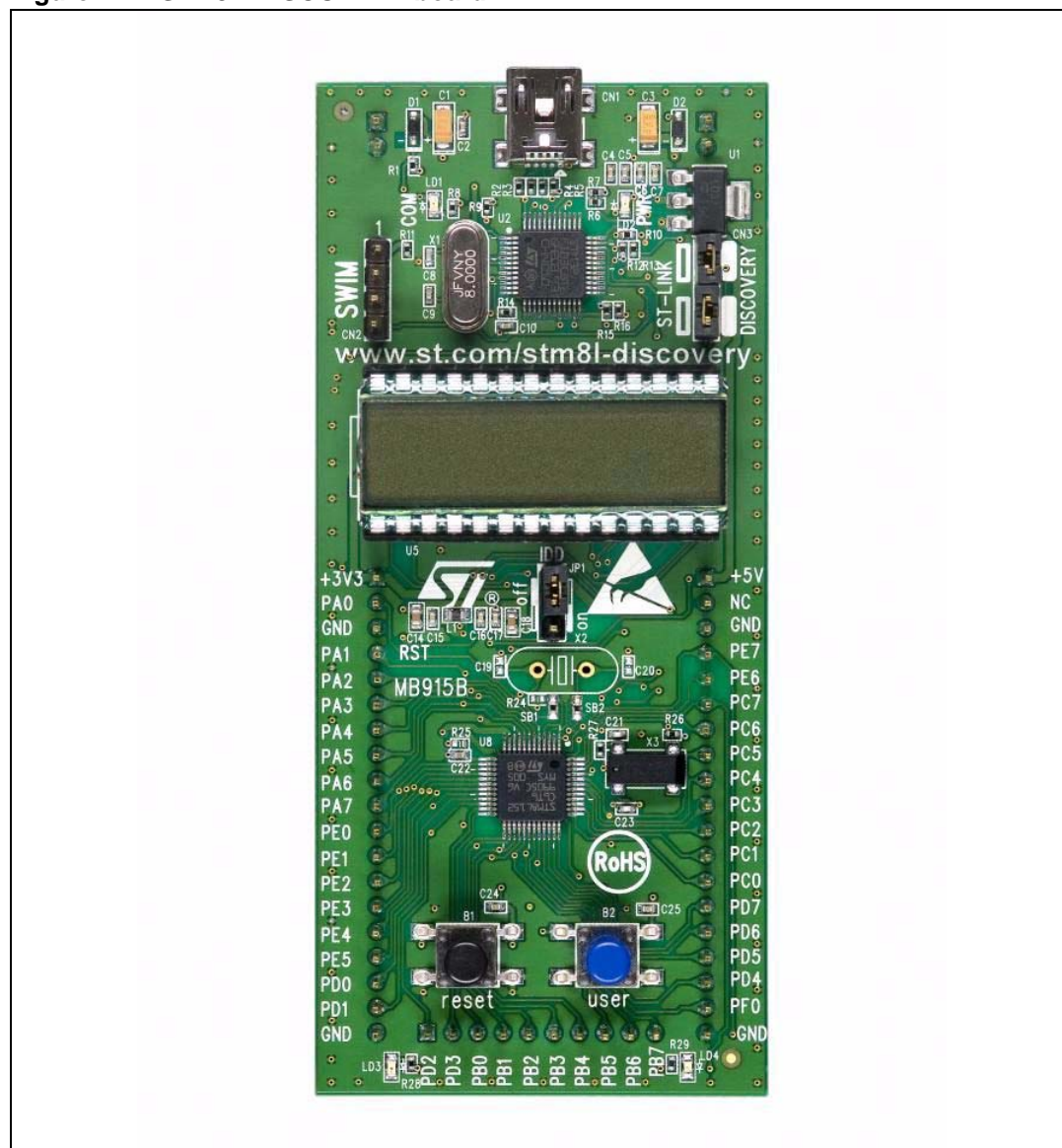


STM8L-DISCOVERY

Introduction

The STM8L-DISCOVERY helps you to discover the STM8L ultralow power features and to develop and share your applications. It is based on an STM8L152C6T6 and includes an ST-Link embedded debug tool interface, LCD (24 segments, 4 commons), LEDs and push buttons.

Figure 1. STM8L-DISCOVERY board



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1 Quick start






The STM8L-DISCOVERY is a low-cost and easy-to-use development kit to quickly evaluate and start a development with an STM8L ultralow power microcontroller.

For more information on the STM8L-DISCOVERY and for demonstration software visit www.st.com/stm8l-discovery.

1.1 Getting started

1. Check jumper positions on the board, JP1 and CN3 ON (Discovery selected).
2. Connect the STM8L-DISCOVERY board to a PC with a USB cable to power the board. Red LED LD2 (PWR) then lights up.
3. Function 1 is executed and each click on user button B2 changes the executed function as described in [Table 1](#).

Table 1. Functions

Function	LED LD3/4	Bars	Value displayed
1	Blink		STM8L V _{DD} voltage measured
2	Off		STM8L consumption measured in Run mode
3	Off		STM8L consumption measured in Low power mode, LCD on
4	Off		STM8L consumption measured in Low power mode, LCD off
5	Off		STM8L consumption measured in Halt mode, LCD off

To study or modify the DISCOVERY project related to this demo, visit www.st.com/stm8l-discovery and follow the tutorial. Discover the STM8L features, download and execute programs proposed in the list of projects. This site also contains examples from which you can develop your own applications.

1.2 System requirements

- Windows PC (2000, XP, Vista)
- A/Mini-B USB cable

1.3 Development toolchain

- IAR, Embedded Workbench® for STM8
- STMicroelectronics, ST Visual Develop (STVD)

1.4 Demonstration software

Demonstration software is preloaded in the board's Flash memory. This demonstration uses the built-in IDD measurement feature of the STM8L-DISCOVERY to automatically measure and display on the LCD the consumption of the MCU in run and low power modes.

The latest versions of this demonstration source code and associated documentation can be downloaded from www.st.com/stm8l-discovery.

1.5 Order code

To order the STM8L ultralow power Discovery, use the order code STM8L-DISCOVERY.

2 Features

The STM8L-DISCOVERY offers the following features:

- STM8L152C6T6 microcontroller, 32 KB Flash, 2 KB RAM, 1 KB EEPROM in 48-pin LQFP
- On-board ST-Link with selection mode switch to use the kit as a stand-alone ST-Link (with SWIM connector for programming and debugging)
- Two red LEDs; LD1 for USB communication, LD2 for 3.3 V power on
- Designed to be powered by USB or an external supply of 5 V or 3.3 V
- Can supply target application with 5 volts and 3 volts
- Two user LEDs, LD3 and LD4 (green and blue)
- Two push buttons (User and Reset)
- I_{DD} current measurement
- LCD 28-pin DIP (24 segments, 4 commons)
- Extension header for all QFP48 I/Os for quick connection to prototyping board for easy probing

3 Hardware and layout

The STM8L-DISCOVERY is designed around the STM8L152C6T6 microcontroller in a 48-pin LQFP package.

Figure 2 illustrates the connections between the STM8L152C6T6 and its peripherals (ST-Link, push button, LED, LCD and connectors).

Figure 3 and *Figure 4* help you to locate these features on the STM8L-DISCOVERY.

