PADS to ADIVA
Interface
(Quick-Start User Guide)

Document: 2/8/2021

Notice

Representations in this User Guide are meant as an overview and quick reference. Full details can be found in the On-Line manuals located at the *ADIVA Corporation* website - www.adiva.com

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Getting Started…

- Change PADS database units to either MILS or MM.

- Define Gerber filenames and offsets - place design origin OUTSIDE of all artwork graphics - set artwork "Justification" to "Offset" - enter offset value in MILS or MM (see next slide for greater detail)

- Save Gerber file definitions into PADS database and then output Gerber files.

- Define and separate Drill files into individual files, plated holes, non-plated holes, buried-blind vias.

- Define Drill filenames, set report file to be created in design units, set offsets to same as Gerber, save Drill file definitions into PADS database and then output Drill files.

- Create PADS ascii (jobname.asc) database file in V5.0 format, containing All Data, using current design units set above (either MILS or MM <u>not</u> BASIC).

  It is VERY important that the .asc file be created after the Gerber and Drill files have been created and their definitions saved in the PADS database in order for the .asc file to contain the filenames and formats created.

  ADIVA will be expecting to sync the filenames in the .asc file to match the actual Gerber and Drill filenames.

  <u>NOTE:</u>

- ALL data files (Gerber and Drill along with the .asc file) MUST be of the same units.

- **<u>DO NOT</u>** modify any of the manufacturing filenames after they are created by PADS output or they will be out of sync with the .asc file which will impact the layer recognition and assignment function of the **Pads to Adiva Interface.**

CAM File Offset

Important information regarding data file offsets for Gerber and Drill output

- Adjust the Justification setting in the Options tab for CAM layer setups.

- For a consistent offset for the ADIVA load, The justification option must be set to "offset" and the X Offset: and Y Offset: settings for each layer must match.

- Any other option (in justification) will result in the layers not being aligned when processed.

- Then when going thru the Adiva load, just use the negative equivalent to the PADS offset.

  if the offset in Pads (in mils) is X= 1000, Y= 3000
  then
  the offset in Pads to ADIVA Interface would be X= -1000, Y= -3000

PADS > ADIVA   PROCESS
Basic Steps from Start to Finish

- Copy Gerber & Drill & .asc files into the same, clean directory

- Start Interface, choose .asc file from the above directory, setup data formats and define any offsets if required

- Verify / Modify Layer Assignments

- Verify Layer Description

- Extract a Netlist from Manufacturing Data

- Perform Netlist Compare using CAD Netlist against Mfg Netlist

- Define Pad and Hole Classes

- Run DRC Checks

Step 1

PADS to ADIVA Interface

If using the **Adiva Navigator**, select the **Mentor Pads Import** to start the data import process...
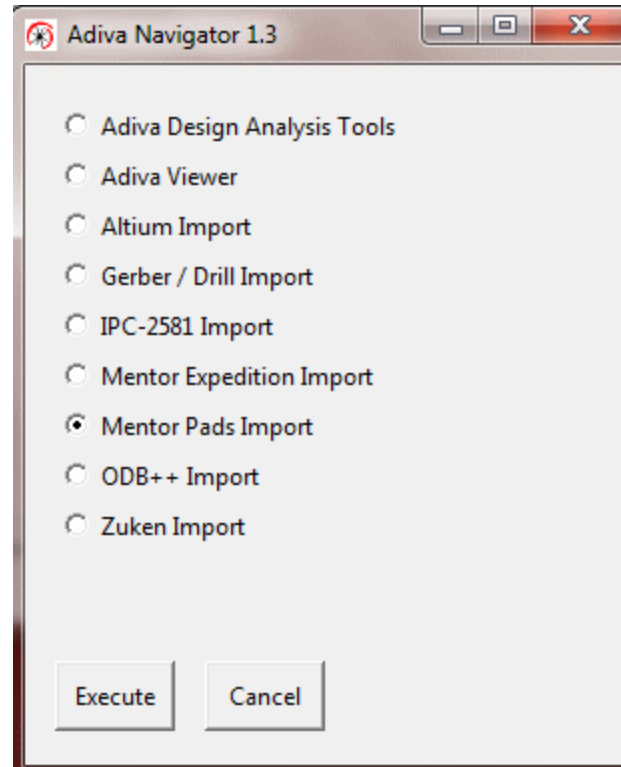
If not using the **Adiva Navigator**, select the Windows Desktop Shortcut to **AdivaPads**.

Either action will produce the **Pads to Adiva Interface** dialog on the next page…

Choose a .asc file from PADS

Set .asc file units

Set Drill Data format fields. In this case, Absolute,2,4,Trail means….

Absolute coordinate reference
2 leading digits
4 trailing digits
Trailing zero suppression

Notice the data file offsets are valued in MILS because the .asc file units value is set to Mils. If the .asc file units are in MM, then these data file offsets need to be in MM units.

Also the values are negative to move Gerber/Drill data back to the CAD system XY values

NOTE:
These default values can be adjusted to reflect your standard settings.

Located in the %ADIVA_DATA% directory (default = c:\adiva\data) is a file named **Pads.fmt**. This file contains the settings that appear by default. Contact ADIVA support directly for file modification details.

Untitled - AdivaPads

File   Edit   View   Help

ADIVA

Your Partners in design excellence - since 1987

Pads ASCII Database

ASCII Database   Z:\data\pads_interface_demo\pads_database_mils.asc   Browse

Aperture   Browse

Coordinate Format (Drill & 274D)

Gerber 274D   Absolute   2   4   None

Drill   Absolute   2   4   Trail

Gerber Format
○ 274X   ○ 274D

Units
○ Inches   ● Mils   ○ MM

Offsets
Gerber Offset   X -1000   Y -1000
Drill Offset   X -1000   Y -1000

Execute   Exit

Ready   NUM

When complete, **Execute** the conversion process

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Step 2

Layer Definition Confirmation and Adjust as Needed

Adjust Layer Names as shown…

If it's a **positive** layer internally – call it an **Inner Circuit**
If it's a **negative** layer internally – call it a **Plane**

Uncheck any filename not desired
to be converted

PADS to ADIVA Layer Assignment

Include	Film Name	Layer Usage	Layer Number	Pads Layer Number
☑	l1_gerber.pho	Top Circuit	1	1
☑	l2_gerber.pho	Inner Circuit	2	2
☑	l3_gerber.pho	Inner Circuit	3	3
☑	l4_gerber.pho	Inner Circuit	4	4
☑	l5_gerber.pho	Inner Circuit	5	5
☑	l6_gerber.pho	Bottom Circuit	6	6
☑	sst_gerber.pho	Top Marking	126	126
☑	ssb_gerber.pho	Bottom Marking	129	129
☑	smt_gerber.pho	Top Mask	121	121
☑	smb_gerber.pho	Bottom Mask	128	128
☑	pmt_gerber.pho	Top Paste	123	123
☑	pmb_gerber.pho	Bottom Paste	122	122
☑	drl.drl	Plated Thru Holes	251	251

Enable All Films   Disable All Films   Continue   Cancel

Make sure you check and adjust
Drill Layer names (Plated / Non-Plated)

PADS to ADIVA Layer Assignment

Include	Film Name	Layer Usage	Layer Number	Pads Layer Number
☑	l5_gerber.pho	Inner Circuit	5	5
☑	l6_gerber.pho	Bottom Circuit	6	6
☑	sst_gerber.pho	Top Marking	126	126
☑	ssb_gerber.pho	Bottom Marking	129	129
☑	smt_gerber.pho	Top Mask	121	121
☑	smb_gerber.pho	Bottom Mask	128	128
☑	pmt_gerber.pho	Top Paste	123	123
☑	pmb_gerber.pho	Bottom Paste	122	122
☑	drl.drl	Plated Thru Holes	251	251
☑	drl_npt.drl	Non Plated Holes	252	252

