



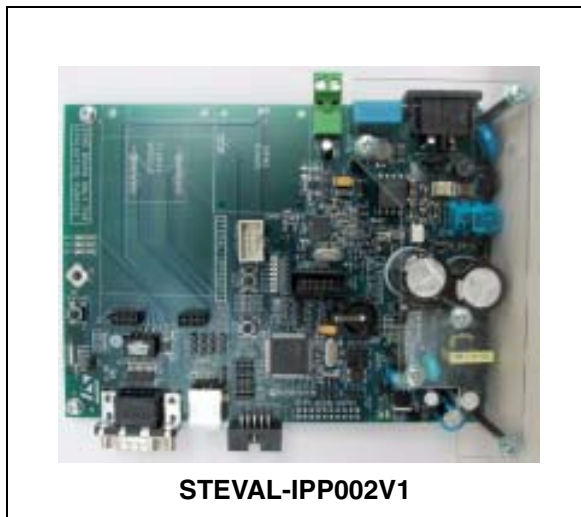
STEVAL-IPP002V1

IEC 61334-5-1 compliant smart meter system for AMI applications
based on STM32, ST7570 PLM, and STPMC1/STPMS1 chipset

Data brief

Features

- Energy measurement by an external metrology board
- S-FSK Power line communication up to 2.4 kbps
- Data communication compliant with DLMS/COSEM specification
- LCD display to show energy consumption information
- USB and RS232/IrDA connectivity
- Optional ZigBee[®] communication capability
- Optional MEMS module support
- Expansion capability for smartcard interface
- RoHS compliant



Description

The STEVAL-IPP002V1 demonstration board can be used as a guideline to designing a typical energy meter board for smart metering applications compliant with the IEC 61334-5-1 standard. It was designed to include advanced features as well as to fit the requirements for next generation energy meters. These extra features can be included in the board by modules for easy customizing.

