is red. LD1 turns to green to indicate that communications are in progress between the PC and the ST-LINK/V2-B.
- LD2 PWR:  
The red LED indicates that the board is powered.
- User LD3:  
The green LED is a user LED connected to the I/O PG13 of the STM32F429ZIT6.
- User LD4:  
The red LED is a user LED connected to the I/O PG14 of the STM32F429ZIT6.
- User LD5:  
The green LED indicates when VBUS is present on CN6 and is connected to PB13 of the STM32F429ZIT6.
- User LD6:  
The red LED indicates an overcurrent from VBUS of CN6 and is connected to the I/O PC5 of the STM32F429ZIT6.

## 7.6 Push-buttons

- B1 USER:  
User and wake-up button connected to the I/O PA0 of the STM32F429ZIT6.
- B2 RESET:  
The push-button connected to NRST is used to RESET the STM32F429ZIT6.

## 7.7 USB OTG supported

The STM32F429ZIT6 drives USB OTG high-speed through its internal PHY, which limits it to USB OTG full-speed on this board. In board schematics, all USB OTG signal names are defined as *OTG\_FS\_xx*, recalling this limitation and the on-board available USB function even if MCU resources come from USB OTG High-Speed pins. The USB Micro-AB connector (CN6) allows the user to connect a host or device component, such as a USB key, mouse, or other.

Two LEDs are dedicated to this module:

- LD5 (green LED) indicates when VBUS is active
- LD6 (red LED) indicates an overcurrent from a connected device

*Note:* The USB OTG host operation is realized once the Discovery is connected to the PC via the ST-LINK cable (mini USB). Once the USB OTG host device is detected and identified, then the USB ST-LINK cable can be removed.

## 7.8 MEMS gyroscope

The Discovery kit embeds a 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 I<sup>2</sup>C/SPI serial interface.

This motion sensor has a full scale of  $\pm 245/\pm 500/\pm 2000$  dps and can measure rates with a user-selectable bandwidth.

The STM32F429ZIT6 controls the motion sensor through the SPI interface.

## 7.9 TFT LCD (Thin-film-transistor liquid-crystal display)

The TFT LCD is a 2.4" display of 262 K colors. Its definition is QVGA (240 x 320 dots) and is directly driven by the STM32F429ZIT6 using the RGB protocol. It includes the ILI9341 LCD controller and can operate with a typical 2.8 V voltage.

## 7.10 64-Mbit SDRAM (1Mbit x 16-bit x 4-bank)

The 64-Mbit SDRAM is a high-speed CMOS, dynamic random-access memory designed to operate in 3.3 V memory systems containing 67,108,864 bits. It is internally configured as a quad-bank DRAM with a synchronous interface. Each 16,777,216-bit bank is organized as 4,096 rows by 256 columns by 16 bits. The 64-Mbit SDRAM includes autorefresh, power-saving, and power-down modes. All signals are registered on the positive edge of the clock signal, CLK.

The STM32F429ZIT6 reads and writes data at 80 MHz.

## 7.11 JP3 (Idd)

The IDD-labeled JP3 jumper allows the consumption of STM32F429ZIT6 to be measured by removing the jumper and connecting an ammeter.

- Jumper ON: STM32F429ZIT6 is powered (default).
- Jumper OFF: an ammeter must be connected to measure the STM32F429ZIT6 current. If there is no ammeter, the STM32F429ZIT6 is not powered.

## 7.12 OSC clock

### 7.12.1 OSC clock supply

The following information indicates all configurations for clock supply selection.

