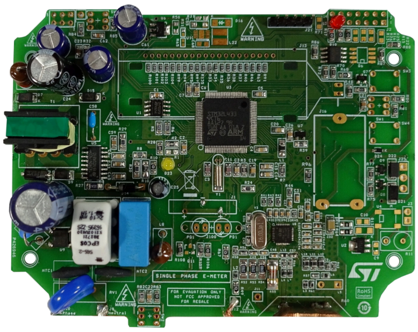
STDES-EMETER1PV1

Data brief

Single phase smart meter using STPM33 and STM32L4



Fully assembled board developed for performance evaluation only, not available for sale

Product summary	
Single phase smart meter using STPM33 and STM32L4	STDES-EMETER1PV1
Firmware for STDES-EMETER1PV1 single phase smart meter using STPM33 and STM32L4	STSW-EMETER1-FW
Ultra-low-power with FPU Arm Cortex-M4 MCU 80 MHz with 256 Kbytes of Flash memory, LCD, USB	STM32L433VCT6
ASSP for metering applications with up to four independent 24-bit 2nd order sigma-delta ADCs, 4 MHz OSF and 2 embedded PGLNA	STPM33
Applications	Single phase meter

Features

- Based on STM32L433VCT6 (100 pins, LQFP) and STPM33
- STPM33 interfaced using SPI with MCU
- Current transformer (CT) and shunt sensing supported for current measurements
- Shunt connected on the primary channel and CT on the secondary
- Active energy difference of two channels signaling tamper condition
- Magnetic tamper detection using Hall effect sensor by MCU interrupt line
- EEPROM interfaced using I²C with MCU to store accumulated energy
- Switch interface for case tamper and terminal cover tamper
- Low power mode supported
- Neutral missing tamper detection implemented using special duty cycling algorithm
- Connectors for GPRS or Sub 1-GHz connectivity
- Measuring RMS/instantaneous voltage, current, kW and power factor (PF)
- Glass LCD (1/8 duty cycle and 20 segments) driven by the MCU LCD controller

Description

The STDES-EMETER1PV1 single-phase smart meter is based on STM32L433VCT6 MCU featuring ARM Cortex-M4 core and STPM33 IC for electricity metering with an accuracy of 0.1%.

It measures electric energy consumption over defined time intervals and sends collected data back to the utility for monitoring and billing, also tracking all the tampers, with the correct date and time.

The smart meter meets the most up-to-date smart metering requirements, such as multi-tariff billing, reactive energy measurement and power quality monitoring to enhance generation, distribution, customer service and billing.

The STDES-EMETER1PV1 comes with an expansion connector to provide GPRS/SubGHz connectivity and a relay control which allows remotely connecting/ disconnecting the load.

The embedded STPM33 IC belongs to an ASSP family of mixed signals designed for high accuracy measurement of power and energy in power line systems using a Rogowski coil, current transformer or shunt current sensors.

The device provides instantaneous voltage and current waveforms and calculates voltage and current RMS values, active, reactive and apparent powers and energies for each channel in compliance with accuracy standards (EN 50470-x, IEC 62053-2x, ANSI12.2x for AC watt meters).

The STDES-EMETER1PV1 single-phase smart meter is a fully assembled board developed for performance evaluation only, not available for sale.