Enable All Films   Disable All Films   Continue   Cancel

Select **Continue** to finish conversion process

Step 3

Data Conversion Complete
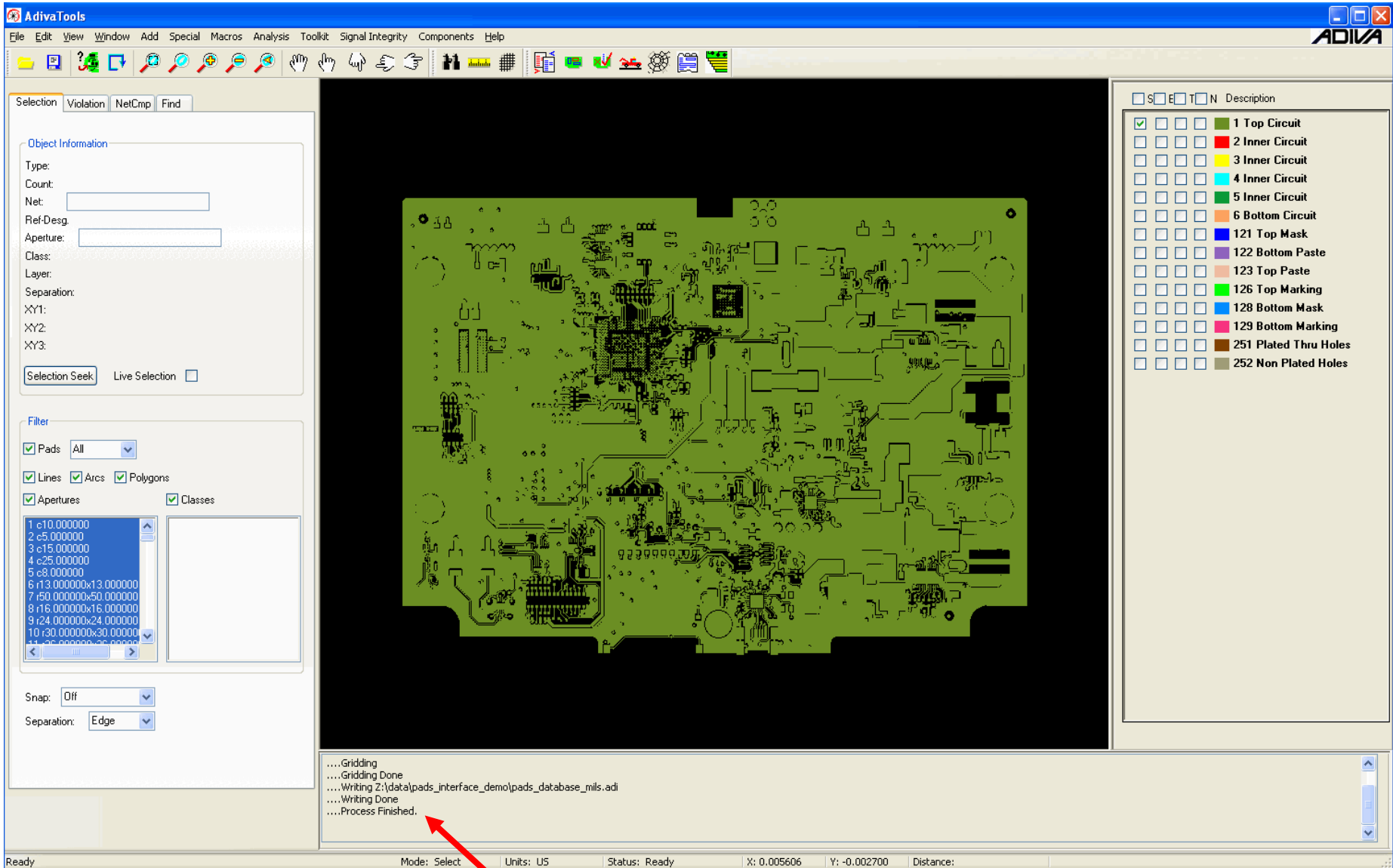
Database is built and ready for tweaking (if needed) when it says "Process Finished"

Step 4

Verify Layer Description
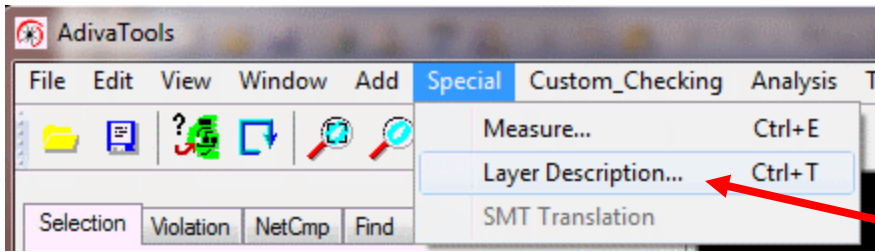
Verify Layer Description Definitions
as read and assembled from the .asc file

Choose **Layer Description** from **Special** menu

It is very important to verify "Type", "Polarity", "Z-Position"
(Z-Position value **MUST** be different for each electrical layer)
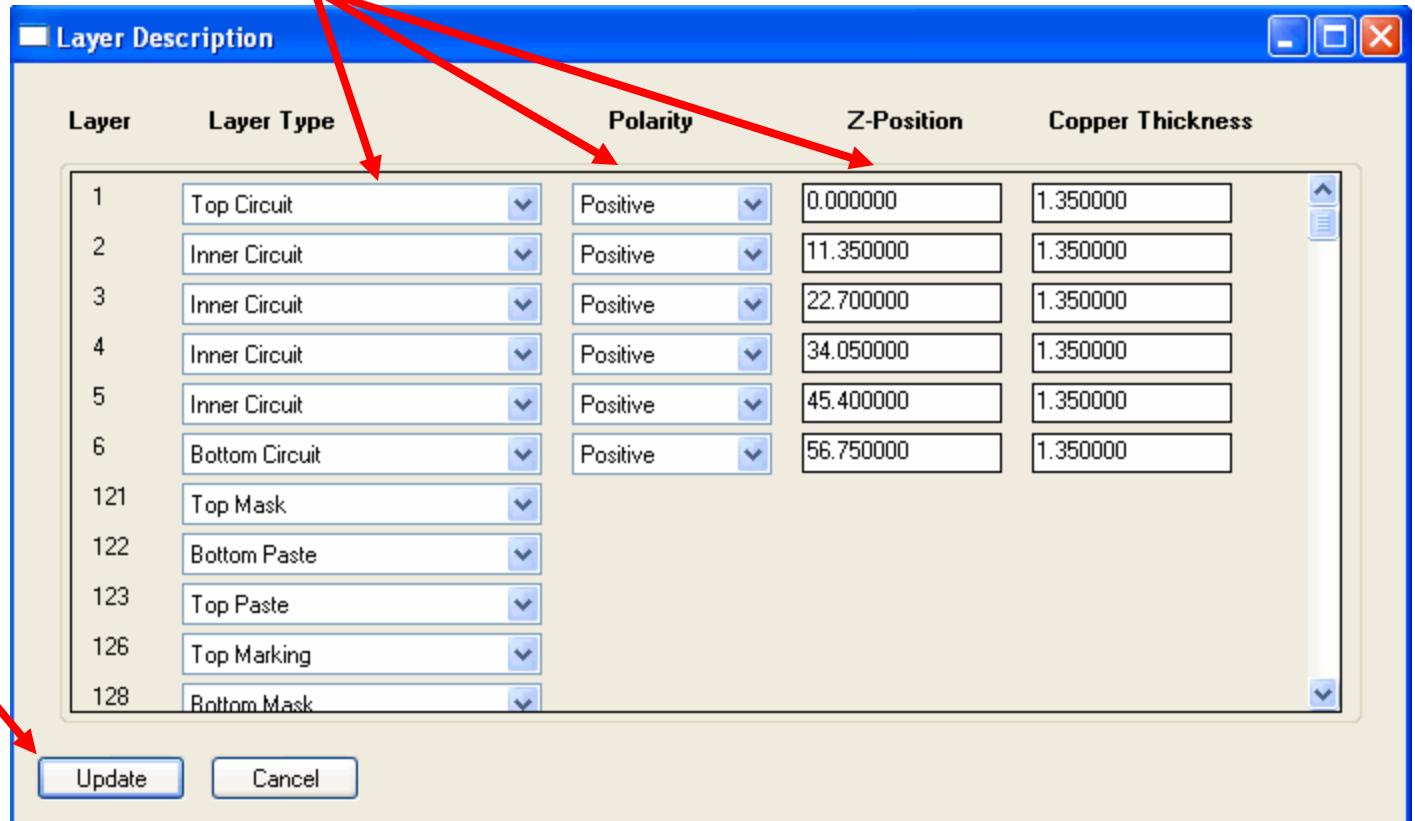
Select **Update**
when complete

Step 5
Database Preparation - Editing

With a built database, there may be several other functions that need to be completed to prepare a design for DRC analysis. These functions may require some light editing of the data. They include….

