UM1482
User Manual

STM8SVLDISCOVERY
STM8S value line discovery

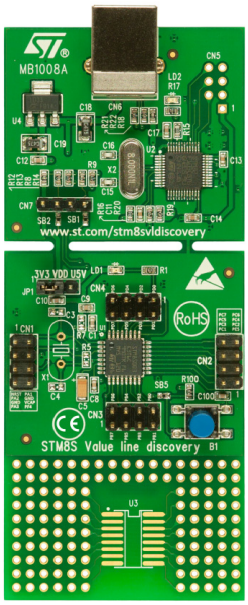
Introduction

The STM8SVLDISCOVERY is a quick start evaluation kit which helps you to discover the STM8S value line features, and to develop your own application. It is based on an STM8S003 and includes an embedded debugger, ST-LINK, and a user button. Numerous applications are available from www.st.com/stm8svldiscovery.

Features

- STM8S003K3T6 microcontroller, 8 KB Flash, 1 KB RAM, 128 bytes EEPROM
- Powered by USB cable between PC and STM8SVLDISCOVERY
- Selectable power of 5 V or 3.3 V
- Push button, B1
- User LED, LD1
- Extension header for all I/Os
- Wrapping area for users own application
- Embedded ST-LINK for STM8S
- USB interface for programming and debugging
- SWIM debug support

Figure 1. STM8SVLDISCOVERY evaluation board



Contents

1 Quick start 5

2 Hardware and layout 6

2.1 STM8S003K3T6 microcontroller 8

2.2 ST-LINK 10

2.2.1 Using the ST-LINK 10

2.2.2 Using the ST-LINK on other STM8S applications 10

2.3 Power supply and power selection 12

2.4 LEDs 12

2.5 Push button 12

3 Daughterboard connection 13

4 Mechanical drawing 15

5 Electrical schematics 16

6 Revision history 19

List of tables

Table 1. SWIM connector CN7 11
Table 2. CN1 pinout 13
Table 3. CN2 pinout 13
Table 4. CN3 pinout 14
Table 5. CN4 pinout 14
Table 6. Document revision history 19

List of figures

Figure 1. STM8SVLDISCOVERY evaluation board . . . 1
Figure 2. Hardware block diagram . . . 6
Figure 3. Top layout . . . 7
Figure 4. STM8S003K3T6 package . . . 8
Figure 5. STM8S003 block diagram . . . 9
Figure 6. Typical configuration . . . 10
Figure 7. ST-LINK without breaking the PCB . . . 10
Figure 8. Separated ST-LINK module . . . 11
Figure 9. Power selection . . . 12
Figure 10. STM8SVLDISCOVERY mechanical drawing . . . 15
Figure 11. STM8SVLDISCOVERY . . . 16
Figure 12. STM8SVLDISCOVERY MCU . . . 17
Figure 13. STM8SVLDISCOVERY ST-LINK (SWIM only) . . . 18

1 Quick start

It is very simple to get started using the STM8SVLDISCOVERY, just follow these four steps:

1. Connect the STM8SVLDISCOVERY to a PC with a USB cable.
2. Press the B1 button, and observe LED LD1 blinking.
3. Press the B1 button to change blinking speed.
4. Visit *www.st.com/stm8svldiscovery* and follow the tutorial, then discover other applications.

You can discover more of the STM8S features by downloading and executing the proposed programs in the project list.

*Note: The software code corresponding to this application is available under the name **Discover (AN3996)** in the project list of the STM8SVLDISCOVERY web page.*

2 Hardware and layout

The STM8SVLDISCOVERY is designed around the STM8S003K3T6 microcontroller in an LQFP32 package. It has two distinct sections that may be separated, the STM8S003K3T6 module and the ST-LINK module.

Figure 2 illustrates the connections between the STM8S003K3T6 and its peripherals (ST-LINK, user button, LED and connectors).

Figure 3 helps you to locate these features on the STM8SVLDISCOVERY board, as well as the potential point of separation (for more details refer to *Section 2.2.2: Using the ST-LINK on other STM8S applications*).

