



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

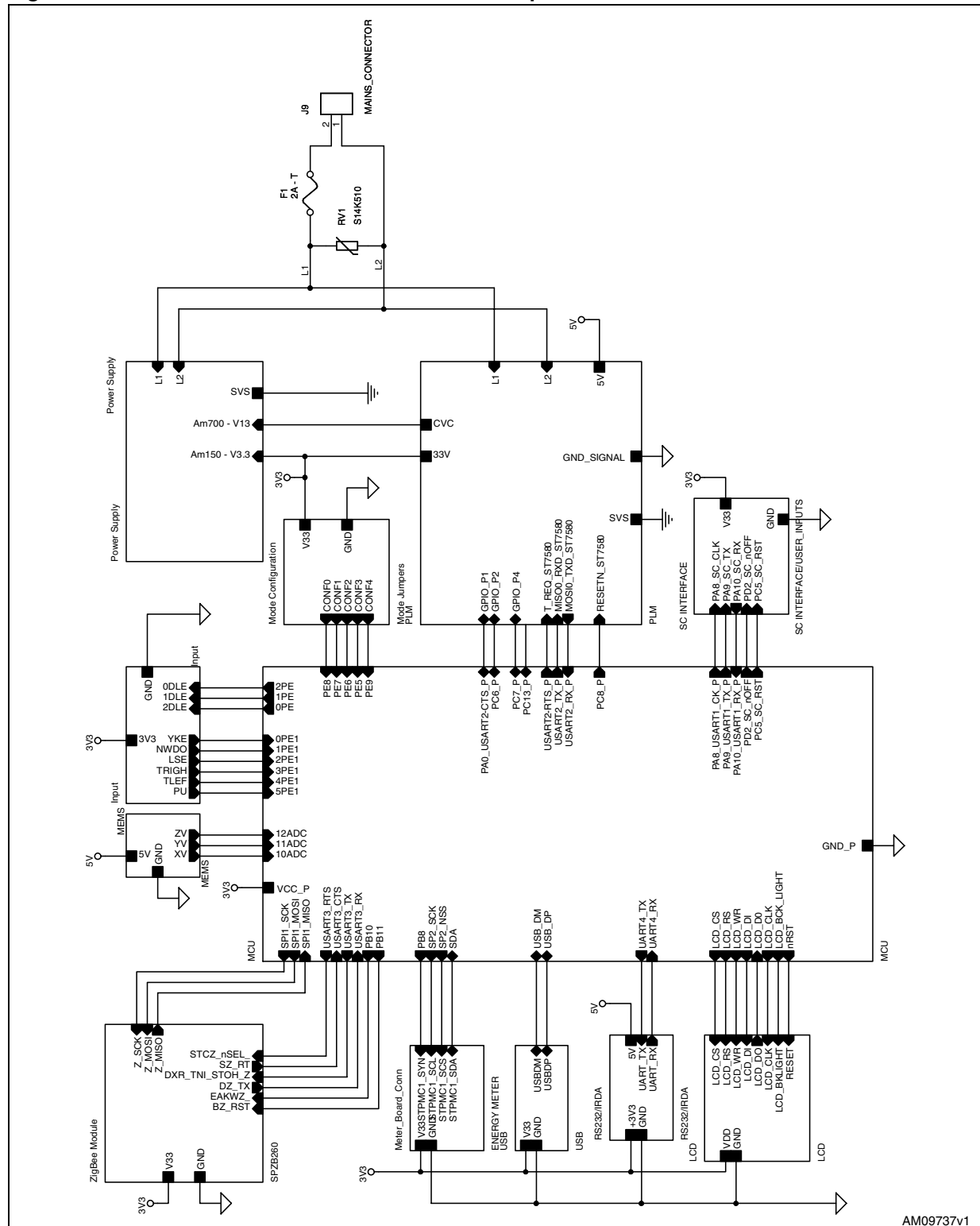


Description

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.

