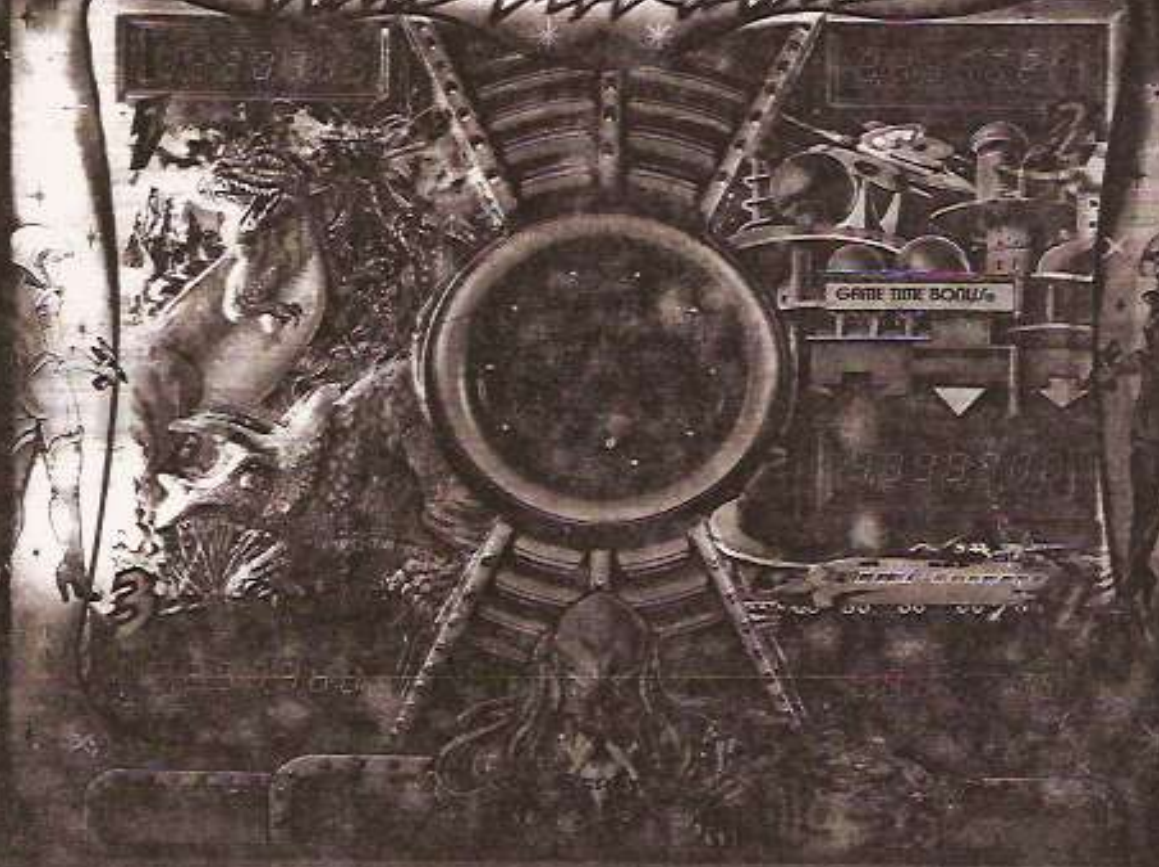


# STAR MACHINE



**ZACCARIA**

# MANUALE D'ISTRUZIONI

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## INSTALLATION

### ASSEMBLING

Assembling should be done as follows:

1. Bolt legs to the cabinet (use special bolts in coin box).
2. Gently extract electric cable and place in the proper 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 the cable is not crushed between the parts. The light board has an automatic coupling that keeps it in a vertical position, to ease the fitting of the 4 bolts with the relevant washers, that can be found in the coin box too.

### VISUAL INSPECTIONS

On all games there are certain points that should be always checked after transport. Some are visual inspections which may be helpful to avoid some time consuming service work later. Minor damages caused by rough handling during the transport are practically unavoidable. Cable connectors may be loosened, switches (especially tilt switches) may lose their proper adjustment. Especially the plumb bob tilt switch should always be adjusted after game is set on location.

1. Check whether cabinet cable is connected to the light board cable.
2. Check for any wires that may have become disconnected.
3. Make sure that the cables do not obstacle the moving parts.
4. Check that all fuses are making good contact.
5. Check whether the transformer is connected for the proper main voltage.
6. Check and adjust the sensitivity of tilt contacts as follows.
  - A. Plumb bob tilt switch.  
Adjust the plumb bob tilt length according to the required sensitivity.
  - B. Rail tilt and ball.  
Put the ball into the rail and check whether it moves properly and closes the contact when the cabinet is raised.
  - C. Shockproof tilt  
There are two:  
The first one near plumb bob tilt, the second one near coin chutes. Adjust contact distance to desired sensitivity.

### GENERAL GAME OPERATION

1. Put one the ball into the bottom hole  
Connect voltage and start the game.
2. The «GAME OVER» lamp is lit (if the TILT lamp lights up, check the sensitivity of the normally open tilt contacts).
3. Check whether the machine accepts properly the coins and increments the relevant credits. Please keep in mind that the machine shall not accept any coins when turned off or if the number of credits has reached the max. programmed amount.
4. If after having started the game the GAME OVER lamp is lit, it is necessary to carry out some control functions, because the data stored in the battery memory, are not valid anymore. If the game has been disconnected for many weeks, this is very likely to happen.  
If on the other hand the machine has been recently used, and the GAME OVER lamp blinks, it is possible that the battery or its reloading circuit are out of order.  
In any case, before starting the machine it is advisable to reprogram it.
5. Act on credit push-button. The «GAME OVER» lamp shall extinguish.
  - A. First player lamp shall be lit.
  - B. The credits are decreased by one.
  - C. «BALLS TO PLAY» lamp shall be lit.
  - D. The playfield is ready and the ball is ejected from the hole.
6. Each time the credit push-button is operated, the number of credits is decreased by one and the number of players is updated.
7. The max. number of credits available is four.

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. 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.
2. Playfield (lower part).
  - Check flipper assembly (tie rod, pin joints and contacts).
  - Check bumpers.
  - Check contact adjustments.
  - Check wiring harness to avoid stresses on the wires and obstacles to the moving parts.
3. Check and adjust tilt sensitivity.  
Remember: an efficient periodic maintenance greatly improves the pintable lifetime and avoids the possibility of damages.

#### NOTE

Games are factory programmed, according to the special requirements of their designation. The main programming elements may be changed, however, by following procedures below.  
We remind you that these procedures shall be performed EXCLUSIVELY by skilled technicians, because wrong programming could cause malfunctions.

#### GENERAL TECHNICAL INFORMATION

To avoid that any cause (battery discharged or others) causes the loss of the data stored in RAM C-MOS, and thus the failure of the pintable, the basic program contains some typical programmings (to replace the switches that had been used with the precedent series).

When the microcomputer notes that the programming data of RAM C-MOS do not apply anymore, recall one of the 6 lists of typical programming (see table I).

For the CHOICE OF THE TYPICAL LIST, that will be called in case of necessity, the DIP SWS. 1, 2 and 3 are used, that are mounted on the C.P.U. board (see figure 1).

On the sound board there are 2 trimmers provided for the separate tuning of the max. volume of sounds and talking.

For the final tuning of the loud-speaker volume, both for sound and for talk, there is a potentiometer provided, that is located inside the cabinet on the right side of the door. At the front board of the cabinet there is a plug for the headset, whose volume shall be adjusted on the headset itself (see figure 3).

To operate on the «TESTS» with the pintable in GAME OVER position, on the door there is an «ADVANCE-RETURN» switch with central rest position (or 2 push-buttons, of which one «ADVANCE» and the other one «RETURN»). By acting on «ADVANCE» at each control the tests progress 1 by 1 from 0 through 37 and then again 0, 1, 2 etc. When pushing again «RETURN», each time the test number is decreased by one (contrary to what happens with «ADVANCE»).

The test number is indicated on the 2 figures of the «BALLS TO PLAY» display (see fig. 2). To leave the test, and return thus to GAME OVER, it is sufficient to stop and then start again the game, or to push ADVANCE or RETURN until the display shows 00.

To clear the «accounting» tests or in any case to amend the programming tests, it is necessary that SW n. 4 on the C.P.U.-board (see fig. 1) points to ON (PROGRAM), and then call the test to be changed, and act on the «CREDIT» push-button. After having cleared or programmed the test, to return in GAME OVER condition and thus to be able to play, call test 00 and then put SW n. 4 in OGG (GAME) position.

If the SW n. 4 has not been reset, and you are still in ON (PROGRAM) condition with the 00 (GAME OVER) test, there will be a buzzing sound and the TILT lamp will be blinking, to inform on the anomalous condition that doesn't allow to use the game.

IMPORTANT: each time the battery or RAM C-MOS 6514-9 are replaced, or in any case of interruption of the memory feeding, it is necessary to act as follows to enter the new program:

- a) Clear the accounting tests (5, 7, 8, 9) even if they apparently are already cleared.
- b) Program the tests from 10 through 37, without forgetting to program also those tests that apparently are already programmed.  
For example, if you wish to program the test 10 with 00, and on the display 00 has already appeared, then push the CREDIT push-button until 00 appears again.

Once the programming has been terminated, the GAME OVER LAMP shall remain lit.

If it is blinking this means that the programming has not been accepted, and thus it has to be repeated in the proper way.

Now we are going to analyse the technical performances in a detailed manner, starting with the self-test function, followed by the accounting functions and eventually the various programming functions.

## SELF TEST

**DISPLAY (Test n. 1).** By this we check optically the proper operation of the display (5 groups of 7 figures each covering a total of 35 figures). The 5 groups are the the following: **1st player display; 2nd player display; 3rd player display; 4th player display; HIGHEST SCORE TO DATE display or DISPLAY CREDIT, TIME BONUS and BALLS TO PLAY.** When this test is entered, all the figures show the same numbers, starting with «0» that immediately becomes «1» then «2» and so on until «9»; then they restart at «0» and so on. By acting on CREDIT push-button the 7 figures of each display indicate 7 numbers in continuous succession.  
Example: 6 5 4 3 2 1 0  
7 6 5 4 3 2 1

**CONTACTS (Test n. 2):** By this test function it is possible to check the proper operation of the 64 INPUT contacts numbered from 00 through 64. When this test is entered, on the 2 figures of the CREDIT display appears the "closed" contact highest in number, and after having opened it, follows the number of the closed contact next in order. If none of the 64 contacts is "closed" no number is indicated. Under these circumstances 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. For the numbering of contacts see fig. 4 N.B. The presence of the ball in the lower hole or the mobile plate in down position respectively keep the contacts 16 and 5 closed. To avoid their interference with the test functions, we recommend to enter the solenoid test to have the plate going up and to remove the possible ball in 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 EACH SINGLE PINTABLE MODEL MAY USE ONLY PART OF THE 24 AVAILABLE SOLENOIDS.**  
In the 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 (mechanical noise).  
The number of employed solenoids is indicated on fig. 6.

**SOUND AND TALKING (Test n. 5).** This test serves to hear the various sounds and phrases programmed for the model and to check whether they are correct; in the same time on the CREDIT display appears the number of the sound or of the phrase being executed.  
To check the proper operation of the SOUND board, use the special self-test program, that is on the board itself (see paragraph self-test sound and talking board).

## 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 number of TILTS (3rd player display) and to the average duration of games (4th player display). The average duration of games is expressed in minutes, and is determined by the ratio between the play time and the number of games that have been played.  
The above accounting functions can be cleared simultaneously, by keeping pressed the CREDIT push-button for about 5 seconds, provided SW n. 4 on the C.P.U. board is on ON (PROGRAM).

**TAKINGS (Test n. 7).** The number of coins collected by the first coin 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 THROUGH 4 GAMES, AND ALSO THE ELECTROMECHANICAL COIN COUNTS IS NOT AFFECTED.**  
To clear it, SW n. 4 on the C.P.U. board (see figure 1) shall be in position ON (PROGRAM), and then act on the CREDIT push-button for about 5 seconds.

**WINNINGS (Test n. 8 and 9).** Test n. 8 indicates the winnings listed per types, that is: on the 1st player is indicated the overall quantity of games that have been played (the addition of the paid games, the won ones and the SERVICE games).  
On the 2nd player display appear the won games.  
On the 3rd player display one can see the number of won balls. Finally the 4th player display shows the quantity of awarded SUPERBONUSES.  
— The test n. 9 shows how the winnings have been obtained.  
The 1st player display indicates how many times the HIGHEST SCORE has been exceeded (NORMAL if test 10 is programmed with 00, RANDOM if test 10 is programmed with 01).  
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, on the 4th player display appears the number of winnings obtained with SPECIAL 2.  
To clear the winnings, SW n. 4 shall be in position ON (PROGRAM); then enter test n. 8 and act on the CREDIT push-button for about 5 seconds; then enter test n. 9 and again press the CREDIT push-button for about 5 seconds.

**COINS** (Tests 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» (one game) has been adopted. The main features of this method are:

- a) the 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) the possibility of establishing a cost per credit that differs from the value of the various coins.
- To achieve proper programming of the cost of one credit, when allowances shall be granted, it is necessary to keep in mind that the cost ratio between the more expensive credit and the less expensive one shall be less than «2».
- The tests 11, 13 and 15 shall be given the unit «value» of the coins that can be introduced respectively 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).
- Do not forget that the coins shall be introduced into the 3 coin chutes in **GROWING ORDER**. The coin with the lowest value shall 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.
- The third coin chute shall receive the coin that has or higher or at least the same value as the coin introduced into the second coin chute.
- The tests, 12, 14 and 16 shall be programmed with the number of credits to be given to each coin introduced respectively into coin chutes 1, 2 and 3.
- If several coins are needed to get one credit, it is necessary to program 00.
- The coin attributed to the third coin chute, shall have the same or higher value than the cost of one credit. (The figure to be programmed on test n. 16 shall be equal to 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.**

Example: 10 p; 50 p; 10 = 1+5  
 100 L; 200 L; 500 L = 1+2+5

As a further guidance for the operators on Table II some actual coin chute programming examples are reported, that are used for some European countries.

**HIGHEST SCORE** (Tests n. 10, 17 and 25). There exists the possibility to choose among 2 different types of H.S.: **NORMAL** (Test 10 = 00) and **RANDOM** (Test 10 = 01). **NORMAL H.S.** represents the max. score value 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. The players that follow shall 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 an area of 12.000.000 points, that is set forth at the beginning of each game.

The minimum value is given by the figure programmed with test 17, and that can range from 0.000.000 through 9.990.000.

The same test is used to program a **NORMAL H.S.** at the beginning, when the pinball 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, otherwise keep it pressed for fast progress. To change the initial value of **Random H.S.** it is necessary that **SW4** on the C.P.U. board is in **ON (PROGRAM)** position, while it may be both on **ON (PROGRAM)** or **OFF (GAME)** 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

Both test 10 and test 25 require **SW n. 4** to be in **ON (PROGRAM)** position to change their programming, and then it is necessary to press the **CREDIT** push-button.

**FOR NORMAL H.S., THE WIN IS AWARDED ONLY TO THE PLAYER WHO OBTAINS THE HIGHEST SCORE, EVEN WHEN THE PLAYERS EXCEEDING THE PRESET HIGHEST SCORE VALUE ARE MORE THAN ONE.**  
**IN THE CASE OF RANDOM H.S. 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. Same represents also the figure beyond which the credits are not increased anymore because of any won games. It is programmable from 10 through 30 by acting on the **CREDIT** push-button, provided **SW4** is set on **ON (RANDOM)**.

**BALLS** (Test n. 20). Same represents the number of balls that are available during each game. It can be programmed from 01 through 02 by acting on the **CREDIT** push-button while **SW4** shall be on **ON**.

**MATCH** (Test n. 20). Match is the possibility to award one replay to the player or to the players, who have managed to get a score on their display the two right end figures correspond to those of **MATCH** (see figure 2). If it is programmed with 00, it is excluded, while if the programmed figure is 01, it is connected. To change the programming act on the **CREDIT** push-button. **SW n.4** shall be set **ON (PROGRAM)**.

**WINNING SCORES** (Test n. 22, 23, 24 and 25). There are three scores, that can be programmed within a range from 0.00 through 9.990.000, respectively with tests 22, 23 and 24. The player or the players who exceed one or more (max. 3) winning scores, are awarded a prize as determined on test n. 25, for each exceeded winning score.

The scores programmed with 0,0 to are not enabled (they do not award any win even when test 25 is programmed for wins). The test n. 25 determines the type of win at each winning score limit, that can be chosen among:

- Test 25 = 00 = non win
- 01 = 1 bonus ball
- 02 = 1 replay
- 03 = 1 superbonus
- 04 = 500.000 points

For the programming of these tests it is necessary that **SW n.4** is on **ON (PROGRAM)**, and then act on **CREDIT** push-button. For the scores (test 22, 23, 24) push repeatedly the **CREDIT** push-button to progress 1 by 1 (corresponding each to 10.000 points). When the button is kept pressed, the progress is fast.

00 = One can vary the number of functions required to light the special lamp.

- 00 = Difficult
- 01 = Medium difficulty
- 02 = Medium - easy
- 03 = Easy

For adjustment or changes, act on CREDIT button when SW 4 is ON (PROGRAM).

Test 27 determines the type of win to be awarded when the Special target is hit while corresponding lamp is lit.

- 00 = no win
- 01 = 1 bonus ball
- 02 = 1 replay
- 03 = 1 superbonus
- 04 = 1.000.000 points

For adjustment or changes, act on CREDIT button when SW 4 is ON (PROGRAM).

**SPECIAL 2 ORANGE** (Test 28, 34 and 35) It is possible, moreover, to tune the difficulty for obtaining lighting up of the "special" lamp, by modifying test n. 34.

- 00 = the lamp in front of the banks is extinguished
- 01 = the lamp in front of the banks is lit
- 02-03 = coupled lighting up of the special lamps

Test 35 determines whether the lamps on the mobile plate are lit one by one or two at a time.

- 00 = The lamps are extinguished one by one.
- 01 = Lamps are extinguished two at a time
- 02 = Like 01
- 03 = Like 01

For adjustment or changes, act on CREDIT button when SW 4 is ON (PROGRAM).

**SOUND BACKGROUND** (Test 29). If during the game a sound background is required, this test shall be programmed with 01, if not with 00. To program or modify, act on CREDIT push-button, provided SW 4 is in ON (PROGRAM) position.

**COIN METER** (Test n. 30). Same is an electromechanical impulse meter, to be connected with the circular 8-way connector located in the cabinet and that 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). The game can be played regularly both with connected and cut-off coin meter, if the test is programmed with 00. Note that the impulse meter is programmed with 00. Note that the impulse meter is always operating regardless of the type of programming used for test 30.

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

The impulse meter and the relevant wiring are available upon request.

**GAME TIME BONUS** (Test n. 31). After having used all the available balls (see test 20 + possible won balls), it is possible to get a game time extension that may range from a minimum of 10 seconds to a maximum of 99 seconds, determined by the play of the last normal ball. This time is indicated by 2 digits in the center of the HIGHEST SCORE TO DATE display (see figure 2). Upon play time expiry, all the controls are stopped, and thus the ball to play runs straight to the hole.

If the test has been programmed 00, the game is terminated normally (game time bonus excluded), while with 01 programming game time bonus is connected. To program or change, act on CREDIT push-button, provided SW 4 is in ON (PROGRAM) position.

**GAME VARIATIONS ON TIME BRIDGE** (Test 32). By this test the bonus multiplier value is determined.

- 00 = Lamps extinguished
- 01 = Lamps 30.000 lit
- 02 = Lamps lit
- 03 = Lamps lit

To program or change, act on CREDIT push-button, provided SW 4 is set on ON (PROGRAM).

**GAME VARIATIONS ON STATIONARY TOP TARGETS** (Test 35). By this test it is possible to determine whether the stationary top targets are extinguished one by one or two at a time.

- 00 = Extinguished one by one
- 01-02-03 = Extinguished two at a time

To program or change act on the CREDIT push-button, provided SW 4 is set on ON (PROGRAM).

### SOUND AND TALK BOARD SELF TEST

With the pinball in GAME OVER condition, act on push-button located on the AUDIO board: the LED shall start blinking, and each blinking indicates the proper performance of a test, covering a total of 5 blinkings (5 tests).

The 1st blinking indicates that the RAM store inside the microprocessor is regularly operating.

The 2nd blinking indicates that PIA 1 (IC 15) that is to be used for the dialogue with the «generated sound» (AY 3-8910) is operating.

The 3rd blinking indicates that PIA 2 (IC 14) that serves for the dialogue with the «speech synthesizer» (TMS 5200) is operating.

The 4th blinking indicates that the «sound generator» (AY-3-8910) is operating.

The 5th blinking indicates that the «special synthesizer» is operating.

If everything operates properly, LID 1 is extinguished and remains in such conditions only after a certain number of sample phrases.

Keep in mind, that the completion of the SELF TEST does not mean at all that the AUDIO-board is correctly operating in all its parts, but it supplies a very good indication.

N. TEST	FUNCTION	N. FUNCTION IN TEST	DESCRIPTION
01	Test Display	1	1* All the displays show equal figures that follow each other 0,1,2...9,0 and so on. 2* By keeping the «CREDIT» push-button pressed, the displays show numbers in succession.
02	Contact test	88	Number of closed contact
03	Lamp test	1	All the piloted lamps are continuously lit and extinguished.
04	Solenoid test	88	The solenoids (from 1 through 24) are energized one after another. The figure indicates the energized solenoid. When it is operative it must be perceived.
05	Sound and talking test	88	Sounds and works are repeated one after another. The figure indicates the sound and the phrase being executed.

### ACCOUNTING

N. TEST	FUNCTION	DESCRIPTION	HOW TO CLEAR
06	Duration	Player 1 display = Time of printable operation (minutes) Player 2 display = Game time (minutes) Player 3 display = Tilt number Player 4 display = Average game duration expressed in minutes	With SW4 ON (PROGRAM) push-button about 5 sec.
07	Takings	Player 1 display = Coins in coin chute 1 Player 2 display = Coins in coin chute 2 Player 3 display = Coins in coin chute 3 Player 4 display = SERVICE games	With SW4 ON act on CREDIT push-button abt. 5 sec.
08	Wins	Player 1 display = Games played in total Player 2 display = Won games Player 3 display = Won balls Player 4 display = Won superbonus	With SW4 ON act on CREDIT push-button for abt. 5 sec.
09	Wins	Player 1 display = H.S. is exceeded Player 2 display = Winning scores are exceeded Player 3 display = Special 1 Player 4 display = Special 2	With SW4 in ON act for about 5 seconds on CREDIT button.

### PROGRAMMING

N. TEST	FUNCTION	PROGRAMMED VALUE	DESCRIPTION	DATA FOR THE PROGRAMMER
10	High-Score types	00 01	NORMAL H.S. or max. scores achieved by one player. RANDOM H.S. or casual scores that may change at the beginning of each game.	With SW4 on ON act on CREDIT push-button.
11	Coin value 1st coin chute	from 01 to 10	Value of the coins for the 1st coin chute (at the left side close to the hinge).	With SW4 on ON act on CREDIT push-button.
12	Coin credits 1st coin chute	from 00 to 15	Credits per each single coin introduced into the first coin chute.	
13	Coin value 2nd coin chute	from 01 to 10	Value of the coins for the 2nd coin chute (at the right side, close to the key).	
14	Coin credits 2nd coin chute	from 00 to 15	Credits per each single coin introduced into the second coin chute.	
15	Coin value 3rd coin chute	from 01 to 10	Value of the coin for the 3rd coin chute (in the center).	
16	Coins credit 3rd coin chute	from 00 to 15	Credits per each single coin introduced into the third coin chute.	
17	High-Score initial value	from 0.00 to 9.99	When test 10 is programmed with 00, initial NORMAL H.S. is programmed. If test 10 is programmed 01, the min. RANDOM H.S. is programmed.	



