

NB-IoT evaluation platform and reference design for asset tracking, smart cities, and metering with ST87M01



Features

- Multisensing wireless platform with cellular connectivity
- Ultracompact, low-power NB-IoT industrial module series with GNSS capability (ST87M01)
- Compact design with embedded antennas
 - Custom PCB antenna for NB-IoT connectivity optimized for bands 3, 8 and 20
 - Chip antenna for GPS (Ignion NN03-320)
- Nano-SIM card socket
- Ultralow power Arm Cortex®-M33 with FPU and TrustZone® at 160 MHz, 2048 Kbytes flash memory (STM32U585RI)
- Ultra low-power 32 Mbit serial SPI page EEPROM (M95P32-I)
- Sensors:
 - Ultralow power 3-axis smart accelerometer (LIS2DUXS12)
 - Low-power and high-precision MEMS nano pressure sensor: 260-1260 hPa absolute digital output barometer (LPS22DF)
 - Temperature and humidity sensor (SHT40-AD1B)
- Expandable via 34-pin FPC connector
- Other components:
 - LiPo battery 480 mAh
 - Plastic box
 - Ready to use SIM-Card

Description

The **STEVAL-NBIOTV1** is a compact, battery-powered evaluation platform and reference design tailored for asset tracking, smart city applications, and metering. Unlike typical reference designs that focus on a single component, the **STEVAL-NBIOTV1** integrates multiple key elements: the **ST87M01** ultracompact, low-power NB-IoT industrial module featuring additional ADC, GNSS, and Wi-Fi positioning capabilities; the **STM32U585RI** microcontroller; onboard sensors; and extra memory via a 32 Mbit serial SPI page EEPROM.

This all-in-one integration enables rapid IoT application development without requiring external add-ons or additional hardware.

An example application code is provided to optimize low-power operation and accelerate time-to-market.

Connectivity and location-based services are powered by the **ST87M01** narrowband IoT (NB-IoT) and GNSS module.

Multiple communication interfaces are supported, including UART, I²C, and SPI. Efficient power management and data storage components are integrated, and an expansion connector allows easy addition of further functionalities.

Please note, the board does not include an STM32 debugger/programmer; a compatible debugger can be purchased separately. The recommended part numbers are **STLINK-V3MINIE** or, alternatively, **STLINK-V3SET**.

Product summary	
NB-IoT evaluation platform and reference design for asset tracking, smart cities, and metering with ST87M01	STEVAL-NBIOTV1
Software examples for STEVAL-NBIOTV1	STSW-NBIOTV1
Ultra-compact, low-power narrowband (NB-IoT) industrial module series with GNSS capability	ST87M01-1301
Ultra-low-power with FPU Arm Cortex-M33 MCU with TrustZone, 160 MHz with 2 Mbytes of Flash memory	STM32U585RIT6
Applications	Metering IoT for smart industry

