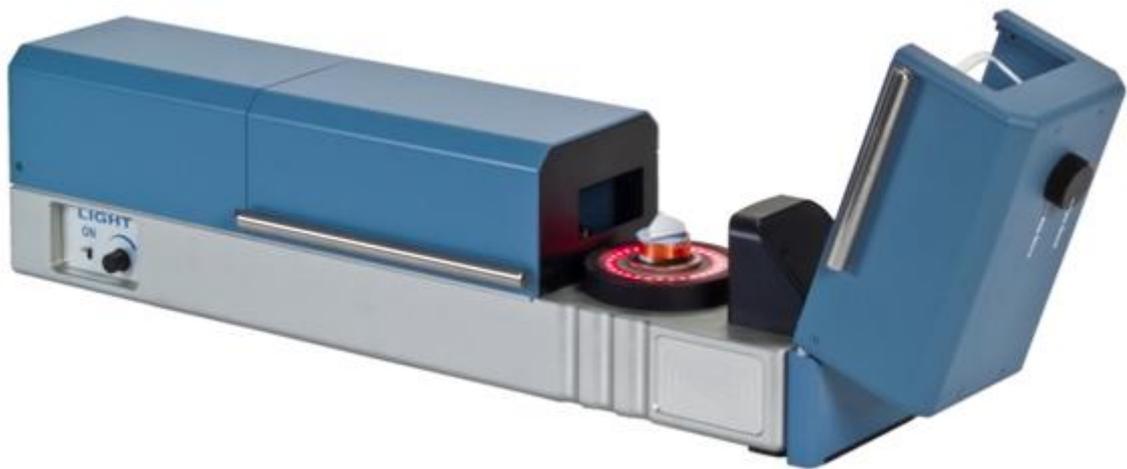




# **STRATEGIST™**

DECISION SYSTEM FOR LASER DIAMOND CUTTING



## **USER GUIDE**

ANOTHER ORIGINAL MANUFACTURING PRODUCT FROM SARIN TECHNOLOGIES LTD.

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## About this document

This guide provides the necessary information to operate the Strategist, a computerized decision making system for LASER diamond cutters.

You require a HASP plug connected to a USB port on your computer that is configured correctly for your system.

## Current market needs

The diamond gem industry is fueled by transforming the precious diamond crystals that are dug up in mines to symmetrically polished gems sold for Jewelry. The quest for a maximum profit on this transformation is the main drive for many technological innovations. After mining, the processing is basically divided into the planning, cutting, and polishing stages. The cutting stage is executed today by traditional blade sawing or by laser cutting, where the use of laser cutting usage is increasing every year.

The laser cutting process requires a relatively large capital investment in machinery, investment in equipment maintenance, and laser cutting specialist personnel. There is also a statistical depreciation connected with a few percent of damage that occurs on a few of the stones causing appreciable financial losses. The Strategist system is aimed at reducing the labor and maintenance costs, increasing the efficiency in the cutting process and reducing any damage done to the diamonds.

In the planning stage, in the past, deciding on the optimal plan was done by a few experienced planning meisters utilizing an assortment of manual tools. Today planning is done considerably faster and more efficiently using digital automated optical modeling and computer optimization tools, by people with less training and a lot less experience. The Strategist system strives to make the same transition, namely, give the laser sawing stage a computerized tool that radically improves decision making, saves time, reduces damage to a minimal and use a better CAD CAM process for diamonds.

## Notes and warnings

The following type note is used in this document.

### **NOTE**

**Take care ...**

## Waste Electrical and Electronic Equipment (WEEE)

### Disposal of electrical and electronic waste



The symbol  is now displayed on Sarin products to show our compliance with directive WEEE. The WEEE directive is about recycling parts and states that no electrical or electronic equipment can be discarded into the city's normal waste disposal system.

### Obligatory acceptance of discarded electrical and electronic equipment

The end user of this product now has the right to request the product supplier to dispose of the product. Therefore, if you require help in discarding this product please contact your local agent or Sarin directly.

## How to contact us

Please contact your local Sarin representative with any questions or comments you may have regarding the site preparation procedure.

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## INTRODUCTION

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The Strategist is a unique system designed to add a computer aided decision system to the Quazer LASER cutting stage, enabling you to increase both your yield and production with absolute minimal damage when using a LASER cutting system.

The Strategist is used to setup multiple dop and stone pairs in a cassette and transfer all parameters containing essential information for each cassette location to the target Quazer, minimizing the Quazer setup time and handling errors.

Each cassette has a built-in ID that automatically ensures that the correct job parameters are used for each stone in the cassette and loaded on the correct Quazer. This is important as each Quazer could be set up differently.

### Important Advisor pre-requisites

The Strategist requires that all stones/jobs coming from the Advisor **MUST** include a realign symbol burnt onto the stone.

To enable realign symbols on the Advisor, see [What to Do on Advisor](#) on page 27

**In this version only one single FULL plane can be processed for each stone on the Strategist.**

### This version supports

- Stone sizes of 2 to 22 mm
- Transfer of essential information to the Quazer at an accuracy equivalent or better when done manually
- Planning the sawing of Quazer jobs only in this version
- Collecting operator decision information for future automatic decision rules

## WORK FLOW SEQUENCE

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The following functions must be performed in the sequence shown below.

1. Start new cassette
2. Import stone file
3. Map stone
4. Ensure there is a realign symbol burnt onto the stone (arrow head)
5. Realign the saw plane
6. Plan job parameters
7. Select a position on the Turnstile cassette
8. Insert the DOP into the selected Turnstile position
9. Save the job
10. Repeat for another DOP or close cassette

## BASIC CONTROLS

### View selector

The view selector buttons, at the top right of the display, are used to change the display format.

Button	Description
	<b>Live Video.</b> The camera is on displaying a live image.
	Displays the saw plane cross section of the stone in <b>2D</b> . This is the view displayed after realigning the saw plane.
	Displays the stone model in <b>3D</b> (STN). When in <b>3D</b> view the <b>Polish, Plane, SideView</b> and <b>Defect</b> buttons are enabled and displayed at the bottom of the screen.
	<b>Offline</b> for use with <b>CAP</b> files previously created in other Sarin systems (Advisor, Galaxy or other) that include video.
	Opens the <b>Cassette</b> screen manually.

### Display controls

The display controls are located at the bottom of the screen.



### Bottom light control

- Click the  button to switch **ON** and **OFF** the bottom light

### Backlight control

- Use the slider to adjust the backlight lighting level



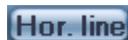
### Image properties

- Use the  slider to adjust the screen illumination



- Use the  slider to adjust the screen contrast

### Screen alignment

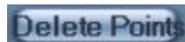


use this line to check that the saw plane marked on the stone is horizontal.



toggles the above mentioned horizontal line display from Color to B&W.

### Delete all points on plane



Deletes all the points already made on the saw plane. You must start again by marking at least three points.

## Cassette management tab control buttons

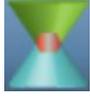
Button	Description
	<b>Pack and go</b> - saves cutting parameters and closes the cassette.
	Starts a new stone.
	<b>DOP pairing</b> - Select a position on the cassette for the stone.
	Starts a new cassette

## Modeling tab control buttons

Button	Description
	Loads a stone file: STN or CAP.
	Starts stone mapping.
	Halts stone mapping.
	Mark saw plane in multiple places (at least three) around the stone's circumference.
	Mark the tip of the arrow side.
	<b>Select arrow</b> - saw-plane cross-point.
	Start realignment process.
	Halt realignment process.

