# MISS BOWLING TURBO

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Manual for exploitation and servicing

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made in Belgium

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MANUAL MISS BOWLING TURBO

PRINCIPLES OF THE GAME.

The Miss Bowling Turbo contains two coloured score cards.the main card on the left and the extra card on the right. They both contain 2 coloured score-lines: RED and YELLOW in the MAIN CARD and GREEN and WHITE in the EXTRA CARD.

The score cards consist of a matrix of 5 COL's and 10 ROW'S.
We can replace the figures horizontally over one position to the left and to the right, starting from a neutral position, using the ABCDE-buttons on the front-molding.They can be replaced just before shooting the 5th ball, depending on the feature which is lit.
We can obtain this feature by pushing several times when starting the game,so reducing the number of points.
In the same way, we also can obtain other features, which increase the possibilities of the game and raise the scores.

THESE FEATURES ARE :

- the score for 3/4/5 figures in line for 4 colours

- corner score : when playing the numbers in the corners in the main card, the score is equal to 5 in line in the red card.

- 4 stars as green : when playing the 4 stars in the extra card, the score is equal to playing 5 in line on the green card.

- Extra card : the game is permitted in the E.C.

- Diagonal striped : the chances of scoring on the E.C.are higher,thanks to the striped lines.

- Bonus 16 : when feature is lit, the next step of the bonus can be achieved, when playing number 16.When it is played 6 times,the bonus bulb will start to flicker. At that moment the player can double the green score by pushing the X-button or collect the bonus.



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- Rollovers : if the rollovers are lit and played, the player can handle the ABC-feature up to the 5th ball.

- OK ANY 2 & ANY 3 : the player can get a free game by playing 2 or 3 stars if this feature is lit. The features of the free game (OK-game) will depend on the red score.

- Extra ball : the player can get four extra balls by pushing of points with the yellow startbutton, if the 5th ball is played.

- The game contains 5 EXTRA BALLS

- The two counters "POT BONUS MAIN CARD" and "POT BONUS EXTRA CARD" are raised by 3 or 5 points, after a fixed number of starts.

- Feature strikes number : When the feature lits, the player is offered the chance to win the POTS. To do so he has to play the 5 numbers circled in black in the Main Card and the Extra Card.



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PLACING THE APPARATUS

2.1 Visual inspection

On receiving the apparatus, it is advisable to check it before connecting it and to find out whether any damage has occured during the transport :
- all plugs have to be put in well
- foreign objects may not lay on the prints(pay attention to the keys)
- the transfo connections and feed cables have to be unimpaired
- all balls need to be in the ball groove.

All connections among the prints are carried out by means of flat cables of 16-24-26 and 50 conductors to avoid confounding these connections.

On the CPU there are two flat cables J281 and 285 and two other J282 and J283 which can be interchanged.In that case, the apparatus will not function properly, but nothing will be damaged. On the PR234, the Magic Motors and 2 flat cables with 16 conductors come together.These may not be interchanged, in order to avoid this, the flat cables have a different colour, blue and grey.The grey cable is indicated on the print by means of a grey label. The direction of the plugs does no longer pose any problems. Essentially, the red conductors on the flat cables refer to PIN 1 of each connector, Pin 1 is also indicated by means of a small triangle on each print. It is not advisable to remove or insert the plugs when the apparatus is connected as this may damage the integrated connections, except for the sw.matrix and the displays.

2.2 Connections between head and body

When dismantling the bingo, 4 cables have to be disconnected :

- the cable to the mecanic counters (MTA 10)
- the feed cable of the CPU (MAT'N LOCK 12)
- the feed cable of the Power Driver (LOCK 15)
- the cable of the switch matrix A (flat J281)

In this case, no mistakes are possible.

Remarks :
---
3 types of connectors have been used, all of the mark AMP

- large white and brown connectors, mate and lock
  the connectors have got 15 contacts (feed-cable, power driver and transformator) or 12 contacts (feed cable CPU) and must not be more loaded than 12A

- connectors in which the conductors and the isolation are fixed into a kind of fork. Type MTA5/10/24 contacts of 4A at most.

- connectors for the flat cables with 16-24-26 or 50 conductors of 1A at most.



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## 2.3. Connecting the telephone box

- TLF A,B,C and D for switch information
- Commun Counters and commun TLF connected with each other on the print.
- TLF IN and TLF OUT for handling the counters, which implies 7 connection wires.
- The counter can also be used for 50VDC.
- Counters of 50VAC can also be used, in that case the bridge BY164 and the C4 capacity (100MF-100V) have to be taken away from the PR235 and the 2 strapps have to be placed between the + connection and an alternating-current connection, the same between the -connection and the other side of the alternating-current connection.

When DIPSW H5 is ON ,the values correspond more exactly with the belgian ones.

| | | | | | | |
|---|---|---|---|---|---|---|
| H5 OFF | : | 10 | 25 | 50 | 100 | 200 | OUT |
| H5 ON | : | 20 | 50 | 100 | 500 | 1000 | OUT |

See information dipswitches

## 3. Mode 3 /5 per point

If the game is started with the Rred button, the replay register is decreased by 3 units. The internal counters are also decreased by the same number of units.

One unit on the replay register corresponds with 1fr. If the game is started with the select button, at the left side of the door, the replay register decreases by 5 units. Afterwards, the Red Button can be used to start.

In the replay register, another digit is found which indicates the mode (3Fr or 5Fr).
By means of DIPSW D1, the function of the Red and Select button can be chosen.

The following possibilities exist :

DIPSW D1 OFF : 1st start with the red button = 3
1st start with select button = 5

DIPSW D2 ON : 1st start with red button = 5
1ST start with select button = 3



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## 4.THE SUPER REFLEX

### 4.1. The reflex

The reflex is an electronic counter (not volatile,so it keeps its value) from 0 up to 128000 (address 8015).This value is typical for the number of benefits the bingo will give.
When the reflex is on 0, the bingo will give many benefits, it is liberal. When the reflex is on 128000 it will give fewer benefits, so it is conservative.
The reflex is a dynamic counter, it varies according as points are decounted or won.
One point started implies a decrease of the reflex by the programmed percentage (see dipsw A1 up to A6) This value is called the reflex ratio . One point scored will increase the reflex by 100 units.
F.ex. the bingo is programmed at 85% and the reflex = 100 000, when starting one point the reflex=99915; suppose 4 points are scored , then the reflex=100315.

The more points are started, the more the bingo will become liberal.The more points are scored, the more the bingo will become conservative. The reflex and the telephone do not function when the door is opened.

### 4.2. The super reflex

After a pre-programmed number of starts (see dipsw D2 and D3) the bingo calculates the real percentage of the game after starting the first ball (eventually extra ball). It compares this percentage with the desired value. When it is not between +2% and -2%, the super reflex will change it : so the bingo is in correction. The super reflex flag is now 43. The super reflex will change the reflex ratio by steps of 5% If the % is too high, the reflex ratio will be 80% f.ex. When it is too low, the reflex ratio will be 90% f.ex. This value can be controlled on the address 8057; super reflex correction.It can be minimum 60% and maximum 125% so once the bingo is in correction, it will become liberal less soon or sooner. The super reflex will intervene after 10000 starts. The number of starts counted can be controlled on the address 8056= super reflex counter.

Rem.: the super reflex uses electronic indexes from group 2.
--- It can be switched off by means of dipsw H7 being OFF.
It does not function when the door is opened.



