

ZACCARIA

Manuale d'istruzioni

Instruction manual

Betriebsanweisungen

Manuel d'instructions

EARTH

WIND

FIRE



INSTRUCTION MANUAL

SERVICE MANUAL «EARTH WIND FIRE»

PART I - INSTRUCTIONS

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PART II - PARTS CATALOGUE

I. INSTALLATION

Assemble the game as follows:

1. Bolt legs to the cabinet (use special bolts in coin box).
2. Gently extract electric cable and place it in the proper cavity, checking that non-skid knot is there.
3. Remove the elastic band that secures the light board and lift it to a vertical position. During this operation make sure that the cable is not crushed between the parts. The same care has to be used when disassembling so as not to squeeze the cables between the parts.

The light board has an automatic coupling that keeps it in a vertical position to ease the assembly of the 4 bolts. Always make sure that the automatic coupling is securely into operation. Open light board and fasten it to the cabinet with the 4 bolts and washers in the coinbox.

VISUAL INSPECTIONS

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid some time consuming service work later.

Minor troubles caused by abusive handling in shipment are unavoidable.

Cable connectors may be loosened, switches (especially tilt switches) may go out of adjustment.

Plumb bob tilt switch should always be adjusted after game is set on location.

1. Check that cabinet cable is connected to the light board cable.
2. Check for any wires that may have become disconnected.
3. Check that cables are clear of all moving parts.
4. Check that there are no tin residues of foreign material due to loose solder between contacts or on the connectors.
5. Check wires for proper soldering. Cold solder connection may not show up in the factory inspection, but vibrations in shipment may break contact.
6. Check that all fuses are making good contact.
7. Check wiring of transformer to correspond to location voltage.
8. Check and adjust tilt switches sensitivity as follows:
 - A. Plumb bob tilt switch (tilt 1)
Adjust the length of plumb bob tilt according to desired sensitivity.
 - B. Rail tilt and ball (tilt 1)
Insert ball in the guide, check that the ball rolls free closing contact when the cabinet is raised.
 - C. Shockproof tilt (tilt 2)
There are 2:
the 1st. near plumb bob tilt, the 2nd. near coin chutes.
Adjust contact distance to desired sensitivity.

II. GENERAL GAME OPERATION

1. Place ball into hole, plug in line cord.

Score displays are set to zero, display for max. score shows the highest score ever obtained (to obtain zero follow instructions, chapter V). «Credit» display shows remaining credits.

2. «Game over» light is lit. If «tilt» light is lit check the adjustment of tilt contacts which should be open.
3. Check that the machine properly accepts coins and advances corresponding credits (see chapter V).

Remember that the machine should not accept any coin when turned off or if the number of credits has reached the programmed max. (see chapter V).

4. If, after ignition, the "GAME OVER" lamp blinks, it will be necessary to make some controls, since the data in storage memory, will be of no value. This is very likely to happen, if the machine was switched off for many weeks. If, on the contrary it has been recently used, and the "GAME OVER" lamp blinks it could well be that the battery or its input circuits are out of order.

When newly starting the machine re-programming will be necessary (see chapter V.).

5. Press «Credit» button - «GAME OVER» and possible «TILT» light should be turned off.
 - a. 1st player warning light should be lit.
 - b. Lamp showing 1st player in game will light up.
 - c. Credits will be decreased by one point.
 - d. BALLS TO PLAY lamp will have to be lit.
 - e. Playfield is ready and the ball ejected from the hole.
6. Each new pressure on «Credit» button will decrease the number of credits and increase indication of numbers of players in game.
7. Maximum number of credits which can be required is 4.

GENERAL REMARKS ON THE GAME

1. The number of balls to be played for each game is regulable (see chapter V).
2. The ball won during the game is immediately thrown in again.
3. The games won while playing for combinations accomplished or for achievement of winning scores are immediately awarded.
4. The games won by exceeding the maximum score (adjustable) are awarded at the end of the game.
5. At the end of the game, the match lamp comes on (if programmed) and a game is awarded to each player having the last two figures of score equal to the match number. The games won are awarded only if the number of maximum credits (adjustable) is not reached.
6. At the end of the game, the player (or players) who has got the superbonus win, is indicated by the winking of the corresponding lights.

N.B. This indication is of no value if the «SUPERBONUS» is programmed on «HIGHEST SCORE». In this case it will be shown on the displays.

7. When 3 balls are programmed per each game, fixed targets scores are increased.

8. If the score of any player exceeds 999.990, the last right hand digit of the display will flash to indicate the over the top score.
9. When highest score is set on «Random» each time a new game is started a new and changeable score will be shown in the programmed range of scores (see test n° 21).
10. When the last ball plays the display "BALLS TO PLAY" assumes "GAME TIME BONUS" function relevant to the time the ball plays.
When the ball goes into the bottom hole it will be rejected to play the time previously obtained.
If during the play, the player wins a BONUS BALL, the time counter stops till when the ball will be lost.
11. An optional electromechanical counter can be supplied.
It counts "weight" or value of the inserted coins (see chapter V - paragraph 9).

III. BOOK-KEEPING FUNCTIONS

«Meter display» button is designed to help operators perform certain accounting functions such as the number of coins dropped and number of total plays.

The operator will know these data at any time.

For this purpose he will have to open the coin chute and push the SELF TEST/METER/PROGRAMMING button.

- 1st player display will show total coins in left coin chute.
- 2nd player display will show total coins in left coin chute.
- 3rd player display will show total coins in central coin chute.
- 4th player display will show total plays.

Max. score display will show total replays.

Same data can be obtained using special print-out unit.

For this purpose, it will be necessary to connect the print-out to the special connector placed inside the cabinet on the right hand side.

Press «Stampa» button on the printer.

All displays and lamps will be turned off and a coupon will be printed as the sample below:

EARTH, WIND, FIRE

SERIAL N 0000

WINNED G 000006

PLAYED G 000013

COINS 1 000003

COINS 2 000002

COINS 3 000000

After printing the machine is ready to start a new game.

IV. GAME ADJUSTMENT

Once the machine has been set up, it is ready to play.

It is, however, advisable to carry out a general inspection in order to make sure that all parts work correctly.

For this purpose there is a «self test» program which is activated each time the «SELF TEST/METER/PROGRAMMING» button is pressed.

TEST THEORY OF OPERATION

1. Press button «self test» once.

«Match» display will show test number (01).

This test verifies book-keeping functions as in chapter III.

2. Press button again.

«Match» display will show test number (02). This test checks that all contacts are correct.

Automatically the digit displays will go from 0, 1, 2 etc. to 9 and repeat continuously.

Use this test to check if some digit segments have been damaged.

3. Press button again.

«Match» display will show test number (03). This test checks that all contacts are correct.

For this purpose it will be necessary to manually close all playfield contacts and those of the cabinet one at the time. Refer to the following list to check that the closed contact number is on «Credit» display.