Figure 2. Hardware block diagram

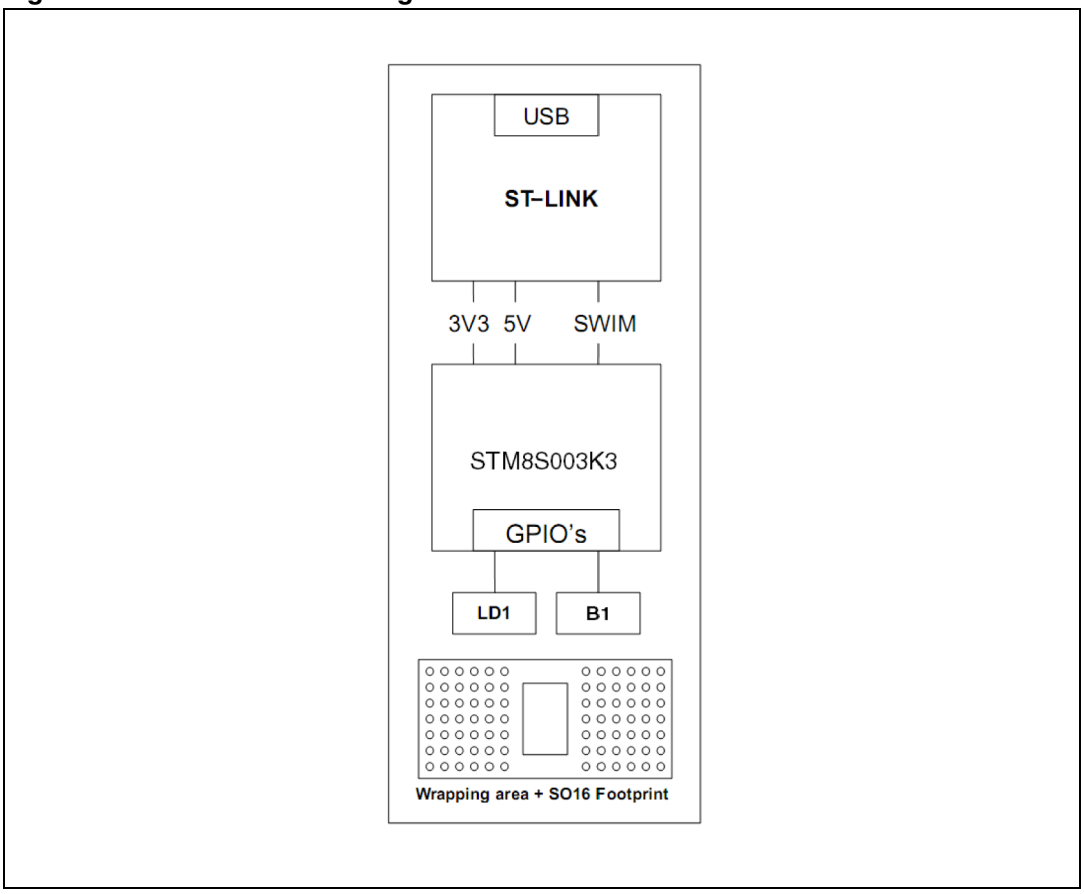
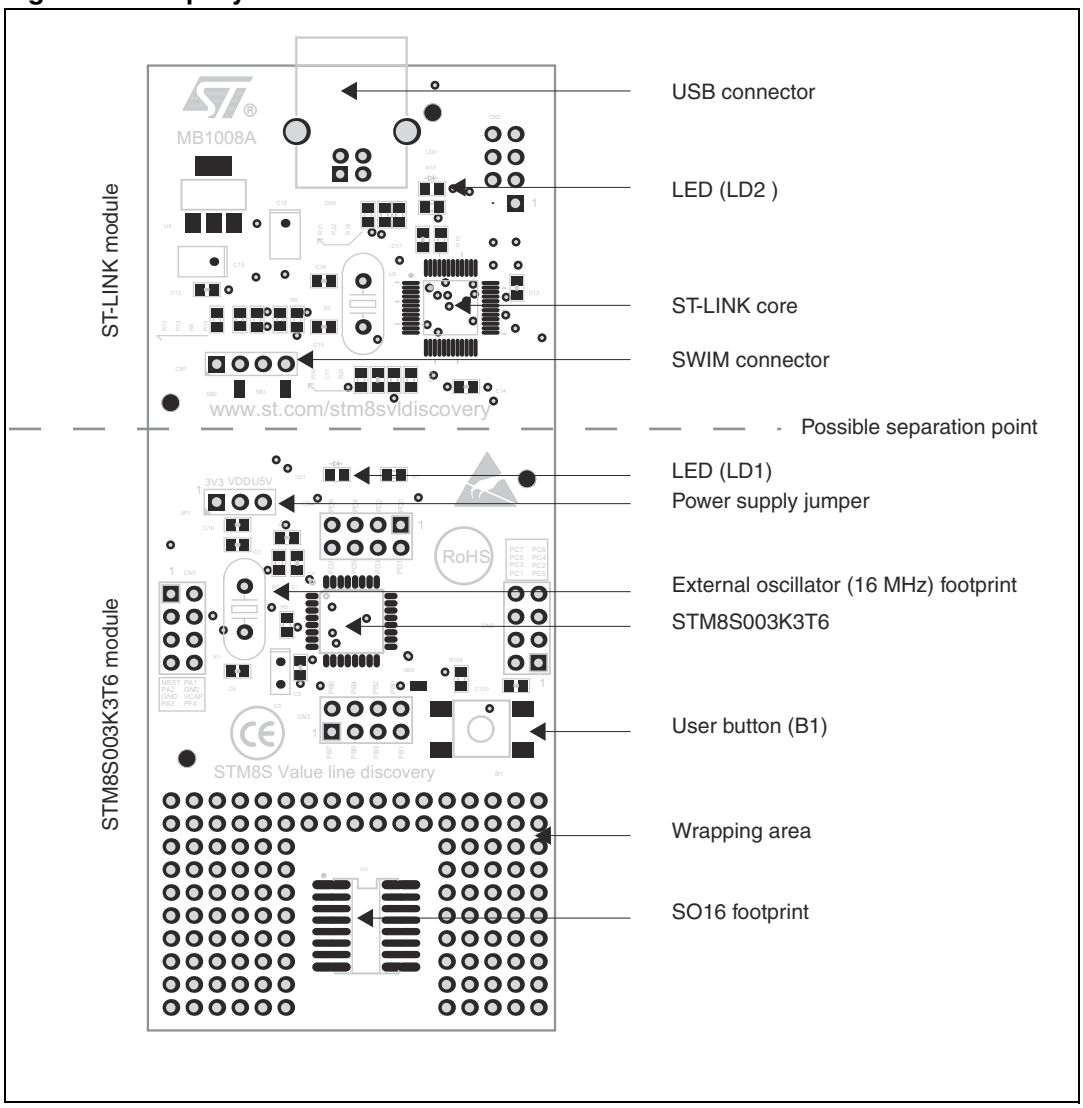
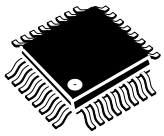


