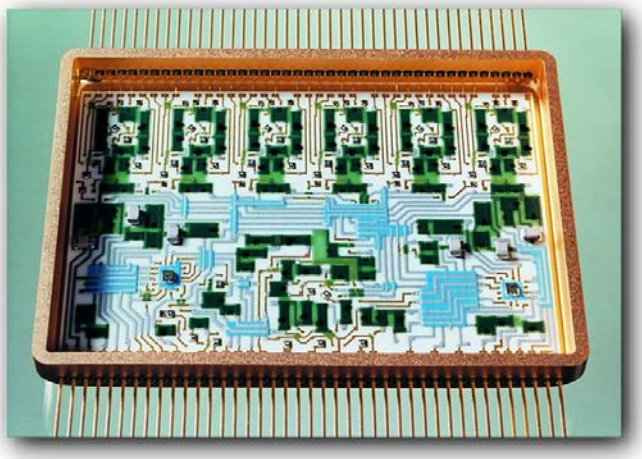
HyDE

The CAD System
for Hybrid and LTCC Circuits



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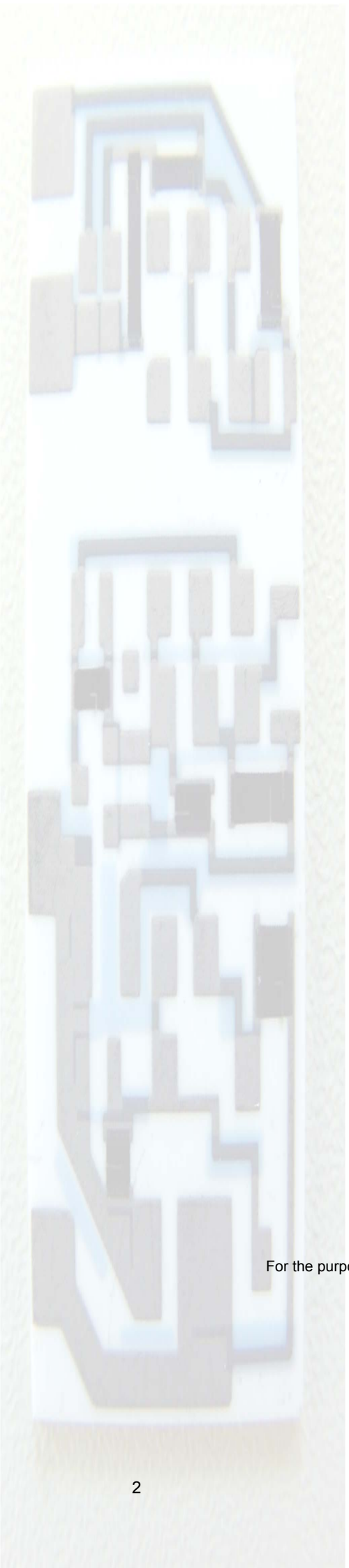

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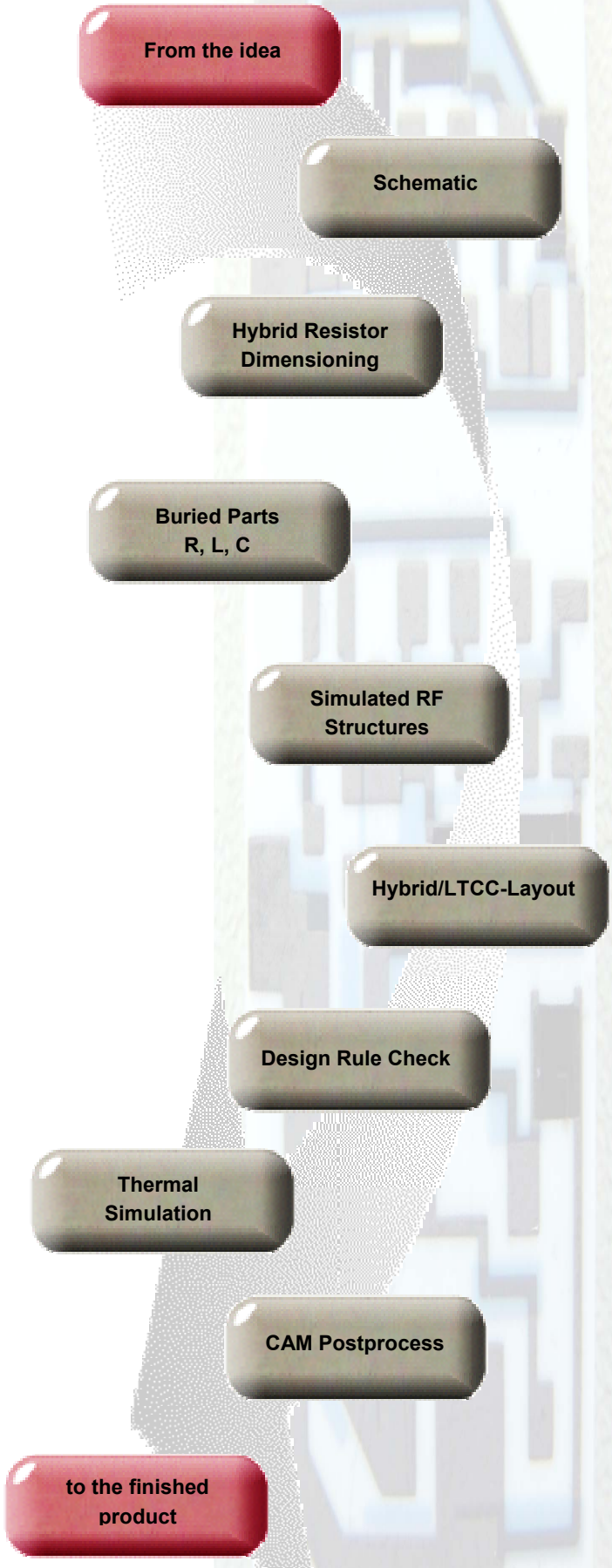
HYDE – continuous, constructive, and open

HYDE is a flexible design system for developing hybrid and LTCC layouts. The scope of work reaches from the schematic capture through the resistor design and the checked layout up to the connection to manufacturing machines. With this system a **continuous software solution** is at your disposal, which helps you to handle the time-consuming calculation and design work of ceramic circuits. Productivity and product quality will increase substantially with HYDE.

The usual CAD systems in the EDA domain easy reach their limits in case of complex graphic demands. HYDE offers with its graphics editor optimal requirements to solve difficult tasks and to **combine ideal constructive and electronic applications**.

HYDE, the ideal solution for mechatronics, sensors and RF circuits.

Often in the CAD domain an heterogeneous net of hardware systems is installed. The most different software products are in use. To assure uncomplicated data transfer between the different CAD systems, the EDM system and the manufacturing machines open interfaces are needed. To enable a correct data conversion HYDE offers among other two internal ASCII interfaces: ARCHIVE and GENERATE. ARCHIVE describes the complete drawing (schematic, layout or mechanics) meaning the graphics including the used libraries, the logic and the hierarchy. GENERATE represents alternatively the entire graphics in a flat structure without hierarchy. These two interfaces with the open command structure make HYDE an **open system** and so it is suitable for the data transfer, the data analysis and the development of internal system connections.



Schematic Capture

Normally the development of the circuit begins with the Schematic Module. In this module all functions for a quick and comfortable creation of schematics are enclosed.

