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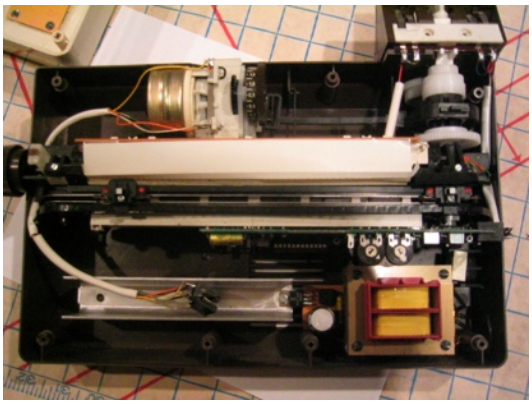
Repair & Service Manual for SIT/SUPERBA Light Scanning Selection Box Model Knitting Machines: S48, D120, W15602, Singer 22331, 2340.

This includes information on how to replace the Light Scanning Belt.



SUMMARY

G E N E R A L I T I E S

1.1. Remarks :

- Do not unsolder any component while printed circuit is under power
- Hold printed circuit only by the edges
- Only touch microprocessor COP 420 by its insulator

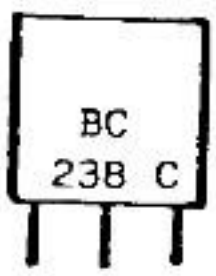
1.2. Measurements :

- Measurements are made with a multimeter Metrix type 462 E.

How to connect the Metrix :

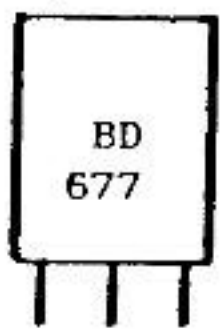
- (-) of metrix is connected onto (-) of Jack plug
- all the measurements are read on 30 VDC scale

1.3. Connection :



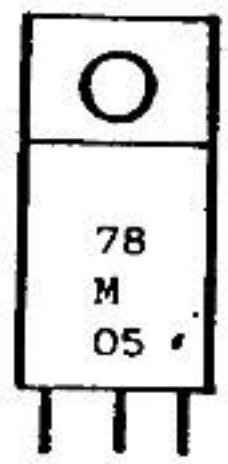
c b e

Transistor



e c b

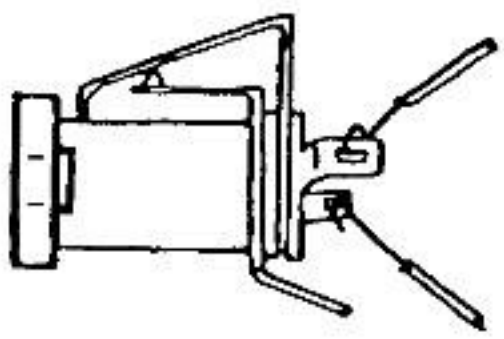
Power transistor



in gnd out

Regulator

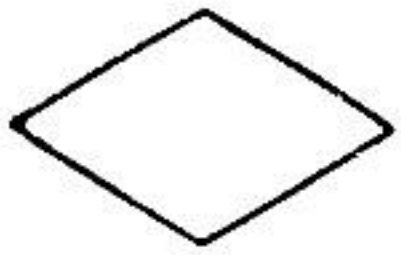
Pin... is for legs of microprocessor COP or of OP amplificator.
Number 1 is on the top left hand side



1.4. Explanation of chart symbols :

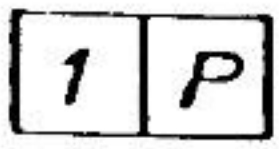
Indicates the beginning of a series of measurements

Indicates an operation to be carried out

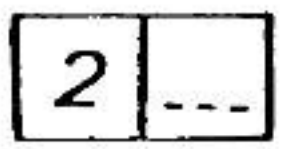


Measurement to be taken at a given point
Involves a decision

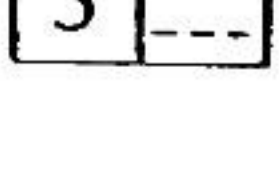
Replace the indicated component



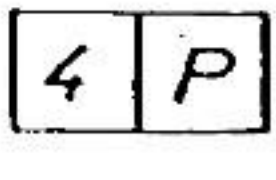
Turn cursor of mentioned component in middle position



Short-circuit mentioned component



Suppress short-circuit on mentioned component



Turn cursor of mentioned potentiometer counterclockwise to the end (potentiometer seen outside of the circuit)

REPAIR OF MATRIX PRINTED CIRCUIT

7.0. How to proceed :

a) Make a full visual checking of the printed circuit to be tested and replace the defective components (burned resistances, unsoldered wirings...)

b) Check printed circuit on simulator :

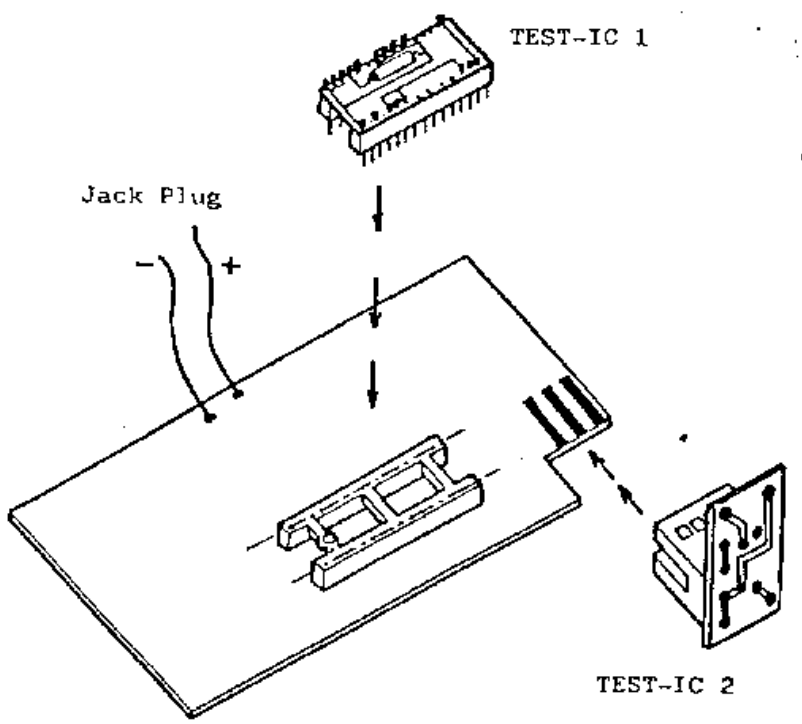
- Disconnect microprocessor COP

- Plug test-IC1 onto COP bracket in the right way, and test-IC2 onto the 6-contacts connector.

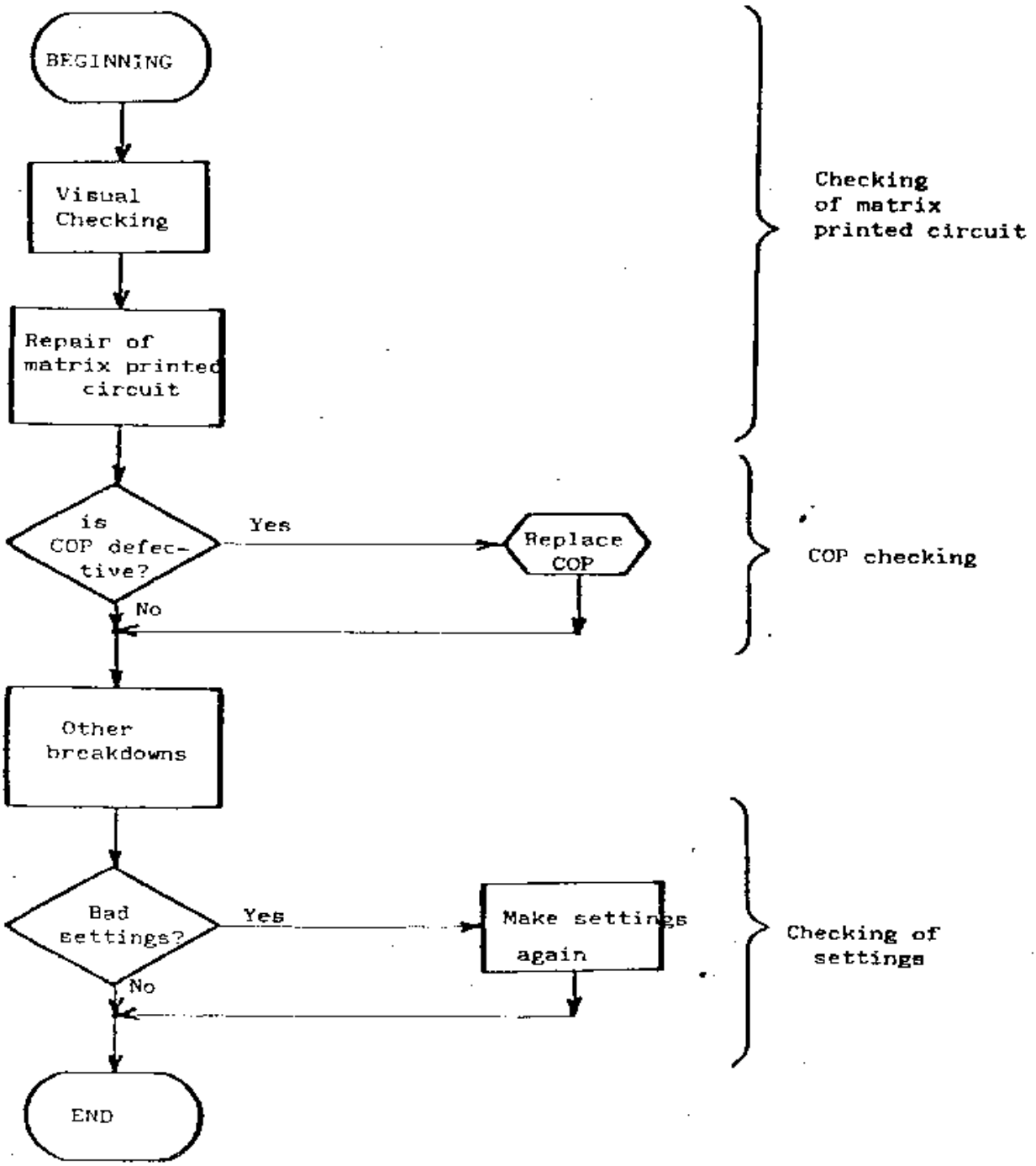
- Connect a 15V supply onto the Jack plug, and start to check printed circuit following the chart instructions.

c) Reconnect COP onto the printed circuit and don't disconnect test-IC2
Plug the supply.
If the same defect is still appearing, make sure that COP is not defective. To this end, connect it onto a printed circuit which is in good order. If the same defect appears, you have to replace it.

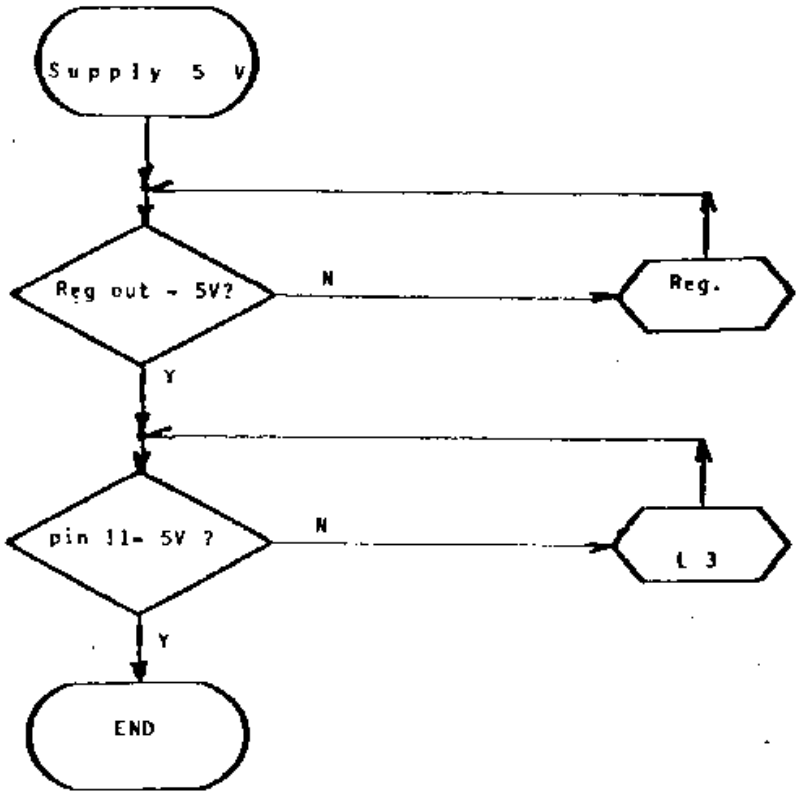
d) Check the settings with test-program



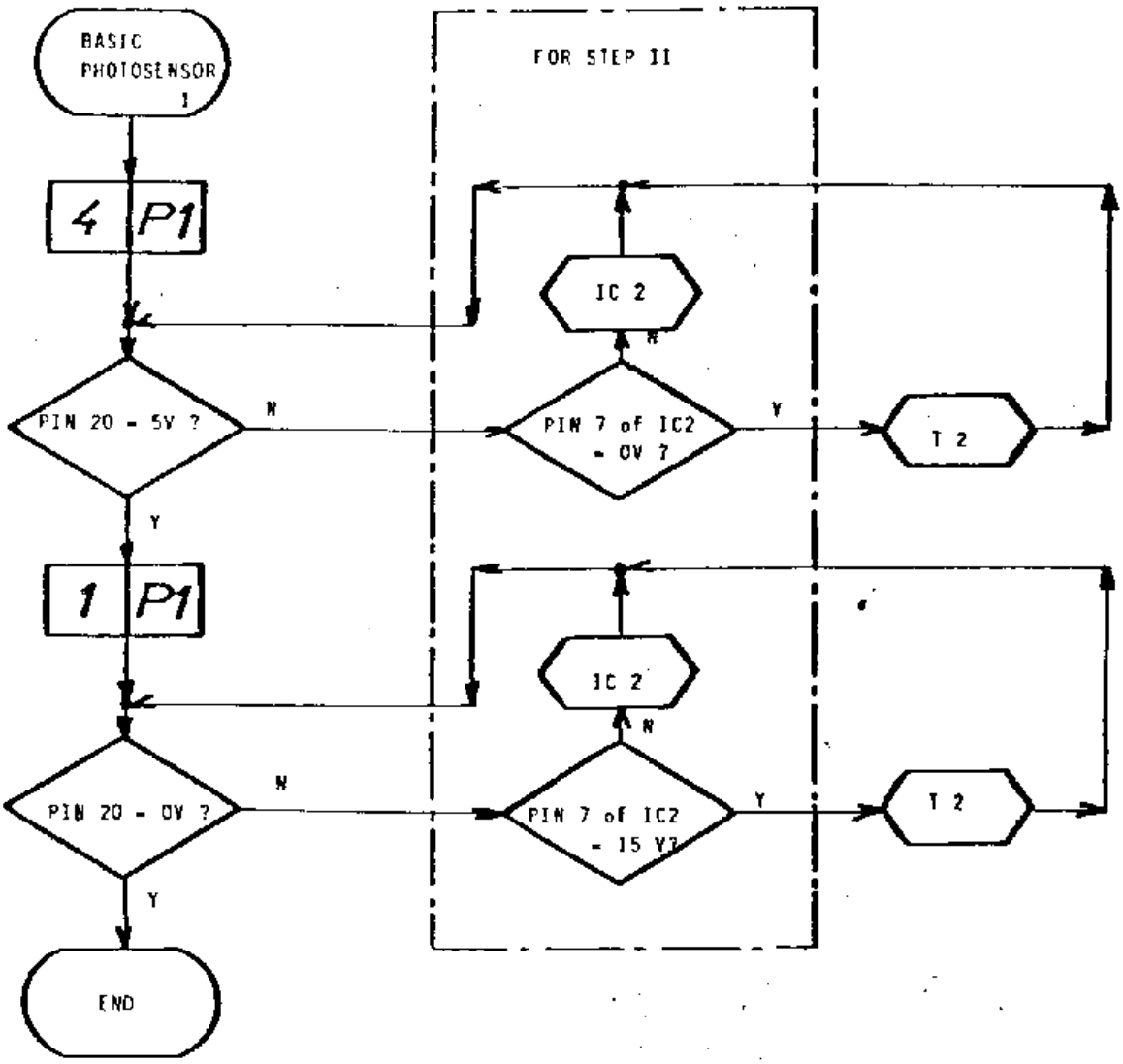
2.1. SYNOPTICAL TABLE OF REPAIR OPERATIONS :



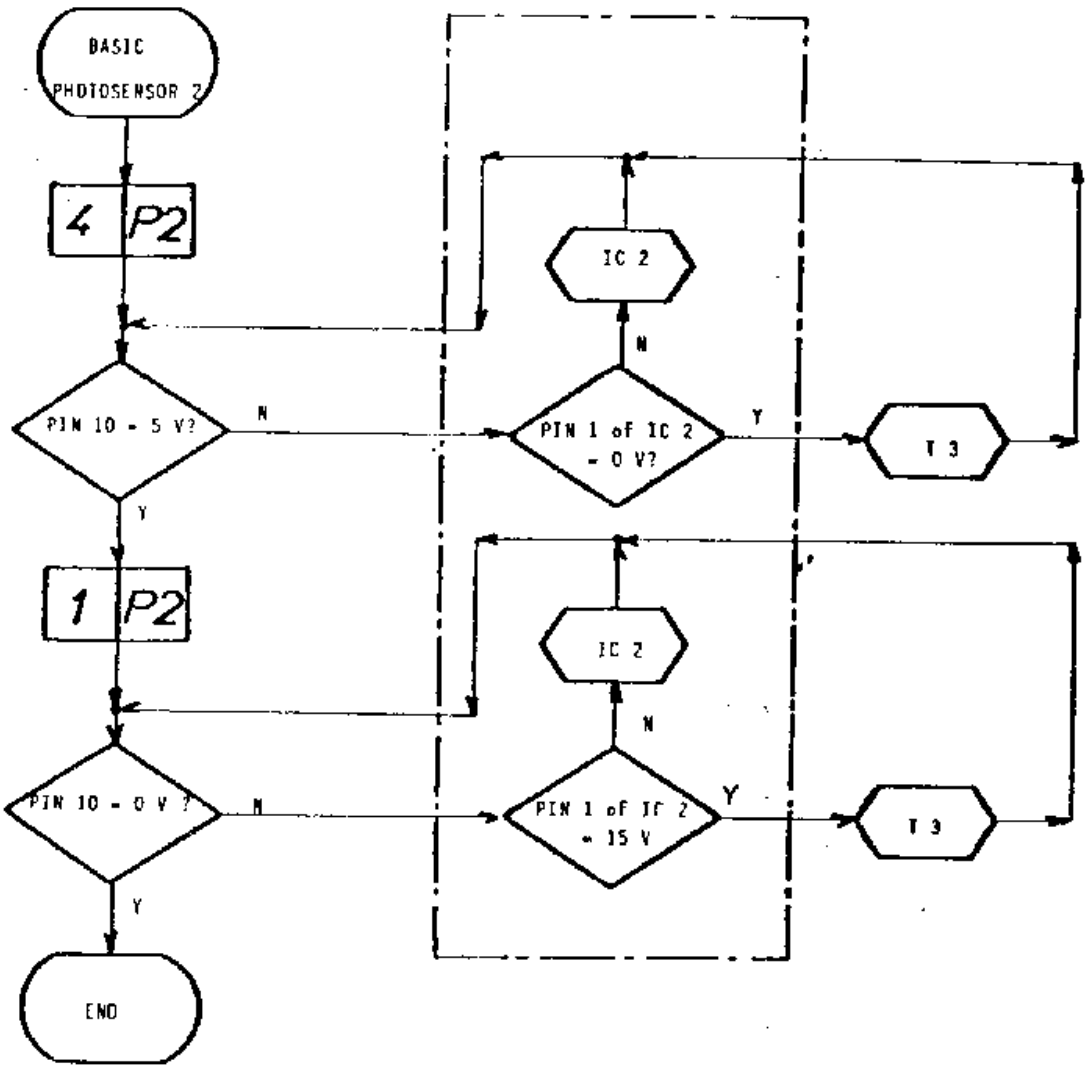
7.2. REPAIR OF 5 V SUPPLY :



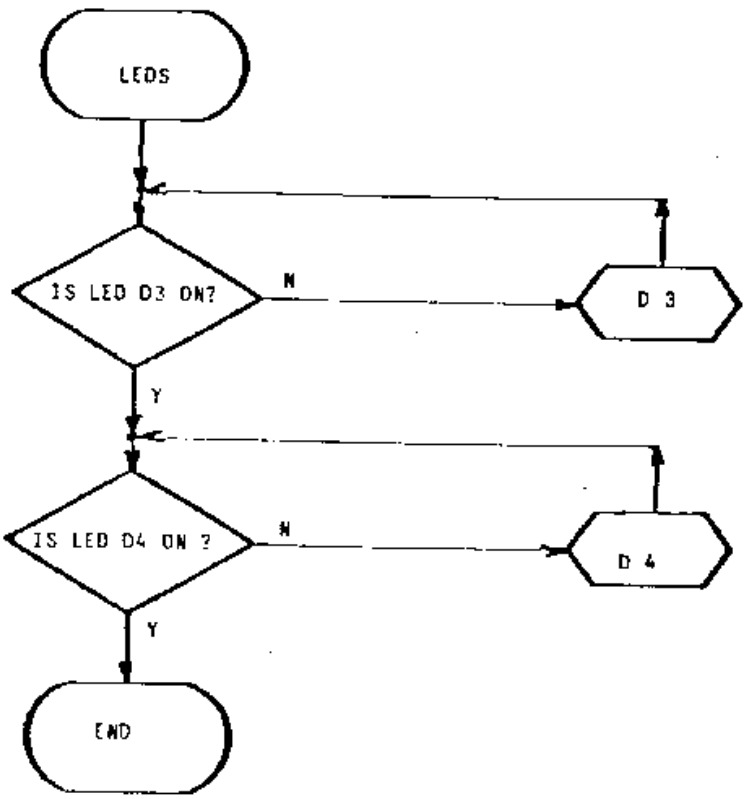
7.3. REPAIR OF BASIC PHOTOSENSOR 1 :



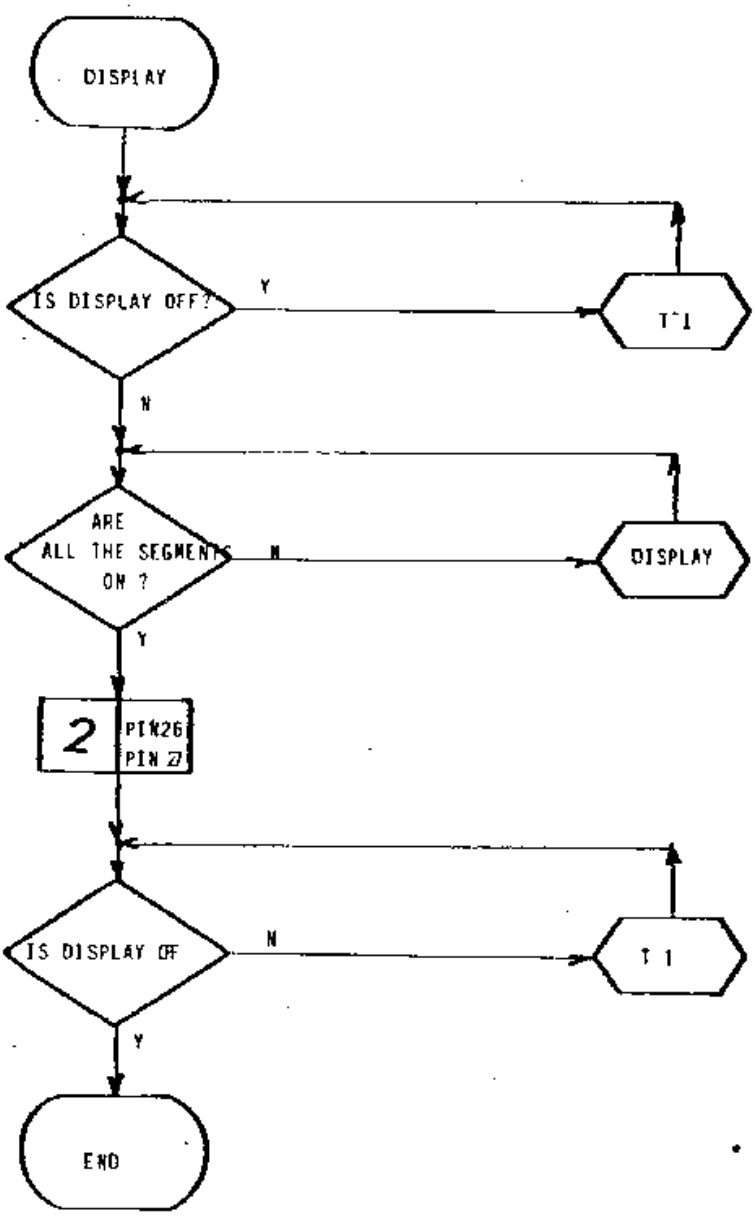
4. REPAIR OF BASIC PHOTOSENSOR 2 :