## Job Planning tab control buttons

Button	Description
	<b>2D lock button</b> - when active (locked) the 2D graphic cannot be moved (changing the job parameters) and all the <b>Job Planning</b> buttons are now <b>enabled</b> .
	<b>Click to select Banding ONLY</b> - used when ONLY banding is to be performed. First click this button and then select a banding profile to suit the selected stone. This adds banding around the complete circumference of the stone. Each additional band is displayed in a different color.
	Deletes the selected Banding.
	Single side cutting process.

Button	Description
	Add spare depth to single sided cut.
	Double sided cutting process.
	Add spare depth to double sided cut.
	When active the Sync button forces the same profile on both sides of the stone when a two side cut is used. In other words, when changing the profile (Type) on any side of a double sided cut the same profile is forced on the other side of the cut automatically.
	<b>Add Banding Automatically (Recommended)</b> - first select a banding profile to suit the selected stone and then click this button to set the banding parameters automatically. This adds banding around the complete circumference of the stone. Each band is displayed in a different color.
	<b>Add Banding Manually</b> - first select a banding profile to suit the selected stone and then click this button to set the banding parameters manually. Each band must be added manually. Each band is displayed in a different color.
	Save stone cutting parameters.

## Saw plane control buttons

Button	Description
	Change to 3D view to edit saw plane.
	Accepts any changes made and saves the new location of the saw plane and changes to 2D view automatically.
	Removes any changes made to the saw plane on the Strategist leaving the original planned imported saw plane.

# USING THE SETTINGS MENU

Only the useful menus relevant to the Strategist operator are shown.

## Opening the Settings menu

The only parameter in the **Settings** menu you need to change is the maximum distance the Strategist operator is able to move the planned saw plane.

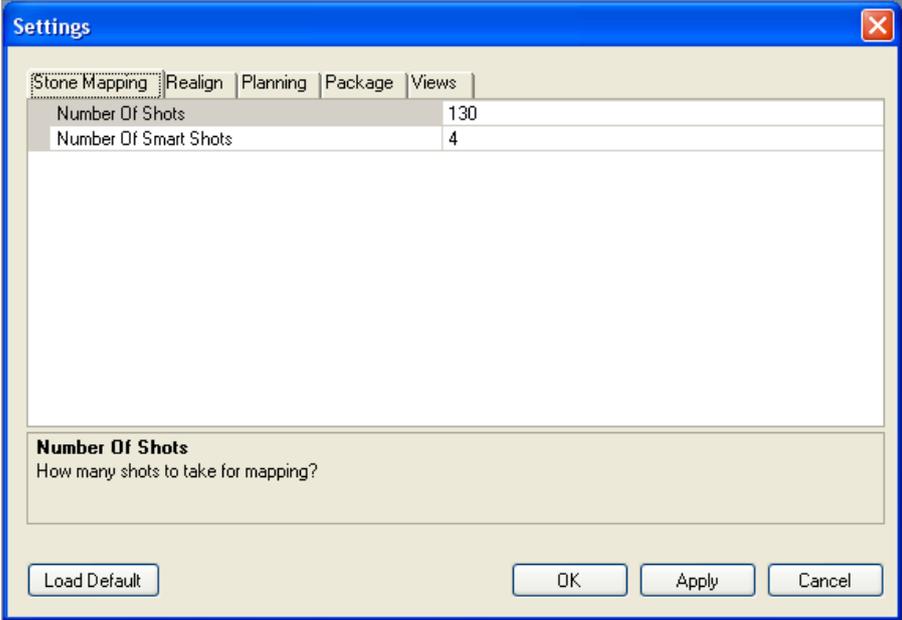
- ◆ To open the Settings menu:



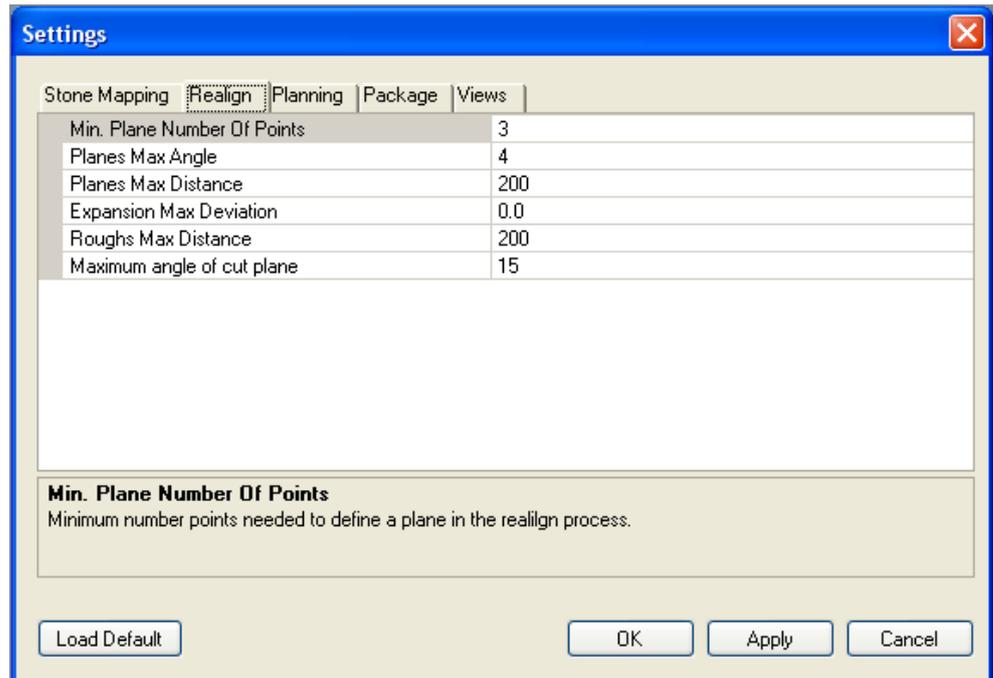
1. Click in sequence, the  button, **Tools** and then **Settings**.



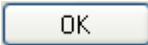
The **Stone Mapping** tab is displayed.



