MISS BOWLING GOLDEN

Manual for exploitation and servicing

made in Belgium

MISS BOWLING GOLDEN

H1 DESCRIPTION OF THE GAME

The basic rules of the game remain the same as with MISS BOWLING TURBO. The MISS BOWLING GOLDEN is also provided with features like 5 extra balls, 2 progressive POTS, mode 3fr/5fr, stripped diagonals, bonus in the green score, OK-game, main card, corners and 4 stars. Also the security system remains the same : the playfield is in poly-urethane, covered with a dome-shaped plexiglass. The electronic key system and double coin switches, tilt-stack and no tilt during start also remain the same.

In the MISS BOWLING GOLDEN, there is a third Bonus, called Golden Bonus. A central vertical line is added to the magic lines. Consequently, the head of the bingo has been enlarged by 38mm and heightened by 50mm. In this central vertical line, a normal price can not be taken. It is only active when the Golden feature is lit. 5-in-line gives here a GOLDEN BONUS.

A supplementary score of 300-600-900 is added. The magic lines "D" of the main card and the extra card become super lines when the respective features Super Line Main Card and Super Line Extra Card are lit.

The same game feature is also new. When this feature is lit, the player can obtain the same game for the same price. It suffices to push the D-button during the following normal start. The replay register is reduced immediately by the price of the game and a % of it is added to the Golden Bonus. So the Golden Bonus can increase quicker then the 2 other ones. The player has the possibility to improve this Same Game play by supplementary starts. The points, deducted from the Replay Register are kept in the memory. As soon as the first ball has been started, the TOTIN counter starts counting these points.
A price is still paid point per point.

The electro-mechanic counters in the bingo are counting point per point but at a lower speed (17 pulses/sec instead of 24 pulses/sec) in order to increase the fiability. The counting happens during the game.

A special system "SEE OLD RPREG" avoids discussing with a player who might pretend that the immediate transfert was not executed cor-rectly.

After each immediate transfert, the previous value of the RPREG can be seen by pushing A-, C- and Manuel Lift button at the same time. The display indicates the old value in "galopping digit"mode. In order to use the See Old RPREG, the door has to be closed. So, the bar-keeper can use this to prove the player the calculation was right.
This system cannot be utilized anymore as soon as a normal transfert follows : f.ex. when starting a point.

The system of the roll-tilts is new. The situation of the roll-tilts can be seen on the TILT DISPLAY. These roll-tilts give information to the player and cannot cause a tilt. On the tiltdisplay,two bulbs indicate whether a tilt has been caused by the hangtilt or by a security tilt.

The WIMI MONITORING MEMORY SYSTEM facilitates the reparation; it conserves all the error- and tilt-codes in the memory. The technician can control the error-and tiltcodes with his service box.

There is also a new security tilt : when moving the magic line which must not be moved f.ex. when the selection has been fallen out (after the 3rd or the 4th ball) or when the selection feature stepper did not made enough steps. (f.ex. when AB has been selected, the C-line must be blocked)

H2 Placing the apparatus

2.1 Visual inspection

When receiving the apparatus, it is advisable to check it before con-
necting 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 atten-
tion to the keys)
- the transfo connections and power cables have to be
unimpaired
- all balls need to be in the ball groove (10 pieces)
- balls in the roll-tilts

On the CPU there are two flat cables J281 and 285 and two other ones
J282 and J283 which can be interchanged. In that case, the apparatus
will not function properly, but nothing will be damaged. On the Magic
Motor PR234 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 direction of the plugs does no longer pose any problems. Essen-
tially 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 connec-
tions,except for the sw. matrix and the displays.

2.2 Connections between head and body

When dismantling the bingo, following cables have to be disconnected

- ground wire
- the cable to the mecanic counters (MTA10)
- the power cable of the CPU (MAT'N LOCK 12)
- the power cable of the power driver (LOCK 15)
- the cable of the switchmatrix A (flat 16 pins blue on J281 and J285 of the CPU)
- cables of the switch matrix C
- cables of the electronic key system
- flat cable between the electronic key module and CPU (on J288 of the CPU)

2.3 Connecting the bingo

Each part of the bingo (prints,cables...) is tested separately. After the assemblage there is a complete test followed by a "burn-in"test (warmth-test) of 24 hours. So, when receiving the bingo, there should be no problems, except for some small problems caused by transport or wrong manipulation. After a visual control the bingo can be put ON :

- when putting the bingo ON, the G.I. must light up
- immediately after that, a relais is activated and the display will light up.
- About 5 seconds later, the other lamps will also light up.

When the TILT-lamps are flickering, the processor is working correctly. The dipswitches are regulated at the desired value. The 3 input-matrixes are tested with the Monitoring Memory System :

- switch matrix A
- switch matrix B (dipswitches)
- switch matrix C

The complete outputmatrixes and the non-matrixed outputs are tested. The counter group 2C is reset (also 1C if desired).
After closing the bingo, (door and frontglass) the electronic keysystem can be activated. Now, the bingo is ready for exploitation.

H3 Hardware differences

3.1 CPU print PR328B

The WIMI 03 and 04 are replaced by 07 and 10. Some dipswitches also have another meaning.

3.2 Modified prints

Display pot PR359
This print contains 1 counter of 5 digits more
It also contains all the display-logic

Display RPREG PR344
This print contains a new counter of 4 numbers giving the Same Game Value. The VAL display is now containing 2 digits in order to give more other informations.

Troughsw print PR538
The switch matrix A is containing again the puls-lift switch on the ball-lifter. Also the leds, giving the situation of the troughswit-ches, are brought together so that a bargraph can be used.

Feature lites PR441
Because of the new features, a new lite-print was needed.

Magic lites PR340
Because of the vertical line on both cards, a new print was needed

3.3 New prints

Roll tilt up & down PR401
With this print, the two contacts of the Up-down roll tilt are placed in switch matrix C.

Roll tilt right & left PR402
Idem but for the right and left contacts of the roll tilt.

Counter interface PR403
Considering the fact that more counters can count at the same time, 1 single resistance. Each counter must have its own serial resistance.

Tilt display PR405
To indicate the situation of the roll tilts, the hang-tilt and the security tilt.

3.4 Identical prints

- the CPU
- Magic Motors
- Power driver PR251
- sound PR256
- service print PR350
- power supply PR243
- electronic key module PR370B

H4 Roll tilts and tilt display

The GOLDEN is provided with standard horizontal roll-tilts and there-
for a special logic has been built in the software. The 4 contacts
left/right and up/down of the roll-tilts are read by switchmatrix C.
4 little bulbs,placed in front of the playfield are indicating the
situation of these contacts.

The system is working as follows :

- when the apparatus is tilt, 1 of the 4 bulbs lights up if the cor-
responding contact is closed.

- when the apparatus is not tilt, the bulbs will indicate the situa-
tion of the contacts, but as soon as a contact has been closed and
opened again, a timer will be started. The bulb will start to flicker
and the apparatus will be blocked for about 30 sec. This means that
no balls are comming up and no game can be started.
In no case the roll tilts will cause a tilt.

In order to avoid cheating and defects in the material, there are 15
different ways the bingo can make a tilt.
2 little bulbs have been placed next to the 4 lamps of the roll-
tilts, so one can make a difference between the false tilts and the
right ones. the first bulb lights up (and remains lit) in case of a
security-tilt. In this case a special bit in the C-MOS memory of the
bingo will change its position (see Wimi Monitoring Memory System).
In spite of the fact that the doortilt is a normal tilt, it is writ-
ten in the monitoring memory bloc.
In this way, discussions between the bar-keeper and the player and
between the owner of the bingo and the bar-keeper can be avoided.

