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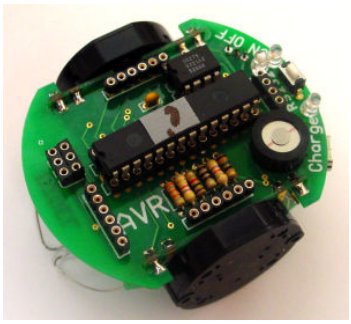
www.didel.com/wellbot/WellbotAvr.pdf

WellbotAvr – Robot kit for AVR Atmega 48/88/168

This robot is attractive for its price and functionnality. Its stepping motors allows for precise displacement. Depending on the position of the sensors, it avoid obstacles or follows a track. Its main interest is to be programmable. A very nice 3-color array of diodes is a cheap option.

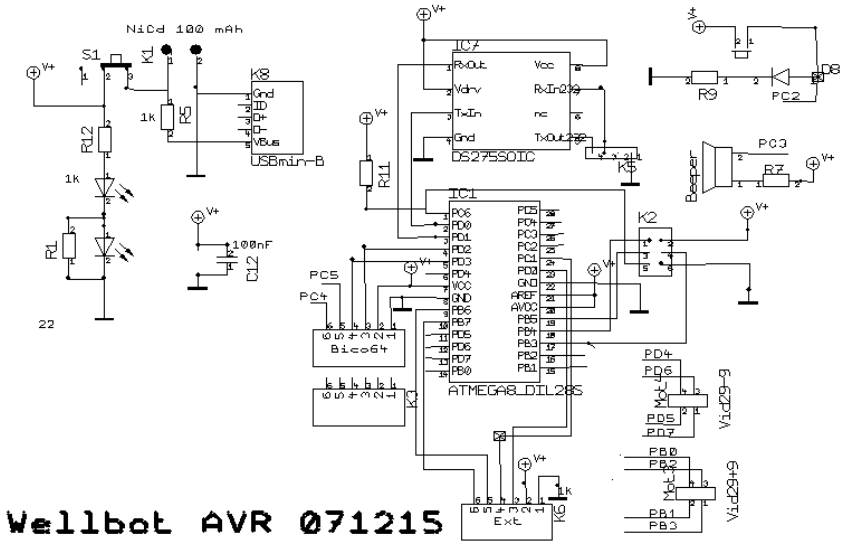


The kit consist of 3 PCB, 2 motors with wheels, 1 NiCd battery 3.6V 100 mAh, socket for processor with pin-out compatible with 16F870, RS232, buzzer, programming and extension connector.

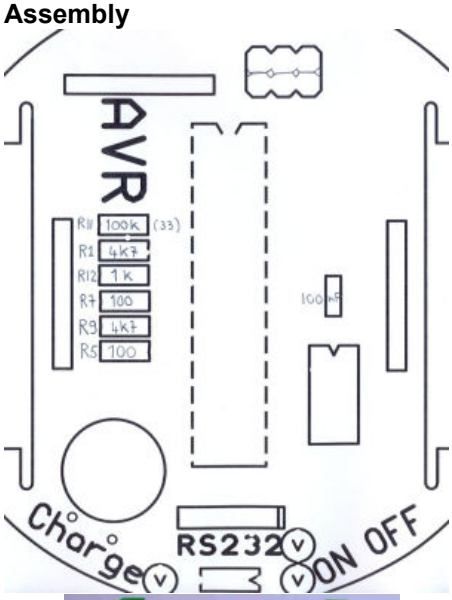
List of components

3x PCB	1 x 22 Ohm (15)	2x VID29 motors	1x DS275
3x Leds	2 x 100 Ohm	2x Wheels	
1x socket DIP8	1 x 1k	1x NiCd 80 mAh	2x springs
1x socket DIP28	2 x 4k7	1x USB conn.	
3x strips 6c	1x 100k (33k)	1x on/off switch	Atmega DIL28
1x strip 4c	1 x 100nF	1x push button	processor not in the kit
1x strip 3x2c			