Figure 3. Top layout



2.1 STM8S003K3T6 microcontroller

Figure 4. STM8S003K3T6 package



LQFP32 7x7

The STM8S003K3T6 8-bit microcontroller offers:
- 8 Kbytes of Flash program memory
- 128 bytes data EEPROM
- 1 Kbyte RAM

MS30010V1

This device provides the following key features:

- High-performance proprietary 8-bit core with excellent code density
- Innovative design architecture, 16-bit index registers, 32-bit memory interface and 3-stage pipeline
- Leading-edge embedded Flash memory technology
- Advanced clock controller to optimize power consumption and noise control
- Large set of embedded peripherals: UART, I²C, SPI, timers, analog, and debugging function

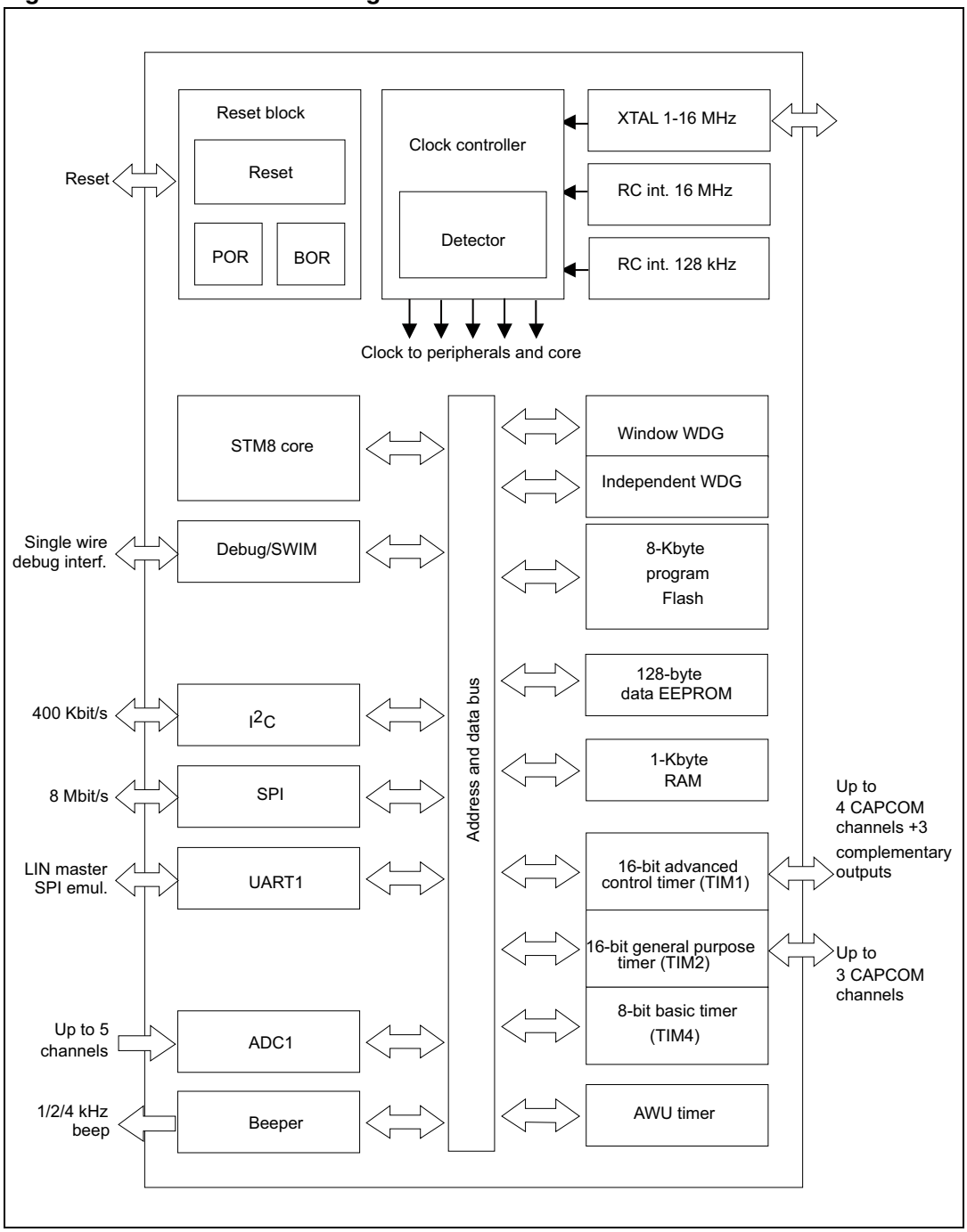
These features provide the following benefits:

- Cost efficiency based on optimized product manufacturing flow
- Lower system cost with embedded peripherals
- Full compatibility with existing STM8S product portfolio
- Efficient power management
- Easy-to-use, non-intrusive, and low-cost development environment

It is particularly suitable for applications such as:

