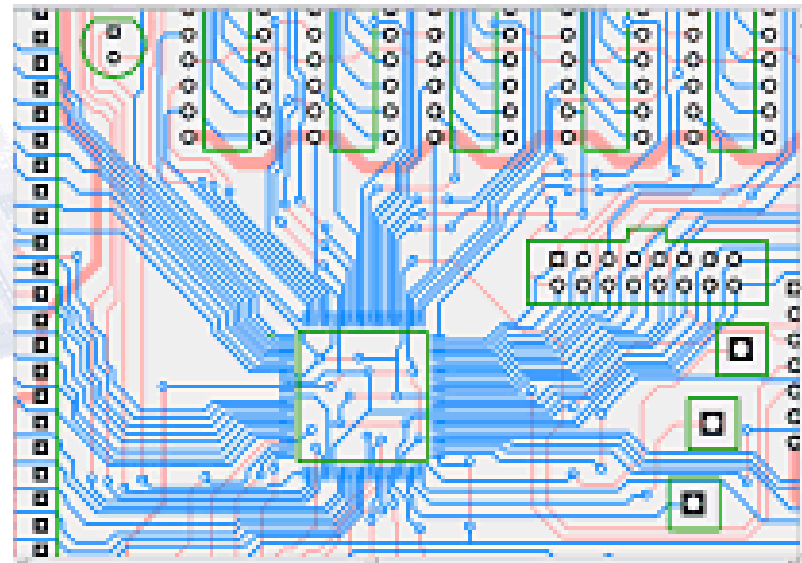
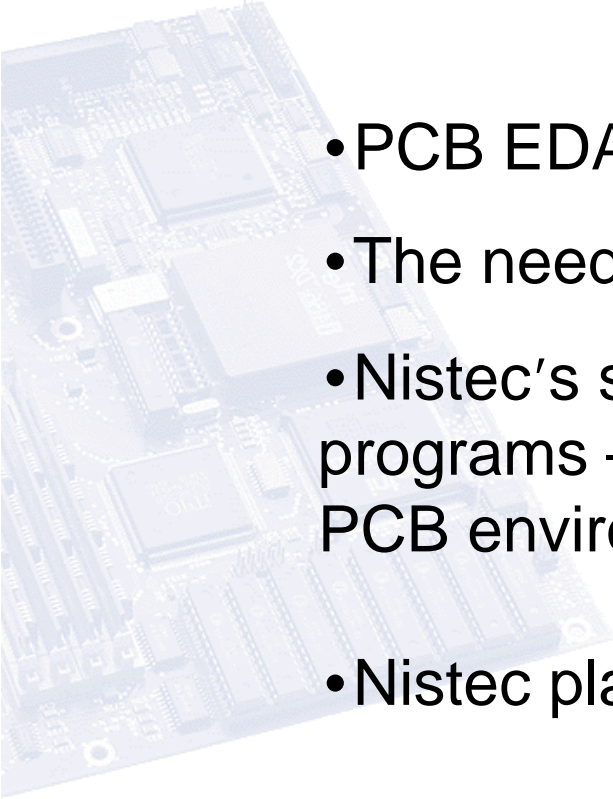


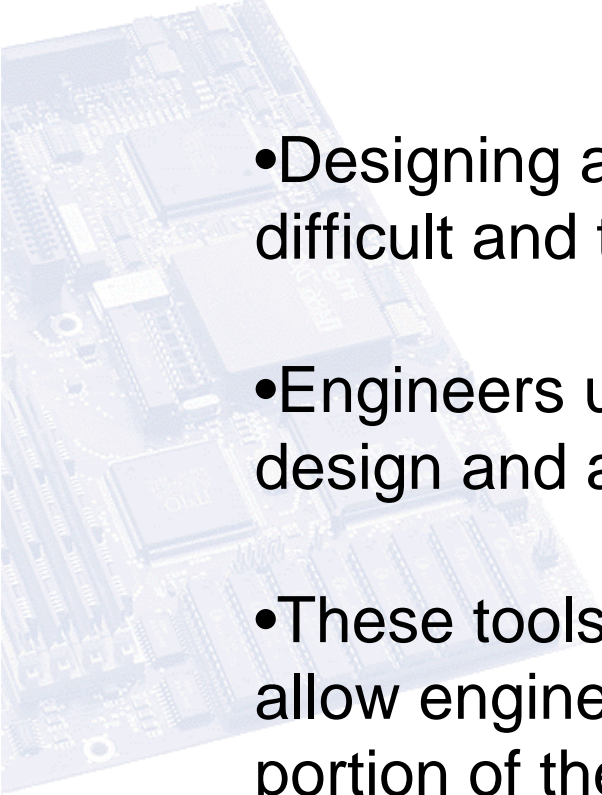
**Efficiently Improve Allegro PCB
Editor Layouts Time to Market
Using Custom Skill Utility
Programs**

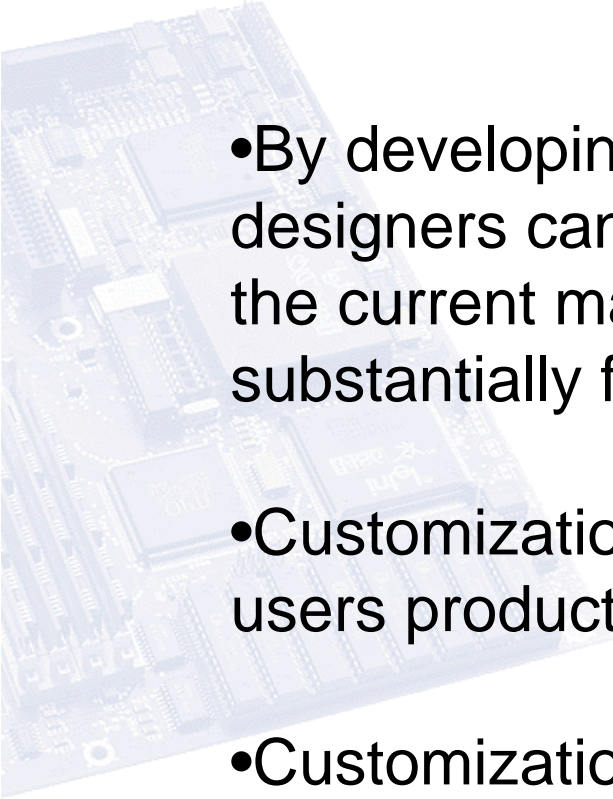


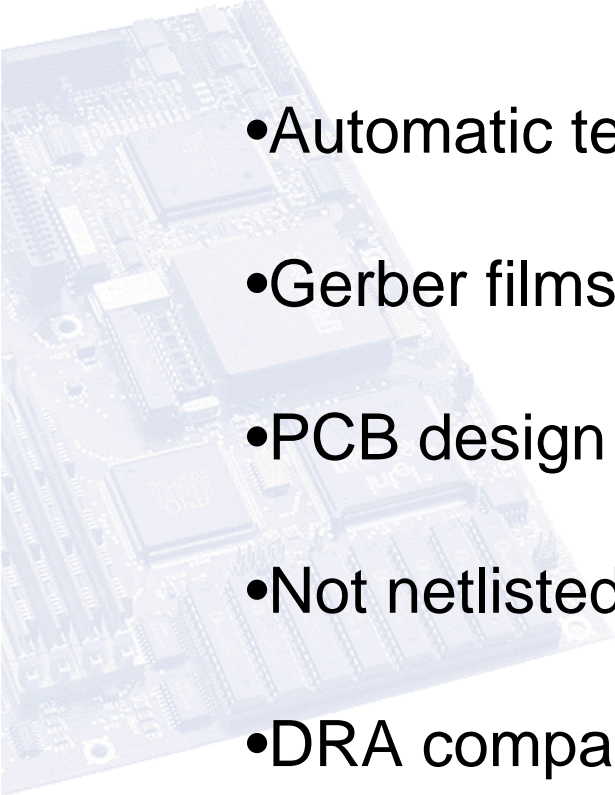
Shimon Beniaminovich
Senior CAD / Applications Engineer
Nistec Design
Nov. 04, 2007

Agenda

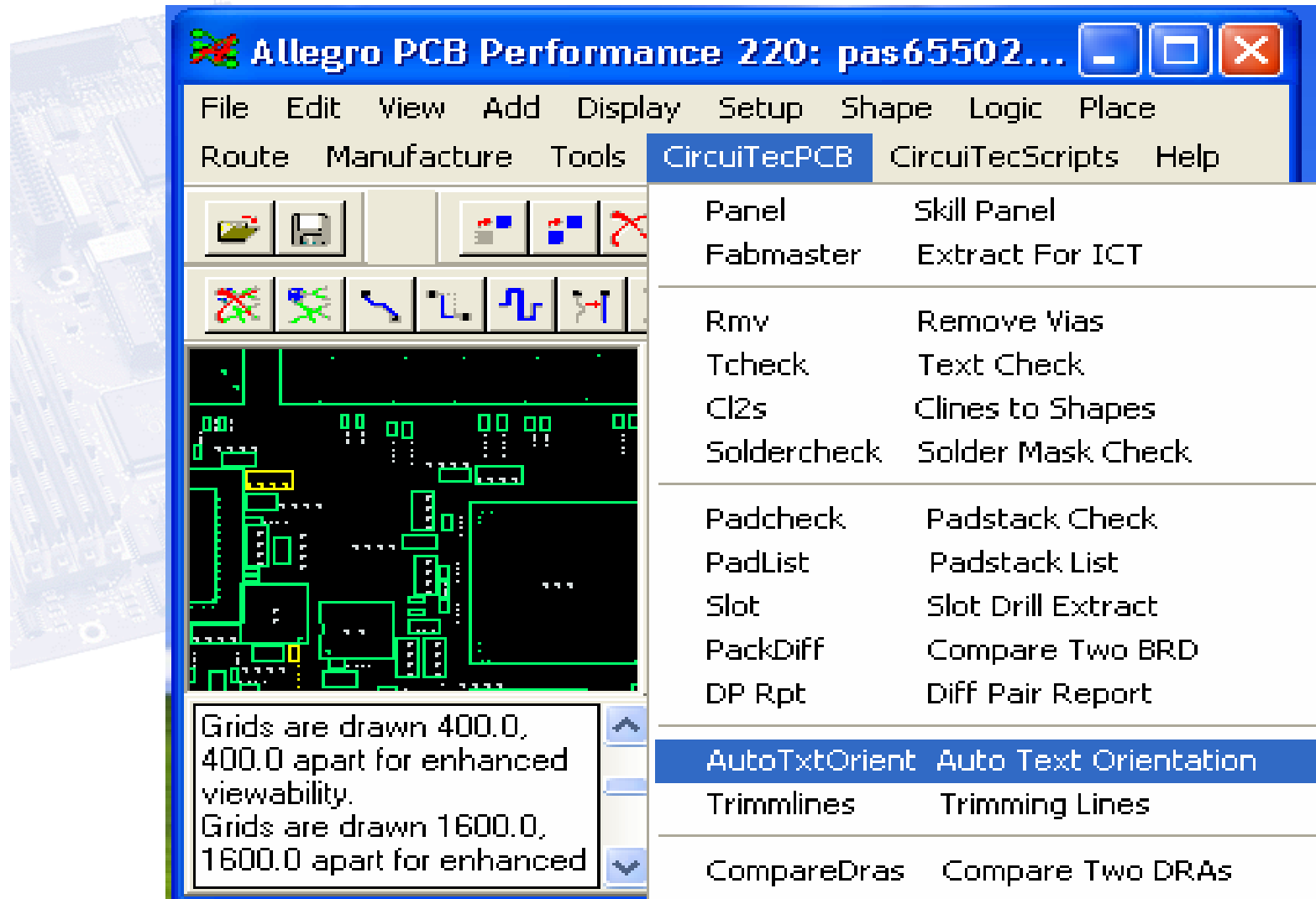
- 
- PCB EDA partial automation – status
 - The need for customization programs
 - Nistec's successful customization programs – examples in Cadence Allegro PCB environment
 - Nistec planned customization programs
 - Customization programs benefits

