



**SystemC AMS / TLM Virtual
Prototype for Telecommunication
Systems using COSIDE®**

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Agenda



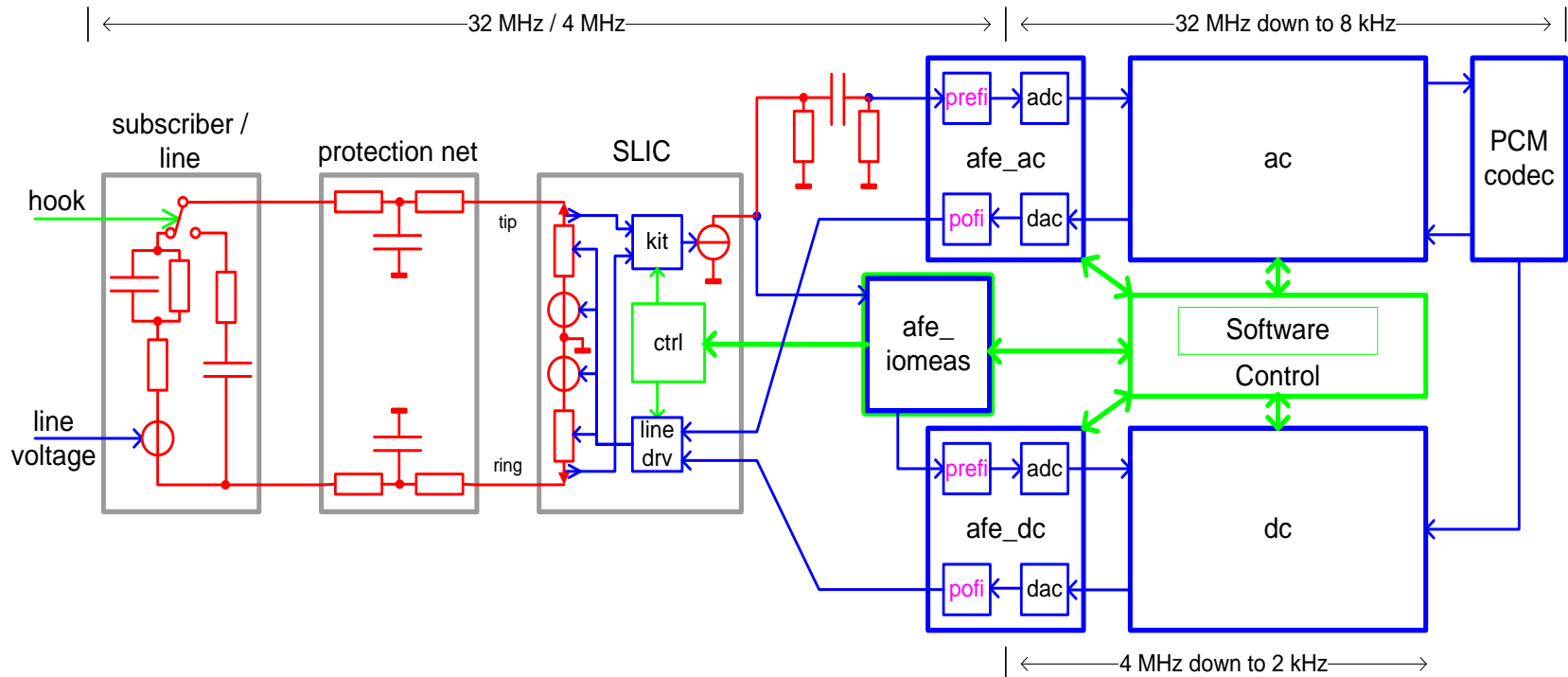
Voice Codec using TLM

Architecture Selection

Electrical Model of DC/DC Converter

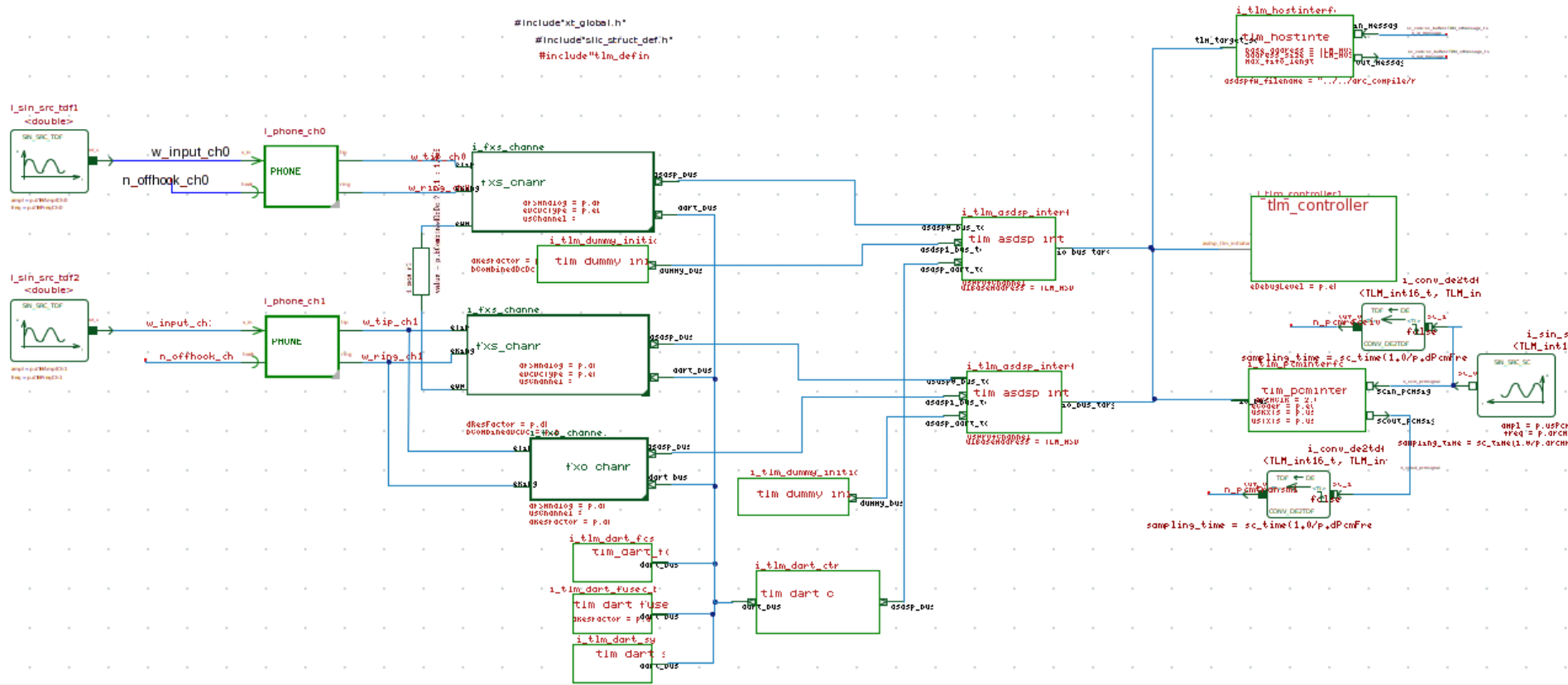
Summary

Old Model of a Voice Codec System



red: Linear electrical
 magenta: Linear DAE's
 blue: Static data flow
 green: pure SystemC

Top Level Schematic of a Voice Codec



Architecture of Voice Codec

- External Interfaces:
 - Host Interface (SPI) including Mailboxes and Registers (TLM, DE)
 - PCM Interface for voice (TLM, TDF)
 - 2 wire Tip/Ring Interface (AMS electrical net)
- Internal Blocks
 - Controller (TLM)
 - Analog Channel (TDF, elec. Net)
- Internal Busses
 - IO Bus for Controller (TLM)
 - FCSI Bus to control analog front end (TLM)
 - Remaining Dataflow connections (TDF)
 - Remaining Control signals (DE)
- External Block
 - Line and Telephone Model (elec. Net)