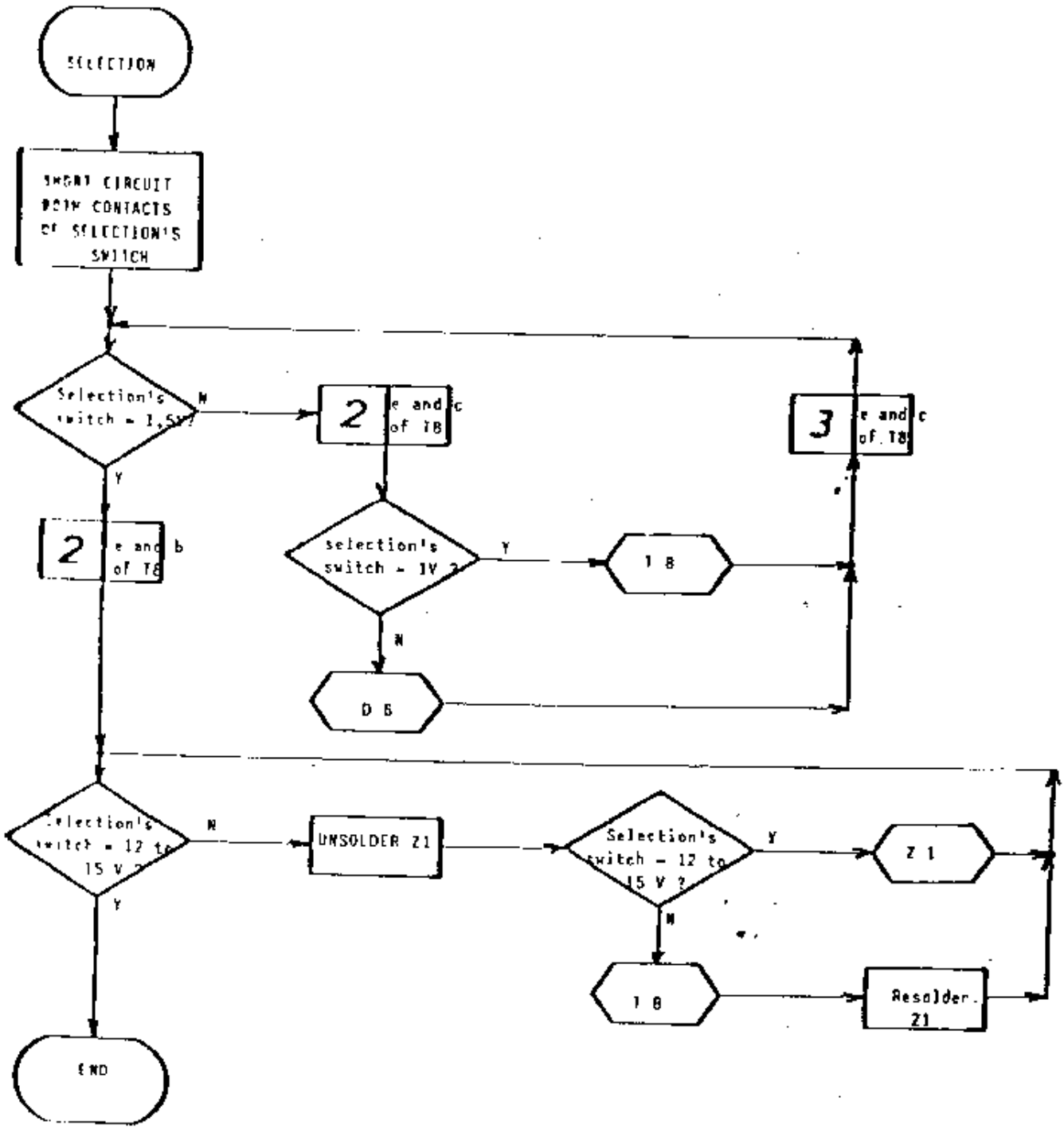
5. REPAIR OF LEDS :



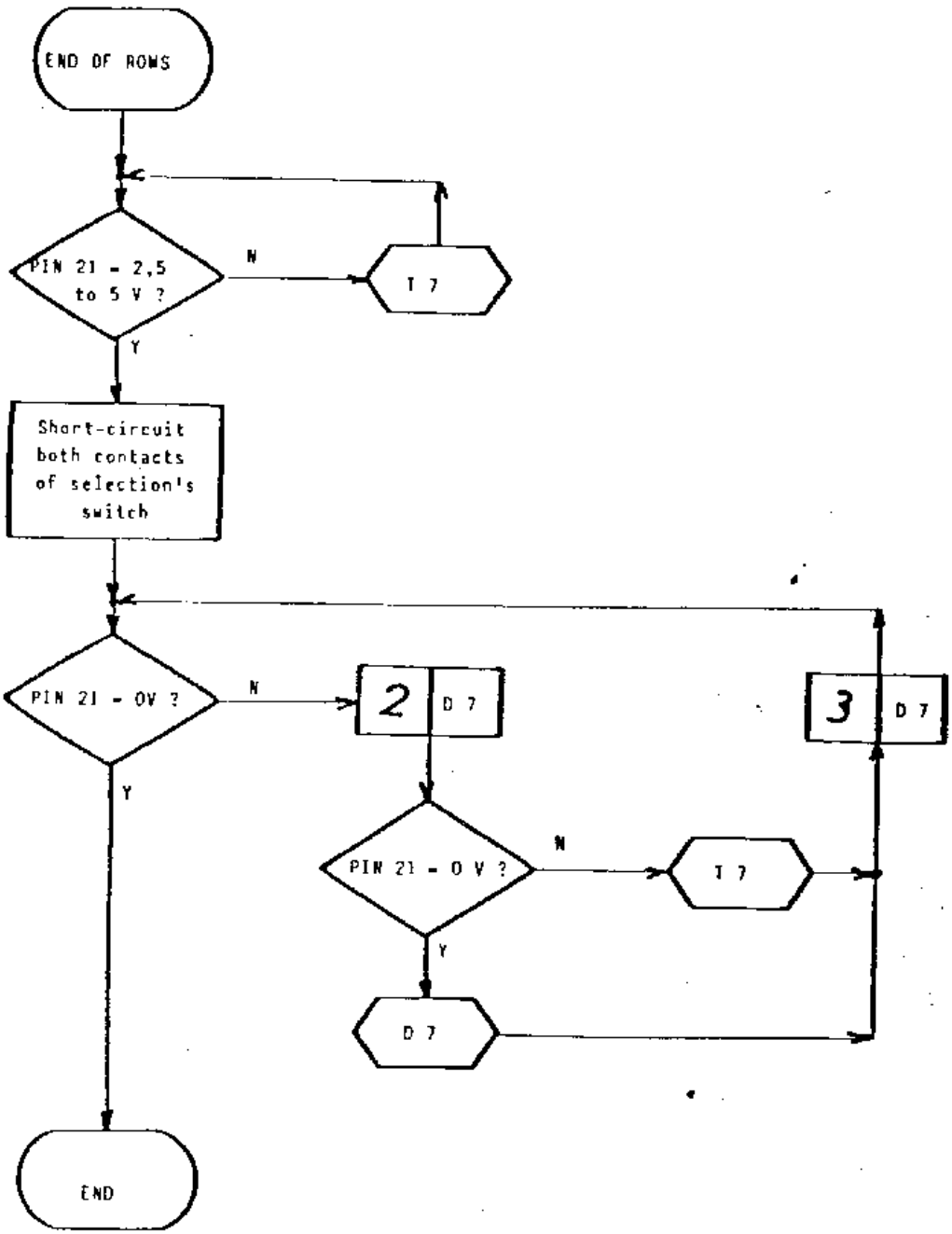
7.6. REPAIR OF DISPLAY :



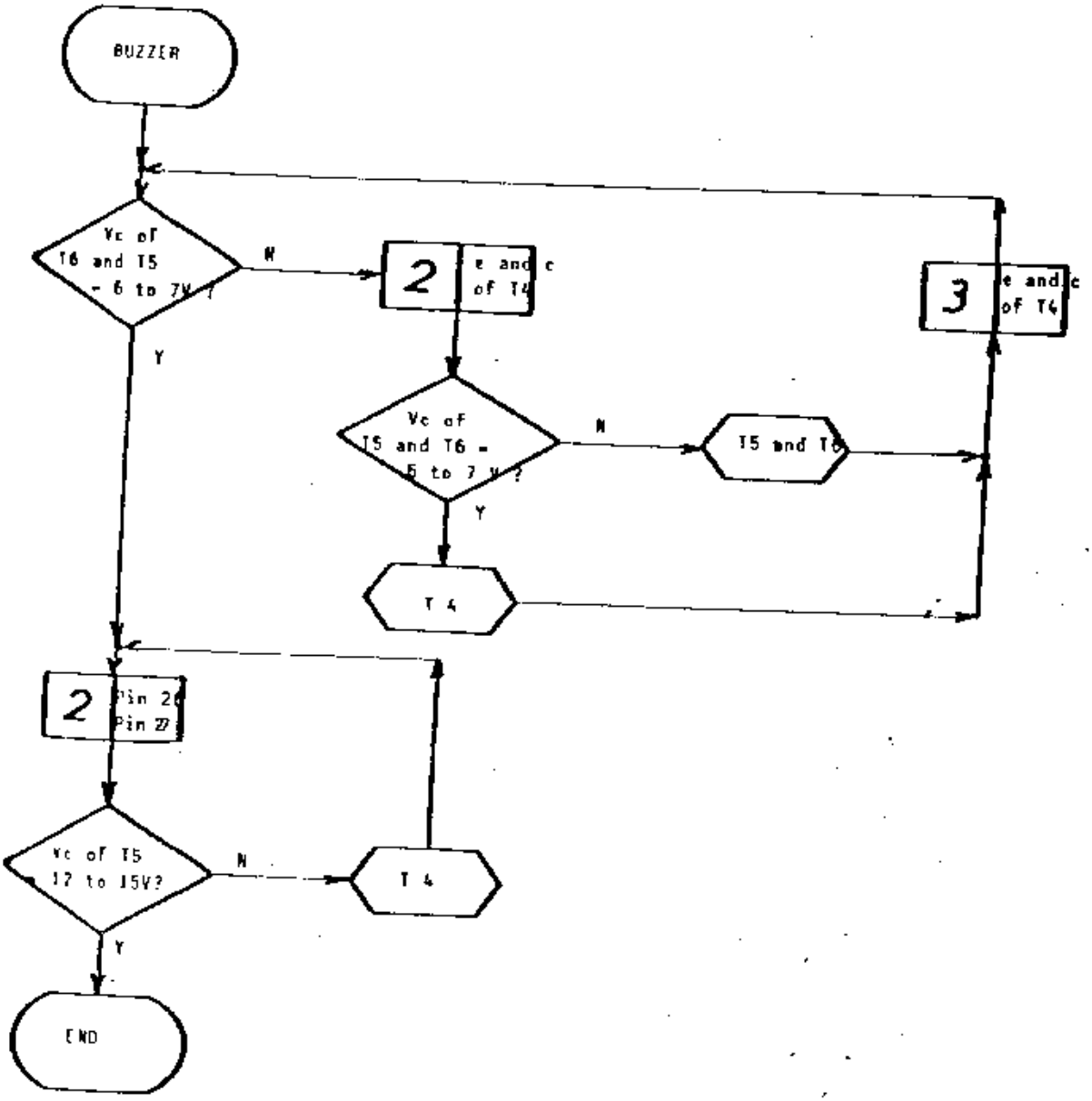
7. REPAIR OF SELECTION :



: ▮ REPAIR OF END OF ROWS :



9. REPAIR OF BUZZER :



10. OTHER BREAKDOWNS :

Matrix printed circuit works properly, COP is not defective but :

Breakdown	Reason
- Buzzer doesn't sound	See transducer's contacts
- COP doesn't work	Check if Vpin 3 = 1 V If not, replace C1
- A key doesn't work	Check keys contacts
- Selection doesn't work properly	Check basic photosensors and their setting
- You can't program the matrix	Check flexible printed circuit

2.11. SETTING OF THE PHOTOSENSORS :

1) Test-program :

The microprocessor COP 420 includes a test-program which allows to make a correct setting of the basic photosensors, thanks to both potentiometer P1 and P2.
The settings are made with printed circuit set in the box and box fixed on the knitting machine or connected with the connection-cord.
To have access to the test-program, press key "F" until F appears.
Then, press key "+1" and key "cancellation" together.
The indicator is off, we are in the test-programm.

2) Setting of the photosensors :

The setting of the photosensors is made introducing a screw-driver in one of the two holes foreseen in the right side of the end cover.

We choose the sensor to be set by means of the reverser :

- Reverser in lower position : setting of P1 : upper hole
- Reverser in upper position : setting of P2 : lower hole

Move the cursor slowly and regularly, the buzzer must emit a series of impulses.

The impulses density is increased or lowered by operating the potentiometer.

Potentiometer must be set on the position in which a maximum of density is obtained.

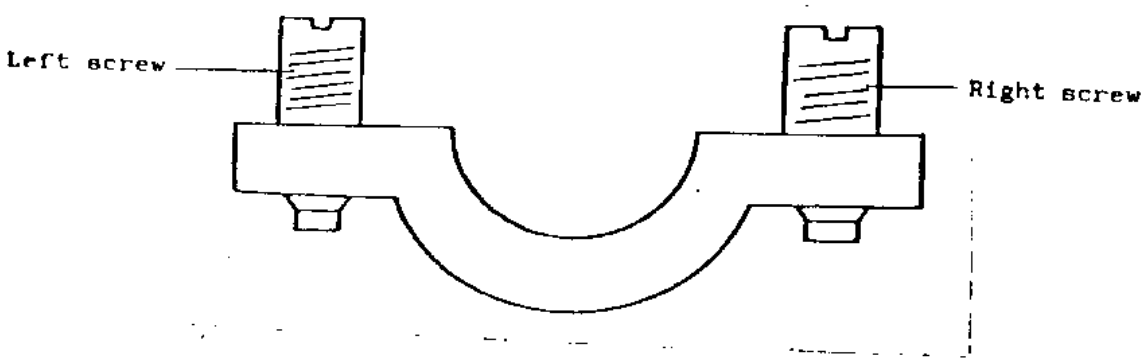
After having set the first potentiometer properly, set the second potentiometer.

To shift to the knitting function, switch off the selection box and switch it on again (operate the "on/off" switch)

3) Setting of both screws on the knitting machine :

The setting of the two potentiometers must be done before to set the 2 screws.

- Take off the right end cover
- Plug test-connection cord and use "birdeyes" function by pressing key F



Each screw must be set separately

- When knitting from left to right, set right screw
- When knitting from right to left, set left screw

First screw : always knit from left to right, for example, and always set the same screw (here right screw)

- Tighten the screw (1/2 turn) until you have selection's mistake when knitting slowly
- When you have mistakes, loosen the same screw, 1/4 per 1/4 until you supress the mistake. Always knit slowly.
- When mistakes are supressed, loosen this same screw of a complete turn (safety turn)

Check selection when knitting slowly and pulling cursor : you must get mistakes

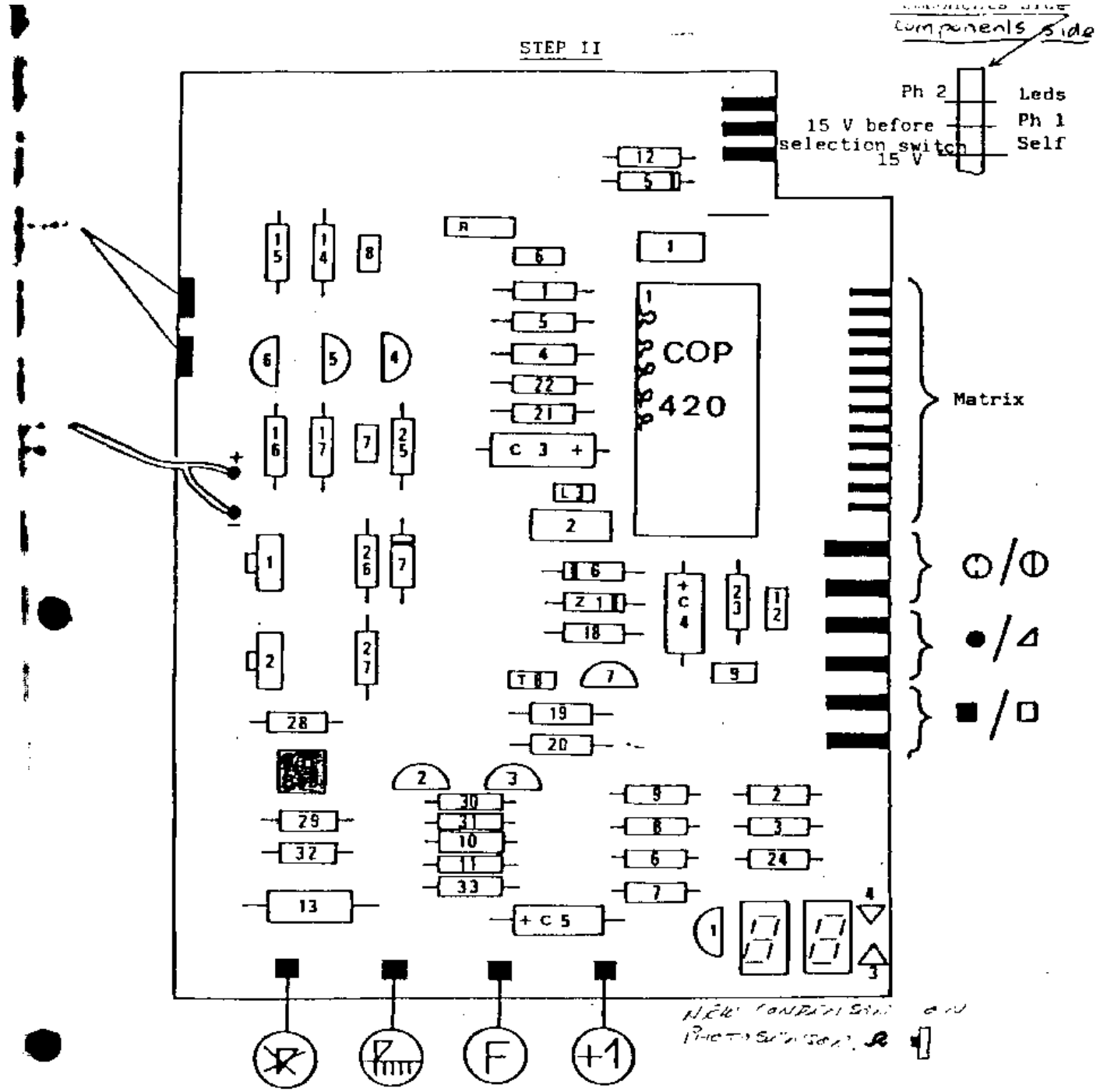
Check selection when knitting fast (fast speed of motor drive) : you must not have mistakes

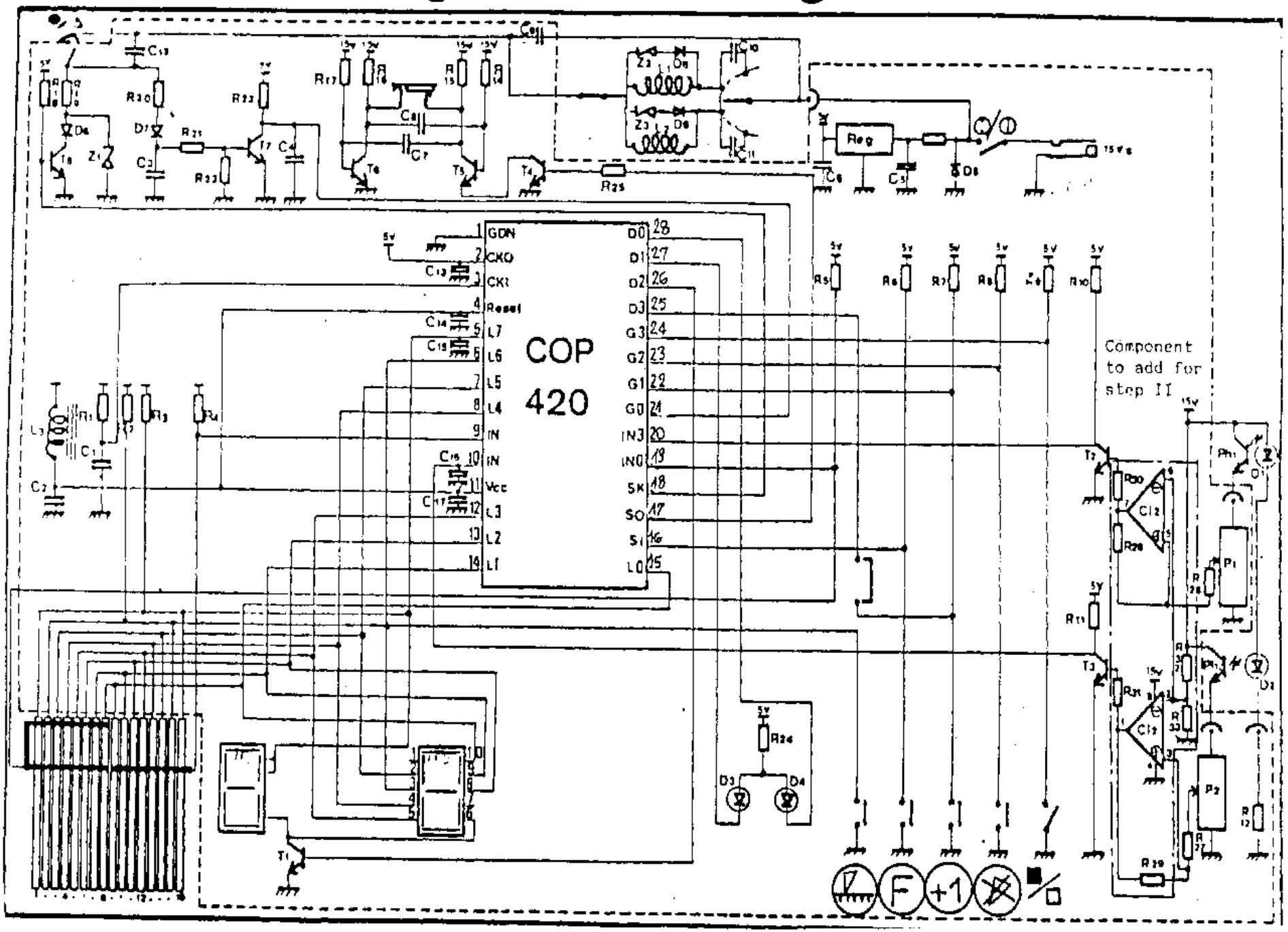
Second screw : set it in the same way
Knit from right to left and always set left screw.

