Manual

InScript® Software

Graphical User Interface

Please, find more information about
installation, commissioning, updating and uninstallation
in document `InScript_software_installation_en.pdf`.

Document as in repository revision 343

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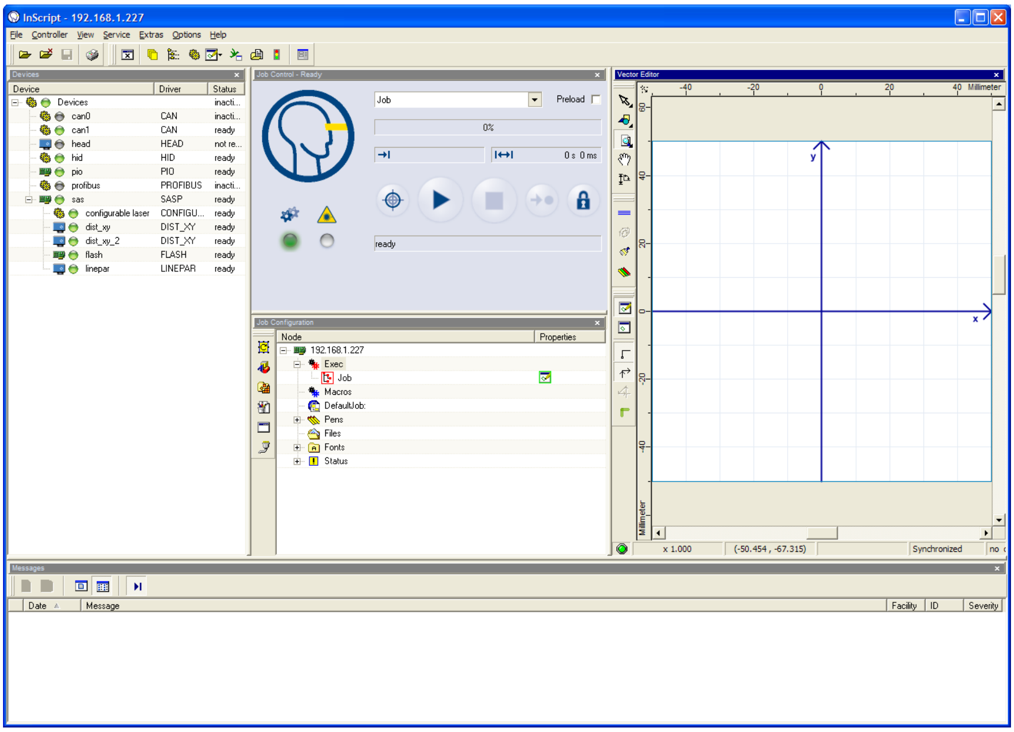
Contents

1. General Information

1.1. Short Description

This document describes the Graphical User Interface of the InScript Software.

Here is the main Window:



1.2. Concept

This is a description of the basic concepts of InScript and ARGES Laser Controllers.

1.2.1. InScript - Controllers

InScript is a *Front-End* for ARGES controller hardware. InScript is used to organize internal structures on the controllers. For instance it is possible to handle *Devices* (see 3 Devices) like scan heads, laser, axis, IOs or other hardware devices. Additionally InScript is used to create so-called *Jobs*, which consist of execution units - so-called *Job Nodes* (see 5 Job Nodes) - that are created, parameterized and put-together in InScript. These *Job Nodes* are organized in a hierarchical tree structure.

The fundamental configuration components are variables which are arranged hierarchically in a tree structure that is stored on the ARGES controller. All components like *Devices*, *Job Nodes* or *Jobs* consist basically of a collection of these variables. But normally a user will only deal with *Nodes* that integrate these variables.

These Nodes are created directly on the controller hardware. The controller hardware then renders DSP (digital signal processor) data for real-time execution of these jobs on the connected hardware (e.g. scan heads), gives interfaces to external IO etc.. The InScript Vector Editor has two modes. One is *Edit* mode, where line data is calculated to some extent at PC side and can be modified. The other mode is the *Preview* mode, where line data is taken directly from the controller's DSP. This gives a clear view of the data that will actually be processed.

InScript
↓↑
Controller
↓↑
Hardware

1.2.2. Summary

Here you can find a summary and deepening of the InScript concepts:

- InScript is a Front-End for ARGES controller hardware
- InScript manages and configures hardware devices on the controllers
- All operations of InScript are Job based
- Jobs are hierarchical tree structures that are executed from their root node to the last node in the last branch
- Each node is an execution, steering or processing element
- Each node consists of variables created on the controller
- These jobs can be created in the Job Configuration editor
- The Vector Editor of InScript shows the visual output of your work in progress
- All of the visual output that InScript provides in preview mode is calculated directly by the controller

1.2.3. Remarks

If you use an NCC controller, you have to be aware that normally the controller is built into the PC (host PC) on which InScript is running. This means that if the PC is shut down, put into stand by or hibernation mode, the NCC controller is powered-off with most PC hardware and looses unsaved settings and jobs. If InScript is running, automatic power state changes (e.g. to stand by or hibernation) are prevented but the user is still allowed to actively put the machine to sleep mode, with all the implications that are stated above. The NCC PCI card is connected to the host PC via an internal PCI slot.

In opposite to this, ASC controllers are stand-alone external appliances, that are independent from your PC. ASC controllers are connected via ethernet to the host PC.

1.3. Overview of Changes

2009-02-11 Remaining Job nodes added (ar)

2009-01-20 Job node added: ARL P3D

2008-02-14 Job nodes added: Raw Lines; RawLines, Tiling and Tile nodes translated to de-DE

2008-01-17 Job nodes added: Tiling, Tile

2007-11-29 Document created

2. Devices Window

Devices are the hardware connected to the controller or present on the controller. The controller uses device specific drivers to control them. Devices and their drivers can be accessed via the *Devices* window.

At the first start of InScript there are already some devices and their drivers present in the *Devices* window. The presence of these devices depends on the controller hardware and the assumption that at least one scan head is installed. These devices cover basic functions of controller and scan head.

You may want to add further devices and their drivers respectively for the devices connected to the controller, but at least one for the laser. How this is done and how to manage devices you will learn in the following sections.

But first let us describe how to open the *Devices* window, see section 2.2 How to Open the Window, and what can be seen in the *Devices* window, see section 2.3 Description of the Window.

Then manage all device related issues in the *Devices* window via the context menu, see section 2.5 Context Menu in the Devices Window and section 2.6 Manage Devices.

2.1. Settings in Devices vs. Settings in Pens

The entries in the *Devices* window represent basicically driver for connected devices and normally you cannot (and should not) change parameters here unless you unlock the parameter by deactivating the red square below a value (see 2.6.5 Edit (Parametrize) for more information). The red square shows that this parameter is controlled by the corresponding pen.

If you want to do special settings, while a job is executed, use Pens (4.9 Manage Pens). These pens can be used in the Job tree by dragging and dropping them (see 4.9.1 Control Device Parameters During Job Execution). Another big advantage is that you can save *Pens* for different purposes in `*.pen` files to reuse them (see 4.9.6 Save Pen).

TIP

Normally device parameters should be used as a kind of basic settings. If you want to change device parameters dynamically while you execute a Job, we highly recommend to use the *Pen* mechanism!

2.2. How to Open the Window

► In the menu, click *View* → *Devices*.
— or —
In the toolbar, click .
The *Devices* window opens.

2.3. Description of the Window

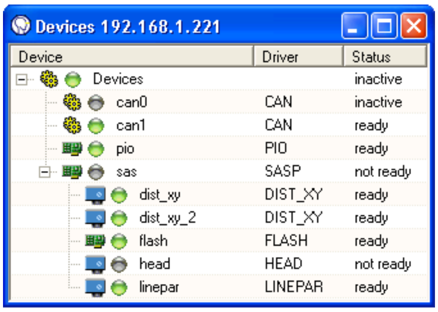


Figure 1: The *Devices* window

***Column* Device** shows which devices are present by a device "category" icon, a status LED (see *Column Status*) and the device's name. Possible device categories are

- generic device
- scan head device
- device on the controller
- motion axis device
- laser device

***Column* Driver** shows the driver's name for the respective device

***Column* Status** shows the driver's status. The driver's status is also shown by a LED next to the device's name. Possible statuses are

- **inactive** the device is inactive
- **activating** the device is being activated
- **not ready** the device is not ready
- **ready** the device is ready to use
- **failure** the device is ready to use
- **deactivating** the device is being deactivated

2.4. Devices Tree Structure

See also figure 1 The *Devices* window.

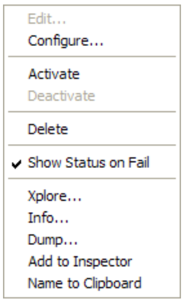
- **Devices** this is the root of the tree structure. If you want to add a device then create it via the context menu of this root node

  - **sas** some devices are located in the *sas* device's subtree, see section 3.3 sas - System Activity State.

    Active devices may be arranged in the *sas* device's subtree. When activating a device this is done automatically in most cases. The *sas* device controls the error state of all connected and activated devices, that are in the *sas* device's subtree. The *sas* device synchronizes the devices in its subtree, see section 2.6.6 Synchronize with Other Devices

2.5. Context Menu in the Devices Window

Use the context menu to manage devices in the *Devices* window. Whether a menu item is enabled or not, depends on the device and its status. The context menu:



Create Device This menu item is only available on the *Devices* root node and opens the *New Device* window to add a device and its driver to the devices tree structure, see section 2.6.2 Create Device

Edit opens the device drivers's editor to parametrize the driver, see section 2.6.5 Edit (Parametrize). Only active device driver's can be edited (parametrized)

Configure opens the device drivers's editor to configure the driver, see section 2.6.3 Configure. Only inactive device driver's can be configured

View Configuration opens the active device drivers's configuration editor. Only inactive device driver's can be configured

Activate activates an inactive device driver, see section 2.6.4 Activate

Deactivate deactivates an active device driver, see section 2.6.8 Deactivate

Delete deletes an incative device driver, see section 2.6.9 Delete. Only inactive device drivers can be deleted

Show Status on Fail if this menu item is selected and if the device falls to a failure state, then its editor window will automatically be opened. If the device is in the *sas* device's subtree, see section 3.3 sas - System Activity State, and if the menu item is selected, then the *sas* device's editor window will be opened additionally

Xplore opens the *Xplorer* window at the selected device driver's variables, see section 8.5 Xplorer

Info opens the *Node Info* window at the selected device driver's variables

Dump opens a *Dump* window of the selected device driver's variables

Add to Inspector opens the Inspector window to add variables, see section 8.9 Node Inspector

Name to Clipboard copies the device driver's name to the clipboard

2.6. Manage Devices

2.6.1. Basic Steps

How to add a device

Step 1 Connect the device to the controller, see the documentation for the controller and the device.

Step 2 Create a device in the *Devices* window, see section 2.6.2 Create Device.

Step 3 Configure the device, see section 2.6.3 Configure.

Step 4 Activate the device, see section 2.6.4 Activate.

Step 5 Edit (parametrize) the device, see section 2.6.5 Edit (Parametrize).

How to use a device

Step 1 Synchronize the device with other devices, see section 2.6.6 Synchronize with Other Devices.

Step 2 Control the device's parameters during job execution, see section 2.6.7 Control Device Parameters During Job Execution.

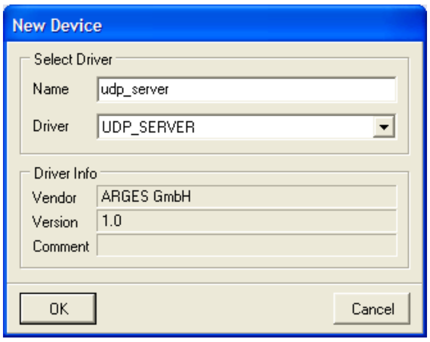
How to remove a device

Step 1 Deactivate the device, see section 2.6.8 Deactivate.

Step 2 Delete a device, see section 2.6.9 Delete.

2.6.2. Create Device

Step 1 On the *Devices* node context menu, right click Devices and choose *Create Device*.
The *New Device* window opens.



Step 2 You may type a customized *Name* for the device.

This name will be used in the *Devices* window in column *Device*.

Step 3 Select a device from the *Driver* list.

Step 4 Find a description of supported devices in section 3 Devices.

If you do not find a compatible device, contact ARGES.

Step 5 Click *OK*.

The device appears in the *Devices* window, but is still inactive. This status is symbolized by a gray LED .

Step 6 Configure the device, see next section.

2.6.3. Configure

The configuration is a basic step for the operation of a device, e.g. select and configure a COM port. Such basic settings can only be modified, if a device is inactive, which is symbolized by a gray LED .

Step 1 Double click the created device.

— or —

Click *Configure* in the device context menu.

Step 2 The configuration window of the corresponding device opens.

Step 3 Configure the device as needed.

Find a description of supported devices in section 3 Devices.

Step 4 To apply the configuration, click *OK*.

The configuration window closes. The device is configured now, but still inactive.

Step 5 Activate the device, see next section.

2.6.4. Activate

CAUTION

Wrong device configuration

Material damage

- Activate the device only if you are sure that it is configured correctly.

Step 1 In the device context menu, click *Activate*.

After a short time the device will be active and ready. This status is symbolized by a green LED. A red LED would symbolize an error, e.g. if no communication could be established with the device.

At the same time a pen section will be created in the *Job Configuration* window in the tree structure under *Pens* → *default*, which belongs to this device, see section 4.9 Manage Pens.

Step 2 Parametrize the device, see next section.

2.6.5. Edit (Parametrize)

To set a device it has to be active. This status is symbolized by a green LED.

Only set parameters, which are constant during a job, e.g. *Settle Time* of the laser power. Settings that may be changed, while executing a job, are labeled with a red checkbox and locked, i.e. they should not be changed here. Set these parameters within the pen section belonging to the device, refer to section 4.9 Manage Pens for more information.

NOTE

If you clear the red checkbox to a gray checkbox then the corresponding setting can be changed in the device and the setting in the corresponding pen section will be ignored. But this may lead to unwanted results.

Step 1 Double click the device.

— or —

Click *Edit* in the device context menu.

The settings dialog of the corresponding device opens.

TIP

To let every input immediately take effect, clear the *Suspend* checkbox. To input all settings first and let them take effect together, select the *Suspend* checkbox. This may be necessary to prevent the device from going into an undefinded state by the temporary input of incompatible settings.

Step 2 Set the device.

Find a description of supported devices in section 3 Devices.

Step 3 Click *OK*.

Step 4

CAUTION

Data loss

Settings will be lost by re-starting the controller.

- In the menu, click *Controller → Save Devices and Default Pen (NVRam)* to prevent data loss.

2.6.6. Synchronize with Other Devices

CAUTION

Loss of synchronization to other devices

Material damage

If you *remove* the device from the *sas* device subtree then the device will **not** be synchronized with the devices remaining in the *sas* device subtree.

- Make sure that the lack of synchronization does not result in material damage (e.g. collision of linear axes, process outside the intended area).

- In the *Devices* window, Drag&Drop the device into the *sas* device's subtree.

TIP

A device reporting an error, symbolized by a red LED, can be deactivated or removed from the *sas* device's subtree. This may be useful for testing purposes, e.g. when working with a switched off laser where the laser device is reporting an error.

2.6.7. Control Device Parameters During Job Execution

Find more information about, how to control device parameters during job execution, in section 4.9 Manage Pens.

2.6.8. Deactivate

CAUTION

Loss of synchronization to other devices

Material damage

If you *deactivate* the device then it will be removed from the *sas* device subtree and the device will **not** be synchronized with the devices remaining in the *sas* device subtree.

- Make sure that the lack of synchronization does not result in material damage (e.g. collision of linear axes, process outside the intended area).

- Click *Deactivate* in the device context menu.
  The device will be set inactive. This status is symbolized by a gray LED.
  At the same time this device's pen section is removed from the *Job Configuration* window under the tree structure *Pens → default*, see section 4.9 Manage Pens.

2.6.9. Delete

To delete a device it has to be inactive. A gray LED symbolizes this status.

Step 1 In the device context menu, click *Delete*.
The *Confirm* window opens.

Step 2 Click *Yes*.
The device will be deleted from the tree structure.
At the same time this device's pen section is removed from the *Job Configuration* window under the tree structure *Pens* → *default*, see section 4.9 Manage Pens.

2.7. Store Configuration

NOTE

If you do not store the settings to the controller NVRam then the settings will be lost after rebooting or restarting the controller.

► In the main menu, click *Controller* → *Save Devices and Default Pen (NVRam)* — or — Choose *Save Devices and Default Pen (NVRam)* in the context menu of the controller in the *Job Configuration* window

3. Devices

3.1. Shared GUI Elements

Some graphical user interface elements are shared by all devices. These elements are summarized here.

3.1.1. When Configuring Inactive Devices

Activate activates the device

OK applies changes made and closes the window

Cancel cancels changes made and closes the window

Restore restores the values as they were before opening the window

3.1.2. When Editing (Parametrizing) Active Devices

■ **(Controlled)** If the checkbox is selected (red ■) then the parameter above the checkbox can not be changed in the device. The parameter is controlled by the pen section which belongs to the corresponding device then. Such a parameter can be changed during job execution, see section 4.9.1 Control Device Parameters During Job Execution).

If the checkbox is cleared (gray) then the parameter above the checkbox can be changed in the device.

NOTE

If you try to set such parameters, where the checkbox is cleared (gray), in the corresponding pen section then the settings in the pen section will be ignored.

Suspend If the checkbox is selected then changes take effect not until clicking *OK*. This is useful, if changes are temporarily not compatible to each other and an error condition would be caused that way.

If this checkbox is cleared then changes will take effect immediately when pressing the *Enter* key

Status shows the device's status

Power State shows the laser's power state (only for laser devices; see the *Power Saver* tab)

Reset acknowledges error conditions and restarts the device

OK applies changes made and closes the window

Cancel cancels changes made and closes the window

Restore restores the values as they were before opening the window

opens the *DefaultPen's* pen section that belongs to this device

3.2. pio - Parallel Inputs and Outputs

for controller	NCC
device type	controller
driver version	1.0

For instance the NCC controller has 2 connectors called *parallel interface inputs* and *parallel interface outputs*. The *pio* device drives these connectors. Find more information about both connectors in *Manual -- NCC System Controller*.

3.2.1. Configure

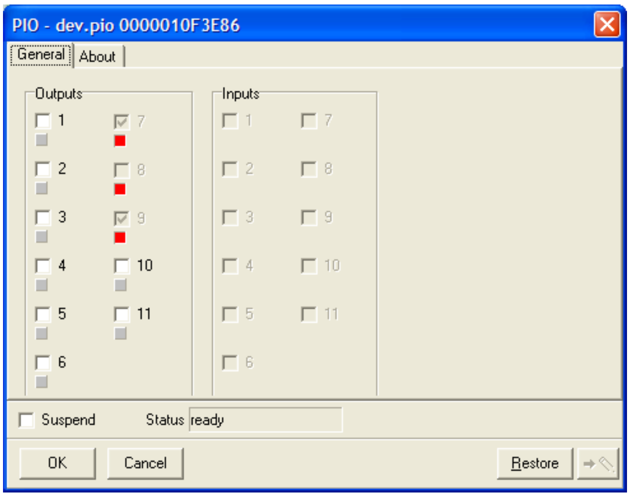
NOTE

The *pio* device can not be configured. The device covers basic functions of the controller. It is always active, and available even on an ASC controller, but there the *ASE USER IO* device (see 3.36 ase user io - USER Inputs and Outputs) has replaced the *pio* device.

3.2.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.2.3. Parametrize - General



Out shows and sets the digital outputs

1 .. 11 If the checkbox is selected then the digital output is set to active

NOTE

To be able communicating with an external super ordinated machine control InScript provides several input and output signals. In the *System Activity State* device, see section 3.3 sas - System Activity State, some of these signals are already assigned to digital outputs. This is why some checkboxes are disabled.

In shows the digital inputs

1 .. 11 If the checkbox is selected then the digital input is set to active

3.2.4. Reading and Setting Parallel Inputs and Outputs

► If you want to readout or set parallel inputs and outputs on the NCC controller manually then open the *pio* device.

— or —

If you want to readout or set parallel inputs and outputs while executing a job then use e.g. 5.44 Script (by setting e.g. `dev.pio.o1` output variable, reading e.g. `dev.pio.i1` input variable or similar variables of the *pio* device) or 5.65 ExtSelect.

3.3. sas - System Activity State

for controller	NCC, ASC
device type	controller
driver version	1.0

The *sas* (or *sasp*) device controls the error state of all connected and activated devices, that are in the *sas* device's subtree. The *sas* device synchronizes the devices in its subtree.

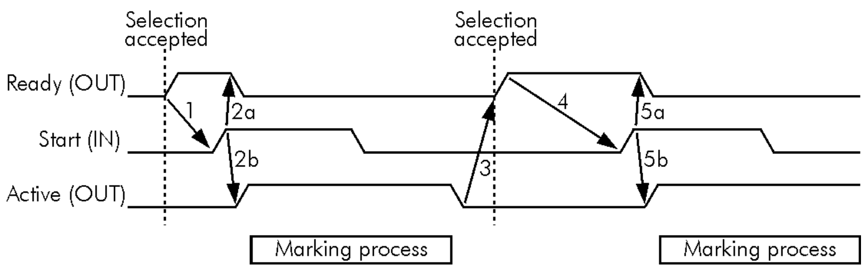
The *sas* device also serves as an interface, when InScript is controlled by an external super ordinate machine control. To start processing by such a machine control it is necessary to apply a *Start* signal to an input of the controller (see *Manual -- NCC System Controller -- parallel interface inputs*). To enable the machine control to monitor the state of the processing system and to request the next program as soon as possible the controller provides the 2 status signals *Ready* and *Active* at an output (see *Manual -- System Controller -- parallel interface outputs*).

It is possible to create a second *SASP* device but normally this is only practical for e.g. testing purposes.

At an NCC controller these signals are located at 2 connectors called *parallel inputs* and *parallel outputs*, see also section 3.2 pio - Parallel Inputs and Outputs and the documentation of the NCC controller.

At the ASC controller these signals are located at 2 connectors called *PLC* and *PLC AUX*, for more information, please see the documentation of the ASC controller.

Timing Diagram



Description Timing Diagram

Digital inputs can be configured to be either high-active or low-active. Therefore they are only addressed as active or inactive signals in the following.

No. 1 When the controller board shows its readiness by an active `Ready signal` you may request the execution of a program by setting the `Start signal` to active.

No. 2a The controller board acknowledges the `Start signal` by setting the `Ready signal` to inactive.

No. 2b The controller board shows the beginning of program execution by activating the `Active signal`.

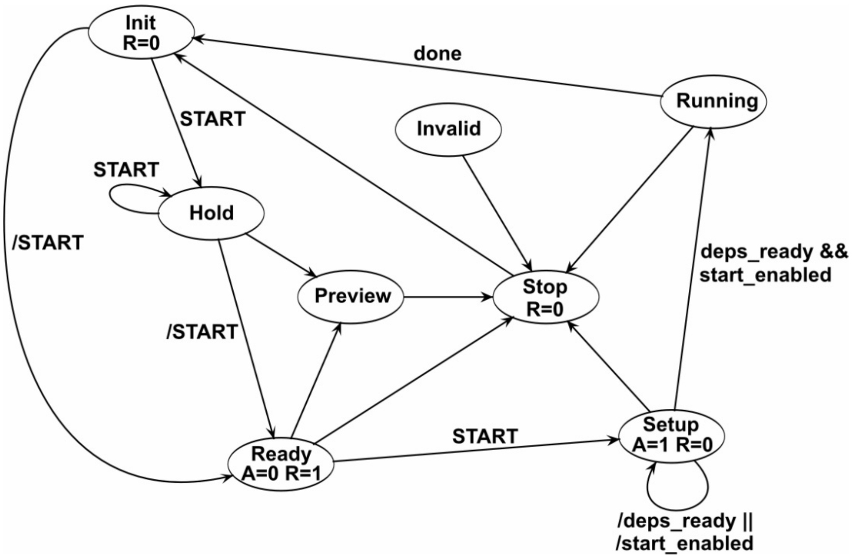
No. 3 When the program ends the controller board sets the `Active signal` to inactive and the `Ready signal` to active.

No. 4 Once the `Ready signal` is active again you may request the execution of the next program.

No. 5a see *No. 2a*

No. 5b see *No. 2b*

State Transition Diagram



Description State Transition Diagram

A=0 inactive state

A=1 active state

R=0 controller board not ready

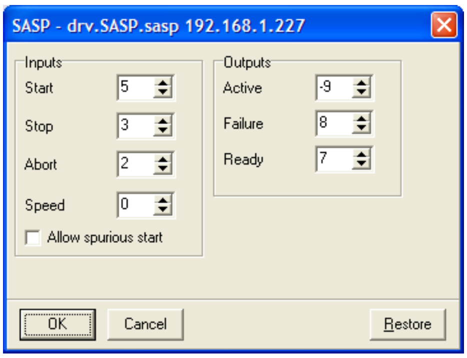
R=1 controller board ready

/ condition is not fulfilled

&& both conditions are fulfilled

|| either one or the other condition is fulfilled

3.3.1. Configure



NOTE

Parameters on this tab are only relevant for the NCC controller.

Inputs

NOTE

A positive value stands for a high-active digital input. A negative value stands for a low-active digital input. The value 0 (zero) means that no digital input will be used.

Start sets the digital input for the *Start* signal

Stop sets the digital input for the *Stop* signal

Abort sets the digital input for the *Abort* signal

Speed this setting is deprecated. It has to be 0

Allow spurious start if this checkbox is **unselected**, an external *Start* signal always gives back an error, while a Job is being executed. If this checkbox is **selected**, a Job is not interrupted by an external *Start* signal but repeated *Starts* do not return any error condition (e.g. for an external pushbutton that gives unwanted repeated signals that cause repeated *Start* signals).

NOTE

Under normal circumstances an undesired second *Start* signal has to be seen as a serious error condition!

Outputs

NOTE

A positive value stands for a high-active digital input. A negative value stands for a low-active digital input. The value 0 (zero) means that no digital input will be used.

Active sets the digital input for the *Abort* signal

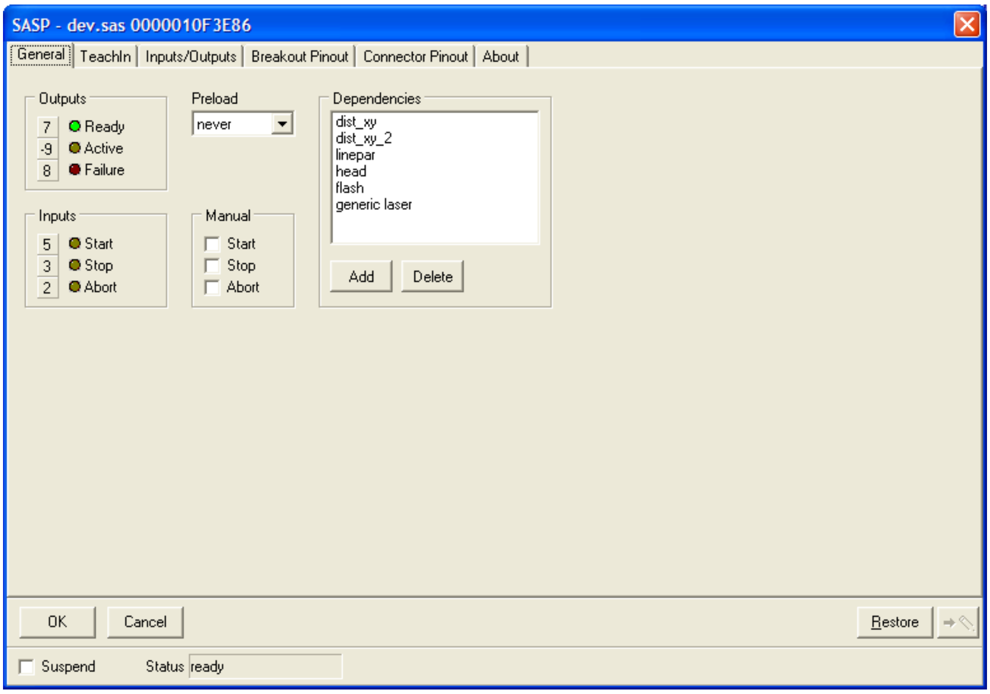
Failure sets the digital output for the *Failure* signal

Ready sets the digital output for the *Ready* signal

3.3.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.3.3. Parametrize - General



NOTE

Parameters on this tab are only relevant for NCC controller.

Outputs shows the assignment of digital outputs to the signals *Ready*, *Active* and *Failure*. The status is shown by representations of LEDs

> **NOTE**
>
> A positive value stands for a high-active digital output. A negative value stands for a low-active digital output. The value 0 (zero) means that no digital output will be used. See also the *Manual -- NCC System Controller -- parallel interface outputs*.

Preload To reduce time from *Start* signal to execution of a job, the data can be loaded and the line vectors can be calculated in advance

always jobs will be pre-loaded

> **NOTE**
>
> If you select *always* and change an already selected job then you have to update the job on the controller board manually. For this de-select the job and then select the job again — or — click *Job Abort*.

never jobs will not be loaded until the *Start* signal

Dependencies lists monitored and controlled devices. When external devices are created by *Create Device* they are automatically added to the list of monitored and controlled devices. In case a critical error occurs at one of these devices the program will be interrupted and the error displayed. If the listed devices are in a standby state then they will be reactivated before beginning the job

Add adds a device to the list. This is necessary, if for testing purposes a device was previously deleted from the list by *Delete*

Delete deletes a device from the list. If you delete a device from the list then the device will not be monitored and controlled. That way it is possible e.g. to ignore error messages from a connected laser system

Inputs shows the assignment of digital inputs to the signals *Start*, *Stop* and *Abort*. The status is shown by representations of LEDs.

NOTE

A positive value stands for a high-active digital input. A negative value stands for a low-active digital input. The value 0 (zero) means that no digital input will be used, see the documentation of the NCC controller.

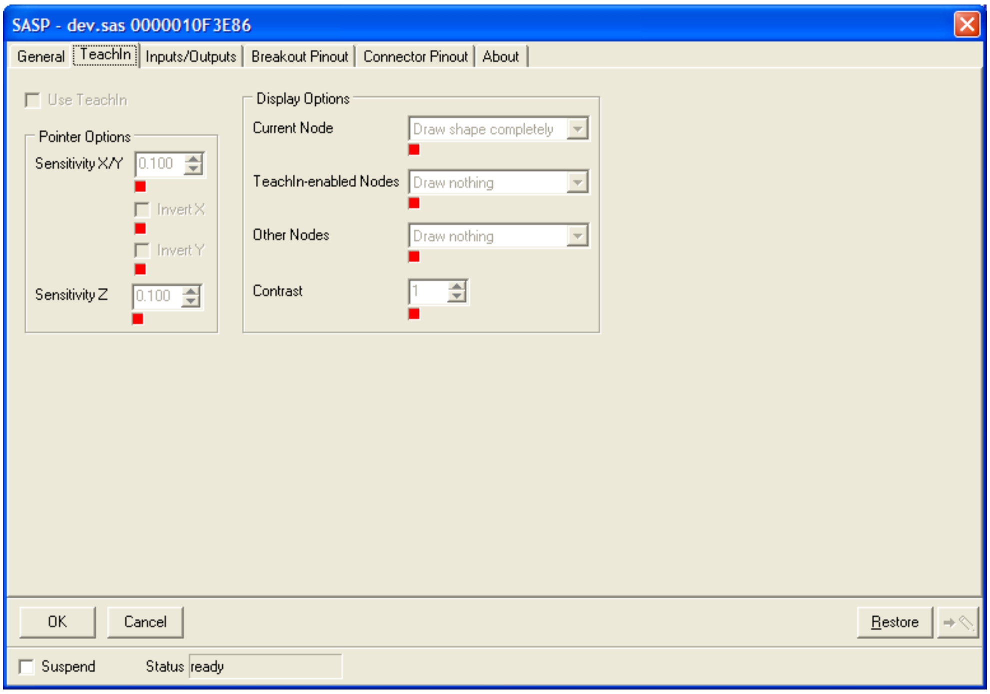
Manual **Start** If the checkbox is selected then the *Start* signal is set to active

Stop If the checkbox is selected then the *Stop* signal is set to active

Abort If the checkbox is selected then the *Abort* signal is set to active

3.3.4. Parametrize - Teach-In

This tab and its settings are normally needed in a *sas Pen Section* for pens that are used for Teach-In (see also 4.9.12 Teach-in *pilot* Pen).



Use Teach-In if this checkbox is selected, the Teach-In function is active, i.e. Teach-In can be started by clicking *Start Teach-In (F8)* in the *Job Control* window (see also 4.9.12 Teach-in *pilot* Pen and 3.1.2 When Editing (Parametrizing) Active Devices)

Pointer Options sets how a pointer device will react

Sensitivity X/Y sets the sensitivity to mouse movement. A higher sensitivity increases the pointer speed on the target and a lower sensitivity decreases the speed

Invert X If the checkbox is selected then the X-axis of the teach-in mouse will be inverted. This does not affect any coordinate system in InScript but assists the teach-in function

Invert Y If the checkbox is selected then the Y-axis of the teach-in mouse will be inverted. This does not affect any coordinate system in InScript but assists the teach-in function

Sensitivity Z sets the sensitivity to mouse wheel movement. A higher sensitivity increases the pointer speed on the target and a lower sensitivity decreases the speed

Display Options sets how the nodes are displayed

Current Node sets how the current node is displayed

Draw shape completely draws the shape completely as defined in the job

Teach-In-enabled Nodes sets how teach-in-enabled nodes are displayed

Draw shape completely draws the shapes completely as defined in the job

Draw nothing ignores these nodes and draws nothing instead

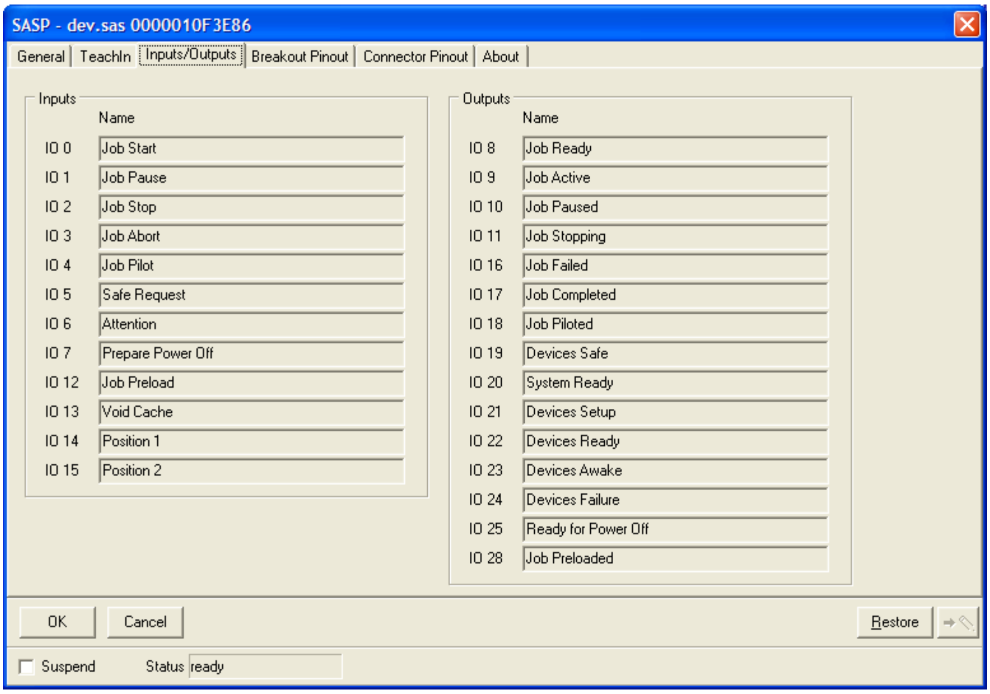
Other Nodes set how other nodes are displayed

Draw shape completely draws the shapes completely as defined in the job

Draw nothing ignores these nodes and draws nothing instead

Contrast sets the contrast of the selected node compared to other nodes when all nodes are shown

3.3.5. Parametrize - Inputs/Outputs



NOTE

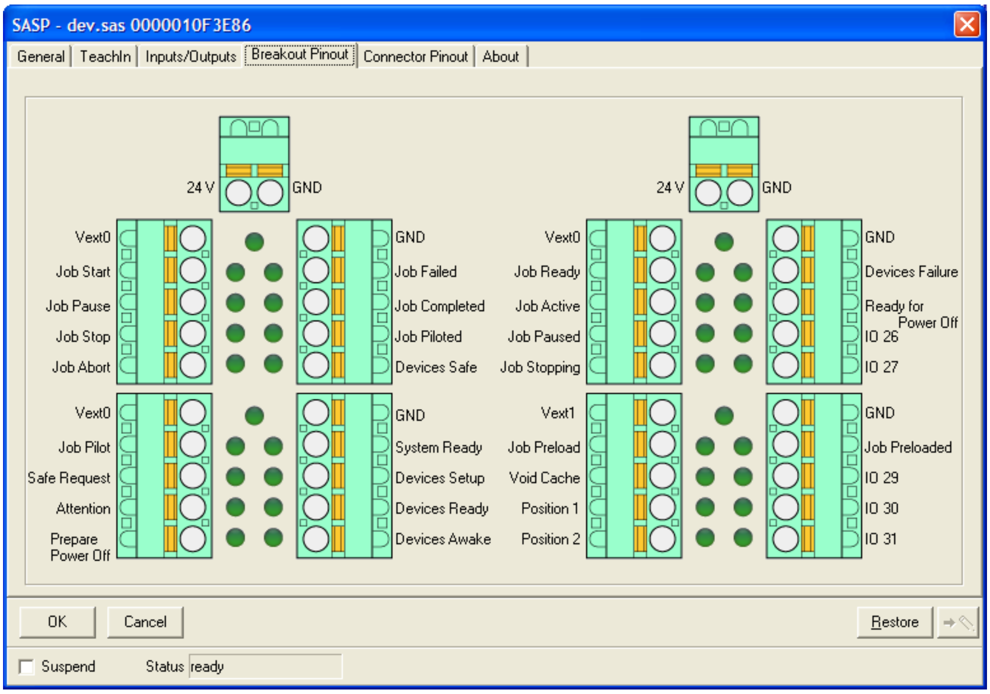
Parameters on this tab are only relevant for the ASC controller.

This tab shows the signal names assigned to the IO numbers at the connectors *PLC* and *PLC AUX*.

TIP

Inputs and outputs can be addressed by their name when using a *Script* node in a job.

3.3.6. Parametrize - Breakout Pinout



NOTE

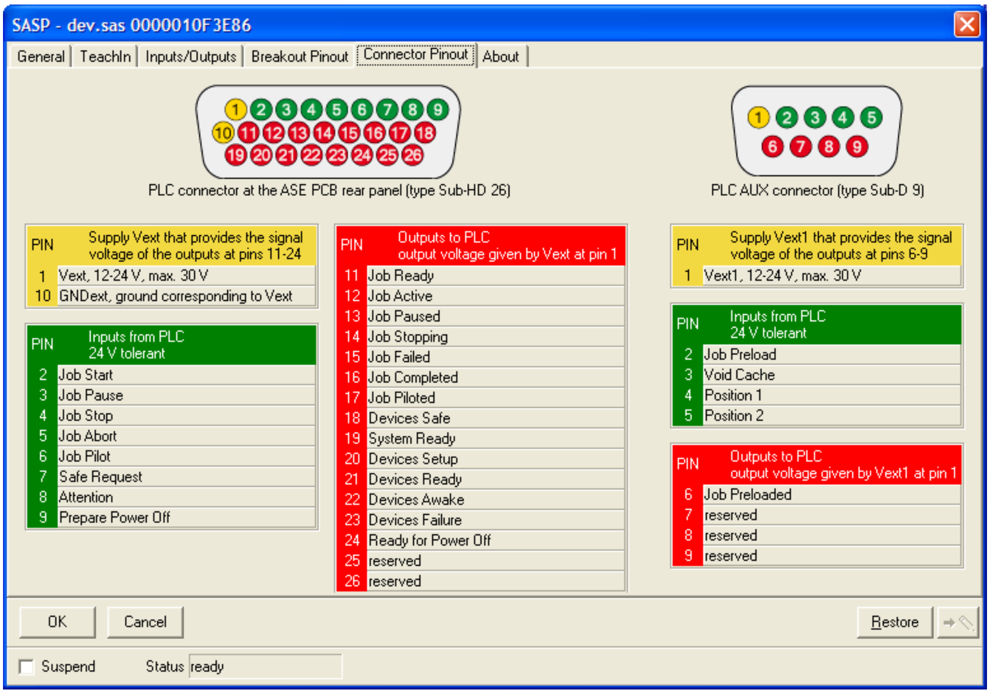
Parameters on this tab are only relevant for the ASC controller.

This tab shows the actual breackout pinout of the PCC breakout box that is connected to the connectors *PLC* and *PLC AUX*.

TIP

You can print this tab using the *Print* button and keep this hardcopy near the PLC breakout box.

3.3.7. Parametrize - Connector Pinout



NOTE

Parameters on this tab are only relevant for the ASC controller.

This tab shows the actual *PLC* and *PLC AUX* connector pinout.

3.3.8. Parametrize - Job Duration Measurement

The feature job duration measurement is controlled via the variable *dev.sas.jobDurationMeasurement*. If the variable is set to *activated* the feature is activated and job cycles after the activation will be measured. If the variable is set to *deactivated* the feature is deactivated and job cycles after the activation will not be measured. See also 5.1 Shared GUI Elements.

3.4. flash - Flash Memory

for controller	NCC, ASC
device type	controller
driver version	1.0

The *flash* device manages the controller's memory.

3.4.1. Configure

NOTE

The *flash* device can not be configured. The device covers a basic function of the controller. The device is always active.

3.4.2. Parametrize

The *flash* device has no graphical user interface.

CAUTION

You have to know exactly how to set the variables here

Loss of data, jobs and other settings

- Do not edit any variables.

3.5. dac_a/b - Digital Analog Converter a and b

for controller	NCC
device type	controller
driver version	1.0

Each *dac* device (*a* or *b*) controls 2 analog outputs for external devices of the NCC controller.

3.5.1. Configure

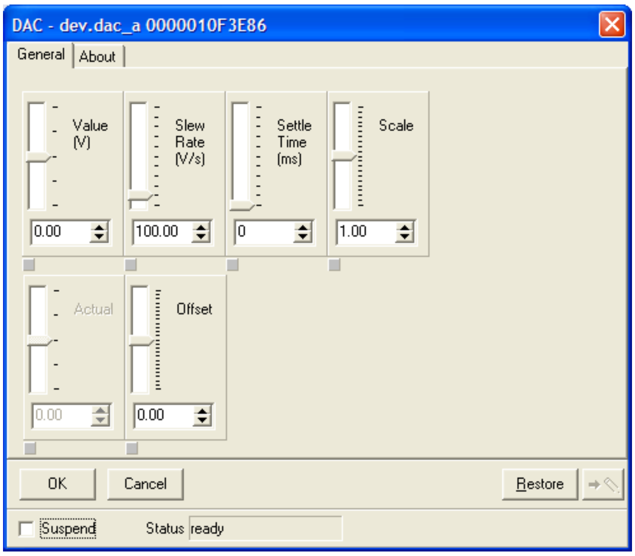
NOTE

The *dac* device can not be configured. The device covers a basic function of the controller. The device is always active.

3.5.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.5.3. Parametrize - General



Value sets the nominal voltage

Slew Rate sets the slew rate by which the voltage rises or drops

Settle Time sets the settling time waited after the nominal voltage stabilizes

Scale sets the voltage scale factor

Actual shows the actual voltage of the analog output. The value is calculated like this:
`(Value + Offset) × Scale = Actual`
If the *Slew Rate* is very small then the development of the actual voltage can be seen here

Offset sets the voltage offset

3.6. dist_xy - Distortion

for controller	NCC, ASC
device type	controller
driver version	1.0

The *dist_xy* device is used to correct scanfield distortions (see the *Manual -- Scan Head*).

NOTE

We **strongly** recommend you to use the wizard and follow the step by step instructions in the *Manual -- Scan Head -- Commissioning*

.

3.6.1. Configure

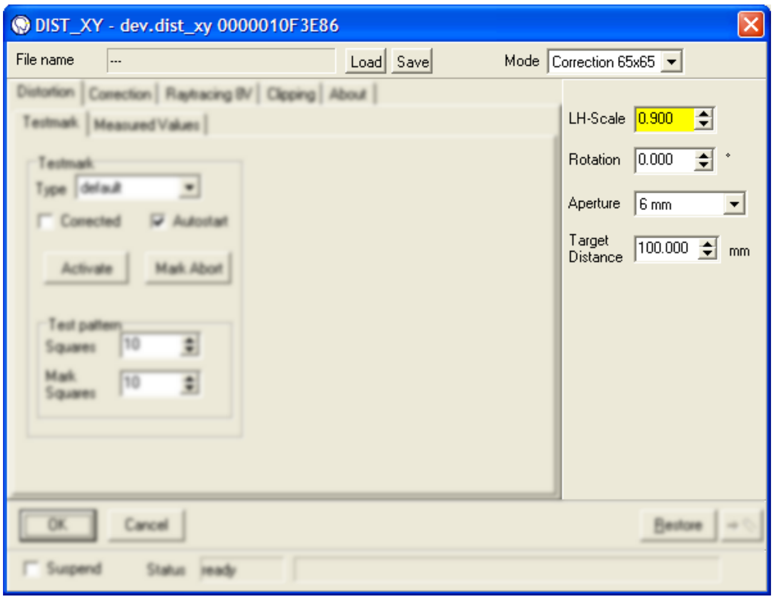
NOTE

The *dist_xy* device can not be configured. The device covers a basic function of the controller. The device is always active.

3.6.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

If you do not use the dist_xy wizard(s) , see the *Manual -- Scan Head* , expert settings can be accessed by double clicking the dist_xy device in the *Devices* window (see 2 Devices Window) and clicking on the *Expert Mode* button. Be aware that these settings are difficult and we recommend you to use the wizard(s)!



File name shows the name of the distortion file in use

Load

> **CAUTION**
>
> Pay attention to the sequence of steps.
>
> A wrong sequence results in a wrong distortion correction.
>
> Before loading a distortion `*.dst` file do the following: In the *dist_xy2* device set the *Mode* to *Correction 65x65* except when using a dual scan head. Only in the latter case set *Mode* to *Distortion*.

opens the *Open* dialog to open a distortion `*.dst` file

Save opens the *Save As* dialog to save a distortion `*.dst` file

Mode selects the mode of correction

Distortion for scan heads with flat field lens

Correction 65x65 for scan heads with focus translator

LH-Scale

CAUTION

Damage of the mirrors possible, if factor exceeds the value of 0.96

If factor exceeds the value of 0.96 then the mirrors can collide at high speeds in one of the corners of the scan field, since the area for line handling is too small then.

We urgently recommend to leave the default value.

sets the factor for the maximal usable area of the whole scan field. The not usable area is needed for line handling

Rotation sets the rotation of the scan field counterclockwise regarding the scan head. For the default orientation of the scan field regarding the scan head at 0° (see 7.8 Coordinate System). The values 0, 90, 180 and 270° with a range of ±3° are allowed. Note that the coordinate system as seen in window Vector Edit is not affected by this. We recommend the default value

Aperture the aperture is only relevant when *Mode* is set to *Correction 65x65*. Specifies the aperture of your scan head. For the aperture of 50mm two settings are possible. Please consult the order confirmation to select the right one

List item	Description
6mm, 11mm, 16mm, 21mm, 31mm, 50mm(066), 50mm(104)	possible Apertures

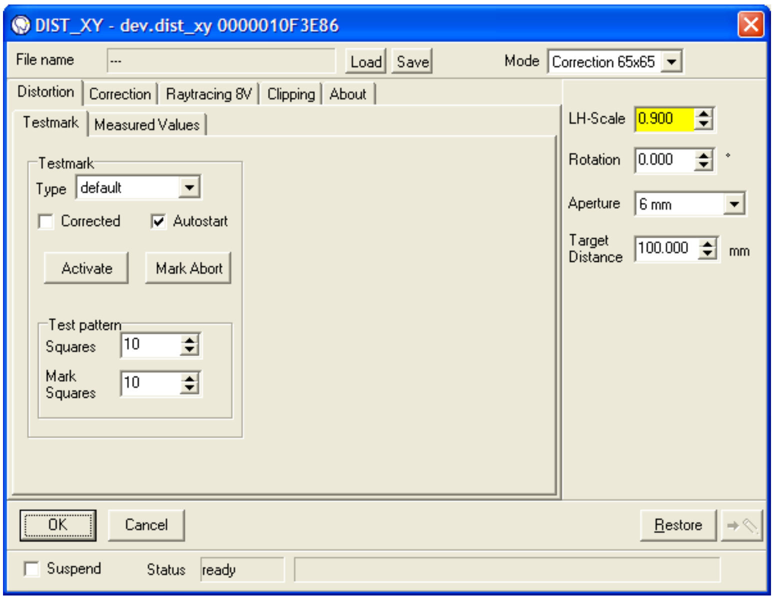
Target Distance the target distance is only relevant if *Mode* is set to *Correction 65x65*. It specifies the distance between the target and the bottom side of the scan head

3.6.3. Parametrize - Distortion

These tabs are only relevant if *Mode* is set to *Distortion*, i.e. for scan heads with flat field lens. The settings in these tabs also specify the *Testmark 2* for scan heads with focus translator

3.6.4. Parametrize - Distortion - Testmark

This tab is only relevant if *Mode* is set to *Distortion*, i.e. for scan heads with flat field lens. The settings in this tab also specify the *Testmark 2* for scan heads with focus translator

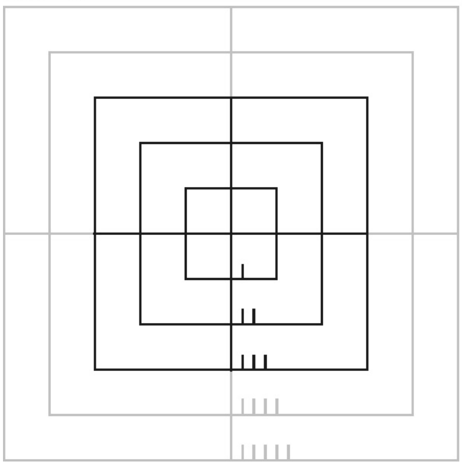


Testmark

Type selects the type o fthe testmark

default available testmark (see figure and parameters below)

scan field



example:
number of squares = 5
squares to mark = 3
squares that will not be marked are gray

Corrected if this check box is selected then the testmark will be output corrected

Autostart if this check box is selected then the testmark will autostart. If it is unchecked, the testmark will only be seleceted and can be previewed in *Vector Editor* (see 7.2 Preview mode)

Activate starts the testmark

Mark Abort aborts the testmark

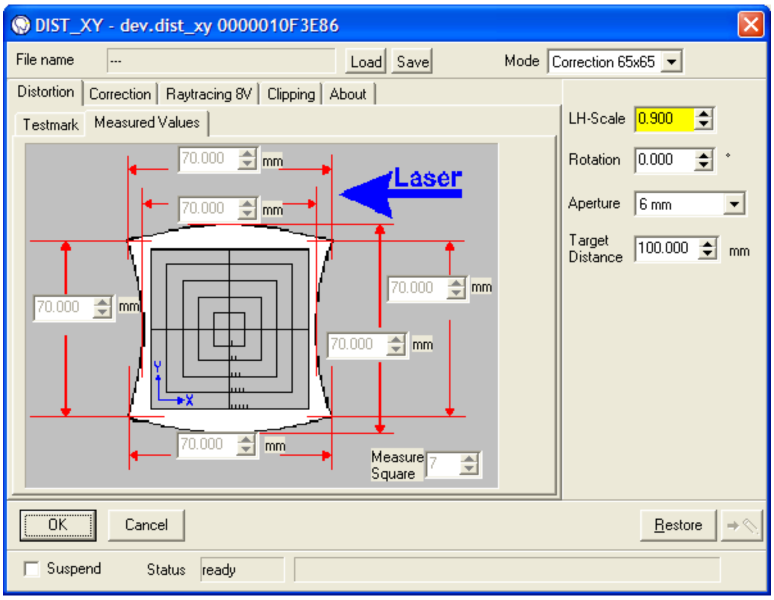
Test pattern

Squares sets the number of squares the scan field is divided in

Mark Squares sets how many of these squares will really be marked in case your target is smaller than the scan field

3.6.5. Parametrize - Distortion - Measured Values

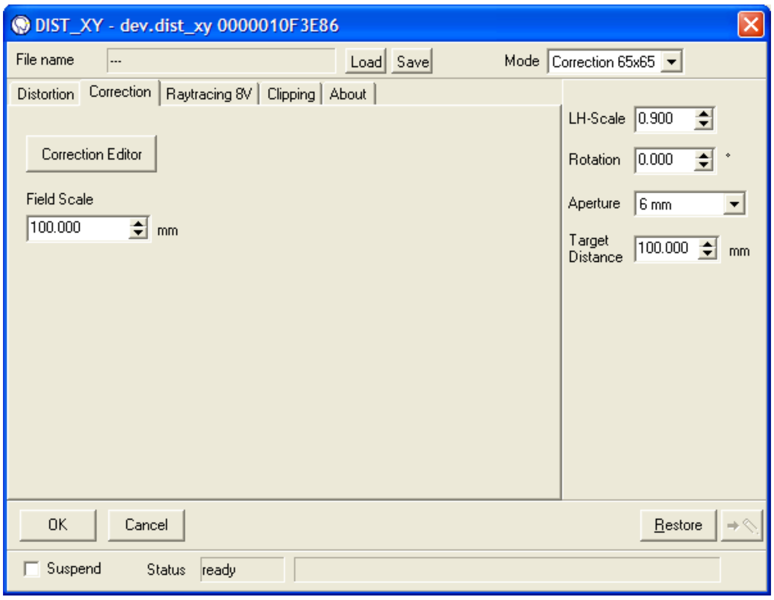
This tab is only relevant if *Mode* is set to *Distortion*, i.e. for scan heads with flat field lens. The settings in this tab also specify the *Testmark 2* for scan heads with focus translator



Measure Square select the largest completely marked square of your testmark and type its number into the *Measure Square* box. Use the number of tick marks of the testmark to determine the right number

Six measured value boxes in the graphic measure the square that you selected in field *Measure Square* and enter the values to the corresponding boxes shown on the screen. Pay attention to the right orientation of the testmark. The tick marks of the testmark have to be oriented as shown on the dialog

3.6.6. Parametrize - Correction



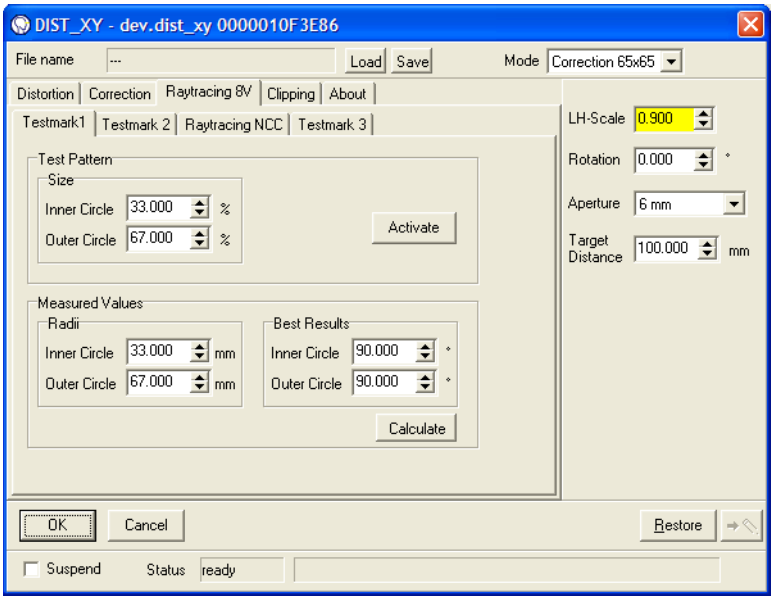
Correction Editor opens the *Correction* window of the *Correction Editor*

Field Scale sets the field size. This parameter is only relevant if *Mode* is set to *Correction 65x65*, i.e. for scan heads with focus translator

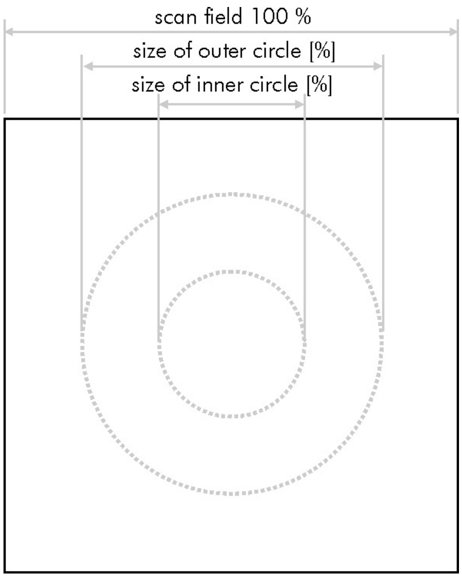
3.6.7. Parametrize - Raytracing 8V

3.6.8. Parametrize - Raytracing 8V - Testmark 1

This tab is only relevant when Mode is set to *Correction 65x65*, i.e. for scan heads with focus translator. Specify the parameters for the initial focus translator testmark here. The testmark divides the scan field into 2 concentric circles. The diameter of the circles can be specified in % of the scan field size in case your target is smaller than the scan field (see the figure under *Test Pattern*).



Test Pattern



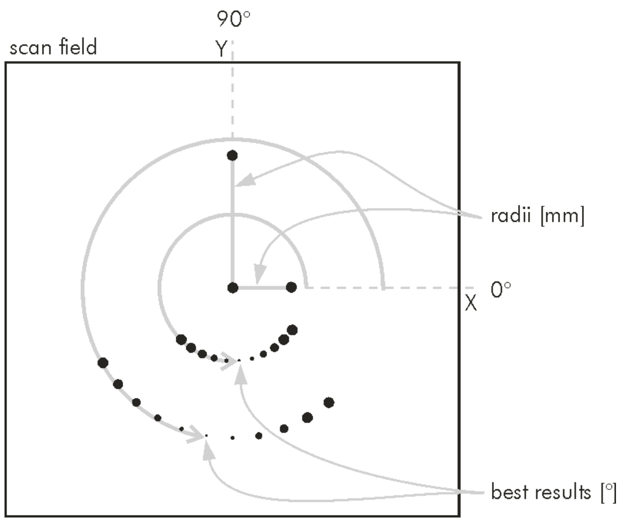
Size sets the size of Testmark 1

Inner Circle sets the inner circle size

Outer Circle sets the outer circle size

Activate outputs the testpattern

Measured Values



Radii

Inner Circle sets the inner circle radius

Outer Circle sets the outer circle radius

Best Results

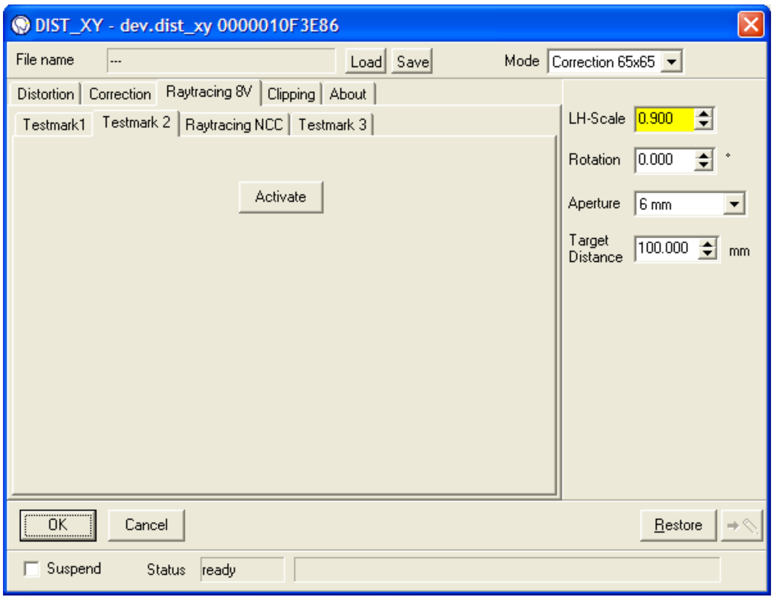
Inner Circle sets the angle of the best result on the inner circle

Outer Circle sets the angle of the best result on the outer circle

Calculate starts the calculation for the initial correction

3.6.9. Parametrize - Raytracing 8V - Testmark 2

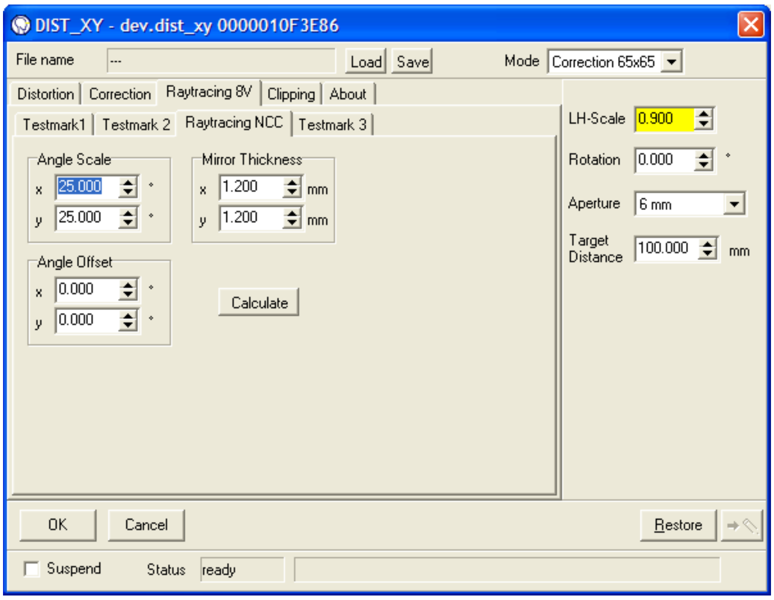
This tab is only relevant if *Mode* is set to *Correction 65x65*, i.e. for scan heads with focus translator. Specify the parameters for the X/Y pincushion testmark (*Testmark 2*) in 3.6.4 Parametrize - Distortion - Testmark.



Activate starts the testmark

3.6.10. Parametrize - Raytracing 8V - Raytracing NCC

This tab is only relevant if *Mode* is set to *Correction 65x65*, i.e. for scan heads with focus translator. Specify additional parameters to calculate the X/Y pincushion correction here.



Angle Scale

x sets the maximum X angle

y sets the maximum Y angle

Mirror Thickness

x sets the mirror thickness in X direction

y sets the mirror thickness in Y direction

Angle Offset

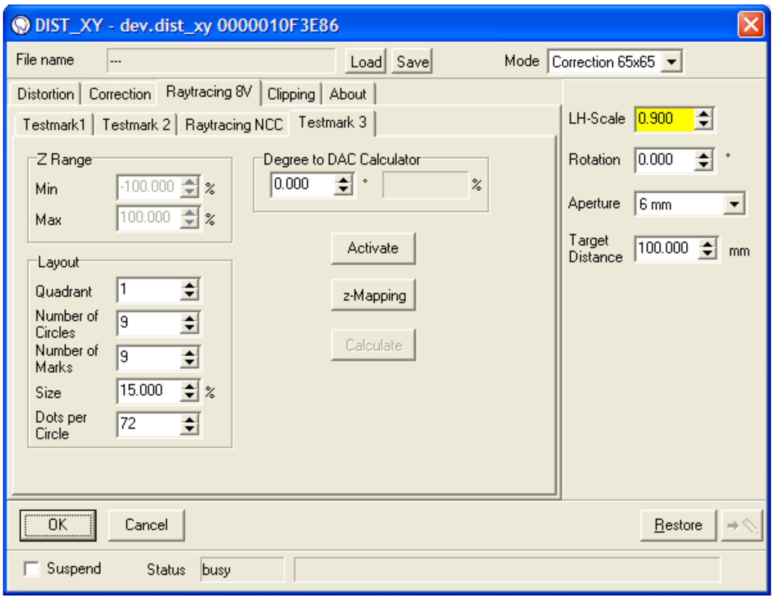
x sets the X angle offset

y sets the Y angle offset

Calculate starts the calculation for the X/Y pincushion correction

3.6.11. Parametrize - Raytracing 8V - Testmark 3

This tab is only relevant when *Mode* is set to *Correction 65x65*, i.e. for scan heads with focus translator. Specify the parameters for the final focus translator testmark here. The testmark outputs several smaller versions of *Testmark 1* along the diagonal of one scan field quadrant (see figure and parameters below).



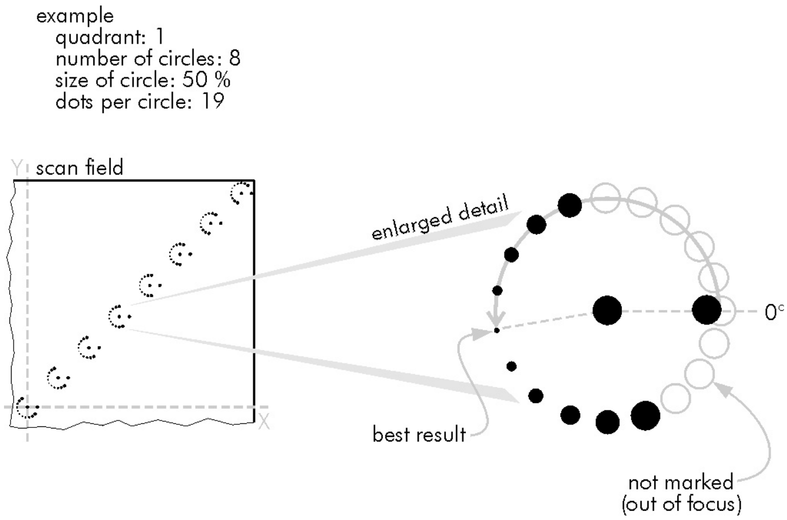
Z Range

Min sets the minimal Z position

Max sets the maximal Z position

Degree to DAC Calculator calculates percentage of an angle. Just type in an angle in degrees and its percentage will be calculated and displayed

Layout



Quadrant sets the mathematical quadrant of the scan field the testmark is executed in

Number of Circles sets the number of circles that are distributed on the diagonal. The first circle will be marked on the origin of the coordinate system, the last will be marked in the corner. The rest of the circles will be distributed equidistantly on the diagonal

Number of Marks sets the number of circles that will be marked beginning from the origin

Size sets the diameter of the circles

Dots per Circle the number of dots that will be marked on each circle

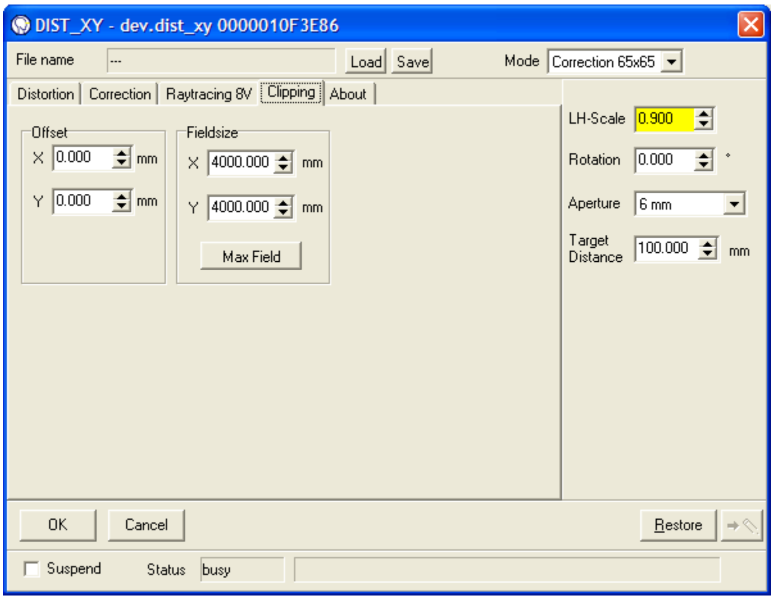
Activate starts the testmark

z-Mapping opens the z-Mapping window

Calculate starts the calculation for the final correction

3.6.12. Parametrize - Clipping

In this tab parameters can be specified to clip the scan field. This means that output will be disallowed outside the specified field.



Offset

X sets the X offset

Y sets the Y offset

Fieldsize

X sets the field size in X direction

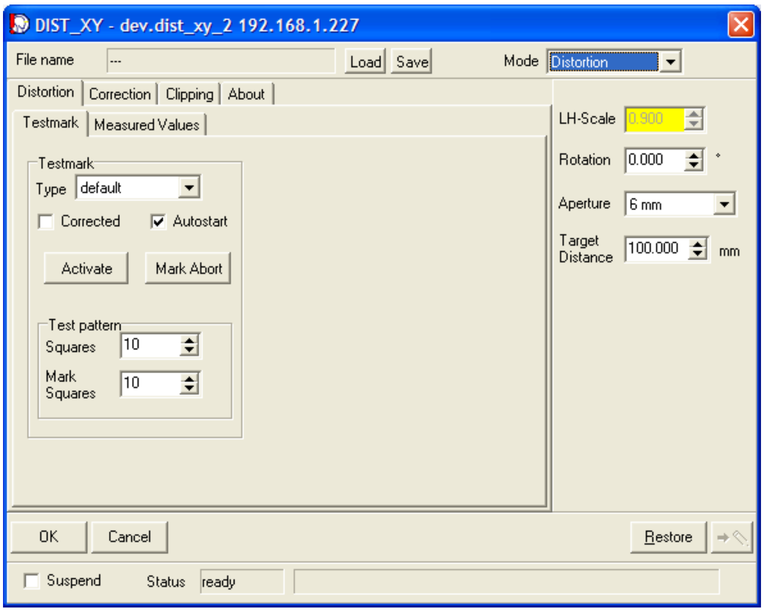
Y sets the field size in Y direction

Max Field sets Fieldsize X and Y to the highest possible value

3.7. dist_xy2 - Distortion

for controller	NCC, ASC
device type	controller
driver version	1.0

The dist_xy2 device can be used to set independent distortion data for the second head of e.g. a dual scan head or a second scanhead that is connected to the same lead as the first scanhead.

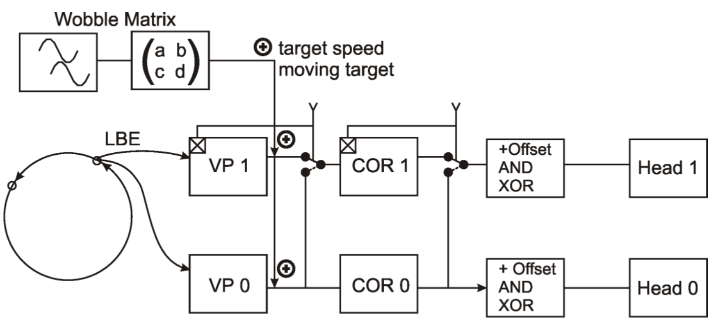


All parameters are described in device driver dist_xy - Distortion (see 3.6 dist_xy - Distortion). The settings are identical.

3.8. head - Scan Head

for controller	NCC, ASC
device type	scan head
driver version	1.0

At the digital signal processor level this device driver distributes the line buffer data (LBE, Line Buffer Entry) to the vector processors VP0 and VP1, see figure. Using a wobble matrix, line data can be superimposed based on an oscillating circular movement. To be able of processing moving objects (process-on-the-fly) an additional speed vector can be accounted for. This, as well as the wobble matrix, affects the vector processor output of VP0 and VP1. The device driver applies the matrices COR0 and COR1 for scan field correction to the resulting line data and in that way forms the wanted output geometry. After that the scan field position can be corrected by adding an offset to the output. In special cases the x- and/or y-axis output value can be set to a constant value.



3.8.1. Configure

NOTE

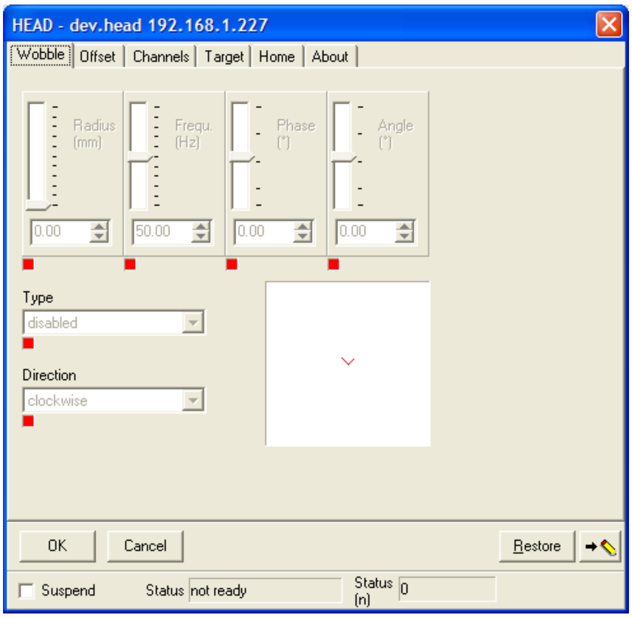
The *head* device can not be configured. The device covers a basic function of the scan head(s). The device is always active.

3.8.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.8.3. Parametrize - Wobble

The line width created directly by the laser is too small for some applications. Thus it is possible to superimpose the linear movement of the scan head with a rotational movement (wobble) to widen the line with.



Radius sets the wobble radius

Frequ sets the wobble frequency

Phase sets the angle for parallel projection of the wobble circle

Angle sets the projection plane direction

Type selects whether the wobble function is switched on or off

- **circular** wobble is switched on
- **disabled** wobble is switched off

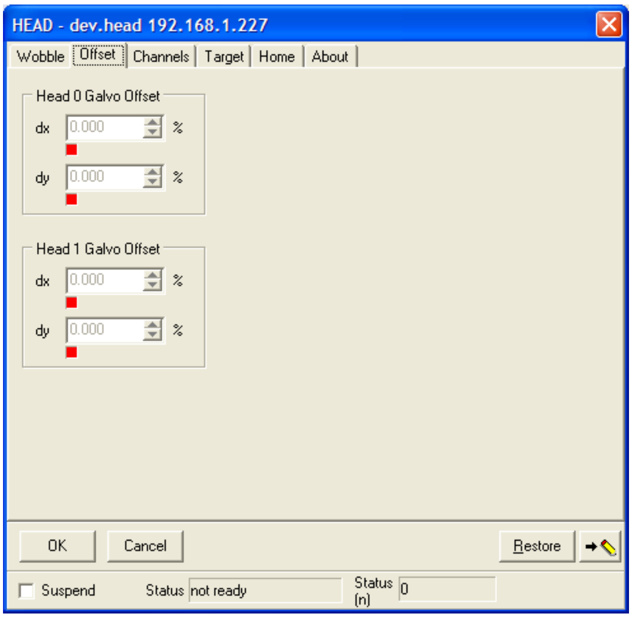
Direction selects the direction of the wobble movement

clockwise clockwise

counter-clockwise counter-clockwise

3.8.4. Parametrize - Offset

In this tab an offset can be compensated resulting e.g. from contorted mirror axes.



Head 0 Galvo Offset

dx sets the offset (in galvanometer angle percent) for the x galvo of head 0

dy sets the offset (in galvanometer angle percent) for the y galvo of head 0

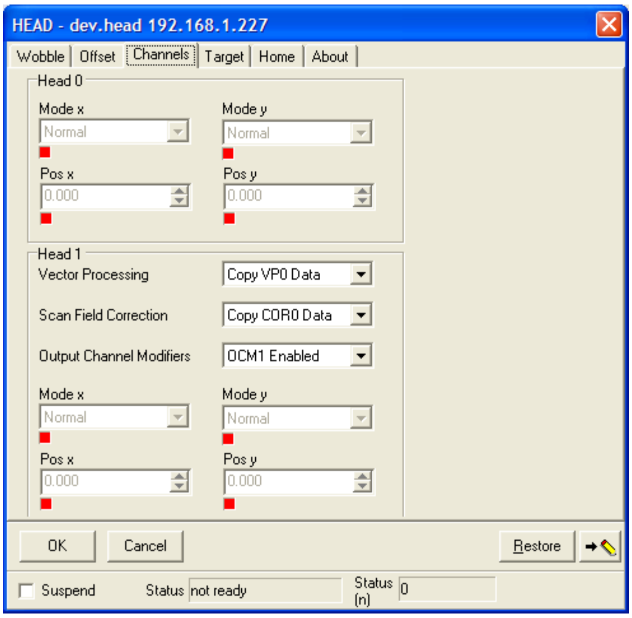
Head 1 Galvo Offset

dx sets the offset (in galvanometer angle percent) for the x galvo of head 1

dy sets the offset (in galvanometer angle percent) for the y galvo of head 1

3.8.5. Parametrize - Channels

In this tab you can control, how the device driver handles line data for the single axes (X and Y of head 0 as well as X and Y of head 1).



NOTE

The settings in groups Head 0 and Head 1 are depending on the type of scan head connected. In the *Manual -- Scan Head -- Configure default pen and device driver* you will find which settings you need for your scan head.

Head 0 settings for the first head

Mode x

Normal the line data is handed over and output without further transformation

Reverse the line data will be output mirrored at the x-axis origin

Zero the x-axis output value stays zero

Min the x-axis output value stays at the lowest possible value (position -100%)

Max the x-axis output value stays at the highest possible value (position +100%)

Specified the x-axis output value stays at the specified value in *Pos x* and *Pos y* respectively

Mode y

Normal the line data is handed over and output without further transformation

Reverse the line data will be output mirrored at the y-axis origin

Zero the y-axis output value stays zero

Min the y-axis output value stays at the lowest possible value (position -100%)

Max the y-axis output value stays at the highest possible value (position +100%)

Specified the axis output value stays at the specified value in *Pos x* and *Pos y* respectively

Pos x sets the relative positions [%] of maximal and minimal deflection of the x-axis. Values in a range between -100% and +100% are allowed. This corresponds to settings *Min* and *Max* respectively in *Mode x*

Pos y sets the relative positions [%] of maximal and minimal deflection of the y-axis. Values in a range between -100% and +100% are allowed. This corresponds to settings *Min* and *Max* respectively in *Mode y*

Head 1 settings for the second head

Vector Processing

Copy VP0 Data if only 1 scan head is used or a 2nd scan head shall use the line data from the vector processor VP0 of the 1st scan head then select this setting. The vector processor VP1 of the 2nd scan head is deactivated and its scan field distortion will not be corrected

VP1 Enable if a 2nd scan head shall produce independent output then select this setting. In addition you have to set *Scan Field Correction* to *COR1 Enabled* to correct the scan field distortion of the 2nd scan head

Scan Field Correction

Copy COR0 Data if only 1 scan head is used or a 2nd scan head shall use the line data from the vector processor VP0 of the 1st scan head then select this setting. The scan field distortion of the 2nd scan head will not be corrected. You should select *Copy VP0 Data* in *Vector Processing* to prevent needless calculations in vector processor VP1

COR1 Enabled if the scan field distortion of the 2nd scan head shall be corrected independently then select this setting. If both scan heads shall output the same line data then in addition select *Copy VP0 Data* in *Vector Processing*. If both scan heads shall output different line data then in addition select *VP1 Enabled* in *Vector Processing*

Output Channel Modifiers selects whether the *Output Channel Modifiers* of Head 0 will be inherited to Head 1 or own *Output Channel Modifiers* (*Mode x*, *Mode y* and *Pos x*, *Pos y*) will be applied

Copy OCM0 Data the settings of Head 0 will be copied

OCM1 Enabled own settings will be applied

Mode x see *Mode x* in group *Head 0*

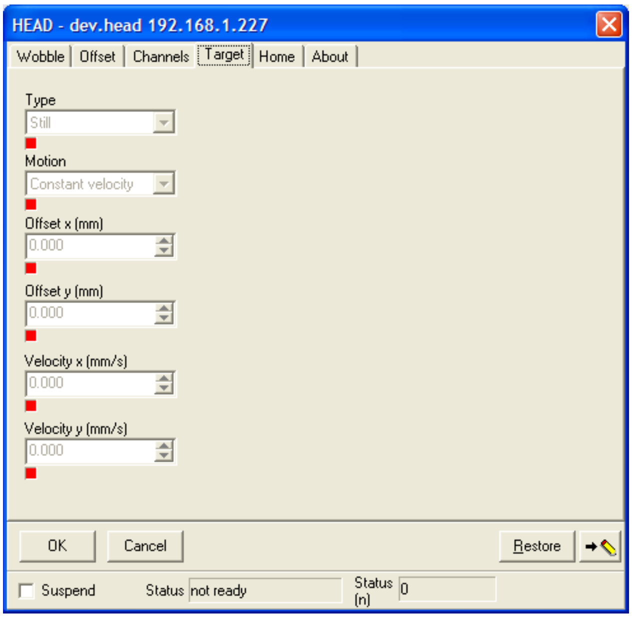
Mode y see *Mode x* in group *Head 0*

Pos x see *Pos x* in group *Head 0*

Pos y see *Pos y* in group *Head 0*

3.8.6. Parametrize - Target

In this tab processing of still or moving objects or targets can be set, e.g. objects moving on a conveyor belt.



Type selects whether a still or moving target is processed

Still if you want to process motionless objects then select this setting. in this case all other settings on this tab will be ignored

Moving if you want to process objects moving in an x-y-plane then select this setting

NOTE

If you select *Moving* then the *Job Start* signal has to be triggered by a sensor at the e.g. conveyor belt to synchronize the processing with the object's movement.

Motion selects how the motion is given

Constant velocity sets the targets's motion velocity to a constant in mm per second. The fields *Velocity x* and *Velocity y* (see below) are activated

Measured velocity sets the targets's motion to a distance in mm. The fields *Distance x* and *Distance y* (see below) are activated

Incremental update sets the targets's motion update to increments in mm. The fields *Increment x* and *Increment y* (see below) are activated

Offset x, Offset y sets the x and y processing offset relative to the target

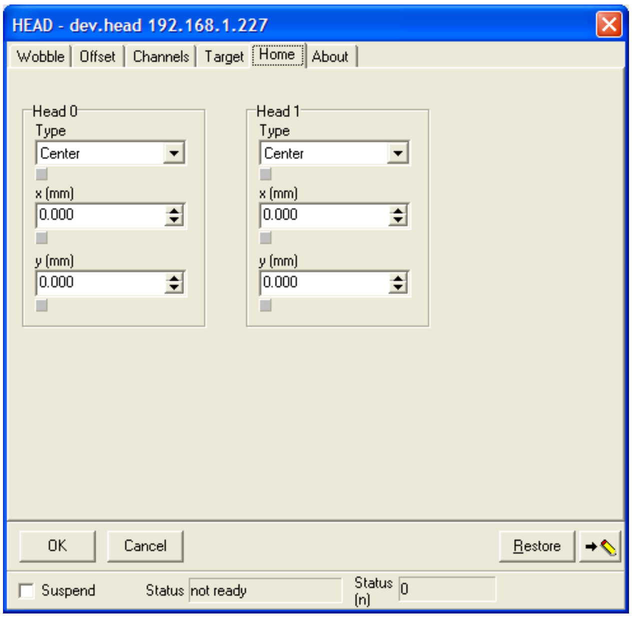
Velocity x, Velocity y active, if *Motion* is set to *Constant velocity*, sets the x and y component of the target's speed vector

Distance x, Distance y active, if *Motion* is set to *Measured velocity*, sets the x and y component of the target's distance

Increment x, Increment y active, if *Motion* is set to *Incremental update*, sets the x and y increment of the target's way

3.8.7. Parametrize - Home

In this tab the home position (origin) for both scan heads (*Head 0* and *1*, if available) can be set.



Head 0

Type selects, how the home position is defined

Center the home position is in the scan field center

First Marking Position the home position is at the coordinates the output starts at

Specified Position the home position is at the coordinates specified in *x* and *y*

Floating (both heads) the home position of both heads is at the coordinates specified in *x* and *y*

x sets the home position x coordinate, see also *Type*

y sets the home position y coordinate, see also *Type*

Head 1

Type selects, how the home position is defined

Center the home position is in the scan field center

First Marking Position the home position is at the coordinates the output starts at

Specified Position the home position is at the coordinates specified in *x* and *y*

x sets the home position x coordinate, see also *Type*

y sets the home position y coordinate, see also *Type*

3.9. scanhead - Scan Head

This device is used for extended runtime information from the scan head and for the configuration and supervision of the tracking delay feature of the scan head via the Local Peripheral Chain (LPC) protocol.

for controller	ASC
device type	scan head
driver version	1.0

3.9.1. Prerequisites

There are serveral prerequisites to use this device.

ARG_ASC_SYS	Version 1.2.22 or higher
ARG_Inscript_FW	Version 2.7.0.839 or higher
ARG_AC2_FW	Version 4.30.283 or higher
IDB416	PCB version V31 or higher
ASC	PCB version V21 or higher

3.9.2. Prerequisites - Detection of the scan head over LPC

There are 2 cables connected to the scan head.

The first is an Ethernet CAT5 cable (with RJ45 connectors) connected to the system controller that carries the scanner position data via the High Speed Serial Interface (HSSI) protocol and additional out-of-band data via the Local Peripheral Chain (LPC) protocol.

The second is the power cable that is either connected to the system controller's SPD PCB or to another power source.

A working LPC connection is essential to run the scanhead device. In order to establish the connection properly follow the appropriate startup procedure:

Prerequisities:
System controller and scan head are properly connected and switched off.

► If the scan head is powered by the system controllers SPD PCB then switch on the system controller.

  - OR -

  If the scan head is powered by a power source other than the system controller's SPD PCB then:

  Step 1 Switch on the scan head.

  Step 2 Switch on the system controller.

CAUTION

Scan head power cycle -- OR -- disconnected Ethernet CAT5 cable

interrupts LPC connection

► Recover the LPC connection by the startup procedure described above.

3.9.3. Configure

dev Shows the detected scan heads. There was no scan head detected if this is empty.

ascVersion The PCB version of the ASC board.

countOfAxis The number of axis of the scan head you want to use.

detect If set to *TRUE*: tries to detect additional scan heads and adds them to *dev*.

3.9.4. Parametrize

ac2FirmwareVersion This shows the firmware version of the AC2 PCB inside the scan head.

ac2HardwareVersion This shows the PCB version of the AC2 PCB inside the scan head.

idbFirmwareVersion This shows the firmware version on the IDB416 interface PCB inside the scan head.

idbHardwareVersion This shows the PCB version of the IDB416 interface PCB inside the scan head.

upTime This shows the total runtime of the scan head in seconds.

numberOfStarts This shows the total number of starts of the scan head.

autorecover This variable controls the behaviour upon a rising edge on the attention signal.

- If *TRUE*: The device will try to recover from failure state if attention is signalled.
- If *FALSE*: The device will not recover from failure state.

updateScanHeadInfo

- If *TRUE*: Communication between scan head and system controller is running when there is *NO* job running.
- If *FALSE*: Communication between scan head and system controller is disabled. The values under *voltages*, *temperatures* and *adcValues* will not be updated anymore.

updateScanHeadInfoWhileMarking

- If *TRUE*: Communication between scan head and system controller is running anytime, also when there *IS* a job running.
- If *FALSE*: Communiction between scan head and system controller is disabled. The values under *voltages*, *temperatures* and *adcValues* are not updated anymore.

3.9.5. Parametrize - status

This parameter variables show the current state of the scan head.
If a certain variable is *TRUE*, this means that a below described state was entered or an event ocurred.

atUpTime Shows the uptime of the scan head at which the last state change was detected.

soaX Safe operating area X-channel was violated.

soaY Safe operating area Y-channel was violated.

fuseX Polyswitch X-channel was triggered.

fuseY Polyswitch Y-channel was triggered.

errorAz Error on ISTAM PCB which could mean polyswitch was triggered or safe operating area was violated.

axisLimit Axis limit was exceeded.

ampUnknown Unknown amplifier error.

supplyVoltage Supply voltage error.

supplyTransient Supply voltage transient.

boardOvertemp Maximum allowed PCB temperature was exceeded.

ampOvertemp Maximum allowed amplifier temperature was exceeded.

ampXDisabled Amplifier on X-channel was disabled.

ampXShutdown Forced shutdown of X-channel amplifier.

ampYDisabled Amplifier on Y-channel was disabled.

ampYShutdown Forced shutdown of Y-channel amplifier.

auxAxisDeactivated Auxiliary axis disabled. This is normal if you have a dual axis system.

ampAuxDisabled Amplifier for auxiliary axis is disabled.

3.9.6. Parametrize - voltages

This subtree shows you the current values of the internal voltages of the scan head.

+Ub Nominal value +24V

vdd Nominal value +15V

+5V Nominal value +5V

-Ub Nominal value -24V

vee Nominal value -15V

+3V3 Nominal value +3.3V

vref Nomianl value +2.5V

3.9.7. Parametrize - adcValues

This subtree shows you the current values of the position and error signals of the scan head.

xErr Control error on X-axis.

yErr Control error on Y-axis.

xPos X-axis Position [-100%;+100%].

yPos Y-axis Position [-100%;+100%].

3.9.8. Parametrize - temperatures

This subtree shows you the current temperatures inside the scan head.

tx X-channel amplifier temperature.

ty Y-channel amplifier temperature.

tu U-channel amplifier temperature.

tv V-channel amplifier temperature.

tPcb scan head pcb temperature.

3.9.9. Parametrize - trackingError

doCalibrate If *TRUE*: The tracking delay calibration procedure is triggered. The values in the subtrees *sfN* will be updated for the configured number of axis after the procedure is completed.

recordCalibrationResult If *TRUE*: The result of the calibration is saved on the controller. This data could be used to do diagnosis of the scan head. The data is located under \\<ASC IP address>\Data

- *trackingErrorCalibration_fromAscToScanHead.bin*: The data that is sent from the system controller to the scan head.
- *trackingErrorCalibration_fromScanHeadToAsc.bin*: The data that is sent from the scan head to the system controller.

safetyValue An integer value in the range of [0;10]. Whereby 0 signifies the least safe setting and 10 signifies the safest setting. Changing this value in the direction of *safer* will cause the system to be more sensitive in regard to control errors inside the scan head. This could mean that you are more likely to get an error from the tracking delay supervision when you run the system at higher process speeds. The default value is choosen to fulfill most customer requirements and will reliably detect a catastrophic failure of the scan head hardware. So you most likely will *NOT* have to modify this value.

disableSafety

- If *TRUE*: Errors from the tracking delay supervision subsystem will *NOT* cause a running job to be aborted and will only print warning messages.
- If *FALSE*: Errors from the tracking delay supervision subsystem will cause a running job to be aborted and will print error messages.

3.9.10. Parametrize - trackingError - sfN

scale The scaling factor for this subframe as determined by the calibration procedure.

offset The offset value for this subframe as determined by the calibration procedure.

delay The delay between set and real value for this subframe as determined by the calibration procedure.

minDelay Lower threshold for the delay value. If the calibrated delay is lower than this value, an error is reported.

maxDelay Higher threshold for the delay value. If the calibrated delay is higher than this value, an error is reported.

currentAccumulator Last read value of the error accumulator. This is in the range of [0.0;1.0].

maxAccumulator Maximum read value of the error accumulator. This is in the range of [0.0;1.0]. This value will be reset to 0.0 when *safetyValue* or one of the *advanced* parameters for this subframe is changed.

accumulatorErrorThreshold If *currentAccumulator* is higher than this value, an error will be reported.

enableMonitoring

- If *TRUE*: The tracking error will be supervised for this subframe and errors will be reported if *currentAccumulator* is higher than *accumulatorErrorThreshold*.
- If *FALSE*: The tracking error will *NOT* be supervised for this subframe on no errors will be reported.

3.9.11. Parametrize - trackingError - sfN - advanced

Internal settings for the tracking error supervision process. This should normally not be changed by the customer.

weight Error weight.

decay Decay factor for value the error accumulator.

maxErrorLimit Maximum limit for the new error value that will be added to the error accumulator.

3.9.12. Messages

This section describes messages that are displayed by the device.

3.9.13. Messages - Failed to communicate with scan head

This is a fatal and non-recoverable error. To leave this state, you have to restart the system.
Possible causes are:

- *Failure during LPC read*: LPC connection to the scan head was lost.
- *Failure during LPC write*: LPC connection to the scan head was lost.
- *Failure during access to ring buffer*: Error during access to the ring buffer that is used for communication between scan head and system controller.

3.9.14. Messages - Internal error in scan head

Possible causes are:

- *Error was caused by AC2*: Error states of the AC2 PCB are included in this message.
- *Error was caused by IDB due to HSSI communication problem*: Please check cabling to the scan head.
- *Unknown error source*: Source of this error could not be determined.

3.9.15. Messages - Timeout while communicating with scan head

This is a fatal and non-recoverable error. To leave this state, you have to restart the system.
A possible error source can be the AC2 PCB.

3.9.16. Messages - Error during access to scan head via LPC

This is a fatal and non-recoverable error. To leave this state, you have to restart the system.
A possible error source can be the IDB416 PCB.

3.9.17. Messages - Maximum allowed error limit exceeded for subframe N

- Value of the error accumulator is higher than the configured threshold.
- Control loop error / tracking delay error is too high.
- Processing speed could be too high for this scan head hardware.
- *safetyValue* is set too low.
- Possible damage of the scan head hardware.

3.9.18. Messages - Number of axis is higher than the number of configured channels

- Please check HSSI configuration: The number of configured HSSI channels must be greater or equal to *countOfAxis*.
- Check that *countOfAxis* is set to the correct number of axis of the scan head.

3.9.19. Messages - Tracking delay out of bounds for subframe N

- Ocurrs directly after running the calibration procedure.
- Please check that the configuration variable *countOfAxis* is set correctly.
- The calibration procedure yielded a delay value that is out of the configured thresholds.
- Possible damage of the scan head hardware.

3.9.20. Mapping of axis names to subframe number

Standard 2D head

Subframe number	Axis name
SF0	X
SF1	Y
SF2	n/a
SF3	n/a

Twin head (Twin Squirrel)

Subframe number	Axis name
SF0	X Head 0
SF1	Y Head 0
SF2	X Head 1
SF3	Y Head 1

Elephant 3D

Subframe number	Axis name
SF0	X
SF1	Y
SF2	Z
SF3	unused or optional attenuator

Precession Elephant

Subframe number	Axis name
SF0	X
SF1	Y
SF2	Z
SF3	unused or optional attenuator
SF4	Phi (Displacement parallel to X axis)
SF5	Theta (Displacement parallel to Y axis)

Pivot scanner

Subframe number	Axis name
SF0	XX
SF1	Y
SF2	Z
SF3	X

3.10. linepar - Line Parameters

for controller	NCC, ASC
device type	scan head
driver version	1.0

The *linepar* device summarizes parameters needed for handling different line types.

How InScript handles lines in general Galvanometers move the mirrors in the deflection system. A nominal position is transmitted to the mirrors. An analog PID-regulator controls the nominal position. The mirrors have an inertia. Therefore, at high speeds, the deflected laser beam lags behind the nominal position with the value of the tracking error. Additional errors exist as the laser beam can not be switched on and off free of inertia. These errors cause a result with inadequate quality. ARGES deflection systems correct these errors using several special methods.

If a line is output between points A and B then InScript defines 2 additional points A' and B'. These points lie on the extensions of the line in both directions. The distance between A' and A is called ***Head***. The distance between B and B' is called ***Tail***. To draw a line from A to B, InScript needs the distance between A' and B'.

If the distance between A' and A is long enough then the speed reaches the wanted value and the difference between nominal and actual position is fixed on this distance. This difference is constant for this speed, i.e. on the distance between A and B the tracking error is constant. But the laser beam **must not** be switched on until point A is crossed by the nominal position by the value of the tracking error. Therefore the laser beam has to be switched on with a delay that corresponds to the tracking error. This delay is called the ON delay. Corresponding to this the laser beam **must not** be switched off until point B is crossed by the nominal position by the value of the tracking error. This delay is called the OFF delay. This means that ON and OFF delay should be positive and equal in value.

In practice the laser beam switch on and off delays (e.g. the shutter delay) have to be taken in account in addition to this value. As these delays may differ, the optimal values for ON delay and OFF delay do not have to be identical. With a long delay for switching the laser beam on an off, it may even be necessary to switch on the laser beam while the nominal position is not even reached which would then result in a negative value of the ON delay.

Line types To make optimal output of lines and polygons possible several line types have to be set apart. Most of the outlines are approximated by polygons in practice, i.e. even simple shapes, e.g. rectangles or circles, are represented by a sequence of lines, where the end point of the 1st line is the start point of the 2nd line, the endpoint of the 2nd line is the start point of the 3rd line and so on. Between lines that follow each other there is always an angle between 0° and 180°. Depending on this angle the joint in the polygon will be output with 1 of 3 methods. These methods correspond to the types *Normal Joint*, *Joint 1* and *Joint 2*. In addition there are the types *Open End* and *Dot*. The following list describes basic terms and methods of line output.

Open End lines of type *Open End* are lines, where the start and end points do not fall on start or end points of other lines. In the figure above can be seen that times for *Head* and *Tail* as well as times for ON delay and OFF delay have to be set

Normal Joint lines of type *Normal Joint* are a sequence of lines, where the end point of one line falls on the start point of the next line. As long as the angle between the lines is obtuse, it is not necessary to correct the path by setting *Head* and *Tail* times. The laser beam is not switched off during such paths

Joint 1 lines of type *Joint 1* are a sequence of lines, where the end point of a line falls on the start point of the next line. At middle angles between the lines the path has to be corrected by setting a *Tail* time. Thus the time is taken in account that is needed until the actual laser beam position reaches the start point of the next line. After that, the nominal position jumps to that point without taking additional time for *Head* in account. The laser beam is not switched off during such paths

Joint 2 lines of type *Joint 2* are a sequence of lines, where the end point of a line falls on the start point of the next line. At pointed angles between the lines the path has to be corrected by setting the time for *Head* and *Tail*. If the end point B' of the line is reached, the nominal position is set to the start point A' of the next line. The laser beam is switched off, as soon as the point is reached on OFF delay and switched on again, if the nominal position reaches the point at ON delay. Joint 2 is a sequence of lines with type *Open End*.

Dot lines of type *Dot* are a special case of a line. Points A and B are at the same position. For the ON time the laser beam stays on this position. The time for *Head* specifies the breaking distance.

3.10.1. Configure

NOTE

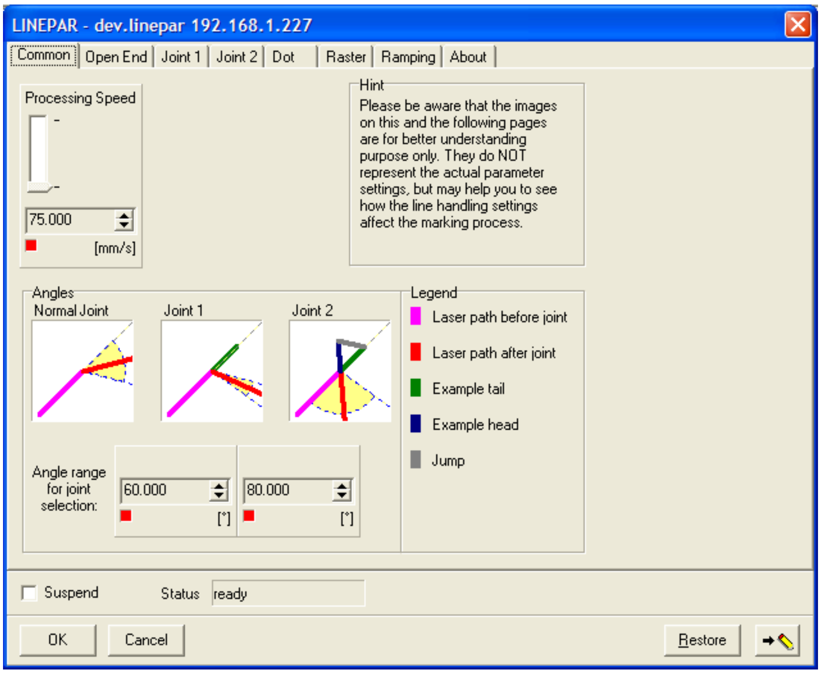
The *linepar* device can not be configured. The device covers a basic function of the scan head(s). The device is always active.

3.10.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.10.3. Parametrize - Common

Processing speed and angles for line types can be set on this tab.

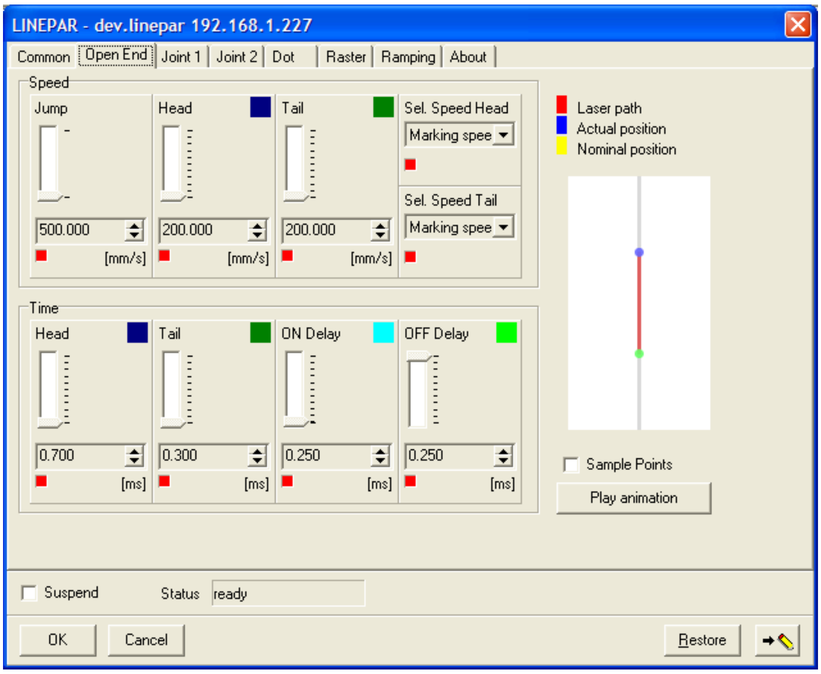


Processing Speed sets the processing speed

Angles set the threshold angles between the joint types *Normal Joint*, *Joint 1* and *Joint 2*

3.10.4. Parametrize - Open End

In this tab set parameters for output of the *Open End* line type.



Speed

Jump sets the jump speed between points where no processing is performed, i.e. when the laser beam is off

Head sets the speed on distance *Head*

Tail sets the speed on distance *Tail*

Select Speed Head in general it is useful for precise line output to select a speed for distances *Head* and *Tail* that equals to the *Processing Speed*. To optimize the line output in rare cases or to create special effects, it may be necessary to set these speeds independent of the processing speed. If you want to do so then select *Specified* in *Sel. Speed Head* and/or *Sel. Speed Tail*

Specified specify the speed on distance *Head* independently in *Speed Head*

Processing Speed speed on distance *Head* equals to the *Processing Speed*

Select Speed Tail see *Sel. Speed Head*

Specified specify the speed on distance *Tail* independently in *Speed Tail*

Processing Speed speed on distance *Tail* equals to the *Processing Speed*

Time

Head sets an additional delay for *Head*

Tail sets an additional delay for *Tail*

ON Delay sets an additional delay for ON Delay

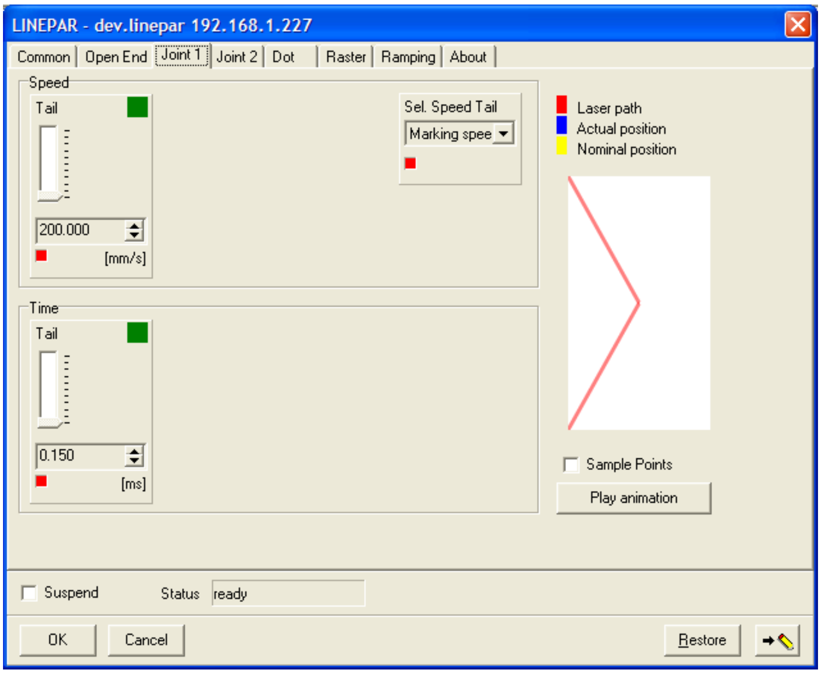
OFF Delay sets an additional delay for OFF Delay

Sample Points if this check box is selected then sample points are displayed in the simulation

Play animation plays the simulation with the set parameters. This way it is easier to understand the effect of single parameters and to find the settings for an optimal result. If the speed is set high you may not see the animated points anymore

3.10.5. Parametrize - Joint 1

In this tab parameters for output of the *Joint 1* line type are set.



Speed

Tail sets the speed on distance *Tail*

Select Speed Tail in general it is useful for precise line output to select a speed for distances *Head* and *Tail* that equals to the *Processing Speed*. To optimize the line output in rare cases or to create special effects, it may be necessary to set these speeds independently from the processing speed. If you want to do so then select *Specified* in *Sel. Speed Tail*

Specified specify the speed independently on distance *Tail* in *Speed Tail*

Processing Speed speed on distance *Tail* equals to the *Processing Speed*

Time

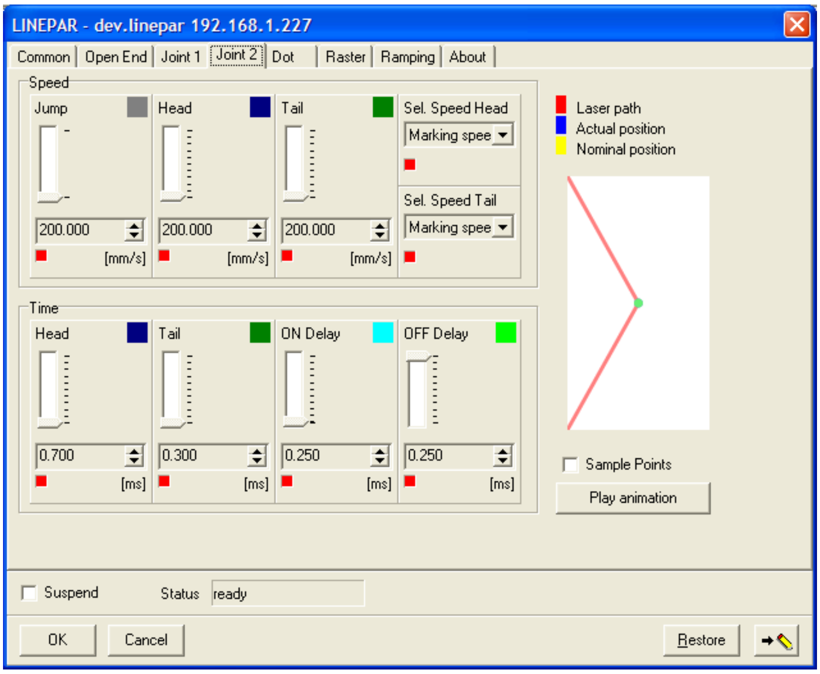
Tail sets an additional delay for *Tail*

Sample Points if this check box is selected then the sample points are displayed in the simulation

Play animation plays the simulation with the set parameters. This way it is easier to understand the effect of single parameters and to find the settings for an optimal result. If the speed is set high you may not see the animated points anymore

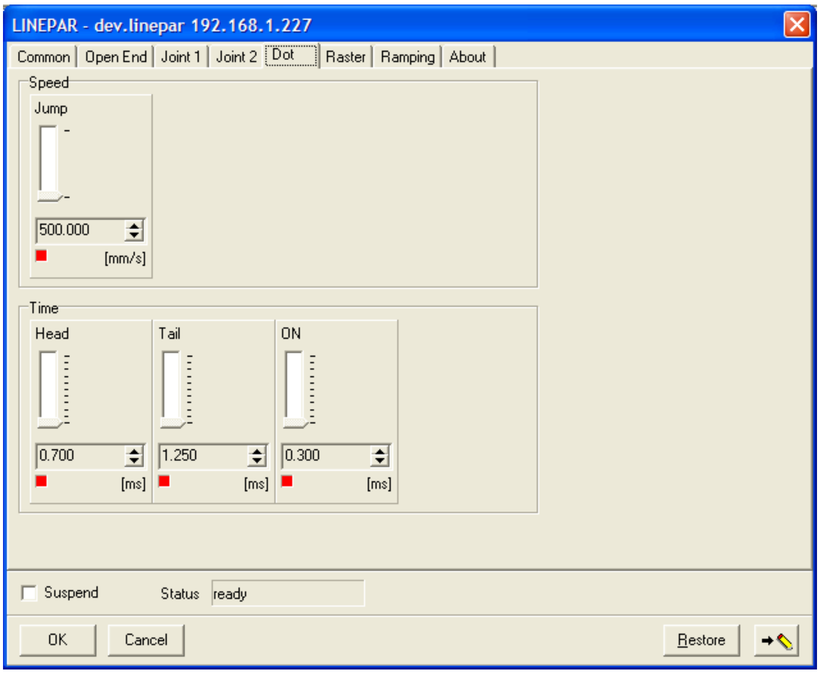
3.10.6. Parametrize - Joint 2

In this tab parameters for output of the *Joint 2* line type are set. As this type equals a sequence of lines of type *Open End*, this tab contains the same settings as the *Open End* tab, see section 3.10.4 Parametrize - Open End.



3.10.7. Parametrize - Dot

In this tab parameters for output of the *Dot* line type are set. The output of dots is special as in this case the processing speed is zero and the laser beam stays on one position for some time. A typical application of this function is the drilling of holes.



Speed

Jump sets the jump speed between points where no processing is performed, i.e. when the laser beam is off

Time

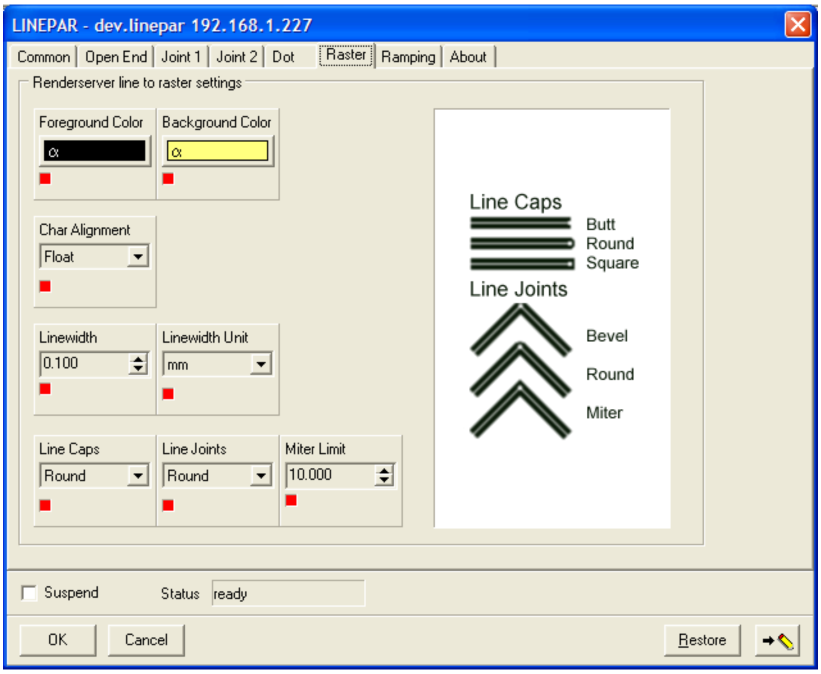
Head sets the time waited after a jump. This is the mirror settling time plus the laser beam ON delay. In general this time is longer than with other line types as the speed has to be completely reduced to zero and not to processing speed

Tail sets the laser beam OFF delay. The tracking error with a stationary processing on a fixed position is zero. This is why contrary to the other line types no negative values can be used here

ON sets the exposure time ("ON-Time") for dots

3.10.8. Parametrize - Raster

In this tab parameters for converting lines to raster units in render server (see 5.13.2 Edit - Render Server) are set.



Foreground Color using this button, you can set the foreground color and alpha channel (transparency) of the lines that are used in render server. Although a laser can't output colors, these settings can be used to create greyscales on rendered bitmaps

Background Color using this button, you can set the background color and alpha channel (transparency) of the background that are used in render server - this setting is only used, if you render a bitmap into a bitmap in color. Although a laser can't output colors, these settings can be used to create greyscales on rendered bitmaps

Char Alignment sets the alignment of characters using the render server. Depending on this settings, either character sizes or the distances between characters are equally spaced in relation to the available pixel resolution

Float the distance of the characters is calculated independent of the underlying pixel resolution

High res pixels the distance of the characters is calculated based on the oversampled pixel resolution (a higher internal resolution to create anti-aliasing etc.). This means that characters may look different but the distances between characters are identical

Low res pixels the distance of the characters is calculated based on the original pixel resolution. This means that characters look identical but the distances between characters vary

Linewidth width of the render server lines

Linewidth unit

mm the width of the render server lines is given in mm

pixel the width of the render server lines is given in pixel

Line Caps also see the graphics on the *Raster* tab

Butt the line ends are cut-off

Round the line ends have a rounded end

Square the line ends have a square end

Line Joints also see the graphics on the *Raster* tab

Miter the joints between lines have no transition

Round the joints between lines are rounded

Bevel the joints between lines are pointed

Miter Limit here you can limit the extent of the tip formed by two lines to prevent excessively pointed joints on very acute angles

3.10.9. Parametrize - Ramping

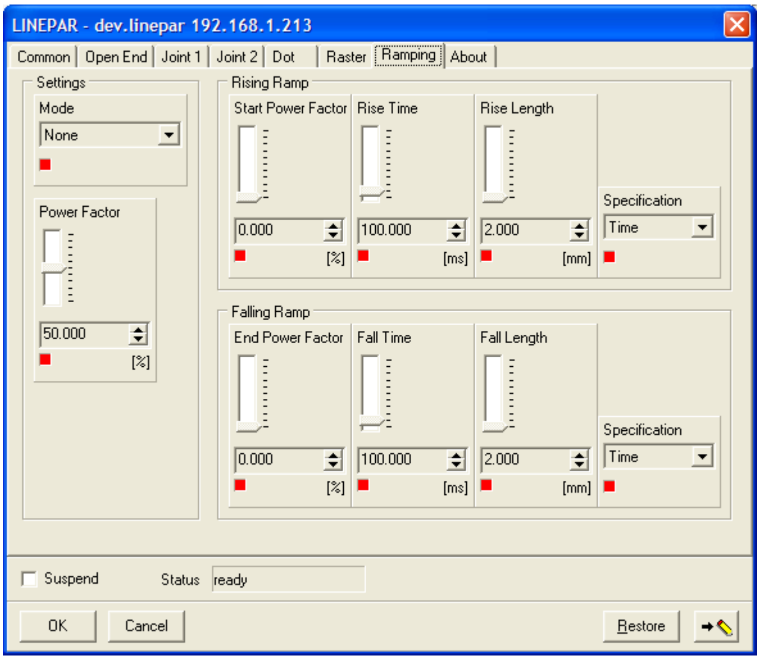
Ramping can be used mainly for overlapping laser markings to prevent e.g excessive material removal, scorching etc. while cutting or welding.

In this tab parameters for ramping are set. Here you can set all aspects of a line's ramping geometry. In former versions of InScript you had to choose a DAC (Digital to Analaog Converter) for ramping. Now, if the set up laser uses a DAC for its power control, this DAC is automatically chosen by the ramping interface.

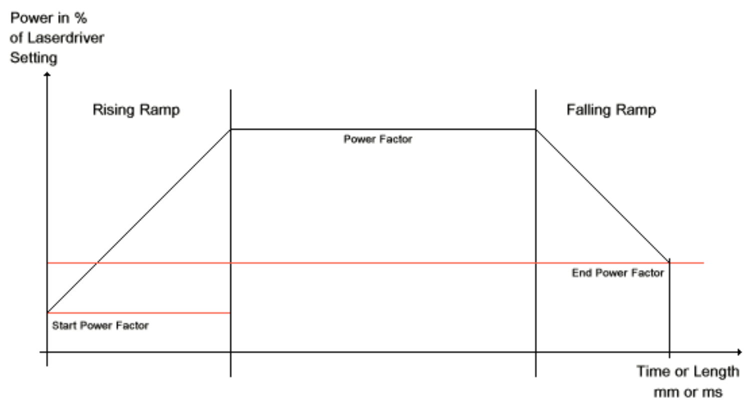
NOTE

If the laser has no DAC for its power control, ramping has no effect!

Ramping can be set over the time or over the length of a laser output. Please choose the *Specification* of your up- and/or down-ramping according to your process.



Mode here you can choose *Linear multiplying* to use ramping or *None* to use the power setting of the laser driver



Power Factor the power factor is the maximum of the ramp. The factor is a fraction of the power that is set in the laser driver (e.g. if the Power in the laser driver is set to 90% and *Start Power Factor* is set to 50%, the maximum of te ramp will be 45% power)

Rising Ramp

Start Power Factor sets the start power factor of the ramping. The factor is a fraction of the power that is set in the laser driver

Rise Time sets the time in which the the power rises

Rise Length sets the length in which the the power rises

Specification

Time the value in *Rise Time* is used. The up-ramping is carried out over a stretch of time

Length the value in *Rise Length* is used. The up-ramping is carried out over a specific length

Falling Ramp

End Power Factor sets the end power factor of the ramping. The factor is a fraction of the power that is set in the laser driver

Fall Time sets the time in which the the power falls

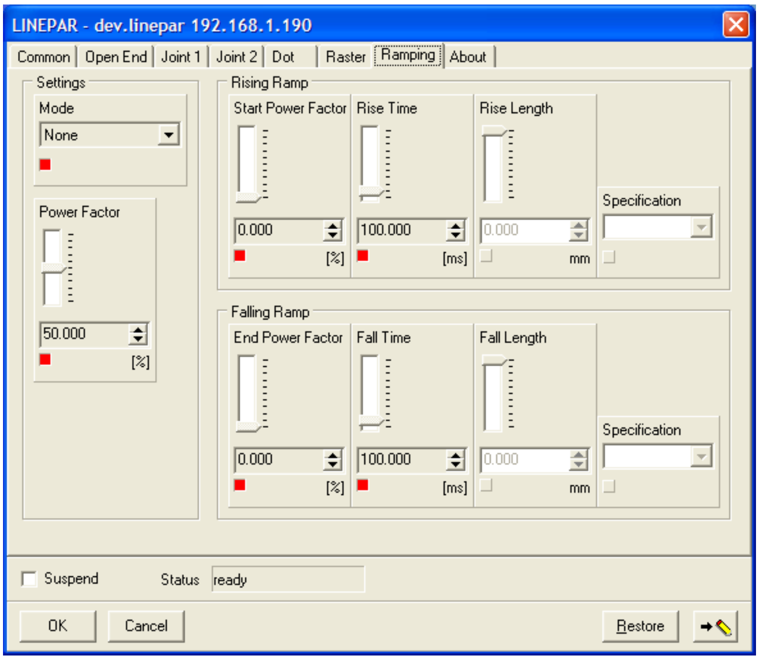
Fall Length sets the length in which the the power falls

Specification

Time the value in *Fall Time* is used. The down-ramping is carried out over a stretch of time

Length the value in *Fall Length* is used. The down-ramping is carried out over a specific length

Particularities On older Firmware versions you will only be able to set the ramping over time. Full ramping over time and length is supported from firmware $\geq$ v2.7.0.443.TP and InScript $\geq$ v2.10.2.1938 on.



3.11. Coherent Avia

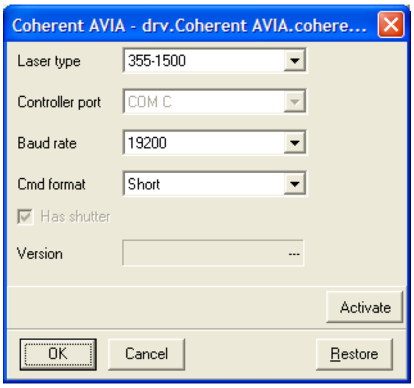
for controller	NCC, ASC
device type	laser
driver version	1.13.18.2

This device driver makes functions and parameters available to control lasers of the AVIA family in InScript via a serial interface. Lasers of the AVIA family are compact diode-pumped solid-state Q-switched lasers providing ultraviolet or infrared output with pulse repetition rates from single shot to 100 kHz.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.11.1. Configure



Laser type

List item	Description
355-1500, 355-1800, 355-3000, 355-4500, 355-7000, 355-X, 266-3000, Ultra 350, Ultra 500, Ultra 1000, Ultra 1500, Ultra2000,	selects the laser type

Controller port

COM A NCC serial interface COM A

COM B NCC or ASC serial interface COM B

COM C ASC serial interface COM C

Baud rate

List item	Description
1200, 4800, 9600, 19200, 38400	selects the serial interface baud rate. If the baud rate exceeds the capability of the selected laser type then the baud rate will automatically be adjusted

Command format

> **Short** selects the short command format
>
> **Long** selects the long command format

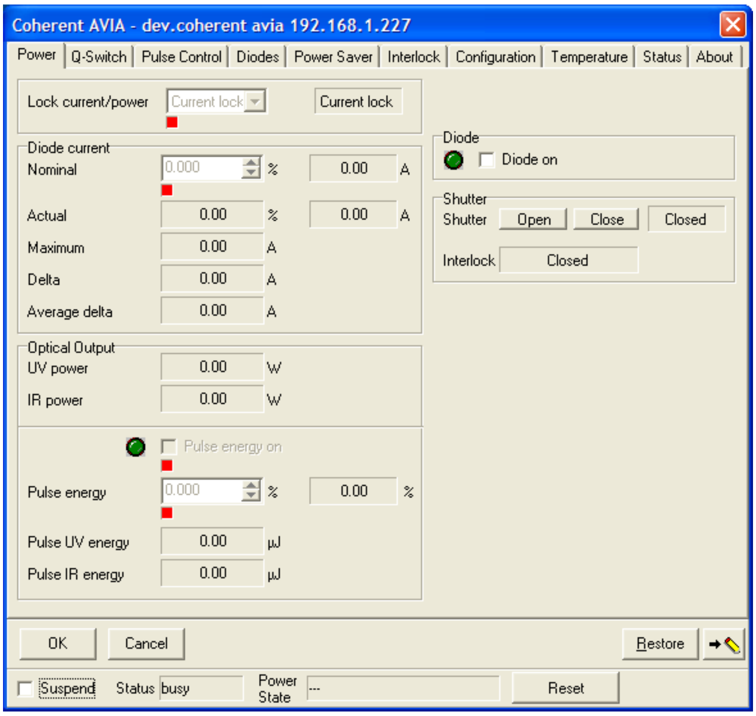
Has shutter if the selected laser type has an optional shutter then this check box is selectable and you can use the shutter by selecting this checkbox. If the selected laser is equipped with a shutter by default then the check box is automatically selected

Version shows the power supply firmware version of the laser

3.11.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.11.3. Parametrize - Power



Lock current/power sets whether to hold the diode current stable or the optical power and shows the setting returned by the laser

> **Current lock** holds the diode current stable
>
> **Power lock** holds the optical power stable

Diode current

> **Nominal** sets the nominal average diode current and shows the setting returned by the laser

Actual shows the actual average diode current

Maximum shows the average diode current maximum calculated from the average diode current

Delta shows the difference between diode currents

Average delta shows the average difference between diode currents

Optical output

UV power shows the ultraviolet average power

IR power shows the infrared average power

Pulse energy on if this check box is selected then the pulse energy can be set manually

Pulse energy sets nominal pulse energy and shows the setting returned by the laser

Pulse UV energy shows the actual ultraviolet pulse energy

Pulse IR energy shows the infrared pulse energy

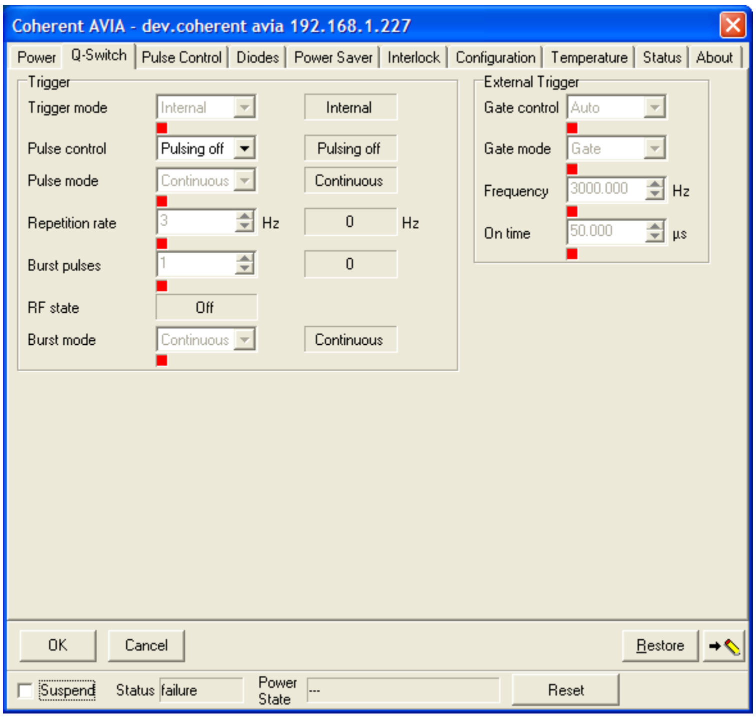
Diode if this check box is selected then the diodes will be switched on. If the LED is lit, the diodes are on

Shutter

Shutter Open/Close opens or closes the shutter and shows the setting returned by the laser

Interlock shows the status of the shutter interlock

3.11.4. Parametrize - Q-Switch



Trigger

Trigger mode sets the trigger mode and shows the setting returned by the laser

Internal uses the laser internal trigger with the parameters in group *Trigger*. The *EXTERNAL ENABLE* input on the power supply rear panel must be connected and active

External uses an external trigger with the parameters in group *External Trigger* (here the controller board oscillator). The *EXTERNAL ENABLE* input on the power supply rear panel must be connected and active

Front panel uses the laser internal trigger with the parameters in group *Trigger*. The *EXTERNAL ENABLE* input on the power supply rear panel does not need to be connected. Gated operation is not possible

Pulse control sets the pulse control and shows the setting returned by the laser

Pulsing off switches the Q-switch pulsing off

Pulsing on switches the Q-switch pulsing on

Pulse mode sets the pulse mode and shows the setting returned by the laser

Continuous generates pulses continuously

Burst generates bursts of pulses

CW alignment generates continuous wave output at low power level for alignment purposes

Repetition rate sets the repetition rate and shows the setting returned by the laser

Burst pulses sets the number of pulses in a burst and shows the setting returned by the laser

RF state shows whether the RF module is on or off

Burst mode sets the burst mode and shows the setting returned by the laser

Continuous sets burst mode to continuous

Pulsed sets burst mode to pulsed

External trigger summarizes parameters to specify the type of signal which will be generated by the controller board oscillator at the Gate output

Gate control sets the gate control

Always off oscillator stays permanently off

Always on oscillator stays permanently on

Auto oscillator will be automatically switched on and off

Gate mode sets the type of signal at the controller board gate output

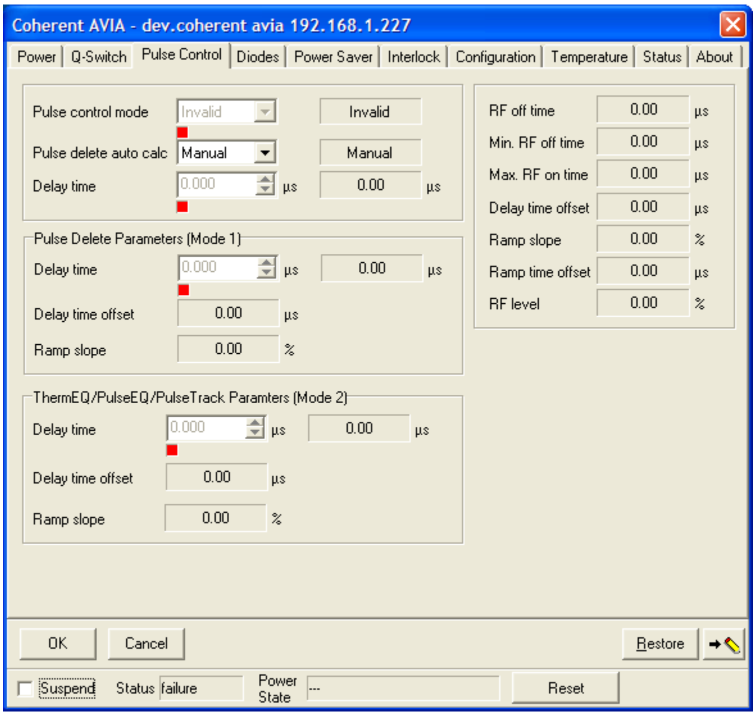
Gated osc pulses will be generated with the parameters Frequency and On time

Gate a single on/off signal will be generated

Frequency sets the frequency to trigger the Q-switch

On time sets the signal on time to trigger the Q-switch

3.11.5. Parametrize - Pulse Control



Pulse control mode sets the pulse control mode and shows the setting returned by the laser. For detailed information consult the corresponding laser manual

- **Pulse Delete** prevents the first laser pulse in any burst from having significantly higher energy than following pulses

- **ThermEQ** turns off the RF between pulses and provides a solution to the laser rod thermal problem (thermal lens)

- **PulseEQ** if *Trigger* mode is set to *Internal* then *PulseEQ* works exactly like *ThermEQ*. If *Trigger* mode is set to *External* then the internal repetition rate determines the pulse energy for external trigger frequencies smaller than the internal repetition rate

- **PulseTrack** if *Trigger* mode is set to *Internal* then *PulseTrack* works exactly like *ThermEQ*. If *Trigger* mode is set to *External* then the width of the trigger pulse determines the laser pulse energy independent to the repetition rate

Pulse delete auto calc switches the delay time calculation to *off* or to *automatic* and shows the setting returned by the laser

- **Manual** the delay time has to be set manually

- **Automatic** the delay time will be calculated automatically. The delay time will not change until a change of the repetition rate is made

Delay Time sets the delay time and shows the setting returned by the laser. If the *Pulse control mode* is set to *Pulse Delete* then this is the pulse delete re-pump time. If the *Pulse control mode* is set to *ThermEQ*, *PulseEQ* or *PulseTrack* then this is the *ThermEQ* delay time

Delay time offset shows the delay time offset. If the *Pulse control mode* is set to *Pulse Delete* then this is the pulse delete time offset. If the *Pulse control mode* is set to *ThermEQ*, *PulseEQ* or *PulseTrack* then this is the *ThermEQ* delay time offset

Ramp slope shows the ramp slope. If the *Pulse control mode* is set to *Pulse Delete* then this is the ramp slope percentage for pulse delete. If the Pulse control mode is set to *ThermEQ*, *PulseEQ* or *PulseTrack* then this is the ramp slope percentage for *ThermEQ*

Ramp time offset shows the ramp time offset

RF level shows the RF level

RF off time shows the RF off time

Minimum RF off time shows the minimum RF off time. If *Pulse control mode* is set *to Pulse Delete* or *ThermEQ* then the RF has to be off that time at least while Q-switching

Maximum RF on time shows the maximum RF on time. If *Pulse control mode* is set to *ThermEQ*, *PulseEQ* or *PulseTrack* then the RF may be on that time at most while Q-switching

Pulse Delete Parameters (Mode 1) summarizes all parameters if the *Pulse control mode* is set to *Pulse Delete*

Delay time sets the re-pump time and shows the setting returned by the laser

Delay time offset shows the pulse delete offset time

Ramp slope shows the pulse delete ramp slope

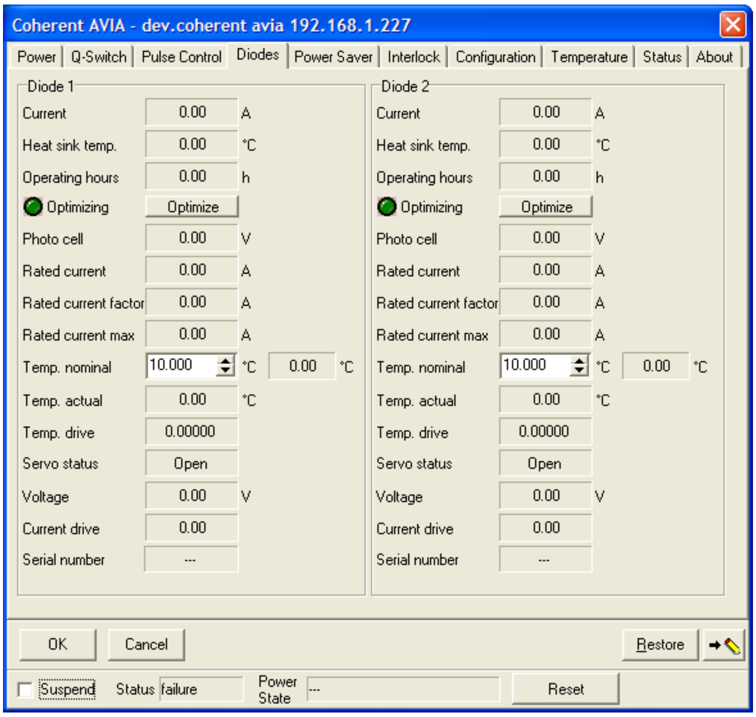
ThermEQ/PulseEQ/PulseTrack Parameters (Mode 2) summarizes all parameters if the *Pulse control mode* is set to *ThermEQ*, *PulseEQ* or *PulseTrack*

Delay time sets the *ThermEQ* delay time and shows the setting returned by the laser

Delay time offset shows the *ThermEQ* offset time

Ramp slope shows the *ThermEQ* ramp slope

3.11.6. Parametrize - Diodes



Diode 1, Diode 2 summarizes parameters regarding the diodes

Current A shows the current

Heat sink temp shows the heat sink temperature

Operating hours shows the operating hours

Optimizing Optimize starts the optimizing process. If the LED is lit the optimization is running

Photo cell shows the photo cell voltage, this is used to check if the diode is good

Rated current shows the set current maximum

Rated current factor value / 1000h. show the degeneration rate (a value of e.g. 0.01 is a 1% increase in maximum current per 1000 hours)

Rated current max. shows the calculated current maximum. This value results from the set current maximum, the increase in rated current by the degeneration rate and operating hours of the diode

Temp. nominal sets the nominal temperature and shows the setting returned by the laser

Temp. actual shows the actual temperature

Temp. drive shows the temperature drive

Servo status shows the servo status

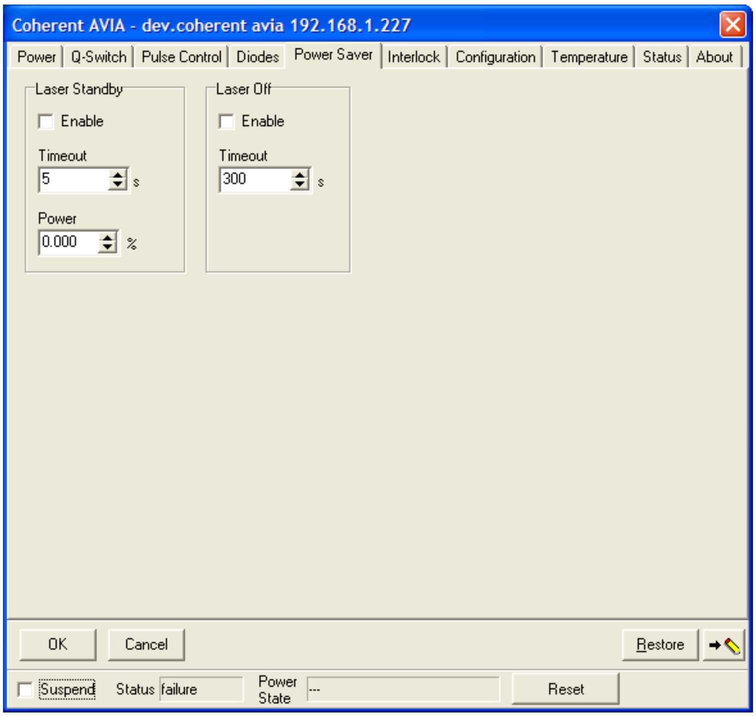
Voltage shows the voltage

Current drive shows the current drive

Serial number shows the serial number

3.11.7. Parametrize - Power Saver

If the laser is not in use for a time then the device driver can automatically switch the laser to standby and switch it completely off to save the diodes.



Laser Standby

Enable if this check box is selected then switching from power state *On* to *Standby* is enabled

Timeout sets the time that will be waited when the laser is not used, before switching it to power state *Standby*

Power sets the power at which the laser is operated in power state *Standby*

Laser Off

Enable if this check box is selected then switching from power state *Standby* to *Off* is enabled

Timeout sets the time that will be waited when the laser is not used, before switching it to power state *Off*

3.11.8. Parametrize - Interlock

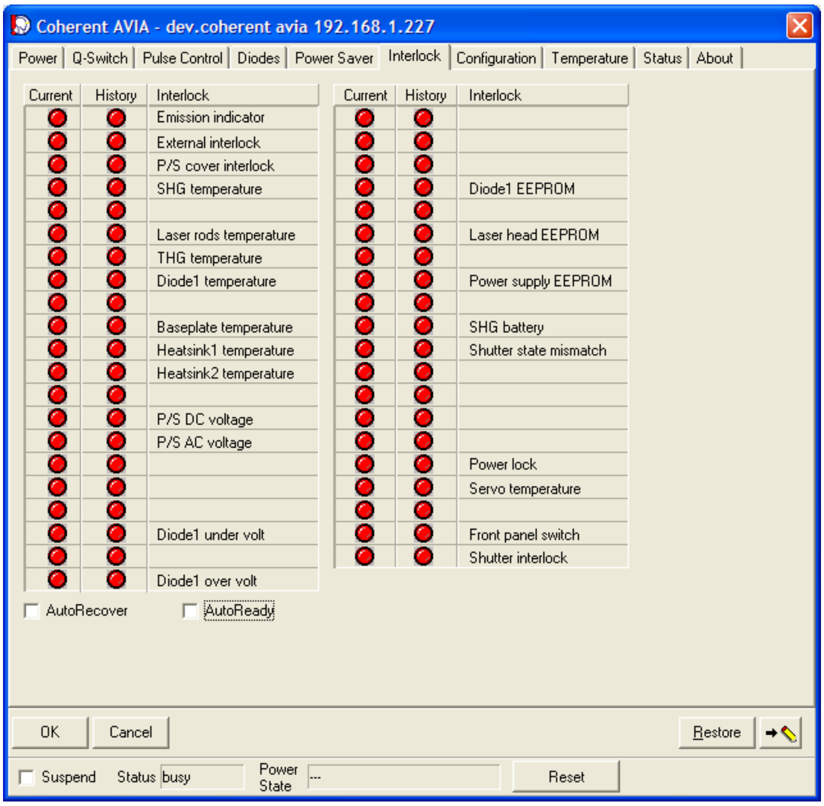


Table a green LED shows the status is OK. A red LED shows that there is or was an error.

The LEDs in column Current show the current status of the corresponding interlock.

The LEDs in column History show the status of the corresponding interlock since the last active acknowledge by the user. Because error conditions may automatically disappear, it is necessary to store the interlock history.

Column Interlock show the interlock short names. For troubleshooting consult the laser manual.

AutoReady if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state *On* and opens the laser shutter. As soon as the system is ready processing begins automatically.

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing.

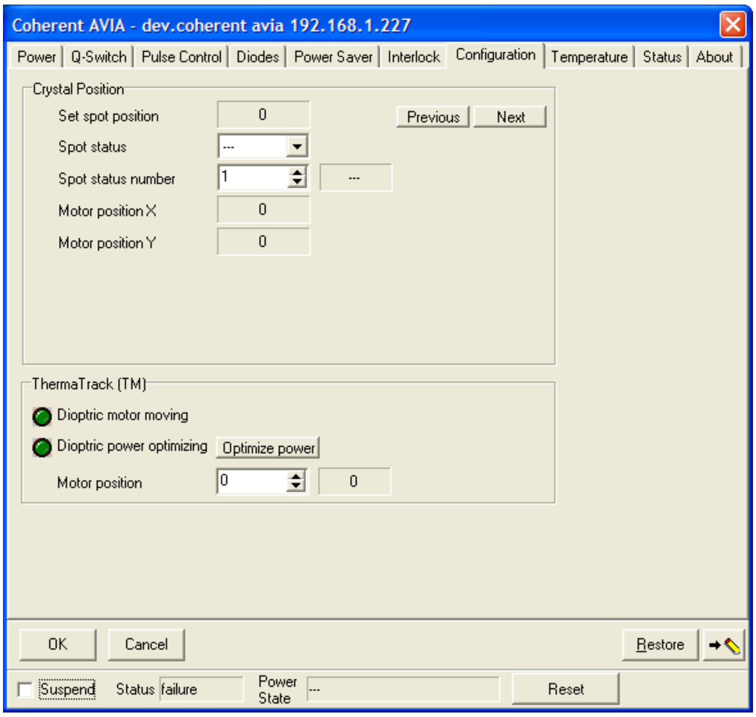
WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.11.9. Parametrize - Configuration



Crystal Position

Set spot position sets the spot position on the crystal and shows the setting returned by the laser

Previous, Next moves the crystal to the previous or next spot position

⚠ CAUTION

Laser beam on moving crystal

Crystal damage

- Set Diodes to off and Pulse control to Pulsing off prior to moving the crystal to a new spot position.

