WinPC-NC...?

...How does it work ?

	Starter
	Light
X	**USB**
X	**Professional**

Quick start guide for connection and startup of a cutting/engraving laser with your CNC machine

In this tutorial you will learn how to use **WinPC-NC** to connect a laser to your CNC machine with a proper software configuration.

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Picture: Engraving laser mounted on CNC machine

There are various functions and laser adjustments available to control a Laser with **WinPC-NC**. Some of them are explained below:

How can a laser be connected and controlled?

In most cases, a laser usually has two signals to be considered regardless of the manufacturer.

There is a **enable signal** for the release and a signal for the power, called **PWM signal**.

The connection and the control follow the same principles as with a speed-controlled spindle. The enable signal indicates the On/Off signal of the software while the other is the specification of the power (PWM).

Signal Overview from the side of the laser:

Laser On/Off Enable 1   **5V digital input**

Laser Power PWM/Enable 2   **5V PWM / digital input**

The logic of the control responds to an AND operation, that means that the laser is switched on as soon as both signal inputs are switched on and activated. If the PWM input is used to control the power, the enable input must be at 5V HIGH AND the PWM signal must be greater than 0V.

Some lasers only need the Enable 2 / PWM laser power or need more signals to be controlled. Please refer to the manual of your device.

Note:

The corresponding pins for enable and power of the laser are found in the user manual of your device. Mostly Pins 1 and 17 are used in *WinPC-NC*.

Danger:

We would like to remind you of the necessary and ordinary protection regulations when dealing with class IV lasers. For more detailed safety guidelines, please refer to the user manual of your device.

Control via *WinPC-NC*

Since version 3.02/06, *WinPC-NC* was specially designed to operate laser heads on a CNC machine. The enable and power input of the laser can be controlled continuously. This variant is primarily for working with 2D Files, such as the PLT or DXF format but can be used with DIN/GCode for laser engraving as well.
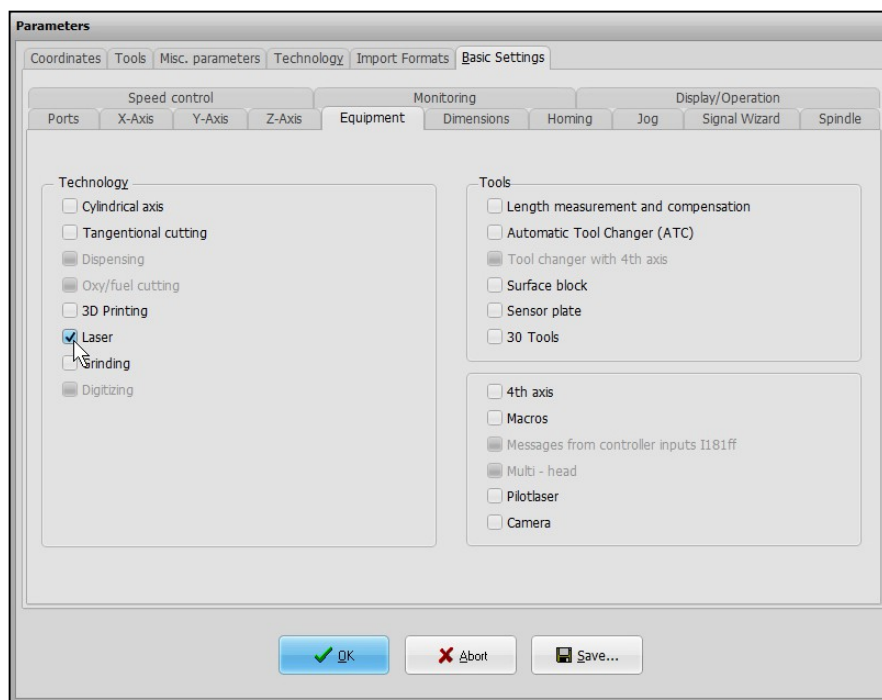
WinPC-NC can control the power of the laser with the PWM signal from 0-100% according to the power values in the cnc file or predefined values. Engravings or lines can be realised with different intensity or images and templates can be engraved or burned with different grayscales.
Furthermore, some calibration and test functions for the laser and special working materials are available on default.

To use this configurations, the laser and the control must be activated first. Click on Parameters, then on *basic settings*:
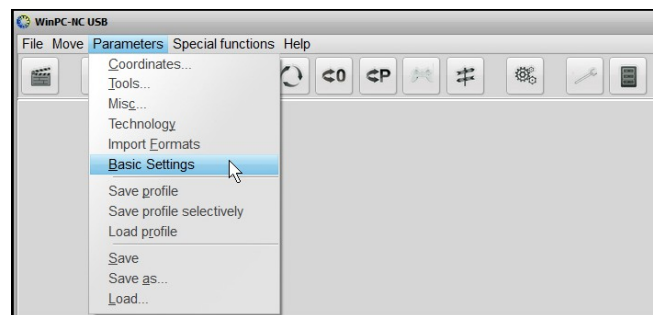
Now navigate to the *equipment* window and activate the *laser*.