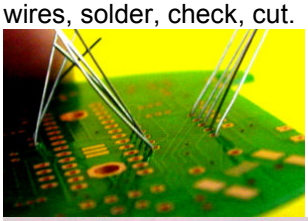
Schematic

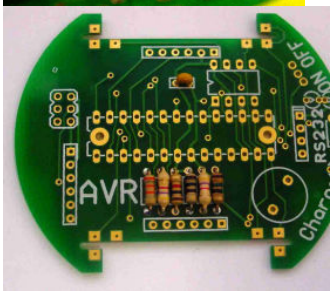


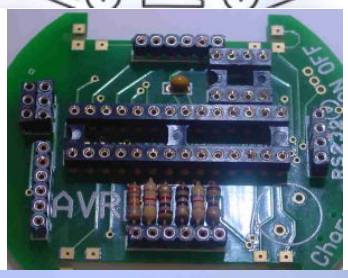
Assembly



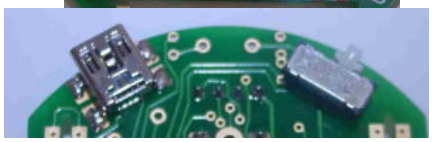
Solder the resistance and capacitor first. Fold the wires, solder, check, cut.



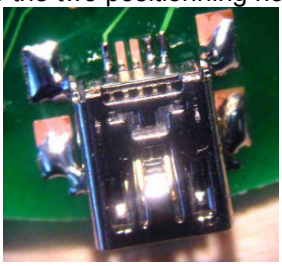




Insert all the sockets. Return on a piece of wood and solder one pin of every connector. Check for correct insertion, solder all.

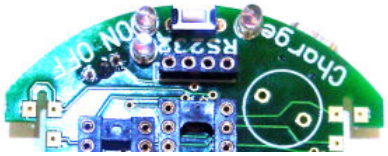


Solder the USB connector.
Notice the two positionning holes.

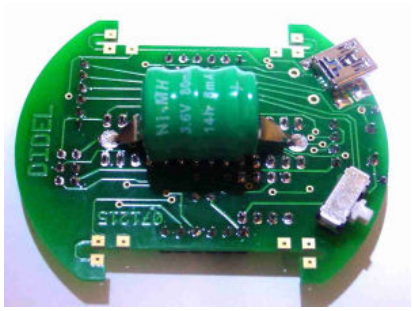


Be carefull not doing a short between USB pins. Only the side ones are soldered.

The switch can be soldered on either side, as you prefer.

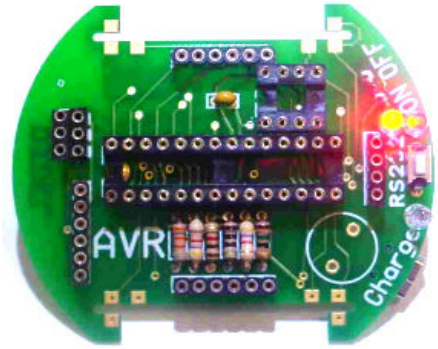


Solder the LEDs, the buzzer, the push-button. For the components that do not position by themself, like the LED, solder one side, heat while positioning with the other hand, solder the second contact when perfect.



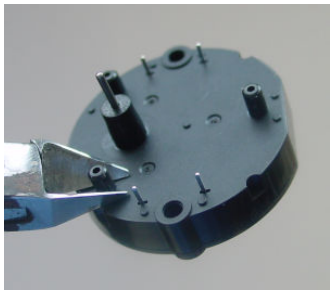
Solder the battery.
Note on this proto serie the pads does not correspond. Bend the battery leafs a maximum.

Power on. One or two LEDs must be on.
Only one if the battery is discharged.