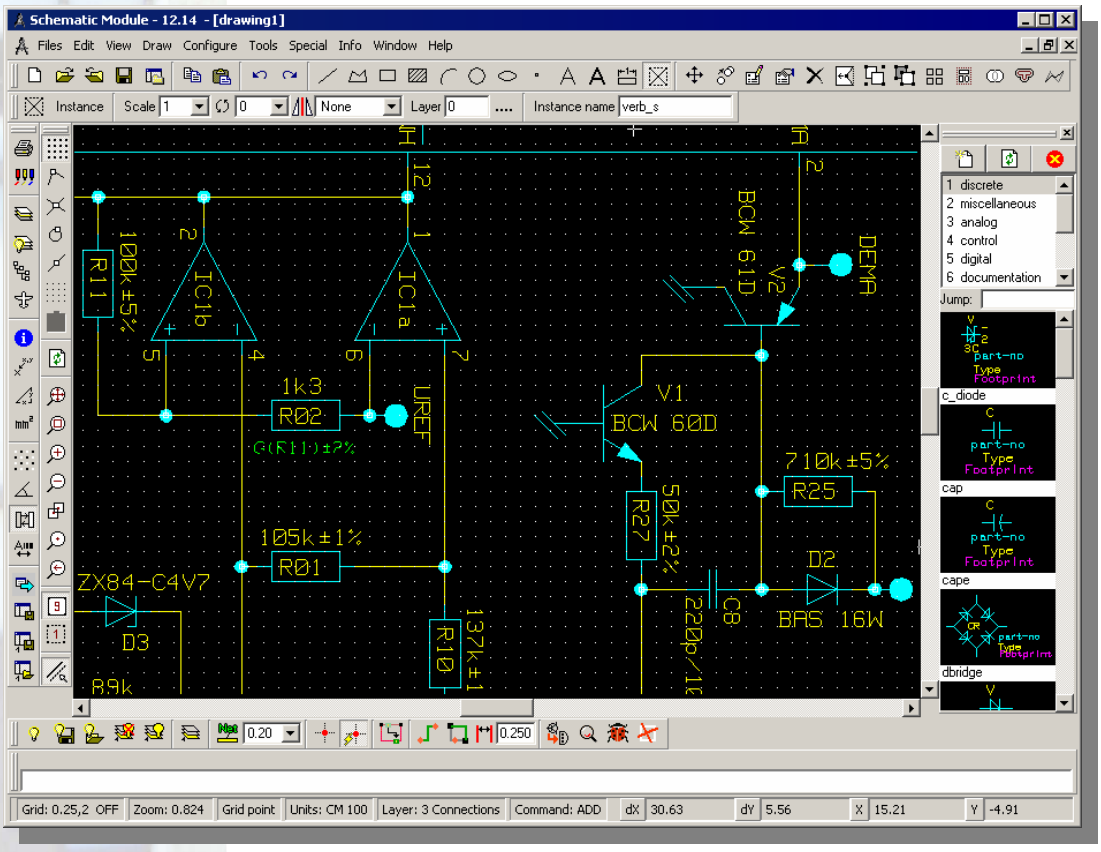
Among the **most important functions** of the Schematic Module there are:

- Display of logic symbols
- Possibility of assigning attribute information to the components (reference designator, type information, part number, and so on)
- Parts list generator
- Generating and merging connection lists (net lists)
- Assigning component footprints to the symbols for a transfer to the Layout Modules (Packaging)
- Data transfer to documentation packages (also for Windows clipboard)
- Unlimited number of symbols, lines and connecting points
- Semi-automatic routing of connection lines

All logical attributes for sources and outputs, power supply, pin and elementary classes as well as the scale of grids on a chip, can be input directly from the graphic plane and displayed immediately. For each combination of types and packages there can be assigned part numbers of their own. All information for net and part lists are available directly after the input.

Net and part-related information, and logical information can be queried and listed at any time.

In the Schematic Module a **library collection** with many representative symbols for drawing the schematic. The fast access to this library with the Symbol Explorer facilitates the creation of schematics. Besides the name specification the **Symbol Explorer** offers also a graphical preview. The symbols can be selected from the different libraries with the mouse and simply added to the schematic.



Schematic Module with Symbol Explorer

As an example the most important parts of the single **library groups** are listed here:

- Active parts: transistors, diodes, and operational amplifier, etc
- Passive parts: resistors, capacitors, and inductors, etc.
- Digital parts: NAND/NOR gates, inverters, latches, flip-flops, and buffers
- Digital basic modules: decoder, 4-bit-decade counter, octal bus buffer and driver, microprocessors, etc
- Further general symbols: system ground, package ground, and plugs/sockets, and other

Comfortable creation of schematics by using the Symbol Explorer.

Single library parts or a group, together with the corresponding electrical connections, can be moved, rotated, mirrored respectively scaled. Thus modifications can be made afterwards, without modifying the existent electrical connections. New components or circuit parts can be copied out of an available circuit.

Another important function is the automatic or semiautomatic **referencing of library parts**. Therewith a continuous numbering of same parts is possible. Another useful function takes care that the symbol texts are always technical correctly readable, meaning represented horizontally.

Already in the schematic a physical package can be associated to each symbol with or without using the Symbol Explorer. Then all parts will be placed in the layout and displayed with the corresponding airlines (**Load Packaging**). Because HYDE is an open CAD system normally net lists and packages from other CAD systems can be imported in the layout module, if adequate changes are made. That means, HYDE can be integrated optimally in an existing IT/CAD structure.

The Schematic Module offers all prerequisites for processing hierarchical designs in logic and corresponding display on the screen. During processing hierarchical designs the **Design Explorer**, which can be displayed in a separate window, is of great advantage. Besides the display of the hierarchical structure it relieves finding symbols and editing single library parts without having to leave the entire drawing.

Creating Hybrid Layouts

In HYDE you can either start with or without a schematic directly with the development of the hybrid layout. An existing net list and maybe a parts list are very useful. Due to many conversion programs available it is also possible to process net lists of other manufacturers.

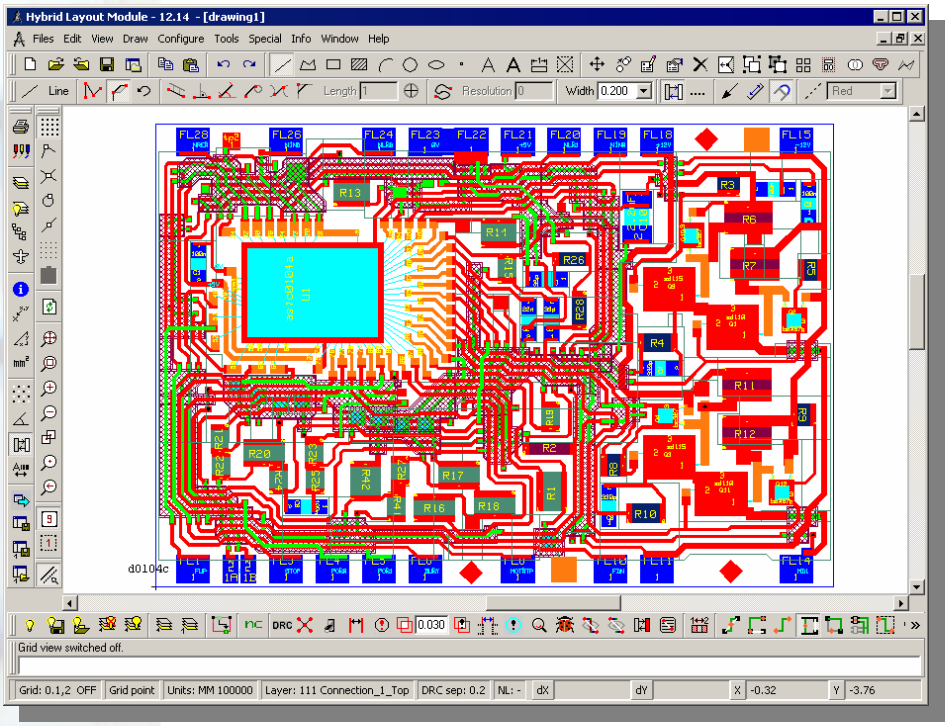
The **Layout Module** offers many functions for an efficient layout design. Often recurring individual command sequences are combined in a user-defined **macro**. For the beginners the recording of the macro can be made by the system. Advanced system users can create themselves also parameterized library parts. Using such macros leads to considerable time saving.

