

#### 4 Reserved Parameter Format (with some minor consistency changes, but other inconsistencies maintained, and some version information. Since this is Version 5.1 baseline, the word 'Format' is still used.)

Init\_Returns\_Impulse, Use\_Init\_Output, GetWave\_Exists, Max\_Init\_Aggressors and Ignore\_Bits

The Model parameter file must have a sub-tree with the heading 'Reserved\_Parameters'. This sub-tree shall contain all the reserved parameters for the model.

The following reserved parameters are used by the EDA tool and are required if the [Algorithmic Model] keyword is present. The entries following the reserved parameters points to its usage, type and default value. All reserved parameters must be in the following format:

```
(parameter_name (Usage <usage>) (Type >data_type>) (Default <values>)  
(Description <string>))
```

*Parameter:*    **Init\_Returns\_Impulse**

*Required:*     Yes

*Usage:*        Info

*Type:*         Boolean

*Format:*       Value after [IBIS Ver] 5.1

*Default:*      Value

*Description:* Tells EDA platform whether the AMI\_Init function returns a modified impulse response.

*Usage Rules:* When this value is set to "True", the model returns the convolution of the impulse response with the impulse response.

*Other Notes:* Format Value is illegal for [IBIS Ver] 5.0 and 5.1 and Default is required. For [IBIS Ver] 5.2, either Value or Default (but not both), are required.

*Examples:*

```
(Init_Returns_Impulse (Usage Info)(Type Boolean)(Default True)  
                      (Description "Valid for all [IBIS Ver] levels")  
)
```

```
(Init_Returns_Impulse (Usage Info)(Type Boolean)(Format Value True)  
                      (Description "Either Value or Default can be used, but not both  
                                  after [IBIS Ver] 5.1")  
)
```

*Parameter:*    **GetWave\_Exists**

*Required:*     Yes

*Usage:*        Info

*Type:* Boolean

*Format:* Value after [IBIS Ver] 5.1

*Default:* Value

*Description:* Tells EDA platform whether the AMI\_GetWave is implemented in this model

*Usage Rules:* Note that if Init\_Returns\_Impulse is set to “False”, then GetWave\_Exists MUST be set to “True”.

*Other Notes:* Format Value is illegal for [IBIS Ver] 5.0 and 5.1 and Default is required. For [IBIS Ver] 5.2, either Value or Default (but not both), are required.

*Examples:*

```
(GetWave_Exists (Usage Info)(Type Boolean)(Default True)
  (Description "Valid for all [IBIS Ver] levels")
)
```

```
(GetWave_Exists (Usage Info)(Type Boolean)(Format Value True)
  (Description "Either Value or Default can be used, but not both
  after [IBIS Ver] 5.1")
)
```

*Parameter:* **Use\_Init\_Output**

*Required:* No, and illegal after [IBIS Ver] 5.1

*Usage:* Info

*Type:* Boolean

*Format:* (Illegal)

*Default:* Value

*Description:* Tells EDA platform whether the AMI\_GetWave is implemented in this model

*Usage Rules:* When Use\_Init\_Output is set to “True”, the EDA tool is instructed to use the output impulse response from the AMI\_Init function when creating the input waveform presented to the AMI\_GetWave function.

If the Reserved Parameter, Use\_Init\_Output, is set to “False”, EDA tools will use the original (unfiltered) impulse response of the channel when creating the input waveform presented to the AMI\_GetWave function.

The algorithmic model is expected to modify the waveform in place.

Use\_Init\_Output is optional. The default value for this parameter is “True”.

If Use\_Init\_Output is “False”, GetWave\_Exists must be “True”.

*Other Notes:* Format Value is illegal.

*Examples:*

```
(Use_Init_Output (Usage Info)(Type Boolean)(Default True)
  (Description "Use_Init_Output illegal after [IBIS_Ver] 5.1")
)
```

The following reserved parameters are optional. If the following parameters are not present, the values are assumed as “0”.

