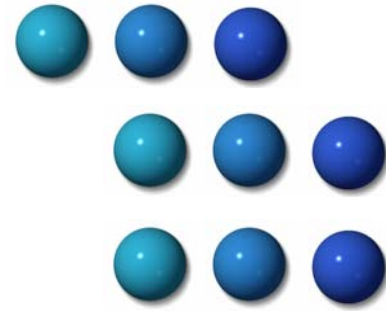
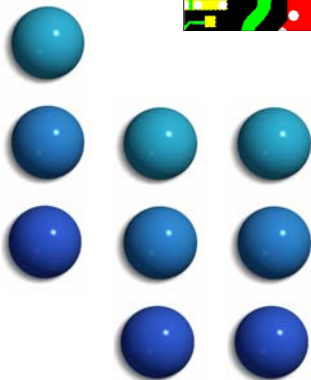
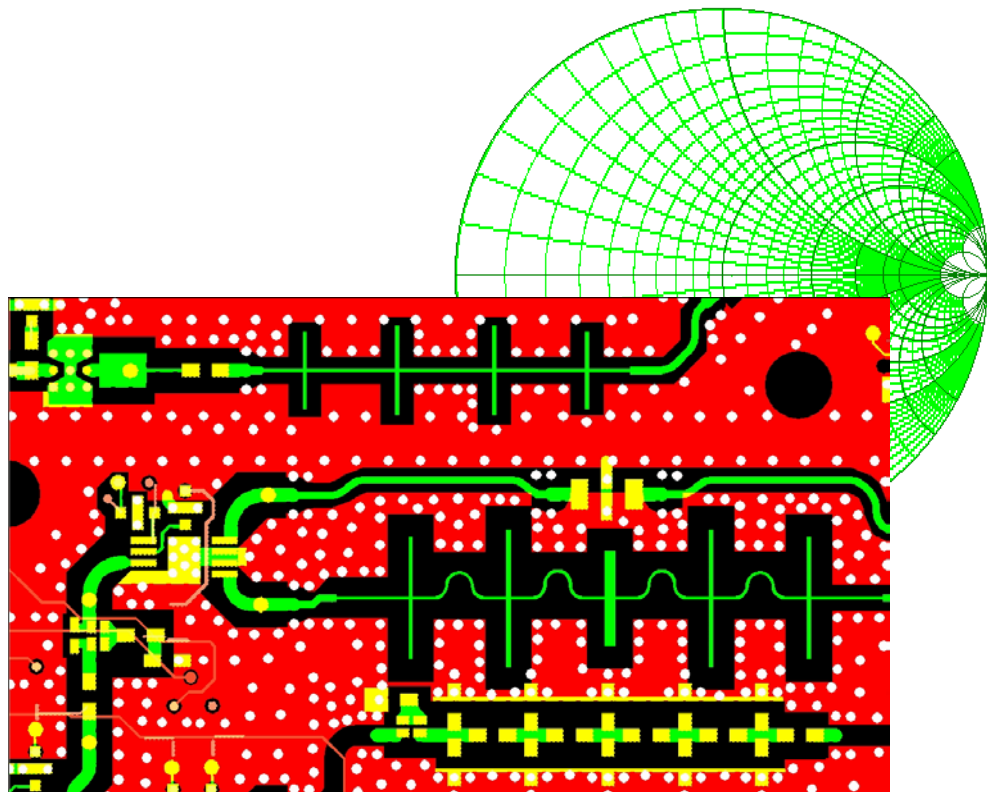


HyDE



RF Layout Software

The Best Supplement to Your
RF/EM Simulation



durst
CAD/CONSULTING GmbH

Contents

Present problem definition with the RF design.....	3
Elegant EDA solution for an ambitious RF design with HYDE	3
The special strengths of HYDE for RF design	3
Comfortable schematic creation	3
Individual layer structure with up to 50 trace levels	4
Support of printed RF components which are embedded in the substrate	4
Exceptional graphic functions for editing RF components	4
Modern routing tool for fast routing	6
Re-use of circuit parts.....	6
Elegant creation of shielding	6
Reliable RF design by DRC	7
Integrated CAM module for a smooth manufacturing of RF circuits.....	8



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For the purpose of technical progress modifications and improvements are subject to change without notice.

