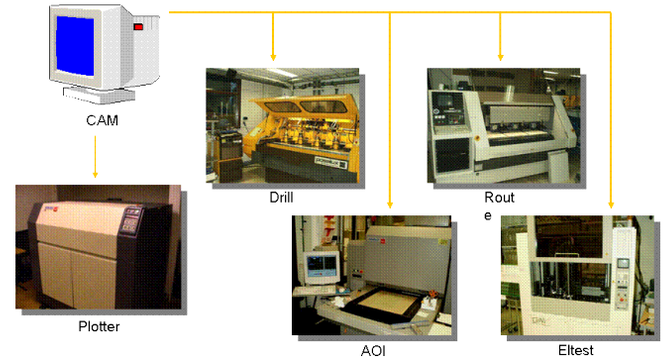
Multilayer production step by step Part1

Preparations in CAM

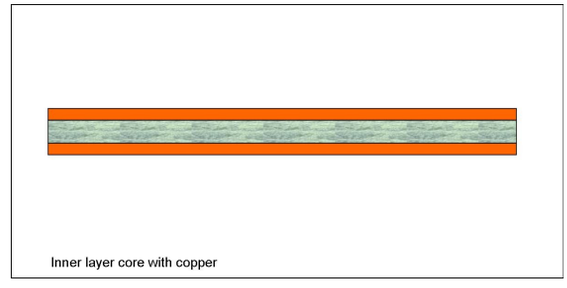
1 Data from customer: Gerber, ODB++, DPF, DXF,HPGL and IPC356
2 Data input: design, drill, drawing, net list and information files
3 Define type of layers: Outer and inner, solder mask, legend print and drill files
4 Design rules check: Checking according to customer specification, standards and supplier capability
4 Preparation for production: PCB stepped on panel, panel frame, targets , drill hole and test cupong
5 Preparation for plotting or LDI: Etch compensation, scaling and final checks.
6 Output data to: Plotters, LDI, Drill, Plating, AOI, Rout, test and other data for final checks.



Production of Multilayer board- Inner layer preparation

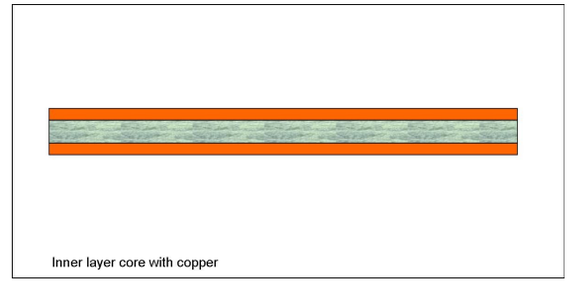
Pick material

Type of materail (FR4,Hight Tg, RO4350, Teflön……)
Dielectric thickness (0,1, 0,2, 0,3, 0,4……..mm)
Copper thickness (18, 35, 70, 105…….µm)



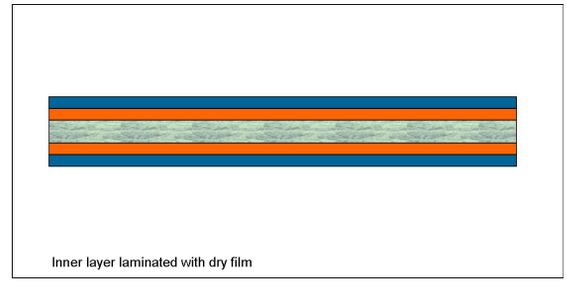
Pretreatment of material

Pretreat material mechanical (pumice) or chemical to get a clean oxide free surface with a micro roughness to optimize dry film adhesion.



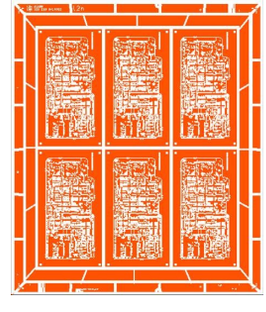
Lamination

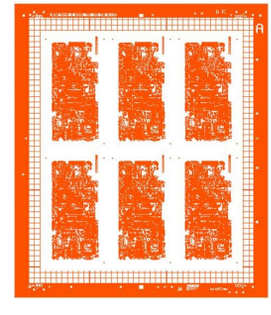
Photosensitive dry film are rolled to the panel with heat and pressure.



