

## (1) INSTALLATION

### ASSEMBLING

#### Assembling procedure:

1. Bolt legs to the cabinet using special bolts you can find inside coin box
2. Gently extract electric cable and place it into the special cavity, checking that non-skid knot is there.
3. Remove the elastic strip that secures the light board and lift it to a vertical position. During this operation make sure that cable is not crushed between the parts.
4. Open the light board and bolt it with the two bolts, using two washers for each bolt.

### CHECKING

On all games there are certain points that should always be checked after transport.

Same are visual inspection which may be helpful to avoid some time consuming service work later on.

Minor damage caused by rough handling during the transport are practically unavoidable.

Cable connector may be loosened, some contact (especially tilt switches) may lose their proper adjustment. Especially the plumb bob tilt switch should always be adjusted after game has been installed.

1. Check whether earth wire of the cabinet is connected to the earth wire of the lights board.
2. Check that all connectors are properly connected.
3. Check that cables do not hinder moving part.
4. Check that all fuses are making good contact.
5. Check whether the transformer is connected for the proper main voltage (check voltage selector switch on the transforming set inside the cabinet).
6. Check and adjust sensitivity of tilt contact proceeding as follows.

- A. Plumb bolt tilt switch. Adjust the plumb bob tilt length according to the sensitivity required .
- B. Rail and ball tilt. Put the ball into the rail and check it moves properly and that it closes the contact when the cabinet is raised.
- C. Shock-proof tilt  
Two of these tilts are provided for:  
the first one is near the plumb bob tilt, the second one near the coin-chutes. Adjust contact distance to desired sensitivity.

## (II) GAME OPERATION

1. Plug power cord to the wall socket and switch the machine on. After about one second displays light up, the lights of the play-field start blinking and the GAME OVER lamp is lit. This indicates that program is running. If the TILT lamp also lights up check the adjustment of tilt contact, which normally should be open. If, after switchin the machine on, the GAME OVER lamp starts flashing, it will be necessary to carry out some checks, because the data stored in the battery memory are no longer valid. If the machine has been left disconnected ( OFF ) for many weeks, this is very likely to happen. If, on the other hand, the machine has been used recently and the GAME OVER lamps flashes all the same, it is possible that the battery or the battery recharging circuit are out of order. In any case before starting the machine it is advisable to reprogram it( see GENERAL TECHNICAL INFORMATION).
2. Place three balls into the lower hole one at a time. Each ball should be automatically sent to the track(store), awaiting to be ejected at the start of the game. Check that each ball operates its relevant microswitch.
3. Check whether the machine accepts the coins properly and increases the relevant credits. Keep in mind that the machine not accept anymore coins once has reached the maximum programmed amount.



4. Press credit push-button.  
GAME OVER lamp should go off.
- A. First player lamp should light up.
- B. The credit are decreased by one
- C. BALLS TO PLAY lamp should light up
- D. The playfield is ready and the first ball is eject from the hole.
5. Each further operation of the credit push-button will cause a decrease in credits and advancement of display showing number of players.
6. The max number of the credits available is four.

### (III) ROUTINE MAINTENANCE ON PLACE OF INSTALLATION

This chapter aims at giving some general pieces of advice in order to maintain the machine in working order so as to avoid unnecessary costs for repair trips and, still more important, to maintain the machine in optimal conditions for the players.

In fact it is well known that players lose interest in the game if the machine does not work well, for example if flippers and bumpers do not react well, if the playingfield is dirty, lights are burnt out, etc....

Operations described hereafter should always be carried out any time the machine is adjusted, even if it is working all right.

1. Check and if necessary tighten, the screws of the rubber holding posts.
2. Check the wearing of the rubber rings and if necessary replace them (remember to check contacts adjustment every time rubber rings are replaced).
3. Carefully clean playfield. Do not use corrosive products.
4. Check flipper units (tie rods, pads, contacts and coils).  
Replace coils when they have poor efficiency. The flipper unit is the most stressed part, and therefore it requires accurate maintenance.
5. Check bumpers (tie rods and pads).



