SENJA
Define Life
In Circuits

Hypertool Scripts
for Data Preparation

HyperTool is Ucamco's ground-breaking advanced customization resource for UCAM. Hypertool Scripts are a plugin to UCAM software. These scripts are compatible to any UCAM versions. Scripts have customizable UI and features and load the data on the CAM tool which makes the data preparation work easy as less time is consumed by eliminating user interventions.

SenjaTec with its knowledge and expertise in CAM related processes has created specific suites of scripts to cater to different needs during the CAM.

We expertise in developing custom tailored scripts which can be categorized into following groups:

1) Pre-CAM

2) Front End Engineering
(that includes 1-Up, Array and Panel).

Pre-CAM

Pre-CAM activity includes tasks like read customer supplied electronic data (Gerber files, drawings, etc.) in any recognized format, Layer alignment, Re-naming of layers and assigning layer attributes as per pre-determined naming conventions, Drawn to flash pad conversions, Contour drawn or filled areas, Assign feature attributes and Perform any other customer specific operations and prepare reports.
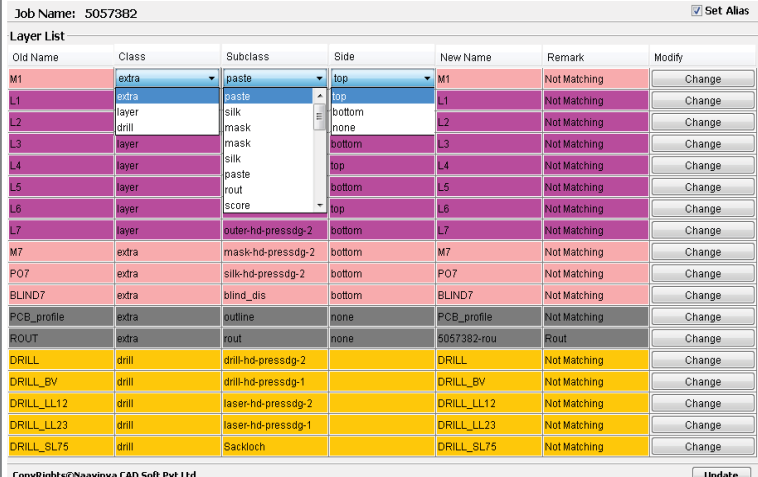
This suite has below scripts to accomplish these tasks during Pre-CAM:

Outline Creation:

The script creates outline layer with respective layer properties and outline objects in the layer, and is rounded off automatically as per parameters defined by the customer.

Layer Naming:

The script fetches layer details from UCAM to script window where the user can modify necessary layer parameters. (Refer *Figure 1*)

Figure 1

Clip Outside Outline:

The script highlights all features present outside the routing area and allow the user to decide whether to retain the selected features or to delete it, this removes the probability of deleting unseen important features in manual process and hence reducing process time.

Layer Verification:

The script checks all layers to identify Overlapping Contour, Invalid Arc, Reverse Aperture if present and list in the script window. With the help of the list same features will be highlighted in the UCAM window.

Net reference compare:

This script creates net reference layers for the first time, build a netlist and compare with net reference layers thereafter with just one click.

Double Drill Verification:

This script highlights double drills, embedded drills and can be customized to delete double drills automatically or move them to an extra layer with suitable layer parameters upon which the user can perform his actions.

Pad Registration:

The script aligns copper and mask pad with respect to drill points by providing an option to define pad registration value with respect to layer type to be aligned.

Front End Engineering

Front End Engineering activity typically includes the tasks like modify drill layer, as per customer specific tolerances, perform and repair DRC errors, Slivers and pin hole elimination, Repair/generate solder-mask layer, Perform silk screen (Legend) clippings, Generate any other job specific layers and drawings (peelable, carbon, gold plating, via plugging, mechanical drawings, drill drawing, etc.), Create route profile, add customer and job specific logos, markings, date code, Etch compensation as per customer specifications, Palletize and panelize as per job requirements, Output and send completed files after thorough validation.

