INNOVATION. PRECISION. EXCELLENCE.

PVA 20/20

Service Manual

Revision B

Precision Valve & Automation
One Mustang Drive
Cohoes, NY 12047

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Table of Contents

1. Introduction

The intent of this manual is to assist those operating a PVA20/20 machine properly set up their own inspections. Each PVA20/20 machine contains a manual provided by modusAOI, which is accessed by clicking 'F1' on the Modus equipment. This manual is supplementary.

Before you operate this system, read the operation and setup manual. This will help you to become familiar with the product and ensure successful operation.

If any questions or problems arise, contact PVA's Technical Support department.

1.1 PVA Contact Information

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1.2 Document History

Revision	Revision Date	Reason for Changes
REV B	January 2021	Major Revision
REV A	June 2019	Initial Release

Note: All photographs and CAD model representations in this document are a "general representation" of the system and its components. The actual appearance of the system and its components can differ based upon customer specific configuration.

1.1 Safety

Certain warning symbols are affixed to the machine and correspond to notations in this manual. Before operating the system, identify these warning labels and read the notices described below. Not all labels may be used on any specific system.

Always wear approved safety glasses when you operate or work near the workcell.

Before you operate the system, read and understand the manuals provided with the unit.

Never put hands or tools in areas with this symbol when the machine is in operation. A dangerous condition may exist.

Read and understand the manuals provided with the unit before any repairs or maintenance is done. Only a qualified individual should do service.

Use caution when there are pressurized vessels. Find and repair any leaks immediately. Always wear appropriate safety equipment when you work with pressurized vessels or vessels that contain chemicals

Shear hazard from moving parts. Avoid contact.

Do not remove protective guarding.

In situations where inattention could cause either personal injury or damage to equipment, a warning notice is used.

Do not smoke near the machine. Always have a fire extinguisher available for emergency use.

Before performing any repairs or maintenance to the system, turn off power and lock out the power disconnect switch.

Warning notices are used to emphasize that hazardous voltages, current, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use. Only qualified personnel should enter areas designated with this symbol.

Laser light source present. Do not stare directly into the beam. Do not use in the presence of highly reflective surfaces

Pinch hazard from moving parts. Avoid contact.

Hot surface. Avoid contact.

Warning, Ultraviolet (UV) light hazard. Do not look directly at the UV light source.

1.2 PVA 20/20 Control Packages

modusAOI software is used to create and run inspections. Scanner and Scanner Lights are the only hardware *modusAOI* software controls. Different PC interface cards are used to enable *modusAOI* software communication with the scanner and other equipment.

modusAOI software cannot operate conveyor, board stops, or any other mechanical feature on the equipment. Current PVA 20/20 machines are controlled by a Galil PLC and a PC. *PVA Portal* software is used to control the conveyor, board stops, scanner height, etc. *PVA Portal* and *modusAOI* reside on the system's PC. There are two monitors, one for *modusAOI* and one for *PVA Portal*.

Some systems have two scanners. They are used to inspect top and bottom side of panels at the same time. These systems have two PCs: the Master/Client and the Slave/Server. The PC controlling the top scanner is the Master PC. *modusAOI* and *PVA Portal* reside on the Master/Client PC. Only *modusAOI* software is installed on the Slave/Server PC. Master/Client and Slave/Server PCs communicate with each other via ethernet cable. *modusAOI* on the Slave/Server PC reports its inspection results to the Master/Client PC. These systems have two monitors. The keyboard is shared between Master/Client and Slave/Server via KVM switch. The other monitor is reserved for PVA Portal.

Every PVA 20/20 has the following modes of operation:

- **Auto Mode:** This is also known as Production mode. Part trafficking and inspection are automated. The way the machine handles the parts depends on the settings in Setup Mode.
- **Setup Mode:** Enables/disables features and handles different modes that control how Auto Mode deals with fixtures entering the machine. These modes are:
    - **Production:** Board stops are used to stop the PCB under the scanner. The PCB is scanned and the result is displayed on the monitor. Failed scans must be confirmed by the operator.
    - **Pass Through:** The PCBs are not inspected and pass through the machine without the use of board stops.
    - **Installation:** Board stops are used to stop the PCB under the scanner. The PCB is scanned and the result is displayed on the monitor. All inspections, pass or fail, must be confirmed by the operator.
    - **Buffer:** This is a conveyor section after the scanner. Two sets of board stops are used: one for the scanner section and one for the buffer. Sometimes it is used to remove bad PCBs from the production line after failed inspection. Boards that successfully pass the inspection proceed down the production line as normal.

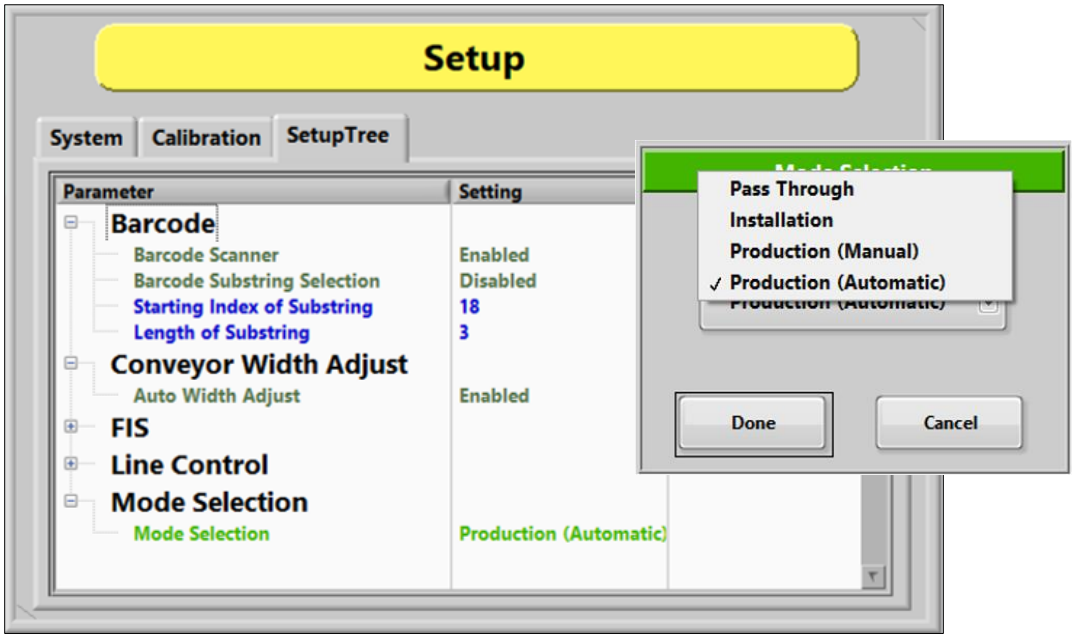


Figure 1: Mode Selection

- **Manual Mode:** The operator can simulate mechanical actions of the equipment that regularly occur in Auto Mode. The following is a list with standard available options. Note that your machine may have only some of them.
  - Run the conveyor or reverse conveyor direction.
  - Adjust conveyor width.
  - Raise or lower the board stops.
  - Turn the machine house lights on or off. These are not scanner lights.
  - Trigger SMEMA outputs and visualize SMEMA inputs.
  - Raise or lower the scanner.
  - Run a single inspection.

1.3 Basic Terminologies

- **modusAOI:** The inspection software used on the PVA 20/20.
- **Front Panel:** The first window after modusAOI software is open.
- **Test Plan Menu:** Environment from where modusAOI programs can be selected and created.
- **Editor:** modusAOI environment where Test Fields for a specific Test Plan can be created and Edited.
- **Test Center**: modusAOI environment where a Test Plan can be tested, and Test Parameters edited/tuned.
- **Test Plan:** A scanned image, containing all test fields and test parameters pertaining to inspection.
- **Test Field (Test Zone)**: A drawn, contour shaped region over the scanned image, used to check for presence/absence of material, fiducials.
- **Test Parameters**: Test parameters are the attributes that make up a test field. Each test field uses these attributes to detect material or features on a board/fixture to allow the inspection to pass or fail.

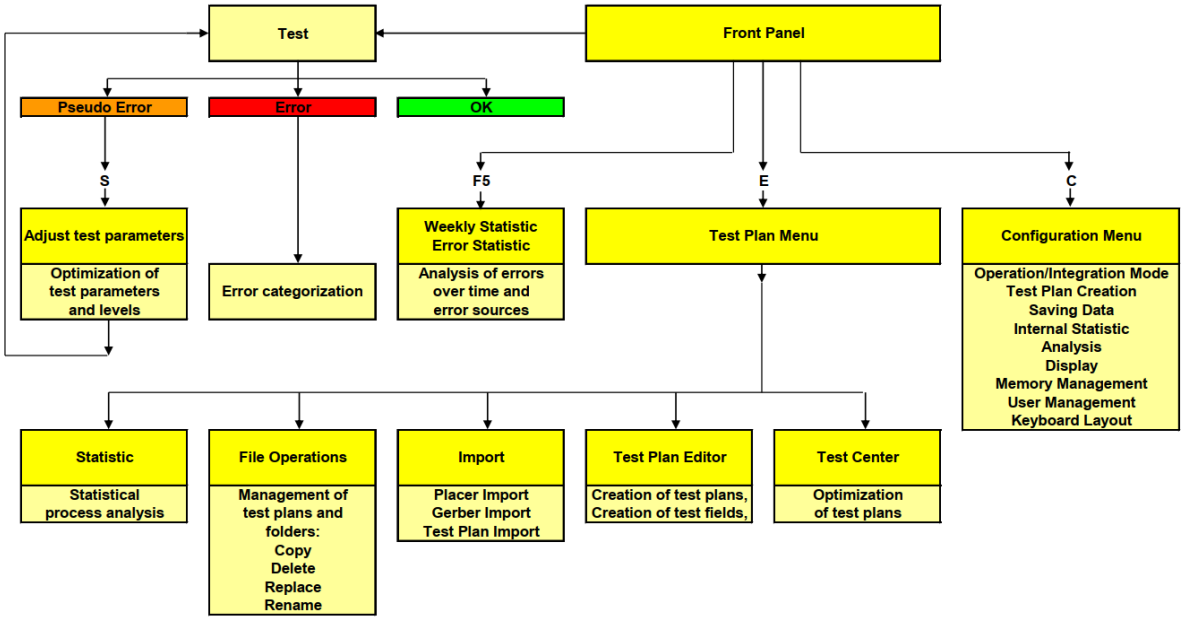


Figure 2: Program Structure of modusAOI

1.4 Keyboard Binds

Important ModusAOI Software Controls		
	Keystroke	Functions
Front Panel	F1	Opens ModusAOI Manual
	C	Opens ModusAOI Configuration Menu
	Q	Shuts Down ModusAOI
	Backspace	Shusts Down PC
Test Center, Editor, Design Mode	D	Access Design Mode in Editor
	Page Up / Page Down	Zooms In and Out on a selected Test Field
	Control + Left Click	Copies Test Fields and Duplicates Test Field Parameters
	Z	Undo
	A	Select All
	Escape	Unselect All
	Delete	Delete Test Field/s
	R	Rotate Test Field by 90^{O} Counter-Clockwise

1.5 Selecting Parts for Setting a Test Plan

Most frequently, PVA20/20 is used to detect conformal coating over PCBs. Good, coated parts and parts with targeted coating defects are needed for finalizing a Test Plan.

If pallets are to be used, the test pallet should be filled with all the PCBs that pallet can handle.

2.modusAOI Front Panel

The Front Panel is both the main menu of modusAOI software and the Auto Mode screen. All major functions available in modusAOI can be selected from here.

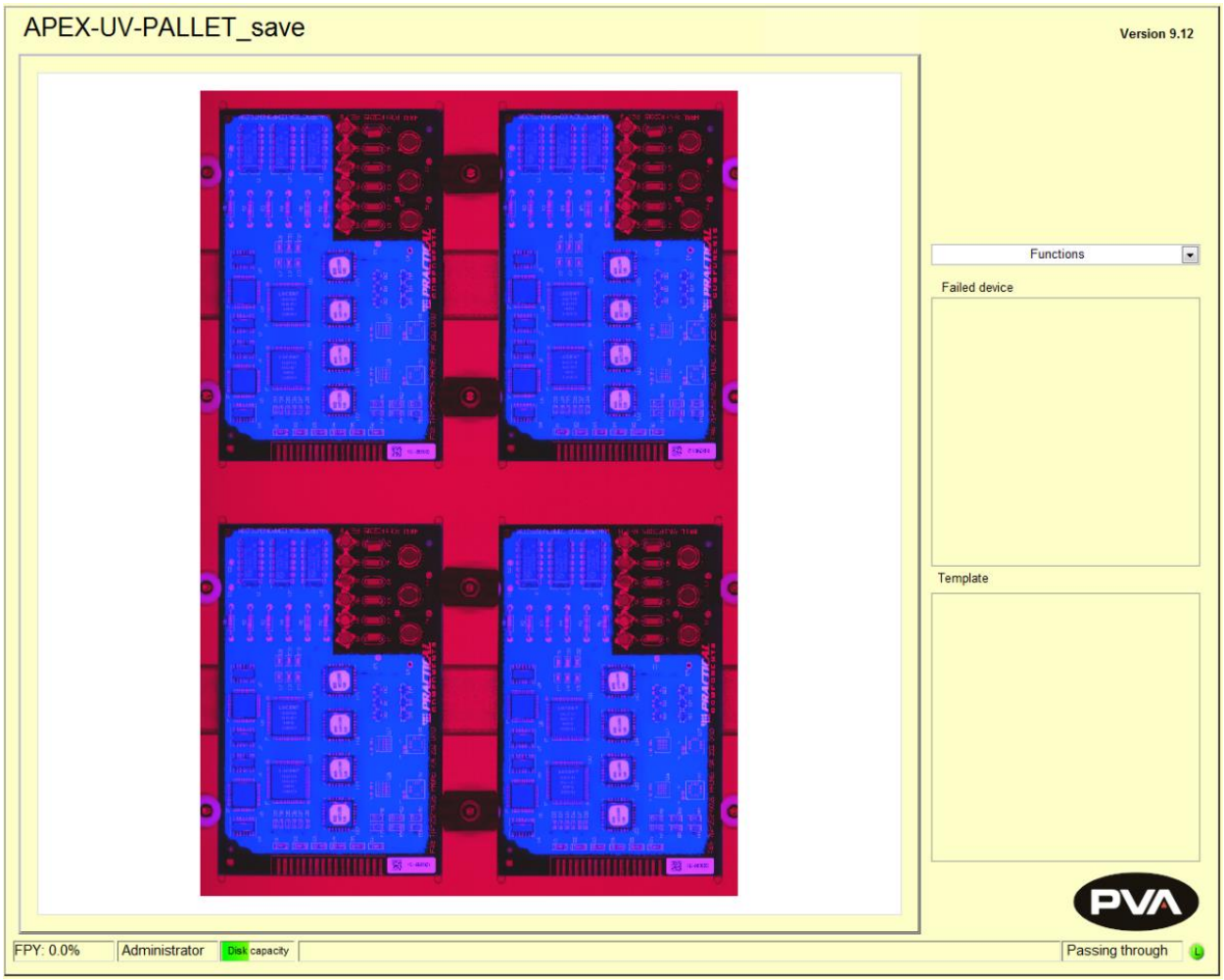


Figure 3: modusAOI Front Panel

2.1 Functions Available from the Front Panel

When the equipment is powered on, the front panel is the first page modusAOI software opens. If a test plan is selected, a preview of the scanned product is displayed in the large windowpane. The current Test Plan name is written at the upper left corner. A dropdown box with the label *Functions* allows access to other modes and tools.

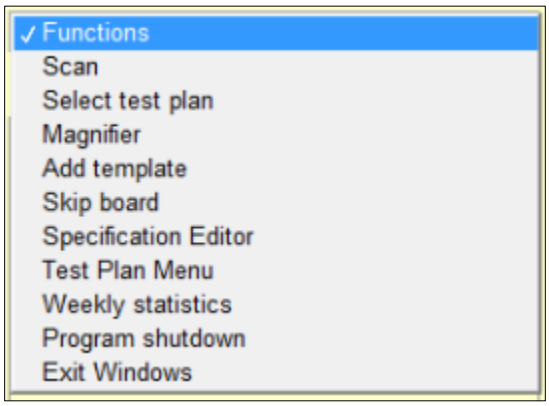


Figure 4: Front Panel Functions

Only a few items are utilized in normal operation:

- **Select Test Plan**: Select from a list of available test plans to run in auto mode.
- **Test Plan Menu:** Allows the user to create and develop inspections. From here, *Test Field Editor* and *Test Center* can be accessed. This is the first place to go to set up new or edit existing test plan.
- **Program Shutdown:** Shuts down the modusAOI software.
- **Exit Windows:** Shuts down the computer.

Configuration Menu: Access to software configuration settings is available through a keyboard shortcut - press letter “C” button on the keyboard when Front Panel is displayed. Password may be set to access this menu. More information is available in the Configuration Menu section.

3. Test Plan Menu

A test plan contains scanned image of a product, test fields, and test field parameters. The Test Plan Menu is devised to navigate through all options where one can create, edit, and organize all test plans. *Test Field Editor*, and *Test Center* can be accessed from here. To enter the test plan menu, go to the *Functions* dropdown box on the Front Panel and select *Test Plan Menu*.

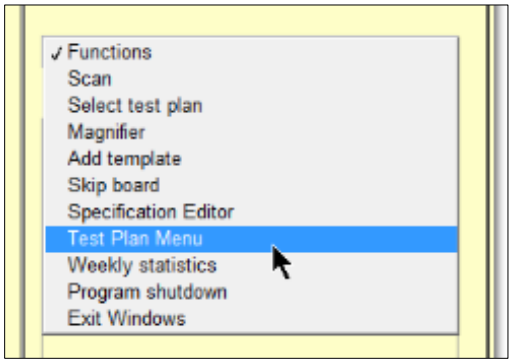


Figure 5: Test Plan Menu

The largest pane in the Test Plan Menu window is the image of the currently selected test plan. A dozen buttons and a pane with a list of the test plans are on the right-hand side.

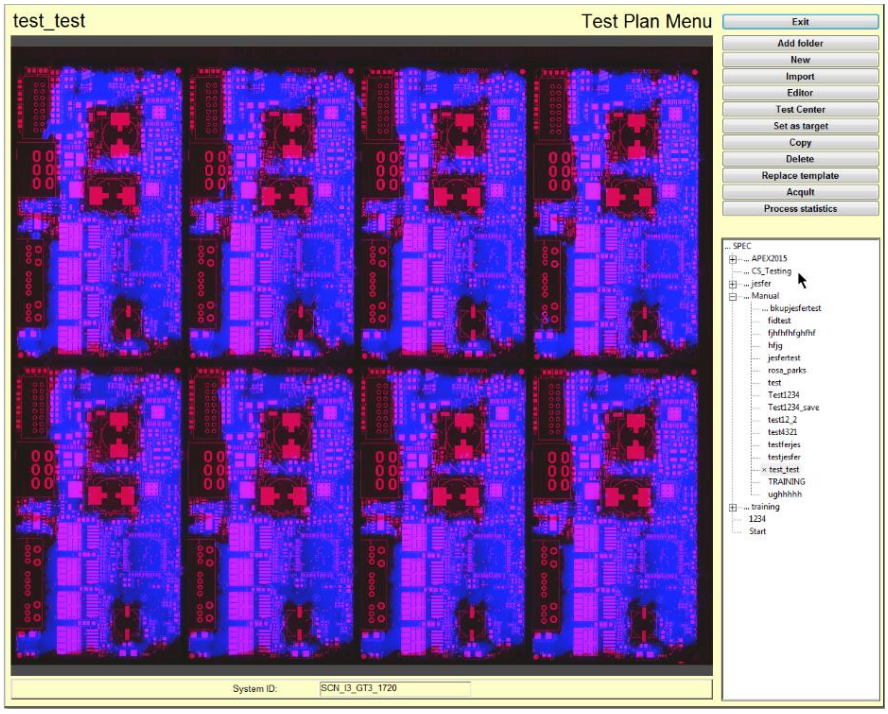


Figure 6: Test Plan Menu Options

3.1.1 Test Plan Menu Options

- **Add Folder**: Creates a new folder. The new folder location depends on the item selected in the Test Plans tree view in the lower pane.
- **New:** Creates a new Test Plan. The new test plan location depends on the item selected in the Test Plans tree view in the lower pane.
- **Import:** Imports test fields from an existing plan into another plan. It also contains Gerber and Placer imports used for bringing in external data. Instead of using these import types, PVA supports the use of coating plan drawings in pdf format.
- **Editor:** Enters *Test Field Editor* environment. Here, test fields are drawn and their initial setup is done. Some advanced functionality is available as well.
- **Test Center:** Enters *Test Center* environment. Here, test field parameters and their Pass/Fail conditions are set.
- **Set as Target:** Selects a Test Plan to be run in Auto Mode. An asterix to the left of the test plan name indicates the plan is selected.
- **Copy:** Copies the highlighted test plan.
- **Delete:** Deletes the highlighted test plan.
- **Replace Template:** Runs a Scan. Upon confirmation, the current test plan image of a selected test plan is replaced with the image from this new scan.
- **Acquit:** Adjusts complex scanner settings and routines.
- **Process Statistics:** Runs troubleshooting tasks. Gives the ability to test variables within the modusAOI software.

3.1.2 Inspections List Pane

- Folders have three dots in front of their names. There is one root folder named *SPEC*. This root folder cannot be deleted.
- When a folder is selected, all but the *Exit, Add Folder, New, and Delete* buttons are grayed out.
- Test Plans can reside in any folder, including the root *SPEC*. In the picture below, test plan *jestts* resides in folder *jesfer*, and test plan *Start* resides in root folder *SPEC*.
- When barcode scanner is used to select a test plan to be run, depending on barcode value, the test plan must reside in the root *SPEC* folder.

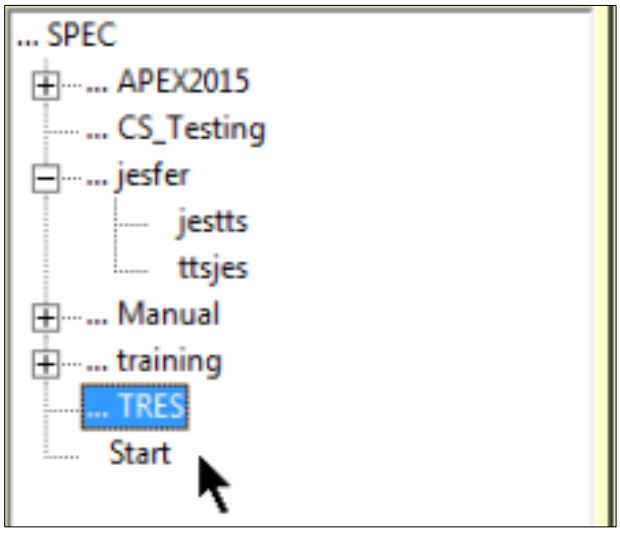


Figure 7: Inspections List Pane

4.Creating a New Test Plan

Creating a new test plan is done by selecting a new test plan location, naming the test plan, selecting a scanner (if two scanners are installed), selecting a scanner light and resolution (600 or 1200 dpi), and cropping the desired scan area.

The sections below will outline these steps in detail.

4.1 New Test Plan

Follow the instructions below to create a new test plan.

1. From Test Plan Menu, select the folder where the new Test Plan should reside.
2. Press **New** to open the Test Plan Wizard.

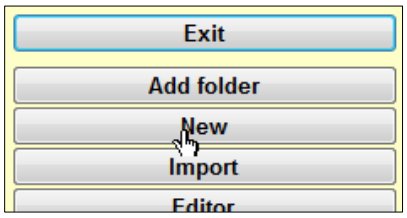


Figure 8: Select New

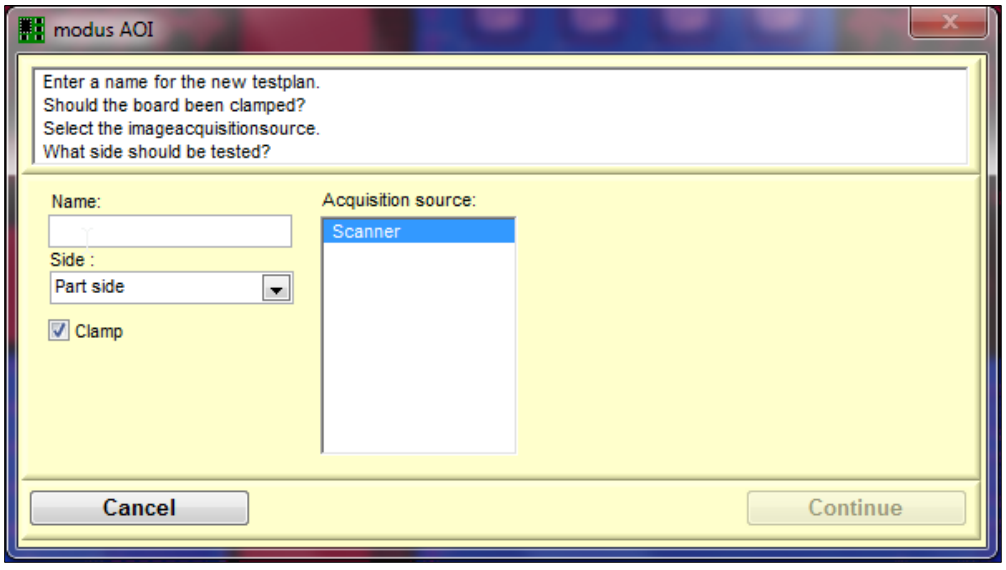


Figure 9: Test Plan Wizard

3. Enter a test plan name in the **Name** field.

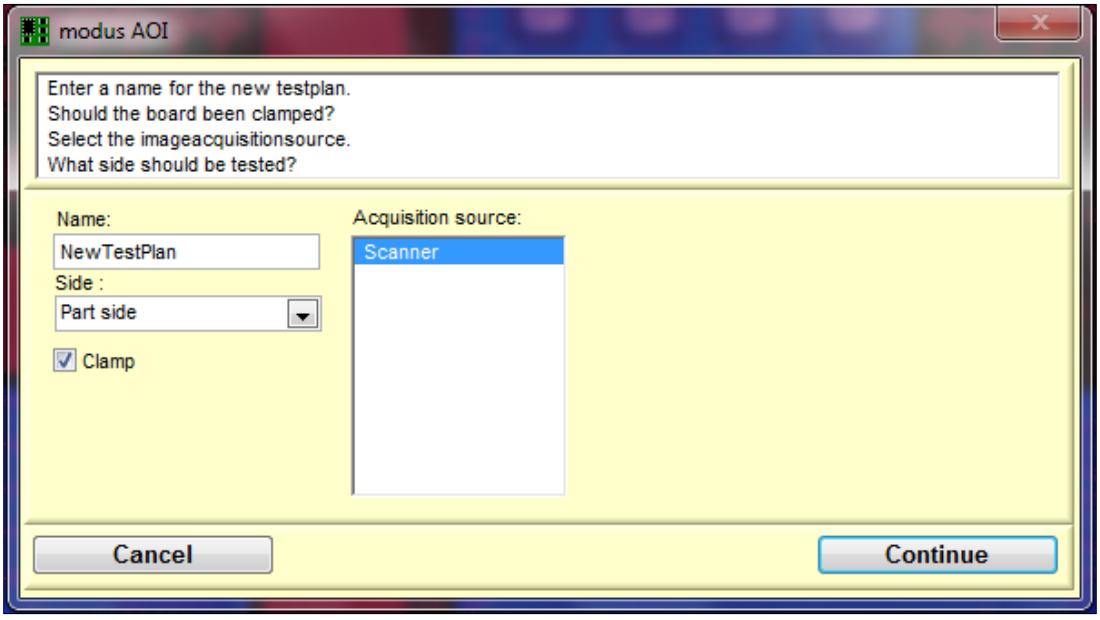


Figure 10: Enter Name

4. From the **Side** dropdown, select either **Part Side** (top scanner), **Solder Side** (bottom scanner) or **Part and Solder Side** (both).

Note: Not all machines have two scanners.

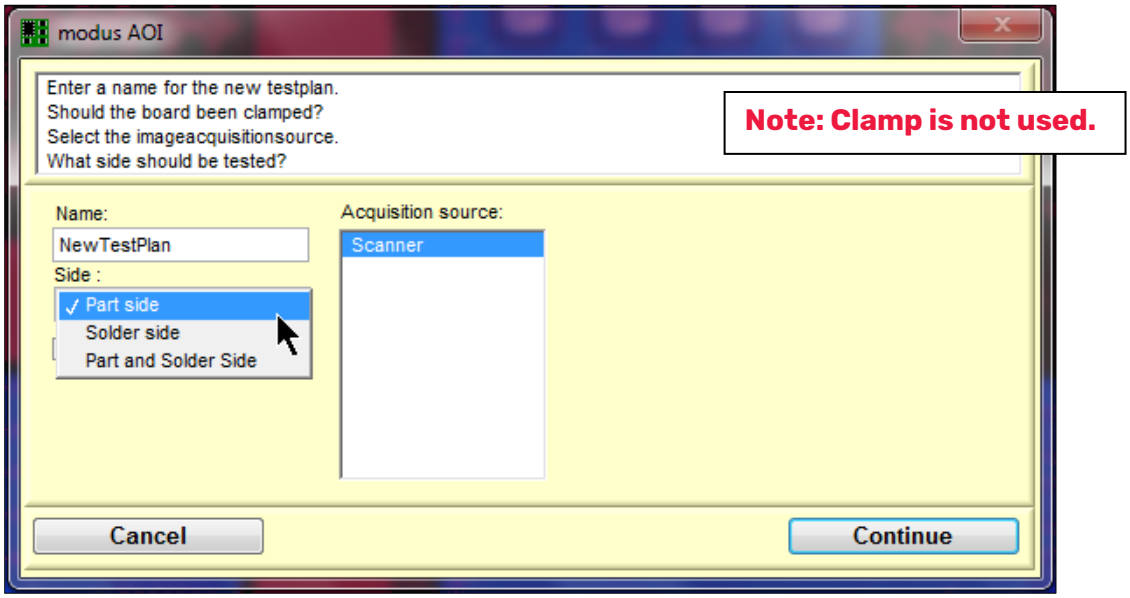


Figure 11: Side Dropdown

5. Select **Continue**. A *Wait For…* display window will open.
6. Select **Continue** again to open the scanning page.

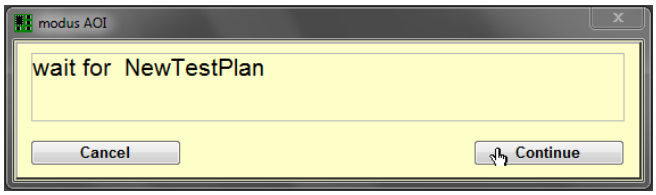


Figure 12: Wait For Window

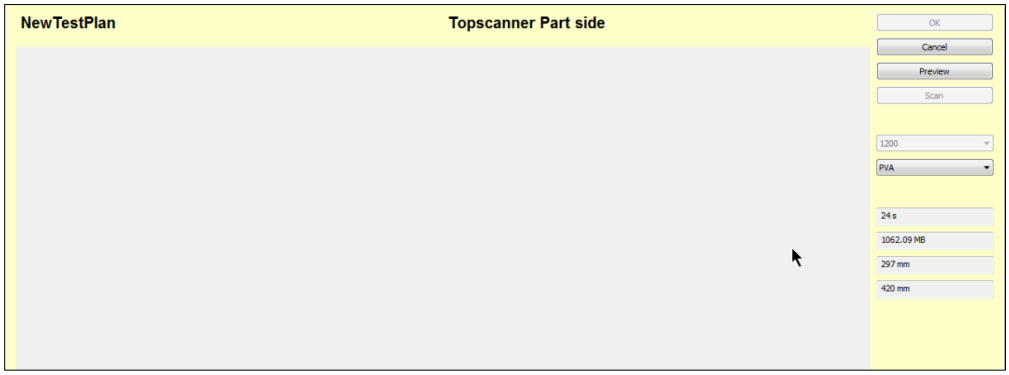


Figure 13: Scanning Page

7. Select a light then click **Preview**. Selecting a lights profile and resolution are options you can keep changing until ideal image is obtained. For the very first product scan, only Preview mode and 1200 dpi resolution are available. After the first scan Preview, Scan, and 600 dpi options become available.

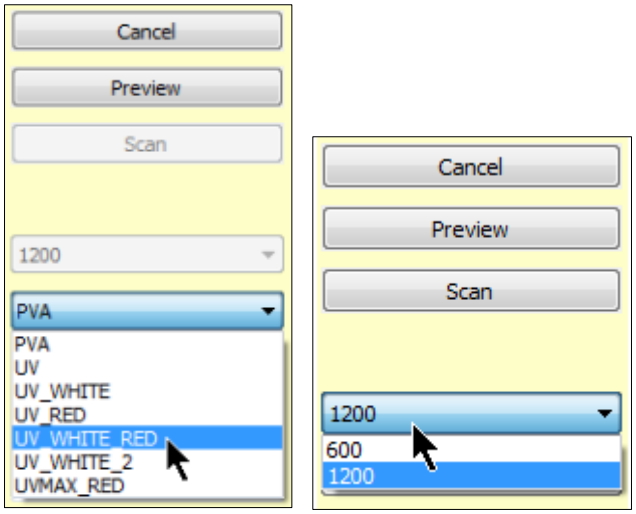


Figure 14: Select a Light

8. Click on **Preview** to create a full scan image.

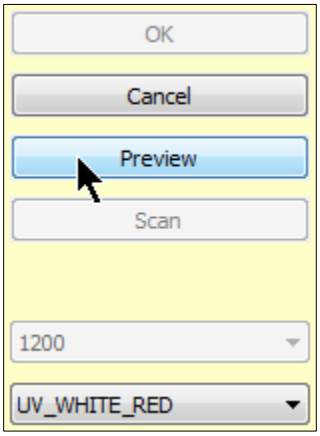


Figure 15: Preview

9. Click on **Scan** to create an image from a predefined/cropped area of the scanner.
10. Use the mouse to select, define, or crop the desired area.