Figure 2. Energy meter board connector section

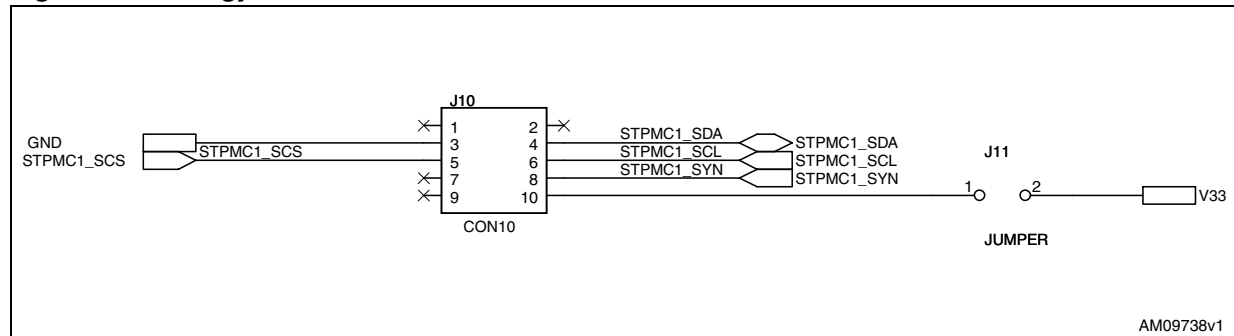


Figure 3. Joystick and LEDs section