Figure 2. Hardware block diagram

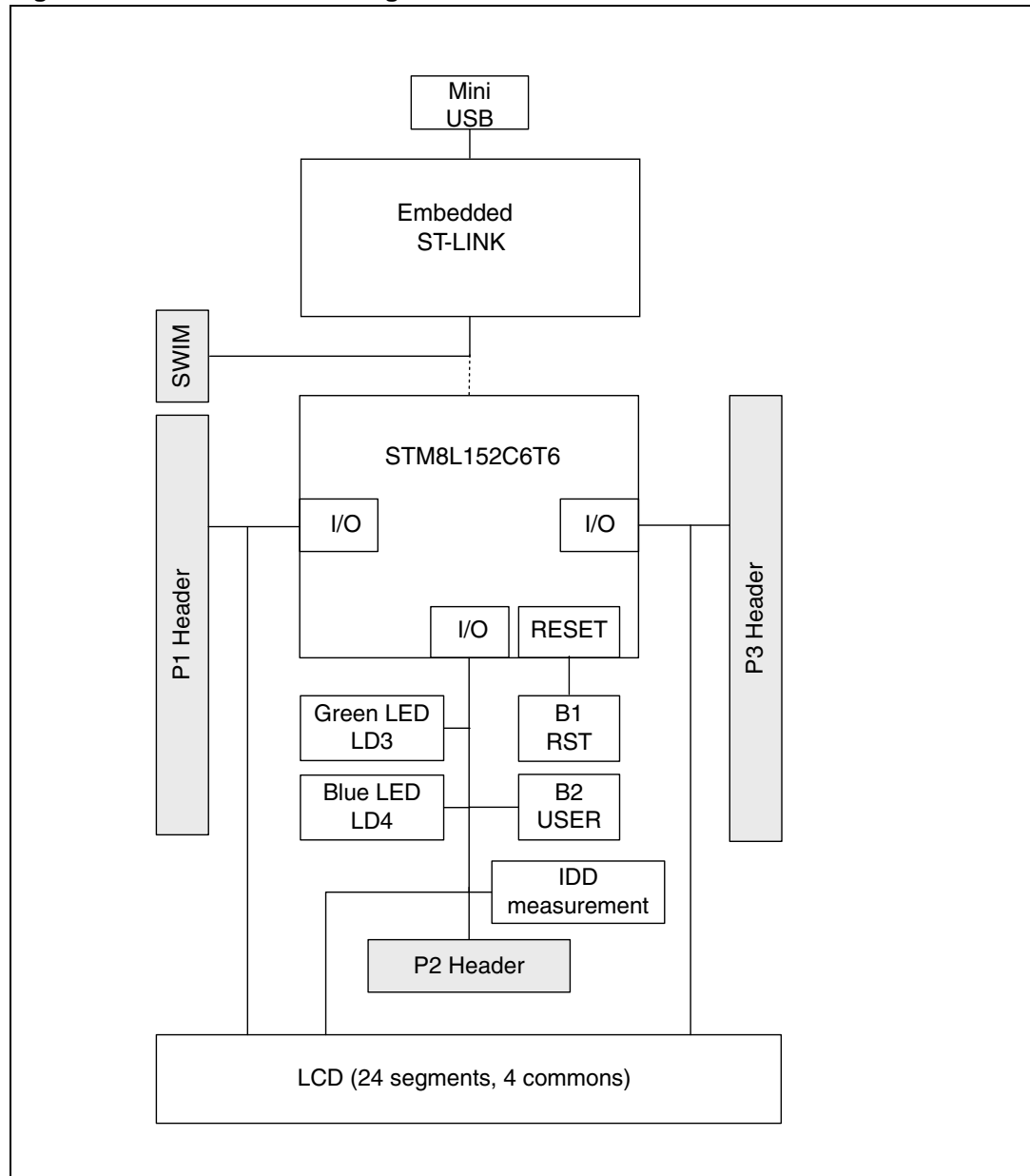


Figure 3. Top layout

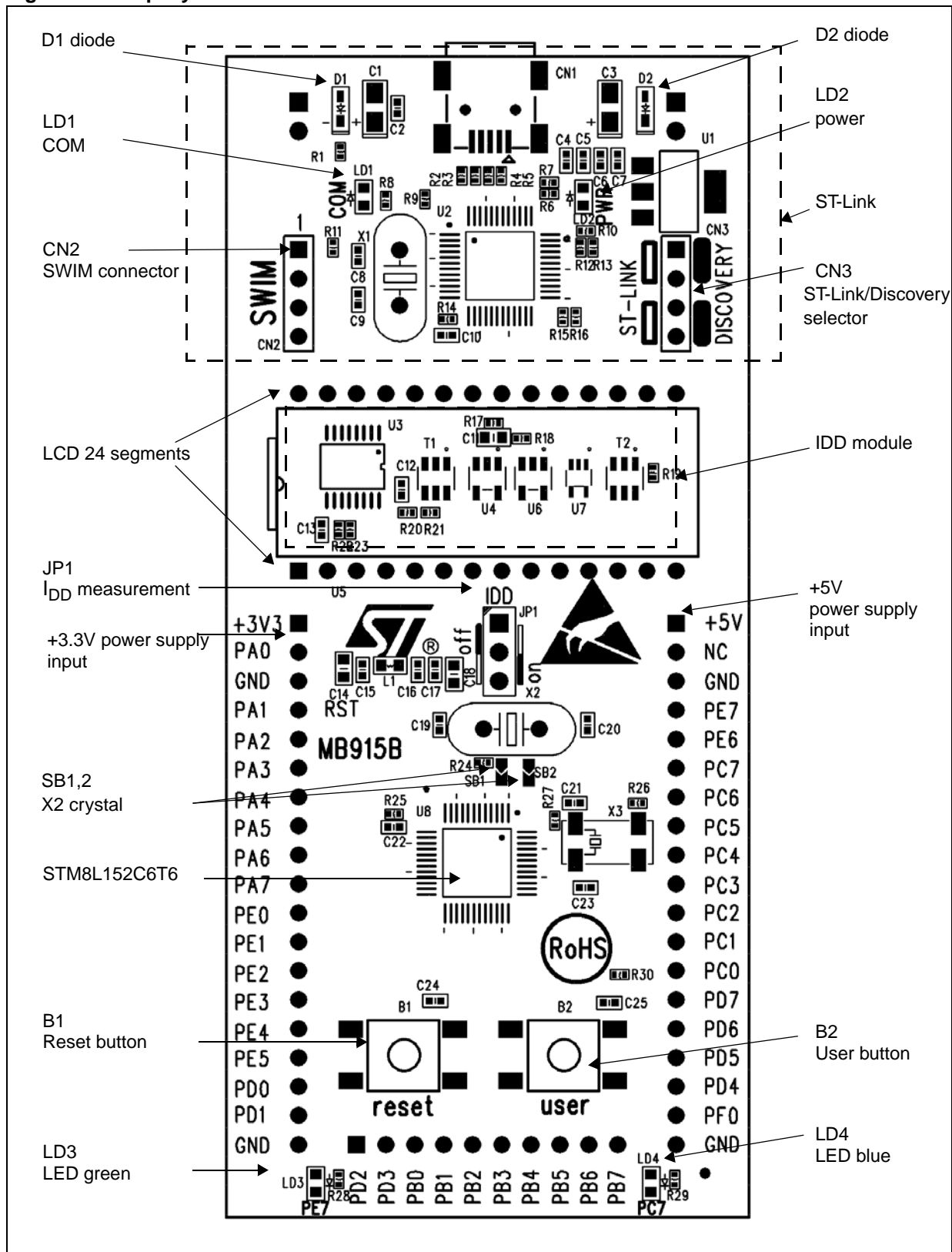
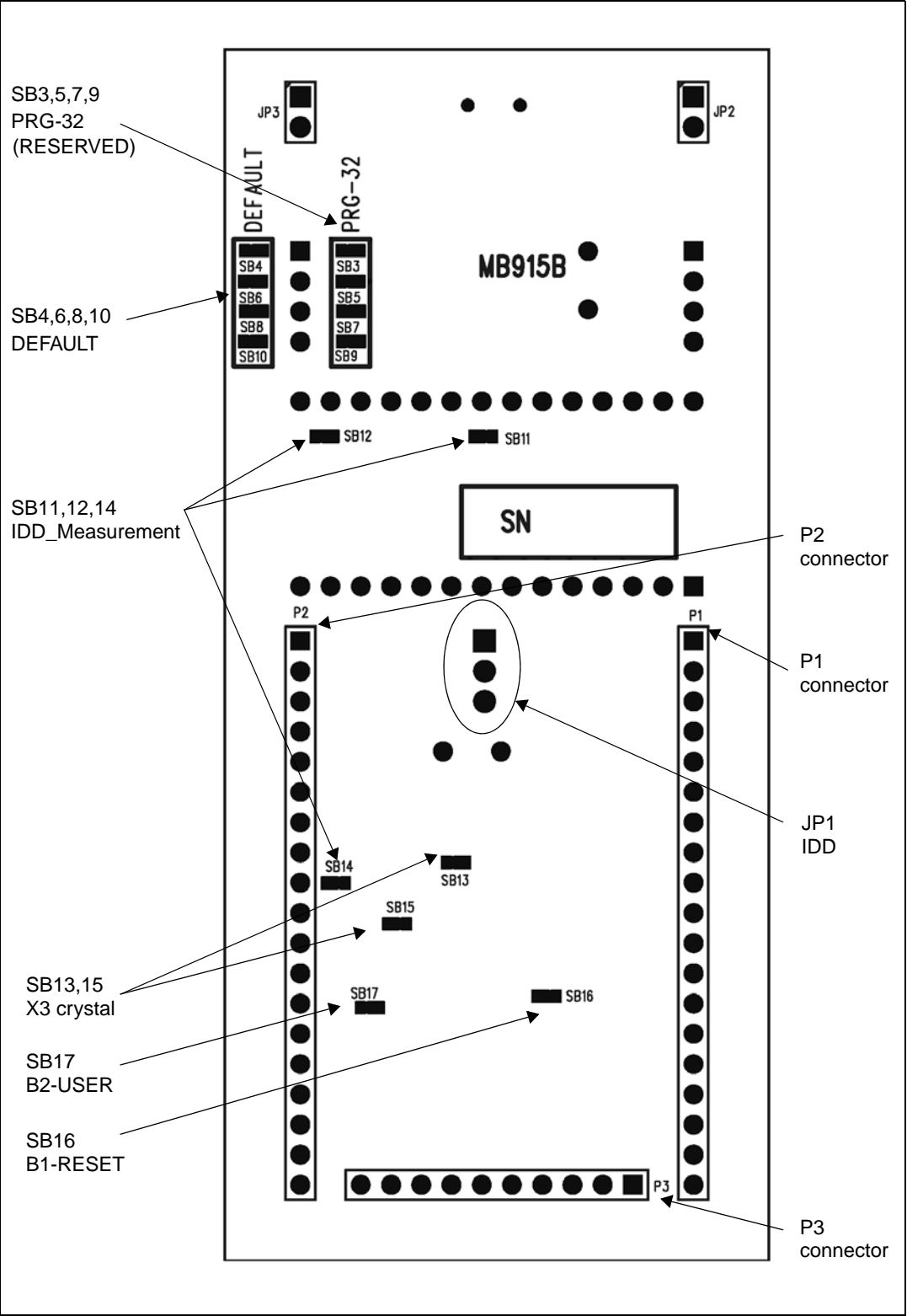


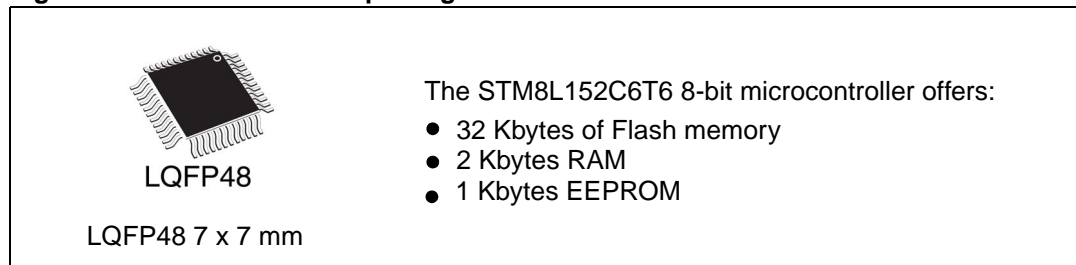
Figure 4. Bottom layout



3.1 STM8L152C6T6 microcontroller

This 8-bit ultralow power MCU has 32 KB Flash, 2 KB RAM, 1 KB data EEPROM, RTC, LCD, timers, USART, I2C, SPI, ADC, DAC and comparators.