1 Block diagram

Figure 1. Block diagram

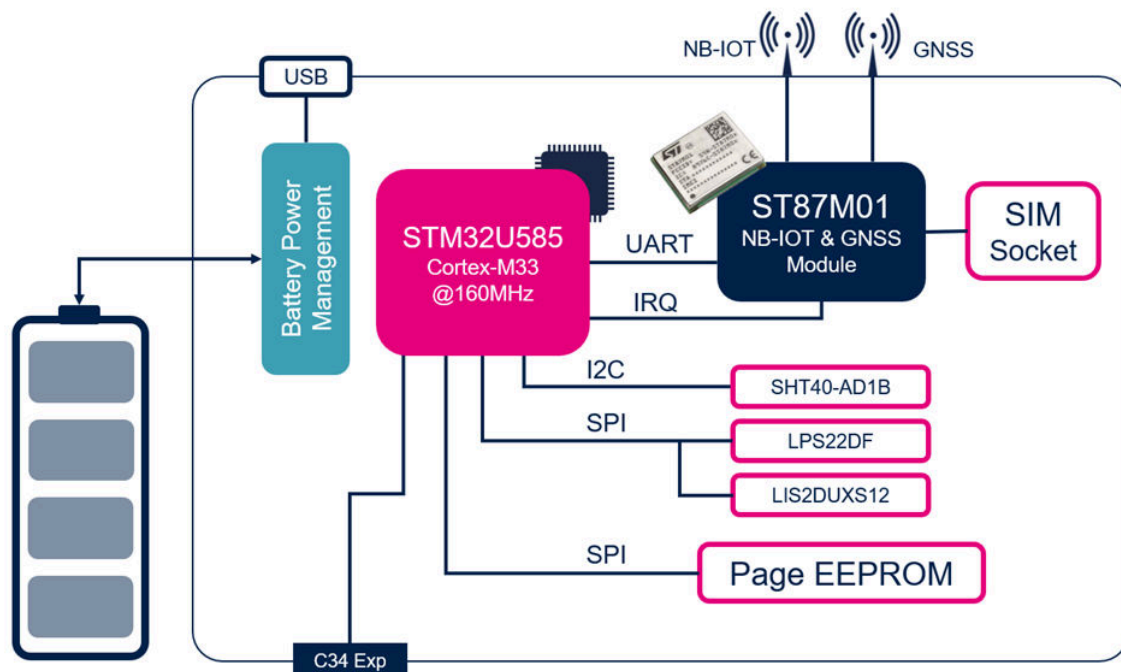
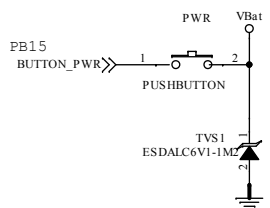
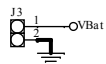
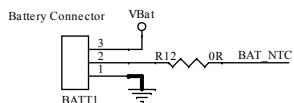
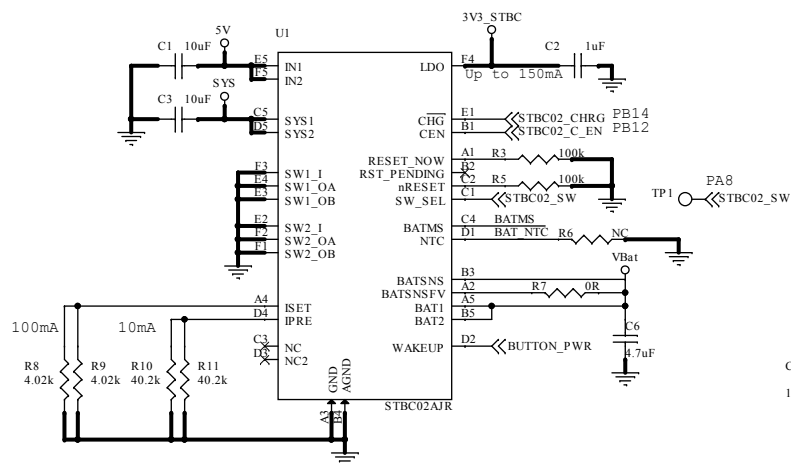
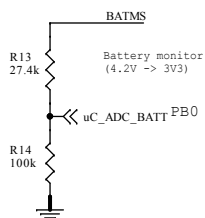
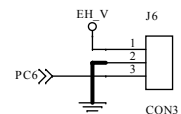


Figure 2. STEVAL-NBIOTV1 circuit schematic (1 of 5)

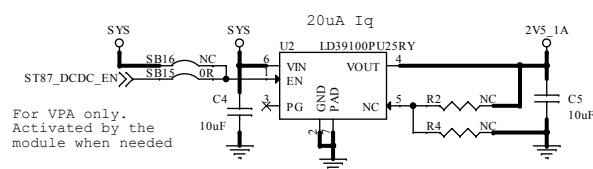
Battery management



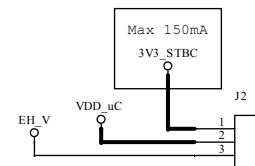
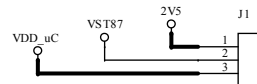
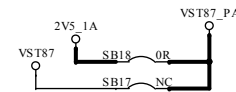
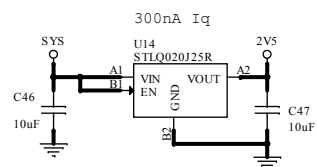
Direct External P.Supply



2V5 LDO (1A)



2V5 LDO (200mA)



P.Supply config	J1	J2	SB15/SB16	SB17/SB18	Description
Default	1-2	1-2	Close/Open	Open/Close	Power supply from Battery/USB/J5. Dual LDO for best power supply performance.
Single LDO	OPEN	1-2	Open/Close	Close/Close	Power supply from Battery/USB/J5. Single LDO for BOM optimization.
Direct external power supply	2-3	2-3	-/-	Close/Open	Direct power supply from CON3 connector Onboard LDOs are not used.
Other configurations are not recommended. Use at your own risk.					