- Consumer electronics
- Large-volume industrial equipment
- PC peripherals
- All mass market electronics

Figure 5. STM8S003 block diagram



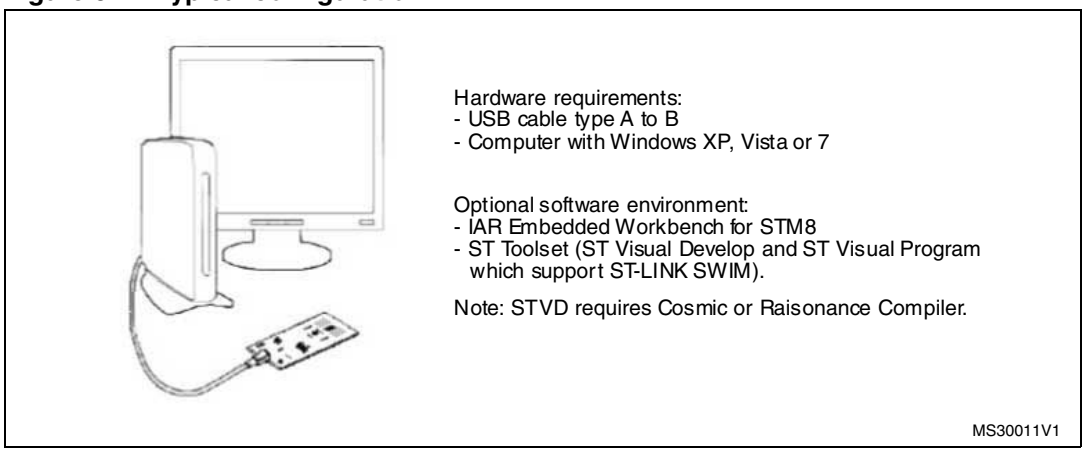
For more information see the STM8S003xx datasheet (Doc ID 018576) on the ST website.

2.2 ST-LINK

The ST-LINK provides a USB interface for programming and debugging using a single wire interface module (SWIM). The ST-LINK module of the STM8SVLDISCOVERY also supplies 5 V and 3.3 V to the STM8S003K3T6 module.

2.2.1 Using the ST-LINK

Figure 6. Typical configuration



Note: The driver for ST-LINK is installed automatically when the USB is connected.

For information about debugging and programming features refer to ST-LINK, STVD, STVP and SWIM on www.st.com.

2.2.2 Using the ST-LINK on other STM8S applications

You can connect your ST-LINK to other STM8S applications in 2 ways:

- By removing the solder bridges: This way uses the ST-LINK without breaking the PCB. Unsolder the two solder bridges SB1 and SB2 under the SWIM connector. See *Figure 7*. You can re-solder the two bridges at a later date thus keeping the STM8SVLDISCOVERY usable.
- By breaking the board and removing the ST-LINK: This way constitutes a good alternative to programming the STM8S devices in other applications. See *Figure 8*.

Note: This ST-LINK only supports the STM8S family. Do not use it with other STM8 families.

Figure 7. ST-LINK without breaking the PCB

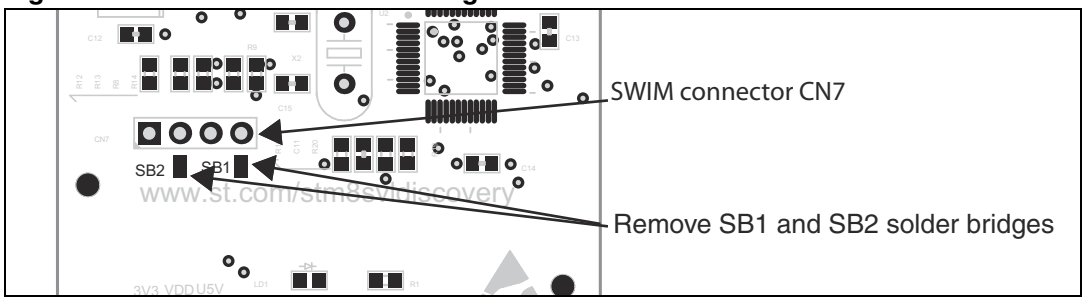
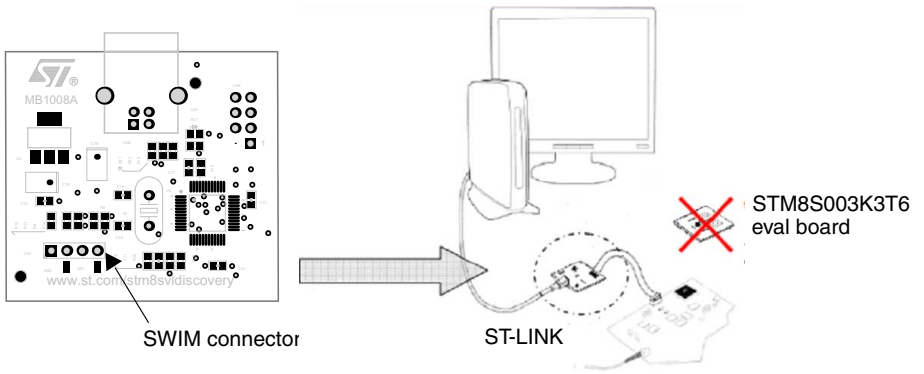


Figure 8. Separated ST-LINK module



Warning: **By removing this module you will lose power supply on the STM8S003K3T6 evaluation board. Consequently, you will need a SWIM cable and an external power supply to program and use the STM8S003K3T6 board.**
To reconnect your STM8S003K3T6 use connector CN7 see *Table 1*.