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## 5.Feature key - key index

In the apparatus there are 3 groups of electronic counters : 1,2 and 3 consisting of :

- TLF IN : all points started with remote control
- TLF OUT : all points decounted with the remote control
- TOT IN : all started points for GAME as well as for E.B.
- TOT OUT : all regained points 3-4-5 in line as well as the Pots
- C.B. : all Pots started via the coin acceptor

Group 1 is used to keep all the counters between 2 accounts. After each account, they have to be placed on 0 again.

Group 2 is used by the CPU to regulate automatically the desired percentage. These counters are very important and may not be voluntary placed on 0.

Group 3 is used as absolute counters and are regulated like the mechanic counters.

In order to facilitate the commercial exploitation, a switch has been added in front of the ball-groove.

By means of this switch the groups of electronic counters can be checked. When the switch is closed the A,B,C,D and E buttons have got the following functions :

| | |
|---|---|
| A BUT | TLF IN |
| B BUT | TLF OUT |
| C BUT | TOTAL IN |
| D BUT | TOTAL OUT |
| E BUT | CASH BOX |

When closing this switch, the RPREG indicates the calculated %

$$\left(= \frac{\text{TOT OUT} \times 100}{\text{TOT IN}}\right)$$

The point value display indicates the group which is visible. When closing the A-but , the TLF IN value can be seen on the POT-display.



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Only the 4 digits on the right have to be charged
f.ex.

| MAIN CARD | EXTRA CARD |
|---|---|
| 0 0 0 1 2 | 0 3 4 5 6 |

In this exemple TLF IN = 0012/3456

One has to strike out the left digit and bring both counters together. So the result can be read.

When no button is pushed, one can read the difference between TLF IN and TLF OUT.If the result is negative, the decimal points are lit. The counters can be placed on 0 by pushing the X-button.

When pushing the yellow button (Extra ball button) one can switch over to another group. 2 appears instead of 1. Now the 5 counters of group 2 can be made visible. The same goes for group 3.
These counters can be found by means of the service box

TLF IN GR 1 = 8018
:
:
CB GR 3 = 8050



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# 6.FUNCTION AND PROGRAMMING OF THE DIPSWITCHES

## 6.1. The dipswitches

The PR328 contains 64 dipswitches(also called pencil switches as they can be handled easily by means of a pencil)
The dipswitches are used to pre-programme the game in different modes. They are subdivided in 8 groups of 8 switches

A 1--8
B 1--8
.
.
.
H 1--8

These dipswitches can only be put inON or OFF position, as indicated.

## 6.2. Checking the dipswitches without opening the apparatus

The door is opened and the service box is connected. When the service switch is closed, the symbol referring to the group of dipswitches can be seen. We first get A, by pushing +1 switch b appears, etc...
The decimal points on the display of the Pots indicate that the dipswitches are closed per group.
This can be read as follows :

POT MAIN CARD  POT EXTRA CARD

8 7 6 5  4 3 2 1

In this exemple it can be seen that the dipsw.3,5,7 and 8 are ON.The addresses of the dipswitches can be read on the RP REG
The digit beneath the RPREG indicates the group of dipswitches

| Symbol which can be read | corresponding group of dipsw. |
|---|---|
| A | A |
| B | B |
| C | C |
| D | D |
| E | E |
| F | F |
| O | G |
| I | H |



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## DIPSWITCH TABLE MISS BOWLING TURBO

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| A | REFLEX RATIO UNITS 1-2-3-4-5-6-7-8-9 BIT 0 | BIT 1 | BIT 2 | BIT 3 | REFLEX RATIO TENTS 60-70-80-90 BIT 0 | BIT 1 | GAME SPEED BIT 0 | GAME SPEED BIT 1 |
| B | NUMBER OFF COINS CSW1 | | NUMBER OFF COINS CSW2 | | NUMBER OFF COINS CSW3 | | NUMBER OFF POINTS CSW1 | |
| C | EE19 ACTIF IF ON | NUMBER OFF POINTS CSW2 | | | NUMBER OFF POINTS CSW3 | | | NUMBER OFF POINTS CSW1 |
| D | IF ON NO TILT DURING START | SUPER REFLEX ACTION BIT 0 | BIT 1 | SELECT GENERAL BOOSTER | SCORE + EB GENERAL BOOSTER | SCORE FIRST OPTION IF ON | MULTIPL SCORE IF ON | CORNER BOOSTER IF ON |
| E | CORNER BOOSTER IF ON | 4 STARS BOOSTER IF ON | 4 STARS BOOSTER IF ON | STRIPP. DIAGON BOOSTER IF ON | STRIPP. DIAGON BOOSTER IF ON | STRIPP. DIAGON BOOSTER IF ON | EXTRA CARD BOOSTER IF ON | ANY 2 BOOSTER IF ON |
| F | ANY 3 BOOSTER IF ON | EXTRA BALL BOOSTER IF ON | EXTRA BALL BOOSTER IF ON | EXTRA BALL BOOSTER IF ON | EXTRA BALL BOOSTER IF ON | COUNT BALLS IF ON | BLOCK REFLEX IF ON | NO RPREG DECREM IF ON |
| G | LOCK WHEN OVER LOAD | OPTION 32 FOR EB 1,2,3 | OPTION 64 FOR EB 4 IF ON | OPTION 32 FOR SELEC-TION | OPTION 80 FOR 5th EB IF ON | 2nd MIXER IF ON | ALWAYS OFF | ALWAYS OFF |
| H | TEST EPROM MEMORY IF ON | RPREG MAX BIT 0 | RPREG MAX BIT 1 | RPREG MAX BIT 2 | OTHER REMOTE CONTROL LIST | ELECTR KEY ACTIF IF ON | SUPER REFLEX ACTION IF ON | 3/5 CREDIT MODE IF ON |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |



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## 6.3.Coin acceptor control

### COINS COUNT ADJUSTMENT CHART

| B4 | B3 | B2 | B1 | FOR RIGHT COIN SLOT |
|---|---|---|---|---|
| C4 | C3 | C2 | C1 | FOR LEFT COIN SLOT |
| OFF | OFF | OFF | OFF | 1 COIN |
| OFF | OFF | OFF | ON | 2 COINS |
| OFF | OFF | ON | OFF | 3 COINS |
| OFF | OFF | ON | ON | 4 COINS |
| OFF | ON | OFF | ON | 5 COINS |
| OFF | ON | OFF | ON | 6 COINS |
| OFF | ON | ON | OFF | 7 COINS |
| OFF | ON | ON | ON | 8 COINS |
| ON | OFF | OFF | OFF | 9 COINS |
| ON | OFF | OFF | ON | 10 COINS |
| ON | OFF | ON | OFF | 11 COINS |
| ON | OFF | ON | ON | 12 COINS |
| ON | ON | OFF | OFF | 13 COINS |
| ON | ON | OFF | ON | 14 COINS |
| ON | ON | ON | OFF | 15 COINS |
| ON | ON | ON | ON | 16 COINS |

