Screen Shots

Table of Contents

File Menu - Load

 New - Clears the current project.

 Open Project – Opens a project that has been saved.

 Load >   **Pin List …** - Loads a Pin list into the project. (see Pin List file format)

   LIQ … - Loads an LIQ file (see LIQ file format)

   Defaults … – Loads all the Default settings into a project.

Note: When a pinlist is loaded for stacked die, the pins are renumbered appending an alpha character to the end of the pin. Pin 1 becomes 1a for the first die, 1 becomes 1b for the second die and so forth. Edge assignments are also applied to the pads on the die at this time.

File Menu - Save
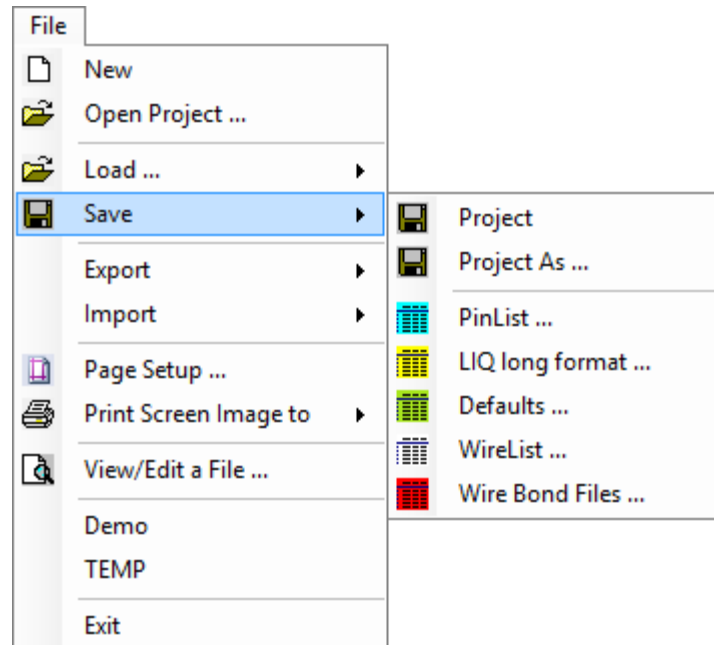
🖫 **Save >**   🖫 **Project** – Saves the project.
🖫 **Project As …** - Saves the project to a new name or directory.
▦ **PinList …** - Extracts the Pin List information from the project.
▦ **LIQ …** - Creates the LIQ file for the project.
▦ **Defaults …** - Saves the Default settings for future use.
▦ **WireList …** - Extracts the Wire List from the project.
▦ Wire Bond Files … - Saves the Die Bond Pad attach points.

Note: The Wire Bond Files are 2 files that are generated in the Pad Ring Explorer. In that tool the attach points are at the center of the Die Bond Pads. In the Wire Bond Explorer they are the actual attach point location with offsets applied. The …_LLC.wbp file references the Lower Left Corner of the die where as the …_CNTR.wbp file references the center of the die.

```
! Bond Pad Centers w/r/t center:


! Left Side Pads:
2          -680.000      930.000   NET2
3          -680.000      870.000   NET3
4          -680.000      810.000   NET4
```

File Menu - Export
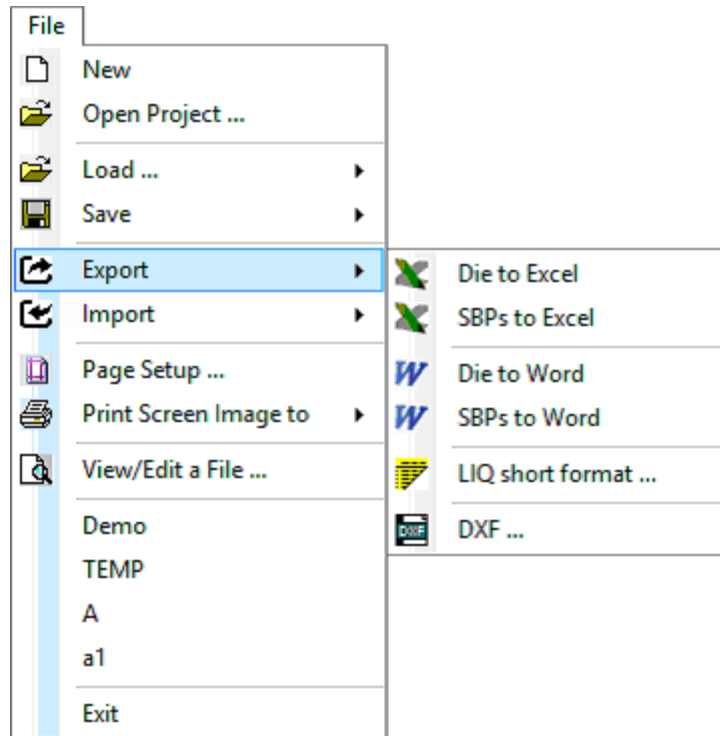
Export >
- **Die to Excel** – Export the CBP information to Excel.
- **SBPs to Excel** – Export the SBP information to Excel.
- **Die to Word** – Exports the CBP information to Word.
- **SBPs to Word** – Exports the SBP information to Word.
- **LIQ short format** – Export an LIQ file using a short format.
- **DXF** – Export the project in DXF file format.
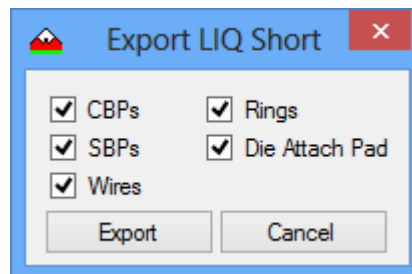
 You can select the specific items you want to export. This LIQ file does not contain any setup information so when it is imported back into AsPacker - Wire Bond Explorer a new project is created and only the die and die pads are imported. At minimum, you should select CBPs or only the die information will be exported. This file will fail to load if you try to use the Load LIQ menu option.
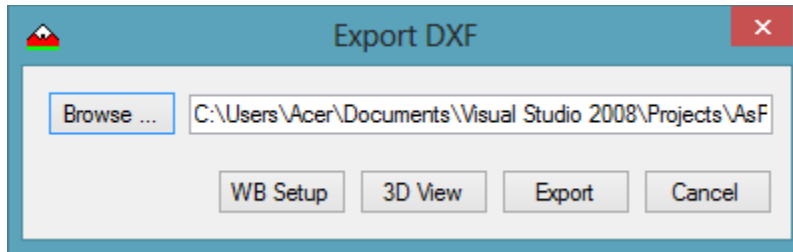
When you export a dxf file you have to first set up the WB information by using the WB Setup button. This will display the WB Setup dialog box. If this process is skipped than the last saved settings will be used. You can also view the design in the 3D Viewer to visually verify that what you see is what you want. Finally you can save the dxf file by browsing to the file directory or if overwriting the existing file, use the Export button. The cancel button will close the Export DXF dialog box. The entire design will be saved. When viewing the dxf in AutoCAD all wires are visible in the wire frame mode. If rendered using opengl they are also visible but when rendered in AutoCAD, the wires are not visible because they are lines and not an object that can be rendered. Once the DXF has been exported the 3D Viewer will display the project.

Each wire in the dxf file is a polyline. For each wire there is a comment preceding the polyline which identifies the parameters for the wire.

For a wire bond the line starts with *WB* followed by the information relating to the wire.

```
999
*WB*  Die: U1  CBP: 1  Type: Signal   NetName: NET1
```

For a stitch the line starts with *STITCH* followed by the information relating to the wire. In this case their are 2 die Ids, CBPs, Types, and Nets relating to each stitch. (*UpperDie/LowerDie*)

```
999
*STITCH* Die: U2/U1 CBP: 10a/11  Type: Ground/Ground  NetName: VSS/VSS
```

This information is for those who want extract the wires from the dxf file and have some basic information about the wire for identification purposes and analysis.

File Menu - Import
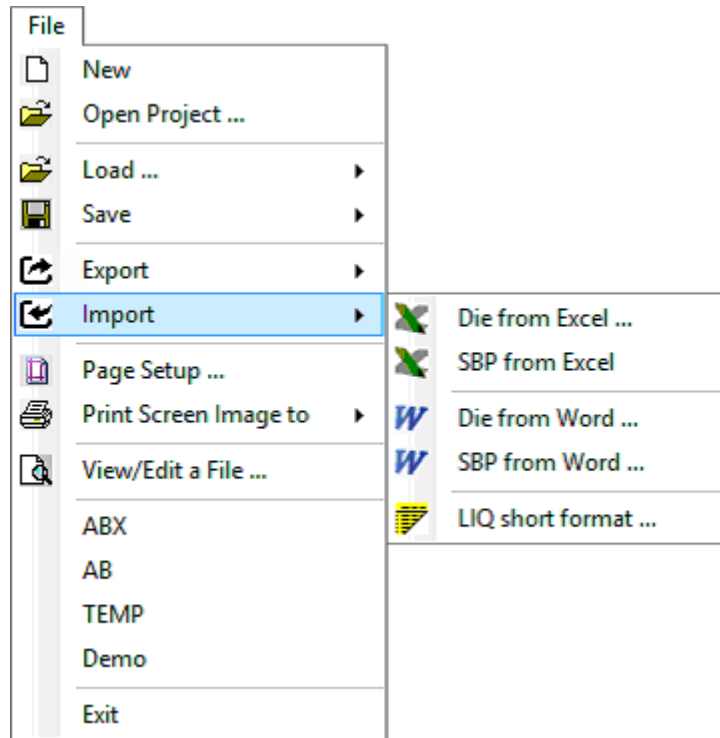
Import >   **Die** from Excel – Import the CBP information from Excel.
              SBPs from Excel – Import the SBP information from Excel.
              Die from Word – Imports the CBP information from Word.
              SBPs from Word – Imports the SBP information from Word.
              LIQ short format – Import an LIQ file but extracting only the die and pads.

File Menu - Print Screen Image
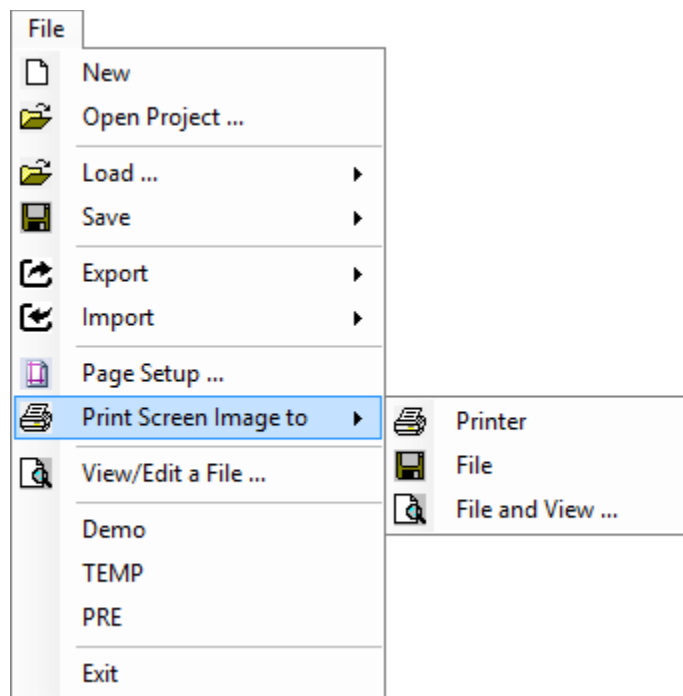
🗔 **Page Setup …** - Opens the Print Page Setup dialog box.
🖨 **Print Project to >** 🖨 **Printer** – Sends the Screen Image to the default printer.
                 💾 **File** – Saves the Image to a RTF in the working directory.
                 🔍 **File and View -** Saves the Image and opens the File View.
🔍 **View/Edit a File …** - Open a selected file for Viewing or Editing. Mainly .kmd files.
    Last Used Project List - Displays the last 4 projects for quick loading.
    Exit – Closes the program.