CABINET CONTACT LIST

- 00 Meter display button
- 01 Plumb hob tilt «ROLL BALL»
- 02 Shock-proof tilt «SLAM TILT»
- 03 Credit button
- 04 Coin chute 1 (left-hand side)
- 05 Coin chute 2 (right-hand side)
- 06 Coin chute 3 (centre)
- 14 Reset highest score button

PLAYFIELD -CONTACT LIST (see table 2)

- | | | |
|------------------------------------|---|----------------------|
| 09 1st. button | 24 1st. moving target | 36 6th. fixed target |
| 10 2nd. button | 25 2nd. moving target | 37 1st. top rollover |
| 11 3rd. button | 26 3rd. moving target | 38 2nd. top rollover |
| 12 Top left-hand bumper | 27 4th. moving target | 39 3rd. top rollover |
| 13 Bottom left-hand bumper | 28 Inside bottom left-hand and right-hand canal | 40 4th. top rollover |
| 16 Outhole | 29 Fixed target right-hand canal | 41 5th. top rollover |
| 17 Lower left-hand kicker | 30 Top right-hand bumper | 42 6th. top rollover |
| 18 Lower right-hand kicker | 31 Bottom right-hand bumper | 43 1st. fixed target |
| 19 Bottom outside right-hand canal | 32 10th. fixed target | 44 2nd. fixed target |
| 20 Ball shoot contact | 33 9th. fixed target | 45 3rd. fixed target |
| 21 Bottom outside left-hand canal | 34 8th. fixed target | 46 4th. fixed target |
| 22 Contacts | 35 7th. fixed target | 47 5th. fixed target |
| 23 Special hole | | |

4. Press button again.

«Match» display will show **test number (04)**.

This test checks that all pilot lamps are working properly.

All lamps except those fix will light.

5. Press button again.

«Match» display will show **test number (05)**.

This test checks all solenoids.

These are activated in sequences from 1 to 20 and corresponding number will be shown on «Credit» display.

SOLENOID LIST (Table n° 4)

01 -	11 Outhole
02 Head and playfield fixed lamps relay	12 Knocker
03 -	13 Left-hand kicker
04 Coin mechanism stop	14 Right-hand kicker
05 -	15 Target bank
06 Top left-hand bumper	16 -
07 Top right-hand bumper	17 -
08 Bottom left-hand bumper	18 -
09 Bottom right-hand bumper	19 -
10 Special hole	20 Flipper relay

Functional tests have now been completed.

Push again the "Self Test/Programming" push-button to set the pinball for a new game.

V. PROGRAMMING

Games are factory programmed according to their designation. Programming elements may however be changed following procedure below.

It is assumed that such procedures will be left EXCLUSIVELY to technicians. Wrong programming could be the cause of malfunction. To verify or to change programming proceed as indicated in points 1 + 25 excluding the setting to zero phase.

1. Open light board with game-up.

To have a total or partial re-programming, set memories to zero as it follows:

A) Press "Programming Enable" pushbutton placed on top left-hand side of CPU BOARD.

B) Make a short circuit between TP19 and TP20, which are placed on bottom right-hand side of CPU board; to do so one can use special tester push rod or isolated copper wire with peeled end.

C) Proceed to the programming as indicated in points 2 + 25.

2. Press "Programming Enable" button on the upper left hand side of CPU circuit

3. Close light board without turning power off.

4. Press "SELF TEST/PROGRAMMING" button in coin chute.

"Match" display will show **test number (06)**. The number of balls per game can be programmed.

Display «Credit» will show the programmed number. To change programme use «Credit» button. The number of balls can be changed from 0 to 7.

5. Press «self test» button.

"Match" display will show present **test number (07)**.

"Match" can be programmed. Such possibility can be included or excluded by pressing «Credit» button.

CREDIT DISPLAY

– 00 match excluded.

– 01 included match

6. Press «self test» button again.

«Match» display will show **test number (08)**. Now the type of wins upon reaching winning score can be programmed.

(With wins programmed on superbonus, the number of credits is not increased but book-keeping function meters are equally up-dated).

Pressing «Credit» button, the following possibilities are available:

– CREDIT DISPLAY = 00

– CREDIT DISPLAY = 01 REPLAY

– CREDIT DISPLAY = 02 BONUS BALL

7. Press «self test» button.

"Match" display will show present **test number (09)**.

Max. number of replays can be programmed. «Credit» display shows present programmed number.

By pressing «credit» button programming is changed from 10 to 60.

8. Press «self-test» button.

"Match" display will show the present **test number (10)**.

Now it is possible to program the type of win awarded upon exceeding maximum score.

«Credit» button shows present programmed number.

Press «credit» button to change programming from 0 to 3.

– CREDIT DISPLAY = 00 SUPERBONUS

– CREDIT DISPLAY = 01 1 replay

– CREDIT DISPLAY = 02 2 replays

– CREDIT DISPLAY = 03 3 replays

9. Press «self test» button.

"Match" display will show **test number (11)**.

The «Weight» (value) of the coins accepted by coin chute 1 can be programmed (see table 1).

«Credit» display will show the present programmed value which can be changed by pressing «credit» button from 0 to 15.

10. Press «Self-test» button.

"Match" display will show **number of test (12)**.

Number of additional credits can be programmed by introducing the coin into coin chute n° 1 (see figure 1). Go on as shown at point 9, to change programming from 0 to 15.