To modify Drill layer…

The Drill Check Suite has scripts to find exact drill type, size, quantity and to optimize the drill path during manufacturing and perform following actions:

Figure 2

Drill Optimization:

To optimize the drill path, the script considers all drills and drill points and generates an output layer that contains the optimized single pass drilling path. It also generates an output layer for all drill layers present in the job which results in a big reduction in machining time. (Refer *Figure 2*)

Drill v/s Copper Pad Check:

The script provides automated DFM check functionality to identify missing copper pads at plated drill points with a single click that selects and views error respective of copper layers in UCAM layers and types of drills which makes user work easier to solve the issue.
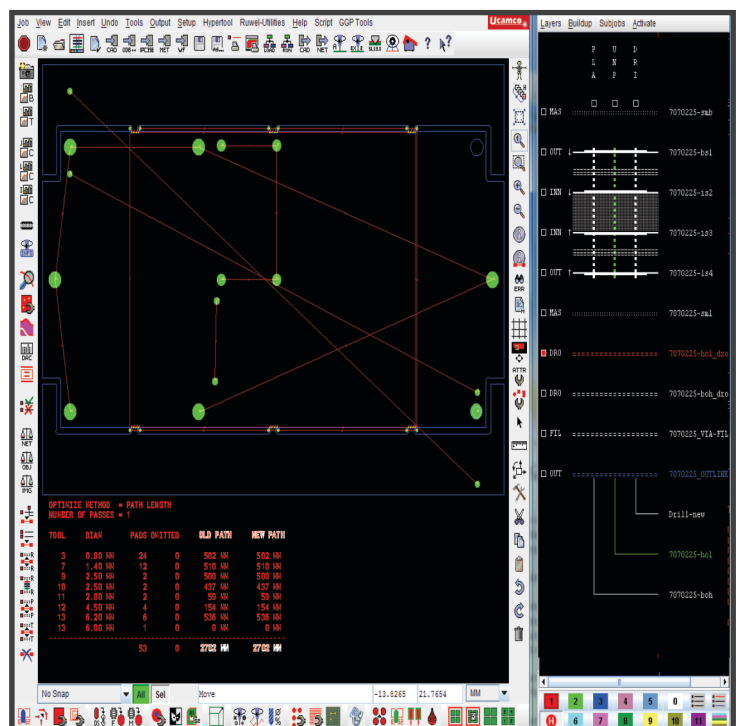
To Perform Copper DRC

The Copper DRC suite aim towards increasing the precision and reducing the CAM time.

NFP Delete (Non-Functional Pads Delete):

The script highlights NFP from inner layers and lists up the counts with respect to layers in the script window and upon confirmation, NFP's from the selected layer will be deleted automatically.

Copper Repair:

The script upon execution checks peelable, pinholes and slivers condition with respect to each copper layer and fix it.

Rout Score Copper Check:

The script checks rout & score to copper design feasibility for all copper layers automatically and upon confirmation, it corrects the error by placing reverse apertures at required places. (Refer *Figure* 3)
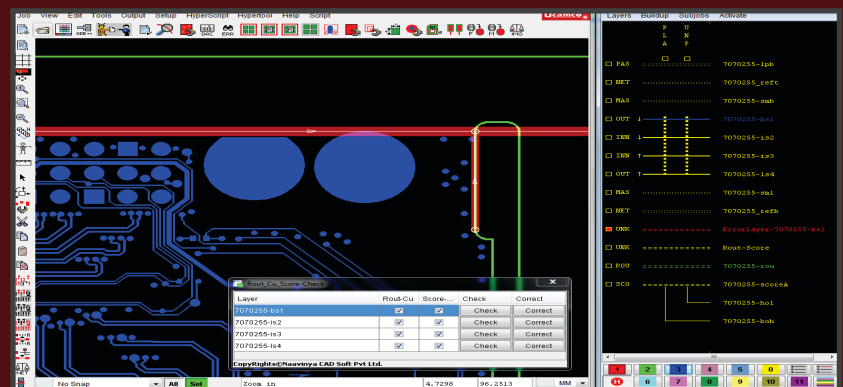

Figure 3

Performing Mask DRC & Adding Rand Features

we use following suite of scripts:

Copper Balance:

By defining the thieving area and copper balance type, thieving will get added in one click which makes the job easy.

