UM1735
User manual

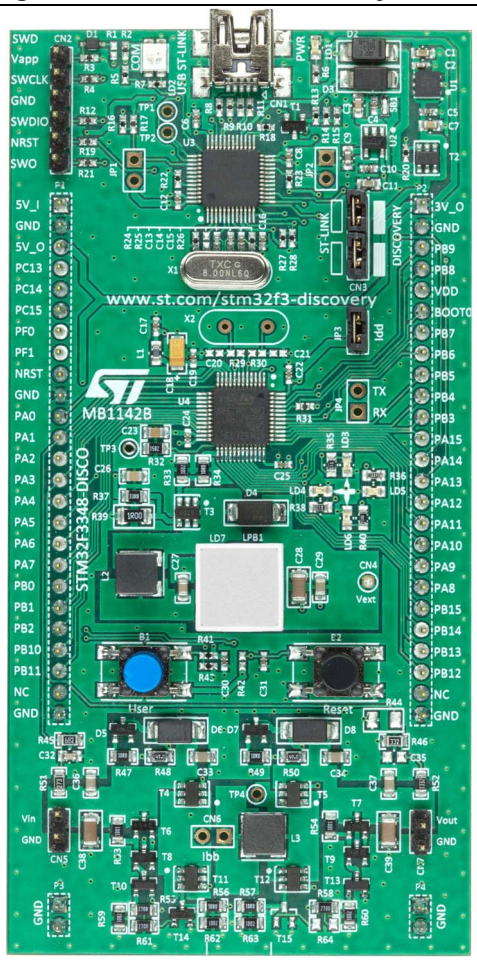
Discovery kit with STM32F334C8 MCU

Introduction

The 32F3348DISCOVERY Discovery kit (order code STM32F3348-DISCO) helps the user discover the full range of features of the STM32F334 line and develop applications. It is based on STM32F334C8T6 and includes ST-LINK/V2-1 embedded debug tool interface, high-brightness LED dimming with buck converter, buck-boost converter, LEDs, and push-buttons.

The board comes with a comprehensive STM32 software HAL library with various packaged software examples.

Figure 1. STM32F334 Discovery board



Picture is not contractual.

Contents

List of tables

List of figures

1 Features

- STM32F334C8T6 Arm®(a) Cortex®-M4 core-based microcontroller featuring 64 Kbytes of flash memory and 16 Kbytes of RAM in an LQFP48 package
- One buck-boost converter
- High-brightness LED dimming with a buck converter
- Four user LEDs
- User and reset push-buttons
- Board connectors:
  - Two 2-pin headers for buck-boost converter I/O voltages
  - Serial Wire Debug (SWD) 6-pin header
  - Extension header to MCU I/Os for a quick connection to the prototyping board and easy probing
- Flexible power-supply options: ST-LINK USB V_{BUS} or external sources
- External application power supply: 3 and 5 V
- On-board ST-LINK/V2-1 debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port, and debug port
- Comprehensive free software libraries and examples available with the STM32CubeF3 MCU Package
- Support of a wide choice of Integrated Development Environments (IDEs) including IAR Embedded Workbench®, MDK-ARM, and STM32CubeIDE

arm

a. Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.

2 Ordering information

To order the 32F3348DISCOVERY Discovery kit, refer to *Table 1*. Additional information is available from the datasheet and reference manual of the target STM32.

Table 1. List of available products

Order code	Board reference	Target STM32
STM32F3348-DISCO	MB1142(1)	STM32F334C8T6

1. 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

STM32XXYYZ-DISCO	Description	Example: STM32F3348-DISCO
XX	MCU series in STM32 32-bit Arm Cortex MCUs	STM32F3 series
YY	MCU product line in the series	STM32F334 product line
Z	STM32 flash memory size: – 8 for 64 Kbytes	64 Kbytes
DISCO	Discovery kit	Discovery kit

3 Development environment

3.1 System requirements

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

3.2 Development toolchains

- IAR Systems® - IAR Embedded Workbench®(d)
- Keil® - MDK-ARM(d)
- 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*.

a. macOS is a trademark of Apple Inc., registered in the U.S. and other countries and regions.

b. Linux is a registered trademark of Linus Torvalds.

c. Windows is a trademark of the Microsoft group of companies.

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 Ω 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 Hardware layout

The STM32F334 Discovery board is designed around the STM32F334C8T6 microcontroller in a 48-pin LQFP package.

Figure 2 illustrates the connections between the STM32F334C8T6 and its peripherals (ST-LINK/V2-1, high-brightness LED dimming with a buck converter, buck-boost converter, LEDs, and push-buttons).

Figure 3 and *Figure 4* help you to locate these features on the STM32F334 Discovery board.

