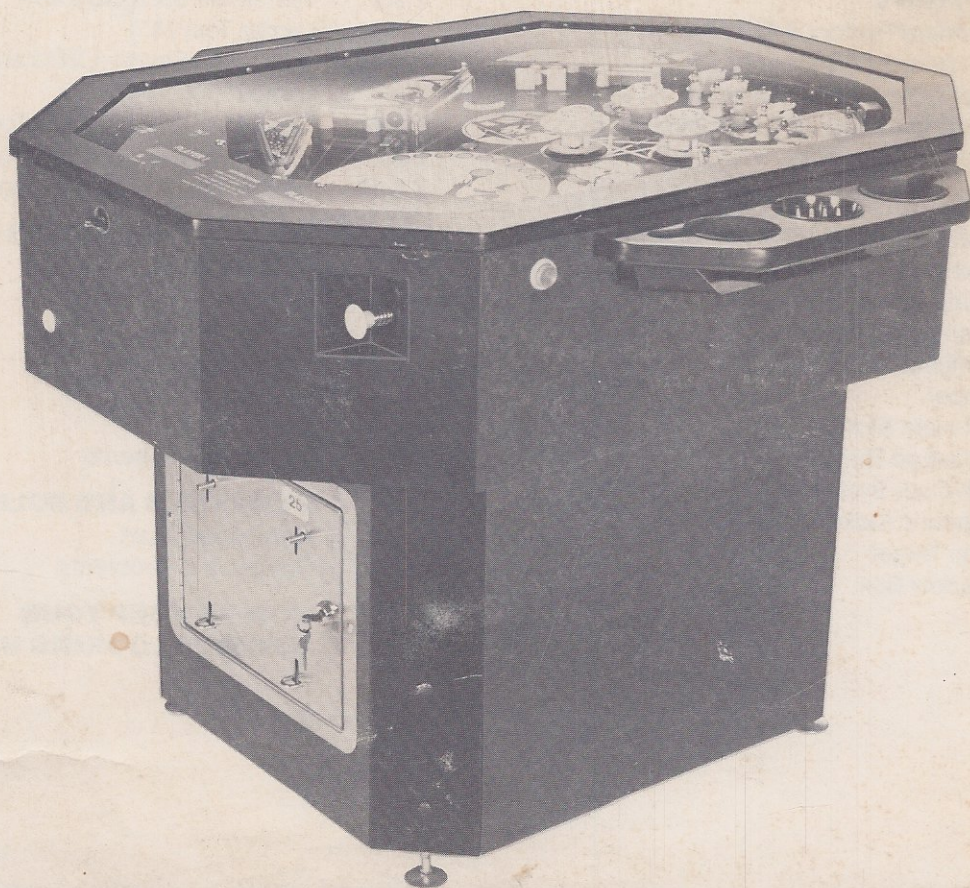


PINBALL COCKTAIL TABLE GAME



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INTRODUCTION 1.0

1.0 INTRODUCTION

The pinball game described in this manual was designed with the benefit of the latest technology whereby many potential service problems have been eliminated.

Additionally the game is equipped with a self-diagnostic system which aids in easy isolation of problems when they do occur. As with all mechanical assemblies, it will be necessary from time to time to replace worn-out parts.

This manual contains a complete listing of parts. When placing an order, please BE SURE to include exact and complete parts numbers, description and name of the game (and the serial number of the machine).

FROM TIME TO TIME CHANGES AND/OR IMPROVEMENTS REFLECTING ADVANCES IN TECHNOLOGY MAY BE MADE IN CURRENT PRODUCTION MODELS. INSERT SHEETS REFLECTING THESE CHANGES WILL BE AVAILABLE UPON REQUEST.

1.1

1.1 WARNINGS

1.1.1 Machine should be plugged ONLY into a grounded outlet.

1.1.2 The power cord has a ground pin to prevent electrical shock. DO NOT DEFEAT ITS PURPOSE by removing that pin! (See illustration No. 1-I, paragraph 1.4.)

1.1.3 If you must use an extension cord to plug the game into a suitable electrical outlet, the plug MUST HAVE WITHOUT EXCEPTION three (3) prongs, and the cord itself must be MEDIUM to HEAVY GAUGE! (14 to 16 gauge).

Thin-wired "household" extensions are not adequate because they usually are not grounded (3-prong). This could affect the game by not being able to handle the amount of power required by the power supply.

1.1.4 Additionally, improper grounding may affect the operation of the game.

1.1.5 It is imperative that everyone servicing this machine must remember and practice at all times certain safety requirements:

Do NOT work on this machine while wearing wet shoes or wet clothing, bulky rings or necklaces...and if your skin is wet or moist, do NOT touch this machine.

ONLY when the above personal conditions have been completely corrected, then you may safely proceed with the servicing of the machine.

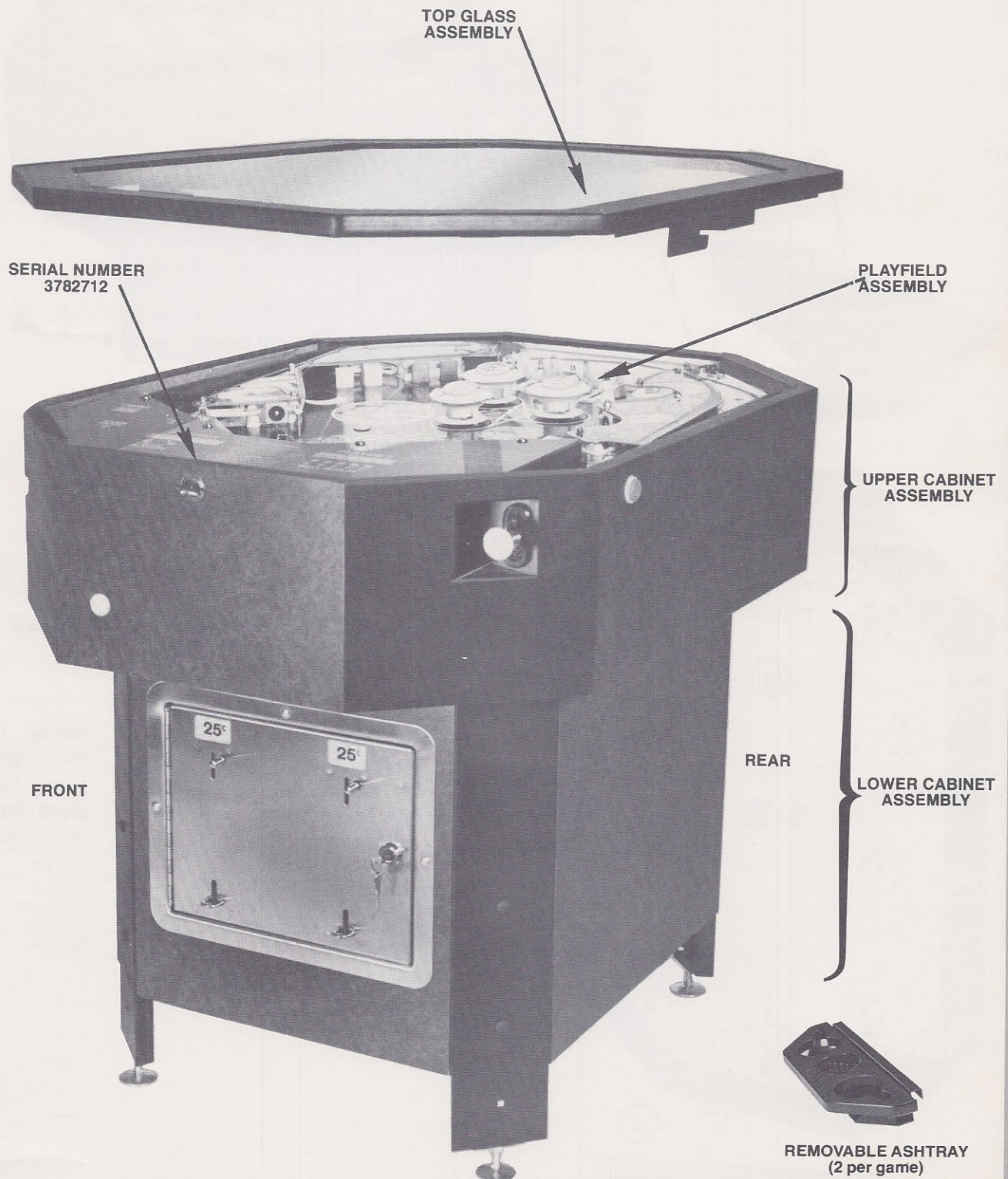
1.2 TOOLS PACKAGE

- 1 – Longnose pliers
- 1 – Wire stripper
- 1 – 5/16" nut driver
- 1 – 3/16" nut driver
- 1 – Phillips screwdriver No. 1 tip
- 1 – Phillips screwdriver No. 2 tip
- 1 – Switch contact adjuster
- 1 – Volt/Ohm/Meter
- 1 – Soldering iron (25-watt)

1.3 SET-UP PROCEDURES – COCKTAIL TABLE

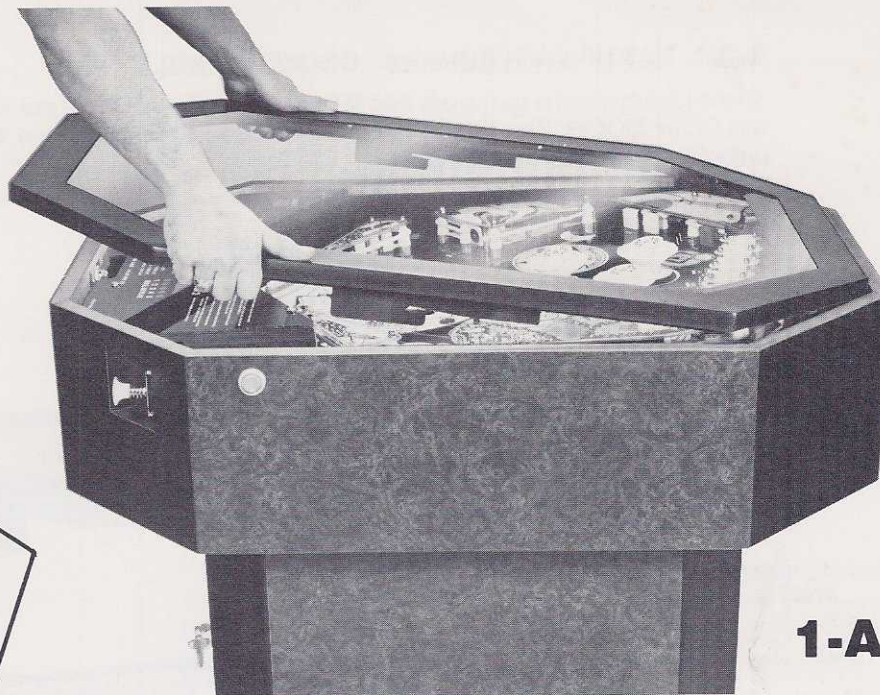
1.3

Three (3) keys to the game are tied to the plunger. Two of them are identical and fit the lock on the COIN DOOR. The third key fits the lock on the front of the UPPER CABINET which unlocks the top glass assembly.



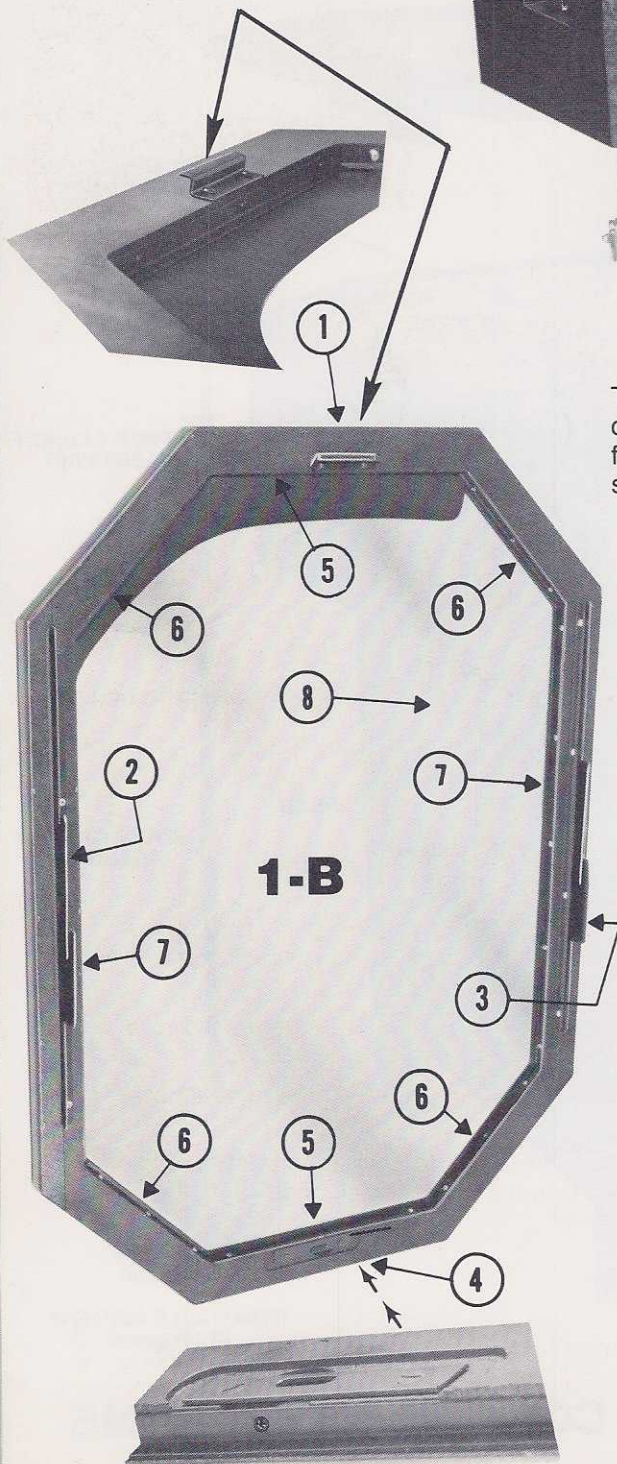
MAJOR ASSEMBLIES OF THE COCKTAIL TABLE GAME

1.3



1-A

To remove the top glass assembly, insert key No. 3 and turn clockwise. Lift slightly the front of the top glass and slide forward, making sure that the top glass frame does not slam against the lock tongue (see illustration No. 1-A).