Figure 5. STM8L152C6T6 package

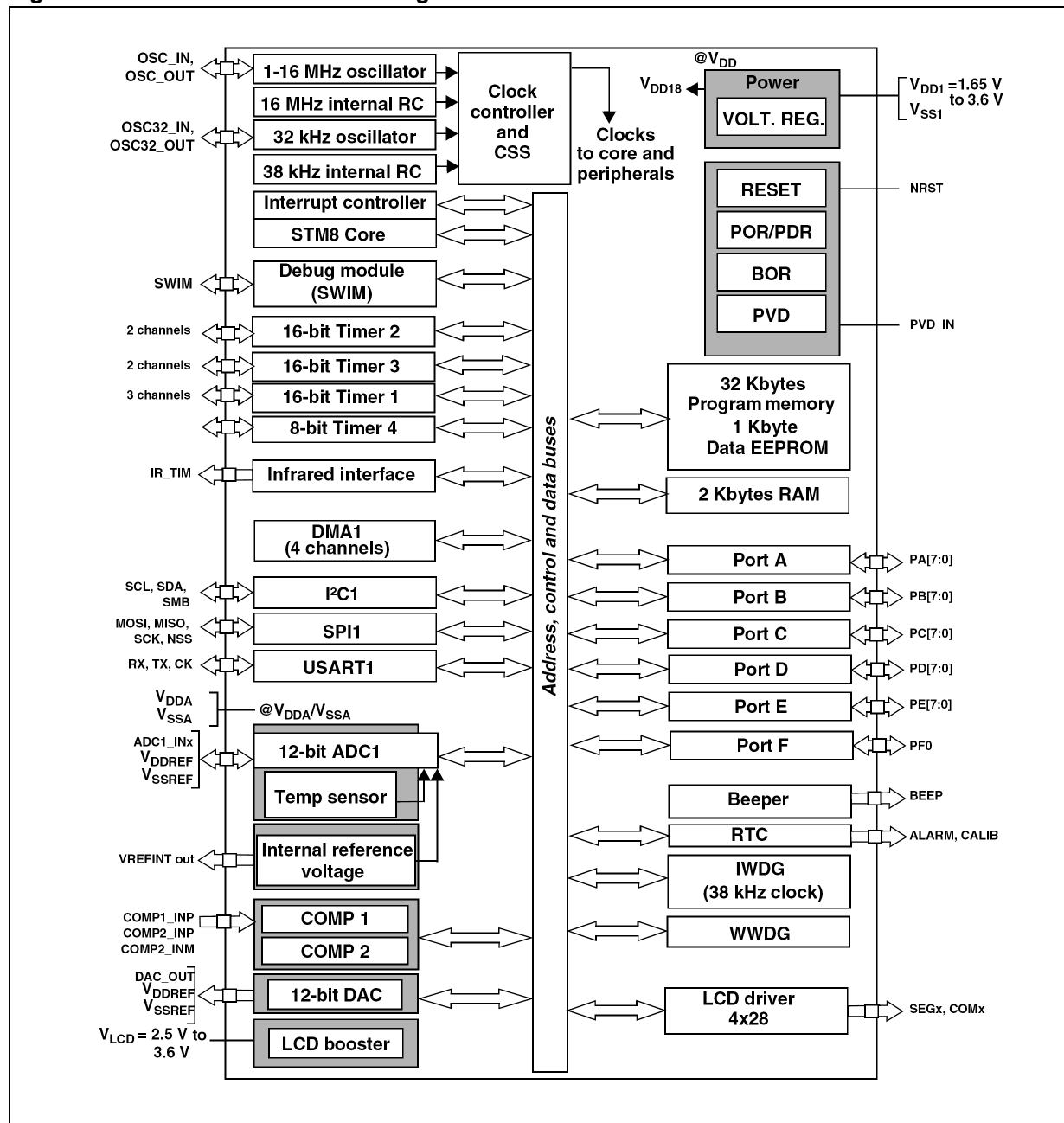


This device provides the following benefits:

- Ultralow power proprietary 130 nm technology:
Speed and power consumption independent of MCU power supply, Ultralow leakage
- Ultralow power design (clock gating, low-power Flash with power-off capability):
Reduced overall Run and Wait mode current consumption by turning off clocks of unused peripherals or Flash
- Sub 1 μ A hardware RTC and AWU system unit:
Ultralow power modes for applications requesting regular wake up
- Range of Low power modes (up to 4):
Suitable for many applications from complete switch off to continuous monitoring at ultralow frequency
- Advanced and flexible clock system (multiple internal and external clock sources):
Switch and adjust frequency and clock sources on the fly depending on application needs
- Direct memory access on board (4-channel DMA):
Autonomy for peripherals, independent from core; can switch off Flash memory and CPU (large current consumption contributors) while keeping peripherals active
- Ultralow power and ultrasafe reset system POR/PDR; additional optional activation BOR:
Integrated safety and security for application
- Ultrafast wakeup from lowest Low power mode (4 μ s):
Fast switching from Static and Dynamic power modes
- Analog functional down to 1.8 V, programming down to 1.65 V:
Full functionality over the complete V_{DD} range

For more information see the STM8L152C6T6 datasheet (Doc ID 15962) on the ST website.

Figure 6. STM8L152C6T6 block diagram



3.2 Embedded ST-Link

The ST-Link programming and debugging tool is integrated on the STM8L-DISCOVERY. The embedded ST-Link can be used in 2 different ways according to the jumper states (see [Table 2](#)):

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

For information about debugging and programming features refer to ST-Link UM0627.

Note: UM0627 contains information about all the ST-Link features. Usage in this situation is restricted to STM8 devices and SWIM support.

Figure 7. Typical configuration

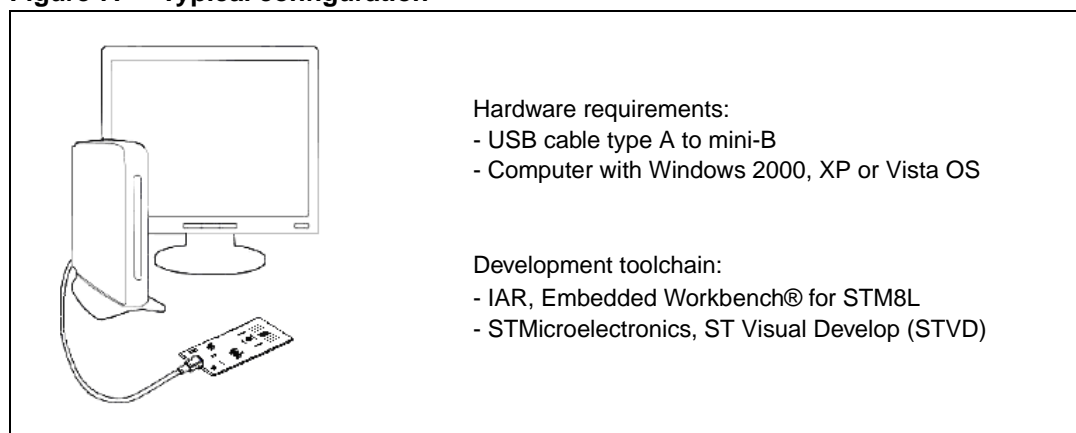


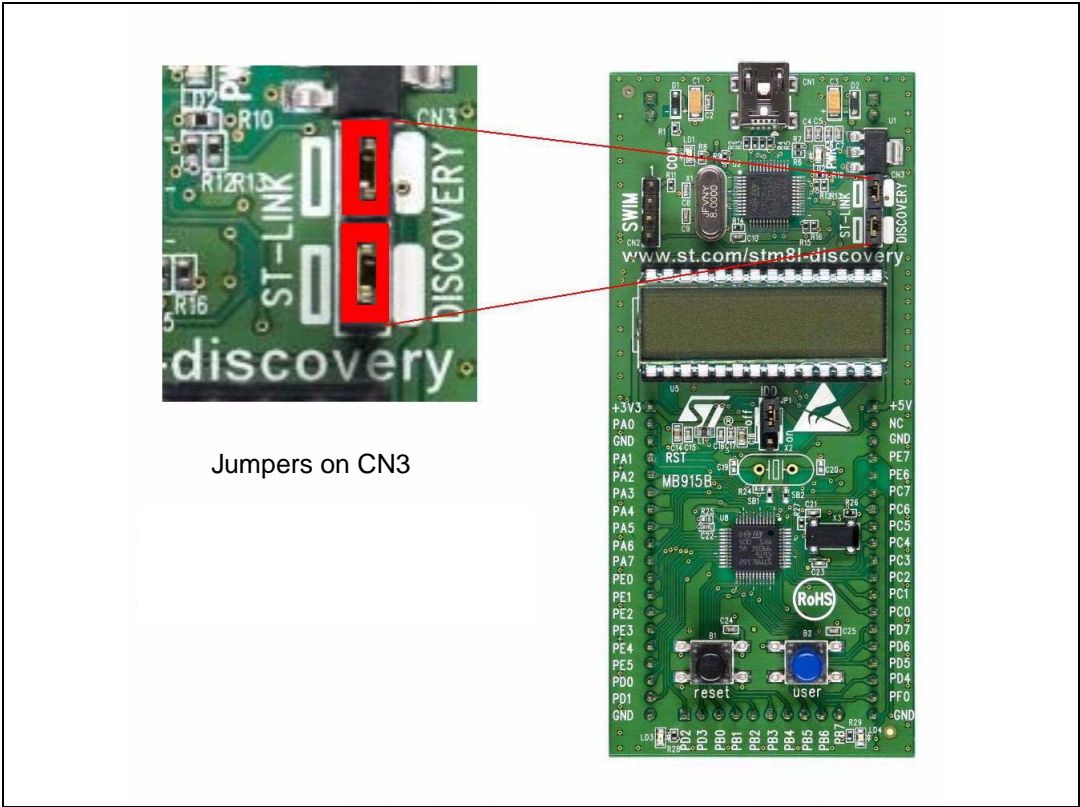
Table 2. Jumper states

Jumper state	Description
Both CN3 jumpers ON	ST-Link functions enabled for on board programming (default)
Both CN3 jumpers OFF	ST-Link functions enabled for external application through CN2 connector (SWIM supported).

3.2.1 Using the ST-Link to program/debug the STM8L on board

To program the STM8L on board, simply plug in the two jumpers on CN3, as shown in [Figure 8](#) in red, but do not use the CN2 connector as that could disturb communication with the STM8L152C6T6 of the STM8L-DISCOVERY.