H5 Wimi's monitoring memory system

The use of the service box remains the same as with the MISS BOWLING
TURBO but the presentation on the displays of the bingo is different.
The displays are placed as follows :

```
        ┌─┬─┬─┬─┬─┐
        └─┴─┴─┴─┴─┘
        GOLDEN BONUS


┌─┬─┬─┬─┬─┐              ┌─┬─┬─┬─┬─┐
└─┴─┴─┴─┴─┘              └─┴─┴─┴─┴─┘
BONUS MAIN C            BONUS EXTRA C


        ┌─┬─┬─┬─┬─┐
        └─┴─┴─┴─┴─┘
           RPREG


        ┌─┬─┬─┬─┐
        └─┴─┴─┴─┘
        SAME GAME


          ┌─┬─┐
          └─┴─┘
           VAL
```
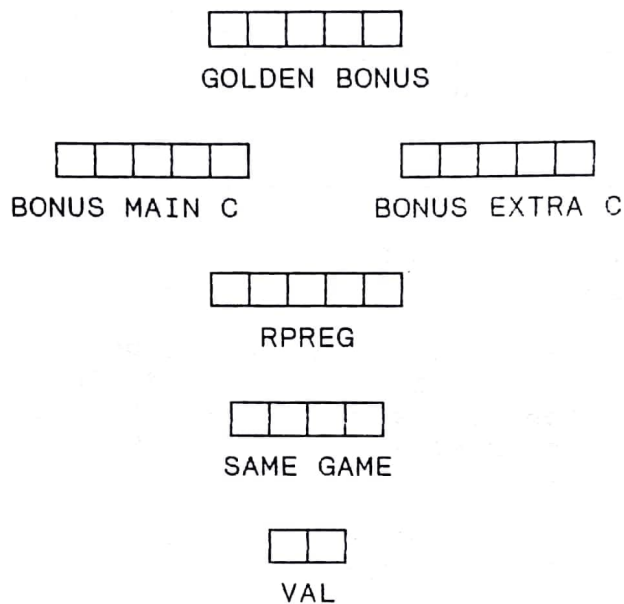
When connecting the service box with open door, the display of the
RPREG shows an address (the Trip tilt D8A3) So the actual tilt code
can be seen on the 2 digits on the right side of the Same Game dis-
play. The data of the 2 following addresses can be seen on the 2
digits on the left side of the Same Game display and on the 2 digits
of the VAL display. The address of the RPREG display can be modified
with the +1 and -1 switches on the service box. In this way, the
desired data can be found. In order to change the data of this
address, the SEE switch on the service box has to be put ON. Now,
the contents of the address indicated on the RPREG display can be
changed by means of the +1 and -1 switches. The contents of the fol-
lowing address can be changed with the IN and OUT switches.

The 2 leftmost digits of the Golden Bonus indicate the last tiltcode
(the one of the previous game=the base of the tilt code stack)
the 2 rightmost digits of the Golden Bonus indicate a number that can
be changed with the +1 and -1 sw of the service box. The number is
called the monitor-index and indicates what can be seen on the 2 dis-
plays of the Bonus Main Card and Bonus Extra Card at that moment. 4
blocs of 8 bytes can be made visible.

- Monitor index 0A   0B   0C   0D   0E   0F   00   01
the situation of the dipswitches A up to H can be seen
f.ex. monitor index = 0E indicates group E
The numbers "0" and "1" in both bonusses (bonus main card and bonus
extra card) indicate whether the switches in group E are opened ("0")
or closed ("1").

- Monitor index A1   A2   A3   A4   A5   A6   A7   A8
The situation of the contacts in switchmatrix A can be looked at bit
per bit (this test is very complete because the opto-couplers are
also tested)

- Monitor index C1 C2 C3 C4 C5 C6 C7 C8
Idem as for A1 to A8 but for switchmatrix C.

- Monitor index D1 D2 D3 D4 D5 D6 D7 D8
The Monitoring Memory bloc can be looked at This is a whole of 64
bits organized in 8 bytes. Each bit is a memory for an abnormal event
during the game: f.ex. a special tilt code or an error code. This
Monitoring Memory bloc is never wiped out(not even if code EE13
appears) Normally, this Monitoring Memory bloc only contains zeros.As
soon as one or more bits are set in this memory bloc ("1") the lamp
in front of the counters will start to flicker when opening the door.
So, it indicates that an abnormal event has been registered by the
monitoring memory bloc.
When pushing the C-button and Man Lift button with open door, every-
thing can be wiped out and the flickering lamp can be lit again.

With this procedure, the Monitoring Memory bloc and the Stack Tilt
can be cleared at the same time.
Each time an abnormal fact has been noticed, it has to be found; next
the Monitoring Memory bloc has to be cleared.

D11 -- not used
D12 -- not used
D13 -- not used
D14 -- tilt because false ball count when pay action
D15 -- tilt because rollover sw red closed manualy
D16 -- tilt because rollover sw yellow closed manualy
D17 -- tilt because shutter manualy activated during the game
D18 -- tilt because 6th ball lifted abnormaly

D21 -- magic motor tilt
D22 -- not used
D23 -- tilt pendulum during start time when dipsw D1 is off
D24 -- tilt because coinsw up & down activated in the same time
D25 -- tilt because double coinsw up activated abnormaly
D26 -- tilt because hole sw open after close
D27 -- tilt because door tilt contact activated
D28 -- tilt because 6 holeswitches closed when no EB is played

D31 -- error code EE19 alarm double coinsw when dipsw C1 is on
D32 -- error code EE01 false interrupt insta value
D33 -- error code EE02 false trap interupt request
D34 -- error code EE03 false 5.5 interrupt request
D35 -- error code EE04 false 6.5 interrupt request
D36 -- error code EE05 false restart 7.5 ; FF instruction execution
D37 -- error code EE06 replay register incorrect
D38 -- error code EE07 improper stack on power-on test

D41 -- error code EE08 test letters into pot
D42 -- error code EE09 improper stack during running
D43 -- error code EE12 multiplication value incorrect
D44 -- error code EE13 cmos memory loss (all cleared)
D45 -- error code EE14 rollover sw red closed more then 20 sec
D46 -- error code EE15 rollover sw yellow closed more then 20 sec
D47 -- error code EE16 lifter motor burn safety
D48 -- error code EE17 shutter motor burn safety

D51 -- error code E1E1 electronic key system on
D52 -- error code E0E0 electronic key system off
D53 -- not used
D54 -- error code EB02 test electronic key false power on
D55 -- error code EB03 electronic key arming operation false
D56 -- error code EB04 electronic key wait code when door open
D57 -- error code EB05 electronic key no present after 30 sec
D58 -- error code EAXX or ECXX test memory ROM/RAM false

D71 till D78 -- not used

D81 till D88 -- not used

H6 Function of the dipswitches

6.1 The dipswitches

The PR328 contains 64 dipswitches which will be pre-programmed in certain modes. They are organized in 8 groups of 8 switches.
A, B, C, D, E, F, G and H each from 1 to 8
These dipswitches only have two positions : ON or OFF, indicated on the body.

6.2 Controlling the situation of the dipswitches

Open the door and connect the service box.
By means of the Monitoring Memory system the dipswitches can be tested bit per bit (see Monitoring Memory system)

REGULATION DIPSWITCHES MISS BOWLING GOLDEN   PROG 3.2

	1	2	3	4	5	6	7	8
A	REFLEX RATIO UNITS BIT 0	REFLEX RATIO UNITS BIT 1	REFLEX RATIO UNITS BIT 2	REFLEX RATIO UNITS BIT 3	REFLEX RATIO TENS BIT 0	REFLEX RATIO TENS BIT 1	SAFETY SYSTEM ACTIF IF ON	GAME SPEED BIT 1
B	NUMBER OFF COINS CSW1		NUMBER OFF COINS CSW2		NUMBER OFF COINS CSW3		NUMBER OFF CREDITS CSW1	
C	IF ON EE19 ACTIF	NUMBER OFF CREDITS CSW2			NUMBER OFF CREDITS CSW3			NUMBER OFF COINS CSW1
D	MAGIC MOTOR SAFETY IF ON	SUPER REFLEX ACTION BIT 0	SUPER REFLEX ACTION BIT 1	SELECT TRIP GEN. BOOSTER	SCORE EB GEN. BOOSTER	SCORE FIRST OPTION IF ON	MULTIP. SCORE STEP IF ON	CORNER BOOSTER
E	CORNER BOOSTER	4 STARS BOOSTER	4 STARS BOOSTER	STRIPP DIAG. BOOSTER	STRIPP DIAG. BOOSTER	STRIPP DIAG. BOOSTER	EXTRA CARD BOOSTER	ANY 2 BOOSTER
F	ANY 3 BOOSTER	EXTRA BALL BOOSTER	EXTRA BALL BOOSTER	EXTRA BALL BOOSTER	EXTRA BALL BOOSTER	TEST BALLS IF ON	BLOCK REFLEX IF ON	NO RPREG DECREM. IF ON
G	LOCK WHEN OVERLD IF ON	OPTION 32 FOR EB1,2,3 IF ON	OPTION 64 FOR EB 4 IF ON	OPTION 32 FOR SELECT IF ON	OPTION 80 FOR EB 5 IF ON	BLOCK MIXER 2 IF ON	IF OFF GROUP 2 DIVIDED AT 1M5	IF ON RELOAD 3 POTS
H	EPROM & EK TEST IF ON	RPREG MAX BIT 0	RPREG MAX BIT 1	RPREG MAX BIT 2	NEW TLF LIST IF ON	EK OFF IF ON EK ON IF OFF	SUPER REFLEX ACTION IF ON	3/5 MODE IF ON
	1	2	3	4	5	6	7	8

