

IR solutions for light planes and robots Ub4 and soft variants

Version plus récente en français www.didel.com/Ir/Mir4.pdf

The **Mir4 (=Ub4)** is a 4-channels receiver that can control many kinds of flying, swimming or rolling, objects, etc. The transmitter is a Didel BimoTel/Emir transmitter with a proprietary protocol.

See www.didel.com/Ir/Emlr.pdf for the list of our IR transmitters.

Didel toys like the Bimo, Airboat, Viva are compatible with our IR format.

Versions supporting PPM/Tanaka and PicooZ format are not supported any more.

The **Ub4** receiver is 22x18mm and the weight is 0.85 grams (1.4 with connectors). If this is too heavy, Didel has a 3-channel **Ir3** 0.25 gram receiver, a 2-channel **Ir2**, 0.28g, more easy to implement and a 1-channel **Ir1** 0.18g, for rubber-powered 2-3 grams models. Battery weight is what really change when the plane has more channels.

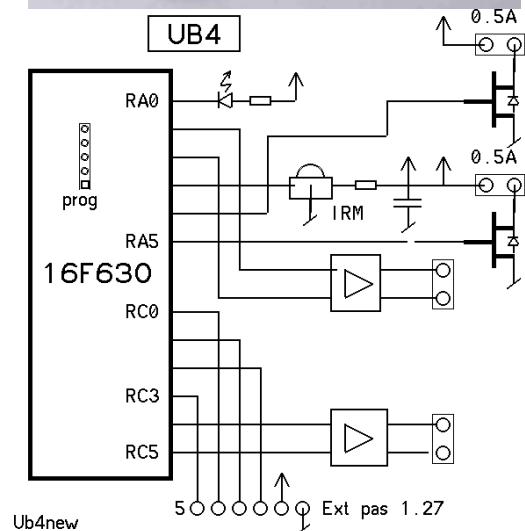
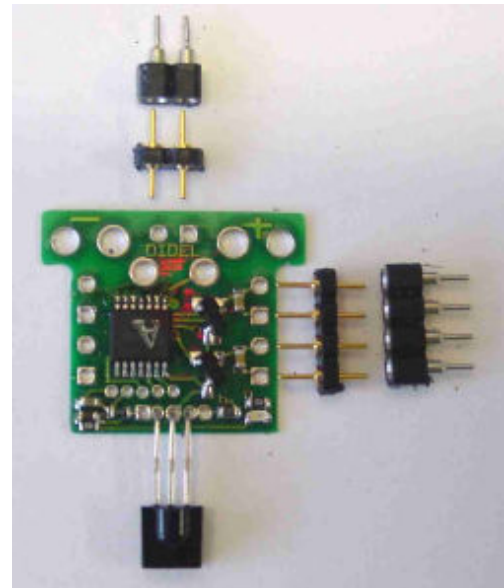
Power is supplied by a connector (2-pin supplied but not soldered) Ask if you want 10mm or 5mm Bahoma magnets.

Voltage is 3 to 6V,

The IR module is not soldered since its position may depends on the application. Check the pictur an use a fine tip soldering iron and 0.5mm solder.

Three hardware versions and many software versions are available.

The processor is the 16F630 that can be programmed on-board with Microchip or Didel tools.



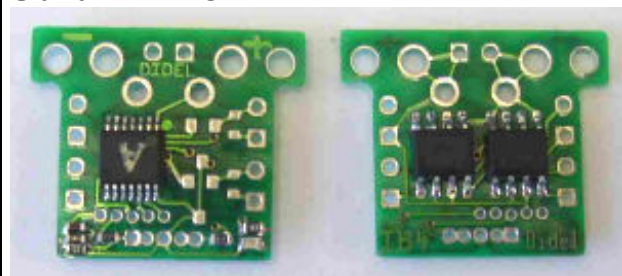
Ub4b has two bidirectionnal channels (H-bridges) and is suitable for a 2-wheel robot, a crane, an x-y plotter, etc. Drivers can deliver 0.5A

Software respond to channels 1 and 2 only and has two versions:

Ub4b-sep assign channels 1 and 2 on outputs 1 and 2.