Spot status number shows the spot status number

Spot status sets the spots status and shows the setting returned by the laser

good spot is still good and may be used

bad spot is bad and must not be used

used spot is or was in use and may be used

Motor position X shows the motor position for the X-direction

Motor position Y shows the motor position for the Y-direction

Spot in use for x h shows the operating hours the spot on the crystal is in use

Crystal warning elapsed x h shows the time elapsed since the last crystal warning

Crystal warning interval x h shows the interval between crystal warnings

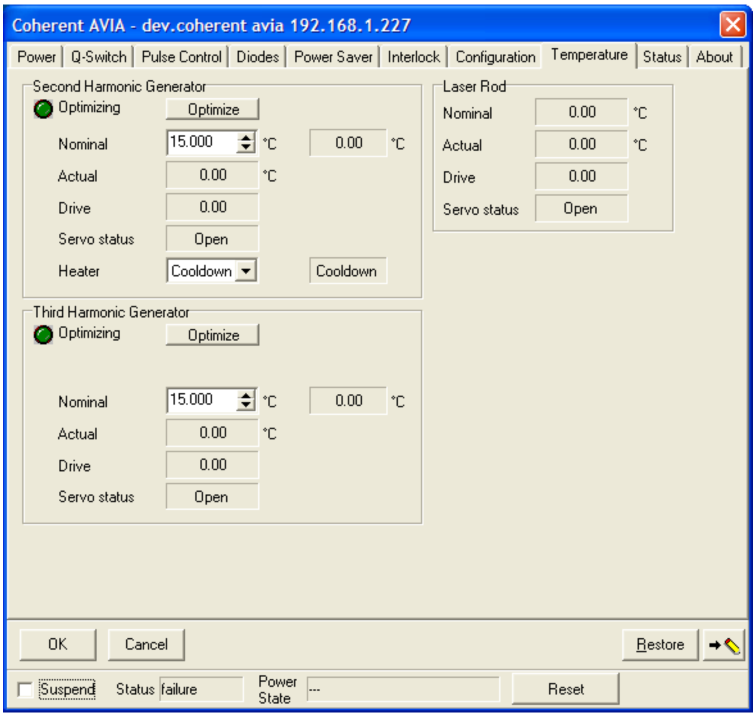
ThermaTrack (TM)

Dioptric motor moving if the LED is lit then the dioptric motor is moving

Dioptric power optimizing **Optimize power** starts the power optimizing process. If the LED is lit the optimization process is running

Motor position sets the motor position and shows the setting returned by the laser

3.11.10. Parametrize - Temperature



Second (SHG), Third (THG) and Fourth Harmonic Generator (FHG)

Optimizing **Optimize** starts the optimizing process. If the LED is lit the optimization process is running

Fine optimizing **Fine optimize** starts the fine optimizing process (only THG). If the LED is lit the optimization process is running

Nominal sets the nominal temperature and shows the setting returned by the laser

Actual shows the actual temperature

Drive shows the drive

Servo status shows the servo status

Heater sets the status of the crystal heater and shows the setting returned by the laser (only SHG and FHG)

Cooldown cools down the crystal for laser shutdown procedure

Heating heats the crystal for laser operation

Laser rod, Resonator

Nominal shows the nominal temperature returned by the laser

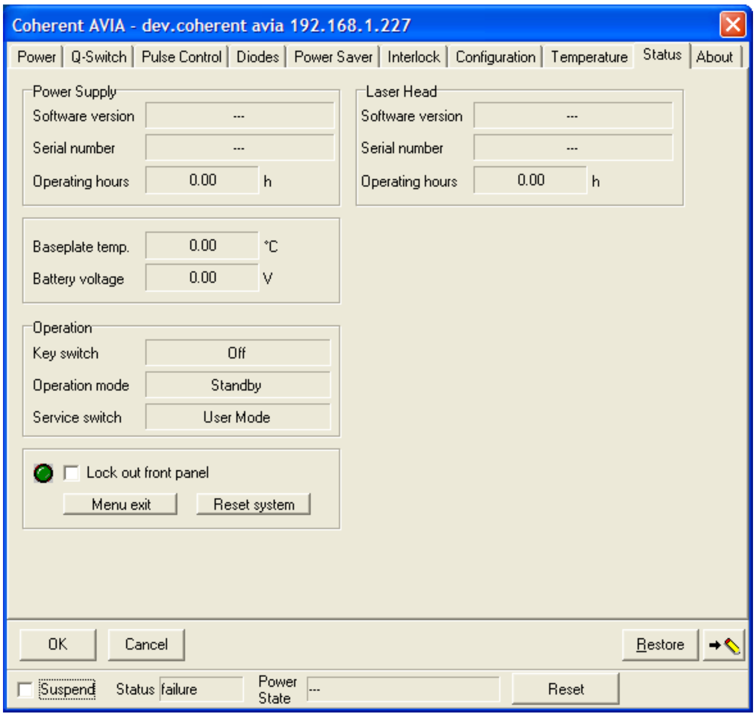
Actual shows the actual temperature

Drive shows the drive

Servo status shows the servo status

Servo tight lock if this LED is lit then the temperature servo tight lock is active

3.11.11. Parametrize - Status



Power supply

Software version shows the power supply firmware version

Serial number shows the power supply serial number

Operating hours shows the power supply operating hours

Base plate temperature shows the power supply base plate temperature

Battery voltage shows the backup battery voltage. Parts in this laser need to be cooled down after operation. In case the regular shutdown procedure is accidentally not executed the backup battery ensures a controlled cool down

Operation **Key switch** shows whether the key switch is on or off

Operation mode shows the operation status the laser is in at the moment

Service switch shows whether the laser is in user or service mode

Lock out front panel if this check box is selected the power supply front panel is locked out from operation control. The LED shows the setting returned by the laser. A lit LED means that the front panel is locked out

Menu exit exits the actual menu to the next higher menu at the power supply front panel

Reset system resets the laser

Laser head

Software version shows the laser head firmware version

Serial number shows the laser head serial number

Operating hours shows the laser head operating hours

3.12. BP Aion / Coherent Prisma

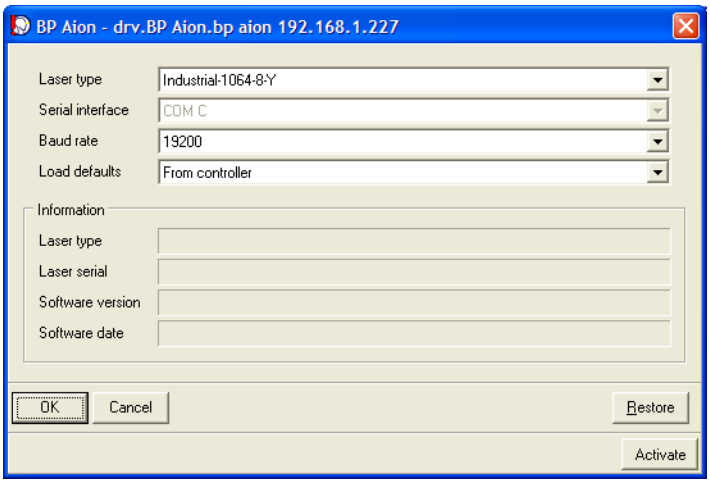
for controller	NCC, ASC
device type	laser
driver version	1.35.8.13

This device driver makes functions and parameters available to control lasers of the AION family in InScript via a serial interface. The Coherent Prisma laser is identical in construction - so you can also use this driver for Coherent Prisma (there is an instance of this driver for Coherent Prisma in InScript driver but momentarily it does not have an own user interface). Lasers of the AION/Prisma family are diode-pumped solid-state lasers providing ultraviolet, visible or infrared output with pulse repetition rates from CW, single shot to 100 kHz and short pulse width from 5 to 30 ns.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.12.1. Configure



Laser type selects the laser type

List item	Description
Industrial-1064-8-Y, -1064-8-V, -1064-8-Y-LP, -1064-8-V-LP, -1064-16-Y, -1064-16-Y-Wafermark, -1064-16-V, -1064-16-Y-LP, -1064-16-V-LP, -532-4-Y, -532-4-V, -532-8-Y, -532-8-V, -355-1-Y, -355-1-V, -355-3-Y	supported laser types

Serial interface selects the serial interface on the controller board

COM A NCC serial interface COM A

COM B NCC or ASC serial interface COM B

COM C ASC serial interface COM C

Baud rate selects the baud rate

List item	Description
1200, 4800, 9600, 19200, 38400	possible baud rates. If the baud rate exceeds the capability of the selected laser type then the baud rate will automatically be adjusted

Information

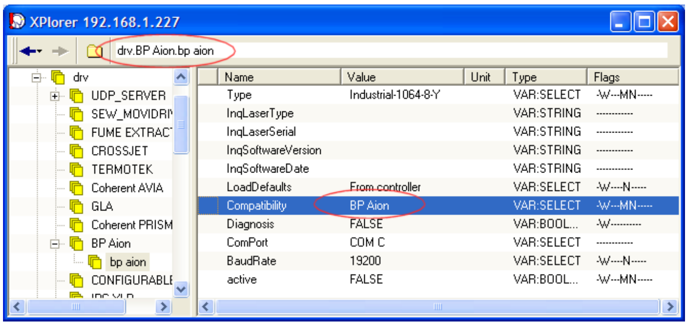
Laser type shows the laser type returned by the laser

Laser serial shows the lasers serial number

Software version shows the lasers software version

Software date shows when the laser software was created

Particularities As long as the BP Aion driver is not activated, you can set the compatibility mode of the laser driver using Xplorer (see 8.5 Xplorer). Open Xplorer () and enter path `drv.BP Aion.bp aion` to the Xplorer. Then adjust the settings under *Select* variable `Compatibility` to *BP Aion*, *Coherent Prisma 2.0* or *Coherent Prisma 2.0 with 1.034f emulation* exactly to the value, that you set at your laser.



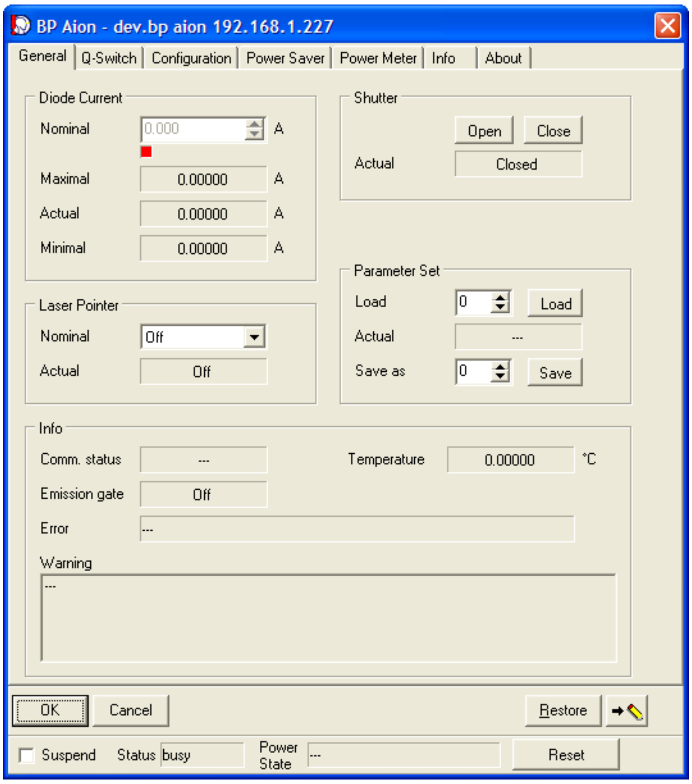
3.12.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

NOTE

Depending on the laser type set in the configuration some of the parameters may not be available.

3.12.3. Parametrize - General



Diode Current

Nominal sets the nominal diode current

Maximal shows the maximal diode current that can be set

Actual shows the actual diode current returned by the laser

Minimal indicates the minimal diode current that can be set

Shutter

Open opens the shutter

Close closes the shutter

Actual shows the actual shutter status

Laser Pointer

Nominal switches the laser pointer off or on and indicates its actual status

- **Off** laser pointer off
- **On** laser pointer on
- **Actual** shows whether the laser pointer is on or off

Parameter Set

Load sets the parameter set to be loaded.

Load Button click here to load the set

Actual shows the parameter set in use

Save sets the number under which the actual set parameters will be saved

Save Button click here to save the set under the name set under *Save*

Info

Comm. status shows the status of the communication between laser and controller board

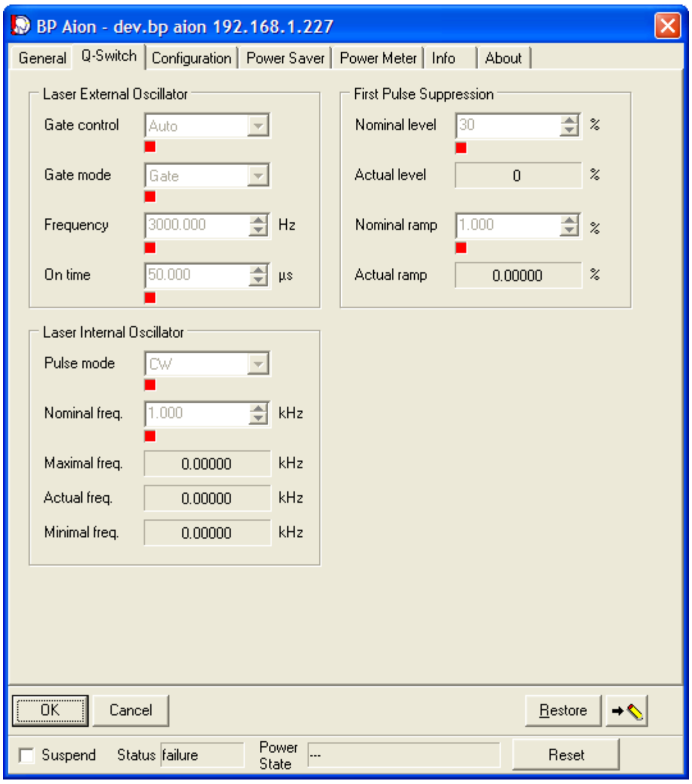
Temperature shows the actual water temperature

Emission gate shows the emission gate status

Error shows the active error returned by the laser

Warning shows the active warnings returned by the laser

3.12.4. Parametrize - Q-Switch



Laser External Oscillator

Gate control sets the gate control

Always off oscillator stays permanently off

Always on oscillator stays permanently on

Auto oscillator will be automatically switched on and off

Gate mode sets the type of signal at the controller board gate output

Gated Osc pulses will be generated with the parameters *Frequency* and *On time*

Gate a single on-/off-signal will be generated

Frequency sets the frequency to trigger the Q-switch

On time sets the signal *On time* to trigger theQ-switch

First Pulse Suppression

Nominal level sets the nominal first pulse level

Actual level indicates the actual first pulse level returned by the laser

Nominal ramp sets the nominal first pulse ramp

Actual ramp indicates the actual first pulse ramp returned by the laser

Laser Internal Oscillator

Pulse mode sets the pulse mode

CW generates CW laser output

Pulsed generates pulsed laser output

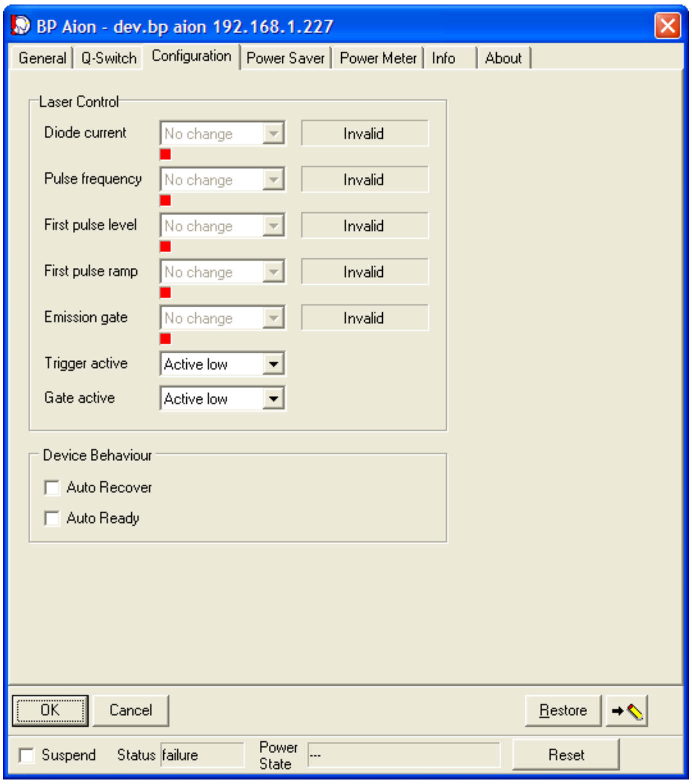
Nominal freq. sets the nominal frequency

Maximal shows the maximal frequency that can be set

Actual shows the actual frequency

Minimal shows the minimal frequency that can be set

3.12.5. Parametrize - Configuration



Laser Control

Diode current sets by which interface the diode current is controlled and indicates the actual interface returned by the laser

No change indicates the interface is actually not in change

Internal the parameter is controlled via the lasers front panel

User the parameter is controlled via the lasers user interface

RS 232 the parameter is controlled via the lasers serial interface

Pulse frequency sets by which interface the pulse frequency is controlled and indicates the actual control returned by the laser. For possible settings see Diode current

First pulse level sets by which interface the first pulse level is controlled and indicates the actual control returned by the laser. For possible settings see Diode current

First pulse ramp sets by which interface the first pulse ramp is controlled and indicates the actual control returned by the laser. For possible settings see Diode current

Emission gate sets by which interface the emission gate is controlled and indicates the actual control returned by the laser. For possible settings see Diode current

Trigger active sets the active signal level of the lasers trigger input

Active low the signal is low active

Active high the signal is high active

Gate active sets the active signal level of the lasers gate input

Active low the signal is low active

Active high the signal is high active

Device Behavior

AutoReady if this check box is selected and a Job Start signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state *On* and opens the laser shutter. As soon as the system is ready processing begins automatically.

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing.

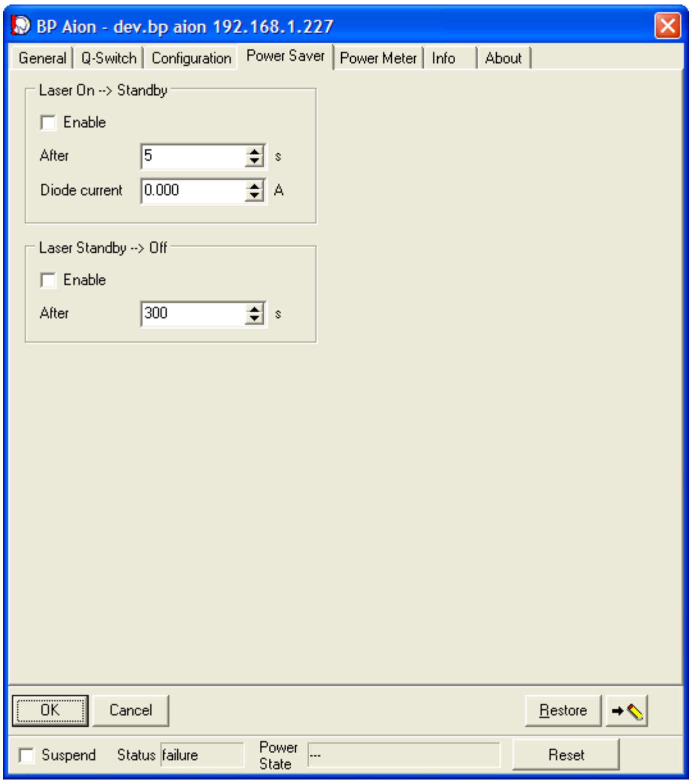
WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.12.6. Parametrize - Power Saver



Laser On → Standby

Enable if this check box is selected then switching from power state *On* to *Standby* is enabled

After sets the time that will be waited and the laser is not used, before switching it to power state *Standby*

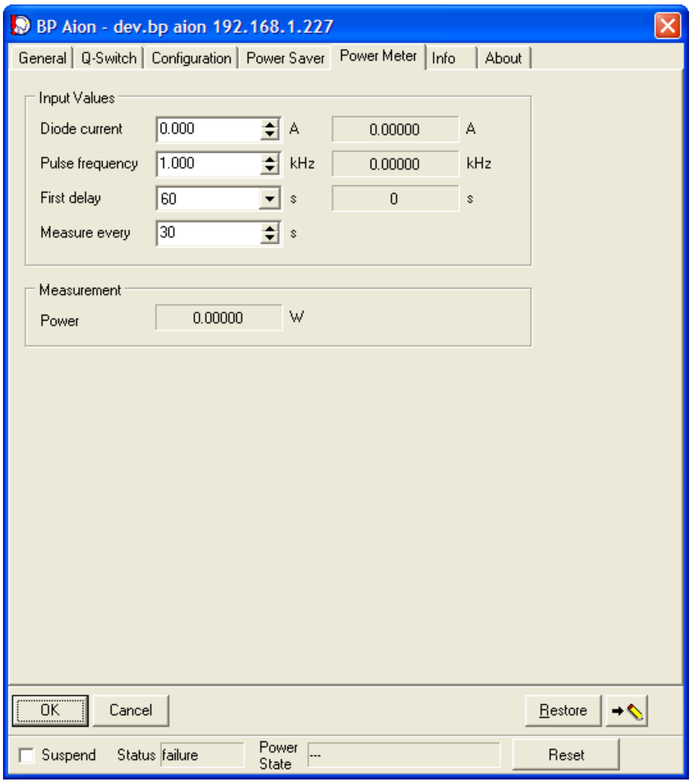
Diode current sets the diode current which will be used in power state *Standby*

Laser Standby → Off

Enable if this check box is selected then switching from power state *Standby* to *Off* is enabled

After sets the time that will be waited and the laser is not used, before switching it to power state *Off*

3.12.7. Parametrize - Power Meter



Input Values

Diode current sets the diode current that will be used for measurement

Pulse frequency sets the pulse frequency that will be used for measurement

First delay sets the delay between the command to measure and the first measurement

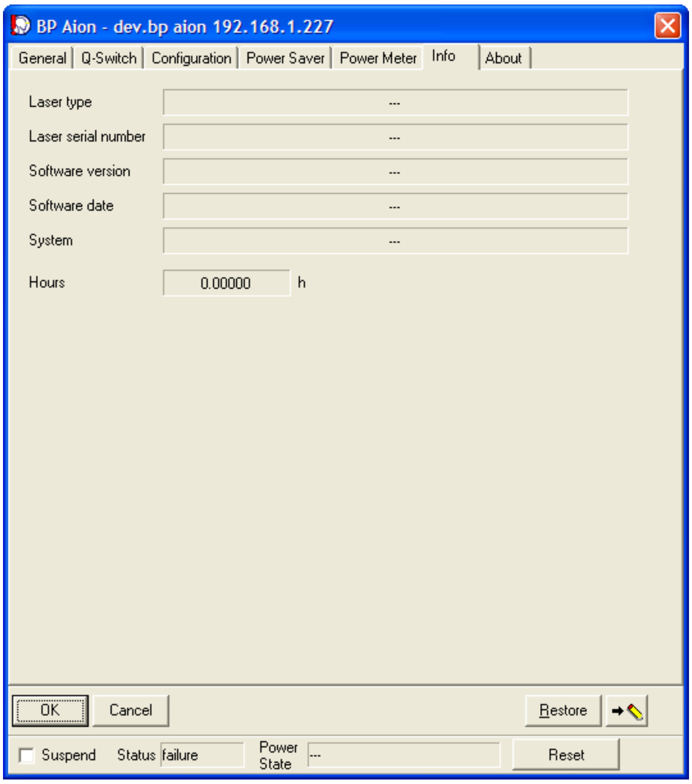
List item	Description
60, 90, 120, 150, 180, 210, 240, 270	delays that can be set

Measure every sets the interval between measurements

Measurement

Power shows the power measured with the parameters in group *Input Values*

3.12.8. Parametrize - Info



Laser type shows the laser type returned by the laser

Laser serial number shows the lasers serial number

Software version shows the lasers software version

Software date shows the date the laser software was created

System shows the lasers system status

Hours shows the lasers operating hours

3.13. configurable laser - Configurable Laser

for controller	ASC
device type	laser
driver version	1.10.2.19

The *configurable laser* device can be configured to control lasers that have no specific laser driver in *InScript*. Please consult the documentation for each laser to configure the driver,

Here are some examples for signals that may occur while controlling a laser:

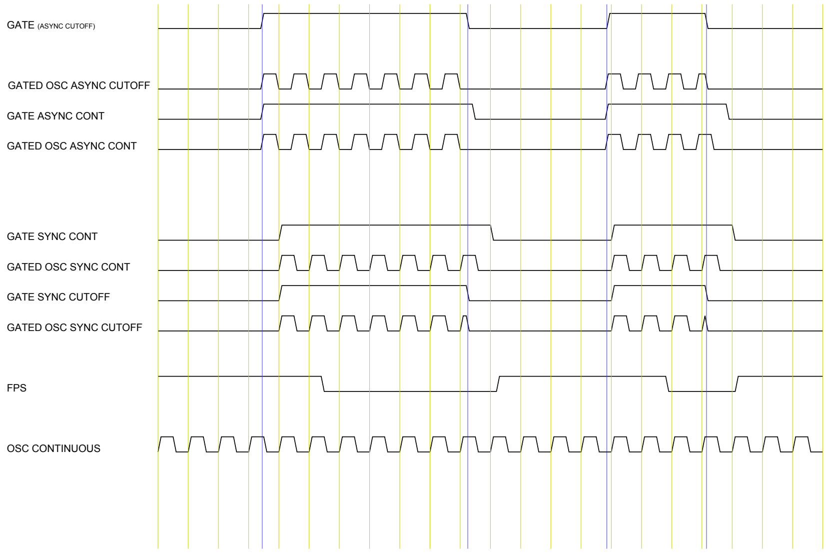


Figure 2: Laser Timing Diagrams

In the description of the configurale laser driver these diagrams are referenced as examples.

List item	Signal	Description
$\text{GATE}_{(\text{ASYNC CUTOFF})}$	gate	Asynchroneous to oscillator.
GATED OSC ASYNC CUTOFF	oscillator	Cut off by asynchroneous gate signal
GATE ASYNC CONT	gate	Asynchroneous and continuous to oscillator
GATED OSC ASYNC CONT	oscillator	No cut-off by asynchroneous gate signal
GATE SYNC CONT	gate	Synchroneous to oscillator
GATED OSC SYNC CONT	oscillator	No cut-off by synchroneous gate signal
GATE SYNC CUTOFF	gate	Synchroneous and continuous to oscillator
GATED OSC SYNC CUTOFF	oscillator	Cut off by synchroneous gate signal
FPS	first pulse suppression	Offset by FPS duration and inversion time
OSC CONTINUOUS	oscillator	Continuous oscillator signal

3.13.1. Configure

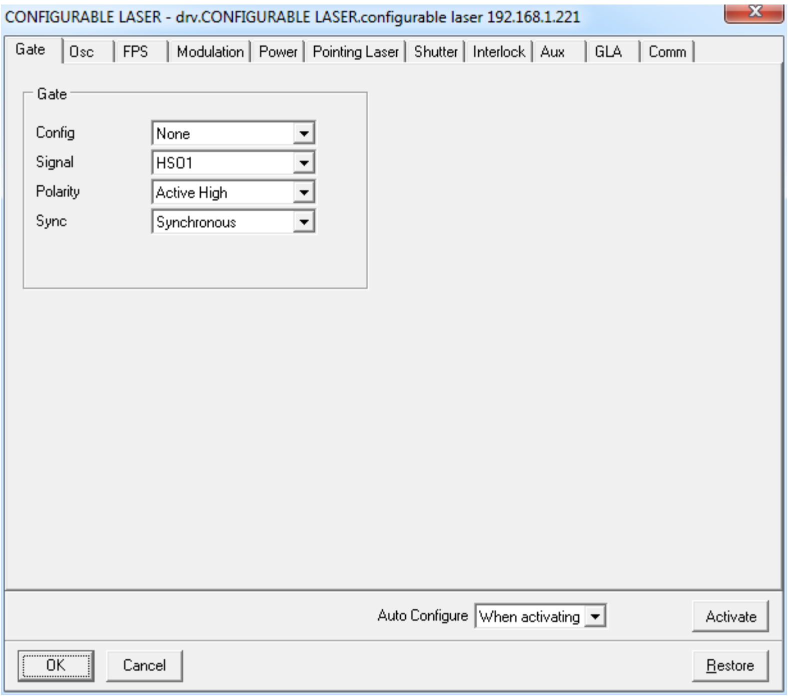
See 3.1.1 When Configuring Inactive Devices for common gui elements while configuring the device.

AutoConfigure if this function is used, a set of standard values is set

- **Off** no auto configuration is executed
- **When activating** auto configuration is executed, when the configurable laser driver is activated

Now auto configuration is executed instantaneous

3.13.2. Configure - Gate



Gate

Config

None mode is set to ungated

Gate mode is set to gated

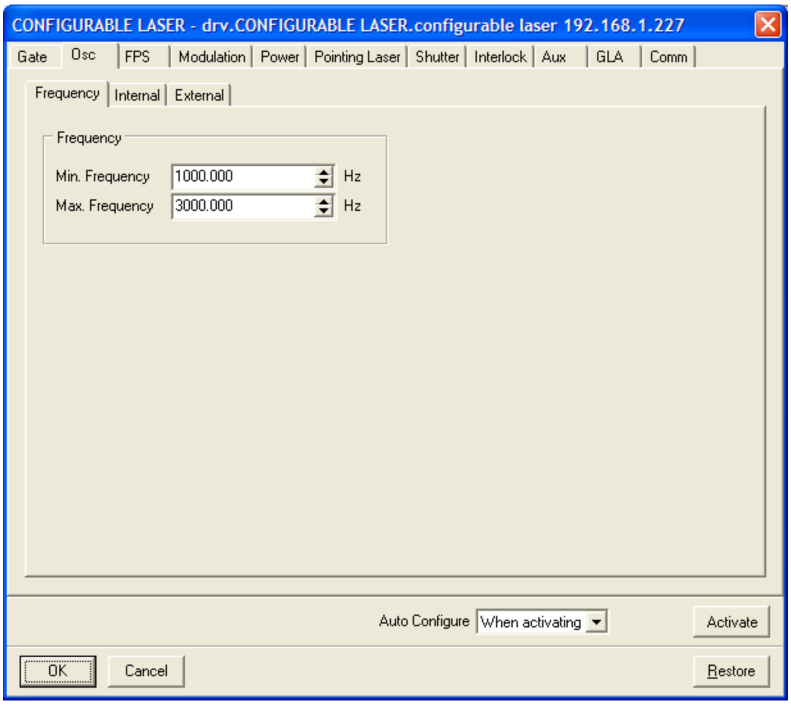
Signal sets the Gate signal to one of the **H**igh **S**peed **O**utputs HSO0 to HSO7 (see the *Manual -- NCC System Controller*)

Polarity sets the polarity to *Active=High* or *Active=Low*

Sync sets the synchronisation to *Asynchronous* or *Synchronous* to Oscillator. See 2 Laser Timing Diagrams for *sync* and *async* examples

3.13.3. Configure - Osc/Frequency

The Oscillator frequency is set in this tab.



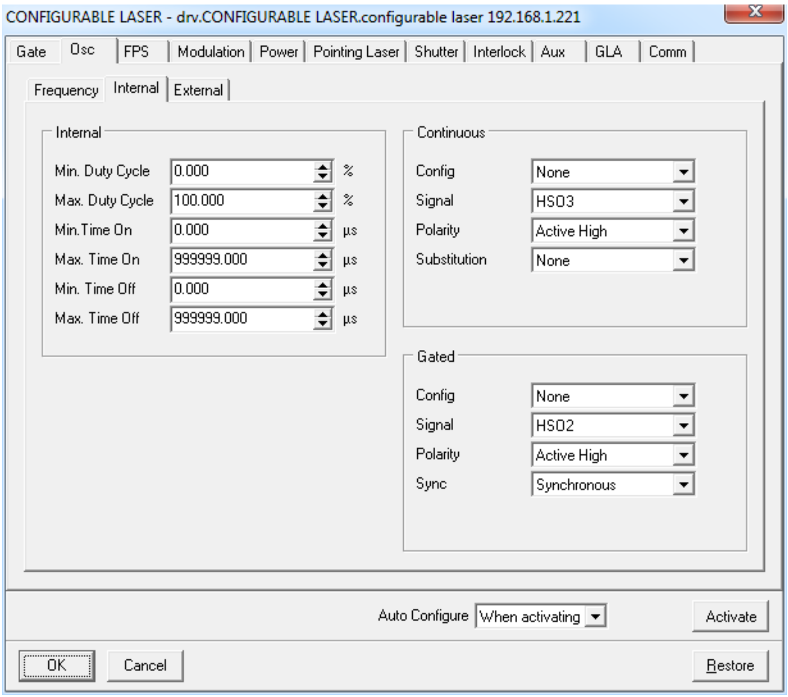
Frequency

Min. Frequency sets the minimum oscillator frequency

Max. Frequency sets the maximum oscillator frequency

3.13.4. Configure - Osc/Internal

Using this tab, controller-internal (or laser-external) oscillator settings of the ASC can be set.



Internal

Min. Duty Cycle sets the minimum Duty Cycle. The duty cycle is the fraction of time that a system is in an "active" state. It is the duration that the function is active high (normally when the signal is greater than zero) divided by the period of the function

Max. Duty Cycle sets the maximum Duty Cycle

Min. Time On sets the minimum On time of the signal

Max. Time On sets the maximum On time of the signal

Min. Time Off sets the minimum Off time of the signal

Max. Time Off sets the maximum Off time of the signal

Continuous

Config

None no continuous signal

Continuous see 2 Laser Timing Diagrams *OSC CONTINOUS*

Gated see any of the *GATED* examples in 2 Laser Timing Diagrams

CO2 reserved for later use

Signal sets the signal to one of the **H**igh **S**peed **O**utputs HSO0 to HSO7 (see the *Manual -- NCC System Controller*)

Polarity sets the polarity to *Active=High* or *Active=Low*

Substitution set *None* for no substitution and *Osc* if oscillation must not be completely interrupted (e.g. for quicker response of fibre laser and bitmap modulation)

Gated

Config

None no gated signal

GatedOsc see any of the *GATED* examples in 2 Laser Timing Diagrams

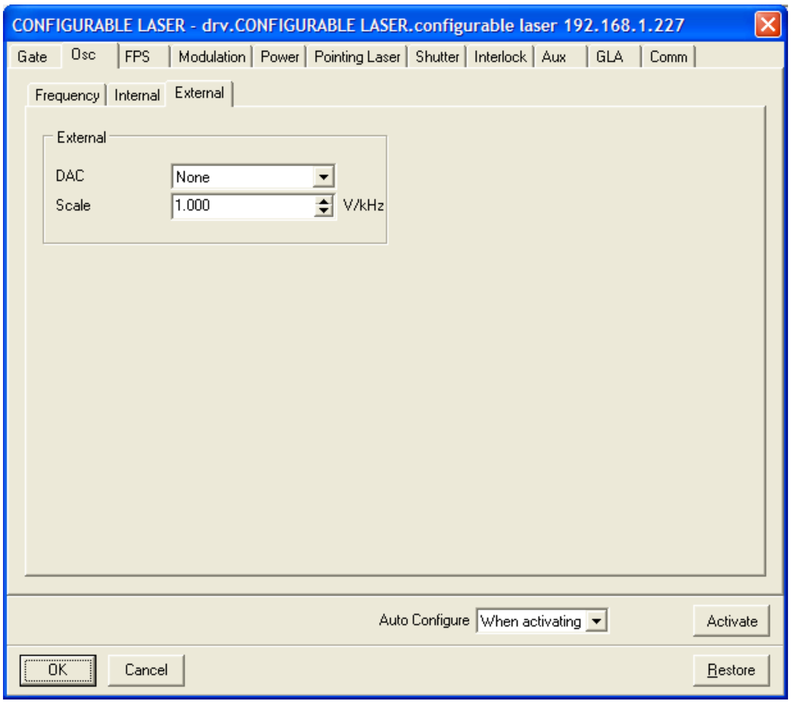
Signal sets the signal to one of the **H**igh **S**peed **O**utputs HSO0 to HSO7 (see the *Manual -- NCC System Controller*)

Polarity sets the polarity to *Active=High* or *Active=Low*

Sync run *Asynchronous* or *Synchronous to Gate*. See 2 Laser Timing Diagrams for *sync* and *async* examples

3.13.5. Configure - Osc/External

Using this tab, controller-external (or laser-internal) oscillator settings of the laser can be set.



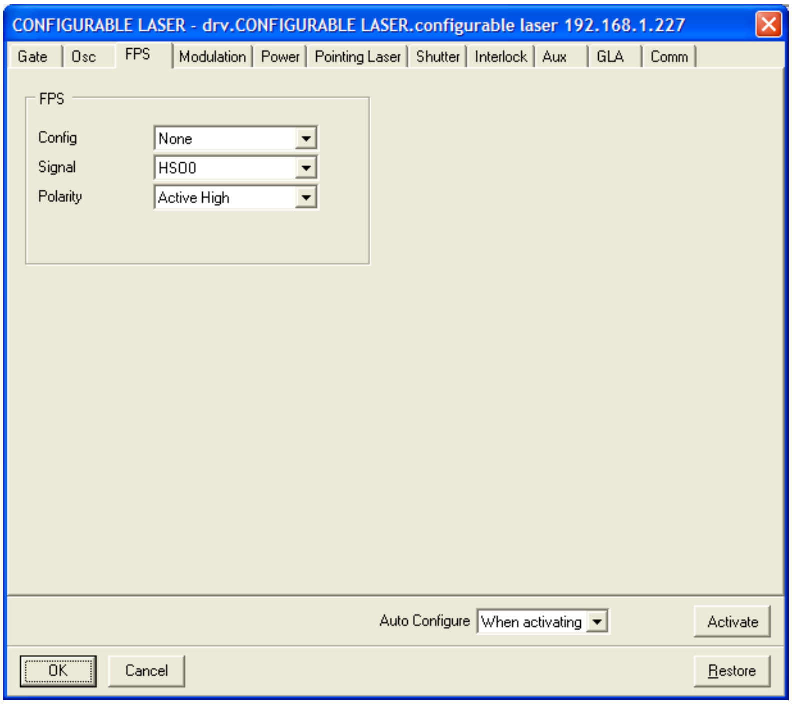
External

DAC the oscillator source can be set to *None* for no external oscillator or to *DAC A* to *DAC D* to use the DAC A FB to DAC D FB (digital-to-analog converter) pins of the DVI laser connector (see the *Manual -- NCC System Controller*)

Scale oscillator scale from 0 V/kHz - 10 V/kHz. Control voltage of the selected DAC output, depending on the used laser

3.13.6. Configure - FPS

Q-switched lasers often have a first pulse in a string of pulses that contains a much greater energy level than those that follow. To prevent this, **F**irst **P**ulse **S**upression settings can be made in this tab.



FPS

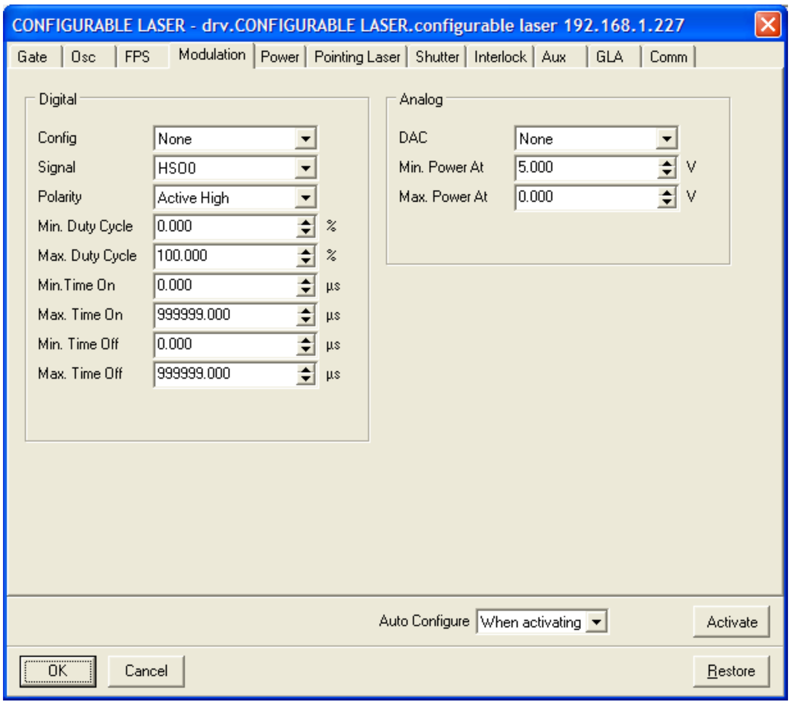
Config first pulse suppression can be set to *None* or it can be realized using a *Delayed Gate* signal depending on the used laser

Signal sets the FPS signal to one of the **H**igh **S**peed **O**utputs HSO0 to HSO7 (see the *Manual -- NCC System Controller*)

Polarity sets the polarity to *Active=High* or *Active=Low*

3.13.7. Configure - Modulation

Modulation is normally used for grayscale pixel modulation.



Digital

Config digital modulation can be set to *None* or it can be switched on using *Digital*

Signal sets the modulation signal to one of the **H**igh **S**peed **O**utputs HSO0 to HSO7 (see the *Manual -- NCC System Controller*)

Polarity sets the polarity to *Active=High* or *Active=Low*

Min. Duty Cycle sets the minimum Duty Cycle. The duty cycle is the fraction of time that a system is in an "active" state. It is the duration that the function is active high (normally when the signal is greater than zero) divided by the period of the function

Max. Duty Cycle sets the maximum Duty Cycle

Min. Time On sets the minimum On time of the signal

Max. Time On sets the maximum On time of the signal

Min. Time Off sets the minimum Off time of the signal

Max. Time Off sets the maximum Off time of the signal

Analog these values set the modulation of the single pulse energy tha is normally used for bitmap grayscale

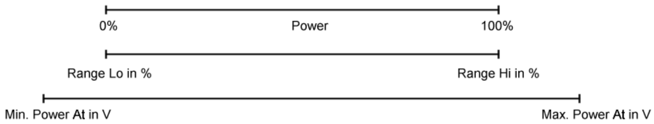
DAC analog modulation can be set to *None* or it can be switched on using *DAC A* through *DAC D* to choose the digital-to-analog converter that shall be used

Min. Power At voltage for the pulse energy that does the minimum change (e.g. black, if the material gets lighter the more energie is applied or white, if the material gets darker) of the material for grayscale output

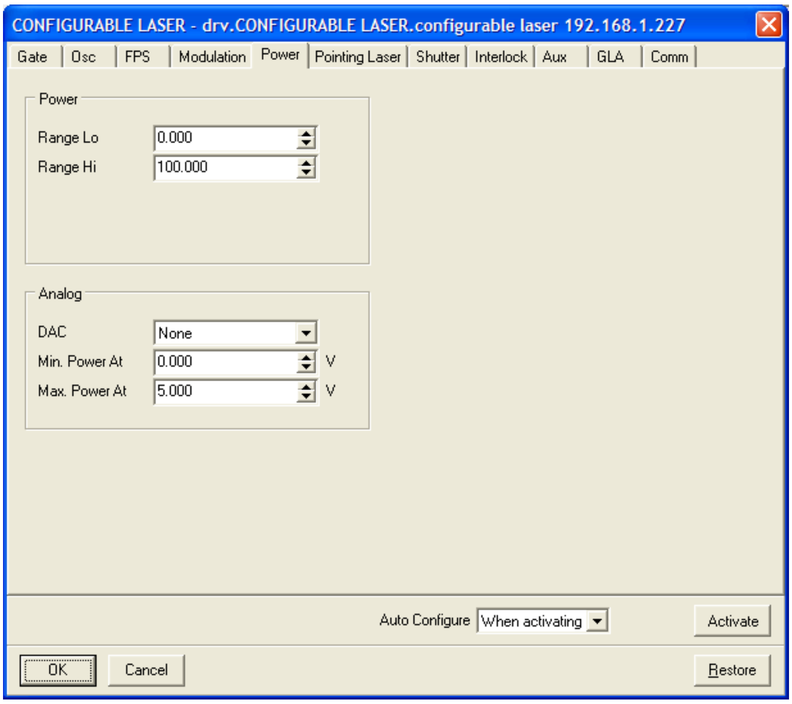
Max. Power At voltage for the pulse energy that does the maximum change (e.g. white, if the material gets lighter the more energie is applied or black, if the material gets darker) of the material for greyscale output

3.13.8. Configure - Power

The settings in this tab set how the used voltage determines the laser power in percent.



The figure above shows how the sum of the settings of this tab influence the resulting power values.



Power

Range Lo sets the lower threshold in percent of the laser power set under *Analog / Min. Power At* that will be used as 0% in all power settings in percent

Range Hi sets the upper threshold in percent of the laser power set under *Analog / Max. Power At* that will be used as 100% in all power settings in percent

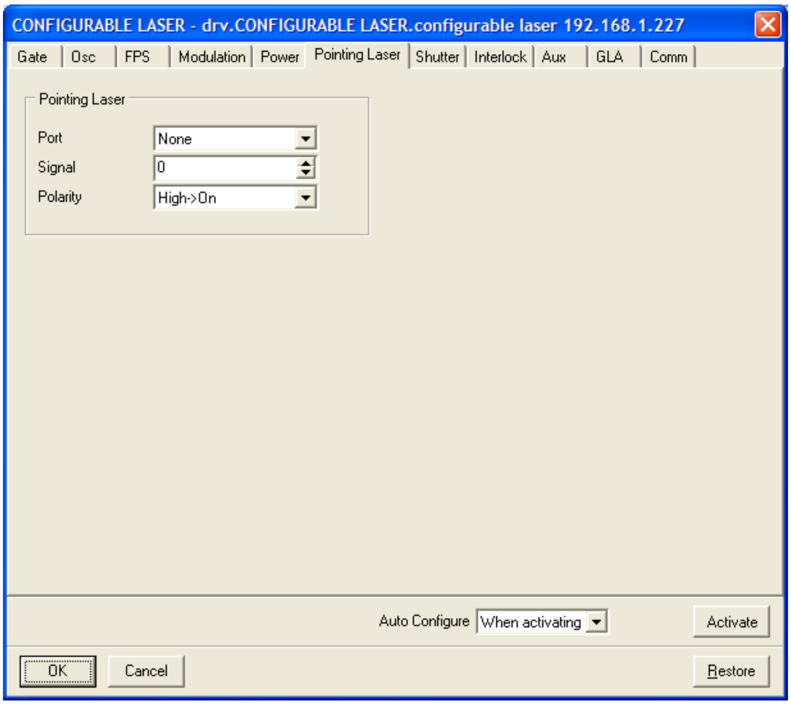
Analog

DAC analog power can be set to *None* or it can be switched on using *DAC A* through *DAC D* to choose the digital-to-analog converter that shall be used

Min. Power At set minimum laser power to this voltage

Max. Power At set maximum laser power to this voltage

3.13.9. Configure - Pointing Laser



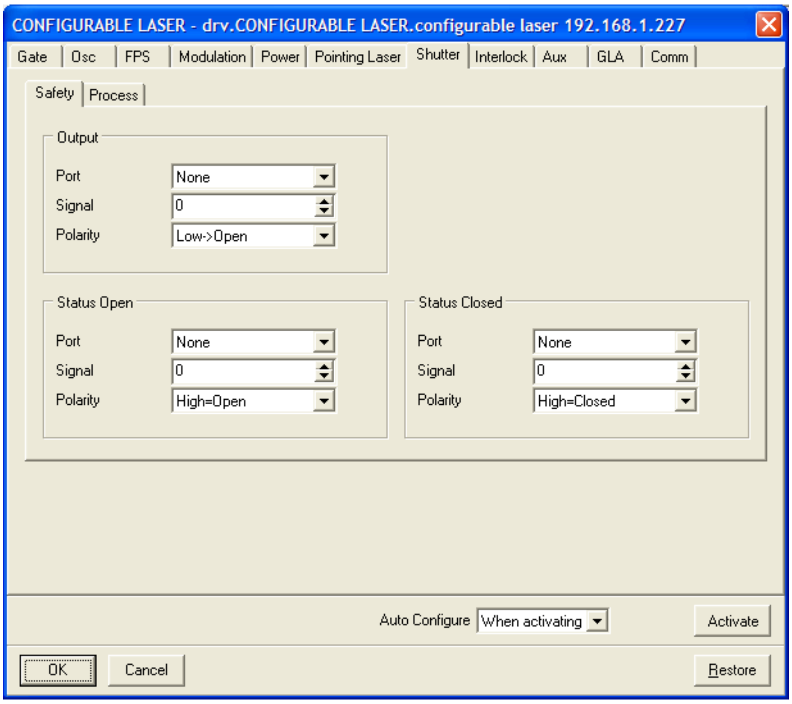
Pointing Laser

Port the port for the pointing laser can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High->On* or *Low->On*

3.13.10. Configure - Shutter/Safety



Output

Port the port for the safety shutter can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High->Open* or *Low->Open*

Status Open

Port the port for the "safety shutter open" status can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High=Open* or *Low=Open*

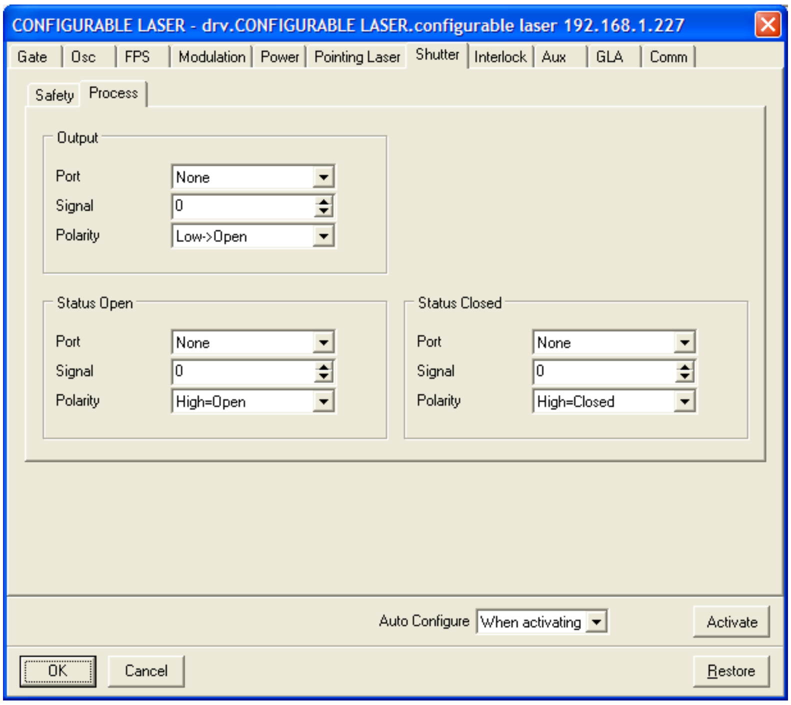
Status Closed

Port the port for the "safety shutter closed" status can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High=Closed* or *Low=Closed*

3.13.11. Configure - Shutter/Process



Output

Port the port for the process shutter can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High->Open* or *Low->Open*

Status Open

Port the port for the "process shutter open" status can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High=Open* or *Low=Open*

Status Closed

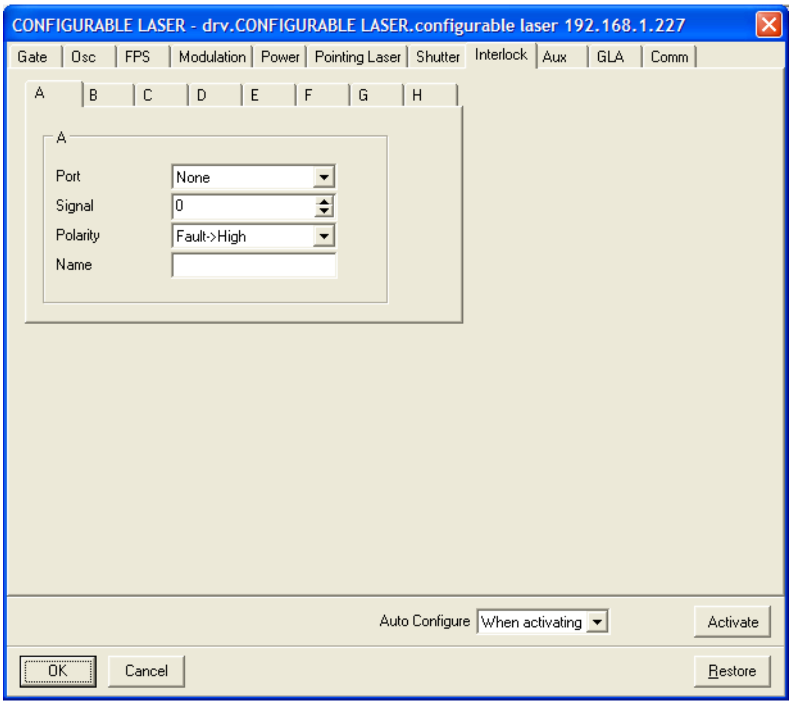
Port the port for the "process shutter closed" status can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *High=Closed* or *Low=Closed*

3.13.12. Configure - Interlock - A-H

This tab configures interlock signals.



A - H

Port the port for the each Interlock (A-H) can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

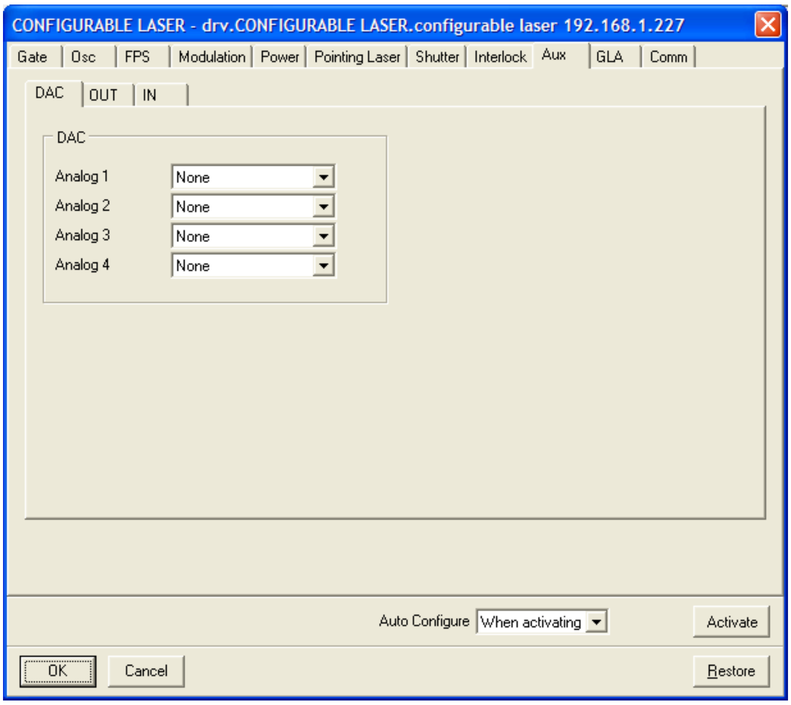
Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *Fault->High* or *Fault->Low*

Name sets a human-readable name for each interlock

3.13.13. Configure - Aux/DAC

Up to four auxiliary DAC outputs can be set in this tab.



DAC

Analog1 analog1 can be set to *None* if no DAC (digital-to-analog converter) is needed or to *DAC A* to *DAC D* to use the DAC A FB to DAC D FB pins of the DVI laser connector (see the *Manual -- NCC System Controller*)

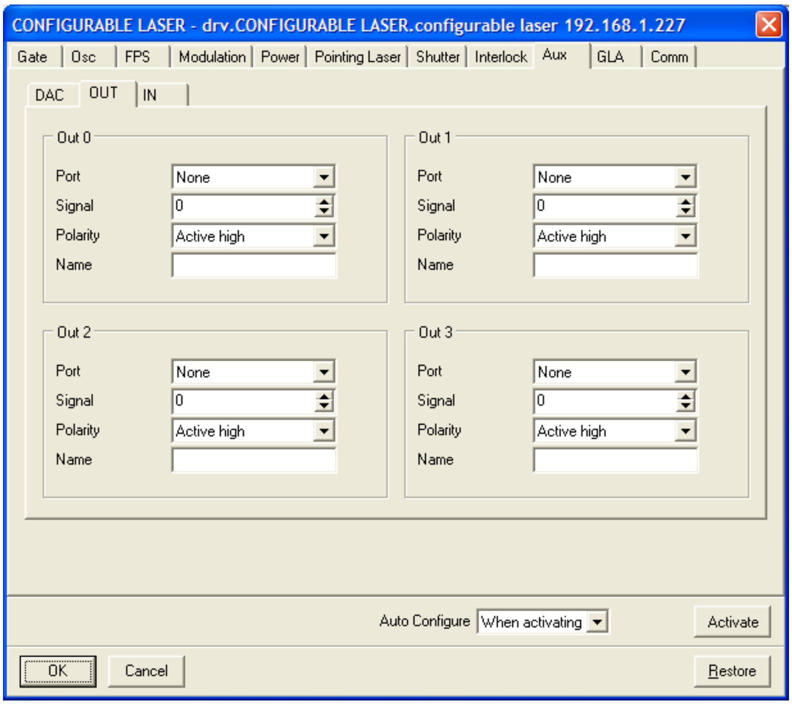
Analog2 analog2 can be set to *None* if no DAC (digital-to-analog converter) is needed or to *DAC A* to *DAC D* to use the DAC A FB to DAC D FB pins of the DVI laser connector (see the *Manual -- NCC System Controller*)

Analog3 analog3 can be set to *None* if no DAC (digital-to-analog converter) is needed or to *DAC A* to *DAC D* to use the DAC A FB to DAC D FB pins of the DVI laser connector (see the *Manual -- NCC System Controller*)

Analog4 analog4 can be set to *None* if no DAC (digital-to-analog converter) is needed or to *DAC A* to *DAC D* to use the DAC A FB to DAC D FB pins of the DVI laser connector (see the *Manual -- NCC System Controller*)

3.13.14. Configure - Aux/OUT

Auxiliary outputs can be set in this tab.



Out 0-3 up to four auxiliary outputs can be configured

Port the port for the auxiliary output can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

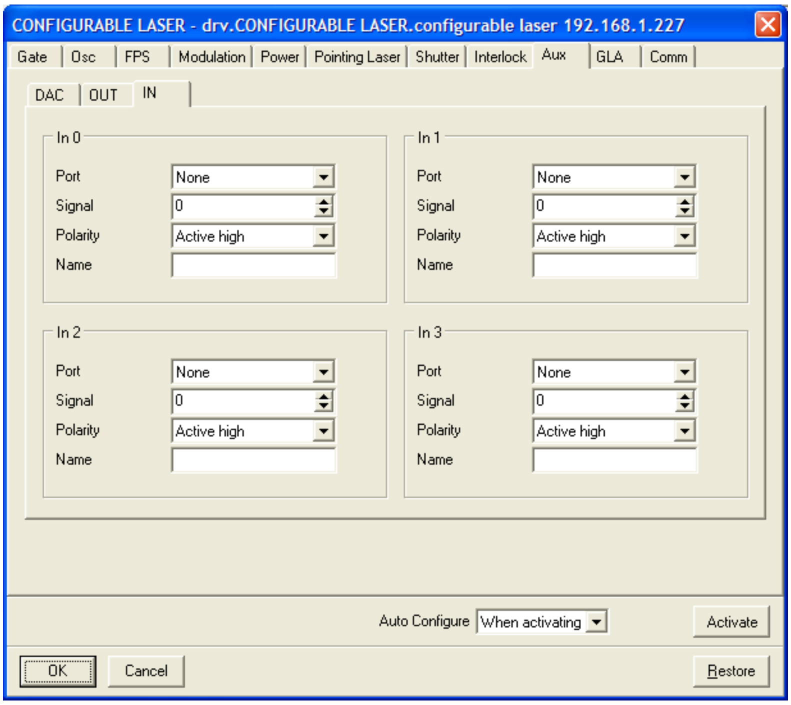
Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *Active high* or *Active low*

Name sets a human-readable name for each output

3.13.15. Configure - Aux/IN

in this tab auxiliary inputs can be set.



In 0-3 up to four auxiliary inputs can be configured

Port the port for the auxiliary input can be set to *None* or it can be set to the *ASE User* device (see 3.36 ase user io - USER Inputs and Outputs), to the High Speed IOs *HSIO* (see the *Manual -- NCC System Controller*) or 16 IOs of the Generic Laser Adapter *GLA* (see 3.13.16 Configure - GLA)

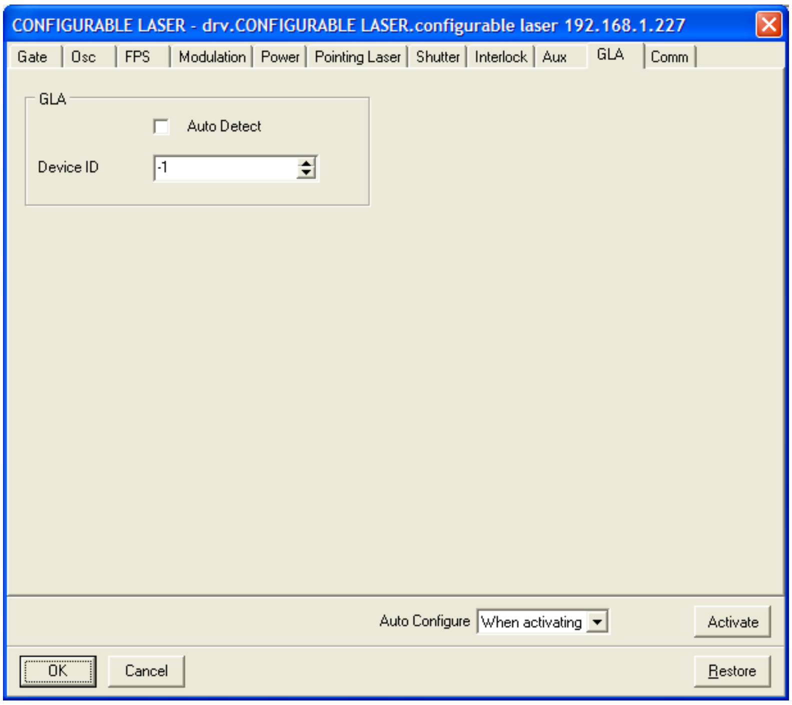
Signal determines which signal of the selected *Port* shall be used (e.g. HSIO and 6 would mean HSIO6)

Polarity sets the polarity to *Active high* or *Active low*

Name sets a human-readable name for each input

3.13.16. Configure - GLA

These seetings are only effective, if a GLA or Generic Laser Adapter is connected. The GLA module is able to distribute the interfaces that can be lead through the DVI-I adapter to generic interfaces. The GLA provides 16 In, Out and High Current IOs. The high current IOs (HCOs/HCIOs) can be controlled by the high speed IOs (HSIOs).



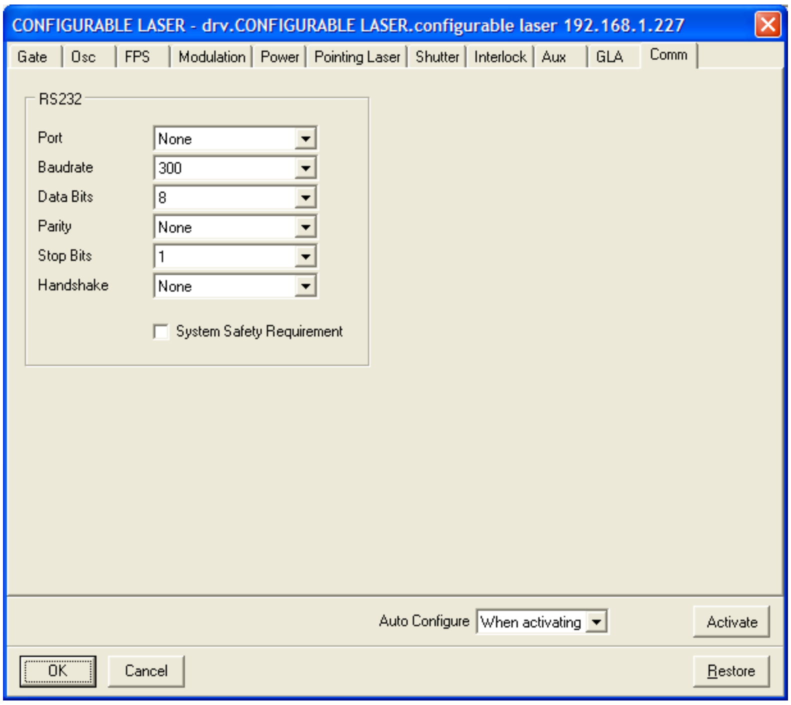
GLA

Auto Detect if this check box is selected a Generic Laser Adapter will be auto detected

Device ID this field shows the ID of the detected GLA or -1 if no GLA was detected

3.13.17. Configure - Comm

To use a COM port for communication with a laser the COM port can be set up under this tab.



RS232

Port

None no COM port

COM A, COM B, COM C selects a serial interface on the ASC controller (normally COM A is not supported without additional hardware)

Baudrate selects the baudrate of the selected *Port*

List item	Description
300, 600, 1200, 2400, 4800, 9600, 19200, 38400	selects the serial interface baud rate. If the baud rate exceeds the capability of the selected laser type then the baud rate will automatically be adjusted, if possible

Data Bits selects the data bits

List item	Description
7, 8, 9	number of data bits

Parity

List item	Description
None, Odd, Even	parity bit that is added to ensure that the number of bits with the value one in a set of bits is even or odd

Stop Bits selects the number of stop bits

List item	Description
1, 2	number of stop bits

Handshake selects the flow control mechanism

List item	Description
none	no handshake is used
XON/XOFF	software flow control XON/XOFF is used
RTS/CTS	hardware flow control RTS/CTS is used

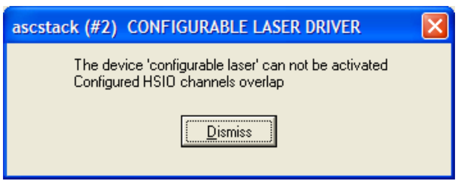
System Safety Requirement if this check box is selected the system checks if there is still communication over the port

3.13.18. Parametrize

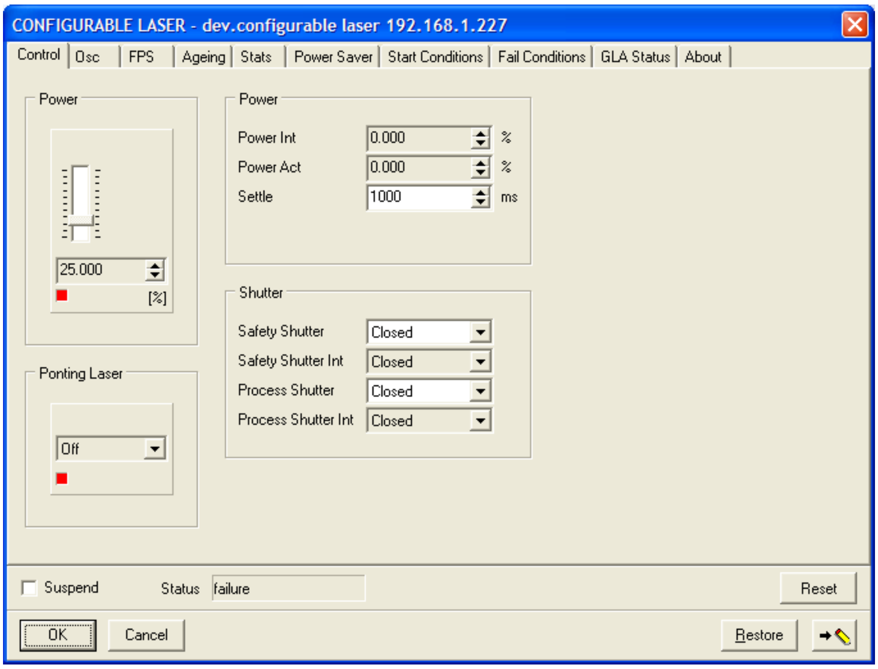
See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

These parameters will be accessible after the device is activated (see 2.6.4 Activate).

If resources (like ports) are multiply assigned or if there are other resource conflicts, then InScript will display an error message while the device is activated (this is only working properly, if the I/O that re-uses an already assigned port is fully implemented).



3.13.19. Parametrize - Control



Power sets the laser power to % (see also 3.13.8 Configure - Power how power in % is defined)

Pointing Laser switches the pointing laser *On* or *Off*

Power

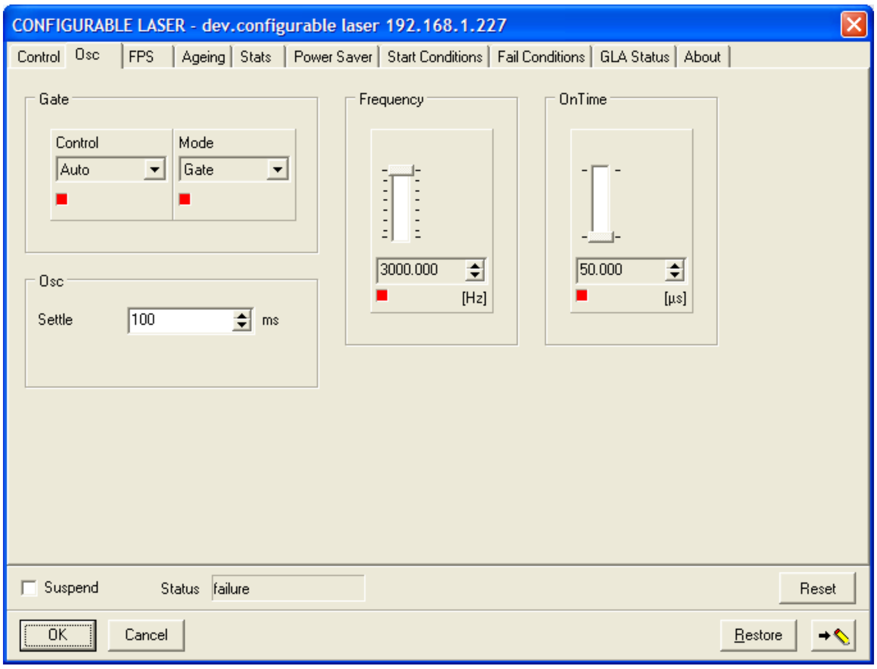
> **Power Int** internal Power in % (specified value eventually modified by power saver etc.)
>
> **Power Act** actual power in % (the last value given to the d/a converter)
>
> **Settle** sets the power settle time, which is the time the laser needs to get to ready state after a change occured

Shutter

> **Safety Shutter** set safety shutter to *Closed* or *Open* (desired state)
>
> **Safety Shutter Int** current state, the safety shutter is *Closed* or *Open* (e.g. the powersaver or an interlock may force the shutter to stay closed)
>
> **Process Shutter** set process shutter to *Closed* or *Open* (desired state)
>
> **Process Shutter Int** currently, the process shutter is *Closed* or *Open* (e.g. the powersaver or an interlock may force the shutter to stay closed)

3.13.20. Parametrize - Osc

Oscillator values can be set in this tab.



Gate

Control

List item	Description
Auto	the oscillator is automatically switched on and off
Always on	the oscillator is always on
Always off	the oscillator is always off

Mode

List item	Description
Gate	a single on/off signal is generated
Gated Osc	pulses are generated with the parameters *Frequency* and *On-Time* (see 2 Laser Timing Diagrams for *gated osc* examples)

Osc

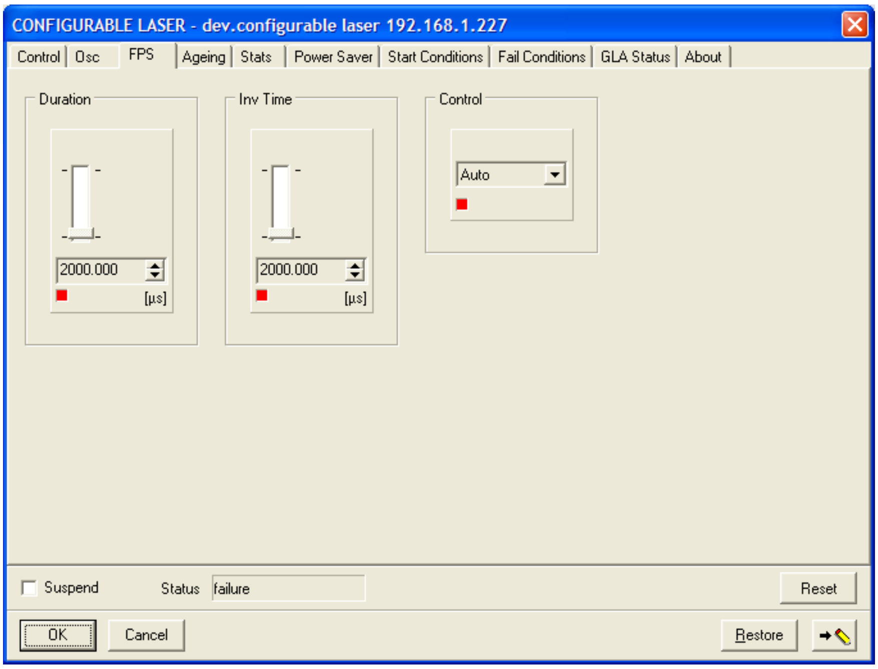
Settle settle time until the laser gets ready after control power was changed

Frequency sets the frequency the laser-internal Q-switch modulator is operated with. This setting defines the laser frequency, when *Gated Osc* is selected in the *Mode* list

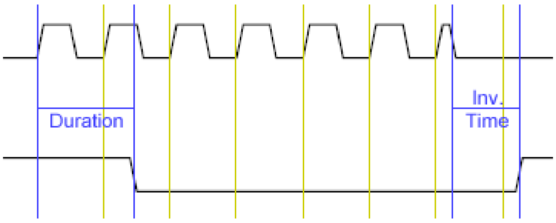
OnTime sets the oscillator ON-time

3.13.21. Parametrize - FPS

Q-switched lasers often have a first pulse in a string of pulses that contains a much greater energy level than those that follow. To prevent this, a FPS or **F**irst **P**ulse **S**uppression can be activated.



The following figure shows *Duration* and *Inversion Time*:



Duration sets the FPS duration

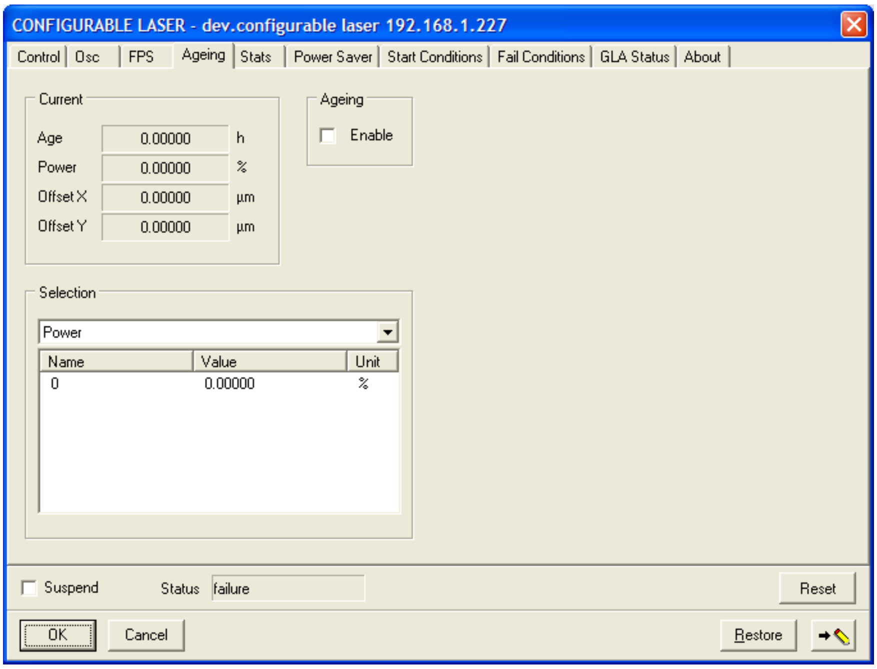
Inv Time sets the FPS inversion time

Control

List item	Description
Auto	the FPS is automatically switched on and off
Always on	the FPS is always on
Always off	the FPS is always off

3.13.22. Parametrize - Ageing

In this tab you can record data about the ageing of lamps or diodes and use this data to automatically compensate the power loss resulting from this ageing. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser.



Current current ageing values are displayed

Age shows the actual number of operating hours of the lamp or diode

Power shows the corrected pumping power

Offset X shows the corrected offset in X direction

Offset Y shows the corrected offset in Y direction

Ageing

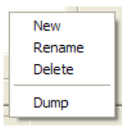
Enable if this check box is selected then the specified characteristics are used to compensate for power loss and offset

Selection

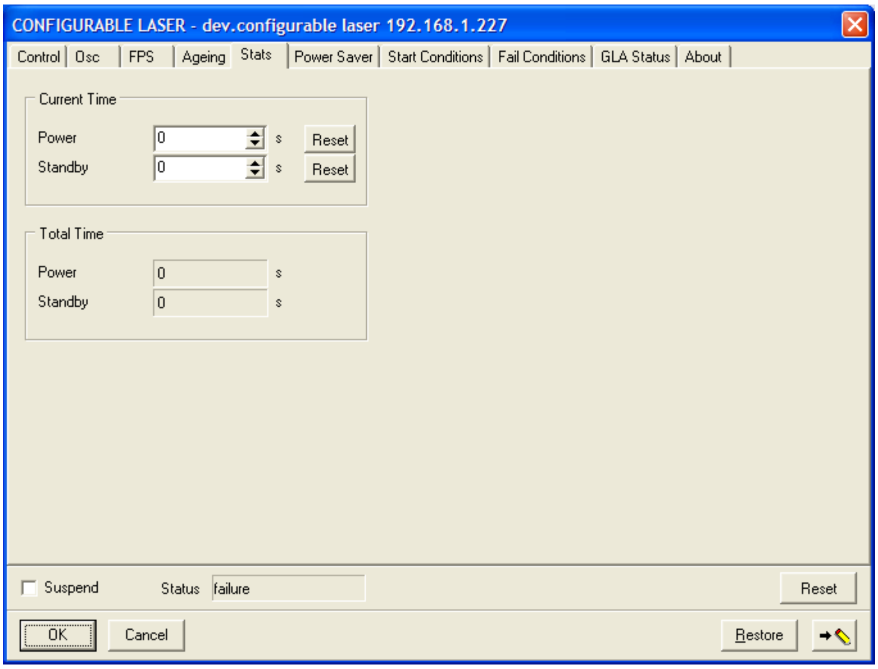
Selection dropdown Enter the values into the table beneath

List item	Description
Power	the pumping power is shown over the number of operating hours
Offset X	the offset in X direction is shown over the pumping power
Offset Y	the offset in Y direction is shown over the pumping power

Selection list the entries for Power, Offset X or Offset Y depending on what is currently selected in the *Selection dropdown* are displayed in this list. You can add *New* entries, *Rename* or *Delete* existing entries or *Dump* the parameters of an entry by right clicking on it and selecting an action from the popup menu. The entries are sorted by the value in the name column



3.13.23. Parametrize - Stats



Current Time

Power expired time in power on state since last reset

Reset (Power) Clicking this button resets *Power* to 0 after a prompt for confirmation. If the reset is caused by a Lamp change, you can enter an Automatic Service Database Entry in the next dialog (see 3.24 Automatic Service Database Entry)

Standby expired time in standby since last reset

Reset (Standby) Clicking this button resets *Standby* to 0 after a prompt for confirmation

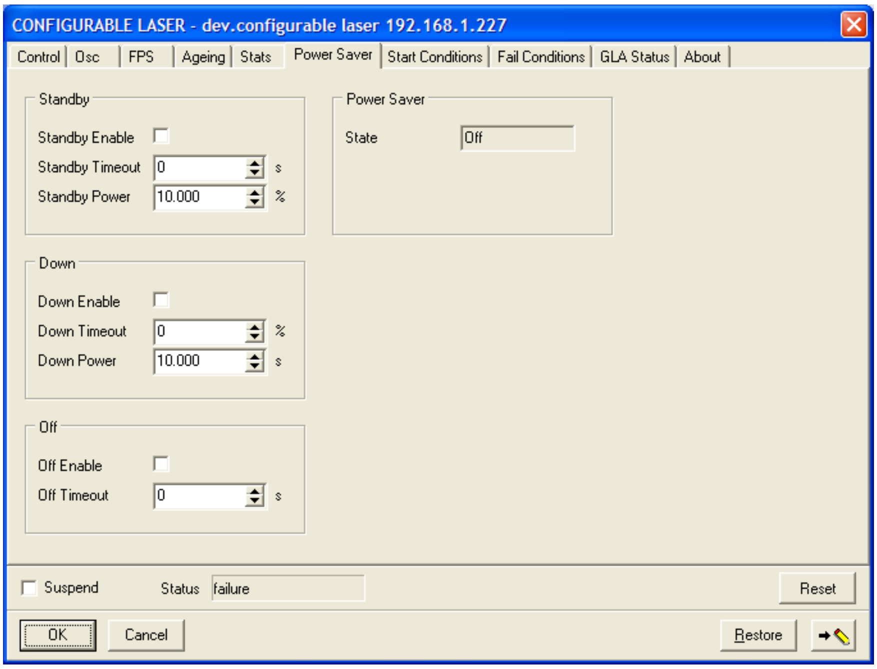
Total Time

Power total time in power on state

Standby total time in standby

3.13.24. Parametrize - Power Saver

This tab specifies the power saver abilities of the connected laser device. Full power saver sequence would be *Standby* → *Down* → *Off*.



Standby

Standby Enable if this check box is selected power state *Standby* is enabled

Standby Timeout *Standby* timeout until the laser goes to standbt in seconds

Standby Power laser power while the laser is in Standby

Down

Down Enable if this check box is selected power state *Down* is enabled

Down Timeout *Down* timeout until the laser goes down in seconds

Down Power laser power while the laser is down

Off

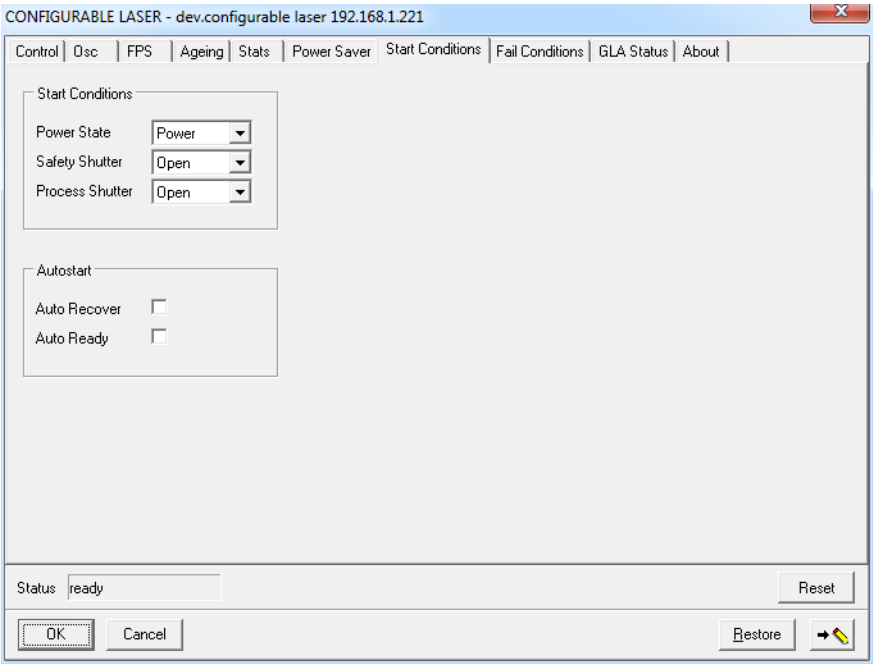
Off Enable if this check box is selected power state *Off* is enabled

Off Timeout *Off* timeout until the laser is switched off in seconds

Power Saver

State displays the current power saver state

3.13.25. Parametrize - Start Conditions



Start Conditions settings for the Start Conditions

Power State settings for the Power State

Power if the power state is *Power* then the system starts

Ignored the power state is ignored

Safety Shutter settings for the safety shutter

Open if the safety shutter is *Open* then the system starts

Ignored the safety shutter is ignored

Process Shutter settings for the process shutter

Open if the process shutter is *Open* then the system starts

Ignored the process shutter is ignored

Autostart automatic re-start conditions

WARNING

Visible and invisible laser radiation

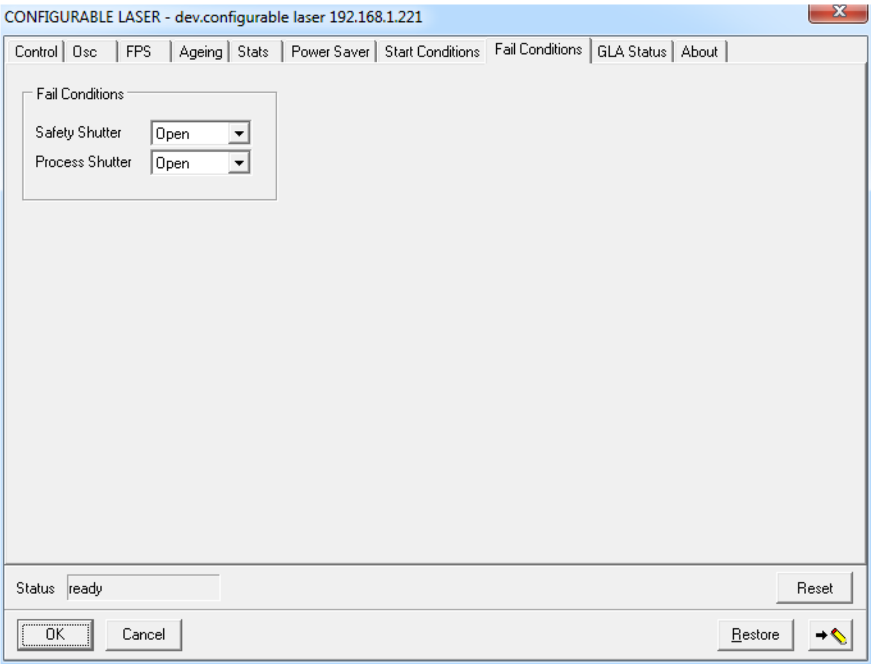
Serious injury or property damage may occur when processing is automatically started.

You are allowed to use *Auto Recover* and *Auto Ready* only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

Auto Recover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries to fix the error. As result the system may automatically continue with processing

Auto Ready if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state Standby then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically

3.13.26. Parametrize - Fail Conditions



Fail Conditions

Safety Shutter

Ignored condition is ignored

Open if the saftey shutter is open, processing is aborted

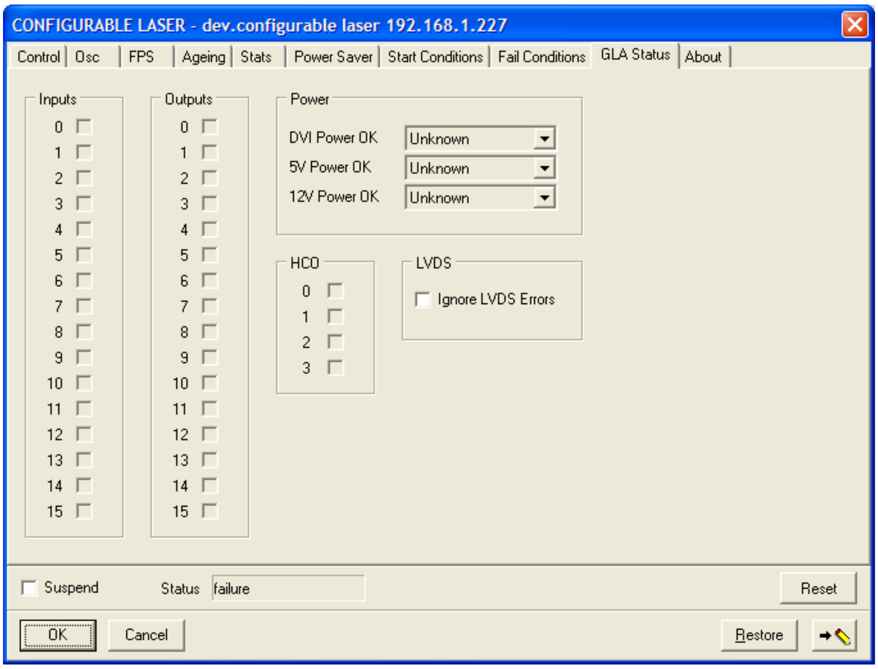
Process Shutter

Ignored condition is ignored

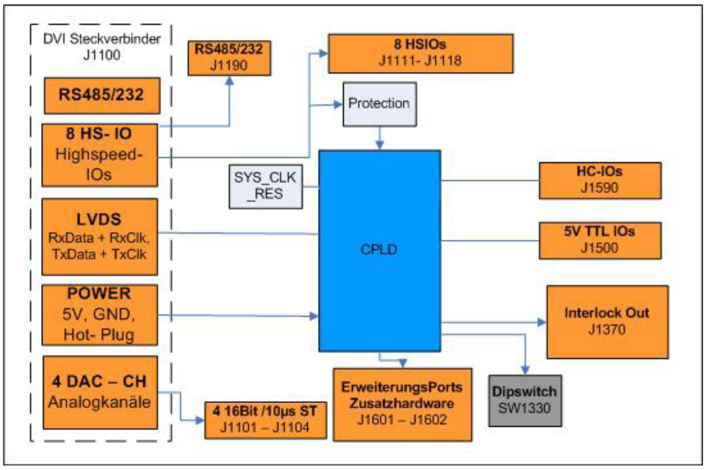
Open if the process shutter is open, processing is aborted

3.13.27. Parametrize - GLA Status

This tab shows the status of the ARGES GLA (ARGES Generic Laser Adapter) IOs and voltages.



GLA functional groups:



Inputs status of the 5V TTL Inputs

0-15 if one of these check boxes is set, then an input signal is high

Outputs status of the 5V TTL Outputs

0-15 if one of these check boxes is set, then an output signal is high

Power

DVI Power OK

List item	Description
Unknown	status of the DVI power is unknown
No	DVI power is not OK
Yes	DVI power is OK

5V Power OK

List item	Description
Unknown	status of the 5V power is unknown
No	5V power is not OK
Yes	5V power is OK

12V Power OK

List item	Description
Unknown	status of the 12V power is unknown
No	12V power is not OK
Yes	12V power is OK

HCO status of the HC-IOs

0-3 if one of these check boxes is selected, then a high current input of the HC-IOs is high

LVDS low-voltage differential signaling, or LVDS, is an electrical signaling system that can run at very high speeds over twisted-pair copper cables

Ignore LVDS Errors if this check box is selected LVDS errors are ignored to be able to keep the driver working even if a signal error occurs. This switch can be used for test purposes

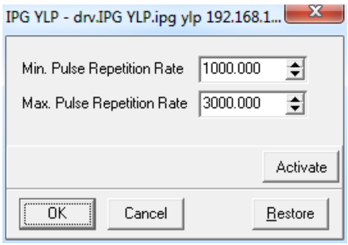
3.14. ipg ylp - Pulsed Ytterbium Fiber Laser by IPG

for controller	ASC
device type	laser
driver version	1.10.2.19

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.14.1. Configure



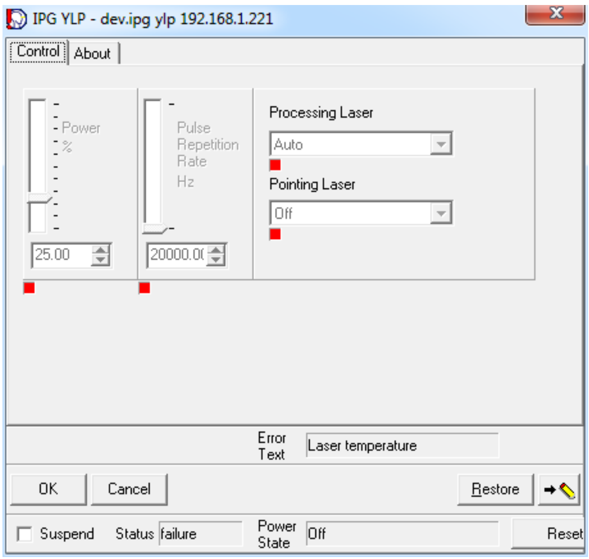
Min. Pulse Repetition Rate sets the lower limit of the pulse repetition rate

Max. Pulse Repetition Rate sets the upper limit of the pulse repetition rate

3.14.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.14.3. Parametrize - Control



Power sets the pumping power. This is a relative value and not standardized to the optical output power. Hence 100% are not the same as maximal optical output power. For example optical laser activity may occur not until the pumping power reaches 35% and the maximal optical output power may be already reached at a pumping power of 70%. Set the desired optical output power at the power supply according to the characteristic diagram which accompanies your laser. Pay attention to the lamp current

Pulse Repetition Rate sets the pulse repetition rate

Processing Laser selects how the processing laser is controlled

Always off the processing laser beam will be always off

Always on the processing laser beam will be always on

Auto the processing laser beam will be automatically switched on and off by InScript

Pointing Laser **Off** switches the pointing laser off

On switches the pointing laser on

Error Text shows error text

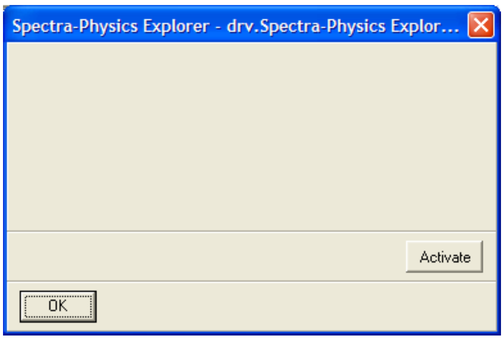
3.15. Spectra-Physics Explorer

for controller	ASC
device type	laser
driver version	1.10.2.19

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.15.1. Configure

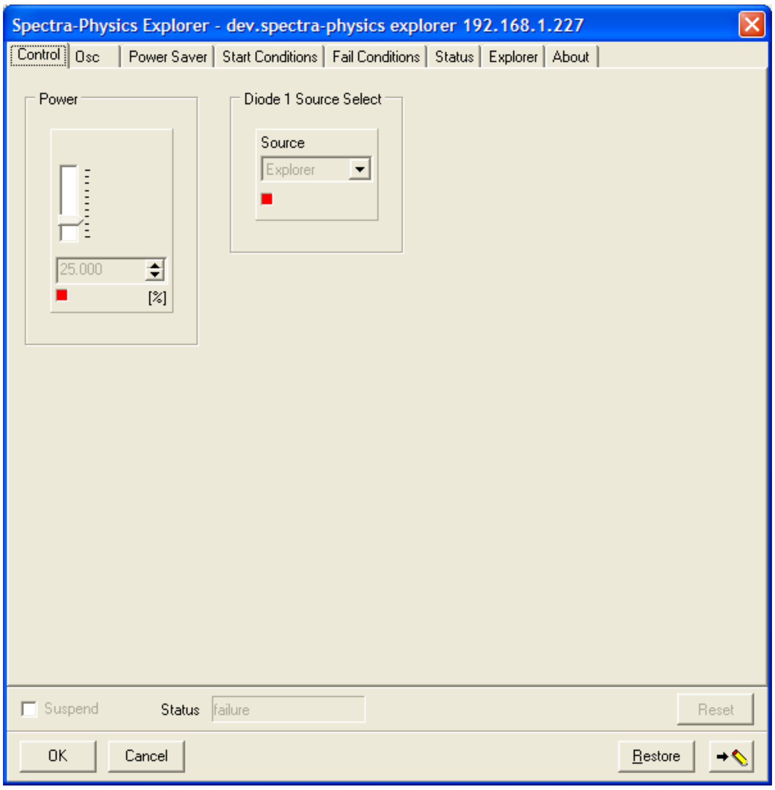


There are no specific settings to configure the Spectra-Physics Explorer laser.

3.15.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.15.3. Parametrize - Control



Power laser power in %

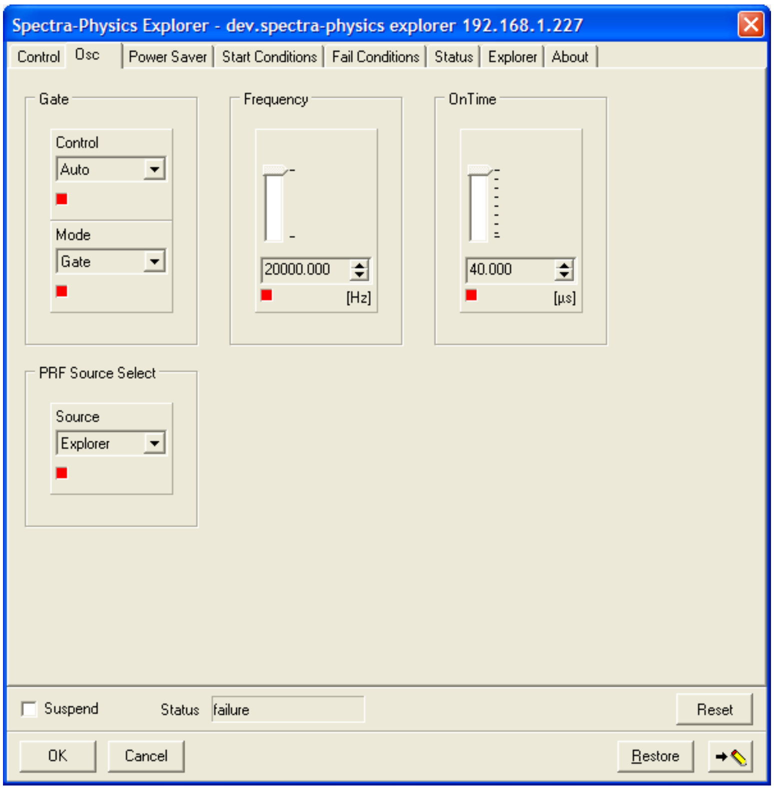
Diode 1 Source Select selects the source for Diode 1's power

Source

Explorer the source for the power is provided by the laser

ASC the source for the power is provided by the ASC controller

3.15.4. Parametrize - Osc



In this tab oscillator settings are done.

Gate settings for the Gate control

Control Gate control

Auto oscillator is automatically switched on/off

Always off oscillator is always off

Always on oscillator is always on

Mode Mode control

Gate single on/off signal is generated

Gated Osc pulses are generated with the parameters *Frequency* and *On-Time* to the right

PRF Source select settings for pulse repetition rate

Source choose the source for the pulse repetition rate

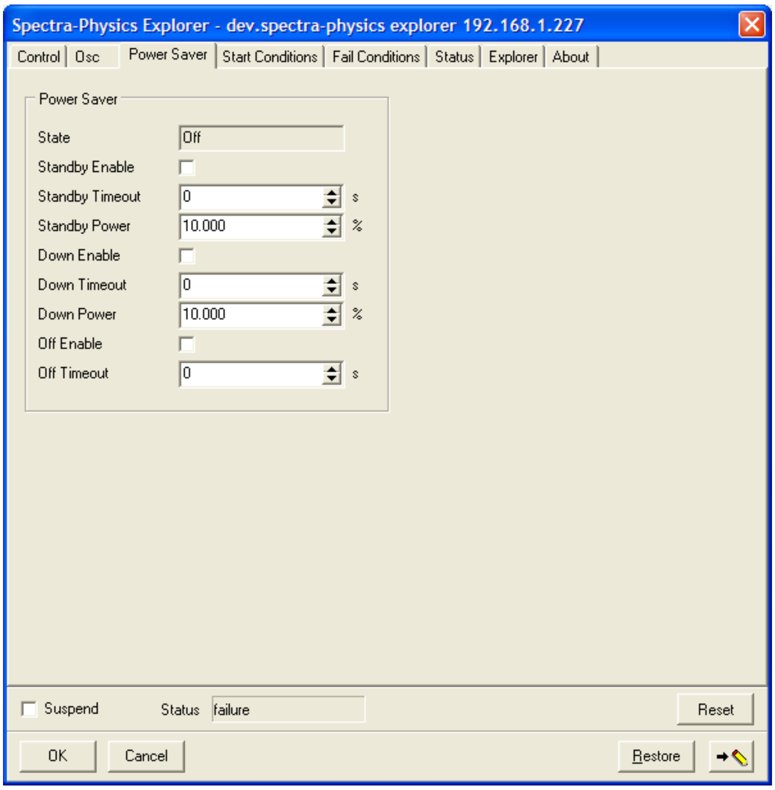
Explorer the pulse repetition rate is provided by the laser

ASC the pulse repetition rate is provided by the ASC controller

Frequency sets the frequency the laser internal Q-switch modulator is operated with. This setting defines the laser frequency, when *Gated Osc* is selected in the *Mode* list

On-Time sets the oscillator ON-time, when *Gated Osc* is selected in the *Mode* list

3.15.5. Parametrize - Power Saver



Power Saver settings for the Power Saver

State current Power Saver State

Standby Enable if this check box is selected then switching from state On to Standby is enabled. Standby mode lowers the current of the diode laser below the threshold for laser output but keeps the diode laser in a state of readiness. All other Explorer components are maintained at operating temperature.

Standby Timeout time to wait until the Laser is switched to Standby (if it is not used)

Standby Power power of the Laser in mode Standby

Down Enable if this check box is selected then switching from state Standby to Down is enabled (this functionality will be implemented later)

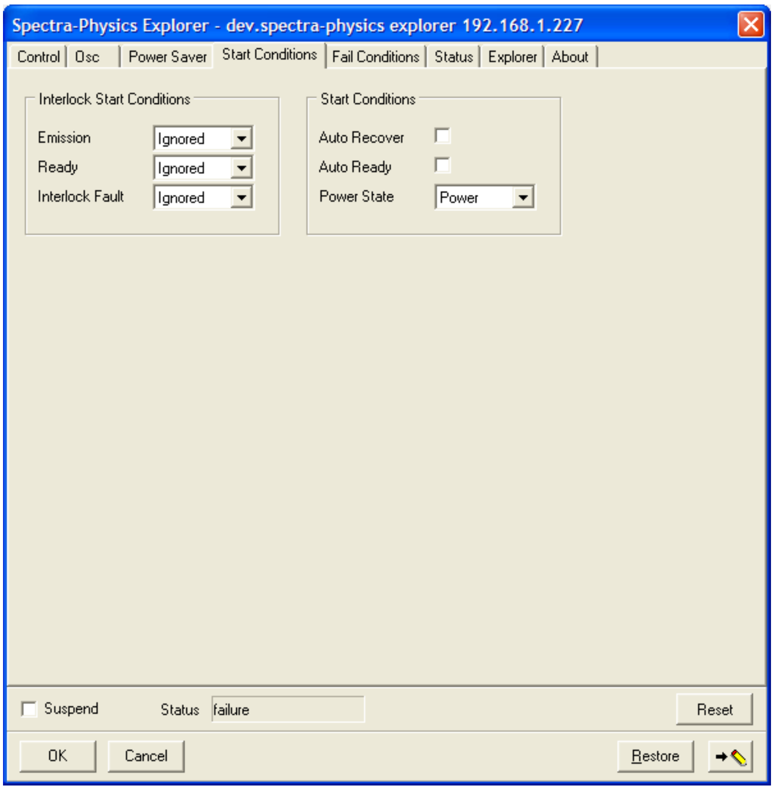
Down Timeout time to wait until the Laser is switched to Down (if it is not used) (this functionality will be implemented later)

Down Power power of the Laser in mode Down (this functionality will be implemented later)

Off Enable if this check box is selected then switching from state Down to Off is enabled. Off is equivalent to the laser's "Sleep" mode. It turns off the Q-switch, the temperature control of the diode and crystals, and the diode laser.

Off Timeout time to wait until the Laser is switched to Off (if it is not used)

3.15.6. Parametrize - Start Conditions



Interlock Start Conditions settings for the Interlock Start Conditions

Emission

Ignored condition is ignored

OK if the state applies, *Job Start* is enabled (∼ Interlock A)

Ready

Ignored condition is ignored

OK if the state applies, *Job Start* is enabled (∼ Interlock B)

Interlock Fault

Ignored condition is ignored

OK the state applies, *Job Start* is enabled (∼ Interlock C)

Start Conditions settings for the Start Conditions

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to use *Auto Recover* and *Auto Ready* only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

Auto Recover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries to fix the error. As result the system may automatically continue with processing

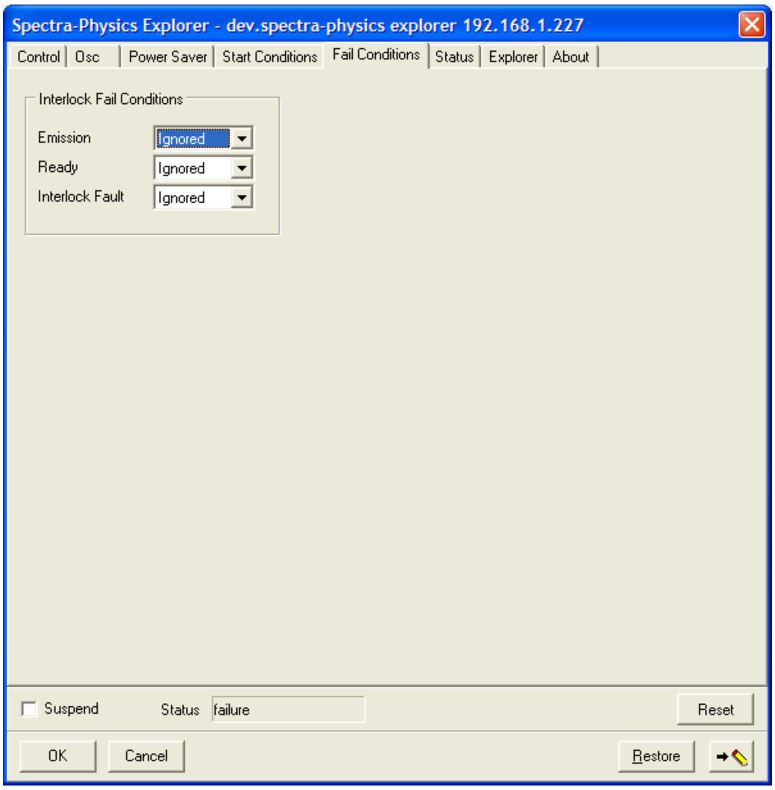
Auto Ready if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state Standby then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically

Power State settings for the Power State

Power if the power state is Power then the system starts

Ignored the power state is ignored

3.15.7. Parametrize - Fail Conditions



Interlock Fail Conditions settings for the Interlock Fail Conditions

Emission

Ignored condition is ignored

Failure if the state applies, processing is aborted

Ready

Ignored condition is ignored

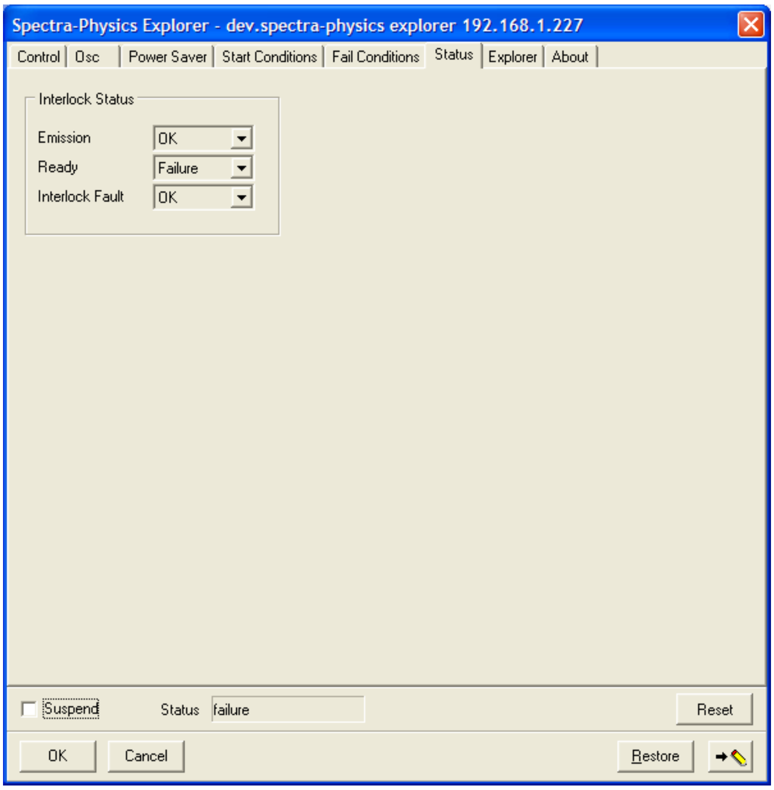
Failure if the state applies, processing is aborted

Interlock Fault

Ignored condition is ignored

Failure if the state applies, processing is aborted

3.15.8. Parametrize - Status



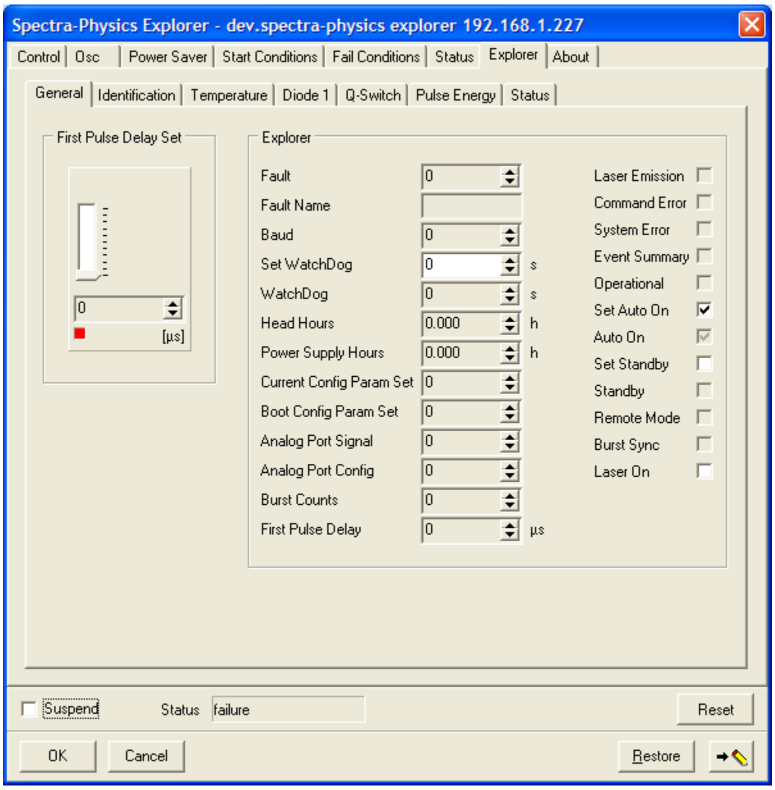
Interlock Status shows the Interlock Status

Emission current status of interlock fail condition *Emission* (possible are "OK", "Failure", "Undefined" and "Unused")

Ready current status of interlock fail condition *Ready* (possible are "OK", "Failure", "Undefined" and "Unused")

Interlock Fault current status of interlock fail condition *Interlock Fault* (possible are "OK", "Failure", "Undefined" and "Unused")

3.15.9. Parametrize - Explorer/General



Explorer

Fault fault code. See Laser User's Manual for more information

Fault Name string counterpart of the Fault Code

Baud current communication speed (baud rate)

Set WatchDog sets the software watchdog alert time in seconds (0 - 110; 0 = watchdog timer off).

WatchDog current watchdog timer for RS-232 communication in seconds. If the Explorer has not received commands within the specified time, the laser will turn off

Head Hours laser head hours of operation in h

Power Supply Hours power supply hours in h. Incremented every 6 minutes that power is supplied

Current Config Param Set current config parameter set user set #n, n=1-4

Boot Config Param Set sets which parameter set is to activate the next time the system is booted (user set #n, n=1-4)

Analog Port Signal status of a function available through the analog interface. See Laser User's Manual for more information

Analog Port Config polarity of the analog interface lines (0 - 255). See Laser User's Manual for more information

Burst Counts number of Burst Counts (0 - 4000, 0 = exit burst mode)

First Pulse Delay FPS delay time in ms (0 - 2000, 0 = exit FPS mode)

Laser Emission status Byte bit0: Laser emission

Command Error status Byte bit2: Command error

System Error status Byte bit3: System error

Event Summary status Byte bit5: Event summary

Operational status Byte bit7: Operational

Set Auto On sets Auto-On mode for remote control if checked

Auto On current Auto-On mode

Set Standby sets Standby mode if checked

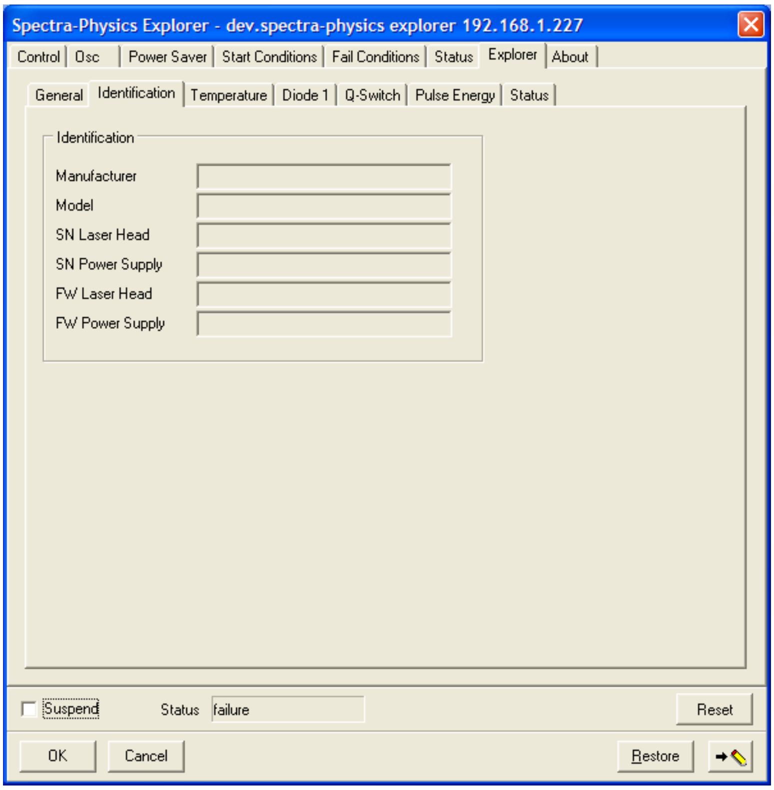
Standby current Standby mode

Remote Mode sets Remote if checked / Local mode if unchecked

Burst Sync is trigger output extended for burst duration

Laser On is laser ON or OFF

3.15.10. Parametrize - Explorer/Identification



Identification

Manufacturer name of the Manufacturer in the product identification string

Model name of the Model in the product identification string

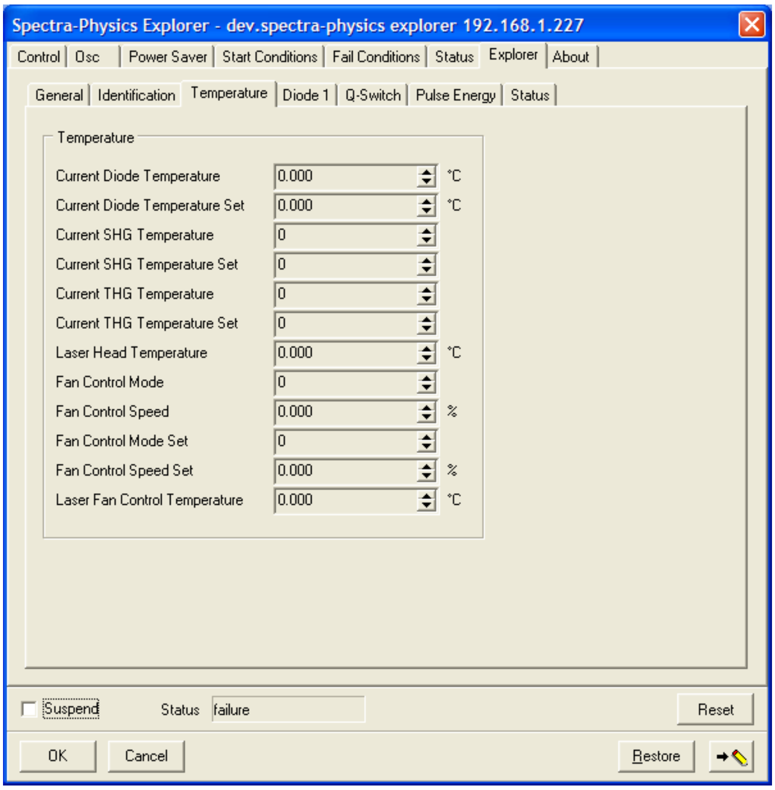
SN Laser Head serial number of the Laser Head in the product identification string

SN Power Supply serial number of the Power Supply in the product identification string

FW Laser Head firmware of the Laser Head in the product identification string

FW Power Supply firmware of the Power Supply in the product identification string

3.15.11. Parametrize - Explorer/Temperature



Temperature

Current Diode Temperature current temperature of the diode laser in °C

Current Diode Temperature Set temperature setting of the diode laser in °C

Current SHG Temperature current temperature of the SHG Crystal in counts (100 4000)

Current SHG Temperature Set last commanded temperature for the SHG Crystal in counts

Current THG Temperature current temperature of the THG Crystal in counts

Current THG Temperature Set last commanded temperature for the THG Crystal in counts

Laser Head Temperature temperature of the Laser Head in °C

Fan Control Mode current Fan control mode

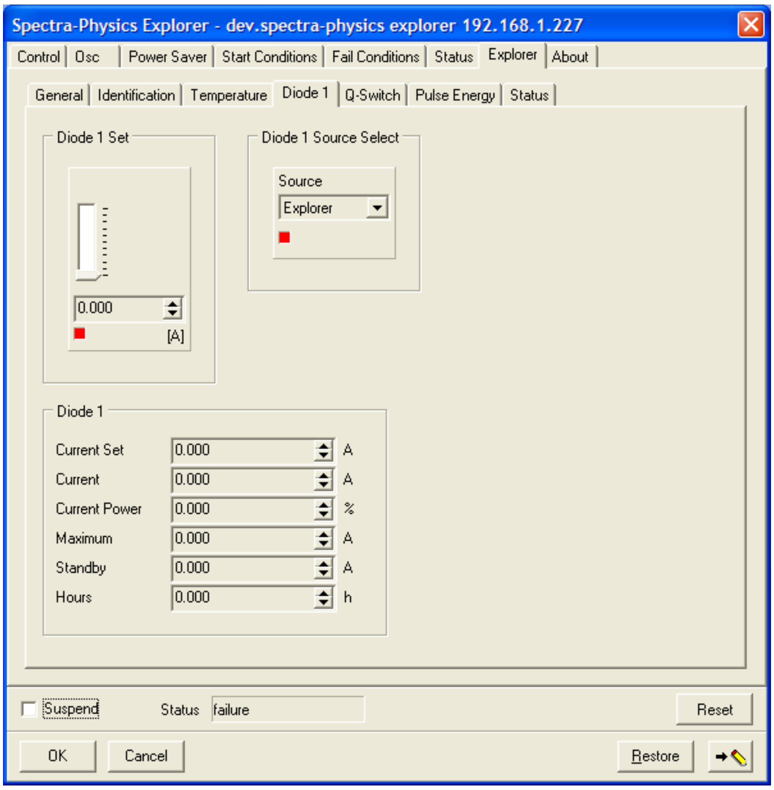
Fan Control Speed percentage of the fan maximum voltage (13V) in %

Fan Control Mode Set sets Fan control mode (0=drive mode (percentage of the voltage), 1=Control mode (speed dependent on laser head temperature)) (this functionality will be implemented later)

Fan Control Speed Set set the fan speed in % of the fan maximum voltage (13V) (this functionality will be implemented later)

Laser Fan Control Temperature laser fan control temperature in °C (this functionality will be implemented later)

3.15.12. Parametrize - Explorer/Diode 1



Diode 1 Set sets the diode laser current in A

Diode 1 Source Select sets the source of the Diode 1 current

Explorer the diode 1 current is provided by the laser

ASC the diode 1 current is provided by the ASC controller

Diode 1 shows parameters of Diode 1

Current Set last commanded diode laser current in A

Current actual diode laser current in A

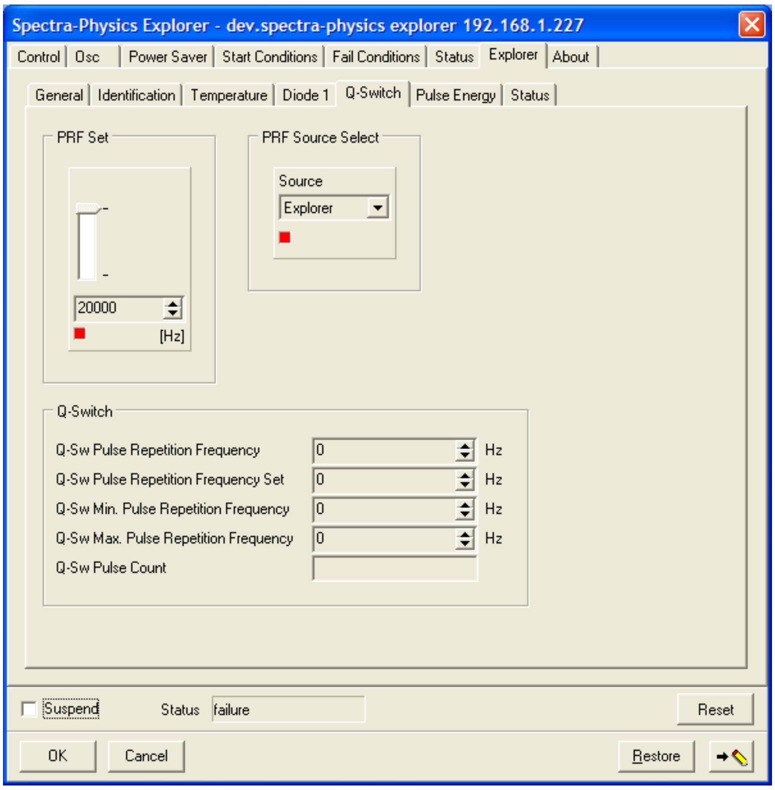
Current Power actual diode laser current in % of the diode current limit

Maximum diode laser current limit in A

Standby diode laser standby current in A

Hours diode laser operating hours in h

3.15.13. Parametrize - Explorer/Q-Switch



PRF Set sets the Pulse Repetition Rate in Hz (0 = change to an external Qswitch trigger source; no emission will occur until a TTL signal is provided on pin 21 to trigger the laser)

PRF Source Select

Explorer the pulse repetition rate is provided by the laser

ASC the pulse repetition rate is provided by the ASC controller

Q-Switch

Q-Sw Pulse Repetition Frequency current value of the PRF in Hz

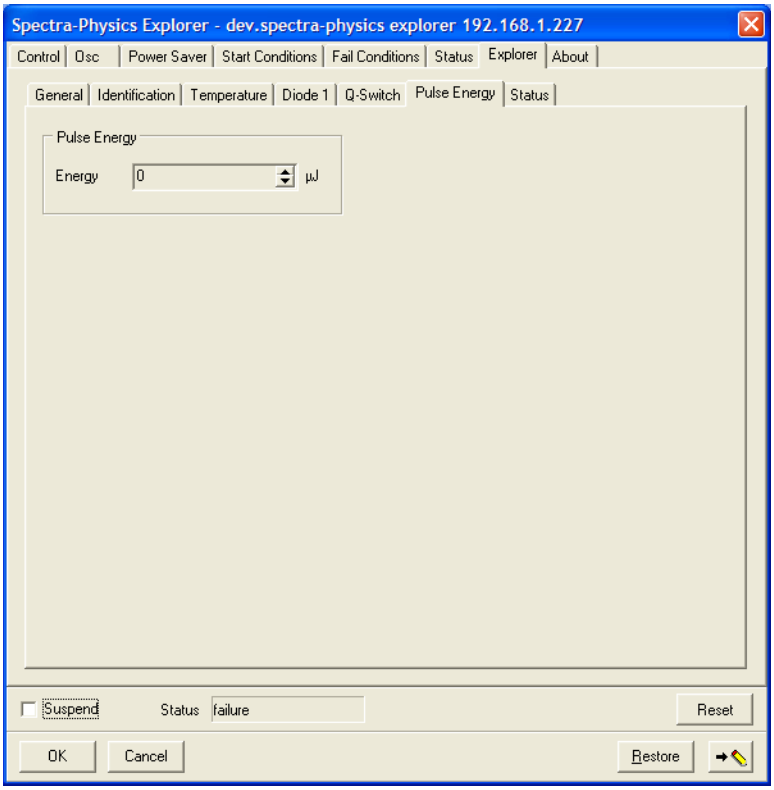
Q-Sw Pulse Repetition Frequency Set last commanded value for the PRF in Hz

Q-Sw Min. Pulse Repetition Frequency minimum pulse repetition frequency in Hz

Q-Sw Max. Pulse Repetition Frequency maximum pulse repetition frequency in Hz

Q-Sw Pulse Count pulse count

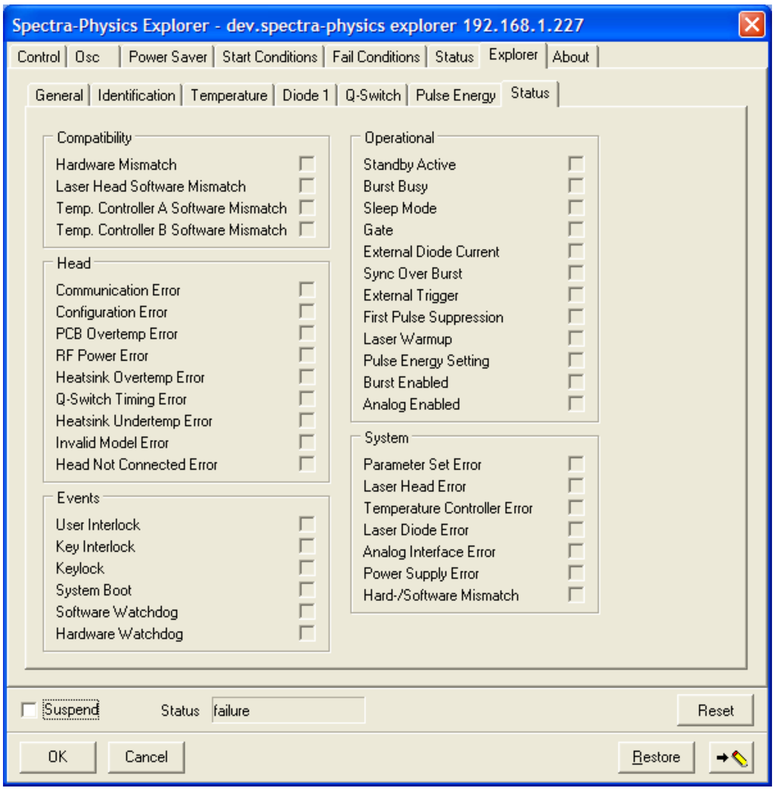
3.15.14. Parametrize - Explorer/Pulse Energy



Pulse Energy

Energy actual pulse energy in μJ

3.15.15. Parametrize - Explorer/Status



Compatibility

Hardware Mismatch "COMPATIBILITY" Register bit0: PCB versions of power supply and laser head do not match

Laser Head Software Mismatch "COMPATIBILITY" Register bit2: power supply software does not match the laser head software version

Temp. Controller A SW Mismatch "COMPATIBILITY" Register bit3: power supply software does not match the software version of the temperature controller A

Temp. Controller B SW Mismatch "COMPATIBILITY" Register bit4: power supply software does not match the software version of the temperature controller B

Head

Communication error "HEAD" Register bit0: an error occurred while communicating with the laser head

Configuration error "HEAD" Register bit1: an error occurred while retrieving or updating the configuration parameters of the laser head

PCB Overtemp Error "HEAD" Register bit2: maximum printed-circuit board temperature was exceeded (laser off)

RF Power Error "HEAD" Register bit3: Q-switch does not work properly

Heatsink Overtemp Error “HEAD” Register bit4: maximum heatsink temperature was exceeded (laser off)

Q-Switch Timing Error “HEAD” Register bit5: invalid Q-switch timing parameters (not lasing)

Heatsink Undertemp Error “HEAD” Register bit6: heatsink temperature is below the minimum of 18°C (typical); the laser system remains fully operational

Invalid Model Error “HEAD” Register bit7: internal model setting does not match the installed software

Head Not Connected Error “HEAD” Register bit8: no laser head detected by the software

Events

User Interlock System Events Condition Register bit0: user interlock is activated

Key Interlock System Events Condition Register bit1: keyswitch is OFF

Keylock System Events Condition Register bit2: keyswitch reset is necessary (this condition can only occur if Auto-On mode is disabled)

System Boot System Events Condition Register bit3: Notification: the laser system has been booted

Software Watchdog System Events Condition Register bit4: software watchdog for communication between the laser system and the host computer is tripped

Hardware Watchdog System Events Condition Register bit5: system has rebooted because the hardware watchdog was activated

Operational

Standby Active System Operational Condition Register bit0: Standby mode is active (by software/external analog signal)

Burst Busy System Operational Condition Register bit1: Burst mode is activated and a burst is being carried out

Sleep Mode System Operational Condition Register bit3: Sleep mode is activated (the Q-switch and TECs are switched off). All serial commands besides status queries will be rejected.

Gate System Operational Condition Register bit5: Gate signal is being applied to the analog port

External Diode Current System Operational Condition Register bit6: external diode current control is activated (pin 18 of the analog port)

Sync Over Burst System Operational Condition Register bit7: SYNC pulse duration is extended to include the whole burst sequence

External Trigger System Operational Condition Register bit10: external triggering mode is activated

First Pulse Suppression System Operational Condition Register bit11: FPS mode is activated

Laser Warmup System Operational Condition Register bit12: laser system is warming up

Pulse Energy Setting System Operational Condition Register bit13: automatic pulse energy adjustment is taking place (typical duration is 2 - 5 seconds)

Burst Enabled System Operational Condition Register bit14: burst mode is enabled, i.e., burst counts is set to <n> counts

Analog Enabled System Operational Condition Register bit15: Explorer laser system is in analog mode

System

Parameter Set Error System Condition Register bit0: a problem with the configuration set(s) occurred (communication error, invalid checksums)

Laser Head Error System Condition Register bit1: a problem with the laser head occurred (communication error, temperature, etc.)

Temperature Controller Error System Condition Register bit2: temperature controller failure (crystals and/or diode laser)

Laser Diode Error System Condition Register bit3: a problem with the diode laser occurred (e.g., cable, current control)

Analog Interface Error System Condition Register bit4: a problem with the analog port pins occurred

Power Supply Error System Condition Register bit5: a problem with the power supply occurred

Hard-/Software Mismatch System Condition Register bit14: updated software does not match the hardware found

3.16. sl4xx and sl8xx

for controller	NCC → legacy device: not included in the standard NCC firmware
device type	laser
driver version	1.0

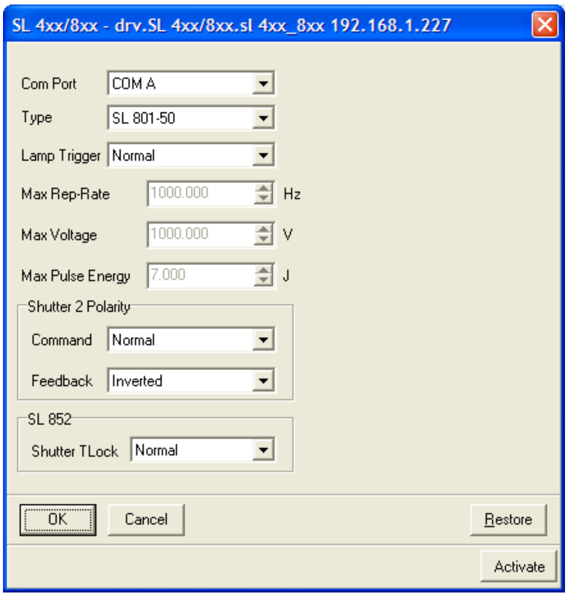
The lasers of series SL4xx and SL8xx are flash lamp pumped pulse lasers Q-switched by a pockels cell. The laser types cover a range of 50 to 100Hz in repetition rate and emit laser radiation with pulse lengths from 6 to 8ns and a wavelength of 1064nm. As an option the frequency doubled wavelength of 532nm can be emitted.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.16.1. Configure

Configure the device driver here to enable communication with your laser.



Port selects the serial interface on the controller board for communication

COM A, COM B available serial interfaces

Type selects the laser type

List item	Description
SL 801-50, SL 801-100, SL 401-50, SL 454-100, SL 852-100, SL 852-100 (no dump), SL 650	laser types supported by the device driver

Lamp Trigger selects at which signal edge the pump lamp is triggered

Normal rising edge

Inverted falling edge

Max Rep Rate sets the maximal repetition rate

Max Voltage sets the maximal voltage

Max Pulse Energy sets the maximal pulse energy

Shutter 2 Polarity

Command sets the command signal polarity to open the shutter. Security relevant shutters are closed when without voltage

Normal Signal high = shutter open

Inverted Signal low = shutter open

Feedback sets the shutter feedback signal polarity

Normal Signal high = shutter open

Inverted Signal low = shutter open

Ignored the signal will be ignored

Inverted & Ignored Signal low = shutter open & the signal will be ignored

SL 852 Shutter TLock selects at laser type SL 852 whether the internal shutter will automatically opened after laser parameters were changed

Normal the internal shutter automatically opens after time *Shutter TLock* which can be set in the *Power Saver* tab

Disabled the shutter stays closed and has to be opened manually. Before continuing work, make sure the laser stabilizes thermally

3.16.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

Power Up switches to the next higher Power State

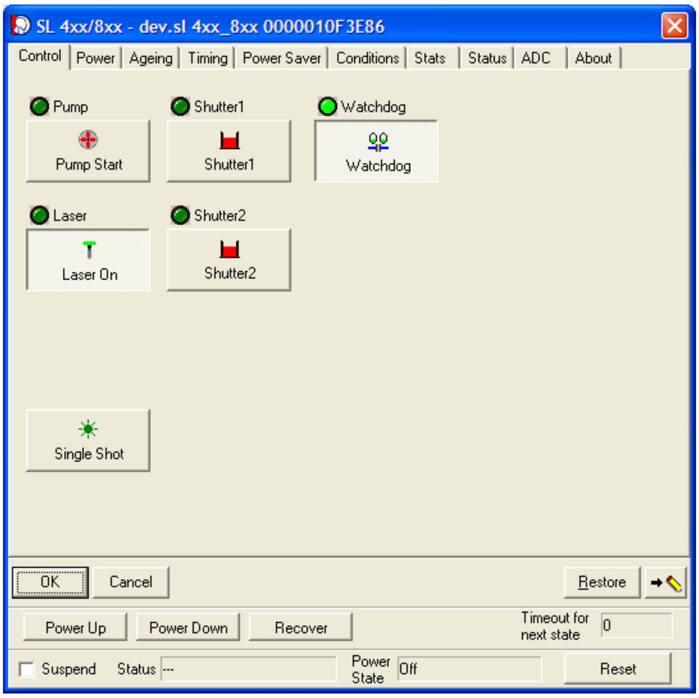
Power Down switches to the next lower Power State

Recover tries to leave the "Failure" state into the "not Ready" state

Timeout for next state shows the time remaining until the laser switches to the next Power State

3.16.3. Parametrize - Control

This tab unites the main controls.



Pump Start switches the internal water cooling pump on and off. If the LED is on then the pump is on

Shutter1 opens and closes the internal laser shutter. If the LED is on then the internal shutter is open

Watchdog enables and disables the monitoring of communication with the controlling computer. If the watchdog detects an interruption then the laser will be automatically switch off. If the LED is on then the watchdog is on

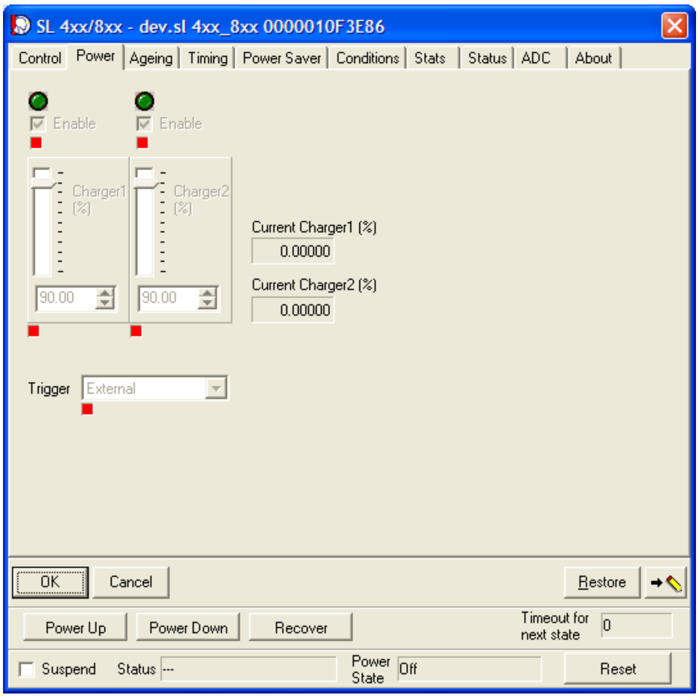
Laser On switches the laser power components on and off. If the LED is on then the power components are on

Shutter2 opens and closes the process shutter. If the LED is on then the process shutter is open

Single Shot triggers a single laser pulse. This function is useful when adjusting or servicing the laser. Not all laser types support this function

3.16.4. Parametrize - Power

The high power versions of the laser series SL4xx/8xx contain an oscillator and an amplifier. Thus they posses 2 charging units which can be set separately in this tab.



Enable if this check box is selected then the respective charger is activated

Charger1 (%), Charger2 (%) sets the charging voltage of charger 1 and charger 2

Current Charger1 (%), Current Charger2 (%) shows the nominal values taking in account the correcting values given in the *Ageing* tab

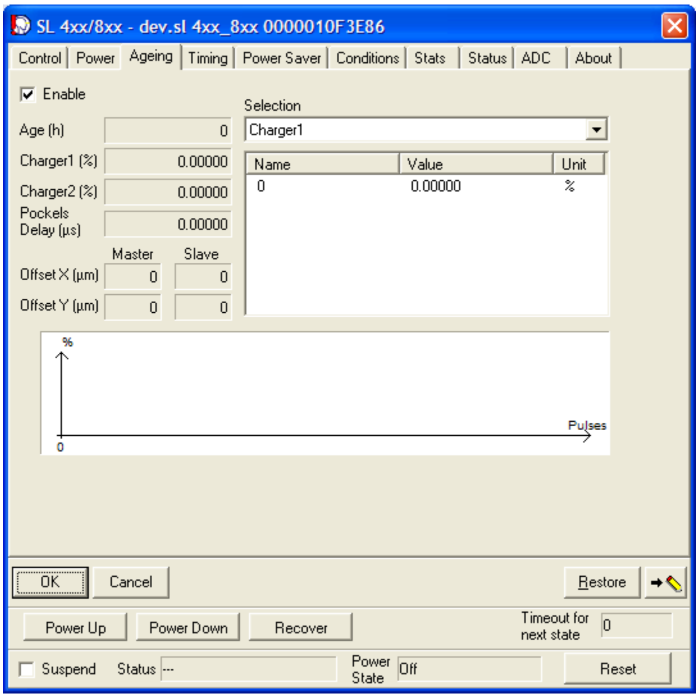
Trigger selects the source of the trigger pulses

External a **laser** internal trigger generator is used

Internal a **laser** external trigger generator is used. The trigger pulses are generated internally on the controller board

3.16.5. Parametrize - Ageing

You can record data about the ageing of lamps in this tab and use this data to automatically compensate the power loss resulting from this ageing. The Pockels delay can also be compensated depending on the number of pulses. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser. As these laser are often used with 2 scan heads, the offset can be compensated separately for the master and the slave scan head.



Enable if this check box is selected then the specified characteristic diagrams are used to compensate for power loss and offset

Age shows the actual number of operating hours

Charger1 shows the corrected charging voltage 1

Charger2 shows the corrected charging voltage 1

Pockels Delay shows the corrected Pockels delay

Offset X, Offset Y - Master, Slave shows the corrected offset for master and slave scan head

Selection selects the parameter shown in the diagram below. Enter the values into the table below. Add rows using the context menu.

Charger1 the charging voltage 1 is shown over the number of pulses as a characteristic diagram

Charger2 the charging voltage 2 is shown over the number of pulses as a characteristic diagram

Voltage the voltage is shown over the number of pulses as a characteristic diagram

PulseEnergy the pulse energy is shown over the number of pulses as a characteristic diagram

PockelsDelay The Pockels delay is shown over the number of pulses as a characteristic diagram

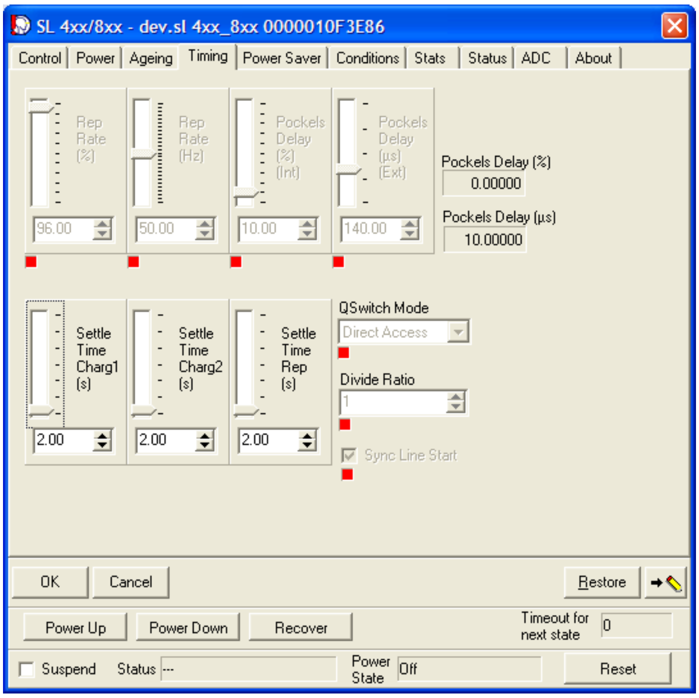
OffsetX the offset in X direction for the master scan head is shown over the pumping power as a characteristic diagram

OffsetY the offset in Y direction for the master scan head is shown over the pumping power as a characteristic diagram

OffsetX_Slave the offset in X direction for the slave scan head is shown over the pumping power as a characteristic diagram

OffsetY_Slave the offset in Y direction for the slave scan head is shown over the pumping power as a characteristic diagram

3.16.6. Parametrize - Timing



Rep Rate (%) sets the repetition rate of the laser internal frequency generator. *Internal* has to be selected in the *Trigger* list in the *Power* tab

Rep Rate (Hz) sets the repetition rate. *Internal* has to be selected in the *Trigger* list in the *Power* tab. The controller board provides the timing for pulse generation. The pulses can be positioned more exactly on the target

Pockels Delay Int (%) sets the pockels delay relative to ignition of the pump lamps. *Internal* has to be selected in the *Trigger* list in the *Power* tab

Pockels Delay Ext (μs) sets the pockels delay relative to ignition of the pump lamps. *External* has to be selected in the *Trigger* list in the *Power* tab

Pockels Delay (%) shows the pockels delay relative to ignition of the pump lamps. *Internal* has to be selected in the *Trigger* list in the *Power* tab

Pockels Delay (μs) shows the pockels delay relative to ignition of the pump lamps. *External* has to be selected in the *Trigger* list in the *Power* tab

Settle Time Charg1 (s) sets the settle time waited after the nominal value for charging voltage 1 has adjusted

Settle Time Charg2 (s) sets the settle time waited after the nominal value for charging voltage 2 has adjusted

Settle Time Rep (s) sets the settle time waited after the nominal value for repetition rate has adjusted

Q-Switch Mode selects the Q-switch mode

Internal the laser automatically switches on and off the Q-switch

Off the Q-switch stays off, i.e. is optically transparent

Direct Access the controller board automatically switches on and off the Q-switch

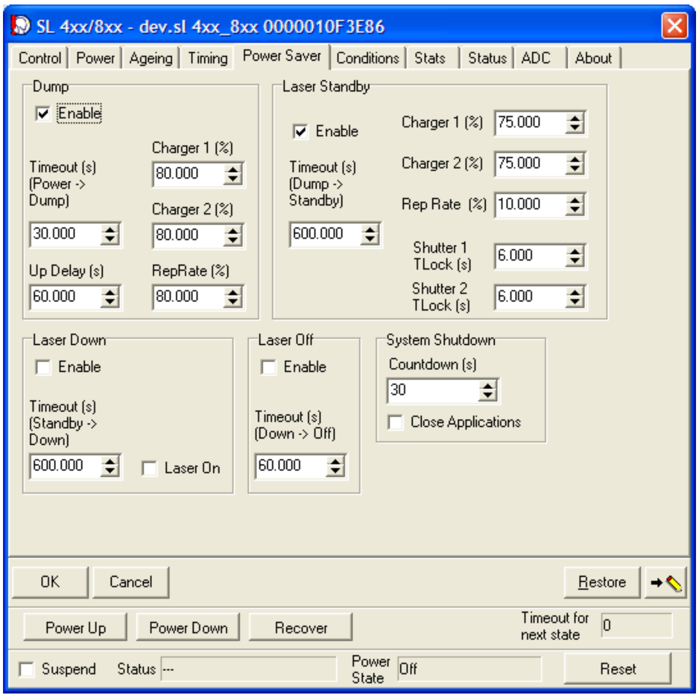
On the Q-switch stays on

Divide Ratio sets the divide ratio the repetition rate is divided by. To hold the laser thermally stable the pump lamp frequency is hold constant and the pockels cell switched each n^{th} pulse

Sync Line Start if this check box is selected then each first pulse is set to the beginning of a line. We recommend to select the check box, when the repetition rate is very low and the pulses on a line have to be arranged reproducible

3.16.7. Parametrize - Power Saver

If the laser is not in use over a time then the device driver can automatically switch the laser to standby state or switch it off completely to spare the lamps.



Dump if the laser beam is not used for short periods only then it is desired to hold stable the thermal balance in the laser and thus beam quality and pointing stability. Normally the laser runs with unchanged parameters in the Dump Power State whereas the laser beam is directed by a mirror to an absorber.

