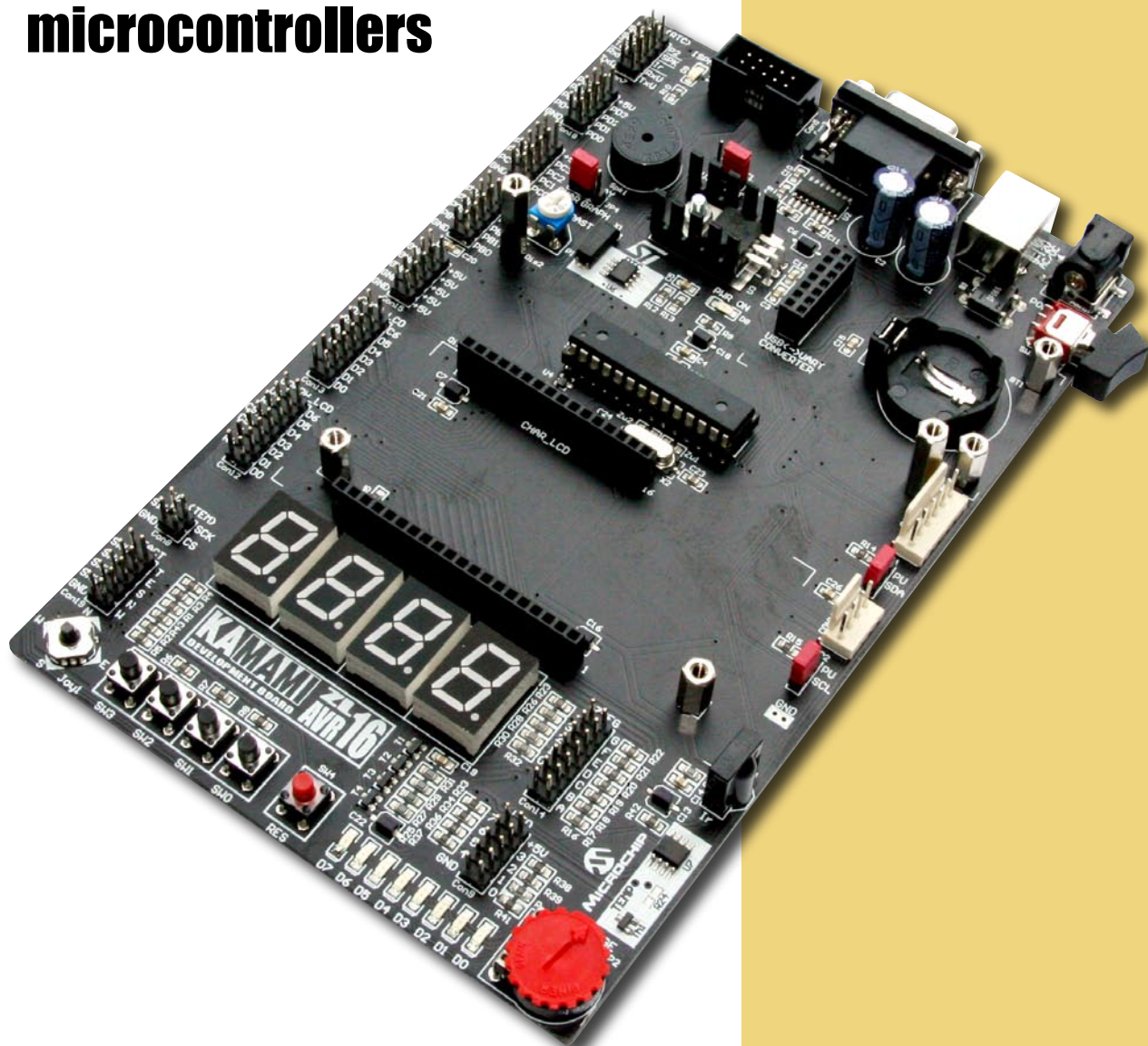


Development board for Atmel ATmega8/48/88/168 microcontrollers



ZL16AVR is an universal development board for ATmega88 (and other AVR microcontrollers in 28-pin package, like ATmega8/48/168). With a wide range of peripherals it can be used as an environment for development of prototypes or as an education board.

Preface

The ZL16AVR board, thanks to its rich set of peripherals, can be used as environment for developing applications for ATmega88 microcontrollers and other in 28-pin package (like ATmega8/48/168).

Basic features

- ▶ ATmega88 microcontroller in DIP package
- ▶ 4 switch keyboard
- ▶ 5-position joystick
- ▶ 8 LEDs
- ▶ four digit seven segment display
- ▶ connector for 2x16 characters LCD display (LCD1602)
- ▶ connector for graphic LCD display with KS0108 controller IC (LCD12864)
- ▶ M41T00 real time clock with socket for CR2032 battery
- ▶ TC77 digital thermometer with SPI interface
- ▶ thermistor
- ▶ TSOP31236 (36kHz) infrared receiver
- ▶ piezoelectric speaker
- ▶ connector for ZL1USB/ZL4USB module (USB<->UART converter)
- ▶ ISP connector
- ▶ USB connector for powering from PC
- ▶ DB9 connector with MAX232 voltage translator for RS232 transmission
- ▶ set of pin connectors with all I/O signals of microcontroller
- ▶ potentiometer

Standard equipment

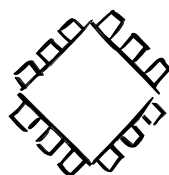
Code	Description
ZL16AVR	▶ Assembled ZL16AVR board with ATmega88

Technical assistance

For technical assistance, please contact support@kamami.com.

Please provide the following data:

- ▶ Version of the operating system
- ▶ Microcontroller type used in your system and its oscillator frequency
- ▶ Detailed description of the problem

**btc**

BTC Korporacja
05-120 Legionowo, Poland
ul. Lwowska 5
e-mail: office@kamami.com
<http://www.kamami.com>

Disclaimer

BTC Korporacja makes no warranty for the use of its products and assumes no responsibility for any errors which may appear in this document nor does it make a commitment to update the information contained herein.

BTC Korporacja products are not intended for use in medical, life saving or life sustaining applications.

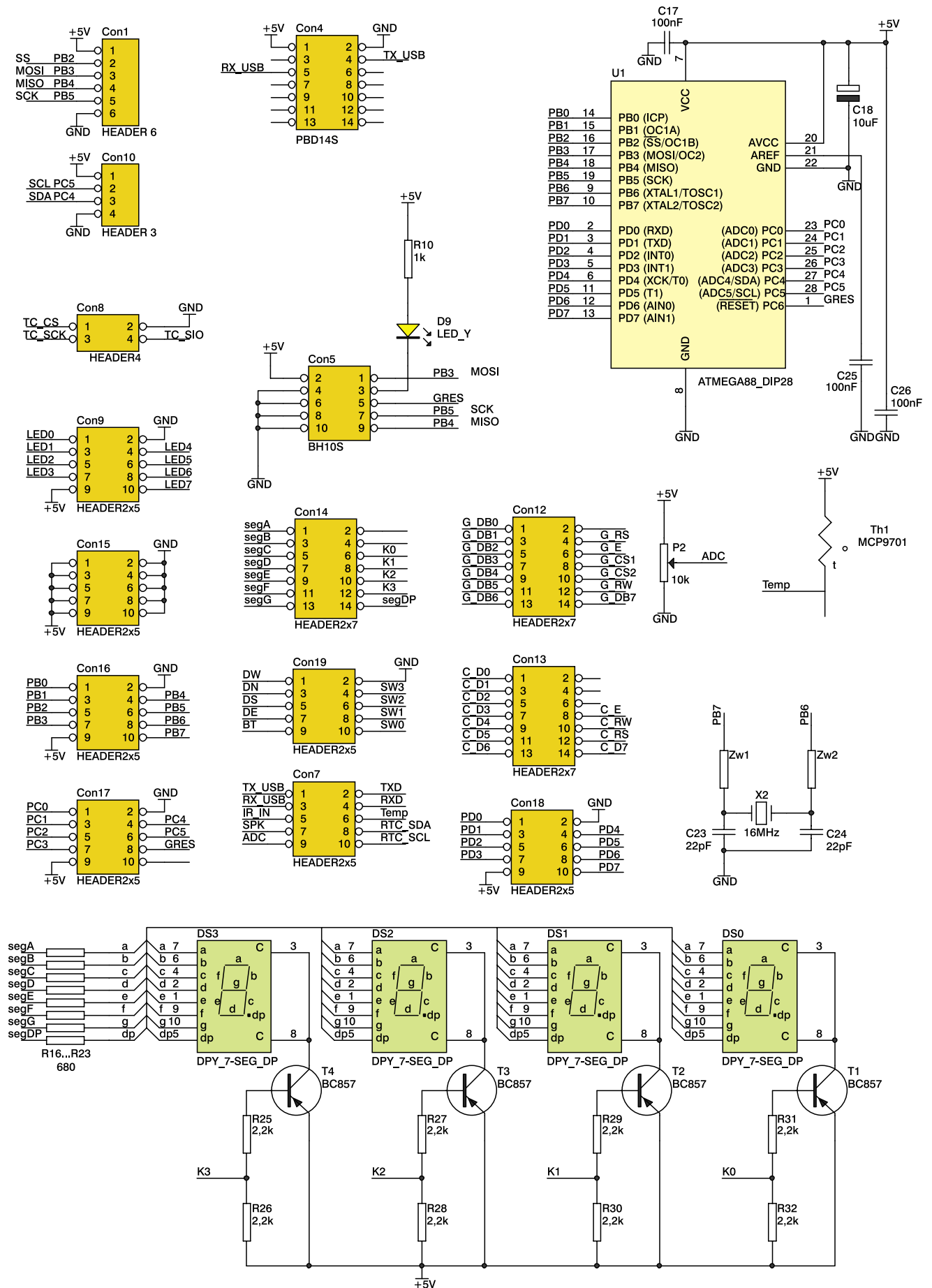
BTC Korporacja retains the right to make changes to these specifications at any time, without notice.