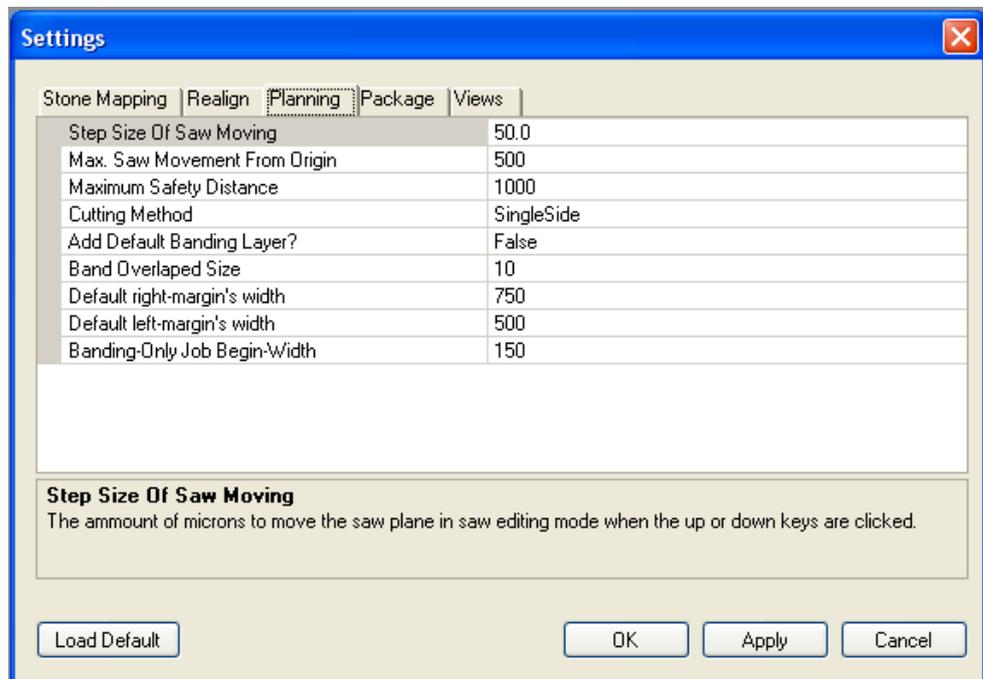
2. Click the **Realign** tab.



There is a short explanation displayed at the bottom of the tab when selecting a parameter, as shown in the example above.

3. Change the **Planes Max Distance** to the required value.
4. Click the  button to save the new value.

### Planning tab



# LOADING A CASSETTE

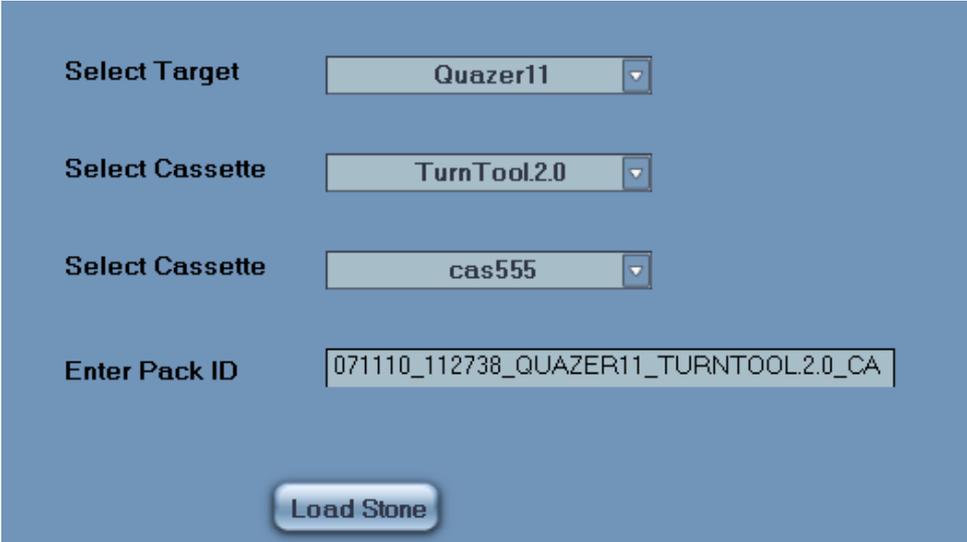
## Cassette management tab

### Starting a new cassette

This screen is used to enter the required information to start a new cassette.

◆ **To open a new cassette:**

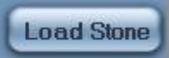
- 1. If you are starting the program, this is the default screen. If not, from the **Cassette Management** tab, click the  button.



This screen is also the default screen when the application opens.

- 2. Select the required cassette information using the table below as a guide.

Item	Description
<b>Select Target</b>	Each Quazer has an ID to ensure handling errors.
<b>Select Cassette Type</b>	You are able to use multiple cassette types.
<b>Enter Pack ID</b>	Only the target Quazer can load this cassette.

- 3. Click the  button to open the **Load Stn/cap** file window.



You can also click the  button to open the **Load Stone** file window.

- 4. After selecting either the **stn** or **cap** files the **Modeling** tab is displayed automatically.

## Modeling tab

### Realigning the saw plane on the stone

This section realigns the saw plane to the Strategist it is loaded on.

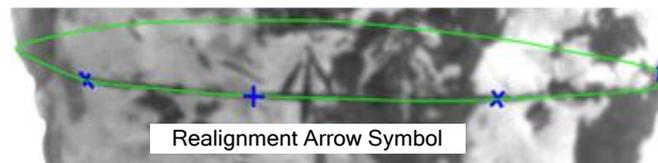
◆ **To mark the saw plane:**

1. From the **Cassette Management** tab click the  button.
2. Take a DOP containing an aligned stone and ensure that it is free of dirt and dust.
3. Insert the DOP into the Strategist and close the cover.
4. Ensure you have the correct lens installed for this stone.
5. Click the  button to start the scan.

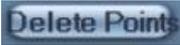
A progress bar is displayed on the screen.

**If the scan is unsuccessful an error message is displayed.**

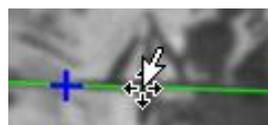
6. Click the **Mark Saw Plane**  button and then click (mark) the saw plane at least three times (or more) around its circumference.



after marking the third point the plane is displayed as a green line.

Clicking the  button deletes all the points already marked.

7. Click the  button and then click the side of the stone the arrow head is pointing to.
8. Click the  button and then click the arrow where it meets the saw plane.



9. Click the  button to start the realignment process.

To **STOP** the realignment process, you can click the  button at any time. **A success or error message is displayed.**

10. If realignment is successful the **Job Planning** tab is displayed.

## Job planning tab

This section sets the job parameters for the target Quazer as each Quazer could have a different setup.

### Types of cuts

You can cut the stone from one or both sides using the Single or Double side buttons. When selecting two sides, the stone is cut alternatively at both sides. You can drag the cut line to any position so creating unequal halves.

### Banding

Banding selects a part of the stone surface you want to transverse with the laser multiple times under restricted power. This ensures the surface tension of the stone is cut without damaging the stone. Each band is numbered when clicking the banding number button. You can add multiple bands to each stone but ensure that each pair is 90 or 180 degrees apart.

### Editing saw (Moving the saw plane)

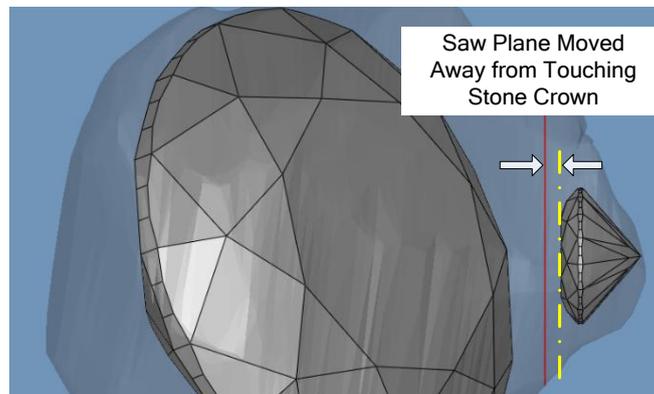
There are times when you need to move the saw plane. For example, if you detect a slight defect on or very close to the actual saw plane.

## Moving the saw plane

- ◆ To move the saw plane:



1. Click the  button (**Edit Saw**), the display changes to 3D view.
2. Drag (using right-click) the saw plane to a clean part of the stone.