Layer Alignment
Board Outline creation
Splitting Non-Plated Holes away from Plated Holes onto their own layer
Removing Title Blocks, Coupons, etc

If this is the case, reference the **ADIVA EDITING QUICK-START GUIDE** for details.

Then continue the process of prepping data for analysis….

Step 6

Gerber Netlist Extraction
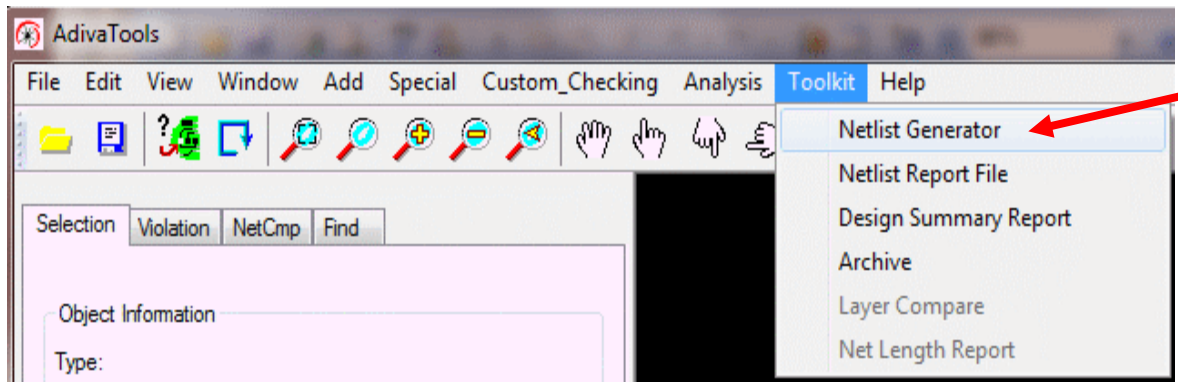
Select **Netlist Generator** from the **Toolkit** menu

When netting of Gerber is complete, "**Process Finished**" will be displayed in message box
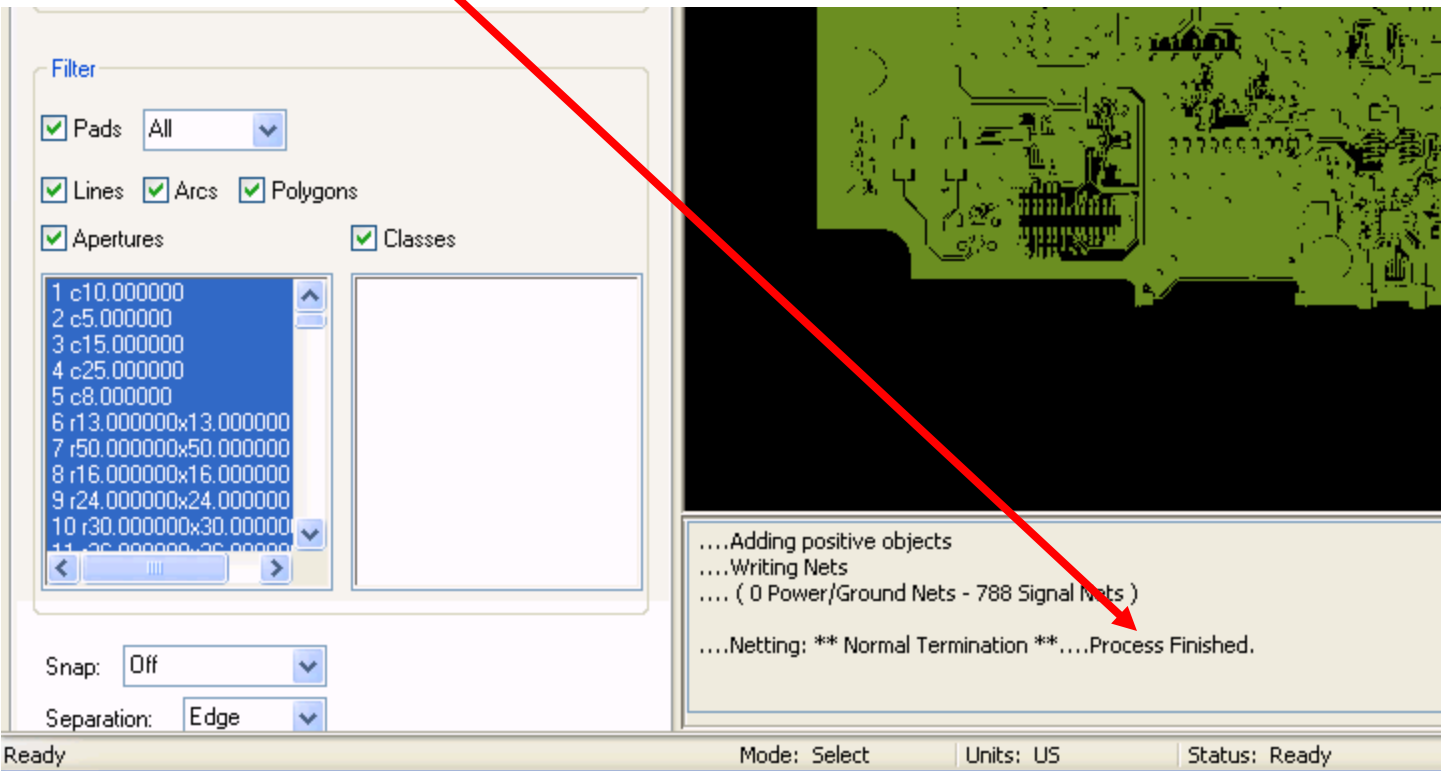
Step 7

Netlist Compare

(See the Adiva Netlist Compare Guide

for further details of this process)
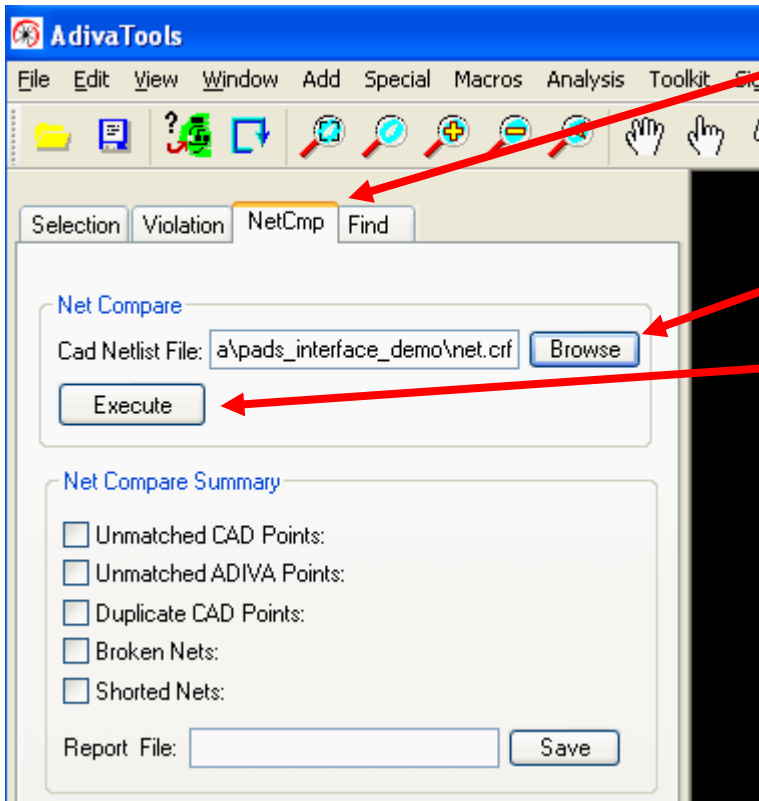
Select the **NetCmp** tab