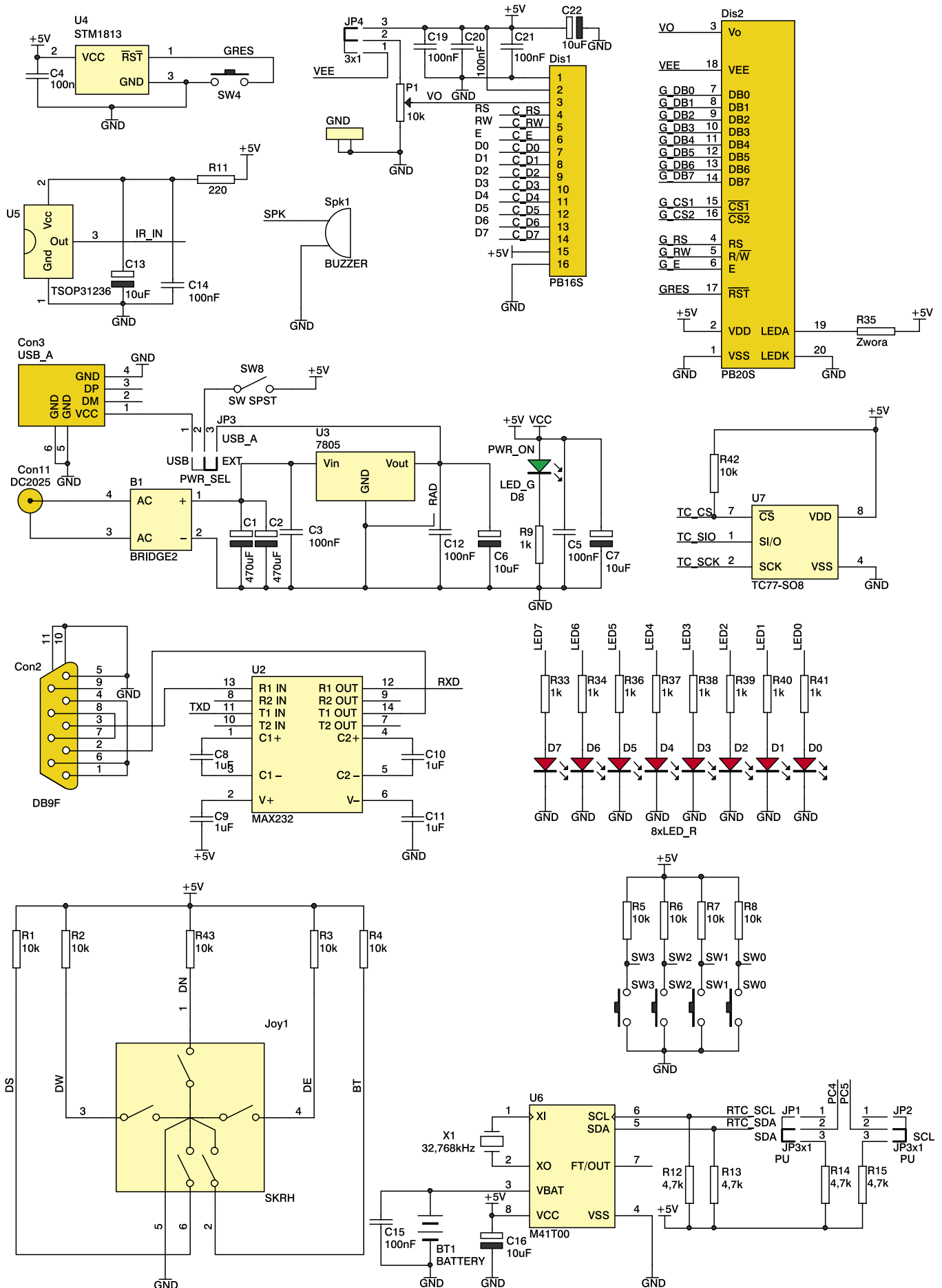
All product names referenced herein are trademarks of their respective companies.

Table of contents

▶ Electric schematic	4
▶ Power supply	6
▶ Keyboard	7
▶ Joystick	8
▶ LEDs	9
▶ LED display	10
▶ Potentiometer	11
▶ TC77 digital thermometer	12
▶ Thermistor	13
▶ Infrared receiver	14
▶ Connector for graphic LCD display	15
▶ Connector for alphanumerical LCD display	16
▶ I ² C bus connector	17
▶ SPI bus connector	18
▶ USB<->UART converter connector	19
▶ M41T00 real time clock device	20
▶ Buzzer	21
▶ ISP connector	22
▶ RS232 connector	23
▶ I/O headers	24

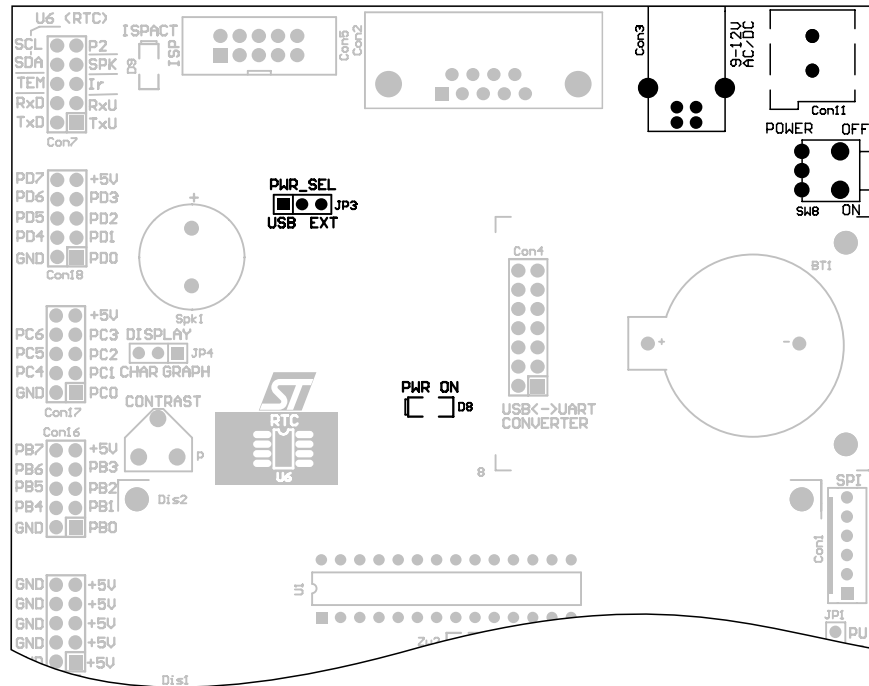
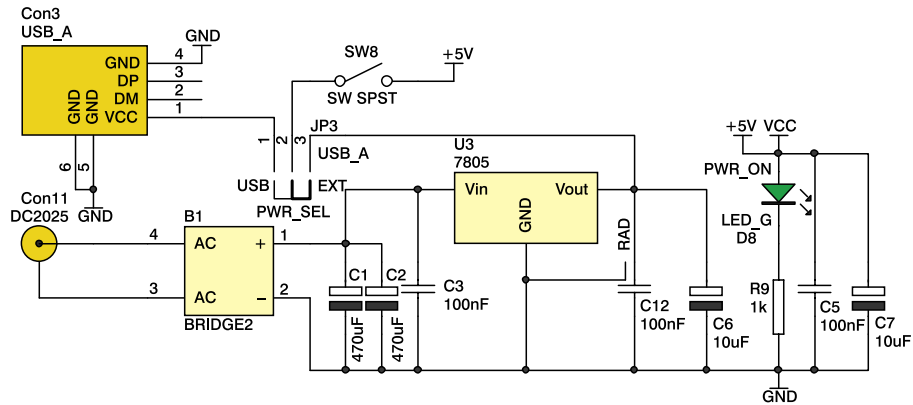
Electric schematic





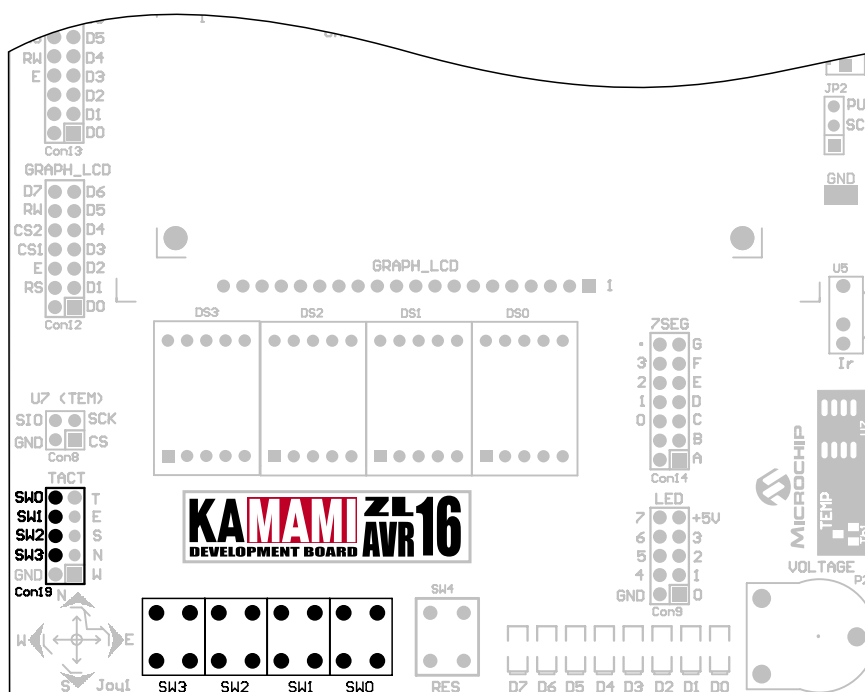
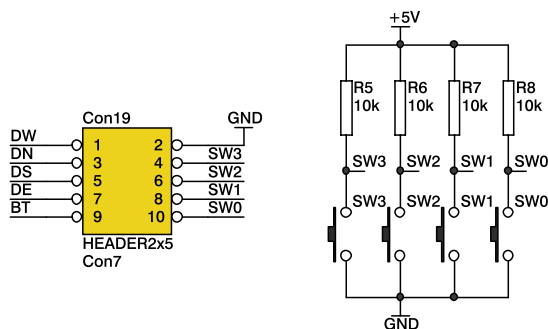
Power supply

The ZL16AVR board can be powered from the USB port of your PC (USB-B Con3, PWR_SEL pin header in the USB position) or an external voltage source with a value 9..12V (DC connector Con11, PWR_SEL pin header in position EXT). Board is equipped with a switch SW8 which allows to disconnect power without removing the plug from the connector Con3 or Con11. LED D8 indicates the inclusion of the supply voltage.