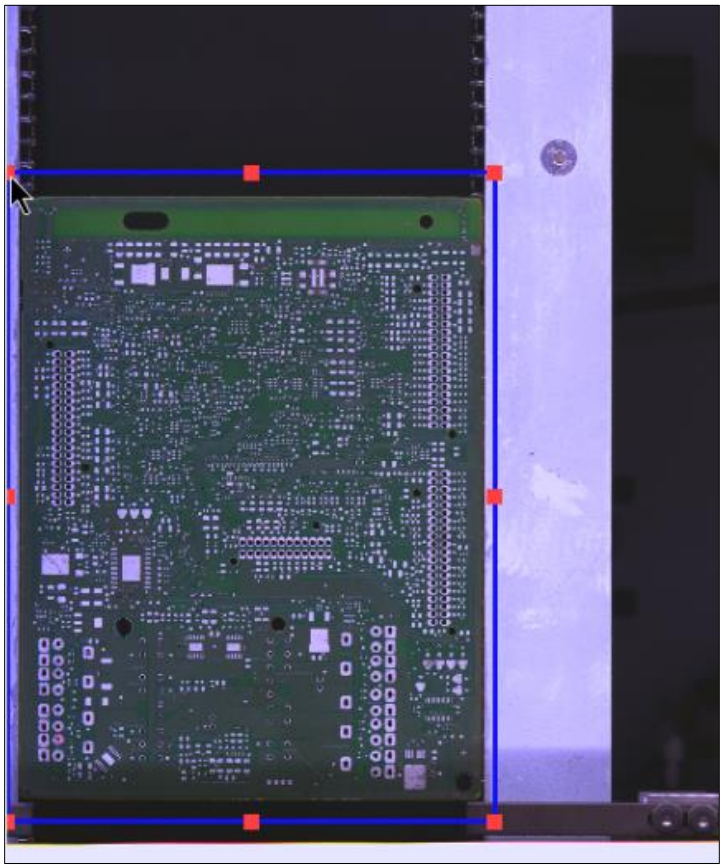


Figure 16: Define Scanning Area

11. Click **Scan** to obtain image of the preselected area.

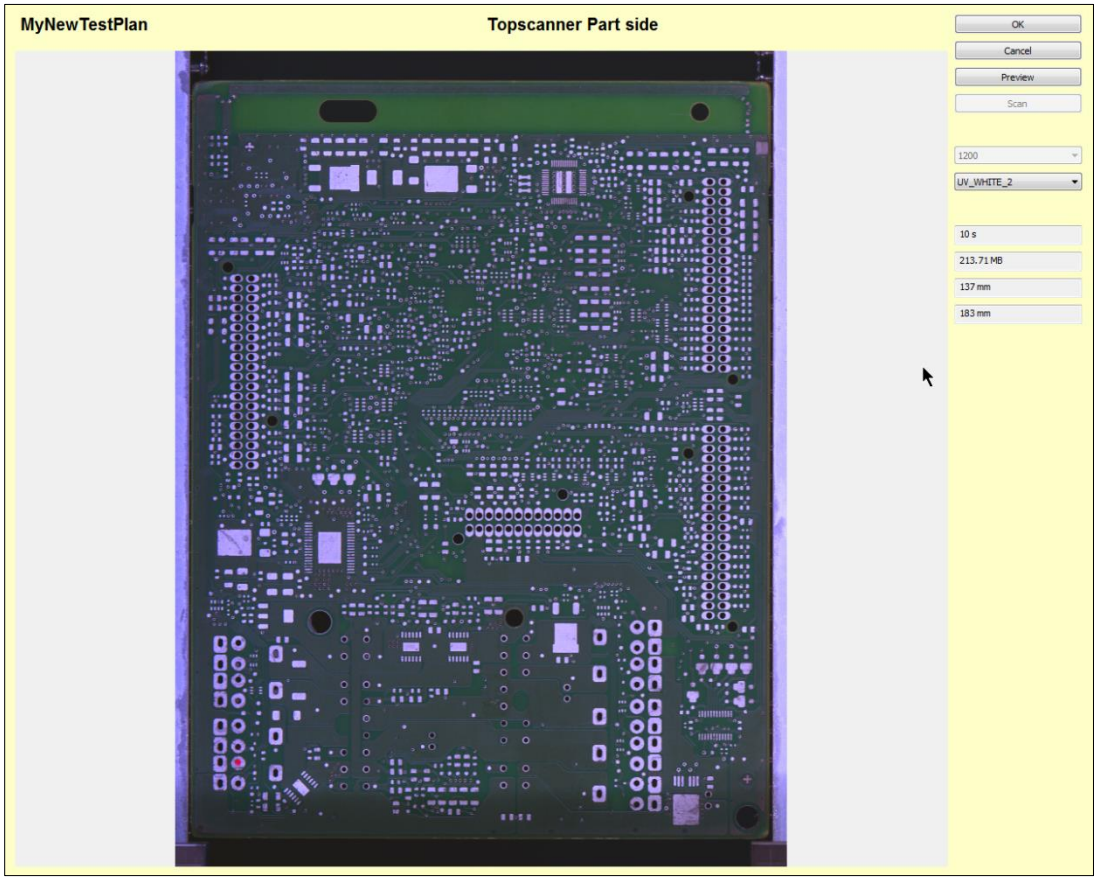


Figure 17: Selected Scanning Area

If the image does not outline the desired features, select a different light and repeat the process until a quality image is obtained. If neither one of the available light profiles produces an image of good quality, another light profile should be created. More information is available in the Creating a New Light Profile section.

12. Press **OK** to finish the creation of the Test Plan.

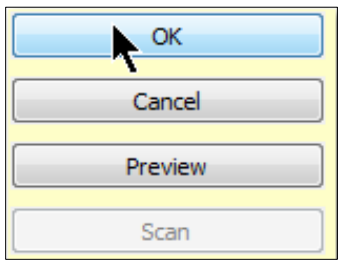


Figure 18: Create Test Plan

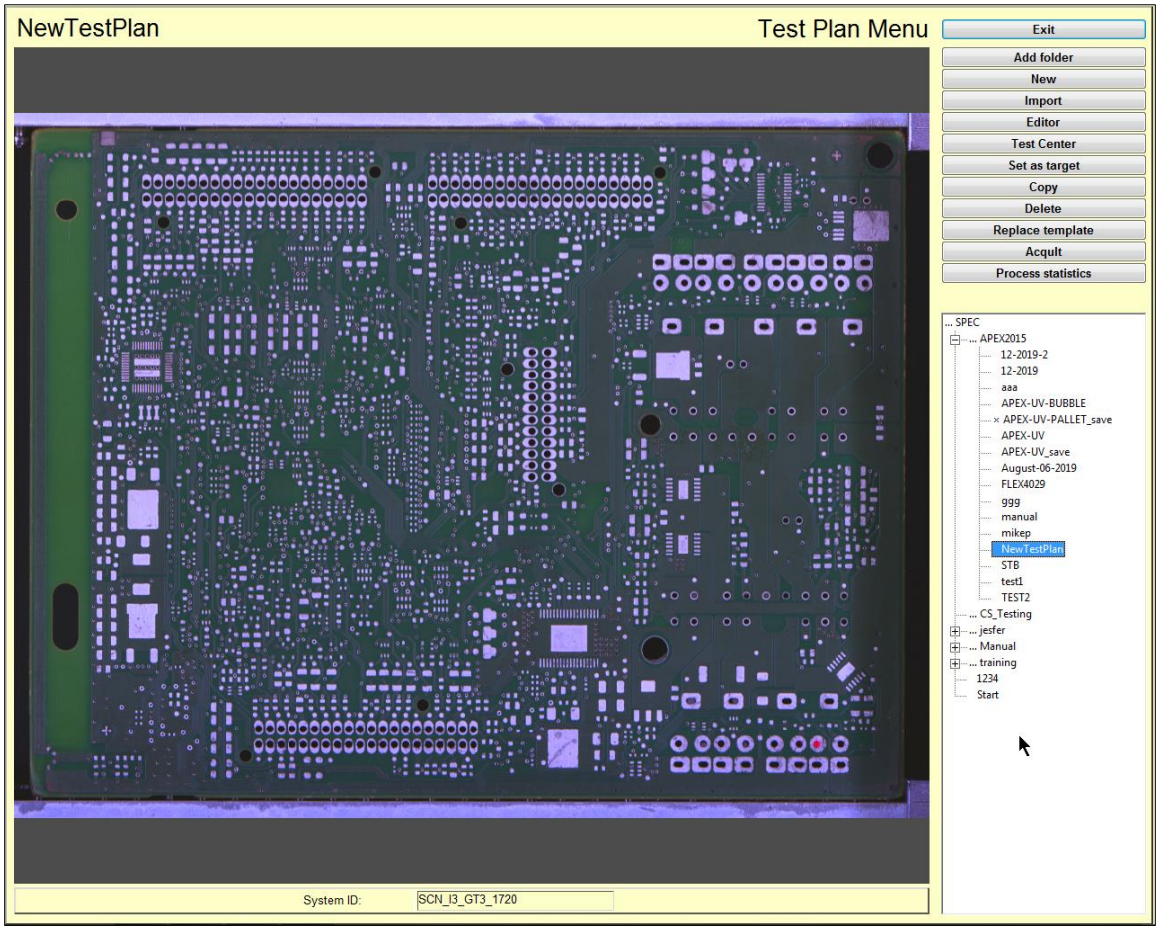


Figure 19: Created Test Plan

4.2 Replacing Template

A properly coated board must be used to create a test plan. If the coating plan changes, you can use the Replace Template option in the test plan menu to replace the test plan image. Follow the steps below to replace test plan template.

1. Place the good board under the scanner at the board stops.
2. In the test plan menu, select **Test Plan**.
3. Select **Replace Template**.

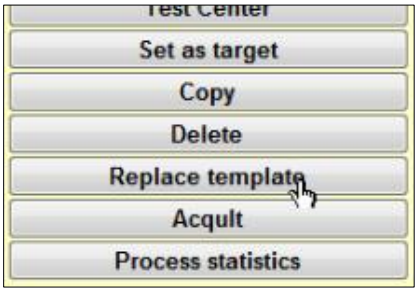


Figure 20: Replace Template

4. A *modusAOI* window display will appear. When asked, *Do you really want overwrite the existing template?*, click **Yes**.

Figure 21: Override Existing Template

5. When the *Wait For..* window appears, click **Continue**.

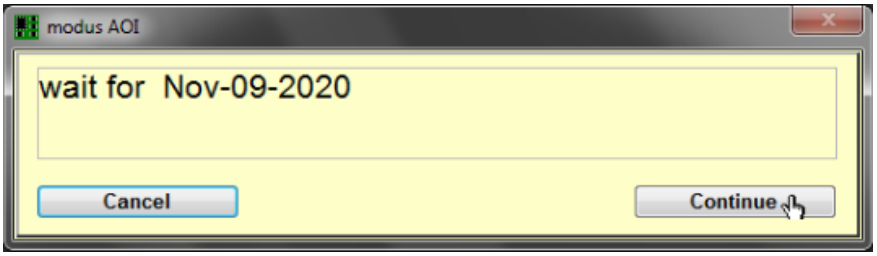


Figure 22: Continue

6. The scanner will start scanning and a *Learning!* message will appear at the center of the screen.

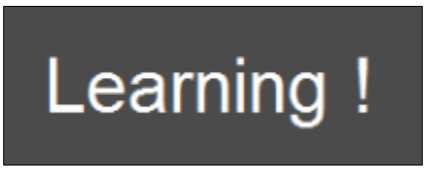


Figure 23: Learning Message

7. If there were fiducials in the test plan, there will be a prompt to correct the fiducial positions. You can click either **Yes** or **No**.

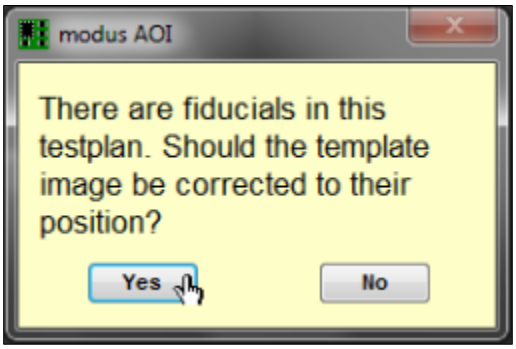


Figure 24: Fiducial Prompt

8. The newly scanned board image is displayed for the test plan.

4.3 Creating a New Light Profile

Scanner Lights are LED strips positioned on both sides of the scanner. The image below shows the LED light strips arrangement.

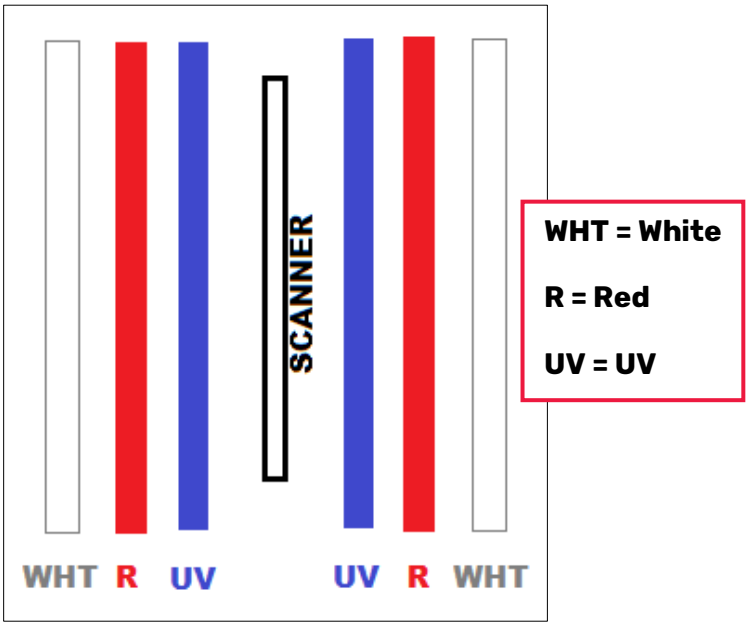


Figure 25: LED Light Strips

Light profiles are listed in section **[PWM]** of the **scanner.ini** file. The intensity of each light strip in a light profile is controlled by its value as entered in **scanner.ini**. The light intensity values vary from 0 to 255.

0 = OFF

255 = Max Intensity (100%)

Example:

[PWM]

UV180Red50White=0;50;180;180;50;15

UV155=0;0;155;155;0;0

UV155red=0;30;155;155;30;0

There are three light profiles in the example above.

Example 1: UV180Red50White

- **UV180Red50White** is the name of the light profile
- The left white light intensity is set to 0, the light is off.
- The left red light intensity is set to 50.
- The left UV light intensity is 180.
- The right UV light intensity is set to 180.
- The right red light intensity is set to 50.
- The left white light intensity is set to 15.

4.4 Creating a New Light Profile

To create a new light profile, follow the steps below.

1. Navigate to ***C:\Argus\exe***.
2. Double click on ***scanner.ini*** to open the file.
3. Find the **[PWM]** section.
4. Enter the name of the new light profile within the [PWM] list. The order of light profiles in this list will dictate the order of light profile names listed in the dropdown menu when creating a Test Plan.
5. Save the changes.
6. Close the ***scanner.ini*** file.

4.5 Editing a Light Profile

To edit a light profile, follow the steps below

1. Navigate to ***C:\Argus\exe***.
2. Open ***scanner.ini***.
3. Find [PWM] section.
4. Edit the light intensity values of the profile you need.
5. Save the changes.
6. Close ***scanner.ini*** file.

5. Editor

The **Test Field Editor** is used to draw basic and complex polygonal shapes called test fields. It is also the place where blocks and panels of test fields are created. The test fields are regions of the image where features should be found or not found. The most common types of test fields are fiducial test fields. Fiducials are the first thing you should create in the editor, followed by blocks, then arrays/panels. A PDF coating test plan can be loaded in the Editor to help place test fields in the test plan as well.

5.1 Creating Fiducial Test Fields

Fiducials are usually circular or x-hair shaped metal etched markings with a diameter between 1 and 3 mm and a contrasting non-metal border. They are used to align a coordinate system to part.

Note: Fiducial test fields can be created for each part/panel in a fixture.

Note: One fiducial on a part or fixture will provide X-axis and Y-axis correction. Two fiducials on a part or fixture will provide X-axis, Y-axis, and skew correction.

To create a fiducial test field, follow the steps below.

1. From the modusAOI front window, select the **Test Plan Menu**.

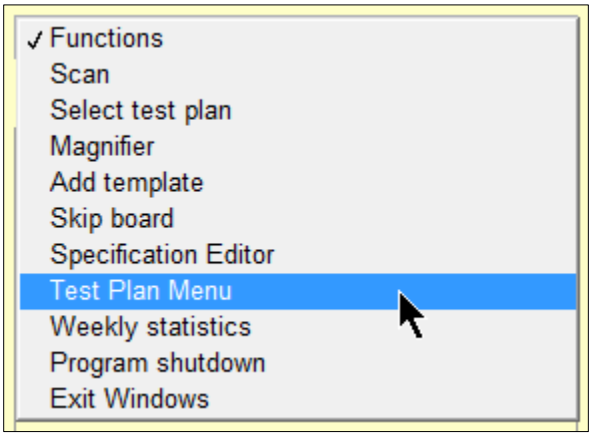


Figure 26: Test Plan Menu

2. In the test plan menu window, select the desired test plan for which to create the fiducials.

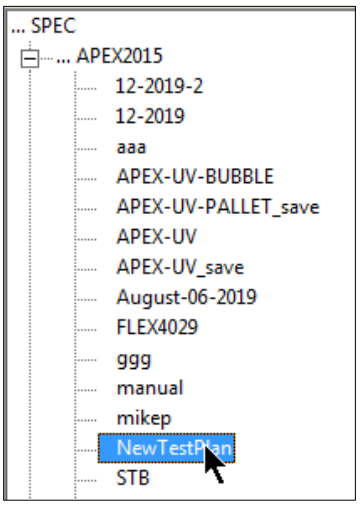


Figure 27: Select Test Plan for Fiducials

3. In the test plan menu window, select **Editor**.

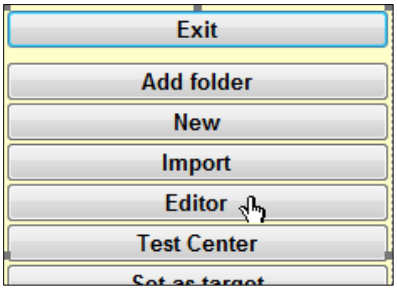


Figure 28: Editor Option

4. In the test field editor, select the **Draw** button.

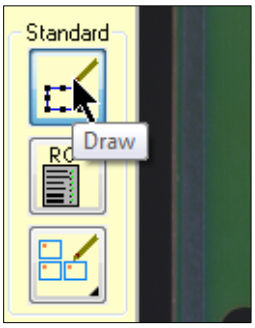


Figure 29: Draw

5. Draw a box around the fiducial feature.

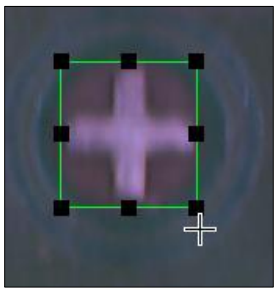


Figure 30: Draw Box Around Fiducial

6. Right click on the box. Select **Test Parameters → New**.

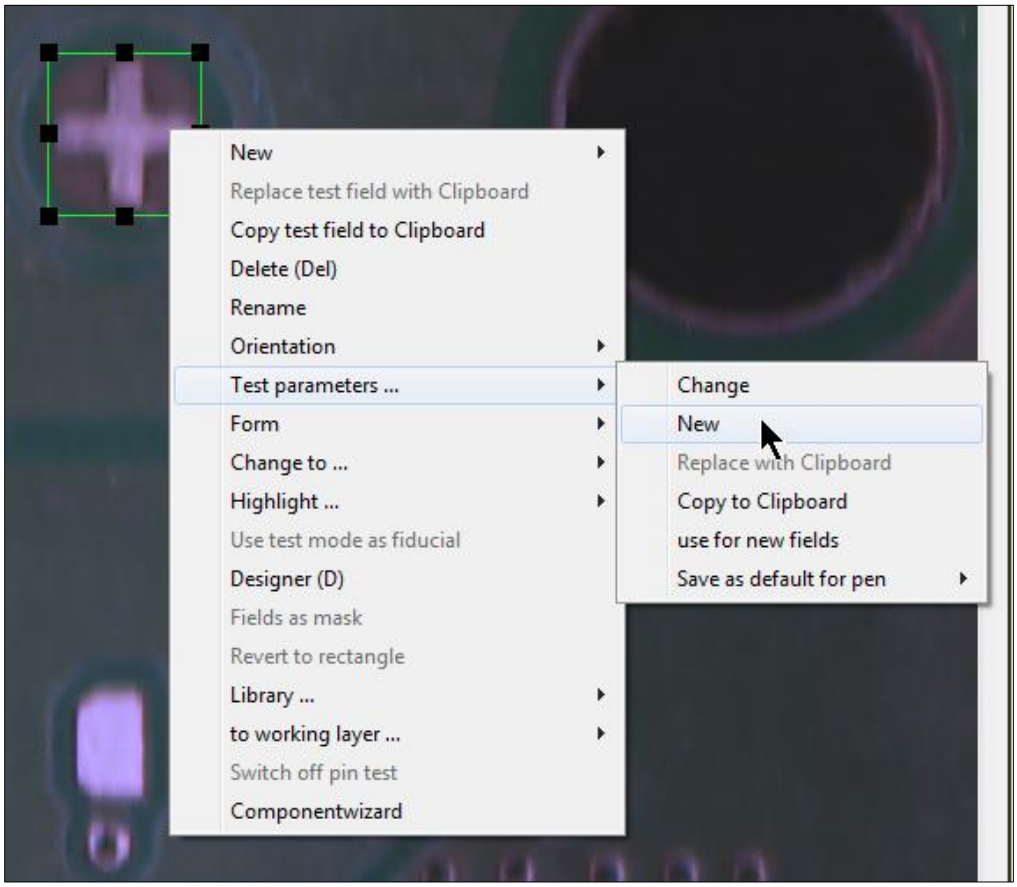


Figure 31: New Test Parameters

7. In the New Setting window, select **Fiducial** under the **Test Object** dropdown.

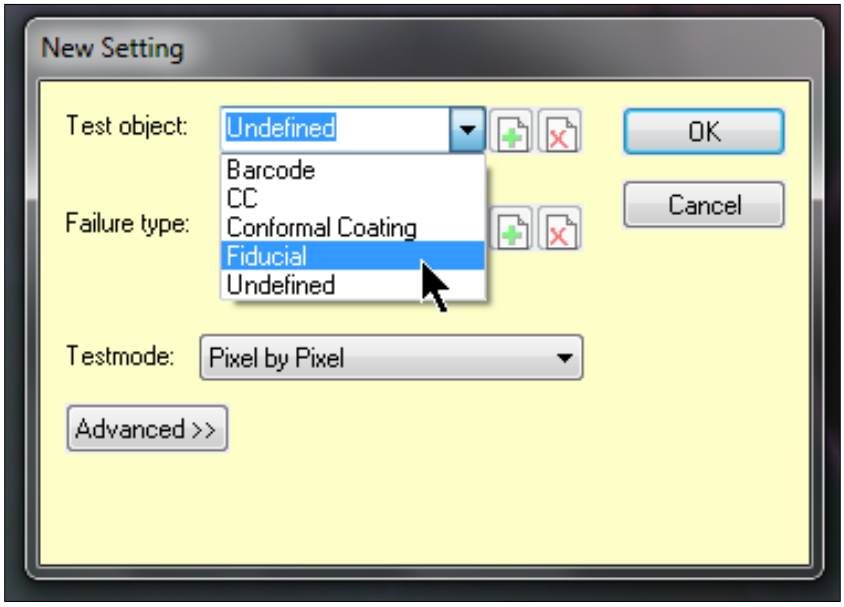


Figure 32: Fiducial Test Object

8. Select **Not Found** under the **Failure Type** dropdown.

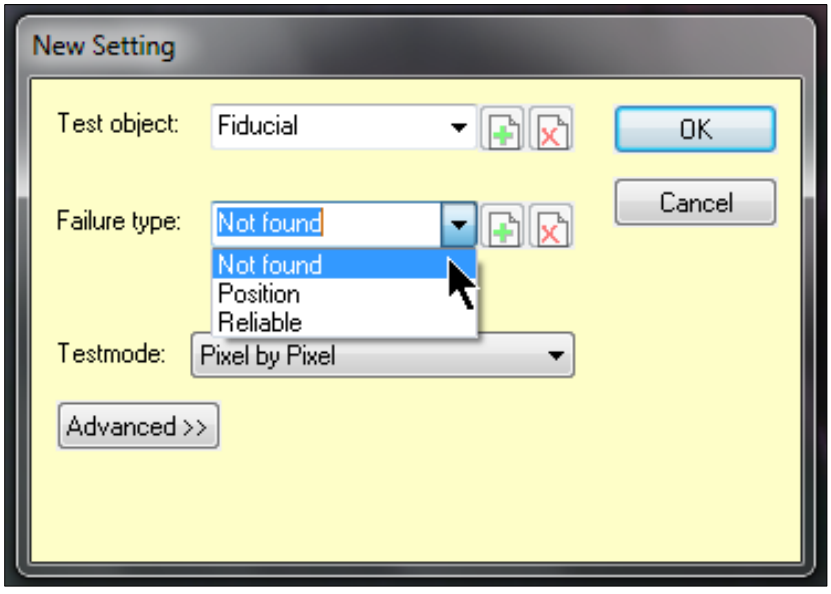


Figure 33: Not Found Failure Type

9. Select **ThAndFind** or **SimpleGrayMatching** under the **Test Mode** dropdown.

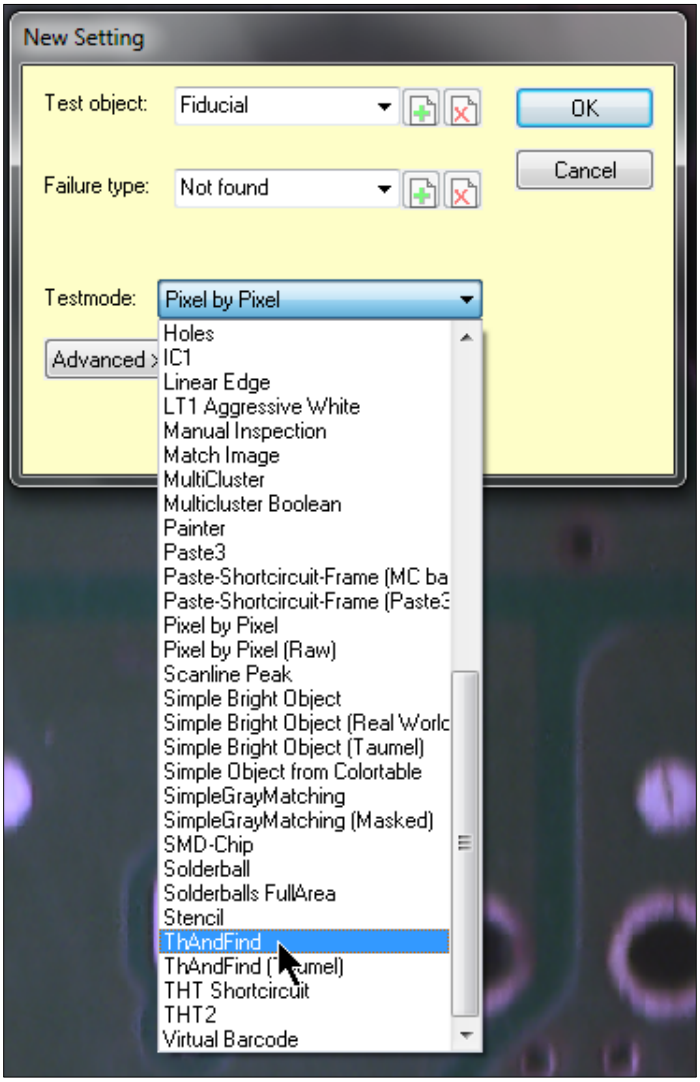


Figure 34: ThAndFind Test Mode

10. Click **Ok**.

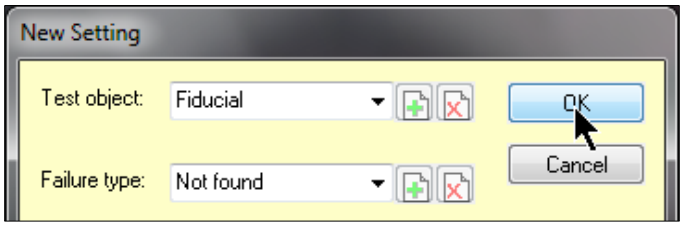


Figure 35: New Setting Ok

11. In the Change Test Paramters window, select **Use This Field as Fiducial (Y/N)**.

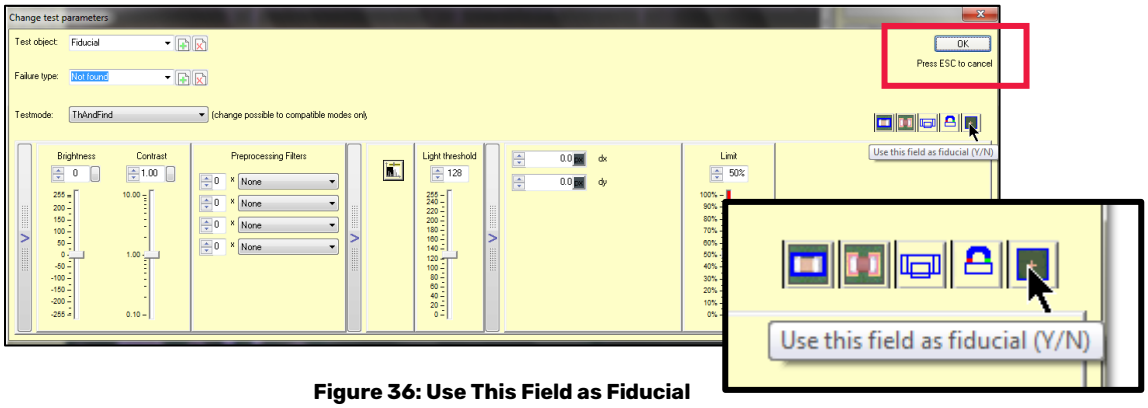


Figure 36: Use This Field as Fiducial

12. Double-click on the fiducial test field. The test field nodes will change from having eight (8) nodes to four (4) nodes.

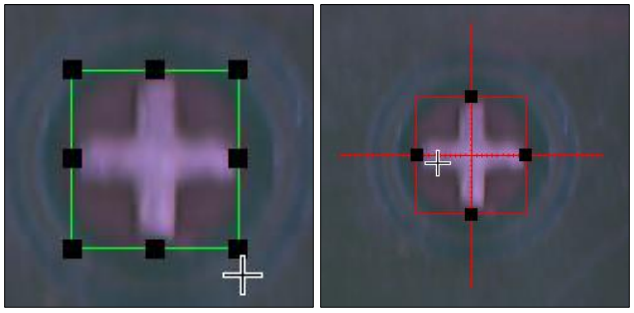


Figure 37: Test Field Nodes

13. Drag one of the nodes to extend the fiducial search region box.

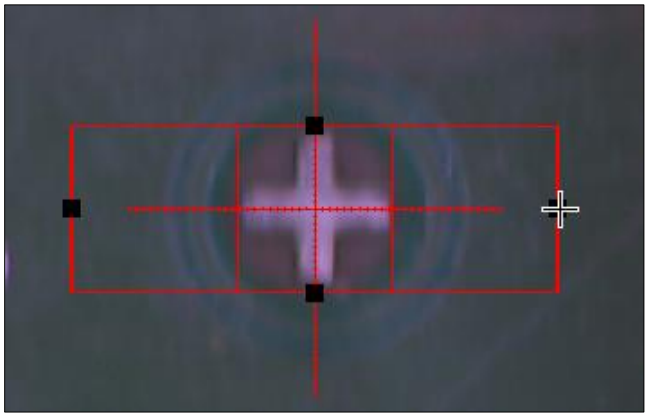


Figure 38: Extend Fiducial Search Region

14. Double-click on the fiducial test field and extend the other side of the fiducial search region box.

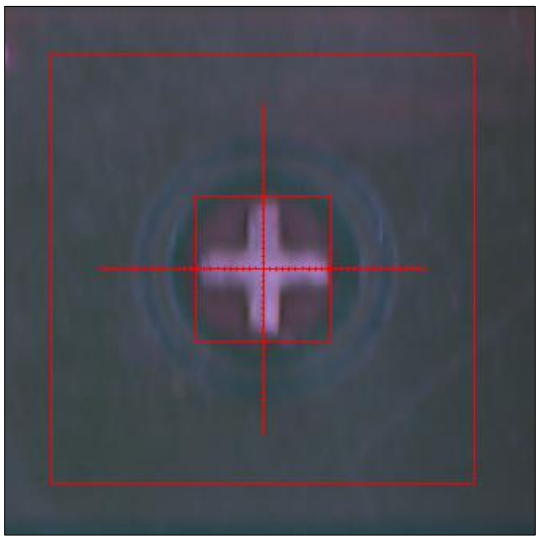


Figure 39: Extend Fiducial Search Region 2

Like any other test field, the fiducial test field can be copied. Any copies will have the same settings. Changes in any one of the copied or the original fields will be carried over to all the copies and the original.

Select then press '**C**' to copy the zone then drag and drop the duplicate. Use the arrow keys to position the test field more accurately over the marking.

To complete the fiducial creation, fiducial parameters must be set in the **Test Center**. More information is available in the Test Center section.

Creating Coating Inspection Test Fields

There are two major types of coating inspections. The **Coat Check** inspects if there is coating at expected locations. The **Keep Out Check** inspects the designated areas to confirm they are free of coating.

Drawing the borders of a test field for detecting conformal coating is the same as drawing the borders of a fiducial test field.