## HOW TO OPERATE ON TESTS

Games are factory programmed , according to the special requirements of the places where they are installed . However, the main programming elements may be changed , following procedures herebelow . We remind you that these procedures should be performed only by skilled technicians, since wrong programming may cause malfunctions , with consequent reduction in takings . In order to operate on tests operate lever switch placed inside the coin-box door .

Pushing it in " UP " position tests advance from 1 to 37 .

Pushing it in " DOWN " position test number decreases .

The test number is indicated by the two figures of the " BALLS TO PLAY " display (see fig. N.2).

In order to leave the tests it is sufficient to switch the machine and then on again, or operate UP or DOWN switch till the "BALL TO PLAY" display shows figure 00.

## HOW TO RESET ACCOUNTING TESTS AND CHANGE PROGRAMMING

In order to clear accounting tests and/or modify programming it is necessary to swite ON (PROGRAM) switch n.4 placed on CPU card (see fig. n.1) then call the test which must be modified and press "CREDIT BUTTON". In order to get back to game position bring switch n.4 back in OFF position (GAME) and switch the machine off and on again.

A buzzing sound and flashing of the tilt lamp indicate that switch n.4 has been left in on position.

## HOW TO REPROGRAM IN CASE OF LOSS OF DATA STORED ON MEMORY RAM C-MOS 6514-9

Any time the battery or ram C-MOS 6514-9 are replaced, or in any case of anomali in the recharging circuit it becomes necessary to reprogram the machine procede as follows:

- A. Reset accounting tests (6,7,8,9) even if ,seemingly, they are already reset.



- B. Program test from 10 to 37 ,keeping in mind you have to program also test which seemingly already programmed.  
For example , if you wish to program test 10 with figure 00 and the display indicate figure 00, push credit button until the display indicate once again figure 00 and so on for all following tests.  
In order to make programming easier a summary table of all tests with recordings of the programming made in the factory has been prepared. We recommend consulting this table before starting programming of each test .
- C. Once programming has been carried through "GAME OVER" lamp should remain lit, if it flashes it means that programming has not been accepted and must be done over again.

#### HOW TO PROGRAM UTILIZATION OF EMERGENCY PROGRAM

In order to prevent blockage of the machine due to loss of the data stored in in the battery memory RAM C-MOS 6514-9, 8 basic program have been provided for. These program can be selected through switches 1,2,3 located on CPU card (see fig.1).

In order to select a basic program different from the one selected in the factory by manufacturers , consult table here below.

#### VOLUME ADJUSTEMENT

On the audio-card there is a trimmer which can be operated with a smaal screw-driver for max volume adjustement. Adjustement of desired volume is done by means of the potentiometer located inside the coin box door,on the right of the cabinet.



( V ) TABLE OF BASIC PROGRAMS WHICH CAN BE SELECTED BY MEANS OF SWITCHES 1 , 2 , 3 ON CPU CARD

In order to prevent blockage of the machine due to loss of the data stored in the memory RAM C - MOS 6514-9 eight different basic programs have been provided for .

Blinking of GAME OVER lamp indicates playing with basic program hereafter selected .

For reprogramming see directions on page . 5 .

