STEVAL-IHT001V2

Cold thermostat kit based on AC switches and the STM8S

Data brief

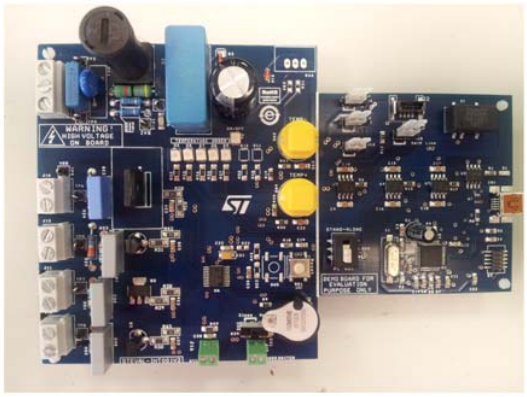
Features

- Low-cost solution for spark-free thermostats:
  - No need for a sealed version
  - Low-cost STM8S microcontroller for thermostat control
  - Low-cost capacitive power supply
- High efficiency:
  - Refrigerator consumption reduction by adjusting and reducing the hysteresis threshold of the temperature
  - Improved efficiency by turning on the defrost resistor only when it's useful and not at each OFF cycle of the compressor (as done in some mechanical thermostats)
- High system immunity:
  - Overvoltage protected ACS switches: ACST610-8FP for compressor control, ACS110-7SN for defrost resistor and ACS102-6TA for light bulb and fan
  - Class A criteria for IEC 61000-4-4 up to above 3 kV levels
- Flexibility:
  - Development: program setting with PC interface to change firmware variables
  - Industrialization: end-of-production MCU programming thanks to FLASH, for soft upgrade and efficient MCU stock management
- RoHS compliant

Description

The STEVAL-IHT001V2 thermostat kit provides a robust and low-cost ST solution (microcontroller and AC switches) to control refrigerators, freezers or fridge/freezer combinations.

Basic, defrost, and air circulation versions are configurable in order to address the low-end and medium-end cooling appliances market. It allows the control of a single-phase induction motor and a light bulb, and optionally, a defrost resistor and a fan, working on 220/240 V_{RMS}, 50/60 Hz mains voltage. The thermostat kit is operational with 100/120 V RMS 50/60 Hz but the supply capacitor value must be modified.



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The board can operate in an ambient temperature range from 0 °C to 60 °C.

The exact maximum temperature depends on the power of the loads. For demonstrative purposes a graphic user interface (GUI) has been developed.

The connection between the PC and STM8S microcontroller, the MCU performing thermostat regulation, is achieved through a USB bus.

As the STM8S is a low-cost MCU without an embedded USB peripheral, an additional MCU (STM32) has been used as a bridge between the PC and STM8S MCU, for demonstrative purposes only.