11. Press «self test» button.
 "Match" display will show **test number (13)**.
 The «weight» (value) of the coins accepted by coin chute 2 can be programmed (see figure 1). Go on as shown at point 9 to change programming from 0 to 15.
12. Press «self test» button again.
 "Match" display will show **test number (14)**.
 Number of additional credits can be programmed by introducing the coin in coin chute n° 2. Go on as shown at point 9.
13. Press «self test» button again.
 "Match" display will show **test number (15)**.
 The «weight» (value) of the coins accepted by coin chute 3 can be programmed. Go on as shown at point 9.
14. Press «self test» button.
 "Match" display will show **test number (16)**.
 The number of additional credits can be programmed by introducing the coin into coin chute n° 3. Go on as shown at point 9. (see chapter VII: programming examples).
15. Press «Self test» button. "Match" display will show **test number (17)**.
 The first game variation can be programmed to light the "FIRE" lamps in order to reach the special:
 — CREDIT DISPLAY = 00, difficult fire starting.
 — CREDIT DISPLAY = 01, easy fire starting for 5 balls.
 — CREDIT DISPLAY = 02, easy fire starting for 3 balls.
 — CREDIT DISPLAY = 03, very easy fire starting.
16. Press «self-test» button again. "Match" display will show **test number (18)**. Second game variation can be programmed. By operating the "Credit" button it is possible to select one of the following possibilities:
 — CREDIT DISPLAY = 00, when entering the Special hole a SUPERBONUS is given.
 — CREDIT DISPLAY = 01, when entering the Special hole a REPLAY is given.
 — CREDIT DISPLAY = 02, when entering the Special hole a Bonus Ball is given.
 — CREDIT DISPLAY = 03, when entering the Special hole 50.000 points are given.
17. Press «self test» button again. "Match" display will show **test number (19)**. Third game variation on the top canals can be programmed:
 — CREDIT DISPLAY = 00, when canals are hit Special is lit and a Bonus Ball is given.
 — CREDIT DISPLAY = 01, when canals are hit Special is lit and 50.000 points are given.
18. Press «Self-test» button.
 "Match" display will show **test number (20)**. Continuous sound during match can be programmed.
 — CREDIT DISPLAY = 00, no continuous sound.
 — CREDIT DISPLAY = 01, yes continuous sound.
NEVER USE 03 PROGRAMMING IN THIS TEST.
19. Press «self test» button. "Match" display will show **test number (21)**.
 Variation can be programmed on the max. score:
 — CREDIT DISPLAY = 00, normal max. score and inserted coins accounting.
 — CREDIT DISPLAY = 01, Random score from 600.000 to 1.700.000. makes low scores more frequent and counts SUPERBONUS.
 — CREDIT DISPLAY = 02, as above makes medium scores more frequent and counts SUPERBONUS.
 — CREDIT DISPLAY = 03, as above makes top scores more frequent and counts SUPERBONUS.
20. Press «self test» button. "Match" display will show **test number (22)**.
 On the «HIGHEST SCORE» display the max. score obtained is reported.
 Press the credit button if zero setting is desired.
21. Press «self test» button. "Match" display will show **test number (23)**.
 «Credit» display shows 1st. winning score (hundred of thousands and tens of thousands).
 To change it act on «Credit» button until the new wished score has been obtained.
22. Press «self test» button. "Match" display will show **test number (24)**.
 «Credit» display shows 2nd winning score (see point n° 21).
23. Press «self test» button. "Match" display will show **test number (25)**.
 «Credit» display shows 3rd winning score (see point n° 21).
24. Press «self test» button.
 "Match" display will show the last **test number (26)**.
 Displays show book-keeping functions (see chapter III).
 To clear meters press «credit» button. Press «self test» button again.
25. Open again the light board and make the base program by means of the special switches on the CPU card (see instructions label on the light board or page 6 of the manual). This programming must be the same as per tests 12,13,6,15,16,7,21,8 to have the same operating in case of defects on the memory which functions with battery. If the perfect equality between program through tests and base program through switches cannot be reached, make the most approximate programming.
 In this way, if the program on the machine is lost, it will continue operating by the base program, tests which do not appear on the switches will have a preset value on the memory which is not supplied with battery (see "BASE PROGRAM").
- N.B.** Programming changes must always be made first on the tests and then on the switches, as the program on the switches is taken into consideration only in case of loss of the tests program.
 The machine is now ready to play.
- N.B.** On tests number 23,24,25 one cannot programme a score higher than 990.000.
N.B. The «Highest score reset» button placed on the coin mechanism shall be used to position the max. score at the desired level.
 Each time the button is pressed the score advances 100.000 points and when 1.900.000 is totalled, it starts again.

BASE PROGRAM ON SWITCHES

PROGRAMMA BASE

È **IMPORTANTE** impostare questa programmazione uguale a quella precedentemente impostata sui tests corrispondenti per avere lo stesso funzionamento in caso di anomalie sulla memoria batterizzata.
N. B. Il test 11 è programmato fisso a 1.

BASIC ADJUSTMENT

This adjustment should be same as the previous adjustment of the corresponding tests and functions in a similar manner in the case of defects to the memory which functions with battery.
 Test 11 is fixed adjusted to 1.

PROGRAMME BASE

Il est important de faire cette programmation de même que celle précédemment établie sur les tests correspondants de façon à avoir le même fonctionnement en cas d'anomalies sur la mémoire à batteries.
N.B. Le test 11 est programmé fixe à 1.

GRUNDPROGRAMM

Es ist sehr wichtig, auch dieses Programm gemäss dem zuvor auf den entsprechenden tests eingestellten programm einzustellen, um im fall von stoerungen an dem batteriegesteuerten speicher den gleichen betrieb zu haben.
Anm.: Der test nr. 11 ist auf 1 fest programmiert.



SWITCH -A-

1	2	3	4	5	6	7	8		
ON	ON							0 CREDIT	
OFF	ON							1 CREDIT	→ TEST 12 (credit gettoniera 1) (coin chute 1 credit)
ON	OFF							2 CREDITS	
OFF	OFF							3 CREDITS	
		ON	ON					PESO - VALUE 1	→ TEST 13 (peso-valore 2) (coin chute weight-value)
		OFF	ON					PESO - VALUE 2	
		ON	OFF					PESO - VALUE 4	
		OFF	OFF					PESO - VALUE 5	
		OFF	OFF					0 CREDIT	
			ON	ON	ON			1 CREDIT	→ TEST 14 (credit gettoniera 2) (coin chute 2 credits)
			ON	OFF	ON			2 CREDITS	
			OFF	OFF	ON			3 CREDITS	
			ON	ON	OFF			4 CREDITS	
			OFF	ON	OFF			5 CREDITS	
			ON	OFF	OFF			7 CREDITS	
			OFF	OFF	OFF			10 CREDITS	
						ON		3 BALLS	→ TEST 6
						OFF		5 BALLS	

SWITCH -B-

1	2	3	4	5	6	7	8		
ON	ON							PESO - VALUE 2	→ TEST 15 (peso-valore gettoniera 3) (coin chute 3 weight value)
OFF	ON							PESO - VALUE 4	
ON	OFF							PESO - VALUE 5	
OFF	OFF							PESO - VALUE 10	→ TEST 16 (credit gettoniera 3) (coin chute 3 credits)
		ON	ON	ON				1 CREDIT	
		OFF	ON	ON				2 CREDITS	
		ON	OFF	ON				3 CREDITS	
		OFF	OFF	ON				4 CREDITS	
		ON	ON	OFF				5 CREDITS	
		OFF	ON	OFF				7 CREDITS	
		ON	OFF	OFF				10 CREDITS	
		OFF	OFF	OFF				14 CREDITS	→ TEST 7
					ON			NO MATCH	
					OFF			MATCH	
						ON		HI-SCORE RANDOM	→ TEST 21
						OFF		HI-SCORE NORMAL	
							ON	REPLAY	→ TEST 8
							OFF	BONUS BALL	

BASE PROGRAM ON THE MEMORY WHICH DOES NOT FUNCTION WITH BATTERY

- Test (09) 15 Credits
- Test (10) 1 Replay
- Test (11) (01) Always fixed
- Test (17) (01) Normal starting
- Test (18) (02) Bonus Ball
- Test (19) (00) Bonus Ball
- Test (20) (03) No continuous sound
- Test (22) -----
- Test (23) 50
- Test (24) 66
- Test (25) (00) No wins

IMPORTANT INFORMATION TO PROGRAMME THE MACHINE WITH RANDOM SCORE AND CORRECT SUPER-BONUS ACCOUNTING.