Tooling Holes & Fiducial:

By defining the size, shape and location of fiducials and tooling holes, script will add those features to the required location with one click.

Mask DRC check:

The script highlights DRC errors w.r.t Annular ring, Solder mask dam, Coverage issues; With one click on the error list, it will navigate to show the error zone in the Gerber.

Missing Mask:

The script compares copper and mask layers and creates an extra layer containing missing solder mask for copper pads as per customer standard, which makes it easier to verify and update to respective mask layers.

Mask Clearance For Drill:

The script compares drill with mask layers and provide mask clearance missing at drill points w.r.t drill type and size as per customer requirements.

Via Plug Mask Clearance:

By defining via plug drills in drill layer, the script adds missing mask clearance automatically at via plug points.

Panelisation…

While creating the panels the following scripts are used to cross verify the job which has different technologies.
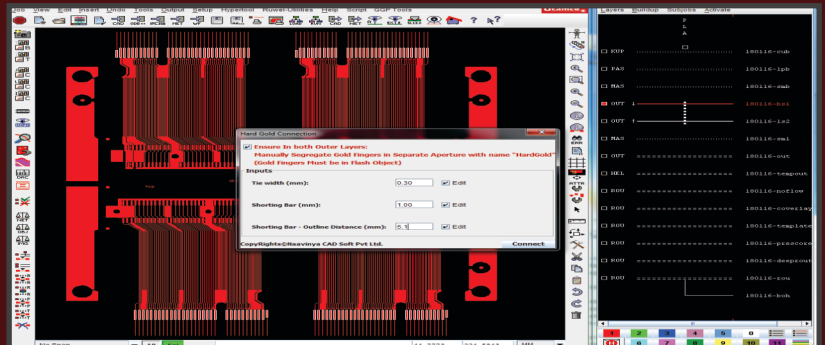

Figure 4

Hard Gold Connection Check:

Script identifies all gold fingers with proper connection to panel frame and highlights it, and the gold fingers without proper connection will not be highlighted pointing out the error at that point.

Using the script **Hard Gold connection** by defining the tie width, shorting bar width and shorting bar to outline distance details, able to add shorting bars automatically which is time-saving and human error eliminated. (Refer *Figure* 4)

Score Modification:

The script adds drill at the start & end point of score lines and extends score lines automatically as per production standard. (Refer *Figure* 5)
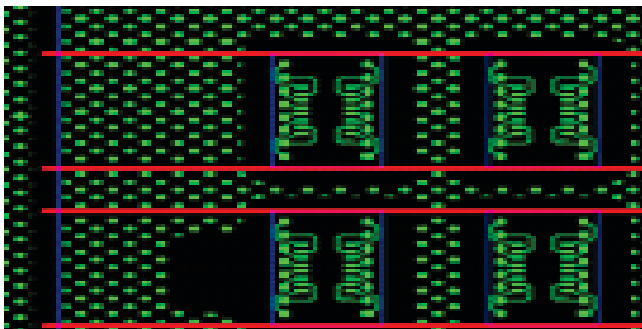

Figure 5

Control Drills Coupon:

The script updates drill & Copper pad details the same as PCB to Control drills coupon automatically without human intervention which is time-saving and easy to work with. (Refer *Figure* 6)
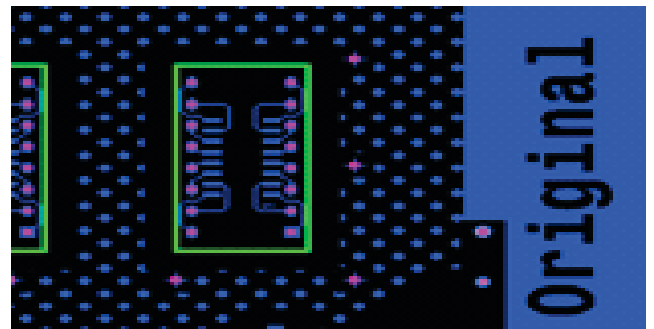

Figure 6

Output Editing:

Upon execution of script define of details like Job Number, Customer Name, Part Number, type of PCB, Number of Layers, Material Type, the script adds up required additional info into respective positions inside output files automatically.