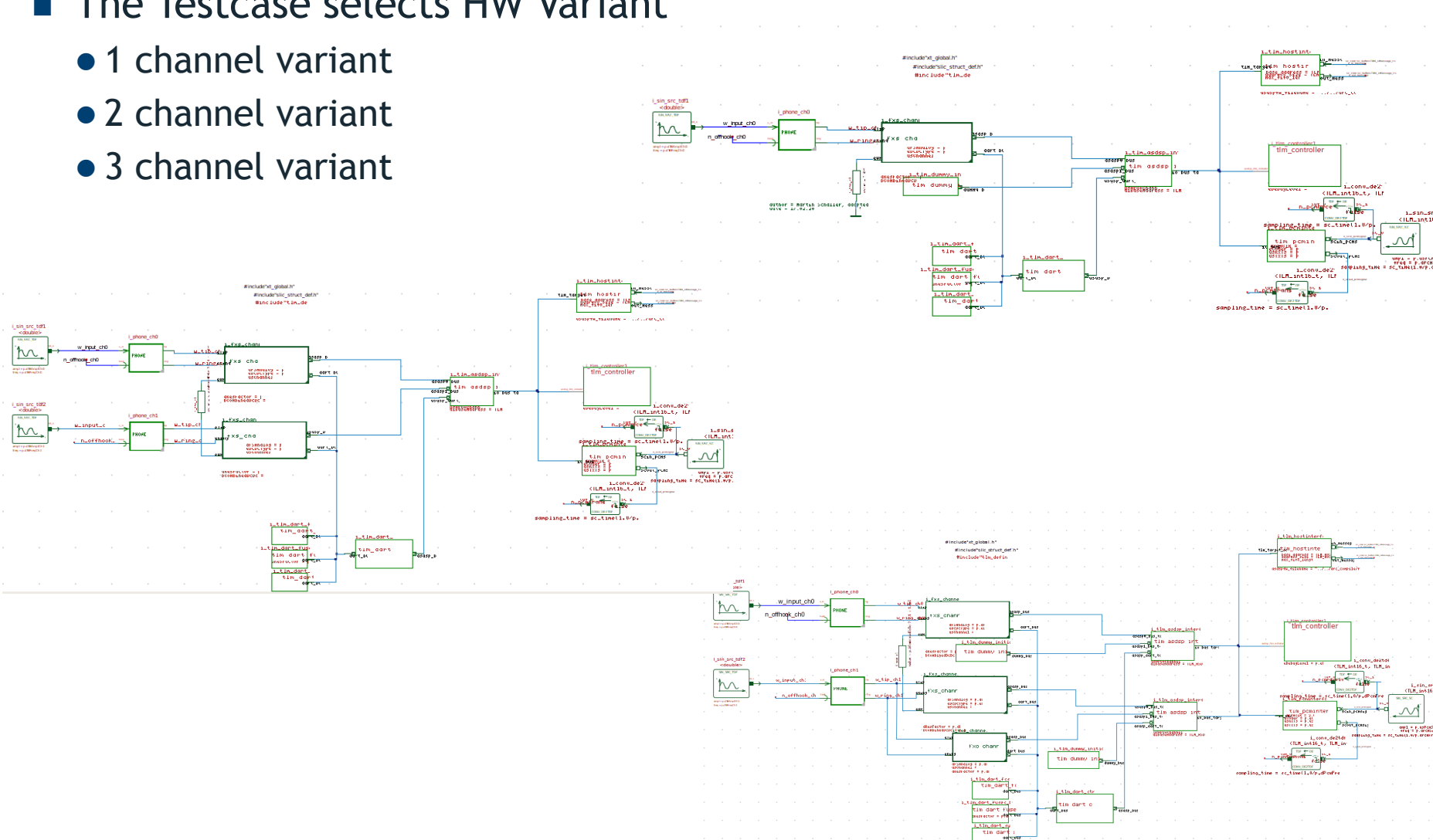
Architecture of Voice Codec

- Controller
 - No instruction set simulator
 - Include FW C-Code
- Timing TLM
 - We keep it simple and use “early completion”
 - Time added for each write access and read access at host controller