5.2 Creating Coating Inspection Test Fields Over a Scanned Part Image

1. From the modusAOI front window, click on **Test Plan Menu**.

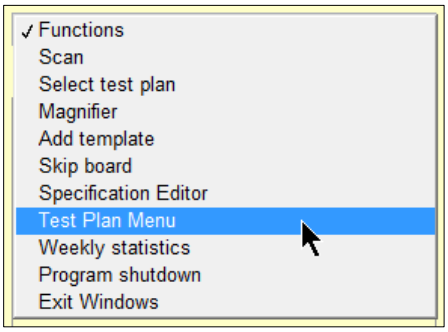


Figure 40: Test Plan Menu

2. Select a desired test plan for which to create the coating inspection test field.

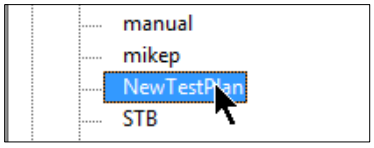


Figure 41: Select Test Plan

3. In the Test Plan Menu window, select the **Editor** option.

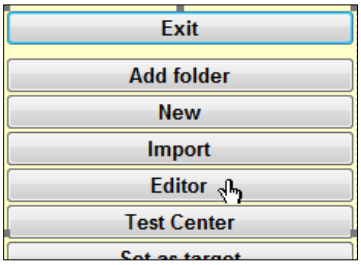


Figure 42: Editor Option

4. In the test field editor, select the **Draw** button.

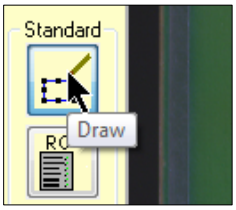


Figure 43: Draw Option

5. Draw a rectangle over the area of interest.

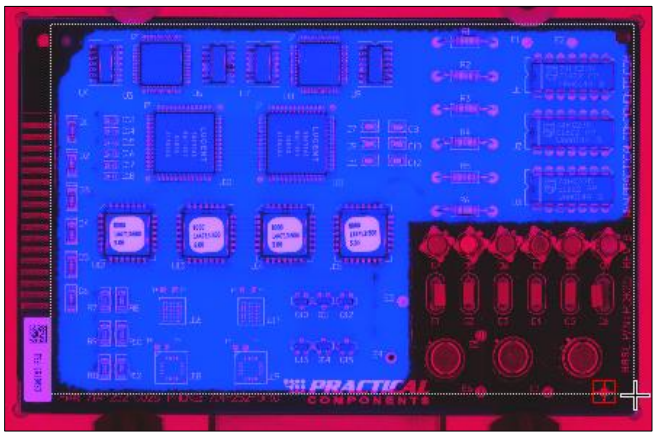


Figure 44: Select Area of Interest

6. Right-click on the box. Select **Test Parameters → New**.

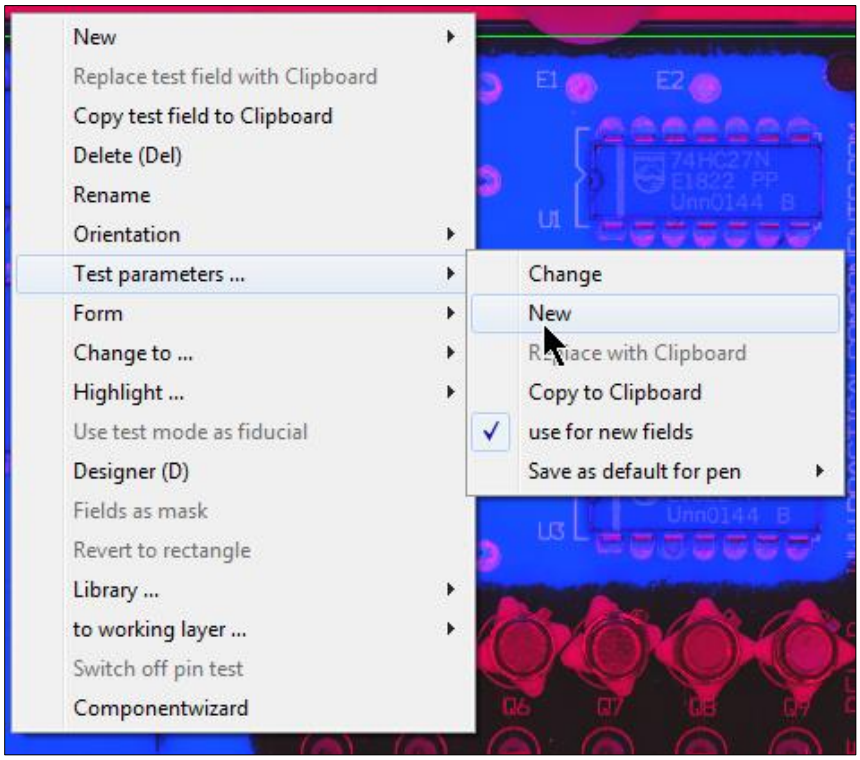


Figure 45: Select New Test Parameters

7. In the New Setting window, select **Conformal Coating** under the **Test Object** dropdown.

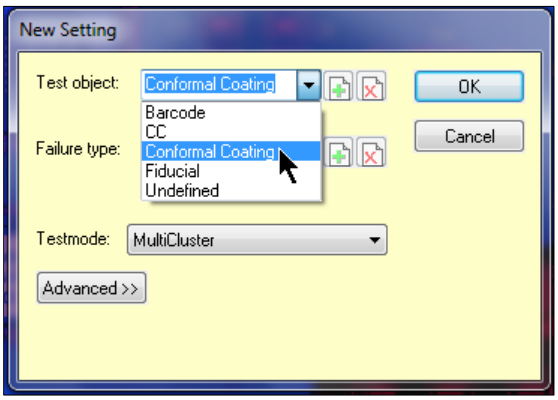


Figure 46: Conformal Coating Test Object

8. Select **No Coating** under the **Failure Type** dropdown.

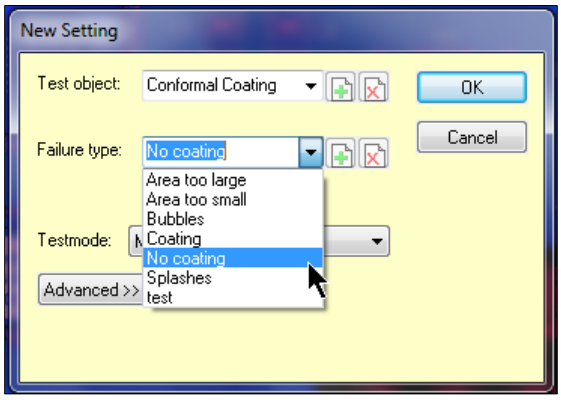
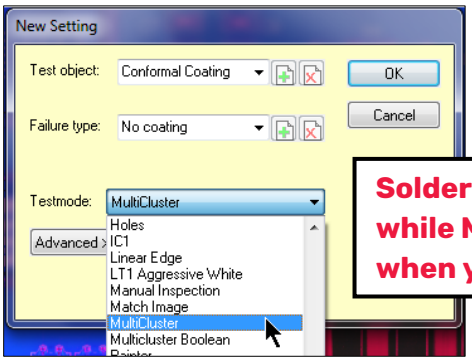


Figure 47: No Coating Failure Type

9. Select **Multi Cluster** or **Solderball** under the Test Mode dropdown.



Solderball allows for masking while MultiCluster is transparent when you overlap test fields.

Figure 48: Test Mode (Multi Cluster)

10. Click **Ok**.

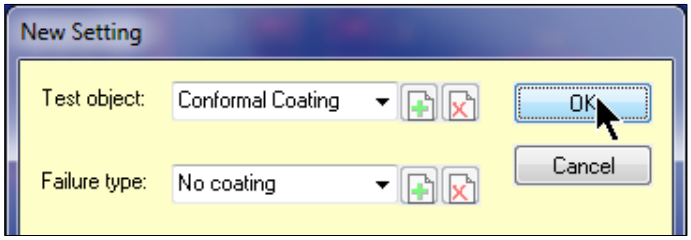


Figure 49: New Setting Ok

11. In the **Standard Test Parameters** window, select **Ok**.

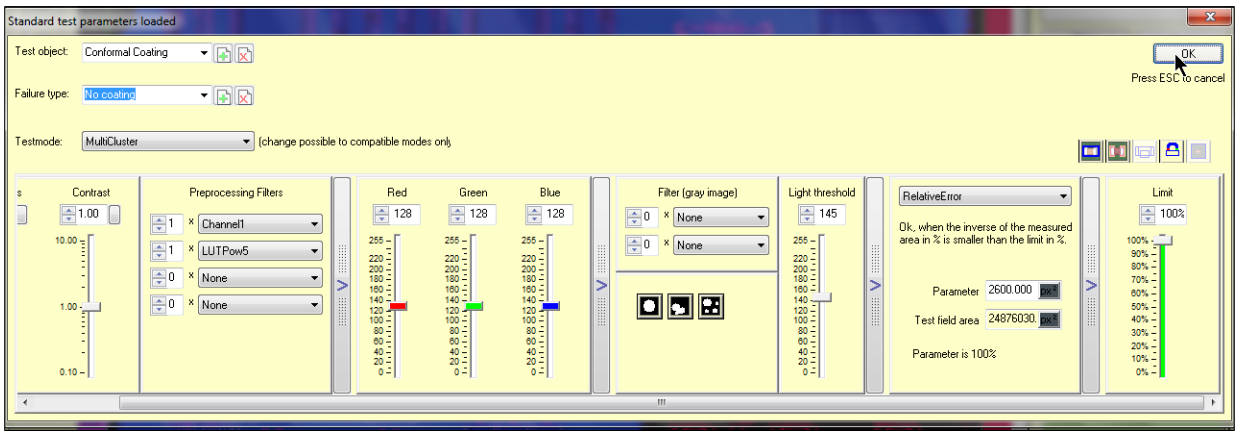


Figure 50: Standard Test Parameters Ok

12. Click on the **Point Add** button in the **Polygon** buttons group in Editor.

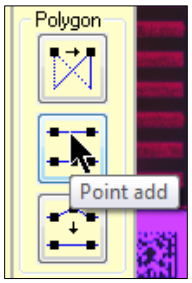


Figure 51: Point Add

13. Add points/nodes to the test field contour line as needed.

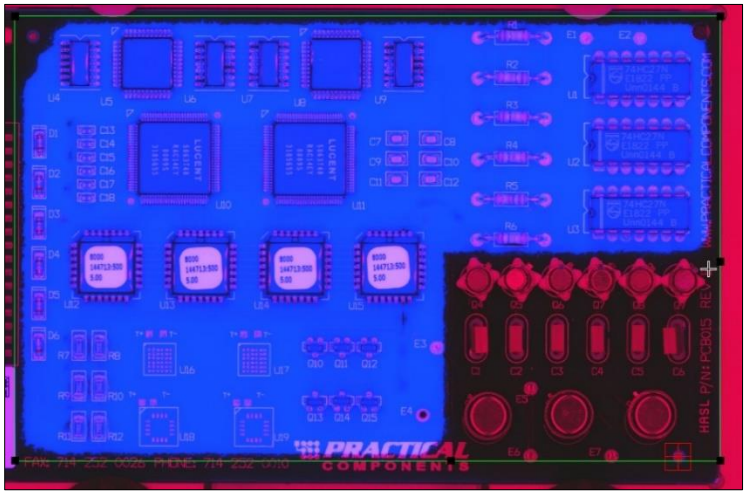


Figure 52: Add Points/Nodes

14. Click on the **Point Move** button in the **Polygon** buttons group in Editor.

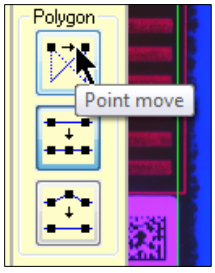


Figure 53: Point Move

15. Click and drag the nodes to adjust the shape of the test field as needed.

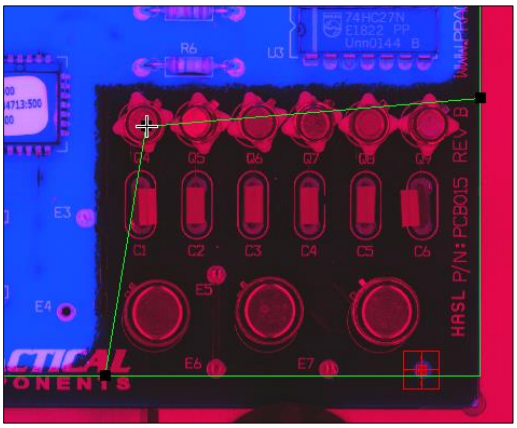


Figure 54: Drag Nodes

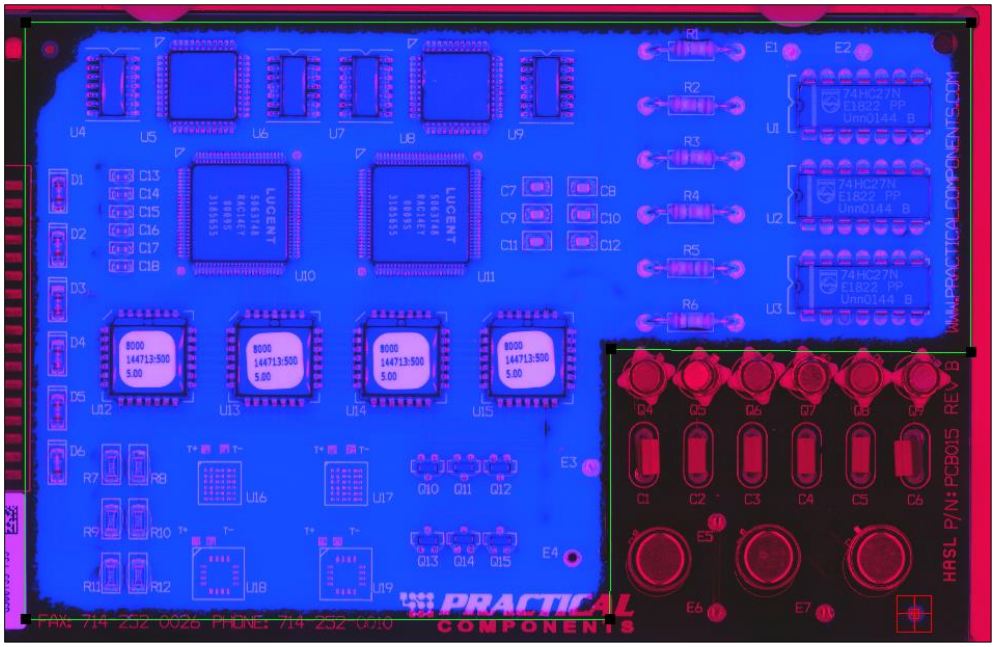


Figure 55: Selected Test Field Area

Creating a Keep-Out inspection test field is the same as creating a Coating Inspection test field, but **Splashes** should be selected from the **Failure Type** dropdown. The parameters set in the *Test Center* will also be different.

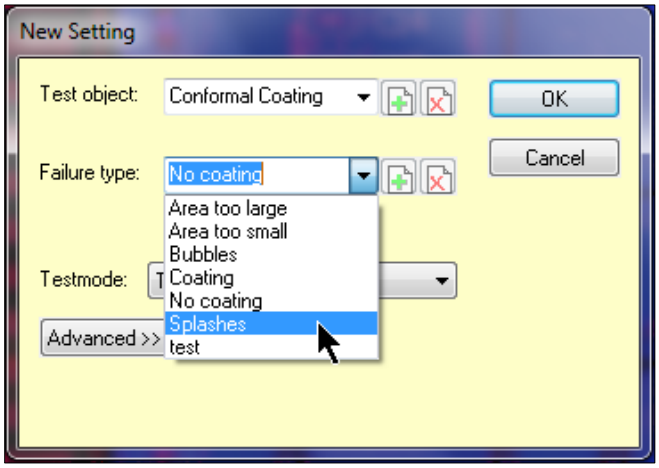


Figure 56: Splashes Failure Type

Once the test fields for a single part are completed, they can be either copied or organized in array. More information is available in the PCB Frames/Panels – Arrays of Test Fields section. To complete the test field creation, its parameters must be set in the **Test Center**. More information can be found in the Test Center section.

5.3 Creating Coating Inspection Test Fields Over a PDF Part Drawing

Test fields can be drawn over a PDF drawing of a part instead of a scanned part image. However, scanned and coated/dispensed parts are needed to complete the setting of the test plan.

1. From the modusAOI window, click on the **Test Plan Menu**.

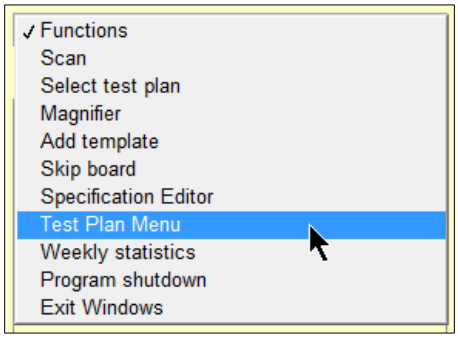


Figure 57: Test Plan Menu

2. Select the desired test plan for which to create the test fields.

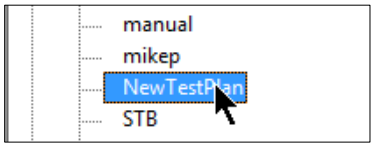


Figure 58: Select Test Plan

3. In the Test Plan Menu window, select **Test Center**.

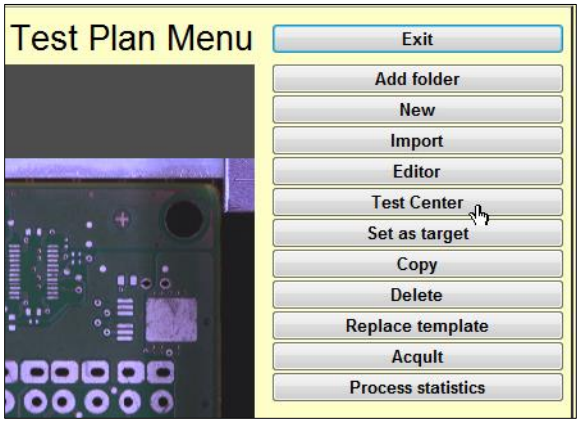


Figure 59: Test Center

4. In the Test Center, select **Menu**.

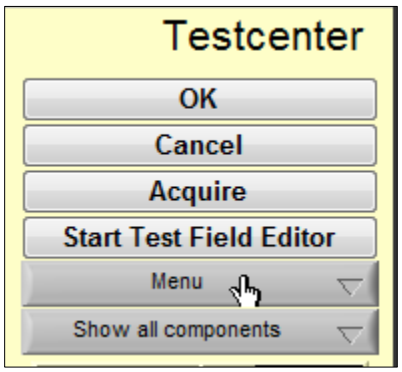


Figure 60: Menu

5. Select the **Load Image** option from the menu dropdown.

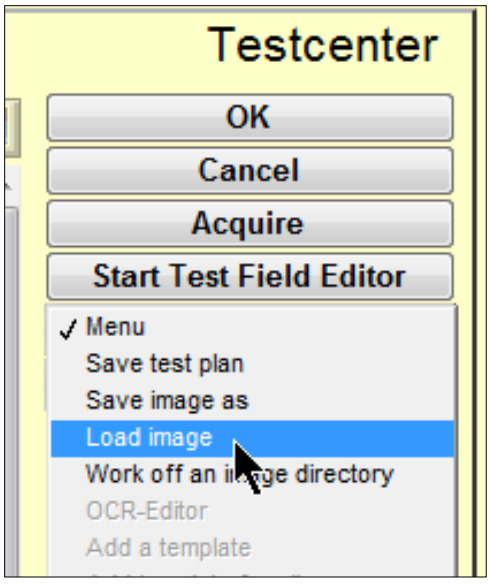


Figure 61: Load Image

6. Select the PDF drawing and click **Ok**.

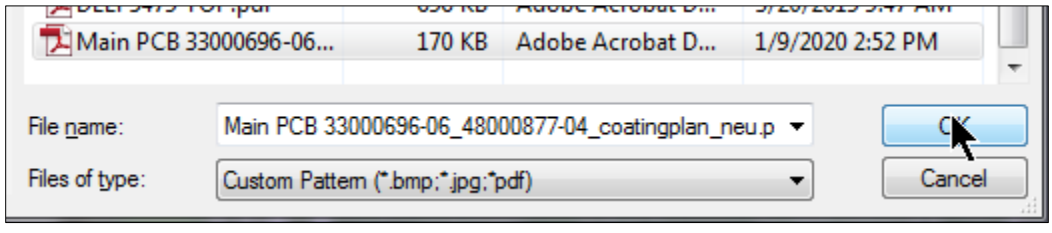


Figure 62: Select PDF Drawing

7. In the **Select Page** window, enter the page number with the correct plan or drawing.
8. Click **Ok**.

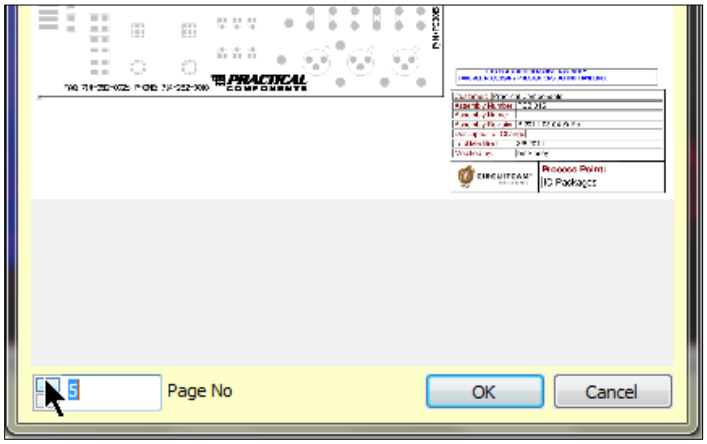


Figure 63: Enter Page Number

9. The **Resize Images to Destination Size** window will open. Here you can **Rotate**, **Resize**, **Align**, and set the **Background** of the image from the PDF file.

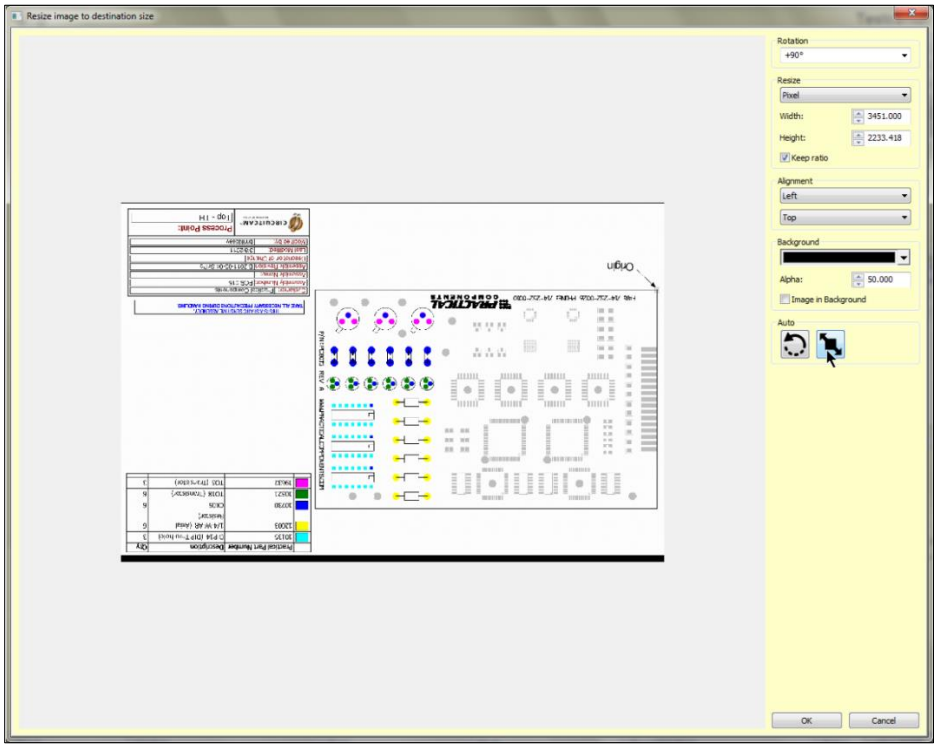


Figure 64: Resize Image

10. From **Rotation** dropdown menu, select the proper rotation degree. This should display the drawing as if it were a part that was scanned.

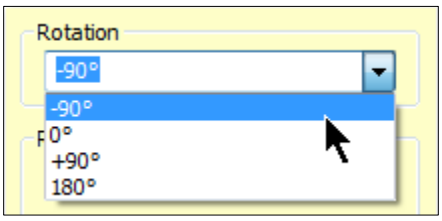


Figure 65: Select Rotation

11. From **Resize** dropdown menu, select an option that will display the correct part size.

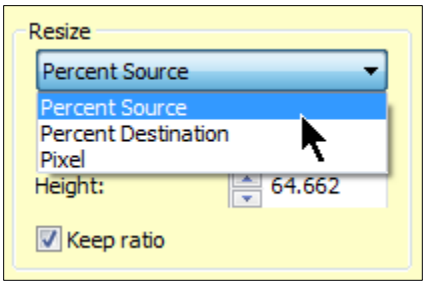


Figure 66: Select Resize Option

12. In **Background**, select the Image in Background checkbox to overlay the PDF drawing with the scanned test plan image.

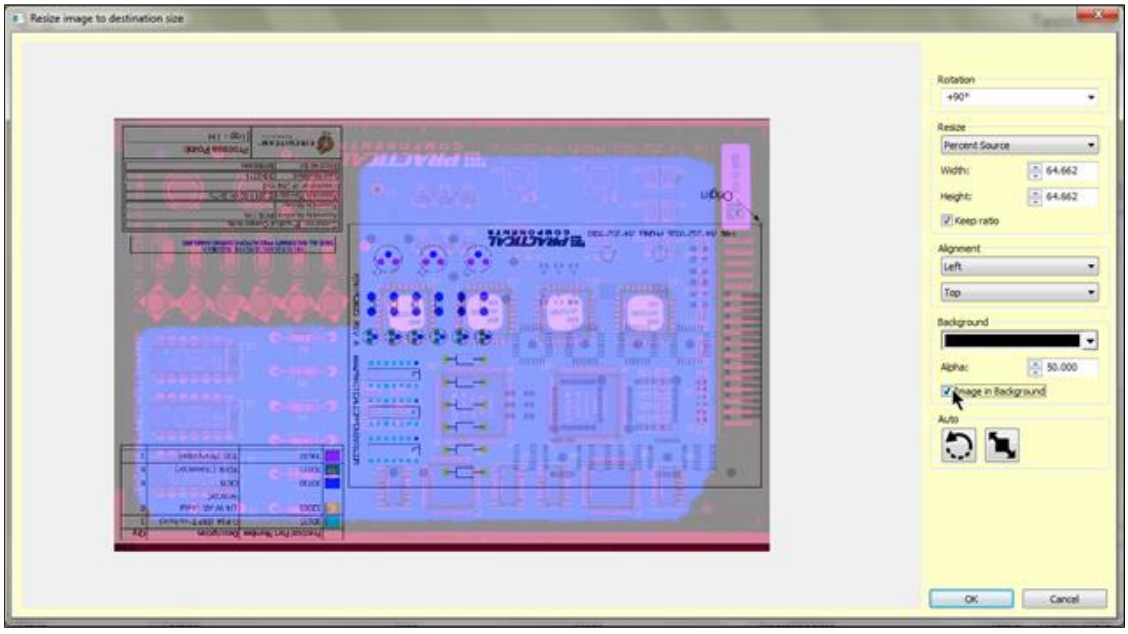


Figure 67: Image in Background

13. Change the Alpha value in **Background** to change the transparency of the scanned and PDF images. This is useful to verify resizing of the PDF drawing to the scanned image. It is not needed to resize and align the PDF drawing to the scanned image.

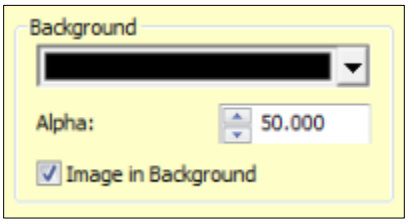


Figure 68: Change Alpha Value

14. Click on the **Rotate** button in **Auto** to auto-rotate the imported PDF drawing.

Figure 69: Rotate

15. Click on the **Resize** button in **Auto** to auto-resize the imported PDF drawing.

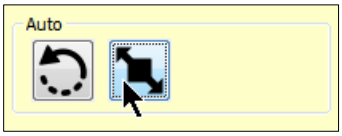


Figure 70: Resize

If the PDF part drawing has proper scaling and if the scanner calibration is working properly, the drawing size will match the size of the part in the scanned image.

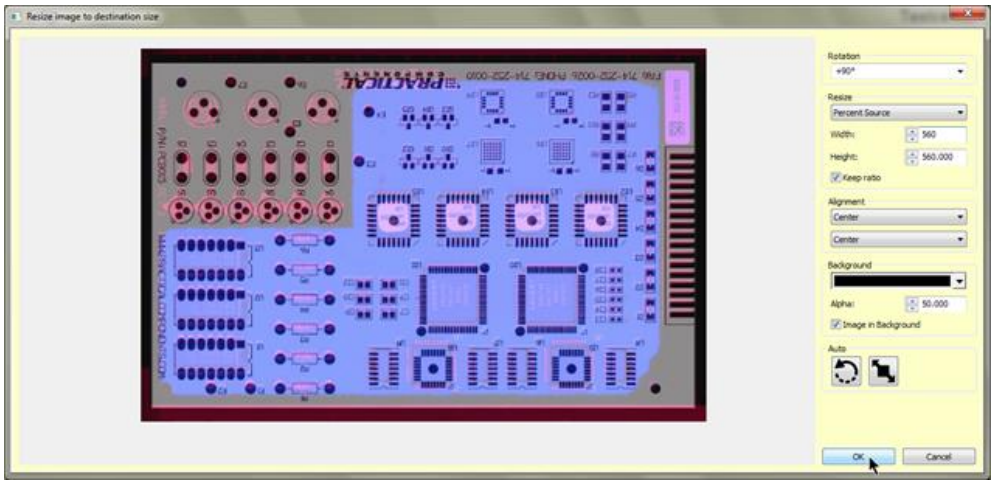


Figure 71: Drawing/Image Match

If the PDF part drawing does not have proper scaling, the drawing size will not match the size of the part in the scanned image. Individual test fields can be scaled properly later.