- 
- Designing a complex electronics product is difficult and time consuming
 - Engineers use EDA and CAD tools to design and analyze products
 - These tools are essential to the process, but allow engineers to automate only a portion of their work

- 
- By developing custom application software designers can apply user-assisted automation to the current manual process and complete projects substantially faster
 - Customization programs dramatically increase users productivity
 - Customization programs provide top quality and high reliability PCB design

- 
- Automatic text orientation program
 - Gerber films - automatic creation utility
 - PCB design padstacks verification program
 - Not netlisted fiducial report utility
 - DRA comparison report utility

Automatic Text Orientation Program (1)



Allegro PCB Performance 220: pas65502...

File Edit View Add Display Setup Shape Logic Place
Route Manufacture Tools **CircuiTecPCB** CircuiTecScripts Help

Panel	Skill Panel
Fabmaster	Extract For ICT
Rmv	Remove Vias
Tcheck	Text Check
Cl2s	Clines to Shapes
Soldercheck	Solder Mask Check
Padcheck	Padstack Check
PadList	Padstack List
Slot	Slot Drill Extract
PackDiff	Compare Two BRD
DP Rpt	Diff Pair Report
AutoTxtOrient	Auto Text Orientation
Trimmlines	Trimming Lines
CompareDras	Compare Two DRAs

Grids are drawn 400.0,
400.0 apart for enhanced
viewability.
Grids are drawn 1600.0,
1600.0 apart for enhanced

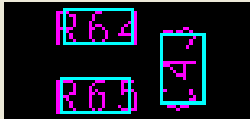
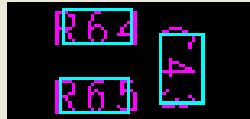
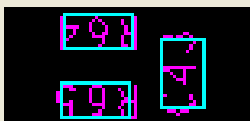
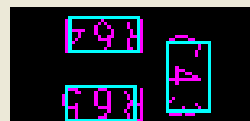
Automatic Text Orientation Program Form (2)



Auto Text Orientation

Choose Your One Preferred Text Orientation Method !!!

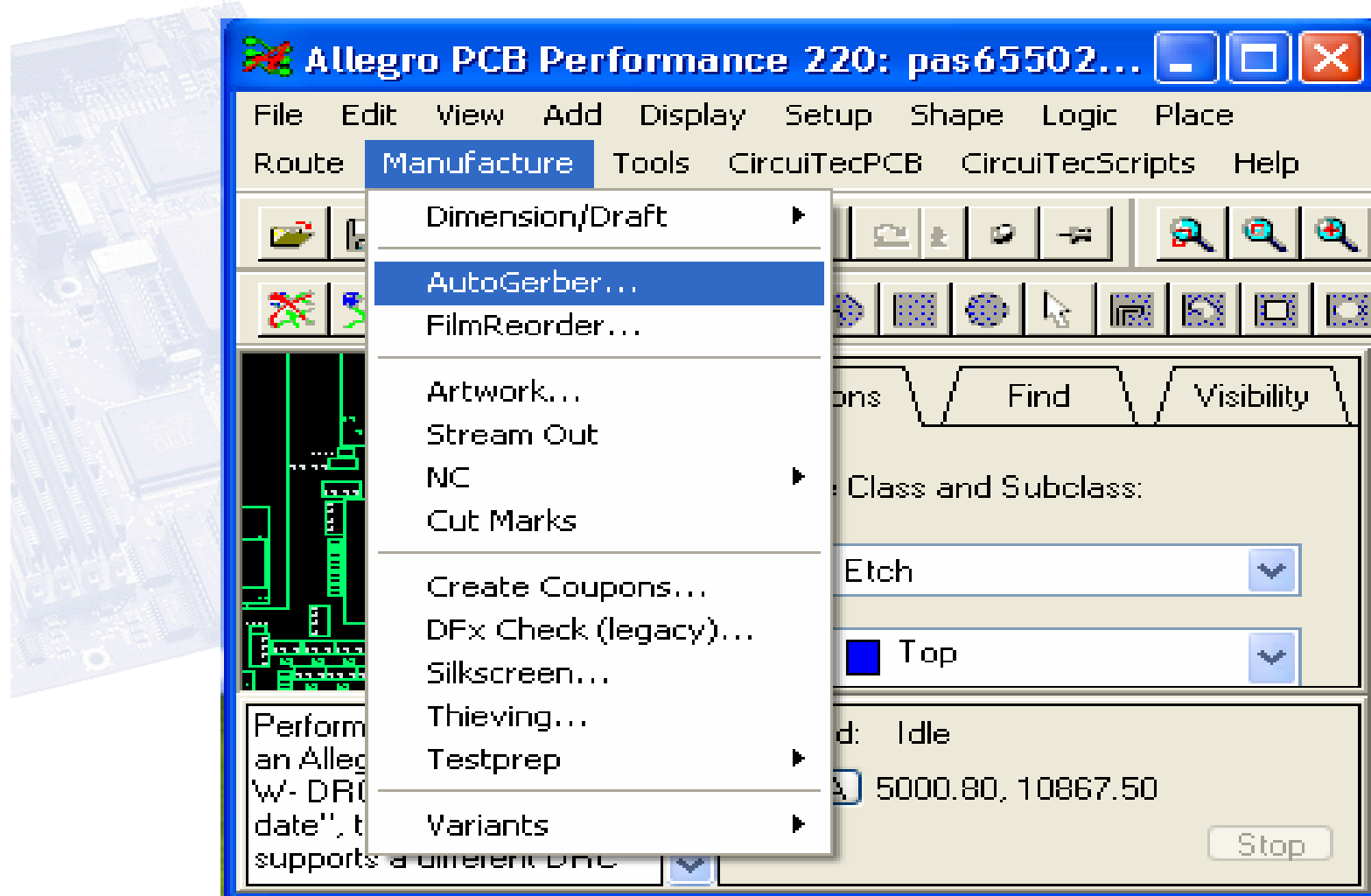
Available Text Orientation Methods

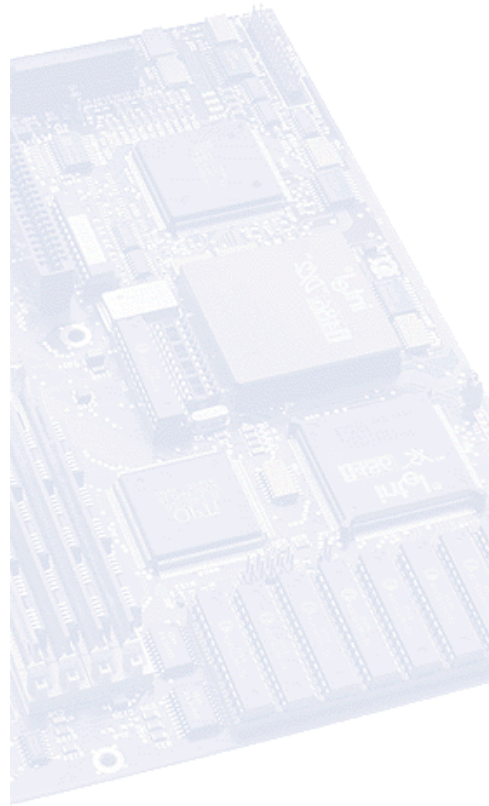
<input checked="" type="checkbox"/> 0 --- 90	<input type="checkbox"/> 0 --- 270
	
