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                            BIRD118_3_draft5.txt
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BIRD ID#:         118.3
ISSUE TITLE:      Analog Parameter Assignments
REQUESTER:        Arpad Muranyi, Mentor Graphics
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                  Taranjit Kukal Cadence Design Systems
DATE SUBMITTED:   October 5, 2010
DATE REVISED:     November 8, 2010  March 23, 2011, June ???, 2012
DATE ACCEPTED BY IBIS OPEN FORUM:


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STATEMENT OF THE ISSUE:

The "Parameters" subparameter of the [External Model] and [External Circuit]
keywords contains a simple listing of the parameters of [External Model]s and
[External Circuit]s without the capabilities of assigning any values to them.
The expectation was that the EDA tool would provide a mechanism to the user
to make the actual value assignments for these parameters.  There are
situations, however, when assigning values to these parameters from within
the .ibs file would be highly desirable so that the assignments could be
defined and/or kept together with the model.

********************************************************************************


STATEMENT OF THE RESOLVED SPECIFICATIONS:

This BIRD is designed to be a close relative of BIRD 117.  The assignment
features described in this BIRD for the parameters listed under the
Parameters subparameter are consistent with the assignment features
described in BIRD 117 for the Converter_Parameters, except that assignments
for Parameters are optional while the assignments for Converter_Parameters
**** are required, and Converter_Parameters may be assigned only numeric
**** values, while Parameters may have other argument types, such as string,
**** Boolean, etc...

**** The Parameters of the [External Circuit] and [External Model] keywords
**** shall be optionally followed by an equal sign and a constant literal
**** value and/or a reference to a parameter name which is located in a
**** parameter tree in a file.  This reference shall begin with the
**** file name, followed by a set of open and close parentheses enclosing
**** the tree root name, any branch names if present and the parameter name.
**** The file reference may point to the .ibs file itself where the
**** reference is made from, or any other file containing one or more
**** parameter trees.  External parameter files shall contain only parameter
**** trees and nothing else, and shall be located in the same directory as
**** the .ibs file.
****
**** When the constant literal and the root name of a parameter tree are
**** both present in such an assignment, the constant literal value shall
**** serve as a default value for the assignment in case the assignment
**** using the reserved word fails for some reason.  The file names of
**** any parameter file must follow the rules for file names given in
**** Section 3, GENERAL SYNTAX RULES AND GUIDELINES.
****
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BIRD118_3_draft5.txt

Multiple [External Model] or [External Circuit] Parameters may be listed
**** on the same line with one assignment, in which case all of the
parameters on that line will be assigned the same value.

If no assignments are made on the [External Model] or [External Circuit]
Parameters line, the parameters will take on their default values as
defined in the external model file referenced by [External Model] or
[External Circuit] declarations. The EDA tool is expected to provide a
mechanism for the user to make selections for multi-valued AMI parameters
through GUI features.

**** To implement this concept, the IBIS specification shall be changed
**** as outlined below. The page number references are with respect to
**** the official IBIS v5.0 specification.

On pg. 107 replace the following lines:

| Parameters:
|
| Lists names of parameters that can be passed into an external
| model file. Each Parameters assignment must match a name or
| keyword in the external file or language. The list of
| Parameters may span several lines by using the word Parameters
| at the start of each line. The Parameters subparameter is
| optional, and the external model must operate with default
| settings without any Parameters assignments.
|
| Parameter passing is not supported in SPICE. VHDL-AMS and
| VHDL-A(MS) parameters are supported using "generic" names, and
| Verilog-AMS and Verilog-A(MS) parameters are supported using
| "parameter" names.

with these lines:

| Parameters:
|
| Lists names of parameters that can be passed into an external
|*   model file. Each Parameters entry must match a name or
| keyword in the external file or language. The list of
| Parameters may span several lines by using the word Parameters
| at the start of each line. The Parameters subparameter is
| optional, and the external model must operate with default
| settings without any Parameters assignments.
|
| Parameter passing is not supported in SPICE. VHDL-AMS and
| VHDL-A(MS) parameters are supported using "generic" names, and
| Verilog-AMS and Verilog-A(MS) parameters are supported using
|*   "parameter" names. ISS parameters are supported for all ISS
|*   parameters which are defined on the subcircuit definition
|*   line.
|*
|**   Parameters are locally scoped under each [External Model]
|*   keyword, i. e. the same parameter under two different
|**   [External Model] will have independent values.
|*
|*   The parameter(s) listed under the Parameters subparameter
|*   may optionally be followed by an equal sign and a numeric,

Page 2

|****   Boolean or string literal and/or a reference to a parameter
|****   name which is located in a parameter tree. The reference
|****   must begin with a file name, followed by an open parentheses
|****   and a the tree root name, a new open parentheses for any
|****   branch names (including the Reserved_Parameters or
|****   Model_Specific branch names if present in the tree) and
|****   the parameter name, and a matching set of closing parentheses.
|****   The file reference may point to the .ibs file itself where
|****   the reference is made from, or any other file which contains
|****   one or more parameter trees. The files referenced must be
|****   located in the same directory as the .ibs file containing the
|****   reference. The file names of parameter files must follow the
|****   rules for file names given in Section 3, GENERAL SYNTAX RULES
|****   AND GUIDELINES. External parameter files may only contain
|****   parameter trees using the tree syntax described in the IBIS
|****   specification.
|****
|****   When a parameter reference and a numeric, Boolean or string
|****   literal are both present in an assignment, they must be
|****   separated by at least one white space. In this case, the
|****   EDA tool should attempt to make the assignment using
|****   parameter reference first. If that fails (for example if
|****   the file doesn't exist) the numeric, Boolean or string
|****   literal shall be used for the assignment. When multiple
|****   parameters are listed on a single line with one assignment,
|****   all of the parameters on that line shall be assigned the
|****   same value by the EDA tool. String literals must be
|****   enclosed in double quotes.
|***
|*   The EDA tool may provide additional means to the user to
|**   assign values to Parameters. This may include the option
|**   to override the values provided in the .ibs file, to allow
|**   the user to make selections for multi-valued parameters in
|****   the parameter tree, or to provide values for uninitialized
|**   Parameters.