Reference	Designation
7 191	Resistance 5,6 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
7 197	Resistance 470 Ω 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 842	Resistance 1 kΩ 1/4 W
7 198	Resistance 47 Ω 2 W
8 466	Resistance 100 kΩ 1/4 W
8 468	Resistance 2,2 kΩ 1/4 W
8 468	Resistance 2,2 kΩ 1/4 W
8 466	Resistance 100 kΩ 1/4 W
8 468	Resistance 2,2 kΩ 1/4 W
8 725	Resistance 2,2 Ω 1/2 W
8 468	Resistance 2,2 kΩ 1/4 W
8 468	Resistance 2,2 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
7 199	Resistance 220 Ω 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 466	Resistance 100 kΩ 1/4 W
8 466	Resistance 100 kΩ 1/4 W
7 010	Resistance 470 kΩ 1/4 W
7 010	Resistance 470 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
7 059	Resistance 39 kΩ 1/4 W
8 467	Resistance 10 kΩ 1/4 W
7 242	Potentiometer 6,8 kΩ
7 242	Potentiometer 6,8 kΩ
7 058	Condensor 2,5 % 200 pF
7 075	Chemical condensor 10 µF
7 075	Chemical condensor 10 µF
7 075	Chemical condensor 10 µF
8 938	Chemical condensor 1 µF
8 939	Condensor 0,1 µF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
7 036	Condensor 0,22 µF
7 036	Condensor 0,22 µF
7 036	Condensor 0,22 µF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 778	Condensor 10 nF
8 774	LED Diode CQY 41
8 774	LED Diode CQY 41
7 879	LED Diode triangular
7 879	LED Diode triangular
8 493	Diode 1 N 4148
8 775	Diode BA 157

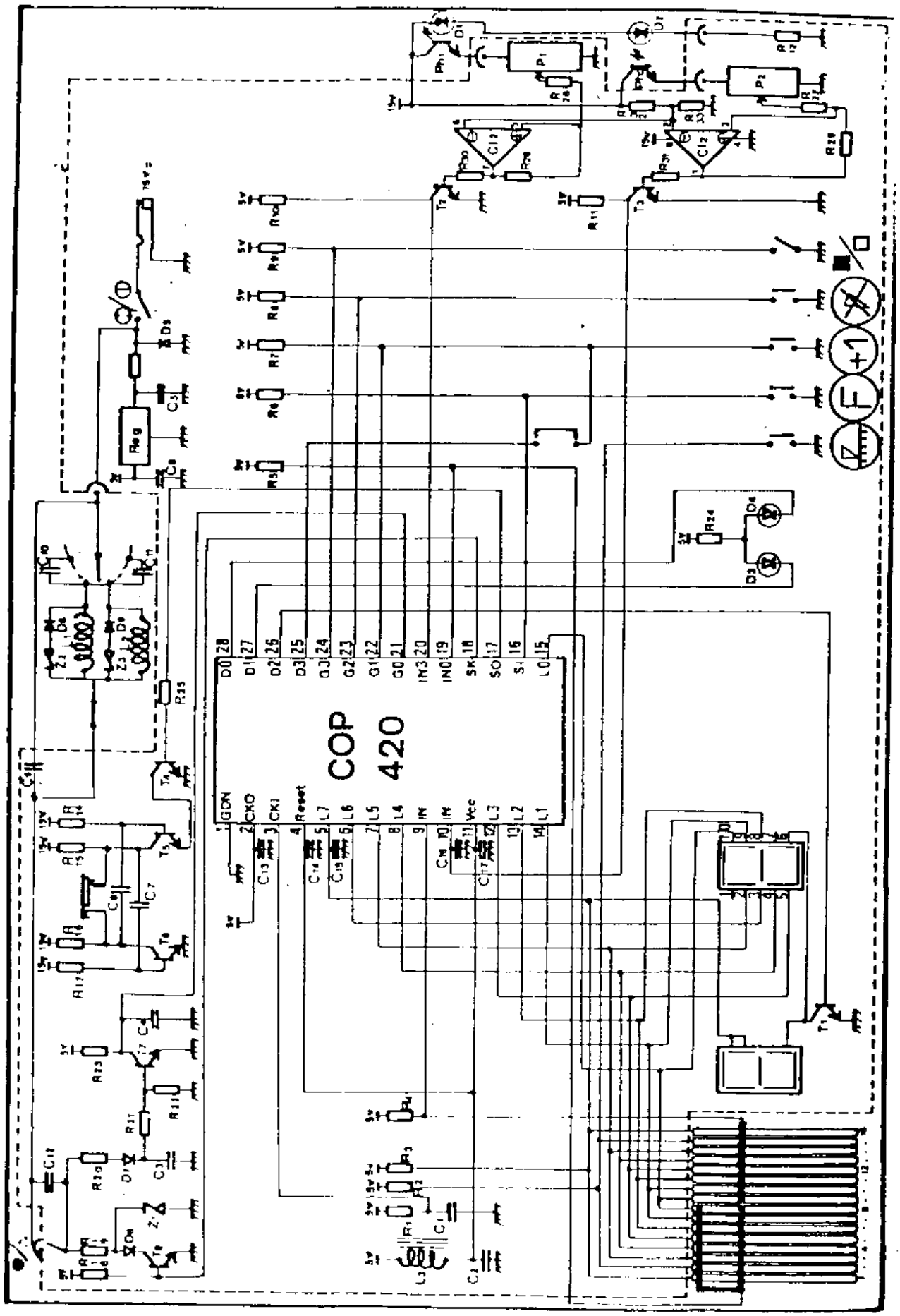
Reference	Designation
8 493	Diode 1 N 4148
8 493	Diode 1 N 4148
8 493	Diode 1 N 4148
8 884	Zener Diode 51 V
8 884	Zener Diode 51 V
8 884	Zener Diode 51 V
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 693	Transistor BC 238 C
8 946	Transistor BD 677
8 765	Phototransistor BPW 17
8 765	Phototransistor BPW 17
7 056	Transducer
7 395	COP 420 for After Sale Service (Assy)
7 187	COP 420
7 245	LM 358
7 188	Regulator 78 M 05
7 189	28 pins bracket
7 192	Jack plug + wiring assy
7 190	Connector 5 contacts assy
7 186	Basic photosensor (assy)
7 193	Supply 220 V - 15 V
7 196	Supply 240 V - 15 V
7 128	Flexible printed circuit
7 129	Double sided matrix printed circuit (assy)
7 184	Basic emitting printed circuit (assy)
7 185	Basic receving printed circuit (assy)
7 244	Single sided printed circuit for OP Amplificator (assy)
7 087	Self 470 µH
7 866	Indicator FND 357
7 866	Indicator FND 357

* The printed circuit is equiped either with IC 1, or with IC 1A


STEP II
Components side
Ph 2
Leds
15 V before selection switch
Ph 1
15 V
Self
COP 420
Matrix
Potentiometer
Resistance
Condensor
Polarized Condensor
Transistor
Power transistor
Regulator
Diode
Zener diode
Led
Self



ELECTRIC DIAGRAM



SUMMARY

G E N E R A L I T I E S

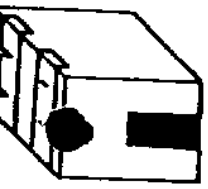
Measurements are made with a multimeter Metrix, type 462 E.

Repairs of COP main circuit can be carried out in three steps :

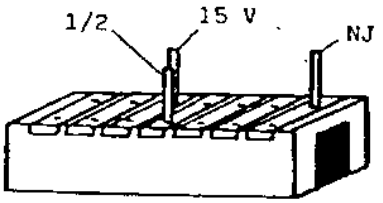
1) Repair of the main circuit on the simulator (without COP)

2) COP checking

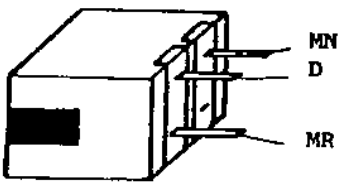
3) Checking of settings



ctor nr 1



Connector nr 2



Connector nr 3

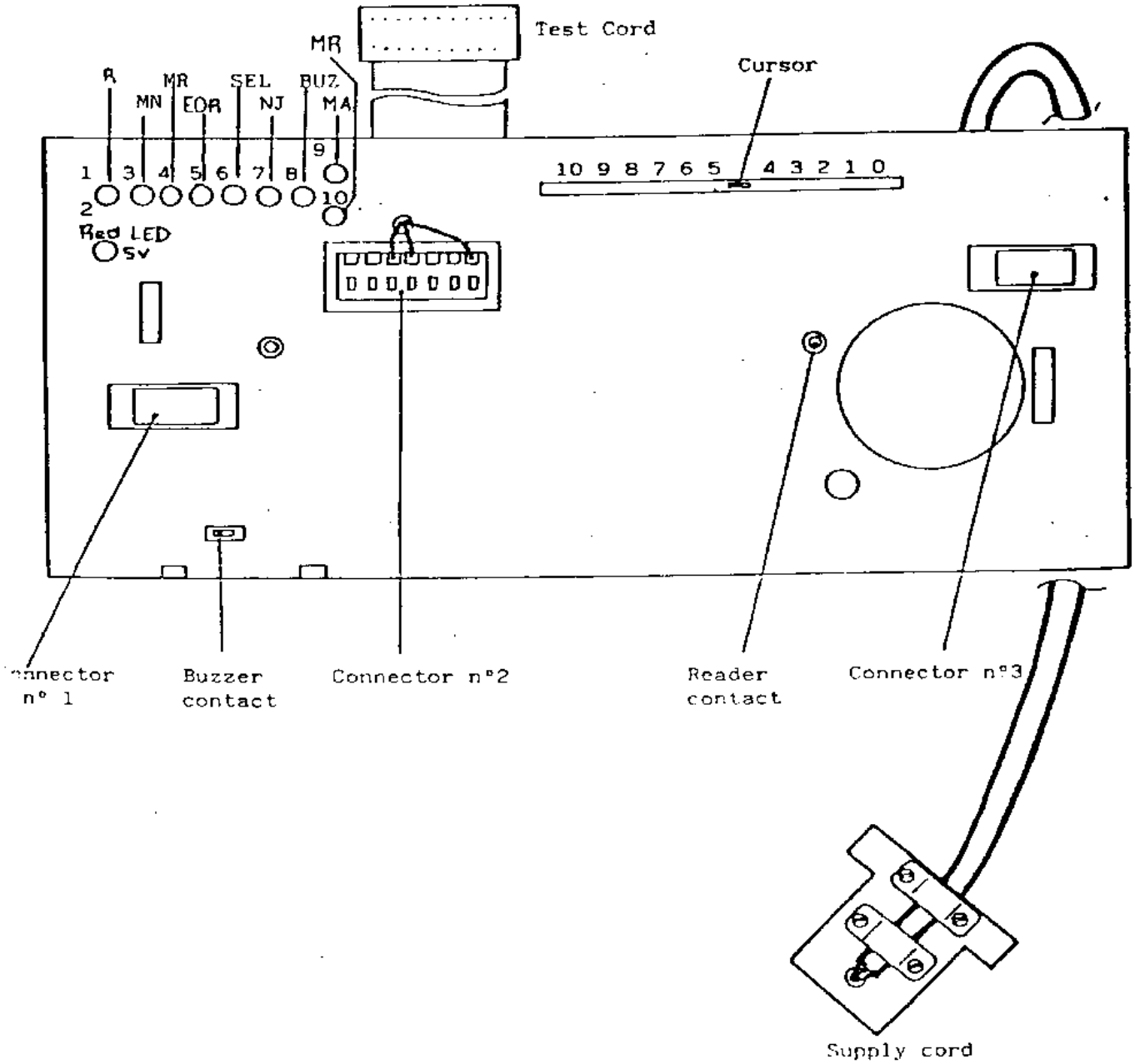
How to connect the metrix :

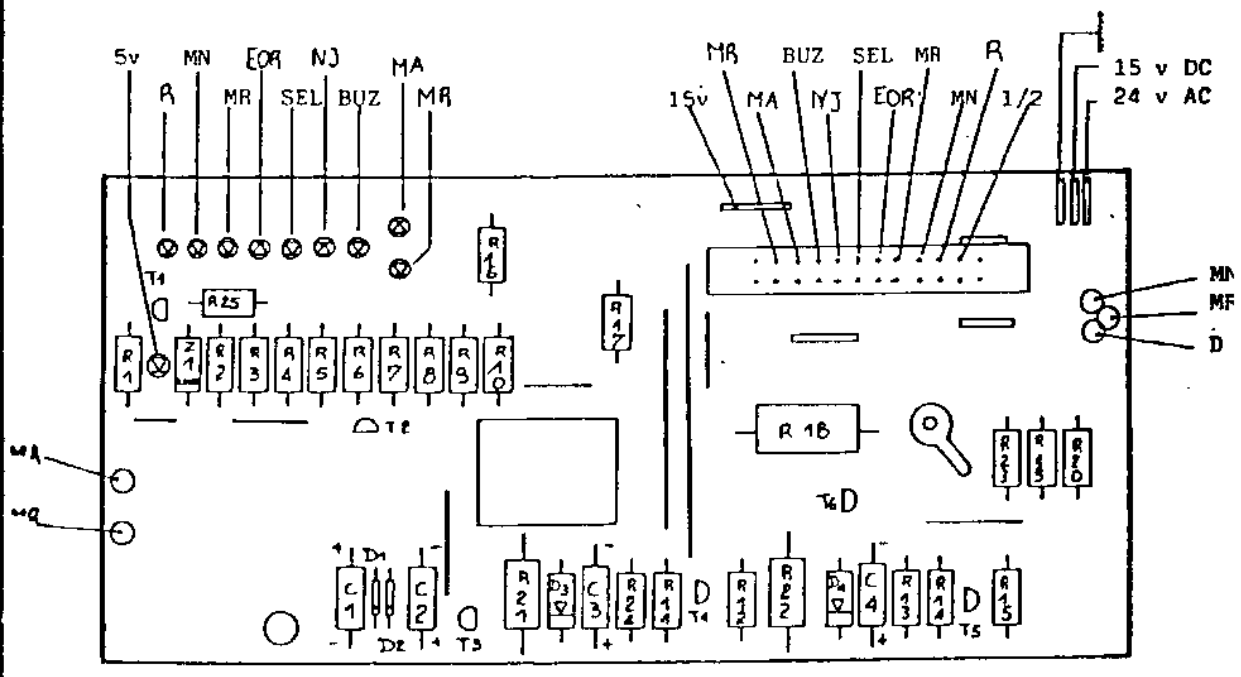
- The plug (-) of the metrix is connected onto the radiator (aluminium plate on which is tighten the regulator MC 7815)

- Measurements for direct tension (VDC) are read on the scale 30 V direct.

- Measurements for alternative tension (VAC) are read on the scale 30 V alternative.

ASSY VIEW OF SIMULATOR COP





ELECTRICAL DIAGRAM OF SIMULATOR PRINTED CIRCUIT COP

CHECKING OF COP PRINTED CIRCUIT ON THE SIMULATOR

Checking a COP printed circuit consists in testing each electronic subassembly.

The operating of a function is correct when a LED is on for the cursor position corresponding to this function and when it is off for the other cursor positions (apart from LED 5 V which remains on).

How to proceed :

1) Remove the microprocessor COP . from its bracket.
   Put the main circuit onto the simulator.
   Connect the connectors, the harness (24 pins) and the supply cord of the simulator with the supply assembly of an open box. Plug in the supply cord of the box on the mains.

2) a. Move the cursor into position 0 (on the right-hand side)

   - Red LED 5 V must be on
   - All the other LEDS must be off.

   b. Move the cursor into the next position. The corresponding LED (see chart hereunder) must be on.

3) If the operating conditions mentioned under 2) are not respected, there is a breakdown on the circuit. In this case, refer to page 7 "Repair of COP circuit

Cursor Position	Test	Corresponding LED	Repair	
0	Supply 5 V	5 V	Supply 5V	P.14
1	Birdseye	R	Birdseye	P.15
2	Reader	R	Reader R	P.16
3	Running of the card	MN	Running of card	P.18
4	Running of the card	MR	Running of card	P.19
5	End of row	EOR	End of row	P.20
6	Selection	SEL	Selection	P.21
7	Norwegian Jacquard	NJ	Norwegian Jacquard	P.22
8	Buzzer	BUZ	Buzzer	P.23
9	Motor advance	MA	Motor advance	P.24
10	Motor reversing	MR	Motor reversing	P.25

* Nota : LED 5 V is on for all the cursor positions.
MN is normal row advance of the program-card
MR is automatic return of the program-card.

COP MAIN CIRCUIT REPAIR

Remarks :

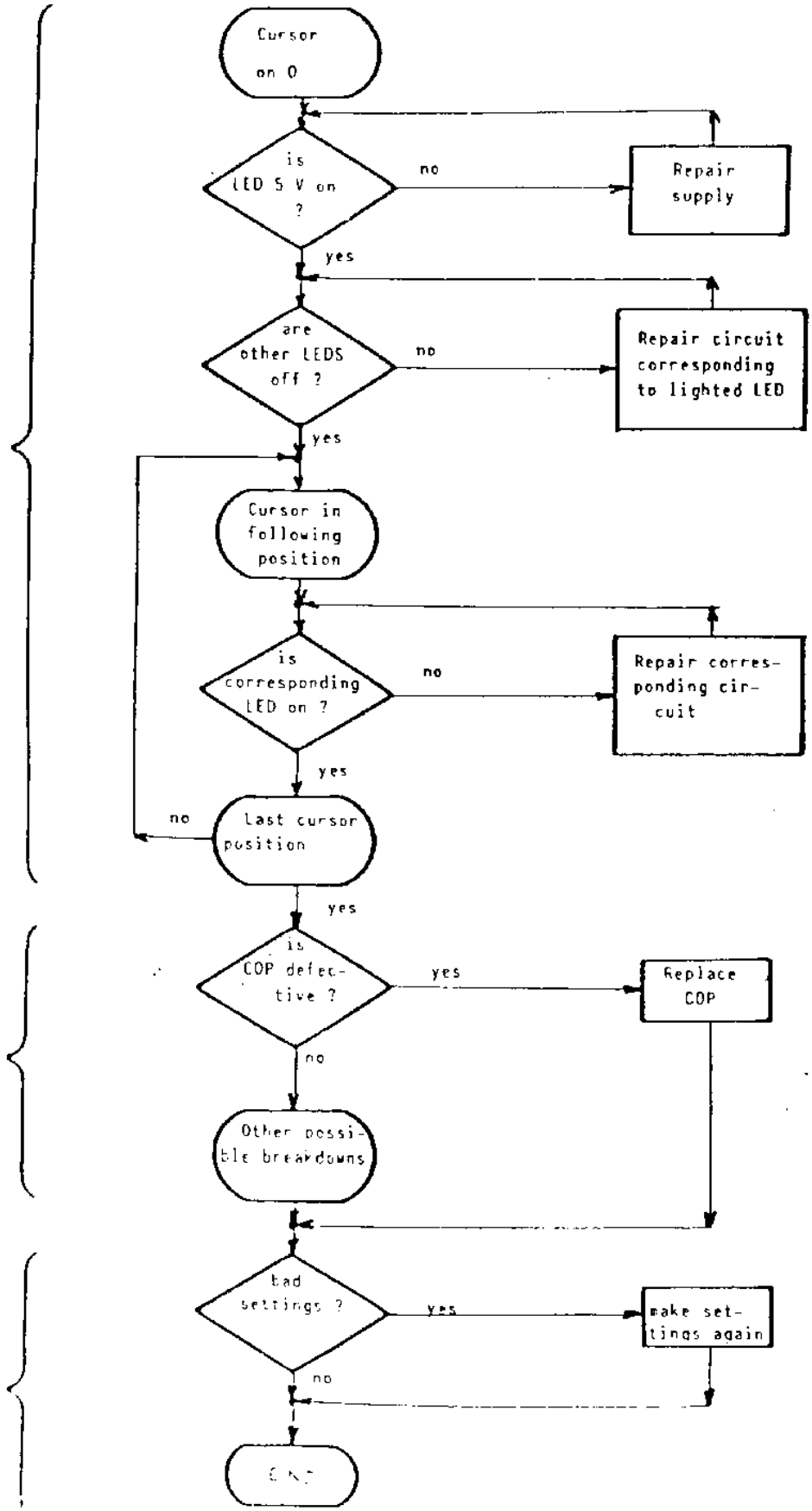
- Do not remove the printed circuit to be tested whilst simulator is under power.
- Do not unsolder any component whilst printed circuit is under power.
- Do not hold the printed circuit by the sides but by the edges.
- Only touch the connectors by their insulators.

How to repair :

1. Check that simulator works correctly
2. Make a full visual checking of the printed circuit to be tested and replace the defective components.
   For inst. : burned resistance.
3. Check the circuit on the simulator after having disconnected the COP

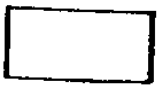
   If a LED is on when the cursor is in position 0, or if inversely the LED is not on during the test, repair the corresponding circuit (as indicated on the table).
4. Connect the COP again on the circuit and remount it in the selection box. If the same defect is still appearing, make sure that the COP is not defective. To this end, connect it onto a main printed circuit which is in good order. If the same defect appears, then the COP is out of order and has to be replaced.
5. Check the settings by means of the test programme p. 27 - 28 - 29.

SYNOPTIC TABLE OF REPAIR OPERATIONS

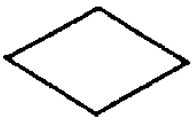


EXPLANATION OF CHART SYMBOLS

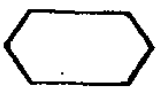
Indicates the beginning of a series of measurements.
Position the cursor.
Indicates the end of a series of measurements.



Indicates an operation to be carried out, a reference or a mark.

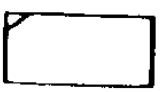


Measurement to be taken at a given point.
Involves a decision



Replace the mentioned component

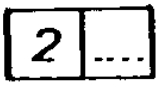
Unsolder pin of mentioned component



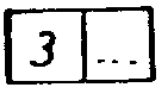
Resolder pin of mentioned component

EXPLANATION OF CHART INSTRUCTIONS

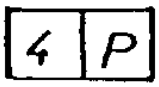
Turn the cursor of mentioned potentiometer in central position (potentiometer seen outside of the circuit).



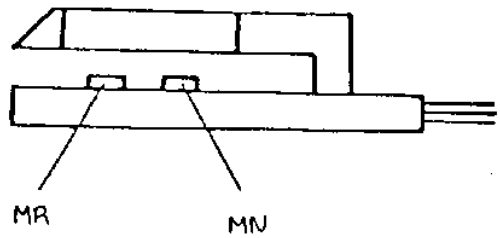
Short-circuit mentioned item.



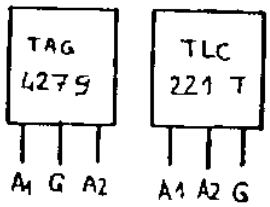
Suppress short-circuit on mentioned item



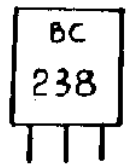
Turn the cursor of mentioned potentiometer anticlockwise to the end. (potentiometer seen outside of the circuit).