To have a correct «Superbonuses» accounting, programme the machine as it follows:

1. "Match" programming has to be excluded (test 07 = 00).
2. The scores which can be programmed with tests 23,24,25 have to be at «Bonus Ball». Programme to zero tests 23,24,25 if «Bonus Ball» is not required.
3. The programme has to be «Superbonus» upon exceeding max. score (test 10 = 00).
4. The programme on Special Target has to be «Bonus Ball» or 50.000 points (test 18 = 02 or 03).
5. Test 21 has to be programmed on 01 or 02 or 03 one of the 3 score ranges to be used each time starts a new game.
 - There is a melody each time «Random Score» is overcome. Book-keeping will record 1 point at the end of the game. (See chapter III - Book-keeping functions).

N.B. With two or more than two players only one «Superbonus» is awarded to the highest score, also indicated on «Highest score» display.

VI. ROUTINE MAINTENANCE ON LOCATION

The purpose of this chapter is to give a general line to follow, so as to maintain the machine in proper operation.

The operations shown have to be carried out each time one operates on the machine, even when on power-up.

1. Follow first 5 tests as shown in chapter IV to check the correct operation of each flipper component.
2. Carefully check that securing screws of electronic boards do not work loose as well as all connectors of the plate.
 - Check and, if necessary tighten the screws of the rubber post.
 - Check the conditions of the rubber rings and, if necessary, change them. (remember to check the adjustment of contacts each time the rubber rings are replaced).
 - Carefully clean playfield. Do not use highly caustic cleaners.
3. Playfield (lower part).
 - Check flipper assembly (tie rod, pin joints and contacts)
 - Check bumpers
 - Check contact adjustments.
 - Check wiring harness to avoid tractions on the wires and obstacles to the moving parts.

Check and adjust tilt sensitivity.

Remember: an effective periodic maintenance greatly improves flipper life time and avoids the possibility of damages.

VII GENERAL INFORMATION

The purpose of this instruction Manual is to help operators perform several simple procedures such as installation, maintenance, and game adjustments.

For more complicated problems and repairs, that should always be done by specialized people more details procedures are available in Part II Technical Instructions.

COINS/CREDIT PROGRAMMING EXAMPLES

This game can be programmed for whatever combination of coins and credits. One has only to take into account the following data:

- The weight (value) of the coins can range from 0 to 15.
- The number of credits relevant to each coin can be changed from 0 to 15.
- Possible ratios of coin values:

- a) 1 - 2 - 5 or
- b) 2 - 5 - 10 or
- c) 5 - 10 - 15 or has to be adapted to such ratio

Example n° 1:

- 1 DM = 2 credits
- 2 DM = 5 credits (1 × 2 DM or 2 × 1 DM)
- 5 DM = 14 credits (1 × 5 DM or 2 × 2 + 1 DM or 3 × 1 DM + 2 DM or 5 × 1 DM).

Programming:

Test 11 = 1
Test 12 = 2
Test 13 = 2
Test 14 = 5
Test 15 = 5
Test 16 = 14

In this case the coin chute n° 1 shall accept 1 DM coins and coin chute n° 2 shall accept 2 DM coins. Coins chute n° 3, shall accept 5 DM coins.

Example n° 2:

- 1 FR = 1 credit
- 2 FR = 3 Credits (2 × 1 FR) (1 credit allowance)

Programming:

Test 11 = 1
Test 12 = 1
Test 13 = 2
Test 14 = 3
Test 15 = 4
Test 16 = 6

In this case coin chute n° 1 shall accept 1 FR coins. Coin chutes n° 2 and n° 3 are not provided.

Example n° 3:

- 1 FR = 0 credits
- 2 FR = 1 credit (2 × 1 FR)
- 5 FR = 3 credits (5 × 1 FR) (1 credit allowance).

Programming:

Test 11 = 1
Test 12 = 0
Test 13 = 2
Test 14 = 1
Test 15 = 5
Test 16 = 3

It has to be pointed out that in this case coin chute n° 1 has to accept 1 FR coins and coin chutes n° 2 and n° 3 cannot be installed.

Example n° 4:

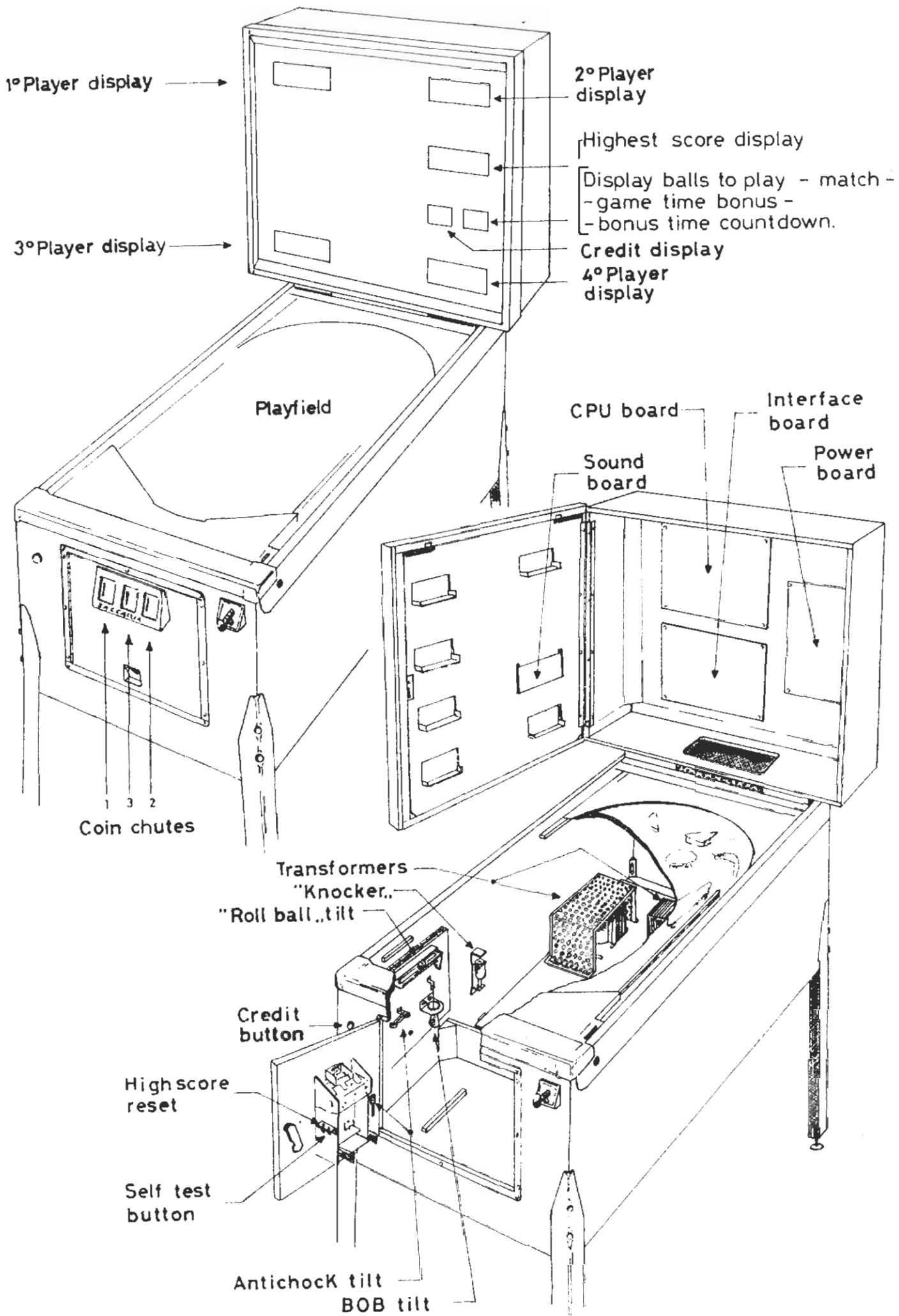
- 10 P = 1 credit (1 × 10 P)
- 50 P = 5 credits (1 × 50 P or 5 × 10 P)