Figure 2. STM32F334 Discovery board hardware block diagram

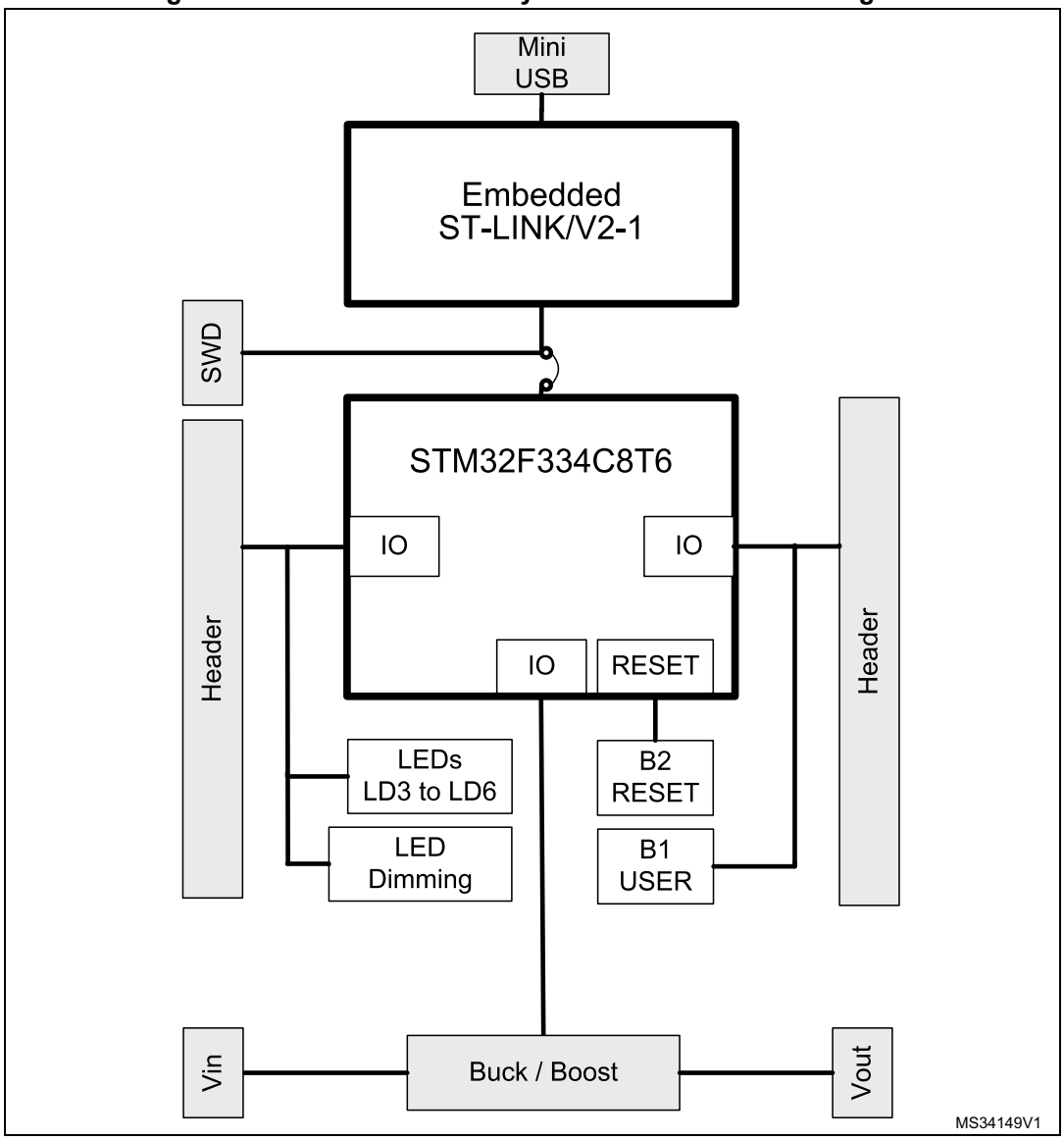


Figure 3. Top layout

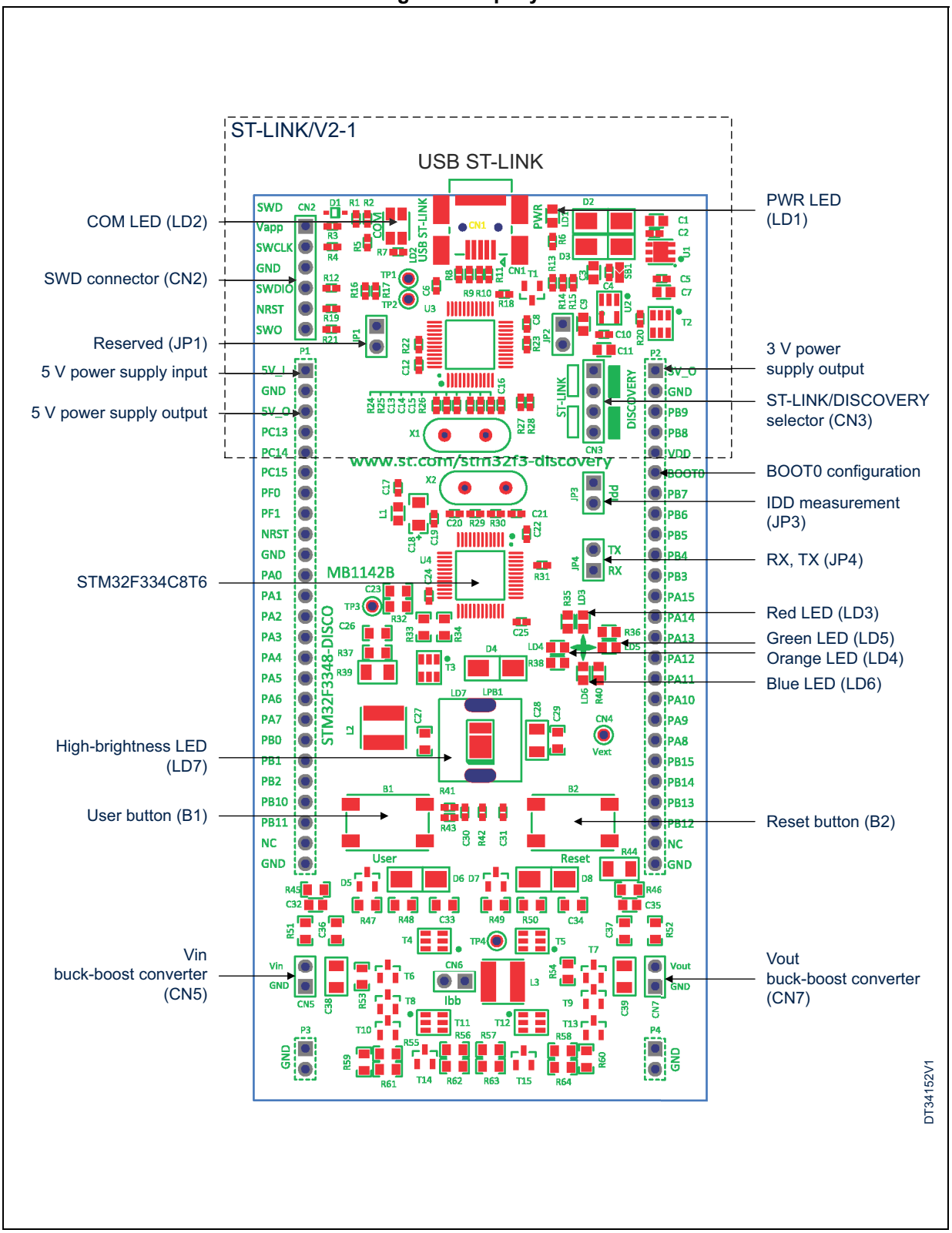


Figure 4. Bottom layout

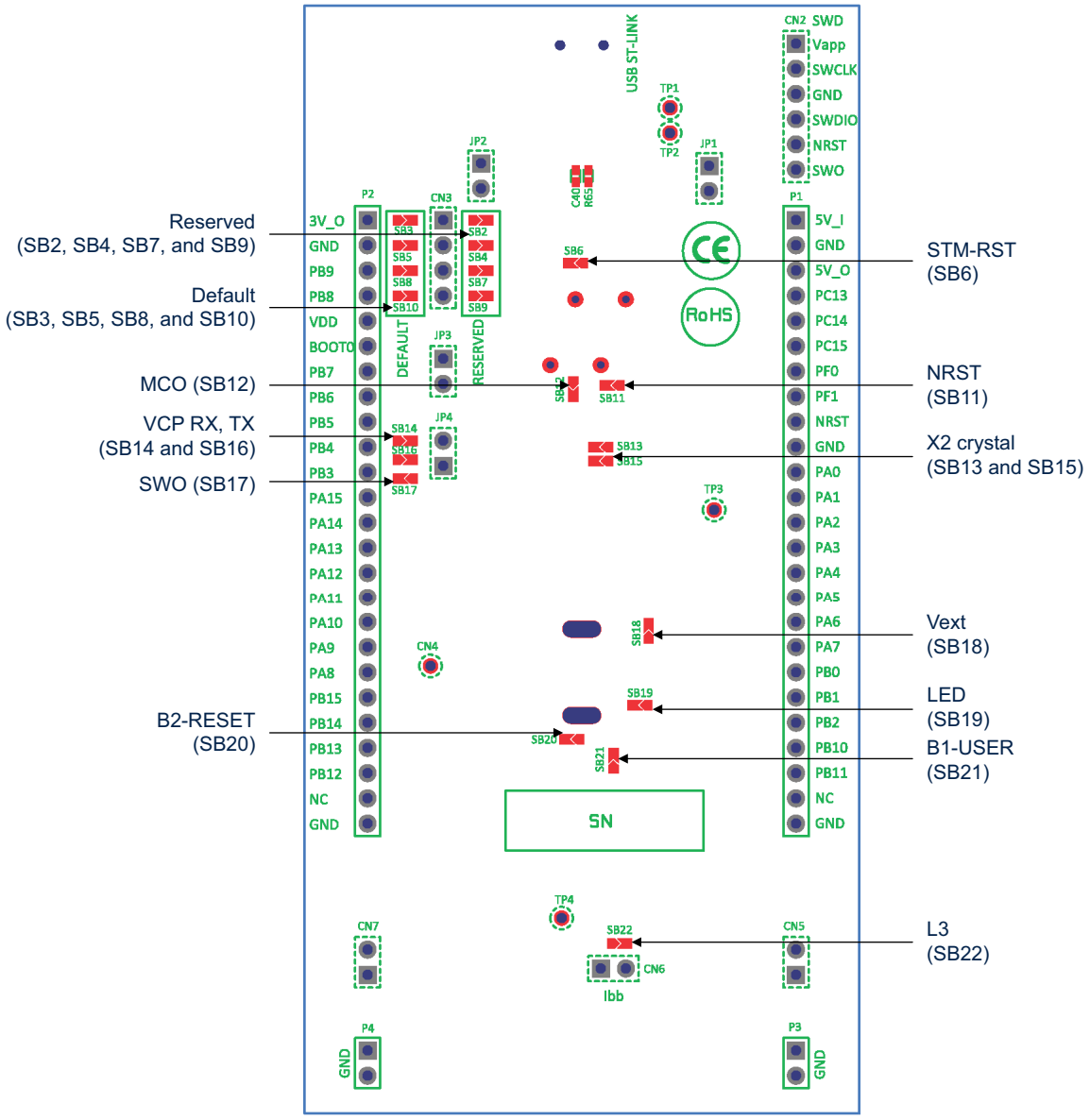
