Hipex RC: Virtual Connect Names for Unfinished Nets

Introduction

Hipex RC is an accurate and fast full-chip hierarchical extraction software that performs extraction of parasitic capacitances and resistances from hierarchical layouts. When the layout contains unfinished nets the parasitic RC netlist will number the unfinished nets individually (ex: VCC:95 VCC:96). This application note will describe how to use virtual connect names to resolve the unfinished nets.

Procedure

When running Hipex on layouts that have unfinished nets the output to the RC extraction can look like the following:

```
.subckt IO_EXAMPLE
XI1  A  B  IOECL  I1/PO  VCC  VCC:215  VCC:216
VCC:217 VCC:218 VCC:219 VCC:220 VRO VT2 VEE
IO_ALPHA
XI5  A  B  IOECL  I5/PO  VCC  VCC:161  VCC:162
VCC:163 VCC:164 VCC:165 VCC:166 VRO VT2 VEE
IO_BETA
*** Parasitic networks ***
.
.
.
```

Note that VCC is broken up into separate nets. To generate a RC netlist with one VCC net the user should make the following changes:

LPE Setup Form for Node Names (Figure 1):

Step1: Add VCC as a global power node name.

Step2: Select "Remove suffix starting with unfinished nets symbol".

Step3: Enter the unfinished net symbol (typically a colon ":").

Step4: Enter the net for the virtual connect name (ex: VCC)

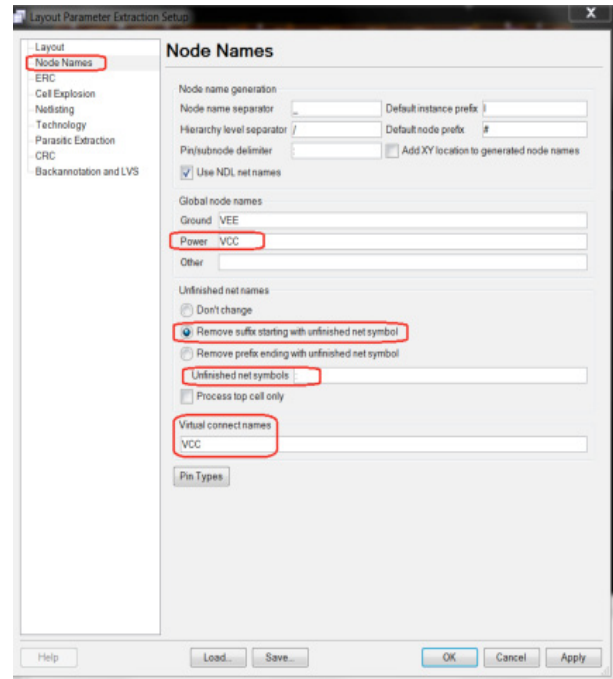Figure 1: Node Names Setup.

Step5: Click the "Apply" button and then click the "OK" button to close the form

Layout Setup

Step1: Add a colon to the top level layout cell (ex: VCC:) for each placed text of the same name on the layout, and when necessary, add text (ex: VCC:) to the un-labeled net segments.

Step2: Save the top level cell

Extraction Run

Step1: Run Hipex-NET to extract new netlist

Step2: Run HPIEX-RC to extract parasitic elements

After completing the LPE setup and layout changes the output of the RC extraction will look like the following:

```
.subckt IO_EXAMPLE
XI1 A B IOECL I1/PO VRO VT2 VCC VEE IO_ALPHA
XI5 A B IOECL I5/PO VRO VT2 VCC VEE IO_BETA


*** Parasitic networks ***
.
.
.
```

Conclusion

Hipex RC provides the option to use virtual connect names for unfinished nets in the extraction netlist. The user can follow this methodology to virtually connect several nets at the same time such as ground, power, and other nets. The virtual connect name option can prove useful for verifying designs before final metal connections are made at the top level of the design.