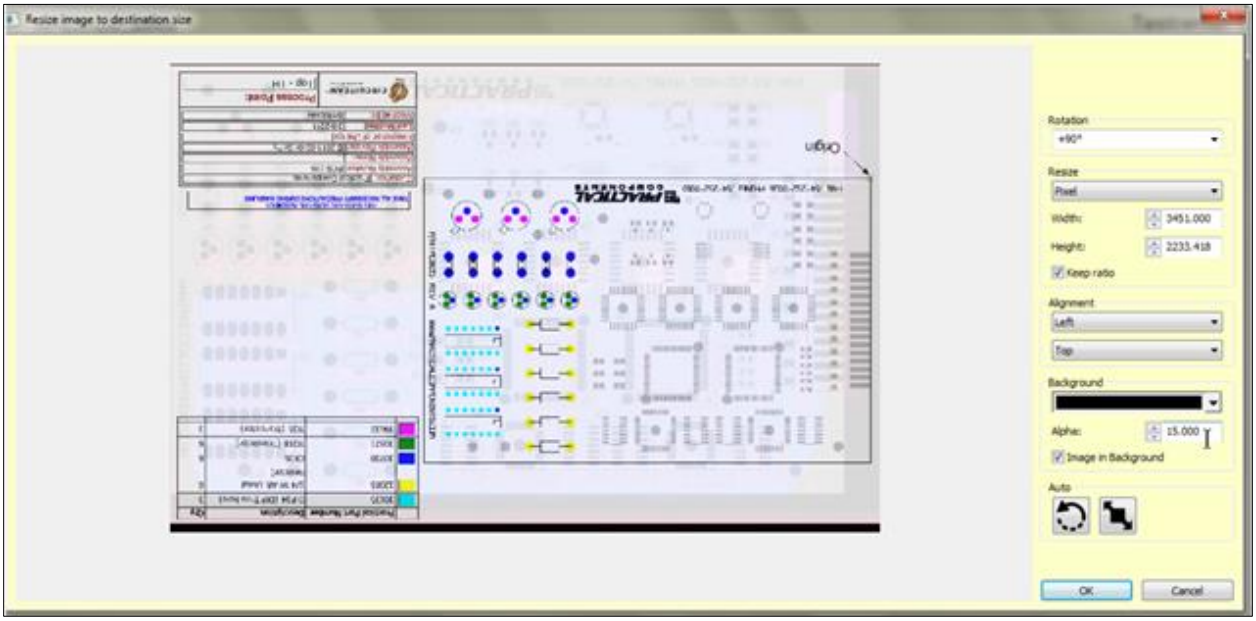


Figure 72: Drawing Without Proper Scaling

16. Click **Ok** to complete the PDF import.

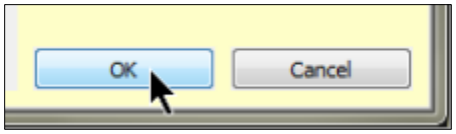


Figure 73: Complete PDF Import

17. In the Test Center, select **Start Test Field Editor**.

Figure 74: Start Test Field Editor

18. In the test field editor, open the **Template** dropdown.

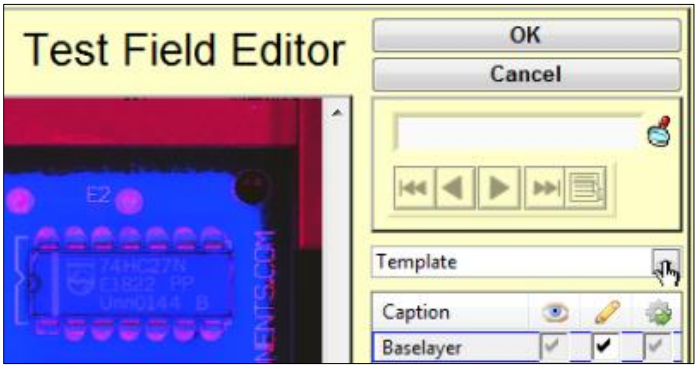


Figure 75: Template Dropdown

19. From the dropdown menu, select **DuT** to display the PDF image.

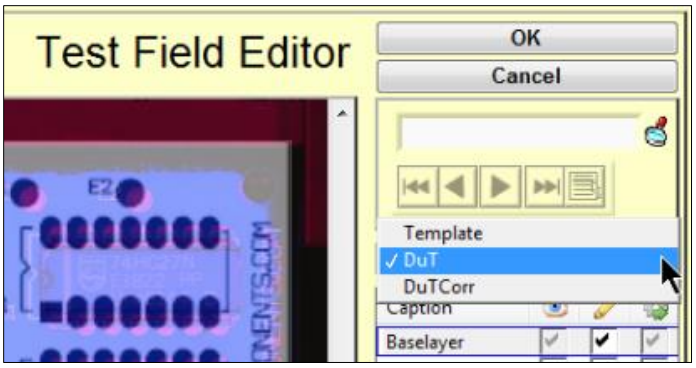


Figure 76: DuT

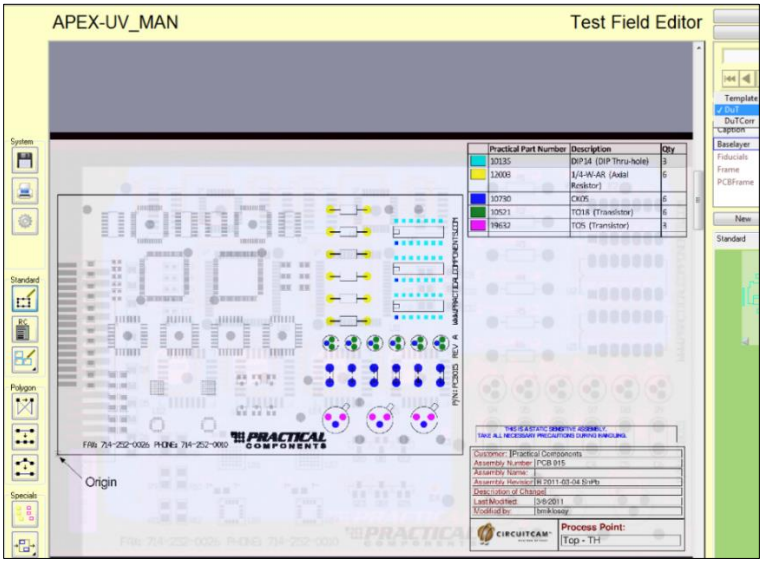


Figure 77: PDF Image Displayed

20. Draw test fields as you would over a scanned image.

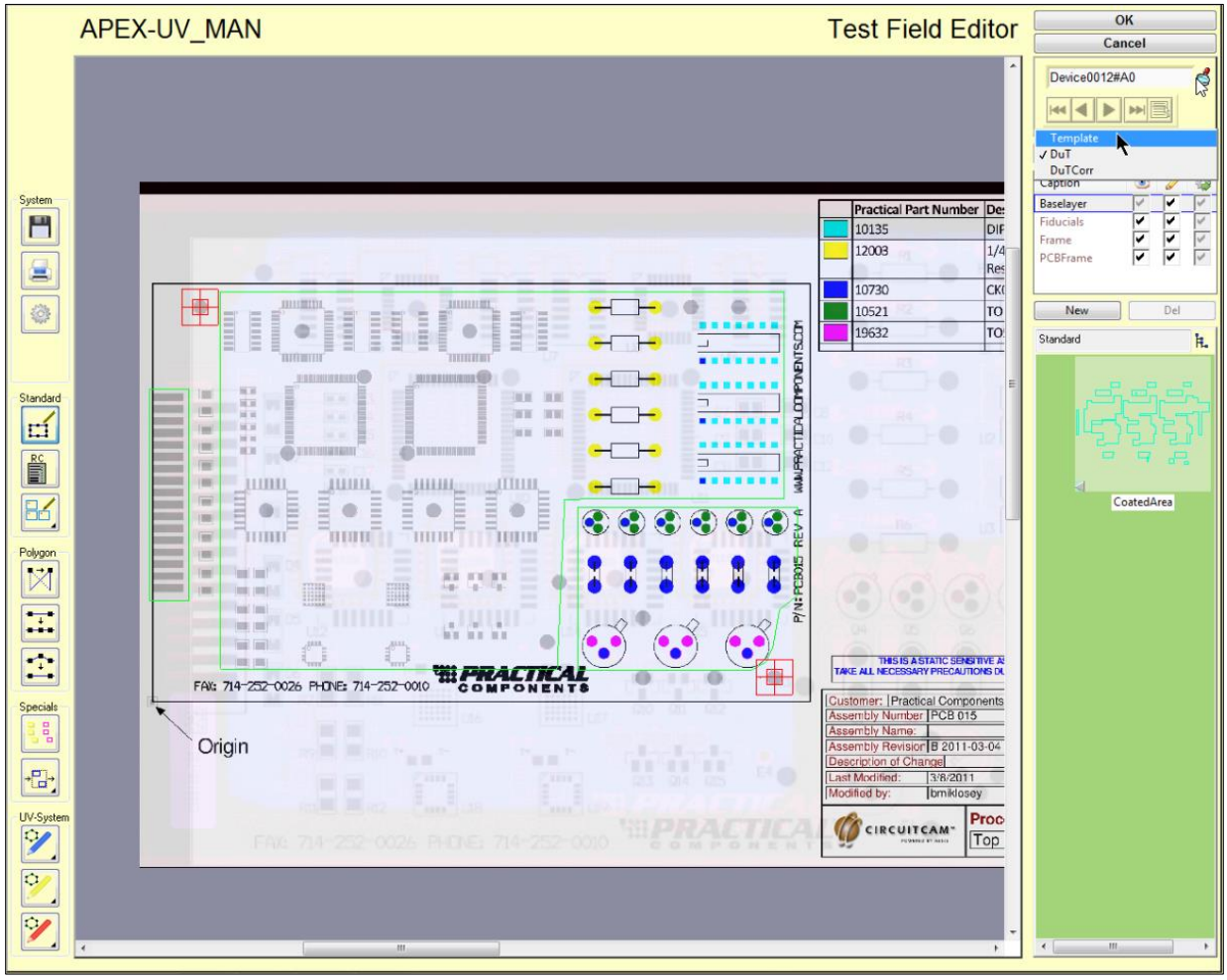


Figure 78: Draw Test Fields

21. Select **Template** from the dropdown menu to view the scanned image only.

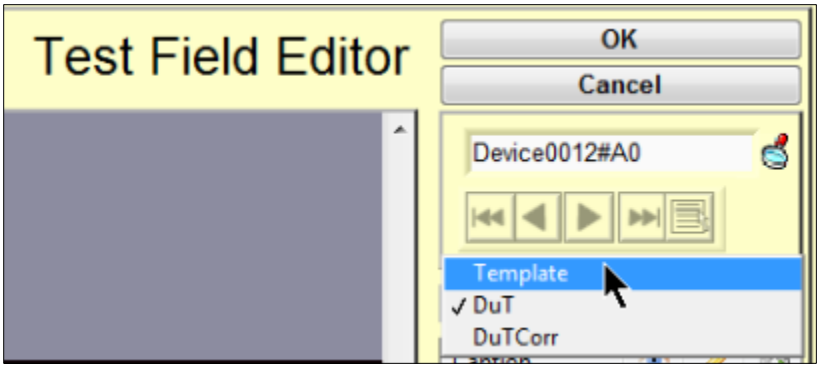
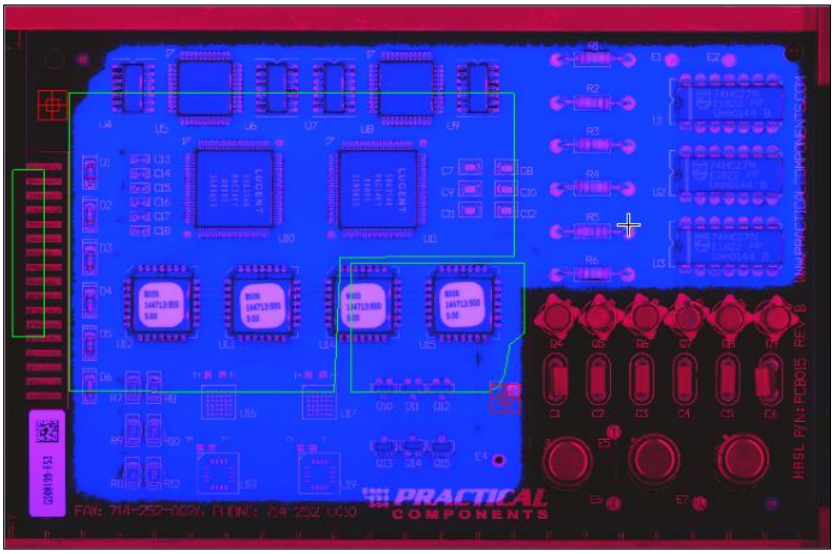


Figure 79: View Scanned Image Only

The following steps should be performed if the PDF part drawing was not 1:1 with the scanned part image.

If the proper board was not available at the time of creating the test plan, it is necessary to replace the test plan template. More information can be found in the Replacing Template section.



22. Press and hold **Ctrl** while creating a box, enclosing all of the test fields.

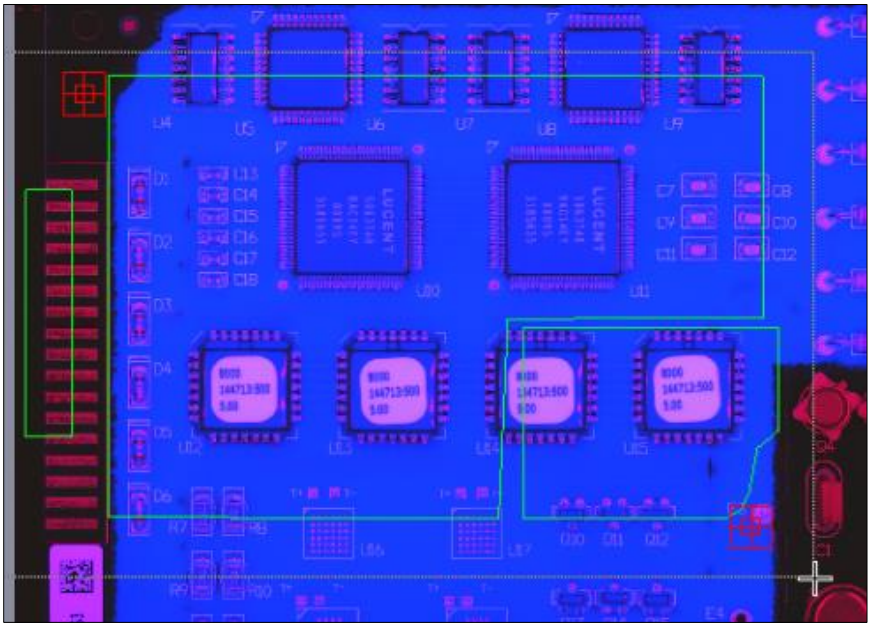


Figure 80: Enclose Test Fields

23. When completed, all test fields borders will be red and eight (8) nodes will surround the selected test fields.

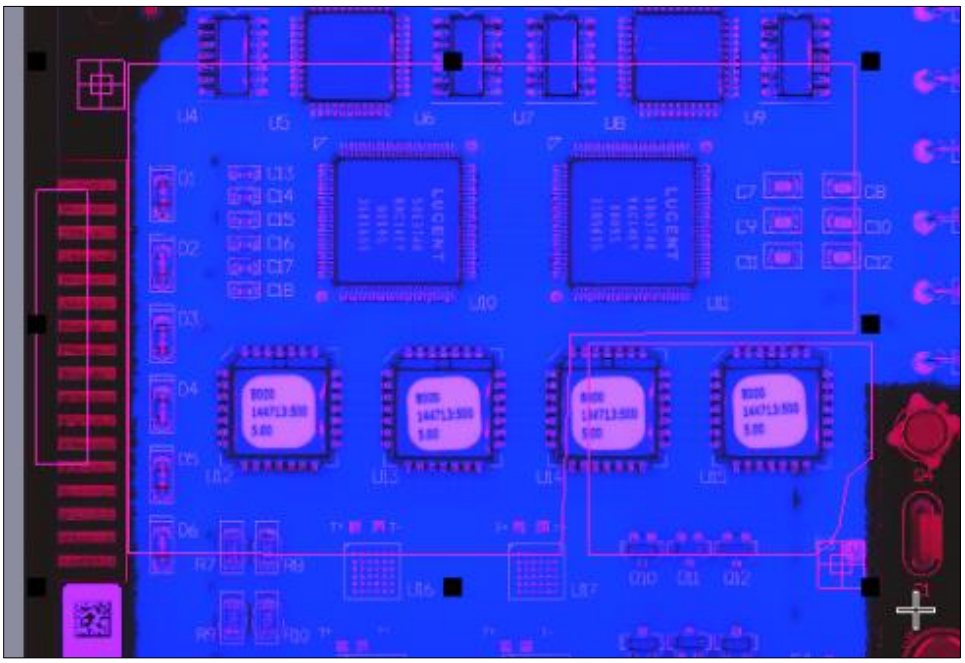


Figure 81: Red Test Field Borders

24. Click and drag one of the corner nodes to resize the test fields group.

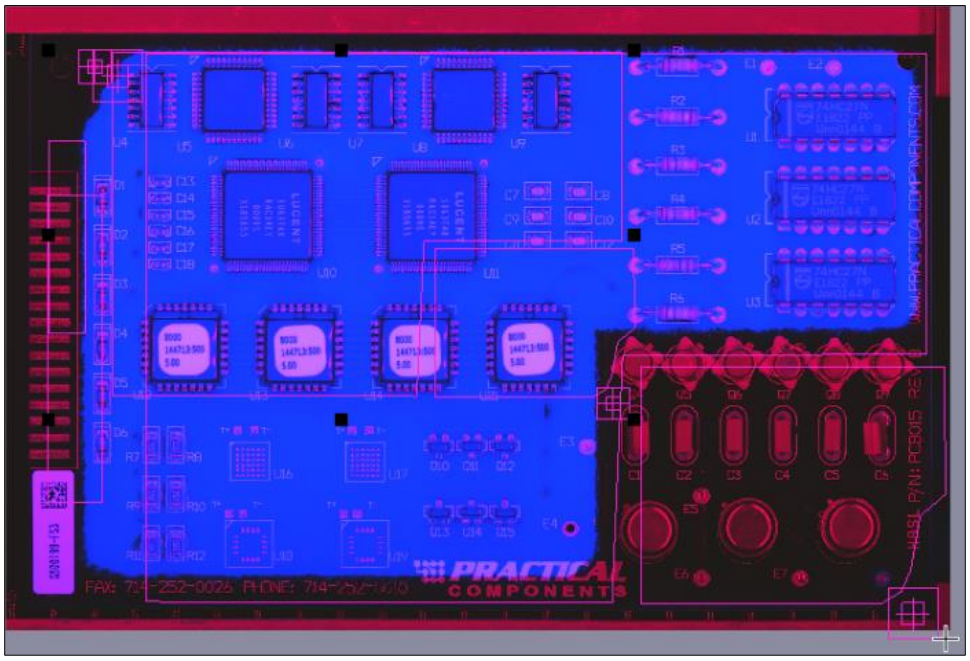


Figure 82: Resize Test Fields Group

25. Use the arrow keys to move the group up, down, left, or right.

26. Click anywhere outside the selected test fields group to exit the group editing.

27. Select any one of the individual test fields to resize or realign if needed.

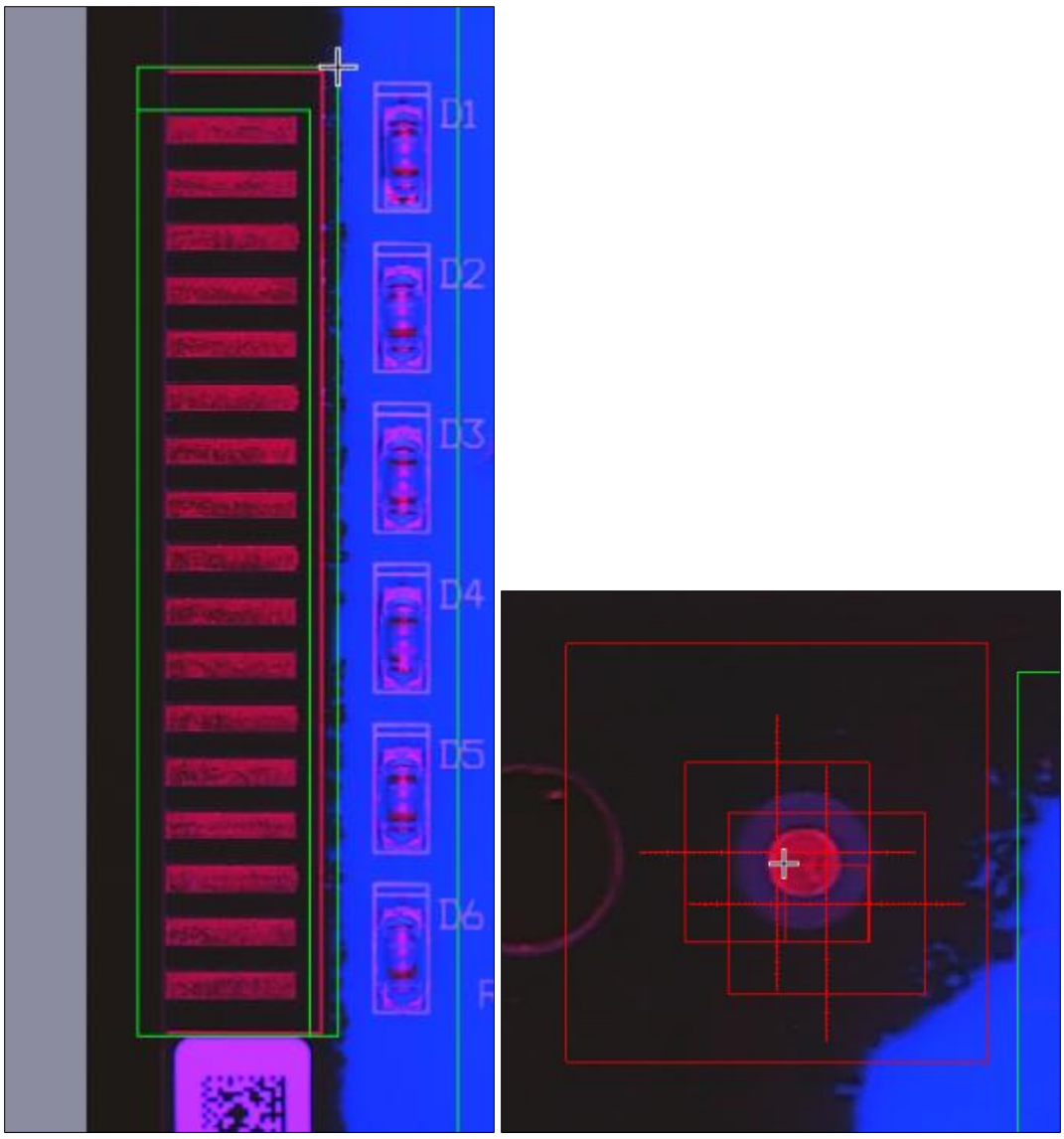


Figure 83: Resize/Align Test Fields

When complete, all test fields should be properly aligned to the scanned part image.

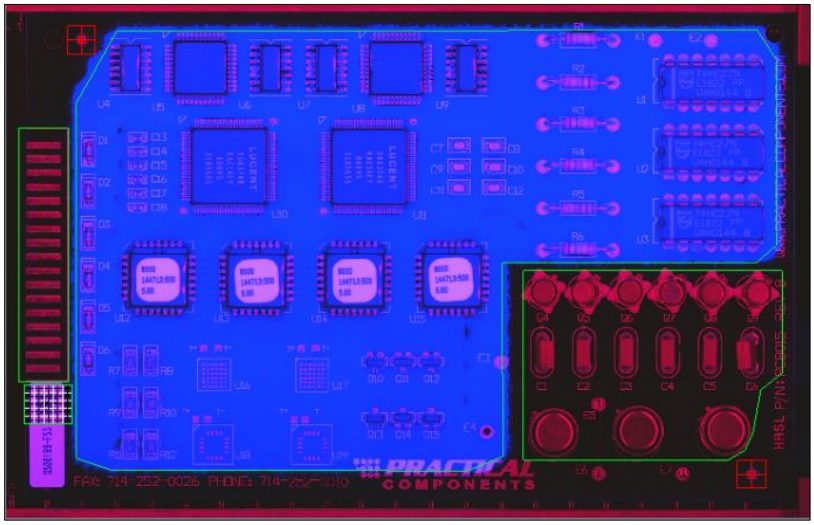


Figure 84: Aligned Test Fields

28. When complete, click **Ok** to save the changes and exit the test field editor.

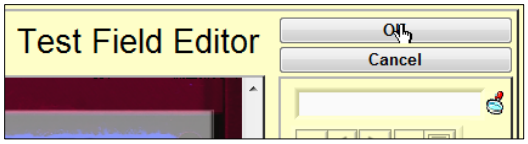


Figure 85: Save Changes

29. In the Test Center, click on the **Layer** dropdown menu.

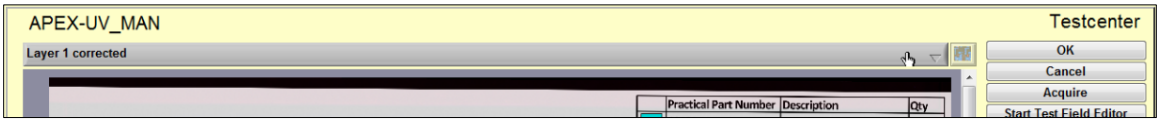


Figure 86: Layer Dropdown

30. Select **Layer 1 Template**.

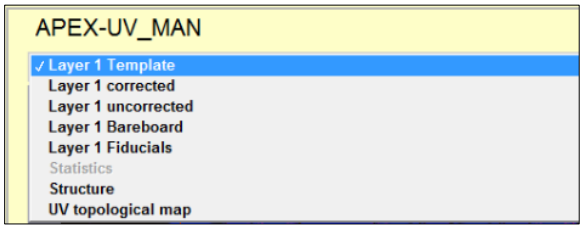


Figure 87: Layer 1 Template

31. Click **Ok** to save the changes and exit the test center.

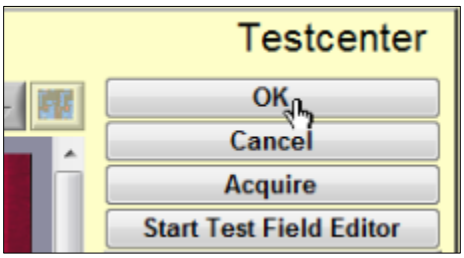


Figure 88: Save Changes

To create coating Inspection test fields over a part picture, use the same process as creating test fields over PDF drawing. Instead of a .pdf file, select a .jpg part image.

To complete the test field creation, its parameters must be set in the Test Center. More information is available in the Test Center section.

5.4 Masking Areas Within a Test Field

While it is possible to create a complex polygonal shape that avoids keep out areas, creating a large test field that includes one or more keep out areas is quicker, but it will require masking of the keep out areas.

Follow these steps to create a coat inspection test field with keep out masked areas.

1. From the modusAOI front window, select the **Test Plan Menu**.

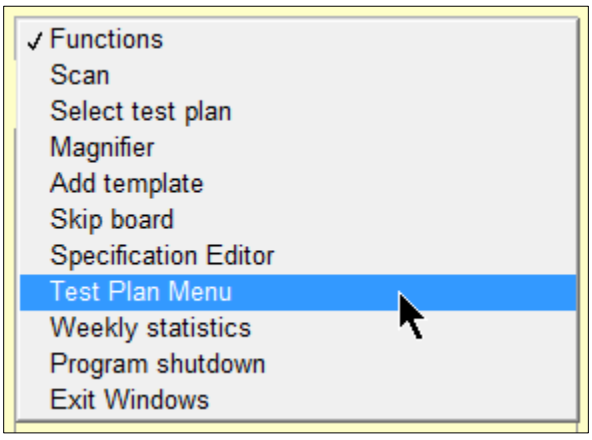


Figure 89: Test Plan Menu

2. In the test plan menu window, select the desired test plan for which to create the fiducials.

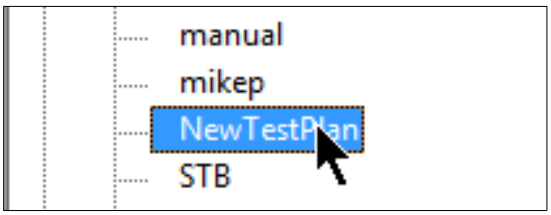


Figure 90: Select Test Plan for Fiducials

3. In the test plan menu window, select **Editor**.

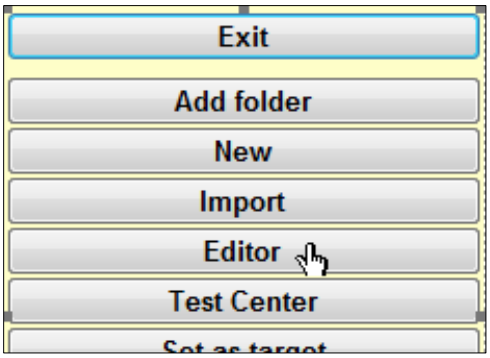


Figure 91: Editor Option

4. In the test field editor, select the **Draw** button.

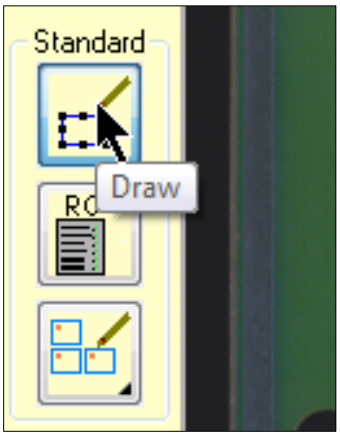


Figure 92: Draw

5. Draw a test field to be used for a coating inspection.

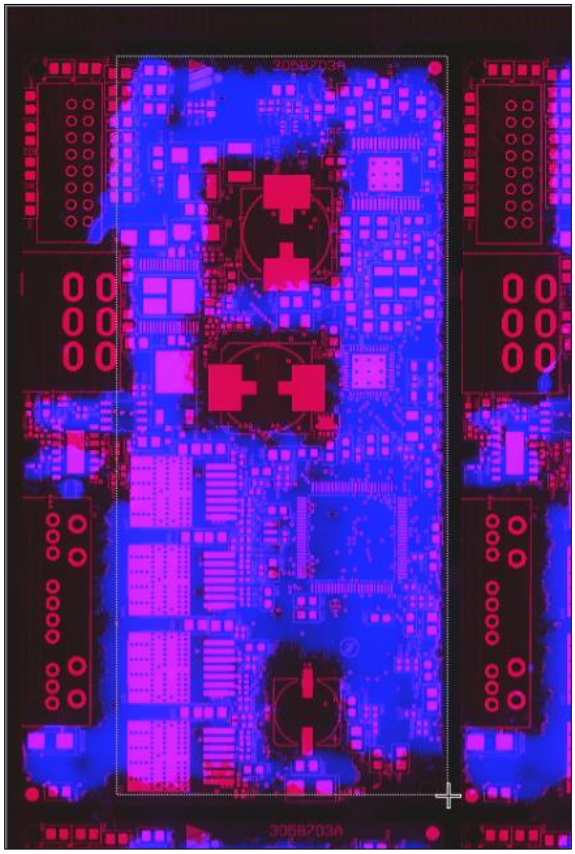


Figure 93: Draw Test Field

6. Right- click on the test field then select **Test Parameters → New**.

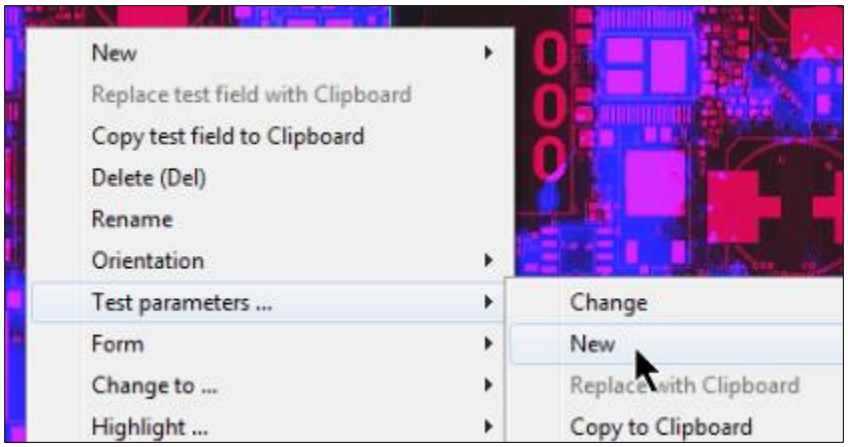


Figure 94: New Test Parameters

7. In the **New Setting** window, select **Conformal Coating** from the **Test Object** dropdown.

Figure 95: Conformal Coating Test Object

8. Select **No Coating** from the **Failure Type** dropdown.

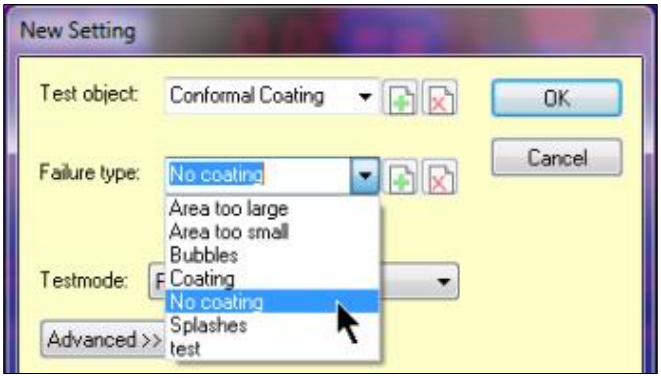


Figure 96: No Coating Failure Type

9. Select **Solderball** from the **Test Mode** dropdown.

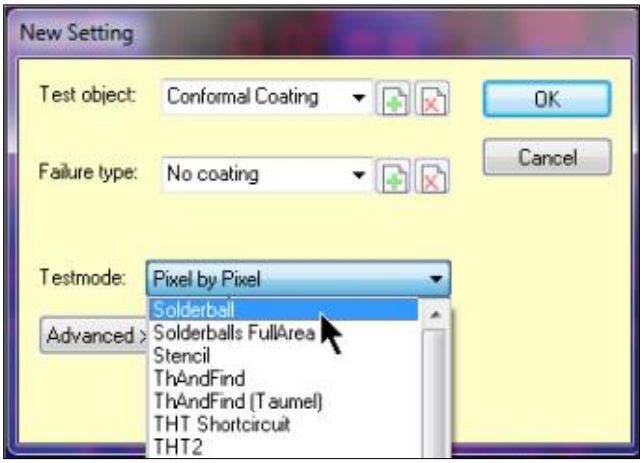


Figure 97: Solderball Test Mode

10. In the **Change Test Parameters** window, click **OK**.

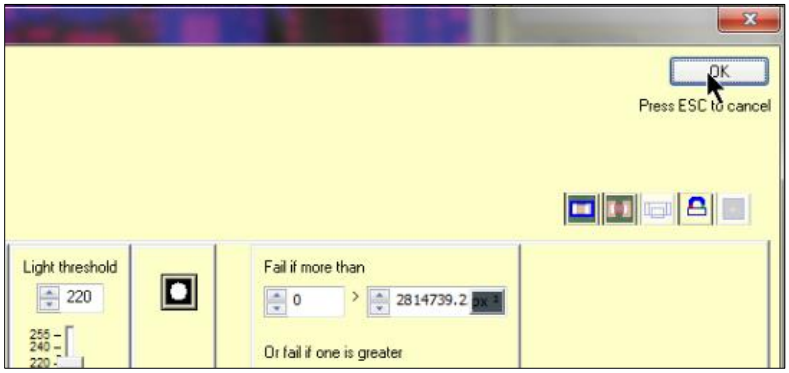


Figure 98: Change Test Parameters Ok

11. Right-click on the test field to verify there is a checkmark next to the **Fields as Mask** option.

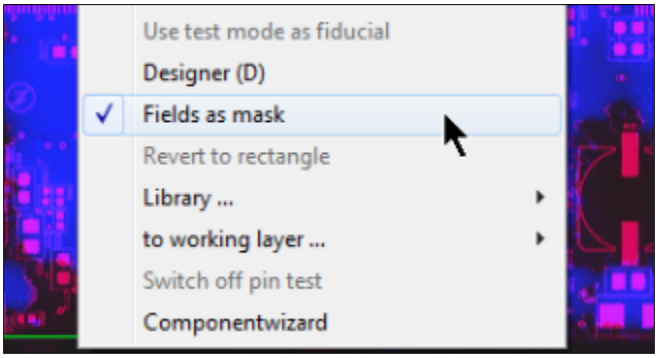


Figure 99: Fields as Mask

12. Draw a new test field to be used as a mask.

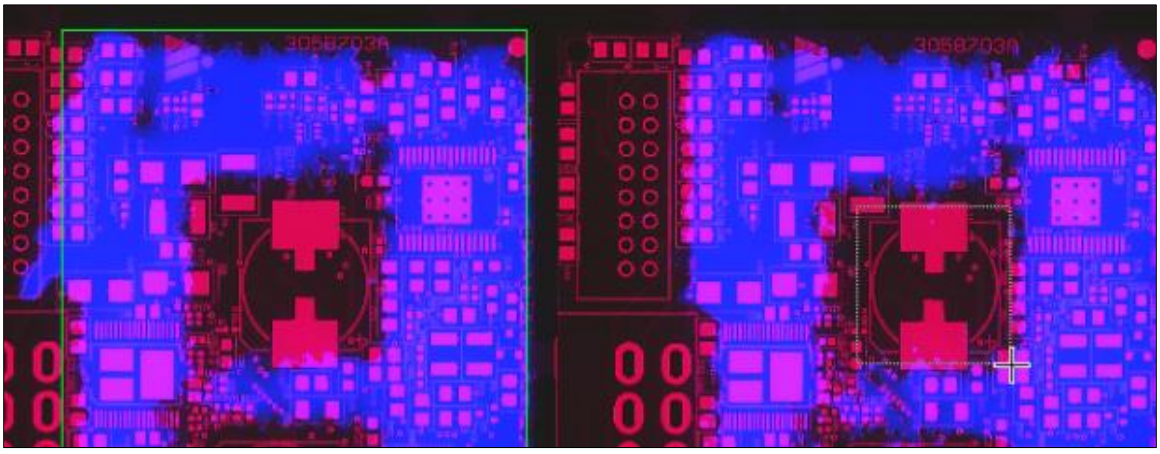


Figure 100: Draw New Test Field as Mask

13. Right-click on the test field and select **Test Parameters → New**.

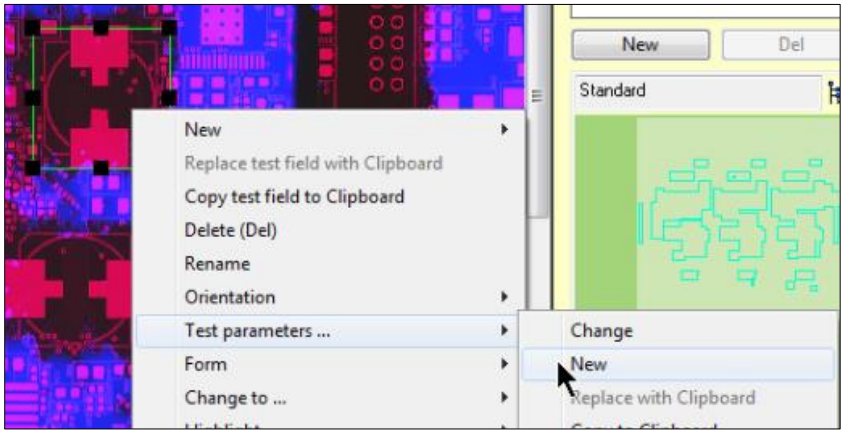


Figure 101: New Test Parameters

14. In the New Setting window, select **Multi Cluster** from the **Test Mode** dropdown.

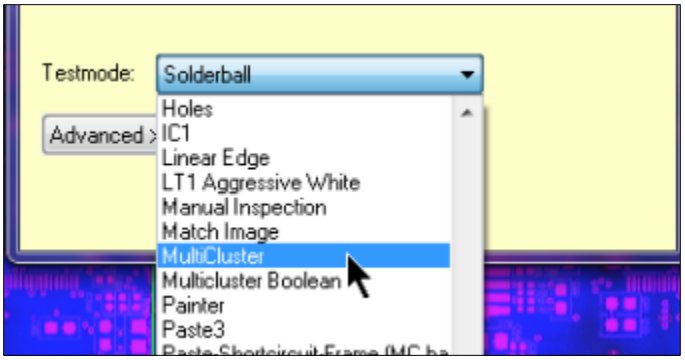


Figure 102: Multi Cluster Test Mode

15. Click **Ok**.

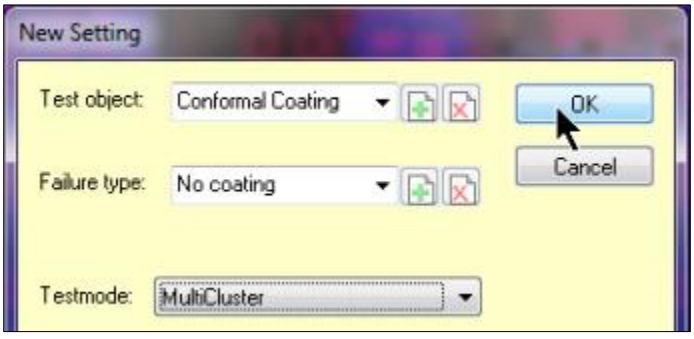


Figure 103: Confirm New Setting

16. In the **Change Test Parameters** window, select the **Test This Field (Y/N)** icon.

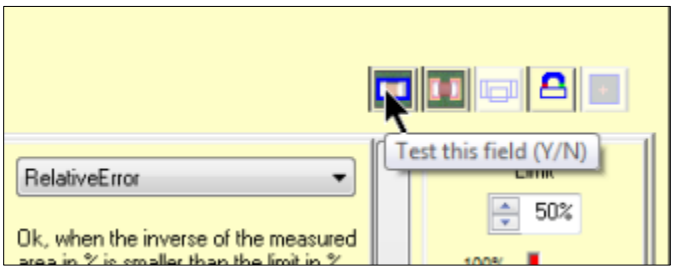


Figure 104: Test This Field (Y/N)

Test parameter controls will disappear form the **Change Test Parameters** window.