6.3 Dipswitch group A

Regulating the reflex
The reflex ratio can be programmed between 60% and 99% with dipswitc
A1,2,3,4,5 and 6. The bonusses and the reflex will not increase when
the door is open

Regulating the units of the reflex ratio

A4	A3	A2	A1	UNITS
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

Regulating the tens of the reflex ratio

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

A7 = safety system OFF if OFF
              ON if ON   (see appendix)

Regulating the speed of the game

A8	SPEED
OFF	FAST
ON	SLOW

6.4 Dipswitch group B & C

Regulating the number of coins and points for the 3 coinacceptors

The MISS BOWLING GOLDEN only works with double coin switches. The diode between COL7 and ROW8 placed on the service print PR350 can be removed. The double coinswitches are put in switchmatrix C. The dipswitches can be regulated as follows :

Number of coins

B6	B5	COINSW 3
B4	B3	COINSW 2
B2	B1	COINSW 1

OFF	OFF	1
OFF	ON	2
ON	OFF	3
ON	ON	5

Number of points

C7	C6	C5	COINSW 3
C4	C3	C2	COINSW 2
C8	B8	B7	COINSW 1

OFF	OFF	OFF	1
OFF	OFF	ON	2
OFF	ON	OFF	4
OFF	ON	ON	5
ON	OFF	OFF	10
ON	OFF	ON	15
ON	ON	OFF	20
ON	ON	ON	50

ERROR CODE 19

If C1 is switched ON and the coinswitches are not working normally, the game will block. The error code EE19 appears. In order to work normally, the bingo must be switched OFF and ON again with the door opened and the keyswitch closed. If C1 is not switched ON, the coins already put in the apparatus are annulated and an abnormal sound can be heard. After that, the coinswitches are working again. At this moment the game is tilt with tilt code 8B or 8C.

6.5 Dipswitch groep D
No tilt during start
When activating D1, the Magic Motor is controlled on manual mouvement in case this is not allowed anymore.

Super reflex action speed

D3	D2	NUMBER OF STARTS
OFF	OFF	1000
OFF	ON	2500
ON	OFF	5000
ON	ON	10000

These dipswitches are regulating the number of starts after which the super reflex will calculate the % and change the reflex-ratio if necessary.

Features
D4 : When activating D4 , more chances are added to the selection and trip relais.

D5 : When activating D5,more chances are added to the score and to the extra balls.

D8 : When activating D8 more chances are added to the corners.

First option score
In case D6 is ON, the selection and trip relay will not be activated unless the green score has reached the value 32. This enables the scores to increase more rapidly.

Multiple score step
In case D7 is ON , the possibility of MSS exists. With the MISS BOW-LING TURBO, the score can leap from 4 right to 32 in case the dipsw D7 is ON.

6.6 Dipswitch group E

Features
E1 : When activating E1 more chances are added to the corners

E2-E3 : When activating E2 or/and E3 more chances are added to the 4 stars

E4-E5-E6: if ON, E4 E5 and E6 are giving more chances to the stripped diagonals

E7 : When E7 is ON, more chances are added to the Extra Card

E8 : When E8 is ON, more chances are added to "any 2".

6.7 Dipswitch group F

Features
F1 : in case F1 is switched ON, more chances are added to "any 3"

F2-F3-F4-F5 are giving more chances to the extra balls
ATTN: this also counts for the 4th and 5th extra ball.

Testing the number of balls

F6 : When activating F6 , the switches closed by the balls are counted. In case switches are abnormally closed or remain closed, the game will be tilt at the moment the R-but is pushed in order to obtain a price.
With the MISS BOWLING TURBO, the decimal point of the RPREG should light up, but with MISS BOWLING GOLDEN this is not possible because the displays are constructed in another way. Nevertheless, this abnormal situation can be found again because it is kept in the Monitoring Memory bloc.

Blocking the reflex

F7 : When activating this switch, the reflex remains at the same value.

Decounting points with Power up

F8 : If F8 is switched ON, points are not decounted when putting the line voltage ON.

6.8 Dipswitch groep G
Deblocking teh Replay register MAX

Dipswitch H1,2 and 3 allow for regulating the value of the RPREG. With regard to the TURBO, the GOLDEN will react in another way; each time payment of a price is started, it will be achieved even when the RP REG has been exceeded. Only after this, the apparatus will block. So, a new game cannot be started.

Depending on dipsw G1, there are two possibilities :

G1 OFF : the lamp at the right of the Golden Bonus (alarm) remains extinguished. Points can be decreased with the remote control.

G1 ON : the ALARM lamp starts to flicker and points cannot be decreased anymore. A technician has to be called for in order to decrease the points with the usual procedures.

Option 32 for selection and extra balls

G2 : ON -- option 32 for 1st, 2nd and 3rd extra bal
G3 : ON -- option 64 for 4th extra ball
G4 : ON -- option 32 for selection
G5 : ON -- option 80 for the 5th extra bal

This option guarantees that the selection and the 1st,2nd and 3th extra ball are increasing 1 step after 32 starts. The 4th extra ball will advance 1 step after 64 starts and the 5th ball after 80 starts.

Mixer 2

In case G6 is ON, chances for extra ball and score are reduced.
G7 : if OFF dividing by 10 TOTI-TOTO group 2 after 1M5
G8 : if ON reload 3 bonusses

6.9 Dipswitch groep H Automatic test

H1 : In case H1 is ON, the Eprom- and Key Module test are started

Regulating the RPREG MAX

H4	H3	H2	RPREG MAX
OFF	OFF	OFF	5000
OFF	OFF	ON	10000
OFF	ON	OFF	15000
OFF	ON	ON	20000
ON	OFF	OFF	25000
ON	OFF	ON	50000
ON	ON	OFF	100000
ON	ON	ON	200000

H6 allows for switching ON/OFF the electronic key system

If H6 is switched OFF and the tension is switched OFF and ON again, without the electronic key being connected, the electronic key module will start working again.
From now on, H6 must remain OFF.

Switching ON/OFF the super reflex

The super reflex is switched ON with dipsw H7 ON. When switching H7 OFF, the super reflex is deconnected so that the normal reflex keeps working on.

When blocking the reflex :
- the super reflex flag is on 0
- the super reflex correction remains at the same value but the reflex decreases by the value programmed by the dipsw.
- the super reflex counter continues counting and is not reset anymore.

When H7 is switched ON, the bingo gets immediately in correction because the super reflex is raised above its programmed value.

3fr/5fr mode or points mode

H8 : When putting H8 ON, one can work in 3Fr/5Fr mode.
When putting H8 OFF, one can work in pointsmode. The VAL display will indicate an FF (extinguished)

H7 The electronic key system

7.1 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.

7.2 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...)

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 ope-
          rate normally after 20 seconds.
        - the game is now ready for servicing
        - remove the key, close the door and activate the system by swit-
          ching A-but, C-but and E-but simultaneously.
        - The EK OFF lamp will extinguish

7.3 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 automati-
                    cally 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 con-
nected.

7.4 Testprogram
There are two different possibilities to start the test program :
- when switching the bingo on
- during the game
By executing this testprogram, the information of the RAM in the K.M.
is always erased.

The key module consists of 3 parts, to be checked separately :
- the eprom
- the CMOS RAM in the K.M.
- the key

By this test program, the different parts will be checked several ti-
mes. This allows for testing both the appropriate key as a standard
key EKTEST. When a standard key operates properly and one's personal
key indicates a faulty result, this means that or the EPROM or the
personal key is defective.

Starting the test program
When the test program is started, the game will block and even the
service box will no longer operate.