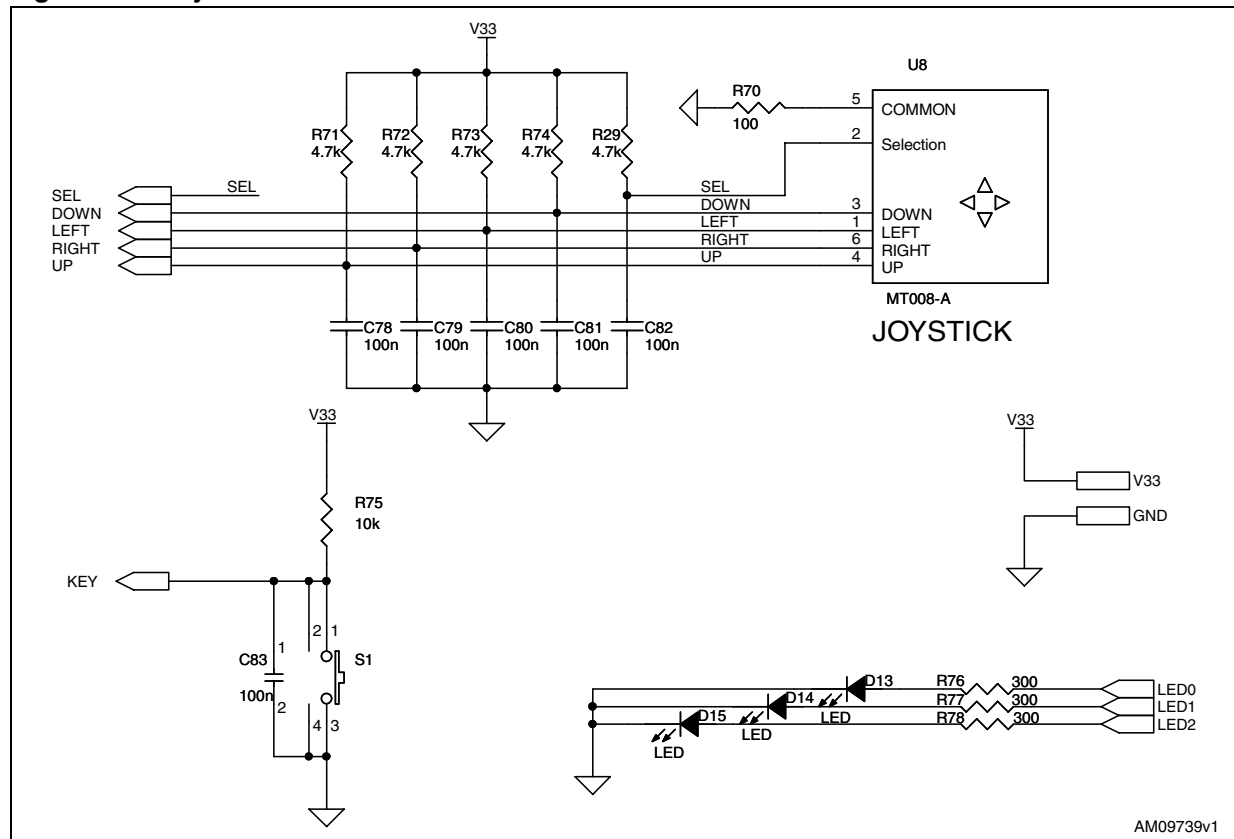


Figure 4. LCD color display connectors

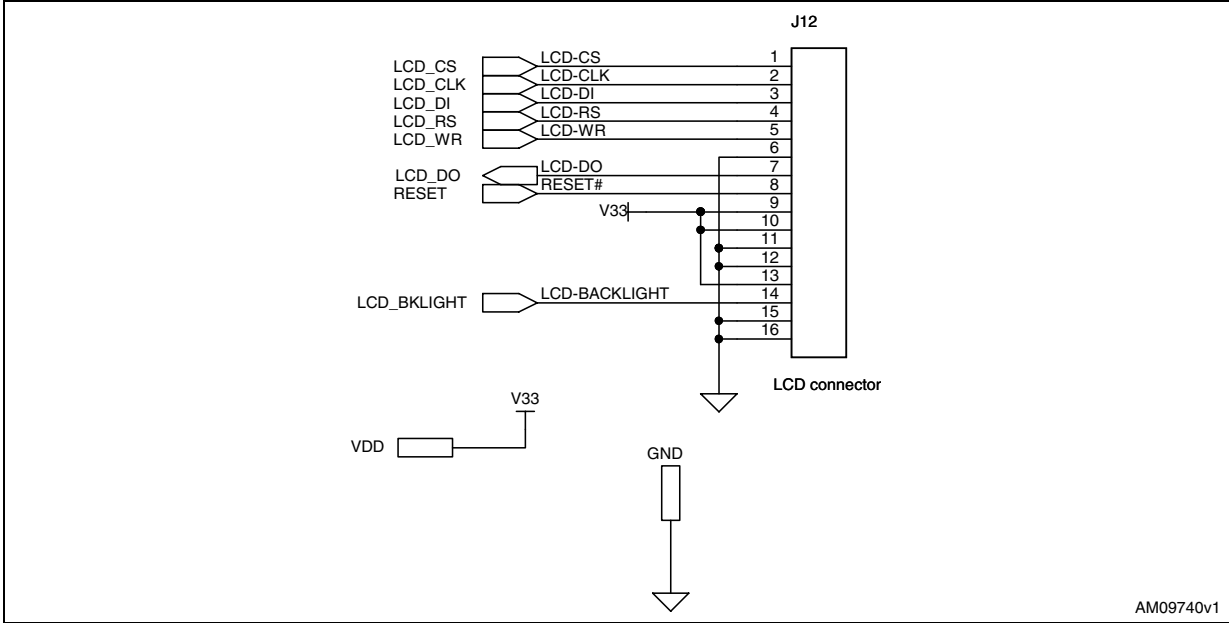


Figure 6. MEMS section

