



ZL11AVR



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Description

Development kit for AT90S1200/2313/ATtiny2313 microcontrollers. A board designed for building simple applications with AVR AT90S1200, AT90S2313 and ATtiny2313 microcontrollers. Its equipment, easy adaptation to personal requirements, as well as hardware compatibility with the AVT-3500 board make it suitable for both beginners and advanced users who want to work with microcontrollers or quickly build a microprocessor controller.



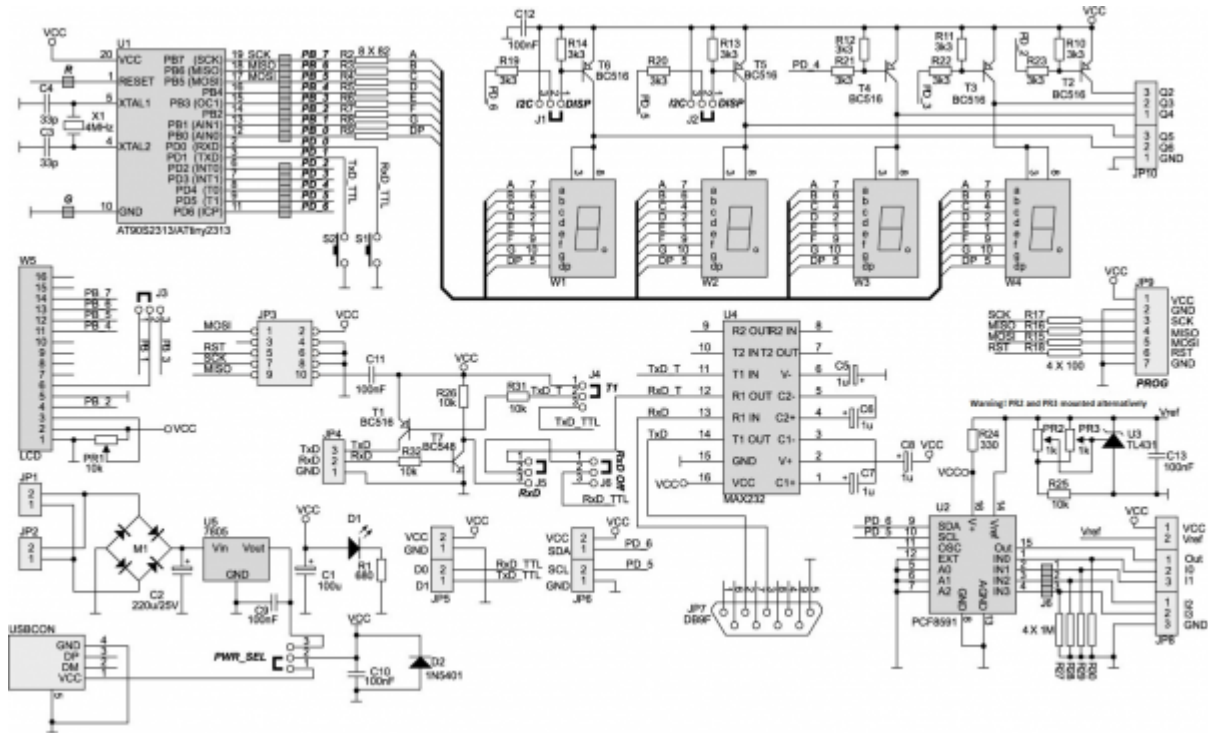
Basic feature and parameters

- ATtiny2313 microcontroller with flash memory programmed in the system - ISP (board is adapted to cooperate with microcontrollers AT90S1200, AT90S2313 and ATtiny2313),
- ISP connector for programming microcontrollers,
- built-in 4-digit, multiplexed LED display,
- possibility of using the LCD display with the controller compatible with HD44780 (e.g. LCD1602),
- microcontroller can be programmed using standard Atmel ISP programmers from Atmel and ZL20PRG programmer,
- built-in 4-channel, 8-bit A/D converter and 8-bit D/A converter (PCF8591),
- built-in precision reference voltage source with adjustable value,
- possibility of powering from USB or external power supply 9...12 VDC (built-in voltage converter),
- built-in RS232 interface (with voltage converter on MAX232 or transistors),
- microcontroller I / O port lines available on pin connectors,
- 2-button keyboard,
- configuration with a few jumpers