<input type="checkbox"/> 90 --- 180	<input type="checkbox"/> 180 --- 270
	

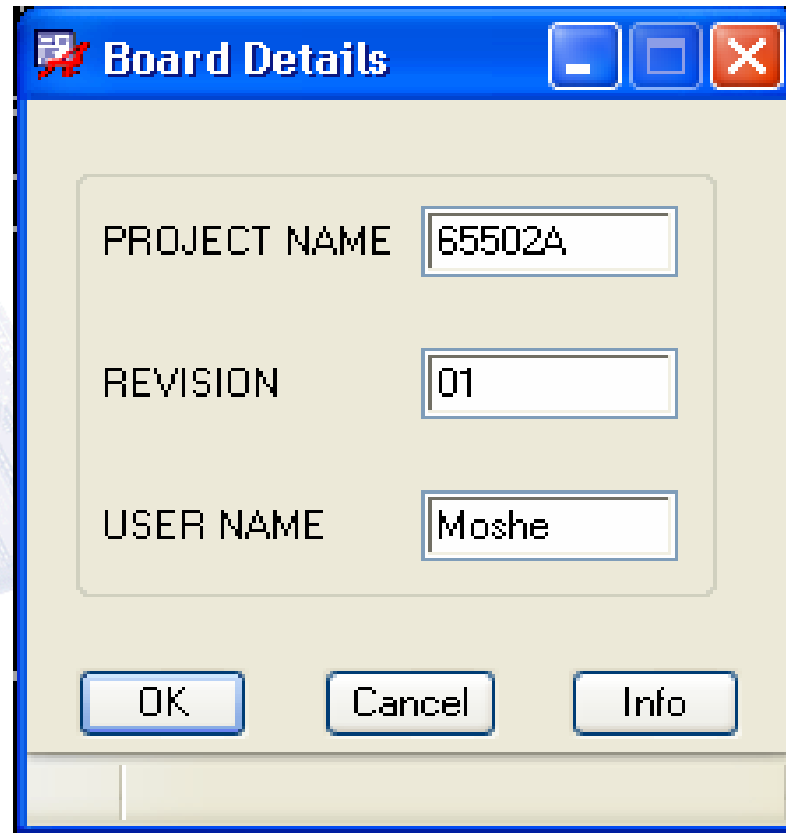
Select Area For Text Orientation

OK Cancel Info

Gerber Films – Automatic Creation Utility (1)



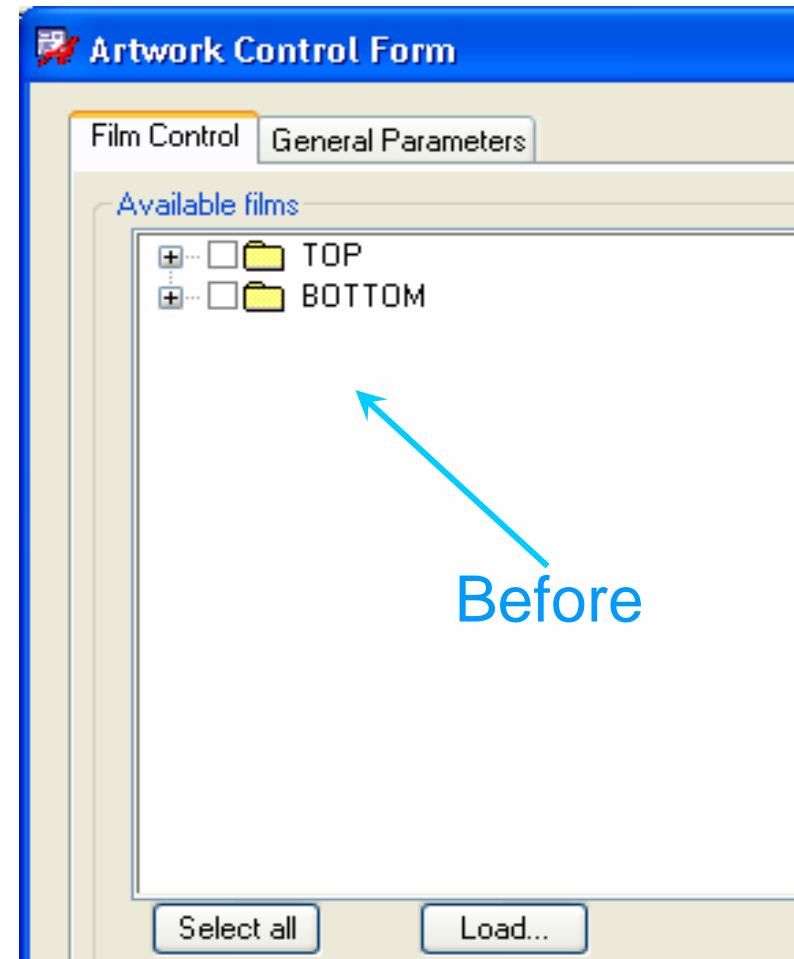
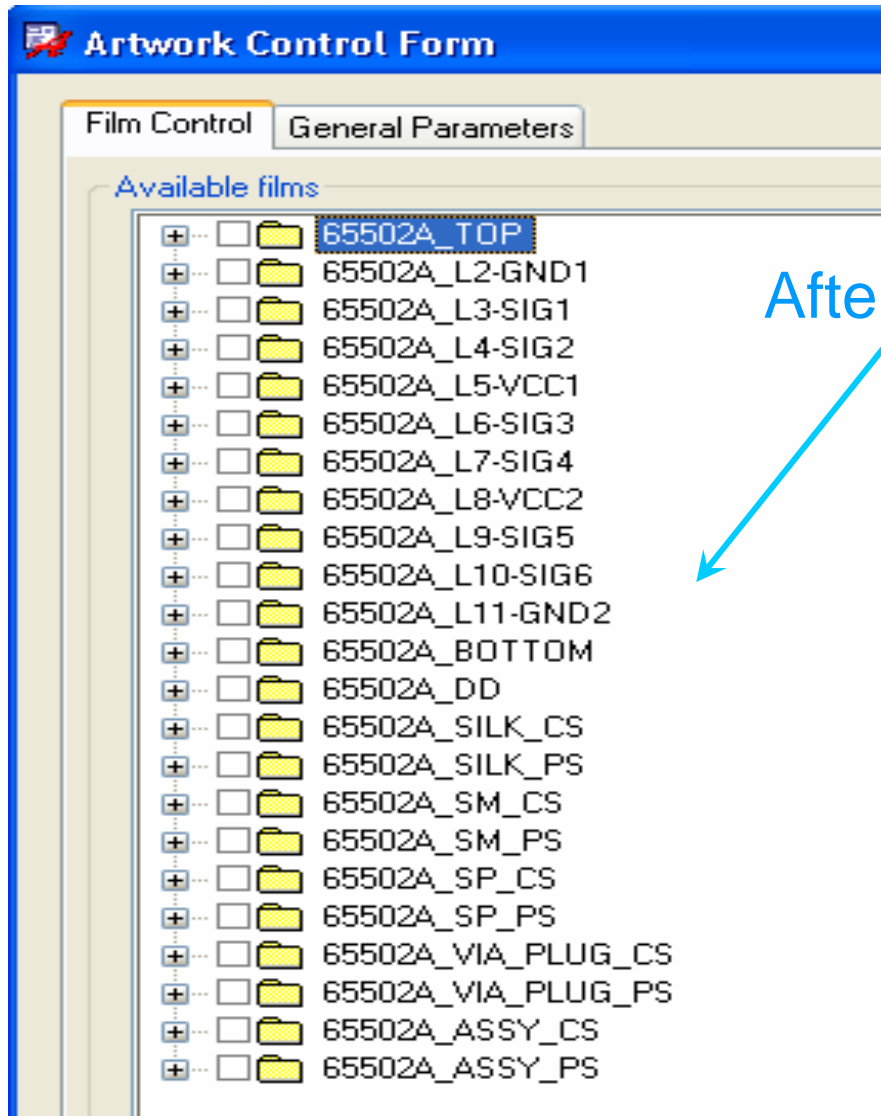


 Board Details

PROJECT NAME	<input type="text" value="65502A"/>
REVISION	<input type="text" value="01"/>
USER NAME	<input type="text" value="Moshe"/>

Before and After Activating the Utility (3)

Saving time in these design actions – 98% !



Created Class/Subclass Details (4)



