XBotMicro for Arduino

XBotMicro swiss design is a small, low power robot base, with all what you need to test sensors and behaviours and learn a lot about C programming and robots. During software development, it is powered by the microcontroller card 5V, 100mA. Autonomous operations are powered by its included rechargeble battery 3.2 to 3.7V.

What you get
A nice box that includes a fully tested robot base with LiPo battery,   whiskers, plus spacers and specially made short connecting wires and two longer ones.
The XBot is powered by a 250mAh LiPo battery that will provide 4 hours of autonomy if you do not add power hungry old fashioned sensors.
The switch on the right side powers the board at 3.7V. The switch on the left side power the motors.

Switch the power on and look at the two LEDs next to the switch.
If the voltage is higher than 3.7V, they are both on.
If the voltage is lower than 3.2V, only one is on and it is time to recharge the LiPo.
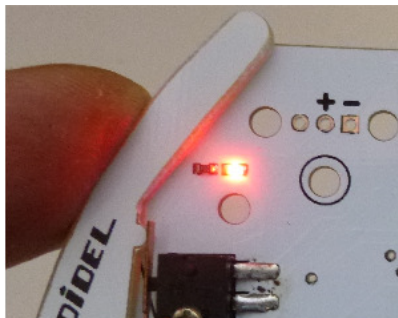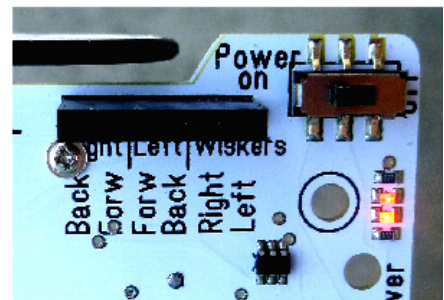
Depress the   whiskers, the LEDs are lit when the corresponding microswitch is on.

On the two rear pins, you get the status for the Right and Left   whiskers, "HIGH" when the whisker is not pushed, "LOW" when pushed.

XBotMicro can move by itself
The motors are powered trough the switch at rear left. Four lines control the two motors, and you can immediately check their function.

Use a wire to connect the + (HIGH) to one of the 4 motor inputs. There is a second + on the front connector; connect the long wires and see how fast the XBot moves and turns. To stop the motors, you switch off the motor control, and you can still see on the bicolor LEDs which direction the motor would take if powered – green forward, red backward.
You like electronics? No need for a processor, you may do a lot of funny tricks with just 2 LDRs, or a 555. Add your own protoboard on the top of the Xbot and test your ideas.
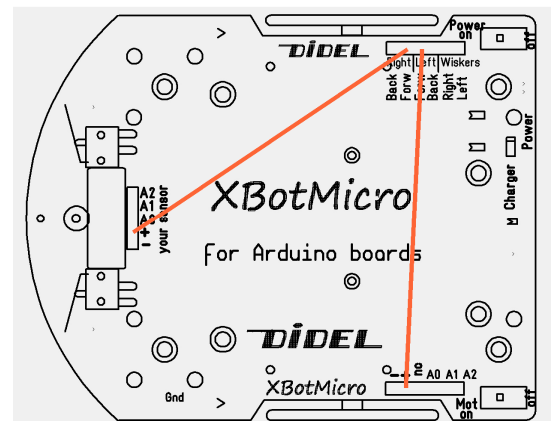
More features.
Motors have a gear ratio of 1:96. Current is 20 to 30mA per motor for normal moves. With the Didel wheels 32mm in dia, the max speed is ~50cm/s. It is impossible to guarantee a perfect straight line.

LiPo capacity is 250mAh, shorts and empty battery protected. LiPo is recharged in 3-5 hours. As for all LiPos, voltage at full charge is 4.1V, but drops quickly at 3.8, stays at 3.7V for a long time, and then drops and switch-off.

Control signals
Six lines control the motors and get the information from the whiskers.
The two power lines are on the left rear connector. These lines will receive the +5V from your board when connected to USB. If the LiPo battery is not fully loaded, this +5V will be used to charge it (about 50mA during the charge, a LED indicates it is charging).
If the robot is autonomous, the 3.7V of the LiPo battery will be sent to your board.
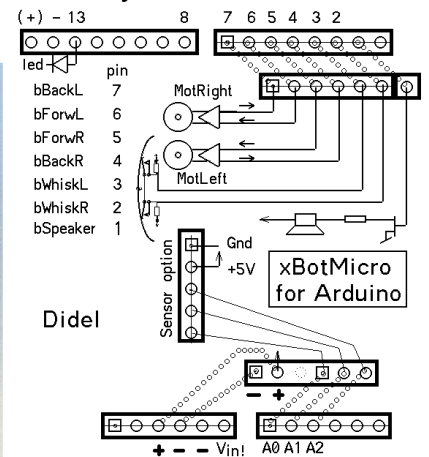

Connect your Arduino compatible board
Position the spacers according to your board. Screws below, the board holds already well on the nylon pins. Optionally use spacers as bolts.

The position of the connectors permits clean connections toward Arduino boards. We provide specially developed short wires.
Use red and black wires for power.
Pay attention on correct wiring with the power lines, wrong connections may be destructive.
Continue with www.didel.com/xbot/XbotBegin.pdf
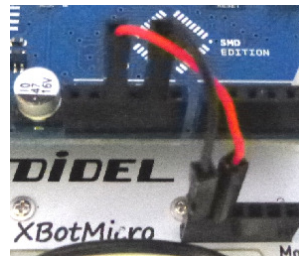
Arduino recommended wiring and definitions

```
#define bBackL 4   // left motor on PORTD
#define bForwL 5   // pwm possible
#define bForwR 6   // pwm possible
#define bBackR 7   // right motor
#define  bWhiskL 2 // whisker left
#define  bWhiskR 3 // whisker right
#define bSp 1      // speaker
```

```
void setup ()  {
  DDRD  &= 0b11110011 ; // bits 3 2 in
  DDRD  |= 0b11110000 ; // bits 7..4 out
  PORTD &= 0b00001111 ; // motors stopped
}
// idea for a simple obstacle avoidance
void loop () {
    … move forward
    if (ObstRight  … back, turn left
    else if (ObstLeft)  … back turn right
}
```

PWM is available on pins 5 et 6. Going backward is possible with a simple trick, see
http://playground.boxtec.ch/doku.php/motor/bidirectional_motorcontrol_arduino?s[]=motor&s[]=control
or http://www.didel.com/diduino/CommandeMoteurs.pdf (in French)

French version of this document (4 pages) under http://www.didel.com/xbot/XBotMicro.pdf