1-B

TOP GLASS COMPLETE ASSEMBLY

Assembly No. 307-1-14

LOCATION	DESCRIPTION	PART No.
1	Top Hold Tongue	324-03-0800
2	Left Top Slide Lock	324-03-1100
3	Right Top Slide Lock	324-03-1000
4	Top Lock Latch	324-03-1200
5	Glass Support End	307-3-6
6	Glass Support Corners	307-3-7
7	Glass Support Side	307-3-5
8	Tempered Glass	307-8-4

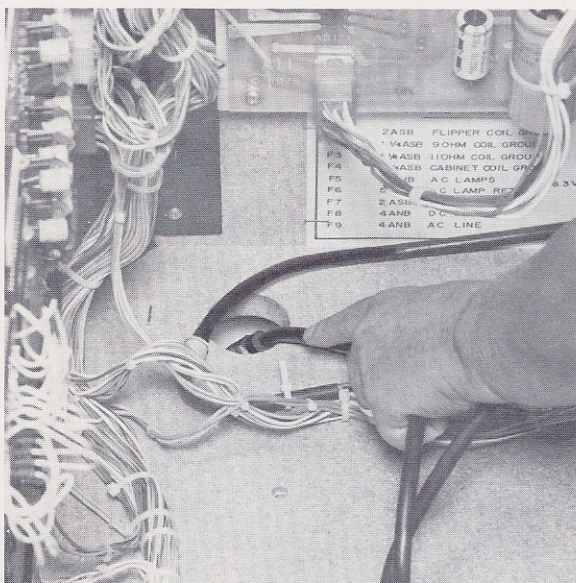
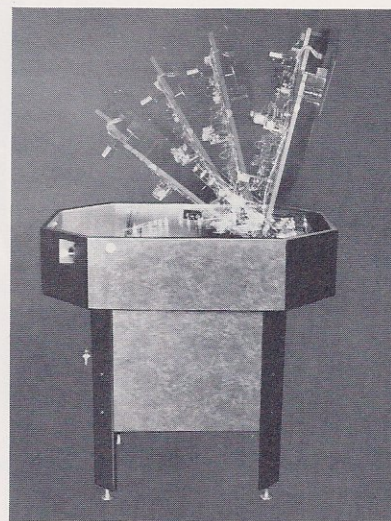
1.4 WHAT TO DO BEFORE APPLYING POWER

1.4

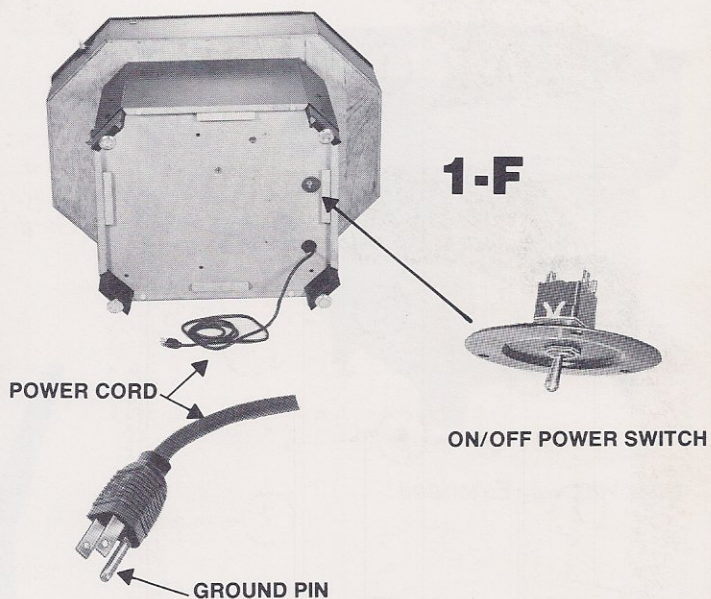
1-C



1-D



1-E



To open the PLAYFIELD, place both hands palms-up underneath the SHADOW BOX at the FRONT of the game, and lift UPWARD (see illustration No. 1-C) until it locks in the bracket at the back of the UPPER CABINET (see illustration No. 1-D).

The power cord is tied to the CASH BOX inside the machine. Cut the tie, and pass the cord through the hole at the bottom left of the LOWER CABINET (see illustration No. 1-E).

NOTE: The ON/OFF switch is located at the back of the lower cabinet underneath the power supply (see illustration No. 1-F).

BEFORE plugging the line cord into the electrical outlet, the following items should be visually checked for possible minor troubles caused by handling during shipment:

- (1) Fuses should be firm and make good contact.
- (2) All connectors should be completely seated.
- (3) Wires should be clear of all moving parts.
- (4) No wires or foreign objects of any kind should be hanging or lying loose inside the game.

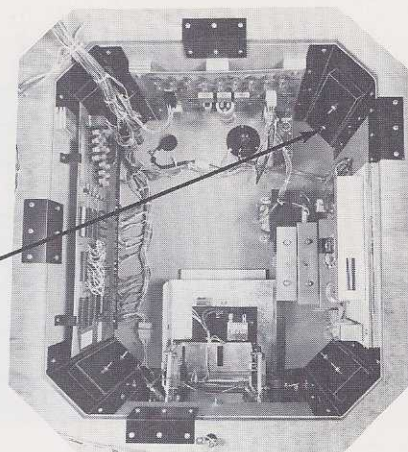
1.4 WHAT TO DO BEFORE APPLYING POWER (continued)



1-G

Legs Fully Retracted (Factory Standard)

Remove two (2)
nuts per leg.

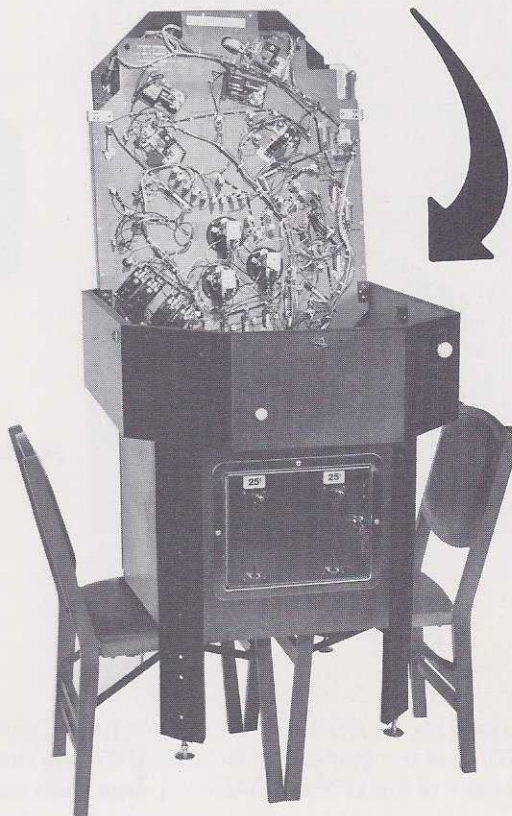


1-J



1-H

Legs Half-way Extended



1-K



1-I

Legs Fully Extended

The factory adjustment is shown in illustration No. 1-G. However, if desired, the legs can be extended to either of the positions shown in the illustrations No. 1-H and No. 1-I.

To adjust:

(1) Elevate the game to a height of at least 12", see illustration No. 1-K. (In this case we have used two chairs.)

(2) Remove the nuts from the inside of the cabinet, see illustration No. 1-J.

(3) Remove the bolts, adjust the legs to the desired position and re-insert bolts and nuts.

1.5 PARTS PACKAGE

1.5

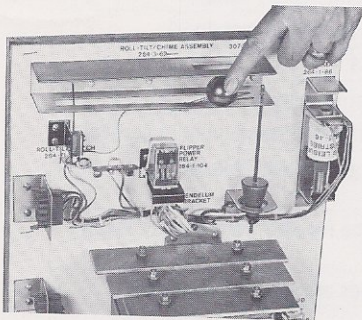
Two (2) balls and one set of four (4) leg levellers with nuts are located inside the CASH BOX. One ball should be placed inside the ROLL-TILT bracket as indicated (see illustration No. 1-L). The second ball should be put into the OUT-HOLE KICKER (see illustration No. 1-M).

The four nuts should be screwed onto the respective leg levellers, and then the levellers inserted into the threaded holes beneath the cabinet (see illustration No. 1-N), and adjusted so that the game stands steady.

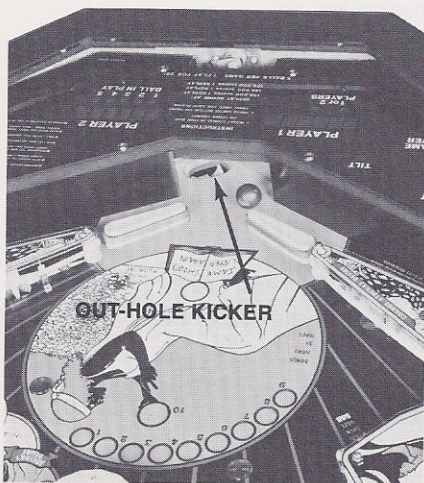
The normal position is when the game stands level. However, it should be noted that

- (1) Raising rear legs will increase ball speed and will decrease scores.
- (2) Lowering rear legs will decrease ball speed and will increase scores.

NOTE: Be sure to adjust ROLL and PENDULUM TILTS after raising the rear legs.

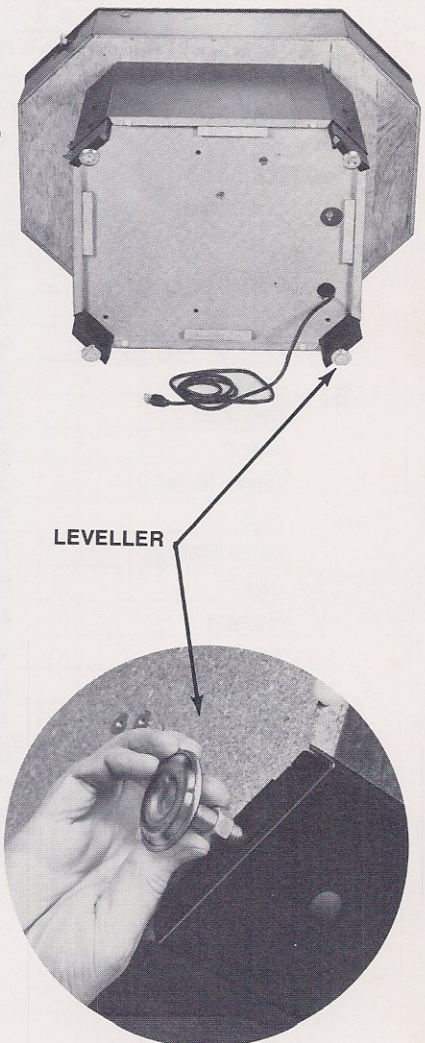


1-L



1-M

1-N



1.6 TERMS AND DEFINITIONS

Activate	Energize.
Add-A-Ball	An extra ball may be awarded on special scores depending on how machine is set.
Background Lamps	Lights on playfield with no special function.
Ball in Play	Ball is currently operating on playfield.
Bonus	Extra points accumulated during play & added to player's score at end of ball.
Bonus Light	Reflects special scoring in process.
Bull's-eye Target	A scoring device mounted on a switch attached to playfield.
Burnishing Tool	A low-abrasive strip of fiberboard coated with grit. Used to clean contact points.
Chime	Audio mechanism. . . refer to paragraph 6.4 illustration No. 6-E.
Circuit	A closed network of conductors through which electric current can flow.
Coil	Many turns of insulated wire wound on a spool.
Coining	Placing suitable coin in the Coin Slot to result in GAME READY status.
Coin Return Slot	When coin is rejected, you may recover it from this location (front door).
Collect Value Target	Special scoring may be won. Refer to paragraph 3.4.1.
Counter	Located in Lower Cabinet. . . registers number of games played.
Contact	An attachment to a switch blade which provides a low resistance point of contact.
Credit	There are several credit options. Credit can mean "games available for play." Refer to paragraph 2.2.
Credit Button	Press this button on front of game to transfer a game for play from Credit Display (once for each player).
Credit Display	This display on shadow box shows how many games are available for play.
Credit Switch	Attached to credit button. . . enables game to start.
Double Bonus	BONUS times two (2).
Drop Target	A scoring device on playfield.
Energize	To activate or to grant power.
Entrance Gate	A one-way device that allows the ball to enter the playfield.
Exit Alley	The passageway on the left & right sides of playfield by which ball leaves playfield.
Flag Gate	A non-scoring device on the playfield which controls the route of the ball.
Flipper	Bat-type lever on lower playfield. . . used to manipulate ball.
Flipper Button	Control on flipper arm. . . located on each side of upper cabinet (left/right).
Fuse	A protective device that opens a circuit whenever there is excessive flow of current.
Game Kicker	This assembly makes sound when credit is added to credit display.
Gap	Space between set of contact points.
Harness	A group of color-coded wires which connect various electronic components.
Insulator	Material that does not conduct electrical current.
Jumper	A wire used to connect two or more points.
LED	A semi-conductor emitting a non-incandescent light (light emitting diode).
Lower Cabinet	Contains cash box & coin counter, computer logic board & these assemblies: roll-tilt, power supply, chime and coin door.
Main Computer Board	Printed circuit board in lower cabinet. . . controls electronics.
Out-Hole	Hole at bottom of playfield from which ball is kicked into shooter alley.

