

CHAPTER 8 2D INSPECTION

MODULE OVERVIEW

Introduction

2D Inspection (2Di) utilizes the machine vision system for accurate detection of paste on the board and stencil after printing. When this option is enabled the board and stencil can be inspected for various aspects of printing as listed in the table below.

When certain function keys are selected the existing machine status page is replaced by a Graphical User Interface (GUI). The GUI allows the user to setup and navigate 2Di sites quickly and easily.

Purpose

By monitoring the printing process, 2Di ensures the continual quality of board printing. 2Di, if licensed, verifies the correct paste coverage, alignment, bridging, volume, blockage and smear, (figure overleaf details).

NOTE: *Advanced Inspection Type option is not available on some machines.*

If there is insufficient paste on the board, paste dispense and reprinting the board operations can be undertaken. If there is too much blockage or smear, the stencil can be cleaned automatically.

2Di optimizes the cycle time by eliminating unnecessary stencil cleaning and paste dispensing operations. To achieve this, the system inspects various areas of the board and/or stencil to detect the following:

Inspection	Type	Description
Paste on Pad	Basic	Amount of the pad covered by solder paste, as a % of the aperture size
Stencil Blockage	Basic	Solder paste remaining inside stencil apertures
Alignment	Advanced	Accuracy of paste positioning compared to the learnt pad
Bridging	Advanced	Distance between adjacent deposits of paste
Volume	Advanced	Volume of paste on the board
Stencil Smear	Advanced	Solder paste on the stencil

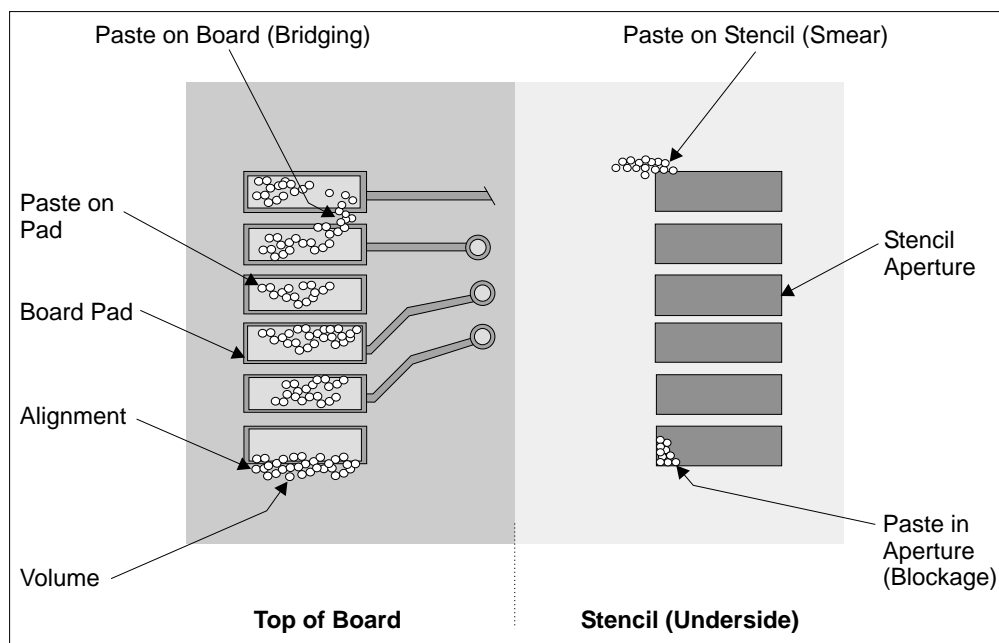


Figure 8-1 Paste on Board and Stencil

Using blockage and paste present information, the system can calculate the following:

- Paste Volume - volume of paste on the board.

Operation

Board and stencil inspection is licensed as a separate feature for each, and specifies the maximum level of inspection which may be selected. The levels of inspection for either feature against inspection type is detailed in the following table:

Inspection Type	Board Inspection	Stencil Inspection
None	No Inspection	No Inspection
Basic	Paste on Pad	Blockage
Advanced	Paste on Pad Bridging Alignment Paste Volume Prediction	Blockage Smear

NOTE

Board Inspection when set to Advanced, checks for paste on and off the pad.

An item only appears in a window while it is appropriate to the current inspection type. In particular, Paste Volume is only calculated and displayed whilst the level of inspection is set to Advanced for both the board and the stencil.

Pre-images

Board inspection is achieved by image comparison. Therefore prior to printing, the camera visits all programmed sites to capture images of the bare sites.

This captured image, called a Pre-image, is taken for every site setup. The two available parameter settings for capturing Pre-images is:

- One - Pre-image captured on the first board in a batch only.
- Every - Pre-image captured on every board of a batch.

There is no provision to select sites to be pre-imaged individually. All sites are pre-imaged once (one) or every cycle (every).

NOTE

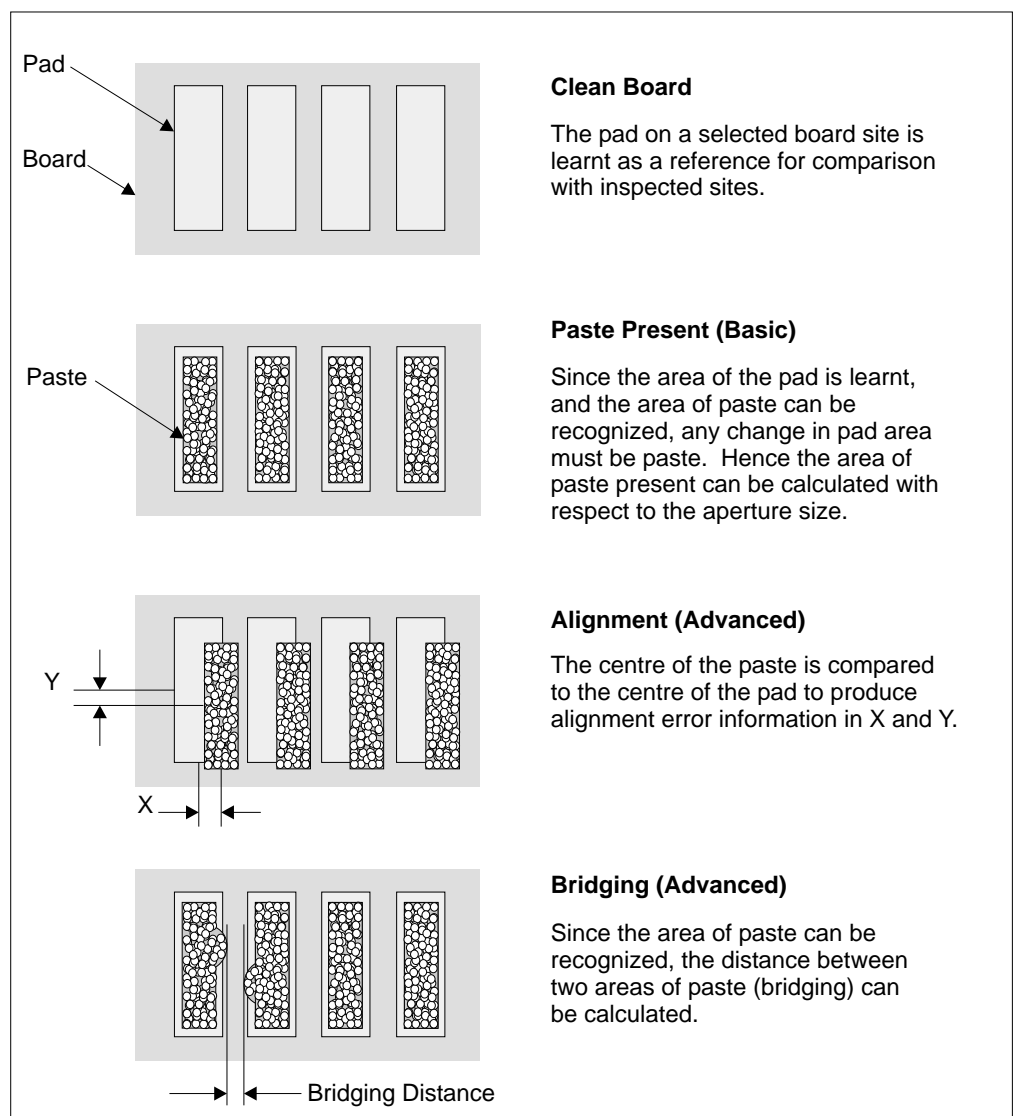
A new batch may be started when the machine is switched ON/OFF or a product file being re-loaded.

Light Calibration

The stencil image is captured once only, (as this does not change throughout the printing process). When the first board enters the machine, the camera visits all sites and stores the size and shape of the apertures. This is a one time operation, therefore the stencil must be clean.

Board Inspection

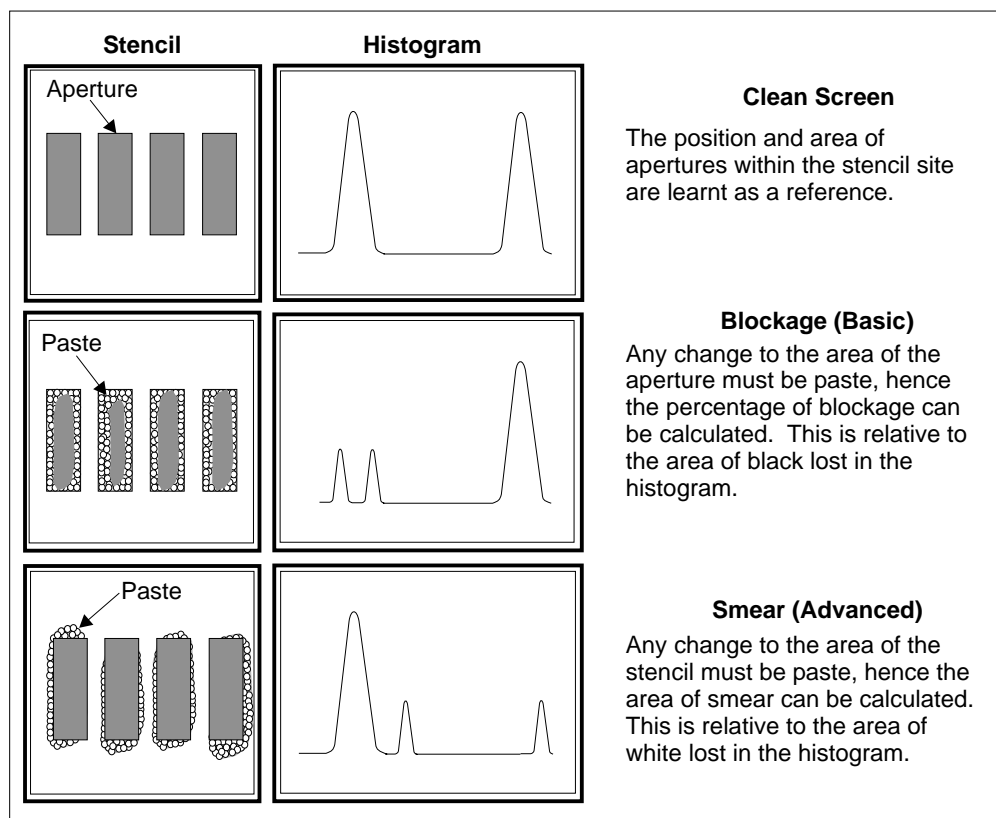
The various board inspections are shown below.