Browse and select the "net.crf" file for this job

Execute the Net Compare Routine
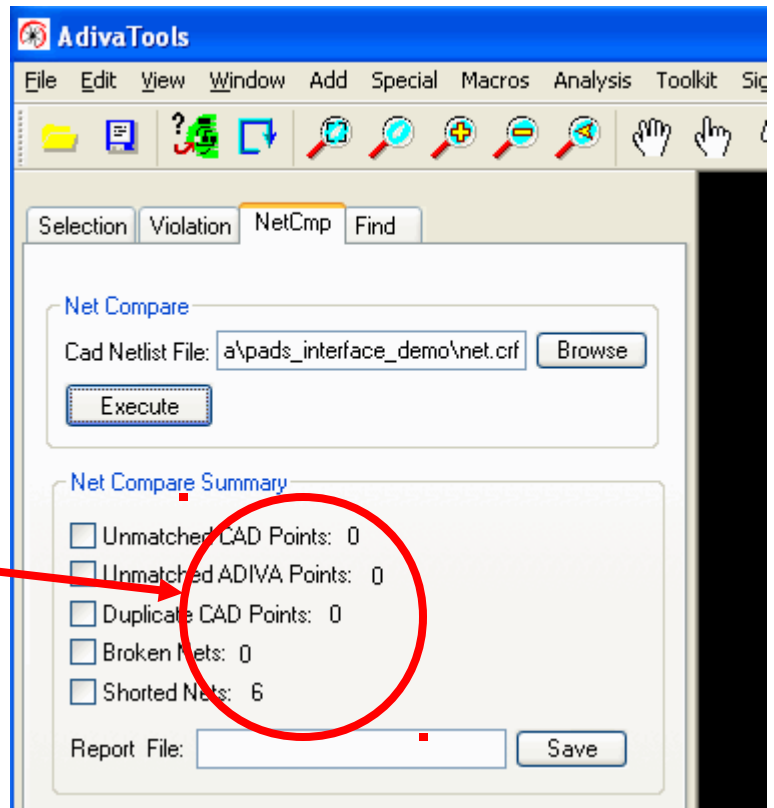
When Net Compare completes, a summary will appear describing any issues

Step 1: Choose the Summary Item to review

Step 2: Scroll to Review Problems and select one to see

Turn on Layer(s)
Redraw or Zoom
if Needed

Highlight toggles on or off the selected netname

Step 3: Select "Show Errors"
to get idea where problem is

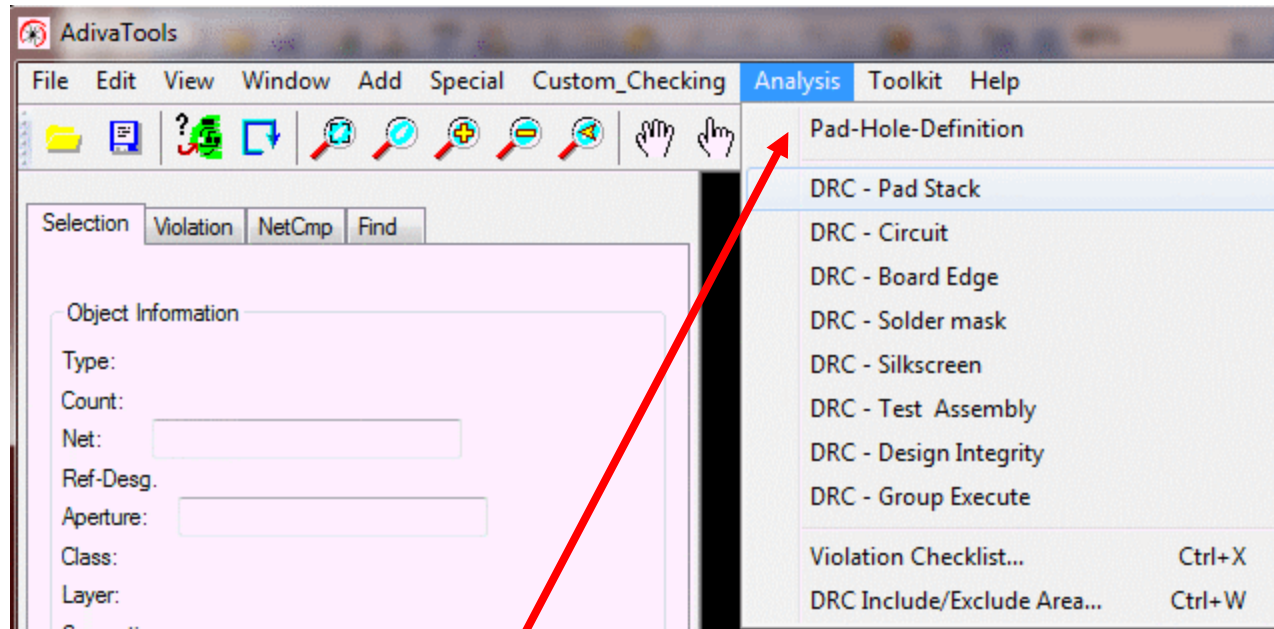Select a pin to bulls-eye its location

Uncheck All Summary Items to "**Exit**" Net Compare

Step 8

Pad / Hole Definition

Adds Pad "FUNCTION" Intelligence to Database

Pad / Hole Definition needed to Identify Pad and Hole types
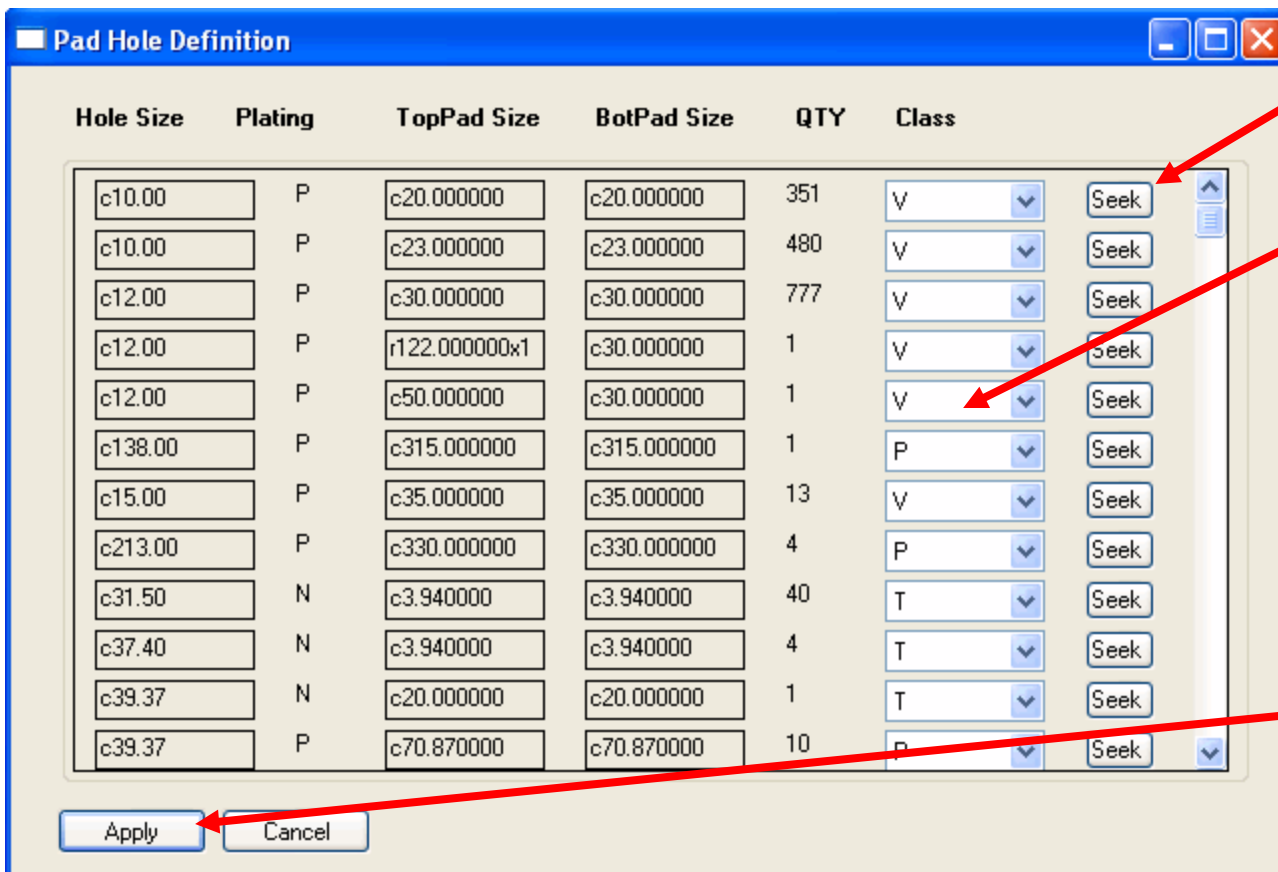so that various checks can be run accurately

