IBIS Parser Update

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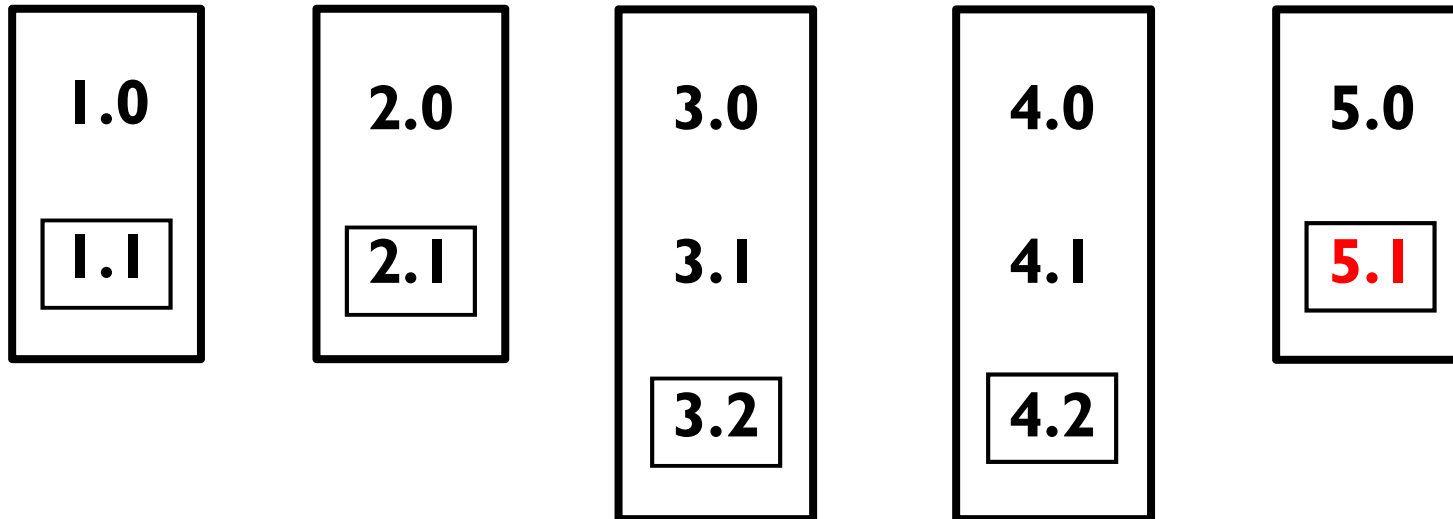
(presented by Anders Ekholm, Ericsson)

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Outline, Specifications and Parsers

- IBIS through Version 5.1
  - ibischk5
- Touchstone Version 2.0
  - tschk2
- Conclusions

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Valid IBIS Versions
and Latest ibischk Versions

1.0	2.0	3.0	4.0	5.0
1.1	2.1	3.1	4.1	5.1
		3.2	4.2	

ibis_chk **ibischk2** **ibischk3** **ibischk4** **ibischk5**

V1.1a V2.1.17 V3.2.9 V4.2.2 **V5.1.2**

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IBIS Parser Major Version Logic

- Subversions upgraded to **last** major version
  - **V5.1** upgrades V5.0
  - **V4.2** upgraded V4.0 and V4.1
  - **V3.2** upgraded V3.0 and V3.1
  - **V2.1** upgraded V2.0
  - **V1.1** upgraded V1.0

- **V5.1** checks **V1.1**, **V2.1**, **V3.2**, **V4.2**, and **V5.1** levels for features and corrections

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Downward Compatibility

- Current IBIS **downward compatible** with all earlier features and syntax
  - Prior EDA implementations supported
  - Existing models remain valid
  - Specification includes all features
  - Earlier specification mistakes corrected
- Specification well tested and corrected

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IBIS-AMI Version Exception

- IBIS-AMI subversions supported by the **.ami** format
- **AMI_Version** required for "**5.1**" files and **later**
  - First Reserved Parameter
  - Use_Init_Output **not legal**
- **Omission** of **AMI_Version implies** "5.0" level
  - Use_Init_Output **legal**
  - **All other AMI_Version "5.1" rules apply**
- Later AMI_Version levels will have more features and possible deprecation at the subversion level
- Later Specification will track all subversion changes