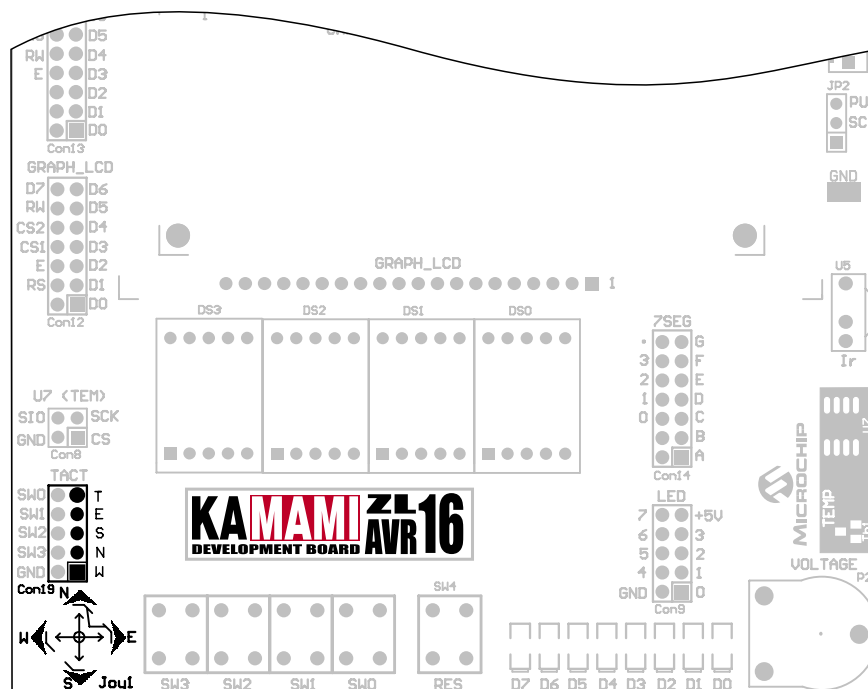
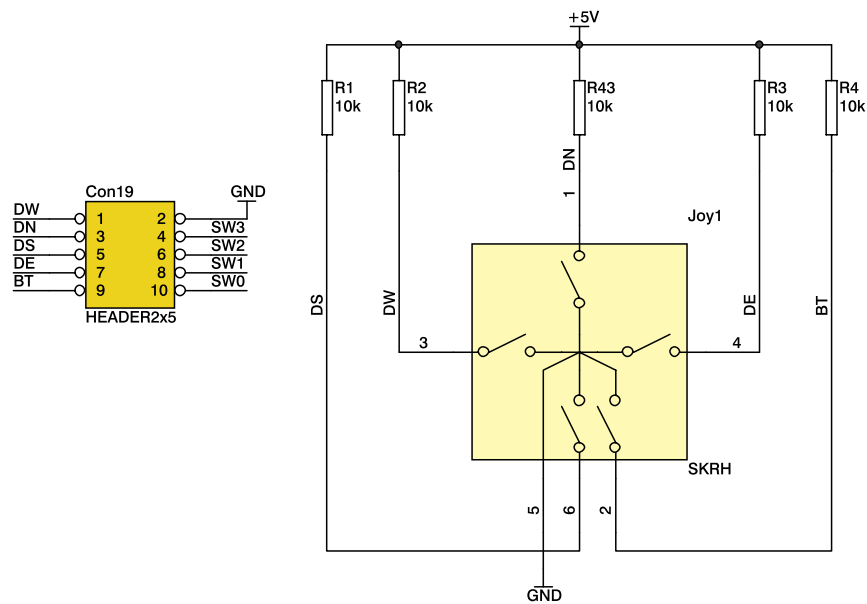
Keyboard

The ZL16AVR board is equipped with four switch keyboard (SW0-SW3). Each button has its own pull-up resistor. Switch lines are available on Con19 connector.



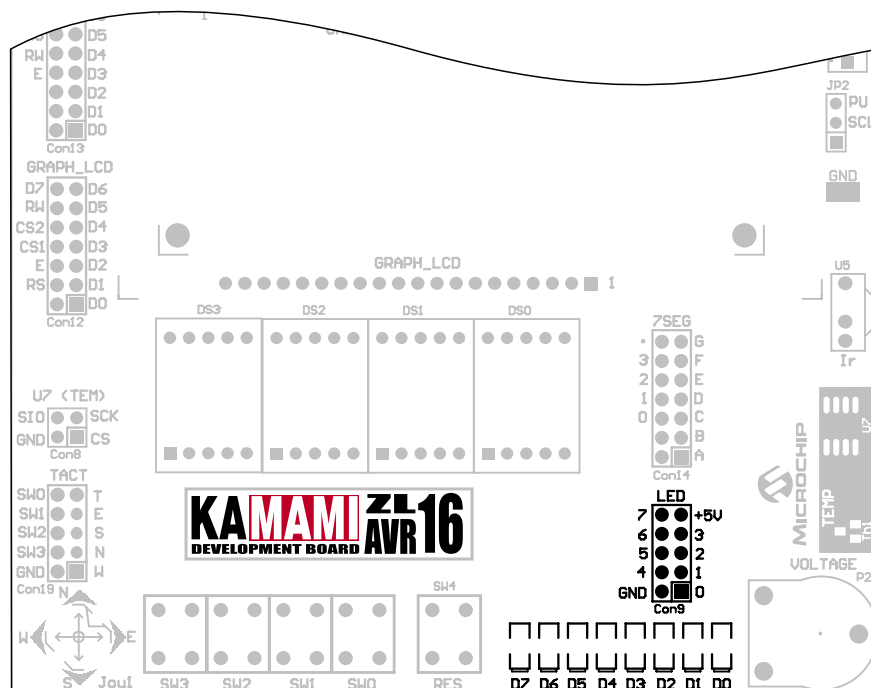
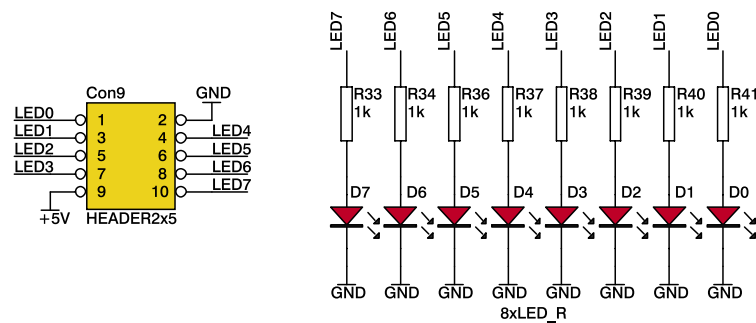
Joystick

The ZL16AVR board is equipped with 5-position joystick. Each position has its own pull-up resistor. Joystick lines are available on Con19 connector.