Select **Analysis** > **Pad-Hole Definition** to start routine

Review the "stackups" that are created by zooming in on Layer 1
And selecting the "**Seek**" button for each Padstack Type. Watch the screen jump
to the next "seek"

NOTE: Only 1 or 2 "seeks" per padstack type should be used to determine if the
default choice is correct.

Do a quick glance at each one, adjust if needed (usually not needed) then move on
to the next one – don't let this process take more than a few minutes!

Pad Hole Definition

Hole Size	Plating	TopPad Size	BotPad Size	QTY	Class	
c10.00	P	c20.000000	c20.000000	351	V	Seek
c10.00	P	c23.000000	c23.000000	480	V	Seek
c12.00	P	c30.000000	c30.000000	777	V	Seek
c12.00	P	r122.000000x1	c30.000000	1	V	Seek
c12.00	P	c50.000000	c30.000000	1	V	Seek
c138.00	P	c315.000000	c315.000000	1	P	Seek
c15.00	P	c35.000000	c35.000000	13	V	Seek
c213.00	P	c330.000000	c330.000000	4	P	Seek
c31.50	N	c3.940000	c3.940000	40	T	Seek
c37.40	N	c3.940000	c3.940000	4	T	Seek
c39.37	N	c20.000000	c20.000000	1	T	Seek
c39.37	P	c70.870000	c70.870000	10	P	Seek

Apply   Cancel

If default choice requires
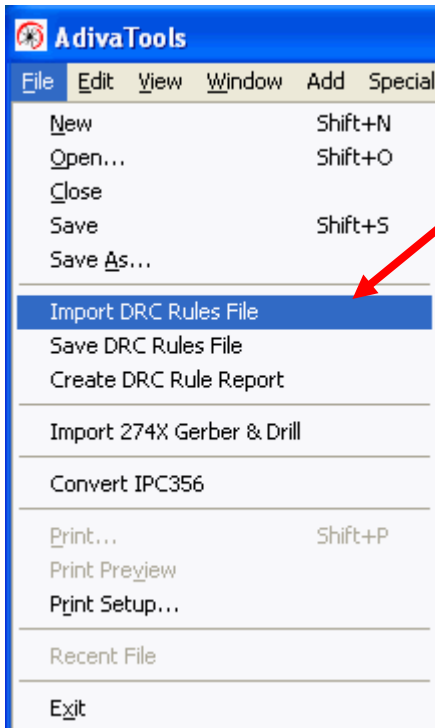adjustment, adjust as needed
to one of the following options…

V = Via
S = SMT
P = Pin -Thru hole
C = Cosmetic (no real function)
t = test point
T = Non-Plated Hole
F = fiducial

Select **Apply** to finish routine

Step 9

Load DRC Check Rules
(See ADIVA DRC Check User Guide for more details)

Select **File** > **Import DRC Rules** to bring in a master set of rules that you may have created.
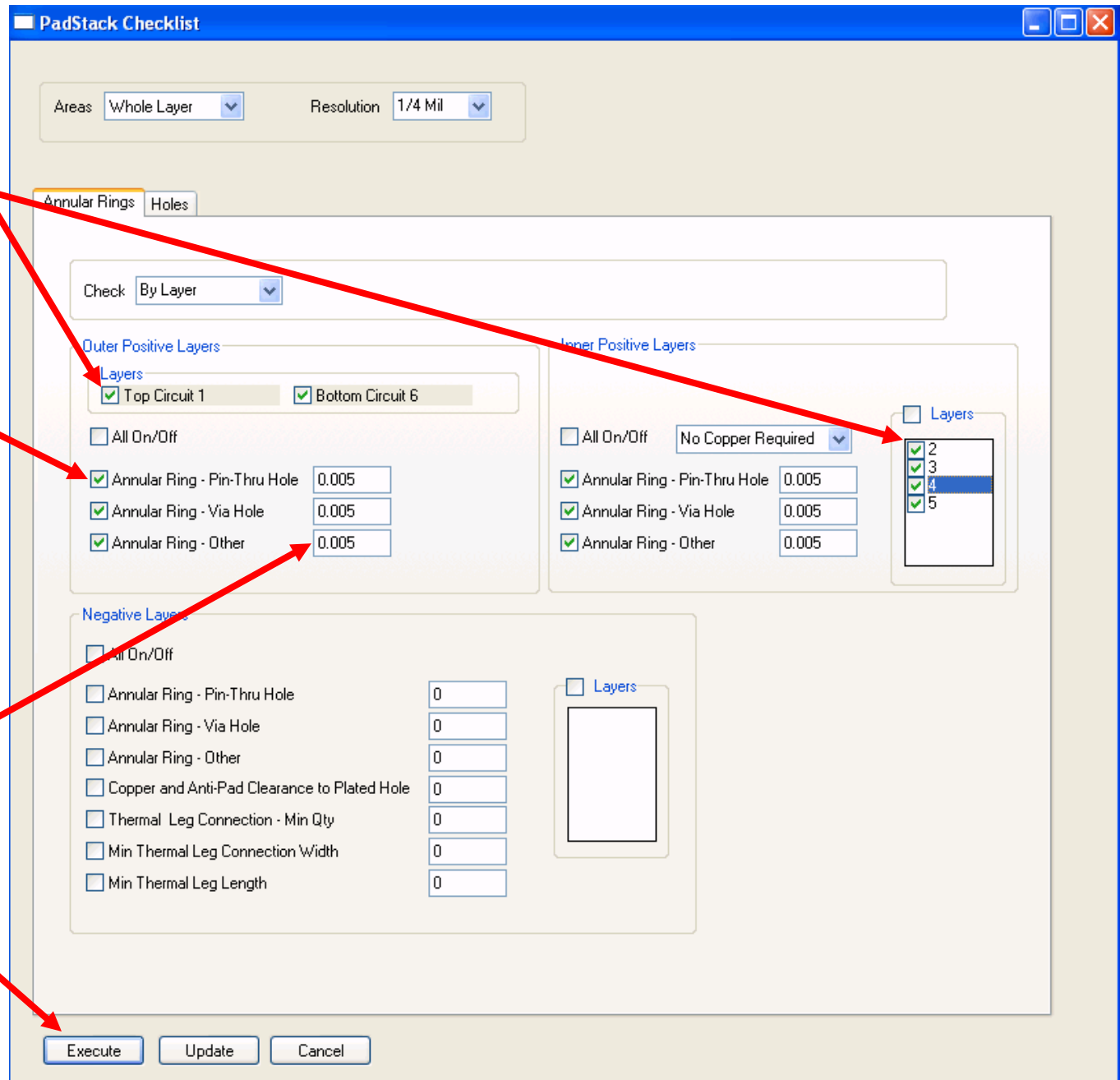
Typically these are stored in the c:\adiva\data directory

In this case, load a file called "**95_example.rul**" which is a basic set of IPC rules and industry standards that ADIVA supplies with all installations.