- **MCO from ST-LINK** (from MCO of the STM32F429ZIT6)  
This frequency cannot be changed. It is fixed at 8 MHz and connected to the PH0-OSC\_IN input of the STM32F429ZIT6. The configuration needed is:
  - SB18 ON, SB19 and R56 OFF
  - SB20, R57, C20, C21, and X3: do not care
- **Oscillator on board** (from X3 crystal)  
For typical frequencies, capacitors, and resistors, refer to the STM32F429ZIT6 datasheet. The configuration needed is:
  - SB18, SB19, and SB20 OFF
  - R56, R57, C20, C21, and X3 ON
- **Oscillator from external PH0** (from external oscillator through pin 10 of the P2 connector)  
The configuration needed is:
  - SB19 ON, SB18 and R56 OFF
  - SB20, R57, C20, C21, and X3: do not care
- **No external oscillator** (from internal oscillator HSI only).  
PH0 and PH1 can be used as GPIO. The configuration needed is:
  - SB19 and SB20 ON, SB18, R56, and R57 OFF
  - C20, C21, and X3: do not care

### 7.12.2 OSC 32 kHz clock supply

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

- **Oscillator on board** (from X2 Crystal, not provided)  
The configuration needed is:
  - SB16 and SB17 OFF
  - R53, R54, C23, C24, and X2 ON
- **Oscillator from external PC14** (from external oscillator through pin 9 of P1 connector)  
The configuration needed is:
  - SB16 ON, R53 OFF
  - SB17, R54, C23, C24, and X2: do not care
- **No external oscillator** (PC14 and PC15 can be used as GPIO).  
The configuration needed is:
  - SB16 and SB17 ON, R53 and R54 OFF
  - C23, C24, and X2: do not care

## 7.13 Solder bridges

**Table 6. Solder bridges**

Bridge	State <sup>(1)</sup>	Description
SB19, 20 (X3 crystal)	OFF	X3, C20, C21, R56, and R57 provide a clock. PH0 and PH1 are disconnected from P2.
	<b>ON</b>	PH0 and PH1 are connected to P2. Remove only R56 and R57.
SB4, 6, 8, 14 (default)	<b>ON</b>	Reserved, do not modify.
SB3, 5, 7, 13 (reserved)	OFF	Reserved, do not modify.
SB22, 23, 24, 25	OFF	Reserved, do not modify.
SB16, 17 (X2 crystal)	OFF	X2, C23, C24, R53, and R54 deliver a 32 kHz clock. PC14 and PC15 are not connected to P2
	<b>ON</b>	PC14 and PC15 are only connected to P2. Remove only R53 and R54.
SB1 (B2-RESET)	<b>ON</b>	B2 push-button is connected to the NRST of STM32F429ZIT6.
	OFF	B2 push-button is not connected to the NRST of STM32F429ZIT6.
SB2 (B1-USER)	<b>ON</b>	B1 push-button is connected to PA0.
	OFF	B1 push-button is not connected to PA0.
SB11, 15 (RX, TX)	OFF	STM32F429 USART1 is not connected to ST-LINK, so VCP is disabled (Default configuration on 32F429IDISCOVERY).
	<b>ON</b>	STM32F429 USART1 is connected to ST-LINK, so VCP is enabled (default configuration on STM32F429I-DISC1).
SB12 (NRST)	<b>ON</b>	NRST signal of connector CN2 is connected to the NRST of STM32F429ZIT6.
	OFF	NRST signal is not connected.
SB9 (SWO)	<b>OFF</b>	SWO signal is not connected.
	<b>ON</b>	SWO signal of connector CN2 is connected to PB3.
SB10 (STM_RST)	<b>OFF</b>	No incidence on the NRST signal of STM32F429ZIT6.
	<b>ON</b>	NRST signal of STM32F429ZIT6 is connected to GND.
SB21 (BOOT0)	<b>ON</b>	BOOT0 signal of STM32F429ZIT6 is at level LOW through 510 Ω pull-down.
	OFF	BOOT0 signal of STM32F429ZIT6 is at level HIGH through 10 KΩ pull-up (not provided).
SB26, 27 (USB OTG)	<b>OFF</b>	PB14 and PB15 are only used for USB OTG and not connected to P2 to avoid noise.
	<b>ON</b>	PB14 and PB15 are connected to P2.
SB18 (MCO)	<b>OFF</b>	MCO signal of STM32F429ZIT6 is not used.
	<b>ON</b>	MCO clock signal from STM32F429ZIT6 is connected to OSC_IN of STM32F429ZIT6.