Present problem definition with the RF design

At present many world-wide enterprises are constrained to use several EDA/CAD tools for the development of ambitious RF circuits. Typically the following tools are used:

- RF simulation tools (ADS, Ansoft-Designer, Microwave Office) for simulating the RF structures
- PCB layout software of different manufacturers for the production of complex layouts
- EM simulation tools (HFSS, CST, Sonnet) for electromagnetic simulation of the RF circuits
- Graphic CAD tools (Autocad, and others) for the rework of RF structures. These are often necessary, because PCB layout software does not have the appropriate graphic functions, in order to be able to change RF structures graphically.
- CAM software for the production of manufacturing data

The development of ambitious RF circuits is substantially made more difficult by the simultaneous use of many different software tools.

Elegant EDA solution for an ambitious RF design with HYDE

The RF layout software HYDE shall contribute, that the development engineers get a tool into their hand with which

- complex circuits can be developed fast and error free with modern routing tools and Design Rule Check.
- simulated RF structures can be elegantly worked over graphically in the context of the complete layout or even RF structures can be as well developed newly.

- manufacturing data can be comfortably generated according to the known CAM standards

HYDE supplements in best way RF/EM simulation tools for an effective RF design.

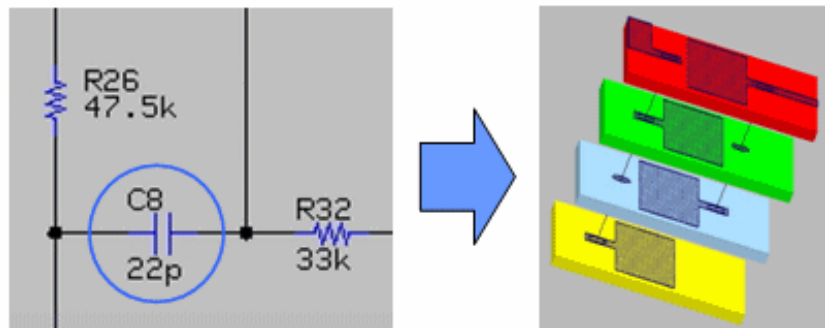
The special strengths of HYDE for RF design

Comfortable schematic creation

With the Schematic Module of HYDE large schematics can be provided in shortest time. A logical connection between the schematic and the physical layout is obviously given. With the footprint allocation a physical component is assigned to each symbol in the schematic.

Essential for RF design is the fact that parts embedded in the substrate, such as capacitors, inductors and also simulated and imported RF structures can be created over as many layers as desired, or only a simple microstrip lines can also be assigned to a schematic symbol.

On the other hand, when developing RF circuits with HYDE it is not mandatory to begin by creating the schematic. Alternatively, the layout or only parts of a layout can be created first. From this point an appropriate net list can be generated.



Assignment of an embedded capacitor to the schematic symbol

Individual layer structure with up to 50 trace levels

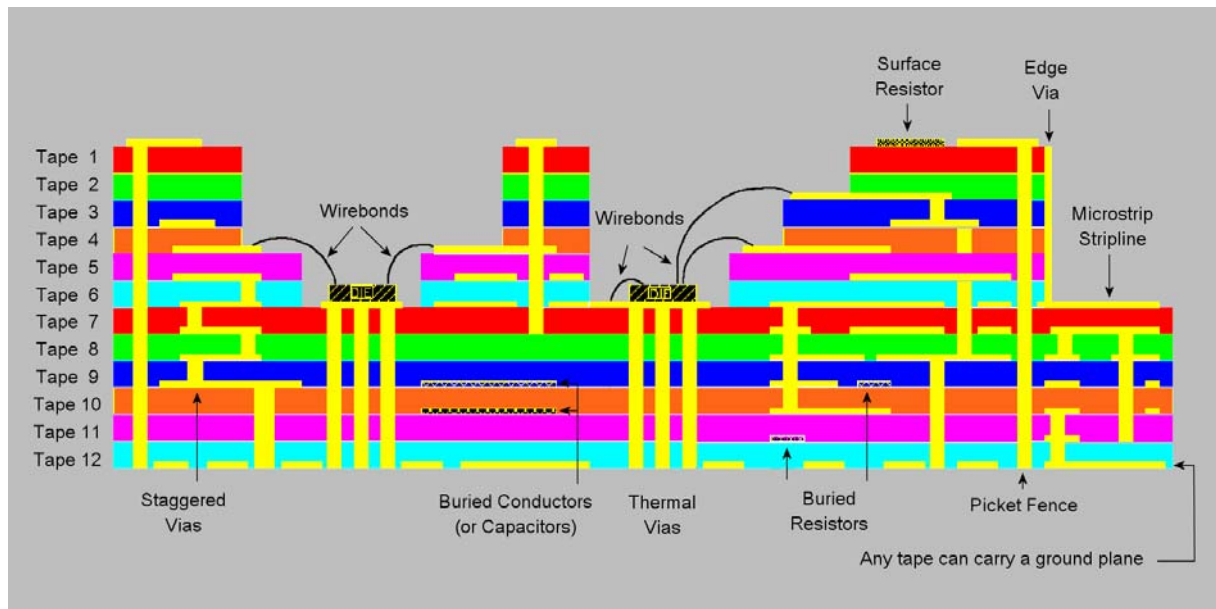
HYDE is characterised by its very high flexibility. Thus HYDE supports the most diverse technologies which are relevant for RF circuits, e.g.:

- Teflon Single- and Multilayer PWBs
- LTCC with up to 50 greentapes
- HTCC
- Hybrid thinfilm
- Hybrid thickfilm with up to 20 different pastes
- PCB

of the substrate. Embedded RF structures can also be shifted and placed within the substrate from an upper to a lower layer. Additionally DIES can be placed on any inner layers from top or bottom side. HYDE allows to create cavities of any shape and on any side in the substrate.



„Hairpin“ filter



Cross Section of a Substrate with up to 50 Tapes

It is possible to work with up to 50 trace levels. Before starting with a project the individual layer structure is specified, so that only the really used number of layers must be managed which keeps the overview.

Support of printed RF components which are embedded in the substrate

As already mentioned, with HYDE arbitrary simulated and on several layers located RF structures (e.g. filters, Baluns, Diplexers and much more) can be imported into HYDE via the DXF- or GDSII format and can be placed on any inner layers

Exceptional graphic functions for editing RF components

Most of the PCB layout systems are usually very limited concerning graphics functionality. Therefore many RF circuit designers are using additionally another CAD tool, in order to solve ambitious graphics tasks. HYDE offers a powerful graphics kernel, to realize also difficult graphical requirements. Typically RF designers have to create complicated trace layer structures, in order to interconnect e.g. striplines, filters and wave guides.

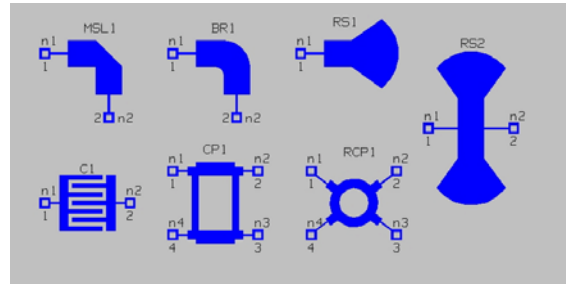
HYDE provides these exceptional graphics characteristics, to create all of these RF specific requirements. HYDE provides excellent:

- editing commands (rotate, mirror, copy, stretch, group, gather, smash, merge of drawing components and equidistants),
- graphic primitives (line, rectangle, polygon, circle, arc, ellipse, hatching, dimensioning, marking, font styles) and
- snapping modes (grid, vertex, intersection, primitive, mid point, system point, outline)