Options Menu
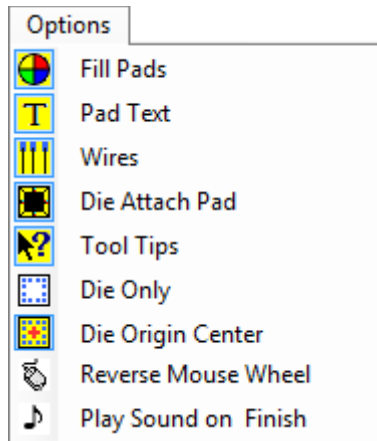
🔵 **Fill Pads** – If checked the Die Pads will be filled rectangles.

T **Pad Text** – If checked the Pad Text will be displayed.

▥ **Wires** – If checked the Wire Bonds will be displayed.

▦ **Die Attach Pad** – If checked the Die Attach Pad will be displayed.

▧ **Tool Tips** – If checked the tool tips will be displayed.

▨ **Die Only** – If checked only the Die will be displayed.

▩ **Die Origin Center** – If checked the Die Origin is the center else LLC.

🖰 **Reverse Mouse Wheel** – If Checked the direction of Wheel Zoom is reversed.

♪ **Play Sound on Finish** – If checked the finish sound is played at fanout completion.

Properties Menu

Properties
- Defaults ...
- Project/Die ...
- Tiers ...
- CBPs/SBPs/Wires ...
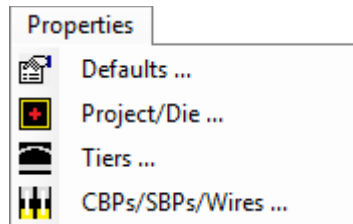
Defaults … - Opens the Default Settings dialog box.
Project/Die … - Opens the Project and Die Settings dialog box.
Tiers … - Opens the Tier Definition dialog box.
CBPs/SBP/Wires … - Opens the Pad and Wire Parameter dialog box.

Tools Menu

Tools
- Die Attach Pad ...
- Tier Assignment ...
- Ruler
- Fanout ...
- Select ...
- CBP Split Manager ...
- Stitch Manager ...
- 3D ▶
  - Wire Bond Setup ...
  - View ...

Die Attach Pad … Opens the Die Attach Pad designer dialog box.
Tier Assignment … Opens the Tier Assignment dialog box.
Ruler – Enables the ruler mode for measuring distances between objects.
Fanout ... – Opens the Fanout tool.
Select … - Opens the Object Selection tool.
Split CBP … - Opens the Split CBP Manager dialog box.
Stitch Manager … - Opens the Stitch Manager dialog box.
3D >   **Wire Bond Setup** – Opens the dialog box used to define the wire bonds for LR estimation and 3D viewing.
              View – Opens the 3D Viewer.

Help Menu
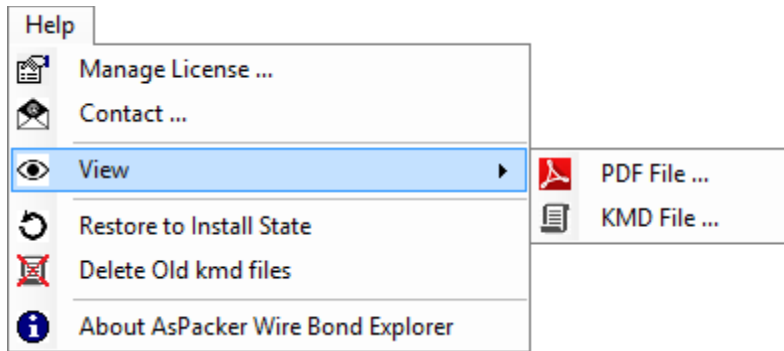
![icon] **Manage License …** – Opens the [License Manager](#) dialog box.
![icon] **Contact …** - Opens the [Contact Message](#) dialog box.
![icon] **View >**   ![icon] **PDF File …** - Opens the View PDF dialog box for viewing files.
       ![icon]   **KMD File …** - Opens the view KMD dialog box for viewing files.
![icon] **Restore to Install State** – Will clear all resets and restore the program to the installed state.
![icon] **Delete Old kmd files** – Will delete all old KMD files leaving the current one intact.
![icon] **About** – Displays the About box.

Note: The PDF files come with the Install and are the Help and Definitions files. The KMD files are all the scripts used in the Demo as examples of a command scripts.

License Manager

- Serial Number – This is currently derived from that Hard Drive on your computer.
- User – Is the name of the computer.
- KeyCode – Identifies the licensing information about the tool. If KeyCode is in a box as seen above it also means that there is a separate Key Code that has been purchased for added features. Clicking on KeyCode will display this keycode.
- Status – Tells you if you are using a Demo or Full Featured version of the tool.
- Features – If enabled and checked the available features for the tool are displayed.
- Information – Is the registered user's information.
- Request Activation Code – Will send an email to AsPacker with the above information that is used when generating the Key Code.
- Update Database – Is used to update the users database with new information.
- Send Email – Is Active when the user information has been filled in.
- Ebter Kdy Code – This will display a data entry dialog box, which is used to enter the new KeyCode for the tool or added features.

Feature List

Serial Number	SN: 188 341 167 14
User	Licensed to: WindyTop
KeyCode	7SY3-76J8-Z6DG-FV9B-01B8-XJWD-LJ
Status	Full Version.
	275 Days Remaining for License.
☑ Features	

☑ Stacked Die   ☐ Feature 9
☐ Feature 2   ☐ Feature 10
☐ Feature 3   ☐ Feature 11
☐ Feature 4   ☐ Feature 12
☐ Feature 5   ☐ Feature 13
☐ Feature 6   ☐ Feature 14
☐ Feature 7   ☐ Feature 15
☐ Feature 8   ☐ Feature 16

[Send Email]   [Enter Key Code]   [Close]

Note: The Features check box is displayed and if checked, the feature list is displayed showing which additional features have been purchased.

Contact Message

To send a message to AsPacker, all you have to do is fill in your email address and write the message. When finished click Send Email and your message will be delivered to AsPacker and we will reply as soon as possible.

Note: The same fields apply here as they did in the License Manager with the exception that the Feature List option is not available.

Main Toolbar
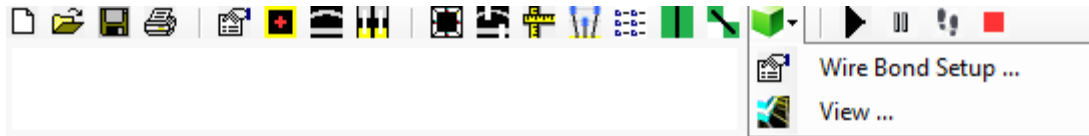
New - Clears the current project.

Open – Opens a project that has been saved.

Save – Saves the project.

Print – Prints the Screen Image.

Properties – Opens the Default Properties dialog box.

Die – Opens the Project and Die Settings dialog box.

Tiers – Opens the Tier Definition dialog box.

Pads – Opens the Pad and Wire Parameter dialog box.

Die Attach – Opens the Die Attach Pad designer dialog box.

Tier Assignment - Opens the Tier Assignment dialog box.

Ruler – Enables the ruler mode for measuring distances between objects.

Fanout ... – Opens the Fanout tool.

Select … - Opens the Object Selection tool.

Split – Opens the Split CBP tool.

Stitch – Opens the Stitch Manager tool.

3D >   Wire Bond Setup – Opens the dialog box used to define the wire bonds for LR estimation and 3D viewing.

View – Opens the 3D Viewer.

Run – Opens the Run Script selection dialog box.

Pause – Pause a currently running Script.

Step – Execute the next command in a currently paused Script.

Stop – Terminates a script that is currently running. (ESC)

Top   -15-
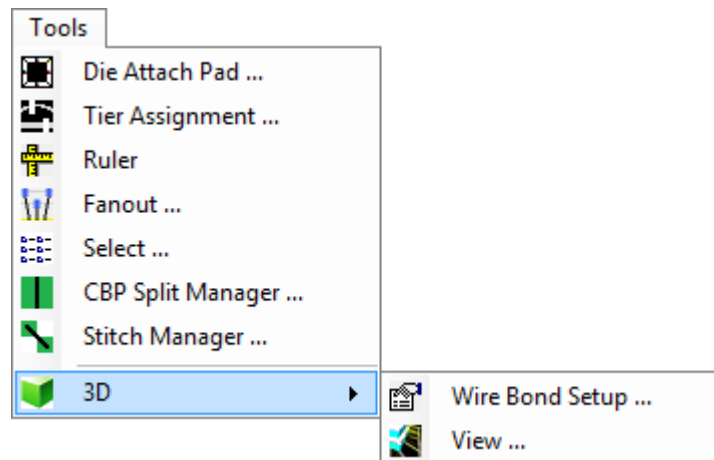
Side Toolbar

First Column Options:

⊕ **Fill Pads** – If Selected the Die Pads will be filled rectangles.

T **Pad Text** – If Selected the Pad Text will be displayed.

||| **Wires** – If Selected the Wire Bonds will be displayed.

▦ **Die Attach Pad** – If Selected the Die Attach Pad will be displayed.

▶? **Tool Tips** – If Selected the Tool Tips will be displayed.

▦ **Die** **Only** – If Selected only the Die will be displayed.

▦ **Die Origin** **Center** – If Selected the Die Origin is the center else LLC.

✎ **Reverse Mouse Wheel** – If Selected the direction of Wheel Zoom is reversed.

♪ **Play Sound on Finish** – If checked the finish sound is played at fanout completion.

▷ **Select Mode** – Cancels edit operations and enters the select mode.

Second Column Edit:

✛ **Move** – Move selected items with mouse. Click Start and End.

⬇ **Move to Tier** – Moves selected SBPs to new tier. (Third Column Tier Select)

✕ **Delete –** Delete selected items.

Third Column Tier Selection:

1:4 – Appears during the Move to Tier edit.

Note: To select items (CBP or SBP) press and hold either Shift or Ctrl and do a click start/end sweep with the mouse.

Navigation

![+] **PgUp** – Zoom in 25% screen size.

![−] **PgDn** – Zoom Out 25% screen size.

![↑] **Up Arrow** – Pan Up 25% screen size.