Enable if this check box is selected then the Dump function is activated

Timeout (s) (Power → Dump) sets the time where after the laser switches to Dump state if not used

Up Delay (s) sets the time where after the laser switches from Dump to Power state when requested

Charger 1 (%) sets the charging voltage 1 while in Dump state

Charger 2 (%) sets the charging voltage 2 while in Dump state

Rep Rate (%) sets the repetition rate while in Dump state

Laser Standby

Enable if this check box is selected then the *Standby* function is activated

Timeout (s) (Dump → Standby) sets the time where after the laser switches to Standby state if not used and already in *Dump* state

Charger 1 (%) sets the charging voltage 1 while in *Standby* state

Charger 2 (%) sets the charging voltage 2 while in *Standby* state

Rep Rate (Hz) sets the repetition rate while in *Standby* state

Shutter 1 TLock (s) sets the time to have pass before shutter 1 can be opened, when the laser switches from *Standby* state to *Power* state

Shutter 2 TLock (s) sets the time to have pass before shutter 2 can be opened, when the laser switches from *Standby* state to *Power* state

Laser Down

Enable if this check box is selected then the *Laser Down* function is activated

Timeout (s) (Standby → Down) sets the time after that the laser is switched to *Down* state if not used and already in *Standby* state

Laser On if this check box is selected then the *Laser On* control signal is active

Laser Off

Enable if this check box is selected then the *Laser Off* function is activated

Timeout (s) (Down → Off) sets the time after that the laser is switched off if not used and already in *Down* state

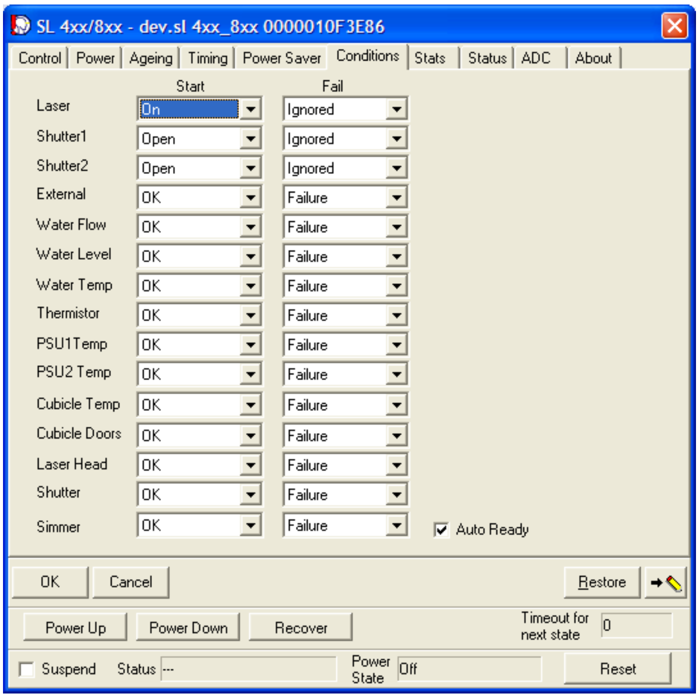
System Shutdown

Countdown (s) sets the time after that the system is switched off

Close applications if this check box is selected then InScript closes the applications

3.16.8. Parametrize - Conditions

In this tab the InScript error handling can be configured and the conditions can be set which have to apply for starting and aborting a job.



NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.

Laser, Shutter1, Shutter2, External, Water Flow,

Water Level, Water Temp, Thermistor, PSU1 Temp,

PSU2 Temp, Cubicle Temp, Cubical Doors, Laser Head,

Shutter, Simmer **Column Start** sets the conditions, which have to apply to enable *Job Start*

Ignored the program ignores the state of the corresponding component and enables *Job Start*

On / Open / OK if the state of the corresponding component applies then the program enables *Job Start*

Column Fail sets the conditions, which have to apply to abort processing

Ignored the program ignores the state of the corresponding component and continues with processing

Off / Closed / Failure if the state of the corresponding component applies then the program aborts processing

AutoReady if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state *On* and opens the laser shutter. As soon as the system is ready processing begins automatically

WARNING

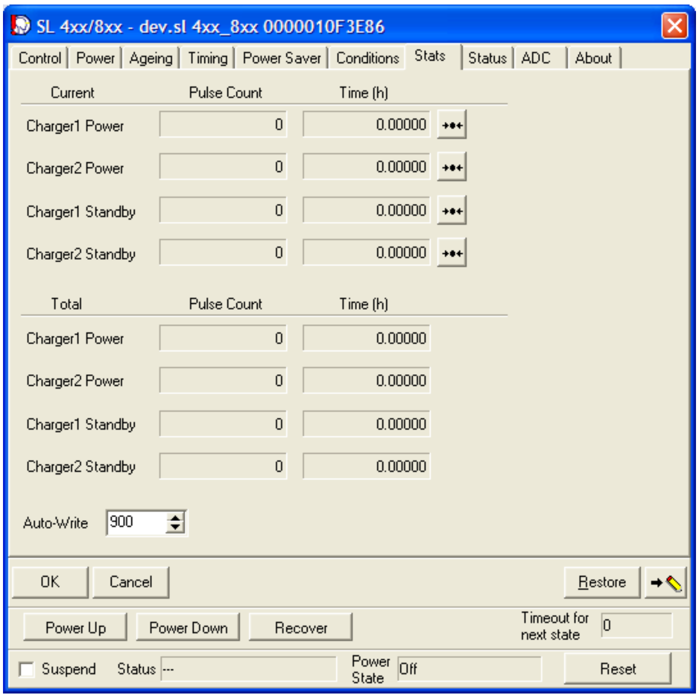
Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.16.9. Parametrize - Stats

This tab shows information about operating hours since the last lamp change as well as the accumulated laser operating hours.



Current

Charger1 Power, Charger2 Power, Charger1 Standby, Charger2 Standby

Pulse Count shows the number of pulses in Standby state and Power state since the last counter reset

Time (h) shows the operating hours in *Standby* state and *Power* state since the last counter reset

resets the counter and opens the *Automatic Service Database Entry* window (see 3.24 Automatic Service Database Entry)

Total

Charger1 Power, Charger2 Power, Charger1 Standby, Charger2 Standby

Pulse Count shows the accumulated number of pulses in *Standby* state and *Power* state

Time (h) shows the accumulated number of operating hours in *Standby* state and *Power* state

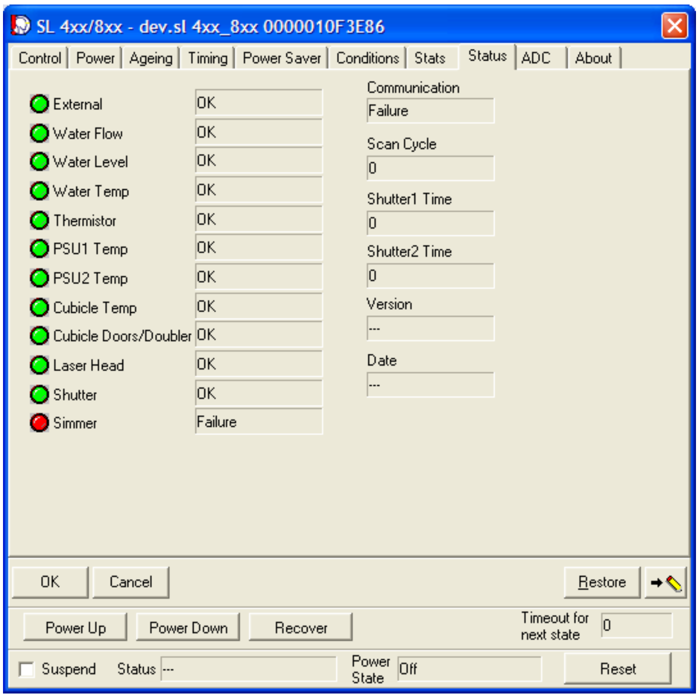
Auto-Write (s) sets the interval by which the operating hours are written to the controller board's flash memory

NOTE

If you switch the laser on only for short times then we recommend to set the interval to 300 s to 900 s. Otherwise larger discrepancies may occur to real operating hours.

3.16.10. Parametrize - Status

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators.



External, Water Flow, Water Level, Water Temp,

Thermistor, PSU1 Temp, PSU2 Temp, Cubicle Temp,

Cubical Doors, Laser Head, Shutter, Simmer

LED and status display shows the state of the corresponding component by a symbolized LED and a text. If the LED is green then the component is OK. If the LED is red then an error occurred at the component

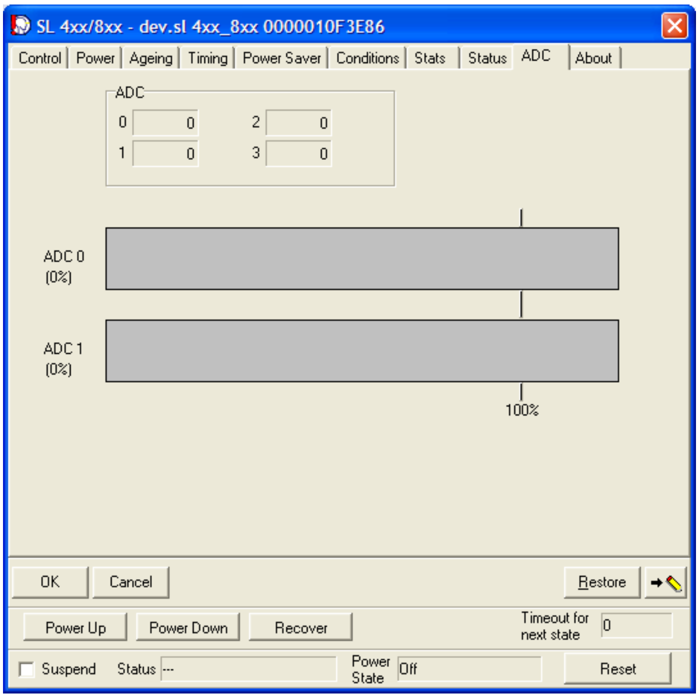
Communication, Scan Cycle, Shutter1 Time,

Shutter2 Time, Version, Date

staus field shows the state of the corresponding component with a text

3.16.11. Parametrize - ADC

This tab shows information about the optical output power of the laser.



ADC

0, 1, 2, 3 shows the optical output power as value for infrared and green laser radiation

ADC0 (%), ADC1 (%) shows the optical output power for infrared and green laser radiation in form of a bar

3.17. haas laser - HL-Series Laser by Coherent

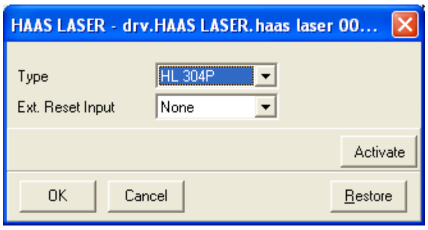
for controller	NCC
device type	laser
driver version	1.0

The *haas laser* device makes functions and parameters available to control lasers of Coherent's HL-family.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.17.1. Configure



Type sets the laser type

HL 304P only this type is supported at the time

Ext. Reset Input sets the parallel input at the controller by which messages can be acknowledged resp. the laser can be resetted, see section 3.2 pio - Parallel Inputs and Outputs and the documentation of the NCC controller

None no digital input will be used

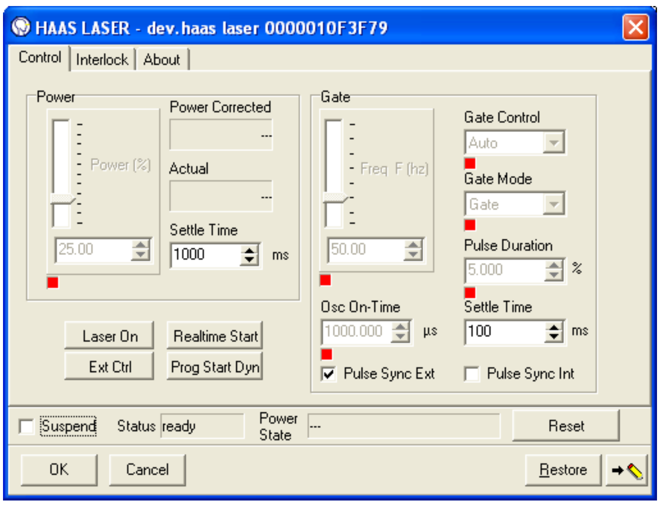
1 .. 5 the corresponding parallel input is high active

1 inverted .. 5 inverted the corresponding parallel input is low active

3.17.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.17.3. Parametrize - Control



Power

Power sets the pumping power. This is a relative value and not standardized to the optical output power. Hence 100% are not the same as maximal optical output power. For example optical laser activity may occur not until the pumping power reaches 35% and the maximal optical output power may be already reached at a pumping power of 70%. Set the desired optical output power at the power supply according to the characteristic diagram which accompanies your laser. Pay attention to the lamp current

Power Corrected shows the corrected pumping power. During a pumping lamp's span of life different aging processes result in a slow power loss. If the laser is always working at the same power level then this power loss can be recorded against operating hours and then adjusted. For this purpose the lamp current will be increased

Actual shows the actual pumping power

Settle Time sets the settle time which will be waited after the nominal pumping power is reached

Gate

Freq. F sets the frequency the Q-switch is triggered with

Gate Control sets the gate control

Auto oscillator will be automatically switched on and off

Always off oscillator stays permanently off

Always on oscillator stays permanently on

Gate Mode sets the type of signal at the controller board gate output

Gated Osc pulses will be generated with the parameters *Freq F* and *Osc. On Time*

Gate a single on-/off-signal will be generated

Pulse Duration sets the nominal pulse duration

Osc. On Time sets the On time for the oscillator

Settle Time sets the settle time which will be waited after the nominal frequency is reached

Pulse Sync. Ext. If the check box is selected then the controller board provides the synchronization signal for the pulses

Pulse Sync. Int. If the check box is selected then the laser provides the synchronization signal for the pulses

Laser On sets the laser to state ready

Realtime Start starts lines of a laser program which are processed with the WRS (WaitRealtimeStart) function. Select laser programs by placing a *Laser Haas* node within a job at the desired position

Ext. Ctrl. routes the laser control functions to its external control interface. In this case the external control is the controller and InScript

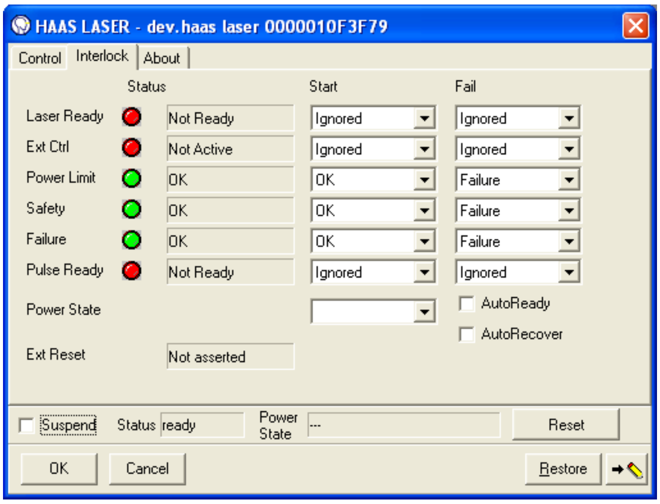
Prog. Start Dyn. starts a laser program dynamically. Select laser programs by placing a *Laser Haas* node within a job at the desired position

3.17.4. Parametrize - Interlock

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators. You can set the conditions which have to apply for a job start with *Job Start* and at which faults a job shall be canceled resp. which faults will be ignored. Further on you can set InScript's reaction to faults.

NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.



Laser Ready, Ext. Ctrl., Power Limit, Safety, Failure, Pulse Ready, Power State and Ext. Reset

Column Status shows the respective component state by a symbolic LED and text. If the LED is green then the component works correctly. If the LED is red then a fault occurred at the component

Column Start sets the conditions which have to apply so that the program enables *Job Start*

- **Ignored** The program ignores the respective component state and enables *Job Start*
- **Ready, External, OK and Ready** If the respective component state applies then the program enables *Job Start*

Column Fail sets the conditions which have to apply so that the program cancels a running process

- **Ignored** The program ignores the respective component state and continues with processing
- **Failure** If the respective component state applies then the program cancels the processing

AutoReady If the check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started

► You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover If the check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued

► You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.18. lasag laser 2 - RTPS and VCPS Controlled Lasers by LASAG

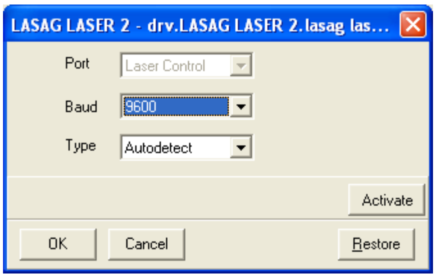
for controller	NCC
device type	laser
driver version	1.20.32.2

The *lasag laser 2* device makes functions and parameters available to control RTPS and VCPS controlled LASAG lasers.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.18.1. Configure



Port selects the controller's serial interface to communicate with the laser

Laser Control the LASER CONTROL connector interface will be used

Baud selects the baud rate

600, 1200, 2400, 4800, 9600, 19200 possible baud rates

Type selects the laser type

RTPS power controlled

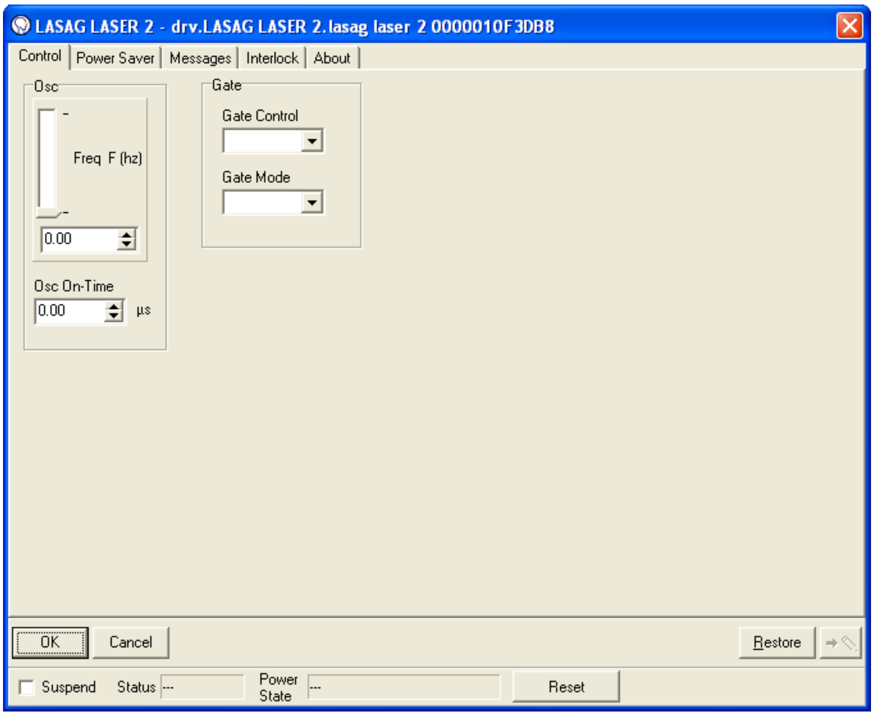
VCPS voltage controlled

Autodetect tries to determine the laser type automatically

3.18.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.18.3. Parametrize - Control



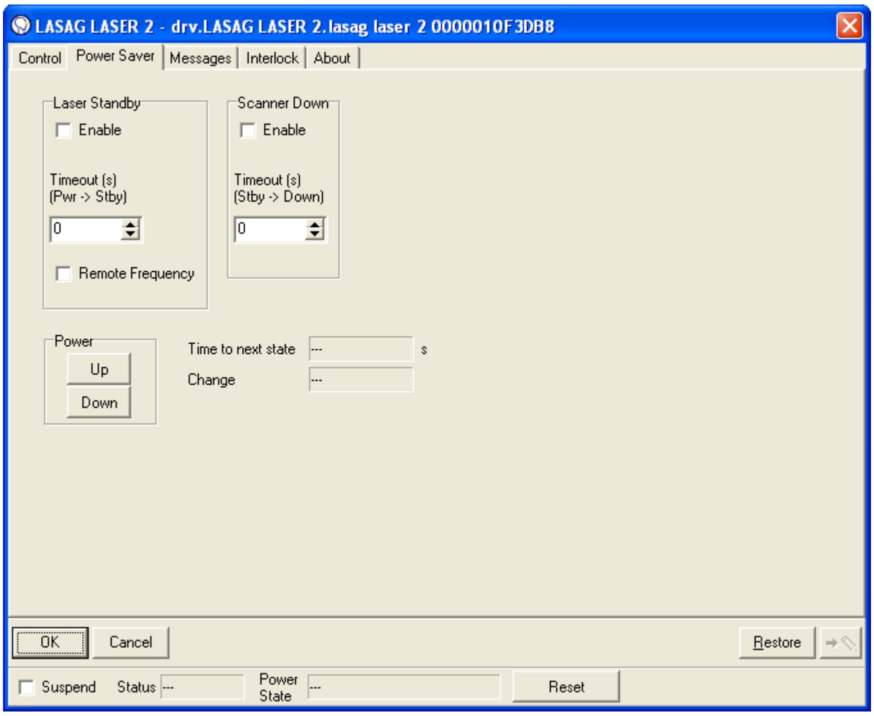
Osc

> **Freq** sets the frequency the Q-switch is triggered with
>
> **Osc On-Time** sets sets the on-time for the oscillator

Gate

> **Gate Control** selects the gate control
>
> > **Auto** oscillator will be automatically switched on and off
> >
> > **Always off** oscillator stays permanently off
> >
> > **Always on** oscillator stays permanently on
>
> **Gate Mode** selects the type of signal at the controller gate output
>
> > **Gated Osc** pulses will be generated with the parameters *Freq* and *Osc On-Time*
> >
> > **Gate** a single on-/off-signal will be generated

3.18.4. Parametrize - Power Saver



Laser Standby

Enable if this check box is selected then switching from power state *Power* to *Standby* is enabled

Timeout (Pwr → Stby) sets the time that will be waited while the laser is not used, before switching it to power state *Standby*

Remote Frequency if this check box is selected the parameter Remote Frequency is set (extern) to suppress the internal pulse generation

Scanner Down

Enable If the check box is selected then switching from power state *Standby* to *Down* is enabled

Timeout (Stby → Down) sets the time that will be waited when the laser is not used, before switching it to power state *Down*

Power

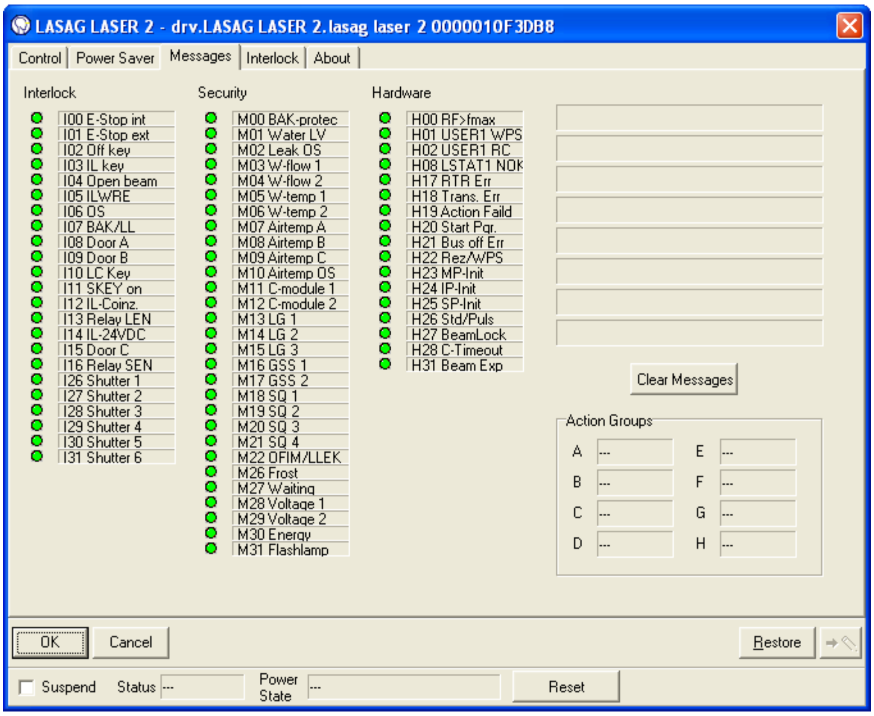
Up switches the laser into a higher power saver state

Down switches the laser into a lower power saver state

Time to next state shows the time remaining, before switching to the next power saver state

Change shows whether a transition from one to another state is in progress or not

3.18.5. Parametrize - Messages



Interlock, Security, Hardware shows the state of laser messages (green LED = state OK; red LED = state not OK)

Text boxes show the 8 latest messages

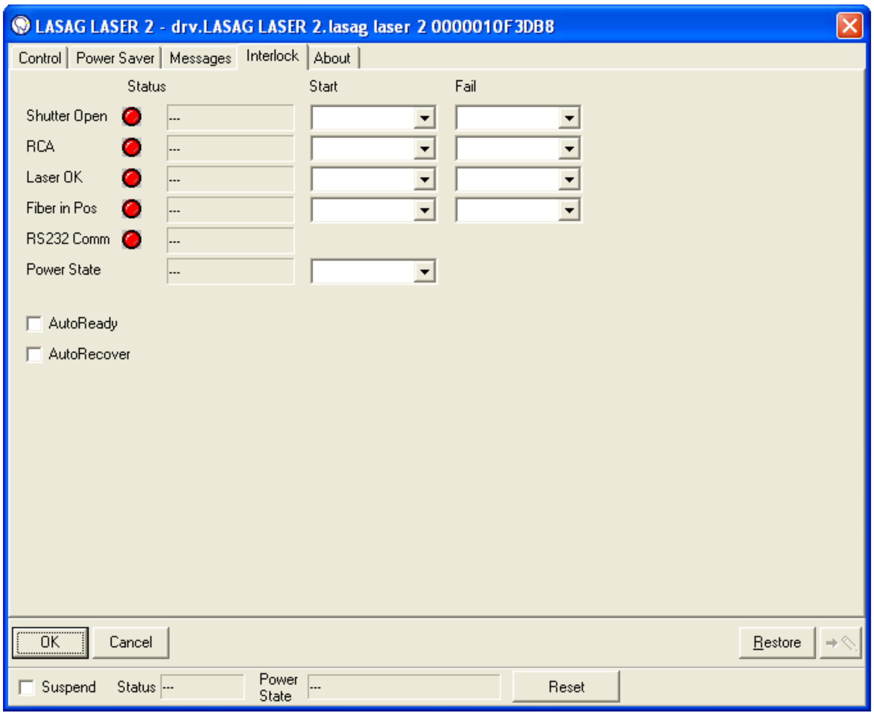
Clear Messages clears the 8 latest messages

Action Groups

A .. H shows the action group state

3.18.6. Parametrize - Interlock

This tab shows information about the interlock states in your laser. If an error occurs then it can be localized easier. Furthermore the error handling by InScript can be configured and the conditions can be set that have to be true for starting a job via *Job Start*. It can also be set which errors abort a job and which shall be ignored.



NOTE

Settings in this tab do not prevent the laser from shutting down, if an error occurs. These settings just affect the behavior of InScript in case of an error.

Shutter Open, RCA, Laser OK, Fiber in Pos, RS232 Comm, Power State

Column Status shows the respective component state with a symbolic LED and a text. A green LED shows the component is OK. A red LED shows an error at the component

Column Start selects conditions to be true to release *Job Start*

Ignored The program ignores the respective component state and releases *Job Start*

Open and OK and Power respectively If the respective component state is true then the program releases *Job Start*

Column Fail selects conditions to be true to abort a running process

Ignored The program ignores the respective component state and proceeds with the process

Closed and OK respectively If the respective component state is true then the program aborts the process

AutoReady If the check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started

- You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover If the check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued

- You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.19. cw200s

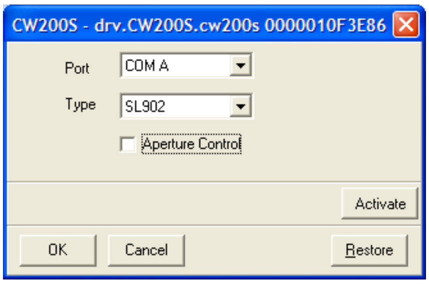
for controller	NCC
device type	laser
driver version	1.0

This device driver controls continuously (cw) lamp pumped or diode pumped solid state lasers via a serial interface.

NOTE

For details how to operate your laser type, consult the corresponding manual.

3.19.1. Configure



Port selects the serial interface on the controller board for communication

COM A serial interface A

COM B serial interface B

Type selects the type of power supply

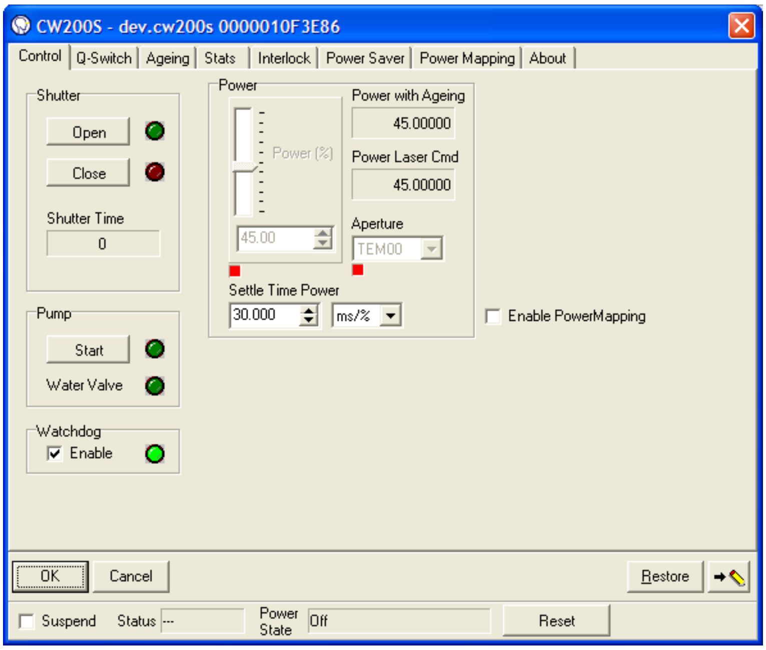
List item	Description
SL902, SL1308MA, SLD21xx, CW60-04	power supplies supported by the device driver

Aperture Control if this check box is selected then aperture control is activated

3.19.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.19.3. Parametrize - Control



Shutter

Open opens the mechanical shutter. If the LED is on, the shutter is open

Close closes the mechanical shutter. If the LED is on, the shutter is closed

Shutter Time shows the shutter time

Power

Power sets the electrical pumping power. This setting is not a relative value and is **not** normalized to the optical laser output. Therefor 100% are not equal to the maximal optical output power. Optical laser activity may occur e.g. at an electrical pumping power of 35% and the maximal optical output power may be reached at 70%. Set the wanted optical output power by observing the lamp current at the power supply and according to the characteristic diagram accompanying your laser

Power with Ageing shows the corrected electrical pumping power. Within the lifetime of a lamp several ageing processes result in a slow power loss. If the laser is working at a constant electrical pumping power then the power loss can be measured depending on the operating hours and compensated later on by increasing the lamp current. In the *Ageing* tab the ageing behavior can be recorded

Power Laser Cmd shows the actual electrical pumping power

Aperture selects the aperture

TEM00 for TEM00

MM for multi mode

Settle Time sets the settle time waited after the nominal value for pumping power has adjusted. The settle time can be set in ms/% or in ms

Enable Power Mapping if this check box is selected then the Power Mapping is activated (see 3.19.9 Parametrize - Power Mapping)

Pump

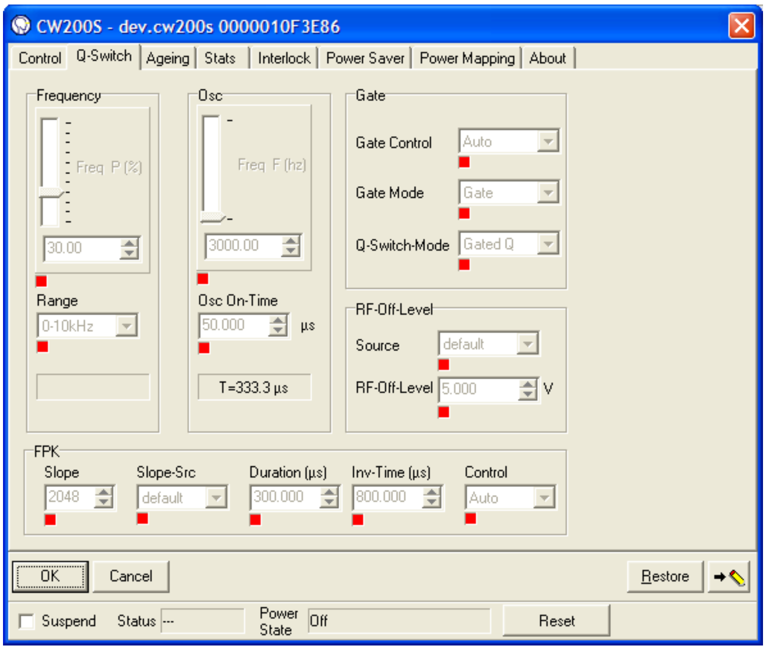
Start starts the cooling water pump. If the LED is on, the pump runs

Water Valve if the LED is on, the water valve is open. In controlled state the water valve opens and closes in cycles

Watchdog

Enable if this check box is selected then the laser watchdog is activated. Then the laser checks if the communication between controller board and laser is OK. If the communication is interrupted, e.g. when the controlling computer crashed, then the laser automatically switches off. If the check box is cleared then the laser continues working with the actual parameters

3.19.4. Parametrize - Q-Switch



Frequency

Freq P sets the frequency within the *Range*. The laser triggers the Q-switch with this frequency. This setting defines the laser frequency, when *Gated Q* or *Internal Q* is selected in the *Q-Switch-Mode* list

Range selects the frequency range

0 - 10kHz from 0 to 10kHz

0 - 100kHz from 0 to 100kHz

label shows 1 / Freq P

Osc

Freq F sets the oscillator frequency by which the controller board triggers the Q-switch

Osc On-Time sets the oscillator ON-time

label shows 1 / Freq F

Gate

Gate Control selects the gate control

Always off oscillator stays always off

Always on oscillator stays always on

Auto oscillator is automatically switched on and off

Gate mode selects the signal generated at the controller board Gate output

Gated Osc pulses are generated with the parameters *Freq F* and *Osc On-Time*

Gate a single on/off signal is generated

Q-Switch-Mode selects the Q-switch mode

Gated Q the laser triggers the Q-switch with frequency *Freq P*. The pulses are enabled via the controller board Gate output

Internal Q the laser triggers the Q-switch with frequency *Freq P*. The level at the controller board Gate output is irrelevant

Gated CW the Q-switch modulator enables the laser as long as there is a signal at the controller board Gate output

Triggered Q the Q-switch modulator works similar to *Gated CW*, but uses edge triggering. The RF OFF time is set to 5 μs

RF-Off-Level Source selects the source of the RF-Off-Level. Please consult the manual of your laser for possible settings

default laser

External controller board

RF-Off-Level sets the Q-switch modulator voltage in off state, i.e. if the laser is enabled. To generate a laser pulse the q-switch modulator voltage is set to 0V

FPK (First Pulse Kill) in continuously pumped solid state laser with Q-switch the first laser pulse is significantly high, when the Q-switch inhibited laser emission for a longer time and a pulse burst was output later. The super pulse at the beginning of the burst decreases the processing quality at many applications. Please find more detailed information about this subject in section 3.23 Background to Modes of Operation et sqq. and in the manual of your laser.

Slope sets the FPK slope

Slope-Src selects the FPK slope source

default the laser provides the FPK slope

RS 232 the controller board provides the FPK slope (see *Slope*)

Duration sets the time during which the FPK slope takes effect

Inversion Time sets the time after which a super pulse occurs

Control selects the FPK control

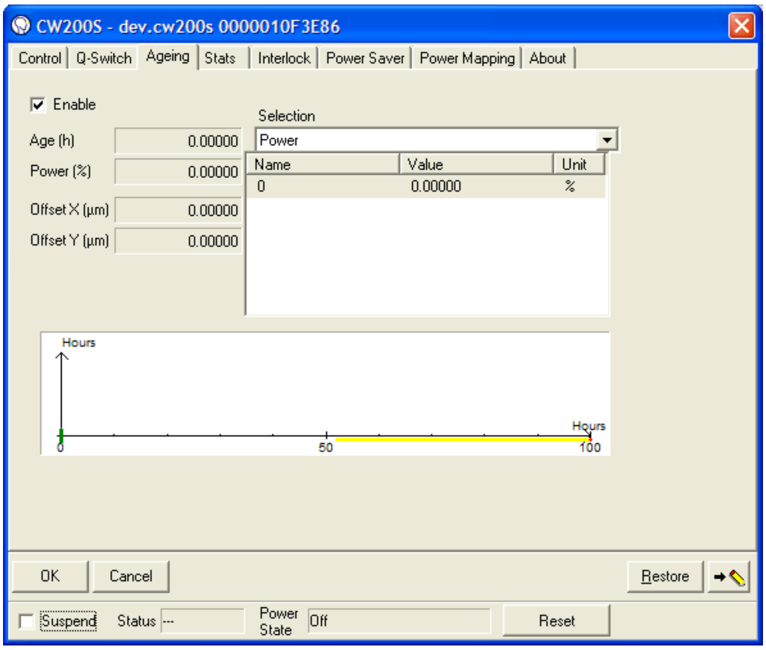
Auto FPK is automatically switched on and off

Always off FPK stays always off

Always on FPK stays always on

3.19.5. Parametrize - Ageing

In this tab you can record data about the ageing of lamps or diodes and use this data to automatically compensate the power loss resulting from this ageing. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser.



Enable if the check box is selected then the specified characteristic diagrams are used to compensate for power loss and offset

Age shows the actual number of operating hours of the lamp or diode

Power shows the corrected pumping power

Offset X, Offset Y shows the corrected offset in X and Y direction

Selection selects the parameter shown in the diagram below. Enter the values into the table beneath. Add rows via the list's context menu

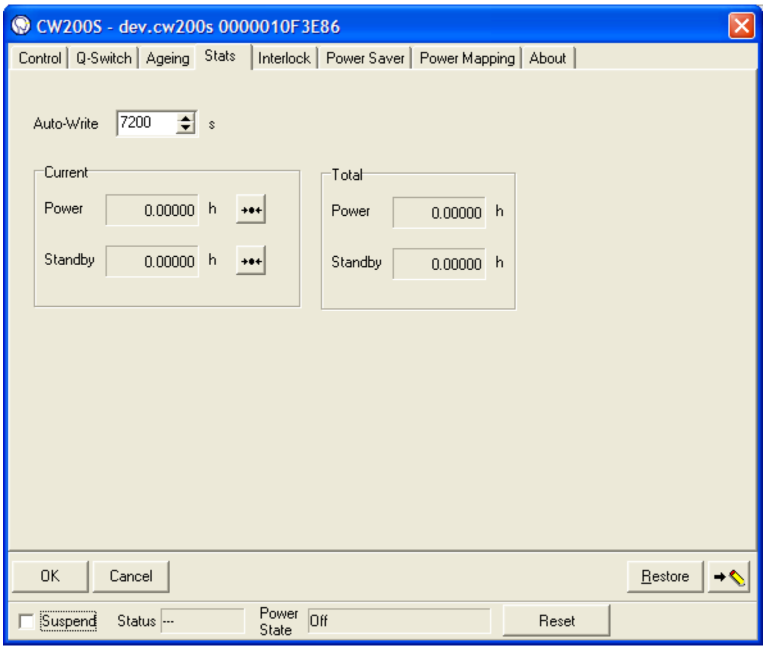
Power the pumping power [%] is shown over the number of operating hours as a characteristic diagram

OffsetX the offset in X direction [μm] is shown over the pumping power as a characteristic diagram

OffsetY the offset in Y direction [μm] is shown over the pumping power as a characteristic diagram

3.19.6. Parametrize - Stats

This tab shows information about operating hours since the last lamp or diode change as well as the accumulated laser operating hours.



Auto-Write sets the interval in which the operating hours are written to the controller board flash memory.

NOTE

If you switch on the laser only for short times then we recommend to set the interval to 300 to 900 s. Otherwise larger discrepancies may occur to real operating hours.

Current

Power shows lamp or diode operating hours in power state since the last counter reset

resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry) item[Standby] shows the laser operating hours in standby state since the last counter reset

resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry)

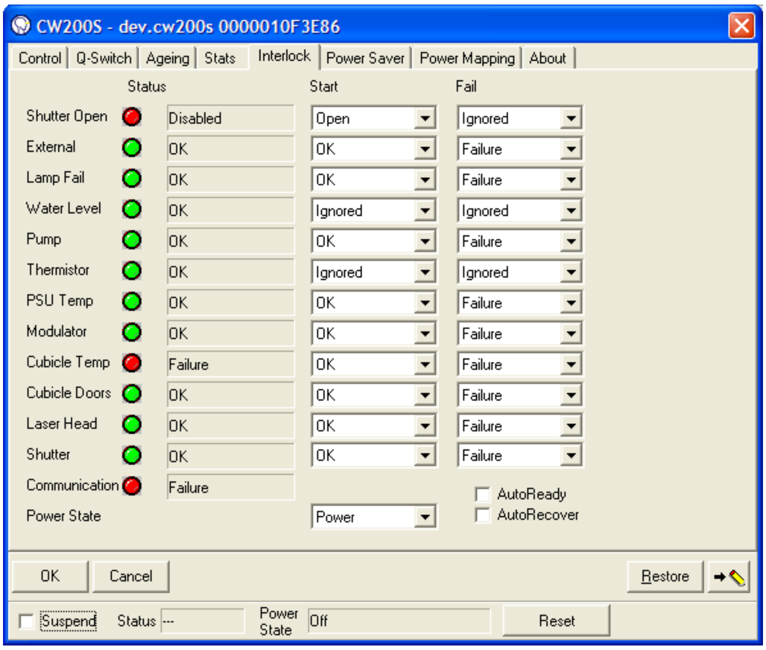
Total

Power shows the accumulated lamp or diode operating hours in power state

Standby shows the accumulated laser operating hours in standby state

3.19.7. Parametrize - Interlock

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators. You can set the conditions which have to apply for a job start with *Job Start* and at which faults a job shall be canceled resp. which faults will be ignored. You can also set InScript's reaction to faults, here.



NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.

Shutter Open, External, Lamp Fail, Water Level,

Pump, Thermistor, PSU Temp, Modulator, Cubicle Temp,

Cubicle Doors, Laser Head, Shutter, Communication,

Power State

Column Status shows the state of the corresponding component by a symbolized LED and a text. If the LED is green then the component is OK. If the LED is red then an error occurred at the component

Column Start sets the conditions, which have to apply to enable *Job Start*

Ignored the program ignores the state of the corresponding component and enables *Job Start*

Open / OK / Power if the state of the corresponding component applies then the program enables *Job Start*

Column Fail sets the conditions, which have to apply to abort processing

Ignored the program ignores the state of the corresponding component and continues with processing

Closed / Failure if the state of the corresponding component applies then the program aborts processing

AutoReady if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state Standby then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically.

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing.

WARNING

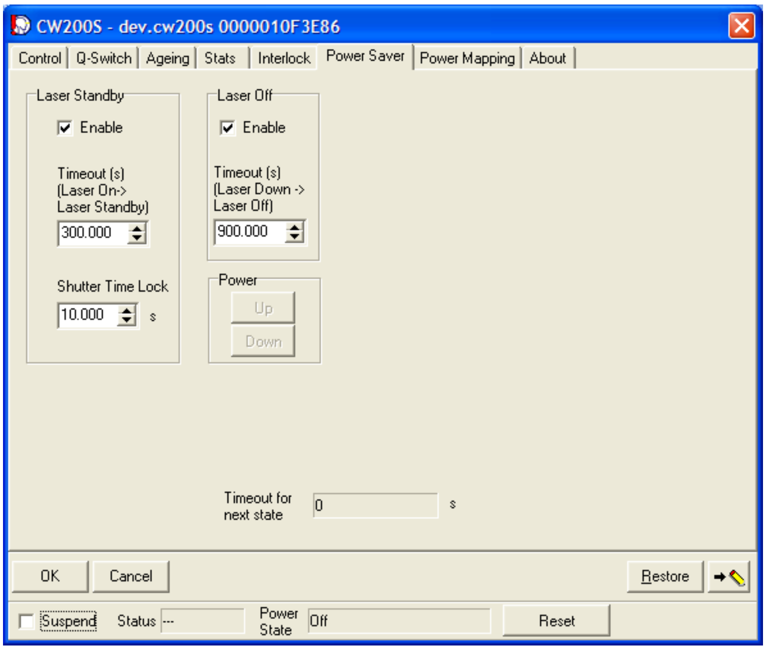
Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.19.8. Parametrize - Power Saver

If the laser is not in use over a time then the device driver can automatically switch the laser to standby state or switch it off completely to spare the lamps or diodes.



Laser Standby

Enable if this check box is selected then the standby function is activated

Timeout (Laser On → Laser Standby) sets the time where after the laser switches to standby state if not used

Shutter Time Lock sets the time that has to pass before the shutter can be opened, when the laser switches from *Off* to *Standby* state

Laser Off

Enable if this check box is selected then the laser off function is activated

Timeout (Laser Down → Laser Off) sets the time after that the laser is switched off if it is not used and already in down state

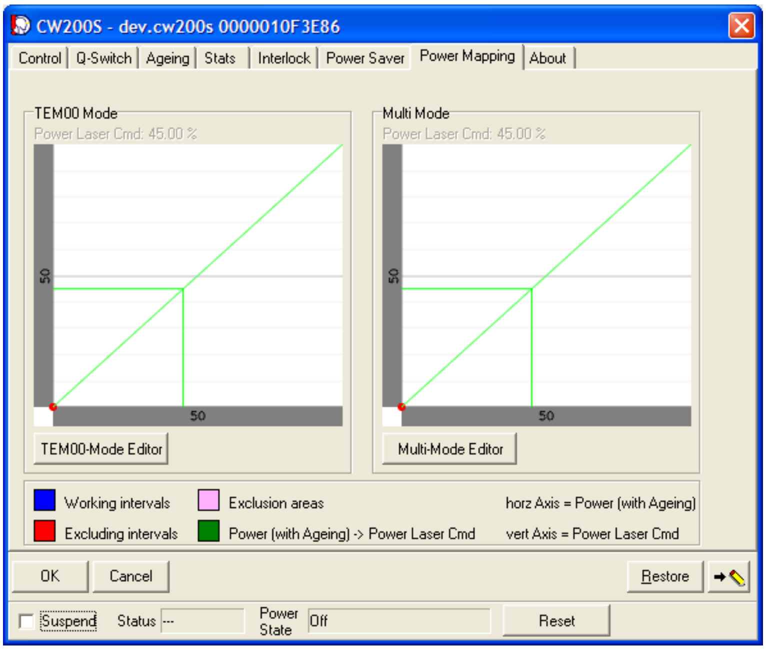
Power

Up switches from one power state to next higher power state

Down switches from one power state to next lower power state

Timeout for next state shows the time remaining before switching from the actual power state to the next

3.19.9. Parametrize - Power Mapping



TEM00-Mode shows the power mapping in TEM00 mode

TEM00-Mode Editor opens the *TEM00-Mode Mapping* window

Multi-Mode shows the power mapping in Multi Mode

Multi-Mode Editor opens the *Multi-Mode Mapping* window

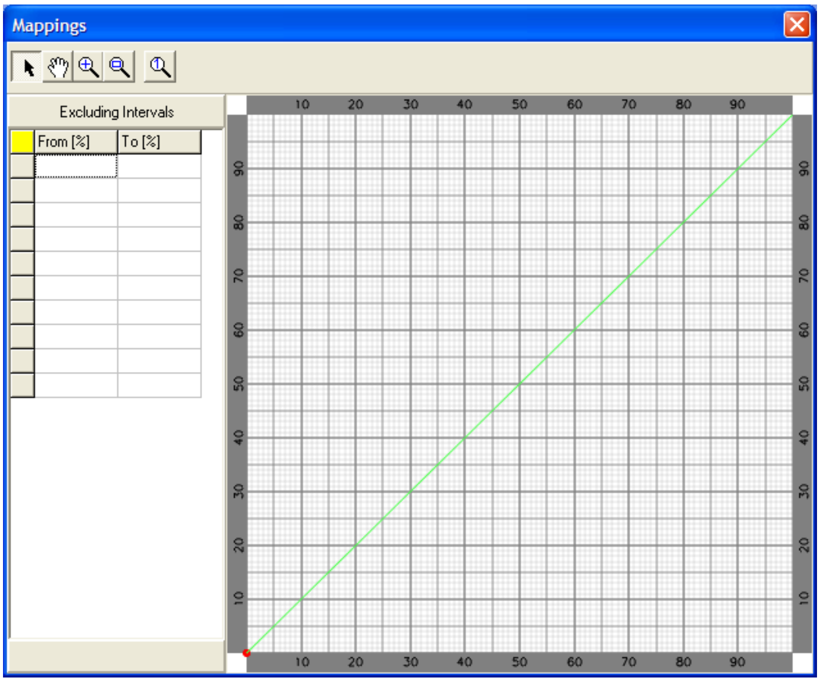


Figure 3: Power Mappings Editor

3.20. idar

for controller	NCC
device type	laser
driver version	1.0

3.20.1. Configure

Configure the device driver here to enable communication with the laser.

The IDAR laser power supply is controlled via analog voltage, these settings are meant for experimental operation via RS232.

Port selects the serial interface on the controller board for communication

COM A, COM B assigns the *idar* device to one of the serial interface connectors at the NCC controller, see the documentation of the NCC controller

Configure DAC if this check box is selected then the analog outputs are set to defined start values. The offset voltages are set to 0V and the voltage scale is set to 1 (see 3.5 dac_a/b - Digital Analog Converter a and b)

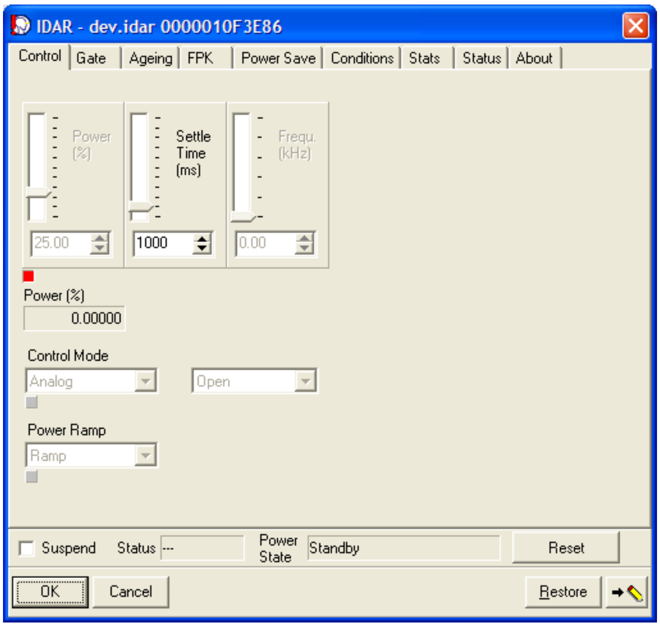
NOTE

Select the check box only if the laser device driver shall control laser parameters.

3.20.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.20.3. Parametrize - Control



Power sets the electrical pumping power. This setting is not a relative value and is not normalized to the optical laser output. Therefor 100% are not equal to the maximal optical output power. Optical laser activity may occur e.g. at an electrical pumping power of 35% and the maximal optical output power may be reached at 70%. Set the wanted optical output power by observing the lamp current at the power supply and according to the characteristic diagram accompanying your laser

Settle Time sets the settle time waited after the nominal value for pumping power has adjusted

Frequ. sets the laser repetition rate

Power shows the actual power. Within the lifetime of a lamp several ageing processes lead to a slow power loss. If the laser is operated with constant power then this loss can be recorded and compensated over the operating hours. For this purpose the lamp current is increased. In the *Ageing* tab the ageing behavior can be recorded

Control Mode for details see the manual of your laser

Analog control mode is set to Analog

Serial control mode is set to Serial

drop down for Shutter for details see the manual of your laser

Open Shutter is open

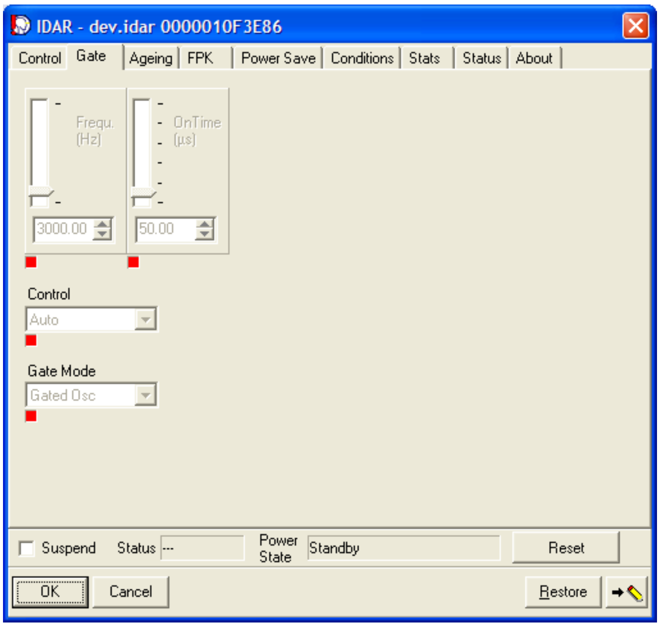
Closed Shutter is closed

Power Ramp for details see the manual of your laser

Ramp use power ramping

No Ramp do not use power ramping

3.20.4. Parametrize - Gate



Frequ sets the frequency the laser internal Q-switch modulator is operated with. This setting defines the laser frequency, when *Gated Osc* is selected in the *Gate Mode* list

On-Time sets the oscillator ON-time

Control selects the gate control

Always off oscillator stays always off

Always on oscillator stays always on

Auto oscillator is automatically switched on and off

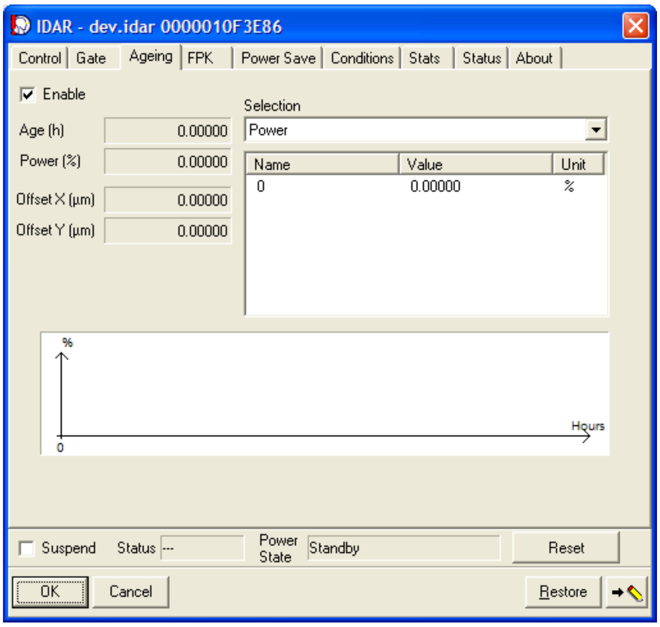
Gate Mode selects the signal generated at the controller board's Gate output

Gated Osc pulses are generated with the parameters *Frequ* and *On-Time*

Gate a single on/off signal is generated

3.20.5. Parametrize - Ageing

In this tab you can record data about the ageing of lamps or diodes and use this data to automatically compensate the power loss resulting from this ageing. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser.



Enable if this check box is selected then the specified characteristic diagrams are used to compensate for power loss and offset

Age shows the actual number of operating hours of the lamp or diode

Power shows the corrected pumping power

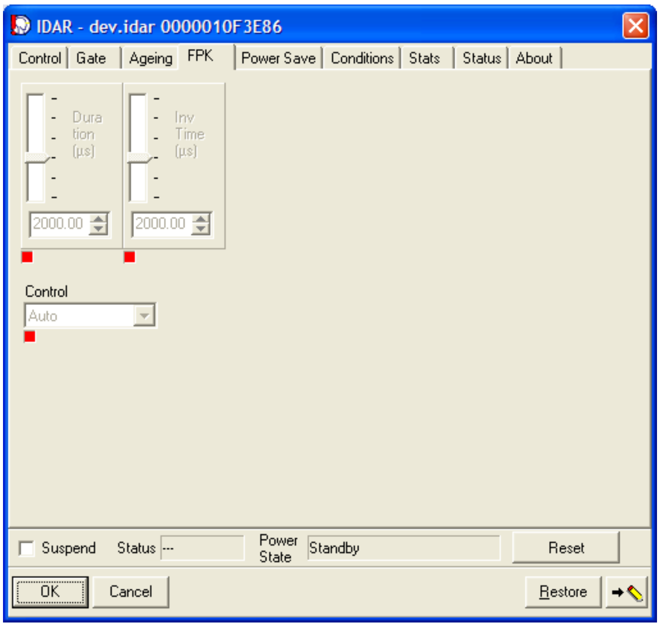
Offset X, Offset Y shows the corrected offset in X and Y direction

Selection selects the parameter shown in the diagram below. Enter the values into the table beneath. Add rows via the context menu.

> **Power** the pumping power [%] is shown over the number of operating hours as a characteristic diagram
>
> **OffsetX** the offset in X direction [μm] is shown over the pumping power as a characteristic diagram
>
> **OffsetY** the offset in Y direction [μm] is shown over the pumping power as a characteristic diagram

3.20.6. Parametrize - FPK

In continuously pumped solid state lasers with Q-switch the first laser pulse is significantly high, when the Q-switch inhibited laser emission for a longer time and a pulse burst was output thereafter. The super pulse at the beginning of the burst decreases the processing quality at many applications. Please find more detailed information about this subject in section 3.23 Background to Modes of Operation et sqq. and in the manual of your laser.



Duration sets the time during which the FPK takes effect

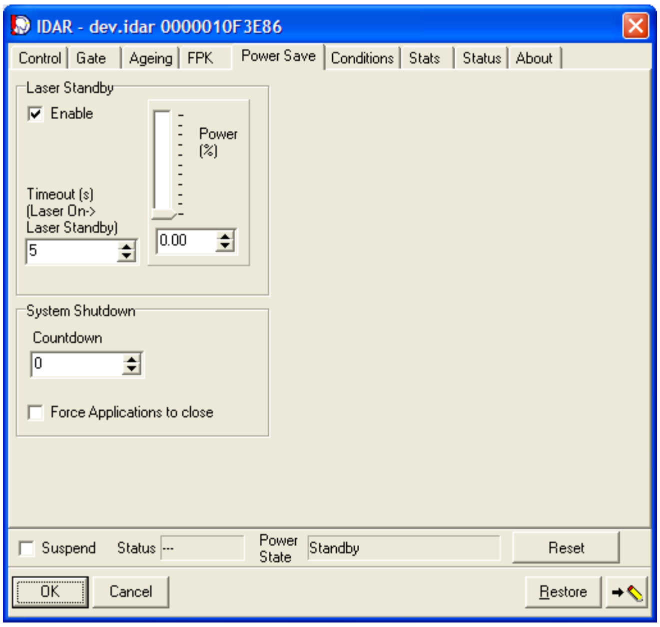
Inv Time sets the time after which a super pulse occurs

Control selects the FPK control

> **Auto FPK** is automatically switched on and off
>
> **Always off** FPK stays always off
>
> **Always on** FPK stays always on

3.20.7. Parametrize - Power Save

If the laser is not in use over a time then the device driver can automatically switch the laser to standby state or switch it off completely to spare the lamps or diodes.



Laser Standby

Enable if this check box is selected then the standby function is activated

Timeout (Laser On → Laser Standby) sets the time where after the laser switches to standby state if not used

Power sets the pumping power the laser is operated in standby state

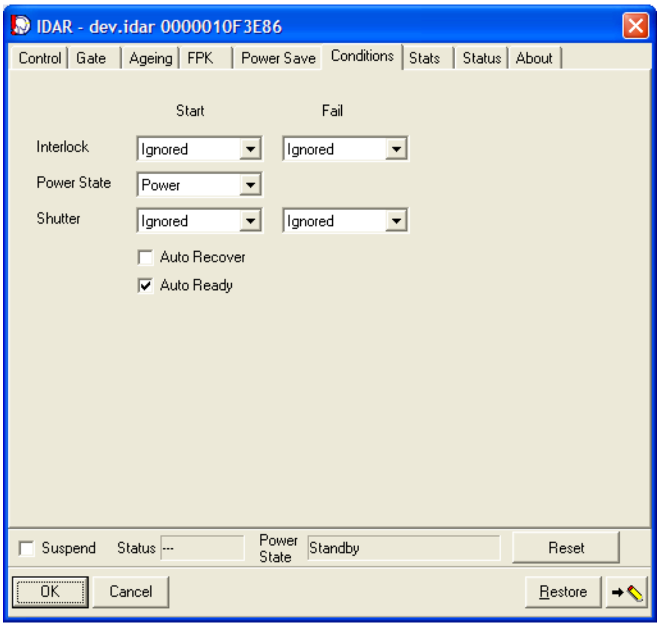
System Shutdown

Countdown sets the time after that the system is switched off

Force application to close if this check box is selected then InScript closes the applications

3.20.8. Parametrize - Conditions

In this tab the InScript error handling can be configured and the conditions can be set which have to apply for starting and aborting a job.



NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.

Interlock, Power State, Shutter

Column Start sets the conditions, which have to apply to enable *Job Start*

Ignored the program ignores the state of the corresponding component and enables *Job Start*

OK / Power / Open if the state of the corresponding component applies then the program enables *Job Start*

Column Fail sets the conditions, which have to apply to abort processing

Ignored the program ignores the state of the corresponding component and continues with processing

Closed / Failure if the state of the corresponding component applies then the program aborts processing

AutoRecover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing.

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoReady if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state Standby then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically.

WARNING

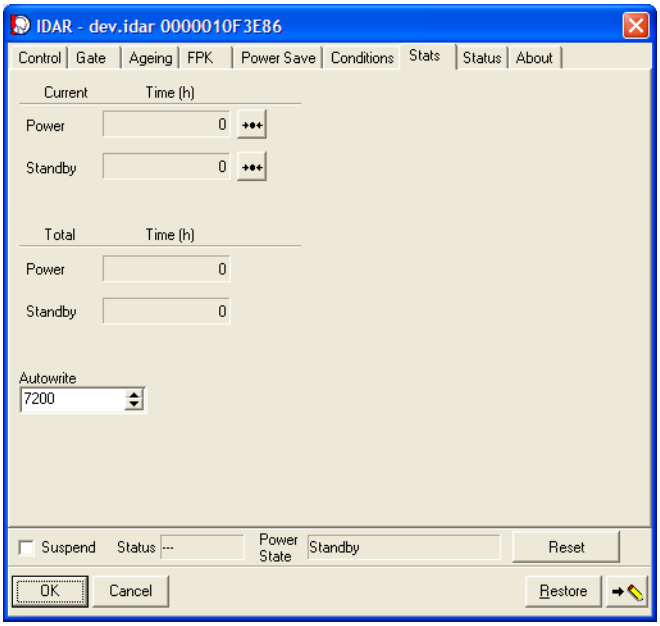
Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.20.9. Parametrize - Stats

This tab shows information about operating hours since the last lamp change as well as the accumulated laser operating hours.



Current

Power shows the number of pulses in Power state since the last counter reset resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry)

Standby shows the number of pulses in Standby state since the last counter reset

resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry)

Total

Power shows the accumulated number of operating hours in Power state

Standby shows the accumulated number of operating hours in Standby state

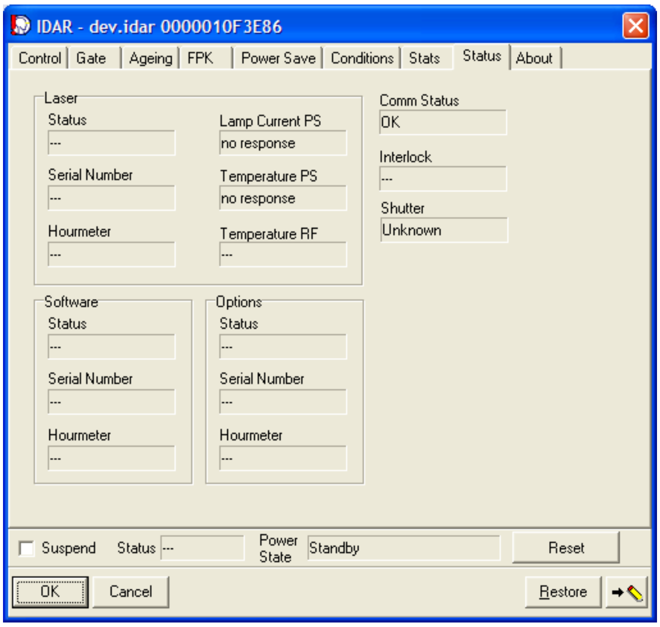
Auto-Write sets the interval by which the operating hours are written to the controller board's flash memory

NOTE

If you switch the laser on only for short times then we recommend to set the interval to 300 to 900 s. Otherwise larger discrepancies may occur to real operating hours.

3.20.10. Parametrize - Status

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators.



Laser

Status shows the laser status

Serial Number shows the laser serial number

Hourmeter shows the laser operating hours

Lamp Current PS shows the lamp current PS

Temperature PS shows the temperature PS

Temperature RF shows the temperature RF

Comm Status shows the communication status

Interlock shows the interlock status

Shutter shows the shutter status

Software

Status shows the software status

Serial Number shows the software serial number

Hourmeter shows the software operating hours

Options

Status shows the options status

Serial Number shows the options serial number

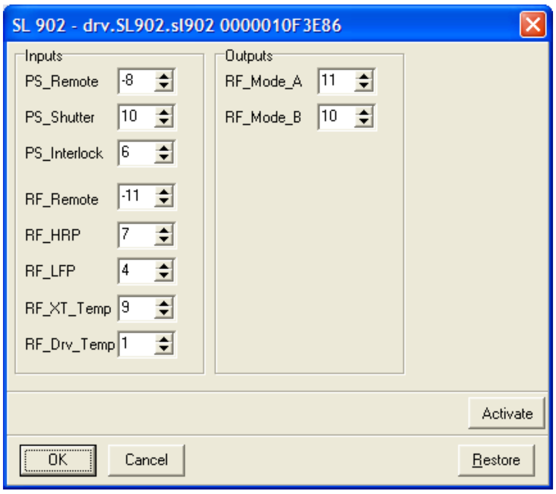
Hourmeter shows the options operation hours

3.21. sl902

for controller	NCC
device type	laser
driver version	1.0

3.21.1. Configure

Configure the device driver here to enable communication with the laser.



NOTE

If you use a connecting cable from ARGES then the default configuration **must not** be changed.

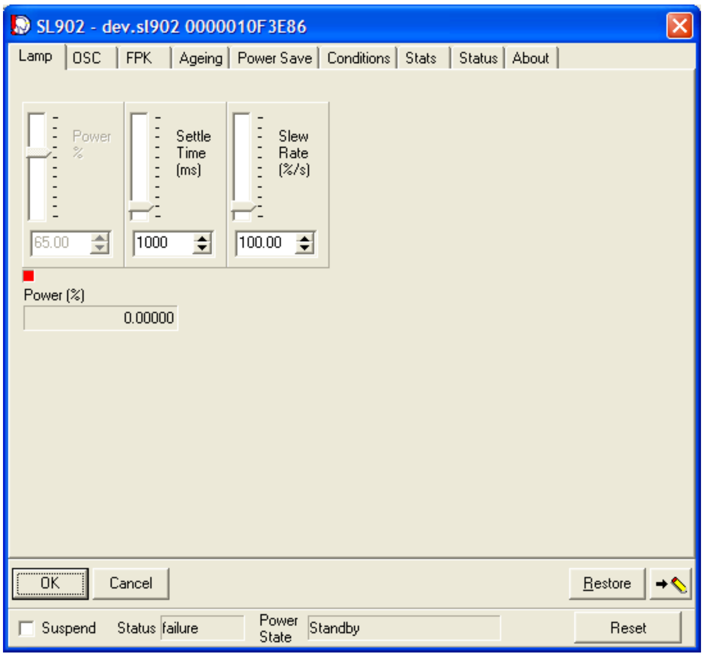
Inputs assigns the named signals to the digital inputs on the controller board. A positive value corresponds to a high active digital input. A negative value corresponds to a low active digital input. The value 0 (zero) means that no input is used

Outputs assigns the named signals to the digital outputs on the controller board. A positive value corresponds to a high active digital output. A negative value corresponds to a low active digital output. The value 0 (zero) means that no output is used

3.21.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.21.3. Parametrize - Lamp



Power sets the electrical pumping power. This setting is not a relative value and is not normalized to the optical laser output. Therefor 100% are not equal to the maximal optical output power. Optical laser activity may occur e.g. at an electrical pumping power of 35% and the maximal optical output power may be reached at 70%. Set the wanted optical output power by observing the lamp current at the power supply and according to the characteristic diagram accompanying your laser

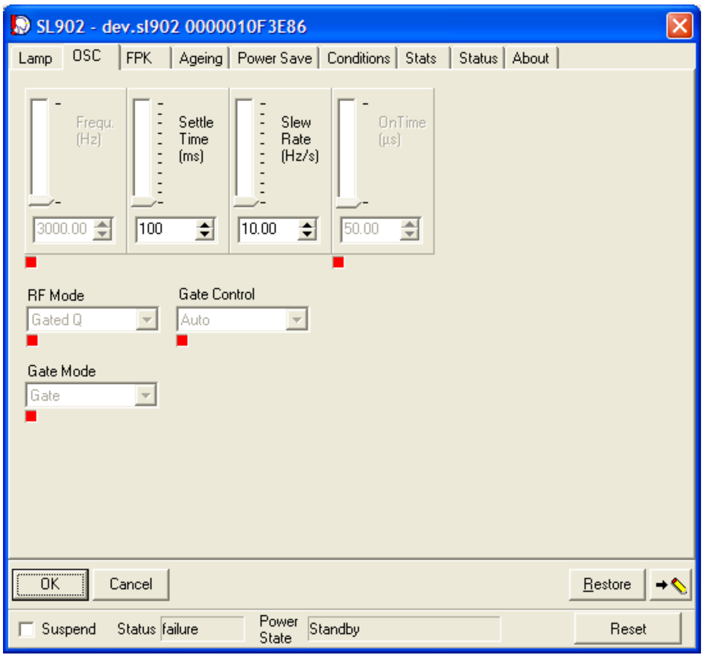
Settle Time sets the settle time waited after the nominal value for pumping power has adjusted

Slew Rate sets the rate the nominal value for pumping power is approached with

Power shows the corrected pumping power

3.21.4. Parametrize - OSC

In this tab Q-switch mode settings can be done.



Frequ (Hz) sets the oscillator frequency by which the controller board triggers the Q-switch

Settle Time (ms) sets the settle time waited after the nominal value for frequency has adjusted

Slew Rate (Hz/s) sets the rate the nominal value for frequency is approached with

On-Time (μs) sets the oscillator ON-time

RF Mode selects the RF mode

- **Gated Q** the laser triggers the Q-switch with frequency *Frequ*. The pulses are enabled via the controller board Gate output
- **Internal Q** the laser triggers the Q-switch with frequency *Frequ*. The level at the controller board Gate output is irrelevant
- **Gated CW** the Q-switch modulator enables the laser as long as there is a signal at the controller board Gate output
- **Triggered Q** the Q-switch modulator works similar to *Gated CW*, but uses edge triggering. The RF OFF time is set to 5 μs

Gate Control selects the gate control

- **Always off** oscillator stays always off

Always on oscillator stays always on

Auto oscillator is automatically switched on and off

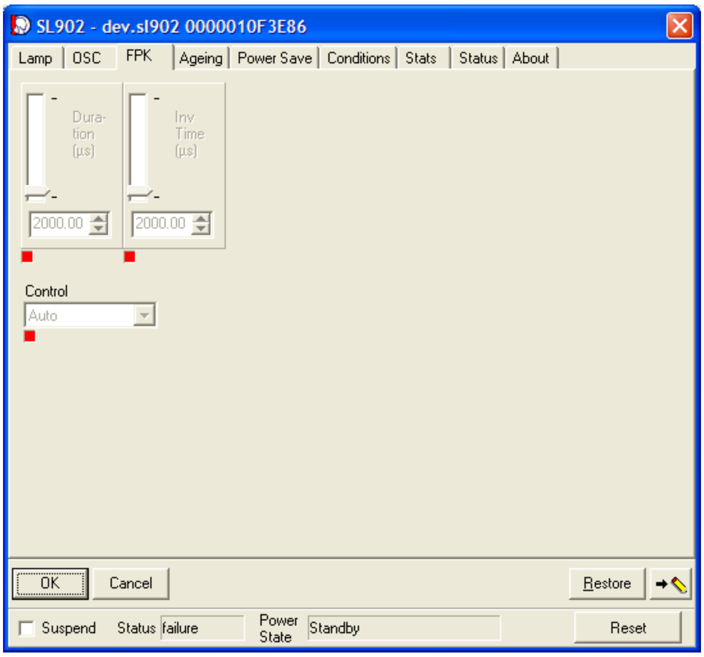
Gate Mode selects the signal generated at the controller board Gate output

Gated Osc pulses are generated with the parameters *Freq F* and *Osc On-Time*

Gate a single on/off signal is generated

3.21.5. Parametrize - FPK

In continuously pumped solid state lasers with Q-switch the first laser pulse is significantly high, when the Q-switch inhibited laser emission for a longer time and a pulse burst was output thereafter. The super pulse at the beginning of the burst decreases the processing quality at many applications. Please find more detailed information about this subject in section 3.23 Background to Modes of Operation et sqq. and in the manual of your laser.



Duration (µs) sets the time during which the FPK takes effect

Inv Time (µs) sets the time after which a super pulse occurs

Control selects the FPK control

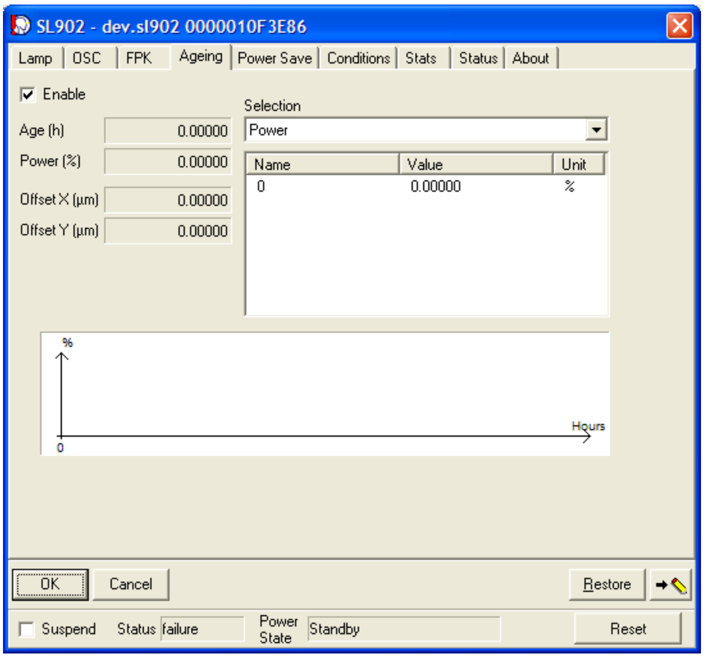
Auto FPK is automatically switched on and off

Always off FPK stays always off

Always on FPK stays always on

3.21.6. Parametrize - Ageing

In this tab you can record data about the ageing of lamps or diodes and use this data to automatically compensate the power loss resulting from this ageing. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser.



Enable if this check box is selected then the specified characteristic diagrams are used to compensate for power loss and offset

Age shows the actual number of operating hours of the lamp or diode

Power shows the corrected pumping power

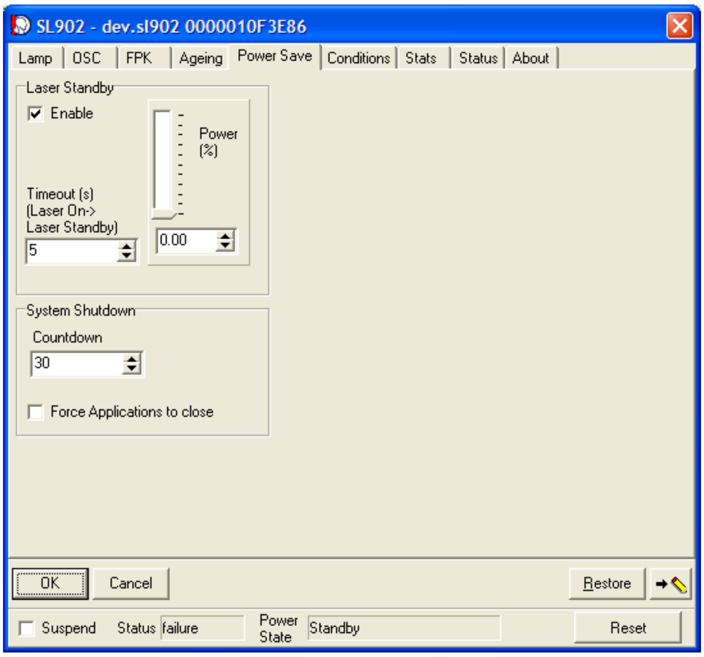
Offset X, Offset Y shows the corrected offset in X and Y direction

Selection selects the parameter shown in the diagram below. Enter the values into the table beneath. Add rows via the context menu.

- **Power** the pumping power [%] is shown over the number of operating hours as a characteristic diagram
- **OffsetX** the offset in X direction [μm] is shown over the pumping power as a characteristic diagram
- **OffsetY** the offset in Y direction [μm] is shown over the pumping power as a characteristic diagram

3.21.7. Parametrize - Power Save

If the laser is not in use over a time then the device driver can automatically switch the laser to standby state or switch it off completely to spare the lamps or diodes.



Laser Standby

Enable if this check box is selected then the standby function is activated

Timeout (s) (Laser On → Laser Standby) sets the time where after the laser switches to standby state if not used

Power sets the pumping power the laser is operated in standby state

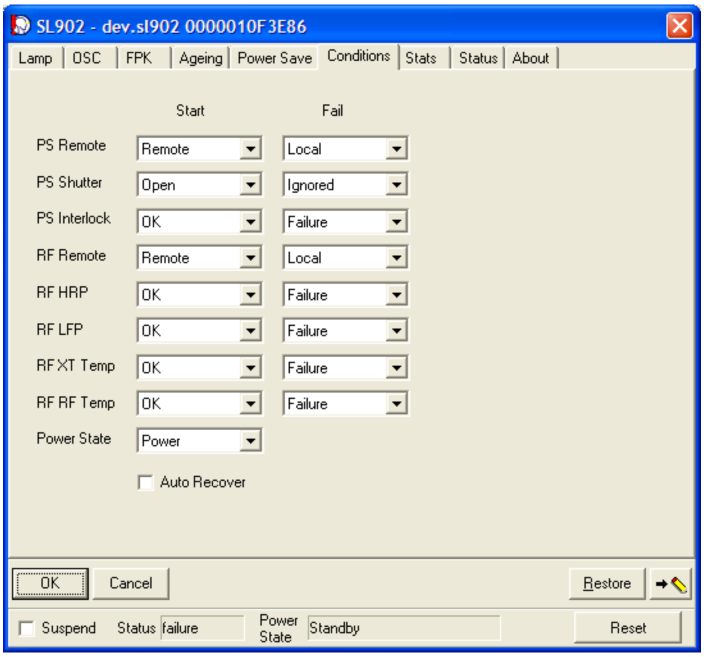
System Shutdown

Countdown sets the time where after the system is switched off

Force application to close if this check box is selected then InScript closes the applications

3.21.8. Parametrize - Conditions

In this tab the InScript error handling can be configured and the conditions can be set which have to apply for starting and aborting a job.



NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.

PS Remote, PS Shutter, PS Interlock, RF Remote,

RF HRP, RF LFP, RF XT Temp, RF DRV, Temp, Power State

Column Start sets the conditions, which have to apply to enable *Job Start*

Ignored the program ignores the state of the corresponding component and enables *Job Start*

Remote / Open / OK / Power if the state of the corresponding component applies then the program enables *Job Start*

Column Fail sets the conditions, which have to apply to abort processing

Ignored the program ignores the state of the corresponding component and continues with processing

Local / Closed / Failure if the state of the corresponding component applies then the program aborts processing

Auto Recover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing.

WARNING

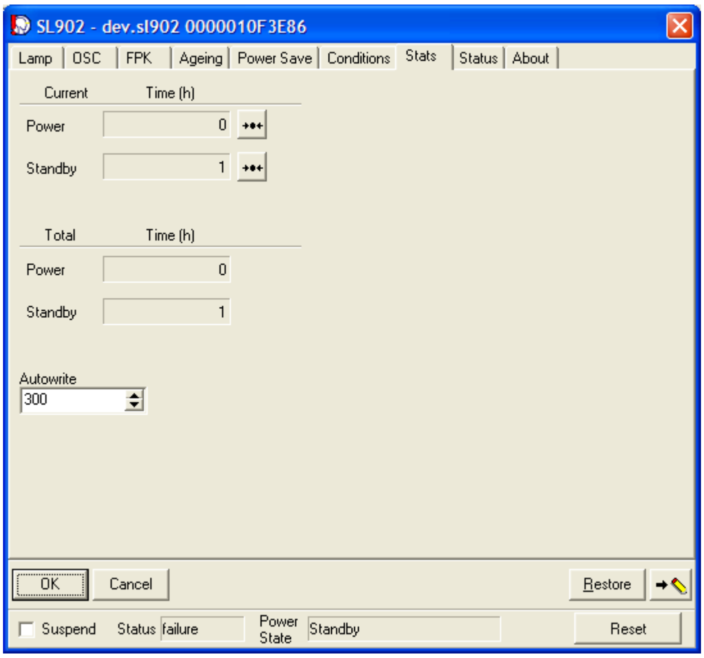
Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued.

You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.21.9. Parametrize - Stats

This tab shows information about operating hours since the last lamp change as well as the accumulated laser operating hours.



Current

Power shows the number of pulses in Power state since the last counter reset

 resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry)

Standby shows the number of pulses in Standby state since the last counter reset

 resets the counter and opens the Automatic Service Database Entry window (see 3.24 Automatic Service Database Entry)

Total

Power shows the accumulated number of operating hours in *Power* state

Standby shows the accumulated number of operating hours in *Standby* state

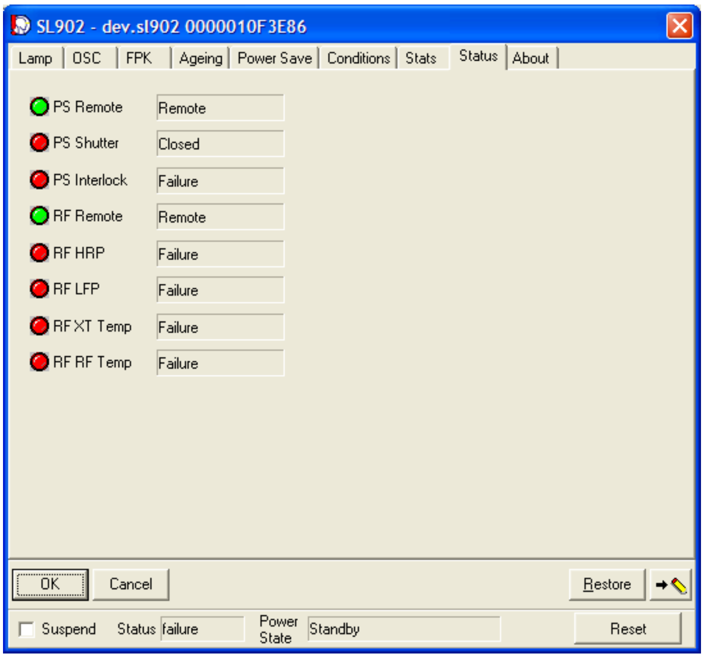
Auto-Write sets the interval by which the operating hours are written to the controller board's flash memory

NOTE

If you switch the laser on only for short times then we recommend to set the interval to 300 s to 900 s. Otherwise larger discrepancies may occur to real operating hours.

3.21.10. Parametrize - Status

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators.



PS Remote, PS Shutter, PS Interlock, RF Remote,

RF HRP, RF LFP, RF XT Temp, RF DRV Temp

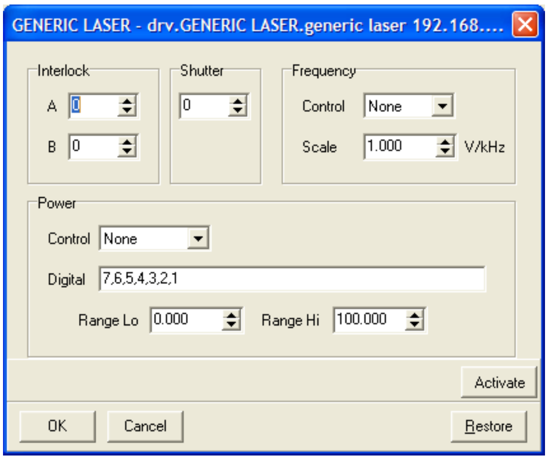
LED and status display shows the state of the corresponding component by a symbolized LED and a text. If the LED is green then the component is OK. If the LED is red then an error occurred at the component

3.22. generic laser - Generic Laser

for controller	NCC, ASC
device type	laser
driver version	1.38.2.2

The *generic laser* device is able to control most of the lasers lacking a specific laser driver.

3.22.1. Configure



Interlock

> **NOTE**
>
> A negative value means that the parallel input is low active. A value of 0 (zero) means that no input shall be used.

A sets the laser interlock A to a parallel input on the controller

B sets the laser interlock B to a parallel input on the controller

Shutter

Shutter input field sets the shutter control to a parallel output on the controller

> **NOTE**
>
> A negative value means that the parallel input is low active. A value of 0 (zero) means that no input shall be used. On NCC based controllers the value 12 sets the shutter control to the *Aux* output of the LASER CONTROL connector on the controller. On ASC based controllers the value 17 sets the shutter control to the *Aux* output of the LASER CONTROL connector on the controller.

Frequency

Control selects, by which analog output the oscillator frequency *Freq F* is controlled

- **None** no output
- **DAC A** analog output A
- **DAC B** analog output B

Scale sets the scale of oscillator frequency *Freq F* on the analog output

Power

Control selects by which analog output the pumping power is controlled

None no output

DAC A analog output A

DAC B analog output B

Parallel parallel output

Duty Cycle power is controlled by the duty cycle of a CO_2 laser. The duty cycle is defined as laser pulse duration divided by the whole period

Digital sets the pumping power control to parallel outputs. In the box the parallel output for the most significant bit is on the left and the the parallel output for the least significant bit is on the right. The parallel outputs are separated by commas

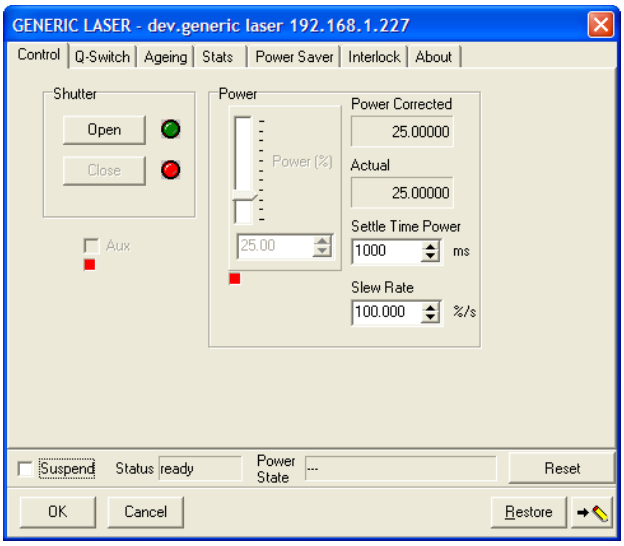
Range Lo sets the lower limit for pumping power

Range Hi sets the upper limit for pumping power

3.22.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.22.3. Parametrize - Control



Shutter

Open opens the mechanical laser shutter. If the LED is lit then the shutter is open

Close closes the mechanical laser shutter. If the LED is lit then the shutter is closed

Power

Power sets the electrical pumping power. This setting is not a relative value and is *not* normalized to the optical laser output. Therefor 100% are not equal to the maximal optical output power. Optical laser activity may occur e.g. at an electrical pumping power of 35% and the maximal optical output power may be reached at 70%. Set the wanted optical output power by observing the lamp current at the power supply and according to the characteristic diagram accompanying your laser

Power Corrected shows the corrected electrical pumping power. Within the lifetime of a lamp several ageing processes result in a slow power loss. If the laser is working at a constant electrical pumping power then the power loss can be measured depending on the operating hours and compensated later on by increasing the lamp current. In the *Ageing* tab the ageing behavior can be recorded

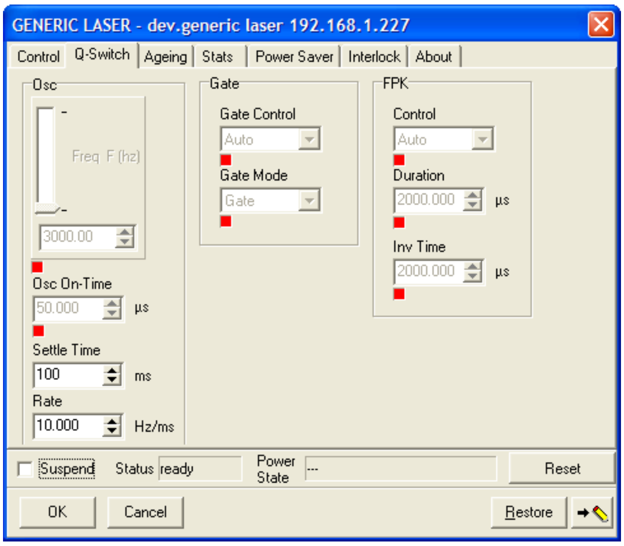
Actual shows the actual electrical pumping power. The upper and lower limit is set in the device driver configuration in *Range Hi* and *Range Lo*

Settle Time sets the settle time waited after the nominal value for pumping power has adjusted

Slew Rate sets the rate the nominal value for pumping power is approached with

Aux if this check box is selected then the *Aux* output of the controller's LASER CONTROL is set to active

3.22.4. Parametrize - Q-Switch



Osc

Freq F sets the oscillator frequency by which the controller triggers the Q-switch

Osc On-Time sets the oscillator ON-time

Settle Time sets the settle time waited after the nominal value for frequency has adjusted

Slew Rate sets the rate the nominal value for frequency is approached with

Gate

Control selects the gate control

Always off oscillator stays always off

Always on oscillator stays always on

Auto oscillator is automatically switched on and off

Gate Mode selects the signal generated at the controller's *Gate* output

Gated Osc pulses are generated with the parameters Freq F and Osc On-Time

Gate a single on/off signal is generated

FPK (First Pulse Kill) In continuously pumped solid state lasers with Q-switch the first laser pulse is significantly high, when the Q-switch inhibited laser emission for a longer time and a pulse burst was output thereafter. The super pulse at the beginning of the burst decreases the processing quality at many applications. Please find more detailed information about this subject in section 32.3.6.3, page 287 et sqq. and in the manual of your laser.

Control selects the FPK control

Auto FPK is automatically switched on and off

Always off FPK stays always off

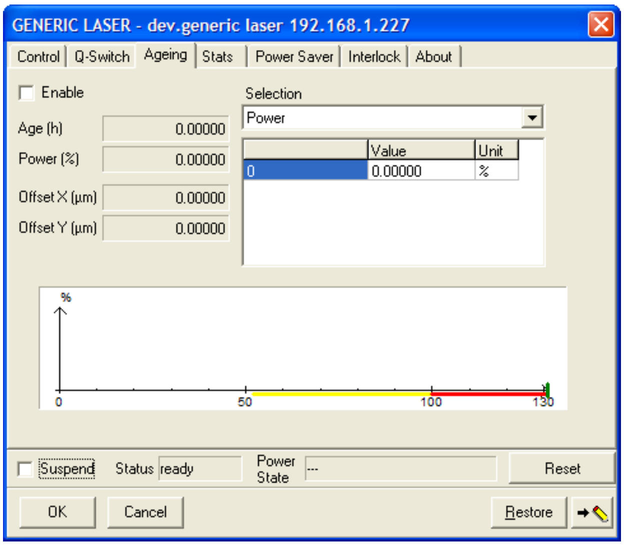
Always on FPK stays always on

Duration sets the time during which the FPK slope takes effect

Inversion Time sets the time after which a super pulse occurs

3.22.5. Parametrize - Ageing

In this tab you can record data about the ageing of lamps or diodes and use this data to automatically compensate the power loss resulting from this ageing. In addition the offset depending on power can be recorded to minimize the influence of power on the pointing stability of the laser.



Enable if this check box is selected then the specified characteristic diagrams are used to compensate for power loss and offset

Age shows the actual number of operating hours of the lamp or diode

Power shows the corrected pumping power

Offset X shows the corrected offset in X direction

Offset Y shows the corrected offset in Y direction

Selection Enter the values into the table beneath. Add rows via the context menu

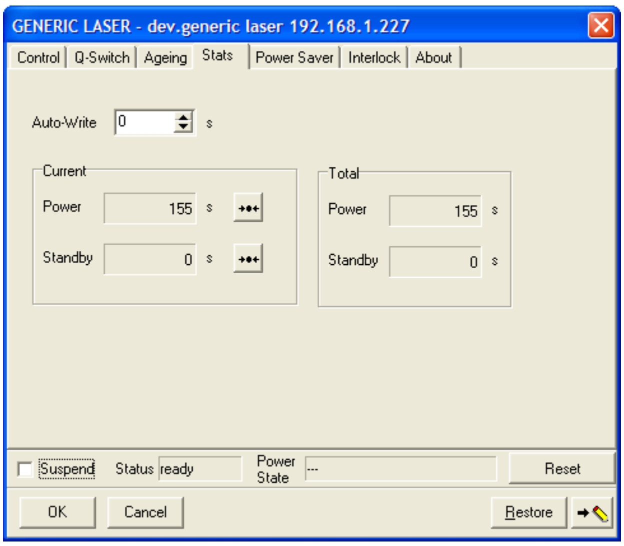
Power The pumping power is shown over the number of operating hours as a characteristic diagram

OffsetX The offset in X direction is shown over the pumping power as a characteristic diagram

OffsetY The offset in Y direction is shown over the pumping power as a characteristic diagram

3.22.6. Parametrize - Stats

This tab shows information about operating hours since the last lamp or diode change as well as the accumulated laser operating hours.



Auto-Write sets the interval by which the operating hours are written to the controller's board flash memory

NOTE

If you switch the laser on only for short times then we recommend to set the interval to 300 to 900 s. Otherwise larger discrepancies may occur to real operating hours.

Current

Power shows lamp or diode operating hours in power state since the last counter

reset resets the counter and opens the 3.24 Automatic Service Database Entry window

Standby shows the laser operating hours in standby state since the last counter

reset resets the counter and opens the 3.24 Automatic Service Database Entry window

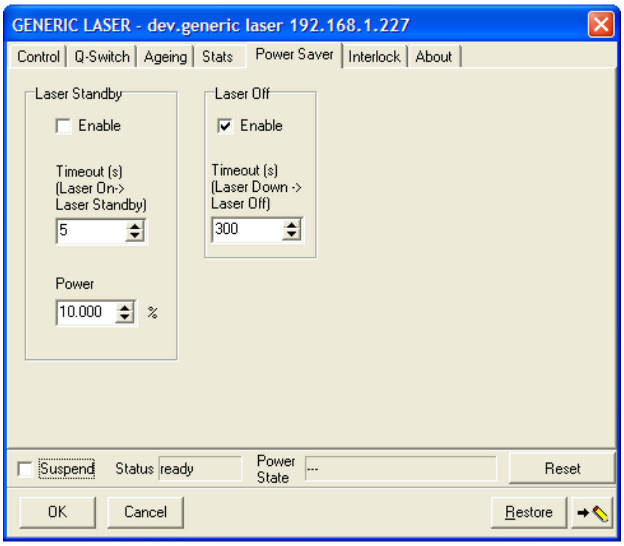
Total

Power shows the accumulated lamp or diode operating hours in power state

Standby shows the accumulated laser operating hours in standby state

3.22.7. Parametrize - Power Saver

If the laser is not in use over a time then the device driver can automatically switch the laser to standby state or switch it off completely to spare the lamps or diodes.



Laser Standby

Enable if this check box is selected then the standby function is activated

Timeout (Laser On → Laser Standby) sets the time where after the laser switches to standby state if not used

Power sets the pumping power for standby state

Laser Off

Enable if this check box is selected then the lase off function is activated

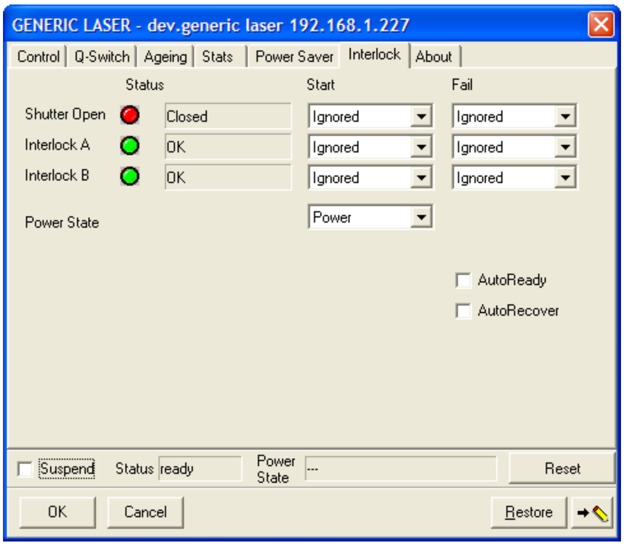
Timeout (Laser Down → Laser Off) sets the time where after the laser is switched off if not used and already in standby state

3.22.8. Parametrize - Interlock

In this tab you get information about the interlock state of your laser. A fault can be identified more easily by indicators. You can set the conditions which have to apply for a job start with *Job Start* and at which faults a job shall be canceled resp. which faults will be ignored. Further on you can set InScript's reaction to faults.

NOTE

Settings in this tab can not prevent the laser from shutting off when a fault occurs. The settings only affect InScript's behavior in reacting to faults.



Shutter Open, Interlock A, Interlock B, Power State

Column Status shows the state of the corresponding component by a symbolized LED and a text. If the LED is green then the component is OK. If the LED is red then an error occurred at the component

Column Start sets the conditions, which have to apply to enable *Job Start*

Ignored The program ignores the state of the corresponding component and enables *Job Start*

Open / OK / Power If the state of the corresponding component applies then the program enables *Job Start*

Column Fail sets the conditions, which have to apply to abort processing

Ignored The program ignores the state of the corresponding component and continues with processing

Closed / Failure If the state of the corresponding component applies then the program aborts processing

AutoReady if this check box is selected and a *Job Start* signal occurs then the driver gets the system automatically ready and begins with processing. When the driver is e.g. in power state *Standby* then it automatically switches to power state On and opens the laser shutter. As soon as the system is ready processing begins automatically

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically started

- You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

AutoRecover if this check box is selected and an error occurs then InScript executes a reset of the laser and tries that way to fix the error. As result the system may automatically continue with processing

WARNING

Visible and invisible laser radiation

Serious injury or property damage may occur when processing is automatically continued

- You are allowed to select this check box only if the optical path is completely encapsulated in a enclosed machine. Entries into the machine have to be equipped with approved interlock switches. If an entry is opened then the interlock switch has to shut the laser safety shutter by force with the highest priority. The machine has to comply with the laser safety regulations for manufacturing. The machine has to be approved by an authorized representative for laser safety.

3.23. Background to Modes of Operation

Q Switching

Q-switching of a CW laser oscillator refers to a process whereby the usual CWoscillation of the laser is modulated to provide short, high peak power pulses of laser radiation.

Q-switching is accomplished by temporarily reducing the quality factor (Q) of the laser resonator by the addition of a loss. Because of the low Q, the laser is prohibited from oscillating; however pumping of the laser rod continues allowing energy to be stored in the laser rod. When the Q is increased (i.e. the loss removed) the field in the resonator grows rapidly utilizing the energy stored in the laser rod. The consequence is the generation of a pulse with peak power well in excess of what is achievable under normal CW operation.

Acoustooptic Modul

The type of Q-switch employed in the Spectron DPSS laser is an acoustooptic modulator. An Acoustooptic modulator is a block of transparent quartz with an acoustic transducer bonded to one side. in acoustooptic modulators an acoustic wave sets up a pattern of density variations in the quartz crystal, the crystal then effectively functions as a diffraction grating changing the fraction of incident light it transmits.

This change in the quartz crystal is in response to the application of an external RF control signal.

First Pulse Kill (FPK)

If the laser resonator has been blocked for a time period longer than the Q-switching period the first laser pulse to be generated will be abnormally large in energy. This is often not desired and can lead to problems during material processing (see 4 Typical "First Pulse" effect when the laser is processing single characters).

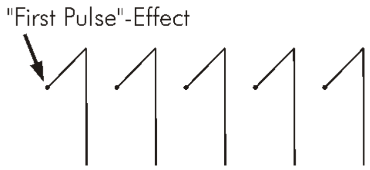


Figure 4: Typical "First Pulse" effect when the laser is processing single characters

To eliminate this effect FPK control is included as a standard system feature. The FPK operates by reducing the rate at which the RF control signal is removed from the modulator and so diminishing the intensity of the first laser pulse. If required the FPK can be overridden. If the FPK is switched off the FPK input must be enabled a minimum of 50μs before the Gate signal is applied and then each subsequent pulse from the laser will be suppressed.

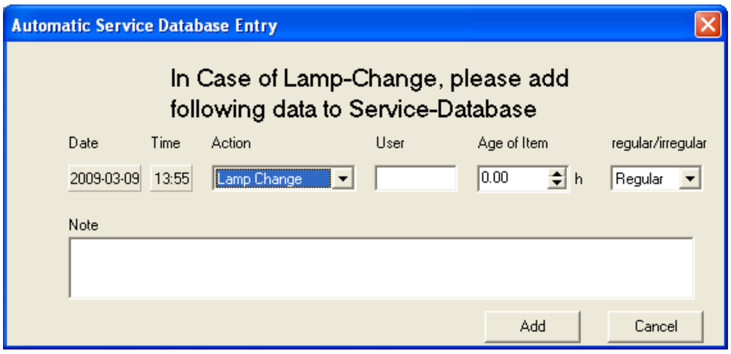
Safety Features

- Acoustooptic modulator over temperature
- RF modulator over temperature

The interlocks are combined to produce to a relay contact output which, when the RF unit is used in conjunction with the CW200S system controller, is fed into the interlock chain. An additional protection function is included which will not allowed the RF unit to move into any mode other than RF Off when the pump is not switched on.

3.24. Automatic Service Database Entry

To support the management of your service documentation, an entry can be added to the service database in this window.



Date, Time shows the actual date and the actual time that will be written to the service database

Action selects the action performed during the service

Amp Lamp Change at the moment only *Amp Lamp Change* is implemented

User sets the engineer's name who performed the service

Age of Item sets the age of the exchanged part since the last counter reset

regular/irregular selects, whether this is a regular or irregular service

Regular regular service

Irregular irregular service

Note sets an informative text that will be written to the service database

Add adds the entry to the service data base

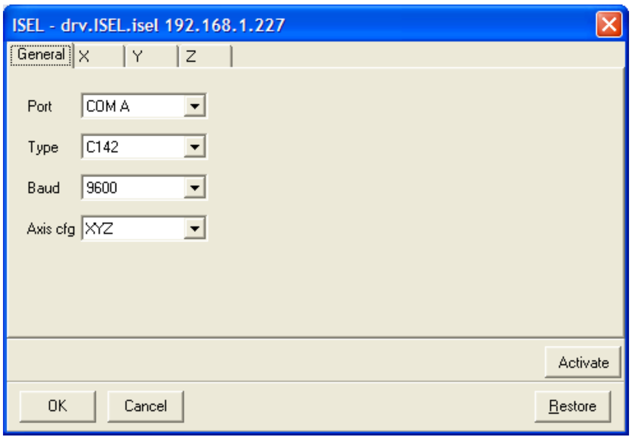
Cancel discards the entry and closes the window

3.25. isel - Universal Control for Motion Axes by ISEL

for controller	NCC, ASC
device type	motion axes
driver version	1.23.2.4

The *isel* device can control miscellaneous ISEL motion controllers.

3.25.1. Configure - General



Port selects the serial interface on the controller board for communication

COM A, COM B available serial interfaces

Type selects the motion control type

C142 4 axes motion control C142-4.1

IMC_MP iMC-MP motion control

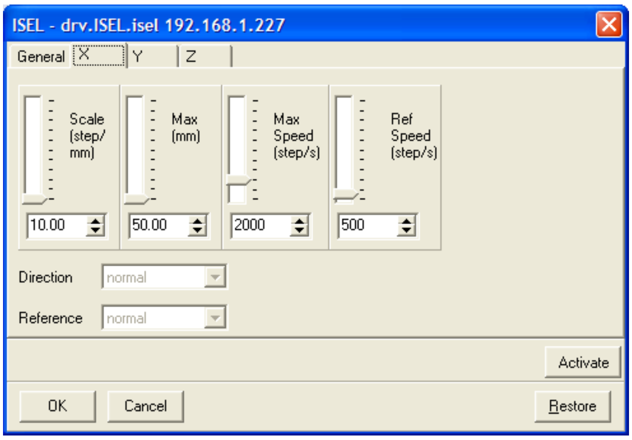
Baud selects the baud rate for the serial interface

9600, 19200 possible baud rates

Axis cfg selects, which axes has to be configured and controlled

X, XY, XZ, XYZ, XA, XYA, XZA, XYZA possible combinations of axes. Depending on the combination the respective tabs are shown

3.25.2. Configure - X / Y / Z / A



NOTE

Values making sense result from the properties of the servo motor connected and the spindle slope. Type in the values from the axis data sheet here. Too high values may result in positioning errors.

Scale sets the scale, i.e. the steps necessary to move 1 mm

Max sets the maximal traverse path

Max Speed sets the maximal speed

Ref Speed sets the speed used for finding the system home position

Direction selects the position of the reference point, see the ISEL control manual

- **normal** normal direction
- **reverse** reverse direction

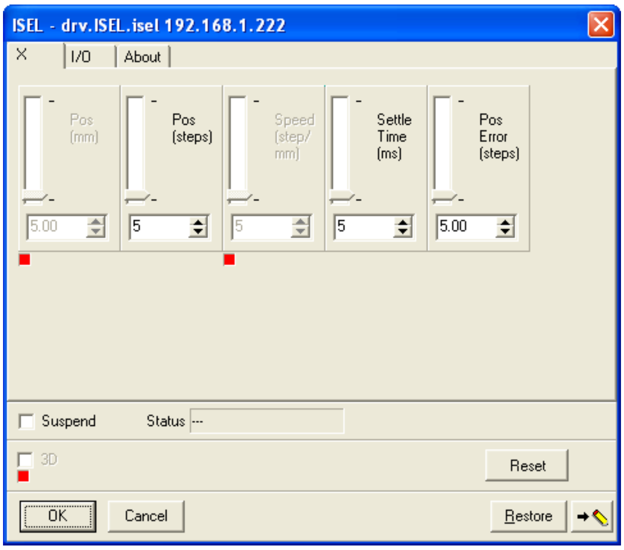
Reference sets

- **normal** normal direction
- **reverse** reverse direction

3.25.3. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.25.4. Parametrize - X / Y / Z / A



Pos (mm) sets the absolute position in mm

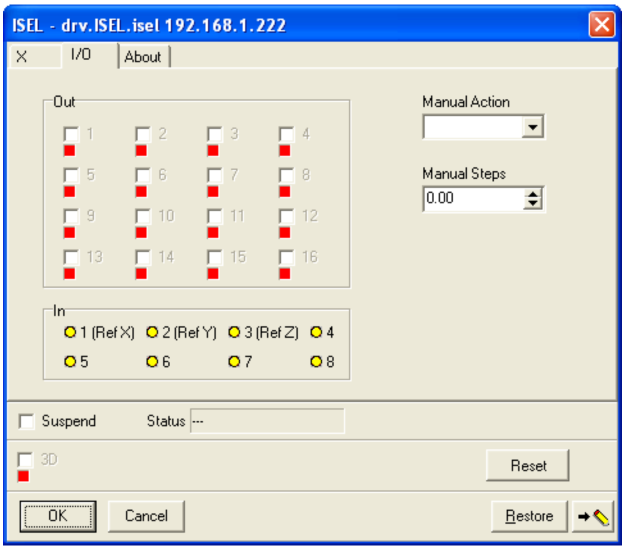
Pos (steps) sets the absolute position in steps

Speed sets the speed

Settle Time sets the settle time. This additional time is waited for, when the control has finished motion. This may be necessary, when e.g. a heavy mass is moved and the axis shows a damped oscillation at the end of the move

Pos Error not implemented yet

3.25.5. Parametrize - I/O



Out

1 ..16 if the check box is selected then the output is set to active. The I/Os are situated on the ISEL motion controller

In

1 (Ref X), 2 (Ref Y), 3 (Ref Z), .. 8 shows the state of the inputs. If the LED is lit then the input is active. Please note that the inputs 1, 2 and 3 show the reference switch state of the axes and can not be used for other purposes

Manual Action selects the action, see *Manual Steps*

none no action will be taken

X, Y, Z, A positive the respective axis will be moved in positive direction

X, Y, Z, A negative the respective axis will be moved in negative direction

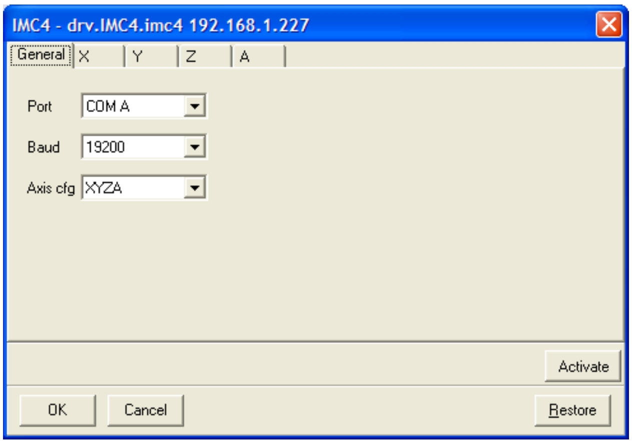
Manual Steps sets the number of steps to move

3.26. imc4 - IMC4 Motion Control

for controller	ASC
device type	motion axes
driver version	1.0

The *imc4* device is a stepper motor driver that can control up to four stepper motors.

3.26.1. Configure - General



Port selects the serial interface on the controller board for communication

COM A, COM B available serial interfaces

Type selects the motion control type

C142 4 axes motion control C142-4.1

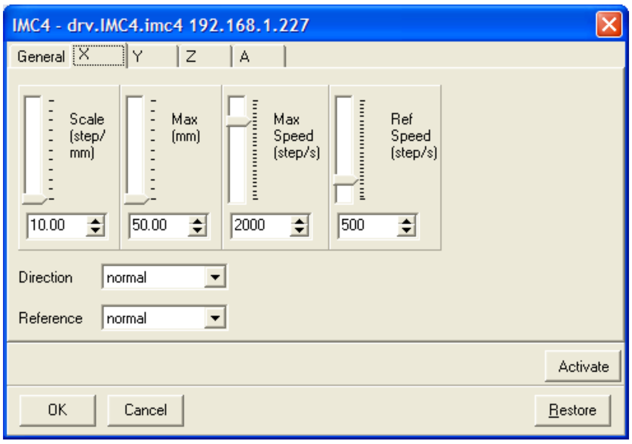
Baud selects the baud rate for the serial interface

9600, 19200 possible baud rates

Axis cfg selects, which axes has to be configured and controlled

X, XY, XZ, XYZ, XA, XYA, XZA, XYZA possible combinations of axes. Depending on the combination the respective tabs are shown

3.26.2. Configure - X / Y / Z / A



NOTE

Values making sense result from the properties of the servo motor connected and the spindle slope. Type in the values from the axis data sheet here. Too high values may result in positioning errors.

Scale sets the scale, i.e. the steps necessary to move 1 mm

Max sets the maximal traverse path

Max Speed sets the maximal speed

Ref Speed sets the speed used for finding the system home position

Direction selects the position of the reference point, see the ISEL control manual

- **normal** normal direction
- **reverse** reverse direction

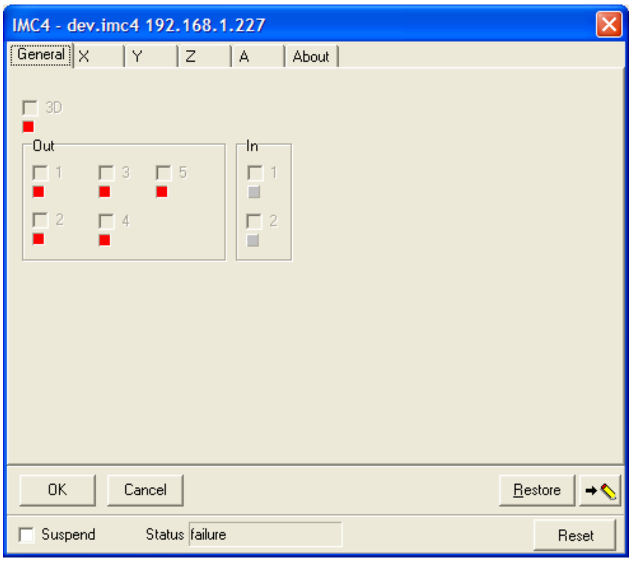
Reference selects the position of the reference point, see the IMC4 control manual

- **normal** normal direction
- **reverse** reverse direction

3.26.3. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.26.4. Parametrize - General



3D If the check box is selected then the motion control interpolates the axes motions in a way that axes X, Y and Z start and stop at the same time. Please note that axis A can not be synchronized with the other axes

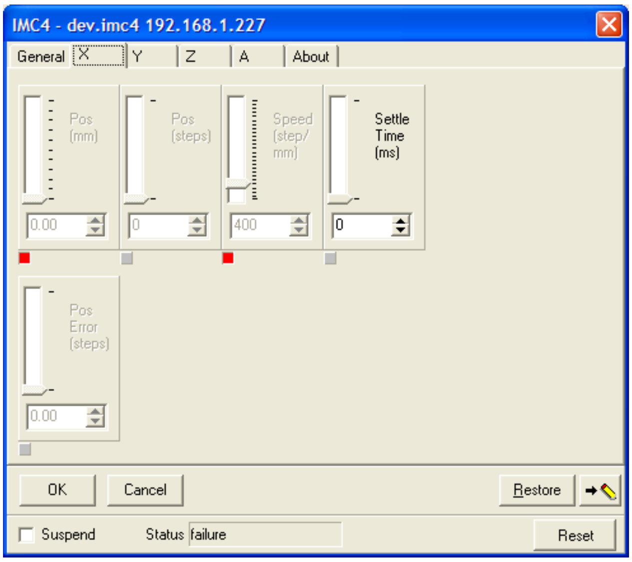
Out sets

1 .. 5 If the check box is selected then the corresponding parallel output is set to active

In sets

1 .. 2 If the check box is selected then the corresponding parallel input is active

3.26.5. Parametrize - X / Y / Z / A



Pos (mm) sets the absolute position

Pos (step) sets the absolute position

Speed sets the speed

Settle Time sets the settle time. This additional time is waited for, when the control has finished motion. This may be necessary, when e.g. a heavy mass is moved and the axis shows a damped oscillation at the end of the move

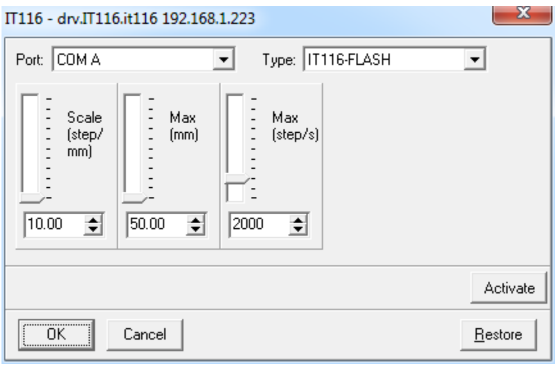
Pos Error not implemented yet

3.27. it116 - Control for Motion Axis IT116 by ISEL

for controller	NCC, ASC
device type	motion axes
driver version	1.62.114.3

The *it116* device is meant for 1 axis and simple positioning tasks. The axis is controlled via a serial interface.

3.27.1. Configure - General



NOTE

Values making sense result from the properties of the servo motor connected and the spindle slope. Type in the values from the axis data sheet here. Too high values may result in positioning errors.

Port selects the serial interface on the controller for communication

COM A, COM B available serial interfaces

Type selects the controller type

IT116, IT116-Flash, IT116-Mini supported controller types

NOTE

Setting IT116-Flash or IT116-Mini supports also the newer LES-4 axis as well as its predecessor.

CAUTION

Limit switch 2 of a newer LES-4 axis is not recognized by a controller of type IT116.

Material damage

- **Do not** use setting IT116 in combination with a newer LES-4 axis.
- In case you have to use the IT116 setting in combination with the newer LES-4 axis, ISEL provides an instruction manual for downgrading the newer LES-4 axis to its predecessor.

Scale sets the scale, i.e. the steps necessary to move 1 mm

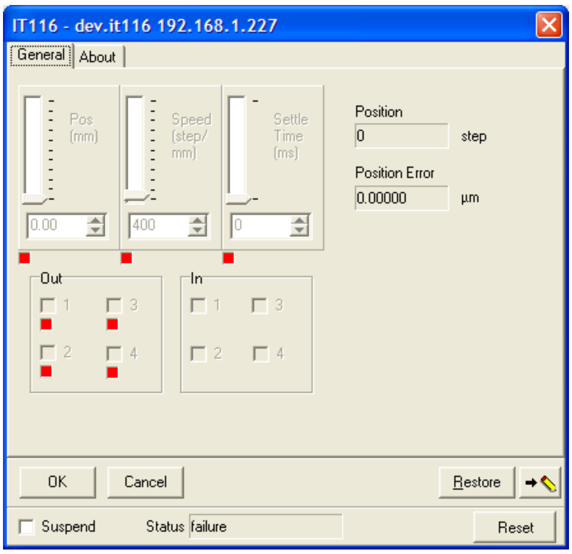
Max (mm) sets the maximal traverse path

MAx (steps/s) sets the maximal speed

3.27.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.27.3. Parametrize - General



Pos sets the nominal position

Speed sets the speed

Settle Time sets the settle time. This additional time is waited for, when the control has finished motion. This may be necessary, when e.g. a heavy mass is moved and the axis shows a damped oscillation at the end of the move

Position shows the current position

Position Error shows the position error

Out sets

1 .. 4 If the check box is selected then the corresponding parallel output is set to active

In sets

1 .. 4 If the check box is selected then the corresponding parallel input is active

3.28. ims - IMS Motion Control

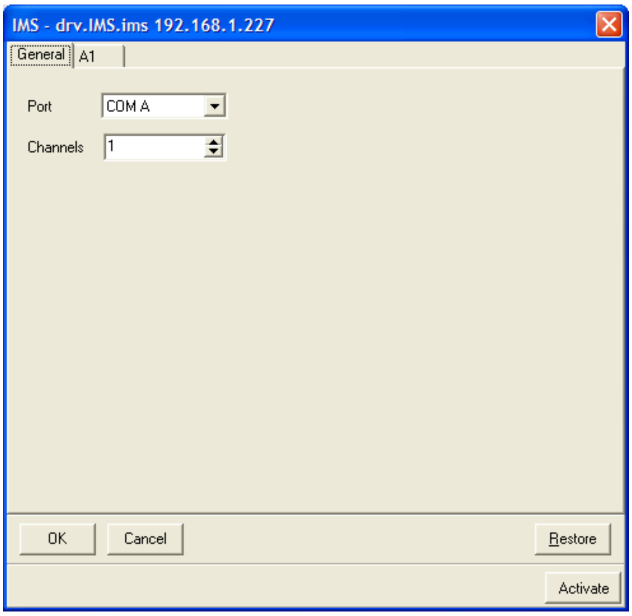
for controller	NCC, ASC
device type	motion axes
driver version	1.0

The *ims* device controls IM483 servo motor modules by Intelligent Motion Systems Inc. Up to 8 of these modules can be controlled via 1 serial interface in a bus connection.

NOTE

Before activating the device driver, the number of motion axes has to be entered in *Channels*, the motor configuration has to be entered for each motion axis and an unique name has to be chosen in the respective tab in the *Name* list.

3.28.1. Configure - General



NOTE

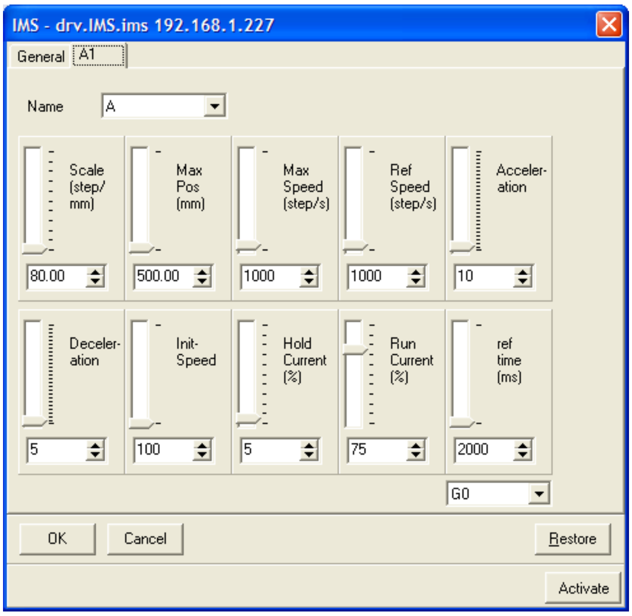
Values making sense result from the properties of the servo motor connected and the spindle slope. Type in the values from the axis data sheet here. Too high values may result in positioning errors.

Port selects the serial interface on the controller for communication

COM A, COM B available serial interfaces

Channels sets the number of IMS modules connected to the serial interface. Depending on the number the respective tabs appear for configuration. Up to 8 modules can be configured

3.28.2. Configure - A1 .. A8



Name selects an unique character for the motion axis

A .. Z, a .. z available characters

Scale sets the scale

Max Pos sets the maximal traverse path

Max Speed sets the maximal speed

Ref Speed sets the speed used for finding the system home position

Acceleration sets the acceleration in arbitrary units from 0 to 255

Deceleration sets the deceleration in arbitrary units from 0 to 255

Init-Speed sets the initialization speed in arbitrary units from 0 to 255

Hold Current sets the hold current applied to the servo motor while holding position. This current acts like a motor break. Please note, that a too high hold current applied over a longer time results in motor overheating

Run Current sets the current applied to move the motor

Ref Time sets the maximal allowed time for finding the home position

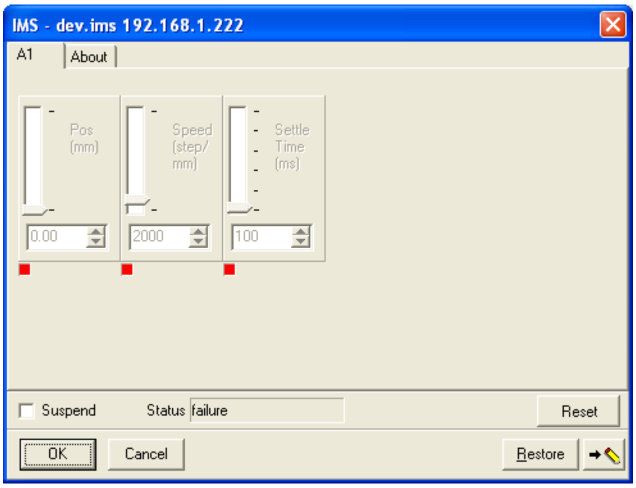
Initialisation dropdown selects the mode of initialization

- **G0** starts the customer specific initialization program from address 0
- **F** normal initialization

3.28.3. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.28.4. Parametrize - A1 .. A8



Pos sets the nominal position

Speed sets the speed

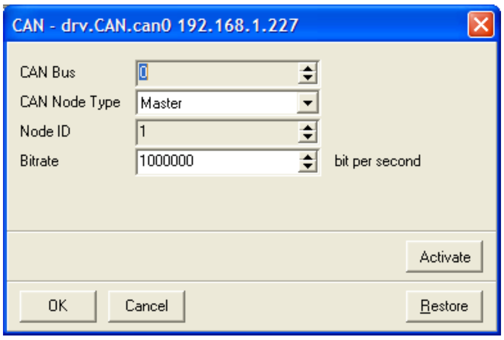
Settle Time sets the settle time. This additional time is waited for, when the control has finished motion. This may be necessary, when e.g. a heavy mass is moved and the axis shows a damped oscillation at the end of the move

3.29. can0/1 - Controller Area Network

for controller	ASC
device type	misc.
driver version	1.0

The *can0/1* device drives the CAN interface at the ASC controller. The can1 device is used for internal purposes. The can0 device is used for communication via can bus. See the *Manual -- ASC System Controller* for the CAN connector's pinout.

3.29.1. Configure



CAN Bus shows the CAN bus number

CAN Node Type selects the CAN node type

- **Master** sets the bus as *Master*
- **Slave** sets the bus as *Slave*

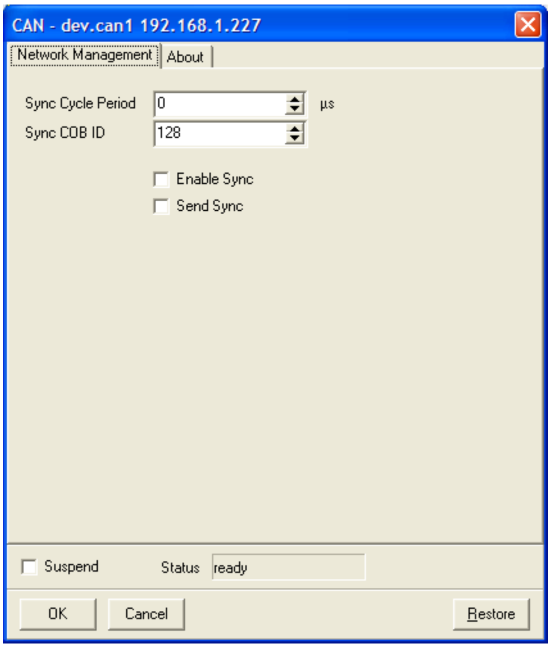
Node ID shows the node ID number

Bitrate sets the bitrate

3.29.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.29.3. Parametrize - Network Management



Sync Cycle Period sets the Sync cycle time. Only a master device can send Sync signals to all slaves. This Sync signal initiates all slaves to send responses at the same time (the returned values are "synced"). This value should not be less than 4000 μs (4 ms)

Sync COB ID sets the ID for the Sync COB (communication object)

Enable Sync If the checkbox is selected then synchronization is enabled

Send Sync if this checkbox is selected then a *Sync* signal is sent to all slaves (see also *Sync Cycle Period*). The checkbox is unchecked immediately after the Sync signal was sent

Particularities

Here is a short example sequence of events for starting up a CAN communication:

Step 1 Connect the can0 device to the CAN bus (can0 = ASC 9-pin connector) , see the *Manual -- ASC System Controller*

Step 2 Configure device can0

Step 3 Set *CAN Node Type* to *Slave*

Step 4 Configure *Node ID* and *Bitrate* the values of your CAN bus

Step 5 Activate the can0 device (see 2.6.4 Activate)

After the device is activated, the ASC should be visible by the CAN Master device and it will output the name "ASC5200Slave" on the ObjectDictionary-Index 0x1008.

PLC States

The current PLC state can be queried over ObjectDictionary-Index 0x2003:0x01. The value is composed by these bits:

Bit1	DEVICES_FAILURE	0x0002
Bit2	DEVICES_READY	0x0004
Bit4	JOB_READY	0x0010
Bit5	JOB_ACTIVE	0x0020

Job Control

Job Start write 1 to ObjectDictionary-Index 0x2000:0x00

Job Abort write 1 to ObjectDictionary-Index 0x2002:0x00

Load Job to load a job, you have to write its file name (e.g. "Jobfile.job") to ObjectDictionary-Index 0x2013:0x00. The job has to be saved on the filesystem of the ASC controller (e.g. \\<ASC ip-number>\Data\jobs)

Select Job to select a job, write the job name (the name of the Job node, not the file name, which may be different) to ObjectDictionary-Index 0x2014:0x00

Job variables and other variables can be modified via CAN.

PDOs - Process Data Objects

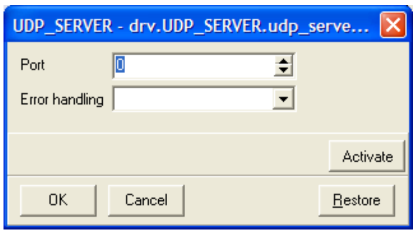
Four PDOs or Process Data Objects with up to 64 bit can be defined. A possible use of this feature could be to send a PDO every time the PLC state changes.

3.30. udp_server - User Datagram Protocol Server

for controller	ASC
device type	misc.
driver version	1.0

The *udp_server* device enables communication between an ASC controller and a client by transport of UDP datagrams over ethernet, see documentation *ARG_InScript – ARG_Req_UDP*.

3.30.1. Configure



Port sets the UDP port for the server

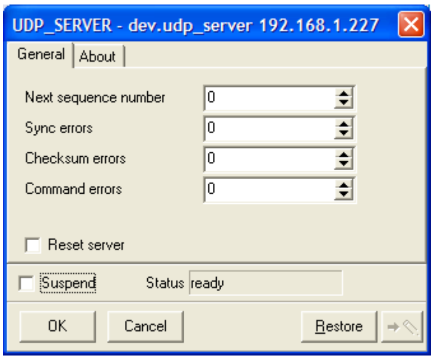
Error handling selects how errors will be handled

> **Count only** errors will only be counted
>
> **Device failure** the device will fall in failure state
>
> **Send message** a message will be sent on error

3.30.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.30.3. Parametrize - General



Next sequence number shows the next sequence number (the UDP protocol itself does not have sequence numbers; this is the internal sequence number for UDP data packages or *UDP datagrams*)

Sync errors shows the number of sync errors

Checksum errors shows the number of checksum errors

Command errors shows the number of command errors

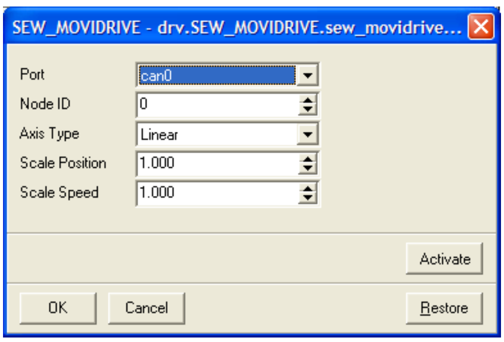
Reset server if the checkbox is selcted then the server will be reset

im

3.31. sew_movidrive

for controller	ASC
device type	misc.
driver version	1.0

3.31.1. Configure



Port selects which CAN device will be used

can0 CAN device 0 will be used

can1 CAN device 1 will be used

Node ID sets the node ID

Axis Type selects the axis type

Linear sets the type to linear axis

Rotation sets the type to rotation axis

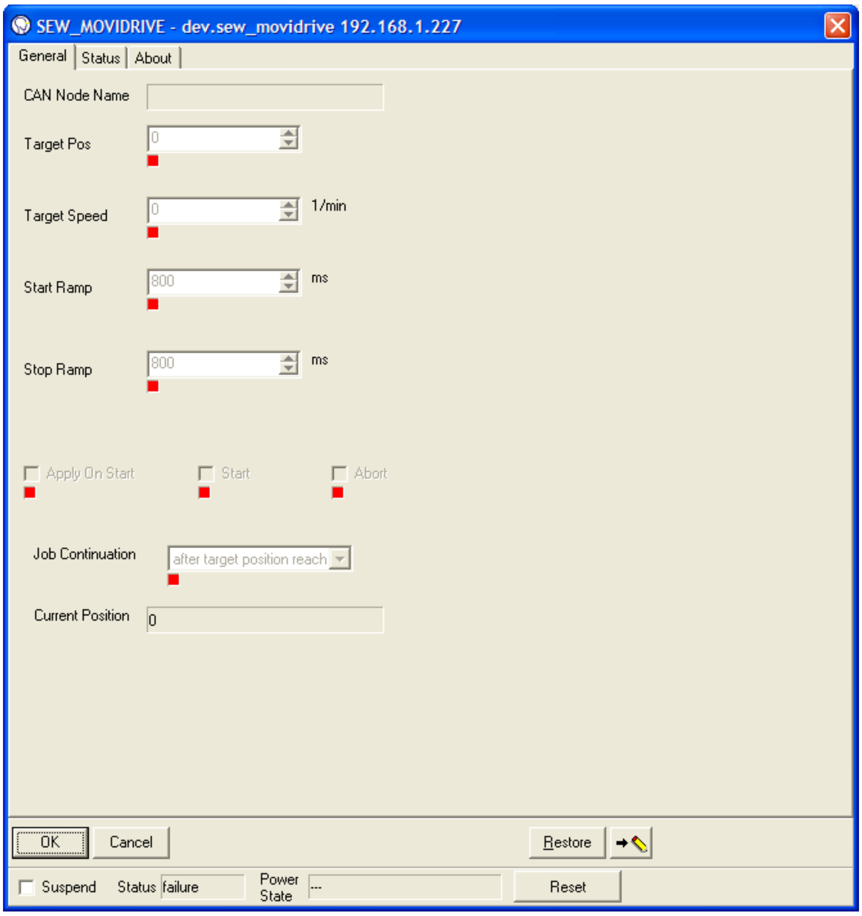
Scale Position sets the factor the position will be scaled with

Scale Speed sets the factor the speed will be scaled with

3.31.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.31.3. Parametrize - General



CAN Node Name shows the CAN node name

Target Pos sets the nominal position

Target Speed sets the nominal speed

Start Ramp sets the time for acceleration until the target speed is reached

Stop Ramp sets the time for deceleration until stop

Apply On Start if this checkbox is selected a CAN sync signal is sent out after successfully sending the PDO (CAN Process Data Object). For instance you can use this mechanism if you have two axis and want to apply the settings synchroneously. Uncheck *Apply On Start* for the first axis then do the settings. Check *Apply On Start* for the second axis and do the settings. On start a CAN sync signal is sent and all parameters in the BUS system are set simultaneously.

Start if this checkbox is selected then axis motion will be started. The checkbox is unchecked immediately after pressing it

Abort if this checkbox is selected then axis motion will be aborted. The checkbox is unchecked immediately after pressing it

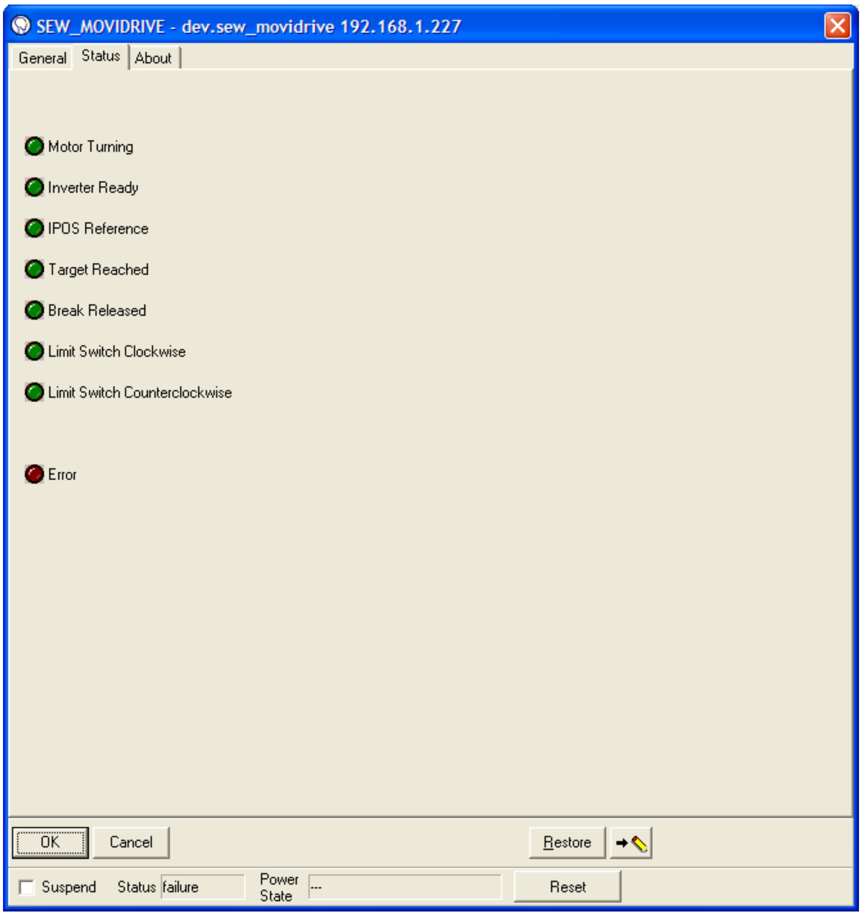
Job Continuation selects when the job will be continued

while moving the job will be continued while the axis is moving. E.g. for processing while the axis is moving

after target position reached the job will be continued if the target position is reached. E.g. for processing after the axis reached a position

Current Position shows the current position

3.31.4. Parametrize - Status



Motor Turning the green LED is lit when the motor is turning

Inverter Ready the green LED is lit when the inverter is ready

IPOS Reference the green LED is lit when the drive is referenced (reference travel has completed successfully)

Target Reached the green LED is lit when the nominal position is reached

Break Released the green LED is lit when the break is released

Limit Switch Clockwise the green LED is lit when

Limit Switch Counterclockwise the green LED is lit when

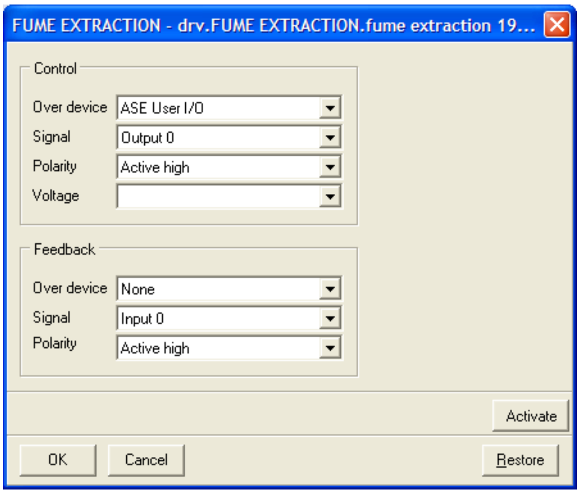
Error the red LED is lit when an error occures

3.32. fume extraction - Fume Extraction

for controller	ASC
device type	misc.
driver version	1.0

The *fume extraction* device drives a fume extraction by control and feedback signals. Parameters regarding these signals and which device (i.e. connector) they should be located at can be defined here.

3.32.1. Configure



Control The Control signal will be sent to the fume extraction device over a device, which usually is a connector, e.g. the USER connector at the ARGES System Controller, see section 3.36 ase user io - USER Inputs and Outputs

Over device sets the device

Signal sets the output, which will be used for the Control signal on the chosen device

Polarity sets the polarity of the Control signal, i.e. defines whether the fume extraction device needs a high or a low active signal

Voltage sets the output voltage for the Control signal

Internal 5V sets the output voltage to 5 V and fixes this voltage for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

External sets the output voltage to the external supply voltage and fixes this voltage for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

Any sets the output voltage to any voltage that is defined for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

Feedback The Feedback signal will be received from the fume extraction device over a device, which usually is a connector, e.g. the USER connector at the ARGES System Controller, see section 3.36 ase user io - USER Inputs and Outputs

Over device sets the device

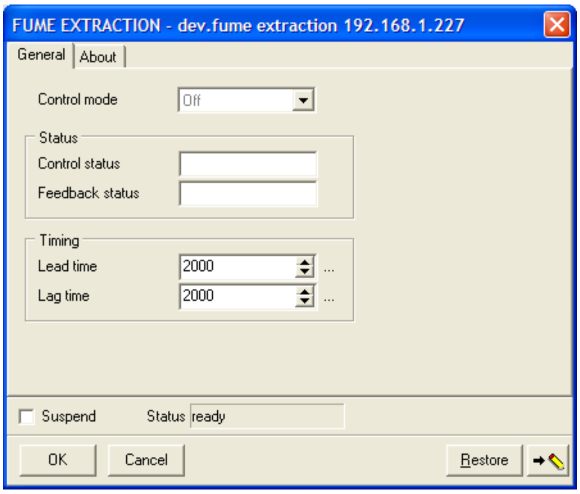
Signal sets the input, which will be used for the Feedback signal on the chosen device

Polarity sets the polarity of the Feedback signal, i.e. defines whether the fume extraction device supplies a high or a low active signal

3.32.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.32.3. Parametrize - General



Control mode sets whether the fume extraction device is switched *Off*, *On* or *Job controlled*. To control the fume extraction device, while a job is being executed, use InScript's pen mechanism. How to use pens and change parameters during a job, see section 4.9 Manage Pens

Status

Control signal shows the signal's level and the level's human readable name

Feedback signal shows the signal's level and the level's human readable name

Timing

Lead time sets the time needed to establish the air flow necessary for nominal operation

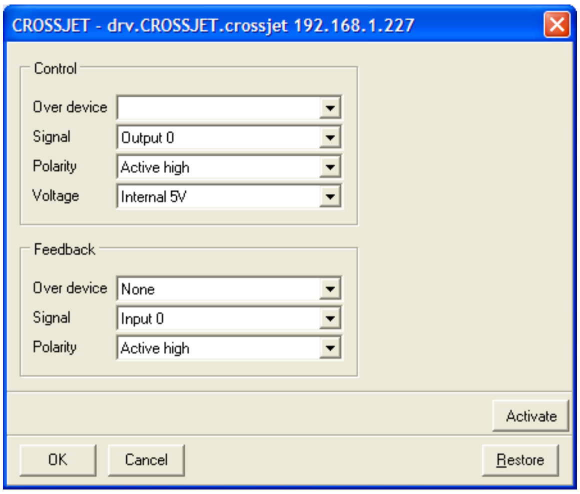
Lag time sets the time needed to maintain the air flow necessary for nominal operation after the processing has ended

3.33. crossjet - Crossjet

for controller	ASC
device type	misc.
driver version	1.3.2.2

The *crossjet* device drives a crossjet nozzle by control and feedback signals. Parameters regarding these signals and which device (i.e. connector) they should be located on, can be defined here.

3.33.1. Configure



Control The Control signal will be sent to the crossjet device over a device, which usually is a connector, e.g. the USER connector at the ARGES System Controller, see section 3.36 ase user io - USER Inputs and Outputs

Over device sets the device

Signal sets the output, which will be used for the Control signal on the chosen device

Polarity sets the polarity of the Control signal, i.e. defines whether the crossjet device needs a high or a low active signal

Voltage sets the output voltage for the Control signal

Internal 5V sets the output voltage to 5 V and fixes this voltage for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

External sets the output voltage to the external supply voltage and fixes this voltage for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

Any sets the output voltage to any voltage that is defined for the entire block of outputs the signal belongs to, see e.g. section 3.36 ase user io - USER Inputs and Outputs

Feedback The Feedback signal will be received from the crossjet device over a device, which usually is a connector, e.g. the USER connector at the ARGES System Controller, see section 3.36 ase user io - USER Inputs and Outputs

Over device sets the device

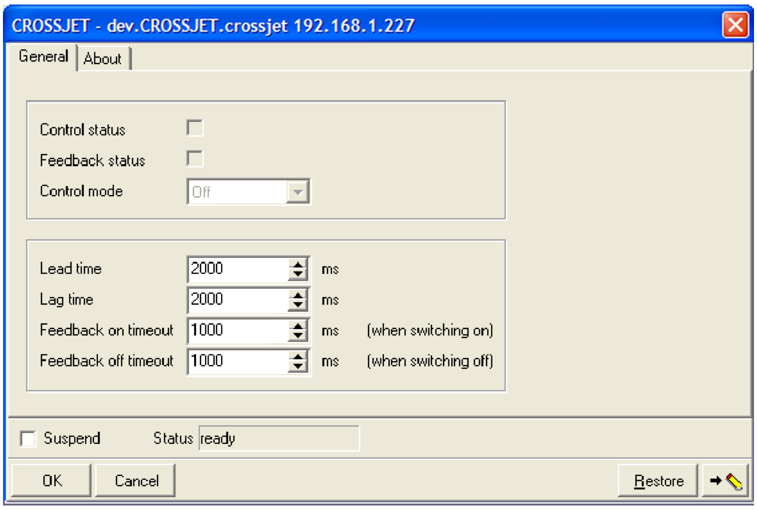
Signal sets the input, which will be used for the Feedback signal on the chosen device

Polarity sets the polarity of the Feedback signal, i.e. defines whether the crossjet device supplies a high or a low active signal

3.33.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.33.3. Parametrize - General



Control mode sets whether the crossjet device is switched *Off*, *On* or *Job controlled*. To control the crossjet device, while a job is being executed, use InScript's pen mechanism. How to use pens and change parameters during a job, see section 4.9 Manage Pens

Status

Control signal shows the signal's level and the level's human readable name

Feedback signal shows the signal's level and the level's human readable name

Timing

Lead time sets the time needed to establish the air flow necessary for nominal operation

Lag time sets the time needed to maintain the air flow necessary for nominal operation after the processing has ended

Feedback on-timeout sets the time period in which the crossjet device has to send the Feedback signal when it was switched on

Feedback off-timeout sets the time period in which the crossjet device has to send the Feedback signal when it was switched off

3.34. hid - Human Interface Device

for controller	ASC
device type	misc.
driver version	1.0

The *hid* device manages ASC displays using a can bus. It can be activated or deactivated. Normally the device must not be configured or parameterized.