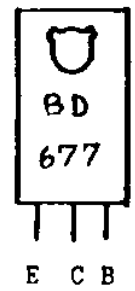
Regulator



Triac

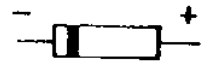


Transistor

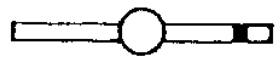


Transistor

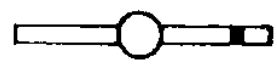
Zener



Diode



Photodiode

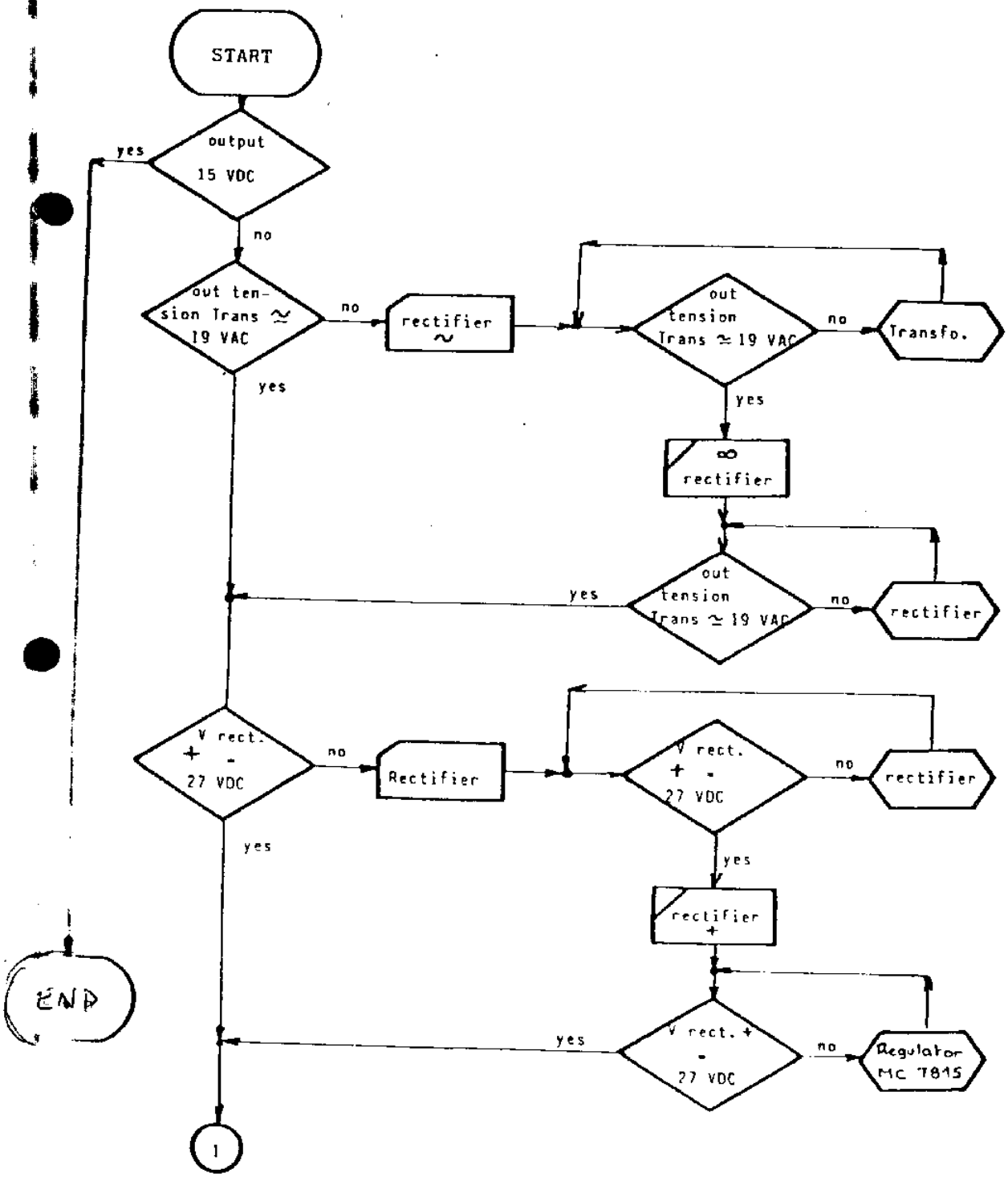


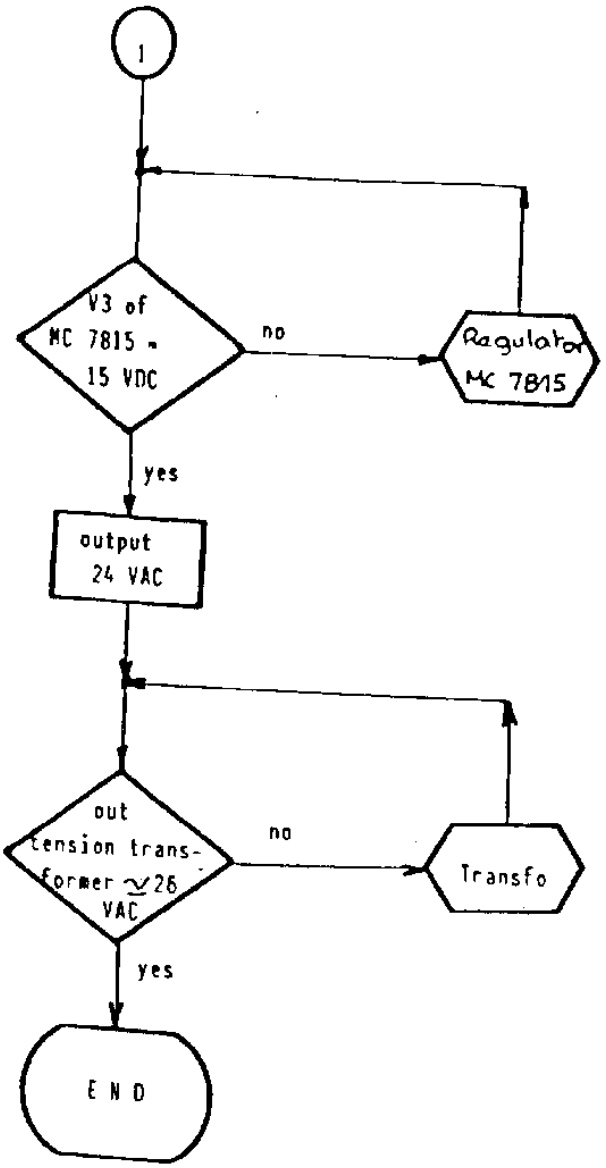
Phototransistor

Meaning of letters t, b, l, r according to components items :

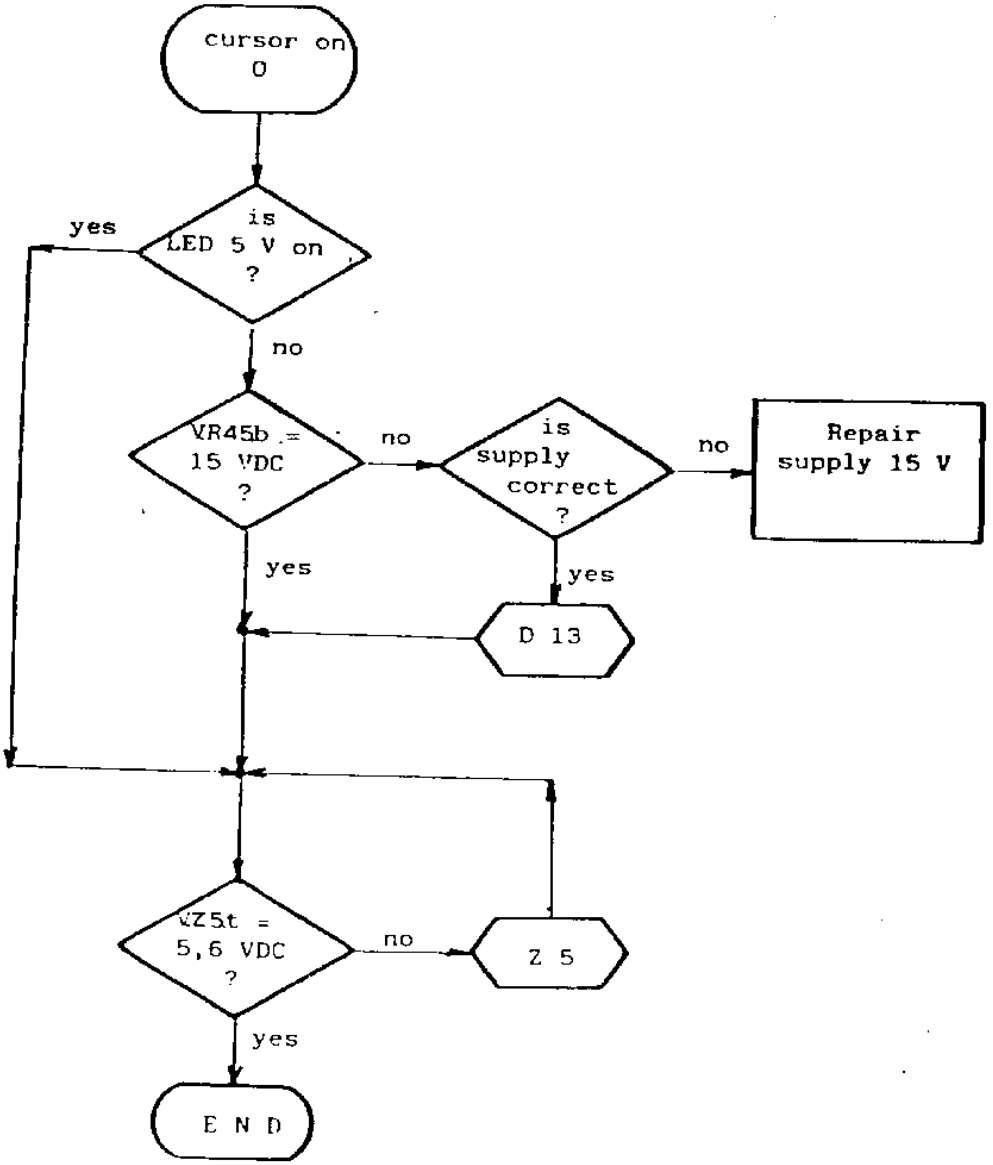
t : top pin
b : bottom pin
l : left pin
r : right pin

SUPPLY REPAIR

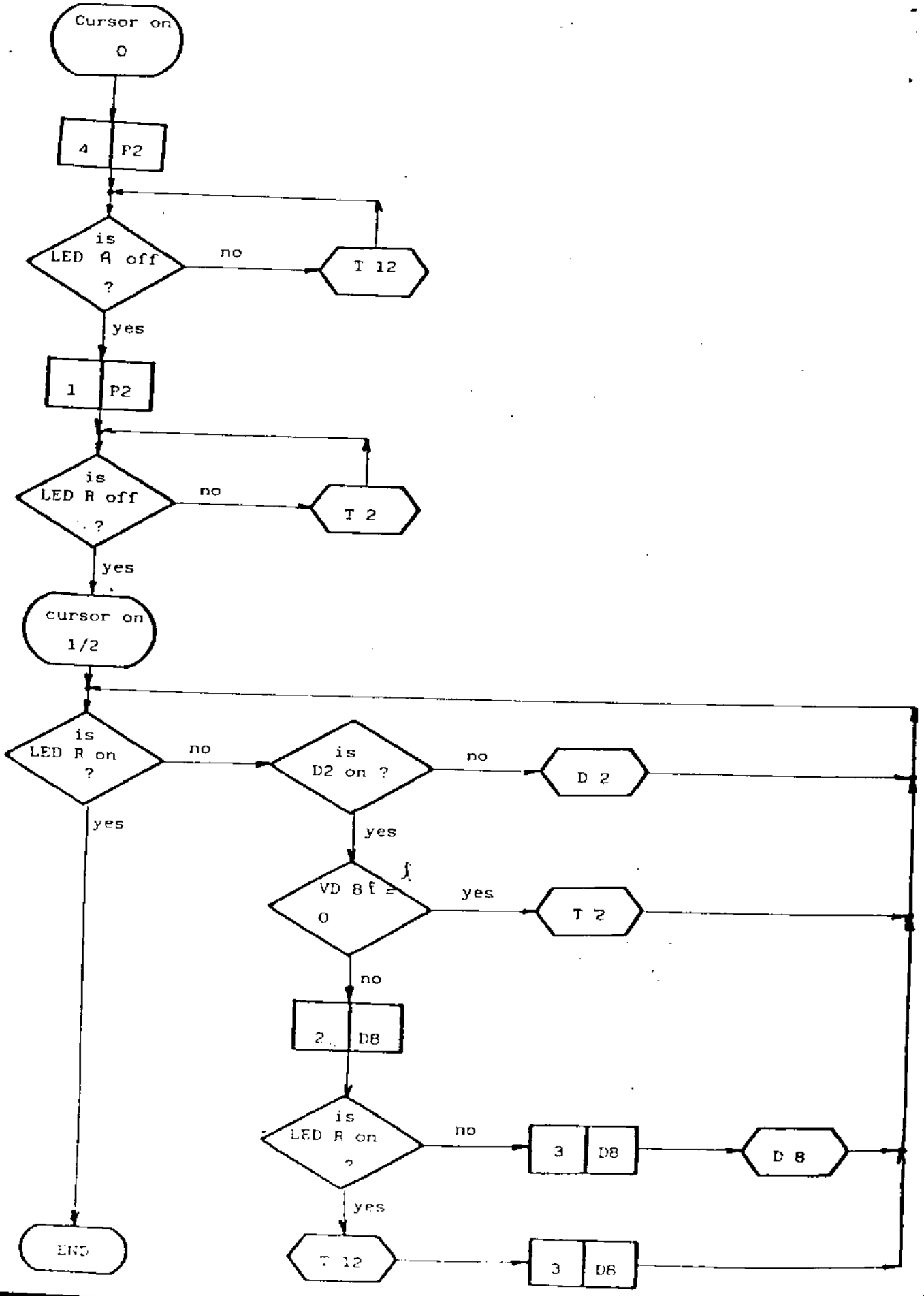



1
V3 of MC 7815 = 15 VDC
no
Regulator MC 7815
yes
output 24 VAC
out tension transformer ~26 VAC
no
Transfo
yes
E N D

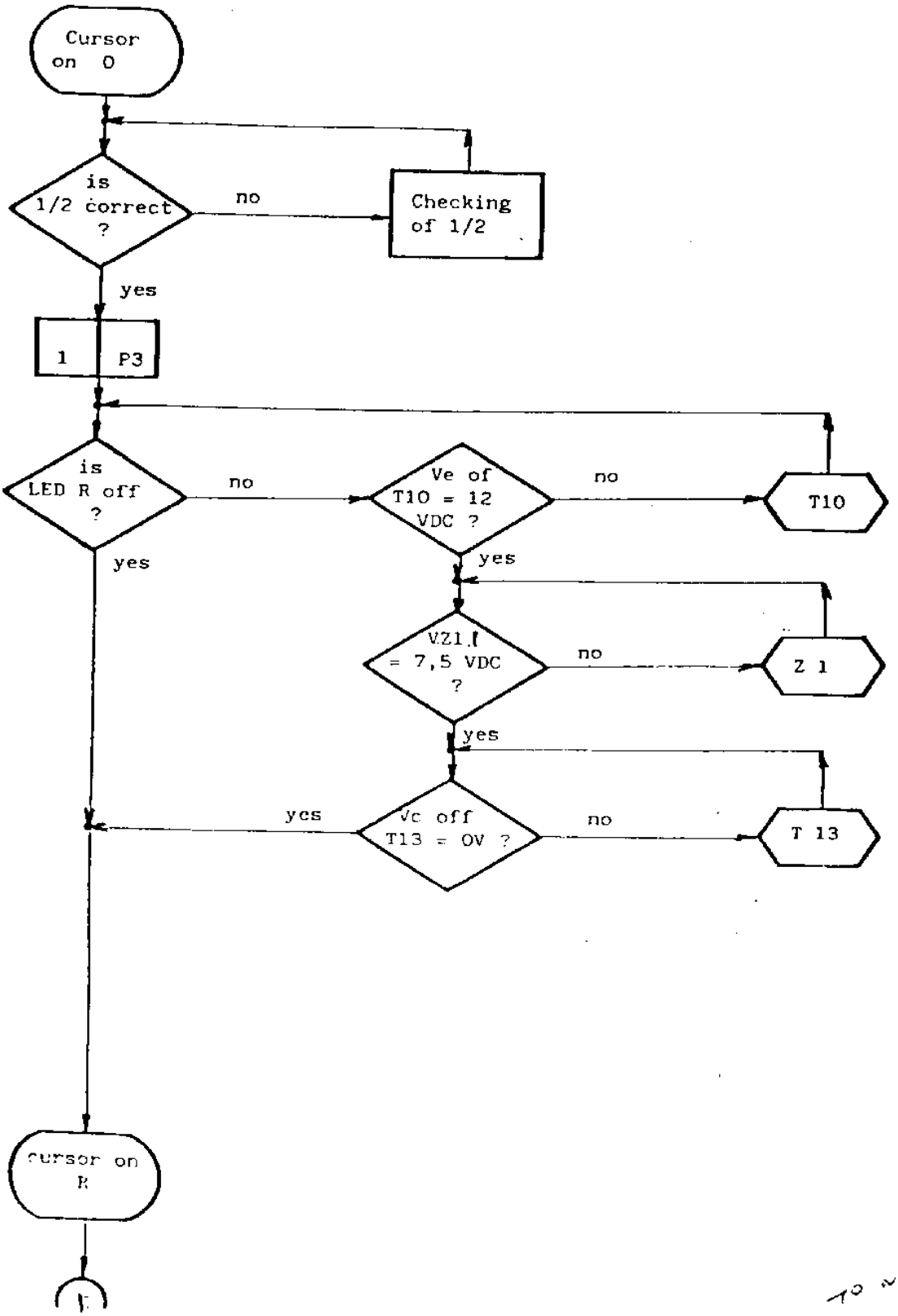
0 - CHECKING OF SUPPLY 5 V



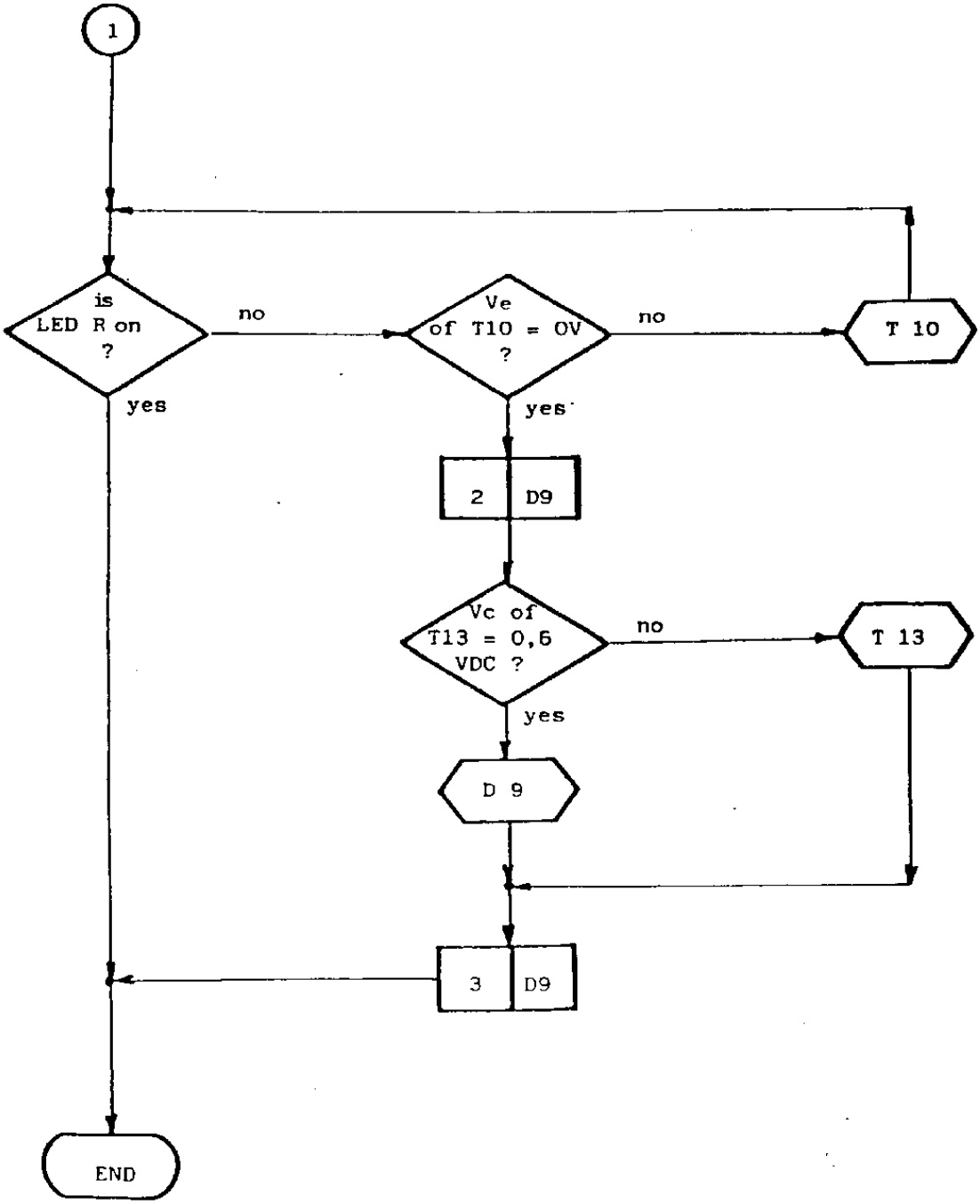
1 - CHECKING OF EVERY OTHER NEEDLE SELECTION 1/2



2 - READING CHECKING

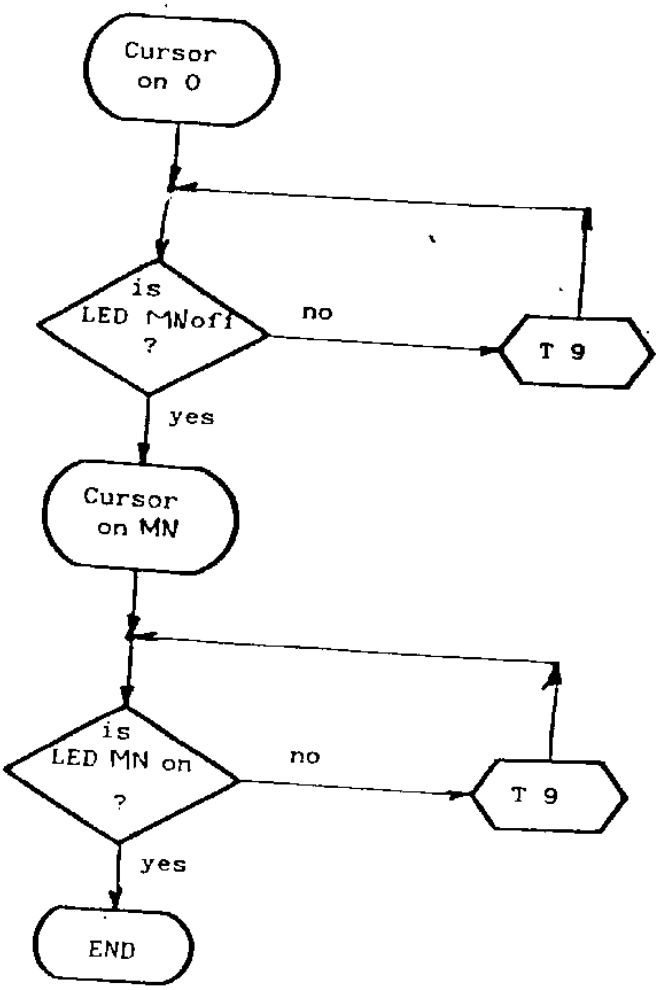


TO NEXT PAGE


1
is LED R on ?
no
Ve of T10 = OV ?
no
T 10
yes
yes
2 D9
Vc of T13 = 0,6 VDC ?
no
T 13
yes
D 9
3 D9
END

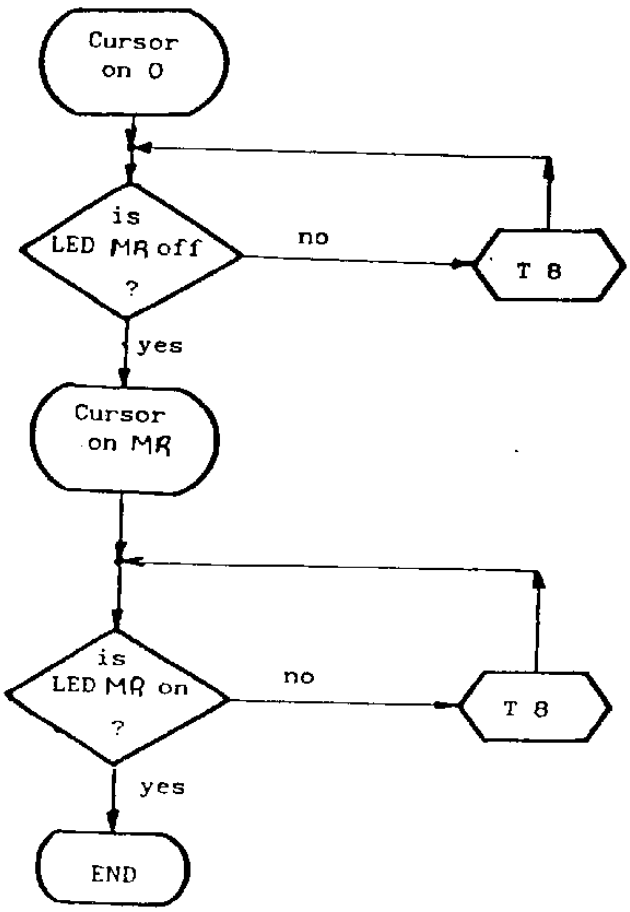
3 - CHECKING

OF THE RUNNING OF THE CARD (MN)