Figure 8. STM8L-DISCOVERY connections image



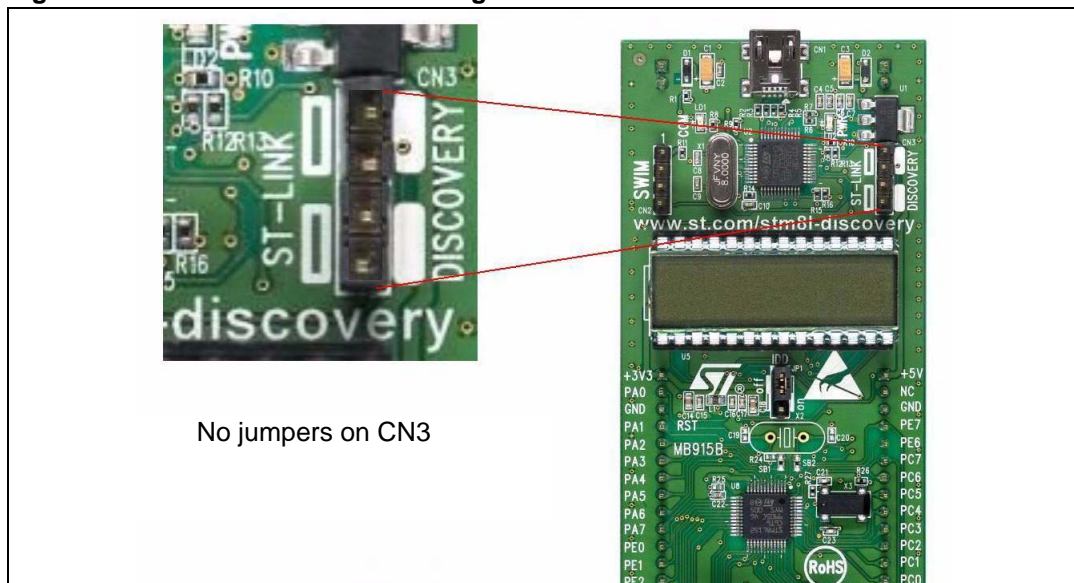
3.2.2 Using the ST-Link to program/debug an external STM8L application

It is very easy to use the ST-Link to program the STM8L on an external application. Simply remove the 2 jumpers from CN3 as shown in [Figure 9](#), and connect your application to the CN2 debug connector according to [Table 3](#).

Table 3. Debug connector CN2 (SWIM)

Pin	CN2	Designation
1	VDD_TARGET	VDD from application
2	SWIM	SWIM data input/output
3	GND	Ground
4	SWIM_RST	SWIM reset

Figure 9. ST-Link connections image



3.3 Power supply and power selection

The power supply is provided either by the host PC through the USB cable, or by external power supply (5 V or 3.3 V). The D1 and D2 protection diodes allow the 5V and 3V3 pins to be used independently as input or output power supplies (see [Figure 3](#)). The 5V and 3V3 pins can be used as an output power supply for use by an application board connected on pin headers (P1 to P3). In such a case, the 3V3 pin provides only a 3V power supply and the power consumption must be lower than 100 mA. The 5V and 3V3 pins can also be used as an input power supply for the board when the USB connector is not connected to the PC.

Note: If an external power supply is used, it must conform to EN 60950-1 SELV (safety extra low voltage) LPS (limited power source) definitions.

If the 5V and 3V3 pins are used as an input power supply, the STM8L-DISCOVERY board must be powered by a power supply unit or auxiliary equipment complying with standard EN-60950-1: 2006+A11/2009, and must be safety extra low voltage (SELV) with limited power capability.

3.4 LEDs

- LD1 COM: Red LED indicates communication in progress between PC and ST-Link.
- LD2 PWR: Red LED indicates that the board is powered.
- LD3 PE7: Green LED is a user LED connected to the I/O PE7 of the STM8L152C6T6.
- LD4 PC7: Blue LED is a user LED connected to the I/O PC7 of the STM8L152C6T6.

3.5 Push buttons

- B1 RST: Push button is used to RESET the STM8L152C6T6.
- B2 USER: User push button connected to the I/O PC1 of the STM8L152C6T6.

3.6 Built-in I_{DD} measurement circuit

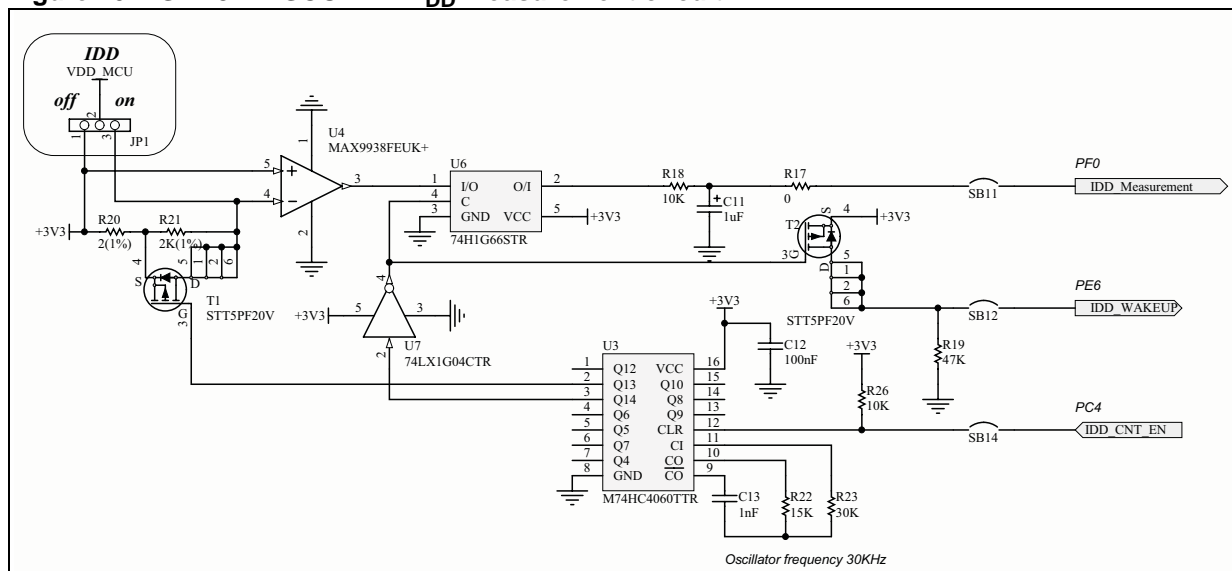
The STM8L-DISCOVERY built-in I_{DD} measurement circuit allows the consumption of the STM8L152C6T6 to be measured and displayed on the LCD Glass while the MCU is in Run or Low power saving modes.

- JP1 in ON position: STM8L152C6T6 is powered through I_{DD} measurement circuit (default).
- JP1 in OFF position: STM8L152C6T6 is powered directly by +3V3, I_{DD} measurement circuit is bypassed.

Note: When jumper JP1 is removed the current consumption of the STM8L152C6T6 can be measured by connecting an ammeter between jumper JP1 pin 1 and pin 2.

For I_{DD} measurement by the MCU itself, the circuit below is implemented on the STM8L-DISCOVERY. Solder bridges SB11, SB12 and SB14 must be closed and a jumper must be plugged between JP1 pin 2 and pin 3.

Figure 10. STM8L-DISCOVERY I_{DD} measurement circuit



3.6.1 Run mode

In Run mode, I_{DD} current is measured using the operational amplifier MAX9938FEUK+ (U4) connected to the 2 Ω shunt resistor (R20). In this case IDD_CNT_EN remains high during measurement, so R21 remains in short-circuit during the measurement because of transistor T1 which remains ON permanently. The jumper JP1 must be connected between pins 2 and 3 of JP1. The measurement range in this case can be up to 30 mA.

3.6.2 Low power mode

In Low power modes (Halt or Active halt), I_{DD} current is measured using the operational amplifier MAX9938FEUK+ (U4) connected to the 2K Ω shunt resistor (R21), controlled by the analogue switch STT5PF20V (T1). In this case the counter 74HC4060 (U3) enabled by IDD_CNT_EN manages the measurement timing according to [Figure 11](#). The measurement range in this case can be up to 30 μ A.

3.6.3 Low power mode I_{DD} measurement principle

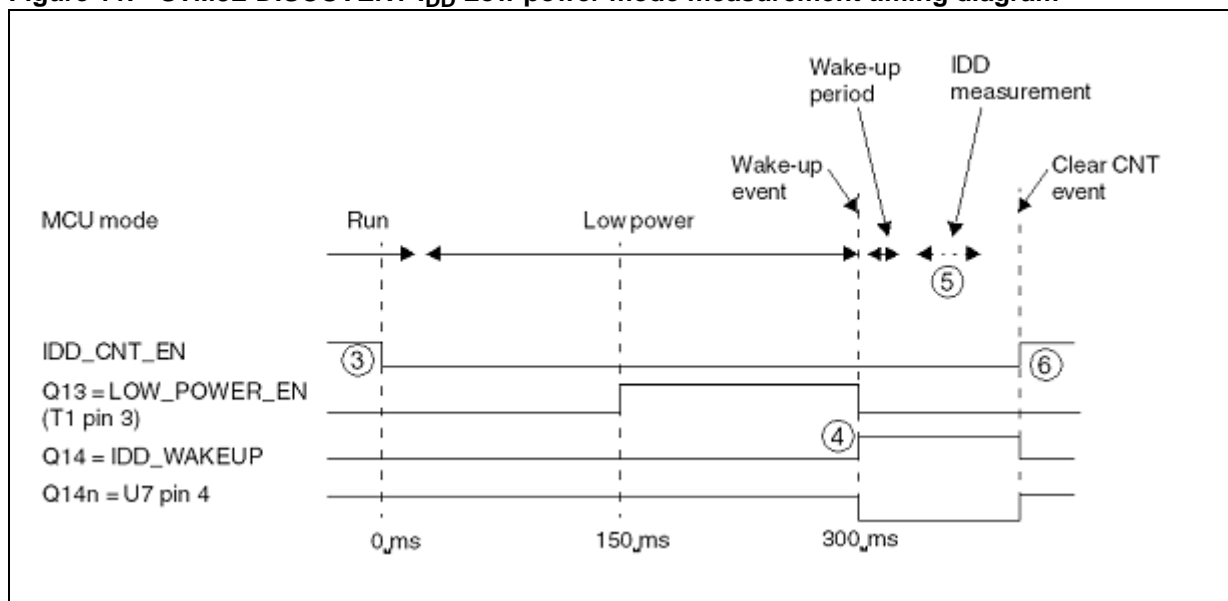
The principle used to measure a current when the STM8L152C6T6 is in Low power mode is:

1. Configure ADC to measure voltage on the IDD_Measurement pin.
2. Configure PE6 to serve as wakeup pin.
3. Enter Low power mode after setting IDD_CNT_EN (PC4) signal low.
4. IDD_WAKEUP rising edge wakes up the MCU after around 300 ms.
5. Start ADC conversion as soon as possible after wakeup in order to measure the voltage corresponding to Low power mode on capacitor C11.
6. Reset the counter by programming IDD_CNT_EN high (in less than 70 ms after the wakeup) to avoid the R21 2 K Ω resistor being connected later in Run mode.

