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A Tour of the IBIS Quality Specification DesignCon East IBIS Summit April 5, 2004

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IQ Specification and Example

- http://www.sisoft.com/ibis-quality/docs

- IQ_Specification.txt
- IQ_Example.ibs
- IQ_Checklist.xls

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IBIS Quality Specification Levels

- Level 0 requirements
  - Most Level 0 requirements can be checked by ibischk3 version 3.2.9 or later software.
  - Ibischk3 is highly recommended, to avoid performing level 0 checks manually
- Level 1 requirements
  - Level 1 includes all items in level 0
  - Plus checks for correctness and completeness, and basic simulation tests
- Level 2 requirements
  - Level 2 includes all items in levels 1 & 0, plus correlation:
  - Spice Correlation and/or Bench Correlation
  - IBIS Accuracy Handbook
    - Correlation Levels (1,2,3)
    - Figure of Merit (FOM)

IQ Specification Index

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IQ IBIS File Example

```
[File Name]  iq_example.ibs
[File Rev]    1.0
[Date]         3/30/2004
[Source]      Developed by: Signal Integrity Software, Inc.
[Notes]        Rev 1.0  - 03/30/04 Release as iq_example. RJH

|IQ SUMMARY Overall Quality of component and models Level 2

|IQ Level 0 - 0 errors 12 warnings
|IQ Level 1 - All checks done for completeness and correctness
|IQ Level 2 - HSPICE Correlation (2003.09) completed FOM =99%
|IQ Buffer SSTLDATIO/SSTLADDIO:    Quality level 2
|IQ Level 0
|    All I/O Models: When running through ibischk3, this file
|    contains 12 warnings about pullup and pulldown being non-monotonic.
|    This is due to an IBIS Parser Bug, BUG71.
| IQ WARNING (line  209) - Pulldown Maximum data is non-monotonic
| IQ WARNING (line  210) - Pulldown Typical data is non-monotonic
|    IBISHCK 4.0 produces 0 errors and 0 warnings
|IQ Level 1
|    All Level 1 checks performed and are either OK or NA
|    Limitations: Ccomp is a compromise between driving and receiving.
|IQ Level 2
|    Using VT IBIS Data compared to source HSPICE models FOM = 99%.
```

```
|IQ BEGIN IBIS Quality Checklist
|
|IQ FILE: iq_example.ibs      IQ Level:       2
|IQ XX  2.1     LEVEL 0  Header passes IBISCHK
|IQ XX  2.2     LEVEL 0  Latest [IBIS ver] used
|IQ XX  2.3     LEVEL 0  Do not use [Comment Char]
|IQ XX  2.4     LEVEL 0  [File Name] is correct
|
|IQ COMPONENT: IQ_EXAMPLE     IQ Level:       2
|IQ XX  3.1.1   LEVEL 0  [Package] must have typical values
|IQ XX  3.1.2   LEVEL 0  [Package] Parasitics must be reasonable
|IQ XX  3.1.3   LEVEL 0  [Define Package Model] present if
|IQ XX  3.1.4   LEVEL 1  [Package] parasitics are validated datasheet
|IQ XX  3.2.1   LEVEL 0  [Pin] section complete
|IQ XX  3.2.2   LEVEL 0  [Pin] model names not too long
|IQ XX  3.2.3   LEVEL 0  [Pin] models present in file
|IQ XX  3.2.4   OPTIONAL [Pin] RLC complete
|IQ XX  3.2.5   LEVEL 1  [Pin] RLC parasitics are validated datasheet
|IQ NA  3.3.1   LEVEL 0  [Diff Pin] referenced pins exist
|IQ NA  3.3.2   LEVEL 0  [Diff Pin] Vdiff and Tskew complete
|
|IQ MODEL: SSTLADDIO          IQ Level:       2
|IQ XX  4.1.1   LEVEL 0  [Model] parameters have correct typ/min/max
|IQ XX  4.1.2   LEVEL 0  [Model] Model_type
|IQ XX  4.1.3   LEVEL 0  [Model] C_comp is reasonable
|IQ XX  4.1.4   LEVEL 1  [Model] C_comp is correct
|IQ XX  4.1.5   LEVEL 2a [Model] C_comp SPICE correlation
|IQ __  4.1.6   LEVEL 2b [Model] C_comp laboratory correlation
```

