PCB Design With HDL Designer

v Motivation
   - Time savings
   - Money savings
   - Simplicity

v Approach
   - Use single tool for PCB and FPGA design
   - More FPGA designs than PCB designers
   - Use HDL designer for schematic capture
PCB Design With HDL Designer
Design Process

- PCB Design Process (Minimal):
  - Schematic Capture
  - Displaying Reference Designators and Component Information on Schematic
  - Netlist Creation and Conversion
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Schematic Capture - Symbols

- Part Symbols
  - HDL Symbol Editor
    - Part Name
    - Part Number
    - Package Type
    - Pin Name (or Port Name)
    - Pin Number
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Schematic Capture – Schematic Diagrams

- Schematic Diagrams
  - HDL Block Diagram Editor
    - Part Information from Part Symbol
      - Pin Number
      - Package Type
      - Part Number
    - Connection Information
      - Nets
      - Reference Designators
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Schematic Capture – Schematic Diagrams

package list
library ieee;
use ieee.std_logic_1164.all;
use ieee.std_logic_arith.all;
i

declarations
ports
a : in
b : in
o0 : out

diagram signals
vcc : std_logic
vcc : std_logic
vcc : std_logic

pin_o0 = "1" (string)

pin_b0 = "2" (string)

pin_o1 = "3" (string)

pin_a1 = "4" (string)

pin_b1 = "5" (string)

pin_o1 = "6" (string)

pin_gnd = "7" (string)

pin_o3 = "8" (string)

pin_b3 = "9" (string)

pin_o3 = "10" (string)

pin_b2 = "11" (string)

pin_o2 = "12" (string)

pin_b2 = "13" (string)

pin_vcc = "14" (string)

part_num = "part_a008" (string)

pkg_type = "dip14" (string)
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VHDL Coding

- Issue - Where to include Pin Numbers in VHDL?
  - Comments
  - Possible
  - VHDL Attributes
  - Designer
  - VHDL Generics
  - Chosen Approach but displays pin numbers as a block of text
PCB Design with HDL Designer
Netlist Conversion

- Issue – How can a PADS netlist be produced?
  - Comments
    - Possible
  - VHDL Attributes
    - Good Approach but not displayed on Block Diagrams in HDL Designer
  - VHDL Generics
    - Chosen Approach but displays pin numbers as a block of text

```vhdl
GENERIC (  
  pin_a0 : string := "1";  
  pin_o0 : string := "2";  
  pin_a1 : string := "3";  
  pkg_type : string := "dip14";  
  part_num : string := "part_ac04"
);
```
Conclusion