

Annex 3 Codis de cel·les paramètriques

- **Nand2 v1**

```
(setq Wptotal_a 42000000)
```

```
(setq Wptotal_b 42000000)
```

```
(setq Wptotalps 8400000)
```

```
(setq Wp_a 6000000)
```

```
(setq Wp_b 6000000)
```

```
(setq Wpseudo 6000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
(setq tr_a (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_a Wp_a) 0))
```

```
(setq tr_b (transistor
```

```
(list "ee" (+ (p2x (aillant_tr tr_a)) N502 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_b Wp_b) 0))
```

```
(setq trl (transistor
```

```
(list "ee" (+ (p2x input_a  
 ) N502 N503))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps Wpseudo) 0))
```

```
(setq input_b (contacte_es (+ N502 N503 (maxtrX (list tr_b trl)))))
```

```
(setq output (contacte_es (+ (p2x input_b) N502 N503)))
```

```
(contacte_porta tr_a "v" (p2x input_a))
```

```
(contacte_porta tr_b "v" (p1x input_b))
```

```
(setq contc (contacte_porta trl "h" (- PmVssDD N504 N601)))
```

```
(aillant_cont trl contc)
```

```
(setq cont (contacte2_m (aillant_tr tr_a) (aillant_tr trl) (p1x (porta tr_a)) (+ (p2x output) N504)))
```

```
(fingers tr_a (list Pmvddeb (p2y cont)) 0)
```

```
(fingers tr_b (list Pmvddeb (p2y cont)) 0)
```

```
(fingers trl (list (p1y cont) Pmgnddd ) 1)
```

```
(carrils (cadr output))
```

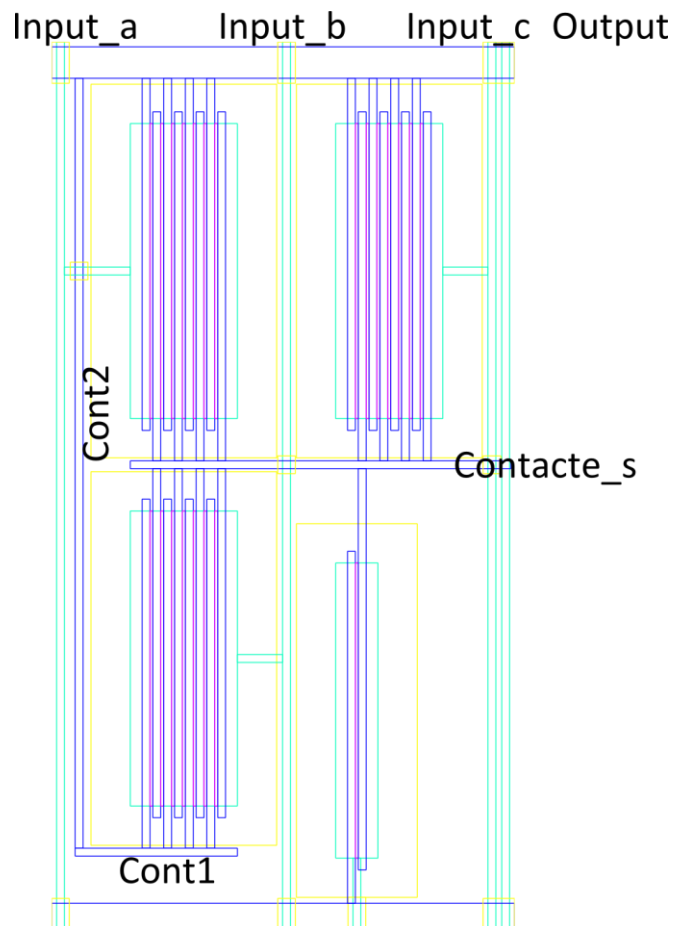
```
(aillant_io input_a)
```

```
(aillant_io (list input_b output))
```

```
(aillant_intersec cont input_b)
```

```
(aillant_intersec (list contacte_s input_c))
```


- **Nand3 v2**



```
(setq Wptotal_a 42000000)
```

```
(setq Wptotal_b 42000000)
```

```
(setq Wptotal_c 42000000)
```

```
(setq Wptotalps 8400000)
```

```
(setq Wp_a 6000000)
```

```
(setq Wp_b 6000000)
```

```
(setq Wp_c 6000000)
```

```
(setq Wpseudo 6000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
(setq tr_a (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_a Wp_a) 0))
```

```
(setq tr_b (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_a)) N601 N503 N503))
```

```
(list Wptotal_b Wp_b) 0))
```

```
(setq cont1 (contacte2_h
```

```
(list (- (p1x (aillant_tr tr_b)) N601 N503 N901) (- (p1y (aillant_tr tr_b)) N601 N503))
```

```
(list (p2x (porta tr_b)) nil)))
```

```
(setq cont2 (contacte2_h
```

```
(list (p1x cont1) (+ (p1y cont1) N601))
```

```
(list (+ (p1x cont1) N601) pmVddEB)))
```

```
(setq input_b (contacte_es (+ (maxtrX (list tr_a tr_b)) N503 N502)))
```

```
(setq tr_c (transistor  
  
(list "ee" (+ (p2x input_b) N502 N503))  
  
(list "es" (- PmVddEB N503 N602))  
  
(list Wptotal_c Wp_c) 0))
```

```
(setq trl (transistor  
  
(list "ee" (+ (p2x input_b) N502 N503))  
  
(list "ei" (+ PmGndDD N503 N602))  
  
(list Wptotalps Wpseudo) 0))
```

```
(setq input_c (contacte_es (+ (maxtrX (list tr_c trl)) N503 N502)))
```

```
(setq output (contacte_es (+ N502 N503 (p2x input_c))))  
  
(setq cont_a (contacte_porta tr_a "v" (p2x input_a)))
```

```
(aillant_intersec cont_a cont2)  
  
(contacte_porta tr_b "v" (p1x input_b))  
  
(contacte_porta tr_c "v" (p1x input_c))  
  
(setq contc (contacte_porta trl "h" (- PmVssDD N504)))  
  
(aillant_cont trl contc)
```

```
(setq contacte_s (contacte2_m (aillant_tr tr_a) (aillant_tr tr_b) (p1x (porta tr_a)) (+ (p2x output) N504)))  
  
(fingers tr_a (list Pmvddeb (p2y contacte_s)) 0)  
  
(fingers tr_c (list Pmvddeb (p2y contacte_s)) 0)  
  
(fingers tr_b (list (p1y contacte_s) (p2y cont1)) 1)  
  
(fingers trl (list (p1y contacte_s) PmGndDD) 1)
```