1. The default SBx state is shown in bold.

## 7.14 Extension connectors

The male headers P1 and P2 can connect the STM32F429 Discovery board to a standard prototyping/wrapping board. STM32F429ZIT6 GPIOs are available on these connectors. An oscilloscope, a logic analyzer, or a voltmeter can also probe P1 and P2.

Table 7. STM32 pin description versus board functions

STM32 pin		Board functions																		
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2
BOOT0	138	BOOT0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21	-
NRST	25	NRST	-	-	RESET	RESET	RESET	-	-	-	B2	-	-	-	-	5	-	-	-	12
PA0	34	-	-	-	-	-	-	-	-	-	B1	-	-	-	-	-	-	-	-	18
PA1	35	-	-	-	-	-	-	INT1	-	-	-	-	-	-	-	-	-	-	-	17
PA2	36	-	-	-	-	-	-	INT2	-	-	-	-	-	-	-	-	-	-	-	20
PA3	37	-	-	-	DB3	B5	-	-	-	-	-	-	-	-	-	-	-	-	-	19
PA4	40	-	-	-	VSYNC	VSYNC	-	-	-	-	-	-	-	-	-	-	-	-	-	22
PA5	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21
PA6	42	-	-	-	DB6	G2	-	-	-	-	-	-	-	-	-	-	-	-	-	24
PA7	43	-	-	-	-	-	-	-	-	-	-	I2C_EXT_RST	-	-	-	-	4	-	-	23
PA8	100	-	-	-	-	-	-	-	-	-	-	SCL	SCL	-	-	-	3	-	53	-
PA9	101	-	USART1_TX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52	-
PA10	102	-	USART1_RX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	-

Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																		
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2
PA11	103	-	-	-	DB14	R4	-	-	-	-	-	-	-	-	-	-	-	-	50	-
PA12	104	-	-	-	DB15	R5	-	-	-	-	-	-	-	-	-	-	-	-	49	-
PA13	105	SWDIO	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	48	-
PA14	109	SWCLK	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	47	-
PA15	110	-	-	-	-	-	-	-	-	-	-	-	INT	-	-	-	-	-	46	-
PB0	46	-	-	-	DB13	R3	-	-	-	-	-	-	-	-	-	-	-	-	-	28
PB1	47	-	-	-	DB16	R6	-	-	-	-	-	-	-	-	-	-	-	-	-	27
PB2	48	BOOT1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
PB3	133	SWO	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	28	-
PB4	134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	-
PB5	135	-	-	SDCKE1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	-
PB6	136	-	-	SDNE1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	-
PB7	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	-
PB8	139	-	-	-	DB4	B6	-	-	-	-	-	-	-	-	-	-	-	-	19	-
PB9	140	-	-	-	DB5	B7	-	-	-	-	-	-	-	-	-	-	-	-	20	-
PB10	69	-	-	-	DB8	G4	-	-	-	-	-	-	-	-	-	-	-	-	-	48
PB11	70	-	-	-	DB9	G5	-	-	-	-	-	-	-	-	-	-	-	-	-	47
PB12	73	-	-	-	-	-	-	-	ID	-	-	-	-	-	-	-	-	4	-	50

Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																		
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2
PB13	74	-	-	-	-	-	-	-	VBUS	Green	-	-	-	-	-	-	-	1	-	49
PB14	75	-	-	-	-	-	-	-	DM	-	-	-	-	-	-	-	-	2	-	52 (1)
PB15	76	-	-	-	-	-	-	-	DP	-	-	-	-	-	-	-	-	3	-	51 (2)
PC0	26	-	-	SDNWE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14
PC1	27	-	-	-	-	-	-	CS	-	-	-	-	-	-	-	-	-	-	-	13
PC2	28	-	-	-	CSX	CSX	CSX	-	-	-	-	-	-	-	-	-	-	-	-	16
PC3	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15
PC4	44	-	-	-	-	-	-	-	PSO	-	-	-	-	-	-	-	-	-	-	26
PC5	45	-	-	-	-	-	-	-	QC	Red	-	-	-	-	-	-	-	-	-	25
PC6	96	-	-	-	HSYNC	HSYNC	-	-	-	-	-	-	-	-	-	-	-	-	57	-
PC7	97	-	-	-	DB10	G6	-	-	-	-	-	-	-	-	-	-	-	-	56	-
PC8	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	-
PC9	99	-	-	-	-	-	-	-	-	-	-	SDA	SDA	-	-	-	1	-	54	-
PC10	111	-	-	-	DB12	R2	-	-	-	-	-	-	-	-	-	-	-	-	45	-
PC11	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44	-
PC12	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	-
PC13	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-
PC14	8	OSC32_IN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-

Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																			
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2	
PC15	9	OSC32_OUT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-
PD0	114	-	-	D2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	-
PD1	115	-	-	D3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41	-
PD2	116	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-
PD3	117	-	-	-	DB11	G7	-	-	-	-	-	-	-	-	-	-	-	-	-	39	-
PD4	118	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38	-
PD5	119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	-
PD6	122	-	-	-	DB0	B2	-	-	-	-	-	-	-	-	-	-	-	-	-	36	-
PD7	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	-
PD8	77	-	-	D13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54
PD9	78	-	-	D14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53
PD10	79	-	-	D15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56
PD11	80	-	-	-	TE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55
PD12	81	-	-	-	RDX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58
PD13	82	-	-	-	WRX	-	DCX	-	-	-	-	-	-	-	-	-	-	-	-	-	57
PD14	85	-	-	D0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60
PD15	86	-	-	D1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	59
PE0	141	-	-	NBL0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	-
PE1	142	-	-	NBL1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-
PE2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-
PE3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-
PE4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-
PE5	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-

Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																			
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2	
PE6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-
PE7	58	-	-	D4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37
PE8	59	-	-	D5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40
PE9	60	-	-	D6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39
PE10	63	-	-	D7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42
PE11	64	-	-	D8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41
PE12	65	-	-	D9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44
PE13	66	-	-	D10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43
PE14	67	-	-	D11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46
PE15	68	-	-	D12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45
PF0	10	-	-	A0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-
PF1	11	-	-	A1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-
PF2	12	-	-	A2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-
PF3	13	-	-	A3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-
PF4	14	-	-	A4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
PF5	15	-	-	A5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-
PF6	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
PF7	19	-	-	-	DCX	-	SCL	SCK	-	-	-	-	-	-	-	-	-	-	-	-	6
PF8	20	-	-	-	-	-	-	MISO	-	-	-	-	-	-	-	-	-	-	-	-	5
PF9	21	-	-	-	SDA	-	SDI/SDO	MOSI	-	-	-	-	-	-	-	-	-	-	-	-	8
PF10	22	-	-	-	ENABLE	DE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
PF11	49	-	-	SDNRAS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32
PF12	50	-	-	A6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31
PF13	53	-	-	A7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34



Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																			
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2	
PF14	54	-	-	A8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
PF15	55	-	-	A9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36
PG0	56	-	-	A10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
PG1	57	-	-	A11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38
PG2	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62
PG3	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61
PG4	89	-	-	BA0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	-
PG5	90	-	-	BA1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	-
PG6	91	-	-	-	DB17	R7	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-
PG7	92	-	-	-	DOTCLK	CLK	-	-	-	-	-	-	-	-	-	-	-	-	-	59	-
PG8	93	-	-	SDCLK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58	-
PG9	124	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-
PG10	125	-	-	-	DB7	G3	-	-	-	-	-	-	-	-	-	-	-	-	-	34	-
PG11	126	-	-	-	DB1	B3	-	-	-	-	-	-	-	-	-	-	-	-	-	31	-
PG12	127	-	-	-	DB2	B4	-	-	-	-	-	-	-	-	-	-	-	-	-	32	-
PG13	128	-	-	-	-	-	-	-	-	Green	-	-	-	-	-	-	-	-	-	29	-
PG14	129	-	-	-	-	-	-	-	-	Red	-	-	-	-	-	-	-	-	-	30	-
PG15	132	-	-	SDNCAS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	-
PH0	23	OSC_IN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10