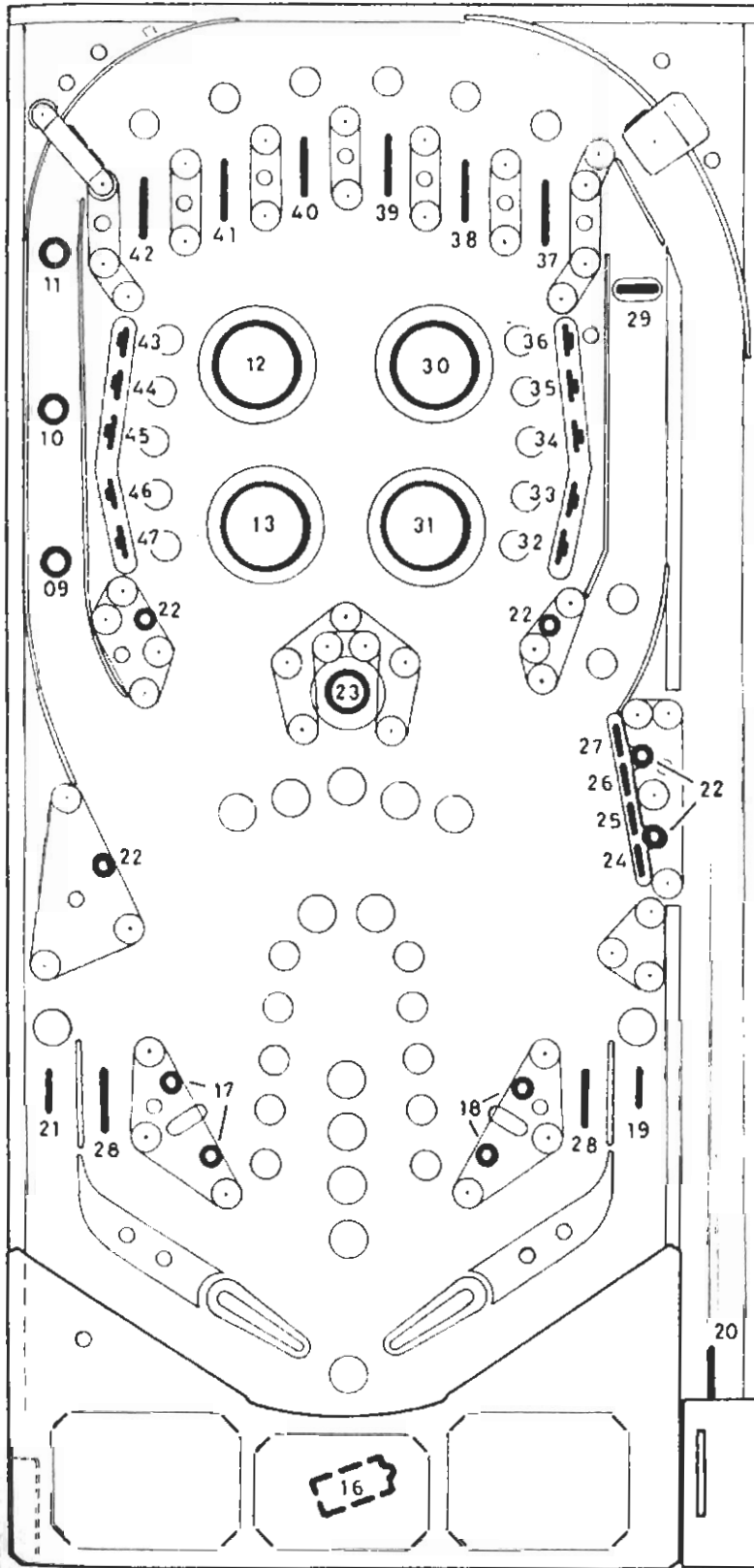
Programming:

Test 11 = 1
Test 12 = 1
Test 13 = 5
Test 14 = 5
Test 15 = 5
Test 16 = 5

In this case the coin chute n° 1 shall accept 10 P coins - coin chute n° 2 shall accept 50 P coins.

VERY IMPORTANT: Position from 11 to 16 have always to be programmed regardless the number of installed coin chutes.