## Segue: PROGRAMMING

N. TEST	FUNCTION	VALUE PROGRAMMED	DESCRIPTION	DATA FOR THE PROGRAMMER
18	Not used			
19	Max credits	from 10 to 30	Max number of credits beyond which coin chutes are locked, and no won games are attributed anymore	Act on CREDIT push-button with SW4 on ON
20	Balls	from 01 to 07	Balls per play	Act on CREDIT push button with SW 4 on ON
21	MATCH	00 01	Match excluded (no wins) Match connected (1 Replay)	Act on CREDIT push-button with SW4 on ON
22	1st winning scores	from 0.00 to 9.99	1st winning score, which awards the win programmed on test n.26 when exceeded. 0.00 = no win	With SW4 on ON act stepwise on CREDIT push-button for slow progress. For fast progress keep it pressed
23	2nd winning scores	from 0.00 to 9.99	2nd winning score which awards the win programmed on test n. 26 when exceeded. 0.00 = no win	
24	3rd winning scores	from 0.00 to 9.99	3rd winning score which awards the win programmed on test n.26 when exceeded. 0.00 = no win.	
25	Wins with HIGHEST SCORE	00 01 02 03 04	No win 1 Replay 2 Replay 3 Replay 1 Superbonus	With SW4 on ON act on CREDIT push-button
26	Wins with scores (see test 22, 23, 24)	00 01 02 03 04	No win 1 Bonus Ball 1 Replay 1 Superbonus. 500.000 points	With SW4 on ON act on CREDIT push-button
27	Wins with Special 1	00 01 02 03 04	No win 1 Bonus Ball 1 Replay 1 Superbonus 1.000.000 points	With SW4 on ON act on CREDIT push-button
28	Wins with Special 2	00 01 02 03 04	No win 1 Bonus Ball 1 Replay 1 Superbonus 300.000 points	With SW4 on ON act on CREDIT push-button
29	Background Sound	00 01	Background sound excluded Background sound connected	With SW 4 on ON act on CREDIT push-button
30	Coin meter	00 01	Normal operation both with excluded and with connected impulse meter When impulse meter is disconnected the pin table cannot be used	With SW4 on ON act on CREDIT push-button
31	Game Time Bonus	00 01	<Game time bonus> disconnected Count down connected	With SW4 on ON act on CREDIT push-button
32	Time bridge variation	00 01 02 03	Lamps extinguished Lamp 30.000 lit Lamps lit Lamps lit	Press CREDIT button when SW4 is ON
33	Special 1 MACHINE	00 01 02 03	Difficult Medium difficulty Medium-easy Easy	Press CREDIT button when SW4 is ON
34	Special 2 ORANGE	00 01 02-03	Difficult Medium difficulty Easy	Press CREDIT button when SW4 is ON
35	Stationary top targets	00 01-02-03	Extinguished one by one Extinguished two at a time	Press CREDIT button when SW4 is ON
36	Mobile plate stationary targets	00 01 02 03	Extinguished one by one Extinguished two at a time Extinguished two at a time Extinguished two at a time	
37	Not used			

IMPORTANT: With SW4 in ON (PROGRAM) position, the pinball cannot enter a game, even though there may be credits available, and the machine is in GAME OVER condition. A buzzer and the blinking of the TILT lamp indicate anomalous condition.

**TROUBLE SHOOTING**

CONDITION	CAUSE	REMEDY	NOTES
The game cannot be started	<ul style="list-style-type: none"> <li>- No voltage available</li> <li>- Plug is off</li> <li>- The 3-way connector (CN-line-) of the feeder rack is not connected</li> <li>- Mains fuse burned</li> <li>- The 9-way connector (CN-Ja-) on the feeder rack disconnected</li> <li>- Mains switch open</li> <li>- Connector (CN 1) on feeder and connectors (CN-J1-J2-J3-) on feeder rack disconnected</li> <li>- Voltage change over not or insufficiently connected</li> </ul>	<ul style="list-style-type: none"> <li>- Plug in</li> <li>- Connect</li> <li>- Replace</li> <li>- Replace</li> <li>- Close</li> <li>- Connect</li> <li>- Correct</li> </ul>	<p>If they burn again, this means that there is a short circuit</p> <p>The voltage change over unit contains also the mains fuse</p>
All stationary lamps are not lit	<ul style="list-style-type: none"> <li>- Fuse F2 on the feeder rack thrown out.</li> <li>- CN J1-J2-J3 connector not connected</li> <li>- Electric wire disconnected</li> </ul>	<ul style="list-style-type: none"> <li>- Replace</li> <li>- Plug in</li> <li>- Connect</li> </ul>	Shall not be more than 20A; if it is thrown out again there is a short-circuit
All the piloted lamps are not operating	<ul style="list-style-type: none"> <li>- 5 VRM is not available</li> <li>- The connector between C.P.U. and the interface is disconnected</li> <li>- Interface (CN 16) feeding connector is not plugged in</li> <li>- The connectors of the lamps on Interface (CN 18-19-20-21-22) are not connected</li> <li>- The connectors at the feeder board output are disconnected (CN 2-3-4)</li> <li>- At the C.P.U. input and at the interface 5,6 V d.c. are missing</li> <li>- C.P.U. is always cleared</li> <li>- Others</li> </ul>	<ul style="list-style-type: none"> <li>- Fuse F3 (15A) on Power-board is burned</li> <li>- Tighten the loose connectors</li> <li>- Fuse F2 (5A) is burned and shall therefore be replaced. If it is thrown out again, there is a short circuit. Replace feeder board. Replace feeder and then replace C.P.U.</li> <li>- Replace interface</li> </ul>	Test carefully with tester
All displays are extinguished.	<ul style="list-style-type: none"> <li>- + 170 V d.c. is missing because fuse F1 (1A) is burned.</li> <li>- Or high voltage regulator is damaged.</li> <li>- Or high voltage regulator safety circuit is actuated.</li> <li>- At C.P.U. -input +5.6 V is missing</li> <li>- CN 14 or all connectors of displays are disconnected</li> <li>- Display damaged</li> <li>- C.P.U. damaged</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the fuse.</li> <li>- Check with the tester whether the high-voltage feeder operates. When safety device is actuated, try to disconnect the displays. If the feeder operates at 170 V this means that on the displays there exists a short circuit. To restore +170 V it is necessary to stop the pinball and then to start it again</li> <li>- Check and if necessary replace the F2 (5A) fuse on the feeder board</li> <li>- Plug in connectors</li> </ul>	
On all the displays wrong figures are appearing	<ul style="list-style-type: none"> <li>- Cable damaged</li> <li>- C.P.U. damaged</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the cable</li> <li>- Replace C.P.U.</li> </ul>	
One or more figures on one or more displays are wrong.	<ul style="list-style-type: none"> <li>- Display damaged</li> <li>- Cable damaged</li> </ul>		
All figures are too bright	<ul style="list-style-type: none"> <li>- +170 V feeder damaged</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the feeder board</li> </ul>	
All the solenoids do not work	<ul style="list-style-type: none"> <li>- 39 VRM input is missing</li> <li>- CN 17 connector is not plugged in</li> <li>- Interface damaged</li> <li>- C.P.U. damaged</li> </ul>	<ul style="list-style-type: none"> <li>- Reset the fuse</li> <li>- If it is thrown out again there is a short circuit</li> <li>- Plug in the connector</li> <li>- Replace the Interface</li> <li>- Replace the C.P.U.</li> </ul>	
One or more solenoids do not work	<ul style="list-style-type: none"> <li>- Coils burned</li> <li>- Darlington burned</li> <li>- Electric wires loose</li> <li>- The fuses under the playfield have been thrown out</li> </ul>	<ul style="list-style-type: none"> <li>- Replace coil and the relevant Darlington</li> <li>- Replace the Darlington and check the diode on the coil.</li> <li>- Connect the loose wires</li> <li>- Reset the burned out fuses</li> </ul>	
One or more solenoids are always energized	<ul style="list-style-type: none"> <li>- Interface-board damaged</li> <li>- C.P.U. damaged</li> <li>- Short circuit</li> </ul>	<ul style="list-style-type: none"> <li>- Replace the Interface-board</li> <li>- Replace the C.P.U. board</li> </ul>	
All the contacts remain inactive	<ul style="list-style-type: none"> <li>- CN 10-11 connectors are loose</li> <li>- C.P.U. is damaged</li> </ul>	<ul style="list-style-type: none"> <li>- Plug in</li> <li>- Replace C.P.U.-board</li> </ul>	

CONDITION	CAUSE	REMEDY	NOTES
One or more contacts do not work	<ul style="list-style-type: none"> <li>- Loose wires</li> <li>- Interrupted or loose</li> <li>- Contact oxydized</li> </ul>	Connect all the loose wires Reset the diode Clean the contact	
One or more contacts are wrongly read	<ul style="list-style-type: none"> <li>- The contact wires are short circuited and also with respect to the lamp and solenoid wires</li> <li>- Diode contacts are short circuited</li> <li>- C.P.U. is damaged</li> </ul>	Eliminate the short circuit  Replace the short circuited diode Replace C.P.U.	
All sounds and words are missing	<ul style="list-style-type: none"> <li>- The loudspeaker is not connected or damaged</li> <li>- Loudspeaker potentiometer cut off</li> <li>- CN 6 connector (Sound board) disconnected</li> <li>- 5 V d.c. feeding voltage is missing</li> <li>- +12 V d.c. feeding voltage missing</li> <li>- +5 V d.c. feeding voltage missing</li> <li>- Sound and talk board damaged</li> </ul>	Connect, if necessary replace  Replace another one having similar features Plug in the connector  Replace fuse F4 (1A) on the feed board, if burned Replace fuse F2 (5A) on the feed board, if burned If +5 V d.c. are missing, but +12 V d.c. are available, replace the regulator 78H05 Replace the sound and talk board	

**VERY IMPORTANT.** Never connect or disconnected the connectors while the game is running

The game is supplied with a special plug to connect a print-out unit that is very useful to print on paper all the most important accounting functions, as well as the serial number of the game.  
 Hereafter a fac-simile print out.  
 The same plug is to be used also for the coin meter.

**TIME MACHINE**  
 SERIAL N 1532  
 WONNED G 000000  
 PLAYED G 000003  
 COINS # 1 000003  
 COINS # 2 000003  
 COINS # 3 000003  
 \*\*\*\*\*

CONNECTOR CARD FOR TIME MACHINE  
INPUT/OUTPUT POSITION ON THE CONNECTOR  
FEEDER BOARD

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
-----------	-----	-------------	--------

POWER Board

CN1	→ 1 2 3 4 5 6 7 8 9 10 11 12	□ Red Red Brown Brown Yellow Yellow Blue Blue White White Green Green	— 165 Vac 0,3 A 165 Vac 0,3 A 10 Vac 0,5 A 10 Vac 0,5 A 10,5 Vac 6 A 10,5 Vac 6 A 43 Vac 5 A 43 Vac 5 A 6,5 Vac 15 A 6,5 Vac 15 A 6,5 Vac 15 A 6,5 Vac 15 A
CN2	→ 1 2 3 4 5 6	□ — Black — Violet Pink White	— GND +39 Vrm common for all the solenoid in the cabinet Cabinet - Playfield interconnections For flipper control
CN3	→ 1 2 3 4 5 6	□ White Pink — Brown Violet —	— Cabinet - Playfield interconnections For flipper control +5 Vrm common all controlled playfield lamps +39 Vrm common for playfield solenoids —
CN4	→ 1 2 3 4	□ — Brown — —	— — +5 Vrm common light board controlled lamps —
CN5	→ 1 2 3 4 5 6 7 8 9 10 11 12	□ Grey Black Black Red Red White Black Yellow Black Green Red Blue	— Flipper Relay GND GND + 5,6 Vdc + 5,6 Vdc Power Failure GND 170 Vcc GND - 5 Vdc + 5,6 Vdc + 12 Vdc

SOUND Board

CN6-T	→ 1 2 3 4	□ Black Green Red Blue	— GND - 5 Vdc + 5,6 Vdc + 12 Vdc
CN6-C	5 6	Yellow-grey Violet-white	Output Sound e Speech Output Sound e Speech

C.P.U. board

CN9	→ 1 2 3 4	□ Yellow Black White Red	— 170 Vcc GND Power Failure + 5,6 Vdc
CN10	1 2 3 4 5 6 7	Yellow-orange Grey-yellow White-pink Pink-black — White Grey	Printer - RX + Printer - RX - Printer - TX - Printer - TX + — Contacts - row 0 Contacts - row 1

CONNECTOR	PIN	WIRE COLOUR	SIGNAL
CN10	8	---	---
	9	---	---
	10	White-grey	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	Violet-brown	Contacts - column 6
	18	Yellow-violet	Contacts - column 7
19	---	---	
20	---	---	
CN11	1	---	---
	2	---	---
	3	Red	Contacts - row 2
	4	Yellow	Contacts - row 3
	5	Black	Contacts - row 4
	6	Green	Contacts - row 5
	7	Blue	Contacts - row 6
	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	---	---	
19	---	---	
20	---	---	

**INTERFACE Board**

CN16	1	□ Black	---	
	2	Red	GND + 5.6 Vdc	
	3	Black	GND	
	4	Orange	Flipper Relay	
CN17-C	1	□ Pink-white	---	
	2	White-red	Knocker Coin mechanism coil	
CN17-P	3	Yellow-Pink	Central pop	
	4	White-Violet	Top hole	
	5	Yellow-White	Left pop	
	6	Brown-White	Out hole	
	7	White-Blue	Left flap	
	8	Green-White	Right flap	
	9	Brown-Green	Left bank	
	10	Red-Green	Right pop	
	11	Yellow-Orange	Motor relay	
	12	Orange-White	Right bank	
	CN17-T	13	Brown-Yellow	Crown 1
		14	Grey-White	Wheel lamp 4
15		Black-White	Wheel lamp 7	
16		Green-Black	Back 1	
17		Yellow-Grey	Wheel lamp 8	
18		White-Pink	Wheel lamp 5	
19		Red-White	Wheel lamp 9	
20		Yellow-Pink	Crown 3	
21		Violet-White	Back 2	
22		Yellow-White	Crown 2	
23		White-Brown	Wheel lamp 6	
24		Blue-White	Wheel lamp 10	
CN18	1	Yellow-white	Top fixed target 4	
	2	Light blue	Pop	
	3	Blue-Yellow	Right bank	
	4	Light green-Grey	Time bridge 1	
	5	White-Pink	Time bridge 2	
	6	---	---	
	7	---	---	
	8	---	---	
	9	Yellow-Orange	Top fixed target 2	
	10	White-Green	Top fixed target 5	
	11	Red-White	Top fixed target 7	
	12	Light green-Orange	80.000 pts	
	13	White	Time bridge 6	
	14	Brown	Time bridge 4	
	15	Blue-Red	30.000 pts time bridge	
	16	Orange-Violet	Top fixed target 1	
17	Blue-Grey	30.000 pts		
18	Red-Black	50.000 pts		
19	Blue-Orange	Lamp special green		
20	Blue-White	Time bridge 5		

CONNECTOR	PIN	WIRE COLOR	FUNCTION
CN19	1	Pink	Lamp special red
	2	White-Orange	Advance multiplier
	3	Light green-Brown	10,000 pts
	4	Violet-Red	Bonus 4 past
	5	—	—
	6	Brown	Lamp special orange
	7	Brown-Orange	Bonus 6 past
	8	Pink-Violet	Bonus 2 past
	9	Yellow-Grey	Bonus 7 past
	10	Green-Blue	Bonus ball
	11	Yellow-Brown	Bonus 3 past
	12	Violet	Bonus 9 past
	13	Violet-Blue	Bonus 5 past
	14	—	—
	15	Black-Blue	Multiplier time bridge
	16	Pink-Blue	Bonus 10 past
	17	Red-Grey	Bonus 5 future
	18	Pink-Yellow	Bonus 8 past
	19	Pink-Black	Bonus 2 future
	20	Green-Yellow	Bonus 8 future
CN20	1	Yellow-White	Bonus multiplier x 10
	2	Light-Blue	Bonus multiplier x 20
	3	Yellow-Blue	Lamp "M"
	4	Light green-Grey	Bonus 10 future
	5	Pink-White	Bonus 4 future
	6	Pink-Brown	Bonus 3 future
	7	Orange-Grey	Lamp "H"
	8	Light green-Violet	Lamp "I"
	9	Yellow-Orange	Lamp "C"
	10	Green-White	Lamp "A"
	11	Black-Violet	Bonus multiplier x 5
	12	White-Brown	Fixed target A
	13	Black-Green	Fixed target D
	14	Blue-Brown	Lamp "E"
	15	Blue-Red	Lamp "N"
	16	Green-Blue	Fixed target F
	17	Grey-Blue	Fixed target E
	18	Black-Red	Fixed target B
	19	Blue-Orange	Fixed target C
	20	—	—
CN21	1	—	—
	2	Orange-Grey	Time bridge
	3	Light green-Violet	Top fixed target 3
	4	Pink-Brown	Top fixed target 6
	5	—	—
	6	—	—
	7	—	—
	8	Orange-White	Bonus 6 future
	9	—	—
	10	—	—
	11	—	—
	12	White-Red	Bonus 9 future
	13	—	—
	14	White-Violet	Bonus 1 past
	15	Black-Grey	Bonus 7 future
	16	Orange-Brown	Bonus 1 future
	17	—	—
	18	Red-Violet	Left bank
	19	—	—
	20	—	—
CN22	1	—	—
	2	Blue-White	Wheel lamp 2
	3	Violet-Brown	UP (game time bonus)
	4	Orange-Black	Balls to play
	5	Yellow-Red	Credit
	6	Yellow-Black	Match
	7	Violet-White	Wheel lamp 1
	8	Green	Can play 1
	9	Violet-Pink	Wheel lamp 3
	10	White-Black	Tilt
	11	—	—
	12	Yellow	Can play 2
	13	Black	Can play 4
	14	Violet - Yellow	Down (game time bonus)
	15	White-Grey	Game over
	16	Green-Red	Super bonus
	17	Red	Can play 3
	18	Blue	Highest score
	19	Green-Blue	Bonus ball
	20	—	—

CABINET

Printer service optional * * * * * * * *	A B C D E F G H	Red Black Yellow-violet Grey Yellow-orange Yellow-grey White-pink Black-pink	43 Vac 43 Vac Column 7 Row 1 Printer RX+ Printer RX- Printer TX- Printer TX+
J4 * * * * * * * *	1 2 3 4 5 6 7 8 9	Brown Yellow Red Yellow-green Red Black Light blue Black Blue	Electric wier Service socket Service socket Electric wier 43 Vac Electric filter Electric wier 43 Vac Electric filter

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	off	on	on	on	off	off	on	off	on	off	off	off	off	off
10 High score	0			1			0			0			0			0			0			0		
11	01			01			01			01			01			01			01			01		
12	00			00			00			00			01			00			01			01		
13	02			02			05			05			02			02			02			01		
14	01			00			03			03			03			01			02			01		
15	02			03			05			10			05			02			02			01		
16	01			01			03			07			07			01			02			01		
17	3,00			4,00			4,00			4,00			4,00			4,00			4,00			4,00		
18	—			—			—			—			—			—			—			—		
19	15			15			15			15			15			15			15			15		
20	03			03			03			03			03			03			03			03		
21	1			1			1			1			1			1			1			1		
22	1,00			1,50			1,50			1,50			1,50			1,50			1,50			1,50		
23	2,00			3,00			3,00			3,00			3,00			3,00			3,00			3,00		
24	000			000			000			000			000			000			000			000		
25	1			1			1			1			1			1			1			1		
26	1			2			2			2			2			2			2			2		
27	2			2			2			2			2			2			2			2		
28	1			1			1			1			1			1			1			1		
29	1			1			1			1			1			1			1			1		
30	0			0			0			0			0			0			0			0		
31	1			1			1			1			1			1			1			1		
32	1			1			1			1			1			1			1			1		
33	1			1			1			1			1			1			1			1		
34	1			1			1			1			1			1			1			1		
35	1			1			1			1			1			1			1			1		
36	1			1			1			1			1			1			1			1		
37	—			—			—			—			—			—			—			—		

NATION	EMPLOYED COINS	COST OF CREDITS	FIRST COIN		SECOND COIN		THIRD COIN		Multiplication factor imp. count. (coin count.)
			Value Test 11	Credits Test 12	Value Test 13	Credits Test 14	Value Test 15	Credits Test 16	
ITALY	1 coin m. = 100 £	2x100 = 1 Pl.	01	00	01	00	02	01	x 100 £
	2 coin m. = 100 £	3x100 £ = 1 Pl.	01	00	01	00	03	01	
	1 coin m. = 100 £ 2 coin m. = 200 £	2x100 £ = 1 Pl. 1x200 £ = 1 Pl.	01	00	02	01	02	01	x 100 £
		3x100 £ = 1 Pl. 1x200 £ = 1 Pl. +1x100 £ = 1 Pl.	01	00	02	00	03	01	x 100 £
	1 coin m. = 200 £	1x200 £ = 1 Pl.	01	01	01	01	01	01	x 200 £
	2 coin m. = 200 £	3x200 £ = 2 Pl.	02	00	02	00	03	01	x 200 £
ENGLAND	1 coin m. = 10 p 2 coin m. = 50 p	1x10 p = 1 Pl. 1x50 p = 6 Pl.	01	01	05	06	05	00	x 10 p
		2x10 p = 1 Pl. 1x50 p = 3 Pl.	01	00	05	03	05	03	x 10 p
BELGIUM (AUSTRIA) (HUNGARY)	1 coin m. = 5 FRS 2 coin m. = 10 FRS	2x5 FRS = 1 Pl. 1x10 FRS = 1 Pl.	01	00	02	01	02	01	x 5 FRS
		3x5 FRS = 1 Pl. 1x10 FRS = 1 Pl. +1x5 FRS	01	00	02	00	03	01	x 5 FRS
FRANCE (DANM.) (SWEDEN)	1 coin m. = 1 FR 2 coin m. = 5 FR 3 coin m. = 10 FR	2x1 FR = 1 Pl. 1x5 FR = 3 Pl. 1x10 FR = 7 Pl.	01	00	05	03	10	07	x 1 FR
WEST. GERM. (SWITZERL.)	1 coin m. = 1 DM 2 coin m. = 2 DM 3 coin m. = 5 DM	1x1 DM = 2 Pl. 1x2 DM = 5 Pl. 1x5 DM = 14 Pl.	01	02	02	05	05	14	x 1 DM (FS)
		1x1 DM = 1 Pl. 1x2 DM = 3 Pl. 1x5 DM = 7 Pl.	01	01	02	03	05	07	x 1 DM (FS)
YUGOS.	1 coin m. = 5 DIN 2 coin m. = 10 DIN	1x5 DIN = 1 Pl. 1x10 DIN = 2 Pl.	01	01	02	02	02	02	x 5 DIN
		2x5 DIN = 1 Pl. 1x10 DIN = 1 Pl.	01	00	02	01	02	01	x 5 DIN
SWITZERL.	1 coin m. = 1 FS 2 coin m. = 2 FS	1x1 FS = 2 Pl. 1x2 FS = 5 Pl. 5 FS = 14 Pl.	01	02	02	05	05	14	x 1 FS
		1x1 FS = 1 Pl. 1x2 FS = 3 Pl. 5 FS = 7 Pl.	01	01	02	03	05	07	x 1 FS



