CobraUSB - Quick Start Guide 1.1

PC connection: just use a USBA/B cable. The USB section of the board is self-powered from USB. So as soon as you insert the board (even unpowered at 24VDC) it should be recognized as a HID (Human Interface Device), no driver required, and blue led start flashing.

Power supply connection. If you got the "notebook kind", you get it already fitted with the connector for Cobra. Just plug it in! If you got the "industrial kind", please use two wires, usually red (+) and black (–) for +24VDC and GND. Looking at the screw terminal from outside the board, you have + on the left and – on the right. "+" and "–" is also written on bare board screen printing and on aluminium front panel in enclosed board. When you apply power to the board, the green led will light up.

Stepper motors connection. You have in order: A- A+ B+ B- looking at screw terminals from outside. Connect one stepper motor winding between A+ and A-, the other one between B+ and B-.
If you have a 4 wires stepper motor, use a digital multimeter in continuity test to find the two coils.
If you have a 6 wires stepper motor, must NOT use the central tap on each coil. With continuity test on a digital multimetr, find two groups of three wires. Each group belongs to a winding. To find the two ends and center tap, use digital multimeter in 20Ohm scale: between central tap and each ending, you find half the ohms that you find between the two ends. You must use the two ends, and NOT use the central taps.
If you have a 8 wires stepper motor, with digital multimeter continuity test find four groups of two wires. Each is half a winding. Must realize a series-connection and realize two full windings from the four half-windings. Please refer to motor datasheet for color scheme of that manifacturer. Trial&error with 8 wires is risky.
Old kind, 5-wires and 10-wires stepper motors CANNOT be driven by Cobra.
ATTENTION! Always connect or disconnect stepper motors when 24VDC power is OFF. So if it's already OFF, you may connect or disconnect stepper motors safely. If it's ON, You must first turn it OFF, then disconnect or connect stepper motors, then turn it ON again.

Microstep setting. You may choose 1:1 1:2 1:4 or 1:16. You may use two jumpers to set the microstep for each axis individually. On board screen printing, find a scheme that tells you which combination (open/absent – closed/present) of the two jumpers, sets which option for microstep setting. Please note a open jumper can be completely removed and stored elsewhere, or you may leave it on the board – so you don't loose it – but plugged with only one side, and the other side floating. We recommend 1:4 microstep. This gives 800 microstep/revolution from a 200 step/revolution stepper motor. And is a good compromise between resolution, power transfer, smoothness and less noisy behaviours.

Current setting. You can adjust each axis independently. There is a individual trimmer for each axis. It goes from 0Amp start of scale, to 2Amp full scale.
To find the right setting for your motor, use your ears!!! With a lower current than needed, stepper motor will be very quiet and develop little torque. With just right current setting, the stepper motor will have a normal noise and emit sound tunes, and have smooth movements. With a higher than needed current settings, stepper motor will overshot with a small "ding" at each step, then come back .Movement won't be smooth. Motor body will overheat. And you'll get LESS torque from your motor than you would with a lower current setting. Stepper motors work OK with a lower current setting than nominal, they just loose some strength. So if you're uncertain on correct position, keep in mind that a *lower* current setting is better than a *higher* current setting.

Thermal protection. The full scale (2Amp) is chip maximum absolute ratings, and is not recommended using it. If you need full 2Amps, we recommend using bigger drivers (say 3Amp or 4Amps, to use at 2Amps and have headroom).
2Amp option is there for this special case. You may just drive very small nema17 or even smaller nema14 motors at 2Amps. Small motor will reach 2amp nominal current with low duty-cycle for the chip power MOSfet, and board will not heat up a lot.
With bigger nema23 motors at 2amps, the cobra drivers need longer duty-cycles to sustain 2Amps, the board will heat more. Eventually thermal protection will trip, and switch off the load. When it cools down, it will switch load on again. And so on. If you notice this on/off cycle repeating every 2-3 seconds, please choose a smaller current setting and/or add a fan. On cobra there's a fan connector for 24VDC fan (fan sold separately).

Optocoupler in. Input 24VDC in the optocoupler input, and see the yellow led light up. Remove 24VDC power in the optocoupler input, and the yellow led will shut off. You may use normally open (connect them in parallel) or normally closed (connect them in series) switches with the optocoupler input. Power supply for optocoupler input can be same power source as main board power source, or another power source for isolation.

Relay output. When relay is ON, red led will light up. The relay coil controls the relay contact: a switch. You have "C" Common, "NO" normally open and "NC" normally closed screw terminal posts. This works as any switch. Usually you don't use the NC post. You use the C and the NO. Consider this a SPST (single pole single throw) switch, and use in your application. Usually you route the supply of your spindle one pole directly to the spindle, and the other pole "passes trough" the relay contact, ad it would through a manual switch.
For DC loads <50V, you may use the CobraUSB relay directly. For main voltage 110VAC or 230VAC loads it's better to use a servo-relay in the electrical plant to control the spindle itself, and use the relay on cobra to control the servo-relay coil in the plant. So that you don't have lethal voltage on cobra board traces.

PWM output. CobraUSB is capable of PWM output. To use this, it is necessary to desolder the mechanical relay, and use a 24VDC solid state relay (SSR), instead.

SOFTWARE

Download devCNC Foam from http://www.devcad.com/

Configuring cobraUSB in devCNC foam is simply a matter of choosing "CobraUSB by ideegeniali 12 pin" in the settings / Controller and output pins. And that's all there is to it, really. Ideegeniali and DevCad woked together to provide a configuration procedure as easy as possible to the user.
Please read online help and user manual of devCNC Foam to understand how the program works.

Should you need any assistance on hardware, please contact ideegeniali
Should you need any assistance on software, please contact devcad