1 Schematic diagrams

Figure 1. **STDES-EMETER1PV1 circuit schematic (1 of 8)**

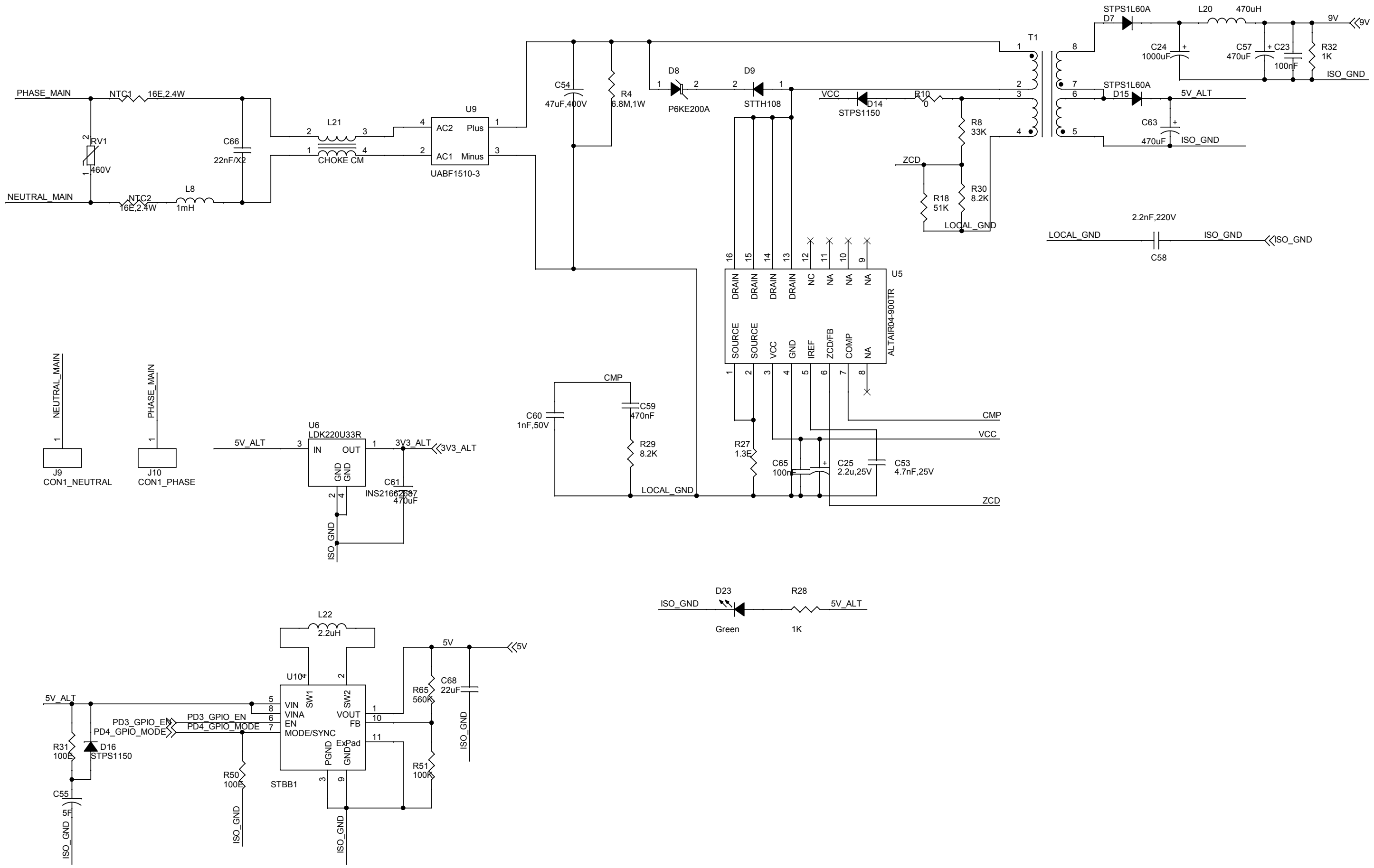


