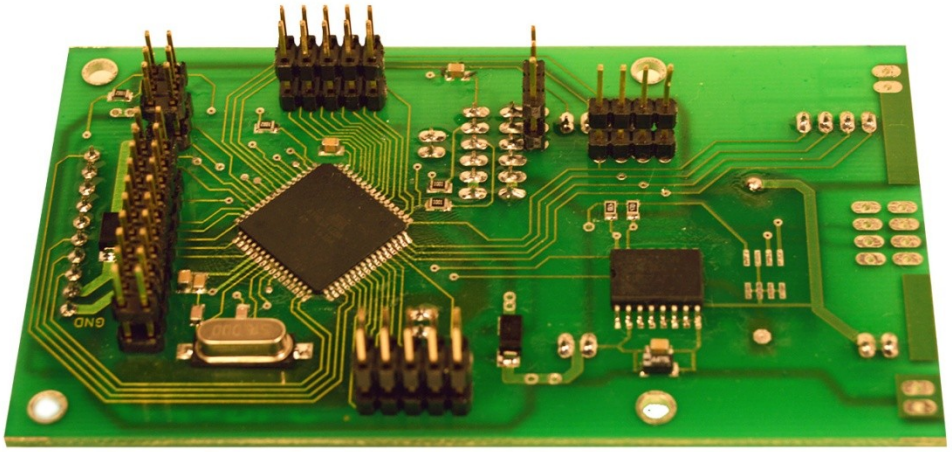
ArdoPLC
www.arduinoplc.com



CPU MODULE
BIN 4010

MANUAL

CONTENT

1. CPU MODULEM BIN 4010

1. 1. INTRODUCTION

The CPU module BIN 4010 is primarily designed for ArdoPLC control units. However, nothing prevents its use in other applications. The module can also be purchased separately as all ArdoPLC modules. The module is fitted with connectors to extend it. Modules for extensions are for example a display module, keyboard module, etc. The BIN 4010 module is based on the ARDUINO platform. Its programming is possible in the ARDUINO IDE programming environment. The program can be loaded using the ICSP (X3) connector, or the serial line on the X6 connector. Since manufacturing, the module contains a serial bootloader.

1. 2. MODULE CONSTRUCTION

The BIN 4010 module as mentioned above is ready for extension with, for example, the BDI 5010 display module, the BKE 6010 keyboard module or the I/O peripheral module BBA 1010. We intend to extend this list of modules into the future with additional extension modules.

The BIN 4010 is based on an AT mega 128A processor. The processor in the LQFP 64 case has 128Kbytes Flash, 4Kbytes SRAM and 4Kbytes of EEPROM memory. The module is fitted with a DS3231 RTC circuit whose backup is provided by a CR2032-sized lithium battery. The battery is stored in a case, for possible replacement.

The module is fitted with an external EEP of AT24C64 memory.