The **most important functions** of this module are:

- Support of the SMD and Chip&Wire technology, including MCM
- Grid-related or gridless design
- Automatic calculation of the resistor paste areas
- Paste amount calculation
- Transfer of the paste resistors into the layout, including the trim cuts from the dimensioning program
- Interactive editing resp. swapping of already placed paste resistors
- Individual electrical association of SMD, bond, and resistor pads to the different trace layers
- Calculation of the bond wire lengths with screen warning in case of exceeding a minimum or maximum bond wire length
- Generating parts lists and connection lists out of the layout
- External connection list compare with foreign net lists is possible, to check the concordance if no Schematic Module is used

HYDE has different display modes at its disposal, which optimizes the clearness of the hybrid layout. The **most important display modes** are:

- Display of filled or unfilled traces with or without width and an individually defined safety clearance to the nearest component
- Highlighting single layers or layer groups of the top or bottom side resp. both sides
- Highlighting the top and bottom side parts using different line types



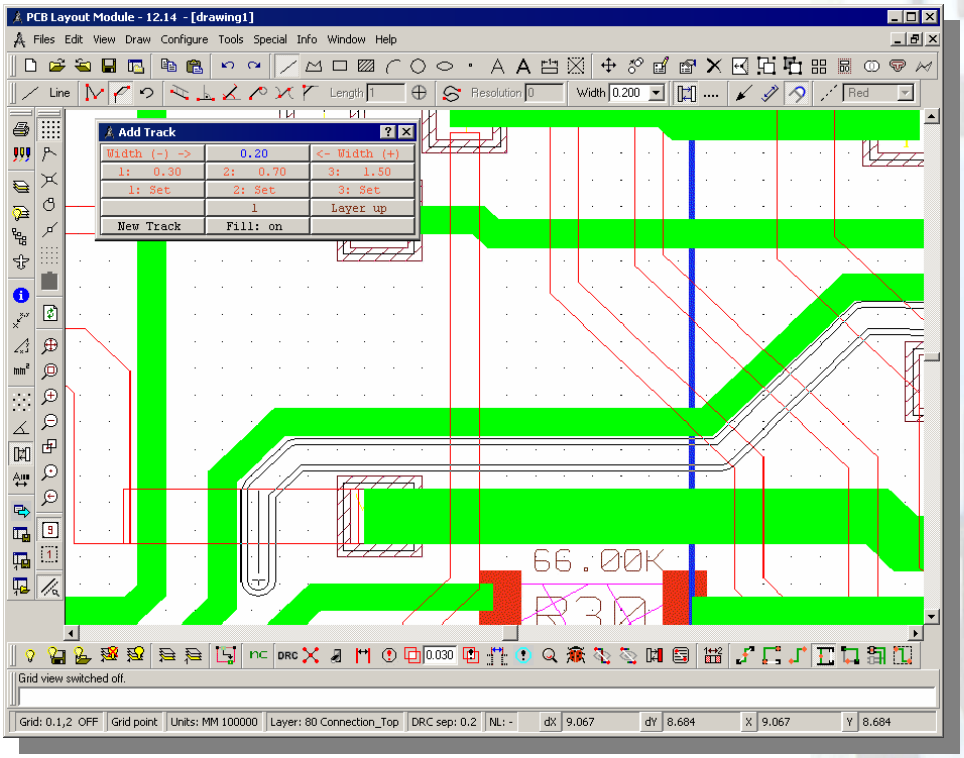
In the Layout Module, as well as in the Schematic Module parts can be placed and modified very easily at any point on the substrate using the mouse or by entering the coordinates via keyboard. Continuously variable rotation or the input of predefined rotation angles is possible. Parts placed in the Hybrid Layout can be moved without loosing the existing electrical connections (airlines) to the other parts. Logical information such as pad size, distances from elements or net information can be queried at any time in the main window or they can be output on a printer. All components of a part can be directly modified in the context of a layout (e.g. package, connection pads, and all notes associated to the part), without having changed the original library element. The modified part must be saved afterwards with a new name.

HYDE supports the user in developing double-sided hybrid layouts with 5 trace layers, 3 isolation layers between the connection layers, 20 layers for resistor pastes and many additional layers. A corresponding parts structure with traces on the top and bottom side is preset.

Because of the flexibility of HYDE the symmetrical build **layer structure** can be extended customer-specific for future processes. A Layout Module with an LTCC and PCB specific layer structure is also available. HYDE provides 8192 layers altogether.

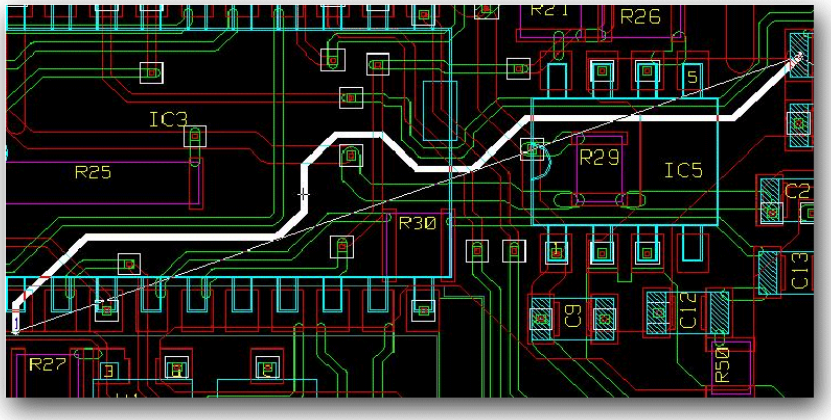
HYDE offers an exceedingly flexible layer structure, predestined for user-specific applications.

A particularly powerful macro of the Layout Module is the routing macro. It enables the **segmental routing** of a point-to-point connection (airline) between two parts through a variable trace guiding. Vias between the layers will be set automatically by just changing the side. When moving the cursor the trace is directly displayed graphically with its preset width and round or flat ends. When routing, a line can be preset and displayed with safety distance around the trace. Thus you can keep the minimum distances between the traces and the parts already during the interactive layout creation.



Preview of a Trace with Adjustable Safety Distance

The **2-Point-Router** is an autorouter, which routes a track between 2 points independently, for example by clicking an airline or from 2 arbitrary connection points. The course of the trace can be directly controlled with the cursor after the "Follow-me" principle. For pointing the way of the traces to be routed in-between stops are applicable. Keepout areas as well as the distances defined in the DRC will be kept automatically. Due to this facility the layouter can directly apply his know-how on the design when routing.



Quick and Flexible Routing with the 2 Point Router

A meticulously exact cursor guiding is not necessary any more when layouting, whereby complex designs will be routed considerably faster. The mode of operation of the 2-Point-Router is 45°-related and gridless. Besides the PCB applications it is especially suited for hybrid thickfilm and thinfilm circuits and LTCC applications. When using the 2-Point-Router time-consuming configuration normally needed for an autorouter with complex analogue circuits are no longer necessary. The 2-Point-Router also eliminates the "clumsy" connections, which appear when complete autorouter are applied, because each net is handled separately.

During the route process a safety distance can be pre-selected in the layout. This distance is displayed graphically at the cursor.

The Hybrid Layout Module provides a large **parts library**. Thereby on the one hand standard SMD parts and DIEs are concerned (so called naked chip components) and on the other hand hybrid resistor shapes (variable parameterized components). Especially hybrid resistors for which the geometrical size can be defined or modified in a toolbox, offer great freedom for the layouter at utilization of different paste systems in case of minimum space provided. Very often, the graphics editor of HYDE will be used for the ambitious requirements in the field of RF. Printed inductors or capacitors as well as arbitrary RF components can be programmed as macro instances with a corresponding toolbox. The desired geometrical parameters can be preset and modified over the toolbox in a simple manner.