TAV. I

Programmi base - Basic programs - Programmes de base - Grundprogramme

N° test	ITALIA 1	ITALIA	GREAT BRITAIN	FRANCE	DEUTSCH.	BELGIQUE	JUGOSLA.	U.S. A.																			
	SW			SW			SW			SW			SW			SW			SW								
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3			
	on	on	on	off	on	on	on	off	on	off	on	off	on	on	off	off	on	off	on	off	on	off	off	on	off	on	
	—			—			—			—			—			—			—			—			—		
11 01	01			02			01			01			01			01			01			01			01		
12 00	00			01			00			00			01			00			01			01			01		
13 02	02			05			02			05			02			04			02			01			01		
14 01	01			03			01			03			03			02			02			01			01		
15 02	02			05			5			10			05			04			02			01			01		
16 01	01			03			3			07			07			02			02			01			01		
17 750	500			750			750			750			750			750			750			750			750		
18 High score 0	0			1			0			0			0			0			0			0			0		
19 15	15			15			15			15			15			15			15			15			15		
20 03	03			03			03			03			03			03			03			03			03		
21 1	1			1			1			1			1			1			1			1			1		
22 120	150			300			300			300			300			300			300			300			300		
23 160	400			600			600			600			600			600			600			600			600		
24 200	000			000			000			000			000			000			000			000			000		
25 0	1			1			1			1			1			1			1			1			1		
26 0	1			2			2			2			2			2			2			2			2		
27 0	2			2			2			2			2			2			2			2			2		
28 0	1			1			1			1			1			1			1			1			1		
29 1	1			1			1			1			1			1			1			1			1		
30 0	0			0			0			0			0			0			0			0			0		
31 1	1			1			1			1			1			1			1			1			1		
32 1	1			1			1			1			1			1			1			1			1		
33 1	1			1			1			1			1			1			1			1			1		
34 1	1			1			1			1			1			1			1			1			1		
35 1	1			1			1			1			1			1			1			1			1		
36 —	—			—			—			—			—			—			—			—			—		
37 —	—			—			—			—			—			—			—			—			—		



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FIG. 1

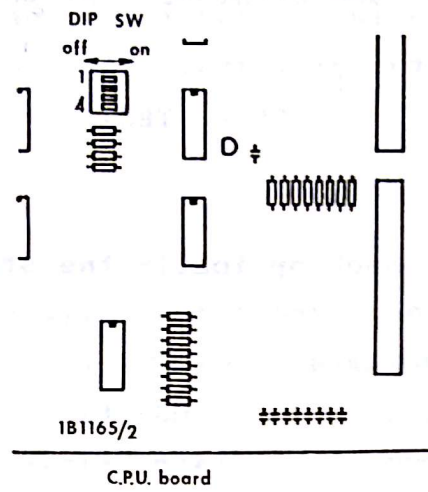
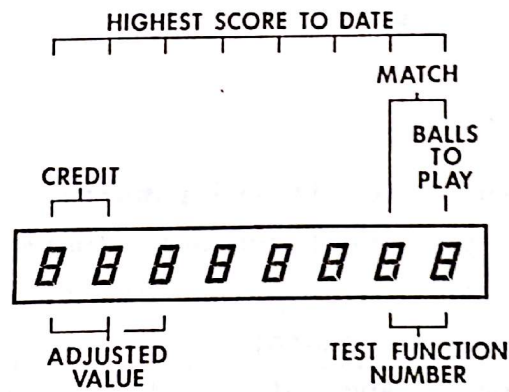


FIG. 2





For the numbering of contacts see fig. 4 .

IMPORTANT : Balls in the lower hole keep closed contacts  
n. 16 , 17 , 18 , 19 .

To prevent these contacts to interfere with the test , it is  
advisable to call the solenoids test , in order to eject the ball  
from the lower hole .

#### LAMPS ( Test n. 3 )

All the " piloted " lamps , that have been divided into two  
groups , are lit and extinguished alternatively at regular  
intervals .

Check whether there are any lamps that are not operative .

#### SOLENOIDS ( Test n. 4 )

All the solenoids ( coils ) are energized in sequence from 1  
through 24 . The number of the energized solenoid appears on  
the CREDIT display in that very moment .

Note that test all the solenoids are treated in the same way  
( either used or not ), and thus on the CREDIT display the  
numbers of all the 24 possible solenoids are indicated .

Those that are not operative and are missing do not cause any  
effect .

#### SOUND AND TALKING ( Test n. 5 )

This test serves to hear the various sound and sentences  
programmed for the model and check whether they are correct .

In the same time on the CREDIT display the number of the  
sentence being executed appears .



## ( VI ) GAME REGULATION

We are now going to analyse in detail the technical performances, starting with the self-test functions , followed by the accounting functions and eventually by the various programming functions .

### SELF TEST

#### DISPLAY ( Test n. 1 )

With this test we check optically the proper operation of the display .

We have following groups :

1st Player display .                      2nd Player display .

3rd Player display .                      4th Player display .