Figure 2. **STDES-EMETER1PV1 circuit schematic (2 of 8)**

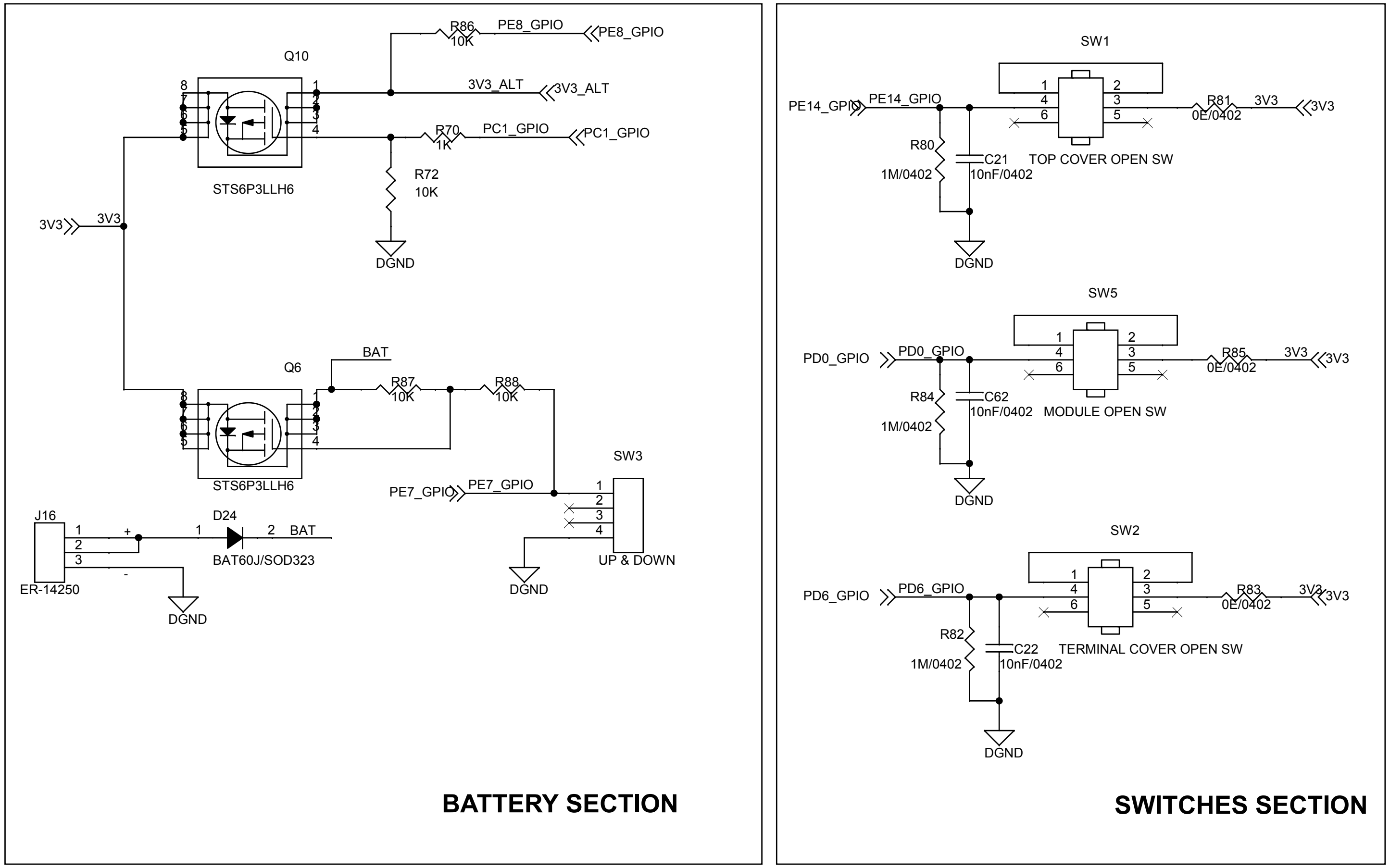