NOTE

The *hid* device has no graphical user interface.

CAUTION

You have to know exactly how to set the variables here

Loss of data, jobs and other settings

- Do not edit any variables unless explicitly told to do so by ARGES.

3.35. profibus - Process Field Bus

for controller	ASC
device type	misc.
driver version	1.0

The *profibus* device requires optional hardware. Find more information about the *profibus* device in the documentation *ARGES System Controller – Fieldbus Interface for PROFIBUS – Interface Description*.

NOTE

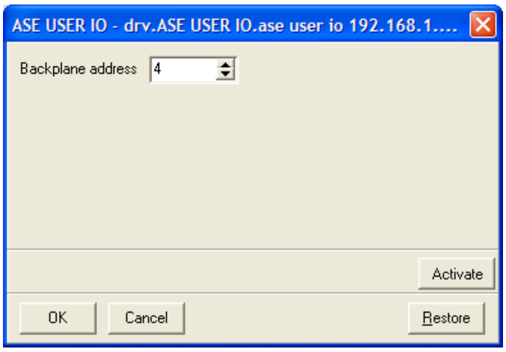
The *profibus* device has no graphical user interface yet.

3.36. ase user io - USER Inputs and Outputs

for controller	ASC
device type	misc.
driver version	1.0

The *ase user io* device controls inputs and outputs located at the ASC controller's *USER* connector or its respective breakout box.

3.36.1. Configure



Backplane address sets the ASE PCB's backplane address in the ASC PCB stack

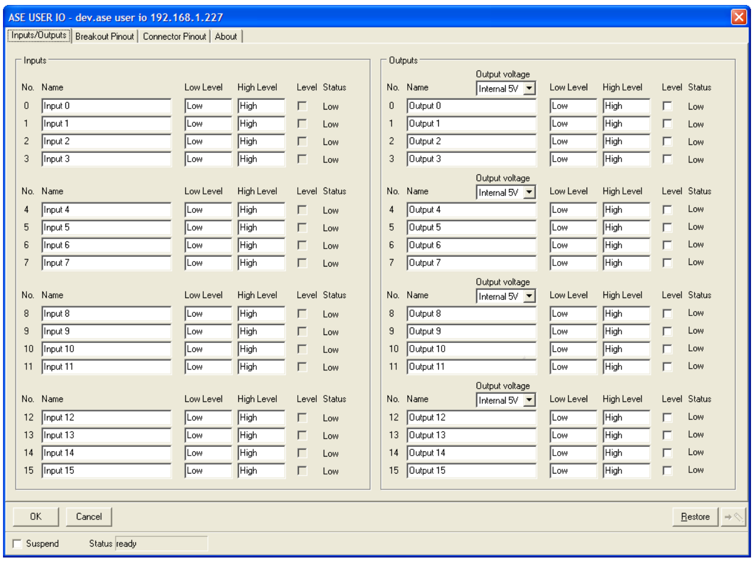
NOTE

Do not modify this setting without consulting ARGES.

3.36.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.36.3. Parametrize - Inputs/Outputs



Inputs/Outputs **No.** shows the input and output number

Name shows the signal's name that is linked from a device to the respective input or output.

Unused inputs and outputs are shown as *Input n* or *Output n*. Only unused inputs and outputs can be renamed here. Such inputs and outputs are set to low level and are high active by default

TIP

Inputs and outputs can be addressed by their variable name when using the *Script* node in a job. The signal's variable name appeares in the *Name* column, in the context menu.

Low level shows the human readable name for the signal's low level

High level shows the human readable name for the signal's high level

Level
shows the input signal's level
shows and sets the output signal's level

Status shows the human readable name for the signal's actual level

Output voltage sets the output voltage for a group of 4 outputs each

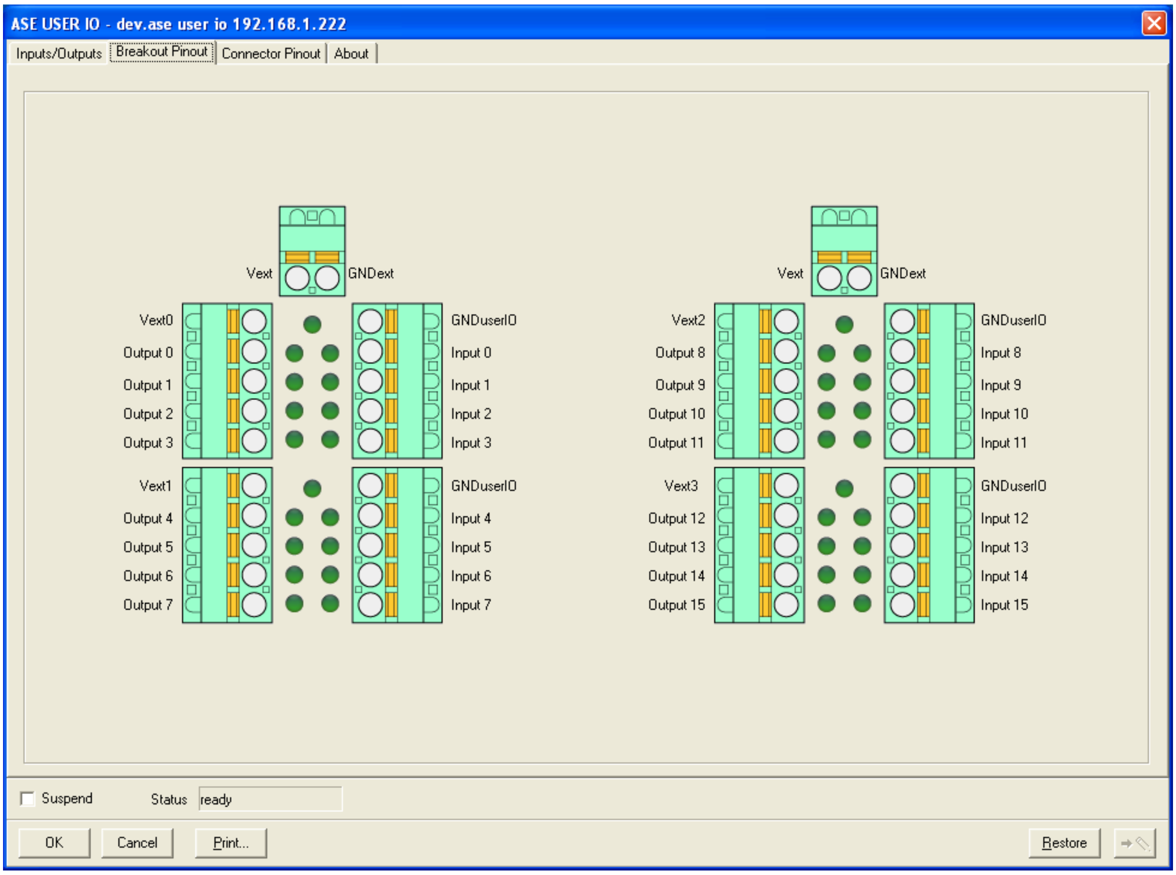
Internal 5V sets the output voltage to 5 V

External sets the output voltage to 5 — 28 V depending on the supply voltage connected to the upper V_{ext}/GND_{ext} connector at the USER breakout box, see section 3.36.4 Parametrize - Breakout Pinout.

NOTE

With this setting the $V_{ext0\ ..\ ext3}/GND_{userIO}$ pair of the respective group has to be hard-wired to the upper V_{ext}/GND_{ext} connector.

3.36.4. Parametrize - Breakout Pinout

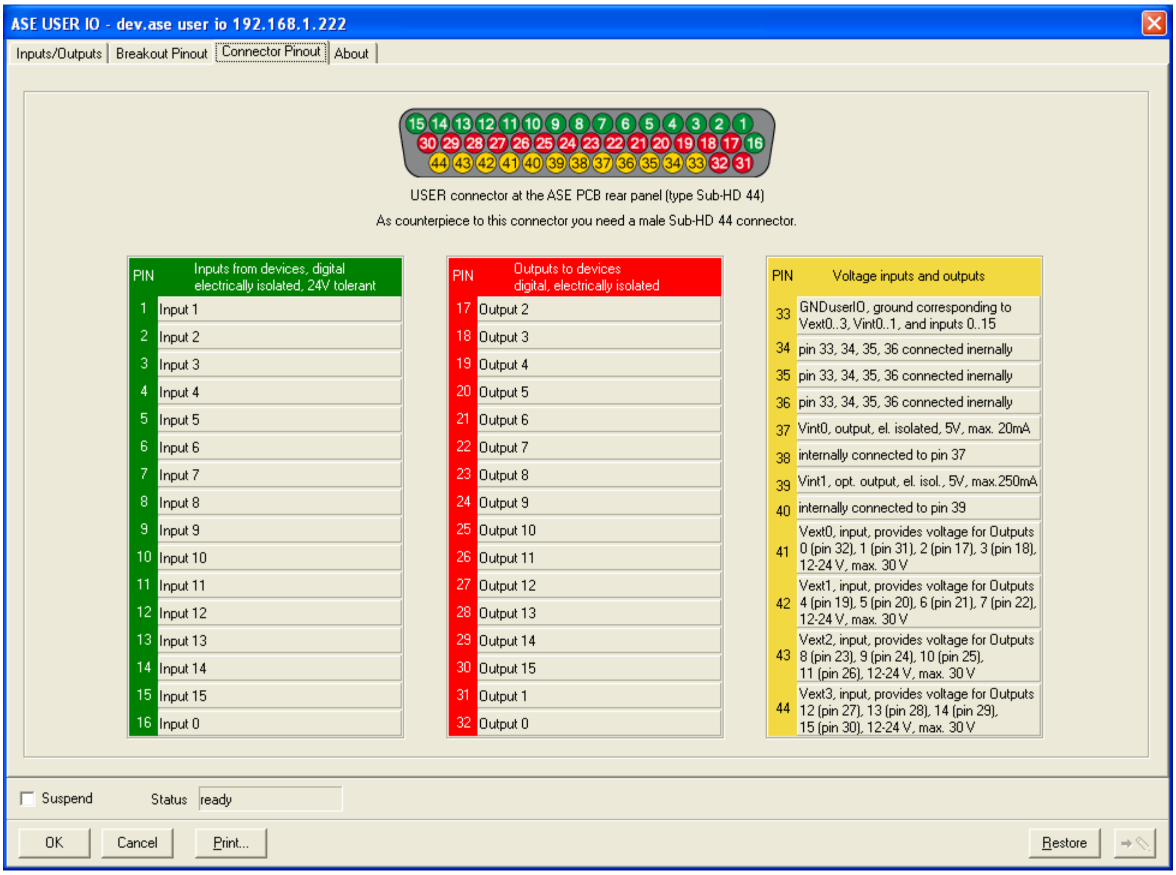


This tab shows the actual breakout pinout as defined in tab *Inputs/Outputs* and in the devices connected to the USER Inputs/Outputs device.

TIP

Print this tab and keep the hardcopy near the USER breakout box.

3.36.5. Parametrize - Connector Pinout



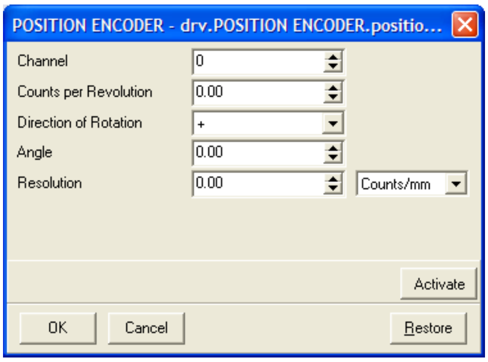
This tab shows the current connector pinout as defined in tab *Inputs/Outputs* and in the devices connected to the *ase user io* device.

3.37. position encoder - Position Encoder

for controller	ASC
device type	misc.
driver version	1.4

The *position encoder* device enables the usage of a position encoder. The device is using 4-fold-gating.

3.37.1. Configure



Channel sets the connector at the ASC controller the encoder is connected to. If the encoder is connected to connector ENCODER 1 then select "0". If the encoder is connected to connector ENCODER 2 then select "1"

Counts per Revolution sets the expected counts per revolution.

> **NOTE**
>
> Take account of 4-fold gating and possible gear boxes.
>
> Example:
> Encoder signals per encoder revolution × 4 × gear transmission ratio = counts per revolution
> e.g. 2048 × 4 × 216 = 1769472

Direction of Rotation selects the direction of rotation

+, – inverts whether the resulting signals are incremental or decremental. This actually depends on the machine setup

Angle sets the angle between the object's motion vector and the scan field's X-axis. This angle is measured counterclockwise (positive values)

Resolution sets the expected resolution.

Counts per revolution : object length or circumference = resolution
e.g. 1769472 : 1981 = 893.221

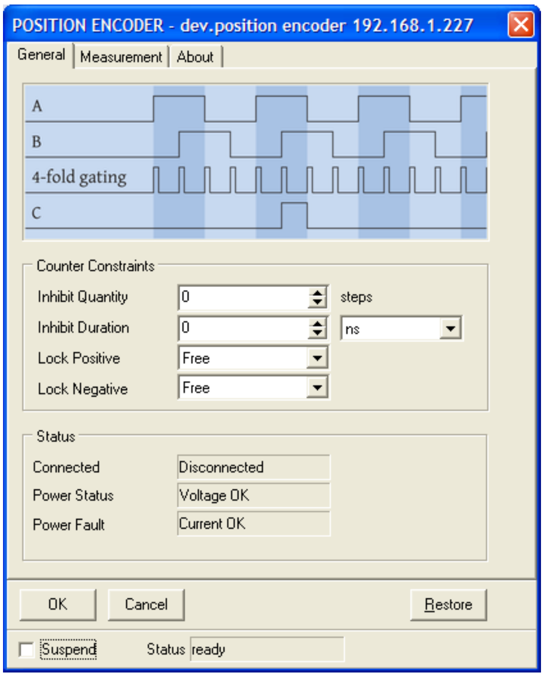
Resolution unit dropdown sets the unit for the value in *Resolution*

Counts/mm, mm/Count, Counts/degree, Degrees/Count possible units

3.37.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.37.3. Parametrize - General



Counter Constraints

Inhibit Quantity sets the number of steps that will be ignored for the C-signal when measurement begins. Whatever comes last of *Inhibit Quantity* and *Inhibit Duration*

Inhibit Duration sets the time in ns, µs, ms or s for which the steps will be ignored for the C-signal when measurement begins. Whatever comes last of *Inhibit Quantity* and *Inhibit Duration*

Lock Positive selects whether incremental counts are counted or not

Free incremental counts are counted

Locked incremental counts are not counted

Lock Negative selects whether decremental counts are counted or not

Free decremental counts are counted

Locked decremental counts are not counted

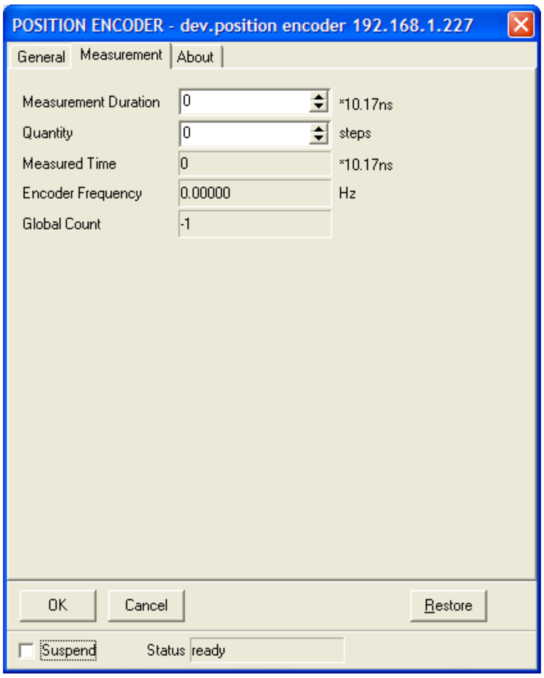
Status

Connected shows whether the position encoder device is connected or not. See the documentation of the ASC controller: At the ENCODER connector pins 9 and 11 have to be connected at the encoder side of the supply cable

Power Status shows whether the voltage is OK or not

Power Fault shows whether the current is OK or not

3.37.4. Parametrize - Measurement



Measurement Duration sets the duration ($\times$ 10.17 ns) used for velocity measurement. The value has to be high enough to get reliable results. This method is recommended in case the velocity is high. For low velocity see *Quantity*

Quantity sets the quantity of steps used for velocity measurement. This method is recommended in case the velocity is low. For high velocity see *Measurement Duration*

NOTE

At the moment this method is not implemented yet.

Measured Time shows the measured time in $\times$ 10.17 ns

NOTE

At the moment this function is not implemented yet.

Encoder Frequency shows the encoder frequency

Global Count shows the global counts. To reset the *Global Count* reset the ASC controller.

3.37.5. Processing-On-The-Fly

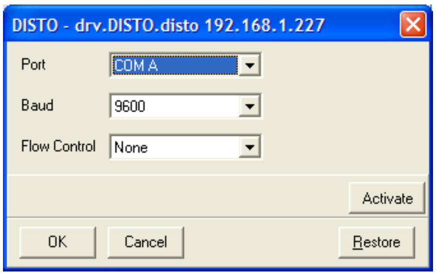
If you need more information concerning this topic, please contact ARGES.

3.38. disto - Distance Measurement Module

for controller	ASC
device type	misc.
driver version	1.0

The *disto* device enables communication with the Distance Measurement Module.

3.38.1. Configure



Port selects the port for communication with the distance measurement module

COM A, COM B assigns the *disto* device to one of the serial interface connectors of the controller

Baud selects the baud rate

4800, 9600, 19200, 38400 possible baud rates

Flow Control selects, how the data flow is controlled

None not controlled

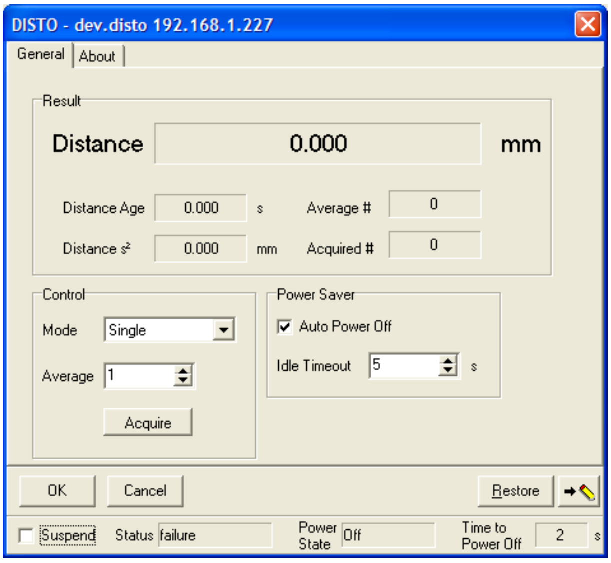
RTS/CTS controlled via hardware, i.e. via the RTS/CTS lines

3.38.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.38.3. Parametrize - General

The disto device enables the laser to measure distances in combination with an e.g. Leica rangefinder.



Result

Distance shows the distance

Distance Age shows the time passed since the distance was measured last

Average # shows the number of averaged distance values

Distance s^2 shows the standard deviation of the measured values or averaged values respectively, see also *Mode*

Acquired # shows the total number of measurements

Control

Mode selects the mode of measurement

Single the distance will be measured when clicking *Acquire*

Continuous the distance will be measured continuously

Average sets the number of measurements to average the value shown in *Distance*

Acquire click to start measuring, click once again to stop measuring

Power Saver

Auto Power Off If the checkbox is selected then the module will be switched off after the time given in *Idle Timeout*

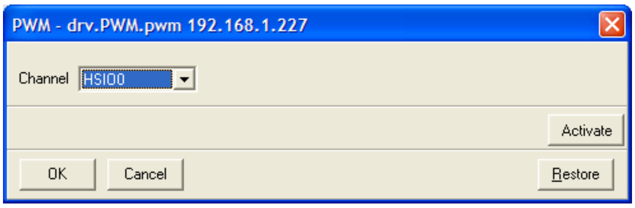
Idle Timeout sets the period after that distance measuring module will be switched off when the module is idle

3.39. pwm - Pulse Width Modulation

for controller	NCC (since NCC 1704A), ASC
device type	misc.
driver version	1.17.2.2

The *pwm* device generates a signal for pulse width modulation.

3.39.1. Configure



Channel selects the channel where the *pwm* signal will be output

HSIO0 .. HSIO7 — or — 2, 4, 5
If an ASC controller is used then this assigns the *pwm* signal to one of the high speed I/Os at the *LASER CONTROL* connector, see the documentation of the ASC controller

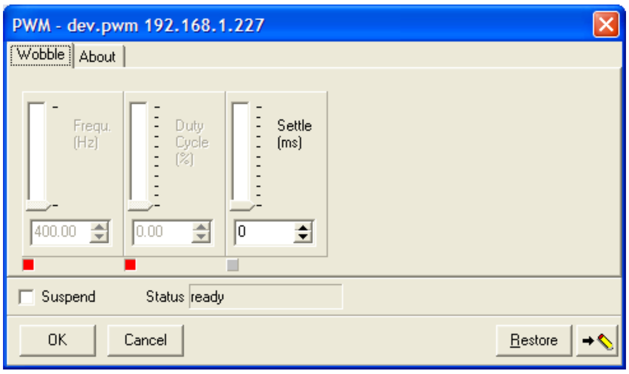
— or —

If an NCC controller is used then this assigns the *pwm* signal to one of the given outputs at the *parallel outputs* connector, see the documentation of the NCC controller

3.39.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.39.3. Parametrize - Wobble



Frequ sets the frequency of the *pwm* signal

Duty Cycle sets the *pwm* signal's pulse length in percent of the frequency specified in *Frequ*

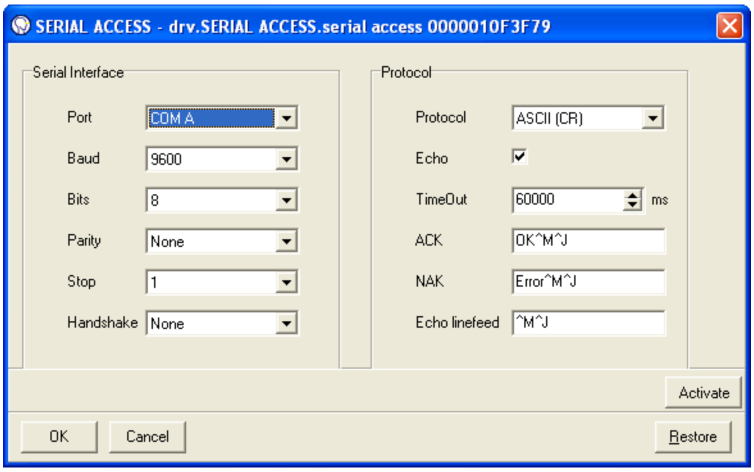
Settle sets the settle time for the *pwm* signal to stabilize its value

3.40. serial access - Serial Interface

for controller	NCC
device type	misc.
driver version	1.0

The *serial access* device enables communication via one of the NCC controller's serial interfaces.

3.40.1. Configure



Serial Interface

Port selects the serial interface for communication

COM A, COM B assigns *serial access* device to one of the serial interface connectors at the NCC controller, see the documentation of the NCC controller

Baud selects the baud rate

300 .. 38400 possible baud rates

Bits selects the transmission format length

7, 8, 9 possible lengths in bit

Parity selects the parity

None no parity

Odd odd parity

Even even parity

Stop selects the number of stop bits

1, 2 possible number of stop bits

Handshake selects, how the data flow is controlled

None not controlled

XON/XOFF controlled via software

RTS/CTS controlled via hardware, i.e. via the RTS/CTS lines

Protocol

Protocol selects the ASCII character interpreted as line end

ASCII (CR) carriage return

ASCII (LF) line feed

Echo If the checkbox is selected then the characters received will be send back as an echo

Time Out sets the allowed time between receiving the last character and receiving the line end character. If this time is exceeded then the command will be discarded

ACK sets the acknowledge string sent on success. Type control characters like Ctrl-M (CR) as `^M`

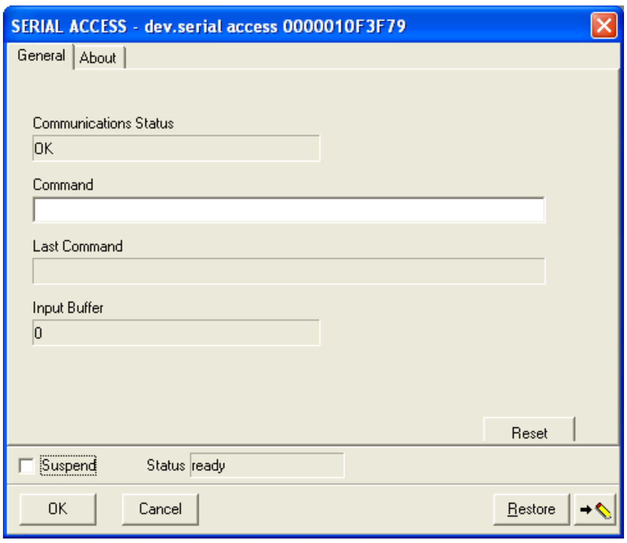
NAK sets the not-acknowledge string sent on failure. Type control characters like Ctrl-M (CR) as `^M`

Echo linefeed sets the string sent on line end. The characters interpreted as line end are defined in *Protocol*. The *Echo* checkbox has to be selected. Type control characters like Ctrl-M (CR) as `^M`

3.40.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.40.3. Parametrize - General



Communications Status shows the communication status between the controller and the connected device

Command text box to type in a command line.

Scripting language commands will be accepted here, see section 5.44.2 Scripting Language. Use *Script* nodes to access the serial interface during job execution, see section 5.44 Script. Similar to the conventional scripting a row of different commands can be seperated by semicolons.

The command line end identifies the end of the script here. The command line length has to be less than 4 kB

Last Command shows the last executed command line

Input Buffer shows the number of characters currently in the receive buffer while characters are received

3.40.4. Communication Examples

The following examples show communication using the serial access device:

Set a Variable and Job Start

Protocol:	`ASCII (CR)`
ACK:	`OK^M^J`
sent:	`$myvar$ = 256; mark_start(); (CR)`
received:	`OK (CR) (LF)`

Here is a description of this communication:

- An external device sends a string **to** the controller via the specified serial port
- The controller gets the string "`$myvar$ = 256; mark_start();`"
- The string is followed by a (CR) **C**arriage **R**eturn caharacter. this ends the communication as specified in *Protocol*
- Now the string is executed as scripting command(s):
    1. `$myvar$=256;` → Variable usr.var.myvar is set to 256 (if it does not exist it is created)
    2. `mark_start();` → processing of the laser is started (as if you would click on *Start* ▸)
- After the controller received the string, it will send the sequence of bytes specified under ACK (normally `OK^M^J`)
- If an error occurs (e.g. a timeout), the controller will answer with the sequence of bytes specified under NAK (normally `Error^M^J`)

Send a Variable via COM A

Any scripting command can be sent as a string. For instance, another possibility would be to use the serial send() command of the InScript scripting language to return a variable:

Protocol:	`ASCII (CR)`
ACK:	
sent:	`send("COM A","$usr.var.myvar$"); (CR)`
received:	

But in this case you will have to be sure that the ACK, NAK or Echo communication does not interfere. So all these fields have to be blank and unchecked.

Here is a description of this communication (we assume that variable $myvar$ exists and has a value of 256):

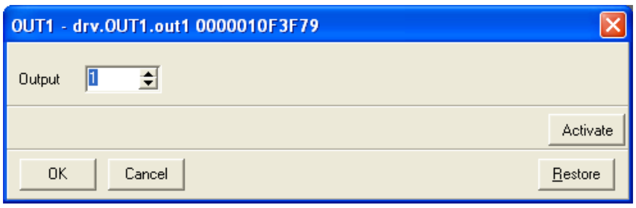
- An external device sends a string **to** the controller via the specified serial port
- The controller gets the string "`send("COM A","$usr.var.myvar$");`"
- The string is followed by a (CR) **C**arriage **R**eturn caharacter. this ends the communication as specified in *Protocol*
- Now the string is executed as scripting command(s):
  - send("COM A","$usr.var.myvar$"); → The controller returns the string "256" through COM port A

3.41. out1 - Address Parallel Output Via Pens

for controller	NCC
device type	misc.
driver version	1.0

If you want to address one output at the NCC controller's *parallel outputs* connector via a pen then use the *out1* device.

3.41.1. Configure

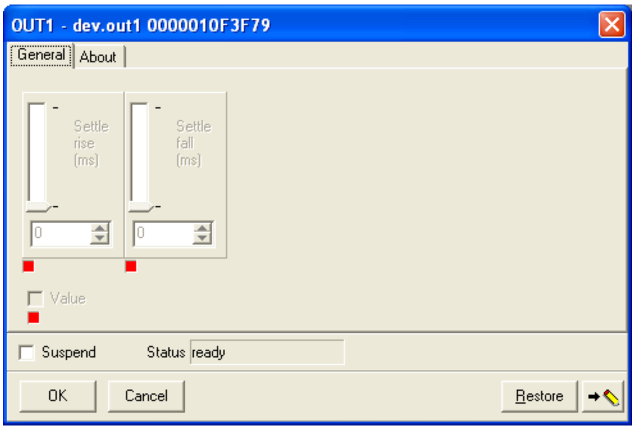


Output sets the output to be addressed at the *parallel outputs* connector of the NCC controller, see the documentation of the NCC controller

3.41.2. Parametrize

See 3.1.2 When Editing (Parametrizing) Active Devices for common gui elements while parametrizing the device.

3.41.3. Parametrize - General



Settle rise sets the settle time for the rising slope of the signal

Settle fall sets the settle time for the falling slope of the signal

Value If the checkbox is selected and if the pen is in use during job execution then the signal will be output

4. Job Configuration Window

The term *job* can be understood as a program, that can be designed using InScript. This program controlls the devices connected to the controller.

Jobs consist of nodes, which are hierarchically related to one each other and are displayed as a tree structure. There are different types of nodes. Each type has its function and properties. Nodes containing other nodes are called parent nodes of the latter ones which are called child nodes (with reference to their parent node). Child nodes inherit properties of their parent nodes.

The job and thus the wanted output results from the arrangement of the nodes within the tree structure. This is summarized by the term *Job Configuration*. The tree structure is displayed in the *Job Configuration* window.

This tree structure contains nodes, which generate graphical output and are called graphical objects. In most cases these nodes are the leaves of the tree structure. The graphical objects of jobs also can be created in the *Vector Editor* window, see section 7 Vector Editor Window. But the job tree structure (work flow) can only be edited in the *Job Configuration* window.

4.1. How to Open the Window

► In the menu, click *View* → *Job Configuration*.
— or —
In the toolbar, click  .
The *Job Configuration* window opens.

4.2. Description of the Window

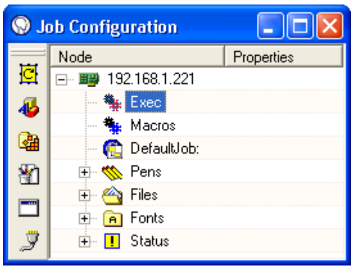


Figure 5: The *Job Configuration* window

***Toolbar* Standard Nodes** provides the nodes to be inserted into an executable job. Build up jobs from these nodes in the *Exec* branch of the tree structure. How to manage jobs, see section 4.6 Manage (Executable) Jobs

***Column* Node** shows which job nodes are present by job node "type" icon and the node's name. For information about the main job node "types" marking the branches of the tree structure, see section 4.3 Job Configuration Tree Structure

- shows that the node is selected for execution, see section 6.3 Select Job for Execution

- Node if the cursor is on a node then the node is selected for the next action from context menu or keyboard

***Column* Properties** shows the properties of the node in column *Node* in the same line

- shows that the node has a view in *Vector Editor*, see section 4.4.2 Exec

- shows that the node is selected in the *Vector Editor*, see section 4.4.2 Exec

- shows that the node has a backdrop image, see section 4.4.2 Exec

4.3. Job Configuration Tree Structure

See also figure 5.

<Address|IP> this is the root of the tree structure. It shows the controller that is attached to this instance of InScript. Next to the symbol you find the name of the NCC controller or the IP address of the ASC controller. How to manage controllers, see section 4.5 Manage Controllers

Exec contains executable jobs, i.e. programs that control the devices connected to the controller. How to manage and design jobs, see section 4.6 Manage (Executable) Jobs

Macros can contain parts of jobs, which can be reused in different places of jobs, see sections 4.7 Manage Macros

DefaultJob can contain a link to user-defined job file. After booting the controller this job file will automatically be loaded. How to manage the default job, see section 4.8 Manage Default Job

- **Pens** in the *Pens* subtree pens with different properties can be defined. Each pen contains pen-sections. Each pen-section is assigned to an active device, see section 3 Devices. In the pen-sections the parameters of the assigned devices can be set. A device may e.g. be the scan head itself, a laser, a motion axis or else.

  That way you can create a collection of pens, whose properties are tailored to different tasks.

  By inserting a Pen Link node into the job you can activate the parameters defined in the pen. If pens are used in a graphics file, e.g. in HPGL files, then you can assign them via a Pen Set node to the pens you created.

  How to work with pens, see section 4.9 Manage Pens. You will also find an example in section 4.9.1 Control Device Parameters During Job Execution

- **Files** in the *Files* subtree vector and raster graphic formats can be imported. They remain as objects in this subtree and are e.g. referenced to by symbolic links in the *Exec* subtree. How to work with files, see section 4.10 Manage Files

- **Fonts** in the *Fonts* subtree all additional fonts which are available in RAM of the controller can be seen. If you use a font e.g. in a Text node and **execute** this node, the font is visible in the Fonts subtree. How to work with fonts, see section 4.11 Manage Fonts

- **Status** in the *Status* subtree important information about processing times of the last executed jobs and the currently selected job node is stored

4.4. Context Menus for the Respective Branch in the Tree Structure

Use the context menu to manage the job configuration in the *Job Configuration* window. Each main branch of the tree structure has its own context menu. Some branches have several types of context menus depending on the level in the tree structure. Whether a menu item is enabled or not, depends on the job node and its status. The context menu:

4.4.1. Controller (root node)

Find more information in section 4.5 Manage Controllers.

> **NOTE**
>
> The ASC controller is not administrated via InScript. It is administrated via a so called Web Interface, see section 4.5.2 ASC Web Interface. The context menu of the *Job Configuration* root node, showing the IP address of the ASC controller and allows the actions shown in the next figure, left side.

The NCC controller is administrated via InScript. The context menu of the *Job Configuration* root, showing the ID of the controller and allows the actions shown in the next figure, right side.

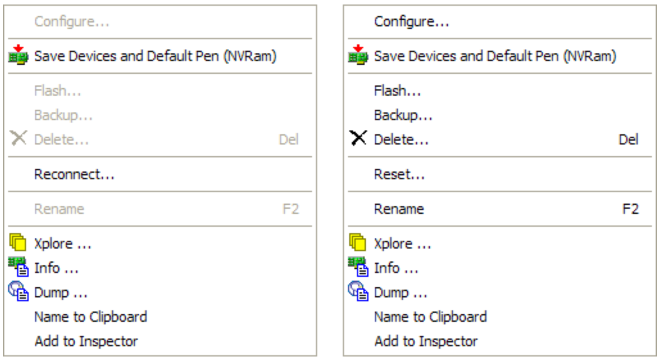


Figure 6: The controller (root node) context menu for the ASC (left) and for the NCC (right) controller

Configure shows the *Board Configuration* window for the NCC controller, see section 4.5 Board Configuration Window

Save Devices and Default Pen (NVRam) saves all current settings to the NVRam (non-volatile RAM) of the controller, see section 2.7 Store Configuration

Flash

> **CAUTION**
>
> Data loss
>
> The firmware or the user data together with the firmware present on the NCC controller will be lost in this procedure.
>
> ► Save the jobs, user data and/or firmware before continuing.

flashes a new firmware to the NCC controller, see also section 4.5 Board Configuration Window

Backup backups the current NCC controller firmware. User data will *not* be saved, see also section 4.5 Board Configuration Window

Delete

> **CAUTION**
>
> Data loss
>
> The current NCC controller firmware and user data on the NCC controller will be lost in this procedure.
>
> ► Save the user data and/or firmware before continuing.

User data or Jobs, Pens, Files and Fonts will be deleted if you select them and click *Delete*. You can use *Backup* to save the data in advance, see also section 4.5 Board Configuration Window

Reconnect

> **CAUTION**
>
> Data loss
>
> Your settings may be lost by reconnecting the ASC controller as it will be restarted as well.
>
> ► Save your settings before reconnecting.

restarts and reconnects the ASC controller

Reset

⚠ **CAUTION**

Data loss

Unsaved User Data and Jobs will be lost.

► Save the user data and/or jobs before continuing.

resets the NCC controller

Rename renames the NCC contoller node

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

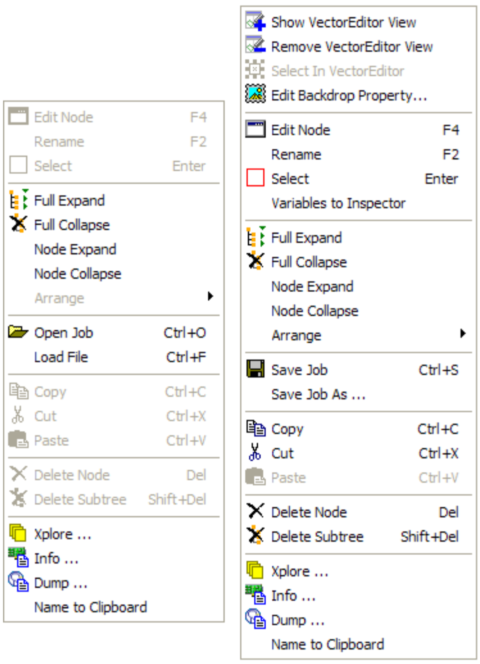
Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

4.4.2. Exec

Find more information in section 4.6 Manage (Executable) Jobs.



Show VectorEditor View adds the view of the selected subtree to the *Vector Editor*, see section 4.6.27 Show VectorEditor View

Remove VectorEditor View removes the view of the selected subtree from the *Vector Editor*, see section 4.6.28 Remove VectorEditor View

Select in VectorEditor selects the selected node in the *Vector Editor*, see section 4.6.29 Select in VectorEditor

Edit Backdrop Property opens the *Edit backdrop property* window of the selected node, see section 4.6.30 Edit Backdrop Property

Edit Node opens the node editor of the selected node, see section 4.6.16 Edit Node

Rename renames the selected node, see section 4.6.17 Rename Node

Select selects the selected node for execution, see section 6.3 Select Job for Execution

Deselect deselects the selected node from execution, see section 6.3 Select Job for Execution

Variables to Inspector copies the *Variables changable in Operator Mode* from the selected *Job* node to the *Inspector*, see section 8.9 Node Inspector

Full Expand expands all subtrees in the *Job Configuration* window, see section 4.6.21 Expand Exec Tree

Full Collapse collapses all subtrees in the *Job Configuration* window, see section 4.6.22 Collapse Exec Tree

Node Expand expands a subtrees in the *Job Configuration* window, see section 4.6.23 Expand Subtree

Node Collapse collapses a subtrees in the *Job Configuration* window, see section 4.6.24 Collapse Subtree

Arrange arranges the order of nodes on the selected tree hierarchy level, see sections 4.6.25 Arrange Subtree and 4.6.26 Arrange Node

- **Make First** makes the selected node first in its subtree
- **Up** moves the selected node one place up in its subtree
- **Down** moves the selected node one place down in its subtree
- **Make Last** makes the selected node last in its subtree

Open Job opens a *.job file, see section 4.6.3 Open Job

Load File loads a file, see section 4.6.4 Load File

Save Job saves a job, see section 4.6.5 Save Job

Copy puts a copy of the selected node and its subnodes to clipboard

Cut puts a copy of the selected node and its subnodes to clipboard and removes it from the tree structure

Paste pastes a copied or cut node and its subnodes from clipboard into the tree structure. The root node has to be able to contain subtrees

Delete Node deletes the selected node and leaves all subnodes untouched

Delete Subtree deletes the selected node and all its subnodes

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

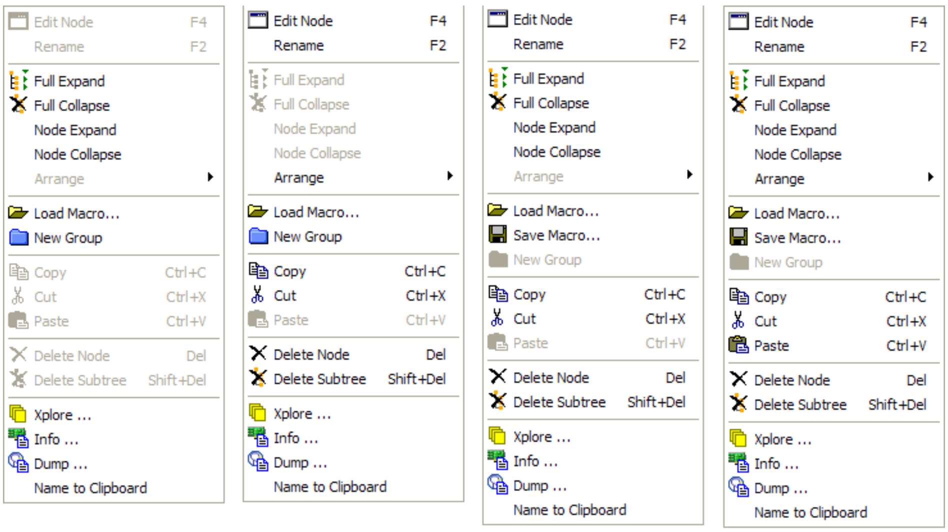
Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

4.4.3. Macros

Find more information in section 4.7 Manage Macros.



Edit Node opens the node editor of the selected node, see section 4.6.16 Edit Node

Rename renames the selected node, see section 4.6.17 Rename Node

Full Expand expands all subtrees in the *Job Configuration* window, see section 4.6.21 Expand Exec Tree

Full Collapse collapses all subtrees in the *Job Configuration* window, see section 4.6.22 Collapse Exec Tree

Node Expand expands a subtrees in the *Job Configuration* window, see section 4.6.23 Expand Subtree

Node Collapse collapses a subtrees in the *Job Configuration* window, see section 4.6.24 Collapse Subtree

Arrange arranges the order of nodes on the selected tree hierarchy level, see sections 4.6.25 Arrange Subtree and 4.6.26 Arrange Node

- **Make First** makes the selected node first in its subtree
- **Up** moves the selected node one place up in its subtree
- **Down** moves the selected node one place down in its subtree
- **Make Last** makes the selected node last in its subtree

Load Macro loads a macro, see section 4.7.6 Load Macros

Save Macro saves a macro, see section 4.7.5 Save Macros

Load Subtree loads a *.tre file under a node that can contain subtrees, see section 4.6.12 Load Subtree

Save Subtree as saves the selected node and its subnodes to a *.tre file, see section 4.6.13 Save Subtree. The node must not be a *Job* node

New Group creates a new macro group, see section 4.7.4 Group Macros

Copy puts a copy of the selected node and its subnodes to clipboard

Cut puts a copy of the selected node and its subnodes to clipboard and removes it from the tree structure

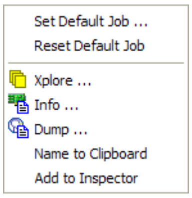
Paste pastes a copied or cut node and its subnodes from clipboard into the tree structure. The root node has to be able to contain subtrees

Delete Node deletes the selected node and leaves all subnodes untouched

Delete Subtree deletes the selected node and all its subnodes

4.4.4. DefaultJob

Find more information in section 4.8 Manage Default Job.



Set Default Job sets a job as default, see section 4.8.1 Set Default Job

Reset Default Job sets no job as default, see section 4.8.2 Reset Default Job

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

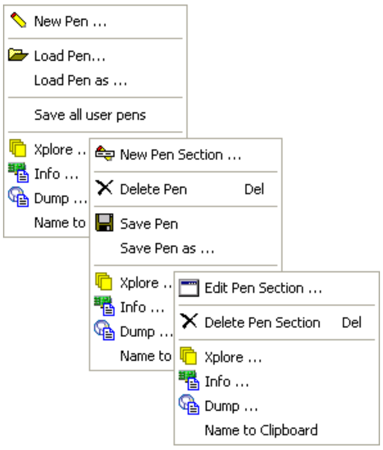
Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

4.4.5. Pens

Find more information in section 4.9 Manage Pens.



New Pen creates a new pen, see section 4.9.2 Create New Pen

Load Pen loads a pen, see section 4.9.4 Load Pen

Load Pen as loads a pen and provides the possibility to change the pen name, see section 4.9.5 Load Pen as

Save all user pens saves all pens created by the user, i.e. saves *not* the default pen

New Pen Section creates a pen section, see section 4.9.2 Create New Pen

Delete Pen deletes a pen, see section 4.9.8 Delete Pen

Save Pen saves a pen, see section 4.9.6 Save Pen

Save Pen as saves a pen and provides the possibility to change the file name, see section 4.9.7 Save Pen as

Edit Pen Section opens the pen section's editor, see section 4.9.3 Edit Pen Section

Delete Pen Section deletes a pen section, see section 4.9.9 Delete Pen Section

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

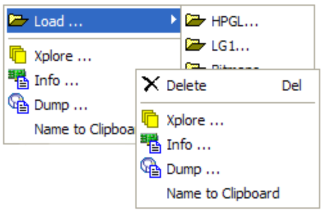
Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

4.4.6. Files

Find more information in section 4.10 Manage Files.



Load

HPGL loads a HPGL vector file to the *Files* subtree, see section 4.10.5 Load - Creating Nodes Manually

LG1 loads a LG1 vector file to the *Files* subtree, see section 4.10.5 Load - Creating Nodes Manually

Bitmaps loads a graphics file to the *Files* subtree, see section 4.10.5 Load - Creating Nodes Manually

Delete deletes the selected node

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

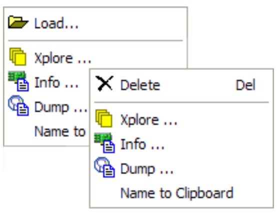
Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

Add to Inspector opens the *Xplorer* window at the selected node. Find information about the *Xplorer* in section 8.5 Xplorer

4.4.7. Fonts

Find more information in section 4.11 Manage Fonts.



Load loads a **.fdt* or **.sfh* file, see section 4.11 Manage Fonts for more information on font handling and fonts

Delete removes the font from the *Fonts* folder in the *Job Configuration* window

Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

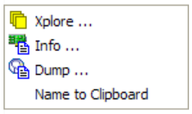
Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

Add to Inspector opens the *Xplorer* window at the selected node. Find information about the *Xplorer* in section 8.5 Xplorer

4.4.8. Status



Xplore opens the *Xplorer* window at the selected node. Find information about the Xplorer in section 8.5 Xplorer

Info opens the *Node Info* window. Information coming from the controller about the selected node will be shown

Dump opens the *ARGES InScript* window. Information coming from the InScript software about the selected node will be shown

Name to Clipboard copies the full path and name of the selected node to the clipboard

Add to Inspector opens the *Xplorer* window at the selected node. Find information about the *Xplorer* in section 8.5 Xplorer

4.5. Manage Controllers

NOTE

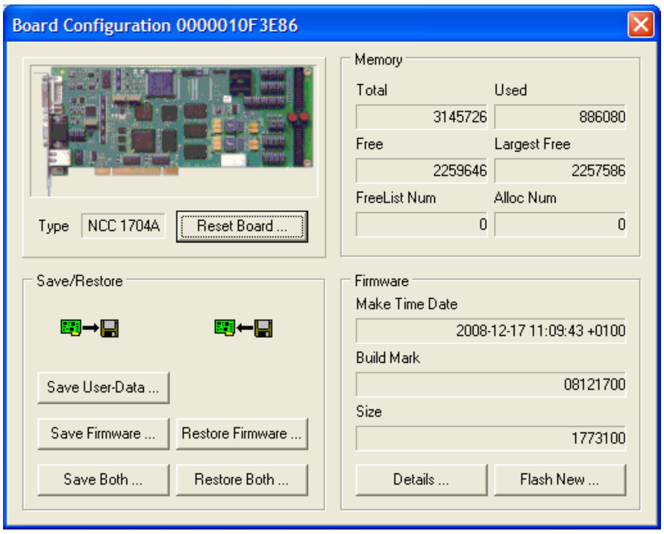
The ASC controller is not administrated via InScript. It is administrated via a so called Web Interface, see section 4.5.2 ASC Web Interface.

The NCC controller is administrated via InScript.

The following topics refer to NCC.

Board Configuration Window

If you choose *Configure* from the context menu or double click the root of the *Job Configuration* tree, you get the *Board Configuration* window:



Among other things you can flash and backup the firmware and user data of the NCC controller in this dialog. The firmware is the basic software that enables the NCC controller to work. The user data is all settings you made on the controller. Please be aware that if you change the firmware or user data of your controller also the functionality of the controller may change.

NOTE

It is always advisable to save the current firmware and user data before you change the current configuration!

Type displays the sub-type of the ASC controller

Reset Board cautionData lossUnsaved User Data and Jobs will be lost.

- Save the user data and/or jobs before continuing (check this section for more information)!

The controller board will be reset

Save/Restore

Save User-Data saves the NCC user data to a `*.fdb` file. This file can **not** be restored by the user - you will have to contact ARGES to do be able to this. This function exists mainly for debugging purposes

Save Firmware saves the current firmware to a `*.ffb` file

Restore Firmware

CAUTION

Data loss

The current firmware and the user data on the controller board will be lost in this procedure.

- Save the user data and/or firmware before continuing (check this section for more information)!

Restores firmware from a `*.ffb` file.

Save Both saves firmware and user data to a `*.fb` file. Use this function to save your current settings

Restore Both

⚠ **CAUTION**

Data loss

The current firmware and the user data on the controller board will be lost in this procedure.

► Save the user data and/or firmware before continuing (check this section for more information)!

Restores firmware and user data from a `*.fb` file

Memory

Total shows the total amount of memory

Used shows the currently used memory

Free shows the currently free memory

Largest Free shows the curently largest free memory block

Firmware

Make Time Date creation date and time of the current firmware

Build Mark build mark of the current firmware

Size size of the current firmware

Details Menu

Flash/Reorganize reorganize a probably corrupted Flash memory of the controller board. The data area is deleted. If the reorganization is done *Flash reorganisation succeeded.* is shown in the Messages window (see 8.10 Messages)

Flash/Enhanced Reorganization reorganize a probably corrupted Flash memory of the controller board with an enhanced algorithm that *tries* to collect valid blocks of the data area to keep them. If the reorganization is done *Enhanced flash reorganisation succeeded.* is shown in the Messages window (see 8.10 Messages).

View/Refresh refresh the data shown in the tabs *Flashlist* and *Flash 1*

Tabs Flashlist shows statistics about the flash memory

Flash 1 shows a memory map of the flash memory

Flash New

CAUTION

Data loss

The current firmware and the user data on the controller board will be lost in this procedure.

- Save the user data and/or firmware before continuing (check this section for more information)!

Flashes a new firmware from `*.fls` file a to the controller

The following topics refer to NCC and ASC.

4.5.1. Basic Actions Managing a Controller

This chapter describes some basic and recurring actions manging a controller.

Toggle Between Controllers

To connect to one or more controllers by default on InScript startup, see section 8.4.23 Sub Category - Startup *Connect Controllers*.

- In the main menu, click *View* → *Controllers*, see section 8.3.3 View.

Save Data to NVRam

Saves the user data (i.e. configuration and settings of installed devices), jobs, pens (except for the default pen), files and name settings to the NCC controller board or stores it on the ASC controller. In not saving this data, it would be lost when switching off the PC with the controller card (NCC) or resetting/switching off the controller (ASC and NCC).

- In the menu, click Controller → Save to NVRam.
  — or —
  In the tree structure in the board symbol context menu, click *Save to NVRam*.

Save User Data/Firmware to Disk

On NCC Controller:

Saves the user data (i.e. configuration and settings of installed devices), firmware or both to the disk.

Step 1 In the menu, click *Controller* → *Configure*.
— or —
In the board symbol context menu, click *Configure*.
The Board Configuration window opens.

Step 2 Click Save User-Data or Save Firmware or Save Both.
The Save as window opens

Step 3 Name the file and select a location to save it to.
The files automatically receive a file name extension *.fdb (flash data backup), *.ffb (flash firmware backup) or *.fb (flash backup)

Step 4 Click Save.

On ASC Controllers:

Saves shown configuration files to disk.

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *Backup and Restore*

Step 3 Click on *Download* under *Backup Controller Configuration* and select a location on e.g. your hard disk to save the ASC configuration files (packed in `conf.tar.gz`) that are shown in the list

Restore NCC User Data/Firmware from Disk or Restore ASC Configuration Files from Disk

CAUTION

Data loss

The firmware or the user data together with the firmware present on the controller board will be lost in this procedure.

Save the actual configuration data and/or firmware before continuing (see 4.5.1 Save User Data/Firmware to Disk)!

On NCC Controllers:

Restores only the firmware or the user data together with the firmware from disk to the controller board.

Step 1 In the menu, click *Controller* → *Configure*.
— or —
In the board symbol context menu, click *Configure*
The Board Configuration window opens.

Step 2 Click *Restore Firmware* or *Restore Both*. Restore Both restores the firmware ***and*** the user data.
After a query the *Open* window opens

Step 3 Select the (saved) file

Step 4 Click *Open*

Step 5 This process may take some time - all current settings will be replaced with the saved settings

On ASC Controllers:

Restores the selected configuration files to the ASC controller.

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *Backup and Restore*

Step 3 Select the checkbox(es) of the configuration file(s) in the list under *Restore Controller Configuration* and click on *Browse*

Step 4 Select the (saved) `conf.tar.gz` file (see 4.5.1 Save User Data/Firmware to Disk) and click on *Open*

Step 5 Click on *Upload* to upload and install the configuration files

Step 6 This process may take some time - all current settings that you selected will be replaced with the saved settings

NOTE

The version numbers in *System Info* → *Installed ASCModules* will not be updated using this procedure (see 4.5.1 Show Flash or ASCmodule Info)!

Load Firmware from Disk

CAUTION

Data loss

The firmware present on the controller board will be lost in this procedure.

Save the current firmware before continuing (4.5.1 Save User Data/Firmware to Disk)!

On NCC Controllers:

Loads the firmware from disk to the controller board.

Step 1 In the menu, click *Controller* → *Board Configuration*.
— or —
In the board symbol context menu, click *Configure*.
The Board Configuration window opens

Step 2 Click *Flash New*
After a query the *Open* windows opens.

Step 3 Select the Firmware file (normally these files look like this: `fw-<version>.fls`)

Step 4 Click *Open*

On ASC Controllers:

Loads the firmware from disk to the controller board.

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *Install ASCModule*

Step 3 Click on *Browse*

Step 4 Select the firmware file
(normally these files look like this: `ARG_ASC_FW_<version>.tar.gz`)

Step 5 Click on *Install* to upload and install the firmware file

Show Flash or ASCmodule Info

On NCC Controllers:

The flash area is a non volatile storage area. Here you can see details about memory usage and fragmentation of this area. Cleaning up the flash area can be dangerous for the data stored in this area - so please consult with AGRES before doing this! In menu *Flash* → *Reorganize* or *Flash* → *Enhanced Reorganization* you can clean up the flash area.

Step 1 In the menu, click *Controller* → *Configure*.
— or —
In the board symbol context menu, click *Configure*.
The Board Configuration window opens

Step 2 Click Details.
The Flash Info window opens

On ASC Controllers:

There is no "real" Flash area on an ASC controller. But you can see the installed ASCmodules using the Webinterface.

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *System Info* → *Installed ASCModules* The currently installed firmware and ASC-modues are shown

Delete Jobs, Pens and Files

> ⚠ **CAUTION**
>
> Data loss
>
> The Jobs, Pens and Files present on the controller board will be lost in this procedure.
>
> Save the current Jobs, Pens and Files before continuing!

On NCC Controllers:

Deletes only the jobs, pens and files from the controller board.

- In the menu, click *Controller* → *Delete*.
  — or —
  In the board symbol context menu, click *Delete*.
  After a query the jobs, pens (except for the default pen) and files will be deleted from the controller board.

On ASC Controllers:

There is no *Delete* function for the ASC controller. Just delete the items in *Job Configuration* window.

Reset

CAUTION

Data loss

Changes in user data (i.e. configuration and settings of installed devices), jobs, pens, files and name settings will be lost, if the controller board is reset and the changes were not saved to the controller board's NVRam.

Save jobs, pens files and data before continuing (4.5.1 Save Data to NVRam).

On NCC Controllers:

Resets the controller board. This may be necessary, when the controller board does not react any more as result of an error.

- In the menu, click *Controller* → *Configure*.
  — or —
  In the board symbol context menu, click *Configure*.
  The Board Configuration window opens
- Click *Reset Board*.
  After a query the controller board will be reset

On ASC Controllers:

On ASC you can reset the firmware, completely restart the controller or halt the controller to switch it off:

Reset Firmware

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *InScript Firmware*

Step 3 Click on *Restart InScript Firmware*
The Firmware will restart.

Restart Controller

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *Halt/Reboot*

Step 3 Click on *Reboot*
The controller will reboot. This may take some time!

> **NOTE**
> The Controller will reboot. Because of this the connection of the Webinterface will be interrupted and you can only restart after the controller has rebooted.

Halt Controller

The controller will completely halt and after that you may e.g. switch it off.

Step 1 Open the ASC Webinterface and log in (see 4.5.2 ASC Web Interface)

Step 2 Click on *Administration* → *Halt/Reboot*

Step 3 Click on *Halt*
The controller will stop all processes. This may take some time!

> **NOTE**
> The Controller will halt. Because of this the connection of the Webinterface will be interrupted and you can only restart after the controller has rebooted.

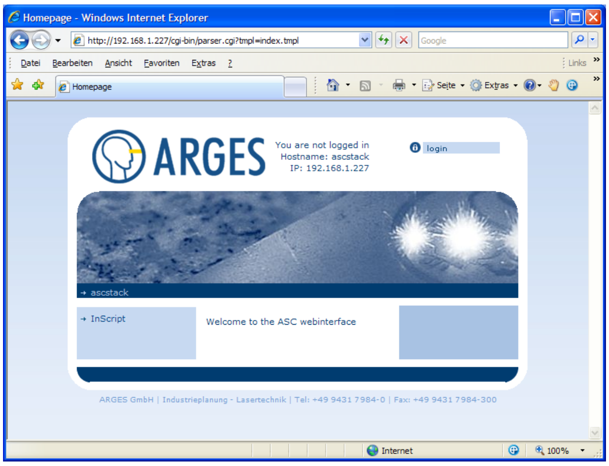
Step 4 After the ASC controller has halted, you may completely switch it off

The following topics refer to ASC.

4.5.2. ASC Web Interface

To connect to the ASC Web Interface use an internet browser that has a connection to the ASC controller. The PC InScript is running on is connected to the ASC controller and should also be able to connect to the controller via a web browser:

Step 1 Type the IP address of the ASC controller (e.g. 192.168.1.42) into the address field of the browser and press the Enter key.
The ASC Web Interface for the addressed controller opens.



Step 2 Click login in the upper right corner of the page.

The login page opens.

The default user name is *root* and the default password is *arges*.

When logged in administrative tasks can be done.

Short description of the Web Interface menu:

Administration

Shell input Linux shell commands in the *Command input* field.

Output will be shown in the *Output of your last command* field.

Adjust Time sets the time and date on the controller

Network Settings sets the IP Address, Netmask etc.

Network Folders **published** not implemented, yet

used adds an anonymous user share *Share-location* to *Name* on the controller as a search path by now only for *RawLines* node

Backup and Restore Backups and restores current firmware, firmware configuration, work settings and user settings.

NOTE

Restoring the firmware using this tool will *not* update the versions of the installed FW ASCModule.

Install ASCmodule ASCmodules are installation modules for the ASC controller. These modules can be obtained by ARGES and are `*.tar.gz` files. User the *Browse* button to browse to the ASCmodule and press *Install* to install the module. Be sure that you have a valid module for your system!

CAUTION

Data loss

Controller settings may be lost

- Be sure that you have the right ASCmodule for your system
- All your settings may be lost after installing ASCmodules

Boards shows hardware information of your ASC cntroller boards

InScript Firmware

CAUTION

Data loss

Please note that your current jobs and configuration will be lost if you did not save them (just like they would be lost on power down).

- Be sure that you saved your jobs and configuration!

Press the *Restart InScript Firmware* button to completely restart the firmware of your controller.

RenderServer Press the *Restart RenderServer* button to restart the RenderServer of your controller.

Halt/Reboot Press the *Reboot* button to reboot your controller. Press the *Halt* button to halt your controller. After *Halt*, the controller can be switched off

System Info

Config report click on the link to see and print the config report

Processes shows all running processes on the controller

CPU Usage shows a graphic overview of the CPU usage for different time intervals

Memory Usage shows a graphic overview of memory usage for different time intervals

Network Usage shows a graphic overview of network usage in time or packets for different time intervals

System Temperature shows the system temperature

System Voltages shows the system voltages

Boards shows hardware information of your ASC cntroller boards

Installed ASCmodules shows all installed ASC modules (not version of firmware ASCmodule updated if you *Administration* / *Restore* a firmware)

Support Info

Versions shows the exact Linux and firmware versions

Logfiles lets you check the system, secure and CGI log

Create support info lets you create and download a file with information about the controller which is relevant for our support team

InScript

Manual in future versions of the *Web Interface* you will find the manual here

4.6. Manage (Executable) Jobs

TIP

A complete example for creating, saving and executing a job can be found under 10.1 First and Important Steps.

In the *Job Configuration* window, jobs are created as direct child nodes of the *Exec* node, see figure 7.

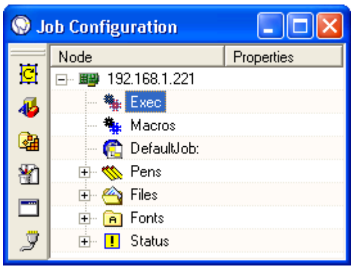


Figure 7: The *Job Configuration* window

The toolbar *Standard Nodes*  combines the available node types to groups.

- To open a "node type group" toolbar, click the corresponding symbol on the *Standard Nodes* toolbar.

  Find a detailed description of each node type in section 5 Job Nodes.

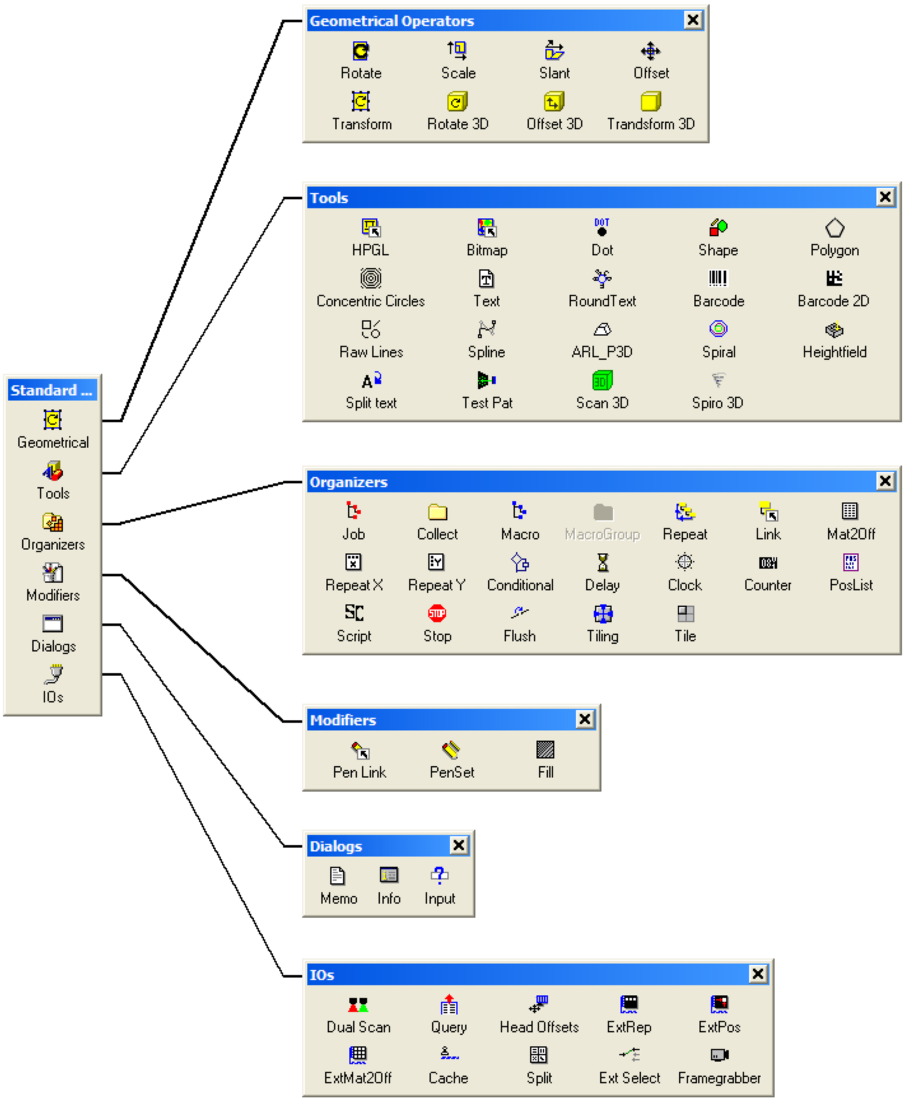


Figure 8: The Standard Nodes toolbar and the "node type group" toolbars

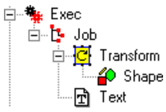
The nodes are combined to these groups:

- *Geometrical Operators* geometrically transform their child nodes
- *Tools* are the actual generators of output and normally the "leaves" of the tree structure
- *Organizers* structure the job or change its work flow
- *Modifiers* modify the output appearance
- *Dialogs* interactively show or query information
- *IOs* control external devices, mainly motion axes and data

4.6.1. Basic Steps

The Order How Jobs are Processed

Jobs are executed top down. Have a look to following example, how jobs are composed:



1. At first the *Job* node is executed. It serves as an element of organization to distinguish one job from others.
2. Next the *Transform* node is executed. This geometrically transforms (offsets, scales, rotates and slants) all its child nodes.
3. Then the *Shape* node is executed. It outputs a primitive shape (e.g. line, rectangle or ellipse). Because it is child of the *Transform* node the transformation set there affects the shape, i.e. the shape will be output with an offset, scaled, rotated and slanted respectively.
4. At last the *Text* node is executed. This outputs an user-defined text. Because it has no *Transform* node as direct or indirect parent node, it will be output without any change.

How to Create a Job

Step 1 Create a job, see section 4.6.2 Create Job.

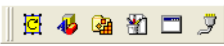
— or —

Open a job, see section 4.6.3 Open Job.

— or —

Clear and load a job, see section 4.6.9 Clear and Load Job.

Step 2 Create a view on the job in the *Vector Editor* window to visualize the scan head's output, see section 4.6.27 Show VectorEditor View.

Step 3 Use the *Standard Nodes* toolbar  to create nodes.

Find an overview of job nodes in figure 8. Find more information about the different job node types in section 5 Job Nodes.

Step 4 Use the context menu to manage and structure the job tree.

When designing the hierarchy keep paragraph The Order How Jobs are Processed in mind.

Step 5 Create pens with special device parameter settings.

For general information about pens see section 4.9 Manage Pens. How to create a pen, see section 4.9.2 Create New Pen.

Step 6 Apply these pens by using the *Pen Link* or the *Pen Set* node in the job, see sections 5.49 Pen Link and 5.50 Pen Set.

When designing the hierarchy keep paragraph The Order How Jobs are Processed in mind.

How to Execute a Job

Find more information about job control in section 6 Job Control Window.

Step 1 Select a job for execution, see section 6.3 Select Job for Execution.

Step 2 **CAUTION**

Visible and/or invisible laser radiation

The user is responsible for observing the laser safety regulations valid in his country.

- Avoid eye or skin exposure to direct or scattered radiation.

Start the job, see section 6.4 Start (Execute) Job.

4.6.2. Create Job

NOTE

The *Job* node can be only created as a child of the *Exec* node.

We urgently recommend to create a *Job* node for each job and to place the job in the *Job* node subtree. Thus the single jobs will be shown with the *Job* node name in the sub menus of InScript. Moreover the *Job* node offers settings affecting how the job is executed (see section 5.30 Job).

- In the menu, click *File* → *New Job*.

  — or —

  In the *Job Configuration* window in the *Organizing Operators* tool bar, click . Be sure that the cursor is set to the *Exec* node to allow this.

  In the *Job Configuration* window a new *Job* node is created as a child node of the *Exec* node.

4.6.3. Open Job

Step 1 In the menu, click *File* → *Open Job*.

— or —

In the *Exec* node context menu, click *Open Job*.

The *Open* window opens.

Step 2 Select the job file.

Step 3 Click *Open*.

In the *Job Configuration* window the selected job appears as a child node of the *Exec* node. Referenced pens of a job are automatically loaded. See 4.9.7 Save Pen as where pens have to be saved to be loaded automatically.

4.6.4. Load File

Step 1 In the menu, click *File* → *Load File*.

— or —

In the *Exec* node context menu, click *Load File*.

The *Open* window opens.

Step 2 Select the file.

The file format may be one of the offered formats.

Step 3 Click *Open*.

In the *Job Configuration* window the file will appear in the applicable branch of the tree structure.

4.6.5. Save Job

- In the menu, click *File* → *Save Job*.

  If there is more than one *Job* node as a child node of the *Exec* node in the *Job Configuration* window then a sub menu opens. Select the job, you want to save. If you want to save all Jobs that are in the *Exec* node, you may choose **ALL** or use the `Ctrl-Shift-s` shortcut for this action. This will open the *Save All Jobs* dialog

4.6.6. Save Job as

Step 1 In the menu, click *File* → *Save Job As*.

If there is more than one *Job* node as a child node of the *Exec* node in the *Job Configuration* window then a sub menu opens. Select the job, you want to save here.

— or —

In the tree structure, select the *Job* node you want to save and in the tool bar, click  .

The *Save* as window opens.

Step 2 Name the file and select a folder to save it to.

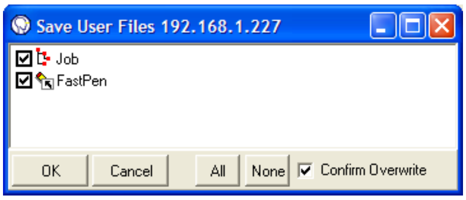
Step 3 Click *Save*.

If there is more than one *Job* node as a child node of the *Exec* node in the *Job Configuration* window then a sub menu opens. Select the job, you want to save

4.6.7. Save Multiple Jobs

Step 1 In the menu, click *File* → *Save All User Files*.

The *Save User Files* window opens.



Step 2 Select the jobs you want to save by selecting their prefixed check boxes.

Step 3 Click *OK*.

The jobs will be saved with the names being displayed in the *Job Configuration* window. The file type `*.Job` will automatically be assigned to the files. The files will be saved to the folder defined in preferences (see 8.4.26 Sub Category - File Handling).

4.6.8. Delete Job

NOTE

If you want to open a job again later on then you have to save it before deleting the job from the tree structure. The procedure "Delete" deletes the job only from the tree structure and not from the file system.

If you want to delete a job from the file system then you have to do so via the operating system.

Step 1 Select the root node of the subtree you want to delete.

Step 2 In the context menu, click *Delete Subtree*.

— or —

Press the *Shift* and *Del* key at the same time.

The subtree including the selected node is deleted from the tree structure.

4.6.9. Clear and Load Job

NOTE

To clear a job means to delete it from the Digital Signal Processor (DSP) line buffer of the controller board. Saved jobs will not be deleted from the file system in doing so.

Step 1 Click .

The *Open* window opens.

Step 2 Select the job file.

Step 3 Click *Open*.

In the *Job Configuration* window all jobs are cleared, the selected job loaded as child node of the *Exec* node and selected for output.

4.6.10. Create Node

Step 1 In the tree structure select the node that shall become parent node of the new node.

Step 2 In the *Standard Nodes* tool bar, click the node group.

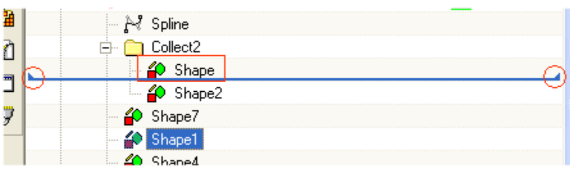
Step 3 In the node group tool bar click the node type.
You will find a description of the nodes in section 5 Job Nodes.
In the tree structure the node appears as the child node of the selected parent node.

> **NOTE**
>
> Not all node types accept child nodes, e.g. most of the graphical operators. If these are selected in the *Job Configuration* window then the node tool bars are deactivated and colored gray.
>
> To view a node in the *Vector Editor* window you have to define first, which node you want to view, see section 7.9.1 Add View of Node or Subtree from Job Configuration to Vector Editor.

4.6.11. Drag and Drop Job Nodes

If you want to move an existing job node under another node that is able to hold child nodes (e.g. *Job*, *Collect*, all *Geometrical Operators*, *Script*, *Raw Lines* or *PosList*), you may just drag and drop it on this node. After that you may change its position using the *Arrange* functions (see 4.6.25 Arrange Subtree). The place, where the node is added (at the start or at the end of the branch) is determined by the preferences setting Job Creation (see 8.4.27 Sub Category - Job Creation).

To move nodes or subtrees using the mouse, press and hold the `Shift` key while you move a node or subtree in the tree. The node is then placed on, above or below the node where the small indicators of the positioning bar point:



If you want to duplicate a node or subtree, just press and hold the `Ctrl` key while you move a node or subtree in the tree. The node is then duplicated on, above or below the node where the small indicators of the positioning bar point.

4.6.12. Load Subtree

Step 1 In the tree structure select the node that shall become parent node of the subtree.

Step 2 In the context menu, click *Load Subtree*.
The *Open* window opens.

NOTE

Not all nodes accept child nodes, e.g. most of the Graphical Operators. If these are selected in the *Job Configuration* window then the *Load Subtree* menu item will be deactivated and colored gray.

Step 3 Select the job file.

TIP

Subtrees can be saved as `*.tre` files (see section 4.6.13 Save Subtree).

Step 4 Click *Open*.

In the tree structure the subtree appears as the child node of the selected parent node.

NOTE

To view a node in the *Vector Editor* window you have to define first, which node you want to view (see section 7.9.1 Add View of Node or Subtree from Job Configuration to Vector Editor).

4.6.13. Save Subtree

Step 1 In the tree structure select the subtree root node you want to save.

Step 2 In the context menu, click *Save Subtree as*.

— or —

In the *Standard* tool bar, click .

The *Save as* window opens.

Step 3 Name the file and select a folder to save it to.

Step 4 Click *Save*.

The file type `*.tre` will automatically be assigned to the file. The file will be saved to the *Job* folder of the InScript installation.

4.6.14. Delete Node

► In the context menu, click *Delete Node*.

— or —

In the tree structure select the node and press the *Del* key.

If the deleted node has child nodes, these nodes will be lifted to the level of the deleted node.

4.6.15. Delete Subtree

NOTE

If you want to open a subtree again later on then you have to save it before deleting the subtree from the tree structure. The procedure *Delete Subtree* deletes the subtree only from the tree structure and not from the file system.

If you want to delete a subtree (saved as job) from the file system then you have to do so using the operating system e.g. via Windows Explorer.

Step 1 In the tree structure select the subtree root node you want to delete.

Step 2 In the context menu, click *Delete Subtree*.

— or —

Press the *Shift* and *Del* key at the same time.

After you confirm the safety prompt the subtree including the selected node is deleted from the tree structure.

4.6.16. Edit Node

► In the tree structure double click the node you want to edit.

— or —

In the node context menu, click *Edit Job Node*.

— or —

Select the node and press the *F4* key.

The corresponding editor opens.

You will find a description of the node types in section 5 Job Nodes.

4.6.17. Rename Node

Names have to be unique in one level of the tree structure. If collisions occur, e.g. by renaming or moving a node, then an unique name will automatically be generated from the double name (e.g. `Rotate` will turn to `Rotate1`).

The following characters are not allowed and are automatically replaced by a _-character:

Character	Description
.	full stop
:	colon
*	asterisk
?	question mark
"	double quote
<	less than
>	greater than
|	vertical bar
/	slash
\	backslash

Step 1 In the tree structure select the node and click the node slowly once again without triggering a double click.

— or —

In the node context menu, click *Rename*.

The node name changes into a box.

Step 2 In this box type the new name.

Step 3 Press the *Enter* key.

— or —

In the *Job Configuration* window, click a free area.

4.6.18. Cut Subtree

Step 1 In the tree structure select the subtree root node you want to cut.

Step 2 In the context menu, click *Cut*.

— or —

Press the *Ctrl* and *X* key at the same time.

The subtree is cut from the tree structure and pasted to the clipboard.

4.6.19. Copy Subtree

Step 1 In the tree structure select the subtree root node you want to copy.

Step 2 In the context menu, click *Copy*.

— or —

Press the *Ctrl* and *C* key at the same time.

The subtree is copied to the clipboard.

4.6.20. Paste Subtree

Step 1 In the tree structure select the node you want to paste the subtree as its child node.

Step 2 In the context menu, click *Paste*.

— or —

Press the *Ctrl* and *V* key at the same time.

The subtree is pasted to the tree structure. Be aware that variable names may change by moving the nodes they belong to.

4.6.21. Expand Exec Tree

In the tree structure subtrees can be expanded, like e.g. in the Windows Explorer folder view.

In addition it is possible to fully expand the Exec tree with the following procedure.

Step 1 In the Exec tree structure select any node.

Step 2 In the context menu, click *Full Expand*.
The Exec tree expands.

4.6.22. Collapse Exec Tree

In the tree structure subtrees can be collapsed, like e.g. in the Windows Explorer folder view.

In addition it is possible to fully collapse the Exec tree with the following procedure.

Step 1 In the Exec tree structure select any node.

Step 2 In the context menu, click *Full Collapse*.
The Exec tree collapses.

4.6.23. Expand Subtree

In the tree structure subtrees can be expanded, like e.g. in the Windows Explorer folder view.

In addition it is possible to fully expand subtrees with the following procedure. This may save some clicks on more complex jobs.

Step 1 In the tree structure select the subtree root node you want to fully expand.

Step 2 In the context menu, click *Node Expand*.
The subtree expands at the selected node.

4.6.24. Collapse Subtree

In the tree structure subtrees can be collapsed, like e.g. in the Windows Explorer folder view.

In addition it is possible to fully collapse subtrees with the following procedure. This may save some clicks on more complex jobs.

Step 1 In the tree structure select the subtree root node you want to fully expand.

Step 2 In the context menu, click *Node Collapse*.
The subtree collapses at the selected node.

4.6.25. Arrange Subtree

To edit the tree structure in the *Job Configuration window*, e.g. to change the order of execution or to group subtrees, there are several possibilities.

- Drag&Drop the subtree root node to the node where it shall be inserted as the node's child.

  — or —

  While holding the *Shift* key pressed Drag&Drop the subtree root node to the place on the tree structure where it shall be inserted. At the current position an indicator appears.

  — or —

  Move the subtree using Ctrl-↑ and Ctrl-↓ (up or down in its current level)

  The child nodes of the moved node will be moved as well. Be aware that variable names may change by moving the nodes they belong to.

4.6.26. Arrange Node

Step 1 Select a node.

Step 2 In the node context menu, click *Arrange* → *Make First* or *Make Last* and *Up* or *Down* respectively.

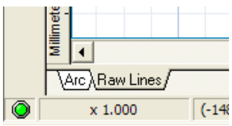
— or —

Move the node using Ctrl-↑ and Ctrl-↓ (up or down in its current level)

On its level in the tree structure the node will be made the first or last or moved one position up or down respectively.

4.6.27. Show VectorEditor View

In the *Vector Editor* it is possible to create views on different subtrees from the *Job Configuration* window and to switch them quickly, e.g. to view a node before and after its transformation. If more than 1 *Vector Editor view* exists then new views will be displayed in new tabs in the *Vector Editor*, see the figure below.



Step 1 In the *Job Configuration* window, select the subtree root node you want to view in the *Vector Editor*.

Step 2 In the context menu, click *Show VectorEditor View*.

The subtree will be displayed in the *Vector Editor*. In the *Job Configuration* window in the node's *Property* column, a icon appears.

4.6.28. Remove VectorEditor View

Step 1 In the *Job Configuration* window, select the subtree root node you want to remove from the *Vector Editor*.

— or —

In the *Vector Editor*, select the view tab you want to remove.

Step 2 In the respective context menu, click *Remove VectorEditor View* or *Remove Current View* respectively.

The subtree will be removed from the *Vector Editor*.

4.6.29. Select in VectorEditor

If it becomes difficult to distinguish objects in the *Vector Editor* and thus hard to select them there then this is a good method to pick the right object.

> **NOTE**
>
> Only nodes, that can be displayed in the *Vector Editor*, can be selected this way.

Step 1 In the *Job Configuration* window, select the *Vector Editor view*, containing the node you want to select in the *Vector Editor*. In the *Job Configuration* window a *Vector Editor view* is symbolized by an icon in the respective node's *Properties* column.

— or —

In the *Vector Editor*, select the view tab, containing the object you want to select.

Step 2 In the *Job Configuration* window in the respective node's context menu, click *Select in VectorEditor*.

The object will be selected in the *Vector Editor*. In the *Job Configuration* window in the node's *Property* column, a icon appears.

4.6.30. Edit Backdrop Property

The *Vector Editor* is able to show a background image for most of the nodes present in the *Exec* branch of the tree structure in the *Job Configuration* window. This image is called backdrop image. The backdrop image can be a static bitmap or an image provided by a frame grabber. This can be used e.g. for easier alignment on workpieces.

> **NOTE**
>
> The backdrop image will only be shown, if
>
> in the *Vector Editor's* Editor mode: the node is selected in the *Vector Editor* window.
>
> — or —
>
> in the *Vector Editor's* Preview mode: the node is selected for output in the *Job Configuration* window.

Step 1 In the *Job Configuration* window in the node context menu, click *Edit Backdrop Property*.
The *Edit backdrop property* window opens.

Step 2 Set the backdrop image properties as described below this instruction in paragraph Edit backdrop property window.

Step 3 Click *OK*.
in the *Job Configuration* window, the icon appears in the node's *Properties* column.

Edit backdrop property window

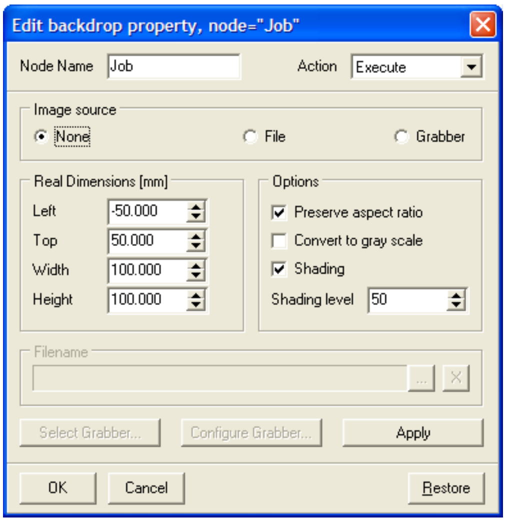


Image source selects the source of the backdrop

None no backdrop will be used

File a bitmap file will be used as backdrop image

Grabber an image provided by a frame grabber will be used. The frame grabber may be e.g. a camera, that is connected to the system

Real Dimensions sets the real dimensions of the image

Left sets the left edge of the image (X-coordinate relative to the scan field's origin)

Top sets the top edge of the image (Y-coordinate relative to the scan field's origin)

Width sets the image's width

Height sets the image's height

Options

Preserve aspect ratio if this checkbox is selected then either the backdrop image's width or height will be fit to the frame (Width, Height) and the aspect ratio will be preserved

Convert to gray scale if this checkbox is selected then the image will be converted to a gray scale image

Shading if this checkbox is selected the image's transparency will be set to *Shading Level*

Shading Level If *Shading* is set then this value influences the transparency of the backdrop image. "50" means 50% transparency, "100" means no transparency

Filename if *Image source* is set to *File* then this sets the filename of the image. Use to browse for a backdrop image. removes the filename from *Filename*

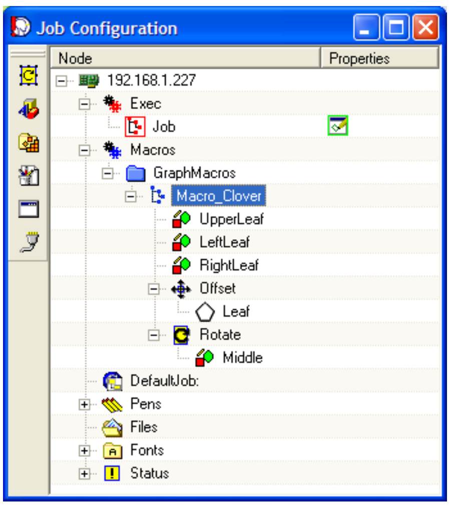
Select Grabber if *Image source* is set to *Grabber* and if a compatible image grabber hardware is connected to the InScript PC then select the image grabber hardware here as source of the backdrop image

Configure Grabber if *Image source* is set to *Grabber* and if a compatible image grabber hardware is connected to the InScript PC then configure the image grabber hardware here

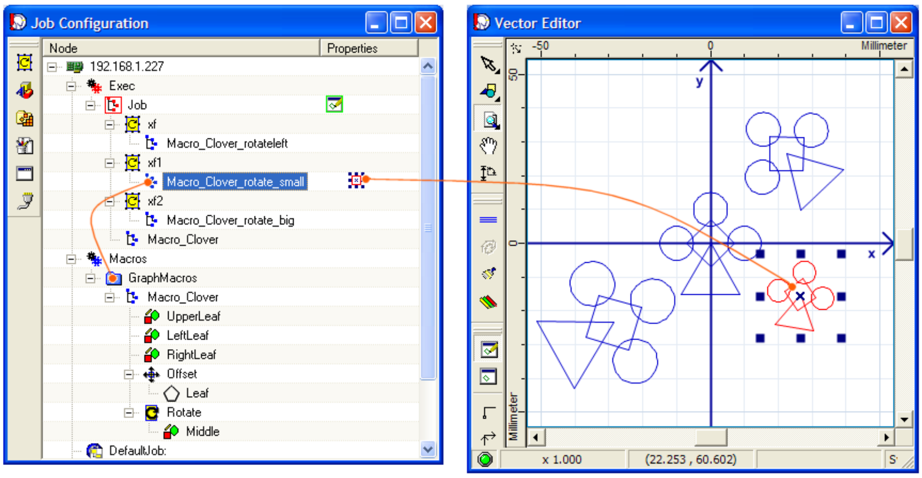
Apply applies the currently set image to the *Vector Editor* without closing the window

4.7. Manage Macros

Macros are mostly small subtrees of nodes that can be re-used in different spots of a Job. As an example you may have a specific graphical object that consists of a number of different nodes.



If you want to use this object in different spots of your job (e.g. in different offsets, sizes and/or rotations) then you may create a macro that has all the elements of this item. After that you can re-use this element all over your job by dragging and dropping it to the place in your job where you want to use it.



Using this mechanism you can re-use pre-defined objects or change objects that are spread over a job in one central place.

4.7.1. Create a new Macro

Step 1 Select the *Macros* node in *Job Configuration* window

Step 2 Click on *Organizers* → *Macro* in the *Standard Nodes* toolbar
A new *Macro* node is inserted under the *Macros* node

Step 3 Rename the *Macro* node to a suitable name (see 4.6.17 Rename Node)

Step 4 Place the nodes that shall build your macro under the *Macro* node

TIP

To have a visualisation of the macro, you may want to develop it in your *Job* (see 4.6 Manage (Executable) Jobs) under *Exec*. Best you use a *Collect* node (see 5.31 Collect). In this way you can display the macro in Vector Editor (see 4.6.27 Show VectorEditor View) and then drag and drop the *Collect* node under the *Macro* node.

Step 5 Now you can use the *Macro* by dragging and dropping it to your *Job* (see 4.7.2 Link a Macro to a Job)

4.7.2. Link a Macro to a Job

To use a macro in a Job, you have to link it into the Job.

Step 1 Create a Job (see 4.6 Manage (Executable) Jobs)

Step 2 Add the nodes that you want to use

Step 3 Create a macro (see 4.7.1 Create a new Macro)

Step 4 Drag and drop the created macro dragging its node to the place in the Job, where it shall be executed

— or —

Insert a Macro node (see 5.32 Macro) and type the *Macro Group* (if the macro is not in a group just leave the field blank) and Link Target (the macro's name).

Step 5 If the macro is in the wrong place you can move its macro link like a standard node (see 4.6.26 Arrange Node)

4.7.3. Create a Macro Group

To sort macros in different groups (e.g. maths macros, graphic macros etc.) you can create different macro groups.

Step 1 Select the *Macros* node in *Job Configuration* window

Step 2 Click on *Organizers* → *MacroGroup* in the *Standard Nodes* toolbar

A new *MacroGroup* node is inserted under the *Macros* node

Step 3 Rename the *MacroGroup* node to a suitable name (see 4.6.17 Rename Node)

Step 4 Now you can create macros in this macro group or drag and drop existing macros to this macro group (see 4.7.4 Group Macros)

4.7.4. Group Macros

To have macros grouped in logical sections, you may put macros of similar function into a *MacroGroup*.

Step 1 Create a *MacroGroup* node (see 4.7.3 Create a Macro Group)

Step 2 Rename the *MacroGroup* to a name that characterizes the Macros you want to collect in this group

Step 3 Now you can create macros in this macro group or drag and drop existing macros to this *MacroGroup* (see 4.7.4

4.7.5. Save Macros

Step 1 Create a macro (see 4.7.1 Create a new Macro)

Step 2 To save this macro right click on the Macro node under *Macros* and select *Save Macro*

A *Save Job Macro* window opens and you can specify the place and name to save the macro as a `*.imc` file

4.7.6. Load Macros

Step 1 Right click on the *Macros* node and select *Load Macro*.

— or —

Right click on a *MacroGroup* under the *Macros* node and select *Load Macro*.

Step 2 Select the `*.imc` macro that you want to load to the *Macros* node

The Macro will be loaded under the right clicked node

4.8. Manage Default Job

In the *DefaultJob* node any saved job can be set as default. After the controller has been reset, the default job will automatically be loaded, selected for execution and started.

4.8.1. Set Default Job

Step 1 In the *DefaultJob* node's context menu, click *Set Default Job*. The *Open* window opens. Select the job file you want to set as default.

— or —

Drag&Drop the `*.job` file from the Windows Explorer to the *DefaultJob:* node.

The path and file name will appear next to the *DefaultJob:* node.

Step 2 Save the setting to the controller's NVRam, see section 2.7 Store Configuration.

4.8.2. Reset Default Job

► In the *DefaultJob* node's context menu, click *Reset Default Job*.
The *DefaultJob* node will be cleared.

4.9. Manage Pens

The InScript pen concept is similar to that well known from drawing programs. In a drawing program e.g. the line color, width and style can be defined for a pen. In InScript e.g. the laser power, frequency and processing speed can be defined for a pen instead.

Pens are made up of pen sections. Each pen section contains the settings of the corresponding active device driver. A pen section only contains device driver parameters that can be changed during a job.

Pens are self-contained files located in the *Pens* branch of the tree structure in the *Job Configuration* window. They are not embedded into a job. *Pen Link* or *Pen Set* nodes link to the pens in a job. This way a pen can be used in several jobs or in parts of jobs.

4.9.1. Control Device Parameters During Job Execution

Device parameters can be saved to pens. By linking to these pens from the job tree structure, device parameters can be changed at specific points during job execution.

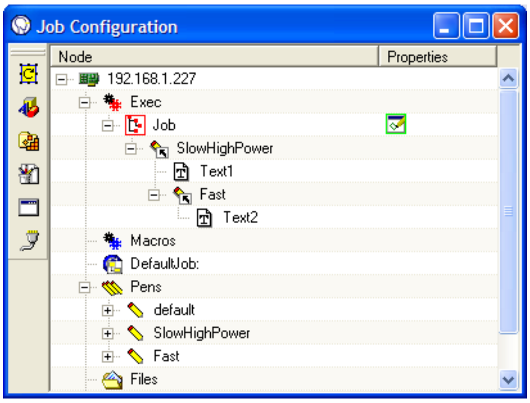
Step 1 Create pens with the parameters you want to change during the job, see 4.9.2 Create New Pen.

Step 2 Create *Pen Link* nodes in the job tree structure at the locations, where you want to change the parameters, see 5.49 Pen Link.

— or —

Drag&Drop the pens to the locations where you want to change the parameters.

Example In the following figure there are 2 pens defined in the *Pens* subtree. One pen is called *Fast* and setting the processing speed to 1000 mm/s. The second pen is called *SlowHighPower* and setting the processing speed to 50 mm/s and the laser power to 80%.

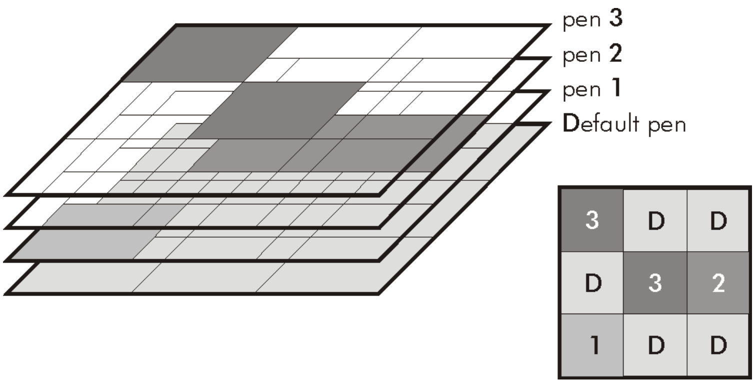


In this example *Text1* is output with 50 mm/s and 80% laser power, but *Text2* is child node of the *Pen Link* nodes *SlowHighPower* as well as *Fast*. As *Fast* is direct parent node to *Text2* and *SlowHighPower* only is indirect parent node, *Fast* overwrites the processing speed setting of *SlowHighPower* with its own setting. This causes *Text2* to be output with 80% laser power and 1000 mm/s processing speed.

Explanation As with other nodes the properties of the nodes *Pen Link* and *Pen Set* are inherited by their child nodes.

The default pen always exists and is used when no other pen is explicitly used. It also contains pen sections for each device driver, but at least the pen sections *dist_xy*, *dist_xy_2*, *linepar*, *head* and *sas*, as these devices are always active. If additional devices are active then the corresponding pen sections also appear in the default pen.

Pens can be "stacked" comparable to cards. On these cards the parameters are printed in fixed positions. The *Default Pen* is at the stack bottom. All possible parameters are printed on this card. A user defined pen is a card with specific parameters printed on. All other positions are transparent. By stacking the cards and looking at the stack from above the parameters result from all visible parameters. The following image illustrates this.



4.9.2. Create New Pen

Step 1 In the *Pens* node context menu, click *New Pen*.
The *New Pen* window opens.

Step 2 In *Pen Name*, type the name.

Step 3 Click *OK*.
The new pen is created as child of the *Pens* node.

Step 4 In the new pen context menu, click *New Pen Section*.
The *New Pen Section* window opens.

Step 5 In the *Device* list, select the device driver containing the parameters you want to control during a job.
You will find a description of the device drivers in 3 Devices.

Step 6 Click *OK*.
A new pen section is created as child of the new pen. This pen section belongs to the selected device driver and represents its parameters controllable during a job.

Step 7 If you need further pen sections for other device drivers then click *New Pen Section* in the new pen context menu and proceed as with the pen section created just now.

Step 8 Edit all newly created pen sections, see section 4.9.3 Edit Pen Section.

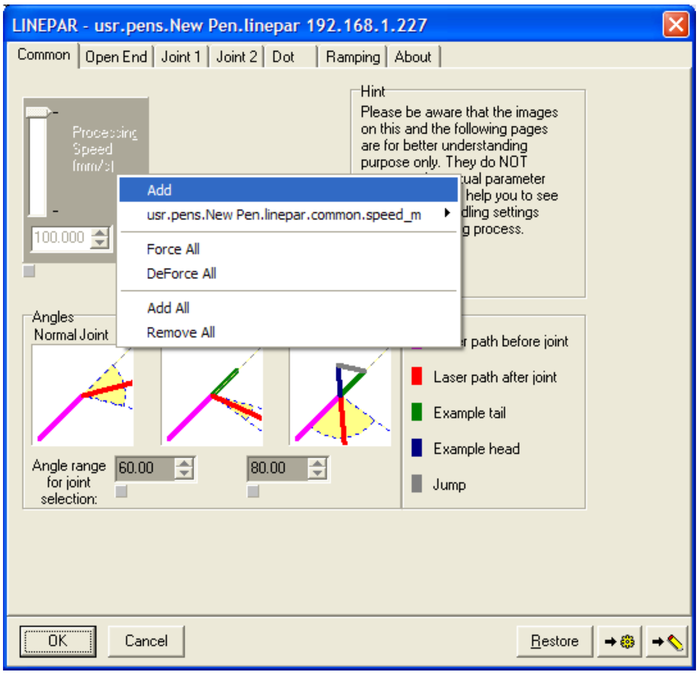
4.9.3. Edit Pen Section

Step 1 Double click the pen section.
— or —
In the pen section context menu, click *Edit Pen Section*.
The editor opens.
A pen sections contains only device driver parameters that can be changed during a job. You will find a description of the respective device drivers in 3 Devices.

NOTE

Changes made here will immediately take effect on the device. If you want e.g. increase the laser power then just increase the corresponding value. The change immediately takes effect.

Step 2 If the input box is locked (gray) then the parameter value is taken from the default pen. To unlock the input box, click *Add* in its context menu. To unlock all input boxes, click *Add All* in the context menu.



— or —

If the parameter value from the default pen shall be taken then the input boxes have to be locked. To lock an input box click *Remove* in its context menu. To lock all input boxes, click *Remove All* in the context menu.

Step 3 Set the parameter value.

Step 4 Repeat the previous 2 steps for all input boxes where the settings shall differ from the default pen.

Step 5 Click *OK*.

4.9.4. Load Pen

Step 1 In the *Pens* node context menu, click *Load Pen*.

The *Open* window opens.

Step 2 Select the pen.

Step 3 Click *Open*.
The pen appears in the tree structure with the name you saved it.

4.9.5. Load Pen as

Step 1 In the *Pens* node context menu, click *Load Pen As*.
The *Open* window opens.

Step 2 Select the pen.

Step 3 Click *Open*.
The *Load Pen As* window opens.

Step 4 In *Name*, type the name, the pen shall have in the tree structure.

Step 5 Click *OK*.
The pen appears in the tree structure with the given name.

4.9.6. Save Pen

► In the pen context menu, click *Save Pen*.
The pen is saved with the name visible in the *Job Configuration* window. The pen is saved in the `Pens` folder of the InScript installation.

4.9.7. Save Pen as

Step 1 In the pen context menu, click *Save Pen As*.
The *Save as* window opens.

Step 2 Name the file and select a folder to save it to.

> **NOTE**
> When a job is loaded then InScript tries to load the pens used within the job. Save the pen either to the same folder where the job is saved or to the InScript installation's `Pens` folder (located in the Windows %ProgramFiles% folder). That way you ensure that the pens used will be automatically loaded. First the pen is searched in the folder, where the job is located and then in the InScript installation's `Pens` folder.

Step 3 Click *Save*.

4.9.8. Delete Pen

► In the pen context menu, click *Delete Pen*.
The pen will be deleted from the tree structure. Saved pens will not be deleted from the file system.

4.9.9. Delete Pen Section

► In the pen section context menu, click *Delete Pen Section*.
The pen section will be deleted from the tree structure. Saved pen sections will not be deleted from the file system.

4.9.10. Assign Pens to "Line Colors" of a Vector Graphics File

In some vector graphics file formats pen numbers are already assigned to lines, e.g. to tell a plotter to print lines in different colors. In InScript pens can be assigned to these pen numbers. This way specific lines from the vector graphics file can be output with specific device parameter settings.

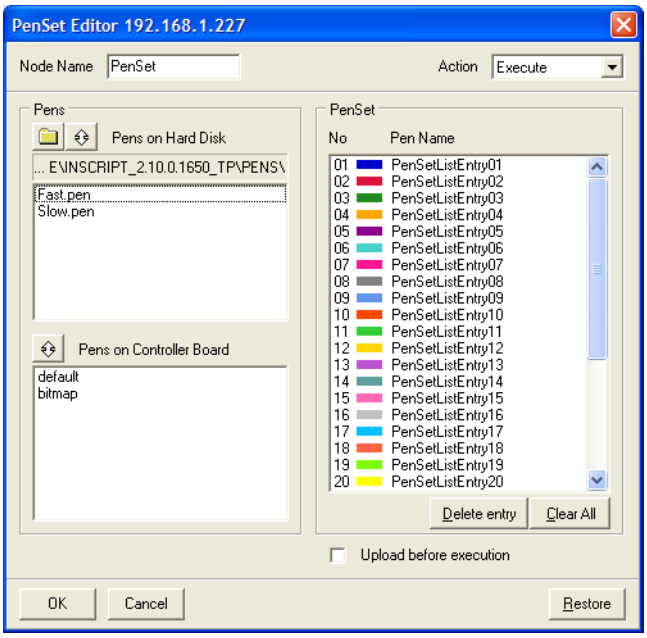
Step 1 In a drawing programm, create a vector graphics file, that is supported by InScript and where pen numbers are assigned to lines.
Lines, that shall be output with the same parameters, shall have the same pen number.

Step 2 Import the file to InScript.

Step 3 Create pens with the parameters you want to use for specific pen numbers, see 4.9.2 Create New Pen.

Step 4 Create a *PenSet* node as parent of the node, that outputs the vector graphics.

Step 5 Double click the node.
The *PenSet Editor* window opens.



Step 6 Drag&Drop the pen from the *Pens* group to the *Pen Set* group and the wanted pen number.
Find more information about the *Pen Set* node in section 5.50 Pen Set.

4.9.11. Force Execution of a Pen Link Node That Has No Child Nodes

If a *Pen Link* node does not have any child nodes generating line data then InScript ignores this *Pen Link* node in the *Exec* subtree. However pens can contain parameters e.g. to move a linear axis. You can force execution of these parameters. For this reason the *Force* checkbox exists at some parameters in the pen tabs.

If the checkbox is selected (yellow ■) then the parameter will be executed.

If the checkbox is cleared (gray ■) then the parameter will be ignored.

► Click the checkbox to execute (yellow ■) and ignore (gray ■) respectively the corresponding parameter.
  — or —
  In the context menu, click *Force All* to execute (yellow ■) all parameters and *DeForce All* to ignore (gray ■) all parameters respectively.

4.9.12. Teach-in *pilot* Pen

⚠ **CAUTION**

Visible and invisible laser radiation

The user is responsible for observing the laser safety regulations valid in his country.

Avoid eye or skin exposure to direct or scattered radiation while you teach-in or use a harmless sort of pilot laser to minimize danger.

To use the Teach-in button of the Job Control window (see 6.2 Description of the Window Teach-in), a pen called *pilot* has to be created. This pen has to have a *sas* pen section. Under tab *TeachIn* the *Use TeachIn* checkbox has to be set (see 4.9.2 Create New Pen and 4.9 Manage Pens how to create a pen and a pen section).

Follow these steps to create a *pilot* pen:

Step 1 Right click on the *Pens* node in *Job Configuration* window and select *New Pen*.
The *New Pen* window opens

Step 2 Type *pilot* into the *Pen Name* it box

Step 3 Click on *OK*
A pen called *pilot* (the name is case dependend) is created under the *Pens* node

Step 4 Right click the *pilot* pen node and select *New Pen Section*.
The *New Pen Section* window opens.

Step 5 Select *sas* in the drop down list.

Step 6 Click on *OK*
A pen section called *sas* is created under the *pilot* pen node

Step 7 Double click the *sas* pen section.

The *SASP usr.pens.pilot.sas* window opens

Step 8 Click on tab *TeachIn*, right click the *Use TeachIn* checkbox and select *Add*.

The *Use TeachIn* checkbox is now active for this pens

Step 9 Check the *Use TeachIn* checkbox.

The pilot pen is set for TeachIn

Step 10 Optional Step - Only needed if a seperate distortion correction for a pointing laser was done!

Create a second new *dist_xy* pen section (as described above)

Step 11 Optional Step - Only needed if a seperate distortion correction for a pointing laser was done!

Click on tab *Common*, right click the *Optical Path* combo box and select *Add*.

The *Optical Path* checkbox is now active for this pens

Step 12 Optional Step - Only needed if a seperate distortion correction for a pointing laser was done!

Set the *Optical Path* to *Pointing Laser*.

This enables that the distortion for the pointing laser is used (a distortion for the pointing laser has to be created: see the *Manual -- Scan Head -- Correct scan field for pointing laser*) , which differs from the distorion of the processing laser because of a different wave length of the pointing laser's light.

Step 13 Assure that the pointing laser is activated in a corresponding pen section of your active laser device.

In TeachIn the Job will be output in a loop. Therefore you have to avoid laser settings working with a potentially high power processing laser output.

> ⚠ **CAUTION**
>
> Visible and invisible laser radiation
>
> If the pilot pen settings are set to a output range that is in a dangerous range, the operator of the TeachIn is in hazard of injury!
>
> We urgently recommend that the pilot pen settings are verifyed to be in a range that is not dangerous.

TIP

Please be aware that if you execute TeachIn (see 6.2 Description of the Window under TeachIn) in standard configuration, only nodes that are placed under *Geometrical Operator* nodes are output.

4.10. Manage Files

InScript can handle graphic files which were created by other programs.

4.10.1. File Formats

NOTE

Not all graphics formats are supported in all places of InScript.

The following pixel file formats are supported:

- Windows bitmap (*.bmp)
- Joint Photographic Experts Group (*.jpg, *.jpeg)
- Tagged Image Format File (*.tif, *.tiff)
- Portable Network Graphic (*.png)
- Graphic Interchange Format (*.gif)
- Targa (*.tga, *.vst, *.icb, *.vda, *.win)
- PC Paintbrush (*.pcx, *.pcc, *.scr)
- Adobe PhotoShop (*.psd, *.pdd)
- Portable Bitmap (*.ppm, *.pgm, *.pbm)
- Silicon Graphics Inc. (*.bw, *.rgb, *.rgba, *.sgi)

NOTE

At the moment the ARGES RenderServer only supports the PGM format. The PGM format must not have a comment, like it is inserted e.g. by GIMP. The PGM file has to be in binary format, there has to be a "P5" signature in the binary file.

The following vector file formats are supported:

- Hewlett Packard Graphics Language (Plotter) (*.hpgl, *.plt)
- ARGES RawLines (*.arl)
- AutoCAD Drawing eXchange Format (*.dxf)
- VeCAD drawing (*.vec)
- LG1(*.lg1)
- IGES (*.igs)

4.10.2. Scope

In the *Job Configuration* window, see section 4 Job Configuration Window, pixel and HPGL files can be loaded to the *Files* node using its context menu. By doing so these files are uploaded to the controller. They are not automatically embedded into a job, but have to be referred to e.g. by a *Bitmap File Link* node, see section 5.13 Bitmap, or a *HPGL File Link* node, see section 5.12 File Link (HPGL). This way a file can be referred to several times without increasing the memory requirements on the controller.

Alternatively the *Bitmap File Link* node can render pixel files using the ARGES RenderServer. Vector files can be embedded into a job, after the line data has been imported via the *Raw Lines* node, see section 5.22 Raw Lines.

4.10.3. Save

Store graphic files created with external programs to one of the following locations in the file system:

- to the same folder, the job file has been loaded from
- to the *HPGL* or *Pics* folder of the folder, the job file has been loaded from
- to the *HPGL* or *Pics* folder of the InScript installation

When you open a job, InScript automatically tries to load associated files from the file system, in case they are not yet loaded into the controller's memory.

4.10.4. Load - Creating Nodes Automatically

For all file formats Drag&Drop automatically creates all necessary nodes in the *Job Configuration* window.

► Drag&Drop the graphic file from the *Windows Explorer* to the wanted position in the tree structure in the *Job Configuration* window.
  With pixel based files a *Bitmap File Link* node is automatically created on this position in the tree structure and the file is loaded to the *Files* node. With HPGL files a *HPGL File Link* node is automatically created on this position in the tree structure and the file is loaded to the *Files* node. With vector files (with the exception of HPGL) a *Raw Lines* node is automatically created on this position in the tree structure and a window for vector graphic import opens.

4.10.5. Load - Creating Nodes Manually

Depending on the file format there are several possibilities to use existing graphic files in InScript. For this purpose you have to create nodes and edit their settings in the *Job Configuration* window.

If you want to refer to a pixel file by a *Bitmap File Link* node

Step 1 In the *Files* node context menu, click *Load* and select the file type.
The *Open* window opens.

Step 2 Select the file.

Step 3 Click *Open*.
The file appears in the tree structure as child of the *Files* node.

Step 4 In the tree structure at the wanted position, create a *Bitmap File Link* node.

Step 5 In the *Bitmap File Link* node in the *File name* list, select the file. The list offers only files located in the *Files* subtree.

Step 6 Edit the *Bitmap File Link* node settings, see section 5.13 Bitmap.

If you want to call a pixel file from a render server

Step 1 In the tree structure at the position wanted, create a *Bitmap File Link* node.

Step 2 Edit the *Bitmap File Link* node settings, see section 5.13 Bitmap.

If you want to refer to a HPGL file by a HPGL File Link node

Step 1 In the *Files* node context menu, click *Load* and select the file type.
The *Open* window opens.

Step 2 Select the file.

Step 3 Click *Open*.
The file appears in the tree structure as child of the *Files* node.

Step 4 In the tree structure at the wanted position, create a *HPGL File Link* node.

Step 5 In the *HPGL File Link* node in the *File name* list, select the file. The list offers only files located in the *Files* subtree.

Step 6 Edit the *HPGL File Link* node settings, see section 5.12 File Link (HPGL).

If you want to embed a vector file in a job

Step 1 In the tree structure at the wantedposition, create a *Raw Lines* node.

Step 2 Edit the *Raw Lines* node settings, see section 5.12 File Link (HPGL).

4.10.6. Examples

- To create graphics you can use standard graphics software. Save the graphic files using these programs.
- Depending on the file format there are several possibilities to use existing graphic files in In-Script:

  pixel file formats In the tree structure, load the file as child node of the *Files* node first and refer to the file by a *Bitmap File Link* node from the job.

  — or —

  Create a *Bitmap File Link* node in the Job and get the file from a render server.

  HPGL file format Load the file as child node of the *Files* node in the tree structure and refer to the file by a *HPGL File Link* node from the job.

  — or —

  Create a *Raw Lines* node in which the line data will be embedded in the job.

vector file formats Create a *Raw Lines* node in which the line data will be embedded in the job.

That way a *Raw Lines*, *Bitmap File Link* or *HPGL File Link* node is created in the job. The nodes can be handled as any other graphical operator interactively in *Vector Editor* or e.g. by inserting a *Transform* node in the job.

4.11. Manage Fonts

InScript can handle different font formats. Its native binary font format is the `*.fdt` format and its ASCII based counterpart `*.sfh`.

4.11.1. Font Formats

The following font formats are supported:

NOTE

<data folder> can be either the InScript installtion folder under operating systems $\leq$ Windows XP or the InScript Documents folder (see InScript's Start menu entries for these folders) on operating systems $\geq$ Windows Vista.

- InScript Fonts (`*.fdt` in the `<data folder>\Fonts` folder)
- Firmware ROM Fonts (special vector fonts available on all controllers)
- TrueType Fonts (`*.ttf` in the `<windows folder>\Fonts` folder)
- Raster Fonts (`*.FON` in the `<windows folder>\Fonts` folder)

4.11.2. Scope

In the *Job Configuration* window, see section 4 Job Configuration Window, fonts that are used by the controller are shown in the *Fonts* node. InScript `*.fdt` fonts can be loaded to the *Fonts* node using its context menu. The font files are uploaded to the controller board. If you use a Text node, Round Text node, Barcode node, Barcode 2D node, Split Text node etc. then the fonts will be automatically converted to `*.fdt` format and uploaded to the controller.

NOTE

At the moment UTF-8 characters (8-bit UCS/Unicode Transformation Format - it is able to represent any character in the Unicode standard like Asian, Cyrillic or other non-latin characters, yet is backwards compatible with the limited ASCII format) are only supported in the *Text* node, see section 5.18 Text *Native 8 bit, UTF-8*.

4.11.3. Use TTF Fonts without InScript

Newer InScript Firmware versions ($\geq$ v2.6.0.376) fully support TrueType fonts at controller side. To use a full RenderServer support with this feature you have to have RenderServer $\geq$ v1.1.3.100.

To use these fonts directly and without using InScript to convert them, you have to follow these steps:

Step 1 Open e.g. Windows Explorer on a PC that is connected to the ASC

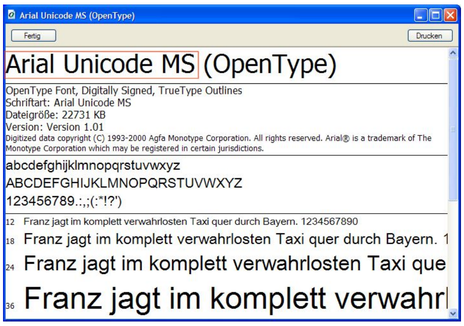
Step 2 Type
e.g. `\\192.168.1.42\Data\fonts\ttf`
into the Windows Explorer address field for controller 192.168.1.42

Step 3 Copy the TrueType font (TTF) that you want to use on ASC side to this SAMBA share of the ASC controller

Step 4 After up to 30 seconds the font can be used (the font list is updated in 30 second intervals)

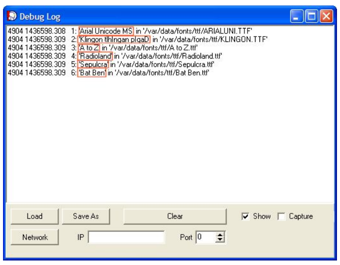
Step 5 To use the font, you have to find out its name (not the filename but its internal English name).

E.g. double click the TTF file on an English Windows XP and get its name (e.g. "ARIALUNI.TTF" and get "Arial Unicode MS" as its name). From InScript v2.10.1.1780.TP on English font names are supported on all Windows Language versions



— or —

Open InScript Xplorer, set variable `dbg.DebugLog` to TRUE and type „DumpLocalFonts" in string variable dbg.DbgCmd (without quotes and case sensitive). The Debug Log shows all names and files of the ASC-locale fonts



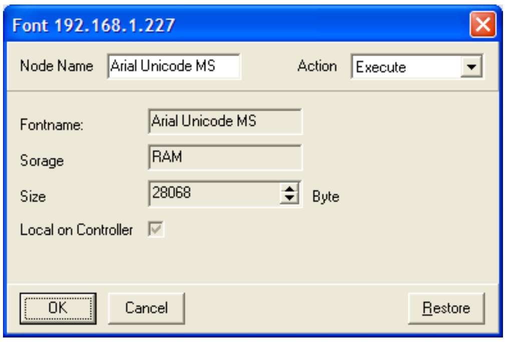
Step 6 This internal English font name (not the filename) can now be typed e.g. in the field „Font" of a Text node (5.18 Text)

At first this Font can not be found in the Font dropdown menue - only after it had been typed in or if it is also installed in the Windows Fonts folder. Also be sure that Encoding is set to UTF-8 if you want to use more unconventional glyphs. If the Font is not available in Windows the Font may not be shown correctly in the Text node editor but in Vector Editor you have to get the right output

The sequence to find fonts is:

1. Locally on the ASC controller
2. InScript and Windows (only if InScript is running)

This means that if a font is not found on the ASC, InScript/Windows tries to load this font. A controller-local font will be shown in the Font information dialog as "Local on Controller" (see 4.4.7 Fonts) if you double-click on exec → Fonts → <fontname>.



4.11.4. Convert to FDT

Older versions of InScript ($<$ v2.10.1.1780) and especially of the InScript Firmware ($<$ v2.6.0.376) did not support the direct use of TrueType Fonts on controller side as described under 4.11.3 Use TTF Fonts without InScript. In this case the fonts have to be converted to `*.fdt` format. This can be done using the InScript menu entry *Extras* → *Convert Font to FDT*, see section 8.14 Convert Font to FDT.

4.11.5. Example

NOTE

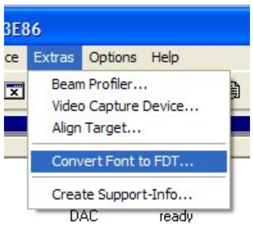
<data folder> can be either the InScript installtion folder under operating systems ≤ Windows XP or the InScript Documents folder (see InScript's Start menu entries for these folders) on operating systems ≥ Windows Vista.

Use TrueType Fonts on ASC without InScript Running If you want to use a TrueType font on an ASC controller without InScript actively running, e.g. while using the ARGES controller library, you will have to convert the font using InScript and place it in the ASC controller's fonts folder. The font will *only* be available for Vector output.

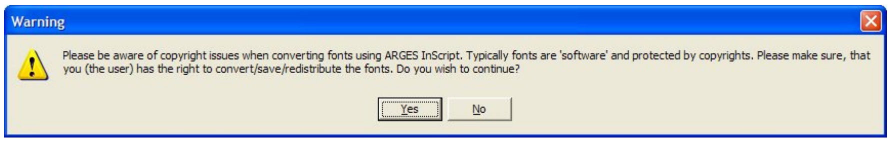
Step 1 If the font you want to use is not in the `<windows folder>\Fonts` folder, you have to copy it to this location. You may use either TrueType or Raster fonts.

Step 2 Start the InScript software.

Step 3 In the main menu, click *Extras* → *Convert Font to FDT*.

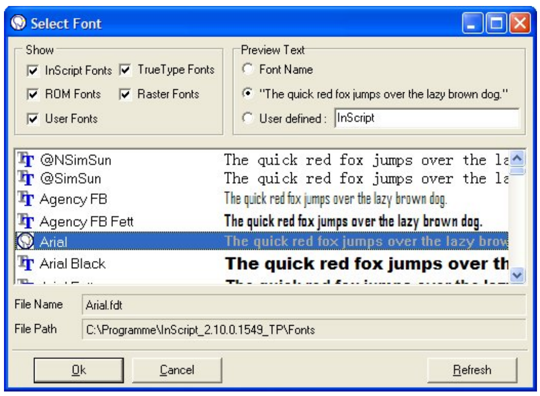


Step 4 Read the copyright information:



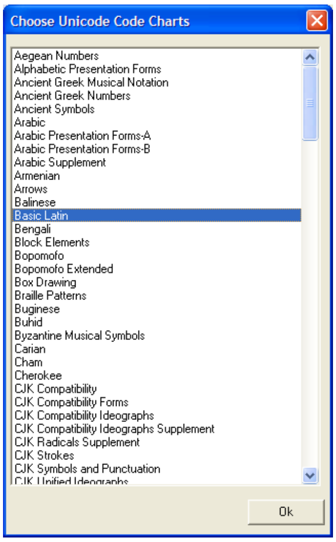
Step 5 Only if you are sure that your font is compliant with the copyright warning, confirm the dialog by clicking *Yes*.

Step 6 Select the font you want to convert from the list, e.g. Arial:



Step 7 Click *OK*.

Step 8 Select the Unicode Code Chart that you need (normally chart *Basic Latin* contains all European glyphs). We recommend that you do not choose a full set of charts! The more charts you select, the more extensive the conversion will be



Step 9 Click *OK*.

Step 10 Select a destination folder for the converted FDT font, e.g. <data folder>\Fonts.

Step 11 Click *Save*.

To avoid problems, be sure to save the font with the same filename as the font's name. The name is case in-sensitive.

Step 12 To have the font available on your ASC controller at all times, you have to copy the *.fdt file you created into the *Fonts* folder of this controller
e.g. \\192.168.1.42\Data\fonts
using *Windows Explorer* or any other method of copying a file.

Step 13 Now you may use this font in any node, e.g. *Text* or *Roundtext*, without the need to have InScript running in the background to convert the font.

5. Job Nodes

Job Nodes are used as parts of complex Job structures. They are arranged in a hierarchical tree and under normal circumstances, they are arranged under a *Job Node* of type *Job* (see 5.30 Job) as root of this tree.

5.1. Shared GUI Elements

Some GUI elements are common to all job nodes. They are described here in summary.

Node Name When creating a job node, its type will automatically be written into *Node Name*. You should name the job node depending on its function in the job. This makes complex jobs easier to understand.

Action selects the action to be performed when executing the job node.

Execute The job node and all its children job nodes will be executed, i.e. the complete tree beneath and including the current job node, will be executed.

Skip The job node and all its children job nodes will not be executed.

Neutral The job node itself will not be executed. But all its children job nodes will be executed.

Some job nodes, e.g. *Counter*, have additional list items:

Execute Once The job node will be executed exactly once. After it has been executed the list item is automatically set to *Done & Disabled*.

Done & Disabled The job node and all its children job nodes will not be executed. *Done & Disabled* is automatically set after the job node was executed with setting *Execute Once*.

stats.totalDuration This variable shows the length of time this job node takes to be executed. This also includes including its child nodes. The measurement is only valid after the job node has been executed and after the active state has been left. The *active* state can be checked via the variable *dev.sas.active*. This feature requires a Inscript-FW version 3.0.0-908 or higher. This feature has to be activated via the variable *dev.sas.jobDurationMeasurement*. See also 3.3.8 Parametrize - Job Duration Measurement.

OK applies the changes made and closes the window.

Cancel discards the changes made and closes the window.

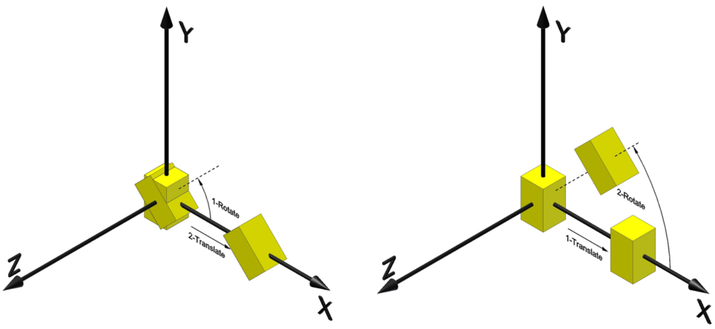
Restore resets the values to the values which were set when the window was opened.

5.2. Sequence of Transformations

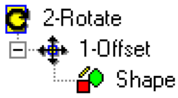
The order of a sequence of tranformations is crucial to its result. Here is an example for this problem:

Let's start with a simple set of two transformations. A 45° counterclockwise rotation about the origin around the Z-axis, and a translation down the X-axis. Suppose that the object you are drawing is small compared with the translation (so that you can see the effect of the translation), and that it is originally located at the origin. If you rotate the object first and then translate it, the rotated object appears on the X-axis. If you translate it down the X-axis first, however, and then rotate about the origin, the object is on the line y = x, because of the 45° rotation, as shown in following figure. In general, the transformation path is critical. If you do transformation A and then transformation B, you normally get a different result if you do it vice versa.

Please be aware of this problem if you create a jobs using different tranformations from the *Geometrical Operators* group.



The example shown above can be realized in InScript like this:



5.3. COM Ports in Job Nodes

There are possibilities to set COM ports in several *Job Nodes*. These COM ports refer to different physical ports on the ASC or NCC controller. In this section you may find a small summary which port is refered to on which controller type.

5.3.1. ASC Controller

CAUTION

Damage of the PC's interface module

If the connector is fully wired, the COM B combined CAN/RS232 interface of the ASC controller may damage the PC's interface module. Especially caused by the +10V CAN cable (pin 9).

To avoid damage, only connect pin 2, pin 3 and pin 5. You may obtain a special adpter connector from ARGES to avoid this problem.

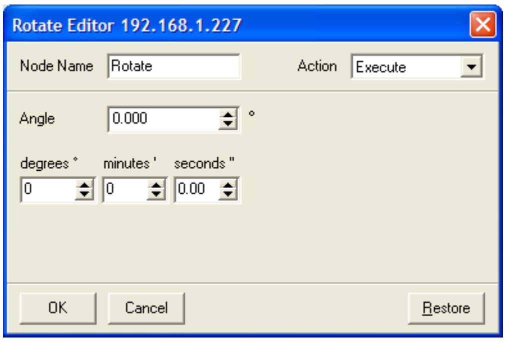
Port	Connector	Comment	Reference
COM A	-	N/A	N/A
COM B	CAN/RS232 (50-115200 Baud)	this is a combined RS232/ CAN connector	see *Manual -- ASC*
COM C	DVI Connector (50-115200 Baud)	used for communication with the laser	see *Manual -- NCC*

5.3.2. NCC Controller

Port	Connector	Comment	Reference
COM A	Serial connector (300-38400 Baud)	serial connector at the slot bracket	see *Manual -- NCC*
COM B	Serial connecor (300-38400 Baud)	serial connector at the slot bracket	see *Manual -- NCC*
COM C	DVI Connector (300-115200 Baud)	used for communication with the laser	see *Manual -- NCC*

5.4. Rotate

This node rotates its child nodes by a given angle. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Angle sets the angle by which the child nodes will be rotated in decimal representation.

— or —

sets the angle by which the child nodes will be rotated represented in **degrees**, **minutes** and **seconds**.

Depending on the input fields, each representation is automatically converted into the other. A positive angle rotates counterclockwise and a negative angle rotates clockwise. Because In-Script handles angles internally in a decimal representation, small rounding errors may occur in the seconds value.

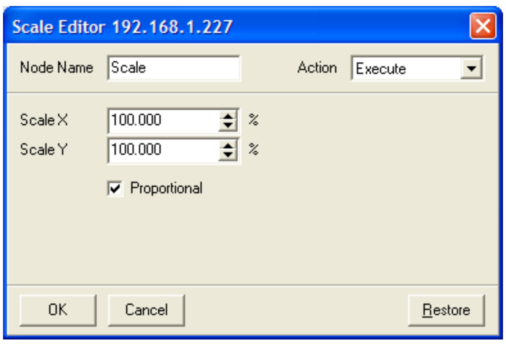
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.5. Scale

This node scales its child nodes, i.e. it scales them up or down. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Scale X sets the scale in X-direction.

Scale Y sets the scale in Y-direction.

Proportional If the check box is selected then the node proportionally scales in X- and Y-direction. If the check box is cleared then different scaling for X- and Y-direction can be specified. That way graphical objects beneath this node can be orthogonally distorted.

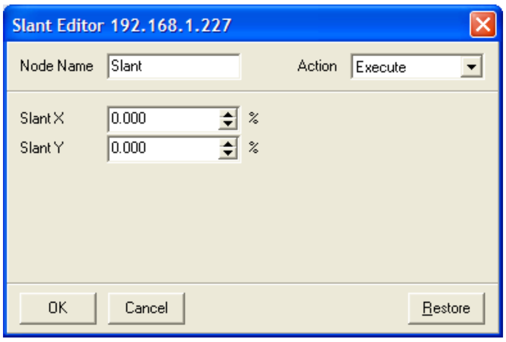
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.6. Slant

This node performs a slant on its child nodes. This transformation turns e.g. a rectangle into a parallelogram. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Slant X sets the slant in X-direction. A value of 100% changes a vertical line into a line slanted by 45°.

Slant Y sets the slant in Y-direction. A value of 100% changes a horizontal line into a line slanted by 45°.

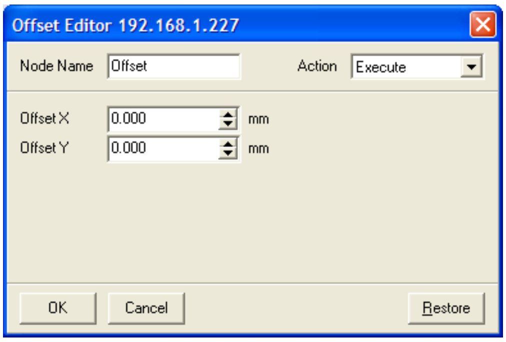
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.7. Offset

This node offsets its child nodes. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset X sets the offset in X-direction.

Offset Y sets the offset in Y-direction.

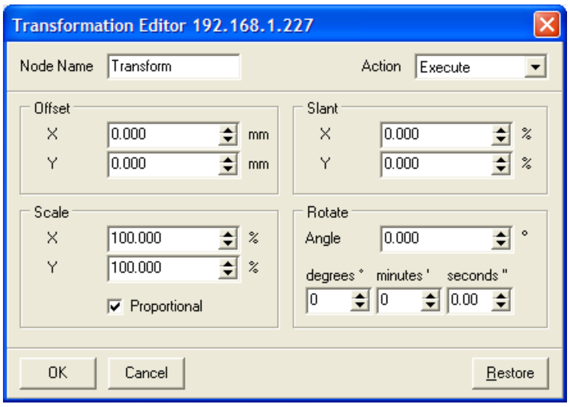
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.8. Transform

This node is a combination of the geometrical operators Rotate, Scale, Slant and Offset. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset, Scale, Slant, Rotate The node executes the geometrical operators in the following order: Scale → Slant → Rotate → Offset

1. Scale (see section 5.5 Scale)
2. Slant (see section 5.6 Slant)
3. Rotate (see section 5.4 Rotate)
4. Offset (see section 5.7 Offset)

If you want to execute the geometrical operators in a different order then you have to manually insert the corresponding operators in the needed order into the tree structure.

NOTE

If you do not make use of all transformations in the node then insert only the geometrical operators you really make use of into the tree structure. The transformation will be executed faster then.

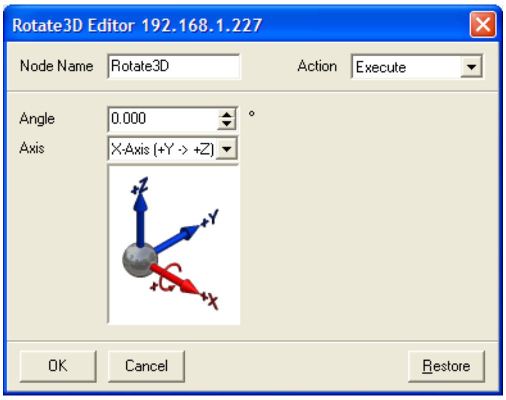
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.9. Rotate3D

When using a 3D scan head this node rotates its child nodes by the given angle around one defined axis. This node has to be placed inside a Scan 3D node (see section 5.28 Scan 3D). Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Axis sets the rotation axis

X-Axis (+Y → +Z) rotates around the X-axis

Y-Axis (+Z → +X) rotates around the Y-axis

Z-Axis (+X → +Y) rotates around the Z-axis

Angle sets the angle by which the child nodes will be rotated in decimal representation.

A positive angle rotates counterclockwise and a negative angle rotates clockwise

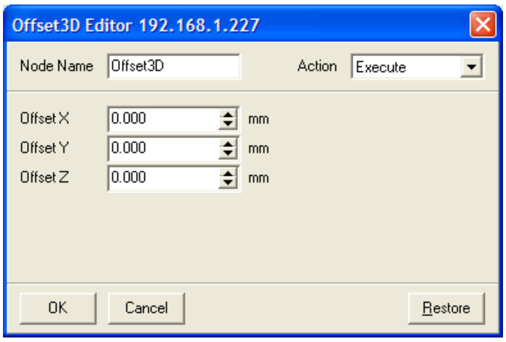
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.10. Offset3D

When using a 3D scan head this node offsets its child nodes. This node has to be placed inside a Scan 3D node, see section 5.28 Scan 3D. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset X sets the offset in X-direction

Offset Y sets the offset in Y-direction

Offset Z sets the offset in Z-direction

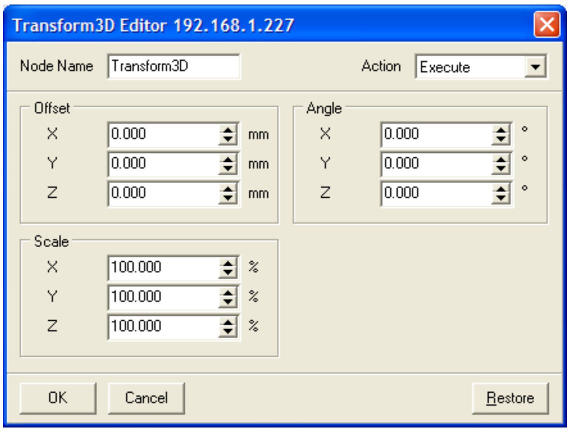
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.11. Transform3D

When using a 3D scan head this node offsets, scales and rotates its child nodes. This node has to be placed inside a Scan 3D node. Remember that the order of transformations is essential, see section 5.2 Sequence of Transformations. If you *only* have to do an offset or a rotation then use the Offset3D or Rotate3D node. The tranformation will be significantly faster then.



The node executes the geometrical operators in the following order:
Rotate (Angle) → Scale → Offset

Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset

- **X** sets the offset in mm of the subnodes in X-direction
- **Y** sets the offset in mm of the subnodes in Y-direction
- **Z** sets the offset in mm of the subnodes in Z-direction

Angle

- **X** sets the rotation of the subnodes around the X-axis in degrees
- **Y** sets the rotation of the subnodes around the Y-axis in degrees
- **Z** sets the rotation of the subnodes around the Z-axis in degrees

Scale

- **X** scales the size of the subnodes in X-direction with the given percentage
- **Y** scales the size of the subnodes in Y-direction with the given percentage
- **Z** scales the size of the subnodes in Z-direction with the given percentage

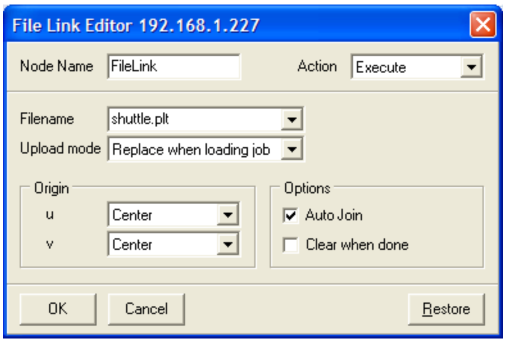
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.12. File Link (HPGL)

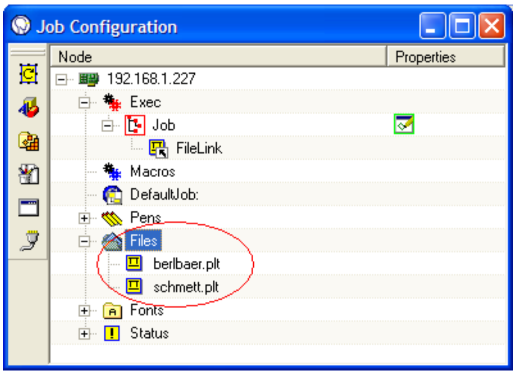
By this node a file can be output which is located in the *Files* folder on the controller. This node representates only a link to this file, i.e. the needed memory does not sum up, if the HPGL file is used several times in a job.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Filename sets the filename the link points to. In the list files appear that are located in the *Files* folder on the controller



Upload mode selects when the file shall be uploaded

Replace when loading job When the job is uploaded and a file with the same name already exists on the controller then the existing file will be overwritten by the new file

Upload when loading job When the job is uploaded and a file with the same name does not exist yet then the file will be uploaded

Upload before execution The file will be uploaded directly before each job execution, only if a file with the same name does not exits yet on the controller

Origin

u selects the origin in the file in X-direction

Floating as defined in the file

Left at the left edge

Center in the center

Right at the right edge

v selects the origin in the file in Y-direction

Floating as defined in the file

Top at the upper edge

Center in the center

Bottom at the lower edge

Options

Auto Join When a plotter outputs a HPGL file, the pen is moved up and down again in the corners of a zigzag line. The laser beam would switch off and on again at these corners. If the check box is selected then the line ends are automatically joint. This way the laser beam stays switched on

Clear when done If the check box is selected and the bitmap file was output by *Job Start* or *Preview* then the file will be deleted from the controller's memory

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.13. Bitmap

This job node outputs bitmap files or renders data from the Bitmap job node's subtree into a bitmap file, which then is output.

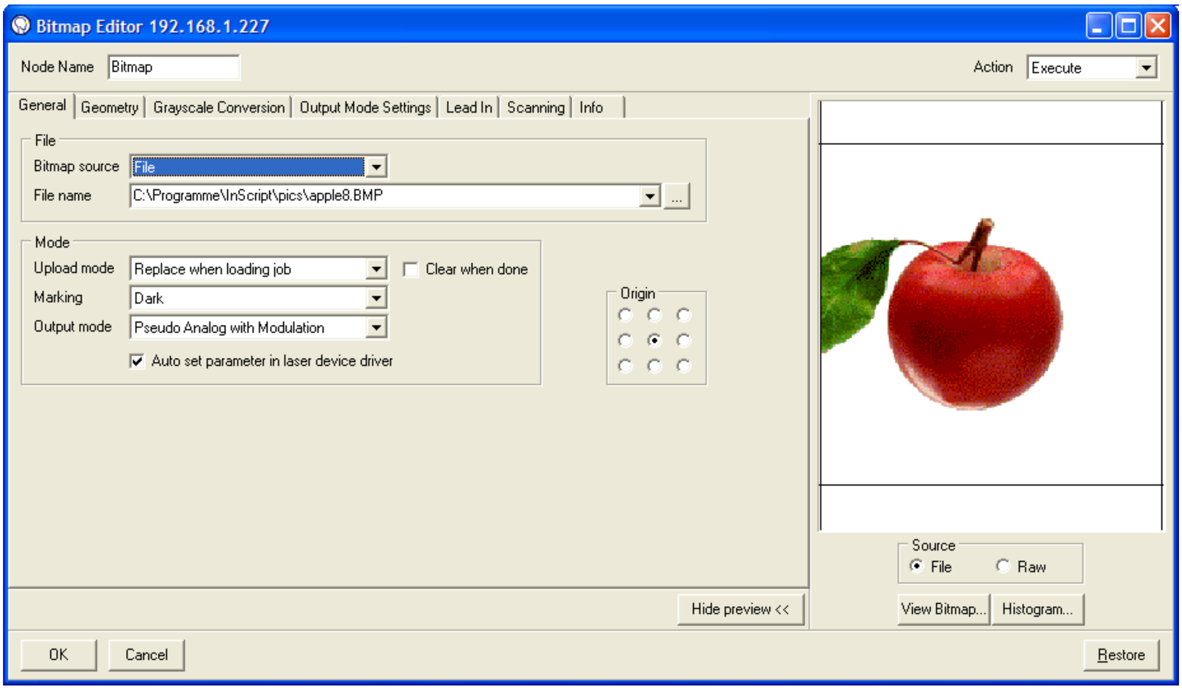
Before the Bitmap job node processes a color bitmap file, the file has to be converted to gray scale, the so called *Raw* file. This *Raw* file is the input data for the Bitmap job node. Parameters which are set in the Bitmap job node apply directly to this *Raw* file.

If a subtree of the Bitmap job node shall be output then the subtree is rendered by a render server into a bitmap file while the Bitmap job node is executed. The bitmap file is saved by the render server into a folder and then loaded by InScript from this folder to be output by the Bitmap job node. Some Bitmap job node settings, like e.g. in the *Geometry* tab in the *Target Image Size* group are then specifications for the render server.

The Bitmap job node can output bitmap files in the output modes described in section 5.13.1 Edit - General, *Output mode*.

5.13.1. Edit - General

The parameters on this tab affect the general properties of the bitmap file.



Node name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

File

Bitmap source selects the source of the bitmap file, which shall be output

File The bitmap file inscribed in the *File name* box will be output

File created from subnodes The subtree beneath the Bitmap job node will be rendered into a bitmap file, which will be output afterwards

Stream image created from subnodes The subtree beneath the Bitmap job node will be rendered into a stream image, which will be output

NOTE

If you want to render the subtree beneath the Bitmap job node into a bitmap file and output it then you have to select *File created from subnodes* in the *Bitmap source* list and *Streaming in the Upload mode* list. In this case you have to specify the file name in the *Render Server* tab. This tab is only shown in the *created from subnodes* source modes.

File name selects the name of the bitmap file, which shall be output. Using *Render Server*, the specified file name will be filled in automatically here

Mode

Upload mode selects when the bitmap file will be uploaded to the controller

Replace when loading job When the job is uploaded and a bitmap file with the same name already exists on the controller then the existing file will always be overwritten by the new file

Upload when loading job When the job is uploaded and a bitmap file with the same name does not exist, then the bitmap file will be uploaded

Replace before execution The bitmap file will always be uploaded directly before each job execution even if a bitmap file with the same name already exists on the controller

Upload before execution The bitmap file will be uploaded directly before each job execution only if a bitmap file with the same name does not yet exits on the controller

Streaming The bitmap file will be uploaded as a continuous stream while it is processed by the controller

Clear when done if this check box is selected and the bitmap file was output using *Job Start* or *Preview*, the file will be deleted from the controller's memory after processing it

Marking selects how the color of the material changes after processing

Dark The material darkens after processing

Bright The material brightens after processing

Output mode selects the mode the bitmap file will be output with

NOTE

Depending on the mode only tabs and parameters that are relevant for the respective mode are displayed.