Action 1
- put dipswitch H1 ON
- connect the service box and switch SVSW (SV1) ON
- when switching the bingo ON, the test program will be executed for
  as long as H1 and SERV are ON.

Action 2
When the bingo is switched on, the test program will start operating
in case H1 and SERV are ON.
The information of the CMOS RAM in the E.K. will be erased so, if the
EKM had been ON , the bingo would enter into code after finishing the
test.

Description of the testprogram E.K.M.
On the display, "BONUS EXTRA CARD CCCC" appears in order to indicate
that the test has been started. The display will indicate :

GOLDEN BONUS

BONUS MAIN C   BONUS EXTRA C

The BONUS EXTRA C indicates XA1XX and the SAME GAME DISPLAY indicates
8000

A1: indicates that the test of the CMOSRAM in the key module is being
carried out.

   80 : indicates hexadecimal the number of the tests carried out
        e.g. in this case : 80H = 128
        each cycle consits of reading, writing and comparing
   00 : in case the number of errors detected is not equal to 0, the
        test will stop as it is of no use to go on with it when the CMOS
        RAM is defective or when a security switch is still open. In
        case the number of errors detected is equal to 0 the testing
        will go on and the display will indicate the following informa-
        tion :

The EXTRA BONUS C indicates XA2XX and the SAME GAME DISPLAY indicates 646A.

A2 : indicates that both the key and the eprom in the E.K.M. are being tested.
64 : indicates the number of tests carried out in hexadecimal (100d)
6A : indicates the number of tests carried out faulty, in this case
     0. Each number beyond 6A indicates a number of faulty tests
     e.g. 6C - 6A=2 so 6C indicates two faulty tests
          consequently, this is not correct, normally not a single
          faulty test should be detected. Afterwards, the display
          will indicate:

     BONUS EXTRA C   SAME GAME DISPLAY
     XA2XX   646A

A3 : indicates that the testing of the key is being carried out (this standard key can be delivered by our firm)
After 128D tests have been carried out,it starts all over again.
We would advise to repeat the whole test more than once, before it is concluded that everything is working perfectly. We would also suggest to disconnect the security switches and to replace them by a DIN plug with one switch to detect errors in wiring.
This test is very complete.

attention : when a key is connected in the wrong way, it will cer-tainly be defective, all flatcables have to be connected with Pin 1 via the red cable.

7.5 Wiring scheme for the electronic key system
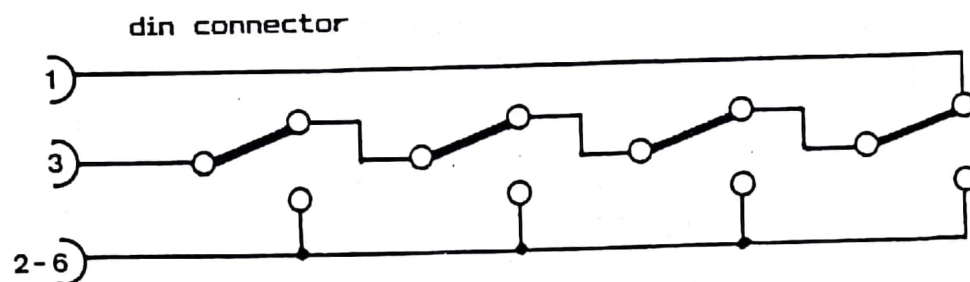
din connector

The situation, as showed above is out of service (all contacts are closed). In case one of the switches is closed, the connection be-tween 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 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.
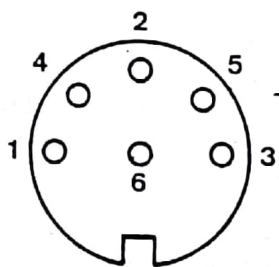
H8 The tilt codes

For each way, one can make a tilt, a special code exists. This infor-
mation is written in the memory position TTILT.

Codes :

```
        80 : tilt caused by a hang-tilt
   81 - 82 : Tilt caused when starting the game.
        83 : tilt caused because of a ball too much in the playfield when
               the C-button is pushed.
        84 : Tilt caused because the red-rollover remains closed
        85 : Idem but for the yellow rollover.
        86 : Tilt caused by withdrawing the board underneath the playfield
        87 : Tilt caused by bringing up a ball manually
        88 : Tilt caused by moving a magic motor after this has not been
               permitted
        8B : Tilt caused by closing simultaneously the upper and lower
               switch of the double coinswitches.
        8C : Tilt caused by closing 2 times the upper switch without clo-
               sing the lower one.
        8D : Tilt caused because the time between the up and down switch is
               not correct.
        8E : Tilt caused by the doortilt.
        8F : Tilt caused because 6 holeswitches are closed when pushing the
               R-button while an extra bal has not been played.
```

At the moment the bingo is tilt,the tilt code is written in the trip-
tilt. With the next start, the contents of the trip tilt is trans-
mitted to the tiltcode buffer. So if one wants to know the reason why
the bingo is tilt, one has to read the contents of the trip-tilt or
to start a new game and read the contents of the tilt buffer. This
happens with the service box. The last tilt is on address D8C7 and
the last tilt but one is on address D8C8. The cause of the tilt of
the 22 last games is kept in the tiltcode buffer. When during a game,
there is no tilt, 00 appears in the last address of the tiltcode buf-
fer.
The inscription of the tilt codes happens with the door being closed.

H9 The error codes

When the program detects an error, it will stop automatically and the display will indicate an error-code. The letters "EEEEE" appear on the RPREG and the SAME GAME DISPLAY indicates an error code. The information on the other displays does not have any significance.

codes
EE05 : Valse 7.5 interrupt.
EE06 : Abnormal value of the RPREG.
EE07 : STACK TEST is tested before the program starts
EE08 : Letters in the RPREG or in the BONUSSES
EE09 : STACK LEVEL : abnormal course of the program.
EE12 : Abnormal value of the multiplicationcoefficient.
EE13 : The CMOS RAMS lost their information, f.ex. when making a clear
EE14 : Red roll over has remained closed for more than 15 seconds (door
       closed)
EE15 : Idem for the yellow roll over.
EE16 : Lifter motor remains under tension for more than 15 seconds
EE17 : Idem but for the shutter motor.
EE19 : When using the double coinswitches and something abnormal hap-
       pens, this code can be removed with the service switch or the
       keyswitch on.

ECXX : RAM TEST : XX = high bytes from the wrong address.
EAXX : CKSUM ROM : XX = high byte from the following ROM adres.

E0E0 : Electronic key is deconnected.
E1E1 : Electronic key is connected.

EB02 :
EB03 : See chapter of the electronic key.
EB04 :
EB05 :

H10 The super reflex

10.1 The reflex

In the MISS BOWLING GOLDEN the reflex can be programmed between 60%
and 99%, unit per unit.
The dipswitches A1-2-3-4 indicate the units.
A5-6   indicate the tens.

One point scored will increase the reflex by 100 units
One point started implies a decrease of the reflex by the value pro-
grammed by the DIPSW or eventually by the corrected value of the
reflex ratio. The reflex is an electronic counter(it is not volatile,
so it keeps its value) It goes from 000000 (liberal) up to 128000
(conservative). The reflex and the telephone system do not function
when the door is open.

10.2 The super reflex

The reflex ratio does not give the real percentage of payment. The
DIPSW which programme the reflex ratio between 60% and 99 % are con-
sidered to be the desired value of the percentage of payment.

This happens in both directions: the reflex ratio can be between 10% and
150% In case the reflex ratio is not in the allowed deflection margin,
the super reflex will control the game more closely, in order to be able
to intervene sooner.

The super reflex is switched on by means of DIPSW H7 ON. With DIPSW
D2-3, the number of starts can be programmed after which an eventual
correction has to be made.

10.3 Use of the electronic indexes

Here there are two groups :

1 : TLFI - TLFO - TOTI - TOTO - CASH

These are 5 counters of 8 numbers which follow in the memory on suc-
cessive addresses in the cited order. They facilitate the monthly
settlement. They can be reset by pushing the X-button and manual lift
button with the key switch on and with the number of the indexgroup
on 1C.
These counters do not influence the game, they only facilitate the
commercial exploitation. So this group can be used as a monthly
counter or as a copy of the mechanic counters.