Flexibility of selecting different HW Variants

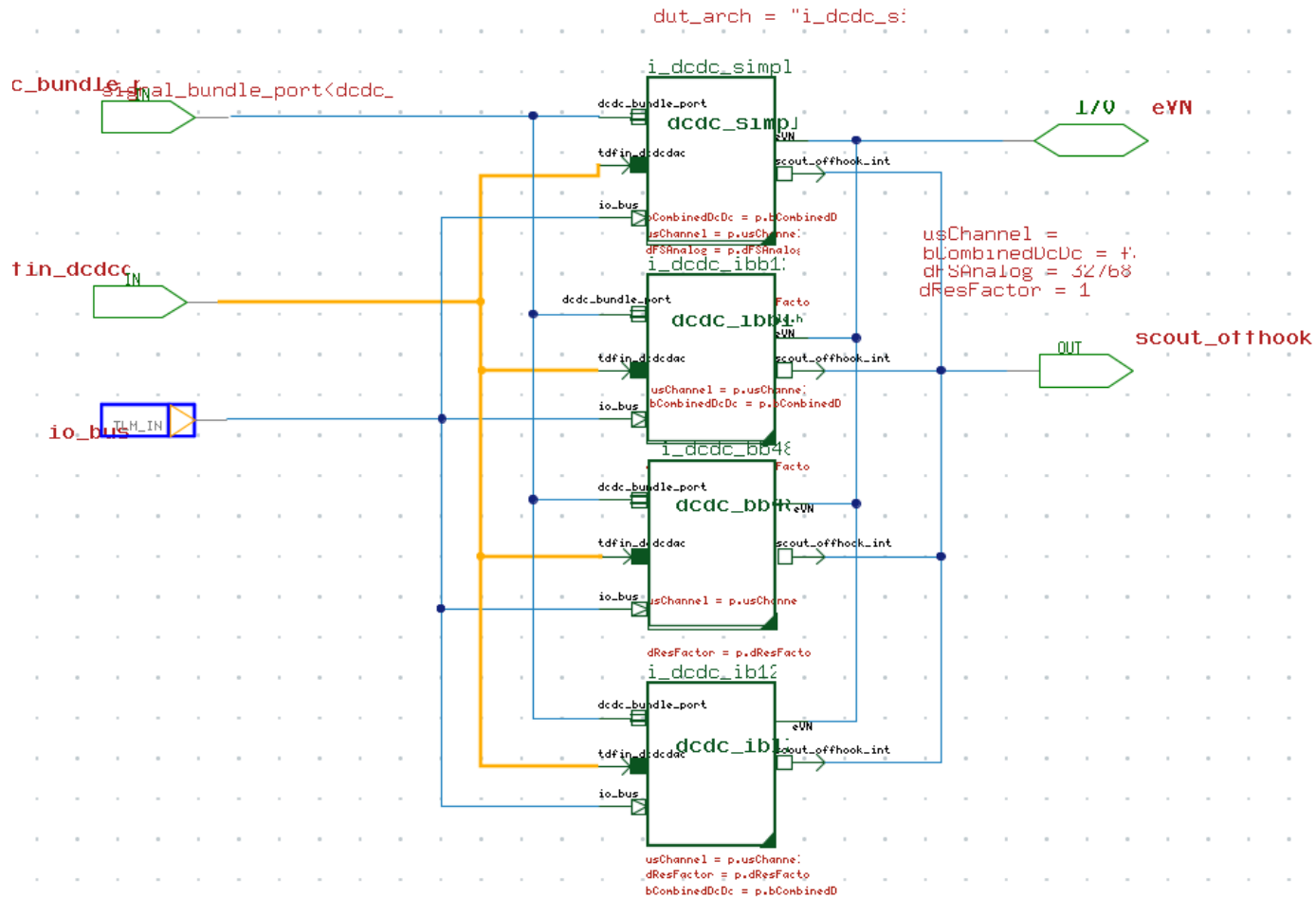
■ The Testcase selects HW Variant

- 1 channel variant
- 2 channel variant
- 3 channel variant



Architecture Selection

- Testcase selects which DC/DC converter is used