### REPLAY REGISTER (TRANSFER BY COIN) VALUE CHART

| B8 | B7 | B6 | B5 | FOR RIGHT COIN OPERATING |
|---|---|---|---|---|
| C8 | C7 | C6 | C5 | FOR LEFT COIN OPERATING |
| | | | | TRANSFER POINT COUNT |
| OFF | OFF | OFF | OFF | 0 POINT (coin sw inactive) |
| OFF | OFF | OFF | ON | 1 POINT |
| OFF | OFF | ON | OFF | 2 POINTS |
| OFF | OFF | ON | ON | 3 POINTS |
| OFF | ON | OFF | OFF | 4 " |
| OFF | ON | OFF | ON | 5 " |
| OFF | ON | ON | OFF | 6 " |
| OFF | ON | ON | ON | 7 " |
| ON | OFF | OFF | OFF | 8 " |
| ON | OFF | OFF | ON | 9 " |
| ON | OFF | ON | OFF | 10 " |
| ON | OFF | ON | ON | 11 " |
| ON | ON | OFF | OFF | 12 " |
| ON | ON | OFF | ON | 13 " |
| ON | ON | ON | OFF | 14 " |
| ON | ON | ON | ON | 20 " |



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## 6.4. Regulating the reflex

The reflex can be programmed between 60% and 90% by means of the dipswitches A 1 2 3 4 5

### a. Regulation of the units of the reflex ratio

| A4 | A3 | A2 | A1 | unit values of the reflex ratio |
|---|---|---|---|---|
| OFF | OFF | OFF | OFF | 0 |
| OFF | OFF | OFF | ON | 1 |
| OFF | OFF | ON | OFF | 2 |
| OFF | OFF | ON | ON | 3 |
| OFF | ON | OFF | OFF | 4 |
| OFF | ON | OFF | ON | 5 |
| OFF | ON | ON | OFF | 6 |
| OFF | ON | ON | ON | 7 |
| ON | OFF | OFF | OFF | 8 |
| ON | OFF | OFF | ON | 9 |

### b. Regulation of the tens of the reflex ratio

| A6 | A5 | TENS |
|---|---|---|
| OFF | OFF | 60 |
| OFF | ON | 70 |
| ON | OFF | 80 |
| ON | ON | 90 |

### c. Blocking the reflex

When DIPSW H7 is ON, the reflex stops

note : if the door is opened, the reflex will not change

### d. Regulating the number of starts after which the super reflex will correct the reflex ratio if necessary

| D3 | D2 | NUMBER OF STARTS |
|---|---|---|
| OFF | OFF | 1,000 |
| OFF | ON | 2,500 |
| ON | OFF | 5,000 |
| ON | ON | 10,000 |



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## 6.5 Regulation of the RP REG MAX (see also 6.6)

The dipswitches H2 3 4 allow for programming the maximum value of the rep reg.These dipswitches form a binary code which programmes one of the following values :

| H4 | H3 | H2 | RPREG MAX |
|---|---|---|---|
| OFF | OFF | OFF | 6,000 |
| OFF | OFF | ON | 10,000 |
| OFF | ON | OFF | 12,500 |
| OFF | ON | ON | 15,000 |
| ON | OFF. | OFF | 20,000 |
| ON | OFF | ON | 25,000 |
| ON | ON | OFF | 50,000 |
| ON | ON | ON | 100,000 |

## 6.6 Putting the bingo into operation again, after RPREG MAX has been reached.

When RP REG Max has been reached, the game is blocked and the RP REG remains at the programmed value.
The number of points cannot be decreased anymore, nor by using the ON/OFF button, neither by using the out-button (the latter depends on G1).By means of DIPSW G1, two modes can be programmed :

G1 ON : it is possible to deblock the game by using the OUT button or by switching the bingo ON/OFF.
Consequently, a technician has to be called for

G1 OFF : it is no use to switch the bingo OFF/ON, the points can be decreased by pushing the OUT button

It can be easily notified when the RPREG Max has been reached, because then, the tilt-bulb remains burning instead of flickering.

In order to deblock the bingo, the following has to be done
- opening the door and connecting a service box
- at the same time, giving a pulse by using the +1,-1 and SEE

The counter will be put on 0 and the TILT and GAME trips will automatically be pulled up. We can complete the payment by pushing the R button.



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## 6.7.Regulating the speed of the game

The dipsw.A7-8 allow for programming 4 different speed possibilities, according to the following table :

| A8 | A7 | | | |
|---|---|---|---|---|
| OFF | OFF | DEGREE | 1 | FASTEST |
| OFF | ON | DEGREE | 2 | |
| ON | OFF | DEGREE | 3 | |
| ON | ON | DEGREE | 4 | SLOWEST |

## 6.8.Security systems

When dipsw F6 is ON, the switches closed by the balls are counted. In total, 10 balls are present, so at most 10 switches can be closed by the balls.
When there are switches closed in an abnormal way or when they remain closed, the game will be TILT from the moment the R-button is pushed. The MISS BOWLING TURBO has been fit with double, complete switches which make cheating more difficult.

## 6.9.Regulating the points in case of POWER UP

F8 ON : power up does not imply decreasing the points
F8 OFF: power up means decreasing the points

## 6.10.Telephone values

With the MISS BOWLING TURBO , two different remote control lists can

be used, depending wether dipsw H5 is ON or OFF

H5 OFF : indicates the former values

ON : indicates the new values, better suited for the 3FR/5FR mode

The remote control system is based on binary codes
There are 4 bits : A B C D. According to the binary codes which are forming 4 bits, following transferts are done :



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## 6.11. Option 32 for selection and extra ball

Dipsw 64 ON : option 32 for selection
63 ON : option 64 for 4th extra ball
62 ON : option 32 for 1st, 2nd and 3rd ball

This option gives the certainty that the selection and the 1st, 2nd and 3rd extra ball will move one step forward after 32 starts and that the 4th extra ball moves one step forward after 64 starts.

## 6.12. Memory test

When H1 is ON a permanent test of the EPROM memory is carried out (see chapter 12 error codes)
This dipsw has to be off when the bingo is working normally

## 6.13. MULTIPLE STEP SCORE

When DIPSW D7 is ON, we have the opportunity of multiple step score. With MISS BOWLING TURBO, a score can immediately jump from 4 to 32 with Dipsw D7 ON

## 6.14. First option score

In case D6 is ON, the selection and trip relays will not be activated unless the green score has reached the value. This enables the scores to be sent up more rapidly.

## 6.15. Regulating the features

The principle remains the same : in case the dipsw is ON, more chances are added :

- score and extra ball : D5 (in general)
- selection and trip relays : D4 (in general)
- corner D8 (65-10) and E1 (78-9)
- 4 stars as green : E2 (JPA) E3 (JPB)
- Stripped Diagonals : E 4 5 6
- Extra Card : E7
- Any 2: E8
- Any 3: F1
- Extra ball : F2 F3 F4 F5 (17 16 15 14)
  also for the 4th ball
- second mixer - remark : if G6 is ON, the chances for extra ball and the score are reduced.



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## 7. REGISTERING POINTS VIA THE SERVICE BOX

The door is opened, the service box connected and the service sw closed. When the A and B buttons are closed at the same time, 100 or 500 points are registered on the RPREG , depending on the position of H5.

In case any points are registered when the door is open, it has to remain open when playing.

If this does not happen, the interior electronic counters will not function properly and the working of the super reflex is interrupted because the balance is not correct anymore.

## 8. TESTING THE INPUT MATRIXES

### 8.1 The input matrixes

A matrix can be represented as a rectangle. It consists of ROWS and COLUMNS (COL).
At every point of intersection of a Row and a Col, a switch and a diode are placed in series.
Referring to an A matrix , A COL and A ROW are used.
The diodes are always connected with the cathode in the direction of the Rows. On the CPU, the switch matrix A is in contact with the connector J281.

