MixedMode Netlist Generation Using Gateway

1. Introduction

Gateway now allows circuit schematics to be saved as an ATLAS MixedMode netlist to be run using the ATLAS device simulator.

2. Creating the Netlist

To create a MixedMode netlist through Gateway the following steps are required:

i.   Create a new symbol for the ATLAS device in Gateway

ii. Create a schematic using the new symbol along with other SPICE symbols.

iii. Edit the ATLAS Control File

iv. Generate the netlist

Creating an ATLAS device symbol in Gateway

To create a new symbol for the ATLAS device in Gateway do the following (see figure 1):

a) Open Gateway and the workspace

b) File->New Symbol
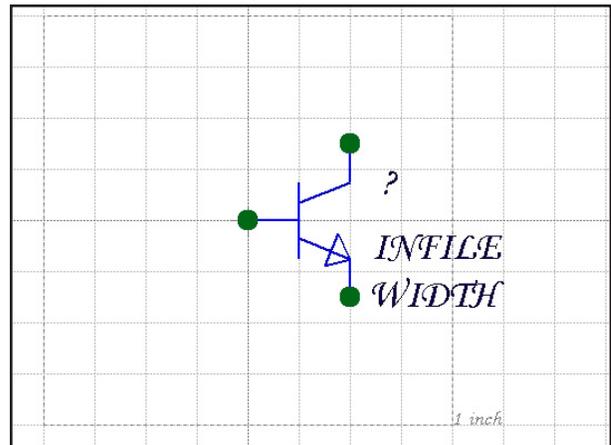

Figure 1. ATLAS symbol creation.

c) Add graphics, pins and attributes to the symbol.

d) Create an ATLAS template string in the format: @PREFIX@PATH %$B %$C %$E $INFILE $WIDTH

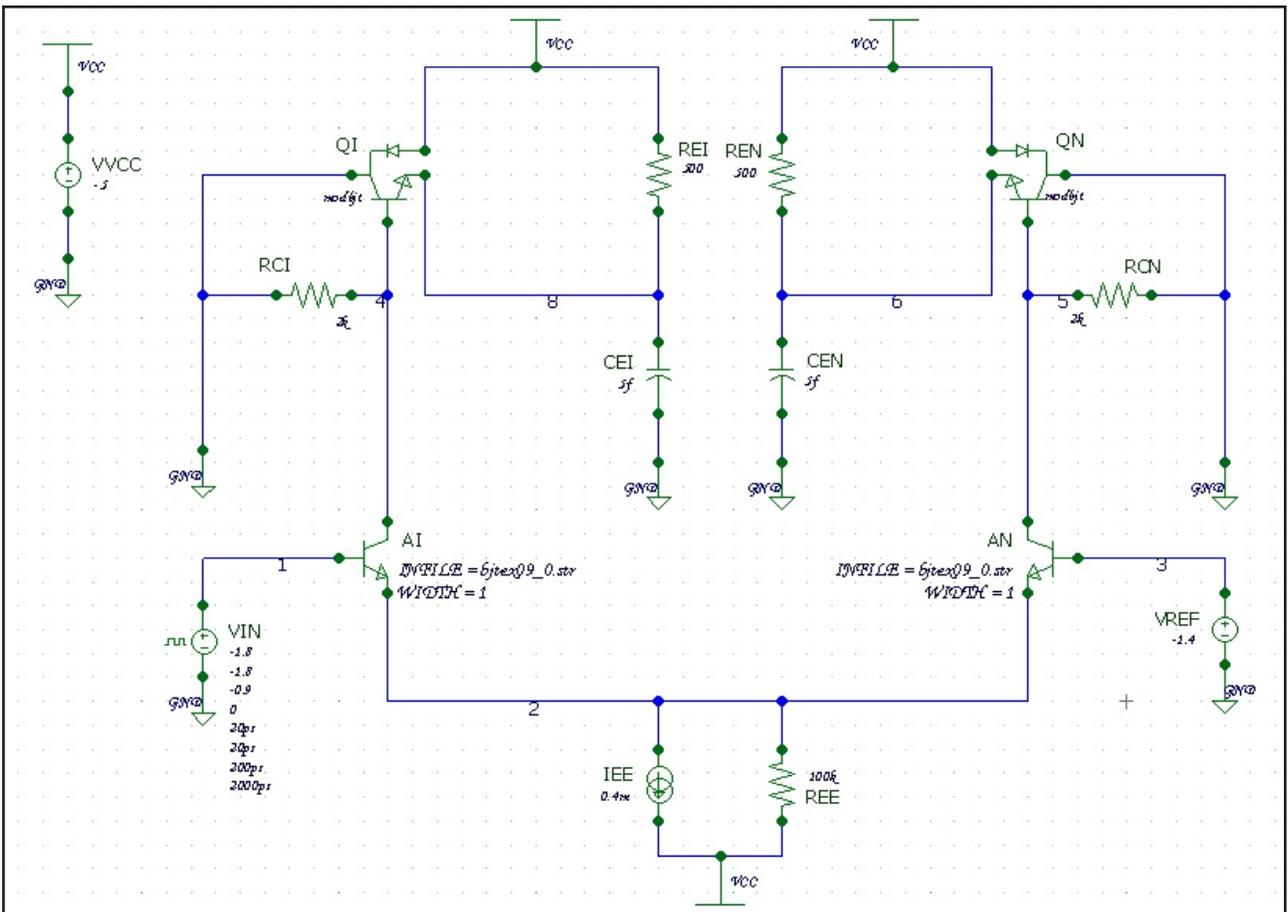e) Save the symbol to a library in the workspace, e.g. spicelib