![↓] **Down Arrow** – Pan Down 25% screen size.

![◄] **Left Arrow** – Pan Left 25% screen size.

![►] **Right Arrow** – Pan Right 25% screen size.

![□] **Center** – Zooms all.

![🔍] **Magnifying Glass** – Zoom window. (*Mouse clicks start and stop to create zoom window.*)

![👆] **Point Finger** – Pans selected spot to the center of the screen.
    Pan can also be done with a Middle Mouse Click in the main view.

World View
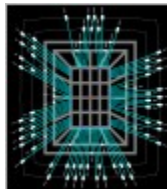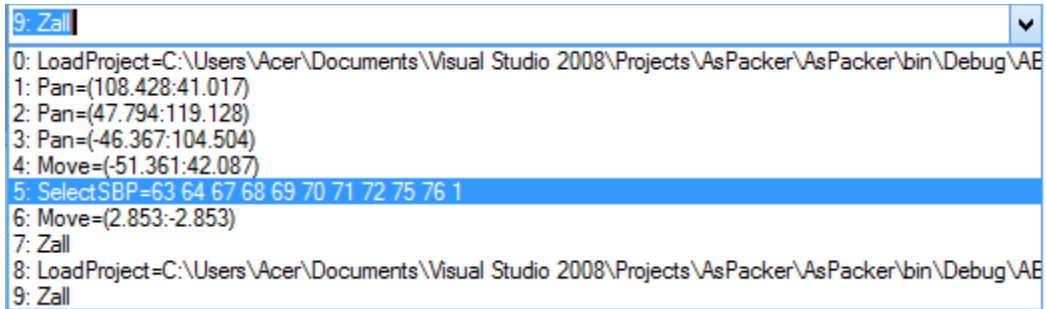
Allows you to pan to a given point in the design by clicking anyplace on the World View.

Saved File List

File List – Lists up to the last 4 projects that were saved. You can load a saved project by clicking on the project name. The complete file path of the project file can be seen by hovering the cursor over the file name.
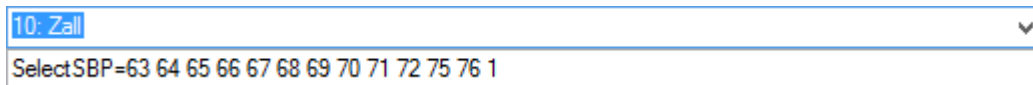
Command Log

```
9: Zall
0: LoadProject=C:\Users\Acer\Documents\Visual Studio 2008\Projects\AsPacker\AsPacker\bin\Debug\AE
1: Pan=(108.428:41.017)
2: Pan=(47.794:119.128)
3: Pan=(-46.367:104.504)
4: Move=(-51.361:42.087)
5: SelectSBP=63 64 67 68 69 70 71 72 75 76 1
6: Move=(2.853:-2.853)
7: Zall
8: LoadProject=C:\Users\Acer\Documents\Visual Studio 2008\Projects\AsPacker\AsPacker\bin\Debug\AE
9: Zall
```

All commands are recorded as they are executed in the log file and added to the command log list. This is a drop down list from which you can select a command to be repeated. Once selected, it is moved down to the command line. Press enter and the command will be executed.
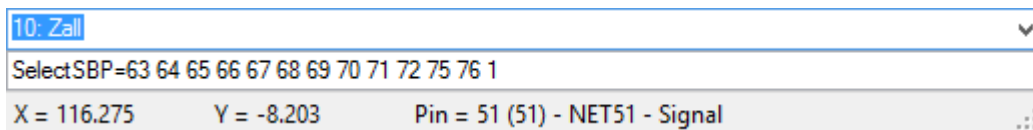
Command Line

```
10: Zall
SelectSBP=63 64 65 66 67 68 69 70 71 72 75 76 1
```

Commands can be entered on the command line, which is located just below the Command Log. Any command in the Command Log list can be executed by entering "!" followed by the command number and pressing Enter. Entering "!!" will repeat the previous command.(*See Command Format documentation for more information.*)

Status Line

```
10: Zall
SelectSBP=63 64 65 66 67 68 69 70 71 72 75 76 1
X = 116.275      Y = -8.203        Pin = 51 (51) - NET51 - Signal
```

Cursor position X/Y is displayed in the status line and if the cursor is over a pad than basic information is displayed about the pad.

Defaults: (External Tools)
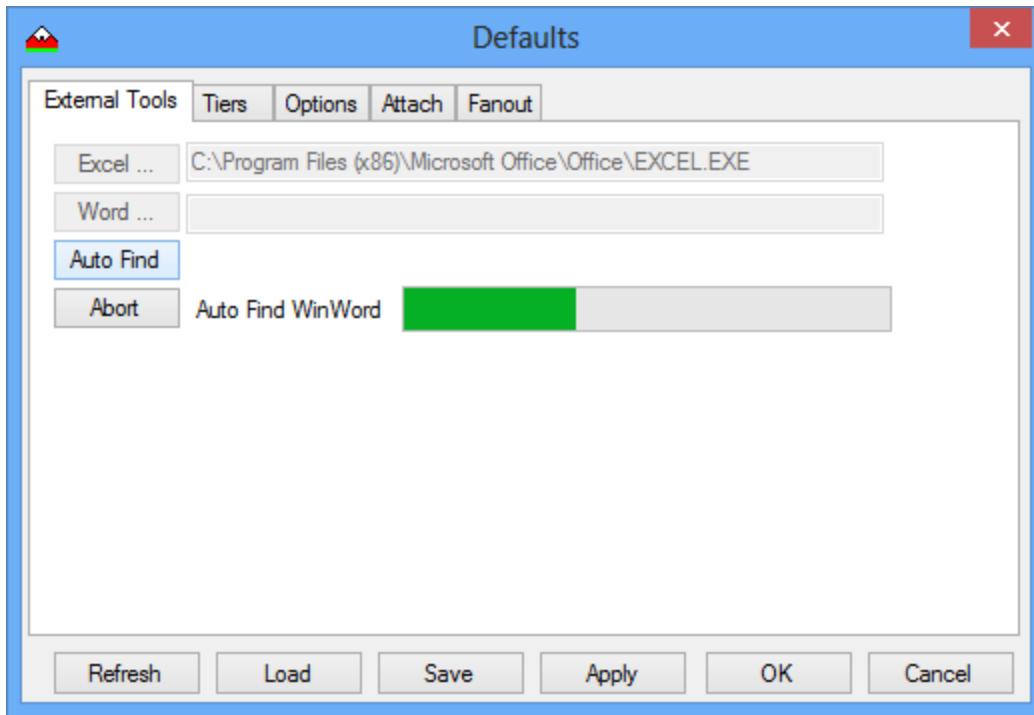
Excel ... - Allows you to browse for Excel.exe
Word ... - Allows you to browse for WinWord or WordPad
Auto Find – Does an automatic search of the hard drive for both Excel and Word.
Abort – Appears after you initiate the auto find sequence. The progress bar indicates that a search is in progress. (*When the program is run for the first time Auto Find is automatically initiated.*)
Refresh – Reload the Default settings.
Load – Load the Default Settings from a saved file.
Save – Save the Default Settings to a file.
Apply – Applies the Default settings to the design. (Enabled when there is an active project)
OK – Applies the Default settings to the design and closes the dialog box. (Enabled when there is an active project.)
Cancel – Aborts the Default settings and closes the dialog box.

Auto Find
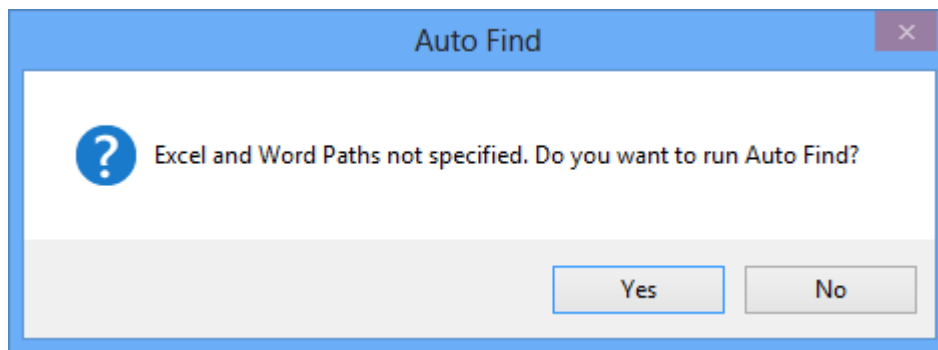
During the first run after and install and no Word or Excel path have been detected the Auto Find dialog box is displayed giving you the option to run Auto Find or skip the process so you can manually search for the path to the programs. This is handy if you are using a third party or open source word processor and spreadsheet program. If No is selected than "No Path" is placed in the missing Excel or Word path fields. This is to prevent the Auto Find from running upon subsequent executions of the program. Auto find and manual searching can be executed any time in the future.

Both Auto Find and Manual Find stores the information in the .ini file automatically and no save is required. This is done since these 2 parameters are basically machine dependent where all other parameters are program or project dependent.

The Apply and OK features are only enabled if there is an active program. This is because when Apply and OK are pressed they effect and open or active project. If there is no active project there is nothing to apply the values to.