The saw plane maximum distance value is set in the **Settings** menu. See [Opening the Settings menu](#) on page 7.

3. If you want to go back to the original planned saw plane, Click the



button to remove any change to the saw plane.

4. Finally, if you are happy with the new location, click the  to accept and save the new location of the saw plane.

**The 2D view is now displayed automatically.**

## Adding banding automatically

If you need to add banding manually, see [Adding banding manually](#) below.

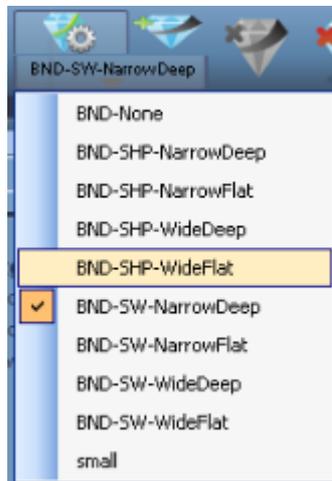
### IMPORTANT NOTE

**When using automatic banding, bands are added around the complete circumference of the stone. Manual banding requires adding the banding one at a time.**

◆ **To add banding information automatically:**



1. Click the button to lock the 2D view ensuring that the rotational position of the stone is not moved inadvertently.  
**The Planning buttons are now enabled.**
2. Select a Banding profile.



The selected banding profile sets the thickness, speed and the width of the cut.



3. Click the button to start the automatic Banding process.



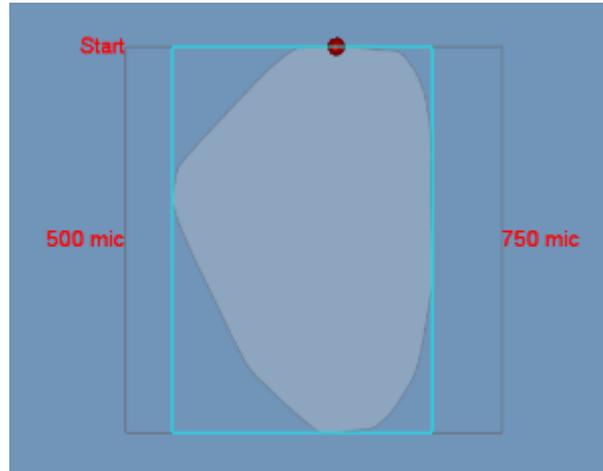
4. Delete any unwanted bands or drag the handles at the end of the banding to change the banding length.

## Adding banding manually

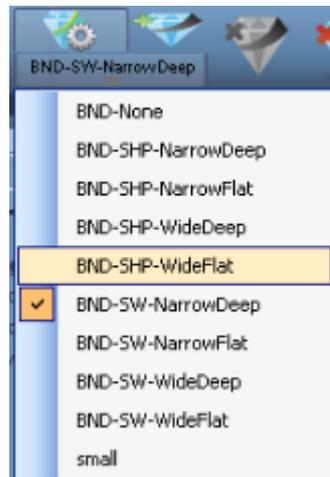
It is suggested that only experienced operators use this option when a particular problematical stone requires it.

◆ **To add banding information manually:**

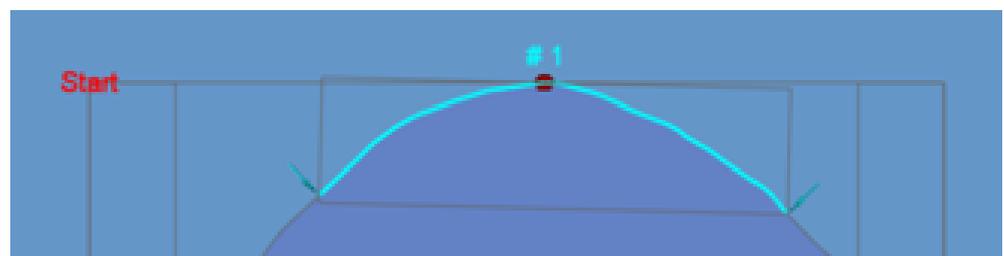
1. Rotate the stone until the start point is in the required position.



2. Click the  button to lock the 2D view ensuring that the rotational position of the stone is not moved inadvertently.  
**The Planning buttons are now enabled.**
3. Select a Banding profile.



4. Click the  button to start the manual Banding process.



The default Band is shown as a colored line on the top of the stone. When multiple banding is used each band is displayed in a different color.

5. Left click the mouse to drag and rotate the band location.

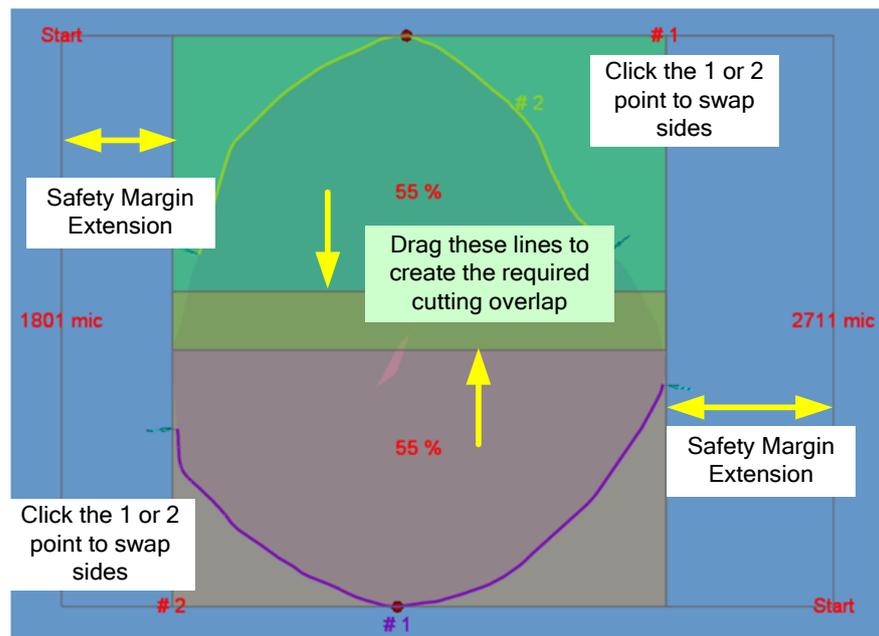
The log top of the band job always moves to the highest point when rotating the band.

6. Using Table 1 below, as a guide, click one of the **Cut Control** buttons. In the example below the  button was used (double side with ext).