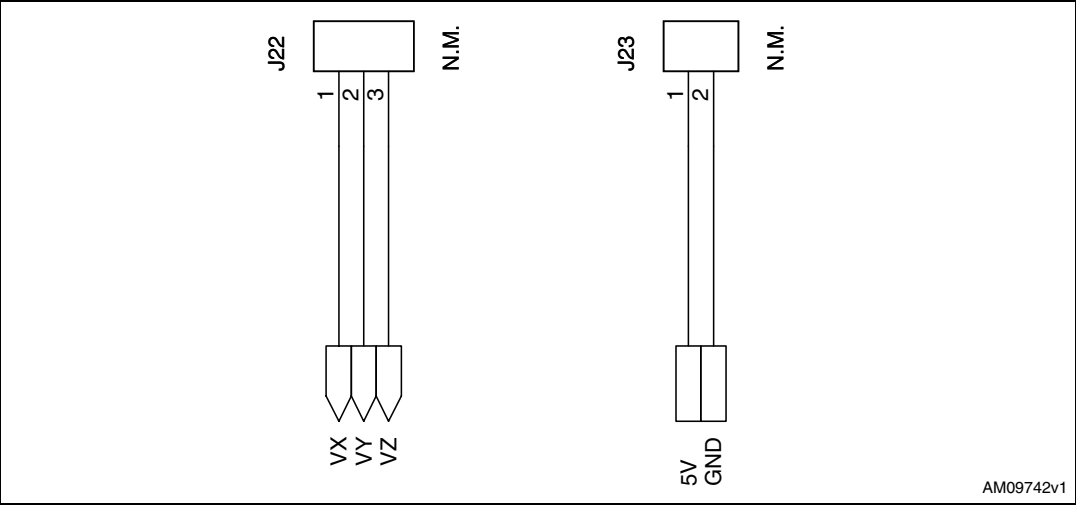


Figure 7. Mode configuration section

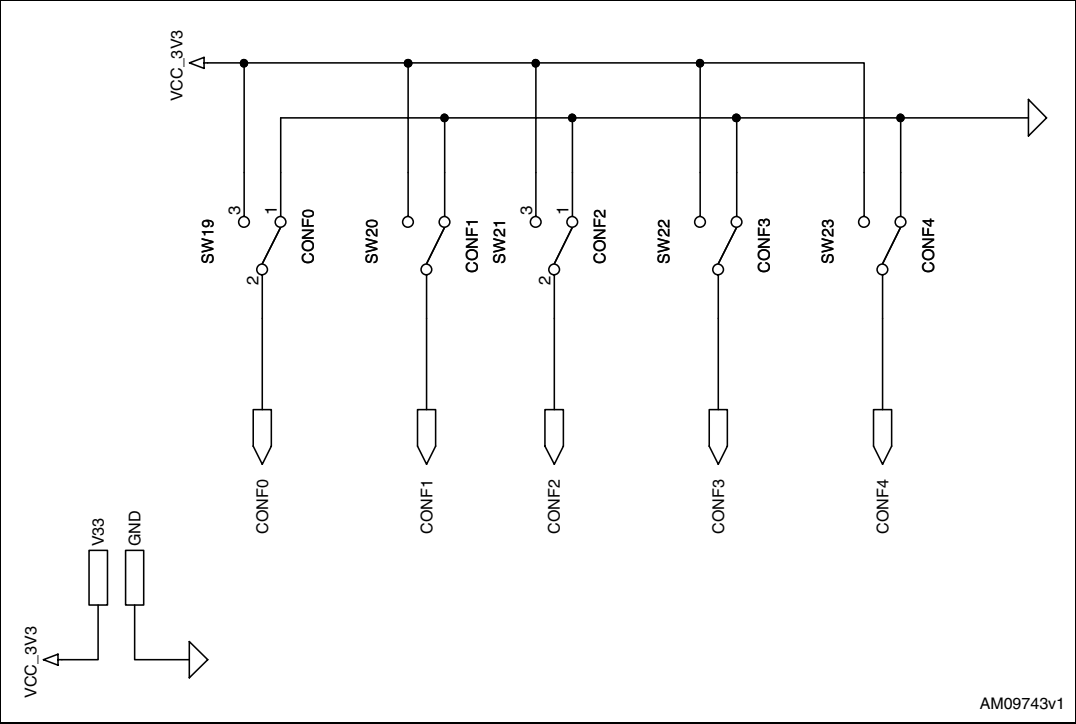
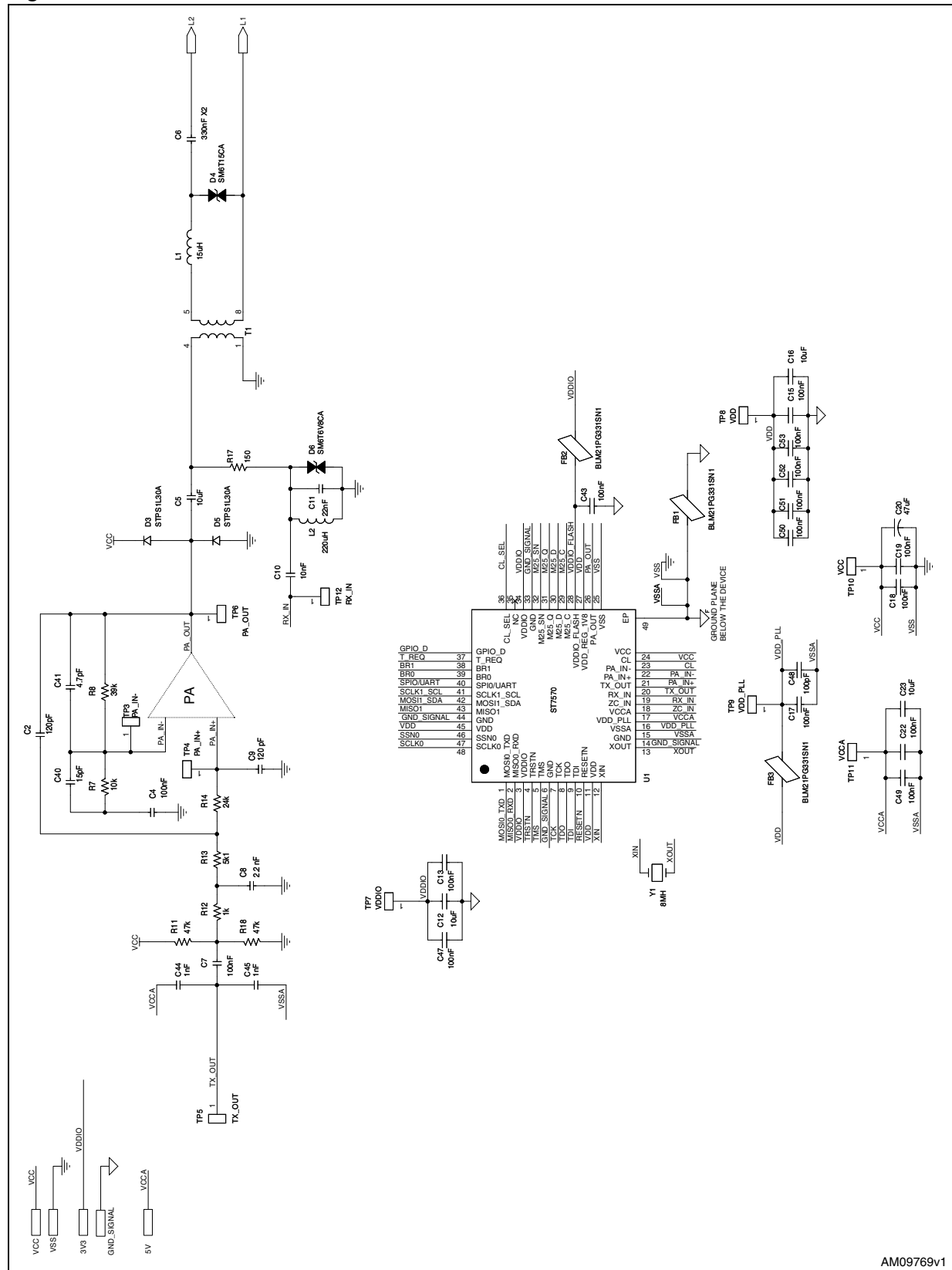