2 : TLFI - TLFO - TOTI - TOTO - CASH

This group is the same as the previous one, but these counters are
helping the super reflex to calculate the percentages and to make
corrections if necessary (esp.TOTI and TOTO)
when the super reflex is switched on (DIPSW H7 ON)the contents of
these counters is very important for the game. That's why they are
called : SUPER REFLEX INDEXES

These two groups move like the electromechanical counters and only
the second group influences the game. The first group is indicative.

Description of the keyswitch display

The following figure shows the displays of the game :

GOLDEN BONUS

BONUS MAIN C   BONUS EXTRA C

RPREG

SAME GAME

VAL
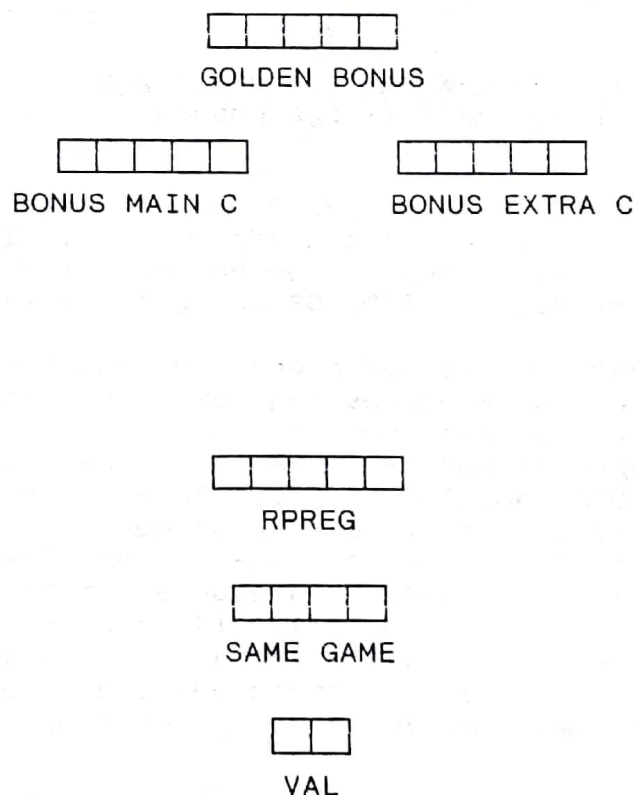
When the keyswitch, at the inside of the game, is switched on, the name of the group (1Cor2C) can be seen on the VAL display. One can pass to another group by pushing the yellow button during 1 sec and releasing it on the number of group 2C. When the bingo is put on, it will always be at group 1C.

the game count appears on the RPREG : this is the value, in a number of coins,of the previous game (the number of coins for the extra balls is not counted)

The BONUS MAIN C and the BONUS EXTRA C indicate the value of the indexes choosen with buttons A and E

        A = TLFI
        B = TLFO
        C = TOTI
        D = TOTO
        E = CASH

When no button is switched on, the difference between TLFI-TLFO can be seen. When the letters "CCCC" appear on the GOLDEN BONUS, then the value is negative. On the SAME GAME DISPLAY, the real percentage in the index groups 1C or 2C can be seen (when SVSW is OFF)

When the SVSW is ON, the desired counter can be changed with the 4 leftmost buttons (but A till E). The counters are changed in groups of 2 numbers from 00 up to 99. This can happen faster when the bingo is tilt.

When closing the hangtilt, the VAL display indicates the real percentage (dipswitch A1-A6)

In order to set the entire group on 0, the X-button has to be switched on.(the calculated percentage is AAAA because the calculation has become impossible)

In case one wants to reset group 2C the value 10000 is written, automatically in the TOTI. In TOTO, the program writes a number equal to 100 x the programmed value of the percentage : 70% can be programmed with A1 to A6. At a reset of group 2C TOTI = 10000 and TOTO = 7000

Group 2 has to be reset when placing a new bingo, when replacing a CPU, when changing the programmed percentage with the dipswitches or when replacing the memory module. The counters TOTI and TOTO will be adapted automatically when their value becomes to high. In case TOTI reaches or exceeds the value of 1000000 TOTI and TOTO are divided automatically by 100. This happens at the first correction and when starting the first ball, this means : after 500 starts when the bingo is in correction or after the number of starts programmed with D2-3, if the bingo was not in correction.The TOTI is now 10 000. The percentage between TOTI and TOTO remains the same (the numbers after the comma are ignored). Once the bingo is placed, group 2C must not be touched anymore. When pushing the R-button, the bingo will calculate the balance in group 2C.
Now, there are two possibilities :

- or the balance is correct at 1 point exact. In this case BONUS MAIN
C and BONUS EXTRA C remain extinghuised, which means that the balance
is correct.

- or the balance is not correct. In this case a number indicating the
error in the balance appears on the BONUS MAIN C and BONUS EXTRA C
If the GOLDEN BONUS indicates CCCC , the balance is negative. This
means that the outputs are greater than the inputs, points are
created. If the GOLDEN BONUS indicates AAAA the balance is positive.
The inputs are greater than the outputs; points have disappeared.

The inputs of the game are all the points created by CASH (coins) or
TOTO (points won). The outputs are all the points which have been
consumed; TOTI (lost points) - Decount.

the balance is now INPUTS - OUTPUTS.

The result of this operation always has to be 0, if this is not the
case, the indexes are incorrect because of a wrong manipulation
f.ex. having points decounted, registered with the service box,
with the door closed or closing the door during the decount of these
points
Faulty indexes can also be created by errors in the CPU ; f.ex. when
code EE06 has appeared, the replay register is erased. So points are
disappeared. These points are included in the inputs but not in the
outputs. By this fact, the balance becomes positive, which means that
points are disappeared. A negative balance means that points are
created and lost or decounted afterwards.

H11 Testing the INPUTMATRIXES

11.1 The 3 inputmatrixes

A matrix can be represented as a rectangle. It consists of Rows(ROW) and columns(COL).

At every point of intersection of a ROW and a COL, a switch and a diode are placed in serie

Refering 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.

The switchmatrix B consists of 64 dipswitches.

The switchmatrix C contains the switches on the magic motors, the switches of the roll tilts and the coinswitches. On the CPU , sw.matrix C is in contact with the connector J285. The 3 sw.matrixes can be tested with the service box via the monitoring memory system.

11.2 Testing switchmatrix A

The next table indicates the place of every switch on the matrix The switches are numbered from 1 up to 64.

	ACOL1	ACOL2	ACOL3	ACOL4	ACOL5	ACOL6	ACOL7	ACOL8
ROW1	1 1	2 2	3 3	4 4	5 5	6 6	7 7	SHUTTER SWITCH 26
ROW2	8 8	9 9	10 10	11 11	12 12	13 13	BALL GATE SW 27	CARRY OVER SHUT. 28
ROW3	14 14	15 15	16 16	17 17	18 18	19 19	20 20	21 21
ROW4	22 22	23 23	24 24	25 25	RED ROLL OVER 29	YEL. ROLL OVER 30	BALL RUN AWAY 31	KEY SW 32
ROW5	TROUGH SW 1 33	TROUGH SW 2 34	TROUGH SW 3 35	TROUGH SW 4 36	TROUGH SW 7 37	CO. LIFT 38	TROUGH SW 9 39	MAN LIFT 40
ROW6	R BUT 41	X BUT 42	SEL.BUT 43	DOOR SW 44	TROUGH SW 0 45	TROUGH SW 5 46	TROUGH SW 6 47	TROUGH SW 8 48
ROW7	TILT SW 49	RED BUT 50	YEL BUT 51	A BUT 52	B BUT 53	C BUT 54	D BUT 55	E BUT 56
ROW8	PULS LIFT 57	 58	SV 1 SERV 59	SV 2 +1 50	SV 3 -1 61	SV 4 SEE 62	SV 5 OUT 63	SV 6 IN 64

Switchmatrix A can also be tested with the IN-test of the service box.
In order to carry out the IN-test, the following has to be done :
 1 - Switch on the tilt contact to close the holes.
 2 - Remove all the balls.
   As a result, all contacts of the sw matrix will be open, except
   for the door switch (which is closed when the door is open)
 3 - Connect a service box and put the IN switch into operation.

The display BONUS MAIN CARD must show continuously number 44, this is
the number of the doorswicth. Next, all contacts to be tested have to
be put into operation one by one. The number of these contacts must
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 follow-
ing has to be done:

J281 has to be disconnected from the CPU and has to be 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. When two Led Rows are lit, there is a short-circuit be-
tween the two Rows.