The SMD parts library is package-related with many reflow top and reflow bottom parts. It can be divided into the following groups:

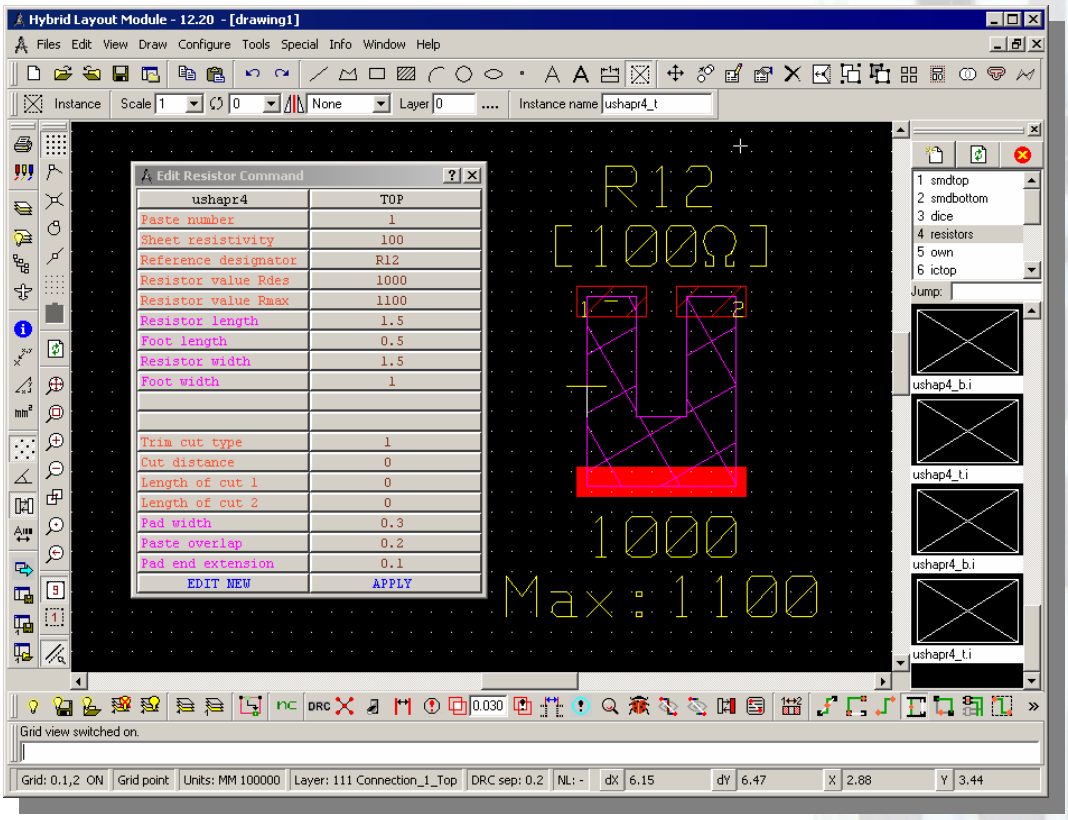
- IC parts
- Semiconductor chips with and without packages (DIES)
- Discrete parts (resistors, diodes, capacitors, transistors, inductors, and so on)
- Vias
- Substrates
- Predefined paste resistors
- Project-specific paste resistors
- Documentation parts
- Test points, fiducial marks, and others

In the current window parts can be swapped with other or similar library parts with other names. This makes sense if vias existing in the layout have to be replaced when inserting an additional trace layer.

The accordance between the schematic and the layout is checked and guaranteed with the **forward and backward annotation**. If the symbols are changed in the schematic this modification is displayed in the layout and vice versa. If parts are changed in the layout it is shown in the schematic.

With the **Design Explorer** the whole hierarchical structure of the drawing is displayed. The Design Explorer works like the WINDOWS Explorer. When clicking the parts in the Design Explorer they are enlarged or identified by blinking. These parts can be directly graphically modified or renamed without changing the electric properties. This way drawings can be displayed even more clearly and edited easier.

With the Hybrid Layout Module **isolation layers (crossover)** for trace intersections with any shape can be created. For example 3 isolation layers can be put on top of each other. Then with the Offset command the layer placed on the top can be defined smaller for a certain value than the layer directly underneath. This way at the border of crossover isolation a staircase effect can be formed. With the Offset command **power and ground planes** which have a fixed distance to the traces or substrate border can be defined without any difficulty.



Hybrid Thickfilm Resistor as Parameterized Macro Part

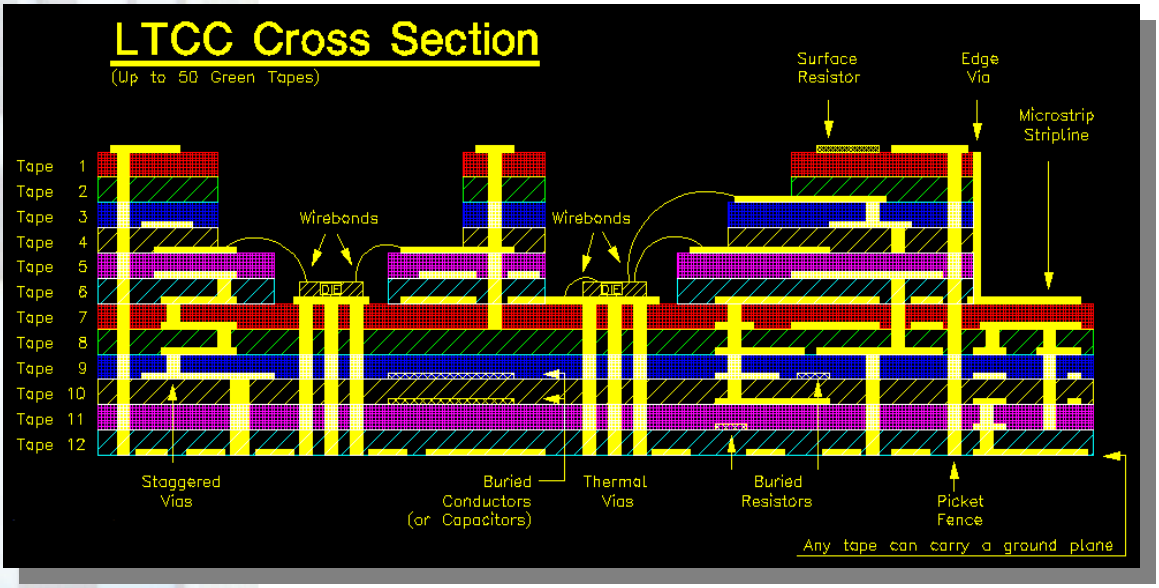
LTCC Design

Conventional EDA systems normally don't offer special functions, that are needed for developing LTCC circuits. **HYDE processes up to 50 tapes with about 100 information layers each** (e.g. traces with different materials, resistor pastes, cavities, vias, bond layers, solder pastes, glue and many more) per tape. Additionally on each outer sides of the ceramic there are up to 5 printed trace layers (hybrid layers with up to 3 isolation layers each). Because LTCC circuits are very often applied for RF applications, on one hand sophisticated graphical functions are necessary and on the other hand complex circuits should be developed fast and reliable with comfortable routing tools. Both features are accomplished with the LTCC Module in best manner.

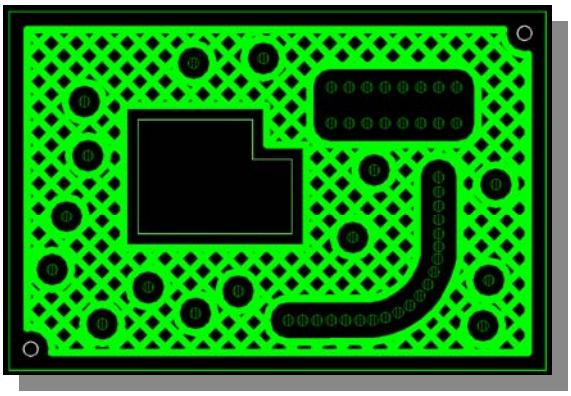
By the high flexibility and openness of HYDE exceptional technologies can also be realised. **Buried DIEs** can be placed in such a way that bonding on different tapes is possible. Especially in this exceptional case the Design Rule Check (which can also be applied to each single tape) is a great help.