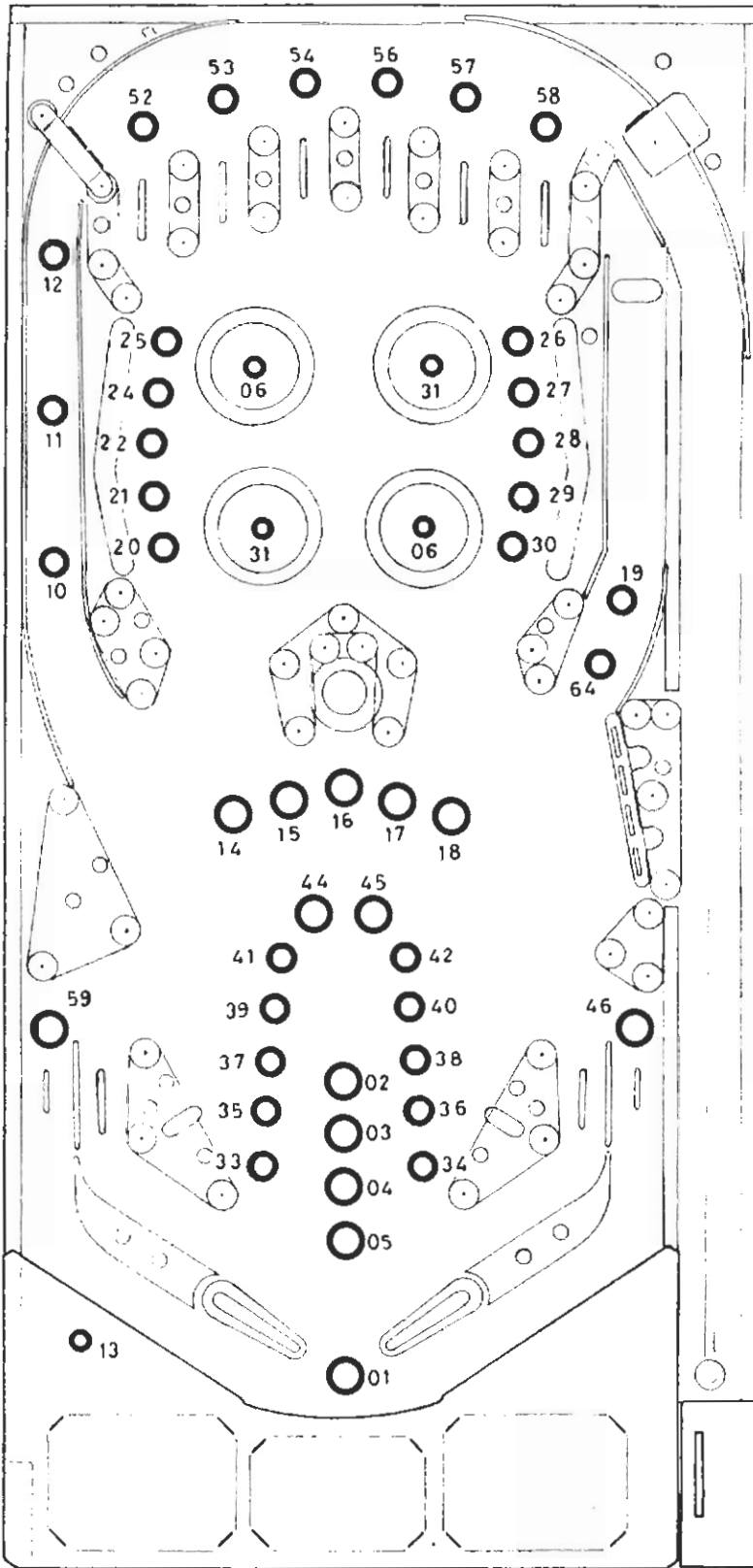


Contact Number	Description
09	1st. button
10	2nd. button
11	3rd. button
12	Top left-hand bumper
13	Bottom left-hand bumper
16	Outhole
17	Lower left-hand kicker
18	Lower right-hand kicker
19	Bottom outside right-hand canal
20	Ball shoot contact
21	Bottom outside left-hand canal
22	Contacts
23	Special hole
24	1st. moving target
25	2nd. moving target
26	3rd. moving target
27	4th. moving target
28	Inside bottom left-hand and right-hand canal
29	Fixed target right-hand canal
30	Top right-hand bumper
31	Bottom right-hand bumper
32	10th. fixed target
33	9th. fixed target
34	8th. fixed target
35	7th. fixed target
36	6th. fixed target
37	1st. top rollover
38	2nd. top rollover
39	3rd. top rollover
40	4th. top rollover
41	5th. top rollover
42	6th. top rollover
43	1st. fixed target
44	2nd. fixed target
45	3rd. fixed target
46	4th. fixed target
47	5th. fixed target