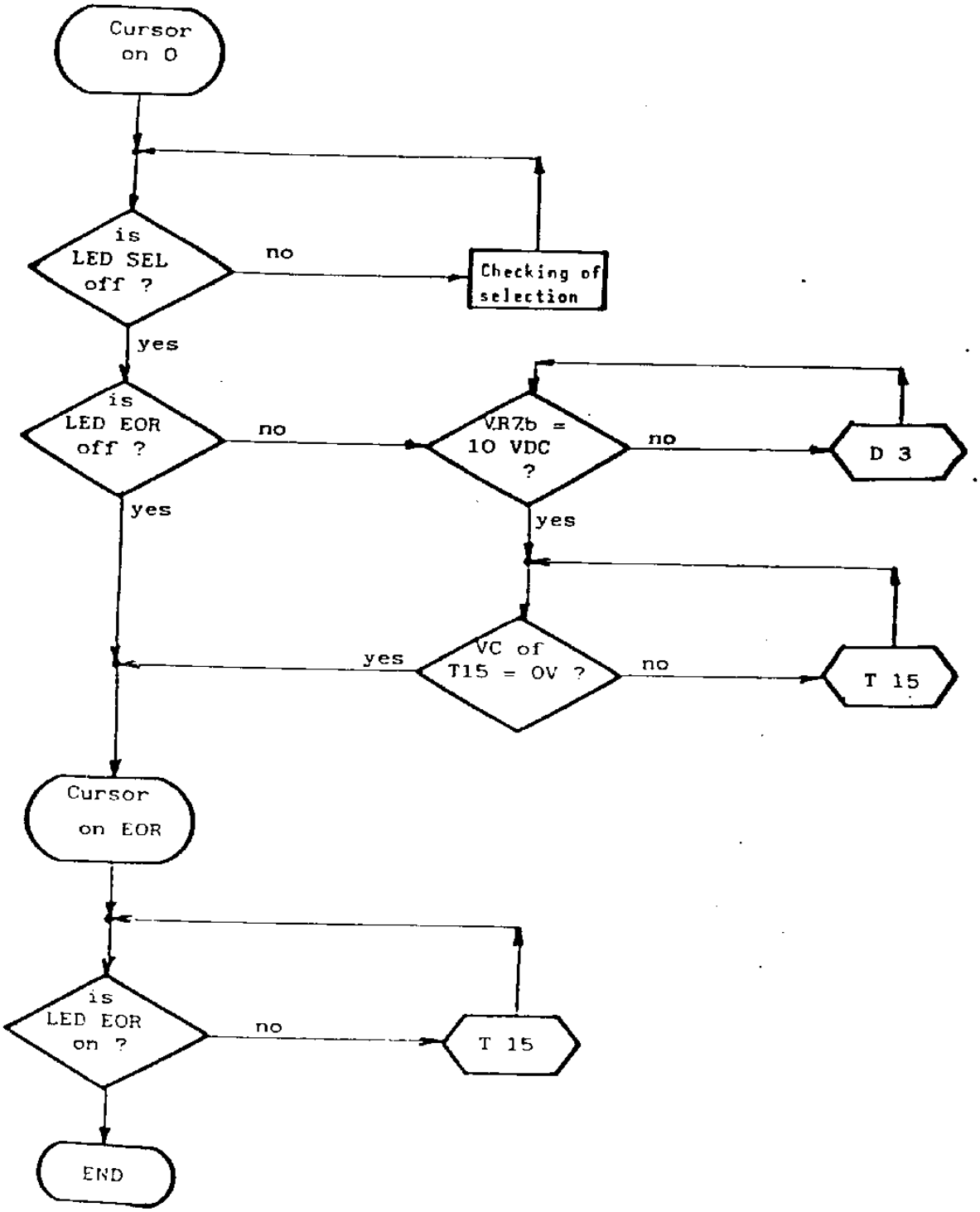


4 - CHECKING

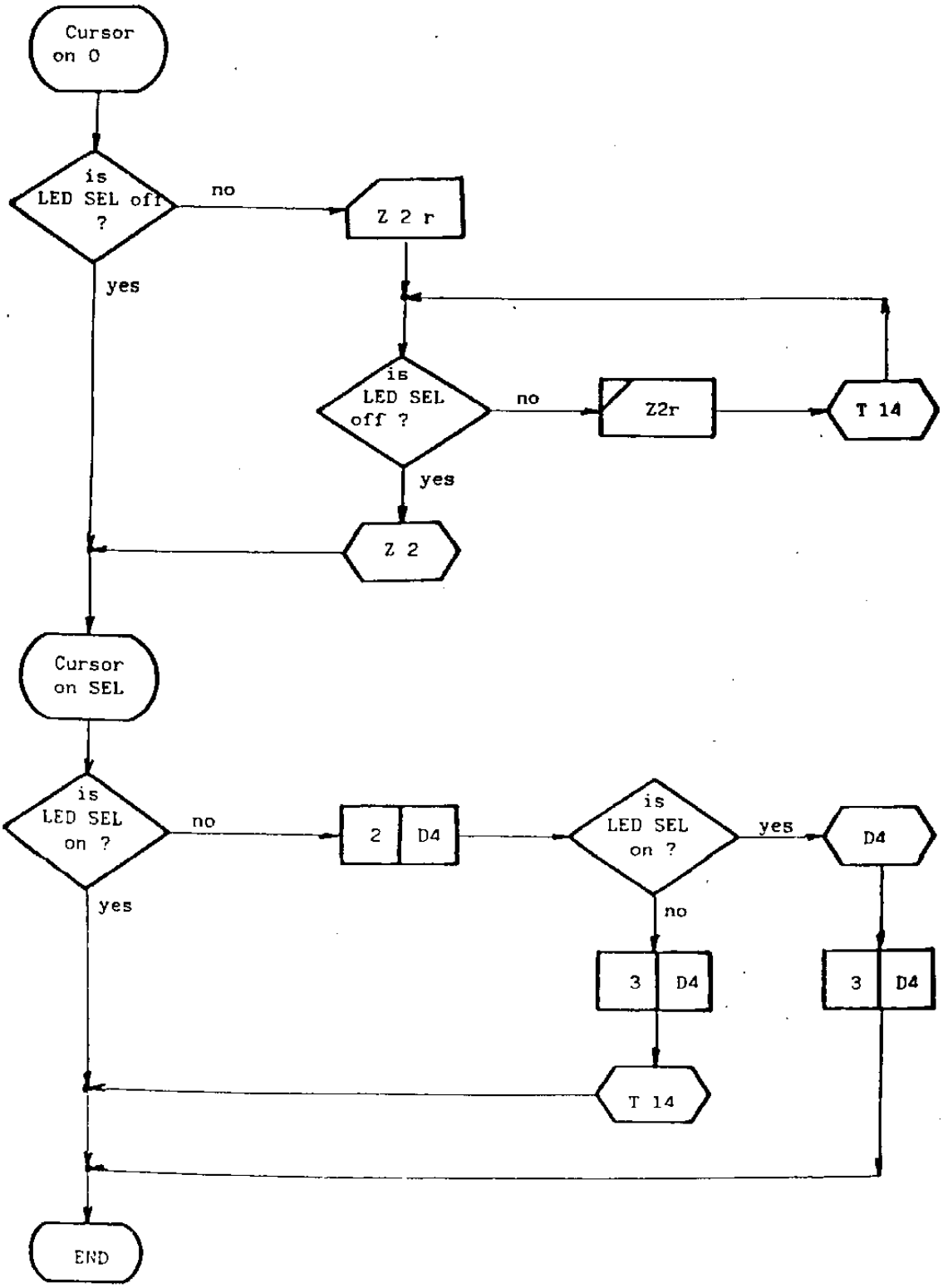
OF THE RUNNING OF THE CARD (MR)