1 Circuits schematic

Figure 1. STEVAL-IPP002V1 circuit schematic - top



AM09737v1

Figure 2. Energy meter board connector section

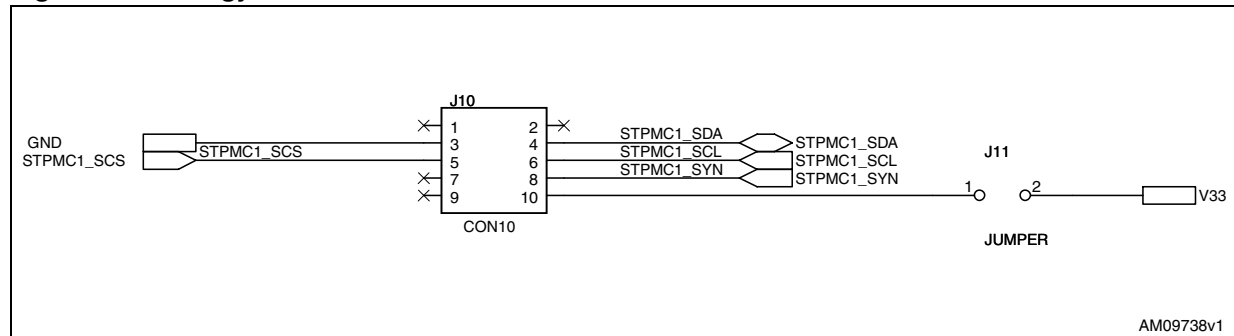


Figure 3. Joystick and LEDs section

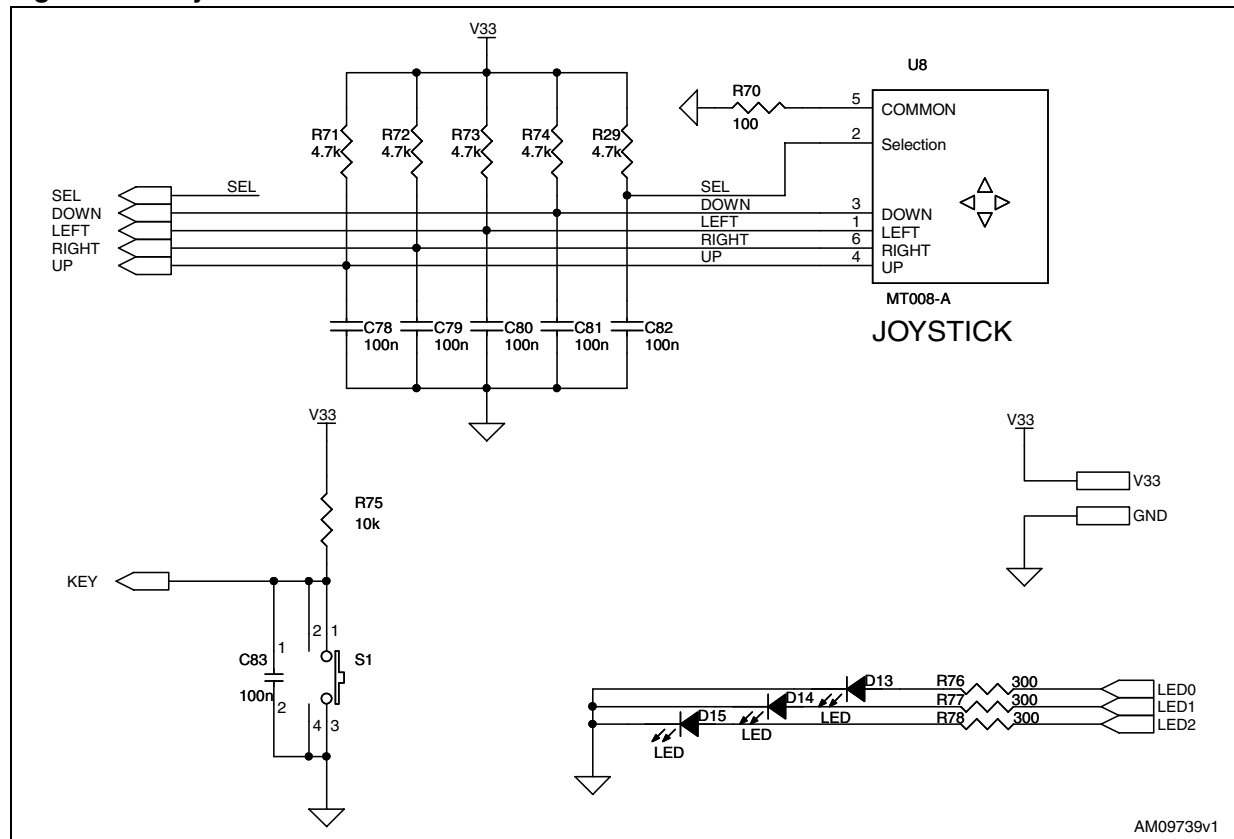