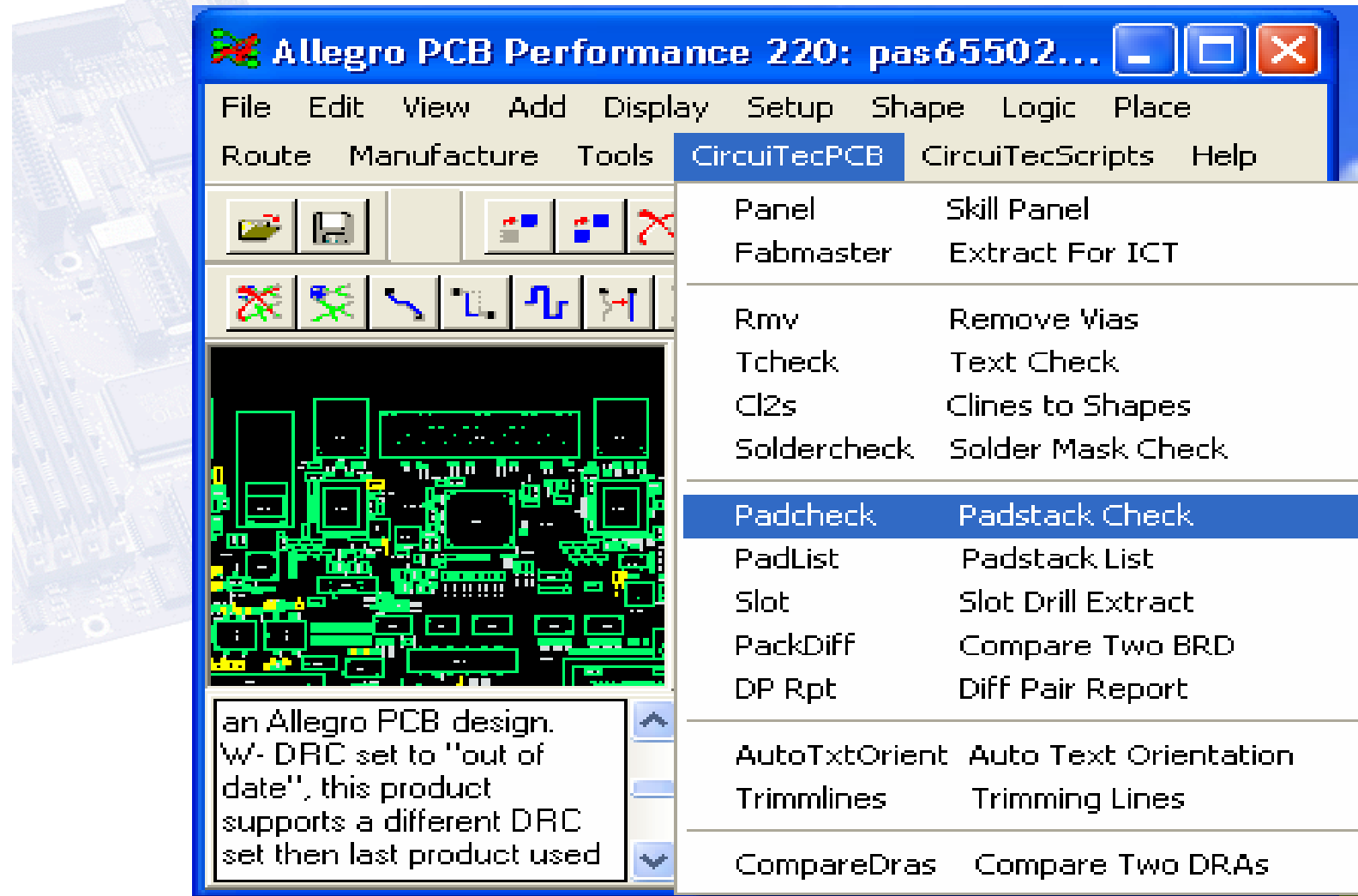
Artwork Control Form

Film Control General Parameters

Available films

- 65502A_BOTTOM
 - ◆ BOARD GEOMETRY/PS_FORMAT
 - ◆ VIA CLASS/BOTTOM
 - ◆ PIN/BOTTOM
 - ◆ ETCH/BOTTOM
 - ◆ BOARD GEOMETRY/OUTLINE
 - ◆ BOARD GEOMETRY/FORMAT_TOP
- 65502A_DD
 - ◆ BOARD GEOMETRY/DRILL
 - ◆ MANUFACTURING/NCLEGEND-1-12
 - ◆ MANUFACTURING/NCDRILL_LEGEND
 - ◆ MANUFACTURING/NCDRILL_FIGURE
 - ◆ DRAWING FORMAT/OUTLINE
 - ◆ BOARD GEOMETRY/OUTLINE
 - ◆ BOARD GEOMETRY/DIMENSION
 - ◆ BOARD GEOMETRY/DD_FORMAT
 - ◆ BOARD GEOMETRY/FORMAT_TOP
- 65502A_SILK_CS
- 65502A_SILK_PS
- 65502A_SM_CS
 - ◆ BOARD GEOMETRY/SM_CS_FORMAT
 - ◆ VIA CLASS/SOLDERMASK_TOP
 - ◆ PIN/SOLDERMASK_TOP
 - ◆ PACKAGE GEOMETRY/SOLDERMASK_TOP
 - ◆ BOARD GEOMETRY/OUTLINE
 - ◆ BOARD GEOMETRY/SOLDERMASK_TOP
 - ◆ BOARD GEOMETRY/FORMAT_TOP
- 65502A_SM_PS

PCB Design Padstacks Verification Program (1)



The screenshot shows the Allegro PCB Performance 220 software interface. The title bar reads "Allegro PCB Performance 220: pas65502...". The menu bar includes File, Edit, View, Add, Display, Setup, Shape, Logic, Place, Route, Manufacture, Tools, CircuiTecPCB, CircuiTecScripts, and Help. The CircuiTecPCB menu is open, displaying a list of tools and checks. A preview window shows a PCB design with green highlights. A text box at the bottom left contains the following text:

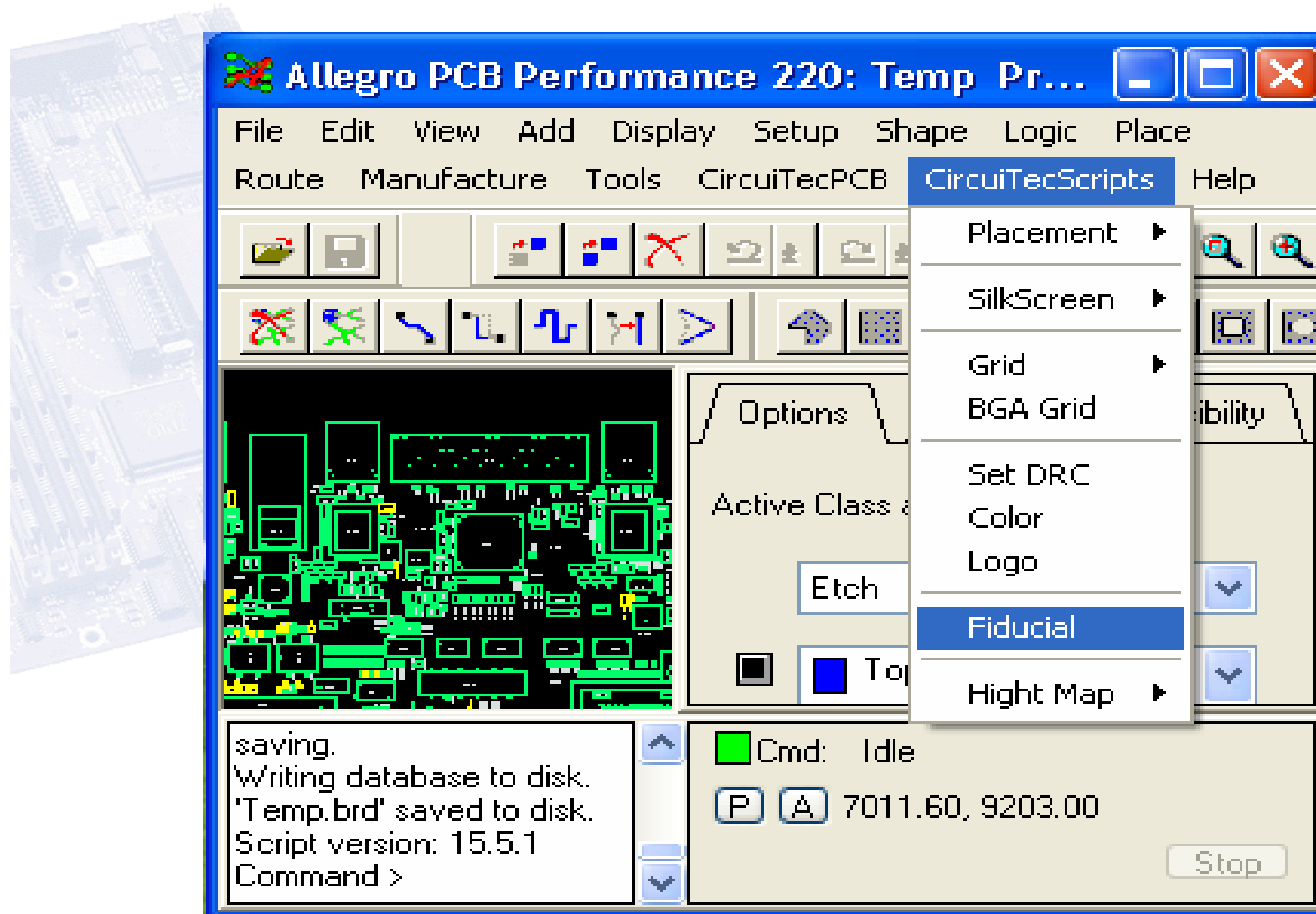
an Allegro PCB design. W- DRC set to "out of date", this product supports a different DRC set then last product used

Panel	Skill Panel
Fabmaster	Extract For ICT
Rmv	Remove Vias
Tcheck	Text Check
Cl2s	Clines to Shapes
Soldercheck	Solder Mask Check
Padcheck	Padstack Check
PadList	Padstack List
Slot	Slot Drill Extract
PackDiff	Compare Two BRD
DP Rpt	Diff Pair Report
AutoTxtOrient	Auto Text Orientation
Trimmlines	Trimming Lines
CompareDras	Compare Two DRAs