Plotting Film

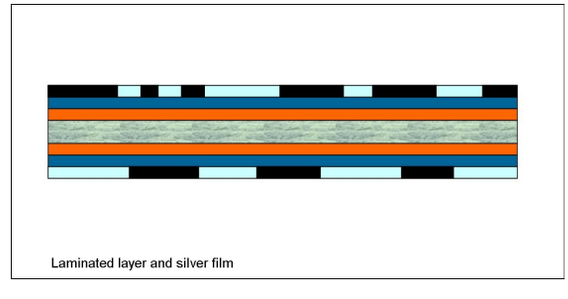
Silver films are plotted for inner layer, outer layer solder mask and legend print to use as contact copies to expose pattern on to panels
Sample of inner and outer layer film





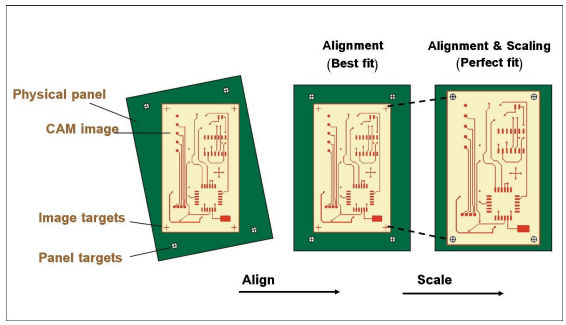
Exposure by contact copies

Exposure can be done with silver film contact copies or without films using Laser Direct Imaging (LDI)



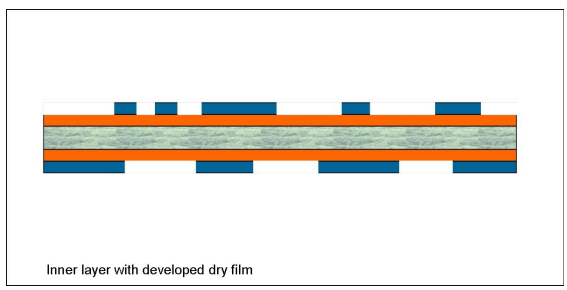
Exposure by LDI

This methods is very accurate because it use the CAM data directly and are also ably to adjust and resize the image to predrilled holes.

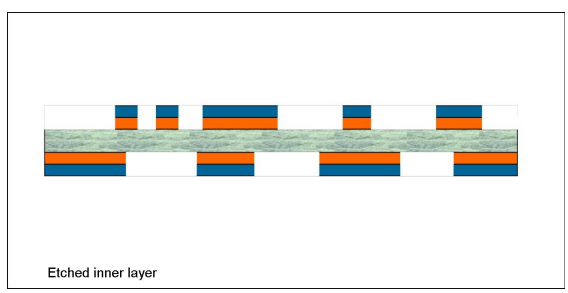


Develop unexposed film

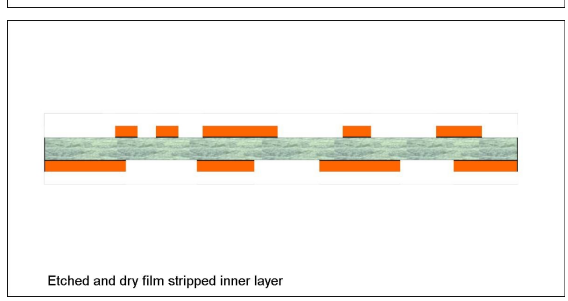
Most of these films are alkali based and will be developed in very mild soda solution (1%)