EARTH WIND FIRE

LAMP ARRANGEMENT

+ Head lamps
 ++ Head and playfield lamps



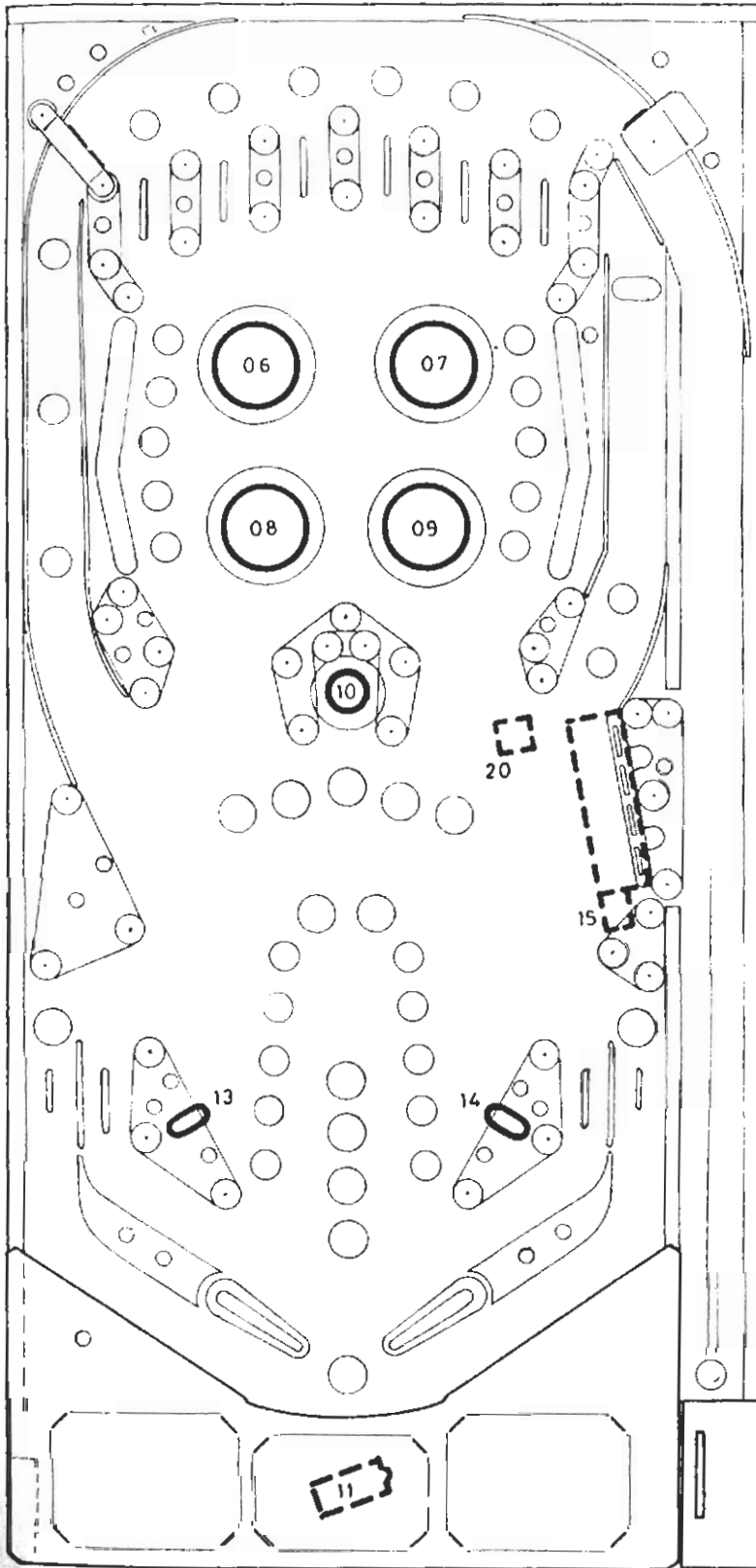
EARTH WIND FIRE

TABLE III

LAMP n°	Description	Driver n° (SCR)
++ 01	Bonus ball	SCR 57
02	Bonus x 2	SCR 61
03	Bonus x 3	SCR 62
04	Bonus x 4	SCR 54
05	Bonus x 5	SCR 55
06	Top left-hand and bottom right-hand bumpers	SCR 56
+ 07	Game over	SCR 59
+ 08	Match	SCR 58
09	-	SCR 53
10	1st. button	SCR 64
11	2nd. button	SCR 60
12	3rd. button	SCR 63
13	Credit	SCR 44
14	Fire	SCR 43
15	Fire	SCR 26
16	Special	SCR 25
17	Fire	SCR 27
18	Fire	SCR 45
19	Top right-hand canal	SCR 51
20	5th. fixed target	SCR 35
21	4th. fixed target	SCR 15
22	3rd. fixed target	SCR 8
+ 23	Ball to play	SCR 42
24	2nd. fixed target	SCR 24
25	1st. fixed target	SCR 23
26	6th. fixed target	SCR 28
27	7th. fixed target	SCR 50
28	8th. fixed target	SCR 33
29	9th. fixed target	SCR 9
30	10th. fixed target	SCR 46
31	Top right-hand and bottom left-hand bumpers	SCR 7
+ 32	Bonus time countdown	SCR 41
33	Bonus 1000	SCR 11
34	Bonus 2000	SCR 29
35	Bonus 3000	SCR 32
36	Bonus 4000	SCR 14
37	Bonus 5000	SCR 49
38	Bonus 6000	SCR 22
39	Bonus 7000	SCR 5
40	Bonus 8000	SCR 48
41	Bonus 9000	SCR 12
42	Bonus 10000	SCR 21
+ 43	Game time bonus	SCR 30
44	Big bonus 10000	SCR 39
45	Bonus 20000	SCR 4
46	Special bottom outside right-hand canal	SCR 38
+ 47	Can play 1	SCR 3
+ 48	Can play 2	SCR 13
+ 49	Can play 3	SCR 2
+ 50	Can play 4	SCR 37
+ 51	Tilt	SCR 20
52	6th. top rollover	SCR 31
53	5th. top rollover	SCR 19
54	4th. top rollover	SCR 36
+ 55	Super bonus	SCR 1
56	3rd. top rollover	SCR 18
57	2nd. top rollover	SCR 47
58	1st. top rollover	SCR 34
59	Special bottom outside left-hand canal	SCR 40
+ 60	Player 1	SCR 52
+ 61	Player 2	SCR 17
+ 62	Player 3	SCR 6
+ 63	Player 4	SCR 16
64	Top right hand canal	SCR 10

SOLENOID LIST

TABLE IV



Sol. n°	Description	DRIVER N° (Darlington)
01	-	Q 14
02	Head and playfield Fixed lamps relay	Q 5
03	-	Q 18
04	Coin mechanism stop	Q 17
05	-	Q 6
06	Top left-hand bumper	Q 7
07	Top right-hand bumper	Q 8
08	Bottom left-hand bumper	Q 4
09	Bottom right-hand bumper	Q 13
10	Special hole	Q 3
11	Outhole	Q 19
12	Knocker	Q 15
13	Left-hand kicker	Q 9
14	Right-hand kicker	Q 12
15	Target bank	Q 20
16	-	Q 1
17	-	Q 2
18	-	Q 11
19	-	Q 10
20	Flipper relay	Q 21

EARTH WIND FIRE

IX. CONNECTOR CARD FOR «EARTH WIND FIRE»

INPUT/OUTPUT POSITION ON THE CONNECTORS

FEEDER BOARD

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN1	1	Red	165 Vac 0.2 A
»	2	Red	165 Vac 0.2 A
»	3	Blue	43 Vac 10 A
»	4	Blue	43 Vac 10 A
»	5	White	7.5 Vac 15 A
»	6	Green	7.5 Vac 15 A
»	7	Yellow	10.5 Vac 3 A
»	8	Yellow	10.5 Vac 3 A
»	9	Brown	10.5 Vac 0.5 A
»	10	Brown	10.5 Vac 0.5 A
»	11	Black	15 Vac 0.5 A
»	12	Black	15 Vac 0.5 A
»	13	White	7.5 Vac 15 A
»	14	Green	7.5 Vac 15 A
CN2	1	Yellow-green	GND
»	2	—	—
»	3	Dark green-light blue	7.5 Vac cabinet fixed lamps
»	4	Brown-red	7.5 Vac cabinet fixed lamps
»	5	—	—
»	6	Light blue-red	+ 39 VRM common for all the solenoids in the cabinet
»	7	Pink-yellow	CABINET-PLAYFIELD INTERCONNECTIONS FOR FLIPPER CONTROL
»	8	Pink-white	
CN3	1	Pink-white	
»	2	Pink-yellow	
»	3	Blue	7.5 Vac cabinet fixed lamps
»	4	Yellow	7.5 Vac cabinet fixed lamps
»	5	Brown	+ 7.5 VRM common for all controlled playfield lamps
»	6	Violet-white	+ 39 VRM common for playfield solenoids
CN4	1	Blue	7.5 Vac light board fixed lamps
»	2	Yellow	7.5 Vac light board fixed lamps
»	3	Brown	+ 7.5 VRM common light board controlled lamps
»	4	Brown-light green	+ 12 VRM common for loudspeaker

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN5	1	Black	GND
»	2	Red	+ 5 Vdc
CN6	1	White	- 5 Vdc
»	2	Blue	+ 5 Vdc
»	3	Red	+ 12 Vdc
»	4	Green	+ 7.5 VRM
»	5	Black	GND
»	6	Yellow	+ 170 Vdc