**Table 1: Cut Control Buttons**

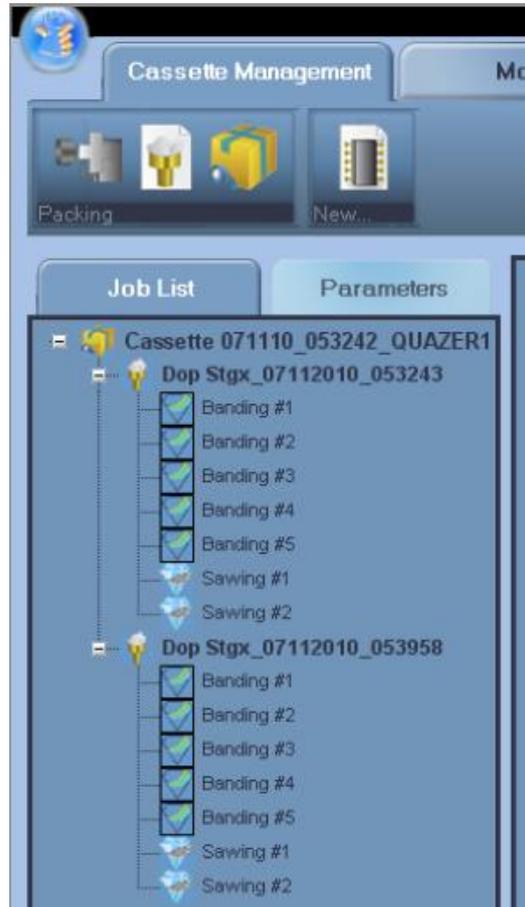
Button	Description
	Single or 1 side.
	Double side.
	Single side with spare.
	Double side with spare.

7. Click the  button to add more bandings (2 x bandings shown below).



8. Click the  button to number the bands.

9. The job list is displayed on the left-hand side of the screen.

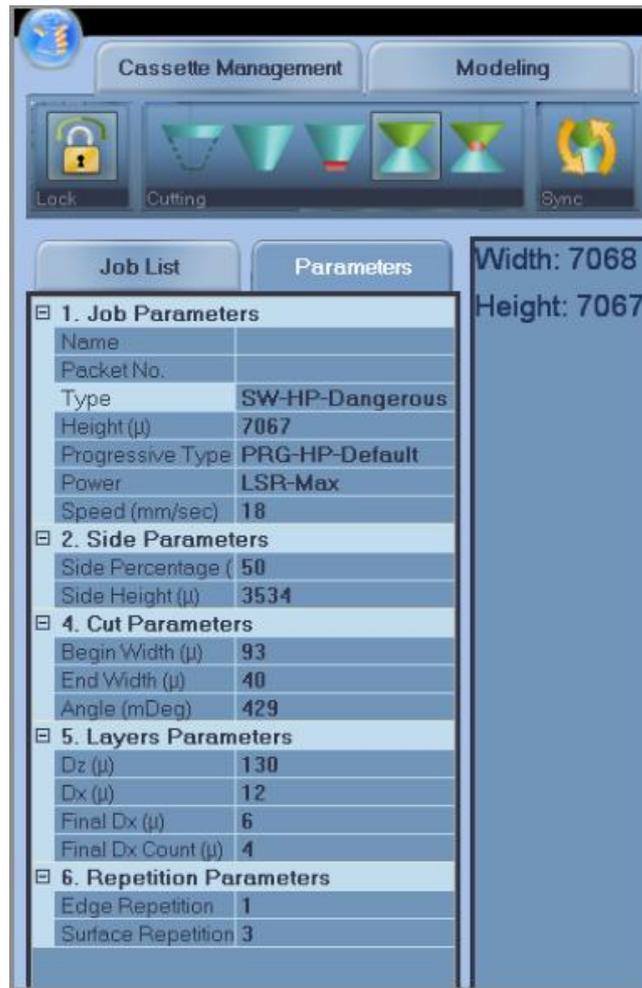


10. Use the right-click menu to (click where the cursor is shown above) to relocate the jobs in the sequence you want them to run (top down).

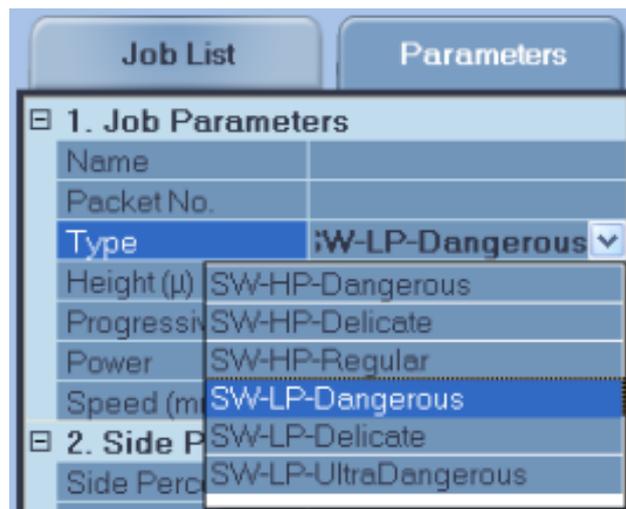


11. If you need to delete a banding, see [Delete selected banding](#) on page 17.

12. Setting the job parameters changes them automatically and the results are displayed on the left-hand side of the screen as shown below.



13. Click the **Type** row (Job Parameter 1) to open the profile list.



14. Click the required profile suitable to the selected stone.

15. Click the  button to save the job parameters and open the cassette screen.

16. Go to *DOP pairing controls* on page 17.

## Using the 3D view controls

When in 3D view the following buttons are enabled and displayed at the bottom of the screen.

1. Use the  and  buttons to show or hide these display properties.
2. Click the  button to see the side view of the stone with the saw plane parallel to the viewer.
3. Click the  button to see the defects of the stone in 3D view.



## Delete selected banding

◆ **To delete selected banding parameters:**

1. Select the band you want to delete using the mouse.
2. Click the  button to delete the selected banding.

## Delete all banding

◆ **To delete all banding parameters:**

- ☐ Click the  button to delete all the banding.

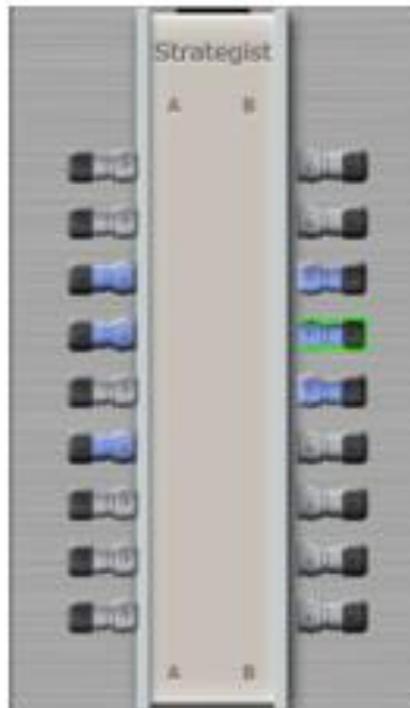
## DOP pairing controls

When the stone job planning parameters are completed you must save the information on the server connected to the local area network (LAN) or a Disc-on-key so that the parameters are available to the target Quazer.

As soon as you select a cassette DOP position the position turns blue.

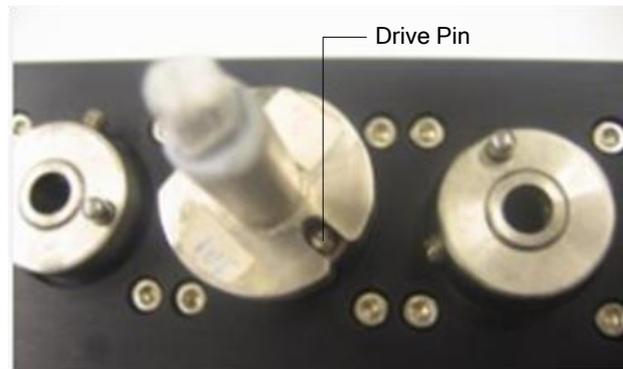
◆ **To select a position on the cassette for the stone:**

1. Click an empty position on the cassette before you install the DOP in that position.



As shown in the example above the selected position turns **blue**.