(carrils (cadr output))

(aillant_io input_a)

(aillant_io input_b)

(aillant_io (list input_c output))

(aillant_intersec contacte_s input_b)

(aillant_intersec contacte_s input_c)

- **Nand4 v2**

```
(setq Wptotal_a 42000000)
```

```
(setq Wptotal_b 42000000)
```

```
(setq Wptotal_c 42000000)
```

```
(setq Wptotal_d 42000000)
```

```
(setq Wptotalps 8400000)
```

```
(setq Wp_a 6000000)
```

```
(setq Wp_b 6000000)
```

```
(setq Wp_c 6000000)
```

```
(setq Wp_d 6000000)
```

```
(setq Wpseudo 6000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
(setq tr_a (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_a Wp_a 0))
```

```
(setq tr_b (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_a)) N601 N503 N503))
```

```
(list Wptotal_b Wp_b 0))
```

```
(setq input_b (contacte_es (+ (maxtrX (list tr_a tr_b)) N503 N502)))
```

```
(setq input_c (contacte_es (+ (p2x input_b) N503 N502)))
```

```
(setq tr_c (transistor
```

```
(list "ee" (+ (p2x input_c) N502 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_c Wp_c 0))
```

```
(setq tr_d (transistor
```

```
(list "ee" (+ (p2x input_c) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_c)) N601 N503 N503))
```

```
(list Wptotal_d Wp_d 0))
```

```
:: contactes de distribució vdd
```

```
(setq cont1 (contacte2_h
```

```
(list (- (p1x (aillant_tr tr_b)) N601 N503 N901) (- (p1y (aillant_tr tr_b)) N601 N503))
```

```
(list (p2x (porta tr_d)) nil)))
```

```
(setq cont2 (contacte2_h
```

```
(list (p1x cont1) (+ (p1y cont1) N601))
```

```
(list (+ (p1x cont1) N601) pmVddEB)))
```

```
(setq input_d (contacte_es (+ (maxtrX (list tr_c tr_d)) N503 N502)))
```

```
(setq trl (transistor
```

```
(list "ee" (+ (p2x input_d) N502 N503))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps Wpseudo 0))
```

```
(setq output (contacte_es (+ N502 N503 (p2x (aillant_tr trl)))))
```

```
(setq cont_a (contacte_porta tr_a "v" (p2x input_a)))
```

```
(aillant_intersec cont_a cont2)
```

```
(contacte_porta tr_b "v" (p1x input_b))
```

```
(contacte_porta tr_c "v" (p1x input_c))
```

```
(contacte_porta tr_d "v" (p1x input_d))
```

```
(setq contc (contacte_porta trl "h" (- PmVssDD N504)))
```

```
(aillant_cont trl contc)
```

```
:: contacte de sortida
```

```
(setq contacte_s (contacte2_m (aillant_tr tr_a) (aillant_tr tr_b) (p1x (porta tr_a)) (+ (p2x output) N504)))
```

```
(fingers tr_a (list Pmvddeb (p2y contacte_s)) 0)
```

```
(fingers tr_c (list Pmvddeb (p2y contacte_s)) 0)
```

```
(fingers tr_b (list (p1y contacte_s) (p2y cont1)) 1)
```

```
(fingers tr_d (list (p1y contacte_s) (p2y cont1)) 1)
```

```
(fingers trl (list (p1y contacte_s) PmGndDD) 1)
```

(carrils (cadr output))

(aillant_io input_a)

(aillant_io (list input_b input_c))

(aillant_io input_d)

(aillant_io output)

(aillant (list (list (p1x input_b) (p1y cont1)) (list (p2x input_c) (p2y cont1))))

(aillant (list (list (p1x input_b) (p1y contacte_s)) (list (p2x input_c) (p2y contacte_s))))

(aillant_intersec contacte_s input_d)

- Nand 4 v3

(diferent relació d'aspecte i layout)

```
(setq Wptotal_a 42000000)
```

```
(setq Wptotal_b 42000000)
```

```
(setq Wptotal_c 42000000)
```

```
(setq Wptotal_d 42000000)
```

```
(setq Wptotalps 8400000)
```

```
(setq Wp_a 4000000)
```

```
(setq Wp_b 4000000)
```

```
(setq Wp_c 4000000)
```

```
(setq Wp_d 4000000)
```

```
(setq Wpseudo 2000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
(setq tr_a (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_a Wp_a) 0))
```

```
(setq tr_b (transistor
```

```
(list "ee" (+ (p2x input_a) N601 N502 N502 N901 N901 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_a)) N601 N503 N503))
```

```
(list Wptotal_b Wp_b) 0))
```

```
(setq input_b (contacte_es (+ (maxtrX (list tr_a tr_b)) N503 N502)))
```

```
(setq input_c (contacte_es (+ (p2x input_b) N503 N502)))
```

```
(setq tr_c (transistor
```

```
(list "ee" (+ (p2x input_c) N502 N503))
```

```
(list "es" (- PmVddEB N503 N602))
```

```
(list Wptotal_c Wp_c 0))
```

```
(setq tr_d (transistor
```

```
(list "ee" (+ (p2x input_c) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_c)) N601 N503 N503))
```

```
(list Wptotal_d Wp_d 0))
```

```
(setq cont1 (contacte2_h
```

```
(list (- (p1x (aillant_tr tr_b)) N601 N503 N901) (- (p1y (aillant_tr tr_b)) N601 N503))
```

```
(list (p2x (porta tr_d)) nil)))
```

```
(setq cont2 (contacte2_h
```

```
(list (p1x cont1) (+ (p1y cont1) N601))
```

```
(list (+ (p1x cont1) N601) pmVddEB)))
```

```
(setq input_d (contacte_es (+ (maxtrX (list tr_c tr_d)) N503 N502)))
```

```
(setq output (contacte_es (+ N502 N503 (p2x input_d))))
```

```
(setq trl (transistor
```

```
(list "ed" (- (p2x input_d) N502 N502 N503))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps Wpseudo 0))
```

;; - contacte sortida - càrrega activa

(setq cont3 (contacte2_h

(list (p1x (porta trl)) (+ (p2y (aillant_tr trl)) N503))