NOTE

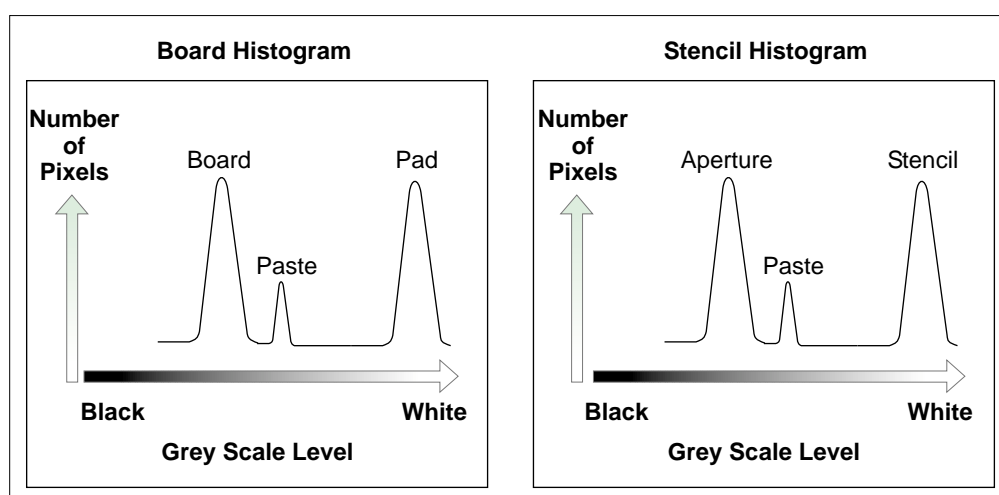
Uneven tinning of the board and/or misaligned solder mask may be seen as paste, which could cause false readings. DEK's Green camera and lighting setup can eliminate this effect.

Stencil Inspection The various stencil inspections are shown below. (Histogram information is detailed on this page.)



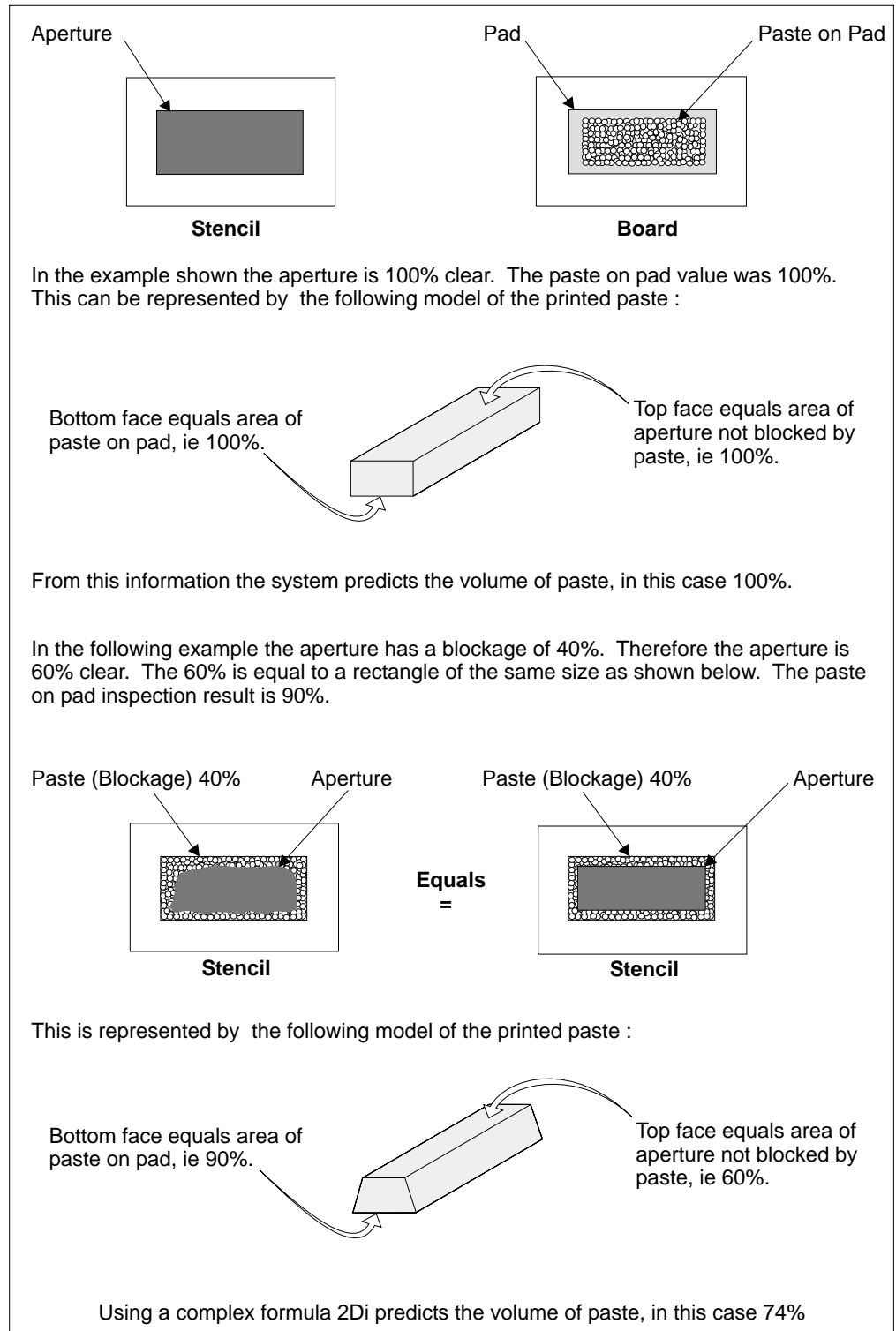
Histogram

The vision card analyses the grey scale levels of the pixels that make up the site image. From this information a histogram is produced, this can be used as a visual aid to setting up lighting for 2D inspection.



Paste Volume Prediction

The volume of paste on a pad can be predicted using both 2Di blockage and paste on pad inspection results. This is only available whilst the level of inspection is set to Advanced for both board and stencil. An example of how paste volume prediction is achieved is shown in the graphic below.



Auto Learn 2Di inspection can automatically learn different types of features as shown below.

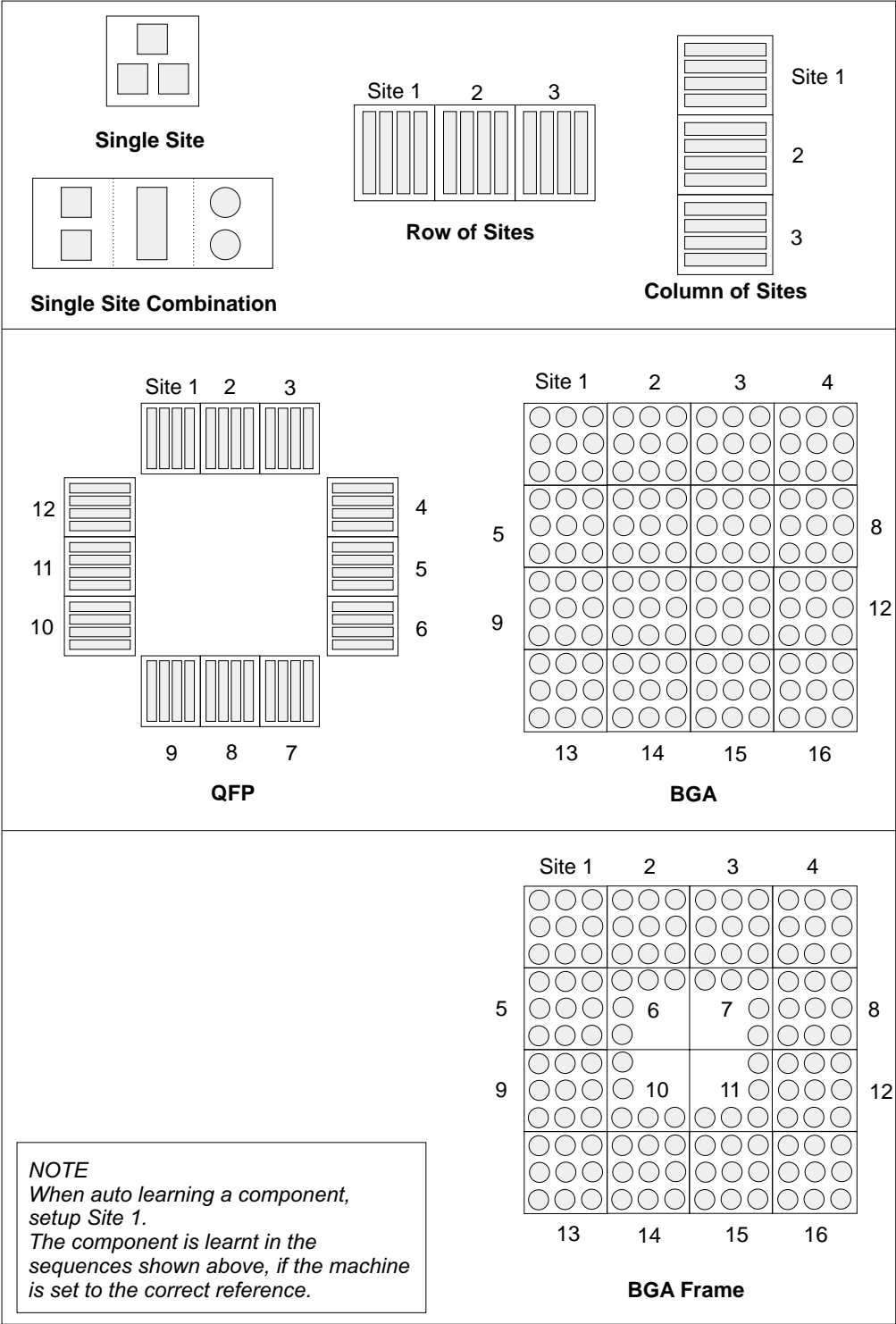


Figure 8-2 Auto Learn Site Types

Inspection Cycles

During setup, sites are given a priority of either Every Cycle (EC) or General (G). The amount of sites inspected during each cycle is set using the min sites/cycle parameter, this must be set to at least the amount of every cycle sites. As the name suggests, EC sites are inspected every cycle. General sites are inspected depending on the value of the min sites/cycle parameter and the number of EC sites as follows:

Number of general sites inspected per cycle = Min sites/cycle parameter - EC sites.

The general sites are inspected in rotation as shown below.

min sites / cycle = 5 In the example below, seven sites have been setup, with two given the priority of Every Cycle (EC) and five given the priority of General (G) . The min sites/cycle parameter is set at 5. As there are two EC sites, this leaves three G sites to be inspected at each cycle as shown.							
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
	EC	EC	G	G	G	G	G
Cycle 1	EC	EC	G	G	G		
Cycle 2	EC	EC	G			G	G
Cycle 3	EC	EC		G	G	G	
Cycle 4	EC	EC	G	G			G
Cycle 5	EC	EC			G	G	G

	SITES
Cycle 1	3, 4, 5
Cycle 2	6, 7, 3
Cycle 3	4, 5, 6
Cycle 4	7, 3, 4
Cycle 5	5, 6, 7
Cycle 6	process repeats

Figure 8-3 Site Inspection Cycles

Lighting

The lighting levels for 2D inspection is software controlled. For a more detailed description of the camera and optical unit refer to the Technical Reference Manual, Camera and Vision Systems Module Chapter.

The green camera lighting parameters and functions are shown below. Each lighting group can be set by the operator to a level between 0 to 15, where 15 is the brightest.