LTCC-specific DRC tests assure a faultless development of complex circuits. With a comfortable copying function polygonal tape and **cavity structures** can be transferred on any tapes so that the use of buried dies can be realized fast. Additionally with this function **micro-channels** with an arbitrary geometrical shape for fluidic applications (e.g. for chemical, biological, and medical sensor and actuator applications) can be developed excellently in the LTCC substrate (so called micro-fluidics).

Placing **buried RF structures**, resistors, capacitors, and inductors is indispensable for developing RF applications. Transferring them on any tape is very easy with HYDE. Simulated RF layouts (e.g. from ADS, HFSS, Ansoft Designer, Microwave Office) can be transferred in DXF or GDSII format in the HYDE library. As a result the requirement for an easy development of sophisticated RF circuits is given.



For a reliable RF design the creation of **shielding and ground planes** is very important. With the hatch command designed to universality complex ground planes can be created easily within seconds. For the LTCC technology cross hatched areas are needed for a good adhesion of the green tapes among each other. With HYDE the line width and distance and angle of the cross hatch can be defined. Of course this cross hatched shielding can be connected to the ground potential using vias. In addition **shielding fences** an be created in the same easy manner.



When creating the films the **shrinking process** of the ceramics can be **considered** which is later needed for the sintering process. Through this an exact measure is guaranteed for all parts in case of pick and place and eventual trimming. For a good thermal dissipation of the parts through the ceramic layers the design tool offers the possibility to create **thermal vias** with an arbitrary placing.

Online Design Rule Check

The integrated Online Design Rule Check (DRC) can be applied electric and/or geometric.

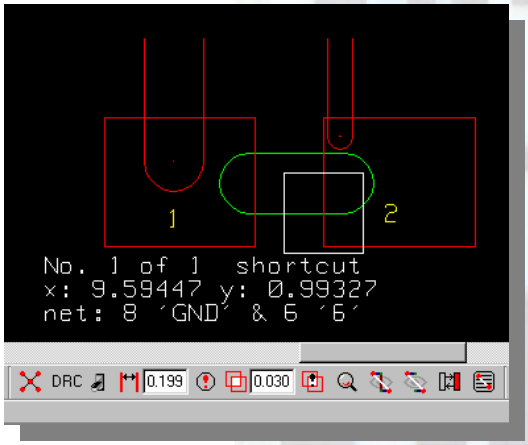
Performance Features of the geometric DRC

- Check of the minimum distance of the components to each other
- Check of distances up to 10^6-fold of the defined user units
- Definition of up to 255 regions on the board with various distances and different layers
- Saving the design rules for storing the different test criteria and for future comparisons
- Net distance checks which controls the distances between net – net, net – board, net - keepout, and allows an individual distance for each component in the net
- Part placement checks which controls the distances between part – part, part – board boundary, as well as the part – keepout

Performance Features of the electric DRC

- Automatic assignment of signal-bearing components (e.g. line, polygon, rectangle)
- During the layout phase the drawn components will be checked on short circuits with other nets
- Prevention of short circuit connections during the design phase
- Identification of complete nets with shortest connections (minimum spanning tree)
- Automatic check of crossover isolations in a hybrid layout

After finishing the hybrid/LTCC layout a net list can also be generated out of it. The Connection Lister Compare program compares the net list of the layout with the net list of the schematic or any imported netlist. The program checks if between the physical and logical design the necessary concordance exists, whereby it is irrelevant if the schematic net list comes from another system. Finally, a report is created, which lists every deviation and informs the user about the correctness of the design.



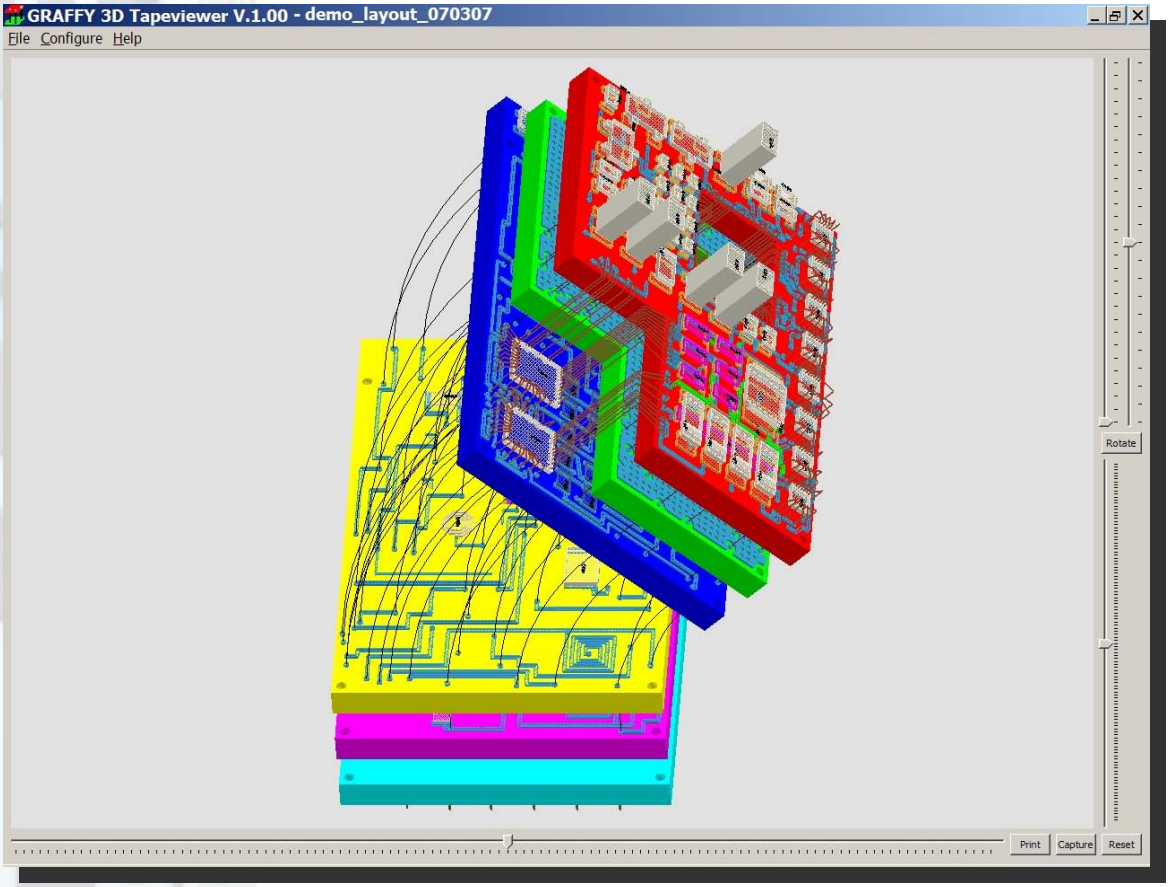
Tapeviewer

The tree-dimensional view of the LTCC layout allows an optical check of all tapes.

With a 3D view of the top and bottom side as well as each single tape of a complex LTCC layout buried components for example

- DIEs inside cavities
- Printed resistors
- Simulated RF layout structures
- Traces
- Vias
- Thermal vias
- Shielding etc.

can be viewed at their place and checked for a suitable design in addition to the Design Rule Check. By rotating any single greentape for arbitrary angles the layer structure can be viewed three-dimensional from each direction.