Line Normal Black and white output. The bitmap is output as a sequence of horizontal or vertical lines. The figure below shows a bitmap (left) and its output by the Bitmap job node in mode *Line Normal* (right). To output lines the Bitmap job node uses settings in the *linepar* pen section of the actual pen, i.e. the lines are output with head and tail

Line Optimized Black and white output. Like in *Line Normal* mode the bitmap is output as a sequence of horizontal or vertical lines with head an tail. In some situations, e.g. at high processing speed, the tail of one line may overlap with the head of the next line. To position the laser beam from the tail end to the head beginning the direction of movement has to be reversed. This causes jumps. In this case the *Line Optimized* mode ignores the normal handling of the affected lines. The Bitmap job node continues at processing speed and switches the laser beam off and on at the affected places. This prevents jumps. The line data calculation thereby takes longer. The time saving in output may be possibly nullified

Raster →OBSOLETE Output mode Black and white output. Like in *Dot* mode the bitmap file is output with a dithering algorithm, which approximates gray scales. Contrary to the *Dot* mode the *Raster* mode does not position on each laser pixel, but outputs a whole scan line with constant speed. In doing so the laser beam is switched on and off when passing a laser pixel. To output the laser pixel the Bitmap job node does not use any settings in pens. The settings have to be made in the *Raster Settings* tab

Dot Black and white output. The bitmap is output with a dithering algorithm, which approximates gray scales. For this purpose the bitmap is divided into cells of n×m laser pixel (dot positions). According to the gray value within these bitmap cells the cells are filled with dot patterns. To output the dots the Bitmap job node uses settings in the *linepar* pen section of the actual pen. The scan head separately positions each dot. This method positions each dot exactly, but needs much time. For materials needing a very long exposure time solely the *Dot* mode is suitable

Pseudo Analog Grey scale output. Like in *Raster* mode a scan line is output with constant speed, while the laser beam is switched on and off. Contrary to the *Raster* mode the bitmap gray scales are not approximated by a dithering algorithm, but the laser pixel are output with more or less laser energy. The laser energy controlled by a controlled first pulse. A first pulse is generated by exciting the laser active medium without the laser emitting light. Then the laser emits the accumulated energy in one pulse. In other situations this effect is unwanted, but here it is used to output true 256 gray scales. To get good results with this method you need a material where color changes with absorbed laser energy

Pseudo Analog with Modulation Grey scale output. The image area is scanned with constant speed. To output grayscale the laser power is affected by pulse width modulation and an analog control voltage

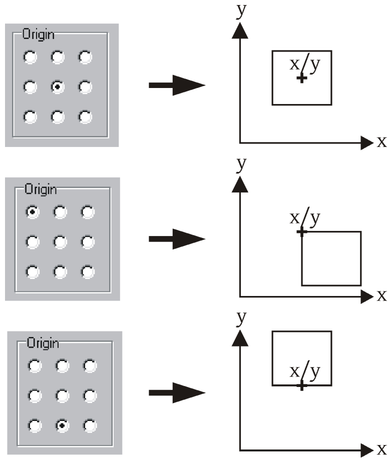
CW Analog Grey scale output. The image area is scanned with constant speed. To output grayscale the laser power is affected by an analog control voltage

Triggered Analog Grey scale output. The image area is scanned with constant speed. To output grayscale the laser power is affected by pulse width modulation

External Rendering Grey scale output. Has to be selected when the bitmap is already rendered by e.g. a Bitmap job node which is child job node of the original Bitmap job node

Auto set parameter in laser device driver If the check box is selected and the Bitmap job node is output then the parameters in the laser device driver will be automatically set, as bitmap graphic possibly need to be output with different parameters than vector graphic. If the check box is cleared then the parameters have to be set manually, i.e. via pens in the job

Origin A graphics object is framed by a so called bounding box. In group *Origin* you may specify the point (or handle) within the bounding box of the bitmap which coordinates and geometrical operations refer to. In group *Origin* the central radio button is pre-selected. Thus the bounding box center is at coordinates x/y (see following figure). If e.g. the upper left radio button is selected instead then the upper left bounding box corner is at coordinates x/y (see following figure). Following examples show settings of *Origin* and their effect:



Show/Hide preview see section 5.13.9 Edit - Preview

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

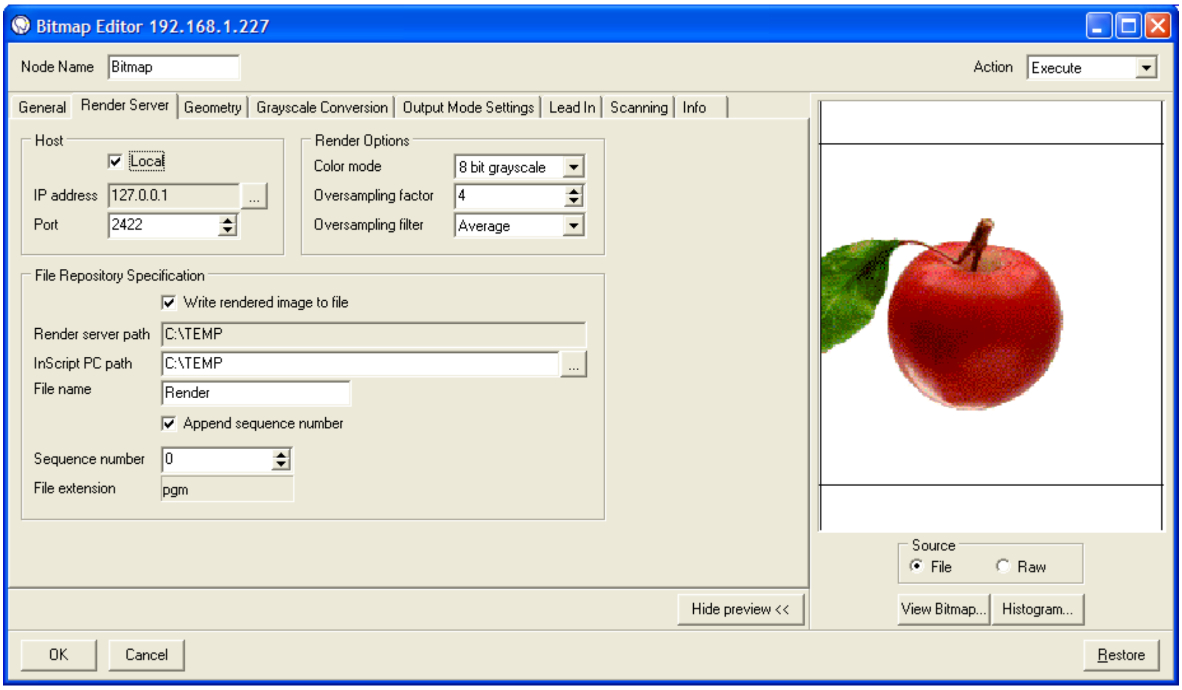
5.13.2. Edit - Render Server

NOTE

This tab only appears when in *General* tab *Bitmap source* is set to a *created from subnodes* setting. The referenced Render Server has to be running or you may get unpredictable results.

The parameters in this tab affect the external Render Server, which creates a bitmap file from the subtree of the Bitmap job node. The Render Server is a very powerful tool. Conventional laser output is only possible in vectorized form. On the other hand you are able to mark bitmaps on different materials in different brightness and greyscale. The ARGES Render Server combines these features by giving the possibility to e.g. create white characters on a dark bitmap or to use anti-aliasing for normally plain vectorized lines in a rendered bitmap before the system starts processing.

There are two independent ARGES Render Server solutions. One way is to use the Render Server that you may install with the InScript Software on a PC. Another way is to use a Render Server module controller-side on an ASC-n controller (this is not possible using an NCC controller, which has to use the Render Server running on a PC). To use the ASC controller-side Render Server, the corresponding ASCModule has to be installed on this controller.



Host

Local If the check box is selected then the Render Server has to reside on the local PC (the PC where InScript is running). If the check box is not selected the Render Server may reside on a remote PC or ASC-n controller and a correct host address and a port have to be specified

IP address sets the IP address where the host with the Render Server can be found. The so called localhost or "this computer" always translates to 127.0.0.1

Port sets the port where the host with the Render Server can be found. Normally InScript uses local client port 2422

Render Options

Color mode selects the color depth and the color space of the output bitmap

8 bit grayscale greyscale with 256 colors

24 bit RGB RGB with 16.7 million colors

32 bit RGBA RGB with 16.7 million colors and an Alpha channel

Oversampling factor sets the oversampling factor

Oversampling filter

Average average filtering

File Repository Specification

Write rendered image to file If the check box is selected then the rendered image will be written to a file. If *Upload mode* is set to *Streaming* in tab *General* and if you want to view the result of rendering in the Vector Editor then this check box has to be selected.

Render Server path sets the path (viewed from Render Server site), where the Render Server saves the bitmap file

InScript PC path sets the path (viewed from InScript site), from which InScript loads the bitmap file

File name sets the file name. Type in the file name without file name extension

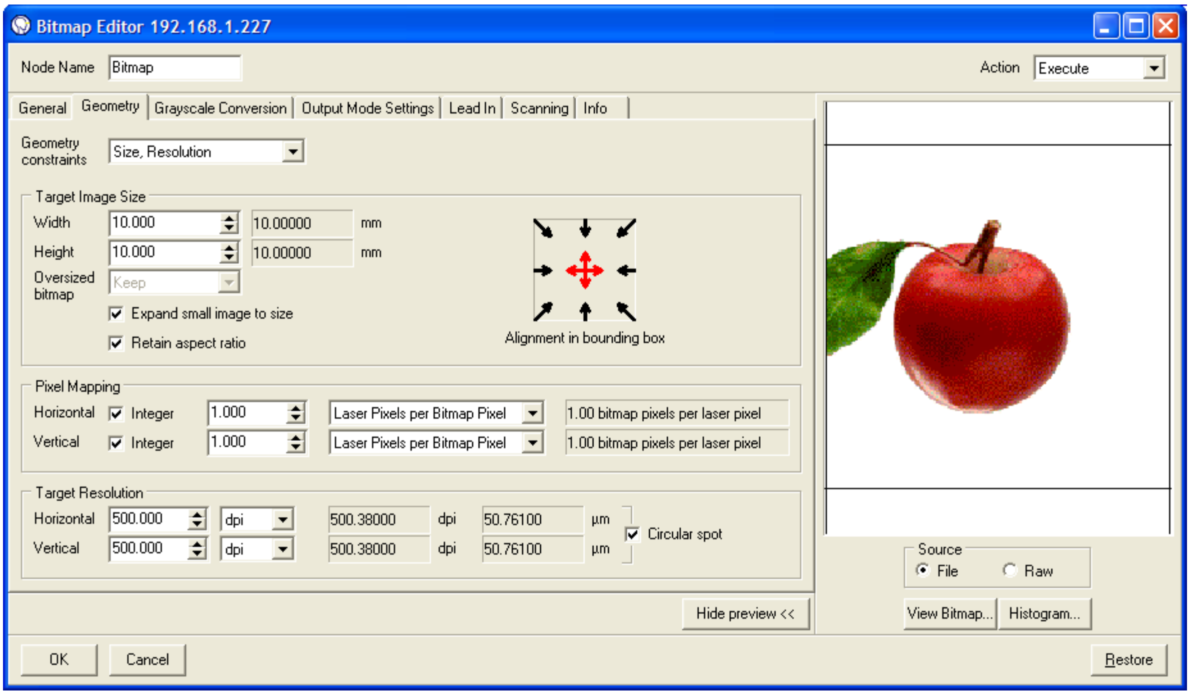
Append sequence number If the check box is selected then a number will be appended to the file name. This number will be automatically increased by 1 with the next bitmap file

Sequence number shows and sets the number which will be appended to the file name

File extension shows the file name extension

5.13.3. Edit - Geometry

The parameters in this tab define the size and the pixel mapping and the resolution respectively of the output.



Geometry constraints In this tab there are the 3 groups *Target Image Size*, *Pixel Mapping* and *Target Resolution*. *Geometry constraints* selects a superior and a inferior parameter group. The remaining third parameter group will then be automatically adjusted to the other groups. If the values in the inferior parameter group are not conform to the values of the superior parameter group then they will be automatically set to values near to the original ones. The superior parameter group always predominates

Size, Resolution Size is superior, Resolution is inferior and Pixel Mapping is subordinated

Resolution, Size Resolution is superior, Size is inferior and Pixel Mapping is subordinated

Size, Pixel Mapping Size is superior, Pixel Mapping is inferior and Resolution is subordinated. If the render server is used then this menu item is not available

Resolution, Pixel Mapping Resolution is superior, Pixel Mapping is inferior and Size is subordinated. If the render server is used then this menu item is not available

As an example, you may want to be 100% sure that the size of the output is not changed and that the resolution (in Dots per Inch that have influence of the brightness and contrast of a picture) are exactly as set. Then you choose *Size, Resolution*. The size will remain exactly as set and dots per inch will also not be changed. To be able to represent the image in laser pixel, these have to be adjusted to maintain size and resolution as set.

Target Image Size

Width sets the width of the bitmap's bounding box. The Bitmap job node scales the bitmap that it fits completely into the bounding box (see also *Retain aspect ratio*). If you create a bitmap using the Render Server then the bitmap is created in the specified size not before the Bitmap job node is executed. Hence only an already created bitmap can be previewed

Height sets the height of the bounding box, see *Width*

Oversized bitmap selects the way a bitmap is treated that is bigger than the bounding box *Width*×*Height*. This is only needed in *Constraint* mode *Resolution, Pixel Mapping* because only here size may vary.

Keep keeps the bitmap size

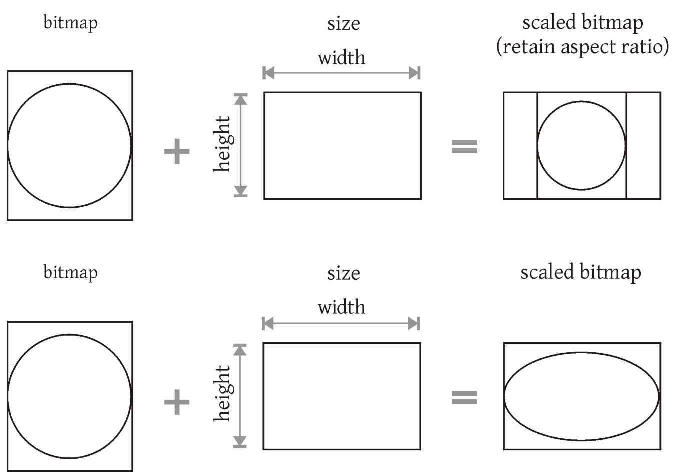
Shrink shrinks the bitmap to the bounding box' *Width*×*Height*

Clip clips the bitmap to the bounding box' *Width*×*Height*

Expand small image to size If the check box is selected then the bitmap will be enlarged to the size *Width* × *Height*

Retain aspect ratio If the check box is selected then the aspect ratio will be retained (see the following figure, upper row).

If the check box is de-selected then the box *Width* × *Height* will be completely filled. Thus the bitmap can be stretched or compressed in one direction (see the following figure, lower row)



Alignment in bounding box selects, how the bitmap will be aligned within the box *Width* × *Height*.

If you create a bitmap using the render server then the bitmap size and the box size always correspond which makes alignment of the bounding box take no effect

Pixel Mapping

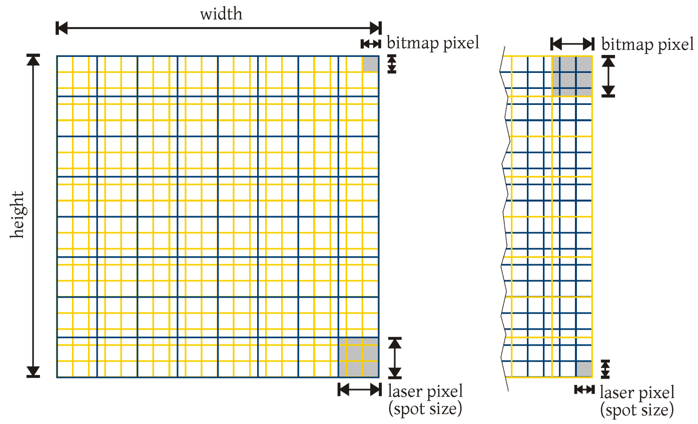
Horizontal sets the mapping of bitmap pixel to laser pixel (spot size) in horizontal direction and shows the calculated value of the laser pixel to bitmap pixel mapping or vice versa.

If the check box is selected then the calculated value will be truncated

Laser Pixels per Bitmap Pixel The value has the unit *Laser Pixels per Bitmap Pixel*

Bitmap Pixel per Laser Pixel The value has the unit *Bitmap Pixel per Laser Pixel*

The following figure shows an example where the laser pixel are bigger than the bitmap pixel (left side of the figure). The reverse case is also possible (right side of the figure)



Vertical sets the mapping of bitmap pixel to laser pixel (spot size) in vertical direction and shows the calculated value of the laser pixel to bitmap pixel mapping or vice versa.

If the check box is selected then the calculated value will be truncated

Target Resolution

Horizontal sets the resolution of the output bitmap or the laser pixel size respectively (spot size) in horizontal direction and shows the calculated values

dpi The value has the unit *dpi* (dots per inch)

µm The value has the unit μm (micrometer or micron)

Vertical sets the resolution of the output bitmap or the laser pixel size respectively (spot size) in vertical direction and shows the calculated values

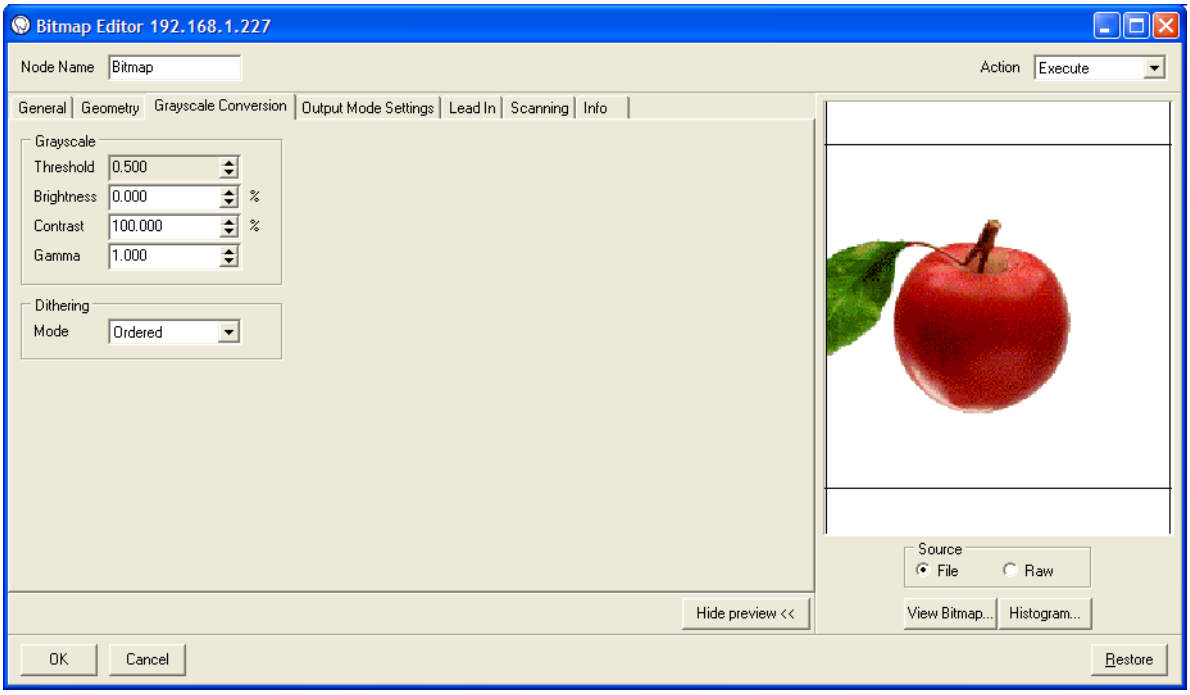
dpi The value has the unit *dpi* (dots per inch)

µm The value has the unit μm (micrometer or micron)

Circular spot If the check box is selected then the horizontal and vertical size of the laser pixel (spot size) are assumed to be equal

5.13.4. Edit - Grayscale Conversion

In this tab you set the parameters for converting a color bitmap into a gray scale bitmap or dithering it.



Grayscale

Threshold sets within the output modes *Line Normal* and *Line Optimized* the threshold where a line will be output, e.g. from 0.500 = 50.0% black

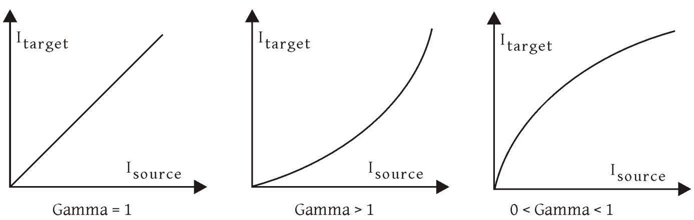
Brightness sets the bitmap brightness within the output modes *Raster*, *Dot* and the *Analog* output modes

Contrast sets the bitmap contrast

Gamma sets the Gamma value. The Gamma value maps the source bitmap pixel intensity to the target bitmap pixel intensity. The following figure shows the connection between source bitmap intensity I_{source}, target bitmap intensity I_{target} and Gamma

NOTE

The Gamma value makes it partially possible to compensate a nonlinear response of the material or the laser system used.



$$I_{target} = I_{source}^{Gamma}$$

Dithering

Mode Within the output modes *Dot* and *Raster* the gray tones are approximated by variously dense dot patterns. 2 dithering methods are available

Ordered approximates one gray tone always by the same dot pattern. This method applies better to bitmaps with large areas of the same gray tone

Error Diffusion approximates a gray value with varying dot patterns, where the gray values of neighboring bitmap pixel are taken into account

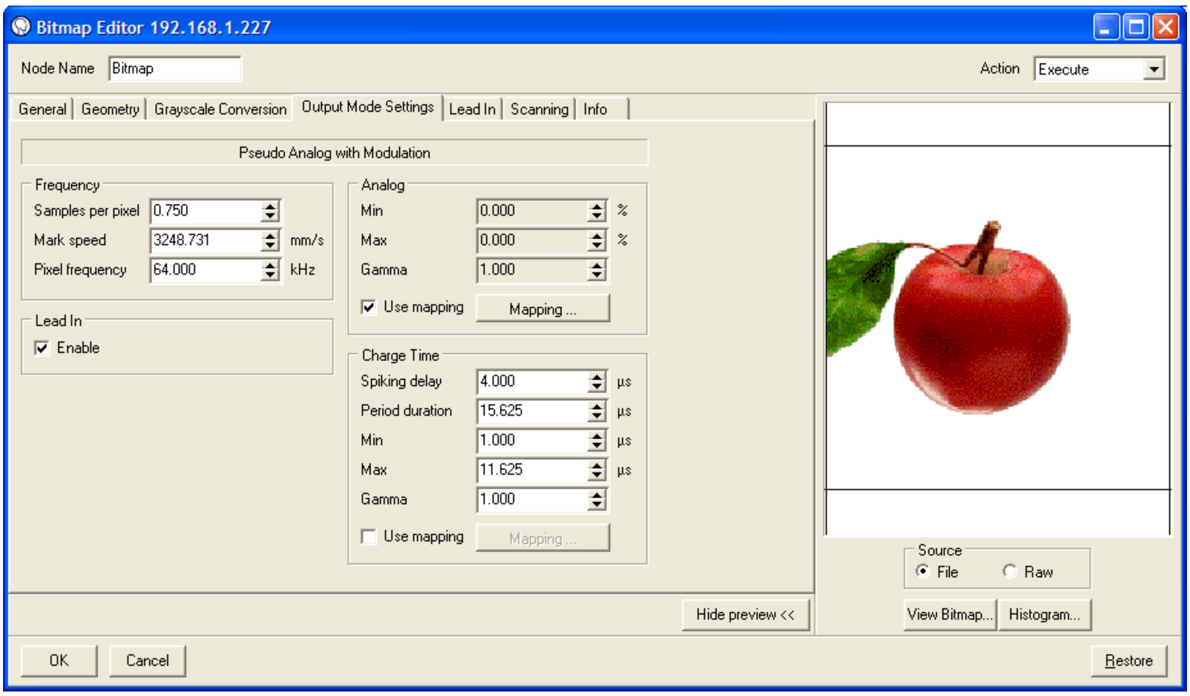
5.13.5. Edit - Output Mode Settings

NOTE

This tab only appears, if in the General tab Output mode is **not** set to Line Normal or Line Optimized. Depending on the output mode you have chosen, only the suitable parameters are displayed. In *Pseudo Analog with Modulation* mode most of the parameters are shown. Therefor not all settings are visible in the screenshot but they are referenced in the description.

In this tab you set the parameters affecting the corresponding mode and controlling the optical laser power.

The settings in this tab have a direct effect on the Digital Signal Processor (DSP) of the controller. Hence most of the values are given in samples. The DSP processes 48000 samples per second, i.e. one sample equals 1/48000 sec.



Frequency The values in the Frequency section are different approaches of the processing speed and depend on each other (so if you alter one value the others will also be altered). A pixel frequency of 64 kHz is a good base value for ARGES products. Depending on the Frequency, the charge time is influenced

Samples per pixel sets the time to output a laser pixel

Mark speed shows the processing speed that results from the setting in *Samples per pixel*

Pixel frequency shows the pixel frequency that results from the setting in *Samples per pixel*

Lead In

Enable if this check box is selected the *Lead In* tab will be available, where you can set the relevant parameters, see section 5.13.6 Edit - Lead In

Pixel ON-time sets the raster timing, i.e. the time the laser beam is switched on for each laser pixel

Analog These settings control the optical output power dependent on the bitmap pixel intensity. Normally they are only needed for very demanding approaches

Min sets the value in the Digital Analog Converter (DAC), which defines the pixel intensity 0

Max sets the value in the Digital Analog Converter (DAC), which defines the pixel intensity 255

Gamma see *Gamma* in section 5.13.4 Edit - Grayscale Conversion

Use mapping If the check box is selected then the *Bitmap Analog Mapping* is activated

Mapping opens the *Bitmap Analog Mapping* window, see section 5.13.10 Edit - Mapping

Charge Time A higher frequency is decreasing the available maximum Charge Time and thus the available energy. So if the marked picture is to light, you may have to reduce Pixel frequency to get more Max charge time (or more laser energy)

Spiking delay sets the spiking delay

Period duration sets the period duration

Min sets the minimum

Max sets the maximum

Gamma see *Gamma* in section 5.13.4 Edit - Grayscale Conversion

Use mapping If the check box is selected then the *Bitmap Pseudo Analog Mapping* is activated

Mapping opens the *Bitmap Pseudo Analog Mapping* window, see section 5.13.10 Edit - Mapping

Gate Active Time

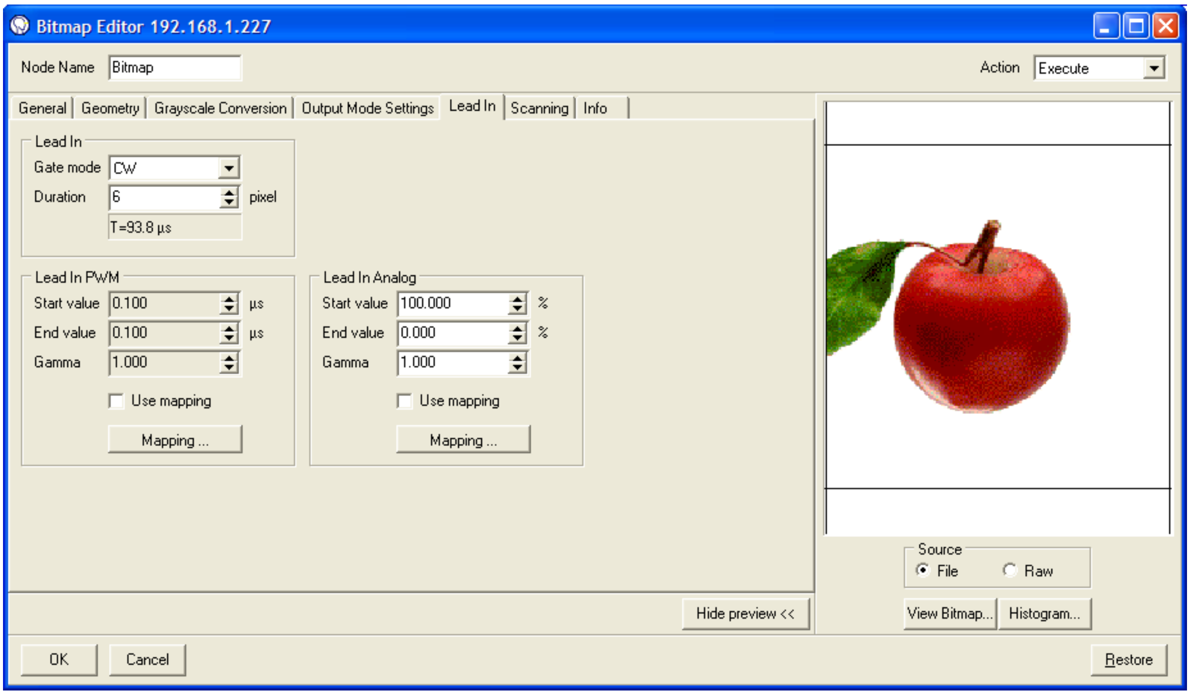
Value sets the time the Gate signal is active

5.13.6. Edit - Lead In

NOTE

This tab only appears, if in the *Output Mode Settings* tab the *Enable* check box is selected in the *Lead In* group.

In this tab you define parameters affecting the lead in and lead out, i.e. the beginning and ending of a scan line. These settings can for example be used to avoid a first pulse of high energy after the Q-switch is opened that may cause a dark edge where the laser starts to process.



Lead In

Gate mode selects the mode for the oscillator on the controller

CW at the Gate output a simple on/off signal will be output

Triggered at the Gate output pulses will be output

Duration sets the number of laser pixel used for the lead in. Below this field the calculated time for the lead in is shown

Lead In PWM

Start value sets the pulse width used at the beginning of the lead in

End value sets the pulse width used at the ending of the lead in

Gamma cp. Gamma in section 5.13.4 Edit - Grayscale Conversion

Use mapping If the check box is selected then the *Bitmap PWM Lead In* is activated

Mapping opens the *Bitmap PWM Lead In* window, see section 5.13.10 Edit - Mapping

Lead In Analog

Start value sets the value in the Digital Analog Converter (DAC), which will be used at the beginning of the lead in

End value sets the value in the Digital Analog Converter (DAC), which will be used at the ending of the lead in

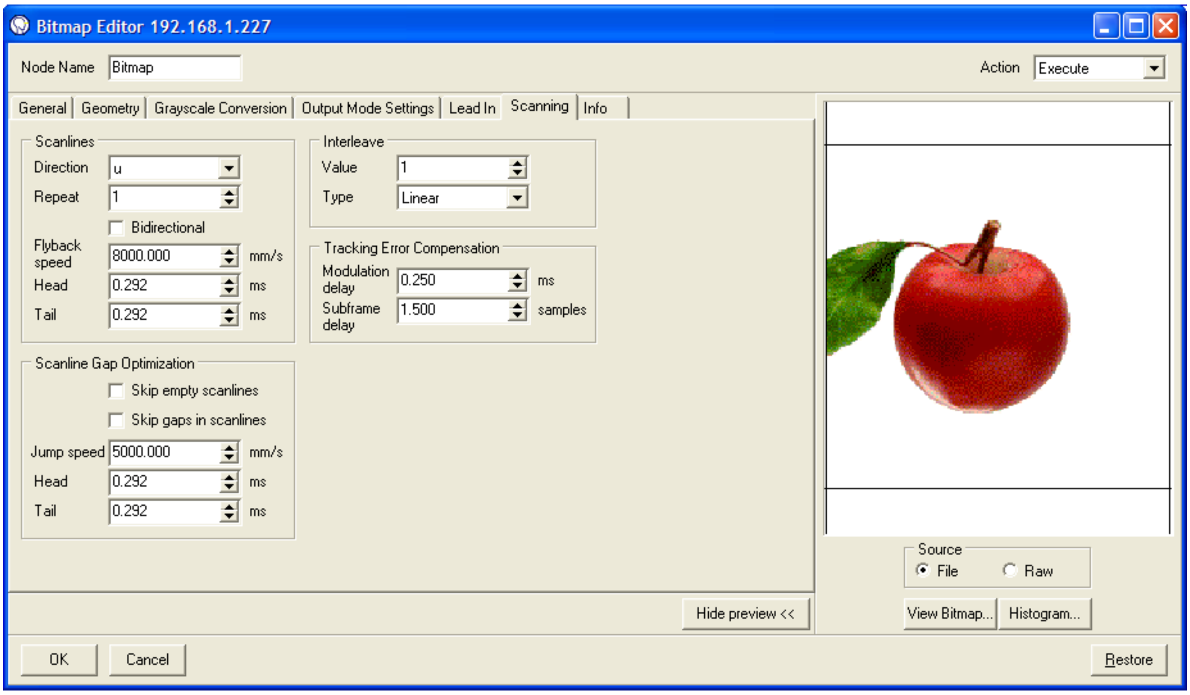
Gamma cp. Gamma in section 5.13.4 Edit - Grayscale Conversion

Use mapping If the check box is selected then the *Bitmap Lead In* is activated

Mapping opens the *Bitmap Lead In* window, see section 5.13.10 Edit - Mapping

5.13.7. Edit - Scanning

In this tab parameters are defined affecting the output of scan lines. You can set parameters for the scan direction and optimization.



Scanlines

Direction selects the scan line direction.

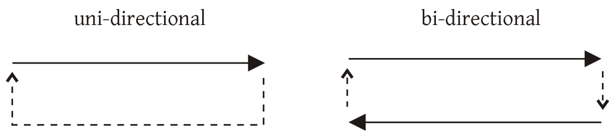
NOTE

If in tab *General* in list *Upload mode* the item *Streaming* is selected then the item *u* **has to** be selected here.

u The scan lines are oriented in the u direction (x). The picture is processed horizontally. If you check Bidirectional the picture is processed left-to-right ' right-to-left ' left-to-right ' etc.

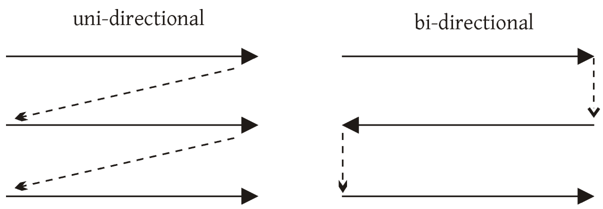
v The scan lines are oriented in the v direction (y). The picture is processed vertically. If you check Bidirectional the picture is processed top-to-bottom ' bottom-to-top ' top-to-bottom ' etc.

Repeat sets how often one single scan line will be output. If the *Bidirectional* check box is selected then 2 successive scan lines will be repeated together, see following figure.



Bidirectional If the check box is selected then the scan lines will be bidirectionally output. The scan head "jumps" at the end of a line to the "end" of next line and scans it in opposite direction. This behavior is similar to that of dot-matrix printers.

If the check box is de-selected then all scan lines will be output in one direction. The scan head "jumps" to the beginning of the next line, see following figure.



NOTE

In output modes *Normal Line*, *Line Optimized* and *Dot* be aware that the settings are adjusted in the actual pen in pen section *linepar* in a way that the scan lines are not shifted to each other.

For all other output modes you have to optimize the settings by executing the following procedure:

Step 1 Be sure that the ARGES Render Server is running.

Step 2 In the *Devices List* window in the *linepar* device Editor choose the tab *Raster*.

Step 3 Click the red *Controlled* button beneath the *Char Alignment* combo box

Step 4 Choose *Low res pixel*.from the list

Step 5 Load this job:
`jobs\DetermineTrackingError\DetermineTrackingError.job`
in the InScript folder.

Step 6 Execute the job.

Step 7 Follow the instructions given in the job.

NOTE

If you are using an ASC controllers then double click the Text *Bitmap* node (not the Text *Text* node below it) and click on the *Render Server* tab. Uncheck the *Local* check box and enter the IP number of the PC that has a local render server running under *IP address*. The script is created for a local render server and adjustments for a ASC based Render Server would be more complicated to do.

Flyback speed sets the fly back speed at a line end or column end respectively for jumping to the next line or column

Head sets the time being used for the line head, see section 3.10 linepar - Line Parameters

Tail sets the time being used for the line tail, see section 3.10 linepar - Line Parameters

Scanline Gap Optimization

Skip empty scanlines If the check box is selected and a scan line contains no output then the scan line will be skipped

Skip gaps in scanlines If the check box is selected and a scan line contains sections with no output then these gaps will be skipped

Jump speed sets the jump speed for skipping whitespace within scanlines

Head sets the time being used for the line head, see section 3.10 linepar - Line Parameters

Tail sets the time being used for the line tail, see section 3.10 linepar - Line Parameters

Interleave

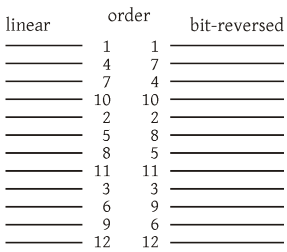
Value If the value (N) is greater than 1 then the scan lines will not be successively output, but N-1 lines will be omitted and only every N-th line will be output. The omitted lines will be output in later passes.

This may be reasonable, when the material to be processed is sensitive to heat and needs time to cool down before heating it up again near the first heating, see *Type*

Type selects, in which order the scan lines will be output

Linear The following figure shows an example for Value = 4 and 12 lines

Bit-reversed Each n'th line is drawn but 2nd and 3rd lines are swapped to prevent overheating for more delicate materials. E.g. Value=4 and 12 lines



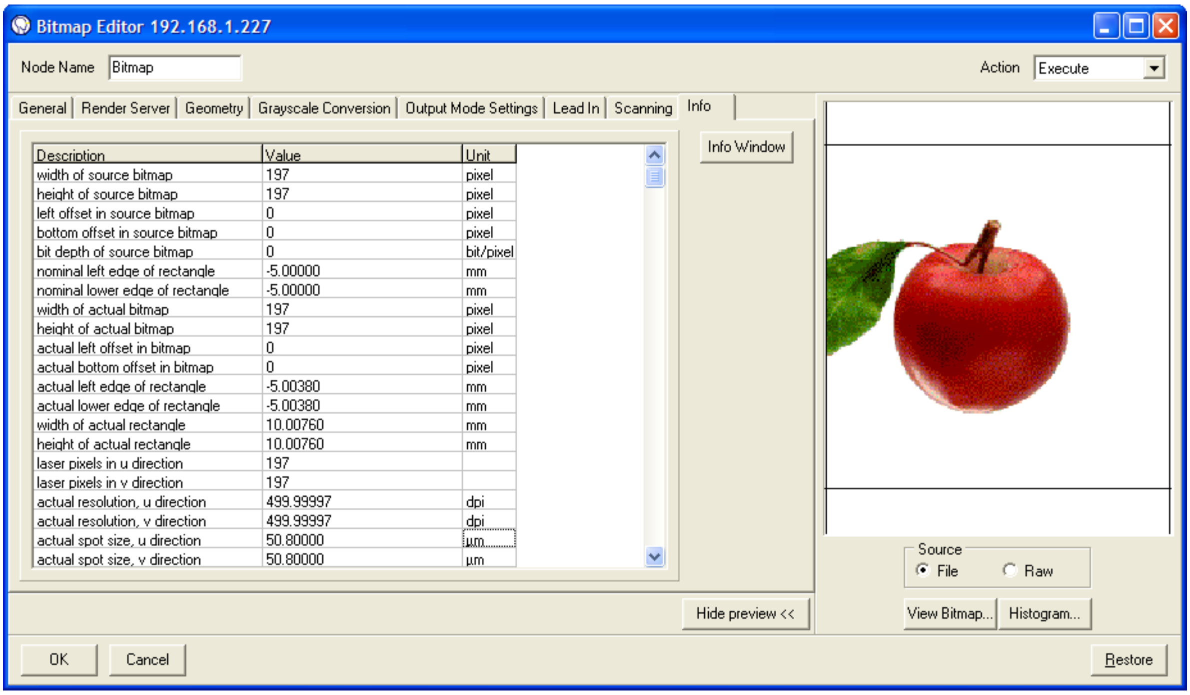
Tracking Error Compensation

Modulation delay samples sets the delay for switching the laser beam on at the beginning of a scan line and switching it off at the ending of a scan line. If the *Bidirectional* check box is selected in the *Scanning* tab then this delay prevents the scan lines being output shifted to each other because of the tracking error. Tracking error means that the laser is switched on before the laser spot reaches its nominal position at the beginning of the scan line and is switched off before it reaches the end of the scan line

Subframe delay sets the subframe delay. This setting has a direct effect on the Digital Signal Processor (DSP) of the controller. Hence it is given in samples. The DSP processes 48000 samples per second, i.e. one sample equals 1/48000 sec

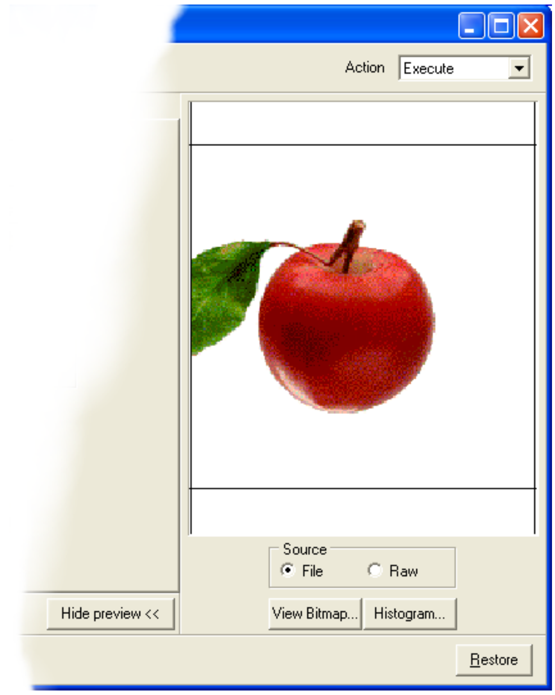
5.13.8. Edit - Info

This tab summarizes information about the uploaded bitmap file and set parameters.



Info Window opens the *Bitmap Info* window. The information of the *Info* window is displayed in a separate window

5.13.9. Edit - Preview



Show preview / Hide preview shows / hides the preview of the bitmap file. The preview takes in account parameters from the groups *Target Image Size* and *Grayscale*

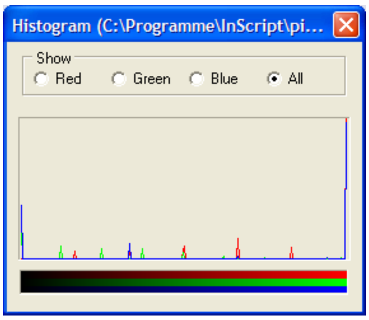
Source

File uses the image data from the original bitmap file

Raw uses the original raw image data that will be output by the bitmap node. Color will be converted to gray scale and the parameters *Brightness*, *Contrast* and *Gamma* will be accounted for. If no raw data is available the preview window will show *No preview available*

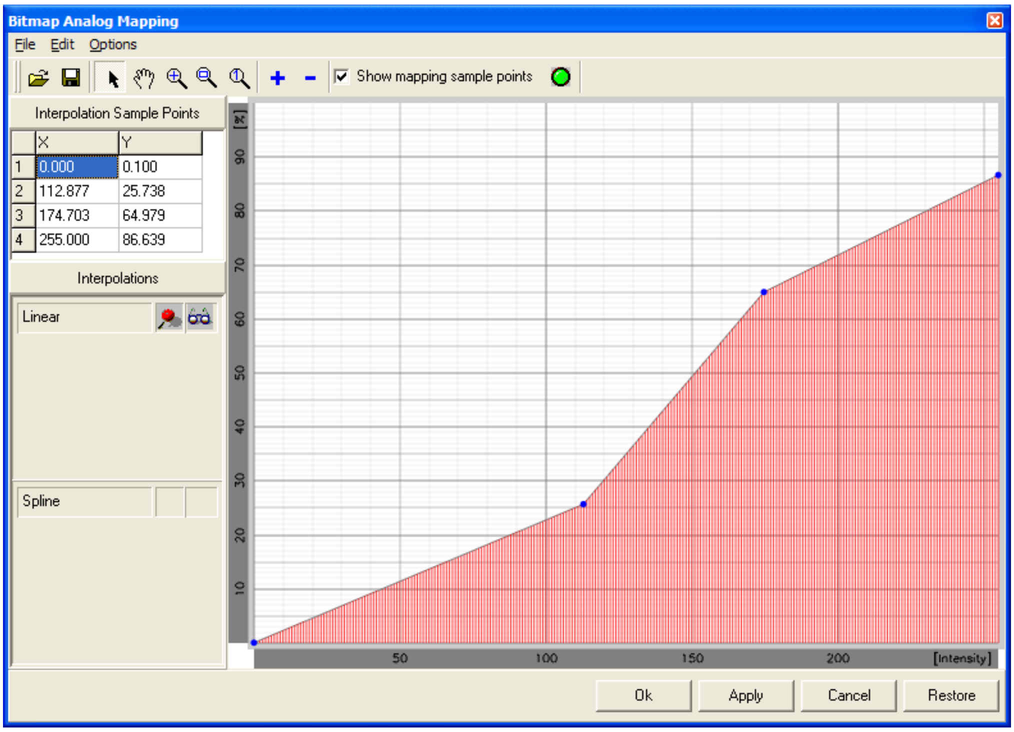
View Bitmap opens the *Bitmap Viewer* window showing the current bitmap. The parameters *Brightness*, *Contrast* and *Gamma* will have no effect in this window. The bitmap source is defined in *Source*

Histogram opens the *Histogram* window with the current bitmap's histogram. The bitmap source is defined in *Source*



5.13.10. Edit - Mapping

In this window you can freely define a mapping. This mapping can be the *Bitmap Analog Mapping*, *Bitmap Pseudo Analog Mapping*, *Bitmap PWM Lead In Mapping* or *Bitmap Lead In Mapping*.



- opens the *Open* dialog
- opens the *Save As* dialog
- switches into *Select* mode where points in the diagram can be moved
- switches into *Pan* mode. If the diagram is zoomed in and only a cutout can be seen then the cutout can be moved
- switches into *Zoom in/out* mode. Place the mouse pointer on the point in the diagram you want to zoom in/out and click the left/right mouse button
- switches into *Zoom by window* mode. Place the mouse pointer on a corner of the area you want to zoom in, hold pressed the left mouse button and and draw the mouse pointer to the opposite corner of the area. As soon as you release the left mouse button the blue marked area will be zoomed in
- shows the whole diagram
- switches into *Add points* mode. In the diagram, click the position where you want to add a point
- switches into *Remove points* mode. Click the point you want to delete

Show mapping sample points If the check box is selected then the interpolation sample points will be showed in the diagram (red vertical lines)

Table - Interpolation Sample points displays the points form the diagram in a tabular form

1st Column In the table the yellow marked line corresponds with the turquoise marked point in the diagram

2nd Column (X) coordinate on the horizontal axis

3rd Column (Y) coordinate on the vertical axis

Table - Interpolations

1st Column For mapping 2 types of interpolations are available (gray line/curve). Linear fits a linear interpolation to the points. Spline fits a spline interpolation to the points. To use the spline interpolation there have to be more than 2 points in the table or diagram respectively

2nd Column To apply a interpolation type to the mapping, click the corresponding row of the 2nd column. The red pin symbol shows that the interpolation type is in use

3rd Column To show the interpolation in the diagram, click the corresponding row of the 3rd column. The glasses symbol shows that the interpolation is displayed. The interpolation will be displayed as a gray line/curve in the diagram

Diagram In the *Bitmap Analog Mapping* window the value for the Digital Analog Converter (DAC) in % is plotted against the bitmap pixel intensity (gray value).

In the *Bitmap Pseudo Analog Mapping* window the Charge Time in μs is plotted against the bitmap pixel intensity (gray value).

In the *Bitmap PWM Lead In* window the pulse width in μs is plotted against the pixel in the lead in.

In the *Bitmap Lead In* window the value for the Digital Analog Converter (DAC) in % is plotted against the pixel in the lead in.

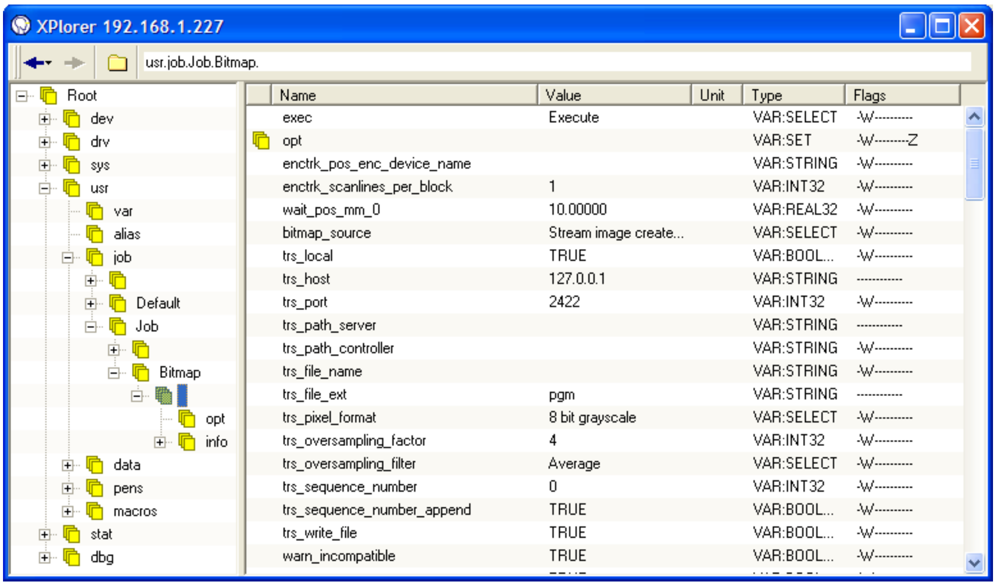
TIP

To add a point, place the mouse pointer on the position in the diagram where you want to add it and in the context menu, click *Add point*. To delete a point, click *Delete* in the point's context menu.

5.13.11. Edit - Position Encoder

Step 1 In the Bitmap job node's context menu, click *Xplore*.

Step 2 Navigate to `usr.job.Job.Bitmap`.



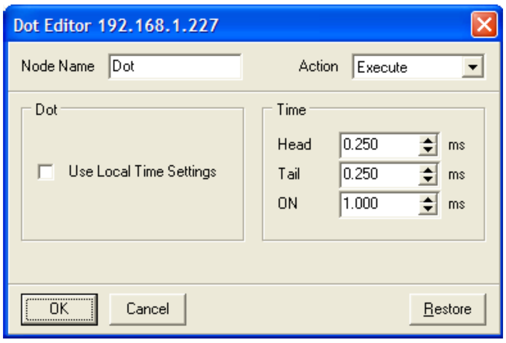
enctrk_pos_enc_device_name sets the name of the encoder device used for position tracking. Look up the name of the encoder device in window *Devices List*

enctrk_scanlines_per_block sets the number of scanlines in a block. Between the blocks the encoder waits for the next encoder position. Only for a very high velocity the value might be > 1

wait_pos_mm_0 sets the distance between C-signal position and object processing

5.14. Dot

Using this node single dots can be output. To drill e.g. holes with defined parameters, set the parameters in the *Job Configuration* window in the *Default-Pen*, pen section *linepar*, in the *Dot* tab.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Dot here you can activate the local dot parameters

Use local time settings If this check box is selected then the values under *Time* are used and not the values that are set in the default pen, another active pen or the linepar device under Dot (see also 4.9 Manage Pens or 3.10 linepar - Line Parameters)

Time here you can set local dot parameters

- **Head** sets the time waited after a jump. This is the mirror settling time plus the laser beam ON delay. In general this time is longer than with other line types as the speed has to be completely reduced to zero and not to processing speed
- **Tail** sets the laser beam OFF delay. The tracking error with a stationary processing on a fixed position is zero. This is why contrary to the other line types no negative values can be used here
- **ON** sets the exposure time ("ON-Time") for dots

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.15. Shape

This node outputs basic geometrical shapes like lines, rectangles and ellipses.

Node Name see section 5.1 Shared GUI Elements

Layout

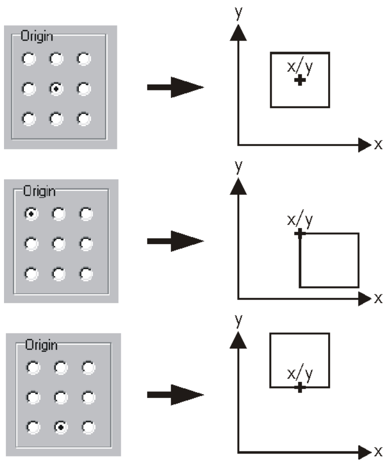
- **Type** selects the geometrical shape
  - **Line** draws a line
  - **Rectangle** draws a rectangle
  - **Ellipse** draws an ellipse
- **X1** sets the origin X coordinate
- **Y1** sets the origin Y coordinate
- **Width** sets the graphic object width

Height sets the graphic object height

Origin
The graphical object is within a bounding box. In the Origin group you select the bounding box point of origin to which coordinates and geometrical operations are referring.

In the *Origin* group the center point is pre-selected. Thus the bounding box center is at the coordinates X1/Y1. If e.g. the right lower radio button is selected then the right lower corner is at the coordinates X1/Y1.

Following examples show settings of *Origin* and their effect:



Absolute If the check box is selected then group *Origin* is deactivated and *Width* / *Height* are replaced by 2 absolute coordinates *X2* / *Y2*. This way you can specify the graphic object size and position in the absolute coordinates X1, Y1, X2 and Y2

Corners
Only if *Rectangle* is selected in the *Type* list then this group is activated. By this group the rectangle corners can be rounded

Radius sets the rectangle corner radius

Segments sets the number of lines the corner radius is approximated with. A higher number improves the approximation but increases memory requirements and output time

Action see section 5.1 Shared GUI Elements

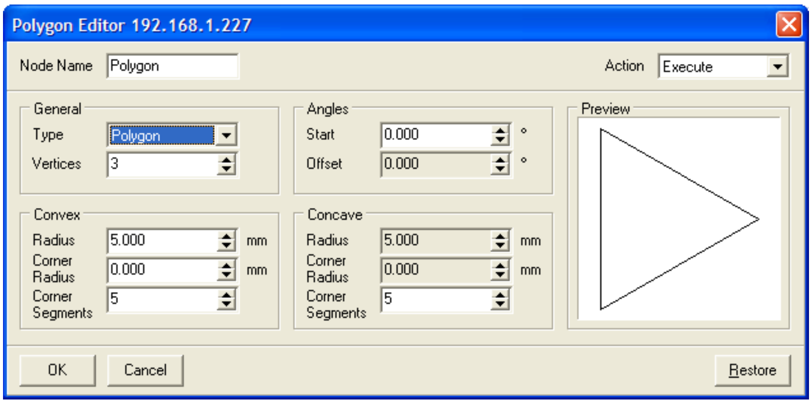
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.16. Polygon

This node outputs polygons. These can have a convex or concave outline.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

General

Type selects the polygon type

Polygon draws a polygon with as many corners as specified in *Vertices*. If this list item is selected then *Angles — Offset*, *Concave — Radius* and *Concave — Corner* are deactivated. These settings are only required if Type *Star* is selected

Star draws a star with N corners on the inner radius and N corners on the outer radius, where N is set in *Vertices*

Vertices sets the number of corners

Angles

Start sets the angle, where the first corner occurs

Offset If *Star* is selected in the *Type* list then the corners on the inner radius are rotated by this angle regarding the corners on the outer radius

Convex

Radius sets the outer radius

Corner Radius sets the corner radius

Corner Segments sets the number of lines approximating the corner radius

Concave

Radius sets the inner radius

Corner Radius sets the corner radius

Corner Segments sets the number of lines approximating the corner radius

Preview shows the polygon preview with the parameters set

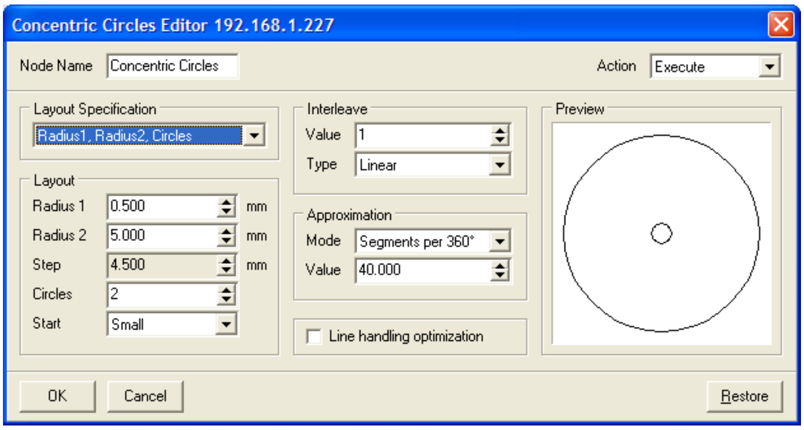
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.17. Concentric Circles

This node outputs concentric circles.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Layout Specification selects by which parameters concentric circles are specified in the *Layout* group. Whichever list item is selected, input boxes are deactivated and calculated automatically in the *Layout* group

Radius1, Radius2, Circles set inner, outer radius and number of circles

Radius1, Step, Circles set inner radius, step width between radii and number of circles

Radius2, Step, Circles set outer radius, step width between radii and number of circles

Radius1, Radius2 → Step set inner, outer radius and number of steps. Here the number of steps is subordinated to the other both parameters and will be automatically fitted, when not according to these parameters

Radius1, Step → Radius2 set inner, number of steps and outer radius. Here the outer radius is subordinated to the other both parameters and will be automatically fitted, when not according to these parameters

Radius2, Step → Radius1 set outer radius, number of steps and inner radius. Here the inner radius is subordinated to the other both parameters and will be automatically fitted, when not according to these parameters

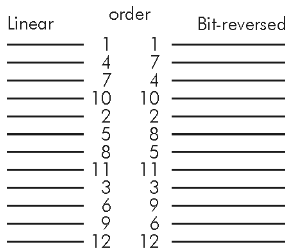
Interleave

Value If the value (N) is larger than 1 then the circles are not output back-to-back, but N-1 circles will be skipped and only each N^{th} will be processed. Skipped circles will be output in later passes.

This may be reasonable, if the processed material is sensitive to heat and needs time to cool down before being heated up again in a nearby area (see *Type*)

Type selects the order the circles are output with

Linear/Bit-reversed the following figure shows an example for *Value* = 4 and 12 lines



Layout

Radius 1 sets the inner radius

Radius 2 sets the outer radius

Step sets the step width between the radii

Circles sets the number of circles

Start selects the circle the output shall begin

Small with the smallest circle

Large with the largest circle

Approximation

Mode The circles are approximated by polygons. Select the boundary condition for these polygons. Specify the boundary value in *Value*

Segments per 360° number of lines in the polygon

Segment length limit length of polygon lines [mm]

Deviation limit max. deviation for circular shape [mm]

Value sets the boundary value of *Mode*

Line handling optimization If the check box is selected then InScript arranges the start of a circle relative to the end of the previous circle in a way a fluent motion results

Preview shows the concentric circles preview with the parameters set

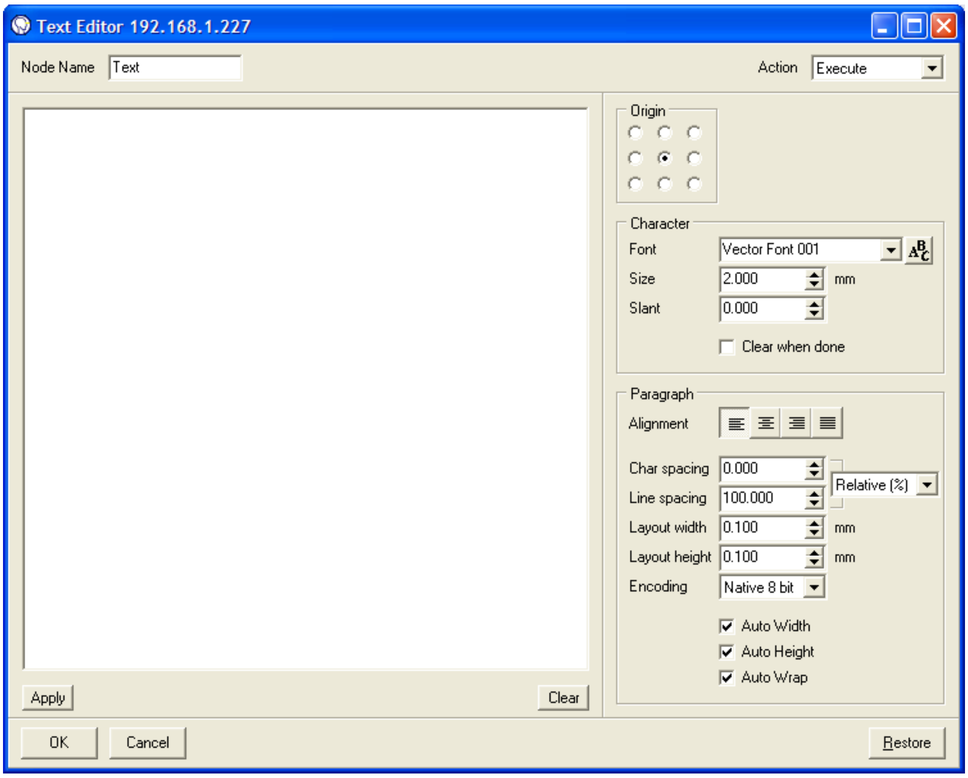
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.18. Text

By this node you can create and format text. The text can be slanted in different angles, scaled in width and height and distorted.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Text Box In the text box type in the text or variable to be output. Embed a variable in 2 $-characters, e.g. the variable `$stat.time.DateStr$` outputs the actual date. How the name of a variable is acquired and how to work with variables, you will learn in section 5.44.2 Scripting Language.

If you want to output the $-character then it has to be preceded by the \-character, thus you have to type in \$. If you edit a job file directly via a text editor then the $-character has to be preceded by 2 \-characters, thus you have to type in \\$.

Apply applies the text without closing the *Text Editor* window

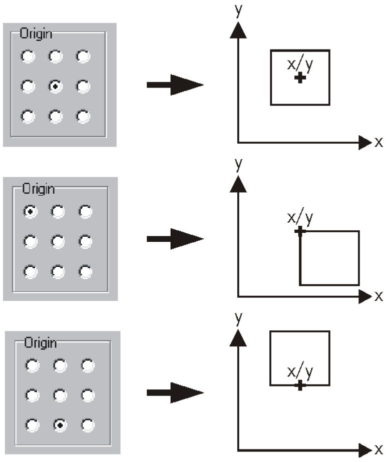
Clear clears the text from the text box

Origin

The graphical object is within a bounding box. In the Origin group you select the bounding box point of origin to which coordinates and geometrical operations are referring.

In the *Origin* group the center point is pre-selected. Thus the bounding box center is at the coordinates X1/Y1. If e.g. the right lower radio button is selected then the right lower corner is at the coordinates X1/Y1.

Following examples show settings of *Origin* and their effect:



Character

Font selects a font from a dropdown list.

opens the *Select Font* window, see section 5.67 Select Font - Window. All installed customer specific fonts are displayed and can be used. The fonts are located in the Fonts folder of the InScript installation

Size sets the character height

Slant sets the text slant. The slant angle results from the arctan of the entered value. Values from +3 to 3 are allowed

Clear when done If the check box is selected and the node has been executed then the font will be deleted from the controller's memory

Paragraph

Alignment justifies the text (left, center, right, full)

Char spacing sets the distance between characters (tracking)

Line spacing sets the distance between lines

selects the unit for the values in Char spacing and Line spacing

Relative (%) The values are given relative to the single tracking and single line distance

Absolute (mm) The values are given absolute

Layout width sets the bounding box width

Layout height sets the bounding box height

Encoding selects the encoding

Native 8 bit, UTF-8 available encodings. If you want to copy UTF-8 or UNICODE characters to the Text editor, the source of the copying has to be capable of doing this (e.g. Windows WordPad supports this data exchange). The used font also has to support all glyphs or characters that you want to use. UTF-8 is the 8-bit UCS/Unicode Transformation Format - it is able to represent any character in the Unicode standard like Asian, Cyrillic or other non-latin characters, yet is backwards compatible with the limited ASCII format

Auto Width If the check box is selected then the bounding box width will be automatically adjusted to the width of the longest line

Auto Height If the check box is selected then the bounding box height will be automatically adjusted to the text height

Auto Wrap If the check box is selected then the text will be automatically wrapped at the bounding box. If the check box is cleared then the text will be automatically condensed to fill the bounding box width

OK see section 5.1 Shared GUI Elements

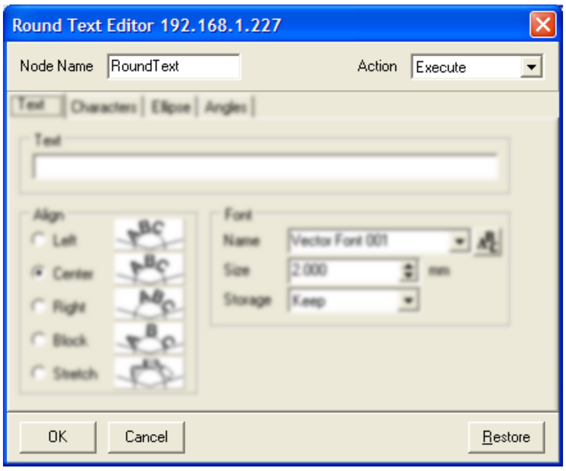
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.19. RoundText

This node outputs text aligned to circular or elliptical arcs.

5.19.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

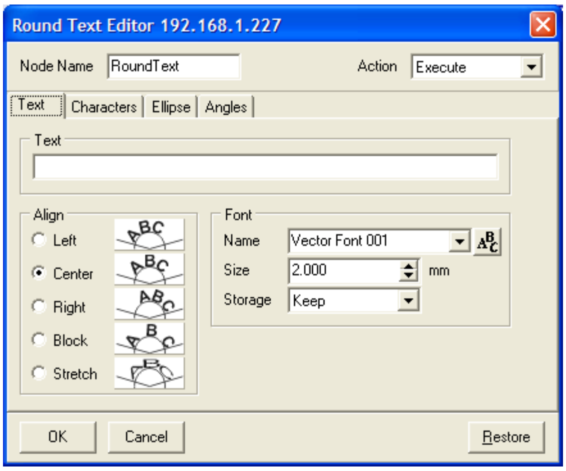
Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.19.2. Edit - Text



Text In this text box type in the text or variable to be output. Embed a variable in 2 $-characters, e.g. the variable `$stat.time.DateStr$` outputs the current date. How the name of a variable is acquired and how to work with variables, you can see in section 5.44.2 Scripting Language. If you want to output the $-character then it has to be preceded by the \-character, thus you have to type in \$. If you edit a job file directly via a text editor then the $-character has to be preceded by 2 \-characters, thus you have to type in \\$

Align selects the alignment in an angular range. The angular range is specified in tab *Angles*

Left aligns the text to the left

Center aligns the text centered

Right aligns the text to the right

Block aligns the text with justified settings - the gaps between characters are stretched

Stretch aligns the text with justified settings - the characters are stretched

Font **Name** selects the font

 opens the *Select Font* window, see section 5.67 Select Font - Window. All installed customer specific fonts are displayed and can be used. The fonts are located in the Fonts folder of the InScript installation

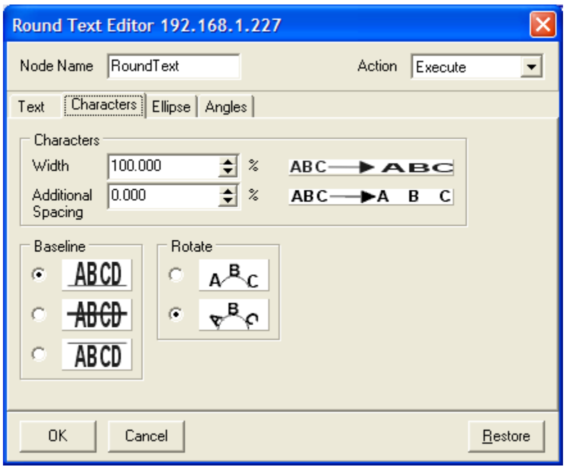
Size sets the character height

Storage selects what happens to the font after the text was output

Keep The font will be kept in the controller board memory

Remove The font will be removed from the controller board memory

5.19.3. Edit - Characters



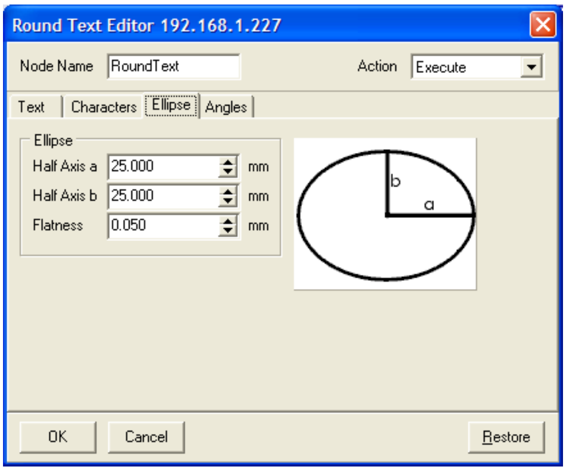
Characters **Width** sets the character width. The character width is given in percent of the standard character width. Values between 1% and 500% are allowed

Additional Spacing sets the additional distance between characters. The additional distance is given in % of the standard character width. Values between -50% and 500% are allowed

Rotate selects the character alignment regarding their base line. If you select the upper button then the characters will keep their direction. If you select the lower button then the characters will be aligned along the arc, i.e. they will be rotated

Baseline selects whether the base line, the center line or ascender shall be aligned to the arc

5.19.4. Edit - Ellipse



Ellipse

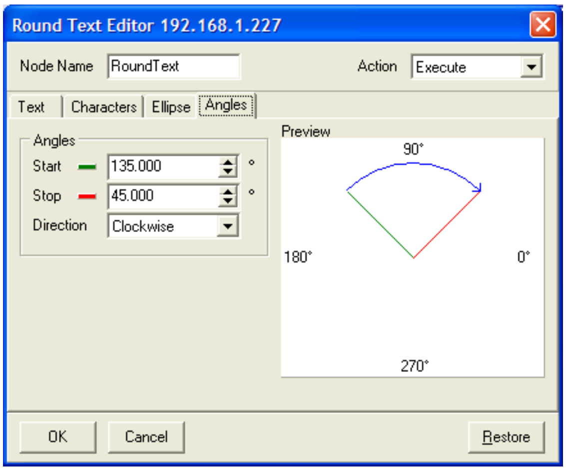
Half Axis a sets the length of major axis a

Half Axis b sets the length of minor axis b

Flatness sets the distance from the center to either focus of the ellipse divided by the distance from the center to either vertex or *Flatness*

Particularities The characters are aligned along an arc. This arc is approximated by a polygon. Depending on the number of polygon lines a deviation from the arc occur. The parameter sets the maximal allowed deviation from the arc.

5.19.5. Edit - Angles



Angles

Start sets the angle at the arc, where the text begins

Stop sets the angle at the arc, where the text ends

Direction selects the text direction

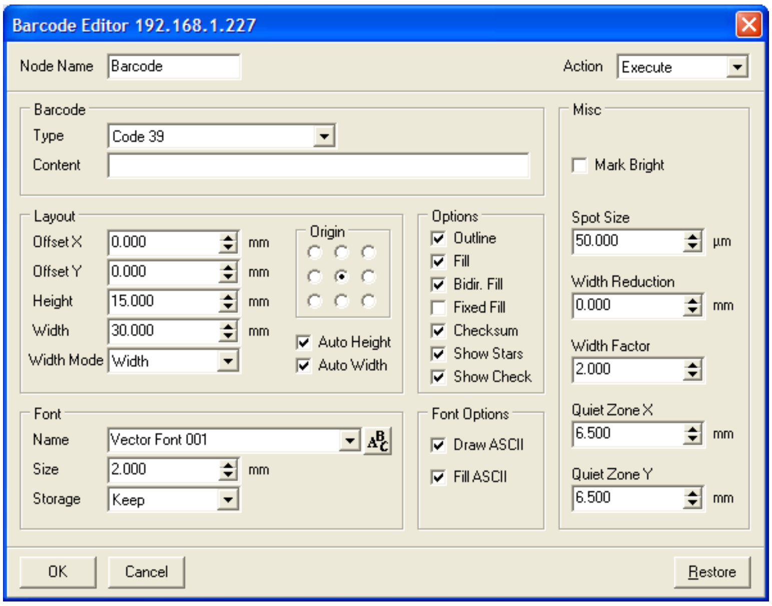
Clockwise clockwise from *Start* to *Stop*

Counterclockwise counterclockwise from *Start* to *Stop*

Preview shows angle, range and direction in which the text is output

5.20. Barcode

Using the Barcode node different barcode types can be created.



Barcode

Type selects the barcode type

Code 39 also known as "USS Code 39", "Code 3/9", "Code 3 of 9", "USD-3", "Alpha39" or "Type 39" is a barcode symbology that can encode uppercase letters (A through Z), digits (0 through 9) and a handful of special characters like the $ sign

Code 93 is a barcode symbology designed in 1982 by Intermec to provide a higher density and data security enhancement to Code 39. It is an alphanumeric, variable length symbology

Code 128 is a very high-density barcode symbology. It is used for alphanumeric or numeric-only barcodes. It can encode all 128 characters of ASCII and, by use of an extension character (FNC4), the Latin-1 characters defined in ISO/IEC 8859-1

Code 2/5 interleaved is a continuous two-width barcode symbology encoding digits

Codabar is a linear barcode symbology. The body of a Codabar string may only encode the numerals 0 through 9. Some variants allow the symbols dollar, dash, plus sign, colon, slash, and dot

EAN 13 European Article Number (EAN) is a barcoding standard which is a superset of the original 12-digit Universal Product Code (UPC). In EAN-13 the symbol encodes 13 numerals divided into four parts

EAN 8 is a shortened version of the EAN-13 code. It includes a 2 or 3 digit country code, 4 or 5 data digits (depending on the length of the country code), and a checksum digit

UPC A UPC-A barcode consists of two bars and two spaces, all UPC-A barcodes consist of exactly (3 × 2) + (12 × 2) = 30 bars

UPC E To allow the use of UPC barcodes on smaller packages where a full 12-digit barcode may not fit, a 'zero-compressed' version of UPC was developed called UPC-E

Content Type in the text or variable to be output into this text box. Embed a variable in 2 `$`-characters, e.g. the variable `$stat.time.DateStr$` outputs the current date. How the name of a variable is acquired and how to work with variables, you can see in section 5.44.2 Scripting Language. If you want to output the `$`-character then it has to be preceded by the `\`-character, thus you have to type in `\$`. If you edit a job file directly via a text editor then the `$`-character has to be preceded by 2 `\`-characters, thus you have to type in `\\$`

Layout

Offset X sets the reference point X position

Offset Y sets the reference point Y position

Height sets height of the the barcode

Width sets the width of the barcode depending on *Width Mode*

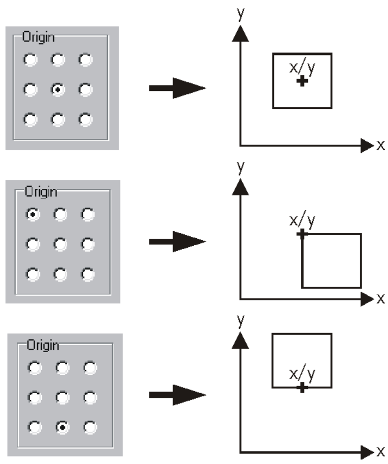
Width Mode selects to what the *Width* refers

- **Width** *Width* refers to the whole barcode
- **Module width** *Width* refers to **one** barcode module (i.e. the width of a "bar")

Origin
The graphical object is within a bounding box. In the Origin group you select the bounding box point of origin to which coordinates and geometrical operations are referring.

In the *Origin* group the center point is pre-selected. Thus the bounding box center is at the coordinates X1/Y1. If e.g. the right lower radio button is selected then the right lower corner is at the coordinates X1/Y1.

Following examples show settings of *Origin* and their effect:



Auto Width If this check box is selected then the bounding box' width will be automatically adjusted to the width of the barcode

Auto Height If this check box is selected then the bounding box' height will be automatically adjusted to the height of the barcode

Options

Outline If the check box is selected then the barcode modules will be outlined

Fill If the check box is selected then the barcode modules will be filled

Bidir. Fill If the check box is selected then the barcode modules will be bidirectionally filled

Fixed Fill If the check box is selected then the distance between the filling lines will be strictly adhered to. Thus the module width may differ from the nominal value and some barcode scanners may have problems to read the barcode. If the check box is cleared then the outlines confining the module will be set exactly. Thus the readability is increased for barcode scanners. The distance between filling lines may differ from the nominal value, so that visible gray scales occur on certain materials

Checksum If the check box is selected then the checksum will be coded into the modules. Only specific barcode types provide this option

Font

Name selects a font from a dropdown list

 opens the *Select Font* window, see section 5.67 Select Font - Window. All installed customer specific fonts are displayed and can be used. The fonts are located in the Fonts folder of the InScript installation

Size sets the character height

Storage selects what happens to the font after the text was output

Keep The font will be kept in the controller board's memory

Remove The font will be removed from the controller board's memory

Font Options

Draw ASCII If the check box is selected then the ASCII characters from the *Content* box will be output beneath the barcode

Fill ASCII If the check box is selected then the ASCII characters from the *Content* box will be filled

Misc

Mark Bright select this check box, if the material becomes brighter marking it

Spot Size sets the real physical spot size on the target

Width reduction reduces the width of barcode modules by the input value to compensate for the line width on the target

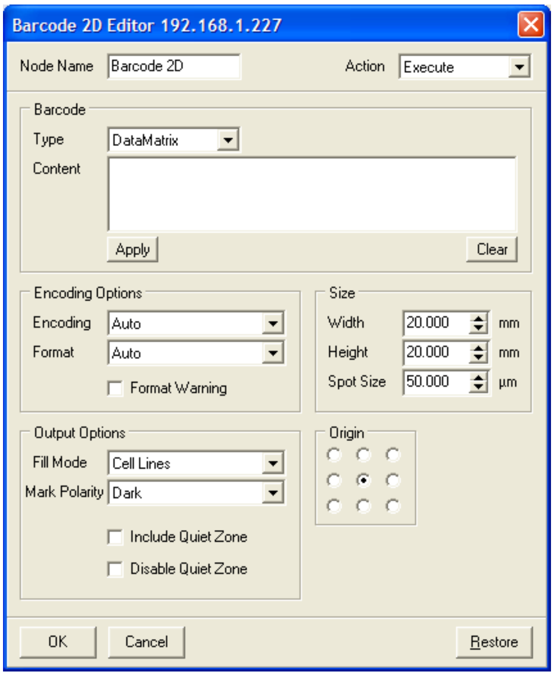
Width factor Some Barcode types provide modules in exactly 2 widths (narrow and wide). Width factor sets the ratio of narrow and wide modules. With a factor of 2.000 the wide modules are twice as wide as the narrow modules

Quiet Zone X sets the width in X-direction of the area, where no marking will be output around the barcode

Quiet Zone Y sets the height in Y-direction of the area, where no marking will be output around the barcode

5.21. Barcode 2D

This node creates 2D barcodes in different encodings.



Barcode

Type selects the 2D barcode type

DataMatrix version may 8, 1997 / ISO 16022; Error Correction Code 200 is supported

Content Type in the text or variable to be output into this text box. Embed a variable in 2 $-characters, e.g. the variable `$stat.time.DateStr$` outputs the current date. How the name of a variable is acquired and how to work with variables, you can see in section 5.44.2 Scripting Language. If you want to output the $-character then it has to be preceded by the \-character, thus you have to type in \$. If you edit a job file directly via a text editor then the $-character has to be preceded by 2 \-characters, thus you have to type in \\$.

Encoding Options

Encoding selects the encoding according to ISO 16022

ASCII is used to encode data that mainly contains ASCII characters (0-127). It encodes approximately one alphanumeric or two numeric characters per byte. As a general rule, use *ASCII* to encode text that includes uppercase and lowercase letters with or without numbers and punctuation

C40 is used to encode data that contains only numeric and upper case characters. *C40* encodes approximately three alphanumeric data characters into two bytes

Text is used to encode data that mainly contains numeric and lowercase characters. *Text* encodes approximately three alphanumeric data characters into two bytes

Base256 is used to encode images, double-byte characters, binary data and 8 bit values

None no encoding is used

Auto tries to automatically choose an encoding

Format selects the encoding format

nXm sets the number of cells per line and the number of lines in the barcode

Auto automatically selects the format to encode the information given in Text with the smallest possible format

Format warning If the check box is selected and you enter an information which can not be encoded then a warning will be output

Size

Width sets the 2D barcode width

Height sets the 2D barcode height

Spot Size specifies the real physical spot size on the target. The spot size can not be set this way, but is specified so InScript can perform calculations. If Cell Lines, Cell Lines Bidi, Cell Lines Bidi Cont, Cell Dot Array Quad or Cell Dot Array Hex are selected in Fill Mode then the dot density can be modified by changing the Spot Size. At 50μm 20 dots per mm will be output, at 100μm only 10 dots per mm will be output

Output Options

Fill mode selects the way the 2D barcode cells will be filled

Cell Lines fills the barcode cells with horizontal lines. The distance between the lines is specified in Spot Size. The lines will be output unidirectionally from the left to the right

Cell Lines Bidi as Cell Lines, but bidirectionally, i.e. the lines will be output alternating from the left to the right and vice versa

Cell Lines Bidi Cont as Cell Lines Bidi, but the end of a line will be connected to the start of the next line by a vertical line. A kind of sinuous line develops

Cell Dot outputs a dot in the barcode cell center

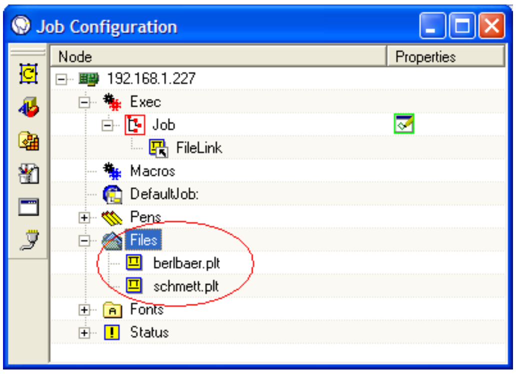
Cell Dot Array Quad fills the barcode cell horizontally and vertically with n times n dots. The number n results from the Spot Size setting and the cell size

Cell Dot Array Hex as Cell Dot Array Quad, but the dots of successive lines will be shifted against each other and a kind of honeycomb pattern develops

Cell Subnodes fills each barcode cell with the object which is child node of the Barcode 2D node

Scanline unidirectional fills the barcode cells with scanlines in one direction

Bitmap creates a bitmap of the set-up barcode with *Bitmap Name* (see there for more information) in the *Files* folder of the controller



Mark Polarity specifies, how the color of the material changes after marking

Bright the material darkens

Dark the material brightens

Include quiet zone If the check box is selected then a margin around the 2D barcode stays unmarked. This margin takes 10% of barcode width and height

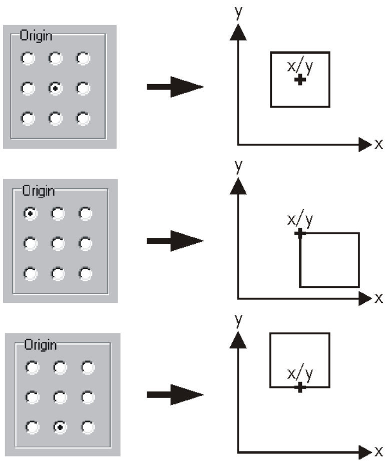
Disable quiet zone If the check box is selected then the whole width and height will be used for the 2D barcode

Origin

The graphical object is within a bounding box. In the Origin group you select the bounding box point of origin to which coordinates and geometrical operations are referring.

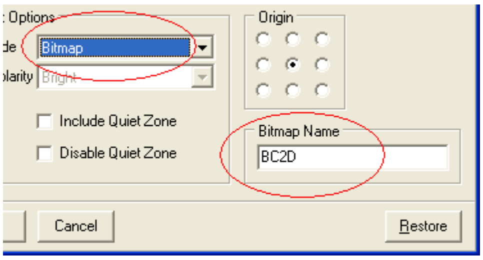
In the *Origin* group the center point is pre-selected. Thus the bounding box center is at the coordinates X1/Y1. If e.g. the right lower radio button is selected then the right lower corner is at the coordinates X1/Y1.

Following examples show settings of *Origin* and their effect:



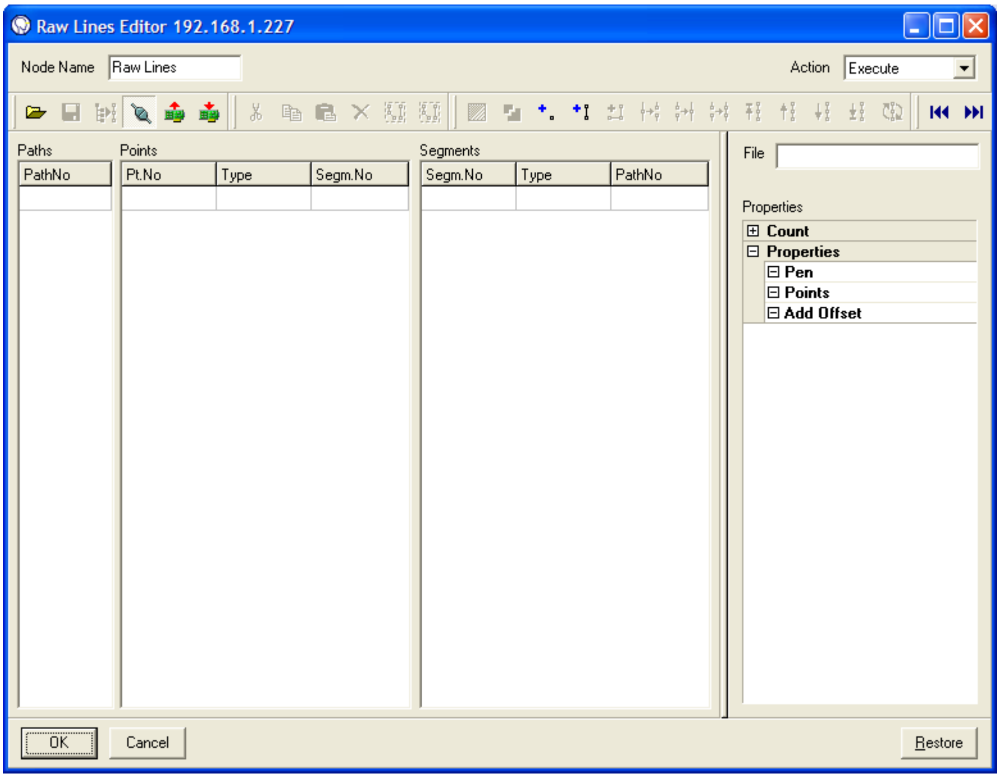
Bitmap Name this input field is only accessible, if Fill mode → Bitmap is selected. As default a file called BC2D is created in the *Files* folder on the controller. It refers to a bitmap of the set-up barcode. If you change the filename and execute the Job containing the *Barcode 2D* node, a new file will be created in the *Files* folder of the controller. If the filename is not changed, the bitmap of the barcode will be recreated using the same filename. This can be used to put the

Barcode2D under a Bitmap node (see 5.13 Bitmap) using the setting *File created from subnodes* or *Stream image created from subnodes*



5.22. Raw Lines

Using this node, line data can be integrated into a job. The line data can either be embedded directly in the *Raw Lines* node or be loaded, pre-processed and passed on to the controller on request.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Import opens the *Open* window. Select a file of type `arl`, `hpgl`, `plt`, `lg1`, `dxf` or `vec` to open it. In the latter 2 cases the *Vector Graphics Import* window will be opened, see section 5.22.1 Vector Graphics Import Window

Export saves the line data in a file of type ARGES Raw Lines `arl`

Create rawlines from subnodes creates line data from subnodes of the *Raw Lines* node

Refresh fetches the line data from the controller in offline mode

Apply sends the line data to the controller in offline mode

Switch to online (embedded) mode **Switch to offline (request) mode** selects, whether the line data will be embedded to the job or the line data will be requested by the controller, when the node is executed. In online mode the line data is together with the job on the controller and changes are applied immediately. In offline mode changes have to be manually applied to the controller and the line data will be pre-processed, when the file is requested. The offline mode is used when a huge amount of data has to be processed especially by an NCC controller. External line data greater than 1MB (e.g. Autocad DXF) has to be converted to ARL (Arges RawLines Format) in offline mode and has to be streamed using the offline mode. Here is an overview of the two modes:

Shown Button Icon	Current mode	Comment
	RawLines node is in online mode (Default) → the line data is stored on the controller	Data less than 1MB
	RawLines node is in offline mode → the line data is streamed to the controller from an ARL file	Data greater than 1MB

Cut cuts the selection and puts it to the clipboard

Copy copies the selection to the clipboard

Paste pastes the contents of the clipboard

Delete deletes the selected paths, segments or points

Select all selects all paths, segments and points

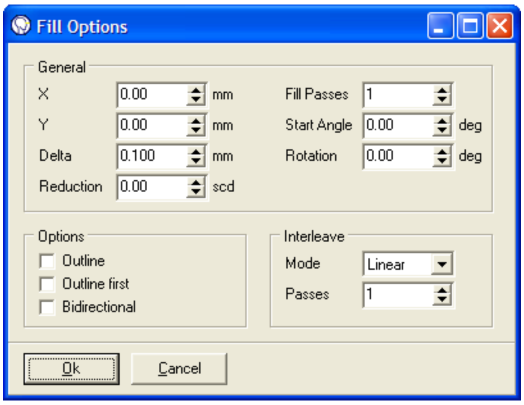
Deselect all deselects all paths, segments and points

Fill fills a closed path. The end point of such a path is jointed with its start point. The symbol ist active only in this case

NOTE

Fill can only be applied to closed line paths!

The Fill Options window opens:



General

X sets the X-coordinate of the first hatching line's reference point. If X = 0 and Y = 0 then the first hatching line goes through the origin of the filled object

Y sets the Y-coordinate of the first hatching line's reference point. If X = 0 and Y = 0 then the first hatching line goes through the origin of the filled object

Delta sets the distance between the hatching lines

> **NOTE**
>
> E.g. a *Scale* node above a *Fill* node will also influence the *Delta*! It may be better to place Geometrical Operator nodes below a *Fill* node.

Reduction sets the *scan distance* (scd) between the contour and the hatching lines. The real distance results from this value times the distance between the hatching lines in *Delta*

Fill Passes sets the number of fill passes

Start Angle sets the angle for the hatching lines in the first fill pass

Rotation sets the angle by which the hatching lines are rotated after every fill pass

Options

Outline if this check box is selected then an outline will be drawn

Outline first if this check box is selected then the outline will be drawn first and ater that the object will be filled. The Outline check box has to be selected

Bidirectional if this check box is selected then the hatching lines will be output bidirectionally. This increases output velocity but deteriorates the quality to a minor degree. If head-, tail-, on- and off-delays are not correctly set in device Line Parameter (see 3.10 linepar - Line Parameters) then output errors will occur e.g. shifted fill lines

Interleave

Mode selects the interleave mode

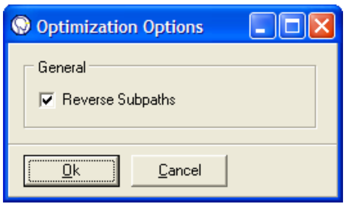
Linear every nth hatching line will be output. The value for n is entered in *Passes*

Bit reversed the hatching lines will be output in a pattern which will maintain a minimal distance during the passes

Passes if *Passes* is greater than 1 then the hatching lines will be not output immediately one after another. Hatching lines will be skipped and output in a later pass. This is useful when the material that will be processed is sensitive to heat and needs time to cool down before heating it up again nearby

Optimize sorts all segments of a path in a sequence and optionally reverses its subpaths, if you select *Reverse Subpaths* in the *Optimization Options* window. Select the paths you want to optimize and click *Optimize*

The *Optimization Options* window opens:



General

Reverse Subpaths if this check box is selected then the sub paths are reversed in output direction

Create dot creates a point at the scan field's origin

Create line creates a line at the scan field's origin

Append line appends a line to a path. The point of type *End* will be in the scan field's origin. Select a point of type *End* and click *Append line*

Split path splits a path in 2 paths at 1 point. Select a point of type *Join* and click *Split path*

Join joins 2 points to 1 at half distance between them. Select a point of type *End* and a point of type *Start* and click *Join*

Connect connects 2 points with a line. Select a point of type *End* and a point of type *Start* and click *Connect*

Make path(s) first moves a path in the *Paths* list to the beginning of the list. Select a *Path* and click on *Make path(s) first in list*

Move path(s) up moves a path up in the *Paths* list. Select a *Path* and click *Move path(s) up*

Move path(s) down moves a path down in the *Paths* list. Select a *Path* and click *Move path(s) down*

Make path(s) last moves a path in the *Paths* list to the end of the list. Select a *Path* and click on *Make path(s) last in list*

Reverse path(s) reverses the direction a path is being executed

Show previous selected block shows the previous selected block in the *Paths*, *Segments* and *Points* list

Show next selected block shows the next selected block in the *Paths*, *Segments* and *Points* list

Paths lists all paths. Paths consist of jointed segments

Segments lists all segments. A segment has a start and an end point. If the end point of segment A is also the start point of segment B then it is of type *Join*

Points lists all points. A point can be the *Start* or *End* of a segment or it can be the *Join* between 2 segments

File shows the file used

Properties shows some properties regarding the line data.

Additionally pens can be assigned to *Paths* here. To do so the *Raw Lines* node has to be child of a *Pen Set* node and *Pens* have to be defined, see section 4.9 Manage Pens. To assign a pen to a path select the *Path*. In *Properties*, double click *PenNo*. Type in the pen number to be used for this path and press the *Enter* key

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

Example 1 Figures 9 and 10 show an example where 2 paths are selected in the *Paths* list and their corresponding *Segments* and *Points* as well as their graphical representation.

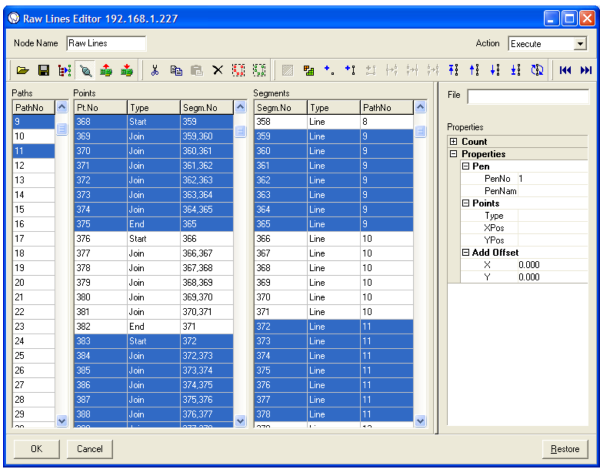


Figure 9: Two paths selected in the *Paths* list and their corresponding *Segments* and *Points*

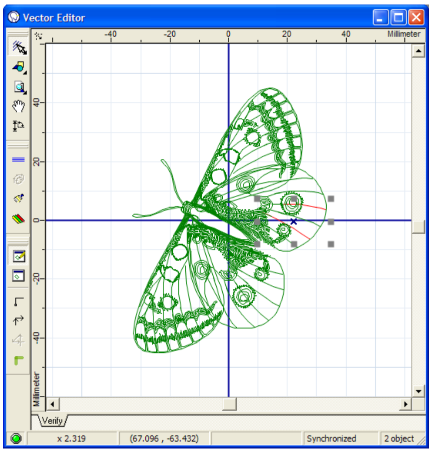


Figure 10: Graphical representation of the line data in figure 9 (selected paths red)

Example 2 Figure 11 shows, how you can add a point on an existing line in Vector Editor. The Vector Editor has to be in *Handle Points* mode to do this.

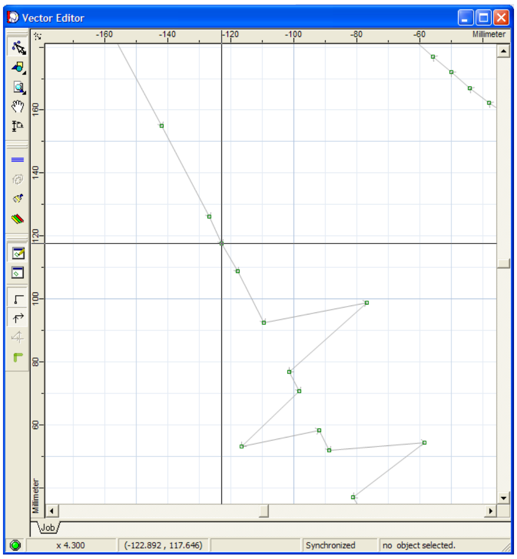
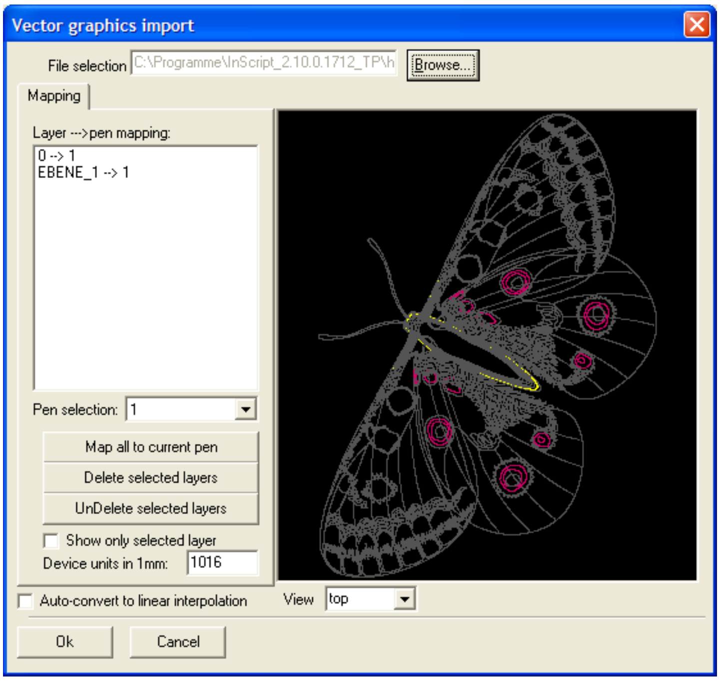


Figure 11: *RawLines* point added by double clicking

If the first point in the RawLines list is a 2D point, a 2D point is inserted. If the first point in the RawLines list is a 3D point, a 3D point is inserted.

5.22.1. Vector Graphics Import Window

This window opens, when importing a DXF or VEC file. It provides the possibility to define which layers to import and to assign pens to layers.



File selection shows the name of the file

Browse opens the *Open* window

Mapping In the left window area pens can be assigned to layers of the file. The layers to be imported can be selected

Layer → pen mapping In the list all layers available in the file are shown as `[Layername]` → `[PenNr]`. Each layer is assigned to PEN 1 by default. To assign a layer to a pen, select the layer and then in *Pen selection* select the pen

Map all to current pen assigns all layers to the pen selected in *Pen selection*

Delete selected layers excludes the selected layers from import and marks them as "deleted"

UnDelete selected layers includes the selected layers to import

Show only selected layer If the check box is selected then only selected layers are shown. Use this function to check, whether the layers marked for import are complete or not. Select all layers marked for import and check in the preview

Device units in 1mm sets the "device units" per mm.

DXF files are unitless. A distance of e.g. 10 "device units" may correspond to 10 microns, 10 inches, or even 10 meters. It is therefore very important that you specify the meaning of the device units

Auto-convert to linear interpolation If the checkbox is selected then

View selects the view (if present) on the drawing

Preview The right window area shows the vector graphic to be imported

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

The preview window has some additional functionality, which can be accessed using its context menu. You have two different context menues. If no elements are selected, the *Zoom and Properties Context Menu* is available and if you select objects in the preview window, the *Edit Context Menu* menu can be used.

Zoom and Properties Context Menu and Mouse Usage . . . .

This menu is available, if no objects are selected in the preview window. If Objects are selected, use *Unselect all* from *Edit Context Menu* to get back to the *Zoom and Properties Context Menu*.

Mouse in the *Selection* mode the hair cross is shown with an additional square at the intersection. This square shows the tolerance area, i.e. all objects within this square will be selected by a click. Selected objects are shown in color and have additional handling points.

To select an object in the *Selection* mode, place the mouse pointer on the object and press the left mouse button. If the mouse pointer is not placed on an object a rectangle can be dragged open. All objects within this rectangle will be selected

Mouse Wheel the mouse wheel can be used to zoom in or out of the preview window. The position of the cursor is the center of zooming

Repeat ... lets you repeat the action shown after *Repeat*

Zoom Extents zoom to fit all lines to the preview window (you can re-center the drawing using this function)

Zoom Window the next left click and drag action will open a zoom window

Zoom Previous goes back to the previous zoom setting

Magnifier opens or closes a magnifier window in the lower right corner of the preview window

Undo undo the last action

Redo redo the last action

Properties opens a properties window of the DXF or VEC file

Drafting Aids opens the *Drafting Aids* window

In this window you can set the *Grid*, *Polar Tracking* (pre-defined angles) and *Object Snap* (the cursor snaps to different objects).

Options opens the *Drafting Options* window

In this window you can set options for the Display, Selection of objects, Drafting, Import/Export formats and seave these settings in Profiles.

Edit Context Menu and Mouse Usage . . . .

This menu is available, if any object is selected in the preview window. Select *Unselect all* to get back to the *Zoom and Properties Context Menu*.

> **NOTE**
>
> Keep in mind that this dialog shall and can not replace a CAD program. In general the graphic should be completely edited, when starting the import into InScript. If you change a graphic within this dialog then it will most probably not be consistent with the VEC or DXF file any more.

Mouse in the *Selection* mode the hair cross is shown with an additional square at the intersection. This square shows the tolerance area, i.e. all objects within this square will be selected by a click. Selected objects are shown in color and have additional handling points.

To select an object in the *Selection* mode, place the mouse pointer on the object and press the left mouse button. If the mouse pointer is not placed on an object a rectangle can be dragged open. All objects within this rectangle will be selected

Mouse Wheel the mouse wheel can be used to zoom in or out of the preview window. The position of the cursor is the center of zooming

UnSelect All de-selects all selected objects

Properties depending on the selected objects, properties can be edited like e.g. line thickness, arrows, font, etc. A reference to the parameters can be found in the documentation to your CAD system

Copy copies selected objects

Move moves selected objects

Rotate rotates selected objects; the center of rotation can be selected freely

Scale scales selected objects

Mirror mirrors objects

Explode explodes groups to less complex objects

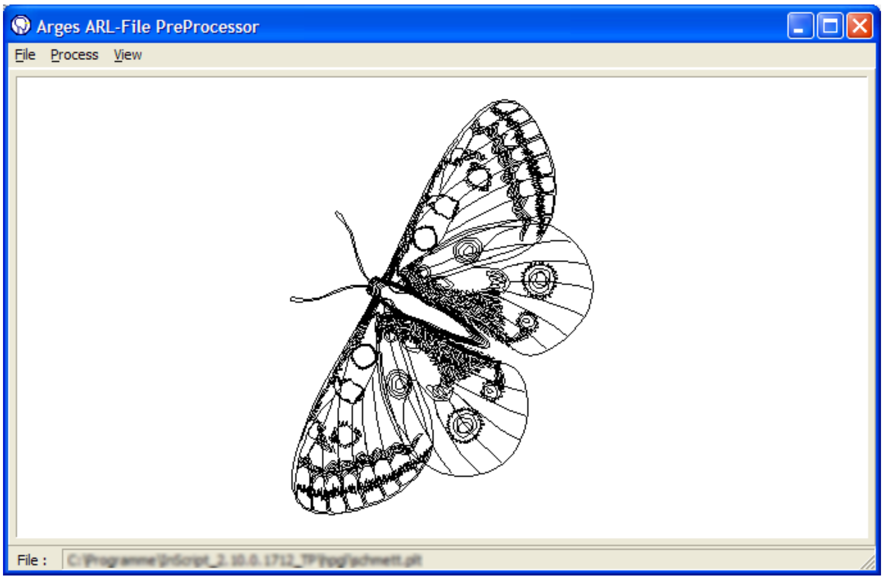
Join join objects

Erase erases selected objects

Create Block blocks groups of selected objects

5.22.2. ARGES ARL File Preprocessor

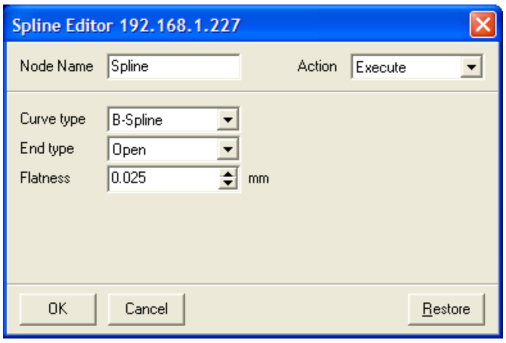
The functionality of the *ARGES ARL File Preprocessor* is now included into the *RawLines* node. See *Fill* and *Optimize* under 5.22 Raw Lines. The original preprocessor `ArlPro.exe` can still be accessed in the `\Program Files\InScript\bin` folder.



Its usage is very similar to the integrated functionlity.

5.23. Spline

By this node spline curves can be created and output.



Curve type selects the curve type

B-Spline the curve is of type B-Spline

End type selects what type of ends the curve has

Open the curve begins at the second point defined and ends at the last but one point defined

Extended the curve begins at the first point defined and ends at the last point defined

Closed the curve is automatically closed between the last and the first point defined

Flatness the curve is approximated by a polygon. Depending on the number of polygon lines a deviation from the curve occur. This parameter sets the maximal allowed deviation from the curve

5.23.1. How to create a spline curve

Step 1 Create a Spline node in the *Job Configuration* tree structure.

A Spline node is shown in the tree structure and in Vector Editor window a blue Spline wild-card symbol is shown.

Step 2 Optionally set any parameter (see above) in the *Spline* node.

Step 3 In the *Vector Editor* window, select the *Spline* wild-card symbol.

The Spline wild-card symbol changes its color from blue to red.

Step 4 Right click the *Spline* wild-card symbol and select *Handle Points*.

The Spline wild-card symbol turns color from red to green.

Step 5 In the *Vector Editor* window, **double click** the positions where the interpolation points for the spline curve shall be.

A grey connecting line between points is drawn. This is an auxiliary line to see which points are successive.

Step 6 If you double click any already set point, it will be removed *Handle Objects*.

Step 7 If all points are set, right click the gray spline and select *Handle Objects*.

The spline will turn from gray to blue.

NOTE

You have to create at least four points to create the first spline curve.

5.23.2. How to handle points of a spline curve

Step 1 In the *Vector Editor* window, select the spline curve.

The spline curve turns color from blue to red.

Step 2 Right click the spline and select *Handle Points*.

The spline changes its color from red to grey.

Step 3 To create a new end point, double click at the new position.

The new point will become the last point defined.

— or —

To create a new point between 2 existing points, double click the connecting auxiliary line between these 2 points.

— or —

To move a points, Drag&Drop the point to its new position.

— or —

To delete a point, select the point to be deleted and press the *Del* key. The point will be deleted after confirmation.

5.24. ARL P3D

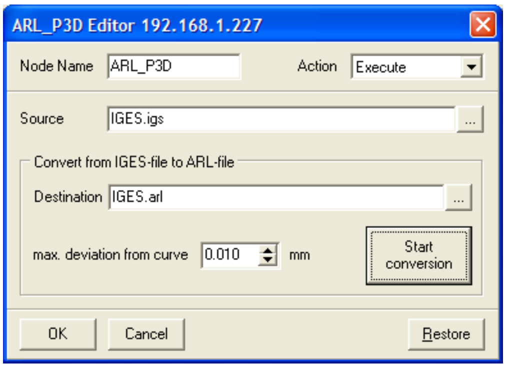
This node loads and outputs ARL-files and converts IGES-files to ARL-files.

The acronym ARL means ARGES Raw Lines. The ARL data format is used by InScript to process 3D data.

The acronym IGES means Initial Graphics Exchange Specification. IGES defines a neutral data format that allows the digital exchange of information among computer-aided design systems. The IGES data format is standardized.

NOTE

A scan head with focus translator (without a flat field lens) and a 3D cartesian field correction for this scan head are required to use this node.



Source sets the location of the ARL-file to use. Only if an IGES-file is specified as *Source* then the group *Convert from IGES-file to ARL-file* will be shown (see also 8.15 Convert IGES file to Jobstructure for more IGES conversion options)

Convert from IGES-file to ARL-file only if the *Source* is an IGES-file then this group appears, where an IGES-file can be converted to an ARL-file. This is necessary as an IGES-file may consist of geometrical elements that can not be processed by InScript. Only geometrical elements of type line and B-spline will be converted. All other elements will be ignored. The conversion approximates curves by polylines with a max. allowed deviation from the curve's shape given by the user

Destination sets the location, where the converted file will be saved to. After conversion this location will be copied to *Source*

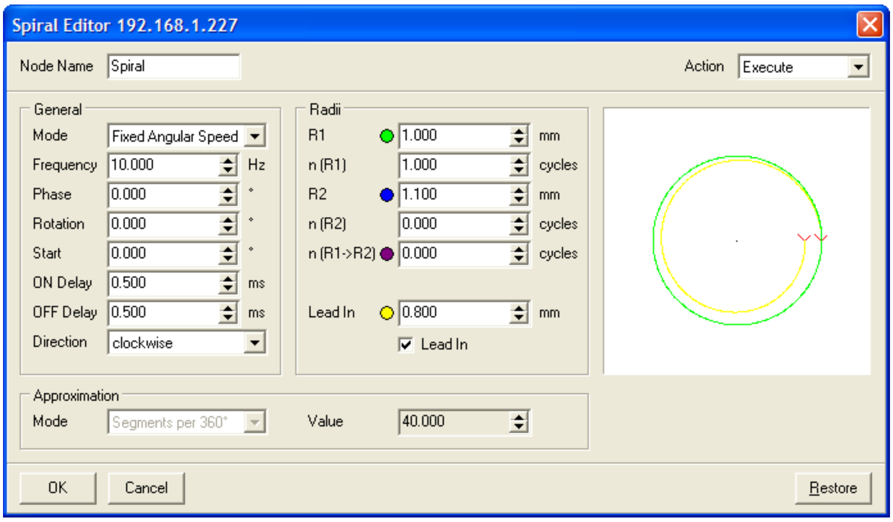
max. deviation from curve sets the max. deviation of a ARL-file's polyline from the shape of the IGES-file's curve. In general a value of 0.01 mm is recommended

Start conversion starts the conversion

5.25. Spiral

To enable the node functionality, you have to set *Type* to *circular* in the *Job Configuration* window in *Pens* → *default* → *head* in the *Wobble* tab.

This node creates spirals. Particularly when producing drill holes this node is useful. In this node a lead in can be defined to place the first pulse in an area outside the later function area. Trepanning cycles can be specified for the inner and outer radii of the spiral. By defining the phase angle e.g. laser specific roundness deviations can be compensated or oval shapes can be intentionally set.



General

Mode determines the speed that will be held constant

Fixed Angular Speed the spiral is output with constant angular speed

Fixed Linear Speed the spiral is output with constant track speed

Frequency sets the rotation frequency the spiral is output with

Phase sets the spiral projection angle. At 0° the spiral is symmetrical, at 90° only a line is visible

Rotation sets the projection axis angle referring to the XY coordinate system

Start sets the start point angle referring to the XY coordinate system

ON Delay sets the ON delay

OFF Delay sets the OFF delay

Direction selects the rotational direction of the spiral

clockwise clockwise rotation

counter-clockwise counter-clockwise rotation

Radii

R1 sets the spiral radius R1

n(R1) sets the number of revolutions output with radius R1

R2 sets the spiral radius R2

n(R2) sets the number of revolutions output with radius R2

n(R1→R2) sets the number of revolutions output between the radii R1 and R2

Lead In if the check box *Lead In* is selected then an additional radius can be specified here

Lead In (check box Check box to activate *Lead In* input field

Approximation

Mode selects, how the spiral is approximated. This list is only active, if *Fixed Linear Speed* is selected in list *Mode* in group *General*

Segments per 360° number of segments per revolution. The value is set in *Value*

Segment length limit maximal segment length in mm. The value is set in *Value*

Deviation limit maximal segment deviation in mm from the spiral. The value is set in *Value*

Value sets the value regarding Mode

Particularities Simultaneously to inputs all changes will be shown in the preview window. The colors beside the input fields represent the colors in the preview.

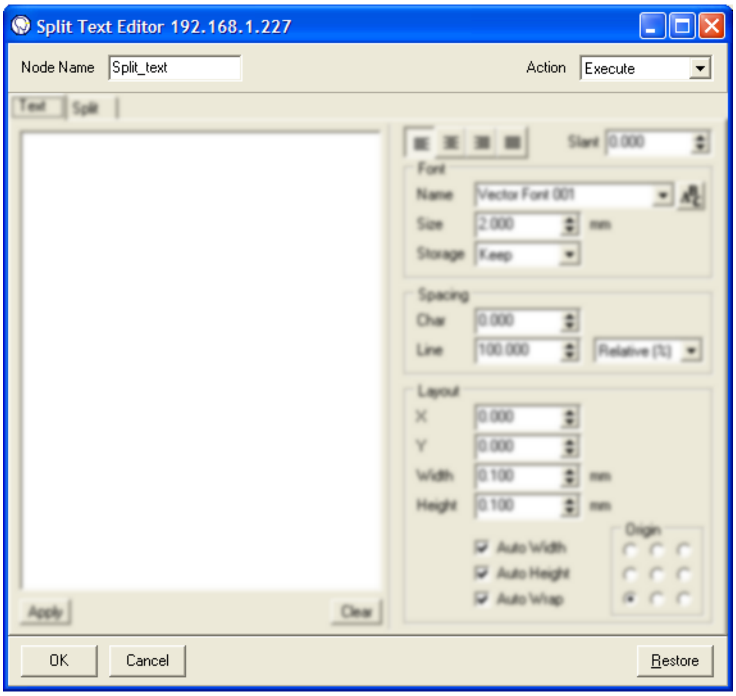
5.26. Split Text

By this node text can be divided into tiles. You can define the size, offset and overlap of these tiles. That way e.g. curved objects can be processed rotating around an axis in the scan field or work pieces can be processed that are larger than the scan field.

i NOTE

In Tab Split axes have to be selected, otherwise the text will not be displayed in the Vector Editor.

5.26.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

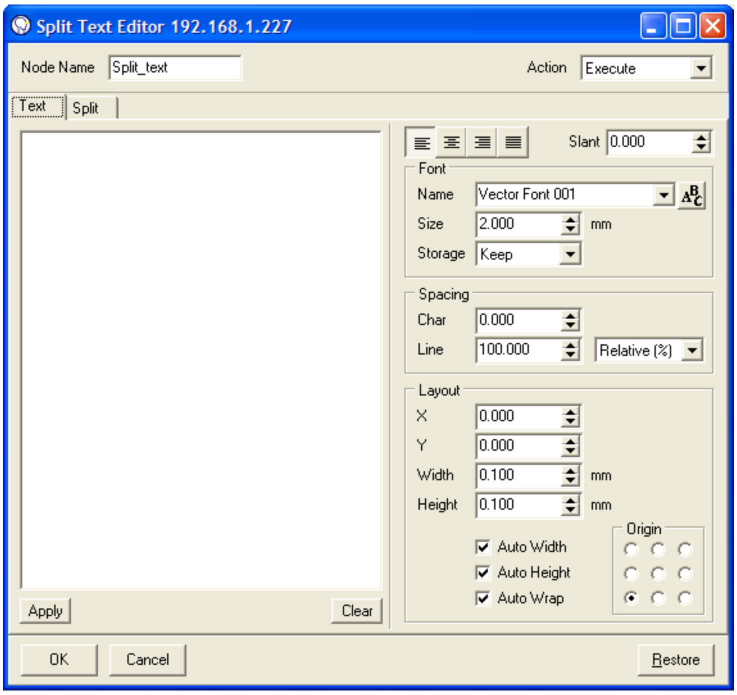
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.26.2. Edit - Text

Using this tab you can create and format text. The text can be slanted in different angles, scaled in width and height and distorted.



Text Box in the text box type in the text or variable to be output. Embed a variable in 2 $-characters, e.g. the variable `$stat.time.DateStr$` outputs the actual date. How the name of a variable is acquired and how to work with variables, you will learn in section 5.44.2 Scripting Language.

If you want to output the $-character then it has to be preceded by the \-character, thus you have to type in \$. If you edit a job file directly via a text editor then the $-character has to be preceded by 2 \ characters, thus you have to type in \\$.

Apply applies the text without closing the Text Editor window

Clear clears the text from the text box

justifies the text (left, center, right, full)

Slant sets the text slant. The slant angle results from the arctan of the entered value. Values from +3 to 3 are allowed

Font

Name selects a font from a dropdown list.

opens the *Select Font* window, see section 5.67 Select Font - Window. All installed customer specific fonts are displayed and can be used. The fonts are located in the Fonts folder of the InScript installation.

Size sets the character height

Storage selects what shall happen to the font after the text was output

Keep the font will be kept in the controller board memory

Remove the font will be removed from the controller board memory

Spacing

Char sets the distance between characters (tracking)

Line sets the distance between lines.

The second list selects the unit for the values in *Char* and *Line*

Relative the values are given relative to single tracking and single line distance in %

Absolute the values are given absolute in mm

Layout

X sets the origin X coordinate

Y sets the origin Y coordinate

Width sets the bounding box' width

Height sets the bounding box' height

Auto Width if the check box is selected then the bounding box width will be automatically adjusted to the width of the longest line

Auto Height if the check box is selected then the bounding box height will be automatically adjusted to the text height

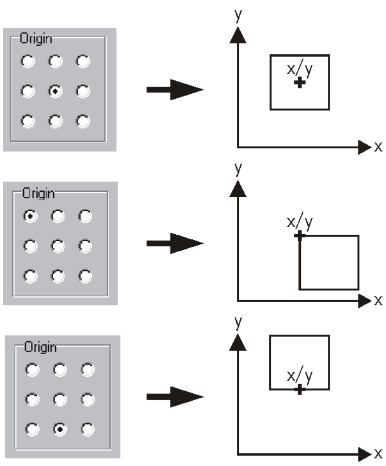
Auto Wrap if the check box is selected then the text will be automatically wrapped at the bounding box. If the check box is cleared then the text will be automatically condensed to fill the bounding box width

Origin

The graphical object is within a bounding box. In the Origin group you select the bounding box point of origin to which coordinates and geometrical operations are referring.

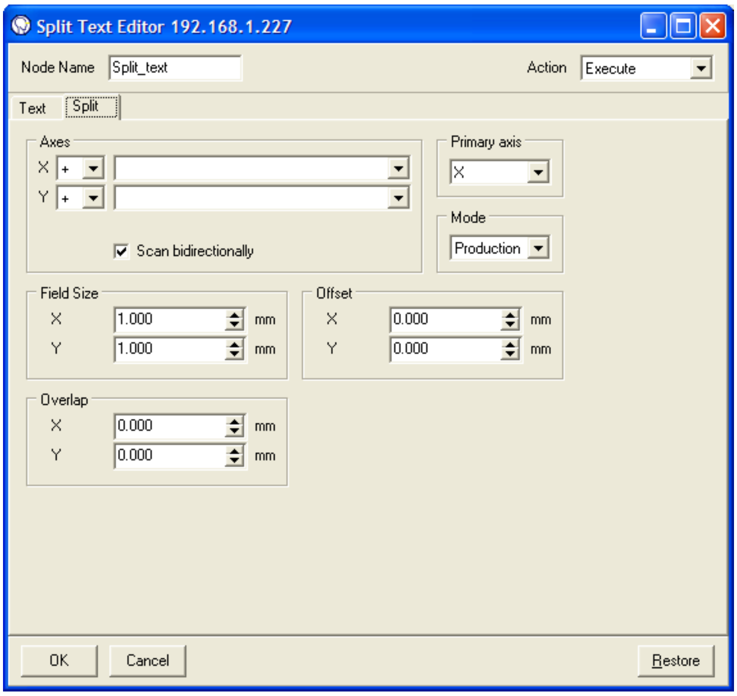
In the *Origin* group the center point is pre-selected. Thus the bounding box center is at the coordinates X1/Y1. If e.g. the right lower radio button is selected then the right lower corner is at the coordinates X1/Y1.

Following examples show settings of *Origin* and their effect:



5.26.3. Edit - Split

In this tab you can divide the text into tiles, i.e. set their size, offset and overlap as well as set the axes to be moved after each tile has been output.



Axes

X, Y selects the axes and direction they will be moved

+ axis *forward* direction (depending on the device)

- axis *backward* direction (depending on the device)

→ The second list offers only axes which have a present and activated device driver. In this list axes can be assigned to the X and Y direction

Scan bidirectionally If the check box is selected then successive lines will be output in opposite direction

Primary axis selects the axis, the lines will be output with

X the X axis

Y the Y axis

Mode selects the mode, the tiles will be output with

Production show the tiles as they will be output. As the to be processed object is moving in the scan field, the tiles will be shown overlapped

Setup "simulates" the movement of the axes and shows the tiles clearly arranged side by side

Field Size

X sets the tile size in X direction

Y sets the tile size in Y direction

Offset

X sets the tile offset in X direction

Y sets the tile offset in Y direction

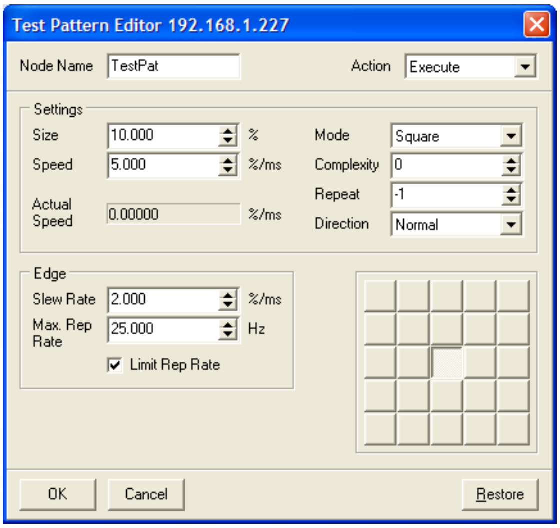
Overlap

X sets the tile overlap in X direction

Y sets the tile overlap in Y direction

5.27. TestPat

This node creates a test pattern for testing ans setup purposes at factory side.

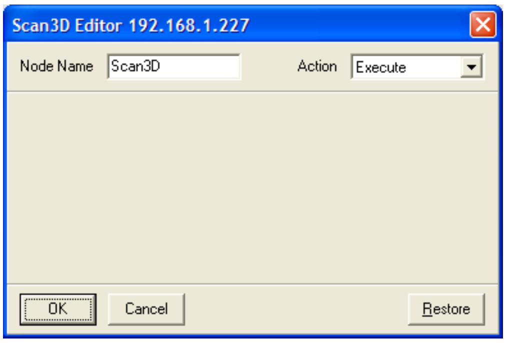


NOTE

This special node should only be used if you are instructed to do this by ARGES.

5.28. Scan 3D

This node enables you to use the nodes Offset 3D and Rotate 3D, i.e. to offset the output plane in 3 dimensiones and to rotate it around 3 coordinate axes. The offset and rotation is restricted by the frustum of pyramid which is spanned by the maximum deflection of the XY scan block and the focal range of the focus translator.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

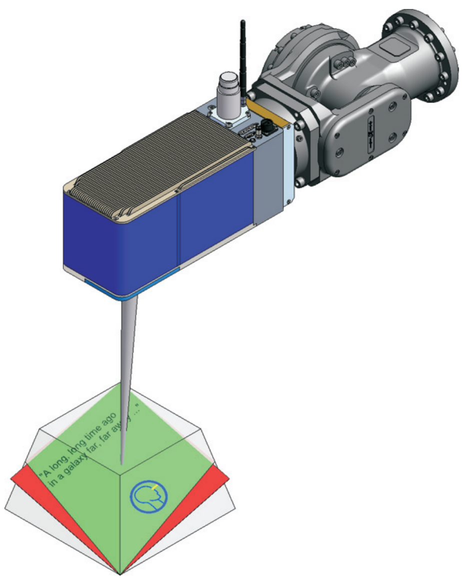
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

Particularities

NOTE

This node can be only used in combination with a scan head of type Elephant including a focus translator. A 3D cartesian field correction has to be performed during configuration. The Z range given in the 3D cartesian field correction determines the height of the frustum of a pyramid.



5.29. Spiro 3D

CAUTION

Damage of scan head possible

To control the focus translator Spiro 3D uses the same channel which is also used by Bitmap File Link to control gray scale output.

- Do not use Spiro 3D in any combination with Bitmap File Link.

NOTE

To enable the function of this node *Type* has to be set to *circular* in window *Job Configuration* in **Pens** → **default** → **head** in the *Wobble* tab.

To Enable Precession

If your scan head has a precession unit built in then you have to set some more parameters else skip this procedure.

Step 1 In the main menu, click *View* → *Xplorer*.

— or —

In the tool bar, click .

The *Xplorer* window opens.

Step 2 In the tree structure open the folder *dev* → *head* → *config*.

Step 3 In the list set the variables:
`ssi_protocol` to *Specified*
`ssi_n_chn` to 6

Step 4 In the main menu, click *Controller* → *Save to NVRam*.

Step 5 In the main menu, click *Controller* → *Configure*.

The *Board Configuration* window opens.

Step 6 Click *Reset Board*.

Principle

Circles, ellipses, spirals and helixes are defined by states. Each state in his part is defined by a set of parameters. You specify the states in a sequence. Circular, elliptical, spiral and helical movements are generated by interpolation of the set of parameters of one state into the set of parameters of the next state. The number of turns it takes to change one state into the next state is the base for this interpolation.

Here is a short overview of requirements and parameter sets:

Circles, Ellipses and Spirals

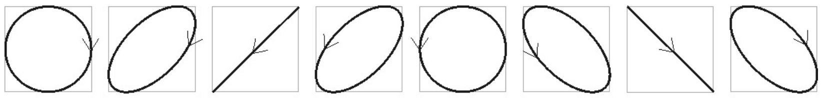
Requirements: scan head with XY-block (degrees of freedom 2: X- and Y-direction)

To process circles and ellipses InScript combines a sinusoidal rotary movement of the X-galvanometer with the cosinusoidal rotary movement of the Y-galvanometer. To describe these shapes you need a base set of 4 parameters. These are:

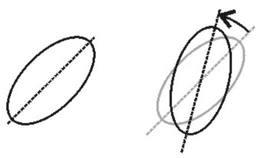
Revs specifies the revolutions it takes to interpolate linearly the current state from the previous state. Thus the parameter Revs and the frequency define the time of transition from the previous state to the current state. As there exist no previous state for state 1 the parameter Revs always is 0 in state 1.

Rad1 specifies the radius [mm] or in other words the amplitude of the sinusoidal and cosinusoidal rotary movement of the mirrors.

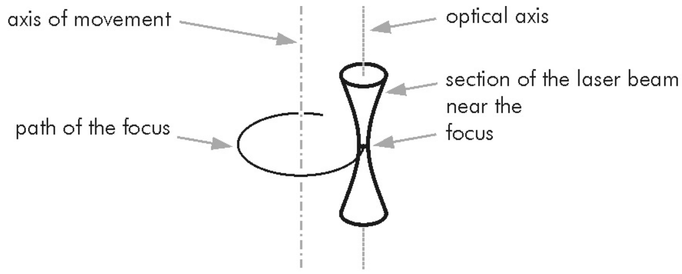
Phase1 specifies the phase [°] between the sinusoidal and cosinusoidal rotary movement of the mirrors. A phase of 0° results in a circle. A phase >0° and <90° results in a ellipse where ellipticity grows with increasing phase angle. The long axis of this ellipse lies at 45° between the X- and Y-axis. A phase of 90° results in a line which lies at 45° between the X- and Y-axis. Etc (see following figure).

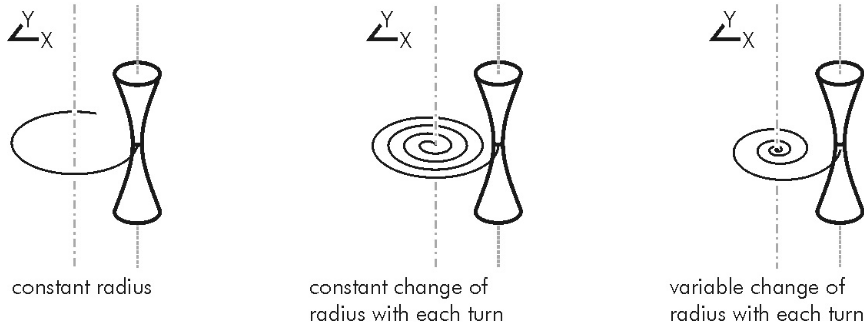


Rot1 specifies the rotation [°] around the center of the movement or in other words a phase shift between the frequency and the sinusoidal and cosinusoidal rotary movement of the mirrors simultaneously. An example is shown in the following figure.



To describe a spiral you need the previous base set of parameters plus a second state of these parameters. The movements that can be achieved are shown in the following figure. For simplification a telecentric lens is assumed and parameters Phase1 and Rot1 are set to 0.

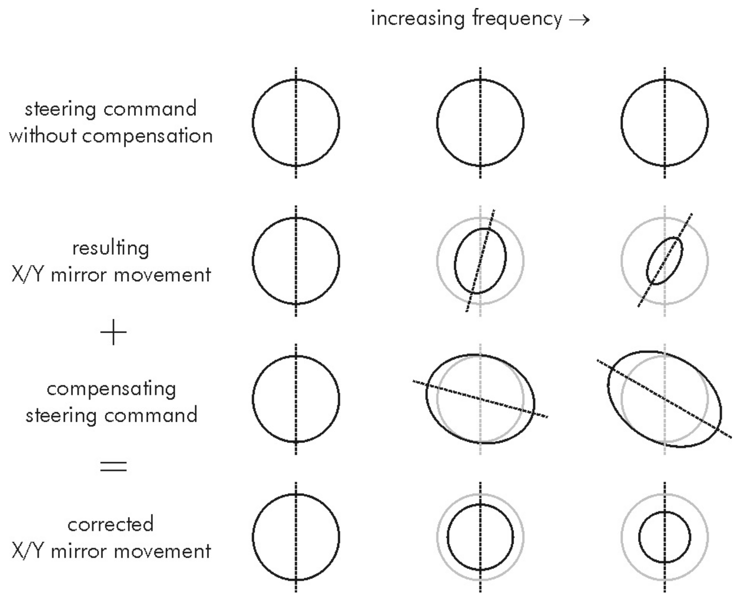




The following effect occurs with larger apertures of the scan head and the larger internal beam expansion factors.

The mass and thus the inertia of the Y-mirror is larger than of the X-mirror. This causes a phase shift between the sinusoidal and cosinusoidal rotary motion of the mirrors.

With small frequency (typically < 50 Hz) the phase shift is negligible small. With a circular steering command a circle is processed. By increasing the frequency continuously the phase shift finally is not negligible any more. Instead of the circle an ellipse is processed, whose long axis shrinks and rotates around the center. Additionally the ellipse gets increasingly flatter (see following figure).



NOTE

To process circles even with small radii and high frequencies you have to determine by experiment the compensating values for radius, phase and rotation. This is the first step you have to take before continuing to other shapes.

With increasing frequency the described effect leads to a non-linear rise of the power dissipation in the galvanometers. To prevent the galvanometers' burn out a hardware and a software fuse exist. The hardware fuse can not be set. As software fuse a limit of the frequency is used. This limit is preset in a way that with larger apertures the hardware fuse and with smaller apertures the software fuse responds. If your application demands it and you got a scan head with small aperture then the limit can be increased. If you wish to do this, please contact ARGES.

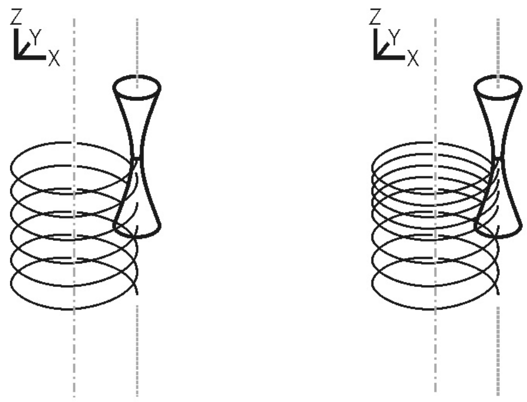
Helixes

Requirements: scan head with XY-block and focus translator (degrees of freedom 3: X-, Y- and Z-direction)

The set of parameters for helixes is based upon the set of parameters for circles, ellipses and spirals. In addition a parameter to position the Z-axis has to be specified. The principle of defining the mentioned movements by states allows e.g. helical movements even with variable slope.

Z specifies the position of the focus translator [%]. You need a calibration curve which maps the position of the focus translator [%] to the resulting position of the focus in Z-direction, e.g. [mm]. As this curve is dependent on the optics used and as there is a high variety of combinations possible, determine the calibration curve by experiment, please. Note that scan field is corrected only for one Z-position of the focus.

The movements which can be achieved are shown in the following figure. To simplify matters a telecentric lens is assumed and the parameters Phase1 and Rot1 are set to 0.



constant feed rate of focal plane in z-direction

variable feed rate of focal plane in z-direction

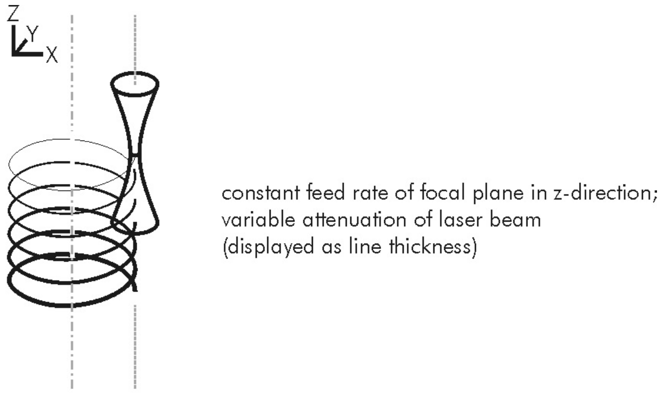
Attenuation

Requirements: scan head with XY-block, focus translator and attenuator (degrees of freedom 4: X-, Y-, Z-direction and attenuation of the laser beam)

The set of parameters for attenuation is based upon the set of parameters for helixes. In addition a parameter for the attenuation of the laser beam has to be specified.

Aux specifies the position of the attenuator [%]. You need a calibration curve which maps the position of the attenuator [%] to the resulting attenuation of the laser beam, e.g. [W]. Please determine the calibration curve by experiment.

The movements which can be achieved are shown in the following figure. To simplify matters a telecentric lens is assumed and the parameters Phase1 and Rot1 are set to 0.



Precession
Requirements: scan head with XY-block, focus translator and precession unit (degrees of freedom 5: X-, Y-, Z-direction and precession of the laser beam, but because of technical reasons precession is configured for 6 channels)

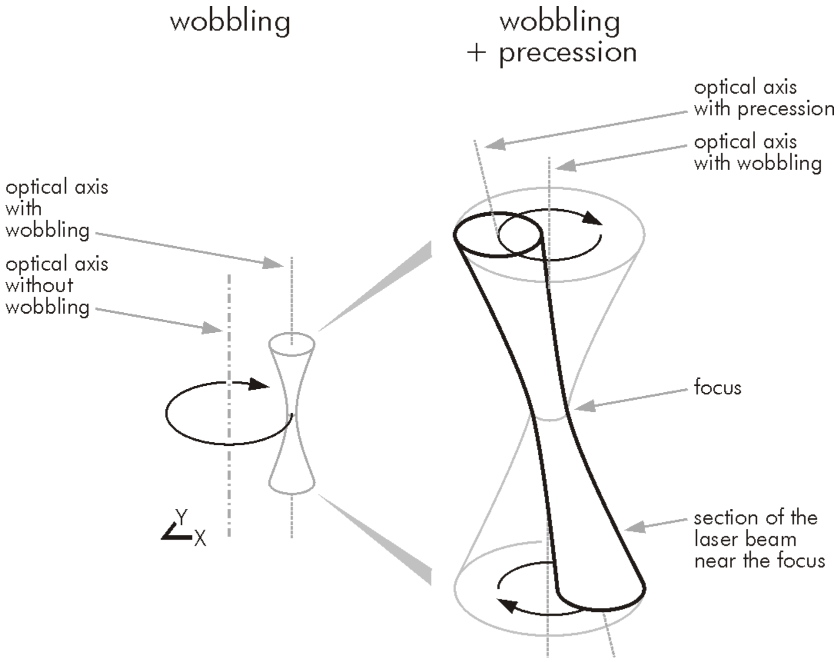
> **NOTE**
>
> The precession frequency is identical to the wobbling frequency. The focus stays any time on the trajectory described in circles, ellipses, spirals and helixes.

The set of parameters for precession is based upon the set of parameters for helixes. In addition some parameters for precession of the laser beam has to be specified. These are:

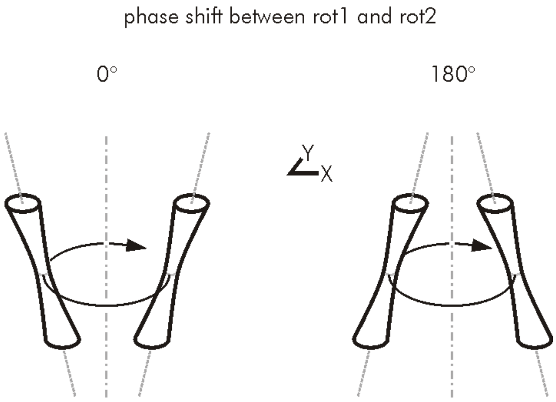
Rad2 specifies the radius of beam displacement [%]. In combination with focusing optics this results in a precession angle on the target. You need a calibration curve which maps the radius [%] to the resulting precession angle of the laser beam [°].

Phase2 As both plates for beam displacement have the same inertia, so the problem with different inertias like with the X- and Y-mirror does not occur here. Therefore the radius of beam displacement, which is defined by radius Rad2, will be constant even with higher frequencies. Nevertheless the parameter Phase2 is useful to obtain elliptical movements. For more information see parameter Phase1.

Rot2 As both plates for beam displacement have the same inertia, so the problem with different inertias like with the X- and Y-mirror does not occur here. Therefore the radius of beam displacement, which is defined by radius Rad2, will be constant even with higher frequencies. Nevertheless the parameter Rot2 is useful to obtain elliptical movements. For more information see parameter Rot1.

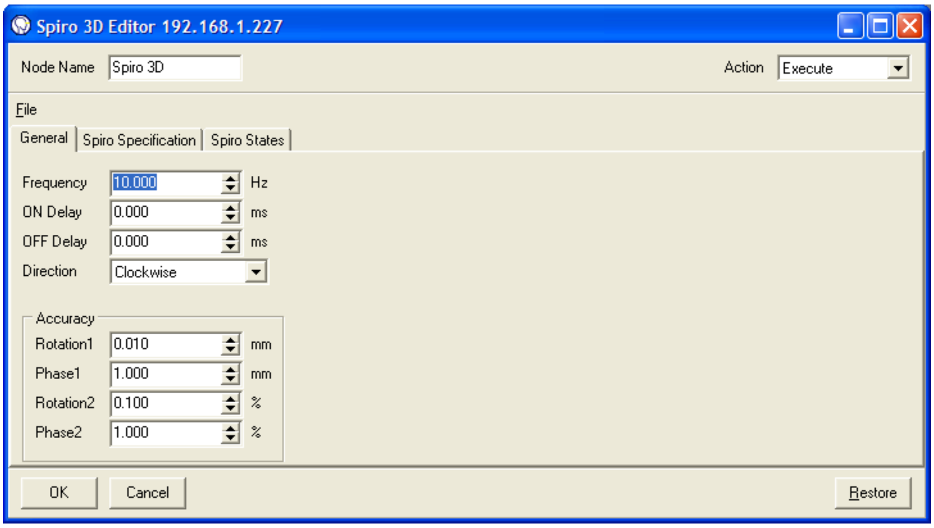


There is a useful relation between the parameters Rot1 and Rot2 which is shown in the following figure.



5.29.1. Edit - General

In the general tab parameters for output are set.



Frequency rotary frequency of the circle, ellipse, spiral or helix [Hz]

ON Delay ON Delay [ms] (see section 3.10 linepar - Line Parameters)

OFF Delay OFF Delay [ms] (see section 3.10 linepar - Line Parameters)

Direction

Clockwise clockwise rotation

Counterclockwise counterclockwise rotation

Accuracy

Rotation1 accuracy of rotation 1 [mm]

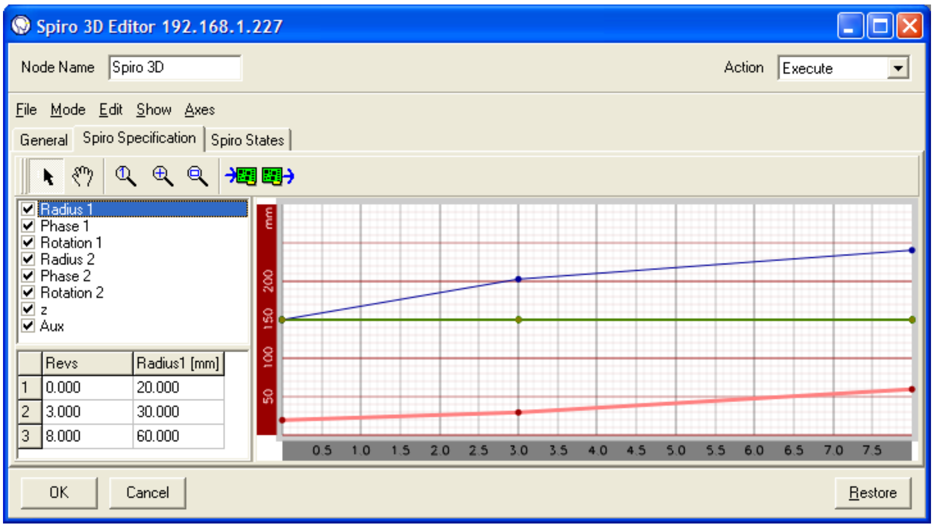
Phase1 accuracy of phase 1 [mm]

Rotation2 accuracy of rotation 2 [%]

Phase2 accuracy of phase 2 [%]

5.29.2. Edit - Spiro Specification

The Spiro Specification and Spiro States tabs display the same data in 2 different ways. For description of parameters see section 5.29.3 Edit - Spiro States.



List of parameters

In the list activated parameters are shown in the diagram.

NOTE

All parameters can be activated even if they are not used with the configuration of your scan head.

Table

The table shows the manually set parameters of a state.

NOTE

A change in column Revs can result in the addition of a new state or in the combination of existing states.

Diagram

The yellow marked area corresponds to the yellow marked state in the Spiro States tab.

Menu, Tool Bar and Usage

File → Apply save the current specification to the controller board

File → Reload load specifications from the controller board

File → Save and Close save the current specification to the controller board and close the window

File → Discard and close discard the changes and close the window

Mode → Select edit diagram

Mode → **Pan** pan shown area (if zoomed in)

Mode → **Zoom in** to zoom in the shown area press the left mouse button; to zoom out the shown area press the right mouse button

Mode → **Zoom window** span with the mouse pointer an area which should be zoomed in

Mode → **Zoom 1** reset zoom factor to 1

Edit → **<parameter>** select a parameter for editing. To edit a parameter in the table and the diagram:

Step 1 Mark the parameter in the list of parameters.
— or —
Click *Edit* → *<parameter>* in the menu.
— or —
Click *Edit* → *<parameter>* in the context menu of the diagram.

Step 2 Drag the point in the diagram.
— or —
Delete a point via its context menu.
— or —
Add a point via the graphs context menu.

Show → **<parameter>** shows a parameter. To show a parameter in the diagram:

► Activate its check box in the list of parameters.
— or —
Click *Show* → *<parameter>* in the menu.
— or —
Click *Show* → *<parameter>* in the context menu of the diagram.

Show → **Nothing except** shows only the parameters which are selected in the sub menu

Show → **Show all** Shows all parameter

Show → **Edited data only** couples view with editing. As soon a parameter is selected for editing it is shown and all other parameters are hidden

Show → **horizontal/vertical lines** show horizontal/vertical lines at the interpolation points in the diagram

Axes → **<Parameter>** → **top/bottom/both or left/right/both** show axes at specified positions in the diagram

An area of values can be zoomed in by holding the left mouse button pressed on the axis and spanning the area with the mouse pointer.

All axes on left side Shows all axes on the left side of the diagram

All axes on right side Shows all axes on the right side of the diagram

All axes on both sides Shows all axes on both sides of the diagram

Axes → Show only active axis show only the axis which is relevant to edit the current parameter

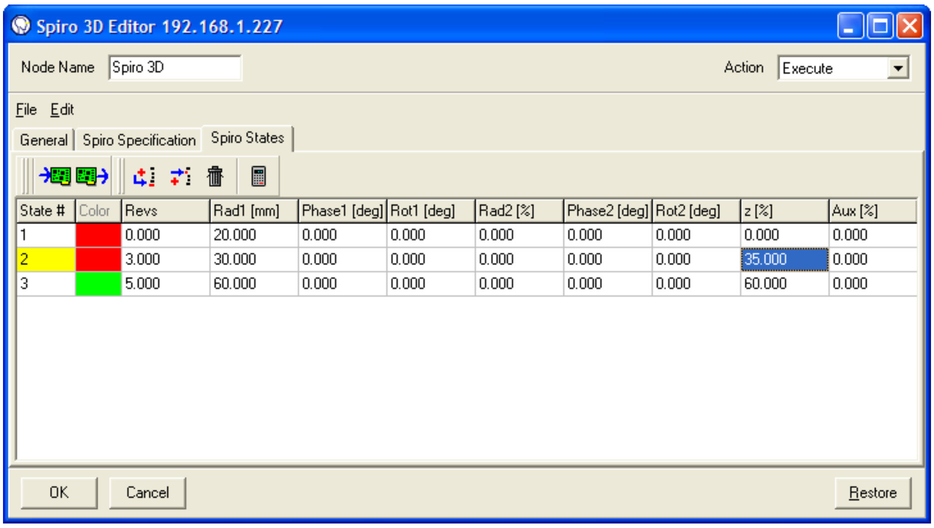
Axes → Colorize active axis highlights the axis which is associated to the current parameter

5.29.3. Edit - Spiro States

The Spiro States and Spiro Specification tabs display the same data in 2 different ways.