In order to connect the switchmatrixes flat cables with 16 conductors are used.

### 8.2 Testing switchmatrix A

This remains the same s for Miss Bonus, but the Key contact, Trough switches 8 and 9 and Select Button are added.
The table on the next page indicates the place of every switch on the matrix.
The switches are numbered from 1 up to 64.



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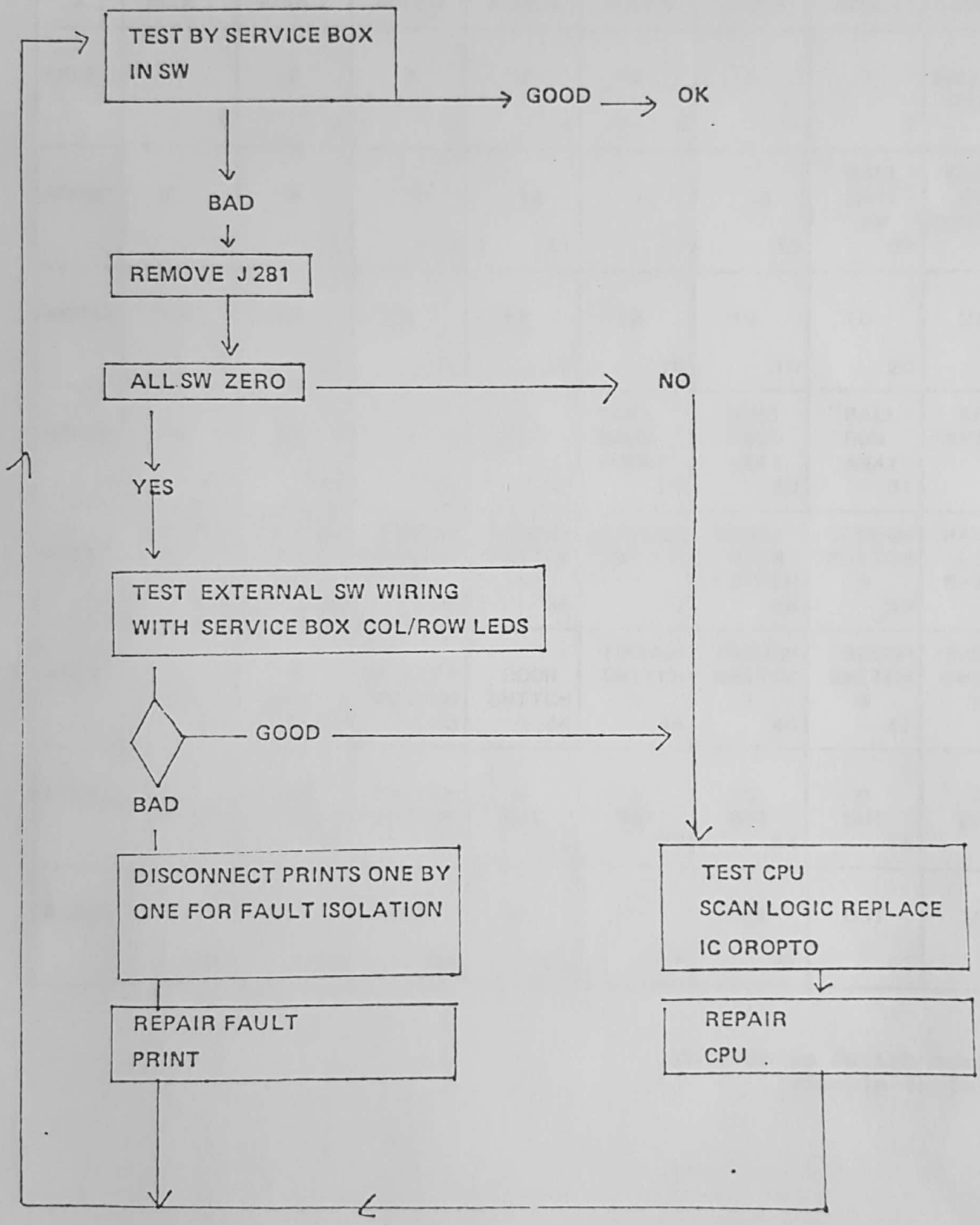
CHART FLOW FOR SW MATRIX A
TROUBLE SHOOTING

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## SWITCHMATRIX A

| A | ACOL1 | ACOL2 | ACOL3 | ACOL4 | ACOL5 | ACOL6 | ACOL7 | ACOL8 |
|---|---|---|---|---|---|---|---|---|
| AROW1 | 1 1 | 2 2 | 3 3 | 4 4 | 5 5 | 6 6 | 7 7 | SHUTTER SWITCH 26 |
| AROW2 | 8 8 | 9 9 | 10 10 | 11 11 | 12 12 | 13 13 | BALL GATE SW 27 | CARRY OVER SHUTTER 28 |
| AROW3 | 14 14 | 15 15 | 16 16 | 17 17 | 18 18 | 19 19 | 20 20 | 21 21 |
| AROW4 | 22 22 | 23 23 | 24 24 | 25 25 | ROLL OVER RIGHT 29 | ROLL OVER LEFT 30 | BALL RUN AWAY 31 | KEY SWITCH 32 |
| AROW5 | TROUGH SWITCH 1 33 | TROUGH SWITCH 2 34 | TROUGH SWITCH 3 35 | TROUGH SWITCH 4 36 | TROUGH SWITCH 7 37 | CARRY OVER LIFTER 38 | TROUGH SWITCH 9 39 | MANUAL LIFT SWITCH 40 |
| AROW6 | R BUT 41 | X BUT 42 | SELECT BUTTON 43 | DOOR SWITCH 44 | TROUGH SWITCH 0 45 | TROUGH SWITCH 5 46 | TROUGH SWITCH 6 47 | TROUGH SWITCH 8 48 |
| AROW7 | TILT SWITCH 49 | RED BUTTON 50 | YELLOW BUTTON 51 | A BUT 52 | B BUT 53 | C BUT 54 | D BUT 55 | E BUT 56 |
| AROW8 | 57 | 58 | SERV 59 | +1 60 | -1 61 | SEE 62 | OUT 63 | IN 64 |

EX. 26 is switch number
visible in IN-test



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In order to carry out the IN-test, the following has to be done :

- switch on the tilt contact to close the holes
- remove all the balls
  as a result, all contacts of the Sw matrix will be open, except for the door sw. (which is ON when the door is open)
- connect a service box and put into operation the SW SV 6 : IN (test of the inputs)

The display POT MAIN CARD must show continously number 44, this is the number of the door sw. Then all contacts to be tested have to be put into operation one by one. The number of these contacts has to appear alternating with the number 44. Only two numbers may appear.
If an error is found when carrying out the IN test, it can be due to the CPU or to the exterior connections. To find this out, the following has to be done :

J281 has to be disconnected from the CPU and connected to the second plug at the right side of the service box. Row 1 has to be put into operation by means of the rotation switch, only one Led row must be lit.
If two Led Rows are lit, there is a short-circuit between the two Rows.

Next the 8 cobtacts of Row 1 have to be tested (the Led Col has to be lit and again, only one per contact)
Switch to Row 2 by means of the rotation switch and repeat the whole test. when a short-circuit is found, the prints connected to this cable, have to be disconnected.