The measurement timing is given in [Figure 11](#). In Low power modes, the 2 K Ω resistor is connected when T1 goes off after entering Low power mode. Q13 output of the counter allows connection of the 2 K Ω resistor when the current I_{DD} becomes very low.

[Figure 11](#) shows how the counter and T1 ensure that, 150 ms after IDD_CNT_EN falling edge, the shunt resistor R21 is connected between VDD_MCU and the power supply in order to reduce the measurement range to 30 μ A full scale (instead of 30 mA in Run mode). Then after another 150 ms for current stabilization, R21 is shorted, the IDD measurement is stored in C11, and the MCU is woken up. After wakeup the MCU can measure the IDD current corresponding to the Low power mode stored in C11.

Figure 11. STM8L-DISCOVERY I_{DD} Low power mode measurement timing diagram



3.6.4 I_{bias} current measurement procedure

In Low power mode the bias current of operational amplifier input (U4 pin 4) is not negligible compared to I_{DD} current (typical I_{bias} is ~240 nA). To obtain a reliable STM8L152 I_{DD} measurement it is mandatory to subtract the bias current from the I_{DD} low power measurement since this current is not sunked by the MCU. I_{bias} is measured during production test and stored in the MCU EPROM. The demonstration software, Discover, uses this value to display the correct I_{DD}. The I_{bias} measurement procedure is part of the demonstration software and can be launched if required.

The procedure for I_{bias} measurement (implemented in the Demo) is:

1. Power off the board (disconnect the USB cable).
2. Set jumper JP1 to OFF position (pins 1 and 2).
3. Push down B2 (USER button), power on the board from the USB.
4. Wait at least 1 second before releasing B2, the LCD displays the I_{bias} measurement.
5. Power off the board (disconnect the USB cable).
6. Set jumper JP1 to ON position (pins 2 and 3). The I_{bias} value is now stored. The bias current is then subtracted from the I_{DD} measurement performed in Low power mode.

3.7 Solder bridges

Table 4. Solder bridge

Bridge	State ⁽¹⁾	Description
SB1,2 (X2 crystal)	Off	PA2, PA3 are disconnected from P1 X2, C19, C20 and R24 provide a clock as shown in schematics
	On	PA2, PA3 are connected to P1 (X2, C19, C20, R24 must not be fitted)
SB3,5,7,9 (DEFAULT)	On	Reserved, do not modify
SB4,6,8,10 (PRG-32)	Off	Reserved, do not modify
SB11,12,14 (IDD_Measurement)	Off	PFO, PE6, PC4 are available and IDD module cannot be used JP1 must be set to OFF
	On	PFO, PE6, PC4 are used by IDD module JP1 must be set to ON
SB13,15 (X3 crystal)	Off	PC5, PC6 are only connected to P2 (but do not remove X3, C21, C23, R27)
	On	PC5, PC6 are connected to P2. X3, C21, C23 and R27 provide 32 KHz clock
SB16 (B1-RESET)	Off	PA1/RESET signal is only connected to P1
	On	PA1/RESET signal is used by ST_LINK as SWIM_RST and also connected to P1
SB17 (B2-USER)	Off	PC1 is only connected to P2
	On	PC1 is connected to P2 and push button B2 for user

1. Default state is in **bold** type.

3.8 LCD (24 segments, 4 commons)

This LCD allows the STM8L152C6T6 to display any information on six 14-segment digits and 4 BARs, using all COMs. (See the LCD segment mapping in [Figure 12](#) and pin connections in [Table 5](#).)

Note: This LCD also supports six 8-segment digits by only using COM0 and COM1. This configuration allows COM2 and COM3 to be used as I/O ports. In this case the 2 LCD pins must not be plugged into the LCD socket. To proceed with this configuration, remove the LCD carefully, slightly open the COM2 and COM3 pins (pin 13 and pin 14) of the LCD, then replug it in the socket.

Characteristics overview:

- 24 segments and 4 commons
- Drive method: multiplexed 1/4 duty, 1/3 bias
- Operating voltage: 3 V
- Operating temperature: 0 to 50°C
- Connector: 28-pin DIL 2.54 mm pitch

Note: When the LCD is plugged, all I/O ports listed in [Table 5](#) are unavailable. To use one of these as I/O, you must remove the LCD.

Figure 12. LCD segment mapping

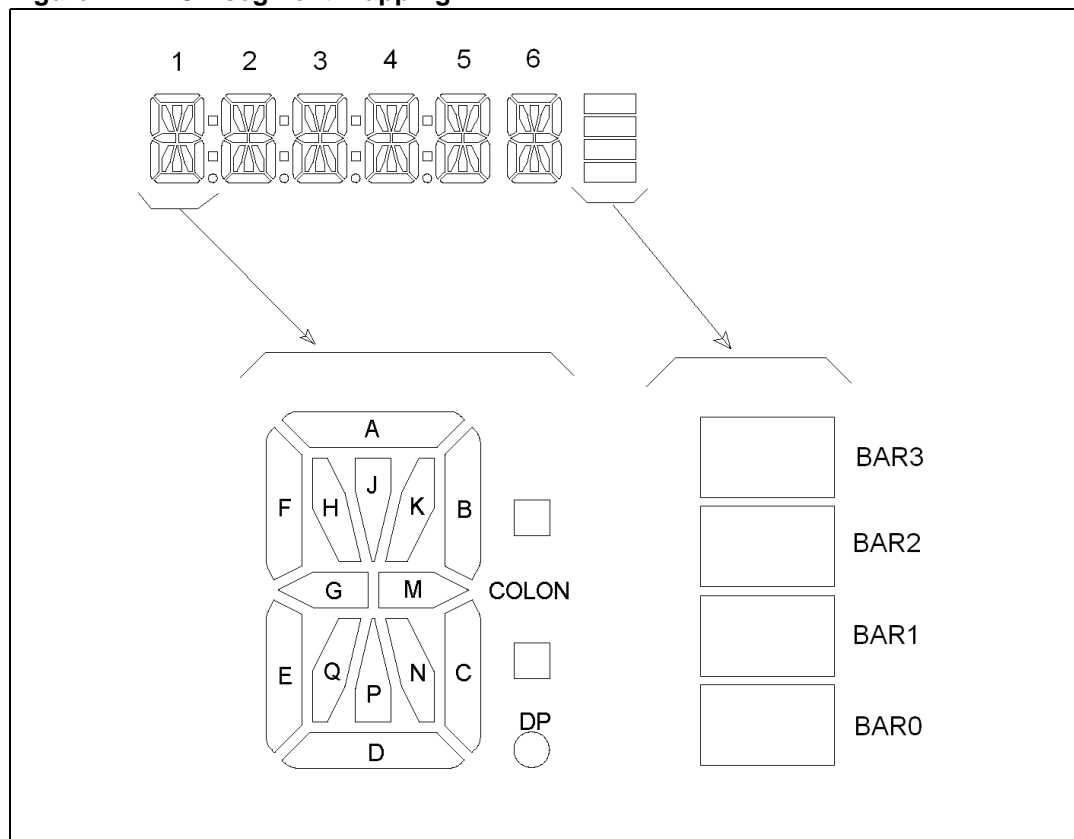


Table 5. LCD connections

STM8L152C6T6	LCD				
Pin name	Pin	COM3	COM2	COM1	COM0
PA7_LCDSEG0	1	1N	1P	1D	1E
PE0_LCDSEG1	2	1DP	1COLON	1C	1M
PE1_LCDSEG2	3	2N	2P	2D	2E
PE2_LCDSEG3	4	2DP	2COLON	2C	2M
PE3_LCDSEG4	5	3N	3P	3D	3E
PE4_LCDSEG5	6	3DP	3COLON	3C	3M
PE5_LCDSEG6	7	4N	4P	4D	4E
PD0_LCDSEG7	8	4DP	4COLON	4C	4M
PD2_LCDSEG8	9	5N	5P	5D	5E
PD3_LCDSEG9	10	BAR2	BAR3	5C	5M
PB0_LCDSEG10	11	6N	6P	6D	6E
PB1_LCDSEG11	12	BAR0	BAR1	6C	6M
PD1_LCDCOM3	13	COM3			
PA6_LCDCOM2	14		COM2		
PA5_LCDCOM1	15			COM1	
PA4_LCDCOM0	16				COM0
PB2_LCDSEG12	17	6J	6K	6A	6B
PB3_LCDSEG13	18	6H	6Q	6F	6G
PB4_LCDSEG14	19	5J	5K	5A	5B
PB5_LCDSEG15	20	5H	5Q	5F	5G
PB6_LCDSEG16	21	4J	4K	4A	4B
PB7_LCDSEG17	22	4H	4Q	4F	4G
PD4_LCDSEG18	23	3J	3K	3A	3B
PD5_LCDSEG19	24	3H	3Q	3F	3G
PD6_LCDSEG20	25	2J	2K	2A	2B
PD7_LCDSEG21	26	2H	2Q	2F	2G
PC2_LCDSEG22	27	1J	1K	1A	1B
PC3_LCDSEG23	28	1H	1Q	1F	1G

4 Extension connection

Male headers P1, P2 and P3 can connect the STM8L-DISCOVERY to a standard prototyping/wrapping board. All GPI/Os of STM8L152C6T6 are available on it. P1, P2 and P3 can also be probed by an oscilloscope, logical analyzer or voltmeter.