Figure 4. LCD color display connectors

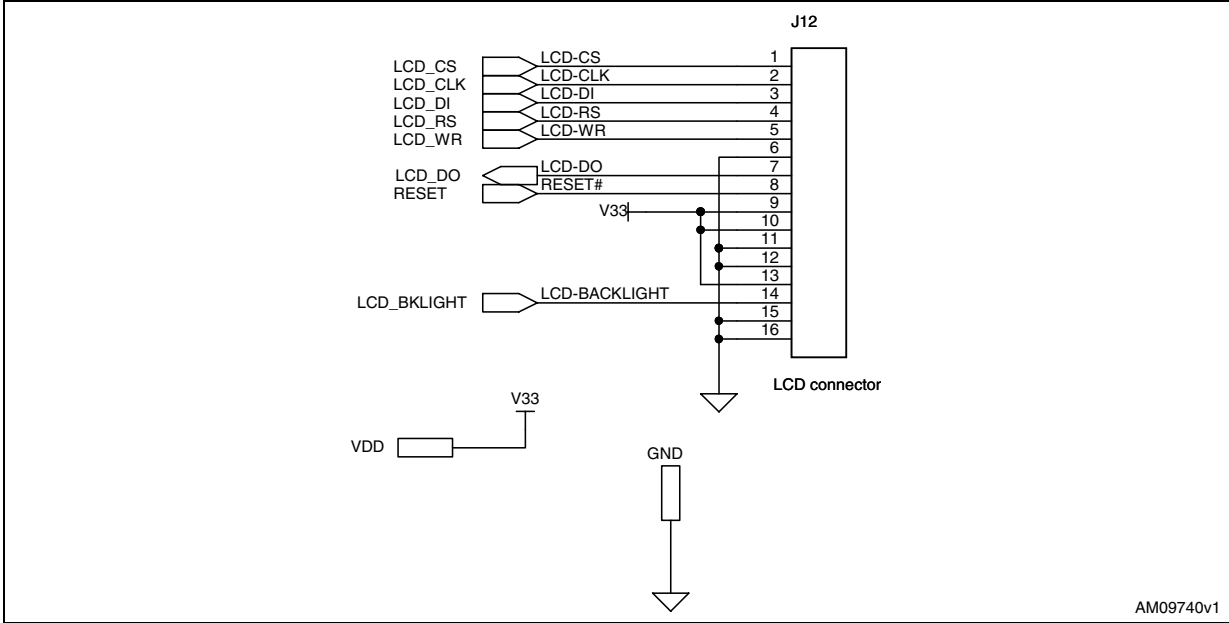


Figure 6. MEMS section

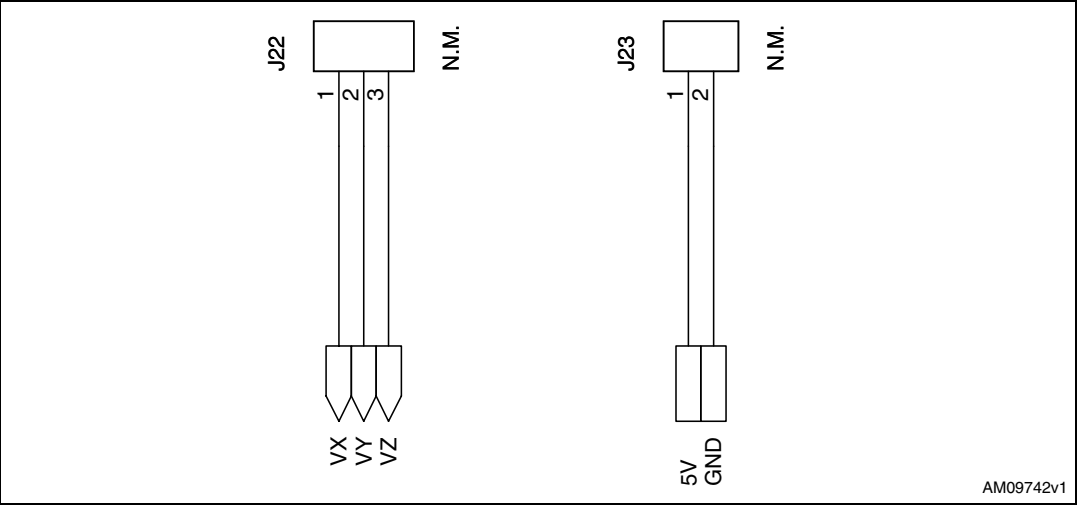


Figure 7. Mode configuration section

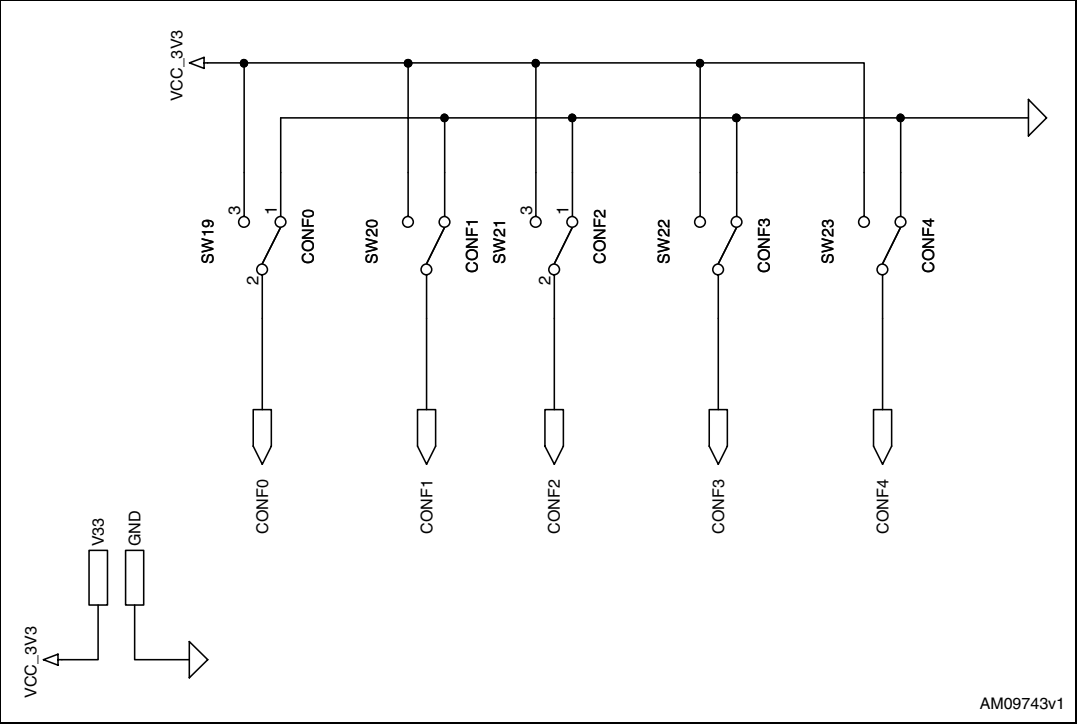


Figure 9. Microcontroller connection