These are :
the PR238 : the TROUGH SW
the PR246 : 1 up to 5 the HOLE SW of the Playfield
the PR350 : here, the door contact MTA 10, the select and the key switch MTA 5 and the contacts of the play-field FLAT16 are come together. Starting from this print, a flat 16 goes to the Trough Switch and further to the CPU (J281). The proper service box and the cable can also produce short circuits in the sw matrix.

Suppose the statical test is all right, but the IN test keeps lighting up numbers of the contacts operating then the defect is on the CPU. It will be seen that the defect is found on an 8 sw of a row or a col or in any case on a multiple of 8 sw.

The scan pulses for testing the switchmatrix A are incited by Q10 on the points 32.33.34.35
These scan pulses have to be rectangular and may not be transformed. These same signals can be measured on the test-points TP 1,2,3 and 4 and via the gates of Q1 (TPA= 2,1 ms, TP2= 4,3 ms, TP3= 8,5 ms and TP 4= 17,1 ms)
The scanpulses are comming from a 3 to 8 decoder Q5. If the 8 switches of a single or more rows do not get through, this can be due to decoder Q5.



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Sometimes it is also possible that the scan pulses are transformed. In this case, the switches will not get through or the wrong switches will be detected.
In case of 8 switches of one and the same COL the following IC's have to be replaced :

| | | | |
|---|---|---|---|
| A COL 1 | ---- Q6 | A COL 5 | --- Q22 |
| 2 | ---- Q8 | 6 | --- Q23 |
| 3 | ---- Q7 | 7 | --- Q24 |
| 4 | ---- Q9 | 8 | --- Q25 |

these are opto-couplers of the type 4N25 (6 pins). They are placed in groups of 2, in 1-pins IC sockets, teh middle pin being left open. See to it that the opto's are placed correctly in the socket.
On the following page the trouble shooting chart for Sw Matrix A. is given.

## 8.3. TEST OF SWITCH MATRIX B = DIPSWITCHES

PROCEDURE: see chapter 6.2

With this closed switch, a decimal print corresponds on the Pot Main Card and Pot Extra Card.

TROUBLE SHOOTING

When we notice a difference, we have to apply the same procedure as with Sw Matrix A, the testpoints now are TP 5,6, 7, 8.
The 3 to 8 decoder is for the Switch Matrix B Q44 (74145).
Here, there are no opto-coupleurs on the Col's. If the scan-signals are right, we have to find a dipswitch or a broken diode or a short-circuit on the print. It is also possible that Q33 or Q34 transform the scan signals (replace Q33 and Q34 one by one)
If the scan signals on Q36 are not present, they have to be changed.

## 8.4 TEST OF THE SWITCH MATRIX C

On the CPU shedule we can see that the construction of the switch matrix C (J285) is totally equal to Sw matrix A.
The testprocedure :
Connect a Service Box with e Sw +1 and -1,
establish the address of the magic Sw A (see chapter 11 "See Inside")
In version MBV1.0 the Magic SWA address is totally equal to 8218.
On this address, we can control the two switches on the motor A.

| | |
|---|---|
| In central position we have to read | 00 |
| In run position (the 2 Sw On) | 03 |
| In left position | 02 |
| In right position | 01 |



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when the address is increased by one unit, the switches of magic motor B can be checked, etc...

Magic Motor A ----- 8021B
B ----- 8021C
C ----- 8021D
D ----- 8021E
E ----- 8021F

when the address is increased once more (821D) , the telephone switches can be checked. When the switches are ON, they correspond to the following codes :

10 ----- 01
25 ----- 02
50 ----- 03
100 ----- 04
7 ----- 07
OUT ----- OFF

TROUBLE SHOOTING IN CASE OF A DEFLECTION

The procedure is the same as with sw matrix A. The only difference is that J285 is used as connector and Q52 as decoder.

The opto-couplers are :

for CCOL 1--- Q55 CCOL 5 --- Q72
CCOL 2--- Q57 CCOL 6 --- Q74
CCOL 3--- Q56 CCOL 7 --- Q73
CCOL 4--- Q58 CCOL 8 --- Q75

The four test points are TP 9-10-11-12. The same signals have to be received as with the former matrixes. Switchmatrix C arrives on the CPU via connector J285. When this plug is connected with the service box, it is possible to check the matrix statically by means of the following table :
The opto-coupleurs are :



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## SWITCHMATRIX C

| C | CCOL1 | CCOL2 | CCOL3 | CCOL4 | CCOL5 | CCOL6 | CCOL7 | CCOL8 |
|---|---|---|---|---|---|---|---|---|
| CROW1 | MAGIC A SWITCH LEFT | MAGIC A SWITCH RIGHT | | | | | | |
| CROW2 | MAGIC B SWITCH LEFT | MAGIC B SWITCH RIGHT | | | | | | |
| CROW3 | MAGIC C SWITCH LEFT | MAGIC C SWITCH RIGHT | | | | | | |
| CROW4 | MAGIC D SWITCH LEFT | MAGIC D SWITCH RIGHT | | | | | | |
| CROW5 | MAGIC E SWITCH LEFT | MAGIC E SWITCH RIGHT | | | | | | |
| CROW6 | REMOTE CONTROL A | REMOTE CONTROL B | REMOTE CONTROL C | REMOTE CONTROL D | | | | |
| CROW7 | | | | | | | | |
| CROW8 | COIN SW 1 UP | COIN SW 2 UP | COIN SW 3 UP | COIN SW 1 DOWN | COIN SW 2 DOWN | COIN SW 3 DOWN | ALWAYS ON | DOOR TILT |



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## 9. TESING BULBS AND MOTORS

### 9.1 THE 2 LAMP MATRIXES

Miss Bowling Turbo contains 2 identical matrixes of 16 X-lines and 8 Y-lines, either 128 bulbs in each matrix, or 256 different bulbs in the entire game.

Another particularity of Miss Bowling Turbo is the VM now being 32 volt.
The + VM is connected by means of the Y-lines and the GN DVM by means of the X-lines.

(The cathodes of the diode in serie with the bulbs will be orientated towards the X-lines)

As there two identical matrixes, they are called AX/AY and BX/BY The AX/AY matrix leaves the CPU and is connected to J282 by means of a flat cable consisting of 26 conductors. The BXY matrix is connected to J283 , it can be seen on the scheme that an identical cable has been used.

The two connectors can be interchanged without any danger of damaging anything, but it will give an unlogical game.

### 9.2 TESTING THE LITES AND MOTORS

By means of the service box, the lites and motors test can be put into operation by connecting the SV5=OUTSW to the serv box.
The bulbs of the game are extinguished except for one and a number between 1 and 118 appears on the display pot main card = the number of the corresponding bulb.
Serv SW +1 and -1 are changing this number.
As a result, all bulbs of the two matrixes can be activated, this happens very fast.

When the circuit is disconnected and afterwards connected again with the door left open, the number of the bulb will not have changed. When pushing the R-button, number 1 will appear on the display and consequently the test will start again from 1( the same happens when switching the game on/off with the door being closed) The magic lites are only lit in vertical columns of groups of 5 lites.
As for Miss Bowling Turbo, the activation of the counters and engines is also carried out in the output matrix. The bulbs are numbered from 1 up to 100. Afterwards the electronic counters are tested.