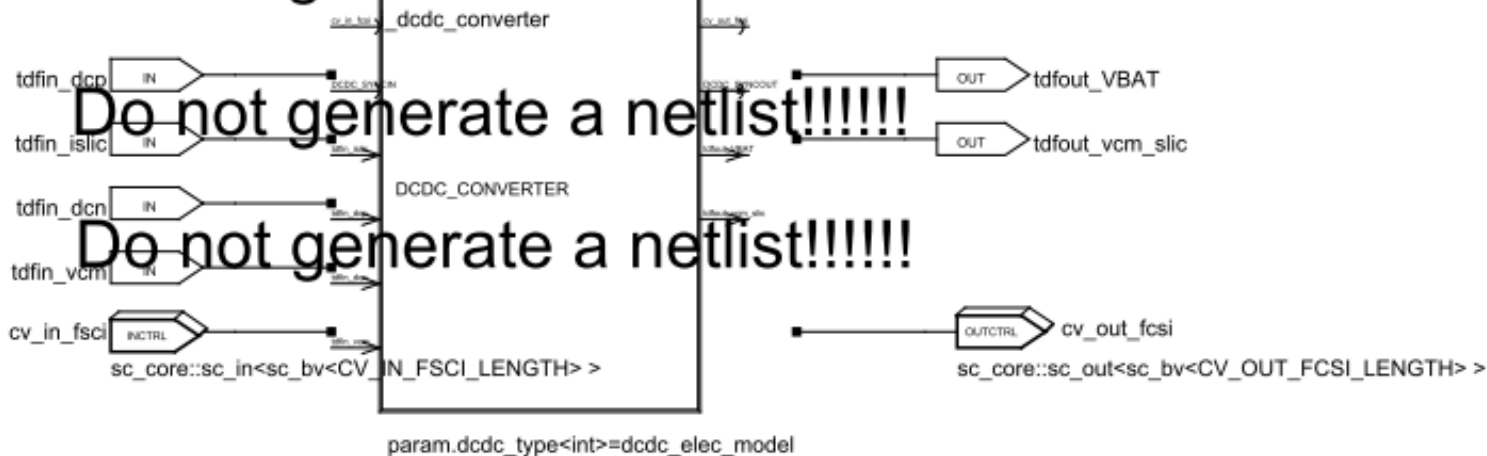


Old solution of architecture selection

- Selection had to be written manually

Do not generate a netlist!!!!!!

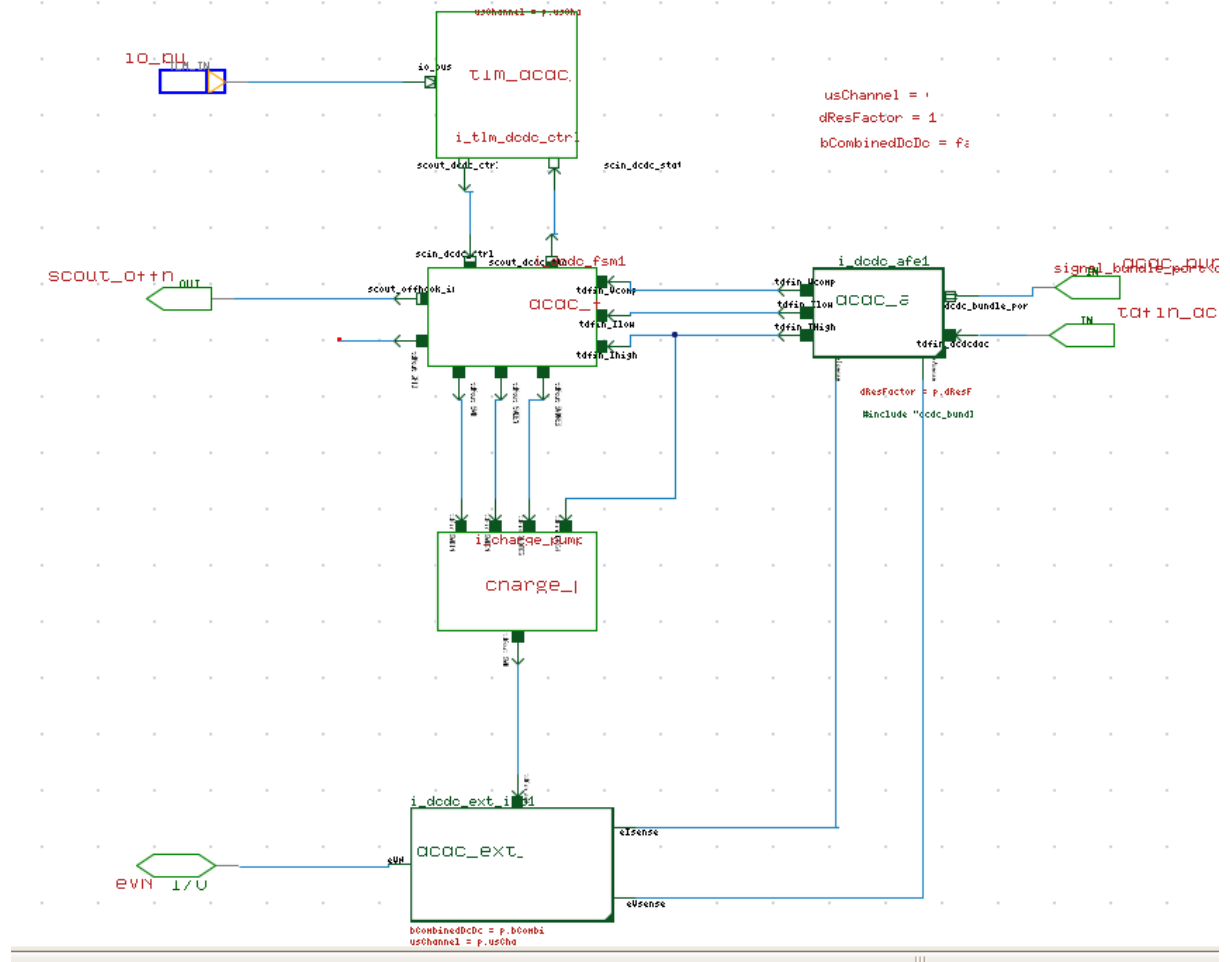
Do not generate a netlist!!!!!!



