

ViewMate Pro Release Notes

New Features

11.24.50

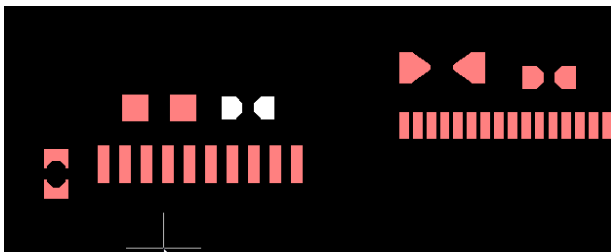
- **Mirrored View**
“View > Mirrored on X” will toggle the mirrored view mode.
The loaded data will not mirrored only the view.
- **New EMS Magician**
V1.2.4

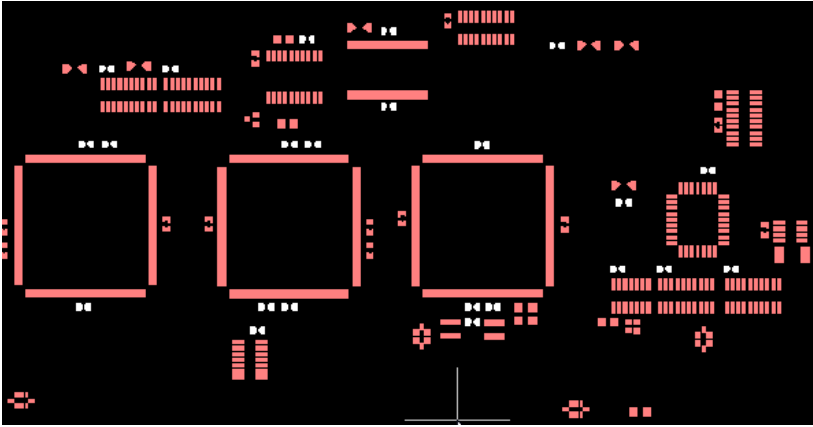
11.24.43

- **New EMS Magician**
V1.2.3

11.24.36

- **New in the D Codes Setup Table (F5)**
 - Changing Shape of D Codes While Preserving Dimensions: when selecting more than one D Code and changing the shape, the dimensions of the D Codes selected will be preserved. This is useful, as an example, when changing a number of Q shapes to R shapes.
 - A new command to change all diamond shapes to rotated squares, preserving geometry: “Operations > Convert D to S”.
- **Selecting Patterns**
“Select > Similar Pattern”. Will select (in the same layer) all elements that are similarly arranged as the selected elements. Both position and shape are taken into consideration.
This is most useful for groups of component landings (either pads or polygons), but work for any type of elements.





- **Calculating Solder Paste Volume and Weight**

“Tools > Stencil Apertures > Ratios / Volume > Paste Volume / Weight”. Computes the volume of the paste for the selected elements assuming the thickness given by “Stencil Thickness”. The solder paste density needs to be given as a parameter.

11.24.30

- **Copy Coordinates to Clipboard**

New item in the context menu (right-click). Allows the current coordinates to be copied into another document if needed (such as Excel).

- **Combine the Data from Several Layers into One**

In the Layers Setup dialog (F10), select several layers, then right click and pick “Combine Selected”. This will move all the data into the first layer in the selection. The remaining layers will be empty.

- **Support for Subscription Licenses**

11.24.27

- **BGA and QFN Stencils**

Pick “General Component” for a stencil creation.

When all pads are round (C) and the patterns is a matrix, it will be interpreted as BGA (Ball Grid Array) and the only option is to replace the rounds with a shape taken from another D Code.

When pads are arranged in 4 rows outside with a rectangular belly pad inside, it will be processed as QFN, with window splits for the belly pad.

For more info please see “Stencil_Apertures.pdf” in the “Documentation” folder.

- **Import ODB++**

Component info, if present, is also transferred to CPU/CPL pads.

Support for “oblong_ths” shape.

- **Import IPC-2581**

Support for slots (“SlotCavity”).

11.24.24

- **Export StL**

Export all layers in StereoLithography (StL) format into a folder.

Useful to make 3D views with the appropriate software.

- **View Drill Stack Up**
“View > Info > Drill Stack Up”.
Shows in a text dialog the drill layers stackup relative to the circuit layers. Layer types must be set.

11.24.20

- **View D Code and Tool Codes Used In Certain Layers**
Two new commands “Setup > D Codes in Layers” and “Setup > Tool Codes in Layers”.
- **Exclude Import of ODB++ Component Layers**
“File > Import > ODB++ Options > Exclude COMPONENT Type Layers”.
Component layers render more slowly and, when not otherwise needed, one can exclude from import.
- **Components Geometry**
“Components / Generate Geometry Layers”.
Generates layers corresponding to existing component layers, but having only the geometry (as traces).

11.24.15

- **Support for Gerber Extended AperFunction Directive**
This directive associates a D Code (aperture) with a function.
An example is: %TA.AperFunction,ViaPad*%
Support has been added for both import and export. The function names are in the Gerber spec.
The D Codes Setup table (F5) has an additional column for this, called “Function”. A blank value means there is no function specified.
Currently the function field is only used for import and export, no special meaning for CAM internal operations.
- **Insert Empty Layer**
In the Layers Toolbar context menu a new command: “Insert Empty Layer” will insert an empty layer before the current one and shift the current and all following down to make room.
- **Selects Pads with VIA Drill Holes**
“Select > Special > Pads With VIA Holes” will select all pads in the visible conductive layers that have a hole of “VIA” type.

11.24.11

- **D Code Usage Per Layer**
The “Layers” command in the D Code table now shows layers used for individual D Codes in the group of selected D Codes.
- **D Code Info in CSV Format**
In the D Code Setup table “Operations > Export as CSV File” will create a file that can be opened in Excel.
- **New Edge To Edge Distance Tool**
“View > Distance > Edge To Edge Distance Tool” displays the distance between the edges of two elements.

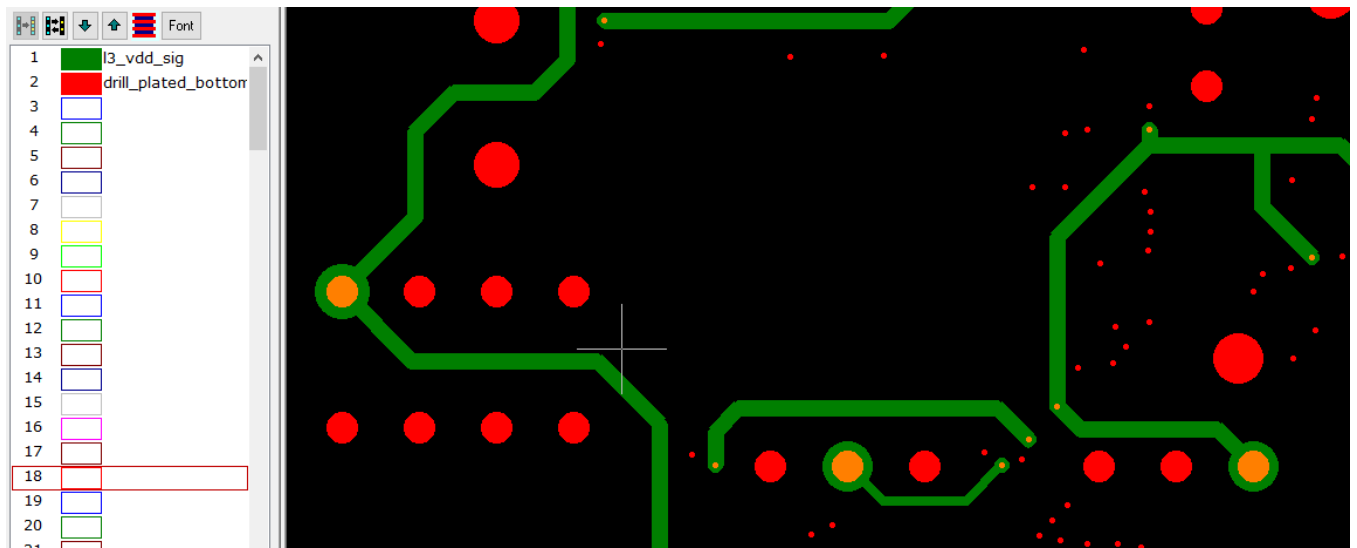
11.24.3

- **Generate Soldermask**
"Tools > Soldermask/paste > Generate Soldermask from PadMaster".
An option was added to add rounded corners to shapes that are rectangular.
- **Copy By Displacement**
"Edit > Edit Selection > Copy By Displacement".
Works the same as "Move By Displacement" but does a copy instead of a move.

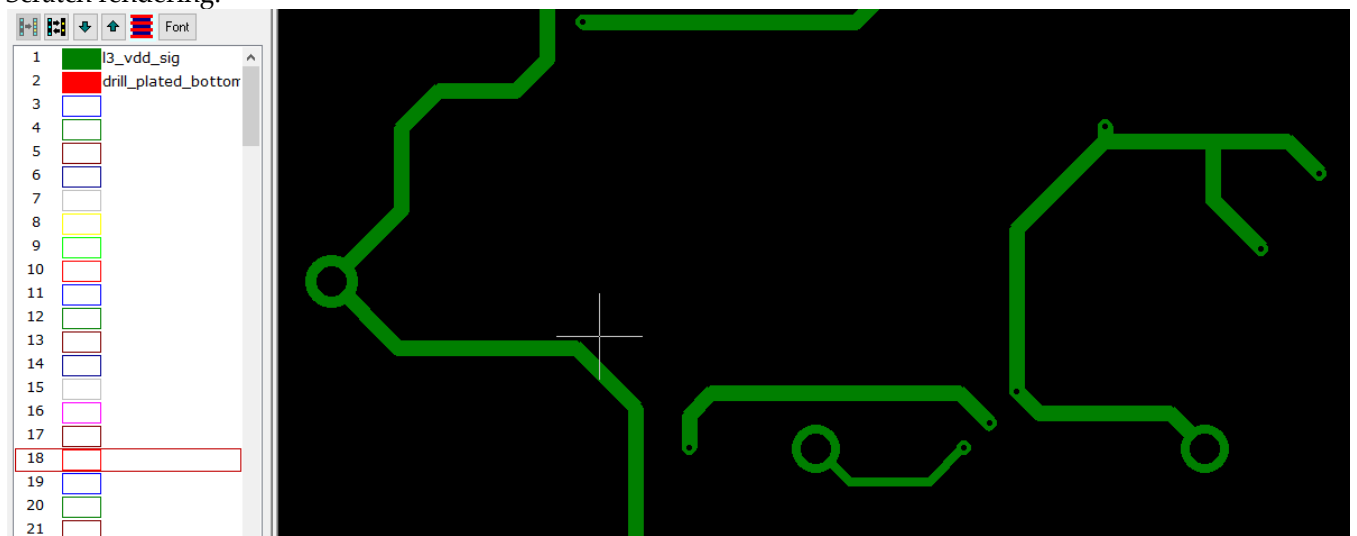
11.24.1

- **Change Coordinate of a Selected Pad or Linear Trace**
"Edit > Edit Selection > Change Coordinates".
- **New Release of EMS Magician (V1.2.1)**
 - Enable back button on every step without restrictions
 - Update Help Files
 - PCB Analyzer - Update "First" button behavior
 - Bug: Layers deleted when we switched to panelize module if the PCB Analyzer has not finalized all the steps.
 - Bug: On some rare occasions when the StartOver button was pressed there were temporary layers that remain active in viewmate
 - Bug: Whenever button was click it load the Original temporary file saved by EMS instead of the loaded on viewmate.
 - Bug: PCB Analyzer - Clip to board outline panel was not clearing after start over event
 - Bug: PCB Analyzer - Identify layers was not updating the layers if DFA Settings changed after reordering layers
 - Bug: If for some reason AppData files are removed the application crash on launch
- **Render Drill and Rout Layers as Scratch**
"Setup > Render Drill Layers as Scratch".
If checked, will cause the drill and rout layers to render as scratch over all the other layers.

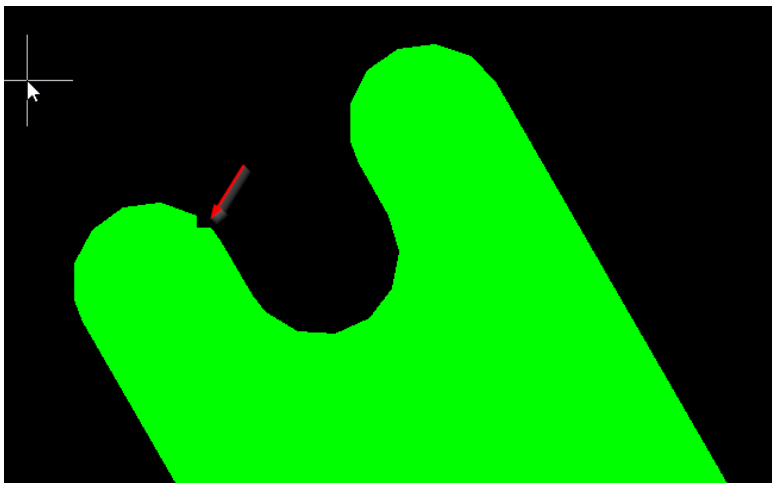
Normal rendering:

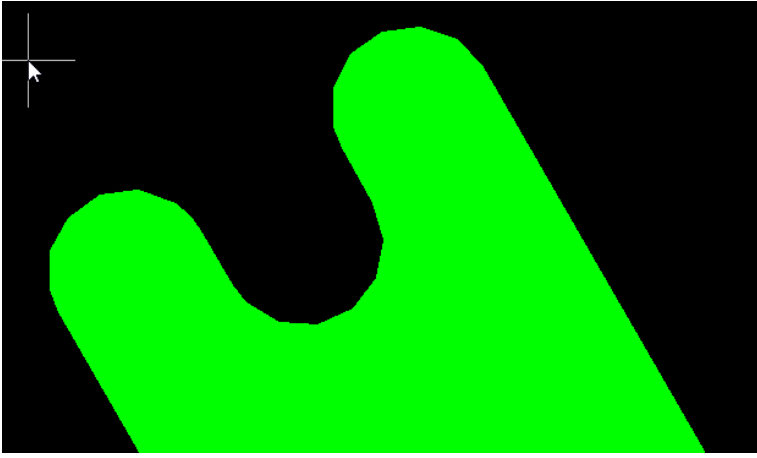


Scratch rendering:



- **New Method to Remove Dents in Polygons**
 “Edit > Edit Selection > Polygons > Remove Dents”.





- **3D Viewer Now Supports Stencil Layers As Well**

Layers of type STL/STU..Needs new version of the 3D viewer executable as well (https://downloads.pentalogix.com/3DBoardViewer64_Setup.zip)

- **Layer Type in Layers Toolbar**

Display can not be controlled with "Setup > Preferences > Show Layer Type In Layers Toolbar".

- **Polygon Chords to Arcs**

Algorithm improvement.

11.22.40

- **New Selection Tool**

"Select > Select By Dcode Tool".

This is a tool to select an element and all active elements of the same D Code as the one selected.

Once the tool is activated, click on an element (pad, trace) of interest.

- **Convert to Positive Operation**

Has been improved.

- **Select Short Traces**

"Select > Special > Short Traces".

Active Traces shorter than the given dimension are selected.

- **Layer Type in Layers Toolbar**

The layer name is now followed by the 3 letter layer type except for the default (SIG).

11.22.31

- **EMS Magician Is Now Part of the Installation**

It needs no additional licensing.

"Tools > EMS Magician" or "View > Toolbars > Additional Tools".

- **New Gerber Export Option**

It appears that a lot of other software packager and machines that consume Gerber can still not accept the latest specifications in the Gerber syntax.

To help exporting for such targets a new option has been added.

Gerber Options For Export

File Format	Data Format	Fields
RS274-X Options	Polygons	Miscellaneous

☐ Output Thermal primitive (7)

☒ Output Step And Repeat codes (SR)

☐ Output time stamp header

☐ Output LN (Layer Name)

Negative layer is "IPNEG" followed by:

☐ LPD ☒ LPC

☐ Output rotated and complex shapes as outline

This will use the AM outline (code 4) to export complex apertures.

This appears to be acceptable to most older software.

This option is only relevant in “V1” export mode:

☐ X2 (Gerber Extended V2) (Recommended)

☒ RS-274X (Gerber Extended V1)

☐ RS-274-D (Basic Gerber - no shape info)

(This format has been revoked by the Gerber standard)

11.22.24

- **Insert Edge to Edge Dimension**

“Insert > Edge to Edge Dimension”. This operation is similar to “View > Distance > Edge To Edge Measurement Tool”. It is a tool that allows you to click on two elements and inserts edge to edge markup into an empty layer.

You need to setup using “Insert > Loc and Dim Setup” as below:

Location and Dimensioning Tool Setup

Text height: 0.01

Font: ODB Standard

Digits to the right of the decimal point

☒ Maximum 3

☐ Exactly

☐ Append units (inch)

Dimensioning Tool

☐ Extend bars (Ctrl overrides)

☐ Horizontal or vertical only (Shift overrides)

☒ Orientation from largest dimension

Tolerance text::

(Optional)

Text height and font can be anything you like.

When picking elements, start with the rightmost one in order to have the text orient correctly.

11.22.21

- **Gerber Export of Non-standard Apertures**

They are now exported in different formats, depending on whether Gerber Extended V1 or V2 is selected in the Options dialog. If V1 option is selected only aperture macro (AM) features that existed in V1 are used.

11.22.16

- **More Efficient Export of Rounded Rectangle D Codes in Gerber**

- **Import ODB++**

Added fonts: "simplex" and "datecode". Dynamic text \$WW (week number) and \$YY (year).

11.22.12

- **Components Text Rendering for Rotated/Mirrored Components**

New option added to show text horizontally regardless of component rotation or mirroring. "Components > Show Text Horizontally".

11.22.10

- **D Codes Table – Rounding Values**

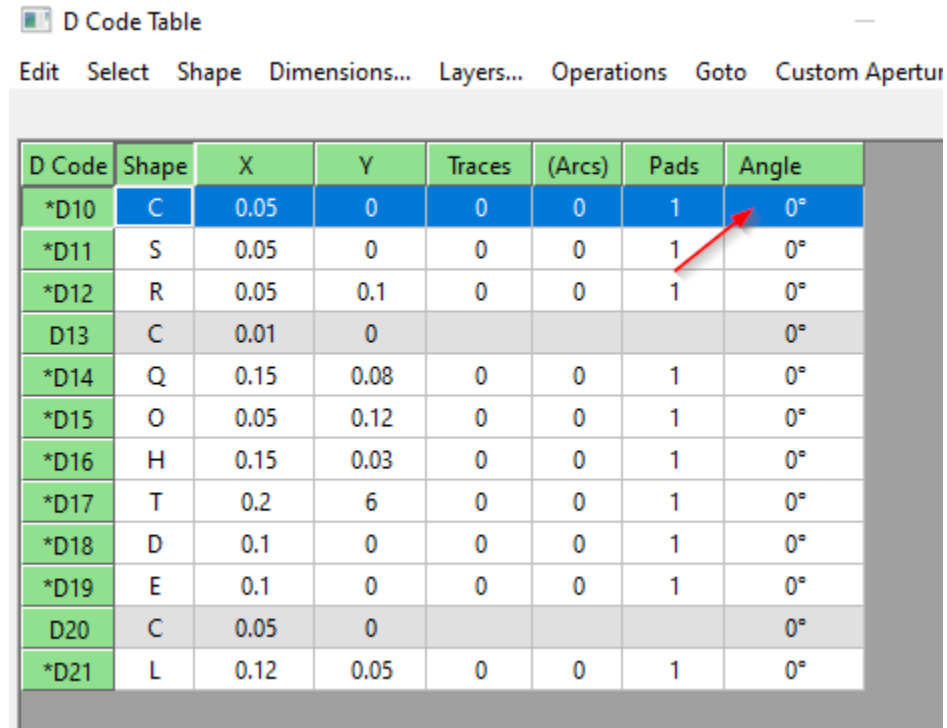
Additional rounding option added.

11.22.1

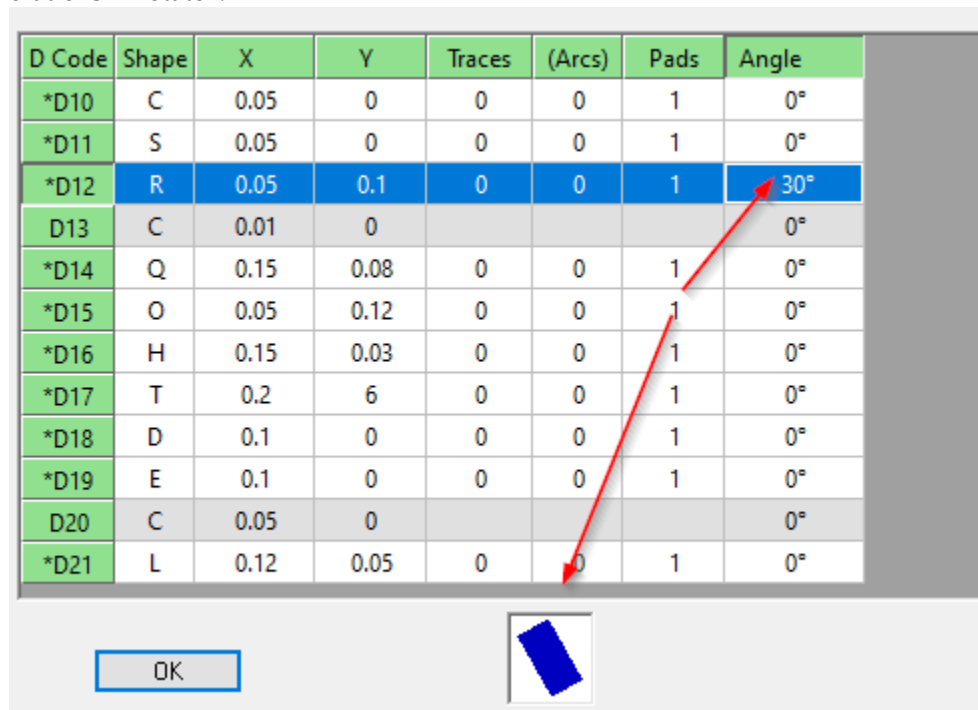
- **Rotated D Codes**

D Codes can now be rotated.

The Setup D Codes dialog now shows an “Angle” that can be set.

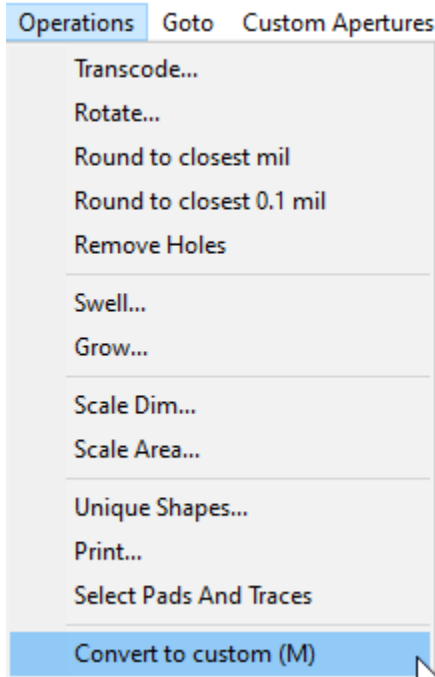


You can set this angle by double clicking on the cell, or selecting any number of D Codes and doing “Operations > Rotate”.



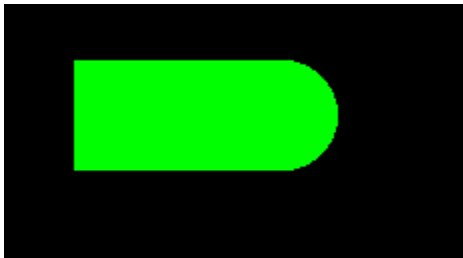
When saving a .bin file, rotated D Codes are converted to custom (M) shapes, to make the output backward compatible with previous versions of the CAM software. When opening these files in the current

version, the customs will be converted to rotated built-in shapes. One can also convert selected rotated D Codes to custom (M).



- **New built-in D Code Shape**

“Bullet” (single character designator “L”). Also known as hal-obround. Same as the obround shape (O), but with only one rounded end (to the right). Other orientations can be achieved using the “Angle” feature (see above).



- **Select by Range of Values**

“Select > Special > Pads in Size Range” and “Select > Special > Area Range”
Selects elements with size values in a range of two values.

11.20.29

- **Insert Rotated Rectangle**

“Insert > Rectangle”.

If Shift is pressed when picking the first corner, the user will be asked to click on 2 more corners. These will define a possibly rotated rectangle.

11.20.24

- **Setup > Save Parameters to File**

Saves the parameter values of some of the commands. These can be restored later from the saved file. A preliminary set of parameters are now saved. More will be added later.

- **View > Selection > D Codes**
In visible layers only.
- **Select Drill Holes and Routing Paths**
"Select > Drill And Rout". Use this to select elements of chosen tool numbers in a set of layers.
The command works on visible layers only. So, to restrict selection to certain layers turn off the others.
Tools numbers can be picked from the dialog that is displayed.
- **Option to Control Info to Clipboard**
"Setup > Preferences > Info To Clipboard When Selecting".
- **Last Used Option for Transcode D Code Dialog**
Allows quick usage for the last D Code used for transcoding.
- **Added Centroid Info**
"Components > Save Centroid File" also saves the width and height of the component (non-rotated).

11.20.16

- **Extra Info When Selecting a Pad or Polygon**
When selecting just one pad or one polygon, the following info is saved in the Windows clipboard:
width, height, perimeter, area.
This can then be pasted into a text document.
- **Import ODB++**
Better handling of complex jobs.
- **New Layer Visibility Action**
For the layers toolbar. The new action is Ctrl+Shift+Double-click. This will make visible ONLY the range of layers between the previous active layer and the layer double-clicked.
This is in addition to the previously available actions:
 - Double-click: toggle visibility of current layer
 - Shift+Double-click: make visible range
 - Ctrl+Double-click: turn range visibility off
- **Optional Tolerance Text**
In "Insert > Loc and Dim Setup". If tolerance text is entered it will be added to the dimension text.

11.20.7

- **Insert Barcode**
"Insert > Text" now has a number of barcode "fonts". Their name includes (Barcode).
The only relevant items for inserting a barcode are "Height" and "Aspect Ratio". For barcode types that are square (like QRCode), "Aspect Ratio" will be ignored and "Height" will be the size of the generated barcode. For the others height will be given by "Height" and width by "Aspect Ratio" X "Height".
- **New Clipping Operation**
"Edit > Break Using Line". Similar to "Break Traces and Clip Polygons", but uses a line segment to break instead of a frame. For polygons, the line segment needs to completely cross the polygon (cannot start from inside the polygon).

11.20.4

- **Layer Organizer**

Now supports up to 24 layers,

- **Select Text Based on Content**

“Select > Special > Text”. This will select all text blocks that match the regular expression you enter.

It uses regex, which is a bit more complicated than regular text, but allows for flexible searches.

You will need to learn just a few patterns. For instance:

- ABC will match all the text blocks that are exactly ABC

- ABC.* will match all text blocks that start with ABC. The dot character in regex matches any character and star means one or more.

- .*ABC.* will match all text blocks that contain ABC anywhere.

Be careful when you want to match an actual dot or star or any other character that has meaning to regex.

In cases like these you need to escape the character with a backslash.

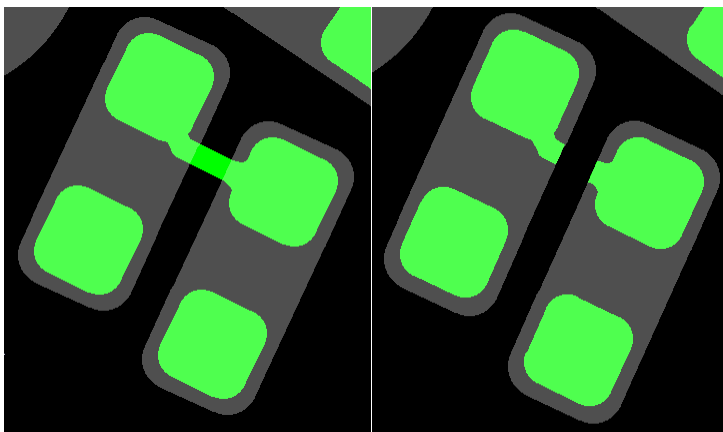
For instance ABC\. will match all blocks that are exactly “ABC.”.

There are many regex tutorial on the web,

- **Clip One Layer by Another**

“Edit > Region Clipping”. Elements in the first layer will be clipped by elements in the second layer.

The result in the first layer will be the clipped data as polygons. Elements that do not intersect the second layer will be deleted.



11.20.1

- **Import IPC-2581**

Files in IPC-2581 format can now be imported.

11.18.52

- **Zoom on Selection**

“View > Zoom > On Selection” or “Ctrl + Shift + Home”.

11.18.51

- **Stencil Windows**

Some irregular shapes were processed incorrectly.

- **Import Gerber X2**
Component and net info was imported incorrectly.
- **View > Selection > D Codes**
Only one D Code of the same size was shown. Same for View > Selection > Tool Codes

11.18.46

- **New Component Operations**
"Component > Select". Can select/deselect CAM components and pads with component info.
"Component > Add Component Info to Pads" can be used to add component info from component layers (CMU and CML) to the corresponding layers with pads: copper, soldermask and solderpaste (CPU/CPL, SMU/SML, SPU/SPL). Only visible layers will be processed.
- **Support for Gerber X2 Component Info**
Support for "TO.C" (reference designator) and "TO.P" (pin name)".
- **Shortcut for "Go > Center of Selection"**
Ctrl+Shift+K.
- **"Go > Coordinates" improvement**
One can now type arithmetic operation in the X and Y boxes. For instance: "10.2+0.25" or "230.1 / 1.25".
Only two terms allowed and no units in this case.
- **Ratio Validation**
"Tools > Validate Ratios". Useful for stencil and paste layers. Works on current layer by selecting pads or polygons that satisfy the requested rule.
Select Pads/Polygons By Ratio In Current Layer

Wall Thickness:

☒ Aspect Ratio:

☐ Area Ratio:

Select Pads That Are

☒ Larger

☐ Smaller

Intended usage is for solderpaste or stencil layers,
but can be used on any layer.
Pads and polygons only.

Computation of ratio is based on thickness and the bounding box of each element.

If dim is the dimension of the bounding box the formulas are:

Aspect ratio = (smallest of dim.x and dim.y) / thickness

Area ratio = (dim.x * dim.y) / (2 * (dim.x+dim.y) * thickness)

11.18.40

- **Changing Date in Text**

“Edit > Edit Selection > Text > Change Date”.

This applies to selected text blocks that contain a date. The new operation allows changing the date to the current date (today).

The date needs to contain year, month and day, but the order is arbitrary.

The user is prompted with the format: “YYYY-MM-DD”. The string can be changed if the order in the text does not match. For instance one could input “DD-MM-YYYY”.

Note that the separator (“-”, in this case) does not need to be the same in the text, but the new replacement date will use it.

For instance: “YYYY-MM-DD” will match “2021-03-02” or “2021 03 02” or “2021:03:02”. Any separator as long as it is the same. However, the replacement date will use “-”.