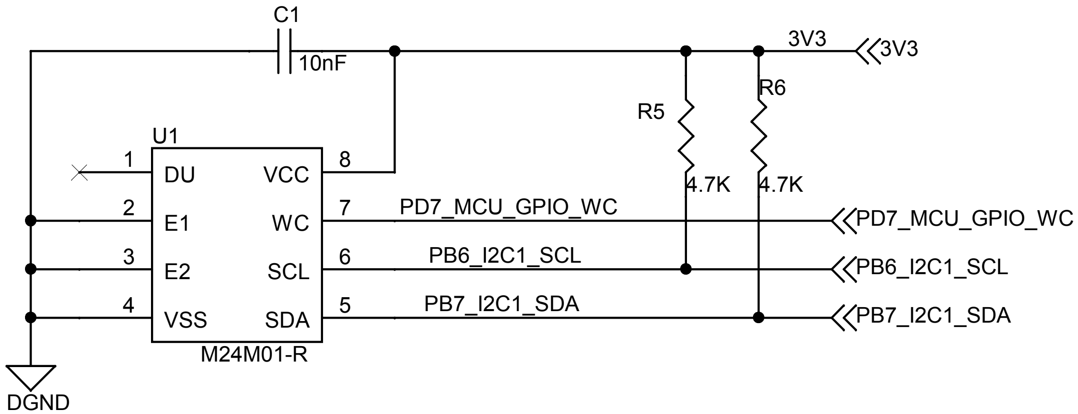
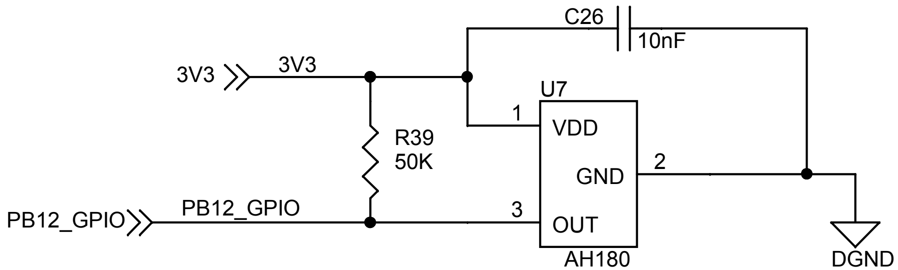