The Spiro is defined by states. Each state is represented by a set of parameters which can be set manually (black values) or which are calculated automatically (grey values). The spiral develops by linear interpolating the set of parameters from one state to the next state.

The yellow marked state corresponds to the yellow marked area in the Spiro Specification tab.



Please read the introduction to this node for a description of parameters (columns of the table).

Menu, Tool Bar and Usage

File → Apply save the current specification to the controller board

File → Reload load specifications from the controller board

File → Save and Close save the current specification to the controller board and close the window

File → Discard and close discard the changes and close the window

Edit → Add append a new state to end of table. The values of the last state are copied to the new one

Edit → Insert after insert a new state after the currently marked state. The values from the marked state are copied to the new one

Edit → **Delete** delete the currently marked state

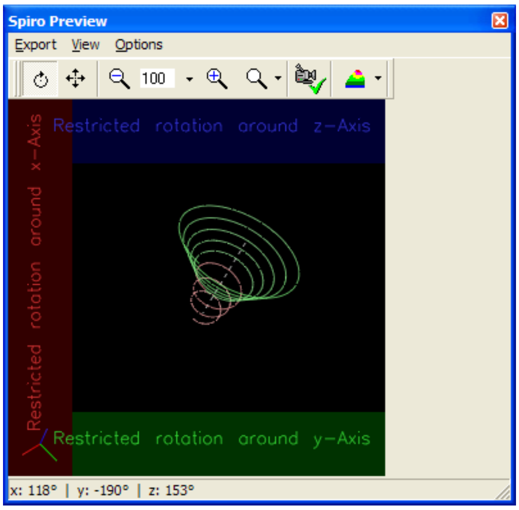
Edit → **Calculated** Calculate values between states

To edit automatically calculated values (grey values) deactivate Calculated in the context menu of the cell. An interpolation point is added to the diagram in the Spiro Specification tab.

5.29.4. Edit - Spiro Preview

The Preview tab visualizes the set parameters. For visualization the parameters are optimized:

- Dimensions x, y, z are normalized. The spiral is drawn into a virtual cube and in this way changes to one dimension are shown proportionally
- The number of shown revolutions in interstate transitions is limited. If the number exceeds 5 the number is scaled by a root-function in such way the numbers of revolution in all interstate transitions is proportional
- Parameters Rad2, Phase2, Rot2 and Aux are not shown



Tool Bar and Usage

Rotate Mode To rotate the scene hold the left mouse button pressed and move the mouse. If you do this when the mouse pointer is inside the colored areas the rotation is restricted to one axis. If you additionally press the CTRL button the scene is rotated additionally along the z-axis. To move the camera hold the right mouse button pressed and move the mouse. If you do this when the mouse pointer is inside the colored areas the movement is restricted to one axis

Move Mode To move the scene hold the left mouse button pressed and move the mouse. If you do this when the mouse pointer is inside the colored areas the rotation is set to a special axis

Zoom out, **Zoom menu**, **Zoom in** and **Zoom in slider** To zoom in or out of the scene click on the *Zoom in* or *Zoom out* button. Another possiblity is to use the *Zoom in Slider* towards the in or out direction. All functionality plus a direct input of a zoom percentage is combined in the *Zoom menu*. Zooming step-by-step can also be achieved using the mouse wheel

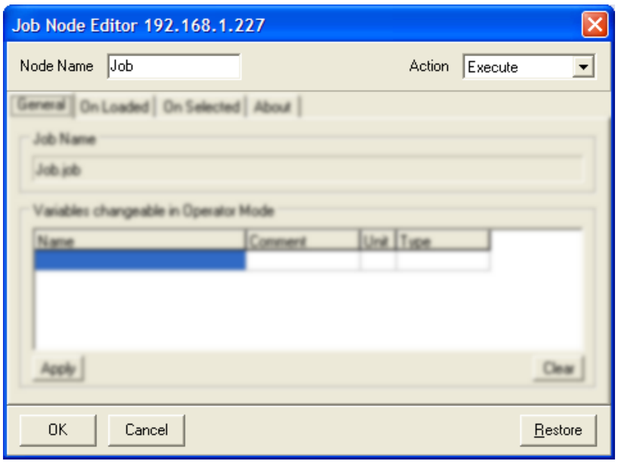
Reset camera view resets the camera position to standard

View options the *Show axis* command in this menu switches the axis indicator in the bottom left corner on or off

5.30. Job

This node combines all its child nodes to an executable unit with a name. A Job can be saved and loaded. These files normally have the extension `.job`.

5.30.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

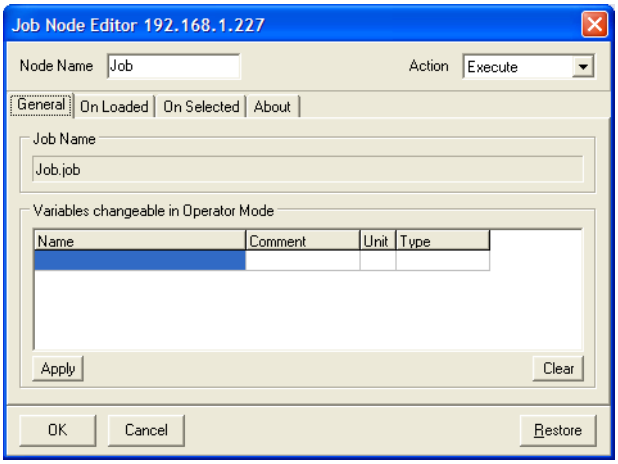
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.30.2. Edit - General

In this tab you can define variables changeable in Operator Mode, see section 9 Supervisor and Operator Mode.



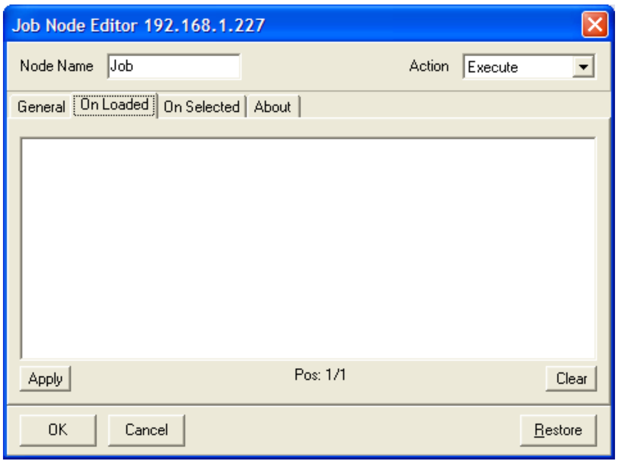
Job

Name shows the job name. If you want to change the name then rename the node itself, see section 4.6.17 Rename Node

Variables changeable in Operator Mode In this table, you can define the variables changeable in Operator Mode. How this is done, see section 9 Supervisor and Operator Mode.

5.30.3. Edit - On Loaded

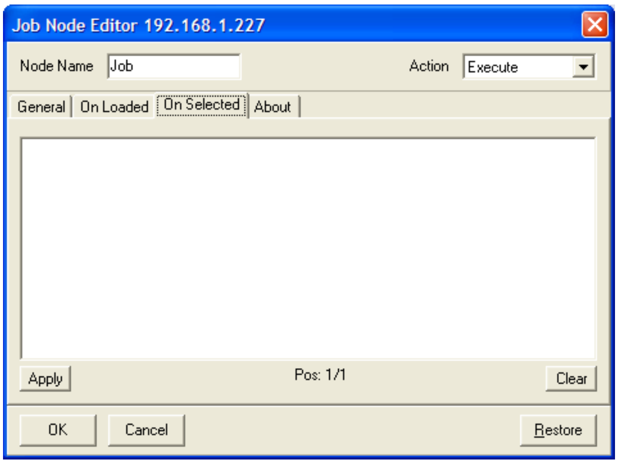
In this tab enter the script, that shall be executed as soon as the job is loaded.



Text box in this text box type the script that will be executed as soon as the job is loaded. You will find a description of the scripting language in section 5.44.2 Scripting Language

5.30.4. Edit - On Selected

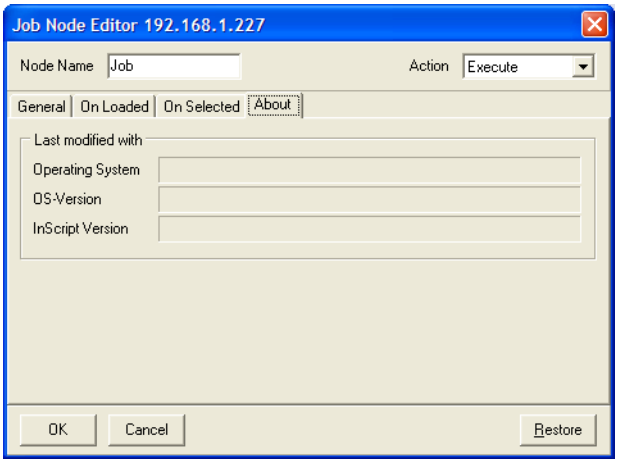
In this tab enter the script, that shall be executed as soon as the job is selected.



Text box in this text box type the script that will be executed as soon as the job is selected. You will find a description of the scripting language in section 5.44.2 Scripting Language

5.30.5. Edit - About

This tab shows information about the operating system and the InScript version under that the job file was saved. These fields are only filled if the job was saved and loaded.



Last modified with

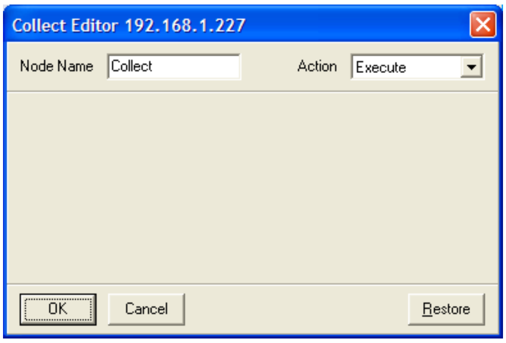
Operating System shows the operating system under that the job was saved

OS-Version shows the operating system version under that the job was saved

InScript-Version shows the InScript version under that the job was saved

5.31. Collect

This node combines its subtrees to one node. That way a collection of subtrees can be linked to (see section 5.35 Link), saved or executed if necessary. Also execution units under nodes can be combined for scripting (e.g. `exec_subtree()` see 5.44 Script) or *ExtSelect* nodes (see 5.65 ExtSelect).



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

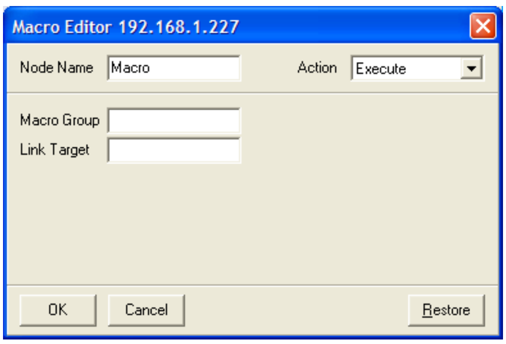
Restore see section 5.1 Shared GUI Elements

5.32. Macro

Like a *Job*, a macro node consists of a subtree of child nodes that can be executed. Macros are collections of nodes that can be re-used at several places in a job. E.g. you can create a macro that creates a special geometrical figure that consists of several shapes. If you need that figure in different places, you can reuse the macro and don't have to re-create the figure (see 10.3 Create Macros for an example).

A new Macro node is always created under *Job Configuration* → *Macros* (see 4.7 Manage Macros). It can also be created under a MacroGroup node, see section 5.33 MacroGroup, to put similar macros in groups that are easier to handle and to find. Macros can be saved and loaded and get the extension `.imc`.

After you have created a macro it can be dragged & dropped to the place in the job, where it is needed. The standard name after dropping the macro in a Job tree will be *Macro* or *Macron*, where n is a rolling number.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Macro Group Name of the *MacroGroup* the *Macro* was created in (if the *Macro* is created directly under *Job Configuration* → *Macros* this field is blank

Link Target original name of the *Macro* that is linked to the node

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

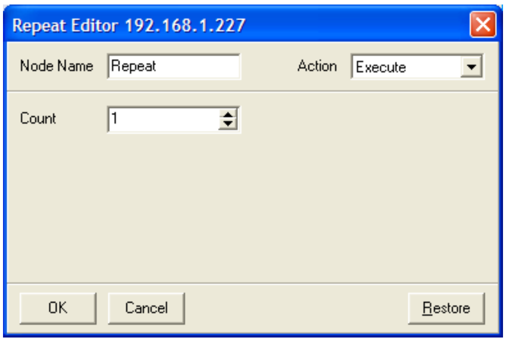
5.33. MacroGroup

A MacroGroup can be used to combine several macros under a group. As an example you could group all macros that do graphical output under *MacroGroup* Graphics or all IO dependend macros under *MacroGroup* IOs (see 4.7 Manage Macros for more information)

Particularities MacroGroups can **only** be created under *Job Configuration* → *Macros*.

5.34. Repeat

This node repeats all child nodes in its subtree.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Count sets the number of repetitions. If Count is set to -1 then the child nodes will be **repeated infinitely**. If Count is set to 0 then the child nodes will **not be executed**

OK see section 5.1 Shared GUI Elements

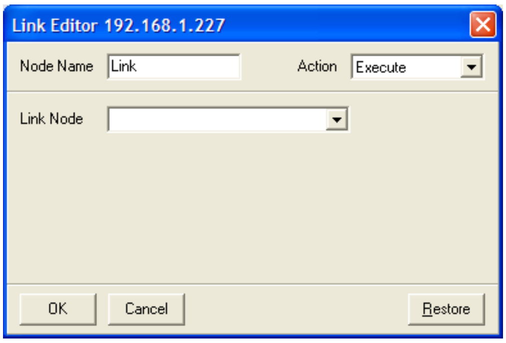
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

Particularities If the Repeat variable can be found under e.g. `usr.job.Job.Repeat..num`, the repeat counter can be found under `usr.job.Job.Repeat..n` for e.g. processing its current value in e.g. a Script node, see section 5.44 Script.

5.35. Link

This node creates a logical link to another node in the tree structure. With this node a sequence of nodes can be called and applied to a subtree. Such a sequence of nodes can be combined e.g. under a Collect node, see section 5.31 Collect or all linked nodes can be stored in a *Job* node in several *Collect* nodes to save and load them.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

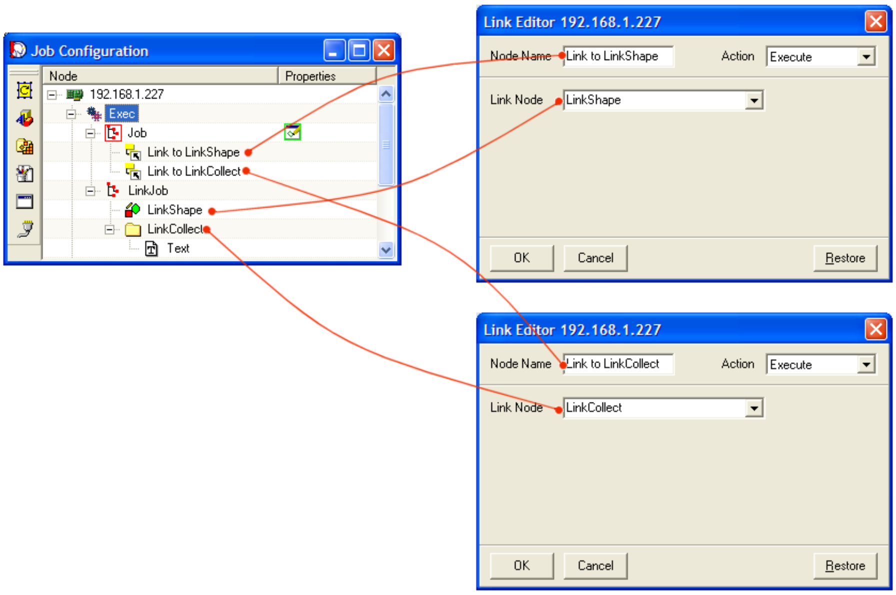
Link Node sets the target node name within the tree structure. Just use the name of this node. If several nodes of the same name are available in the tree hierarchy, then the **first occurence** of this name in the job tree(s) is executed

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

Particularities Almost any type of node can be linked. Here is an example for a *Job* called `LinkJob` that contains a *Shape* node called `LinkShape` and a *Collect* node called `LinkCollect` that are linked from *Job* `Job` using the *Link* nodes `Link to LinkShape` and `Link to LinkCollect`:



TIP

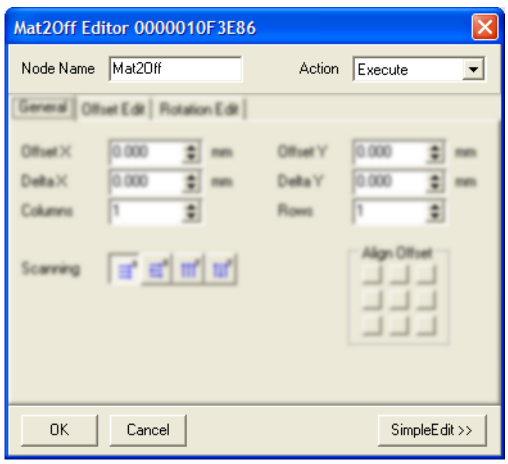
You could also create a *Link* node to the *Job* `LinkJob` itself.

5.36. Mat2Off

With this node, positions of output nodes can be arranged in a matrix of columns and rows. This is a fast and optimized method to output graphical elements, text or the output of any node in defined rows and columns.

This node is a combination of the Repeat-X and Repeat-Y nodes, see sections 5.37 Repeat X and 5.38 Repeat Y. But this node offers extended functionality by providing accelerated output, offset and rotation for single elements without further programming and origin alignment. It also provides the possibility for bi- and unidirectional output over X axis or Y axis.

5.36.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

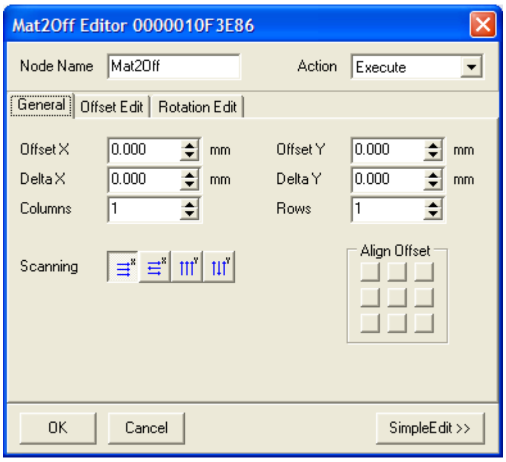
Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

5.36.2. Edit - General

Arrangement of the columns and rows.



OffsetX sets the offset for the first matrix element in X direction

OffsetY sets the offset for the first matrix element in Y direction

DeltaX sets the column distance in X direction

DeltaY sets the row distance in Y direction

Columns sets the number of columns

Rows sets the number of rows

Scanning

 outputs with primary axis = x, unidirectional

 outputs with primary axis = x, bidirectional

 outputs with primary axis = y, unidirectional

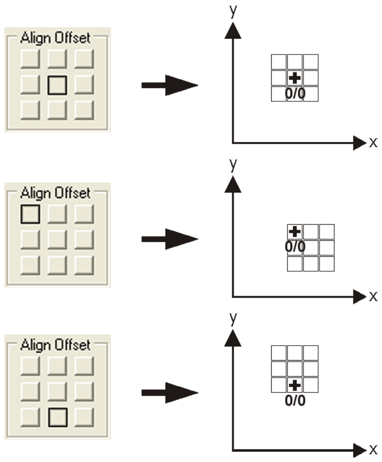
 outputs with primary axis = y, bidirectional

Align offset
using these buttons *OffsetX* and *OffsetY* can be adjusted that the matrix field of all elements is centered or offset to the origin of the coordinate system (or to a point in the coordinate system, if e.g. an *Offset* node (see 5.7 Offset) that moves the matrix to this point is placed before the Mat2Off node). The calculation is also dependend on the *Origin* settings of the *Mat2Off* node's

sub elements. Offsets or rotations of single matrix elements (see 5.36.3 Edit - Offset Edit or 5.36.4 Edit - Rotation Edit) are ignored in the calculation.

If you click on one of the *Align Offset* buttons, *OffsetX* and *OffsetY* are modified.

Following examples show settings of *Align Offset* and their effect on the offset of whole group of matrix elements:



After a button was clicked, *OffsetX* and *OffsetY* are modified and the offset of the *Mat2Off* can be seen in the Vector Editor, if a Vector Editor view is defined under *Job Configuration* (see 4.4.2 Exec *Show VectorEditor View* how to do this).

5.36.3. Edit - Offset Edit

In this tab single matrix elements can be offset, e.g. the element in row 1, column 1 3.000 mm in X direction and 2.000 mm in Y direction from its normal position in the matrix, see the following figure.

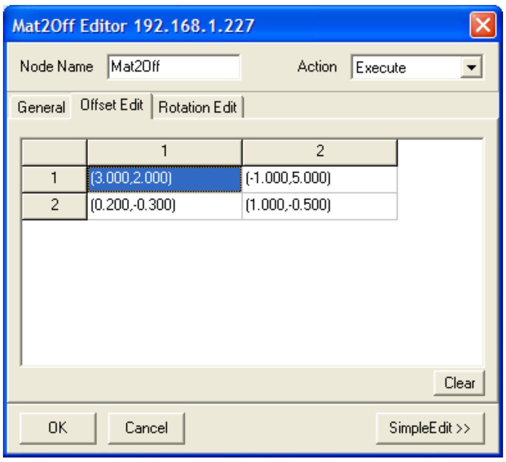


Table Cells enter the offset data here. To enter the data, double click the corresponding cell or in the cell context menu, click *Edit Cell* and **confirm the input by pressing the Enter key**. The columns correspond to the matrix X direction. The rows correspond to the matrix Y direction. Within a cell at the left the X coordinate and at the right the Y coordinate of the offset in reference to the normal position in the matrix are displayed. To delete the values in a cell select *Delete Cell* from the context menue

Clear discards and clears the entered values

5.36.4. Edit - Rotation Edit

In this tab single matrix elements can be rotated. Enter the rotation angle into the corresponding cell.

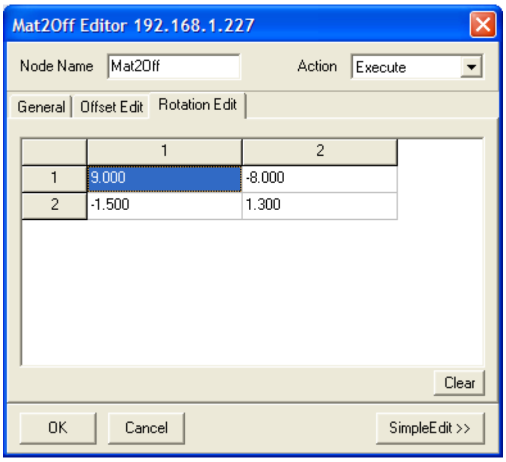
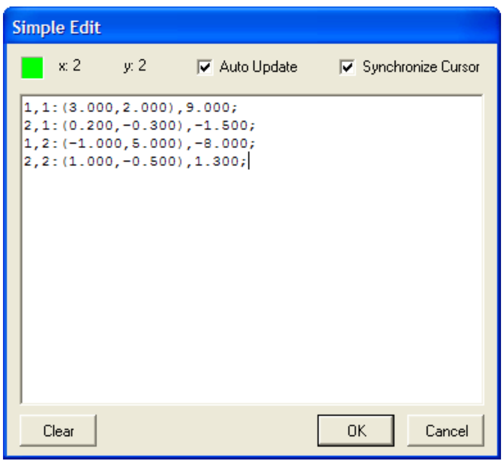


Table Cells Enter the rotation value here. To enter the data, double click the corresponding cell or in the cell context menu, click *Edit Cell* and **confirm the input by pressing the Enter key**. To delete the values in a cell select *Delete Cell* from the context menue

Clear discards and clears the entered values

5.36.5. Simple Edit

The Simple Edit window displays offset data as present on the controller board. In this window the offset and rotation data can be edited directly.



Auto Update If the check box is selected then the data will automatically be updated on the tabs Offset Edit and Rotation Edit as soon as the data is modified in the Simple Edit window

Synchronize Cursor If the check box is selected then the cursor on tabs Offset Edit and Rotation Edit will be synchronized with the cursor in the Simple Edit window

Text Box values can be entered like this:

```
x-position,y-position:(x-offset,y-offset), rotation;
```

e.g.

```
1,1:(10.000,10.000),10.000;
2,1:(20.000,20.000),30.000;
1,2:(30.000,30.000),20.000;
2,2:(40.000,40.000),40.000;
```

Clear discards and clears the entered values

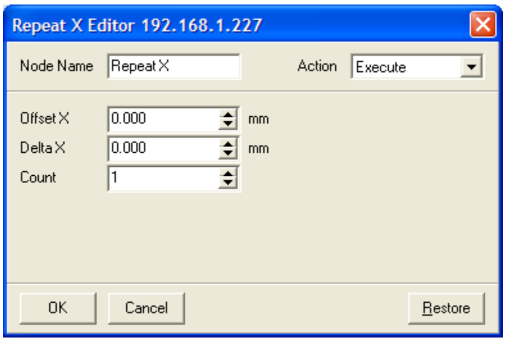
OK applies the entered values and closes the window

Cancel discards and clears the entered values and closes the window

Particularities A green indicator signals a valid input and a red indicator signals an error in the input values or structure.

5.37. Repeat X

This node repeats the output of all its child nodes and moves each output in X direction.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset X sets the offset of the first output in X direction

Delta X sets the distance between the single outputs in X direction

Count sets the number of repetitions

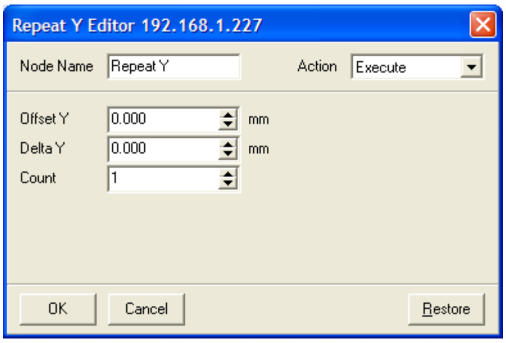
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.38. Repeat Y

This node repeats the output of all its child nodes and moves each output in Y direction.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Offset Y sets the offset of the first output in Y direction

Delta Y sets the distance between the single outputs in Y direction

Count sets the number of repetitions

OK see section 5.1 Shared GUI Elements

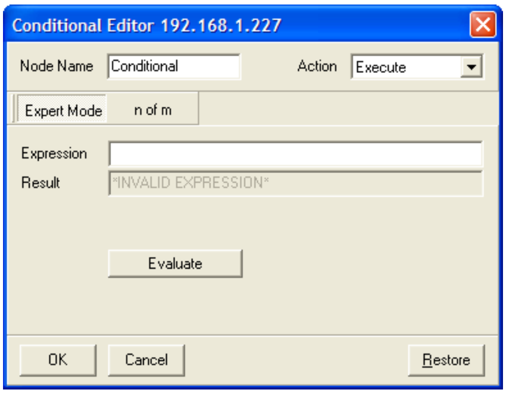
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.39. Conditional

This node evaluates a condition. If the condition is true then the node's subtree will be executed. If the condition is false then the node's subtree will be skipped.

5.39.1. Edit - Expert Mode



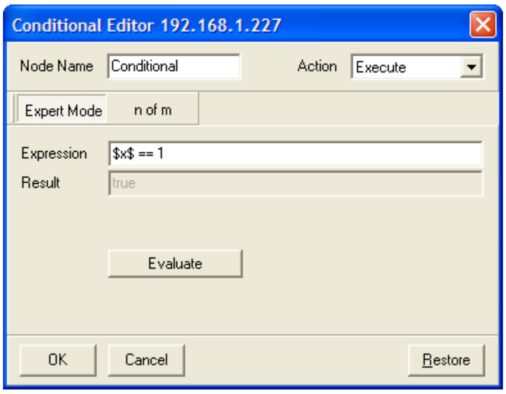
Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Expression sets the expression containing the condition in the scripting language, see section 5.44.2 Scripting Language

Result shows the result. The condition may be *true* or *false*

Evaluate evaluates whether the condition is *true* or *false* and shows the result in *Result*. For the example below a variable x was defined and set to a value. The node checks whether the condition `$x$==1` (i.e. x equals 1) is true or false. As the condition is true, its subnodes will be executed

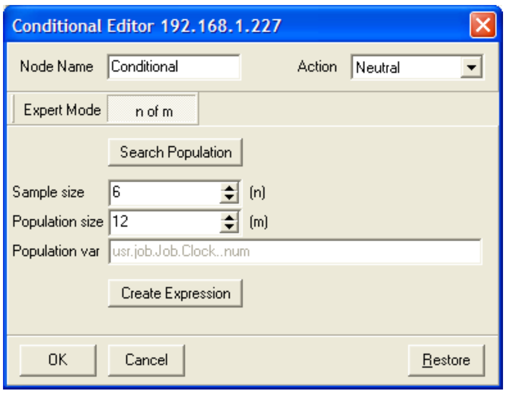


OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.39.2. Edit - n of m



Search Population gets the population size of the parent node and fills it into *Population size*.

Possible parent nodes and their population variables for *Population size* are:

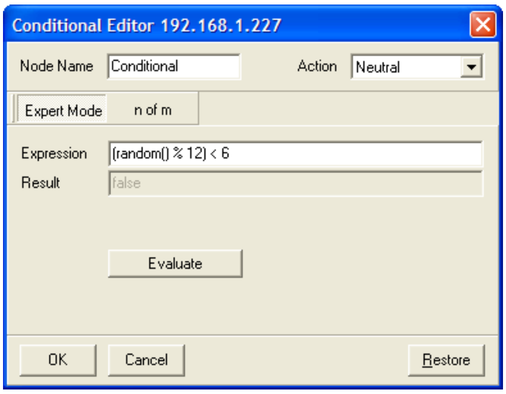
Node	population variable
Repeat	..num
Repeat X	..num
Repeat Y	..num
Clock	..num
ExtRep	..num
Mat2Off	..nx * ..ny
ExtMat2Off	..nx * ..ny
PosList	..positions (number of ~)

Sample size can be set after pressing *Search Population*. This is the maximum number of samples taken randomly from the population or elements of the parent node

Population size can be set after pressing *Search Population* and defines the last element taken for n of m from the parent node

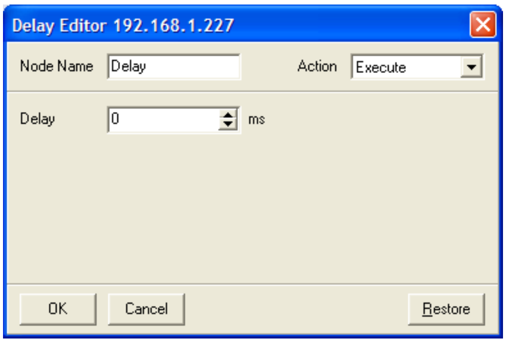
Population var shows the population variable used from the parent node

Create Expression creates an expression from the data entered in tab *n of m* and inserts it into *Expression* on tab *Expert Mode*. The example below was created from the data given in the screenshot above



5.40. Delay

By this node a defined delay can be inserted in a job.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Delay sets the delay in ms

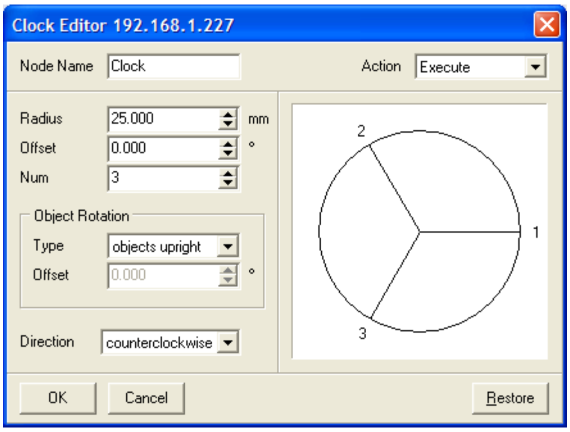
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.41. Clock

Using this node you can arrange output around a circle. The node divides a circle into positions and alignments. Then it outputs a subtree at these positions. If the node has several subtrees then these subtrees will be output after their sequence and distributed to the positions until all positions are taken.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Radius sets the radius of the circle on which the objects are positioned

Offset sets the start angle for the first position. A positive angle rotates counterclockwise. A negative angle rotates clockwise

Num sets the number of positions distributed on the circle

Object Rotation

Type selects whether the objects shall be rotated

objects upright all objects stay upright

objects rotated the objects are rotated around the circle

Offset The offset can only be set, if *objects rotated* is selected. The offset sets the angle applied to the objects additional to rotation. A positive angle rotates counterclockwise. A negative angle rotates clockwise

Direction selects the direction the objects are distributed with

counterclockwise distributes the objects counterclockwise

clockwise distributes the objects clockwise

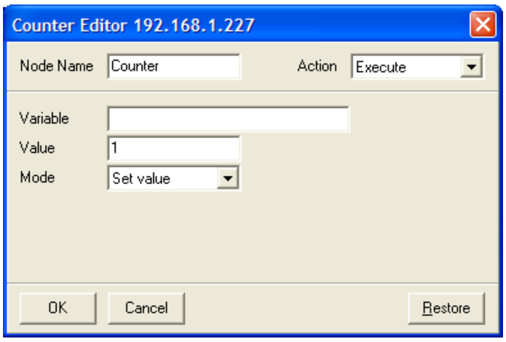
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.42. Counter

By this node you can set and modify numerical and alpha numerical variables, see section 10.6 Rolling Barcode Numbers.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Variable sets the variable name, which shall be modified (without $ signs)

Value sets the value, which shall be assigned to the variable. The specific action can be set under *Mode*

Mode selects the mode, how *Value* is will be assigned to *Variable*. A the string or value has to be set under *Value*

Set String assigns a string to an alpha numerical variable (e.g. of type STRING or TEXT)

Set Value assigns a value to a numerical variable (e.g. INT32, REAL64 etc.)

Add Value adds a value to a numerical **OR** even to an alpha numerical variable (e.g. a STRING variable "000-000-999" will be updated to "000-001-000" after *Add Value* with *Value* 1 was executed - any alphabethic characters may be inserted before, between or after the numerical values)

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

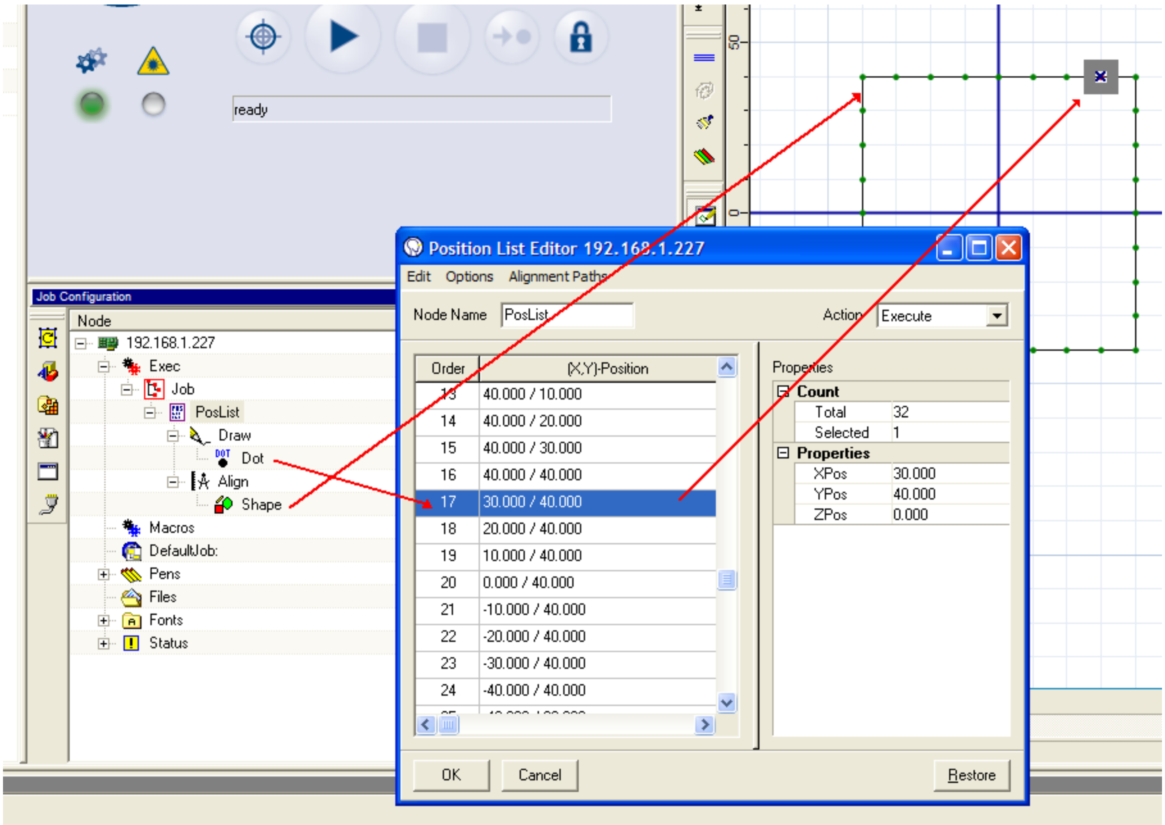
Particularities Right-clicking on a variable field in a Node editor, selecting *Name to Clipboard* and using using ctrl-V on the *Variable* filed can be used to fill a variable name into this field. You may also use the Xplorer to create variables under `usr.var` to use them here, see section 8.5 Xplorer.

5.43. PosList

The PosList node outputs graphical objects at specified positions. These positions are managed in a list. The node contains exactly 2 child nodes, the Draw and the Align node.

When the PosList node is executed, the content of the Draw branch is output at all listed positions. To produce an output the Draw node has to contain graphical child nodes.

By means of the Align node new positions can be generated along a path or already existing positions can be aligned to a path. Usage of the Align function and of the Align node respectively is optional. The following figure shows an example.



PosList Menu

Edit

Cut cuts the selected position

Copy copies the selected position

Paste pastes the position

Delete deletes the selected position

Select All selects all positions

Deselect All deselects all positions

Options

View if menu item Z-Pos, A-Val, PathId, Repeats or Ramping is selected these values are shown in the properties window

Conversion Options opens the Poslist's Line To Dot Conversion Options window, see section 5.43.2 Conversion Options

Old-Style Node Editor opens the "Old Style" PosList node, see section 5.43.5 PosList "Old Style"

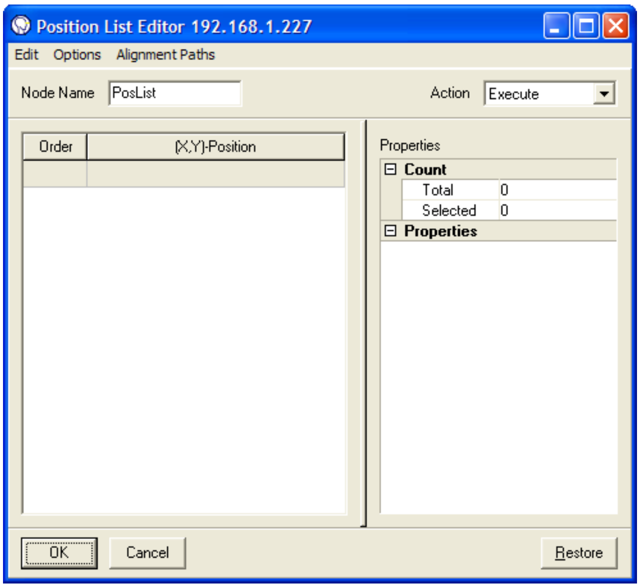
Alignment Paths

Get gets the alignment path lines

Convert to Positions creates new positions along the alignment pathn under *Align* as defined in *Conversion Options*

Remove removes the alignment path

5.43.1. Edit - PosList



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Order,(X,Y)-Position position list. This list shows the order and coordinates of all positions. In the *Properties* list the values of selected positions can be edited.

Count shows the number of positions and how many are selected

Properties all properties of **selected** positions can be edited here

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

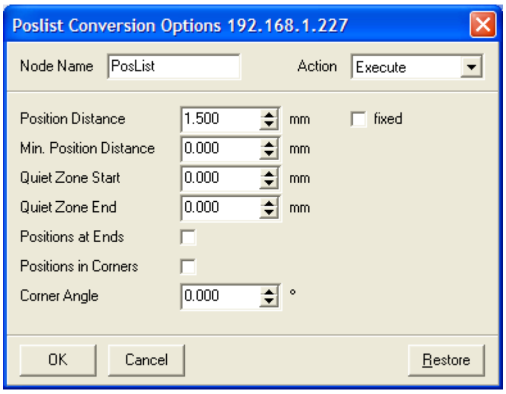
NOTE

The PosList node is able to hold up to 10000 positions.

5.43.2. Conversion Options

In this window set the parameters for the "Line To Dot Conversion" algorithm. The algorithm converts line data from the Align node in an order of positions. Its function will be explained in the following of the window description.

To open the PosList *Conversion Options* window, in the menu, click *Options* → *Conversion Options*.



Position Distance sets the distance between positions to be created along the alignment path

fixed if the check box is selected then the distance between the positions is fixed and must not be varied by the algorithm

Min. Point Distance sets the minimal distance between the positions

Quiet Zone Start sets the length of the quiet zone at the start of the alignment path. The quiet zone will not be converted into positions by the algorithm

Quiet Zone End sets the length of the quiet zone at the end of the alignment path. The quiet zone will not be converted into positions by the algorithm

Points at Ends if this check box is selected then positions will be forced at the start and end of an open alignment path

Points in Corners if this check box is selected then positions will be forced at the corners of an alignment path

Corner Angle if *Points in Corner* is selected then *Corner Angle* sets the minimal angle to create a position

Particularities

The Line to Dot Conversion algorithm converts line data from the Align node into a sequence of positions.

Here is an explanation of its functionality:

Definition of Terms

segment a single line with a start point and an end point

path an order of connected segments, where the end point of one segment lies on the start point of the next segment

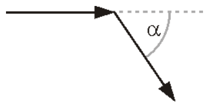
open path a path, where the end point of the last segment differs from the start point of the first segment

closed path a path, where the end point of the last segment lies on the start point of the first segment

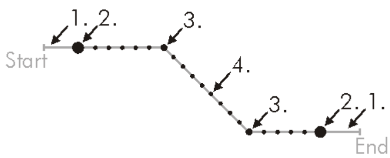
distance on path distance between the start point of the path and the position measured along the path itself

corner a point, where 2 consecutive segments meet

corner angle angle describing the change in direction of 2 segments forming a corner



Example: Open Path



Description of the points:

Point 1 The quiet zones are determined. If the sum of the quiet zones is greater than the path length then the algorithm does not create any positions. In this case the algorithm ends.

Point 2 If the Points at Ends check box is selected then the algorithm creates positions at the inner end of the quiet zones. If the distance between 2 positions along the path is less than the Min. Point Distance then the algorithm creates only the position at the inner end of the start quiet zone.

Point 3 If the Dots in Corners check box is selected then the algorithm creates positions at corners where the angle exceeds the angle defined in Corner Angle. If the distance to the previous point or the end point is less than the Min. Point Distance then the algorithm creates no position at that point.

Point 4 The algorithm creates further positions in between the already existing positions.

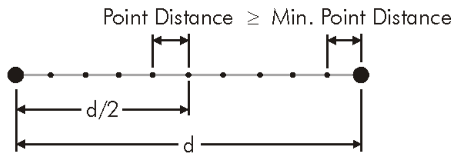
Example: closed path

- At first the algorithm analyzes all corners. The first corner exceeding the Corner Angle is defined as first position and serves as starting point for further proceeding. If no corner exceeds the Corner Angle or if the Points in Corners check box is not selected then the starting point of the analysis itself serves as starting point for further proceeding.
- The algorithm creates positions at the following corners exceeding the Corner Angle and where the distance before and after is less than the Min. Point Distance.
- The algorithm creates further positions in between the already existing positions.

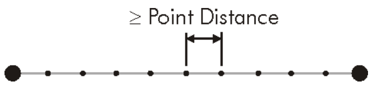
Example: creating further positions

For each path segment created up to now between 2 corners the following procedure is used:

- If the *fixed* check box is selected and if the *Min. Point Distance* is not exceeded then a position is created exactly in the middle between 2 corners. Beginning at this position further positions are created in both directions until their distance is equal to the *Min. Point Distance* (see figure).



- If the *fixed* check box is cleared then the distance between 2 corners is divided by *Point Distance* and the result made an integer (n). n is reduced by 1 as long as the position distance is larger than *Min. Point Distance* at an equal spacing (with *On Path Distance = Point Distance*). That followed the algorithm creates positions equally spaced between the 2 original positions (see figure).



5.43.3. Using PosList

Positions

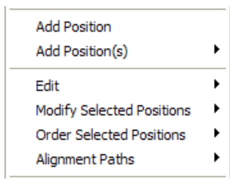
The Position List Editor shows the x- and y-coordinates of the positions and their order for output. If the PosList node is in the current view of the Vector Editor then these positions are also graphically displayed in the Vector Editor.

The positions can be edited either in the Position List Editor or the Vector Editor, that is by editing the coordinates in the list or moving the positions with the mouse or the cursor keys.

NOTE

To enable editing of positions in the Vector Editor, click Handle Elements in the PosList objects context menu (see 7.4.1 Mode).

If you right click an element of a *PosList* or the *Alignment Path* in *Handle Elements* mode, the *Vector Editor* context menu shows these aditional entries:



Here is a description of *Alignment Path*-related and element-related options:

Edit under this menu item selection and modifcation of elements on a specific *Alignment Path* can be set

Cut copy selected postion(s) to the clipboard and remove it/them from the current path

Copy copy selected postion(s) to the clipboard

Paste insert *Cut* or copied (*Copy*) positions at the position where they were originally cut or copied from

Delete delete selected position(s)

Select All select all positions on the path

Deselect All deselect all positions on the path

Select All Ramped if *Ramping* is selected in *Options* → *View* menu of the PosList editor, *Ramping* can be set for each element. If it is set for an element, this element will be selected using this item

Select All Repeated if *Repeats* is selected in *Options* → *View* menu of the PosList editor, *Repeats* can be set for each element. If more than one repeat is set for an element, it will be selected using this item

Select Positions On Path all positions on the current path wil be selected

Deselect Positions On Path all positions on the current path wil be deselected

Modify Selected Positions distribute positions along the *Alignment Path*

Move To Closest Line moves the selected position(s) to the closest line(s) in relation to the coordinates of each position of the *Alignment Path* to their current position (after it was e.g. removed from the path using the *Shift* key)

Move To Closest Corner moves the selected position(s) to the closest corner(s) of the *Alignment Path* to their current position (after it was e.g. removed from the path using the *Shift* key)

Distribute On Whole Line distributes the selected position(s) evenly across the complete *Alignment Path* ignoring all corners

Distribute Between Two Positions On Line distributes the selected positions evenly between the outermost selected positions along the *Alignment Path*

Distribute Between Closest Corners distributes the selected position(s) evenly between the *Alignment Path*'s nearest corners enclosing the selection

Add Closest Corners And Distribute Between distributes the selected position(s) evenly between the *Alignment Path*'s nearest corners enclosing the selection and adds a position at each corner

Order Selected Positions modify the order of the positions in the PosList

Make First make selected position(s) the first in the list

Make Last make selected position(s) the last in the list

In Path Direction order selected positions of a *Alignment Path* by their occurence along the *Alignment Path* in its output direction (an *Alignment Path* has to be visible)

Opposite Path Direction order selected positions of a *Alignment Path* by their occurence along the *Alignment Path* against its output direction (an *Alignment Path* has to be visible)

Alignment Paths modify alignment paths

Get get an *Alignment Path* and display it

Convert To Positions after you *Get* an *Alignment Path* from the *PosList*'s *Align* subnode, you can convert the path to positions according to the *PosList*'s *Conversion Options* (see 5.43.2 Conversion Options) - the current positions will **not** be affected

Remove remove the current *Alignment Path*

Snap Positions To Path if this item is selected, all positions will only be dragable along the current *Alignment Path* if you do not use the *Shift* key to override this option

Conversion Options shows the *PosList*'s *Conversion Options* dialog (see 5.43.2 Conversion Options for more information)

Here are some practical examples to show the posibilities editing single or multiple *Positions* using a *PosList* node. The examples refer to editing using the PosList editor or the *VectorEditor*:

Add click *Add Position* in the *Vector Editor* context menu. A position is added at the current mouse pointer position.

NOTE

Momentarily positions can only be added via *Vector Editor* and not via *Position List Editor*!

. the Using *Add Position(s)* sub menu you can add positions *At Closest Corner*, *At All Corners* or *At Line Ends*.

Select in the Position List Editor select a region of *Positions* using `Shift-click` or several Positions using `Ctrl-click`. In *Vector Editor* select one position by just clicking on it or more positions by using `Shift-click`.

Select All Press the `Ctrl` and 'a' key at the same time or *Edit* → *Select All* in the context menu.

Copy, Cut & Paste Copy (`Ctrl-c`), cut (`Ctrl-x`) and paste (`Ctrl-v`) can be used

Delete

Step 1 Select the position that you want to delete.

Step 2 Press the *Delete* key.
— or —
Click *Delete Position* in the context menu.

Move (in VectorEditor)

NOTE

To snap positions to alignment paths, in the Vector Editor in the context menu, click *Alignment Paths* → *Snap Positions To Paths*. To activate or de-activate *Snap Positions To Path* temporarily, press and hold the `Shift-key` while moving positions.

Step 1 In the graphical editor select the position you want to move. If several positions are selected then their relative distances will be preserved.

Step 2 Drag the Position to the new place.

Move (exact values in PosList editor) In the *PosList* Editor's position list click the position you want to edit. Now you can edit the values of this position under *Properties*. These keys can be used:

Key	Function
Tab / Shift-Tab	toggles between x, y and the values that are selected under *Options* → *View*
Enter	confirms the input
ESC	unmarks the position in the positions list

Alignment Paths

The Align node that is automatically created with the *PosList* node contains all alignment path line data. You only need the following functions, when aligning the positions to the line data in the *Align* node.

NOTE

To display alignment paths in *Vector Editor*, click *Handle Elements* in the PosList objects context menu in *Vector Editor*.

Get Alignment Paths

- In the menu, click *Alignment Paths* → *Get*.

  All previously defined alignment paths will automatically be removed before loading the new paths. If the maximal position area (red rectangle) is too small to show all lines then it will automatically be resized.

Select All Positions On an Alignment Path

Step 1 Select the alignment path containing the positions you want to select.

Step 2 In the context menu, click *Edit* → *Select Positions on Path*.

Add Positions To an Alignment Path

Step 1 Select the positions to be added to the nearest alignment path.

Step 2 In the context menu, click *Modify Selected Positions* → *Move To Closest Line*.

The positions are added to the alignment path so that their coordinates are as close as possible to their original coordinates.

Distribute Positions On an Alignment Path

Step 1 Select the positions to be distributed.

Step 2 In the context menu, click *Modify Selected Positions → On Whole Line* to distribute the positions equally spaced on the whole alignment path, click .

At first positions which are not on the alignment path are added to the alignment path in a way their coordinates are as close as possible to their original coordinates. Then the first position is placed on the path start and the last position on the path end. All other positions are equally spaced on the path. Their order is preserved.

— or —

To distribute the positions equally spaced between two positions, click *Modify Selected Positions → Between two Points on Line*.

The positions are distributed between (two) outer positions. These two positions remain at their place. The order of the positions is preserved.

Order On the Alignment Path

Step 1 Select the positions that shall be newly ordered.

Step 2 In the context menu, select *Order Selected Positions → In Path Direction* or *Opposite Path Direction* to reverse the position execution order.

The position coordinates are preserved. Only the order is changed.

— or —

To make the positions first / last in the order of execution, select *Order Selected Positions → Make First* or *Make Last*.

The position's coordinates are preserved. Only the order is changed.

5.43.4. Position Teach-In

To execute a teach-in for positions, a scan field correction has to exist for the device you want to do the teach in with. This device can be a processing laser, a pointing laser or a video capture device. The scan field correction ensures, that the device's coordinate systems are congruent and that the different optical paths are taken into account. We presume, you already have created scan field corrections for the devices (see the *Manual -- Scan Head*).

As a teach-in can be executed with different devices, InScript has to be told, which device it is, you want to execute the scan field correction with. For this purpose you will learn in this section, how to create an execution context.

To execute a Teach-In, you just select the appropriate execution context then and start the Teach-In.

Create/modify a Pen for Teach-in

A valid scan field correction is required for the device, you want to execute the teach-in with (see the *Manual -- Scan Head*). As an execution context is created via InScript's pen-mechanism, we additionally presume, that you are familiar with, how to manage pens (see section 4.9 Manage Pens).

Step 1 Create a new pen, named e.g. `Teach-In with pointing laser` or `Teach-In with video capture device`.

Step 2 Create a new pen section for the *dist_xy* device in this pen.

Step 3 Double click this *dist_xy* pen section.
The *DIST_XY* window opens.

Step 4 In the context menu of group *Optical Path*, click *Add*.
The options become selectable.

Step 5 Select the device, you want to create the execution context for, e.g. `Pointing laser` or `Video capture device`.

Step 6 Click *OK*.

Step 7 Create further pen sections for devices, you want to switch on via the execution context later on (be sure that no potentially dangerous devices are used for teach-in)
These devices may be e.g.

- Laser, whose device drivers and pen sections respectively allow to switch on and off a pointing laser
- Pointing laser, video capture device, illumination, etc.. Find applicable device drivers in section 3 Devices. Read about how to configure a video capture device in section 8.12 Video Capture Device.

Another possibility would be to modify the pen you use in your Job for the PosList so it only uses e.g. `Pointing laser` or `Video capture device`.

CAUTION

Visible and/or invisible laser radiation

The user is responsible for observing the laser safety regulations valid in his country.

Step 1 Avoid eye or skin exposure to direct or scattered radiation.

Step 2 Be sure that you only use **this** pen for teach-in and that all dangerous emissions of the laser device are switched off in this pen.

Execute Teach-In

A teach-in can be executed either in the Vector Editor window or on the target directly. You can move positions with a pointing device in the Vector Editor. Depending on which optical path you selected, this can be monitored live on the target (pointing laser) or in a video window (video capture device).

Furthermore all elements on the InScript GUI can be accessed. When executing the teach-in at the target, a pointing laser projects the positions on the target. It is not necessary to sit in front of the PC at the screen, but it is possible to move the positions with a mobile pointer device. InScript prevents, that elements in the GUI can be clicked by mistake.

Requirements to execute a teach-in are:

- A teach-in pen has to exist for the device, you want to execute the teach-in with, see section 5.43.4 Create/modify a Pen for Teach-in)

- A PosList node with positions has to exist

Teach-In at the PC

Step 1 Be sure that you use a pen that is set-up for teach-in in your job

Step 2 In the Job Configuration or Vector Editor window, select the PosList node.

Step 3 Switch the Vector Editor to "Handle Elements" mode ( ).

Step 4 In the Vector Editor window in the context menu, click *Teach-In Start*.

The Teach-In Status window opens. It shows the teach-in status and the selected position's absolute coordinates.

> **NOTE**
>
> You could also use *Teach-In Target Start*, if you only want to move one position.

Step 5 Select the position you want to move.

Step 6 To move the position in the XY-plane, move it with the pointing device or the keyboard, as you are used to.

To edit the Z-coordinate, turn the mouse wheel.

— or —

Enter the coordinates in the Teach-In Status window.

Step 7 Edit further positions as described in the previous 2 steps.

Step 8 To quit the teach-in, in the *Vector Editor* window in the context menu, click *Teach-In Stop*.

Teach-In directly at the target

Step 1 Be sure that you use a pen that is set-up for teach-in in your job

Step 2 In the *Job Configuration* or *Vector Editor* window, select the *PosList* node.

Step 3 Switch the *Vector Editor* to *Handle Elements* mode ( ).

Step 4 In the *Vector Editor* window in the context menu, click *Teach-In Target Start*.

The *Teach-In Status* window opens. It shows the teach-in status and the selected position's absolute coordinates.

> **NOTE**
>
> You could also use *Teach-In Target Start*, if you only want to move one position.

On the screen the mouse pointer is fixed and at the target the positions can be moved now.

Step 5 To select a position, press and hold the right mouse button and turn the mouse wheel.

Step 6 To move the position in the XY-plane, press and hold the left mouse button and move the mouse.
To edit the Z-coordinate, turn the mouse wheel.
— or —
Enter the coordinates in the Teach-In Status window.

Step 7 Edit further positions as described in the previous 2 steps.

Step 8 To quit the teach-in, press the Esc-key on the keyboard.

Particularities This mode is *not* connected to the F8 Start teach-in mode in *Job Control*.

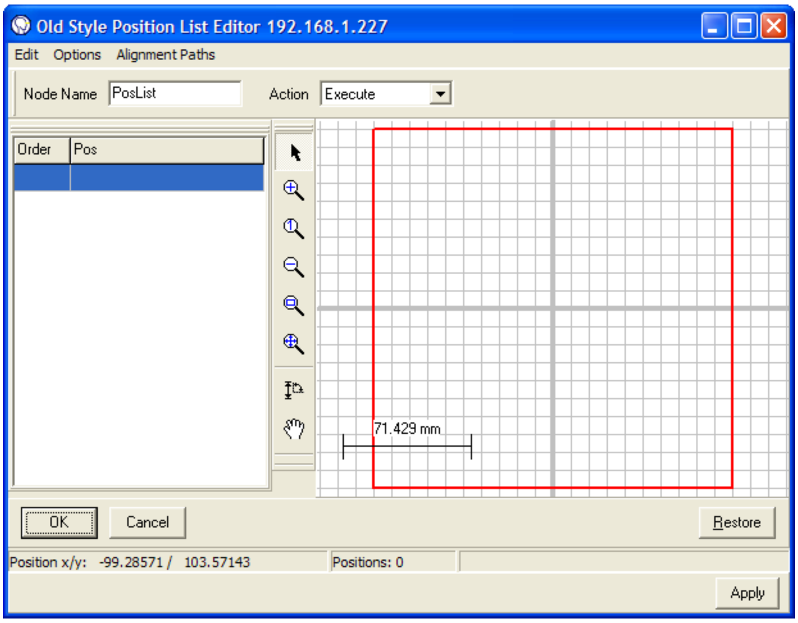
5.43.5. PosList "Old Style"

This is an older version of the PosList Editor. The functions are identical to the PosList node. Please find a description of the functions in section 5.43 PosList.

To Open the Old Style PosList Editor:

Step 1 Open the PosList node.

Step 2 In the menu, click Options → Old-Style Node Editor.
The Old Style Position List Editor window opens.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Menu

Edit

- **Cut** cuts the selected position
- **Copy** copies the selected position
- **Paste** pastes the selected position
- **Delete** deletes the selected position
- **Select All** selects all positions

Options

- **Preferences** opens the Pos List Options window

Alignment Paths

- **Get** gets the alignment path lines
- **Convert** to Points converts the alignment path lines into positions
- **Remove** removes the alignment path

List of positions The position list shows the coordinates. You may type in exact values here or change the order, the positions are output with

NOTE

The PosList node is able to hold 10000 positions at most.

Tool bar

- **pointer** selects positions or moves selected positions
- **zoom in** zooms in the view beneath the mouse pointer by pressing the left mouse button
- **zoom 1:1** zooms the view to the maximal allowed position area
- **zoom out** zooms out the view beneath the mouse pointer by pressing the left mouse button
- **zoom area** zooms in the area dragged open by the mouse pointer
- **zoom to fit** fits the view so all positions can be seen
- **measure** measures distances and angles
- **hand** moves the view within the graphical editor

Graphical Editor in the graphical editor positions can be created, deleted and edited. These positions serve as alignment coordinates. The red rectangle shows the maximal value range. The rectangle size can be set in the menu Options → Preferences in the Pos List Options window in the General tab in group Pos List Range

Status bar the status bar shows the actual mouse pointer position, the number of positions and the number of selected positions

OK see section 5.1 Shared GUI Elements

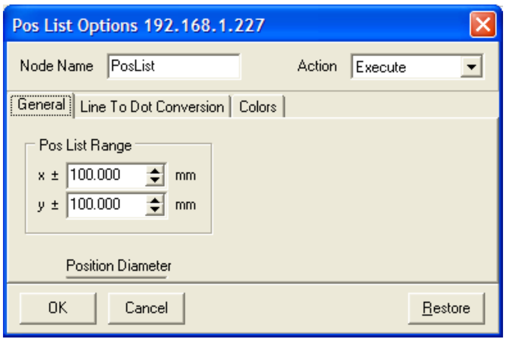
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

Apply applies the position list to the controller board without closing the window

Window Pos List Options To open the Pos List Options window, in the menu, click Options → Preferences.

General



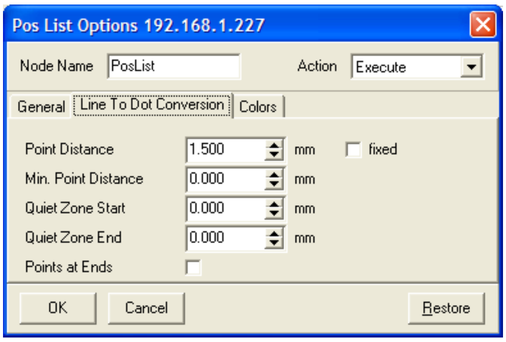
Pos List Range the maximal allowed position area is shown by a red rectangle in the graphical editor.

x ± sets the maximal position range in x-direction

y ± sets the maximal position range in y-direction

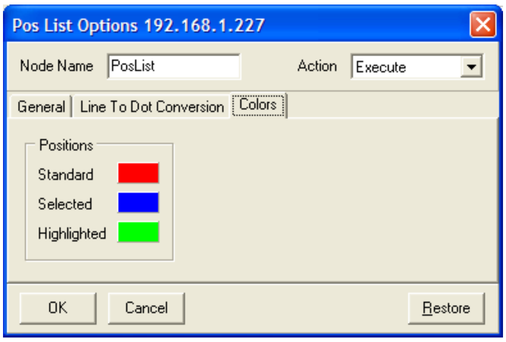
Position Diameter sets the point diameter representing the positions. If this value is 0 (zero) then the point diameter is independent of the zooming factor

Line To Dot Conversion in this tab the parameters for the "Line To Dot Conversion" algorithm are set, see section 5.43 PosList



You will find a description of these parameters in section 5.43.2 Conversion Options

Colors in this tab the assignment of colors to possible position states can be set



Positions

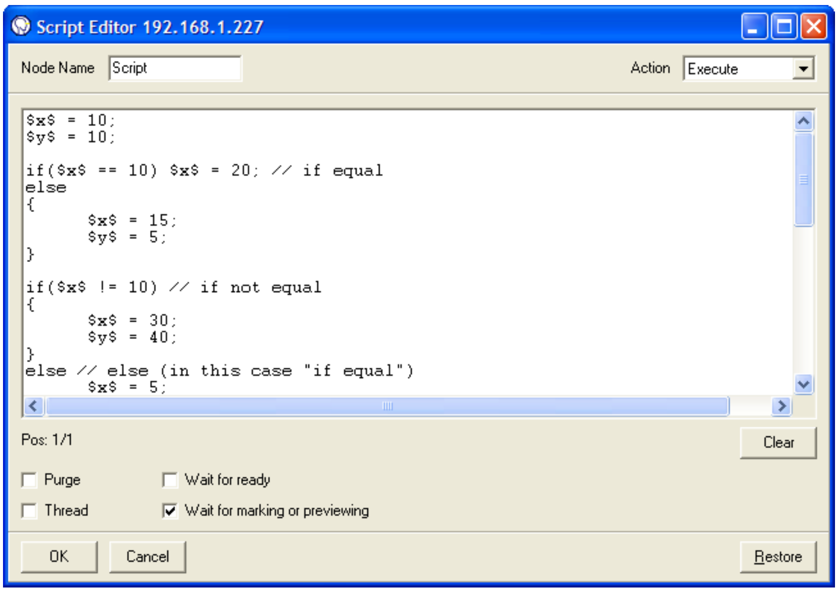
Standard, Selected, Highlighted to select the colors in a dialog, click the colored buttons

5.44. Script

To implement complex programs with specific functions InScript offers an internal scripting language (see section 5.44.2 Scripting Language).

In the Script node such scripts can be input and conditions for their execution can be set.

5.44.1. Edit - Script



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Edit Box type the script (source code) in this box

Clear discards and clears the current script

Purge if the check box is selected then the script will not be executed until all line data is executed above the Script node in the job tree

Thread if the check box is selected then the job tree beneath the Script node will be executed while the script will be executed in parallel

Wait for ready if the check box is selected then the controller waits with executing the script, until the SASP device driver is in state Ready. Example: In windowDevices List there is the device driver of a linear axis in the subtree of device driver SASP. While the linear axis is moving, its device driver and thus the device driver SASP are not in state Ready

Wait for processing or previewing if the check box is selected and in device driver SASP in tab General the parameter Preload is set to always then the controller waits with executing the script, until the SASP device driver changes its state from Preloading to state Processing or Previewing

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.44.2. Scripting Language

The InScript controller scripting language resembles the syntax and semantics of the programming language C. Unlike in C the object types are not determined until runtime. Furthermore the parameter values of functions have no strict type. Like in C Script formatting, like e.g. line breaks or line indents only improve readability and have no effect on execution.

NOTE

The scripting language is case-sensitive.
It is vital that each command is terminated by a semicolon.

Data Objects

Terms can consist of constants, variables, function calls and their combinations. Constants can be strings, numbers or logical values (true, false).

String Constants string constants are character strings which are enclosed in double quotes (e.g. "This is a string"). It is possible to insert certain ASCII control characters by escape sequences with a leading backslash:

Escape-Sequence	ASCII-Code	decimal	Character
\a	ASCII BEL	07	bell
\b	ASCII BS	08	backspace
\f	ASCII FF	12	form feed
\n	ASCII LF	10	line feed
\r	ASCII CR	13	carriage return
\t	ASCII HT	09	horizontal tab
\v	ASCII VT	09	vertical tab
\"	"	34	quotation marks
\?	?	63	question mark
\0	ASCII NUL	00	null
\\	\	92	backslash

Numerical Constants numerical constants can be integer (in a range from `-2147483648` to `+2147483647`) or floating point values (in a range from $\pm 10^{38}$) and are notated e.g. as `3.141593` or `3.8e10` or `1e10`.

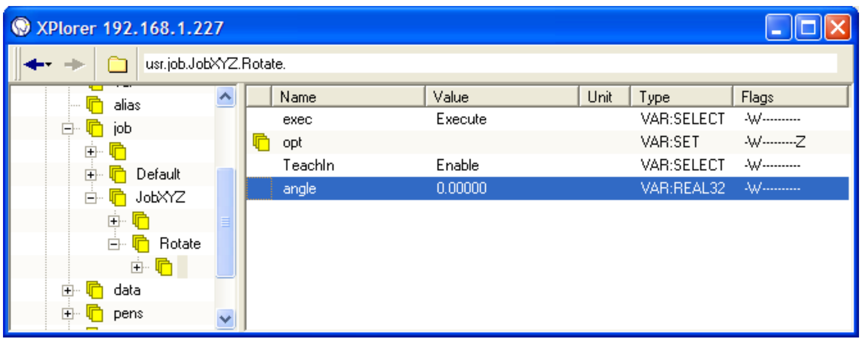
Variables can have the following properties:
name, value, unit (e.g. mm, degree, sec), type, flags

Variables do not have to be declared. They will be automatically created. The type results from the assigned value. But the user can also declare variables, e.g. in `$usr.var.$`, in two ways. On the one hand they can be declared in the *Xplorer* and on the other hand in a Script.

To access a variable the variable name is enclosed in two $ (e.g. `$sys.BoardName$` or `$usr.job.TestJob.Text..text$`).

In InScript variables are arranged in a hierarchical tree structure which is reflected in the variable names and in the job tree structure.

Take e.g. the variable `angle` in `JobXYZ` in node `Rotate`. In the *Xplorer* you will see its tree structure and address:

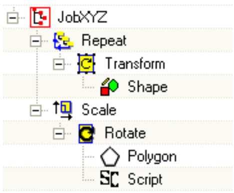


Please note, that variables of a node are combined in a sub folder of this node. As nodes can contain further child nodes, this is more clearly arranged. As this sub folder is nameless, two dots are previous to the variable name in the address.

You can address variables by their *absolute names*. In the above example this is `$usr.job.JobXYZ.Rotate..angle$`.

If you are using variables in scripts then we strongly recommend to address variables by their relative names. Here is an example for **relative names** to show the advantages:

Example



From the script in the above figure you want to address the variables `$usr.job.JobXYZ.Repeat..num$` and `$usr.job.JobXYZ.Scale.Rotate..angle$` by their absolute names. That followed you decide to rename the node JobXYZ in JobABC or to move the branches repeat and Scale in a JobABC. In this case InScript does not find the variables any more, as their absolute names are no longer valid.

If the variables are addressed by their relative names and you execute the above mentioned operations then the names will stay valid.

The respective Script node is the origin for a relative name. The <-character refers to the next higher level in the tree structure. The relative names of these variables from the example are (relative to the Script node):
`$<<<.Repeat..num$`
`$<<.Rotate..angle$`

Please note, that even relative names may become invalid, e.g. when you change the level depth relative to the Script node. In this case just match the number of <-characters in the relative name.

NOTE

If the variable name is given without an explicit path then InScript assumes the variable as user defined and located in the branch `usr.var`.

Types Variables can have different *Types*. Possible types are:

Type	Value	Example
boolean	binary value true or false	true
int	integer 32 Bit	64738
long	integer 64 Bit	2047413647 (not usable for constants)
float	IEEE 754 floating-point number 32 Bit	3.141593
double	IEEE 754 floating-point number 64 Bit	123.12345 (not usable for constants)
string	sequence of Bytes	"This is a string"

NOTE

The types long and double may be used but it is not possible to define constants with this types. That is, constant values (like e.g. 100 or 123.456) always are of type int or float in InScript.

Type conversion (*type casting*) within a term is automatically carried out, but can also be forced. Here is an example:

```
$var$ = (2+3.1) + (string)(3+4) + "xyz";
```

2 and 3.1 are added, the "smaller" type is expanded, i.e. 2 (int) becomes 2.0 (float), then 2.0 and 3.1 are add together, the result is 5.1 (float). 3 (int) and 4 (int) are add together to 7 (int) and then converted into the string "7" (string). Due to analysis order 5.1 (float) is converted to "5.1" (string) and 'add together' with "7" (string), i.e. the strings are joined. The result "5.17" (string) is joined with "xyz" (string). Finally the value "5.17xyz" (string) is assigned to the variable var.

Flags each variable can have a set of flags that control its behaviour. Possible flags are:

Flag	Function	Description
U	user defined variable	The user created the variable
W	writable	The user can change the variable's value
C	controlled by device	only for variables with o-flag. If the c-flag is set then the variable is controlled by the owner variable and adopts its value. If the c-flag is cleared then the variable value can differ from the owner variable's value
O	owned by device	Another variable owns the variable value. If the value of the owner changes then this variable adopts the value. Example: If the processing speed changes in the default pen linepar pen section then the processing speed also changes in the linepar device
T	protected	This variable is changeable but write-protected by the t-flag
M	modified	only for variables with the n-flag. The variable was changes since the last "Save To NVRAM" operation
N	mirrored in NVRAM	the variable value will be written into the NVRam at the next "Save To NVRAM" operation
Q	quick save to NVRAM	only for variables with the n-flag. This means, with every change the variable value will automatically be saved to the NVRam
R	override	momentarily not used
F	force	momentarily not used
P	pen-able	This variable can be used in a pen
c	consumable	The variable is consumed after each job execution and has to be re-set with a new value before it can be accessed again

Operators ....

Unary Operator	Description
!	logical "not"
~	complement binary inverting of all Bits
+	no-op provides symerie with unary "-"
-	minus signed

<table>
<tr><th>Binary Operator</th><th>Description</th></tr>
<tr><td>+</td><td>addition or chaining of strings</td></tr>
<tr><td>-</td><td>subtraction</td></tr>
<tr><td>*</td><td>multiplication</td></tr>
<tr><td>/</td><td>division</td></tr>
<tr><td>%</td><td>modulo (calculates the remainder after division)</td></tr>
<tr><td><<</td><td>binary left shift</td></tr>
<tr><td>>></td><td>binary right shift</td></tr>
<tr><td>|</td><td>binary "or"</td></tr>
<tr><td>&</td><td>binary "and"</td></tr>
<tr><td>^</td><td>binary "exclusive-or"</td></tr>
<tr><td>></td><td>comparison "greater than"</td></tr>
<tr><td>>=</td><td>comparison "greater than or equal"</td></tr>
<tr><td><</td><td>comparison "less than"</td></tr>
<tr><td><=</td><td>comparison "less than or equal"</td></tr>
<tr><td>==</td><td>comparison "equal"</td></tr>
<tr><td>!=</td><td>comparison "not equal"</td></tr>
<tr><td>+=</td><td>addition with assignment
Example: "a+=1;" is identical to "a=a+1;". This applies to the following operators with assignment as well.</td></tr>
<tr><td>-=</td><td>subtraction with assignment</td></tr>
<tr><td>*=</td><td>multiplication with assignment</td></tr>
<tr><td>/=</td><td>division with assignment</td></tr>
<tr><td>%=</td><td>modulo with assignment</td></tr>
<tr><td><<=</td><td>binary left shift with assignment</td></tr>
<tr><td>>>=</td><td>binary right shift with assignment</td></tr>
<tr><td>|=</td><td>binary "or" with assignment</td></tr>
<tr><td>&=</td><td>binary "and" with assignment</td></tr>
<tr><td>^=</td><td>binary "exclusive-or" with assignment</td></tr>
</table>

Functions

NOTE

Not all functions are available in all firmware versions. Older firmware versions may only provide a subset of these functions.

Definition of own functions is not possible with the momentarily available version. But a lot of internal functions are available:

Graphical functions

`commit_pen_stack()` commits the pen stack and forces pen change

`draw_line(x1,y1,x2,y2)` draws a line from <x1>/<y1> to <x2>/<y2> (<xn> and <yn> in millimeters)

`previewing()` returns true, if the controller is in preview mode; otherwise false

`set_clip_rect()` applies the values of "Field Size" and "Field Offset" to the global clipping rectangle. After the function was called it is valid for all job nodes. Then dots and lines can be output only within the specified rectangle

`set_clip_rect (x1,y1,x2,y2)` applies the specified values to the global clipping rectangle. After the function was called it is valid for all job nodes. Then dots and lines can be output only within the specified rectangle

String functions

`strlen(str)` provides the number of characters in the passed string <str>

```
// strlen example
$lenstr$ = "One two two three";
$num$ = strlen($lenstr$); // $num$ == 17
```

`strndup(str,b,n)` provides a part of string <str> with length <n>, where <b> characters will be omitted out at the beginning of <str>

```
// strndup example
$str$ = "One two two three";
$substr$ = strndup($str$,4,7);  // $substr$ == "two two"
```

`chr(chr)` provides a string containing ASCII character chr

```
// chr example
$str$ = chr(65);  // $str$ == "A"
```

`asc(str)` returns the ASCII code of the first character of string <str>

```
// asc example
$num$ = asc("A"); // $num$ == 65
```

`strpos(str1,str2)` returns the first occurence (0 based) of <str2> in <str1> or -1 if <str2> is not found

```
// strpos example
$posstr$ = "One two two three";
$num$ = strpos($posstr$, "two");  // $num$ == 4
```

`strrpos(str1,str2)` returns the first occurence (0 based) of <str2> in <str1> searched from the back or -1 if <str2> is not found

```
// strrpos example
$posstr$ = "One two two three";
$num$ = strrpos($posstr$, "two"); // $num$ == 8
```

strtok(str,strdelim,n) returns information about a substring in <str> between characters in <strdelim> (<n>=0: return number of tokens <n>=1:return first substring <n>=-1:return last substring)

strtok(str,strdelim) returns number of substrings in <str> between characters in <strdelim>

```
// strtok example
$tokstr$ = "token1.token2,token3";
$str$ = strtok($tokstr$, ".,", 1);  // $str$ == "token1"
$num$ = strtok($tokstr$, ".,", 0);  // $num$ == 3
$str$ = strtok($tokstr$, ".,", -1); // $str$ == "token3"
$num$ = strtok($tokstr$, ".,"); // $num$ == 3
```

Processing functions

mark_start() starts execution of a selected job

mark_stop() sets the "stop" flag to stop at a specific point (i.e. at a Stop node in the job)

mark_abort() aborts a running job

wait4marking() waits until the system is in state "processing"

wait4ready() waits until the "System Activity State" device (SASP) is in state "ready" (e.g. when values were changed in the default pen and the changes are executed)

purge() causes the scan head to completely output buffered vector data; after this, the function returns

idle() distributes computing time to other processes (e.g. in waiting loops)

msleep(t) delays further execution for the given time <t> (in milliseconds), the computing time is distributed to other processes

info_dlg(value) outputs a simple information window showing the <value> in brackets

```
// info_dlg example
$i$ = 10;
$str_hw$ = "Hello World";

// dialog with "Hello World!"
info_dlg("\"" + $str_hw$ + "!\"");

 // dialog with i=10
info_dlg("i=" + $i$);

// in this example the dialog with i=10 will show ABOVE the
// dialog with "Hello World!" because it executed after it
```

subtrees() returns the number of sub nodes of the Script node

exec_subtree(n) executes the <n>th sub node of the Script node, counting starts at 0

exec_subtree(name) executes the subtree <name> (e.g. `exec_subtree(Transform);` if you have a subtree `usr.job.Script.Transform`) **below** the script node

disable_abort() after calling this function, abort (viz. `ms_break`) is disabled

enable_abort() after calling this function, abort (viz. `ms_break`) is (re-)enabled

HostExec(prg,arg) calls executable <prg> with argument <arg> on host

ms_break() returns true if job is aborted or false otherwise (useful in connection with `disable_abort()`,`enable_abort()`)

clock() returns a value in seconds

```
// clock example
$time1$ = clock();
msleep(2000);          // sleep 2 seconds
$time2$ = clock();

$timeelapsed$ = $time2$ - $time1$;  // calculates elapsed time
                                    // between time1 and time2
                                    // this should be _around_
                                    // 2.000000 seconds
```

Math functions

random() returns a pseudo-random 64-Bit integer value

sin(f) returns the sine of <f>

cos(f) returns the cosine of <f>

sqrt(f) returns the square root of <f>

fabs(f) returns the absolute value of <f>

baseconv(v,b,d) returns a string of value <v> to the numeral base of <b> with <d> digits (e.g. baseconv(255,16,8) results in 000000FF, which is the value 255 to the base 16 (hexadecimal) with 8 digits)

acos(f) returns the arccosine of <f>

asin(f) returns the arcsine of <f>

atan(f) returns the arctangent of <f>

atan2(f1, f2) returns the arctangent of <f1>/<f2>

exp(f) returns the exponential function e raised to the power <f> (e is Euler's constant)

log(f) returns the natural logarithm of <f> (<f> has to be greater than 0)

log10(f) returns the base-10 logarithm of <f> (<f> has to be greater than 0)

pow(f1,f2) returns the number <f1> raised to the power <f2>

`tan(f)` returns the tangent of <f>

Data management

`remove_files()` removes all data objects in the "Files" set

`create_node(name, type, flags)` creates a new node with properties <name>, <type> and <flags>

```
// create_node example
create_node("usr.var.x", "VAR:INT32", "NQ");
```

`delete_node(name)` tries to delete a node (variable, job, etc.) with the given <name>

`set_node_flags(name, flags)` sets the <flags> of a node with the given <name>

`set_minval(name, minval)` sets the minimal value for the variable <name> to <minval>

`set_maxval(name, maxval)` sets the maximal value for the varaible <name> to <maxval>

`node_exists(name)` returns true, if the node <name> exists, else false

`get(name)` gets the value of a node with the given <name> ($usr.var.x$=get("usr.var.y") does the same as $usr.var.x$=$usr.var.y$, but the <name> argument to get() can be constructed at run-time)

`set(name, value)` sets the value <value> of a node with the given <name> (set("usr.var.a",123) does the same as $usr.var.a$=123, but the <name> argument to set() can be constructed at run-time)

`DebugLog(str)` enter <str> to the Debug Log

`get_unit(name)` returns unit of variable <name>

`line_flush()` flushes the DSP line draw buffer (like purge in script node e.g. change external parameter (focus, axis etc.), draw line, flush, change external parameter (focus, axis etc.), draw line, flush etc.)

`select_job(name)` select job <name> (e.g. select_job("usr.job.MyJob");) could be used for variable dbg.script_cmd as a "run once" (not usable in a conventional script because then system is processing)

`test_node_flags(name,flags)` check if flags are set in <flags> of node <name>

```
// test_node_flags example
if(test_node_flags("usr.var.TEST","U") == true)
{
  info_dlg("Flag U set!");
}
```

Input and output functions

`serial_setup(port, bps, bits, parity, stop)` Initializes interface <port> ("COM A" or "COM B") with the settings <bps> bits per second, <bits> data bits (7,8,9), <parity> (0=none 1=odd 2=even), <stop> stop bits (1,2)

```
// serial_setup example
serial_setup("COM A", 9600, 8, 0, 1); // COM A, 9600 bps, 8 data
    bits, no parity, 1 stop bit
```

`send(port, string)` sends <string> via interface <port> ("COM A" or "COM B")

`send_hex(port, string)` sends <string> via interface <port> ("COM A" or "COM B"), where <string> represents the bytes to be transmitted in hexadecimal notation

```
// send_hex Example
serial_setup("COM A", 9600, 8, 0, 1); // COM A, 9600 bps, 8 data
    bits, no parity, 1 stop bit
send_hex("COM A", "48616c6c6f0d0a"); // sends the charachters "
   Hallo<CR><LF>" via interface COM A
```

`receive_byte(port)` receives a character from interface <port> and returns its value as INT32. If no character is available then -1 is returned

```
$byte$ = receive_byte("COM A");  // wait forever for a byte
```

`receive(port, maxchars, delim, timeout)` receives data from interface <port> and returns received data as a string. Maximum <maxchars> characters will be receiced. If a character is received contained in string <delim> then receiving will also be stopped (this last character will not be returned). At the latest after <timeout> (in seconds) the function returns its result

```
// wait 10 minutes (600 seconds) for 10 Bytes
$tenchars$ = receive("COM A", 10, "", 600);
if(strlen($tenchars$) < 10) info_dlg("Reply too short - timeout
   occured!");

// wait 10 minutes (600 seconds) for a maximum of 1024 Bytes
// until \n (newline) is sent
$string$ = receive("COM A", 1024, "\n", 600);
```

`TCP_Open(ip,port)` open TCP connection <ip> on <port>, returns handle to TCP connection

`TCP_Close(handle)` close TCP connection <handle> (returned by TCP_Open)

`TCP_Receive(handle,maxch,delim,timeout)` receives data from TCP handle and returns received data as a string. Maximum <maxchars> characters will be receivced. If a character is received contained in string <delim> then receiving will also be stopped (this last character will not be returned). At the latest after <timeout> (in seconds) the function returns its result

```
// TCP_Receive Example
$handle$ = TCP_Open ("192.168.1.42" , 80);

TCP_Send($handle$ , "GET index.html\r\n");
$html$ = TCP_Receive($handle$ ,10 ,"" ,5); // wait 5 seconds for
    10 Bytes

```

```
// see if 10 characters were received or if we had a timeout
if(strlen($html$) != 10) info_dlg("A timeout occured - received
    less than 10 chars!");
else info_dlg($html$);

TCP_Close($handle$);
```

TCP_Send(handle,data) send data <string> to TCP <handle> (returned by TCP_Open)

```
// TCP Example
$handle$ = TCP_Open("192.168.1.227", 80);
TCP_Send($handle$, "12345");
TCP_Close($handle$);
```

Control Flow

A control flow statement is a statement whose execution results in a decision being made as to which of two or more control flows should be followed. See 5.44.2 Scripting Examples for some examples.

Simple statements are e.g. assignment of values or function calls. Each instruction of a statements is ended by a semicolon ";". Several instructions can be combined to a single statements by enclosing them into curly braces, e.g.:

```
$second$ = $second$ + 1;
if($second$ >= 60)
{
  $second$ = 0;
  $minute$ = $minute$ + 1;
}
```

statement a statement can be one or more scripting command. If there are more scripting commands, they may be grouped using curly braces { and } or have to be grouped if they are executed e.g. under an *if* statement:

```
command1

{
  command2
  command3
  command4
}
```

goto and labels a *goto* is a direct jump to a *label*:

```
  goto label1;
  /* whatever you like here - this code is skipped */
label1;   // goto jumps here
```

if is a conditional statement. The *if* statement has two forms:

```
if(expression) statement   // if the expression after the if
                           // is true statement is executed if
                           // it is false statement is skipped

if(expression) statement1 // if the expression after the if
else statement2           // is true statement1 is executed
                          // if the expression after the if
                          // is false statement2 is executed
```

The structure can be as complicated as e.g. this:

```
if(expression){
    if(expression){
        statement(s)
    }
}else{
    statement(s)
}
```

while a *while* loop is a control flow statement that allows code to be executed repeatedly based on a given boolean expression:

```
while(expression)
    statement   // statement is executed while expression
                // is true expression normally is influenced
                // in statement but expression can also be a
                // function that returns true or false
```

do .. while occasionally it is profitable to guarantee at least one execution of the statement following *while*, so an alternative form exists:

```
do
    statement        // statement is executed while expression
                     //  is true (but at least once)
while(expression);   // be aware of the semi-colon after the
                     // while
```

for a *for* loop is a control flow statement which allows code to be repeatedly executed. A *for* loop is classified as an iteration statement because it normally uses an internal loop counter.

```
for (initialize; check; update) statement
                 // initialize: e.g. $i$=0
                 // check:      e.g. $i$ < 10
                 // update:     e.g. $i$ += 2
```

break a *break* statement can be used to leave any loop before its expression is fulfilled or count has expired:

```
while(expression)
{
  statement
  break;    // leave while loop even
```

```
                // if expression is not false
}

for(initialize; check; update)
{
  statement
  break;    // leave while loop even
            // if check is not false
}
```

return a *return* statement exits a script

```
info_dlg("This is shown!");
return;
info_dlg("This is NOT shown!");
$x$ += 1; // not done
```

Scripting Examples

Please reference to these examples for a easier understanding of the scripting language.

Example: A variable `usr.var.x` of type INT32 is created and initialized with value 5. If the variable already exists then only the value is assigned.

```
$x$ = 5;
```

Example: The output `o1 (dev.pio.o1)` is set to true, then the input `i1 (dev.pio.i1)` is waited for before output `o1` is set to false.

```
$dev.pio.o1$ = true;
while (!$dev.pio.i1$)
  idle();
$dev.pio.o1$ = false;
```

Example: The output `o1 (dev.pio.o1)` is set to 1 for 1 second.

```
$dev.pio.o1$ = 1;
msleep(1000);
$dev.pio.o1$ = 0;
```

Example: In the `usr.var.x` node the flag N is **set (+)** and the flag Q is **cleared (-)**.

```
set_node_flags("usr.var.x", "+N-Q");
```

Example: How to create a random value between 4 and 10.

```
$n$ = 4;                    // low value
$m$ = 10;                   // high value

$num$ = $m$ - $n$ + 1;      // get number of items
$rnd$ = random();           // randomize a number
if($rnd$ < 0) $rnd$ *= -1; // remove negative values

// calculate numbers between $n$ and $m$
$rndnum$ = $rnd$ % $num$ + $n$;

info_dlg($rndnum$);
```

Example: To comment your scripts you have two possiblities:

```
/*
  Several lines of
  comment
*/

// one-line comment
```

Example: Each command line is terminated by a semicolon.

```
  $strHelloWorld$ = "Hello World";
  info_dlg($strHelloWorld$);

// info_dlg is also handy for debugging output!
```

Example: Possible scripting control flow:

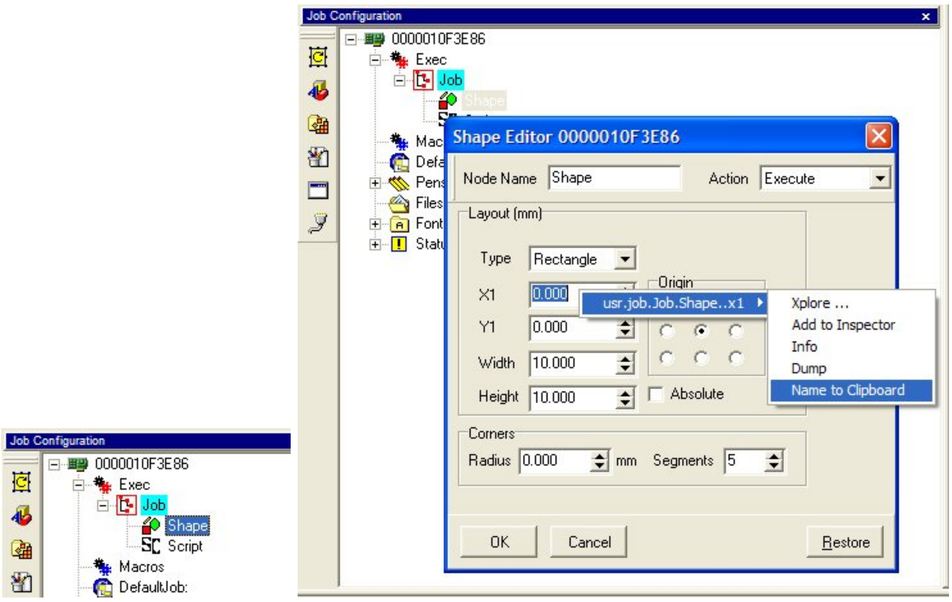
```
$x$ = 10;
$y$ = 10;

if($x$ == 10) $x$ = 20; // if equal
else
{
  $x$ = 15;
  $y$ = 5;
}

if($x$ != 10) // if not equal
{
  $x$ = 30;
  $y$ = 40;
}
else // else (in this case "if equal")
  $x$ = 5;
```

```

while($x$ <= 40) // while x is less than 40
{
  $x$ += 5; // this is the same as %x% = %x% + 5;
}

do
{
  $x$ = $x$ + 5;
}
while($x$ <= 50); // while x is less than 50

$x$ = 0;
while($x$ < 10)
{
  $x$ += 1;
  if($x$ == 5) break; // leave while($x$ < 10) loop after its closing "}"
}
info_dlg($x$); // $x$ is 5!

for($x$=0;$x$<10;$x$+=1) // for i from 0 to 9
{
  $usr.job.Job.Script.Transform..sx$ = $x$;
  exec_subtree("Transform");  // execute node "Transform" below the script node
}
```

Example: Variables are automatically created if you use them, they have to be enclosed by 2 $-characters e.g.:

```
// creates the InScript variable usr.var.myVar
$myVar$ = 10;

// existing variables can also be used e.g.:
if($dev.sas.stat.marking$ == true) goto next;

next:
```

Example: Node variables. You may also use variables that represent node values e.g.: Copy the variable's name to the clipboard and paste it in your script (be careful, if you move the node or rename a job, the variable name may change, so it is better to use relative variables):



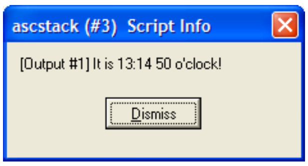

```
$usr.job.Job.Shape..x1$ // absolute variable
$<.Shape..x1$ // relative variable
```

In the second example, you only need one "<" because the Script node is in the same level as the Shape node (be careful, if you move the Script node to a different level it will still invalidate the variable).

Example: String variable arithmethic. For output or edit, variables of different type can be concatenated as strings by using a '+' character.

```
$strVar$ = "It is ";
$x$ = 1;
info_dlg("[Output #" + $x$ + "] " + $strVar$ + $stat.time.TimeStr$ + " o
    'clock!");
```

This will output the current time:

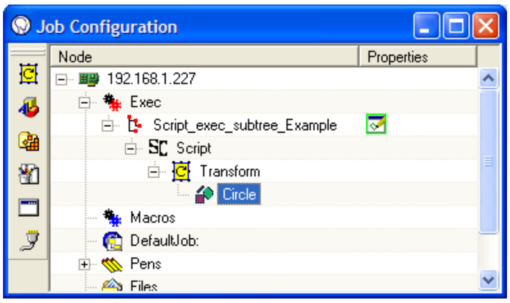


Example: Cast a variable. You can cast variables to different types, which may be handy if you want to format a number (e.g. int) as a string or use a string as a number. To do this you can use the cast operator (<type>). <type> can be e.g. string, int, long, float, double or boolean.

```
// string with 990 as three characters
$strVar$ = "990";

// intVar is the number 990
$intVar$ = (int)$strVar$;
```

```

// add 11
$intVar$ += 11;

// strVar is the string "1001" with four characters
$strVar$ = (string)$intVar$;

// $len$ is 4
$len$ = strlen($strVar$);

info_dlg($strVar$ + " is a " + $len$ + "-digit number!");
```

Example: Execute a subtree below the Script node. To execute node elements from within Script nodes you are able to put a call to an `exec_subtree` function in your script code. Here is the *Job Configuration* view of a job that uses the script snippet below:




```
$usr.job.Script_exec_subtree_Example.Script.Transform..sx$ = 0;
$usr.job.Script_exec_subtree_Example.Script.Transform..sy$ = 0;
$usr.job.Script_exec_subtree_Example.Script.Transform..angle$ = 0;

for($i$=0;$i$<=360;$i$+=10)
{
  $usr.job.Script_exec_subtree_Example.Script.Transform..sx$ = $i$ * 2;
  $usr.job.Script_exec_subtree_Example.Script.Transform..sy$ = $i$ * 2;
  $usr.job.Script_exec_subtree_Example.Script.Transform..angle$ = $i$;

  exec_subtree("Transform");
}
```

Example: Check if a variable (or node because variables are also nodes) exists.

```
if(node_exists("usr.var.DoIExist"))
{
  // Variable DoIExist exists in usr.var
  info_dlg("usr.var.DoIExist exists!");
}
else
{
  // Variable DoIExist does not exist in usr.var
  info_dlg("usr.var.DoIExist does not exist!");
```

```
}
```

Example: Output a text file from a Script. To output text into a file on the host PC you can use the `HostExec` script command in combination with the Windows shell command `echo`.

The example shows a for loop that increments i from 0 to 9. These numbers and i * 2 are output to the file `C:\Output.txt`.

```
HostExec("C:\\Windows\\System32\\cmd.exe", "/C echo Values: > C:\\Output
    .txt");
for($i$ = 0; $i$ < 10; $i$+=1)
{
  $y$=$i$*2;
  HostExec("C:\\Windows\\System32\\cmd.exe", "/C echo i=" + $i$ + "     i
      *2= " + $y$ + " >> C:\\Output.txt");
}
```

Description of the code lines:

- initialize the file `Output.txt` via Windows Shell command echo with first line "Values:"

```
HostExec("C:\\Windows\\System32\\cmd.exe", "/C echo Values: > C:\\
    Output.txt");
```

- repeat code in curly braces 10 times and increment i from 0 to 9

```
for($i$ = 0; $i$ < 10; $i$+=1)
```

- calculate i * 2 for output in second column

```
$y$=$i$*2;
```

- output i 0...9 0...18 to the file `Output.txt`

```
HostExec("C:\\Windows\\System32\\cmd.exe", "/C echo i=" + $i$ + "
       i*2= " + $y$ + " >> C:\\Output.txt");
```

Some Background:

Using `echo` on a `CMD.EXE` command prompt to output text is used like this:
`echo Here is some text`

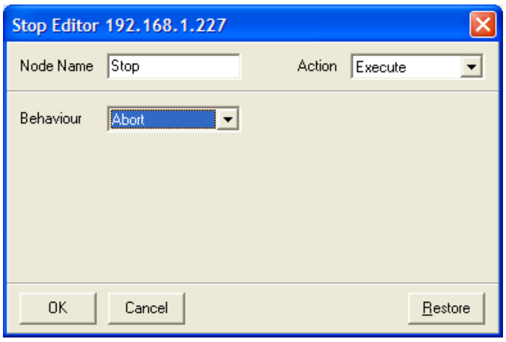
The > pipe command redirects console program text output to a text file and >> appends to a text file. So this appends `Hello` to the text file `TEXT.TXT`:
`echo Hello >> TEXT.TXT`

NOTE

Do not put a number *directly* before the Windows Shell pipe commands > or >> (e.g. `0>>`, which `$i$ + ">>"` would do) this will lead to output to e.g. *stdout* or *sterr*. Just put a space between the number and the pipe (e.g. `0 >>`). Also be sure that e.g. no newline \n or similar characters are in the HostExec line because this would act like having a `CMD.EXE` line with these characters, which could lead to unwanted effects.

5.45. Stop

If you click Job Stop then a job will be aborted or paused at the next Stop node. Thus a job can be aborted or paused at specified points, so that e.g. a just processed part can be finished.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Behavior selects, how the node behaves

> **Abort** The job will be aborted
>
> **Pause** The job will be paused. The job will be continued by clicking Job Stop once again
>
> **Execute** The job will be executed without restrictions

OK see section 5.1 Shared GUI Elements

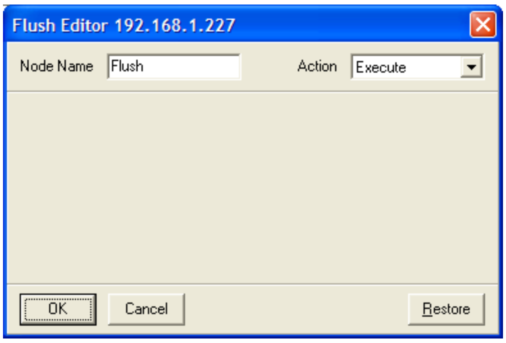
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.46. Flush

The Flush node is closely associated with the Repeat node function. The Repeat node "seamlessly" repeats its child nodes, i.e. without switching off the laser beam in between the repetitions. The Flush node forces the laser beam to switch off between repetitions. For this purpose place the Flush node beneath the node to be repeated. In the example below the Flush node is beneath the Shape node).

Sequence of execution:
Job → Repeat → Laser on → Process Shape → Flush → Laser off → Repeat → Laser on → Process Shape → etc. until the Repeat is exhausted.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

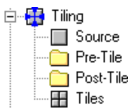
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.47. Tiling

Graphic objects that shall be processed on a bigger surface than the scan field can be divided into tiles by this node. The node has four standard child nodes *Source*, *Pre-Tile*, *Post-Tile* and *Tiles*, see following figure.

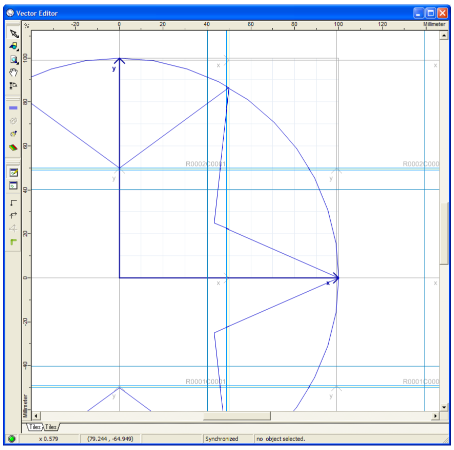


Graphical objects that shall be divided up into tiles have to be child nodes of the *Source* node. The *Tiles* subtree will contain the definition of the single tiles. These tiles are defined by *Tile* nodes, see section 5.48 Tile. These tiles can be automatically generated and filled with the splitted parts by first defining the working area and then clicking on *Create Tiles* and *Split*. To output these tiles side by side on the target area, the target has to be moved after each processing e.g. by external axes. For this purpose further nodes, e.g. *Script* nodes, can be placed into the *Pre-* and *Post-Tile* node, which are executed before and after a single tile is output.

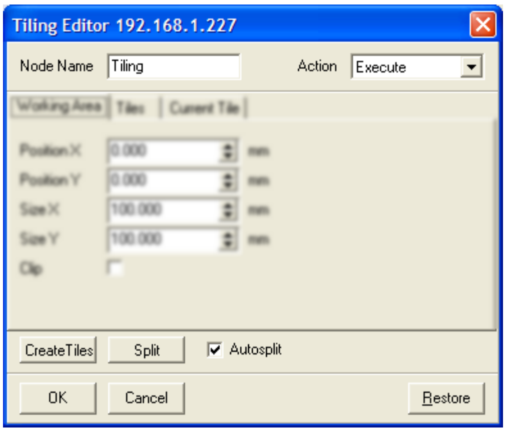
TIP

In the *Tiles* node context-menu, click *Show Vector-Editor View* to get an overview about the graphic objects, the working area and the tiles.

To move points of graphic objects in the *Vector-Editor* window, in the corresponding *Tile* node's context menu, click *Show Vector-Editor View*. In the *Vector-Editor* window, select the graphic object. In its context menu, click *Handle Points*. The points of the selected graphic object can be moved now.



5.47.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Create Tiles automatically creates the tiles needed to output the graphic objects defined in the *Source* subtree. It is possible to create the tiles manually by creating *Tile* nodes, see section 5.48 Tile, as children of the *Tiles* node

Split distributes the content of the *Source* subtree to tiles, which already have to be defined in the *Tiles* subtree. Either create the tiles automatically by clicking *Create Tiles* or create the tiles manually by creating *Tile* nodes as children of the *Tiles* node, see section 5.48 Tile

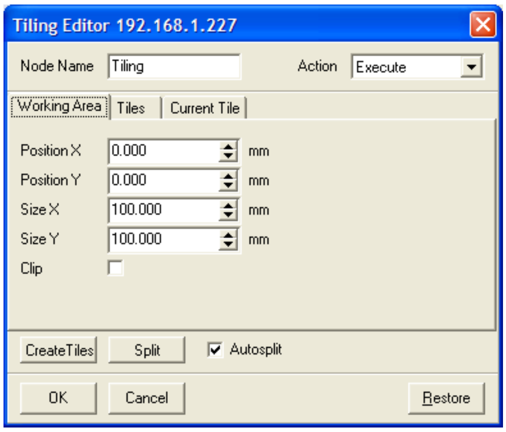
Autosplit If the check box is selected and the node is being executed then the content of the *Source* subtree is automatically split to the tiles. This is necessary if the content of the *Source* subtree is dynamically modified during job execution

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.47.2. Edit - Working Area



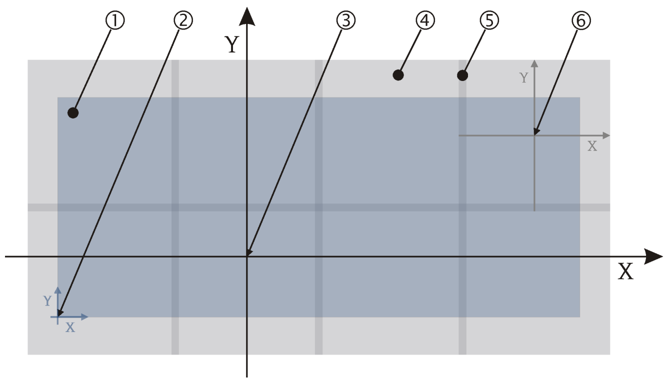


Figure 12: (1) working area; (2) origin of working area; (3) origin of line data; (4) tile; (5) overlap; (6) origin of tile = center of tile

Position X sets the offset between line data origin and working area origin in X-direction

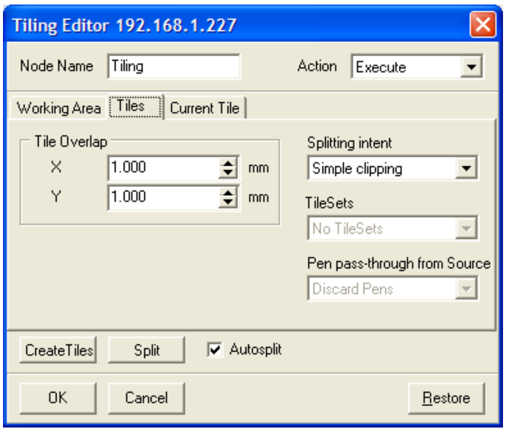
Position Y sets the offset between line data origin and working area origin in Y-direction

Size X sets the working area size in X-direction

Size Y sets the working area size in Y-direction

Clip If the check box is selected then the line data in the *Source* subtree will be clipped at the working area before creating the tiles. The tiles will be created for the remaining line data. The tiles thereby can protrude the working area. The line data will be output within the tiles and thus also outside the working area as the case may be

5.47.3. Edit - Tiles



Tile Overlap

X sets the overlap of the tiles in X-direction

Y sets the overlap of the tiles in Y-direction

Splitting intent

Simple clipping clips the line data at each tile border, i.e. the line data within the overlap will be output by each respective tile

Minimize overlap minimizes the overlap and tries to output a path segment completely in one tile whenever possible, even if it is located partially or completely in the overlap. If the next path segment is partially located in a second neighboring tile (the overlap between these tiles excluded) then it will be completely output by the second tile and additionally the path segment's part within the overlap will be output by the first tile

NOTE

The *Angle* of all tiles has to be zero when using this setting.

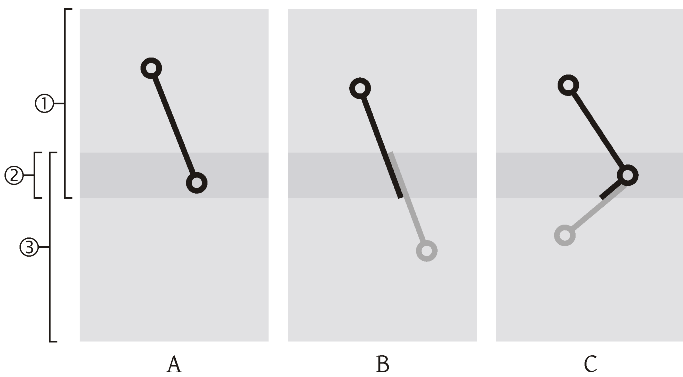


Figure 13: (1), (3) tiles; (2) overlap; (A) path segment located completely in tile 1 and thus output in tile 1; (B) path segment located in tile 1 and tile 2 and thus output in the overlap of both tiles; (C) upper path segment located completely in tile 1 and thus output in tile 1, lower path segment assumed by algorithm to be of type B

TileSets This list is only active, if *Minimize overlap* is selected in *Splitting intent*

No TileSets writes all line data to 1 TileSet

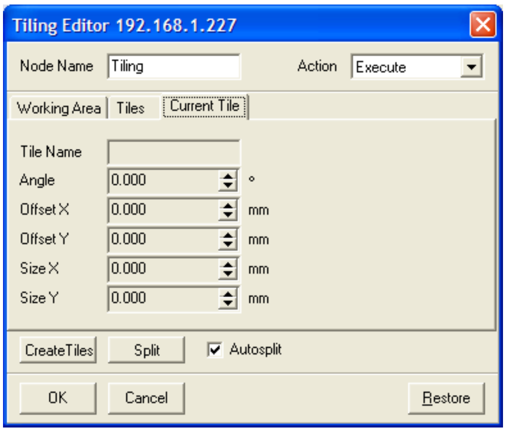
Create TileSets by Pen unites path segments by pen to independent TileSets with own tile count and position. Thus e.g. paths, which are located across several tiles but would fit into 1 tile, can be output in 1 tile by assigning a seperate pen to them

Pen pass-through from Source This list is only active, if *Minimize overlap* is selected in *Splitting intent*

Discard Pens discards the pen information when splitting the line data to the tiles

Pass-through pens passes through the pen information when splitting the line data to the tiles

5.47.4. Edit - Current Tile



Node Name shows the node name of the current tile

Angle shows the rotation angle of the current tile

Offset X shows the offset between line data origin and origin of the current tile in X-direction

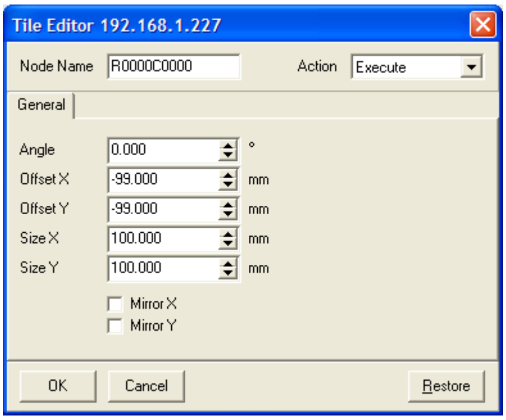
Offset Y shows the offset between line data origin and origin of the current tile in Y-direction

Size X shows the size of the current tile in X-direction

Size Y shows the size of the current tile in Y-direction

5.48. Tile

This node defines a tile and is placed as direct child of the *Tiles* node in the *Tiling* node, see also section 5.47 Tiling. The *Tile* nodes are automatically generated and filled with content, when clicking *Create Tiles* and then *Split* in the *Tiling* node.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Angle sets the angle to rotate the tile

Offset X sets the offset between line data origin and origin of the tile in X-direction

Offset Y sets the offset between line data origin and origin of the tile in Y-direction

Size X sets the size of the tile in X-direction

Size Y sets the size of the tile in Y-direction

Mirror X If the check box is selected then the tile X coordinates will be mirrored

Mirror Y If the check box is selected then the tile Y coordinates will be mirrored

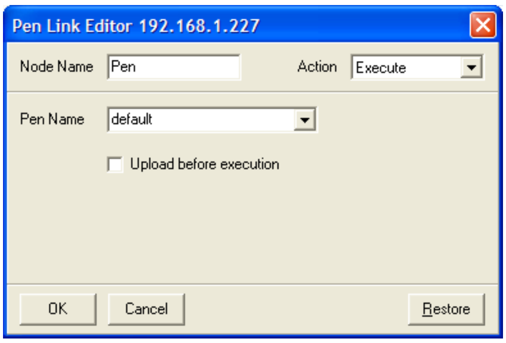
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.49. Pen Link

This node refers to a pen in the *Job Configuration* window in the Pens folder. When a Pen Link node is reached during the execution of a job then the parameters will be set to the values which are defined in the pen at the moment. If several Pen Link nodes are referring to one and the same Pen then the memory required on the controller board does not multiply, because only links to already existing data are used.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Pen Name selects the name of a pen that is stored on the controller board. The pen link is set to this pen

Upload before execution if this check box is selected then the pen will be loaded from the PC to the controller board directly before execution of the Pen Link node. If the pen was already loaded to the controller board then the pen on the controller board will be overwritten. If the pen does not exist on the PC then the pen on the controller board will persist

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

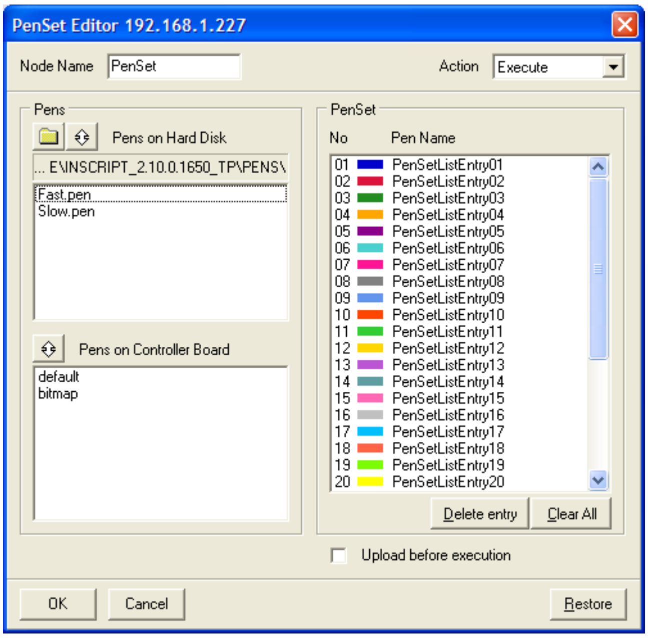
Restore see section 5.1 Shared GUI Elements

5.50. Pen Set

By this node pen numbers can be assigned to pens (sets of parameters). Pen numbers are used e.g. in HPGL-files. In that way you can select pens during a job via the content of e.g. HPGL-files.

By dragging & dropping pens from the *Pens* group they can be assigned to pen numbers in the *Pen Set* group. You can select pens from the Pens folder (on the hard disk e.g. from the `C:\Program Files\InScript\Pens` folder) or pens from the controller board (in the *Job Configuration* window in the *Pens* folder).

If the Job reaches this node on its execution pen numbers from 1 to maximal 32 are assigned to the pens defined in the pen folder on the controller board. When a Pen Set node is reached during the execution of a job then the parameters will be set to the values which are defined in the pens at the moment.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Pens

switches to the folder view. To return to the previous view double click the wanted folder in the folder view

Pens on Hard Disk refreshes the list of pens on the hard disk

Path Box currently selected path for pens on hard disk

Pens on Hard Disk List pens which are available on the hard disc in the current path

Pens on Controller Board refreshes the list of pens on the controller board

Pens on Controller Board List pens which are available on the controller board

PenSet

Pen Set List to assign a pen number to a pen drag & drop a pen either from the list *Pens on Hard Disk* or from the list *Pens on Controller Board* to the wanted pen number (PenSetListEntrynn) in the *PenSet* group. After that the name of the pen is shown. To change the colors of the pen numbers see 8.4.14 Sub Category - Screen Styles / View Styles / Editor Mode *Vector Editor Pen Settings*.

Delete entry deletes the selected mapping between pen and pen number

Clear all clears all mappings between pen and pen number

Upload before execution if this check box is selected then the pen will be loaded from the PC directly before execution of the Pen Link node to the controller board. If the pen was already loaded to the controller board then the pen on the controller board will be overwritten. If the pen does not exist on the PC then the pen on the controller board will persist

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

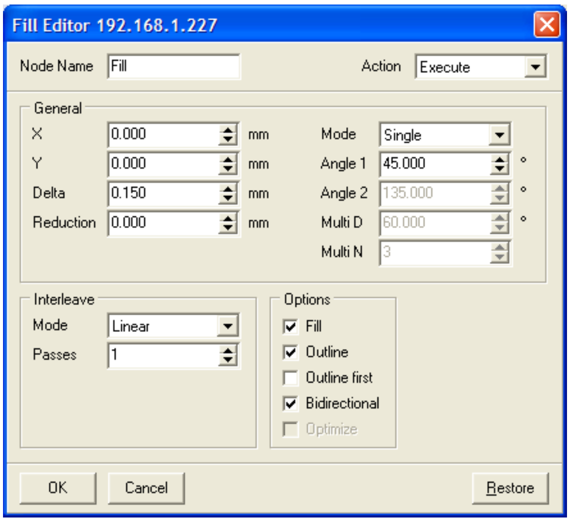
Restore see section 5.1 Shared GUI Elements

5.51. Fill

Using this node graphical objects can be filled with several hatchings. All graphical nodes below a *Fill* node will be modified by this node by adding the fill lines between outlines. Because of this these nodes are treated as a group in Vector Editor and can't be set to element or point mode (see Handle Elements and Handle Points under 7.4.1 Mode or 7.5 Context Menu). In standard color settings these subnodes will be visualized gray if you e.g. point edit inside a RawLines (see 5.22 Raw Lines) node; to see the currently edited point or line in Vector Editor, you may set the *Fill* node's *Action* field to *Neutral* (see 5.1 Shared GUI Elements).

NOTE

If you fill a graphical object with a hatching and scale it after that the hatching will also be scaled (e.g. the *Delta* settings will not be correct). You can avoid this by placing the *Scale* node under the *Fill* node and not vice versa.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

General

X sets the X-coordinate of the first hatch line's reference point. When X = 0 and Y = 0 then the first hatch line passes through the origin of the filled object

Y sets the Y-coordinate of the first hatch line's reference point. When X = 0 and Y = 0 then the first hatch line passes through the origin of the filled object

Delta sets the distance between the hatch lines or fill lines

Reduction sets the scan distance between the contour and the hatching lines

Mode selects the fill mode

Single simple hatching with angle *Angle 1*

Cross cross hatch with angles *Angle 1* and *Angle 2*

Multi multiple hatching with starting angle *Angle 1*. All folllowing hatches will be rotated by angle *Multi D* as many times as specified in *Multi N*

Offset filling pattern, which consists of equidistant contours to the outer contour

Angle 1 sets the angle of hatching 1

Angle 2 sets the angle of hatching 2, if *Cross* (cross hatch) is selected in *Mode*

Multi D see *Mode*, list item *Multi*

Multi N see *Mode*, list item *Multi*

Interleave

Mode selects the interleave mode

Linear every n^{th} hatch line will be output. The value for n is entered in *Passes*

Bit-reverse The hatch lines will be output in a pattern which will maintain a minimal distance during the passes

Passes if *Passes* is greater than one then the hatch lines will be not output immediately one after another. Hatch lines will be skipped and output in a later pass. This may be useful, when the material to be processed is sensitive to heat and needs time to cool down before heating it up again near the first heating

Options

Fill if this check box is selected then the object will be filled

Outline if this check box is selected then an outline will be drawn

Outline first if this check box is selected then the outline will be drawn before the object will be filled. The Outline check box has to be activated to use this option

Bidirectional if this check box is selected then the hatch lines will be output bidirectionally. This increases the velocity but deteriorates the quality. If head-, tail-, on- and off-delays are not set correctly in device Line Parameter (see 3.10 linepar - Line Parameters) output errors will occur

Optimize this check box is grayed out and can not be activated. The optimize algorithm is still experimental and would produce unexpected results

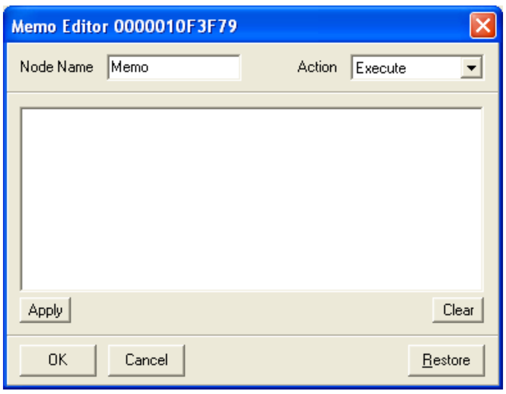
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.52. Memo

Using this node you may add remarks and comments into the tree structure of the job. This node is completely neutral and executes no further function.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

NOTE

The node always acts neutral, no matter what is selected here.

Textbox In the text box type in the text which should be shown when the node is edited

Apply applies the text typed in

Clear clears the text typed in

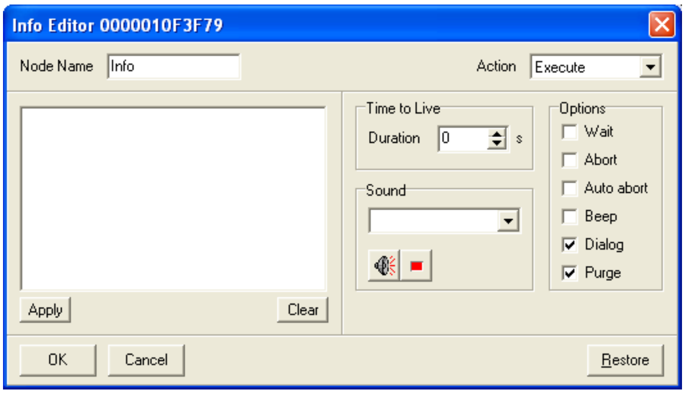
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.53. Info

This node displays notes, warnings, variables and/or plays sounds.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Textbox In the text box type in the text which should be displayed when the node is executed. A variable may also be displayed by using InScript's scripting language syntax, see 5.44.2 Scripting Language

Apply applies the text typed in

Clear clears the text typed in

Time to Live

Duration sets the duration the information is displayed with. If the value is set to 0 then the *Info* window is displayed until you click one of its buttons

Sound From the list select a file in the wav-format to be played back. In the list only wav-files are shown which can be found in the InScript `Sounds` folder, e.g. in `C:\Program Files\InScript\Sounds`

- plays the selected wav-file
- stops the play back of the selected wav-file

Options

Wait If the check box is selected then the job will be halted until the *Continue* button has been clicked or the *Time to Live* has elapsed

Abort If the check box is selected then an *Abort* button is displayed by which the still running job can be aborted.

If the check box *Wait* is additionally selected then the job will be halted and a *Continue* button is displayed by which the job can be continued

Auto abort If the check box is selected then the job is automatically aborted after *Time to Live* elapses. If *Time to Live* is set to 0 then the job will be aborted immediately

Beep If the check box is selected then a beep will be played back

Dialog Only if the check box is selected then an *Info* window will be displayed. This is useful when only a sound should be played back

Purge If the check box is selected then all lines data, which lies before this node, will be executed before the *Info* window is displayed

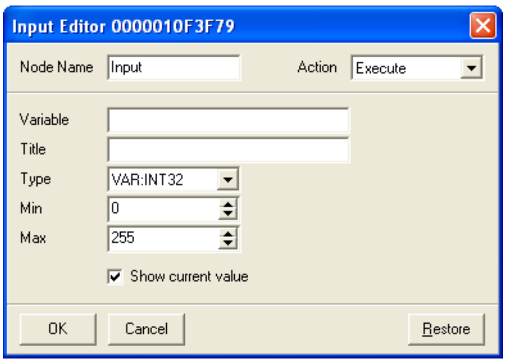
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.54. Input

Use this node to display or to input a variable during job execution. The job will be halted until the *Continue* button has been clicked.



Node Name see section 5.1 Shared GUI Elements

Variable sets the variable name, that you want to display and/or to input

If you want to edit a system parameter, type in the complete path, e.g. `usr.pens.default.linepar.common.speed_m` for the processing speed in the default pen.

If you want to edit an user specific parameter, type in either the complete path, e.g. `usr.var.MyParameter` or just `MyParameter`.

Make sure to use the correct *Type* (see below)

Title sets the text which is shown when the *Input* window is displayed

Column if the *Input* node is a subnode of a *Query* node (see section 5.56 Query) then you can select columns of the *Query* node's Database source that will be handed over to a variable in the *Variable* field

Type selects the variable type. All numerical variables are signed

VAR:INT32 Integer 32 Bits

VAR:INT64 Integer 64 Bits

VAR:REAL32 IEEE 754 floating-point number 32 Bits

VAR:REAL64 IEEE 754 floating-point number 64 Bits

VAR:STRING Sequence of Bytes

Min sets the minimal permitted input value

Max sets the maximal permitted input value

Show current value If the check box is selected then the current value of the variable is shown when the *Input* window is displayed

Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

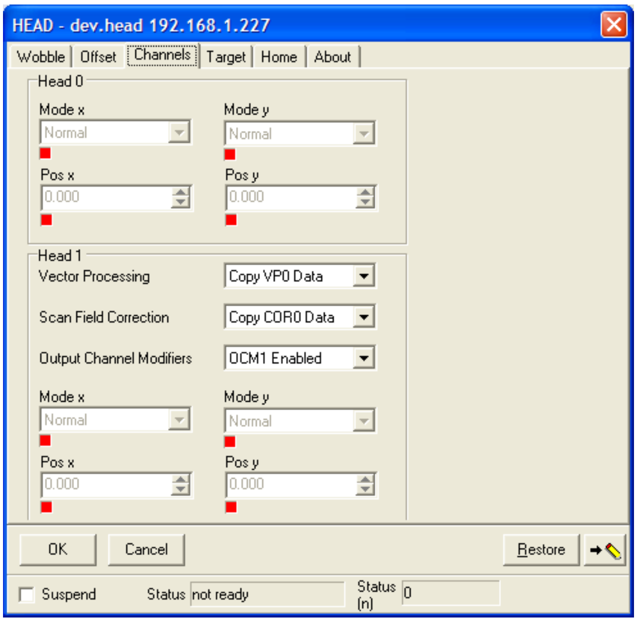
5.55. Dual Scan

The Dual Scan technology was developed by ARGES and applied for a patent. It is applied in wavelength selective processing and is based on a single pulsed laser beam source which simultaneously emits 2 wavelengths. Both wavelengths are separated and directed into 2 independent scan heads.

NOTE

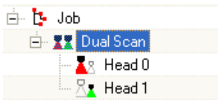
To control both scan heads independently settings have to be changed in the *Head* device driver in the *Channels* tab:

In the *Vector Processing* list, select *VP1 Enabled* and in the *Scan Field Correction* list, select *COR1 Enabled*. Using these settings vector calculations and scan field correction will be performed **seperately** for scan head 1 (Head 1, slave). Or else the slave scan head follows the master scan head output.

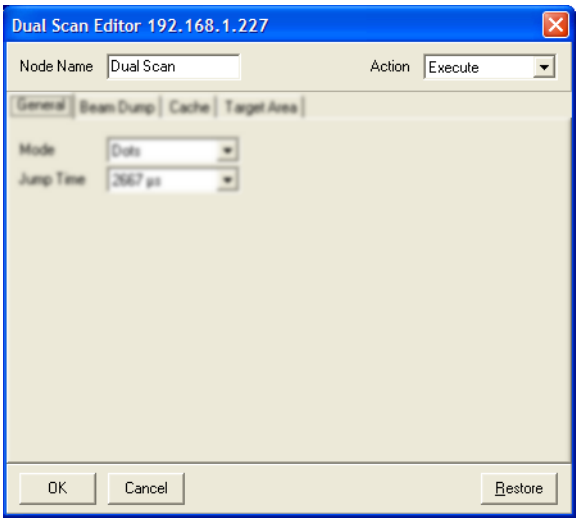


The Dual Scan node contains 2 child nodes, where Head 0 stands for the master scan head and Head 1 stands for the slave scan head. Settings are made only in the Dual Scan node as neither the Head 0 nor the Head 1 node have editors.

All nodes in the Head 0 subtree generate an output only on the master scan head. All nodes in the Head 1 subtree generate an output only on the slave scan head.



5.55.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

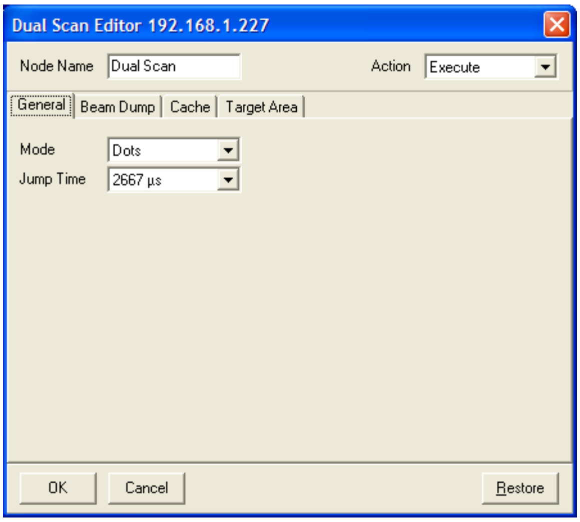
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.55.2. Edit - General

In the General tab the mode and the jump time for the Dual Scan node can be set.



Mode selects the mode of the Dual Scan node

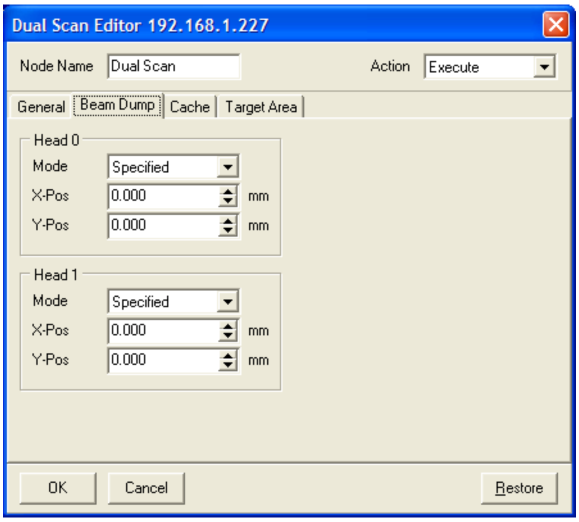
> **Dots** this setting is obsolete

Jump Time selects the time a scan head needs to jump from one position to the next

> **2667 s, 5333 s, 10667 s, 21333 s** possible times that can be set

5.55.3. Edit - Beam Dump

A Dual Scan system uses a single laser beam source which simultaneously emits pulses at 2 wavelengths. Both scan heads direct laser pulses to the respective target. The number of pulses needed depends on the process and may be different for both scan heads. If e.g. the master scan head needs 100 pulses for its task, while the slave scan head needs only 70 pulses, then a beam dump position has to be specified for the slave scan head. The super numerous pulses of the slave scan head will be output to this position where they do not affect the process result.



Head 0, Head 1

Mode selects the position to which the super numerous pulses are output

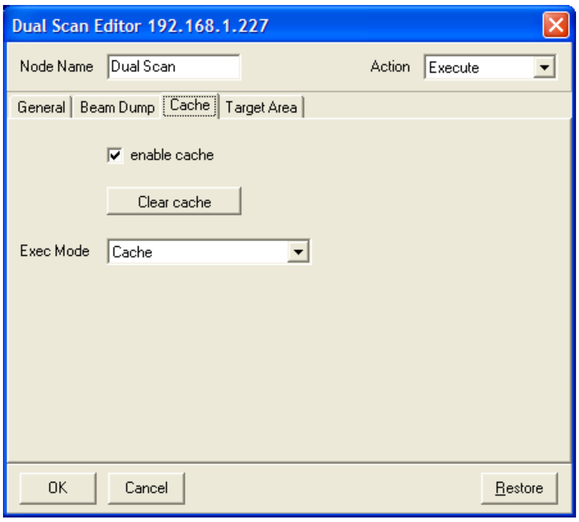
Specified the beam dump position is specified in X-Pos and Y-Pos

Last Dot the last dot position will be used as beam dump position

X-Pos, Y-Pos sets the beam dump position X- and Y-coordinate

5.55.4. Edit - Cache

In this tab the cache memory settings are specified.



Enable if the check box is selected then the whole output is saved internally. If the same job is executed several times then the data from the 1st output will be re-used. This way the output will be accelerated as the vectors have not to be calculated again

Clear clears the cache memory content

Exec Mode selects the cache mode. If you want to output lines then *Parallel Execution* **has to be selected**. If you want to output dots then use one of the other settings

Cache the cache memory content stays preserved upon the Dual Scan subtree was executed

Cache, clear after execution the cache memory content will be cleared upon the Dual Scan subtree was executed

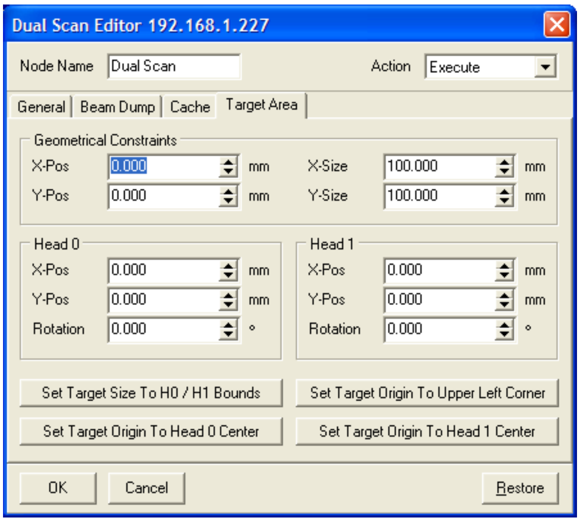
Parallel Execution the line data will not be saved to the cache memory. Both Dual Scan subtrees will be output in parallel

5.55.5. Edit - Target Area

The rectangle enclosing both scan fields is called the target area. In this tab the size as well as the position and the rotation of both scan fields regarding the target area can be specified.

NOTE

The Target Area is only set for better visualisation of the dual scan fileds. It does not influence the actual laser output.



Geometrical Constraints

X-Pos, Y-Pos sets position of the target area origin. The target area origin is in its left upper corner. The reference point of this position is specified by the 3 *Set Target Origin To* buttons

X-Size, Y-Size sets the target area width and height

Head 0, Head 1

X-Pos, Y-Pos sets the positions of the scan field center points. The reference point of this position is specified by the 3 *Set Target Origin To* buttons

Rotation sets the scan field rotation angles around their center point

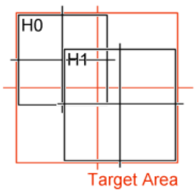
Set Target Size To H0/H1 Bounds sets the target area size to the bounding box of both scan fields. I.e. in the *Geometrical Constraints* group the *X-Size* and *Y-Size* values will automatically be calculated from the scan field size, position and rotation

Set Target Origin To Upper Left Corner defines the target area origin as origin for all coordinates on this tab

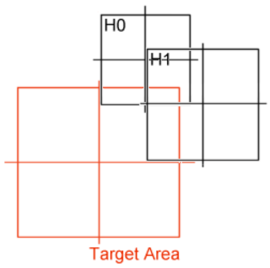
Set Target Origin To Head 0 Center defines the center point of the Head 0 scan field as origin for all coordinates on this tab

Set Target Origin To Head 1 Center defines the center point of the Head 1 scan field as origin for all coordinates on this tab

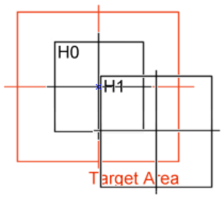
Set Target Size To H0/H1 Bounds



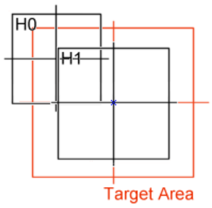
Set Target Origin To Upper Left Corner



Set Target Origin To Head 0 Center



Set Target Origin To Head 1 Center



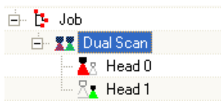
5.55.6. Example

To control two scan heads with one laser source, you can use the *Dual Scan* node. The laser beam has to be splitted by a beam splitter. In this case, the scan heads can be located above the same area or on oposite sides of the workpiece. The laser power is always the same for both scan heads because the *Dual Scan* node handles both scanheads with a single laser source. So the source always has to obey the needs of both scan heads and can not act individually for each scanhead. Here is ane example that shows this behaviour:

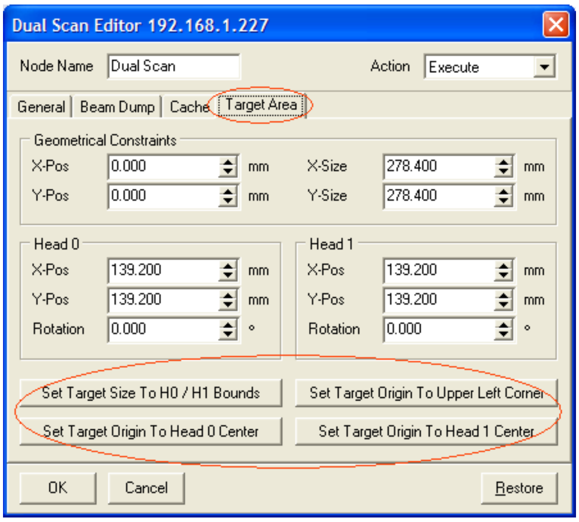
Step 1 Create a new Job via *Organizers / Job*. Rename it e.g. to Dual

Step 2 Add a *Dual Scan* node under the newly created Dual job node

Step 3 You will automatically get *Head 0* and *Head 1* nodes under this *Dual Scan* node

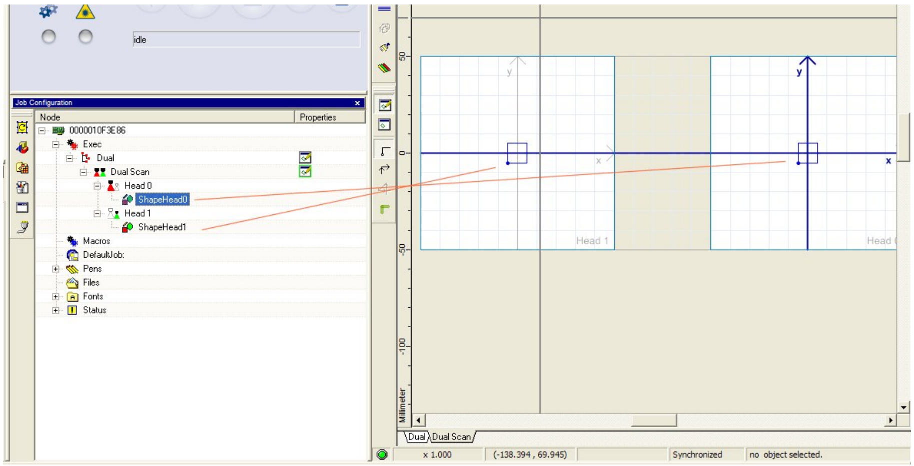


Step 4 Double-click the *Dual Scan* node. The Dual Scan Editor opens. On tab *Target Area* (see 5.55.5 Edit - Target Area), the scan field and rotation for each head can be set:

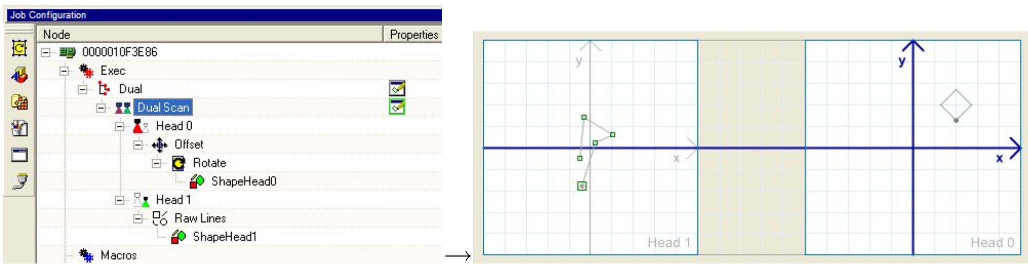


Step 5 Create two shapes under each head (e.g. rectangles called ShapeHead0 and ShapeHead1). *Be sure that both shapes have the same number of lines!* If there are more lines in one of the shapes, the laser beam of this head has will go to the beam dump outside the scanfield while the other head processes the surplus line(s)

Step 6 You may create a Vector editor view for each scan head using right-click, "Show VectorEditor view" on Head 0 and/or Head 1 or you use the dual view in the Vector Editor:



Step 7 Each shape can be modified in any way (e.g. move points via a *Raw Lines* node or *Reverse Paths* in the Raw Lines Editor see 5.22 Raw Lines), rotate, scale, offset or slant each shape of each head:



NOTE

As long as the lines have the same length (e.g. rotate, offset etc.) there is no problem, but if you have different line-lengths after transformations, you may get problems because the laser's energy will be distributed over a longer stretch or condensed on a smaller stretch causing different intensity of the marking.

5.56. Query

The *Query* node is used to read data from external files. The file formats range from ASCII (INI, TXT) over Excel (XLS) to database (MDB, DBF) files.

The ASCII file formats

INI The INI file format is the standard INI configuration file format e.g.:

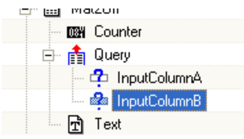
```
; comment
[section]
name=value
```

TXT The TXT file format's values are tab-separated. The first line holds the column names and "» " is a tab (ASCII 09) e.g. a file with three columns "Column A", "Column B", "Column C":

```
Column A» Column B» Column C
Value a1» Value b1» Line 1
Value a2» Value b2» Line 2
Value a3» Value b3» Line 3
```

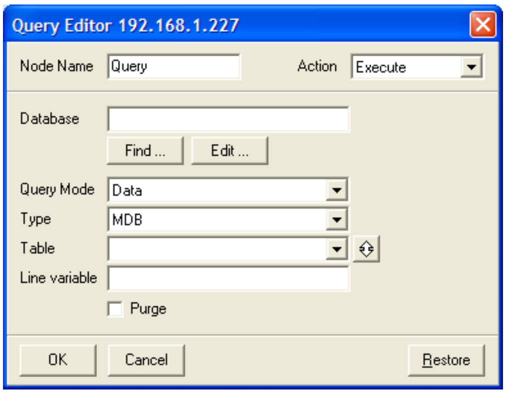
NOTE

To read columns of data sources into variables, place an Input node under the Query node *for each column* you want to read, see section 5.54 Input.



If an Input node is subnode of a Query node then it will show a new field called column showing all possible columns of the parent Query node's data source.

See section 10.7 Read Data From a TXT File for an example.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Database sets the database file name

Find opens an Open window for the file type set under *Type*

Edit opens the specified file with the editor/application registered under Windows for the specified *Type*

Query Mode selects the sort of information the query provides

- **Data** data will be provided by the query
- **Number of Records** the number of records will be provided by the query

Type selects the database type

- **INI** INI file
- **TXT** ASCII text file with tab as separator
- **XLS** Excel file
- **MDB** Microsoft Access file
- **DBF** DBase file

Table selects a table from the file. This box is only available, if a *Type* is selected that may contain several tables in one file (e.g. XLS or MDB)

 refreshes the tables if the data source was changed

Line-variable sets the line number that shall be read. E.g. a *Variable* of a Counter node (see section 5.42 Counter) or a variable that is incremented in a Script node (see section 5.44 Script) can be used

INI-Section sets the INI section of a standard INI file that shall be queried. This box replaces *Line-variable* if *Type* INI is selected

Purge if this check box is selected then InScript waits for output of all line data in nodes before the *Query* node in the tree structure

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

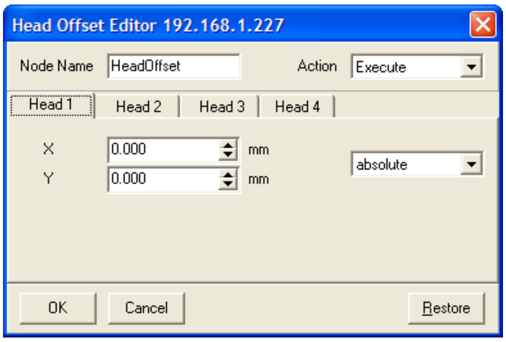
5.57. Head Offsets

Use this node with multi scan head systems

- to compensate minor offsets between scan heads
- to adjust a synchronous output to different targets

5.57.1. Edit - Head 1 to 4

In these tabs the offset for scan heads 1 to 4 can be set.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

X sets the offset of the respective scan head in X direction

Y sets the offset of the respective scan head in Y direction

Coordinates drop down selects the offset's origin

  absolute the offset is specified in absolute coordinates

  relative the offset is specified in relative coordinates

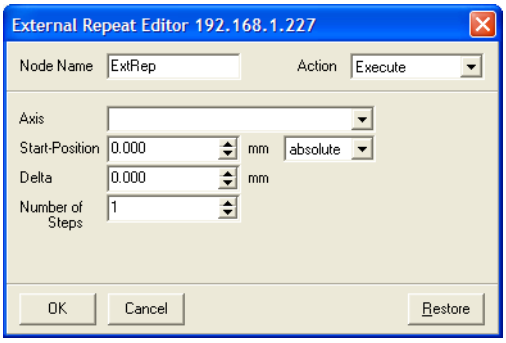
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.58. ExtRep

Using this *ExtRep* or *External Repeat* node a subtree can be output repeatedly and e.g. an external linear axis can be moved after each repetition. This way e.g. scales or other linear repetitions can be output. The function is similar to that of the "internal" Repeat node (see section 5.34 Repeat).



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Axis selects the axis to be controlled. Only installed and active device driver can be selected here

Start Position sets the start position of the first output element

Position drop down selects the start position origin

> **absolute** the *Start Position* is specified as absolute position on the axis
>
> **relative** the *Start Position* is specified relative to the current axis position

Delta sets the distance by which the axis is moved between the repetitions

Number of Steps sets the number of repetitions

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

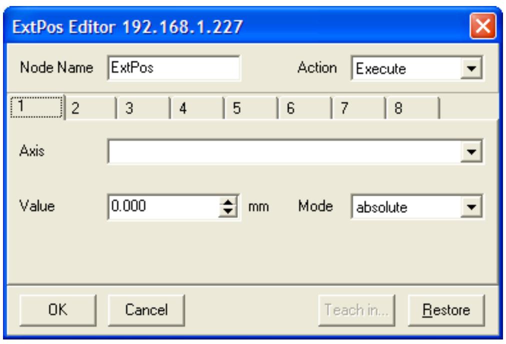
Restore see section 5.1 Shared GUI Elements

5.59. ExtPos

Using this node up to 8 external axes can be positioned. The axes will be positioned in the order from 1 to 8.