1 Schematic diagrams

Figure 1. Control side schematic

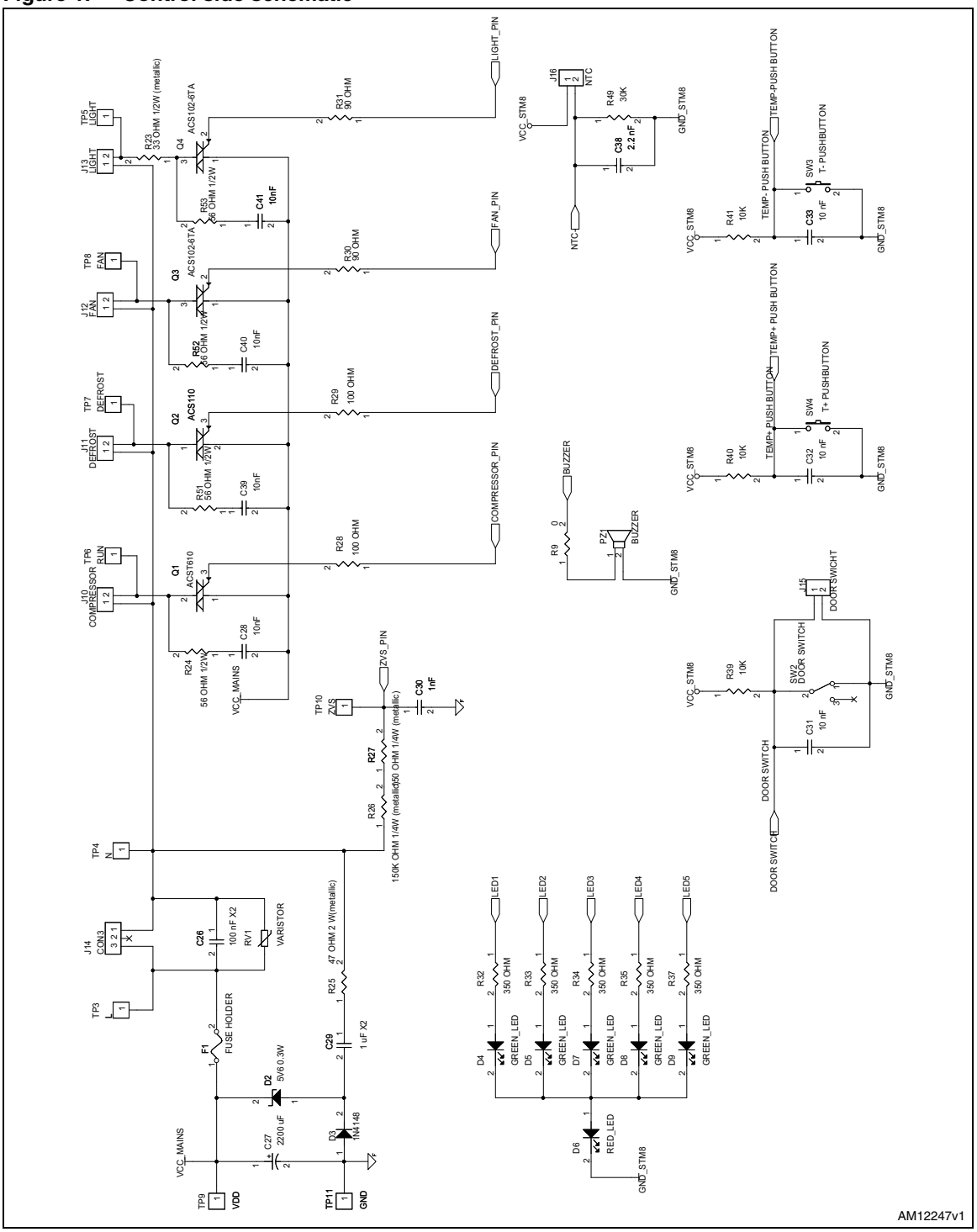


Figure 2. Control side schematic - STM8S

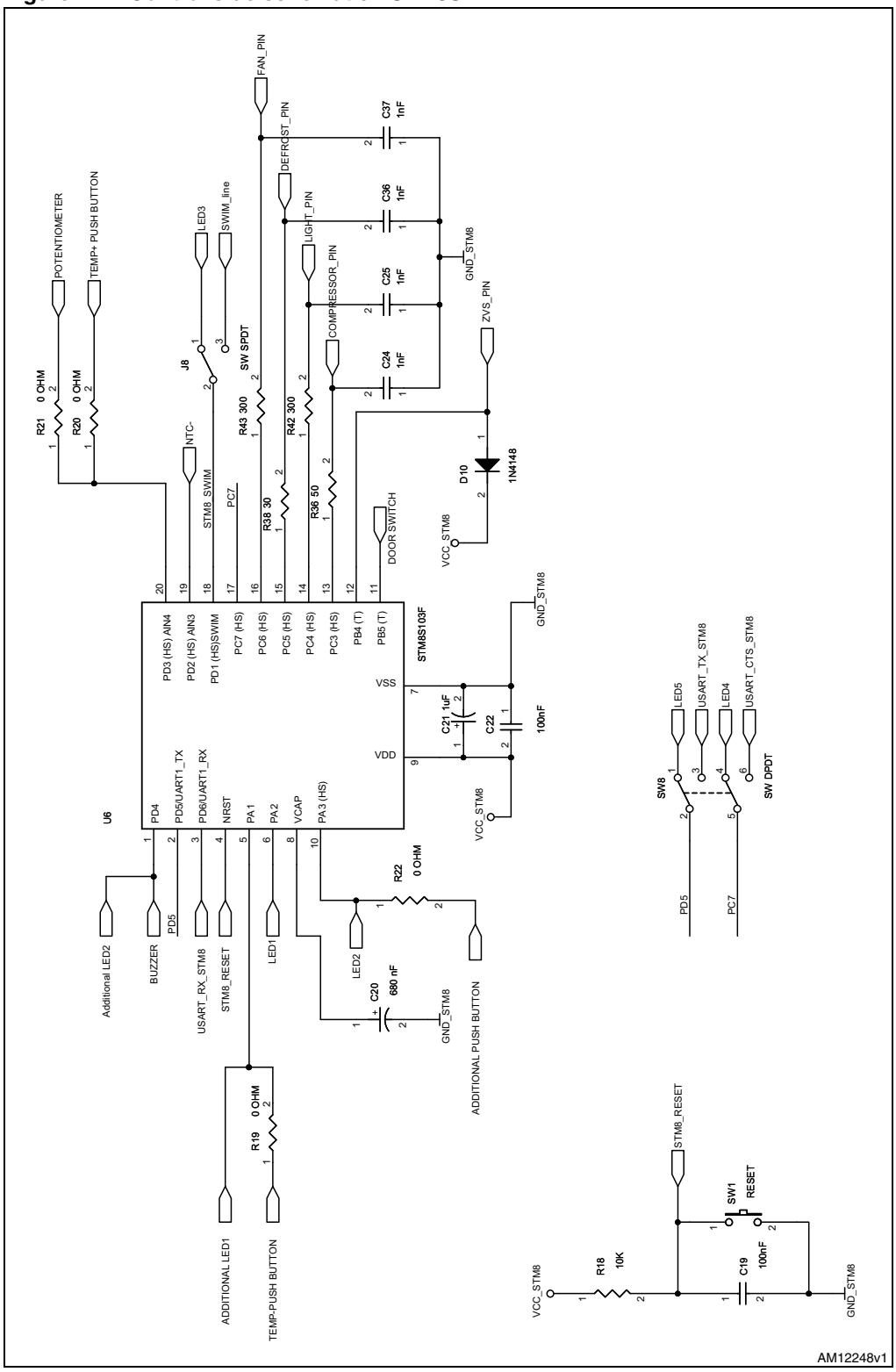