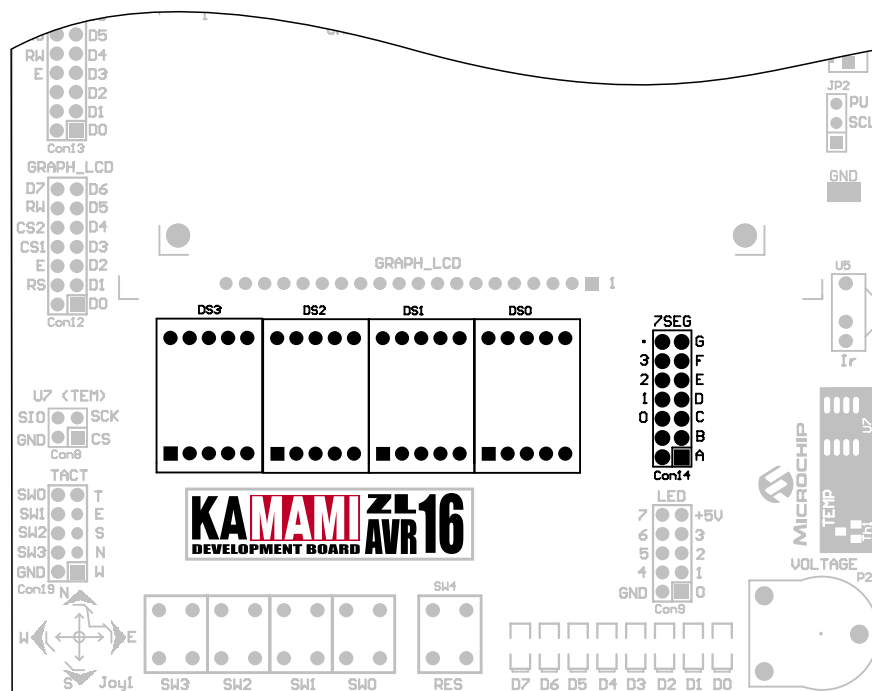
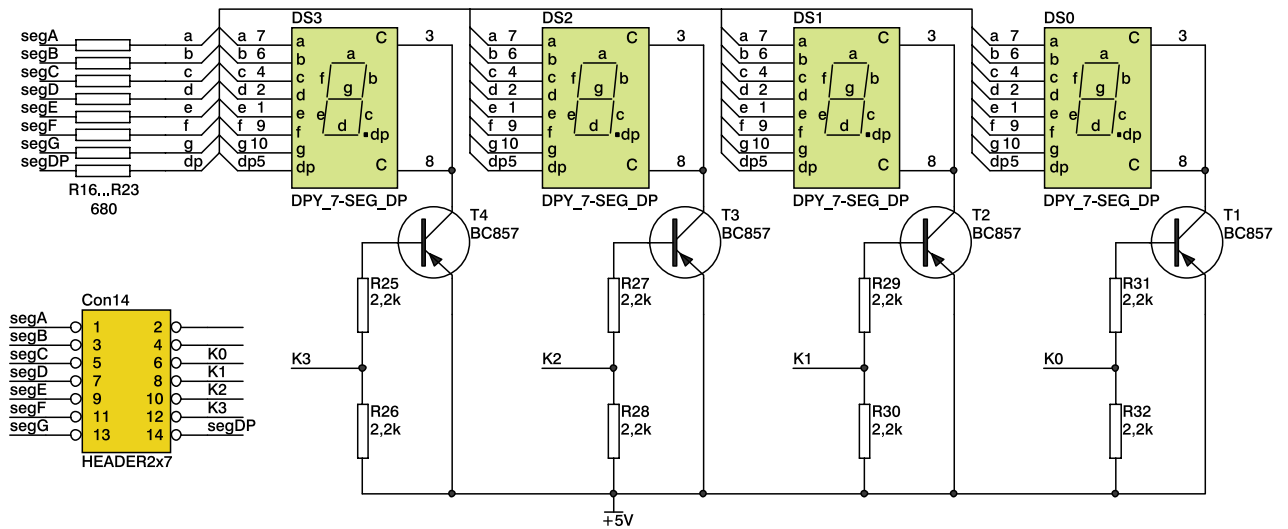
LEDs

The ZL16AVR board is equipped with 8 LEDs (active state: high). Control lines for LEDs are available on Con9 connector.



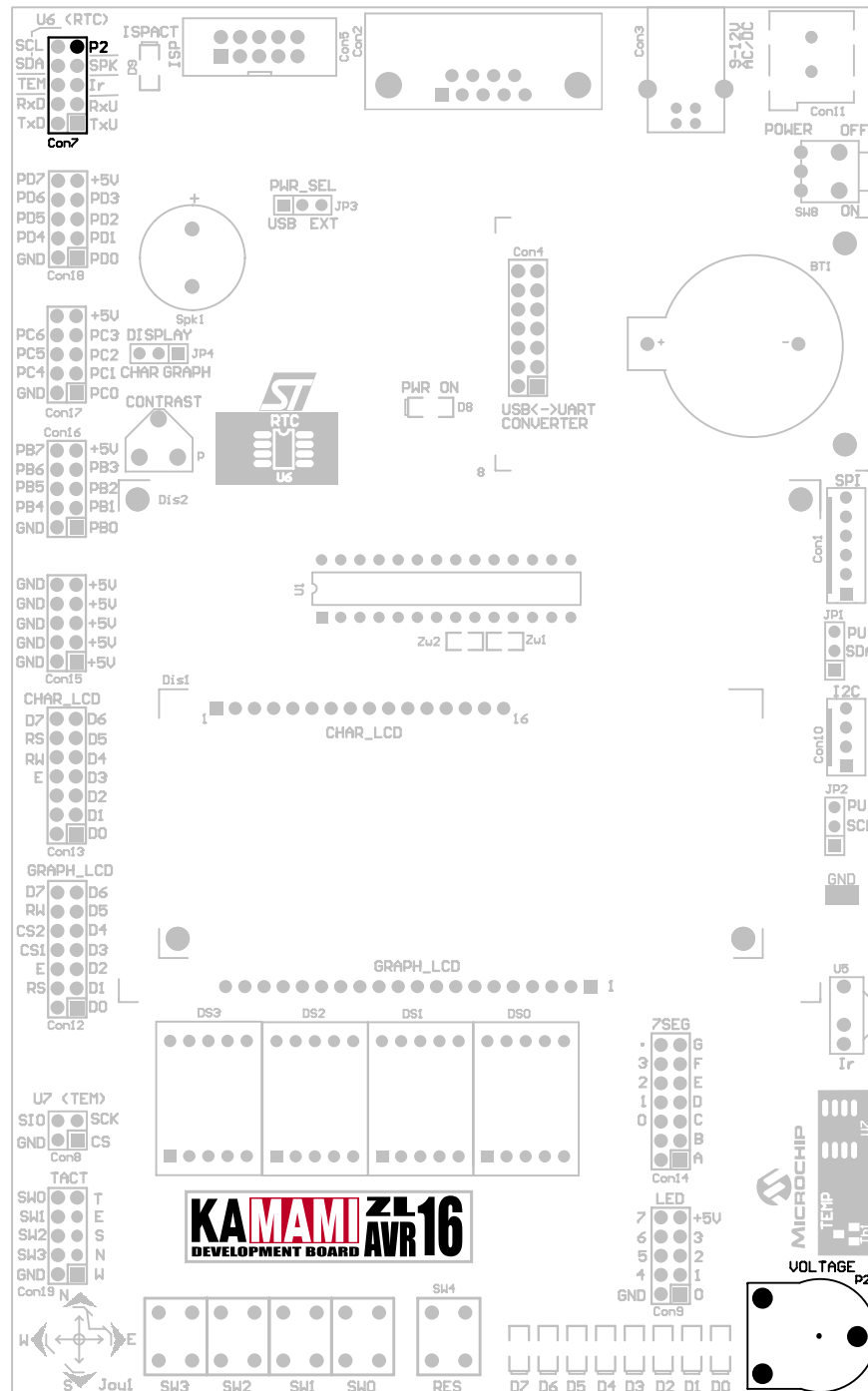
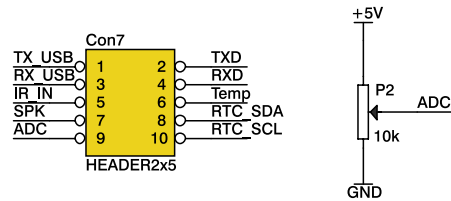
LED display

The ZL16AVR board is equipped with four-digit seven segment LED display (DS0-DS3). Control signals for LED display are available on Con14 connector.



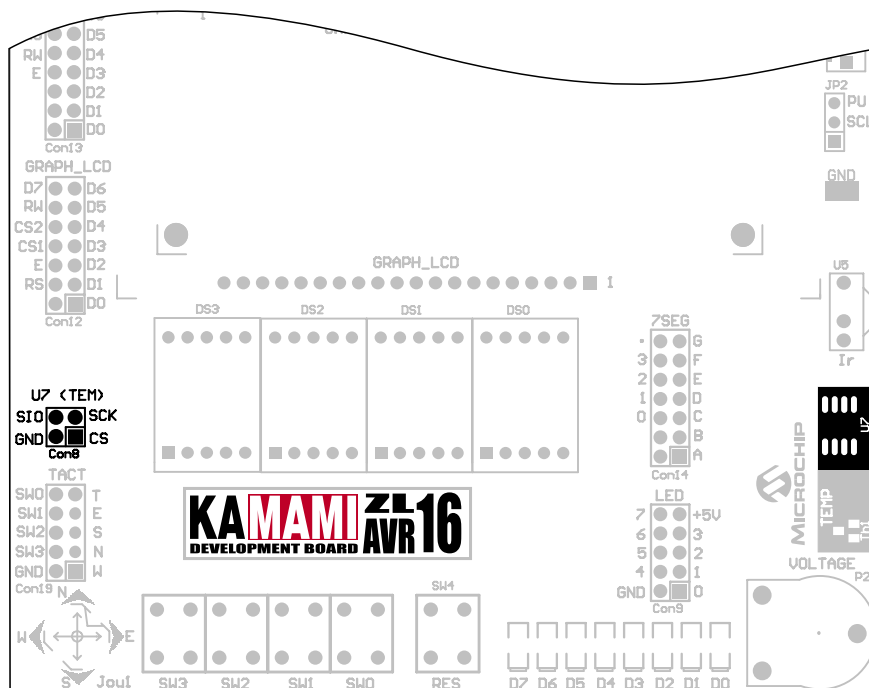
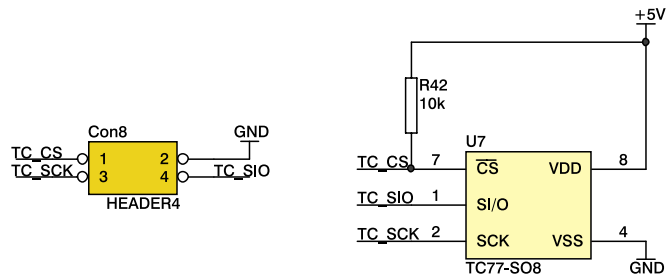
Potentiometer

The ZL16AVR board is equipped with potentiometer, which can be used for setting voltage on input of analog to digital converter. The slider of potentiometer is available on Con7 connector (marked as P2).