(list (+ (p2x output) N504) nil)))

(setq cont_a (contacte_porta tr_a "v" (p2x input_a)))

(aillant_intersec cont_a cont2)

(contacte_porta tr_b "v" (p1x input_b))

(contacte_porta tr_c "v" (p2x input_c))

(contacte_porta tr_d "v" (p1x input_d))

(setq contc (contacte_porta trl "h" (- PmVssDD N504)))

(aillant_cont trl contc)

(setq contacte_s (contacte2_m (aillant_tr tr_a) (aillant_tr tr_b) (p1x (porta tr_a)) (+ (p2x output) N504)))

(fingers tr_a (list Pmvddeb (p2y contacte_s)) 0)

(fingers tr_c (list Pmvddeb (p2y contacte_s)) 0)

(fingers tr_b (list (p1y contacte_s) (p2y cont1)) 1)

(fingers tr_d (list (p1y contacte_s) (p2y cont1)) 1)

(fingers trl (list (p1y cont3) PmGndDD) 1)

(carrils (cadr output))

(aillant_io input_a)

(aillant_io (list input_b input_c))

(aillant_io input_d)

(aillant_io output)

(aillant (list (list (p1x input_b) (p1y cont1)) (list (p2x input_c) (p2y cont1))))

```
(aillant (list (list (p1x input_b) (p1y contacte_s)) (list (p2x input_c) (p2y contacte_s))))
```

```
(aillant_intersec contacte_s input_d)
```

```
(aillant_intersec cont3 input_d)
```

- Nand 4x2

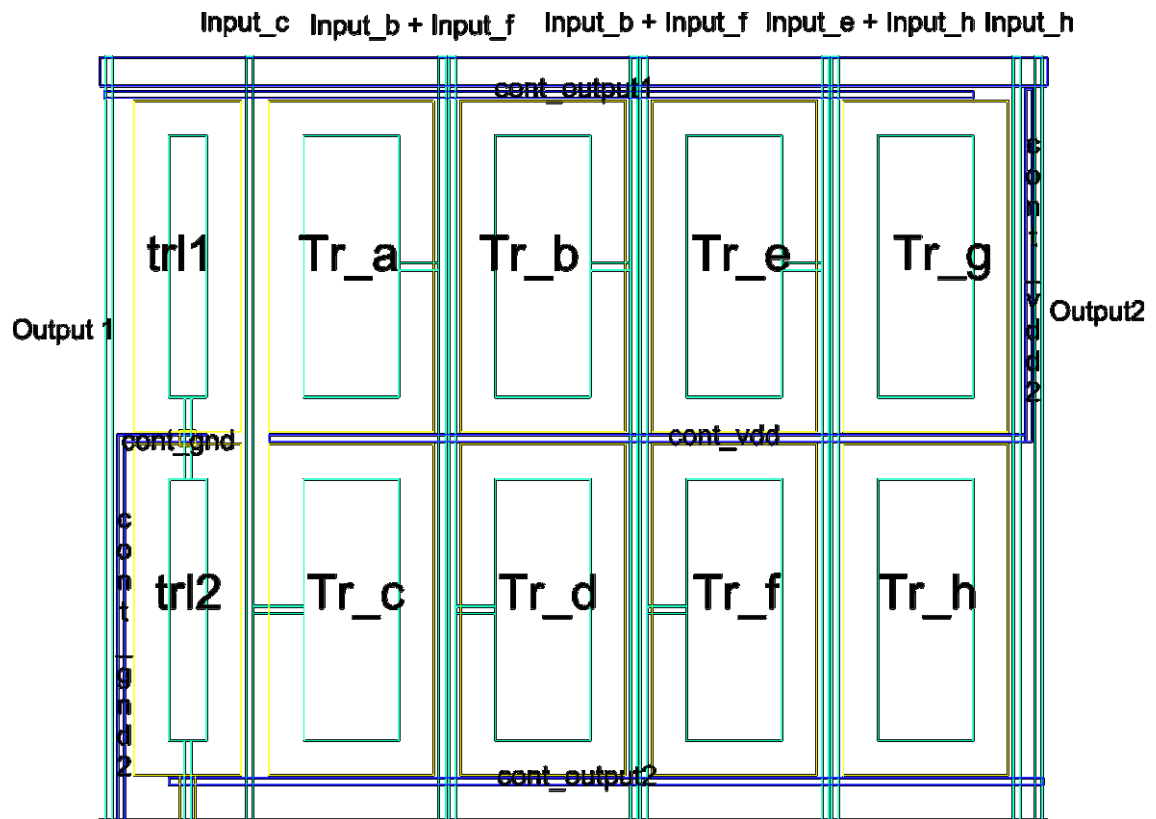


Figura 1 Esquema d'emplaçament

```
(setq Wptotal_a 42000000)
(setq Wptotal_b 42000000)
(setq Wptotal_c 42000000)
(setq Wptotal_d 42000000)
(setq Wptotal_e 42000000)
(setq Wptotal_f 42000000)
(setq Wptotal_g 42000000)
(setq Wptotal_h 42000000)
(setq Wptotalps1 8400000)
(setq Wptotalps2 8400000)
(setq Wp_a 6000000)
(setq Wp_b 6000000)
(setq Wp_c 6000000)
```

```

(setq Wp_d 6000000)

(setq Wp_e 6000000)

(setq Wp_f 6000000)

(setq Wp_g 6000000)

(setq Wp_h 6000000)

(setq Wpseudo1 6000000)

(setq Wpseudo2 6000000)

;; sortida 1 + desbordament met1 met2

(setq output1 (contacte_es (+ DesplXaS N504)))

(setq extrem_superior (- PmVddEB N503 N602 N601 N901))

;; transistor de càrrega 1 (filera dalt)

(setq trl1 (transistor

(list "ee" (+ (p2x output1) N501 N502 N601 N602 N503))

(list "es" extrem_superior)

(list Wptotalps1 Wpseudo1)

0))

;; transistor de càrrega 2 (filera baix)

(setq trl2 (transistor

(list "ee" (+ (p2x output1) N501 N502 N601 N602 N503))

(list "es" (- (p1y (aillant_tr trl1)) N503 N601 N503))

(list Wptotalps2 Wpseudo2) 0))

;; entrada c

(setq input_c (contacte_es (+ (maxtrx (list trl1 trl2)) N502 N503)))

(setq tr_a (transistor

(list "ee" (+ (p2x input_c) N502 N503))