CPU BOARD

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN7	1	Yellow	+ 170 Vdc
»	2	Black	GND
»	3	Green	+ 7.5VRM
»	4	Red	+ 12 VRM
»	5	Blue	+ 5 Vdc
»	6	White	- 5 Vdc
CN8	1	Orange-yellow	Printer - RX +
»	2	Yellow-grey	Printer - RX -
»	3	White-pink	Printer - TX -
»	4	Violet - black	Printer - TX +
»	5	—	—
»	6	White	Contacts - line 0
»	7	Grey	Contacts - line 1
»	8	—	—
»	9	—	—
»	10	Grey-white	Contacts - column 0
»	11	Black-white	Contacts - column 1
»	12	Red-green	Contacts - column 2
»	13	Black-yellow	Contacts - column 3
»	14	Black-orange	Contacts - column 4
»	15	Red-yellow	Contacts - column 5
»	16	□	—
»	17	Brown-violet	Contacts - column 6
»	18	Yellow-violet	Contacts - column 7

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CNS	1	—	
»	2	—	Contacts - line 2
»	3	Red	Contacts - line 3
»	4	Yellow	Contacts - line 4
»	5	Black	Contacts - line 5
»	6	Green	
»	7	—	
»	8	—	
»	9	—	
»	10	Grey-white	Contacts - column 0
»	11	Black-white	Contacts - column 1
»	12	Red-green	Contacts - column 2
»	13	Black-yellow	Contacts - column 3
»	14	Black-orange	Contacts - column 4
»	15	Red-yellow	Contacts - column 5
»	16	Brown-violet	Contacts - column 6
»	17	Yellow-violet	Contacts - column 7
»	18	□	

INTERFACE BOARD

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN 13	1	—	—
» »	2	□	—
» »	3	Orange-light blue	Coin mechanism stop
» »	4	Green-grey	Knocher
» »	5	—	—
» »	6	Violet-grey	Fixed lamps relay (head)
» »	7	—	—
CN 14	1	—	—
» »	2	Orange-white	Top left-hand bumper
» »	3	Green-white	Bottom left-hand bumper
» »	4	Brown-white	Out hole
» »	5	Black-white	Bottom right-hand bumper
» »	6	White-blue	Top right-hand bumper
» »	7	Orange-yellow	Special hole
» »	8	Light green-brown	Target bank
» »	9	Yellow-grey	Right-hand kicker
» »	10	White-grey	Left-hand kicker
» »	11	—	—
» »	12	Yellow-white	Flipper relay

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN 15	1	Brown-dark green	Bottom right-hand bumper
» »	2	Light blue-pink	Central left-hand targets bank
» »	3	red-light blue	Bonus × 5 lamp
» »	4	—	—
» »	5	Red-orange	Top left-hand and bottom right-hand bumpers
» »	6	Brown-black	Bonus × 2 lamp
» »	7	Yellow-violet	Bonus × 3 lamp
CN 16	1	Pink-grey	Bonus × 4 lamp
» »	2	Light blue	Bonus ball lamp
» »	3	Sky-blue-grey	2nd. button lamp
» »	4	Sky-blue-white	3rd. button lamp
» »	5	Dark green-pink	1st. button lamp
» »	6	—	—
» »	7	Dark green-blue	Central left-hand targets bank small coil (03)
» »	8	Dark green-light blue	Fixed lamps relay
» »	9	Violet-light blue	Central left-hand targets bank small coil (05)
» »	10	Green-white	3rd. fixed target lamp
» »	11	Red-white	Special lamp
» »	12	Orange-light green	"Fire" lamp
» »	13	White	"Fire" lamp
» »	14	Brown	Credit lamp
» »	15	White-orange	Top right-hand and bottom left-hand bumpers lamp
» »	16	Blue-light green	9th. fixed target lamp
» »	17	Blue-grey	2nd. fixed target lamp
» »	18	Black-red	"Fire" lamp
CN 17	1	Pink	"Fire" lamp
» »	2	—	—
» »	3	Brown-light green	Top right-hand canal lamp
» »	4	Violet-red	1st. fixed target
» »	5	Violet-white	6th. fixed target lamp
» »	6	Orange	10th. fixed target lamp
» »	7	Brown-orange	Bonus 7000 lamp
» »	8	—	—
» »	9	Yellow-grey	Bonus 1000 lamp
» »	10	Violet-orange	Bonus 6000 lamp
» »	11	Brown-yellow	Bonus 2000 lamp
» »	12	Violet	Special bottom outside left hand canal
» »	13	Blue-violet	2nd. top rollover lamp
» »	14	Black-grey	Bonus 20000 lamp
» »	15	Black-blue	Bonus 9000 lamp
» »	16	Pink-blue	Bonus 10000 lamp
» »	17	Red-grey	Big bonus 10000 lamp
» »	18	Yellow-pink	Bonus 8000 lamp

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN 18	1	Yellow-white	Special bottom outside right-hand canal lamp
» »	2	Blue-red	Bonus 5000 lamp
» »	3	Yellow-blue	6th. top rollover lamp
» »	4	Light green-grey	Bonus 4000 lamp
» »	5	Pink-white	5th. top rollover lamp
» »	6	Pink-brown	Bonus 3000 lamp
» »	7	—	—
» »	8	Blue-brown	7th. fixed target lamp
» »	9	Yellow-light green	4th. fixed target lamp
» »	10	□	—
» »	11	Pink-black	3rd. top rollover lamp
» »	12	Violet-black	8th. fixed target lamp
» »	13	White-brown	4th. top rollover lamp
» »	14	Black-green	Top right-hand canal lamp
» »	15	Orange-dark green	—
» »	16	Blue-orange	1st. top rollover lamp
» »	17	White-blue	5th. fixed target
» »	18	—	—
CN 19	1	—	—
» »	2	—	—
» »	3	Light-blue	Bonus ball lamp
» »	4	—	—
» »	5	—	—
» »	6	—	—
» »	7	—	—
» »	8	—	—
» »	9	Yellow-violet	Player 1 lamp
» »	10	Red-yellow	Ball to play lamp
» »	11	Light green-violet	Bonus time cont down
» »	12	□	—
» »	13	—	—
» »	14	—	—
» »	15	—	—
» »	16	Black	Can play 4 lamp
» »	17	Grey-violet	Game over lamp
» »	18	Yellow-orange	Game time bonus

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN 20	1	—	—
» »	2	Brown-violet	Player 3 up lamp
» »	3	Dark green-violet	Match lamp
» »	4	White-black	Tilt lamp
» »	5	—	—
» »	6	Black-yellow	Player 2 up lamp
» »	7	—	—
» »	8	—	—
» »	9	Yellow	Can play 2 lamp
» »	10	—	—
» »	11	Red-green	Player 4 up lamp
» »	12	—	—
» »	13	—	—
» »	14	□	—
» »	15	Green	Can play 1 lamp
» »	16	Red	Can play 3 lamp
» »	17	Grey-white	Super bonus lamp
» »	18	—	—
CN 22	1	Blue	7.5 Vac
» »	2	Yellow	7.5 Vac
» »	3	Brown-light green	+12 VRM
» »	4	Yellow-dark green	GND
» »	5	Black	Loudspeaker
» »	6	Red	Loudspeaker