FIG.1

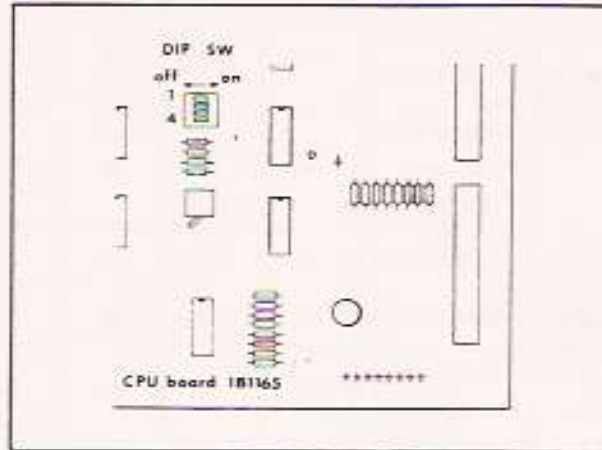
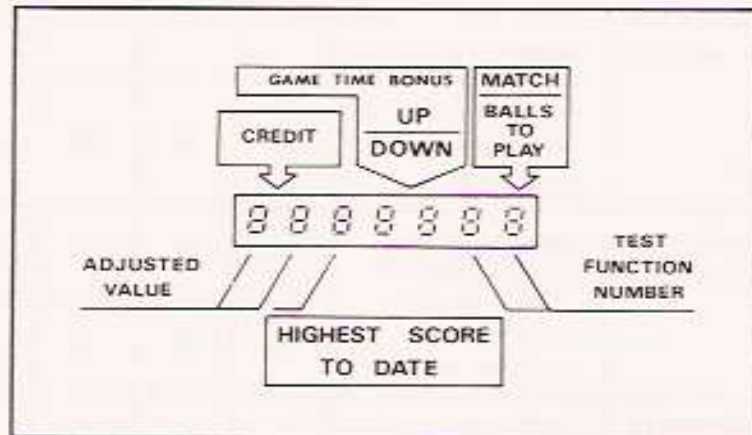
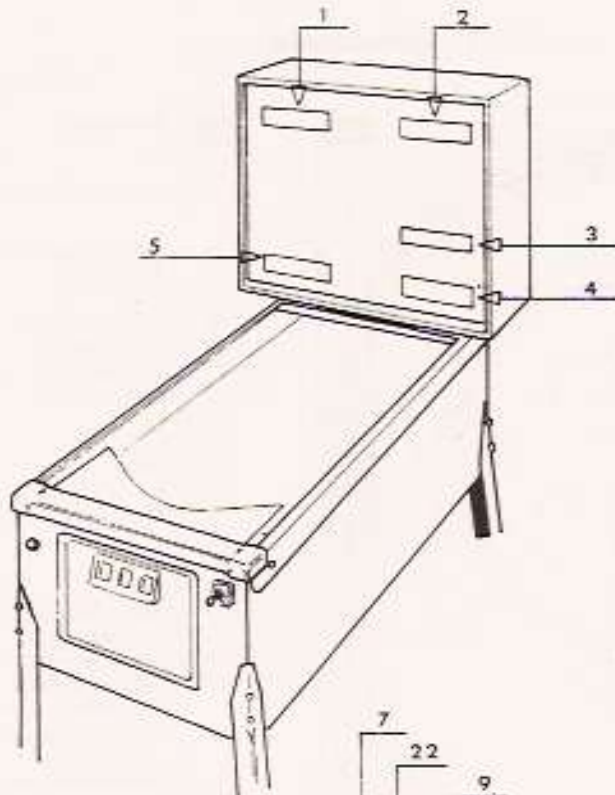


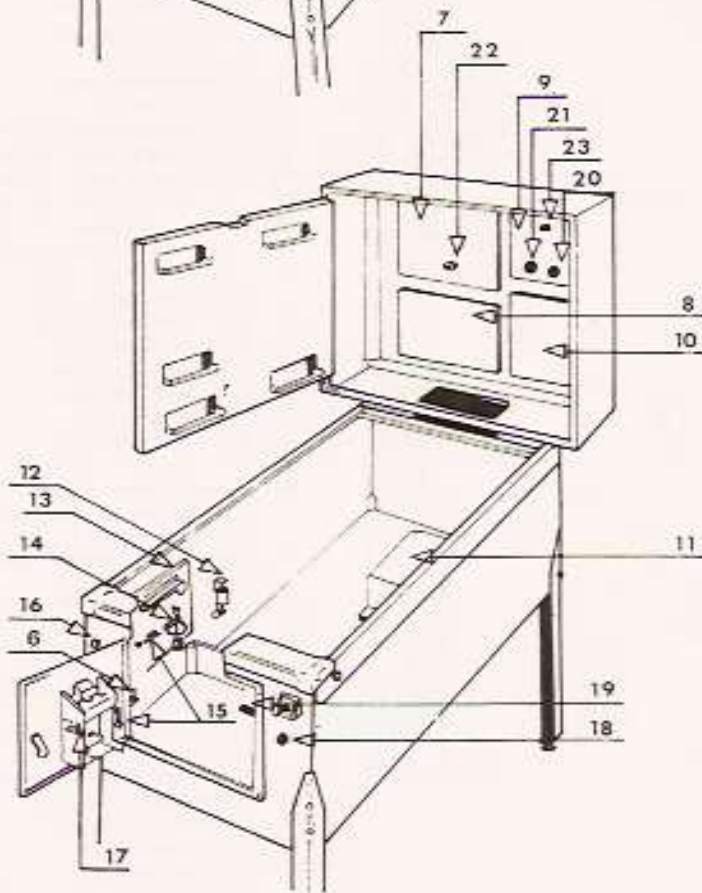
FIG.2



ASSEMBLY DRAWING



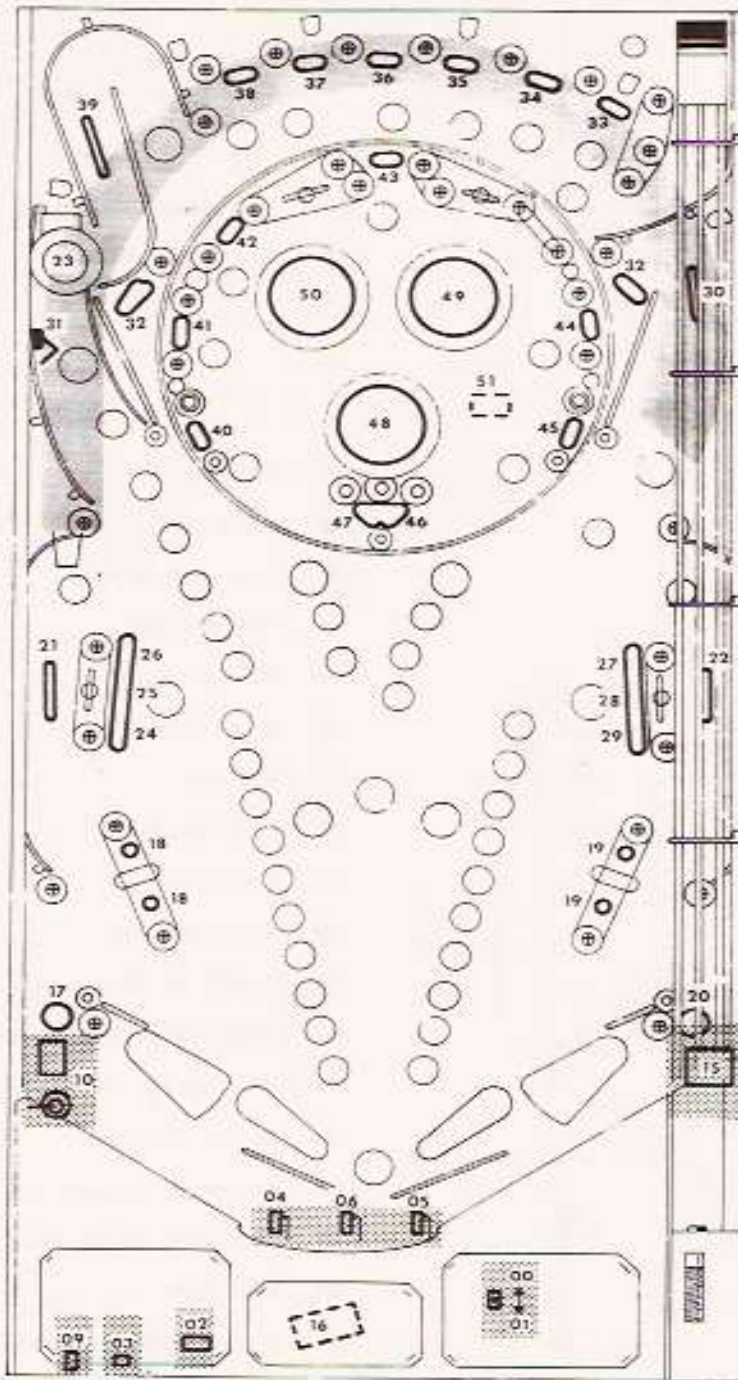
- 1 - 1st player display  
Highest score display
- 2 - 2nd player display
- 3 - Credit display  
Display ball to play  
Match  
Game time bonus
- 4 - 4th player display
- 5 - 3rd player display



- 6 - Service button
- 7 - C.P.U. board
- 8 - Interface board
- 9 - Sound board
- 10 - Power board
- 11 - Transformer
- 12 - Knocker
- 13 - Roll ball tilt
- 14 - Bob tilt
- 15 - Antichoc tilt
- 16 - Credit button
- 17 - Advance & Return test
- 18 - Head phone jack
- 19 - General vol.
- 20 - Maximum speech vol.
- 21 - Maximum sound vol.
- 22 - Dip SWS
- 23 - Sound self-test button

FIG. 4

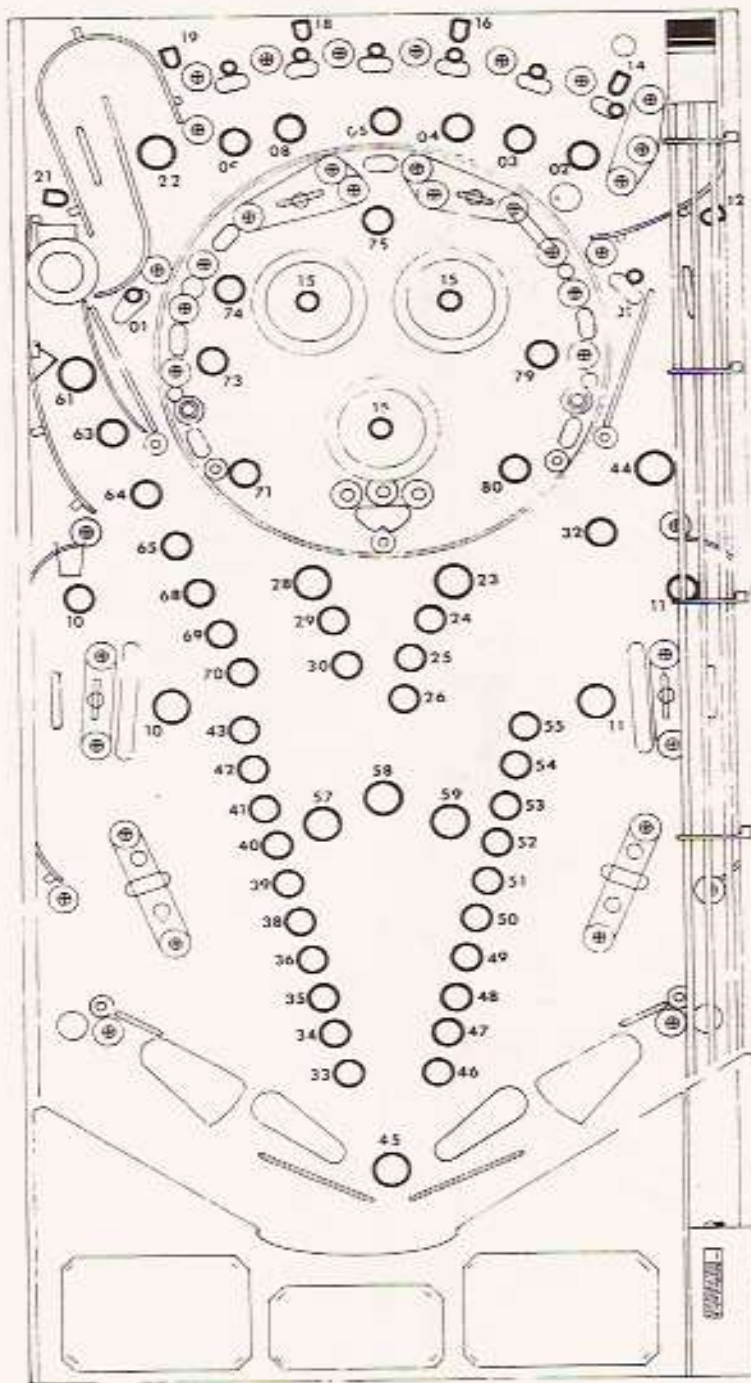
CONTACT ARRANGEMENT



Contact Number	Description
00	Advancement test
01	Return test
02	Tilt 2
03	Credit Service
04	Coin Switch 1
05	Coin Switch 2
06	Coin Switch 3
07	—
08	—
09	Credit
10	Tilt
11	Factory burn test
12	—
13	—
14	—
15	Printer contact
16	Out hole
17	Left outer exit canal
18	Left flap contacts
19	Right flap contacts
20	Right outer exit canal
21	Left central canal
22	Right central canal
23	Hole machine
24	1st moving target left bank
25	2nd moving target left bank
26	3rd moving target left bank
27	3rd moving target right bank
28	2nd moving target right bank
29	1st moving target right bank
30	1st time bridge canal
31	2nd time bridge canal
32	"1" top fixed target
33	"2" top fixed target
34	"3" top fixed target
35	"4" top fixed target
36	"5" top fixed target
37	"6" top fixed target
38	"7" top fixed target
39	Contact green special
40	"A" Moving bumper assembly fixed target
41	"B" moving bumper assembly fixed target
42	"C" moving bumper assembly fixed target
43	"D" moving bumper assembly fixed target
44	"E" moving bumper assembly fixed target
45	"F" moving bumper assembly fixed target
46	Fixed special orange target
47	Fixed special red target
48	Central pop contact
49	Right pop contact
50	Left pop contact
51	Contact moving bumper assembly

FIG. 5

## LAMP ARRANGEMENT

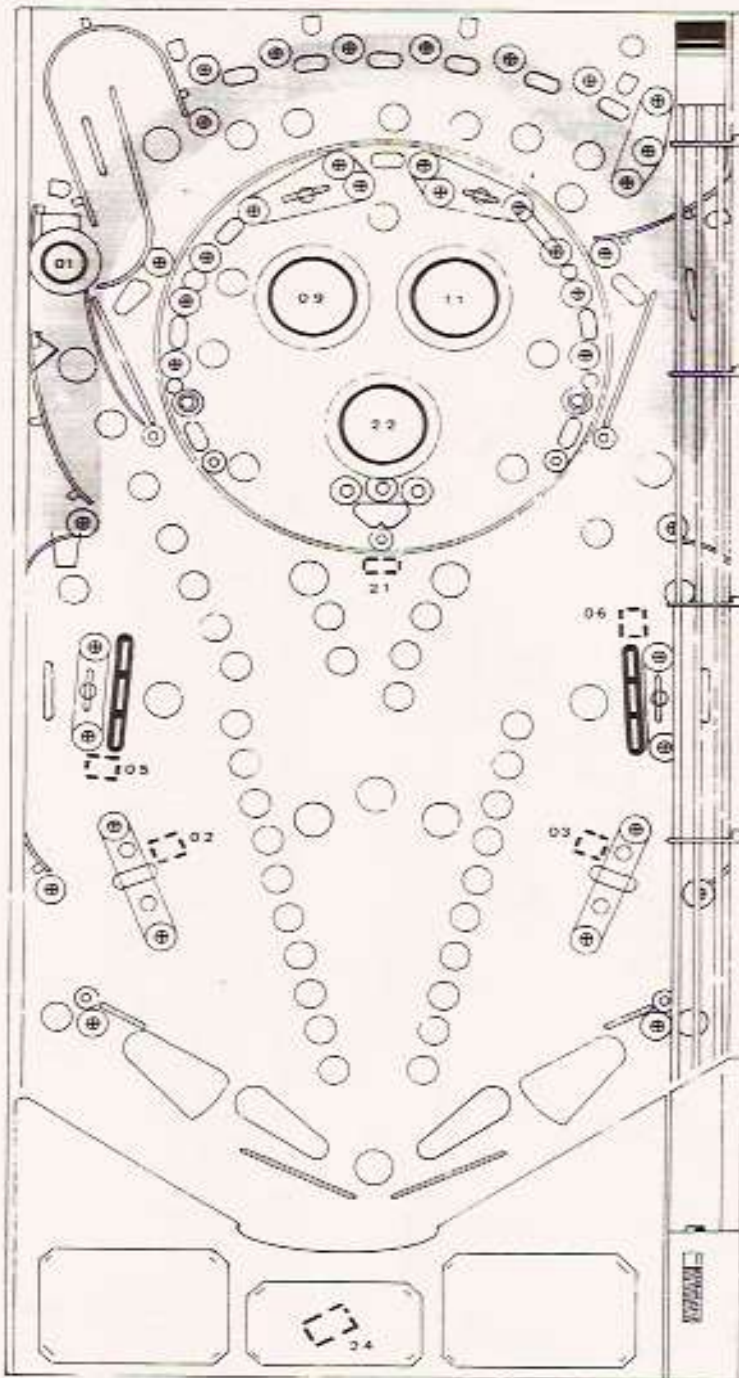


Lamp	Description	Driver n° SCR
01	Top fixed target 1	80
02	Top fixed target 2	66
03	Top fixed target 3	67
04	Top fixed target 4	78
05	Top fixed target 5	70
+06	Game over	66
+07	Tilt	65
08	Top fixed target 6	72
09	Top fixed target 7	71
10	Left bank	76
11	Right bank	77
12	Time bridge 1	75
+13	Match	74
14	Time bridge 2	73
15	Pop	79
16	Time bridge 3	69
+17	Ball to play	8
18	Time bridge 4	45
19	Time bridge 5	35
20	Flipper relay	64
21	Time bridge 6	54
22	Lamp special green	44
23	Lamp special orange	26
24	80.000 pts	63
25	50.000 pts	18
26	30.000 pts	27
+27	Credit	9
28	Lamp special red	53
29	Advance multiplier	17
30	10.000 pts	62
+31	UP (game time bonus)	7
32	30.000 pts time bridge	36
33	Bonus 1 past	43
34	Bonus 2 past	61
35	Bonus 3 past	15
36	Bonus 4 past	16
+37	Wheel lamp 1	25
38	Bonus 5 past	33
39	Bonus 6 past	34
40	Bonus 7 past	52
41	Bonus 8 past	23
42	Bonus 9 past	24
43	Bonus 10 past	5
44	Multiplier time bridge	51
+45	Bonus ball	6
46	Bonus 1 Future	41
47	Bonus 2 Future	59
48	Bonus 3 Future	13
49	Bonus 4 Future	31
50	Bonus 5 Future	14
51	Bonus 6 Future	60
52	Bonus 7 Future	42
53	Bonus 8 Future	32
54	Bonus 9 Future	50
55	Bonus 10 Future	49
+56	Super Bonus	3
57	Bonus multiplier × 5	21
58	Bonus multiplier × 10	4
59	Bonus multiplier × 20	40
+60	Can play 1	22
61	Lamp "M"	56
+62	Can play 2	12
63	Lamp "A"	30
64	Lamp "C"	39
65	Lamp "H"	57
+66	Can play 3	2
+67	Can play 4	11
68	Lamp "I"	46
69	Lamp "N"	20
70	Lamp "E"	38
71	Fixed target "A"	56
+72	Down (game time bonus)	10
73	Fixed target "B"	37
74	Fixed target "C"	29
75	Fixed target "D"	47
+76	Wheel lamp 2	28
+77	Wheel lamp 3	1
+78	Highest score	19
79	Fixed target "E"	46
80	Fixed target "F"	55

+ head lamps  
+ + head and playfield lamps

FIG. 6

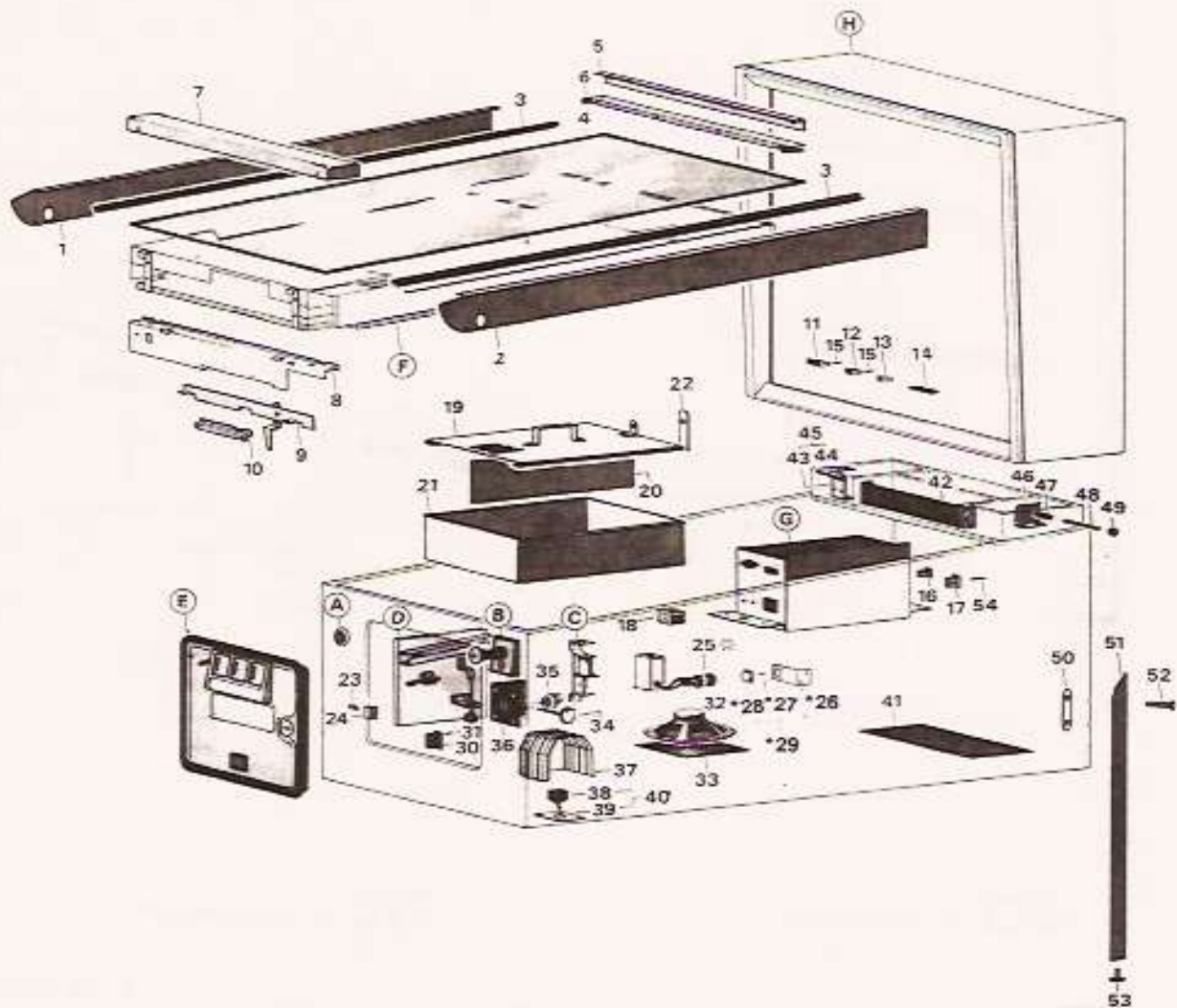
SOLENOID ARRANGEMENT



Sol n°	Description	DRIVE (darlington)
01	Top hole	Q 5
02	Left flap	Q 14
03	Right flap	Q 9
04	Knocker	Q 20
05	Left bank	Q 4
06	Right bank	Q 13
07	Wheel lamp 4	Q 3
08	Coin mechanism coil	Q 15
09	Left pop	Q 19
10	Wheel lamp 5	Q 7
11	Right pop	Q 18
12	Crown 1	Q 8
13	Wheel lamp 6	Q 6
14	Wheel lamp 7	Q 17
15	Wheel lamp 8	Q 12
16	Wheel lamp 9	Q 2
17	Wheel lamp 10	Q 1
18	Back 1	Q 22
19	Back 2	Q 21
20	Crown 2	Q 11
21	Motor relay	Q 23
22	Central pop	Q 10
23	Crown 3	Q 16
24	Out hole	Q 24