Figure 3. STDES-EMETER1PV1 circuit schematic (3 of 8)

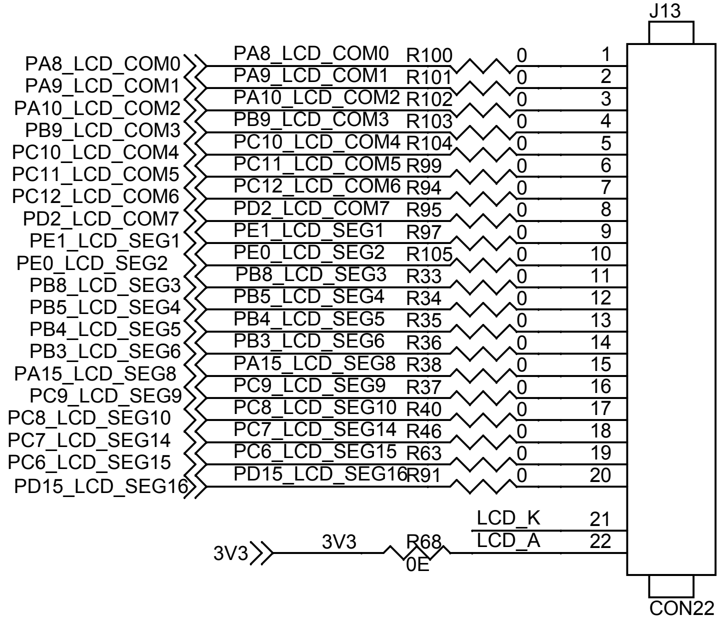


EEPROM SECTION



HALL SENSOR SECTION

Figure 4. **STDES-EMETER1PV1 circuit schematic (4 of 8)**