1.6 TERMS AND DEFINITIONS

Out-Hole Kicker	Solenoid-operated device used to propel the ball into Shooter Alley.
P. C. Board	Printed circuit board.
Pitted Contacts	Severely damaged contacts (see "Contacts").
Playfield	Playing area of game.
Plunger	Spring-loaded mechanism that propels ball up Shooter Alley onto playfield.
Power Up	Application of electrical power to machine.
Rebound Kicker	Reverses the ball's direction of travel.
Rejector	Refuses to accept coins when they are not correct.
Replay	Special option available under certain conditions. Refer to paragraphs 3.0 and 3.1.
Re-Set	Trouble-shooting may be involved. Please refer to paragraph 8.1.
Roll-Over Button	A spring-loaded device which scores when the ball passes over.
Roll-Over Switch	Bent wire protruding slightly above the playfield surface/has scoring function.
Roll-Tilt	A tilt device to prevent abuse in an effort to prolong the game.
Same Player Shoots Again	The person who is playing will have the opportunity to shoot an extra ball after the ball in play.
Schematic	Drawing showing wiring of components by means of a shorthand system of symbols and lines.
Score Display	Printed circuit boards that display points scored.
Score Glass	Plexiglass panel covering score units.
Self-Diagnostic	Identifying the problem from its own symptoms.
Self-Test	A procedure used to identify problems. See "self-diagnostic."
Shadow Box	An assembly on which are mounted the CREDIT and SCORE displays and also the "Game Over" and "Tilt" lamps.
Shooter Alley	Plunger propels ball upward in this area to accomplish entrance onto playfield.
Slam Switch	When the game is jarred or bumped, this switch ends game immediately.
Sleeve	A replaceable liner inside a solenoid.
Sling Shot	See "Rebound Kicker."
Solenoid	See "Coil."
"Special When Lit" Light	Shows possible Replay/Add-A-Ball status.
Squirrel Cage	Fan Blade.
Star Roll-Over Button	A star-shaped roll-over button.
Sunflower Cap	Thumper bumper cover . . . marked on top to indicate points scored when hit.
Thumper Bumper	Scoring feature on the Playfield which adds action to the ball.
Tilt	Self-protective device built into game to discourage abuse of machine.
Transformer	Electrical component used primarily to adjust voltage ratios up or down.
Triple Bonus	BONUS times three (3).
Upper Cabinet	Contains plunger assembly, flipper activator switch assembly, credit switch assembly and playfield assembly.
Wafer	A thin plastic disc at base of thumper bumper. When bumped by ball, it activates the switch.

2.0 GENERAL GAME OPERATION

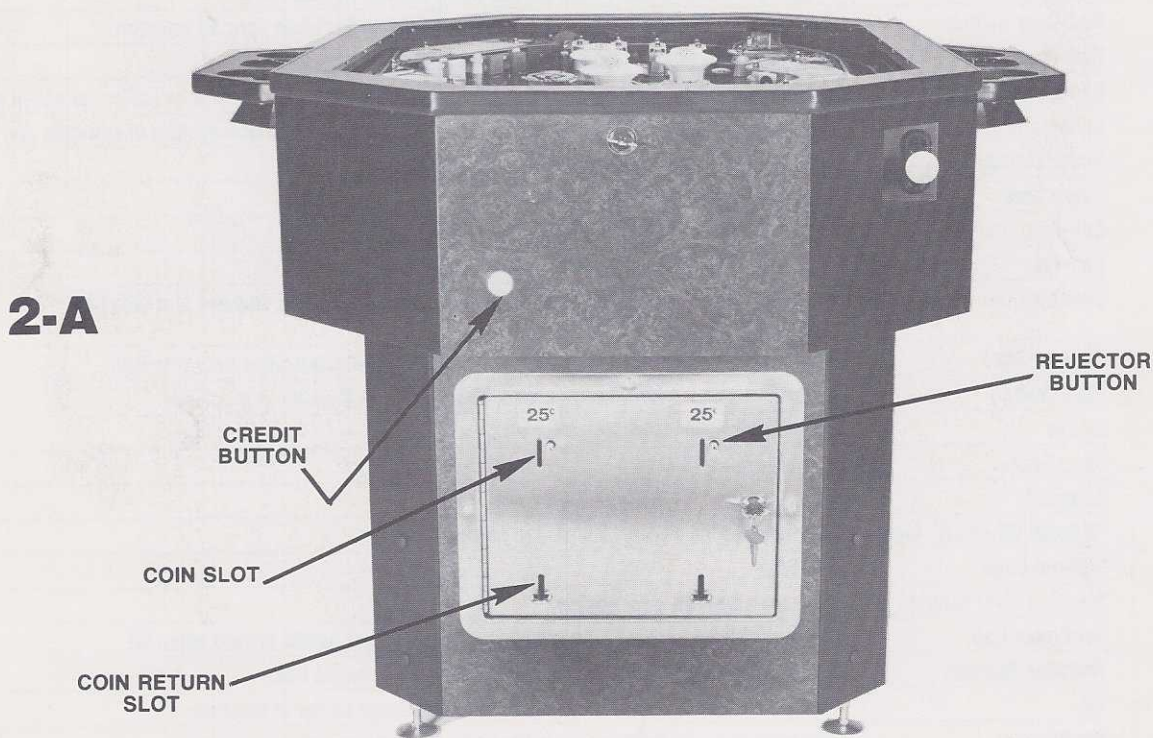
2.1 COINING THE GAME (Coin Insertion)

Coin enters the game through the COIN ACCEPTANCE slot located in the COIN DOOR (see illustration No. 2-A). When a coin is accepted, the TOTAL PLAY COUNTER advances, and there is a "knocking" sound caused by the GAME KNOCKER, indicating that the game has recognized the coin.

The CREDIT DISPLAY advances one if the game is adjusted for "one coin – one credit." If the coin is not accepted, it is returned when the REJECTOR button is pressed, and it may be picked up from the "Coin Return Slot." Additional coins will advance credit one at a time.

Pressing the CREDIT button on the FRONT of the cabinet will cause the OUT-HOLE KICKER (see illustration No. 1-J) to serve the ball to the SHOOTER ALLEY (see illustration No. 2-B).

A credit is subtracted from the CREDIT DISPLAY for each time the CREDIT button is pressed.



FRONT OF GAME

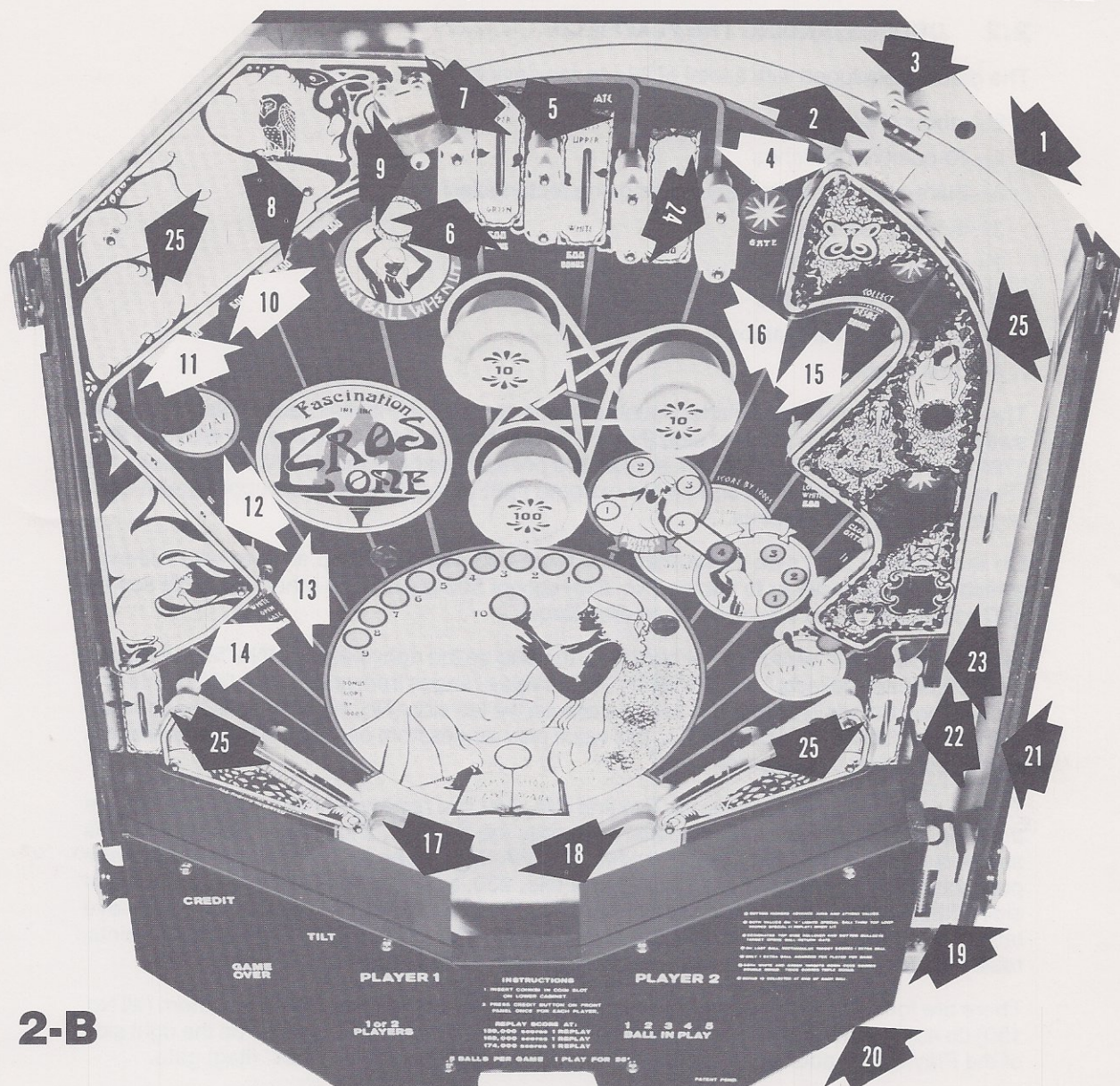
The first "BALL IN PLAY" LED is lit. The GAME OVER lamp goes OFF, and the first player's score flashes. This indicates that the game is ready for play.

Shooting the ball initiates PLAY by closing the GAME START ROLL-OVER switch in the middle of the SHOOTER ALLEY.

PLAYFIELD

ASSEMBLY No. 324-06-1000

2.2



2-B

DESCRIPTION OF PARTS IN PLAYFIELD

(Illustration #2-B)

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	Eros One playfield	324-06-1000	14	Rubber ring 1 1/4"	264-8-30
2	Top ball guide	307-8-3	15	Rubber ring 2 1/2"	264-8-31
3	Rebound assembly gate	292-1-6	16	Rubber ring 2"	235-8-104
4	Star button insert	315-8-6	17	Ball drain rails L.H.	307-04-0810
5	Playfield bumper post	264-5-26	18	Ball drain rails R.H.	307-04-0710
6	1 1/2" Double flange guide rail	264-8-2024	19	Ball plunger cover	307-6-4
7	Rebound bumper assembly	264-1-17	20	Score glass	324-6-0700
8	No. 6-32 x 5/16" cap nut	10140010	21	Ball side rail No. 1	307-04-0310
9	Rubber #33	264-8-101	22	Ball side rail No. 2-B	324-04-0410
10	Rubber ring 1 1/2"	264-8-30	23	Ball side rail No. 2-A	324-04-0300
11	Rubber ring 3/4"	264-8-28	24	1 1/2" Single flange guide rail	264-8-2004
12	Rubber ring 3 1/2"	235-8-107	25	Bumper cover (set)	324-06-0600
13	Mini post screw	10430001			

2.2 UNDERSTANDING THE PLAYFIELD

The game is equipped with a total of 29 scoring devices:

- 2 – rebound kickers
- 4 – 10-point rail switches
- 3 – Bull's-eye targets (two square and one rectangular)
- 3 – thumper bumpers
- 7 – wire roll-over switches
- 4 – star roll-over buttons
- 2 – amber roll-over buttons
- 4 – drop targets

The three wire roll-over switches located at the top of the Playfield are called "entrance switches." The one on the right side (No. 210) scores 500 points...the one in the center (No. 170) raises the upper white target, scores 500 points, advances the BONUS, and opens the "Free Ball" (flag) gate. The one on the extreme right (No. 180) raises the upper green drop target and scores 500 points.

On the extreme right side of the Playfield about mid-way to the top are two wire roll-over switches. The one closer to the top (No. 210) scores 500 points. The other (No. 220) scores 500 points and raises the lower green drop target.