```

```
(list "es" extrem_superior)
```

```
(list Wptotal_a Wp_a 0))
```

```
(setq tr_c (transistor
```

```
(list "ee" (+ (p2x input_c) N503))
```

```
(list "es" (- (p1y (aillant_tr tr_a)) N503 N601 N503))
```

```
(list Wptotal_c Wp_c 0))
```

```
(setq input_a (contacte_es (+ (maxtrx (list tr_a tr_c)) N502 N503)))
```

```
(setq input_d (contacte_es (+ (p2x input_a) N502)))
```

```
(setq tr_b (transistor
```

```
(list "ee" (+ (p2x input_d) N502 N503))
```

```
(list "es" extrem_superior)
```

```
(list Wptotal_b Wp_b 0))
```

```
(setq tr_d (transistor
```

```
(list "ee" (+ (p2x input_d) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_b)) N503 N601 N503))
```

```
(list Wptotal_d Wp_d 0))
```

```
(setq input_b (contacte_es (+ (maxtrx (list tr_b tr_d)) N502 N503)))
```

```
(setq input_f (contacte_es (+ (p2x input_b) N502)))
```

```
(setq tr_e (transistor
```

```
(list "ee" (+ (p2x input_f) N502 N503))
```

```
(list "es" extrem_superior)
```

```
(list Wptotal_e Wp_e 0))
```

```
(setq tr_f (transistor
```

```
(list "ee" (+ (p2x input_f) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_e)) N503 N601 N503))
```

```
(list Wptotal_f Wp_f 0))
```

```
(setq input_e (contacte_es (+ (maxtrx (list tr_e tr_f)) N502 N503)))
```

```
(setq input_h (contacte_es (+ (p2x input_e) N502)))
```

```
(setq tr_g (transistor
```

```
(list "ee" (+ (p2x input_h) N502 N503))
```

```
(list "es" extrem_superior)
```

```
(list Wptotal_g Wp_g 0))
```

```
(setq tr_h (transistor
```

```
(list "ee" (+ (p2x input_h) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tr_g)) N503 N601 N503))
```

```
(list Wptotal_h Wp_h 0))
```

```
(setq input_g (contacte_es (+ (maxtrx (list tr_g tr_h)) N502 N503)))
```

```
:: carril output 1
```

```
(setq cont_output1
```

```
(contacte2_h
```

```
(list (- (p1x output1) N504)
```

```
(+ (p2y (aillant_tr tr_g)) N503)
```

```
(list (p2x (porta tr_g)) nil)))
```

```
:: carril de distribuci3n interna de vdd
```

```
(setq cont_vdd (contacte2_m
```

```
(aillant_tr tr_a)
```

```

(aillant_tr tr_c)

(p1x (aillant_tr tr_a))

(+ (p2x input_g) N503 N602))

)

(setq cont_vdd2 (contacte2_h

(list (p2x cont_vdd) (p1y cont_vdd))

(list (+ (p2x cont_vdd) N601) PmVddEB)))

;; carril output2

(setq output2 (contacte_es (+ (p2x cont_vdd2) N502)))

;; carril contacte a output 2

(setq cont_output2

(contacte2_h

(list (p1x (porta trl2))

(- (p1y (aillant_tr trl2)) N503 N601))

(list (+ (p2x output2) N504) nil)))

(carrils (cadr cont_output2))

(setq cont_gnd (contacte2_m

(aillant_tr trl1)

(aillant_tr trl2)

(- (p1x (aillant_tr trl1)) N503 N601)

(max

(p2x (porta trl1))

(p2x (porta trl2))))))

```

```
(setq cont_gnd2 (contacte2_h  
(list (- (p1x cont_gnd) N601) PmGndDD)  
(list (p1x cont_gnd) (p2y cont_gnd))))
```

```
(contacte_porta tr_a "v" (p1x input_a))  
(contacte_porta tr_b "v" (p1x input_b))  
(contacte_porta tr_c "v" (p2x input_c))  
(contacte_porta tr_d "v" (p2x input_d))  
(contacte_porta tr_e "v" (p1x input_e))  
(contacte_porta tr_f "v" (p2x input_f))  
(contacte_porta tr_g "v" (p1x input_g))  
(contacte_porta tr_h "v" (p2x input_h))
```

```
(setq cont_trl1  
(contacte_porta trl1 "h" (p2y (porta trl2))))
```

```
(setq cont_trl2  
(contacte_porta trl2 "h" (- PmVssDD N504 N601)))
```

```
(aillant_intersec cont_output1 input_c)  
(aillant_intersec cont_output2 input_c)  
(aillant_intersec cont_output2 input_g)
```

```
(aillant_intersec cont_gnd cont_trl1)  
(aillant_intersec cont_vdd input_g)  
(aillant (list (list (p1x input_a) (p1y cont_vdd))
```

```

(list (p2x input_d) (p2y cont_vdd))))

(aillant (list (list (p1x input_a) (p1y cont_output1))

(list (p2x input_d) (p2y output1))))

(aillant (list (list (p1x input_a) (p1y cont_output2))

(list (p2x input_d) (p2y output2))))


(aillant (list (list (p1x input_b) (p1y cont_vdd))(list (p2x input_f) (p2y cont_vdd))))

(aillant (list (list (p1x input_b) (p1y cont_output1))

(list (p2x input_f) (p2y output1))))

(aillant (list (list (p1x input_b) (p1y cont_output2))

(list (p2x input_f) (p2y output2))))


(aillant (list (list (p1x input_e) (p1y cont_vdd))

(list (p2x input_h) (p2y cont_vdd))))

(aillant (list (list (p1x input_e) (p1y cont_output1))

(list (p2x input_h) (p2y output1))))

(aillant (list (list (p1x input_e) (p1y cont_output2))

(list (p2x input_h) (p2y output2))))


(aillant_cont trl2 cont_trl2)


(fingers tr_a (list (p1y cont_output1) (p2y cont_vdd)) 0)

(fingers tr_b (list (p1y cont_output1) (p2y cont_vdd)) 0)

(fingers tr_e (list (p1y cont_output1) (p2y cont_vdd)) 0)

(fingers tr_g (list (p1y cont_output1) (p2y cont_vdd)) 0)

(fingers trl1 (list (p1y cont_output1) (p2y cont_gnd)) 0)


(fingers tr_c (list (p1y cont_vdd) (p2y cont_output2)) 1)