*Parameter:* **Max\_Init\_Aggressors**

*Required:* No

*Usage:* Info

*Type:* Integer

*Format:* Value after [IBIS Ver] 5.1

*Default:* Value

*Description:* Tells the EDA platform how many aggressor Impulse Responses the AMI\_Init function is capable of processing.

*Usage Rules:* Its value is assumed “0” if Max\_Init\_Aggressors is not present.

*Other Notes:* Format Value is illegal for [IBIS Ver] 5.0 and 5.1 and Default is required. For [IBIS Ver] 5.2, either Value or Default (but not both), are required.

*Examples:*

```
(Max_Init_Aggressors (Usage Info)(Type Integer)(Default 5)
  (Description "Valid for all [IBIS Ver] levels")
)
```

```
(Max_Init_Aggressors (Usage Info)(Type Integer)(Format Value 5)
  (Description "Either Value or Default can be used, but not both
    after [IBIS Ver] 5.1")
)
```

*Parameter:* **Ignore\_Bits**

*Required:* No

*Usage:* Info

*Type:* Integer

*Format:* Value after [IBIS Ver] 5.1

*Default:* Value

*Description:* Tells the EDA platform how long the time variant model takes to complete initialization.

*Usage Rules:* This parameter is meant for AMI\_GetWave functions that model how equalization adapts to the input stream. The value in this field tells the EDA platform how many bits of the AMI\_GetWave output should be ignored.

Its value is assumed “0” if Ignore\_Bits is not present.

*Other Notes:* Format Value is illegal for [IBIS Ver] 5.0 and 5.1 and Default is required. For [IBIS Ver] 5.2, either Value or Default (but not both), are required.

*Examples:*

```
(Ignore_Bits (Usage Info)(Type Integer)(Default 1000)
  (Description "Valid for all [IBIS Ver] levels")
)
```

```

)
(Ignore_Bits (Usage Info)(Type Integer)(Format Value 1000)
  (Description "Either Value or Default can be used, but not both
    after [IBIS Ver] 5.1")
)

```

Tx-only reserved parameters: Tx\_Jitter and Tx\_DCD

The following reserved parameters provide textual description to the user defined parameters.

These reserved parameters only apply to Tx models. These parameters are optional. If these parameters are not specified the values default to no jitter specified in the model ("0" jitter). If specified, they must be in the following format:

```

(parameter_name (Usage <usage>) (Type <data_type>) (Format <data_format>)
(Default <values>) (Description <string>))

```

**Parameter:** Tx\_Jitter

**Required:** No

**Usage:** Info, Out

**Type:** Float, UI

**Format:** Gaussian, Dual-Dirac, DjRj, Table

**Default:** (Optional for value pair or triple, illegal after [IBIS Ver] 5.1)

**Description:** Tells EDA platform how much jitter exists at the input to the transmitter's analog output buffer.

**Usage Rules:**

**Other Notes:** (Default is not shown in the examples.)

**Examples:**

```

(Tx_Jitter (Usage Info)(Type Float)(Gaussian 1e-9 1e-12)
  (Description "Gaussian <mean> <sigma>")
)

```

```

(Tx_Jitter (Usage Info)(Type Float)(Dual-Dirac 1e-9 2e-9 1e-12)
  (Description "Dual-Dirac <mean> <mean> <sigma>")
)

```

```

(Tx_Jitter (Usage Info)(Type Float)(1e-9 2e-9 10e-12)
  (Description "DjRj <MinDj> <MaxDj> <sigma>")
)

```

```

(Tx_Jitter (Usage Info)(Type Float)
  (Table
    (Labels "Row_No" "Time" "Probability")
      (-5 -5e-12 1e-10)
      (-4 -4e-12 3e-7)
  )
)

```

```

        (-3 -3e-12 1e-4)
        (-2 -2e-12 1e-2)
        (-1 -1e-12 0.29)
        (0 0 0.4)
        (1 1e-12 0.29)
        (2 2e-12 1e-2)
        (3 3e-12 1e-4)
        (4 4e-12 3e-7)
        (5 5e-12 1e-10)
    )
)

```

**Parameter:** **Tx\_DCD**

**Required:** No

**Usage:** Info, Out

**Type:** Float, UI

**Format:** Value, Range, Corner

**Default:** Value (illegal with Value after [IBIS\_Ver] 5.1)

**Description:** Tx\_DCD (Transmit Duty Cycle Distortion tells the EDA platform the maximum percentage deviation of the duration of a transmitted pulse from the nominal pulse width.