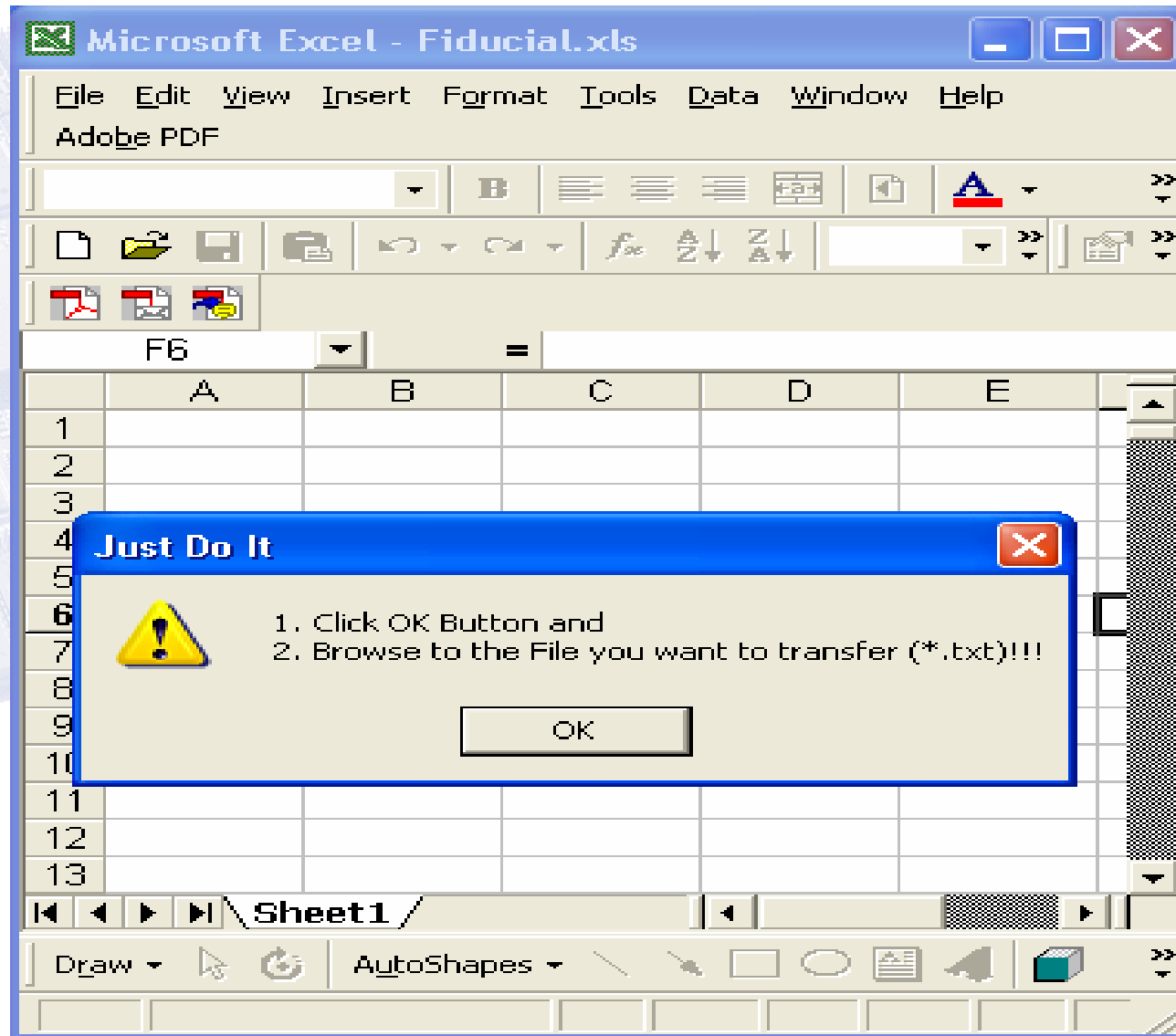
```
padcheck.rpt - Notepad
File Edit Format View Help
***Padcheck Report Location Is: C:\AutoTxtorient\DXF\padcheck.rpt
SMT280X310_SP doesn't have a pad in SOLDERMASK_BOTTOM
SM197X197_NPST doesn't have a pad in PASTEMASK_TOP
***T.H. Error***: At H69 Drill Diameter 69.00 Figure_Character
Founded : NULL_P Used Before by CIR80D47P!!!
***T.H. Error***: At H69 SOLDERMASK_TOP width Height
Expected : 109 < SMfreeDia < 159
Founded : SMfreeDia = 89.00!!!
***T.H. Error***: At H69 SOLDERMASK_BOTTOM width Height
Expected : 109 < SMfreeDia < 159
Founded : SMfreeDia = 89.00!!!
***SMT Error*** : At FID_40_80_40 SOLDERMASK_TOP width
Expected:(40.00 + 6)>width>(40.00 + 4)
Founded: 80.00!!!
***SMT Error*** : At FID_40_80_40 SOLDERMASK_TOP Height
Expected:(40.00 + 6)>Height>(40.00 + 4)
Founded: 80.00!!!
***T.H. Error***: At CIR150D118P Pad Diameter for Drill 118.00
Expected : (118.00 + 18)<PadDiameter<(118.00 + 30)
Founded : 150.00!!!
=====
***T.H. Error***: The ThermalPad and AntiPad Reports !!!
=====
***T.H. Error***: At OBL150X80D100X400-2 ThermalPad Geometry
Expected : FLASH
Founded : NULL!!!
***T.H. Error***: At OBL150X80D100X400-2 InnerPad Geometry
Expected : CIRCLE
Founded : NULL!!!
```

Performed Skill extract & ActivePerl data processing and report for designs top quality and high-reliability, in compliance with IPC2221

Not Netlisted Fiducial Report Utility (1)

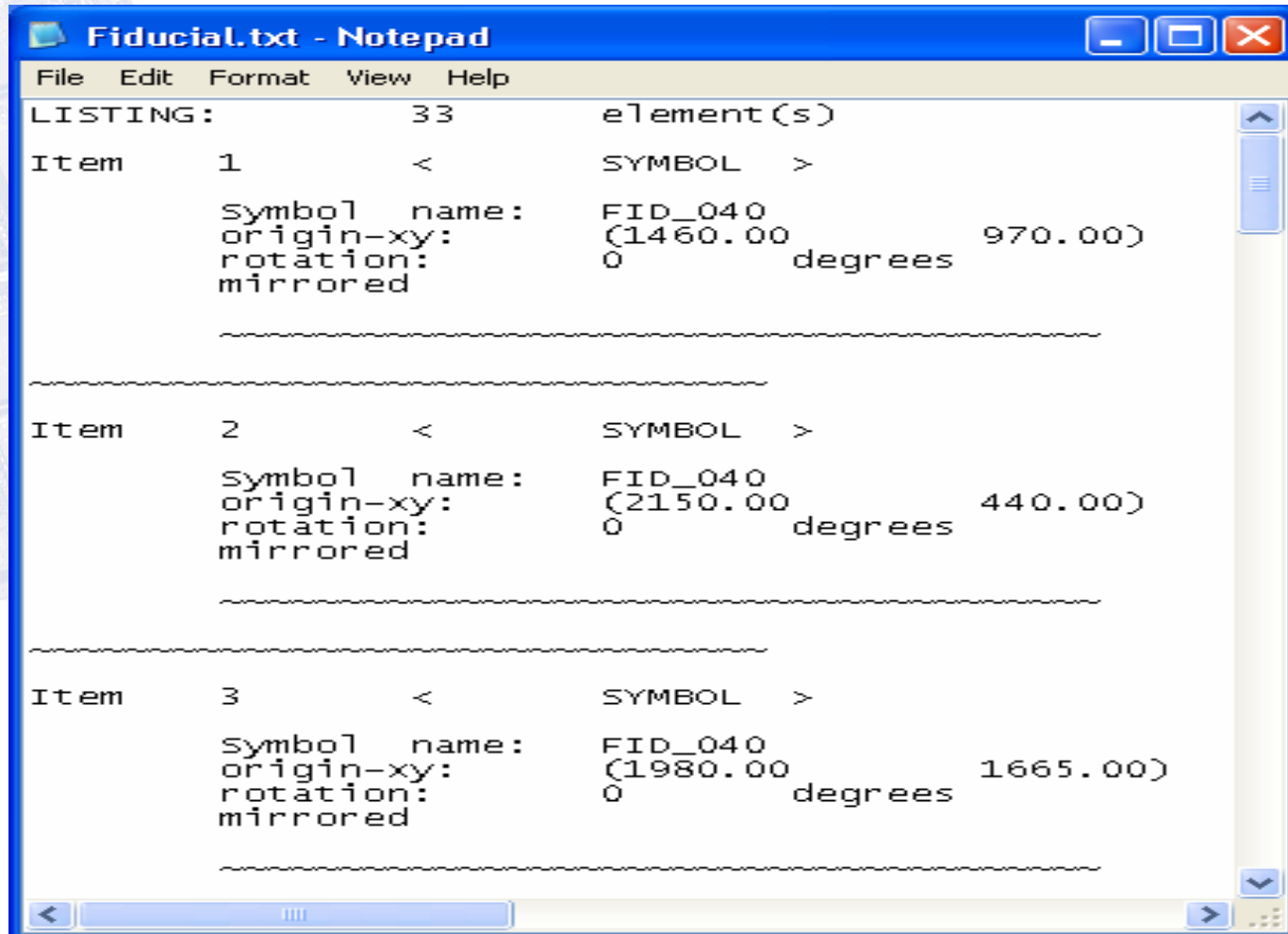


VBA Excel Launched by Allegro Script (2)



Fiducial Text File to Transfer (3)

The created (not netlisted) fiducial report file below is an input text file to transfer



```
File Edit Format View Help
LISTING:          33      element(s)
Item      1      <      SYMBOL      >
          symbol name:  FID_040
          origin-xy:   (1460.00      970.00)
          rotation:    0      degrees
          mirrored

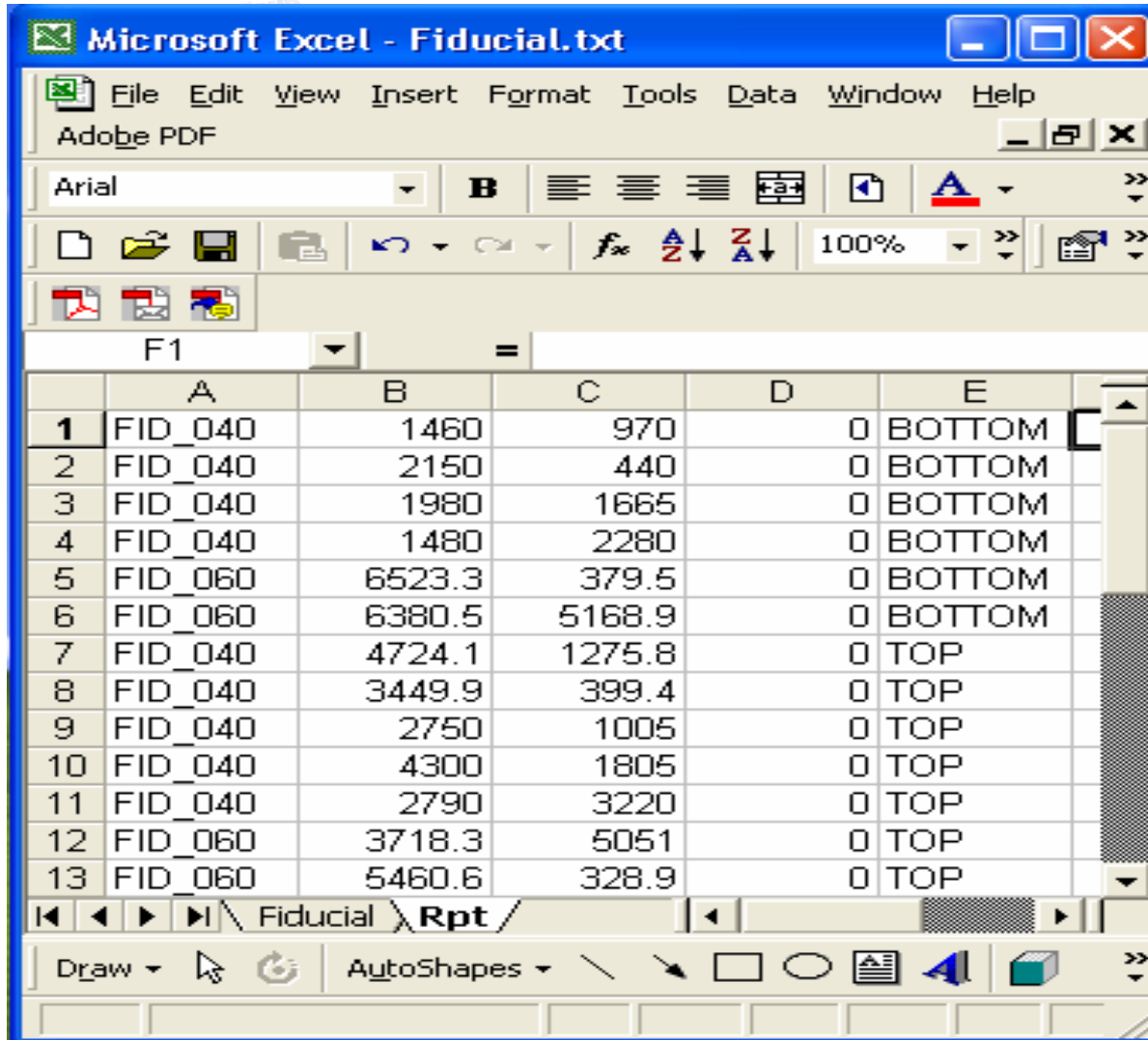
-----

Item      2      <      SYMBOL      >
          symbol name:  FID_040
          origin-xy:   (2150.00      440.00)
          rotation:    0      degrees
          mirrored

-----

Item      3      <      SYMBOL      >
          symbol name:  FID_040
          origin-xy:   (1980.00      1665.00)
          rotation:    0      degrees
          mirrored
```