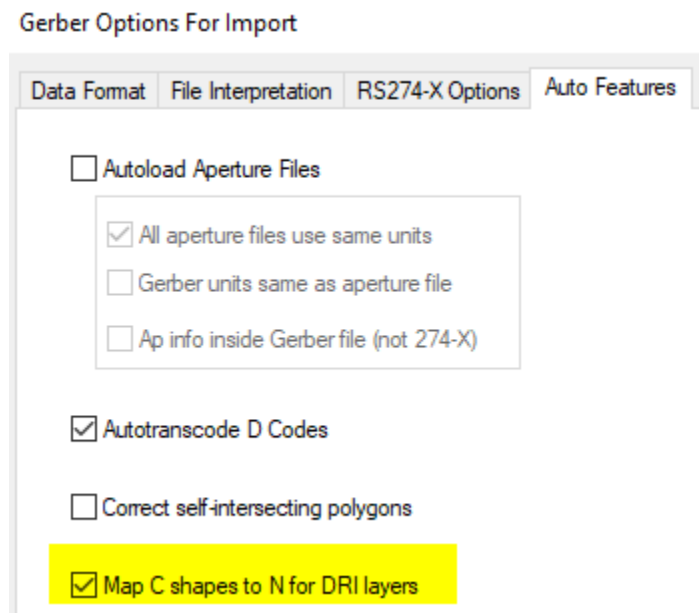
- **Insert > Chamfer**

Reverted to previous behavior where traces that are not really part of the chamfer can be moved.

- **Import Gerber Autoconvert C to N**

This was previously the default for DRI layers or when importing files with the “.dri” extension.

Not this feature can be turned on or off:



11.18.37

- **New Delete Vertex Operation**

“Edit > Edit Traces > Delete Vertex”. A tool to delete the vertex common to two straight traces. Clicking on the vertex deletes the two traces and replaces them with a spanning trace (endpoints equal to the other endpoints of the removed traces).

11.18.36

Improved Display of Selected D Codes and Tool Codes

“View > Selection > D Codes” and “View > Selection > NC Tools” now includes a count of elements also.

Edit Custom Font

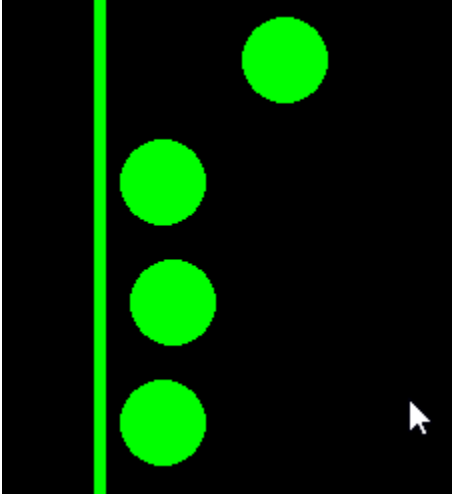
Read the document “Font Editing.pdf” in the installation folder.

New Shave Pads Command

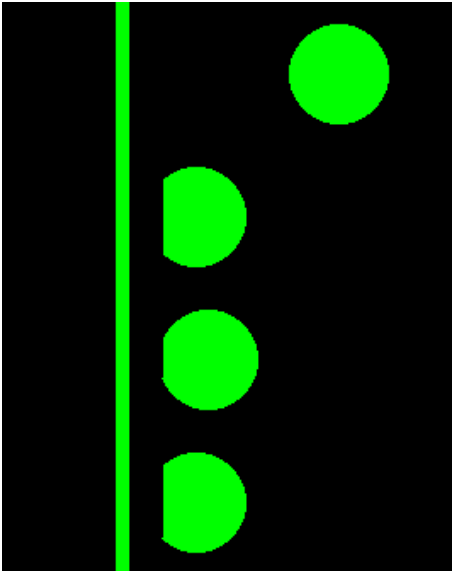
“Edit > Shave Pads > Shave Pads vs Trace”. Select a trace and any number of pads next to it.

This new command will shave the pads to insure the desired gap.

Before:



After:



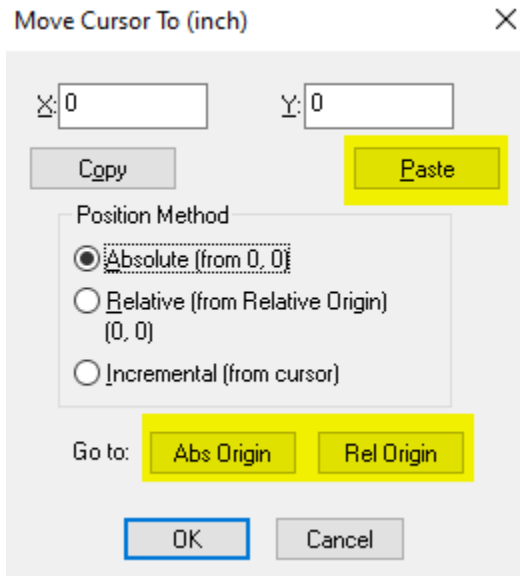
11.18.29

- **“Select > Connected”**

Added “add” (Shift key) and “remove” (Ctrl key) modes.

- **New Functionality in “Go > Coordinates”**

Several new buttons have been added.



The “Paste” button will paste the text currently in the Windows clipboard into the X/Y fields.

This is useful mostly for copying a pair of coordinates, for instance from an Excel spreadsheet. The pair should be separated by spaces. The two items will be pasted into to X and Y fields.

The “Origin” buttons will move the cursor to the absolute origin (0,0) or relative origin (if set).

- **Improved Display of “Elements Overlapping Crosshair”**

11.18.21

- **Mirror X Option for Print**

Useful for printing images for the bottom side of a board.

11.18.19

Elements Overlapping Cursor

The dialog showing info on the elements that overlap the cursor now show more detailed information.

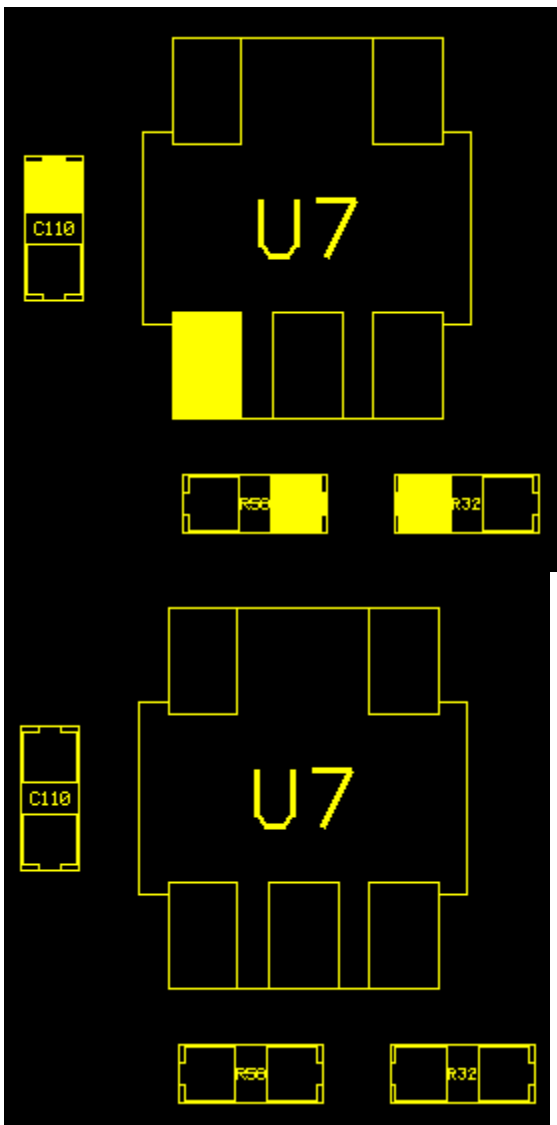
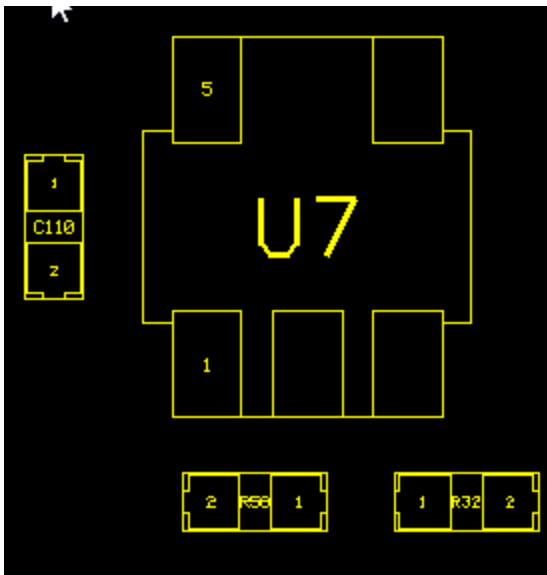
Import GDS-TXT

Now allows for several files to be imported in one operation.

Pin 1 Display Options for Components

“Components > Pin 1 Rendering”. Has 3 options: Text, Filled, None. Previous way of rendering was None.

Examples are shown below for the 3 modes:



Footprint Polygons from Component Data

“Components > Generate Footprint Layers”: if component layers are present (CMU, CML), usually from

ODB++ data, one can generate polygons for the footprints (pins) in new layers.

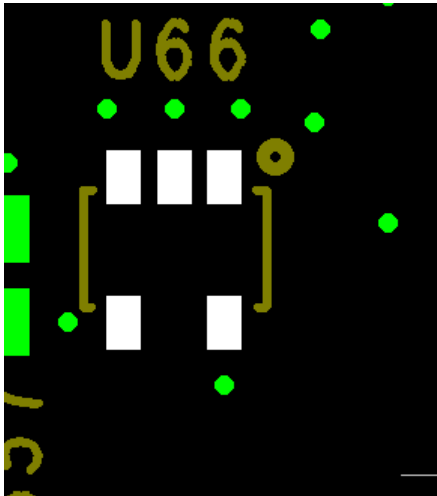
New Method to Find Component Footprints.

“Components > Find Similar Footprints”.

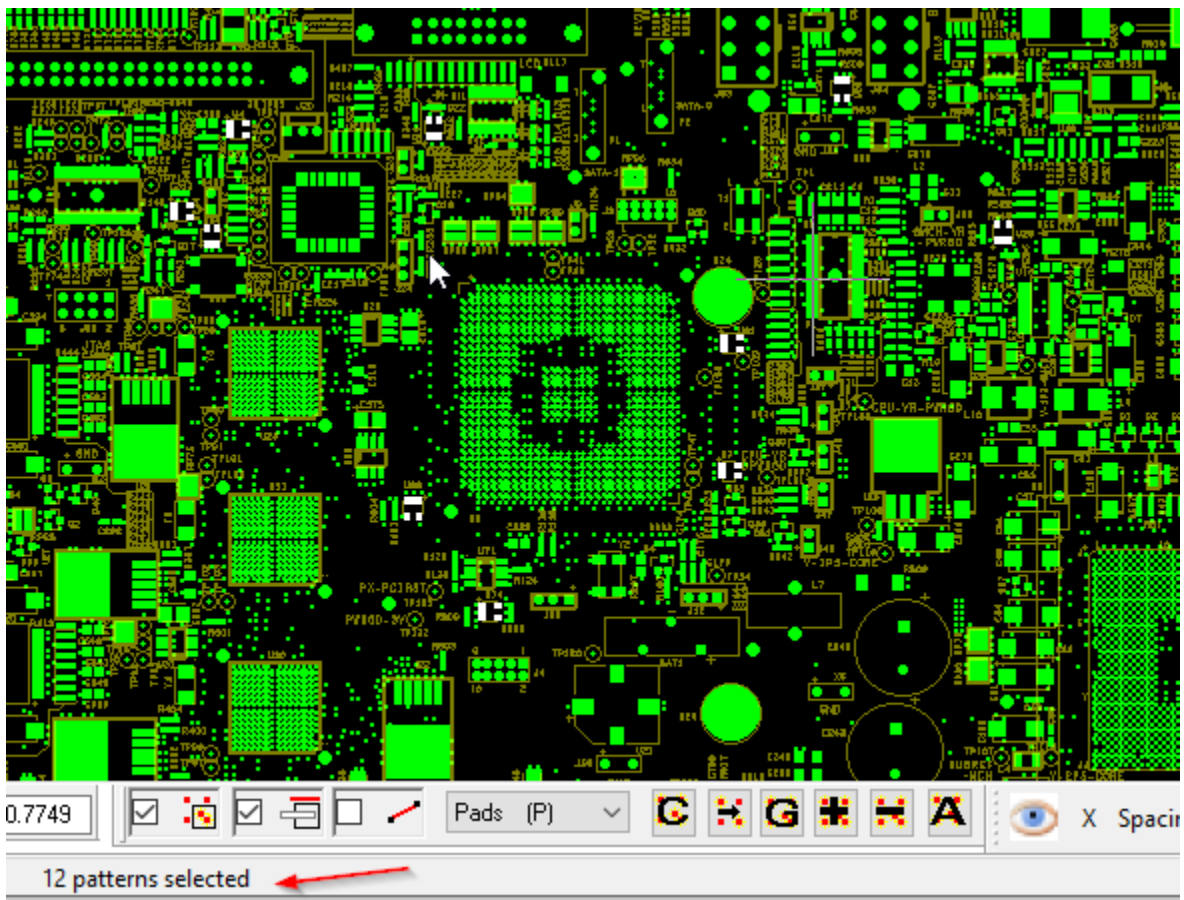
One first needs to select the pads belonging to a component. Then use the above command. Similar arrangements of pads in the same layer will be selected.

Note that this works for any pattern of pads, they don't need to belong to a component.

An example: Select the pads as shown below from the soldermask layer:



After the executing the command, the screen will show:

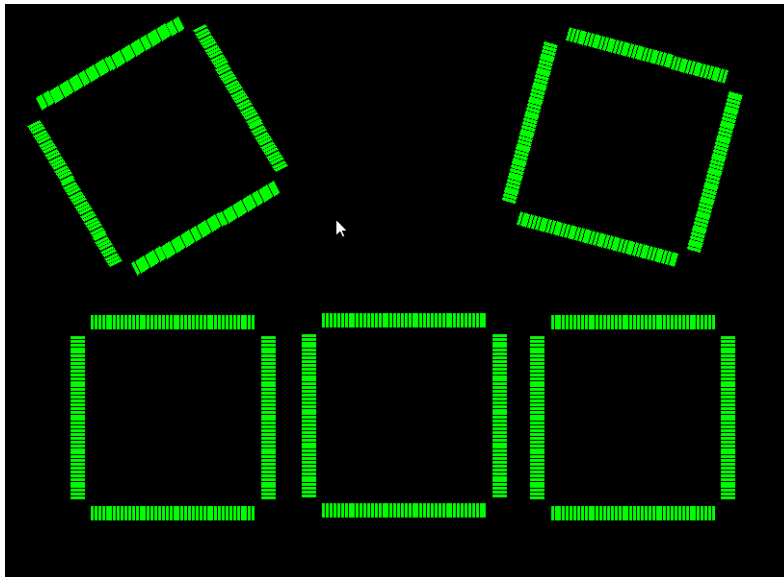


12 additional such patterns have been found.

The silkscreen layer need not be present. Only shown for illustrative purposes.

11.18.11

- **Select Invalid Polygons**
“Select > Special > Invalid Polygons”. Selects polygons that are not valid according to the Gerber or ODB standard (self-intersecting).
- **Replicate To More Than One Layer**
“Edit > Edit Selection > Replicate” now allows selecting more than one layer to replicate to. This is possible only if the selection to replicate is in one layer only.
- **Footprint Polygons from Component Data**
“Components > Generate Footprint Layers”: if component layers are present (CMU, CML), usually from ODB++ data, one can generate polygons for the footprints (pins) in new layers.
- **Stencils Can Be Generated for Rotated Components As Well**



11.18.7

- **3D Board Viewer**
Added menu item to select layers to display in the 3D viewer menu.
Layers of types SPU/SPL are also rendered. In addition, only visible layers are rendered, so one can choose what is rendered in 3D.
A new version of the 3D viewer is also needed.
Download from here:
http://downloads.pentalogix.com/3DBoardViewer64_Setup.zip
- **HomeBase Stencil**
Can now process rotated rectangle pairs.

- **Select Off Center Pads**

“Select > Special > “Off Center Pads in Two Layers”. Selects pads in two chosen layers. A pad will be selected if it overlaps a pad in the other layer, but has a different center.

- **Select Pads with Plated Holes**

“Select > Special > Pads With Plated Holes” will select pads in a copper layer that have corresponding plated drill holes in the drill layers in the current job.

11.18.1

- **Import and Export Gerber Components**

Support for the new Gerber components format (called Gerber X3) has been added.

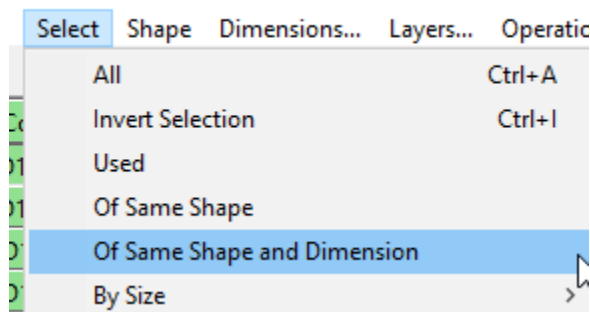
To export component layers (of type CMU and CML) one needs to pick “X2” as the format from the Options dialog.

11.16.73

- **Changing Shapes of D Codes in Different Orientation**

There is a new command in the D Codes Setup dialog that selects all D Codes of the same shape independent of orientation.

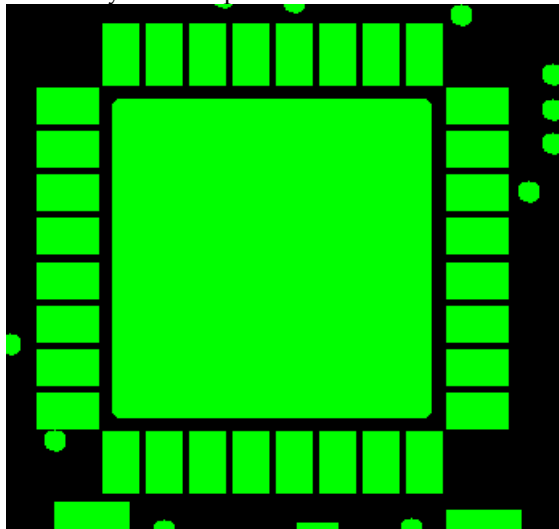
D Code Table



This can be used to select all D Codes that have the same shape type and dimensions, independent of orientation.

One common use case is the following.

Assume you have pads as shown below:

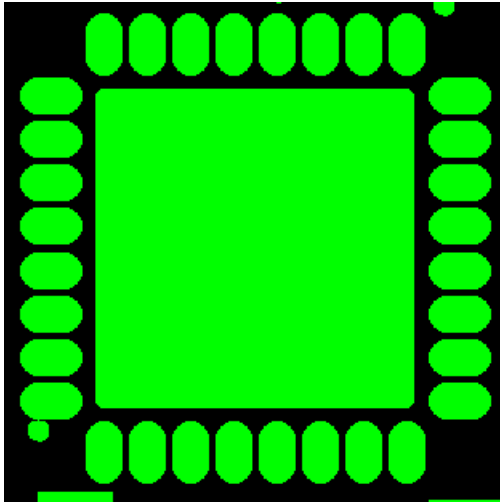


and you want to convert the rectangles to obrounds.

In the Setup dialog you can use the above command to select the two D Codes (or even select them manually. Then press “O” for Obround. When the dimensions dialog comes up click OK, although you could

also change the dimensions if you wanted.

The result will be:

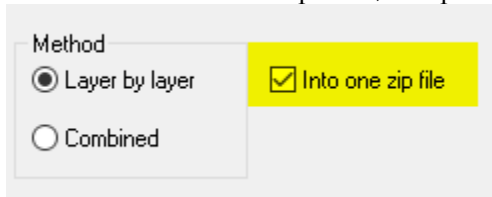


- **3D Viewer Supports Blind Vias**

Previous version ignored blind vias and they did not appear in the 3D view. A new version of the 3D Viewer executable is also needed (V3.0 or higher).

- **Export to Zip File**

When several files are exported, an option has been added to export them as a zipped file.



- **Several Files In Open Dialog**

One can now pick more than one file in the "File > Open" dialog. Of course, this is mostly useful for import, not for open. One should open only one .bin file.

11.16.64

- **Larger D Code Numbers Allowed**

Largest legal D Code number has been changed to 99,999. Previous value was 9,999.

11.16.53

- **File Import Dialogs are Now Resizable**

- **Import DXF Splines**

Splines are now approximated with straight segments. However, the rendering may not match exactly the one seen in AutoCad in all cases.

11.16.46

- **Layer Visibility**

The Layers Toolbar right-click menu has a new entry "Stays Visible" which can be checked for a layer so that it remains visible while the "Next" and "Previous" buttons are pressed.

Useful when one wants one or more reference layers to be always visible while navigating through the rest.

- **Installer Does Not Need Admin privileges**

11.16.43

- **Repeating Last Move**

New menu item "Edit/Edit Selection/Repeat Last Move".

This will be active once a move operation was done. After that, this command will do a move on whatever is selected using the displacement of the last move.

Useful when one wants to move several separate elements by the same amount.

11.16.42

- **Insert Text Aspect Ratio**

The insert text dialog has a new field called "Aspect ratio". A value of 1.0 will have the nominal text scaling, Values larger than 1 will compress horizontally, while smaller than 1 will expand.

- **Moving Center of Custom Shapes (M)**

Sometimes one needs to move the center of M shapes that have irregular shapes.

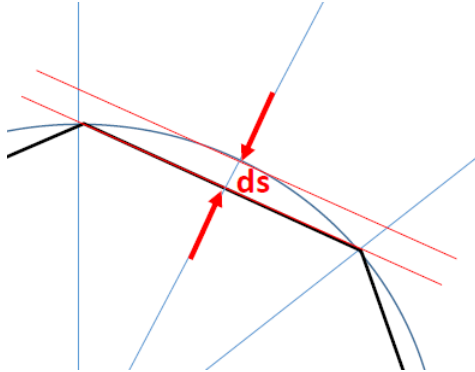
To do this, select one pad with the D Code to change, then move the cursor to the location for the desired center. Then do "Edit/Set M Shape Center to Cursor"

11.16.41

- **New Arc to Chords Parameter**

For all the operations that convert arcs to chords a new parameter has been added, sagitta.

It is the distance shown as "ds" in the diagram below:



This is a good measure as to how well the chords approximate the arc.

11.16.37

- **Rotate and Mirror Transcode Report**

A new option in the dialogs has been added to generate a text file report of the D Codes that were trans-coded.

- **Job Report**

"File/Report/Generate" now also includes a per layer D Code report.

11.16.26

- **Offset Polygons**

“Edit/Edit Selection/Polygons/Offset”.

New operation to inflate or deflate polygons. Similar to swell, but will avoid generating new arcs. For the swell operation the distance from the new contour to the old one is always the specified swell amount.

For offset this is not case at the vertices.

11.16.22

- **Select Elements of a Given Tool Number**

“Select / All NC T#”.

Will prompt for a tool number and then select all elements (pad, trace, routing path) mapped to that tool number. The shortcut key for this is Ctrl+Shift+T.

11.16.16

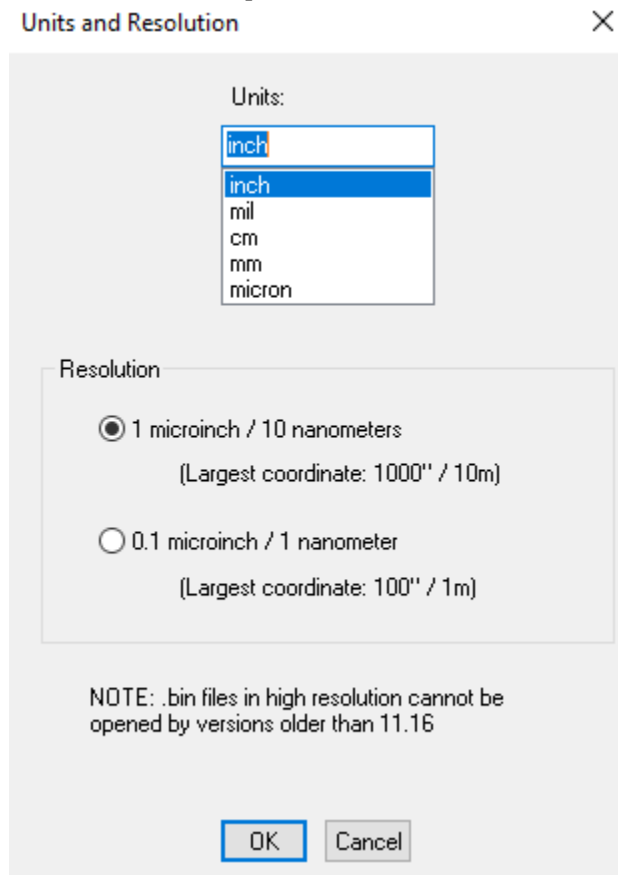
- **New Units and Resolution**

The units selection now allows for “micron” as well as the other previous units.

When specifying the units with text, one can use “micron” or “um”.

There is now also a way to specify the internal database resolution. This is independent of the units.

To do this use “Setup / Units”:



Note that for PCB applications, the “1 microinch” resolution is more than adequate. This was the resolution of previous versions of the software. The new “1 nanometer” resolution is needed when processing chip CAD data.

11.16.12

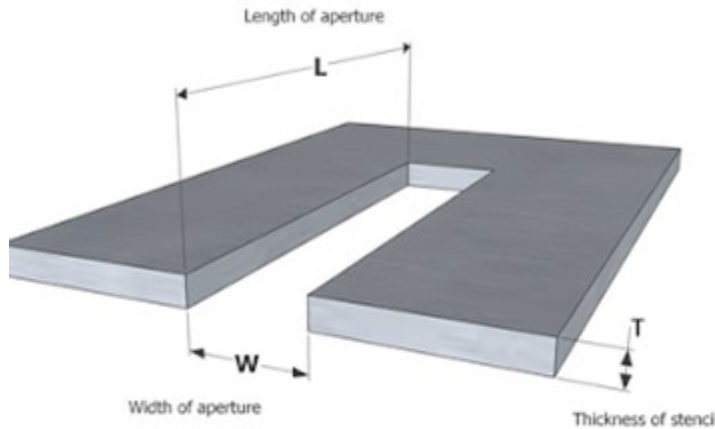
- **Stencil Ratios Computation**

“Tools/Stencil Apertures/Ratio”.

These ratios are computed on the selected elements. Need to select a stencil (or part of a stencil first).

Also, one needs to specify the thickness of the “wall” before getting the ratio (for “Area Ratio” and “Surface Area Ratio”).

The formulas for “Aspect Ratio” and “Area Ratio” are below:



$$\text{Aspect Ratio} = \frac{\text{Aperture Width (W)}}{\text{Stencil Thickness (T)}} > 1.5$$

$$\text{Area Ratio} = \frac{\text{Area of Pad (L x W)}}{\text{Area of Aperture Walls (2 x (L+W) x T)}} > 0.66$$

For “Surface Area Ratio” the formula is based on the exact shape of the aperture: area of aperture walls divided by the area of the aperture.

- **Polygon Cleanup**

A new command has been added: “Edit / Edit Selection / Polygons / Combine Short Straights”. Given a tolerance value, any pair of successive straight edges where each is shorter than the tolerance will be replaced with an edge connecting the outside vertices of the pair.

- **Export DXF**

Files with step and repeat will be exported using BLOCK and INSERT, resulting in smaller output files. Only top-level step and repeat blocks will be exported this way.

- **Import/Export GDS-TXT**

GDS Binary files are currently not supported.

Only the flat part of the GDS data is imported (BOUNDARY, PATH, BOX at top-level).

Data is converted to polygons before export.

11.16.7

- **Select by Line**

A new selection tool has been added, “Select/Select By Line Tool”.

This is a tool similar to the “Select/Selection Tool” but will select elements intersecting a dragged line rather than a frame.

The usual filters are considered (Only current layer etc.).

Keyboard modifiers are: “Shift” to add to an existing selection and “Ctrl” to remove from an existing selection.

- **Copy/Paste Coordinates String**

One can now copy the text of the current coordinates to the Windows clipboard. This text can be later copied elsewhere, as needed.

There are two ways of doing this.

- By clicking on any of the coordinate display boxes in the Position toolbar (normally in the lower left corner of the application).
- By pressing the new "Copy" button in the "Go/Coordinates" box. In this case the text for both coordinates is copied.

11.16.1

- **New Insert Mode: Polygons**

The "Insert" menu has a new command "Polygons". This will allow a user to click on a number of consecutive edges of a polygon and, when done, insert a polygon element.

To stop insertion and generate the polygon, double-click or press Enter twice.

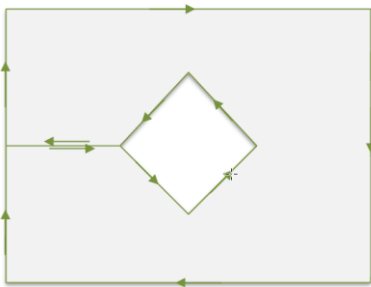
If the point where the insertion was stopped is not the start point, a connecting edge will be added back to the start point.

Previously, the only way to insert a polygon was via a several step operation:

- first one needed to insert zero width traces ("F" type D Code)
- then select them
- and finally run "Edit/Edit Selection/Polygons/F to Polygons".

The limitation of this new mode is that one can only generate polygons with straight edges (no arcs). If arcs are needed the "F" method shown above should be used.

Note that it is possible to generate a polygon with holes also, but one need to use overlapping edges to travel to the hole and back. These are called cut-in contours:



To facilitate matching vertices in the pending contour a new shortcut has been added: Ctrl+Shift+J (jump to closest vertex of current contour).

- **Round Chamfers for Polygons**

New command to add round chamfers at polygon vertices where two straights meet: "Edit/Edit Selection/Polygons/Add Round Chamfers".

This will replace a vertex where two straights meet with an arc tangent to both straight edges.

There are two methods for doing this:

- one can specify the radius of the arc (same radius will be used at all vertices).
- one can specify the offset from the vertex to the added arc (different radiuses will result depending on the angle of the edges)

11.14.59

- **Swell By Percentage**

To swell by percentage type in a number followed by a percent sign in the "Edit/Edit Selection/Swell"

dialog. The amount to swell by will be:

- the percentage of the width of symmetrical D Codes
- the percentage of the largest inscribed circle diameter for asymmetrical D Code shapes and polygons.

- **Stencil Sanity Check**

A user settable parameter has been added – the allowed center offset, as a percentage of the pad dimensions. The smaller the number the more errors will be reported.

11.14.49

- **New version of Layer Organizer**

This version of the Layer Organizer allows you to quickly set the color of the organized layers. You can also quickly control layer visibility to show only the top, bottom or inner layer view of your design. You can use the new “Layer Color Manager” to setup “Layer Color Templates” that make it easy for you to map each layer to one of the 15 available colors in our CAM editors.

More information on this is in the “Layer Organizer Release Notes.pdf” file in the “Documents” folder.

- **Components**

Added ability to create stencil outlines for packages and generate stencil layers from component layers.

- **Import XNC**

Support for the XNC metadata (layer and tool info).

11.14.45

- **Export XNC**

This is an NC data format that includes drill and rout data. It is defined as “The PCB CAD to CAM Exchange NC Format”.

The format is described here:

https://www.ucamco.com/files/downloads/file/300/the_xnc_file_format_specification_draft.pdf

It is based on the Excellon format, but is completely unambiguous.

No format needs to be provided by the user.

