Command box wiring 2

Limit switches connector.

(For limit switch installation see sheet 9)

In addition to the three input for limit switches, a fourth signal line was added to detect tool depth.
You position the tool over the contact, and slowly go down till contact action.
It does allow automatic depth adjustment when changing one tool. (software do that automatically)

Limit switches on the axis are not absolutely required, but a 'tool switch' is highly recommended.

5V voltage present on limit switch connector will be used for laser power supply. These lasers are useful to define the origin, on the side of a board for example. Their cost is very low (i've paid mine 4 Euros each)

External command connector :

Electrical box relay do have a dry contact (normally open or normally closed, at your choice) to stop the machine in case of operation of emergency shutdown button.
It is very important that this shutdown stop the steps, but left the steppers current supplied, if not the carriage will fall down under it's own weight..
A lot of control boards cut the current when asking the stop.
That function must not be used but you must have a mean to stop the step flow.
If the board don't have this possibility, one solution is to cut computer power supply.
This is possible by wiring the relay serially with the computer startup button.
Though, on recent computers (les than 6 years), startup button is not an on/off switch but a pushbutton. That can be modified by changing the computer motherboard settings, and by replacing the pushbutton by an on/off button.

It is also possible to cut 110-230V computer supply, but cables must be perfectly isolated from others cables in very low voltage (5 - 12V), and must NOT go through Sub-D 9 connector.

Output of equipment command (router head or cooling fluid pump), can be with a voltage of 5V or 12V. 12V is recommended, which allow, depending the board output power, to command a mechanical relay. Though, i recommend the use of a static relay (thyristors), but care must be taken of their proper cooling.

Some boards do have relays directly installed on it. Generally, these relays are not adapted to switch high power reactive load, as our router motors, because they create high voltage peak when shut down. So you will polarised these relays in 12V, and will cable them to the DB-9 connector. Also, that will avoid having domestic voltage (110-230V) in the command box.

It is reminded that domestic voltage can KILL, so it is important thet you well understand what you are doing when connecting command box to electrical box.

Electrical box will be energised before any connection to the command box.
A careful check with a controller that in all service conditions (emergency shutdown on/off, header motor on/off), domestic voltage NEVER appear on the linking connector.
Earthing of both boxes will be checked.

Connector plugging will only be done after these checking.

A signal line sending the information of emergency shutdown to the computer have been set.
The computer will then stop the cutting after a shutdown. That may allow to not lost a part, but with no guaranty at all, because decceleration of the heavy carriage of Otocoup machine risk to drive to step losses. On smaller machine, that can be OK.