Figure 105: Test Parameter Controls Disappear

17. Click **Ok**.

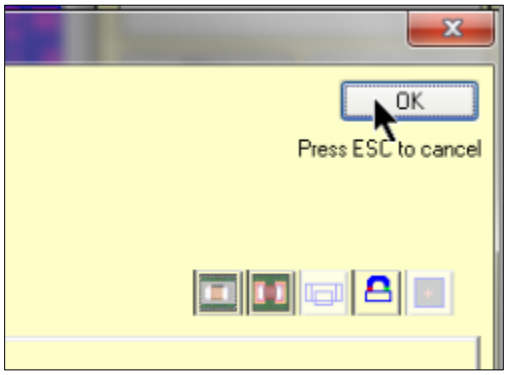


Figure 106: Change Test Parameters Ok

18. In the test field editor, drag the masked test field over the large coating inspection test field.

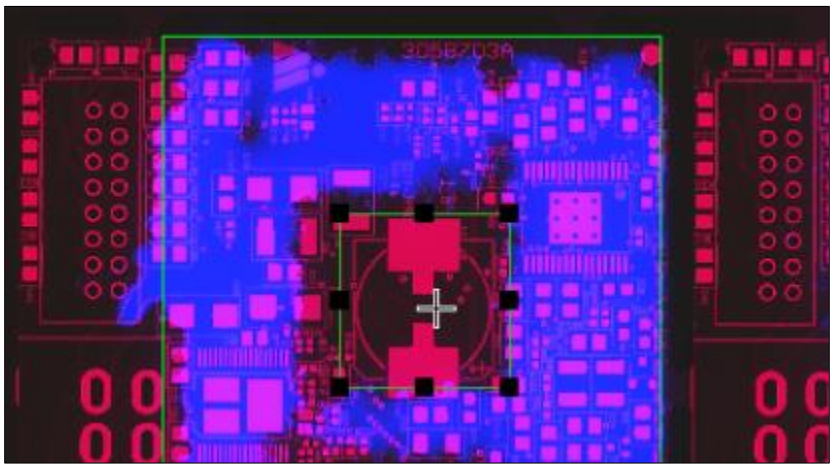


Figure 107: Drag Masked Test Field

19. In the test field editor, click **Ok** to save changes and exit.

Figure 108: Save Changes

20. In the Test Plan Menu, select **Test Center**.

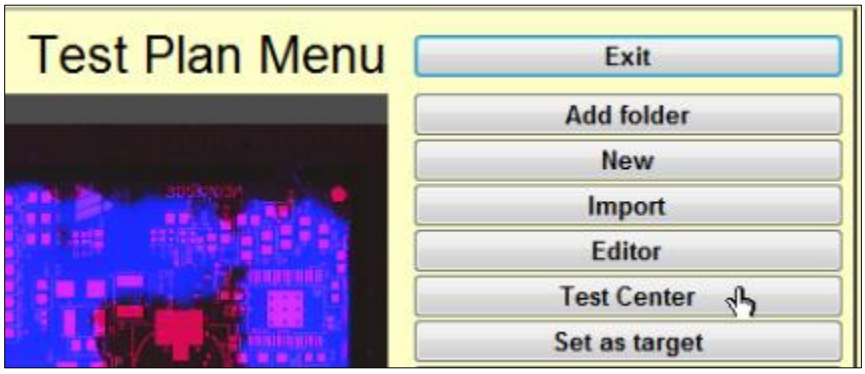


Figure 109: Test Center

21. In Test Center, click on the large test field.

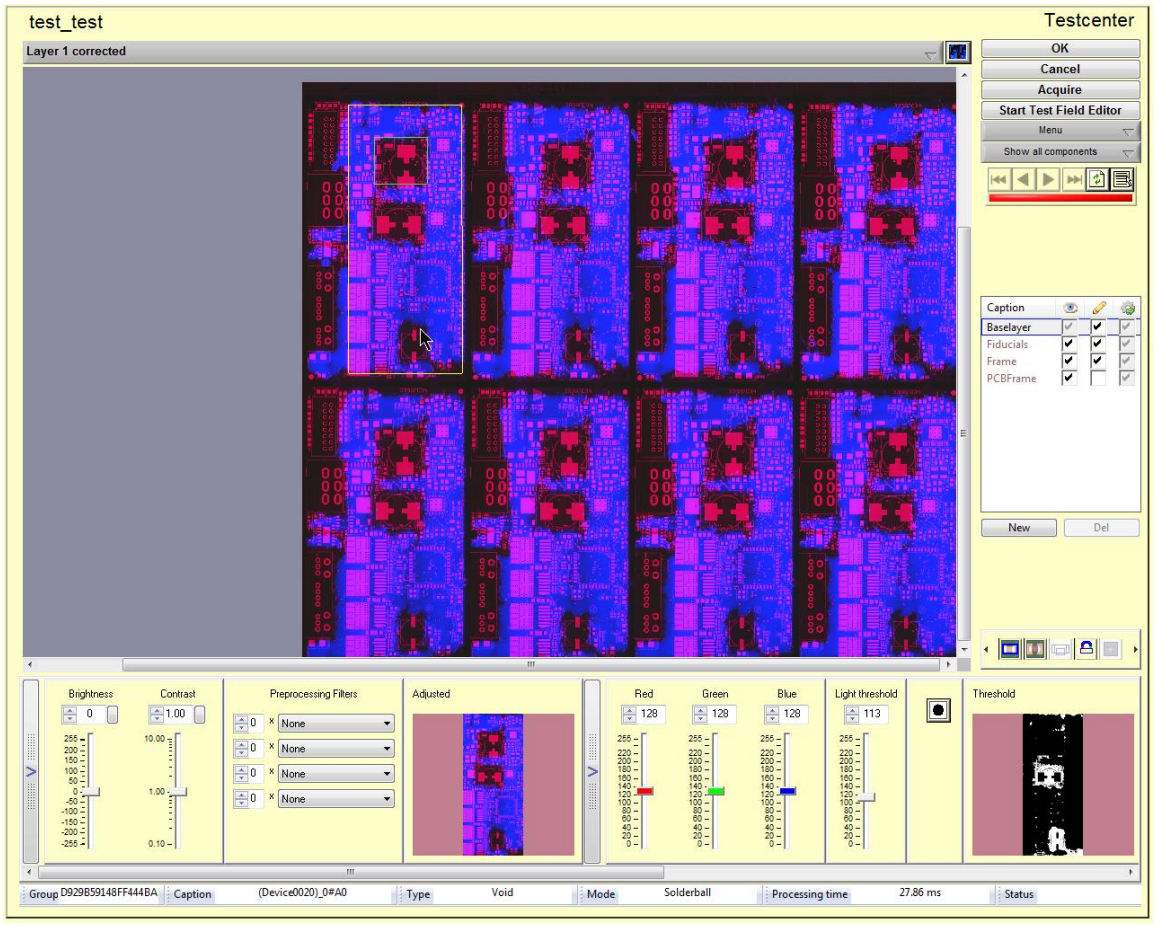


Figure 110: Click on Large Test Field

22. In the **Pre-Processing Filters** column, enter **1** in the top number field.

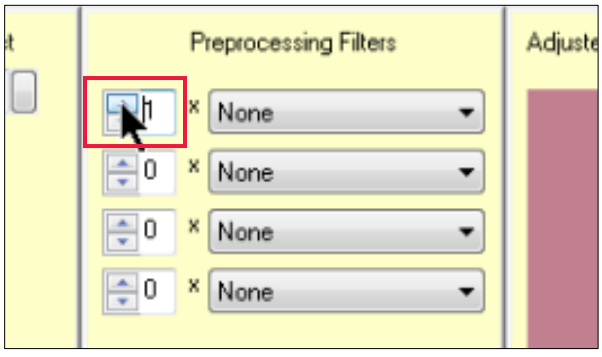


Figure 111: Pre-Processing Filters

23. From the **Filters** dropdown menu, select a filter that would create a good contrast between the material and the background. In this example, Channel 1.

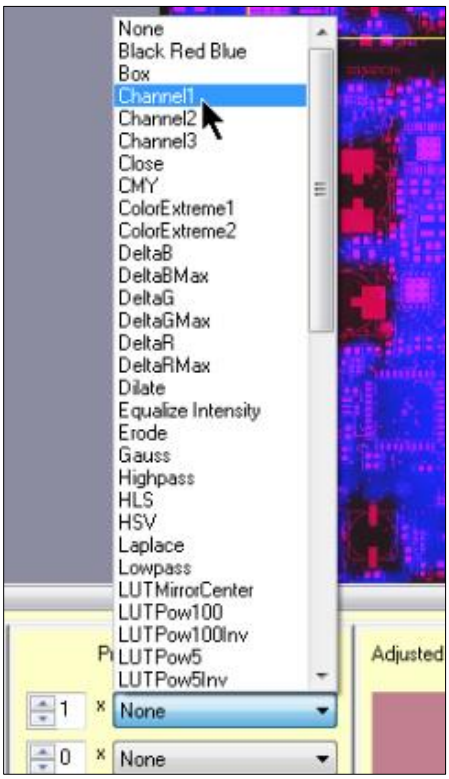


Figure 112: Select Contrasting Filter

24. Adjust the **Light Threshold** level until the coating material is outlined.

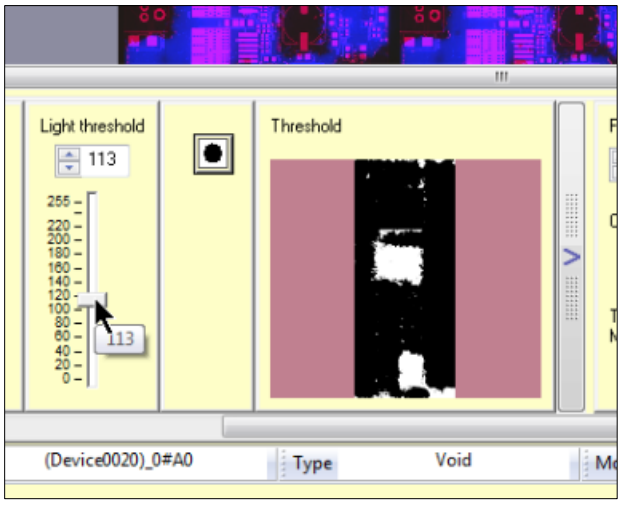


Figure 113: Light Threshold Level

5.5 Combining Test Fields

While the polygon tool can be used to create complex test fields, sometimes it is easier to combine preexisting test fields.

Rules for Combining Test Fields

- The test fields must be overlapping.
- Test fields must have the same test mode.
- Test field parameters should be left unadjusted until after the fields have been combined.

Follow these steps to create and combine test fields.

1. Draw/create the test fields. Do not change any test field parameters until later. Make sure the fields that should combine overlap.

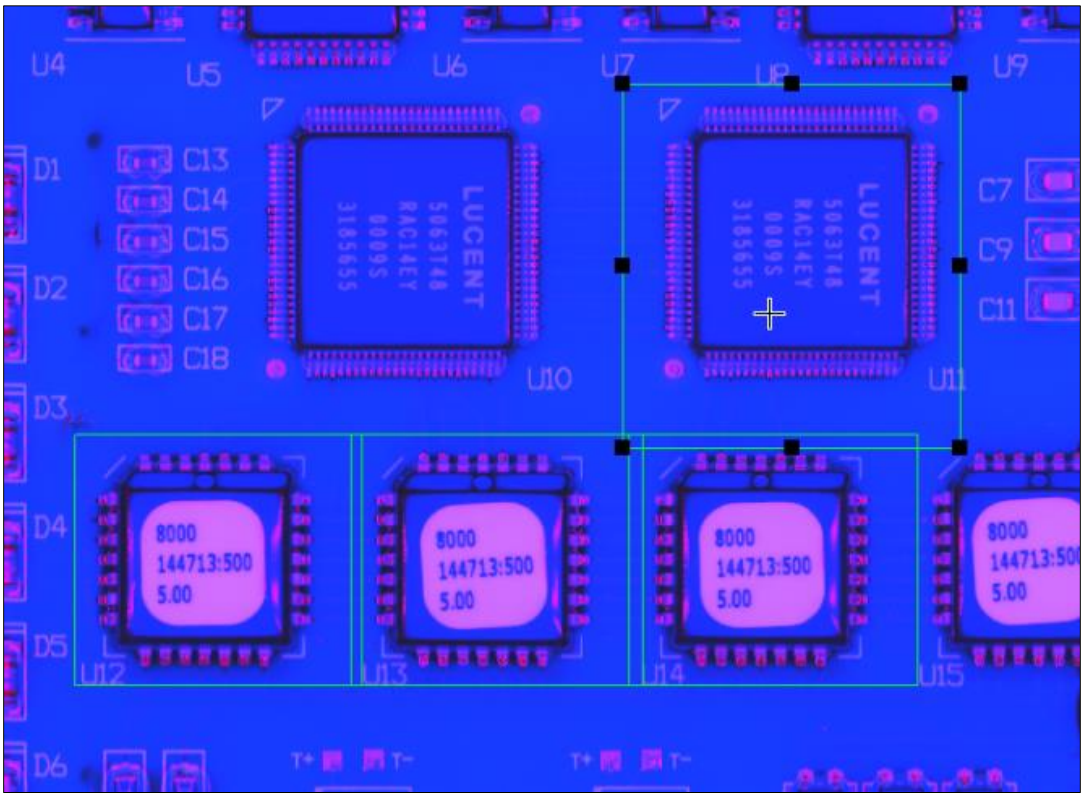


Figure 114: Draw/Create Overlapping Test Fields

2. Press and hold the '**CTRL**' key. Left-click on each of the fields that should be combined. The selected test fields borders will change to purple.

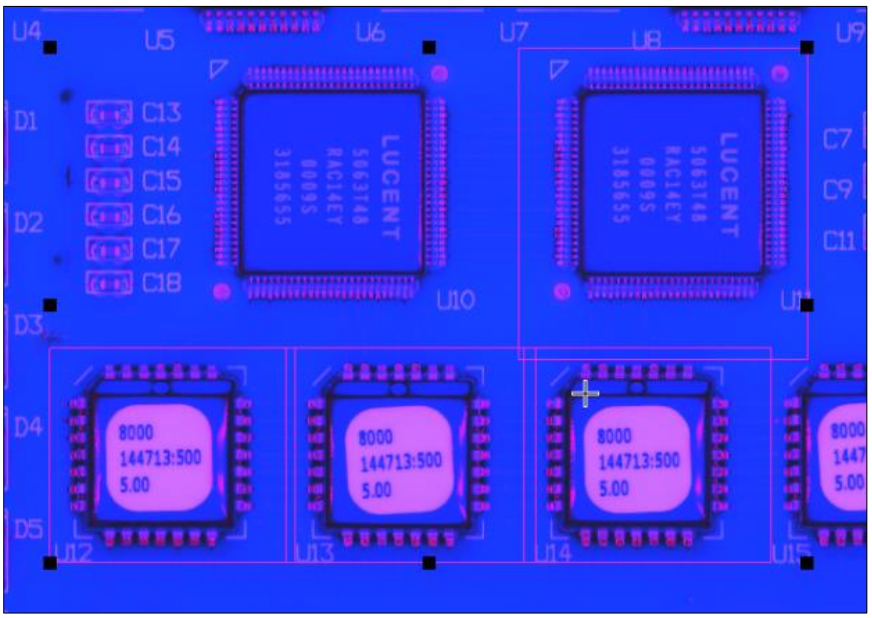


Figure 115: Test Field Purple Borders

3. Right-click in either one of the selected test fields. Select **Test Fields → Combine Test Fields**.

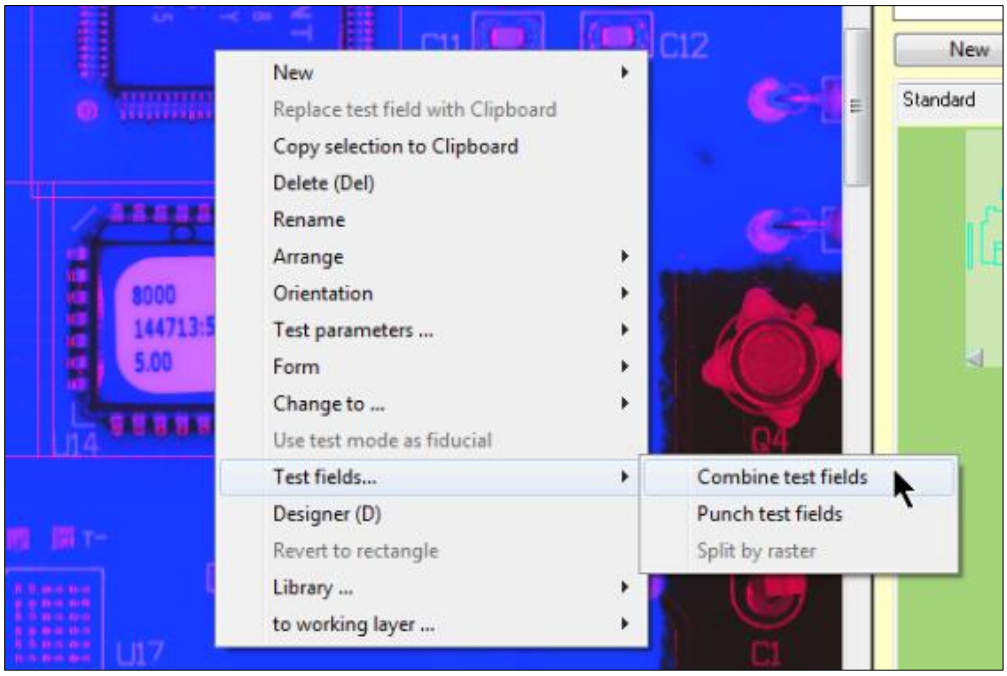


Figure 116: Combine Test Fields

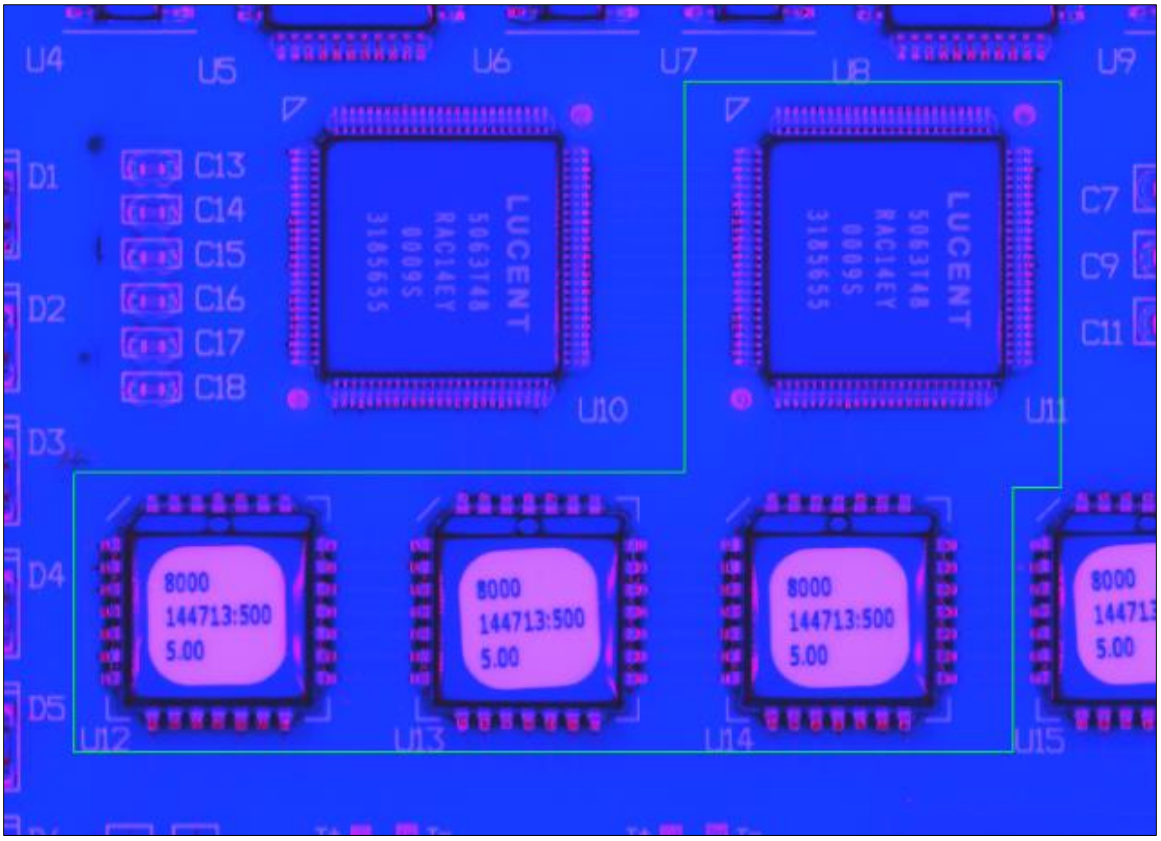


Figure 117: Combined Test Fields

6. Designer Mode

Designer Mode is a hidden section within the Test Field Editor. Designer Mode enables the creation of a library test field and group blocks. If a component or a group of components appears in more than one product, one can save already created test field(s) as blocks and reuse them in other test plans.

6.1 Creating a New Library Test Field/Group Block

1. Select a Test Plan.
2. Enter the Test Field Editor.
3. Draw Test Field(s).
4. Select the Test Fields. Press and hold '**CTRL**' and left-click the border of the fields. The test field borders will turn purple.

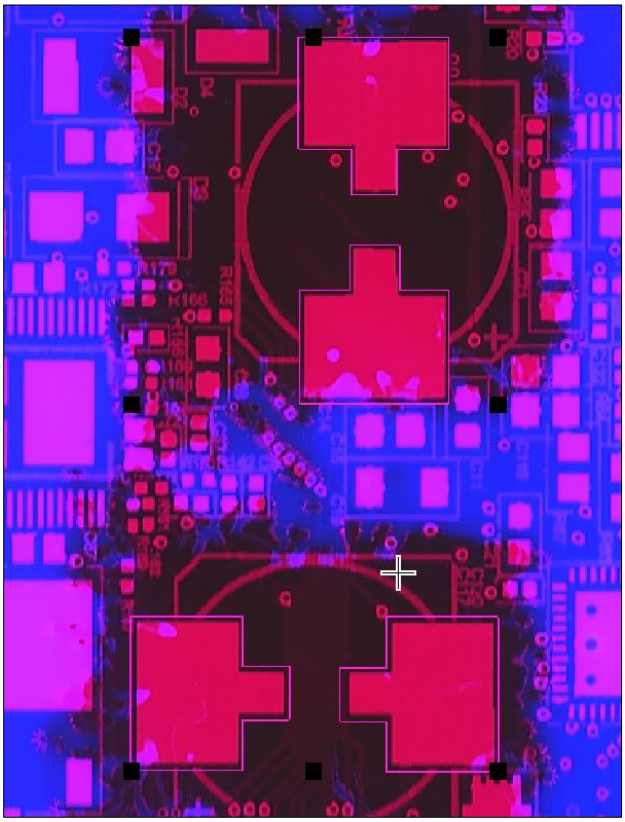


Figure 118: Select Test Fields

5. Press letter '**D**' on the keyboard or right-click then select **Designer** from the dropdown menu.

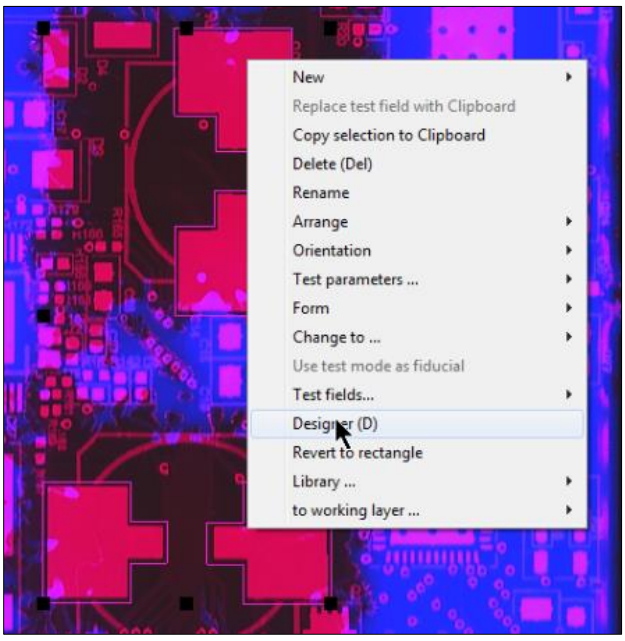


Figure 119: Designer

6. The image border changes to cyan and the test field borders are unselected.

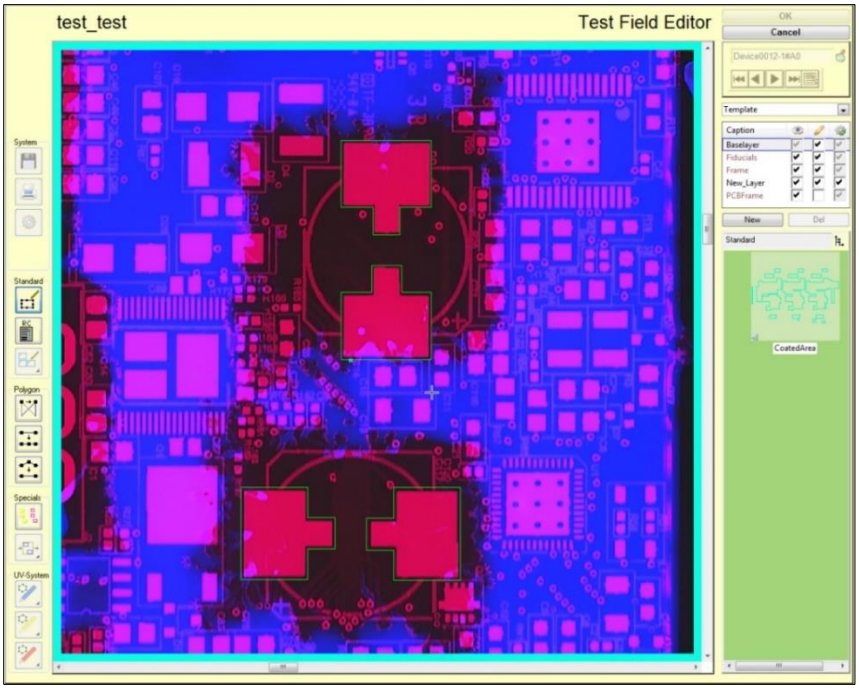


Figure 120: Unselected Test Fields/Cyan Border

7. Select the test fields then press the letter '**D**' on the keyboard again.
8. In the **Design Verlassen** popup window, select **New Type**.

Figure 121: New Type

9. Click on the tree icon in the new block window to select a folder location for the new block.

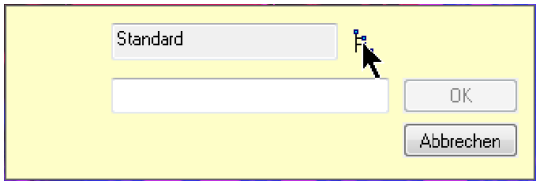


Figure 122: Tree Icon

10. Select a folder.

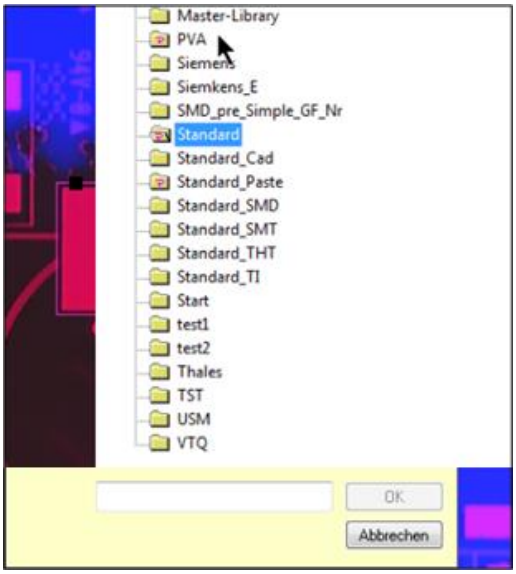


Figure 123: Select a Folder

11. Enter a name for the new block.

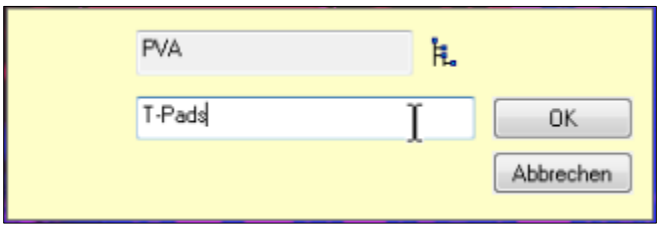


Figure 124: New Block Name

12. Click **Ok**.

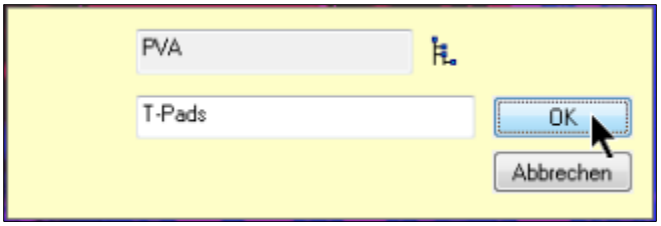


Figure 125: New Block Ok

The new block appears in the block list pane on the right-hand side. This block is only saved in the library of this inspection and is not yet available for use in other inspections.

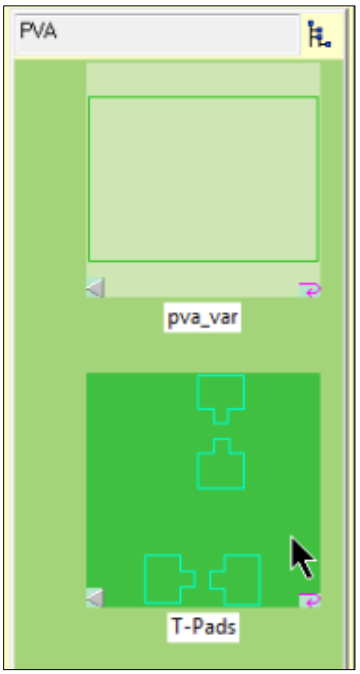


Figure 126: New Block

13. Right-click on the test field group, then select **Library → Save to Library**. Once saved, the block will be available for the rest of the inspections.

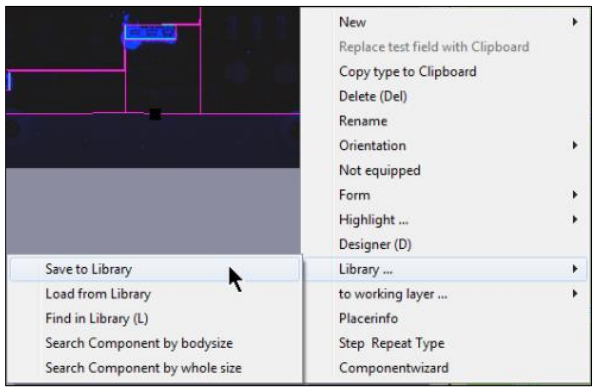


Figure 127: Save to Library

6.2 Creating a Variant of an Existing Block

Often there are more than one version of an existing product with only minor design changes introduced. For those instances, it is recommended to use an existing block to create a variant instead of creating a new block from scratch. Follow the steps below to create a variant of an existing block.

1. Select a Test Plan.
2. Open the Test Plan in Test Field Editor.
3. Select a block or drag and drop a desired block from the library.

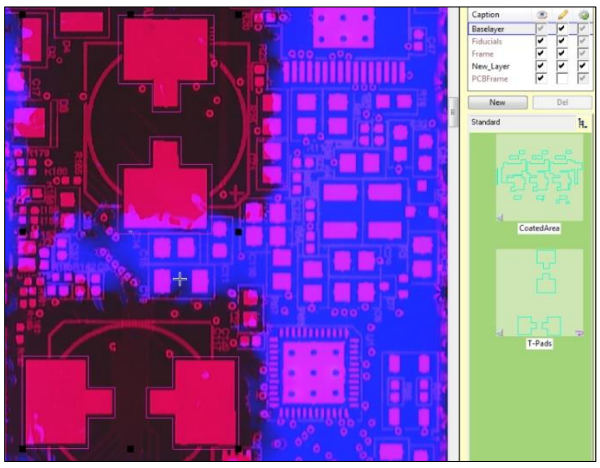


Figure 128: Select Block

4. Once a block is selected, press the letter '**D**' on the keyboard or right-click on the block then select **Designer** from the dropdown menu to enter Designer Mode.

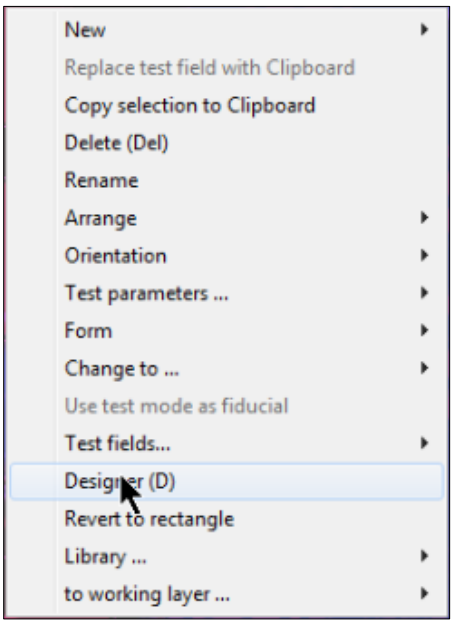


Figure 129: Enter Designer Mode

5. Edit the block as needed.

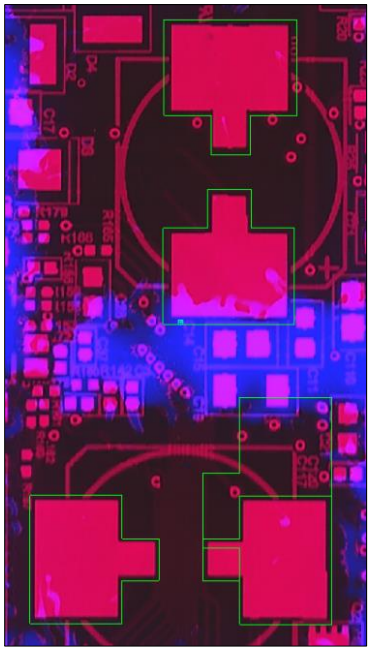


Figure 130: Edit Block

6. Select all test fields of the newly edited block.

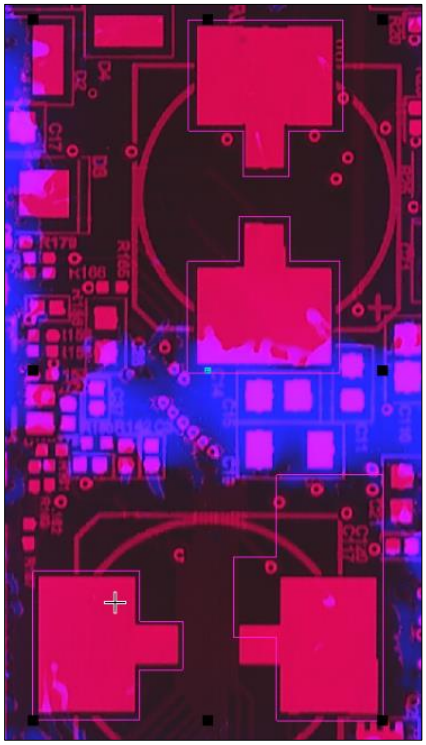


Figure 131: Select Test Fields

7. Press the letter '**D**' on the keyboard or right-click on the block then select **Designer** from the dropdown menu to open the **Designer Verlassen** window.

