

Wildcards in Port Mapping

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What Do We Want Port Mapping * to Mean?

- Currently, Port Mapping works as follows:
 - “The asterisk character (“*”) may be used as a wildcard for Data_usage EMD to represent multiple terminals, but only in the context of ports identified as “Type P” (meaning, where rails are involved). Where the wildcard is used, it has the effect of shorting the associated terminals.”
 - Examples 11 and 13 feature the wildcard character, and are highly similar
 - Example 13 is shown below, for simplicity, to use in live editing
- Problem: the examples only ever use * as a wildcard for Physical **references** for Ports of both Types... as GND
 - “GND” in Port Mapping does not have special meaning (contrast to “A_gnd”)
 - By other rules, for Type P ports, “*” is a reference designator, and “GND” is a name (Bus_label:<designator>:<name> or Bus_label:*:<name>)
 - Note that * use as an EMD Designator is illegal in IBIS 8.0, ironically
- Proposal: adjust language to allow both Type P and reference (“-”) to be declared through wildcards – **is this correct and sufficient?**

Example 13 – Unsupported in IBIS 8.0

- Example 13: An EMD-like model example with one reference at all Designator pins and another at EMD pins using **EMD rail signal names with RefDes wildcards** [portions removed for space]

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[Begin Port Map]
Port 1 (Type S) (Side Die1) (Physical U1.94) (Net A0) -(Physical Bus_label*:GND )
Port 2 (Type S) (Side Die2) (Physical U2.94) (Net A0) -(Physical Bus_label*:GND )
Port 3 (Type S) (Side Die3) (Physical U3.94) (Net A0) -(Physical Bus_label*:GND )
Port 4 (Type S) (Side EMDpin) (Physical K2) (Net A0) -(Physical GND )
...
Port 121 (Type S) (Side Die1) (Physical U1.71) (Net CLK_c) -(Physical Bus_label*:GND) (Diff_port 123)
Port 122 (Type S) (Side EMDpin) (Physical E2) (Net CLK_c) -(Physical GND) (Diff_port 124)
Port 123 (Type S) (Side Die1) (Physical U1.70) (Net CLK_t) -(Physical Bus_label*:GND) (Diff_port 121)
Port 124 (Type S) (Side EMDpin) (Physical D2) (Net CLK_t) -(Physical GND) (Diff_port 122)
...
Port 163 (Type P) (Physical U1.VDD) (Side Die1) (Net VDD) -(Physical Bus_label*:GND )
Port 164 (Type P) (Physical U2.VDD) (Side Die2) (Net VDD) -(Physical Bus_label*:GND )
Port 165 (Type P) (Physical U3.VDD) (Side Die3) (Net VDD) -(Physical Bus_label*:GND )
Port 166 (Type P) (Physical VDD) (Side EMDpin) (Net VDD) -(Physical GND )
[End Port Map]
```

Is this Illegal? * is used, but for the reference, not the declared Port

We never actually declare the separate "GND" Type P Ports; should we change GND and add them?

Implied legal (Type P context), but use with reference is unclear

Backup/Reference

Wildcards in IBIS 8.0 for EMD

Wildcard Usage

- IBIS 8.0: two uses of “wild” (“wildcard”) in reference to AMI globbing, but with no syntax specified
- Nearly 200 uses of *, mostly in equations, in comments, for pointers, or for “shorthand” references to similar syntax (e.g., “C_comp_”)
- EMD Rules
 - EMD Designator use of * is illegal
 - Page 408: “*.<signal_name> shall represent all of the [Designator Pin List] <signal_name> entries at all [Designator Pin List] interfaces shorted together.”
 - Page 409: “*.<bus_label> shall represent all of the [Designator Pin List] <bus_label> entries at all [Designator Pin List] interfaces shorted together.”

IBIS 8.0 EMD Rules (1 of 3)

- EMD Designator use of * is illegal
- Page 408
 - “*.<signal_name> shall represent all of the [Designator Pin List] <signal_name> entries at all [Designator Pin List] interfaces shorted together.”
- Page 409
 - “*.<bus_label> shall represent all of the [Designator Pin List] <bus_label> entries at all [Designator Pin List] interfaces shorted together.”

IBIS 8.0 EMD Rules (2 of 3)

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- *.Y is permitted as POWER or GND terminal Terminal_type_qualifier for signal_name or bus_label on Terminal_type Pin_Rail, per Table 51
- “2) “*.Y” indicates that all of the “Y” named POWER and GND terminals on each of the [Designator Pin List] interfaces are shorted together”

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“For designator interfaces only, involving rails:

For *all* designator interfaces, terminals with the same signal_name may be reduced to a single terminal for modeling purposes with the syntax:

<Terminal_number> Pin_rail signal_name <*.signal_name>

For *all* designator interfaces, terminals with the same bus_label may be reduced to a single terminal for modeling purposes with the syntax:

<Terminal_number> Pin_rail bus_label <*.bus_label>

This syntax excludes rail terminals at the [EMD Pin List] interface. There may exist electrical connections between all of the *.<name> terminals. The connections are not necessarily physical shorts on any one interface or between any of the interfaces.”

IBIS 8.0 EMD Rules (3 of 3)

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“Within an [EMD Group] and for all referenced [EMD Set] keywords and their encapsulated [EMD Model] keywords, Pin_Rail terminals are considered merged into a single terminal across designator interfaces (not the EMD interface) based on these rules:

- i. Pin_Rail signal_name *.<signal_name> shorts all connections with signal_name <signal_name> for all designator interfaces (not the EMD interface)
- ii. Pin_Rail bus_label *.<bus_label> shorts all connections with bus_label <bus_label> for all designator interfaces (not the EMD interface)
- iii. No corresponding rule for pin_name entries exists since connected rail pin_names can differ at different interfaces”