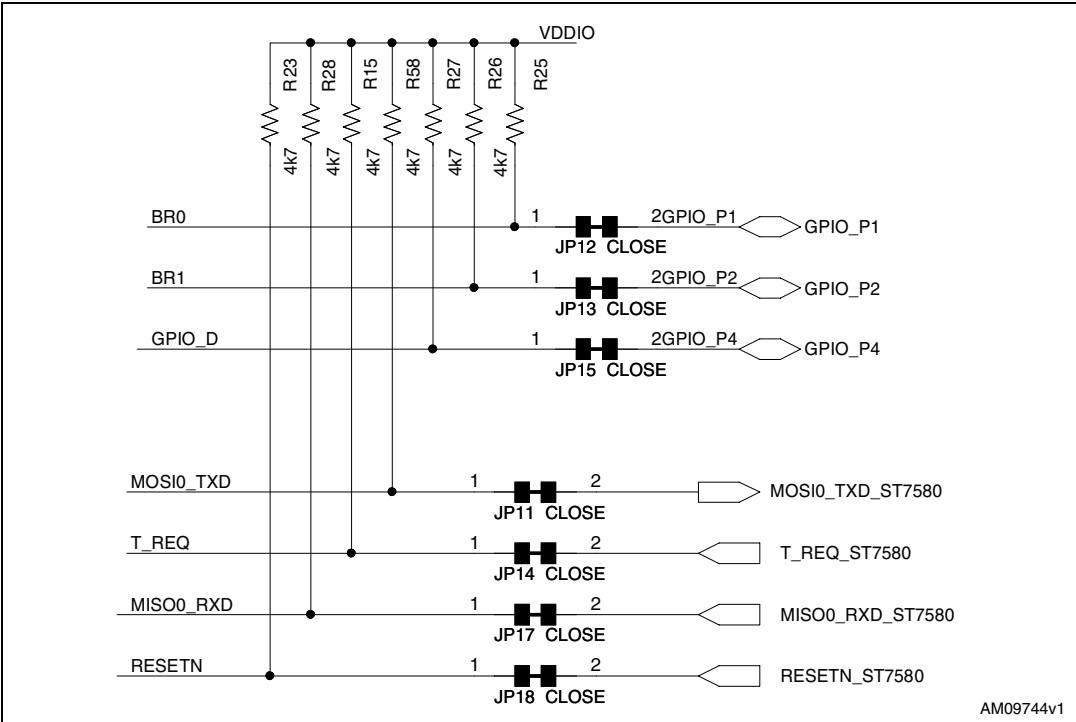


Figure 10. ST7580 reset button

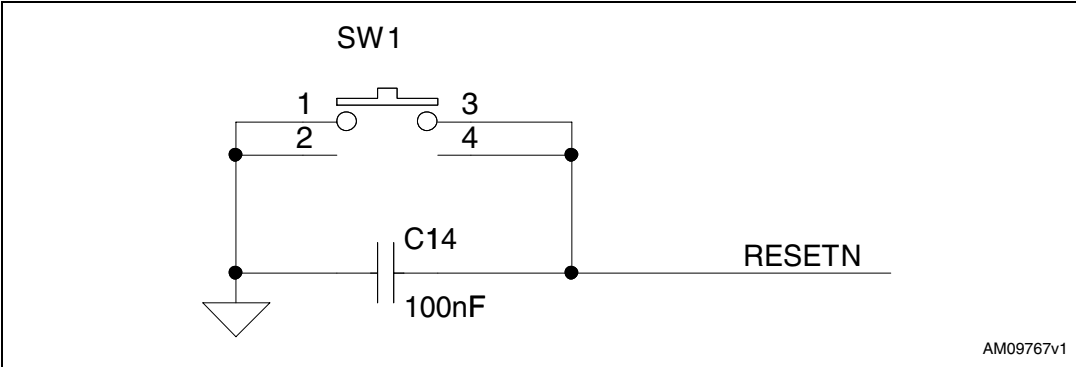
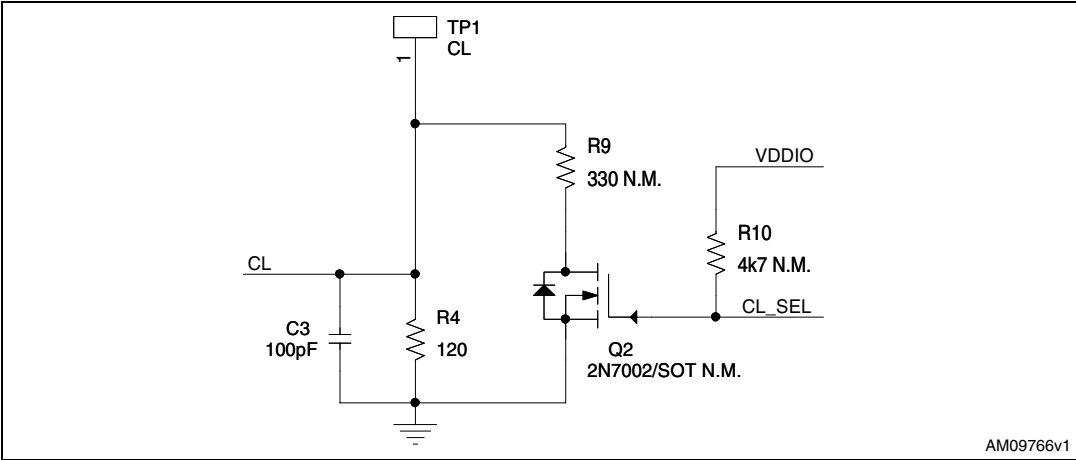


Figure 11. Current limit setting



Schematic diagram of the SPI/UART interface circuit. The diagram shows a connector J2 with pins 1, 3, and 5 connected to VDDIO, T_REQ, and a common ground respectively. Pins 2, 4, and 6 are connected to MOSI0_TXD, MISO0_RXD, and a common ground. A 4k7 resistor R24 is connected between the SPI/UART signal line and ground.