Ub4b-sep is very suitable for a car with a steering actuator (stick left-right) and one motor for the speed (stick forward-backward).

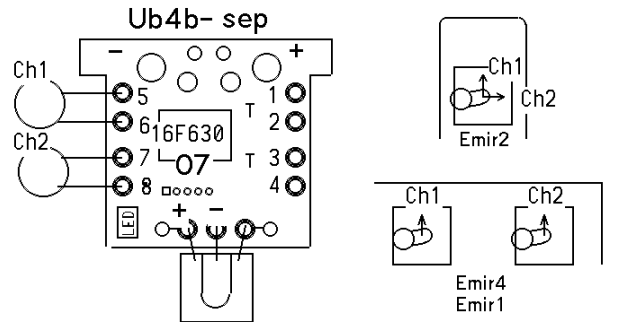
Ub4b-xx 22 CHF



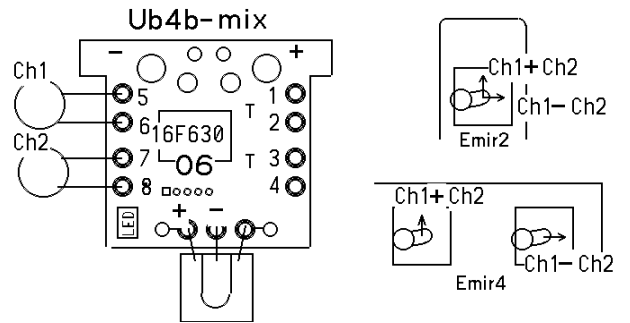
It can be used also for a crane or any device where the two motors must be controlled independantly.

Ub4b-mix is the best for a 2-wheel vehicle controlled by a single joystick, like the Bimo.

Channels 1 and 2 are mixed to activate outputs 1 and 2. When the joystick is pushed (channel 1 max value, channel 2 zero), both motors get the maximum power.



Soft Ic01.hex



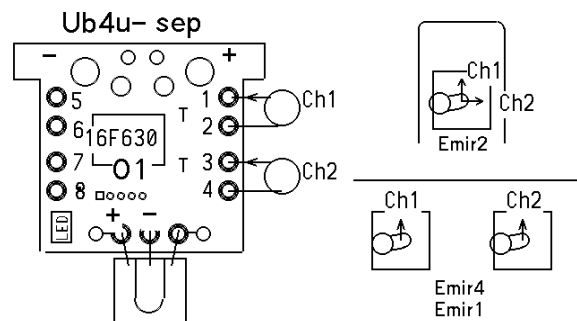
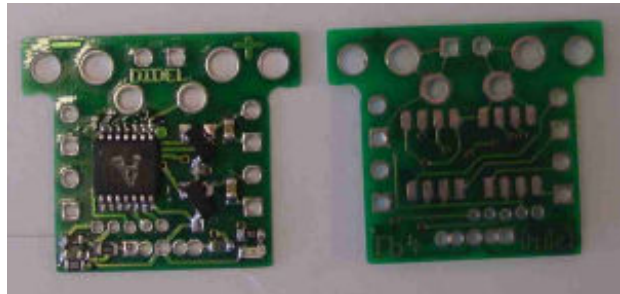
Soft Ic02.hex

Ub4u has two unidirectionnal outputs (transistors) and is good for a twin motor plane, a vehicle that can moves forward only, and many gadgets .

Three software versions exist **Ub4u-sep** (06) separate the two channels.

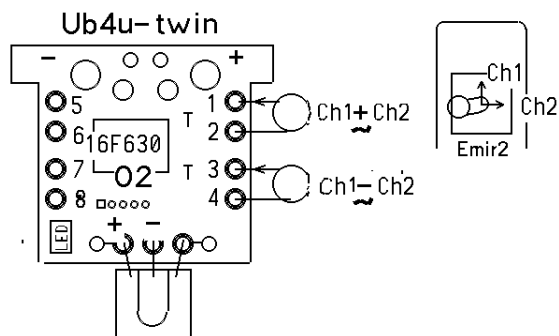
Since it is unidirectionnal and the joysticks have a return spring, there is no speed in the center and on the down side

Ub4u-xx 22 CHF



Soft Ic06.hex

Soft Ic05.hex



Soft Ic07.hex

Ub4u-mix (05) mixes the two channels for a vibrating robot. Full side, one motor is stopped.