There are two "exit" wire roll-over switches: the one on the right exit alley (No. 50) advances the BONUS and collects "JUNO's WISH"...this value ranges from one (1) to 4,000 points and is explained further in paragraph 2.4. The one on the left side (No. 40) advances the BONUS and collects "ATHENA's DESIRE"...this value also ranges from one (1) to 4,000 points and is explained further in paragraph 2.4.

The game has 3 bull's-eye targets. The first (No. 240, the rectangular one) is located above the drop targets. It scores 1000 points, advances the BONUS, and gives an extra ball if it is struck during the play of the last ball when EXTRA BALL lamp is lit. For details, please see paragraph 2.4. The second bull's-eye target (No. 230, a square one) is located on the right side of the Playfield, scores 500 points, raises the lower white drop target. The third bull's-eye target (No. 170, also a square one) located on the left side of the Playfield scores 500 points, raises the upper white drop target and opens the "Free Ball" (flag) gate.

There are four (4) 10-point switches, also referred to as "rail switches." Three of them (all No. 150) do nothing other than score 10 points each. The other (No. 190) located on the right side of the Playfield, in addition to scoring 10 points, also closes the "Free Ball" (flag) gate.

The game has 2 rebound kickers...one is close to each flipper. The basic purpose of these kickers is to add speed to the ball. However, each performs an additional function: The left one (No. 10) scores 100 points and changes ATHENA's DESIRE, and the right one (No. 30) scores 100 points and changes JUNO's WISH.

The game has several roll-over buttons designed to score points when the ball passes over them. There are two amber ones in the area of the BONUS lights...the one on the left (No. 150) scores 10 points, and the one on the right (No. 210) scores 500 points. The green roll-over buttons with the white inserts are called "Star" roll-over buttons. The one on the right side of the entrance alley (No. 190) scores 10 points and closes the free-ball gate. The one on the top of the roll-through alley (No. 40) collects "ATHENA's DESIRE" and advances the BONUS. The one in the center of the alley (No. 50) collects "JUNO's WISH" and advances the BONUS. On the left side of the Playfield is another star roll-over button (No. 140), which scores 500 points, advances the BONUS, and performs a special feature as outlined in paragraph 2.4.

2.3 BONUS

2.3

In the middle of the PLAYFIELD is a series of lamps, known as the BONUS LAMPS, numbered 1 to 10. Each time an advance BONUS switch scores, the BONUS lamps progress one at a time. The BONUS points are collected when the ball goes into the OUT-HOLE KICKER. The BONUS lamps represent 1,000 points each, ranging from 1 to 10.

2.3.1 DOUBLE BONUS is obtained by knocking down all four (4) DROP TARGETS to the surface of the PLAYFIELD. The DOUBLE BONUS lamp comes ON. If this action is repeated during the course of the SAME ball, the DOUBLE BONUS lamp goes OUT, and the TRIPLE BONUS lamp comes ON. The DROP TARGETS are numbered No. 250, No. 260, No. 270 and No. 280.

DOUBLE BONUS means that the points accumulated in the BONUS bank would be " $\times 2$." TRIPLE BONUS means " $\times 3$." For instance: BONUS lamp is ON... the DOUBLE BONUS would mean that, at the end of that ball, an additional 10,000 (5×2) points would be added to the player's score. Likewise on the TRIPLE BONUS with the same No. 5 ON: an additional 15,000 (5×3) points would be added to the player's score.

2.3.2 DROP TARGET

Each target scores 500 points when knocked to the surface of the PLAYFIELD. When the final fourth one is struck, all DROP TARGETS automatically re-set.

The DROP TARGETS can also be raised individually when the ball rolls over the following switches:

- (1) Switch No. 170 raises UPPER WHITE.
- (2) Switch No. 220 raises LOWER GREEN.
- (3) Switch No. 230 raises LOWER WHITE.
- (4) Switch No. 180 raises UPPER GREEN.

2.4 SPECIAL FEATURES

2.4.1 ATHENA's DESIRE / JUNO's WISH

On the right side of the front THUMPER BUMPER is a series of four (4) lamps labelled "1" through "4." These lamps are known as ATHENA's DESIRE. At the start of the game, lamp No. 1 is lit. Each time the left REBOUND KICKER scores, the light changes to the next value. After it gets to "4," the sequence is repeated.

Below these lamps and slightly to the right is another series of four (4) lamps. These are called JUNO's WISH, and they function in the identical manner as ATHENA's DESIRE except they are controlled by the right REBOUND KICKER.

If the No. 4 lamp on ATHENA's DESIRE is lit at the same time as the No. 4 lamp on JUNO's WISH, the SPECIAL WHEN LIT lamp comes ON.

If, during this time, the ball rolls over STAR roll-over switch (No. 140), the game gives either a FREE GAME or a FREE BALL, depending on how the game is set. If the game is set on ADD-A-BALL, then SAME PLAYER SHOOT AGAIN light comes ON... if it is set on REPLAY, then a credit is added to the CREDIT DISPLAY.

2.4.2 EXTRA BALL WHEN LIT

On each player's last ball, the EXTRA BALL WHEN LIT lamp located in front of the rectangular BULL'S-EYE TARGET lights. If the ball strikes that target (switch No. 240... see illustration No. 7-B), the SAME PLAYER SHOOT AGAIN lamp comes ON, giving the player an extra ball. A free ball is played immediately after the ball on which it was won.

2.5 END OF BALL

When the ball returns to the OUT-HOLE KICKER, the bonus points are added to the player's score. In the case of one player, the BALL IN PLAY advances... the ball is returned to the SHOOTER ALLEY... and the score flashes.

In the case of two players, the ball does not advance. The second player's score flashes, indicating that it is time for the other player to play.

When the last player's last ball enters the OUT-HOLE KICKER, the player's LED goes OUT, and the GAME OVER lamp flashes. The GAME OVER lamp and score display lamps are the only lamps that are lit on the SCORE GLASS at this time.

2.6 SLAM/SWITCH/TILT MECHANISM

2.6.1 The SLAM SWITCH, which is located on the inside of the COIN DOOR, is designed to discourage unnecessary abuse to the game. SLAMMING THE MACHINE results in loss of game or games... the machine simply goes DEAD! A short delay occurs, after which the GAME OVER lamp flashes indicating the end of game or games, whichever is being played.

The SLAM SWITCH is factory-adjusted to approximately 1/16" gap between contacts. Decreasing the gap will make the switch more sensitive. Opening the gap will reduce sensitivity. (See illustration No. 2-C.)

NOTE: *Always adjust the WEIGHTED blade to attain the desired sensitivity.*

2.6.2 The game is equipped with a TILT mechanism designed to discourage the player from jolting or lifting the machine in an attempt to prolong play (see illustration No. 2-D). Tilting the game causes the flippers to go dead. The thumper bumper and the rebound kicker lights go OUT. The FLIPPER SWITCHES cannot be activated. The TILT lamp located on the SCORE GLASS assembly flashes.

NOTE: *Adjustment instruction on illustration No. 2-D.*

If one person is playing, the ball in play will advance. If two persons are playing, it will move to the next player. The OUT-HOLE KICKER propels the ball into the ALLEY, and the game returns to NORMAL. (The net effect of tilting the game is loss of a ball to the player who did the tilting.)

NOTE: *Game will not tilt until ball rolls over BALL-IN-PLAY switch.*

The TILT mechanism consists of one electrical circuit which can be activated by either of two mechanical assemblies:

The first assembly is called the ROLL-TILT, and is activated when the front of the machine is lifted, allowing the ball in illustration No. 2-D to roll down the bracket until it touches the ROLL-TILT switch. It can be adjusted by loosening screws "A," "B" and "C," and sliding the end of the bracket that is closer to the switch UP to decrease sensitivity, and DOWN to increase sensitivity.

The other TILT assembly is called the PENDULUM TILT, and is activated when the machine is jolted causing the weight to touch the pendulum bracket. Sensitivity can be decreased by sliding the weight and the clip UPWARD on the pendulum ROD... similarly sensitivity can be increased by sliding the weight and the clip DOWNWARD on the pendulum ROD.

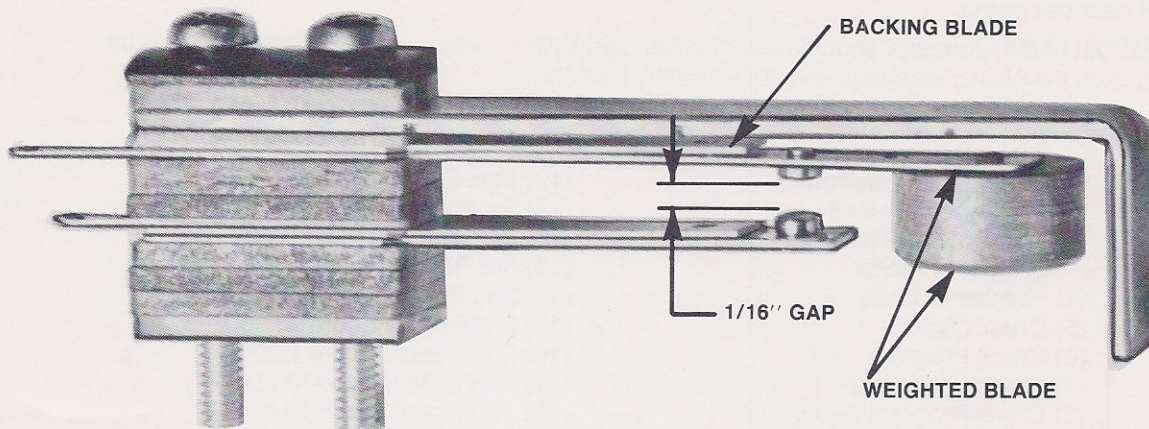
Be sure that the pendulum rod and the pendulum weight are ALWAYS centered. If necessary, adjust the pendulum bracket by loosening screws "D" and "E" (see illustration No. 2-D), and then adjust accordingly.