Figure 15. 8051 program Flash memory

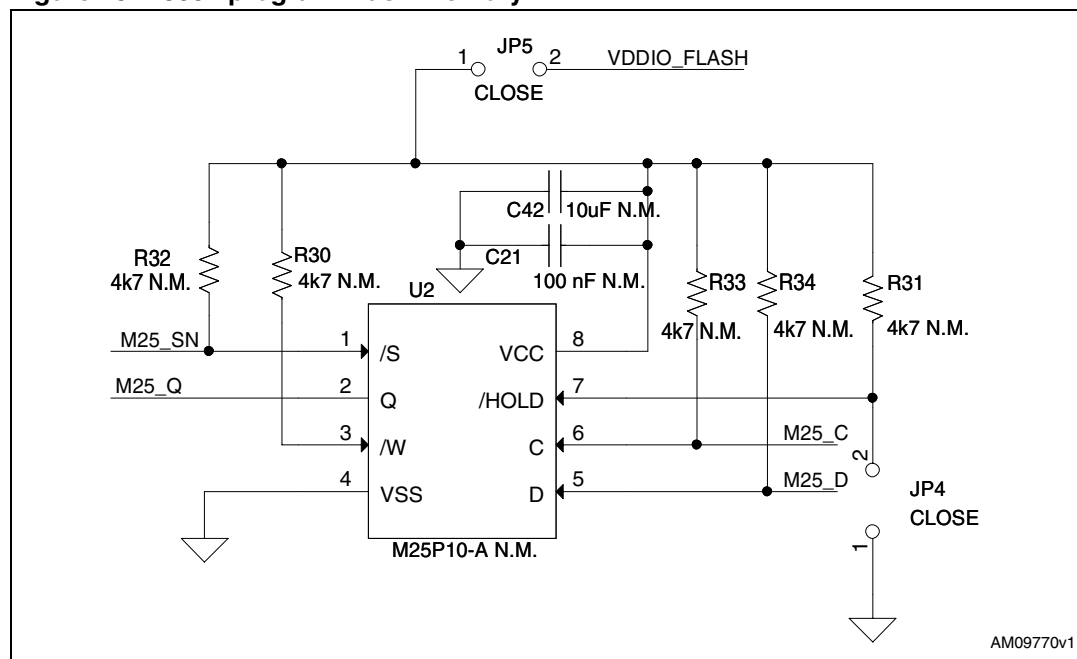
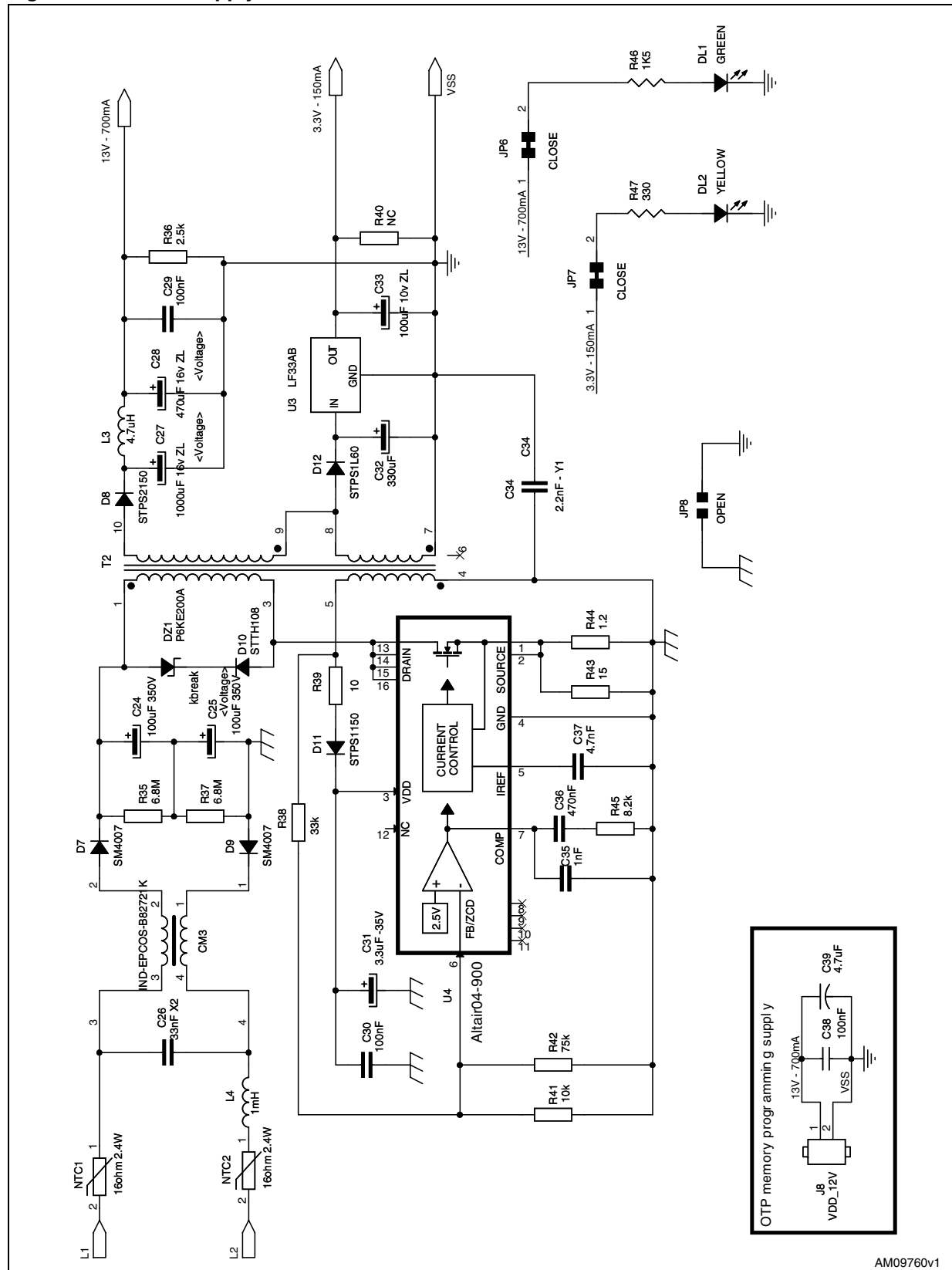