2. Physically insert the DOP into the selected position ensuring that the drive pin is fully engaged.



3. Click the  button to set the position.
4. Open another stone/DOP or close the cassette.

## Closing the cassette on the strategist

When closing the cassette the job parameters are sent on the local network to the target Quazer or saved on a Disk-on-key. The cassette presents its ID when plugged into the Quazer to ensure the correct cassette is being installed.

◆ **To close the cassette:**



- Click the **Pack** button to close the cassette.

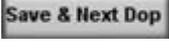
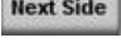
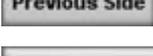
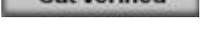
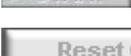
The saved information is sent to the target Quazer over the local area network or can also be saved on a Disk-on-key.

## USING CASSETTES ON THE QUAZER



When the  button is clicked on the Strategist the data is sent to the target Quazer. As soon as the cassette is loaded in the target Quazer the cassette ID is displayed on the screen.

### Control Buttons

Button	Description
	Selects a single cassette for loading.
	Selects two cassettes for loading.
	Loads the pack information from the Strategist.
	The cursor marks the exact location of the inscribed Cross on the stone.
	The stone is not accepted. The machine moves to the next DOP.
	Saves changes made to the stone placement, moves to the next DOP.
	Selects the second side parameters.
	Selects the first side parameters.
	Cuts all verified stones in the sequence they were saved on the Strategist.
	Check that the correct job is loaded then click <b>Verify</b> . The machine places the arrow head engraved on the stone ( first job in the pack under the Laser beam.
	When the cassette <b>WHITE</b> reference mark (Cross) is perfectly aligned with the <b>RED</b> cross click this button to lock alignment.
	Cuts all stones in the sequence they were saved on the Strategist.
	Goes to the Laser S tart cut position.
	Goes to the Laser Top position.
	Goes to the Laser End cut position.
	Starts the cutting process.
	Clears all information saved for the loaded cassette.



Zoom option – select a zoom multiplier.

## Loading one or two cassettes in the Quazer

### ◆ To load a cassette/s in the quazer:

1. Physically carry the loaded cassette to the target Quazer and place it on the work table.
2. Remove any used cassettes that may already be loaded in the Quazer.
3. If you are loading two cassettes place them in the left and right positions connecting the cassette cable first and leaving the center position empty.

### **OR**

If loading only one cassette install it in the center position.

## Setting up the cassette and loading a job

### ◆ To setup the cassette and load a job:

1. Connect a cable to the cassette.



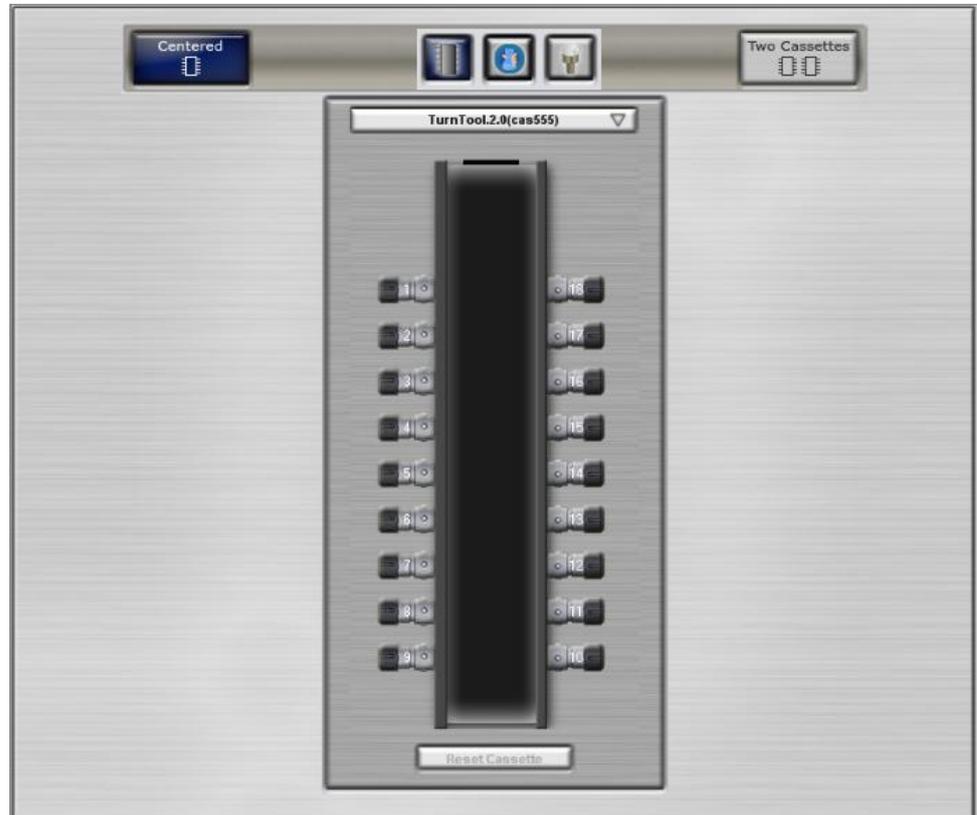
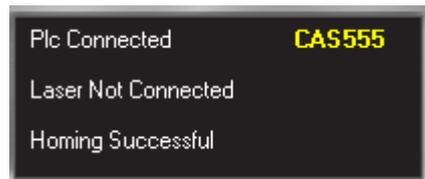
In this example we used a centrally loaded cassette.

2. Ensure the other end of the cable is connected as shown below.



3. When the Quazer application is loaded the initial cassette screen opens automatically

When a Turnstile cassette is connected the ID is displayed as shown below.



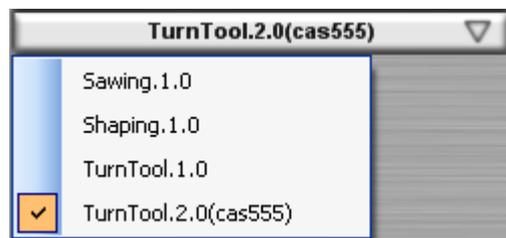
4. Ensure all three LEDs are lit on the end of the cassette.



5. Click the  button as we are loading only one cassette.

If two cassettes are loaded place them into the **Left** and **Right** positions leaving the **Center** position empty.

6. Open the cassette type list and choose a cassette.



7. Check that the **Plc ID** displayed on the screen is correct.

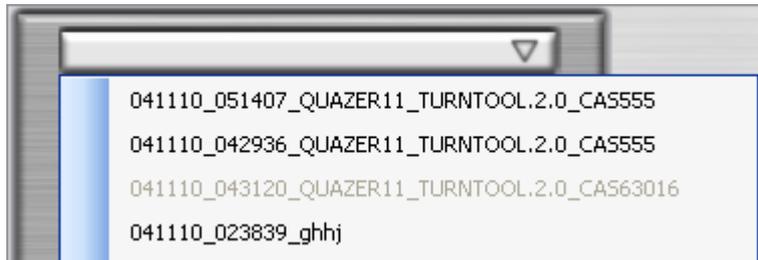




- Click the  button to load the pack information from the Strategist.