Defaults: (Tiers)
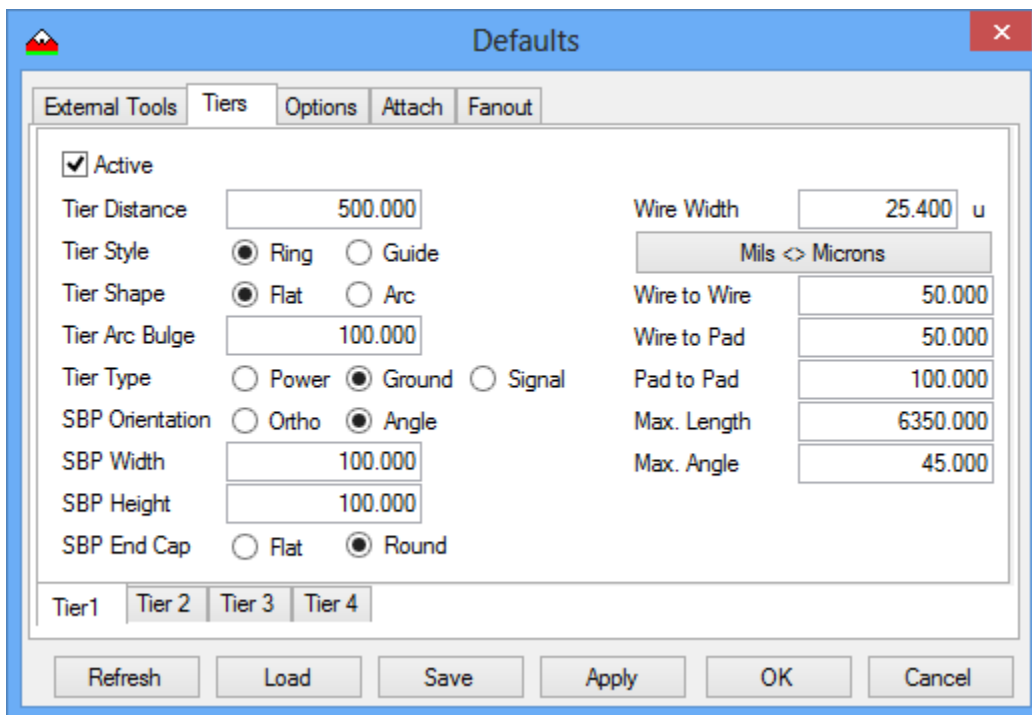
Active – If checked it makes this tier active for use.
Tier Distance – Is the distance to the tier from the edge of the base die.
Tier Style – Defines the type of tier. Rings are solid copper where guides are imaginary lines.
Tier Shape – Defines the shape of the tier. If Arc, then a bulge needs to be defined.
Tier Arc Bulge – This is the height of the arc at the center point of the arc.
Tier Type – Defines how the tier is used. Either Power, Ground, or Signal.
SBP Orientation – Defines how the SBPs are oriented. If angled they point to the CBP.
SBP Width – Defines the width for all SBPs on that tier.
SBP Height – Defines the height for all SBPs on that tier and the width of a Ring.
SBP End Cap – Defines how the SBP is drawn. Round or square end caps.
Wire Width – Is the diameter of the wire bond in Microns.
Mils <> Microns – Changes the displayed Wire Width values from Mils to Microns.
Wire to Wire – The DRC distance from wire to wire. Currently not used and reserved.
Wire to Pad – The DRC distance from Wire to Pad use in the fanout process.
Pad to Pad – The DRC distance from Pad to Pad used in the fanout process.
Max. Length – The Post process DRC check wire length limit.
Max. Angle – The Post process DRC check wire angle limit.
Refresh – Reload the Default settings.
Load – Load the Default Settings from a saved file.
Save – Save the Default Settings to a file.
Apply – Applies the Default settings to the design.
OK – Applies the Default settings to the design and closes the dialog box.
Cancel – Aborts the Default settings and closes the dialog box.

Defaults: (Options)
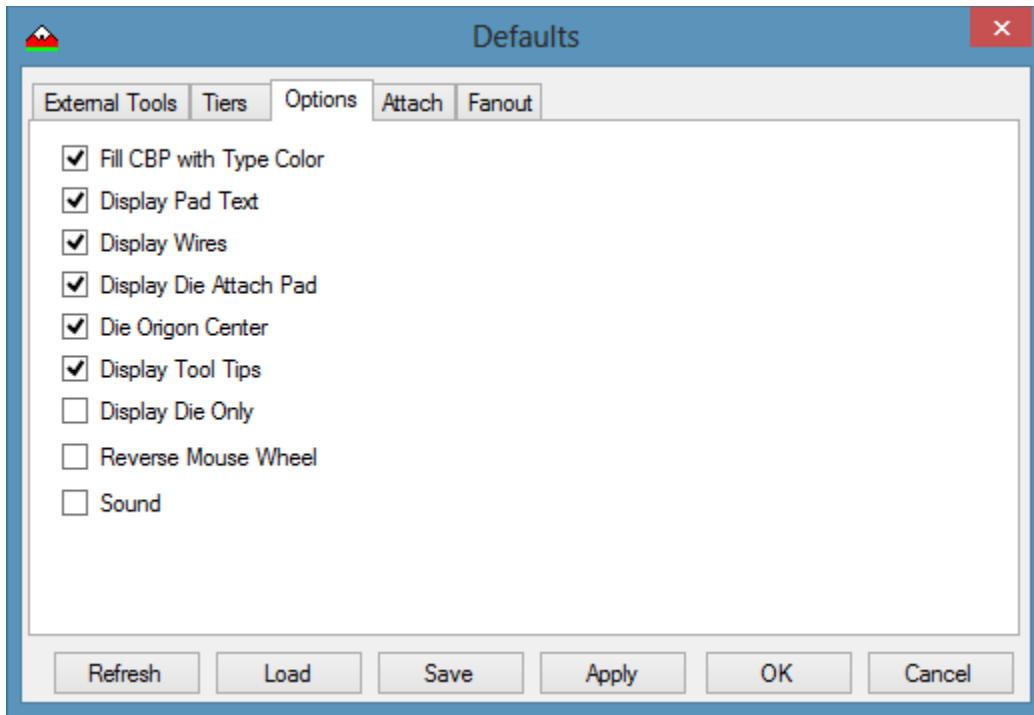
Fill CBP with Type Color – If checked the Die Pads will be filled rectangles.
Display Pad Text – If checked the Pad Text will be displayed.
Display Wires – If checked the Wire Bonds will be displayed.
Display Die Attach Pad – If checked the Die Attach Pad will be displayed.
Die Origin Center – If checked the Die Origin is the center else LLC.
Display Tool Tips – If checked the tool tips will be displayed.
Display Die Only – If checked only the Die will be displayed.
Reverse Mouse Wheel – If Checked the direction of Wheel Zoom is reversed.
Sound – If checked the finish sound is played at fanout completion.
Refresh – Reload the Default settings.
Load – Load the Default Settings from a saved file.
Save – Save the Default Settings to a file.
Apply – Applies the Default settings to the design.
OK – Applies the Default settings to the design and closes the dialog box.
Cancel – Aborts the Default settings and closes the dialog box.

Defaults: (Attach)
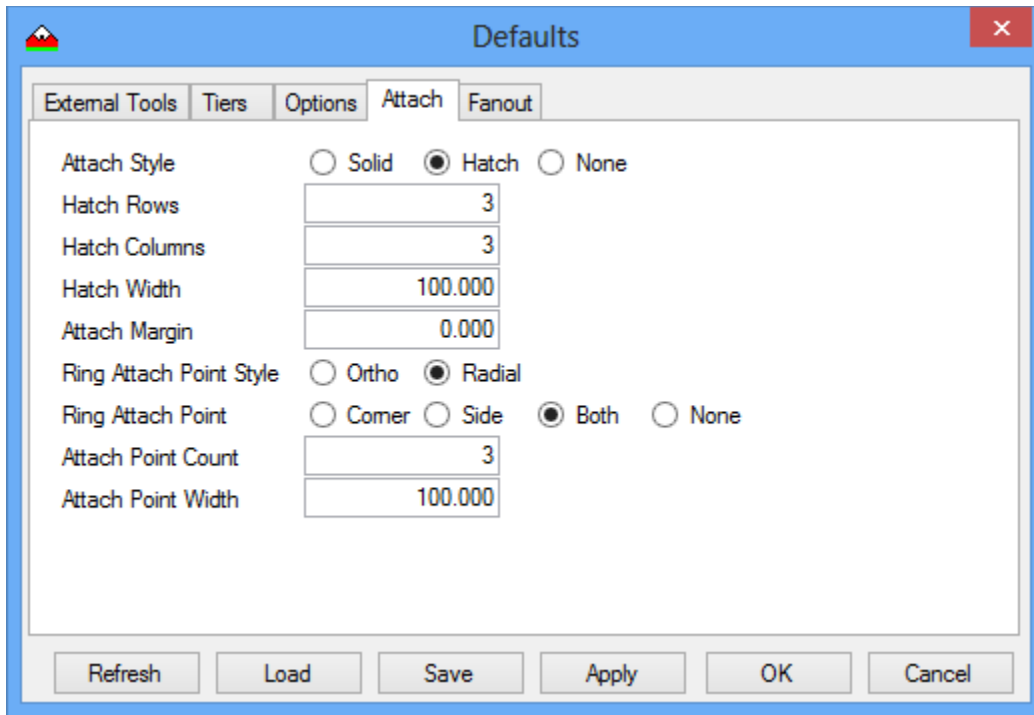
Attach Style – Solid, Hatched (Uses Hatch Columns, Rows and Width), or None
Hatch Rows – If Hatched is selected this is the number of horizontal lines in the pattern.
Hatch Columns – If Hatched is selected this is the number of vertical lines in the pattern.
Hatch Width – If Hatched is selected this is the width of the hatch pattern lines.
Attach Margin – The over or under margin of the Attach Pad referenced to the Die.
Ring Attach Point Style – Defines how the Die Attach Pad is connected to the first ring.
Attach Point Count – Defines how many attach point wires are to be added to each side.
Attach Point Width – Defines the width of the Attach Point wires.
Refresh – Reload the Default settings.
Load – Load the Default Settings from a saved file.
Save – Save the Default Settings to a file.
Apply – Applies the Default settings to the design.
OK – Applies the Default settings to the design and closes the dialog box.
Cancel – Aborts the Default settings and closes the dialog box.

Defaults: (Fanout)
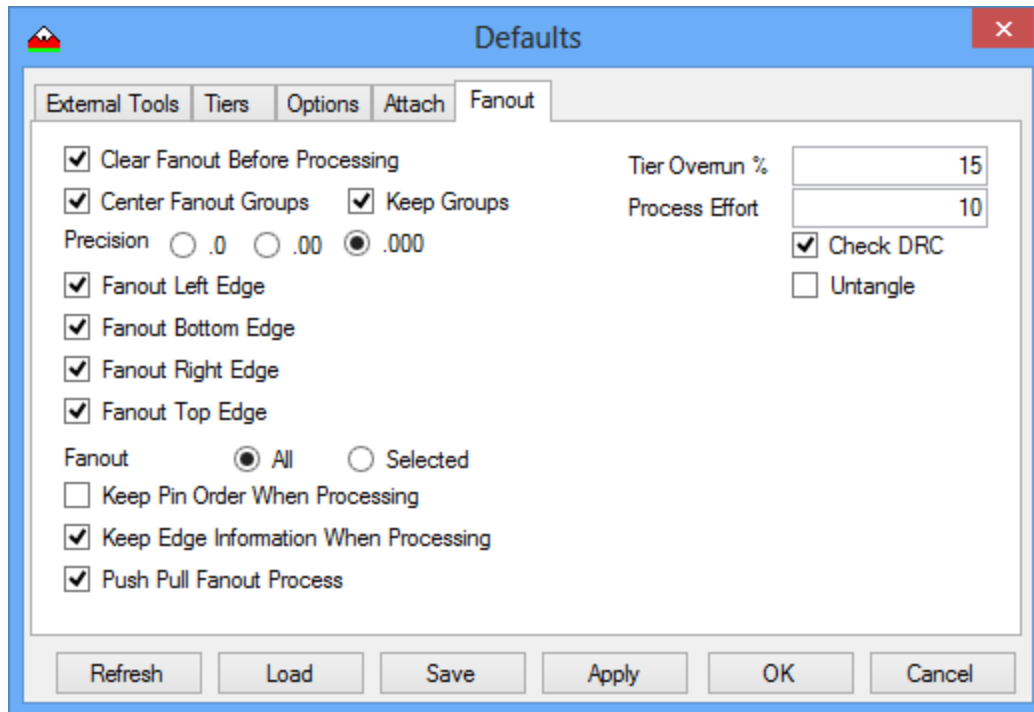
Clear Fanout Before Processing – Will remove fanout data placing SBP inline with CBPs.
Center Fanout Groups – Will center the groups during the fanout process.
Keep Groups – Will maintain group assignment if multiple fanout runs are done.
Precision – Defines how hard the fanout process tries to center groups.
Fanout Left Edge – Executes fanout of the Left Edge.
Fanout Bottom Edge – Executes fanout of the Bottom Edge.
Fanout Right Edge – Executes fanout of the Right Edge.
Fanout Top Edge – Executes fanout of the Top Edge.
Fanout – All pads or selected pads.
Keep Pin Order When Processing – Keep the original Pin Order.
Keep Edge Information When Processing – Keep the original Edge Assignment.
Push Pull Fanout Process – Allows fanout to Push and Pull SBP positions for accuracy.
Untangle – Advanced option for Stacked Die applications. (Crossed wire repair)
Tier Overrun – Defines how far past the end of the tier pads can be placed.
Process Effort – Defines how many iterations are used during the fanout process.
Check DRC – If checked, a post process DRC check will be run for Wire Length and Angle.
Refresh – Reload the Default settings.
Load – Load the Default Settings from a saved file.
Save – Save the Default Settings to a file.
Apply – Applies the Default settings to the design.
OK – Applies the Default settings to the design and closes the dialog box.
Cancel – Aborts the Default settings and closes the dialog box.