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"ibischk5" Parser

- Ibischk5, Version 5.1.2
  - Free executables:
    http://www.eda.org/ibis/ibischk5/
  - Bug reports:
    http://www.eda.org/ibis/bugs/ibischk/
- Checks all [IBIS Ver]s of IBIS files
- Over $117,000 of contracted work since 1993
- Supports .ibs, .pkg, .ebd, and .ami formats
  - directly or through higher level linkages

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Flags in ibischk5

```
Usage: ibischk5          <IBS filename>
     : ibischk5  -ebd <EBD filename>
     : ibischk5  -pkg <PKG filename>
     : ibischk5  -ami <AMI filename>
Usage: ibischk5  -caution -numbered       <IBS filename>
     : ibischk5  -caution -numbered -ebd <EBD filename>
     : ibischk5  -caution -numbered -pkg <PKG filename>
     : ibischk5  -caution -numbered -ami <AMI filename>
The flags prior to the file name can be in any order,
and the -caution and/or -numbered flags are optional.
```

- **–ami** for <file_name>.ami (algorithmic model interface control file)
- **–numbered** for numbered **E**rror, **W**arning, **N**otes and **C**aution messages

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ibischk5 {–numbered} –ami file4.ami

```
Checking file4.ami for IBIS 5.0 Compatibility...

ERROR - Illegal Usage value A specified for Param1
ERROR - Illegal Type value B specified for Param1
ERROR - Illegal Format value C specified for Param1
ERROR - No Reserved_Parameters found

Errors  : 4

File Failed
```

```
Checking file4.ami for IBIS 5.0 Compatibility...

E4627 - Illegal Usage value A specified for Param1
E4627 - Illegal Type value B specified for Param1
E4627 - Illegal Format value C specified for Param1
E4622 - No Reserved_Parameters found

Errors  : 4

File Failed
```

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Message Number File Being Updated (Over 1150 unique message strings)

	Number	Symbol in Code	Message string	Parameters	Comment	Category	Clasification
1							
2	100	MDL_ERR_0	Unable to Allocate Memory: %s %d	filename, line number	The code failed to allocate memory in <filename> at <linenumber>	Internal Error	E
3	101	MDL_ERR_1	Unable to get IBIS structure		Program data structures are corrupt	Internal Error	E
4	102	MDL_ERR_2	Orphan Model keyword.		Model keyword found but not within a Model declaration	Error with IBIS file Line number	E
5	103	MDL_ERR_3	Illegal Digital Port <%s> (not allowed in SPICE Ports section)	portname	Improper use of Digital port <portname>	Error with IBIS file Line number	E
6	104	MDL_ERR_4	D_switch not allowed with (D_drive,D_receive,or D_enable) in		Improper use of D_switch	Error with IBIS file Line number	E
7	105	MDL_ERR_5	%s not allowed with D_switch in Ports/A2D/D2A Section			Error with IBIS file Line number	E
8	106	MDL_ERR_6	Reserved Digital Port <%s> used as	portname	Improper use of Reserved Digital port <portname>	Error with IBIS file Line number	E
9	107	MDL_ERR_7	Orphan data line keyword.		A Model related data line was found where none was expected	Error with IBIS file Line number	E
10	108	MDL_ERR_8	TTgnd Typical value should be >0		Improper TTgnd typical value	Error with IBIS file Line number	E
11	109	MDL_ERR_9	TTgnd Min value should be >0		Improper TTgnd minimum value	Error with IBIS file Line number	E
12	110	MDL_ERR_10	TTgnd Max value should be >0		Improper TTgnd maximum value	Error with IBIS file Line number	E
13	111	MDL_ERR_11	TTgnd typ value is not in between		Improper range for TTgnd	Warning	W
14	112	MDL_ERR_12	TTpower Typical value should be >0		Improper TTpower typical value	Error with IBIS file Line number	E
15	113	MDL_ERR_13	TTpower Min value should be >0		Improper TTpower minimum value	Error with IBIS file Line number	E
16	114	MDL_ERR_14	TTpower Max value should be >0		Improper TTPower maximum value	Error with IBIS file Line number	E
17	115	MDL_ERR_15	TTpower typ value is not in between		Improper range for TTPower	Warning	W
18	116	MDL_ERR_16	[Model Spec] should be specified immediately after all the subparameters of a model and		Improper positioning of [Model Spec]	Error with IBIS file Line number	
19	117	MDL_ERR_17	[Receiver Thresholds] should not be specified for model type %s	modeltype	Receiver thresholds are not allowed for a <modeltype> which is not an Input or I/O model type	Warning with IBIS file Line number	W
20	118	MDL_ERR_18	[Add Submodel] should be specified before other keywords for a model		Improper positioning of [Ad Submodel]	Error with IBIS file Line number	E
21	119	MDL_ERR_19	%s Already Defined For Model '%s'	sub parameter/keyword, modelname	A model <sub-parameter or keyword> was already defined for <modelname>	Error with IBIS file Line number	E
22	120	MDL_ERR_20	[Receiver Thresholds] should be specified immediately after all the subparameters of a model and before the other keywords of a		Improper positioning of [Receiver Thresholds] keyword	Error with IBIS file Line number	E
23	121	MDL_ERR_21	Expecting Keyword. Invalid Line		An invalid line was found where a keyword was expected	Error with IBIS file Line number	E