Figure 3. STEVAL-NBIOTV1 circuit schematic (2 of 5)

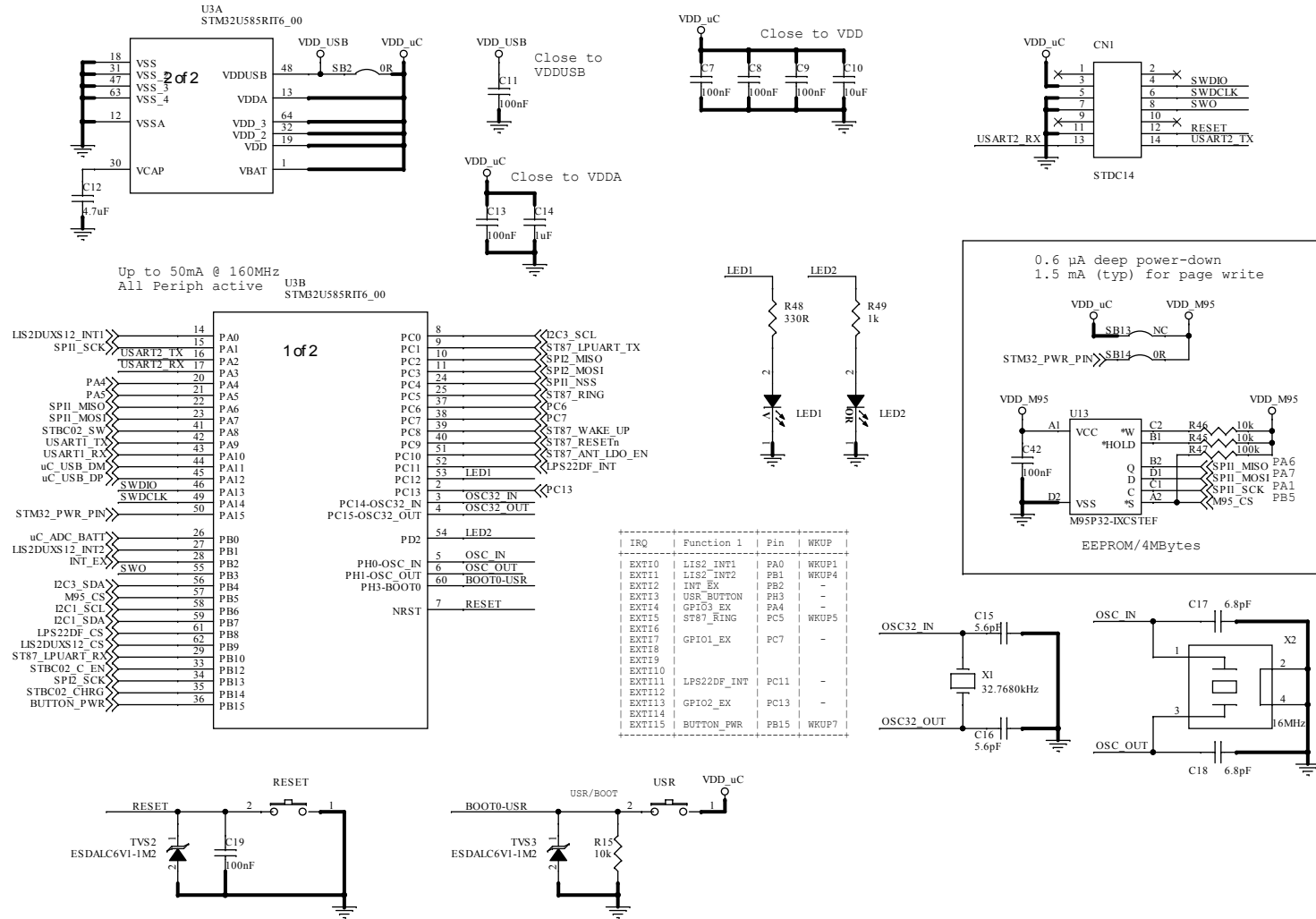


Figure 4. STEVAL-NBIOTV1 circuit schematic (3 of 5)