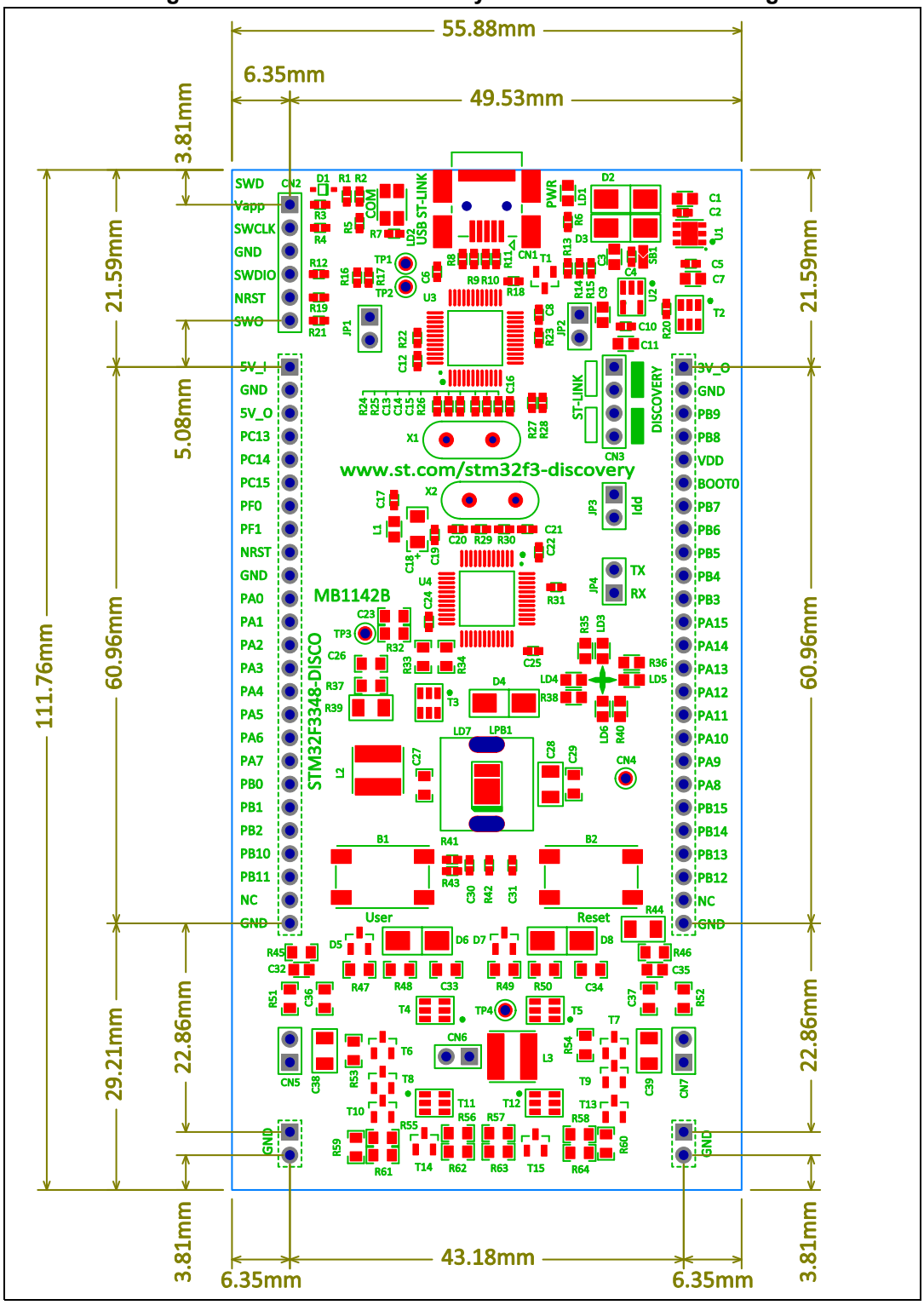


Figure 5. STM32F334 Discovery board mechanical drawing



5.1 Embedded ST-LINK/V2-1

The ST-LINK/V2-1 programming and debugging tool is integrated on the STM32F334 Discovery board.