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Recent ibischk5 Version 5.1.2

- Major IBIS-AMI syntax implementation
  - IBIS Version 5.1 – rules clarified and CHECKED
  - Table-syntax defined and now parsed
  - **Major Errors now detected** (versus not being checked in the older Version 5.0.7)

- 23 BIRDs on IBIS and IBIS-AMI syntax

- 13 BUG reports on file testing for specification compliance closed through BUG138

- Source code checked with 44 new test files since V5.0.7

- Unfortunately, some new BUGs may be discovered with more usage

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"tschk2" Parser

- Checks Touchstone Version 1.0 (TS1) and Version 2.0 (TS2)
  - Error and Warning numbers
  - Free executables: http://www.eda.org/ibis/tschk2/
- Converts TS1 to TS2, TS2 to TS1 where practical with **-canonical*** flags
- Provides comment headers and real, imaginary format (RI) with **-describe** flag
- Source code package includes 440+ test cases
- C++, well documented
- Only one mixed mode BUG found so far

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tschk2 {-canonical*} FILE

- **{-canonical | -canonical-v2}**
  - **TS1, TS2 → TS2**
  - Provides number of ports, frequencies and other information
  - Un-normalizes TS1 Y-, Z-, G- and H-parameters and effective noise resistance

- **{-canonical-v1}**
  - **TS1, TS2 → TS1** where practical
  - Applies column formatting rules and 2-port 21_12 ordering
  - Normalizes TS2 Y-, Z-, G- and H-parameters and effective noise resistance
  - No mixed mode or selectable reference resistance processing

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71 tschk2 Messages

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Conclusions

- ibischk5 and tschk2 parsers - **officially** check files for specification compliance

- Parsers helps test specification rules for clarity and accuracy

- BUG process continues to improve the parsers and eliminate mistakes

- **Parsers are critical to IBIS success**

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Useful Links Under IBIS
Home Page: www.eda.org/ibis/

ver5.1/　　　　　　　　　**IBIS Version 5.1** (August 24, 2012)
ibischk5/　　　　　　　　**ibischk5 Version 5.1.2** (October 2012)

touchstone_ver2.0/　　　**Touchstone Version 2.0** (April 24. 2009)
tschk2/　　　　　　　　　**tschk2 Version 2.0.0** (December 2009)

quality_ver2.0/　　　　　**IBIS Quality Specification** (Oct. 30, 2009)
ibis-iss_ver1.0/　　　　　**Interconnect SPICE Subcircuit Specification
Version 1.0** (October 7, 2011)

editorial_wip/　　　　　　**Editorial Task Group** (wip)
interconnect_wip/　　　　**Interconnect Task Group** (wip)
macromodel_wip/　　　　**Advanced Technology Task Group (**wip)
quality_wip/　　　　　　　**Quality Task Group** (wip)

(wip: work in progress)

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