5.59.1. Edit - 1 to 8

In these tabs you define the axis and set the position the axis shall move to.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Axis sets the axis that shall be moved. Only installed and activated device drivers can be selected here

Value sets the position

Mode selects the origin of the position in *Value*

absolute Value is specified as absolute position on the axis

relative Value is specified as relative position on the axis

OK see section 5.1 Shared GUI Elements

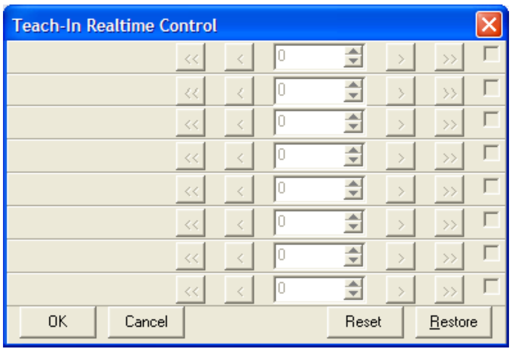
Cancel see section 5.1 Shared GUI Elements

Teach in opens the *Teach in - Realtime Control* window. This button is only active if one device driver for external devices is installed and active

Restore see section 5.1 Shared GUI Elements

5.59.2. Edit - Teach in Realtime Control

In this window the specified axis can be positioned directly. The position can be transfered to the ExtPos window.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Axis variable shows the variable name of an axis that can be modified

 **and**  moves the axis in one direction by 10 steps

 **and**  moves the axis in one direction by 1 step

Position input field sets the position directly. Using the keyboard or the arrow keys the axis can be moved continuously in the needed direction

Position check box if the check box is selected then the position will be transfered directly to the ExtPos window

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Reset resets all entries

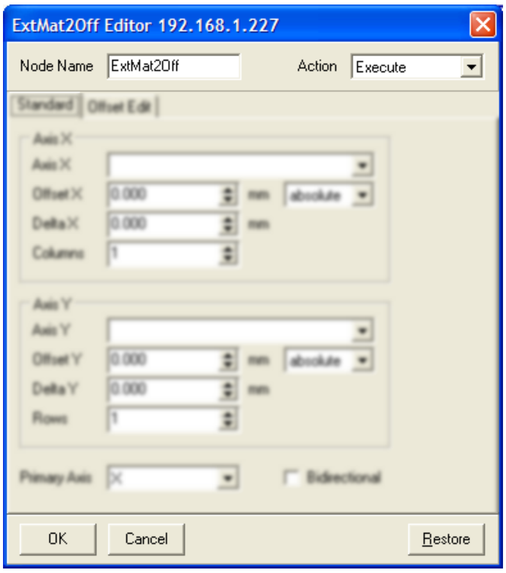
Restore see section 5.1 Shared GUI Elements

5.60. ExtMat2Off

This node is comparable to the "internal" Mat2Off node. But instead of two galvanometer axes two *external* axes can be controlled. E.g. a XY table. This way the scan field can be enlarged.

Using the External Mat2Off node matrix like layouts of positions can be created. The node is a combination of the Repeat-X and the Repeat-Y nodes (see section 5.37 Repeat X and section 5.38 Repeat Y), but with extended functionality. This provides accelerated output, exceptions from the normal position in the matrix without special programming as well as bidirectional output.

5.60.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

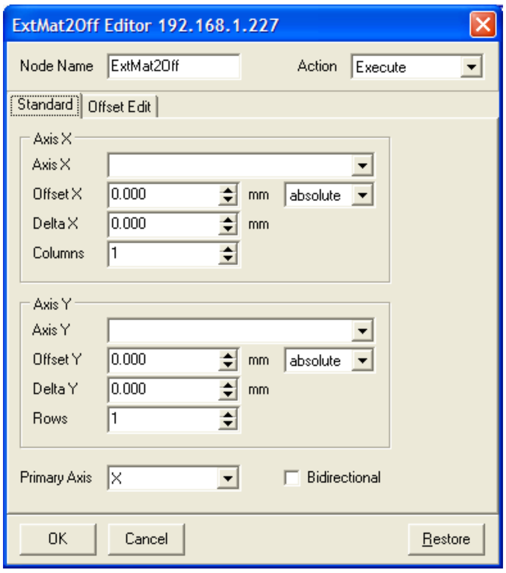
Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.60.2. Edit - Standard



Axis X

Axis X assigns an axis to the X direction. Only axes of installed and active device drivers can be selected here

Offset X sets the first matrix element offset in X direction

Offset drop down selects whether the offset is specified in absolute or relative coordinates

absolute the axis will be positioned to the absolute coordinate in Offset X

relative the axis will be positioned relatively to the current position by the value in Offset X

Delta X sets the distance between the columns in X direction

Columns sets the number of columns

Axis Y

Axis Y assigns an axis to the Y direction. Only axes of installed and active device drivers can be selected here

Offset Y sets the first matrix element offset in Y direction

Offset drop down selects whether the offset is specified in absolute or relative coordinates

absolute the axis will be positioned to the absolute coordinate in Offset Y

relative the axis will be positioned relatively to the current position by the value in Offset Y

Delta Y sets the distance between the columns in Y direction

Rows sets the number of rows

Primary Axis sets the axis the output begins with. This causes a line by line or column by column output

Bidirectional if the check box is selected then the matrix will be output bidirectionally. If it is cleared then the columns or rows will always be output in one direction

5.60.3. Edit - Offset Edit

In this tab single matrix elements can be offset, e.g. the element on position in row 1, column 2 is offset by -1.000 mm in X direction and 5.000 mm in Y direction referring to its normal position in the matrix (see figure below).

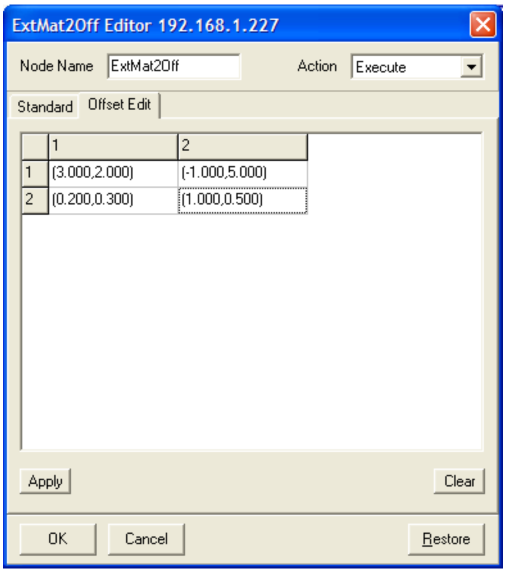


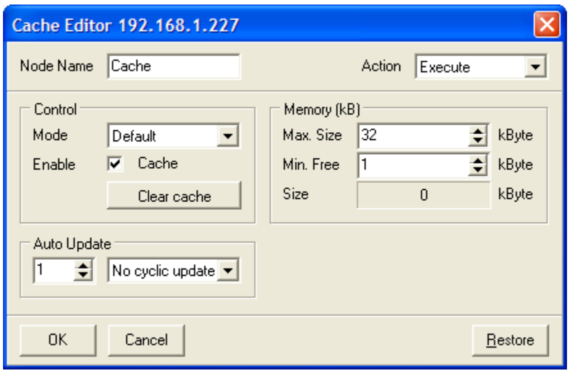
Table Cells enter the offset data here. To enter the data, double click the corresponding cell or in the cell context menu, click *Edit Cell* and **confirm the input by pressing the Enter key**. The columns correspond to the matrix X direction. The rows correspond to the matrix Y direction. Within a cell at the left the X coordinate and at the right the Y coordinate of the offset in reference to the normal position in the matrix are displayed. To delete the values in a cell select *Delete Cell* from the context menue

Apply applies the entered values

Clear clears and discards the entered values

5.61. Cache

This node saves line vectors for further output. In this way the output speed can be optimized as the line vectors do not have to be re-calculated for each output. Calculation time may especially be saved outputting complex graphical objects like e.g. filled outlines.



Control

Mode selects the node mode

Default currently only *Default* is implemented

Enable if this check box is selected then the complete output will be saved internally. If the same job is executed for several times then the data of the first output will be re-used. In this way the output will be sped up as the line vectors do not have to be re-calculated

Clear Cache clears the cache memory contents

Memory(kB)

Max. Size sets the maximum memory size reserved for the cache

Min. Free sets the minimum free memory size

Size shows the current memory requirements of the subtree

Auto Update

Interval spin control sets the time interval n, after which the line vectors will be re-calculated

Interval unit dropdown sets the time interval unit, after which the line vectors will be re-calculated

No cyclic update the line vectors will not be re-calculated in intervals

Seconds, Minutes, Hours, Days the line vectors will be calculated after n seconds, n minutes, n hours or n days

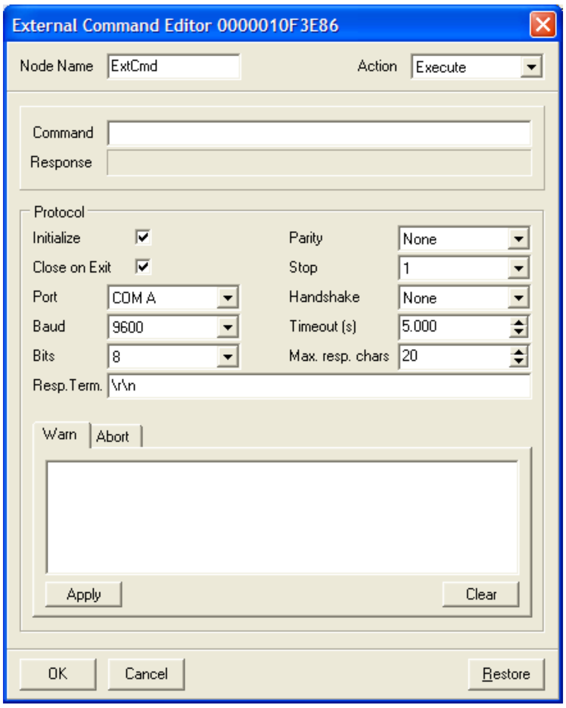
New Second, New Minute, New Hour, New Day the line vectors will be calculated each n new second, n new minute, n new hour or n new day

5.62. ExtCmd

Using this node a command can be sent via one of the controller board's serial interfaces (COM A or COM B) to an external device. Then a specific time will be waited for an answer and, corresponding to the answer, it will be decided whether the job is continued, a warning is output or the job is aborted.

NOTE

Re-introduced to ASC from firmware version 2.6.0.412 on. In older firmware versions, this node was only available on NCC controllers.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Command enter the command to the external device here. The command line end is the command end here. The command line must not exceed 4kB

List of possible control characters:

Escape-Sequence	ASCII-Code	decimal	Character
\a	ASCII BEL	07	bell
\b	ASCII BS	08	backspace
\f	ASCII FF	12	form feed
\n	ASCII LF	10	line feed
\r	ASCII CR	13	carriage return
\t	ASCII HT	09	horizontal tab
\v	ASCII VT	09	vertical tab
\000	octal 000	00	octal input e.g. \015 = CR
\x00	hex 00	00	hexadecimal input e.g. \x0D = CR

Response shows the string received by the controller board via the serial interface

Protocol

Initialize if the check box is selected then the serial interface will be initialized before the *External Command* node is executed and the receive buffer will be cleared

Close on Exit if the check box is selected then the serial interface will be closed as soon the *External Command* node has been executed

Port selects the serial interface on the controller board for communication

- **COM A** available serial interfaces (COM A) NCC
- **COM B** available serial interfaces (COM B) NCC & ASC
- **COM C** available serial interfaces (COM C) ASC (available only in firmware versions > 2.6.0.412)

Baud selects the serial interface baud rate

- **300, 600, 1200, 2400, 4800, 9600, 19200, 38400** possible baud rates

Bits selects the transmission format length in Bit

- **7, 8** possible lengths

Parity selects the parity

- **None** no parity
- **Odd** odd parity
- **Even** even parity

Stop selects the number of stop bits

- **1** 1 stop bit
- **2** 2 stop bits

Handshake selects, how the data flow is controlled

- **None** not controlled
- **XON/XOFF** controlled via software
- **RTS/CTS** controlled via hardware, i.e. via the RTS/CTS lines

Time Out sets the maximal allowed time between receiving the last character and receiving the line end character. If this time is exceeded then the whole input will be discarded

Max. resp. char. maximum response characters. Sets the number of characters waited for reception after the string from the *Command* box was sent

Resp. Term. response terminator. Sets the string marking the answer's end. These characters are waited for after the string from the *Command* box was sent

Warn after a valid answer was received, it will be compared with the string entered here. If the answer is equal to this string then a warning will be output

Abort after a valid answer was received, it will be compared with the string entered here. If the answer is equal to this string then the job will be aborted

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.63. Host Execute (or Execute Host Application)

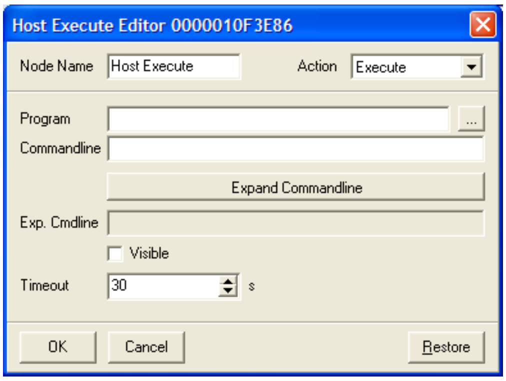
Using this node programs can be executed on the host PC. If the called program generates a file of name `>program name<.result` InScript tries to read this file. Entries of the following form can be read by InScript:

```
FloatVariable=nnn,nnn
IntegerVariable=nnn
BoolVariable=TRUE, FALSE, True, False, true, false
StringVariable=abc..xyz
```

Each entry that is found in the file is saved as the recognized variable type to the `..opt subtree` of the *Host Execute* node. Thus results produced by the called program can be reported back to InScript.

NOTE

This node is only available on NCC controller.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Program sets the program to be executed, e.g. `c:\windows\system32\notepad.exe`

 opens the window *Select File to execute* where a program can be selected

Commandline sets the parameter(s) for the *Program* that is executed. According to upper example this may be the file to be edited e.g. `C:\Program Files\InScript\config\inscript.ini`. Parameters may contain variables e.g. `$VarName$`, see 5.44.2 Scripting Language

Expand Commandline if variables are used in the command lne the commandline is shown with all resolves variables in the *Exp. Cmdline* box

Exp. Cmdline shows the commandline with resolved variables

Visible if this check box is selected then the program will be executed *Visible*. If it is not checked, you will see **no Windows** of the called program. It is executed in the background

Timeout sets the timeout for executing the program. After this time period the application is terminated if possible and a failure is shown. If you choose a period of -1 seconds InScript waits until the application terminates by itself

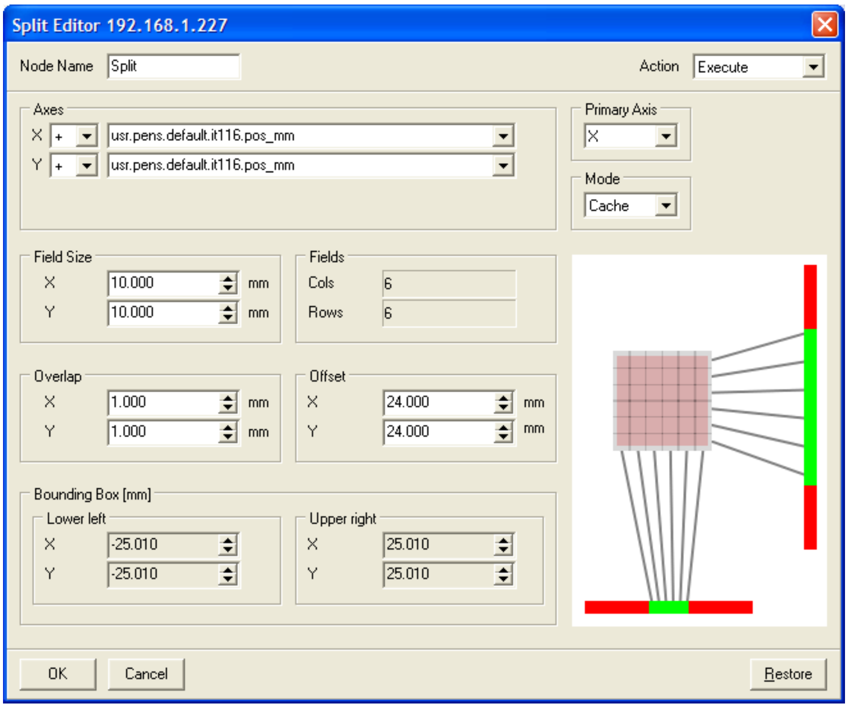
OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.64. Split

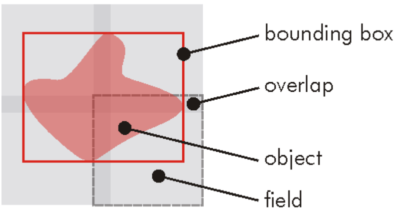
Using this node objects can be output that are larger than the scan field. The node divides an object in fields that can be covered by the scan field. To reassembles these fields, the workpiece is moved by 1 or 2 axes as soon as one field has been output.



NOTE

The principle effect of the parameters is shown in the white area on the right side of the Split Editor window. The diagram appears not until the bounding box values are "known" to the Split node. For this purpose the Split node has to have at least one child node producing output. After axis are defined the green area shows the area in that the axis can operate, the lines show which splits are assigned to which part of the axis.

The following figure illustrates the terms used in the following text.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Axes

X, Y selects the axis movement direction

+ positive direction

- negative direction

assigns an axis to the X or Y direction. Only axes of installed and active device drivers can be selected here

Primary Axis

Axis down selects the primary axis

X the fields will be output line by line

Y the fields will be output column by column

Mode

Mode drop down If you want to output an object with fixed size then select *Cache* in *Mode*. Then the bounding box will be automatically calculated and you do not have to specify the size in the *Bounding Box* group. If you want to output an object with variable size then select *Execute* in *Mode* and specify the size in the *Bounding Box* group

Cache the Split node calculates the lines of the whole subtree first and stores it to an internal cache memory. Then the single fields are output. All dynamic subtree elements, as e.g. serial numbers, get the values they have at the moment the Split node is output

Execute the child node is executed for each field. Each dynamic element gets the value it has at the moment the field is output

NOTE

If Cache is selected then enough RAM storage space has to be available on the controller board to store the line data.

Field Size

X, Y sets the field size the object is divided to. The size must not exceed the scan head field size. The scan head field size is defined in device driver *dist_xy*

Fields

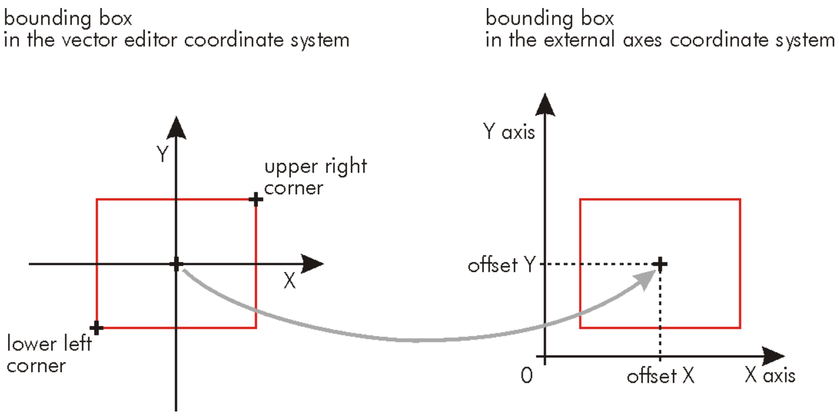
Cols, Rows shows the number of columns and rows the object is divided to

Overlap

X, Y sets the overlap the fields are output with. Negative values create a gap between the fields

Offset

X, Y sets the offset between the job coordinate system origin and the position on the external X or Y axis The following figure illustrates how the bounding box coordinates are linked to the offset.



Bounding Box

Lower left / Upper right X, Y lower left or upper right corner of the object bounding box. If you want to output an object with fixed size then select *Cache* in *Mode*. Then the bounding box will be automatically calculated and you do not have to specify the size in the *Bounding Box* group. If you want to output an object with variable size then select *Execute* in *Mode* and specify the size in the *Bounding Box* group

OK see section 5.1 Shared GUI Elements

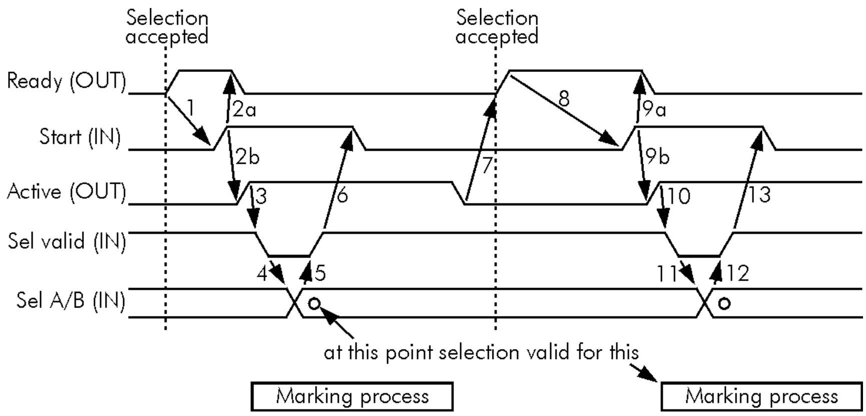
Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.65. ExtSelect

Using the *External Select* node and the parallel interface inputs (see the *Manual -- NCC System Controller*) a subtree beneath the *External Select* node can be selected for execution by evaluating digital inputs. Up to 8 of the 11 digital inputs are available for this purpose. The remaining 3 digital inputs are reserved for communication with an external super ordinate machine control (3.3 sas - System Activity State).

Timing Diagram



Description Timing Diagram

Digital inputs can be configured to be either high-active or low-active. Therefore they are only addressed as active or inactive signals in the following.

No. 1 When the controller board shows its readiness by an active *Ready signal* you may request the execution of a program by setting the Start signal to active.

No. 2a The controller board acknowledges the *Start signal* by setting the *Ready signal* to inactive.

No. 2b The controller board shows the beginning of program execution by setting the *Active signal*.

No. 3 After the controller board has set the *Active signal* to active you may set the *Sel valid signal* to inactive to prepare a new selection.

No. 4 Once the *Sel valid signal* is set to inactive you may change the selection at the digital inputs SEL_0 to SEL_7.

No. 5 As soon as valid data is set to the digital inputs SEL_0 to SEL_7, accept this data by setting the *Sel valid signal* to active.

No. 6 Once the data is accepted, set the *Start signal* to inactive again.

No. 7 When the program ends the controller board sets the *Active signal* to inactive and the *Ready signal* to active.

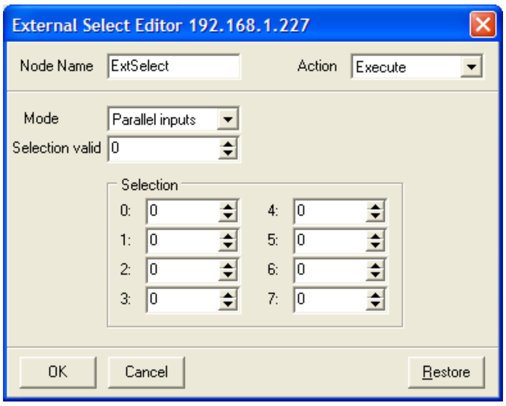
No. 8 Once the *Ready signal* is active again you may request the execution of the next program.

No. 9a see *No. 2a*.

No. 9b see *No. 2b*.

No. 10 see *No. 3*.

etc.



Node Name see section 5.1 Shared GUI Elements

Action see section 5.1 Shared GUI Elements

Mode

Parallel inputs uses the parallel interface inputs (see the *Manual -- NCC System Controller*) for the external selection of a subtree

Selection valid defines the digital input which enables the reading of digital inputs (cp. timing diagram above). A positive value stands for a high-active digital input. A negative value stands for a low-active digital input. The value 0 (zero) means that no digital input will be used

NOTE

If *Preload* is set to *always* in the device driver SASP (see SASP 3.3.3 Parametrize - General), you have to set a digital input in *Selection valid* because the DSP will immediately start to pre-process the job and ExtSelect will very probably check the input values too early. So setting a *Selection valid* input, the digital inputs are not read until the level at this input is "active". If Preload is set to never in the device driver SASP this is not necessary because job processing is not immediately done but can e.g. be triggered from extern.

e.g.
Preload=false: Set inputs → start Job → ExtSelect evaluates inputs

Preload=true: Job processing immediately starts → Set inputs → ExtSelect waits for *Selection valid* input high/low (e.g. Input 8 would be high = 8 and low = -8) → Set *Selection valid* Input → ExtSelect evaluates inputs

Selection

0 to 7 assigns the parallel interface inputs (see the *Manual -- NCC System Controller*) to the selections SEL_0 to SEL_7. The entered values correspond to the digital inputs. A positive value stands for a high-active digital input. A negative value stands for a low-active digital input. The value 0 (zero) means that no digital input will be used

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

How to assign the selections SEL_0 to SEL_7 to External Select subtrees

1. Arrange every subtree beneath a Collect node (see section 5.31 Collect).
2. Arrange the Collect nodes beneath the External Select node.
3. Rename the Collect nodes.

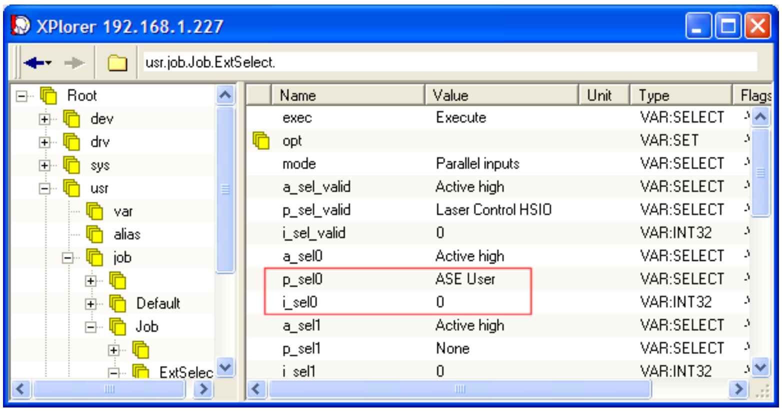
The bit pattern within the first 8 characters of the node name is analyzed for the selection. The first character within the bit pattern is the least significant bit. This bit corresponds to selection SEL_0. The eighth character is the most significant bit. This bit corresponds to selection SEL_7. These characters are allowed:

Character	Description
0	inactive
1	active
other	other characters than 0 (zero) and 1 will be ignored, but have to be allowed within a node name

Particularities Momentarily there is no user interface to configure the *ASE user inputs* (see 3.36 ase user io - USER Inputs and Outputs) or *Laser Control HSIO* (high speed I/Os at the LASER CONTROL connector, see the documentation of the ASC controller) for ASC controllers for the Ext-Select function. To be able to use this functionality, you have to use the Xplorer (see 8.5 Xplorer):

To assign signals to the ASE user I/O interface or Laser Control HSIO, create the *External Select* node in the job tree. Then right click on the node and select "Xplore". Now enter the path `ExtSelect` (or <name> of the ExtSelect node, if you changed its name) → `<unnamed>` Set variable.

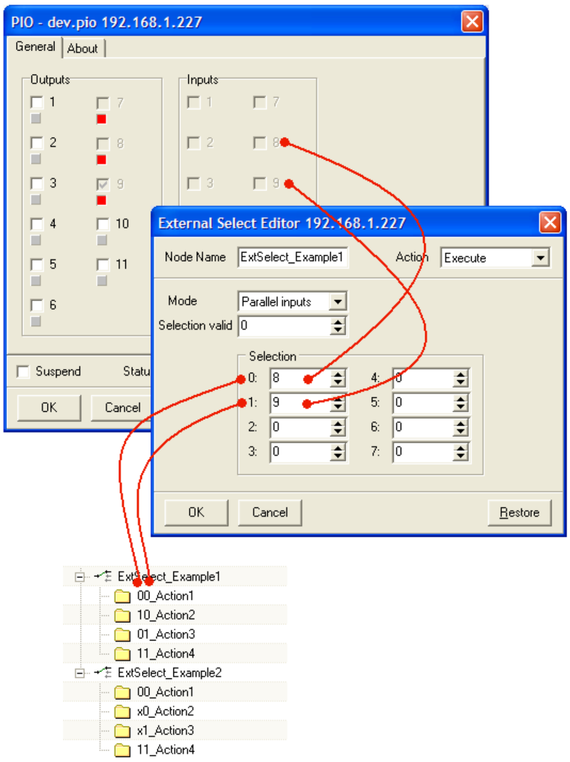
In this list you can select the *ASE user* or *Laser Control HSIO* port by clicking on the corresponding "`p_seln`"-variables. You may also select each port number in the corresponding "`i_seln`"-variables.



Example

In this example selection SEL_0 is assigned to Input8 (see the*Manual -- NCC System Controller*) and selection SEL_1 is assigned to Input9.

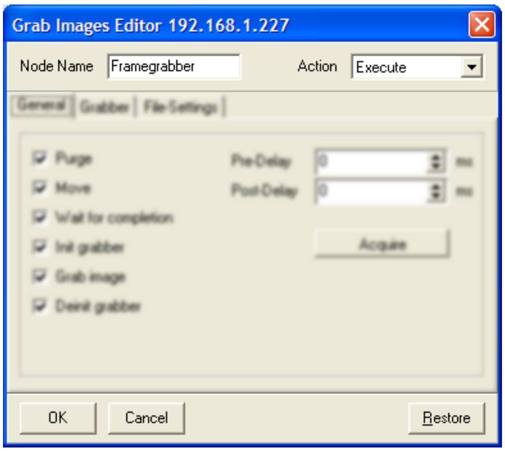
That way up to 4 subtrees can be selected (in the following figure: ExtSelect_example1). Because characters other than 0 (zero) and 1 are ignored, several subtrees can be selected by 1 bit pattern as well (in the following figure: ExtSelect_example2). In this case the collectively selected subtrees will be executed top down (in this case *Collect* nodes (see 5.31 Collect) with the needed functionality below them are used as subtrees).



5.66. Framegrabber

This node allows to grab images with a video capture device.

5.66.1. Edit - Shared GUI Elements



Node Name see section 5.1 Shared GUI Elements

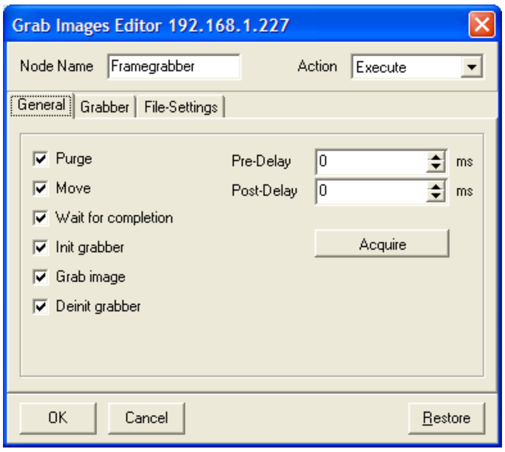
Action see section 5.1 Shared GUI Elements

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Restore see section 5.1 Shared GUI Elements

5.66.2. Edit - General



Purge if this check box is selected then all line data before the *Framegrabber* node will be output by the scan head before executing the *Framegrabber* node

Move if this check box is selected then an image will be grabbed when the mirrors reach their current position. Example: The *Framegrabber* node is child of a *PosList* node (see section 5.43 PosList). The position list defines where images have to be grabbed

Wait for completion if the check box is selected then the job will be paused until the image is grabbed. If the check box is cleared then the job will be continued while grabbing

The check boxes Init grabber, Grab image and Deinit grabber can be used to optimize timing when grabbing several images with the same video capture device. Example: A *Framegrabber* node is child of a PosList node. The virtual grabbing is done by this node (Grab image selected). The video capture device is initialized before the PosList node (Init grabber selected) and deinitialized after the PosList node (Deinit grabber selected).

NOTE

Trying to initialize an already initialized video capture device normally leads to an error. In the example above this can happen if the job is aborted before it is deinitialized and restarted. Either manually deinitialize the video capture device or place another *Framegrabber* node with *Deinit grabber* selected before the 1st *Framegrabber* node with *Init grabber* selected. Use the latter method only if the video capture device is solely used by *Framegrabber* nodes and shall not to be available for other processes.

Init grabber if this check box is selected then the video capture device in use will be locked for other processes

Grab image if this check box is selected then the video capture device will grab an image when the node is executed

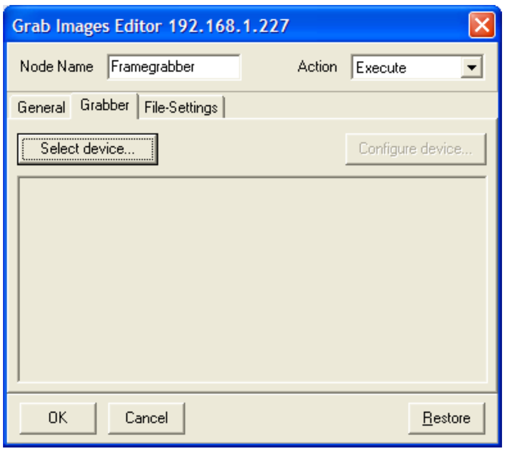
Deinit grabber if this check box is selected then the video capture device in use will be unlocked for other processes

Pre-Delay sets the time to wait before grabbing an image. When e.g. switching between several not externally synchronized cameras connected to 1 frame grabber, it takes time to synchronize the frame grabber to the new analog signal and to stabilize the image

Post-Delay sets the time to wait before considering the grabbing as completed

Acquire manually grabs an image from the video capture device and saves it with the settings specified in the *File-Settings* tab

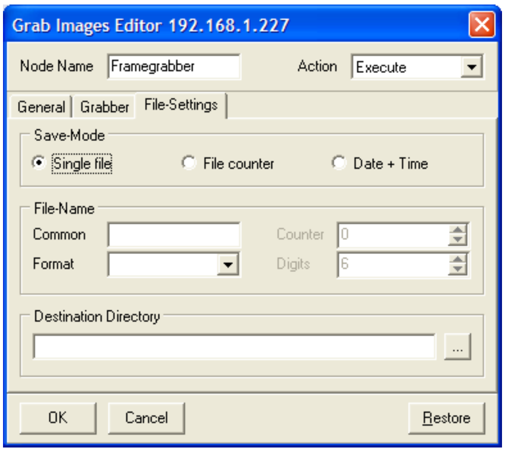
5.66.3. Edit - Grabber



Select device opens the *Select device* window where a video capture device can be selected from a list of available devices

Configure device opens the *Configure device* window where settings for the selected video capture device can be done. Please refer to the video capture device documentation

5.66.4. Edit - File-Settings



Save-Mode selects how the file name is built

Single file the file name is built from *Common* and *Format*, e.g. Common=TEST and Format=BMP results in TEST.BMP

File counter the file name is composed of *Common*, the *Counter* with *Digits* length and the *Format*, e.g. Common=IMAGE_, Counter=1, Digits=6 and Format=TGA results in IMAGE_000001.TGA for the 1st image

Date+Time the file name is composed of *Common*, the *Format* and the date (dd.mm.yyyy) and time (hh.mm.ss.ms), e.g. Common=IMG_, Format=JPG and the image was grabbed at 5th of December 2002 at 10:35:13 and 477 ms results in IMG_05.12.2002_10.35.13.477.JPG

File-Name

Common sets the common name of the file name

Counter sets the counter appended to the name beginning with the given value

Digits sets the number of *Counter* digits

Format selects the format the files are saved

BMP BMP format (Windows Bitmap)

JPG JPEG format (Joint Photographic Experts Group)

TGA TGA format (Truevision Targa)

Destination Directory selects the destination directory to save files to

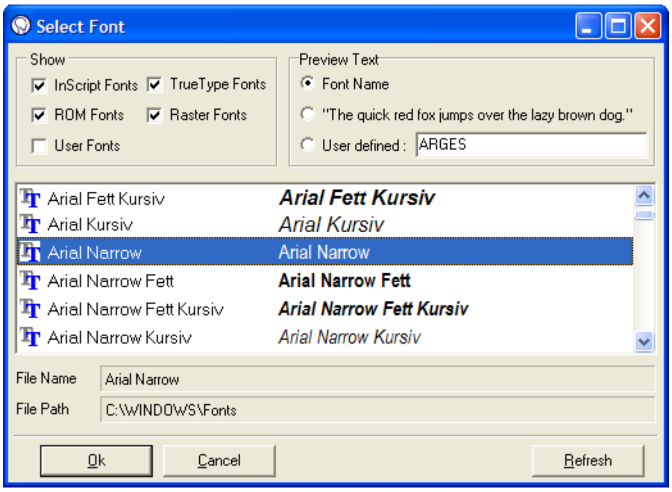
 opens the window *Browse for Folder* where a directory can be chosen to save the images in

NOTE

Homonymous files will be replaced. Be careful selecting your filenames if you want to keep the files.

5.67. Select Font - Window

Select the font to be used in this window.



Show InScript Fonts, TrueType Fonts, ROM Fonts, Raster Fonts, User Fonts

If the check box is selected then the corresponding fonts are displayed in the preview list

Preview-Text Font-Name; "The quick ..."; User defined: ...

selects, which text will be displayed in the preview list

Font Name the font name will be displayed

"The quick ..." the sentence "The quick red fox jumps over the lazy brown dog.", which contains all letters from a-z will be displayed

User defined a user defined text will be displayed

In the preview list in the left column the font names are displayed available from the font types selected in the *Show* group. The names are preceded by a symbol indicating the font type. In the right column the text defined in the *Preview Text* group is displayed in the corresponding font

File Name shows the font name

File Path shows the path, where the font is located

OK see section 5.1 Shared GUI Elements

Cancel see section 5.1 Shared GUI Elements

Refresh refreshes the preview list of available fonts

6. Job Control Window

The *Job Control* window is the central control for executing jobs that are present in the *Job Configuration* window.

6.1. How to Open the Window

► In the menu, click *View* → *Job Control*.

— or —

Press the *F9* key.

The *Job Control* window opens.

6.2. Description of the Window

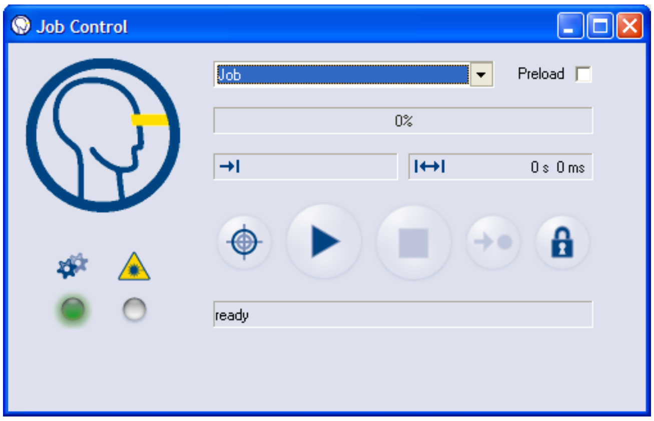


Figure 14: Job Control window

ARGES logo the ARGES logo's beam will flash while the laser is processing

List with jobs selects a job for execution. Only jobs, from the *Job Configuration* window and with a *Job* node as root node, are listed here

Preload if this checkbox is selected then processing –not the execution– of the job will be started before clicking *Job Start* as far as the line buffer is sufficient. This may significantly speed up execution time.

⚠ **CAUTION**

Wrong initialisation data

The controller will start calculating the job right away. So externally initialized variables, system time etc. may be wrongly or not initialized at all.

► Use this setting only if no dependencies on initialisation data exists.

Progress bar shows the interpolated progress of job execution. If the job execution time exceeds the interpolated time the progress bar will flash until the job has ended. The execution time will be interpolated from previous execution times of the job

Time to job end shows the estimated time until the job ends

Job duration shows the estimated job duration

Teach-in starts a teach-in. To use this button, a pen called *pilot* has to be created, see section 4.9.12 Teach-in *pilot* Pen and 3.3.4 Parametrize - Teach-In, that has a *dist_xy* pen section set, where the *Optical Path* in the *Common* tab is set to e.g. *Pointing Laser* and in the *sas* pen section under tab *TeachIn* the *Use TeachIn* checkbox is set. You may also press the *F8* key instead

CAUTION

Visible and invisible laser radiation

If the pilot pen settings are set to a output range that is in a dangerous range, the operator of the TeachIn is in hazard of injury!

We urgently recommend that the pilot pen settings are verifyed to be in a range that is not dangerous.

TIP

Please be aware that if you execute TeachIn in standard configuration, only nodes that are placed under *Geometrical Operator* nodes are output.

Job Start starts to process the selected job. You may also press the *F5* key instead

Job Pause this button will replace the *Job Start* button if it is clicked. Momentarily *Job Pause* is not implemented

Job Abort aborts the momentarily executed job immediately. You may also press the *F7* key instead

Job Stop stop at the next *Stop* node, see section 5.45 Stop. You may also press the *F6* key instead

Safe State brings devices to a safe state. You may also use F9 for this functionality. Momentarily *Safe State* is not implemented

Controller status shows the controller's status

Laser status shows the laser beam status: off or on

Status text box shows the current system status: idle, ready, processing, failure, see section 8.8 System Status

6.3. Select Job for Execution

InScript can hold several jobs ready in the *Job Configuration* window. The root node of these jobs has to be a *Job* node. To determine, which of these jobs shall be executed, it has to be selected for execution first. Only one job may be selected at a time.

There are different, equally good possiblities to select a job for execution:

- In the *Job Control* window, select a job from the list.

  NOTE

  This is only possible with InScript v2.10.xx and higher. In previous versions of InScript this list was used to select an *Execution Context* — this feature is obsolete.

  — or —

  In the *Job Configuration* window in the *Job* node's context menu, click *Select*.

  — or —

  In the *Job Configuration* window, place the cursor on the *Job* node and press the *Enter* key.

The job will be loaded into the controller's line buffer. In the *Job Configuration* window the selected job's icon will be framed with a red rectangle. For InScript v2.10.xx and higher a selected *Job* node will be shown in the *Job Control* window in the list.

TIP

If you do the selection in the *Job Configuration* window then you may select the root node of a job's subtree as well. This may save time when testing jobs. A selected subtree will not be shown in the *Job Control* window in the list.

A selected job can be deselected in the same way. The job is deleted from the controller's line buffer then.

6.4. Start (Execute) Job

Step 1 Select the job you want to execute, see section 6.3 Select Job for Execution.

Step 2 **CAUTION**

Visible and/or invisible laser radiation

The user is responsible for observing the laser safety regulations valid in his country.

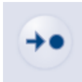
- Avoid eye or skin exposure to direct or scattered radiation.

To start the job, click  .

6.5. Abort Job Immediately

- To abort the job, click  .

6.6. Stop Job at Next Stop Node

- To stop the job at the next *Stop* node, click  .

  NOTE

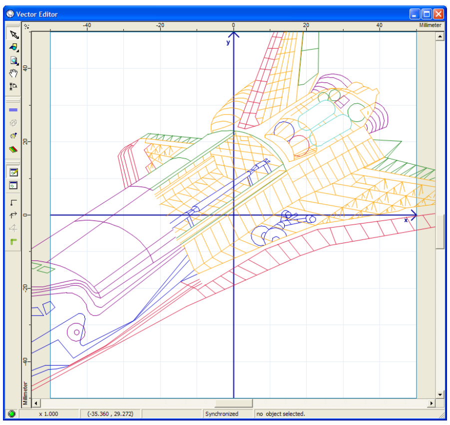
  If there is no *Stop* node present in the job then the job will be executed to its end, see section 5.45 Stop.

7. Vector Editor Window

The *Vector Editor* visualizes jobs and their output. The *Vector Editor* has 2 basic modes, the Editor and the Preview mode. Both modes are described in the following sections.

7.1. Editor mode

In *Editor* mode the data is generated from the tree structure of the selected job or subtree in the *Job Configuration* window. In *Editor* mode graphical objects can be directly added, edited and modified in the Vector Editor window. Additional information like start points and direction arrows can be shown.



Open the *Vector Editor* window in Editor mode as follows:

- In the menu, click *View* → *Editor* → *Editor*.

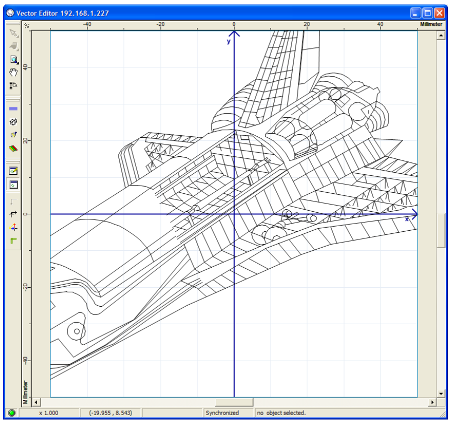
  — or —

  In the toolbar, click the small black triangle in  and then click *Editor*.

  The current mode is marked with a dot.

7.2. Preview mode

In *Preview* mode the actual line data rendered by the controller's DSP (Digital Signal Processor) is shown in the exact order and scaled to the field size as the scan head would output these lines. Editing in the *Vector Editor* window is *not* possible in this mode, but arrows, head, jump and tail vector lines can be shown as additional information, see section 3.10 How InScript handles lines in general.



Open the *Vector Editor* window in Preview mode as follows:

- In the menu, click *View* → *Editor* → *Preview*.

  — or —

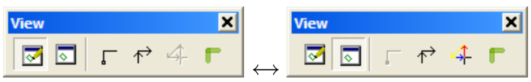
  In the toolbar, click the small black triangle in and then click *Preview*.

  The current mode is marked with a dot.

7.3. Fast Toggeling of Editor and Preview Mode

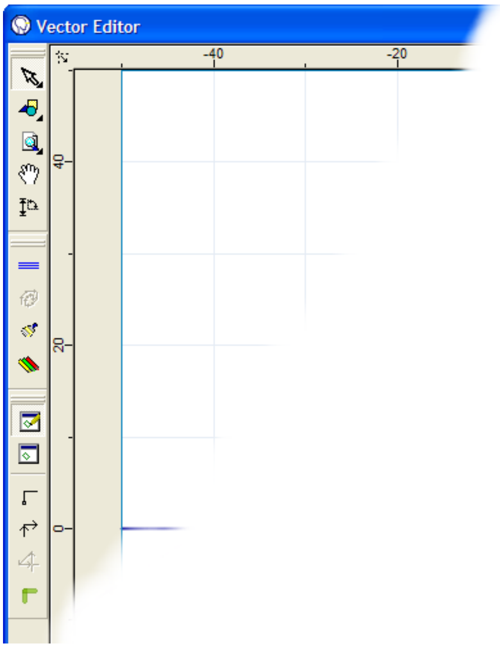
Requirement The Vector Editor window has to be open.

- In the Vector Editor's *View* toolbar (shown undocked in figure below), click *Show Editor* or *Show Preview* .



7.4. Toolbars

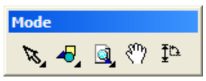
On the left side of Vector Editor its toolbars are initially docked.



Here is a description of the *Vector Editor* toolbars:

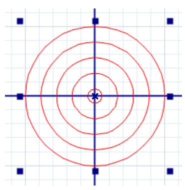
7.4.1. Mode

The *Mode* toolbar combines the following tools which can be applied in the *Vector Editor* window.

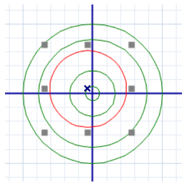


Modify Object(s) to open the *Select* toolbar, click for the time set in section 8.4.28 Sub Category - User Interface *Popup after* the *Modify Object(s)* symbol. This toolbar provides tools for selecting objects and to edit them in the *Vector Editor* window

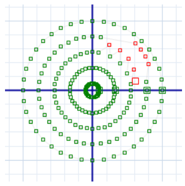
Handle Objects selects single graphical objects or groups of objects



Handle Elements Some nodes are composed of several graphical objects. Such nodes are e.g. the nodes *Mat2Off*, *PosList*, *RawLines* and *Tiling*-Tiles. The *Handle Elements* tool selects single graphical objects or groups of these objects within these nodes. This symbol is not active until such a node has been selected with the *Handle Objects* tool



Handle Points In some nodes graphical objects are defined by points. These are e.g. end points of lines within the nodes *RawLines* and *Tiling*-Tiles. The *Handle Points* tool selects single points or groups of points within these nodes. This symbol is not active until such a node has been selected with the *Handle Objects* tool



Select all objects selects all objects in the *Vector Editor* window

Deselect all objects removes all selections from objects in the *Vector Editor* window

Select previous object selects the object which precedes the actual object in the internal list. In the internal list the objects are listed in the order they were created

Select next object selects the object which succeeds the actual object in the internal list. In the internal list the objects are listed in the order they were created

Point operator these operators are only active if the object selected in *Vector Editor* is composed of points, like e.g. end points of lines in the nodes *RawLines* and *Tiling*-Tiles and the Editor is in *Handle Points* mode:

Create Dot creates a single dot

Create line creates a line consisitng of 2 dots

Append line appends a line to a selected point

Split path splits a path of lines at a selected point

Join joins two selected points

Connect connects an end point (last point of a line path) and a start point (big rectangle at the beginning of a line path) of a line path with a new line

Make path(s) first in list makes selected path(s) first in the *RawLines* list, see section 5.22 Raw Lines, so it is output first

Move path(s) up in list moves selected path(s) one position up in the *RawLines* list, see section 5.22 Raw Lines, so it is output one position earlier

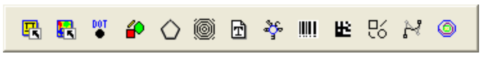
Move path(s) up in list moves selected path(s) one position down in the *RawLines* list, see section 5.22 Raw Lines, so it is output one position later

Make path(s) last in list makes selected path(s) last in the *RawLines* list, see section 5.22 Raw Lines, so it is output last

Reverse path(s) reverses the order of the selected path(s) last in the *RawLines* list, see section 5.22 Raw Lines

Enter offset and add it to selected points opens the *Enter Offset* dialog and offsets all selected points by the entered values after pressing *OK*

Create Object(s) to open the *Create* toolbar, click for the time set in section 8.4.28 Sub Category - User Interface *Popup after* the *Create Object(s)* symbol. This toolbar provides tools to create objects directly in the *Vector Editor* window



NOTE

In *Preview* modes of the *Vector Editor* this toolbar is not active.

Create HPGL File Link creates a *HPGL-File-Link* node, see section 5.12 File Link (HPGL)

Create Bitmap File Link creates a *Bitmap-File-Link* node, see section 5.13 Bitmap

Create Dot creates a *Dot* node, see section 5.14 Dot

Create Shape creates a *Shape* node, see section 5.15 Shape

Create Polygon creates a *Polygon* node, see section 5.16 Polygon

Create Concentric Circles creates a *Concentric Circles* node, see section 5.17 Concentric Circles

Create Text creates a *Text* node, see section 5.18 Text

Create RoundText creates a *Round Text* node, see section 5.19 RoundText

Create Barcode creates a *Barcode* node, see section 5.20 Barcode

Create 2D-Barcode creates a *2D Barcode* node, see section 5.21 Barcode 2D

Create RawLines creates a *RawLines* node, see section 5.22 Raw Lines

Create Spline creates a *Spline* node, see section 5.23 Spline

Create Spiro creates a *Spiro* node, see section 5.25 Spiral

Change Zoom State to open the *Change Zoom* toolbar, click for the time set in 8.4.28 Sub Category - User Interface *Popup after* the *Change Zoom State* symbol. This toolbar provides tools to increase and decrease the view zoom factor and to adapt the view in the *Vector Editor* window, see also section 8.6 Birdview.

Scale view by window changes the mouse pointer to a magnifying glass with a cross hair and lets you drag a bounding box over the area you want to zoom. Aspect ratio of the zoomed part will be adjusted to the *Vector Editor* window

Increase view scale zooms into the view. You can also achieve this effect by scrolling an (optional) mouse wheel away from you

Decrease view scale zooms out of the view. You can also achieve this effect by scrolling an (optional) mouse wheel toward you

Scale view to real size tries to scale the Vector Editor image closely to the real output size. On many output devices, like e.g. CRT-monitors, the width and height can vary in a wide range, therefor the view will often only approximate the real size

Scale view by factor opens a window where the zoom factor can be input

Scale view to current selection scales the view so that the selected object(s) fit(s) into the view

Fit page to window scales the view so that the whole output area fits into the *Vector Editor* window

Fit page height to window scales the view so that the output area height fits into the *Vector Editor* window

Fit page width to window scales the view so that the output area width fits into the *Vector Editor* window

Pan view pans a partial view in the *Vector Editor* window:

Step 1 Place the mouse pointer on a point in the *Vector Editor* view and hold the left mouse button pressed.

In that way you "grab" the drawing area.

Step 2 Drag the *Vector Editor* view moving the mouse pointer until the wanted partial view can be seen.

Step 3 Release the mouse button.

You may eventually repeat this procedure until the view is adjusted.

Measure length and angle measures the distance and angle between objects in the Vector Editor window:

Step 1 Place the mouse pointer on the start point in *Vector Editor*, where you want to begin your measurement, and hold the left mouse button pressed.

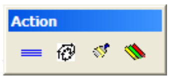
Step 2 Move the mouse pointer to the wanted end point.

As long as you hold the left mouse button pressed, a yellow rectangle will be shown at the left bottom edge of the *Vector Editor* window. In this rectangle the distance between start and end point and the angle between the line connecting these points and the coordinate system's X-axis will be shown.

Step 3 Release the mouse button.

7.4.2. Action

The *Action* toolbar combines possible user actions.



Refresh line data/Refresh DSP data refreshes the data shown in the *Vector Editor* window:

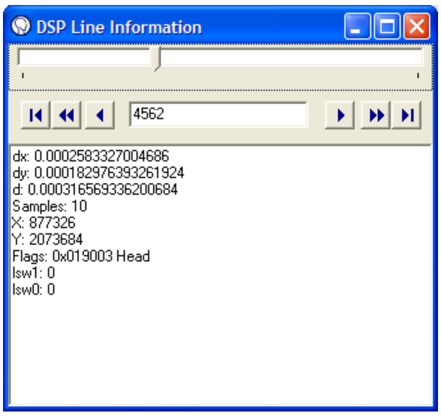
- In *Editor* mode: *Refresh line data* updates the line data calculated from the active job's tree structure, see section 7.1 Editor mode
- In *Preview* mode: *Refresh DSP data* updates the DSP data calculated by the controller's DSP (Digital Signal Processor), see section 7.2 Preview mode

After pressing , the button will change to until the refresh is done. While the refresh is in progress, it can be canceled by clicking the symbol.

Incremental Paint of DSP-Data opens the *Incremental View Of DSP-Data* window. This function is only available in *Preview* mode and only shows all data if a detailed mode with *Show Arrows* and *Show Head / Jump / Tail* is set, see section 7.4.3 View. Sequence, timing and other data of the DSP line data can be stepped through and visualized in *Vector Editor* using this tool. Use this tool for debugging or optimization.

NOTE

While a refresh is in progress, *Incremental Paint of DSP-Data* and some of the icons in toolbar *View* will not be available, see section 7.4.3 View.



Line Data slider use this slider to step through all line data displayed in *Vector Editor*. The stepping of the line data is reflected in the *Vector Editor* window while dragging the slider

First element jumps to the first element in the DSP line data

Previous line path jumps to the first line (head) of the previous line path

Previous element jumps to the previous element

Line Number input field you can enter a line number into this field. Up to this line the data will be output and the slider will be set to this line

Next element jumps to the next element

Next line path jumps to the first line (head) of the next line path

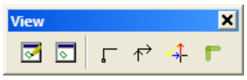
Last element jumps to the last element in the DSP line data

Redraw window refreshes the *Vector Editor* window

Show VectorEditor PenSettings Dialog opens the *Editor Pen-Settings* window, see section 8.4.14 Sub Category - Screen Styles / View Styles / Editor Mode *Vector Editor Pen Settings*

7.4.3. View

In the *View* toolbar you can configure the mode and style of the *Vector Editor* output.



Show Editor switches to *Editor* mode, see section 7.1 Editor mode. It toggles with

Show Preview switches to *Preview* mode, see section 7.2 Preview mode. It toggles with

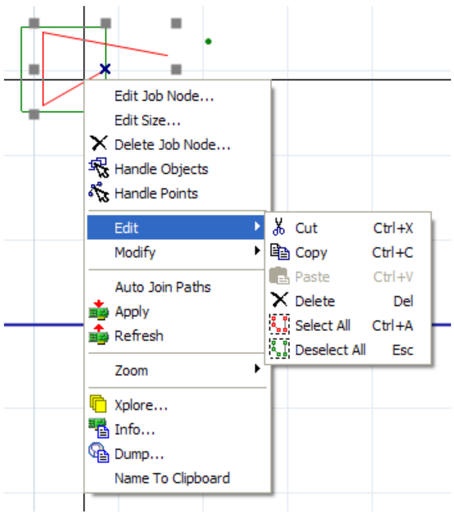
Show StartPoints shows the start points of line paths. This symbol is not active in *Preview* mode

Show Arrows shows processing direction arrows

Show Head / Jump / Tails shows head, jump and tail lines, see section 3.10 How InScript handles lines in general. This symbol is not active in *Editor* mode

Show Customized shows lines with customized line colours, width and transparency, see section 10.9 Visualize Stacked Objects in VE Edit and Preview Mode

7.5. Context Menu



The Vector Editor context menu handles all kinds of object related tasks.

NOTE

The Vector Editor's context menu's contents depend on the selected objects and on the current mode of the editor (handle objects, handle elements or handle points see 7.4.1 Mode). So not all of its entries are always available!

Edit Job Node open the Job editor of the node object beneath the cursor

Edit Transformation opens the parent *Transformation* node of an object. This item is only available, if the *Vector Editor* object has a *Transform* node as parent. This is automatically created if you scale or move the object

Edit Size opens a Width and a Height dialog for the node object beneath the cursor. This item is only working, if the *Vector Editor* object has a *Transform* node as parent. This is automatically created if you scale or move the object

Delete Job Node deletes the node object beneath the cursor after a security dialog

Handle Objects see 7.4.1 Mode *Handle Objects*

Handle Elements see 7.4.1 Mode *Handle Elements*

Handle Points see 7.4.1 Mode *Handle Points*

Edit to edit *Vector Editor* nodes in element or point mode use the *Edit* submenu

- **Cut** cut a selected element of the curent object in element mode to clipboard
- **Copy** copy a selected element of the curent object in element mode to clipboard
- **Paste** paste an element from clipboard to the current object in element mode
- **Delete** delete a selected element or point in the current object in element or point mode
- **Select all** select all elements or points in the current object in element or point mode
- **Deselect all** deselect all selected elements or points in the current object in element or point mode

Modify to Modify *Vector Editor* nodes in element or point mode use the *Modify* submenu. See 7.4.1 Mode *Point operator*

Auto Join Paths tries to automatically join paths at selected *line end* / *line start* point pairs that lie on the same coordinates

Apply Apply all changes to the controller board

Refresh Refresh settings from controller board

Zoom to zoom in Vector Editor use the *Zoom* submenu (see also 7.4.1 Mode *Change Zoom State*)

- **Zoom In** zooms into *Vector Editor* at the current cursor position
- **Zoom Out** zooms out of *Vector Editor* at the current cursor position
- **Zoom To Object** zoom near the object under the cursor

Fit To Window scales the view so that the whole output area fits into the *Vector Editor* window

Xplore open the Xplorer at the object's variables that is under the cursor

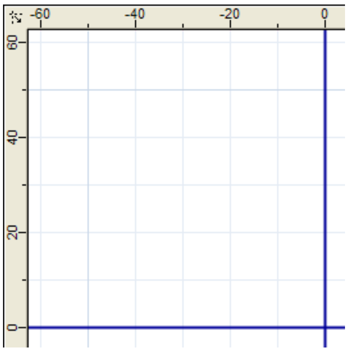
Info gives *Info* data of the object under the cursor

Dump gives *Dump* data of the object under the cursor

Name To Clipboard copies the ful path of the object under the cursor to clipboard

7.6. Rulers

Lines that extend from the mouse pointer show the actual position of the mouse pointer on the rulers.



7.6.1. Set Origin

Step 1 In the point of intersection of both rulers position the mouse pointer on the symbol

Step 2 Hold the left mouse button pressed and drag the mouse pointer to the desired position on the coordinate system

Step 3 Release the left mouse button.
The ruler origin is set to the actual position of the mouse pointer.

7.6.2. Center Origin

- To center the ruler origin in reference to the scan field, double click the symbol

7.7. Status Bar

The status bar contains following indicators (from the left to the right):

 shows the status in form of a color LED

 **red** The computing power of the system is fully required by the Vector Editor or another process. The Vector Editor is not ready and neither keyboard nor mouse input is possible

 **yellow** Line data is still requested. The Vector Editor is conditionally ready

 **green** The Vector Editor is ready

shows the zoom factor

shows the actual position (X,Y) of the mouse pointer

 shows the offset (dX, dY) during moving, the scaling factor (sX, sY) during scaling, the angle (dA) during rotating as well as the slant factor (slX, slY) during slanting of objects

shows a status text

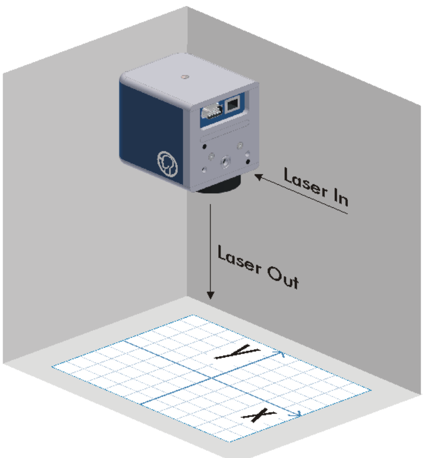
shows the number of selected objects

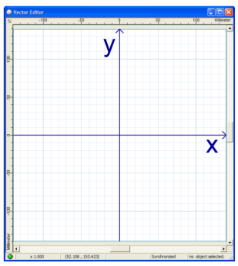
7.8. Coordinate System

The left figure shows how the coordinate system on the target beneath the scan head is oriented by default. How to change this scan field orientation on the target can be found in the *Manual -- Scan Head*.

NOTE

You will have to create a new scan field correction, if you do this. The right figure shows how the coordinate system is oriented by default in Vector Editor. How to change the page size and the orientation of the coordinate system in the Vector Editor can be seen under 8.4.15 Sub Category - Screen Styles / Page.





7.9. Manage Objects in Vector Editor

Graphical objects can be modified directly in *Vector Editor* if it is set to *Editor* mode (see 7.1 Editor mode) and a Job is selected in *Job Configuration* window using the *Show VectorEditor View* in the context menu.

You may create, select, offset, scale, rotate and slant an object. A corresponding *Transformation* node (see 5.8 Transform) *xf* will be automatically placed above the object(s) you edit in the Job tree in the *Job Configuration* window.

All these tranformations can also be achieved by making numerical inputs in parent *Transform* nodes (see 5.8 Transform), *Rotate* nodes (see 5.4 Rotate), *Scale* nodes (see 5.5 Scale), *Slant* nodes (see 5.6 Slant) or *Offset* nodes (see 5.7 Offset) of objects.

7.9.1. Add View of Node or Subtree from Job Configuration to Vector Editor

See also 4.6.27 Show VectorEditor View.

Step 1 Select the subtree root node you want to view in the Vector Editor view.

Step 2 In the context menu, click *Add Vector Editor View*.
The subtree lines are displayed in the Vector Editor view.

7.9.2. Remove View of Node or Subtree from Vector Editor

See also 4.6.28 Remove VectorEditor View.

Step 1 Select the subtree root node you want to remove from the Vector Editor view.

Step 2 In the context menu, click *Remove Vector Editor View*.
The subtree lines are removed from the Vector Editor view.

7.9.3. Create Objects

You may create an Object either in *Job Configuration* window (see 4 Job Configuration Window) or using the 7.4.1 Mode *Create Object(s)* tool bar.

7.9.4. Select Objects

To edit an object in *Vector Editor*, you can select it directly by clicking it with the mouse pointer (be sure you click on a line of the object to select it unless you set *Treat all objects as filled* in 8.4.6 Category - Vector Editor) or right click the node you want to edit in *Job Configuration* and select *Select in VectorEditor*. this can be helpful if several objects are stacked. See also chapter 4.6.29 Select in VectorEditor.

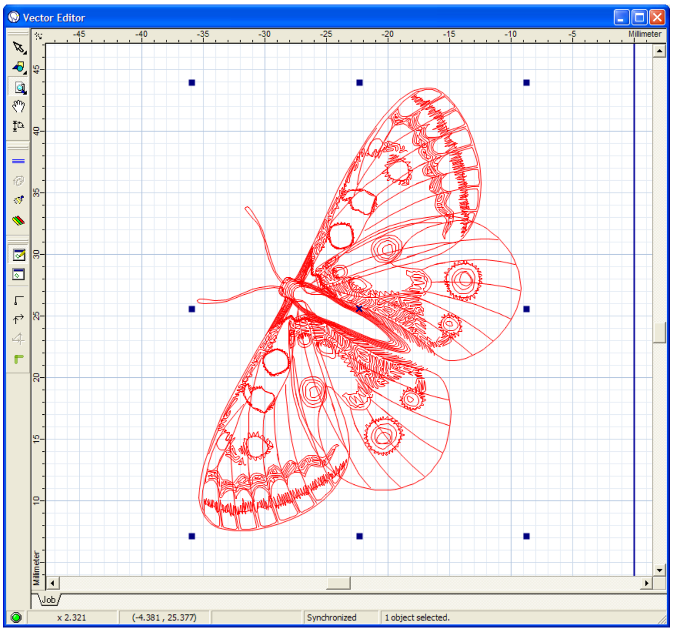
- Multiple objects can be selected by pressing `Shift` and sequentially click the objects
  --or
  click on a free space in the drawing area and open a dotted bounding box around all objects you want to select
- to seelct all objects in *Vector Editor* use *Select all objects* in the *Mode* toolbar (see 7.4.1 Mode)
- If Objects are stacked on each other you can select them by pressing `Alt` and clicking the objects until the wanted is selected.

7.9.5. Deselect Objects

To deselect a single object, hold the `Shift` key and click the object in *Vector Editor* or right click the selected node you want deselect in *Job Configuration* and select *Deselect in VectorEditor*. this can be helpful if several objects are stacked. If you want to deselect all selected objects, just click on a clear space in the editor.

7.9.6. Offset (Move) Objects

To move objects, just click on the object a bounding box around the object with an X in the middle wll be shown.

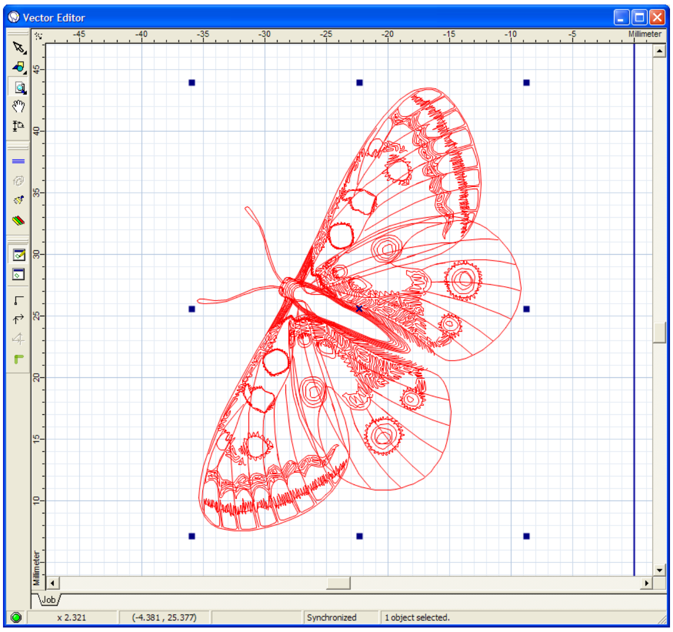


If you click and drag the X then the object will be moved.

The exact offset will be shown in the Vector Editor status bar (see 7.7 Status Bar).

7.9.7. Scale Objects

To scale objects, just click on the object a bounding box around the object with rectangles along the side will be shown.

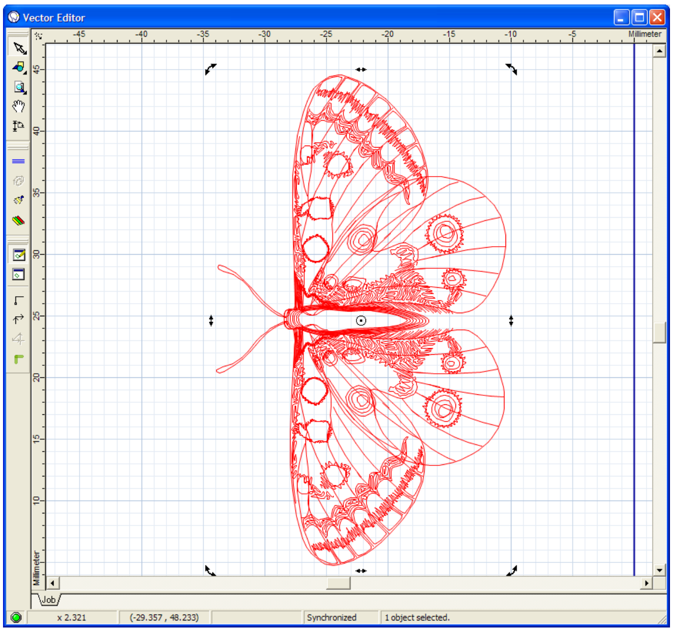


- If you click and drag one of the rectangles on the corners of the bounding box, the object will be scaled mainaining its aspect ratio
- If you click and drag one of the rectangles on the sides of the bounding box, the object will only be scaled in the direction of the mouse movement loosing its aspect ratio
- If you additionally press `Shift` while scaling an object, it will be scaled expanding from its center
- If you additionally press `Control` while scaling an object, it will be scaled in steps as defined under 8.4.6 Category - Vector Editor *Stepwidths for stepwise operations*.

The exact scaling amount will be shown in the Vector Editor status bar (see 7.7 Status Bar).

7.9.8. Rotate Objects

To rotate objects, just slowly click *twice* on the object a bounding box around the object with rounded arrows at the corners will be shown.



- If you click and drag one of the rounded arrows on the corners of the bounding box, the object will be rotated

- To move the rotation center, just click and drag the point and circle in the center of the object to the desired position

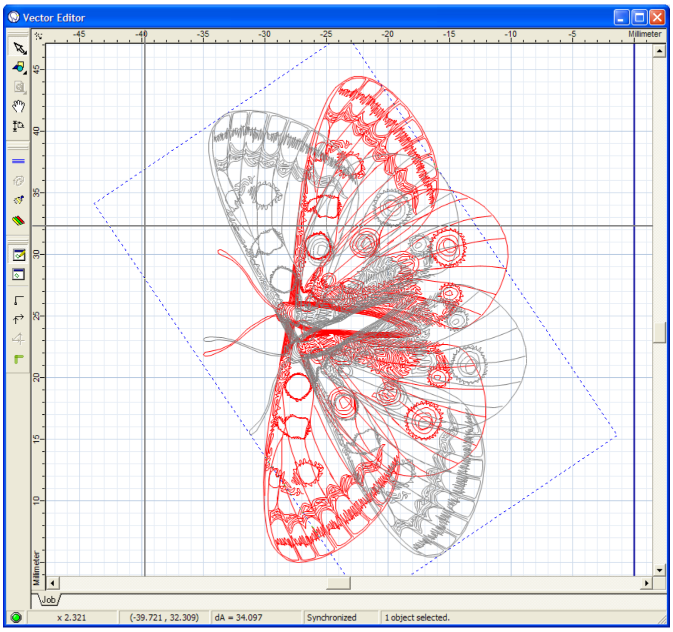
- To modify the rotation center of the object right click the point and circle in the center of it. A context menu with he following items is shown:

  Set RotationCenter a *Set rotation center* window opens. Here you can enter the inates of the rotation center in absolute or offset coordinates

  Reset RotationCenter resets the rotation center to the center of the object

  Reset X-Position only only resets the rotation center's x coordinate to the center of the object

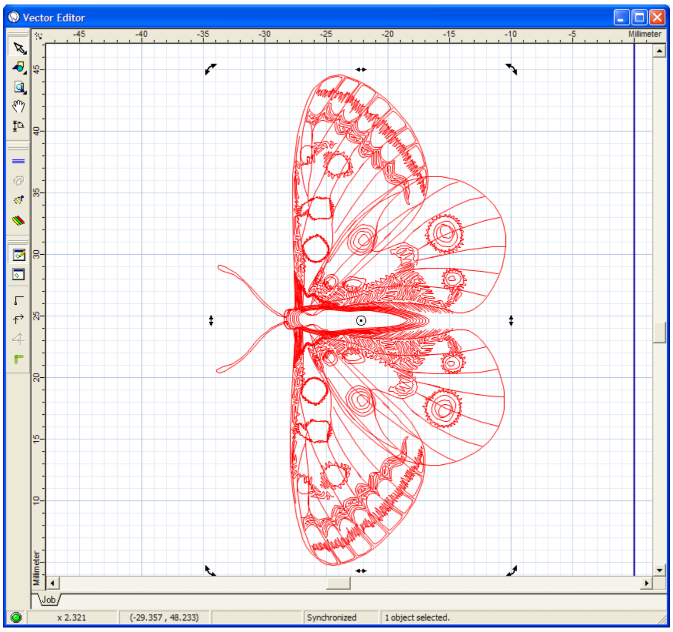
  Reset Y-Position only only resets the rotation center's y coordinate to the center of the object



The exact rotation in degree will be shown in the Vector Editor status bar (see 7.7 Status Bar).

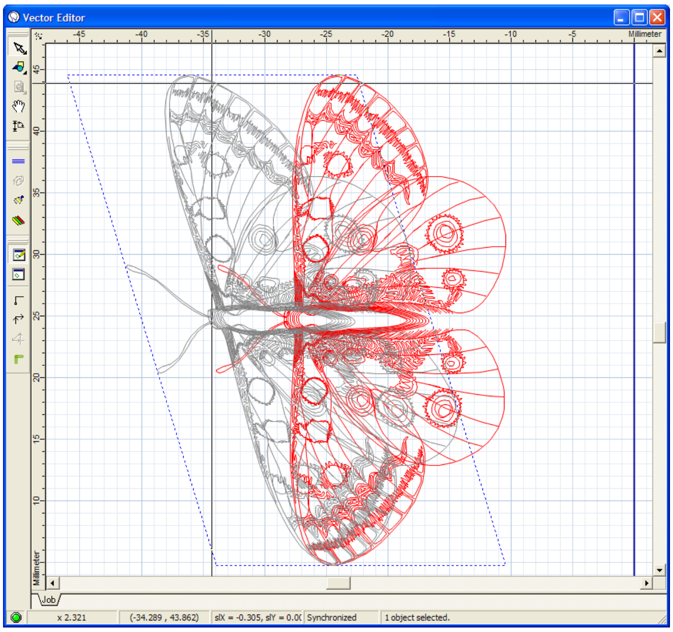
7.9.9. Slant Objects

To slant objects, just slowly click *twice* on the object a bounding box around the object with double arrows at the sides will be shown.



- If you click and drag one of the double arrows on the side of the bounding box, the object will be slanted
- If you additionally press `Shift` while slanting an object, it will be slanted around its center

- If you additionally press `Control` while slanting an object, it will be slanted in steps as defined under 8.4.6 Category - Vector Editor *Stepwidths for stepwise operations*.



The exact slant amount will be shown in the Vector Editor status bar (see 7.7 Status Bar).

7.9.10. Keyboard Shortcuts

While working with the *Vector Editor* some actions can be done using keyboard shortcuts instead of using the mouse.

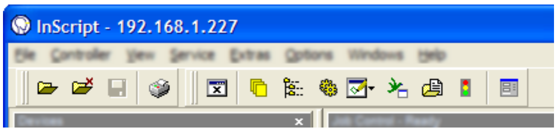
Shortcut	Description
F5	redraws the window
Ctrl + A	select all objects
ESC	de-selects all objects
Tab	selects next object, if no or exactly one object is selected
Shift + Tab	selects previous object, if no or exactly one object is selected
Del	deletes selected object(s) after a confirmation
←, ↑, ↓ or →	moves the selected object left, up, down or right
Ctrl + ←, ↑, ↓ or →	moves the selected object in small steps left, up, down or right
Shift + ←, ↑, ↓ or →	moves the selected object in bigger steps left, up, down or right

8. Toolbars, Menus and Other GUI Components

All remaining GUI components are described in this chapter. Most of them are accessible via InScript Windows toolbar or using the InScript menu.

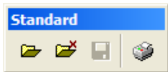
8.1. InScript Toolbars

Here is an overview of the InScript Window main toolbars.



8.1.1. Standard Toolbar

Here you can see the *Standard* toolbar undocked:



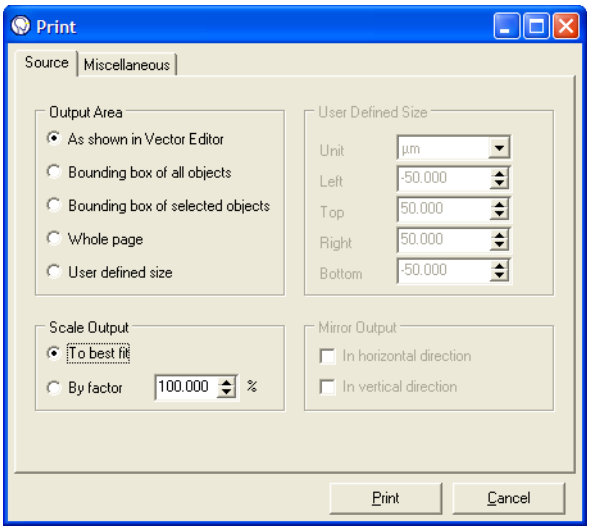
Open Job opens the *Open* file dialog. Here you can load a *Job* file (see 4.6.3 Open Job). You may use `Ctrl+O` to access this function

Clear + Load Job opens the *Open* file dialog. After you choose a job file, and open it, all nodes under *Exec* will be cleared and the selected job is loaded (see 4.6.9 Clear and Load Job)

Save Job if the cursor in *Job Configuration* opens the *Save Job* window. If the cursor in the *Job Configuration* window window is on a job, you can save it clicking this icon (see 4.6.5 Save Job)

Show ProntOptions dialog, then print output on Form if the *Vector Editor* window is active, clicking this icon opens the *Print* window

Source Tab in this tab the graphics area to print is defined



Output Area selects the area, that shall be printed

As shown in Vector Editor prints the current Vector Editor view

Bounding box of all Objects prints all objects

Bounding box of selected Objects prints selected objects

Whole page prints the whole output area

User defined size prints a part of the output area, as defined in group *User defined sector size*

User Defined Size

Unit selects the unit for all values in this group. Possible values are μm, mm, cm and m

Left, Top, Right, Bottom size of the printed area with regard to the coordinate system in the *Vector Editor* window

NOTE

Enter only valid coordinates, i.e. Left < Right, Top > Bottom.

Scale Output selects the scale the area shall be printed with

To best fit the print area is scaled that it fits best onto the paper (aspect ratio is preserved)

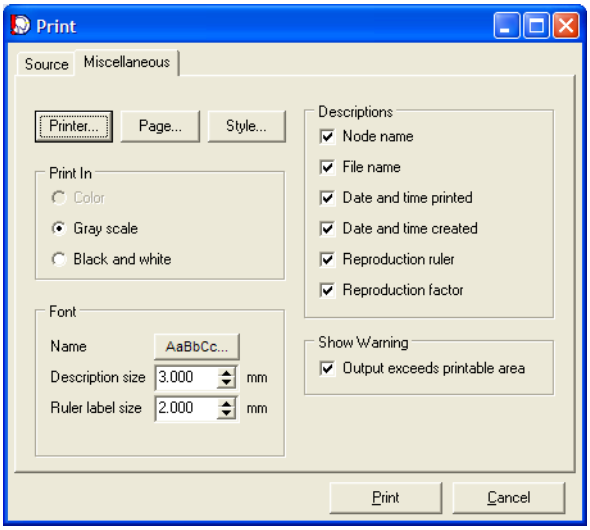
By factor the area is scaled to the given factor

Mirror Output mirrors the output as specified

In horizontal direction if this check box is selected the output is mirrored in horizontal direction (not implemented if grayed)

In vertical direction if this check box is selected the output is mirrored in vertical direction (not implemented if grayed)

Miscellaneous tab more output options can be set in this tab



Printer opens the category *Global* → *Printing* → *Printer-Settings* in preferences

Page opens the category *Global* → *Printing* → *Page Margins* in preferences

Style opens the category *Editor* → *Printer-Styles* → *Common* in preferences.

> **NOTE**
>
> Preferences categories *View-Styles*, *Page* and *Grid* also contain settings that affect printing.

Print In

- **Color** prints the lines in color on a color printer

  > **NOTE**
  >
  > The used printer has to be configured for color printout.

- **Gray scale** prints the lines in gray scales
- **Black and white** prints in black and white

Descriptions

- **Node name** if this check box is selected then the node name will be printed in the upper info area
- **File name** if this check box is selected then the file name will be printed in the upper info area
- **Date and time printed** if this check box is selected then the current date/time will be printed in the upper info area
- **Date and time created** if this check box is selected then the file date/time will be printed in the upper info area
- **Reproduction ruler** if this check box is selected then a ruler and the scale will be printed in the lower info area
- **Reproduction factor** if this check box is selected then the zoom factor will be printed in the lower info area

Font

- **Name** opens the *Select Font* window
- **Description size** sets the info text size
- **Ruler label size** sets the ruler label size

Show Warning

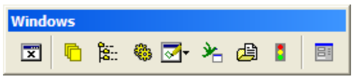
- **Output exceeds printable area** if this check box is selected and the output area does not fit to the printable area then a warning will be displayed

Print prints the defined graphics area

Cancel cancels printing

8.1.2. Windows Toolbar

Here you can see the *Windows* toolbar undocked:



Close Job Editors close all job editors (see 8.2 Close Job Editors)

Show Xplorer opens an *Xplorer* window (see 8.5 Xplorer)

Show Job Configuration opens the *Job Configuration* window (see 4 Job Configuration Window) if it is not already open

Show Devices opens the *Devices* window (see 2 Devices Window) if it is not already open

Show Vector Editor opens the *Vector Editor* window (see 7 Vector Editor Window) if it is not already open. If you click on the black triangle, you may choose the *Vector Editor* mode *Editor* (see 7.1 Editor mode) or *Preview* (see 7.2 Preview mode)

Show Birdview opens the *Birdview* window (see 8.6 Birdview)

Show Quick Settings opens the *Quick Settings* window (see 8.7 Quick Settings)

Show System Status opens the *System Status* window (see 8.8 System Status)

Show Preferences Dialog opens the Preferences Dialog (see 8.4 Preferences). You may use `Ctrl+P` to access this function

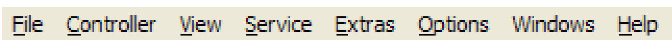
8.2. Close Job Editors

Sometimes *Job Editors* "get lost" behind the main InScript window. If you want to be sure that all of these editors are closed use this functionality.

To close **all** open Job Editor windows click on *Close Job Editors* in InScript *Windows* toolbar or press *Shift + F4*.

8.3. InScript Menu

Here is an overview of the main menu items of InScript.



8.3.1. File

New Job inserts a new Job node into the subtree *Exec* in *Job Configuration* window

Open Job opens a job file

Load File opens a job or graphics file

Save Job saves a job. If several jobs are available then a menu is displayed where the job can be selected

Save Job As saves a job under a new name. If several jobs are available then a menu is displayed where the job can be selected

Save All User Files saves all subtrees which have a Job node as parent node

<File History> shows the recently opened jobs. You can select any dissplayed job to load it

Close Board closes the InScript window of the current controller. If the last InScript window is closed then the InScript software is closed

Exit InScript exits InScript

8.3.2. Controller

Configure opens the *Board Configuration* window (only on NCC controller)

Save Devices and Default Pen (NVRam) saves the devices and the default pen to the controller's NVRam (NCC) or to a file on the controller (ASC)

Flash opens the *Open* window, from where the firmware or a backup can be loaded to the controller (only on NCC controller)

Backup opens the *Save As* window, where the firmware or a backup can be saved from the controller (only on NCC controller)

Delete opens the *Delete* window, where to choose which data shall be deleted from the controller (only on NCC controller)

Reset resets the controller after a confirmation (only on NCC controller)

Reconnect re-connects the controller after a confirmation (only on ASC controller)

8.3.3. View

Controllers if several controller boards are in one PC and/or remote controllers are connected (see 8.4.23 Sub Category - Startup for more information how to configure multiple controllers) then InScript windows for further controller boards can be opened from this list. you may also open windows for controllers that were newly added via 8.4.23 Sub Category - Startup

Job Control opens the corresponding window (6 Job Control Window). If the menu item is checked then the window is already open

Job Configuration opens the corresponding window (4 Job Configuration Window). If the menu item is checked then the window is already open

Birdview opens the corresponding window (8.6 Birdview). If the menu item is checked then the window is already open

Editor opens the *Vector Editor* window (7 Vector Editor Window). If the menu item is checked then the window is already open. In a sub menu the *Vector Editor* modes Editor or Preview can be toggled. A dot shows which of the VE modes is active

Quick Settings opens the corresponding window (8.7 Quick Settings). If the menu item is checked then the window is already open

Devices opens the corresponding window (3 Devices). If the menu item is checked then the window is already open

System-Status opens the corresponding window (8.8 System Status). If the menu item is checked then the window is already open

Messages opens the corresponding window (8.10 Messages). If the menu item is checked then the window is already open

Filesystem Browser very rudimentary controller file system browser. If the menu item is checked then the window is already open

Node Inspector opens the corresponding window (8.9 Node Inspector). If the menu item is checked then the window is already open

Xplorer opens the corresponding window (8.5 Xplorer). If the menu item is checked then the window is already open. Multiple Xplorer may be opened

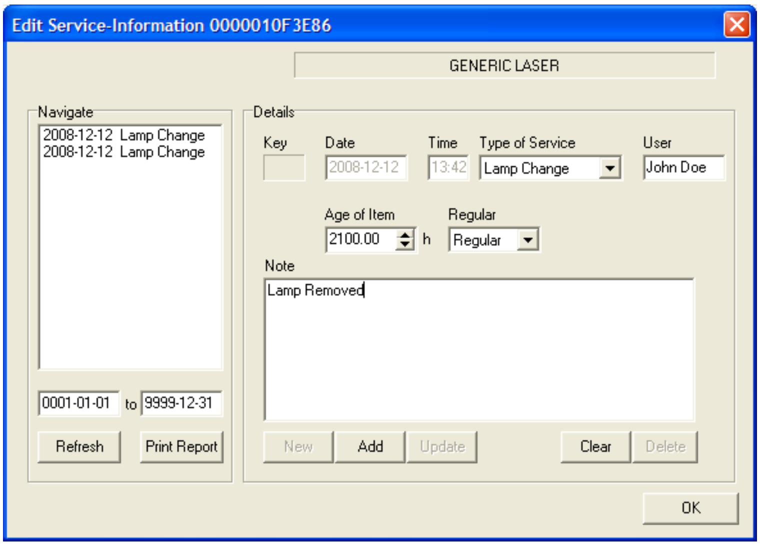
Load Layout loads a saved layout of windows (8.17.4 Save/Load Window Layout)

Save Layout saves the current layout of all windows and their state (8.17.4 Save/Load Window Layout)

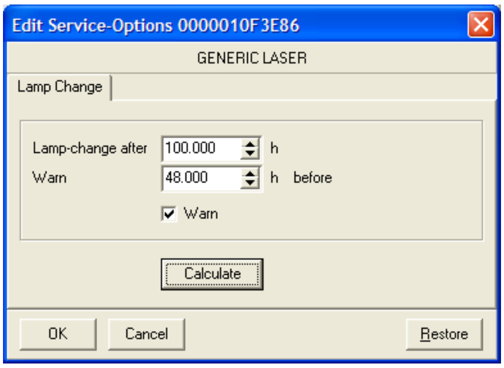
Mode in a sub menu you may toggle between Operator and Supervisor mode (9 Supervisor and Operator Mode). A dot shows which of the modes is active

8.3.4. Service

Service Data opens the Edit Service-Information window, where service events of your laser can be managed. To create a new entry in the *Navigate* list click the button *Add*. If you double click on a list item in the *Navigate* list, the data for this entry is displayed and can be modified. This dialog is laser specific



Service Options opens the Edit Service-Options window, where service intervals that will be displayed automatically can be set. This dialog is laser specific and not available for all laser types. The laser (e.g. CW200S, IDAR, SL902, Generic Laser, Lasag Laser, Haas Laser oder SL 4xx/8xx) has to be *active* or in a *failure* state to have this menu option available



8.3.5. Extras

Beam Profiler opens the Beam Profiler window, where a beam profile can be analyzed (8.11 Beam Profiler)

Video Capture Device opens a video capture device dialog (a video capture device is required see 8.12 Video Capture Device)

Align Target opens the *Align Target* window, by which targeting tools (cross-hair or a target image) can be positioned in the scan field (frame grabber required see 8.13 Align Target)

Convert Font to FDT opens the *Select Font* window. After selecting a font it can be saved in FDT format that is supported by ARGES controler (8.14 Convert Font to FDT)

Create Support-Info opens the *InScript Support-Info Wizard* (8.16 Create Support Info)

8.3.6. Options

Preferences opens the Preferences window to set all basic settings (8.4 Preferences

Administrator Password opens the Password window to set the password for toggling between operator and administrator mode (9.1 Set and Edit Password)

Password active activates or deactivates the operator and administrator mode password. If the menu item is checked then the password is active (9.2 Activate and Deactivate Password)

8.3.7. Windows

Close Job Editors closes all open job editor windows. Also hidden job editor windows (e.g. behind the main window) are closed

<Window list> hidden windows (e.g. behind the main window or other windows) can be accessed from this list and sent to the front. If a window is out of bounds (viz. its coordinates are outside of the visible desktop coordinates) and you selcet it from the *Windows* menu, this window is moved to visible coordinates and to the front

8.3.8. Help

Contents n/a

Index n/a

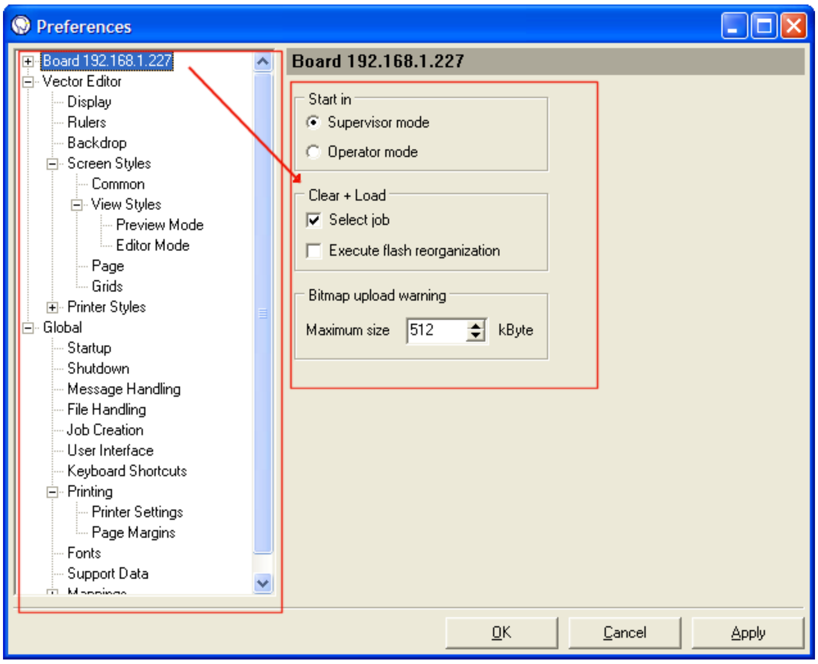
Find n/a

How n/a

About displays detailed information about ARGES, the software version and firmware version

8.4. Preferences

In the Preferences window the preferences for InScript are set. The possible settings are combined in categories and presented in a hierarchical tree structure. This structure groups preferences in related topics.

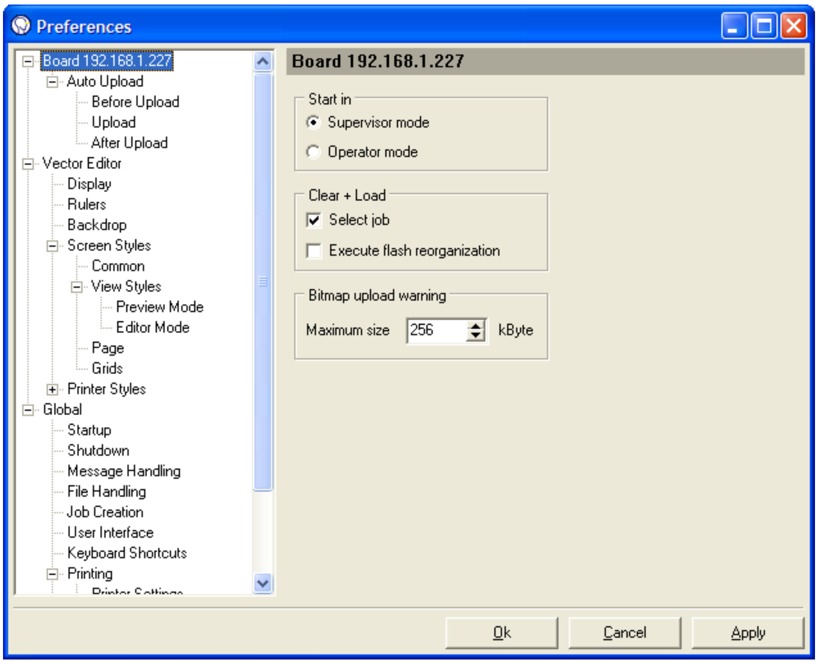


The Preferences window is seperated in two parts. Te left part is a tree that is arranged in categories. If you choose a topic on the left side of the window, then you will get the related parameters on the right side of the dialog.

To open the Preferences window press *Show Preferences dialog*  in InScript *Windows* toolbar, use *Options* / *Preferences* in the main menu or press *Ctrl + P* simulataneously.

8.4.1. Category - Board nnnnnnnn or xxx.xxx.xxx.xxx

In category Board preferences are made for each individual controller board. NCC Controllers will be represented by their number (nnnnnnnn) and ASC Controllers by their IP address (xxx.xxx.xxx.xxx).



Start in selects, whether the Board window is opened in Supervisor mode or in Operator mode on initial start (9 Supervisor and Operator Mode)

Supervisor mode all available information and settigns will be displayed in InScript

Operator mode only the information necessary for operation will be displayed in InScript

Clear + Load selects, how InScript will behave when you click the symbol in the *Standard* tool bar

Select job if this check box is selected then the job automatically will be selected for execution

Execute flash reorganization if this check box is selected then the controller board flash memory will be reorganized before loading a job

Bitmap upload warning **Maximum size** size of a bitmap file on the controller board above which a warning will be displayed and the file will not be uploaded. Enlarge this value to be able to upload larger files to the controller.

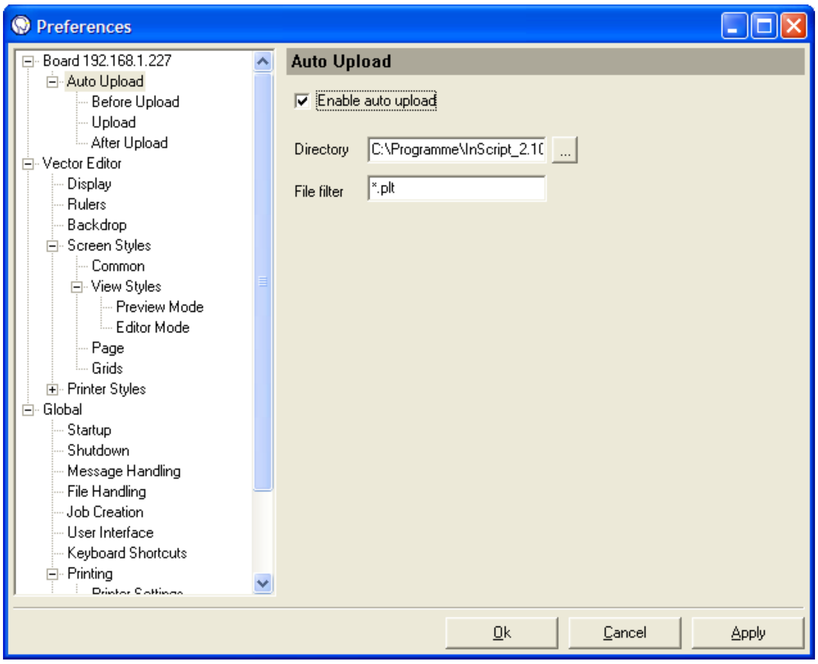
NOTE

Do not enlarge this value too much (esp. on NCC controllers) because only a limited amount of memory is available. Better use *Streaming* for bitmaps in that case (see 5.13.1 Edit - General)!

If bitmap files are uploaded to the controller board then they are automatically converted into bitmap files with a color depth of 8 Bit gray scales. A bitmap file, which has e.g. a color depth of 24 Bit and a file size of 500 kByte, needs on the controller board approx. 170 kByte.

8.4.2. Category - Auto Upload

Using the settings in Auto Upload you decide, if and when InScript automatically uploads files from a local folder to the controller board.



Enable auto upload if this check box is selected then InScript searches in a defined folder on the PC or on the network. The folder's contents will be uploaded to the controller board and eventually executed (see 8.4.3 Sub Category - Before Upload, 8.4.4 Sub Category - Upload and 8.4.5 Sub Category - After Upload)

Directory sets the folder in which InScript will search for auto load data

 opens the *Browse for Folder* window, where you can select the folder in which InScript shall search

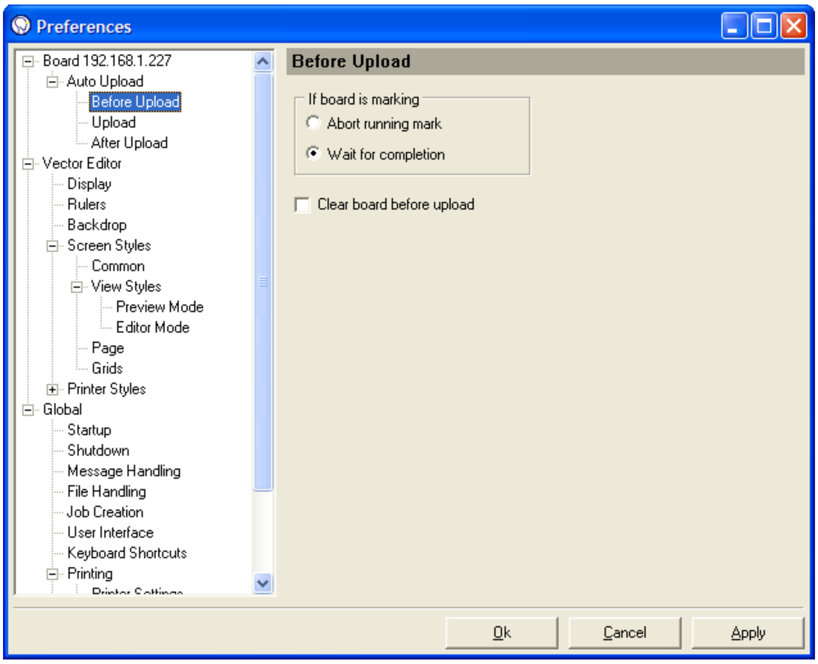
File filter sets the filter for filename(s) which shall be uploaded from *Directory*

8.4.3. Sub Category - Before Upload

Using the settings in *Before Upload* you define how InScript shall behave before files are automatically uploaded from a folder to the controller board.

NOTE

Only if the check box *Enable* auto upload is selected in category *Auto Upload* then it is possible to make any settings here.



If board is marking

Abort running mark if a *File filter* file is present in the *Auto Upload Directory* then the running job will be aborted

Wait for completion if a *File filter* file is present in the *Auto Upload Directory* then the running job will be completed

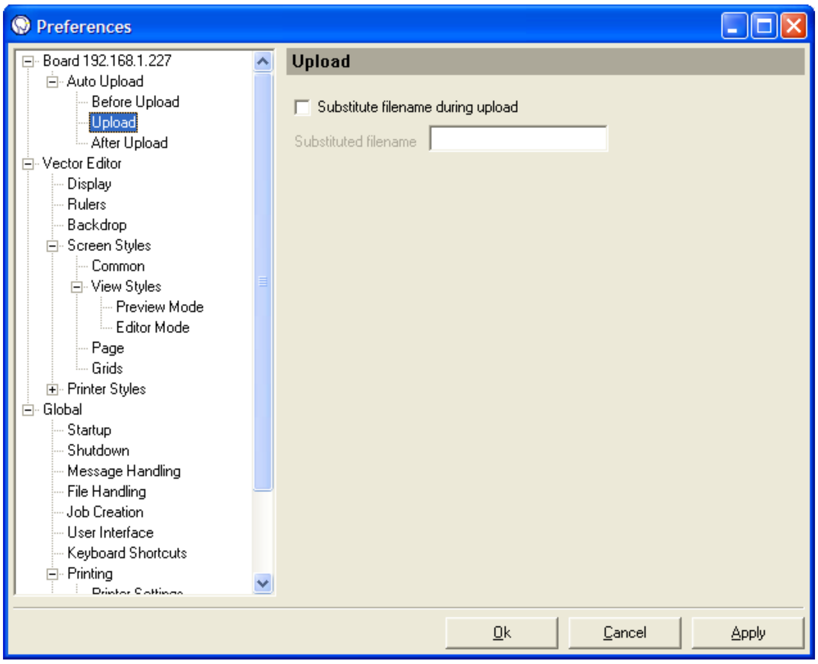
Clear board before upload if this check box is selected then the user data (jobs, files, pens etc.) will be deleted from the controller board before the sought-after file(s) will be uploaded

8.4.4. Sub Category - Upload

Using the settings in *Upload* you define, if the file shall be uploaded having a new name to the controller board and which name the file shall get.

NOTE

It is only possible to make any settings here if the check box *Enable auto upload* is selected in category *Auto Upload*.



Substitute filename during upload if this check box is selected then the file will be uploaded with the new name defined in *Substituted filename* to the controller board

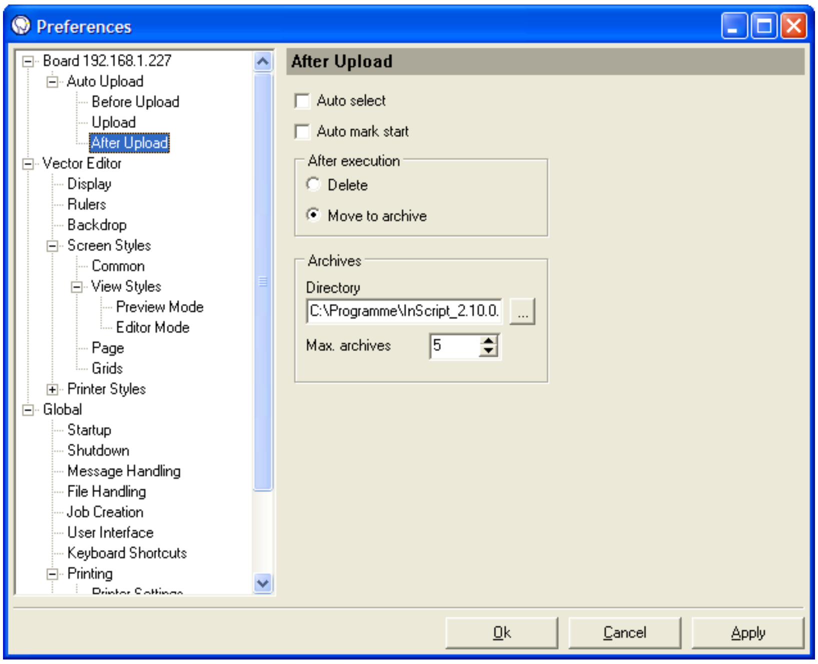
Substituted filename sets the new name under which the file will be uploaded to the controller board

8.4.5. Sub Category - After Upload

Using the settings in *Upload* you define, how InScript shall behave after files were automatically uploaded from a folder to the controller board.

NOTE

It is only possible to make any settings here if the check box *Enable auto upload* is selected in category *Auto Upload*.



Auto select if this check box is selected then the uploaded file will be automatically selected for execution

Auto mark start if this check box is selected then the job will automatically be started as soon as the file was uploaded

After execution selects, how the file shall be handled after the job was executed

Delete the file will be deleted from the file system

Move to archive the file will be moved to an archive folder (see Archives in this section)

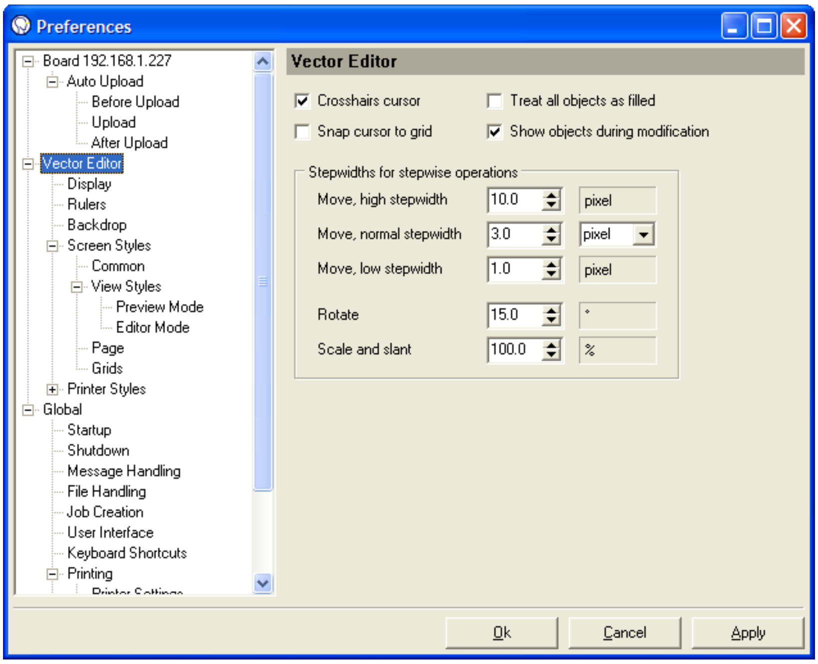
Archives **Directory** sets the archive folder name, where the file will be moved to (see After execution in this section)

opens the *Browse for Folder* window, where you select the archive folder. The file will be moved to a new sub folder in the archive folder

Max. archives sets the maximum number of sub folders in the archive folder that will be created. If this number is exceeded then the oldest sub folder will be deleted and replaced by the new sub folder

8.4.6. Category - Vector Editor

In this category the basic properties of the Vector Editor window are set.



Haircross cursor if this check box is selected then a haircross cursor is displayed in addition to the mouse pointer

Treat all objects as filled if this check box is selected then all objects will be handled like filled objects. To select a "filled" object click on a place within the outline of the object. If the check box is cleared then its outline has to be clicked to select the object

Snap cursor to grid if this check box is selected, the haircross cursor snaps to the *Vector Editor* grid. The grid properties can be defined in section 8.4.16 Sub Category - Screen Styles / Grids and 8.4.21 Sub Category - Printer Styles / Grids

Show objects during modification if this check box is selected and you modify (e.g. move, rotate) a object in *Vector Editor* then the object will be shown during modification. If the check box is cleared then only a frame (bounding box) will be shown instead of the object. We recommend to de-select the check box to speed up execution when objects have many lines

Stepwidths for stepwise operations this group combines settings for widths of stepwise operations in *Vector Editor*

Move, high/normal/low stepwidth sets 3 stepwidths for moving objects with the *arrow keys*, *Alt-arrow keys* and *Shift-arrow keys* in *Vector Editor*.

unit for the stepwith drop down

pixel the stepwidth is given in screen pixel

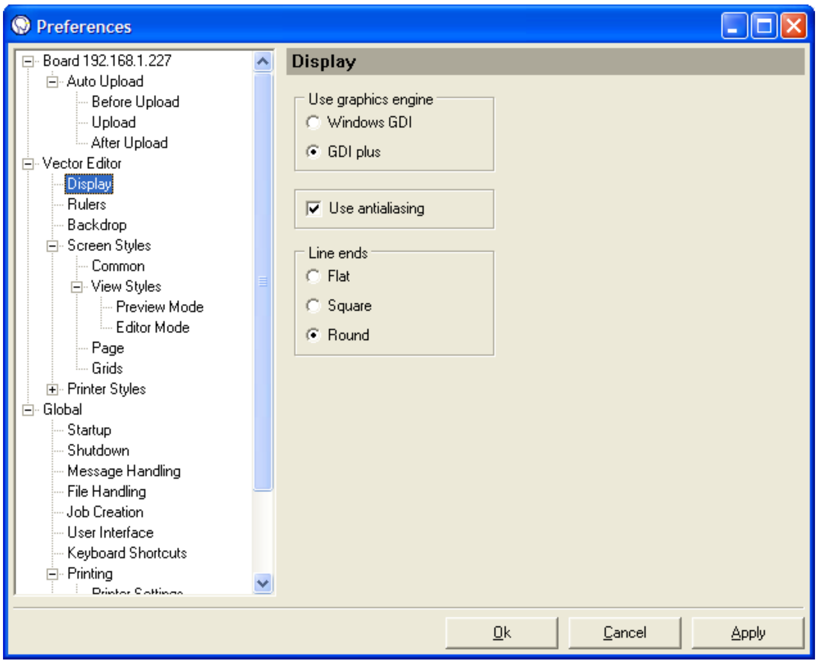
µm the stepwidth is given in µm

Rotate sets the rotation angle stepwidth used when objects are rotated by holding the *Ctrl* key pressed at the same time

Scale and slant sets the scale and slant stepwidth used when objects are scaled or slanted by holding the *Ctrl* key pressed at the same time

8.4.7. Sub Category - Display

In this category the basic properties of the display are set.



Use graphics engine here you can set the Windows graphics engine that shall be used for *Vector Editor*

Windows GDI Windows **G**raphics **D**evice **I**nterface

GDI plus **G**raphics **D**evice **I**nterface plus

Use antialiasing if this check box is selected then the lines will be antialiased in the *Vector Editor*

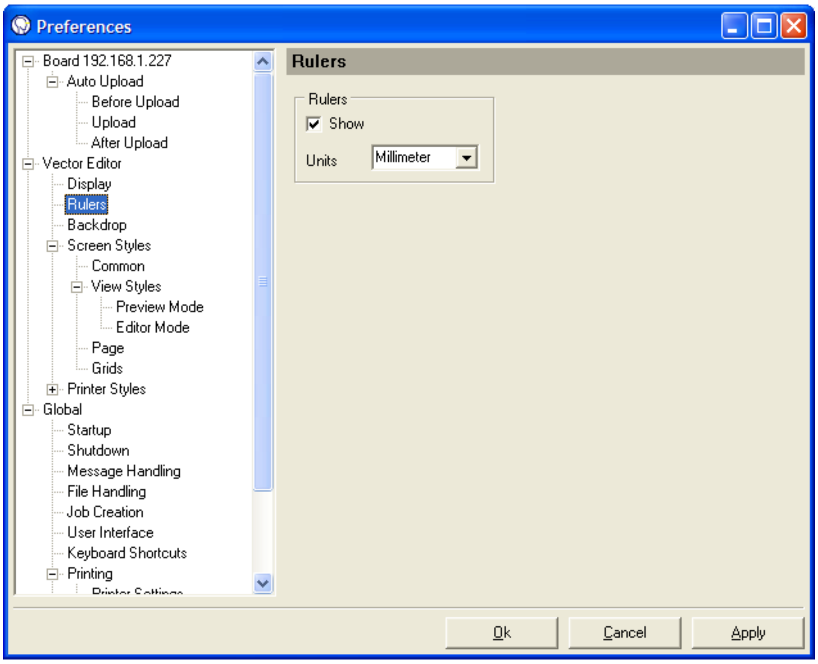
Line ends in *Vector Editor* lines are shown with a width that can be set in section 8.4.13 Sub Category - Screen Styles / View Styles / Preview Mode 8.4.14 Sub Category - Screen Styles / View Styles / Editor Mode. In the Line ends group you define, how the line ends look like. The result is shown in the following figure. (The line with its end point is black and the line, how it can be seen in the Vector Editor, is gray.)

Flat 

Square 

Round 

8.4.8. Sub Category - Rulers



Rulers

Show if this check box is selected then rulers are shown at the left and upper edge of the *Vector Editor* drawing area

NOTE

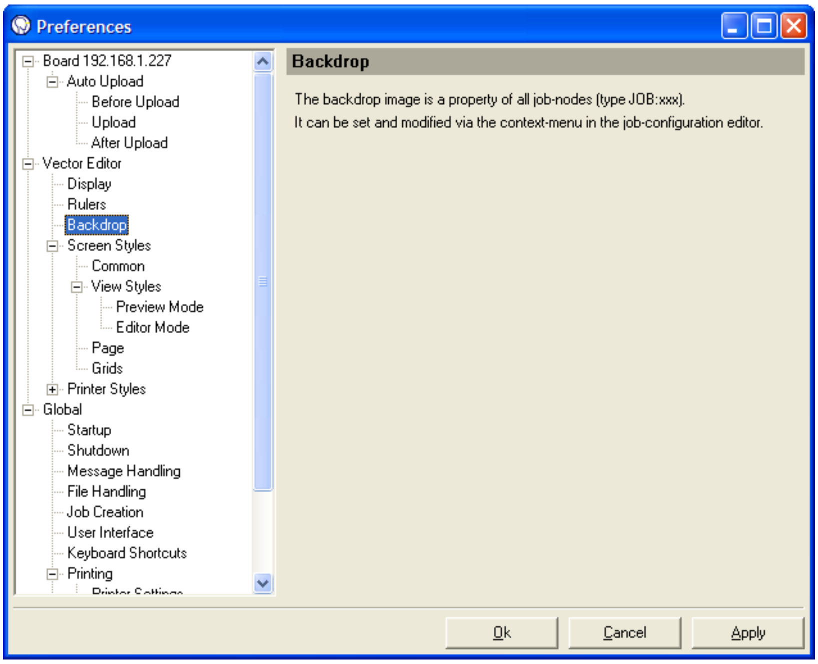
To open this category automatically, double click the rulers in the *Vector Editor* window.

Units sets the unit, the rulers are labeled with

List Items	Description
meter, decimeter, centimeter, millimeter, micrometer, yard, feet, inch, 1/10 inch, 1/100 inch, 1/1000 inch	possible units the rulers are labeled with

8.4.9. Sub Category - Backdrop

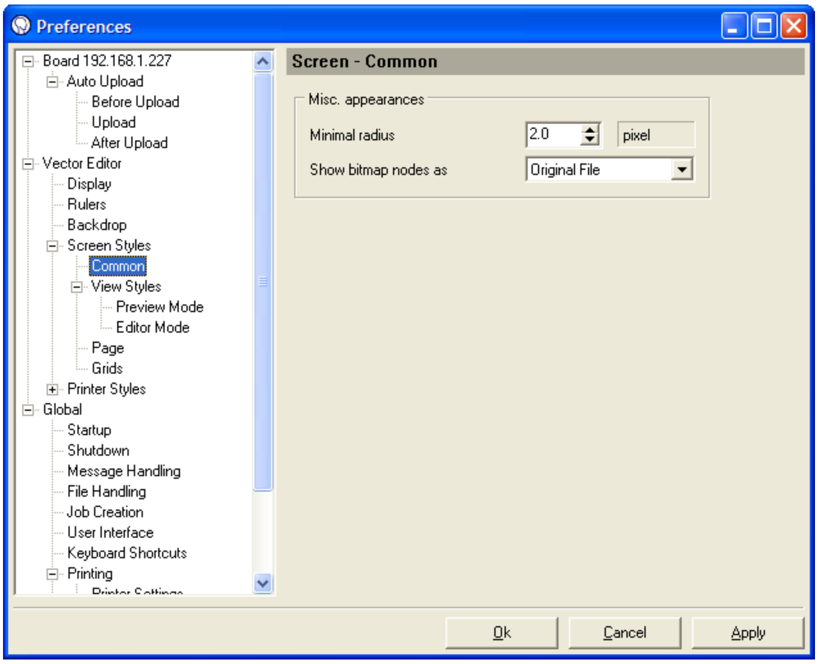
The backdrop image is a special property of job nodes. Set the backdrop image as described in 4.6.30 Edit Backdrop Property.



8.4.10. Sub Category - Screen Styles

In this category the object styles for the *Vector Editor* window are set.

8.4.11. Sub Category - Screen Styles / Common



Misc. appearances

Minimal radius pixel sets the minimal radius Segment Start Points and single Points (Dots) that are shown within the *Vector Editor*. This way small objects stay visible even if you zoom out in *Vector Editor*

Show bitmap nodes as sets, how images of *Bitmap File Link* nodes or *Bitmap* nodes are shown

Simple Frame the image is shown as frame (bounding box)

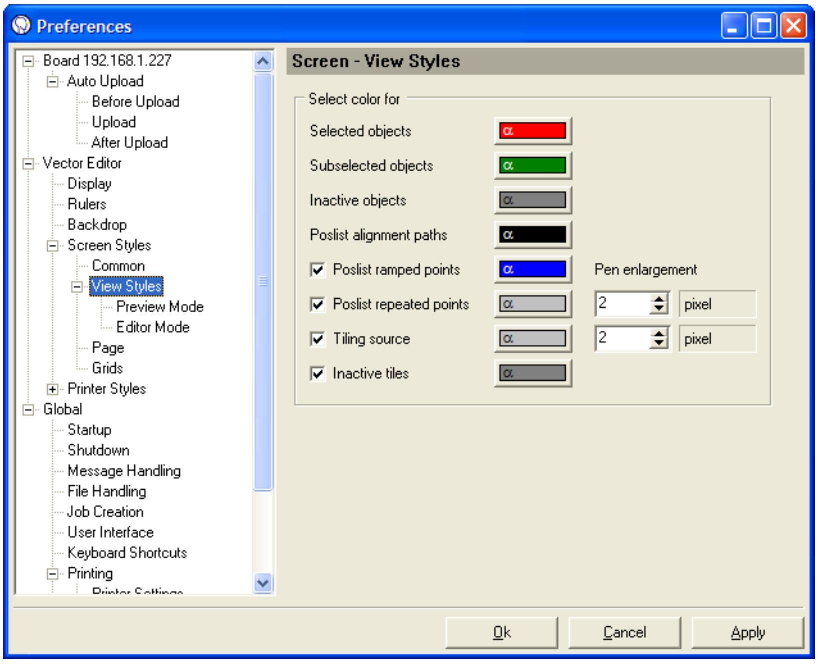
Default Bitmap instead of the image the ARGES logo is shown

Original File the image is shown like it is in the original file, i.e. eventually in color

Gray Converted the image is shown in gray scale

8.4.12. Sub Category - Screen Styles / View Styles

In this category the graphical object properties are set for the *Vector Editor* view.



Select color for these settings select colors for *Vector Editor* objects

Selected objects sets the color used for objects selected in the Vector Editor

Subselected objects some nodes, like e.g. Mat2Off (see 5.36 Mat2Off), consist of several sub nodes. Depending on the handle mode these nodes are handled as entire objects, elements or points. *Subselected objects* sets the color for elements or points if this node is selected in the Vector Editor

Inactive objects sets the color used for objects not selected in the *Vector Editor* view

Highlighted objects sets the color used for objects selected e.g. in the *PosList* node in the *Vector Editor* view

PosList alignment paths sets the color used for PosList node Alignment Paths (see 5.43 PosList) in the *Vector Editor* view

PosList ramped points sets the color used for PosList node Ramped Points (see 5.43 PosList) in the *Vector Editor* view

PosList repeated points sets the color used for PosList node Repeated Points (see 5.43 PosList) in the *Vector Editor* view

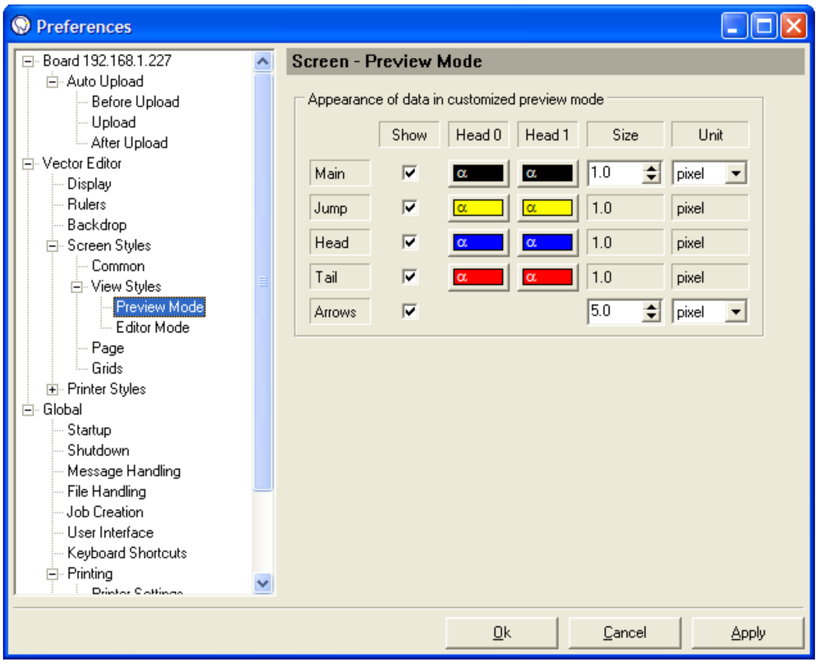
Tiling Source sets the color used for the Tiling Source (see 5.47 Tiling), when the *Vector Editor* view is activated for a tile

Inactive Tiles sets the color used for tiles not selected in the *Vector Editor* view, when the *Vector Editor* view is activated for a tile

Pen enlargement pixel enlarges the objects *PosList* repeated points and *Tiling Source* by the set value. This makes the display of these objects more clear

8.4.13. Sub Category - Screen Styles / View Styles / Preview Mode

In this category the graphical object properties are set for the Vector Editor preview mode, customized style. Some of these parameters affect the display of the line handling.



The *Appearance of data in preview mode* group input boxes are combined in a table. The graphical objects are arranged in rows. Their properties are arranged in columns.

Explanation of the **rows**. Settings can be made for the following graphical objects. These settings affect only the preview mode with head, jump, tails and arrows:

Graph. object	Description
Main	Lines
Jump	Jumps, i.e. scan head movements with the laser deactivated
Head	Correction or "acceleration" lines at the beginning of lines
Tail	Correction or "slow down" lines at the end of lines
Arrows	Arrows at the end of lines

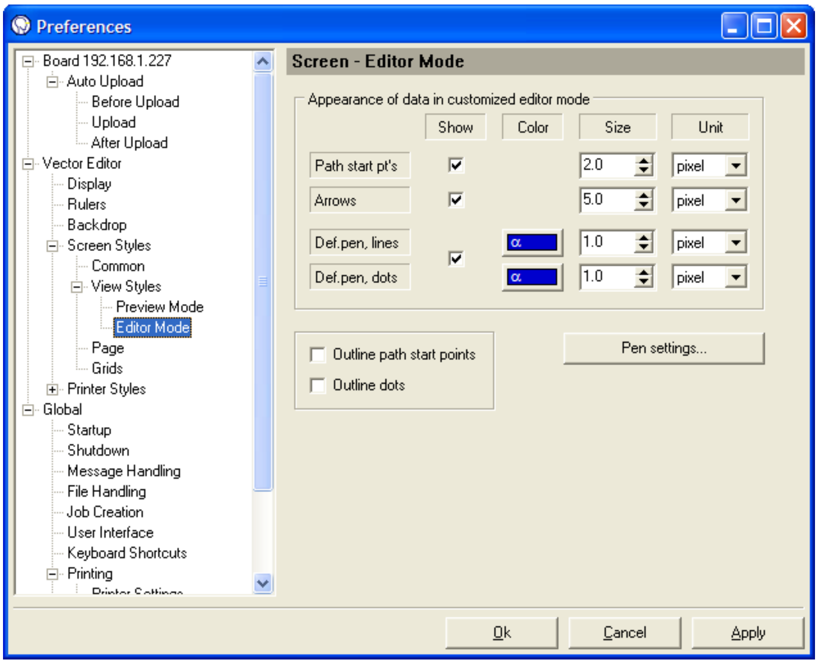
The line handling and thus head and tail are described in detail in device LINEPAR (line parameter) in 3.10 linepar - Line Parameters.

Explanation of the **columns**. Settings can be made for the following graphical objects:

Parameter	Description
Show	If the check box is selected then the corresponding graphical objects will be shown in preview mode
Head0	shows and sets the color of the corresponding graphical objects for the first scan head
Head0	shows and sets the color of the corresponding graphical objects for the second scan head
Size	sets the line width of Main, Jump, Head and Tail and the arrowhead length of Arrows respectively
Unit	sets the unit for the value in Size. Pixel or μm can be selected

8.4.14. Sub Category - Screen Styles / View Styles / Editor Mode

In this category the graphical object properties are set for the Vector Editor editor mode, customized style. Some of these parameters affect the display of the line handling.



Explanation of the **rows**. Settings can be made for the following graphical objects:

Graph. object	Description
Path start pt's	Circle at the beginning of lines
Arrows	Arrow at the end of lines
Def.pen, lines	Lines in the Default Pen (Pen 1 *Pen Settings*)
Def.pen, dots	Dots in the Default Pen (Pen 1 *Pen Settings*)

The line handling and thus head and tail are described in detail in device LINEPAR (line parameter) in 3.10 linepar - Line Parameters.

Explanation of the **columns**. Settings can be made for the following graphical objects:

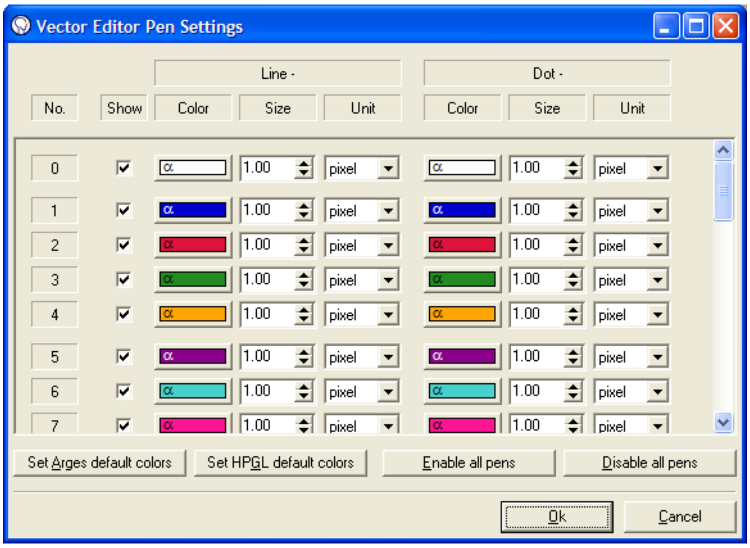
Parameter	Description
Show	If the check box is selected then the corresponding graphical objects will be shown in editor mode
Color	shows and sets the color of the corresponding graphical objects
Size	sets the line width of Def.pen, lines, the radius for Def.pen, dots, and Segm.start pt's and the arrowhead length of Arrows
Unit	sets the unit for the value in *Size*. Pixel or μm can be selected

Outline path start points if this check box is cleared then the *Path start pt's* circles will be shown filled

Outline dots if this check box is cleared then the Dots will be shown as filled circles

Pen-Settings opens the *Vector Editor Pen Settings* window

Vector Editor Pen Settings Pen numbers can be assigned to pens (parameter sets) by the *Pen Set* node (see 5.50 Pen Set). Pen numbers are used e.g. in HPGL files. That way pens can be selected via the content of e.g. HPGL files during a job within a graphical object. In this window can be set, how pens of such *Pen Sets* will be displayed in *Vector Editor*.



In this window the input boxes are combined in a table. The single pens are arranged in rows. Their properties are arranged in columns.

Explanation of the columns. Settings can be made for the following parameters. These parameters can be set differently for lines and dots:

Parameter	Description
Show	If the check box is selected then the corresponding graphical objects will be shown
Color	shows and sets the color of the corresponding graphical objects
Size	sets the line width
Unit	sets the unit for the value in *Size*. Pixel or μm can be selected

Set Arges Default Colors sets all pens to ARGES standard colors

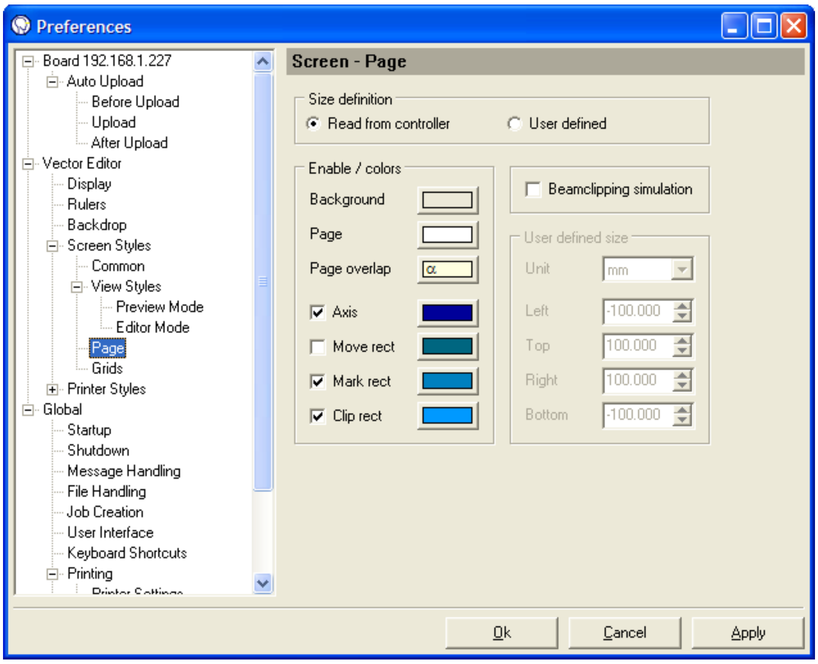
Set HPGL Default Colors sets all pens to HPGL standard colors

Enable All Pens selects all check boxes in the *Show* column

Disable All Pens clears all check boxes in the *Show* column

8.4.15. Sub Category - Screen Styles / Page

In this category the scan field properties regarding appearance in the Vector Editor are set.



Size definition selects, how the page size shall be determined

Read from controller the page size will be determined from the settings in device *dist_xy*

User-defined the page size and coordinate system orientation in the *Vector Editor* will be determined from the values set in the User defined size group

Enable / colors

Background shows and selects the background color of the area not belonging to the scan field

Page shows and selects the background color of the page (whole scan field)

Page overlap shows and selects the color for page overlap. Such overlaps can occur with job nodes like e.g. *Dual Scan* and *Tiling*

Axis shows and selects the color for the coordinate plane and the axes legend. If the check box is selected then the coordinate plane and the axes legend will be shown

Move rect shows and selects the color for the rectangle, which encloses the area where the scanner mirrors can move to. If the check box is selected then the Move rectangle will be shown

Mark rect shows and selects the color for the rectangle, which encloses the area where the laser beam is allowed to be on. If the check box is selected then the Mark rectangle will be shown

Clip rect shows and selects the color for the rectangle, which encloses the output area. If the check box is selected then the Clip rectangle will be shown

Beamclipping simulation if this check box is selected then in the page view the *Vector Editor* simulates shadowing effects within the scan head, e.g. page corners can be clipped

User defined size settings for page size and coordinate system orientation in *Vector Editor*

Unit **μm, mm, cm, m** unit for the values *Left*, *Top*, *Right*, *Bottom*

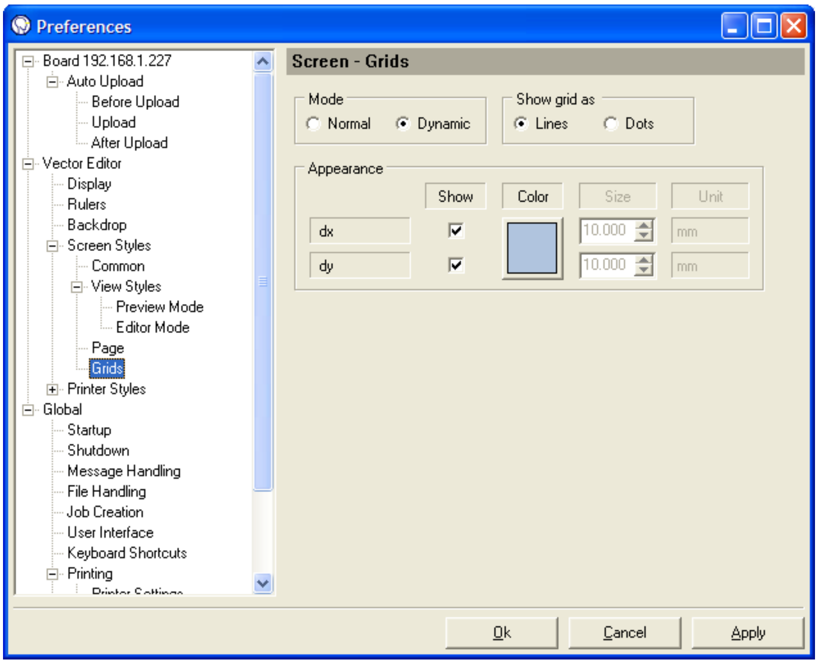
Left, Top, Right, Bottom set the page size and coordinate system orientation in the *Vector Editor*

NOTE

The page size and coordinate system orientation in *Vector Editor* are independent from the scan field size and coordinate system orientation on the target. This is useful, e.g. when transferring jobs from a scan head with a small scan field to a scan head with a large scan field. Then the page size in *Vector Editor* can be adjusted, that the graphical objects in a job can be seen properly even in viewing the whole page.

8.4.16. Sub Category - Screen Styles / Grids

In this category the grid line properties are set.



Mode

Normal a fixed distance between the grid lines will be used, as defined in the *Appearance* group in the *Size* column

Dynamic a dynamic distance between the grid lines will be used, which will be adapted to the zoom factor. The dynamic distance results from the setting in *Units* in category *Rulers*. That way non-metrical distances between grid lines are possible

Show grid as

Lines the grid lines will be shown as lines

Dots the grid lines will be shown as dotted lines

Appearance in this window the input boxes are combined in a table. The distances between the grid lines in X direction *dx* and Y direction *dy* are arranged in rows. Their properties are arranged in columns.

Explanation of the column inscription. Settings can be made for the following parameters:

Parameter	Description
Show	If the check box is selected then the grid lines will be shown
Color	shows and sets the grid line color
Size	sets the distance between the grid lines
Unit	sets the unit for the value in *Size*

8.4.17. Sub Category - Printer Styles

In this category the appearance of graphics on printed documents is set. In general the printer resolution is higher than the screen resolution. Compared to the *Screen Style* category therefore in the *Printer Style* category higher values are necessary when entering parameters in pixel.

8.4.18. Sub Category - Printer Styles / Common

The settings correspond to the settings in 8.4.11 Sub Category - Screen Styles / Common.

8.4.19. Sub Category - Printer Styles / View Styles

The settings correspond to the settings in 8.4.12 Sub Category - Screen Styles / View Styles, 8.4.13 Sub Category - Screen Styles / View Styles / Preview Mode and 8.4.14 Sub Category - Screen Styles / View Styles / Editor Mode.

8.4.20. Sub Category - Printer Styles / Page

The settings correspond to the settings in 8.4.15 Sub Category - Screen Styles / Page.

8.4.21. Sub Category - Printer Styles / Grids

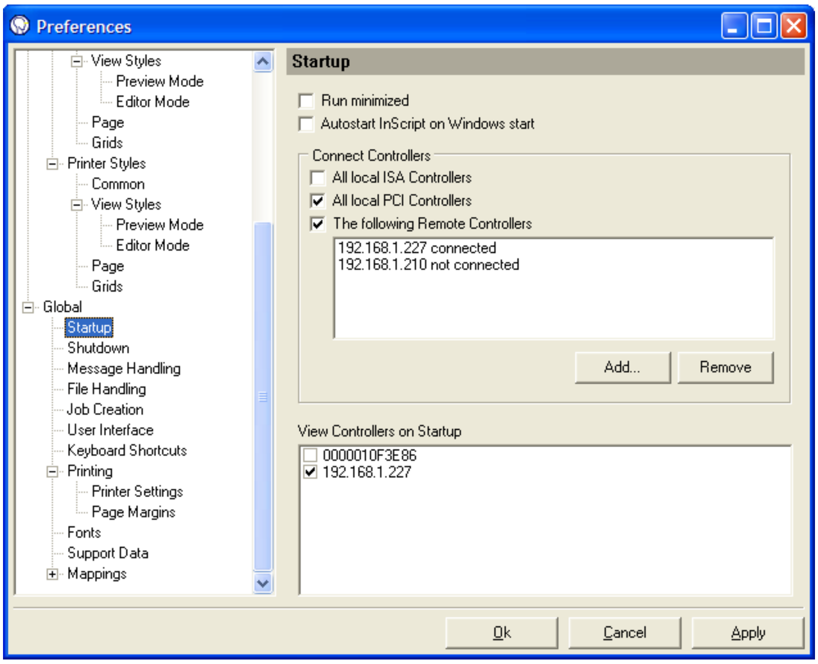
The settings correspond to the settings in 8.4.16 Sub Category - Screen Styles / Grids.

8.4.22. Category - Global

In this category general inScript settings are made.

8.4.23. Sub Category - Startup

In this category the InScript behavior at program start is set. This is one of the central settings to determine which controller (ASC via IP or NCC on a PCI card in your computer) shall be loaded on program start.



Run minimized if this check box is selected then InScript is started as a button in the task bar

Autostart InScript on Windows start if this check box is selected then InScript will be automatically started when Windows is started

Connect Controllers

All local ISA Controllers if this check box is selected then InScript will connect to all local ISA Controllers on startup

All local PCI Controllers if this check box is selected then InScript will connect to all local PCI Controllers on startup

The following Remote Controllers if this check box is selected then InScrpt will connect to the Remote Controllers in the list below this option

Controller list lists the Remote Controllers that InScript will connect to on startup

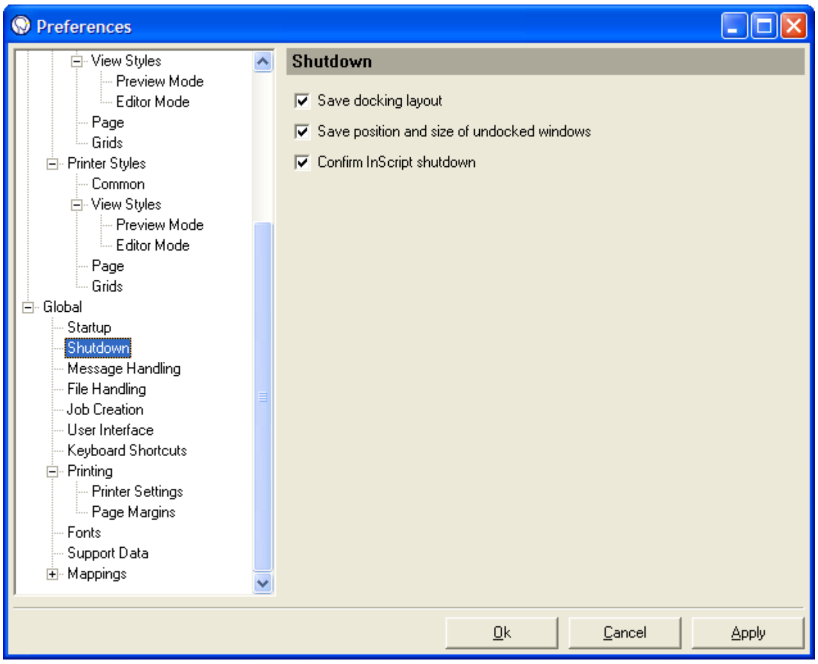
Add opens the *Enter IP Connection* window where the IP-address and the port for the Remote Controller to be connected can be entered

Remove removes the selected Remote Controller from the *Controller list* above

View Controllers on Startup all connected Controllers (see *Controller list* above) are listed here. To automatically open a Controller on InScript program start, select the corresponding check box. If all check boxes are cleared then the first Controller in the list will be automatically opened in InScript

8.4.24. Sub Category - Shutdown

In this category the InScript behavior at program exit is set.



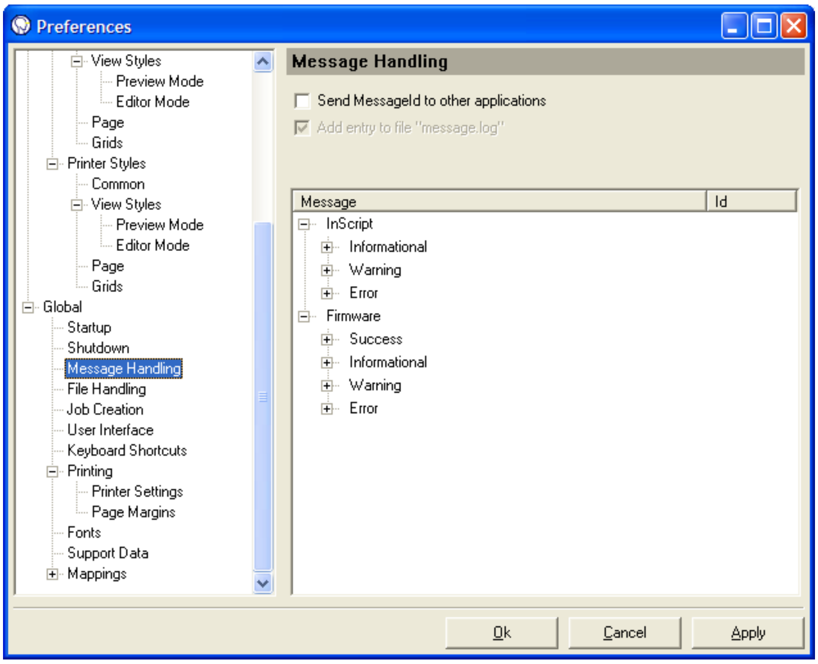
Save docking layout if this check box is selected and InScript is exited then the current Board window layout will be saved to the file `STANDARD.LAY` in the InScript\bin folder

Save position and size of un-docked windows if this check box is selected then the un-docked window position and size will be saved.

Confirm InScript shutdown if this check box is selected and InScript is exited the user will be asked if he is sure to exit InScript

8.4.25. Sub Category - Message Handling

This category specifies, how InScript handles messages.



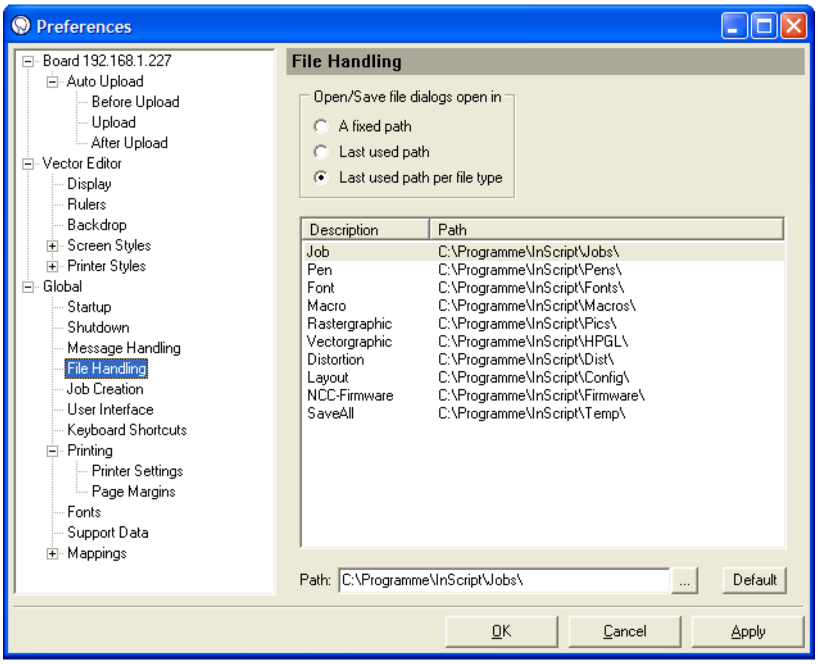
Send MessageId to other applications if this check box is selected then MessageIds of the corresponding messages will be passed to other applications

Add entry to file "message.log" if this check box is selected then the messages will be written to the message.log file in the InScript\bin folder. This item is set by default and is not changeable in the current version of InScript

Message list this list shows all possible messages and their IDs

8.4.26. Sub Category - File Handling

Here you can specify how InScript is storing recently used paths of file requestors



Open/Save file dialogs open in

A fixed path all file requester will open using this path. The path that is set here will not be modified by browsing to another folder in any file requester. The currently selected fixed path will be shown in the *Path list* and can be modified as described below under *Path list*

Last used path all file requester will open using this path. The path will be modified, each time you browse to another folder in any file requester. The currently active *Last used path* will be shown in the *Path list* and can be modified as described below under *Path list*

Last used path all file requester will open using this path. The path will be modified, each time you browse to another folder in any file requester. The currently active *Last used path* will be shown in the *Path list* and can be modified as described below under *Last used path per file type* file requester will open using the paths depending on the file type of a file and each time you browse to another folder in a file type dependent file requester, this path will be modified for the corresponding file type. Here are the currently supported file types:

NOTE

<data folder> can be either the InScript installtion folder under operating systems $\leq$ Windows XP or the InScript Documents/InScript Application Data folder (see InScript's Start menu entries for these folders) on operating systems $\geq$ Windows Vista.