SLAM SWITCH

ASSEMBLY No. 288-1-19

2.6.2

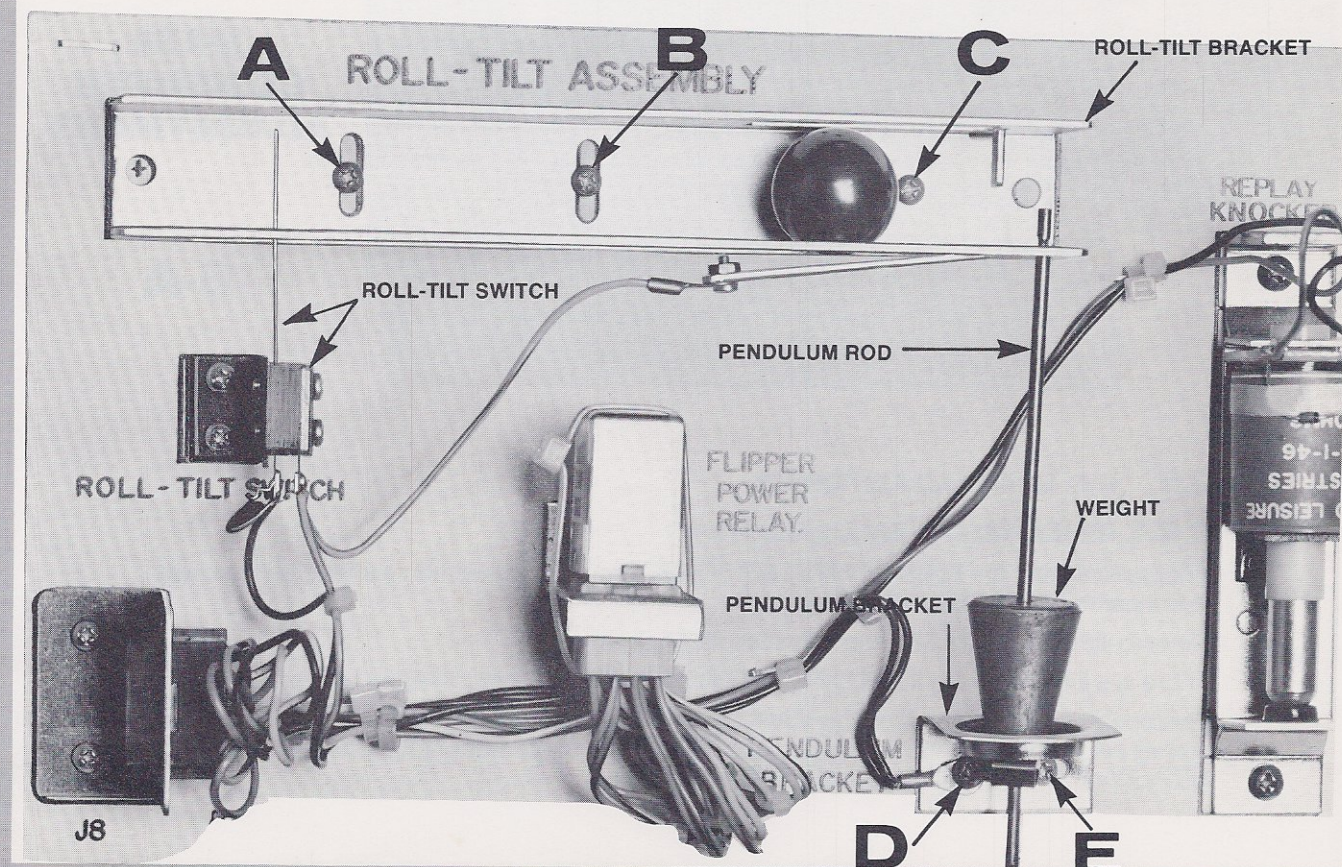
2-C



NOTE: FOR LOCATION OF
SLAM SWITCH SEE
ILLUST. 6-F., PARAGRAPH 6.5

TILT MECHANISM ADJUSTMENTS

2-D



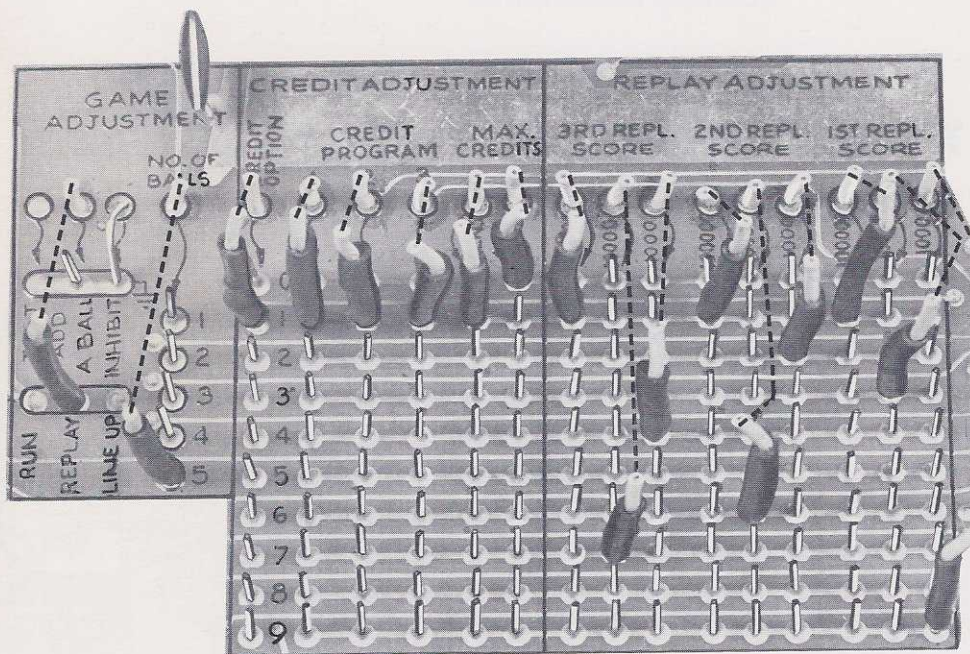
3.0 GAME ADJUSTMENTS AND OPTIONS

3.1 STANDARD FACTORY ADJUSTMENTS

Several game adjustments and options are performed by moving jumpers on the MAIN COMPUTER BOARD (see illustration No. 3-A). These jumpers determine cost and number of balls per game.

IMPORTANT: Jumpers should never be handled by the wires... INSTEAD they should be held by the plastic housings and pulled gently from the pin.

- | | |
|--|-----------------------------------|
| (1) Run Test – No Jumper | (10) Max Credits Units – 0 |
| (2) Replay/Add-A-Ball – Lower Pin | (11) 3rd Replay Score 100,000 – 1 |
| (3) Line-up Inhibit – No Jumper or Inhibit | (12) 3rd Replay Score 10,000 – 7 |
| (4) Number of Balls – 5 | (13) 3rd Replay Score 1,000 – 4 |
| (5) Credit Option – 1 | (14) 2nd Replay Score 100,000 – 1 |
| (6) Credit Program 1 – 1 | (15) 2nd Replay Score 10,000 – 6 |
| (7) Credit Program 2 – 1 | (16) 2nd Replay Score 1,000 – 2 |
| (8) Credit Program 3 – 1 | (17) 1st Replay Score 100,000 – 1 |
| (9) Max Credits Tens – 1 | (18) 1st Replay Score 10,000 – 3 |
| | (19) 1st Replay Score 1,000 – 9 |



**MAIN
COMPUTER
ADJUSTMENT**

3-A

3.2 P. C. BOARD ADJUSTMENTS

3.2.1 REPLAY/ADD-A-BALL SELECTIVE

Prior to removing the MAIN COMPUTER BOARD for game adjustments and options, power to the game **MUST BE DISCONNECTED!**

Refer to illustration No. 3-A, and adjust accordingly.

There is a jumper on the MAIN COMPUTER BOARD for winning "Replay" or "Add-A-Ball."

This option is programmed on the MAIN COMPUTER BOARD by placing the jumper on the proper pin as indicated on the computer board. This jumper determines whether a SCORE REPLAY or SPECIAL gives an extra ball or a free game.

3.2.1

Example 1: With jumper on lower pin labelled REPLAY, and with sufficient score, or by hitting SPECIAL WHEN LIT bull's-eye target while the lamp is lighted, player can win free games.

Example 2: With jumper on upper pin labelled ADD-A-BALL, no free games can be won. However, when player hits SPECIAL WHEN LIT bull's-eye target while the lamp is lighted, or with sufficient scores, extra balls can be won.

Example 3: If no extra balls are to be awarded on sufficient scores, put ADD-A-BALL jumper on upper pin, and put all 9 jumpers on 0's on REPLAY adjustments which automatically eliminates winning free games.

LINE-UP INHIBIT: This feature not included in routine games.

NUMBER OF BALLS ADJUSTMENT: This jumper determines the number of balls played per game. 1 to 5 balls can be selected by moving jumper to correspondingly numbered pin.

3.2.2 CREDIT OPTIONS & CREDIT PROGRAMS

There are several credit options which determine the number of credits given by various combinations of the COIN SWITCH. Please note that the top pin of each row is a "0." The options function as follows:

(1) Credit Option "0" – This is not used.

(2) Credit Option "1" – In this mode, one activation of coin switch will give the number of credits as per Credit Program 3. Credit Programs 1 and 2 are NOT used ... ignore these jumpers.

Example 1: With credit option on pin 1 and credit program 3 on pin 1, the coin-activating switch will give 1 game.

Example 2: With credit option on pin 1 and credit program 3 on pin 2, the coin-activating switch will give 2 games etc.

(3) Ignore all other credit option pins for cocktail games.

MAXIMUM CREDITS: These jumpers determine the maximum number of games that can be stored in the credit section. There is a "tens" program jumper and a "units" program jumper. It should be noted that the top of each column starts with a "0" pin.

Example 1: If the left jumper is on left row pin 1, and right row pin 0, then the credit section can store a maximum of ten (10) free or paid games, or combination thereof.

Example 2: If the left jumper is on left row pin 0, and right jumper is on right row pin 5, then the credit section can store a maximum of five (5) free or paid games, or combination thereof.

3.2.3 REPLAY ADJUSTMENT

There are three programmable winning score values. Each value has 100,000 ... 10,000 ... and 1,000-point settings. It should be noted that the top pin in each column is a "0."

Example: If a value of 76,000 was desired as one of the replays, the 100,000 jumper would be on pin 0 ... the 10,000 jumper would be on pin 7 ... and the 1,000 jumper would be on pin 6.

NOTE: Scores should be lower for 3-ball games.

The 2nd replay score must be set higher than the 1st, and the 3rd replay score must be set higher than the 2nd. Differences of scores should be at least 10,000 in accordance with the above example, and may be even higher, depending on abilities of players to win free games. ONLY THREE (3) FREE GAMES can be won with sufficient scores.

NOTE: Where free games are allowed, the rule of thumb is 20% free games to encourage more play.

Therefore, if the game counter indicates that 500 games have been played since the last collection of coins, and there are approximately 400 coins in cash box, the players are winning approximately 20% of total games played.

If there are too many or too few free games based on this count, adjust the REPLAY ADJUSTMENT jumpers accordingly.

An OPTIONAL REPLAY COUNTER is available with complete installation procedure.

4.0 PLAYFIELD OPERATIONAL AND PARTS REMOVAL PROCEDURES

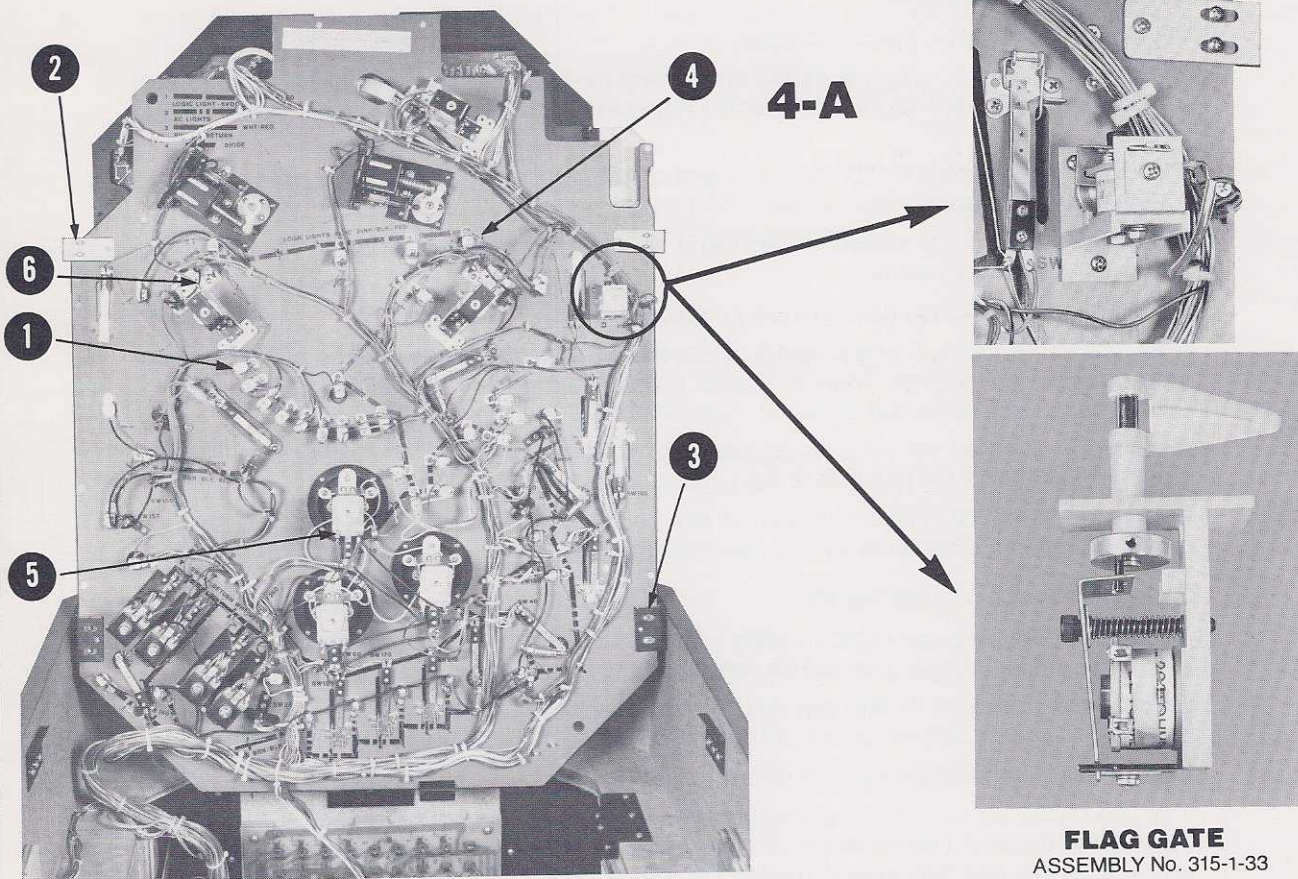
4.1 HOW TO REMOVE AN ASSEMBLY (Refer to Illustration No. 4-A)

To remove an assembly from the PLAYFIELD (except the thumper bumper and flipper assemblies as referred to respectively in paragraphs 4.2 and 4.3), proceed as follows:

- (1) Remove the screws that mount the assembly to the bottom of the playfield.
- (2) Carefully unsolder all connecting wires.
- (3) Then gradually remove the assembly.

NOTE "1": If the assembly is being replaced, the wires should be unsoldered and transferred one-by-one to insure connection of the proper points.

NOTE "2": It is absolutely necessary that the screws and wires are replaced in the exact location from which they were removed.



DESCRIPTION OF SOME PARTS BELOW PLAYFIELD

LOCATION	DESCRIPTION	PART No.
1	Lamp Socket (long)	50190008
2	Playfield Bracket	264-3-40
3	Playfield Hinge	307-1-19
4	Lamp Socket (short)	50190006
5	Thumper Bumper Assembly	315-1-3851
6	Rebound Kicker (or Sling Shot)	315-1-19

4.2 THUMPER BUMPER

The THUMPER BUMPER is probably more responsible for generating ball action than any other item on the PLAYFIELD, and it necessarily must function properly at all times.

OPERATION:

When the ball hits the THUMPER BUMPER wafer, the wafer pushes the activator rod downward, closing the switch. When the switch is closed, the COIL energizes and pulls the THUMPER BUMPER KICKER downward, pushing the ball in the opposite direction.

This assembly should be adjusted so that the switch closes when the wafer is half-way between the HOME position and the surface of the PLAYFIELD. If the switch closes before the wafer gets to the half-way point, the COIL is energized before the ball is close enough to the inside...as a result, it is not propelled with sufficient force.

If the switch is adjusted so that it closes after the half-way point, a ball travelling at a fast pace can sometimes go all the way IN and back OUT without being recognized by the switch, resulting in a dead (inactive) THUMPER BUMPER.