3D View of a Rotated LTCC Design

Hybrid Resistor Design

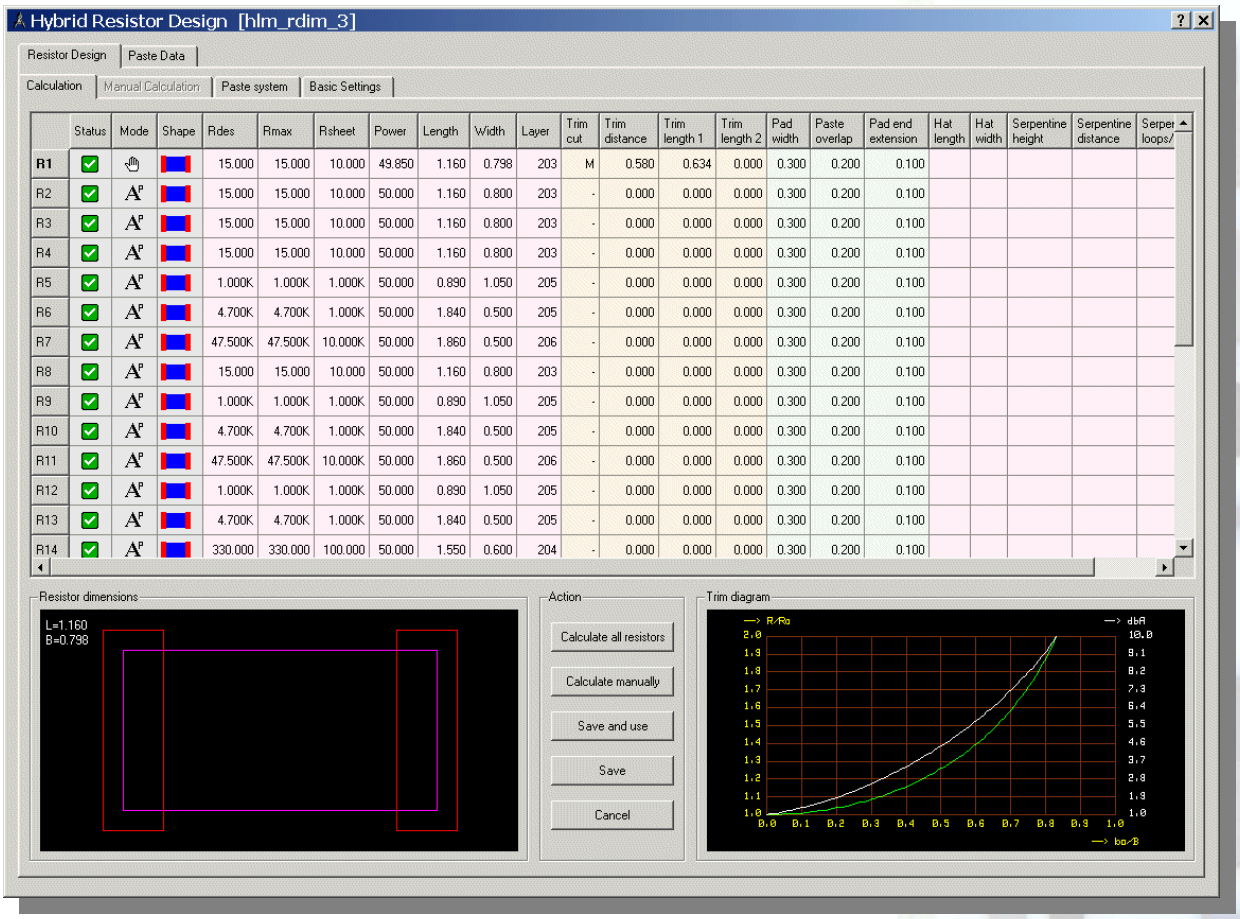
The resistor design is of special importance within every hybrid/LTCC design system. The accuracy of the resistor calculation affects directly the size and as a result the required space as well as the quality of the developed electronic circuits.

After defining all corresponding resistors with their resistor value and geometrical shape in the schematic, the parameters of all resistors will be transferred automatically to the resistor calculation tool and calculated there.

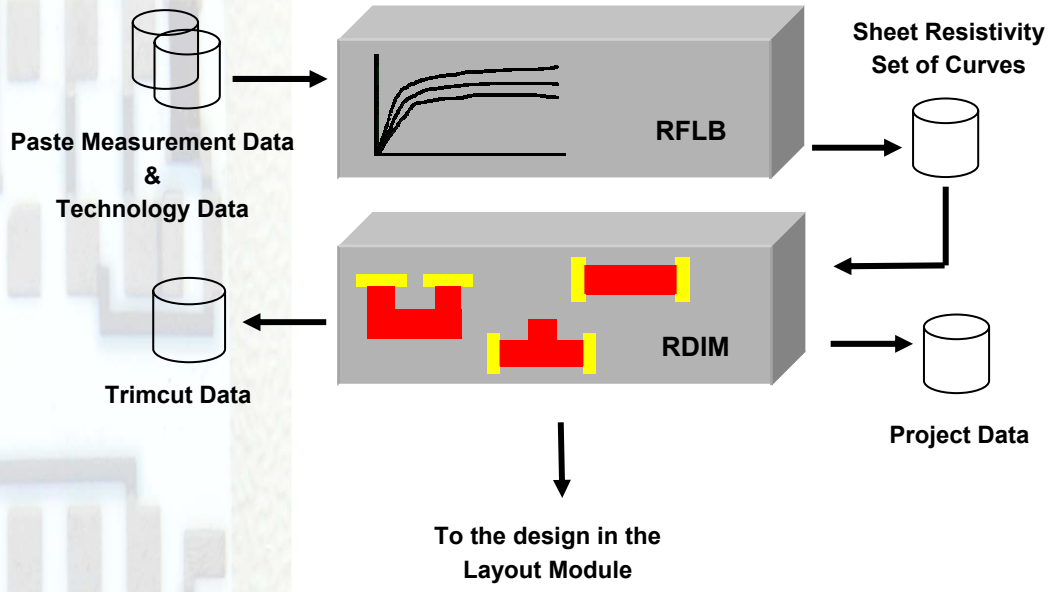
The calculated resistors are represented in a spread sheet showing the geometrical shape and all parameters assigned. If desired any parameter of the resistors can be modified individually before starting a single or a group calculation.

After this the resistor geometries will be transferred automatically back to the layout. When layouting the resistors parts then behave like all other parts in the layout with their airlines.

Printed resistors can be calculated and placed on top and bottom side of a layout as well as for inner layers (buried) or in the LTCC on any tape.



A graphical overview of the **Hybrid Resistor Design Concept** is shown below:



For calculating the paste resistors HYDE needs information on the paste measurement data of a test substrate as well as technology data of the paste and the substrate. The paste measurement data are extracted out of the test substrate using measuring devices and then they are read in HYDE and managed and processed there.

The **technology data**, which can be ranged in the following groups and which have already been determined by the substrate are enclosed in another system menu.

- Pastes of different manufacturers (Heraeus, DuPont, ESL, and other)
- Sheet resistivity value
- Substrate (ceramic, dielectric, steal and other)
- Number of firings
- Trace materials (silver, silver-paladium, gold, and other)

If the menu settings correspond to the measuring data to be read in, these can be directly transferred into the system. If the paste of a certain manufacturer is missing in the system menu, it can be easily extended and in the next step the corresponding measurement data can be read in. By this customizing it is guaranteed, that new technologies and processing methods can also be considered in the future.

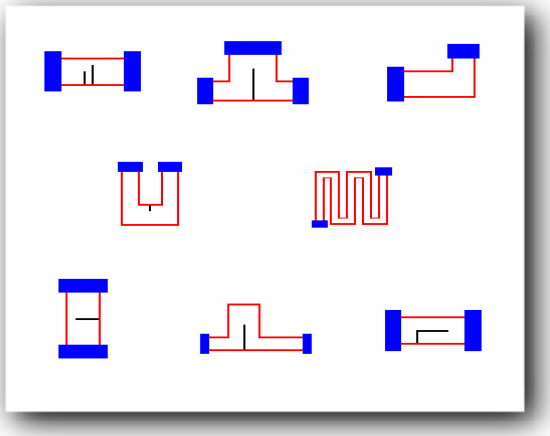
Each record of paste measuring data is associated to a certain technology setting. But because the sheet resistivities are dependent of the geometry and do not have a linear sheet-related behaviour, an individual calculation of the resistors with the measured data stored in the system has to be done. The measurement data base must be created for each new paste uniquely and this forms the base for future resistor designs.

The real resistor design takes place in an easy user dialogue of the windows-guided user interface and begins with the specification of the technology. Then the resistor shape will be selected. After selecting the reference designator the parameters for this resistor are calculated either automatically or manually.