This export is a bit different from the other PentaLogix exports in that the software picks the file name(s) based on the current job name. All visible layers with NC data will be exported.

Note that this format is designed for CAD data and as such, does not support step and repeat commands.

It is best to use this to export one-up data.

However, if the CAM data does contain step and repeats the export will still work, but the data will contain multiple copies in the stepped positions.

These files can be imported by any software that accepts Excellon data, as it is a subset of Excellon.

They contain meta information about the layer type and tool types, but these are embedded in comment lines, so they will be ignored by readers that do not support XNC.

The next release of our software will also interpret this info (on import).

- **Update Available Prompt**

Users who do not want to be prompted when a new version of the software is available can now turn on the periodic check with “Help/Update Reminder”.

- **Setting Folder for Persistence/Configuration**

Software parameters / user preferences are saved in a file named ViewMatePro.cfg.

These parameters are then loaded the next time the software starts.

The default folder where this file is saved is the user's "home" folder, given by the Windows environment variables "HOMEDRIVE" and "HOMEPATH". This folder needs to be writable.

In some cases IT personnel sets these to folders that are not writable.

To mitigate this, there are two ways to tell the software which folder to use:

1. Starting the software with arguments on the command line.
"/cfg *foldername*", where *foldername* is the path to the folder
2. Setting the Windows environment variable "PENTALOGIX_HOME" to the path of the folder.

- **Components**

1. New command to select and show a component of a given Reference Designator ("Components/Select by Reference Designator").
2. Save a centroid file from loaded component information ("Components/Save Centroid File").

- **Path in Layer Names**

A new option to drop the path part in layer names ("Setup/Drop Path from Layer Names"). During certain import operations the layer names will contain the full path. When this option is checked, the path part is dropped and only the file name is kept.

11.14.35

- **Setting Layer Colors Based on Layer Type**

"Setup/Layer Colors/Set by Layer Type".

Will set the color of loaded layers based on the layer type. There is a default mapping from layer to layer color index but it can be modified using "Setup/Layer Colors/Restore Layer Type Map from File".

The best way to create such a file is to first save the current one, then modify the generated file with a text editor. This is important because the layer type strings in the file are the only allowed values.

The default file looks like this:

```
CopperUpper=10
CopperLower=9
PowerGround=7
Signal=2
Drill=12
Via=15
Rout=4
BoardOutline=4
SilkscreenUpper=14
SilkscreenLower=14
SoldermaskUpper=7
SoldermaskLower=7
SolderpasteUpper=7
SolderpasteLower=7
ComponentUpper=14
ComponentLower=13
```

Note that some of strings refer to a whole set of layer types. For instance "PowerGround" refers to PW1, GD2, P25 etc.

Currently these are the only strings allowed. More can be added if needed in later versions.

The number after the equals sign is the color index in the color list that appears when choosing a color in the user interface. So, for instance, 1 is dark blue in the default setup, 2 is dark green etc.

If the colors are mapped to other RGB values, then the indices refer to the new values.

Once the map is changed, it will be remembered the next time the software starts.

- **Components**

A whole set of operations has been added for dealing with component info. It is in under "Components" in the main menu. There are too many new features to describe here.

Documentation is included in the “Documentation” folder in the installation directory.
Please look for “Components in CAM Software.pdf”.

- **Raster Mode for Compare Layers**

A new mode has been added to the Compare Layers operation. In addition to “Element by element” and “Copper area” there is now a “Raster” mode. In this mode comparison is done by using the raster images of the layers.

The advantage is that this operation is a lot faster.

The disadvantages:

- only one error is reported. This makes this mode useful when comparing two layers that are supposed to be identical and one is interested only in a yes/no answer.
- it may need a lot of memory. If there isn't enough memory available, the comparison will switch to “Copper area” mode.

- **Compare Layers by Name**

A new command has been added “Tools/Compare Layers/Compare by Layer Name”.

This is useful for comparing job data before and after. Both sets of data need to be loaded. Layer pairs with the same name are compared. Only the first error is reported.

This is most useful for checking two versions of the same data that are expected to be identical as far as geometry. It will use Raster Mode, unless the memory needed is too large in which case it will switch to copper area.

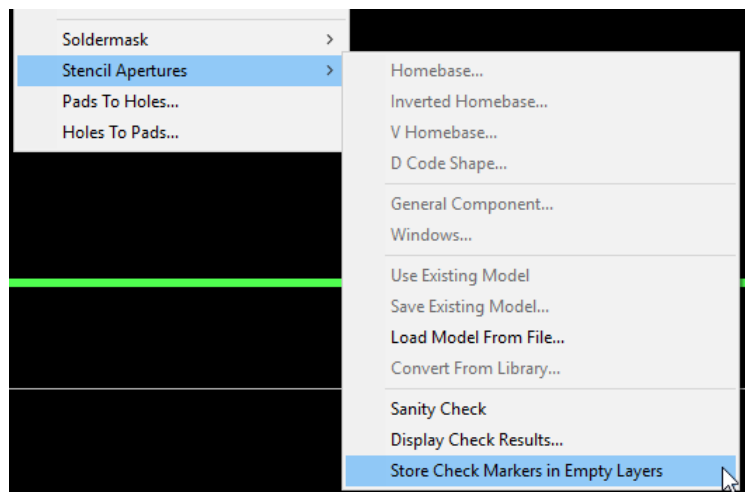
- **Import Directory Improvement**

For directories that have both Gerber files and drill files, the drill file format, if not specified, will be computed to match the Gerber files rather.

11.14.21

- **Stencil Tool Sanity Check**

The error markers can now be stored as pads in empty layers. This allows the errors to be printed if needed. They are stored as “T” shapes, but can later be remapped to any desired shape.



11.14.1

- **Improved ODB++ Import**

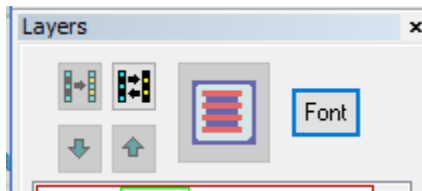
The ODB import module has been rewritten. It now supports ODB++ V8.

The import dialog has a checkbox for using the old (legacy) import module, if needed as a fallback.

- **Text Size in Layers Toolbar**

On high resolution monitors, the text of the Layers Toolbar can be hard to read.

A new font selector button has been added ("Font"). This allows changing the font and the size of the font.



- **Reviewing Markers from a Previous Operation**

"View/Navigate Markers" will bring up again the navigation dialog from the previous operation that generate one, like polygon corrections, layer compare etc. If you modify the data after the operation that the markers applied to, reviewing the markers will still point to the old data locations.

- **Loaded Layer Marker in Layers Toolbar**

The "*" marker for loaded layers has been removed. Users complained that it was hard to differentiate it from the "+" marker (multiple polarities). One can see which layers are loaded by the fact that their color bar is solid.

11.12.54

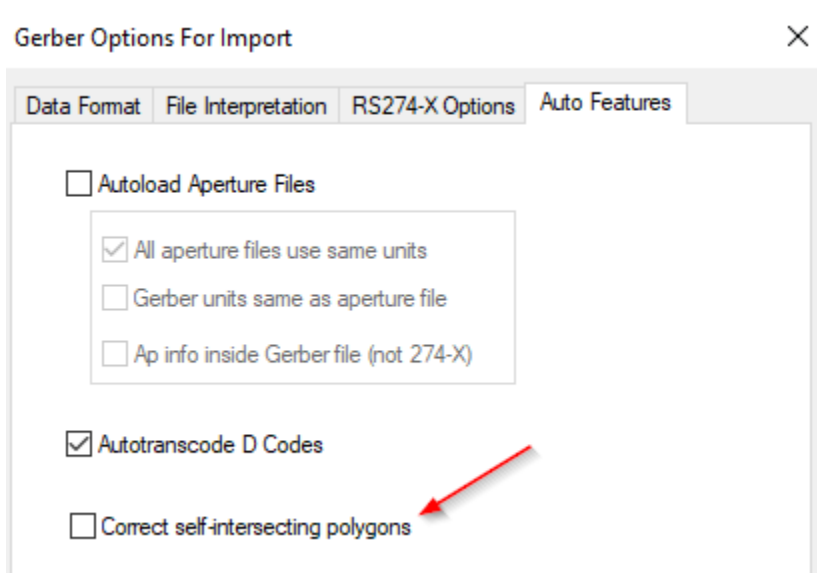
- **Gerber Import – Self-intersecting Polygons**

The handling of self-intersecting polygons has been changed. These are polygons where edges intersect at points which are not endpoints of the edges (this includes overlapping edges).

These polygons are not acceptable according to the Gerber spec.

Previously the user was prompted to auto-correct these polygons.

Now a new options has been added to the Gerber import Options dialog:



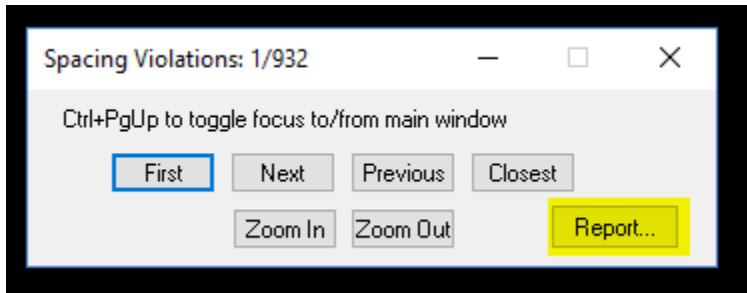
When unchecked, polygons will be left as in the import data (without prompting).

When checked, polygons will be auto-corrected and at the end of the import a dialog will pop up to navigate the places where the corrections took place (only one place per polygons is marked). This allows for a quick visual check to make sure the auto-correction behaved as expected.

Note that if the data is only loaded for viewing, or if one wants to re-export the polygons in the same state, leaving the polygons unchanged is an acceptable option.

- **Report Info**

One can now save a report after certain inspection operations, such as the Stencil Aperture Sanity checks, Layer Compare etc. The navigation dialog has a new button called “Report”:



This will bring up a dialog with the text for all the items which can then be copied and pasted into a file, if needed.

11.12.48

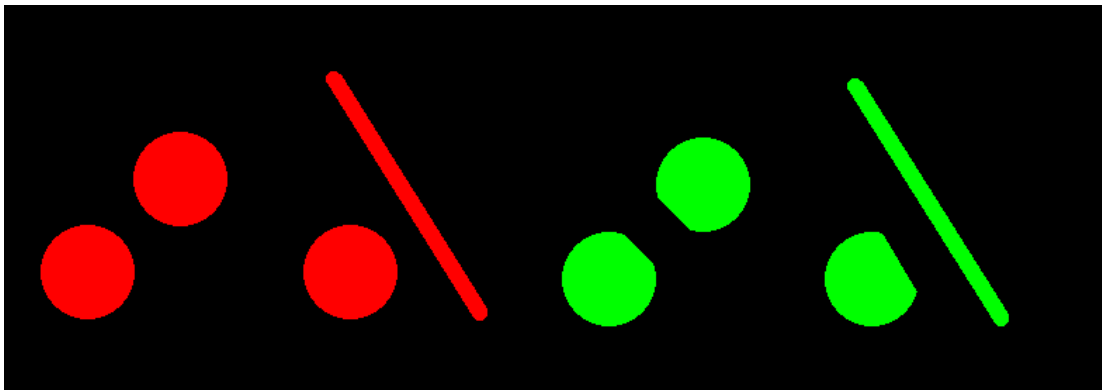
- **New Pad Shave Operation**

In addition to the “Shave Pad Tool” (in “Edit/Shave Pads/Shave Pad Tool”) a new operation has been added that shaves a pair of pads or a pad versus an adjoining trace.

This is “Edit/Shave Pads/Shave Selected”.

For this you need to select two adjoining pads or a pad and a trace and activate this command. You will be prompted for the desired gap between the two. Scratch elements will be inserted to shave the pads to create the desired gap.

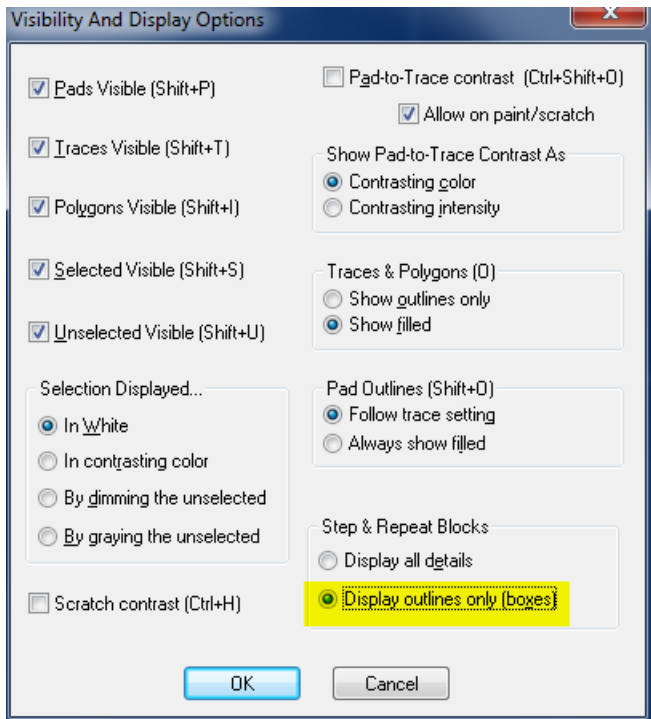
An example of before (red) and after (green) is shown below:



11.12.46

- **Step and Repeat Visualization**

When picking “Display outlines only” in the “Setup/Visibility and Display” dialog:



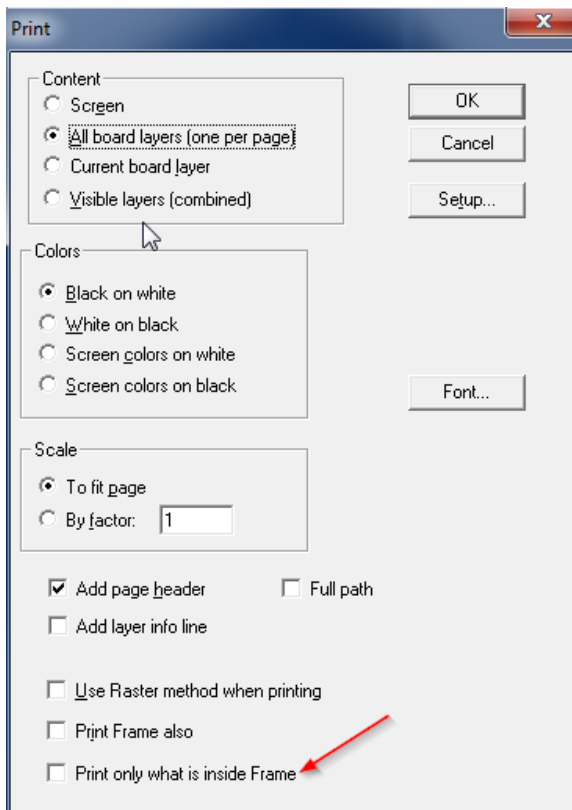
the behavior has changed to display elements in the first step and repeat block. Previously only a box was displayed for this block also. This gives a better idea as to what is step and repeated.

- **Drill Proximity Sort**

An new sort method has been added to start sorting from the upper-left corner.

- **Print Options**

A new option has been added to print only the contents of the frame:

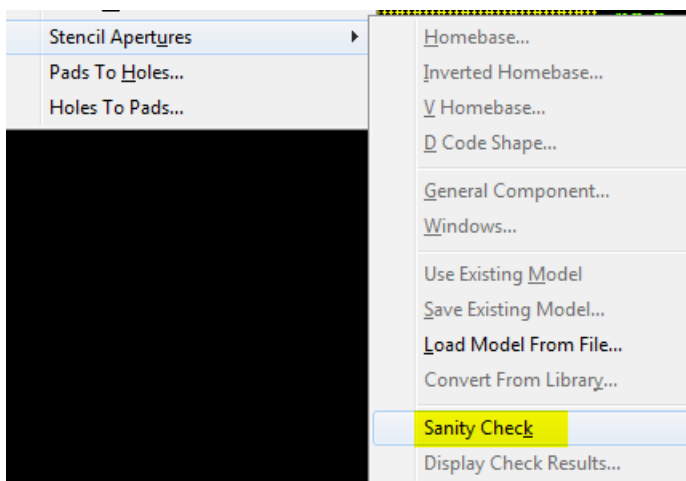


- **Gerber Export**

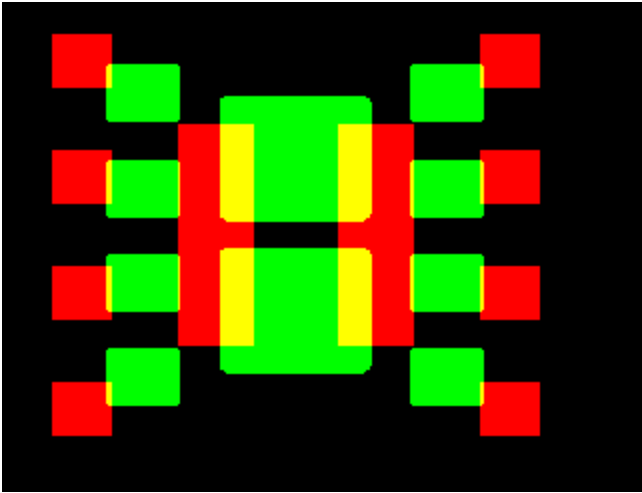
Export of wide arcs has been improved to account for loss of accuracy when exporting at resolutions that are lower than the internal data resolution (.6 English, .5 metric).
It is highly advisable to export at the highest resolution whenever possible.

- **Stencils Sanity Check**

A sanity check has been added to the stencils operations.



One first needs to make visible only two layers: the pads layer and the stencils layer. The check is done comparing the two layers. Elements are flagged which are out of place, like below:



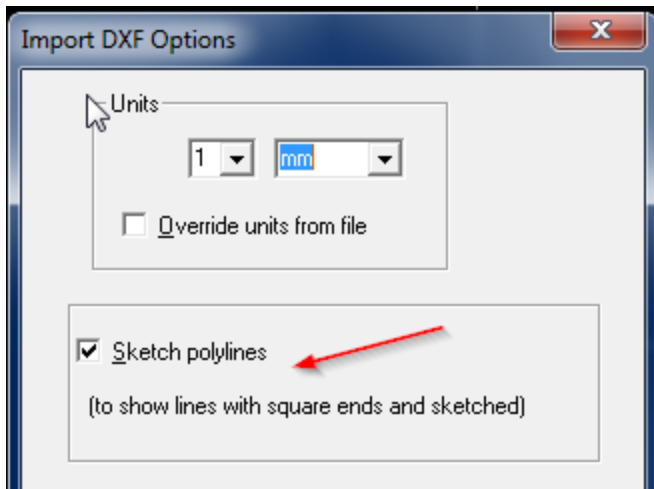
- **3D View**
Scoring layers are now visible in the 3D view (layers of type “SCG”).

11.12.40

- **Generate Images in SVG Format**
SVG stands for Scalable Vector Graphics and is a standard web format. Files with the .svg extension can be opened in Windows by double-clicking on them. They open in a web browser (Internet Explorer, etc.). The new feature is at: ‘File/Print to “.svg” File’. SVG images are useful because they can be scaled while preserving smoothness. In the web browser use the Zoom feature. In the “Layer By Layer” mode, one file is generated for each visible layer and then the collection is zipped, resulting in a .zip file. In the “Combined” mode, the image colors will look different then in the CAM software, because color blending is done differently in SVG.

11.12.37

- **New Option for DXF Import**
DXF files have lines that end with square ends. Sometimes this is the desired way of importing them. When that is the case, the “Sketch polylines” option shown below should be checked.



In most cases, when the lines correspond to circuit traces, this option should be left unchecked.

- **Gerber X2 and Netlist Info**

The new Gerber Extended V2 format (known as X2) can contain netlist info for the data elements (the net name). This is now implemented for import and export. For export you need to pick “X2” format from the “Options” dialog. For import, the netlist data is imported without any extra settings.

11.12.32

- **Import Gerber**

A warning has been added when generating data for a D Code the shape of which is undefined. Most useful for extended Gerber import, when the header does not define all the D Code shapes.

- **3D Viewer Improvement**

F type contours in rout layers are automatically converted to polygons in the drawn image.

11.12.28

- **3D View – Save Image File**

A new command has been added to the “3DView” menu: “Save Image To File”. This will save the 3D image to a file without invoking the 3D viewer. The file can later be opened in the 3D viewer, with “File/Open” or dragging and dropping.

11.12.26

- **Import DXF Improvement**

If the data contains zero-width lines, the user will be prompted with an option to convert the contours to filled polygons.

- **64 bit 3D Viewer**

The 3D Viewer is now a separate install. This way users can choose the 64 bit viewer or the 32 bit viewer. The 64 bit viewer can only be used on 64 bit versions of Windows, but it can display larger boards due to not having memory limitations. Installer can be downloaded from the PentaLogix FTP site.

11.12.22

- **Improved Gerber Extended AM Parsing**
Parenthesized expressions are now allowed.

11.12.18

- **NC Tool Numbers Range**
When importing NC drill and rout data, tool numbers up to T999999 are now accepted. Internally the allowed ranged is still T1 through T255, so tool numbers larger than 255 will be transcoded during import.
- **Larger Toolbar Buttons**
Many of the toolbars have buttons that are difficult to see on high resolution monitors. There are now new buttons in many of the toolbars and their size can be picked by the user ("View/Toolbars/Button Size" or "Setup/Preferences/Toolbar Button Size").

11.12.14

- **New Tool for Organizing Layers**
Can be activated from several places, including "Setup/Layer Organizer" and an icon on the layers toolbar. It makes it easier to organize and identify the individual layers of the loaded data. Pressing the help icon in this add-on gives a complete description of its capabilities.
- **Import .pdf**
"File/Import/PDF As Vector" now imports separate pages of the PDF file into separate layers.
- **3D Viewer Export to .stl Files**
The 3D Viewer can now export .stl (stereo-lithography) file of the image. One file per image entity is exported because the .stl files do not contain color info.
- **New shortcut: Ctrl+Shift+F5**
This is for displaying the NC tools setup dialog. There are two version of it: the legacy and the newer version. One can pick which one is displayed with "Setup/Preferences/Use Old Tool Codes Dialog". Pressing "Shift+F5" will display the one picked by this preference setting. Pressing "Ctrl+Shift+F5" (new shortcut) will display the other one.

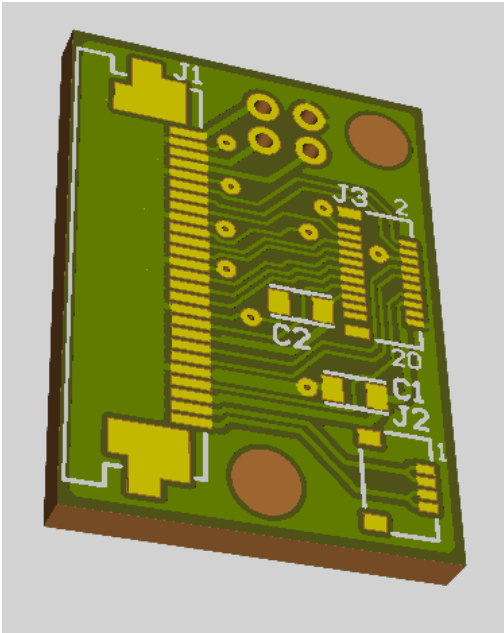
11.12.9

- **Visualizing Scratch Elements**
At times it is hard to see where scratch elements exists on a layer. There is now a quick way to select them in order to see where they are: "Select/Special/Scratch". This works only on active elements, the same way as the selection commands in "Select/Special".
- **3D Viewer Improvements**

11.12.6

- **3D View of Boards**
The menu bar has a new item called "3D View".
This allows starting a 3D viewer of the currently loaded board data. The separate application is a viewer only, the board can be viewed but not modified.

The image data is generated in ViewMate Pro and relies on layers being correctly labeled with layer type. The following layer type will be used to generate the image:
 BOL, CPU, CPL, SKU, SKL, MSU, MSL and DRI.
 At least BOL and CPU must be present in order for an image to be generated.
 The BOL layer (board outline) must contain a valid board outline. Either a set of connected traces or one polygon.
 The viewer uses OpenGL to render. Because of this, it will only work on graphics adapters that support OpenGL and preferably V6.14 or later. Usually updating the graphics card with the latest driver from the card manufacturer or computer manufacturer takes care of this problem.
 A sample view of a simple board is shown below:



11.12.1

- **Toolbars Positioning**

Toolbar positions and docking are now remembered separately for different screen resolutions. This helps users with laptops and docking stations, where resolution can change when docked. Toolbars must be arranged again when resolution changes, but once set positions will be remembered. Another change is that toolbar positions will not need to be reset when a new major version of the software is released.

- **New Stencil Shape**

V shape:



11.10.77

- **New DFM Report Viewer**

New module that allows viewing of DFM reports generated by the PCB Analyzer product, using “live CAM data”. “Tools/EMS Magician/DFM Report Viewer”. For more detailed release notes please read the

viewer release notes found in the installation folder.

- **Convert Circles to Pads**
Some CAD output contains circles (arcs) where pads are intended. This new operation converts them to pads. "Edit/Edit Selection/Special/Convert Circles to Pads". Only full-circle arcs will be converted.

11.10.74

- **Import ODB++**
Support for dynamic text: \$\$JOB, \$\$STEP and \$\$LAYER.
- **Save and Restore DFM parameters**
One can now save sets of parameters to text files. "Custom DFM": "Save Parameters To File" and "Restore Parameters From File".
- **Select Approximate Duplicates**
A new method to select duplicates that are not identical. They can differ by a user specified tolerance. "Select/Special/Approx Duplicate Elements".
- **Contour Netlist Extraction**
Endpoint / midpoint computation has been improved.

11.10.63

- **Gerber X2 - TF.FileFunction Implemented**
The FileFunction attribute for Gerber X2 has been implemented for export and import. When exporting a file set in X2 and importing it using Import/Directory or Import/Zip, the proper layer order is preserved.
- **Gerber X2 – Nested Step and Repeat Implemented**
Both import and export.

11.10.56

- **X and Y Options Added for Drill Serpentine Sort**
In "Tools/Drill". If X is picked the sort will go on the X direction first.
- **Preliminary Support for Exporting Gerber Extended V2**
Option added for V2 export. More exported items will be added later.

11.10.50

- **Import of PDF files**
"File/Import/PDF". Note that only pdf files that have vector content, such as fab drawings, will give good results. One such example is in the Samples folder.

11.10.40

- **Built with Visual Studio 2013. Does not need .Net V2.0 any longer.**

11.10.24

- **This is the last release built with Visual Studio 2008**

11.10.17

- **Tool Codes Setup dialog improvements**
 - The "Swell Drills" operation allows swelling by positive or negative values.
 - A new operation "Merge Tools" allows merging all the tools that have the same type and diameter into one tool. This applies to drill holes as well as routing paths.

11.10.14

- **New selection command for selecting small elements**
"Select/Special/Small Area". Will select element whose area is smaller than the value specified for the user. This is useful for finding very small elements hidden by other elements or just hard to see because of their size

11.10.9

- **Faster User Interface for the Tool Codes Setup dialog**
- **Improved License Activation Dialog**

11.10.1

- **Improved parsing of Gerber files with modal flashes (D03).**

11.8.24

- **Communicator**
Need to tell your customer about a problem with their Gerber, Drill or Stencil data?
Now, you can communicate with your users over email using "Live CAM Data". With ViewMate Communicator, you can create a communication that includes one or more "Live CAM Views".
Turn on the layers you want your customer to see. Mark the location of a problem with the marker. Then click the "Add View" button to save the View. You can add multiple views if you have more than one issue to resolve.
Set up your communication recipients using the "Manage Recipients" dialog. You can even create "Email Groups" that you can recall easily at a later date. Set up one email group to communicate with the engineer or PCB designer. Set up another email group to include the purchasing agent. When you're ready to send your communication, just choose the email group and click the "Send" button. Your communication

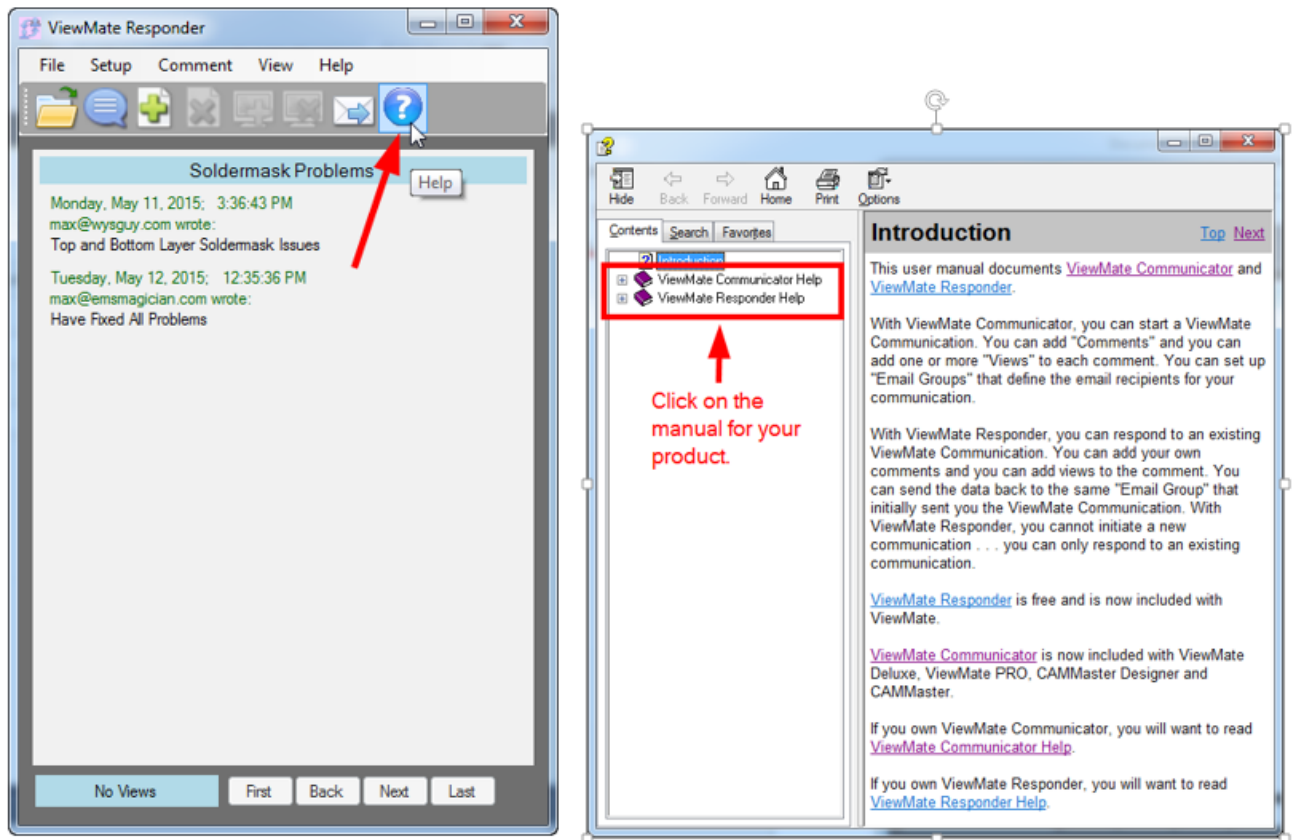
with “Live CAM Data” will be sent to your email recipients.