HIGHEST SCORE TO DATE display , CREDIT display , BALLS TO PLAY display . When this test is entered all figures show the same numbers , starting with " 0 " that immediatly become " 1 " and then " 2 " and so on until " 9 " then they restart at " 0 " and so on .

Pushing CREDIT button , the 7 figures of each display start indicating 7 numbers in continuos succession .

Example : 6 5 4 3 2 1 0

7 6 5 4 3 2 1

etc. etc.

#### CONTACTS ( Test n. 2 )

By this test function it is possible to check the proper operation of the 64 INPUT contacts numbered from 00 to 63 . When this test is entered the two figures of the CREDIT display indicate the " closed " contact highest in number . After having opened it , the number of the closed contact next in order appears . If none of the 64 contacts is " closed " no number is indicated . Under these conditions it is possible to check whether all the contacts work properly , by closing them one by one and making sure that each time the corresponding number appears on the special display provided .

## ACCOUNTING FUNCTIONS

### TIME ( Test n. 6 )

Same contains the accounting data relevant to the time (minutes) of pintable operation, 1st player display to the actual duration of the game ( minutes ) ( 2nd player display ), the total number of TILTS ( 3rd player display ) and the average duration of games ( 4th player display ).

The average duration of games is expressed in minutes , and is determined by the ration between the play time and the number of games that have been played .

The above accounting functions can be cleared simultaneously , by keeping presse the CREDIT push-button for about 5 seconds , provided SW n. 4 on the C.P.U. boards is on ON ( PROGRAM ) .

### TAKINGS ( Test n. 7 )

The number of coins collected by the first chute ( on the left side ) is indicated on the 1st player display .

The number of coins collected by the second coin chute ( on the right side ) is shown on 2nd player display . The 3rd player display accounts for the number of coins introduced into the third coin chute ( the central one ). On the 4th player display the number of "service" games is reported, that is those games obtained by pressing the " SERVICE " push-button that is located inside the door on the left side .

Note that the " SERVICE " push-button does not change the number of credits, because it enters directly from 1 to 4 games, and also the electromechanical counter is not affected .

To consent clearing SW n.4 on the C.P.U. board ( see fig. 1 ) should be in ON position ( PROGRAM ), and then push-button " CREDIT " must be kept pressed for at least 5 seconds .



## WINNINGS ( Test n.8 and 9 )

Test n. 8 indicates winnings listed per types, that is : 1st player display indicates the overall quantity of games that have been played (the sum of games paid, games won and SERVICE games). The 2nd player displays indicates the games won . The 3rd player display indicates the number of won balls. Finally, the 4th player display indicates the number of awarded SUPERBONUSES .

Test n. 9 shows how the winnings have been obtained .

The 1st player display indicates how many times the HIGHEST-SCORE has been exceeded .

The 2nd player display shows the number of winnings obtained with winning scores .

The 3rd player display shows the number of winnings obtained with SPECIAL 1 .

Finally , 2nd player display appears the number of winnings obtained with SPECIAL 2 .

To clear the winnings SW n.4 should be in ON position (PROGRAM), then enter test n.8 and press CREDIT push-button for at least 5 seconds , then enter test n.9 and again press CREDIT push-button for at least 5 seconds .

## SERVICE ( Test n.10 )

Test n.10 indicates :

Total number of n.2 Tilts on 1st player display ( game tilts ).

Total number of Credits cancelled by tilt n.2 , on 2nd player display .

## PROGRAMMING

COINS (Test n. 11, 12, 13, 14, 15, 16 )

To meet the requirements due to the various types and values of coins used in the different countries , a highly sophisticated method for programming the cost of one " credit " ( game ) has been adopted .

The main features of this method are :

- A ) Possibility of giving one credit with several coins .
- B ) Same number of allowances if the value of the introduced coins is the same , regardless of their number and type .
- C ) Possibility of establishing a cost per credit that differs from the value of the various coins .

To achieve proper programming of the cost for one credit, in case allowances are granted, it is necessary to keep in mind that the cost ratio between the most expensive credit and the less expensive one has to be less than " 2 " .

Tests 11, 13, and 15 should be programmed with the unit " value " of the coins introduced into coin chute n.1 ( on the left side ), coin chute n.2 ( on the right side ) and coin chute n.3 ( in the middle ) , respectively .