File type	Description	Standard Path XP|higher OS
Job	*.job,*.tre	<data folder>\Jobs|Jobs
Pen	*.pen	<data folder>\Pens|Pens
Font	*.fdt,*.sfh	<data folder>\Fonts|Fonts
Macro	*.imc	<data folder>\Macros|Macros
Rastergraphic	BMP (*.bmp), JPEG (*.jpg,*.jpeg), TIFF (*.tif,*.tiff), PNG (*.png), GIF (*.gif), TARGA (*.tga,*.vst,*.icb,*.vda,*.win), PCX (*.pcx,*.pcc,*.scr), Photoshop (*.psd,*.pdd), Portable Map (*.ppm,*.pgm,*.pbm), SGI (*.bw,*.rgb,*.rgba*.sgi)	<data folder>\Pics|RasterGraphics
Vectorgraphic	HPGL (*.hpgl,*.plt), LG1 (*.lg1), IGES (*.igs), Arges Rawline File (*.arl) ACAD Draw. eXch. Format (*.dxf) VeCAD Drawing (*.vec)	<data folder>\HPGL|VectorGraphics
Distortion	*.dst,*.aed	<data folder>\Dist|Distortions
Layout	*.lay*,*.bly*,*.tly*	<data folder>\Config|Config
NCCFirmware	*.fls,*.fb,*.ffb,*.fdb	<data folder>\Firmware|Firmware
SaveAll	Path for *Save All User Files* see 4.6.7 Save Multiple Jobs	<data folder>\Temp|Temp

All other file requester of less frequently used file types will open in the InScript installation path. The currently active *Last used paths per file type* will be shown in the *Path list* and can be modified as described below under *Path list*

Path list corresponding to the settings in *Open/Save file dialogs open in* path entries are displayed in the path list. If you click on a path entry in the list box, you can modify it in the *Path* edit box or select a valid path by clicking on the browse button ... . If you click on *Apply* or *OK*, the new path(s) will be used

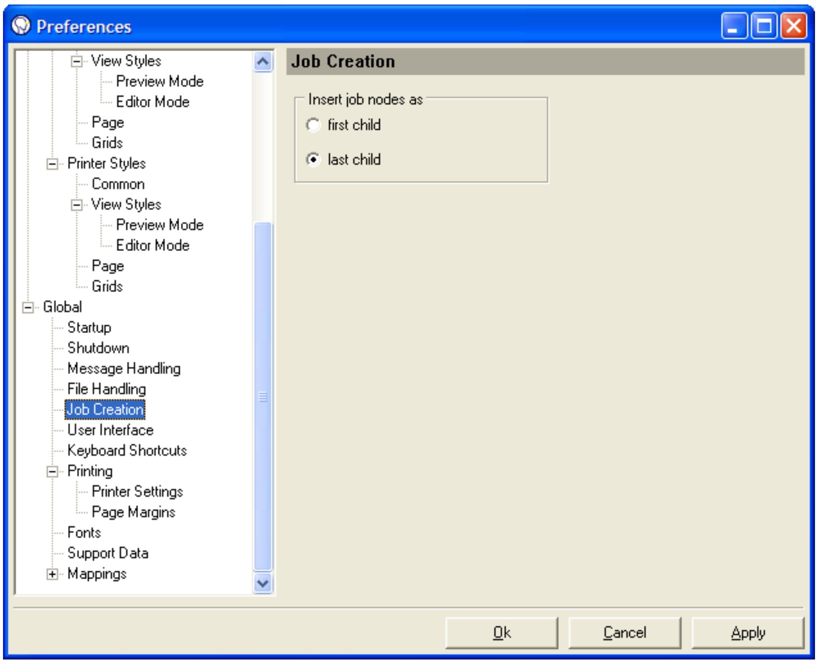
Path selected entries of the *Path list* can be modified here

... opens the *Choose a directory* dialog to browse for a valid path for the currently selected item of the *Path list*

Default this button is only available, if *Last used path per file type* is selected. If this button is clicked, then the standard folder in the InScript installation folder are preset

8.4.27. Sub Category - Job Creation

In this category the way is set, how job nodes are created.



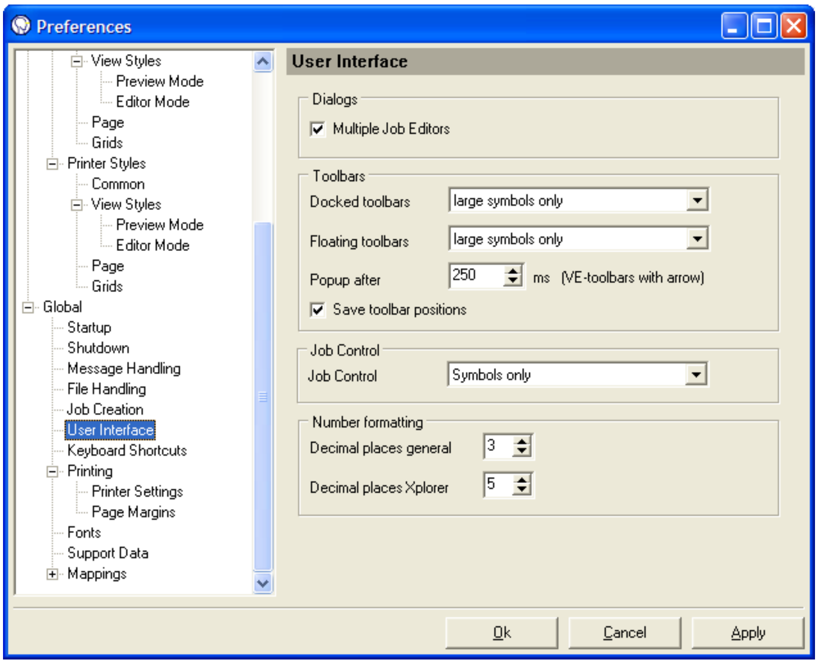
Insert job nodes as

first child if you add a new job node it will be inserted as first child to the current node (see 4.6.10 Create Node)

last child if you add a new job node it will be inserted as last child to the current node (see 4.6.10 Create Node)

8.4.28. Sub Category - User Interface

In this category the tool bar behavior, look and input filed sizes are set.



Dialogs here the behaviour of Job Editor dialogs is set

Multiple Job Editors if this check box is selected then it is allowed to open Job Editor windows (e.g. for a *Shape* and *Text* in *Job Configuration*) for several Job Nodes in parallel. If this check box is unchecked then opening a Job Editor while another is open will close this first editor

Toolbars here the look of toolbars is set

Docked toolbars determines the look of docked toolbars

text only no icons, only text

small symbols only only small icons, no text

large symbols only only large icons, no text

large symbols, text beside large icons with text to the right

large symbols, text beneath large icons with text beneath

Floating toolbars determines the look of un-docked toolbars

text only no icons, only text

small symbols only only small icons, no text

large symbols only only large icons, no text

large symbols, text beside large icons with text to the right

large symbols, text beneath large icons with text beneath

Popup after determines the delay that *Vector Editor* toolbars with arrow (e.g. ) use until their toolbar pops up. Below this delay the icon is selected (e.g. 250 ms = 1/4 second)

Save toolbar positions if thsi check box is selected and InScript is exited then the tool bar positions will be saved

Number formatting here the formats of numbers is set

Decimal places general sets the number of decimal places for real numbers except for Xplorer

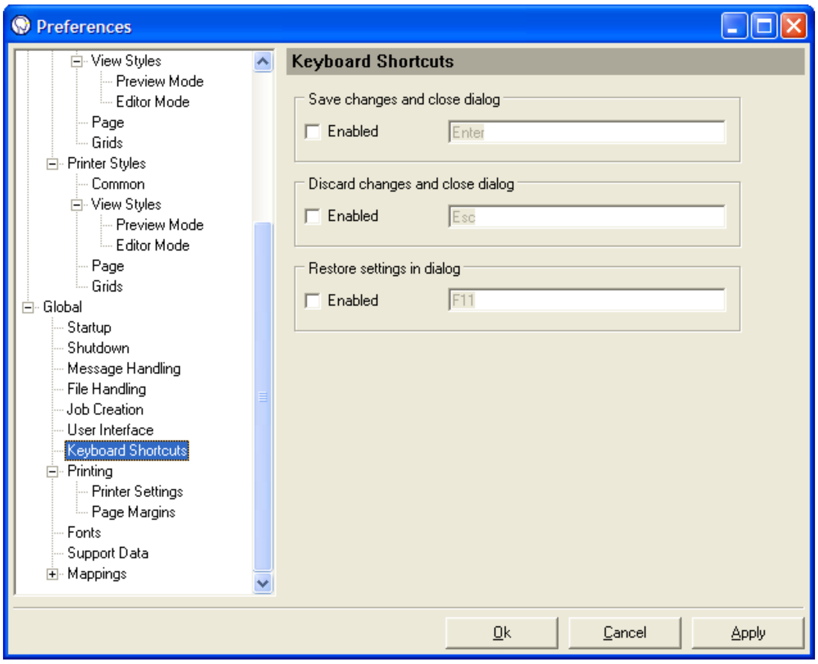
Decimal places Xplorer sets the number of decimal places for real numbers in Xplorer (see 8.5 Xplorer)

8.4.29. Sub Category - Keyboard Shortcut

In this category buttons can be mapped to keyboard shortcuts. These settings can be activated or deactivated.

NOTE

The keyboard shortcuts are only effective in job, pen and device windows.



Save changes and close dialog this key setting corresponds to the *OK* button

Enabled if this check box is selected then the keyboard shortcut is active.

Key input field set the cursor into this input field and type the key you want to use

Discard changes and close dialog this key setting corresponds to the *Cancel* button

Enabled if this check box is selected then the keyboard shortcut is active.

Key input field set the cursor into this input field and type the key you want to use

Restore settings in dialog this key setting corresponds to the *Restore* button

Enabled if this check box is selected then the keyboard shortcut is active.

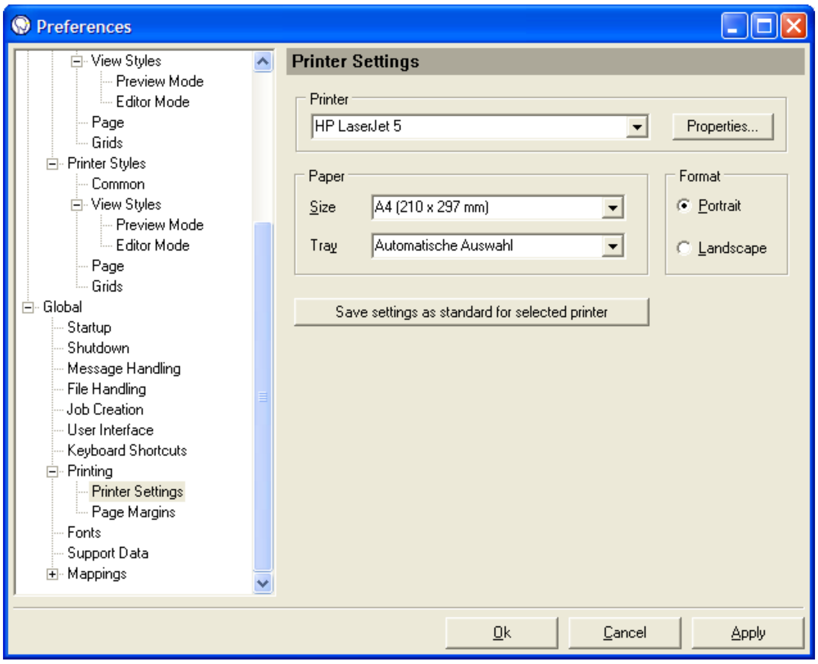
Key input field set the cursor into this input field and type the key you want to use

8.4.30. Category - Printing

In this category the properties for printing are set.

8.4.31. Sub Category - Printer Settings

In this category possible printer properties are set.



Printer **Printer list** select the printer you want to print on from the drop down list

Properties opens the standard Windows printer dialog. The dialog depends on the installed printer driver

Paper

Size sets the paper size. The offered list items depend on the selected printer

Tray sets the paper tray. The offered list items depend on the selected printer

Format

Portrait the output will be printed in portrait format

Landscape the output will be printed in landscape format

NOTE

Even in orientation Landscape captions will be positioned at the upper and lower page border. On one hand this allows long captions (e.g. node or file names) on the other hand printable area will not be utilized. Before printing major series do some test prints to ensure the output matches your expectations.

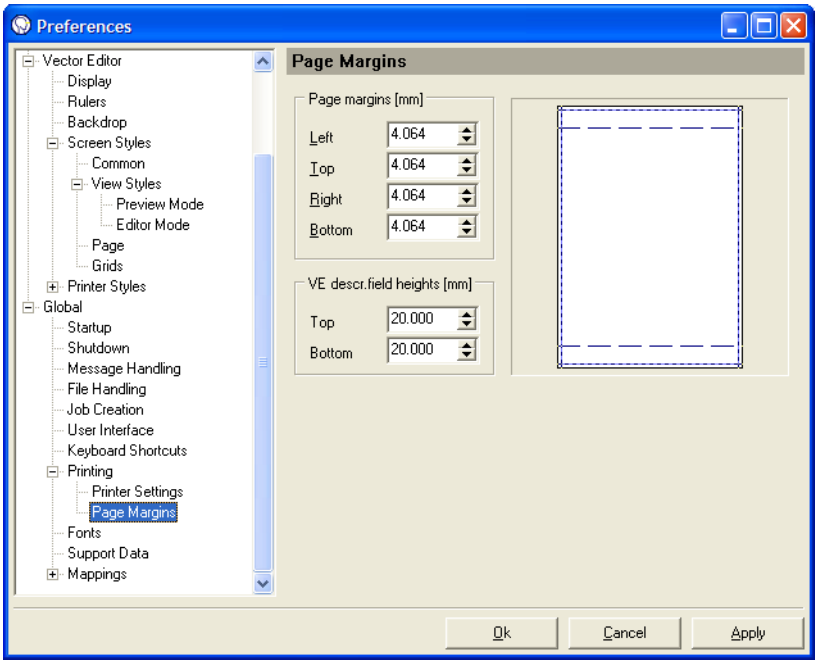
Save settings as standard for selected printer sets the properties as printer standard in InScript. Other applications are not affected

NOTE

The settings of the standard Windows printer dialog are also included in these settings. All settings are saved in the binary file `[printername].PRD` in the InScript\PrinterData folder. If you do not want to use these settings any more then define other ones or delete the PRD file that has the printer's name you want to discard. If you are using a color printer and if the output is set to color in the standard Windows printer dialog then the *Vector Editor* print function offers a convenient way to choose color, gray or black and white printing.

8.4.32. Sub Category - Page Margins

In this category the page margins and the space reserved for description fields are set.



Page margins **Left, Top, Right, Bottom** using these fileds you can set the page margins

VE descr.field heights item[Top, Bottom] using these fields you can set the height of the top and bottom description field

Page preview field the preview on the right side shows the parameter's effect.

The page areas are assigned as follows:

dashed black line printable area

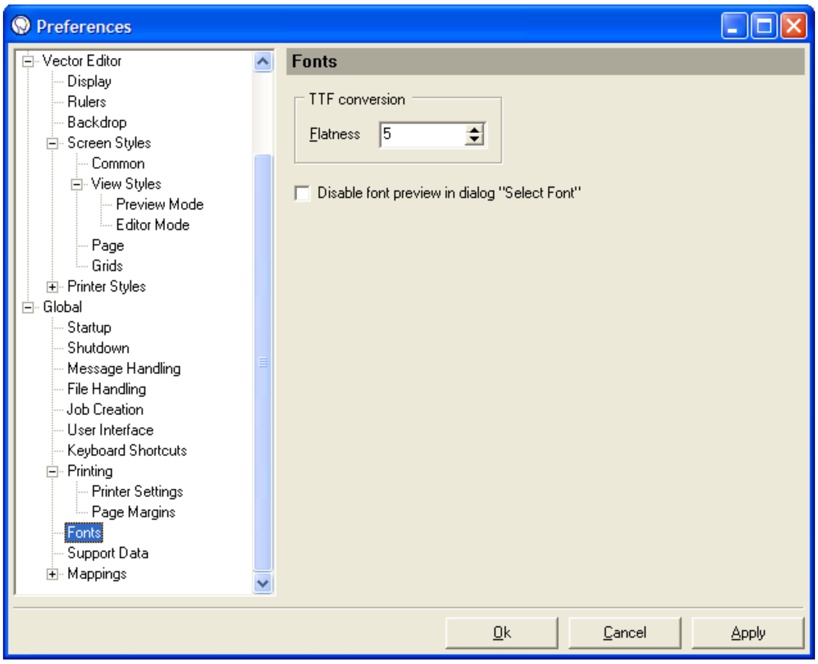
continuous blue line page margins

dashed blue line lower/upper edge of the top/bottom description field

turquoise line parameter that is currently edited

8.4.33. Sub Category - Fonts

In this category the handling of TrueType fonts in InScript is set.

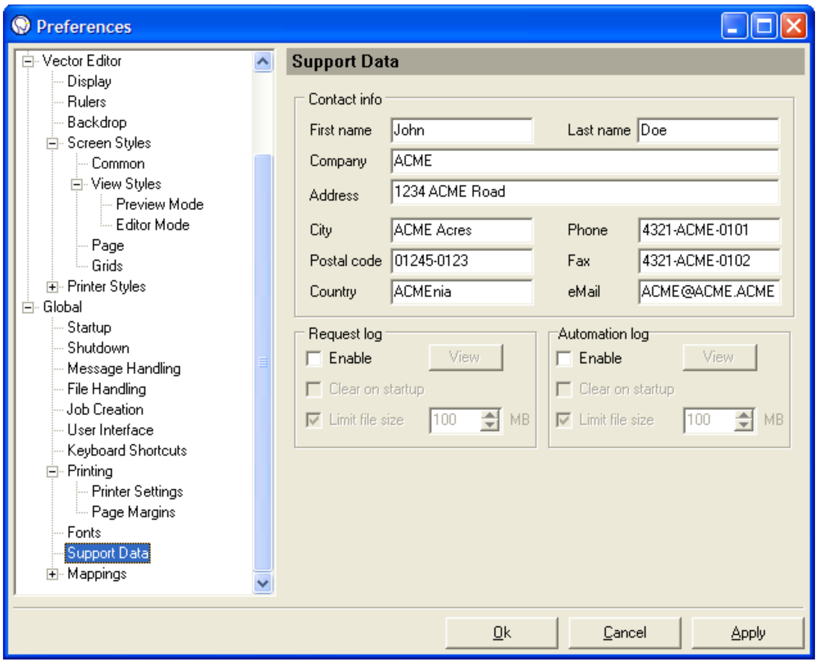


TTF-Conversion Flatness TrueType fonts including curves and arcs are converted to lines. Flatness specifies the conversion quality. The smaller the value is the higher the quality, but the more lines and data result from the conversion

Disable font preview in dialog "Select Font" if this check box is selected then no preview of InScript-, ROM- and user fonts will be shown in the *Select Font* window. The preview of TrueType fonts is not affected

8.4.34. Sub Category - Support Data

In this category, you can enter your contact info. This will be used e.g. in the InScript Support-Info Wizard (menu *Extras* → *Create Support-Info*). In addition the settings for `request.log` and `autmation.log` files can be changed. These files record the communication between the controller hardware and InScript on PC side. The file may be useful for support requests.



Contact info fields to fill in ct information. This information will be included in automatic support requests

Request log

Enable if this check box is selected then the communication between controller board and PC will be logged in the `request.log` file in the `InScript\Log` folder. This is useful for testing and debugging

View shows the contents of the `request.log` file

Clear on startup if this check box is selected the `request.log` file will be cleared on InScript startup

Limit file size if this check box is selected then the `request.log` file size will be limited to the given size. If this size is reached then logging will be terminated

Automation log

Enable if this check box is selected then the communication between controller board and PC will be logged in the `automation.log` file in the `InScript\Log` folder. This is useful for testing and debugging

View shows the contents of the `automation.log` file

Clear on startup if this check box is selected the `automation.log` file will be cleared on InScript startup

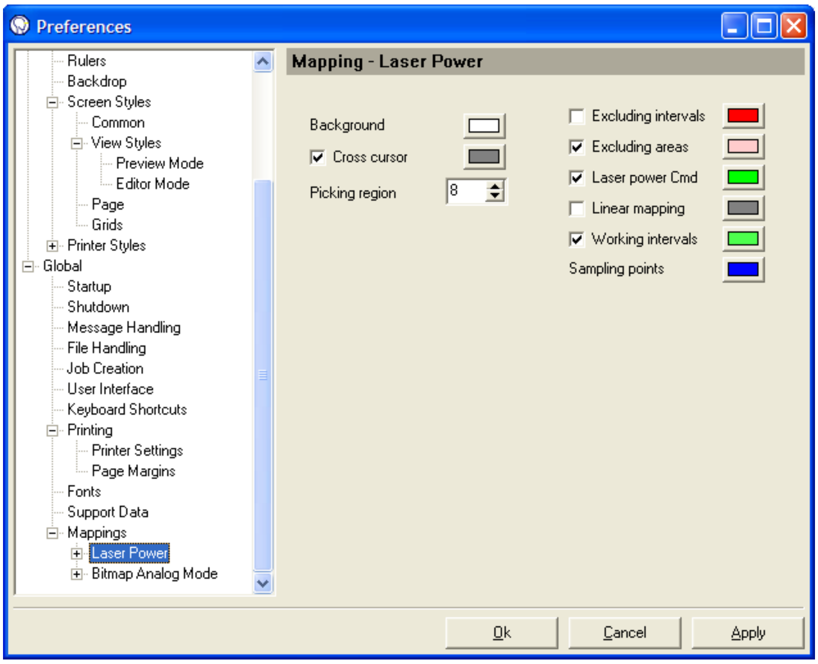
Limit file size if this check box is selected then the `automation.log` file size will be limited to the given size. If this size is reached then logging will be terminated

8.4.35. Sub Category - Mappings

In this category the editor properties for mappings are set, e.g. for power mapping.

8.4.36. Sub Category - Mappings / Laser Power

In this category the editor properties for the power mapping in the laser device driver are set. If the *Power Mapping* tab is present in your laser device driver then the power mapping editor can be opened via this tab.



These settings are the same for *Laser Power*, *Multi* and *TEM00*.

Background shows and selects the background color

Cross cursor if this check box is selected then the mouse pointer is displayed as a haircross cursor. The button shows and selects the haircross color

Picking region sets the mouse pointer sensitivity for selecting *Excluding intervals*

Excluding intervals shows and selects the boundary color of the excluding intervals

Excluding areas shows and selects the excluding area color

Laser power Cmd shows and selects the color for current nominal laser power

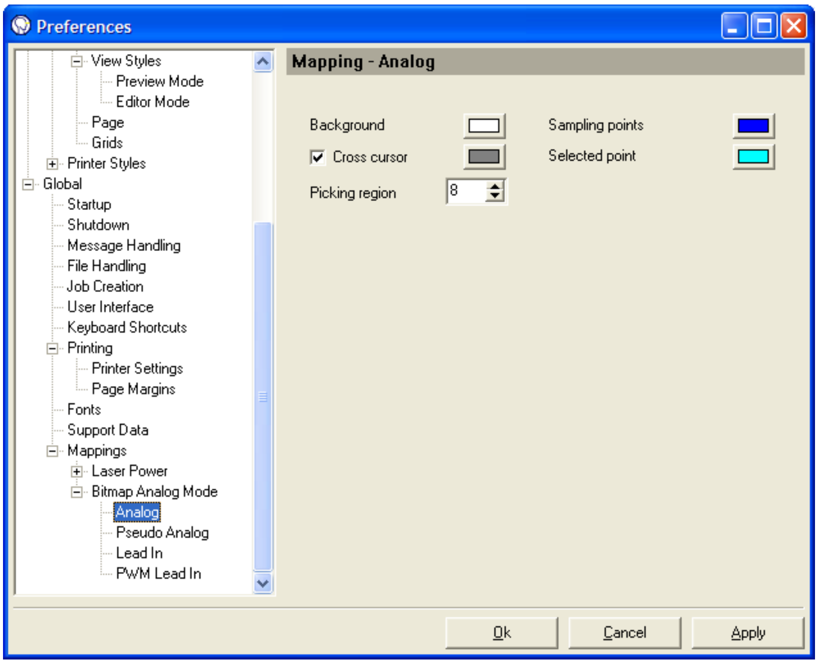
Linear Mapping shows and selects the linear mapping color

Working intervals shows and selects the working interval color

Sampling points shows and selects the sampling point color

8.4.37. Sub Category - Mappings / Bitmap Analog Mode

In this category the editor properties for the *several mappings in the bitmap node analog modes* are set. If the *Output Mode Settings* or *Lead In* tab are present in the bitmap node editor then the power mapping editor can be opened via this tab.



These settings are the same for *Analog*, *Pseudo Analog*, *Lead In* and *PWM Lead In*.

Background shows and selects the background color

Cross cursor if this check box is selected then the mouse pointer is displayed as a haircross cursor. The button shows and selects the haircross color

Picking region sets the mouse pointer sensitivity for selecting Selected points

Sampling points shows and selects the sampling point color

Selected points shows and selects the color of selected points

8.4.38. Restrict Permissions for Users

To restrict certain users from changing InScript settings you can limit access rights for these users to the Windows system registry and/or relocate the InScript settings from the user registry to machine registry. Here are instructions on how to do this:

CAUTION

Data loss

Settings of Windows or InScript may be damaged editing Windows registry or the `InScript.ini` file

- Using Registry Editor incorrectly can cause serious, system-wide problems that may require you to re-install Windows to correct them. ARGES cannot guarantee that any problems resulting from the use of Registry Editor can be solved. Use this tool at your own risk.
- Editing the `InScript.ini` file can cause unwanted behaviour of InScript. Please create a copy of this file using Windows Explorer or similar tools to be able to revert your changes to the original InScript.ini file.

To enable all users to save settings (This is the default setting)

1. Open the file `InScript.INI` with a text editor. You will find this file in folder `InScript\bin`.
2. Search for section `[Application]`.
3. If no entry `RegistryRoot` exists in section `[Application]` then create this entry.
4. Set the value of `RegistryRoot` to 1 (`RegistryRoot=1`). Now all settings will be saved under registry root-key `HKEY_CURRENT_USER`.

To enable only users with administrator permissions to save settings

1. Open the file `InScript.INI` with a text editor. You will find this file in folder `InScript\bin`.
2. Search for section `[Application]`.
3. Set the value of entry `RegistryRoot` to 2 (`RegistryRoot=2`)
   --or--
   Delete the `RegistryRoot` entry. Now all settings will be saved under registry root-key `HKEY_LOCAL_MACHINE`.
4. Start InScript.
5. Configure InScript as wanted.
6. Exit InScript. Only if a user with administrator permissions closes InScript under his account the settings will be saved now. Assuming a standard configuration of Windows 2000/NT/XP all other users can read the settings now, but are not allowed to change them.

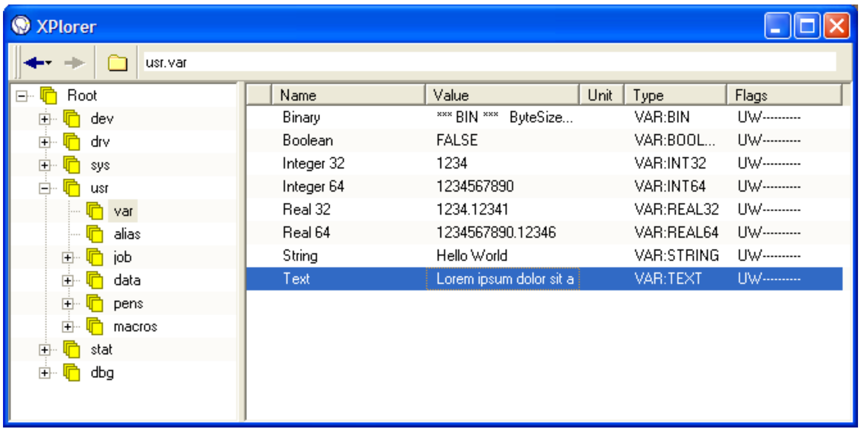
To enable selected users to save settings

1. Open the file `InScript.INI` with a text editor. You will find this file in folder `InScript\bin`.
2. Search for section `[Application]`.
3. Set the value of entry `RegistryRoot` to 2 (`RegistryRoot=2`)
   --or--
   Delete the `RegistryRoot` entry. Now all settings will be saved under registry root-key `HKEY_LOCAL_MACHINE`.

4. Start InScript.
5. Configure InScript as wanted.
6. Exit InScript. Only if a user with administrator permissions closes InScript the settings will be saved now. Assuming a standard configuration of Windows 2000/NT/XP all other users can read the settings now, but are not allowed to change them. Now you have to grant permissions to selected users.
7. On the task bar click *Start* → *Execute*. Window Execute opens.
8. In the *Open* box type the filename `RegEdt32.exe`.
9. Click OK. Window Registry Editor opens. Within this window further windows open.
10. Open the `HKEY_LOCAL_MACHINE` branch.
11. In the registry editor tree structure browse to *SOFTWARE* → *Arges* → *InScript*.
12. Select the registry-key.
13. Click *Security* → *Authorization* in the menu. Further information on how to assign authorizations to a registry-key and how to edit the authorization list (adding and deleting of users and groups) take from documentation or online-help of the registry editor!

8.5. Xplorer

The fundamental configuration components are variables that are stored on the ARGES controller. All components like *Devices*, *Job Nodes* or *Jobs* consist basically of a collection of these variables. Normally variables are combined into *Nodes*, *Devices* of other collections but sometimes it can be handy to manipulate these variables directly. To do this the Xplorer can be used. Via Xplorer the hierarchical tree of variables can be browsed and modified (see 8.5.2 Edit Variables in Xplorer) similar to the file structure of Windows Explorer.



8.5.1. Xplorer Window

To open the Xplorer window press *Show Explorer* in InScript *Windows* toolbar. To open another Xplorer window you can either click *Show Explorer* again or right click on almost any variable in InScript and choose *Xplore* or *Explore here ...* to open an Xplorer window for this variable.

Xplorer Toolbar use the Xplorer toolbar to navigate directly to a variable or to browse to previous variables.

 browses to the previously viewed variable. If you click on the small arrow beside this button you will get a history of previously viewed variables

 browses to the next variable that you viewed

 creates a new variable at the current cursor position

Xplorer Path Input Bar here you can directly enter a variabe path e.g. usr.var.test that you copied e.g. from a Job Node editor

Xplorer variable tree this window displays the variables in a tree structure on the left side. If a node in this tree structure is selected then the node's variables with all their properties are displayed in the list on the right side

Xplorer variable list if a node in this tree structure is selected then the node's variables with all their properties are displayed in this list

Name	Value	Unit	Type	Flags
Boolean Variabel	FALSE		VAR:BOOL...	UW----------
Integer Variable	123		VAR:INT32	UW----N----c

Name name of the variable. Free to choose but has to be unique in its branch of the variable tree

Value value of the variable depending on its *Type*

Unit unit of the variable. Only set on internal variables, not editable

Type type of the variable (possible are VAR: BIN (binary data you can type into a Hex Editor or load via *Load from binary file* in Xplorer context menu), BOOLEAN (TRUE or FALSE), INT32 (32bit integer), INT64 (64bit integer), SELECT (dropdown with values), SET (collection of variables), STRING (a sequence of characters), TEXT (a sequence of characters that can be input using a multiline editor) or JOB: any Job Node)

Flags flags for the variables. The variables can be set by right clicking on the variable's *Flags* column and choosing one or more of these flags:

Flag	Function	Description
U	user defined variable	The user created the variable
W	writable	The user can change the variable's value
C	controlled by device	only for variables with o-flag. If the c-flag is set then the variable is controlled by the owner variable and adopts its value. If the c-flag is cleared then the variable value can differ from the owner variable's value
O	owned by device	Another variable owns the variable value. If the value of the owner changes then this variable adopts the value. Example: If the processing speed changes in the default pen linepar pen section then the processing speed also changes in the linepar device
T	protected	This variable is changeable but write-protected by the t-flag
M	modified	only for variables with the n-flag. The variable was changes since the last "Save To NVRAM" operation
N	mirrored in NVRAM	the variable value will be written into the NVRam at the next "Save To NVRAM" operation
Q	quick save to NVRAM	only for variables with the n-flag. This means, with every change the variable value will automatically be saved to the NVRam
R	override	momentarily not used
F	force	momentarily not used
P	pen-able	This variable can be used in a pen
c	consumable	The variable is consumed after each job execution and has to be re-set with a new value before it can be accessed again

NOTE

Not all flags can be set manually in all places!

8.5.2. Edit Variables in Xplorer

NOTE

It is not possible to create or manipulate variables in all subtrees of the variable tree. Normally users only manipulate variables that are located under `usr` viz. `usr.var` and `usr.job`.

Create a new Variable place the cursor in Xplorer where you want to create a new variable and select  or use context menu *New...* The *New Node* window will open.

Name enter a name for the variable

Type there are two types of variables that can be created:

Type VAR a Variable

Type JOB a Job with all its subnodes

Sub Type for Variables you may choose BIN (binary data you can type into a Hex Editor), BOOLEAN (TRUE or FALSE), INT32 (32bit integer), INT64 (64bit integer), SELECT (drop-down with values), SET (collection of variables), STRING (a sequence of characters) or TEXT (a sequence of characters that can be input using a multiline editor) and for JOB you can choose almost any Job Node from the dropdown (see 5 Job Nodes).

Index sets the index position at that the variable is inserted

Edit a Variable to edit an existant variable, just double click its *Value* column and edit the values. On some variable type it is possible to in- or decrement or page the values by just placing the cursor on the line and using Ctrl-cursor up / Ctrl-cursor down. If you are in a numerical edit field (you double clicked the *Value* column of a variable) you can also use:

Key	effect	comment
crsr-up / crsr-dn	in- / decrement value by 1	
shift crsr-up / crsr-dn	in- / decrement value by 10	
ctrl crsr-up / crsr-dn	in- / decrement value by 0.1	only on REAL
alt crsr-up / crsr-dn	in- / decrement value by 0.01	only on REAL

Delete a Variable to delete a variable select it and press the *Del* key or select *Delete* from its context menu

Rename a Variable to rename a variable select it and press the *F2* key or select *Rename* from its context menu

Context Menu the context menu can be opened by right clicking a variable in the Xplorer variable list

New, Rename, Delete please refer to the descriptions above

Explore here... opens an Xplorer window at the selected variable

Add to Inspector opens inspector and adds the selected variable to it

Load from binary file ... only on BIN variables, Loads binary data to a BIN variable

Save to binary file ... only on BIN variables. Saves binary data to a .bin file

Value to Clipboard copies the value of a variable to clipboard

Nodename to Clipboard copies the name of a variable to clipboard

Fullpath to Clipboard copies the complete name and path of a variable to clipboard. This is very handy for e.g. Scripting (see 5.44.2 Scripting Language). Be sure that you do not forget to enclose the variable path and name in $$

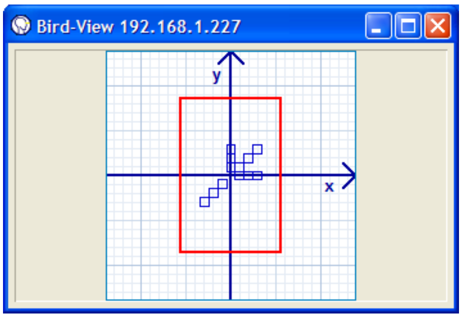
Info shows the node info

Dump dumps internal node data

Sorting enabled if this item is checked you can sort the Xplorer variable list by column (just click on the column header taht you want to sort by)

8.6. Birdview

The *Birdview* window shows a view of the whole scan field. If you view a zoomed area of the scan field in *Vector Editor* window then the *Birdview* window shows the size and position of this area related to the whole scan field as a red bounding box and provides a better overview.



8.6.1. Birdview Window

To open the *Birdview* window press *Show Birdview*  in InScript *Windows* toolbar.

Scan Field the scan field is shown as a light blue square in the Birdview window

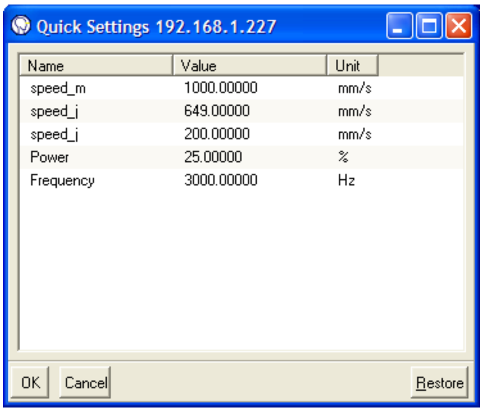
Zoom Area the zoomed area is shown as a red bounding box

8.6.2. Birdview Zooming

To change the zooming just drag the red *Zoom Area* bounding box to the size you want. The box will then be adjusted to the aspect ratio of the current *Vector Editor* view. Seldom it is necessary to use *Alt-Tab* to switch once from InScript to another window and back to make mouse input possible.

8.7. Quick Settings

In the *Quick Settings* window the most important parameters for line output and of the laser can be set. The displayed parameters are always depending on the active laser device. You will find further information about these parameters in section 3.10 linepar - Line Parameters.



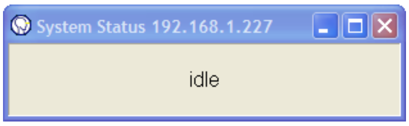
To open the *Quick Settings* window press *Show Quick Settings* in InScript *Windows* toolbar.

8.8. System Status

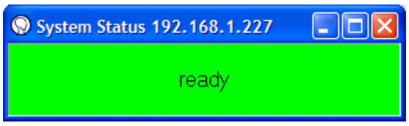
The System Status window displays the status of the system as color and text. It is possible to maximize the window. That way you can watch the system status even if viewing the screen from a greater distance.

The system status is shown as follows:

gray stands for "idle"

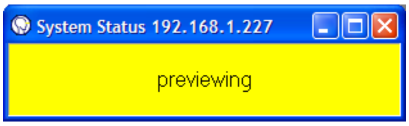


green stands for "ready"

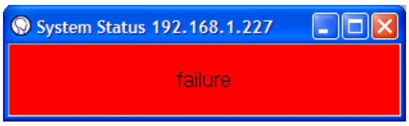


flashing yellow/green stands for "processing"

yellow stands for "previewing"



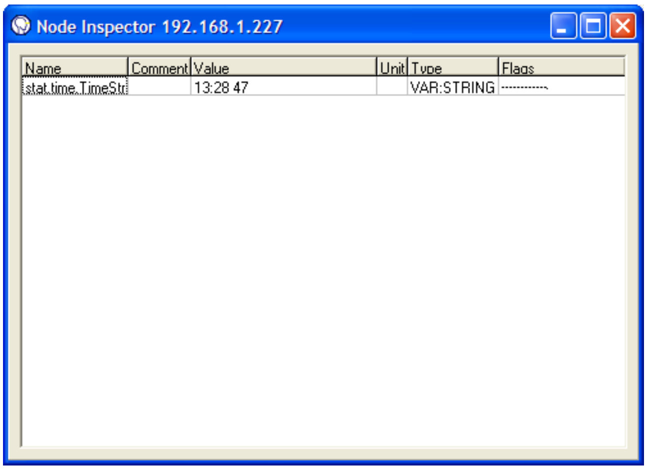
red stands for "failure"



To open the *System Status* window press *Show System Status*  in InScript *Windows* toolbar.

8.9. Node Inspector

The InScript Node Inspector displays variables in a separate window and groups them in a list, e.g. to monitor, edit or access them easily.



To open the *Node Inspector* window select *View* → *Node Inspector* in the InScript menu (see 8.3.3 View) or right click a variable you want to add to Inspector and select *Add to Inspector* in its context menu.

8.9.1. Add to Node Inspector

To access and edit variables frequently, they can be grouped in the Inspector view.

- Right click on a variable field of a Dialog (e.g. a Node Editor) and select the variable name. A sub menu opens. Click *Add to Inspector*
  --or--
  Click Add to Inspector in the context menu of a variable in Xplorer window (see 8.5 Xplorer).
  The Node Inspector window opens and the selected variable is added to the list of variables.

8.9.2. Node Inspector Context Menu

The Inspector has an own context menu:

<variable> click on this menu item to Xplore (see 8.5 Xplorer), get Info, get a Data Dump or copy the name or value of the variable to the clipboard

Always on Top select this item to make the Inspector window a topmost window that can't be covered by regular windows (except other topmost windows) or simultaneously press *Ctrl+T*

Remove From List remove the selected variable from the *Inspector* view (the variable is not deleted)

Info get an info summary of the selected variable

New User Variable lets you create a new user variable (see 8.5.2 Edit Variables in Xplorer). The variable is added to the Inspector view, right away

Delete User Variable if a variable has the user flag 'U', it can be completely deleted from the Inspector window

Save saves the current Inspector view. You will only be prompted if you want to save the view. Only one view can be stored at a time

Load loads the Inspector view saved with *Save*. You will only be prompted if you want to load this view

8.10. Messages

The Messages window shows system messages. There are two different views for messages: messages detail view (see 8.10.5 Messages Detail) and messages list view (see 8.10.6 Messages List).

To open the *Messages* window use InScript *Menu* → *View* → *Messages*. If the menu item is checked then the window is already open

8.10.1. Messages Types

There are three types of messages:

- Informational
- Warning
- Error

8.10.2. Messages Toolbar

Delete selected message deletes one selected message in list view or the current message in detail view (see 8.10.3 Delete a selected Message)

Delete all messages deletes all current messages. This can be used to start a set of new messages that e.g. shall not be confused with older messages (see 8.10.4 Delete all Messages)

Show selected message details switches to the messages detail view (see 8.10.5 Messages Detail)

Show messages in a list switches to the messages list view (see 8.10.6 Messages List)

Always focus the last message always jumps to the last incoming message (see 8.10.7 Always focus the last message)

8.10.3. Delete a selected Message

To delete a single message in list view, select it with the list's cursor using the mouse or cursor keys and click on . The selected message will be deleted.

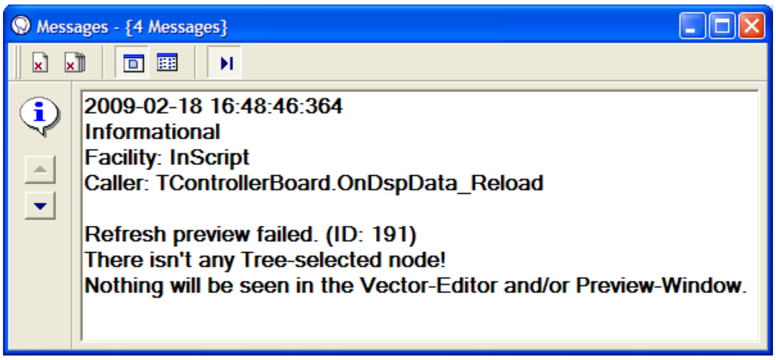
If you are in detail view, the currently displayed message will be deleted.

8.10.4. Delete all Messages

To delete all messages click on . All message will be deleted. The messages window will show "No messages available".

8.10.5. Messages Detail

Deatil information of the currently selected message is shown.



Click on to show the details.

Icon severity Informational, Warning or Error is shown

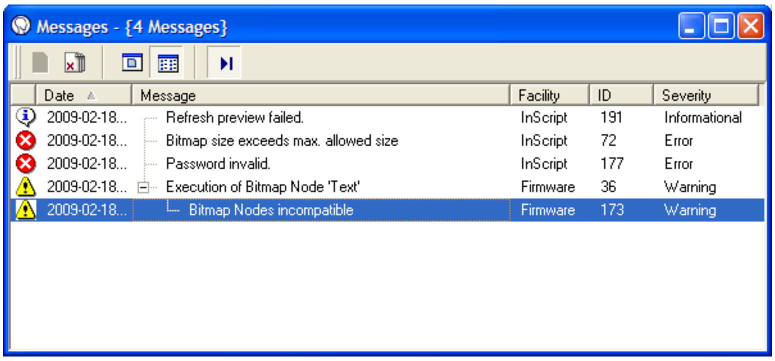
Previous message go to the previous message

Next message go to the next message

Messages box shows the text of the main message and its sub messages (if available)

8.10.6. Messages List

All current messages are shown in a list. Messages that have sub messages are grouped in treeviews to view sub messages click on the '+' sign beside the message text. You may also use the mouse over box of each list item to see complete messages.



Click on to show the list. The list has the following columns:

Icon column a sign for Informational, Warning or Error is shown

Date date and time of occurance of the message

Message message text

Facility reporting system part e.g. InScript or controller firmware

ID Message ID

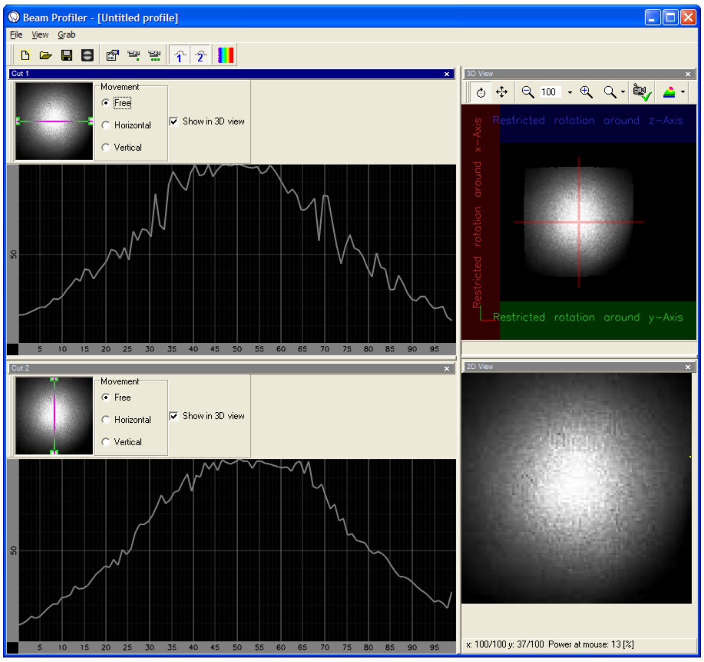
Severity Informational, Warning or Error

8.10.7. Always focus the last message

If this button set, the list or detail view will always show the last incoming message. If the button is not set, then the list or detail view will remain on the currenty selected message.

8.11. Beam Profiler

The beam profiler visualizes basic information about the intensity distribution in a cross section of the beam. The frame grabbing functions are available only if a supported frame grabber is installed in the PC.



To open the *Beam Profiler* window use InScript *Menu* ⟶ *Extras* ⟶ *Beam Profiler*.

8.11.1. Menu

File

New creates a new ARGES beam profile

Open opens an ARGES beam profile `*.abp` file

Import imports an image

Save saves an ARGES beam profile `*.abp` file

Save as saves an ARGES beam profile `*.abp` under a new name

Exit closes all open windows belonging to the beam profiler. These windows will be reopened automatically next time opening the beam profiler

View

Show line cut 1 opens the window *Line Cut 1*

Show line cut 2 opens the window *Line Cut 2*

Show Profiles opens the window *Beam profile*

Show Histogram opens the window *Histogram*

2D profile opens the window *2D view*

3D profile opens the window *3D view*

Edit palette opens the window *Palette editor*

Load Layout opens the window *Load Beam Profiler Layout From File*

Save Layout opens the window *Save Beam Profiler Layout To File*

Grab

Grab single image grabs a single image from the frame grabber

Grab continuous continuously grabs images from the frame grabber

Select device opens the window *Select device*

Configure device opens the window *Configure device*

8.11.2. Toolbar

Create new profile creates a new ARGES beam profile

Open beam profile opens an ARGES beam profile `*.abp`

Save profile saves an ARGES beam profile `*.abp`

Import beam image imports an image as a beam profile

Configure capture device opens the window *Configure device*

Capture single frame grabs a single image from the frame grabber

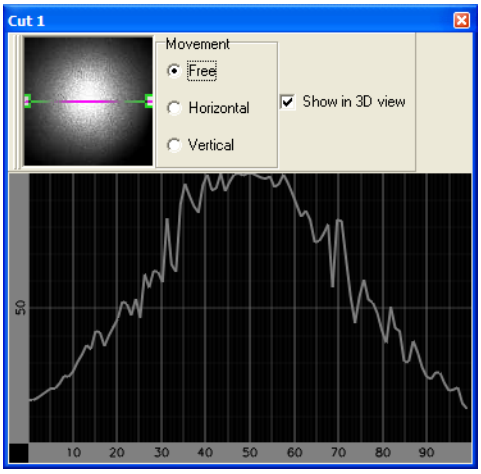
Capture a series continuously grabs images from the frame grabber

Show cut 1 opens the window *Line Cut 1*

Show cut 2 opens the window *Line Cut 2*

Open palette editor opens the window *Palette editor*

8.11.3. Window Line Cut 1 / 2



Movement **Free, Horizontal, Vertical** creates a line cut in the preview on the left. The intensity along this line is shown in the diagram below the preview. These types of can be created:

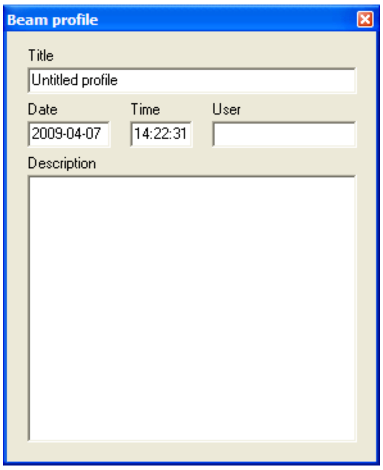
Free the line ends of the cut can be dragged to the desired position

Horizontal a vertical line cut can be moved horizontally

Vertical a horizontal line cut can be moved vertically

8.11.4. Window Beam profile

This window shows additional information which will be saved beside the image information in the ARGES beam profile files.



Title sets the beam profile title

Date sets the date (in the format YYYY-MM-DD) the beam profile was captured

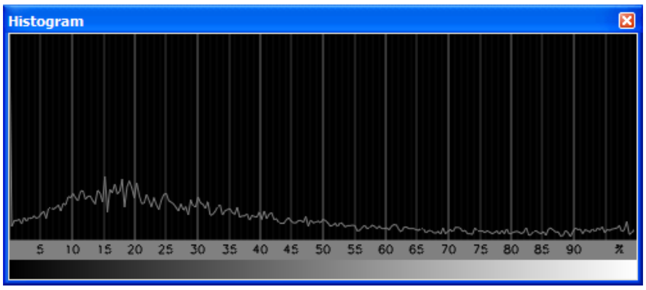
Time sets the time (in the format HH:MM:SS) the beam profile was captured

User sets the user who captured the beam profile

Description sets a description of the beam profile

8.11.5. Window Histogram

The window shows the weighting of intensity in the beam profile.



8.11.6. Window 2D view

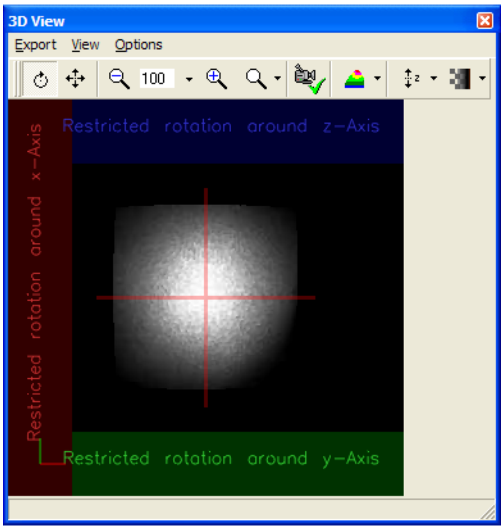
The window shows the 2 dimensional top view of the beam profile.

To zoom the view

1. In the context menu click Zoom
2. Click the zoom factor you want to zoom to

8.11.7. Window 3D view

The window shows the 3 dimensional view of the beam profile.



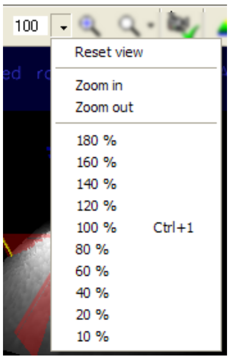
Toolbar

Rotate Mode in this mode the left mouse button rotates the object and the right mouse button moves the camera

Move Mode in this mode the left mouse button moves the camera and the right mouse button rotates the object

Zoom out zooms out of the view

Zoom factor 100 here you can enter a zoom factor in percent or choose from one of these settings if you click on the black triangle:

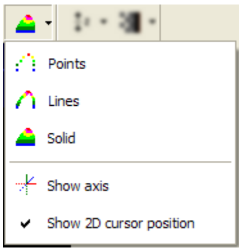


Zoom in zooms into the view

Zoom in slider zooms in or out of the view using the slider

Reset camera view resets the camera view to top view

View Options lets you choose from one of these options:



> **Points** shows the sample points of the profile
>
> **Lines** shows the profile as lines
>
> **Solid** shows the profile as a solid surface
>
> **Show axis** shows x,y and z axis in the lower left corner
>
> **Show 2D cursor position** shows the curser position of the window *2D View* (see 8.11.6 Window 2D view) as a yellow vector

Z Elevation shows more or less z 3D elevation using a slider

Transparency shows more or less transparency using a slider

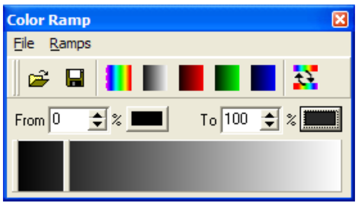
TIP

If you want to rotate/move the object/the camera exactly around/along one axis then click and move the mouse within the colored areas at the side and bottom of the window.

.

8.11.8. Window Color Ramp

With the color ramp editor you can assign colors to laser beam intensity. Either use one of the pre-defined color ramps or define one by yourself.



To define a power ramp, follow these steps:

There are 2 sliders on the color ramp preview. Their positions within the preview correspond to the image intensity in percent as shown in the From/To boxes. The intensity range between these sliders can be filled with a color ramp. That way it is possible to define own color ramps.

Step 1 Move the sliders to the desired positions or type the intensity [%] into the From/To boxes

Step 2 Double click a slider or click the corresponding color button.
The window Color opens

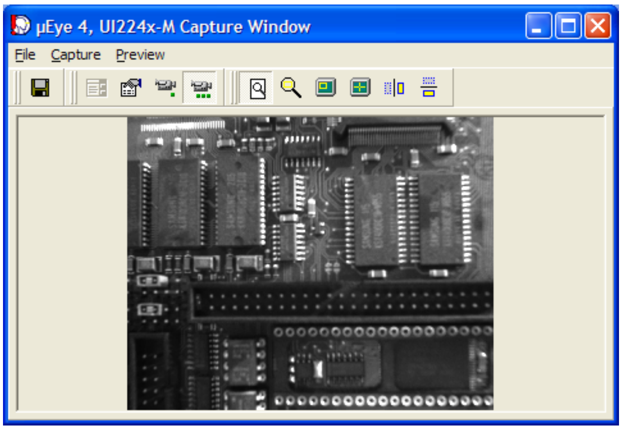
Step 3 Select a color

Step 4 Click *OK*
The intensity range between the 2 sliders will be filled with the color ramp shown on the color buttons.

By repeating this procedure with different slider positions and colors it is possible to define your own color ramps.

8.12. Video Capture Device

Using the functions of the window shown below, *Video Capture Devices* can be selected, configured and used in InScript.



To open the *Video Capture Device* window use InScript *Menu* → *Extras* → *Video Capture Device*.

8.12.1. Setup

Prerequisites

At least one *Video Capture Device* has to be installed in Windows, i.e. the hardware and its Windows driver have to be installed. How to install a *Video Capture Device* in Windows should be described in the *Operator Manual* of the respective *Video Capture Device*.

Initialization

Step 1 In InScript in the menu, click *Extras* → *Video Capture Device*.
The Capture Window opens

Step 2 In the Capture Window's menu, click *Capture* → *Select device*.
The *Select Video Capture Device* windows opens.

Step 3 Select a *Video Capture Device*

Step 4 Click *OK*.
The *Select Video Capture Device* windows closes

Step 5 In the Capture Window's menu, click *Capture* → *Configure device*.
The Configure Video Capture Device window opens

Step 6 In the respective tabs, configure the *Video Capture Device* according to its documentation provided by the manufacturer of the *Video Capture Device*.
Basically select the correct *Color Format* on tab *Mode* and the correct *Type* on tab *Sensor*. The latter one is responsible if the captured image is shown in scale 1:1 or not, where the camera pixel are equal to the pixel shown on the screen.

Step 7 Click OK.
The *Configure Video Capture Device* window closes

Step 8 In the *Capture Window* in the menu, click *Capture* → *Single image* or *Live image*. The image will be displayed in the *Capture Window* and the *Video Capture Device* is ready

8.12.2. Functions

How to capture a single or a live image

- In the menu, click *Capture* → *Single image* or *Live image*

How to save an image

If the *Video Capture Device* is set to capture a live image, it will be reset to capture a single image as soon you perform the next step. This single image will be saved.

Step 1 In the menu, click *File* → *Save Image As*.
The *Save Image* window opens

Step 2 Select a path and enter a file name to save the image to

Step 3 Click *Save*.
The *Save Image* window closes

How to print an image

If the *Video Capture Device* is set to capture a live image, a single image will captured and printed at the time you perform the next step. If you want to print the image on a printer other than the default printer, click *File* → *Print Setup* and select a printer.

► In the menu click *File* → *Print Image*

How to fit an image to the Capture Window

► In the menu, click *Preview* → *Fit to window*

How to show crosshairs

► In the menu, click *Preview* → *Show crosshair*

How to flip an image

► In the menu, click *Preview* → *Flip horizontal* or *Flip vertical*

How to use the region of interest

A region of interest specifies a region, which can be enlarged to the *CaptureWindow*. Before a region of interest can be used, it has to be specified in the first place.

Step 1 In the menu, click *Preview* → *Show region of interest*.
A yellow frame marks the selected region of interest in the image:
- To move the region, place the mouse pointer on the region's center, press and hold left mouse button and move the mouse.
- To resize the region in 1 dimension, place the mouse pointer on the region's edge, press and hold left mouse button and move the mouse.
- To resize the region in 2 dimensions, place the mouse pointer on the region's corner, press and hold the left mouse button and move the mouse.

Step 2 In the menu, click *Preview* → *Use region of interest*.
The image will be clipped to the region of interest

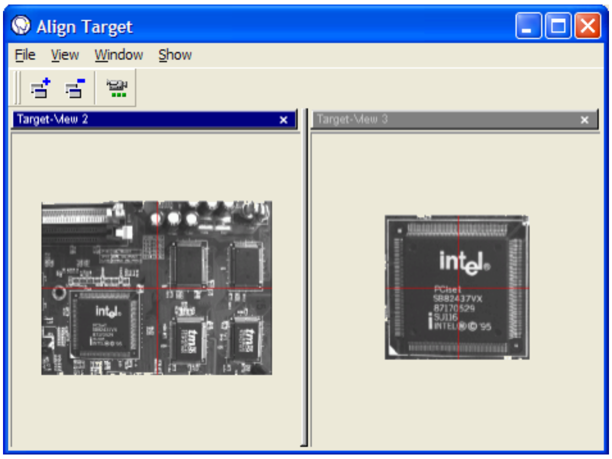
TIP

Fit the image to the Capture Window.

8.13. Align Target

This window is only available when a frame grabber is installed in the PC. In the *Align Target* window one or more images of one or more video sources can be displayed in different resolutions. This is helpful, if one or more targets have to be repeatedly aligned.

You can e.g. display a complete image with half video resolution and one or more cut outs of the same image in full video resolution. Several video sources and frame grabbers can be toggled.



To open the *Align Target* window use InScript *Menu* → *Extras* → *Align Target*.

To see captured video frames you have to add a target view and show live images. Subsequently target tools (cross hairs or target images) can be selected, configured and positioned.

Add Target View

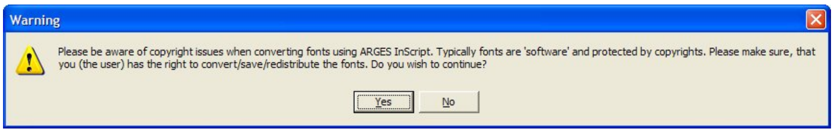
Step 1 In the *Target Align* window menu, click *Windows* → *Add Target View*.
— or —
In the *Align Target* window in the tool bar, click on Add a new TargetView window .
A new Target View window opens. The window will still be empty.

Step 2 In the context menu, click *Select Video Source*

8.14. Convert Font to FDT

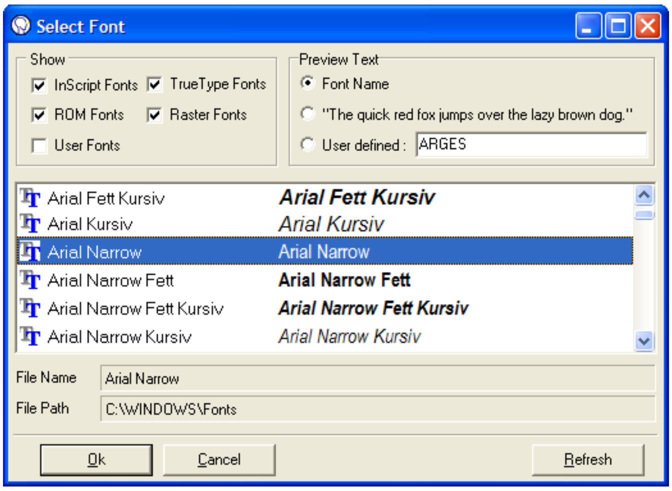
To open the *Convert Font to FDT* window use InScript *Menu* → *Extras* → *Convert Font to FDT*.

Step 1 A Warning will be shown:



If you are sure that your font is compliant with the copyright warning, confirm the dialog by pressing *Yes*.

Step 2 Now the *Convert Font to FDT* window is shown:



Show in this section you can choose the font file types that will be shown in the *Fonts list*

NOTE

<data folder> can be either the InScript installtion folder under operating systems $\leq$ Windows XP or the InScript Documents folder (see InScript's Start menu entries for these folders) on operating systems $\geq$ Windows Vista.

InScript Fonts if this check box is selected *.fdt fonts in <data folder>\Fonts will be shown

TrueType Fonts if this check box is selected *.ttf fonts in <windows folder>\Fonts will be shown

ROM Fonts if this check box is selected special vector fonts that are available on all controllers will be shown

Raster Fonts if this check box is selected *.FON fonts in <windows folder>\Fonts will be shown

User Fonts if this check box is selected User Fonts will be shown

Preview Text lets you choose a preview text for the *Fonts list*

Font Name if this check box is selected the font's name will be used as an example

The quick red fox jumps over the lazy brown dog if this check box is selected "The quick red fox jumps over the lazy brown dog" will be used as an example. This sentence contains all English characters from a to z

User defined if this check box is selected you can enter an own string that will be used as an example

Fonts list shows a list of all availabel fonts that meet the conditions of *Show*

File Name shows the file name of the selected font

File Path shows the path to the selected font

OK if a font is selected the *Choose Unicode Code Charts* dialog opens (if a TTF font is chosen for conversion) then the *Save as* dialog opens. You can save the font in FDT format

Cancel cancels the conversion process

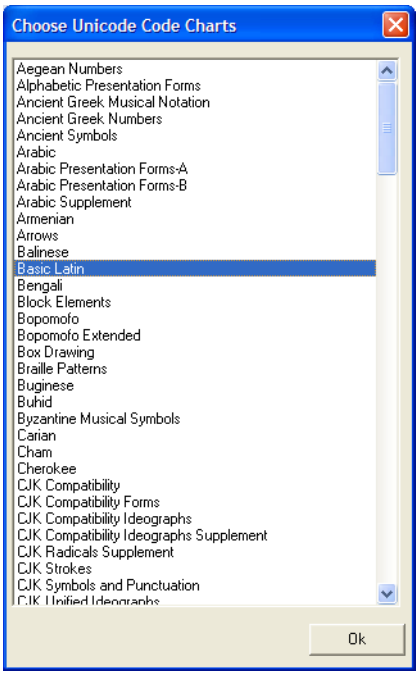
Refresh refreshes the *Fonts list*

Step 3 Click *OK*

Step 4 With TTF fonts, a list of *Code Charts* in the *Choose Unicode Code Charts* window opens. These Code Charts represent different scripts (like European scripts, Asian scripts, even ancient scripts and more). Each font can include different code charts! You may choose more than one *Code Chart* for conversion. But please be aware that choosing lots of code charts can lead to huge amounts of data that have to be converted. Normally it is better to choose a small subset.

TIP

The `Basic Latin` code chart includes most of the common characters. If you are unsure which Code Chart you shall choose, use *Basic Latin* if it is available.



Step 5 Click *OK*

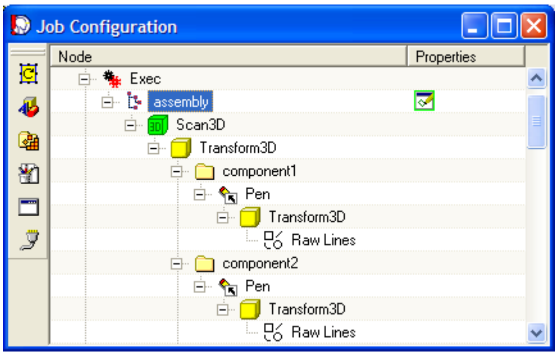
Step 6 The *Save as* Window opens and you may select a path and filename for the converted FDT font (normally the preset filename should be kept

8.15. Convert IGES file to Jobstructure

To open the *Convert IGES file to Jobstructure* window use InScript *Menu* → *Extras* → *Convert IGES file to Jobstructure ...*. This menu item allows you to convert IGES 3D vector files to a InScript Job structure.

The conversion takes all curves and composite curves in the IGES file and creates a Job structure. The curves and/or composite curves should have labels that are set up like this: name#penname (if no labels are available, the curves or composite curves will be placed under an "Objects*n*" Collect node and as pen, the default pen will be used). This will assign names to curve or composite curve data and also associate a pen (the pen has to exist on the system) with each curve or composite curve of the given name.

The output job will look like this:



Description:

```
+Job node: Name = Name of IGES filename

  +Scan3D node for all following nodes of the Job

    +Transform3D node for all following nodes of the Job

      +Collect node: Name = Label "name" of (composite) curve
       (or "Objects(n)" if no label is used in the IGES file)

        +Pen link node: Pen Label "penname" of (composite) curve
         (or Default pen, if no label is used in the IGES file)

           +Transform3D node

             +Raw Lines node with the line data of the (composite) curve

      +Collect node: Name = Label "name" of (composite) curve
       (or "Objects(n)" if no label is used in the IGES file)

        +Pen link node: Pen Label "penname" of (composite) curve
         (or Default pen, if no label is used in the IGES file)

           +Transform3D node

             +Raw Lines node with the line data of the (composite) curve
```

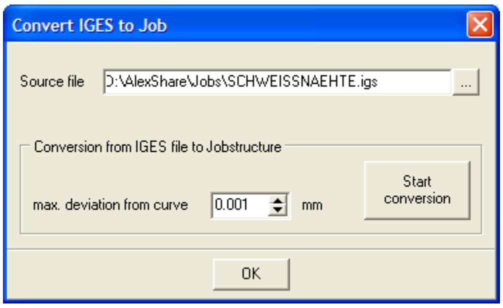
```
etc.
```

Step 1 Use the menu item *Extras* → *Convert IGES file to Jobstructure ...*

Step 2 A dialog will be shown

Step 3 You can browse to your `*.IGS` IGES file by clicking on the ... button

Step 4 After the file is selected the dialog will look like this:



max. deviation from curve here you can set the maximum deviation of curves. Curves are approximated with lines, if this value is higher, less lines will be used for the approximation

Start conversion if this button is pressed, the conversion of the IGES file to a Job structure starts

OK if this button is pressed, the dialog will be closed, no conversion will be done

Step 5 Click on the *Start conversion* button to start the conversion of the IGES file

Step 6 InScript will convert the IGES file into a Job structure in the *Job Configuration* window

Step 7 Now you may save the Job to an InScript Job file (see 4.6.5 Save Job)

Step 8 The conversion has ended. A message in the message window (see 8.10 Messages) shows the status of the conversion (e.g. "Conversion from IGES-file to Jobstructure succeeded." indicates that the conversion succeeded and "Conversion from IGES-file to Jobstructure failed." indicates that the conversion failed).

8.16. Create Support Info

If you want to report a problem in InScript you can use the *InScript Support-Info Wizard* to create detailed information of your system and the issue itself.

To open the *InScript Support-Info Wizard* window use InScript *Menu* → *Extras* → *Create-Support-Info*.

Follow these steps through the Wizard:

Step 1 Read the welcome screen.
Click on *I Agree* if you want to continue

Step 2 To include all your contact information in the Support Info you have to fill in your Name, Adress, Phone number, Fax number and eMail adress.

> **NOTE**
>
> If you want to store this information for further requests click on *Set as default*.

Click on *Next* to continue.

Step 3 Describe the issue you want to report as exact as possible. To do this type a description into the Edit field. Date and time of your report are shown at tthe bottom of the input field.

Click on *Next* to continue.

Step 4 Choose the Range of information you want to report

Information Range sets predefined information ranges

- **Default** selects a standard range of information
- **Minimal** selects a minimal range of information
- **Maximal** selects all information
- **User** the wanted information can be selected under *Information to embed*

Information to embed the selected information will be included in the Support Info

- **System Status** includes the current status of the system (hardware and software versions etc.)
- **InScript Ini-File** includes the current `inscript.ini` file
- **InScript Registry Path** includes all current InScript registry entries
- **Current Job + Linked Files** N/A
- **NCC Tree Snapshot** includes a snapshot of the current variable tree
- **Flash Image** includes an image of the current flash memory
- **Ram Image** N/A

Click on *Next* to continue.

Step 5 While this screen is shown InScript collects the wanted information if you click on *Start*. The current status and progress will be shown after you click *Start*. If the collection of information is done the Next button will be available.

Click on *Next* to continue.

Step 6 Have a view of the collected information.

Click on *Next* to continue.

Step 7 Now all the Support Info is packed and you have several possibilities to proceed with it

Save to file save the compressed data to disk

Save splitted save the compressed data to disk but split it for different media

Mail to tries to open your standard windows mail client software. The compressed data has to be attached manually as described in the requestor and in the mail's text body

Delete Temp-Files On Finish if this check box is selected the created files will be deleted after you click on *Finish*

Click on *Finish* to exit the Wizard.

8.17. Arrange Windows and Tool Bars

In InScript the user can freely arrange windows and tool bars. If InScript is closed the layout will be saved and restored with the next program start. Whether the layout of docked and/or un-docked windows and tool bars will be saved, you can set in the preferences (see 8.4.24 Sub Category - Shutdown).

8.17.1. Undocking

1. Place the mouse pointer on the window title bar or on the 2 parallel lines of the tool bar
2. Hold the left mouse button pressed and draw the window or tool bar to the desired position
   --or--
   Double click the window title bar or the 2 parallel lines of the tool bar.

   The window or the tool bar un-docks, i.e. changes into a separate window.

8.17.2. Docking

Tool Bars

1. Place the mouse pointer on the title bar of the tool bar.
2. Hold the left mouse button pressed and draw the tool bar to the desired position
   --or--
   Double click the title bar.

   The tool bar will be docked.

Windows

1. Place the mouse pointer on the window title bar.
2. Hold the left mouse button pressed and draw the window to the desired position. Frames will show the position in which the window will be docked. Often it is good to place the mouse pointer on title bars of other docked windows to achieve a desired position.

   The window will be docked.

   NOTE

   If you double click the window title bar then the window will be maximized instead of being docked. It behaves like any other window in Windows.

Pop-up Tool Bars in e.g. *Vector Editor* there are secondary tool bars that pop up after you press a tool bar button for a longer time (as set in 8.4.28 Sub Category - User Interface *Popup after*). These tool bar buttons are marked with a little triangle in the bottom right corner.

1. Undock pop-up tool bars from such a button by double clicking them.

   The triangle is removed, the toolbar is floating and may be docked like other tool bars.
2. To re-attach the toolbar to such a button, just make it floating and press the [x] close button of this tool bar window.

   The little black triangle will be re-displayed

8.17.3. Prevent Docking

Hold the *Ctrl* key pressed while drawing the window or tool bar respectively across the InScript window. The window will not dock at any position.

8.17.4. Save/Load Window Layout

NOTE

<data folder> can be either the InScript installtion folder under operating systems $\leq$ Windows XP or the InScript Application Data folder (see InScript's Start menu entries for these folders) on operating systems $\geq$ Windows Vista.

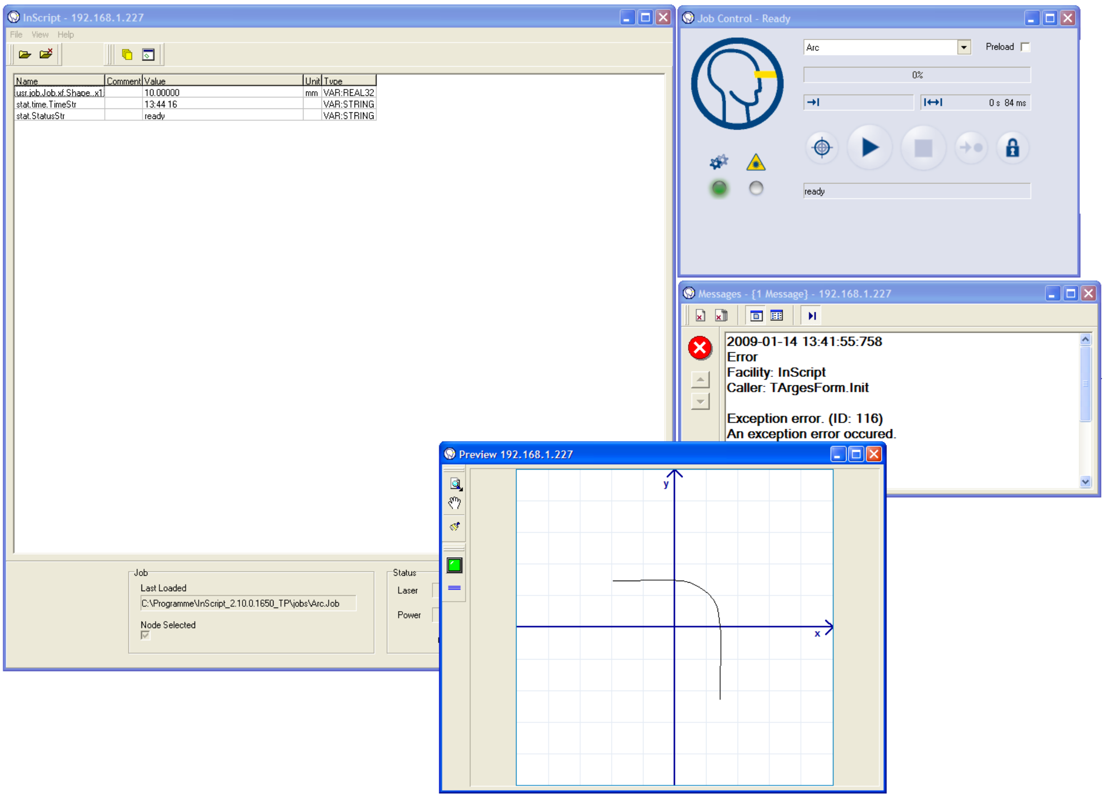
To save the current window layout to a file use InScript *Menu* → *View* → *Load Layout* and InScript *Menu* → *View* → *Save Layout* (see 8.3.3 View). To save the standard layout that is loaded on start of InScript write over `<data folder>\config\standard.lay`. The file `standard.lay` is normally written with the current window settings if you exit InScript but you may deactivate this behaviour under InScript *Menu* → *Global* → *Shutdown* by unchecking *Save docking layout* and *Save position and size of undocked windows* (see 8.4.24 Sub Category - Shutdown)

9. Supervisor and Operator Mode

What?

The Operator mode is intended e.g. for manufacturing, when persons shall execute jobs, set specific parameters, but beside this are not allowed to change the configuration of InScript in no way.

Unlike *Supervisor* mode only a very limited set of dialog elements is available in the *Operator* mode (see following figure).



How?

Here you will learn, how to set, edit, activate, deactivate the password for Supervisor mode and how to toggle between supervisor and operator mode. To enable the operator of setting a specific variable, this variable has to be shared with the Operator mode.

9.1. Set and Edit Password

To prevent Operators from switching to InScript supervisor mode a password can be specified.

InScript has to be in Supervisor Mode

Step 1 Click *Options* → *Supervisor Password ...* in InScript menu.

The Password window opens

Step 2 If a password already exists then type the password in the *Password* box. If you want to specify a password and did not have a password before leave the *Password* box blank

Step 3 Type the new password in the *New Password* box and in the *Repeat new Password* box.

Step 4 Click OK.

The new password is set.

9.2. Activate and Deactivate Password

InScript has to be in Supervisor Mode.

If you toggle from Operator to Supervisor mode and a password has to be entered you may deactivte this temporarily.

- In the menu, click *Options* → *Password active*.

A check mark shows if the password is active or not.

9.3. Enter a Password to Return from Operator Mode

InScript has to be in Operator Mode and a password has to be set and active (see 9.1 Set and Edit Password and 9.2 Activate and Deactivate Password).

Step 1 If you are in Operator mode and a password is set and active, select *View* → *Mode* → *Supervisor* from the main menu

Step 2 If a password is set and active, this dialog will be shown:

Step 3 enter the password you set (see 9.1 Set and Edit Password) to get back to InScript Supervisor mode.

If you check the *Ask again during this session* checkbox the password will be requested each time you want to switch from Operator to Supervisor mode. If you uncheck this checkbox, you will not be asked to enter the password until InScript was restarted

Step 4 Click *OK* to switch to Supervisor mode

9.4. Toggle Supervisor and Operator Mode

Step 1 If you are in Supervisor mode click *View* → *Mode* → *Operator* in InScript menu

— or —

If your are in Operator mode click *View* → *Mode* → *Supervisor* in InScript menu.

A dot shows which mode is active.

Step 2 If you toggle fromOperator to Supervisor mode and a password is active then the window *Enter Password* opens.

Type the password in the *Password* box and click OK.

9.5. Start in Supervisor or Operator Mode

Step 1 In the menu, click *Options* → *Preferences*.
The Preferences window opens.

Step 2 In the tree structure, click *Board*.

Step 3 In the *Start in* group, click *Operator mode* or *Supervisor mode*.

Step 4 Click OK.
When InScript starts next time, it starts in the corresponding mode.

9.6. Make Variables Accessible in Operator Mode

InScript has to be in Supervisor Mode. The node with the variable has to be in a Job node subtree.

Step 1 Open the node containing the variable that you want to make visible in *Operator mode* or browse to the variable in Xplorer.

Step 2 In the input box context menu of the variable (or the context menu in Xplorer) , click *[variable name]* → *Add to Inspector*.
The *Node Inspector* window opens and the variable is added to the list.

Step 3 In the *Job Configuration* window open the *Job* node in whose subtree the node with [variable name] is located.

Step 4 Drag&Drop the variable from the list in the *Node Inspector* window to the list in the *Job Node Editor* window.
The variable is added to the list in the *Job Node Editor* window.

Step 5 In the *Job Node Editor* window, click OK.

Step 6 Save the subtree (see 4.6.13 Save Subtree).
If you load the job in *Operator* mode the variables, you have added to the job, can be edited and/or viewed.

10. Exercises and Examples

The following exercises and examples illustrate, how to work with InScript. The first and important exercise (10.1 First and Important Steps) shows how to produce a simple output. Besides this you will learn general procedures in working with InScript. Thus we strongly recommend to do the first exercise.

In other exercises we assume that the concept of InScript and the previous chapters are known. Therefore known steps will be described only briefly.

NOTE

The settings shown only illustrate principles and depend on the connected hardware. To prevent damage you have to be familiar with hardware properties of your devices before starting a job and/or changing process parameters. ARGES does not assume liability for consequential damage.

10.1. First and Important Steps

The goal of this exercise is to output the text "Hello world" within a frame and to get familiarized with general connections in InScript, this includes working with jobs in *Job Configuration* and *Vector Editor* window as well as the difference between *Preview* and *Editor* mode the *Vector Editor*.

Step 1 In the menu, click *File* → *New Job*.
-- or --
In *Job Configuration* window, select the *Exec* node and then successively click the symbols *Organizers* and *Job* .

In the *Job Configuration* window a new *Job* node is created as child of the *Exec* node.

Step 2 Select the *Job* node in the *Job Configuration* window and then successively click the symbols *Tools* and Text .

In the *Job Configuration* window a new *Text* node is created as child of the *Job* node.

Step 3 Double click the *Text* node.

The *Text Editor* window opens.

Step 4 Click inside the text box on the left side of the editor.

Step 5 Type the text "Hello world". The text will be shown in the text box.

Step 6 Click *Apply*.

Step 7 Leave the *Text Editor* window open.

In this exercise the tree structure beneath the *Exec* node contains only one *Job* node. But there can be several *Job* nodes. To determine that the controller board and Vector Editor "know" which node to output, you have to "select" the node for output even if only one *Job* node is present:

Step 1 Select the root node of the subtree to be output in the *Job Configuration* window. In this exercise this root node is the *Job* node.

NOTE

If the *Job* node already has a red rectangle around its name in the tree then only *Deselect* will be available and you may continue with the next step. As an exercise you could *Deselect* / *Select* the *Job* node.

Step 2 In the context menu, click Select.
--or--
Press the Enter key.

A red square appears around the root node. The subtree is loaded to the controller board line buffer.

To verify how the output would look like open the *Vector Editor* in *Preview* mode. This mode takes the line data from the controller board and displays them as they would be output by the scan head:

Step 1 Click on the little arrow to the right of the symbol.

A menu opens.

Step 2 Click Preview.

The text "Hello world" is displayed in the *Vector Editor* window.

As the Preview mode takes the line data directly from the controller board, the line data cannot be edited in this mode. The edit menu of the *Vector Editor* will be grayed.

Step 3 In the *Text Editor* window that we left open, change the value of Size (if the Editor was covered up by the InScript main window you just have to double click the *Text* node again).

Step 4 Press the Enter key.

NOTE

The character size does not change in Vector Editor. This is not an error but a property of the Preview mode. Often a job contains complex objects with several thousand lines. It would take a lot of time to update every change in the line data. Therefore the line data is not automatically updated. You have to update the line data from the controller board manually to display them:

Step 1 Click the (Update DSP-Data) symbol in *Vector Editor Action* toolbar,.

The text will be displayed with the new size.

Step 2 To display changes immediately in *Vector Editor*, click *Add Vector-Editor View* in the *Job* node context menu.

This toggles *Vector Editor* to *Editor* mode. Furthermore the subtree that was selected in this way is displayed in the Vector Editor and can be edited there. The edit menu of the *Vector Editor* us ungrayed.

Step 3 In the *Text Editor* window, change the value of Size.

The character size now changes automatically in the *Vector Editor* window.

Step 4 Click OK.

The *Text Editor* window closes.

The next thing we want to do is to draw a frame around the text. As you already familiar with the *Text* node you could create a *Shape* node this time and place it under an *Offset* or *Transform* node to move it to the desired position. But most of the graphical *Tools* operators (the Shape node is a part of them) can also be created interactively using the *Vector Editor*'s edit menu:

Step 1 In the Vector Editor window, click and hold on the symbol until a tool bar opens.

Step 2 Click the Create Shape symbol.

Step 3 In the *Vector Editor* window, open up a rectangle enclosing the Text "Hello world" by clicking and dragging its outline.

As soon as you release the mouse button, the red dashed draft line turns to a rectangle. At the same time in the *Job Configuration* window 2 new nodes appear: a Transform node with name "Shape" and a Shape node with name "Shape", which is a child of the Transform node.

Accuracy is not relevant for this *exercise*, it only shows basic operation of InScript. You do not have to align the rectangle exactly. But InScript could provide a lot of possibilities to set exact numerical values instead of interactively move objects in *Vector Editor*. Just double click any node in *Job Configuration*, place it under a Geometrical Operator node and double click this node or right click any object in *Vector Editor* (if it is child of a transformation node) and choose *Edit Transformation*, *Edit Size* or even *Edit Job Node* to set a lot of possible values like size, offset etc. as exact values (see 5 Job Nodes for more information).

Step 4 Before starting the process you have to check and set its parameters (e.g. laser power, processing speed).

NOTE

The *Job* node you want to output already is selected for output. This is symbolized by the red square around the node.

CAUTION

Visible and invisible laser radiation

The user is responsible for observing the laser safety regulations valid in his country.

Avoid eye or skin exposure to direct or scattered radiation.

In the tool bar, click the symbol.

The job will be started.

Step 5 Save the job to use it as starting point for new exercises by right clicking it and choosing *Save Job* from its context menu.

To find more information see 5 Job Nodes and 7 Vector Editor Window.

10.2. Create an Arc

To create an Arc, you can use the *Raw Lines* node. This also ensures that the laser beam is not interrupted (e.g. for welding) on subsequent objects after the arc was drawn.

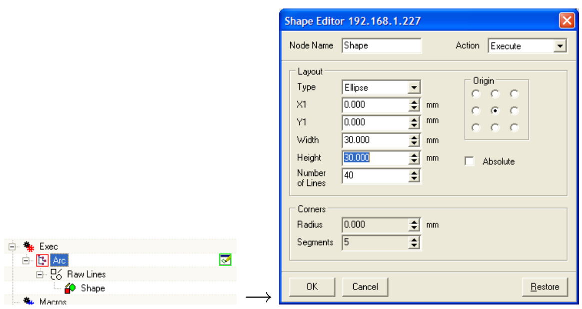
Here is an example howto do this:

Step 1 Create a new Job via *Organizers* / *Job*. Rename it to e.g. Arc.

Step 2 Create a Vector view for this Job by right clicking it and selecting *Show vectorEditor View*.

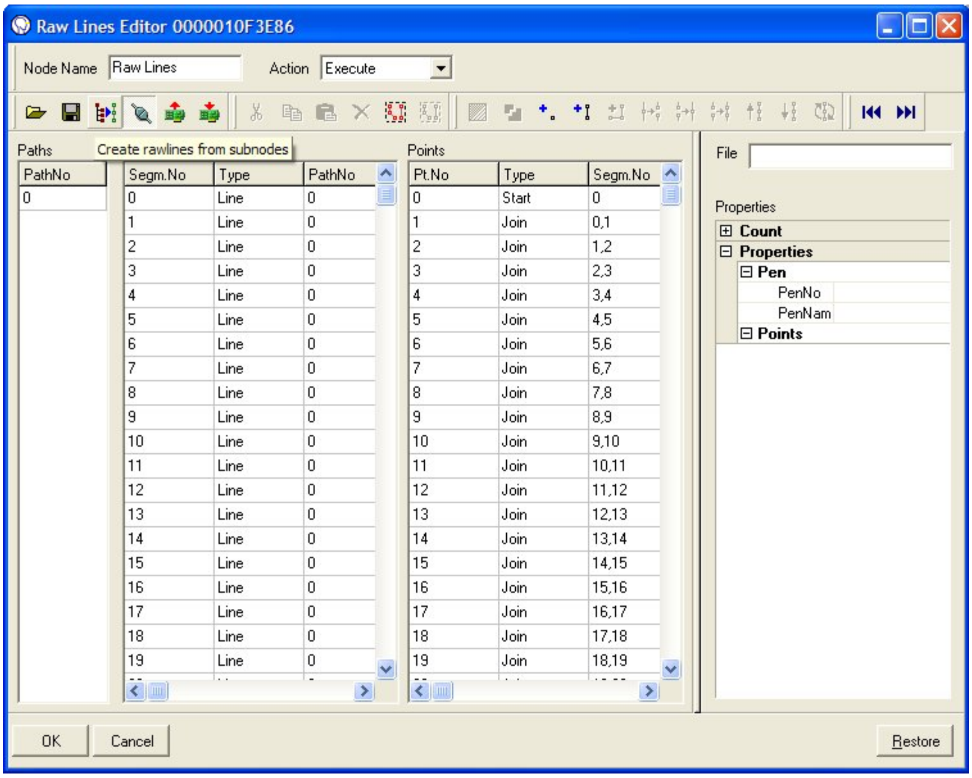
Step 3 Insert a *Raw Lines* node under the Arc job node via *Tools* / *Raw Lines*.

Step 4 Insert a *Shape* node under the Arc job node via *Tools* / *Shape* and double-click the *Shape*, set Type to ellipse, Width to 30.000 mm and Height also to 30.000 mm:



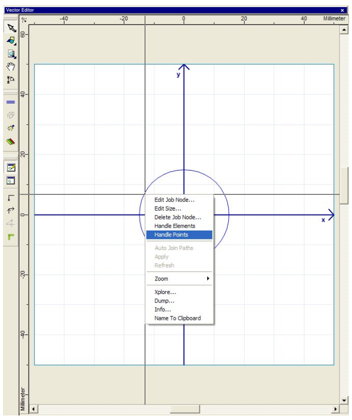
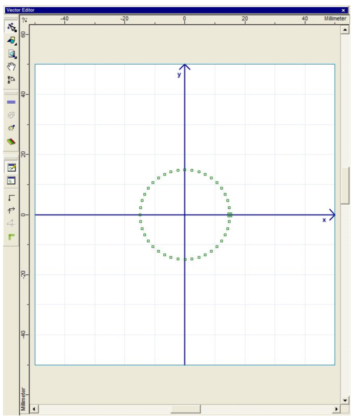
You may use different shapes for different purposes.

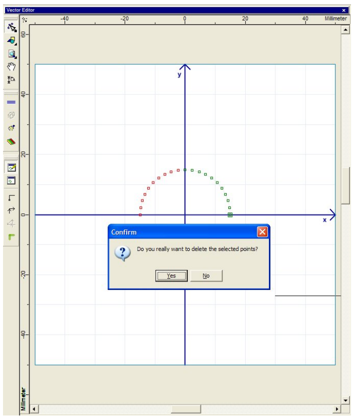
Step 5 Double-click the *Raw Lines* node and click *Create rawlines from subnodes*:



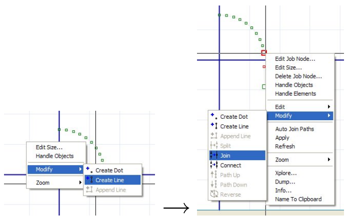
→ all elements of the *Shape* are shown in the *Raw Lines* Editor

Step 6 Right click on the *Shape* in Vector Editor and choose *Handle Points*:

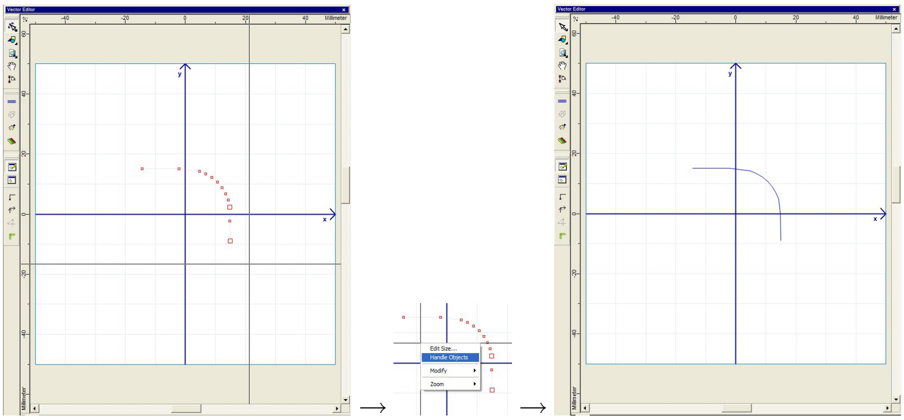
 →  →



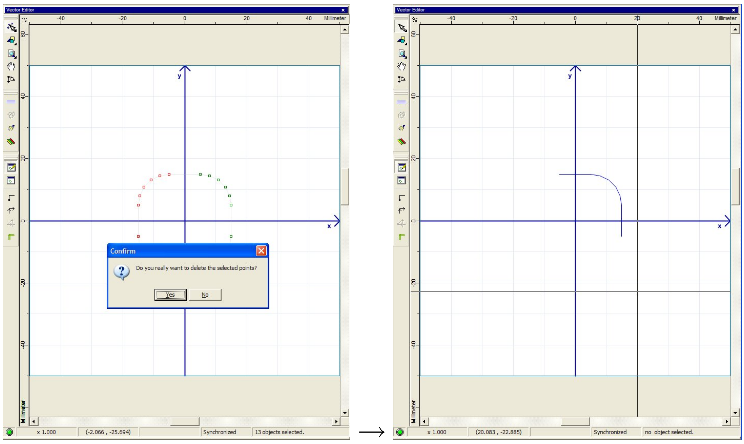
Select all the points you do not need and delete them. Double-click the the start point (the point with the enlarged square) to break the object. Create e.g. a line and Join it with the Arc by selecting two points, right-click them and select "Modify / Join".



Step 7 You can also do this on the other End of the Arc, then switch to "Handle Objects":



Step 8 This could also be done on basis of a *Rectangle* with rounded corners. Please try to find a scenario suiting your circumstances!

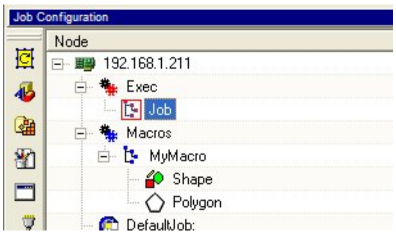


10.3. Create Macros

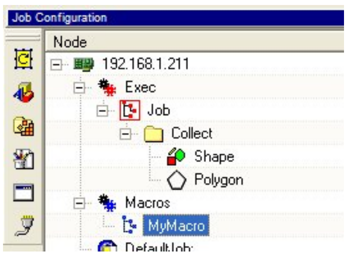
Macros are small collections of nodes and instructions that can be re-used in one or more jobs on different locations of this or these jobs. These macros can be handeled within the *Job Configuration* window. Macros can only be created on ASC controllers from FW v2.5.0.264 and InScript v2.10.0 (ACME1928) and are not supported on NCC controllers!

Create and Save a Macro to create a macro, please follow these example steps:

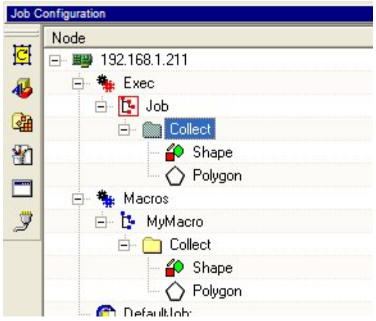
- Create a macro from scratch
  - Add a new „Macro“ node Under the „Macros“ section via *Organizers* / *Macro* . Rename it to e.g. „MyMacro“.
  - Add all functionality to you want to use to this macro. In this example e.g. a *Shape* and a *Polygon*.



- Create a macro from an existing sub-tree under *Exec* via drag & drop
  - For instance you got a Job with a collection of a Shape and a Polygon in the „Exec“ section in the Job Configuration window.
  - Add a new *Macro* node Under the *Macros* section via *Organizers* / *Macro* . Rename it to e.g. „MyMacro“.

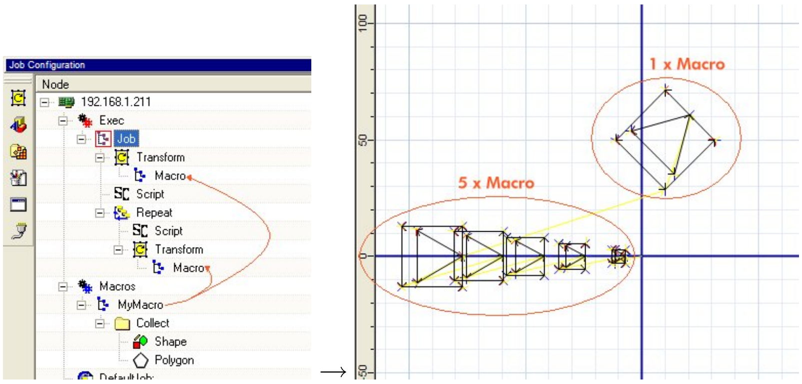


- Now you can just drag and drop the Collect node on the „MyMacro" node. If you press the *Ctrl* key, the Collect node and its sub-tree are **copied**. Elseway it will be **moved**. If you copy it using *Ctrl*, the result will look like the example picture.



After you created a macro, you can save it for later use. Just right-click e.g. "MyMacro" and choose *Save Macro...* from the context menu.

Use a Macro to use this macro, you only have to drag & drop it to the place in your *Job* where the functionality of the nodes stored in the macro is needed. Here the macro is used once below a transformation node and repeated five times and transformed under a Repeat node.



10.4. Create a Tiling Node

The *Tiling* node is meant to split the area of a workpiece that is bigger than the scan field into sections that fit in the scanfield. After processing one section you can move the workpiece to a different position (e.g. by using an axis table) to continue processing in the area(s) that were outside the scanfield.

Step 1 A valid fieldsize of the scanfield has to be avialable.

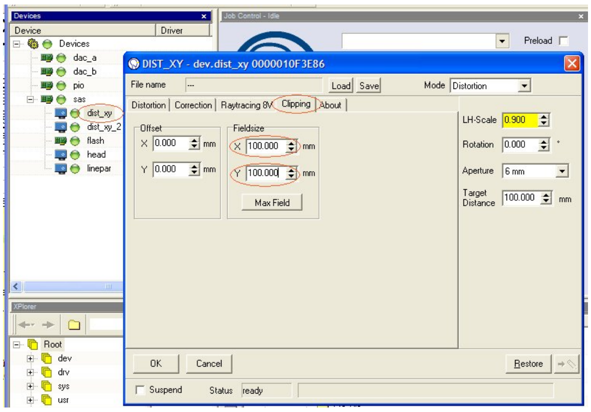
⚠ **CAUTION**

Data loss

Your scanfield settings will be lost if you execute this step in a fully configured system.

Normally the filedsize should already be set correctly while doing the scanfield correction and this should **only be done for sheer testing purposes**!

Only if no valid fieldsize of the scanfield exists you could set your fieldsize to e.g. 100×100 under *Devices* / *dist-xy* / *[Expert mode]* / *Clipping*



Step 2 In this example the fieldsize is smaller that the actual workpiece that shall be processed, so you have to use Tiling to cover the complete area of the workpiece.

Step 3 Create a new *Job* via *Organizers* / *Job* . Rename it to e.g. "Tiles".

Step 4 Create a Vector view for this Job by right clicking it and selecting *Show vectorEditor View*.

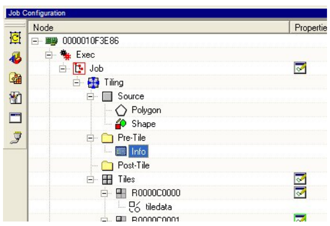
Step 5 Insert a *Tiling* node under the Tiles Job via Organizers / Tiling . InScript will create a *Source*, *Pre-Tile*, *Post-tile* and a *Tiles* node under the new *Tiling* node (see 5.47 Tiling for more information).

Step 6 Insert a *Shape* and/or a *Polygon* under *Tiling* / *Source* that should be processed on the workpiece. This Shape should be bigger than the fieldsize you set (e.g. an ellipse with width and height 200 an/or a star with Convex Radius 100 and Concave Radius 50).

Step 7 Double click the *Tiling* node and click on *[Create Tiles]* (this example shows, how to automatically create a Tiled output. If you want to distribute the output over pre-created tiles in the Tiles subnode of a Tiling node, you can use the *[Split]* button).

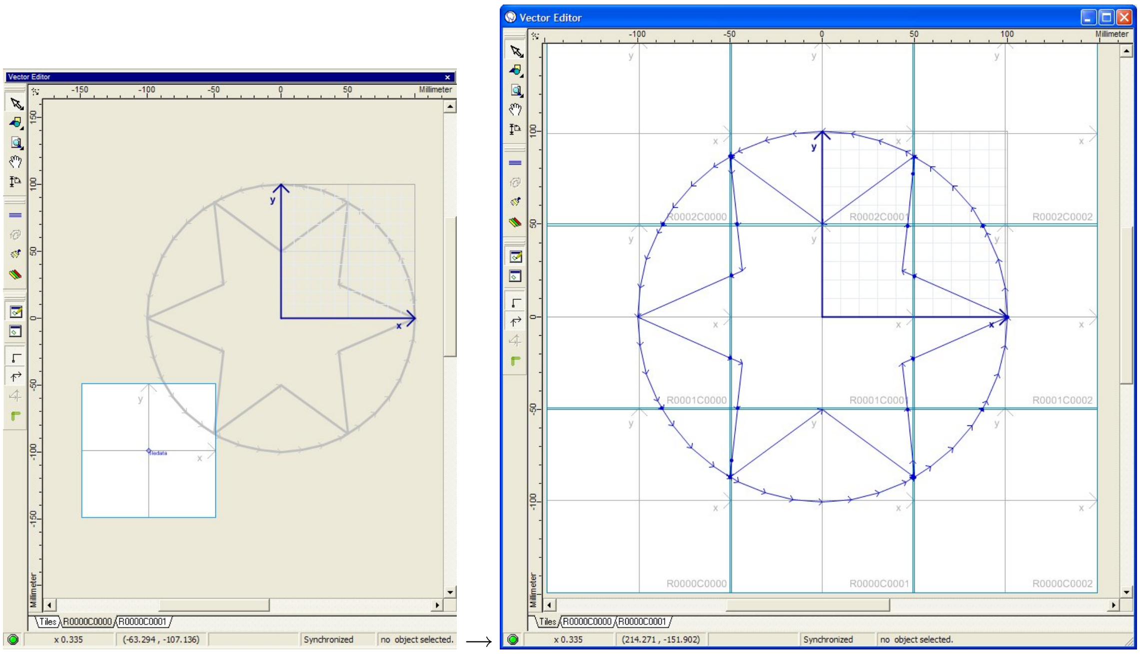
Step 8 InScript will create several *Rxxxxxxxxx* nodes unter the *Tiles* node of the *Tiling* node.

Step 9 To do table translations between each tile, you can use the *Pre-Tile* and *Post-tile* nodes. In this example we will only add an Info node via Dialogs / Info to *Pre-Tile*. As message we enter "Next Tile ..." to the *Info* dialog by double clicking the *Info* node (you may use almost all nodes in *Pre-Tile* and *Post Tile*).



The tiled objects and scanfield sections can be visualized in *Vector Editor*. There are some possibilities to do this.

To visualize the tiles, right click the *Tiles* node and choose *Show Vector Editor View* or right click on any of the created *Rxxxxxxxxx* nodes and choose *Show Vector Editor View* to view these tiles' areas. Or visualize the complete job with overlapping areas by selecting it.

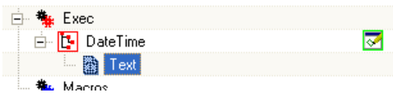


10.5. Insert Date and Time in a Job

To insert date and/or time in a InScript job, you can use the controller variables `stat.time.TimeStr` and `stat.time.DateStr`.

Step 1 Create a new Job via *Organizers* / *Job* . Rename it to e.g. DateTime.

Step 2 Insert a text node under the DateTime job node via Tools / Text :



Step 3 Double-click the text node and enter the following:

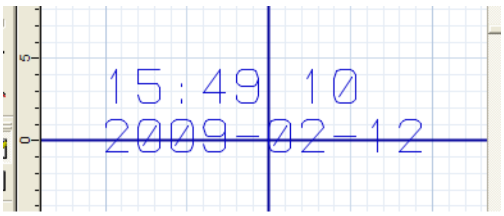
`$stat.time.TimeStr$`

`$stat.time.DateStr$`

Here you could also choose a different font or other output properties.

Step 4 Select the job by pressing the `[Enter]` key and create a vector editor view for this job by right clicking the *Job* node and selcting *Show VectorEditor View*.

Step 5 Execute the job.



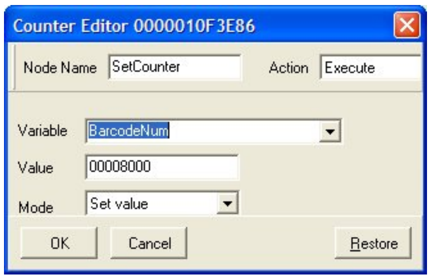
If you want to format the output of date or time, you can use different stat.time.* controller variables like `stat.time.Year`, `stat.time.Month2` (e.g. "02" for February - most of these variables have a 2 digit counterpart), `stat.time.Month`, `stat.time.Day`, `stat.time.Hour`, `stat.time.Minute`, `stat.time.Second`. You can find these variables in Xplorer under path *Root / stat / time* and copy their variable names with right click on variable / *Fullpath to Clipboard*. You can e.g. use Time: `$stat.time.Hour$:$stat.time.Minute2$:$stat.time.Second2$` in a text node. You will get an output like "Time: 9:02:45".

10.6. Rolling Barcode Numbers

If you want to create a Barcode with rolling numbers, you can use the *Counter* node. A *Counter* node is set to a specific number and then increments it for a certain amount. For this you need two *Jobs* in this example. One *Job* to set the starting number and one *Job* to process barcodes.

Step 1 Create a new *Job* via *Organizers* / *Job*. Rename it to e.g. InitBarcode. With this job we will set the initial number value of the barcode.

Step 2 Insert a *Counter* node under the RollingBarcode job node via *Organizers* / *Counter* and double-click the *Counter* node:

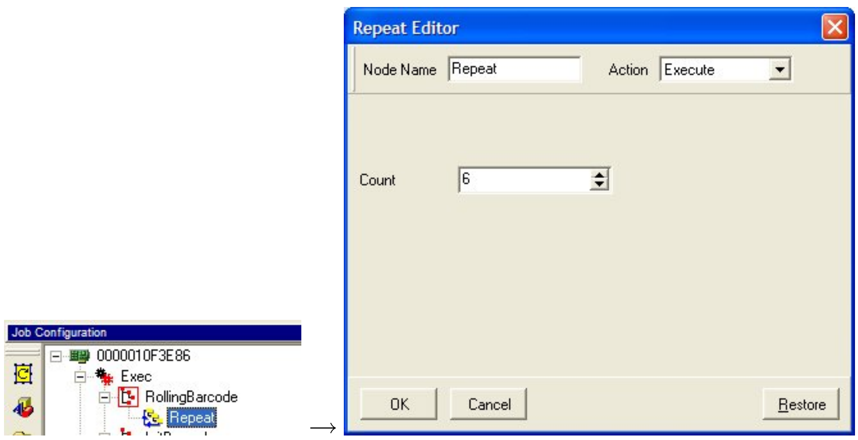


Step 3 Name the node (e.g. SetCounter). Insert a variable name (e.g. BarcodeNum), set the *Value* field to the needed start value of the barcode (e.g. 8000) and choose *Set value* as *Mode*.

If you start the job InitBarcode, the barcode's number will be initialized with 8000. You can use this job to set a new start number.

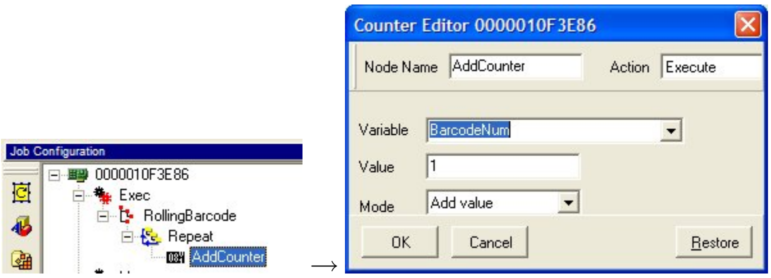
Step 1 Create a second Job via Organizers / Job. Rename it to e.g. RollingBarcode.

Step 2 Insert a Repeat node via via Organizers / Repeat and double click the *Repeat* node:



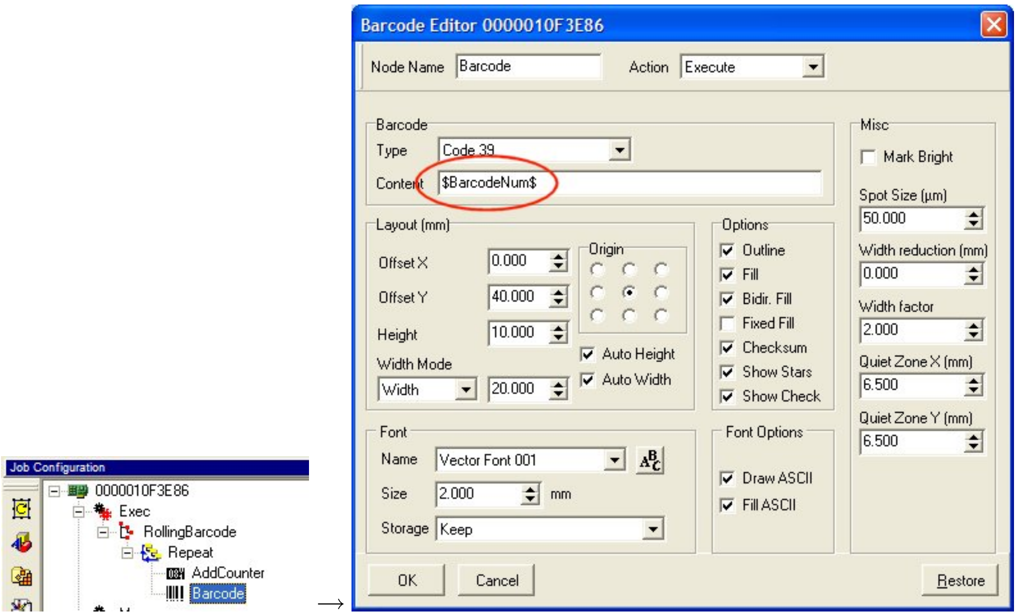
Step 3 Set the *Count* value to e.g. 6 (drawing barcodes needs a considerable amount of time, so be sure that your pen linepar speed and jumps are high or this number is low).

Step 4 Insert a counter node via Organizers / Counter and double click this new *Counter* node:



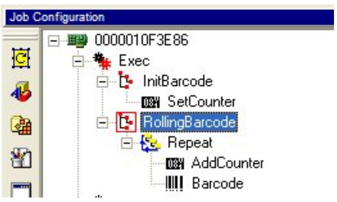
Insert the variable name used in the InitBarcode job's SetCounter (e.g. `BarcodeNum`) to the *Variable* field, set the *Value* field to the increment you want to use for your rolling barcode number (e.g. 1). Then choose *Add value* as Mode.

Step 5 Now insert a Barcode node under the Counter node via Tools / Barcode and double click the *Barcode* node:



Insert the variable name in $$ signs ($BarcodeNum$) in the *Content* field (eventually adjust other barcode settings).

Step 6 Select the job by pressing the [Enter] key.



Step 7 Execute the job.

To view a successive numbering in the preview window of InScript you can press *Show Preview* consecutively (the job will be rendered on the controller and that's the reason why the counter node is incrementing the bar code number).

10.7. Read Data From a TXT File

The *Query* node (see 5.56 Query) in connection with the *Input* node (see 5.54 Input) can be used to read data from different data source (e.g. INI files, TXT files, Excel, MDB or DBF files). This example shows how to read data from a Tab seperated TXT file.

The TXT file has to look like this (the '»' represent tabs):

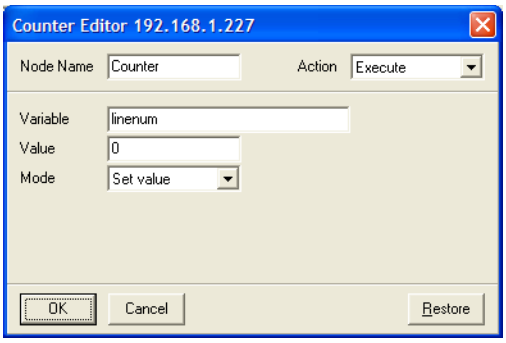
```
Column 1» Column 2» Column 3
Value a1» Value b1» Value c1
Value a2» Value b2» Value c2
Value a3» Value b3» Value c3
```

Create this file with an ASCII editor (e.g. notepad.exe) and save it as Input.txt inthe same folder as you will save your job. We will read the data of all three columns and output it using a *Mat2Off* and a *Text* node.

Step 1 Create a new Job via *Organizers* / *Job* . Rename it to e.g. ReadTXT.

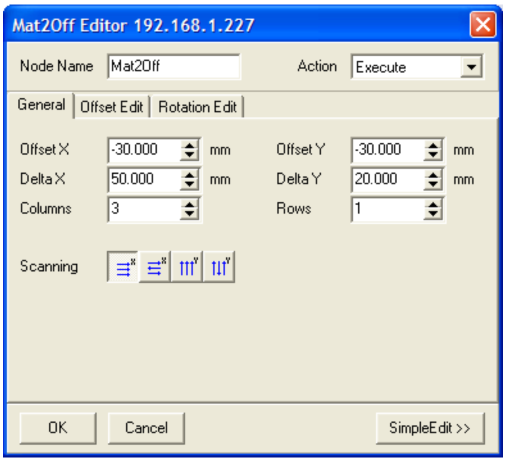
Step 2 Create a Vector view for this Job by right clicking it and selecting *Show vectorEditor View*.

Step 3 Create a Counter node via *Organizers* / *Counter* under the Job node ReadTXT and double click it to set its parameters like this:



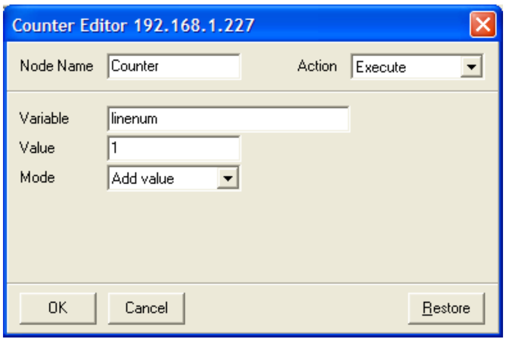
This initializes the line number counter to 0.

Step 4 Create a *Mat2Off* node via *Organizers* / *Job* and double click it to set its parameters like this:



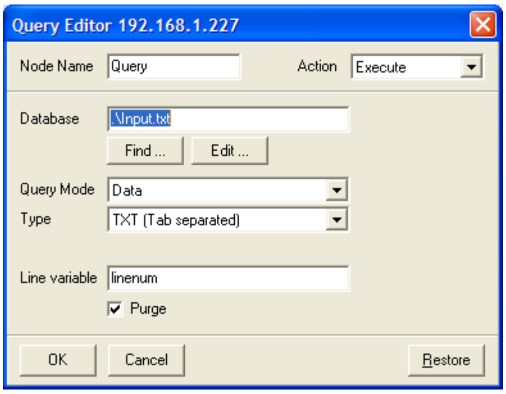
This sets the initial positions of the output and sets the number of *Columns* and *Rows* in the TXT file. This numbers must match the TXT file's actual number of rows and columns (3 columns and 1 row because the header is omitted and in each loop three values are read).

Step 5 Under the *Mat2Off* node create another *Counter* node via *Organizers* / *Counter* and double click it to set its parameters like that:



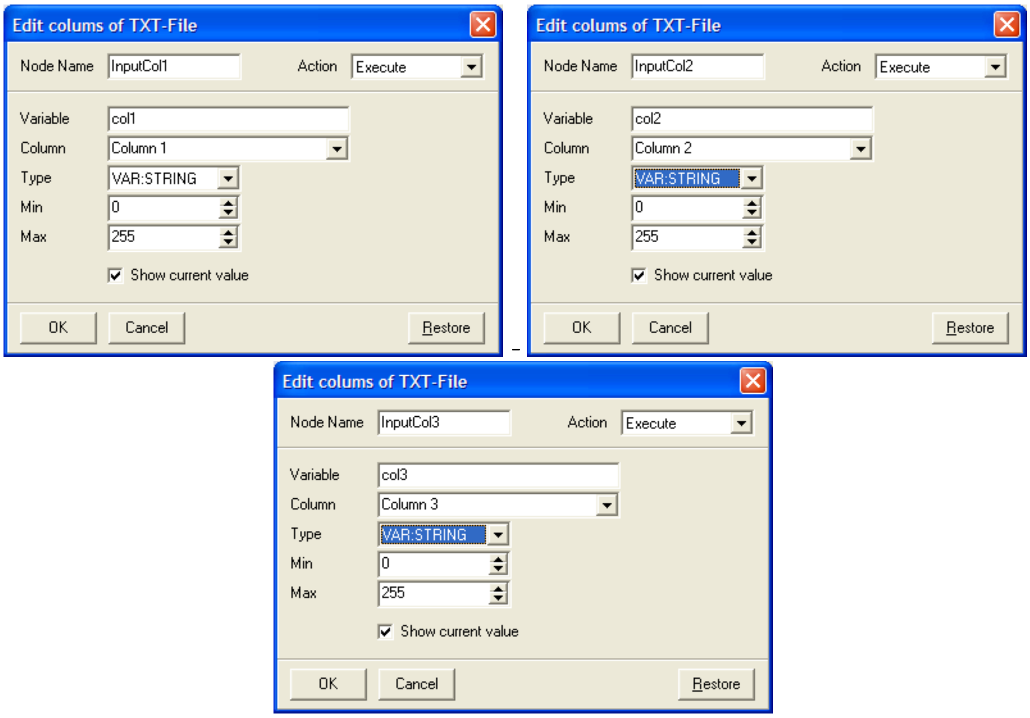
This increments the linenum variable by one on each *Mat2Off* loop.

Step 6 Place a *Query* node under the *Mat2Off* node via *IOs* / *Query* and configure it like this:

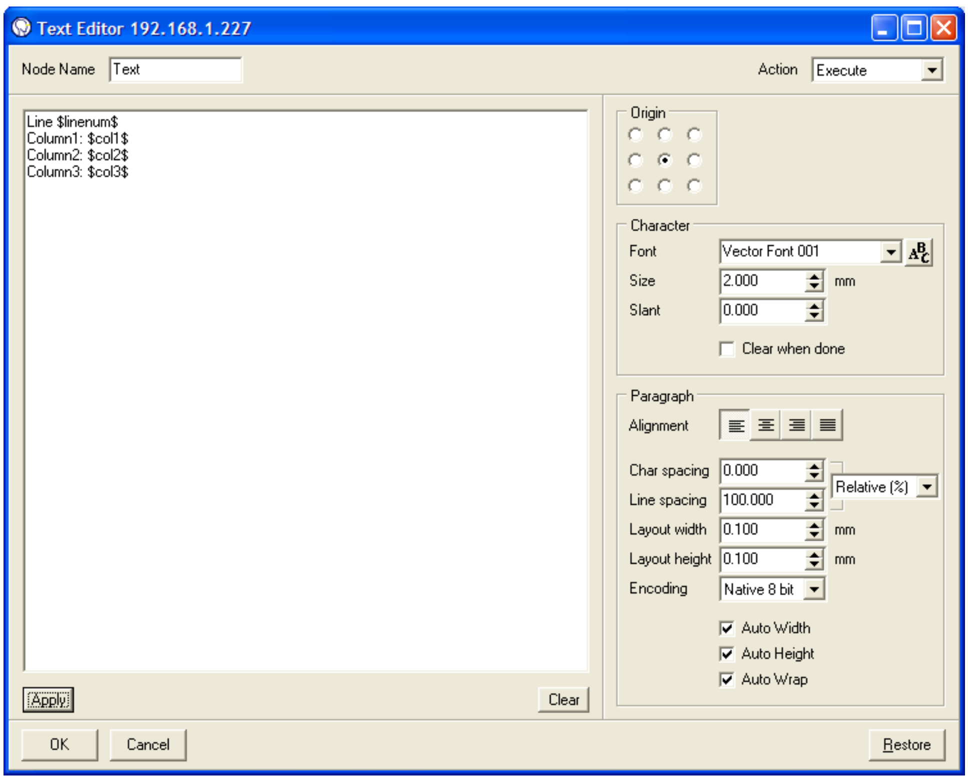


This makes the data in the TXT file accessible for *Input* nodes under this *Query* node.

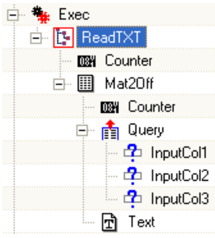
Step 7 Place three *Input* nodes under the *Query* node via *Dialogs* / *Input* and configure them like this:



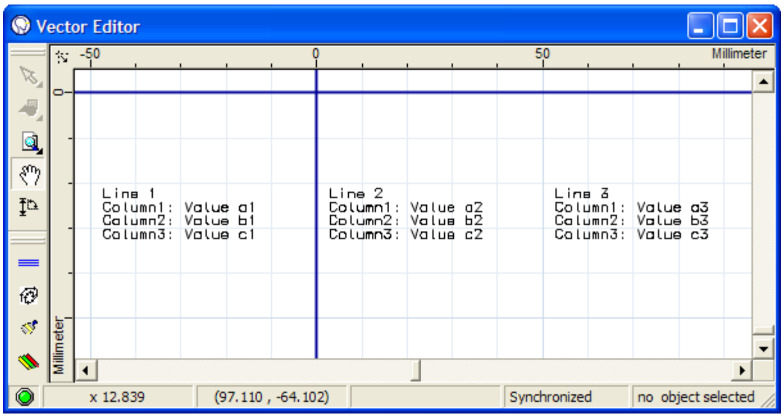
Step 8 Place a *Text* node under the *Mat2Off* node via *Tools* / *Text* and configure it like this:



Step 9 The ReadTXT job should look like this:



Step 10 *Select* the *Job* ReadTXT for output using its context menu and click on *Show Preview*  in *Vector Editor*. The output will look like this:



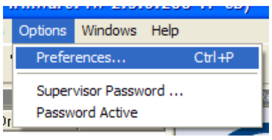
NOTE

If you choose *Show Editor*  in *Vector Editor* the output will not show the correct data because in this *Vector Editor* mode the processing of the external file is not fully carried out.

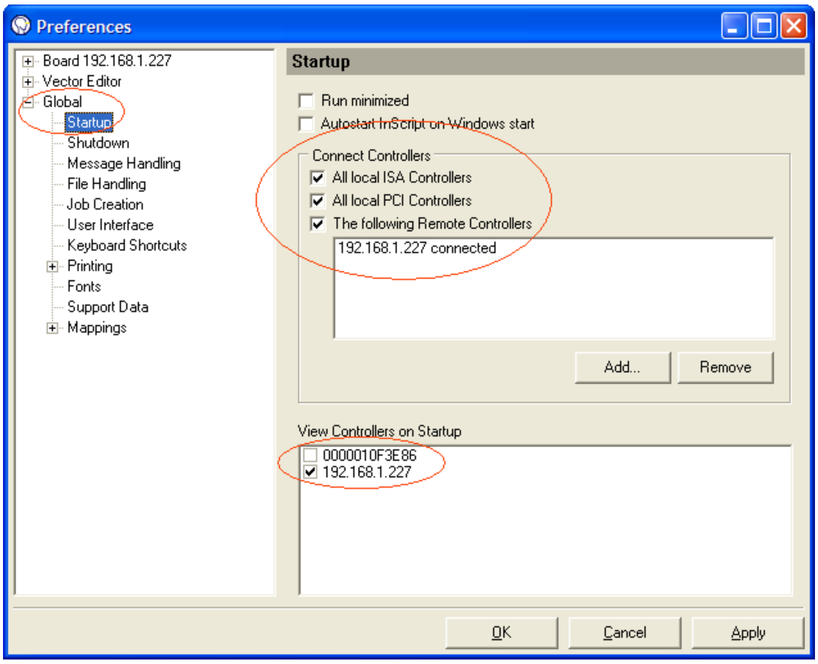
10.8. Select Different Controller on Startup

InScript can be configured that only specific controller types are detected on start-up. To select this you have to do these steps:

Step 1 Select Options / Preferences from the InScript menu:



Step 2 Under Global / Startup, you can set which controllers you want to detect during startup of InScript.



If you do not select any controller type, InScript will prompt you for a controller type during startup.

Step 3 After you selected the type(s) of controller to find on startup, InScript will only scan for this type of controller, which normally speeds up the start of InScript.

10.9. Visualize Stacked Objects in VE Edit and Preview Mode

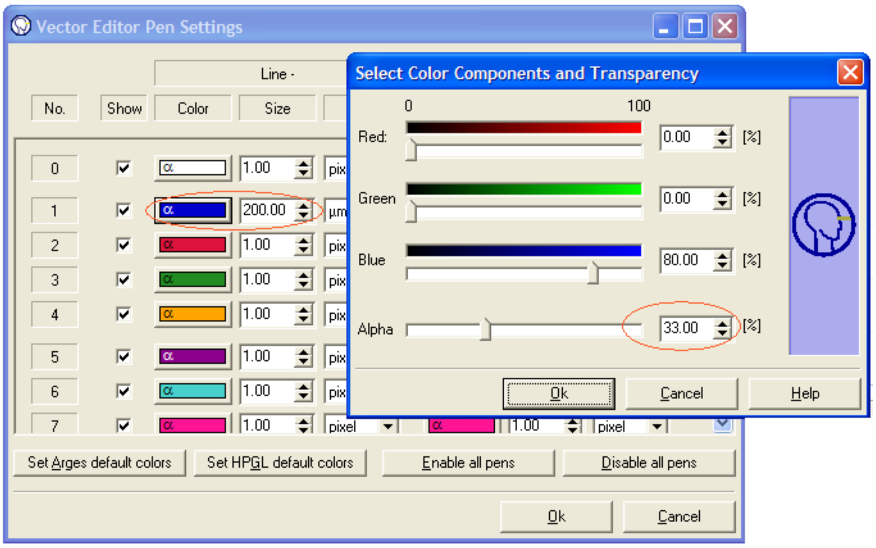
To see if objects are stacked above other objects or even completely cover other objects you may create a customized view for customized line sizes, colors and transparencies in *VectorEditor*. This can be done independently for *Edit* and *Preview* mode. After setting this up (as described below) you may switch on the customized view via *Show Customized*.

10.9.1. Visualize Stacked Objects in VE Edit Mode

Step 1 Use *Show Vector Editor Pen Settings Dialog* toolbar item.

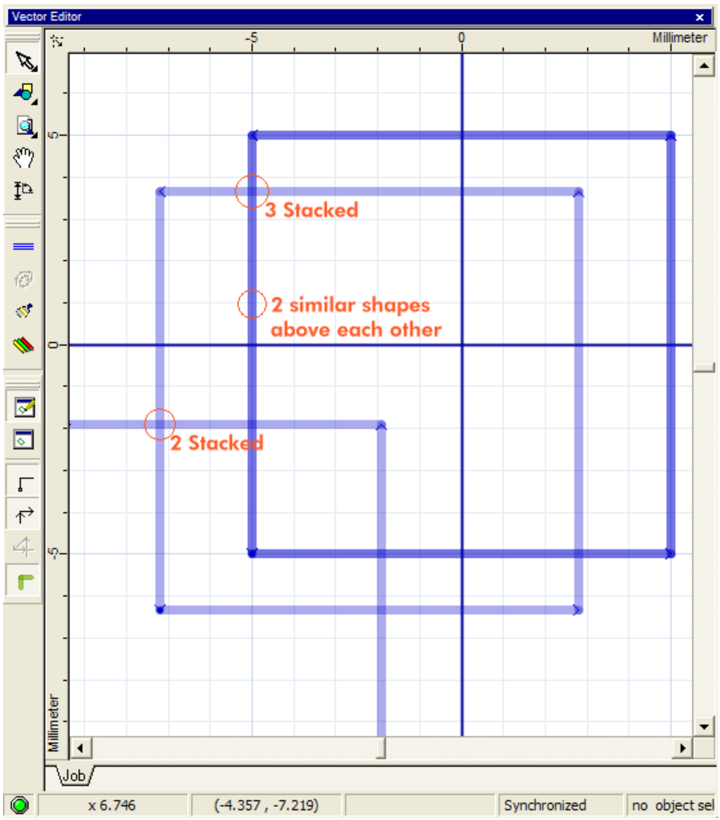
Step 2 Set e.g. *draw color* No. 1 to 200 micrometer.

Step 3 Set *Alpha channel* to e.g. 33% (for up to 3 stacked lines: 3 * 33% uses almost 100%).



Step 4 Activate Show Customized 

Step 5 On intersections, you can see stacked lines by increasing darkness if you switch to VE *Edit Mode*.

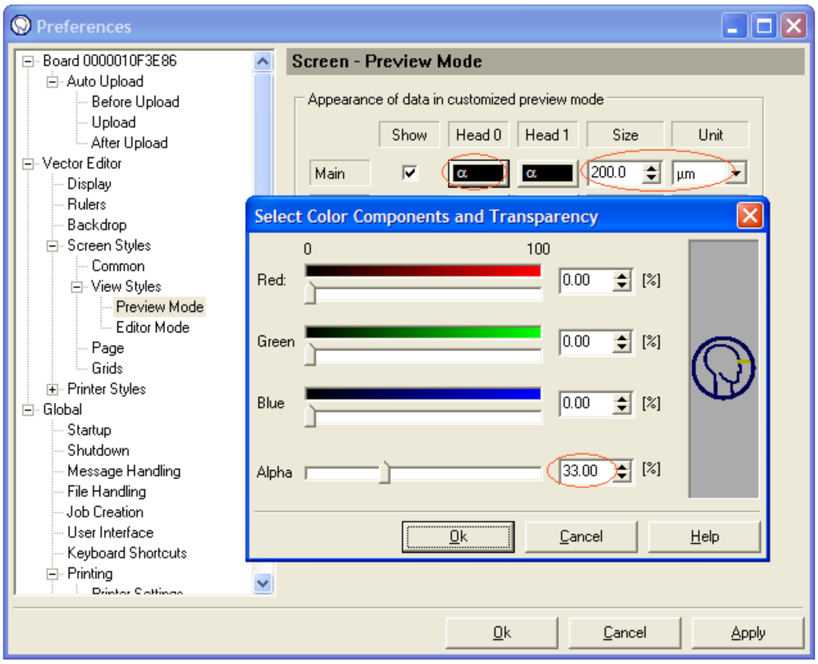


10.9.2. Visualize Stacked Objects in VE Preview Mode

Step 1 Use *Options* / *Preferences* / *Vector Editor* / *Screen Styles* / *View Styles* / *Preview Mode*.

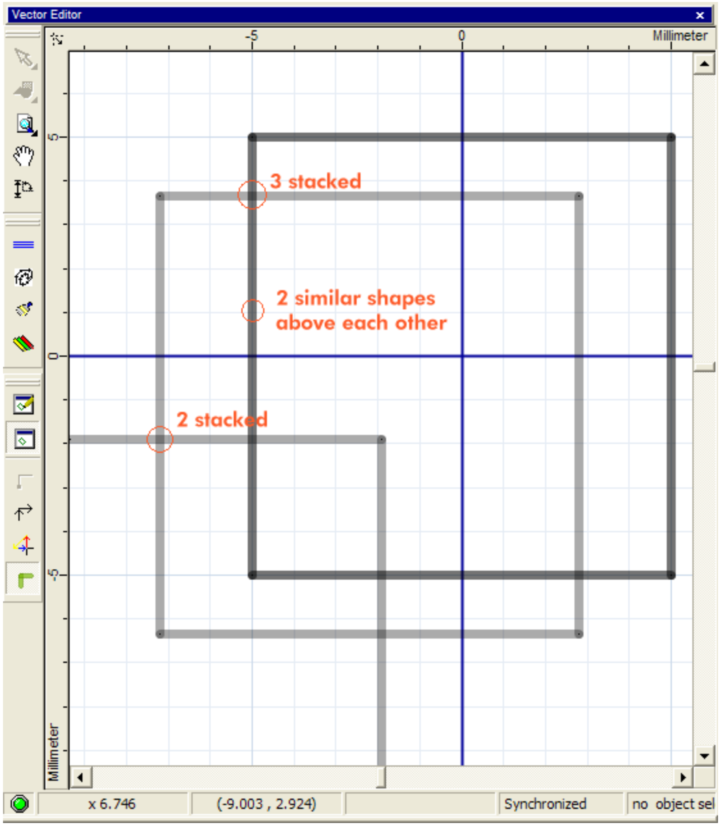
Step 2 Set *Main* to 200 micrometer.

Step 3 Set *Alpha channel* of e.g. Head 0 to e.g. 33% (for up to 3 stacked lines: 3 * 33% uses almost 100%).



Step 4 Activate Show Customized 

Step 5 On intersections, you can see stacked lines by their different darkness if you switch to VE *Preview Mode*.



Appendices

A. Troubleshooting

This section gives some guidance on problems. If you can't find a solution here, please contact the support department.

A.1. GiveIO Driver Problem

The GiveIO problem is a result of a driver for ISA controller cards, that may not be properly installed or broken after installing and uninstalling a second InScript version.

Symptoms

InScript displays the following message:

In case you are using Windows XP an Access Violation may occur. The exact error sympthoms are:

1. A dialog with "Error 2"
2. A dialog with "Could not use IO Driver, Could not start IO Driver, Could not install IO Driver" (as shown above)
3. A dialog with "Error 0"
4. A dialog with an exception like: "An exception (C0000096) occured during DllEntryPoint or DllMain in module: C:\...\NCCG32.DLL"
5. InScript starts but the ISA controller is not reachable

Possible Causes

NOTE

There is no ISA card support NCC cards $\leq$ 1703 for operating systems $\geq$ Windows Vista from InScript v2.10.2.1935 on. This error only happens with active ISA card support.

- If you have two parallel InScript installations and uninstall one of them, the GIVEIO.SYS is deinstalled and is not accessable on the next boot by the second InScript installation
- The GIVEIO.SYS service could not be started because the old InScript Deinstaller did not remove the GiveIO driver correctly. The driver is broken
- The GIVEIO.SYS service could not be started because Inscript was started without running the install programm first (e.g. starting a copy of InScript.exe without running the install program)

Resolution

Step 1 Un-install InScript via the Uninstall InScript entry in the *Start* menu

Step 2 **Reboot**

Step 3 Re-install InScript with the install program

Step 4 Start InScript and see if the error is fixed

If this does not work:

Step 1 Copy the folder <InScript folder>\Tools\GiveIOClean and all its contents in the InScript folder on your hard disk to e.g. C:\GiveIOClean

Step 2 Uninstall InScript with the install program (to remove the GiveIO entries from the registry)

Step 3 Check the Registry to see if all GiveIO entries are removed from the registry paths
`HKEY_LOCAL_MACHINE/System/CurrentControlSet/Services/giveio`
`HKEY_LOCAL_MACHINE/SYSTEM/CurrentControlSet/Enum/Root/LEGACY_GIVEIO`
and in the corresponding `ControlSet00n` paths

Step 4 If entries are still there execute the batch `GiveIOClean.cmd` from the copied folder e.g. C:\GiveIOClean.
The registry will be cleard from all GiveIO entries

Step 5 **Reboot** → Be sure that you do not omit this step, otherwise the old GiveIO driver may persist!

Step 6 Re-install InScript using the setup program.

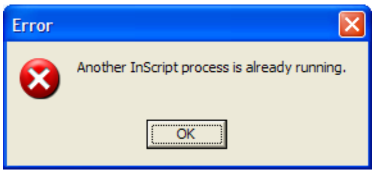
Step 7 Start InScript and see if the error is fixed

A.2. Another InScript process is already running

Only one InScript application may run at the same time. If you start InScript it checks if another instance of this program is already loaded in Windows.

Symptoms

On startup, InScript displays the following dialog:



After clicking *OK*, the started InScript version does not start.

Possible Causes

- Another InScript instance is already running. The Winow of this InScript is visible, minimized or hidden behind other windows
- A crashed InScript instance is running in the background without any visible window

Resolution

If another InScript is running and it is visible:

Step 1 Close the additional incstance of InScript by clicking *OK* on the dialog shown under A.2 Symptoms

Step 2 Switch to the already running InScript instance by clicking on its icon in the Windows task bar (normally this should also restore a minimized InScript window)

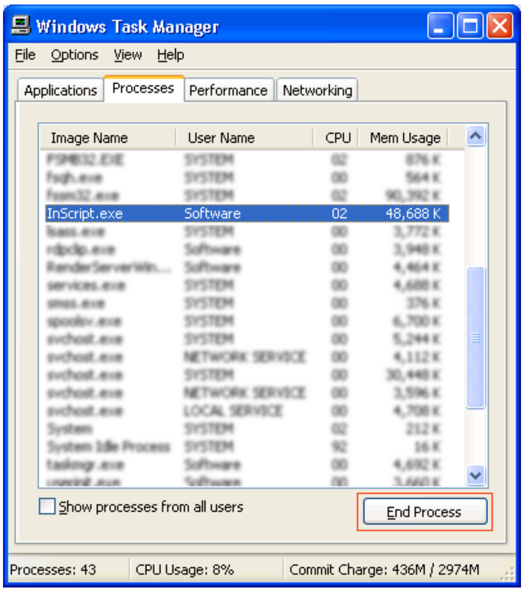
Step 3 Continue using this InScript instance

If there is no InScript visible, another InScript instance may have crashed and it is still running in the background. To stop this task, you can use the following steps:

Step 1 Open the Windows Task Manager by pressing the `Ctrl`, `Shift` and `Esc` keys simultaneously

Step 2 Change to tab `Processes`

Step 3 Find and select the InScript task:



Step 4 Click on `End Process` to stop the crashed InScript task

Step 5 Restart InScript

A.3. Flash Corruption Problem

If the Flash memory of the NCC controller is corrupted, data can't be read properly from it.

Symptoms

When starting InScript a sequence of messages appears on the screen with the text "VAR '[variable-name]' get_var_from_blk=invalid".

Possible Causes

The controller board's flash is probably corrupted.

Resolution

Reorganize the flash as follows:

Step 1 In InScript menu, click *Controller* → *Configure*. The window Board Configuration opens.

Step 2 Click *Details*.
The window Flash Info opens

Step 3 In the meniu of window *Flash Info* click *Enhanced Reorganization*. As soon the flash is reorganized the message "`Enhanced reorganization successful!`" appears

Step 4 Click *OK*

A.4. Settings seem to Disapear

All settings have to be saved to the controller. If you do not save them they will be lost after each reset or restart of the controller (ASC), reset of the controller board (NCC) or the host PC (NCC).

Symptoms

With every reset of the ASC controller, NCC controller board or booting of the PC that contains the NCC controller board, my settings disappear (e.g. device driver, default parameters etc.).

Possible Causes

The settings are not saved to the controller.

Resolution

- You have to save the settings to the NVRam of the controller board. In the menu click *Controller* → *Save to NVRam* (see also 2.7 Store Configuration).

A.5. InScript Search Paths Special Configuration

I want to configure the InScript Search Paths. These paths are automatically searched if InScript does not find a file in the current path.

Description

If InScript does not find a file that is refernced in a Job, it searches in some additional locations. These locations can be set in the InScript.ini configuration file.

NOTE

This feature is **NOT** supported on operating systems $\geq$ Windows Vista due to the more restricted access rights in many system folders on these operating systems.

Resolution

Step 1 Edit file <Path to InScript Home>\config\inscript.ini with an ASCII editor (e.g. Microsoft Notepad)

Step 2 Find section [Search_Paths]

Step 3 Select the appropriate file-type/path pair, e.g. HPGL=<path> that you want to change or extend item Change the path as desired, where:

More than 1 search path per file-type can be specified by using a semicolon ";" as delimiter. InScript goes through all specified paths in the given order using the first file that it finds. The full stop "." equals the current job path The tilde "~" equals the InScript Home folder.

Example "*Pics* in two local folders"

```
[Search_Paths]
Pics=C:\InScriptData\HPGL;C:\InScriptData\HPGL2,.plt
```

Example "*HPGL* on a network drive X:"

```
[Search_Paths]
HPGL=X:\InScriptData\HPGL,.plt
```

Example "*Jobs* on a network drive using UNC paths"

```
[Search_Paths]
Jobs=\\Goliath\Softdev,.plt
```

A.6. A Job has to be executed a second time to use current parameters

Symptoms

When a job is executed using *Preview* or *Job Start*, InScript ignores settings, changing variables or external parameters until the job is executed a second time. Then these settings take effect.

Possible Causes

In the *General* tab of the *sas* device driver *Preload* is possibly set to *always*. This pre-executes the job on the controller board and writes the line data to the digital signal processor (DSP) as soon as you only select the job. If parameters are set after job selection then they will not take effect until the job is loaded to the controller board once again.

Resolution

- Set *Preload* to *never* in the *General* tab of the *sas* device driver if this behaviour is not wanted.

  — or —

Click on *Vector Editor Show Preview* 

This executes the changed job on the controller board for preview and loads the updated line data to the digital signal processor (DSP). If you execute a *Job Start* after that then the controller board outputs this updated line data from the line buffer.

For each parameter you can set in a pen there exists a corresponding parameter in the associated device driver. In the device driver these parameters can be identified by the Controlled check box. If the check box is de-activated (gray) then the parameter of the device driver is in effect. To take the parameter of the pen in effect you have to activate (red) the check box. In the device driver, which belongs to the pen, click the de-activated (gray) check boxes of the affected parameters. This activates (red) the check boxes and takes the parameters of the pen in effect.

A.7. Pen Parameters seem to be Ignored

Symptoms

A parameter that was set in a pen seems to be ignored by InScript.

Possible Causes

For each parameter you can set in a pen there exists a corresponding parameter in the associated device driver. In the device driver these parameters can be identified by the *Controlled* check box. If the check box is de-activated (gray) then the parameter of the device driver is in effect.

Resolution

To take the parameter of the pen in effect you have to activate (red) the check box.

- ► In the device driver, which belongs to the pen, click the de-activated (gray) check boxes of the affected parameters. This activates (red) the check boxes and takes the parameters of the pen in effect.

A.8. Asynchroneous Execution Problem

Symptoms

During a job the connected devices are not running synchronously. E.g. the laser begins processing while a linear axis yet stands still though the axis should move.

Possible Causes

The device driver *sas* has to be used to synchronize the connected and activated devices.

Resolution

To enable the device driver *sas* of controlling devices they have to be child nodes of the *sas* device driver in the *Devices* window (see 3 Devices).

- Drag & Drop the corresponding device driver(s) into the device driver *sas*.

A.9. Invisible PLT-File Line Data

Symptoms

PLT-files are not shown in the Vector Editor.

Possible Causes

You are using a version of InScript that is older than version 2.7.1 and there is no pen defined in your PLT-file or your pen is set to pen 0. Older versions of InScript automatically used pen 0 if no pen was defined in the PLT-file. But the color of pen 0 is preset to background color, which makes the graphic invisible.

Resolution

- Change the color of pen 0 to another color than the background color.

A.10. Language Mix on Non-English Operating Systems

Symptoms

Some menus and dialogs in InScript are displayed in the language of the Operating System.

Possible Causes

These menus and dialogs are provided by the Windows Operating System and depend on the settings there. National and international Windows versions exist. The international Windows version is delivered with our industrial PCs.

Resolution

It is only possible to change the language in these menus and dialogs, if you are using an international OS version. Be aware that such a change also extends to other programs where it is possibly not wanted. To change the language to English in these menus and dialogs follow these steps:

Step 1 In the Windows Start menu, click *Settings* → *Control Panel* → *Regional Options*.
The Regional Options window opens

Step 2 In the *General* tab of the *Menus and dialogs* list, select English

Step 3 Click *OK*