

## Contents

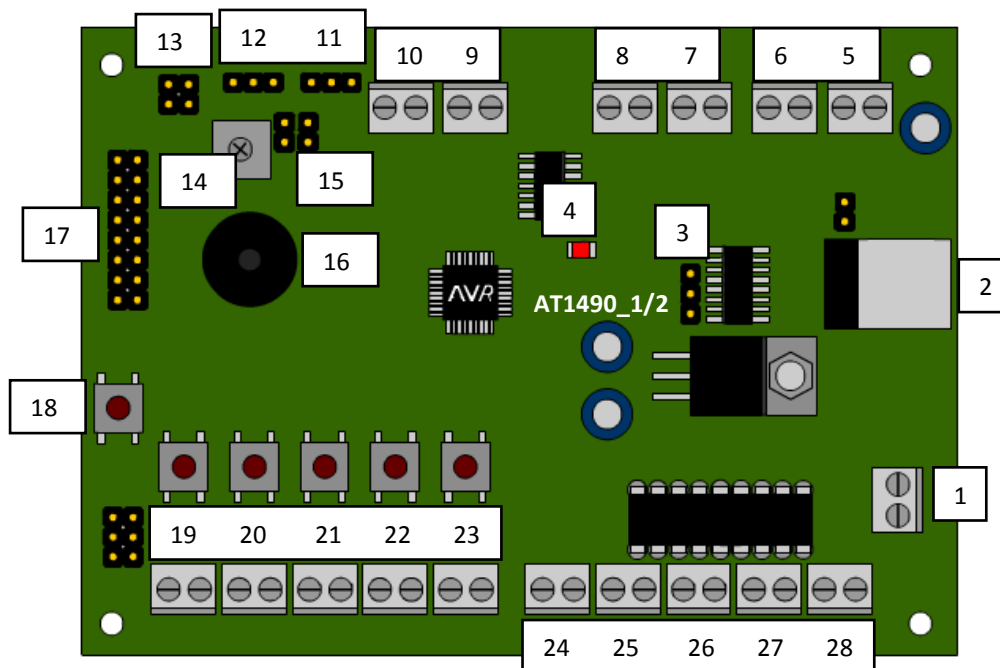
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## YAAB Layout

The YAAB is a PCB provided with basic hardware to control external hardware. It's a complete solution to get you started with soldering and programming in micro controllers. This section describes all the inputs/outputs on the YAAB.

Before using this document, please make sure you have the correct PCB version (rev 1-2). It can be found on the PCB top and bottom side (the \_1/2 part of AT1490\_x).

For all external devices you connect, you should connect the grounds. If you do not, there is a good change something will break.



### 1 – Power supply

<b>Description</b>	The power supply for the YAAB.
<b>Connections</b>	+ VCC - Ground
<b>Specifications</b>	9-12VDC
<b>Library</b>	None

### 2 – USB B Communication/Programming

<b>Description</b>	First, this port can be used to program the YAAB. In your own program you can use it to communicate with another device
<b>Connections</b>	4-pins connector according to usb (b) specification
<b>Specifications</b>	USB specification
<b>Library</b>	uart

### 3 – TTL Uart communication

<b>Description</b>	This can be used to use TTL communication via the uart
<b>Connections</b>	1 Rx 2 Tx 3 Ground
<b>Specifications</b>	TTL 5VDC
<b>Library</b>	uart