Keep in mind that the coins have to be introduced into the 3 coin chutes in GROWING ORDER according to their value .

The coin with the lowest value must be introduced into the first coin chute . To the second coin chute can be assigned a coin of the same or higher value than the first one .

Into the third coin chute should be introduced coins with a value higher or equal to the one of the coins introduced into the second coin chute .

Test 12, 13, 14, and 16 shall be programmed with the number of credits to be allowed to each coin introduced respectively into coin chutes 1, 3 and 3 .

If more coins are necessary to get one credit , figures 00 must be programmed .

The coin value attributed to the third coin chute shall be equal or higher to the cost of one credit . ( The number to be programmed in test n. 16 must be equal or higher than 1 ).



THE UNIT VALUE OF COINS IS THE FIGURE OBTAINED BY DIVIDING THE ACTUAL VALUE OF THE COINS BY THE MAX , COMMON DIVISOR .

Examples :

100 L. -200 L. -500 L.

10 P. -50 P.

M.C.D. = 100

M.C.D. = 10

Values = 1- 2- 5

Values = 1- 5

To make the task of operators easier on Table n. 1 can be found some actual coin chute programming examples for several European Countries .

HIGH SCORE ( Test n. 18, 17, and 25 )

There exists the possibility of choosing between 2 different types of H.S. :

NORMAL ( Test 18 = 00 ) and RANDOM ( Test 18 = 01 ).

NORMAL H.S. represents the max. score achieved by one player .

When this score is exceeded by one or more players , it is replaced by the score obtained by the player who has totalled the highest score . Following players must exceed the new H.S. value to have their winning score recorded .

RANDOM H.S. on the contrary consists of a casual score , ranging within a top limit of 2.000.000 points that is set forth at the beginning of each game .

The minimum value is given by the figure programmed with test n. 17 and can range from 00.000.000 to 99.990.000 .

The same test is used to program a NORMAL start H.S. , when the pintable is installed , or in any case to clear or change the existing H.S. value . To do so , press several times the CREDIT push-button , if slow progressing is required , or keep it pressed for fast progress . To change the initial value of RANDOM H.S. it is necessary that SW n. 4 on the CPU board is in ON ( PROGRAM ) position , while it may be both on ON ( PROGRAM ) or OFF ( GAME ) position to change the initial value of NORMAL H.S. .

The player who exceeds the NORMAL or RANDOM H.S. wins the prize established by the programming of test n.25 , with the following possibilities .

Test 25 = 00 = No win  
          01 = 1 Replay  
          02 = 2 Replays  
          03 = 3 Replays  
          04 = 1 Superbonus

To modify either test 18 or test 25 SW n.4 must be in ON position ( PROGRAM ), then press CREDIT push-button .

FOR NORMAL H.S. , THE WIN IS AWARDED ONLY TO THE PLAYER WITH THE HIGHEST SCORE , EVEN WHEN THE PLAYERS EXCEEDING THE PRESET HIGHEST SCORE VALUE ARE MORE THAN ONE .

IN THE CASE OF RANDOM HIGH SCORE THE WIN IS GIVEN TO ALL THE PLAYERS WHO EXCEED THE PRESET H.S. VALUE .

MAX CREDIT ( Test n.19 )

Same represents the max. number of credits that can be recorded before the coin chute locking mechanism is released , thus preventing further introduction of coins . It represents also the figure beyond which credits are no more increased by won games. It can be programmed from 10 to 30 pressing CREDIT pushbutton , provided SW n.4 is in ON ( PROGRAM ) position .

BALLS ( Test n. 20 )

It represents the number of balls which can be played in one game. It can be programmed from 01 to 07 pressing CREDIT pushbutton provided SW n.4 is ON .

MATCH ( Test n. 21 )

Match is the possibility to award one replay to the player or to the players who have managed to get a score with last two right end figures equal to the two figures of MATCH ( see fig. 2 ) . If it is programmed with 00 it is excluded , while if it is programmed with 01 it is connected .