On pg. 126 replace the following lines:

| Parameters:
|
| Lists names of parameters that can be passed into an external
| model file. Each Parameters assignment must match a name or
| keyword in the external file or language. The list of
| Parameters may span several lines by using the word Parameters
| at the start of each line. The Parameters subparameter is
| optional, and the external model must operate with default
| settings without any Parameters assignments.
|
| Parameter passing is not supported in SPICE. VHDL-AMS and
| VHDL-A(MS) parameters are supported using "generic" names, and
| Verilog-AMS and Verilog-A(MS) parameters are supported using
| "parameter" names.

with these lines:

| Parameters:
|
| Lists names of parameters that can be passed into an external

|*   model file. Each Parameters entry must match a name or
| keyword in the external file or language. The list of
| Parameters may span several lines by using the word Parameters
| at the start of each line. The Parameters subparameter is
| optional, and the external model must operate with default
| settings without any Parameters assignments.
|
| Parameter passing is not supported in SPICE. VHDL-AMS and
| VHDL-A(MS) parameters are supported using "generic" names, and
| Verilog-AMS and Verilog-A(MS) parameters are supported using
|*   "parameter" names. ISS parameters are supported for all ISS
|*   parameters which are defined on the subcircuit definition
|*   line.
|*
|*   Parameters are locally scoped under each [External Circuit]
|*   keyword, i. e. the same parameter under two different
|*   [External Circuit] will have independent values.
|*
|*   The parameter(s) listed under the Parameters subparameter
|*   may optionally be followed by an equal sign and a numeric,
|****   Boolean or string literal and/or a reference to a parameter
|****   name which is located in a parameter tree. The reference
|****   must begin with a file name, followed by an open parentheses
|****   and a the tree root name, a new open parentheses for any
|****   branch names (including the Reserved_Parameters or
|****   Model_Specific branch names if present in the tree) and
|****   the parameter name, and a matching set of closing parentheses.
|****   The file reference may point to the .ibs file itself where
|****   the reference is made from, or any other file which contains
|****   one or more parameter trees. The files referenced must be
|****   located in the same directory as the .ibs file containing the
|****   reference. The file names of parameter files must follow the
|****   rules for file names given in Section 3, GENERAL SYNTAX RULES
|****   AND GUIDELINES. External parameter files may only contain
|****   parameter trees using the tree syntax described in the IBIS
|****   specification.
|****
|****   When a parameter reference and a numeric, Boolean or string
|****   literal are both present in an assignment, they must be
|****   separated by at least one white space. In this case, the
|****   EDA tool should attempt to make the assignment using
|****   parameter reference first. If that fails (for example if
|****   the file doesn't exist) the numeric, Boolean or string
|****   literal shall be used for the assignment. When multiple
|****   parameters are listed on a single line with one assignment,
|****   all of the parameters on that line shall be assigned the
|****   same value by the EDA tool. String literals must be
|****   enclosed in double quotes.
|***
|*   The EDA tool may provide additional means to the user to
|**   assign values to Parameters. This may include the option
|**   to override the values provided in the .ibs file, to allow
|**   the user to make selections for multi-valued parameters in
|****   the parameter tree, or to provide values for uninitialized
|**   Parameters.

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ANALYSIS PATH/DATA THAT LED TO SPECIFICATION

If a parameter is defined as a multi-valued parameter in the parameter tree
** (Range, List, etc...) which must be resolved to a single value by a
** selection, the EDA tool may provide a GUI mechanism to the user to make
** that selection, or the default value of the parameter shall be used for
** the simulation. The EDA tool may also provide mechanisms to make
assignments to unassigned Parameters, or to override hard-coded assignments,
or single valued parameter assignments.

*** BIRD 118 was flawed because it allowed the usage
** of the "AMIfile()" syntax under [External Circuit] to reference .ami
*** file parameters. BIRD 118.1 removed the possibility to
** use the reserved word "AMIfile()" under [External Circuit] to eliminate
** that problem.

*** In BIRD 118.2 a modification was made to the rules of the reserved
*** word AMIfile(). The modification made provisions for the usage of a
*** default value in case the assignment using the reserved word fails
*** for some reason. These changes are marked by three asterisks at the
*** beginning of each line.

**** In BIRD 118.3 the concept of AMIfile() was generalized so that instead
**** of referencing strictly .ami parameter files with the reserved word
**** AMIfile(), any file containing parameter trees may be referenced.

****

ANY OTHER BACKGROUND INFORMATION:

Since the examples provided in BIRD 117 apply to this BIRD as well, there
are no examples in this BIRD.

Notes with respect to BIRD 118.3:

Parameter trees inside an .ibs file shall be enclosed by two new keywords,
[Begin Parameter Trees] and [End Parameter Trees] described in a separate
BIRD.

We need to consider to separate the general tree syntax and BNF to its own
section in the IBIS specification, so that the syntax would be applicable
to allparameter trees, not only AMI parameter trees. The AMI context
specific rules (such as Reserved and Model_Specific AMI parameters)
should be described in the AMI portion of the specification. General
parameter files really do not have any context specific rules, other than
the Reserved_Parameters and Model_Specific parameter branches not being
required at all, which rule is captured in this BIRD.

****