Another important aspect of the switch adjustment is the tension on the upper blade. Too much tension will cause the wafer to resist the ball, and too little tension will cause the wafer to be pushed down too easily.

We suggest that the switch be cleaned and adjusted only when necessary. Adjustments should be done as explained in paragraph 8.5.

4.2.1 CHANGING THE BULB

To change the light bulb, remove the two (2) screws at the top of the THUMPER BUMPER cap and replace the bulb. Make sure that the socket is firm.

It may be necessary to adjust the socket with pliers or similar tool.

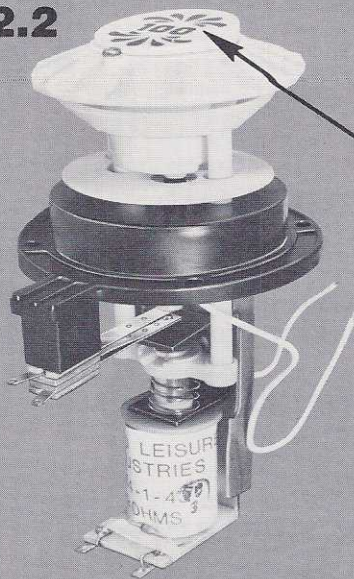
4.2.2 REMOVAL FROM PLAYFIELD

Should it become necessary to change a major part on the THUMPER BUMPER, the entire assembly should be removed from the game in the following manner:

- (1) Remove the cover (sunflower cap).
- (2) Remove the four (4) screws that mount the base to the PLAYFIELD.
- (3) Unsolder the following wires:
 - (a) 2 wires connected to the switch.
 - (b) 2 light-bulb socket wires.
 - (c) Coil wires.

The assembly can be dis-assembled as shown in illustration No. 4-B.

4.2.2

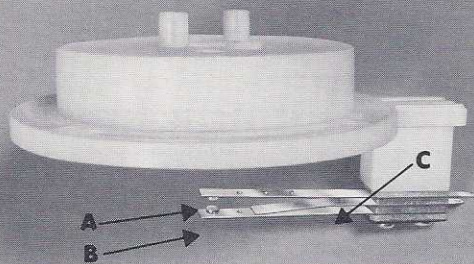


100 POINTS
THUMPER BUMPER CAP
PART NO. 324-06-0600

THUMPER BUMPER SWITCH ADJUSTMENT

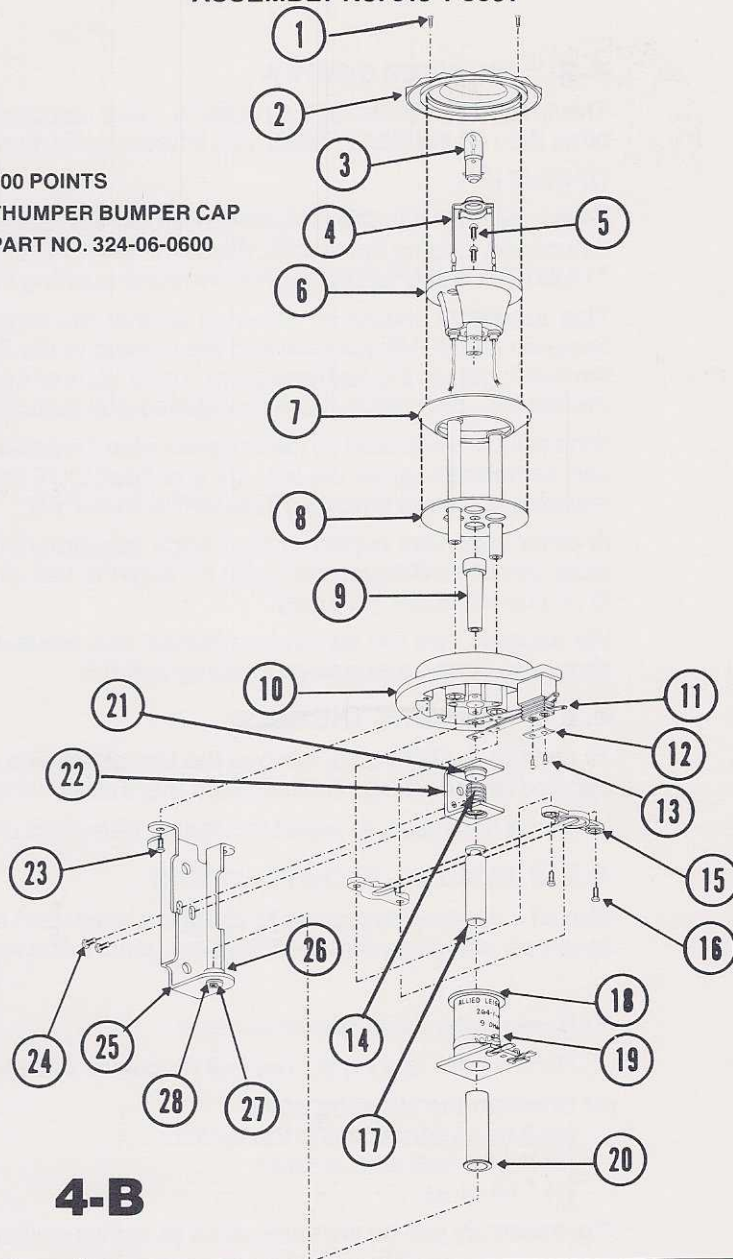
Blades "A" and "C" must have no bends. Blade "B" is pre-bent to allow a 1/32" gap between Blades "A" and "C" while in its normally OPEN position.

Any adjustment necessary must be done ONLY to Blade "B".



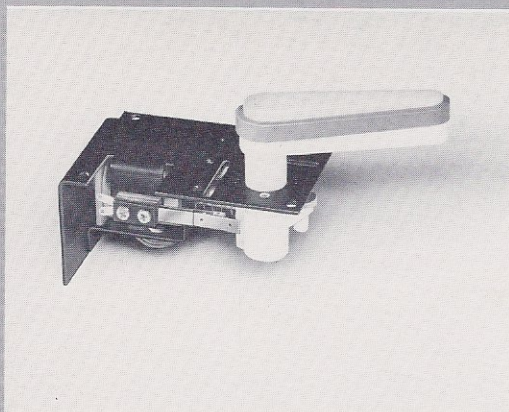
THUMPER BUMPER

ASSEMBLY No. 315-1-3851



4-B

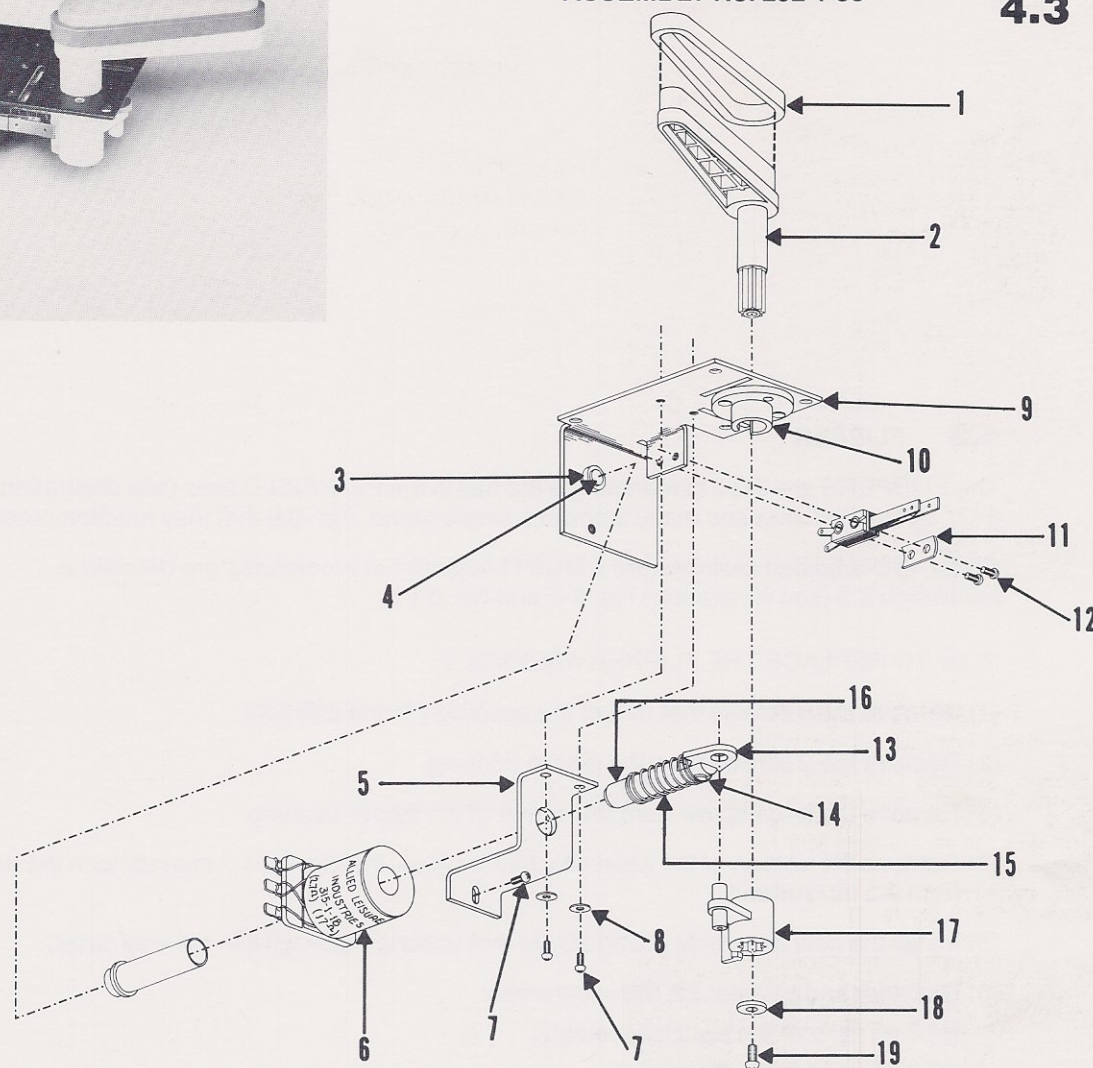
LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	No. 4 × 3/8" Phillips RD/SMS	10040003	15	Thumper bumper kicker link	264-5-27
2	Sunflower cap 10 pts Thumper Bumper	324-06-0500	16	No. 6-32 × 1/2" Phillips P.H.M.S. self-tap "T" point	10050011
3	Lamp #44	50180004	17	Solenoid plunger Type "B"	235-2-16
4	Light socket	50190015	18	Coil	264-1-46
5	No. 6-32 × 3/4" Phillips self-tap screw "T"	10050014	19	2-amp diode	50100010
6	Thumper bumper base	264-8-22	20	Coil sleeve	235-8-214
7	Thumper bumper kicker	264-5-30	21	Rubber pad	235-8-68
8	Thumper bumper wafer	288-5-2	22	Thumper bumper stop	235-3-31
9	Rod push actuator	288-5-1	23	No. 6-32 × 1/2" Phillips P.H.M.S.	10050011
10	Thumper bumper base	264-5-24	24	No. 6-32 × 1/4" Whiz lock M.S.	10020001
11	Switch assembly	288-70-10	25	Thumper bumper bracket	264-3-59
12	Switch tension plate	235-73-58	26	Solenoid stop	307-2-9
13	No. 4-40 × 5/8" Phillips P.H.M.S.	10050017	27	140 × .531 oval hd brass tub	10220029
14	Spring "T" bumper	235-8-7	28	#6 flat washer	10190043



4-C

FLIPPER ASSEMBLY No. 292-1-38

4.3



LEFT FLIPPER		
COIL PIN	WIRE COLOR	QUANT.
INSIDE	Brn/Blk/Yellow	2
MIDDLE	White/Brown	1
END	Violet/Black	1
Sw Conn "A"	Brn/Blk/Yellow	1
Sw Conn "B"	White/Brown	1

RIGHT FLIPPER		
COIL PIN	WIRE COLOR	QUANT.
INSIDE	Violet/Blk/Brn	2
MIDDLE	White	2
END	Brown/Black	2
Sw Conn "A"	Brown/Black	1
Sw Conn "B"	White	1

NOTE: Inside pin is the one closest to the Playfield. Switch Connections "A" and "B" are interchangeable.

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	Red flat rubber ring	264-8-45	11	Switch tension plate	235-73-58
2	Flipper arm	264-5-76	12	No. 5-40 × 1/2" Phillips P.H.M.S.	10010087
3	Solenoid stop	264-2-28	13	Offset link	264-3-106
4	Brass brake lining rivet	10220022	14	Eyelet .123 × 1/2"	10260001
5	Solenoid bracket sleeve layout	264-3-140	15	Plunger spring Type "A"	235-8-8
6	2.7-ohm coil	315-1-18	16	Solenoid plunger Type "E"	264-2-27
7	No. 6-32 × 3/16" Phillips P.H.M.S.	10010102	17	Flipper actuating cam	264-5-25
8	#6 flat washer nickel plate	10190043	18	3/16" ID 1/2" OD 1/16" thick	10190045
9	Base plate flipper LH - RH	264-3-132	19	No. 10-32 × 3/8" Phillips P.H.M.S. "T" point	10050032
10	Flipper bushing	264-5-31			

4.3

4.3 FLIPPER

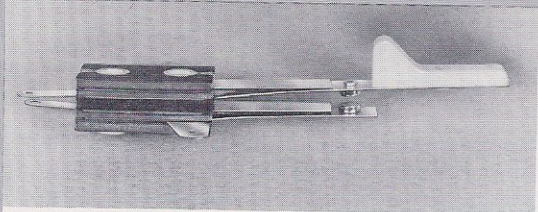
The FLIPPERS are used to manipulate the ball in the PLAYFIELD area (see illustration No. 4-C). Since they are used many times in a single game, it is vital that they function properly.