101 : telephone IN
102 : telephone OUT
103 : total IN
104 : total OUT
105 : CASH
106 : Meter 1 (reserve)
107 : Meter 2 (reserve)
108 : lighting bulb of the counter
109 to 118 : magic lites per groups of 5 lits



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## 9.3 REGULATING THE INTENSITY OF THE BULBS

On the CPU, there are 2 potentiometers P1 and P2 beneath the Memory Module.

P1 is used to regulate the intensity of the bulbs of the AXY matrix
P2 is used to regulate the intensity of the bulbs of the BXY matrix

AXY : this matrix implies the magic lites, the score and extra ball bulbs
BXY : this matrix implies the feature, the tilt and selection bulbs

These potentiometers regulate the width of the pulses connected to the lamps. (pulses of 28,8 Volt)



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## 10. TESTING THE POWER VOLTAGES

The following voltages are used :

### 10.1 VCC AMOUNT

This is a voltage of about 11 volt DC, from which 3 voltages are derived :

a. the 5,25 V to give power to the IC's on the CPU
b. 6VDC to give power to the relays on the telephone system and those of the electromechanical counters
c. giving power to the 7 segment displays

The presence of Vcc (and consequently of Vcc amount) is indicated by a small led on the CPU, next to the heatsink. Beneath the heatsink, 2 testpoints are found. The right one being the GND and the left one the Vcc.

It is possible to measure Vcc amount on the connection of the C13 capacity. The Vcc has to amount to 5,25 V and can be regulated by means of potentiometer P4 next to the black heatsink.

Note : - the heatsink is not connected to the mass
- the CPU must not be taken by the chilling sheet

### 10.2 The +VM

The transfo has been supplied with 3 taps and as mentioned in chapter 9.3 the intensity of the light can be regulated electronically. However , +VM voltage must never be more than 33 Volt DC, as these voltages may damage the 7445 IC's on the CPU. The +VM depends upon the number of bulbs lit.
The transistors forming part of the output matrixes are on power driver PR251. The =VM can be seen on the middle heat-sink. It consists of the grey transistors BDX33. The GND is placed on the two outmost heatsinks, it consits of the green transistors BDX34.

### 10.3 General Illumination : GI

This is a tension of 6,3 VAC which is used to illuminate the front panel and the playfield and to feed the opto-couplers of the telephone system. This G.I. is rectified on the PR235 The testpoint of this G.I. capacity C3 or 470 Mf 16Vopto On PR 235 TLF IN , the voltage has to be more than 8VDC.

### 10.4 50 VAC

This voltage is used to give power to the game engines. It is rectified on the PR235 to feed the counter in the telephone box (see C4=100 MF 100V)
This volatge can be 70 V. The 50VAC test points are found on the PR 234 (magic motor)
The integrated circuits on this print are clearly indicated with 50VAC 1 and 50 VAC 2.



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## 11 SEE INSIDE - SERVICE BOX WIMI

The Wimi service box is a small box, indispensible for running the game. It combines two apparatusses in one :

- test of the apparatus switches.
- an apparatus for reading the memory positions of the game (left connector and six switches)
SV 1 up to SV 6, respectively SERV/plus 1/-1/SEE/OUT/IN).

It is connected to the PR 350 by means of a flat cable consisting of 16 conductors. Both on the PR 350 and teh service box, the red wire is to be at the upper side.

### 11.1 SEE INSIDE

With this programm, the memory positions can be checked and changed.

Procedure :
- connect the service box to the PR 350
- close the SERVSW , other letters and numbers will be read on the displays.

EXAMPLE

DPMC DPEC

RPREG

The displys give at this moment the data of 3 successive addresses of the memory :

| | | |
|---|---|---|
| Address | 8024 | data 52 |
| | 8025 | 24 |
| | 8026 | 03 |

these 3 addresses indicate the position of the reflex, so it can be seen that the reflex is equal to 32.452

The selected position in the memory is called the address = a number consisting of 4 figures or letters.

The address can be changed using the +1 and -1 buttons. Keep in mind that the addresses and data are always expressed in hexadecimal numbers.
It is possible to change the addresses step by step, by means of the +1 or -1 switches. If one of the switches is continually ON, the addresses will change at a very high speed.



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# H12 The electronic key system

## 12.1 Generalities

The electronic key system consists of 3 separate parts :

- the key module
- the elektronic key
- wiring and switching

The key module is a printed circuit connected to the CPU via J709 and to which the electronic key is connected. This print contains a 24pins IC socket for an Eprom type 2716-450 ns containing a decoded description of the key. The CPU reads the information, both of the Eprom and of the key and compares it. The key module also contains a CMOS RAM and a battery. The CPU can read and change the information of this RAM. This CMOS RAM is fed through the network of contacts which protects the different parts of the game.

From the moment, one of the contacts is activated, the data which has been written into the CMOS RAM by the CPU will be swept out, even if the game is not ON. When switching on the bingo, the CPU will check if the data is correct; if so, the game will start and the contents of the CMOS RAM will be checked periodically. In case the data does not correspond, a special key has to be connected to the key module. In case the key is recognized, the CPU will ignore the data of the CMOS RAM during the following sequences in order to be able to close the door. The moment the bingo is switched on, the data will again be written into the CMOS RAM and the periodic control starts.

The indications mentioned above have to be followed rigorously, if not the security system will be activated, the game will be blocked and the error codes EB04 or EB05 will appear.

## 12.2 Use of the key

In case one wants to open the game when the key module is on, the tension can be on or off. In both cases the contents of the CMOS RAM will be erased when opening one of the switches. In case the tension is on, this will immediately be detected by the CPU. In case the tension is not on, this will only be detected when switching it on and in case no key is connected, the error code EBQ2 will appear.

Consequently, when this code appears, it indicates that when the tension was switched on, the CMOS RAM information had been erased and that no key was connected.

In this case, one only has to connect the appropriate key and to switch on the game again; at that moment the game will start and the information will not be checked as long as the tension is on. At that moment, the game is completely ready for servicing. The moment the tension is switched off and on again, the CPU will compare periodically the contents of the Eprom with the one of the CMOS RAM. When at first checking, the contents of the CMOS RAM proves to be wrong, the error code EBQ3 will appear. This means that the information of the key written into the CMOS RAM is incorrect (e.g.a switch which is still on, a defective key, etc...)



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Summary :

1. If one wants to open the bingo when the tension is off :

- open the door and activate the doorswitch - connect a key and switch the tension on, from that moment the key may be removed.
- all switches can be removed without the game is stopped. - remove the key and close the door - switch the game on and off in order to activate the system

2. If one wants to open the game when the tension is on :

- when the door is opened, all the G-segments will light up; at this moment one has got about 20 seconds to close the door-switch and to connect a key. If a key corresponds to the Eprom, the game will continue to operate normally; if not, the error code EBQ5 will appear after 20 seconds. When the apparatus is not opened via the door, the error code EBQ4 will appear immediately.

Consequently :
- open the door and all the displays will extinguish
- disconnect the door-switch, connect the key, the game will operate normally after 20 seconds.
- the game is now ready for servicing
- remove the key, close the door and activate the system by switching A-but, C-but and E-but simultaneously.
- The EK OFF lamp will extinguish

12.3 Switching the electronic key system on and off

A. Switching the electronic key system off

In order to switch it off, only the dipswitch H6 is used, placed in its normal position is OFF

We proceed as follows :
- the appropriate key is connected
- H6 is switched ON
- when switching the game on, the code E0E0 has to appear which means that the electronic key system is switched off.
- after having switched the game off and on again, the switches do no longer have any influence.