Fiducial Report Excel File (4)



Microsoft Excel - Fiducial.txt

File Edit View Insert Format Tools Data Window Help

Adobe PDF

Arial B

F1 =

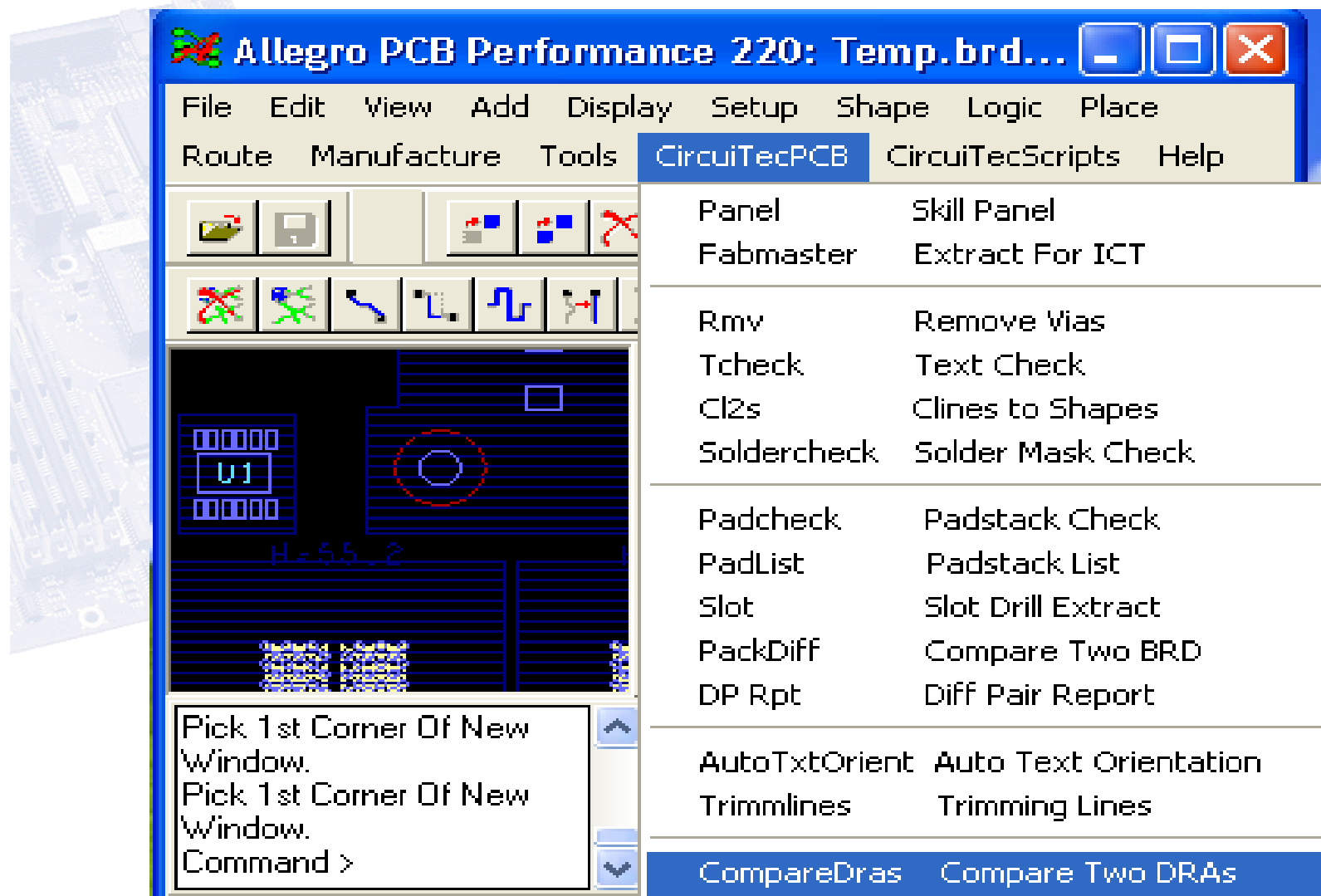
	A	B	C	D	E
1	FID_040	1460	970	0	BOTTOM
2	FID_040	2150	440	0	BOTTOM
3	FID_040	1980	1665	0	BOTTOM
4	FID_040	1480	2280	0	BOTTOM
5	FID_060	6523.3	379.5	0	BOTTOM
6	FID_060	6380.5	5168.9	0	BOTTOM
7	FID_040	4724.1	1275.8	0	TOP
8	FID_040	3449.9	399.4	0	TOP
9	FID_040	2750	1005	0	TOP
10	FID_040	4300	1805	0	TOP
11	FID_040	2790	3220	0	TOP
12	FID_060	3718.3	5051	0	TOP
13	FID_060	5460.6	328.9	0	TOP

Fiducial Rpt

Draw AutoShapes

The part of the PCB design reports to a customer and/or EMS (Electronic Manufacturing Services) subcontractor

Browse Two DRAs to Compare (1)



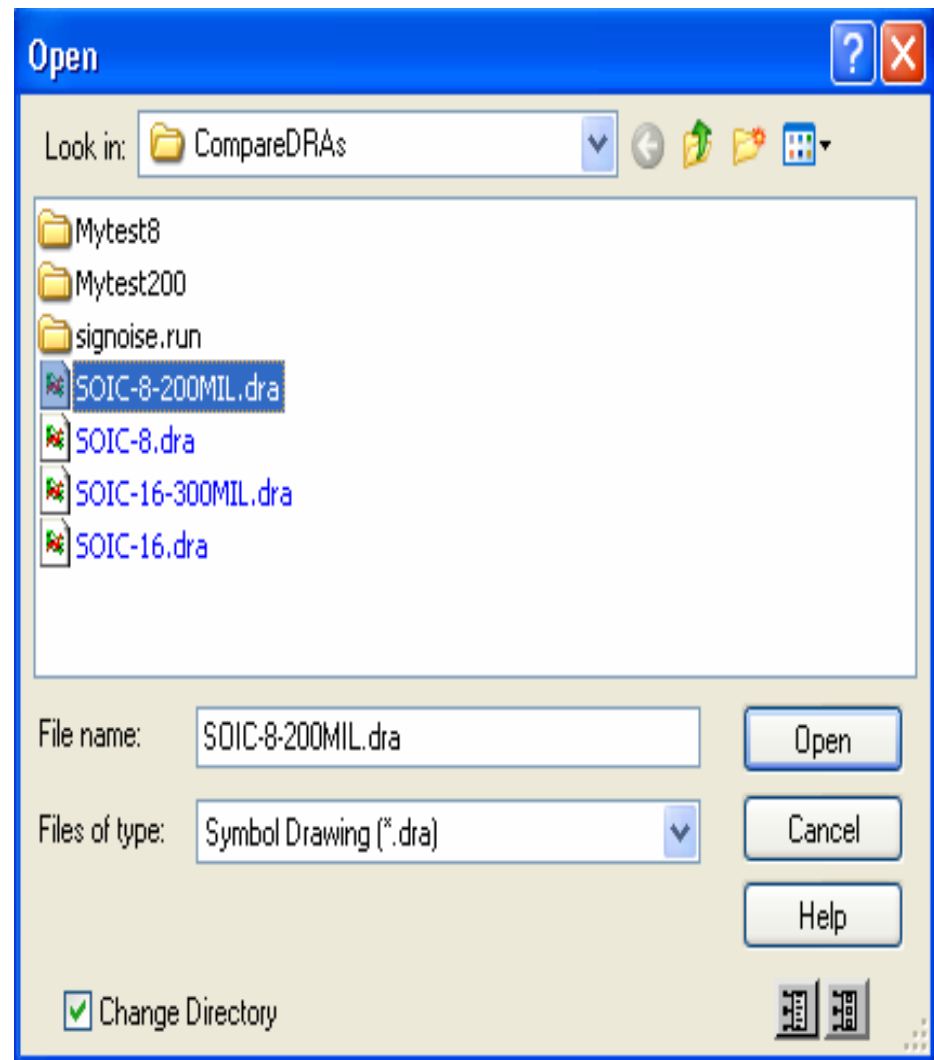
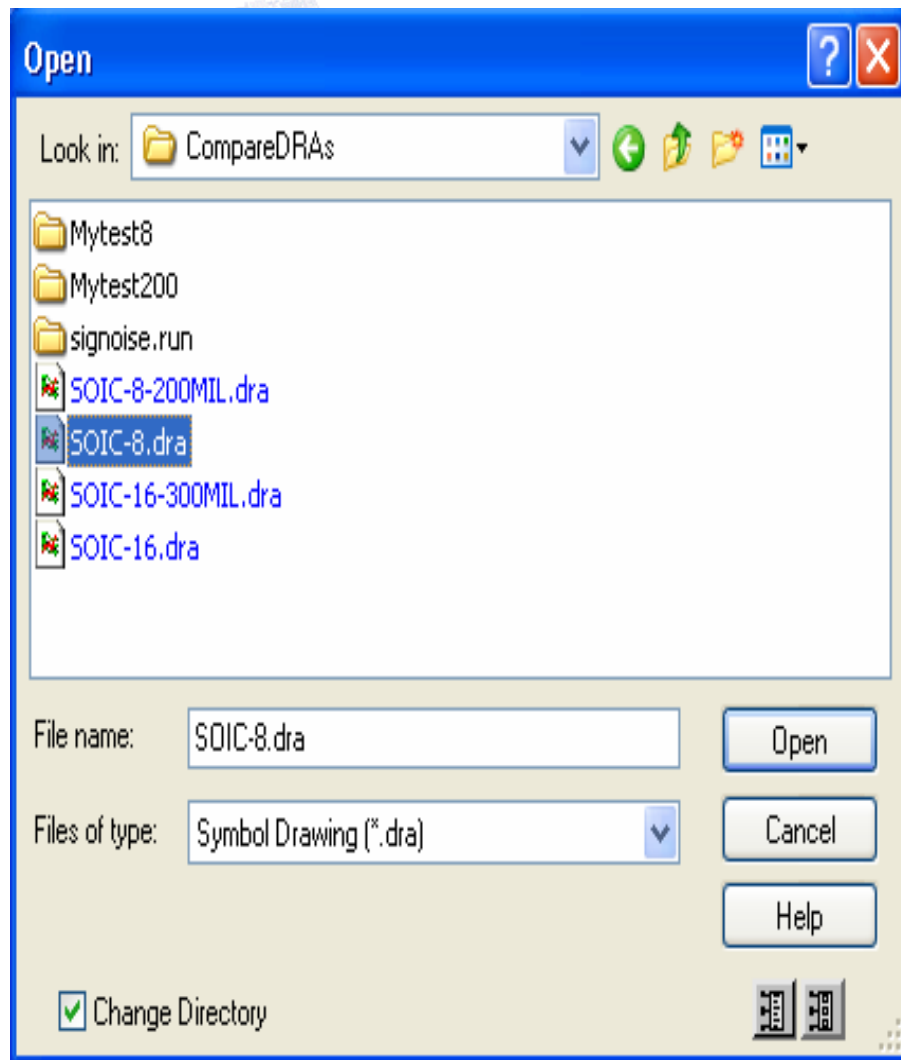
Allegro PCB Performance 220: Temp.brd...

