

# Use of IBIS models at Alcatel

John Fitzpatrick  
IBIS European Summit at DATE  
25/02/98

## Topics

- ▼ Managing IBIS models
- ▼ Verifying IBIS models
- ▼ Short-cuts for model creation
- ▼ Extracting design information from models
- ▼ IBIS models in ASIC design cycle
- ▼ Conclusion

- ▼ Common file system for CAD tools and Web server
- ▼ Web based interface
  - to upload, create and edit models
  - to verify models
  - to extract design information
- ▼ Both buffer and component libraries
- ▼ IBIS parser written in Perl



**Edit IBIS file**

Original File: [smhvt162374.ibs](#)

Direct new BCD file to: ☐ Browser ☐ Models in development  
☐ Server ☐ Supplier models  
☒ Qualified models

Date:  From: 1991-05-15

Filename:

Version:  (Max: 0.5.4)

IBIS Version:

Allocated Code:

CIBS:

Type:

Notes:

25/02/97

Ref : SSD/TD/DMM/BET.TC/98.009/JF

**Component:**

**Manufacturer:**

**Package:**

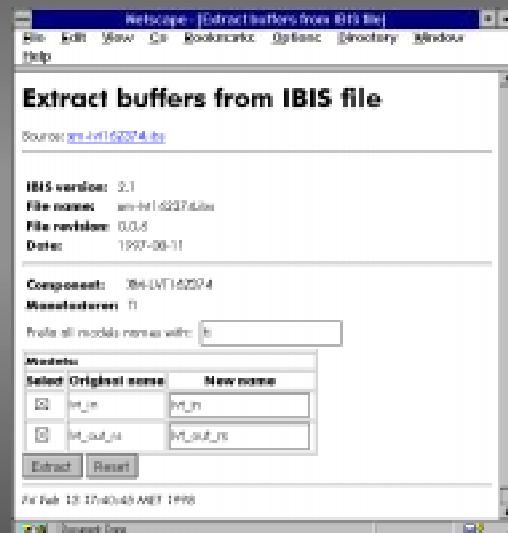
parameter	typ	min	max
R_pkg	30n	27n	35n
L_pkg	3.85n	3.12n	5.85n
C_pkg	4nF	300f	7nF

**Buffer models**

Original name	New name	Reload	File
bt_in	<input type="text" value="LVT_I1"/>	<input type="checkbox"/>	<a href="#">bt_in.buf</a>
bt_out_rs	<input type="text" value="LVT_OUT_RS"/>	<input type="checkbox"/>	<a href="#">bt_out.buf</a>

**Pin:**

Pin	Signal	Buffer	R_pin	L_pin	C_pin
1	<input type="text" value="OE1"/>	<input type="text" value="bt_in"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2	<input type="text" value="IQ1"/>	<input type="text" value="bt_out_rs"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



25/02/97

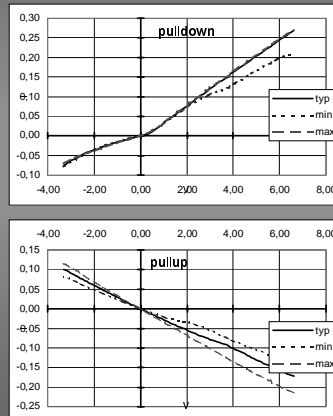
Ref : SSD/TD/DMM/BET.TCI/98.009/JF

- ▼ ibischk2 + additional checks
- ▼ Component header information
- ▼ Calculate attributes
- ▼ Visual inspection of curves
- ▼ No simulations!
- ▼ No measurements!

25/02/97

Ref : SSD/TD/DMM/BET.TCI/98.009/JF

- ▼ No good tool graphical tool to visualise the model.
- ▼ Experiments with Excel and Visual Basic.
- ▼ Add clamp curves together, or with pullup or pulldown, to get real response!
- ▼ Filter out superfluous data like huge clamping currents.