**Usage Rules:**

**Other Notes:**

**Examples:**

```

(Tx_DCD (Usage Info)(Type Float)(Range 2 0 5)
 (Description "Range <typ> <min> <max>")
)

```

Rx-only reserved parameters: Rx\_Clock\_PDF and Rx\_Receiver\_Sensitivity

These reserved parameters only apply to Rx model. These parameters are optional. If the parameters are not specified, the values default to “0”. If specified, they must be in the following format:

```

(parameter_name (Usage <usage>) (Type <data_type>) (Format <data_format>)
(Default <values>) (Description <string>))

```

**Parameter:** **Rx\_Clock\_PDF**

**Required:** No

**Usage:** Info, Out

**Type:** Float, UI

**Format:** Gaussian, Dual-Dirac, DjRj, Table

**Default:** (Optional for value pair or triple, illegal after [IBIS Ver] 5.1)

**Description:** Tells EDA platform the probability density function of the recovered clock.

*Usage Rules:*

*Other Notes:* (Default is not shown in the examples.)

*Examples:*

```
(Rx_Clock_PDF (Usage Info)(Type Float)(Format Gaussian 1e-9 1e-12)
  (Description "Gaussian <mean> <sigma>")
)

(Rx_Clock_PDF (Usage Info)(Type Float)(Format Dual-Dirac 1e-9 2e-9 1e-12)
  (Description "Dual-Dirac <mean> <mean> <sigma>")
)

(Rx_Clock_PDF (Usage Info)(Type Float)(Format DjRj 1e-9 2e-9 10e-12)
  (Description "DjRj <MinDj> <MaxDj> <sigma>")
)

(Rx_Clock_PDF (Usage Info)(Type Float)
  (Format Table
    (Labels "Row_No" "Time" "Probability")
      (-5 -5e-12 1e-10)
      (-4 -4e-12 3e-7)
      (-3 -3e-12 1e-4)
      (-2 -2e-12 1e-2)
      (-1 -1e-12 0.29)
      (0 0 0.4)
      (1 1e-12 0.29)
      (2 2e-12 1e-2)
      (3 3e-12 1e-4)
      (4 4e-12 3e-7)
      (5 5e-12 1e-10)
    )
  )
)
```

*Parameter:* **Rx\_Receiver\_Sensitivity**

*Required:* No

*Usage:* Info, Out

*Type:* Float, UI

*Format:* Value, Range, Corner

*Default:* Value (illegal with Value after [IBIS\_Ver] 5.1)

*Description:* Tells the EDA platform the voltage needed at the receiver data decision point to ensure proper sampling of the equalized signal.

*Usage Rules:* In the example below, 100 mV (above +100 mV or below -100 mV is needed to ensure the signal is sampled correctly

*Other Notes:*

*Examples:*

```
(Rx_Receiver_Sensitivity (Usage Info)(Type Float)(Format Value 0.1)
  (Description "Single Value choice, Default is optional")
)
```

```
(Rx_Receiver_Sensitivity (Usage Info)(Type Float)(Default 0.1)
    (Description "Default replaces Format Value after [IBIS Ver] 5.1")
)
```

```
(Rx_Receiver_Sensitivity (Usage Info)(Type Float)(Format Range 1.0 -0.1
1.0)(Default 0.05)
    (Description "Range <typ> <min> <max>")
)
```

```
(Rx_Receiver_Sensitivity (Usage Info)(Type Float)(Format Corner 0.0 0.1 -
0.1)(Default 0.05)
    (Description "Corner <typ> <min> <max>")
)
```