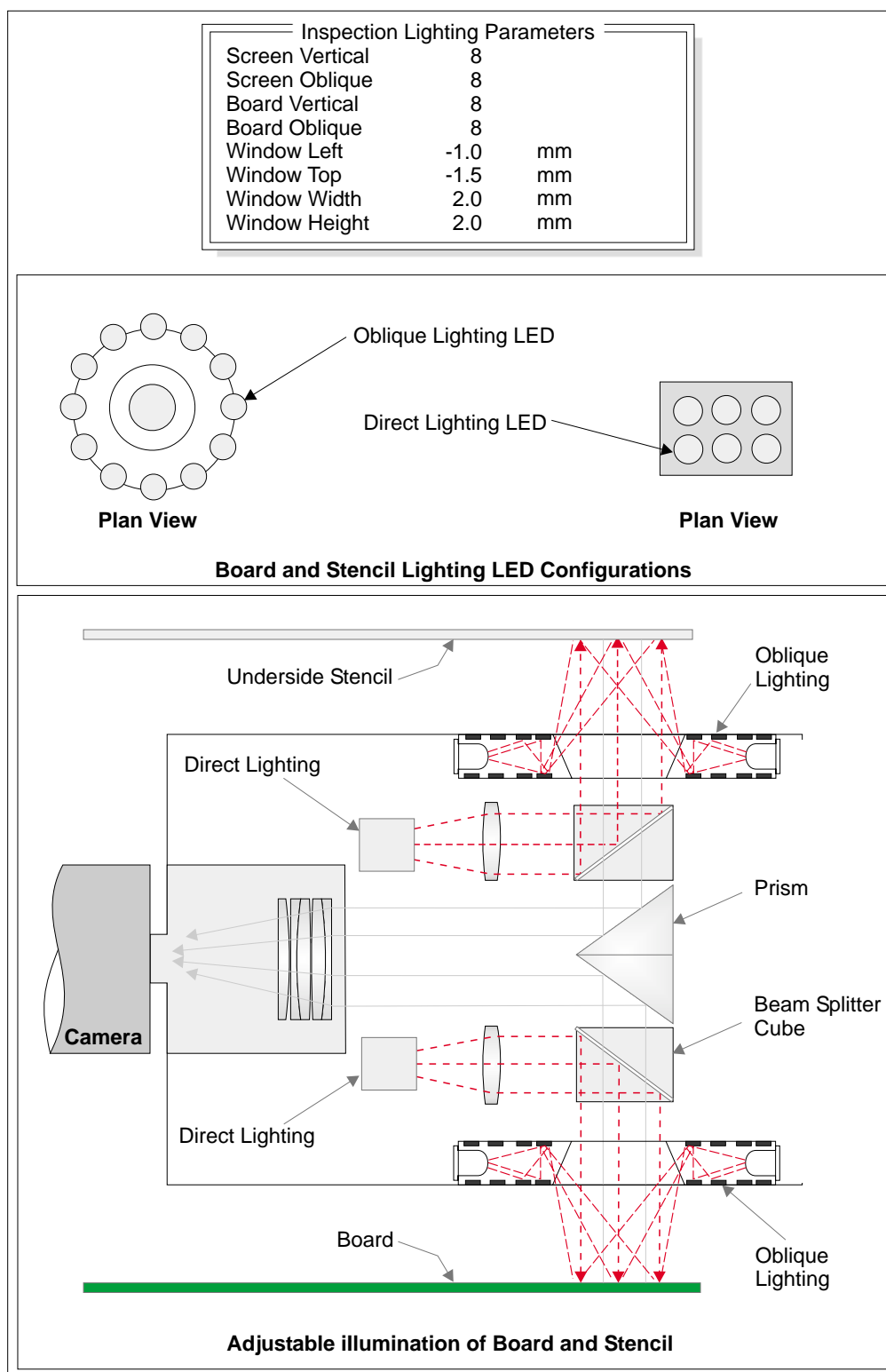


Figure 8-4 Software Controlled Lighting - Green Camera

Image Recording

Selecting **Save Image** saves the inspection object data using the save object command. This option is only available if image recording in set preferences is set to VP or PC disk.

It is recommended to use PC disk only for image recording. When saved the file name is inspnnnn.im2, where *n* is an incrementing number.

The first image saved after initialization is insp0001.im2.

NOTE

VP disk saves to the Vision HD if fitted.

Inspection Setup

Correct inspection setup is the key to effective inspection. By following the steps of the setup sequence, shown in the summary below and the setup guide over the page, effective inspection may be achieved. Refer to the 2D Inspection Setup section of this chapter for step by step procedures on inspection set up.

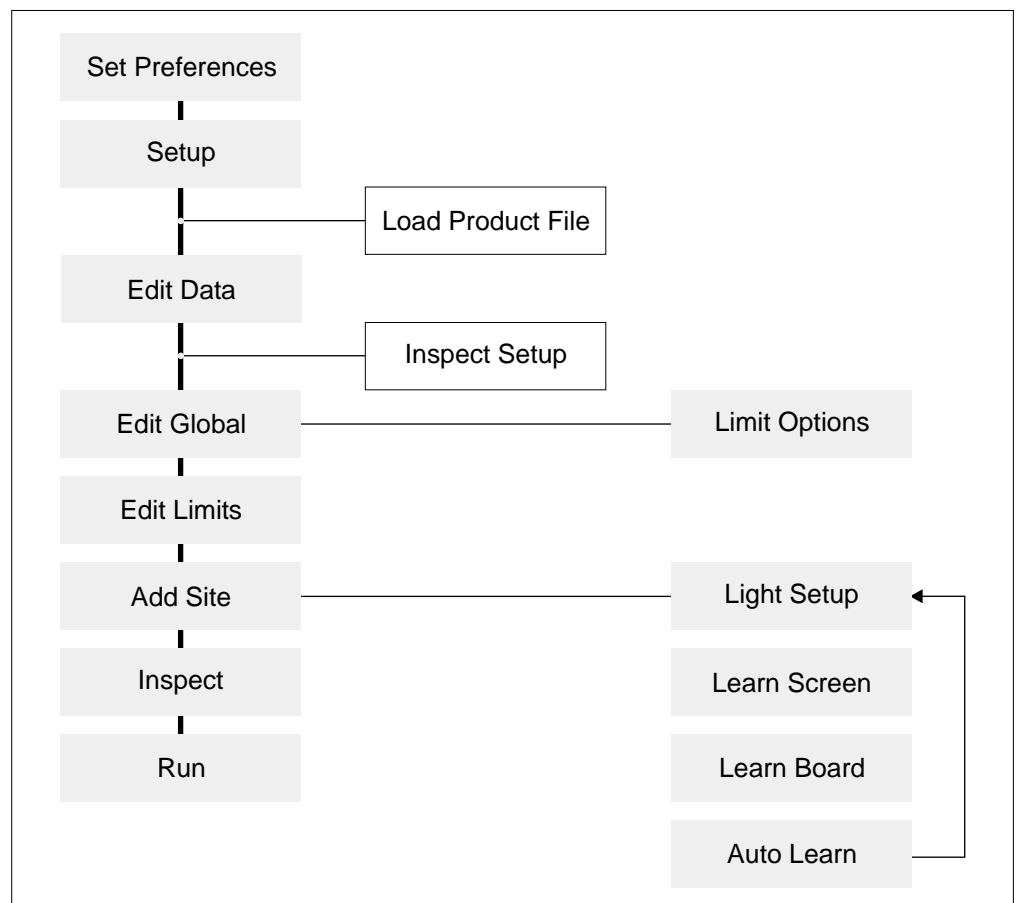


Figure 8-5 Summary of Setup

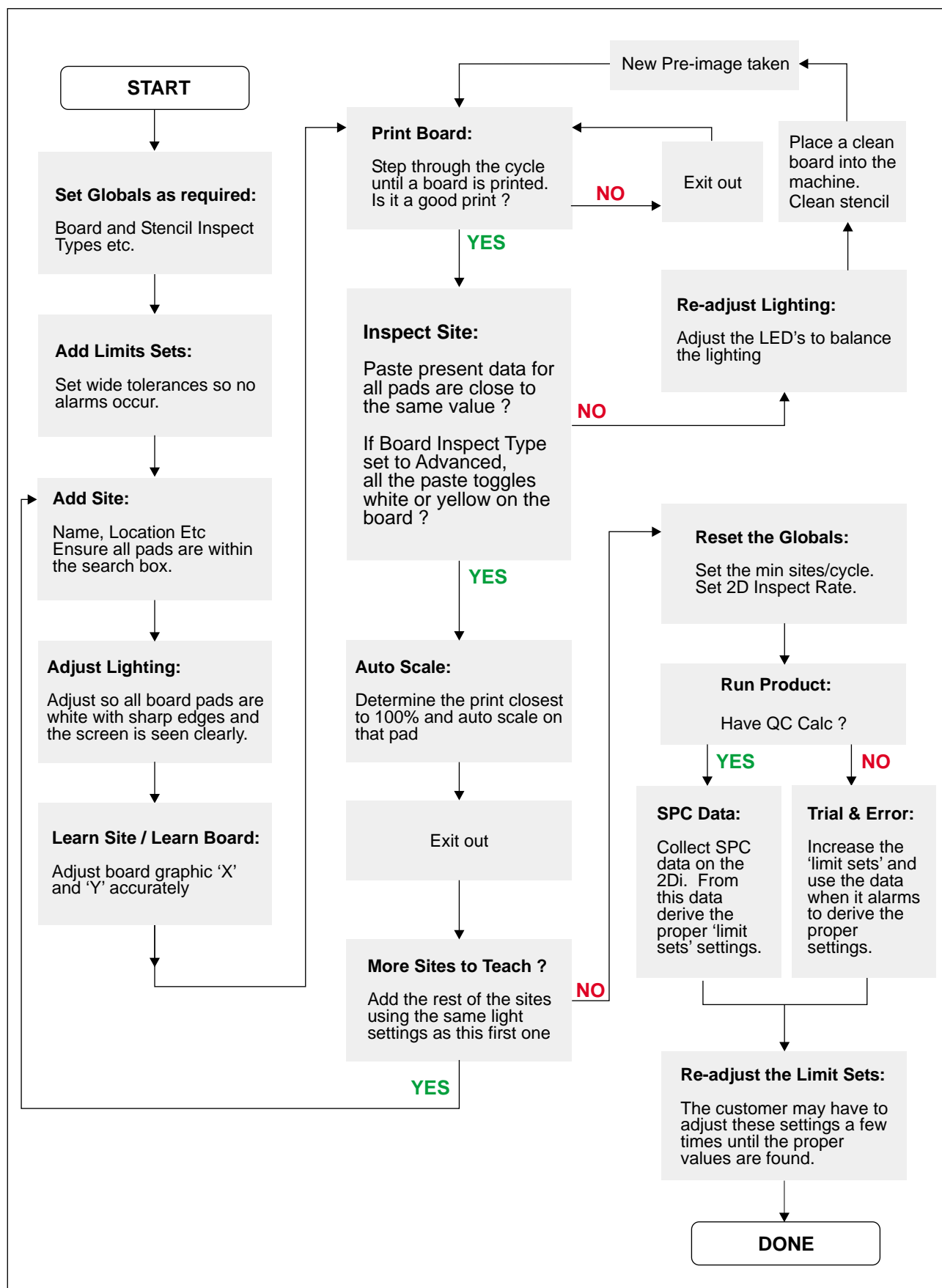


Figure 8-6 2D Inspection Setup Guide

Graphical User Interface (GUI)

2D inspection utilizes a Graphical User Interface (GUI) allowing inspection sites to be set up quickly and easily.

The 2Di GUI screen is displayed when Inspect Setup is selected on the menu bar. The GUI provides the user with the following functions:

- A graphical representation of the board to be set up.
- Site Priority colour coding.
- Operations Buttons.
- List of inspection devices and sites.
- List of programmed site parameters.
- Current X and Y mouse coordinates.
- Vision window of board and stencil.
- Camera view adjustable using vision window scroll bars (when available).

NOTE

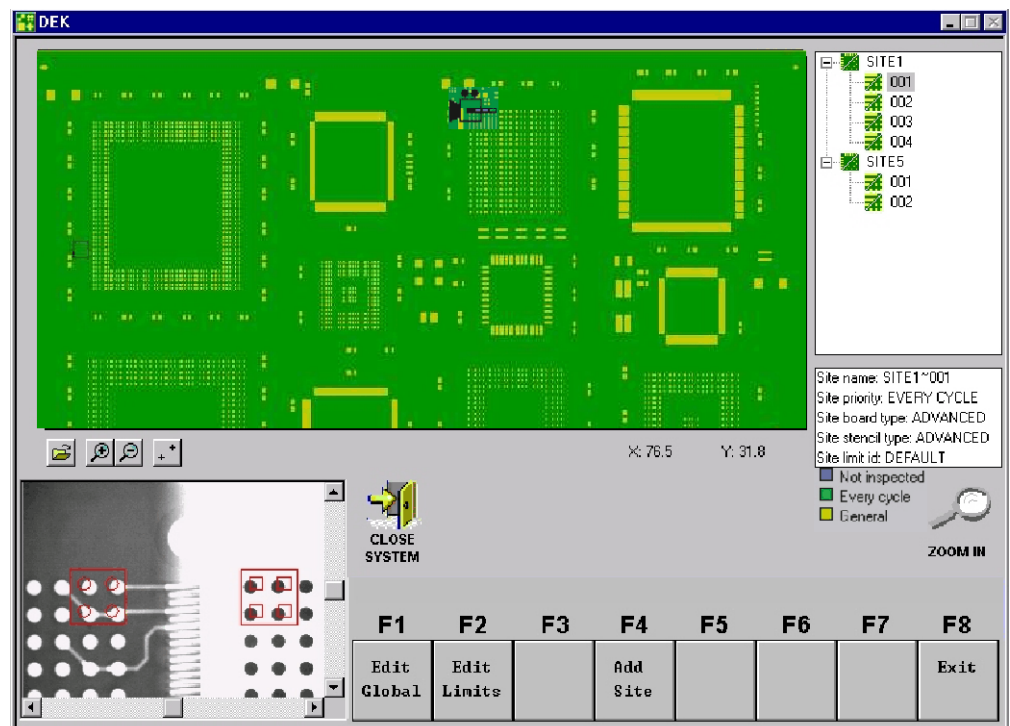
Refer to GUI 2Di Interface figure and table further in this section.