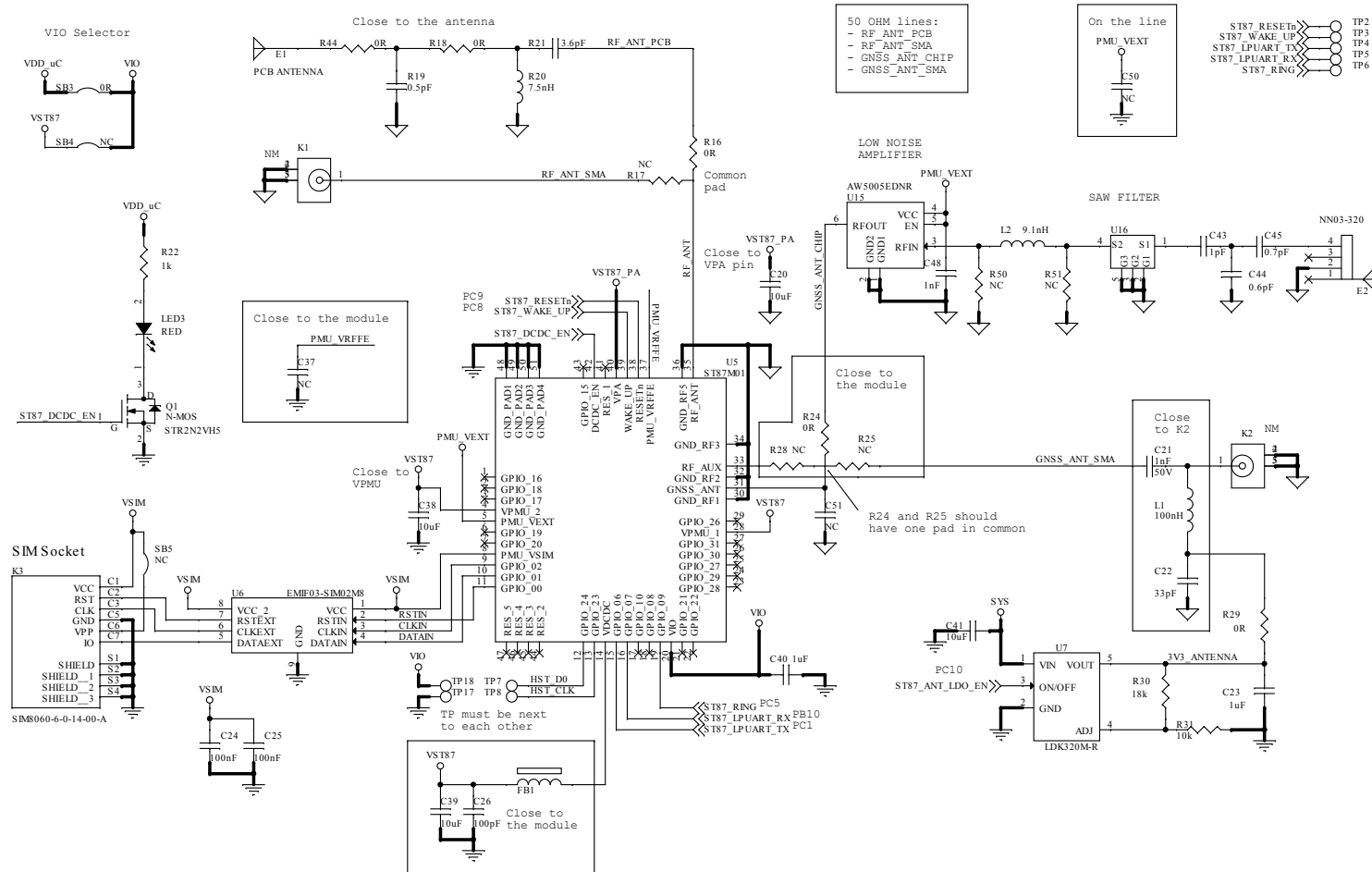


Figure 5. STEVAL-NBIOTV1 circuit schematic (4 of 5)