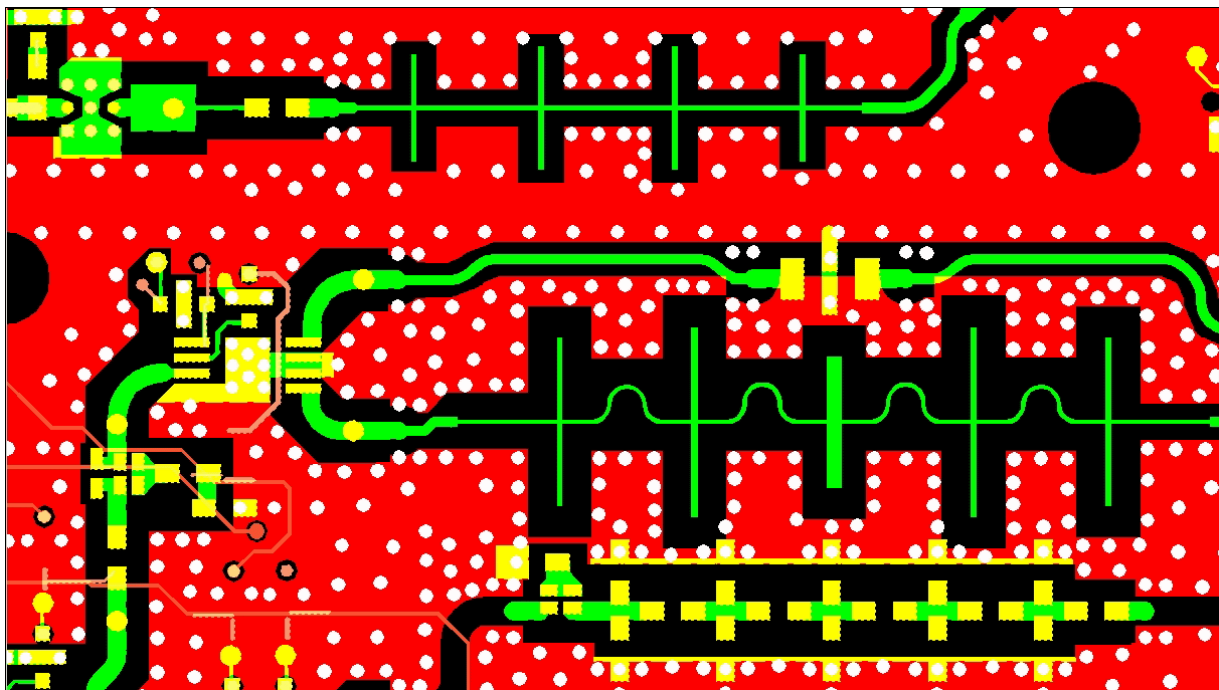
for all parts, RF components and traces. They can be edited logically or graphically in the context of the whole layout design without any problems.

If after an accomplished EM simulation the changed geometrical data of the RF components have to be used in the layout, then these can either be imported into HYDE via DXF or GDSII and then inserted into the existing layout or all the changes can be used for a manual redesign with the comprehensive graphic functions of HYDE.

With the comfortable macro language of HYDE corresponding microstrip components can also be created as so called macro instances. This means that these components can be provided very fast by the input of the appropriate geometrical parameters without creating the complex geometry exactly measured and then inserted in the RF layout.



Examples of microstrip components

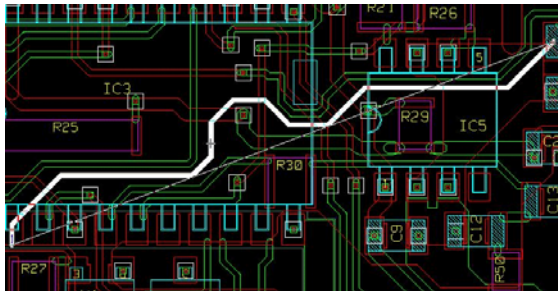


RF layout example (Keithley Instruments)

Modern routing tool for fast routing

For all that the high flexibility and the graphical strengths of HYDE it has a high performance 2-point autorouter. If RF circuits combined with several pin-rich DfEs have to be developed, then complex circuits can be routed error free with this routing tool within a short time. The 2-point router is an autorouter, which routes a trace between 2 points independently, e.g. by clicking an airline or from 2 arbitrary connection points.

The direction and even the complete trace can be directly affected with the cursor after the "Follow Me" principle. Keepouts, as well as the distances defined in the DRC are kept automatically. During layouting a cursor guidance with utmost care is not necessary any longer, whereby complex designs are routed substantially faster. The 2-point router also supports multi-layer routing by using a design-dependent via menu.