Table 7. STM32 pin description versus board functions (continued)

STM32 pin		Board functions																		
Main function	LQFP144	System	VCP	SDRAM	LCD-TFT	LCD-RGB	LCD-SPI	Motion sensor	USB	LED	Push-button	I <sup>2</sup> C Ext	Touch panel	Free I/O	Power supply	CN2	CN3	CN6	P1	P2
PH1	24	OSC_OUT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	VDD	-	-	-	22	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 V	-	5	-	-	1
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3 V	-	-	-	-	2
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 V	-	8	-	1	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5 V	-	-	-	2	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	GND	3	7	5	63	11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	GND	-	-	-	64	29
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	GND	-	-	-	-	63
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	GND	-	-	-	-	-

1. If SB27 is ON.
2. If SB26 is ON.



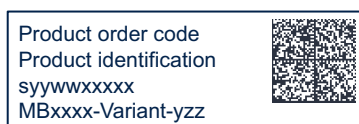
## 8 32F429IDISCOVERY product information

### 8.1 Product marking

The product and each board composing the product are identified with one or several stickers. The stickers, located on the top or bottom side of each PCB, provide product information:

- Main board featuring the target device: product order code, product identification, serial number, and board reference with revision.

Single-sticker example:

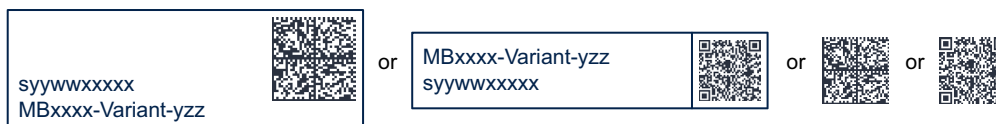


Dual-sticker example:



- Other boards if any: board reference with revision and serial number.

Examples:



On the main board sticker, the first line provides the product order code, and the second line the product identification.

On all board stickers, the line formatted as “*MBxxxx-Variant-yzz*” shows the board reference “*MBxxxx*”, the mounting variant “*Variant*” when several exist (optional), the PCB revision “*y*”, and the assembly revision “*zz*”, for example B01. The other line shows the board serial number used for traceability.

Products and parts labeled as “*ES*” or “*E*” are not yet qualified or feature devices that are not yet qualified. STMicroelectronics disclaims any responsibility for consequences arising from their use. Under no circumstances will STMicroelectronics be liable for the customer’s use of these engineering samples. Before deciding to use these engineering samples for qualification activities, contact STMicroelectronics’ quality department.

“*ES*” or “*E*” marking examples of location:

- On the targeted STM32 that is soldered on the board (for an illustration of STM32 marking, refer to the STM32 datasheet *Package information* paragraph at the [www.st.com](http://www.st.com) website).
- Next to the evaluation tool ordering part number that is stuck or silk-screen printed on the board.

Some boards feature a specific STM32 device version, which allows the operation of any bundled commercial stack/library available. This STM32 device shows a “*U*” marking option at the end of the standard part number and is not available for sales.

To use the same commercial stack in their applications, the developers might need to purchase a part number specific to this stack/library. The price of those part numbers includes the stack/library royalties.

