# ACTIVE COMPONENTS

BITWISE INDICATORS

When modelling the likes of 7 segment displays or other devices which contain a number of elements, it is sometimes useful to consider the state to be a binary value. Otherwise, for a seven input device there are 128 different combinations which would require you to draw 128 different symbols.

Taking the 7 segment display as an example, the model is defined as a bitwise indicator by the setting up the *Active Component Model* dialogue as follows:
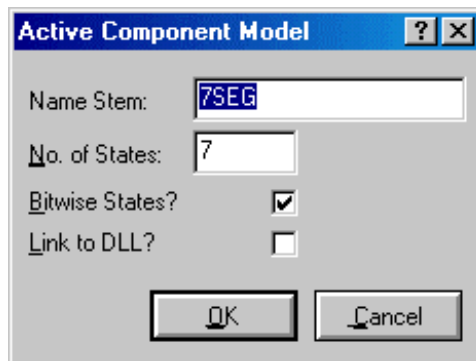
This also specifies that the symbol name stem is 7SEG and that there are 7 elements.

For each element, two symbols are required, together with a common symbol that renders the background of the display. The full set of active symbols required therefore looks like this:
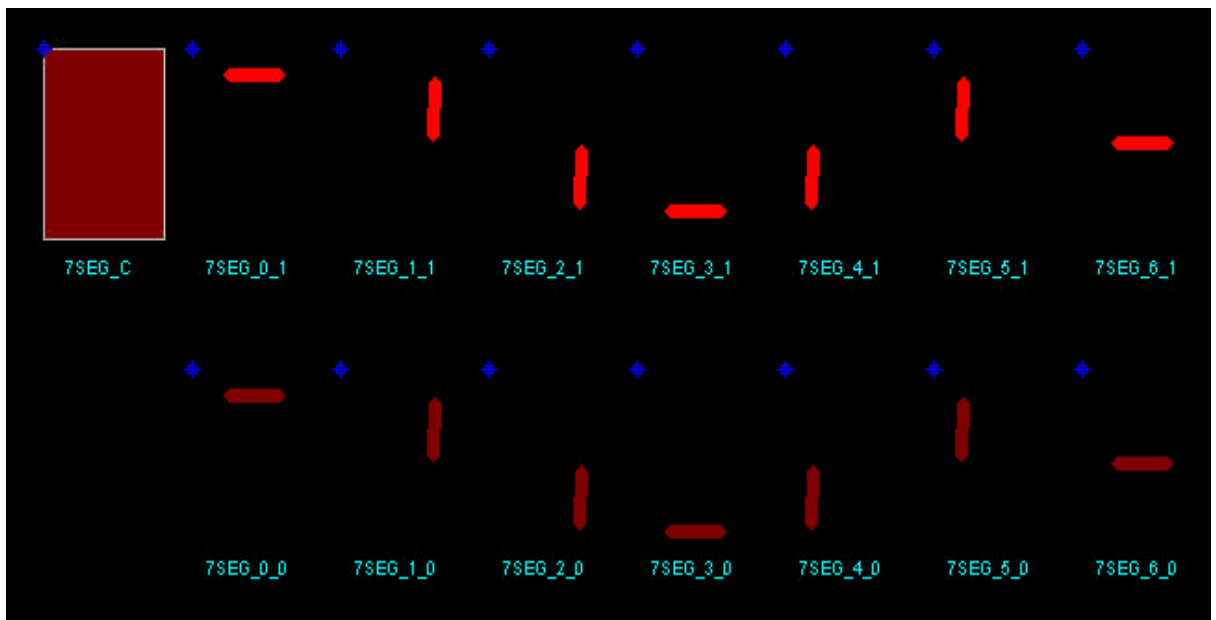

For clarity, we have decomposed the symbols so that it is clear that each symbol is defined with an origin corresponding to the top left of the display panel. If bit 0 of the state value is clear then 7SEG_0_0 is drawn, but if it is set then 7SEG_0_1 is drawn. Similarly bit 1 of the state value selects between 7SEG_1_0 and 7SEG_1_1 and so on.

If a digital 7 segment display model is required, then this can be achieved by specifying an RTDPROBE primitive directly with

```
PRIMITIVE=DIGITAL,RTDPROBE
```

Given that the display device is then created with seven pins named D0 thru D6 then this will suffice.

However, if it is desired to model the analog characteristics of the LEDs then it is necessary to use a schematic model:
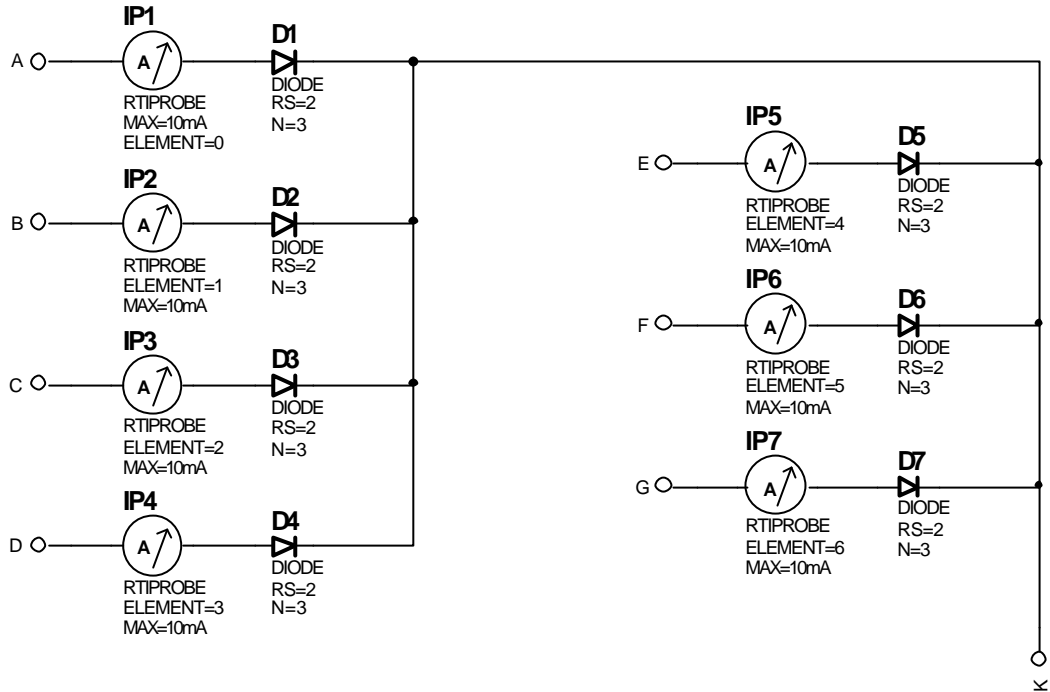
The current through each diode is measured by a separate RTIPROBE. The **ELEMENT** properties of these probes are used to determine which segment of the display graphic is controlled.

This model is, of course, for a common cathode display.