2. BASIC PARAMETERS MODULE BIN 4010

2. 1. MODULE DESIGN AND ELECTRICAL PARAMETERS

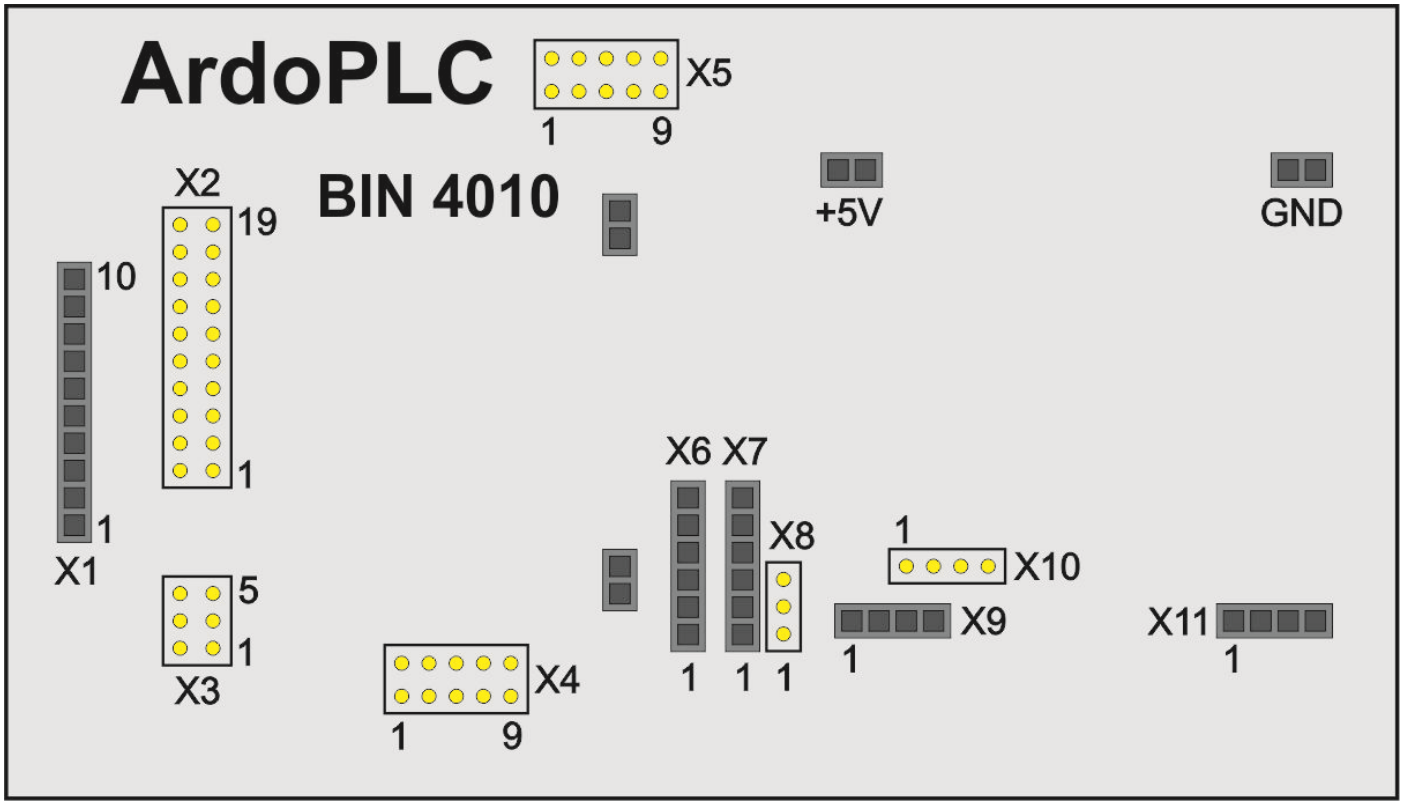
Tab 2.1 Basic parameters

Dimension length x widht x height	102 x 58,5 x 24mm
Power module	

Power supply Module power input	5V DC Max 0,2W
Connection	
Connectors	Pin head connector

3. CONNECTION MODULE BIN 4010

3. 1. CONNECTION OF CONNECTORS



3. 1. 1 CONNECTION CONNECTORS FOR THE DISPLAY MODULE

The X1 connector are specified to attach a display module, such as BDI 5010. The plugging of individual connector pins shows the table.

CONNECTOR X1			
X1.PIN	**PIN PROC. / PIN ARDUINO**	**X1.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PC1 29	**6.**	PC0 28
2.	PB2 10	**7.**	PD7 25
3.	PB3 11	**8.**	PD6 24
4.	PB1 9	**9.**	+5V
5.	PE3 3	**10.**	GND

3. 1. 2 CONNECTION CONNECTORS OF THE KEYBOARD MODULE

The X9, X11, 5V and GND connectors are specified for attaching a keyboard module, e.g. BKE 6010. The plugging of individual connector pins shows the table. When using the BKE 6010 keyboard module, the X11 connector pins are NOT USED. These processor outputs control DO 9, DO 10 outputs on the BBA 1010 module. The other two, are rolled out to the P1 connector of the BBA 1010 module.

CONNECTOR X9			
X9.PIN	**PIN PROC. / PIN ARDUINO**	**X9.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PE4 4	**3.**	PE6 6
2.	PE5 5	**4.**	NEZAPOJEN

The plugging of the X10 and X11 connectors is identical. The X10 connector is for dual use of processor pins as well as on the base BBA 1010 module.

CONNECTOR X11 and X10			
CON.PIN	**PIN PROC. / PIN ARDUINO**	**CON.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PA2 42	**3.**	PA4 40
2.	PA3 41	**4.**	PA5 39

3. 1. 3 CONNECTION CONNECTORS OF THE BASIC MODULE

The BIN 4010 processor module can be expanded to include a basic peripheral module, such as the BBA 1010 module. To this end, the CPU module is populated with X2, X3, X4, X5 and X10 connectors.

Note! A BRE 7010 reduction is required to connect the BIN 4010 CPU module and the base BBA1010 module.