File Edit View Add Display Setup Shape Logic Place
Route Manufacture Tools **CircuiTecPCB** CircuiTecScripts Help

Panel	Skill Panel
Fabmaster	Extract For ICT
Rmv	Remove Vias
Tcheck	Text Check
Cl2s	Clines to Shapes
Soldercheck	Solder Mask Check
Padcheck	Padstack Check
PadList	Padstack List
Slot	Slot Drill Extract
PackDiff	Compare Two BRD
DP Rpt	Diff Pair Report
AutoTxtOrient	Auto Text Orientation
Trimmlines	Trimming Lines
CompareDras	Compare Two DRAs

Pick 1st Corner Of New Window.
Pick 1st Corner Of New Window.
Command >

Browse two DRAs to compare (2)



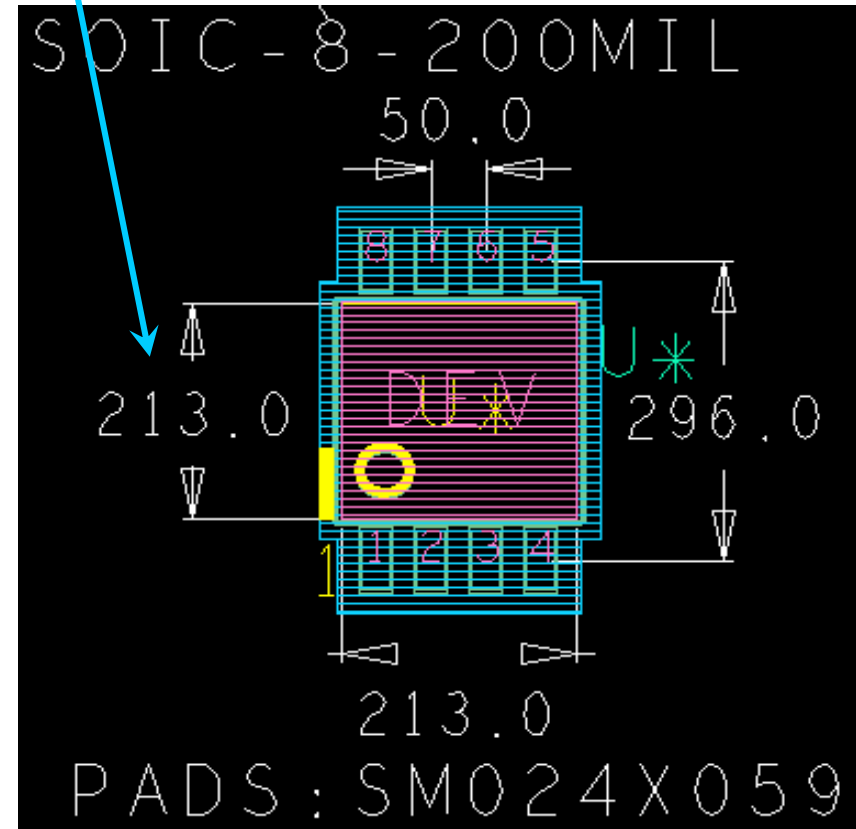
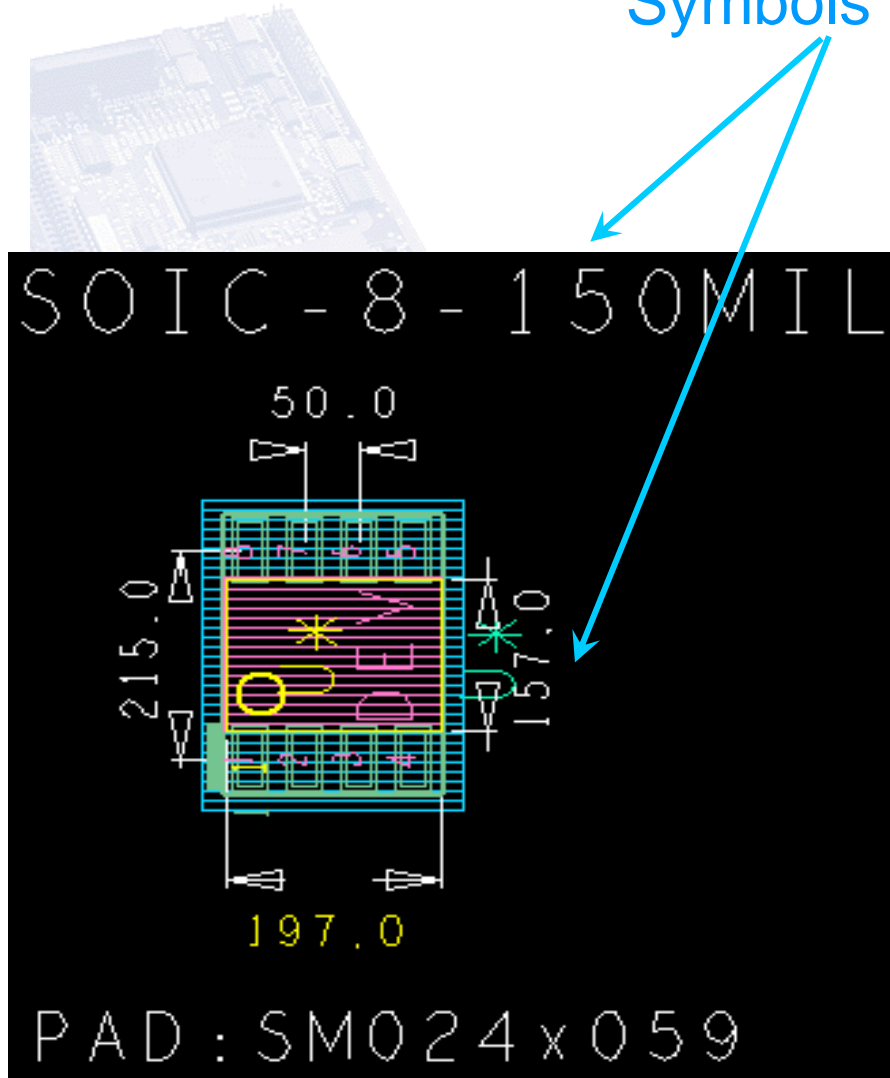
Two Compared DRAs Differences Report (3)

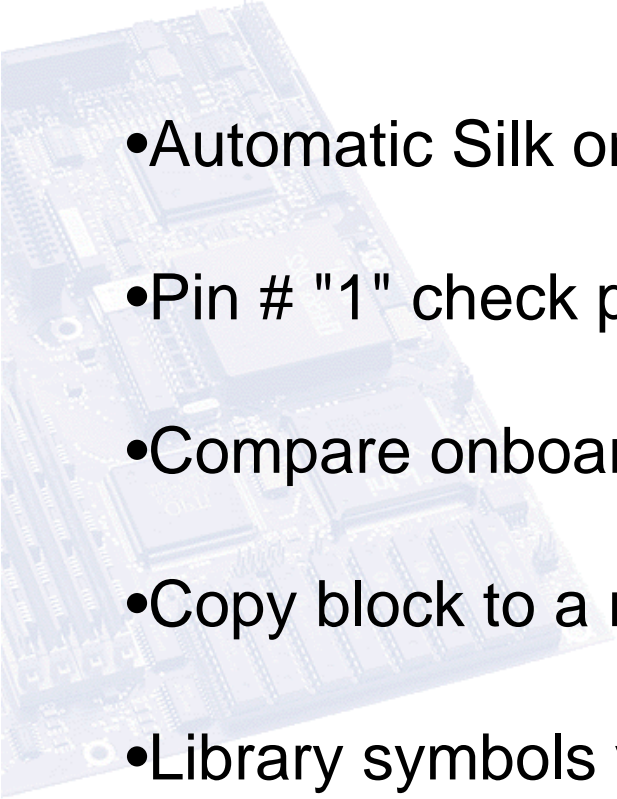
Diff 1: Change line 3 (left file) to line 3 (right file)