# MECCANICA

**catalogo  
ricambi**



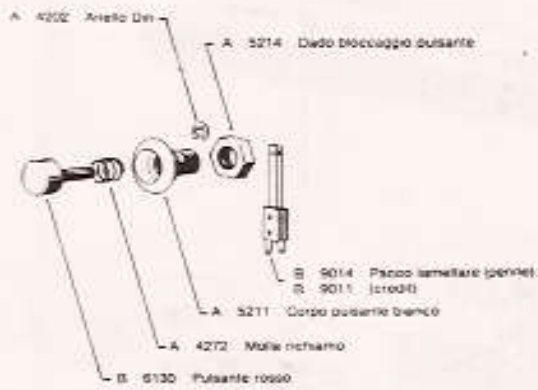
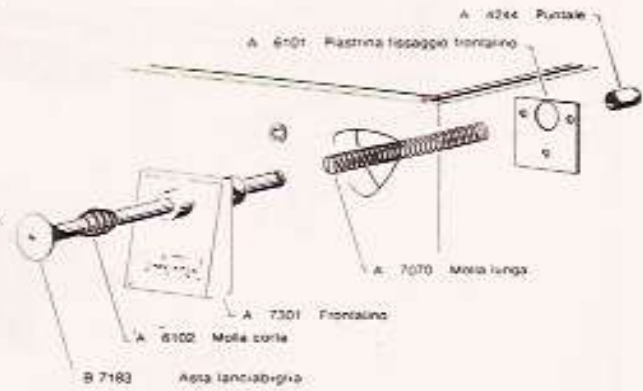
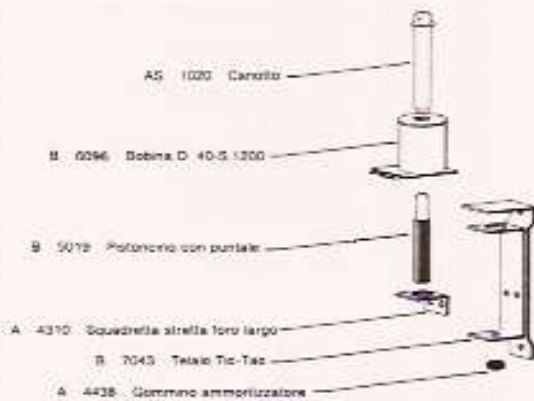
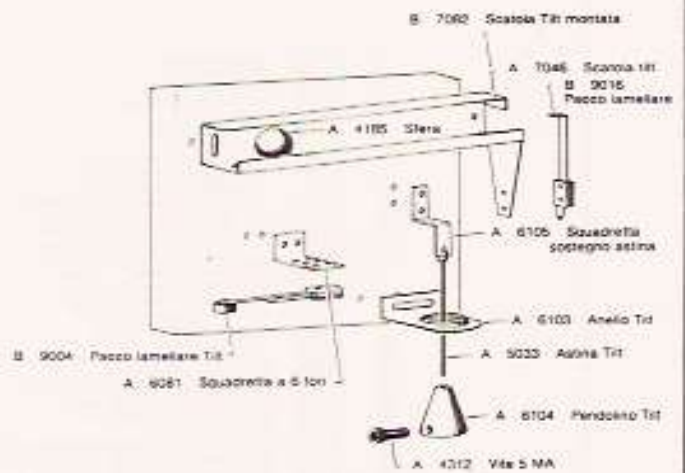
1	A 7219	Sponda sinistra
2	A 7218	Sponda destra
3	A 7039	Guida vetro
4	MV 015	Vetro del piano di gioco
5	A 7073	Angolare vetro
6	A 7074	Colletto cassone
7	B 7090	Poggiatesta
8	B 7085	Appiglio poggiatesta
9	B 7044	Leva appoggio poggiatesta
10	A 7069	Squadretta fissaggio leva
11	CE 1986	Connettore 1 vie maschio (femmina)
12	CE 1989	Connettore 3 vie piatto (femmina)
13	CE 1988	Connettore 2 vie piatto (femmina)
14	CE 1984	Connettore 20 vie nero (femmina)
15	CE 1985	Chiave di polarizzazione 640630-1
16	CE 1808	Connettore 2 vie AMP volante
17	CE 1764	Connettore 3 vie AMP volante
18	CE 1765	Connettore 9 vie AMP volante
19	B 7517	Copertino cassetta monete
20	A 7272	Divisorio cassetta monete
21	B 7276	Cassetta monete
22	A 8078	Squadretta fissaggio cassetta monete
23	CE 3002	Pulsante a saldare 2633 - 9433
24	A 5317	Squadretta a «L» porta pulsante credit
25	CEB 145	Contatore «Valore» delle monete
26	A 7174	Squadretta porta connettore
27	CE 1325	Contatto femmina
28	CE 1926	Connettore per stampante UTG porta femmina
29	B 7173	Connettore per stampante montato e cablo
30	CE 1306	Connettore femmina 2 x 6 MODU 2
31	CE 1340	Contatto femmina MODU 2
32	CE 2018	Altoparlante TW 4 J <sub>2</sub>

33	A 7150	Rota protezione altoparlante
34	CE 1753	Potenziometro 100 Ω
35	CE 3082	Jack cuffia
36	A 7406	Staffa supporto potenziometro e Jack
37	A 7217	Protezione interruttore
38	A 4425	Interruttore
39	A 5112	Plastina porta interruttore
40	B 7132	Interruttore montato
41	A 7386	Lamiera forata 320 x 160
42	A 7176	Rota protezione colletto cassone
43	B 7140	Cerniera malchito con perno
44	A 7155	Cerniera corta
45	B 7171	Compiuto cerniera
46	A 6256	Squadretta guida asta agenzia automatico
47	A 6258	Molla agenzia automatico
48	A 6257	Asta agenzia automatico
49	A 6250	Manopola zigrinato 5 MA
50	A 6106	Plastina fissaggio bottoni
51	E 003	Gamma fusore
52	A 7047	Bottoni
53	B 7045	Piedino
54	CE 1966	Contatto AMP maschio

## \*OPTIONAL

A	Vedi:	TAV. II	pag. 5
B	Vedi:	TAV. II	pag. 5
C	Vedi:	TAV. II	pag. 5
D	Vedi:	TAV. II	pag. 5
E	Vedi:	TAV. III	pag. 6-7
F	Vedi:	TAV. IV	pag. 8-9
G	Vedi:	TAV. XII	pag. 18
H	Vedi:	TAV. XIV	pag. 19

## TAV. II

**A** PULSANTE**B** C 8004 LANCIABIGLIA**C** C 8091 TIC-TAC**D** C 9006 TAVOLETTA TILT



**AUSTRALIA**  
20  
A 1098  
A 1007

**AUSTRIA**  
5 10  
A 1098  
A 1007

**BELGIO**  
5 10  
A 1098  
A 1007

**DANIMARCA & SVEZIA**  
1<sup>Kr</sup> 5<sup>Kr</sup> 10<sup>Kr</sup>  
A 1098  
A 1007

**FRANCIA & SVIZZERA**  
1<sup>F</sup> 2<sup>F</sup> 5<sup>F</sup>  
A 1098  
A 1007

**GERMANIA**  
1<sup>DM</sup> 2<sup>DM</sup> 5<sup>DM</sup>  
A 1098  
A 1007

**GIAPPONE**  
50<sup>Yen</sup> 100<sup>Yen</sup>  
A 1098  
A 1007

**INGHILTERRA**  
10<sup>P</sup> 50<sup>P</sup>  
A 1098  
A 1007

**ITALIA**  
100<sup>LIRE</sup> 200<sup>LIRE</sup>  
A 1098  
A 1007

**JUGOSLAVIJA**  
1<sup>DIN</sup> 2<sup>DIN</sup>  
A 1098  
A 1007

**LIBANO** 25 50  
A 1098  
A 1007

**OLANDA** 1<sup>G</sup>  
A 1098  
A 1007

**UNGHERIA** 2  
A 1098  
A 1007

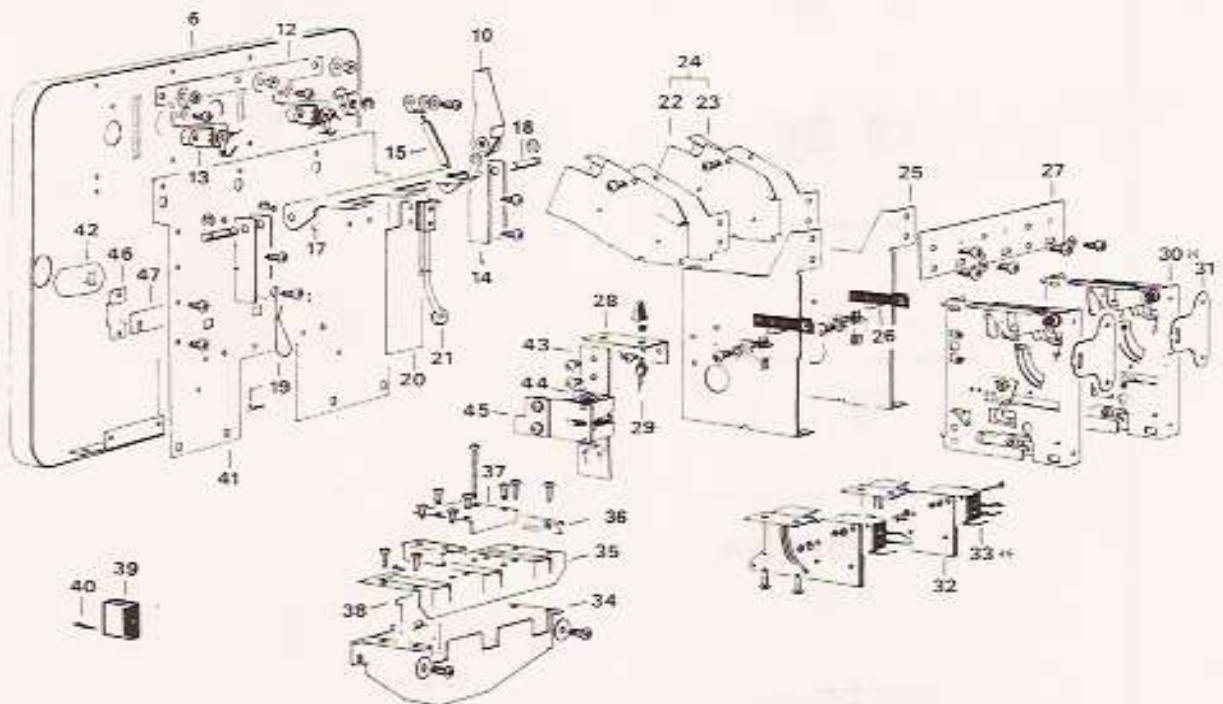
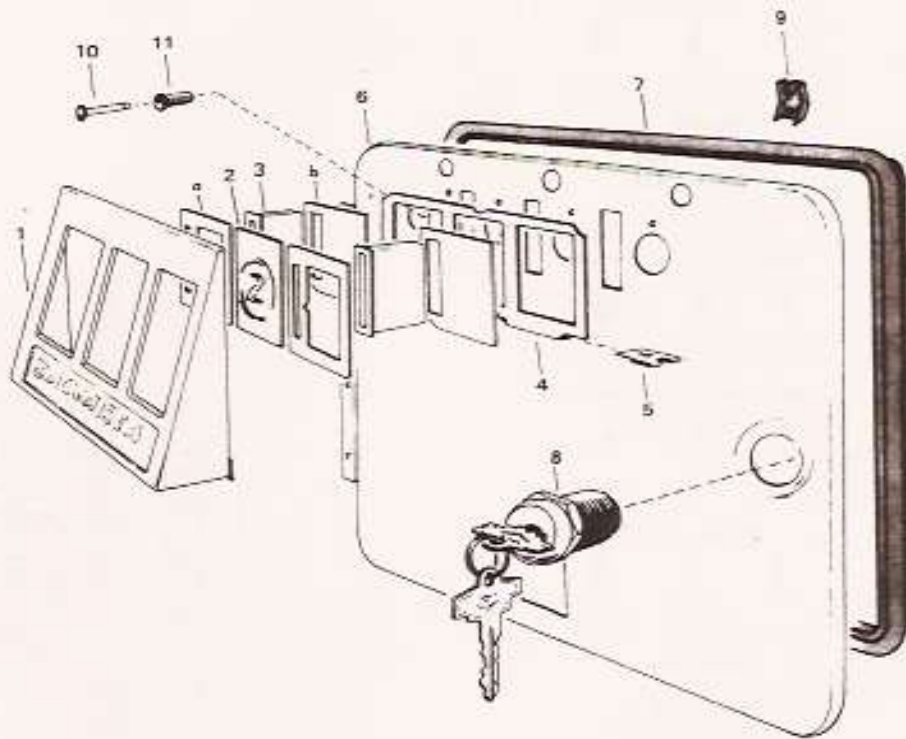
**U.S.A. & CANADA** 25c 50c  
A 1098  
A 1007

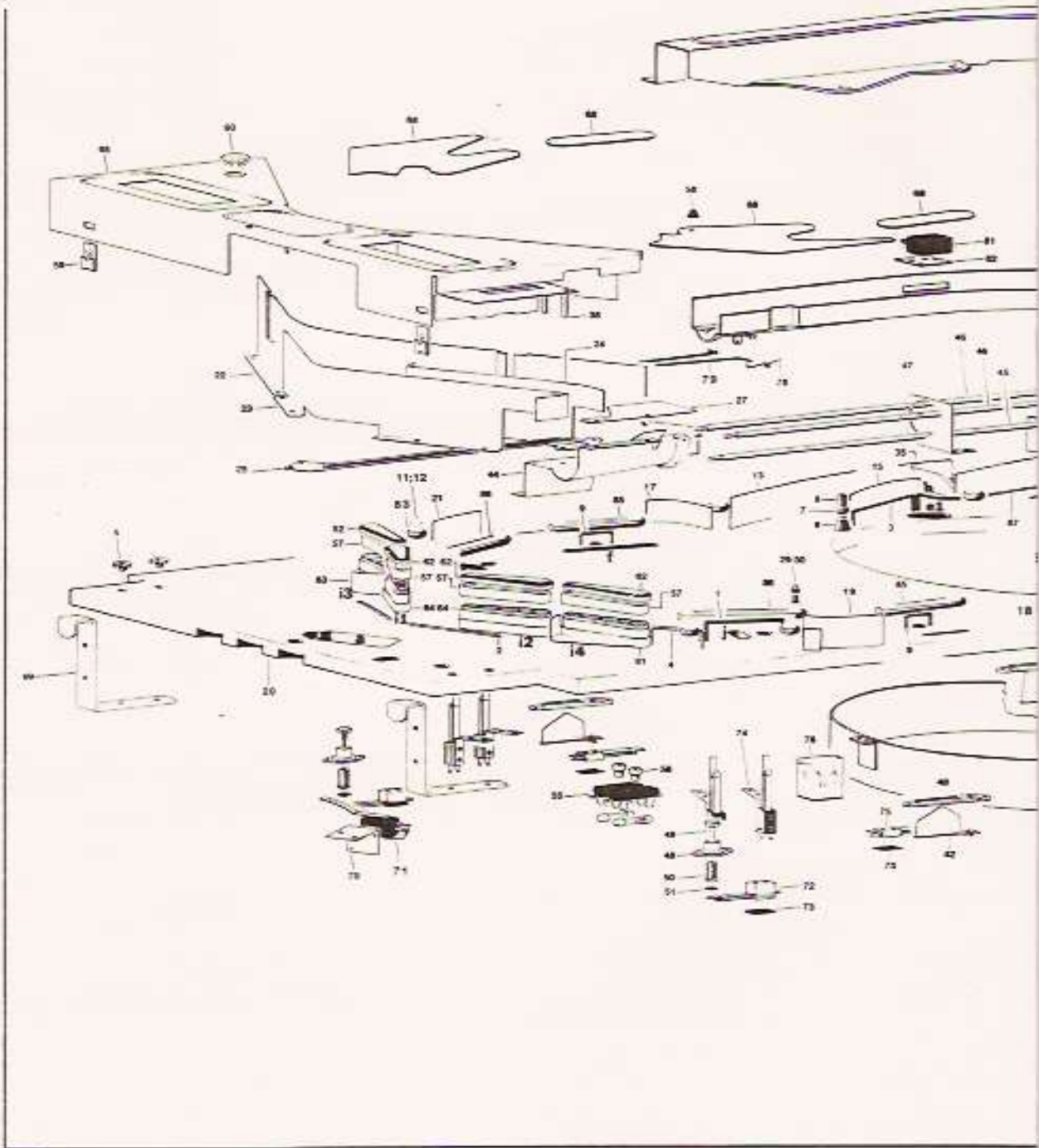
a = introduzione moneta (in m.)  
b = introduzione sigillata (p. ser.)

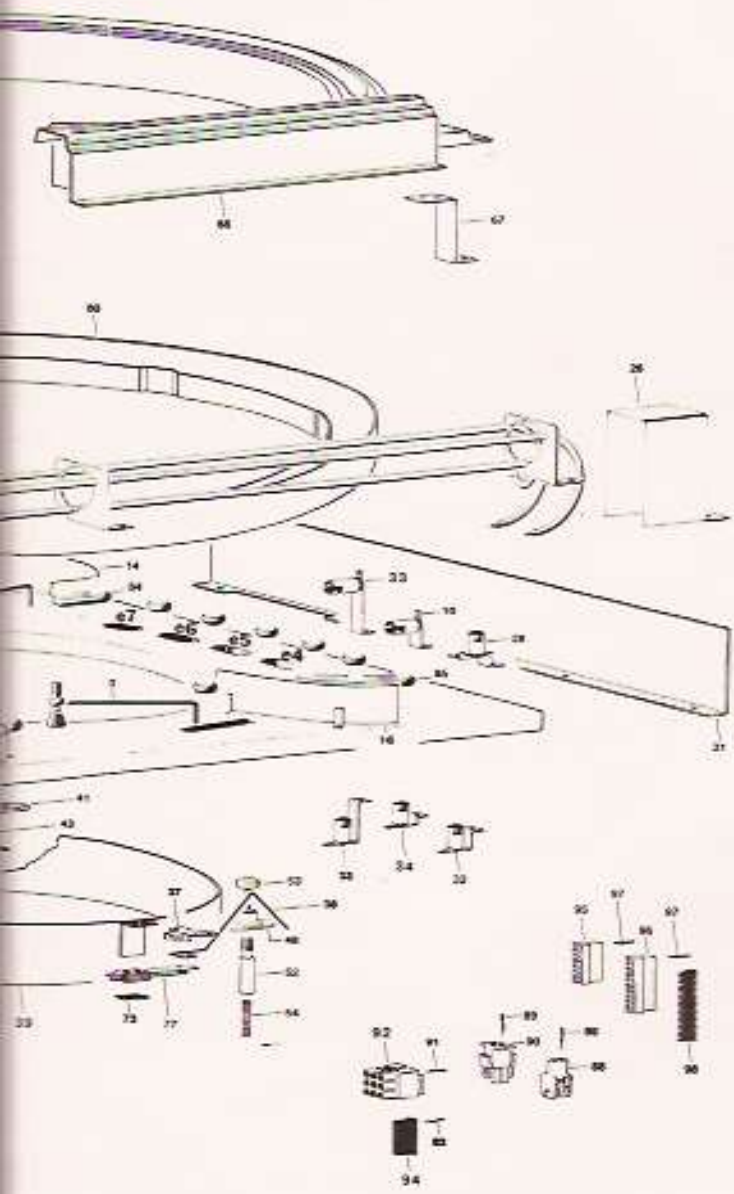
- 1 ASB 116 Frontalino sportello con cerniera
- 2 A 5029 Piastrina con marchio
- 3 A 5036 Guisa moneta in plastica
- 4 A 7005 Componente fissaggio accessori
- 5 A 4387 Piastrina semidobba
- 6 B 7194 Sportello con cerniera
- 7 A 7238 Cornice in alluminio pressofuso
- 8 B 7195 Serratura
- 9 A 4460 Staffa fissaggio cornice
- 10 A 4031 Pulsante scatto moneta
- 11 A 4032 Componente per pulsante
- 12 A 5008 Asa per frontalino
- 13 B 5009 Barra lampada ano sportello
- 14 A 6001 Cavalletto sportello
- 15 A 5201 Molla richiamo leva di scatto
- 16 B 6007 Leva con boccola
- 17 A 6002 Leva di scatto gettoniera
- 18 A 4005 Perno per cavalletto sportello
- 19 A 5021 Ferritto porta chiave sportello
- 20 A 5025 Cartoncino isolatore sportello
- 21 B 6015 Picco lamellare 10
- 22 A 7009 Scorrimento maschio
- 23 A 7008 Scorrimento femmina
- 24 B 6075 Scorrimento accoppiati
- 25 B 7006 Supporto gettoniera
- 26 A 5252 Forcellina fissaggio gettoniera
- 27 A 5014 Piastrina accoppiamento supporto
- 28 A 5206 Squadrella porta (in)
- 29 CE 3085 Deviazione con (in)
- 30 "B 7084 Gettoniera L. 100  
B 7175 Gettoniera L. 200  
B 7002 Gettoniera 25 C  
B 7096 Gettoniera 5 P  
B 7097 Gettoniera 10 F  
B 7098 Gettoniera 5 P  
B 7099 Gettoniera 10 P  
B 7147 Gettoniera 50 P  
B 7111 Gettoniera 0,50 ptg  
B 7112 Gettoniera 1 DM  
B 7113 Gettoniera 2 DM  
B 7114 Gettoniera 5 DM  
B 7126 Gettoniera 1 FG  
B 7129 Gettoniera 2 FG  
B 7148 Gettoniera 10 Fr. Belg  
B 7233 Gettoniera 5 Dinari  
B 7234 Gettoniera 10 Dinari  
A 5114 Piastrina fissaggio gettoniera  
B 6109 Piastra porta micro  
"B 5053 Micro nero  
B 5054 Micro bianco  
B 5055 Micro bianco  
B 7300 Raccoglitore in lega  
A 6009 Copertura per raccoglitore moneta  
A 7279 Squadrella longitudinale antride  
A 5010 Squadrella a 4 ton  
A 5011 Canaletto  
CE 1338 Connettore maschio 2 x 6 vie MODU 2  
CE 1348 Contatto maschio MODU 2  
A 7002 Piastra supporto gettoniera  
A 4325 Leva per serratura sportello anteriore  
B 7143 Alloggiamento bobina  
B 6101 Bobina D. 12x5, 5.000 con nucleo  
B 7142 Piastrina con componente in ottone  
A 5002 Ferro barra attrezzi moneta  
A 5001 Barra anelli moneta