The plugging of the above connectors shows the following tables.

CONNECTOR X2			
X2.PIN	**PIN PROC. / PIN ARDUINO**	**X2.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PE2 2	**11.**	+5V
2.	PB2 10	**12.**	+5V
3.	PE7 7	**13.**	GND
4.	PB3 11	**14.**	GND
5.	PB4 12	**15.**	PD0 18
6.	PB0 8	**16.**	PD1 19
7.	PB6 14	**17.**	PD3 21
8.	PB5 13	**18.**	PD2 20
9.	RST	**19.**	PD5 23
10.	PB7 15	**20.**	PD4 22

CONNECTOR X3			
X3.PIN	**PIN PROC. / PIN ARDUINO**	**X3.PIN**	**PIN PROC. / PIN ARDUINO**
1.	RST	**4.**	PE0 0
2.	GND	**5.**	PE1 1
3.	PB1 9	**6.**	+5V

Note! The X3 connector also serves as a programming ICSP connector.

CONNECTOR X4			
X4.PIN	**PIN PROC. / PIN ARDUINO**	**X4.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PF1 46 / A1	**6.**	PF4 49 / A4
2.	PF0 45 / A0	**7.**	PF7 52 / A7
3.	PF3 48 / A3	**8.**	PF6 51 / A6
4.	PF2 47 / A2	**9.**	PA1 43
5.	PF5 50 / A5	**10.**	PA0 44

CONNECTOR X5			
X5.PIN	**PIN PROC. / PIN ARDUINO**	**X5.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PC3 31	**6.**	PC6 34
2.	PC2 30	**7.**	PA7 37
3.	PC5 33	**8.**	PG2 36
4.	PC4 32	**9.**	PA6 38
5.	PC7 35	**10.**	NOT USE

CONNECTOR X10			
X10.PIN	**PIN PROC. / PIN ARDUINO**	**X10.PIN**	**PIN PROC. / PIN ARDUINO**
1.	PA2 42	**3.**	PA4 40
2.	PA3 41	**4.**	PA5 39

3. 1. 4 CONNECTION OF OTHER CONNECTORS

The remaining X6, X7 and X8 connectors are for programming. We will use the X6 connector, and the UC - 2102 converter (details in the MODULE PROGRAMMING chapter) to introduce the program into the microcontroller. The remaining X7 and X8 connectors are ready for possible later use, for example to add another additional processor module. Connect of the X6 connector is shown in the following table.

CONNECTOR X6			
X6.PIN	**PIN PROC. / PIN UC - 2102**	**X6.PIN**	**PIN PROC. / PIN UC - 2102**
1.	RST DTR	**4.**	+5V +5V
2.	PE1 RXD	**5.**	GND GND
3.	PE0 TXD	**6.**	GND GND

4. PROGRAMMING MODULE BIN 4010

4. 1. BASIC INFORMATION

As mentioned at the beginning, it is possible to program the unit in the ARDUINO IDE programming environment. The created and translated program is uploaded to the unit via a serial line, using a USB converter to UART. The recommended converter is UC - 2102 see image. The converter can be purchased in our eshop.

serial converter UC - 2102

Since manufacture, the unit contains a serial bootloader. So it's possible to start programming the unit immediately. The programmer's connection to the module is provided by a programming connector x6 (See connector engagement table X6).

4. 2. ARDUINO IDE SETING

In order to program the unit from the ARDUINO IDE environment, it is necessary to install the kernel for the ATmega 128A processor and the controller for the programmer.We start with the simpler one and that is the installation of the UC - 2102 programmer control. From the manufacturer's website

www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-driversuj

Download the driver file for your operating system and install everything as directed. Once installed, your programmer will appear in the device manager. You can set its COM assignments in the ARDUINO IDE tab of Tools - Port . Next, on the Tools - Programmer tab, choose the USBasp programmer. It remains to install the kernel package for the processor into the ARDUINO IDE. We'll use the "MegaCore - Master" package. This can be found at https://github.com/MCUdude/MegaCore.

Follow the installation instructions on the same page. If all goes well, set MegaCore to ATmega128 in the ARDUINO IDE, on the Tools - Development board tab. Set the crystal to 16 MHz and you can begin prgramming. The above settings and installations apply to the ARDUINO IDE 1.6 and above.

5. ATTACHMENTS

5. 1. IMAGE ATTACHMENT

TOP and BOTTOM module BIN 4010