Representation of Board

Two types of board image files are available for displaying the product on the GUI board representation screen:

- Bitmap file (.bmp)
- Extended Gerber file data (.gbx)

To display the board representation in bitmap or gerber file format, the relevant .bmp/.gbx information must be pre-loaded into the machine PC. The image is scaled to fit the representation of the board on display, (example of gerber file import shown below).



If no image files are available, the display defaults to a standard board size representation of the product file being printed.

By utilizing the mouse control or touchscreen (if available), any area of the board representation selected by the user roughly positions the camera to this area. Fine positioning is then carried out by adjusting the X and Y scroll bars in the vision window. Existing sites can easily be selected and adjusted using the mouse control and touchscreen (if available).

NOTE

The vision window X and Y scroll bars are displayed only when movement of the camera is allowed within GUI.

Site Colour Coding Sites displayed on the board representation are coloured according to their site priority parameter setting, as detailed in the following table.

Site Priority	Display Colour
Every Cycle	Green
General	Yellow
Not Inspected	Blue

NOTE

The current selected site is displayed in black.

Operations Buttons The four operations buttons are sited underneath the representation of the board and are used to perform functions on the board. These are:

- Open Image File - allows user to browse and select .bmp/.gbx image file.
- Zoom In - zooms in to sites on the board representation.
- Zoom Out - zooms out from sites on the board representation.
- Fiducial Positions - show/hides board fiducial positions.

List of Devices and Sites The list of devices and sites created are displayed in an expandable and collapsible form.

By selecting a site in the list, the camera moves to that site position and the board representation site is highlighted with a camera position icon.

By selecting a device in the list, the device list automatically expands to show all sites within that device. The first site within the list is selected and the camera moves to that site position, the board representation site is highlighted with a camera position icon.

NOTE

In this instance a device itself can never be selected.

Site Parameters The site parameters window enables the user to view the editable parameters for the current site selected.

NOTE

The parameters in this display are view only.

X and Y Site Coordinates The X and Y site coordinates display is the current position of the mouse pointer on the board.

Vision Window

The video monitor displays what the camera views, (both board and stencil). A Region of Interest (ROI) box (red outlined), representing the current boundary of the site is superimposed on both stencil and board displays.

When movement of the camera is allowed within GUI, scroll bars are displayed in the vision window to enable fine positioning of the camera unit during site setup.

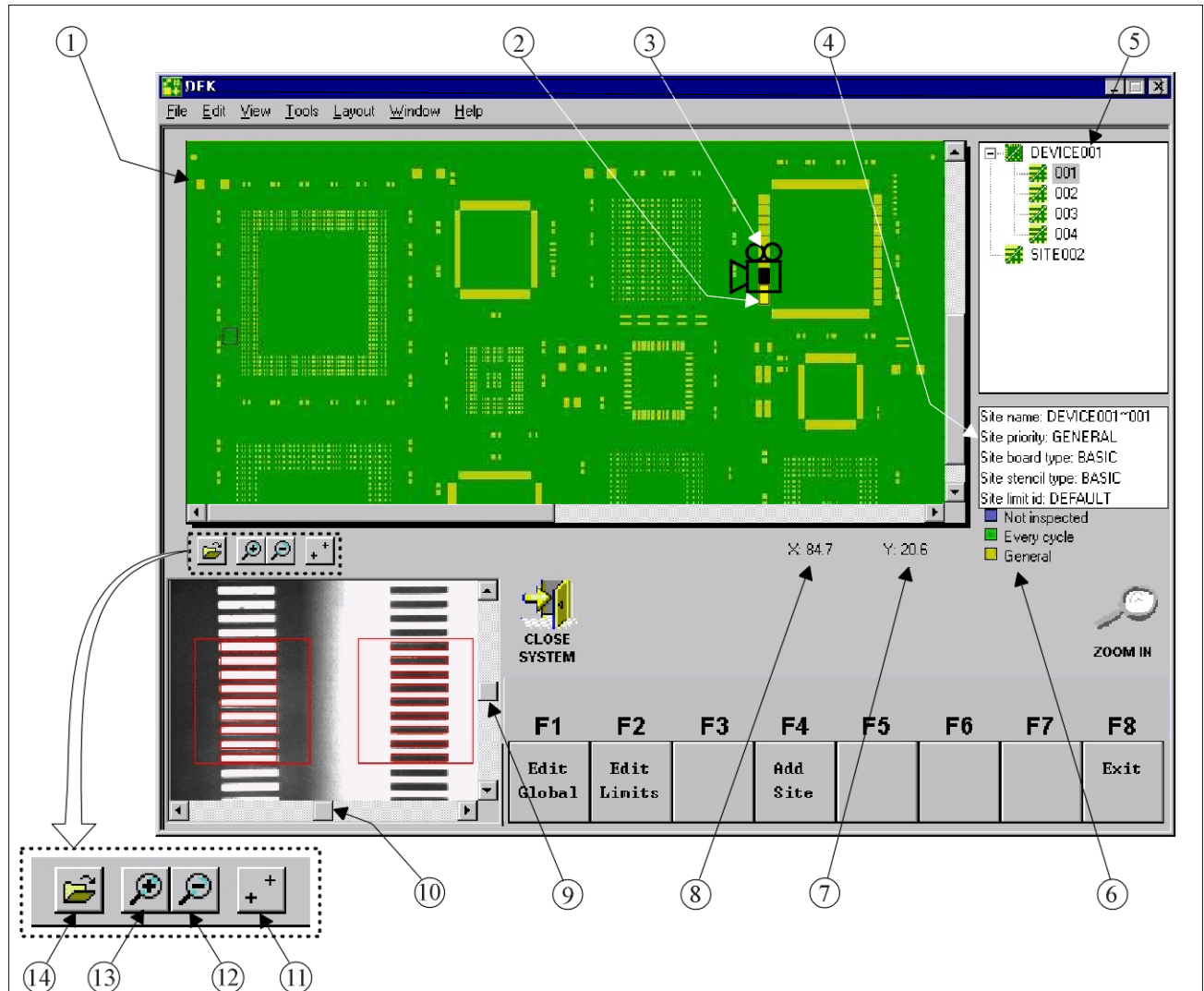


Figure 8-7 GUI 2Di Interface (Bitmap File Representation)

Item	Description	Item	Description
1	Board Representation (.bmp or .gbx image file)	2	Inspection Site
3	Camera Position Icon	4	Inspection Site Parameters
5	Site List	6	Site Priority Guide
7	Site Y Coordinates (current mouse position)	8	Site X Coordinates (current mouse position)
9	Vision Window Y Scroll Bar (when available)	10	Vision Window X Scroll Bar (when available)
11	Show / Hide Fiducial Positions	12	Zoom Out on Board Representation
13	Zoom In on Board Representation	14	Open .bmp or .gbx Image file

2D INSPECTION SETUP

Preparation For 2D inspection functionality the machine requires 2D Inspection in set preferences to be set to enabled. Carry out the following procedures:

Set Preferences

1. Select **Maint.**

Run	Open Cover	Paste Load	Clean Screen	Adjust	Setup	Monitor	Maint.
-----	------------	------------	--------------	--------	-------	---------	---------------

2. Select **Set Prefs.**

Calibrat Pressure	Calibrat Offset	Calibrat Vision	House Keeping	Set Prefs	Diagnost	Test Cycles	Exit
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3. Using the **Next** and **Incr** keys, set 2D Inspection to **Enabled**.

			Next	Previous	Incr.	Decr.	Exit
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4. Select **Exit**. The message '**Printer configuration data file saved**' is displayed in the message prompt bar above the menu bar.

			Next	Previous	Incr.	Decr.	Exit
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5. Select **Exit**.

Calibrat Pressure	Calibrat Offset	Calibrat Vision	House Keeping	Set Prefs	Diagnost	Test Cycles	Exit
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Load Product File

1. Select **Setup**.

Run	Open Cover	Paste Load	Clean Screen	Adjust	Setup	Monitor	Maint.
-----	------------	------------	--------------	--------	--------------	---------	--------

2. Select **Load Data**. The message '**Use keyboard to action product search**' is displayed in the message prompt bar above the menu bar.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
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The Load Data File window appears.

3. Use the **Left**, **Right**, **Up** and **Down** keys to highlight a product file. If the product to be setup is a new one, select an existing product file and modify it, (Edit Data refers).

Load		Rebuild List	Left	Right	Up	Down	Exit
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4. Select **Load**.

Load		Rebuild List	Left	Right	Up	Down	Exit
------	--	--------------	------	-------	----	------	------

5. Select **Exit**. The machine loads the product file and trains the fiducials.

Load		Rebuild List	Left	Right	Up	Down	Exit
------	--	--------------	------	-------	----	------	------

Edit Data

1. If the loaded product file is the correct one, go to Step 9. If the file needs to be modified continue with Step 2.

2. Select **Setup**.

Run	Open Cover	Paste Load	Clean Screen	Adjust	Setup	Monitor	Maint.
-----	------------	------------	--------------	--------	-------	---------	--------

3. Select **Edit Data**.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
------	-----------	-----------	----------------	---------------	----------------	-----------------	------

The following window is displayed:

Edit Current Process Parameters		
PRODUCT NAME	Dek04	
PRODUCT ID	Dek04	
DWELL HEIGHT	30	mm
DWELL SPEED	24	mm/s
SCREEN ADAPTOR	NONE	
SCREEN IMAGE	EDGE	
CUSTOM SCREEN	DISABLED	
BOARD WIDTH	101.5	mm
BOARD LENGTH	152.5	mm
BOARD THICKNESS	1.6	mm
FRONT PRINT SPEED	150	mm/s
REAR PRINT SPEED	150	mm/s
FLOOD SPEED	20	mm/s
PRINT FRONT LIMIT	0.0	mm
.. more		

4. To change the product name; highlight product name using the **Next** and **Previous** keys. Select **Incr.** Type in the required product name and press **Enter** using the keyboard.

5. If the product name is changed the message ‘**Do you also want to create a copy of the inspection file?**’ is displayed. Select one of the following:

Yes			Global Only				No
-----	--	--	-------------	--	--	--	----

Yes - All data is copied, including the sites coordinates.

Global Only - The global parameters and limits are copied.

No - No inspection file is copied. Use when setting up an inspection file for the first time.

6. Using the **Next**, **Previous**, **Incr.** and **Decr.** keys, edit the current process parameters for the new product.

	Save		Next	Previous	Incr.	Decr.	Exit
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7. Press **Save**.

	Save		Next	Previous	Incr.	Decr.	Exit
--	-------------	--	------	----------	-------	-------	------

8. When the message ‘**Board Data File Saved**’ is displayed, press **Exit**.

	Save		Next	Previous	Incr.	Decr.	Exit
--	------	--	------	----------	-------	-------	-------------

9. Select **Mode** until **Step** appears in mode option of the printer status display.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
-------------	-----------	-----------	----------------	---------------	----------------	-----------------	------

If the required stencil is already in the printer go to Step 16.

If the stencil needs to be changed continue with Step 9.

10. Select **Change Screen**.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
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11. When the message ‘**Open Front Cover and Remove screen**’ is displayed lift the printhead cover.