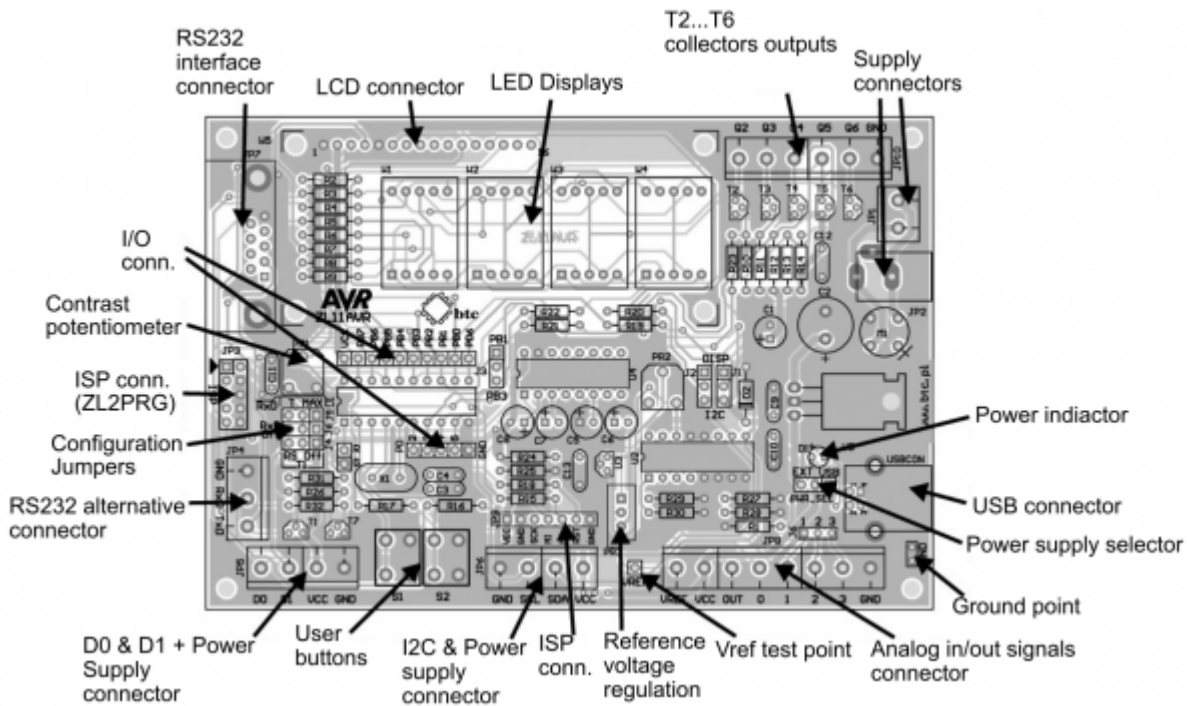
Standard equipmend

Code	Description
ZL11AVR	• Assembled and launched module with ATtiny2313 microcontroller

Electrical schematic



Placement of elements on the board



Connecting the LCD display to the microcontroller

Assignment of LCD module interface signals to the microcontroller pins:

Output name of LCD	Output number of LCD	Port line name of AVR
RS	4	PB2
E	6	PB1 or PB3 (see the table below)
D4	11	PB4
D5	12	PB5
D6	13	PB6
D7	14	PB7

Selection of the signal controlling the E line of the LCD module (J3):

Position	Designation on PCB	Signal E controlled from line...
1-2	PB1	...PB1
2-3	PB3	...PB3

Connecting the LED display to the microcontroller

The way of connecting display segments to the microcontroller I/O line

Segment LED	Line I/O
A	PB7
B	PB6
C	PB5
D	PB4
E	PB3
F	PB2
B	PB1
DP (point)	PB0

The method of connecting amplifiers of common display cathodes to the microcontroller I/O line

Display cathode...	Line I/O
...W1	PD6
...W2	PD5
...W3	PD4
...W4	PD3

Jumper J1, J2, PWR_SEL function

J1 jumper function

Position	Designation on PCB	Description
1-2	DISP	If PD6 controls W1 anode
2-3	I2C	If PD6 is SDA line

J2 jumper function

Position	Designation on PCB	Description
1-2	DISP	If PD5 control W2 anode
2-3	I2C	If PD5 is SCL line

Selecting of power source (between USB and non-stabilized external power supply) can be made using the PWR_SEL jumper

Position	Designation on PCB	Description
1-2	USB	Power supply from USB
2-3	EXT	Power supply from external 9...12 VDC

RS232 interface

In the case of self-assembly of the board, one of two possible variants of the voltage interface should be selected. Because of reliability, an interface based on the MAX232 (U4) chip is recommended. In this case, you can not assemble elements: T1, R32 and J4.

Jumper J4, J5 and J6 are used to select the voltage interface (in case the user decides to install both of his versions on the board). The jumpers J4... 6 functions are shown below.

J4 jumper function

Position	Designation on PCB	Description
1-2	Off	T1 base disconnected from line TxD_TTL (recommended position for MAX232 in RS232)
2-3	RS	T1 base connected to line TxD_TTL (recommended position for transistor voltage converter in RS232)

J5 jumper function

Position	Designation on PCB	Description
1-2	MAX	T7 collector disconnected from line RxD_TTL (recommended position for MAX232 in RS232)
2-3	T	T7 collector connected to line RxD_TTL (recommended position for transistor voltage converter in RS232)

J6 jumper function

Position	Designation on PCB	Description
1-2	-	Recommended position when T7 is not used as an input buffer
2-3	RxD Off	Recommended position when T7 is used as an input buffer and MAX232 is used in RS232

ISP programming

The microcontroller used in the board can be programmed using the ISP (In System Programming) programmer, for example ZL20PRG. There are two ISP connectors available:

- JP3, adapted to standard IDC10 connectors (ZL20PRG),
- JP9, enabling the use of any programmer equipped with one-contacts connectors.

Both connectors make possible to power ISP programmers with 5V voltage.

Placement of ISP signals on JP3 connector:

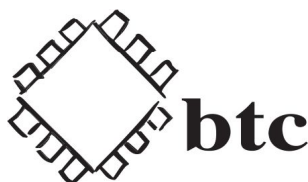
MOSI	●1	2●	VCC
	●3	4●	GND
RST	●5	6●	GND
SCK	●7	8●	GND
MISO	●9	10●	GND

C/A and A/C converters

The standard equipment of the board is PCF8591, which integrates a 4-channel A/D converter (each channel with a resolution of 8 bits) and a D/A converter with a voltage output (also with a resolution of 8 bits). Access to the converters is possible via the I2C bus. The reference voltage for the converters is generated by the U3 chip. It is regulated with using PR3 potentiometer (or PR2, depending on the version).

Reset

Microcontroller used in the ZL11AVR board can be reset by the user with a jumper placed on the pins marked as G and R. Their short circuit reset the microcontroller.



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