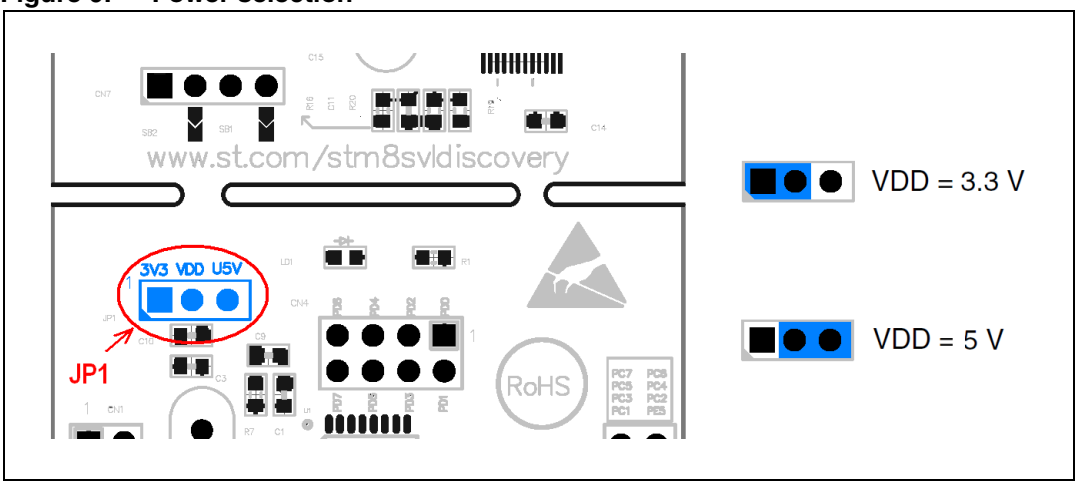
Table 1. SWIM connector CN7

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

2.3 Power supply and power selection

The power supply is provided by a USB connector. Jumper JP1 selects the VDD value (5 V or regulated 3.3 V) see *Figure 9*.

Figure 9. Power selection



2.4 LEDs

The ST-LINK provides two LEDs:

- LD1: Green LED LD1 is connected to the I/O PD0 of STM8S003K3.
- LD2: Red LED LD2 indicates communication between PC and ST-LINK.

2.5 Push button

Push button B1 is connected to the I/O PB7 of STM8S003K3.

3 Daughterboard connection

Four 12-pin male headers CN1, CN2, CN3 and CN4 are connected to the STM8S003K3T6 microcontroller.

See the following tables for pin assignments.

Table 2. CN1 pinout

CN1 pin	Pin (chip)	Pin name	Type	Main function	Alternate function
1	1	NRST	I/O	Reset	
2	2	OSCIN/PA1	I/O	Port A1	
3	3	OSCOUT/PA2	I/O	Port A2	
4	4	GND	S	Digital ground	
5	4	GND	S	Digital ground	
6	5	VCAP	S	1.8 V regulator capacitor	
NC	6	VDD	S	Digital power supply	
7	7	PA3	I/O	Port A3	Timer 2 - channel 3 / SPI master slave
8	8	PF4	I/O	Port F4	

Table 3. CN2 pinout

CN2 pin	Pin (chip)	Pin name	Type	Main function	Alternate function
1	17	PE5	I/O	Port E5	SPI master slave
2	18	PC1	I/O	Port C1	Timer 1 - channel 1 / UART2 synchronous clock
3	19	PC2	I/O	Port C2	Timer 1 - channel 2
4	20	PC3	I/O	Port C3	Timer 1 - channel 3
5	21	PC4	I/O	Port C4	Timer 1 - channel 4
6	22	PC5	I/O	Port C5	SPI clock
7	23	PC6	I/O	Port C6	SPI master out / slave in
8	24	PC7	I/O	Port C7	SPI master in / slave out