To change programming press CREDIT pushbutton . SW n.4 must be in ON ( PROGRAM ) position .



## WINNING SCORES ( Test n. 22, 23, 24, and 26 )

There are 3 scores, that can be programmed between 00.0 and 99.990.000 , with tests 22, 23, and 24 respectively .

The player or the players who exceed one or more ( max. 3 ) winning score are awarded a prize as determined by test n. 26 for each exceeded winning score .

Scores programmed with 00.0 are not enabled ( they do not award any win even if test 26 is programmed for wins ) .

Test n. 26 determines type of win for each winnin score :

### TEST 26 :

- 00 = No win
- 01 = Extra ball
- 02 = Replay
- 03 = 1 Superbonus
- 04 = 2.000.000 Points

To program these tests SW n.4 must be in ON ( PROGRAM ) position , then press CREDIT pushbutton.

For the score ( test 22, 23, 24 ) push repeatedly the CREDIT pushbutton to progress 1 by 1 ( each step corresponding to 10.000 points ) .

When the button is kept pressed the progress is fast .

## SPECIAL 1 RED ( Test n. 27 and 35 )

Through test n. 35 red special duration can be varied .

### TEST 35 :

- |      |               |            |    |      |
|------|---------------|------------|----|------|
| 00 = | Difficult     | Duration : | 10 | sec. |
| 01 = | Medium        | " "        | 15 | sec. |
| 02 = | Medium - easy | " "        | 18 | sec. |
| 03 = | Easy          | " "        | 18 | sec. |

To program and modify press CREDIT pushbutton provided SW n.4 is in ON ( PROGRAM ) position .

Test n. 27 determines the type of win to be awarded when the special target is hit , if the relevant lamp is lit.

Test 27 :

00 = No win  
01 = 1 extra ball  
02 = 1 replay  
03 = 1 superbonus  
04 = 2.000.000

To program and modify press CREDIT pushbutton , provided SW 4 is in ON ( PROGRAM ) position .

SPECIAL 2 ORANGE ( Test n. 28, 34 )

By modifyng test n. 34 it is possible to grade difficulty in obtaining lighting up of " special " lamp .

Test 34 :

00 = Special is on after the 2nd sequency .  
01 = Special is on after the 1st sequency .  
02 - 03 = Special is on after the 1st sequency .

Test n. 28 determines the type of win to be awarded when the orange special target is hit , if the relevant lamp is lit .

Test 28 :

00 = No win  
01 = 1 extra ball  
02 = 1 replay  
03 = 1 superbonus  
04 = 1.000.000

To program and modify press CREDIT pushbutton , provided SW 4 is in ON ( PROGRAM ) position .

COIN METER ( Test n. 30 )

This is an electromechanical impulse - counter , to be connected to the 8 -ways circular connector located in the cabinet which records the " UNIT VALUE " of the coins introduced into the



3 coin chutes . It is never modified by the wins or the service games ( obtained through the SERVICE push-button ).

If test is programmed with 00 game can be played both with connected and cut off coin meter , if the test is programmed with 01 the machine works only if the impulse counter is connected . Note that the impulse meter is always in operation , regardless of the type of programming used for test n. 30 .

To program or to change , push CREDIT push-button , provided SW n. 4 is in ON ( PROGRAM ) position .

The impuls meter and relevant wiring are available upon request .

#### EXTRA BALLS NUMBER VARIATION ( Test n. 32 )

This test is used to determine max. number of extra balls which can be won .

Test 32 :

- 00 = 1 Extra ball
- 01 = 3 Extra balls
- 02 = 3 Extra balls
- 03 = 3 Extra balls

To program or change , push CREDIT push-button , provided SW 4 is in ON ( PROGRAM ) position .

#### BALLS GAME VARIATION ( Test n. 33 )

Lighting up of lamps in front of the spiral ( LEFT HILL - RIGHT HILL ) can be varied as follows .

Test 33 :

- 00 = At the start of the game all lights are off.
- 01 = At the start of the game 30.000 points lamp is lit .
- 02 = At the start of the game 50.000 points lamp is lit .
- 03 = At the start of the game LAST LAMP lamp is lit