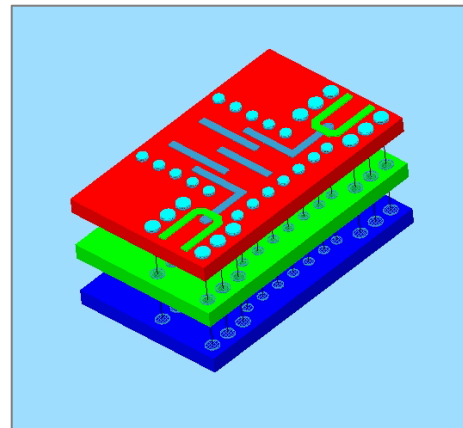
Fast and flexible routing with the 2-point router

Re-use of circuit parts

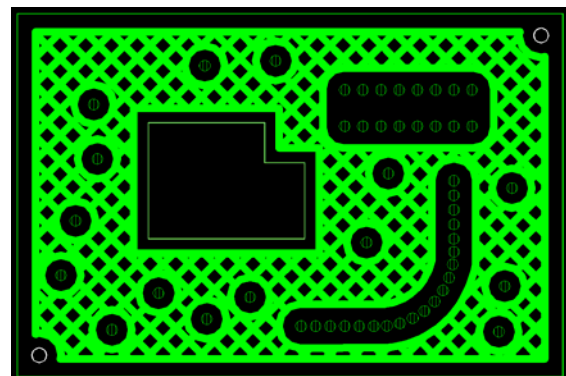
A further special strength of HYDE consists in the ability to cut out certain functional blocks e.g. VCOs or amplifiers from a larger circuit and to insert them again in a new circuit. Thus development time also can be reduced considerably.

Elegant creation of shielding

For a reliable RF design the production of shields and ground planes is very important. With the hatch command which is designed for universality, complex filled or hatched ground planes can be produced very simply and within seconds. For the LTCC technology cross-hatched surfaces are needed for a good adhesion of the greentapes among themselves. With HYDE the line width, the distance and the angle of the hatching lines can be defined absolutely free. Of course this ground plane screen can be automatically bound to the ground potential through VIAs. Additional picket fences with numerous VIAs can also be produced in a simple way.



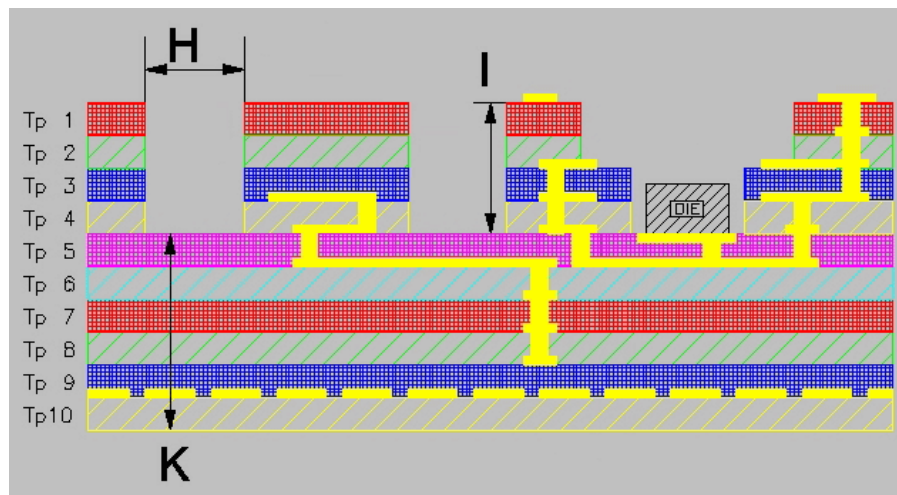
Band-pass filter with picket fence



Cross-hatched ground plane with cavity and vias

Reliable RF design by DRC

With the help of the Design Rule Check (DRC) the electrical constraints between schematic and layout are checked. In addition, for a production-correct development of any RF circuit the Designs Rule Check is essential. So the most different geometrical distances can be defined, which have to be kept automatically when routing the layout. Of course the DRC checks also the correct electrical connection and the appropriate geometrical distances both with embedded RF components in the substrate and with buried DIEs in cavities. Designs are also supported and fully checked, where bonding is done from a DIE to any contact layers.