Figure 16. Power supply section



The schematic diagram illustrates the internal circuitry of the AM09761V1 module. Key components include:

- U9 (TSM0505S):** A transceiver IC connected to the 5V and 5V_ISOL pins. Its pins are labeled VIn+, VIn-, Vout+, and Vout-.
- IC1 (ST3232EBDR):** A multi-channel transceiver IC. It is powered by 5V and 5V_ISOL. Its pins include C1+, C1-, C2+, C2-, T1IN, T1OUT, T2IN, T2OUT, R1IN, R1OUT, R2IN, and R2OUT. It is connected to the DB9-male connector (QN1) via RX-0, TX-0, RX-1, and TX-1.
- U10 (IL712S-1E):** A logic inverter IC. Its pins are VDD1, VDD2, GND1, GND2, IN1, IN2, OUT1, and OUT2. It is connected to the DB9-male connector (QN1) via RX-0, TX-0, RX-1, and TX-1.
- IC2 (TFDU4300):** A transceiver IC. Its pins include SD, TxD, RxD, Anode(VCC2), Cathode, VCC1, and VLogic. It is connected to the DB9-male connector (QN1) via RX-0, TX-0, RX-1, and TX-1.
- Capacitors:** Various capacitors are used for decoupling and timing, including C68, C67, C69, C70, C71, C91, C92, C72, and C75.
- Resistors:** Resistors R59, R60, R61, R62, R54, R55, R56, and R57 are used for pull-up and pull-down purposes.
- Connectors:** The DB9-male connector (QN1) is used for serial communication. The 5V and 5V_ISOL pins are used for power supply.