The embedded ST-LINK/V2-1 tool 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) that describes in detail all the ST-LINK/V2 features.

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

- New features supported on ST-LINK/V2-1:
  - USB software re-enumeration
  - Virtual COM port interface on USB (*Section 5.1.3*)
  - Mass storage interface on USB
  - USB power management request for more than 100 mA power-on USB
- Features not supported on ST-LINK/V2-1:
  - SWIM interface
  - Minimum supported application voltage limited to 3 V

There are two different ways to use ST-LINK/V2-1, depending on the jumper states (refer to *Table 4*):

- Program/debug the MCU on board. Refer to *Section 5.1.4*.
- Program/debug an MCU in an external application board using a cable connected to the SWD connector (CN3). Refer to *Section 5.1.5*.

Table 4. Jumper states

Jumper state	Description
Both CN3 jumpers ON	ST-LINK/V2-1 functions enabled for on-board programming (default)
Both CN3 jumpers OFF	ST-LINK/V2-1 functions enabled for application through external CN2 connector (SWD supported)

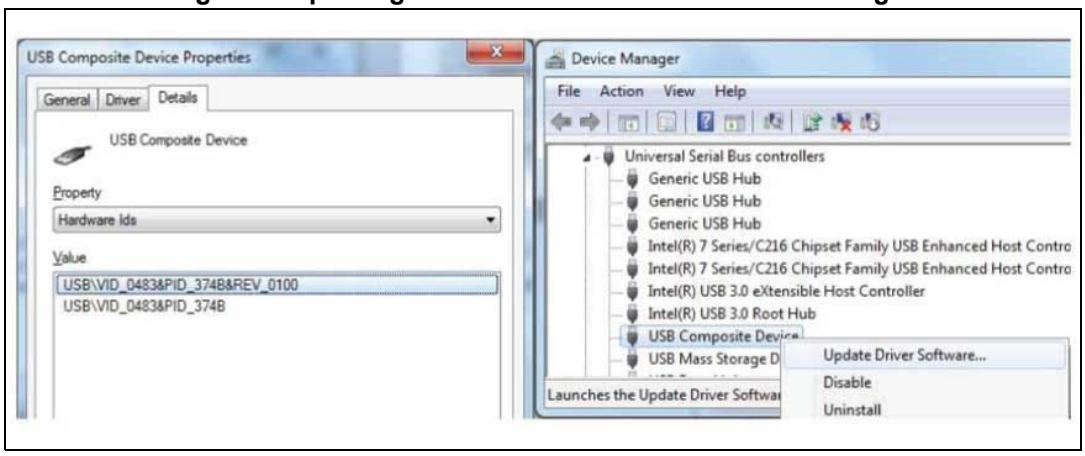
5.1.1 Drivers

Before Windows 10, ST-LINK/V2-1 required a dedicated USB driver that can be found at *www.st.com*.

In case the STM32F334 Discovery board 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 (*Figure 6*), and from the device manager update the driver of the connected device.

Note: Prefer using the "USB Composite Device" to handle a full recovery.

Figure 6. Updating the list of drivers in the device manager



5.1.2 ST-LINK/V2-1 firmware upgrade

ST-LINK/V2-1 embeds a firmware upgrade mechanism for the in-place upgrade through the USB port. The firmware might evolve during the lifetime of the ST-LINK/V2-1 product (for example new functionality, bug fixes, and support for new microcontroller families). Visit *www.st.com* periodically to stay up-to-date with the latest firmware version.

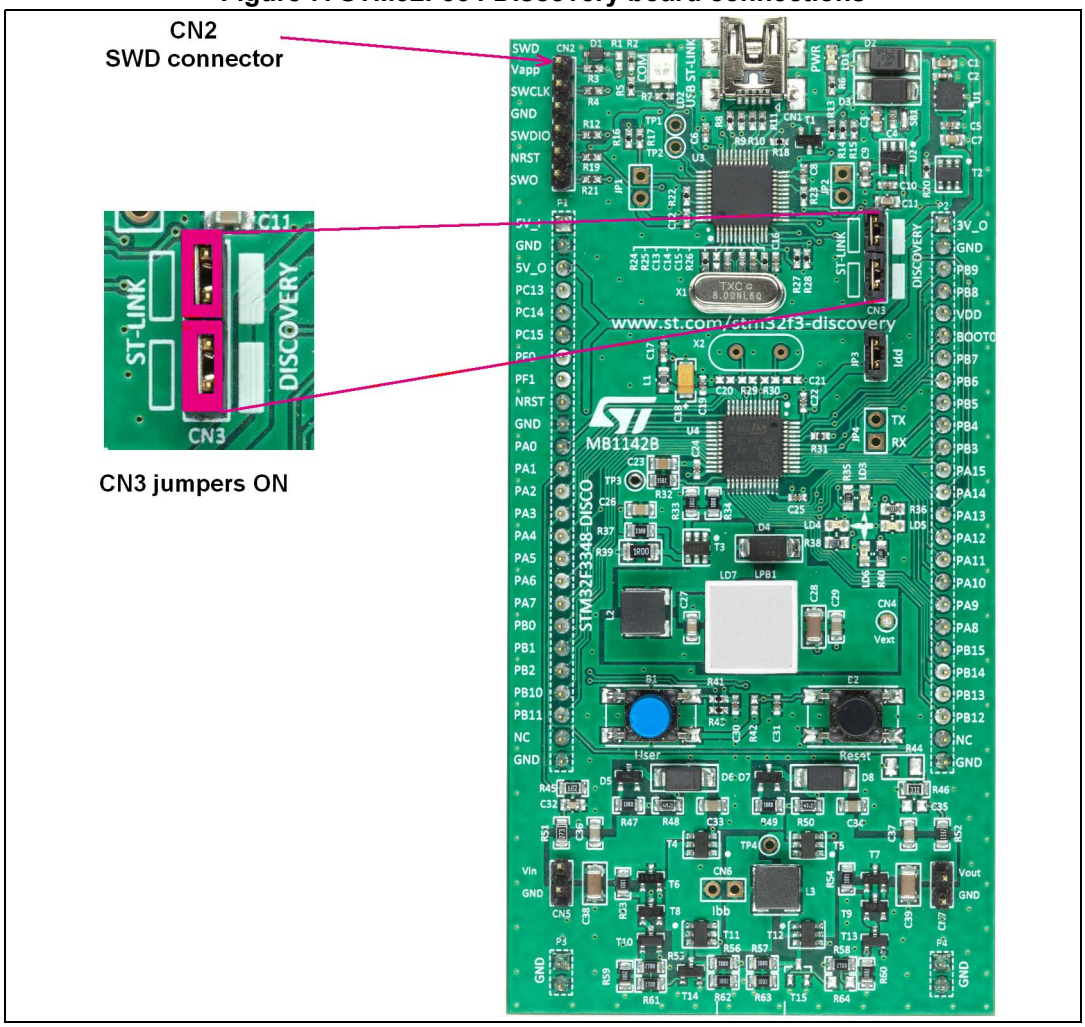
5.1.3 VCP configuration

ST-LINK/V2-1 supports the Virtual COM port (VCP). To enable this function, the solder bridges SB14 and SB16 (refer to *Figure 4*) are ON. *Table 6* indicates this with the ON state.

