

# Automation Features and Optimization with Paragon<sup>™</sup>

In automated bond testing, optimization of the setup process is critical to increase efficiency and provide return on investment. Nordson's Paragon™ software is an intuitive and highly configurable environment, helping streamline the process of automation pattern set up, whilst ensuring tests perform at the highest speed. In this application note we highlight some features to help operators set up the most robust automated bond testing routines.

## Time Saving Bookmarks

When programming on a large sample with many interconnects, often operators will need to return to a prominent feature, which involves maneuvering and refocusing of the cameras over large distances. Using bookmarks, you can move between saved locations and avoid manual navigation times. The feature provides users with the functionality to record the X, Y, Z, and theta axis positions. Focus heights and important locations such as fiducials & calibration targets can be set as bookmarks to increase programming efficiency, allowing swift return to a location with sharp focus. The graphic in figure 1 shows the Alignment camera returning to a location saved via the Image Capture camera.



*Figure 1.* Feature can be navigated to interchangeably between cameras that are fitted

## Automation Features and Optimization with Paragon™

**Application Note** 

💹 Dage Paragon							
Access Setup Sample Windows Help 😡	. 🛛 🔳 🛃	🖬 🖳 🛃 🖌		1	64.43 g T	es	t completed :
Testing Analysis Automation	Machine			0	Focus A		
Hide Subsurfaces P1KG	-	Units mm	🖪 💽 🗖 🖨 Dr	0	Focus B		
New Surface Import Examine/Help		P1KG		0	Focus C		
<b>▲</b> <i>√</i> P1KG	Calibrate Image Capt	ure camera to cartridge			Location A	•	
A Surfaces 1	Teach at Image Captu	ire camera 🔹 🔻			Location B	F.	
Al wire surface	✓ Use separate camera window				Location C	+	
	Start Teach	Start Trial			Calibration Target	•	
	End Teach	Pause		+	Add New Bookmark		J Tool Tip
	Move to origin	Repeat test			C		E Image Capture
	Realign	Abort					
							Alignment
💹 Image Capture							
🖸 😤 🔎 1:1 1:2 1:4 📻 🗸 🚍 🖉 🖉 🖉 🖉 🖉	🕘 c 🖪 👻 🛨 💽			Dc	Store 🍽 🔍 📕 🤅	etup	Drav
						alam	
						OKIN	arks

Figure 2. The bookmarks menu can be accessed from the icons at the top of the main Paragon™ screen or camera windows



To add a custom bookmark, use the icons found at the top of the Paragon<sup>™</sup> window or the shortcut buttons located at the top of any camera window (Figure 2). Select the device to teach location with and this will open the bookmark window. Custom bookmarks will appear within the bookmarks drop-down once saved to provide quick & easy access during automation programming.

## Camera Lighting Memory

The Image Capture camera provides high resolution images and optimal lighting conditions vary device-to-device for post-test failure mode images. The ideal failure mode image with optimum lighting must have minimal bright spots caused by the illumination and reflectivity of the sample (Figure 3). Adjustments to camera properties prior to each automation test is not an efficient process, so Paragon<sup>™</sup> gives users the ability to store lighting settings within the test group for each sample.

**Figure 3.** Comparison of reflective solder ball failure where a bright image (top) obscures some of the detail that is seen in the ideal failure mode image (bottom)

## Automation Features and Optimization with Paragon™

**Application Note** 

\land Image Cap	oture and Video Recording of Test
Save image	Camera and Light Settings
None 🔻	Store
Store the current	camera and light settings
	Remove
- Record video	Video camera Video capture quality

Figure 4. The option to store camera and lighting settings is found within Test Group

The option can be found in the Testing tab of Paragon™ within the "Image Capture and Video Recording of Test" section (Figure 4). Simply click "Store" to save current illumination and camera settings into the test group, so they can be recalled at the appropriate time. In automation you can avoid on-the-fly lighting and camera adjustments.

## Hassle-Free Test Points

As bonds are tested in the order of programming, the option to recalculate test points can allow flexibility and save time by preventing the need to laboriously reteach wires chronologically. When wires are added to the automation pattern, a window pops up to aid with the input of dimensions, test offset and test position along the wire. The test points are automatically calculated from the information in this window after the start and end points of the wire are programmed.

The example in Figure 5 shows the wire test point is initially defined as 50% along wire and the on-screen animation (Figure 6) shows that this could cause the hook to contact the die when rotating into the space underneath the wire. After inputting a new "percent along wire" value in the dimensions window, right click on the programmed wire, and select the option to recalculate the wire test point. The option can also be used to recalculate an entire wire group to update hundreds of wires if necessary, saving an enormous amount of time.

🔊 Wires 1	х	Y	Z	Theta	Lower limit	Approach of	
Test Group	Automate	d Destructive W	/ire Pull	•			0.125 mm
Inter-wire Sa	afe Height		0.000				
Random size	e 0	Land					Had Director
Wire Detect	ion	Default Setting	gs 👻	Enable			Hook Diameter
1 Start	1.447	-0.300	-0.014	0		83	0.050 mm
1 End	1.047	1.242	-0.575	0	Animate		
1 Test	Delete V	Vire 1		105	5.975	0.000	Percent along wire
	Delete			wise	Separate r	otation	60 %
2 Start	insert wi	re before wire	16	0			
2 End	Insert wi	re after Wire 1		0	Animate		
2 Test	Move th	e hook to the		102	5.975	0.000	When test point calculated automatically,
	Toggle h	ook Theta and		wise	Separate r	otation	skip to the next wire Start
3 Start	Clockwis	e for Wire 1		0			Set Lower limit to test point height minus this value
3 End	Set Wire	1 as Test point	template	0	Animate		0.200
3 Test	Recalcul	ate the test loca	ation for Wire 1	97	5.975	0.000	
L		Pause	Exclude	Clockwise	Separate r	otation	Update all test points 🗹 Automatically update
4 Start	3.139	-0.301	-0.015	0			Defaulture for Annual effect
4 End	3.030	1.264	-0.575	0	Animate		Default value for Approach offset
4 Test	2.997	0.475	6.175	94	5.975	0.000	0.000
		Pause	Exclude	Clockwise	🔲 Separate r	otation	
5 Start	0.000	0.000	0.000	0			Update all test points
5 End	0.000	0.000	0.000	0	Animate		Show when new set added
5 Test	0.000	0.000	0.000	0	0.000	0.000	Close

Figure 5. Test points can be recalculated from the menu that appears when you right click on the wire

# Automation Features and Optimization with Paragon<sup>™</sup> Application Note





*Figure 6.* Wire automation test points in the automation window before and after the 'percent along wire' is modified by using test point recalculation

## Conclusions

When used effectively, automated bond testing eliminates human error, improves result repeatability and overall test quality. Paragon<sup>™</sup> automation does this by enhancing the overall user experience, incorporating assistance features. This gives the operator the utmost confidence in creating a precise and reliable automation test routine.

#### For more information, speak with your Nordson representative or contact your Nordson regional office

### Americas

+ 1 760 930 3307 sales@nordsondage.com

### Europe

+44 1296 317800 globalsales@nordsondage.com

#### China

+86 512 6665 2008 sales.ch@nordsondage.com

Germany +49 89 2000 338 270 sales.de@nordsondage.com

Japan +81 120 537 555 sales.jp@nordsondage.com

#### Korea

+82 31 462 9642 korea.at.cs@nordson.com

South East Asia +65 6552 7533 sales.sg@nordsondage.com

Taiwan +886 2 2902 1860 globalsales@nordsondage.com

#### **United Kingdom**

+44 1296 317800 globalsales@nordsondage.com