Figure 8. Power line modem section



AM09769V1

Figure 9. Microcontroller connection

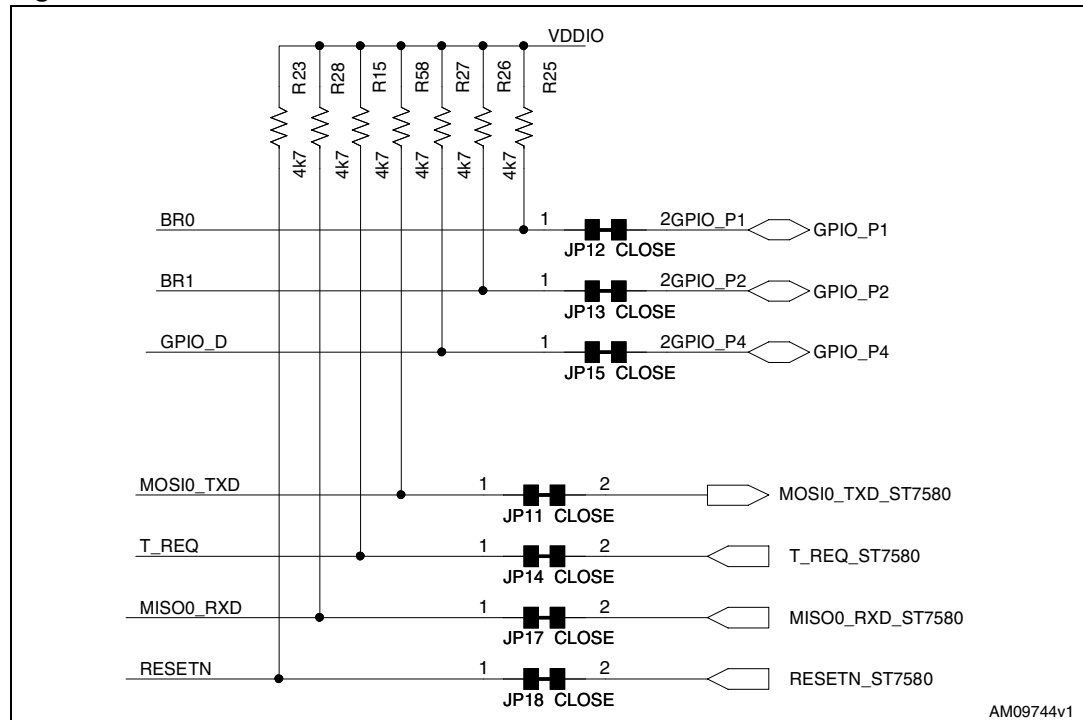


Figure 10. ST7580 reset button

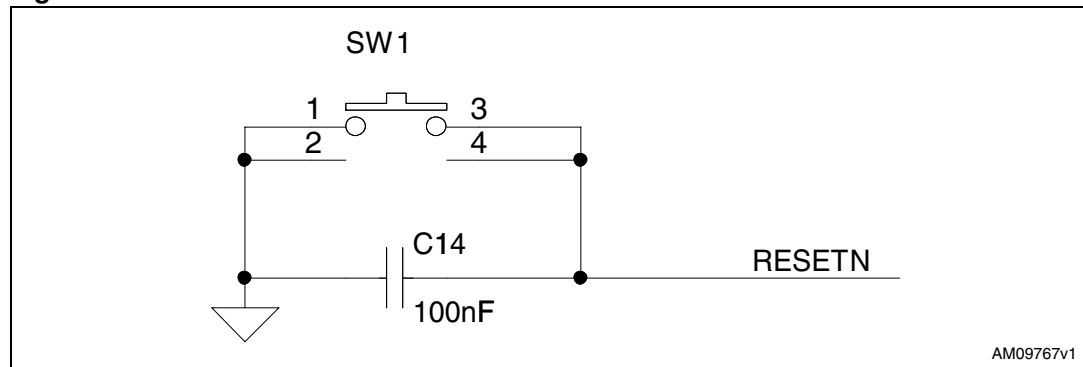


Figure 11. Current limit setting

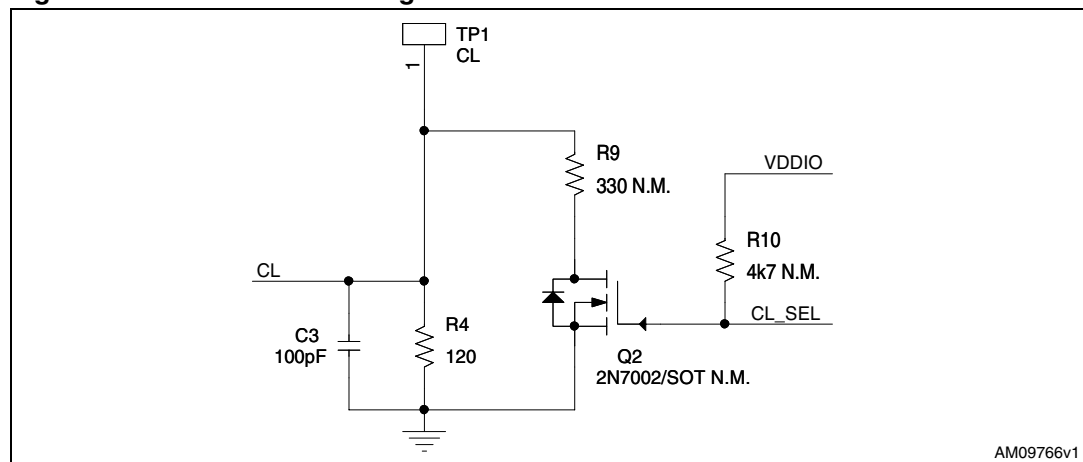
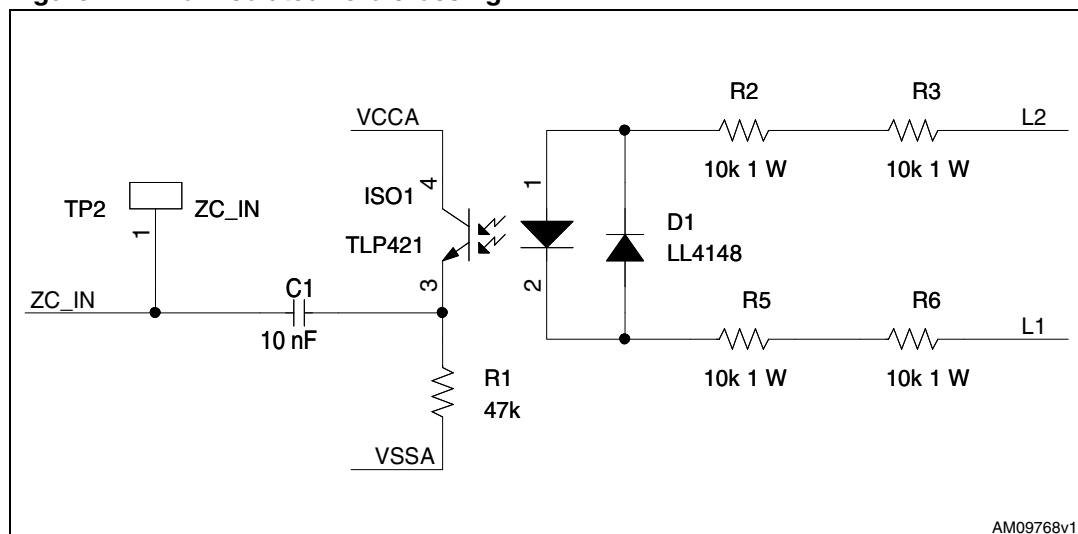
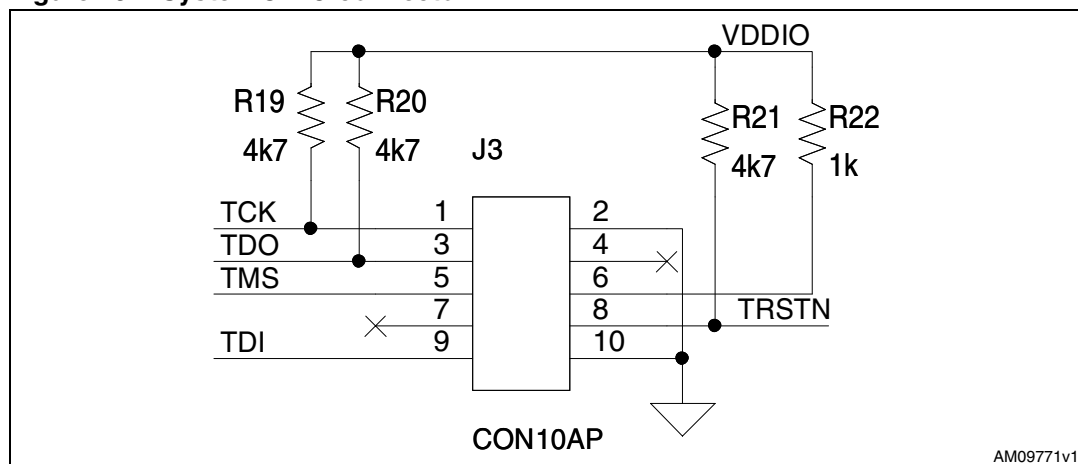