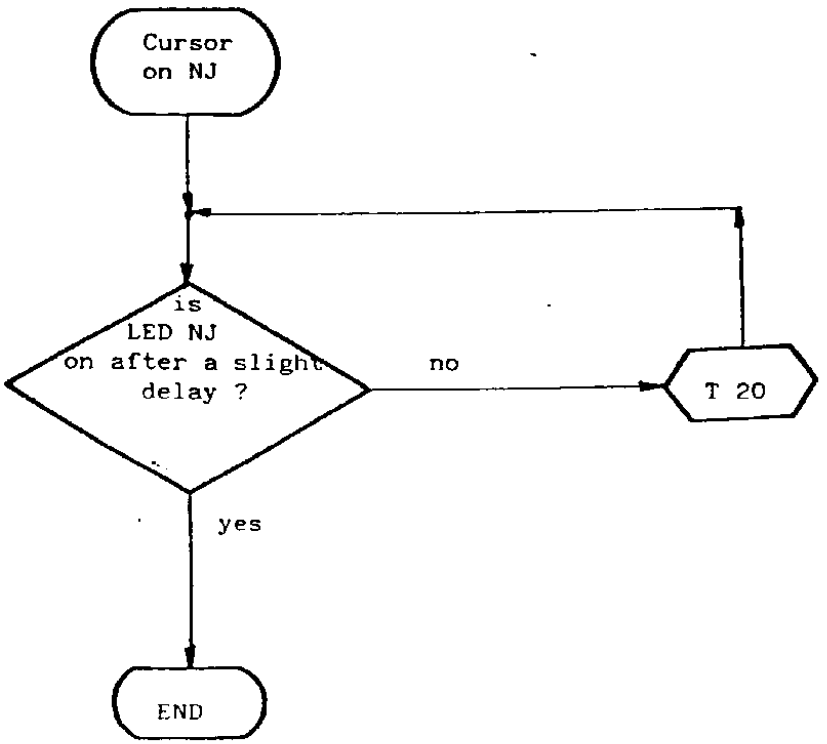
5 - CHECKING OF END OF ROW



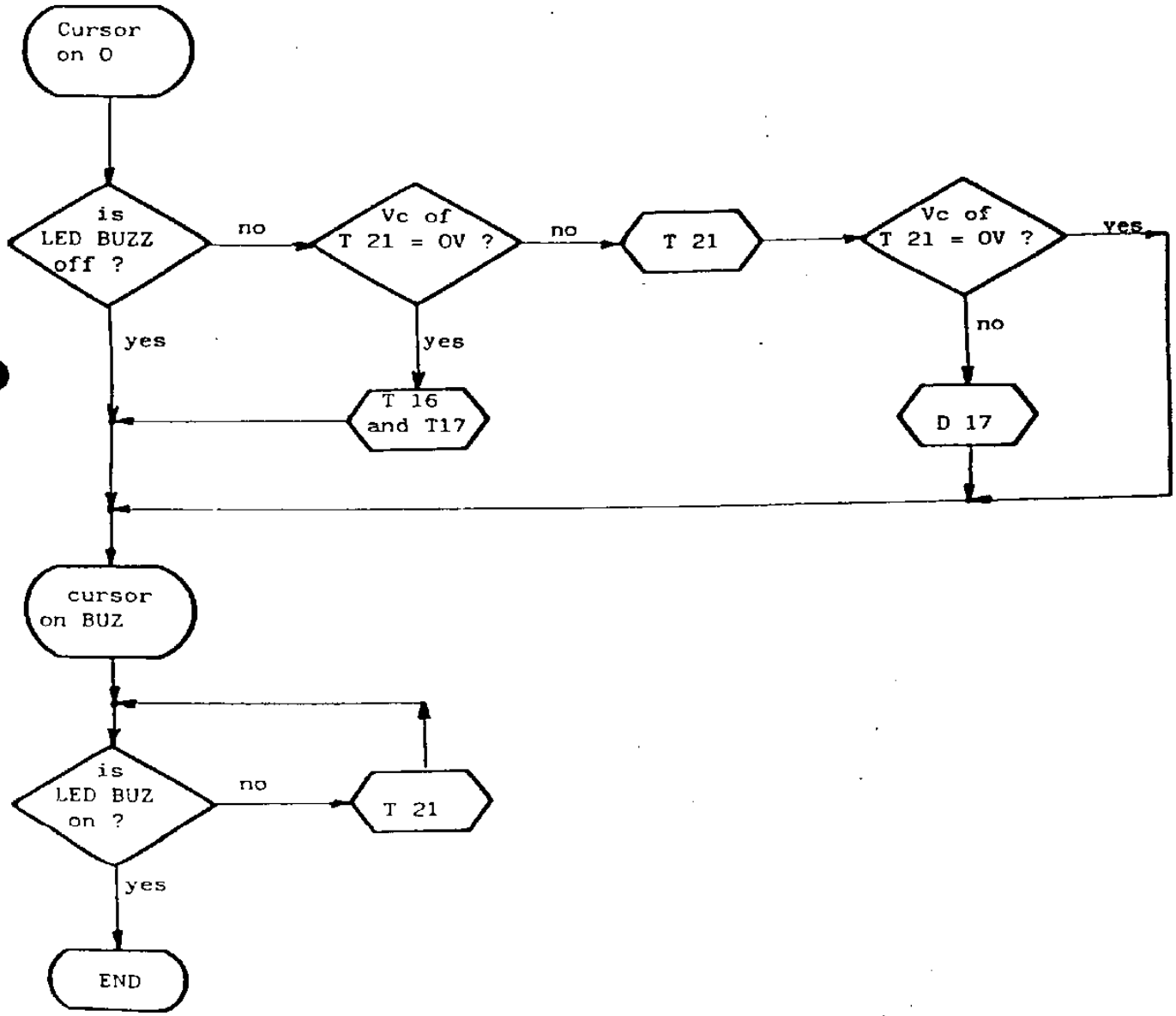
6 - CHECKING OF SELECTION



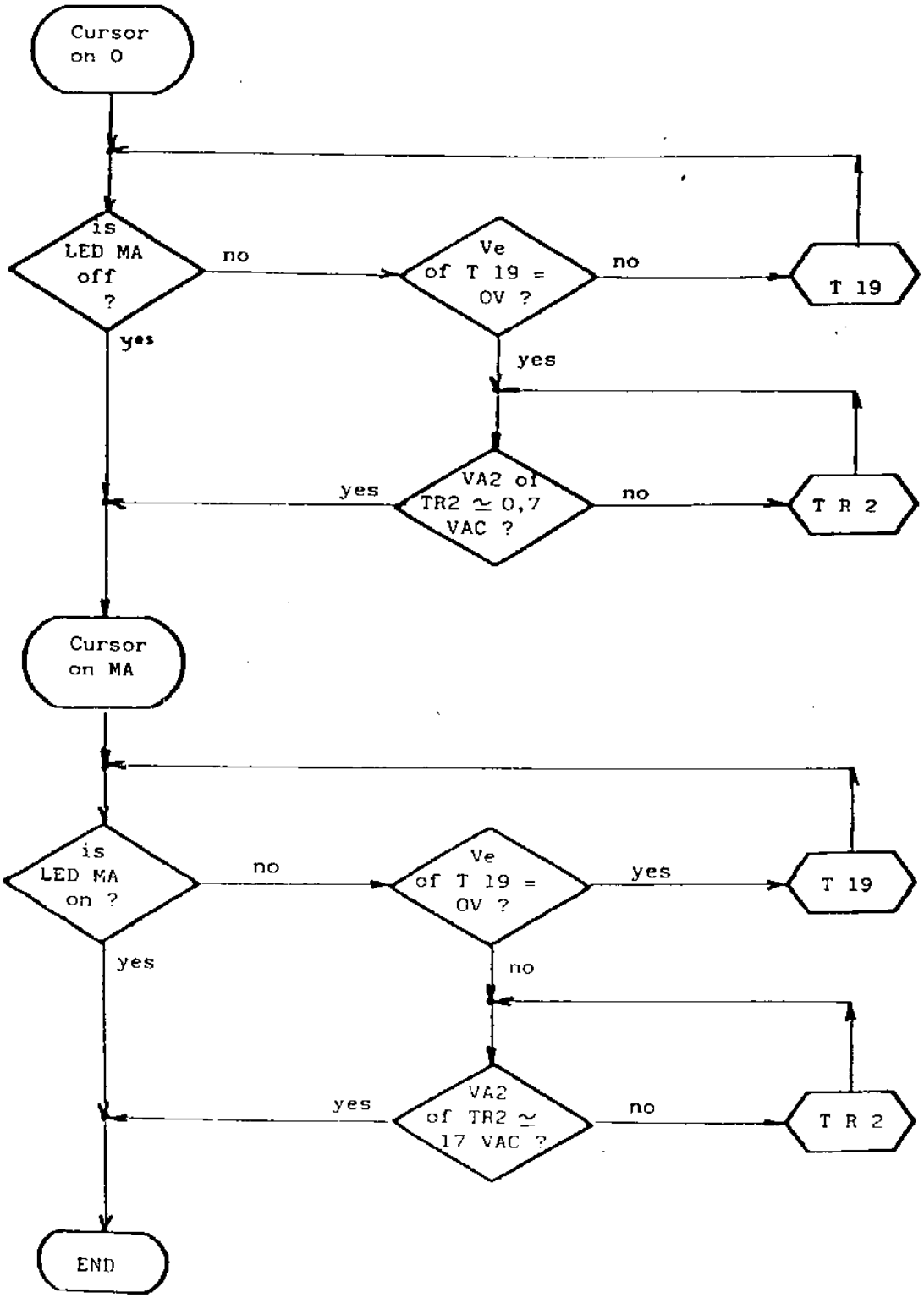
7 - CHECKING NORWEGIAN JACQUARD



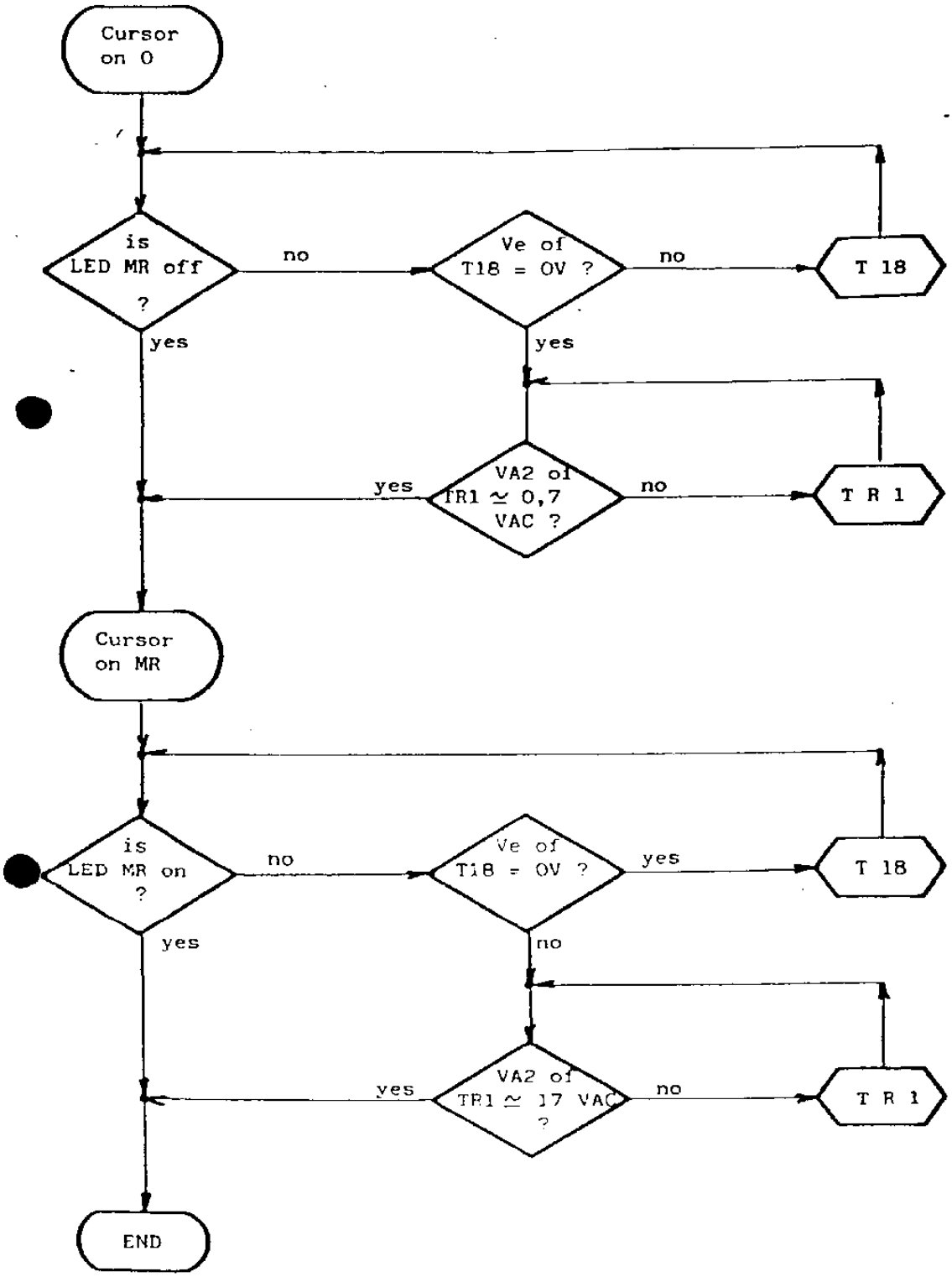
8 - BUZZER CHECKING



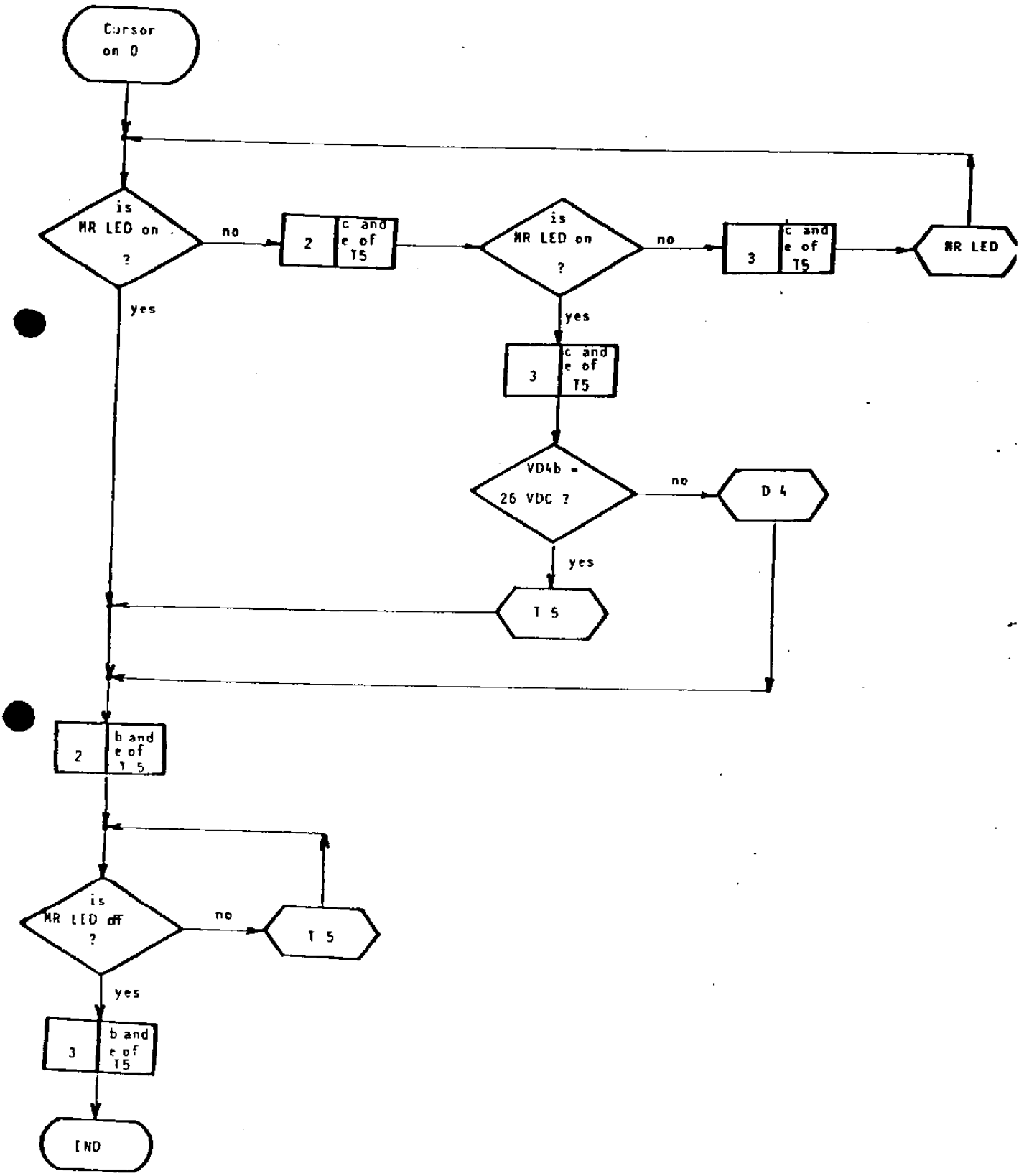
9 - MOTOR ADVANCE CHECKING



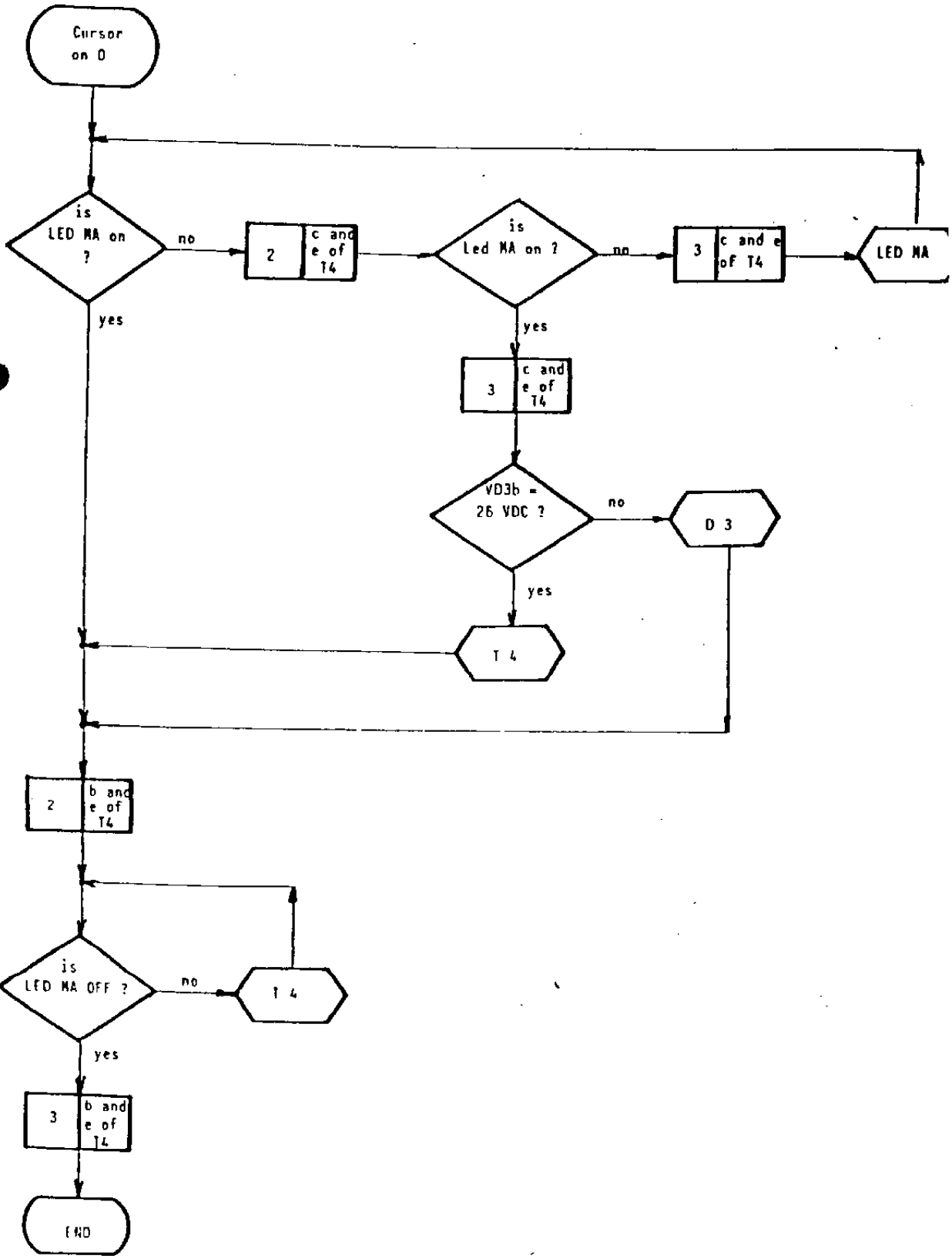
10 - MOTOR REVERSING CHECKING

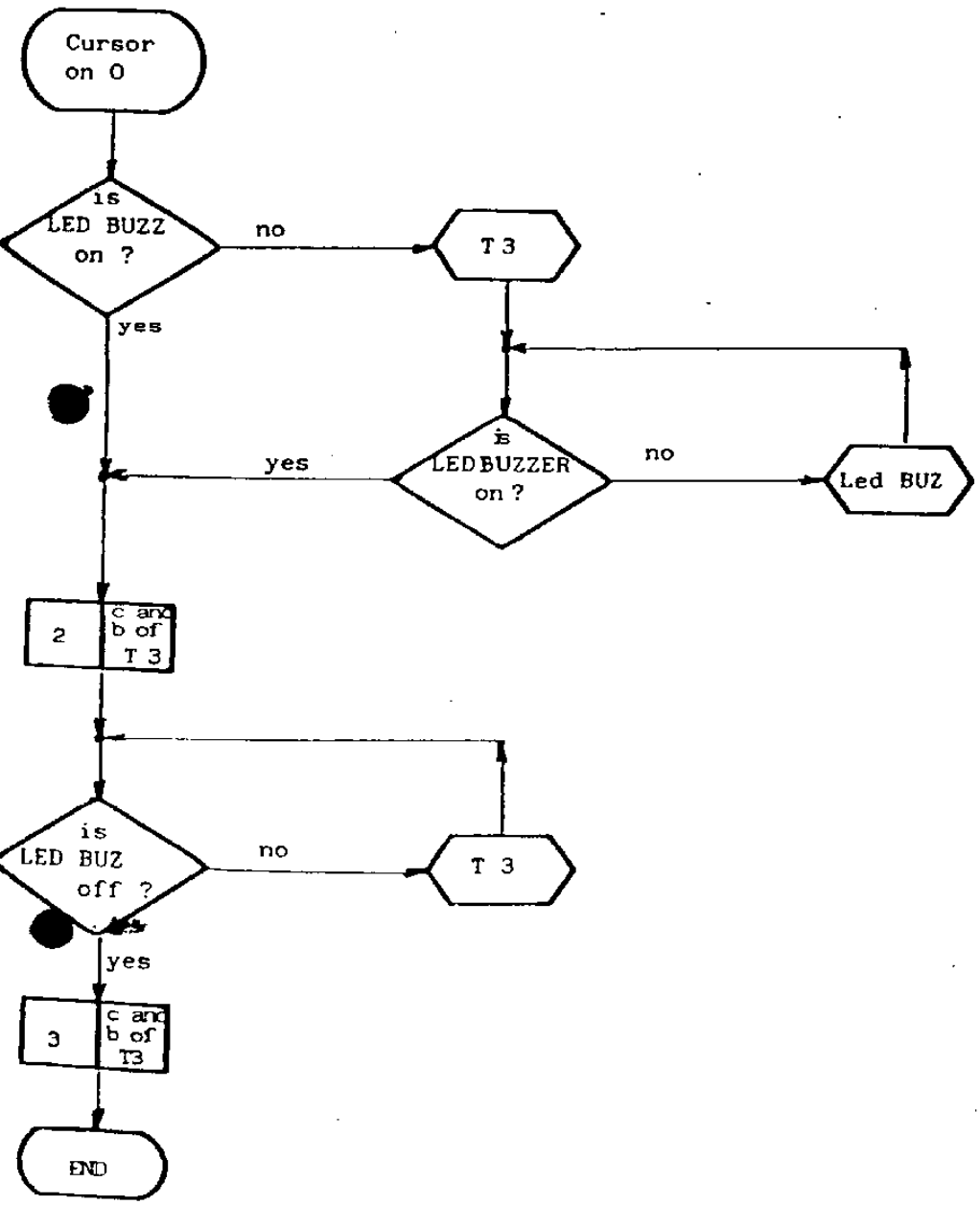


MOTOR REVERSING CIRCUIT 10

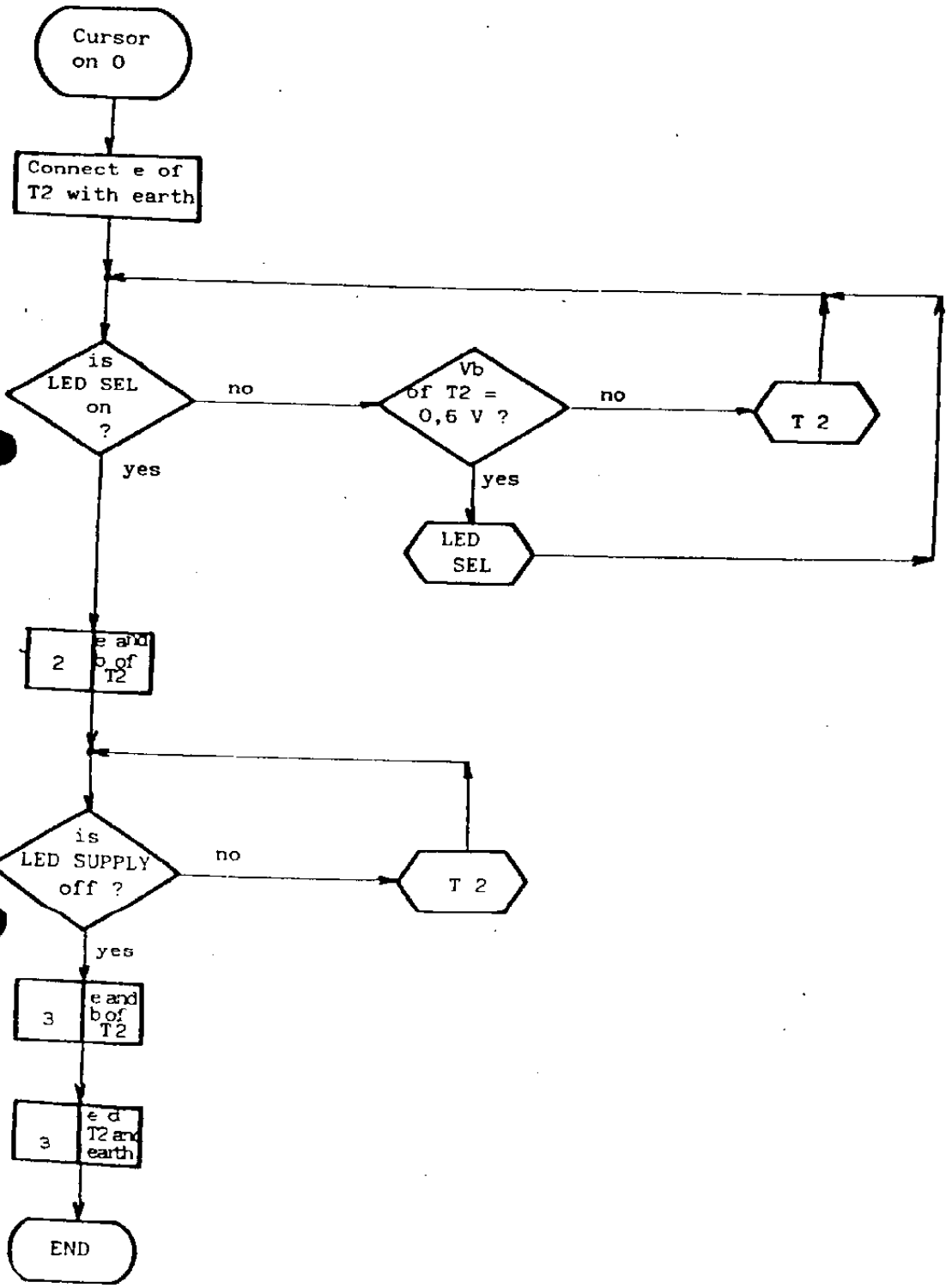


MOTOR ADVANCE CIRCUIT 9

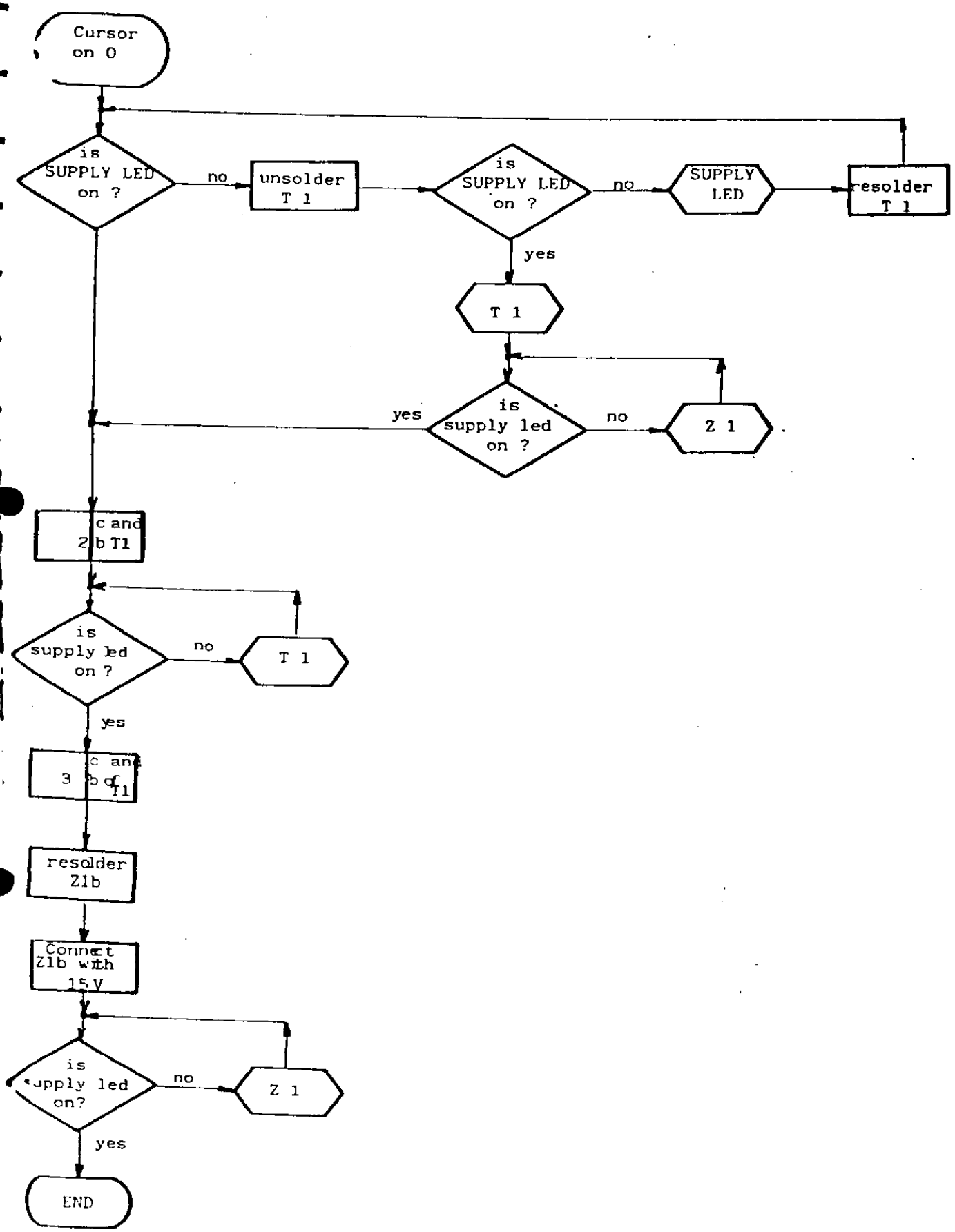



Cursor on 0
is LED BUZZ on ?
no
T 3
yes
is LED BUZZER on ?
yes
no
Led BUZ
2
c and b of T 3
is LED BUZ off ?
no
T 3
yes
3
c and b of T3
END

SELECTION CIRCUIT 6



SUPPLY CIRCUIT 0



4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

a) Centring of 1/2 :
- set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
- for this test, the maximum density of impulses must be obtained in both ways of carriage crossing
- to get it, operate the centring screw of 1/2
- check if the first needle left of 0 knits when the carriage is moved from the left-hand side to the right-hand side in positive.
If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :
- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

a) Centring of 1/2 :
- set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
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If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :
- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

TEST AND SETTINGS OF SELECTION BOX

Remark : when knitting normally, the buzzer emits a brief sound each time the selection box is switched on. This sound indicates that the selection box and the COP circuit work well.

Start position of dashboard switches

Move : - the "on/off" switch into position "on"
- the reverser into position "positive"
- the other switches into central position

1. Test of buzzer

Put a screwdriver in the hole foreseen to this end and short-circuit both contacts.
The buzzer sounds
Remove the screwdriver
The buzzer stops : the switches test programme is started.

Remark : If the buzzer does not sound, check the main printed circuit on the simulator.

2. Test of switches

When operating a switch, the buzzer sounds (apart from switch 1/2). Carry out the test as follows :

- Motor advance
- Motor reversing
- Row advance stop
- Norwegian Jacquard
- Stop every second row
- Move reverser switch from positive into negative position.

During the last operation, the buzzer emits a short sound to indicate the beginning of the readers test.

Remark : - The function 1/2 is not tested in the switches programme ; however, it does not prove possible to test reading 1/2 and centring 1/2 when it is out of order.

- If the buzzer does not sound when operating a switch, check the switches circuit.

OTHER POSSIBLE BREAKDOWNS

The test of the main printed circuit on the simulator is correct, the COP is not defective BUT :

BREAKDOWNS	REASON
Running of the card not correct	See : - Motor - MN.MR assembly
Reading is wrong	See : - Reading assembly (photosensor, lights ...) - Reading setting
Buzzer does not sound	See transducer contacts
Nothing at all is working : - No "bip" when switching on the selection box	Check if V C10± + = 2,5 VDC If not, replace the condensor C10
- No selection - Motor advance is not correct, etc.	
The buzzer works but the light D5 on the top cover is not on	Replace D5
A function of the dashboard does not work	Test switches by means of test programme
Programm test cannot be reached	- Check test contacts - Replace D10 and D11

TEST AND SETTINGS OF SELECTION BOX

Remark : when knitting normally, the buzzer emits a brief sound each time the selection box is switched on. This sound indicates that the selection box and the COP circuit work well.

Start position of dashboard switches

Move : - the "on/off" switch into position "on"
- the reverser into position "positive"
- the other switches into central position

1. Test of buzzer

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Remove the screwdriver
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When operating a switch, the buzzer sounds (apart from switch 1/2). Carry out the test as follows :

- Motor advance
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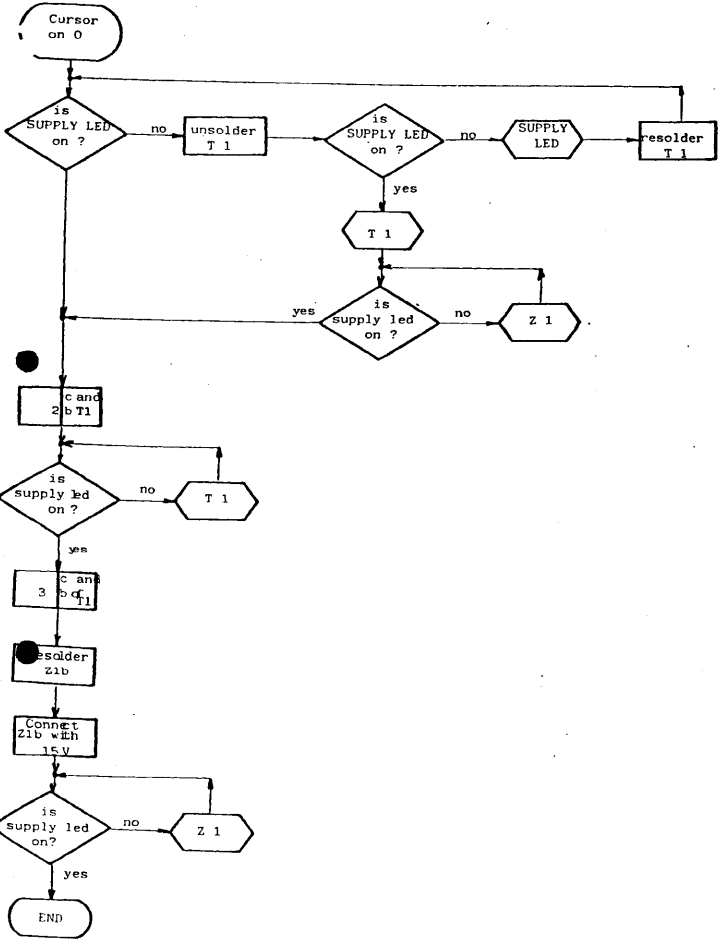
Remark : - The function 1/2 is not tested in the switches programme ; however, it does not prove possible to test reading 1/2 and centring 1/2 when it is out of order.

- If the buzzer does not sound when operating a switch, check the switches circuit.

SUPPLY CIRCUIT 0



4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

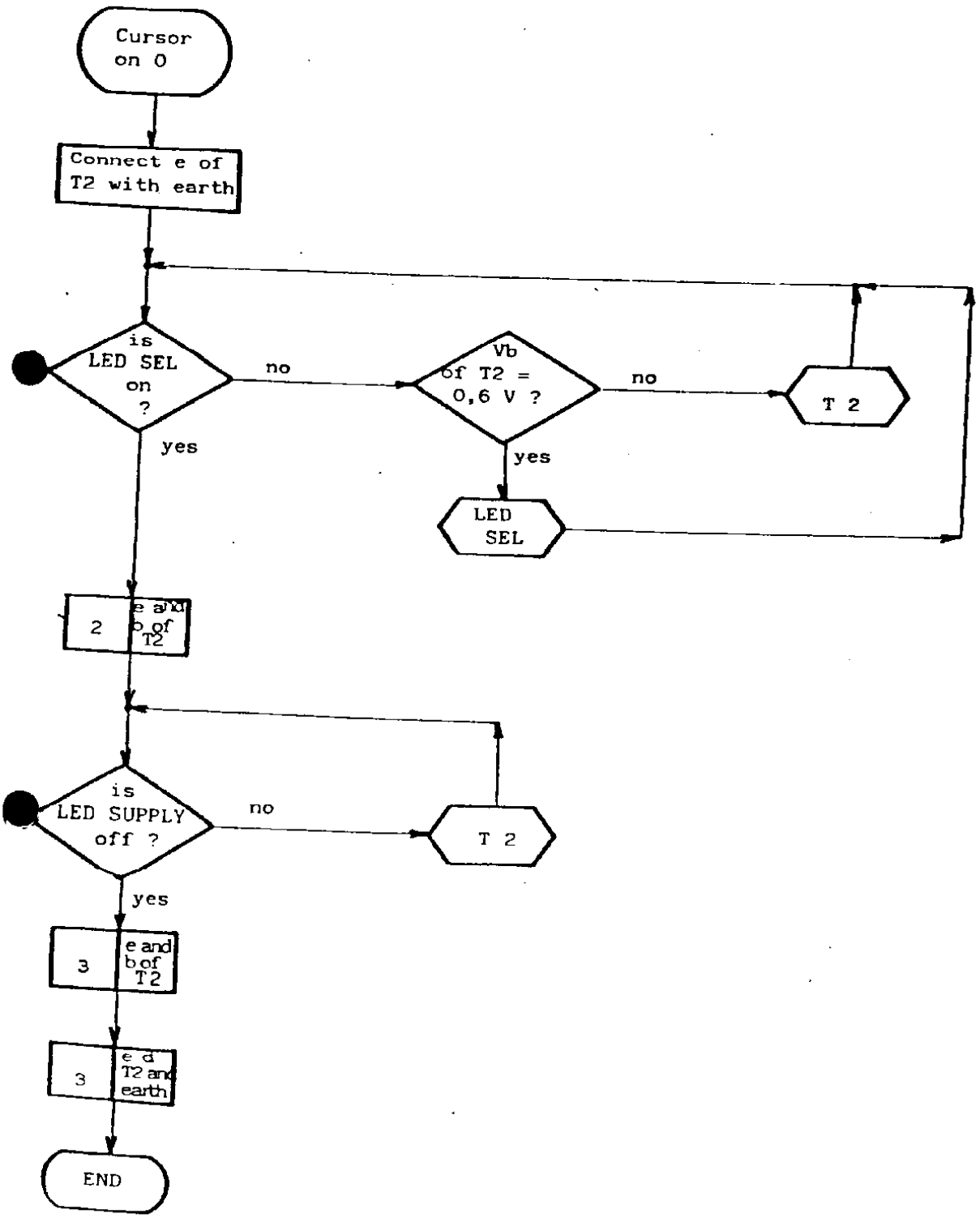
a) Centring of 1/2 : - set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
- for this test, the maximum density of impulses must be obtained in both ways of carriage crossing
- to get it, operate the centring screw of 1/2
- check if the first needle left of 0 knits when the carriage is moved from the left-hand side to the right-hand side in positive.
If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