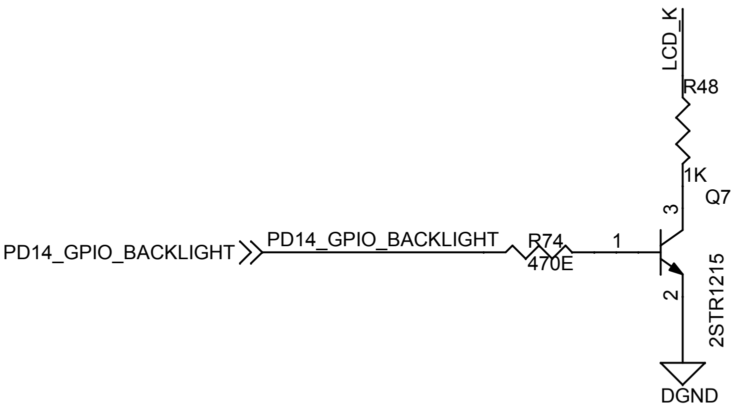


Figure 5. **STDES-EMETER1PV1 circuit schematic (5 of 8)**

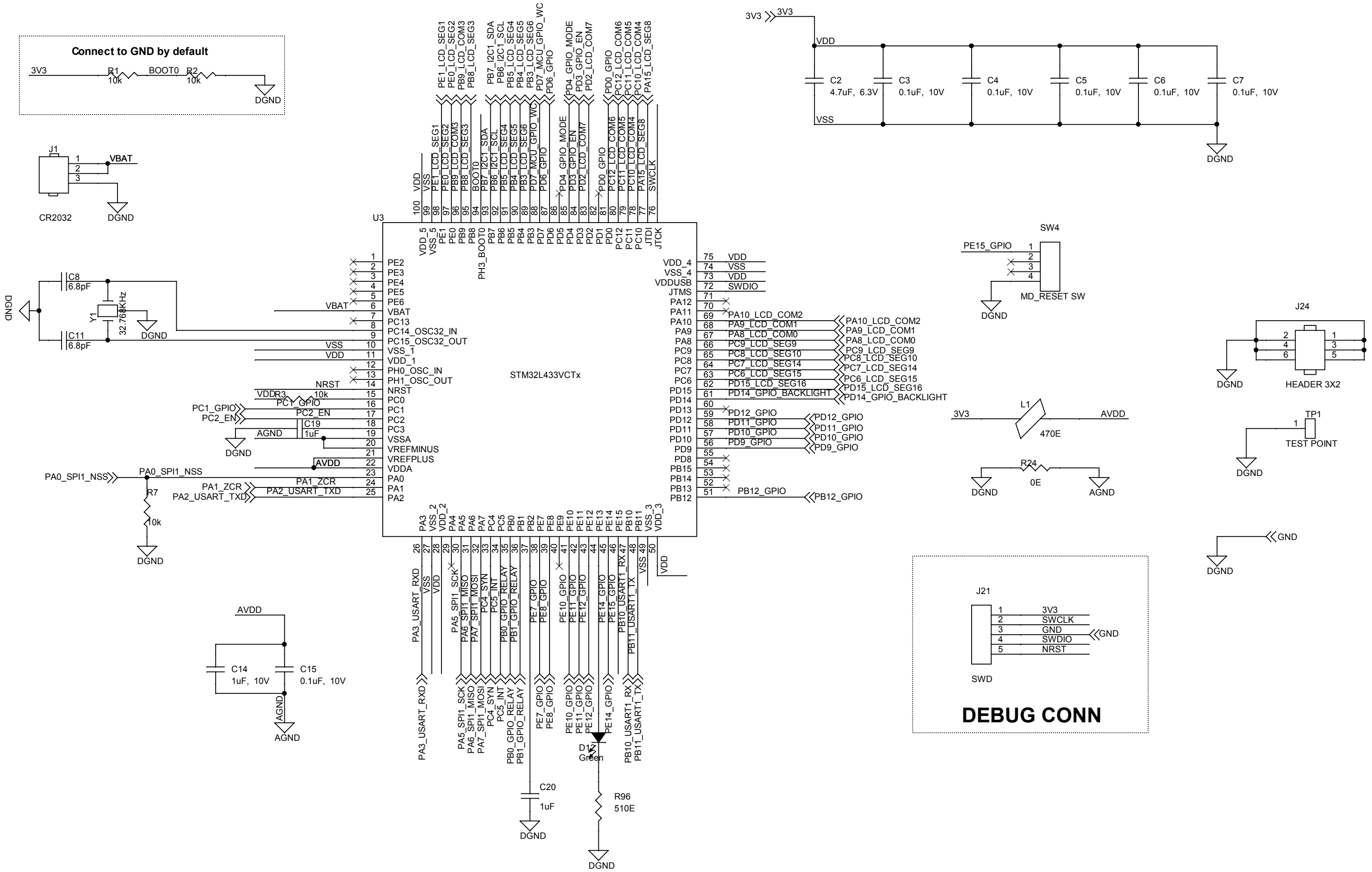
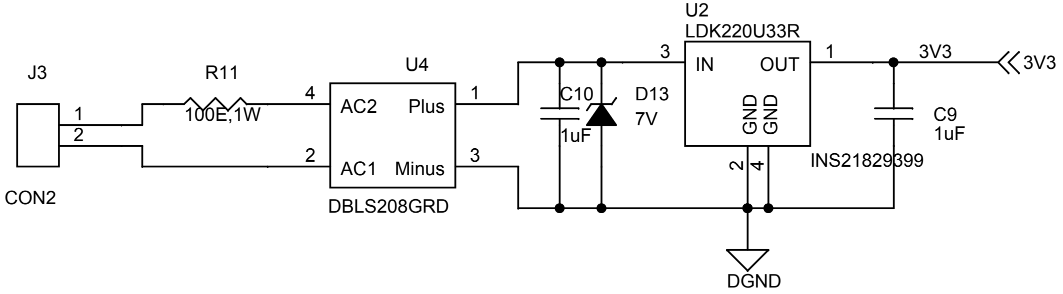
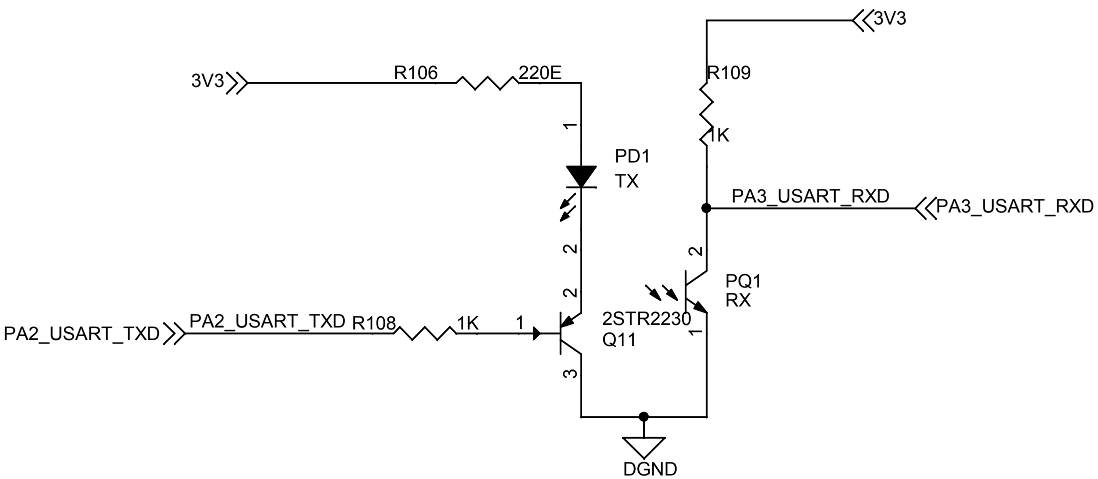