12. Remove the stencil from the printer.

13. Fit the new stencil into the printer ensuring the correct orientation of the stencil.

14. Lower the printhead cover.

15. Press the **System** button.

16. Select **Change Screen**.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
------	-----------	-----------	----------------	----------------------	----------------	-----------------	------

17. Select **Exit**.

Mode	Load Data	Edit Data	Setup Squeegee	Change Screen	Change Tooling	Change Language	Exit
------	-----------	-----------	----------------	---------------	----------------	-----------------	-------------

18. Select **Run**.

Run	Open Cover	Paste Load	Clean Screen	Adjust	Setup	Monitor	Maint.
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If the Camera Idle Position in Set Preferences is set to Behind Rail, the following window and menu bar is displayed:

Camera Behind Rail Warning

The CAMERA HOME POSITION is set to 'Behind Rail'

Ensure that no tooling pins or other obstructions are on the table behind the rear rail, as these could cause damage to the camera.

This option will only have an effect for boards that are less than 250mm wide.

This option can be disabled from the set preference page.

Continue Run							End Run
--------------	--	--	--	--	--	--	---------

Selecting **Continue Run** clears the warning window and the print cycle continues.

Selecting **End Run** clears the warning window, the print cycle is aborted and control is returned to the ready page.

If the Unload Board Start in Set Preferences is set to Separation, the following window and menu bar is displayed:

Unload Board Speedup Warning

The UNLOAD BOARD SPEEDUP option is set to 'Separation'

With this option enabled it should be noted that there is only a minimal clearance between the underside of the board and any tooling being used, while the board is being unloaded.

This option must not be used for boards that are populated on the underside, as this could damage the boards.

Continue Run							End Run
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Selecting **Continue Run** clears the warning window and the print cycle continues.

Selecting **End Run** clears the warning window, the print cycle is aborted and control is returned to the ready page.

NOTE

If Camera Idle Position is set to Behind Rail and Unload Board Start is set to Separation, the warning windows appear one after the other in the order shown above.

Even with Unload Board Start set to Separation, with 2Di enabled it has no affect, although the warning window and menu bar are still displayed.

19. If the stencil has not been changed the message **'Screen has not been changed for this product'** is displayed, select **Use Screen** to continue.

20. Select **Auto Board**.

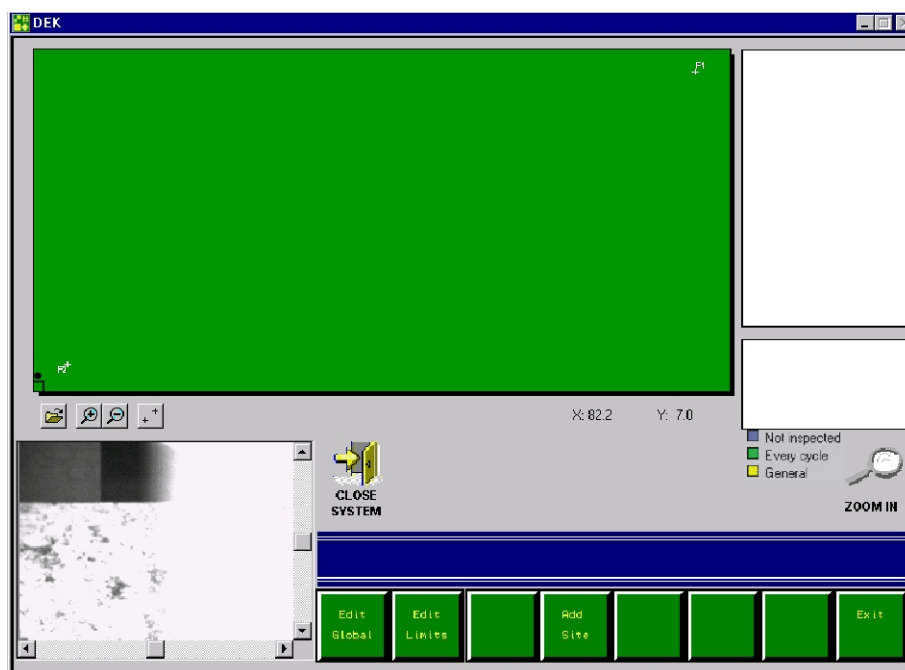
Auto Board	Manual Board						Exit
------------	--------------	--	--	--	--	--	------

21. Setup the board and stencil fiducials.

22. Select **Inspect Setup**. If this option is unavailable, check set prefs for 2D Inspection enabled. The following message on the operator prompt bar is displayed, **'Click on the board representation to add a new site or select an existing site to edit'**.

Step	Open Cover		Inspect Setup			Single	Exit
------	------------	--	---------------	--	--	--------	------

The following 2Di GUI window (example) appears:



CAUTION

FIDUCIAL POSITION. If during the print cycle, the position of board fiducials are changed, the position of previous inspection sites, (if any) may be affected. Small changes are automatically compensated for, however large changes, ie more than 3mm may require sites to be relearnt.

NOTE

If selecting a product file with site listings pre-loaded, a '**Please Wait**' indicator bar may be displayed whilst all sites are being downloaded.

Edit Global

1. Select **Edit Global**.

Edit Global	Edit Limits		Add Site				Exit
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NOTE

Delete Site is only available if at least one site exists already. Next Site and Previous Site are only available if at least two sites exist already.

The following Edit Global Parameters window is displayed:

Edit Global Parameters	
STENCIL 2DI TYPE	ADVANCED
BOARD 2DI TYPE	ADVANCED
PRE-IMAGE MODE	EVERY
MIN SITES/CYCLE	0
WARNING LIMIT	3
BLOCKAGE ACTION	MANUAL ACTION
BLOCKAGE CLEAN	MODE 1
SMEAR ACTION	MANUAL ACTION
SMEAR CLEAN	MODE 2
LOW PASTE ACTION	MANUAL
INSPECT AFTER CLEAN	DISABLED

NOTE: Advanced Inspection Type option is not available on some machines.

2. Enter the parameter values below using the **Next**, **Previous**, **Incr.** and **Decr.** keys.

Limit Options			Next	Previous	Incr.	Decr.	Exit
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- Pre-images to **Every**
- Warning Limit to **20**, this can be reduced later in 'adjust inspect'
- Blockage Action to **Manual Action**, this can be changed later in 'adjust inspect'
- Smear Action to **Manual Action**, this can be changed later in 'adjust inspect'.

A definition of all 2Di parameters and their values is given at the end of this chapter.

On completion of successful setup, parameters can be adjusted to suit the product.

3. Select **Limit Options**.

Limit Options			Next	Previous	Incr.	Decr.	Exit
---------------	--	--	------	----------	-------	-------	------

Global Limit Set Options	
Blockage	Enabled
Smear	Enabled
Paste	Enabled
Alignment	Enabled
Bridging	Enabled
Volume	Enabled

These are usually set to enabled. If for any reason a particular inspection option is not required, set to disabled. If any global limit options are disabled the corresponding limit sets and parameters are greyed out. These are global limits, therefore they are active for the whole product. If a particular inspection is not required for a specific type of site, this can be achieved later in limit set options for the site.

4. Enter global limit options using **Next**, **Previous**, **Incr.** and **Decr.** keys.

			Next	Previous	Incr.	Decr.	Exit
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5. Select **Exit**.

			Next	Previous	Incr.	Decr.	Exit
--	--	--	------	----------	-------	-------	------

6. Select **Exit**.

Limit Options			Next	Previous	Incr.	Decr.	Exit
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Edit Limit Set

1. Select **Edit Limits**.

Edit Global	Edit Limits	Delete Site	Next Site	Previous Site	Edit Site	Inspect Site	Exit
-------------	--------------------	-------------	-----------	---------------	-----------	--------------	------

NOTE

Some buttons in the menu bar above may not be shown, depending if sites already exist.

The following window is displayed:

Limit Sets	Limit Parameters																										
Default	<table> <tr> <td>Limit Set ID</td><td>Default</td></tr> <tr> <td>Blockage Warning</td><td>10%</td></tr> <tr> <td>Blockage Alarm</td><td>15%</td></tr> <tr> <td>Smear Warning</td><td>0.01 sq mm</td></tr> <tr> <td>Smear Alarm</td><td>0.15 sq mm</td></tr> <tr> <td>Paste Warning</td><td>90%</td></tr> <tr> <td>Paste Alarm</td><td>80%</td></tr> <tr> <td>Align Warning</td><td>0.02 mm</td></tr> <tr> <td>Align Alarm</td><td>0.03 mm</td></tr> <tr> <td>Bridge Warning</td><td>0.05 mm</td></tr> <tr> <td>Bridge Alarm</td><td>0.04 mm</td></tr> <tr> <td>Volume Warning</td><td>80%</td></tr> <tr> <td>Volume Alarm</td><td>70%</td></tr> </table>	Limit Set ID	Default	Blockage Warning	10%	Blockage Alarm	15%	Smear Warning	0.01 sq mm	Smear Alarm	0.15 sq mm	Paste Warning	90%	Paste Alarm	80%	Align Warning	0.02 mm	Align Alarm	0.03 mm	Bridge Warning	0.05 mm	Bridge Alarm	0.04 mm	Volume Warning	80%	Volume Alarm	70%
Limit Set ID	Default																										
Blockage Warning	10%																										
Blockage Alarm	15%																										
Smear Warning	0.01 sq mm																										
Smear Alarm	0.15 sq mm																										
Paste Warning	90%																										
Paste Alarm	80%																										
Align Warning	0.02 mm																										
Align Alarm	0.03 mm																										
Bridge Warning	0.05 mm																										
Bridge Alarm	0.04 mm																										
Volume Warning	80%																										
Volume Alarm	70%																										

Limit sets list the different sets of limit parameters that are available, initially only default is available. Limit parameters list the current limits for the highlighted limit set.

2. At this point either:

- Add limits to create a new limit set, continue with **Add Limits** below.
- or
- Edit limits to edit an existing limit set, go to the **Edit Limits** section.

NOTE

It is recommended that during setup, parameters are set at a level that no alarms occur (coarse). Once the inspection is correctly setup, the parameters can be tightened during production in 'adjust inspect'.

Add Limits

1. Select **Add Limits**.

Add Limits	Edit Limits		Next Limit	Previous Limit			Exit
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NOTE

Next limit and previous limit are only available if at least one limit, plus the default, exist already.

- Use the keyboard to enter the ID of the new limit set and press **Enter**.

NOTE

Limit ID may be any name up to 20 characters in length including spaces.

Edit Limit Parameters		
Limit Set ID	COARSE	
Blockage Warning	20	
Blockage Alarm	25	
Smear Warning	1.00	sq mm
Smear Alarm	1.50	sq mm
Paste Warning	70	
Paste Alarm	65	
Align Warning	0.200 mm	
Align Alarm	0.250 mm	
Bridge Warning	0.015 mm	
Bridge Alarm	0.010 mm	
Volume Warning	80	
Volume Alarm	70	

- Enter parameters using the **Next**, **Previous**, **Incr.** and **Decr.** keys. A coarse set of values is shown above.

		Save Limits	Next	Previous	Incr.	Decr.	Exit
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- Select **Save Limits**. The message 'Saving Fiducial Data - Please Wait Board data file saved' is displayed.

		Save Limits	Next	Previous	Incr.	Decr.	Exit
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- Select **Exit**.

		Save Limits	Next	Previous	Incr.	Decr.	Exit
--	--	-------------	------	----------	-------	-------	------

- Select **Edit Limits**.

Add Limits	Edit Limits		Next Limit	Previous Limit			Exit
------------	-------------	--	------------	----------------	--	--	------

- Go to Step 3 of Edit Limits (next page).

Edit Limits

1. Select **Edit Limits**.

Add Limits	Edit Limits		Next Limit	Previous Limit			Exit
------------	--------------------	--	------------	----------------	--	--	------

The following window is displayed:

Edit Limit Parameters			
Limit Set ID	COARSE		
Blockage Warning	20		
Blockage Alarm	25		
Smear Warning	1.00	sq mm	
Smear Alarm	1.50	sq mm	
Paste Warning	70		
Paste Alarm	65		
Align Warning	0.200 mm		
Align Alarm	0.250 mm		
Bridge Warning	0.015 mm		
Bridge Alarm	0.010 mm		
Volume Warning	80		
Volume Alarm	70		

2. Enter parameters using the **Next**, **Previous**, **Incr.** and **Decr.** keys. A coarse set of values is shown above

Limit Options		Save Limits	Next	Previous	Incr.	Decr.	Exit
---------------	--	-------------	-------------	-----------------	--------------	--------------	------

3. Select **Limit Options**.

Limit Options		Save Limits	Next	Previous	Incr.	Decr.	Exit
----------------------	--	-------------	------	----------	-------	-------	------

Site Limit Set Options	
Blockage	Enabled
Smear	Enabled
Paste	Enabled
Alignment	Enabled
Bridging	Enabled
Volume	Enabled

These are usually set to enabled. If for any reason a particular inspection is not required, set to disabled. If any global limit set options are disabled the corresponding parameters are greyed out. These are limit set options, therefore they are only active for this particular limit set. If a particular inspection is not required for the whole product, this can be achieved in global limit options, under edit globals, earlier in this chapter.