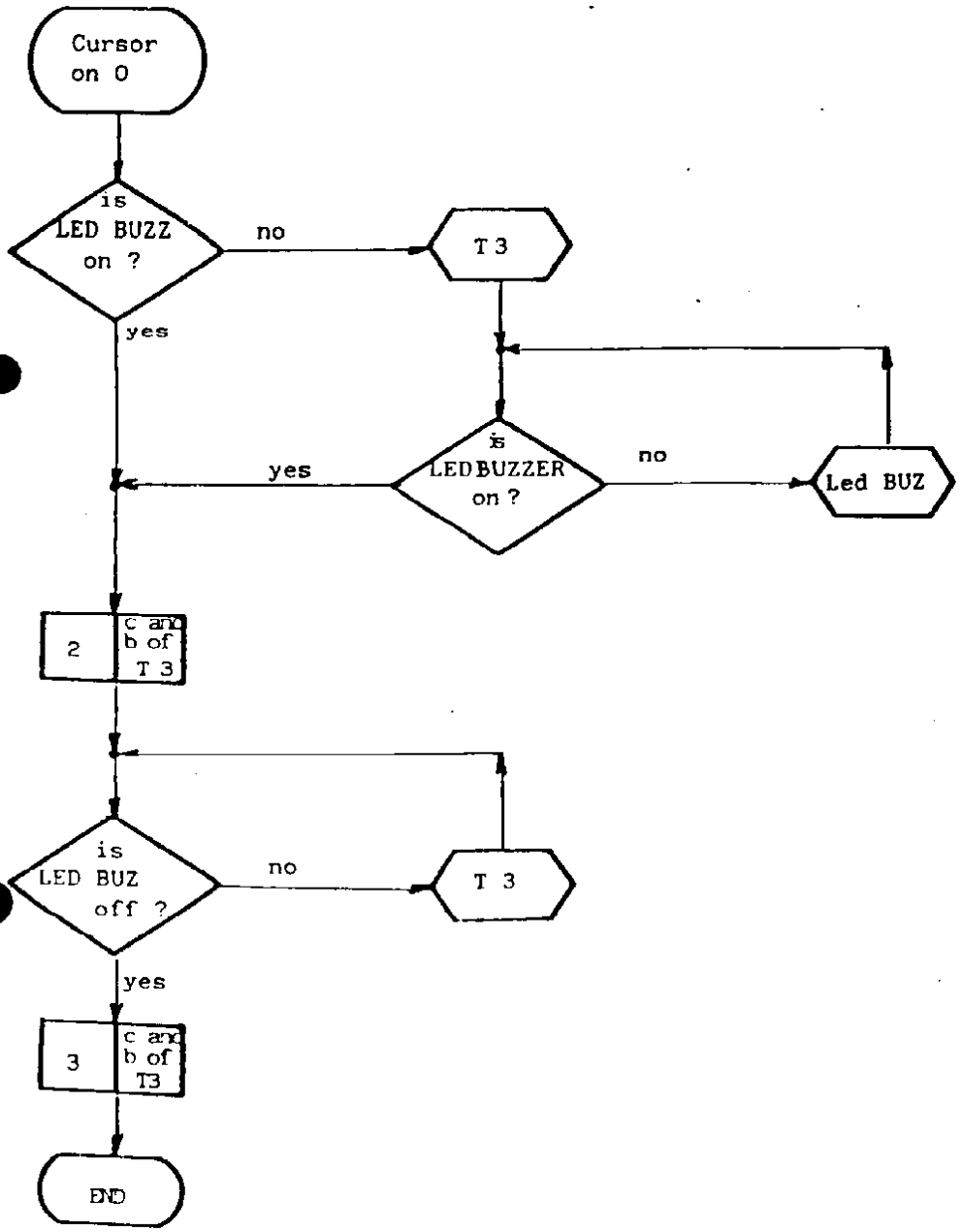
How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

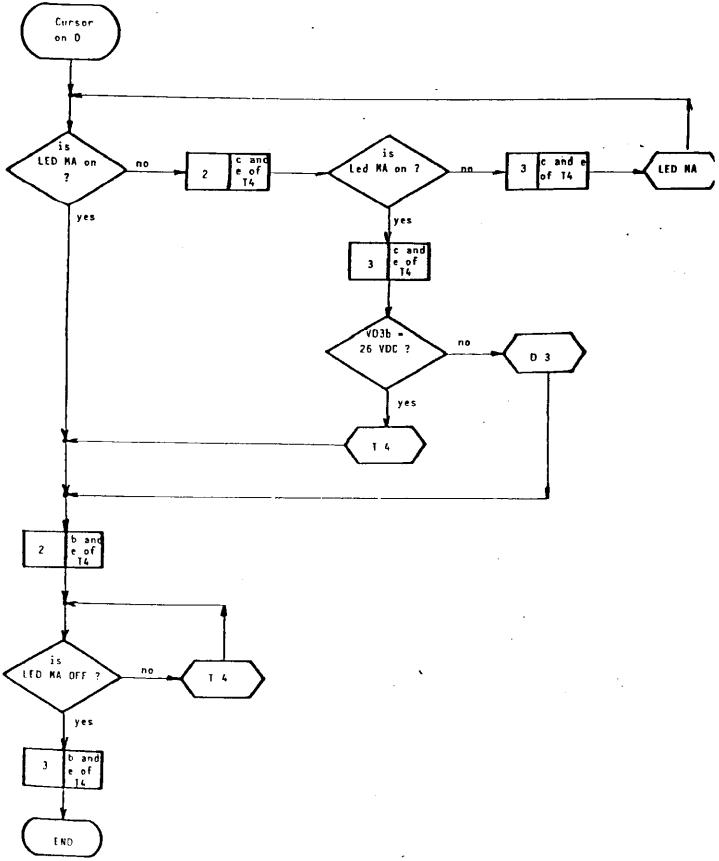
SELECTION CIRCUIT 6



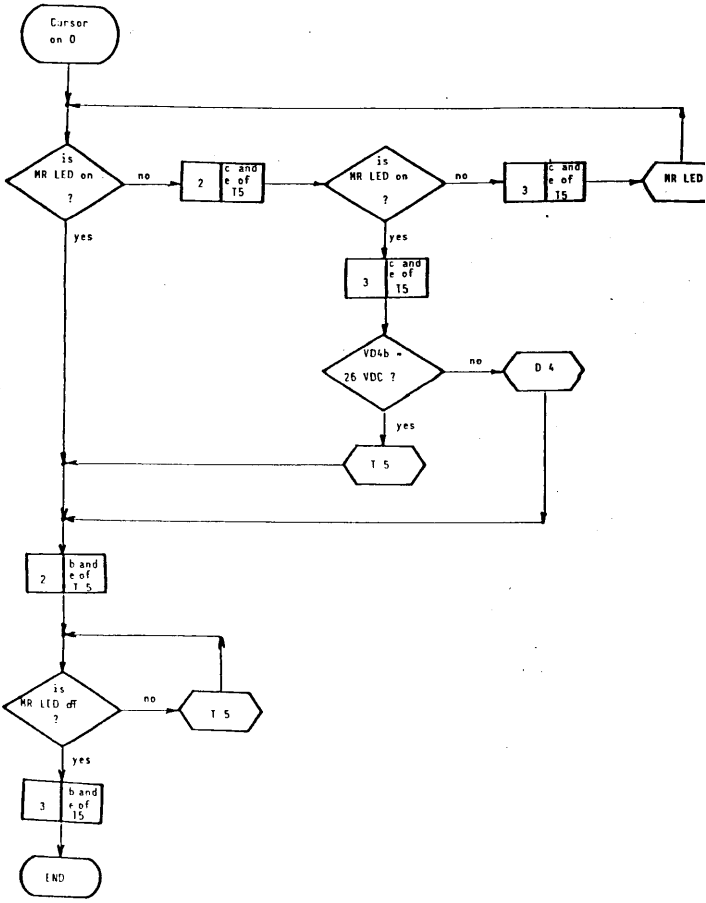
BUZZER CIRCUIT 8



MOTOR ADVANCE CIRCUIT 9



MOTOR REVERSING CIRCUIT 10



Item		Reference	Designation			
R 1		884 3	Resistance	6,8	kΩ	1/4 W
R 2		846 7	Resistance	10	kΩ	1/4 W
R 3		884 3	Resistance	6,8	kΩ	1/4 W
R 4		846 7	Resistance	10	kΩ	1/4 W
R 5		846 8	Resistance	2,2	kΩ	1/4 W
R 6		872 5	Resistance	2,2	Ω	1/2 W
R 7		706 2	Resistance	330	Ω	1/4 W
R 8		884 2	Resistance	1	kΩ	1/4 W
R 9		846 8	Resistance	2,2	kΩ	1/4 W
R10		846 8	Resistance	2,2	kΩ	1/4 W
R11		884 2	Resistance	1	kΩ	1/4 W
R12		846 7	Resistance	10	kΩ	1/4 W
R13		869 4	Resistance	680	Ω	1/4 W
R14		846 8	Resistance	2,2	kΩ	1/4 W
R15		846 7	Resistance	10	kΩ	1/4 W
R16		846 6	Resistance	100	kΩ	1/4 W
R17		846 7	Resistance	10	kΩ	1/4 W
R18		846 7	Resistance	10	kΩ	1/4 W
R19		846 7	Resistance	10	kΩ	1/4 W
R20		846 7	Resistance	10	kΩ	1/4 W
R21		846 7	Resistance	10	kΩ	1/4 W
R22						
R23		846 7	Resistance	10	kΩ	1/4 W
R24		846 7	Resistance	10	kΩ	1/4 W
R25		846 7	Resistance	10	kΩ	1/4 W
R26		846 7	Resistance	10	kΩ	1/4 W
R27		846 7	Resistance	10	kΩ	1/4 W
R28		846 6	Resistance	100	kΩ	1/4 W
R29		707 3	Resistance	47	kΩ	1/4 W
R30		846 7	Resistance	10	kΩ	1/4 W
R31		884 2	Resistance	1	kΩ	1/4 W
R32		706 0	Resistance	56	Ω	1/4 W
R33		846 7	Resistance	10	kΩ	1/4 W
R34		884 2	Resistance	1	kΩ	1/4 W
R35		706 0	Resistance	56	Ω	1/4 W
R36		884 2	Resistance	1	kΩ	1/4 W
R37		846 7	Resistance	10	kΩ	1/4 W
R38		846 7	Resistance	10	kΩ	1/4 W
R39		846 6	Resistance	100	kΩ	1/4 W
R40		846 7	Resistance	10	kΩ	1/4 W
R41		846 6	Resistance	100	kΩ	1/4 W
R42		846 8	Resistance	2,2	kΩ	1/4 W
R43		846 8	Resistance	2,2	kΩ	1/4 W
R44		846 6	Resistance	100	kΩ	1/4 W
R45		706 1	Resistance	120	Ω	1 W
R46		705 9	Resistance	39	kΩ	1/4 W
R47		864 2	Resistance	1	kΩ	1/4 W
R48		884 2	Resistance	1	kΩ	1/4 W
G		705 6	Transducer G			
		704 4	Main printed board			
		706 4	Bracket for printed circuit 24 plugs			
		706 6	Contacts COP for tests			
		707 2	Contacts for transducer			
		706 3	Integrated circuit COP 410 L			
L 3		708 7	Self 470 µH			
		859 4	Bracking skate			

Item	Reference	Designation		
P 2	724 2	Potentiometer 6,8 kΩ		
P 3	722 1	Potentiometer 220 kΩ		
Tr1	898 4	Triac TLC 221 T		
Tr2	898 4	Triac TLC 221 T		
T 2	707 4	Phototransistor TIL 621		
T 8	869 3	Transistor BC 238 C		
T 9	869 3	Transistor BC 238 C		
T10	869 3	Transistor BC 238 C		
T12	869 3	Transistor BC 238 C		
T13	869 3	Transistor BC 238 C		
T14	894 6	Transistor BD 677		
T15	869 3	Transistor BC 238 C		
T16	869 3	Transistor BC 238 C		
T17	869 3	Transistor BC 238 C		
T18	869 3	Transistor BC 238 C		
T19	869 3	Transistor BC 238 C		
T20	869 3	Transistor BC 238 C		
T21	869 3	Transistor BC 238 C		
Z 1	894 2	Diode Zener 4,7 V		
Z 2	888 4	Diode Zener 51 V 1 W		
Z 5	705 7	Diode Zener 5,6 V 1 W		
D 2	877 4	LED CQY 41		
D 3	849 3	Diode IN 4148		
D 4	877 9	Diode BA 157		
D 8	849 3	Diode IN 4148		
D 9	849 3	Diode IN 4148		
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D16	849 3	Diode IN 4148		
D17	849 3	Diode IN 4148		
C 4	893 8	Chemical condensor	1 µF	20 V mini
C 5	893 8	Chemical condensor	1 µF	20 V mini
C 6	871 9	Non polarized condensor	10 µF	20 V mini
C 7	707 5	Polarized condensor	10 µF	20 V mini
C 8	707 5	Polarized condensor	10 µF	20 V mini
C 9	897 5	Non polarized condensor	9,5 µF	
C10	705 8	Condensor	200 pF	2,5 %
C11	703 6	Plastic condensor	0,22 µF	20 V mini
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C13	893 9	Plastic condensor	0,1 µF	20 V mini
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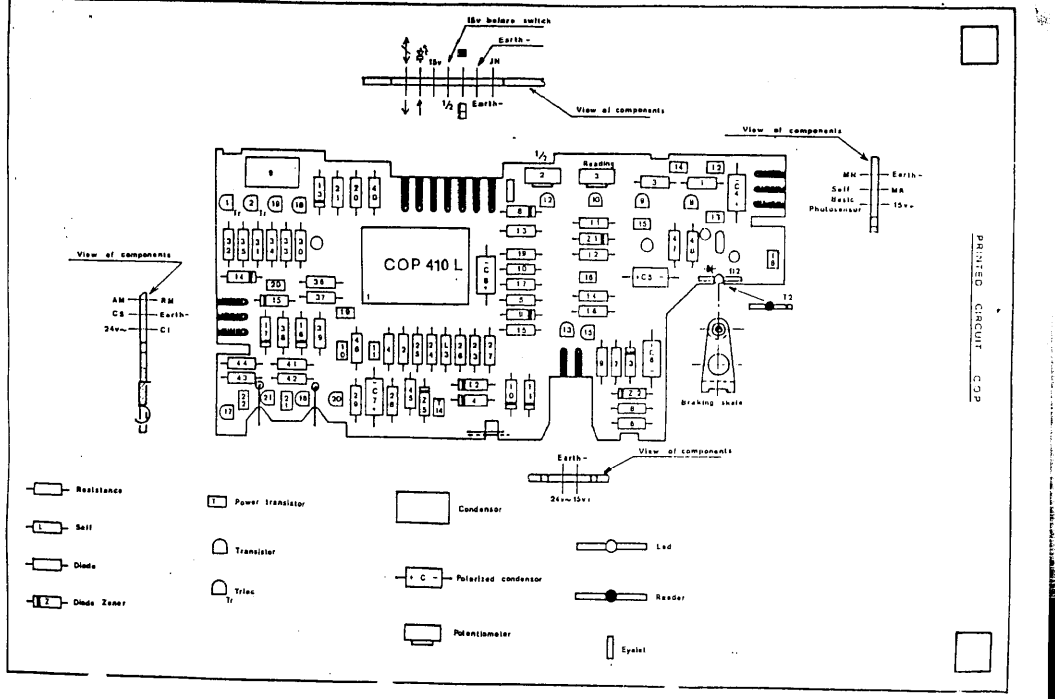
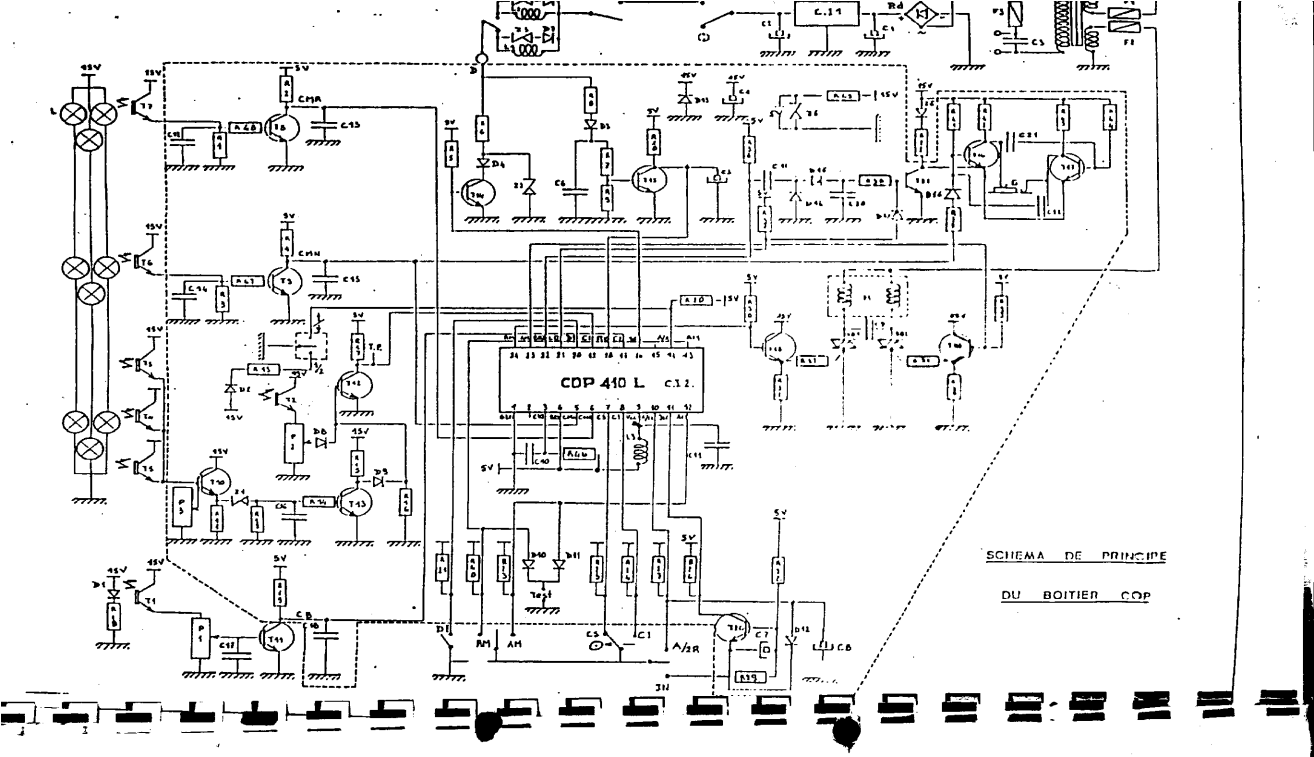
C15	893 9	Plastic condensor	0,1 µF	20 V mini
C16	893 9	Plastic condensor	0,1 µF	20 V mini
C18	846 2	Plastic condensor	4,7 nF	
C19	893 9	Plastic condensor	0,1 µF	20 V mini
C20	893 9	Plastic condensor	0,1 µF	20 V mini
C21	877 8	Ceramic condensor	10 nF	20 V mini
C22	877 8	Ceramic condensor	10 nF	20 V mini


15v before switch
Earth -
JN
15v
Earth -
View of components
View of components
Reading
COP 410 L
MN
Self
Basic
Photosensor
Earth -
MA
15v +
PRINTED CIRCUIT C.D.P
View of components
AM
CS
24v~
RM
Earth -
CI
Braking skate
View of components
Earth -
24v~ 15v +
Resistance
Self
Diode
Diode Zener
Power transistor
Transistor
Triac
Condensor
Polarized condensor
Potentiometer
Led
Reader
Eyelet


COP 410 L C.12.
SCHEMA DE PRINCIPE
DU BOITIER COP

REPAIR OF MATRIX PRINTED CIRCUIT

7.0. How to proceed :

a) Make a full visual checking of the printed circuit to be tested and replace the defective components (burned resistances, unsoldered wirings...)

b) Check printed circuit on simulator :

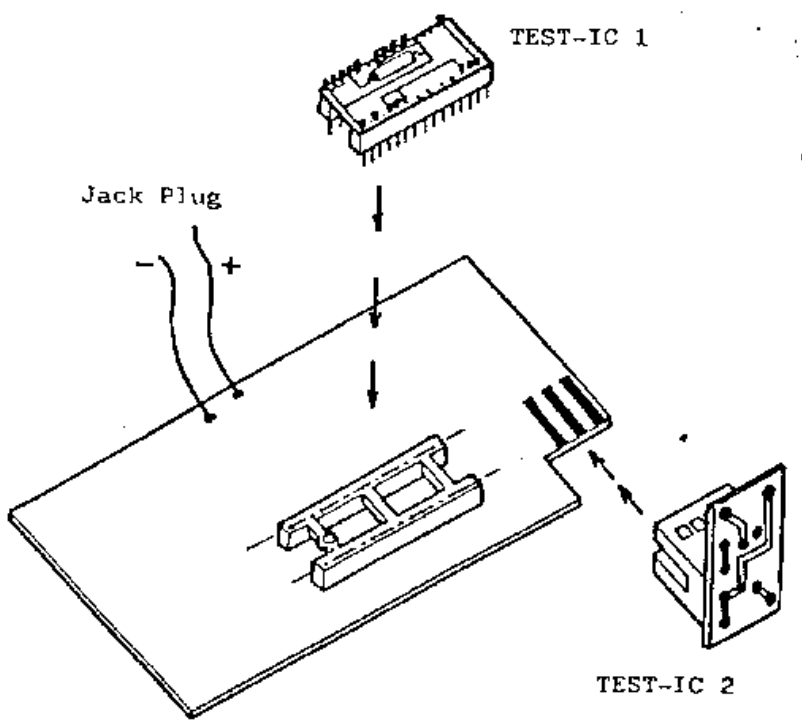
- Disconnect microprocessor COP

- Plug test-IC1 onto COP bracket in the right way, and test-IC2 onto the 6-contacts connector.

- Connect a 15V supply onto the Jack plug, and start to check printed circuit following the chart instructions.

c) Reconnect COP onto the printed circuit and don't disconnect test-IC2
Plug the supply.
If the same defect is still appearing, make sure that COP is not defective. To this end, connect it onto a printed circuit which is in good order. If the same defect appears, you have to replace it.

d) Check the settings with test-program



4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

a) Centring of 1/2 :
- set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
- for this test, the maximum density of impulses must be obtained in both ways of carriage crossing
- to get it, operate the centring screw of 1/2
- check if the first needle left of 0 knits when the carriage is moved from the left-hand side to the right-hand side in positive.
If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :
- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

a) Centring of 1/2 :
- set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
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- check if the first needle left of 0 knits when the carriage is moved from the left-hand side to the right-hand side in positive.
If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :
- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

TEST AND SETTINGS OF SELECTION BOX

Remark : when knitting normally, the buzzer emits a brief sound each time the selection box is switched on. This sound indicates that the selection box and the COP circuit work well.

Start position of dashboard switches

Move : - the "on/off" switch into position "on"
- the reverser into position "positive"
- the other switches into central position

1. Test of buzzer

Put a screwdriver in the hole foreseen to this end and short-circuit both contacts.
The buzzer sounds
Remove the screwdriver
The buzzer stops : the switches test programme is started.

Remark : If the buzzer does not sound, check the main printed circuit on the simulator.

2. Test of switches

When operating a switch, the buzzer sounds (apart from switch 1/2). Carry out the test as follows :

- Motor advance
- Motor reversing
- Row advance stop
- Norwegian Jacquard
- Stop every second row
- Move reverser switch from positive into negative position.

During the last operation, the buzzer emits a short sound to indicate the beginning of the readers test.

Remark : - The function 1/2 is not tested in the switches programme ; however, it does not prove possible to test reading 1/2 and centring 1/2 when it is out of order.

- If the buzzer does not sound when operating a switch, check the switches circuit.

OTHER POSSIBLE BREAKDOWNS

The test of the main printed circuit on the simulator is correct, the COP is not defective BUT :

BREAKDOWNS	REASON
Running of the card not correct	See : - Motor - MN.MR assembly
Reading is wrong	See : - Reading assembly (photosensor, lights ...) - Reading setting
Buzzer does not sound	See transducer contacts
Nothing at all is working : - No "bip" when switching on the selection box	Check if V C10± + = 2,5 VDC If not, replace the condensor C10
- No selection - Motor advance is not correct, etc.	
The buzzer works but the light D5 on the top cover is not on	Replace D5
A function of the dashboard does not work	Test switches by means of test programme
Programm test cannot be reached	- Check test contacts - Replace D10 and D11

TEST AND SETTINGS OF SELECTION BOX

Remark : when knitting normally, the buzzer emits a brief sound each time the selection box is switched on. This sound indicates that the selection box and the COP circuit work well.

Start position of dashboard switches

Move : - the "on/off" switch into position "on"
- the reverser into position "positive"
- the other switches into central position

1. Test of buzzer

Put a screwdriver in the hole foreseen to this end and short-circuit both contacts.
The buzzer sounds
Remove the screwdriver
The buzzer stops : the switches test programme is started.

Remark : If the buzzer does not sound, check the main printed circuit on the simulator.