```

(fingers tr_d (list (p1y cont_vdd) (p2y cont_output2)) 1)

(fingers tr_f (list (p1y cont_vdd) (p2y cont_output2)) 1)

(fingers tr_h (list (p1y cont_vdd) (p2y cont_output2)) 1)

(fingers trl2 (list (p1y cont_gnd) (p2y cont_output2)) 1)

(aillant_io output1)

(aillant_io input_c)

(aillant_io (list input_a input_d))

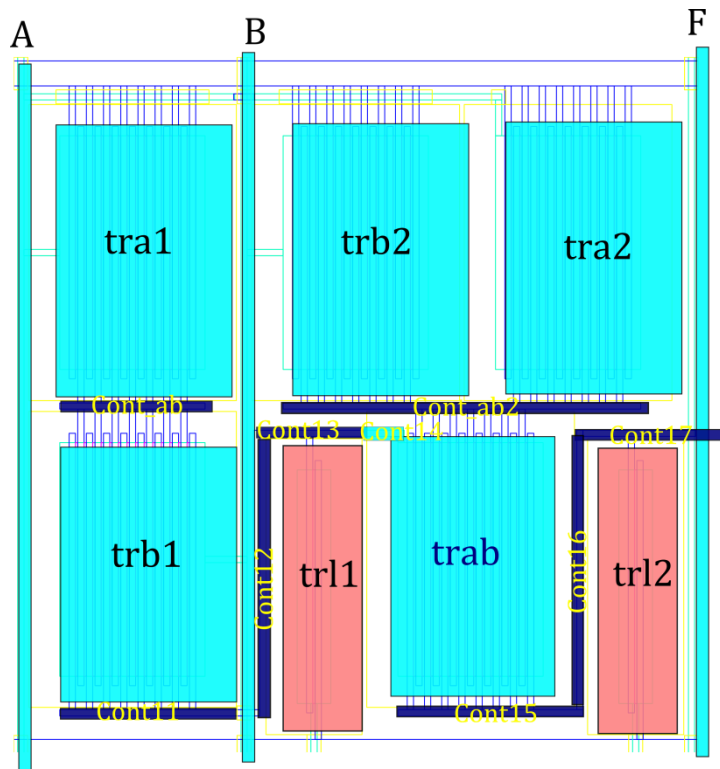
(aillant_io (list input_b input_f))

(aillant_io (list input_e input_h))

(aillant_io (list input_g output2))

(carrils (cadr output2))

- Xor v1 (contactes de porta centrals)



;; transistors sèrie

(setq Wptotal_a1 84000000)

(setq Wptotal_b1 84000000)

;; transistors paral·lel

(setq Wptotal_a2 84000000)

(setq Wptotal_b2 84000000)

(setq Wptotal_ab 84000000)

```
(setq Wptotalps1 8400000)
```

```
(setq Wptotalps2 8400000)
```

```
(setq Wp_a1 6000000)
```

```
(setq Wp_b1 6000000)
```

```
(setq Wp_a2 6000000)
```

```
(setq Wp_b2 6000000)
```

```
(setq Wp_ab 6000000)
```

```
(setq Wpseudo1 6000000)
```

```
(setq Wpseudo2 6000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
;; distància ocupada per la distribució del carril d'entrada a
```

```
(setq dist_vertical (- PmVddEB (+ N502 N503 N501 (* N901 2))))
```

```
;; Valor inicial:
```

```
;; (- PmVddEB N503 N602)
```

```
(setq tra1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" dist_vertical)
```

```
(list Wptotal_a1 Wp_a1) 0))
```

```
(setq trb1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tra1)) N601 N503 N503))
```

```
(list Wptotal_b1 Wp_b1) 0))
```

```
(setq cont_ab (contacte2_m (aillant_tr tra1) (aillant_tr trb1) (p1x (porta tra1)) (max (p2x (porta tra1))  
(p2x (porta trb1)))))
```

```
(setq input_b (contacte_es (+ (maxtrx (list tra1 trb1)) N503 N502)))
```

```
(setq cont11 (contacte2_h  
(list (p1x (porta trb1)) (- (p1y (aillant_tr trb1)) N503 N601))  
(list (+ (p2x input_b) N503 N901 N601) nil)))
```

```
(setq trl1 (transistor  
(list "ee" (+ (p2x cont11) N503 N901))  
(list "ei" (+ PmGndDD N503 N602))  
(list Wptotalps1 Wpseudo1 0))
```

```
(setq cont12 (contacte2_h  
(list (- (p2x cont11) N601) (p2y cont11))  
(list (p2x cont11) (+ (p2y (aillant_tr trl1)) N601 N503))))
```

```
(setq trb2 (transistor  
(list "ee" (+ (p2x input_b) N502 N503))  
(list "es" dist_vertical)  
(list Wptotal_b2 Wp_b2 0))
```

```
(setq tra2 (transistor  
(list "ee" (+ (p2x (aillant_tr trb2)) N502 N503))  
(list "es" dist_vertical)  
(list Wptotal_a2 Wp_a2 0))
```

```
(setq mig_tra2 (/ (- (p2x (porta tra2)) (p1x (porta tra2)))) 2))
```

```
;;(setq cont_tra2 (contacte1_h  
;; (list (p2x input_a) (+ (p2y (aillant_tr tra1)) N502 N503))  
;; (list (+ (p1x (porta tra2)) mig_tra2 N501) nil)))
```

```
(setq cont_tra21 (contacte1_h  
(list (p2x input_a) (+ (p2y (aillant_tr tra1)) N502 N503))  
(list (- (p1x input_b) N503 N901) nil)))
```

```
(setq cont_tra22 (contacte1_h  
(list (+ (p2x input_b) N503 N901) (+ (p2y (aillant_tr tra1)) N502 N503))  
(list (+ (p1x (porta tra2)) mig_tra2 (+ (/ N501 2))) nil)))
```

```
;; connexió pont entre cont_tra2 i input_b  
  
(setq pont (contacte2_h  
(list (- (p1x input_b) N503 N504 N901) (p1y cont_tra22))  
(list (+ (p2x input_b) N503 N504 N901) (p2y cont_tra22))))
```

```
(setq trab (transistor  
(list "ee" (+ (p2x (aillant_tr tr1)) N502 N503))  
(list "es" (- (p1y (aillant_tr tra2)) N601 N503 N503))  
(list Wptotal_ab Wp_ab 0))
```

```
(setq cont13 (contacte2_h
```

```
(list (p2x cont12) (- (p2y cont12) N601))
```

```
(list (p2x (aillant_tr trl1)) nil)))
```

```
;; mig del transistor ab, pel contacte de porta
```

```
(setq mig_trab (/ (- (p2x (porta trab)) (p1x (porta trab)))) 2))
```

```
;; terminal del contacte de porta del transistor ab
```

```
(setq cont14 (contacte1_h
```

```
(list (- (p2x cont13) N504) (p1y cont13))
```

```
(list (+ (p1x (porta trab)) mig_trab (+ (/ N501 2))) nil)))
```

```
(setq cont_ab2 (contacte2_h
```

```
(list (p1x (porta trb2)) (- (p1y (aillant_tr trb2)) N503 N601))
```

```
(list (max (p2x (porta trb2)) (p2x (porta tra2)) (p2x (porta trab))) nil)))
```

```
(setq cont15 (contacte2_h
```

```
(list (p1x (porta trab)) (- (p1y (aillant_tr trab)) N503 N601))
```

```
(list (+ (p2x (aillant_tr trab)) N503 N601) nil)))
```

```
(setq trl2 (transistor
```

```
(list "ee" (+ (p2x cont15) N503 N602))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps2 Wpseudo2) 0))
```

```
(setq cont16 (contacte2_h
```

```
(list (- (p2x cont15) N601) (p2y cont15))
```

```
(list (p2x cont15) (+ (p2y (aillant_tr trl2)) N601 N503))))
```

```
(setq output (contacte_es (+ (p2x (aillant_tr trl2)) N502 N503)))
```

```
(setq cont17 (contacte2_h
```

```
(list (p2x cont16) (- (p2y cont16) N601))
```

```
(list (+ (p2x output) N504) nil)))
```

```
(carrils (cadr output))
```

```
(contacte_porta tra1 "v" (p2x input_a))
```

```
(contacte_porta tra2 "h" (p1y cont_tra22))
```

```
(contacte_porta trb1 "v" (p2x input_b))
```

```
(contacte_porta trb2 "v" (p2x input_b))
```

```
(contacte_porta trab "h" (p1y cont14))
```

```
(setq contc (contacte_porta trl1 "h" (- PmVssDD N504)))
```

```
(aillant_cont trl1 contc)
```

```
(setq contc (contacte_porta trl2 "h" (- PmVssDD N504)))
```

```
(aillant_cont trl2 contc)
```

```
(fingers tra1 (list Pmvddeb (p2y cont_ab)) 0)
```

```
(fingers trb1 (list (p1y cont_ab) (p2y cont11)) 1)
```

```
(fingers tra2 (list Pmvddeb (p2y cont_ab2)) 0)
```

```
(fingers trb2 (list Pmvddeb (p2y cont_ab2)) 0)
```