8. Select Variant in the **Designer Verlassen** window.

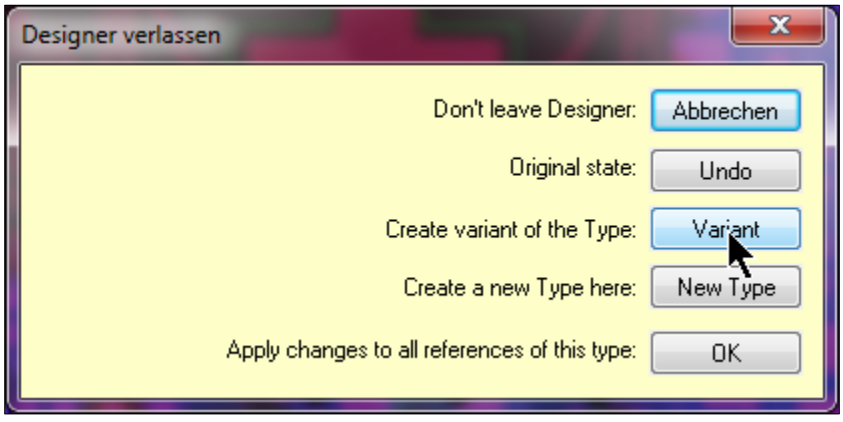


Figure 132: Select Variant

9. Type a name for the variant in the **Variant** field, then click **Ok**.

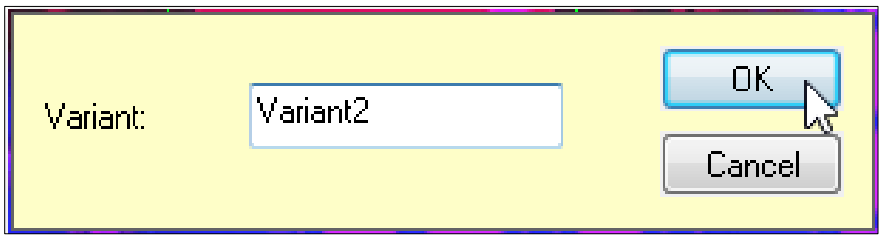


Figure 133: Variant Name

10. In the blocks window, click on the lower left corner of the block icon.

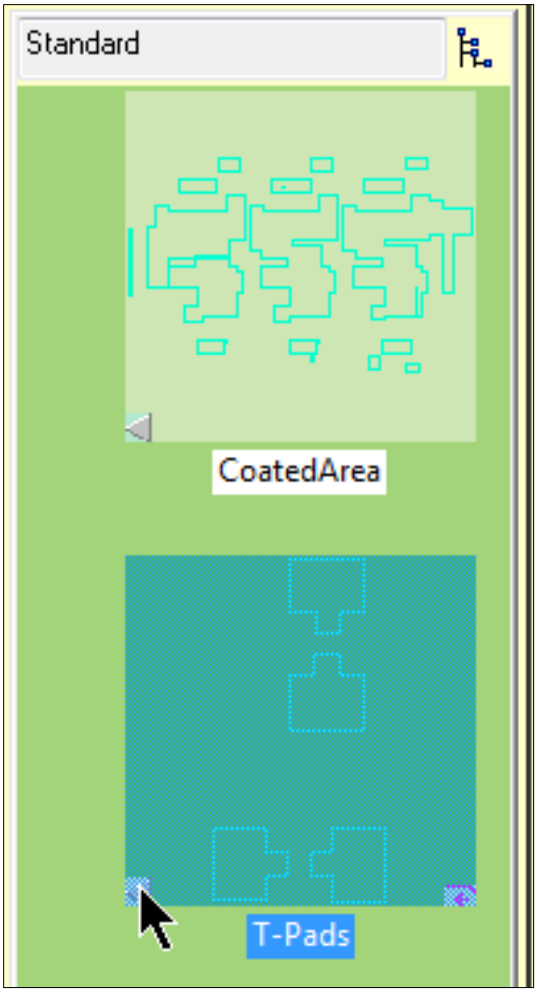


Figure 134: Click Block Icon

11. Drag and drop the new variant on the image in the Test Field Editor.

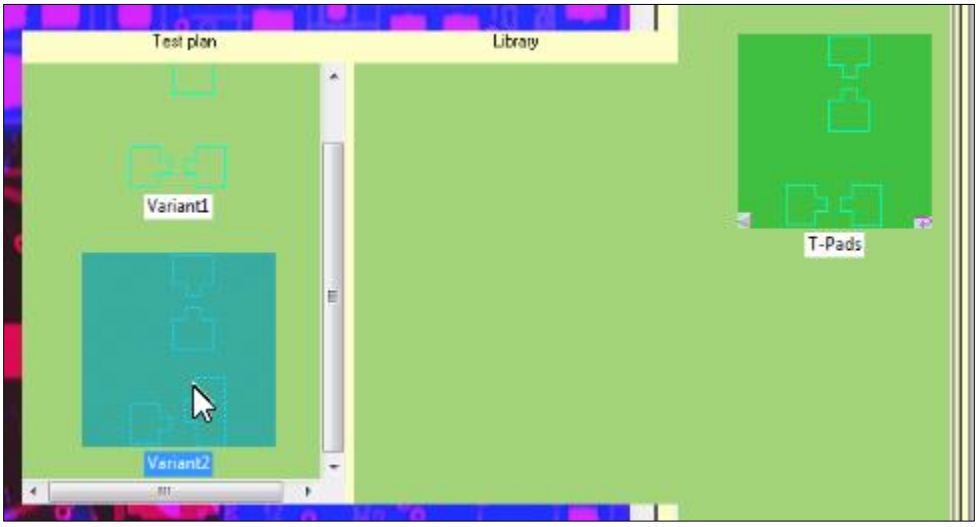


Figure 135: Drag and Drop New Variant

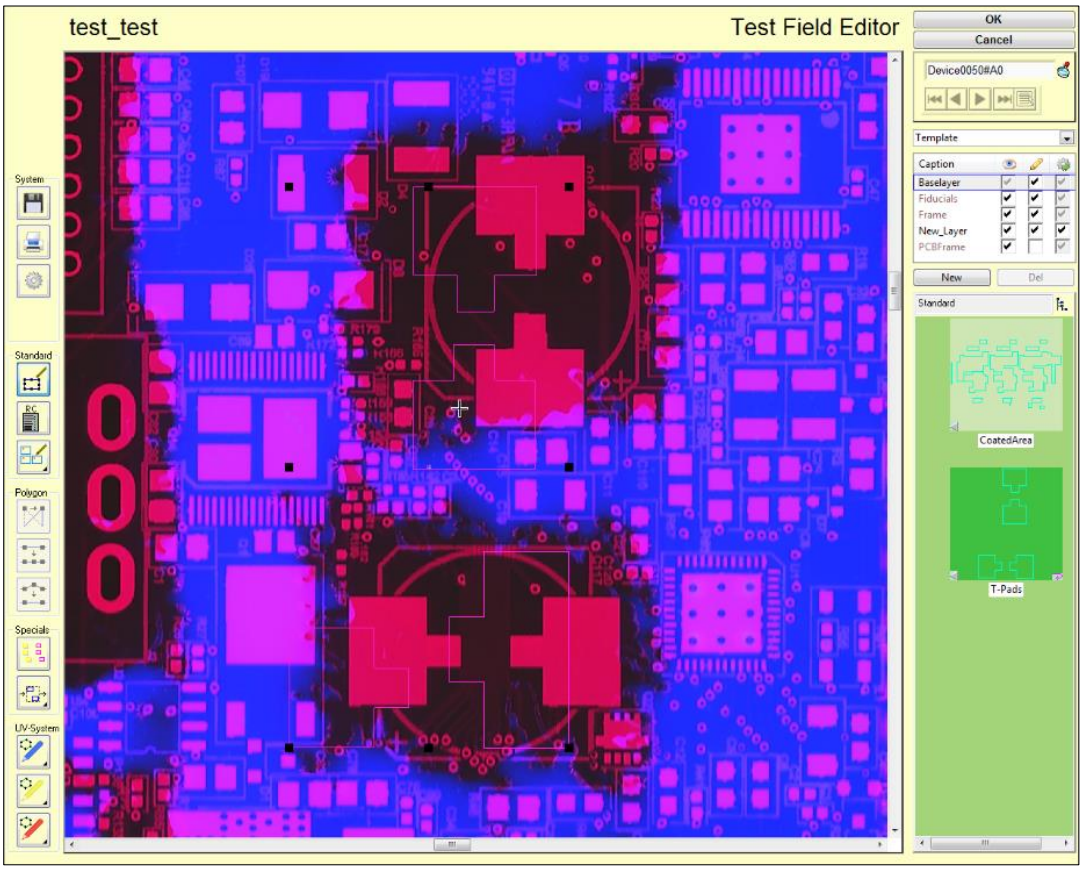


Figure 136: New Variant

6.3 Using Blocks

Note: While the library is visible in design mode, the grouped zones cannot be dragged and added to the scanned image. The only exception to this is the block that was just created in design mode. It is recommended to only add blocks to the scanned image from Editor mode.

Note: Once a block is created, it is not possible to change its test parameters. One must use/place the block on the image to do so. After placing a block on the image, one can edit its parameters in Editor and in Test Center as any other test field.

7. PCB Frames/Panels – Arrays of Test Fields

Often, PCBs are arranged in an array with identical PCB panels on one big board. A feature in modusAOI allows the user to easily create arrays of PCB Frame Panel Test Fields. The feature is useful when reporting issues on individual PCB panels within the multi-panel/multi-frame board as well.

Note: If part only contains a single PCB frame, there is no need for panels/arrays.

Note: Once a panel is created, it is no longer possible to draw new test fields within the panel area. Test fields can be drawn outside of the panel, then dragged within the panel and given new test fields parameters.

Note: Do NOT copy and paste panels. Each panel gets a unique position number. Copying and pasting panels results in having more than one panel with the same position number. This creates a problem when reporting inspections pass/fail data.

7.1 Creating PCB Frame/Panel Arrays

1. Open the inspection in the Test Field Editor.
2. If the test fields have not been created over PCB Frame/Panel 1, press letter 'A' on the keyboard to select all test fields, then move and align the fields over Panel 1.
3. Select the **Multiple Panels** icon.

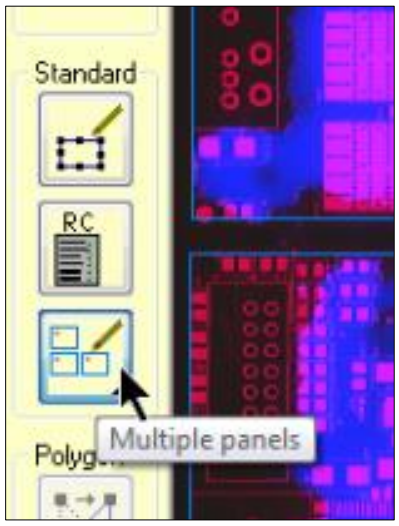


Figure 137: Multiple Panels

4. Draw a rectangle over the panel to include the whole panel with the already created test fields.

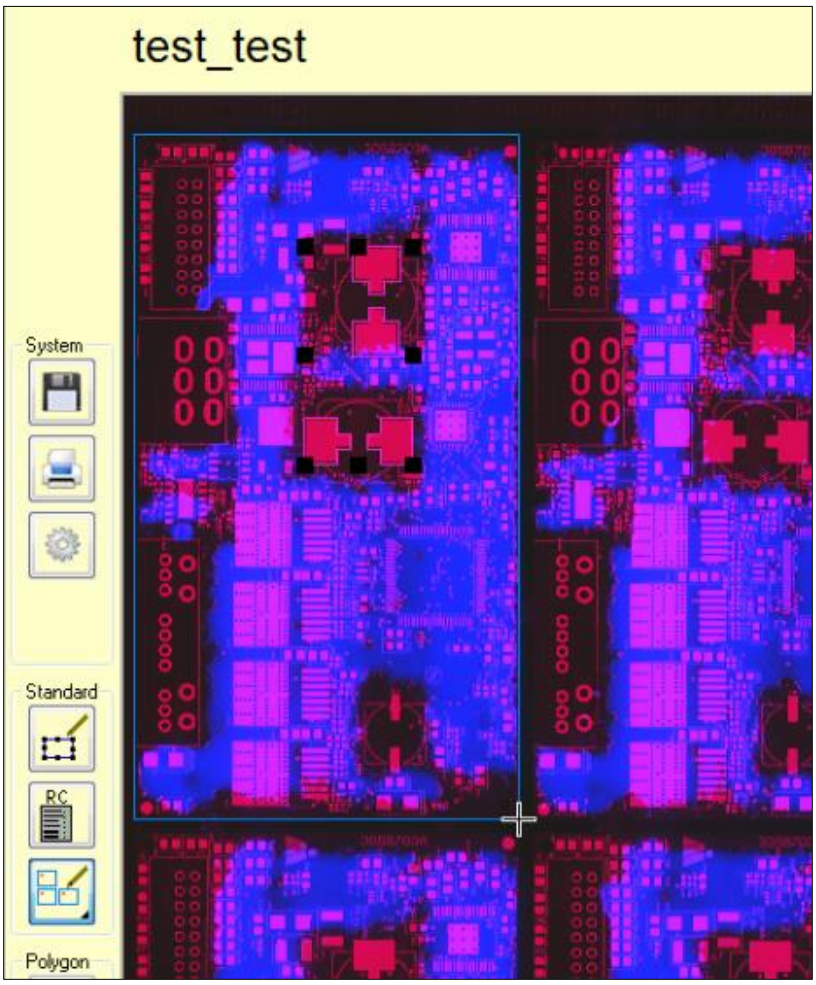


Figure 138: Draw Rectangle

5. Right-click within the panel boundaries then select **Multi Copy**.

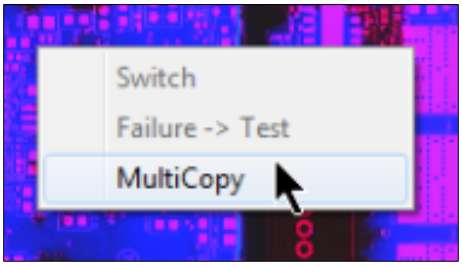


Figure 139: Multi Copy

6. In the **Multicopy PCB** window, set the **Number** of panels in the horizontal and vertical, as well as the **Horizontal Offset** and **Vertical Offset**.

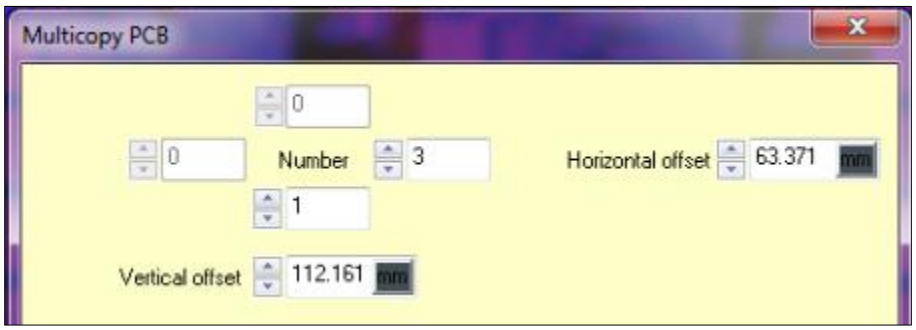


Figure 140: Enter Number and Offset

7. Choose the **Numbering Scheme** that applies to the case.

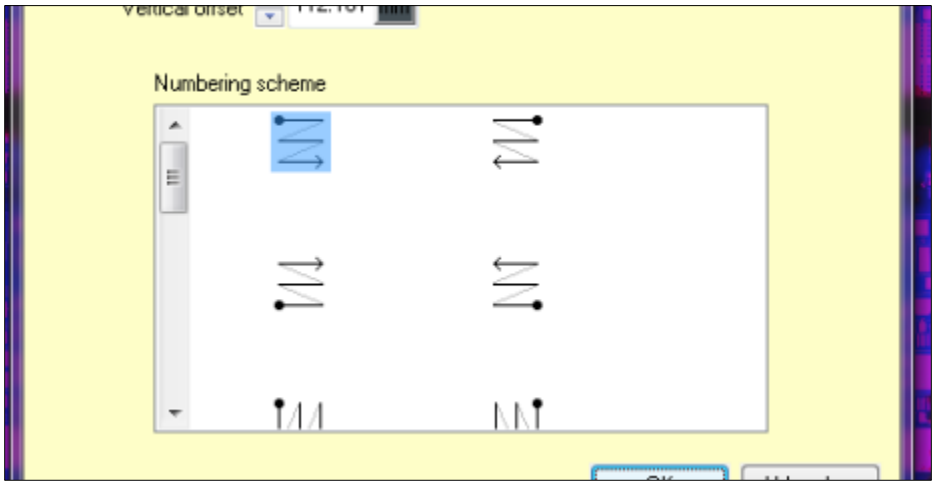


Figure 141: Choose Numbering Scheme

8. Click **Ok**.
9. Click on the PCB frame/panel to see its array number in the upper right window

Figure 142: Array Number

10. Open the inspection in Test Center to set the test field parameters for Pass/Fail. Read the Test Center section for more details.

7.2 Creating Randomly Placed Arrays

1. Open the inspection in Test Field Editor
2. If the test fields have not been created over PCB Frame/Panel 1, press letter 'A' on the keyboard to select all test fields, then move and align the fields over Panel 1.
3. Select the **Multiple Panels** icon.
4. Click on the arrow at the lower right corner of the **Multiple Panels** icon.

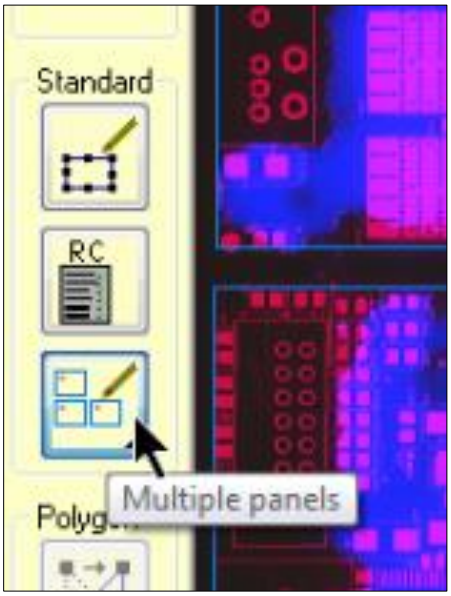


Figure 143: Multiple Panels

5. Select **Draw/Move PCBs**.

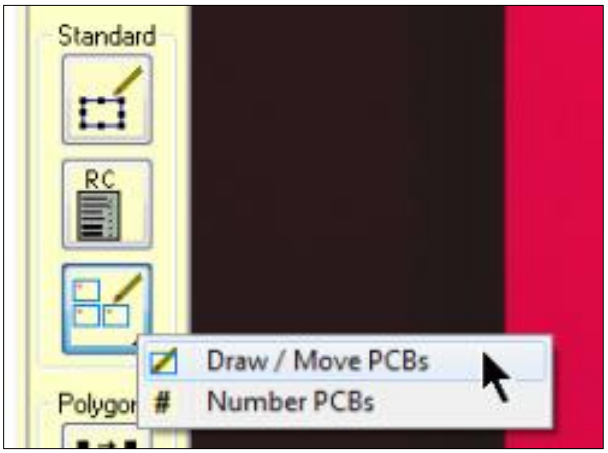


Figure 144: Draw/Move PCBs

6. Draw a rectangle, enclosing the test fields that should be included in the panel.

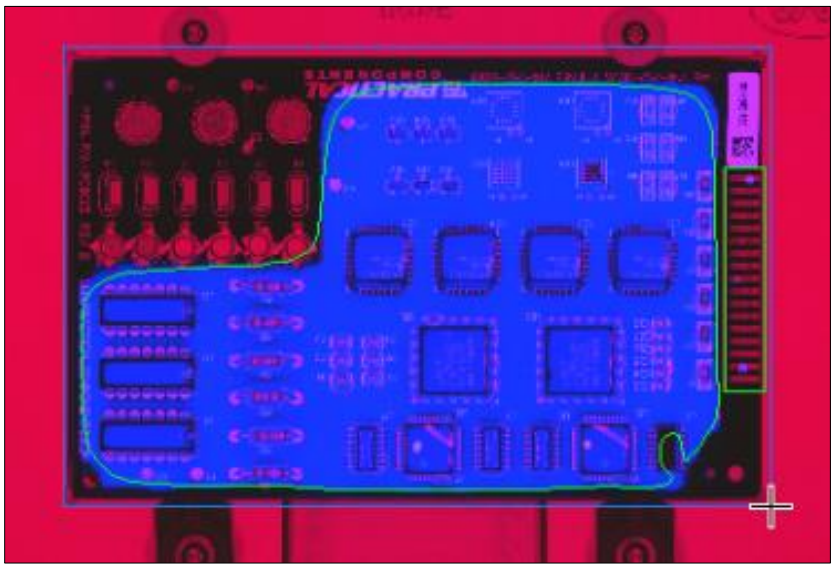


Figure 145: Draw Rectangle

7. Select the panel. Click inside the panel (not over a test field) or press the letter '**A**' on the keyboard to select all.

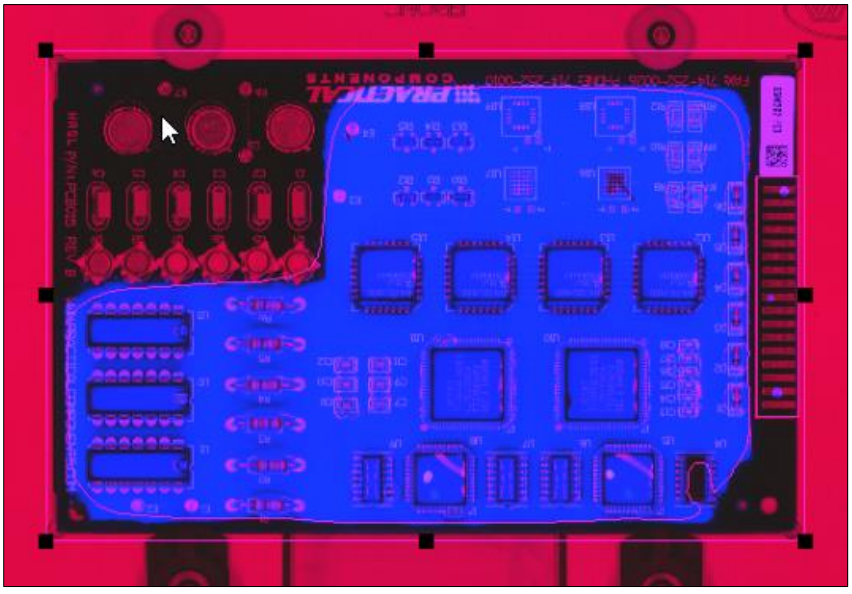


Figure 146: Select Panel

8. Press **C** on the keyboard to copy the panel, then drag and drop the duplicate.

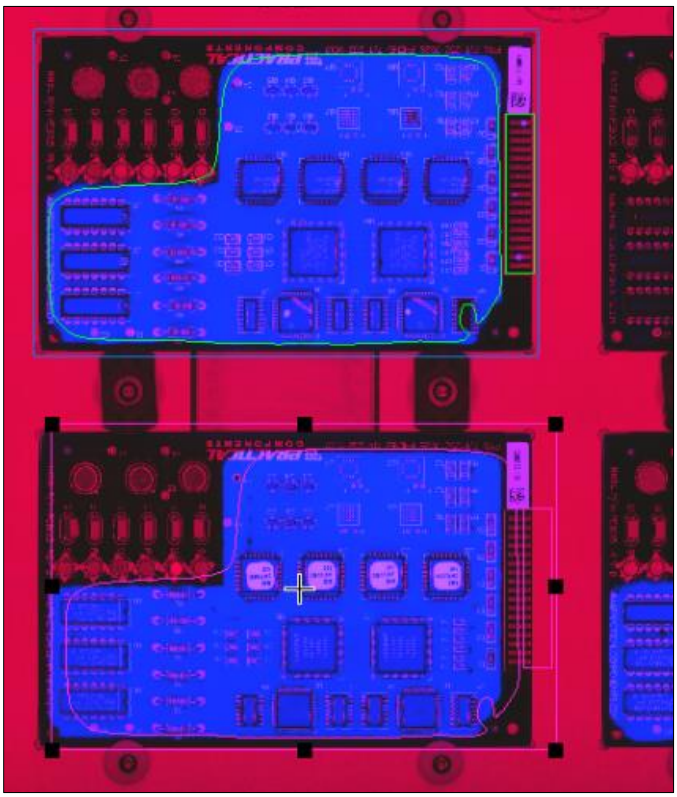


Figure 147: Copy and Paste Panel

9. Select and drag the panels or use the arrow keys and zoom to align the panels.

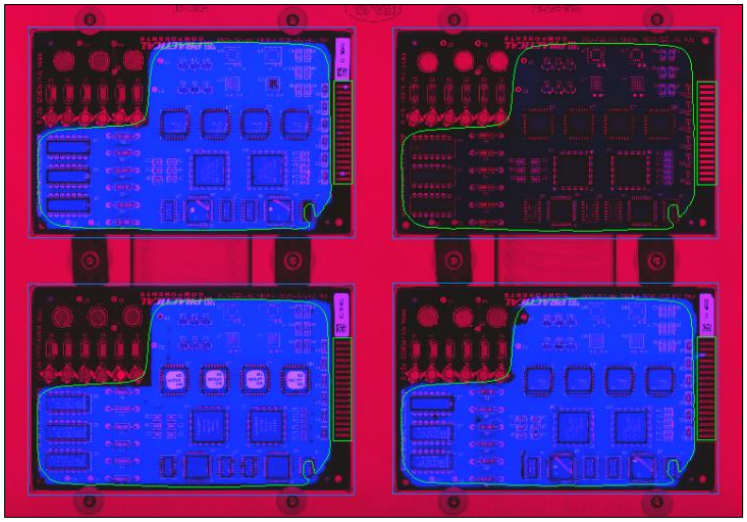


Figure 148: Align Panels

7.3 Rearranging PCB Frames/Panels Enumeration

1. Open the inspection in Test Field Editor.
2. Click on the arrow at the lower right corner of the **Multiple Panels** icon.
3. Select **Number PCBs**.

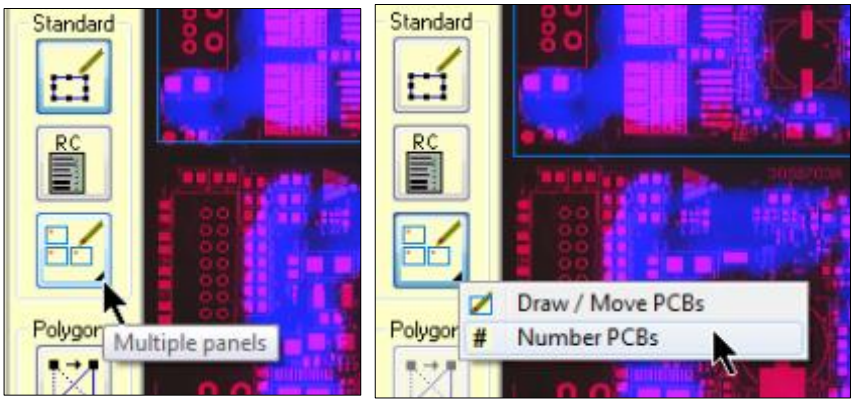


Figure 149: Multiple Panels/Number PCBs

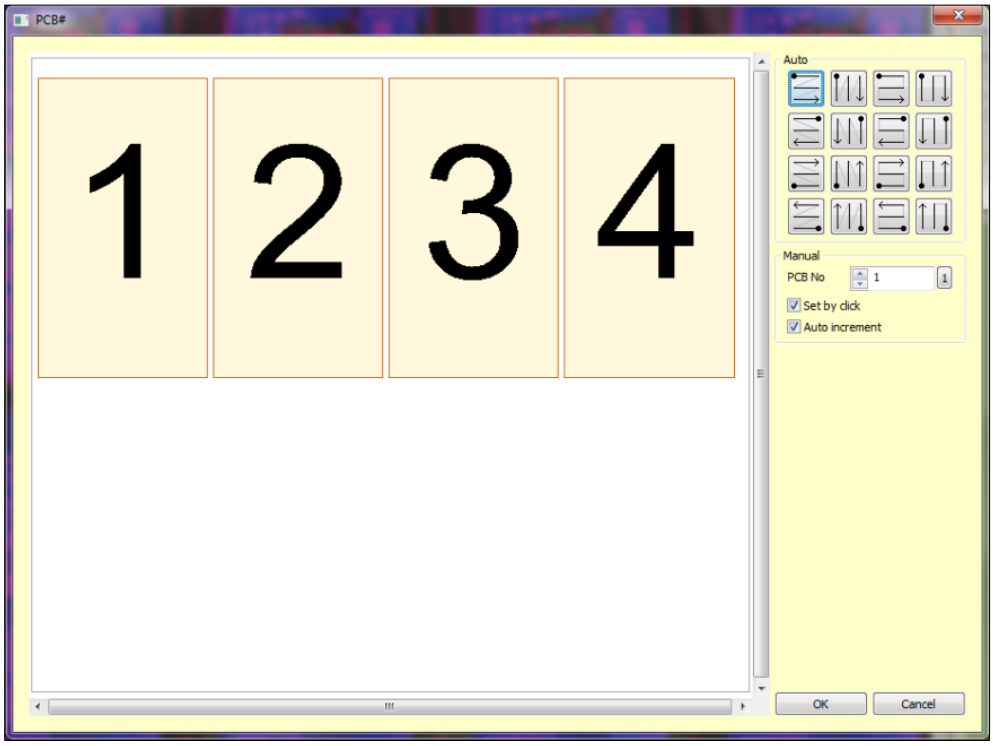


Figure 150: Number PCBs

4. Use one of the **Auto** enumeration schemes or assign panel numbers manually.

Figure 151: Auto

Figure 152: Assign Panel Numbers Manually

5. Click **Ok** to complete panel numbering.

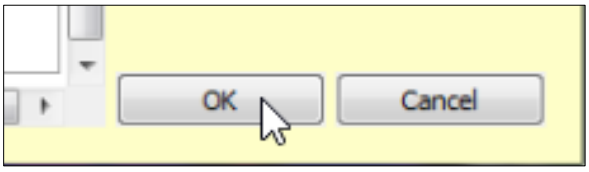


Figure 153: Complete Panel Numbering Ok

7.4 Reporting PCB Frame/Panel Inspection Results

When a test plan is run with PCB frames/panels, the error/fail case reporting is organized according to the numbering scheme chosen when the PCB frames/panels were created.

Figure 154: Error/Fail Case Reporting

8.Test Center

After the test fields have been created, their parameters must be set. Test field parameters determine whether a test field passes or fails when a test plan is run. Test field parameters are set in the **Test Center**.

Note : Test field parameters are shared between all copies. Any parameter changes made to any of one test fields will also occur to all other copied test fields and original.

Note: Both good and bad coated boards are needed to finalize parameters settings and pass/fail conditions.

8.1 Accessing Test Center

1. From the front panel, select **Test Plan Menu**.

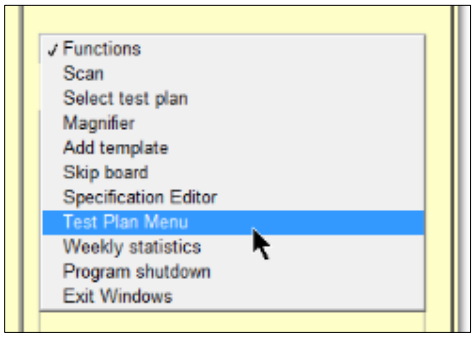


Figure 155: Test Plan Menu

2. In the test plan menu, select the desired inspection.

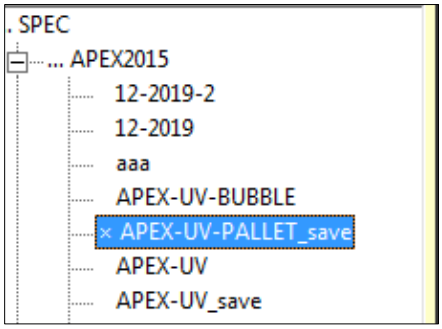


Figure 156: Select Inspection

3. In the test plan menu, select **Test Center**.

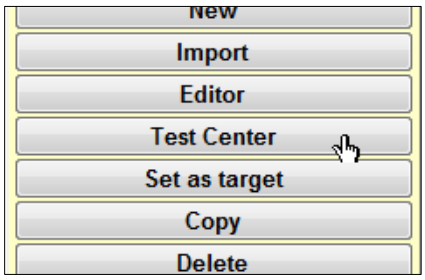


Figure 157: Test Center

8.2 Understanding Test Field Parameters

While the test field parameters can be adjusted in Editor, there is not a preview window that shows the live changes of the image processing. In the Test Center, the effects of all image processing steps are visible in a preview window.

When a test field is selected in Test Center, the controls of the selected test field open in a pane at the bottom of the window. The controls are arranged in a logical order from left to right. The nature and quantity of the controls depend on the test field type.

8.2.1 Brightness and Contrast

These parameters control the brightness and contrast of the test field on the image.

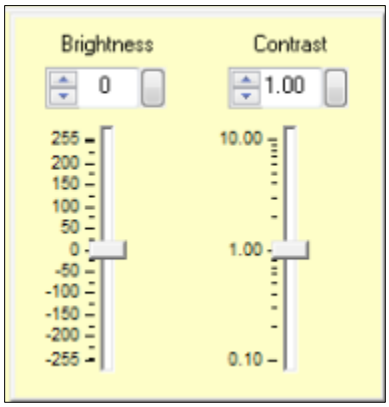


Figure 158: Brightness and Contrast

- Changing the brightness parameter makes the image brighter or darker.
- Changing the contrast parameter increases the contrast between the bright and dark sections of the image.
- Test fields with **ThAndFind**, **SimpleGrayMatching**, **MultiCluster**, and **Solderball** test modes have these parameters.

8.2.2 Preprocessing Filters

All test fields have **Preprocessing Filters** to manipulate image content. Up to four different filters are executed one after another. The **Filter Iteration** number is entered in the numeric field to the left of the filter name. Enter zero to disable filter execution.

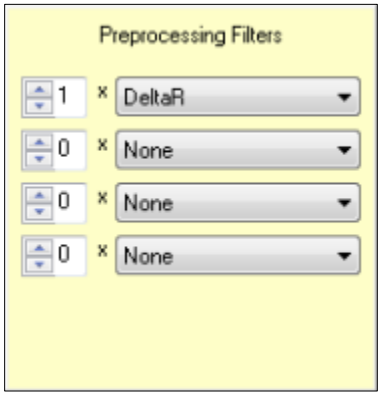


Figure 159: Preprocessing Filters

Filter algorithms are selected from a dropdown list. The processed image is displayed in the **Adjusted** pane, next to **Preprocessing Filters** pane.

