Dependency notation

1 General explanation

Dependency notation is a means of denoting the relationships between inputs, between outputs, or between inputs and outputs, without actually showing all the elements and interconnections involved.

NOTE - Apart from its use in complex elements, dependency notation should not be used to replace the symbols for combinative elements.

The information provided by dependency notation supplements that provided by the qualifying symbols for an element's function.

In the convention for dependency notation, use will be made of the terms "affecting" and "affected". In the case where it is not evident which inputs must be considered as being the affecting or the affected ones (for example, if they stand in an AND relationship), the choice may be made in any convenient way.

In some complex elements, outputs may have an effect on inputs and other outputs. For the sake of simplicity, the text of sections 2 and 3 refers to "affecting inputs" only, but it should be understood that the recommended notation applies to affecting outputs also.

2 Convention

Dependency notation usually defines relationships between internal logic states. However, in the case of 3-state outputs, passive-pull-down outputs, passive-pull-up outputs and open-circuit outputs (symbols S01493 (12-09-03) through S01498 12-09-08)), ENABLE dependency (A00284) defines relationships between the internal logic states of affecting inputs and the external states of affected outputs.

Application of dependency notation is accomplished by

- labelling the input affecting other inputs or outputs with a particular letter symbol denoting the relationship involved followed by an identifying number, and

- labelling each input or output affected by that affecting input with that same number.

If it is the complement of the internal logic state of the affecting input [output] that does the affecting, a bar shall be placed over the identifying number at the affected input [output].

NOTE - For an example of use, see symbol S01669 (12-42-11). For a technique avoiding the use of a bar, see the note with symbol S01691 (12-49-04).

If the affected input or output requires a label to denote an effect it has on the element, this label shall be prefixed by the identifying number of the affecting input.

If an input or output is affected by more than one affecting input, the identifying numbers of each of the affecting inputs shall appear in the label of the affected one, separated by commas. The left-to-right order of these identifying numbers is the same as the sequence of the affecting relationships (see also section 25).

Two affecting inputs labelled with different letters shall not have the same identifying number unless one of the letters is A (see section 23).

If two affecting inputs have the same letter and the same identifying number, they stand in an OR relationship to each other.

If the labels denoting the functions of affected inputs or outputs must be numbers (for example, outputs of a coder), the identifying numbers to be associated with both affecting inputs and affected inputs or outputs shall be replaced by another character selected to avoid ambiguity, for exampie Greek letters.

An affecting input affects only the corresponding affected inputs and outputs of the symbol.

3 Types of dependency

The following types of dependency are defined.

AND, OR, and NEGATE dependencies are used to denote Boolean relationships between inputs and/or outputs.

INTERCONNECTION dependency is used to indicate that an input or output imposes its logic state on one or more other inputs and/or outputs.

TRANSMISSION dependency is used to indicate controlled transmission paths between affected ports.

CONTROL dependency is used to identify a timing input or a clock input of a sequential element and to indicate which inputs are controlled by it.

SET and RESET dependencies are used to specify the internal logic states of an RS-bistable element when the R- and S-inputs both stand at their internal 1-States.

ENABLE dependency is used to identify an Enable input and to indicate which inputs and/or outputs are controlled by it (for example which outputs take on their high-impedance condition).

MODE dependency is used to identify an input that selects the mode of operation of an element and to indicate the inputs and/or outputs that depend on that mode.

ADDRESS dependency is used to identify the Address inputs of a memory.

Table I (see A00276_Table_EN.pdf below) lists the various dependencies and summarizes their effects. More detailed definitions appear in A00277 through A00289, together with illustrations of the concepts. In these illustrations, following general symbols are used.

S01566 (12-27-01) through S01578 (12-27-13)
S01607 (12-30-01)

S01610 (12-32-01)

S01623 (12-34-01)

S01626 (12-36-01) through S01629 (12-36-04)

S01636 (12-38-01) through S01643 (12-38-08)

S01655 (12-40-01)

S01674 (12-44-01) and S01675 (12-44-02)

S01678 (12-46-01) through S01682 (12-46-05)

S01685 (12-48-01) through S01687 (12-48-03)

S01706 (12-50-01) through S01710 (12-50-05)

S01723 (12-52-01)

In Table I, the word "action" implies

- that affecting inputs will have their normally defined effect on the function of the element;

- that affected outputs will take on the internal logic States determined by the function of the element.