Attention : a total RAM clear or a change of the CPU will automatically start operating the electronic key system. In order to disconnect the system, the procedure mentioned above has to be repeated.

Switching the system on again

H6 constantly OFF. Switch on the tension, at this moment the code E1E1 will appear. The E.K. system is now working again, so that when the tension is switched on again an appropriate key has to be connected.



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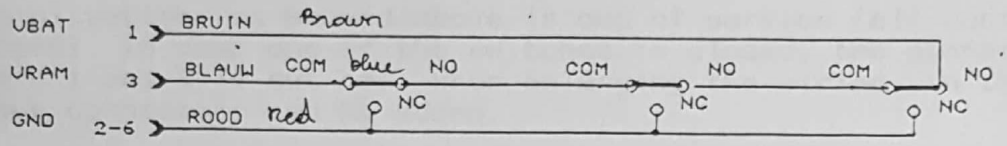
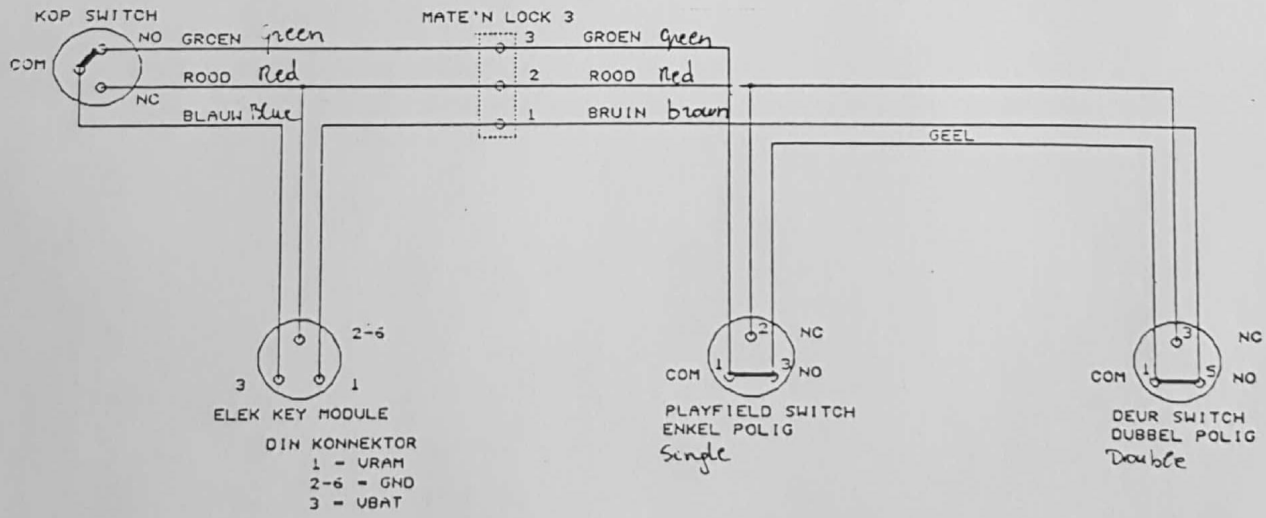
## 12.4. Wiring scheme for the electronic key system

din connector




The situation as showed above is out of service (all contacts are closed). If one of the switches is opened, the connection between 1 and 3 is cut off. When enlarging the wiring in the same way, other connectors can be added.

In order to test the wiring only an Ohm-meter is needed :
- when all switches are closed, a short-circuit has to be measured between pin 1 and pin 3
- this should never be done between pins 1 and 2
- when there is a faulty contact and a connection between 1 and 2 should occur when closing the switches, the diode 1N4148 on the electronic key module will be defective.

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- this should never be done between pins 1 and 2
- when there is a faulty contact and a connection between 1 and 2 should occur when closing the switches, the diode 1N4148 on the electronic key module will be defective.



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MAGIC LITES POSITION ON FRONT PANEL

| MAIN CARD | | | | | | | | | EXTRA CARD | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Á | B | C | D | E | | | | AA | BB | CC | DD | EE | | | | | |
| | F | G | H | I | J | | | | FF | GG | HH | II | JJ | | | | | |
| | K | L | M | N | O | | | | KK | LL | MM | NN | OO | | | | | |
| | P | Q | R | S | T | | | | PP | QQ | RR | SS | TT | | | | | |
| | U | V | W | X | Y | | | | UU | VV | WW | XX | YY | | | | | |

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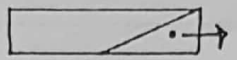
# MISS BOWLING LITES MATRIX BX - BY



Lite number when OUT test with service box.

| | BY1 | BY2 | BY3 | BY4 | BY5 | BY6 | BY7 | BY8 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BX1 | Rollover Left 49 | Rollover Right 50 | | | | | | | | |
| BX2 | Shutter Motor 51 | Lifter Motor 52 | | | | | | | | |
| BX3 | Magic motor A 53 | Magic motor B 54 | Magic motor C 55 | Magic motor D 56 | Magic motor E 57 | Pot Main 58 | Pot EC 59 | Extra Card 60 | TLF I 101 | meter 107 |
| BX4 | Bonus Make 61 | Bar 5 62 | Bar 4 63 | Bar 3 64 | Bar 2 65 | Bar 1 66 | IF 16 67 | No connect 68 | TLF O 102 | Lite meter 108 |
| BX5 | → 69 | → 70 | → 71 | → 72 | A 73 | B 74 | C 75 | D 76 | Tot I 103 | See 109 |
| BX6 | E 77 | Select 78 | Strike 79 | Strike 80 | NC 81 | NC 82 | NC 83 | NC 84 | Tot O 104 | Magic Lites |
| BX7 | Corners 85 | 4 Stars 86 | Any 2 87 | Any 3 88 | OKBox 89 | 5TH 90 | EXTRA 91 | BALL 92 | Cash Box 105 | On AXY |
| BX8 | Before 4 93 | Before 5 94 | Stripped 95 | Tilt Up 96 | Tilt down 97 | SP1 98 | SP2 99 | NC 100 | meter 1 106 | |