Properties: (Project and Die)

Project Name – This is the current project name.
Work Path – Is the location where the project resides.
Net List – Is the name of the netlist if it has been loaded.
Pin List – is the name of the pinlist if it has been loaded.
Component – List of components in the project.
Part – Is the part name of the selected component.
Delete Component – Will delete the currently selected component from the design.
Width – Is the Die Width of the selected component.
Height – Is the Die Height of the selected component.
Thick – Is the Die Thickness of the selected component.
X Offset – The X offset of the selected component. Base Die = 0.
Y Offset – The Y offset of the selected component. Base Die = 0.
Z Offset – The Z offset of the selected component Base Die = 0.
Back Bias – Is the Back Bias of the selected component.
Rotation – Is the rotation applied to the selected component. Base Die = 0.
Rotate/Update Edges – Rotates a Stacked Die by 90° increments and updates edge information.
Apply – Applies the Project/Die Settings to the design.
OK – Applies the Project/Die Settings to the design and closes the dialog box.
Cancel – Aborts the Project/Die Settings and closes the dialog box.

Properties: (Tiers)

Active – If checked it makes this tier active for use.
Distance from Die Edge – Is the distance to the tier from the edge of the base die.
Style – Defines the type of tier. Rings are solid copper where guides are imaginary lines.
Shape – Defines the shape of the tier. If Arc, then a bulge needs to be defined.
Bulge – This is the height of the arc at the center point of the arc.
Type – Defines how the tier is used. Either Power, Ground, or Signal.
Orientation – Defines how the SBPs are oriented. If angled they point to the CBP.
End Cap – Defines how the SBP is drawn. Round or square end caps.
Width – Defines the width for all SBPs on that tier.
Height – Defines the height for all SBPs on that tier and the width of a Ring.
Wire Width – Is the diameter of the wire bond in Microns.
Wire to Wire – The DRC distance from wire to wire. Currently not used and reserved.
Wire to Pad – The DRC distance from Wire to Pad use in the fanout process.
Pad to Pad – The DRC distance from Pad to Pad used in the fanout process.
Max. Length – The Post process DRC check wire length limit.
Max. Angle – The Post process DRC check wire angle limit.
Mils <> Microns – Changes the displayed Wire Width values from Mils to Microns.
Apply – Applies the Tier Settings to the design.
OK – Applies the Tier settings to the design and closes the dialog box.
Cancel – Aborts the Tier Settings and closes the dialog box.

Properties: (Pads and Wire)

CBP:

       Pad – The CBP pad number. (If slit than additional segments are p.1, p.2 …)
       Type – Power (red), Ground (green), or Signal (blue)
       X – X Location of the center of the pad.
       Y – Y Location of the center of the pad.
       Height – The Height of the pad as viewed in the project.
       Width – The Width of the pad as viewed in the project.
       Edge – The Assigned Edge of the pad.

SBP:

       PkgPin – The SBP Package Pin Number. (If CBP is split, pad numbers are pp.1, pp.2 …)
       Tier – The tier assignment of the SBP.
       X – X Location of the center of the pad.
       Y – Y Location of the center of the pad.
       Height – The Height of the pad as assigned in the Tiers Setup.
       Width – The Width of the pad as assigned in the Tiers Setup.
       Edge – The Assigned Edge of the pad. (normally the same as the CBP)
       Rotation – The rotation of the SBP.

Wires:

       CBPoffX – The X offset of the CBP attach point as viewed at the top if the die.
       CBPoffY - The Y offset of the CBP attach point as viewed at the top if the die.
       SBPoffX – The X offset of the SBP attach point as viewed at the top if the die.
       SBPoffY - The Y offset of the SBP attach point as viewed at the top if the die.
       Length – The length of the Bond Wire.
       Width – The Width of the BondWire.
       Angle – The Angle of the Bond Wire.

Apply – Applies any changes to the selected CBP, SBP, or Wire.
OK – Applies any changes to the selected CBP, SBP, or Wire.
Cancel – Aborts current modification and closes the dialog box.

Properties: (Stitches)

Note: When stacked die are used and interdie stitching is employed the Pad Property dialog box displays the stitch information when a stitch is selected. Only the Stitch wire attach point offsets can be modified here.

Pad1:

Pad – Is the CBP pad name of the first pad.
X – Is the center X location of the pad.
Y – Is the center Y location of the pad.
Edge – Is the residing edge of the pad.
Die – Is the die that the pad is on.

Pad2:

Pad – Is the CBP pad name of the second pad.
X – Is the center X location of the pad.
Y – Is the center Y location of the pad.
Edge – Is the residing edge of the pad.
Die – Is the die that the pad is on.

Stitch:

Pad1offX – Pad1 wire attach point X offset.
Pad1offY – Pad1 wire attach point Y offset.
Pad2offX – Pad2 wire attach point X offset.
Pad2offY – Pad2 wire attach point Y offset.
Length – Stitch wire length.

Apply – Applies any changes to the selected Stitch.
OK – Applies any changes to the selected Stitch.
Cancel – Aborts current modification and closes the dialog box.

Tools: (Die Attach Pad)
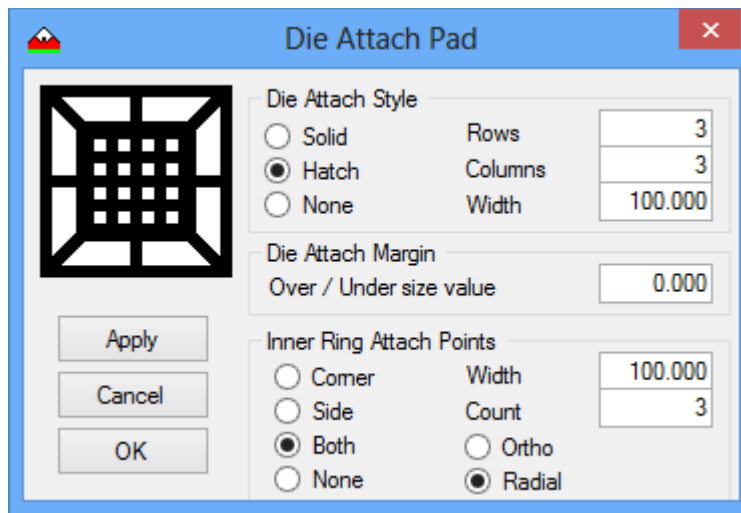
Die Attach Style – Solid, Hatched (Uses Hatch Columns, Rows and Width), or None
Rows – If Hatched is selected this is the number of horizontal lines in the pattern.
Columns – If Hatched is selected this is the number of vertical lines in the pattern.
Width – If Hatched is selected this is the width of the hatch pattern lines.
Die Attach Margin – The over or under margin of the Attach Pad referenced to the Die.
Inner Ring Attach Point – Defines how the Die Attach Pad is connected to the first ring.
Width – Defines the width of the Attach Point connections.
Count – Defines how many attach point connections are to be added to each side.
Apply – Applies the Die Attach Setup to the project.
Cancel – Aborts the Die Attach Setup and closes the dialog box.
OK – Applies the Die Attach Setup to the project and closes the dialog box.

Tools: (Tier Assignment)
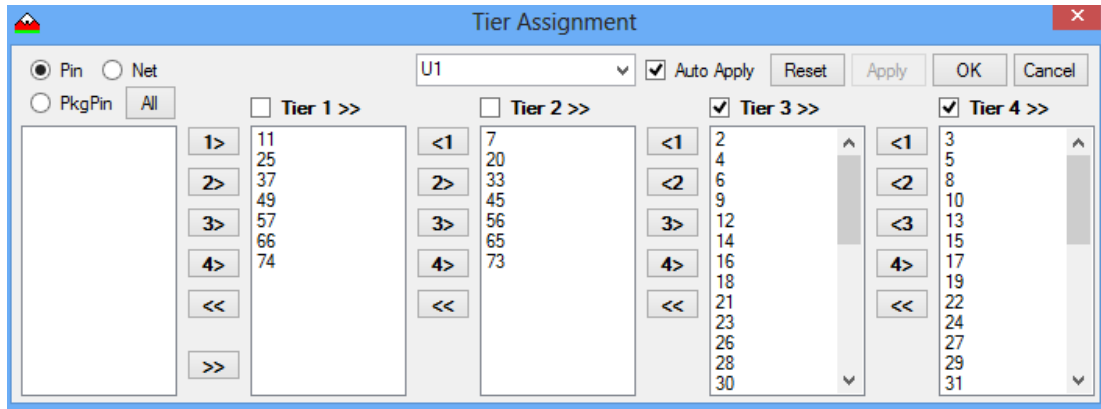
Pin/**Net**/**PkgPin** – Defines how the data is displayed in the list.
Component list – Selects the component to be used for Tier Assignment.
Auto Apply – If checked, Tier assignment will happen dynamically as they are assigned.
Split Tier Check Boxes - Used when assigning a set of selected pins to multiple tiers (>>).
Lists – Left is the origin list. The other 4 are the individual Tier Lists.
Assign buttons – Moves selected pins from origin list to the assigned list (>) or back (<<).
-    Also moves selected pins form tier to tier. (> / <)
Reset – Will place all Tier Assignments back to the origin list.
OK – Applies the Tier Assignment to the design and close the dialog box.
Cancel – Aborts the Tier Assignment process and closes the dialog box.