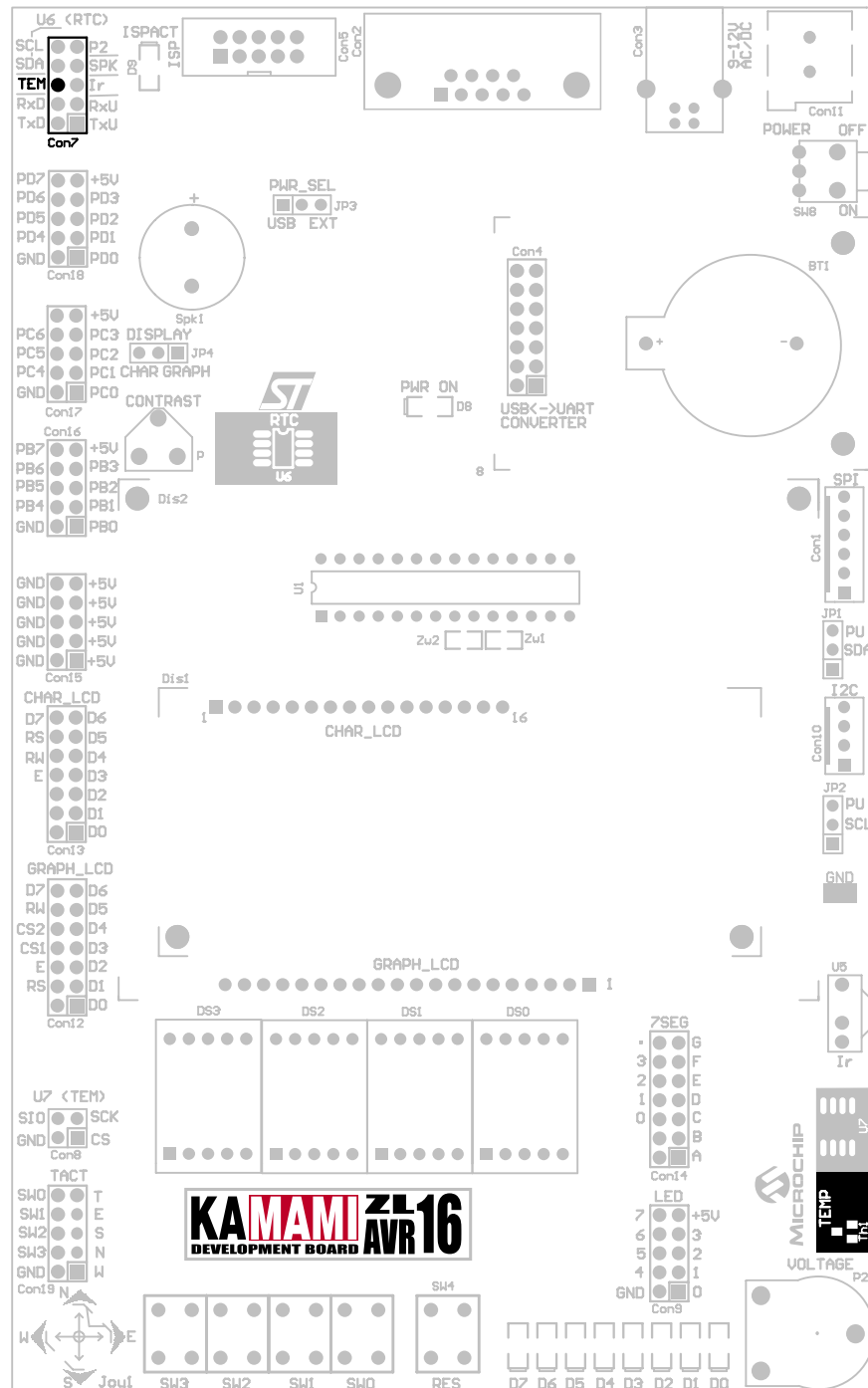
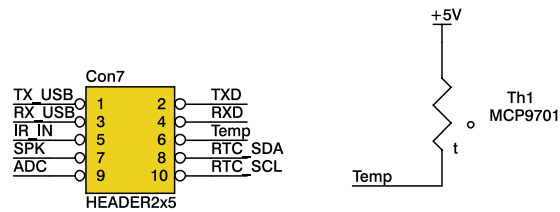
TC77 digital thermometer

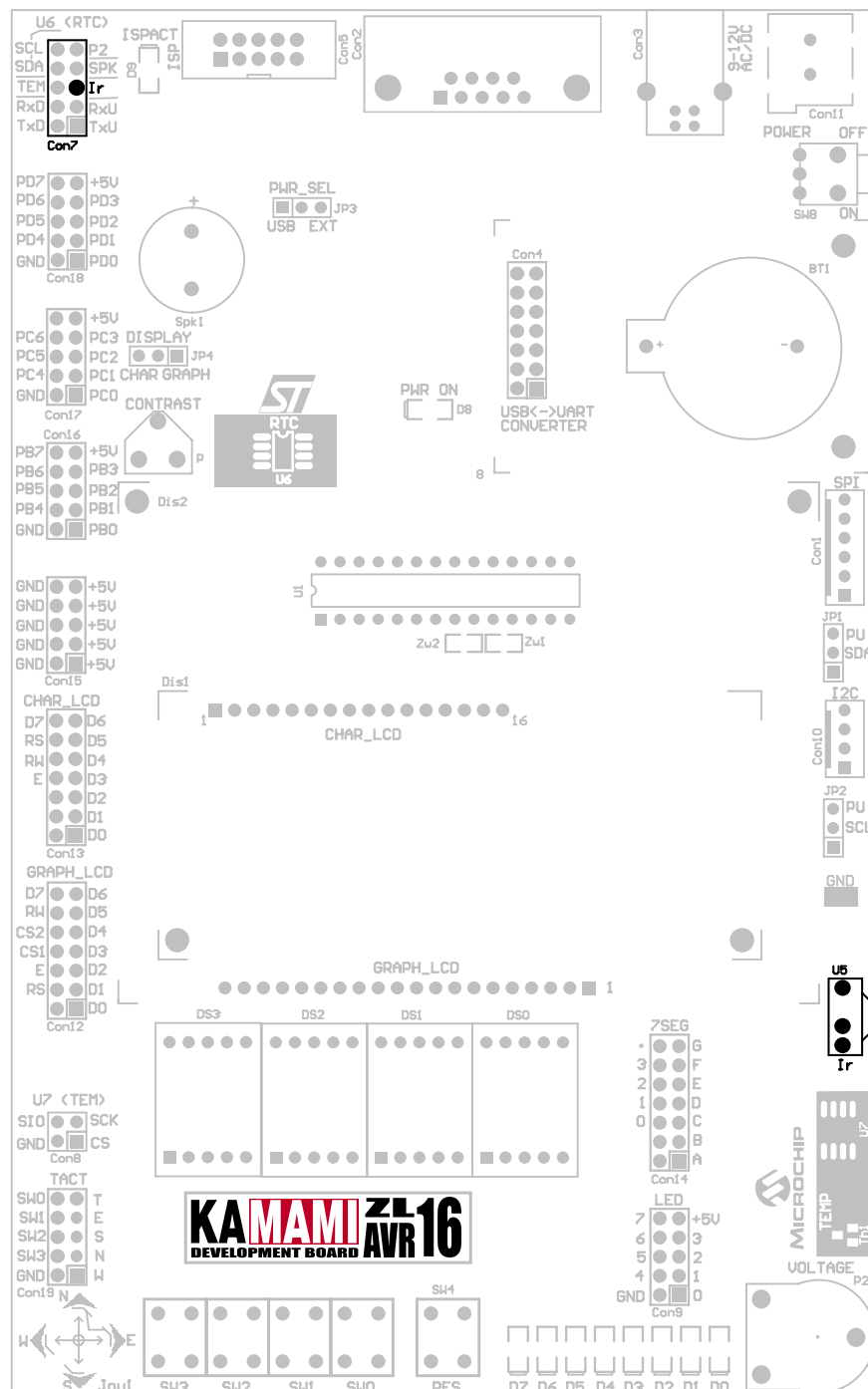
The ZL16AVR board is equipped with TC77 digital thermometer device (Microchip). TC77 device works on SPI bus. SPI lines (SCK, SIO, CS) are available on Con8 connector.