If either blockage or paste is set to disabled, volume is also disabled. Once volume is disabled by this method it is not automatically enabled should both blockage and paste be re-enabled. Volume must be selected and set to enabled.

4. Enter limit set options using **Next**, **Previous**, **Incr.** and **Decr.** keys.

			Next	Previous	Incr.	Decr.	Exit
--	--	--	------	----------	-------	-------	------

5. Select **Exit**.

			Next	Previous	Incr.	Decr.	Exit
--	--	--	------	----------	-------	-------	------

6. Select **Save Limits**. The message '**Saving Fiducial Data - Please Wait Board data file saved**' is displayed.

Limit Options		Save Limits	Next	Previous	Incr.	Decr.	Exit
---------------	--	-------------	------	----------	-------	-------	------

7. Select **Exit**.

Limit Options		Save Limits	Next	Previous	Incr.	Decr.	Exit
---------------	--	-------------	------	----------	-------	-------	------

8. Select **Exit**.

Add Limits	Edit Limits		Next Limit	Previous Limit			Exit
------------	-------------	--	------------	----------------	--	--	------

Selecting an Existing Site

To edit an existing site carry out one of the following procedures:

- Using the mouse left button or touchscreen (if available) select the position of the site on the representation of the board.
- Using the mouse left button or touchscreen (if available) select the site (or device) name on the devices and site list.
- Use the Next / Previous buttons on the menu bar.

When an existing site is selected the following GUI display information is updated:

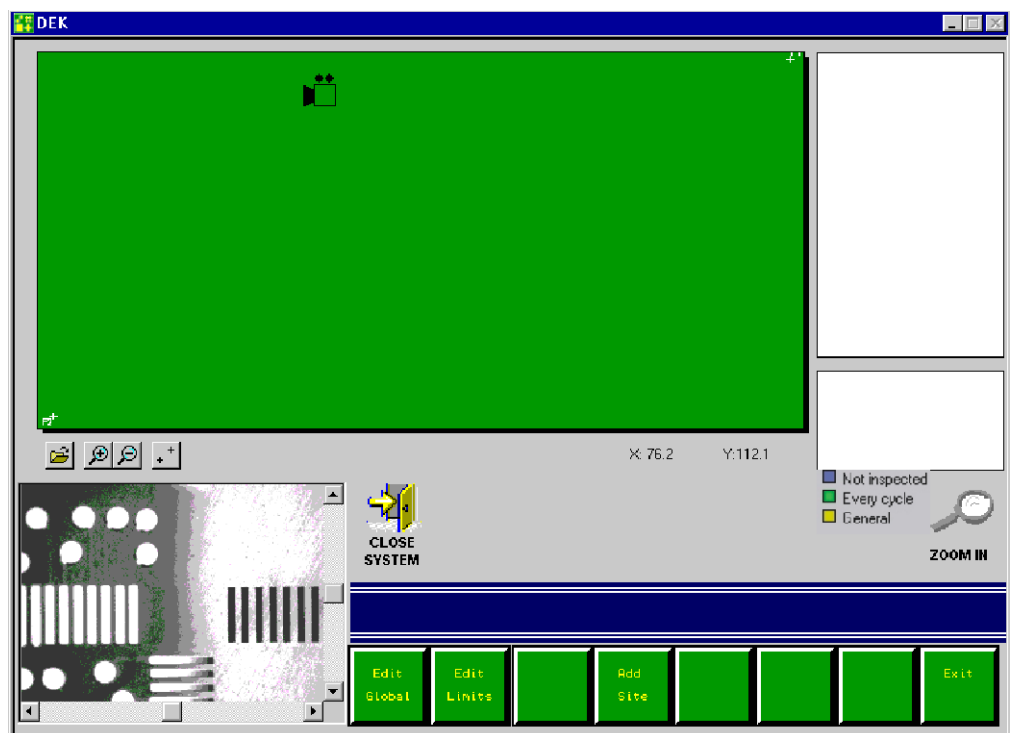
- Site parameter information.
- Site X and Y coordinates.
- Vision panel camera display image of new site.

How to Add a Site The following procedure details a typical example of creating a new site with the GUI board representation displaying the default standard board size format.

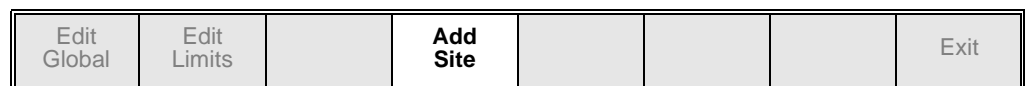
NOTE

It may be an advantage to have a board at hand in order to roughly estimate required site locations.

1. Roughly position the camera to a desired site using either the mouse controls or touchscreen (if available). Click on the desired area of the monitor board representation.
2. A camera icon appears at the area selected. The machine camera moves to the selected area (and board and stencil features are displayed in the vision window). X and Y coordinates of the position is displayed.



3. To position the camera more accurately to the required inspection site, adjust the X and Y screen bars displayed in the vision window.
4. Select **Add Site**.



The site name is automatically appended to a default name, ie SITE001.

If an existing site is selected the menu bar also includes Delete, Edit and Inspect site function buttons.

NOTE

*The operator can rename the new site as required by selecting **Incr.** or **Decr.** and using the keyboard. Press **Enter** on completion.*

Edit Site Parameters		
SITE NAME	SITE1	
SITE PRIORITY	EVERY CYCLE	
SITE BOARD TYPE	ADVANCED	
SITE STENCIL TYPE	ADVANCED	
SITE ALIGNMENT	X AND Y	
SITE LIMIT ID	DEFAULT	
PASTE SCALING	1.00	
SITE X COORD	75.9	mm
SITE Y COORD	111.7	mm
SITE WIDTH	2.00	mm
SITE HEIGHT	2.00	mm
SCREEN GRAPHIC X	0.00	mm
SCREEN GRAPHIC Y	0.00	mm
.. more		

NOTE

The message *'Use the mouse in the stencil view window to position and size the site or edit the parameters'* is displayed in the message prompt bar.

5. Adjust the following edit site parameters to suit the required application:

- Site Priority
- Stencil Inspect Type
- Board Inspect Type
- Site Alignment
- Site Limit ID

6. Highlight site limit ID using the **Next** and **Previous** keys.

	Learn Screen	Light Setup	Next	Previous	Incr.	Decr.	Exit
--	--------------	-------------	-------------	-----------------	-------	-------	------

NOTE

If new inspection file, only default limit is set.

7. Select **Incr.**

	Learn Screen	Light Setup	Next	Previous	Incr.	Decr.	Exit
--	--------------	-------------	------	----------	--------------	-------	------

Limit Sets
DEFAULT
COARSE
BGA
QFP

8. Using **Next Limit** or **Previous Limit** keys, highlight the limit set required that was created in either add limits or edit limits.

Use Limit			Next Limit	Previous Limit			Exit
-----------	--	--	-------------------	-----------------------	--	--	------

9. Select **Use Limit**.

Use Limit			Next Limit	Previous Limit			Exit
-----------	--	--	------------	----------------	--	--	------

Lighting Setup

1. Select **Light Setup**.

	Learn Screen	Light Setup	Next	Previous	Incr.	Decr.	Exit
--	--------------	-------------	------	----------	-------	-------	------

Inspection Lighting Parameters			
SCREEN VERTICAL	8		
SCREEN OBLIQUE	8		
BOARD VERTICAL	8		
BOARD OBLIQUE	8		
WINDOW LEFT	-1.5	mm	
WINDOW TOP	-1.5	mm	
WINDOW WIDTH	3.0	mm	
WINDOW HEIGHT	3.0	mm	

Figure 8-8 Green Camera Lighting Parameters

2. Using the **Next**, **Previous**, **Incr.** and **Decr.** keys, adjust the lighting parameters to a level whereby the stencil and board pads are just whitening out, without blooming, default level 8 is usually adequate for the majority of setups.

			Next	Previous	Incr.	Decr.	Exit
--	--	--	------	----------	-------	-------	------

3. Select **Exit**.

			Next	Previous	Incr.	Decr.	Exit
--	--	--	------	----------	-------	-------	------

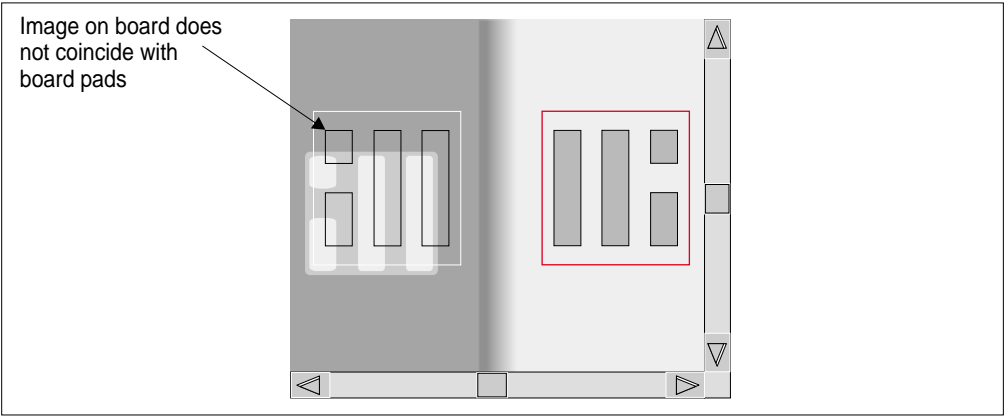
Site Setup

4. Using one of the controls listed, carry out the following:
- Mouse - Drag and drop the red Region Of Interest box (ROI) to the desired position.
 - Touchscreen (if available) - Drag the red ROI box to the desired position.
 - Manual Function Buttons - **Next**, **Previous**, **Incr.** and **Decr.** keys adjust the ROI position via the parameters.

5. Select **Learn Screen**.

Add Site	Learn Screen	Light Setup	Next	Previous	Incr.	Decr.	Exit
----------	--------------	-------------	------	----------	-------	-------	------

The message '**Stencil Learnt. Use the mouse in the board view to align the board graphic or edit the parameters**' is displayed in the message prompt bar.

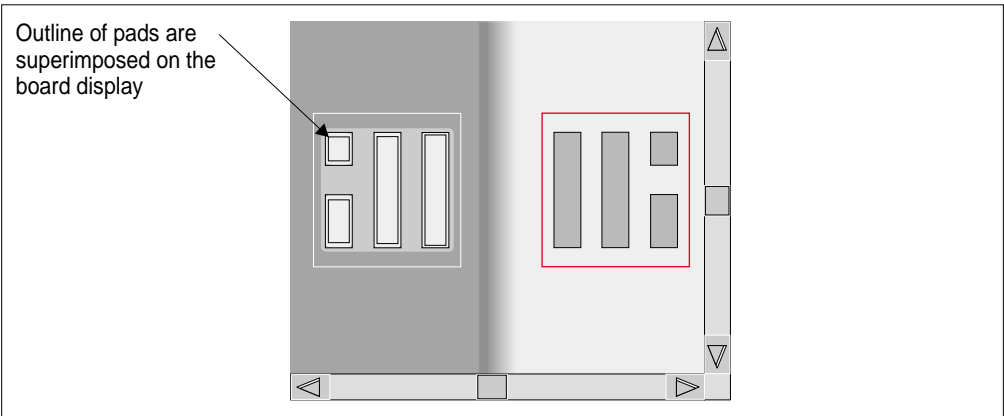


If the graphics on the board side requires adjusting, use the Incr. Decr. to adjust the X and Y offsets to align the overlay onto the pads.

Learn Site Parameters		
BOARD GRAPHIC X	0.0	mm
BOARD GRAPHIC Y	0.0	mm

6. Select **Learn Board**.

Learn Board	Adjust Screen		Next	Previous	Incr.	Decr.	Exit
--------------------	---------------	--	------	----------	-------	-------	------



The message **'Board Learnt'** is displayed in the message prompt bar.