The Gerber data can be converted into a 274-X format with customized machine codes added as per requirement using the **274-X Output generation script.**

PCB Panel Over check:

The script will verify panel elements overlapping on the PCB area and list up all copper layer details along with verification error count displayed within the script window where user can view error details in UCAM window (Refer *Figure* 7)

Figure 7

Supporting scripts for Production Panel...

Benefits of Hypertool scripts:

Our suite of automation scripts at different stages of CAM operation helps the engineers to

- Expect high quality output.
- Less human intervention.
- Reduce processing time
- Improves cycle time.
- Extending the capabilities of existing tools
- Customising work-flows to your precise needs

Use our automation expertise to improve the productivity of your in-house systems and reduce the risk of errors. We can supply custom solutions against your specification or provide off-the - shelf speed-up routines.

Scale Text Change:

The script loads up layer names into the script window with predefined scaling parameters listed, with flexibility to assign specific scaling parameters to each layer and upon confirmation, scaling parameter text will be added automatically to all defined layers.

LDI Registration:

With the execution of the script and defining panel frame details, registration marks of different shapes in a different layer will be added automatically and can be customized for adding registration marks using templates as per requirements.
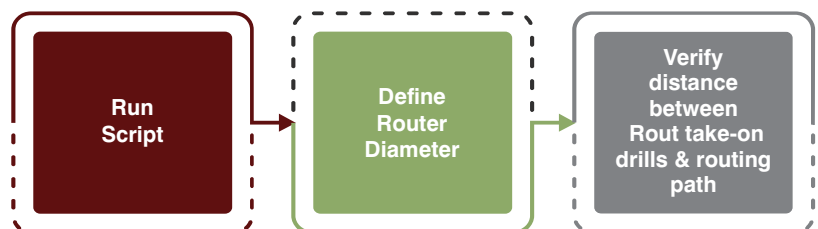
Plot Layer Scaling:

The script identifies the scaling parameter respective of each layer and scales all object of that layer with X and Y co-ordinate value defined in the scaling parameter.

Paste Output…

The script supports different formats of outputs like 274X, ODB data, PDF, etc. It generates a paste output layer along with outline dimension and part number details by incorporating Fiducial details in paste output as defined.
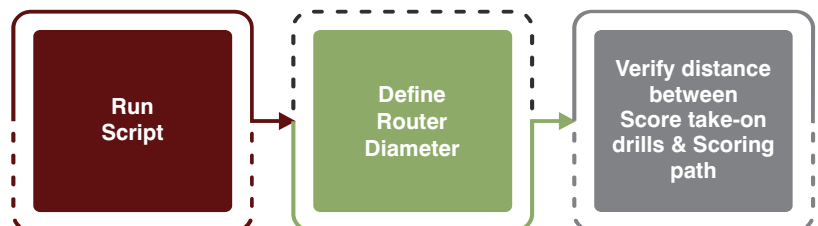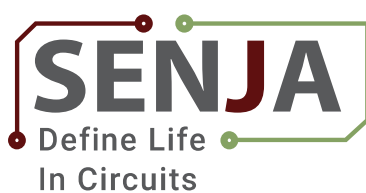
Rout Take-On Drill Check:

This script works as given below:

| Run Script | → | Define Router Diameter | → | Verify distance between Rout take-on drills & routing path |

Score Take-On Drill Check:

This script works as given below:

| Run Script | → | Define Router Diameter | → | Verify distance between Score take-on drills & Scoring path |

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