Table 6. P1 pinout

Pin number (P1)	Pin number (STM8L)	Board pin name	Type	Main function	Alternate function	LCD (U5)
1		+3V3			3.3 V board power supplied or supply external application when USB connected	
2	1	PA0	I/O	Port A0	PA0/[USART1_CK](3)/ SWIM/BEEP/ IR_TIM (7)	
3	9/40	GND			Ground	
4	2	PA1	I/O	Reset	NRST/PA1(1)	
5	3	PA2	I/O	Port A2	PA2/OSC_IN/ [USART1_TX](3)/ [SPI1_MISO] (3)	
6	4	PA3	I/O	Port A3	PA3/OSC_OUT/ [USART1_RX](3)/ [SPI1_MOSI](3)	
7	5	PA4	I/O	Port A4	PA4/TIM2_BKIN/ LCD_COM0(2)/ ADC1_IN2/ COMP1_INP	LCD_COM0
8	6	PA5	I/O	Port A5	PA5/TIM3_BKIN/ LCD_COM1(2)/ ADC1_IN1/ COMP1_INP	LCD_COM1
9	7	PA6	I/O	Port A6	PA6/[ADC1_TRIG](3)/ LCD_COM2(2)/ ADC1_IN0/ COMP1_INP	LCD_COM2
10	8	PA7	I/O	Port A7	PA7/ LCD_SEG0(2)(4)	LCD_SEG0
11	14	PE0	I/O	Port E0	PE0(4)/ LCD_SEG1(2)	LCD_SEG1
12	15	PE1	I/O	Port E1	PE1/TIM1_CH2N / LCD_SEG2(2)	LCD_SEG2
13	16	PE2	I/O	Port E2	PE2/TIM1_CH3N / LCD_SEG3(2)	LCD_SEG3
14	17	PE3	I/O	Port E3	PE3/LCD_SEG4(2)	LCD_SEG4
15	18	PE4	I/O	Port E4	PE4/LCD_SEG5(2)	LCD_SEG5

Table 6. P1 pinout (continued)

Pin number (P1)	Pin number (STM8L)	Board pin name	Type	Main function	Alternate function	LCD (U5)
16	19	PE5	I/O	Port E5	PE5/LCD_SEG6(2)/ ADC1_IN23/ COMP2_INP/ COMP1_INP	LCD_SEG6
17	20	PD0	I/O	Port D0	PD0/TIM3_CH2/ [ADC1_TRIG](3)/ LCD_SEG7(2)/ ADC1_IN2 2/ COMP2_INP/ COMP1_INP	LCD_SEG7
18	21	PD1	I/O	Port D1	PD1/TIM3_TRIG/ LCD_COM3(2)/ ADC1_IN21/ COMP2_INP/ COMP1_INP	LCD_COM3
19	9/40	GND			Ground	

Table 7. P2 pinout

Pin number (P2)	Pin number (STM8L)	Pin name	Type	Main function	Alternate function	LCD (U5)
1		+5V			5 Volts board power supplied or supply external application when USB connected	
2		NC				
3	9/40	GND			Ground	
4	48	PE7	I/O	Port E7	PE7/LCD_SEG27(2)	
5	47	PE6	I/O	Port E6	PE6/LCD_SEG26(2)/ PVD_IN	
6	46	PC7	I/O	Port C7	PC7/LCD_SEG25(2)/ ADC1_IN3/ COMP2_INM/ COMP1_INP	
7	45	PC6	I/O	Port C6	PC6/OSC32_OUT/ [SPI1_SCK](3)/ [USART1_RX](3)	
8	44	PC5	I/O	Port C5	PC5/OSC32_IN / [SPI1_NSS](3)/ [USART1_TX](3)	
9	43	PC4	I/O	Port C4	PC4/[USART1_CK](3)/ I2C1_SMB/CCO/ LCD_SEG24(2)/ ADC1_IN4/COMP2_INM/ COMP1_INP	

Table 7. P2 pinout (continued)

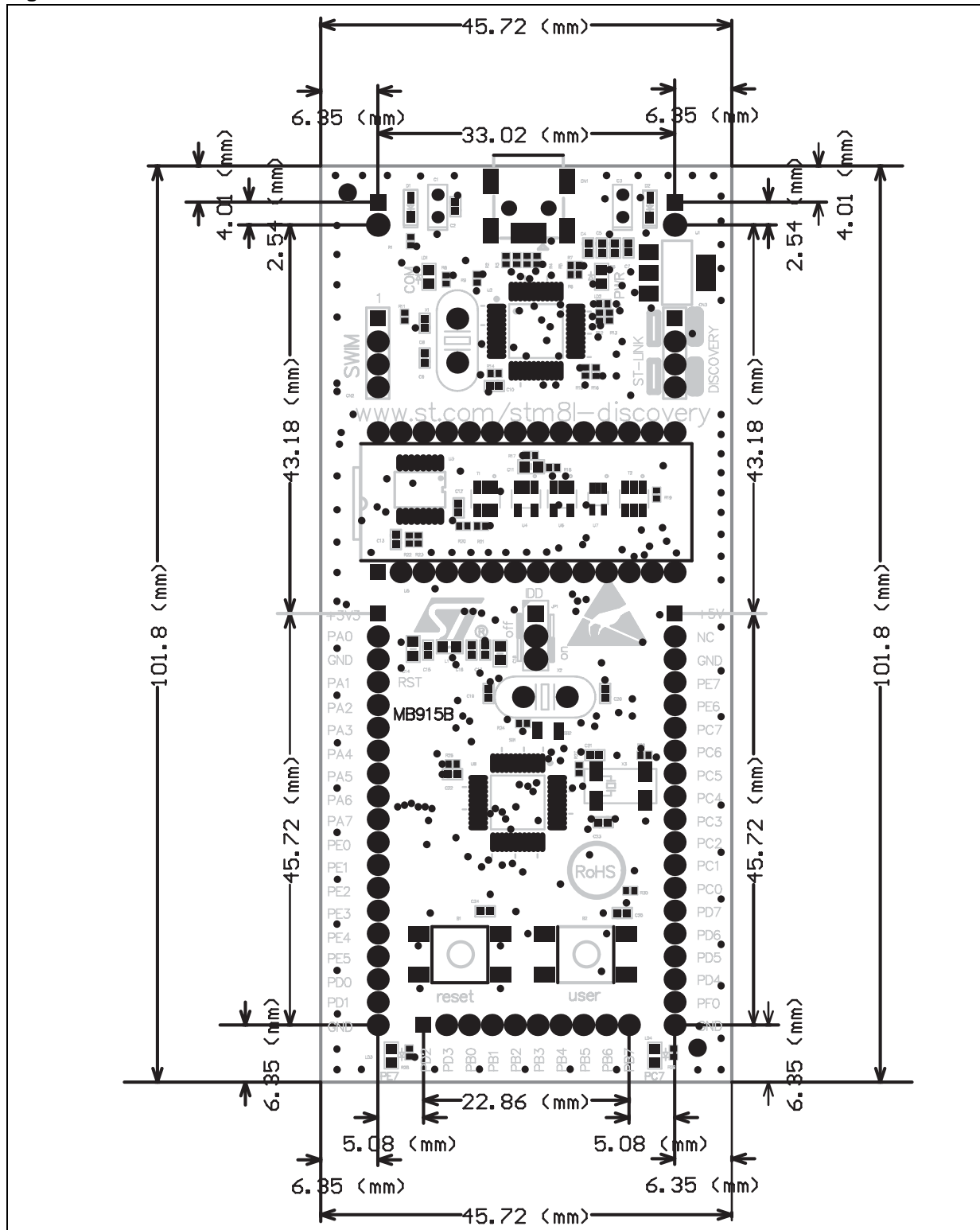
Pin number (P2)	Pin number (STM8L)	Pin name	Type	Main function	Alternate function	LCD (U5)
10	42	PC3	I/O	Port C3	PC3/[USART1_TX](3)/ LCD_SEG23(2)/ ADC1_IN5/ COMP1_INP/ COMP2_INM	LCD_SEG23
11	41	PC2	I/O	Port C2	PC2/[USART1_RX](3)/ LCD_SEG22/ ADC1_IN6/ COMP1_INP/ VREF_OUT	LCD_SEG22
12	38	PC1	I/O	Port C1	PC1(4)/I2C1_SCL	
13	37	PC0	I/O	Port C0	PC0(4)/I2C1_SDA	
14	36	PD7	I/O	Port D7	PD7/TIM1_CH1N / LCD_SEG21(2)/ ADC1_IN7/ RTC_ALARM/ VREF_OUT/ COMP1_INP	LCD_SEG21
15	35	PD6	I/O	Port D6	PD6/TIM1_BKIN / LCD_SEG20(2)/ ADC1_IN8/ RTC_CALIB/ VREF_OUT/ COMP1_INP	LCD_SEG20
16	34	PD5	I/O	Port D5	PD5/TIM1_CH3 / LCD_SEG19(2)/ ADC1_IN9/ COMP1_INP	LCD_SEG19
17	33	PD4	I/O	Port D4	PD4/TIM1_CH2 / LCD_SEG18(2)/ ADC1_IN10/ COMP1_INP	LCD_SEG18
18	32	PF0	I/O	Port F0	PF0/ADC1_IN24/ DAC_OUT	
19	9/40	GND			Ground	

