

**What is Wrong with Pin Mapping
How to Fix It**
**What is Wrong with signal_name
How to Fix It**

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signal_name == Data Book Name

The first column is pin_name (aka component “Pin Number”), and the second column is signal_name. On page 21 of IBIS 6.0:

“The second column, signal_name, gives the data book name for the signal on that pin.”

What does it mean when two supply pins have the same Data Book Name (e.g. VDD, with VDD=3V)?

There is no Data Book standard, but if you ask any designer, it means they have the same Voltage.

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2 STATEMENT OF INTENT

In order to enable an industry standard method to electronically transport IBIS modeling data between semiconductor vendors, EDA tool vendors, and end customers, this template is proposed. The intention of this template is to specify a consistent format that can be parsed by software, allowing EDA tool vendors to derive models compatible with their own products.

One goal of this template is to represent the current state of IBIS data, while allowing a growth path to more complex models/methods (when deemed appropriate). This would be accomplished by a revision of the base template, and possibly the addition of new keywords or categories.

Another goal of this template is to ensure that it is simple enough for semiconductor vendors and customers to use and modify, while ensuring that it is rigid enough for EDA tool vendors to write reliable parsers.

Finally, this template is meant to contain a complete description of the I/O elements on an entire component. Consequently, several models will need to be defined in each file, as well as a table that equates the appropriate buffer to the correct pin and **signal name**.

Pin Mapping can be Problematic

[Pin]	signal_name	model_name	R_pin	L_pin	C_pin
1	VDD	POWER			
2	VDDQ	POWER			
3	VDDQ	GND			
4	VPP	POWER			
6	VSS	GND			
10	DQ1	DQ	342.6m	1.366nH	0.495pF

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[Pin Mapping]	pulldown_ref	pullup_ref	gnd_clamp_ref	power_clamp_ref	ext_ref
1	NC	PWR			
2	NC	PWR			
3	GND2	NC			
4	NC	PWR			
6	GND1	NC			
10	NC	NC	GND1	PWR	

Description of Problems

Problem 1:

2	VDDQ	POWER
3	VDDQ	GND

Signal Name pins 2 and 3 are signal_name VDDQ and therefore data book name VDDQ. I do not think one can be POWER and the other GND.

Problem 2:

Bus Label PWR “Shorts” pins 1, 2 and 4, and therefore signal_names VDD, VDDQ and VPP. This is inconsistent with the common understanding that the data book Pinout Names define the connectivity.

New Rules

All POWER and GND pins that have the same “bus label” must have the same signal_name.

- If two pins have the same signal_name, then if one of the pins had model_name POWER than the other pin must have model_name POWER.
- If two pins have the same signal_name, then if one of the pins had model_name GND than the other pin must have model_name GND.
- A Pin Mapping Bus Label may contain only I/O pins and POWER pins or I/O pins and GND pins.
- All of the POWER pins in a Pin Mapping Bus Label must have the same signal_name.
- All of the GND pins in a Pin Mapping Bus Label must have the same signal_name.

Comments on New Rules

Arpad:

By not allowing a Bus Label to connect two POWER or GND pins with the same name, then we can use Pin Mapping to determine uniquely what is the Reference voltage signal_name. Yes it would only apply to POWER and GND pins because IBIS allows all of the pins of the same memory data bus to have the same signal_name.

Randy:

If two data book names are the same, they are at the same Voltage, but may be supplied by two different voltage sources both supplying the same Voltage. And if two names are different and the two names have the same voltage, they may be supplied by one or two voltage source that supply the same voltage, and in this special case, the pins on the two voltage may be shorted together in the package.

So to translate this into [Pin Mapping] rules, a Bus Label may “connect” two different supply pin signal_names, as long as the PCB supplies the same voltage to the pins on each signal name.

IBIS Keepers of the Faith:

The third field on [Pin] records (signal_name) is gibberish – it has no meaning. Therefore putting some meaning into the signal_name field is potentially dangerous and should be avoided.

How Pin Mapping has Been Used

As a practical matter, the only IBIS files I have seen that use Pin Mapping have Bus Labels equal to signal_name.

We could enhance Pin Mapping to allow reserved Bus Labels to be a signal_names of POWER and GND pins, and do not require these Bus Labels on the POWER and GND pins.