E

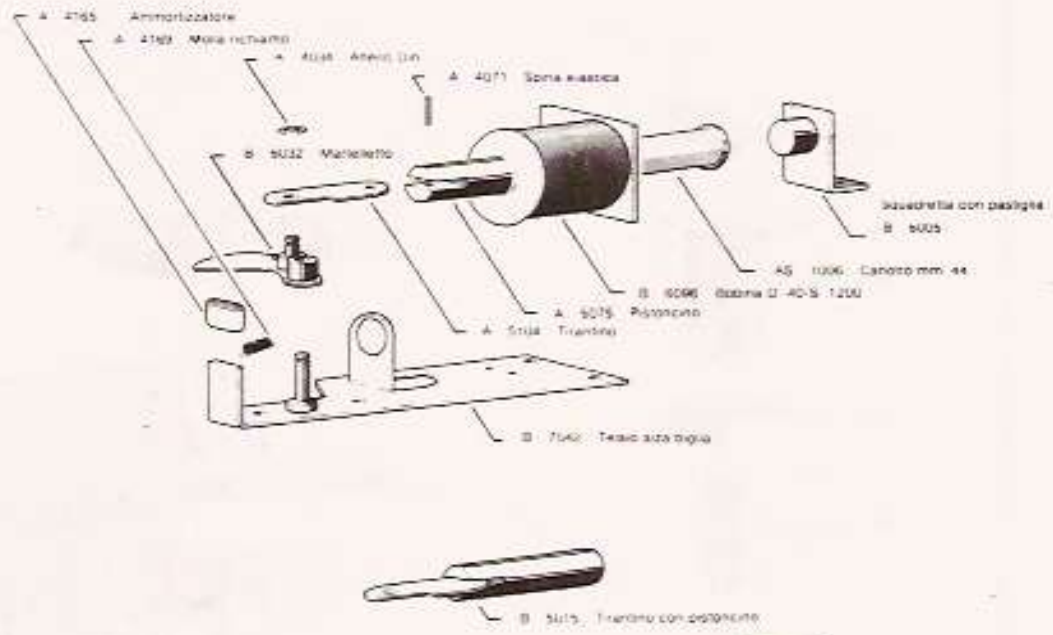
C 8140 SPORTELLINO PORTA GETTONIERE



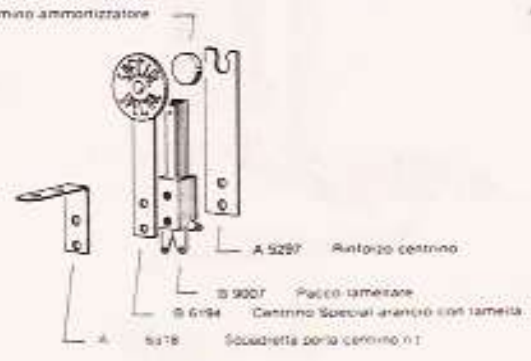




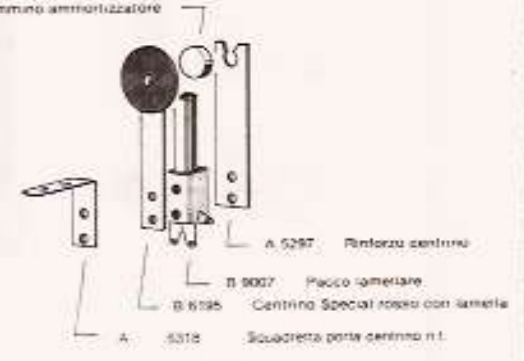
- 1 A 4431 Ferretto alto mm. 80
- 2 A 4368 Ferretto basso mm. 60
- 3 A 4242 Ferretto alto mm. 114
- 4 A 4235 Ferretto alto mm. 60
- 5 A 4386 Dado securt. Ø194
- 6 A 5433 Componente rimposti
- 7 A 4537 Giommino rimposti
- 8 A 4570 Rimposti
- 9 A 4609 Ferretto mm. 30 (infilassai)
- 10 B 6272 Portalampeada piatto alto mm. 15
- 11 AS 1096 Colonna mm. 27 azzurra
- 12 A 6201 Colonna mm. 27 rossa
- 13 XB 057 Guida pallina mm. 28 x 261,5
- 14 XB 056 Guida pallina mm. 28 x 270
- 15 XB 059 Guida pallina mm. 28 x 135,5
- 16 XB 060 Guida pallina mm. 28 x 125
- 17 XB 061 Guida pallina mm. 20 x 52,5 piedino sinistro
- 18 XB 062 Guida pallina mm. 20 x 52,5 piedino destro
- 19 XB 063 Guida pallina mm. 20 x 63 piedino destro
- 20 MRB 626 Pano di gioco serigrafato
- 21 XB 064 Guida pallina mm. 28 x 63 piedino sinistro
- 22 A 7361 Angolare basso carter
- 23 A 7359 Guida pallina lunga alla
- 24 A 7360 Guida pallina corta alla
- 25 A 7363 Sinario pallina
- 26 A 7474 Sculture annesso guide trafilie
- 27 A 6319 Copertura lenza biglia
- 28 B 6177 Portalampeada parte tempo
- 29 A 7363 Vite portaspalle Ø14
- 30 A 7355 Vite portaspalle legno
- 31 A 7480 Angolare rinforzo piano di gioco
- 32 B 7000 Portalampeada medio
- 33 B 7002 Portalampeada alto
- 34 B 7029 Portalampeada basso
- 35 A 7285 Squadretto annesso pallina
- 36 MRB 623 Graduatore serigrafato
- 37 A 6094 Ferretto passaggio sinistro
- 38 A 4683 Ferretto lungo per lancia sinistra
- 39 B 7345 Caricchio con angolari
- 40 AS 1029 Fissaggio grande
- 41 AS 1036 Fissaggio piccolo
- 42 AS 1042 Basetta in plastica grande
- 43 AS 1043 Basetta in plastica piccola
- 44 B 7290 Staffa raccoglitore pallina P.C.
- 45 A 7475 Trafilie centrale
- 46 A 7479 Trafilie esterna
- 47 A 6269 Supporto trafilie 90°
- 48 A 5199 Basetta per pulsantino
- 49 A 5337 Fiochetto in mascherino
- 50 A 5283 Innesco in ottone
- 51 A 4280 Quickie
- 52 A 4680 Barretta in ottone guida pulsante
- 53 B 5078 Pulsante in metallo
- 54 A 4688 Molla cilindrica
- 55 B 7054 Portafusibile
- 56 A 4068 Giommino per rimposti
- 57 A 4245 Fiochetto flipper
- 58 A 4279 Copercchia inox
- 59 A 4343 Piastrina semidoppia fissaggio carter
- 60 A 4362 Ø194 rosso
- 61 AS 1151 Corpo penna larga Ø20x3 blu
- 62 AS 1152 Copercchia penna flipper blu
- 63 AS 1153 Corpo penna larga Ø20x3 blu
- 64 AS 1154 Corpo penna smontabile
- 65 MRB 628 Carter serigrafato "Time Machine"
- 66 MRB 621 Copertura canale termofornato
- 67 A 4574 Staffa a "C" supporto piano rialzato
- 68 MRB 623 Isola piano "Time Machine"
- 69 A 7364 Supporto alto per piano di gioco
- 70 A 5296 Supporto medio della buca finali
- 71 B 7054 Micro interruzione della buca finali
- 72 B 9009 Pacco lamellare per pulsante a sfera
- 73 A 6020 Piastrina copri pacco lamellare
- 74 B 9010 Pacco lamellare flap
- 75 B 9008 Pacco lamellare passaggi
- 76 CBC 006 Relay RTI-41 B CO41
- 77 B 9010 Pacco lamellare buca bassa
- 78 A 4564 Molla a torsione richiamo ferretto
- 79 A 4562 Ferretto doppia pallina
- 80 B 7348 Canale trasparente assemblato
- 81 B 8185 Microinterruzione Ø 5100B
- 82 A 4679 Piastrina 32 x 30 fissaggio micro
- 83 A 4246 Giommino n° 1
- 84 A 4250 Giommino n° 2
- 85 A 4252 Giommino n° 4
- 86 A 4253 Giommino n° 5
- 87 A 4694 Ferretto alto mm. 174
- 88 CE 1009 Connettore 2 vie AMP da pannello
- 89 CE 1566 Contatto AMP maschio
- 90 CE 1568 Contatto AMP volante
- 91 CE 1565 Contatto AMP femmina
- 92 CE 1703 Connettore 3 vie AMP volante
- 93 CE 1340 Contatto MODU 2 femmina
- 94 CE 1562 Connettore 2 x 9 MODU 2 porta femmine
- 95 CE 1895 Connettore 7 vie AVG femmina, arancio
- 96 CE 1891 Connettore 10 vie AVG femmina, giallo
- 97 CE 1563 Chiavetta di polarizzazione
- 98 CE 1584 Connettore 20 vie AVG femmina, nero



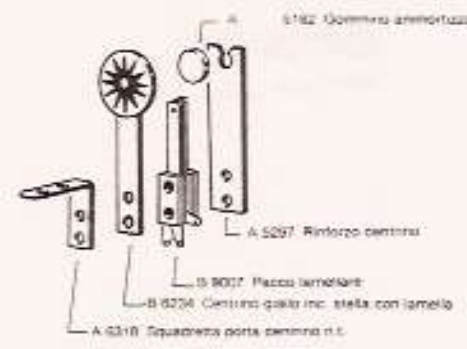
**Fb**  
 C 8224 CENTRINO FISSO «SPECIAL» ARANCIO ASSEMBLATO



**Fc**  
 C 8225 CENTRINO FISSO «SPECIAL» ROSSO ASSEMBLATO



**Fd**  
 C 8310 CENTRINO FISSO GIALLO INC. STELLA ASSEMBLATO

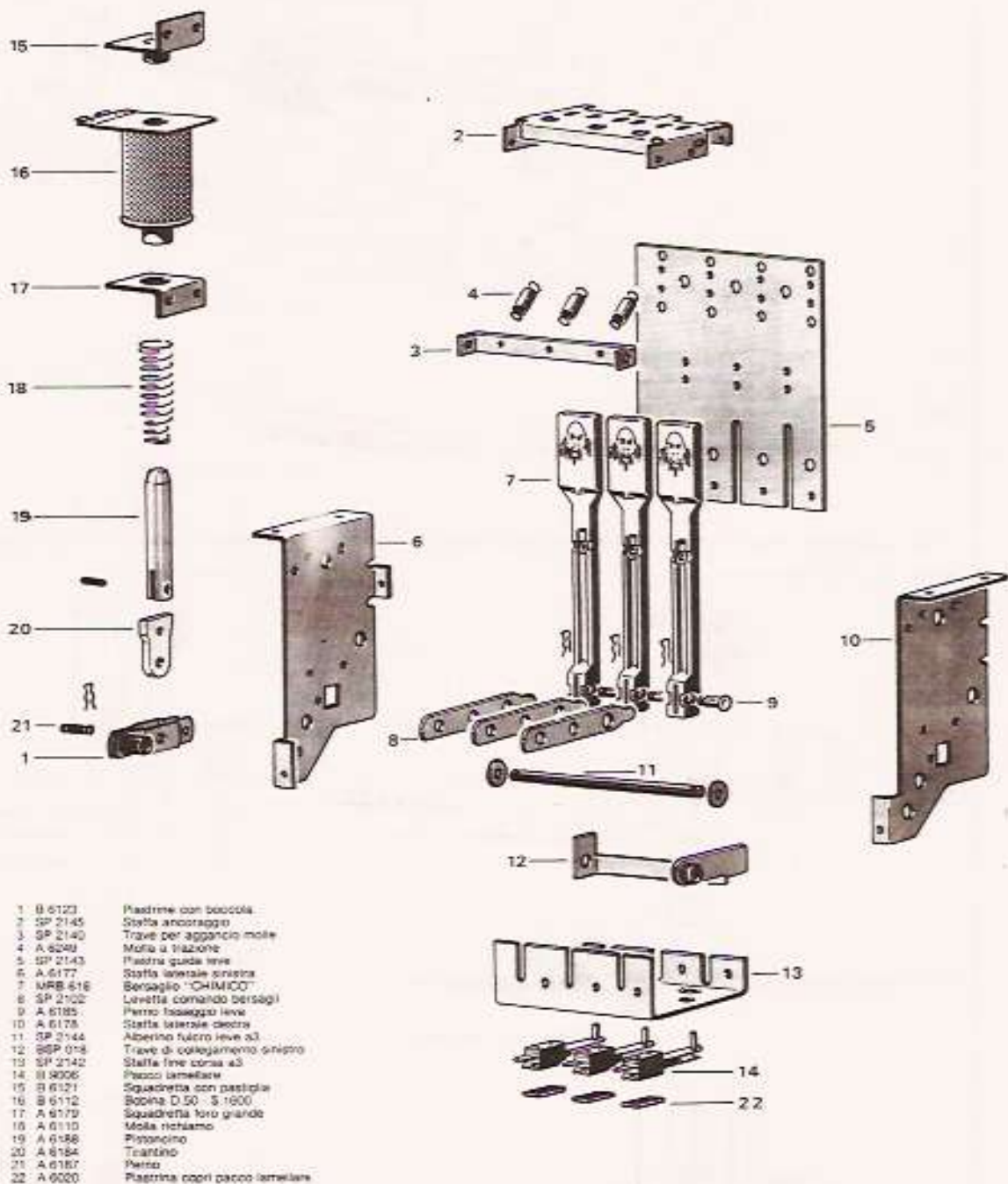


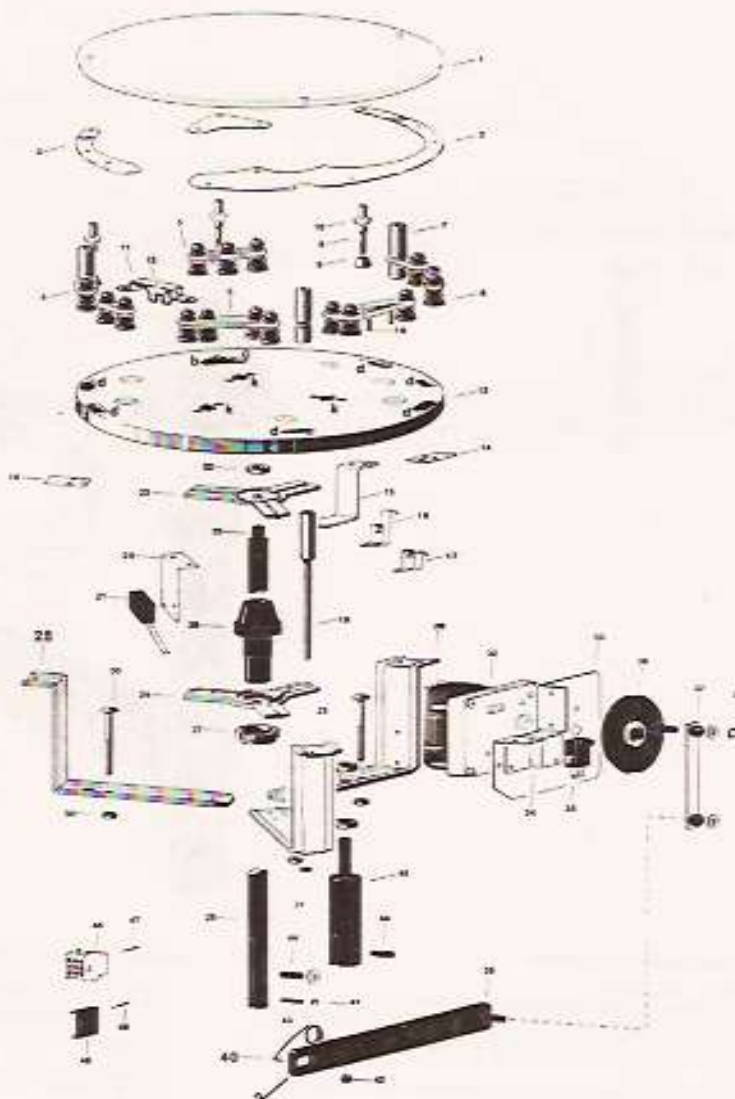
- Fe**
- Fe1 C 8311 Centrino trasparente n° 1 assemblato
  - Fe2 C 8312 Centrino trasparente n° 2 assemblato
  - Fe3 C 8313 Centrino trasparente n° 3 assemblato
  - Fe4 C 8314 Centrino trasparente n° 4 assemblato
  - Fe5 C 8315 Centrino trasparente n° 5 assemblato
  - Fe6 C 8316 Centrino trasparente n° 6 assemblato
  - Fe7 C 8317 Centrino trasparente n° 7 assemblato



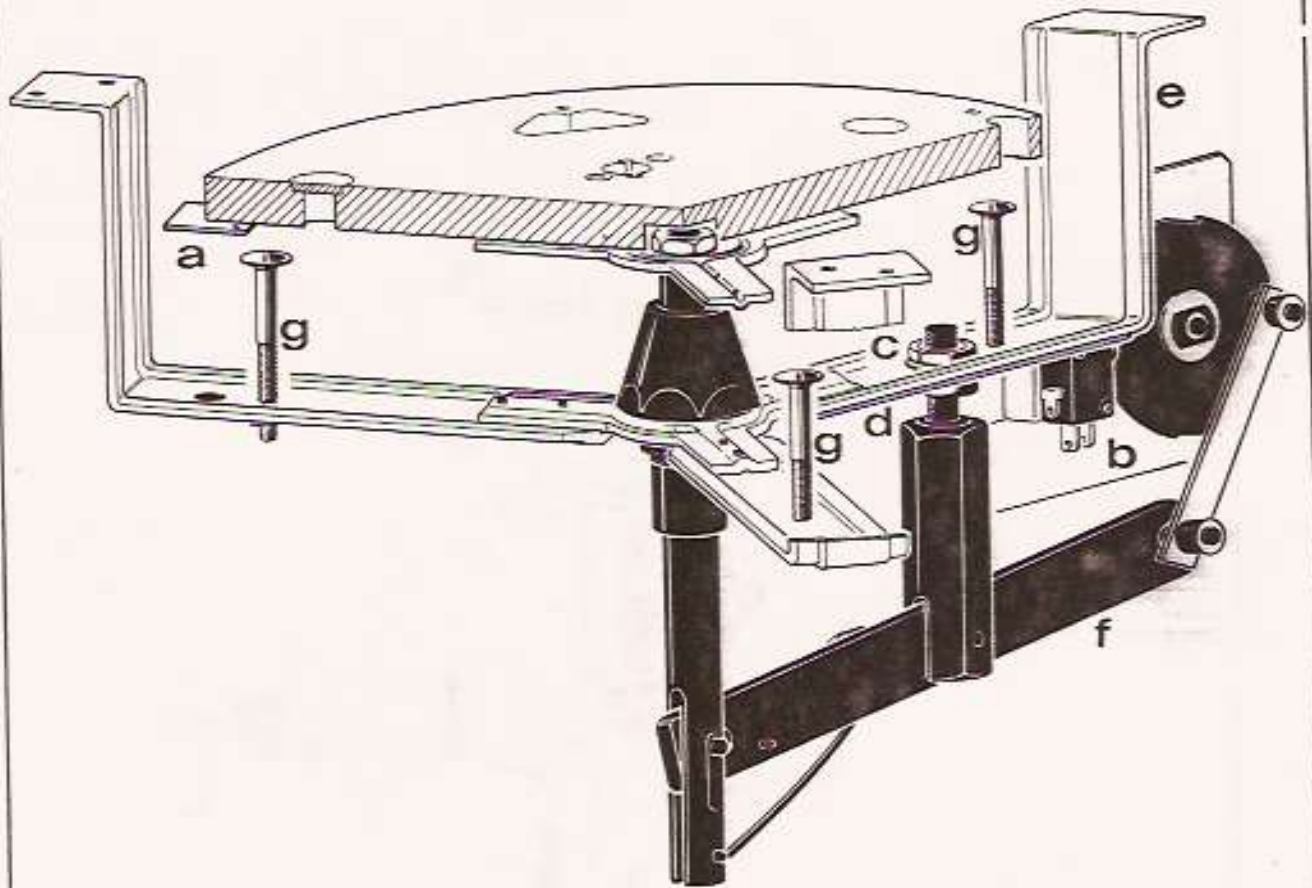
Fi

C 8309 BANCO BERSAGLI A TRE POSIZIONI SINISTRO T.M.





1	MRB 616	Piano in plexiglass temperato	26	B 6221	Guida per albero con boccia
2	MRB 624	Isola termoplastica sinistra	27	A 5367	Giara M25 x 1,5
3	MRB 622	Isola termoplastica destra	28	A 7509	Staffa a "Z" gruppo ascensore
4	A 4248	Gommino n° 1	29	A 7510	Staffa a "Z" fissaggio motore
5	A 4252	Gommino n° 4	30	A 6570	Vite M5 x 60 con dado
6	AS 1086	Colonnella mm. 27 ezzurra	31	A 4120	Boccia in plastica per staffa
7	A 5360	Perno supporto plexiglass	32	B 7329	Motore 48 V con riduttore 10 g. min
8	A 4570	Minipost fileto 4MA x 51	33	A 7512	Piastrina fissaggio motore
9	A 4533	Componente per minipost	34	A 5358	Squadretta per micro 29 x 61 x 1
10	A 4537	Gommino per minipost	35	B 6158	Microinteruttore con rullino
11	X 037	Portacelo mm. 48	36	B 6228	Disco a camme Ø 76 assemblato
12	X 035	Ferretto unidirezionale mm. 48	37	B 6227	Alza con boccia assemblata
13	MRB 631	Piano mobile in legno temperato	38	A 4212	Anello DIN Ø 4
14	A 4588	Pastina mm. 35 x 20 a 3 ton	39	B 7547	Leva gruppo ascensore assemblata
15	A 5366	Staffa a "Z" per pulsante	40	A 5368	Molla a torsione gruppo ascensore
16	B 7002	Portalampea alto	41	A 4555	Anello DIN Ø 3,2
17	B 7003	Portalampea medio	42	A 4573	Boccia Ø 9,5, Ø 16,4, h. 5,5
18	A 4628	Ferretto alto mm. 30	43	A 4661	Perno Ø 4 x 22,5
19	B 6220	Ranetta con perno inserito	44	A 4667	Perno Ø 6 x 25
20	A 5384	Squadretta fissaggio micro 48 x 23	45	A 6340	Bianca magnetica fulcro leva
21	B 6164	Microinteruttore per buca finale	46	CE 1744	Connettore 3 vie AMP da pannello
22	A 4585	Dado UNI 10 x 1 h. 8	47	CE 1966	Contatto AMP maschio
23	A 7507	Componente a stella superiore	48	CE 1591	Connettore MODU 2,2 x 9 porta maschi
24	A 7508	Componente a stella inferiore	49	CE 1348	Connettore MODU 2 maschio
25	A 7506	Albero gruppo ascensore			



## REGOLAZIONI GRUPPO ASCENSORE

- 1) Livellamento piano mobile
  - a) portare a battuta sul piano le piastine di livellamento (a)
  - b) portare a fine corsa superiore la carrina del motorino mediante il micro (b)
  - c) allentare il dado (c) fino a non avere pressione sul dado stesso
  - d) portare a 1 mm. lo spazio tra il dado (c) e la staffa (d)
  - e) avvitare forte il dado (c) e controllare il parallelismo dell'asta (f) con la parete dell'assa
- f) fare compiere alcuni movimenti al piano mobile e controllare che la pressione sulla piastina (a) non sia eccessiva
- 2) Livellamento pleoglass
  - a) portare la carrina del motorino a fine corsa inferiore mediante il micro (b)
  - b) livellare il pleoglass mediante le viti (g) svitando i dadi delle viti stesse
  - c) bloccare di nuovo il dado a operazione terminata

## MOVING BUMPER ASSEMBLY ADJUSTMENT

- 1) Moving assembly leveling
  - a) Make leveling plates (a) contact playfield
  - b) Lead motor cam to upper stop point by micro (b)
  - c) Loosen nut (c) until no pressure is exerted on the nut itself
  - d) Make distance between nut (c) and Z bracket (d) equal to 1 mm.
  - e) Tighten nut (c) as much as possible and make sure about parallelism between rod (f) and slot wall.
- f) Make moving assembly accomplish some rising and falling movements and make sure that pressure exerted on plate (a) is not excessive.
- 2) Plexiglass leveling
  - a) Lead motor cam to lower stop point by micro (b)
  - b) By screws (g), level plexiglass by screwing out nuts of the same screws.
  - c) After that, retighten nuts.