Table 4. CN3 pinout

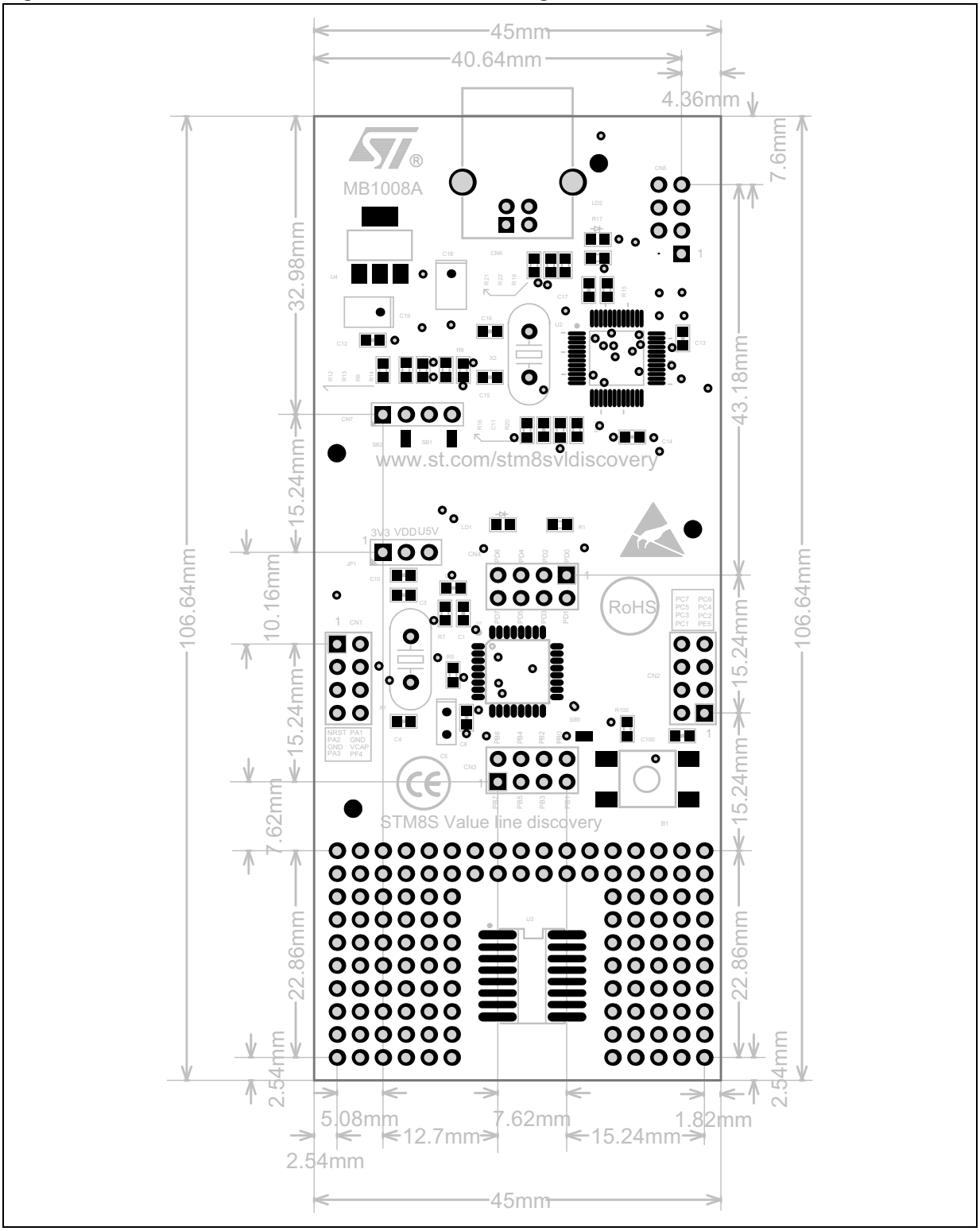
CN3 in	Pin (chip)	Pin name	Type	Main function	Alternate function
1	9	PB7/B1	IO	Port B7	
2	10	PB6	IO	Port B6	
3	11	PB5	I/O	Port B5	I2C data
4	12	PB4	I/O	Port B4	I2C clock
5	13	PB3	I/O	Port B3	Analog input 3 / Timer 1 external trigger
6	14	PB2	I/O	Port B2	Analog input 2 / Timer 1 inverted channel 3
7	15	PB1	I/O	Port B1	Analog input 1 / Timer 1 inverted channel 2
8	16	PB0	I/O	Port B0	Analog input 0 / Timer 1 inverted channel 1

Table 5. CN4 pinout

CN4 pin	Pin (chip)	Pin name	Type	Main function	Alternate function
1	25	PD0/LD1	I/O	Port D0	Timer 1 - break input / configurable clock output
2	26	PD1/SWIM	I/O	Port D1	SWIM data interface
3	27	PD2	I/O	Port D2	Timer 2 - channel 3
4	28	PD3	I/O	Port D3	Timer 2 - channel 2 / ADC external trigger
5	29	PD4	I/O	Port D4	Timer 2 - channel 1 / BEEP output
6	30	PD5	I/O	Port D5	UART1 data transmit
7	31	PD6	I/O	Port D6	UART1 data receive
8	32	PD7	I/O	Port D7	Top level interrupt / Timer 1 - channel 4