7. If **'...Board Not Learnt'** is displayed, select **Adjust Screen** and return to Step 4.

Learn Board	Adjust Screen	Auto Learn	Next	Previous	Incr.	Decr.	Exit
-------------	----------------------	------------	------	----------	-------	-------	------

If device is to be learnt select Auto Learn as detailed in the next section.

Auto Learn

Prior to carrying out auto learn, the 2Di setup described in the preceding pages must have been carried out. To successfully auto learn, the site setup should be the base site of the device, (Figure 8-2 Auto Learn Site Types refers).

1. Select **Auto Learn**.

Learn Board	Adjust Screen	Auto Learn	Next	Previous	Incr.	Decr.	Exit
-------------	---------------	-------------------	------	----------	-------	-------	------

The message '**Select Component type to Auto Learn:**' is displayed. The following messages appear beneath this message in rotation.

Row - Start at left most end of horizontal

Column - Start at topmost end of vertical

QFP - (Quad Flat Pack) - Start at left most end at top of left horizontal line

BGA - (Ball Grid Array) - Start at top left corner of array

2. Select the required component to learn.

Learn Row	Learn Col		Learn QFP	Learn BGA	Learn BGAframe		Exit
-----------	-----------	--	-----------	-----------	----------------	--	------

The message bar reports the progress of the auto learn as a set of sites of the appropriate type are created and learnt. The original site, and each site that is created, is given the same name as the original site, but with a '~' symbol followed by a three digit number in sequence.

As each new site is created and learnt, the newly created name and data is displayed in the Edit Site Parameters window.

NOTE

*During Auto Learn, if any creating or learning sequence fails, the message '**Adjust Site.**' appears with an explanation the user is given the opportunity to recover the sequence or abort the operation.*

3. On completion of a successful auto learn of the selected component, the following menu bar is displayed:

Edit Global	Edit Limits	Delete Site			Edit Site	Inspect Site	Exit
-------------	-------------	-------------	--	--	-----------	--------------	------

4. Repeat Steps from Site Setup for further auto learn features.

5. If feature not completely learnt, the following menu bar is displayed:

Adjust Site	Learn Board	Learn Screen				Continue	Exit
-------------	-------------	--------------	--	--	--	----------	------

6. Select **Adjust Site**. The learn site parameters window is displayed.

Adjust Site	Learn Board	Learn Screen				Continue	Exit
--------------------	-------------	--------------	--	--	--	----------	------

Learn Site Parameters		
SITE X COORD	52.0	mm
SITE Y COORD	36.5	mm
SITE WIDTH	2.00	mm
SITE HEIGHT	2.00	mm
SCREEN GRAPHIC X	-0.01	mm
SCREEN GRAPHIC Y	-0.01	mm
BOARD GRAPHIC X	0.00	mm
BOARD GRAPHIC Y	0.00	mm

7. Adjust site parameters as required using **Next**, **Previous**, **Incr.** and **Decr.** keys.

Continue	Learn Board	Learn Screen	Next	Previous	Incr.	Decr.	
----------	-------------	--------------	-------------	-----------------	--------------	--------------	--

8. Select **Learn Screen**.

Continue	Learn Board	Learn Screen	Next	Previous	Incr.	Decr.	Exit
----------	-------------	---------------------	------	----------	-------	-------	------

9. The message '**Screen Learnt**' is displayed. If message '**....Screen Not Learnt**' is displayed, edit the site parameters and select **Learn Screen**.

10. Select **Learn Board**.

Adjust Site	Learn Board	Learn Screen				Continue	Exit
-------------	--------------------	--------------	--	--	--	----------	------

11. The message '**Board Learnt**' is displayed. If message '**....Board Not Learnt**' is displayed, edit the site parameters and select **Learn Board**.

12. Select **Continue**. The auto learn process continues.

Adjust Site	Learn Board	Learn Screen				Continue	Exit
-------------	-------------	--------------	--	--	--	-----------------	------

The message bar reports the progress of the auto learn as the system searches for a site, learns a site and moves to the next site.

13. On completion of a successful auto learn of the selected component, the following menu bar is displayed:

Edit Global	Edit Limits	Delete Site			Edit Site	Inspect Site	Exit
-------------	-------------	-------------	--	--	-----------	--------------	------

14. Carry out Section Inspect for all sites.

Inspect

1. Select **Exit**.

Edit Global	Edit Limits	Delete Site	Next Site	Previous Site	Edit Site	Inspect Site	Exit
-------------	-------------	-------------	-----------	---------------	-----------	--------------	------

2. Select **Step** until board is printed.

Step			Inspect Setup			Single	Exit
------	--	--	---------------	--	--	--------	------

3. Select **Step** until the Inspect Setup menu button is displayed.

Step						Single	Exit
------	--	--	--	--	--	--------	------

4. Select **Inspect Setup**.

Step			Inspect Setup			Single	Exit
------	--	--	---------------	--	--	--------	------

5. Select **Inspect Site**.

Edit Global	Edit Limits	Delete Site	Next Site	Previous Site	Edit Site	Inspect Site	Exit
-------------	-------------	-------------	-----------	---------------	-----------	--------------	------

The following window is displayed:

Inspection Results					
SITE NAME			SITE 1		
Maximum Blockage			0%	PASS	
Smear Area			0.00 sq mm	PASS	
Minimum Paste			94%	PASS	
X Alignment			+0.007mm	PASS	
Y Alignment			-0.003mm	PASS	
Bridging			5.012mm	PASS	
Minimum Paste Volume			93%	PASS	
Bridge Warnings			0		
Bridge Alarms			0		
No.	Blockage	Paste Present	Volume	AlignX	AlignY
1	0%	94%	93%	+0.007	-0.003
2	0%	98%	97%	+0.006	-0.002

NOTE

A reliable paste present reading is made only when the lighting is set correctly.

6. If the board inspection type is set to advanced carry out Steps 6a and 6b. If the board inspection type is set to none or basic carry out Step 6c.

a. Select **Toggle Paste**.

Auto Scale	Toggle Paste		Next	Previous		Save Image	Exit
------------	---------------------	--	------	----------	--	------------	------

NOTE

Selecting toggle paste either shows or hides the paste display overlay onto the monitor. The toggle paste facility on the board image is only functional with the board inspection type set to advanced. Toggling paste on the stencil is only available on Horizon and Infinity machines and only with the stencil inspect type set to advanced.

- b. Ensure that the paste display overlay coincides with the presence of paste. If this is correct go to Step 19. If this is incorrect, note the position of the non-existent paste and continue with Step 7.

NOTE

If the paste display overlay coincides with the presence of paste, any poor inspection results are due to process problems and not 2Di setup.

- c. Ensure that the inspection results are consistent with the amount of paste on the pad. If this is correct go to Step 19. If this is incorrect continue with Step 7.

7. Select **Exit**.

Auto Scale	Toggle Paste		Next	Previous			Exit
------------	--------------	--	------	----------	--	--	-------------

8. Select **Edit Site**.

Edit Global	Edit Limits	Delete Site	Next Site	Previous Site	Edit Site	Inspect Site	Exit
-------------	-------------	-------------	-----------	---------------	------------------	--------------	------

9. Select **Light Setup**.

		Light Setup	Next	Previous	Incr.	Decr.	Exit
--	--	--------------------	------	----------	-------	-------	------

10. Adjust the lighting parameters to improve the lighting conditions in the suspect areas.

11. Select **Exit**.

	Record Image		Next	Previous	Incr.	Decr.	Exit
--	--------------	--	------	----------	-------	-------	-------------

NOTE

Record Image button is displayed if Image Recording is enabled in Set Preferences.

12. If lighting is changed the following menu bar is displayed:

Apply to Full Set			Apply to All				Exit
-------------------	--	--	--------------	--	--	--	------

Select the following button to adopt the changes to:

- **‘Apply to Full Set’** - to update only this device
- **‘Apply to All ’** - all learnt sites
- **‘Exit’** - just the current site

13. Select **Exit**.

		Light Setup	Next	Previous	Incr.	Decr.	Exit
--	--	-------------	------	----------	-------	-------	-------------

14. Select **Exit**.

Edit Global	Edit Limits	Delete Site			Edit Site	Inspect Site	Exit
-------------	-------------	-------------	--	--	-----------	--------------	-------------

15. Select **Step** to step through inspection routine.

Step			Inspect Setup			Single	Exit
-------------	--	--	---------------	--	--	--------	------

16. Select **Exit** to remove board from machine.

Edit Global	Edit Limits	Delete Site			Edit Site	Inspect Site	Exit
-------------	-------------	-------------	--	--	-----------	--------------	-------------

17. Place a clean board onto the machine rails and clean the stencil (Clean Screen).

18. Repeat Steps 4 - 8.

19. Select **Auto Scale**.

Auto Scale	Toggle Paste		Next	Previous		Save Image	Exit
-------------------	--------------	--	------	----------	--	------------	------

Selecting auto scale automatically adjusts the paste scaling value for the current site, to cause the value of paste present, on the pad currently selected in the inspection result list, to be reported as 100%. The inspection results window is updated accordingly. If the calculated value for paste scaling falls outside the range of allowable values, an error window is displayed and the paste scaling value is set to the limit nearest the calculated value. However, if the currently selected paste present value is zero, no adjustment of the paste scaling value takes place and an error window is displayed. A prompt is displayed giving the new scaling factor value each time it is changed. The auto scale button is only present if board inspection is being performed.

20. Select **Exit**.

Auto Scale	Toggle Paste		Next	Previous		Save Image	Exit
------------	--------------	--	------	----------	--	------------	-------------

21. Select **Exit**.

Edit Global	Edit Limits	Delete Site			Edit Site	Inspect Site	Exit
-------------	-------------	-------------	--	--	-----------	--------------	-------------

22. Select **Step** to remove the board from the machine.

Step			Inspect Setup			Single	Exit
-------------	--	--	---------------	--	--	--------	------

23. Clean the board and stencil.

24. Carry out Section How to Add a Site and create all required sites, using the same lighting parameters as before (see Auto Learn).

25. On completion carry out Section Inspect.

26. Set required 2D inspect rate and the Min site/cycle parameters in edit global.

27. This completes the 2Di setup. Commence print run in auto mode.

NOTE

*During production use **Adjust Inspect** to fine tune the inspection process.*

Adjustment During Print Cycle Most inspection parameters may be adjusted whilst a print cycle is in progress. The parameters that may be adjusted are:

- Global Limits
- Limit Sets
- Site Parameters

NOTE

The site coordinate parameters are not available whilst a print cycle is in progress.

To access the parameter adjustment menu during a print cycle select **Adjust Inspect**.

End Run	Stop Cycle	Paste Load	Clean Screen	Adjust	Knead Paste	Adjust Inspect	
---------	------------	------------	--------------	--------	-------------	-----------------------	--

The following window is displayed:

Global Inspect Parameters		Site Parameters	
2D Inspect Rate	1	Site Name	IC 27 - 1
Stencil Inspect Type	Advanced	Site Priority	General
Board Inspect Type	Advanced	Stencil Inspect Type	Advanced
Pre-image	Every	Board Inspect Type	Advanced
Min. Sites/Cycle	10	Site Alignment	X and Y
Warning Limit	3	Limit Set ID	Fine
Blockage Action	Auto	Paste Scaling	1.00
Blockage Clean	Mode 2		
Smear Action	Manual		
Smear Clean	Mode 1		
Low Paste Action	Re-print		
Inspect After Clean	Enabled		
No. Sites	30		

Edit Global	Edit Limits	New Pre-images			Edit Site		Exit
-------------	-------------	----------------	--	--	-----------	--	------

The New Pre-images button is only available if Pre-image is set to 1.

NOTE

If an error occurs when adjusting inspection parameters during a print cycle, the adjustment page closes.

Any changes made are saved.