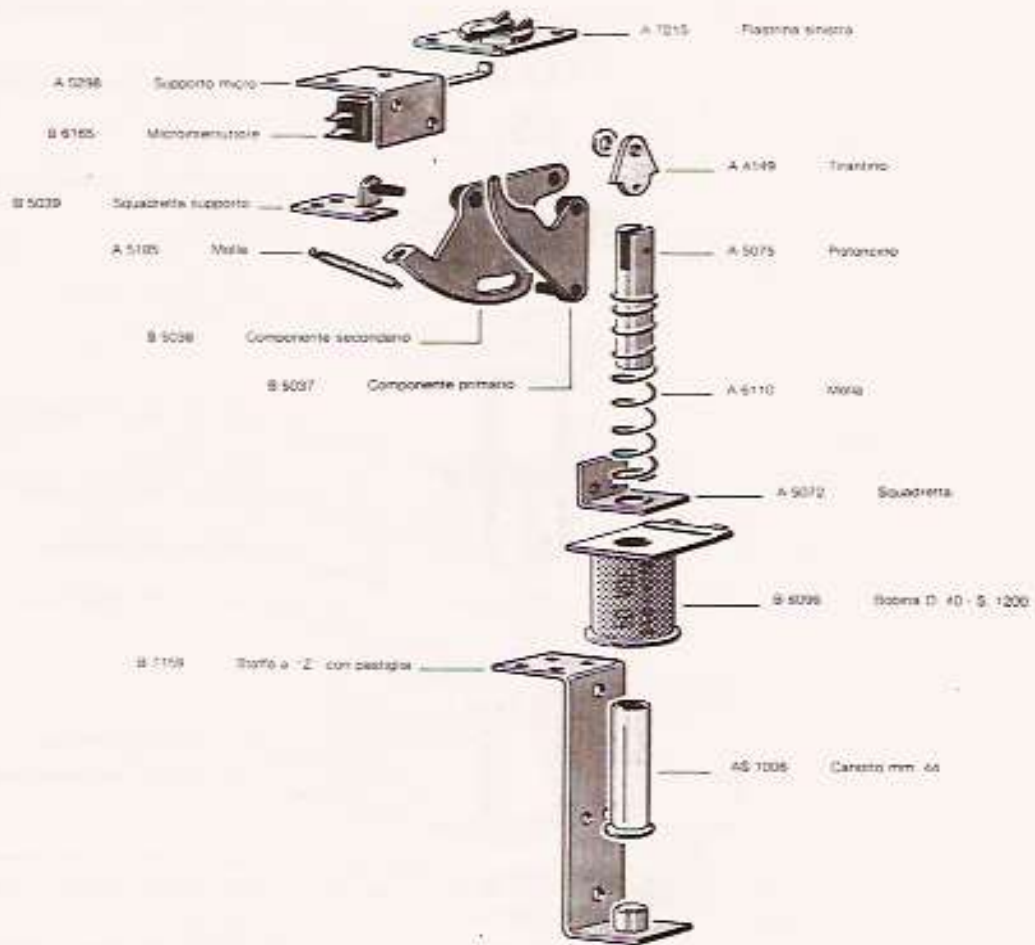
## REGLAGE DU GROUPE MONTANT

- 1) Nivellement du plateau mobile
  - a) Porter les piastres de nivellement (a) jusqu'à toucher le plateau du jeu.
  - b) Porter la came du petit moteur juste au point d'arrêt supérieur par le micro (b).
  - c) Desserrer le dé (c) jusqu'à ce que aucune pression ne soit exercée sur le dé même.
  - d) Rendre la distance entre le dé (c) et l'attache à Z (d) égale à 1 mm.
  - e) Serrer le dé (c) bien étroit et contrôler le parallélisme entre la tige (f) et la paroi du trou.
- f) Faire accomplir quelques mouvements au plateau mobile et s'assurer que la pression sur la plaquette (a) ne soit pas trop élevée.
- 2) Nivellement du pleoglass
  - a) Porter la came du petit moteur juste au point d'arrêt inférieur au moyen du micro (b).
  - b) Nivelier le pleoglass au moyen des vis (g) en desserrant les écrous des vis mêmes.
  - c) Après cette opération, bloquer les écrous à nouveau.

## EINSTELLUNG DER AUFZUGSGRUPPE

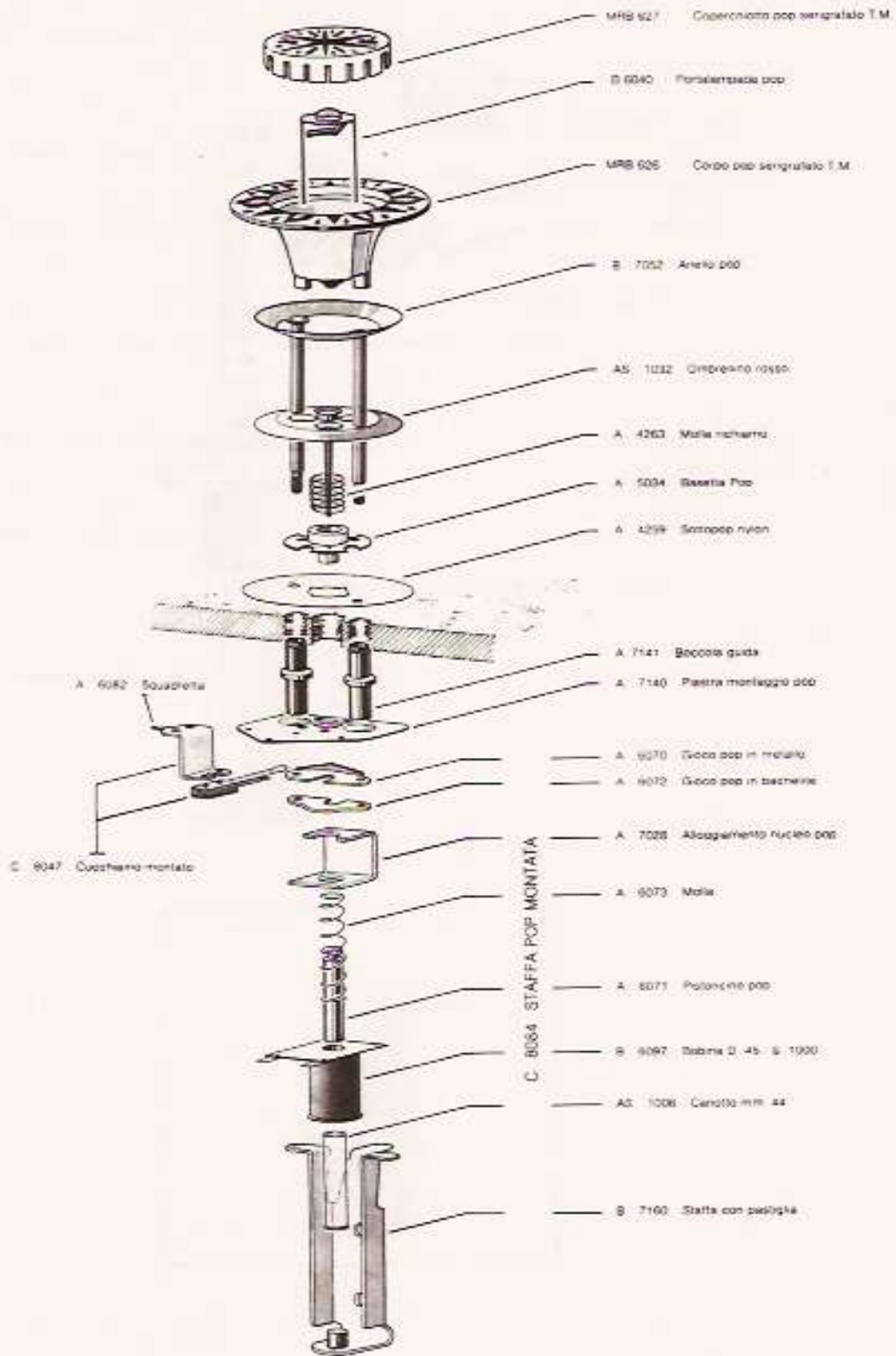
- 1) Horizontale Ausrichtung der beweglichen Platte
  - a) Man lege die Auslöseventile (a) auf die Platte auf.
  - b) Man bringe die Kurven des Elektromotors mittels des Mikroschalters in die Position der oberen Anlage.
  - c) Man löse die Mutter (c), bis dieser keinerlei Druck mehr unterworfen ist.
  - d) Man reguliere den Abstand zwischen der Mutter (c) und der Halterung (d) auf 1 mm ein.
  - e) Man achte auf die Mutter (c) fest zu, und kontrolliere, ob die Stange (f) perfekt parallel ist mit der Wand des Schlittens.
  - f) Man führe einige Bewegungen der beweglichen Platte aus, und kontrolliere, ob kein zu starker Druck auf die Plättchen (a) ausgeübt wird.
- 2) Positionierung des Plexiglasses
  - a) Man bringe die Kurven des Elektromotors mittels des Mikroschalters (b) in die untere Anlage.
  - b) Man richte das Plexiglas mittels der Schrauben (g) aus indem man die Muttern der Schrauben selbst aufschraubt.
  - c) Man schraube die Muttern nach Beendigung dieser Maßnahme wieder fest.

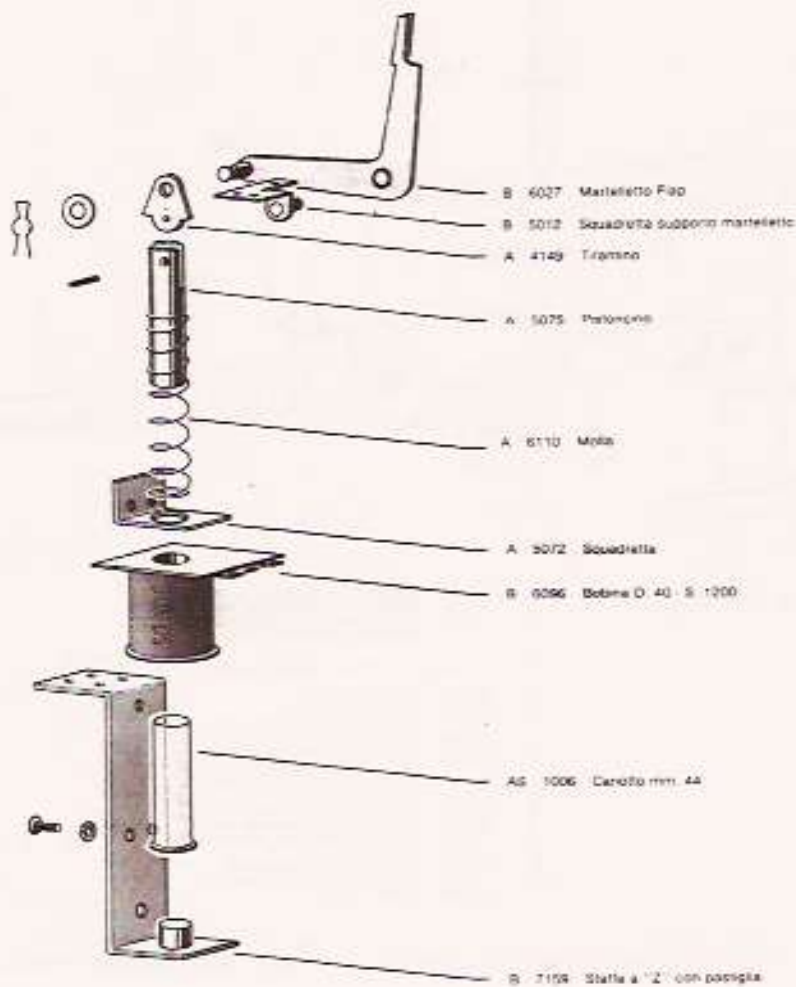




C 8082 Staffa a "Z" montata

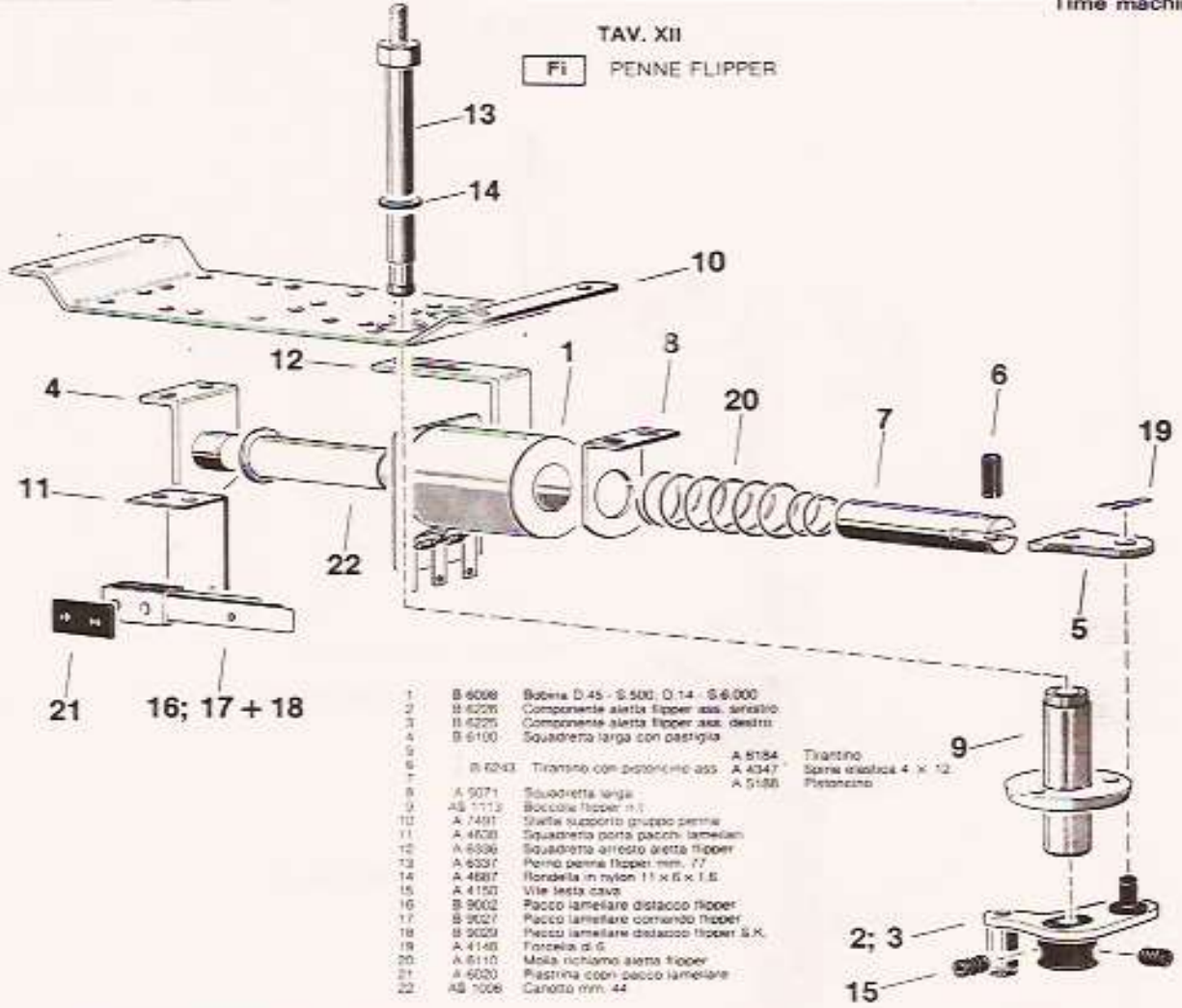






TAV. XII

FI PENNE FLIPPER

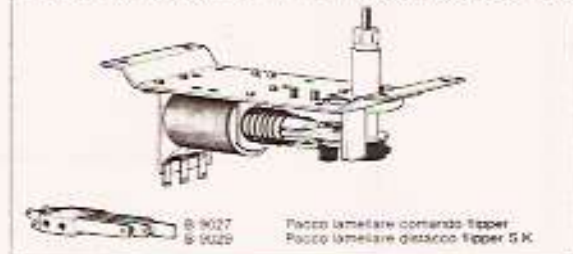


- 1 B 6008 Bobina D 45 - S.500; D 14 - S.6.000
- 2 B 6226 Componente aletta flipper ass. sinistro
- 3 B 6225 Componente aletta flipper ass. destro
- 4 B 6100 Squadreta larga con pastiglia
- 5
- 6
- 7 B 6243 Tirante con pistoncino ass. A 6184 Tirante  
A 4347 Spina elastica 4 x 12  
A 5185 Pistoncino
- 8 A 5071 Squadretta larga
- 9
- 10 AS 1113 Boccia flipper n.1
- 11 A 7491 Staffe supporto gruppo penna
- 12 A 4630 Squadretto porta pacchi lamellari
- 13 A 6536 Squadretto arretrato aletta flipper
- 14 A 6337 Penna flipper mm. 77
- 15 A 4687 Rondella in nylon 11 x 6 x 1,6
- 16 A 4150 Vite testa cava
- 17 B 9002 Pacco lamellare distacco flipper
- 18 B 9027 Pacco lamellare comando flipper
- 19 B 9029 Pacco lamellare distacco flipper S.K.
- 20 A 4148 Forcella di G
- 21 A 6110 Molla richiamo aletta flipper
- 22 A 6020 Pastiglia copri pacco lamellare
- AS 1008 Carotto mm. 44

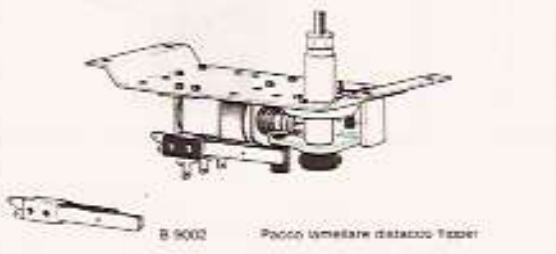
FI 1 8322 GRUPPO FLIPPER COMANDO SINISTRO



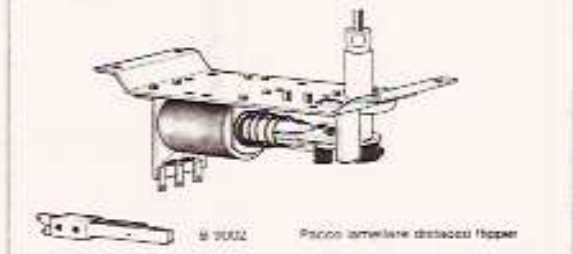
FI 2 C 8321 GRUPPO FLIPPER COMANDO DESTRO