(fingers trab (list (p1y cont_ab2) (p2y cont15)) 1)

(fingers trl1 (list (p1y cont14) Pmgnddd) 0)

(fingers trl2 (list (p1y cont17) Pmgnddd) 0)

(aillant (list

(list (p1x (porta tra1)) (p1y cont_tra21))

(list (p2x (porta tra1)) (p2y cont_tra21))))

(aillant (list

(list (p1x (porta trb2)) (p1y cont_tra22))

(list (p2x (porta trb2)) (p2y cont_tra22))))

(aillant (list

(list (p1x (porta tra2)) (p1y cont_tra22))

(list (p2x (porta tra2)) (p2y cont_tra22))))

(aillant (list

(list (p1x input_b) (p1y cont_tra21))

(list (p2x input_b) (p2y cont_tra22))))

(aillant_intersec cont11 input_b)

(aillant_io input_a)

(aillant_io input_b)

(aillant_io output)

Xor v2 (contactes de porta als extrems)

;; transistors sèrie

(setq Wptotal_a1 84000000)

(setq Wptotal_b1 84000000)

;; transistors paral·lel

(setq Wptotal_a2 84000000)

(setq Wptotal_b2 84000000)

(setq Wptotal_ab 84000000)

(setq Wptotalps1 8400000)

(setq Wptotalps2 8400000)

(setq Wp_a1 6000000)

(setq Wp_b1 6000000)

(setq Wp_a2 6000000)

(setq Wp_b2 6000000)

(setq Wp_ab 3000000)

(setq Wpseudo1 6000000)

(setq Wpseudo2 6000000)

(setq input_a (contacte_es DesplXaS))