Next, the 8 contacts 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. Repeat the test for
the 8 rows. When a short-circuit is found, the prints connected with
this cable, have to be disconnected :
- the PR538 : troughswitch
- the PR246 : 1 to 5 the holeswitches of the playfield
- the PR350 : the service box print - on this print the contacts of the
              door (MTA10), the select and the key sw (MTA 5) and the
              contacts of the playfield (FLAT 16) are coming together.
              starting from this print, a flat 16 goes to the Trough sw
              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 light-
ing up wrong 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 sw matrix A are incited by Q10 on the
points 32 33 34 35.
The scan pulses have to be rectangular and may not be transformed. The
same signals can be measured on test points TP 1 2 3 and 4 via the AND.
gates of Q21 (TPA=1,8 msec TP2=3,6 msec   TP3=7,2 msec   TP6=14,4msec)

Then the scan pulses are coming from a 3 to 8 decoder Q5. When the 8
switches of a single or more rows do not get through, this can be due
to decoder Q5. 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 :
                ACOL1 -- Q6   ACOL5 -- Q22
                ACOL2 -- Q8   ACOL6 -- Q23
                ACOL3 -- Q7   ACOL7 -- Q24
                ACOL4 -- Q9   ACOL8 -- Q25

These opto-couplers are placed in groups of 2 in 14 pins IC sockets,
the middle pin being left open. See to it that the optos are placed
correctly in the socket !

11.3 Testing switchmatrix B
see monitoring memory system.

When a deflection is found, the same procedure has to be applied as with the switchmatrix A.The testpoints are TP5, 6, 7 and 8. The 3 to 8 decoder Q44 is used for switch matrix B. Here ,there are no opto-coplers on the COLS.

If the scan signals are correct, a defective diode or a short-circuit have to be found on the print. It is also possible that the signals are transformed due to Q33 or Q34 (replace Q33 and Q34 one by one). When no scan signals are received on the IC has to be replaced.

11.4 Testing switchmatrix C

On the scheme of the CPU it can be noticed that switchmatrix C (J285) is completely identical to switch matrix A. The test also happens with the monitoring memory system.

The testprocedure is the same as with sw.matrix A, but now the con-nector is J285 and the decoder is now is Q71.
The opto-coplers are :

CCOL1	-- Q55	CCOL5	-- Q72
CCOL2	-- Q57	CCOL6	-- Q74
CCOL3	-- Q56	CCOL7	-- Q73
CCOL4	-- Q58	CCOL8	-- Q75

The 4 testpoints are TPO9, 10, 11 and 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 :

SWITCHMATRIX C

C	CCOL1	CCOL2	CCOL3	CCOL4	CCOL5	CCOL6	CCOL7	CCOL8
CROW1	MAGIC A LEFT	MAGIC A RIGHT						
CROW2	MAGIC B LEFT	MAGIC B RIGHT						
CROW3	MAGIC C LEFT	MAGIC C RIGHT						
CROW4	MAGIC D LEFT	MAGIC D RIGHT						
CROW5	MAGIC E LEFT	MAGIC E RIGHT						
CROW6								
CROW7				TILT UP&DOWN LEF&RIG	TILT RIGHT	TILT LEFT	TILT UP	TILT DOWN
CROW8	COIN SW1 UP	COIN SW2 UP	COIN SW3 UP	COIN SW1 DOWN	COIN SW2 DOWN	COIN SW3 DOWN		DOOR TILT

H13 The electronic sound

This is incited by the AY-3-8912 on the CPU

This IC has to receive on pin15 a block wave signal of 1.79 Mhz (period = 558ms. This can be checked on TP14. This frequency can be set by means of potentiometer P3, but this is not critical.

The player can switch OFF the sound if he wishes to do so. Then he has to play tilt and push the A and E buttons at the same time.

On the display of the MISS BOWLING GOLDEN, decimal points cannot be lit anymore. So the player does not have any indication whether the sound is activated or not. When the sound is ON, a tune will be heard immediately, to indicate this.

The volume is controlled by means of the potentiometer P1 on the PR 256 amplifier. The connector of the CPU has to indicate blockwaves with an amplitude of 1 Vpp.

H14 Clear RPREG

During servicing, it is interesting to be able to put the replay
register on 0, without leaving points on the counter. As for the MISS
BOWLING GOLDEN, points can only be decounted with the telephone sys-
tem and with the door being closed. So points should be registered by
the counters. In order to prevent this, the replay register can be
reset as follows :

- open the door
- connect the serv sw
- close C-but and R-but at the same time

The replay register is put at 0 and no point is registered neither on
the mechanic counters nor on the electronic ones.

H15 Golden procedures memento

- Reset overload game   ;- switch power OFF and ON
                           - door closed, close +1, -1 and SEE but

- Clear trip tilt   ;- door open, close SVSW and IN

- Set 100 points   ;- door open, close A-,B- and SVSW

- Test switch access   ;- door open, SVSW OFF, close IN

- Test lites access   ;- door open, SVSW OFF, close OUT

- Clear monitor blok   ;- door open, close C-but and Man Lift

- See old RPREG value   ;- close A-but, C-but and Man Lift but

- Switch sound ON/OFF   ;- A but. and E but. during tilt

- Elec key arming   ;- door closed A but., C but.and E but.

- Internal keysw display;
    - Access   ;- internal keyswitch ON
    - See groupe 1C/2C   ;- yellow but
    - clear all groupe   ;- X button+Man lift
    - See/modify balance ;- R button
                  TLFIN   ;- A button
                  TLFOUT ;- B button
                  TOTIN   ;- C button
                  TOTOUT ;- D button
                  CASH   ;- E button
    - modify index   ;- SVSW ON , IN/OUT/SEE/-1 buttons
    - percent compute   ;- SVSW OFF
    - see % dipswitch   ;- close hang tilt

- Clear RPREG   ;- door open, SVSW, C but.and R .but.

H16 Addresses : MISS BOWLING GOLDEN
Version MGV3-2

```
BONUS EXTRA CARD          ; D805
BONUS MAIN CARD           ; D808
BONUS GOLDEN              ; D80B

RPREG                     ; D80E

SUPER REFLEX FLAG         ; D87E
SUPER REFLEX CORRECTION   ; D85E
SUPER REFLEX COUNTER      ; D85B
REFLEX                    ; D817

TLFI GROUP 1              ; D81A
TLFO GROUP 1              ; D81E
TOTI GROUP 1              ; D822
TOTO GROUP 1              ; D826
CASH GROUP 1              ; D82A

RTLFI GROUP 2             ; D82E
RTLFO GROUP 2             ; D832
RTOTI GROUP 2             ; D836
RTOTO GROUP 2             ; D83A
RCASH GROUP 2             ; D83E

TRIP BONUS MAIN C         ; D886
TRIP BONUS EXTRA C        ; D887
TRIP BONUS GOLDEN         ; D888
TRIP OK                   ; D89F
TRIP EB                   ; D8A4
TRIP TILT                 ; D8A3
TRIP BEFORE 4             ; D8A5
TRIP ANY 2                ; D8A6
TRIP ANY 3                ; D8A7
TRIP 4 STARS              ; D8A8
TRIP STRIPPED DIAGONALS   ; D8A9
TRIP BEFORE 5             ; D8AA
TRIP SEL BEFORE 5         ; D8AB
TRIP EXTRA CARD           ; D8AC
TRIP CORNERS              ; D8AD
TRIP ROLLOVERS            ; D8AE
TRIP BONUS                ; D8AF
TRIP GOLDEN BON ENABLE    ; D8B0
TRIP BON ENABLE           ; D8B1
TRIP SUPER LINE MAIN C    ; D8B2
TRIP SUPER LINE EXTRA C   ; D8B3

BONUS STEPPER             ; D804
TIMER STEPPER             ; D8B4
EB STEPPER                ; D8B5
SELECTION STEPPER         ; D8B6
SCORE RED STEPPER         ; D8B7
SCORE YELLOW STEPPER      ; D8B8
SCORE GREEN STEPPER       ; D8B9
SCORE WHITE STEPPER       ; D8BA

REPLAY COUNTER RED        ; D8BB
REPLAY COUNTER YELLOW     ; D8BE
REPLAY COUNTER GREEN      ; D8C1
REPLAY COUNTER WHITE      ; D8C4
```

```
TILT STACK              ; D8C7

CLEAR ALL RAM           ; D814

GAME CNT                ; D161  Value of the game in coins
EB-CNT                  ; D198  Number of coins started for EB
```

PS : after a clear all TOTI 2C will come at 10000 and TOTO 2C at 100
x the programmed percentage. The reflex will be at 80000.