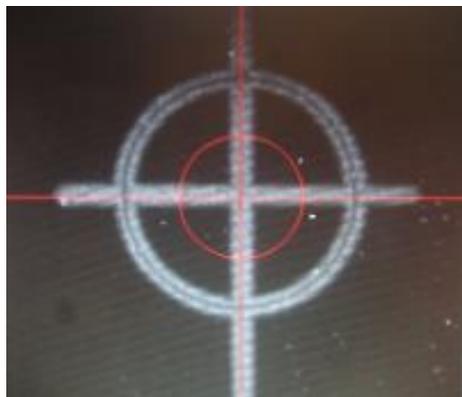


- Open the Pending list for the selected cassette and choose a pack.



The table automatically moves to the cassette reference mark.

- Align the **RED** Cross from the control program exactly with the **WHITE** reference mark (Cross) on the cassette.



- If necessary, align the reference mark manually using the keyboard arrow keys so they are perfectly aligned.
- You can see the Job list displayed on the left-hand side of the screen.



- Click the  button.
- Go to one of the sections below.

## Starting the job without verifying the stones

As soon as a job is loaded you can run it without verifying any of the stones.

◆ **To run the job without verifying the stones:**

1. Ensure that the correct job is loaded.
2. Click the  button.

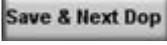
The job is run on all the loaded DOPs automatically in the sequence they were saved on the Strategist.

## Verifying some or all the stones

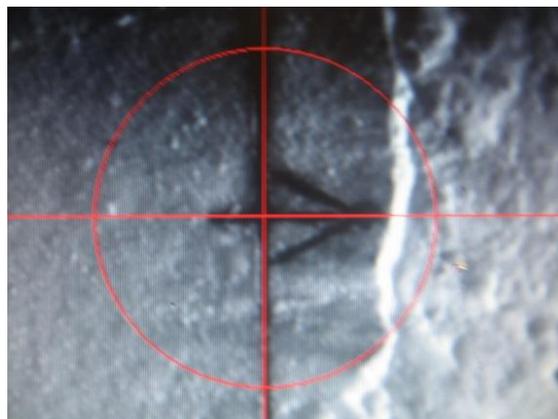
You can verify as many stones as you like on the cassette just ensure they are the ones you ran first on the Strategist.

◆ **To verify some or all the stones:**

1. Ensure that the correct job is loaded.
2. Click the  button.

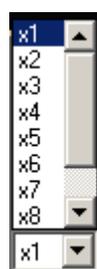
When you click this button the machine places the cross under the Laser beam on the first job only. When you click the  button the machine moves to the next stone (DOP) and places the cross under the Laser. The sequence is the order they were saved on the Strategist.

3. The first stone is checked for any positioning errors.



The picture above shows perfect positioning.

4. Use the Zoom feature if required.



- Click the  button to accept the cross location where it is inscribed on the stone and **thereby** enable the control buttons.

The dop color changes to **BLUE** (OK).

**OR**

- Click the  button to cancel the current DOP position.

The dop color changes to **GRAY**.



- Click the Log buttons  to go to the **Top**, **Start** and **End** cut positions.

These positions may NOT be on the physical stone.

- Click the  button to select the first side parameters or the  button to select the second side parameters.

- When verifying all the stones or only some of them, click the  button to save the changes, if any were made, and then move to the next DOP, if not the last one.

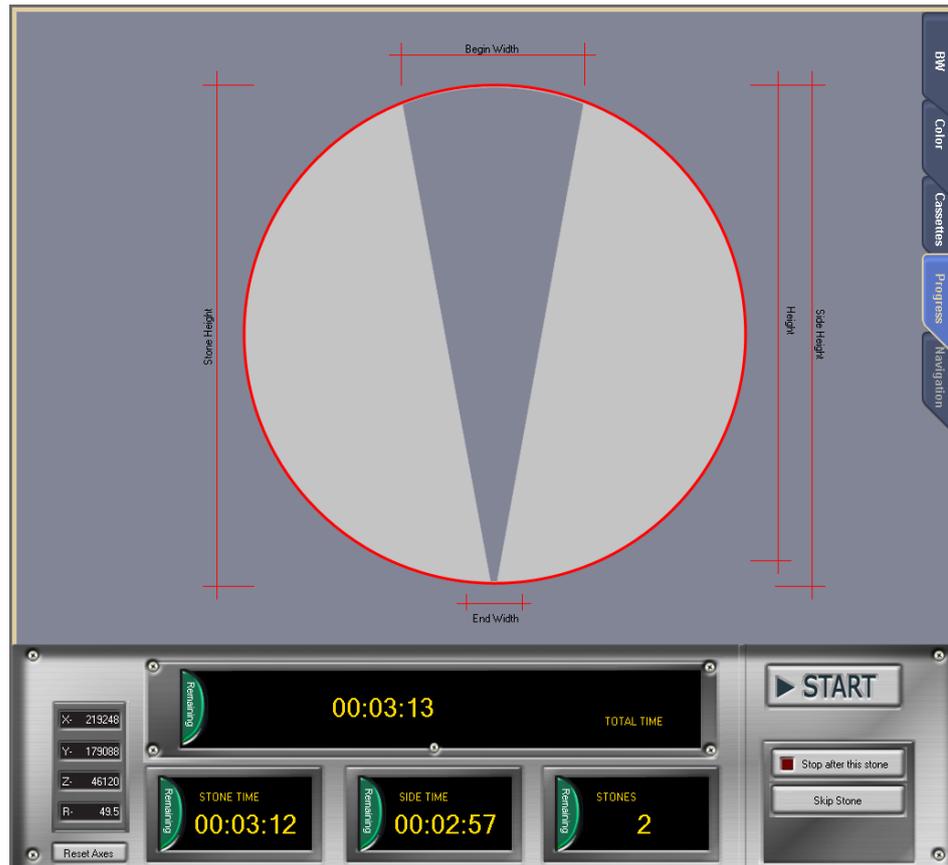


This screen is displayed when the last DOP has been saved.

- Click the **Cut All Stones**  button to cut all the stones in the cassette (even those that were NOT verified).

**OR**

- Click the **Cut Verified**  button to cut **ONLY** the verified stones on the cassette.



- Ensure that the Laser is powered **ON**.



- If powered **OFF**, click the  button.

The button toggles to 

- Click the  button to perform the selected job.

## WHAT TO DO ON ADVISOR FIRST

When using the Strategist you must ensure that all jobs coming from the **Advisor** include a **Realignment** symbol on each stone.

This section explains how to include the symbol as well as adjusting the size of the symbol to suit the current stones.

### NOTE

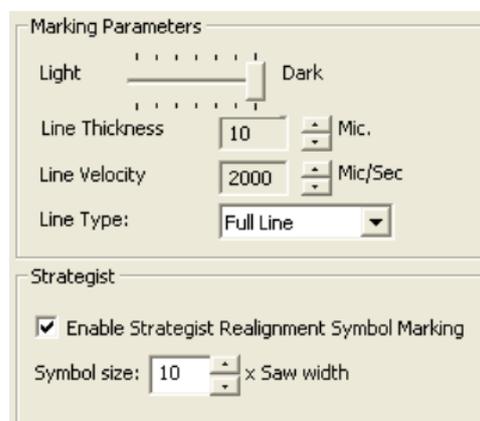
**This section refers to the Advisor ONLY.**

## Enabling and changing the realign symbol size

This section refers to the Advisor **ONLY** and describes how to include the realign symbol on the stone and if required, change its size.