Your customer can open the ViewMate Communication using ViewMate Responder. This program is included free with ViewMate. Your customer can navigate your views. The data is “Live”, meaning the customer can zoom, pan and even edit the data if needed before sending the communication back to you.

Your customer can create their own views to share information with you.

With ViewMate Responder, you cannot create your own communication or set up email recipients. You can only respond to an existing communication.

The new program is fully documented. Just click on the “Help” toolbar button in Communicator and then click on either the “ViewMate Communicator Help” or “ViewMate Responder Help” link.



Discover an entirely new way to communicate with your customers using ViewMate Communicator with “Live CAM Data”!

Best of all – ViewMate Communicator is included free of charge with any of our CAM editors.

- Improved parsing of Gerber files with modal flashes (D03).

11.8.1

- Improved polygon swelling algorithm

11.6.41

- New Tool Codes Setup dialog (Shift+F5)

With this release, in addition to tool diameter and tool type, you can now set the following drill and rout tool parameters:

1. FEED – This is the “InFeed” of the tool and determines how quickly the tool is plunged into the material. Units are either “in/min” or “m/min”.

2. **SPEED** – This is the tool rotation speed in K-RPM. A value of 100 would mean 100,000 revolutions per minute.
3. **RETRACT** – This is how fast the tool is removed from the material at the end of a cut or a drilling cycle. Units are either “in/min” or “m/min”.
4. **ZOFFSET** – This determines how far the tool is plunged into the material (relative to a reference plane). Units are either “in” or “mm”.
5. **TABLEFEED** – This is how fast the rout tool is moved along the contour of the rout path. Note that this is an optional parameter and only applies for rout tools, not drill tools.
6. **MAXHITS** – Determines how many holes can be drilled with a particular tool before requiring a new tool.

You can save multiple feed and speed profiles and recall them for later use. This allows you to use different profiles based upon layer count, material type, etc. You can also use the built-in Column Organizer to import existing Feed and Speed files (commonly in Excel .csv format).

If your drill file does not contain feed and speed information, you can map the feed and speed parameters by utilizing the loaded “Feed and Speed Profile”. By clicking on the “Find Closest” button, we will search the loaded profile and find the closest tool. The new diameter and all associated feed and speed parameters will be shown in the Tool Codes menu. You can setup your feed and speed profiles to contain only the tool diameters that you stock. This way, you can be assured that a selected tool will be one that you have available.

In addition, you can now automatically swell drill sizes to compensate for drill etch factor. You can set multiple drill etch factor ranges based upon tool diameter.

For comprehensive information about how to use the new Tool Codes menu, you can click on the “Help” button after you launch the new Tool Codes dialog (Shift+F5).

If you prefer to use the old, legacy Tool Setup, you can do that by clicking on “Setup/Preferences/Use Old Tool Codes Dialog”.

- **New Excellon export option**

It is called “Omit m.n” and it can be used to omit the output of the “00.0000” type m.n format in the INCH/METRIC line. This is a newer Excellon format spec and is not recognized by all parsers.

- **New Sieb & Meyer export option**

It is called “Rout tool diameters as negative numbers”. When checked, the diameter for tools that are of type “Rout” will be exported as negative numbers.

11.6.35

- **IPC-356 test points imported**

When importing netlist data, “099” records, if present, will be imported as pads on separate layers. These records were previously ignored.

11.6.26

- **Improved Stencil Pattern Search**

When searching for a model a tolerance of 0.1 mils (or 1 micron in metric) is used. This allows for finding components that are slightly off due to rounding errors.

11.6.18

- **Convert Obround Pads to Traces**

This command will convert all O-type pads (obrounds) to geometrically equivalent traces. “Edit/Edit

Selection/Special/Convert O-type Pads to Traces". This is useful if the destination system does not accept arbitrary shaped pads or when one want to export an N/C file. The traces will be exported as nibbles, whereas obround pads cannot be exported as N/C.

- **Stencil Aperture: Multiple Models**

One can apply multiple stencil models on the selection with the new command "Tools/Stencil Apertures/Convert From Library".

- **Two Types of Stencil Windows Models**

One can now generate windows-type models that apply to all selected rectangular pads or just to pad of a given shape.

- To generate a model that applies to only one shape, select only one rectangular pad. Do "Tools/Stencil Apertures/Windows". The model created this way will apply only to pads of the same dimensions as the selected pad.

- If more than one pad was selected when the windows operations is performed, then the resulting model will apply to any rectangular pad.

11.6.11

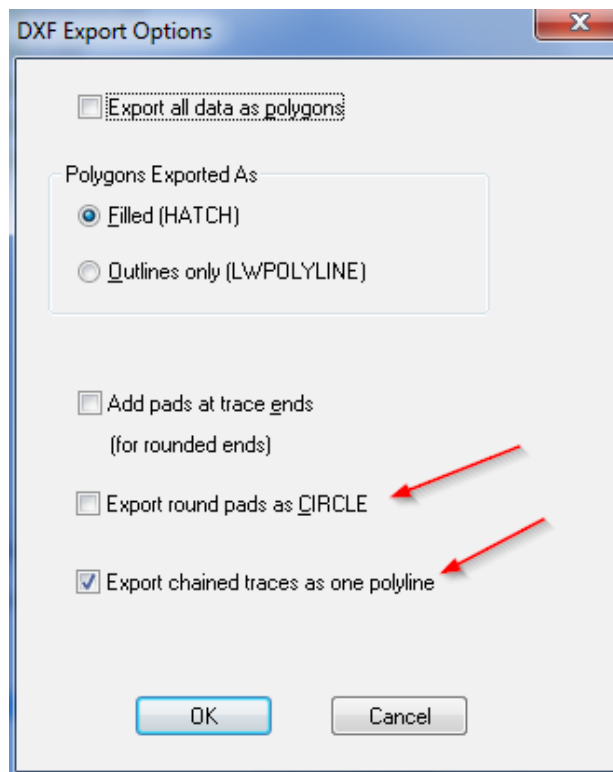
- **Stencil Aperture Libraries**

The stencil module has been improved to allow for saving and reusing aperture models. This is described in an application note:

<ftp://ftp.pentalogix.com/Documents/AppNotes/Stencil/Stencil Libraries.pdf>

- **Improved DXF Export**

Two new export options have been added:



"Export round pads as CIRCLE" will cause round pads to be exported using the DXF CIRCLE entity. This show in AutoCad as a non--filled circle, but it is desirable in certain cases.

"Export chained traces as one polyline" will cause a chains of traces to be exported as one polyline. If unchecked each trace will be exported as a separate polyline.

Chains are groups of traces where one trace's endpoint is the same as the next trace's starting point and all traces have the same width. Export as chains makes editing in AutoCAD easier and also results in a considerably smaller .dxf file.

11.6.0

- **Easier access to endpoint alignment option**

When aligning or selecting traces and polygons there is an options to move the cursor to the endpoint only. Since this is a frequently needed operation, a new button has been added to Selection Toolbar and a new entry in the context menu (mouse right-click).

- **New button to pan up**

A new button has been added in the "Screen" toolbar to supplement the "Next Screen" button. The new button is "Next Screen Up" and it will step in the Y direction, rather than in the X.

11.4.42

- **New Layer Type**

New layer type for stencil layers have been added: STU (Stencil Upper) and STL (Stencil Lower).

11.4.37

- **Gerber Export: New Option for Polygons**

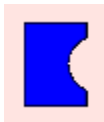
One can choose to export polygons as filled with traces (of a user picked D Code).

- **DXF Export: New Option**

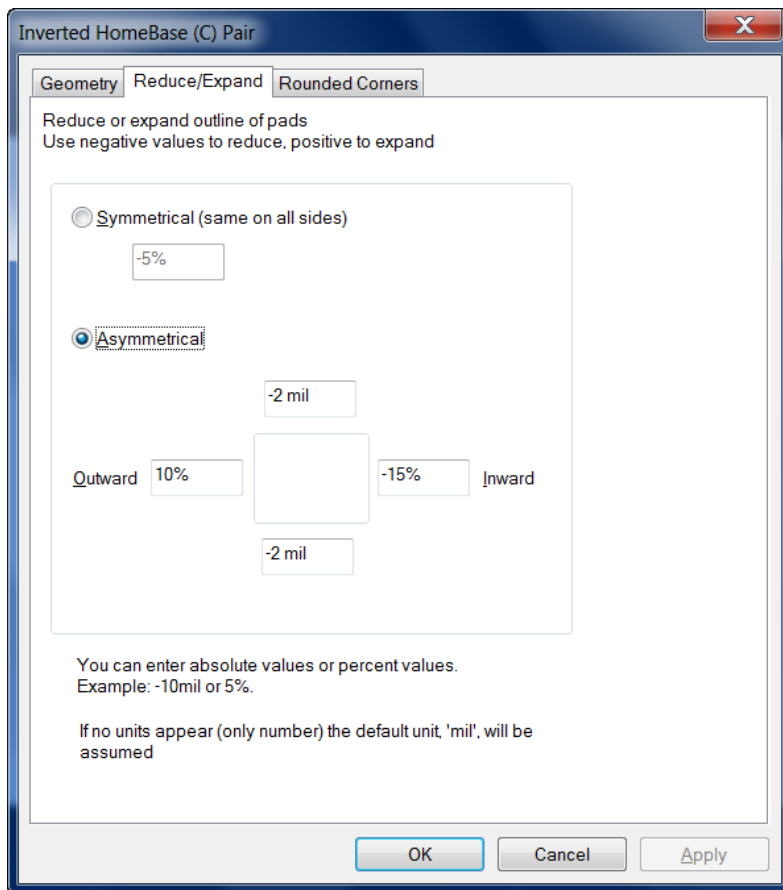
A new option has been added ("Add pads at trace ends") that controls if round pads are added at the ends of traces mapped to round D Codes. If checked, the round pads will be added to make the DXF drawing look like the Gerber image. Otherwise the rounded ends will not be added. This is sometimes useful when the output is used for routing or other tools where the rounding does not matter and may even interfere.

- **Stencil: New Options**

- The "Windows" mode for stencil generation has new options for diagonal splits:
 - crosshatch (this was the only mode before)
 - ascending
 - descending.
- The inverted homebase has a new geometry rule for rounded (called "Simple": straight feet and rounded center). This is only active when "Rounded" is also checked.



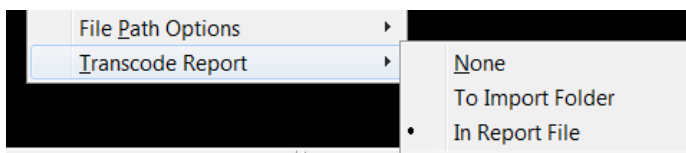
- One can now mix parameters that are given as absolute values and percent, by explicitly entering a percent sign or units. If neither is given, absolute will be assumed in the current units. An example is shown below with mil units for certain parameters and percent values for others.



11.4.29

- **Option for Transcoding Report**

During import (Gerber and others) D Code numbers may need to be transcoded to preserve the specified shape of the D Code. During transcoding a report file is generated. This added option has three choices (available under "File/Import"):



One can:

- disable report to file ("None")
- generate a file called "Transcode Report.txt" in the same folder where the imported file is ("To Import Folder")
- use the file that was picked previously with "File/Report/Set Name" ("In Report File").

- **Gerber Export User Interface**

The two menu entries for exporting Gerber ("Basic Gerber" and "Gerber Extended") have been combined into one. The dialect of Gerber (Extended/Basic) can still be picked from the "Options" dialog.

This change has been made because exporting Basic Gerber is only needed in very rare occasions. Extended Gerber (RS-274X) is almost always the preferred output, since it contains format and shape info.

- **Easier Format Guessing**

The dialog that is shown when one does "File/Import/Guess" (F4) now includes the board size limits to allow for changing them and trying to guess again. Previously one could only set the board size limits on which the guess was based in the "File/Import/Directory/Options" dialog.

- **Turn Off Full Path in Print Header**

A new option has been added to the print options called "Full path". If unchecked, only the filename part of job names or layer names will be printed in the header.

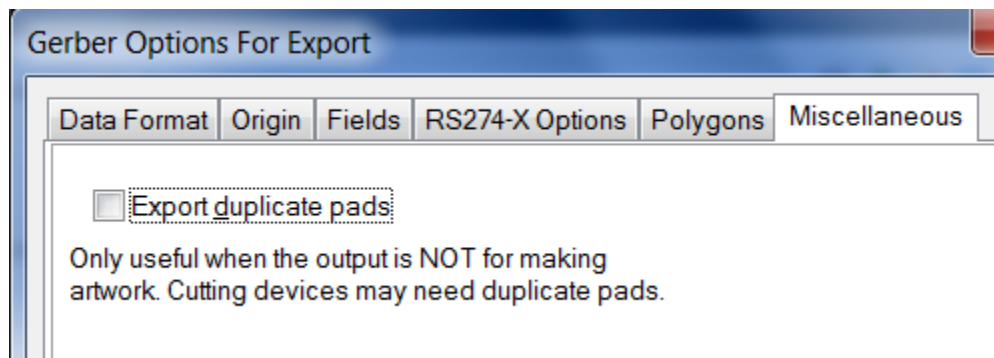
11.4.21

- **Stencil Aperture Generation Improvements**

Obround shapes can now be inflated using the "asymmetric" mode.

- **Option to Export Duplicate Pads**

An option has been added for exporting Gerber files with duplicate pads. These are two or more pads at the same location in the same layer and of the same D Code. Exporting more than one makes no sense when producing circuit artwork, but it is sometime needed for sending the data to certain other NC machines. Unless you specifically need it, leave this option unchecked.



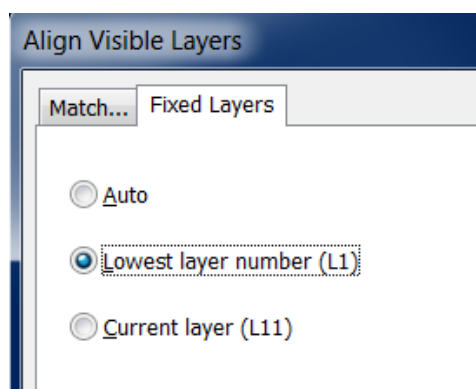
11.4.15

- **ODB++ V7.0 Support**

Rotation of pads (by arbitrary angles) in ODB++ files (introduced in V7.0 of ODB++) is now supported.

- **New Option for Aligning Layers**

"Edit/Move Layers XY Position/Align Visible Layers" (Ctrl+Q) now has a new option tab for allowing the user to select which layers will be moved and which will be left standing during the alignment. There are 3 possibilities:



- 1) "Auto" will work as this command worked before. The software will determine which layers to move and which to keep in place.
- 2) "Lowest layer..." will keep in place the lowest layer number among the visible layers.
- 3) "Current layer" will keep in place the current layer.

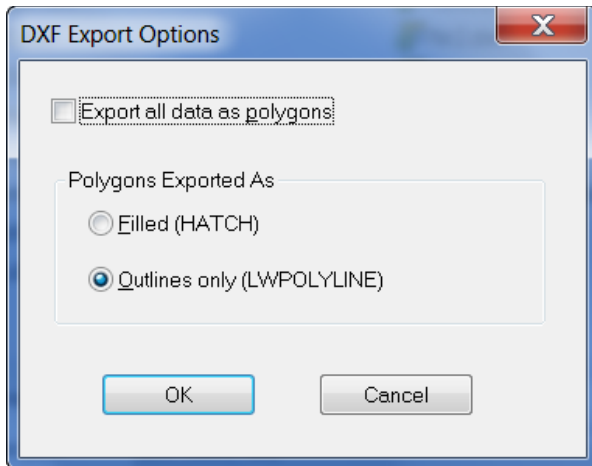
11.4.10

- **Rotated Rectangles for Flash Contours**

"Tools/Convert Drawn Pads/Flash Contours in Selection" now converts rotated rectangles as well. Previously only orthogonal rectangles were detected and converted.

- **DXF Export Options**

An "Options" button has been added to the export DXF dialog. It is shown below:



If "Export all data as polygons" is checked, then all the data (traces, pads etc.) will be converted internally to polygons and then exported as polygons. This usually results in smaller data files, but they may be harder to edit in AutoCad.

The other option controls how the polygons are exported (this applies whether the "Export all data as polygons" was checked or not). The options are filled (using the DXF HATCH entities) or outlined (using DXF LWPOLYLINE entities)

11.4.6

- **Import DXF**

A new options dialog has been added: "File/Import DXF Options". It currently has settings for specifying the units for the DXF file. Previously, the current units in the CAM software were used.

- **Export DXF**

Layers that do not contain scratch elements and are not negative are now exported without converting everything to HATCH entities. POLYLINE and text entities will be used where possible.

- **.bin File Open by Double-Clicking**

A new command has been added to associate or disassociate the ".bin" file extension with this software. It is "Setup/Advanced/Register for .bin files". When checked, one can double-click on a .bin file in Windows Explorer to cause it to open with this software. When unchecked ViewMate Pro does not associate itself

with the .bin extension.

- **New Draw to Flash Operation**

"Tools/Convert Drawn Pads/Flash Contours in Selection" will replace contours drawn with F-type D Codes with pads. Currently only round and rectangular shapes are supported .

- **Layer Info for Printing**

"File/Print" has a new option for adding a line with layer info (layer name, type, etc): "Add layer info line".

11.4.0

- **Import DXF**

One can now import AutoCAD DXF files ("File/Import/DXF").

Some features in DXF are not yet fully supported, but the current implementation should be sufficient to allow import of most PCB related DXF data.

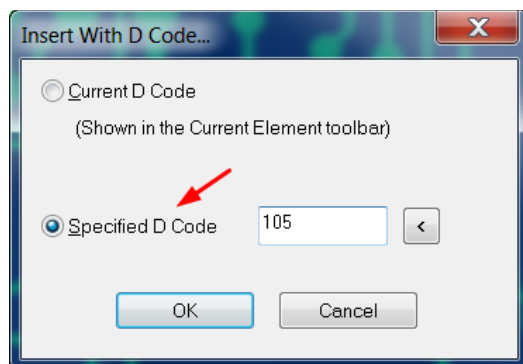
DXF files can contain text in a variety of fonts and our CAM software will map them to the PentaLogix built-in fonts. Because of this, sometimes text spacing will look different than in the original.

More support for unimplemented features will be added in upcoming releases. Please send us .dxf files that do not import correctly for you.

11.2.78

- **Picking D Code for Inserting Elements**

A new user selection has been added to allow picking a specific D Code for inserting elements (pads, traces etc.). Previously newly inserted elements were using the current D Code (from the Current Element toolbar). That is still the default, but the user can now pick a specific D Code for inserting elements.



This is useful when during insert operations the current D Code can change (due to aligning or selection) but the user wants to insert using a specified D Code.

The command to pick this option is under "Insert/Using D Code". This is similar to the existing "Insert/Into Layers".

- **Screen Toolbar Split in Two**

The Screen toolbar has been split into two toolbars, now called **Position** and **Screen**. This is to allow users the choice to turn off one or the other independently. The Position toolbar contains the units, X and Y coordinates and zoom, which are the items more frequently used. Users who don't need the other buttons can now turn the Screen toolbar off and have more room on the screen.

- **Gerber Coordinates with Decimal Point**

"File/Import/Directory" has been improved to recognize Gerber files with coordinates with decimal point

notation. This is not standard Gerber, but such files do exist.

- **New Option for Gerber Import**

The new option is in the "File Interpretation" tab of the options dialog and controls the handling of Gerber blocks without a D command following a tool change (D Code change). An example is shown below:

```
X163830Y76835D01*  
D24*  
X161290Y75565*  
X157480Y76200*
```

The question is how to interpret the block: X161290Y75565*

According to the Gerber spec this should be a move, but some software outputs it expecting that the D command in the previous block should be preserved (D01).

Because of this a new option has been added:

Missing D field after a D Code change

☒ Assume D2 (move)

☐ Keep last encountered D command

It is safest if Gerber files contain a drawing D command in every block (D01, D02 or D03) but this is not always the case.

11.2.74

- **Option for "LN" Directive**

A new option has been added to enable or disable the output of the "LN" (Layer Name) directive in Gerber Extended. It is in the "RS274-X" tab of the export "Options" dialog. Previously the "LN" was written for any layer that was named.

- **Trim Traces Improvement**

"Edit /Trim Selected Traces" now has an additional parameter for clipping. It is a percentage number that allows a user to set the maximum percent of a trace that will be clipped. A maximum length of the clip parameter existed before and it is still present. Only if both are satisfied will a trace be clipped.

11.2.71

- **Check For Updates**

"Help/Check For Updates" will now open in a web browser instead of a child dialog of the application. This allows the application to be closed while the update is being done.

- **Import Directory Improvements**

Better guess for format of drill files.

11.2.64

- **DXF Export**

"File/Export/Autodesk DXF" will export chosen layers in DXF format. One can export layer by layer or combined. Layer by layer will generate one .dxf file for each chosen layer, the file name derived from the layer name. Combined will export all picked layers into one file, but this is of limited utility when several layers are chosen, because the colors are not translucent in DXF. However, this is useful when exporting just one layer when one wants to specify the file name during export.

11.2.60

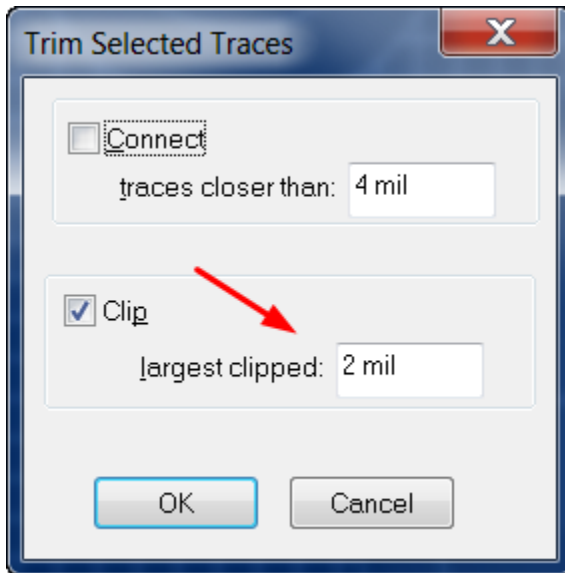
- **Easier Transcoding**

Transcoding groups of D Codes from the "Setup/D Codes" dialog (F5) has been changed ("Operations/Transcode"). The destination range (range of D Code numbers to which the existing D Codes are transcded) does not need to contain a contiguous range of unused D Codes large enough to accomodate the source range. If enough unused D Codes exist in the destination range, the operation will complete. Previously the operation would fail if there was no contiguous range available.

11.2.58:

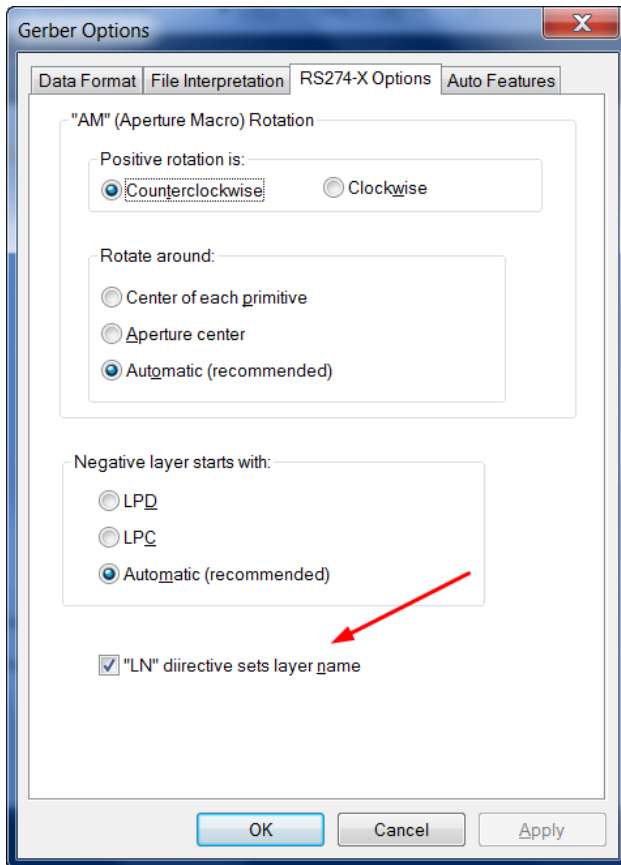
- **New Parameter for Trimming Traces**

A new parameter has been introduced for clipping selected traces. This specifies a maximum length. If the clipped portion would exceed this length the trace is not clipped:



- **Support for Gerber Extended "LN" Directive**

A new option has been added for importing Gerber Extended data :



When the "LN" option is checked, the string that appears in the "LN" directive (Layer Name) in Gerber Extended files will set the name of the layer in the CAM software.

11.2.56:

- **Smart DFM Improvements**

The algorithms used to check for violations have been improved.

11.2.52:

- **New Gerber Export Option**

A new option has been added to the Gerber export dialog. This is to control the data output at the end of a plot. Traditionally a plot ends with "X0Y0D02*M02*", but certain devices have problems with the "X0Y0D02" part. An option has been added to specify if it should be output or not. It is in the "Fields" tab of the options dialog and it is called "X0Y0D02 before end of plot".

- **Selecting Traces By Aperture Size**

"Select/Special/Wide Traces" and "Select/Special/Narrow Traces" have been added. This works similar to the existing "Large Pads" and "Small Pads" commands. They will select traces based on the diameter of their D Code. Selection is only among active elements (taking into account the other filters, if any).

11.2.43:

- **Printing on White Background**

The "Screen colors on white" has been improved to print the exact colors visible on the screen. The "Use Raster method when printing" checkmark must be checked for this to work. This is useful when one

wants the printed image to have the same colors as the screen but one wants to save ink and not print the black background.

- **Selecting Small Pads**
A command has been added for selecting active pads mapped to D Codes with at least one dimension smaller than a user specified value. The command is "Select/Special/Small Pads". It takes into account the selection filters as well, except for the D Code filter (it always checks all D Codes). If for instance one wants to select only small round pads, one can pick the "Shape C" filter item in the Selection Toolbar.
- **Polygons Filter Shortcut**
A new shortcut has been added for using polygons as the selection filter: "Ctrl+Shift+Y". This applies to the filter box in the Selection Toolbar.
- **New Selection Filters**
The filter combobox that appears in the Selection Toolbar (and other dialogs) now has several new added items: "Plated Holes", "Non-plated Holes" and "Via Holes". This restricts selection and operations that work on active elements to just pads of type "N" and mapped to holes of the specified type.
- **D Code Layer Usage Report**
"File/Report/Generate" will now also show on what layers each D Codes is used.

11.2.31:

- **Turn On and Off a Range of Layers (Visibility)**
A new way of changing the visibility of a range of layers has been added to the layers toolbar. To turn ON a range of layers click on the first and Shift+double-click on the last in the range. Similarly to turn OFF a range of layers click on the first and Ctrl+double-click on the last.
- **Stretch Traces Orthogonally**
A new option has been added to allow only orthogonal (horizontal, vertical or at 45 degrees) stretch of straight traces: "Edit/Orthogonal Stretch Only".
- **Paint and Scratch Optimize for Layer**
A command has been added to the right-click menu in the layers toolbar: "Paint and Scratch/Optimize". This will attempt to minimize the number of paint to scratch transitions on a layer by merging groups that do not interfere and adding scratch polygons as holes to containing paint polygons.
- **Guessing Layer Types**
A command has been added to the right-click menu in the Layers Setup (F10) dialog: "Guess layer types from name". It will attempt to determine the type of a layer ("CPU", "CPL" etc.) from the layer name and extension using CAD software standard naming conventions.
- **Select Dangling Traces**
A new command has been added for selecting dangling traces ("Select/Special/Dangling Traces"). This command will look only at active traces, so all the filters and "Only" check marks are taken into account. A dangling trace is a trace which has at least one uncovered endpoint. Normally trace endpoints are covered either by a pad or another trace. If that is not the case, it is usually a problem on circuit layers. One can specify areas to exclude from the check using exclusion zones ("Setup/Exclusion Zones/Insert").
- **Break Intersecting Traces**
This new command ("Edit/Break Intersecting Traces") works on the selected traces (linear or arc) and

breaks traces that intersect at points other than the endpoints of the traces. Such traces are replaced with the resulting fragments.

11.2.26:

- **Smart DFM Improvements**

New methods to correct errors in the data have been added. One can now clip to the board outline elements that cross from inside of the outline to the outside. This happens often on the silkscreen layers. The quote phase now brings up the web browser in a separate window, making it easier to navigate the quoting website.

- **Distance to outside edges**

The edge-to-edge measurement tool (right mouse click - "Edge To Edge Measurement Tool") now displays the distance to the outside edges of the two picked elements, in addition to the distance to the inside edges.

11.2.22:

- **View Layers where a D Code appears**

A new command has been added to the "Setup/D Codes" (F5) dialog that will display the list of layers that contain the D Codes currently picked in the dialog. The name of the new menu command is "Layers".

New features 11.2.8:

- **Excellon Format 1 Import**

An option has been added to the "Options" dialog for "File/Import/Drill & Rout" to allow setting either Format 1 or Format 2 as the format of the data to be imported. This is important when the Excellon file does not contain a FMAT statement because Format 1 and Format 2 commands have different meanings. Previously Format 2 was assumed as the default.

New features 11.2.1:

- **Editing Layer Names**

New commands have been added to the context menu (mouse right-click) in the "Setup/Layers" dialog (F10): "Load layer names from file" and "Store layer names to file". These allow saving the layer names to an ASCII text file and also loading the layers names from a file. This can be useful in several ways:

- To load the names from a fixed template of layers names
- To edit the names when a large number of names need to be changed. To do this, one can do the following: save the current name to a temporary text file, edit the file with notepad or other text editor that allows for group replace operations, finally reload the names from the just edited file.

- **Converting Pads to NC Holes**

There are cases where there is no input drill file, but there is a Gerber or other circuit data pad master. A new tool has been added to convert such layers to NC layers that can be exported as drill data. The new command is "Tools/Pads To Holes".

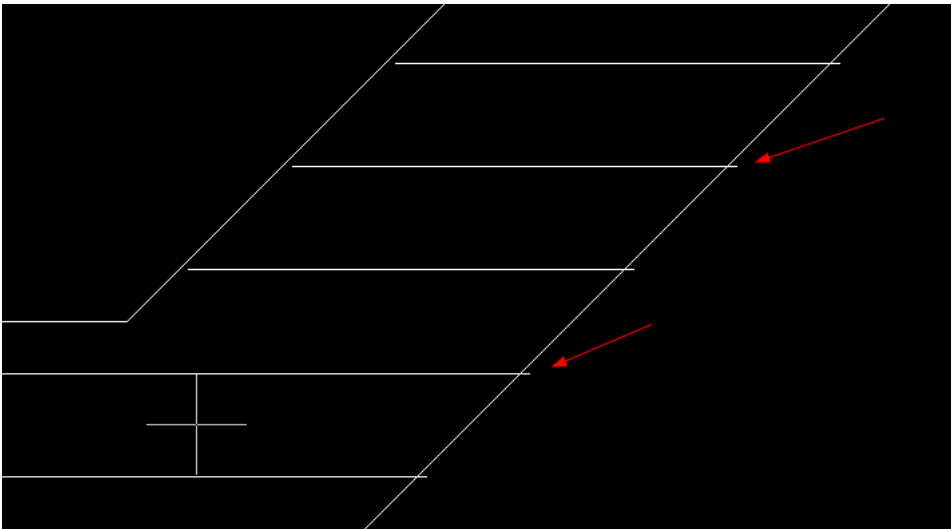
In the layers picked by the users it will transcode any elements mapped to a D Code of shape "C" to a new D Code of type "N" (NC hole). These elements can later be used to generate drill files, to extract netlists or to use in Smart DFM. This command transcodes traces as well, although that is generally less useful. Only visible elements will be transcoded.