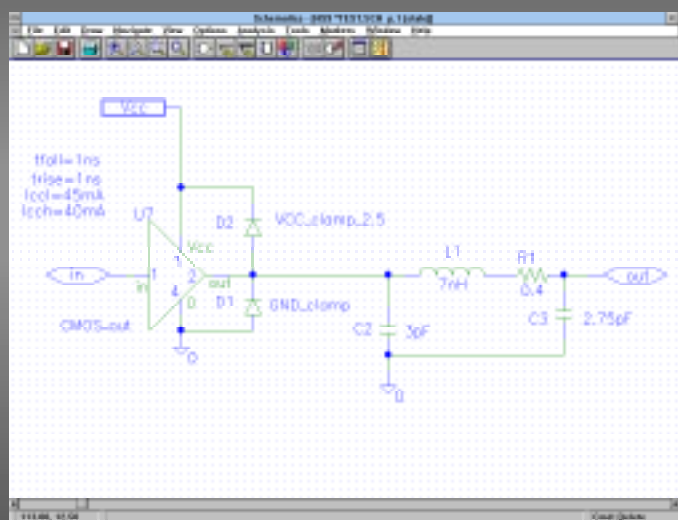


- ▼ What do you do if you can't get a model?
  - Extract pin list from CAD symbol
  - Figure out buffer types from datasheet
  - Use a buffer from a similar component...
  - take a guess at  $V_{cc}$ ,  $I_{cc}$  and  $T_{rise}$
- ▼ In many situations, results obtained with these models are good enough.
- ▼ Not recommended for novices.



25/02/97

Ref : SSD/TD/DMM/BET.TCI/98.009/JF



25/02/97

Ref : SSD/TD/DMM/BET.TCI/98.009/JF

- ▼ Simulation can be time consuming.
- ▼ Condense information of IBIS file for use in design rules:
  - Output impedance (*what value series resistor?*)
  - short-circuit current
  - clamping diodes (*can I interface from 5V to 3V directly?*)
  - critical length (*when do I need to terminate?*)
  - Pull-up and bus-hold inputs.
- ▼ Example: crosstalk rules

Netpage - [IBIS attributes: see MTS2374.000]

File Edit View Go Bookmarks Options Directory Window Help

### Buffer list

Buffer: let in			
Attribute	Type	Slow	Fast
Type		Input	
Input logic		TTL	
$C_{in}$			4pF
$V_{th}$	3.0V		

Buffer: let out rs			
Attribute	Type	Slow	Fast
Type		3-state	
$C_{in}$			9.25pF
$V_{th}$	3.0V		
$L_{out}$			10.0nH
Swing			1.7V
$R_{id}(50\Omega)$	20.0ohms	20.0ohms	20.0ohms
$R_{id}(100\Omega)$	20.0ohms	20.0ohms	20.0ohms
$R_{id}(150\Omega)$	20.0ohms	20.0ohms	20.0ohms
$I_{dd}(min)$	10.0mA	10.0mA	10.0mA
$I_{dd}(max)$	10.0mA	10.0mA	10.0mA
$I_{dd}(min)$	10.0mA	10.0mA	10.0mA
$I_{dd}(max)$	10.0mA	10.0mA	10.0mA

Windows Core

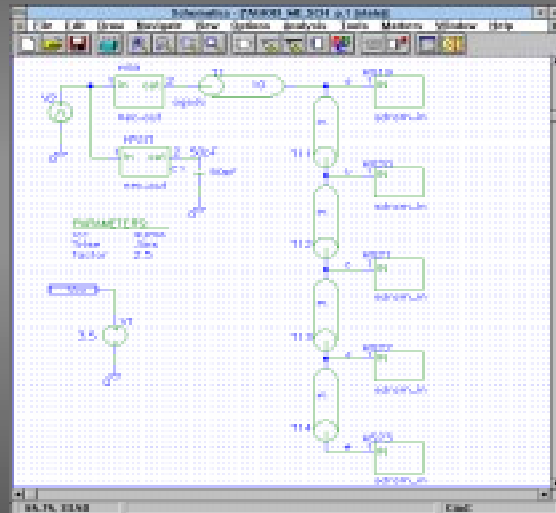




- ▼ Alcatel contract with its Asic suppliers specifies that an IBIS library must be available, but reality is different.
- ▼ IBIS standard and tools not intended for library files
  - pin information less important
  - differential buffers cannot be treated independently of pins
- ▼ IBIS Package models not readily available.  
Extra support needed from IBIS community?

- ▼ IBIS Library used to choose buffer strengths
- ▼ Difficult to allocate timing budget
  - Impossible isolate on-chip and on-board timings.
  - ASIC simulators require a fixed  $C_{load}$  to represent the actual load, which of course is not capacitive!
  - What voltage level for timing measurements?  $V_t$  or  $V_{ih}/V_{il}$ ?
- ▼ IBIS models not suited to ground bounce simulation. Can anything be done?

## Buffer Strength (1/2)



25/02/97

Ref : SSD/TD/DMM/BET.TCI/98.009/JF

## Buffer Strength (2/2)



25/02/97

Ref : SSD/TD/DMM/BET.TCI/98.009/JF