Ub4u-twin (07) also mixes the two channels, but has a special mixing for twin motor planes, if the mixing is not done at the transmitter level. The problem is the maximum speed must never be assigned to the two motors, this would prevent any turning at maximum speed! A table defines the difference of speed according to the position of the stick.

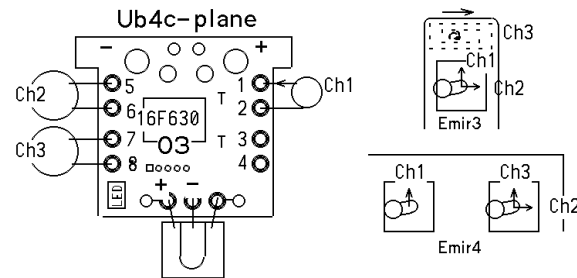
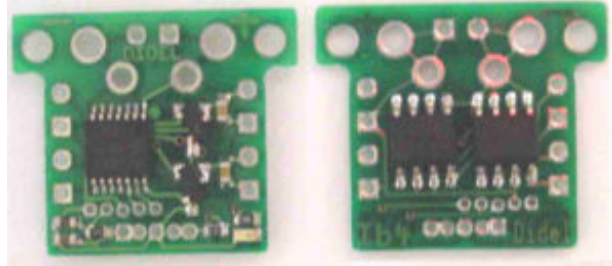
Ub4c is completely populated, that is 4 channels can be implemented. One software version is provided, that requires a 3 channel transmitter.

Ub4c-plane is planned to control for a 10-20 grams model airplane with one motor for the propeller (channel 1, transistor) and 2 channels for magnetic actuators or bidirectional motors with propeller in case of a blimp.

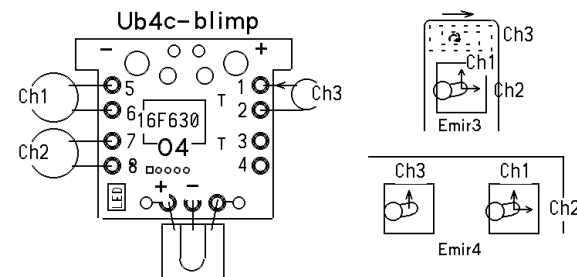
Ub4c-blimp is done for a blimp controlled by Emir3. The vertical propeller is unidirectional for going up and is controlled by the pot of Emir3.

Ub4c-vtail is required if the transmitter cannot mix the channels. Software will be done if enough interest.