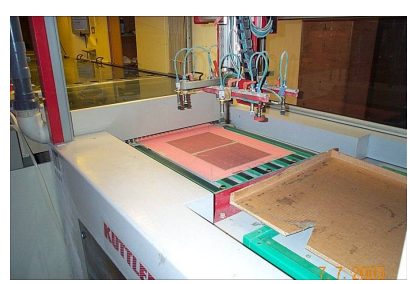


Etch copper



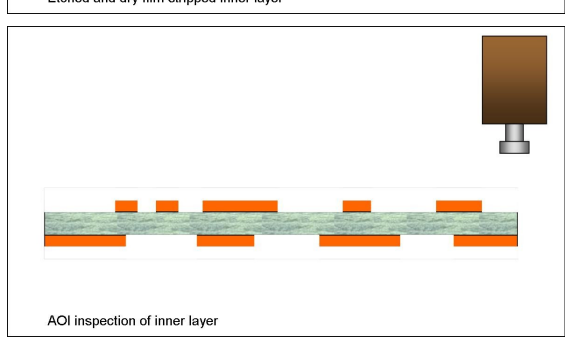
Strip dry film

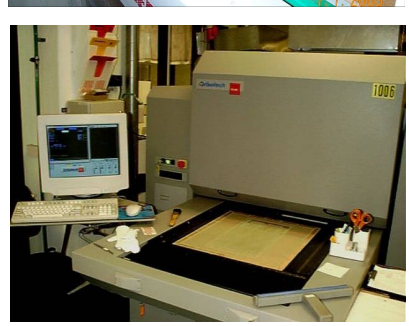




Check inner layer with AOI

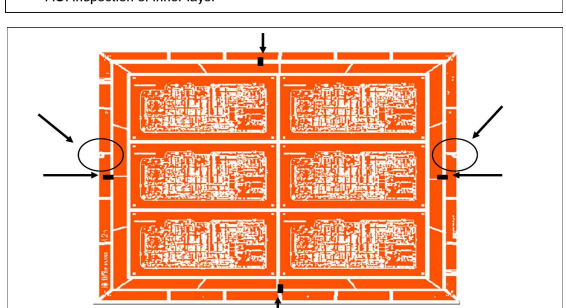
AOI (Automatic Optical Inspection)
In this machine design rule check and direct comparison against CAM data can be performed. This means that faulty inner layers are 100% eliminated through AOI. "Design rule check" means that traces and spaces are above set limits.





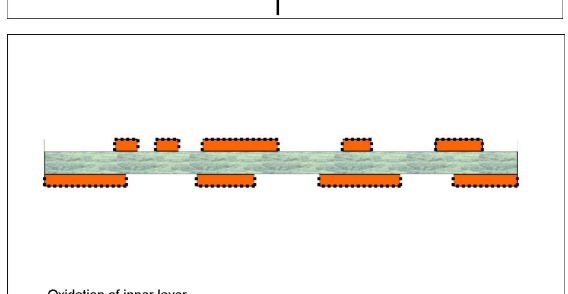
Post-Etch Punsch

All inner layers must be accurately punched to accurately align before being pressed.
The punch has digitized video cameras to register targets or drilled holes and automatically align each panel and punch.



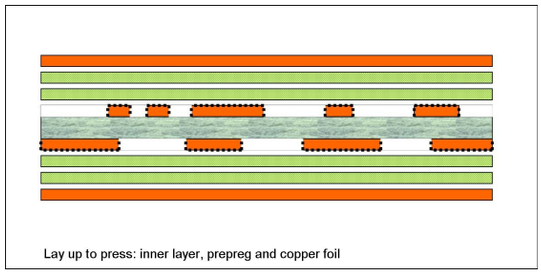
Inner layers adhesion preparation.

There are several types of oxidation most common is brown oxide.
It gives a micro roughness witch is necessary for a good addition when pressed.



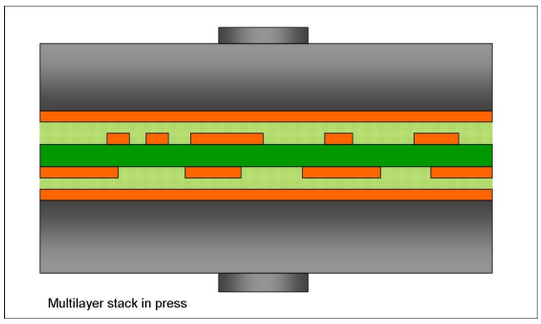
Lay up in stack to press

The mix of inner layer prepreg and copper foil will give the amount of layers and thickness of board.
Sequentially pinned to steel plates which will keep all together through the press cycle.



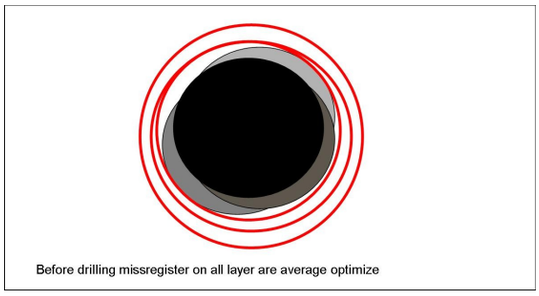
Vacum press of multi layers

The stacked material are now pressed under vacuum and with pressure suited for the material.
Different materials require different press temperature and pressure and heating up and cooling down ramps, all set up and controlled in the multilayer press.



X-Ray registration for drilling

To compensate for all movements of material during pressing and otherwise x-ray punch is used.
The x-ray machine can see copper targets inside the panel and optimize location of new registration holes to be pinned in the following drill cycle.



Check part2 the final production of Multilayer Boards and also the full story of Single and Dubble sided through plated boards