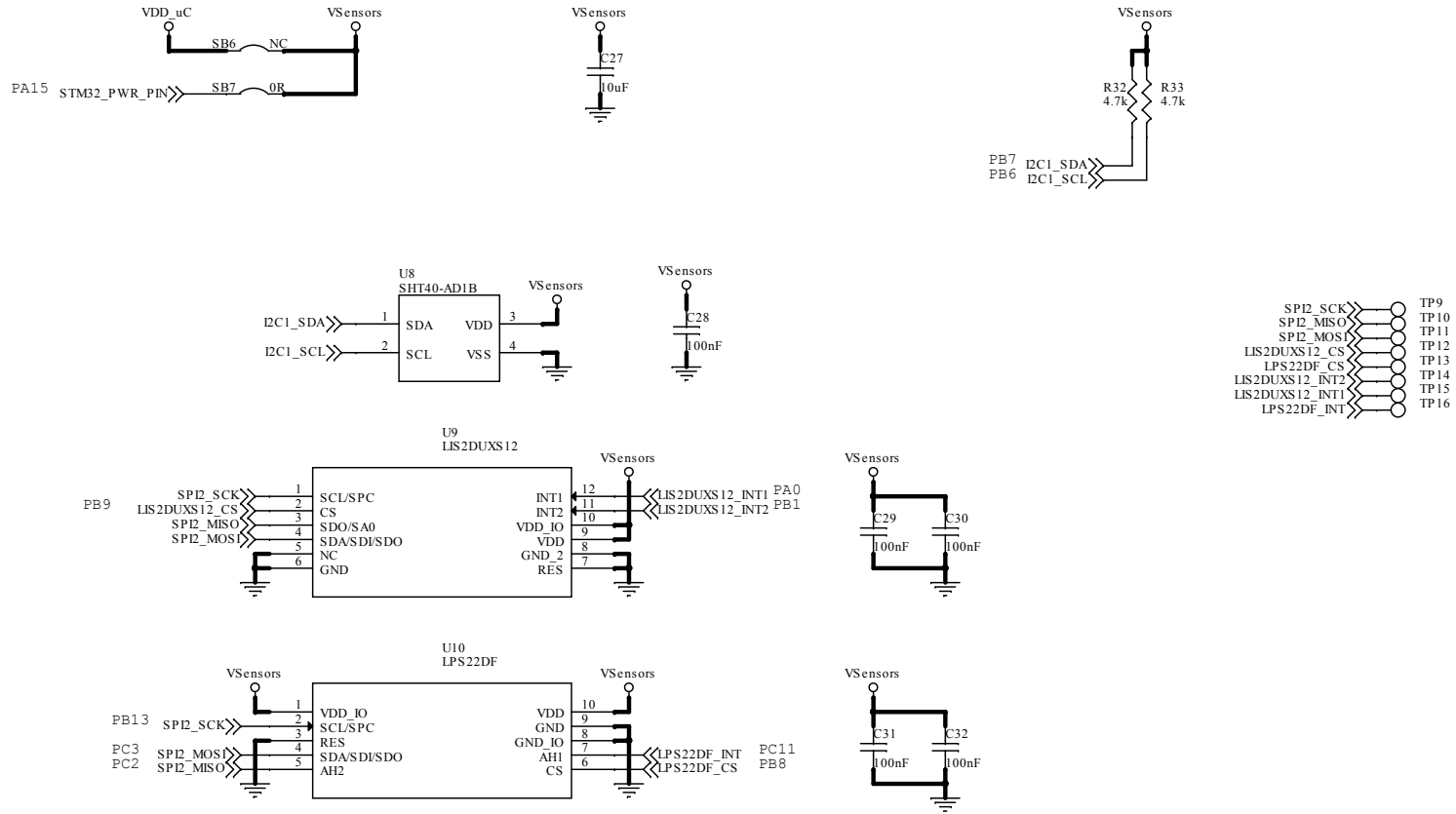
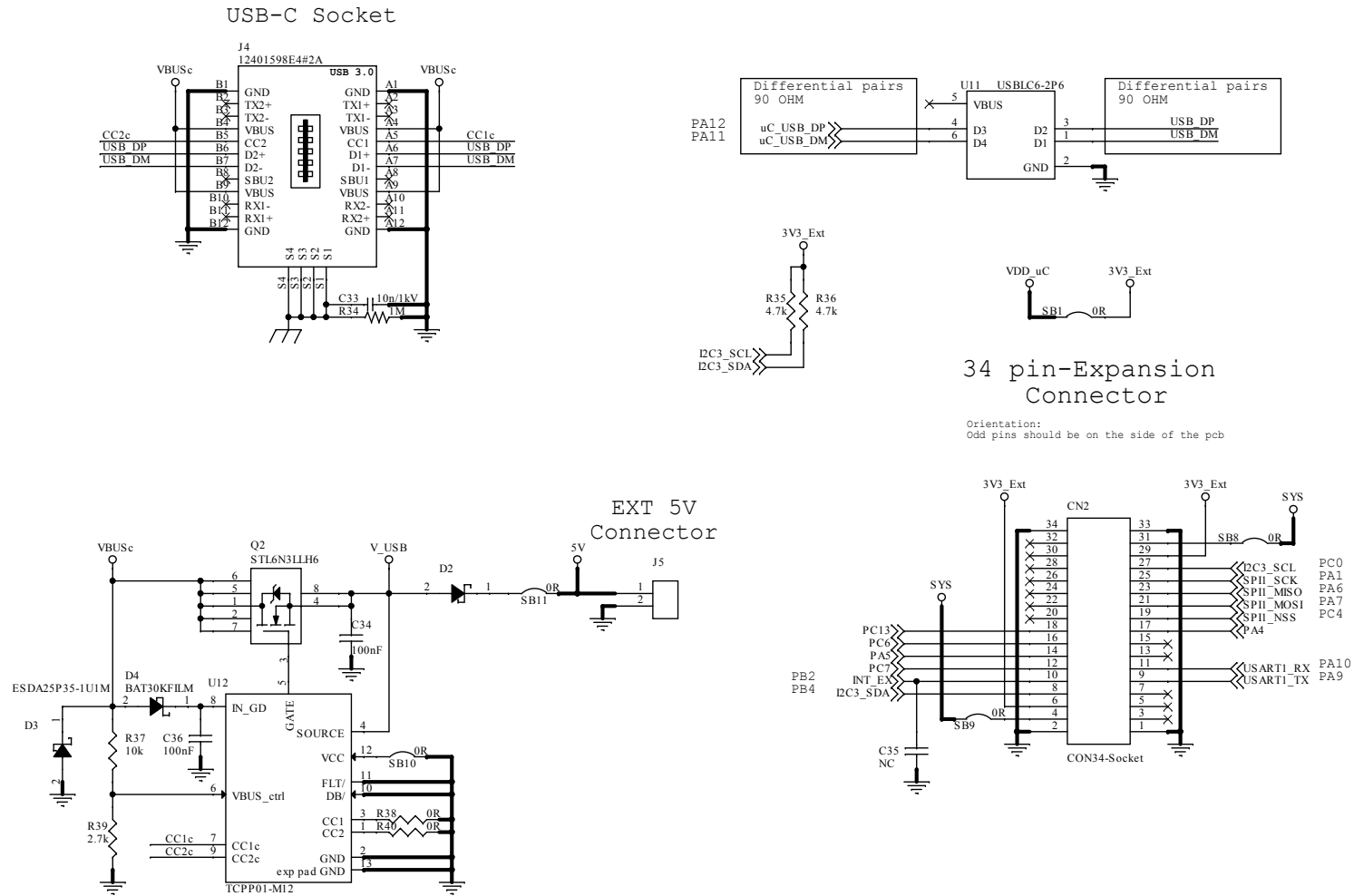


Figure 6. STEVAL-NBIOTV1 circuit schematic (5 of 5)



3 Board versions

Table 1. STEVAL-NBIOTV1 versions

PCB version	Schematic diagrams	Bill of materials
STV\$NBIOTV1A ⁽¹⁾	STV\$NBIOTV1A schematic diagrams	STV\$NBIOTV1A bill of materials

1. This code identifies the STEVAL-NBIOTV1 evaluation board first version. It is printed on the board PCB.

Revision history

Table 2. Document revision history

Date	Revision	Changes
07-Nov-2025	1	Initial release.

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