Figure 6. **STDES-EMETER1PV1 circuit schematic (6 of 8)**



NEUTRAL MISSING SECTION



IR SECTION

Figure 7. **STDES-EMETER1PV1 circuit schematic (7 of 8)**

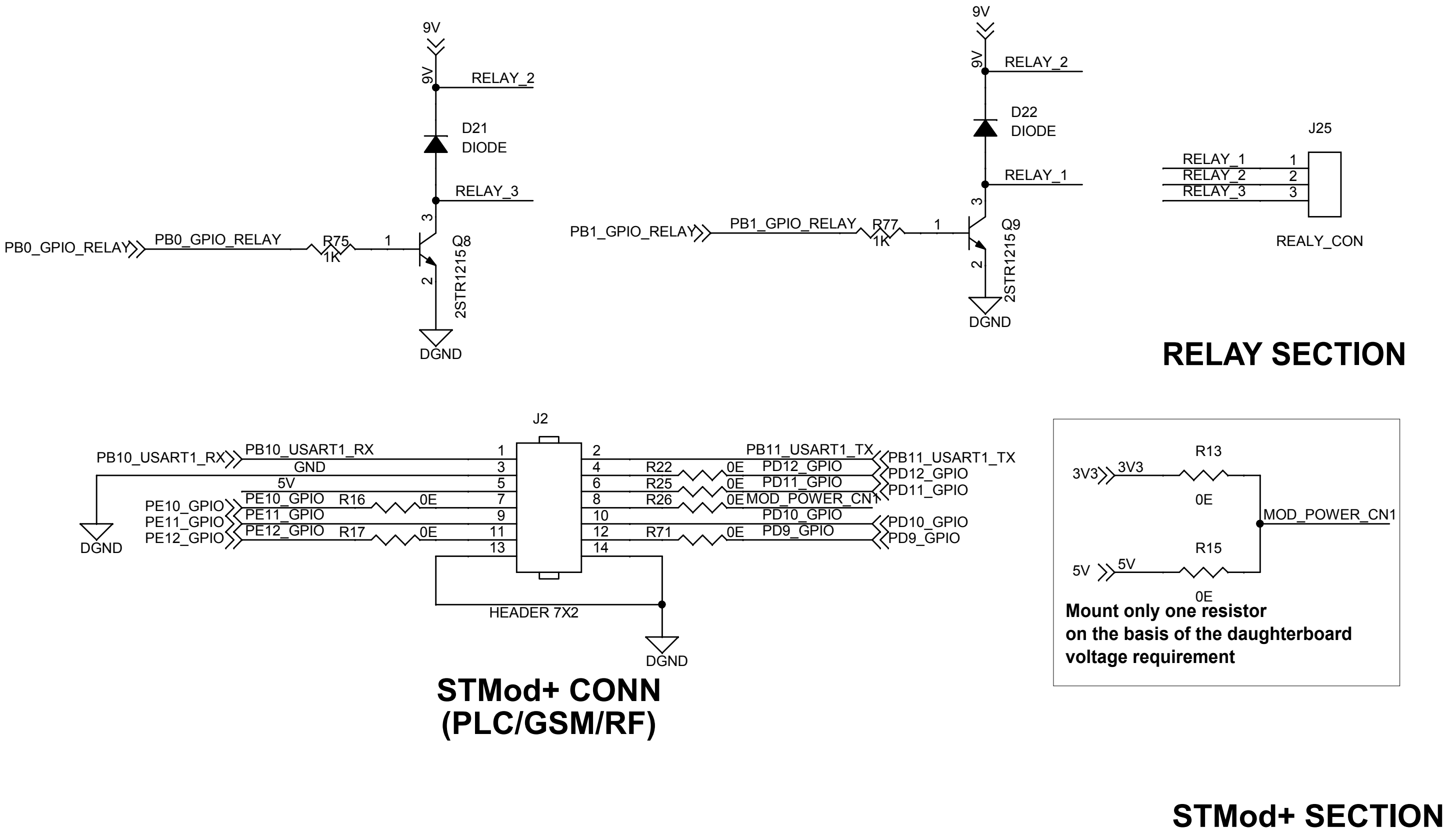