;; distància ocupada per la distribució del carril d'entrada a

```
(setq dist_vertical (- PmVddEB (+ N502 N503 N501 (* N901 2))))
```

```
;; Valor inicial:
```

```
;; (- PmVddEB N503 N602)
```

```
(setq tra1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" dist_vertical)
```

```
(list Wptotal_a1 Wp_a1 0))
```

```
(setq trb1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tra1)) N601 N503 N503))
```

```
(list Wptotal_b1 Wp_b1 0))
```

```
(setq cont_ab (contacte2_m (aillant_tr tra1) (aillant_tr trb1) (p1x (porta tra1)) (max (p2x (porta tra1))  
(p2x (porta trb1)))))
```

```
(setq input_b (contacte_es (+ (maxtrx (list tra1 trb1)) N503 N502)))
```

```
(setq cont11 (contacte2_h
```

```
(list (p1x (porta trb1)) (- (p1y (aillant_tr trb1)) N503 N601))
```

```
(list (+ (p2x input_b) N503 N901 N601) nil)))
```

```
(setq trl1 (transistor
```

```
(list "ee" (+ (p2x cont11) N503 N901))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps1 Wpseudo1 0))
```

```
(setq cont12 (contacte2_h  
(list (- (p2x cont11) N601) (p2y cont11))  
(list (p2x cont11) (+ (p2y (aillant_tr tr1)) N601 N503))))
```

```
(setq trb2 (transistor  
(list "ee" (+ (p2x input_b) N502 N503))  
(list "es" dist_vertical)  
(list Wptotal_b2 Wp_b2 0))
```

```
(setq tra2 (transistor  
(list "ee" (+ (p2x (aillant_tr trb2)) N502 N503))  
(list "es" dist_vertical)  
(list Wptotal_a2 Wp_a2 0))
```

```
(setq cont_tra21 (contacte1_h  
(list (p2x input_a) (+ (p2y (aillant_tr tra1)) N502 N503))  
(list (- (p1x input_b) N503 N901) nil)))
```

```
(setq cont_tra22 (contacte1_h  
(list (+ (p2x input_b) N503 N901) (+ (p2y (aillant_tr tra1)) N502 N503))  
(list (+ (p1x (porta tra2)) N501) nil)))
```

```
(setq cont_tra23 (contacte1_h  
(list (p1x (porta tra2)) (p2y (porta tra2))))
```

```
(list (p2x cont_tra22) (p1y cont_tra22)))
```

```
;; connexió pont entre cont_tra2 i input_b
```

```
(setq pont (contacte2_h
```

```
(list (- (p1x input_b) N503 N504 N901) (p1y cont_tra22))
```

```
(list (+ (p2x input_b) N503 N504 N901) (p2y cont_tra22))))
```

```
(setq trab (transistor
```

```
(list "ee" (+ (p2x (aillant_tr tr1)) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tra2)) N601 N503 N503))
```

```
(list Wptotal_ab Wp_ab 0))
```

```
(setq cont13 (contacte2_h
```

```
(list (p2x cont12) (- (p2y cont12) N601))
```

```
(list (p2x (aillant_tr tr1)) nil)))
```

```
;; terminal del contacte de porta del transistor ab
```

```
(setq cont14 (contacte1_h
```

```
(list (- (p2x cont13) N504) (p1y cont13))
```

```
(list (+ (p1x (porta trab)) N501) nil)))
```

```
(setq cont14-2 (contacte1_h
```

```
(list (- (p2x cont14) N501) (p2y (porta trab))))
```

```
(list (p2x cont14) nil)))
```

```
(setq cont_ab2 (contacte2_h
```

```
(list (p1x (porta trb2)) (- (p1y (aillant_tr trb2)) N503 N601))
```

```
(list (max (p2x (porta trb2)) (p2x (porta tra2)) (p2x (porta trab))) nil)))
```

```
(setq cont15 (contacte2_h
```

```
(list (p1x (porta trab)) (- (p1y (aillant_tr trab)) N503 N601))
```

```
(list (+ (p2x (aillant_tr trab)) N503 N601) nil)))
```

```
(setq trl2 (transistor
```

```
(list "ee" (+ (p2x cont15) N503 N602))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps2 Wpseudo2) 0))
```

```
(setq cont16 (contacte2_h
```

```
(list (- (p2x cont15) N601) (p2y cont15))
```

```
(list (p2x cont15) (+ (p2y (aillant_tr trl2)) N601 N503))))
```

```
(setq output (contacte_es (+ (p2x (aillant_tr trl2)) N502 N503)))
```

```
(setq cont17 (contacte2_h
```

```
(list (p2x cont16) (- (p2y cont16) N601))
```

```
(list (+ (p2x output) N504) nil)))
```

```
(carrils (cadr output))
```

(contacte_porta tra1 "v" (p2x input_a))

(contacte_porta trb1 "v" (p2x input_b))

(contacte_porta trb2 "v" (p2x input_b))

(setq contc (contacte_porta trl1 "h" (- PmVssDD N504 N601)))

(aillant_cont trl1 contc)

(setq contc (contacte_porta trl2 "h" (- PmVssDD N504 N601)))

(aillant_cont trl2 contc)

(fingers tra1 (list Pmvddeb (p2y cont_ab)) 0)

(fingers trb1 (list (p1y cont_ab) (p2y cont11)) 1)

(fingers tra2 (list Pmvddeb (p2y cont_ab2)) 0)

(fingers trb2 (list Pmvddeb (p2y cont_ab2)) 0)

(fingers trab (list (p1y cont_ab2) (p2y cont15)) 1)

(fingers trl1 (list (p1y cont14) Pmgnddd) 0)

(fingers trl2 (list (p1y cont17) Pmgnddd) 0)

(aillant (list

(list (p1x (porta tra1)) (p1y cont_tra21))

(list (p2x (porta tra1)) (p2y cont_tra21))))

(aillant (list

(list (p1x (porta trb2)) (p1y cont_tra22))

(list (p2x (porta trb2)) (p2y cont_tra22))))

```
(aillant (list  
  
(list (p1x input_b) (p1y cont_tra21))  
  
(list (p2x input_b) (p2y cont_tra22))))
```

```
(aillant (list  
  
(list (- (p2x cont_tra22) N501) (+ (p2y (aillant_tr tra2)) N901))  
  
(list (p2x cont_tra22) (p2y cont_tra22))))
```

```
(aillant_intersec cont11 input_b)
```

```
(aillant_io input_a)
```

```
(aillant_io input_b)
```

```
(aillant_io output)
```