Figure 3. Interface side schematic

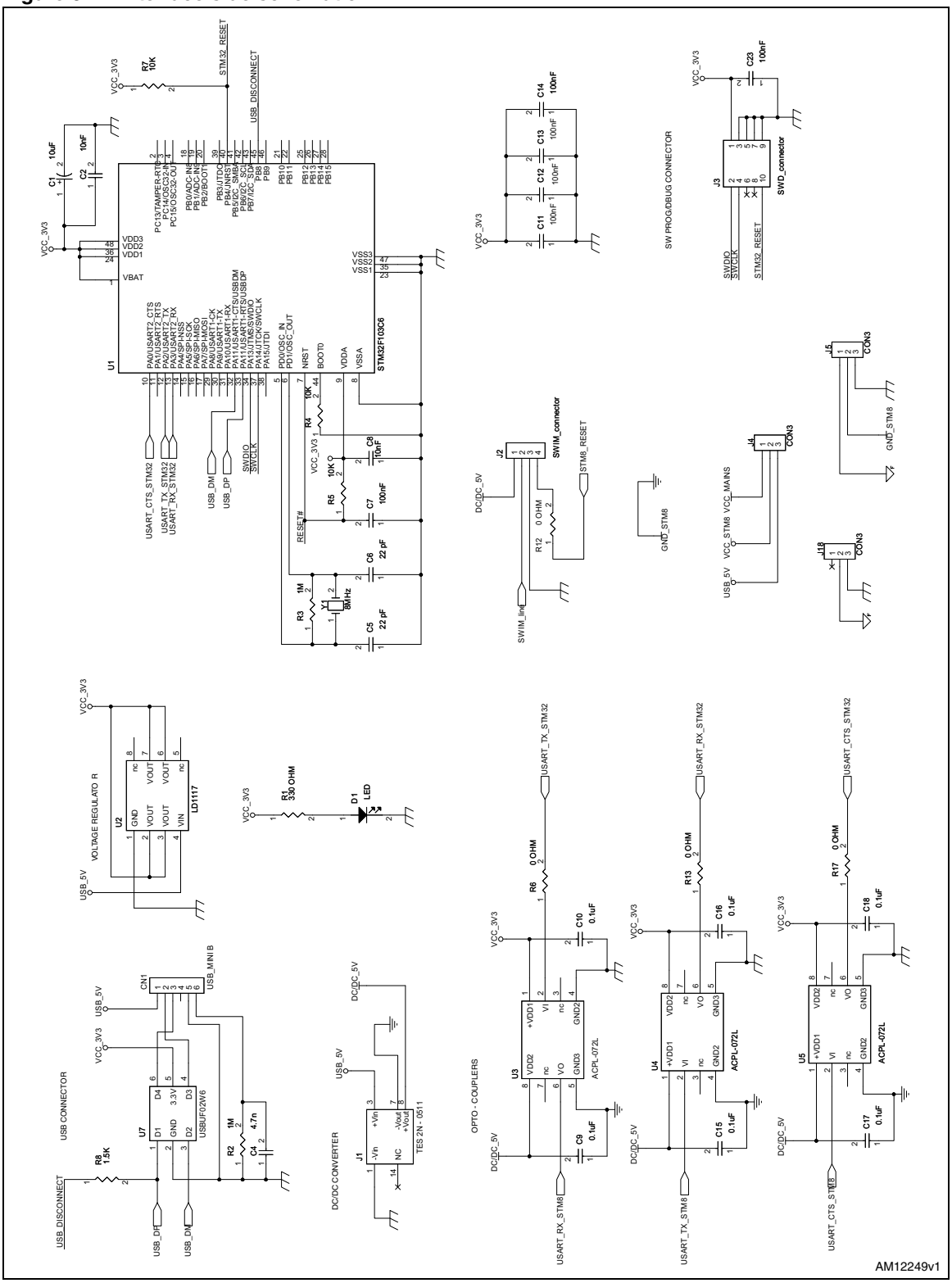
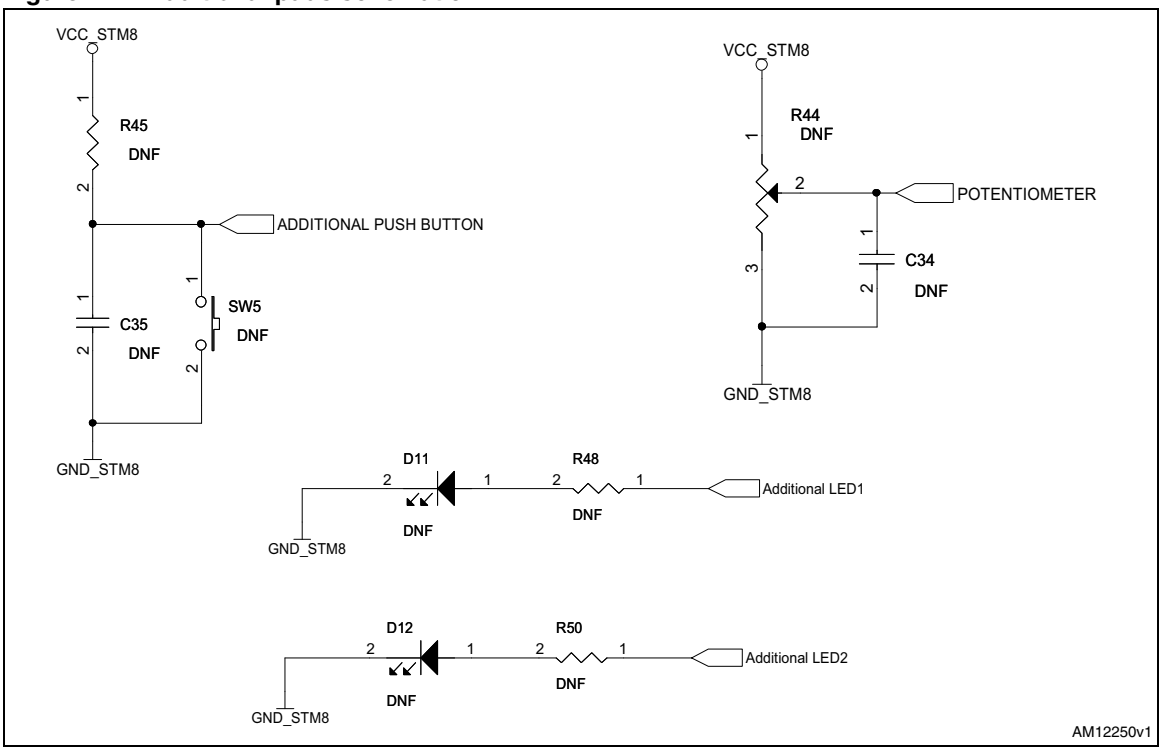


Figure 4. Additional pads schematic



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
31-May-2012	1	Initial release.
18-Sep-2012	2	Changed: figure in cover page and *Figure 1*
16-Oct-2012	3	Updated features.

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