2. Test of switches

When operating a switch, the buzzer sounds (apart from switch 1/2). Carry out the test as follows :

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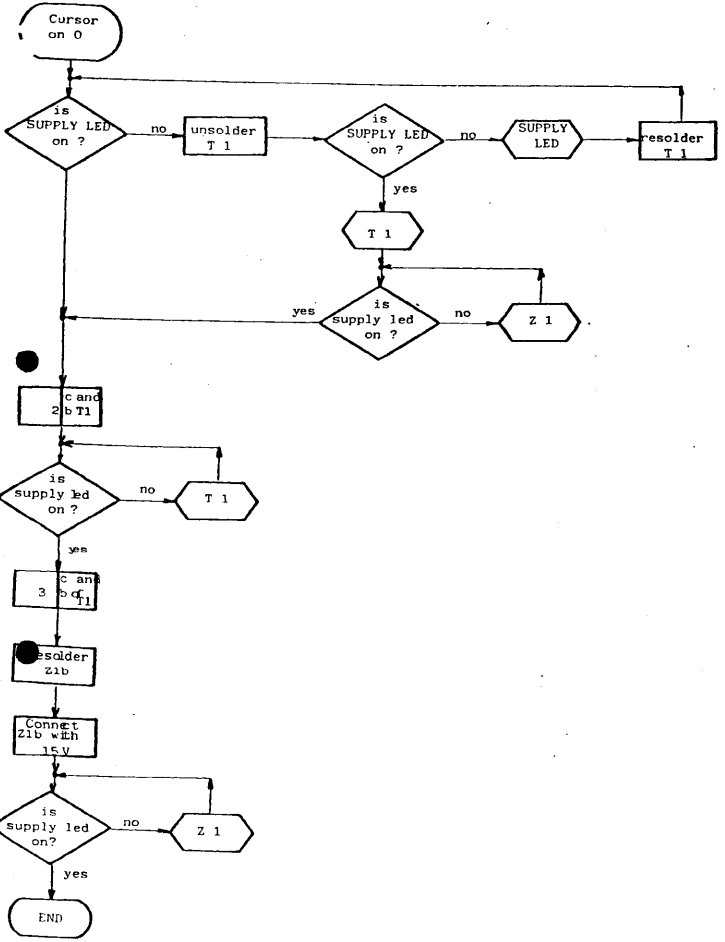
- If the buzzer does not sound when operating a switch, check the switches circuit.

SUPPLY CIRCUIT 0



4. Centring test :

Settings : - needles in non-working position
- no programme-card
- setting of half top cover

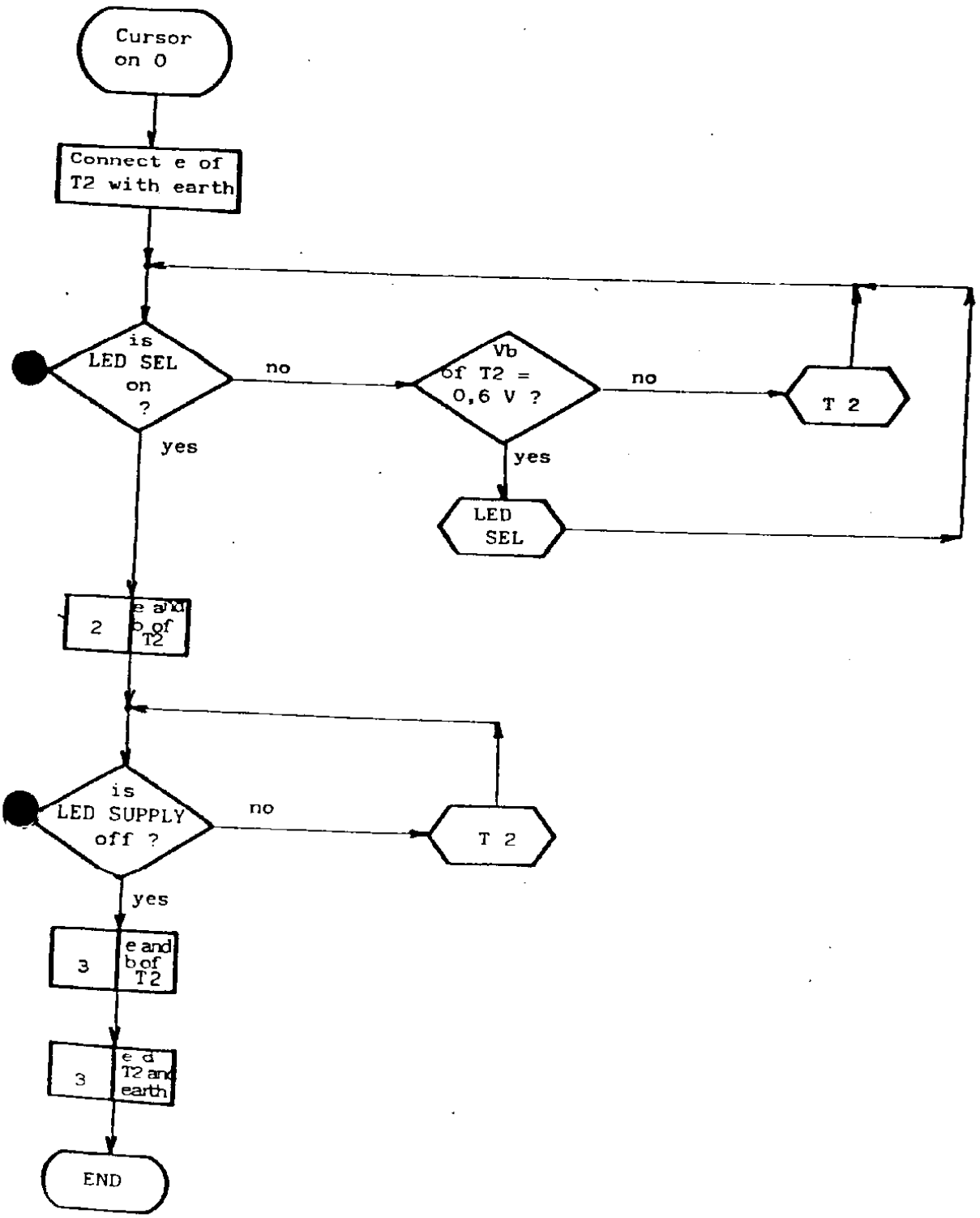
a) Centring of 1/2 : - set the function 1/2
- by moving the carriage slowly and regularly, the buzzer emits a series of impulses as for the readers test.
- for this test, the maximum density of impulses must be obtained in both ways of carriage crossing
- to get it, operate the centring screw of 1/2
- check if the first needle left of 0 knits when the carriage is moved from the left-hand side to the right-hand side in positive.
If the needle does not knit, tighten of 1,5 turn and check the centring again.

b) Centring of reading :- switch off the function 1/2
- programme-card Nr. 1 on a line 1/2, design Nr. 3 (manual setting)
- the setting process is the same of the setting process of centring 1/2
- the maximum density of buzzer impulses (for both ways of carriage crossing) is obtained by operating the centring screw of the reading photosensor.

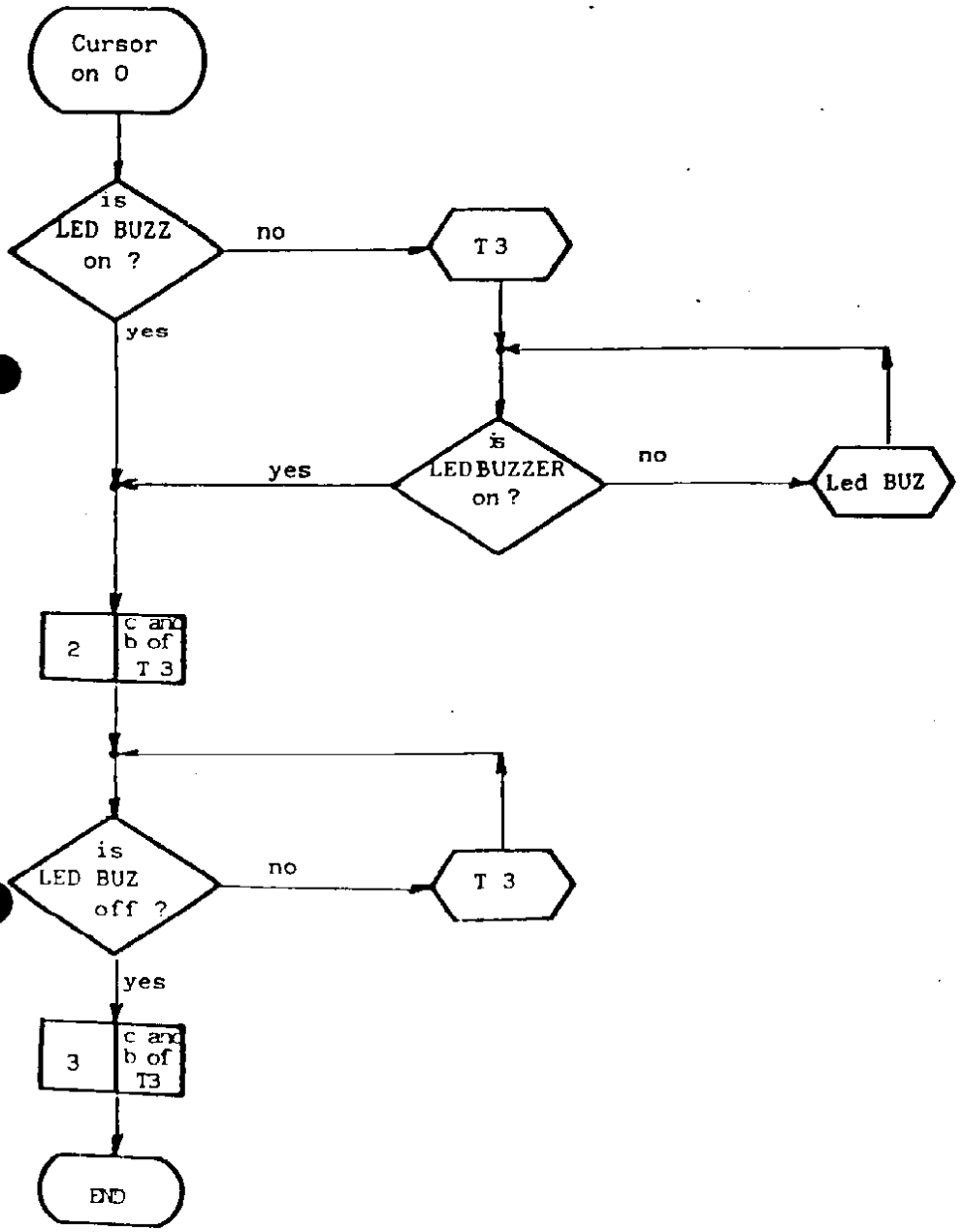
How to shift to the knitting function :

To shift to the knitting function, switch off the selection box and switch it on again (operate the on/off switch).

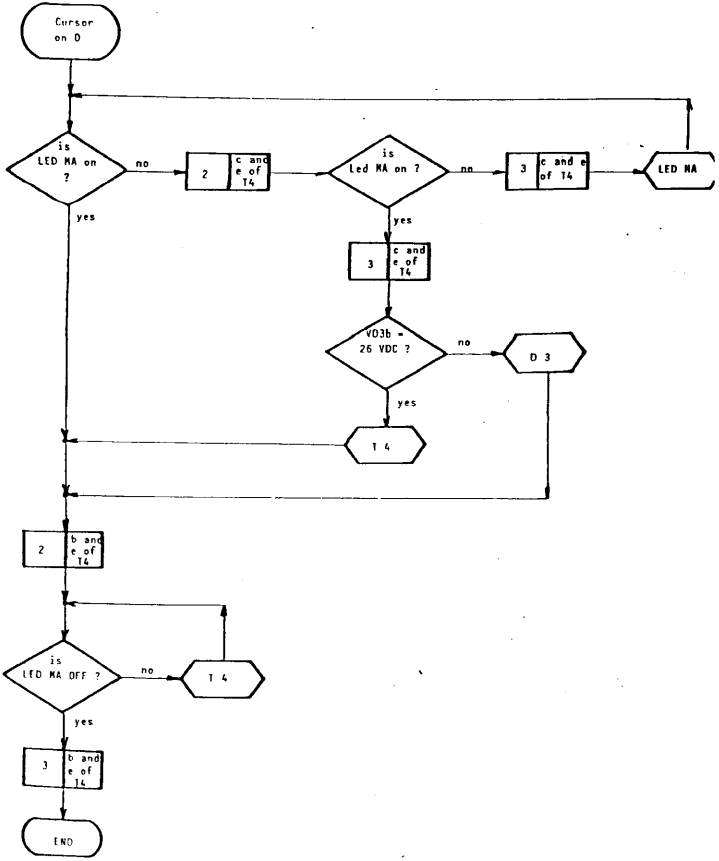
SELECTION CIRCUIT 6



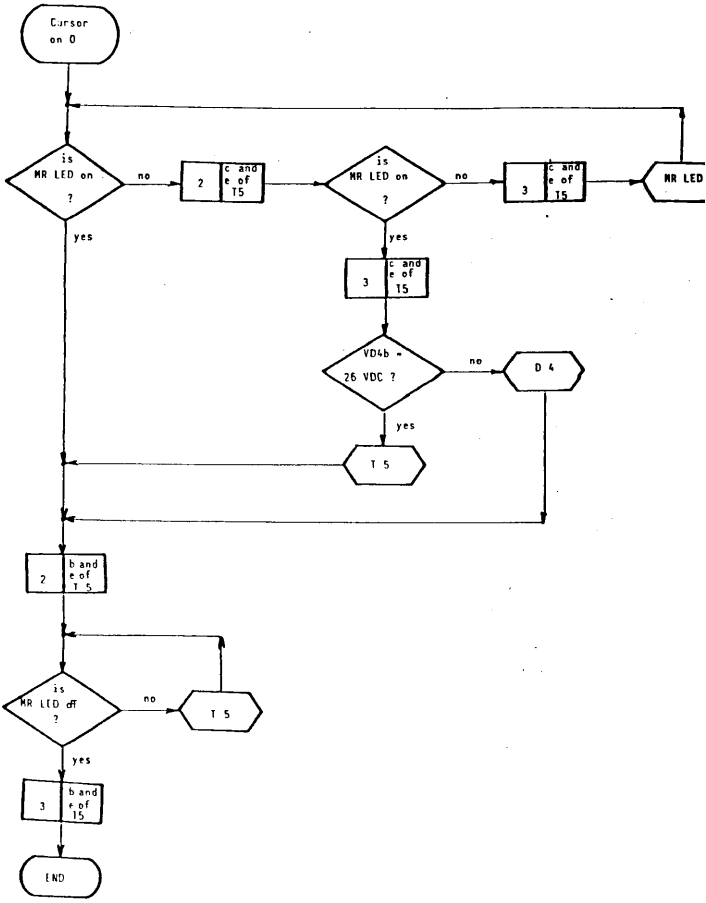
BUZZER CIRCUIT 8



MOTOR ADVANCE CIRCUIT 9



MOTOR REVERSING CIRCUIT 10



Item		Reference	Designation			
R 1		884 3	Resistance	6,8	kΩ	1/4 W
R 2		846 7	Resistance	10	kΩ	1/4 W
R 3		884 3	Resistance	6,8	kΩ	1/4 W
R 4		846 7	Resistance	10	kΩ	1/4 W
R 5		846 8	Resistance	2,2	kΩ	1/4 W
R 6		872 5	Resistance	2,2	Ω	1/2 W
R 7		706 2	Resistance	330	Ω	1/4 W
R 8		884 2	Resistance	1	kΩ	1/4 W
R 9		846 8	Resistance	2,2	kΩ	1/4 W
R10		846 8	Resistance	2,2	kΩ	1/4 W
R11		884 2	Resistance	1	kΩ	1/4 W
R12		846 7	Resistance	10	kΩ	1/4 W
R13		869 4	Resistance	680	Ω	1/4 W
R14		846 8	Resistance	2,2	kΩ	1/4 W
R15		846 7	Resistance	10	kΩ	1/4 W
R16		846 6	Resistance	100	kΩ	1/4 W
R17		846 7	Resistance	10	kΩ	1/4 W
R18		846 7	Resistance	10	kΩ	1/4 W
R19		846 7	Resistance	10	kΩ	1/4 W
R20		846 7	Resistance	10	kΩ	1/4 W
R21		846 7	Resistance	10	kΩ	1/4 W
R22						
R23		846 7	Resistance	10	kΩ	1/4 W
R24		846 7	Resistance	10	kΩ	1/4 W
R25		846 7	Resistance	10	kΩ	1/4 W
R26		846 7	Resistance	10	kΩ	1/4 W
R27		846 7	Resistance	10	kΩ	1/4 W
R28		846 6	Resistance	100	kΩ	1/4 W
R29		707 3	Resistance	47	kΩ	1/4 W
R30		846 7	Resistance	10	kΩ	1/4 W
R31		884 2	Resistance	1	kΩ	1/4 W
R32		706 0	Resistance	56	Ω	1/4 W
R33		846 7	Resistance	10	kΩ	1/4 W
R34		884 2	Resistance	1	kΩ	1/4 W
R35		706 0	Resistance	56	Ω	1/4 W
R36		884 2	Resistance	1	kΩ	1/4 W
R37		846 7	Resistance	10	kΩ	1/4 W
R38		846 7	Resistance	10	kΩ	1/4 W
R39		846 6	Resistance	100	kΩ	1/4 W
R40		846 7	Resistance	10	kΩ	1/4 W
R41		846 6	Resistance	100	kΩ	1/4 W
R42		846 8	Resistance	2,2	kΩ	1/4 W
R43		846 8	Resistance	2,2	kΩ	1/4 W
R44		846 6	Resistance	100	kΩ	1/4 W
R45		706 1	Resistance	120	Ω	1 W
R46		705 9	Resistance	39	kΩ	1/4 W
R47		864 2	Resistance	1	kΩ	1/4 W
R48		884 2	Resistance	1	kΩ	1/4 W
G		705 6	Transducer G			
		704 4	Main printed board			
		706 4	Bracket for printed circuit 24 plugs			
		706 6	Contacts COP for tests			
		707 2	Contacts for transducer			
		706 3	Integrated circuit COP 410 L			
L 3		708 7	Self 470 µH			
		859 4	Bracking skate			

Item	Reference	Designation		
P 2	724 2	Potentiometer 6,8 kΩ		
P 3	722 1	Potentiometer 220 kΩ		
Tr1	898 4	Triac TLC 221 T		
Tr2	898 4	Triac TLC 221 T		
T 2	707 4	Phototransistor TIL 621		
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Z 2	888 4	Diode Zener 51 V 1 W		
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D17	849 3	Diode IN 4148		
C 4	893 8	Chemical condensor	1 µF	20 V mini
C 5	893 8	Chemical condensor	1 µF	20 V mini
C 6	871 9	Non polarized condensor	10 µF	20 V mini
C 7	707 5	Polarized condensor	10 µF	20 V mini
C 8	707 5	Polarized condensor	10 µF	20 V mini
C 9	897 5	Non polarized condensor	9,5 µF	
C10	705 8	Condensor	200 pF	2,5 %
C11	703 6	Plastic condensor	0,22 µF	20 V mini
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C16	893 9	Plastic condensor	0,1 µF	20 V mini
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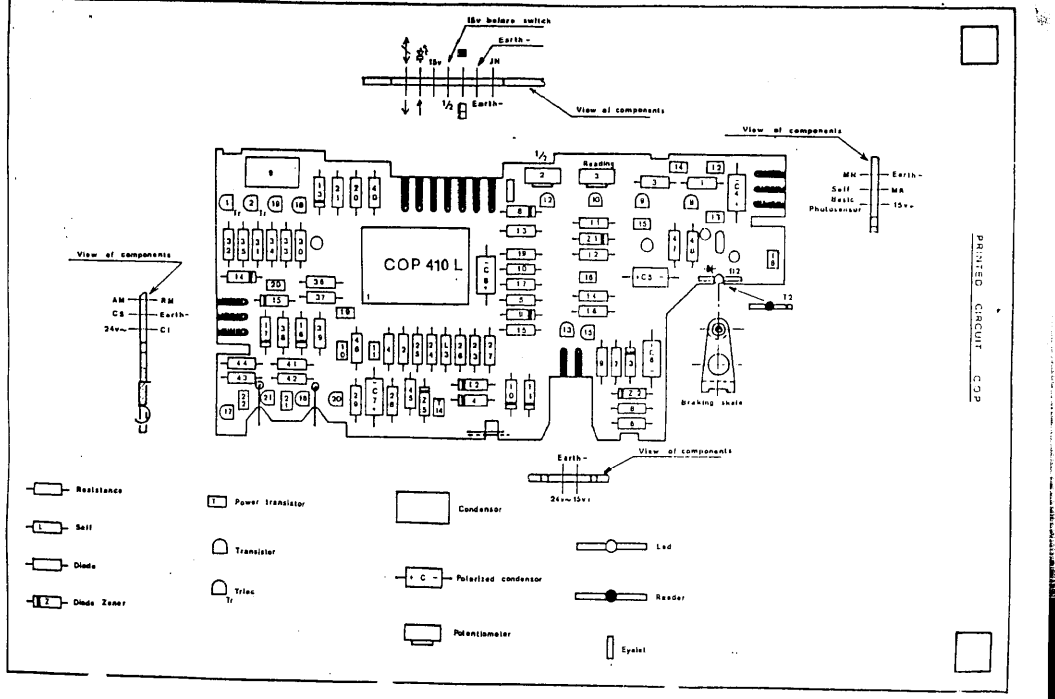
C21	877 8	Ceramic condensor	10 nF	20 V mini
C22	877 8	Ceramic condensor	10 nF	20 V mini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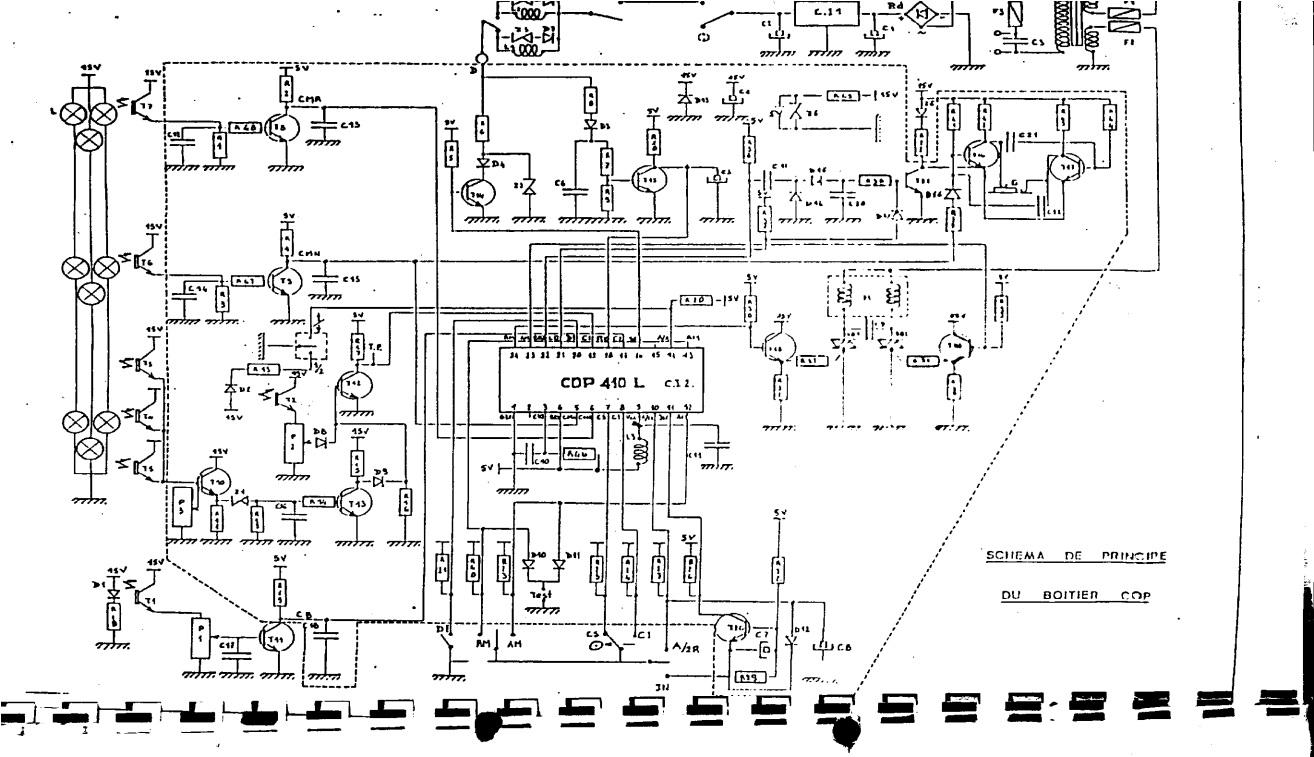
COP 410 L C.12.
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