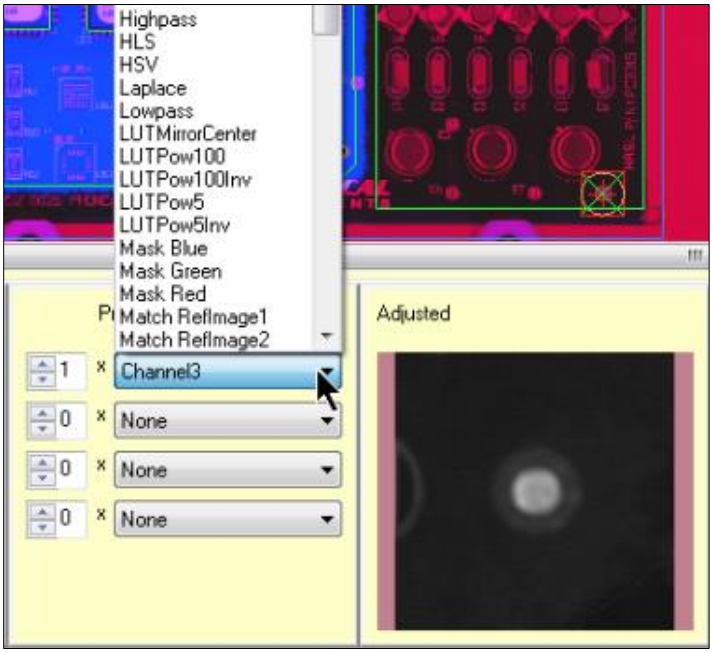


Figure 160: Filter Algorithms

Note: Chapter 11-6 of Modus manual (click 'F1' key from Front Panel) includes details on each one of the filters, along with images.

8.2.3 Threshold

The **Threshold** tools are usually used after preprocessing filters. There are two kinds of thresholding: **color** and **monochrome**. Red, green, and blue filter adjustments are available for color image. Since the threshold filters are performed after preprocessing, the image is usually monochrome. modusAOI recommends adjusting the red, green, and blue channels to their maximum value in these cases. The **Light Threshold** is used most of the time since the images are mostly monochrome.

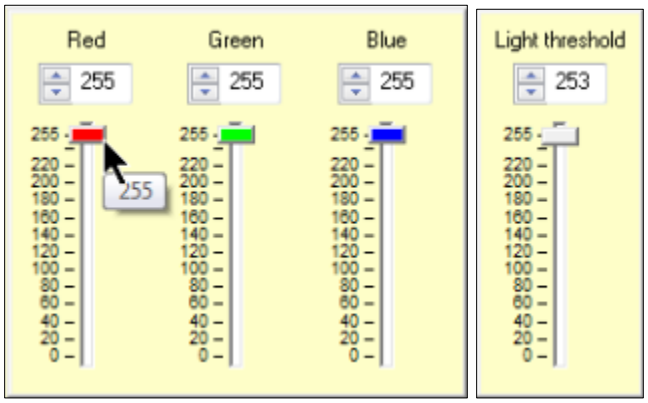
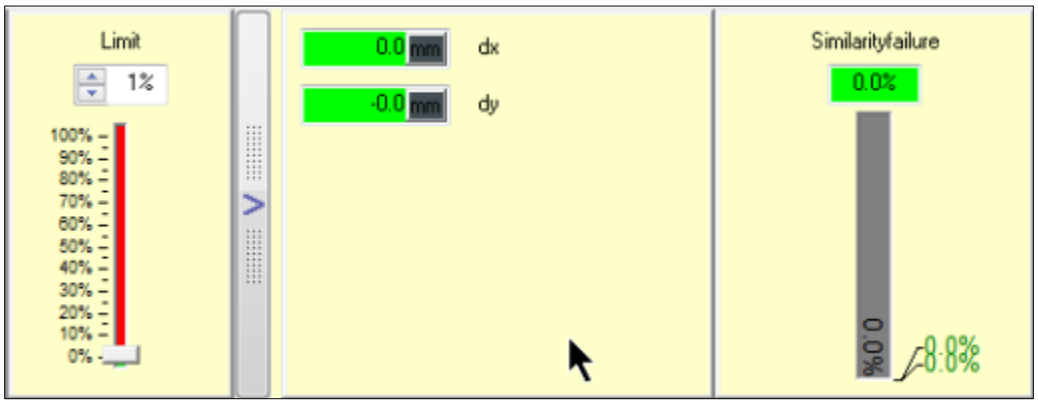


Figure 161: Threshold

8.2.4 Pass/Fail Conditions

There are different types of conditions, however, they can be grouped as fiducial pass/fail conditions and other pass/fail conditions.

Fiducial Pass/Fail Conditions: The fiducial will pass if the allowed Deviation from the expected position is less than allowed **dx** and **dy** and if the **Similarity Failure** is below the **Limit**.



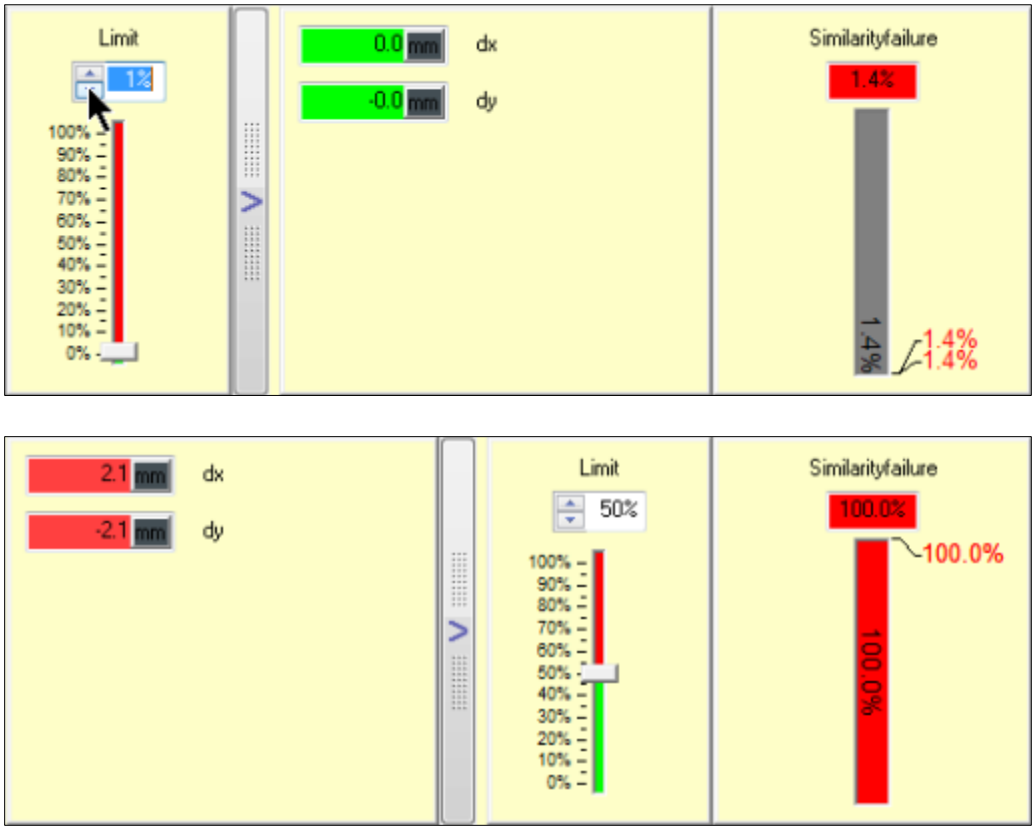


Figure 162: Fiducial Pass Fail Conditions

Other Pass/Fail Conditions: These include methods of comparing detected area (pixels, mm^2…) to either the total area of the test field or a specified value. The following examples show different types of pass/fail conditions of the same Multi Cluster test field.

Ratio

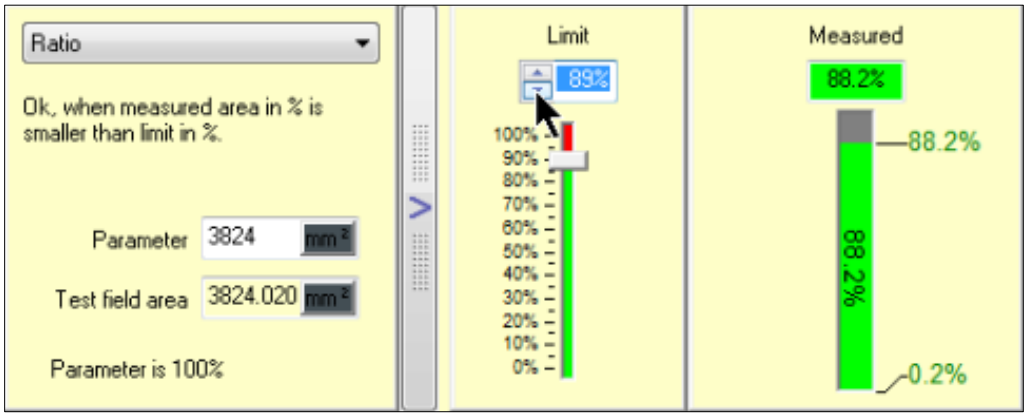


Figure 163: Ratio 1

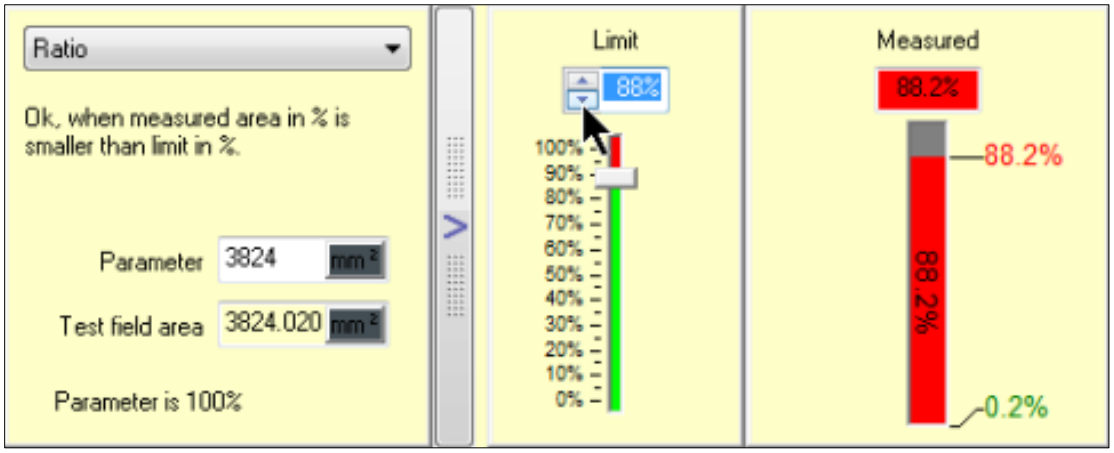


Figure 164: Ratio 2

RatioMax

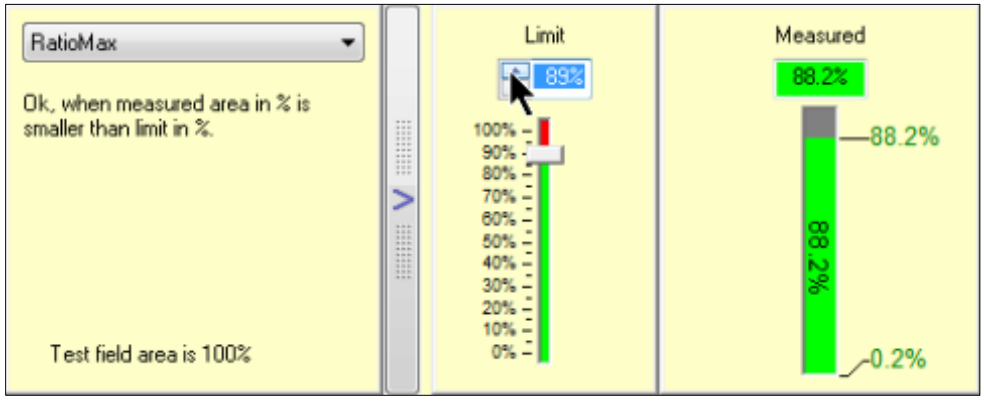


Figure 165: Ratio Max 1

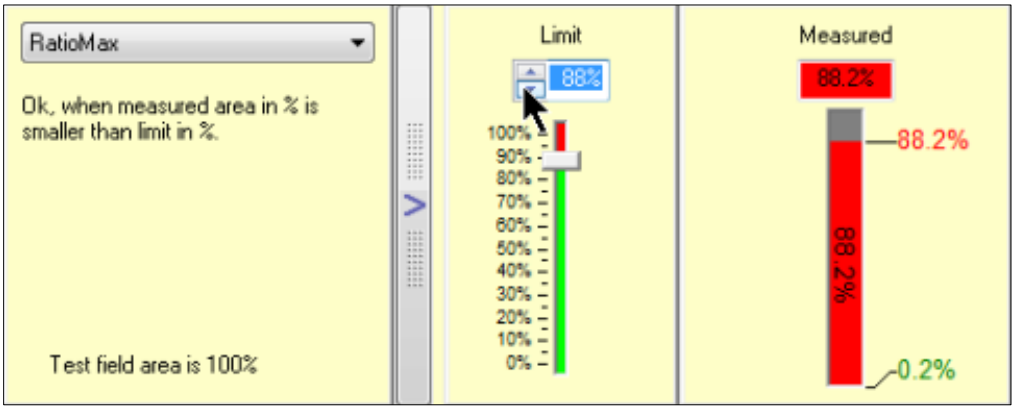


Figure 166: Ratio Max 2

Relative Error

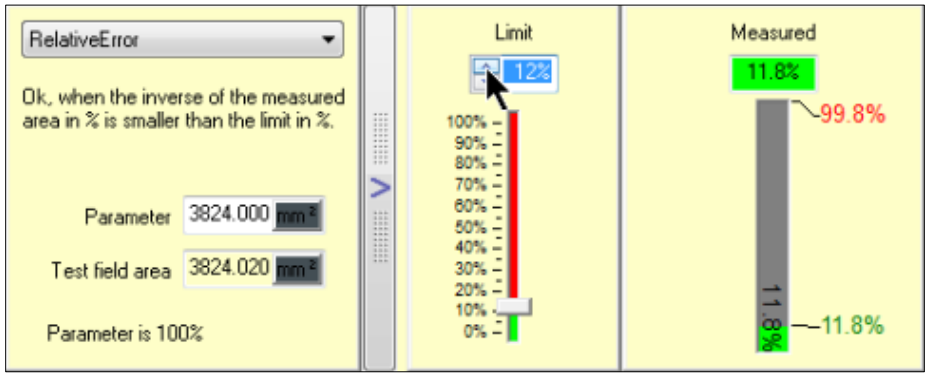


Figure 167: Relative Error 1

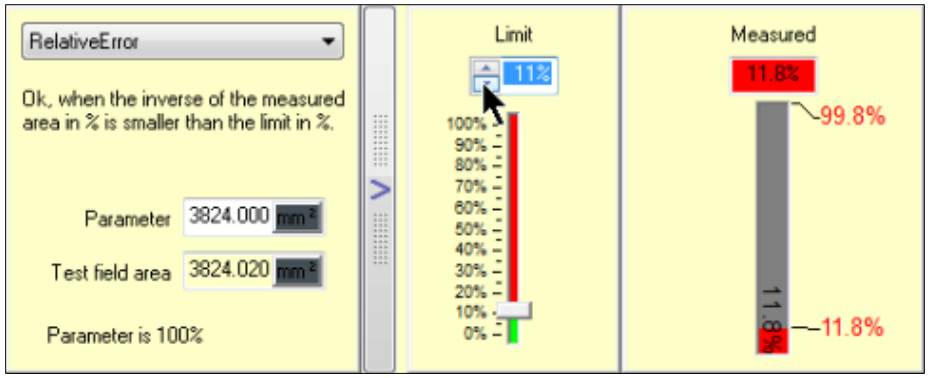


Figure 168: Relative Error 2

Relative Error Max

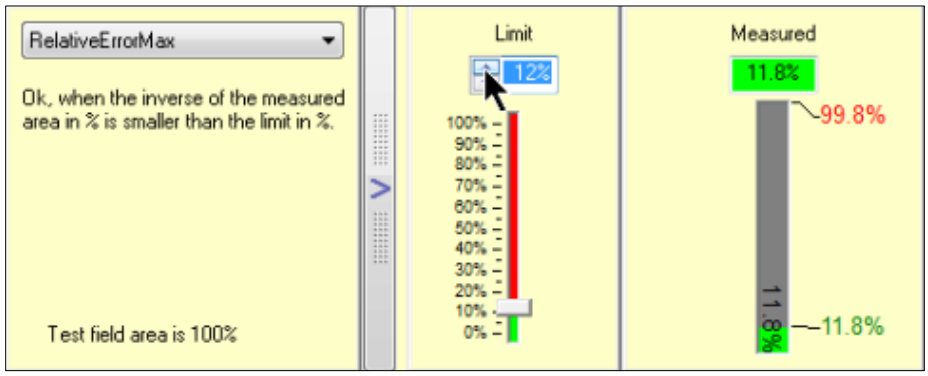


Figure 169: Relative Error Max 1

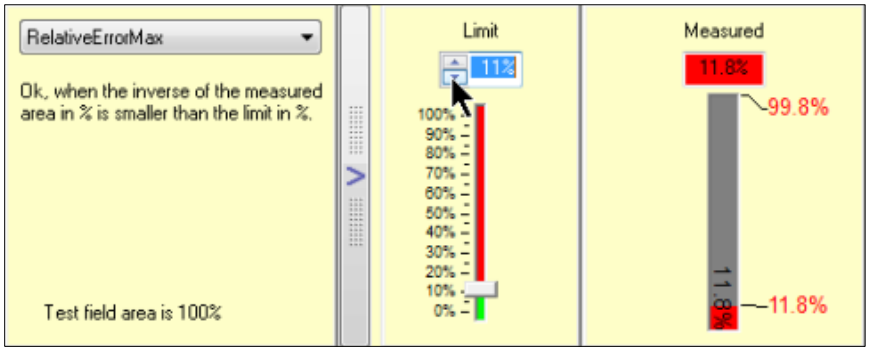


Figure 170: Relative Error Max 2

CmpMore (Compare More)

Allows the user to compare if the detected area (pixels, mm²…) is more than the area entered in the **Parameter** field.

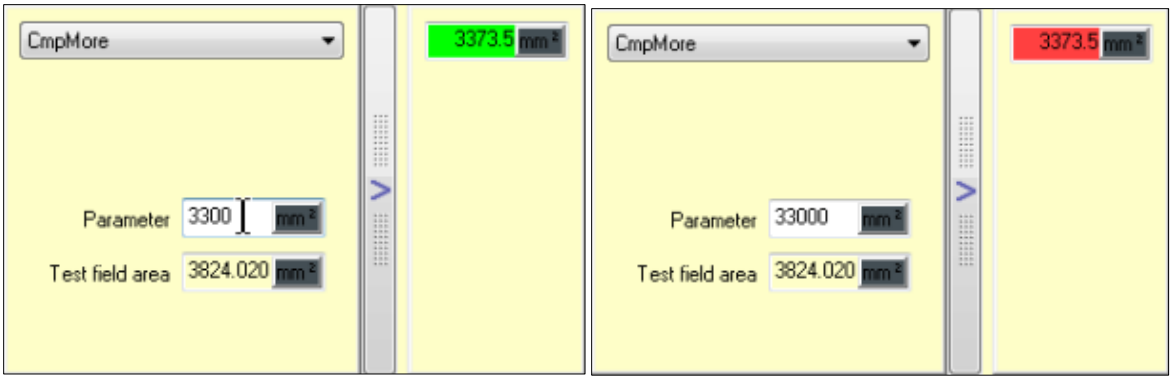


Figure 171: CmpMore

CmpLess (Compare Less)

Allows the user to compare if the detected area (pixels, mm²…) is less than the area entered in the **Parameter** field.

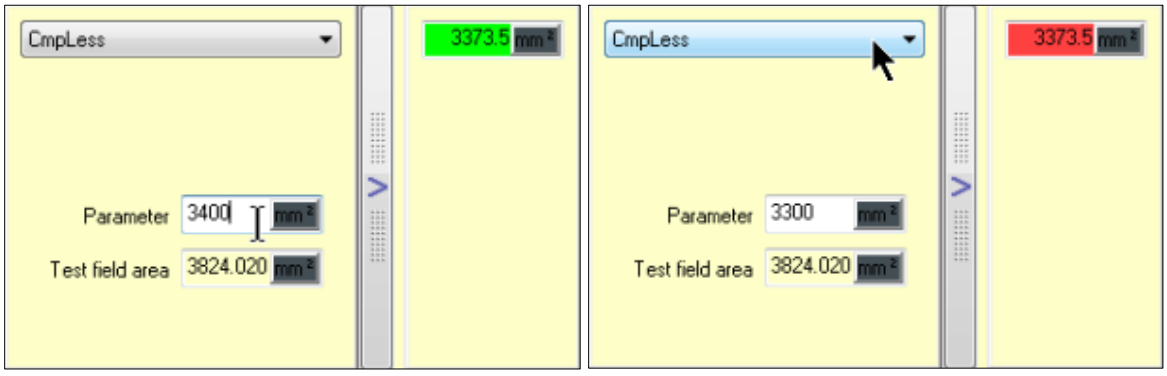


Figure 172: CmpLess

Solderball

The **Solderball** test field is used whenever there is a need to find items that are not supposed to be within the test field area. The Pass/Fail of **Solderball** depends on the blob size and number of blobs. The pass/fail conditions are arranged in OR logic.

Fail if more than X-number of blobs (balls) have an area greater than Y-Number

OR

Fail if one blob (ball) has an area greater than Z-number

X, Y, and Z are numbers entered by the operator.

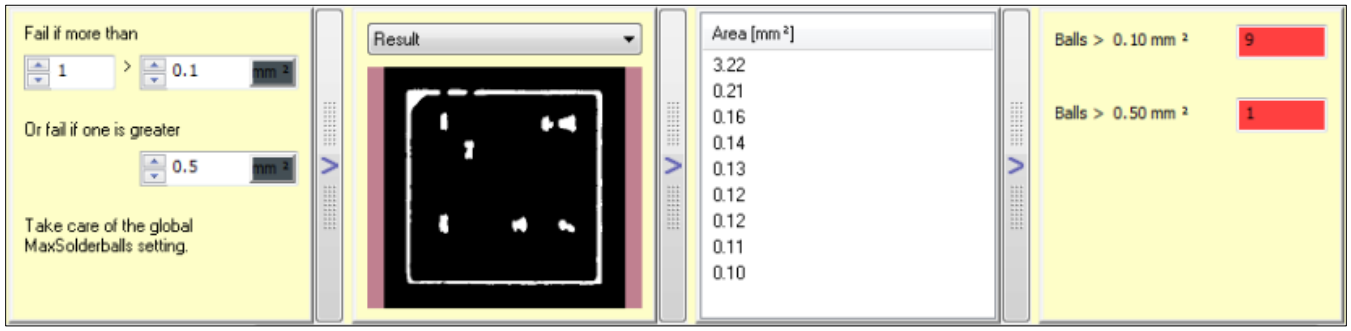


Figure 173: Solderball

8.3 Setting Fiducial Parameters

Two test modes are used for fiducial detection: **ThAndFind** and **SimpleGrayMatching.**

8.3.1 ThAndFind

1. Select the fiducial test field in the Test Center.

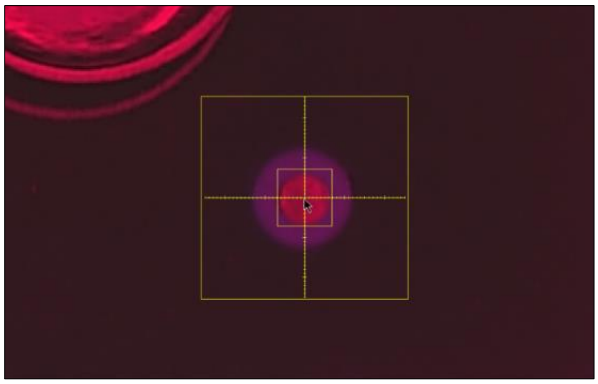


Figure 174: Select Fiducial Test Field

2. The test plan lights are set to illuminate specific objects and features. If the fiducial is not well defined under these light conditions, **Brightness** and **Contrast** can be manipulated to create a better image of the fiducial mark.

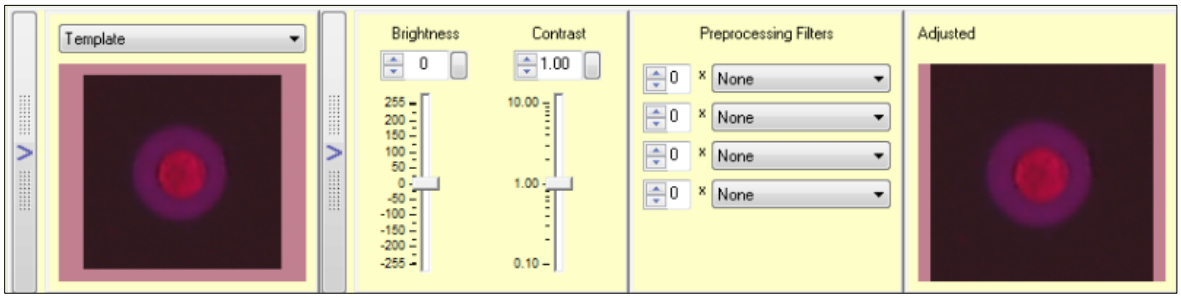


Figure 175: Brighten/Contrast Fiducial

3. Use **Preprocessing Filters** to isolate the fiducial.

Note. Chapter 11-6 of modusAOI manual (click 'F1' key from Front Panel) includes details on each one of the filters, along with images.

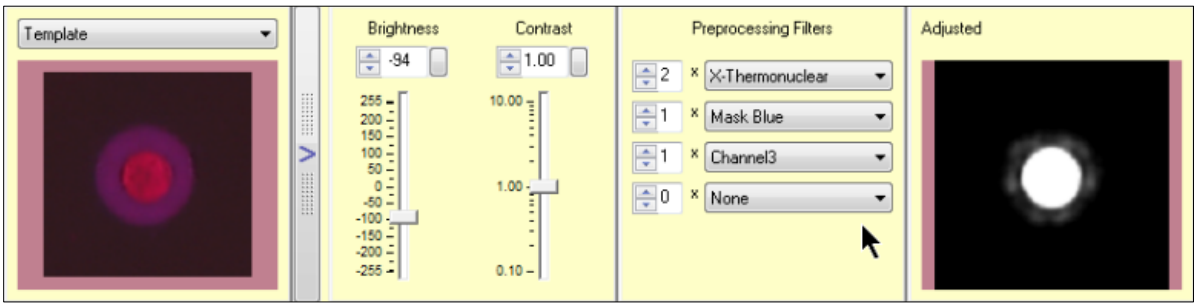


Figure 176: Preprocessing Filters

4. Adjust the **Light Threshold** to binarize the image so only the metal part of the fiducial is outlined.

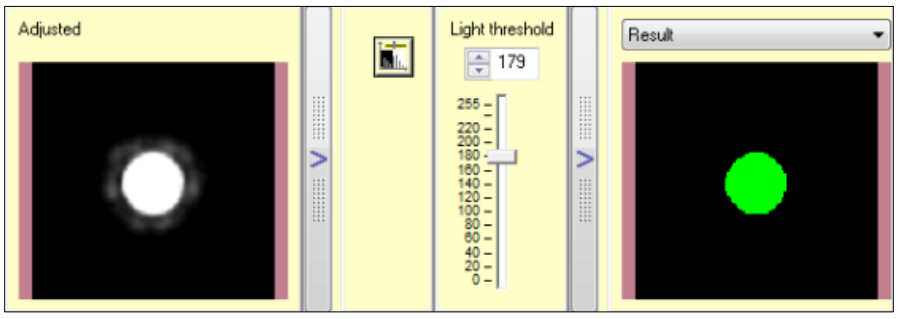


Figure 177: Light Threshold

5. There are two ways to utilize the light threshold: **Manual** and **Automatic**.

Figure 178: Manual and Automatic

6. Set the max deviation (**dx and dy**) from the expected position; common practice is to enter a large number and use the fiducial test field search area as control for the expected position. When fiducials are created, the measured deviation will be zero.

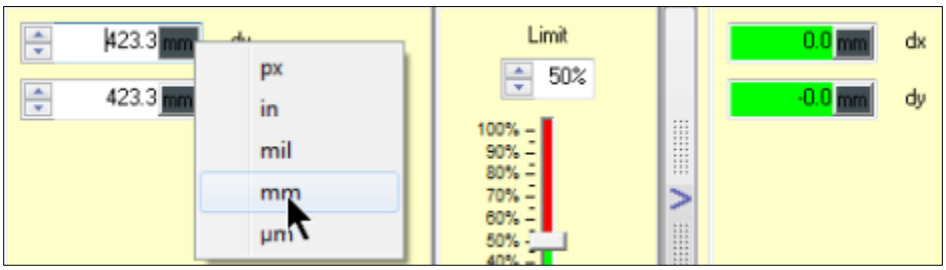


Figure 179: Set Max Deviation

7. Set the **Limit** for **Similarityfailure**. The lower the limit, the stricter it is. This means it must match the original.

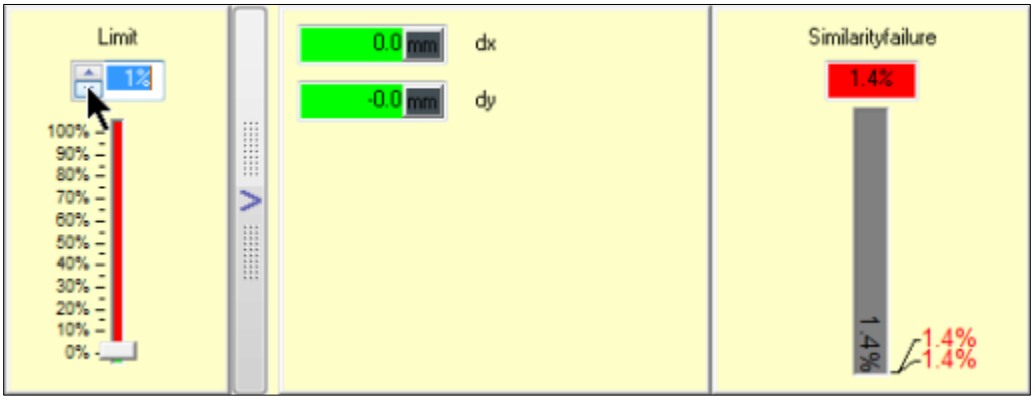


Figure 180: Set Limit

8.3.2 SimpleGrayMatching

1. Select the fiducial test field in the Test Center.

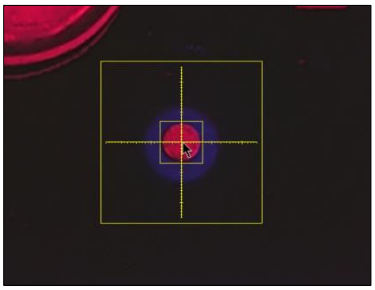


Figure 181: Select Fiducial Test Field

2. The test plan lights are set to illuminate specific objects and features. If the fiducial is not well defined under these light conditions, **Brightness** and **Contrast** can be manipulated to create a better image of the fiducial mark.

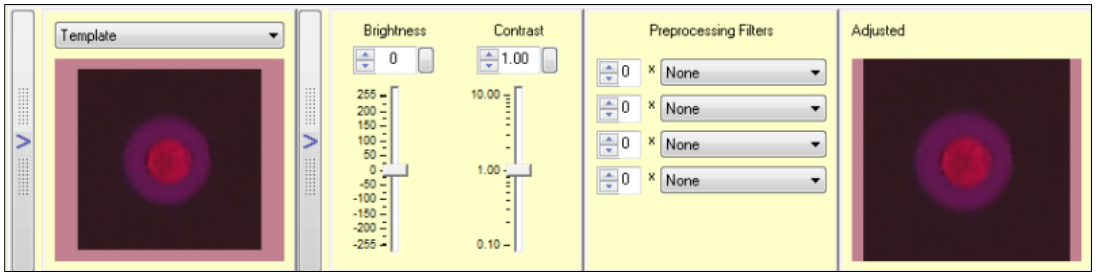


Figure 182: Brighten/Contrast Fiducial

3. Use **Preprocessing Filters** to isolate the fiducial.

Note. Chapter 11-6 of modusAOI manual (click 'F1' key from Front Panel) includes details on each one of the filters, along with images.

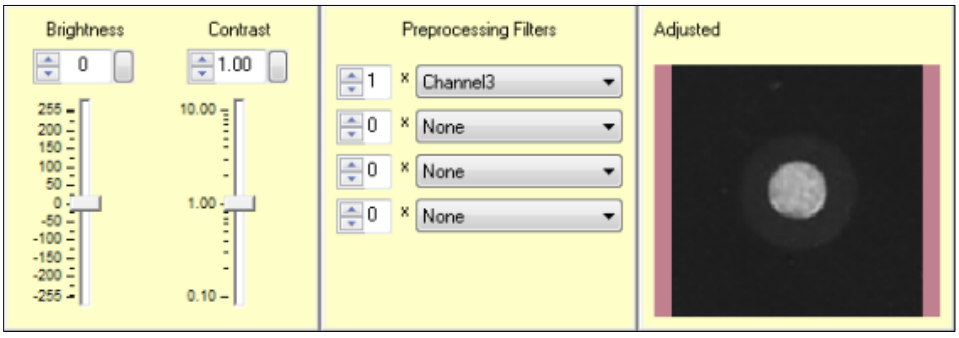


Figure 183: Preprocessing Filters

4. Set the **Downsample** to **1**. Downsampling reduces the pixel resolution of an image by combining groups of pixels.

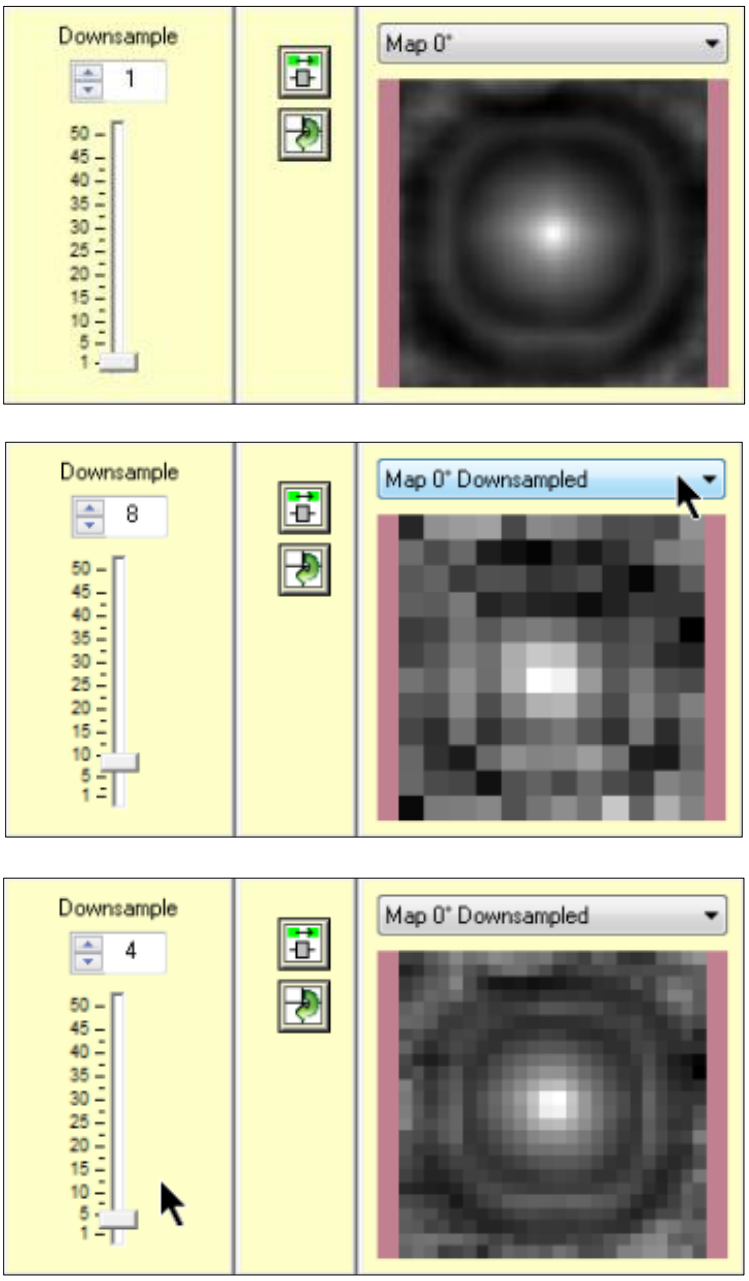


Figure 184: Downsample

5. Set the max deviation (**dx and dy**) from the expected position; common practice is to enter a large number and use the fiducial test field search area as control for the expected position. When fiducials are created, the measured deviation will be zero.