In the next step, the output signals must be assigned according to their functions.

The following logic scheme applies:

Enable Laser   **Q244 Dispensing / Laser (e.g. Pin1)**

Power Laser   **Q218 Sp. speed PWM (e.g. Pin17)**

Switch to the Signal Wizard in parameters-basic settings and search for the corresponding signals in the lower output table. After that, every signal can be assigned with an output pin over the pull-down menu. Confirm each selection by clicking Accept.
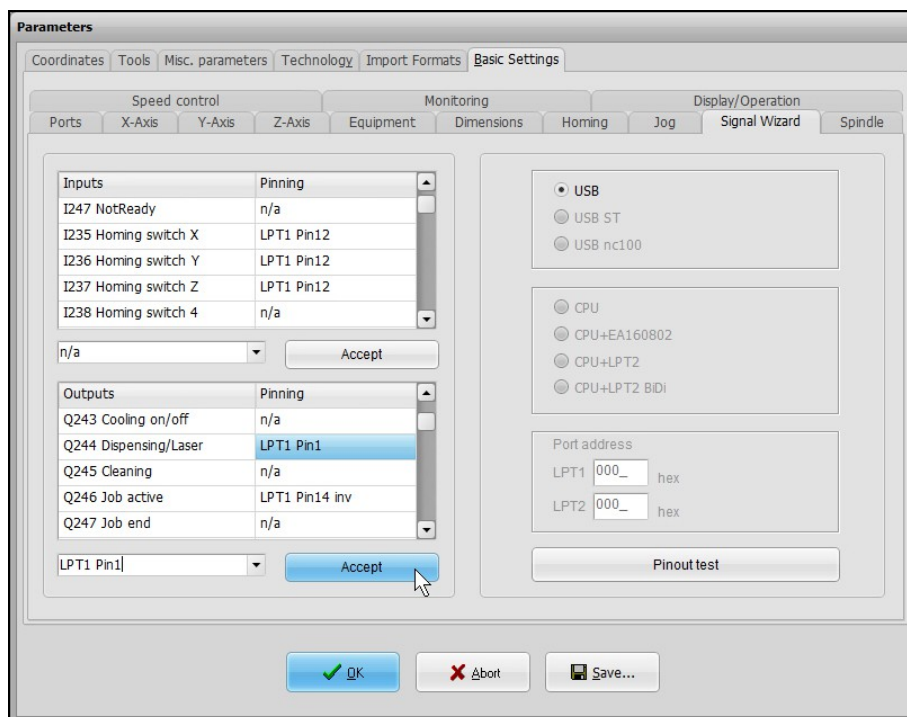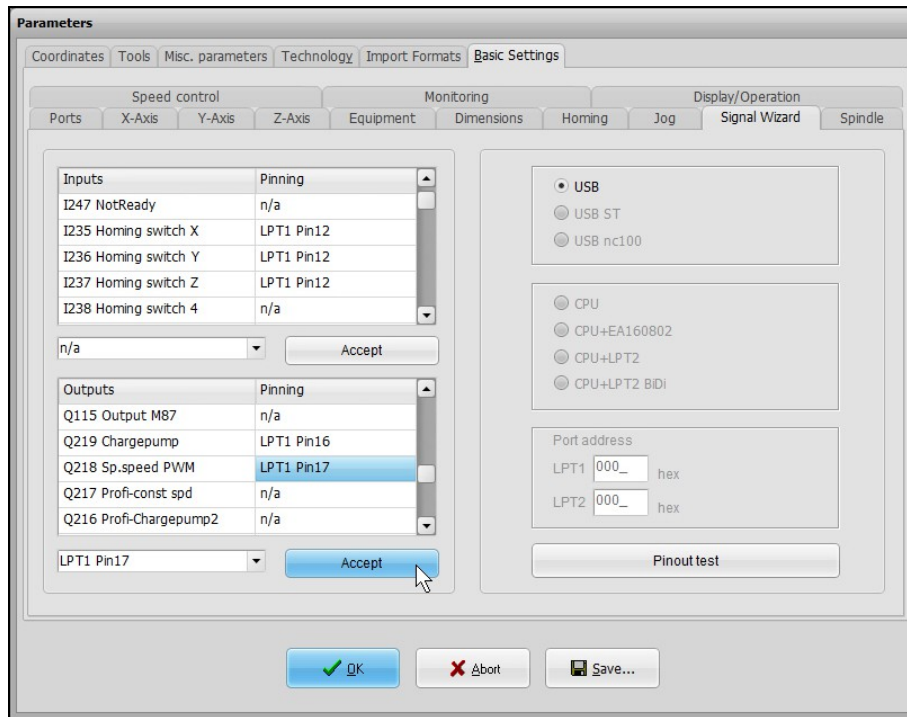
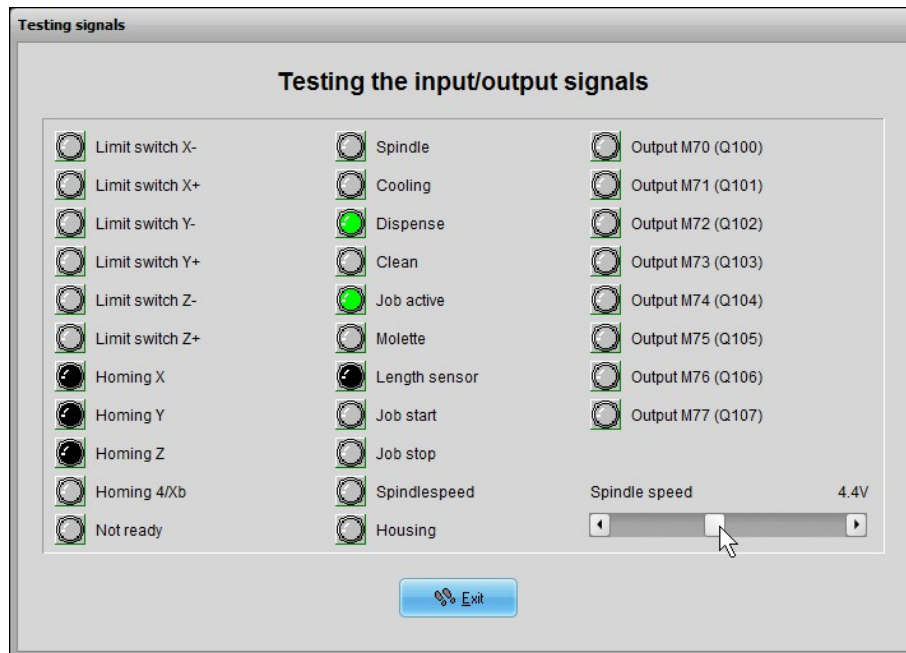*Picture: Assignment Pin 1→ Dispensing/Laser*