5.1.4 Using ST-LINK/V2-1 to program/debug the STM32F334 MCU on board

To program the STM32F334 MCU on board, plug in the two jumpers on CN3, as shown in *Figure 7*, but do not use the CN2 connector as that might disturb communication with the STM32F334C8T6 of the STM32F334 Discovery board.

Figure 7. STM32F334 Discovery board connections



5.1.5 Using ST-LINK/V2-1 to program/debug an external STM32 application

It is very easy to use ST-LINK/V2-1 to program an STM32 microcontroller on an external application. Simply remove the two jumpers from CN3 as shown in *Figure 8* and connect your application to the CN2 debug connector according to *Table 5*.

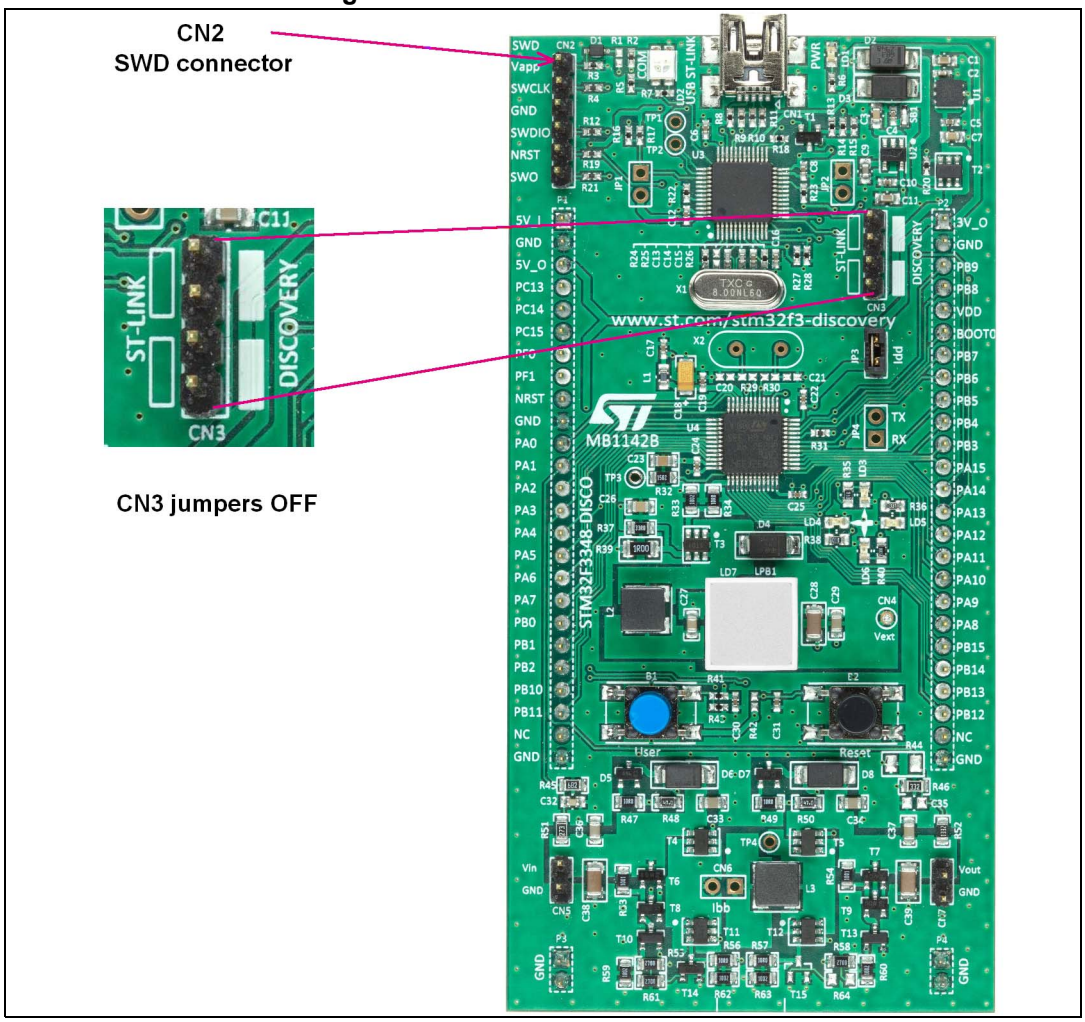
Note: SB11 must be OFF if you use CN2 pin 5 (NRST) in your external application.

SB17 must be OFF if you use CN2 pin 6 (SWO) in your external application.

Table 5. Debug connector CN2 (SWD)

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

Figure 8. ST-LINK/V2-1 connections



5.2 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 STM32F334 Discovery board requires 500 mA from the host PC but around 300 mA is needed for its demo, 100 mA for an extension board, and a safety margin of 100 mA.

The D2 and D3 diodes protect the 5 V pins from external power supplies:

- 5 V and 3 V can be used as output power supplies when an extension board is connected to pins P1 and P2.
  In this case, the 5V_O and 3V_O pins deliver a 5 V or 3.3 V power supply and the power consumption of the extension board must be lower than 100 mA.
- 5 V can also be used as an input power supply, for example, when the USB connector is not connected to the PC. (5V_I pin of P1 header)
  In this case, a power supply unit or auxiliary equipment complying with the EN-60950-1: 2006+A11/2009 standard must power the STM32F334 Discovery board and must be safety extra low voltage (SELV) with limited power capability.

5.2.1 Power supply input from the USB connector

ST-LINK/V2-1 supports USB power management allowing to request more than 100 mA current to the host PC.

All parts of the STM32F334 Discovery board and extension board can be powered from the ST-LINK/V2-1 USB connector CN1 (U5V or VBUS). Note that only the ST-LINK/V2-1 part is power supplied before the USB enumeration as the host PC only provides 100 mA to the board at that time. During the USB enumeration, the STM32F334 Discovery board requires 500 mA of current to the host PC. If the host can provide the required power, the targeted STM32 microcontroller is powered. The red LED (LD1) is turned on. Thus, the STM32F334 Discovery board and its extension board can consume a maximum of 500 mA current, not more. If the host is not able to provide the required current, the targeted STM32 microcontroller and the MCU part including the extension board are not power supplied. As a consequence, the red LED (LD1) remains turned OFF. In such a case, it is mandatory to use an external power supply as explained in the next chapter.