Prepare the motors

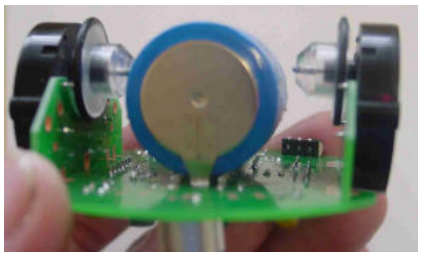
Remove the posts of the motors. If the wire cutter is not very sharp, clean with a knife.



Solder the motors.
Insert the wheels. Put a piece of 0.2 to 0.4mm thick piece (thick paper, two razor blade) as a spacer between the PCB and the wheel when you press the wheel in place. You may add a small drop of glue at the tip of the motor shaft to better hold the wheel.

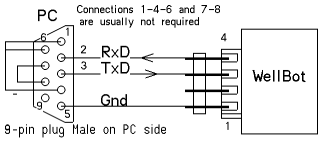
Position the motor PCBs. Solder at one point, check for perpendicularity. When perfectly aligned, solder all points both side.

Insert the processor and the DS275



Serial cable

Solder the serial cable. We guess you will find 4 wires of the length you need, as flexible as possible.



Signal	DB09 pin	Wbot pin
Gnd	1	5
RxD	3	3
TxD	4	2

Explanation of the schematic

The robot is powered by a 3.6V NiMh, 260 mAh. That capacity allows for more than 30 minutes moving and avoiding obstacles. Loading the accumulator is made with a simple resistor limiting the current and lasts 58-10 hours if the accu is completely empty.
For « measuring » the accu voltage, two LEDs are connected in serial, with a resistor in parallel with one of the LEDs. The result is that LED need a higher voltage than the other. Below 3.6V it does not blink. The robot can still work for a long time, with less power for the motors.

The push-button is also shared with the LED under control of the processor. When depressed, the LED is on. Height outputs are used to control the stepping motor, 4 bits on portB, 4 bits on portD. See www.didel.com/bot/Step.pdf (in french).

Port assignement

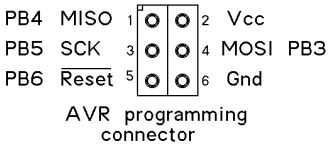
PortB	**PortC**	**PortD**
PB0 motor out	PC0 ext	PD0 Tx
PB1 motor out	PC1 ext	PD1 Rx
PB2 motor out	PC2 i/o LED/sw	PD2 out bico64 ck
PB3 motor out	PC3 HP	PD3 i/o bico64 do
PB4 progr	PC4 ext bico	PD4 motor out
PB5 progr	PC5 ext bico	PD5 motor out
PB6 ext	PC6 progr clr	PD6 motor out
PB7 ext		PD7 motor out

Software

On the Feb 2008 proto serie, no software is provided. Later, Didel will only give link to individuals or company having software to propose.

Programming the AVR

The 6-pin programming connector on the WellbotAVR is the one recommended by AVR.

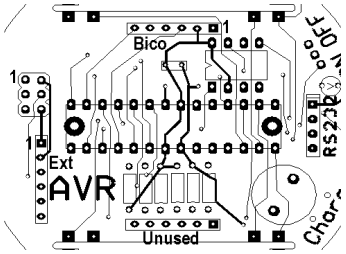


AVR programming connector

Etension connectors

There are three 6-pin connector on the PCB. One is for mechanical positionning of the display or other extension board.

Bico :	Ext :
Pin1 Gnd	Pin1 Gnd
Pin2 Vcc	Pin2 Vcc
Pin3 PD2 Clk	Pin3 PC0
Pin4 PD3 DataOut	Pin4 PC1
Pin5 PC5 DataIn	Pin5 PB6
Pin6 PC4	Pin6 PB7



Options

The WeBico display is seen as a 128-bit shift register. It is hence easy to display any calculated or stored image. See www.didel,com/WeBico.pdef

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