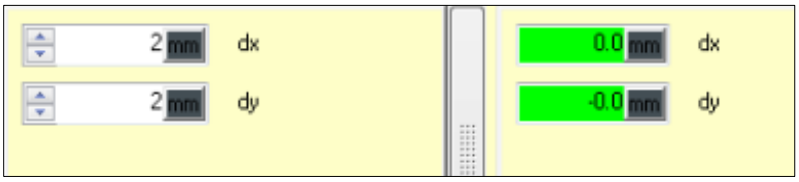


Figure 185: Set Max Deviation

6. Set the **Limit** for **Similarityfailure**. The lower the limit, the stricter it is. This means it must match the original.

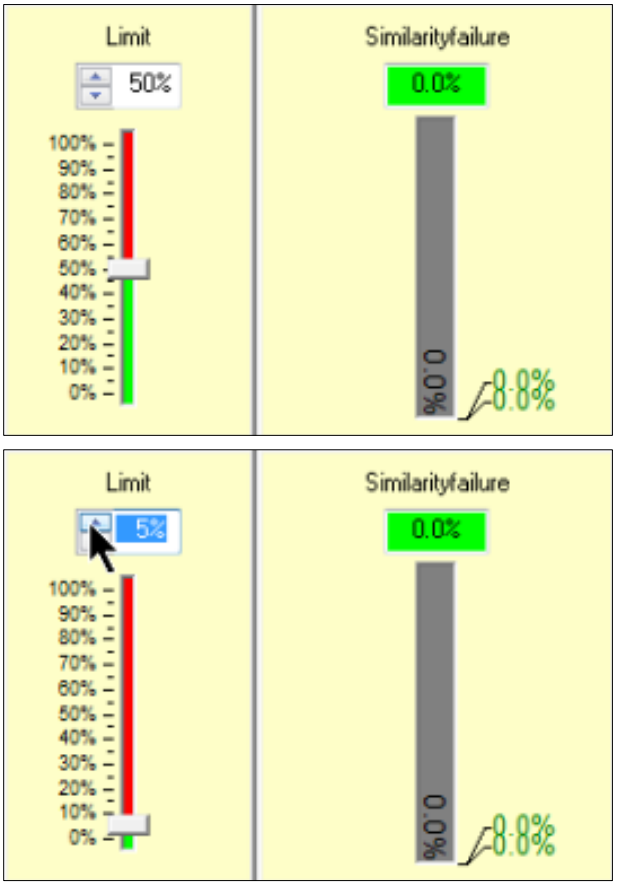


Figure 186: Set Limit

9. Configuration Menu

This is a hidden menu, accessible only from the Front Panel by press the letter “C” on the PC keyboard. The configuration menu can be password protected. The default password is **SCANNER**, all capital letters.

All configurable options are organized in nine (9) tabs:

- *Operation Mode/Integration*
- *Create Test Plan*
- *Save Data*
- *Internal Statistics*
- *Calculation/Appearance*
- *User Administration*
- *Keyboard*
- *System Data*

A few major tasks are accomplished using Configuration Menu:

- *Setting Users, User Levels and Passwords*
- *Setting Modus Keypad (not to be confused with PC keyboard)*
- *Setting Barcode Reader, MES, FIS*

This manual does not present details on the configuration menu.

9.1 Configuring Barcodes for Program Selection

Configuring PVA 20/20 to work with a barcode for program selections requires the following:

- **Software Applications must be installed.**
  - *Pathmaster*
  - *PVA Portal, and LineControl library*
  - *mTCP-PVA*
- **Complete the Barcode Setup in the modusAOI Configuration Menu.**
- **Create a Virtual Barcode test field in every inspection to be selected based on the barcode reading.**

9.1.1 Installing mTCP-PVA

1. Copy **mTCP-PVA.exe** and related files from the PVA M drive - **M:\Software\2. Vision\Modus**.
2. Paste **mTCP-PVA.exe** and **mTCP-PVA.ini** to the **C:\Argus\exe\tools** folder.
3. Create one desktop **mTCP-PVA.exe** shortcut.
4. Create one local **mTCP-PVA.exe** shortcut.
5. Move the local shortcut to **C:\ProgramData\Microsoft\Windows\Start Menu\Programs\Startup**. This will ensure the app will start automatically when the PC powers up.
6. Open **mTCP-PVA.ini**
7. In **mTCP-PVA.ini**, set number in **Port=####** to **RemotePort=####** number in **[TCP]** section in **LineControl.ini**

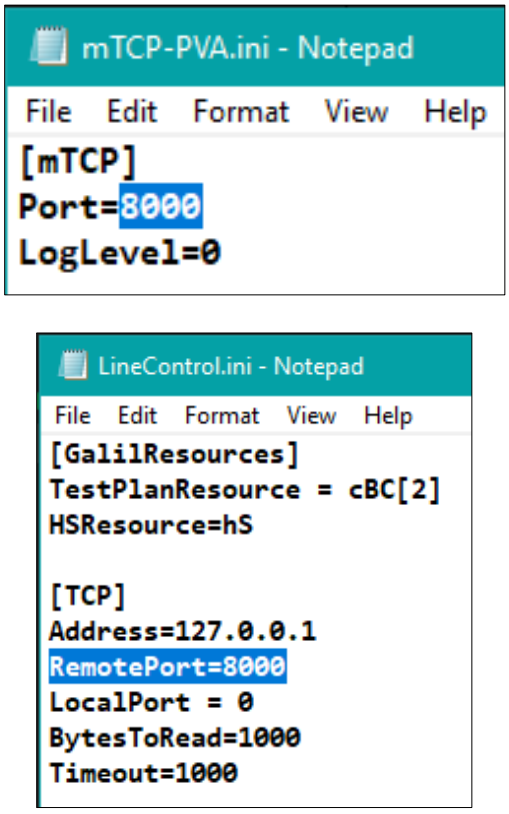


Figure 187: Port and RemotePort

8. Save the changes and close **mTCP-PVA.ini**.

9.1.2 Barcode Setup in modusAOI Configuration Menu

1. Launch **modusAOI**.
2. Once the front page is open, press the letter '**C**' on the keyboard to open the **Configuration Menu**.
3. In the Configuration Menu, click on the **Save Data** tab.

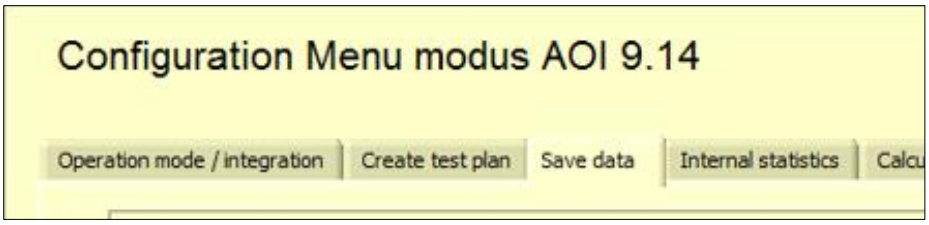


Figure 188: Save Data Tab

4. Select **Barcode Settings**.

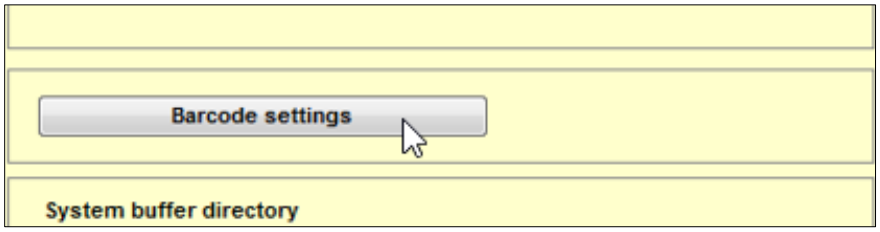


Figure 189: Barcode Settings

5. In the Barcode Settings window, select the **Read Barcode from File** path.

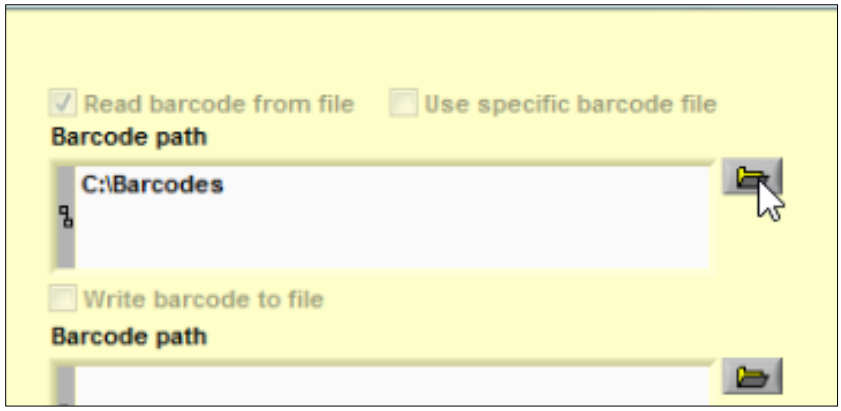


Figure 190: Read Barcode from File

6. Click **Ok**.

7. In the Configuration Menu, navigate to the **Operation Mode/Integration** tab.

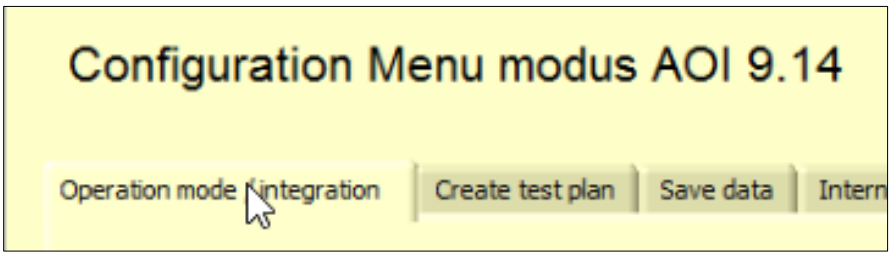


Figure 191: Operation Mode/Integration Tab

8. In the Operation Mode/Integration tab, select the **Check Remote Directory** checkbox.

Figure 192: Check Remote Directory

9. Click **Ok** to save the changes and exit.

9.1.3 Creating a Virtual Barcode Test Field

1. Open the targeted inspection.
2. Create a small, new test field away from any targeted inspection areas.

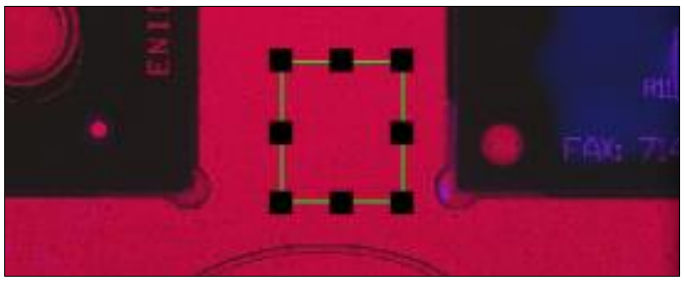


Figure 193: Create New Test Field

3. In the New Setting window, select **Barcode** under the **Test Object** dropdown.

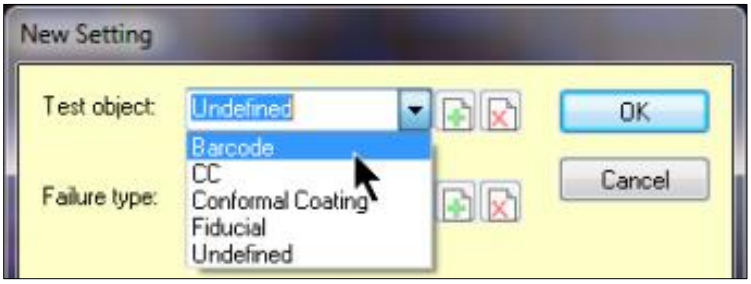


Figure 194: Barcode Test Object

4. Select **Not Found** from the **Failure Type** dropdown.

Figure 195: Not Found Failure Type

5. Select **Virtual Barcode** from the **Test Mode** dropdown.

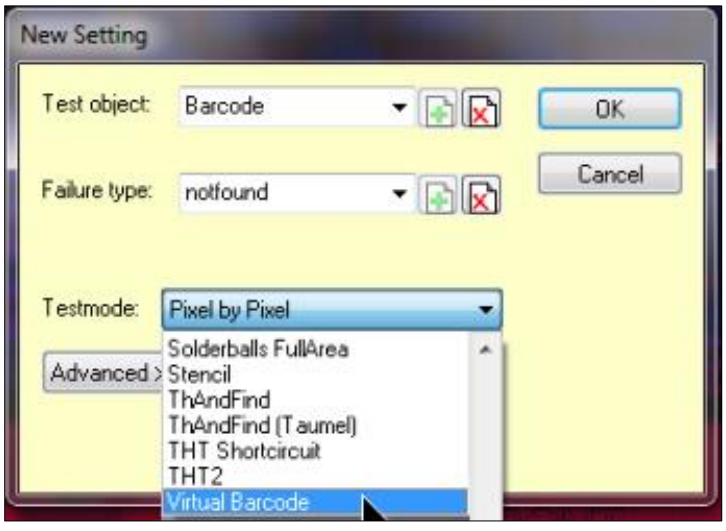


Figure 196: Virtual Barcode Test Mode

6. Click **Ok**.

7. In the **Change Test Parameters** window, select the proper port from the **Port** dropdown.

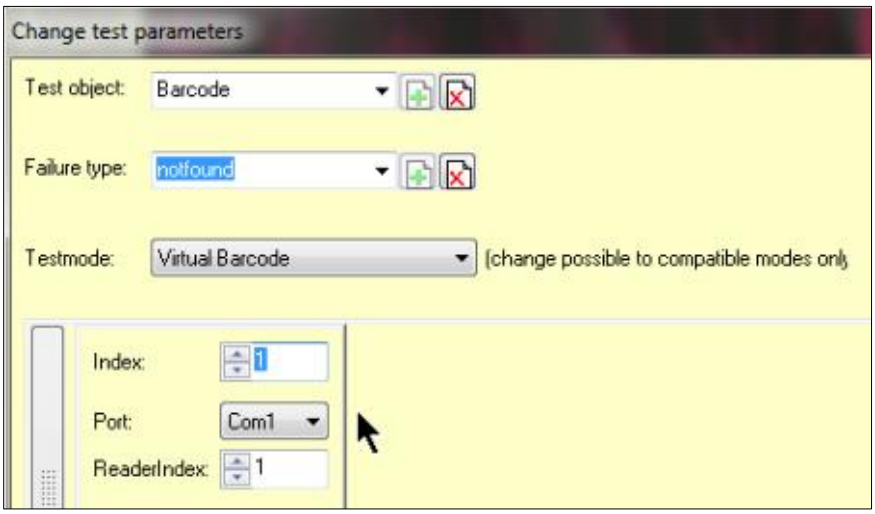


Figure 197: Select Port

8. Click **Ok**.

9. The port number can be changed or set at a later time in the Test Center. Open the inspection in the Test Center, then select the **Virtual Barcode** test field.

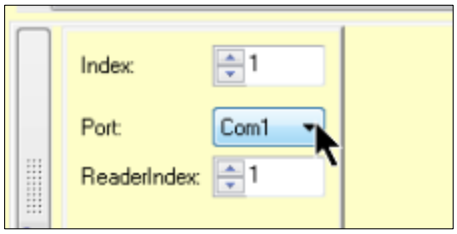


Figure 198: Virtual Barcode Test Field

10. Select **Ok** to save the changes and exit the Test Center.

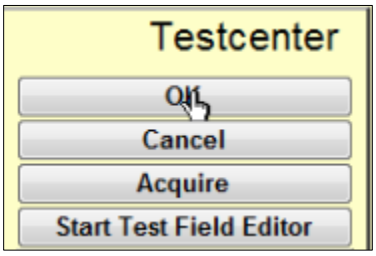


Figure 199: Save and Exit Ok

9.2 Saving Inspection Data

modusAOI offers a way to save data results from inspection if required. The data is organized in a file with an **MTP** extension and plain text format. There are two major steps to set inspection data logging.

- **Enable MTP in Configuration Menu**
- **Enable MTP in a Specific Inspection**

9.2.1 Enable MTP in Configuration Menu

1. In the Front Panel, press the letter '**C**' on the keyboard to launch the Configuration Menu.
2. In **Save Data** tab, select the **MTP** checkbox from the **Custom Data** pane.

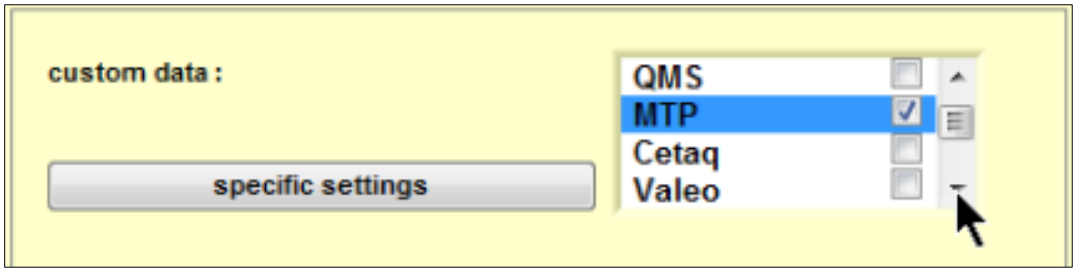


Figure 200: MTP Checkbox

3. Click **Specific Settings**.

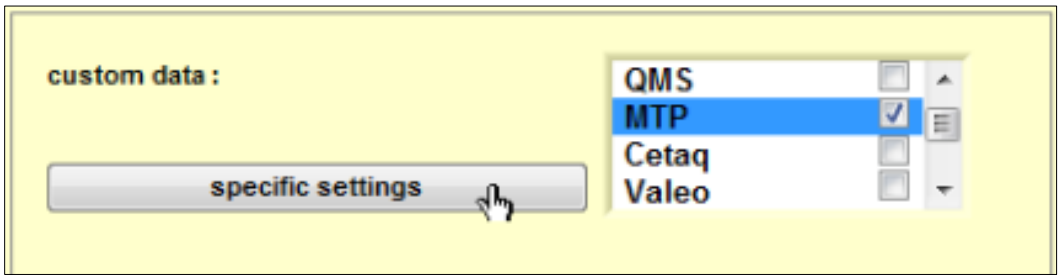


Figure 201: Specific Settings

4. In the **Settings** window, select the **One File Per Test** or **One File Per Day** from the **Write Option** dropdown.

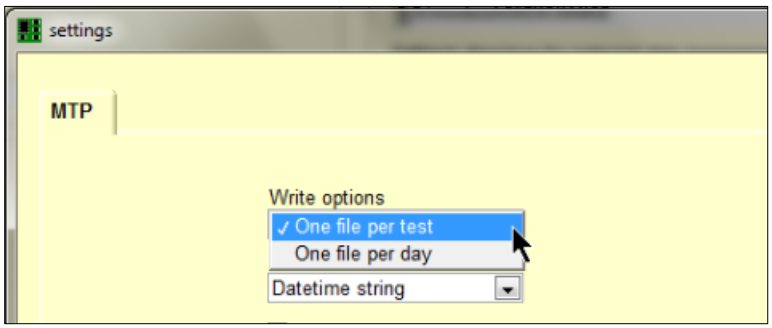


Figure 202: Select Write Option

5. Select **Date Time String** or **Barcode** from the **File Name** dropdown.

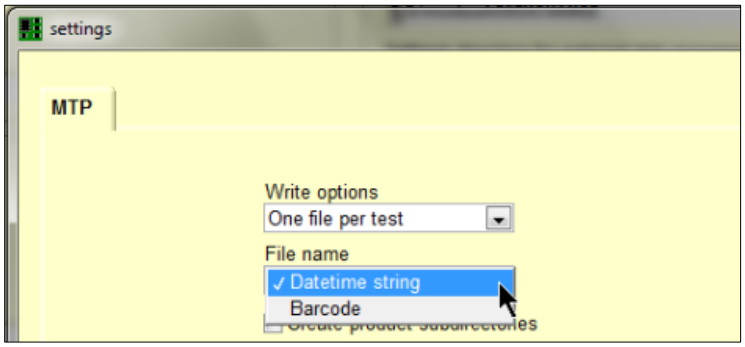


Figure 203: Select File Name

6. Other options include **Create Product Subdirectories**, **Save Data Also When Board Was Skipped**, and **Write Extended Measured Times**. Select all that apply.

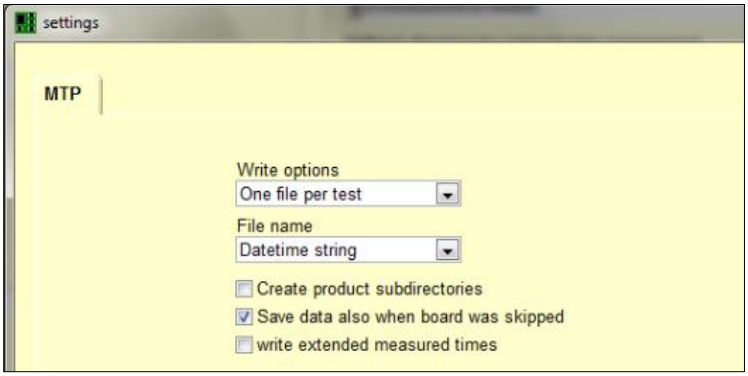


Figure 204: Additional MTP Options

7. Enter a location where the MTP file should be saved.

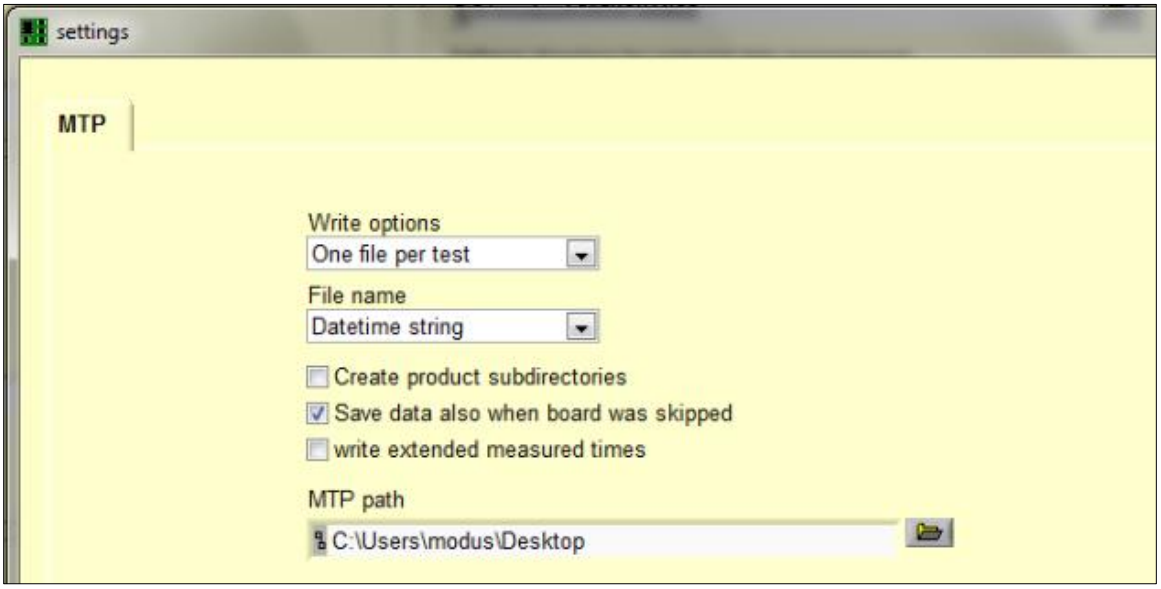
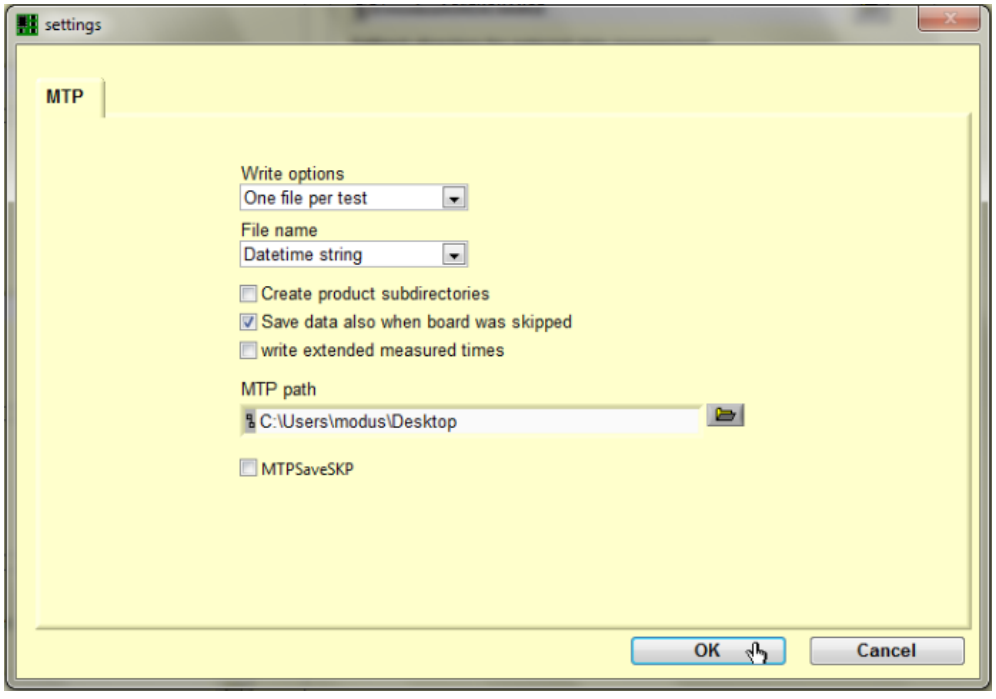


Figure 205: Enter File Location

8. Once complete, click **Ok**.



9. In the Configuration Menu, click **Ok** to save the changes and exit.

9.2.2 Enable MTP in a Specific Inspection

1. In the Test Plan Menu, select the inspection.
2. Click on the **Editor** button to open the inspection.

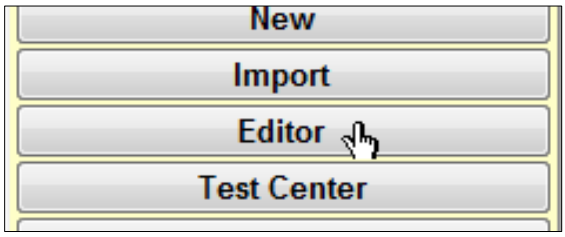


Figure 206: Editor

3. In the Test Field Editor, click on **Settings**.

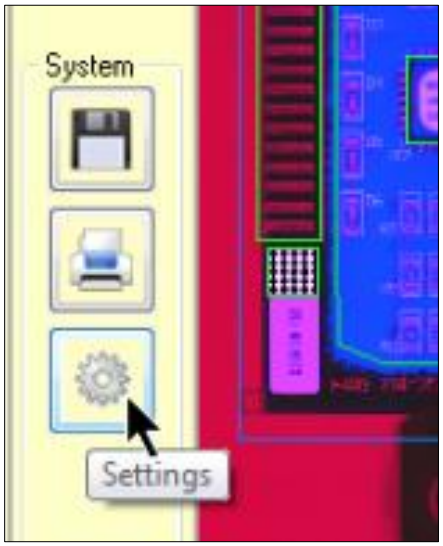


Figure 207: Settings

4. In the modusAOI window, click on the **MTP** tab.

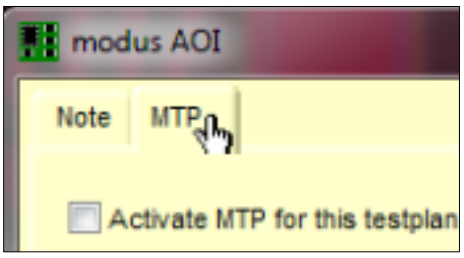


Figure 208: MTP Tab

5. In the MTP tab, select the **Active MTP for This Test Plan** checkbox.

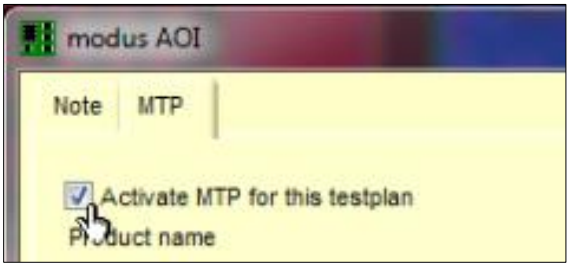


Figure 209: Activate MTP for This Test Plan

6. Enter a **Product Name**.

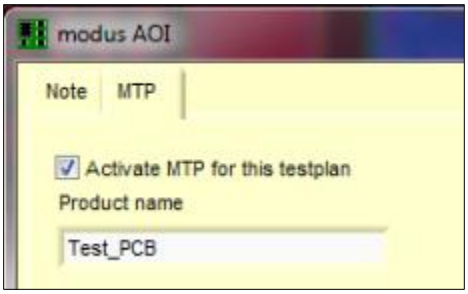


Figure 210: Enter Product Name

7. Enter a **Revision State** and **Order Number** if applicable.

Figure 211: Revision State and Order Number

8. Click **Ok**.
9. In Test Field Editor, click **Ok** to save the changes and exit.

modusAOI generates the **MTP** file at the location, specified in the **Configuration Menu** when the inspection is run in **Auto Mode.** The file can be open using any text editor.

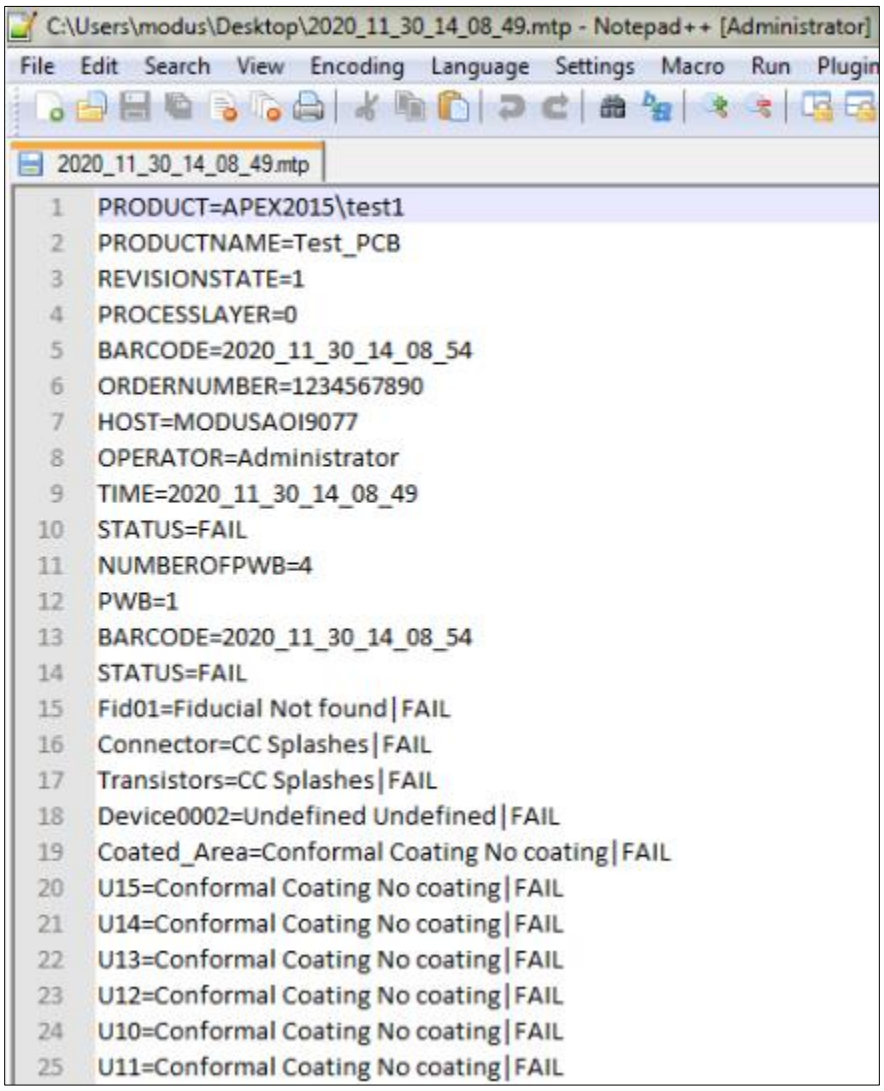


Figure 212: MTP File

10. Notes

11. Warranty

PVA Warranty Policy

PVA warrants the enclosed product against defects in material or workmanship on all components for one year from the date of shipment.

The warranty does not extend to components damaged due to misuse, negligence, or installation and operation that are not in accordance with the recommended factory instructions. Unauthorized repair or modification of the enclosed product, and/or the use of spare parts not directly obtained from PVA (or from factory authorized dealers) will void all warranties.

All PVA warranties extend only to the original purchaser. Third party warranty claims will not be honored at any time.

Prior to returning a product for a warranty claim, a return authorization must be obtained from PVA's Technical Support department. Authorization will be issued either via the telephone, facsimile, or in writing upon your request.

To qualify as a valid warranty claim, the defective product must be returned to the factory during the warranty period. Upon return, PVA will repair (or replace) all components found to be defective in material or workmanship.

(Retain this for your records)

Product Information:

PRODUCT: _____

SERIAL NUMBER: _____

DATE OF PURCHASE: _____

12. Tables of Figures