Clean, well-adjusted switches are a MUST! Adjustment procedures are detailed in paragraph 8.5 (see illustrations No. 8-E and No. 8-F).

HOW TO REPLACE THE FLIPPER ASSEMBLY:

- (1) Remove the 5 screws that mount the assembly to the playfield.
- (2) Remove the 2 screws from the plastic bushing.
- (3) Remove the large screw from the center of the flipper bushing.
- (4) Remove the portion of the assembly that is below the playfield...then remove the arm from the top surface.
- (5) Install the new assembly (using above instructions 1 through 4 in reverse order).
- (6) Unsolder and transfer the following wires:
 - (a) 2 wires from the switch assembly.
 - (b) 3 wires from the flipper coil.

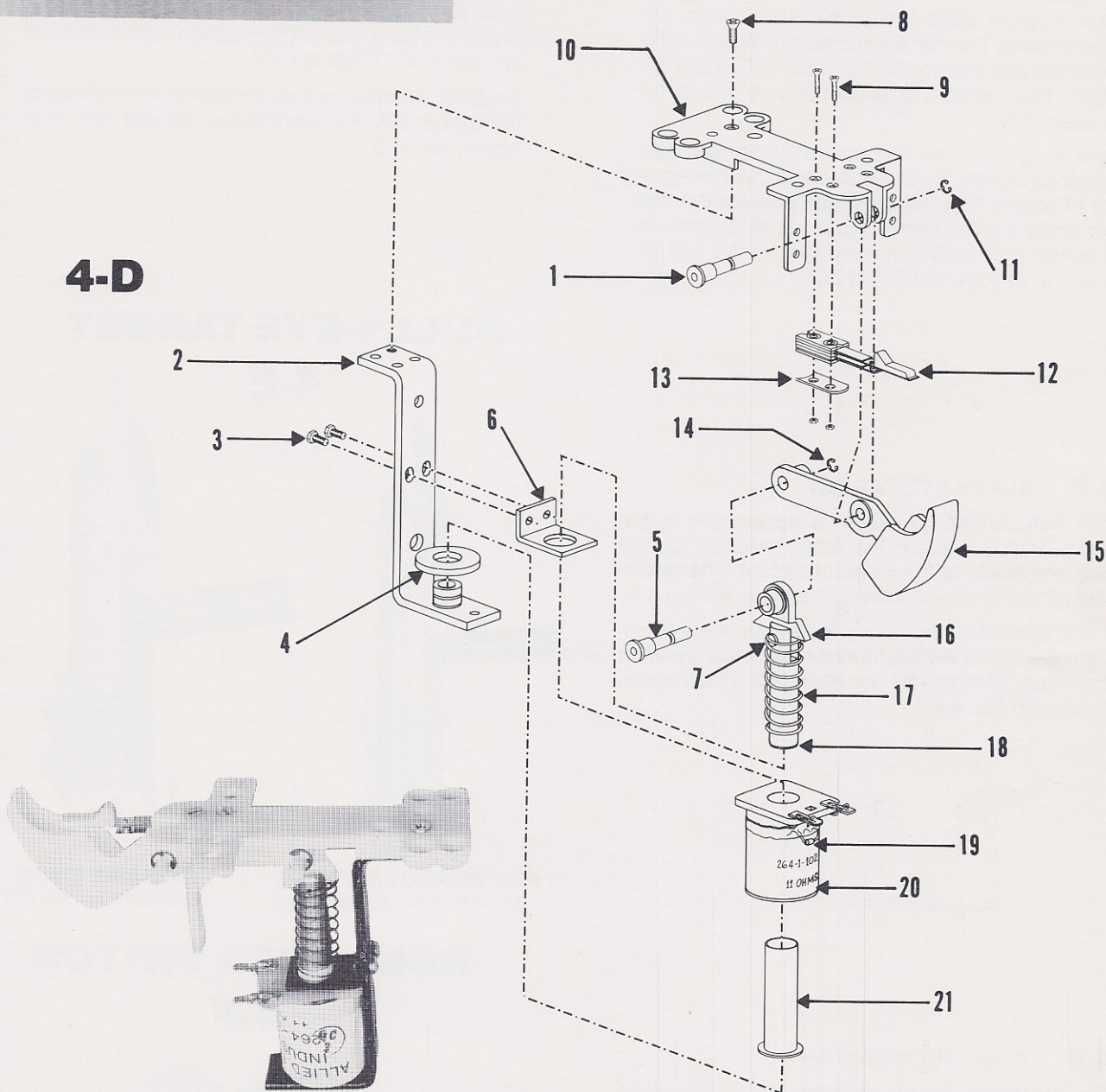
CAUTION: Be sure that the arm is inserted into the bushing at the proper angle before tightening the screw.



OUT-HOLE KICKER 4.4

ASSEMBLY No. 264-1-11

4-D



LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	Ball kicker pin	264-5-40	12	Ball kicker switch assembly	264-71-66
2	Solenoid bracket	264-1-180	13	Switch tension plate	235-73-58
3	No. 6-32 $\times$ 1/4" M.S. Whiz lock	10020001	14	"E" ring #5133-18	10270002
4	Washer aluminum coil shim	288-3-5	15	Ball kicker arm	264-5-39
5	Ball kicker pin	264-5-40	16	Offset link	264-5-46
6	Solenoid bracket #2	264-3-53	17	Plunger spring Type "A"	235-8-8
7	Eyelet	100260001	18	Solenoid plunger Type "D"	235-2-21
8	No. 6-32 $\times$ 1/2" Phillips F.H.M.S.	10010066	19	2-amp diode	10100010
9	No. 5-40 $\times$ 3/4" Phillips F.H.M.S.	10010107	20	11-ohm coil	264-1-102
10	Ball kicker base	264-5-37	21	Coil sleeve Type "A"	235-8-214
11	"E" ring #5133-18	10270002			

4.4 OUT-HOLE KICKER

When the ball rolls into the OUT-HOLE, it closes the kicker switch. The computer recognizing the switch closure adds the BONUS points to the player's score. The coil energizes, pulling the ARM downward and tossing the ball into the SHOOTER ALLEY. The switch adjustment is very critical on this assembly.

When the gap on the contacts is too narrow, they may close rapidly several times in a machine-gun type of sound. This action would prevent the coil from achieving full stroke. As a result, the arm is not pulled with sufficient force to toss the ball all the way to the SHOOTER ALLEY.

When the gap on the contacts is too wide, the switch does not close when the ball returns to the hole. As a result, the game does not recognize the end of the BALL IN PLAY, and does not kick the ball into the SHOOTER ALLEY.

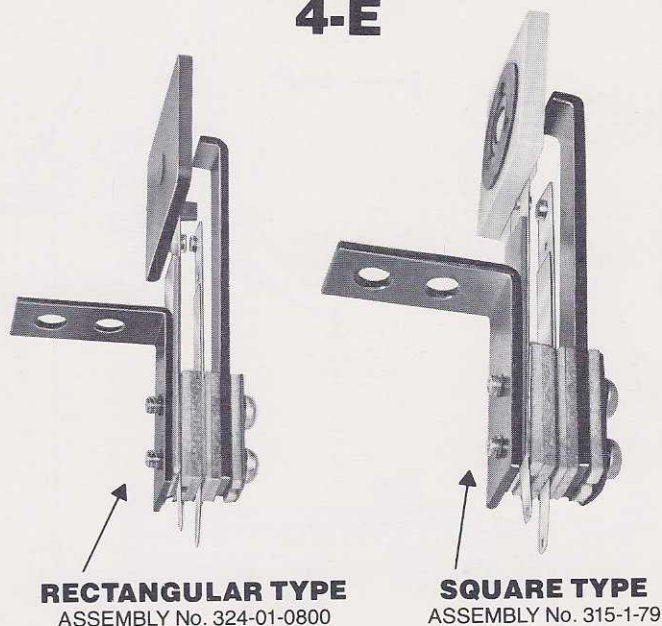
In either situation, adjust the switch as outlined in paragraph 8.5. For clarification, please see illustration No. 4-D.

4.5 BULL's-EYE TARGET

The BULL's-EYE TARGET is assembled in the same manner as are the other switches except that one blade has a target attached. The switch should be adjusted as described in paragraph 8.5.

If and when it is necessary to remove the assembly, remove the two (2) mounting screws, unsolder the wires, and remove the assembly. (Please see illustration No. 4-E.)

BULL's-EYE TARGET 4-E



4.6 ROLL-OVER SWITCH

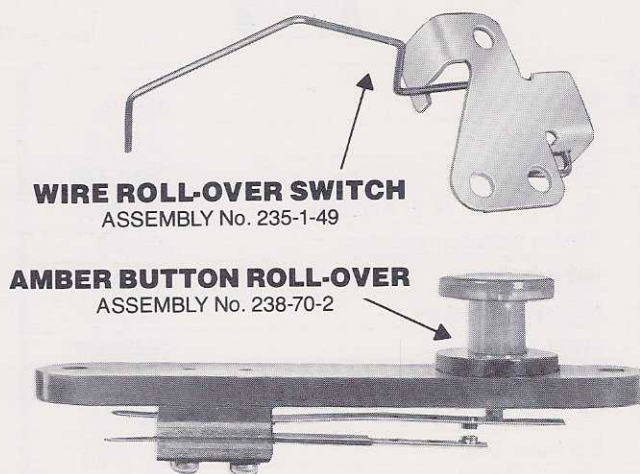
The most important maintenance features about the ROLL-OVER SWITCH are as follows (see illustration No. 4-F):

- (1) Adjustment...as outlined in paragraph 8.5.
- (2) Proper tension on the spring (portion above the playfield surface). The tension should be adjusted so that it is not so stiff as to interrupt the travel of the ball.

Also it must not be too soft because then the ball pushes it sideways rather than straight DOWN.

- (3) To remove a ROLL-OVER SWITCH, just unscrew the mounting screws and unsolder the wires.

ROLL-OVER SWITCH 4-F



4.7 REBOUND KICKER (or Sling Shot)

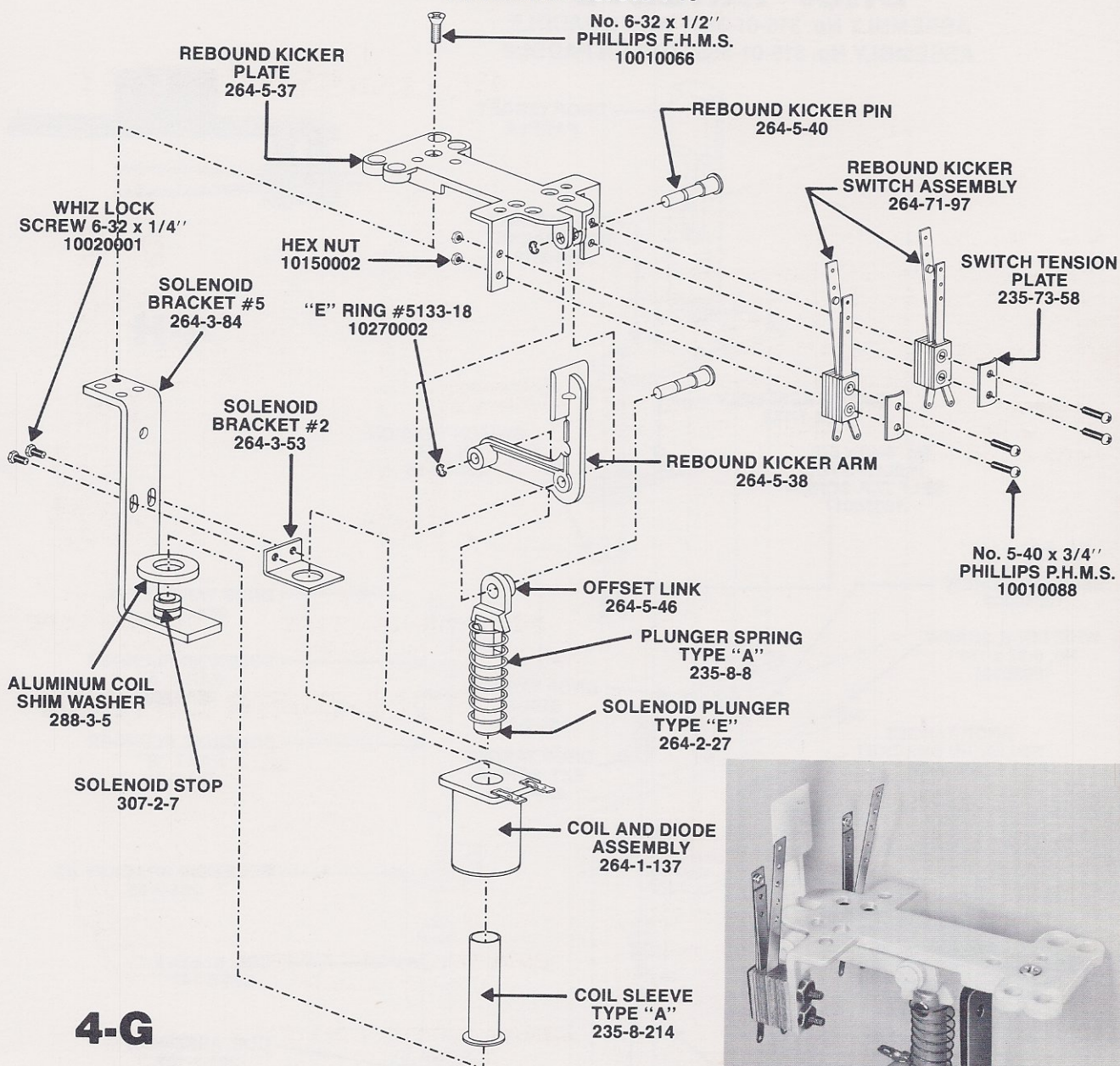
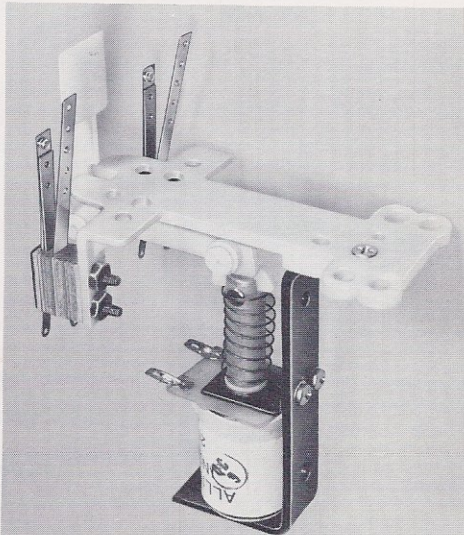
This game is equipped with one or more REBOUND KICKERS designed to generate ball speed (see illustration No. 4-G).