Step 10

DRC Checks

(See ADIVA DRC Check User Guide for more details)

PadStack Checklist

Areas [Whole Layer ▼]   Resolution [1/4 Mil ▼]

Check ON layers to review

| Annular Rings | Holes |

Check [By Layer ▼]

Outer Positive Layers

Layers
☑ Top Circuit 1   ☑ Bottom Circuit 6

☐ All On/Off

Check ON checks to run

☑ Annular Ring - Pin-Thru Hole   0.005
☑ Annular Ring - Via Hole   0.005
☑ Annular Ring - Other   0.005

Inner Positive Layers

☐ All On/Off   [No Copper Required ▼]

☐ Layers
☑ 2
☑ 3
☑ 4
☑ 5

☑ Annular Ring - Pin-Thru Hole   0.005
☑ Annular Ring - Via Hole   0.005
☑ Annular Ring - Other   0.005

Negative Layers

☐ All On/Off

Values are in inches or mm
5-mil space = 0.005 value

☐ Annular Ring - Pin-Thru Hole   0
☐ Annular Ring - Via Hole   0
☐ Annular Ring - Other   0
☐ Copper and Anti-Pad Clearance to Plated Hole   0
☐ Thermal Leg Connection - Min Qty   0
☐ Min Thermal Leg Connection Width   0
☐ Min Thermal Leg Length   0

☐ Layers

Execute to start checks

[Execute]   [Update]   [Cancel]

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Some checks don't use mils for a value…

This is pixels

This is degrees

Step 11

Violation Review

(See ADIVA DRC Check User Guide for more details)

The Violation Checklist appears when checks are completed

The Checklist can also be opened while checks are running by selecting its Toolbar Icon

Violations are displayed by concern level as defined by the range setting

Save violations to a file to read back and review later

Violation Checklist Report

Adjust Violation Range

Violation File: ./my_violation_file.vio

Save Violation File   Read Violation File   Browse

Choose Violations to View...

	Critical		Concern		Tol	Accepted	Param	Layer	Seq	Violation Type	Comment
	12		0		0	-				Thermal Leg Connection - Min Qty	
	12		0		0	0	4.00000	4	34	Thermal Leg Connection - Min Qty	
	12		0		0	0	4.00000	7	36	Thermal Leg Connection - Min Qty	
✓	7	✓	0	✓	0	0	0.00500	2	17	Annular Ring - Via Hole	
✓	7		0		0	0	0.00500	4	18	Annular Ring - Via Hole	
✓	7		0		0	0	0.00500	7	20	Annular Ring - Via Hole	
✓	7		0		0	0	4.00000	5	35	Thermal Leg Connection - Min Qty	
✓	4		0		0	0	0.00500	5	19	Annular Ring - Via Hole	
	2		0		0	0	0.00500	2	21	Annular Ring - Other	
	2		0		0	0	0.00500	4	22	Annular Ring - Other	

Delete Selected Violations   Clear Accepted Violation File

Close Violation Checklist   Save Violation Summary Report

Choose a **Violation Type** and amount to review by using **ViolSeek** on the main user interface

Select **Close Violation Checklist** to close the dialog (violations are not lost)

Adjusting the **Violation Range** effects violation count distribution in the **Violation Checklist**.
The values listed for each range analyze how close a violation comes to the parameter to determine
the category a particular violation will be placed. Changes take effect on **Update**.

For example…. given the range values shown, if a check parameter is 0.005 and the violation
amount is 0.00480 – this violation amount falls within ¼ Mil of the parameter categorizing the
violation as "**Tolerance**". If the violation amount is 0.0046 – this makes the violation amount fall
between ¼ and ½ mil of the parameter making it a "**Concern**" violation.
Anything else is deemed "**Critical**".

Violations can be **sorted** by selecting the column button above each data column.
First selection sorts high to low, second sorts low to high, third sorts high to low again…

Check all boxes on for a violation type to **Delete** or **Save** from list

Violation Checklist Report

Adjust Violation Range

Violation File: ./my_violation_file.vio

Save Violation File   Read Violation File   Browse

Choose Violations to View…

	Critical		Concern		Tol	Accepted	Param	Layer	Seq	Violation Type	Comment
	12		0		0					Thermal Leg Connection - Min Qty	
	12		0		0	0	4.00000	4	34	Thermal Leg Connection - Min Qty	
	12		0		0	0	4.00000	7	36	Thermal Leg Connection - Min Qty	
✓	7	✓	0	✓	0	0	0.00500	2	17	Annular Ring - Via Hole	
✓	7		0		0	0	0.00500	4	18	Annular Ring - Via Hole	
✓	7		0		0	0	0.00500	7	20	Annular Ring - Via Hole	
✓	7		0		0	0	4.00000	5	35	Thermal Leg Connection - Min Qty	
✓	4		0		0	0	0.00500	5	19	Annular Ring - Via Hole	
	2		0		0	0	0.00500	2	21	Annular Ring - Other	
			0		0	0	0.00500	4	22	Annular Ring - Other	

Delete Selected Violations   Clear Accepted Violation File

Close Violation Checklist   Save Violation Summary Report

Creates a text summary report of all DRC violations.
These violations are itemized by violation amounts
and sorted by type. Creation of the file can be either
in ASCII ".txt" file format or in a comma-delimited
spreadsheet-ready format.

Empties all data contained in the
"approved.vio" file. All **Accepted**
violations are returned to the **Violation
Checklist** for review or deletion.

This column shows the checking sequence
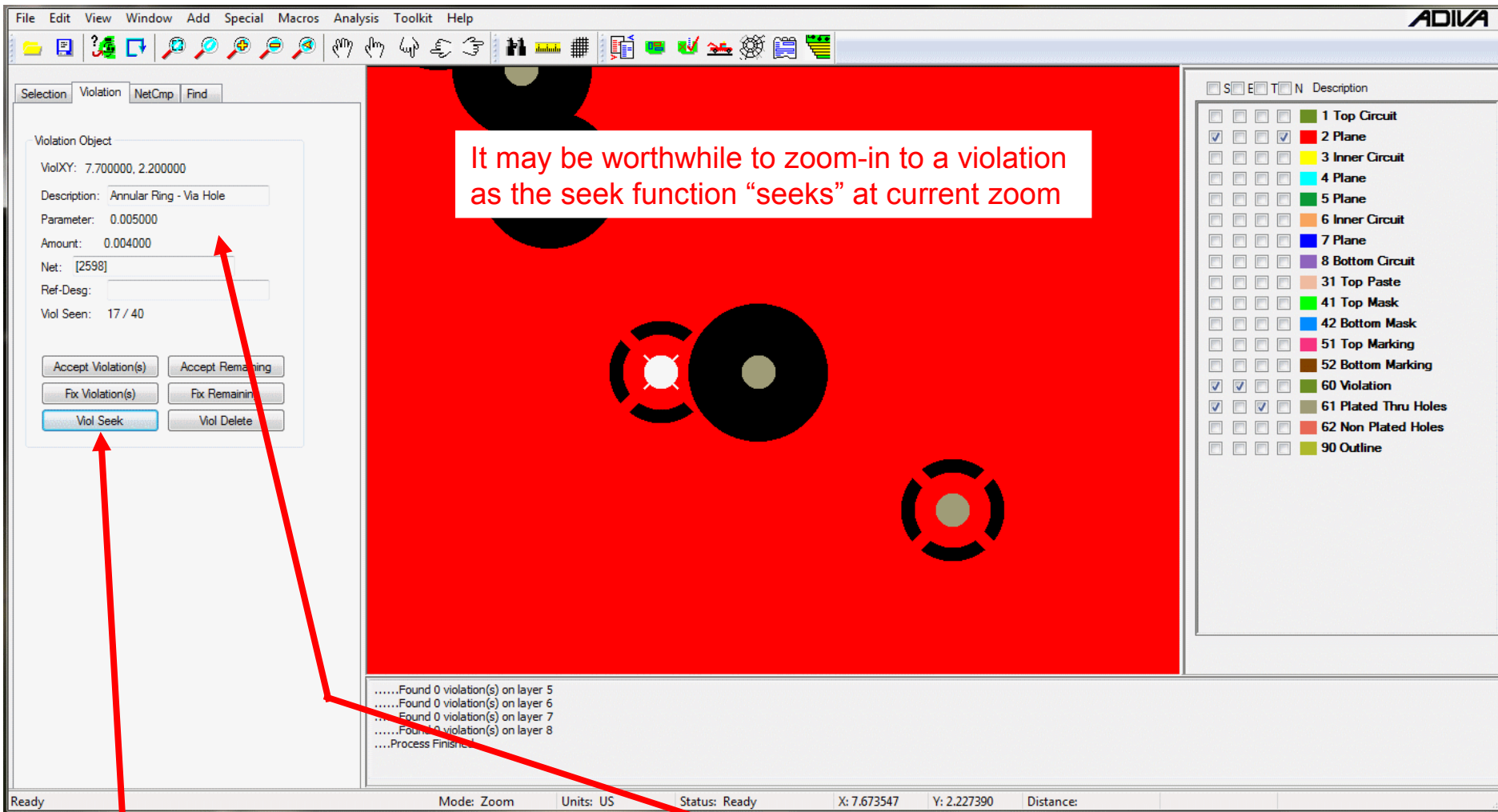which is the order the checks were performed