## 8.2 32F429IDISCOVERY product history

Table 8. Product history

Order code	Product identification	Product details	Product change description	Product limitations
STM32F429I-DISC1	32F429IDISC1/	MCU: – STM32F429ZIT6 silicon revision '5'	Initial revision	No limitation
		MCU errata sheet: – <i>STM32F427/437 and STM32F429/439 line limitations</i> (ES0206)		
		Board: MB1075-F429-B01 or MB1075-F429-C01 (main board)		
	DK32F429I\$AV1	MCU: – STM32F429ZIT6 silicon revision '5'	Main board revision changed	No limitation
		MCU errata sheet: – <i>STM32F427/437 and STM32F429/439 line limitations</i> (ES0206)		
		Board: – MB1075-F429-E01 (main board)		
	DK32F429I\$AV2	MCU: – STM32F429ZIT6 silicon revision '5'	Packaging: plastic blister replaced by a carton box	No limitation
		MCU errata sheet: – <i>STM32F427/437 and STM32F429/439 line limitations</i> (ES0206)		
		Board: – MB1075-F429-E01 (main board)		

### 8.3 Board revision history

**Table 9. Board revision history**

Board reference	Board variant and revision	Board change description	Board limitations
MB1075 (main board)	F429-B01	Initial revision	No limitation
	F429-C01	<ul style="list-style-type: none"> <li>– STM32F103C8T6 replaced by STM32F103CBT6 for ST-LINK/V2-B</li> <li>– SB11 and SB15 ON</li> </ul>	No limitation
	F429-E01	<ul style="list-style-type: none"> <li>– U3: L3GD20 replaced by I3G4250D, and R75 and C54 added</li> <li>– Old STMPE811QTR kept and SX8651 added for two footprints, and U9, C55, and R74 added for SX8651, and original STMPE811QTR circuit kept</li> <li>– CN5 SF-TC240T-9370-T replaced by FRD240C48003-B: pins 1 and 3 for YU and YD swapped, pin 8 connected with 3V</li> <li>– Updated solder bridges: OFF: SB3, SB5, SB7, SB13, SB18 ON: SB4, SB6, SB8, SB14, SB19</li> <li>– For BOM for SX8651: as U9 SX8651IWLTRT is soldered, added R29, R30, and R45 4.7 K<math>\Omega</math> resistors</li> <li>– Updated CN6 footprint</li> <li>– Line added on top silkscreen for CN5 when FPC is mounted</li> </ul>	No limitation

## 9 Compliance statements and conformity declarations

### 9.1 Federal Communications Commission (FCC) compliance statement

#### Part 15.19

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

#### Part 15.21

Any changes or modifications to this equipment not expressly approved by STMicroelectronics may cause harmful interference and void the user's authority to operate this equipment.

#### Part 15.105

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

*Note: Use only shielded cables.*

#### Responsible party (in the USA)

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## 9.2 Innovation, Science and Economic Development Canada (ISED) compliance statement

**This product complies with the ICES-003 standard class B of the ISED regulation.**

ISED Canada ICES-003 Compliance Label: *CAN ICES-3 (B)/NMB-3 (B)*.

*Note:* Use only shielded cables.

**Ce produit est conforme à la norme NMB-003 classe B de la ISDE.**

Étiquette de conformité à la NMB-003 d'ISDE Canada : *CAN ICES-3 (B) / NMB-3 (B)*.

*Note:* Utiliser uniquement des câbles blindés.

## 9.3 UKCA conformity

### Simplified UK declaration of conformity

Hereby, the manufacturer STMicroelectronics, declares that the equipment type 32F429IDISCOVERY is in compliance with the UK Electromagnetic Compatibility Regulations 2016 (UK SI 2016 No. 1091) and with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (UK SI 2012 No. 3032).

*Note:* Use only shielded cables.

## 9.4 CE conformity

### 9.4.1 Simplified EU declaration of conformity

Hereby, STMicroelectronics declares that the equipment type 32F429IDISCOVERY is in compliance with directives 2011/53/EU and 2015/863/EU (RoHS), and 2014/30/EU (EMC).

*Note:* - RoHS: Restriction of hazardous substances  
- EMC: Electromagnetic compatibility

*Note:* Use only shielded cables.

### 9.4.2 Déclaration de conformité UE simplifiée

STMicroelectronics déclare que l'équipement électrique du type 32F429IDISCOVERY est conforme aux directives 2011/53/UE et 2015/863/UE (LdSD), et à la directive 2014/30/UE (CEM).