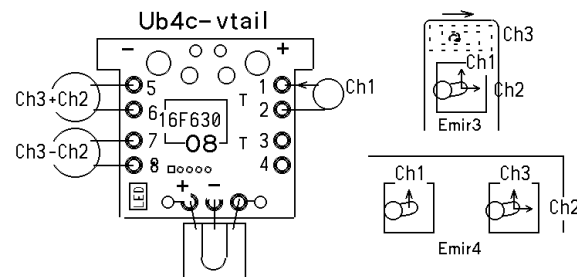
Ub4c-xx - 22CHF



Soft Ic03.hex



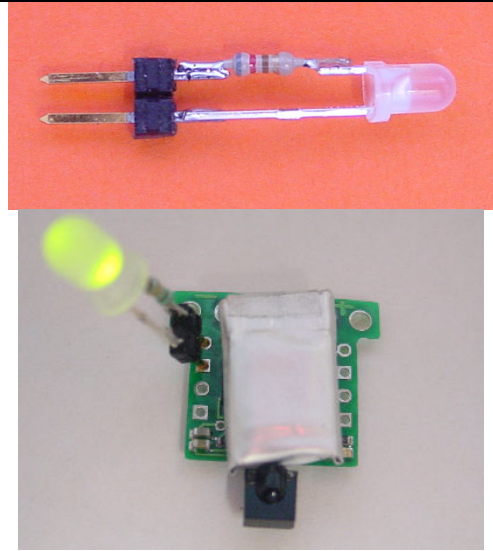
Soft Ic04.hex



Initial test procedure

If transmitter is off and receiver on the software powers the outputs one after the other. Build a tester with the bicolor LED, the 470 Ohm resistor and a male 0.5mm connector. Insert the tester in the metallized holes of the receiver outputs and check the blinking (red/green on bidirectional channels).

Power both the receiver and transmitter (any order). Check with the bicolor LED that you get a signal that depends on the corresponding stick position. The LED intensity is not proportional to the current, but it gives a good idea.



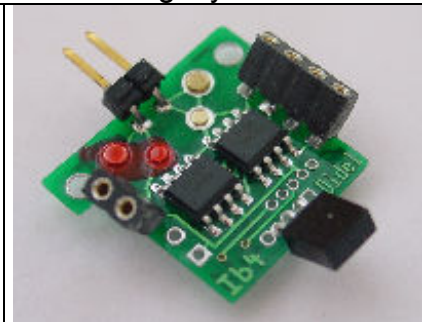
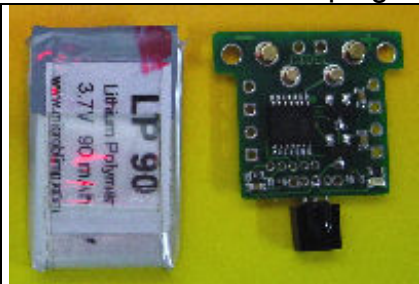
Power-up

A correct power-up means the voltage goes from less than 0.5V to more than 2.8V in less than 10ms. The processor blinks three times, and start a loop in which it tests if a valid IR signal is received. If not, it pulses the output in sequence. If yes, it sends to the outputs the PWM values according to the decoded signal. If the Led blinks faster, there are transmissions errors. Led is ON if the IR signal is lost, and the outputs are set to zero after about one second.

If the battery is removed and put again in the next seconds, power-up is frequently incorrect. Due to the capacitor on board and the very low power consumption of the processor, the voltage needs many seconds to be below the 0.5V that would guarantee a correct start. If you are not convinced, check that if you short the magnets with e.g. a razor blade, the power-up is always good.

Note on connectors

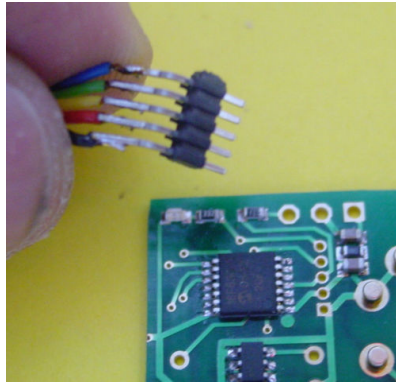
Ub4 circuits accept Bahoma with 10mm and 5mm pitch, but the magnets are not inserted if not explicitly requested. A 2-pin connector (0.5 or 0.7mm pins) is recommended when there is no weight constraints. A molex connector can be used. Ask for a male/female plug when ordering if you are interested.



Reprogramming the microcontroller

For robotic and automata applications, it can be interesting to do your own programming of the Ub4 module. Several tools are available from Didel and many other sources for writing the software and programming the Microchip16F630.

For a variant of the previous modes, the most efficient is to use the SmileNG assembler and adapt the Ub4 free modular software. The ub4 module is connected to the programmer via a 1.27mm 5-pin connector. The male connector is just held inside the PCB holes during the few seconds of programming (a connector can of course be used).



(pictures with old PCB)
a new PCB is being done
in June 09 and will make
the test more easy.

Other IR product documentation

<http://www.didel.com/Ir/IraShort.pdf> 2005, good for understanding the basics

<http://www.didel.com/Ir/IrControl.pdf> 2007, when I believed in the interest of PicooZ

JDN090620/091216