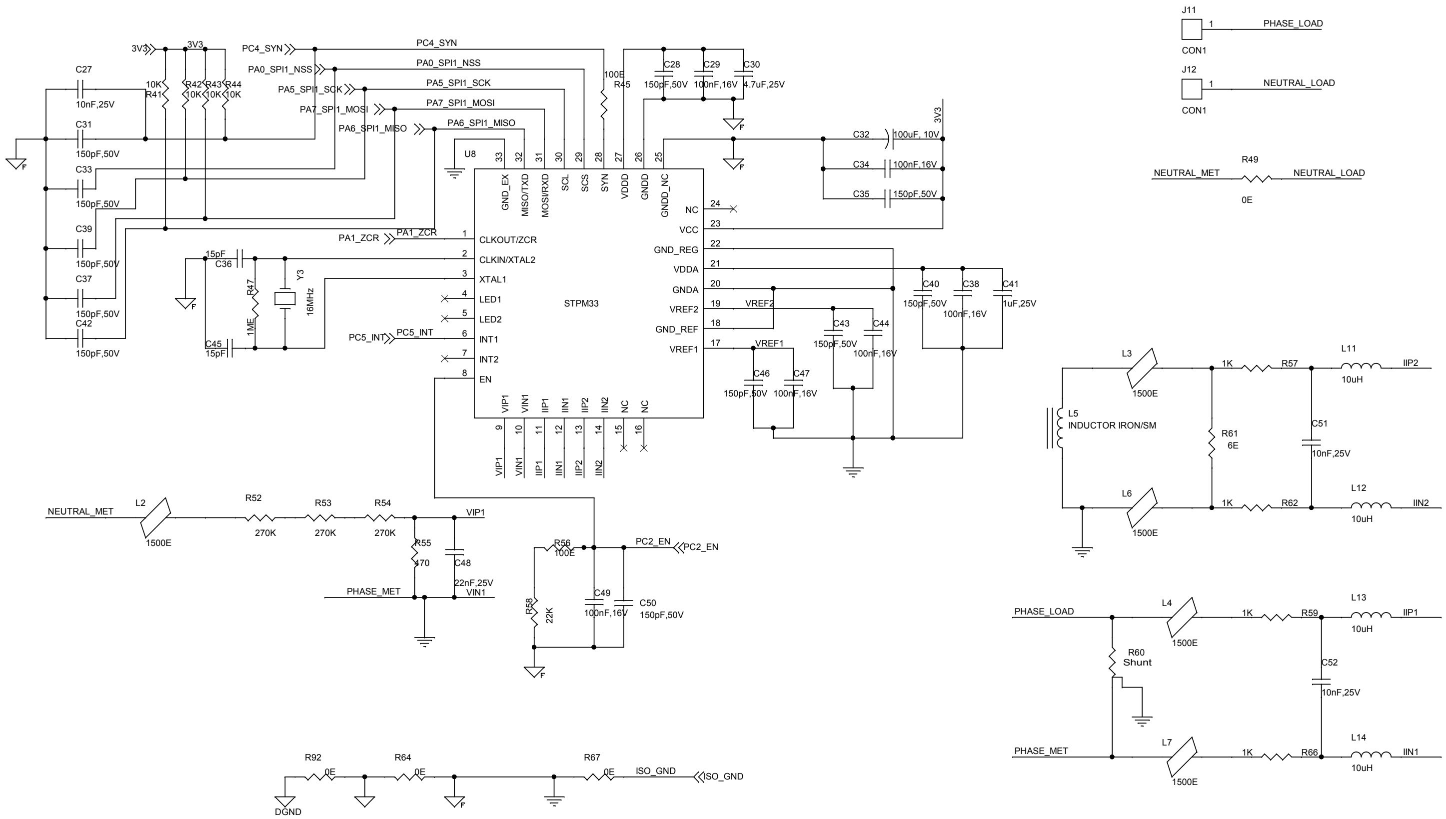


Figure 8. **STDES-EMETER1PV1 circuit schematic (8 of 8)**



Revision history

Table 1. Document revision history

Date	Revision	Changes
23-Aug-2021	1	Initial release.