Tools: (Fanout)
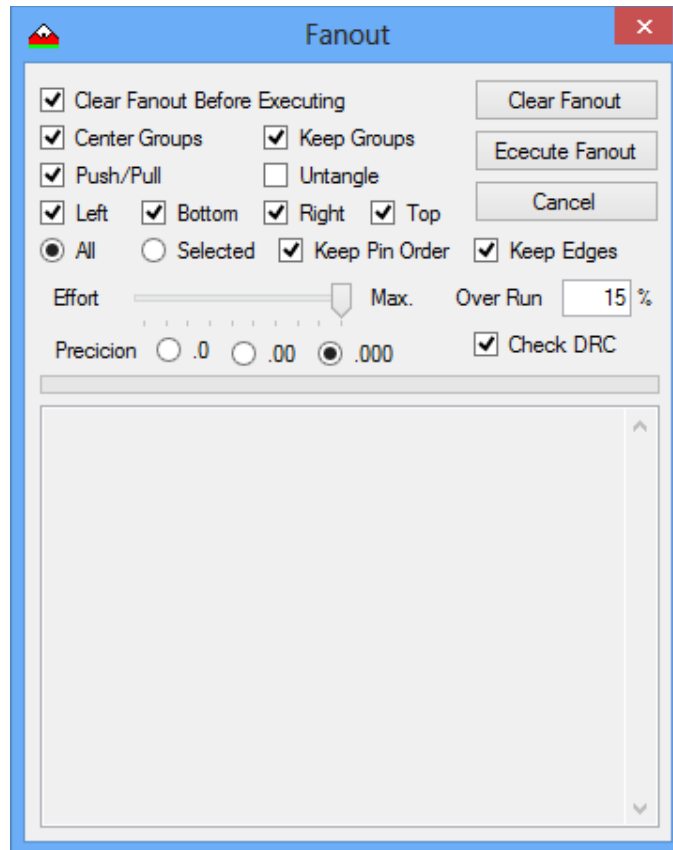
Clear Fanout Before Executing – Will remove fanout data placing SBPs inline with CBPs.
Center Groups – Will center the groups during the fanout process.
Keep Groups – Will maintain group assignment if multiple fanout runs are done.
Push Pull Fanout Process – Allows fanout to Push and Pull SBP positions for accuracy.
Untangle – Advanced option for Stacked Die applications. (Crossed wire repair)
Fanout Left Edge – Executes fanout of the Left Edge.
Fanout Bottom Edge – Executes fanout of the Bottom Edge.
Fanout Right Edge – Executes fanout of the Right Edge.
Fanout Top Edge – Executes fanout of the Top Edge.
Selected/All – Fanout Selected pads or All pads.
Keep Pin Order – Keep the original Pin Order.
Keep Edges – Keep the original Edge Assignment.
Effort – Defines how many iterations are used during the fanout process.
Over Run – Defines how far past the end of the tier pads can be placed.
Check DRC – If checked, a post process DRC check will be run for Wire Length and Angle.
Precision – Defines how hard the fanout process tries to center groups.
Log – Displays the log generated during the fanout process.
Clear Fanout – Clears all fanout information and places the SBPs in line with their CBPs.
Execute Fanout – Initiates the fanout process.
Cancel – Closes the dialog box.

Tools: (Select)
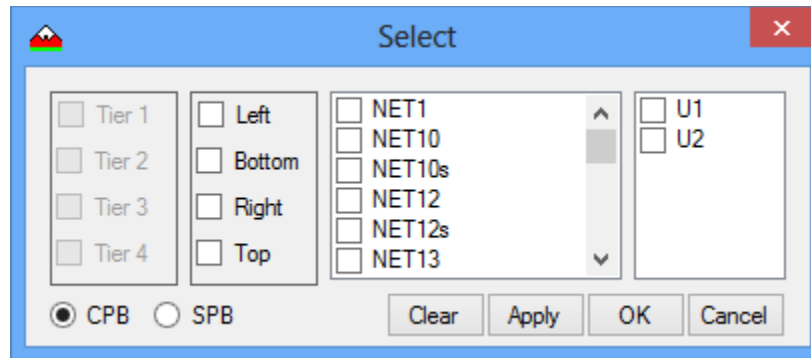
Note: If CBP is selected then the Tiers option is not available.
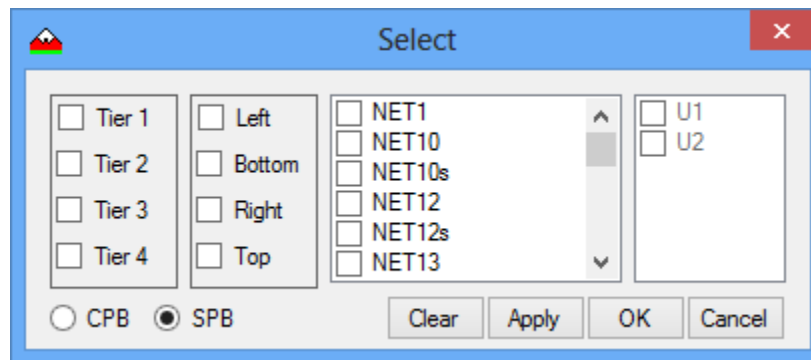
Note: If SBP is selected then the Die option is not available.

Tier(1:4) – If checked, it defines which tiers to use during the selection process.
Edges – If checked, it defines which edges to use during the selection process.
Nets – If checked, it defines which nets to use during the selection process.
Die – If checked, it defines which die to use if stacked devices are used. If none are checked than all die will be inferred in a stacked device scenario.
CBP/SBP – Defines which type of pad is to be selected during the selection process.
Clear – Clears All Selected Pads.
Apply – Applies all the selection options to the design.
OK – Applies all the selection options to the design and closes the dialog box.
Cancel – Cancels the current selection process and closes the dialog box

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Tools: (SplitCBP)
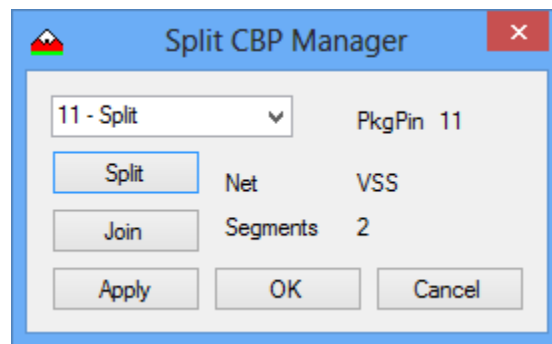
Splitlist – Lists all the pads in the design. If a pad has been split, the pin name has "- Split" appended to it. Once a pin is selected the PkgPin and Net name are displayed. In addition, the number of segments is displayed. A segment count of 1 indicates that the pad has not been slit. If greater than 1 it indicates how many total segments the pad has been slit into.

Split – By clicking on this button, a new segment is added to the pad. What this means is that a new wire is created and a copy of the mother pad is made with the Pin and PkPin name having a .n appended to it. Say you are working with pad 11. The mother Pin is 11. The first split is 11.1. The second split would be 11.2 and so on for as many segments as you add. Once added, the CBP Wire Bond Attach point can be edited using the Pad Property dialog box.

Join – This will remove any split segments from a split CBP.

Apply – Will commit the split information to the project.

OK – Will commit the split information to the project and close the dialog box.

Cancel – Will ignore any slit information and close the dialog box.

Note: If you leave the tool, an automatic Cancel is executed. This is done to maintain database stability and integrity. Once you reenter the dialog box the pad information is reloaded into the tool for further editing.

Note: Even though a pad has been split, the CBP number displayed on the CBP is the mother pin name with out the .n appended. The SBPs segments however do have the .n appended to them.

Tools: (Stitch)
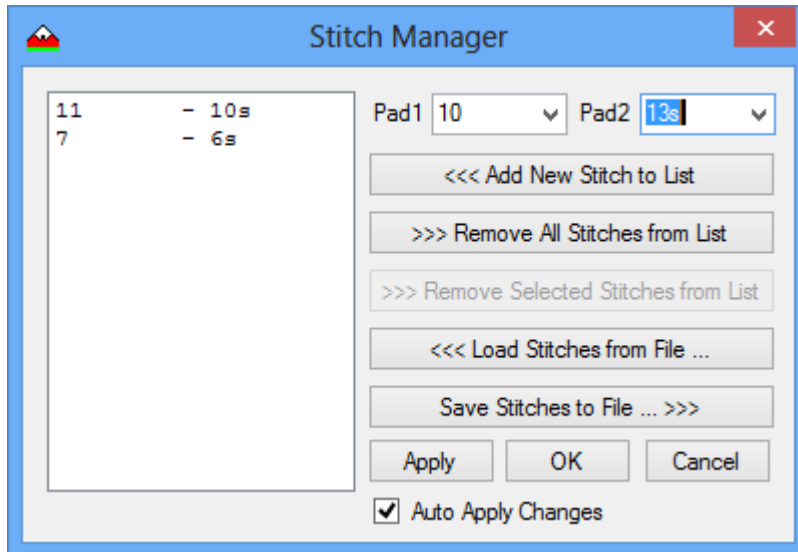
StitchList – Displays all the stitches in the project Pad1 – Pad2
Pad1 - Is the first pad in the stitch.
Pad2 – Is the second pad in the stitch.
Add New Stitch to List – Will add the 2 pads to the stitch list forming a new stitch.
Remove All Stitches from List – Will remove all stitches from the stitch list.
Remove Selected Stitches from List – Will remove all selected stitches from the list.
Load Stitches from File – Opens the dialog box that allows you to select a stitch file to be loaded into the Stitch list.
Save Stitches to File – Opens the dialog box that allows you to save a stitch list to a stitch file.
Apply – Applies the stitches in the stitch list to the project.
OK – Applies the stitches in the stitch list to the project and closes the dialog box.
Cancel – Discards any changes made to the stitch list and closes the dialog box.
Auto Apply Changes – If checked, any changes made to the stitch list will automatically be applied to the project.
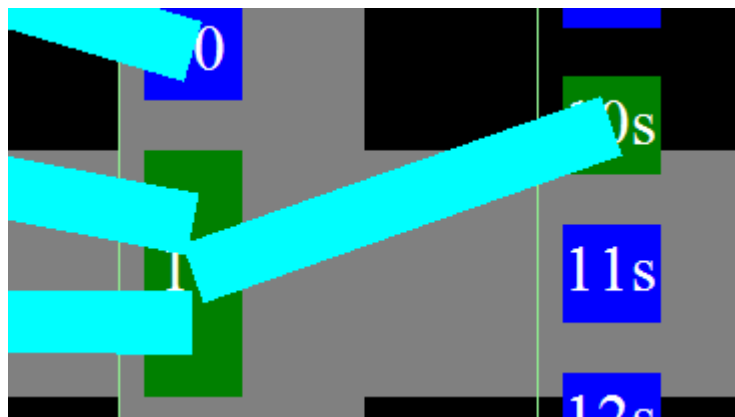
Tools: (3D Wire Bond Setup)

Material – Defines the metal used for the bond wires.
Wire Diameter Mils – Defines the diameter of the bond wire.
Frequency – Is the clocking speed for the Die.
Base Loop Height – Defines the height of the bond wire loop from the base die.
Base Loop Extension – Defines the horizontal distance before the wire descends to the SBP.
Wire Gap – Is the average spacing between wires and defaults to the W2W parameter for tier 1.
Stack Loop Height – Defines the height of the bond wire loop for a stacked die.
Stack Loop Extension – Defines the horizontal distance for a stacked die.
Stitch Loop Extension – Defines the horizontal distance for stitches.