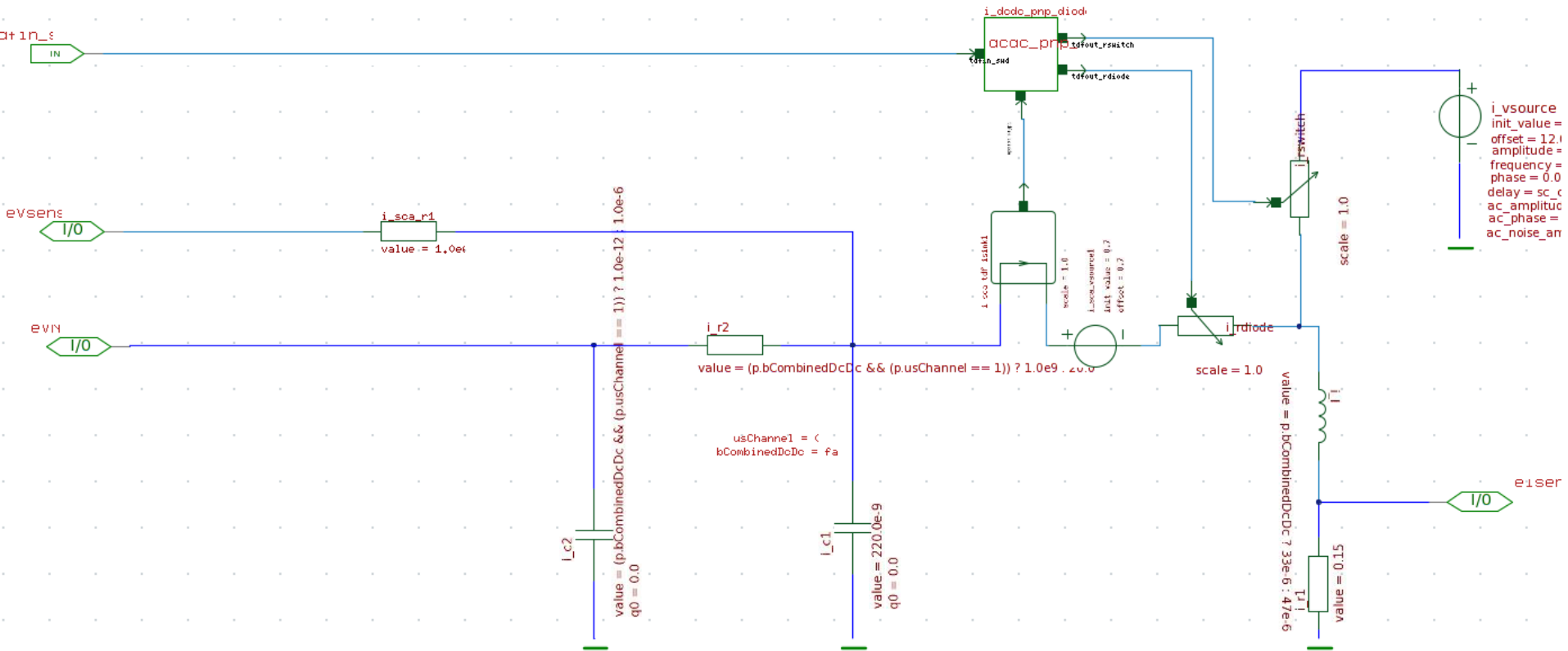
Do not generate a netlist!!!!!!

Electrical Model of DC/DC converter

- Digital HW Block
 - Analog HW Block
 - Charge Pump Block
 - DCDC Externals
-
- TLM Port
 - Elec. Port
 - TDF Port
 - DE Port
 - Bundle Port



Electrical Circuit of DC/DC Externals



Summary

- TLM Model
 - Has better test coverage than our previous used model
 - Effort has to be spent to model HW more accurate
 - Easy to use with Schematic Entry
- Architecture Selection
 - Generate fast and simple Models for Simulation Speedup
 - Easy to use with Schematic Entry