Table 8. P3 pinout

Pin number (P3)	Pin number (STM8L)	Pin name	Type	Main function	Alternate function	LCD (U5)
1	22	PD2	I/O	Port D2	PD2/TIM1_CH1 / LCD_SEG8(2)/ ADC1_IN20/ COMP1_INP	LCD_SEG8
2	23	PD3	I/O	Port D3	PD3/ TIM1_TRIG/ LCD_SEG9(2)/ ADC1_IN1 9/ COMP1_INP	LCD_SEG9
3	24	PB0	I/O	Port B0	PB0/TIM2_CH1/ LCD_SEG10(2)/ ADC1_IN18/ COMP1_INP	LCD_SEG10
4	25	PB1	I/O	Port B1	PB1/TIM3_CH1/ LCD_SEG11(2)/ ADC1_IN17/ COMP1_INP	LCD_SEG11
5	26	PB2	I/O	Port B2	PB2/ TIM2_CH2/ LCD_SEG12(2)/ ADC1_IN16/ COMP1_INP	LCD_SEG12
6	27	PB3	I/O	Port B3	PB3/TIM2_TRIG/ LCD_SEG13(2)/ ADC1_IN15/ COMP1_INP	LCD_SEG13
7	28	PB4	I/O	Port B4	PB4/[SPI1_NSS](3)/ LCD_SEG14(2)/ ADC1_IN14/ COMP1_INP	LCD_SEG14
8	29	PB5	I/O	Port B5	PB5/[SPI1_SCK](3)/ LCD_SEG15(2)/ ADC1_IN13/ COMP1_INP	LCD_SEG15
9	30	PB6	I/O	Port B6	PB6/[SPI1_MOSI](3)/ LCD_SEG16(2)/ ADC1_IN12/ COMP1_INP	LCD_SEG16
10	31	PB7	I/O	Port B7	PB7/[SPI1_MISO](3)/ LCD_SEG17(2)/ ADC1_IN11/ COMP1_INP	LCD_SEG17

5 Mechanical drawing

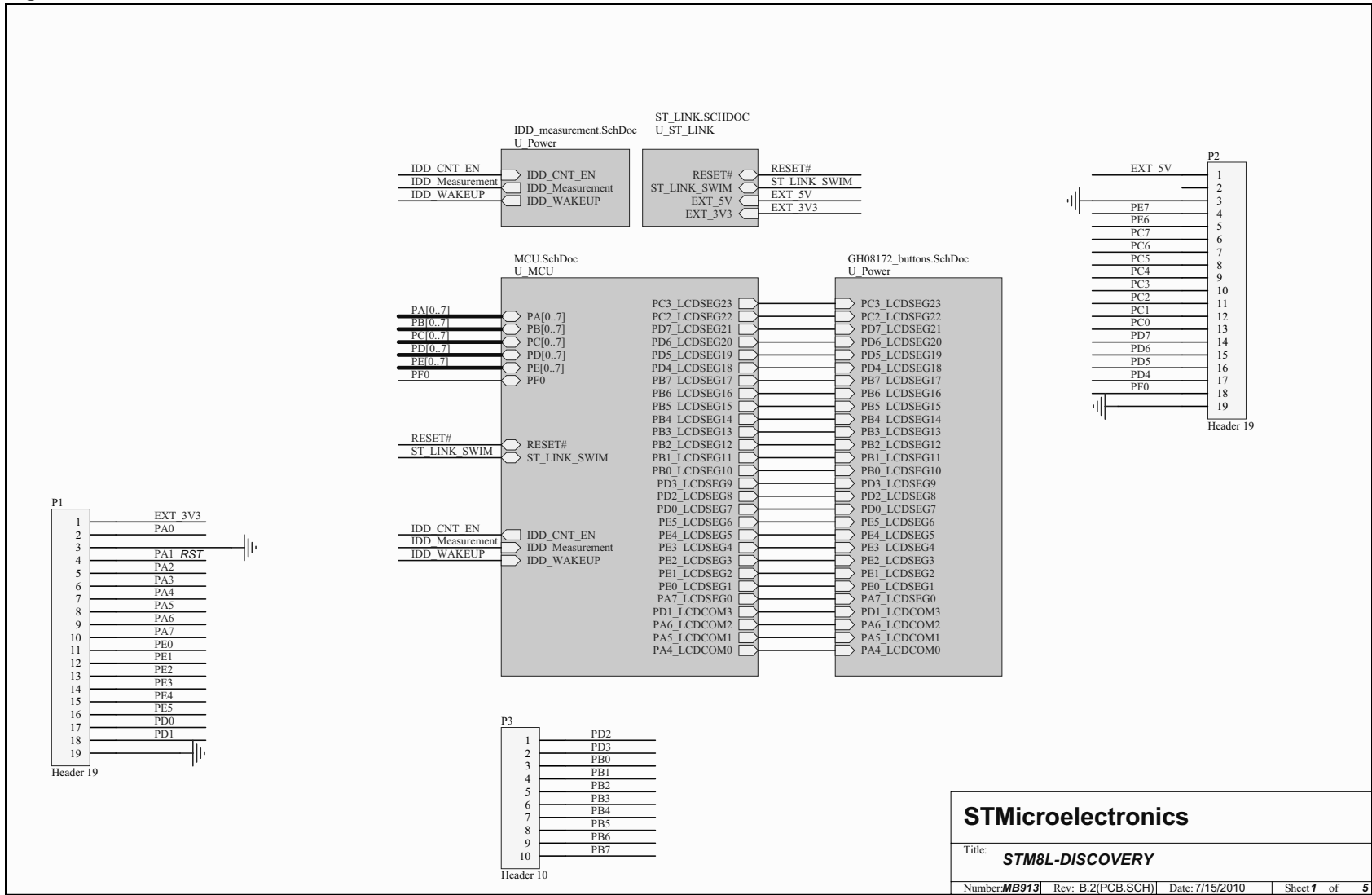
Figure 13. STM8L-DISCOVERY





6 Electrical schematics

Figure 14. STM8L-DISCOVERY

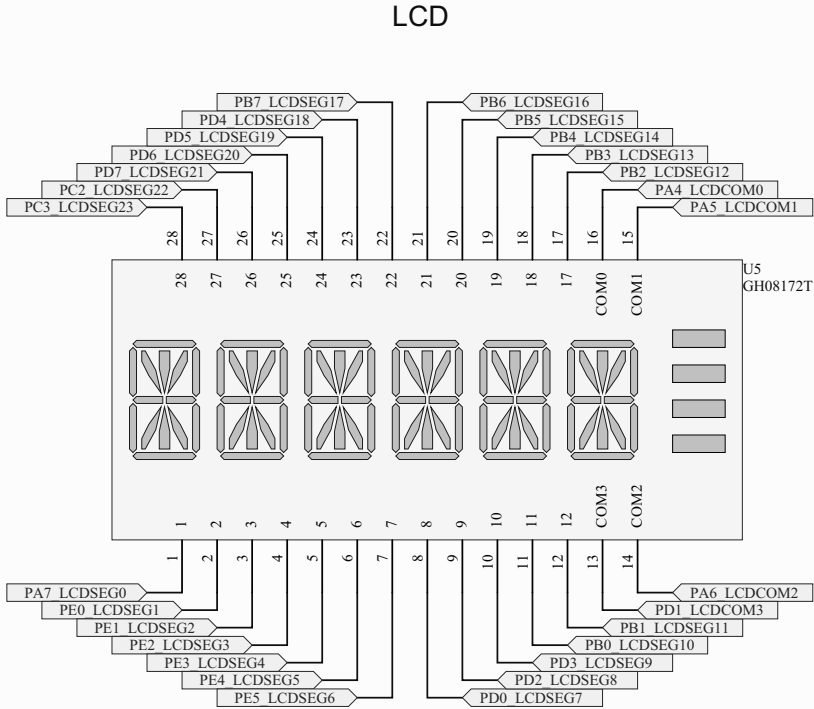


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Figure 15. LCD



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Title: **STM8L-DISCOVERY LCD**

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Figure 16. I_{DD} measurement