Figure 12. Non-isolated zero crossing



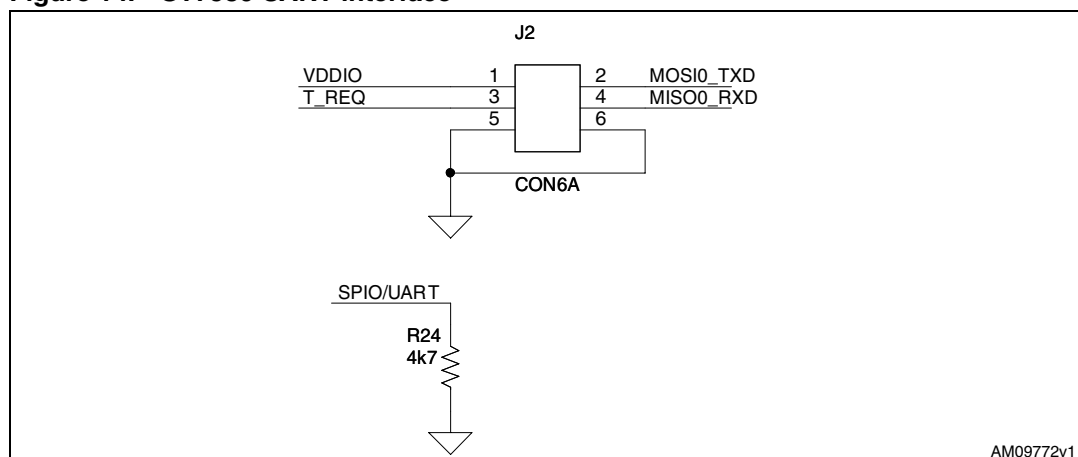
AM09768v1

Figure 13. System JTAG connector



AM09771v1

Figure 14. ST7580 UART interface



AM09772v1

Figure 15. 8051 program Flash memory

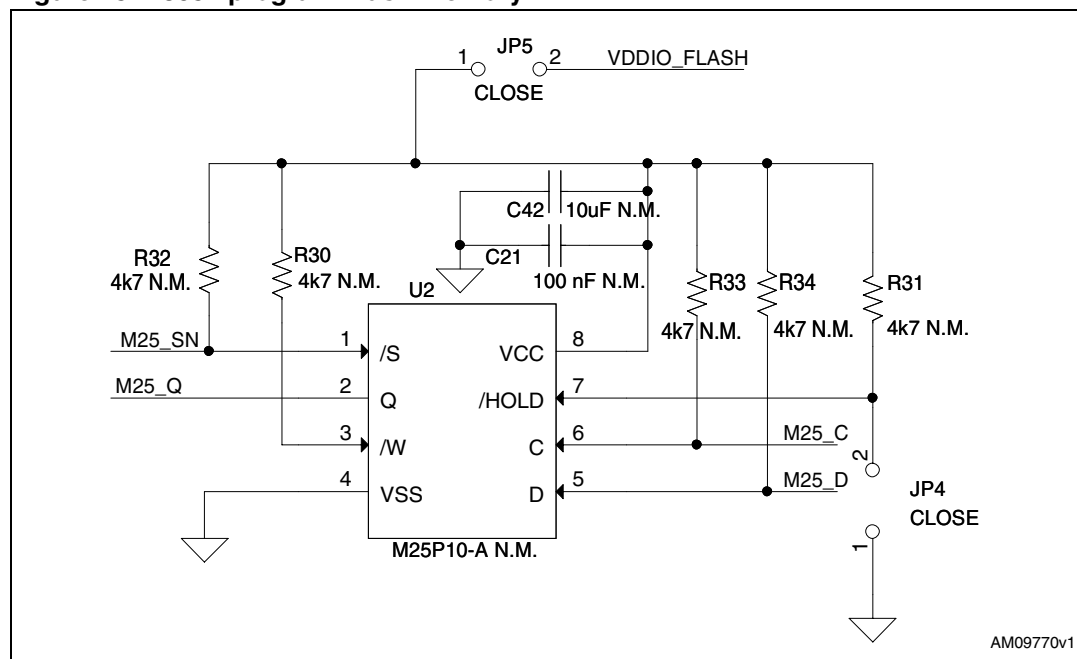
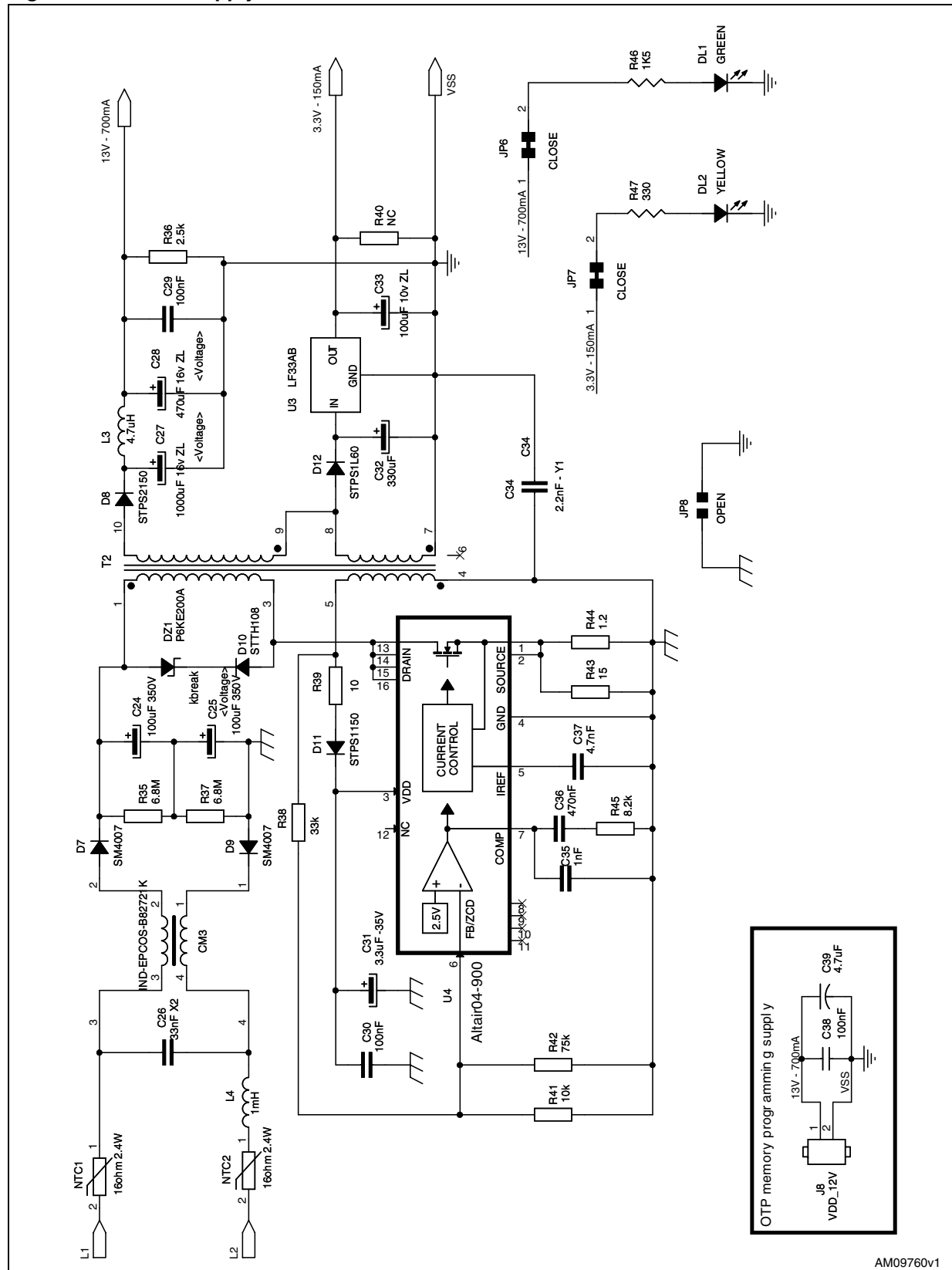