Thermistor

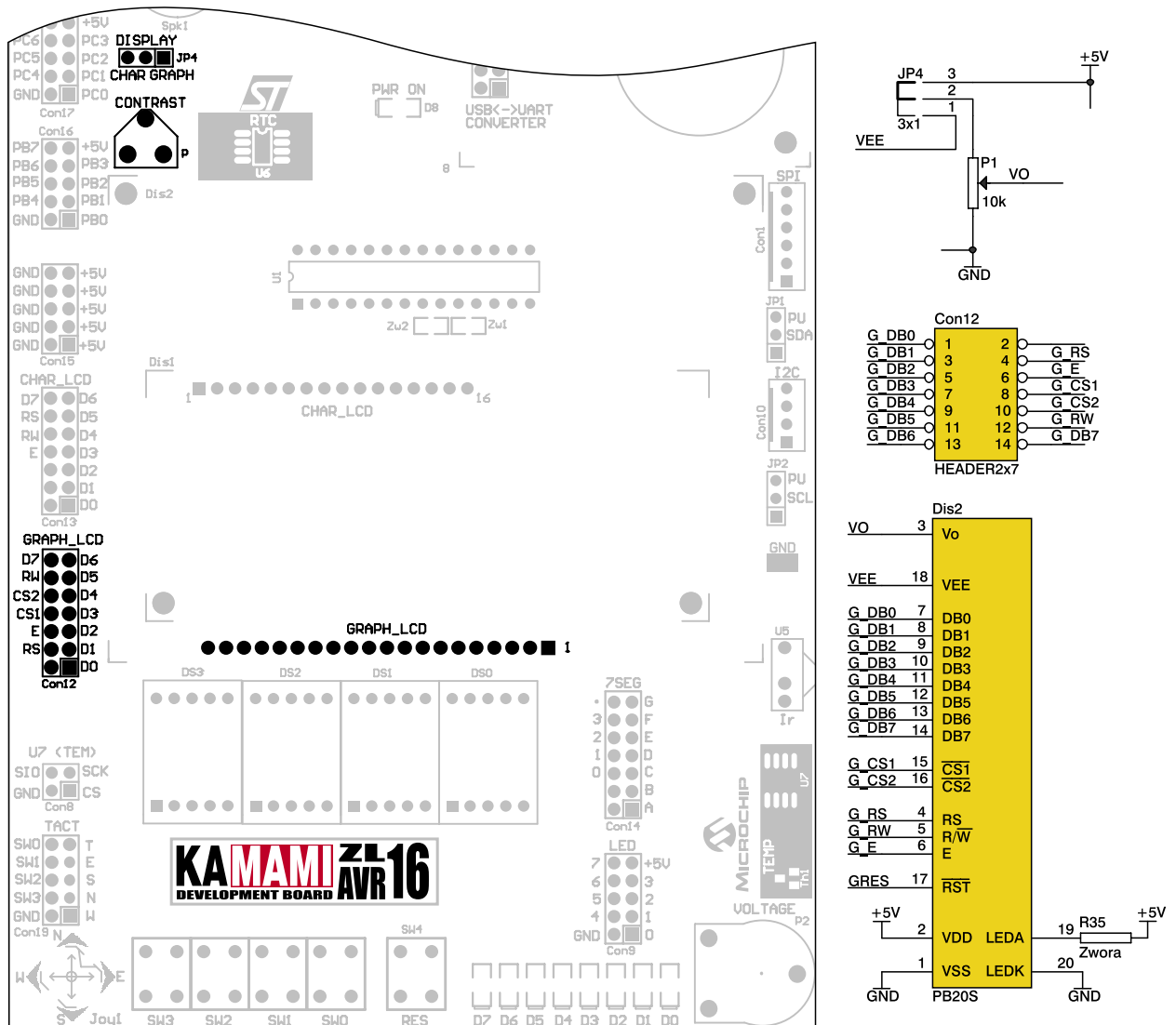
The ZL16AVR board is also equipped with thermistor MCP9701 (Microchip) Output voltage is available on Con7 connector (marked TEM).





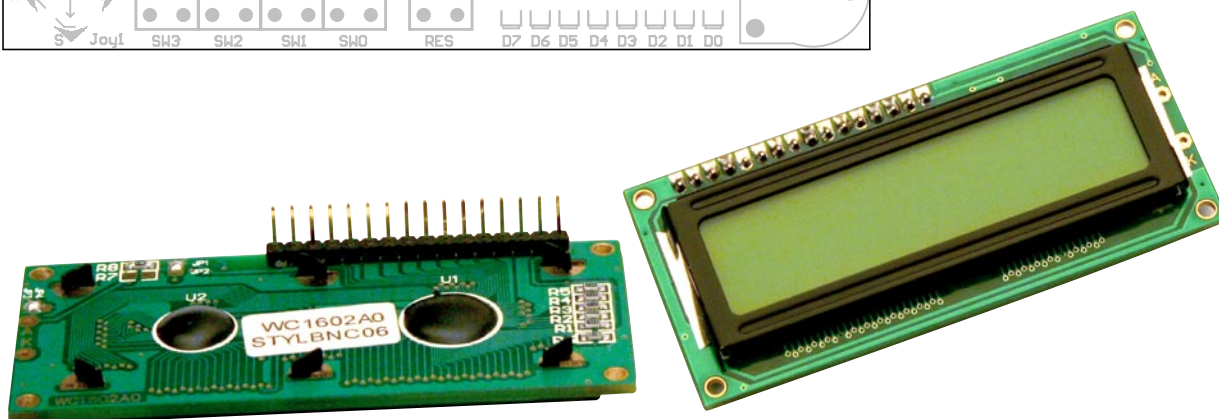
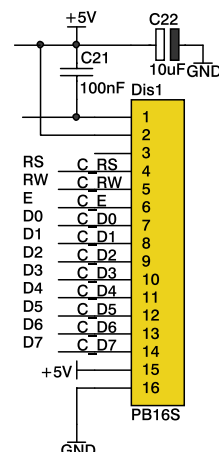
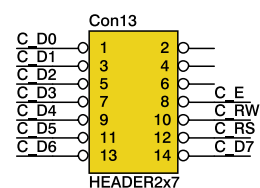
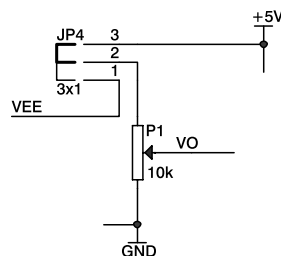
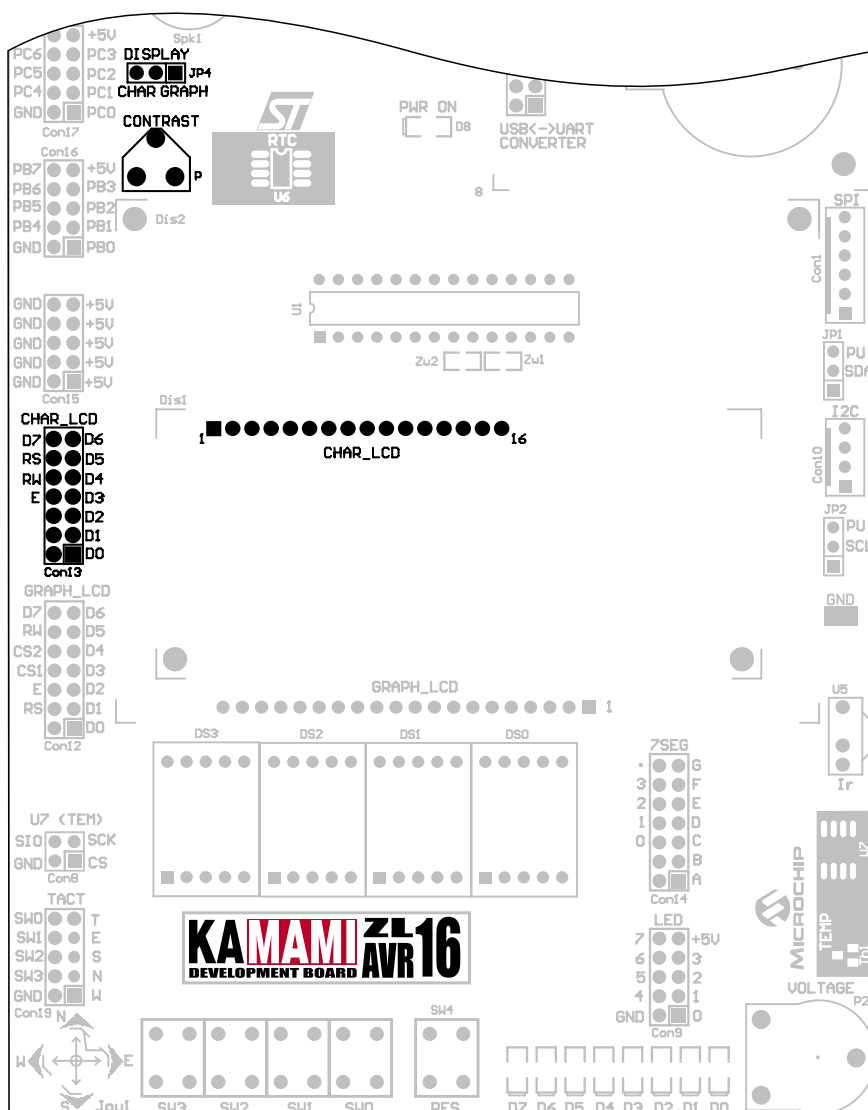
Connector for graphic LCD display

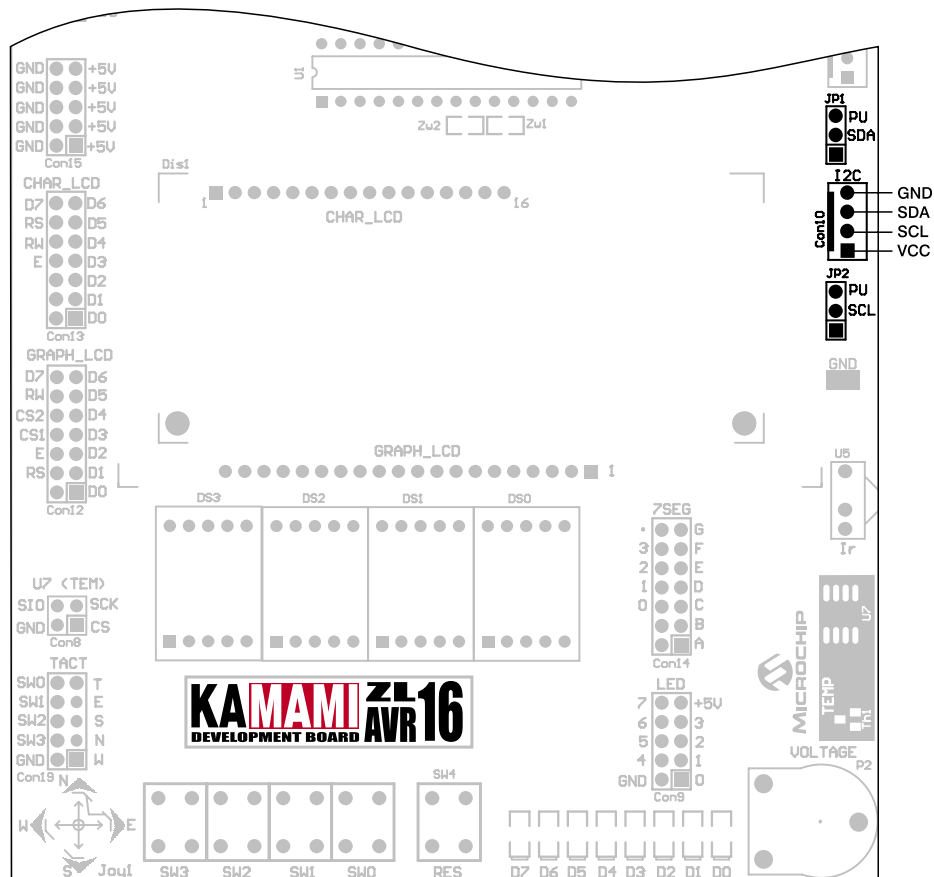
The ZL16AVR board is equipped with connector for graphic LCD display with KS0108 controller (LCD12864). Display's contrast can be adjusted by P1 potentiometer (JP4 DISPLAY pin header in GRAPH position). Control signals for display are available on Con12/LCD_GRAPH connector.