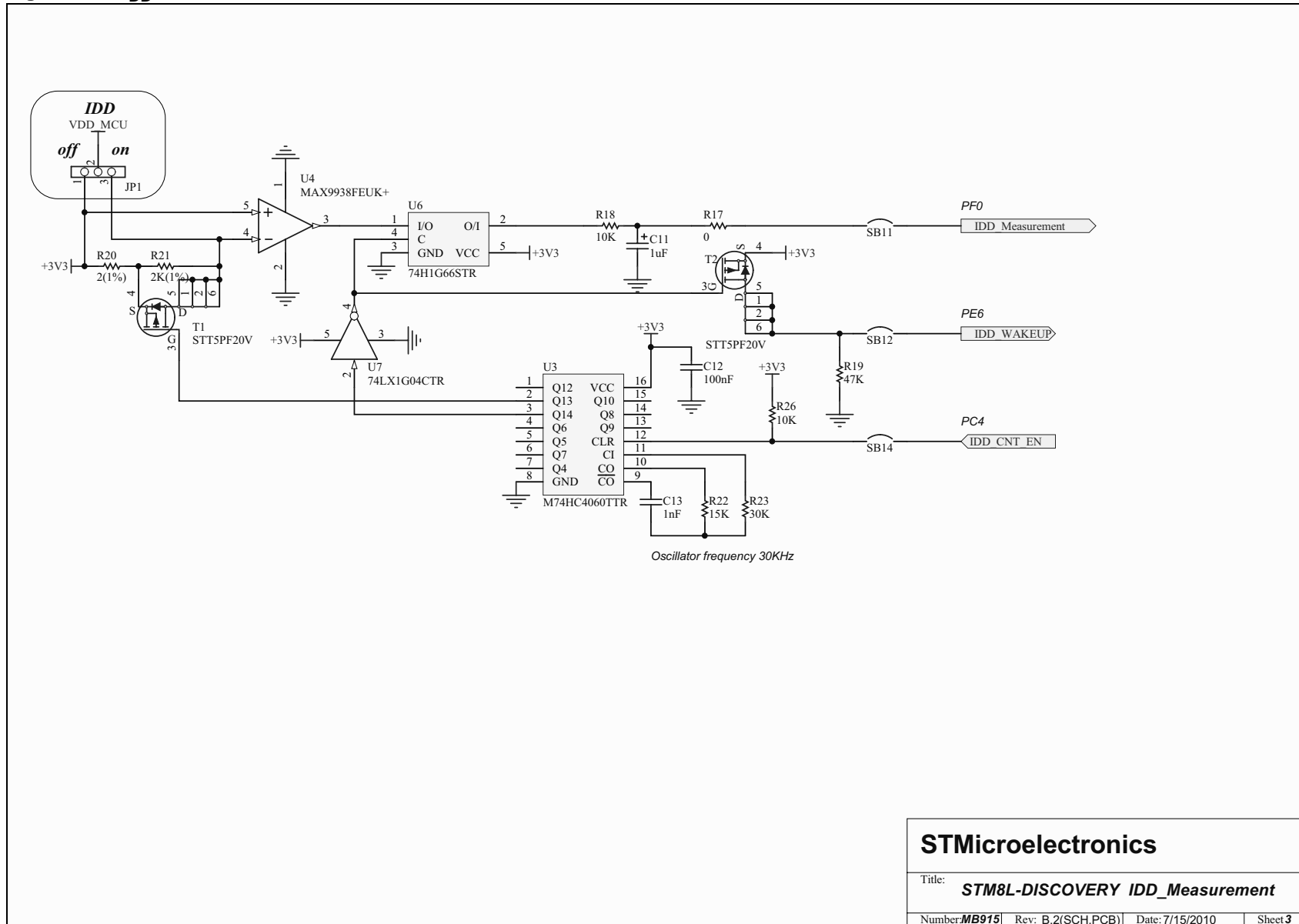
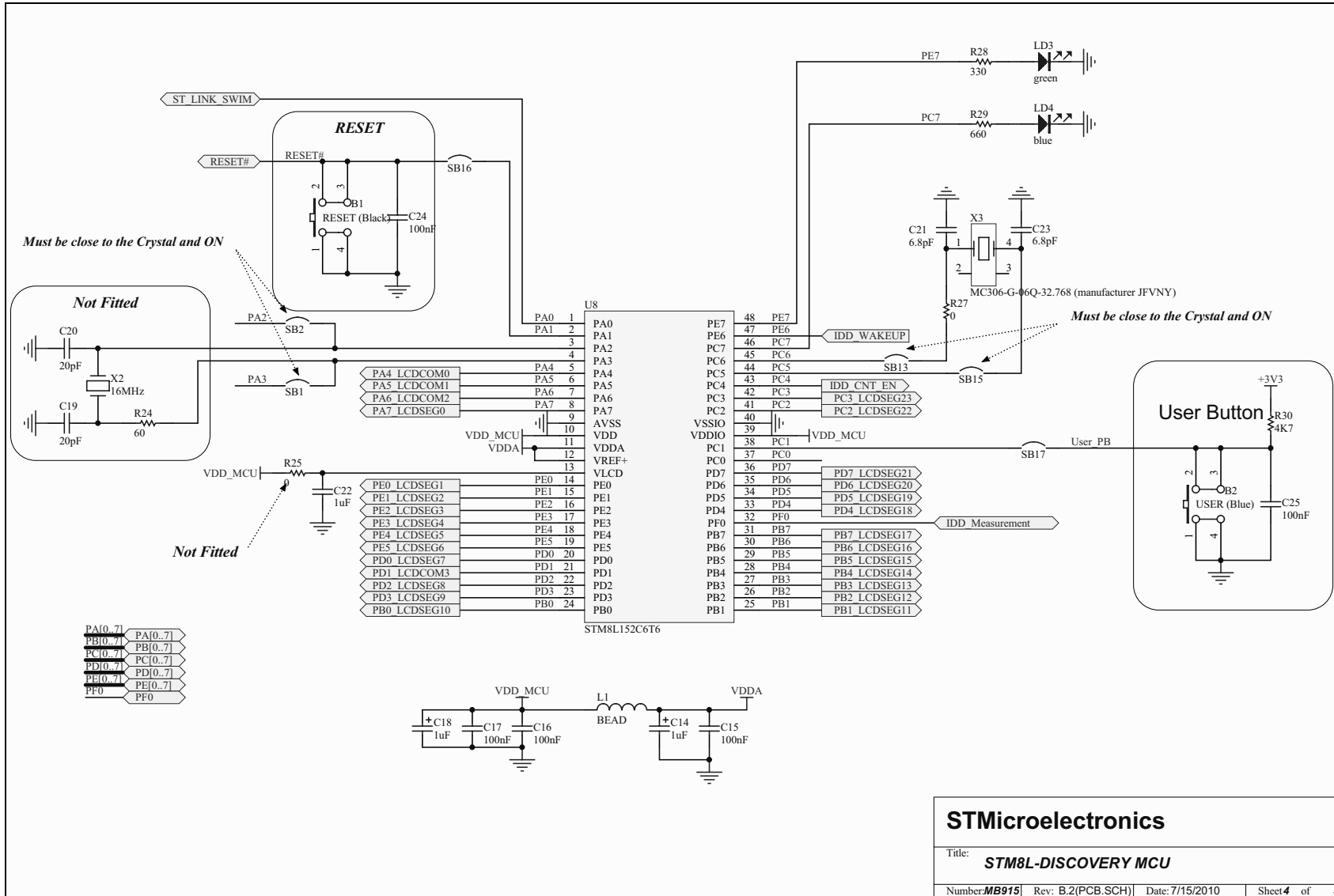


Figure 17. STM8L MCU

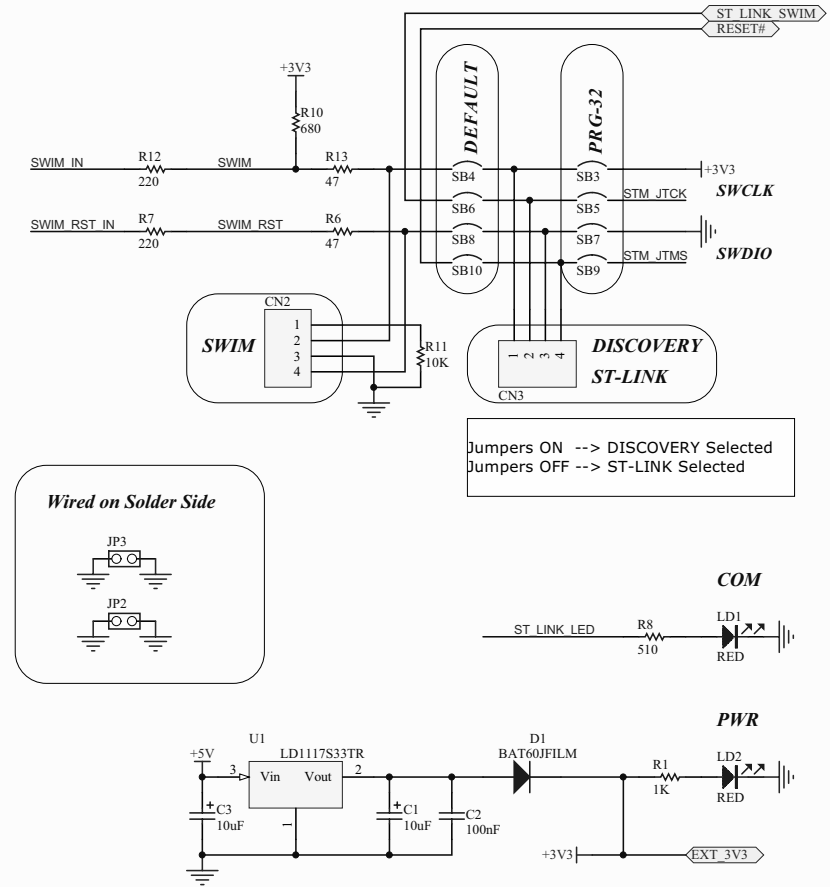
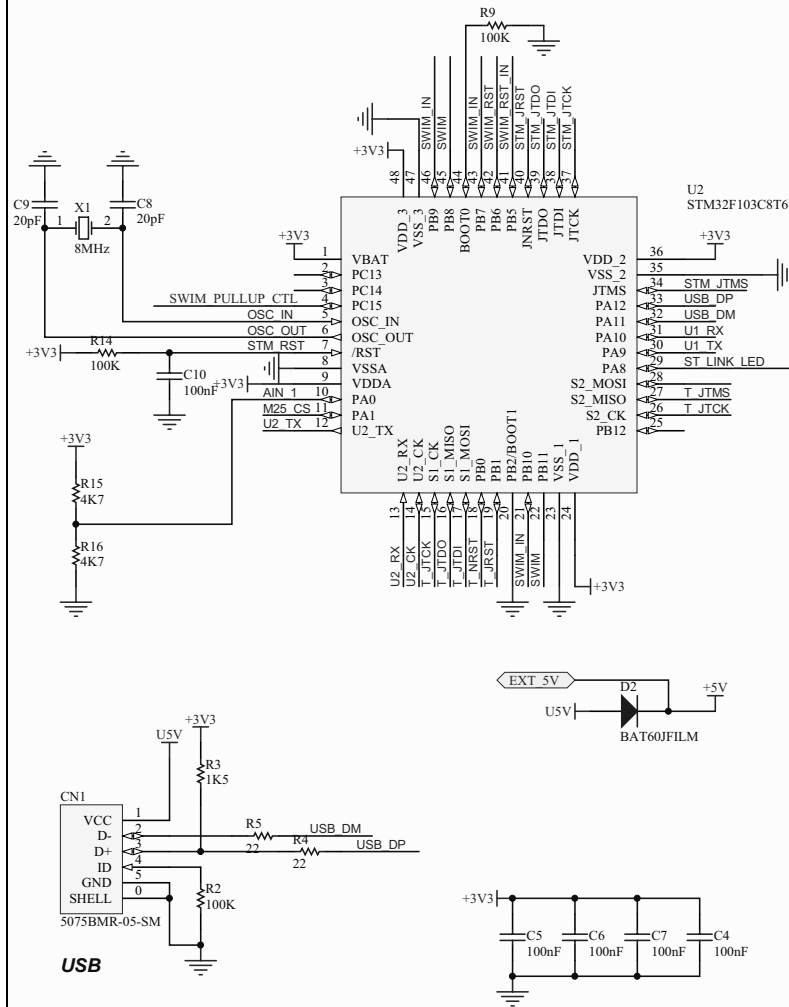


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Figure 18. ST-Link (SWIM only)

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Title: **STM8L-DISCOVERY ST-LINK (SWIM only)**

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7 Revision history

Table 9. Document revision history

Date	Revision	Changes
24-Sep-2010	1	Initial release.
15-Jun-2011	2	Section 5 Mechanical drawing added. Note added to Section 3.3 , measurement range added to Section 3.6.1 and Section 3.6.2 .

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