Figure 16. Power supply section



The schematic diagram illustrates the internal circuitry of the AM09761V1 module. It includes the following components and connections:

- Power Section:**
 - 5V Input:** Connected to the V_{in} pin of the TSM0505S voltage detector (U9).
 - 5V ISOL:** Connected to the V_o pin of U9 and the V₊ pin of the ST3232EBDR (IC1).
 - 5V:** Connected to the VDD1 pin of the IL7125-1E (U10).
 - +3V3:** Connected to the VDD2 pin of U10 and the V₊ pin of IC1.
 - Capacitors:** C89 (100nF) and C87 (100nF) are connected to the V₊ pin of IC1. C70 (100nF) is connected to the V₋ pin of IC1. C91 (47nF) is connected to the GND1 pin of U10. C92 (47nF) is connected to the GND2 pin of U10. C72 (4.7μF) and C75 (0.1μF) are connected to the +3V3 and 5V ISOL lines, respectively.
- Logic Section:**
 - U9 (TSM0505S):** A voltage detector with pins V_{in}+, V_o+, V_{in}-, V_o-, NC1, NC2, NC3, NC4, and NC5.
 - U10 (IL7125-1E):** A logic inverter with pins VDD1, VDD2, IN1, IN2, OUT1, OUT2, GND1, and GND2.
 - IC1 (ST3232EBDR):** A serial-to-parallel converter with pins C1+, C1-, C2+, C2-, T1IN, T1OUT, T2IN, T2OUT, R1IN, R1OUT, R2IN, R2OUT, and GND.
- Communication Section:**
 - UART_TX and UART_RX:** Connected to the TXD and RXD pins of the IC2 (TFTDU4300).
 - IC2 (TFTDU4300):** A TFT display driver with pins SD, TXD, RXD, Anode(VCC2), Cathode, VCC1, and VLogic.
- Connectors:**
 - DB9-male connector:** Connected to the TX-0, RX-0, and GND pins of the IC1.
 - 5V ISOL:** A 5V isolated power source connected to the V₊ pin of IC1.