Picture: Assignment Pin 17 → Spindle Speed PWM

Thus the signals are assigned and we can check that everything works properly. Please save the settings and switch to the *signal test* window in the menu point *special functions-signal test*.

If you click on Dispense you will set Pin 1 HIGH according to the settings in the signal wizard. When you change the PWM signal the laser should be switched on. After that you can control the laser power with the slider at its different intensities.

The configuration is now complete and the laser can be used with **WinPC-NC**.

If you can not control your laser with that two outputs please refer to the manual of your device and check if more outputs are needed.

Alternative control with other output signals

The activation (enable signal) of the laser can be done with the signals for spindle or cooling alternatively. However, it is important to pay attention to the file format of the NC data used.

With loaded 2D data in the formats HPGL, DXF or EPS, the signals for spindle on/off and cooling on/off are automatically generated by **WinPC-NC** and during the execution of these jobs, a connected laser can also be controlled with the cooling signal. **WinPC-NC** switches cooling on at the start of a contour and off at the end of the contour and for empty runs.

Below are the settings for the signal whizard:

Enable Laser   **Q243 Cooling (Pin1)**

Power Laser   **Q218 Spindle Speed PWM (Pin17)**

With loaded DIN/ISO or GCode files the controling of outputs is done with M3/M5 for spindle and M7/M9 for cooling. The time point of switching the signals on/off is exactly defined inside the program job by these commands and the signals must be assigned similarly.

Below are the settings for the signal whizard:

Enable Laser   **Q243 Cooling (Pin1) with commands M7/M9**

Enable Laser   **Q242 Spindle (Pin1) with commands M3/M5**

Power Laser   **Q218 Spindle Speed PWM (Pin17)**

Note:

WinPC-NC controls the laser outputs with the new signal Q244 Dispensing/Laser correct for all nc formats. Q242 Spindle or Q243 Cooling should not be needed.

For special requirements the alternative solution can be used.

Note:

Please refer to the other *WinPC-NC*...?...How does it work? instructions to learn more about the integrated laser calibration functions for cutting and engraving and the special parameter settings for the laser technology.

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