

préciser pour chaque bloc la fonction réalisée...

2.1 PURPOSE

This document describes the function of the basic symbols used for the function diagrams building.

2.2 SCOPE

This document applies to the development of the LVCR.

2.3 REFERENCES

2.4 DEFINITIONS

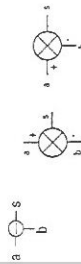
LVCR Lucas Varsity Common Rail
ECU Electronic Control Unit
APV Application Programmable Value
APM Application Programmable Map
APT Application Programmable Table
CPV Constant Programmable Value

2.5 Algebraic operators 1

2.5.1 Subtraction symbol

$$S = a - b$$

Nota: the bottom entry is always subtract to the left entry



2.6 Addition symbol

$$S = a + b$$



2.6.1 Multiplication symbol

$$S = a \times b$$



2.6.2 Division symbol

$$S = a / b$$

Nota : the bottom entry is always the denominator



2.6.3 Absolute value symbol

$$S = \text{abs} (a)$$

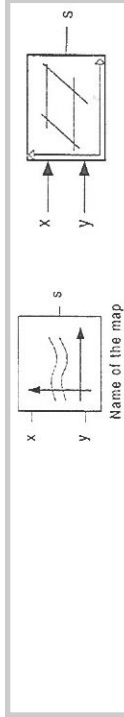


2.6.4 Invert sign symbol

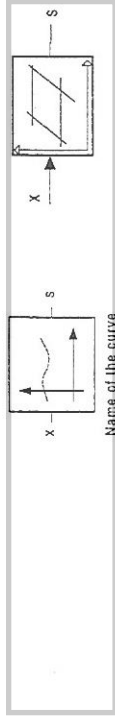
$$S = -a$$



2.6.5 Map



2.6.6 Curve

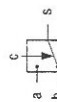


2.7 Selection operators

2.7.1 Condition symbol

C is a boolean value

If c = true then s = a else s = b

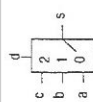


2.7.2 Case symbol

$$S = a \text{ if } d = 0$$

$$S = b \text{ if } d = 1$$

$$S = c \text{ if } d = 2$$



2.8 Logical symbol

2.8.1 Not symbol

$$S = \text{not} (a)$$

A and s are Boolean values



2.8.2 And symbol

$$S = a \text{ and } b$$

A, b and s are Boolean values



2.8.3 Or symbol

$$S = a \text{ or } b$$

A, b and s are Boolean value



2.9 Comparison operators

2.9.1 Equal symbol



S = true if a=b
S = false if a <> b

2.9.2 Different symbol



S = true if a <> b
S = false if a = b

2.9.3 Lower symbol



S = true if a < b
S = false if a >= b

2.9.4 Greater symbol



S = true if a > b
S = false if a <= b

2.9.5 Lower or equal symbol



S = true if a <= b
S = false if a > b

2.9.6 Greater or equal symbol



S = true if a >= b
S = false if a < b

2.9.7 Open interval symbol



S = true if L < a < b
S = false if (a <= b) or (a > b)

2.9.8 Closed interval symbol



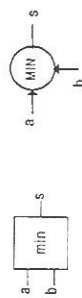
S = true if L <= a <= b
S = false if (a < L) or (a > b)

2.9.9 Greater zero symbol



S = true if a > 0
S = false if a <= 0

2.9.10 Min Symbol



S = a if a < b
S = b if a > b
S = a or b if a = b

2.9.11 Max symbol



S = a if a > b
S = b if b < a
S = a or b if a = b

2.10 Memory

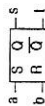
2.10.1 Old value symbol

S = previous 'a' value



2.10.2 Flip Flop symbol

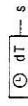
a	b	s	Previous s
False	False	False	False
True	False	True	False
True	True	False	False
False	True	True	True
False	False	False	True
True	True	True	True



2.11 Timer and counter operators

2.11.1 Function Scheduling symbol

S = function process scheduling



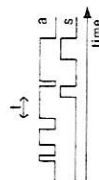
2.11.2 Timer Enable symbol

If E becomes true the timer is set to the current time s=0
If E = true then s=current time - time at initialisation.
If E = false then s=s₀+1
If R = true then s=0 time at initialisation=current time.



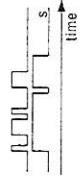
2.11.3 Turn on Delay symbol

Each time a=true a timer is enable, if the timer value is greater or equal to the t value and a is still equal at true. S = true



2.11.4 Turn off Delay symbol

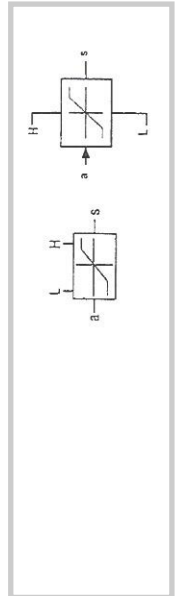
Each time a=false a timer is enable, if the timer value is greater or equal to the t value and a is still equal at false. S = false.



2.12 Miscellaneous operators

2.12.1 Limiter symbol

S = L if a < L
S = a if L <= a <= b
S = H if a > H



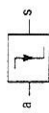
2.12.2 Edge rising symbol

a	Previous a	S
False	False	False
True	False	True
True	True	True
False	True	False



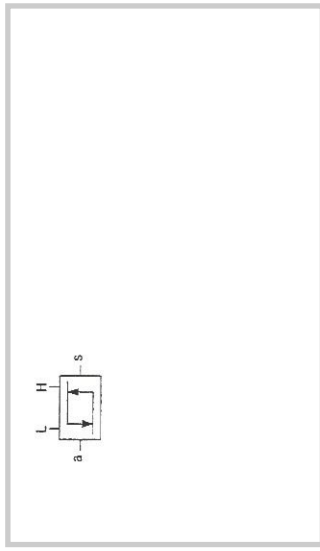
2.12.3 Edge falling symbol

a	Previous a	S
False	False	False
True	False	False
True	True	True
False	True	False



2.12.4 Hysteresis symbol

a	Previous S	S
a < L	False	False
L <= a < H	False	False
a > H	False	True
a > H	True	True
L <= a < H	True	True
a < L	True	False



2.13 transfer function operators

2.13.1 Low pass filter

The purpose of this function is to filter the high frequency.
The filter is reset when reset = true. The initial value is i, and the coefficient is t
dt = task scheduling
S₀=i

$$S_n = \frac{dT}{t} (a_n - S_{n-1}) + S_{n-1}$$