### ◆ To enable and change the size of the realign symbol on the advisor:

1. When the stone planning is completed, click the **Mark** tab.
2. Right-click the **Plane Name** field.



3. Ensure the **Enable Strategist Realignment Symbol Marking** checkbox is selected as shown above.
4. Change as required the **Symbol Size** value (multiples of saw width).
5. Click the  button.

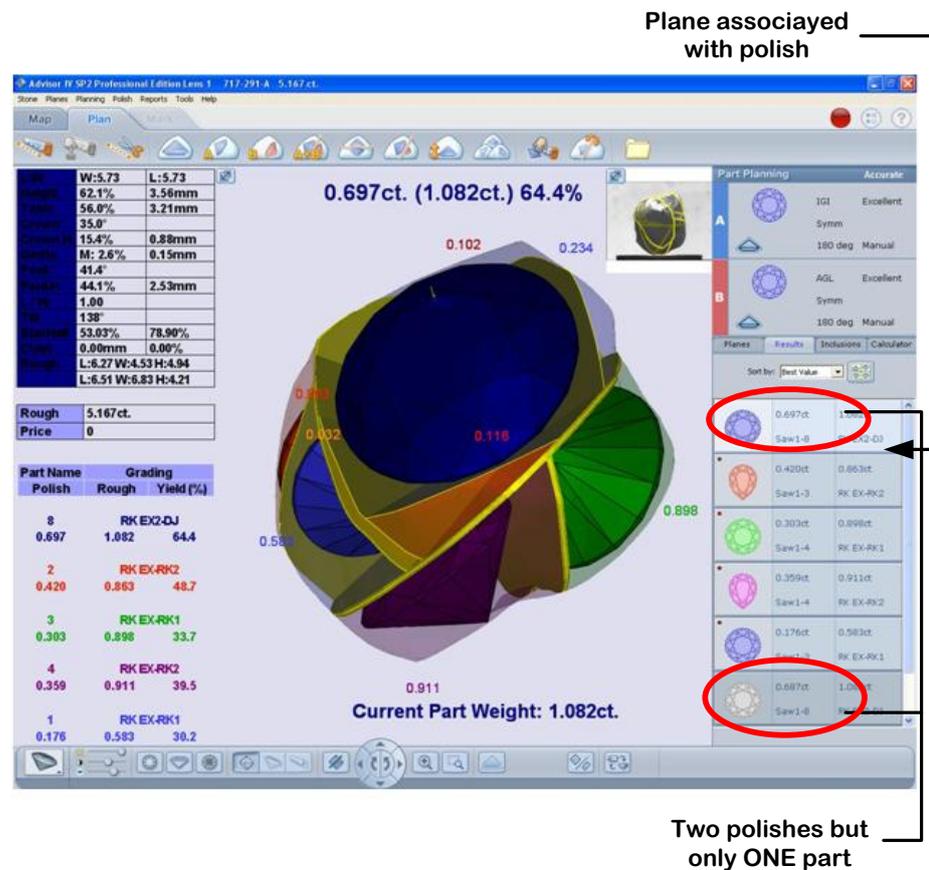
# Burning one saw plane & realign symbol on the stone

## Preparing the stone for the Strategist using Advisor 4.1 and 4.2

This section describes how to burn a single **FULL** saw plane and a realign symbol on the stone so it can be processed by the Strategist.

◆ **To burn a single saw plane & realign symbol on the stone (Advisor):**

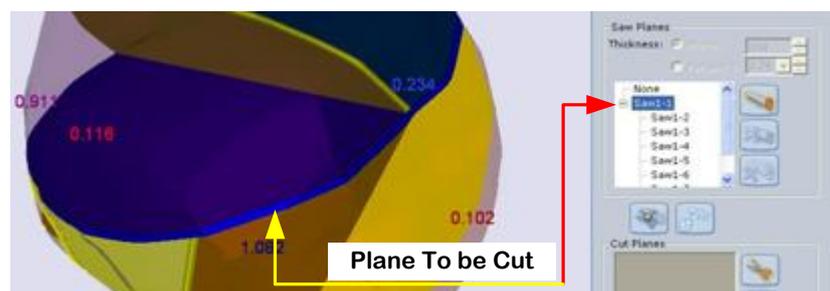
1. In the Advisor **Results** tab, select all the polished items you want to transfer to the Strategist.



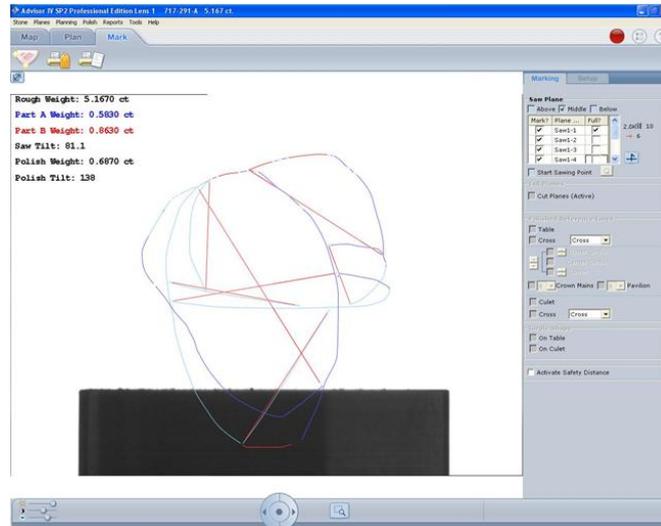
Each part is associated with a plane. This is unimportant to the Strategist as it can **ONLY** handle one **FULL** saw plane at a time.

2. In the **Planes** tab choose a **FULL** plane to be cut on the Quazer.

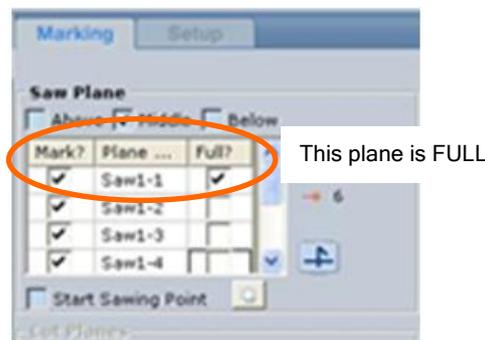
In this version only a **FULL** plane can be selected. A full plane is one that cuts right through the stone leaving two parts.



3. Click the **Mark** tab.



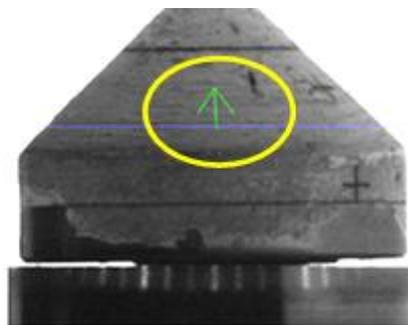
4. Select the plane marked as **FULL**.



This plane is FULL

The column depicting full planes shows the top plane as **FULL**.

5. Since the realign symbol is added to the center of the screen, rotate the stone so that the center of the displayed stone is a suitable area to burn the realign symbol (flat area).



6. Click the  button (**Saw Plane** on the right-hand side of the screen).

To change the realign symbol size, see [Enabling and changing the realign symbol size](#) on page 27.

7. Click the  button to start burning the saw plane and the realign symbol on the stone.