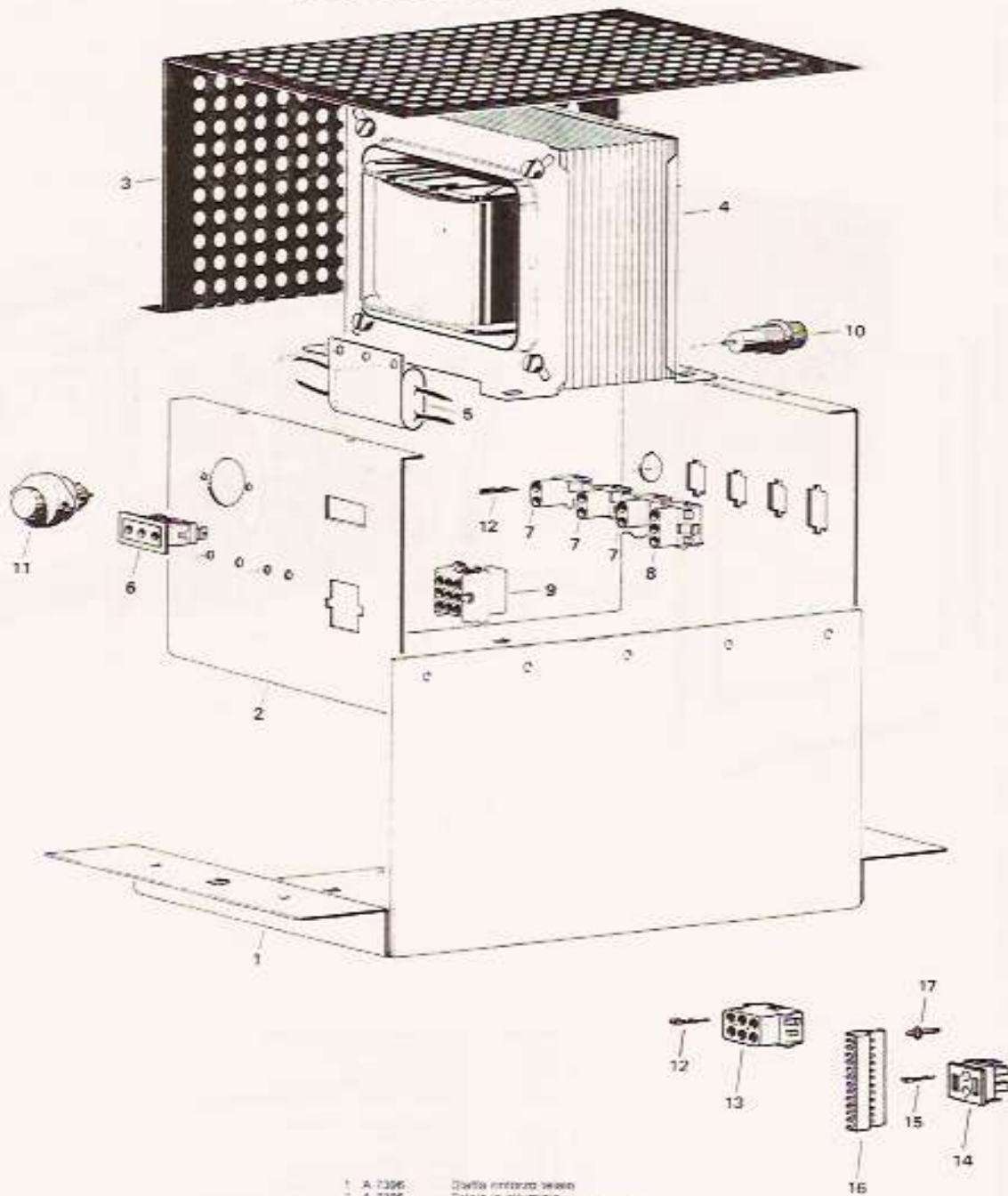


FI 3 C 8320 GRUPPO FLIPPER SINISTRO



FI 4 C 8319 GRUPPO FLIPPER DESTRO

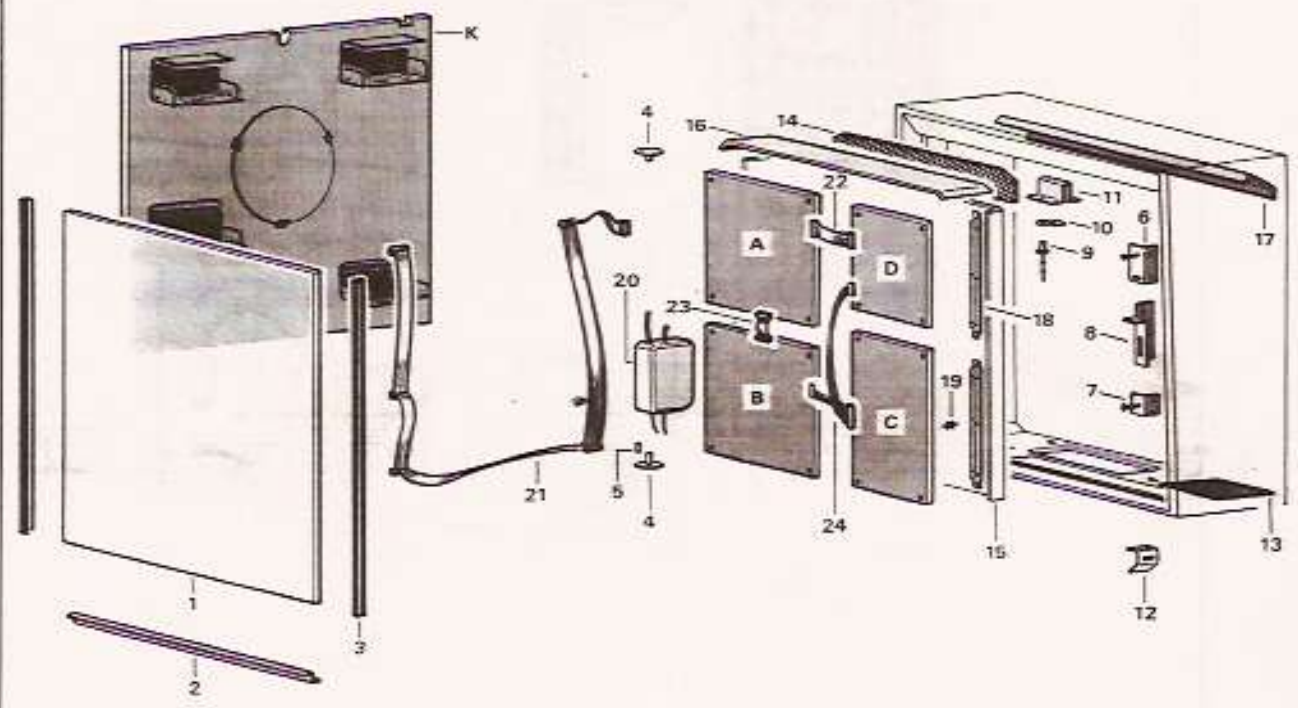




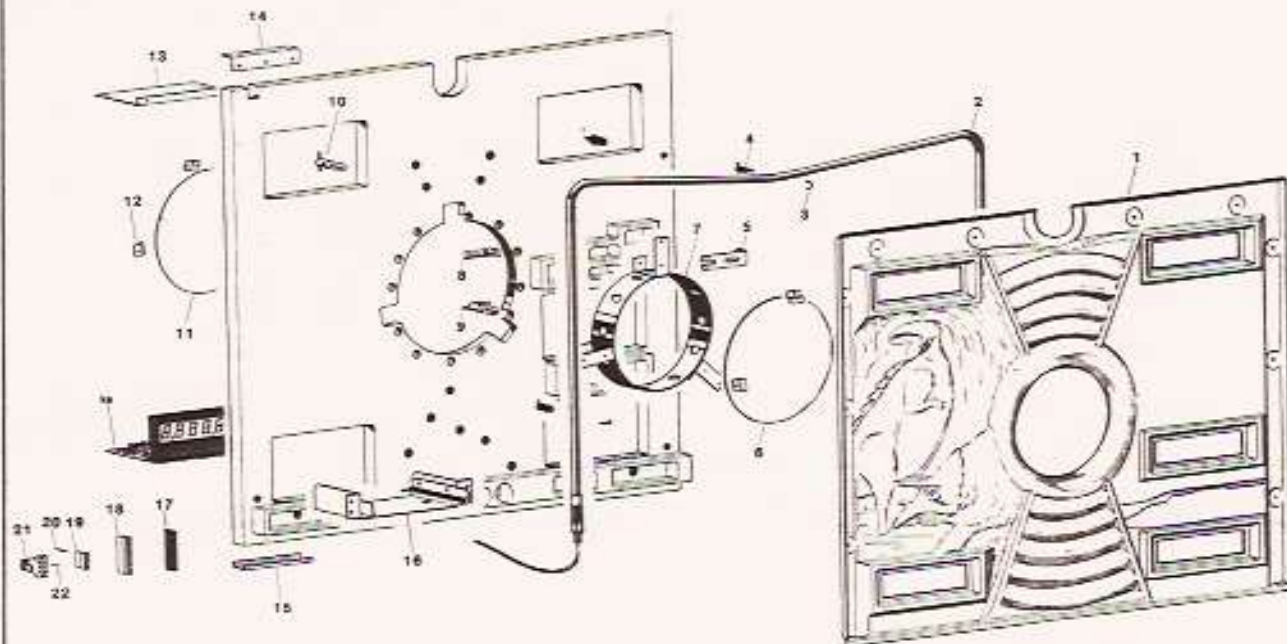
- |    |         |                                       |
|----|---------|---------------------------------------|
| 1  | A 7396  | Questa intesa base                    |
| 2  | A 7395  | Telaio in alluminio                   |
| 3  | A 7397  | Lanterina forata protezione telaio    |
| 4  | C 8188  | Trasformatore 2C 1019                 |
| 5  | C 8068  | Filtri di rete 5A                     |
| 6  | A 6281  | Pressa ciclabile con massa            |
| 7  | CE 1802 | Connettore AMP 2 vie da pannello      |
| 8  | CE 1706 | Connettore AMP 5 vie da pannello      |
| 9  | CE 1754 | Connettore AMP 5 vie da pannello      |
| 10 | CE 1758 | Portastipiti da pannello              |
| 11 | CE 1763 | Cambio tensioni                       |
| 12 | CE 1805 | Contatto AMP femmina                  |
| 13 | CE 1872 | Connettore 5 vie AMP da pannello      |
| 14 | CE 1808 | Connettore 2 vie AMP volante          |
| 15 | CE 1908 | Contatto AMP maschio                  |
| 16 | CE 1585 | Connettore AWG 13 vie femmina, anatro |
| 17 | CE 1960 | Chiave di polarizzazione              |

TAV. XIV

H TESTATA



- 1 MRB 630 Vetro pignato "TIME MACHINE"
- 2 A 7205 Asta sostegno vetro mm. 695
- 3 MV 009 Cornice vetro
- 4 B 6106 Piastrina fulcro bestina
- 5 A 4508 Distanziale in metallo 4,8 x 8 x 14
- 6 A 6282 Squadrella grande riscontro cerniera con foro
- 7 A 6295 Squadrella riscontro cerniera
- 8 A 6247 Staffa a 3 viti
- 9 B 7151 Serratura
- 10 A 4320 Linguetta aggancio serratura
- 11 A 6253 Riscontro porta serraggio
- 12 A 6259 Squadrella aggancio automatico
- 13 A 7220 Protezione in lamiera altrale mm. 110 x 130
- 14 A 7401 Lamiera protezione aereazione
- 15 A 7322 Lamiera schermo testata
- 16 A 7207 Pannello parte superiore mm. 600 x 85
- 17 A 7420 Bandella protezione liquid
- 18 A 7399 Staffa supporto schede
- 19 A 4111 Supporto per C.S.
- 20 C 8304 Trasformatore per neon
- 21 CEB 142 Flat Cable a 6 connettori 20 vie femm.
- 22 CEB 141 Flat Cable a 2 connettori 20 vie femm. C.P.U. SOUND
- 23 CEB 006 Flat Cable a 2 connettori 20 vie femm. C.P.U. INTERFACE
- 24 CEB 196 Cablingo alimentazione schede



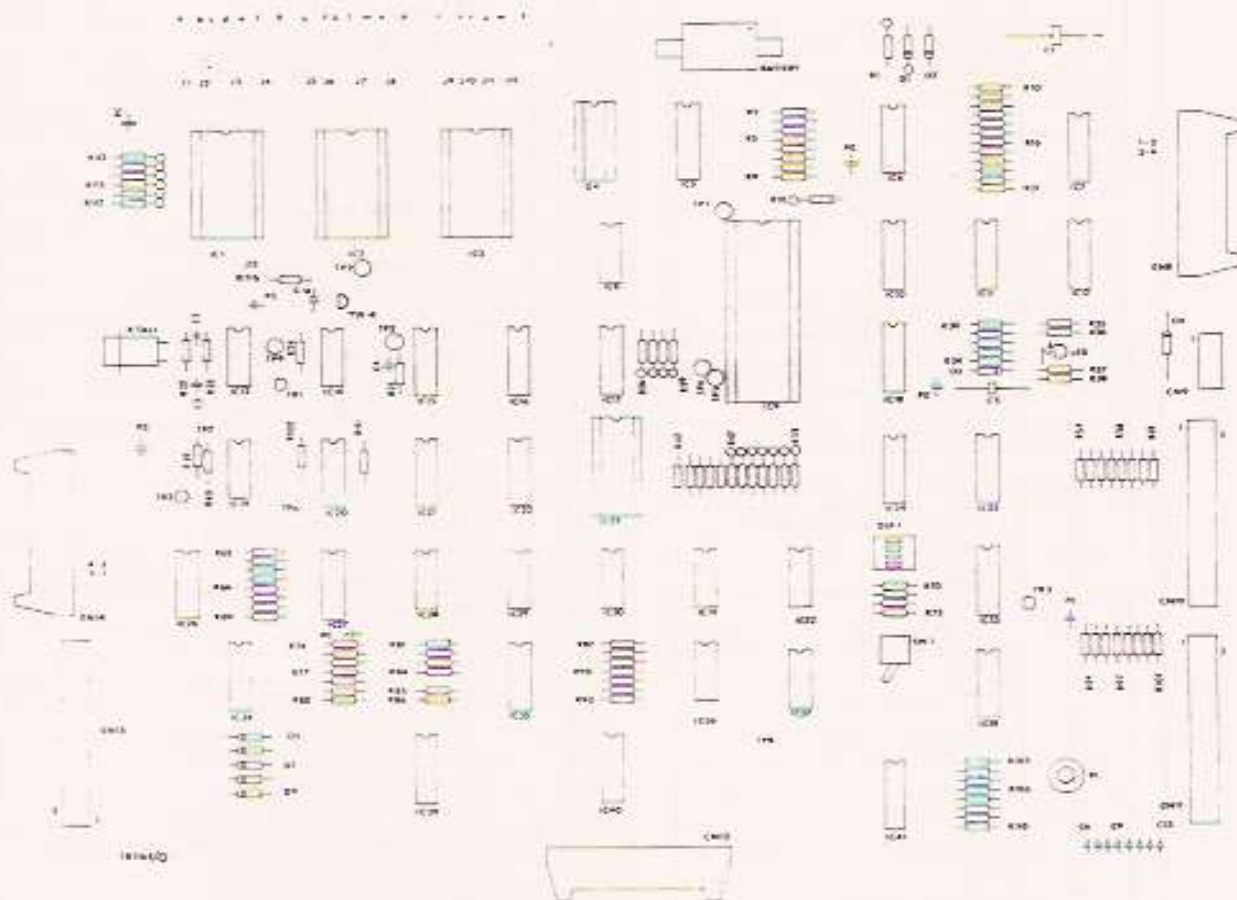
1	MRS 617	Termofornitura serigrafata
2	B 7346	Tubo neon sagomato in vari colori
3	A 4685	Molla ancoraggio neon
4	A 4686	Molla a compressione fissaggio neon
5	A 6251	Coverlaccio chiusura testina
6	MV 096	Disco in vetro semiriflettente mm. 3 x 172
7	B 7341	Colchete forato con staffe ad "U"
8	B 5042	Portalampe piatto
9	B 5043	Portalampe basso
10	B 5041	Portalampe testina
11	MRS 615	Disco a specchio serigrafato mm. 3 x 172
12	A 4675	Staffa a "Z" fissaggio display
13	A 6171	Tettoia protezione display
14	A 6261	Rinforzo a "L" testata superiore
15	A 6252	Rinforzo a "L" testata inferiore
16	B 7137	Staffa supporto display
17	CE 1264	Connettore 20 vie AVG femm. nero
18	CE 1960	Connettore 12 vie AVG femm. giallo
19	CE 1967	Connettore 5 vie AVG femm. grigio
20	CE 1099	Chiusetta di polarizzazione
21	CE 1871	Connettore AMP 5 vie volante
22	CE 1866	Contacto AMP maschio

# ELETTRONICA

**catalogo  
ricambi**



**Ha** CEB 175 C.P.U. BOARD ASSEMBLY WITHOUT MEMERIES  
 CEC 266 C.P.U. BOARD ASSEMBLY WITH MEMERIES

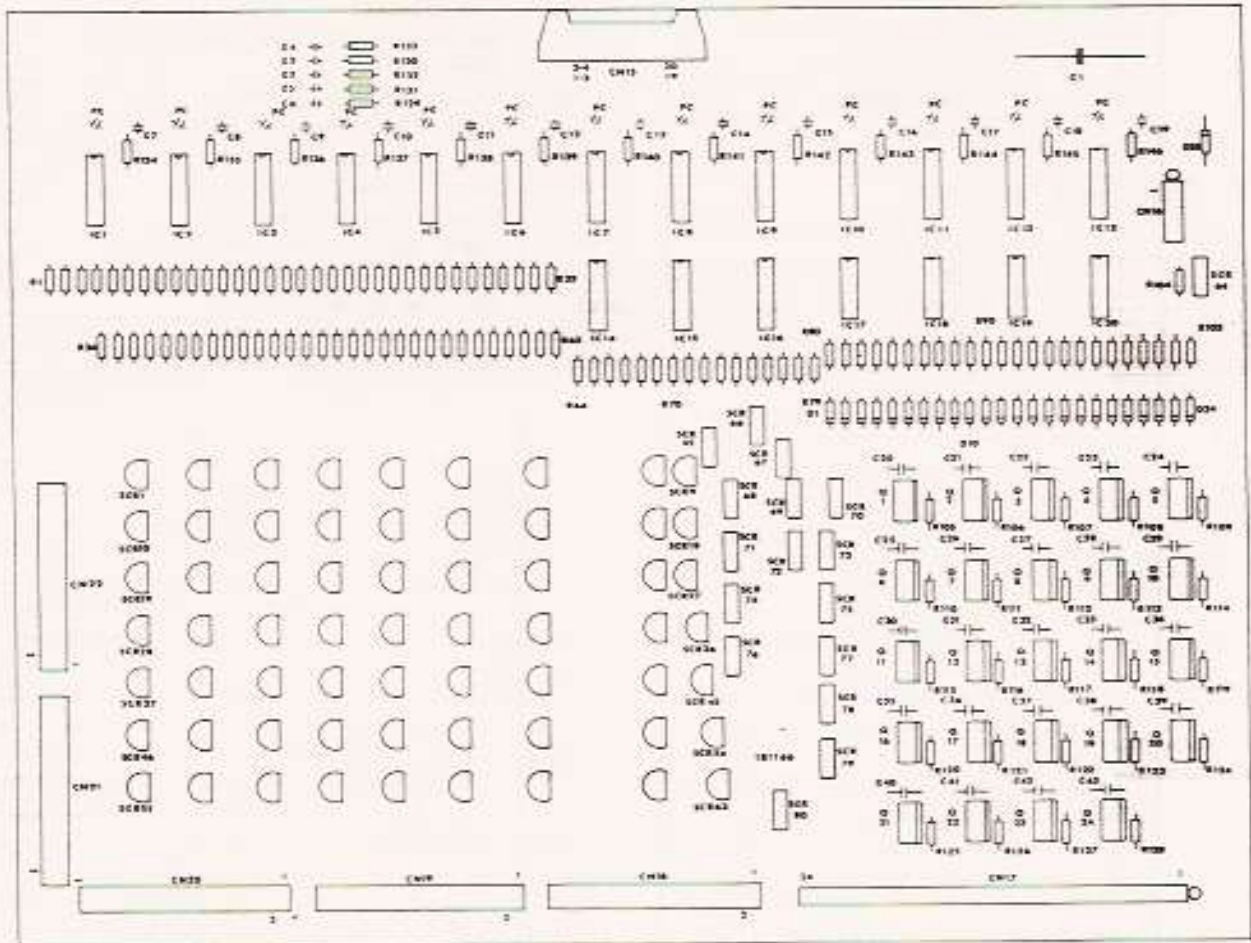


ic1	RE 345	B2532 MOS IC4096 x 8 EPROM (Type Time Machine N. 1)
ic2	RE 346	B2532 MOS IC4096 x 8 EPROM (Type Time Machine N.2)
ic3	RE 347	B2532 MOS IC4096 x 8 EPROM (Type Time Machine N. 3)

ITEM. No	PART DESIGNATION	CODE PART No	DESCRIPTION
1	PC 1B 1165/1	CE 2155	Printed circuit board 1B1165/1
2	CN9	CE 1980	4 pin male conn. MTA 640 383-4
3	CN 10 CN 11	CE 1981	20 pin male conn. MTAS4-828379-D
4	CN6 CN12 CN14	CE 1351	20 flat cable male conn.
5	lc9	CE 1668	2650 - A-1 MOS lc 8 bit M.Proc
6	lc23	CE 1227	2101 AL-4 MOSC lc 256 x 4 RAM
7	lc5	CE 1661	2114 L MOS lc 1K x 4 ram
8	lc4	CE 3004	6414 -9 CMOS lc 1K x 4 ram
9	lc19	CE 1014	4001 BP CMOS lc quad nor gate
10	lc28	CE 1394	4002BP CMOS lc dual 4-in nor gate
11	lc37	CE 1016	4011 BP CMOS lc quad 2-in nand gate
12	lc31	CE 1226	4012BP CMOS lc dual 4-in nand gate
13	lc27 lc35 lc36 lc41	CE 1230	4028BP CMOS lc 10/10 decoder
14	lc6 lc10 lc11 lc33	CE 1231	4042BP CMOS lc quad D latch
15	lc15 lc21	CE 1995	4040BP CMOS lc 12 stage bynary count
16	lc29 lc30	CE 1015	4069BP CMOS lc hey inverter
17	lc32	CE1883	455BP CMOS lc dual 10/4 deco.
18	lc18 lc18 lc24 lc25	CE 1055	40097BP CMOS lc 3 state non inverter buffer
19	lc8	CE1134	74LS00 TTL lc quad 2-in nand gate
20	lc13	CE 1177	74LS 14 TTL lc hey Schmitt trigger
21	lc17	CE 1432	74LS156 TTL lc dual 10/4 decond
22	lc16 lc22	CE 1433	74LS157 TTL lc quad 2-in MPX
23	lc20	CE 1131	74LS171 TTL lc sync. bynary count.
24	lc14	CE 1768	74LS39 TTL lc dual 4 bit bynary count
25	lc7 lc12 lc26 lc34 lc38 lc40	CE 1225	TDA 3881 seven transistor array
26	TR1-TR3	CE 1438	BC548 NPN silicon transistor
27	TR4	CE 1290	BC 337 NPN silicon Transistor
28	D4	CE 1299	1N5400 diode
29	D1 D2 D5 - D9	CE1009	1N4003 diodes
30	D3	CE 1011	1N4148 diode
31	BATT	CE 1396	3.6V 100mA N. cd battery
32	lc9	CE 1245	40 pin lc socket (540 AG11D)
33	lc1 lc2 lc3	CE 1152	24 pin IC socket (524 AG11D)
34	lc4	CE 3080	18 pin IC socket (518 AG11D)
35	C1	CE 1118	100uF 16VL elect. cap. radials leads
36	C5	CE 1100	10uF 16VL tantalum cap. vert lead
37	PC	CE 1005	0,1 uF 50VL ceramic capacitors
38	C4	CE 3095	10Kpf 50VL NPO ceramic. cap.
39	C5-C13	CE 1159	1kpF NPO ceramic cap.
40	C2	CE 1513	470 pF 50VL NPO ceramic cap.
41	C14	CE 1381	220 pF NPO ceramic cap.
42	C3	CE 1906	10pF 50VL NPO ceramic cap.
43	R2-R9-R25-R42-R102 R113 R117	CE 1171	10K 1/4W 5% carbon resistors
44	R10-R21 R24 R35 R39 R40		
	R54-R69 R74-R93 R103 R111	CE 1023	5,6K 1/4 5% carbon resistors
45	R26-R34	CE 1164	2,2K 1/4W 5% carbon resistors
46	R27 R70-R73 R84-R101	CE 1170	1K 1/4W 5% carbon resistors
47	R22 R23	CE 1382	680 1/4W 5% carbon resistor
48	R36	CE 1269	390 1/4W 5% carbon resistor
49	R1	CE 1409	100 1/4W 5% carbon resistor
50	R38	CE 3094	22 1/2W 5% carbon resistor
51	R115	CE 1194	22 K 1/4 W 5% carbon resistor
52	XTAL 1	CE 1743	6MHZ cristal quartz Hc 18/U
53	DIP 1	CE 1356	Dip swirch 4 way
54	LED 1	CE 1542	FLV110 red led
55	lc1 lc2 lc3	CE 1962	B2532 MOS IC 4096 x 8 EPROM