Warning: If the maximum current consumption of the STM32F334 Discovery and its extension boards exceeds 500 mA, it is mandatory to power the STM32F334 Discovery using an external power supply connected to 5V_IN.

Note: In case this board is powered by a USB charger or USB battery, there is no USB enumeration. Therefore, the red LED (LD1) remains OFF permanently and the target MCU is not powered. In this specific case, the jumper JP1 needs to be ON to allow the target MCU to be powered anyway. This is a special use without enumeration and JP1 is OFF. To use this optional power supply, solder a 2-pin header in JP1 and set a jumper (you can use a jumper plugged into P3 or P4)

5.2.2 External power supply inputs: 5V_IN

The external power source 5V_IN is automatically detected. In this case, the current consumption of the STM32F334 Discovery board with its extension board exceeds the allowed current on USB. In this condition, it is still possible to use the USB for communication (programming or debugging only), but it is mandatory to power supply the board first using 5V_IN and then connect the USB cable to the PC. Proceeding this way ensures that the enumeration occurs thanks to the external power source.

The following power sequence procedure must be respected:

1. Connect the external power source to 5V_IN.
2. Power on the external power supply 5V_IN.
3. Check that LD1 is turned on.
4. Connect the PC to the USB connector (CN1).

If this order is not respected, the board might be supplied by VBUS first, then by 5V_IN, and the following risks might be encountered:

1. If the board needs a current higher than 500 mA, the PC might be damaged or the PC can limit the current supply. As a consequence, the board is not powered correctly.
2. Enumeration requires 500 mA (since JP1 must be OFF) so there is a risk that the request is rejected and the enumeration does not succeed if the PC cannot provide such current. Consequently, the board is not power supplied, and the red LED (LD1) remains OFF.

5.3 LEDs

- LD1 PWR:
  The red LED indicates that the board is powered.
- LD2 COM:
  The LD2 default status is red. LD2 turns to green to indicate that the communications are in progress between the PC and ST-LINK/V2-1.
- User LD3:
  The red LED is a user LED connected to the I/O PB6 of the STM32F334C8T6.
- User LD4:
  The orange LED is a user LED connected to the I/O PB8 of the STM32F334C8T6.
- User LD5:
  The green LED is a user LED connected to the I/O PB9 of the STM32F334C8T6.
- User LD6:
  The blue LED is a user LED connected to the I/O PB7 of the STM32F334C8T6.

5.4 Pushbuttons

- B1 USER:
  User/wake-up button connected to the I/O PA0 of the STM32F334C8T6.
- B2 RESET:
  The push-button connected to NRST is used to RESET the STM32F334C8T6.

5.5 High-brightness LED dimming with a buck converter

The STM32F334 Discovery integrates a high-brightness LED dimming feature. This function is designed with on-chip peripherals MCU to reduce the number of external components generally included in analog component-based solutions for LED dimming.

The default LED voltage supply is the 5 V from the 5V_OUT signal or can be provided by an external voltage through CN4 (Vext signal) and by removing the solder of SB18. This external voltage must be between 5 and 15 V.

LED information:

- Reference LE-CWC12100-D, 1 W, Everluck
- VF = 2.8 V typical
- IF = 350 mA maximum

To design a high-brightness LED dimming application, refer to the following documentation and firmware:

- For details concerning I/O ports, refer to the STM32F334C8T6 datasheet.
- For information on software development, refer to the DISCOVER application software on www.st.com/en/product/32f3348discovery.
- For more detail concerning high-brightness LED dimming, refer to the application note *High brightness LED dimming using the STM32F334 Discovery kit* (AN4885).
- The STM32Cube library is available from www.st.com/en/product/32f3348discovery.

Warning: The high brightness of this LED can be very dangerous for your eyes.

For safety reasons, the maximum high-brightness LED forward current is limited by software to 250 mA, and an optical cube-shaped protection is placed over the LED. Do not override this current limitation and do not remove the optical protection while the LED is operating.

The STM32F334C8T6 MCU controls this high-brightness LED dimming feature through the high-resolution timer interface.

Note: If a LED buck converter is used, then a buck-boost converter cannot be enabled.

5.6 Buck-boost converter

The STM32F334 Discovery includes a buck-boost converter. This DC-DC converter function is designed with on-chip MCU peripherals and can convert an input voltage (Vin on CN5) from 3 to 15 V to an output voltage (Vout on CN7) from 3 to 15 V.

Input current on Vin (CN5) and output current on Vout (CN7) are limited to 500 mA max. Whatever the input or output voltage conditions are.

The STM32F334C8T6 MCU controls this buck-boost converter feature through the high-resolution timer interface.

To design a buck-boost converter application, refer to the following documentation and firmware:

- For details concerning I/O ports, refer to the STM32F334C8T6 datasheet.
- For information on software development, refer to the DISCOVER application software on www.st.com/en/product/32f3348discovery.
- For more details concerning the buck-boost converter, refer to the application note *Buck-boost converter using the STM32F334 Discovery kit* (AN4449).
- The STM32Cube library is available from www.st.com/en/product/32f3348discovery.

Note: If a buck-boost converter is used, then the LED buck converter cannot be enabled.

5.7 JP3 (Idd)

The Idd-labeled jumper (JP3) allows the consumption of STM32F334C8T6 to be measured by removing the jumper and connecting an ammeter.

- Jumper on: STM32F334C8T6 is powered (default).
- Jumper off: an ammeter must be connected to measure the STM32F334C8T6 current. If there is no ammeter, the STM32F334C8T6 is not powered.

5.8 BOOT0 configuration

BOOT0 is at a low level through a pull-down R31. If you want to set BOOT0 at a high level, it can be configured by setting a jumper between P2.6 (BOOT0) and P2.5 (VDD).

This facility is offered for fast and instantaneous configuration.

Note: If you need to set BOOT0 at a high level continuously, then unsolder the resistor R31 to avoid consumption of 6 mA while connecting pin P2.6 (BOOT0) and P2.5 (VDD) with a jumper or with a wire.

5.9 USART configuration

The USART2 interface available on PB3 and PB4 of the STM32F334C8T6 can be connected to the ST-LINK/V2-1 MCU to use the Virtual COM port function.

By default the USART2 communication between the target STM32F334C8T6 and ST-LINK/V2-1 MCU is not enabled.

To use the Virtual COM port function with:

- The on-board STM32F334C8T6: Keep SB14 and SB16 ON.
- An external MCU: Put SB14 and SB16 OFF. Solder a 2-pin header on JP4. Then you can directly connect the external MCU Rx and Tx to the JP4 Rx and Tx signals.