Connector for alphanumerical LCD display

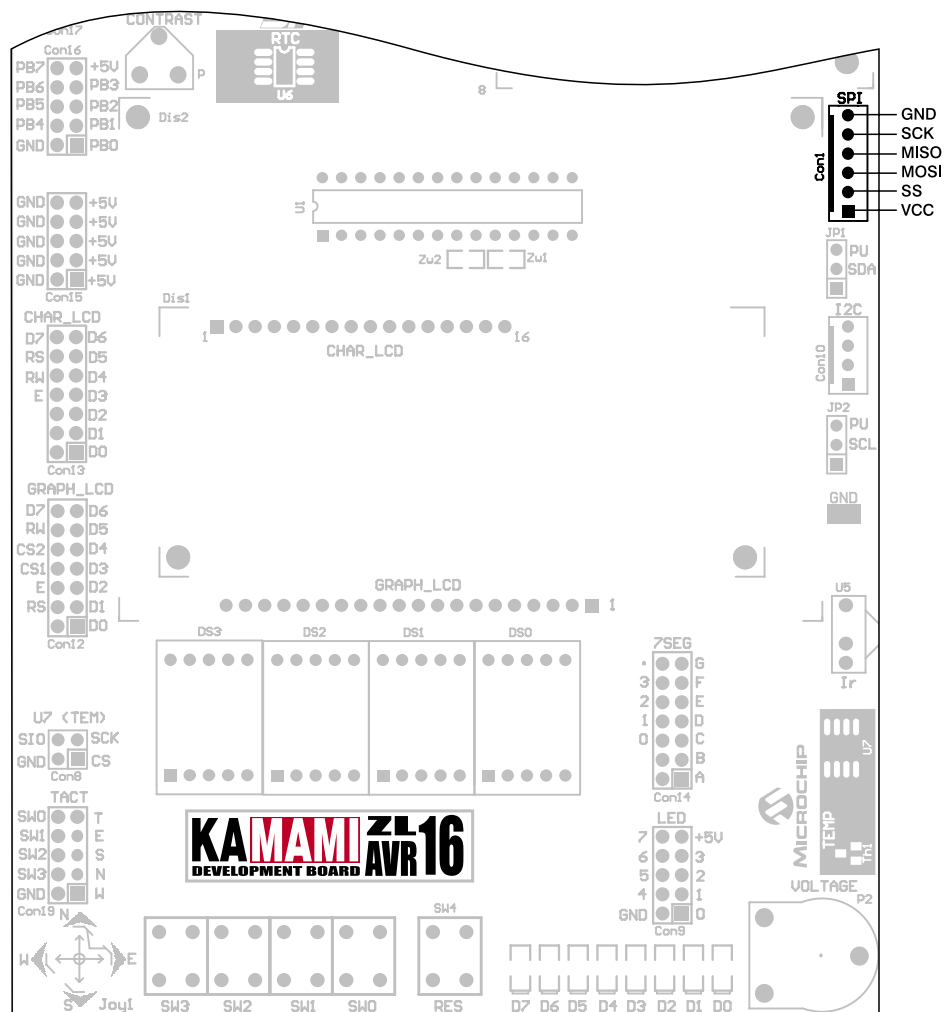
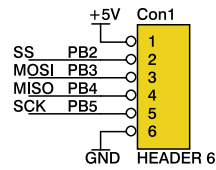
The ZL16AVR board is equipped with connector for alphanumerical LCD display with HD44780 controller (LCD1602). Display contrast can be adjusted by P1 potentiometer (JP4 DISPLAY pin header in CHAR position). Control signals for display are available on Con13/CHAR_LCD connector.





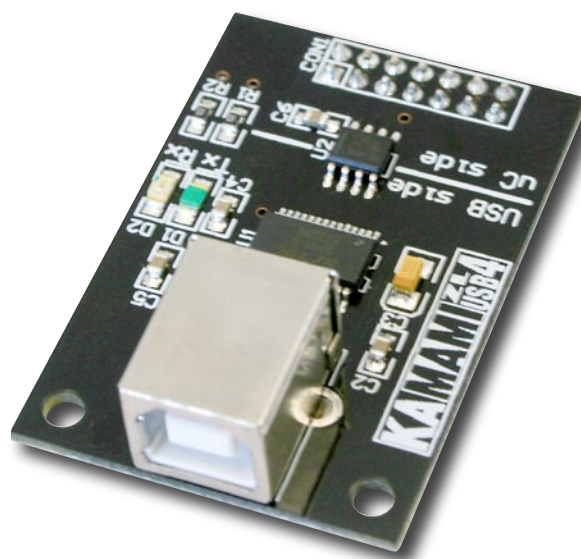
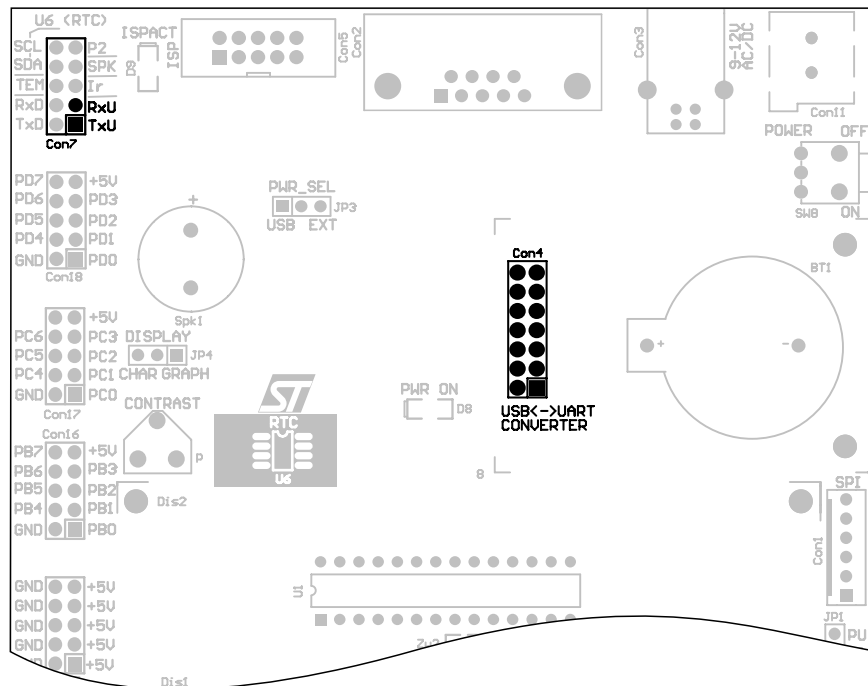
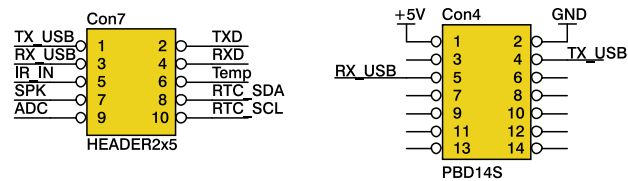
SPI bus connector

The ZL16AVR board is equipped with connector Con1/SPI which can be used for connecting external devices with SPI interface.



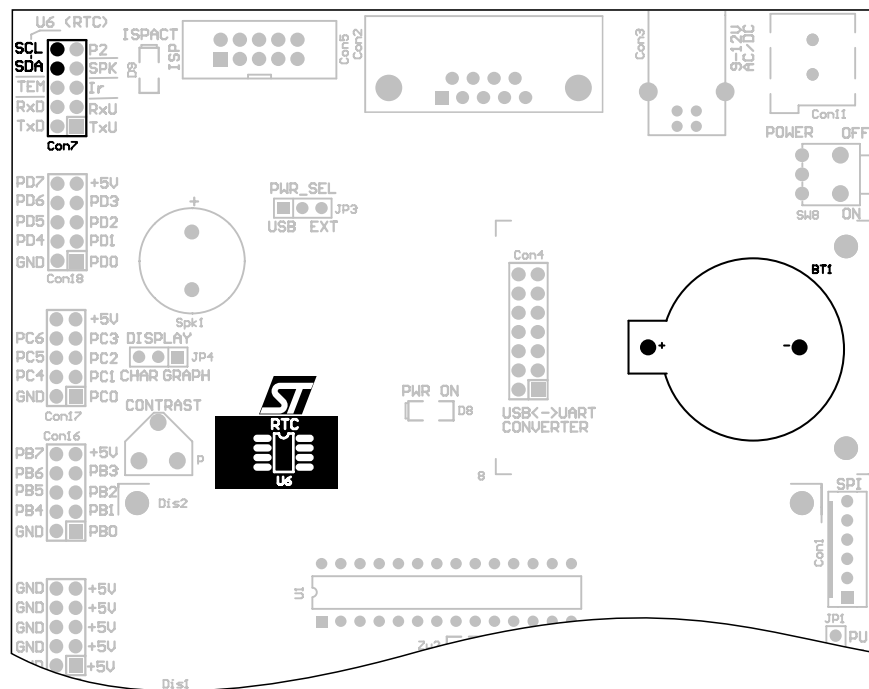
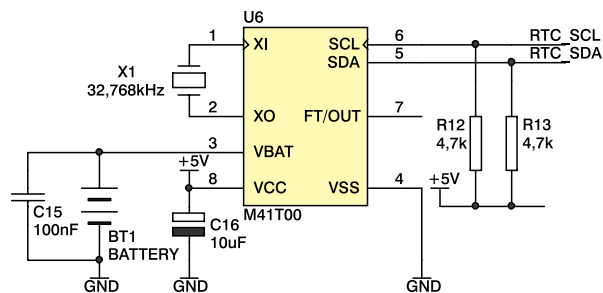
USB<->UART converter connector

The ZL16AVR board is equipped with connector Con4 which can be used for connecting USB<->UART converter module (for example: ZL1USB_A, ZL4USB). UART lines are available on Con7 connector (marked as TxU and RxU).