4 Mechanical drawing

Figure 10. STM8SVLDISCOVERY mechanical drawing



5 Electrical schematics

Figure 11. STM8SVLDISCOVERY

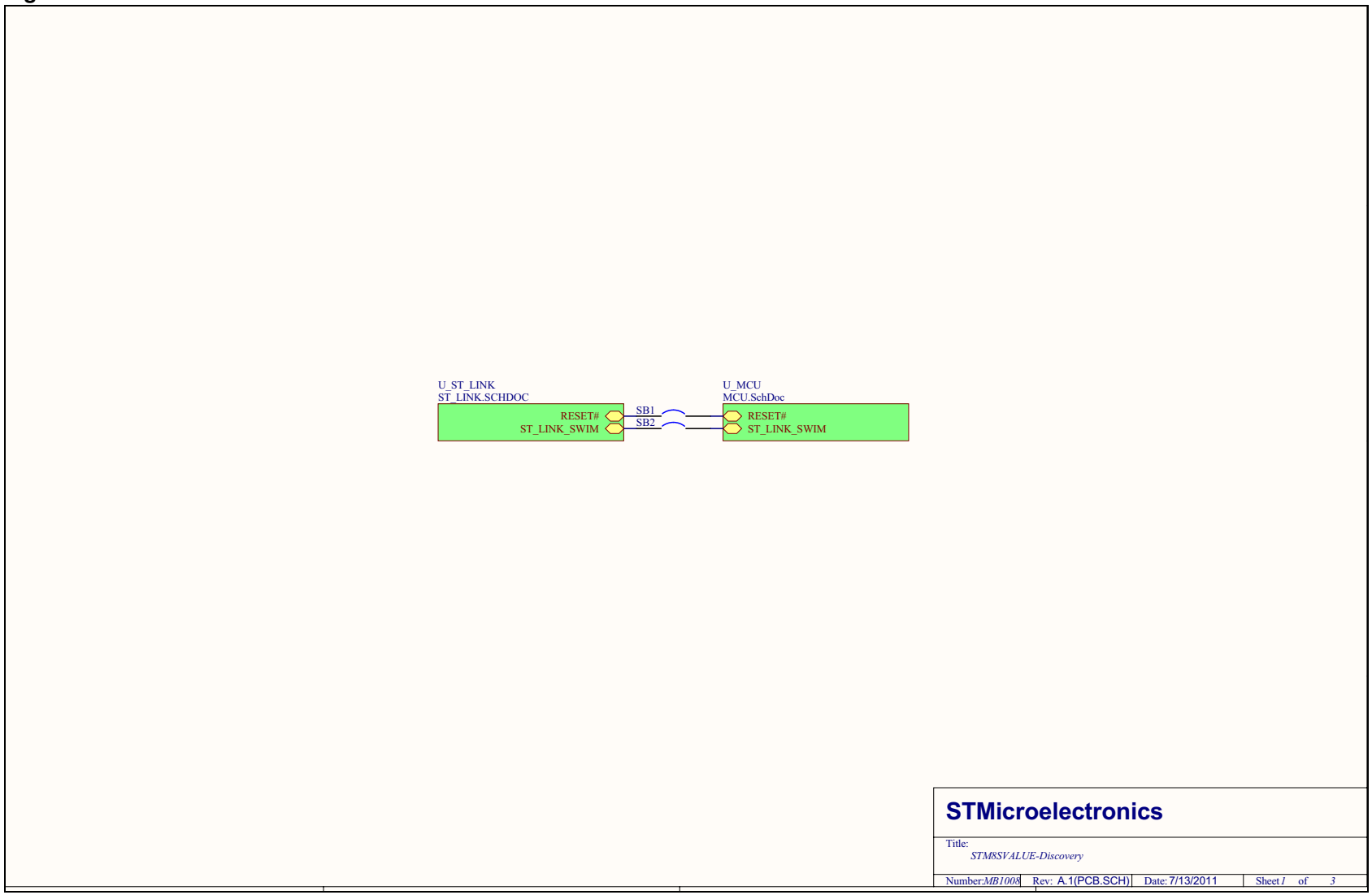


Figure 12. STM8SVLDISCOVERY MCU

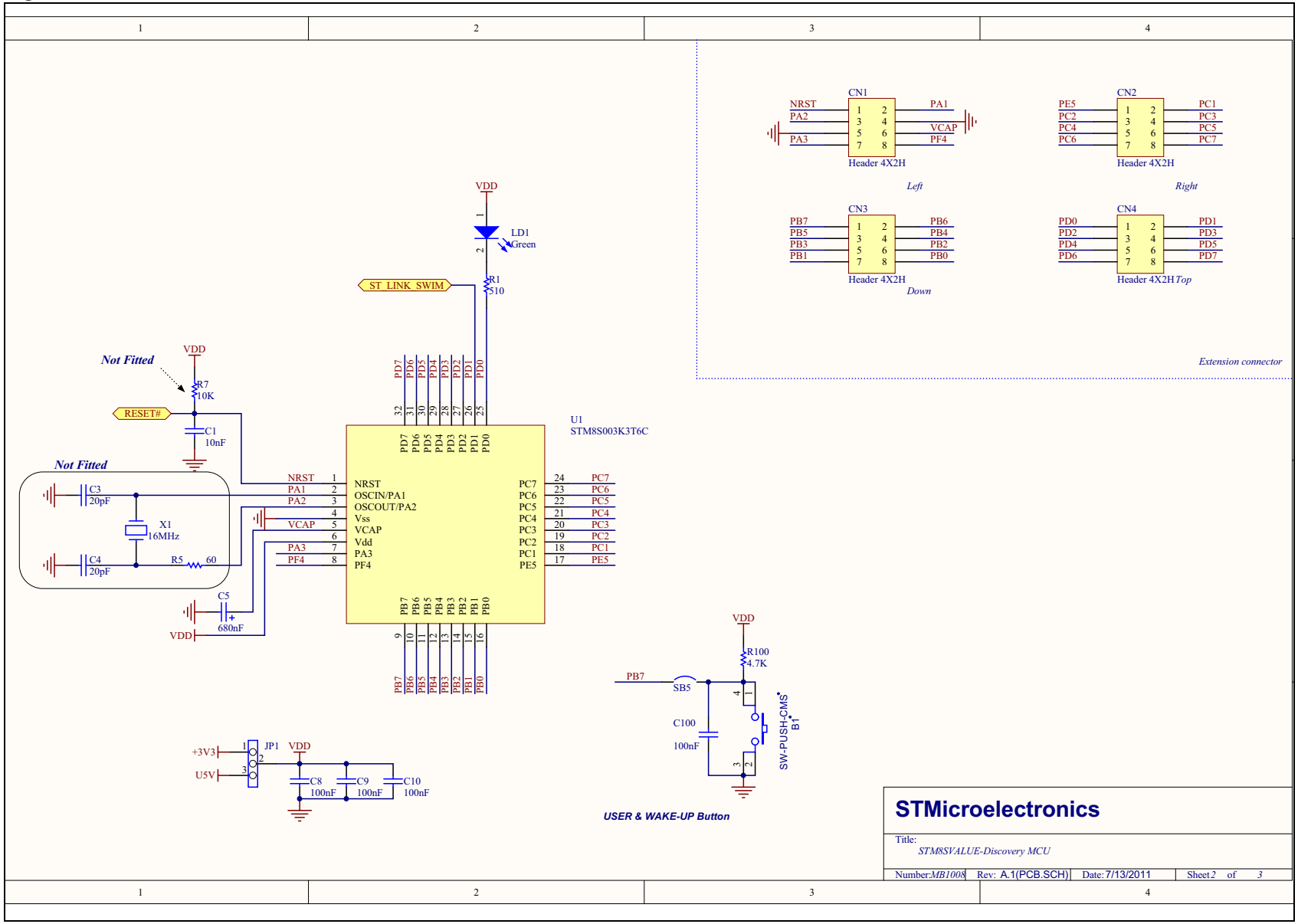
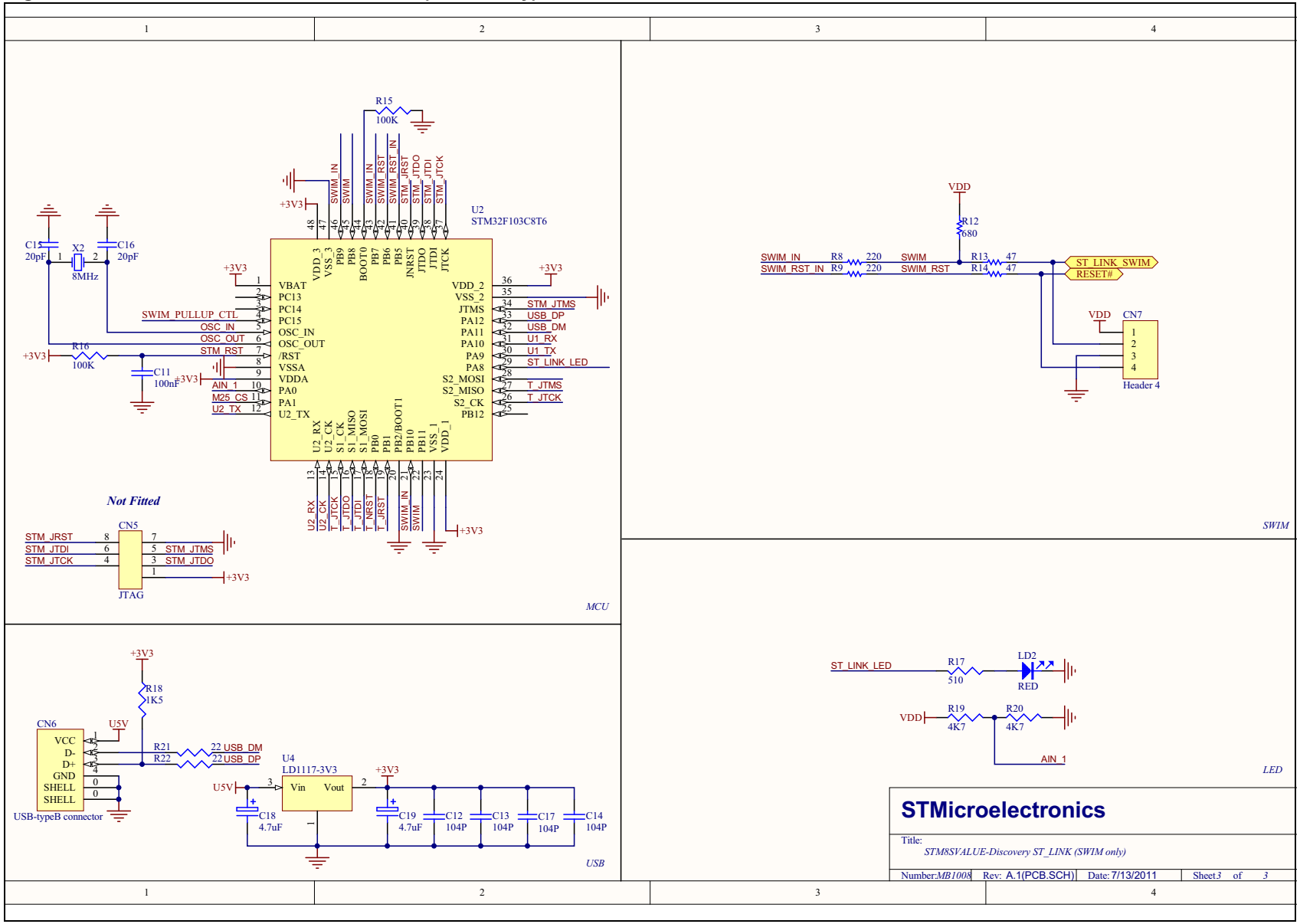


Figure 13. STM8SVLDISCOVERY ST-LINK (SWIM only)



6 Revision history

Table 6. Document revision history

Date	Revision	Changes
18-Nov-2011	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2011 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com