#### 4 – Power LED

**Description** This LED gives is on when the 5v circuit is powered

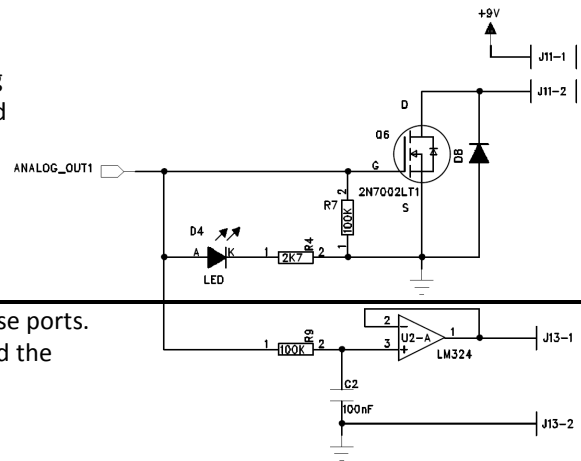
#### 5/7 – PWM output 1 and 2

**Description** You can create a digital signal (pwm) with these ports.

**Connections**  
 + VCC of pwm  
 - Signal of pwm (to ground)

**Specifications** 0-xV, the maximum voltage is depending on the input voltage, since it's connected to this.

**Library** pwm



#### 6/8 – Analog output 1 and 2

**Description** You can create an analog signal with these ports. The ports are controlled by the PWM and the signal is made analog by an R/C filter.

**Connections**  
 + Analog voltage of the pwm  
 - Ground

**Specifications** 0-5V

**Library** pwm

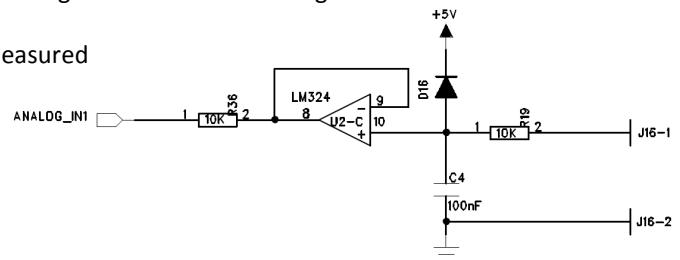
#### 9/10 – Analog input 1 and 2

**Description** These ports measure an analog voltage and convert it to a digital value which can be used in your program.

**Connections**  
 + The voltage which is measured  
 - Ground

**Specifications** 0-5V

**Library** adc



#### 11/12 – Actuators 1 and 2

**Description** An electric actuator can be connected to these ports, so you can move something.

##### Move 2 actuators

The YAAB is able to drive 2 actuators, but In some cases (depending on the loads) it's able to move only 1 at the time.

To avoid this problem you can connect the actuators to an own power supply (5v) which is able to deliver the current (1A per actuator). Make sure you connect the grounds between both circuits.

**Connections**  
 d Data signal to actuator  
 + Power supply for actuator  
 - Ground

**Specifications** 1A max (only able to move 1 at the time)  
 5V

**Library** actuators

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### 13 – I2C connection

<b>Description</b>	Currently not used. For future expansion boards.
<b>Connections</b>	1 VCC 2 SDA 3 SCL 4 Ground
<b>Specifications</b>	TTL 5VDC

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### 14 – Contrast potentiometer

<b>Description</b>	This potentiometer adjusts the display (optional) contrast.
<b>Library</b>	display

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### 15 – I2C pullups

<b>Description</b>	These two jumpers must be connected to get I2C pull-ups.
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### 16 – Buzzer

<b>Description</b>	A buzzer for producing tones. It's connected to a PWM and controlled with the buzzer library.
<b>Library</b>	buzzer

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### 17 – Display

<b>Description</b>	A display (hitachi controller) can be connected on this port. Contrast can be done with the potentiometer on the YAAB and backlight is on this connector.
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#### 4x40 display

This isn't supported because it needs an extra I/O which isn't available on the YAAB.

<b>Connections</b>	1 Vss (Ground) 2 Vdd (5V) 3 Vo (potentiometer) 4 RS (Microcontroller I/O) 5 R/W (Ground) 6 E (Microcontroller I/O) 7 DB0 (Ground) 8 DB1 (Ground) 9 DB2 (Ground) 10 DB3 (Ground) 11 DB4 (Microcontroller I/O) 12 DB5 (Microcontroller I/O) 13 DB6 (Microcontroller I/O) 14 DB7 (Microcontroller I/O) 15 Backlight anode (5V) 16 Backlight cathode (Ground FET switched via Microcontroller I/O)
<b>Library</b>	hitachi