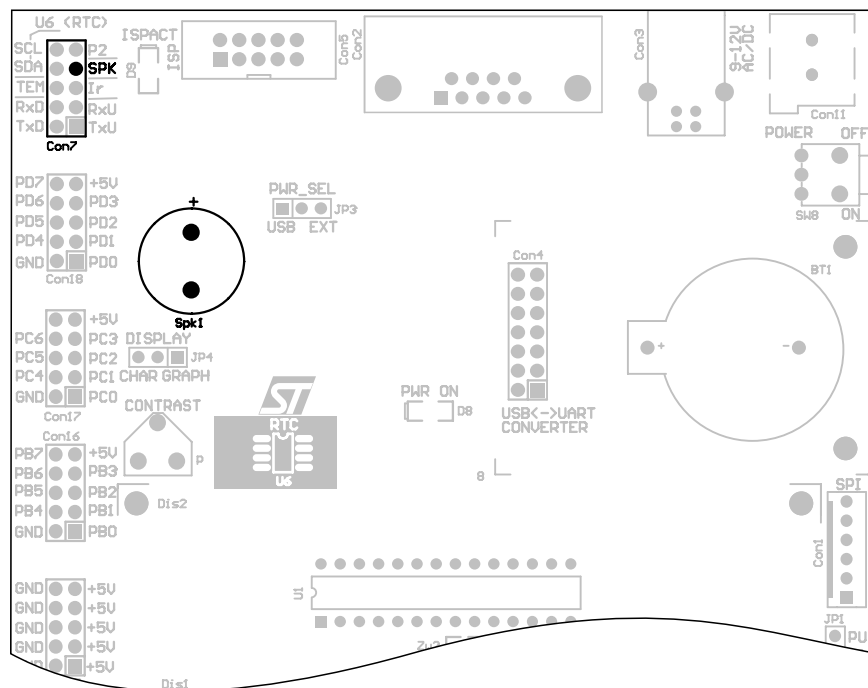
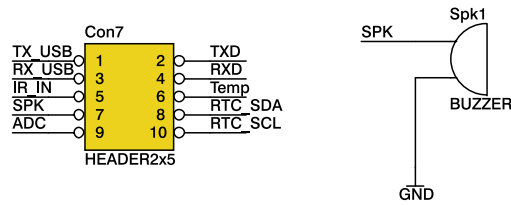
M41T00 real time clock device

The ZL16AVR board is equipped with M41T00 RTC device (STMicroelectronics). In addition to RTC device on the board there are also socket for battery (CR2032) and crystal oscillator. Control signals (SDA and SCL) are available on Con7 connector.



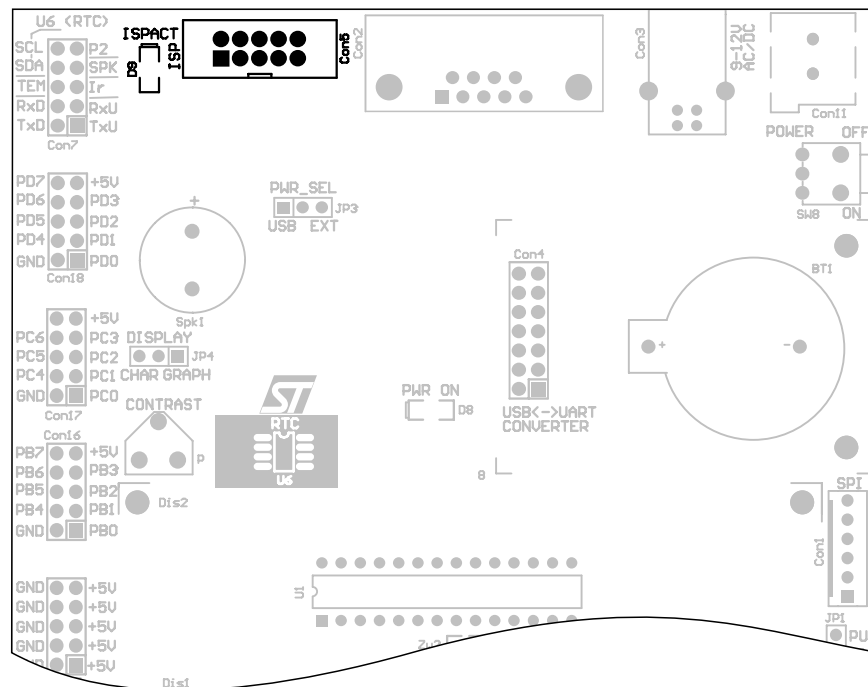
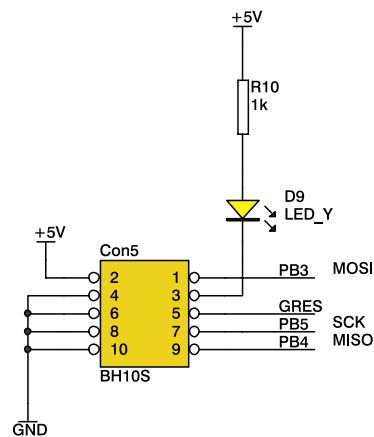
Buzzes

The ZL16AVR board is equipped with piezoelectric buzzer Spk1. Control signal for buzzer is available on Con7 connector (marked as SPK).



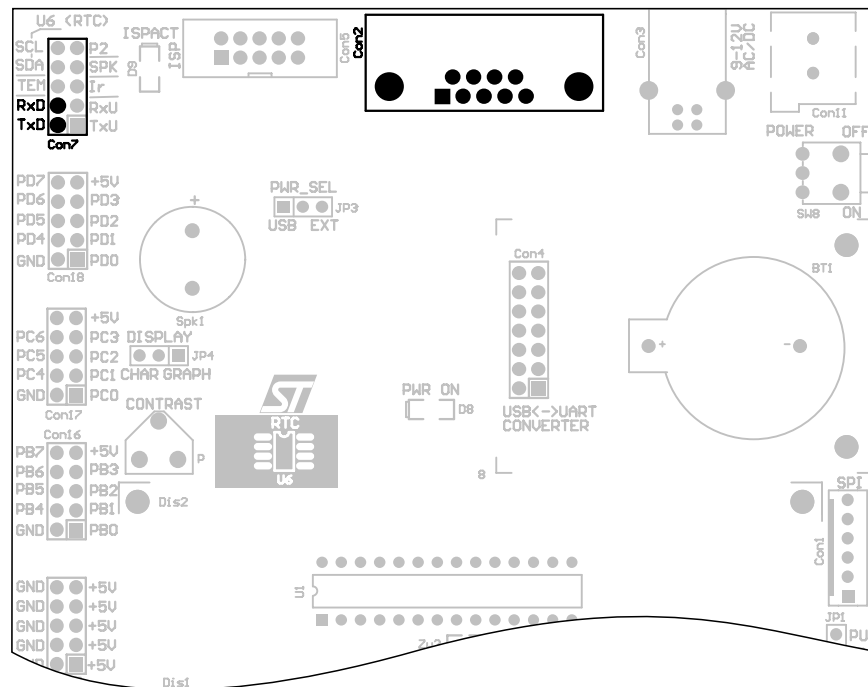
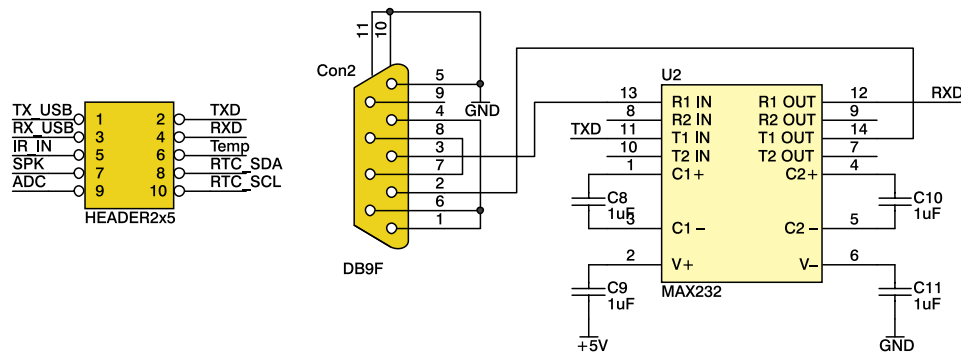
ISP connector

The ZL16AVR board is equipped with Con5 connector (10 pin) which can be used for programming using ISP interface (for example: ZL20PRG, ZL2PRG). Before connecting ISP tool make sure that lines PB3...PB5 are not connected with any low impedance load circuits.



RS232 connector

The ZL16AVR board is equipped with DB9F connector (Con2). This connector can be used to exchange data with PC by RS232 interface. RxD and TxD signals are available on Con7 connector.



I/O headers

