

PHILIPS

Handshake Technology

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Asynchronous design at Philips



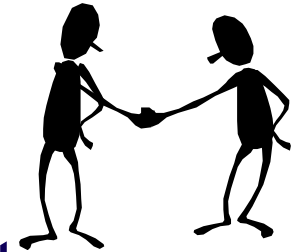
- The Tangram research project started in 1986
- Cooperated closely with product groups to demonstrate advantages in products
- Since 2002 all activities concentrated in Philips Electronic Design & Tools (self-financing internal EDA company)





Improvements in Handshake Technology

- Support for non-handshake signals: clock, probe, exceptions, signal, edge, wait, ...
- Prototyping on FPGAs
- Timing analysis
- Technology mapping
- Scan-testing

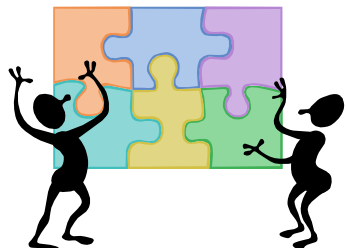
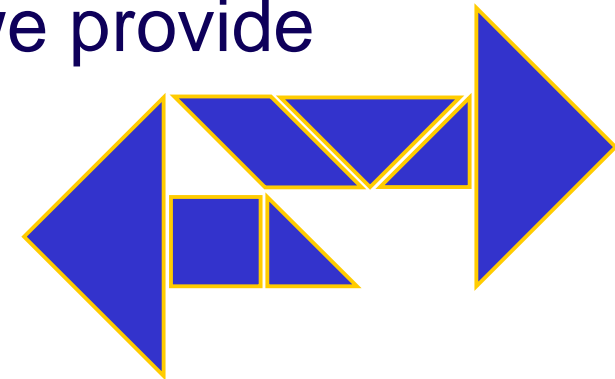


“*Full scan testing of handshake circuits*”
 Ph.D. thesis Frank te Beest (May 2003)



It's a technology, not only a tool

- In addition to the design tools we provide
 - Design service
 - Design support
 - Training and consultancy
 - IP blocks
- This allow customers to have a kick-start and reduce risks and investments



Provide a solution, not a problem

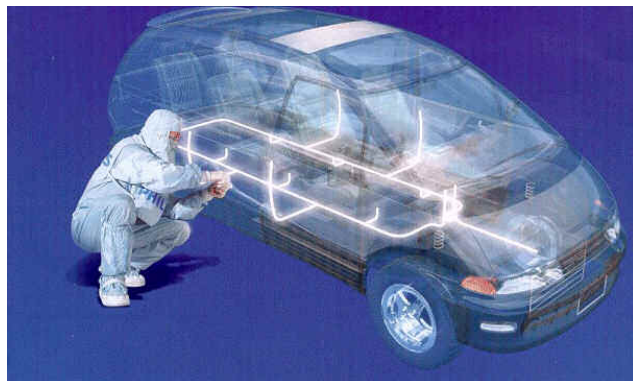




Applications



- Smartcards (Mifare ProX and SmartMX families)
- Connectivity (pager, telephony, remote controls)
- Automotive
- More than 10M ICs based on Handshake Technology are sold

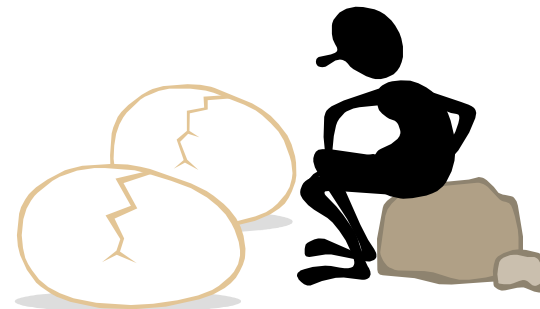




Handshake Technology Status



- Proven technical and commercial feasibility
 - Several reference customers inside Philips
- Business in the Philips Technology Incubator
 - Business development
 - Further development of IP portfolio



- Deliver Handshake Technology also to customers outside Philips



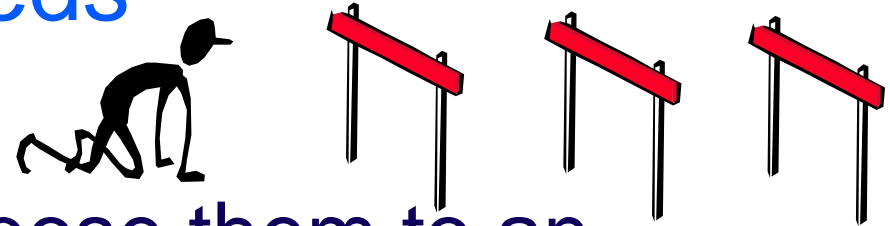
Tool development needs



- Some tool development is still needed:
 - Verification tools (checking synthesis steps)
 - Improved test solution
- But most of the tools are already there
 - NCL, Tangram, Balsa, ...
 - Petrify, Minimalist, Firemaps, ...



Tool development deeds



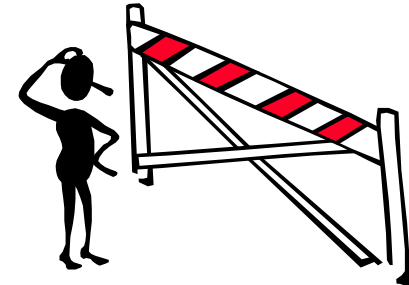
- The challenge is to expose them to an application domain (customers)
 - Address complexity
Tools that can handle realistic applications
 - Address lack of trained designers
Tools that can be handled without too much risk by non-experts (everyone not in this audience)
- Get up the learning curve!





The road to further commercial success

- Demonstrate that asynchronous technology adds value
- Address the issues customers/designers have:
 - Asynchronous design is risky
“it will never work”, “it will give my product a bad connotation”
 - It is a big risk to switch to a technology that:
 - Is new (unproven)
 - Has a very limited user base
 - Upfront investments (training etc.) are needed to be able to design asynchronous circuits





Bringing down the barriers



- Competition helps to create the market
- Improve our image: share the joy not the pain
 - Show the synchronous world what we can achieve.
 - *“A hazard a day, keeps the customer away”*
- Provide customers with a complete solution and not one piece of the puzzle

There's a prosperous future ahead
... make it happen!