*Note: **1**. All these parameters have a custom option that can be used instead of the default value.*
*__2__. The stitch loop height is the same as the Stack Loop Height. **3**. These parameters are used*
*during the LR calculations. **4**. These parameters are also used when viewing the die in the 3D*
Viewer.

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STD / Simple / Complex defines the Wire Bond Model that is used when viewing the project in the 3D Viewer/ Exporting the project to a DXF file and running the LR Estimator. . There are 3 versions of each based on the design. Single die / Stacked die / Stacked Die with Stitches.

The STD model is a 5 segment wire and the default.

Standard 1 Die 5 Segments

Standard 2 Die 5 Segments
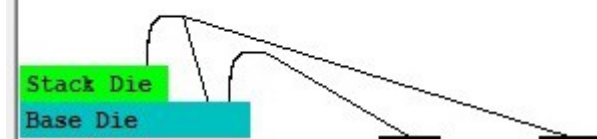
Standard 2 Die with Stitch 5 Segments

The Simple model is based on the EIA/JESD59 Simple model.

Simple 1 Die 3 Segments

Simple 2 Die 3 Segments
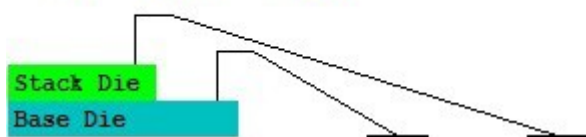
Simple 2 Die with Stitch 3 Segments
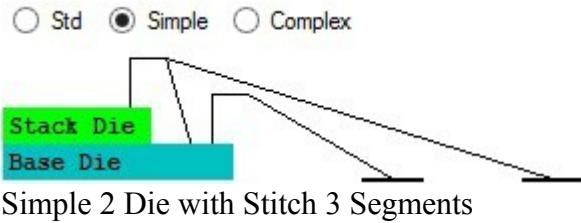
The Preferred or Complex model is based on the EIA/JESD59 preferred model. This model used 3 additional parameters to define the shape of the Bond Wire. The Alpha angle defines the angle of the Bond Wire as it leaves the Die. The Beta angle is the angle of the last segment of the Bond Wire as it approaches the SBP. The Delta determines the position of the bend in the descending wire. Normally this is set to 50% but any value can be entered from 1 to 99.

Complex 1 Die 4 Segments

Complex 2 Die 4 Segments

Complex 2 Die with Stitch 4 Segments
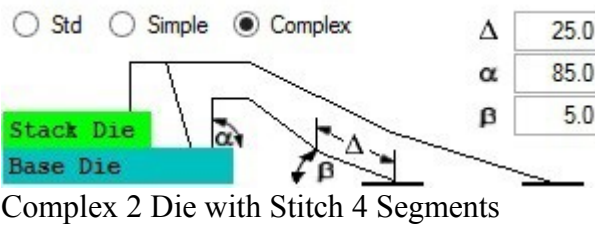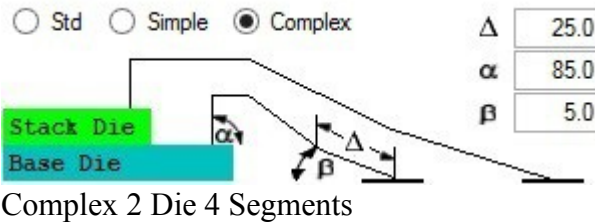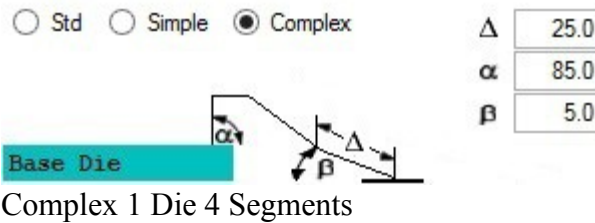
Apply - Applies the values to the project and updates the view at the bottom of the page.
OK – Applies the values to the project and closes the dialog box.
Cancel – Closes the dialog box with out updating the project parameters.
Load – Is used to load a previously saved setup. The default is "WBSU.dat".
Save - Allows you to save the setup parameters in a file for future retrieval.
Note: The Save button toggles between Save and AutoSave by right mouse clicking on the Save Button. This determines what happens when you leave the form. If AutoSave is false than you will be prompted to save changes. I AutoSave is true than any changes will be saved automatically.

Reset – Sets the setup parameters to a known default state.
LR Estimator – Runs the LR estimator based on the parameters and saves the data to a file in the work directory. It is also loaded into the text box at the bottom of the screen for immediate viewing.
Default to – Changes the default and custom values to 1/8, ¼, ½, or full die height.

*Note: **1**. The image at the left bottom of the dialog box gives a representation of what the wire bonds will look like. **2**. The LR calculations are based on the EIA/JEDEC Bond Wire Modeling Standard. **3**. If no stacked die are use than the Stack Die and associated wires are not displayed. **4**. When the LR Estimator is used the 3D Viewer is displayed as a visual aid. **5**. The text box at the bottom of the page displays either the current setup parameters used for LR calculations or the results of an LR calculation*.

Sample output of the LR Estimator

```
*Output File: Demo_LR.doc
*Output Path: C:\Users\Acer\Documents\Visual Studio
2008\Projects\AsPacker\AsPacker\bin\Debug\
*
*Material:                     Au
*Frequency:                 1.000 Mhz
*Wire Diameter:             1.000 Mils
*Wire Distance:            50.000 Microns
*
*Base Loop Height:        250.000 Microns
*Base Extension:          250.000 Microns
*
*Stack Loop Height:       250.000 Microns
*Stack Extension:         250.000 Microns
*Stich Extension:         250.000 Microns
*
Pad: 2        Base Die
  Length:                1970.755 Microns
  Resistance DC:            0.085 mOhms
  Resistance AC:            0.803 mOhms
  Inductance DC:            1.966 nH
  Inductance AC:            1.867 nH
  Inductance Self:         0.507 nH
  Inductance Mutual:       1.337 nH

Pad: 2        Base Die
.
.
```

Tools: (3D Viewer)
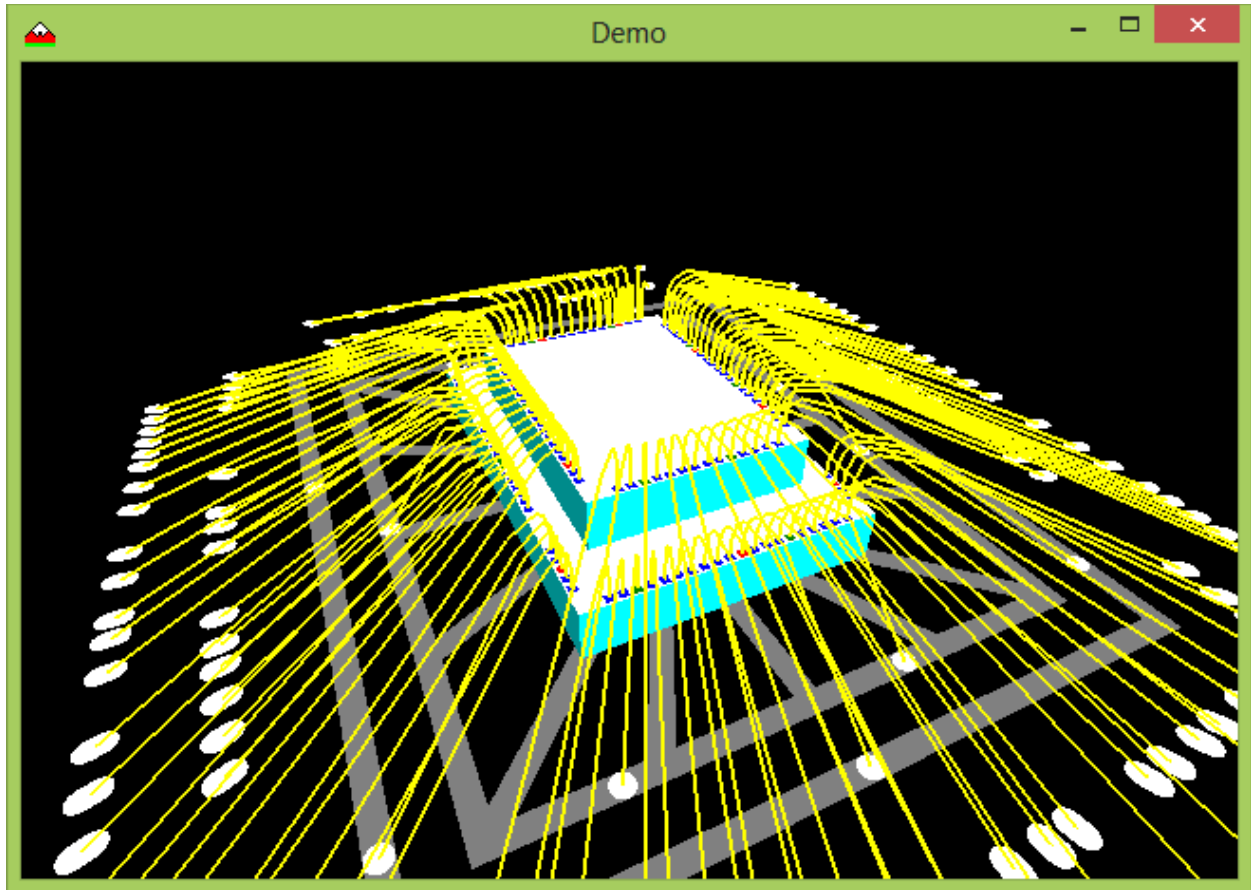
The 3D viewer allows you to look at the die and wire bonds in a 3 Dimension environment. The left mouse button will lets you rotate the die around the X and Z axis giving you a full view from any direction either from the top or bottom. Left/Right rotates around the Z axis. Up/Down rotates around the X axis. The Z rotation of the die follows the mouse and is opposite top and bottom. (*e.g. If the mouse is at the top and moves left the die rotates counterclockwise. If the mouse is at the bottom and moves left the die rotates clockwise.*) If the mouse is in the center portion of the image the die will move left/right and up/down. The mouse wheel allows you to zoom in and out to get a closer look. As mentioned in the Bond Wire Setup section, these wires can be tailored to what ever you want with in reason. If the values are changed in the Wire Bond Setup dialog box and applied, the next time you click in the 3D Viewer the changes will be applied to the view.

	On Top
	Reverse Mouse Wheel
	Wire Bond Setup ...
	Cancel
	Exit
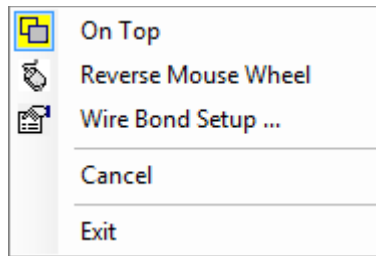
On Top – Places the 3D Viewer on top of all other forms

Reverse Mouse Wheel – Reverses the zoom direction of the mouse wheel.

Wire Bond Setup – Opens the [Wire Bond Setup](#) dialog box.

　　Cancel – Resets the rotations, translations and zoom back to the initial state.

　　Exit – Closes the 3D Viewer.