5.10 OSC clock supply

If PF0 and PF1 are only used as GPIOs instead of clocks, then SB13 and SB15 are ON and R29 and R30 are OFF. (SB12 must be OFF)

MCO from ST-LINK/V2-1 (from MCO of the STM32F103CBT6)
This frequency cannot be changed. It is fixed at 8 MHz and connected to the PF0-OSC_IN pin of the STM32F334C8T6. The configuration needed is:

- SB12 ON and SB13 OFF
- R30 OFF

HSE oscillator on board from X2 crystal (not provided)
For typical frequencies, capacitors, and resistors, refer to the STM32F334C8T6 datasheet. The configuration needed is:

- SB12, SB13, and SB15 OFF
- X2, R29, R30, C20, and C21 ON

Oscillator from external PF0 (from external oscillator through pin 7 of the P1 connector)
The configuration needed is:

- SB13 ON
- SB12 OFF
- R30 OFF

Note: Refer to the application note Oscillator design guide for STM8AF/AL/S, STM32 MCUs and MPUs (AN2867).

5.11 Solder bridges

Table 6. Solder bridges

Bridge	State[1]	Description
SB13, 15 (X2 crystal)	**OFF**	X2, C20, C21, R29 and R30 provide a clock. PF0 and PF1 are disconnected from P1.
	ON	PF0, PF1 are connected to P1 Remove only R29 and R30
SB3,5,8,10 (default)	**ON**	Reserved, do not modify
SB2,4,7,9 (reserved)	**OFF**	Reserved, do not modify
SB20 (B2-RESET)	**ON**	B2 Push Button is connected to NRST of STM32F334C8T6
	OFF	B2 Push Button is not connected to NRST of STM32F334C8T6
SB21 (B1-USER)	**ON**	B1 Push Button is connected to PA0
	OFF	B1 Push Button is not connected to PA0
SB14, 16 (VCP RX, TX)[2]	OFF	PA2, PA3 of STM32F103CBT6 are not connected to PB4, PB3 of STM32F334C8T6
	ON	PA2, PA3 of STM32F103CBT6 are connected to PB4, PB3 of STM32F334C8T6, then SW0 cannot be used and SB17 must be OFF
SB18 (Vext)	**ON**	LED Buck is powered from 5V_OUT
	OFF	LED Buck is powered from CN4
SB22 (L3)	**ON**	Default position.
	OFF	Use CN6 for Current measurement.
SB1 (ST-LINK/V2-1 PWR)	**ON**	ST-LINK/V2-1 module is powered
	OFF	ST-LINK/V2-1 module is not powered
SB19 (LED)	**ON**	Default position.
	OFF	Use it connecting 2 wires for Current measurement.
SB11 (NRST)	**ON**	T_NRST signal from connector CN2 and STM32F103CBT6, is connected to NRST of STM32F334C8T6
	OFF	T_NRST signal is not connected
SB17 (SWO)	**OFF**	SWO signal is not connected
	ON	SWO signal of connector CN3 is connected to PB3, then USART_TX cannot be used and SB16 must be OFF
SB6 (STM_RST)	**OFF**	No incidence on NRST signal of STM32F103CBT6
	ON	NRST signal of STM32F103CBT6 is connected to GND
SB12 (MCO)	**ON**	MCO clock signal from STM32F103CBT6 is connected to OSC_IN of STM32F334C8T6.
	OFF	MCO signal of STM32F103CBT6 is not used.

1. The default value is in bold.
2. The default state is OFF for boards labeled MB1142 B-01 and older.

5.12 Extension connectors

The male headers P1 and P2 can connect the STM32F334 Discovery board to a standard prototyping/wrapping board. STM32F334C8T6 GPIOs are available on these connectors. An oscilloscope, logical analyzer, or voltmeter can also probe P1 and P2.

Table 7. Extension connectors

MCU pin		Board function												
Main function	LQFP48 pin number.	SYSTEM	VCP	Push-buttons	LED	Buck-boost	Buck LED	Free I/O	Power Supply	P1	P2	CN5	CN7	SBx(1)
-	-	-	-	-	-	Vin	-	-	-	-	-	2	-	-
-	-	-	-	-	-	Vout	-	-	-	-	-	-	2	-
BOOT0	44	BOOT0	-	-	-	-	-	-	-	-	6	-	-	-
NRST	7	NRST	-	RESET	-	-	-	-	-	9	-	-	-	SB11, 20
PA0	10	-	-	USER	-	-	-	-	-	11	-	-	-	SB21
PA1	11	-	-	-	-	Vin_Sense	-	-	-	12	-	-	-	-
PA2	12	-	-	-	-	-	-	-	-	13	-	-	-	-
PA3	13	-	-	-	-	Vout_Sense	-	-	-	14	-	-	-	-
PA4	14	-	-	-	-	-	-	PA4	-	15	-	-	-	-
PA5	15	-	-	-	-	-	-	PA5	-	16	-	-	-	-
PA6	16	-	-	-	-	-	-	PA6	-	17	-	-	-	-
PA7	17	-	-	-	-	-	-	PA7	-	18	-	-	-	-
PA8	29	-	-	-	-	P1_Drive	-	-	-	-	19	-	-	-

Table 7. Extension connectors (continued)

MCU pin		Board function												
Main function	LQFP48 pin number.	SYSTEM	VCP	Push-buttons	LED	Buck-boost	Buck LED	Free I/O	Power Supply	P1	P2	CN5	CN7	SBx[1]
PA9	30	-	-	-	-	N1_Drive	-	-	-	-	18	-	-	-
PA10	31	-	-	-	-	N2_Drive	-	-	-	-	17	-	-	-
PA11	32	-	-	-	-	P2_Drive	-	-	-	-	16	-	-	-
PA12	33	-	-	-	-	-	-	PA12	-	-	15	-	-	-
PA13	34	SWDIO	-	-	-	-	-	-	-	-	14	-	-	-
PA14	37	SWCLK	-	-	-	-	-	-	-	-	13	-	-	-
PA15	38	-	-	-	-	-	-	PA15	-	-	12	-	-	-
PB0	18	-	-	-	-	-	BK_Sense	-	-	19	-	-	-	-
PB1	19	-	-	-	-	-	-	PB1	-	20	-	-	-	-
PB2	20	-	-	-	-	-	-	PB2	-	21	-	-	-	-
PB3	39	SWO	USART_TX	-	-	-	-	-	-	-	11	-	-	SB17, 16
PB4	40	-	USART_RX	-	-	-	-	-	-	-	10	-	-	SB14
PB5	41	-	-	-	-	-	-	PB5	-	-	9	-	-	-

Table 7. Extension connectors (continued)