New features 11.0.80:

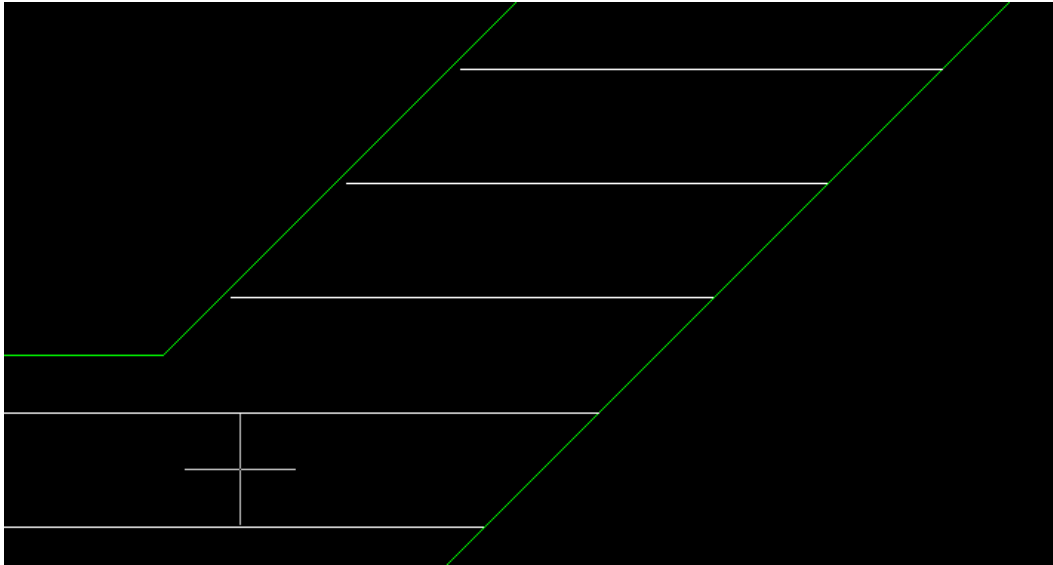
- **US QuickTurn PCBs**
New Smart DFM rule set and prices for quick turn (one day or more) PCBs made in the USA.
- **Improved Copy and Paste**
The "Edit/Copy" (Ctrl+C) and "Edit/Paste" (Ctrl+V) commands now use as reference point the position of the cursor when the copy command is performed. Previously the lower-left corner of the bounding box of the selected elements was the reference point.

New features 11.0.74:

- **Improvement In Trim Selected Traces**
The "Clip" operation of "Edit/Trim Selected Traces" has been improved. It now clips traces extending by small amounts over another trace even at points that are not close to the endpoints of the other trace. Previously the clipping was done only for situations where traces intersected close to their endpoints. This new method is useful to clean up inaccurate polygon fills, such as the one shown in the image that follows:



The above image is shown at zero-width to expose the nature of the fill. After the trim operation, the result will look as shown in the next image:



New features 11.0.71:

- **Tool For Panelizing**

A new command has been added: "Edit/Layers Stackup/Combine By Board Number". This command operates on all visible layers and, if several layers have the same board layer number, it will combine those layers into one (merging into the first layer with that board layer number). Although this is a general purpose command that can be used for other purposes also, its main use is to facilitate panelizing two (or more) different jobs.

The jobs are usually on separate sets of layers but one wants to combine them into a set of panel layers.

For this one can apply the following steps:

1. Place the second set of layers at the desired X and Y location by using one of the move commands..
2. Set the board layer numbers for each layer in the second set so it matches the board layer numbers in the first set. This can be done in the "Setup/Layers" dialog.
3. Execute the "Combine By Board Number" command.

- **New Global Selection Filter**

A new filter has been added for selecting only paint elements (ignoring scratch elements). It is called "Paint Elements". Previously there was only a filter for selecting "Scratch Elements".

New features 11.0.59:

- **Feedback during Move and Copy**

For operations that move or copy the selection the cursor will drag a box representing the limits of the selection (to provide feedback to the user). These operations are: "Edit/Edit Selection/Move", "Edit/Edit Selection/Copy" as well as "Edit/Copy" and "Edit/Cut".

- **Shaving Pads**

A new command has been added which activates a tool for shaving pads ("Edit/Shave Pads"). It is a two step operation: first click on the pad to shave, then click at the edge of the desired shave (inside the pad). The width of the shave can also be typed while in the second step by pressing "X". This tool is useful for correcting occasional DRC/DFM errors, such as encountered during Smart DFM.

- **Including the Frame in Printed Output**

An option has been added to the printing dialog to include the frame in the printed image. It is "Print Frame also".

New features 11.0.47:

- **Export of Excellon Format 1**

An option has been added to allow selection of Format 1 or Format 2 export of Excellon files. Previously data was exported in Format 2 only.

New features 11.0.42:

- **Large Offsets in Gerber and Drill Files**

There are files where all the data is offset by a very large amount which violates the CAM data limits of 1000 inches (or 10m in metric). Now such data can be imported. One needs to use "File/Import/Guess" ("F4") or "File/Import/Directory" for this purpose.

New features 11.0.28:

- **Check My Design**

A new button has been added which allows the user to email to PentaLogix the data currently loaded. This is intended primarily as a way to help users who have trouble with correcting errors found in Smart DFM, but can be used for any purpose when users want help from PentaLogix.

New features 11.0.22:

- **Printing in Screen Colors**

A new method has been added to the "File/Print" dialog: "Screen colors". This will print the image the same way it is displayed on the screen. Since the background of the image is black, this will waste a lot of ink when printing to paper, but it is useful when printing to files, such as PDF files.

New features 11.0.9:

- **Quick Way to Insert Round Polygons**

A new tool is available to insert round polygons It is "Insert/Circle/Polygon" and there is also a button for it on the "Insert" toolbar (shown as a filled circle). The operation takes two clicks: one for the center of the circle, the other for a point on the circumference.

When the goal of the operation is to insert round pads, the "Insert/Pads" tool is preferable, but the insert round polygon can be useful when making corrections (filling in areas or scratching away unwanted copper).

New features 11.0.1:

- **Online Ordering of PCB Boards**

A new online quote and order module has been added (with "Smart DFM"). It is activated via the "Quote" menu command after the data for a one-up is loaded.

The quote module will step the user through a complete setup and preparation of the board data to be ready to send to a manufacturer. The data is checked against the DFM rules of the manufacturer(s) and any errors are displayed. The user can manually correct them or use many of the automatic corrections provided. At the end of the process, an online quote can be requested and, if desired, an online order placed.

The user is thus assured that the board will be manufactured without any further changes needed at the manufacturer side and without delays. The pricing is also very competitive as the manufacturer receives “clean data” that matches their DFM rules.

- **New Tool for Selecting a Set of Connected Elements**

“Select/Connected” is a new tool that allows selecting elements that are connected (touch or overlap).

Once the tool is activated one can click close to an element and that element and all elements in that layer which are connected to it (either directly or indirectly via other connecting elements) are selected. This command works only on visible elements and ignores scratch elements.

Possible uses for this command:

- To generate a board outline. One can click next to one element in the board outline and all connected elements will be selected. This is most useful when traces in the outline do not line up perfectly on top of each other (they intersect or overlap). If one wants to generate a “correct” outline after such a selection is made, the “Edit/Trim Selected Traces” command can be used.
- To check netlist connectivity. This is not really a netlist, because it only works on one layer and ignores scratch elements, but it can be helpful in the case simple designs.

- **Automatic Alignment of Drill Layers**

A new command (“Edit/Move Layers XY Position/Auto-Align Drill Layer”) aligns the drill layer (of type DRI or PTH) to a component layer (CPU or CPL). It will attempt the alignment by trying to match all plated holes in the drill layer to pads in the component layer. Each hole needs to be matched for this operation to succeed, so the component layer needs to have at least as many pads as the drill layer. Only visible elements are considered.

New features 10.6.71:

- **A Quick Way To Insert A Rectangular Polygon**

“Insert/Rectangle/Polygon” will insert a rectangular polygon. The user can pick the two corners of the rectangle. This can be used as a quick way to make corrections to a design by filling in (inserting a paint polygon) or deleting (inserting a scratch polygon).

- **Order of 90-degree Trace Pair**

When inserting 90-degree trace pairs (“Insert/Special Linear Trace/90 Degree Trace Pair”) one can toggle the orientation of the first trace with the Shift key. Previously the first trace was always horizontal.

- **Dimensioning Improvement**

When inserting orthogonal (horizontal or vertical) dimensions (“Insert/Dimension”), the choice between horizontal and vertical is now made from the location of the third picked point (for the text position). Previously this was determined from the endpoints of the measurement (the first two picked points).

- **Export Warning for Small Apertures**

A warning will be generated when exporting Gerber 274X files with apertures smaller than a user specified value. This option can be turned on or off in the export “Options” dialog. It replaces the warning for exporting zero-width apertures (one can still get it by setting the “smaller than” aperture dimension to 0).

New features 10.6.50:

- **Layer Names Shown in Layers Toolbar**

The Layers Toolbar (“View/Toolbars/Layers”) now shows the layer names also in addition to the layer

number and color. The name appears to right of the color box, so one needs to widen the toolbar to show as much of the layer names part as desired.

One can widen the layers toolbar by dragging the right edge with the mouse. Once set to a new width that width will be remembered. It is a user preference as to how much screen space one wants to give up to display layer names.

- **Showing Scratch Elements in Contrasting Color**

There is a new command to set the display mode so that it shows scratch elements as paint in a contrasting color. This is sometimes useful when trying to understand the paint-scratch setup of a layer. Note that this works only on combined (mixed-polarity) layers and not on whole layers that are marked as scratch.

The shortcut to toggle the mode is “Ctrl+H” and the command can also be found in the “Setup/Visibility and Display” as “Scratch contrast”.

- **Inserting Arc Chamfers of Given Radius**

A new command has been added to allow inserting arc chamfers of a fixed radius, specified by the user: “Insert/Chamfer of Radius”. The chamfer is added at the joining point of two linear traces. After the tool is activated, the user needs to click close to this joining point and an arc chamfer is inserted.

New features 10.6.34:

- **Marking a Midpoint**

A new tool to insert a marker at the midpoint between two points picked by the user. These two points are usually picked by aligning to elements, but the tool is general purpose. It is activated with “Go/Mark Midpoint”. It stays active until canceled. Useful for creating reference points when constructing complex geometries.

New features 10.6.0:

- **New Method for Correcting Self-Intersecting Polygons**

When the input data contains self-intersecting polygons, they need to be corrected so that they can be used in later steps of the CAM process. This correction can happen when the data is imported (the user is prompted for doing the correction during the import) or can be done later on selected polygons (with “Edit/Edit Selection/Polygons/Make Well Formed”). This existed already in previous versions of the software. This version adds a new correction method. There are now two methods available, which can be picked by the user via the command “Setup/Self-intersecting Polygon Correction”. These two methods are called:

- Even-odd method
- Non-zero fill method

It is easiest to understand what they mean by looking at the images in the dialog used to pick the method. The most common method (and the only one previously available) is the “even-odd method”. However, some software packages generate polygons that need to be corrected using the “non-zero fill method”.

- **New Command to Select Electrically Connected Elements**

This command is a selection tool. Once active, one can click on an element and all elements that are electrically connected to it, through all layers, are selected. The command to activate the tool is “Tools/Netlist/Select Electrically Connected Elements”. When first activated, it will extract the netlist information for the currently loaded job. All conductive layers will be considered, whether visible or not at the time the tool is activated. This means layers of type SIG, CPU, CPL, all power and ground layers, DRI, PAD, PTH, VIA and VID. If you have other layers that should not be considered in the computation, you should make sure that they have a different type. If they are “work layers”, map them to OTH or

NFL.

Once the netlist info is extracted, the tool can be used repeatedly until modifications are made to the database, when the netlist will again be extracted (automatically) to match the changes made.

To make it easier to select elements, board layers that are negative or of mixed polarity (paint and scratch) will be converted to polygons while this tool is active. They will be restored to their previous state after the tool is deactivated.

An application note describing this command in more detail is at: [ftp://ftp.pentalogix.com/Documents/AppNotes/Select Connected Copper.pdf](http://ftp.pentalogix.com/Documents/AppNotes/Select Connected Copper.pdf).

- **Raster DRC**

There are now two methods of DRC: vector DRC (previously the only method available) and raster DRC. Raster DRC can process data with polygons, paint and scratch and custom shapes, but accuracy depends on the raster resolution set by the user. The finer the resolution, the more accurate the results.

- **Comparing Groups of Layers**

The command “Tools/Compare Layers/Find Differences” can now compare two groups of layers (layer by layer). Each layer in the first group is compared against a corresponding layer in the second group. This makes it easier to compare different versions of the same job. If you need to compare two jobs (or two sets of layers) and want the dialog to be set up automatically with the proper ranges, load the first job then leave one or more blank layers and finally load (import) the second job after the blank layer(s). The layer compare dialog will be set up so that the two ranges to compare will show correctly.

One can still compare just two layers at a time, like in the past. One can also manually enter the layers to compare into the dialog boxes. Note that only visible layers will be compared.

- **Net Midpoint Info**

The command “View/Info/Elements Overlapping Cursor” (also available in the context menu – mouse right click over the view) will now also show the midpoint/endpoint state of a pad (if net info is present in the job). This facilitates checking the midpoint/endpoint state in a layer stackup at a given point.

- **Polarity Combine / Separate Improvements**

The operation of the commands which separate layers of mixed polarity or combine layers (“Edit/Paint and Scratch”) has been improved. The layer stackup of layers which are not involved in the operation is preserved. Previously, empty layers were eliminated during “Combine All”.

Undo has been added to all the operations in this group.

New features 10.4.31:

- **Deleting Holes from D Code Shapes**

A new command has been added to the “Setup/D Codes” (F5) dialog. It is “Operations/Remove Holes”. It will remove holes from all D Codes which have holes. This includes standard shapes with holes, like C (an annular ring), and custom shapes also (M). The operation works on the D Code (or D Codes) selected in the dialog (shown in blue background).

- **Drill Path Sorting and Viewing**

New commands have been added for viewing the path (order of holes) of drill holes in a drill layer and for sorting the holes.

“Tools/Drill/Show Path” will display the path, given the current order of the holes. A dialog is displayed that allows navigating the path.

“Tools/Drill/Proximity Sort” and “Tools/Drill/Serpentine Sort” will sort the holes according to two sorting methods.

- “Proximity Sort” will start from the lower left corner of each tool area and then continue to the next

closest hole until all the holes of that tool are visited.

- “Serpentine Sort” will sort in a serpentine fashion (in bands or strips).

Usually “Proximity Sort” will generate a better result, but this is not guaranteed.

Notes on drill holes order: sorting is best done just before exporting the drill files, because the order can be disturbed by later editing operations and even by selecting and deselecting elements.

To specify first and last holes for a tool number the recommended method is to separate the drill holes into adjacent layers and then export with the “Combined” method.

For instance, if one has holes for tools T1 and T2 in layers 1, 2 and 3, when exporting the three layers together as “Combined” the order would be:

holes of tool number T1 from layer 1, then T1 from layer 2, then T1 from layer 3, followed by T2 from layer 1, then T2 from layer 2 and finally T2 from layer 3. This way has the additional advantage that one can easily see the order of holes via the layer colors.

If there are routing paths in the layers exported they will be exported after the drill data. The only exception is when exporting “Combined”. Then one can have routing paths in layers preceding any layers with drill data and these will be output first.

- **New Tool Type**

For NC tools (D Codes of shape “N” and “Setup/Tool Codes”). The tool type is “**Rout**”. It is intended to be used for routing paths, to differentiate from other tool types. The other types are: “Plated”, “Non-plated”, “Tooling”, “Via” and “?”. Note that .bin files containing such tool types cannot be opened by older versions of the software.

- **More Components Information**

A new command has been added to display component related text, when such information is available. It is “View/Info/Components Text”. Currently this information is extracted when importing ODB++ files (if they contain components information).

- **Dragging the view**

The view can be dragged by holding the mouse left button down and dragging. This has been available for some time in our software but required holding down the Ctrl and Alt keys while dragging. We have now changed the code so one can drag without Ctrl and Alt being pressed. This will work only if no command-tool is active, such as Select or others. If a command-tool is active then pressing the left mouse button will activate the command and to drag one needs Ctrl and Alt pressed. Note also that if you want the view to be dragged in real time, you need to enable it with “Setup/Preferences/Draw View In Real Time”, otherwise the view will only be updated at the end of the drag. When there is a lot of data in the current job dragging in real time may cause flickering because it takes longer to redraw each intermediate step.

- **Improved ODB import**

More support for new features in ODB++ V7.0.

New features 10.4.0:

- **Copy, Cut and Paste**

The standard Window commands for copy, cut and paste have been implemented, with the usual shortcut keys: Ctrl+C, Ctrl+X and Ctrl+V. They are in the “Edit” menu and have buttons in the main toolbar.

Copy and cut work on the selection, so one first needs to select elements. They both copy the selection to the Windows clipboard and cut also deletes the selection (similar to “Edit/Edit Selection/Delete”). Later on, the clipboard data can be pasted (into the same program or another instance of this program or another PentaLogix CAM package). The data will be pasted into the same layers where it was originally, but the location (X, Y) can be different. The rule is that the position of the cursor over the selection when the

copy was done (copy or cut) will match the position of the cursor when the paste is done. So a cut and paste can be used to move selected data from one (X, Y) location to another: select, position cursor, cut, move cursor, paste.

- **Pasting CAM Images Into Documents**

The current view can be copied to the Windows clipboard using “View/Copy View To Clipboard”. The resulting image can then be pasted in a variety of documents, such as a Word file, an email etc. without needing a screen capture program.

- **Button Names for “Favorite Commands” Toolbar**

Buttons in the Favorite Commands toolbar can now be given names in addition to mapping them to bitmap images. After right-clicking on the button, the new option is called “Change Text”. Another new feature of the Favorite Commands toolbar is that the first nine buttons can be activated with shortcuts: Alt+1 through Alt+9. And finally, the button sizes have been increased from 16 by 16 pixels to 24 by 24 pixels to make it easier to generate bitmap images for the buttons.

New features 10.2.71:

- **Toolbar for Favorite Commands**

“View/Toolbars/Favorite Commands” displays a customizable toolbar for favorite commands. This is useful for often used commands which are nested deep in the menu structure and can be accessed quicker this way. The toolbar is described in more detail in the document: “Favorite Commands Toolbar.pdf”. Look for it in the installation folder or on our FTP site (<ftp.pentalogix.com/Documents/AppNotes>).

New features 10.2.45:

- **Easy Way to Navigate Selected Elements**

A new command (“Select/Navigate Selection”) has been added to allow for easy navigation of the currently selected elements. It brings up a dialog with the usual “Next” and “Previous” buttons that allow for easily stepping over all selected elements.

Note that if one changes the selection while the navigation dialog is shown, the new selection will not be reflected in the dialog (one needs to close and reopen the dialog).

- **Finding Intersecting Traces**

A new command to select traces that intersect at points which are not their endpoints (traces which cross). The command is “Select/Intersecting Traces”. Only active elements will be considered, so the “Only” checkmarks etc. will be taken into account. This command is useful as a DRC check.

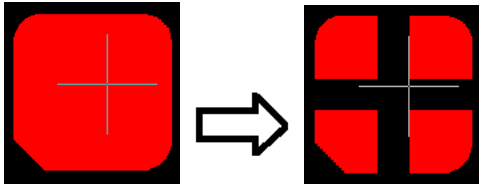
- **Shortcut for Selecting Crossing Elements**

A new shortcut has been added for toggling the selection of elements which cross the frame. This shortcut is “Ctrl+Shift+S”. The button is in the Selection toolbar.

- **Stencil Improvements**

The stencil module (“Tools/Stencil Apertures”) now works on all pad shapes, not only rectangles (except for the homebase, which can only be applied to pairs of rectangular pads).

An example for “Windows” is shown below:



New features 10.2.18:

- **“Edit/Edit Selection/Polygons/F To Polygons”**

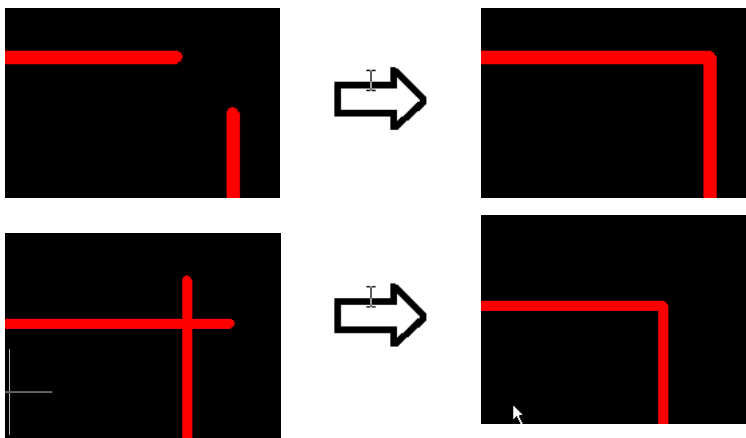
A new user option has been added “Path can continue at overlap”. If checked, will enable special processing of overlapping traces, so that a contour can continue at vertices where traces overlap. If not checked, will force contours to use the traces as they are.

New features 10.2.0:

- **New Commands For Trimming Traces**

These are commands for correcting pairs of traces that either are close to each other at endpoints (but do not connect) or overlap slightly at endpoints. These situations sometimes arise because of rounding errors in the CAD output or inexact manual insertion of traces.

The two types of problems (“Connect” and “Clip”) and their corrections are illustrated below:



These problems can be corrected in one of the following ways:

- by picking the two traces (with a mouse click or the Enter key). This is “Edit/Trim Traces” and acts as a tool (it stays active until the user cancels it).
- by first selecting all the traces that one wants to correct and then issuing the command “Edit/Trim Selected Traces”. A dialog comes up to allow the user to specify which operation is to be done: “Connect”, “Clip” or both and a parameter which determines how far apart the endpoints can be for connecting.

There is a button for the tool version of the command in the “Edit” toolbar.

Both linear and arc traces can be trimmed.

- **Converting Negative Layers To Positive**

Negative layers can now be converted to positive by using paint and scratch. A paint polygon (or several paint polygons) will be inserted before all data to represent the background copper and then the polarity of elements in the original negative layer will be changed so that the result looks the same.

If the data on the negative layer contains the board outline, it will be used to generate the background copper polygons. Otherwise the frame will be used for this purpose, so it needs to be positioned before the operation to surround all data on the layer.

This operation is useful if one later needs to combine negative and positive data in a panel.

The new commands are:

- "Edit/Convert Negative To Positive": allows the user to specify which layers to convert
- Right click on layer in the Layers Toolbar, then "Convert To Positive": converts the picked layer only
- **"Insert/Into Layers"**

A new command to allow users to specify the layers where new elements will be inserted using the "Insert" commands. The user can pick one of two modes:

 - Active Layers

This is the same as insert used to work previously. Elements will be inserted in the active layer or active layers depending on the state of the "Only" checkmark for the current layer (in the Current Element toolbar).
 - Specified Layers

User can specify the layer (or layers) where elements will be inserted. Changing the current layer or the "Only" checkmark does not affect where the elements are inserted. This new mode allows, for instance, to insert into one layer while aligning to elements in another layer.

In both modes, the layers that will receive elements will be marked with a ">" before the layer number in the layers toolbar. Since more room is needed now for displaying the layer number text, the color box will be narrower, but one can adjust that by widening the layers toolbar (drag the right edge of the toolbar).
- **"File/Open Options"**

Groups options that apply to "File/Open" (reading in .bin jobfiles).

 - "Ignore Preferences From Jobfiles" existed previously but was located in "Setup/Preferences".
 - "Do Not Restore Custom Colors" is a new one and will cause the software to ignore custom color definitions (RGB) from jobfiles. This helps users who want to always preserve their own custom color setups (done with "Setup/Layer/Colors" -> "Redefine Color").
- **New Option For Selection**

A new user-settable option has been added to enable the selection using a frame of elements which cross (intersect) the selection frame. When this option is off, only elements which are completely inside the frame are selected (this was the previous behavior of the software).

The option can be found in "Select/Options" and is called "Select also elements that cross the frame". There is also a button for this in the Selection Toolbar ("View/Toolbars/Selection"). It has been added next to the "Inside" button.
- **"File/Import" ("Guess", "Directory" and "Zip")**
 - the interpretation of the format of Gerber files has been improved.
 - for Sieb & Meyer drill files: the format guessed (or set by the user after the guess) will override the format implied in the Sieb & Meyer file (for instance format %%3000 automatically implies metric, trialing zeros, 3.3 and this can now be overridden).
- **"Setup/Frame/Surround All Data" (Ctrl+W)**

State of "zero-width" display ("O") is taken into account when computing the size of the frame.
- **"Tools/Stencil Apertures"**

The shape computation has been improved.
- **"Tools/Snap To Padmaster"**

Traces could be deleted when both endpoints were snapped to the same point. The algorithm has now been changed so in cases like this only one of the endpoints will be snapped.

New features 10.0.26

- **“Tools/Convert Drawn Pads/Global”**
The algorithm has been improved.

New features 10.0.10

- **Shortcut keys for Layers Toolbar**
An options has been added to enable shortcut keys for the layers toolbar. This is in the layers toolbar context menu and is called “Shortcuts enabled”. Shortcuts were removed a few versions back because they were deemed dangerous, as they have a different meaning than the same shortcuts in the main view. However, some users complained and wanted them back so now they are restored (if enabled by the user).
The shortcut keys available are the same as in the past: “V”, “N” and “S”. Note that “V” and “N” work on the whole board layer, just as in the past.

New features 10.0.1:

- **“Edit/Move Layers XY Position/Move Layer Tool”**
A new tool has been added to facilitate layer alignment. The command will activate a tool which consists of two steps:
 - First the user picks an element in the layer that he desires to move. This is done by moving the crosshair close to the element and then clicking (or pressing Enter), similar to how one selects an element.
 - Next the user picks the corresponding element in another layer the same way as in the previous step.At this point the layer of the first element will be moved so that the first element is now on top of the second element (and hopefully the layers are aligned). The whole cycle can then be repeated again for moving another layer. When done, press Escape to cancel the move layer tool, or deactivate it by clicking on its menu entry. This command has the shortcut key combination Ctrl+Shift+Q.
- **Explicit Units**
All the dialog items that refer to a coordinate or a dimension now accept numbers followed by optional units, independent of the current units in use. For instance in the “Move Cursor To” dialog box one could enter “2.3cm” for X, even though the current units may be “inch”. This would cause the cursor to move to 0.905512 inches. The acceptable values for the units are the same as the ones shown in the “Coordinate Units” box: “inch”, “mil”, “cm” or “mm” or any prefix of them which is unambiguous (for instance “in” or even “i” will work instead of “inch”).
- **“Setup/Preferences/User Confirmation For”**
Confirmation for dangerous operations. A new group of preferences that can be turned on or off. When on, they will cause the corresponding operations to prompt for user confirmation before they are done. Currently two such operations covered:
 - **Delete Selected:** will prompt for “Edit/Edit Selection/Delete”
 - **Drag And Drop Layers:** will prompt during a drag and drop in the layers toolbarThese are intended as a safety feature to protect against unintended operations, especially since “delete selected” has a shortcut key (Delete) which can easily be pushed by accident.
More such operations can be added in the future. Please let technical support know which you would like added.
- **“Setup/Preferences/Wheel Forwards Decreases Zoom”**
User preference for those who are used to have the zoom decrease when the mouse wheel is moved forwards and increase when the mouse wheel is moved backwards.

- **“File/Export/Drill” and “File/Export/Rout”, G93-type offsets**
A new option has been added for Excellon export to cause the software to output a G93 (Zero Set) command at the beginning of the file (or the equivalent M49,FA for Sieb and Meyer). It is in the “Options” dialog, under “Output Options” and it is called “Offset”. When turned on, a G93 will be output at the beginning of the file. The value of the offset is taken from the current cursor position, so if you want accurate values, best to disconnect the mouse from the crosshair cursor when activating the dialog. Note that the G93 will be output even if both the X and Y are 0.
- **“Tools/Clip Silkscreen Traces”, new method**
A new method has been added for correcting silkscreen clearance errors. This method inserts scratch polygons into the silkscreen layer to scratch away from interfering silkscreen elements. The old method, which clipped the traces, is still available. The method can be selected by the user in the operation dialog.
- **“Edit/Move Layers XY Position/Move By Displacement”, improved**
This command has been improved to make it easier to align layers. Previously the command dialog included only the X and Y displacements and it moved the “active layers” (as determined by layer visibility and by the “Only” button next to the current layer in the Current Element toolbar). There are two improvements to this command:
 - One can now pick the layers to move in the dialog. There is a text box where one can type in a comma separated list of layer ranges, such as “3, 7-9, 15” (one can also type “All” here). This list is initialized to the currently active layers, so that the command acts as before if the user leaves the layers text box alone.
 - The X and Y displacements in the dialog are initialized to the result of the most recent distance measurement command (if any). This allows the user to previously do a distance command (“D”) to set the move displacement.
- **“Setup/D Codes” (F5), custom shapes**
Custom shapes (M-type) setup dialog: now has two added buttons, “Import” and “Export”. These will import/export to/from Gerber the current custom shape. These commands were available previously as a separate step in the “Custom Apertures” menu of the main dialog, under “Import From File” and “Export To File”. The addition of the new buttons saves some operator steps.
- **“Select/By Intersection”, new option**
A new option has been added: “Check only elements at the same polarity level”. When on, only elements that are of the same polarity (paint or scratch) are checked against each other and also only when they are at the same level in the paint/scratch sequence. So, for instance, an element in the second paint group of the destination is only checked versus elements in the second paint group of the reference. When one wants all elements checked against all other, this option should be left unchecked.
- **“Edit/Edit Selection/Polygons/F To Polygons”, algorithm improved**
Three options have been added for handling polygon holes (when nesting is requested).
 - “Holes cannot overlap”: if two holes overlap one of them becomes a container
 - “Overlapping holes are merged”: two overlapping holes are merged to make a larger hole
 - “Overlapping holes not merged”: the overlapping area of two holes becomes a new container
- **“File/Import/Netlist”**
When the “Add feature (if present in 317)” is checked the feature pad will be added to the CPU and CPL layers. Previously they were added to the DRI layer.
- **“File/Import/Guess-Directory-Zip”**
 - Now supports the Excellon format for decimal placement (000.000).
 - The results dialog has been changed.
 - o The leading, trailing, all present, decimal present radio buttons will enable/ disable the ‘m’ and

- 'n' labels in a similar way that the Import/Drill & Rout/ options dialog behaves.
- If the size the user selects creates a coordinate value outside the 1000 inch, 1000 cm limit, an error is reported and the "OK" button is disabled.
- Files with no data (drill with tool sizes but no drill data) will now report the board size as "0 x 0" instead of "No Data Found".

New features 9.8.70:

- **Drag and Drop in Layers Toolbar**

One can now drag and drop layers to reposition them. In the layers toolbar click on a layer and drag it to the desired spot. The insertion mark will be shown before the layer where the drop will occur. The number (and name) of the layer being dragged can be seen in the status line.

- **New shortcut keys (accelerator keys)**

- **Ctrl+Space:** for the main view context menu (or mouse right-click)
- **Ctrl+Shift+F10:** for "View/Visibility/Layers/Only Visible". This is a command that allows making visible just a group of layers (a comma-separated list of ranges).