Pressing the Esc or Home key will reset the rotations, translations and zoom back to the initial state.

*The Die Image is split into 4 sections. **Upper** and **Lower** used to determine the direction of rotation around the Z axis when in the **Outer** portion of the image. The **Center** portion is used to move left/right up/down. The action taken is based on the starting position of the mouse when the left button is pressed.*

Glossary

ASIC: Application Specific Integrated Circuit.

Bond Wires: The wire that connects the CBP to the SBP or other CBPs if stacked die are used. These are generated during the fanout process. Each bond wire can have an offset applied to them based on x and y directions from the center of the CBP or SBP as viewed if placed at the top of the die. Rotation Note

.
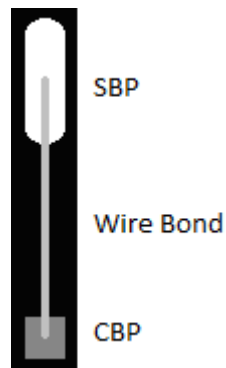
CBP: Component Bond Pad. The wire bond attach point pad on the DIE. This is the pad on the integrated circuit that is used to connect the IO signal from the DIE to the PCB or Substrate. Rotation note.

Die Origin: The coordinate system origin. Center places the origin at the center of the die (Default) or the LLC (Lower Left Corner) if the die. All coordinates written to files such as the LIQ file reflect the Die Origin selection.

Die: The Integrated Circuit with out a package that is to b placed on a PCB or Substrate. Also known as Bare Die. They are normally placed on a Die Attach Pad so that the back of the Die can have a bias voltage applied to it. This is normally Ground or VSS.

Die Attach Pad: The place on the PCB or Substrate where the die is attached. The Die Attach Pad is created using the Die Attach Pad tool. This is where you define the attach pad itself as well as any connections to the first ring or tier.
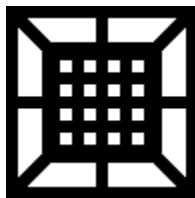
DRC: The various rules applied to the fanout process. This included SBP pad width and height, Pad to Pad and Pad to Wire spacing. Wire length and angle are used during a post process

check and reported in the Fanout Log. The PCB manufactures as well as the wire bonding fabricators specify these values.

Edge: Defines the edge of the die where the CBP reside. (Left, Top, Bottom, Right) These edges are first established when the Pinlist file is read into the system and is dome for each die added to the project. Pads are associated to the edge of the die that is closest to them. These can be altered in various tools but care should be taken when doing so. This is mainly done on corner pads where flipping from one edge to another could make a difference in the fanout pattern.

Effort: During the fanout process this defines how many iterations the process will execute to find the final solution. Each degree (1:10) is an increment of 20 iterations.) If you want a quick view of what the fanout will look like you can set this to minimum. For the best accuracy it should be set to a higher value.

Fanout: The process of generating the pattern of SBPs based on Design Rules established in the Tiers Properties dialog box. This pattern is what is imported into the PCB layout tool for connections to the PCB or Substrate circuits. This is done with the Fanout tool.

Height: Defines the height in microns (y direction) of a CBP, SBP, Die or Tier Bulge (arc). The height of a CBP is as viewed. The height of the SBP is as viewed if placed at the top of the Die. This height also determines the width of a Ring if it is type Ring. Type Guide is just that and is used for SBP placement only.
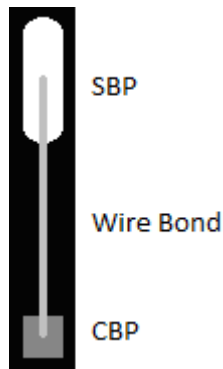
LIQ: Library IQ file. The ASCI file that holds all geometry description of project. It is used to pass information to and from the AsPacker - Wire Bond Explorer tool. All the information that is required to recreate a project is contained in the LIQ file. Care must be taken when editing this file, as one mistake will make the project invalid.

Log: The log file that is created for each session, records all commands that are executed during the session. This log file can then be renamed to .kmd and run as a script using the run=???.kmd format at the command line. This is handy for developing various scenarios and setups. The log can be viewed at the bottom of the tool by clicking on the Log line dropdown arrow. This is the top line at the bottom of the main screen. Any command can be selected and executed by pressing enter after it has been selected. Each command has

a number assigned to it and can also be executed by using "!" followed by the command number and pressing enter. The previous command can be repeated by entering "!!".

LLC: Lower Left Corner of the Die.
MCM: Multi Chip Module. A design that uses several bare die in a mini circuit or package.

Net: The signal or net name associated with a connection. This can be used during the tier assignment phase when you can chose nets instead of pins. This is handy if you want to select all the VCC or VDD signals for attachment to a Ground or Power ring.

Offset: The offset applied to a Stacked Die, if stacked Dies are employed and wire bond attach point relative to the CBP or SBP center point. See wire bonds for more information.

Pin: The pin assignment name of the Die pad supplied in the Die data sheet. By default the SBP pin is named the same during the reading of the pinlist file. These can be changed to any value desired. They are displayed on the screen if the pad text option is active.

PkgPin: The package assignment name of the SBP. Default is the same as the Pin and assigned when the pinlist is read into the project. . These can be changed to any value desired. They are displayed on the screen if the pad text option is active.

PinList: The primary input file to the program that carries all the die information including the die size and all the pads on the die. Information received from the Die manufacturer. **The file format must follow the format as described in the Pinlist File format document.**

Precision: The level of centering precision used during the fanout process and ranges from 1 to 3 decimal places. If Center Groups is selected, the accuracy of the centering is determined by the precision selected. Once the precision level has been reached the centering process will be stopped and the rest of the fanout process continues until finished. This is done to give the most accurate fanout, especially if stacked die is implemented.

SBP: Substrate Bond Pad. The wire bonds attach point on the PCB or Substrate. This is the copper on the PCB or Substrate that attaches the signal to the rest of the circuit. Rotation note.
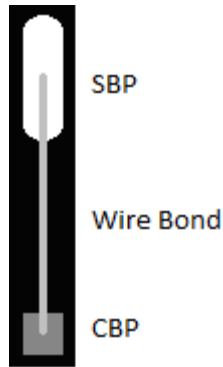
SBP Orientation: The degree of [rotation](#) applied to and [SBP](#) relative to the edge assignment (0 to 90 degrees) as viewed if the edge was at the top of the [die](#). + is to the right of center and – is to the left of center. This is reflected in the [LIQ](#) output which is based on the [ASIC](#) or Die IO pad orientation. This is why Edge information has to be applied when determining the height and width of the SBP in the PCB or [Substrate](#) layout. The top pad is rotated 0°, left 90°, bottom 180°, right 270°.

Stacked Device: If more than one die are used in the design and the die placed on top of the base die are referred to as stacked devices. Up to 3 devices can be stacked on to of the base Die. Each stacked die can be rotated at 90° increments and also have an X or Y offset applied to them.

Stitch: A connection from a pad on one die to a pad on another die in a stacked die situation.

Substrate: If designing a Chip Package, [MCM](#) or Hybrid this is the equivalent to a PCB. It is what the Die sits on and where the [SBPs](#) are placed.

Thick: Defines the thickness in microns (z direction) or the Z placement of a [CBP](#) if a stacked die is implemented. (*This is used in the 3D viewer as well as in the LR estimator to come in future releases*.)

Tier: The ring around the die which is where the [SBPs](#) reside. They can be either a guide with no copper associated with it or a Ring of copper such as power and ground rings. Up to 4 tiers can be used. Normally tier 1 is Ground. Tier 2 is Power and tier 3 and 4 are Signals. Tier 1 can be attached to the [Die attach pad](#) using the [Die Attach tool](#). (*In future releases split rings will be supported for multiple Power and Grounds.*)

Tier Assignment: The tier assignment of the [SBPs](#) is done using the [Tier Assignment tool](#). This determines where the SBPs will be placed during the fanout process. It also tells the Fanout Tool which DRC rule to apply to a given pad. Each tier can have different parameters but it is recommended that you set all to the same. Follow the Fabrication house rules for best results.

Units: This program uses Microns as a unit of measurement. The only exception is the Wire Width ([WW](#)) which can be displayed as Mils or Microns in the [Tiers Property](#), [Default /](#)

[Tiers](#) dialog box and the [Pad properties](#) dialog box. Imports, Exports and all other data based IO is represented in Microns.

Width: Defines the width or thickness in microns (x direction) of a [CBP](#), [SBP](#), [Die](#) and [Die attach pad](#) elements.

Wire Bond Files: These are two files that define the Die Attach Points. The _LLC.wbp references the lower left corner of the Die where as the _CNTR.wbp references the center of the Die.

```
! Left Side Pads:
2          30.000    2000.000   NET2
3          30.000    1940.000   NET3
```

Wires: The connections from the Die to the PCB or [Substrate](#) or Die to Die, ([Bond Wires](#)). (*Die to Die connections are called Stitches add are a future feature to come as the Stacked Die process evolves.*)
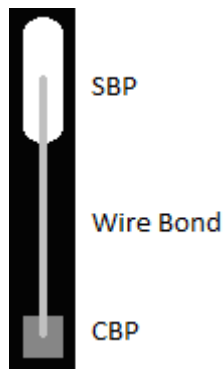
WireList: The extracted wire list containing the connections from the Die(s) and the PCB or [Substrate](#).

WW: Wire Width used during the [Fanout](#) process. This can be viewed and modified in two formats, Mils or Microns. Since most wire bonds are specified in microns you can enter them as microns in the Teirs Properties dialog box by selecting Microns with the Mils <> Microns button. The program will automatically convert this value to microns when the values are applied.

Note on CBP and SBP Rotation
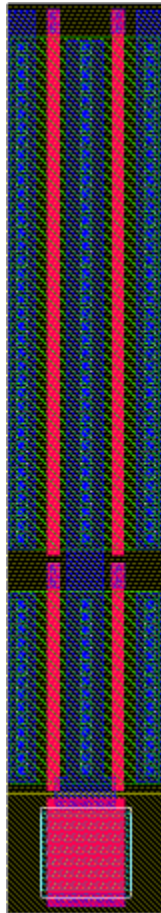
This is what a typical IO cell looks like in an ASIC. The upper part contains all the ESD and logic devices. In this case there is no logic. The bottom part is the Pad on the Die and is where the wire bond attaches to the die. Since this same cell is used on all edges of the die, the rotation of the CBP is reflected in the LIQ file. As a result the die pads Length and Width flip as the pad is placed around the Pad Ring. The same is true when determining the angle of the SBPs and bond wires. These angles are relative to the edge that they are related to. The angle ranges from -180° (left of center) to 180°(right of center) in theory but in reality they are much less. This is different than what the data sheets for a bare die call Height and Width of the CBPs. They don't consider side information just geometries on the die. But when read into AsPacker - Wire Bond Explorer the Edge is automatically detected and assigned to each pad. All SBP Heights and Widths are the same for a given tier since these are defined in the Tier Properties.

This tool keys into another tool (Pad Ring Explorer) that generates the Pad Ring and some command files for an ASIC and ASIC design tools. This tool is cell based with rotation not just pad Height and Width.