SETUP TIPS

Setup Problem	Guide
No inspection setup available	Ensure that 2D inspection is enabled in Set Prefs.
System not inspecting or inspection cycle not being carried out	The 2D option may be disabled or 2D inspect rate may equal 0.
Order of Inspection	<p>If a particular sequence of site inspection is required, the sites should be selected as every cycle sites and setup in the sequence required.</p> <p>Every cycle sites are inspected in the order that they were setup.</p> <p>General sites are inspected in an order that depends on their position and their inspection sequence cannot be set.</p> <p>If at a later date a site is edited the sequence is affected.</p>
Stencil and Board - Cleaning Before Setup	<p>Before 2D inspection setup, ensure the stencil and board being used have been thoroughly cleaned and are free of all paste deposits.</p> <p>If either are not cleaned thoroughly any remaining smearing, partially blocked apertures or paste on the board may cause an incorrect setup.</p>
Site Area Accuracy	Ensure that when setting site parameters (height, width etc.), the site graphic is placed around the site to give clearance from the apertures and pads thus preventing other areas being inspected.
Lighting Conditions	<p>If the inspection result is not as expected, it is possible that the site was learnt under different lighting conditions.</p> <p>This problem may be resolved by re-learning the site under new lighting conditions, or by the use of paste scaling for paste present adjustment.</p>
Site Quality	<p>The sites selected for inspection should be of good quality.</p> <p>Sites should not have rounded or chamfered edges or uneven or excessive tinning, this can lead to misleading results when attempting to learn sites.</p>
Sites Being Lost	<p>Ensure that both board and stencil have been learnt.</p> <p>After adjusting board or stencil site parameters always learn both, further editing can be done at a later stage.</p> <p>The number of pads must equal the number of apertures for a successful site.</p>
Inspection Alarms too Frequent and Unnecessary	<p>This may be a symptom of limits being set too tight.</p> <p>Relax the limits so that results of an acceptable print produce pass or warning, not alarm, or use the global limit option or limit options to disable the particular limit checking.</p>

OPTIONS AFTER AN INSPECTION ALARM

The machine stops at the first inspection alarm. When an inspection alarm occurs, several menu bar options become available.

Accept	Inspect More		Recovery Action	Adjust	Inspect All	Adjust inspect	Reject
--------	--------------	--	-----------------	--------	-------------	----------------	--------

The functional description for each option is as follows:

Accept Selecting this option clears the alarm panel, changes the beacon back to green and feeds the board through the machine.

Inspect More Selecting this option clears the alarm panel, changes the beacon back to green and allows the inspection sequence to continue, until it either completes inspection or raises another alarm.

Recovery Action Selecting this option displays the following menu:

Paste Load	Clean Mode 1	Clean mode 2	Re-print Board				Exit
------------	--------------	--------------	----------------	--	--	--	------

The user prompt text shows the following lines:

‘Clean Mode 1 : XXXX’

‘Clean Mode 2 : YYYY’

Where XXXX and YYYY are the descriptions of the clean mode settings, ie **‘WVWD’** for wet, vac, wet, dry.

Paste Load Selecting this option initiates a paste load cycle, if a paste dispenser is fitted or enables paste to be loaded manually.

Clean Mode 1 and 2 Selecting either clean mode 1 or clean mode 2 initiates the screen clean cycle set up for that mode.

Re-print Board Selecting this option clears the alarm panel and changes the beacon back to green. The board is re-printed and the inspection sequence is started again from the beginning. All the existing alarm information is cleared.

NOTE

The Re-print Board button is not available if the current board has already been re-printed.

Adjust Selecting this option allows the adjustment of process parameters.

Inspect All Selecting this option clears the alarm panel and changes the beacon back to green. The inspection sequence is restarted from the beginning. All the existing alarm information is cleared.

Adjust Inspect Selecting this option displays the following menu:

Edit Global	Edit Limits	New Pre-images			Edit Site	Inspect Site	Exit
-------------	-------------	----------------	--	--	-----------	--------------	------

Edit Global Selecting this option opens the edit global parameters window, allowing parameters that are used throughout the inspection to be altered.

Edit Limits Selecting this option opens the limit sets window, allowing a set of limit parameters to be selected and altered.

New Pre-images Selecting this option initiates a pre-print inspection on the next print cycle to capture the new pre-images. The message '**New pre-images will be collected next print cycle**' is displayed.

NOTE

The New Pre-image button is only available if pre-image is set to 1.

Edit Site Selecting this option opens the site parameters window, allowing adjustment of the site specific parameters.

Inspect Site Selecting this option opens the inspection results window and displays the following menu:

Auto Scale	Toggle Paste		Next	Previous			Exit
------------	--------------	--	------	----------	--	--	------

Selecting **Next** or **Previous** moves the highlight up and down the list of site pads.

Selecting **Toggle Paste** either shows or hides the paste display overlay onto the monitor. The toggle paste facility on the board image is only functional with the board inspection type set to advanced. Toggling paste on the screen is only available on Horizon and Infinity machines and only with the stencil inspect type set to basic or advanced.

Selecting **Auto Scale** automatically adjusts the paste scaling value for the current site, to cause the value of paste present, on the pad currently selected in the inspection result list, to be reported as 100%. This is used where the site pad causing the alarm is actually a good print.

Reject Selecting this option clears the alarm panel and the board is fed to the output end of the rail system and held there.

MENU PARAMETERS

2D Inspect Rate This parameter sets the number of print cycles between inspection cycles, with zero indicating no inspection.

Minimum	Maximum	Increments
0	100	1

Stencil Inspect Type This parameter sets the extent of the stencil inspection. The options are:

None	Basic	Advanced
------	-------	----------

Board Inspect Type This parameter sets the type of inspection to be learnt:

None	Basic	Advanced
------	-------	----------

Pre-image This parameter sets when a pre-image is taken. The options are:

One - First Board Only	Every - Every Board
------------------------	---------------------

Min Sites/Cycle This parameter sets the number of sites to inspect every cycle.

Minimum	Maximum	Increments
Number of Every Cycle sites plus one, ie at least one general site must be inspected	Total number of sites	1

Warning Limit This parameter determines how many consecutive warnings on the same site constitute an alarm.

Minimum	Maximum	Increments
1	20	1

Blockage Action This parameter sets the action performed on a blockage alarm. The options are:

Manual	Automatic
--------	-----------

Blockage Clean This parameter sets the type of screen clean performed on blockage alarm. The options are:

Mode 1	Mode 2
--------	--------

Smear Action This parameter sets the action performed on a smear alarm. The options are:

Manual Action	Automatic
---------------	-----------

Smear Clean This parameter sets the type of screen clean performed on a smear alarm. The options are:

Mode 1	Mode 2
--------	--------

Low Paste Action This parameter sets the action performed on a low paste alarm. The options are:

Manual	Re-print
--------	----------

Inspect After Clean This parameter sets whether the stencil is inspected before the next board is printed following a screen clean. The options are:

Disabled	Enabled
----------	---------

No. Sites This parameter displays the total number of sites.

Minimum	Maximum	Increments
0	1000	1

Site Name The unique name given to a site for identification. The name can have a maximum of 20 characters.

Site Priority This parameter determines the priority of a site. Where the site is part of a device, the value applies to the whole device. The options are:

Not Inspected	General	Every Cycle
---------------	---------	-------------

NOTE

If the machine inspection page is set to GUI 2Di, all displayed sites are coloured coded, depending on their priority setting, (following table refers):

Site Priority	Display Colour
Every Cycle	Green
General	Yellow
Not Inspected	Blue

Site Alignment This parameter sets what alignment data is reported for each site. The options are:

X & Y	X Only	Y Only	None
-------	--------	--------	------

Limit Set ID The unique name given to a set of limits which can be applied to any site. This enables different sites to be inspected according to different limits. The name can have a maximum of 20 characters. A maximum of 14 limit sets can be created.

Paste Scaling

This parameter enables adjustment of the paste scaling value for the current site, to cause the value of paste present on the pad, currently selected in the inspection list, to be reported as 100%. This parameter is used in conjunction with the Auto Scale function.

Minimum	Maximum	Increments
0.01	2.00	0.01

Site X Coord

The coordinate of a site taken from the front left corner of the board, in the X direction.

Minimum	Maximum	Increments
0.0mm	Board Length	0.1mm

Site Y Coord

The coordinate of a site taken from the front left corner of the board, in the Y direction.

Minimum	Maximum	Increments
0.0mm	Board Width	0.1mm

Site Width

The width of the site to be inspected.

Minimum	Maximum	Increments
0.5mm	4.0mm	0.01mm

Site Height

The height of the site to be inspected

Minimum	Maximum	Increments
0.5mm	6.5mm	0.01mm

Blockage Warning

This parameter sets the amount of aperture blockage required to initiate a warning.

Minimum	Maximum	Increments
0%	100%	1%

Blockage Alarm

This parameter sets the amount of aperture blockage required to initiate an alarm.

Minimum	Maximum	Increments
0%	100%	1%

Smear Warning

This parameter sets the amount of stencil smear required to initiate a warning.

Minimum	Maximum	Increments
0.01 sq. mm	10 sq. mm	0.01 sq. mm

Smear Alarm This parameter sets the amount of stencil smear required to initiate an alarm.

Minimum	Maximum	Increments
0.01 sq. mm	10 sq. mm	0.01 sq. mm

Paste Warning This parameter sets the amount of paste on pad required to initiate a warning.

Minimum	Maximum	Increments
0%	100%	1%

Paste Alarm This parameter sets the amount of paste on pad required to initiate an alarm.

Minimum	Maximum	Increments
0%	100%	1%

Align Warning This parameter sets the amount of X or Y alignment error of the paste to initiate a warning.

Minimum	Maximum	Increments
0.005mm	0.25mm	0.001mm

Align Alarm This parameter sets the amount of X or Y alignment error of the paste to initiate an alarm.

Minimum	Maximum	Increments
0.005mm	0.25mm	0.001mm

Bridge Warning This parameter sets the distance between adjacent deposits of paste that if not exceeded initiates a warning.

Minimum	Maximum	Increments
0.01mm	0.5mm	0.005mm

Bridge Alarm This parameter sets the distance between adjacent deposits of paste that if not exceeded initiates an alarm.

Minimum	Maximum	Increments
0.01mm	0.5mm	0.005mm

Volume Warning This parameter sets the volume of paste on pad required to initiate a warning.

Minimum	Maximum	Increments
0%	100%	1%

Volume Alarm This parameter sets the volume of paste on pad required to initiate an alarm.

Minimum	Maximum	Increments
0%	100%	1%

Screen Graphic X The position of the inspection window on the stencil side. This parameter is used to finely adjust the inspection window in the X direction..

Minimum	Maximum	Increments
-3.5mm	3.5mm	0.01mm

Screen Graphic Y The position of the inspection window on the stencil side. This parameter is used to finely adjust the inspection window in the Y direction.

Minimum	Maximum	Increments
-3.5mm	3.5mm	0.01mm

Board Graphic X The position of the inspection window on the board side. This parameter is used to finely adjust the inspection window in the X direction.

Minimum	Maximum	Increments
-3.5mm	3.5mm	0.01mm

Board Graphic Y The position of the inspection window on the board side. This parameter is used to finely adjust the inspection window in the Y direction.

Minimum	Maximum	Increments
-3.5mm	3.5mm	0.01mm

Window Left This parameter sets the position of the histogram window relative to the centre of the image.

The Minimum and Maximum values are calculated from the vision calibration and vary from machine to machine. Increments - 0.1mm.

Window Top This parameter sets the position of the histogram window relative to the centre of the image.

The Minimum and Maximum values are calculated from the vision calibration and vary from machine to machine. Increments - 0.1mm.

Window Width This parameter sets the width of the histogram window.

The Minimum and Maximum values are calculated from the vision calibration and vary from machine to machine. Increments - 0.1mm

Window Height This parameter sets the height of the histogram window.

The Minimum and Maximum values are calculated from the vision calibration and vary from machine to machine. Increments - 0.1mm

Screen Vertical This parameter sets the level of stencil vertical light.

Minimum	Maximum	Increments
0	15	1

Screen Oblique This parameter sets the level of stencil oblique light.

Minimum	Maximum	Increments
0	15	1

Board Vertical This parameter sets the level of board vertical light.

Minimum	Maximum	Increments
0	15	1

Board Oblique This parameter sets the level of board oblique light.

Minimum	Maximum	Increments
0	15	1

Limit Set Options This parameter enables the output of the following inspections:

Inspections
Blockage
Smear
Paste
Alignment
Bridging
Volume