- **"File/Import/Gerber" – "Options"**

A new option has been added to the "File Interpretation" tab: "If data follows M02". It has two possible options: "Make new layer" and "Same layer".

This applies to the (rare) cases where a file has a Gerber M02 command (End Of Program) followed by more Gerber data. If "Make new layer" is picked, the data that follows is put into a new layer. This is the more common setting (and the behavior of previous versions of the software). Sometimes, when the data that follows belongs to the same layer (and perhaps starts with scratch elements), the "Same layer" setting gives the desired results.

- **D Code Size Rounding**

In "Setup/D Codes" (F5), the "Operations" menu has a new rounding item. In addition to the existing "Round to closest mil" (or "Round to closest 0.01 mm" in metric mode) there is now "Round to closest 0.1 mil" (or "Round to closest 0.1 mm" in metric).

- **"Select/Large Pads"**

Will select pads (in visible layers) which have at least one dimension larger than a user given value. This is useful for selecting pads that are really large copper areas (not component landings). These pads can then be replaced with polygons so that they do not interfere with netlist export and other commands that work specifically on pads (like delete unused pads).

- **"Edit/Edit Selection"**

- **"Paint And Scratch / Raise To Top"**

A new command that deals with the paint/scratch order of the selected elements. This command will change the polarity order so that the selected elements will be above (on top of) all the unselected elements (layer by layer). All paint elements in the selection remain paint and all scratch elements remain scratch, just that they will come earlier in the paint/scratch order when all elements in a layer are considered. They will be "promoted" on top of everything else and hence guaranteed to be visible.

- **"Polygons / F To Polygons"**

A new option has been added to facilitate processing of complicated drawings. It is "Allow Intersecting Holes". This option is only relevant when "Nest Polygons" is checked. It allows for intersecting holes and will merge them to make combined holes.

- **“Setup/Frame/Surround All Data” (Ctrl+W)**
A new option has been added “Consider scratch elements also”. When unchecked, scratch elements will not be considered in the computation. When checked, scratch elements are considered the same as if they were paint (this was the previous behavior of this command).
- **Mapping D Codes to N-type shapes**
The user interface for re-mapping non-N shapes to N-shapes in “Setup/D Codes” (F5) has been improved.
- **“File/ Import/ ODB++”**
Importing component and Netlist data has been re-enabled.

New features 9.8.50:

- **New Layer Types**
The following new layer types have been added:

PTH	Drill – Plated Through Hole
NTH	Drill – Non plated Through Hole
BLI	Drill – Blind vias
BUR	Drill – Buried vias
ROU	Routing – generic
RPE	Routing – external plated
RNE	Routing – external non plated
RPI	Routing – internal plated
RNI	Routing – internal non plated
PLA	Plating
SCG	Scoring
- **“File/Import/Gerber” - “Options” – “File Interpretation”**
 - **“Zero-Length Draws”**: an additional option has been added: “Ask”. Previously there were only two possibilities: “Make pads” and “Ignore”. Now there are three: “Make pads”, “Ask” and “Ignore”.

“Make pads”	A pad will be generated to replace the zero-length trace
“Ignore”	Zero-length draws will be ignored
“Ask”	The user will be prompted and given one of the above choices
 - **“End of Block Characters”**: an additional option has been added: “Auto”. When “Auto” is selected, the software will try to determine which the proper setting is for the file being imported.
- **“View/Grid/Display Grid” (G)**
The grid points are now rendered with 5 pixels. The previous 1-pixel grid was difficult to see on high resolution monitors.
- **“File/Import/Guess- Directory- Zip”**
 - HPGL- recognition has been improved.
 - IPC-D350/ IPC-D356 – now searches in the comment areas to determine type.
- **“Tool diameters use opposite units”**
checkbox has been added to the results dialog for drill files. When checked, the tool codes will use the opposite UOM than the data (inch – mm, mm – inch). To use this feature in import directory and Zip, highlight the file in the scan results then press “Edit Format”.

- **“Tools/Convert Drawn Pads/Single Shape” (Ctrl+Shift+P)**
Polygons are now supported. They will be interpreted as zero-width contours for the draw to flash operation.

New features 9.8.20 / 25:

- **New Selection Criterion**
A new entry has been added to the selection criteria in the Selection Toolbar. It is called “Scratch Elements” and, when active, will only select/pick elements that have scratch polarity inside a layer. Note that if the whole layer is set to scratch, that will not cause elements in it to be picked.
- **“Setup/Preferences/Splash Screen”**
Allows enabling or disabling the display of the splash screen at program startup.
- **“Tools/Compare Layers/Save Differences To File”**
The coordinates where differences were detected are saved to a text file.
- **Character Coding for Import and Export**
The character coding (ASCII, EBCDIC, EIA) is now separate for import and export. Previously changing one would also change the other.
- **“File/Import/Guess Directory Zip”**
TAP format drill files with T-Code definitions in the header section will now use the T-Code value rather than the hole size number. The ‘n’ value still defaults to three. The ‘m’ value is now calculated by subtracting the ‘n’ value from the total number of digits in the coordinate data.
- **The results dialog now resizes better.**
- **Gerber files that use CR/LF instead of ‘*’ are now recognized.**
- **Recognizing HPGL and HPGL/2 files has been improved.**

New features 9.8.5:

- **“Select/Covered Active Elements”**
Now handles zero-width elements also. This includes traces mapped to F-type D Codes.
- **“Edit/Edit Selection/Polygons/F To Polygons”**
Algorithm has been improved.

New features 9.8.0:

- **Inserting Scratch Elements Directly**
One can now insert scratch elements into any layer.
Previously, if one wanted to add new scratch elements, one needed to add them to a scratch layer (the whole layer was marked as scratch). While that is still possible, there is a new way to insert scratch elements: the commands “Paint” and “Scratch” in the “Insert” menu. There is also a “scratch” button on the Insert toolbar, which will cause scratch elements to be inserted when the button is depressed (active). While scratch mode is active using any of the above commands, any of the elements inserted with the normal insert commands (“Insert/Pad”, “Insert/Trace”, etc.) will be scratch elements. More precisely,

scratch elements will be inserted into positive layers and paint elements into negative layers, the end result being that they will scratch away from copper.

Note that the “Only” selector next to the layer box in the “Current Element” toolbar will be taken into account (as always the case with insert operations). So, if you want to insert into one layer only, make sure that the “Only” selector is checked.

- **Selecting A Particular Element When There Are Multiple Stacked Elements**

Sometimes there are multiple stacked elements in the same layer. Often this is the case with stacked pads (perhaps a scratch pad to create a clearance and then a paint pad). Since they have the same center, it was previously difficult to select a desired element (just the scratch or just the paint in the example above).

There is now a new way to do this. By executing the select command repeatedly, the selected element will cycle through all candidates in order and one can stop when the desired element is selected. This means double-clicking repeatedly (or single-clicking repeatedly when the selection tool is active).

- **Layer Colors**

There are new commands for saving and restoring the layer color setup. The color setup consists of the color index for each layer (a number between 1 and 15, which maps to one of the 15 colors that can be set at any time) and the color composition (RGB) of each of these 15 colors.

These commands are “Setup/Layer Colors/Save To File” and “Setup/Layer Colors/Restore From File” and they allow saving and restoring the configuration.

To make such a setup the default setup (loaded when the program starts) the command “Setup/Layer Colors/Save As Default” should be used.

Also, the complete color setup is now saved in .bin files. Previously only the layer indices were saved.

- **Distance Measurement**

There are several changes and new features in the distance measurement commands (“View/Distance”).

- The distance is now displayed only in the view (next to the cursor). The Screen Toolbar will display relative X and Y displacement from the start of the distance measurement. The screen display also includes the angle from the start of measurement.
- The “distance from edge” measurement has been merged into the distance tool. Is it now an option that can be turned on and off (“View/Distance/From Edge”), so there is only one distance tool with two modes.
- The command to measure the edge-to-edge distance between two selected elements has been replaced with a tool (“View/Distance/Edge To Edge Measurement Tool”). While this tool is active one can click on two elements (click on first, then click on second) and the edge to edge distance between these two elements is displayed in the status line.

- **Transcoding NC Tools By Descending Size**

The tools setup dialog (“Setup/Tools Codes” or “Shift+F5”) had two buttons for transcoding tools by ascending size. These have been combined into one button “Transcode By Size” with two more methods added to allow transcoding by descending tool sizes also (previously only ascending order was implemented).

The four methods are: “Ascending”, “Ascending By Type”, “Descending” and “Descending By Type”.

- **“Setup/Preferences/Center On Wheel Zoom”**

Controls how the zoom happens when zooming with the mouse wheel. When this option is active (checked) the zoom is combined with a pan so that the position where the zoom started becomes the new center of the view.

- **“View/Coordinates Origin/Set Relative Origin”**
This is a newly added command that sets the relative origin at the current cursor position. It takes the name of the previous “set relative origin tool” (and also the shortcut Shift+R) which is now renamed “Relative Origin Tool” and has no shortcut key. However, it keeps its button on the Screen Toolbar.
- **“File/Import/File Path Options/Current Directory Is Set On Import”**
This is an options that can be turned on or off. When on, the current directory is set to the path of the file-name imported. This can be desirable if one imports files by dragging and dropping (rather than using the File/Import dialog).
- **“File/Import/Drill”**
A new option (in the “Options” dialog “Data Format” tab) called “Tool diameters in opposite units”. When checked, the tool diameter values read in will be interpreted in the opposite units from the ones specified in “Units”. The value in “Units” will be used to interpret coordinates. If the file contains unit directives, such as M71, M72, INCH or METRIC, they will of course override any settings from this dialog.
This is useful for importing files which have the header and the rest of the data in different units, such as diameters in metric and coordinates in English or vice versa.
- **“File/Export/Gerber Extended”**
Two new options have been added in the “Options/RS274-X Options” tab. These will warn the user when the file to be output will contain apertures that are either zero-width or wider than a user specified value. This is useful when outputting to photoplotters (such as the Gerber Crescent) which have aperture size limitations. These options are: “Warn for zero-width D Codes” and “Warn for D Codes of diameter larger than”.
- **“File/Export/Drill”**
A new option has been added for exporting Sieb & Meyer files. It is in “Options/Output Options” and is a pair of M commands that can be output at the top and bottom of the file. These commands are for machine specific M commands, such as M38 (jam) and M39 (loosen), but any numbers can be entered. Sieb & Meyer describes the “Machine Function” commands as being M22 through M27 and M34 through M41. If a box is left empty, then no extra command will be output at that level (top or bottom of the file).
- **“Tools/Design Rules Check/Add Errors From File”**
New command similar to “Load Errors From File” but does not clear the existing errors first. This way one can merge the results saved in several error files into one combined set of errors.
- **D Code rotation**
The operation to rotate a group of D Codes, available in the “Setup/D Codes” (F5) table, has been changed to allow for a user specified angle of rotation. Previously only a rotation of 90 degrees was available. The command is now “Operations/Rotate” (was “Operations/Rotate 90 Degrees”).
- **“View/Distance/Edge To Edge”**
Has been changed from a command to a tool. See description under “Distance Measurement” in the “New” section below.
- **“View/Coordinates Origin/Set Relative Origin”**
This command has been renamed “Relative Origin Tool” and has lost its shortcut (Shift+R) now linked to a new command that sets the relative origin but is not a tool (immediate action). See below under “New” commands.

- **Improvements In Contouring Algorithm (Polygon Merging)**
This algorithm is used in many places, but most importantly in Contour DRC and Contour Netlist extraction. The speed of the algorithm has been dramatically improved for cases where the data to be merged results in a crosshatch. This can often happen in plane layers. Previously such layers were best handled with Raster methods, but now Contour methods can be used throughout.
- **“File/Save Options/Preferences”**
The “Include Net Info” option has been removed from the dialog. Now net info is always saved in a job-file (.bin file), if it is present (if there are elements in the job which have a net info value different from “?”).
- **“File/Import/Gerber/Options”**
The “Data Format” tab items “Left of decimal” and “Right of decimal” are selectively grayed out to convey to the user when they are irrelevant. “Left” is irrelevant in “Leading” omit zeros mode and “Right” is irrelevant in “Trailing”.
- **“File/Import/Guess”**
The Import Guess results dialog has changed for setting m and n. It now uses two buttons to shift the decimal point instead of dropdown boxes. Also the “Apply” button has been removed as the board size is automatically recalculated whenever a parameter is changed.
- **“File/Import/Apertures”**
When importing Pads aperture files, German headers will be recognized. Also the units will default to mm.
- **“File/Import/ODB++”**
 - The ODB++ layer name value will be used during import to set the layer name in the F10 menu.
 - ODB++ will now tag the first copper layer as CPU, last copper layer as CPL. Any layers before the CPU that are silk, soldermask, or solderpaste will be marked as ‘U’pper. If these files are listed the CPU layer, they will be marked as ‘L’ower. Drill layers are now DRI instead of PAD.

New features 9.6.91

- **“View/Visibility/Layer/Board #0 Always Visible”**
A new option for controlling the behavior of the commands that step the visibility of layers. These are in “View/Visibility/Layer”: “Next Layer”, “Previous Layer”, “Next Board Layer” and “Previous Board Layer”.
When “Board #0 Always Visible” is checked, then these commands will always cause board layer #0 to stay on (visible) together with the next board layer in the sequence (next or previous).
- **“File/Import/Net”**
Better handling of IPC-356 “307” records (blind and buried via).
- **“Edit/Edit Selection/Polygons/Make Well Formed”**
The algorithm has been improved to handle a larger variety of malformed polygons.
- **“Select/Duplicate Active Elements”**
Elements that have no width will now be processed by this command also. Previously they were ignored. This includes pads and traces mapped to D Codes that have zero width or of shape type “F”.

- **“File/Import/DPF”**
Now uses the Windows temp directory for temporary files during import.

New features 9.6.81:

- **“File/Import/Apertures”**
A new aperture type (“Proteus.inf”) is now supported.
- **“File -> Import -> Directory/ Zip”**
A new button has been added to the scan results dialog, “ReScan”. When pressed, the user can change the import option settings and rescan the files. In the past the user had to start the import over from the beginning.

New features 9.6.78:

- **“Edit -> Edit Selection -> Special -> Convert Routing Paths To Traces”**
This command replaces the selected routing paths with traces, one trace per edge. Previously this command was available only in CAMMaster (and higher) as “Tools -> Routing -> Ungroup To Traces”.
- **“File -> Import -> Apertures”**
ApSource7 now imports diamonds.
- **“File -> Import -> ODB++”**
Import time has been greatly improved.

New features 9.6.69:

- **Drag The View Using Scrollbars**
When “View->Preferences->Drag View In Real Time” is checked, dragging the scrollbar boxes will also drag the view in real time. Note that the “Drag View In Real Time” also controls the behavior of dragging the view with Ctrl+Alt+Left Mouse button (this was present in previous versions also).
- **“Setup->Tool Codes” (Shift+F5)**
A new command has been added for transcoding tool numbers. It is called “Transcode Selected” and will transcode all the selected tools (which can be contiguous or not) to a contiguous range of tool numbers specified by the user. Of course one can transcode just one tool number, for instance T4 to T9, but also sets like T1, T4, T7 to start at T10, which will cause the transcoding: T1->T10, T4->T11 and T7->T12.
- **“File->Import->From Layers” Uses Cur Dir”**
A new setting which applies only to the command “File->Import->From Layers”. This command imports several files using the layer names as file names. For names that are not full paths, it is not obvious how to complete the path (which directory they are in). Previously the directory was assumed to be the directory of the jobfile. When this new option (“From Layers” Uses Cur Dir) is checked, the “current directory” is used instead. The current directory is an operating system dependent concept and it is changed when file browsing dialogs are used. It is usually the last place where a file was saved/exported or opened/imported.
- **“Paint And Scratch->Expose Scratch”**
Command available in the context menus in the layer toolbar and layer setup dialog (F10). Will correct layers that start with scratch elements (which are invisible). It will add a covering paint rectangle in front of them so as to expose the scratch elements.

New features 9.6.53:

- **Layers Toolbar**

A new way to quickly turn on or off a range of layers has been added.

This is done by clicking the right mouse button and pressing either the Shift or Control keys at the same time. If neither of these keys are pressed, then the normal context menu is displayed. However, if any of these keys is pressed, this action will cause instead to change the visibility of the layers ranging from the current layer to the layer on which the right button is clicked. Shift will cause the range to be made visible, Control will cause the range to be made invisible.

- **“Help/User ID”**

Shows the current User ID for this product and allows the user to enter a new one (in case the existing one is incorrect). Previously the User ID could be only set during installation.

New features 9.6.46:

- **No new features**

This release is to correct a bug in DRC. Please refer to the “9.6.46 Bug fixes” section of this document.

- **“File/Import/Guess” (also, Directory and Zip)**

Gerber extended (RS-274X) files with incorrect format statements (FS) are now easier to import.

Hard to believe, but some Gerber files have format statements which are incorrect. Previously the only way to correct this was to edit the file and change or remove the statement.

Now one can use “Import/Guess” (or “Zip” or “Directory”) which will guess the format and will allow the user to override it in the dialog that appears (checkbox item “Override parameters”).

- **Pads / Traces Contrast**

Contrasting pads and traces with different colors in the same layer is not guaranteed to display correctly when the board layer contains paint and scratch. However, certain users need this feature so much that they would rather use it on such layers also, even if the display is not guaranteed to be correct.

This version enables them to do so, by checking the option “Allow contrast on paint/scratch also” in “View/Visibility/Element/Options”. This is a “use at your own risk” kind of option. The data will always be correct, but the paint/scratch rendering may be incorrect when pads contrast is on.

- **“Edit/Paint And Scratch/Optimize Selection”**

The optimization operation has been improved to pair scratch and paint polygons. Polygons with holes are often represented via paint and scratch because some of the import languages do not have ways of representing polygons with holes directly. Gerber is such an example where holes are represented as scratch polygons.

The optimization operation will now detect such situations and add the scratch polygons as holes of the corresponding paint polygons. This results in fewer scratch elements and sometimes in the complete elimination of scratch elements.

- **“File/Import/Apertures”**

If the aperture import encounters problems, an error file is generated. When the dialog box appears to report that errors have been encountered, a button has been added to view the error file.

- **NC Tool Sizes**

Tool sizes are now saved in jobfiles (binfiles) even if they are not mapped to any D Codes. This facilitates using common setups of NC tools. One can set up the tools, then save an empty (no circuit data) binfile, which can later be opened or imported to restore the settings.

New features 9.6.43:

- **“File/Import/Drill & Rout”**
A new option has been added for importing Excellon files. It is in the “Options” tab of the “Options” dialog. It is called “M00” and controls how M00 statements are interpreted.
There are three possibilities:
 - “Treat as end of program”. This will cause the current program to be terminated and any following data will appear on a new layer.
 - “Ignore”. The statement will be completely ignored.
 - “Increment tool”. The statement is interpreted as a tool change to the next sequential tool number.
- **Crash Report Generation**
If the software crashes, a dialog will come up asking whether to email a crash report to PentaLogix technical support. These reports will be investigated by technical support and they help to find and fix the source of the problem.
- **“File/Import/Aperture”**
A new aperture type “Metric Source” has been added. This aperture type recognizes files that use commas instead of decimal points and has special conversions for an aperture named “SYMB” to targets.

New features 9.6.17:

- **“File/Import/Gerber/Options/RS274-X Options”**
 - The handling of “IPNEG” commands has been improved.
These are used to define a layer as a negative layer. “IP” stands for “Image Polarity”. The issue is how to treat subsequent “LP” commands (“Layer Polarity”). These can be “LPD” or “LPC”. Some files assume “LPD” to be the paint polarity, some “LPC” (“LPC” seems to be more prevalent).
Previously there were only two modes for this option. Now a third one, called “Automatic” has been added that will try to guess the correct setting.

New features 9.6:

- **“Edit/Move Layers/Align Visible Layers” (Ctrl+Q)**
A new command to facilitate aligning layers has been added. It incorporates the methods that were available in the old “Edit/Move Layers/Align” (which it replaces) and it adds more methods.
This command works on all visible layers and will try to move some of them so they align with the others. The following methods are available:
 - 1) Pad or trace in a corner of a layer. The corner to be considered can be specified by the user (upper-right, lower-right, upper-left or lower-left). The software will pick (in each visible layer) the element (pad or trace) closest to the corner in that layer and will use them as reference elements. The layers will be moved so that the reference elements end up on top of each other.
 - 2) One selected element in each layer. The selected elements will be used as references in each layers. The layers will be moved so that the selected elements end up on top of each other. If more than one selected element exists in a layer, an error will be reported and the operation aborts. Layers which have no selected elements will be ignored. To select elements, one can use the selection tool (S) or simply double click on an element. Remember that to add to an existing selection one needs to keep the Shift key pressed while selecting.
 - 3) One selected pad whose type is used as a guide. This is the old “Edit/Move Layers/Align” that has been around for quite a while. It requires the selection to consist of just one pad. If pads similar to it (using the additional rules of “D Code Number Only”, “Shape Type Only” or “Shape Type And Size”) are found in the other layers, the closest to the selected one is picked in each layer and used as the reference for that layer. The layers are then moved so that all these pads end up on top of each other.

This works well only for cases where the layers are not offset by much and there are distinguished pads

(such as targets). If all layers have targets, aligning targets is an easy way to do the job.

In each of these cases some layers will be moved and others not. One layer (at least) is always left where it is. For method (3), that layer is the layer that contains the selected element. For methods (1) and (2), the largest number of layers that already match are left standing. If no layers match already or the operation is done on only two layers, then the “current layer” is left standing.

For many cases more than one method needs to be used. Pads can very often be used for alignment, but some layers have no pads (such as silkscreen layers) and so a second step to align them may be necessary (using traces, or selected elements).

- **“Select/Covered Active Elements”**

A new command that will first clear the selection and then select only the active elements that are completely covered by other elements. These are usually redundant, garbage elements and can be discarded. Note that if two (or more) identical elements are superimposed in the same layer, all will be selected, except one, so that deleting the others does not modify the copper of the layer. Candidates for selection are only active elements, so they must be visible and also all the “Only” buttons and controls are taken into account. One could, for instance, apply it just to pads.

- **“Select/Duplicate Active Elements”**

A new command that will first clear the selection and then select only the active elements which are identical (geometrically) to others. These are usually redundant, garbage elements and can be discarded. Note that of two (or more) identical elements all will be selected, except one, so that deleting the others does not modify the copper of the layer. Candidates for selection are only active elements, so they must be visible and also all the “Only” buttons and controls are taken into account. One could, for instance, apply it just to pads.

This replaces the older command “Select/Duplicates” which acted a bit differently, working only on the elements already selected.

- **“File/Import/Drill & Rout”**

Added support for importing Excellon commands G32 and G33 (“Routing Circle Canned Cycle”) and Sieb & Meyer commands G45, G46 (“Rout A Hole”), G47, G48 (“Rout A Round Card”) and G49, G50 (“Rout a Hole (Rectangle)”).

- **“Setup/D Codes” (F5)**

A new command for selecting elements mapped to a set of D Codes. It is in the menu of the “D Code Table” dialog under “Operations/Select Pads And Traces”. For all the picked D Codes in the table (which are highlighted in dark blue) the elements mapped to those D Codes, and in visible layers, will be selected. This allows selecting elements mapped to more than one D Code.

- **“Tools/Netlist/Select Net”**

A new selection tool that facilitates selecting all elements having the same net name (or number). This was possible previously also, but required a sequence of keystrokes to do, as the “Only” button next to the Netlist box in the Current Element toolbar needed to be turned off then on repeatedly.

This is no longer needed with this new tool. Once activated, one can click (or hit Enter) to select the active element closest to the cursor and, together with it, all the other active elements which have the same net number. This tool acts like the selection tool in the sense that the Shift and Ctrl keyboard keys change the meaning of the selection: if Shift is pressed while clicking, then the operation will add to the selection, if Ctrl is pressed, then it will remove from the present selection and if neither is pressed, then it will make a new selection.

- **“Setup/Preferences/Only One Tool Can Be Active”**

This is a new preference, but it modifies a behavior that existed previously. Certain user tools: zoom

("View/Zoom/Tool" (Z)), select ("Select/Selection Tool" (S)), distance ("View/Distance" (D)) and others are considered "helper" tools in the sense that it is sometimes useful to activate them while another (perhaps multi-step) tool is active (in dormant state). When the helper tool is canceled (by Escape or otherwise) the dormant main tool is reactivated.

Some users do not want this behavior, because they would rather have just one tool active. For those user, this new option has been introduced. When checked and a helper operation is activated, any previous operation is canceled.

- **"File/Import/ODB++"**

- Improved import algorithm is much faster.
- The import process has been streamlined by importing according to the ODB matrix rather than requiring the user to select import order.
- Step and repeat, rotations, and offsets are now imported correctly.
- The profile step is now imported as a BOL type.
- When running in Batch mode, all menus are suppressed.

- **"File/Import/DPF"**

When importing files in metric, the conversion is now much more accurate by using a conversion factor to eight decimal places.

- **Selection Toolbar**

There are several new options to specify elements to select or pick (in the dropdown list):

- "Open Paths": picks open routing paths only.
- "Closed Paths": picks closed routing paths only
- "No Lead-In": picks closed routing paths which have no lead-in
- "Net Midpoints": picks elements which have a net number (or name) and have been marked as net midpoints by a previous net import or net extract operation.
- "Net Endpoints": picks elements which have a net number (or name) and have not been marked as net midpoints by a previous net import or net extract operation.

- **"Edit/Break Traces And Clip Polygons" (Ctrl+B)**

This command was called "Break Traces" before. Now polygons are included in the operation also (when a frame is used for clipping). Any polygons that touch the frame will be clipped by it and subdivided into several polygons, similar to the way a trace is clipped. This provides a powerful new way to manipulate polygons.

Note that this operation is affected by the state of the "Inside" button on the "Selection" toolbar.

- **"File/Import/Gerber"**

- The settings in a Gerber extended "FS" statement (Format Statement) will not change the user settings in File/Import/Gerber/Options. They will of course apply to the current plot, but will not affect later files. This allows the values set by the user to persist.
- Improved handling of approximate arcs (when the radius at one endpoint is different from the radius at the other endpoint).
- The "AM" Rotation modes for "Rotate around" have been expanded to three. Previously there was "Rotate around center of each primitive" and "Rotate around aperture center". Now a new mode has been added, called "Automatic". This will pick one of the two previous modes, depending on the type of primitive.

This has been determined after examining a number of sample file, some of which needed both types of rotation in the same file.

The auto mode seems to be working well with all the sample files examined, but the other two modes

have been left in the user interface as a fallback position, to account for different types of Gerber files that the user may encounter.

- **“View/Distance”**

The distance measurement tools now display the current distance next to the cursor in the main view, in addition to the X box in the “Screen” toolbar.

- **“File/Import/Guess-Directory-Zip”**

- The import options now has checkboxes to include/ exclude certain file types. The file types are:
 - o Scan for Data Files
 - o Scan for Aperture files.
 - o Scan for Netlist files
- The default import order has been changed. Drill files are placed near the bottom of the list; and drill files with tool definitions but no data, immediately precede the drill files. Netlist files are placed last. This is to accommodate net lists with ‘T’ codes.
- Certain file types are filtered from scanning to prevent crashes. Files ending in “PDF”, “DWG”, and DXF” are ignored. Other files are scanned to detect binary data and will be ignored if appropriate.
- Zip now has the same options button found in import directory.
- Tap files without format data will default to the most common parameters. This file format will now be identified as three possible types:
 - o Tap definitions without tool changes will be treated as an aperture file, no drill data imported.
 - o Tap files with Excellon tool definitions will be treated as Excellon drill files.
 - o TAP files with TAP tool definitions and with tool changes will be identified as a new type, NC_TAP. Tool definitions and data imported.
- Imports both the tool and drill data if present. The file type is called “NC-TAP/ Excellon”. When the format isn’t provided, default settings will be used that seem to work in most cases.
- Recognition of Excellon format improved handling of ‘T’, ‘F’, ‘C’, ‘S’ commands. Metric 1, 2, formats recognized.
- Gerber files with large AM (Aperture Macros) import quicker.

- **“File/Import/Apertures”**

- Valor aperture files now import diamonds, thermals, obrounds, and octagons.
- LAV501 apertures now supports octagons and tool definitions.

- **“Help/Check For Updates”**

The user can now specify an interval of time for automatically checking for software updates from the PentaLogix website. This check will be done in the background and the user will only be notified if there is a new version available.

- **“Tools/Snap To Padmaster”**

The “Snap Settings” tab has a new option “Select result”. This determines whether the elements that were snapped are selected or not at the end of the operation. The previous behavior was that they were always selected.

- **“Tools/Compare Layers”**

The speed of the algorithm has been improved.

New features 9.4.73:

- **Unmapped D Codes**
Unmapped D Codes (of shape type "?") and N type D Codes for which the corresponding tools are unmapped (of type "?") will be displayed as a question mark inside a doughnut. This is to make them easy to recognize when looking at the display. Previously they were displayed as rounds.
- **"File/Import/Zip"**
Now has the options button available when selecting a file to import. This is the same options button found in Import Directory.
- **"File/Import/Directory" and "File/Import/Zip"**
The options dialog now has three new checkboxes When selected, File import will scan files for these data types:
 - Scan for Data Files.
 - Scan for Aperture files
 - Scan for Netlist files
- **"File/Export/Drill":**
A warning is issued when trying to export data that contains unmapped tools (of type "?").

New features 9.4.66:

- **"Tools/Compare Layers"**
The "Comparison Method" options have been implemented. There are two methods for comparing two layers:
 - "Element by element"
Each element in the first layers is compared with a corresponding element in the second layer. Where differences are found, elements are selected.
 - "Copper area"
The copper are of the first layer is compared with the copper are of the second layer and a marker will be displayed at spots where there are differences (copper in one layer but not in the other). These differences can be navigated via a dialog. If one closes the dialog the markers will be removed, but they can be brought back again with ("Tools/Compare Layers/Show Differences").
This method is also different from the "Element by element" method in that it handles composites (step and repeat blocks and text blocks).

New features 9.4.6-65:

- **"File/Import/Discard Path In Layer Names"**
Controls how layers are named from file names during import operations.
When checked, only the file name part will be stored as the layer name and the path part of the file name will be discarded.
When unchecked, the hole path name will be used, unless the file is in the same directory as the currently loaded jobfile.
- **"Setup/Visibility and Display"**
"Step & Repeat Blocks". New options have been added for the display of step and repeat blocks. The two options are "Display all details" and "Display outlines only". The new one is the second option. If selected, it will cause all step and repeated data to be displayed on the screen as a boxes, without the detail of the circuit elements inside. This saves time when examining large panels with a lot of panelized

data. Note that this applies only to “blocked” step and repeat data. If the data was step and repeated using copying, this option does not apply, as the step and repeat information is not recorded in the database.

- **“Setup/Layers” (F10)**

New commands to save/restore the default color setup for layers display. The commands are available from the context menu (right mouse click) under “Colors Setup”. There are three commands:

- “Save Current As Default”: the current setup of layer colors and color definitions (RGB content of colors) becomes the default. The next time the software is started, it will display these settings as the default.
- “Restore From Default”: layers colors will be set to the default settings.
- “Restore From Factory Settings”: layers colors will be set to the PentaLogix default values.

- **“Edit/Edit Selection/Move By Displacement”**

A new command to move the selection by user specified X and Y displacement values.