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IQ Checklist Example

IBIS Quality Checklist				
	FILE: iq_example.ibs		IQ Level:	2
☑	2.1	LEVEL 0	Header passes IBISCHK	
☑	2.2	LEVEL 0	Latest [IBIS ver] used	
☑	2.3	LEVEL 0	Do not use [Comment Char]	
☑	2.4	LEVEL 0	[File Name] is correct	
☑	2.5	LEVEL 0	[File Rev] is correct	
☑	2.6	LEVEL 0	[Date] is correct	
☑	2.7	LEVEL 0	[Source] is complete	
☑	2.8	LEVEL 0	[Notes] is complete	
☑	2.9	OPTIONAL	[Disclaimer] and [Copyright]	
	COMPONENT: IQ_EXAMPLE		IQ Level:	2
☑	3.1.1	LEVEL 0	[Package] must have typical values	
☑	3.1.2	LEVEL 0	[Package] Parasitics must be reasonable	
☑	3.1.3	LEVEL 0	[Define Package Model] present if [Package Model] is present	
☑	3.1.4	LEVEL 1	[Package] parasitics are validated against data sheet	
☑	3.2.1	LEVEL 0	[Pin] section complete	
☑	3.2.2	LEVEL 0	[Pin] model names not too long	
☑	3.2.3	LEVEL 0	[Pin] models present in file	
☑	3.2.4	OPTIONAL	[Pin] RLC complete	
☑	3.2.5	LEVEL 1	[Pin] RLC parasitics are validated against data sheet	
na	3.3.1	LEVEL 0	[Diff Pin] referenced pins exist	
na	3.3.2	LEVEL 0	[Diff Pin] Vdiff and Tskew complete and reasonable	
na	3.3.3	LEVEL 1	[Diff Pin] Vdiff and Tskew correct	
na	3.3.4	LEVEL 1	[Diff Pin] referenced pin models matched	
na	3.4.1	LEVEL 0	[Model Selector] referenced [Model]s exist	
na	3.4.2	LEVEL 1	[Model Selector] first [Model] is default	
	MODEL: SSTLADDIO		IQ Level:	2
☑	4.1.1	LEVEL 0	[Model] parameters have correct typ/min/max order	
☑	4.1.2	LEVEL 0	[Model] Model_type	
☑	4.1.3	LEVEL 0	[Model] C_comp is reasonable	
☑	4.1.4	LEVEL 1	[Model] C_comp is correct	
☑	4.1.5	LEVEL 2a	[Model] C_comp SPICE correlation	
	4.1.6	LEVEL 2b	[Model] C_comp laboratory correlation	
☑	4.1.7	LEVEL 1	[Temperature Range] is reasonable	
☑	4.1.8	LEVEL 1	[Voltage Range] or [* Reference] is complete	
☑	4.1.9	LEVEL 1	[Pullup Reference] is reasonable	
☑	4.1.10	LEVEL 1	[Pulldown Reference] is reasonable	
☑	4.1.11	LEVEL 1	[POWER Clamp Reference] is reasonable	

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Summary

- IBIS Quality Specification
  - IQ Levels
  - IQ Index
- IQ IBIS File Example
- IQ Checklist Example

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Additional Resources

- Mailing list
  - Ibis-quality@freelists.org
  - http://www.freelists.org/archives/ibis-quality
- Web site
  - http://www.sisoft.com/ibis-quality
  - http://www.sisoft.com/ibis-quality/docs
- Come visit IBIS booth
- Come to our SI and Timing paper
  - Wed 2pm (6-WP1)
- Come to PASS/FAIL Panel
  - Wed 4 pm
- Thank you and thanks to IQ committee
- Questions ?

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