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### 18 – Reset switch

<b>Description</b>	An switch to reset your program. This switch must also be pressed when you want to upload a new firmware in the YAAB (see YAAB Programmer documentation).
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### 19-23 – Digital inputs (5 total)

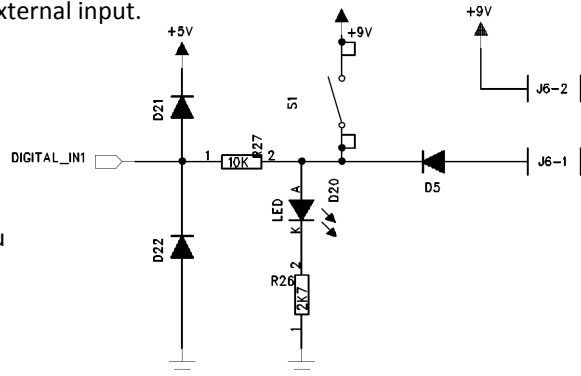
**Description** These 5 ports can be used as switch or external input.

Input 3

Input 3 can only be used when the I2C jumpers are disconnected.

Input 4 and 5

Input 4 and 5 can only be used when you don't have a display. Else they are in use for data.



**Connections** switch Use a input as a switch  
 + Voltage supply, use this when you want to connect a external switch  
 in Ground, Apply a voltage here to switch a input (PnP)

**Specifications** 3-24V  
**Library** inputs

### 24-28 – Digital outputs (5 total)

**Description** These 5 ports can be used to drive something external or just use the LEDs as a display.

Output 3

Output 3 can only be used when the I2C jumpers are disconnected.

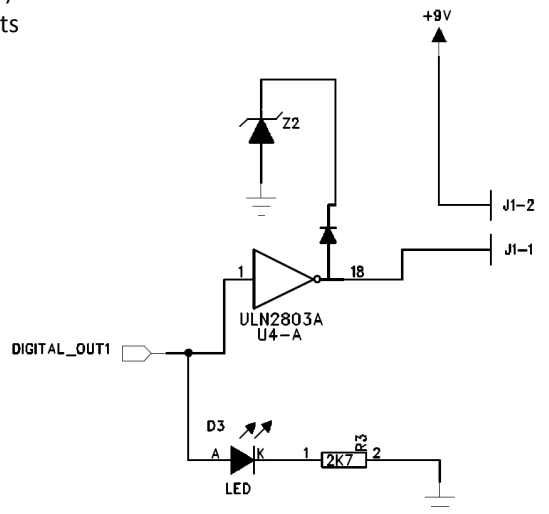
Output 4 and 5

Output 4 and 5 can only be used when you don't have a display. Else they are in use for data.

**Connections** + Power supply for your external device (optional, you can also supply own and only connect the 'out')  
 out Ground with suppressor diode

**Specifications** The + is the same voltage as power supply of the YAAB  
 External power supply max 24V (make sure the ground is connected to the YAAB power supply)

**Library** outputs



## Microcontroller pinout

If you want to make own libraries for new hardware, you need to know which microcontroller port is connected to which connector/hardware.

The list below shows all connections. The ones marked with X are not usable because they are used internally.

Pin	Function
1	Digital output 2
2	Digital input 1
3	X
4	X
5	X
6	X
7	X
8	X
9	Servo 2 PWM
10	Servo 1 PWM
11	Digital input 3/I2C SDA
12	Digital input 2
13	Analog output 1
14	Analog output 2
15	Buzzer PWM
16	Display backlight
17	Digital output 3/I2C SCK
18	X
19	Analog input 2
20	X
21	X
22	Analog input 1
23	Display DB4/Digital input 4
24	Display DB5/Digital input 5
25	Display DB6/Digital output 4
26	Display DB7/Digital output 5
27	Display RS
28	Display E
29	X (reset switch)
30	Uart/USB receive
31	Uart/USB transmit
32	Digital output 1

