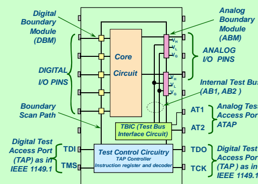
IEEE 1149.4
Standard for a Mixed-Signal Test Bus

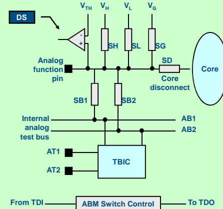
Scope and Purpose

Defines a mixed-signal test bus architecture that provides access to analog and digital test points for:
- Interconnect test
- Parametric test
- Internal test

Top Level Architecture



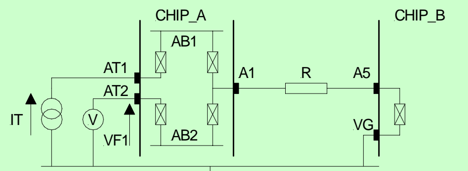
Analog Boundary Module (ABM)



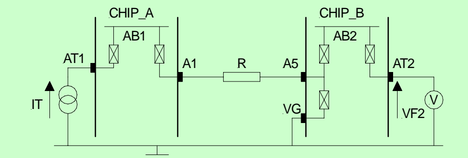
Application Example

Extended interconnect test – measuring R value

- First measurement



- Second measurement



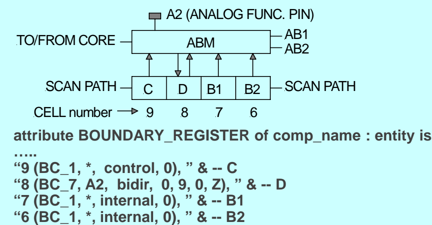
- If Voltmeter impedance >> impedance of the switches
- R = (VF1-VF2) / IT

BSDL Extension
(2010 Revised Version)

- Describes 1149.4 test circuitry in a device
- Compatible with 1149.1 BSDL
- To support test pattern generation process

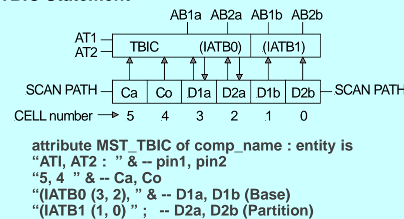
Examples

- Description of boundary registers of an ABM



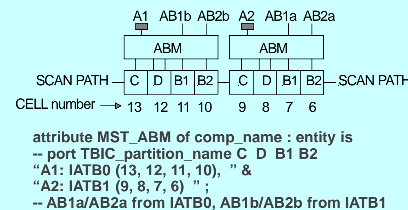
attribute BOUNDARY_REGISTER of comp_name : entity is
.....
"9 (BC_1, *, control, 0), " & -- C
"8 (BC_7, A2, bidir, 0, 9, 0, Z), " & -- D
"7 (BC_1, *, internal, 0), " & -- B1
"6 (BC_1, *, internal, 0), " & -- B2

- TBIC Statement



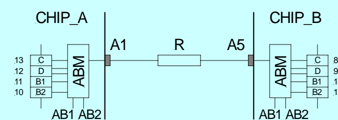
attribute MST_TBIC of comp_name : entity is
"ATI, AT2 : " & -- pin1, pin2
"5, 4 " & -- Ca, Co
"(IATB0 (3, 2), " & -- D1a, D1b (Base)
"(IATB1 (1, 0) " ; -- D2a, D2b (Partition)

- ABM Statement



attribute MST_ABM of comp_name : entity is
-- port TBIC_partition_name C D B1 B2
"A1: IATB0 (13, 12, 11, 10), " &
"A2: IATB1 (9, 8, 7, 6) " ;
-- AB1a/AB2a from IATB0, AB1b/AB2b from IATB1

- Describing cells associated to each ABM



attribute MST_ABM of CHIP_A : entity is
"A1 (IATB0_A: 13, 12, 11, 10)," & -- C, D, B1, B2

Attribute MST_ABM of CHIP_B : entity is
"A5 (IATB0_B: 8, 9, 10, 11)," & -- C, D, B1, B2

Benefits

- Provides interconnect test for high-density surface-mount assembled boards.
- Bridge and open faults detection test for both digital and analog nets can be performed simultaneously.
- Passive analog components between chips are able to be measured.
- Parametric test and internal analog test can also be performed.
- BSDL extension allows mixed-signal chip vendors to provide description of their device's test circuitry in the datasheet.
- Third party tools will be able to generate interconnect test patterns automatically using the provided BSDL from each device.

Potential Applications

- Mixed-signal devices can be used in a system which is tested regularly in the field such as in safety critical applications.
- Examples of safety critical applications include medical, security, transportation and process control.
- Mixed-signal devices for commercial applications.

Further Information

For further information, contact:

IEEE 1149.4 Mixed-Signal Test Bus Working Group at http://grouper.ieee.org/groups/1149/4/index.html

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