- **“Insert/Pad”**

During the insert operation an outline of the shape to be inserted is dragged along with the cursor, giving better feedback as to what the result will be. This includes outlines of complex shapes also.

- **“View/Distance”**

The distance measurement tools (“From Point (D)” and “From Edge”) now stay active until explicitly canceled. So they will stay active when starting other tools, such as the insert trace and pad tools. This is useful for accurate positioning during such insert operations.

- **Pad outline mode (O)**

Custom apertures (shapes of type M) will be showed outlined with primitives displayed individually (both paint and scratch primitives are shown). This allows for a better understanding of the components of a custom shape.

- **“File/Import”**

- **“Gerber”**

“AM” rotation. It has been determined that both interpretation for the rotation of AM apertures exist in Gerber files. The two possibilities are:

- rotate each primitive individually around its center or
- rotate the whole aperture (around the aperture center)

In versions previous to 9.4, the second method was used, then in the early 9.4 releases it was change to the first method. We have now seen files that assume one or the other, so the decision was made to add a user setting, so the user can pick which one to use. It is in “Options/RS274-X Options” and it is called “Rotate around”.

- **“Bitmap”**

Better handling of color bitmaps based with a color palette.

- **“Directory/ Zip/ Guess”**

Recognition of Excellon format has been improved.

The Excellon format statements Metric 1-3 is now recognized.

Adobe Acrobat .PDF, Illustrator .AI, AutoCAD .DXF and certain .DSN files will be ignored for import.

The import order has been changed. Netlist files will be listed last. Drill files will be listed before the Netlist files. If a drill file does not contain coordinate data, it will be the first drill file listed. These changes will help drill sizes to be properly imported.

- **“ODB”**

ODB import is now much faster. Step and Repeat as well as rotate is now handled properly. Profile

layer is now imported as BOL. The menu to arraign layer order has been eliminated. The layers will now import in the order defined by the ODB file.

- **“Setup/D Codes/Operations/Unique Shapes”**

A new option has been added called “Shape types to consolidate”. This allows handling N-type shapes differently. One can apply the operation only to N-type shapes, only to non-N type shapes or to all shapes.

- **“Tools/Compare Layers”**

Two new options have been added:

- “Stop after ... errors”. Allows the user to specify a number of errors after which checking should stop.
- “Tolerance”. Differences smaller than this will be ignored.

New features 9.4.1:

- **“File/Import”**

- “Gerber”

The extended Gerber command “IR’ (Image Rotation) is now supported.

- “Drill & Rout”

Sieb & Meyer rout data is now supported. Previously only drill data was supported for Sieb & Meyer.

- “Bitmap”

ViewMasterPLUS now imports bitmap files. This is a feature that was previously only available in CAMMaster.

- **“Insert/Arrow”**

A tool to insert arrows made out of traces, similar to the arrows generated by “Insert/Dimension”, except that there is no dimensioning. These arrows can be used to mark locations of interest. The height of the arrow is derived from the “Text Height” parameter in the “Inset/Loc and Dim Setup” dialog, similar to the “Insert/Dimension” tool. Once the tool is active, you need to click first at the position of the head of the arrow and then at the position of the tail of the arrow.

- **“Select/Layers”**

A new command to select all elements in a group of layers, specified as a comma-separated list of layer ranges (for instance “3-5, 12, 14-22”). This will make a new selection, any previously selected elements will be deselected first.

- **“Tools”**

- **“Stencil Apertures”**

A new set of tools for creating stencil apertures. The commands and features are described in a separate document: “Stencil Apertures”.

- **Component Information**

Component information is now stored in the database when available from the input files. Currently component information is imported from netlist files (columns 21-31 of IPC-356) and ODB++ files.

It is stored as system custom properties called _Component_Name, _Component_Type and _Component_Pin. These can be used via the custom properties toolbar and the new “Select/Components” command and can be qualifiers in selection operations. One can, for instance, select all elements that have a given component name. More information on this can be found in the “Stencil Apertures” document, although component information can be used independent of stencil apertures.

- **“View/Distance”**

The distance measurement tools (“From Point (D)” and “From Edge”) now stay active until explicitly canceled. So

they will stay active when starting other tools, such as the insert trace and pad tools. This is useful for accurate positioning during such insert operations.

- **Pad outline mode (O)**

Custom apertures (shapes of type M) will be showed outlined with primitives displayed individually (both paint and scratch primitives are shown). This allows for a better understanding of the components of a custom shape.
- **“Setup”**
 - “D Codes” (F5 dialog)
 - o The dialog has been redesigned to allow for column resizing. One can do this in the usual way by dragging the gridline that separates two headings in the headings row, for instance between “X” and “Y”.
 - o One can sort the table by values in a given column. This can be done by clicking on the heading of the column. For instance, clicking on “X” will sort the table by the X dimension of the D Codes (ascending or descending).
 - o The dimensions of the D Code (in the X and Y columns) are displayed at their highest accuracy. Previously, only 6 digits were displayed and the value was rounded if it needed more than 6 digits (including the decimal point).
 - o The shape of the current D Code is displayed in the dialog.
 - o The whole table can now be printed: “Operations/Print”.
 - o The “similar shapes consolidation” command “Operations/Unique Shapes” will now consolidate two D Codes of N-type that are mapped to different tool codes but the same diameter.
 - “Remember Directory for Import”

has been replaced with “Remember Directories”. When checked, separate directory names are remembered for import, export and macros.
- **“View”**
 - “Visibility/Layer/Toggle Layers”:

A comma separated list of layers or layer ranges can now be entered. Previously only a single layer could be toggled.
- **“Insert”**
 - “Loc and Dim Setup”

A new option has been added for the “Insert/Location” and “Insert/Dimension” tools: “Append Units”. When checked the text for the units (“inch”, “mm”, etc.) will appear after the dimension number, otherwise only the number will appear by itself. Previously the text for the units was always present.
 - “Pad”

During the insert operation an outline of the shape to be inserted is dragged along with the cursor, giving better feedback as to what the result will be. This includes outlines of complex shapes also.
- **“File/Import”**
 - “Zip”

Now reports CRC errors when attempting to unzip files. Also applies to TGZ files for ODB++.
 - “ODB++”
 - o The net information will now also be imported, if present in the ODB file. If multiple netlists are available, the user will be prompted to choose the appropriate netlist
 - o PentaLogix layer type recognition has been improved
 - o ODB can now be imported with messages suppressed for batch mode operations
 - “DPF”
 - o TEXT commands are now handled.
 - o Nested blocks now supported. Rotations, scaling, etc. are supported.

- "Netlist"
Board outline records (389) are now recognized and are imported as "F" shape traces.
- "Apertures"
Added a new GAPFile type. Supports the following string types:
!GAPFile Version 3.0
11 Round d:8.0
309 Oblong w:13.0 h:48.0 a:0.00
310 Rectangle Sq w:84.0 h:76.0 a:0.00

- **"Tools"**

- "Generate Polygon Outlines/Vector"
A new selection has been added to the "Outline Settings" tab. It specifies what the resulting outlines will be: polygons or contours made of "F" shape traces. In older versions of the software "F" shape contours were generated, then this was changed to polygons in more recent versions and finally now both methods are available, as many users seem to prefer the "F" shape contours.

New features 9.2.41:

- **"File/Print"**

The print dialog has two new items: a "Font" button and a "Raster" checkbox.

"Font" allows selection of the font for the header. Previously a default font was used and will still be used if no new font is picked.

"Raster" picks which printing method is used: raster bitmap based or Windows GDI based. Note that for Windows ME and lower only the raster method is available. For the other Windows versions the user can pick the preferred method. The Windows GDI based method is faster and works with all printers, whereas the raster method (which sends a potentially large raster bitmap to the printer) is more similar to the screen display (in color mode) as translucency of colors is supported (although the colors may be different on screen and on the printer).

- **More robust handling of network (floating) licenses.**

- **Import Apertures/ Netlists**

In any dialog where the user has the option to **view a file**, the users' defined viewer will be used. If the file type doesn't have a viewer assigned, wordpad.exe will be used.

New features 9.2.27:

- **"File/Import/ODB++"**

By selecting "From Dir", the user can now import ODB jobs directly from the directory without having to create a TGZ or TAR file.

- **"Edit/Edit Selection/Polygons/Separate Holes"**

The holes that result from the separation will be selected, whereas the containers will be unselected. This makes it easy to further process holes if desired. Previously both the holes and the containers were selected.

New features 9.2.21:

- **"Layers Toolbar"**

When a layer contained only scratch elements inside (although the layer as a whole could be marked as paint) it was difficult to figure out what was going on, as the layer would be invisible when viewed by

itself. Now, layers of this kind are marked with a "+" (instead of the "**") to draw attention that something unusual is going on. Then the right click context menu command "Paint And Scratch/Force Inner Polarity To Paint" (which replaces "Separate Layer..." in this case) will make all the inside elements paint and also flip the polarity of the whole layer (if it was paint it becomes scratch and vice versa). At this stage, the data is equivalent to what was there before, but now the polarity can be easily manipulated (via the "Scratch" checkmark).

- **Mouse Wheel Behavior**

Moving the mouse wheel scrolled up and down when the scrollbars were visible and zoomed in and out otherwise. The behavior when the scrollbars are off is unchanged. However when the scrollbars are on, moving the wheel will scroll up and down when no other key is pressed, scroll left and right when the Shift key is pressed and zoom in and out when the Ctrl key is pressed.

New features 9.2.2:

- **"Select/Duplicates"**

Looks for duplicates among the currently selected elements. Only the duplicates will remain selected while all the other elements are deselected. Duplicates are elements that are geometrically identical and in the same spot (on top of each other) and of the same shape (although not necessarily the same D Code). Currently only pads and traces are checked for duplicates (polygons and routing paths are not).

- **"Edit/Edit Selection/Special/Merge Collinear Traces"**

Looks for linear traces in selection that continue each other and are collinear (on the same line) and replaces them with one trace which spans the whole extension.

- **Layers toolbar context menu (right-click)**

Five more commands have been added under "Select": "All", "Traces", "Pads", "Polygons" and "Routing Paths". These commands will select only elements from the layer that was picked and the selection is made independent of the other criteria (the "Only" buttons etc.) as well as independent of element visibility. It is always a "new" selection, meaning that all other previously selected elements will be deselected. The previously existing commands "New", "Add" and "Remove" are preserved and work the same way as before (they are affected by the normal selection criteria).

The new commands give a quick way of selecting a whole layer or just some particular element type within a layer without worrying about the other settings in the software.

New features 9.2:

- **Paint elements and scratch elements can now coexist in the same layer.**

Previously a layer was paint or scratch and all elements inside were of the same polarity (paint or scratch). However, because some import files contained many polarity switches (from paint to scratch and from scratch to paint) each requiring a new layer, the result was a large number of layers. It could even happen that the maximum number of 255 layers was exceeded and so the file could not be imported. Starting with this version, a polarity change in the input will not require a layer change as paint and scratch elements can now coexist in the same layer.

To see how many polarity changes there are in a layer, make that layer the current layer and then do "File/Properties" or Alt+Enter. The number of polarity changes is one of the information lines in the displayed dialog. Multi-polarity layers are also marked with a '+' in the layers toolbar (instead of the '*' for a single polarity layer).

One can still set the polarity of a whole layer as paint or scratch (same as before). If the whole layer polarity is scratch then the polarity of elements inside will be reversed: paint elements will act like scratch and scratch elements will act like paint.

A layer which contains both paint and scratch elements can be separated into an equivalent sequence of layers which contain only one polarity. This makes it easier to edit the data (if necessary) and also conforms to how the software acted in previous releases (for users who prefer it that way). Note that for each polarity switch an extra layer is required. This can be done using commands in the “Paint And Scratch” submenu which appears in several places:

- in the main menu under “Edit”
- in the layers toolbar context menu (right-click of mouse)
- in the Layers Table dialog (F10) context menu.

There are two commands for separation:

- “Separate Current Layer”
- “Separate All”. This separates all layers that have mixed polarity. Note that for users who prefer the old way of storing paint and scratch, the operation to do is “Separate All” after each import.

The reverse operation also exists, to combine a sequence of layers which belong to the same board layer (and perhaps have different polarities) into one layer. Commands for this are in the same “Paint And Scratch” submenus:

- “Combine Layers”
- “Combine All”. This looks for adjacent layers that belong to the same board layer (and are visible) and combines them into one layer. The operation is then repeated for all the layers in the job.

The only way to change the polarity of elements is by setting the layer polarity. So if one needs to change the polarity of only a group of elements inside a layer, one needs to transfer them to an empty layer immediately following the layer in question, set the board layer number to be the same, then change the layer polarity to the desired value and finally combine the two layers into one layer again.

A new version of binfiles is also introduced with this version (V10 of binfiles). This is only needed when saving jobs that have mixed polarity elements in the same layer. Note that older versions of the software will not be able to read/open these binfiles.

The “Paint And Scratch” menu under “Edit” has one more command that acts on the selected elements only: “Optimize Selection”. This command will examine the selection, layer by layer, and within each layer will attempt to reduce the number of polarity switches. Sometimes input files contain a lot of polarity switches that are unnecessary because later paint and scratch elements do not interact (overlap) with previous ones, so it is possible to merge them into fewer polarity groupings. This can be useful when one needs to edit the data and also makes the export/output more efficient.

- **“Insert/Chamfer”**

Activates a tool to insert, move (slide) or delete a chamfer trace. This tool is a combination insert and edit tool. While the tool is active, pressing “Shift” puts it in the insert mode, while pressing “Ctrl” puts it in the remove mode. If none of the keys are pressed, it is in edit (move) mode.

A chamfer trace is a trace connected at both endpoints to other linear traces which act as “rails”. The chamfer can be moved parallel to itself while being guided by the rails. It can be a linear trace or an arc trace. In the edit/remove mode this is determined by what trace is picked for editing, in the insert mode this is determined by “Insert/Arc Chamfer Mode” (once set, it will be remembered for future operations). Note that when picking (either the chamfer to edit, or the junction of the rails where to insert) only active elements will be considered (this means all the “Only” buttons are active).

The insert operation will create a new chamfer starting at the joint of the two rails, while the remove operation will delete an existing chamfer and extend the rails so that they meet.

These operations can be used to rearrange circuits so that they provide more clearance spaces where needed.

- **“Edit/Edit Traces”**

A new group of operations to edit traces. They affect up to three traces at a time. The traces can be straight (linear) or arc traces. The following table provides a summary of the operations.

<i>Name Of Operation</i>	<i>Action</i>	<i>Traces affected</i>
Move Trace	Picks closest trace. The trace then follows the cursor by moving parallel to itself.	1
Move Endpoint	Same as “Move Trace”, but operation starts by picking trace at closest endpoint only.	1
Move Vertex	Picks closest junction (vertex) of two traces. Both traces then follow the mouse by moving parallel to themselves and staying connected.	2
Move Chamfer	Picks closest trace. Each endpoint of the trace needs to be connected to another trace. All three traces then follow the cursor by moving parallel to themselves (as a group).	3
Drag Trace	Picks closest trace and traces connected to each of its endpoints. The picked trace follows the cursor by moving parallel to itself while the connected traces will be stretched (the other endpoints of the connected traces will stay unchanged).	3
Drag Endpoint	Picks the closest trace endpoint. The endpoint then follows the cursor while the trace is stretched (the other endpoint stays unchanged). NOTE: this is the same as the older “Edit/Stretch Traces”.	1
Drag Vertex	Picks closest junction (vertex) of two traces. This vertex then follows the cursor while the traces are stretched (the other endpoints stay unchanged).	2
Drag Chamfer	Picks the closest trace and the two guiding rails attached to each endpoint. The trace then follow the cursor while guided by the rails. NOTE: this is similar to the “Insert/Chamfer” tool in edit mode.	3

The shortcut key for the whole group of commands is F8. Pressing F8 will activate (or cancel) the last used “Edit Traces” command. Pressing Shift+F8 and Ctrl+F8 will step to the next or previous tool (up or down through the menu listing).

- **Viewing of selected elements**

Two new ways of visualizing selected elements have been added to the two that existed. They can be picked from “View/Visibility/Selected”, “Setup/Visibility” or the Visibility Toolbar.

The four modes are:

<i>Mode Name</i>	<i>Color For Unselected</i>	<i>Color For Selected</i>
Display In White	Layer color	Bright white
Display In Contrasting Color	Layer color	Color that contrasts with layer color
Display By Dimming Unselected	Dimmed layer color	Layer color
Display Unselected In Gray	Dark gray	Layer color

The last two modes are the new ones. In both of these modes the selected elements are displayed in the layer color (both traces and pads, even if contrast is turned on). This is meant to help in cases where the continuity of the selected elements across layers is important to visualize, such as when examining netlists. In the last mode the unselected are displayed in one color independent of what layer they belong to. This color defaults to dark gray but can be set by the user to any other color using the “Set Layer Color” dialog that can be reached from several places (“Setup/Colors”, right-click on the Layers Toolbar or from the “Setup/Layers” dialog).

- **“Edit/Edit Selection”:**
 - “Replace With Polygons”
Replaces all selected elements with equivalent polygons. This is similar to the existing “Tools/Generate Polygon Outlines” (“/Vector” for CAMMaster) except that it acts on the selection only and does not swell the resulting polygons during the operation.
 - “Special/Replace M-Type Pads With Primitives”
This is a new command which works on the selection. It will replace all pads in the selection that are of shape M (Custom) with the primitives that make up the shape.
The result will look exactly the same, but will contain no custom shapes. This can be useful when data needs to be exported to devices (or software) that have trouble understanding custom shapes (photoplotters etc.).
A similar command already existed in the software, but was only accessible from the D Code Table (F5) and did not act on the selection, but rather on the D Codes that were picked from the table. That command was “Custom Apertures/Replace With Primitives” and is still there in this version as well. It has been improved to handle custom shapes that contain scratch primitives. Previously such shapes were not processed. Now, these shapes are converted to polygons and then the pads are replaced with these polygons.
“Replace M-Type Pads With Primitives” works the same way: shapes with scratch primitives are replaced with polygons and shapes without scratch primitives are replaced with the constituent primitives (pads, traces, polygons).
- **“File/Import/Drill & Rout”**
Support for FMAT command in Excellon program header.
- **“Setup”:**
 - “Layers” (F10) Context Menu: a new command has been added – “Compact”. The purpose of this command is to eliminate any empty layers from within the sequence of layers in a job. Layers will be transferred so that the relative layer order is the same, but there are no intervening empty layers.
 - “Visibility”:
All the global visibility settings for elements have been assembled into this dialog. All these items exist as other menu entries or dialogs, under “View/Visibility/...” but have been assembled here for quick access.
 - “Colors”:
To set the color of the current layer.
- **Context Menu (mouse right click)**
Added a new command: “Draw To Flash” which will perform the same operation as “Tools/Convert Drawn Pads/Global” with the currently set parameters (it will not display the dialog for the parameters). The method used is “standalone”.
- **“Tools/Delete Pads”**
The “delete unused pads” part of the “Delete Pads” module has been significantly improved. The new code uses contouring methods to find the unused pads, whereas the old method used vector methods. In addition to being more accurate, the new method handles: arcs, polygons, custom shapes (M-type D Codes), paint-and-scratch and negative layers. None of these were handled by the old method. The old method is still available under “Tools/Delete Pads/Vector”. The new method is “Tools/Delete Pads/**Select Unused Pads**”.
It works on the selection only, so you need to select all the elements (both pads and non-pads) that you want considered. In addition, as for all other operations, only visible parts of the selection are processed. Within the selection, the processing is done one board layer at a time, with proper consideration for paint-and-scratch as well as negative layers.

Unused pads are those pads that are electrically connected only to other pads (or are completely isolated). Used pads are those that are electrically connected to traces, polygons or to negative copper areas. At the end of the operation the selection will consist of the unused pads ONLY. If there are no such pads then the selection will be empty. At this point these pads can be easily deleted (by pressing the Delete key) or they can be further processed as desired.

- **“Layers Toolbar”**

Two buttons have been added to facilitate access to two frequently used commands from “View/Visibility/Layer”: “Next Layer” (Shift+Equals) and “Previous Layer” (Shift+Backspace).

- **“File/Import”:**

- “Excellon”: Files with ‘T’ codes that also have ‘F’eed or ‘S’peed or ‘C’ (diameter) commands on the same line will be recognized as Excellon.
- “Apertures”: TraxMaker apertures are now supported using the same algorithms as Protel.
- “Directory- Zip- Guess”:
 - o Gerber files that use CR/LF as a block delimiter. Dialog boxes now have radio buttons for Asterisk or CR/LF block delimiters.
 - o G70/71 (inch/mm) will be recognized in extended Gerber files.
 - o Will now gray out parameters defined in files so that the user cannot change things like the Inch/MM.
 - o Will grey out Quadrant and 360 arc buttons only if G74/ G75 have been found, and G74/ G75 appear in the file before the arc commands (G02/ G03).
 - o Excellon files in inch will be set to 2,4 but won’t be greyed out in the view format dialogs.
 - o When “Format unknown files to known files” is checked in the options box; if the unknown file had m,n or in/metric defined, the algorithm will not change those values.

- **“File/Print”**

A new item has been added for the “Content” box: “Visible layers (combined)”. This will print on one page all visible layers.

- **“Edit/Edit Selection”**

Because of new commands that needed to be added to this submenu (see “Replace M-Type Pads With Primitives”) and to prevent this submenu becoming too long, it has been slightly **reorganized**. A new submenu **“Special”** has been added, which contains the above mentioned new command as well as “Match Two Points” and commands that used to be in the “Arcs” submenu. These commands are likely to be used less often, so they are separated in this submenu.

- **“Edit/Edit Selection Swell”**

speed has been improved, especially for swelling large polygons.

- **“Edit/Edit Selection/Polygons”**

“Make Well Formed” and **“Chords To Arcs”**: More accurate results are computed.

- **“Setup/Layers”**

The height of the rows in the layers dialogs is now remembered and restored. The height can be adjusted by moving the cursor to the border of two rows, waiting for the cursor shape to change, then dragging the border to the desired position.

- **Visibility Toolbar**

A new button has been added for the **visibility of polygons**. A group of four buttons have been added to control how the **selected** elements are displayed (two of these modes are new in this version, see below).

- **Insert Toolbar**

A new button has been added for the new “Insert Chamfer” tool.

New features 9.0.50:

- **For the context menu (the right-click menu over the view)**

the most recently used command will appear as the first entry of the context menu, to facilitate repeating the same command.

- **“Edit/Edit Selection/Arcs/Break Into Quadrants”**

same as “Tools/Convert Arcs/Break Into Quadrants”, but works on selected arcs.

- **“File/Import/Drill & Rout”: “Options/Options”**

new options added for importing Excellon files.

The purpose of this new option is to specify the user desired handling for the “Block Delete” command (the slash (“/”)) at the start of a block. There are now three possibilities in the new “**Block Delete**” box:

(1) Follow BLKD command: the BLKD command in the header of the file will specify whether blocks marked with slash will be read in or ignored. The two forms of the BLKD command are “BLKD,ON” and “BLKD,OFF”.

(2) Read in always: BLKD commands in the header are ignored and blocks marked with slash are always imported.

(3) Delete always: BLKD commands in the header are ignored and blocks marked with slash are always deleted (ignored).

Note that the last two options will override any BLKD setting in the header of the Excellon file.

- **“File/Save Options”**

The two options: “Include Net Info” and “Step And Repeat Blocks” have been moved to a new dialog: “Preferences”. This dialog also has a new item, the desired version number of the jobfile (.bin file).

With newer versions of the CAM software, as more features were added, the jobfile format needed to be updated. The current version of the jobfile format is 9, but it is in general not directly related to the version number of the software. Older versions of the software can of course not read these new jobfiles, so the option has now been added to save older version jobfiles when needed.

When a user chooses for output an older version jobfiles and the job contains elements and features that cannot be represented in that version, those elements will be dropped or converted (if possible). The user will be prompted before the output.

For a short history of jobfile version numbers press the “Info” button in the “Preferences” dialog. This feature is especially useful when saving files for the Pulsar photoplotters. The Pulsars cannot accept files newer than version 6.

- **“File/Export/Cutter Code (HPGL)”**

There is now an “Options” dialog that allows specification of whether to output pads and the manner in which they are output. There are three choices: pads are not output, they are output as a “Pen Down” or they are output as a small circle. Previously pads were always ignored.

- **“File/Import/Guess or Zip or Directory”**

Filenames with the extension of “.err” will be ignored. Files that have import parameters defined in the file, will be displayed with those parameters grayed out (cannot be changed).

New features 9.0:

- **A new layer type has been added.**
The new type is a generic plane layer type. Previously there were five power layer types (PW1-PW5) and five ground layer types (GD1-GD5). In addition to these, there are now 99 generic plane layer types (P01-P99). They can be used for netlist extraction for either ground or power plane layers.
- **A new navigation aid has been added.**
One can now **drag the view** by dragging the mouse (with the left button pressed) while both the Ctrl and Alt keys are pressed. Since redraw times can be long when a lot of data is loaded, the drag can be done in real time or not. This real time feature can be enabled or disabled via "Setup/Preferences/Drag View In Real Time" or "View/Preferences/Drag View In Real Time".
- **Commas as decimal separators.**
In the case of numbers typed into dialogs: commas can now be used as decimal separators (as well as points) to facilitate data entry in countries where the point is not the decimal separator. So the numbers "1.2345" and "1,2345" will be considered the same.
- **"File/Import":**
 - "Guess": a new command for importing files of unknown type or format. The software will attempt to guess the type (Gerber, DPF, Excellon, netlist, etc.) and (where applicable) the format (Leading/Trailing etc.). The file is then imported into the current layer.
 - "Aperture": the wizard now has an additional radio button: "TCodes". When selected, only a tool code and a drill size need be identified. The wizard will translate the codes into Tool codes rather than D codes.
 - "Directory" and "Zip"
Now recognizes bitmap files (.BMP), and netlist files.
- **"Insert/Text"**
 - A new checkbox has been added to the "Add Text" dialog called "Grouped". This will determine whether the newly inserted text will be grouped or ungrouped. It was done so that users who prefer the old (ungrouped) way of storing text do not need to do an "ungroup" after the text is inserted (one can always do an "ungroup" after the fact using "Edit/Edit Selection/Text/Ungroup").
 - A new font has been added: ODB Standard.
- **"Edit/Edit Selection/Replace Arcs With Chords"**
Same as "Tools/Convert Arcs/Approximate By Chords" but works on the selected elements only. Note that the "Tools..." function works on all active elements that are inside the frame.
- **"Edit/Edit Selection/Step And Repeat"**
A new way to load the step distance. There is now a button to the right of the Step X and Y fields (labeled "<"). When pressed it will load the step fields from the current values of the X and Y boxes in the "Screen" toolbar. Most useful when the display is in relative mode or distance measurement mode.
- **"Setup":**
 - "Preferences":
 - o **"Drag View In Real Time"**: see the "drag the view" item above.
 - o **"Ignore Preferences From Jobfiles"**: affects the processing of user preferences and parameters when job files (binfiles) are opened. When checked, these preferences will be ignored (the data in the job files is of course read in). Some users prefer to have the preferences set a certain way and do not want them changed by opening a job file. One example of a set of such preferences are the

Gerber import options (from “File/Import/Gerber/Options”).

- “D Codes”: a new command to quickly go to the first unused D Code following the current D Code (“Goto/Next Unused”).
- “Frame/Visible”: command to turn frame visibility on or off.
- “Advanced/Intensity Contrast By RGB”

this defines how the color intensity contrast is done for the following commands:

“View/Visibility/Element/Options/Show Pad-to-Trace Contrast As Contrasting Intensity” and

“View/Visibility/Selected/Display In Contrasting Intensity”:

- o When , the contrasting color is taken from the table of fifteen defined colors. The table is conceptually divided in two halves, where the lower half (colors 1-7) is usually the “low intensity” half and the upper half (colors 8-15) is usually the “high intensity” half. The contrasting color will be the corresponding spot in the other half (so 1 and 9 are contrasting, 2 and 10 etc).

Note that the actual colors in the table of 15 can be redefined by the user in an arbitrary fashion, so the two halves may not really reflect the “low intensity”/“high intensity” division, but the contrasting mechanism will stay the same.

- o When checked, the contrasting color will be derived by flipping the high order bit of each R,G,B component of the layer color. For instance, the color that is normally color “1” in the fifteen color table (Dark Blue) has R=0, G=0, B=127 (7F hex), so the contrasting color will be R=128, G=128, B=255 (a color that is not in the default fifteen color table).

Some users prefer this mode, although it can be problematic. For instance: a color very close to the Dark Blue from above, for instance R=0, G=0, B=128 (80 hex) will contrast to R=128, G=128, B=0, which is quite different to the previous contrasting color.

- **“Location and Dimensioning Tool Setup” dialog**

a new mode for the number of digits after the decimal point has been added: “**Exact**”. When this option is chosen, that exact number of digits will appear after the decimal point including any trailing zeros. This is useful when the number of digits after the decimal point imply a tolerance for the drawing. The old mode of “Maximum” still exists and works the same way – at most that many digits will be generated, but trailing zeros are dropped.

- **“Go/Favorite Positions”**

A new command has been added, “**Remove All**”, to clear the current list of favorite position (leaves the list empty).

- **“Help”:**

- “Check For Updates”: Checks the PentaLogix website and reports if there are newer versions of the software available for downloading.
- “Release Notes”: To read the release notes for the current version.

- **New accelerator keys (shortcut keys):**

File/Import/Drill	Shift+F2
File/Import/Guess	F4
File/Import/Directory	Ctrl+F4
View/Toolbars/Navigation	Shift+F12

- **“View”:**

- “Toolbars/Editing”: the “Delete” button has been moved to the end of the toolbar. Some users have complained that it was too easy to press it by mistake.

- **“Edit/Edit Selection/Swell”**
previously, if N-type D Codes were in the selection, an error message was displayed and the swell was not done. Now, N-type D Codes in the selection can be swelled, but only if all of the D Codes of that tool number are in the selection (otherwise a transcoding of the tool number would be necessary and this is currently not supported).
- **“Insert”:**
 - “Text”: the font of the dialog has been changed to Courier, which is a fixed width font. This facilitates entering tabular data into the “Text” box (columnar text where the columns need to line up). Note that for this to work the chosen CAM software font should also be of fixed width (one of: DMPL, Uppercase, ODB, 4X7 or 5X7).
 - “Location”: the coordinates that are inserted will be relative to the “Relative Origin” when in “Relative” mode.
- **“File/Import”: “Directory” and “Zip”**
the transcoding report (if there is one) is written to the directory of the imported file(s), with name “Transcode Report.txt”. Previously the user settable report file path was used (from “File/Report/Set Name”).
- **“Tools/Generate Outlines/Vector”:**
 - All D Code shapes are now processed correctly. In the past, more complex shapes were approximated by rectangles.
 - The result of the outlining operation is polygons, instead of F-type traces. If the F-type traces are the desired result, the polygons can be converted to that by using the “Edit/Edit Selection/Polygons/Polygons To F” command.

Important note for those who use the Macro command “.GenerateOutlines”: you will need to change your code to convert the polygons to traces (as mentioned above) after calling “.GenerateOutlines”.
- **“Tools/Convert Drawn Pads/Global”**
speed has been improved and results are more accurate.