Hb

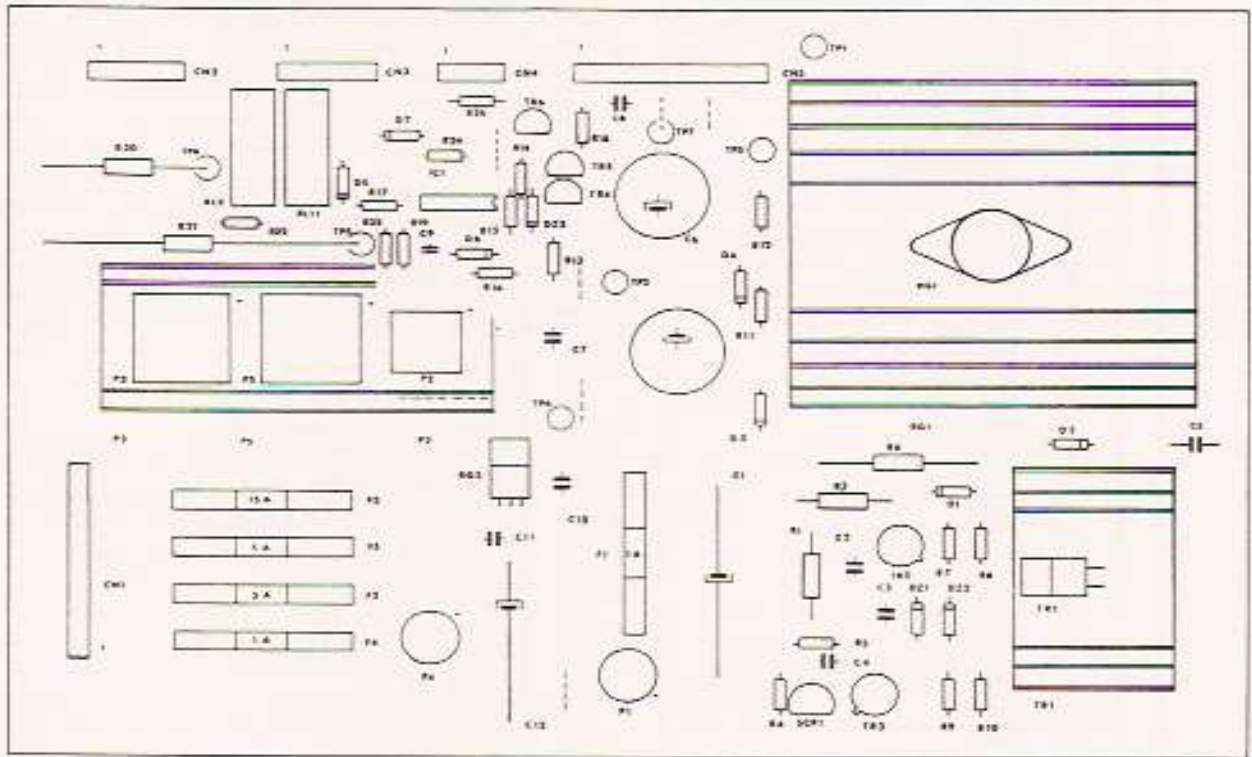
CEC 181 INTERFACE BOARD ASSEMBLY





Hc

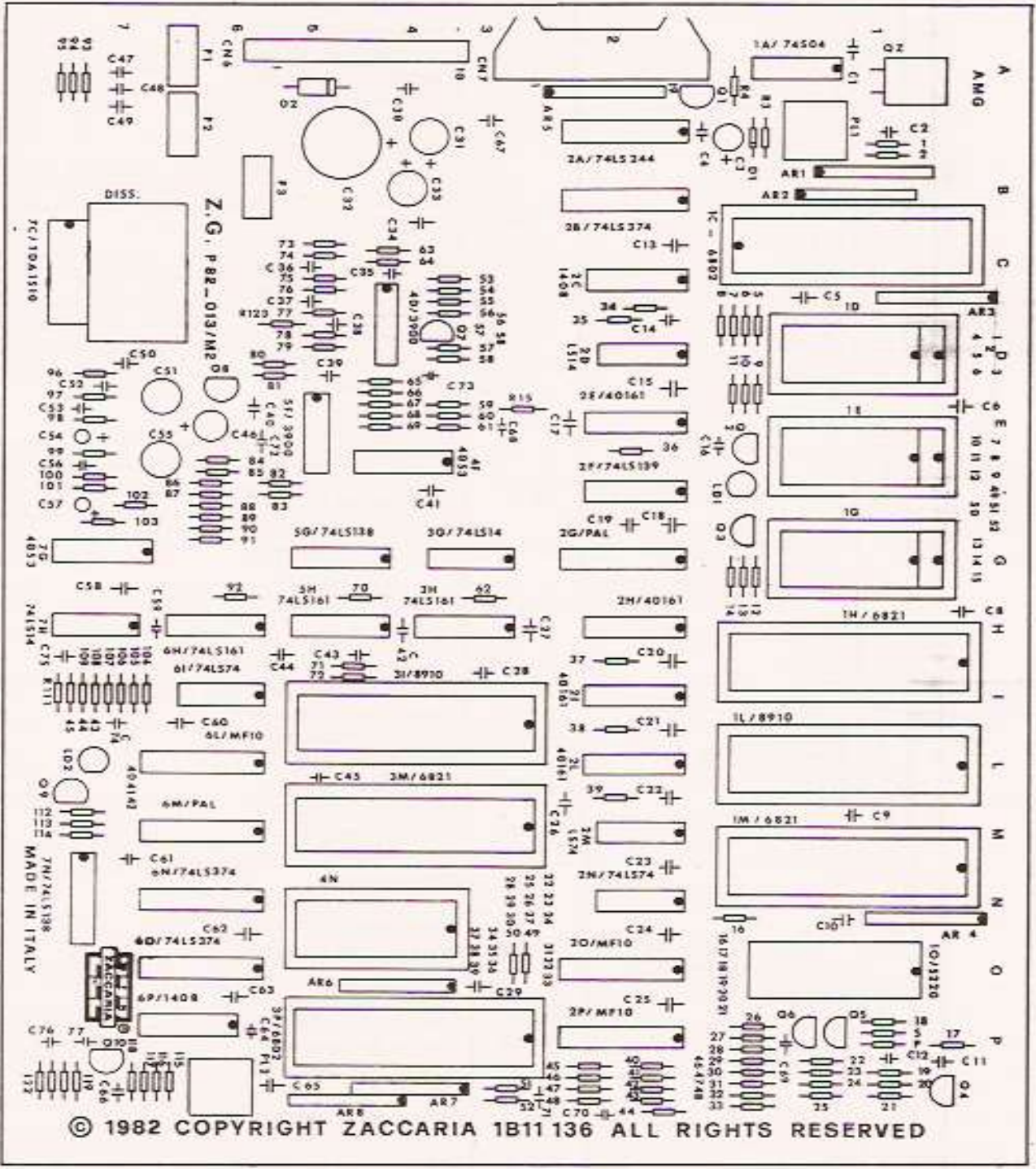
CEC 179 POWER BOARD ASSEMBLY (Vers. X0)



ITEM No	PART DESIGNATION	CODE PART No	DESCRIPTION
1	PC 1B1167/0	CE 2157	Printed circuit 1B1167/0
2	CN1 CN5	CE 1982	12 Pin mate MTA1-640 383-2
3	CN3 CN2	CE 1983	6 Pin male connector MTA1-640 383-6
4	CN 4	CE 1980	4 Pin male connector MTA1-640 383-4
5	RG1	CE 1238	+ 5 5A Voltage regulator 078H05K
6	RG2	CE 1648	-5 1A Voltage regulator 07905VC
7	P1	CE 1274	400V 1A Rectifier Bridge (W04)
8	P5	CE 1105	200V 10A Rectifier Bridge (KBPC 1002)
9	P3	CE 1994	50V 25A Rectifier Bridge (KBPL 25005)
10	P2	CE 1471	50V 8A Rectifier Bridge (KBPL 8005)
11	P4	CE 1233	50V 1A Rectifier Bridge (W005)
12	TR1	CE 1271	2N3585 (2N3584) NPN Transistor
13	TR2-TR3	CE 1272	2N3439 (2N3440) NPN Transistor
14	TR4-TR5	CE 1290	BC 337 NPN Transistor
15	TR6	CE 1290	BC 337 NPN Transistor
16	D1-D2-D3	CE 1009	1N4004 diodes
17	D4-D5-D6-D7	CE 1539	1N4003 diodes
18	D21-D22	CE 1220	75V 0.4W zener diodes (Bz x 79c75)
19	D23	CE 1966	5.6 0.4W zener diodes (Bz x 73c5V6)
20	IC1	CE 1803	LM 339 Linear quad comparator
21	ScR1	CE 3006	2N6564 PN PN SCR
22	C1	CE 1284	100uF 350VL electr cap axial L
23	C2 C3	CE 1399	10kpf 250 VL Polyester cap
24	C4 C8 C11	CE 1005	0.1 uF 50VL ceramic cap
25	C5	CE 1261	0.33uF 250VL polyester cap
26	C6 C6/	CE 1979	10.000uF 16V elec cap axial L
27	C7 C10	CE 1261	0.33 uF 50VL polyester cap
28	C9	CE 1903	1uF 16V elec. cap. vert.
29	C12	CE 1026	1.000uF 25VL elec cap axial L
30	R1	CE 1282	100K 1W 5% C.R.
31	R3	CE 3072	22K 4W 5% ceramic resistor
32	R4	CE 1305	100 1/2W 5% C.R.
33	R5	CE 3038	2.2 1/4W 5% C.R.
34	R6 R20	CE 1659	47 3W 5% ceramic resistor
35	R7 R11 R14 R15 R16 R18 R23 R24	CE 1170	1K 1/4W 5% C.R.
36	R8 R19	CE 1171	10K 1/4W 5% C.R.
37	R9	CE 1185	4.7K 1/4W 5% C.R.
38	R10	CE 1187	100K 1/4W 5% C.R.
39	R12	CE 1289	100 1/4 W 5% C.R.
40	R13 R22	CE 1267	1.5K 1/4W 5% C.R.
41	R 17	CE 1163	470 1/4W 5% C.R.
42	R.21	CE 1263	68010W 5% ceramic resistor
43	F1 - F5	CE 1401	Clips for P.C.B. for 6 x 30 fuse
44	F1 F4	CE 1368	Fuse 6.3 x 32 1A
45	F2 F5	CE 1439	Fuse 6.3 x 32 5A
46	F3	CE 1441	Fuse 6.3 x 32 20A
47	RG1	CE 1275	Heat sink 41/100/B
48	TR1	CE 1275	Heat sink 17/40/C
49	P2 P3 P5	CE 1110	Heat sink 19/100/D
50	TR3	CE 1280	HL61 TO5
51	RL1 RL2	CEC 155	Relay V 23027 B13 A101

**Hd** CEB 197 SOUND & SPEECH BOARD ASSEMBLY WITHOUT MEMORIES

CEC 264 SOUND & SPEECH BOARD ASSEMBLY WITH MEMORIES «ITALIANO»  
CEC 265 SOUND & SPEECH BOARD ASSEMBLY WITH MEMORIES «FRANCESE»  
CEC 266 SOUND & SPEECH BOARD ASSEMBLY WITH MEMORIES «INGLESE»  
CEC 267 SOUND & SPEECH BOARD ASSEMBLY WITH MEMORIES «TEDESCO»



ITEM No	PART DESIGNATION	CODE PART No	DESCRIPTION
1	P.C 1B11 136	CE 2242	Printed circuit PB2-013/M2
2	CN6	CE 3069	Male connector 1-640383-0
3	CN7	CE 1351	Male connector 20PIN 90° F.C.
4	IC1A	CE 1647	Integrated circuit 74SD4
5	IC1C	CE 1714	Integrated circuit 6802P
6	IC1D-1E-1G		Integrated circuit see note 1
7	IC1H-1M	CE 1715	Integrated circuit 6821P
8	IC 1L	CE 1844	Integrated circuit AY 3-8010
9	IC10	CE 1998	Integrated circuit TMS 5200NL Speech
10	IC2A	CE 1569	Integrated circuit 74LS244
11	IC 2B	CE 1843	Integrated circuit 74LS374
12	IC 2C	CE 1730	Integrated circuit MC 1408LB (8N)
13	IC2D-3G	CE 1177	Integrated circuit 74LS14
14	IC2E-2H-2I-2L	CE 1131	Integrated circuit MC 74LS161
15	IC2F	CE 1670	Integrated circuit 74LS139
16	IC2G	CE 3297	Pal 14L4 or 14H4-or 16LB
17	IC2M-2N	CE 1141	Integrated circuit 74LS74
18	IC2O	CE 3296	Integrated circuit MF10CN
19	IC4D-5F	CE 1148	Integrated circuit LM3900N
20	IC4F	CE 1435	Integrated circuit 4053B
21	IC5G	CE 1144	Integrated circuit 74LS138
22	IC7C	CE 3045	Integrated circuit TDA1510
23	R1-2-12-85	CE 1448	Carbon Resistor 470 1/4W
24	R3	CE 1408	Carbon Resistor 27K 1/4W
25	R4-37 - 39	CE 1165	Carbon Resistor 4K7 1/4W
26	R5 - 11-14-34	CE 1024	Carbon Resistor 3K3 1/4W
27	R13	CE 1576	Carbon Resistor 8K2 1/4W
28	R23-29-36-43-48-56-59 - 61-93-94-81	CE 1171	Carbon Resistor 10K 1/4W
29	R18-53-55-66-67-80-82-83-98 - 100-102-103	CE 1167	Carbon Resistor 100K 1/4W
30	R17-19-20 - 22-24-25-58-69-73-101-15	CE 1164	Carbon Resistor 2K2 1/4W
31	R26 - 28-40 - 42-45 - 47	CE 1251	Carbon Resistor 33K 1/4W
32	R16-33-44	CE 1417	Carbon Resistor 3K9 1/4W
33	R35	CE 1214	Carbon Resistor 3M3 1/4W
34	R54 64	CE 1196	Carbon Resistor 470K 1/4W
35	R57	CE 1194	Carbon Resistor 22K 1/4W
36	R63-65-75 - 76-R123	CE 1034	Carbon Resistor 820K 1/4W
37	R66	CE 1193	Carbon Resistor 47K 1/4W
38	R74	CE 1252	Carbon Resistor 220K 1/4W
39	R79	CE 1056	Carbon Resistor 1M8 1/4W
40	R96-99	CE 1306	Carbon Resistor 4,7
41	R97	CE 1392	Carbon Resistor 680
42	ICR1 - 4	CE 1936	Resistor networks LO9-1R-10K
43	ICR5	CE 3031	Resistor networks LO9-1R-4K7
44	C1 4 - 11-13-15-18-20 - 25-30-34-35-40-41-47-48-50-52-56-67	CE 1005	Capacitor 0,1 uF disc ceramic
45	C2-17-19-26	CE 1159	Capacitor 1000 pF disc Ceramic
46	C3-54	CE 1375	Capacitor 4,7 uF Elect. Vert.
47	C12	CE 1298	Capacitor 22pF disc Ceramic
48	C14-C37-C38-C39	CE 1721	Capacitor 47pF disc Ceramic
49	C16	CE 1029	Capacitor 10.000 pF disc Ceramic
50	C31-C33-C51-C55	CE 1118	Capacitor 100 uF elect. vert. 16V
51	C32	CE 1580	Capacitor 1000 uF elect. vert. 16V
52	C36	CE 1513	Capacitor 470 pF disc ceramic
53	C46	CE 1610	Capacitor 47 uF electr. vert. 16V



ITEM No	PART DESIGNATION	CODE PART No	DESCRIPTION
54	C53	CE 1473	Capacitor 330 pF disc ceramic
55	C57-C68 + C73	CE 1541	Capacitor 0,22 uF Tantalum
56	P2-P3	CE 1598	Trimmer 10K
57	Q1-Q7-Q8	CE 1438	Transistor BC 548
58	Q2	CE 1732	Transistor 2N4401
59	Q3-Q4	CE 1894	Transistor 2N3904
60	Q5-Q8	CE 1814	Transistor BC327
61	D1	CE 1011	Diode 1N4148
62	D2	CE 1299	Diode 1N5402/1
63	QZ1	CE 3066	Crystall oscillator 3,579 Mhz
64	PS1	CE 1277	Push button N.O.
65	LE1	CE 1542	Leed FLV 110
67	HS1	CE 3100	Heat Sink for TDA 1510 ML9/30
68	20-2P	CE 3305	20 Pin Socket for I.C.
69	1D-1E-1G-10	CE 3236	28 Pin Socket for I.C.
70	1C-1H-1L-1M	CE 1245	40 Pin Socket for I.C.
71		A 5299	Vite 3MA x 8 TC
72		A 4023	Vite 3MA x 12 TC
73		A 4132	Dado 3MA
74		A 4161	Rondella dentellata 3MA

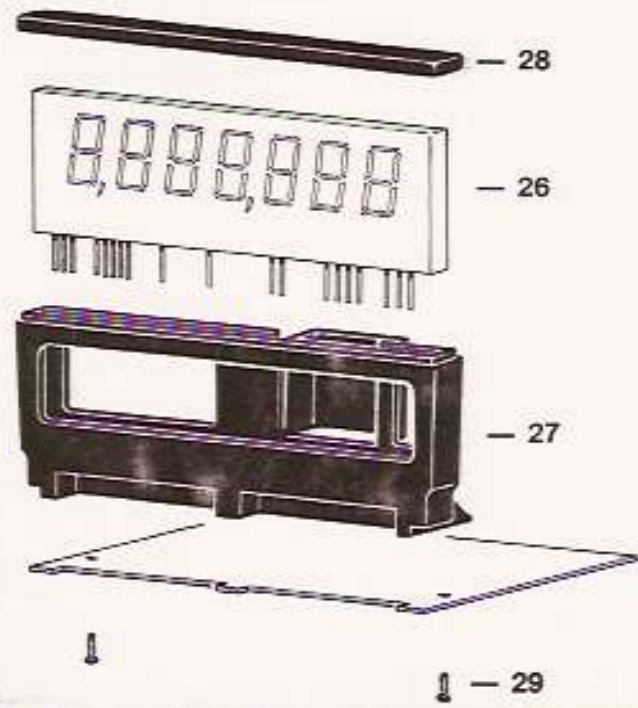
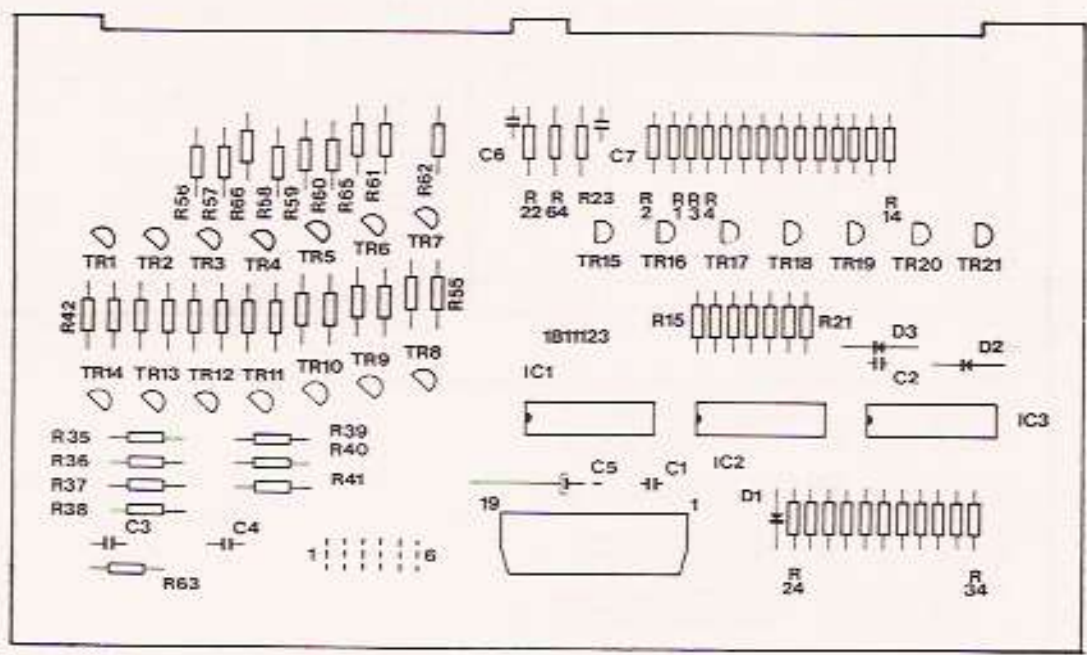
Note 1: Of above integrated circuits, only ics for game sounds are assembled.

1D RE 348 B 2764 M05 IC 8192 x 8 EPROM (Type Italiano n. 1)  
 1E RE 349 B 2532 M05 IC 4096 x 8 EPROM (Type Italiano n. 2)  
 1G RE 350 B 2764 M05 IC 8192 x 8 EPROM (Type Italiano n. 3)  
 1D RE 351 B 2764 M05 IC 8192 x 8 EPROM (Type Inglese n. 1)  
 1E RE 352 B 2532 M05 IC 4096 x 8 EPROM (Type Inglese n. 2)  
 1G RE 353 B 2764 M05 IC 8192 x 8 EPROM (Type Inglese n. 3)  
 1D RE 354 B 2764 M05 IC 8192 x 8 EPROM (Type Tedesco n. 1)  
 1E RE 355 B 2532 M05 IC 4096 x 8 EPROM (Type Tedesco n. 2)  
 1G RE 356 B 2764 M05 IC 8192 x 8 EPROM (Type Tedesco n. 3)  
 1D RE 357 B 2764 M05 IC 8192 x 8 EPROM (Type Francese n. 1)  
 1E RE 358 B 2532 M05 IC 4096 x 8 EPROM (Type Francese n. 2)  
 1G RE 359 B 2764 M05 IC 8192 x 8 EPROM (Type Francese n. 3)

TAV. XX

KA

CEC 247 DISPLAY BOARD ASSEMBLY 7 DIGIT



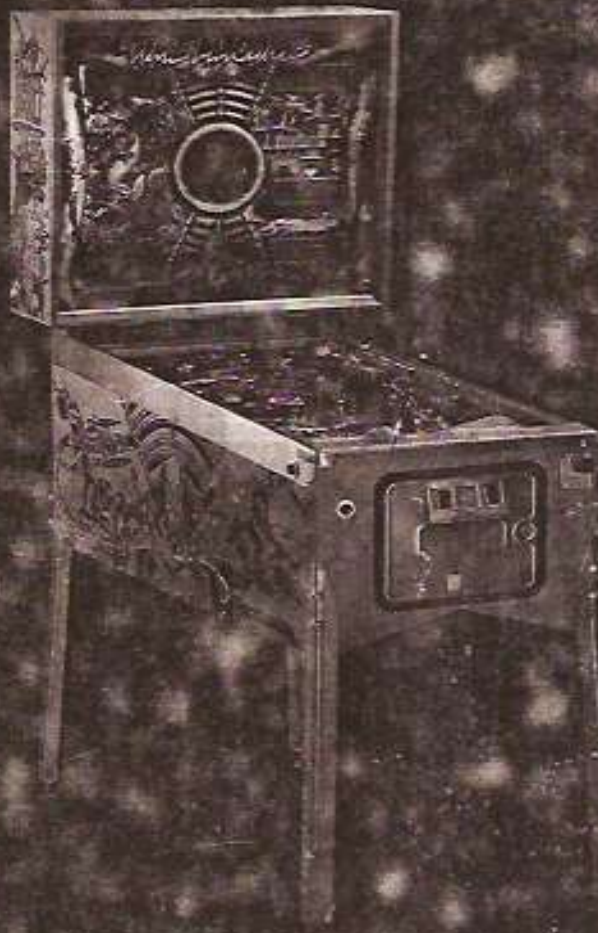


# F.III ZACCARIA

S.p.A.  
di Zaccaria Marino - Franco - Natale

## COSTRUZIONE GIOCHI D'ATTRAZIONE

Via Amarelli, 15 - 40012 CALDERARA DI RENO (Bo) Italy  
Telefono (051) 72.23.81/82 - 72.21.97 - 72.24.05  
con ricerca automatica - Telex 213883 ZACC I



11-01  
12-01  
13-01  
14-01  
15-01  
16-08

TIME MACHINE