MCU pin		Board function												
Main function	LQFP48 pin number.	SYSTEM	VCP	Push-buttons	LED	Buck-boost	Buck LED	Free I/O	Power Supply	P1	P2	CN5	CN7	SBx(1)
PB6	42	-	-	-	RED	-	-	-	-	-	8	-	-	-
PB7	43	-	-	-	BLUE	-	-	-	-	-	7	-	-	-
PB8	45	-	-	-	ORANGE	-	-	-	-	-	4	-	-	-
PB9	46	-	-	-	GREEN	-	-	-	-	-	3	-	-	-
PB10	21	-	-	-	-	-	-	PB10	-	22	-	-	-	-
PB11	22	-	-	-	-	-	-	PB11	-	23	-	-	-	-
PB12	25	-	-	-	-	-	BK_Drive	-	-	-	23	-	-	-
PB13	26	-	-	-	-	-	-	PB13	-	-	22	-	-	-
PB14	27	-	-	-	-	RC	-	-	-	-	21	-	-	-
PB15	28	-	-	-	-	-	-	PB15	-	-	20	-	-	-
PC13	2	-	-	-	-	-	-	PC13	-	4	-	-	-	-
PC14	3	-	-	-	-	-	-	PC14	-	5	-	-	-	-
PC15	4	-	-	-	-	-	-	PC15	-	6	-	-	-	-
PF0	5	OSC_IN	-	-	-	-	-	-	-	7	-	-	-	SB12, 13
PF1	6	OSC_OUT	-	-	-	-	-	-	-	8	-	-	-	SB15

Table 7. Extension connectors (continued)

MCU pin		Board function												
Main function	LQFP48 pin number.	SYSTEM	VCP	Push-buttons	LED	Buck-boost	Buck LED	Free I/O	Power Supply	P1	P2	CN5	CN7	SBx(1)
-	-	-	-	-	-	-	-	-	3V	-	1	-	-	-
-	-	-	-	-	-	-	-	-	5V_IN	1	-	-	-	-
-	-	-	-	-	-	-	-	-	5V_OUT	3	-	-	-	-
VDD	24	-	-	-	-	-	-	-	VDD	-	5	-	-	-
VDD	36	-	-	-	-	-	-	-	VDD	-	-	-	-	-
VDD	48	-	-	-	-	-	-	-	VDD	-	-	-	-	-
VBAT	1	-	-	-	-	-	-	-	VDD	-	-	-	-	-
VDDA	9	-	-	-	-	-	-	-	-	-	-	-	-	-
GND	23	-	-	-	-	-	-	-	GND	2	2	1	1	-
GND	35	-	-	-	-	-	-	-	GND	10	-	-	-	-
GND	47	-	-	-	-	-	-	-	GND	25	25	-	-	-
VSSA	8	-	-	-	-	-	-	-	GND	-	-	-	-	-

1. Signals available depending on SBx value. Refer to *Table 6: Solder bridges* or electrical schematics.

6 32F3348DISCOVERY Discovery kit information

6.1 Product marking

The stickers located on the top or bottom side of all PCBs provide product information:

- First sticker: product order code and product identification, generally placed on the main board featuring the target device.
  Example:

  Product order code
  Product identification

- Second sticker: board reference with revision and serial number, available on each PCB.
  Example:

  MBxxxx-Variant-yzz
  syywwxxxxx

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

On the second sticker, the first line has the following format: *"MBxxxx-Variant-yzz"*, where *"MBxxxx"* is the board reference, *"Variant"* (optional) identifies the mounting variant when several exist, *"y"* is the PCB revision and *"zz"* is the assembly revision, for example B01. The second line shows the board serial number used for traceability.

Parts marked as *"ES"* or *"E"* are not yet qualified and therefore not approved for use in production. ST is not responsible for any consequences resulting from such use. In no event will ST be liable for the customer using any of these engineering samples in production. ST's Quality department must be contacted prior to any decision to use these engineering samples to run a qualification activity.

"E" or *"ES"* 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* 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.

6.2 32F3348DISCOVERY product history

Table 8. Product history

Order code	Product identification	Product details	Product change description	Product limitations
STM32F3348-DISCO	32F3348DISCO/	MCU: – STM32F334C8T6 revision “Z”	– Initial revision – This product identification was delivered indifferently with MB1142-F334-B01 or MB1142-F334-B02	No limitation
		MCU errata sheet: – *STM32F334x4/x6/x8 Rev Z device limitations* (ES0258)		
		Board: – MB1142-F334-B01 or MB1142-F334-B02 (main board)		
	DK32F3348$AU1	MCU: – STM32F334C8T6 revision “Z”	– Packaging: plastic blister replaced by a carton box. – Main board revision changed	No limitation
		MCU errata sheet: – *STM32F334x4/x6/x8 Rev Z device limitations* (ES0258)		
		Board: – MB1142-F334-B03 (main board)		

6.3 Board revision history

Table 9. Board revision history

Board reference	Board variant and revision	Board change description	Board limitations
MB1142 (main board)	F334-B01	Initial revision	No limitation
	F334-B02	SB14 and SB16 fitted ON for VCP	No limitation
	F334-B03	Several components changed due to obsolescence: – LD1, LD3, and LD4 LEDs replaced with new references – D6 and D8 diodes replaced with new reference – T2 replaced with NEXPERIA PMN30XPE – T3, T11, and T12 replaced with ROHM RUQ050N02HZGTR	No limitation

7 Federal Communications Commission (FCC) and ISED Canada Compliance Statements

7.1 FCC Compliance Statement

7.1.1 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.

7.1.2 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.

7.1.3 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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7.2 ISED Compliance Statement

This device complies with FCC and ISED Canada RF radiation exposure limits set forth for general population for mobile application (uncontrolled exposure). This device must not be collocated or operating in conjunction with any other antenna or transmitter.

Compliance Statement

Notice: This device complies with ISED Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

Déclaration de conformité

Avis: Le présent appareil est conforme aux CNR d'ISDE Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

Revision history

Table 10. Document revision history

Date	Revision	Changes
19-Jun-2014	1	Initial release
01-Feb-2016	2	Change of STM32F3x4 to STM32F334 in *Introduction*. mbed-enabled logo added on the cover page. Added mbed-enabled in *Section 3: Features*. Added *Section 2.1: Product marking*. Text change in *Section 2.2: Order code*. Remove Windows Vista in *Section 4.1.1: Drivers*. SB14 and SB16 default position update in *Table 4: Solder bridges* Added *Section 4.1.3: VCP configuration*
06-Jun-2024	3	Reshuffle the document to align with the latest standards: – *Features* to *Conventions* reordering – *STM32F334 Discovery board mechanical drawing* moved to *Hardware layout* – *Electrical schematics* removed Added: – New *List of available products* and *Codification explanation* in *Ordering information* tables – *Section 6: 32F3348DISCOVERY Discovery kit information* with new *Product history* and *Board revision history* tables – *Federal Communications Commission (FCC) and ISED Canada Compliance Statements* Removed the references to Arm® Mbed™.