Figure 18. SC interface/user inputs section

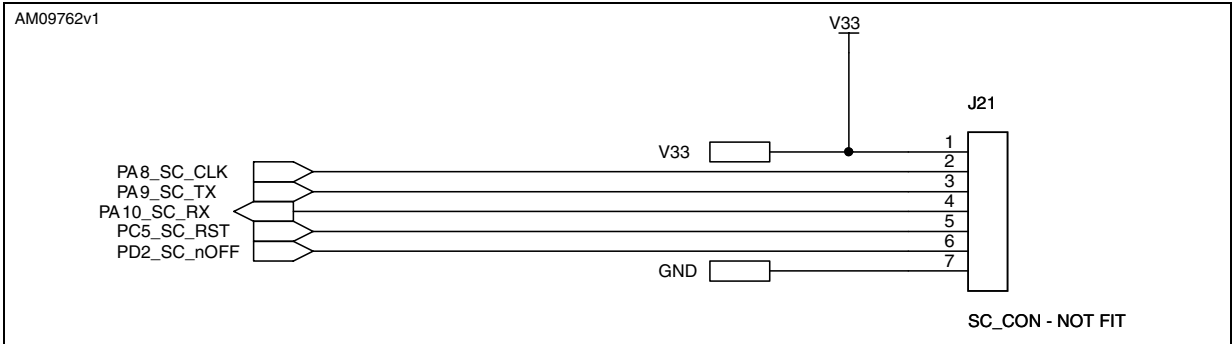


Figure 19. ZigBee® module section

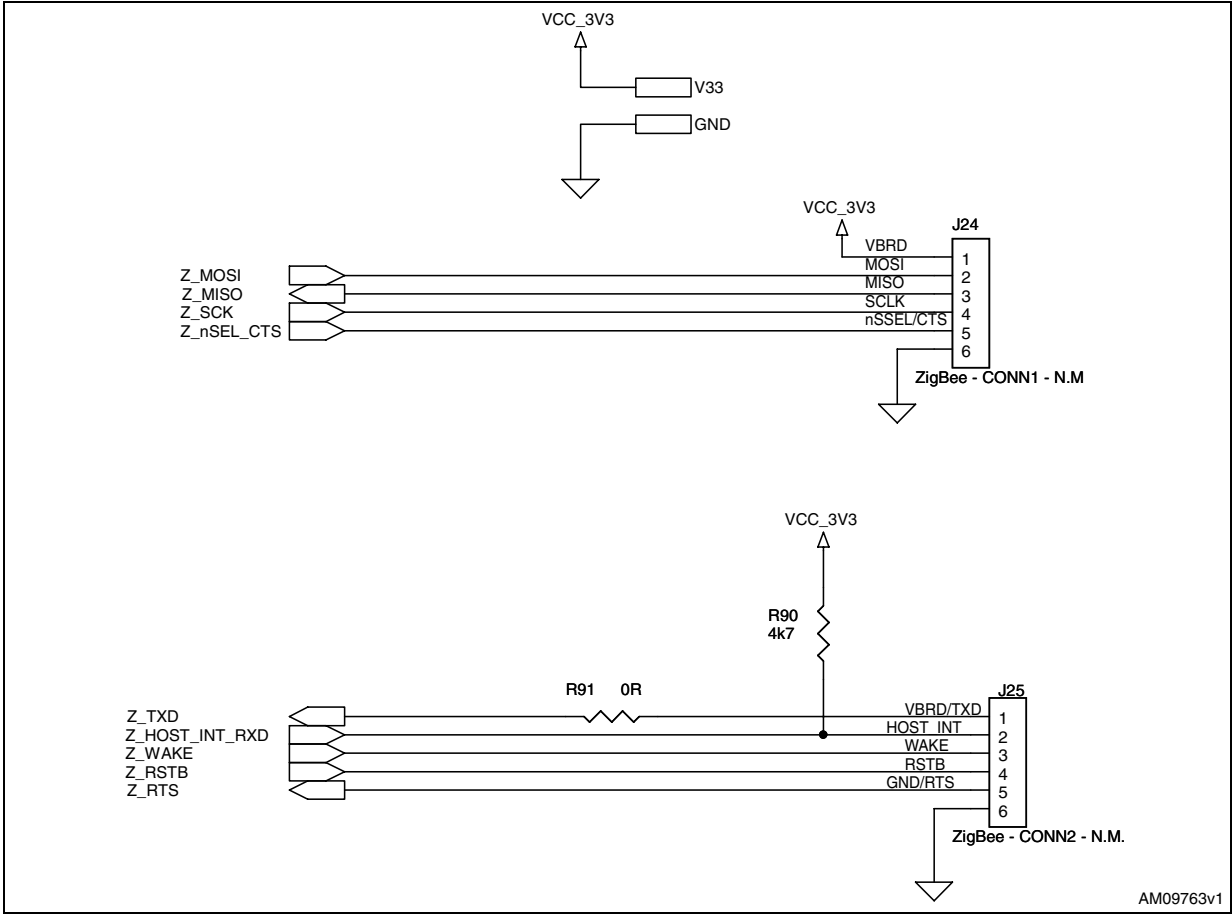
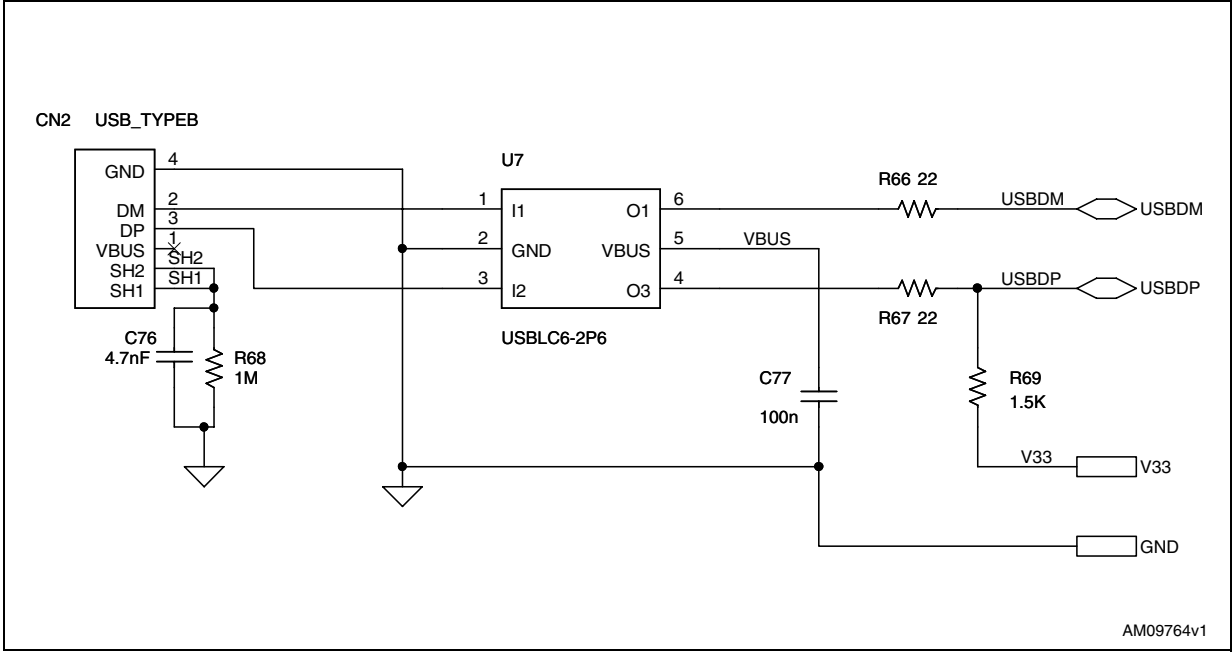


Figure 20. USB section



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
12-May-2011	1	Initial release.
24-Aug-2011	2	Updated <i>Figure 16: Power supply section</i> with a new controller.

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