Xor v3

```
:: transistors sèrie
```

```
(setq Wptotal_a1 84000000)
```

```
(setq Wptotal_b1 84000000)
```

```
:: transistors paral·lel
```

```
(setq Wptotal_a2 84000000)
```

```
(setq Wptotal_b2 84000000)
```

```
(setq Wptotal_ab 84000000)
```

```
(setq Wptotalps1 16800000)
```

```
(setq Wptotalps2 16800000)
```

```
(setq Wp_a1 6000000)
```

```
(setq Wp_b1 6000000)
```

```
(setq Wp_a2 6000000)
```

```
(setq Wp_b2 6000000)
```

```
(setq Wp_ab 3000000)
```

```
(setq Wpseudo1 3000000)
```

```
(setq Wpseudo2 3000000)
```

```
(setq input_a (contacte_es DesplXaS))
```

```
;; distància ocupada per la distribució del carril d'entrada a
```

```
(setq dist_vertical (- PmVddEB (+ N502 N503 N501 (* N901 2))))
```

```
;; Valor inicial:
```

```
;; (- PmVddEB N503 N602)
```

```
(setq tra1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" dist_vertical)
```

```
(list Wptotal_a1 Wp_a1) 0))
```

```
(setq trb1 (transistor
```

```
(list "ee" (+ (p2x input_a) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tra1)) N601 N503 N503))
```

```
(list Wptotal_b1 Wp_b1) 0))
```

```
(setq cont_ab (contacte2_m (aillant_tr tra1) (aillant_tr trb1) (p1x (porta tra1)) (max (p2x (porta tra1))  
(p2x (porta trb1)))))
```

```
(setq input_b (contacte_es (+ (maxtrx (list tra1 trb1)) N503 N502)))
```

```
(setq cont11 (contacte2_h  
(list (p1x (porta trb1)) (- (p1y (aillant_tr trb1)) N503 N601))  
(list (+ (p2x input_b) N503 N901 N601) nil)))
```

```
(setq trl1 (transistor  
(list "ee" (+ (p2x cont11) N503 N901))  
(list "ei" (+ PmGndDD N503 N602))  
(list Wptotalps1 Wpseudo1) 1))
```

```
(setq cont12 (contacte2_h  
(list (- (p2x cont11) N601) (p2y cont11))  
(list (p2x cont11) (p2y (porta trl1)))))
```

```
(setq cont13 (contacte2_h  
(list (+ (p2x (aillant_tr trl1)) N503) PmgndDD)  
(list (+ (p2x (aillant_tr trl1)) N503 N501) (p2y (porta trl1)))))
```

```
(setq trb2 (transistor  
(list "ee" (+ (p2x input_b) N502 N503))
```

```
(list "es" dist_vertical)
```

```
(list Wptotal_b2 Wp_b2) 0))
```

```
(setq tra2 (transistor
```

```
(list "ee" (+ (p2x (aillant_tr trb2)) N502 N503))
```

```
(list "es" dist_vertical)
```

```
(list Wptotal_a2 Wp_a2) 0))
```

```
(setq cont_tra21 (contacte1_h
```

```
(list (p2x input_a) (+ (p2y (aillant_tr tra1)) N502 N503))
```

```
(list (- (p1x input_b) N503 N901) nil)))
```

```
(setq cont_tra22 (contacte1_h
```

```
(list (+ (p2x input_b) N503 N901) (+ (p2y (aillant_tr tra1)) N502 N503))
```

```
(list (+ (p1x (porta tra2)) N501) nil)))
```

```
(setq cont_tra23 (contacte1_h
```

```
(list (p1x (porta tra2)) (p2y (porta tra2))))
```

```
(list (p2x cont_tra22) (p1y cont_tra22))))
```

```
;; connexió pont entre cont_tra2 i input_b
```

```
(setq pont (contacte2_h
```

```
(list (- (p1x input_b) N503 N504 N901) (p1y cont_tra22))
```

```
(list (+ (p2x input_b) N503 N504 N901) (p2y cont_tra22))))
```

```
(setq trab (transistor
```

```
(list "ee" (+ (p2x input_b) N502 N503))
```

```
(list "es" (- (p1y (aillant_tr tra2)) N601 N503 N503))
```

```
(list Wptotal_ab Wp_ab) 0))
```

```
;; terminal del contacte de porta del transistor ab
```

```
(setq cont14 (contacte1_h
```

```
(list (p1x cont12) (- (p2y cont12) N504))
```

```
(list (p2x cont12) (+ (p1y (porta trab)) N601))))
```

```
(setq cont_ab2 (contacte1_h
```

```
(list (p2x cont14) (p1y (porta trab))))
```

```
(list (p1x (porta trab)) nil)))
```

```
(setq cont_ab2 (contacte2_h
```

```
(list (p1x (porta trb2)) (- (p1y (aillant_tr trb2)) N503 N601))
```

```
(list (max (p2x (porta trb2)) (p2x (porta tra2)) (p2x (porta trab))) nil)))
```

```
(setq trl2 (transistor
```

```
(list "ee" (+ (p2x cont13) N502 N503 N601 N602))
```

```
(list "ei" (+ PmGndDD N503 N602))
```

```
(list Wptotalps2 Wpseudo2 1))
```

```
(setq cont17 (contacte2_h
```

```
(list (+ (p2x (aillant_tr trl2)) N502 N503) pmgnddd)
```

```
(list (+ (p2x (aillant_tr trl2)) N502 n503 N601) (p2y (porta trl2))))))
```

```
(setq maxm (max (p2x cont17) (maxtrx (list tra2 trab trl2))))
```

```
(setq output (contacte_es (+ maxm N502 N503)))
```

```
(setq cont15 (contacte2_h
```

```
(list (p1x (porta trab)) (- (p1y (aillant_tr trab)) N503 N601))
```

```
(list (+ (p2x output) N504) nil)))
```

```
(setq cont16 (contacte2_h
```

```
(list (+ (p2x cont13) N602) (p1y (porta trl2)))
```

```
(list (+ (p2x cont13) N601 N602) (p1y cont15))))
```

```
(carrils (cadr output))
```

```
(contacte_porta tra1 "v" (p2x input_a))
```

(contacte_porta trb1 "v" (p2x input_b))

(contacte_porta trb2 "v" (p2x input_b))

(setq contc (contacte_porta trl1 "h" (- PmVssDD N504 N601)))

(aillant_cont trl1 contc)

(setq contc (contacte_porta trl2 "h" (- PmVssDD N504 N601)))

(aillant_cont trl2 contc)

(fingers tra1 (list Pmvddeb (p2y cont_ab)) 0)

(fingers trb1 (list (p1y cont_ab) (p2y cont11)) 1)

(fingers tra2 (list Pmvddeb (p2y cont_ab2)) 0)

(fingers trb2 (list Pmvddeb (p2y cont_ab2)) 0)

(fingers trab (list (p1y cont_ab2) (p2y cont15)) 1)

(fingers trl1 (list (p2x cont12) (p1x cont13)) 0)

(fingers trl2 (list (p2x cont16) (p1x cont17)) 0)

(aillant (list

(list (p1x (porta tra1)) (p1y cont_tra21))

(list (p2x (porta tra1)) (p2y cont_tra21))))

(aillant (list

(list (p1x (porta trb2)) (p1y cont_tra22))

(list (p2x (porta trb2)) (p2y cont_tra22))))

```
(aillant (list  
  
(list (p1x input_b) (p1y cont_tra21))  
  
(list (p2x input_b) (p2y cont_tra22))))
```

```
(aillant (list  
  
(list (- (p2x cont_tra22) N501) (+ (p2y (aillant_tr tra2)) N901))  
  
(list (p2x cont_tra22) (p2y cont_tra22))))
```

```
(aillant_intersec cont11 input_b)
```

```
(aillant_io input_a)  
(aillant_io input_b)  
(aillant_io output)
```