H17 Testing the power voltages

The following voltages are used ;

17.1 VCC amount

This is a voltage of about 11 volt DC, from which 3 voltages are derived :
- the 5,15V for giving power the IC's on the CPU
- the 6VDC for giving power the mechanical counters
- power for 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 quartz heatsink. Beneath the heatsink,2 test points 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 5,15 Volt and can be regulated by means of potentiometer P4, next to the black heat sink.

Note : - the heatsink is not connected to the ground
       - the CPU must not be taken by the heatsink
       - the condensator on the Vcc amount (just near the power
         block) has to be doubled because of the higher consumption
         of current. So a 22000uF16V is placed parallelly to the
         existing condensator.

17.2 The +VM
The transfo has been supplied with 2 shunts for the VM and as already mentioned the intensity of the light can be regulated electronically. However, the +VM voltage must never be more than 33 volt DC, as these voltages may damage the IC's on the CPU. The +VM depends upon the number of the bulbs lit. The transistors forming part of the output-matrixes are on powerdriver PR251. The VM can be seen on the middle heatsink, with the transistors BDX34. The ground is placed on the two outmost heatsinks with the transistors BDX34.

17.3 General illumination G.I.
It consists of a 6.3 VAC which is used to illuminate the front panel and the playfield.

17.4 50 VAC
This voltage is used to give power to the game engines. The 50 VAC test points are found on the PR234 (magic motor). The layouts of this this print are clearly indicated with 50 VAC 1 and 50 VAC 2.

1. Presentation

This new software version MGV3.2 protects the bingo from cheating (dipsw A7)
Some new possibilities are added in order to facilitate servicing and exploitation.

Consequently, the bingo becomes more "sensitive" to wrong manipulation, defective contacts in the switches, etc...In case of an alarm without cheating, the security system is often switched off. MGV3.2 requires a perfect regulation of the bingo, because f.ex. an open switch will give an alarm instead of a simple flickering of a bulb. So, in the beginning MGV3.2 might give false alarm. But everything has been done in order to obtain an error-indication as completely as possible.

This system verifies at each moment whether the balls are mouved correctly. In case an abnormality is detected, the bingo will block completely and indicate what has happened. Now a technician has to be called for. Before the bingo is blocked, everything has been memorized, so the technician can make a complete simulation of the game. This mode is called REPLAY BILLES and REPLAY PAYOUT. Step by step mouvements of the Magic Motors and payments can be controlled. When the bingo is in ALARM BALL all magic lites and displays are flickering and the RPREG indicates the value before the first ball has been played. The telephone system is out of work.

2. ALARM BALL

When the bingo is in ALARM BALL a sound of an abnormal tilt can be heard and everything is flickering rapidly. The abnormal tilt is activated, but the played numbers and codes do not extinguish. The displays of the bonusses are indicating the replay-counters per colour and the RPREG indicates the value when playing the first ball.

A. Reading displays and lites in case of ALARM BALL

```
pushed buttons ---- none
BONUS MAIN CARD --- replay counter red
BONUS EXTRA CARD ---replay counter green
BONUS GOLDEN -------replay counter yellow
REPLAY REGISTER --- value when playing the 1st ball
SAME GAME --------- replay counter white
MULTIPLICATION----- left digit : thousands replay counter white
                    right digit : multiplicator (not flickering)
MAGIC LITES ------- actual balls in playfield
MAGIC LINES ------- actual positions
```

1. X-button pressed : DISPLAY DEFECT MODE
When the X-button is pushed, the displays are placed in DISPLAY DEFECT MODE. The nature of the default is made visible on the multiplication display. It will be identified by the corresponding tilt-code which can be 91 93 94   95 or 97
The other displays will indicate more details in order to help the technician to make a diagnosis.

2. Open after closed : code 91
Once a hole-switch has been closed, it has to remain closed during this game. If it is opened, the bingo will enter into security mode with CODE 91.

The displays and lites will indicate the following information :

```
BUTTONS PRESSED ----- X-button always closed
BONUS MAIN CARD ----- blank
BONUS EXTRA CARD ---- blank
BONUS GOLDEN -------- blank
REPLAY REG ---------- number open after closed
SAME GAME ----------- blank
MULTIPLICATION ------ 91
MAGIC LITES --------- number open after closed
MAGIC LINES -------- actual positions
```

3. Tiltcodes 93 94 : PHOTO WHEN PAY
At every SEARCH-cycle (searching payments via R-and X-but), the bingo is taking a photo of all the holeswitches being closed. When a payment is found, this photo is memorized in the non-volatile RAM memory together with the TOTAL amount (sum of the 4 colours and bonusses).
When a higher price has been found during the following search-cycle, this photo is memorized and the previous one disappears. So it is always the photo of the highest payment which will be displayed and used for testing.

During a new start and during the connection of the bingo the memorized photo will be compared with the actual balls on the playfield. In case this is not right, security code 93 appears (check up during start) or with code 94 (check up when connecting the bingo).
f.ex. let the bingo make a payment, switch the bingo off and remove one of the balls. When connecting the bingo CODE 94 will appear.

```
PRESSED BUTTONS----- X-but always pressed
BONUS MAIN CARD ---- blank
BONUS EXTRA CARD --- blank
BONUS GOLDEN ------- blank
REPLAY COUNTER ----- missing number in photo when pay
SAME GAME ---------- blank
MULTIPLICATION ----- 93/94
MAGIC LITES -------- photo when pay
MAGIC LINES -------- actual positions
```

4. TILTCODE 95 : TOTAL BALL SWITCHES COUNT FALSE
In this test the number of switches closed by the balls is controlled. This should not be more then 10.
```
    These switches are : - holeswitches
                         - trough switches
                         - ball alley switch
                         - ball gate switch
                         - rollovers
```

So in case more than 10 contacts are closed, security code 95 will appear and the switches closed at that moment are photographed. This photo can be seen on the displays of the bonusses. An open switch is represented by a 0 and a closed switch by a 1

```
PRESSED BUTTONS ----  X button always pressed
BONUS MAIN CARD ----  troughsw 9 to 5
BONUS EXTRA CARD ---  troughsw 4 to 0
BONUS GOLDEN -------  from the left to the right: rollover left,
                      right, blank, ball alley sw, ball gate
REPLAY COUNTER -----  total closed contacts (11)
SAME GAME  ---------  ball sw in play when alarm 95
MULTIPLICATION -----  95
MAGIC LITES --------  none
MAGIC LINES --------  actual positions
```

5. TILTCODE 97 : EXTRA BALL COUNT FALSE

With this test one can control whether the number of balls on the playfield do not exceed the number admitted by the extra ball step-per. This system avoids bringing up the balls manually. The tiltcode is 97 and the RPREG indicates the number of balls played.

6. TILTCODE 99 : MANUAL ALARM BALL

By means of the service box, a false alarm ball code can be called, so all features can be utilized. It suffices to write 43 on the address D8F6, alarm ball code 99 will appear.

B. R-BUTTON PRESSED : REPLAY BALLS HISTORY

In case of an ALARM BALL, the R-button has to be pushed ; in REPLAY BALLS MODE the game can be replayed. This happens as follows :
The R-button has to be closed permanantly and with the X-button the balls played are indicated one by one. The displays RPREG and multi-plicator are giving the number and the order of the ball which has been played.
The Magic Lines can also be moved (if this was admitted) when switch-ing on the +1 sw of the service box. During the REPLAY BALLS mode trips BEF4 and BEF5 will fall just like the balls should be played in reality.

```
PRESSED BUTTONS ----   R-but permanently on and X-but for step in
                       balls
BONUS MAIN CARD ----   blank
BONUS EXTRA CARD ---   blank
BONUS GOLDEN -------   blank
REPLAY REGISTER ----   hole number
SAME GAME ---------    order of hole number
MULTIPLICATION -----   tilt code
MAGIC LITES --------   one by one all historical numbers
MAGIC LINES --------   can be moved according to the actual game when
                       +1 is ON
```

C. YELLOW BUTTON : REPLAY PAYOUT MODE

In the REPLAY PAYOUT MODE the complete payment-cycles (search-pays)
can be seen. The following can be reconstructed :
- the exact position of the magic lines
- the numbers played at this moment
- the value of the replay counters of the colours

MGV3.2 memorizes max. 20 SEARCH-cycles. Each cycle(=photo)is numbered
from 1 up to 20 max. At the left of the RPREG the real number of pay-
ments can be seen and at the right one can see the order of the visi-
ble payments.