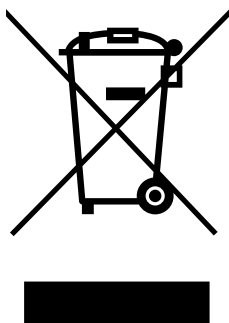
*Note:* - LdSD : directive sur la limitation de l'utilisation des substances dangereuses  
- CEM : compatibilité électromagnétique

*Note:* Utiliser uniquement des câbles blindés.

## 10 Product disposal

### Disposal of this product: WEEE (Waste Electrical and Electronic Equipment)

(Applicable in Europe)



This symbol on the product, accessories, or accompanying documents indicates that the product and its electronic accessories must not be disposed of with household waste at the end of their working life.

To prevent possible harm to the environment and human health from uncontrolled waste disposal, separate these items from other types of waste and recycle them responsibly at a designated collection point to promote the sustainable reuse of material resources.

#### Household users:

Contact the retailer that you purchased the product from or your local authority for details of your nearest designated collection point.

#### Business users:

Contact your dealer or supplier for further information.

# 11 Revision history

**Table 10. Document revision history**

Date	Revision	Changes
10-Sep-2013	1	Initial release.
04-Mar-2016	2	New revision to introduce STM32F429I-DISC1 additional CPN that corresponds to Mbed-Enabled Discovery Kit. Updated: <a href="#">Introduction</a> , <a href="#">Figure 1: STM32F429 Discovery board</a> , <a href="#">Section 5: Quick start</a> , <a href="#">Section 6: Hardware layout</a> , <a href="#">Figure 2: Hardware block diagram</a> , <a href="#">Figure 3: Top layout</a> , <a href="#">Section 6.3: Embedded ST-LINK/V2 (or V2-B)</a> , <a href="#">Table 5: Solder bridges</a> , <a href="#">Table 6: STM32 pin description versus board functions</a> , <a href="#">Section 7: Electrical schematics</a> .
20-Sep-2017	3	Updated <a href="#">Section 6.9: TFT LCD (Thin-film-transistor liquid-crystal display)</a> .
02-Jul-2020	4	Reshuffled document to align with the latest standards: – <a href="#">Introduction</a> to <a href="#">Quick start</a> reordering – <a href="#">Electrical schematics</a> removed – New <a href="#">Table 2: Codification explanation</a> and <a href="#">Section 7: 32F429IDISCOVERY information</a> Updated: – <a href="#">Figure 2</a> , <a href="#">Figure 3</a> , <a href="#">Figure 4</a> , <a href="#">Figure 5</a> , <a href="#">Figure 7</a> , and <a href="#">Figure 8</a> . – <a href="#">Table 4: Jumper states</a> – <a href="#">Section 6.3.4: Using ST-LINK/V2-B to program/debug the STM32F429ZIT6 on board</a> and <a href="#">Section 6.3.5: Using ST-LINK/V2-B to program/debug an external STM32 application</a> for connector CN2, and <a href="#">Table 6: Solder bridges</a> for connector CN3 – <a href="#">Section 6.7: USB OTG supported</a> – Gyroscope MEMS I3G4250D
26-Aug-2020	5	Updated: – Clarification on protection diodes in <a href="#">Section 6.4</a> Added: – Note on USB OTG host device management in <a href="#">Section 6.7</a>
22-Apr-2026	6	Updated: – <a href="#">Section 8: 32F429IDISCOVERY product information</a> with <a href="#">Product marking</a> , <a href="#">Table 8: Product history</a> , and <a href="#">Table 9: Board revision history</a> Added: – <a href="#">Section 3.4: EDA resources</a> – <a href="#">Section 5: Safety recommendations</a> – <a href="#">Section 9: Compliance statements and conformity declarations</a> – <a href="#">Section 10: Product disposal</a> Removed all references to Arm <sup>®</sup> Mbed <sup>™</sup> .

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