By taking into account the geometry-dependent sheet resistivity, thickfilm resistors are calculated in such a way that the circuit can often be operated without laser trimming.

HYDE supports the following **resistor shapes**:

- Rectangle
- Tophat
- Tophat with roof
- U-shape
- U-shape with roof
- Serpentine
- Serpentine with roof
- Angle
- Double angle
- Angle three sided



Graphical Display of the Resistor Shapes

The Resistor Dimensioning Command offers several possibilities to define the resistor, for example:

- Preset of the trim cut tolerance and the resistor value
- Power dissipation and value
- Length and value
- Area and value
- Length and width of a resistor

Taking into account the determined sheet resitivity, the process accuracy and the cooling type the calculated resistor will be displayed with its trim cut. These design options have a high degree of accuracy and offer a maximum of flexibility.

Among further specifications which affect the layout geometry is the connection pad design. As a result the system shows all relevant data concerning the designed resistor.

In order to reach an optimum resistor accuracy the resistor can be trimmed using the trim cut analysis until the design value of the resistor is reached. So manufacturing deviations will be balanced out and/or during a trimming a certain function of the electronic circuit is assured.

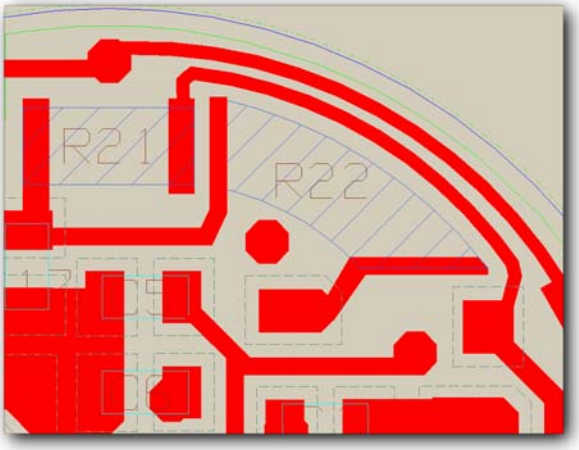
The system is able to provide all data required for this resistor trimming to get the highest possible accuracy.

The resistor determined in the Resistor Dimensioning Command will be saved as a project-specific library part and can be used within HYDE in the layout editor. By simply clicking on the resistor all important parameter settings concerning this resistor are listed. Afterwards this information can be edited interactively.

Polygon Shape Resistor Analysis

(PSRA: Polygon Shape Resistor Analysis)

With the PSRA printed hybrid resistors of any polygonal shape can be created and calculated. The port pads can be placed at any desired position of the polygon-shaped resistor. This means that the space on the ceramic substrate will be used optimally even after additional adjustments. Layout problems due to shortage of space is a problem of the past and an increasing miniaturisation of the circuit is achieved. The PSRA resistor design can be applied for thickfilm as well as for thinfilm technology.



Hybrid Layout with Polygonal Thickfilm Resistor

Thinfilm Resistor Dimensioning

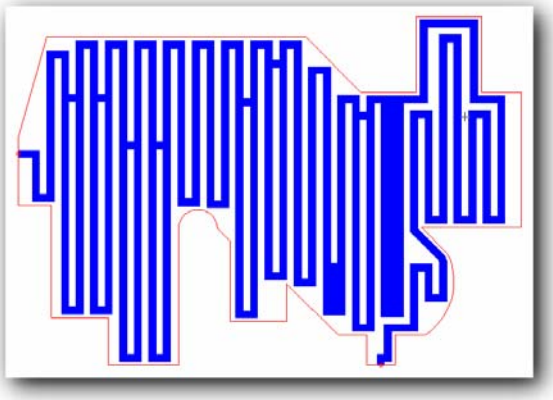
(CTFR: Create Thin Film Resistor)

With HYDE thinfilm resistors of high accuracy used in electronic circuits can be created.

Among other sheet resistivity, resistor design value, resistor trace width and process accuracy will be predefined at the beginning.

After specifying the outer geometrical dimensions for the thinfilm resistor and placing the resistor port pad at any position the thinfilm resistor will be exactly calculated within seconds and graphically dimensioned with its rectangular or polygonal shape.

Rough and middle trim as well as fine trim sections for increasing the circuit accuracy are already included automatically in this serpentine resistor.



Thinfilm Resistor with 3-fold Trimming

Thermal Simulation

The trend to a higher density of packaging in electronic circuits easily leads to thermal problems. Especially on spots of high power dissipation resulting heat can damage the components and the entire circuit.

The thermal simulation allows while still at the design process to discover the unexpected temperature peaks. This means that before a hybrid goes into production probable defects are found and a redesign is started to prevent loss.

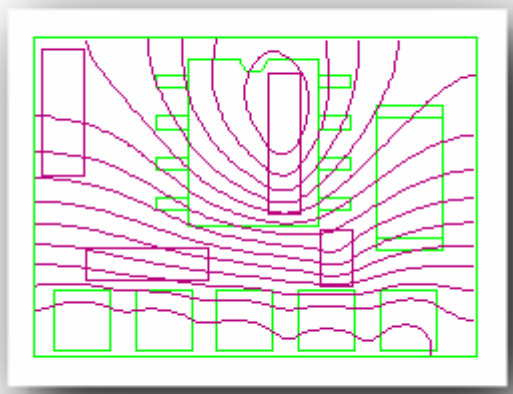
To be able to make a statement on the expected temperature distribution on the hybrid layout a thermal simulation has been integrated in HYDE. This enables to predict the temperature distribution on the hybrid circuit already during the design process. Before the production of the hybrid design begins, possible sources of defect can be found and avoided.

Thermal simulation can be easily applied in HYDE. It is displayed in form of isotherms (lines of equal temperature distribution) on the surface of the layout.

Width the Thermal Simulation it is possible to localise the hot Spots of a circuit already during the design.

It is recognizable at a glance on which spots of the hybrid layout the temperature gets values that could damage the functionality of the designed hybrid circuit. To avoid such critical spots in advance heat sink can be integrated in the layout either when placing library parts or after a first thermal simulation.

The layouter can calculate the temperature development on the hybrid for different types of heat sink. So the most appropriate heat sink can be selected which gives the best price/performance rate.



Hybrid Layout with Isotherms

Thermal reference measurements can be performed very easily by displaying the isotherms on different layers with different colors when using various parts.

Functions like for example switching off unused layer information as well as displaying isotherms and parts simultaneously increase the clarity and the informational value of the thermal simulation.

CAM Applications

In order to fabricate hybrid and LTCC circuits efficiently HYDE offers corresponding functionalities for manufacturing.

HYDE disposes of a powerful, versatile applicable **Material List Generator**. A material list can be generated from both schematic and layout. Part information can be extracted out of a drawing and merged with data in a part data base. The resulting file can be formatted to fit specific requirements and can be sent to a printer or stored in a file. Stored files can be placed in any drawing (as graphical text).