Comments can be added to the checklist and saved to a Violation file. Enter any text
and save the violation file – when the violation file is reloaded, these comments will
display as they were entered

It may be worthwhile to zoom-in to a violation as the seek function "seeks" at current zoom

Violation details are shown here

Once a Violation Type is chosen for review,
select **Viol Seek** to review graphically the violations selected **<shift>Viol Seek** progresses <u>backward</u>

NOTE: Worst violations are always shown first

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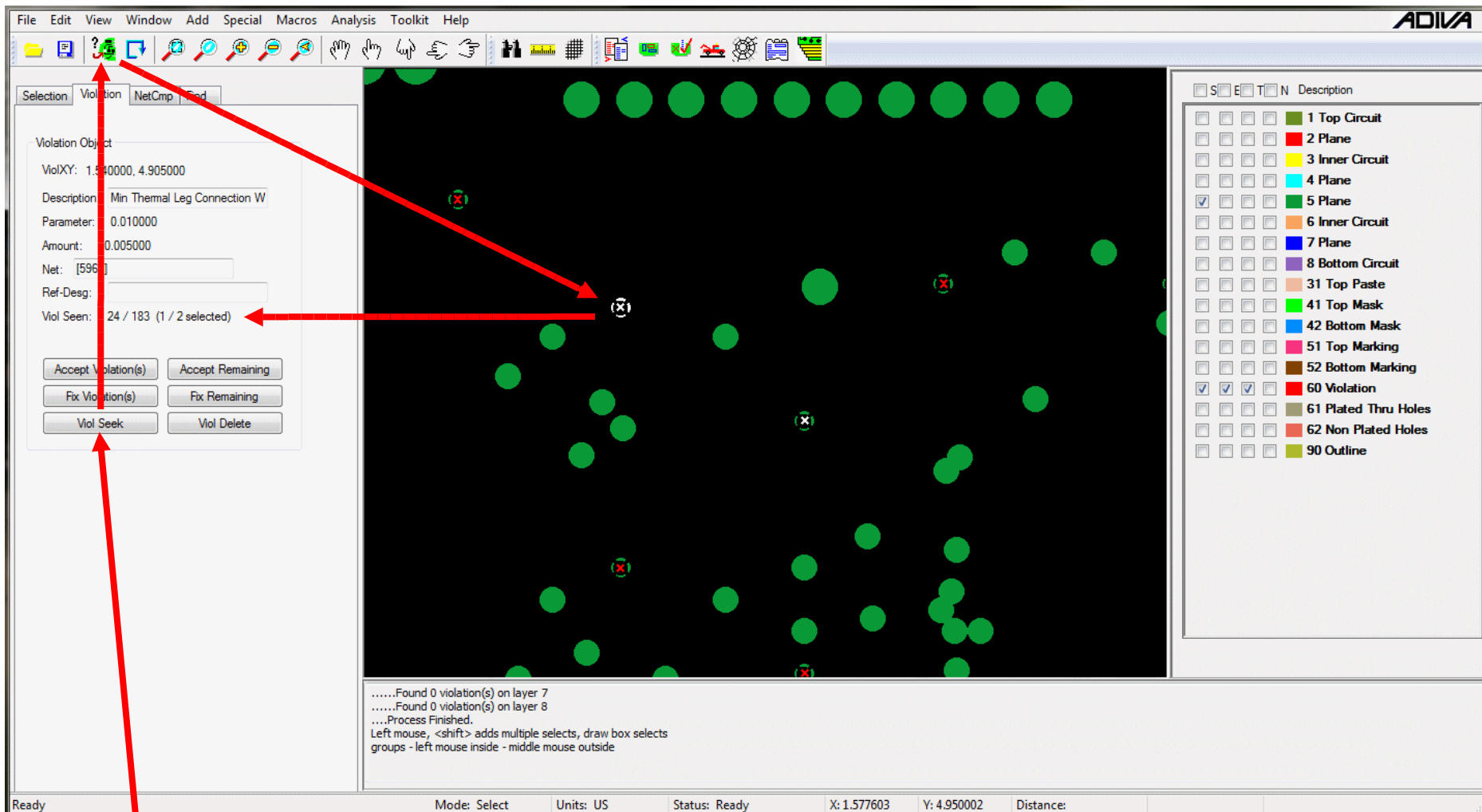
Individual or groups of violations can also be reviewed. **ViolSeek** to the first violation type selected in the **Violation Checklist,** choose the **Select** button then click on an individual violation or window-select a group of violations to review. Notice the **ViolSeen** list shows the qty selected

Read information on the one violation selected – or - **ViolSeek** again to review the group items selected. Choose **Select** again to un-select violations.

A violation (or group of violations) can be **Accepted** which removes the violation(s) from the "violation seek" list.

The violation(s) is(are) not removed – just marked so that the violation(s) is(are) not seen. Notice the violation count shown in the Violation Checklist adjusts to a lower number while the count for the **Accepted** violation(s) increases.
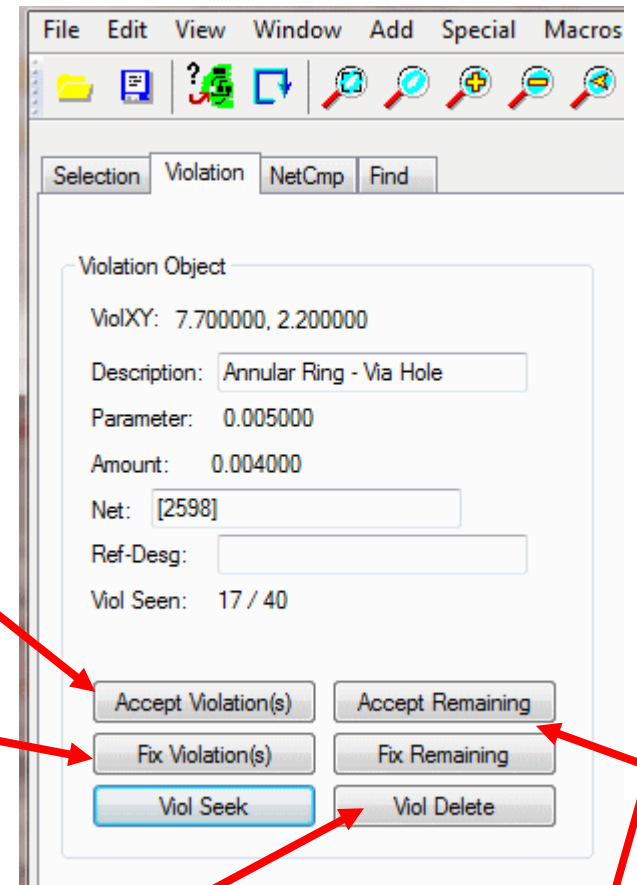
An "approved.vio" file is created in the DRC project directory containing accepted violations. This file can be used in future DRC analysis to filter already approved violations from a new design.