C:\CompareDRAs\Test_report.txt	C:\CompareDRAs\Test_report_cple.txt
19 (" PACKAGE_HEIGHT_MAX = 69 MIL\n")	26 (" PACKAGE_HEIGHT_MAX = 84 MIL\n")
20 ("Summary Drawing Report\n")	27 ("Summary Drawing Report\n")
21 ("C:/CompareDRAs/SOIC-8.dra\n")	28 ("C:/CompareDRAs/SOIC-8-200MIL.dra\n")
22 ("Wed Oct 31 12:07:29 2007\n")	29 ("Wed Oct 31 12:07:49 2007\n")
23 ("Drawing Statistics:\n")	30 ("Drawing Statistics:\n")
24 (" Drawing Extents XL(-812.0) YL(-864.3) XU(416	31 (" Drawing Extents XL(-855.0) YL(-1226.7) XU(414
25 (" Dimensions in mils with 1 decimal places\n")	32 (" Dimensions in mils with 1 decimal places\n")
26 (" Package Symbols: Total(0) Mirrored(0) Pins(0)	33 (" Package Symbols: Total(0) Mirrored(0) Pins(0)\n")
27 (" Mechanical Symbols: Total(0) Mirrored(0) Pin	34 (" Mechanical Symbols: Total(0) Mirrored(0) Pins
28 (" Format Symbols: Total(0)\n")	35 (" Format Symbols: Total(0)\n")
83 ("REFDES,PIN_NUMBER,SYM_NAME,COMP_DEV	88 ("REFDES,PIN_NUMBER,SYM_NAME,COMP_DEVIC
84 ("1...SM059X024,-107.5,75.0,\n")	89 ("1...SM024X059,-75.0,-148.0,\n")
85 ("2...SM059X024,-107.5,25.0,\n")	90 ("2...SM024X059,-25.0,-148.0,\n")
86 ("3...SM059X024,-107.5,-25.0,\n")	91 ("3...SM024X059,25.0,-148.0,\n")
87 ("4...SM059X024,-107.5,-75.0,\n")	92 ("4...SM024X059,75.0,-148.0,\n")
88 ("5...SM059X024,107.5,-75.0,\n")	93 ("5...SM024X059,75.0,148.0,\n")
89 ("6...SM059X024,107.5,-25.0,\n")	94 ("6...SM024X059,25.0,148.0,\n")
90 ("7...SM059X024,107.5,25.0,\n")	95 ("7...SM024X059,-25.0,148.0,\n")
91 ("8...SM059X024,107.5,75.0,\n")	96 ("8...SM024X059,-75.0,148.0,\n")
92 ("Padstack Definition Report\n")	97 ("Padstack Definition Report\n")
93 ("C:/CompareDRAs/SOIC-8.dra\n")	98 ("C:/CompareDRAs/SOIC-8-200MIL.dra\n")
94 ("Wed Oct 31 12:07:29 2007\n")	99 ("Wed Oct 31 12:07:49 2007\n")

Two SOIC-8 DRA Symbols Compare (4)

Symbols differences



- 
- Automatic Silk on pad repair program
 - Pin # "1" check placement utility
 - Compare onboard DRAs to a library
 - Copy block to a range of blocks utility
 - Library symbols verification program

Customization programs benefits (1)

Example: (1)

Comparison between two projects.

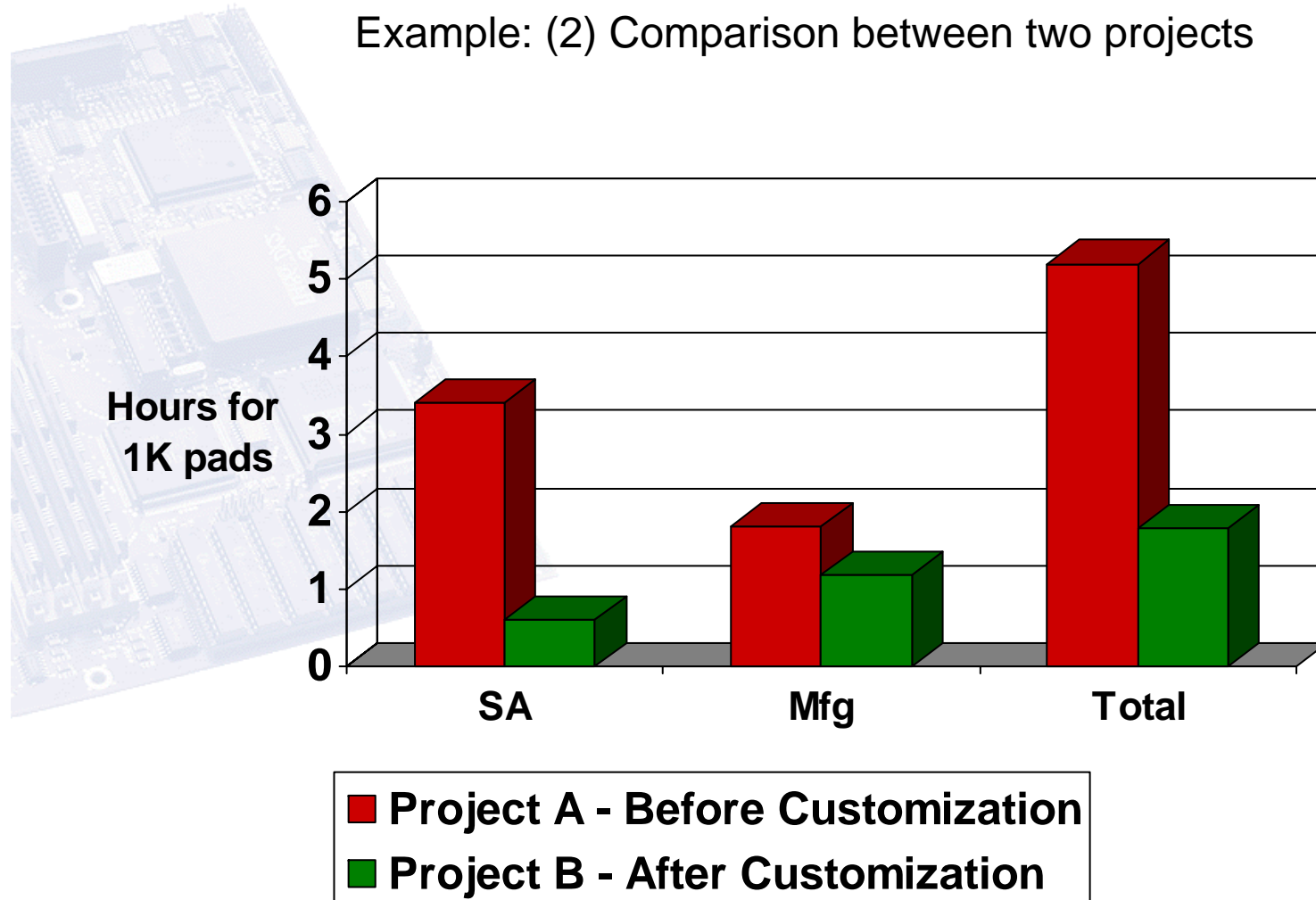
Allegro 15.5.1

- SA** = Silk & Assembly
Manufacturing (Mfg) =
- Artwork Definition
 - Check List
 - Valor
 - Second Opinion Test

	Project A Before Customization	Project B After Customization
Date	March 2006	April 2007
#Pads	9438	10728
SA #Hours	32	6.6
SA Hours for 1K pads	3.4	0.61
Manufacturing #Hours	17	12.75
Mfg Hours for 1K pads	1.8	1.18
Total Hours for 1K pads (SA+Mfg)	5.2 (3.4+1.8)	1.79 (0.61+1.18)
Total Benefit (%)	290%	

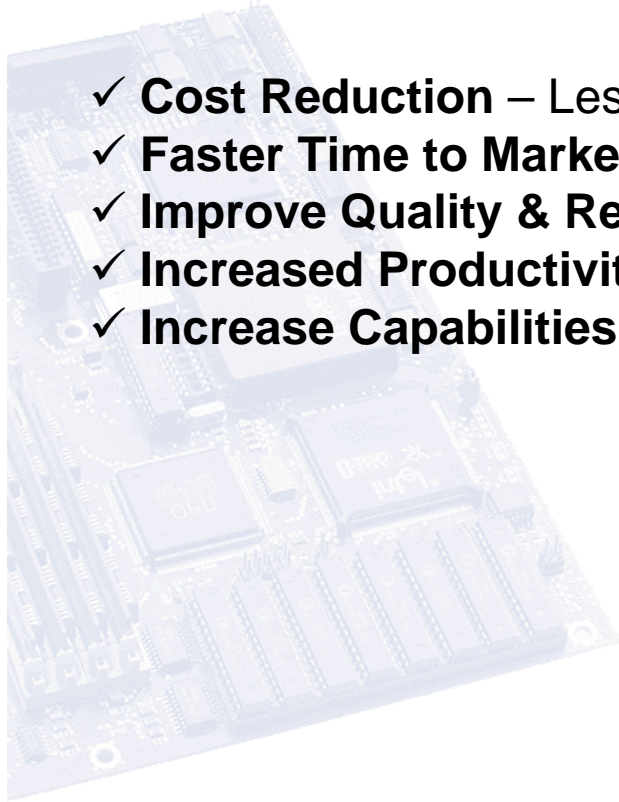
Customization programs benefits (2)

Example: (2) Comparison between two projects



Customization programs benefits (3)

- ✓ **Cost Reduction** – Less hours, less cost.
- ✓ **Faster Time to Market** – Finish the project faster.
- ✓ **Improve Quality & Reliability** – Automatic, less potential for human error.
- ✓ **Increased Productivity** – Time utilization.
- ✓ **Increase Capabilities** - Allows designers to focus on core values.





Thank You for Your Attention!

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