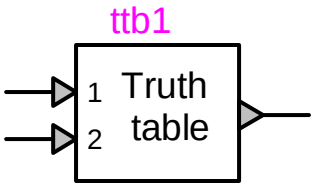
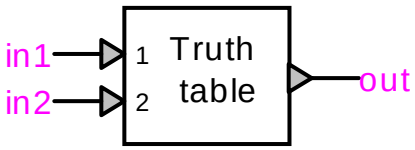
Control device : truth table



1 Description

This device applies a user-specified truth table function to its inputs. The number of inputs is arbitrary. To n inputs correspond 2^n table entries, in ascending binary order of the combinations of the Boolean value of the inputs.

1.1 Pins



This device has two or more signal pins:

pin	*description*	*value when unconnected*
in1	input 1	0
...	more inputs	0
out	output	as calculated

1.2 Truth table

The truth table is the list of output values corresponding to each combination of the Boolean value of the inputs, ordered in ascending order of the binary value of each combination.

For example, a truth table for 3 entries is a list of the 8 binary values that can be taken by the output. Each output value corresponds, in order, to the 8 combinations of input values: 000, 001, 010, 011, 100, etc.

1.3 History

Selection options for the history value of the output signal:

option	*value*	*rules*
zero	Inherit from inputs	
constant value	history(t) = user-defined value	any value, 0 means inherit, use 0.0 to get 0.
function value	history(t) = user-defined function	constant or f(t)

1.4 Scopes

Setting the scope flag enables monitoring of the output signal during the simulation.

1.5 Output signal interpolation

During the simulation, the output value of this device is calculated at successive instants t at intervals Δt. Between these simulation instants, the output value can be set to vary in one of two modes, ramped or stepped:

mode	*output value between* $t - \Delta t$ *and* t^-	*value at* t^-	*value at* t
ramped	interpolated linearly between values out($t - \Delta t$) and out(t^-)	calculated at t^-	calculated at t
stepped	remains at out($t - \Delta t$)	remains at out($t - \Delta t$)	calculated at t

2 Time-domain representation

In the time-domain calculation at t>0, the output value is calculated as follows:

$$out(t) = f((in1(t) > 0),(in2(t) > 0),...) \quad (1)$$

3 Steady-state representation

In the steady-state calculation at t=0, the output value is calculated as follows:

if history is defined, $out(0) = history(0)$

else $out(0) = f((in1(0) > 0),(in2(0) > 0),...)$ (2)

4 Netlist

4.1 Format

Netlist format:

```
_c_fttb;name;npins;npins;out,list(inputs),
history,step/ramp,scope,
history function expression
;
output values
```

field	*description*	*value*
c_fttb name npins npins	part name instance name pin count pin count	 1+count(inputs) 1+count(inputs)
out list(inputs)	signal name of the output signal names of the inputs	
history	history	constant value or "H" for function
step/ramp	calculation mode	"S1" for stepped "S0" for ramped
scope	monitoring, optional	"?s" for enabled
history function expression	optional, required when history field is "H"	
;	optional, required when the above line is present	
output values	space-separated list of binary values	