A violation (or group of violations) can be **Fixed** which creates a file in the DRC project directory called "fix.vio".

This file is typically a collection of violations that a reviewer is interested in having someone else review or fix the violation in a CAD system.

The "fix.vio" file can be read into specific CAD systems or read back into Adiva's **Violation Checklist** to review only the violations to be "fixed".

A violation (or group of violations) can be **Deleted** removing it from the Violation Checklist results list.

File Edit View Window Add Special Macros

Selection | Violation | NetCmp | Find

Violation Object

ViolXY: 7.700000, 2.200000

Description: Annular Ring - Via Hole

Parameter: 0.005000

Amount: 0.004000

Net: [2598]

Ref-Desg:

Viol Seen: 17 / 40

Accept Violation(s)	Accept Remaining
Fix Violation(s)	Fix Remaining
Viol Seek	Viol Delete

Fixing or **Accepting** the **Remaining** violations adds the currently viewed violation and all those left to be seen into their appropriate .vio files

Violations can also be saved in a format suitable for web-browser display

Select the **DRC Archive** Icon for web image creation

A **DRC Archive** dialog will appear…

Design Analysis Archive

Archive Directory	e_demo\.\pads_interface_demo-HTML
Archive Index File	index.htm
Part Number	123_23ASB
Revision	AA
Designer Name	Designer
Checker Name	Checker
Date	
Data Type	Error Data

Description

These Non-Plated Holes are too close…

Create   Cancel

Fill in items such as part number, revision, designer's and checker's name if desired then…

Add any custom notes to help communicate the issue…

Select **Create** to finish the **DRC Archive**

Leave this dialog open and select **Create** for other violations to be archived

To view violations that have been archived to HTML, navigate through **Windows Explorer** finding the Adiva HTML directory (should be under the main job directory) and double-click on "**index.htm**"….
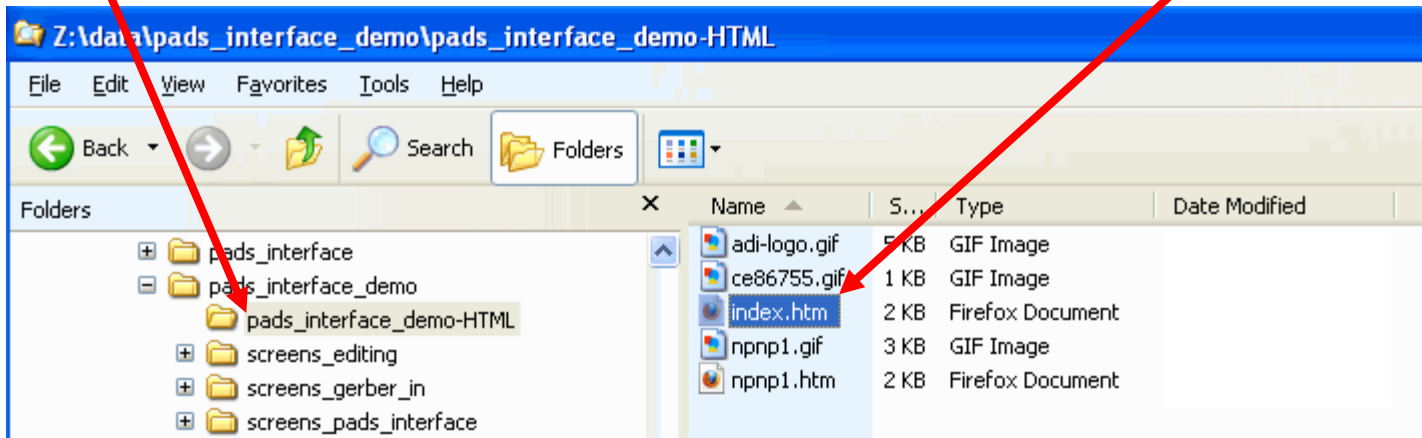
A web browser should open displaying a matrix of violations that have been archived.

Violations should be clearly described – click on one to see a graphic of the violation

Web browser should now show a graphic of the selected violation including specific details about the violation…

Violation Description,
Check parameter,
Violation amount,
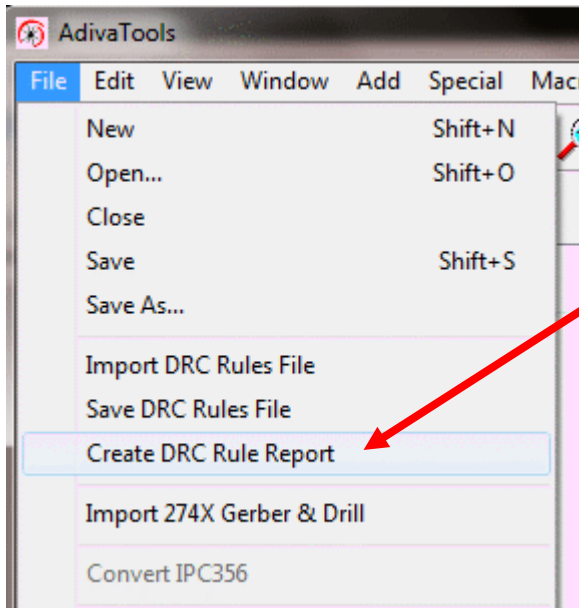XY location,
Layer involved

Custom note
added from main dialog

Same graphic displayed
in AdivaTools DRC Violation
review

Extra DRC Outputs

Select **File > Create DRC Rule Report** to create an ASCII text file documenting all of the DRC Check dialogs.
In this document will be a listing of all DRC Check settings, their values and whether they are on/off.

This is useful in documenting the settings of all DRC checks for later reference.

Select **Toolkit > Design Summary Report** to receive an ASCII text file in comma-delimited (spreadsheet ready) format summarizing details about the design.
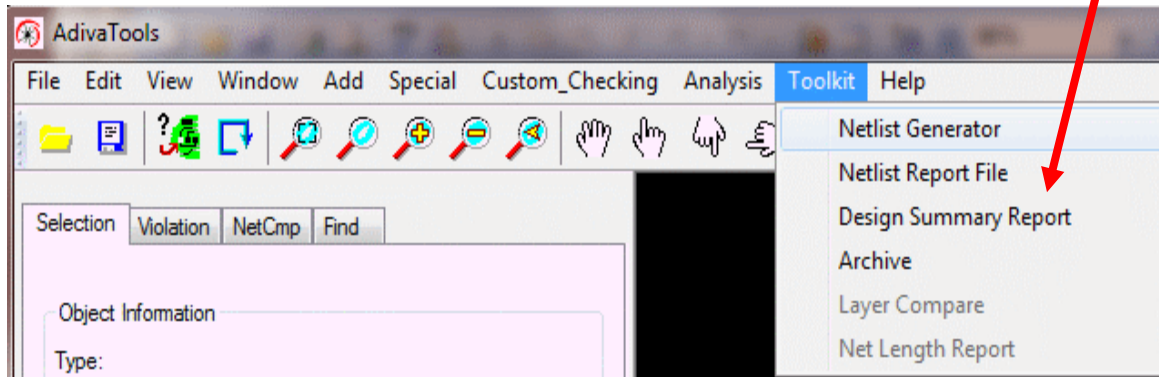
Included in this report is enough information suitable for characterizing the design including items such as board dimensions, hole counts, min spacing values, etc…

END
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Adiva Version 9.5