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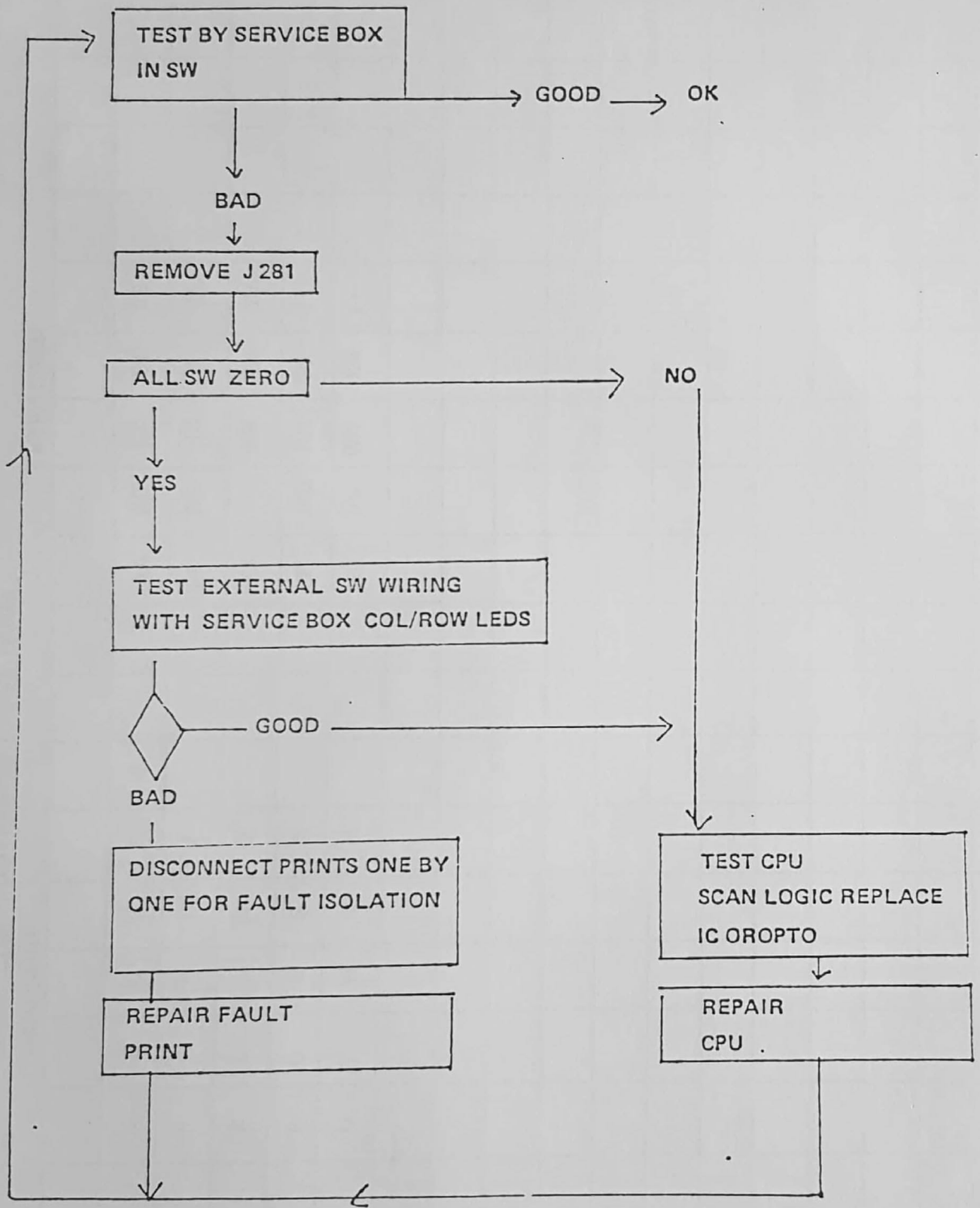
CHART FLOW FOR SW MATRIX A
TROUBLE SHOOTING

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MISS BOWLING

MAGIC LITES POSITION ON FRONT PANEL

MAIN CARD

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | | | | AA | BB | CC | DD | EE | | | | | | | | | | |
| | F | G | H | I | J | | | | FF | GG | HH | II | JJ | | | | | | | | | | |
| | K | L | M | N | O | | | | KK | LL | MM | NN | OO | | | | | | | | | | |
| | P | Q | R | S | T | | | | PP | QQ | RR | SS | TT | | | | | | | | | | |
| | U | V | W | X | Y | | | | UU | VV | WW | XX | YY | | | | | | | | | | |

EXTRA CARD

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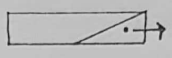
## MISS BOWLING LITES MATRIX BX - BY



Lite number when OUT test with service box.

| | BY1 | BY2 | BY3 | BY4 | BY5 | BY6 | BY7 | BY8 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| BX1 | Rollover Left 49 | Rollover Right 50 | | | | | | | | |
| BX2 | Shutter Motor 51 | Lifter Motor 52 | | | | | | | | |
| BX3 | Magic motor A 53 | Magic motor B 54 | Magic motor C 55 | Magic motor D 56 | Magic motor E 57 | Pot Main 58 | Pot EC 59 | Extra Card 60 | TLF I 101 | meter 107 |
| BX4 | Bonus Make 61 | Bar 5 62 | Bar 4 63 | Bar 3 64 | Bar 2 65 | Bar 1 66 | IF 16 67 | No connect 68 | TLF O 102 | Lite meter 108 |
| BX5 | → 69 | → 70 | → 71 | → 72 | A 73 | B 74 | C 75 | D 76 | Tot I 103 | See 109 |
| BX6 | E 77 | Select 78 | Strike 79 | Strike 80 | NC 81 | NC 82 | NC 83 | NC 84 | Tot O 104 | Magic Lites |
| BX7 | Corners 85 | 4 Stars 86 | Any 2 87 | Any 3 88 | OKBox 89 | 5TH 90 | EXTRA 91 | BALL 92 | Cash Box 105 | On AXY |
| BX8 | Before 4 93 | Before 5 94 | Stripped 95 | Tilt Up 96 | Tilt down 97 | SP1 98 | SP2 99 | NC 100 | meter 1 106 | |

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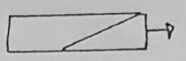
;MISS BOWLING LITES MATRIX AX-AY



Lite number when OUT test whith service box.

| | AY 1 | AY2 | AY3 | AY4 | AY5 | AY6 | AY7 | AY8 | |
|---|---|---|---|---|---|---|---|---|---|
| AX1 | A 109 | F 109 | K 109 | P 109 | U 109 | | | | |
| AX2 | B 110 | G 110 | L 110 | Q 110 | V 110 | | | | |
| AX3 | C 11 1 | H 111 | M 111 | R 111 | W 111 | | | | |
| AX4 | D 112 | I 112 | N 112 | S 112 | X 112 | | | | |
| AX5 | E 113 | J 113 | O 113 | T 113 | Y 113 | | | | |
| AX6 | AA 114 | FF 114 | KK 114 | PP 114 | UU 114 | | | | |
| AX7 | BB 115 | GG 115 | LL 115 | QQ 115 | VV 115 | | | | |
| AX 8 | CC 116 | HH 166 | RR 116 | MM 116 | WW 116 | | | | |
| AX9 | DD 117 | II 117 | NN 117 | SS 117 | XX 117 | | | | |
| AX10 | EE 118 | JJ 118 | OO 118 | TT 118 | YY 118 | | | | |
| AX11 | SCR4 1 | SCR8 2 | SCR16 3 | SCR32 4 | SCR64 5 | SCR128 6 | SCR192 7 | SCR250 8 | |
| AX12 | SCY4 9 | SCY8 10 | SCY16 11 | SCY32 12 | SCY64 13 | SCY128 14 | SCY192 15 | SCY250 16 | |
| AX13 | SCG4 17 | SCG8 18 | SCG16 19 | SCG32 20 | SCG64 21 | SCG128 22 | SCG192 23 | SCG250 24 | |
| AX14 | SCW4 25 | SCW8 26 | SCW16 27 | SCW32 28 | SCW64 29 | SCW128 30 | SCW192 31 | SCW250 32 | |
| AX15 | FIRST 33 | EXTRA 34 | BALL 35 | SECOND 36 | EXTRA 37 | BALL 38 | THIRD 39 | EXTRA 40 | |
| A X16 | BALL 41 | FOURTH 42 | EXTRA 43 | BALL 44 | EB BOX 45 | ROLLOVER BOX 46 | ROLLO. YELLOW 47 | ROLLO. RED 48 | |

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