New features 8.4.50

- **Layer Visibility**
“View/Visibility/Layer” Two new commands have been added to facilitate turning ON and OFF groups of layers:
 - “Make Visible” - Shift+F10
 - “Make Invisible” - Ctrl+F10

One can type a list of layer range, such as “2-4, 14, 20-23” and this list can be interpreted as either layer numbers or board layer numbers (determined by the “Board Layer” item in the dialog).
- **High Resolution Only**
“File/Save Options”: The “**High Resolution**” option has been removed. Binfiles are now always saved in high resolution. Low resolution is only needed for versions 6.0 or earlier of the CAM software.
- **Scroll Bars Changed**
“View/Scroll Bars”: the scroll bars now scroll over the loaded data rather than over a user defined workspace (“Setup/Preferences/Workspace”). For instance: moving the horizontal scroll bar to the leftmost position will place the view over the left margin of the loaded data.

New features 8.4.10

- **Elements Overlapping Cursor**

“View/Info/Elements Overlapping Cursor”: A new command to provide information about elements covering the cursor. A list of all the elements (pads, traces etc.) which cover the cursor will be displayed. This is useful when investigating pad stacks, as it is difficult to know how many pads there are on top of one another. It can also be used in troubleshooting connectivity as one can see the net names of all elements that connect at a certain point.

- **Exporting Polygon Data**

“File/Export” Gerber varieties: Improved rounding of polygonal data when exporting to lower resolutions (lower than .6 in English or .5 in metric).

New features 8.4

- **Navigation View**

A navigation view has been added to show an overview of the relative positions of the current view and the visible data and to allow quick modifications of the view (“View/Toolbar/Navigation”). The current view is represented as a black rectangle and the extents of the visible data are shown as a filled green rectangle.

As opposed to the other toolbars, the Navigation View is not dockable, as its square nature would cause it to take up too large an area of the screen. However its size and position can be modified by the user and it is remembered and restored at the next activation of the software. The input focus can be shifted to the Navigation View by clicking on it or by pressing Ctrl+PgUp. While in the Navigation View Ctrl+PgUp will transfer control back to the main view.

The Navigation View window responds to the following user interaction:

- Left mouse button drag-and-draw:
the view will match the user drawn rectangle.
- Left mouse button click:
will center the view at the spot of the click (at the current zoom level).
- PgUp:
zoom up (same as pressing PgUp in the main view).
- PgDn:
zoom down (same as pressing PgDn in the main view).
- Arrow keys:
pan the view in the direction of the arrow.
- Home:
Same as pressing Home in the main view.

- **Wheel Mouse Support**

Added support for navigation with a **wheel mouse** and support for the middle button of three-button mice:

- Rolling the wheel zooms in and out. Rolling forward zooms in and backwards zooms out. Each click zooms the same amount as a PgUp or PgDn would do. This mode is only active if the scrollbars are off. When the scrollbars are on, rolling the wheel will normally scroll up and down.
- Clicking the wheel (or middle-button of a three-button mouse) will pan the image so that the spot where the click happened will end up in the center of the screen. This is similar (though not identical) to using the End key. One can pan repeatedly in one direction by making sure that the arrow and crosshair cursors are not joined, then moving the arrow cursor close to one of the window edges and clicking the wheel repeatedly.

Notes about setting up the mouse: Mouse button actions and properties can be set up in the Windows Control Panel. The wheel is often set up to cause a scrolling action and pressing the wheel (or middle button) is sometimes set up to simulate a left button double-click. These are user preference that can be changed if desired. This is how these settings interfere with the new features introduced above:

- Scroll:

If the wheel is set to scroll (in the Control Panel) and the CAM scrollbars are visible, then moving the wheel will scroll vertically rather than zoom. This action was present in older versions of the software as well. Note that if the scrollbars are not visible ("View/Scroll Bars") then the setting in the Control Panel does not matter.

- Middle Button:

If the wheel (or middle button) click is set to some other action (other than "Middle Button" or default), the panning described above will not work. Instead, pressing the wheel will activate whatever action it has been programmed to generate in the Control Panel.

So, if the new functionality is desired, one must make sure that the mouse is set up as desired in the Windows Control Panel. In certain cases (depending on the type of mouse) the action of the buttons can be programmed per application, so one could have a particular setting for the CAM software and a different one for other applications.

- **"Setup/Layers" (F10):**

- By layer or Board Layer:

These two views of this setup dialog are now available. The first:

- o By **Layer**

is the same as the operation of this dialog in previous versions.

- o By **Board Layer**

shows only board layers (one entry per board layer).

When one changes a setting for an entry in this mode, all layers in that board layer will be changed. For instance, changing the color of a board layer will cause the color of all layers in the board layer to be changed.

- Right Click Mouse:

The context menu (right mouse click) has several new commands. Two commands that previously showed up only when clicking on top of the "B Layer" column heading now appear at all times. The new commands are

- o "Move Up",

- o "Move Down"

The "Move" commands will move (up or down) by one position a sequence of layers starting from the layer that one clicks on and continuing with all successive loaded layers (until the next empty layer is reached). This is useful (for instance) for making an empty spot to insert a VIA layer.

- o "Insert Selection"

"Insert Selection" will move a selected layer (or range) to the location where one clicks. Loaded layers in the destination range will be moved up to make room for the inserted layers. This command is useful for rearranging the order of layers.

The previously existing commands that now always appear on the context menu are "Renumber board layers" and "Order layers by B Layer".

- **Layers Toolbar**

context menu (right click). Two menu entries have been added:

- "Board Layer ON"

- "Board Layer OFF"

These will turn the visibility of a whole board layer ON or OFF that is for all the layers that are part of that board layer.

- **Remember Directory for Import**
 "Setup/Remember Directory for Import": If set, the File/Import dialog will open in the directory last used for a File/Import operation.
- **Import Files**
 "File/Import" has a new feature:
 - "Drill":
 added support for the following Sieb & Meyer format commands:
 M97, M98 (Drill Plain Text), G84 (Nibble Hole), G85 (Nibble Slot).
- **Export Files**
 "File/Export" has these features:
 - "DPF":
 export in Barco DPF format as documented in "DPF Format Description", DPF Version 5, November 1998, Barco Graphics.
 - "Drill":
 - For Excellon format: a new option for exporting Step & Repeat blocks: "R Repeat Blocks". If **checked**, repeat codes (R#) will be used when possible. If unchecked, repeat codes will not be used and each M02 block will be output by itself. This is useful for machines that do not support the R codes and to minimize the number of M01 (End of Pattern) commands, as there is a limitation of at most 3 nested M01s (Excellon spec).
 - for Sieb & Meyer format: support for G84 (Nibble Hole) and G85 (Nibble Slot).
- **Polygons with Holes**
 The ability to replace polygons with holes with a set of polygons without holes. This is useful for many reasons. One is that the Gerber syntax for polygons (G36/G37) does not allow specification of certain polygons as being holes inside other (containing) polygons. As a result, in order to represent polygons with holes in Gerber one has two options:
 - Make the holes scratch entities (on a separate layer)
 - Decompose the polygons with holes into a set of polygons without holes (which fit together similar to a jigsaw puzzle).
 Method (2) has been added in this release. It appears in two places:
 - "Edit/Edit Selection/Polygons/Decompose Into Strips":
 Will replace any selected polygons that have holes with a number of horizontal polygonal strips without holes, such that the result will represent the exact same copper (same image).
 - New Tab:
 A new tab in the "File/Export/Gerber" Options dialog called "Polygons":
 It has two choices for exporting polygons with holes: "Put holes in scratch layer" and "Decompose into strips". Note that this does not modify the database itself, it just controls how the polygons are exported. Also note that this tab does not appear for exporting MDA Gerber data, as polygons with holes can be represented using POIN/POEX D Codes.
- **Custom Shapes - Polygons with Arcs**
 (D Codes of type M) can now contain polygons with arc edges. Previously only polygons with straight edges were stored and arcs were replaced with approximating straight edges.
 These types of shapes can be generated from several sources:
 - File import
 - D Codes table/Dimensions/Build Shape:
 when the frame includes polygons with arcs
 - Tools/Convert Drawn Pads/Global:
 when the convert pads included polygons with arcs Note that if these shapes exist in the data and a

binfile is saved, a new version of the binfile will be written (version 7) which will not be accepted by older versions of the software.

For exporting Gerber extended variants: The standard Gerber extended does not have a polygon primitive with arc edges (for custom shapes). When exported these edges will be replaced with chords. The MDA extended Gerber format allows arc edges for the polygon primitives.

- **New Edit Selection Features**

“Edit/Edit Selection” has these new features:

- “Swell”:

a new option has been added - “Transcode all swelled D Codes”. If checked will force all D Codes that are swelled to be transcoded even when no unselected elements of that D Code exist. This is useful when preserving the integrity of the original D Codes is desired.

- “Match Two Points”:

This is a general purpose transformation which combines translation (move), rotation and scaling in one step. The user picks two pairs of points. The transformation is done so that the first point in each pair is transformed into the second point.

Note that although all elements in the selection are transformed, the D Codes with which they are drawn are not. Because of this, it is most useful for transforming polygons.

- “Step And Repeat”:

added the ability to edit and change step-and-repeated data. The procedure is the following:

(1) Select the step-and-repeated data.

(2) Do “Edit/Edit Selection/Step And Repeat/One-up”. This will remove the step and repeat from the selected data and make the result ordinary data that can be edited and modified. Up to this point all of the above was available in previous versions. What we have added is that after “One-up” is done the “Step And Repeat” menu will show the step-and-repeat parameters that have just been removed (counts and displacements) at the bottom of the menu (in a list of up to 5 recent step and repeat parameters). These parameters can later be reapplied by just selecting the menu item.

(3) Edit the one-up data as desired.

(4) Select the data for which the step-and-repeat needs to be restored, then pick the step-and-repeat parameters from the bottom of the “Step And Repeat” menu.

When step and repeat blocks are nested, this procedure may need to be repeated several times if the data to be edited is in some inner step-and-repeat block.

- “Polygons”

- o “Separate Holes”:

For all polygons with holes in the selection: remove the holes and add as separate polygons.

- o “Group Holes”:

Group all the contours in the selected polygons and attach as holes contours that are included in others. A contour is defined as a closed path component of a polygon and could be a container or a hole.

Note that for polygons that do not overlap a “Separate Holes” followed by a “Group Holes” will reconstruct the original polygons.

- o “Replace With Fill”:

Selected polygons will be replaced with filled areas using traces of a D Code specified by the user. This D Code must be of shape “C”. Note that to achieve the same result in the past, the polygons had to be converted to F outlines and then one could use “Tools/Fill Polygons/Solid”.

- **Insert Text Spacing**

Extra Spacing - items added for extra character and line spacing. Character and line spacing can be increased by entering the desired values in the dialog boxes. Use 0 for default spacing.

- **“Go”:**
 - “Center Of Selection”:
moves the cursor to the center of the bounding box of the currently selected elements.
 - Center of Element:
“Active Element/Center of Closest”. Similar to “Active Element/Closest” except that the cursor is moved to the center of the element. Most useful for polygons. Shortcut is Ctrl+Shift+A.
- **Shortcut keys:**
 - Layers greater than 9:
To make active a layer number larger than 9. It was previously not possible to quickly set active a layer number that had more than one digit. Pressing any of the digit keys would make the corresponding layer active.
To set higher numbered layers the Ctrl+Shift modifier has been added. So to set the active layer to 24 and should do the following:
Press Ctrl+Shift, while keeping Ctrl+Shift pressed press 2, then 4, then release Ctr+Shift. This would be 3 keystrokes. Note that this does not save many keystrokes over the already existing way (“Setup/Layer/Active (L)”), which would have required: L, 2, 4, Enter (4 keystrokes).
However, some people seem to prefer the new method.
 - Dimensioning Tool:
For the dimensioning tool (Insert/Dimension): Ctrl overrides the “Extended bars” setting in the setup dialog.
- **View Loaded Data From 0,0**
“View/Zoom/...Include (0,0)” This affects the operation of the “View/Zoom/To Show All” (Home) command. If “...Include (0,0)” is set then the origin (coordinates X=0, Y=0) is always included in the data displayed even when it is outside the loaded data (this is how to Home command worked until now). Sometimes it is desirable to only display the loaded data, as the origin can be far away from it. The user has now the option to pick the preferred mode of operation for this command.
- **Changes to Printing Routines**
“File/Print”: The graphics rendering routines for printing have been changed. Windows GDI routines are now used instead of rendering to a bitmap and then sending the bitmap to the printer (as was done previously). As a result, printing should now work for all printers. Previously some printers did not work properly because of memory limitations (the bitmaps were too large) or raster operation limitations. This change should also allow capturing the image in a PDF file (with Adobe Acrobat Distiller) or a Post-Script file.
Note: This new method does not work on Windows 98 or ME, in which case the old method (bitmap based) will still be used. It does work on Windows NT, 2000, XP, 2003 Server.
The color output options have been reduced to two: “black on white” and “colors on white”. Note that colors will not be translucent when printed (this is different from how the colors show on the computer screen). When running under Win98 or ME an additional checkbox is shown called (“Negative”) which will cause the bits in a “black on white” output to be inverted (this is needed on some printers).
- **“File/Import”:**
 - “Job”: “Options”:
Origin selection has been removed. Origin is now always at (0,0). Allowing to set the import origin in a sub-dialog was confusing and dangerous. The imported data can always be moved later if that is desired.
 - “Gerber”:
 - o The user is warned if a self-intersecting polygon is encountered in the input.
 - o The “Full circles in polygons” settings has been removed from “Options/File Interpretation”. The

- “Ignore” choice caused full circles to be silently ignored, which was a problem for many users.
 - “Netlist”:
Misaligned X and Y coordinates in the “Feature Location” field (columns 42-57) are now accepted. The IPC spec states that they should be right justified, but we have seen files where they are left justified. Previously this was considered an error.
 - “Directory/Zip”:
Files that contain all the necessary format information such as Extended Gerber will be displayed in “blue”. The options menu now has a checkbox “Format unknown files to formatted” If selected, files that do not contain all of the format information (such as drill files) will be formatted/scaled to fully formatted files (such as Extended Gerber). These files will be displayed in green and can still be edited.
 - “Aperture Wizard”:
A new checkbox has been added in the third menu titled “Treat commas as decimal ex: 1,00 = 1.00” This will allow the aperture wizard to import files using the European style of decimal identifiers.
- **“File/Export”:**
 - Gerber Extended:
Custom apertures that contain arcs cannot be exported in Extended Gerber because there is no corresponding command to represent them. Previously this caused error 115 and the export aborted. The user then could have converted the custom aperture to replace the arcs. In this version arcs in custom apertures will be automatically exported as sequences of chords.
 - Gerber Varieties:
Improved rounding of polygonal data when exporting to lower resolutions (lower than .6 in English or .5 in metric).
- **Setup Layer Improvements**
“Setup/Layers” (F10): Position and size of the dialog as well as the widths of columns in the table are now saved in the registry and restored next time the program is started. Note that the width of the columns can be modified by the user by dragging the column separators.
- **Replicate to Non-Contiguous Layers**
In the Layers Toolbar; layers can now be replicated to a number of layers that need not be contiguous. Previously only a range of contiguous layers was allowed as the destination.
- **“Edit”:**
 - Chords to Arcs:
“Edit Selection/Polygons/Chords To Arcs”; improved detection of arcs.
 - Transcoding:
“Edit Selection/Transcode”; The “First Unused” option has been changed to “First Unmapped”. This will pick the first D Code that is either not present in the D Code table or has shape of type “?” (unspecified).
 - Aligning Layers:
“Move Layers/Align”; the guide element needs to be selected and to be the only selected element. Previously the guide element was the one from the last “element align with properties” (Shift+A) operation. The new method makes the identity of the guide element clearer.
Also, previously the guide element was only matched against elements of the same D Code. There is now a new setup command “Move Layers/Align Method” that allows the user to pick the method to be used: same D Code (as before), same shape type and same shape (shape type and shape dimensions).
- **TEXT is now Grouped**
The internal representation of text has been changed.

In previous versions text was stored as a sequence of strokes (traces or pads) which were not distinguishable from other (non-text) traces and pads. With this new implementation text is a separate entity (a composite element) so that it can be modified later (by editing the text string, changing the font, rotation etc.) This modification can be done with “Edit/Edit Selection/Text/Change” after selecting one (or more) text blocks. When selecting only one text block, all parameters of the text (including the text string) can be changed. When more than one text block is selected, only parameters that have the same value can be changed (the others are grayed out). An exception to this rule is the font, which can be changed even if the selected blocks have different fonts.

Note that there are other methods to change parameters that are not common to all blocks. For instance one can change the D Code of a group of text blocks by using “Edit/Edit Selection/Transcode” (as one would for other elements).

One can ungroup text by using “Edit/Edit Selection/Text/Ungroup”. This will transform the selected text blocks into their stroke representation (normal traces or pads).

- **Select Text**

The Selection Toolbar criterion dropdown has a new added item called “Text” which can be used to select or navigate over text blocks. Text blocks can only be edited with operations that would result in another text block. So, for instance, moving, rotating and mirroring are allowed, whereas scaling can preserve text blocks only if the two scale factors (X and Y) are the same. If there are not the same, scaling will be done but the text will be ungrouped before the scaling operation.

For other commands, if one finds that they do not affect text blocks in the desired fashion the work-around is to ungroup the text blocks first.

Text blocks will be ignored by most of the commands under “Tools”, except Netlist, DRC and “Generate Soldermask”. Note that for netlist extraction the copper of text blocks is taken into consideration when computing connectivity (of other circuit elements), but no net numbers are ever assigned to text blocks. Binfiles that contain blocked text will not be readable by older versions of the CAM software. If you need to send such data to users of older versions make sure to unblock all text blocks before saving the binfile.

- **“Insert/Loc and Dim Setup”**

a new parameter has been added: “Max digits to the right of decimal”. This can be used to control the precision of the inserted text for location or dimension. Possible values are from 0 to 6 inclusive.

- **“Tools”:**

- “Design Rules Check/Load Errors from File”:

More than one file can be loaded at the same time (with the same load operation). This allows the display of the contents of several files simultaneously. One example where this would be useful is for viewing together the results of several different DRC operations done with per layer rules.

- “Convert Drawn Pads/Global”:

The algorithm for detecting and converting the pads has been improved

New features 8.2.5

- **Auto-Snap to Elements**

“Go/Closest/**Auto-Snap**”. When activated, will cause the cursor to snap to the closest active element before certain operations: element insertion, move etc. These are the same operations that cause the cursor to snap to the closest grid point when the grid is on. Auto-Snap uses the same criteria as Go/Closest/Align (“A”) except that a tolerance is in effect: elements that are farther than the tolerance will not be considered.

When both the grid is on and Auto-Snap is active, Auto-Snap is tried first.

One example when this is useful is when inserting traces that need to align with existing traces or pads.

- **Dimension Tool**

- "Insert/Dimension"

- New dimensioning tool (similar to the "Insert/Location" tool).

- Will insert dimensioning text and arrows. It is a three-step operation:

- (1) Pick the point to measure from

- (2) Pick the point to measure to

- (3) Pick the desired location of the dimensioning text, arrows and bars

- There is a separate setup dialog (Insert/Loc and Dim Setup) for specifying the text size and font as well as various options. This dialog is common to this and the Insert/Location tools. It can also be activated using a context menu (right click) while any of these two tools is active. The options that are specific to the dimensioning tool are:

- Forcing Measurements

- to always be horizontal or vertical (depending on whether the vector from step (1) to step (2) is closer to the horizontal or vertical). Note that this setting can be temporarily overridden by pressing the Shift key while picking point (3).

- Extending the Bars

- to reach close to the step (1) and (2) points.

- **Polygon Features**

- "Edit/Edit Selection/Polygons"

- "Make Well Formed":

- Replaces any malformed polygons in the selection with well formed ones. Well formed polygons have no intersecting edges (except at vertices) and no overlapping edges.

- "Chords To Arcs":

- Approximates sequences of chords with arcs for polygons in the selection. The user can specify a tolerance. The new selection will consist of the changed polygons. If none were changed, the selection remains as before.

- "Arcs To Chords":

- Replaces arcs with sequences of chords that approximate them. The resulting polygons will contain no arcs. The new selection will consist of the changed polygons. If none were changed, the selection remains as before.

- **Convert Drawn Pads to Flash**

- "Tools/Convert Drawn Pads/Global"

- This is a new way of converting drawn pads to flashed pads that uses contouring methods and acts on selected elements. Drawn pads in the selection will be replaced with flashed pads and the resulting selection will be the newly generated flashed pads. There are two methods available: "standalone drawn pads" and "using a guide layer".

- The standalone pads method should be used when the drawn pads are not continued with traces (or when such traces have been removed from the selection).

- The guide layer method uses elements in a different layer (the guide layer) to pinpoint the location of the desired drawn pads. Only those elements in the selection that are completely covered by drawn areas in the guide layer will be used for finding drawn pads. For the purposes of this computation the drawn areas in the guide layer can be inflated or deflated by a "Margin", if desired. Usually the guide layer is the soldermask layer, but it could be any other layer chosen by the user.

- Once blobs have been isolated (in either of the two methods) only those whose max dimension is within the user specified min and max ("From" and "To") will be considered. The resulting contours are checked against the following standard shapes: C, S, R, O, D, E and Q using a user specified "Tolerance". If none of these standard shapes match and the "Generate custom shapes" checkmark is set, then M type D Codes will be generated for these shapes. There is a sub option to this for allowing for concave custom shapes. Normally such shapes are undesirable as flashed pads. An example of a concave shape is a cross,

whereas an octagon is a convex shape. Holes are only allowed in C and S shapes. Note that M shapes will contain a polygonal outline. Since the extended Gerber specification does not allow for arcs in custom shape outlines, all arcs will be converted to approximating chords.

The elements in the selection that have been matched will be deleted and replaced with flashed pads.

Note that if selection already has a pad that covers the whole area at a conversion spot, that pad will be preserved (existing D Code preserved) and any elements covered by it will be deleted.

The starting D Code for the newly generated pads can be specified by the user, as well as the resolution of such shapes (all newly generated shapes will be rounded to the specified resolution).

- **Select by Intersection**

“Select/By Intersection”; Narrows an existing selection depending on the intersection of elements in the selection. The selected elements in the reference layer will be checked against the selected elements in the destination layer. Only those elements in the destination layer selection that satisfy the intersection criteria are preserved in the selection (all other elements are removed from the selection, even from other layers). For the purposes of computing the intersection, the elements in the destination layer will be considered inflated/deflated by a given margin (which can be 0).

The destination layer and the reference layer can be the same in which case the selection will be tested against itself (all elements in the selection versus all others).

Elements that have zero width either as they are in the database or after being deflated by the margin will be ignored during this operation.

- **DRC Enhancements**

“Tools/Design Rules Check” now has these new improvements:

- Gaps within Same Net:

New in “Options” tab: “Check gaps within same net”. When ON, gap errors will be checked even for elements that are in the same net (electrically connected).

- Display Errors with ‘X’:

“Display Errors” has an added option “X marker for all”. When ON, an X marker will be superimposed over the display of all errors. This is to facilitate finding errors for which the display vector is short.

These are hard to see unless one is zoomed in on them. Previously the X marker was only displayed for errors that had a vector of 0 length.

- Saving Errors to a File:

Commands to save/restore the error information to/from a text file:

- o “Save **Errors** To File”

- o “Load **Errors** From File”

This is useful as a way to communicate this info to coworkers or save the information for future examination. Previously the DRC error info was lost when the job was closed. In addition, the resulting files are text files and could conceivably be used for further processing by custom software.

- **“Edit/Insert”:**

- Menu Location Has Moved:

The position of the menu has been moved to “Insert” (top-level menu), because this is a very commonly used submenu. Note that the shortcut key (Insert) still works even with the new location.

- Insert:

When inserting a trace-type (linear or arc), the outline of the shape to be inserted will be displayed around the cursor as a guide to the user.

- **Setup Selected Tools**

A new group has been added: Setup/Tool Codes (Shift+F5) with two buttons:

- “Type + Diameter”

Same as double clicking on the selected tools and will set the type and diameter of the selected tools.

- "Type Only"

Sets only the type of the selected tools, keeping their diameters.

- **Extended Gerber Parsing**

Changed to where LP (layer polarity) commands do not reset pending G36 (polygon area fill) commands.

We have seen customer files of the form:

G36*%LPD*%X-1757Y13D02*...G37*

Previously the LPD command would reset the G36 and the polygon would be lost (replaced with outline traces).

- **Compare Layers Supports Polygons**

"Tools/Compare Layers": support for polygons has been added. Previously polygons were ignored during this operation. Also the option to transfer to another layer has been removed and the results are always returned as the new selection. If so desired, the user can always transfer the result after the comparison is done.

- **Transcoding D Codes**

"Edit/Edit Selection/Transcode" (Ctrl+T): When the user is prompted for the D Code to transcode to, a choice is given between the current D Code and the first unused. Previously only the first unused would appear. Some users preferred the current D Code as they have just set it up in the D Code table in preparation for the Transcode operation.

Bugs Fixed

11.24.50

- **EMS Magician**

MouseBite must validate the position to not crash to another MouseBite or edge segment
Rails were not using Advanced Rail Option values
Add fiducials in rails is not working
Rails should be applied in all the panel

11.24.43

- **EMS Magician**

The option to insert mouse bites using 'Closest to click location' is not working at all.
Panelizer program is generating wrong mouse bites
Removing mouse bites and inserting them again is working wrong.
Sometimes mouse bites are added to the lower-left corner instead of the selected position.
Adding 2, 4, or 5 mouse bites doesn't display the holes correctly.
Finalizing the process to add Mouse Bites is not generating the array.

11.24.41

- **Import ODB++**

Failed when importing .zip files

11.24.40

- **Licensing**

Failed when the license file (.lic) did not have the standard name

11.24.20

- **Export Drill**

The “F, S, B, H, Z parameters, if present” and “F, S, R, N parameters, if present” did not work as expected.

- **Import DXF**

11.24.11

- **D Codes Table (F5)**

Clicking on Angles column header to sort did not work as expected.

- **Stencil Generation**

Bugs fixed.

11.24.3

- **Export Gerber X2**

Crashed on certain data.

- **Arcs**
Converting arcs between English and metric units generated incorrect arcs in some cases.

11.24.1

- **"File > Open" did not update the job name.**
- **Convert Negative to Positive Crash**
- **Tools > Convert Drawn Pads > Global**
Slightly different shapes were recognized as the same.

11.22.30

- **Tango Aperture Import**
- **Export DPF**
Incorrect for rotated shapes

11.22.24

- **Incorrect rendering of small polygons at certain zoom levels**

11.22.21

- **Convert Layer to Positive**
Used the frame instead of board outline layer.

11.22.16

- **Import ODB++**
s_ths import problem.

11.22.12

- **Component Layers**
Some mirrored and rotated components were displayed incorrectly.
- **Gerber Export or Rotated Rectangles**
Rotation was lost in certain cases.

11.22.10

- **Stencil Homebase**
The facing out option was ignored.

11.22.2

- **D Code mirror**
Failed on rotated D Codes.

11.20.29

- **Gerber X2 import**
TO and TD directives misinterpreted.

11.20.24

- **Import > Directory**
Failed on certain data

11.20.16

- **Import ODB++**
Some step-and-repeated ODB files were imported incorrectly.
- **Tools > Stencil Apertures**
V Homebase did not work.

11.20.11

- **Tools > Stencil Apertures**
V Homebase did not work.

11.20.10

- **Import DXF**
Some arc edges were imported as straight.

11.20.7

- **Import ODB**
Some component files were imported incorrectly.
- **Stencil Homebase**
Generated incorrectly oriented parts.

11.20.4

- **Import ODB**
Some component files were imported incorrectly.

11.20.2

- **Bugs in Import IPC-2581 fixed**

11.18.52

- **Stencil Apertures**
Custom apertures from model files were processed incorrectly.

11.18.51

- **Stencil Windows**
Some irregular shapes were processed incorrectly.
- **Import Gerber X2**
Component and net info was imported incorrectly.
- **View > Selection > D Codes**
Only one D Code of the same size was shown. Same for View > Selection > Tool Codes
- **Import DXF**
Some files with splines were imported incorrectly.

11.18.40

- **Move (Shift+M) Reference Frame Disappears When Zooming**

11.18.37

- **Setting Max Undo Memory**

11.18.36

- **Swell Polygon Bug Fixed**
- **Fix ODB++ import bug**

11.18.29

- **Trace Stretching**
Some trace editing command generated incorrect results.

11.18.22

- **Stencil/Windows**
Caused a crash

11.18.21

- **ODB Import Bugs fixed**

11.18.3

- **Some Gerber X2 Layer Types were Misinterpreted**
Copper layers.

11.16.73

- **Transcoding Tool Sizes by Dimension**
Generated incorrect results.

11.16.66

- **Expand Closed Trace Contour**

Did not allow for negative values, so contract was not possible.

11.16.64

- **Mirror Thermals**

Some thermals were mirrored incorrectly.

11.16.60

- **Some rotation operations generated incorrect results**

- **F to Poly failed on certain data**

11.16.59

- **Restored Windows 7 Compatibility**

11.16.55

- **Export Gerber**

Custom apertures that contained arcs were approximated incorrectly (too coarse).

- **Import ODB++**

Tool sizes were sometimes imported incorrectly on step and repeat steps.

11.16.53

- **Import ODB++**

Some polygons were imported incorrectly.

11.16.42

- **Crash in import ODB**

With new import module when components were missing outlines.

11.16.41

- **Print**

With certain settings, printing component layers (CMU/CML) caused a crash.

Release History

NOTE: Not all released versions appear in the list below

Version	Release Date
11.24.1	Feb 20, 2024
11.22.31	Jul 5, 2023
11.22.1	Jan 27, 2023
11.20.1	Nov 10, 2021
11.18.1	Sep 20, 2020
11.16.42	Jan 4, 2020
11.16.1	Jun 11, 2019
11.14.1	Jun 7, 2018
11.12.6	Feb 19, 2017
11.12.1	Dec 15, 2016
11.10.79	Nov 15, 2016
11.8.24	Aug 2, 2015
11.8.1	Feb 11, 2015
11.6.41	Dec 23, 2014
11.10.40	Jan 23, 2016
11.6.35	Sep 28, 2014
11.6.11	Dec 12, 2013
11.6.0	Aug 14, 2013
11.4.45	Jun 8, 2013
11.10.40	Jan 23, 2016
11.4.37	Mar 10, 2013
11.4.29	Dec 2, 2012
11.4.15	Jul 28, 2012
11.4.0	Feb 14, 2012
11.2.78	Nov 30, 2011
11.2.52	Apr 29, 2011

11.2.26	Dec 14, 2010
11.2.8	Sep 29, 2010
11.2.1	Sep 10, 2010
11.0.80	Aug 1, 2010
11.0.74	Jul 1, 2010
11.0.47	Apr 3, 2010
11.0.42	Mar 26, 2010
11.0.28	Feb 25, 2010
11.0.1	Dec 10, 2009
10.6.71	Sep 28, 2009
10.6.0	Apr 28, 2009
10.4.32	Mar 17, 2009
10.4.0	Jan 24, 2009
10.2.71	Jan 10, 2009
10.2.0	Oct 3, 2008
10.0.30	May 30, 2008
10.0.1	Mar 17, 2008
9.8.70	Dec 31, 2007
9.8.0	Sep 10, 2007
9.6.91	May 31, 2007
9.6.0	Jan 2, 2007
9.4.73	Jun 22, 2006
9.4.1	Mar 3, 2006
9.2.41	Jun 30, 2005
9.2	Apr 5, 2005
9.0	Aug 5, 2004
8.4.50	Dec 17, 2003
8.4	Oct 27, 2003
8.2.5	Feb 26, 2003

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