



## The easy way to advanced microelectronics integration technologies or Your Visions are our Challenge

*Fighting against time? Endeavouring to put smaller, lighter and less expensive products on the market?*

*High Density Packaging (HDP) offers new possibilities to increase your competitiveness!*

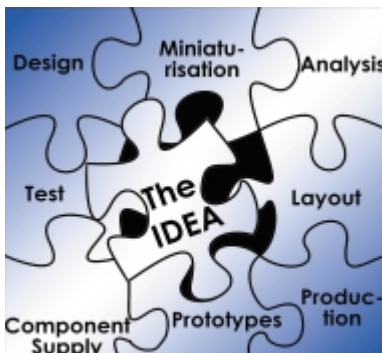
**Art of Technology:** "... what you need is a turnkey solution to integrate these revolutionary technologies directly into your current and future products. And that's what we offer!"

### High Density Packaging (HDP)

HDP is the next logical step in miniaturisation of electronic systems. Using bare dies or Chip Size Packages and highly integrated boards, you can ...

- Reduce costs at system level
- Improve functionality
- Decrease size and weight
- Lower power consumption
- Increase reliability
- Bolster protection against EMI

In opposition to System on a Chip, with HDP technologies combinations of different technologies such



*All-in-one solution for HDP-systems*

as memory,  $\mu$ Ps, analogue, RF and power electronics can easily be combined.

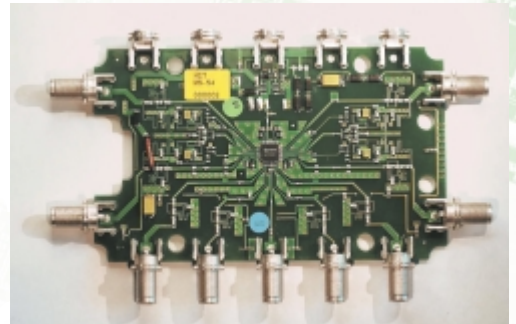
However, HDP combines a huge bunch of different technologies and possible combinations with their respective advantages and disadvantages. In addition, there are many manufacturers on the market with different offers and possibilities, not only in their technological capabilities, but also in the available volumes.

To evaluate all this for a single project is overkill. Art of Technology has the knowledge to support you with the appropriate solution for your project.

### What offers Art of Technology

Art of Technology supports OEM's with turnkey solutions for system development and design. From an idea throughout feasibility studies, system development and design to prototype and volume production Art of Technology is a single access point for state of the art electronics integration technologies in Europe. We deliver our customers HDP based systems according to their needs or specifications. Through a sound standing knowledge of the different HDP technologies as well as the available manufacturers and the fact that Art of Technology is truly independent of any HDP supplier, we can support our customers with the best-suited solution to their specific needs.

Situated in Switzerland, our current primary focus is on a clientele in Central Europe.



*5/4-satellite switch*

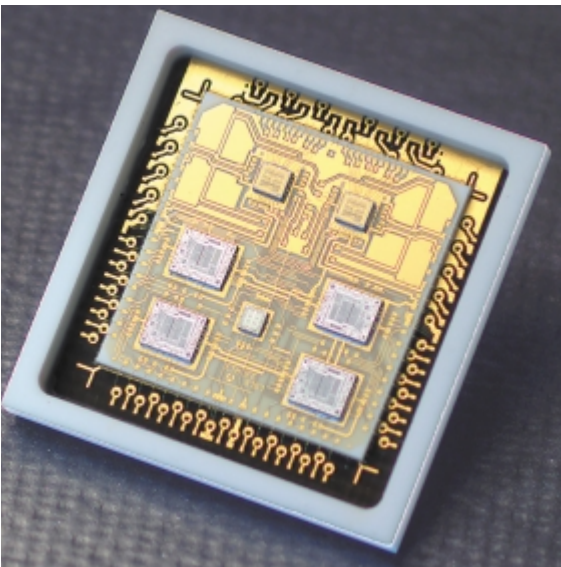
### An Example Multiswitch for DBS (Direct Broadcast Satellite) signals for Richard Hirschmann GmbH&Co

Richard Hirschmann GmbH&Co, Stuttgart builds satellite receiver switches. Picture 2 shows an implementation with five inputs (four satellite and one terrestrial signal) on the lower side and four outputs (receivers) on both sides. The switching of the 2.5 GHz signals is done by an ASIC.

When starting to design a new system with nine inputs Hirschmann realized, that due to the parasitic loads and the necessary strong shielding of the high frequent signals it was not possible to combine two housed ASICs. The Electronics Lab at ETH Zurich, a service centre of Europractice MCM, has been hired to design and layout an HDP module. The module contains seven

bare dies and about two dozens of integrated passive components. The other components remain on the PCB board. Due to the high frequencies (2.5 GHz) a special focus had to be given to the respective layout rules.

Within the EC-project LAP (Large Area Panel processing) it has been decided to develop this module using thin film technologies on ceramic (see picture 3). In addition to the substrate an additional laminate BGA-carrier has been developed on which the module is wire-bonded. The first prototype round showed a better performance for this module than the former version of a 5/4 switch in PCB technology.



Module for 9/4 satellite switch

When the people involved in this project have founded Art of Technology, the company took over the responsibility for the commercialisation of this module. Not focussed on a technology anymore the feasibility study and cost calculation has been revised. This led to a new solution based on a single laminate substrate. Those prototypes are currently in prototype manufacturing.

The integration of the core into a HDP module has several advantages. A better HF signal, one double-sided PCB main board can be used and the metal case needs no alteration.

### Art of Technology

Art of Technology has been founded in October 1999 as a spin-off company of ETH Zurich. The founders are a team of experienced and innovative engineers that worked for four years in Europractice MCM. Art of Technology uniquely combines a large knowledge base of different electronic systems (analogue, digital, RF and power electronics), in-depth electronics integration technology knowledge (gained in Europractice MCM) and manufacturing expertise from World's leading suppliers of advanced packaging technologies.

### In short – with Art of Technology your visions are transformed into a product!

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The Team

### Why choose Art of Technology

5 excellent reasons to choose Art of Technology:

1. No struggle with miniaturisation and technologies!
2. Years of experience with different systems and technologies!
3. Independent of any manufacturer or technology!
4. Able to provide you with the best-suited solution!
5. A single access point to over ten different technologies and over 30 manufacturers!

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**Outsourcing your technology challenges to Art of Technology will enhance your development capacities and enable you to concentrate on your core business. It saves time and money!**

We offer:

- Feasibility studies
- Design and development
- Manufacturing at competent and well tried partners

You gain:

- Smaller products
- More powerful products
- More reliable products
- More efficient products
- New products