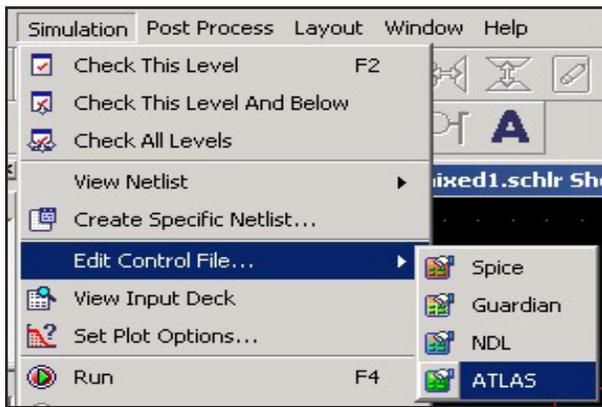Figure 2. ECL inverter circuit schematic.

Figure 3. Control file options.

Create a schematic using the new symbol along with other SPICE symbols

To create a new schematic in Gateway do the following (see figure 2):

• Open Gateway and the workspace
• File->New Schematic
• Place the symbol created in the previous section along with other symbols from the workspace to create a schematic.
• Save the schematic

Edit the ATLAS Control File
This ATLAS control file contains any extra information that is required for ATLAS such as model definitions, spice control statements and information to save.

• Select Simulation->Edit Control File->ATLAS (see Figure 3)
• Add the control file information

A sample ATLAS control file would look like:

```
.model modbjt npn is=1.e-17 bf=100 cje=1f
+ tf=5ps cjc=0.3f rb=100 rbm=20
#
.nodeset v(1)=-1.8 v(2)=-1.8 v(3)=-1.4 v(4)=-1.
+ v(5)=-1. v(6)=-1. v(VCC)=-5.2 v(8)=-1.8
.numeric vchange=0.25 imaxdc=50
.options m2ln print
#
.save outfile=mixed1
.log outfile=mixed1
.tran 1ps 1ns
#
.end
#
# ATLAS models
#
models device=ai reg=1 bipolar
models device=an reg=1 bipolar
```

Table 1. An example ATLAS control file.

Generate the Netlist
Once the schematic is created to generate the netlist the user selects Simulation->View Netlist->ATLAS (see Figure 4)

The Netlist then will be created as shown in Table 2.

3. Extra Options

In Gateway there are a couple of preferences that apply to the MixedMode netlist, these are:

• 3d mode
• Include ATLAS control file in netlist
• Global statements

these options do the following:

3d mode
This option when checked adds .begin 3d at the top of the netlist to place ATLAS in 3d mode.

Include ATLAS control file in netlist
This option when checked will include the ATLAS control file in the netlist. The control file will be appended to the netlist, if the user enters a .end statement in their ATLAS control file then Gateway will not add one. If Gateway detects that a .end is missing it will add one to the end of the netlist.

Global statements
This option when checked (default is on) will add a .GLOBAL statement to the netlist and list any global nodes added in the preferences. This option is stored in the Technology pane of the Preferences dialog.