Figure 18. SC interface/user inputs section

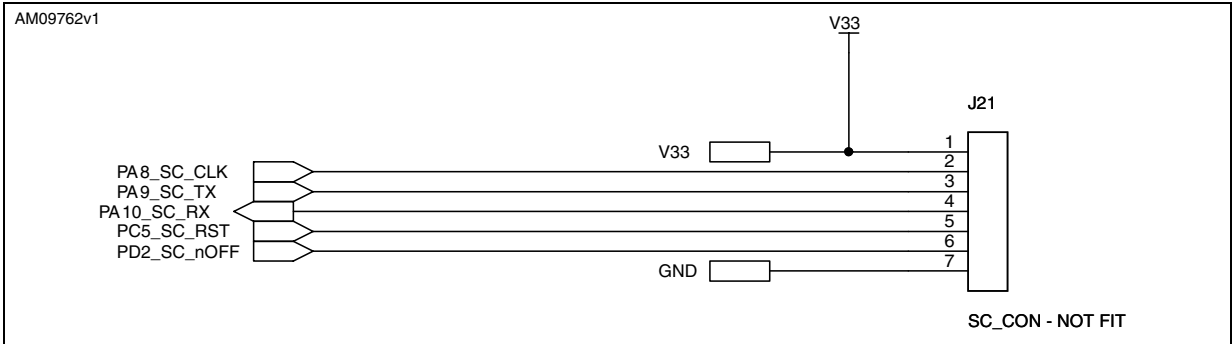


Figure 19. ZigBee® module section

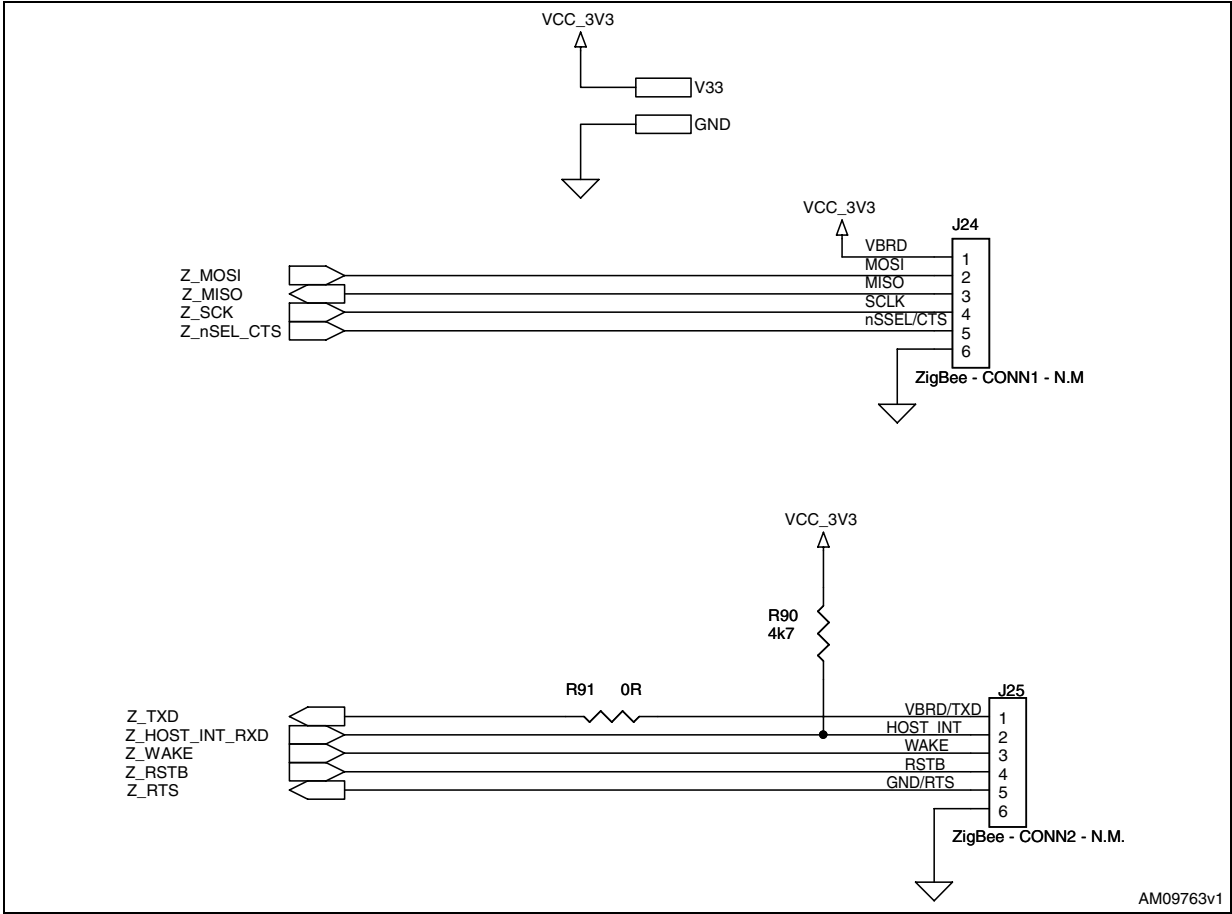
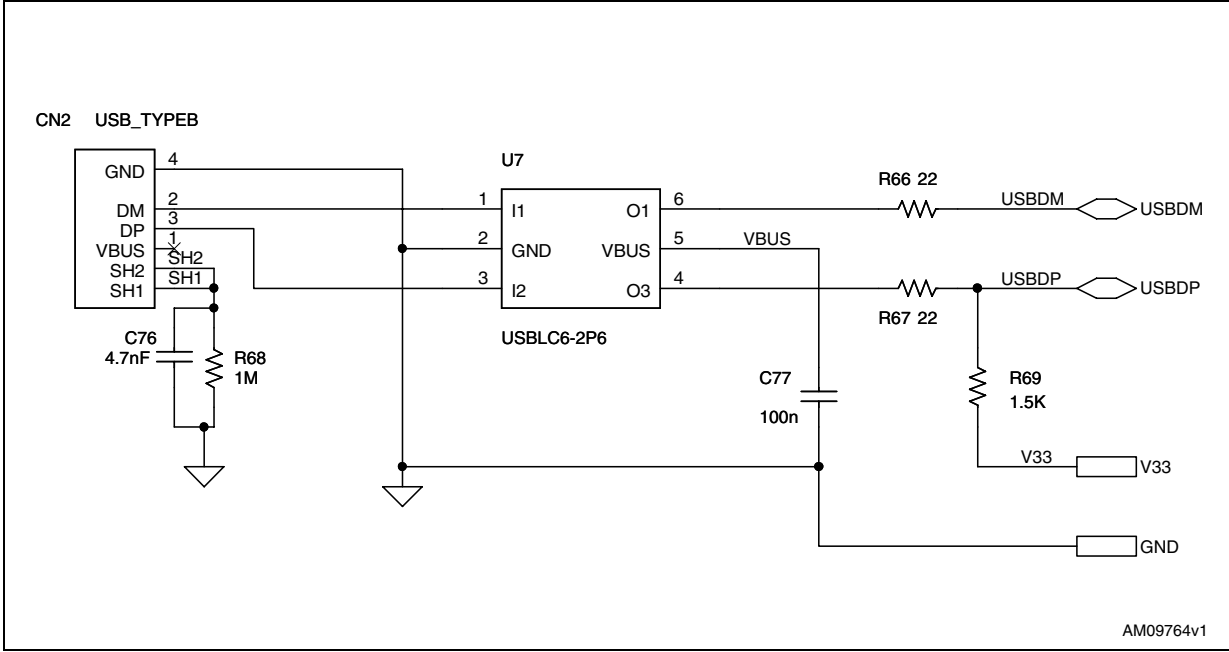


Figure 20. USB section



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. |

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