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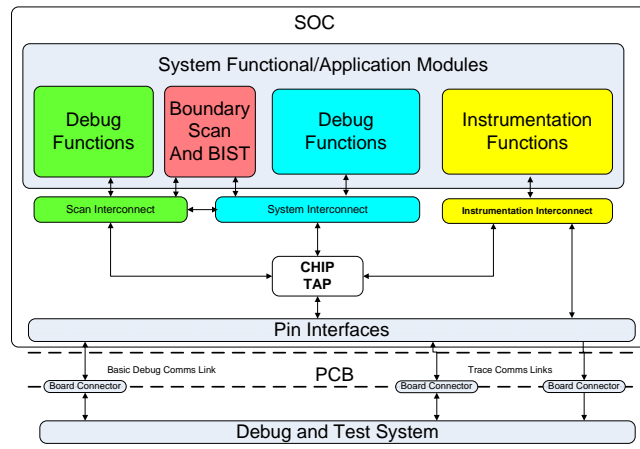


Industry Standards and Their Importance

The Future of Test, Debug, and Instrumentation is upon us.

“Transitioning from Proprietary to Standardized Technology”

Typical SOC Architecture with Test/Debug



Access to and use of the Test, Debug, and Instrumentation Function is very related.

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If everything is compliant and is based fully on the JTAG Protocol, then this is the distribution of Standards Interaction – 1149.7 or 1149.1 can be used to access the chip; 1687 is the preferred method to interact with the TAPC; then either a 1687 SIB can be used to add scan paths to Instrument Interface TDRs, or TDR Interfaces can be used at the Instrument (leaf cell), or a compliant 1500 Wrapper can be used a leaf ending – where the 1500 CDR is used as an Instrument Interface to an Instrument. If there is a need to continue the architecture with Hierarchical connections, then SIBs can be cascaded, or a 1500-like architecture (not a compliant 1500 wrapper, but a 1687 structure that emulates the 1500 wrapper) can be supported where the CDRs contain 1687 SIBs to allow further hierarchical connections.

Compliant alternatives to this “full use” of the Standards are: 1149.1 and 1687 alone or 1149.7, 1149.1, and 1687 alone.

Non-efficient alternatives are to use 1500 alone with a TAPC, but then there are multiple ways to connect the SelectWIR signal (concatenate to TAP IR, or generate 2nd Instruction), which leads to the ambiguity that 1687 was meant to address.

For embedded Instruments, it is allowable to deliver 1687 or 1500 wrapped logic block individually – to make 1500 Plug&Play, though, at least a 1687 SGB should be included to generate the SelectWIR signal – the 1687 interface is naturally 1149.1 Plug&Play.

Complementary work of standards bodies



➤ Debug Emphasis

- MIPI – Mobile industry origin and focus
- NEXUS – Automotive industry origin, broad focus
- OCP – Connectivity emphasis

➤ Test Emphasis

- IEEE 1149.1 – Board level test, other uses related to debug
- IEEE 1687 – Access and control of on-chip instruments
- 1500 – Chip production testing

➤ Portal Emphasis

- IEEE 1149.7
 - Access to Test/Instrument/and Applications Data
 - Uses to 1149.1 Standard as its Foundation

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What is the advantage of industry standards?

➤ Best in class technology

- Delivers the collective wisdom of the industry
- Comprehends Boards, Chips, Die-Stacks, Cores, Logic Partitions, Instruments
- Interoperability of IP
- Open system, framework for extensibility and customization

➤ Lower cost/increased capability

- Standardized Access via a Test Port defined by an IEEE standard
- Hierarchical architecture
- Breath of capability and support
- Independence from pitfalls/constraints/costs of proprietary technology and single source suppliers

➤ Provide bridges to legacy technologies

- Existing IEEE 1149.1 Solutions
- Single Wire Debug (SWD)
- Once Chip Emulation (ONCE)

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This is the way to go. Best in class technology, great capability

Who's involved in creating these standards?

➤ Major companies in:

- North America
- Europe
- Asia

➤ Experts from many disciplines:

- Test
- Debug
- Chip Design

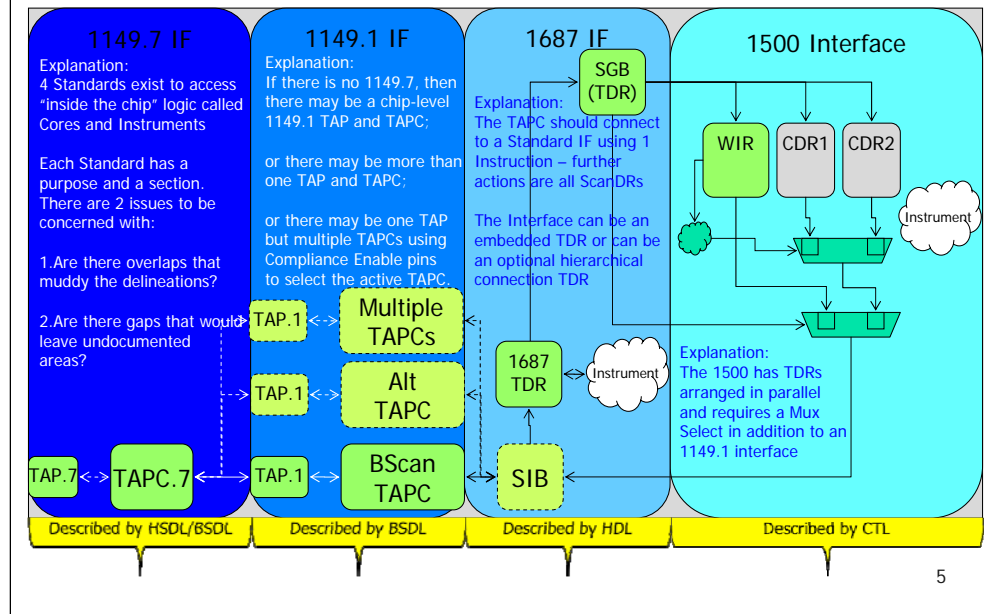
➤ Providers from all layers of the electronics food chain:

- SI IP
- Debug Tools
- Test Tools
- Design Tools
- Chip Manufacturers
- End Equipment Manufacturers

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Momentum is increasing, wealth of experience, wide range of skills brought into addressing the industry's test and debug architecture.

Distribution of IEEE Standard Solution Spaces



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One Possible Multi-Standard Access Solution