4. Using the MixedMode netlist in ATLAS

After generating the netlist in Gateway and saving the file, the netlist can be loaded into DeckBuild and simulated using ATLAS. The resulting nodal voltages and current can be plotted using TonyPlot (see Figure 4).
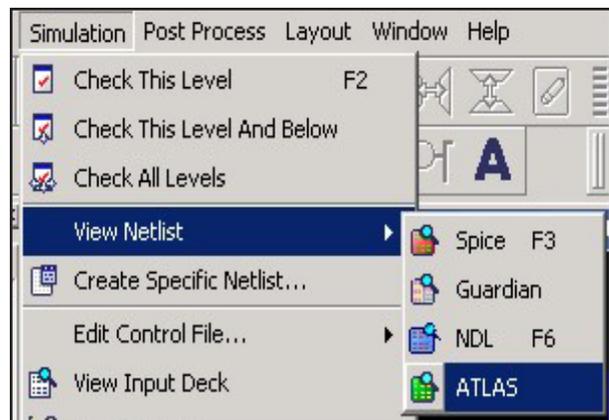

Figure 4. Netlist options.

```
go atlas
.begin
* Gateway 2.8.14.R ATLAS Netlist Generator
* Workspace name: U:\docs\SimStandard\gateway_mixedmode\atlas_new\examples.workspace
* Simulation name: U:\docs\SimStandard\gateway_mixedmode\atlas_new\atlas\mixed1.schlr
* Simulation timestamp: 09-Oct-2008 14:35:59
* Schematic name: mixed1
AI 1=BASE 4=COLLECTOR 2=EMITTER INFILE=bjtex09_0.str WIDTH=1
AN 3=BASE 5=COLLECTOR 2=EMITTER INFILE=bjtex09_0.str WIDTH=1
CEI 8 GND 5f
CEN 6 GND 5f
IEE 2 VCC DC 0.4m
QI GND 4 8 VCC modbjt
QN GND 5 6 VCC modbjt
RCI 4 GND 2k
RCN 5 GND 2k
REE VCC 2 100k
REI VCC 8 500
REN 6 VCC 500
VIN 1 GND DC -1.8 PULSE(-1.8 -0.9 0 20ps 20ps 200ps 2000ps)
VREF 3 GND DC -1.4
VVCC VCC GND DC -5
* Control Deck added to ATLAS netlist
.model modbjt npn is=1.e-17 bf=100 cje=1f tf=5ps cjc=0.3f rb=100 rbm=20
.nodeset v(1)=-1.8 v(2)=-1.8 v(3)=-1.4 v(4)=-1. v(5)=-1. v(6)=-1. v(VCC)=-5.2 v(8)=-1.8
.numeric vchange=0.25 imaxdc=50
.options m2ln print
.save outfile=mixed1
.log outfile=mixed1
.tran 1ps 1ns
.end
# ATLAS models
models device=ai reg=1 bipolar
models device=an reg=1 bipolar
# End of the netlist
```

Table 2. An example of an ATLAS netlist.

5. Conclusion

MixedMode Netlisting from Gateway allows users to create complex circuits in a simply and easy manner and then pass the resulting netlist to ATLAS for simulation.
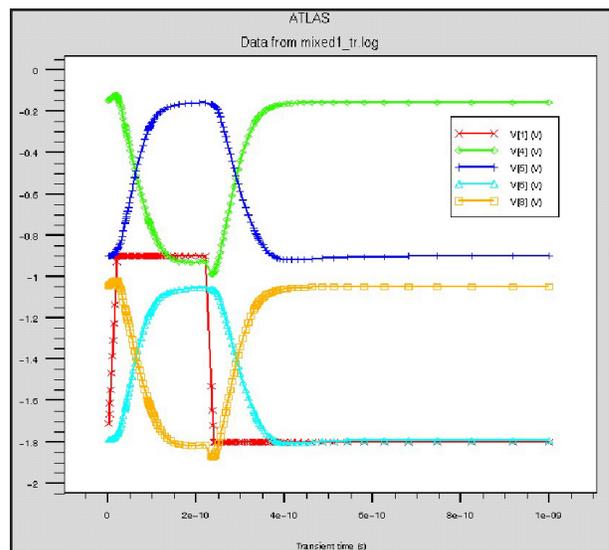

Figure 5: Nodal Voltages vs. Transient Time.