By means of the X-button, payments can be seen, one by one, in chro-
nological order. The number of credits is made visible per colour on
the respective bonusses and same game displays. So one cannot see the
total amount paid in one colour, but the amount of the relative com-
bination.
When switching ON +1 button of the service box,the magic lines will
be moved into the real positions.

```
PRESSED BUTTONS --- yellow but permanently on/ step by X-button
BONUS MAIN CARD --- replay counter red for current search pay
BONUS EXTRA CARD -- "         "      green "    "          "     "
BONUS GOLDEN ------ "         "      yellow    "         "       "
REPLAY REGISTER   at the right : order number of search pay
                  at the left : total number of search pay
SAME GAME -------- replay counter white for current search pay
MULTIPLACTION ---- multiplaction
MAGIC LITES ------ history numbers when current search pay
MAGIC LINES ------ when +1 ON : real position
```

D. MANUAL BUTTON PRESSED : MODE BONUS

When pushing the Manual lift button, one can see whether the bonusses
have been paid during the game. If so, their value is made visible on
the corresponding display. In this mode it can be seen whether it was
an OK-game or a normal game; when the RPREG indicates 34 this means
that it was an OK game.

```
PRESSED BUTTONS ---    manual lift permanently on
BONUS MAIN CARD ---    if hit bonus main
BONUS EXTRA CARD --    if hit bonus extra
BONUS GOLDEN ------    if hit bonus golden
REPLAY REGISTER ---    34 if last game was an OK game
SAME GAME ---------    blank
MULTIPLICATION ----    tiltcode
MAGIC LITES -------    actual numbers
MAGIC LINES -------    actual position
```

E. MOUVING MAGIC LINES

As already mentionned, the magic lines can only be moved when +1 but-
ton of the service box is switched on. After each inspection-mode,
the magic lines are returning to their position at the moment of the
alarm-ball.

F. RESETTING ALARM-BALL

This can be done as follows : DOOR OPEN - SVSW ON - A BUT ON
Now the bingo is back in its normal position. Alarm-ball is deconnected
until a new game is started.

ALARM BALL CAN ONLY WORK WITH :- DOOR CLOSED
                                - SVSW OFF
                                - DIPSW A7 ON

When the RPREG has been exceeded and ALARM BALL becomes operational,
one MUST reset ALARM BALL before the RPREG can be blocked.

SECURITY ON THE MAGIC MOTORS AGAINST MANUAL MOUVEMENT

This security-system is activated with dipswitch D1 ON (the dipsw.of
"no tilt during start"has got another function).
In case the magic lines are moved when this is not admitted, the
bingo will be tilt with tiltcode 88 and bit D21 is placed in the
monitor block.

DISPLAY MODE MANUAL LIFT

When the bingo is working normally, one can always obtain details
about the actual game when opening the door and pushing the manual
lift button.

- the multiplication display indicates the software version
- RPREG indicates the value at the moment the game was started
- the SAME GAME display indicates the total number of points, extra
  balls included.
- the bonusses indicate the "LASTBONUS" values, this is the last
  bonus that has been obtained (not necessarily in this game, it can
  also be the one of 8 days ago)
- all magic lites are flickering
  now defective bulbs can be detected immediately

CODE EE51

When starting a new game and opening the shutter, all holeswitches
are tested when opened. In case a holeswitch is still closed during
10 sec error code EE51 appears. The detected number appears on the
display of the extra card bonus. In case of an alarm-ball bit D26 in
the monitor block is set.

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 playf. /49	Rollover right playf. /50	Display hangtilt /51	Display tilt up /52	Display tilt down /53	/54	/55	/56
BX2	Shutter Motor /57	Lifter Motor /58	Display T. Security /59	Display T. left /60	Display T. right /61	/62	/63	/64
BX3	Magic motor A /65	Magic motor B /66	Magic motor C /67	Magic motor D /68	Magic motor F /69	/70	/71	Extra Card /72
BX4	Bonus Make /73	Bar 5 /74	Bar 4 /75	Bar 3 /76	Bar 2 /77	Bar 1 /78	IF 16 /79	Pot Golden enable /80
BX5	→ /81	→ /82	→ /83	→ /84	A /85	B /86	C /87	D /88
BX6	E /89	Select /90	Pot main card /91	Pot extra C. /92	SCR 300 /93	SCY 300 /94	SCG 300 /95	SCW 300 /96
BX7	Corners /97	4 Stars /98	Any 2 /99	Any 3 /100	OK Box /101	5th /102	Extra /103	Ball /104
BX8	Before 4 /105	Before 5 /106	Stripped /107	Tilt up /108	Tilt down /109	Super line main C. /110	Super line extra C. /111	Two pots enable /112
BX9	Same Game /113	Golden Bonus /114	EK OFF /115	Alarm 2 /116	/117	/118	/119	/120
		TOTI	123					
		TOTO	124					
		CASH	125					
		LAMP	128					

MISS BOWLING LITES MATRIX AX - AY

Lite number when OUT test with service box.

	AY1	AY2	AY3	AY4	AY5	AY6	AY7	AY8
AX1	A 129	B 129	C 129	D 129	E 129	GA 129	AA 129	BB 129
AX2	CC 130	DD 130	EE 130	/	/	/	/	/
AX3	F 131	G 131	H 131	I 131	J 131	GB 131	FF 131	GG 131
AX4	HH 132	II 132	JJ 132					
AX5	K 133	L 133	M 133	N 133	O 133	GC 133	KK 133	LL 133
AX6	MM 134	NN 134	OO 134					
AX7	P 135	Q 135	R 135	S 135	T 135	GD 135	PP 135	QQ 135
AX8	RR 136	SS 136	TT 136					
AX9	U 137	V 137	W 137	X 137	Y 137	GE 137	UU 137	VV 137
AX10	WW 138	XX 138	YY 138					
AX11	SCR4 1	SCR8 2	SCR16 3	SCR32 4	SCR64 5	SCR128 6	SCR192 7	SCR 250 8
AX12	SCY4 9	SCY8 10	SCY16 11	SCY32 12	SCY64 13	SCY128 14	SCY192 15	SCY 250 16
AX13	SCG4 17	SCG8 18	SCG16 19	SCG32 20	SCG64 21	SCG128 22	SCG192 23	SCG 250 24
AX14	SCW4 25	SCW8 26	SCW16 27	SCW32 28	SCW64 29	SCW128 30	SCW192 31	SCW 250 32
AX15	FIRST 33	EXTRA 34	BALL 35	SECOND 36	EXTRA 37	BALL 38	THIRD 39	EXTRA 40
AX16	BALL 41	FOURTH 42	EXTRA 43	BALL 44	EB BOX 45	ROLLOVER BOX 46	ROLLOVER YELLOW 47	ROLLOVER RED 48

SEE INSIDE - SERVICE BOX WIMI

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

- test of the switches
- a machine 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 connectedto the PR 350 by means of a flat cable consisting
of 16 conductors. Both on the PR 350 and the service box, the
red wire is to be at the upper side.

SEE INSIDE

With this program, the memory positions can be checked and
changed.
Procedure :

- connect the service box to the PR 350
- close the SERV SW, other letters and numbers will be read on the
  replay register

Example : Address D 817   data 52
                  D 818   24
                  D 819   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 hexa-
decimal numbers. It is possible to change the adresses step by
step with the +1 or -1 switches. If one of the switches is
continually ON, the addresses will change at a very high speed.

ANOTHER EXAMPLE

Programm address D8B7 = the address of the red score stepper,
by means of the Serv.Sw.
When playing for one point, the red score stepper will
indicate 1 or 2. When pushing the button several times
and consequently reducing the points more than one unit,
the red score and the red score stepper will increase
up to 3 etc... (first score is double).

When switching the SEE button ON, the red score can be
changed by means of the +1 and -1 button. The red score
stepper will always indicate the position.
The procedure described for the red score stepper is also
valid for all steppers.