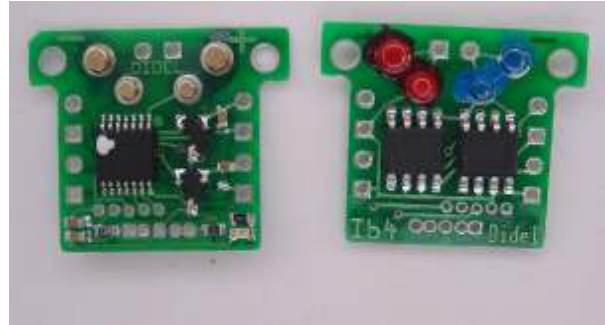


Didel Ib4x – 3 or 4 outputs IR receiver

Software versions: see www.didel.com/Ir/FamReclr.pdf

The **Ib4x** is for controlling all kind of objects. The IR transmitter is a PicooZ transmitter or one of the Didel and Tanaka solutions for IR transmitters and converters from the trainee's plug of a radio toward infrared. The objective was to have a circuit easy to interface with low power motors or LEDs. The circuit can even be re-programmed by the user for different IR protocol or completely new applications if the user has the knowledge and adequate equipment.



Note: The proto serie uses 0.3mm PCB. This is too thin for holding magnets. It will be increased to 0.4mm with next serie of circuits.

Supplied parts

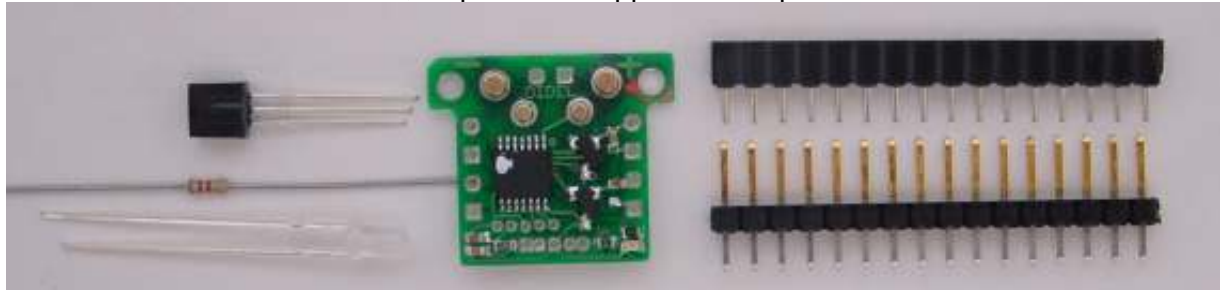
The Ib4x is a PCB with all its electronic components, fully tested.

Connectors are standard 2.54 mm pitch, strong 0.7mm pins.

Power is provided by an optional connector and by 5mm or 10mm Bahoma magnets.

A bicolor LED is providing for test purpose.

The IR receiver is not soldered, its position is application dependant.



Specifications

Module size 22x18mm Weight 0.85g without connectors.

Voltage: 2.8 to 5.5 Volts Current (inactive outputs) 0.2mA.

Propeller transistor: IRLML2402, RdsOn < 0.2 Ohm @ 3V, < 0.05 Ohm @ 5V 0.5A max

Actuator bridge: L9910, RdsOn < 1 Ohm. 0.5A max

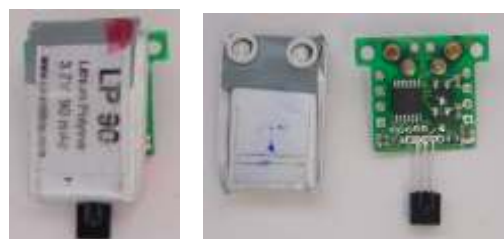
IR receiver module: CHQ 0038D-1, reception distance: 3 to 20 meters depending on transmitter, orientation and reflections.

Microprocessor: 16F630 from Microchip. PWM frequency: about 1 kHz.

Wiring recommendations

Decide how you connect the IR module.

Depending on the size of the Lipo and you application, you may connect it close or over up to 10cm wires. The front of the sensor is on the same side as the microcontroller and LED.



If you add a connector for the power supply (max 6V), solder it on the other side than the processor, so you still can use the Bahoma magnets. Clearly mark the + side.



Solder the bicolor led on a male connector, with the resistor in serie. Resistor value is not critical. A 680 or 1 K ohm resistor is supplied.



Now if you have a Lipo or a power supply, you can immediately check that the components are good. If no IR signal is received, the processor activate one output after the other. Insert the test Led on two outputs (no need of a connector, incline the LED to guarantee the contact) and watch the test light pulse.



Preparing the contacts.

Use a cutting pleyer to break the contact strip at the required length. A 0.3mm saw is preferable, but usually not available. If not clean, use sand paper.



Solder the connectors as preferred. Put pins in the female connectors and use soft balsa to hold the pins in place when soldering.



If the IR transmitter is on, you can check the channels with the bicolor LED.

Inverted polarities and shorts happen even with experienced persons. If you use an external battery, we recommend that you put a 200 mA 6V lamp in serie (or more). The resistance of such a lamp is very low below 100mA. Any excess current will warn you by a bright filament.



Power-up

A correct power-up means the voltage goes to zero to more than 2.8V in less than 10ms. The processor blinks three times, and start a loop in which it test 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. The Led blinks faster in the receive loop, transmissions errors and loss of the IR signal light the LED.

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.

Adding a 22kOhm resistor in parallel to the decoupling capacitor will add 0.2 mA to the permanent consumption, and discharge the capacitor down to 0.5V in one second. Should we do it on all modules?

FAQ

1) How to fix the PCB? Well, you can glue it or use velcro. If the wires are maintained on the structure not too far away from the connector, the circuit will hold well enough.

2) What is the meaning of $R_{dsOn} < 0.1 \text{ Ohm}$? – There is a voltage loss in the transistor that depends on the current. If you connect a 200 mA motor, $U = R \cdot I = 0.1 \text{ Ohm} \times 0.1 \text{ A} = 0.01 \text{ V}$.

4) Can I put a motor on the rudder output? Yes, but the working current must be limited to 200 mA for good efficiency. The bidirectional output can control a $> 10 \text{ Ohm}$ magnetic actuator, or $< 0.1 \text{ mm}$ SMA wire.

Reprogramming the microcontroller

For robotic and automaton applications, it can be interesting to do your own programming of the Ib4 module. Several tools are available from Didel and many other sources for writing the software and programming the Microchip16F630.

The Ib4 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). Schematic and assembler program are available on request.