Individual Design Rule Check

Integrated CAM module for a smooth manufacturing of RF circuits

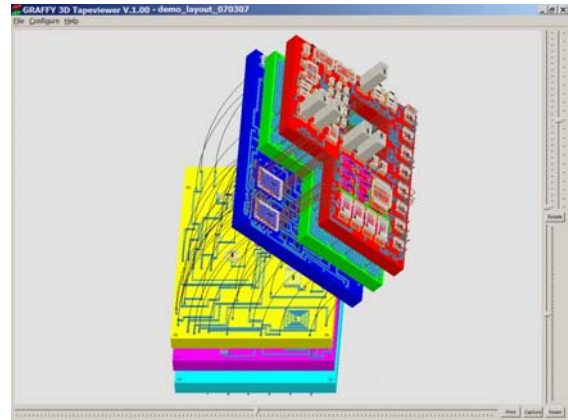
In order to be able to manufacture RF circuits economically, HYDE offers appropriate functionalities for manufacturing the designs.

HYDE has a very flexible and capable parts list generator. Both from the schematic and from the layout, a formatted parts list can be generated.

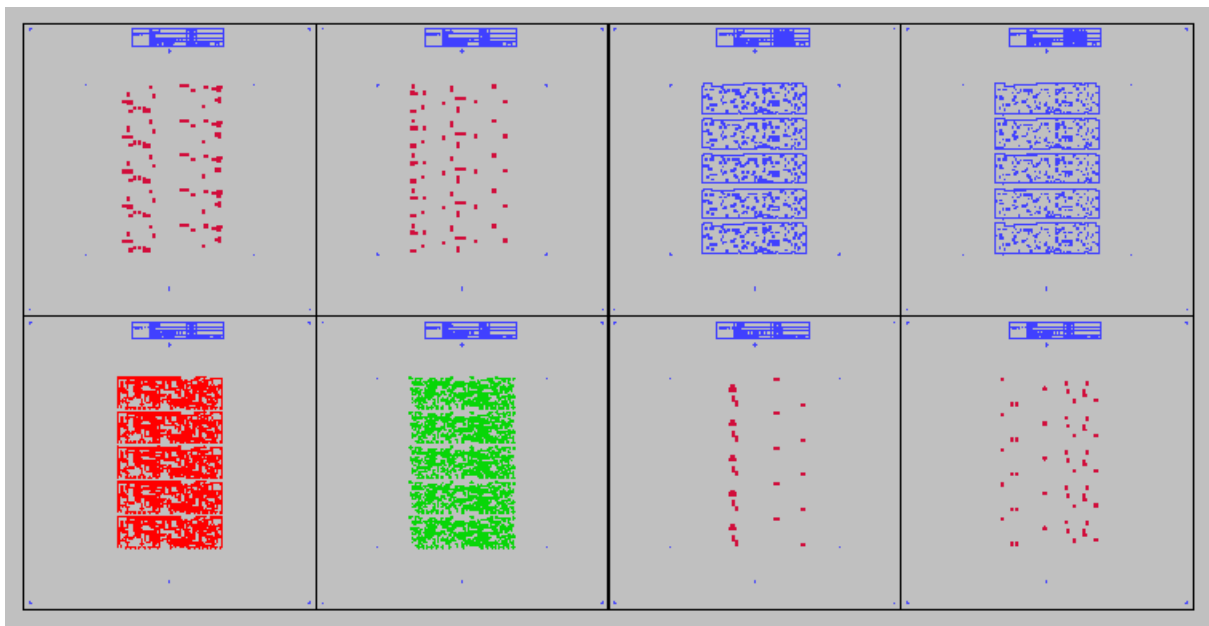
Further a step & repeat placement for the film generation can be created in Gerber or also GDSII format. Into the step & repeat placement additionally fiducial marks and a text field for the data evaluation of each used field can be inserted. Also Gerber data can be imported and examined by the geometrical Design Rule Check for manufacturing validity.

As well post processors for drilling, milling and punching machines are offered. Also the control of SMD Pick&Place machines for the assembly of RF circuits is offered with HYDE.

For a clear and easy to read production-correct documentation all relevant information layers can be defined with only one mouse-click in the show manager with pre-configured show filters. Additionally the physical RF design can be represented as 3D design for a better illustration. The complete electrical wiring in the substrate is shown.



3D view of a an opened LTCC design



Creating the step&repeat for the film generation

References



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