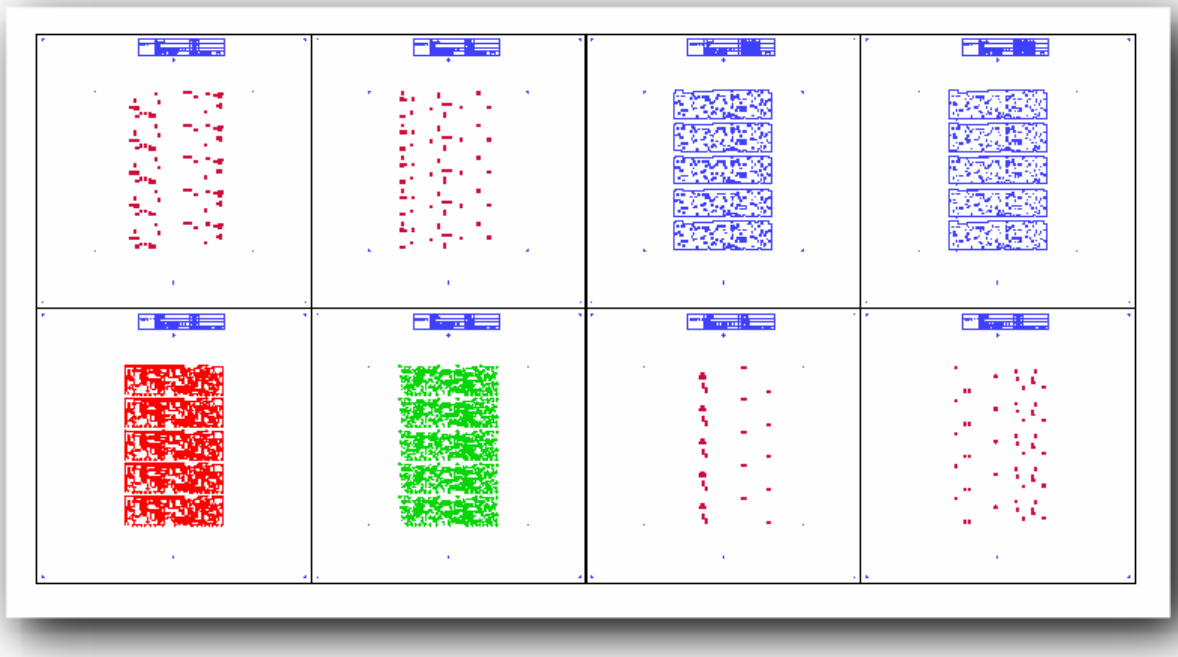
The parts data base is integral part of the system. It can be defined and structured according to the own conceivabilities. Import and export is realized via the ASCII interface.

Before manufacturing the ceramic circuit all **paste amounts** for the hybrid resistors, the traces and the isolation layers in the layout can be exactly calculated in the forefront.

In addition the **generation of the step&repeat of a layout for the film creation** can be performed in Gerber or GDSII format. In the layout matrix there can be placed extra passer and fiducial marks and a text field for the data determination of each layout matrix field.

With HYDE different **versions of hybrid/LTCC layouts** can be **managed** suitable for documentation. If variable parts are used with similar layouts, the unchanged drawing (main drawing) will be saved as a part. As a result it is possible to insert different parts in the versions and a new version drawing can be saved. If for example the layout has to be changed in all versions, the main drawing is modified as a part.

If HYDE is used in the IT network of a company all relevant data of a project as well as the belonging library data can be made available for the company database of a PDM system . If desired we individually customize these interfaces to every PDM system.



Creating the Step&Repeat for the Film Generation

Available Interfaces

Applications	Formats	Products	Notes
Graphical Systems	DXF	AutoCAD	bidirectional
	DWG	AutoCAD	bidirectional
	GDSII	Exposer	bidirectional
	HPGL	Printer and Plotter	bidirectional
	HPGL/2	Printer and Plotter	only output
	Postscript	div. systems	only output
	Vector-EPS		
	Raster-EPS		
	PCL5, EPSON	Printer	only output
	IBMpro, Apple, NEC,		
	OKI, OCE		
	PCX, PGM,	Pixel	only output
	TIFF, JPG, BMP, CGM,		
	SGIRGB		
	FaxG3, FaxG4	Fax	only output
DTP Systems	MIF	FrameMaker	only output
	CGM	z. B. Interleaf	only output
Mechanical	MI	HP ME10	bidirectional
CAD Systems	IGES	CATIA etc.	only input
Electronic Design	EDIF (Connection list)	div. systems	only output
Systems	HEDIT/HEDIM	BICAD	only input
	Orcad	Connection list	only input
	Protel	Connection list	only input
	PADS	Connection list	only input
	Workview	Connection list and footprints	only input
	CR5000 (Zuken)	Connection list	only input
	Intergraph	Connection list	only input
	ADS/MDS (Agilent)	Graphics (ARCHIVE/GENERATE)	bidirectional
CAM Systems	Standard GERBER	Photoplotter	bidirectional
Connection to	Extended GERBER	Photoplotter	bidirectional
production machines	EXCELLON	NC/Drill Machines	bidirectional
	SIEB&MAIER	NC/Drill/Mill Machines	bidirectional
	SINUMERIK	NC/Drill Machines	only output
	SMD-Pick&Place	Pick&Place Machines	only output
	Unidat	Pick&Place, Bonding, Trimming	only output
Other Interfaces	EMF	WINDOWS Clipboard	bidirectional
	ARCHIVE/GENERATE	HP EGS/HP MDS-ADS	bidirectional
MS-Office	ASCII Format	MS-EXCEL	bidirectional
		MS-WORD	

System Requirements

Computer System

PENTIUM PC with at least 1 GHz
(WINDOWS 2000/XP/Vista [32/64])

PENTIUM PC with at least 1 GHz
(Linux, Kernel 2.2.16 or higher)

Display

1280 x 1024 pixel monitor with 255 colors,

1024 x 768 pixel monitor or other formats
(with limitations).

Graphics accelerators are not supported.

Memory and disk space

150 MB free disk space for installing
GRAFFY/HYDE,

500 MB disk space for user files
(recommended),

500 MB RAM for WINDOWS/LINUX
(minimum)

Plotter, printer

HPGL capable plotter/printer,

all from WINDOWS supported printer

3-button mouse (USB/PS-2, HIL),
scroll wheel recommended

CD drive

Licensing

Node-locked (Single User License)

WINDOWS: Hardkey (Dongle) on USB, parallel or serial port

LINUX: Hardkey (Dongle) on USB or parallel port

Floating (Net License)

WINDOWS: FLEXlm with reference Ethernet ID of the network adapter

LINUX: on demand

GRAFFY/HYDE supports under LINUX the diskless mode as well as remote mode and X-Terminals.

Service and Support

We provide our customers with a multilevel service and support.

In the first phase a detailed **analysis** of the existing system environment is made. In the **consulting phase** following we point out which possibilities are conceivable, in order to solve its tasks more effectively and thus more economically.

The DURST CAD/CONSULTING GmbH feels itself obligated beyond the system installation to be further present for their customers and helping them facilitate handling the system.

In each case the direct contact of the customer with a system engineer of DURST CAD/CONSULTING GmbH is offered. The **support** includes telephone, fax and email up to consulting at customer's site.

The individual steps up to the **realization** of the solution developed in co-operation with the customer are planned exactly; a time frame is specified. Before the complete system runs, it can be possible to make **developments and/or individual adaptations**. This can be e.g. the case if it is necessary to integrate HYDE into a system environment already existing at the customer site.

Software service really means for us "service at the customer".

Maintenance agreements can be made at customer request. They cover a hotline support as well as regular software updates and the possibility of downloading new HYDE versions from the web.

Trainings

We offer HYDE trainings in German and English with company-specific goals, from the introductory training, which makes the user gradually familiar with HYDE, up to the advanced trainings for the consolidation of already existing system knowledge. Furthermore individual trainings are offered, which are oriented at the customer needs. Trainings are given either at the DURST CAD/CONSULTING GmbH company location or locally at the customer site.

References

The great number of HYDE users is a proof for the quality of the software. HYDE is a user software developed by an experienced expert group. Please ask us for more information. We would be gladly at your disposal for a detailed demonstration.

HUBER+SUHNER

METALLUX ELECTRONIC

TU WIEN

NEWAYS

EPFL ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Hipot-hyb

LEWICKI microelectronic

TES Electronic Solutions

MSE

Micro-Hybrid Electronic GmbH

SIEGERT electronic

Agilent Technologies

MICRODUL

reinhardt MICROTECH

TADITEL Automotive Electronics. TACTEL Electronics.

BERU

Tyco Electronics

LUST HYBRIDTECHNIK

RHe MICROSYSTEMS

VIA electronic

BENNING

THALES

PDI Premier Devices A Sirenza Company

AFT GROUP

Continental TEMIC

TAIYO YUDEN

Institut "Jožef Stefan"

HE SYSTEM ELECTRONIC

Metrohm

TECHNOGRAPH

... and other

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