The switches of these assemblies should be adjusted so that the rubber touches the blade while maintaining a gap of 1/16" as outlined in paragraph 8.5.

After switch adjustment, please refer to paragraph 7.3.3 (Self-Diagnostic TEST MODE THREE) to verify proper switch adjustment.

REBOUND KICKER (or SLING SHOT)

ASSEMBLY No. 315-1-19

**4-G**

4.8 DROP TARGET

The DROP TARGET (see illustration No. 4-H), like the THUMPER BUMPER, is an electro-mechanical assembly.

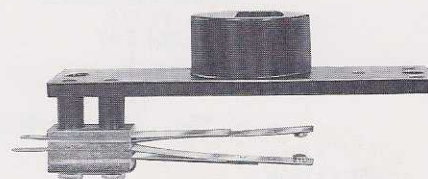
The movement from the top of the PLAYFIELD surface is strictly mechanical. However, on the way down, the edge of the paddle catches the switch, closing it and causing the game to score.

When the ball rolls over a RAISE DROP TARGET switch, the computer recognizes the switch closure and energizes the respective coil, pushing the plunger and paddle upward until it is locked in position at the top of the PLAYFIELD.

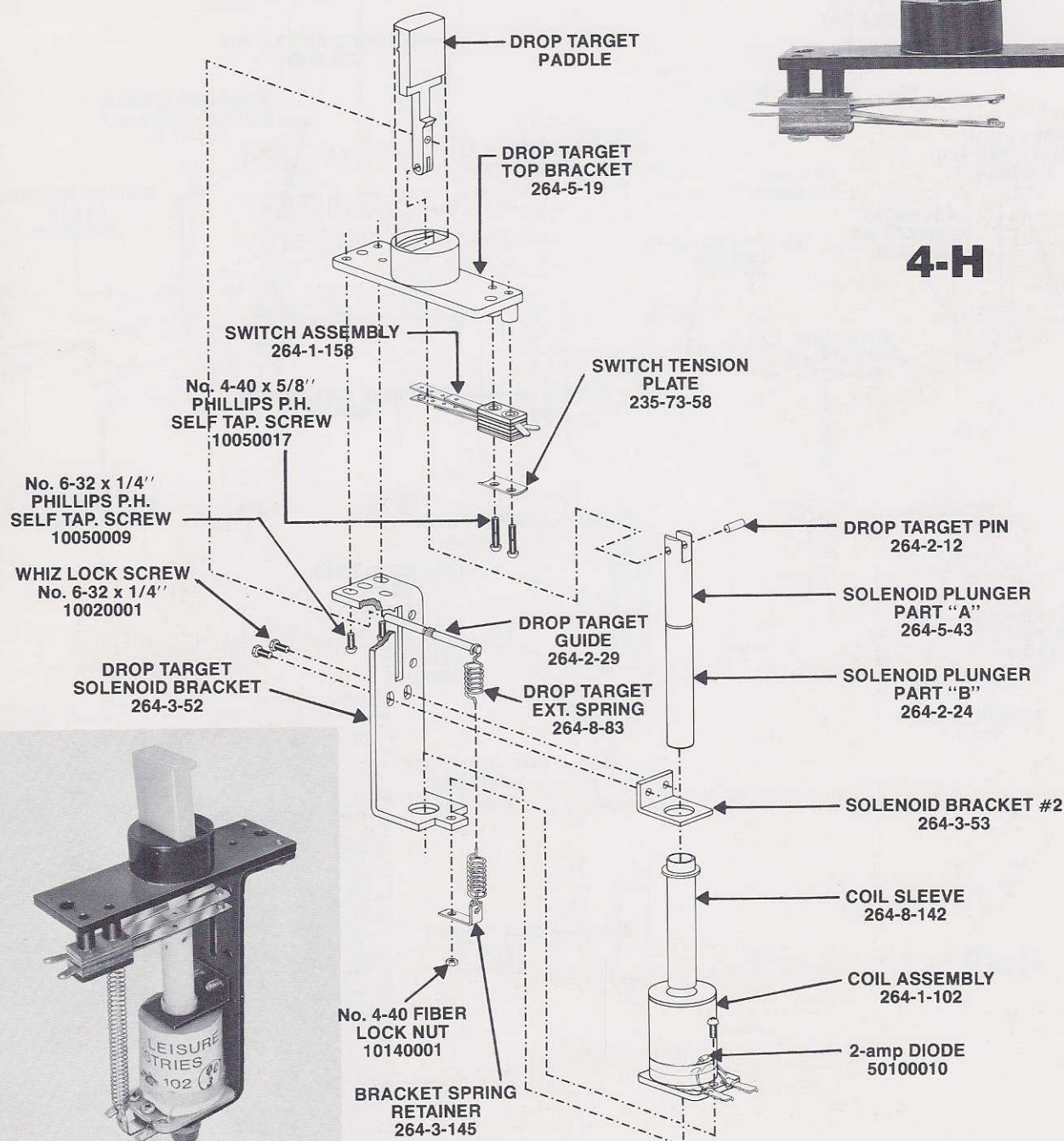
DROP TARGETS

ASSEMBLY No. 315-01-3651 WHITE PADDLE

ASSEMBLY No. 315-01-3652 GREEN PADDLE



4-H



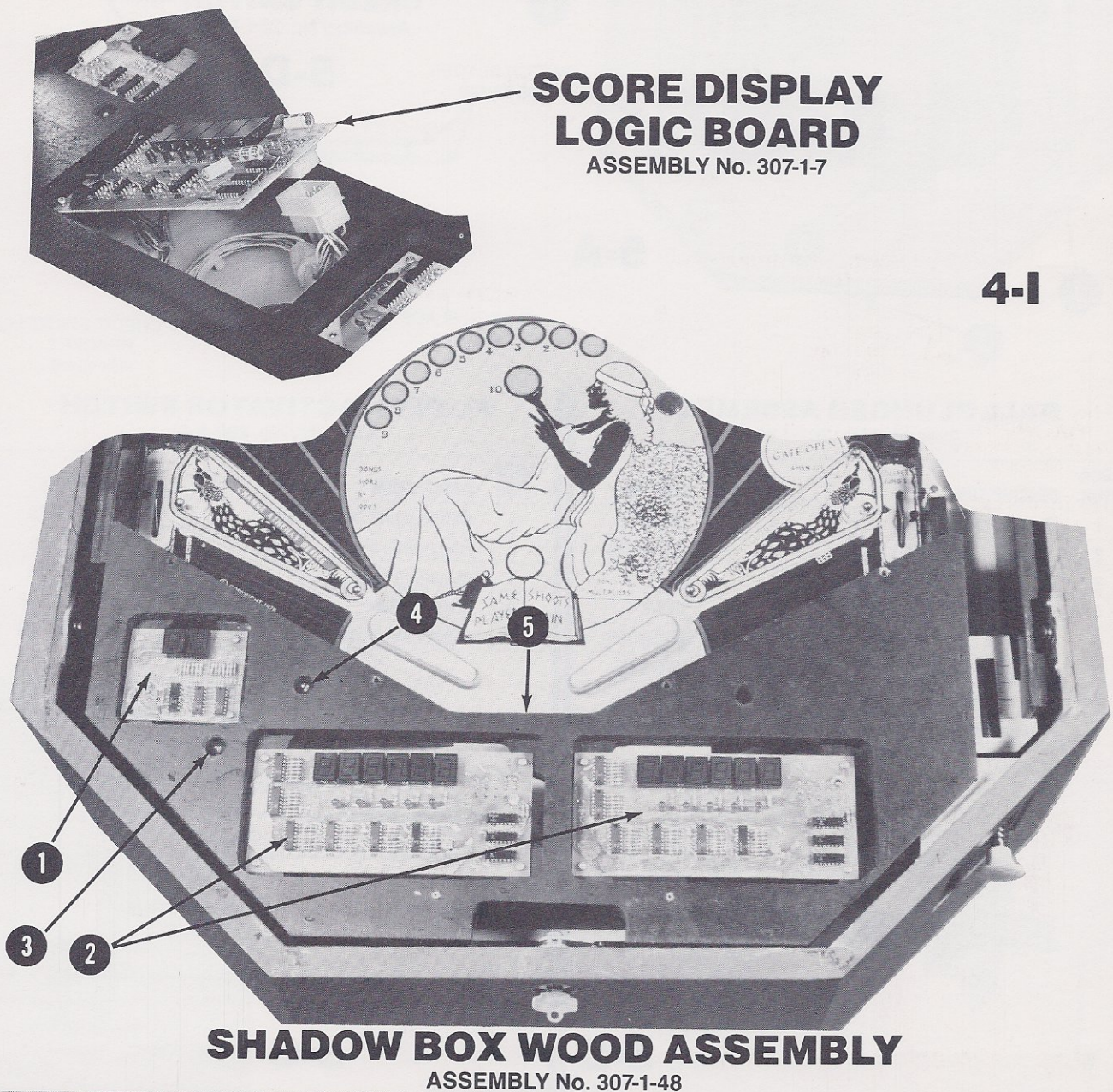
4.9 SHADOW BOX

The SHADOW BOX is the assembly at the front of the Playfield on which the SCORE GLASS is mounted. This assembly contains the following parts described below and shown on illustration No. 4-1:

<u>Location</u>	<u>Description</u>
(1)	CREDIT DISPLAY logic board.
(2)	Two SCORE DISPLAY logic boards.
(3)	GAME OVER lamp.
(4)	TILT lamp.
(5)	SHADOW BOX wood assembly.

To remove the SHADOW BOX assembly:

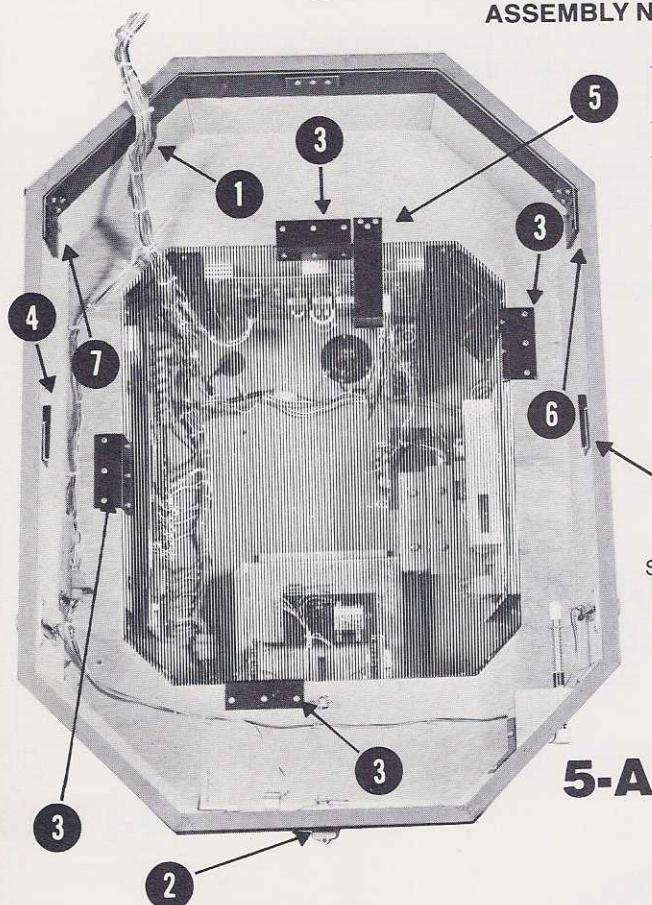
- (1) Lift the Playfield and remove the 2 anchor screws that hold the assembly to the Playfield.
- (2) Unplug all harness wires.
- (3) Lower the Playfield and remove the 6 screws that hold the score glass.



5.0

UPPER CABINET ASSEMBLY

ASSEMBLY No. 324-01-2200



LOCATION	DESCRIPTION	PART No.
1	Playfield Main Harness	324-12-0100
2	Fort-Lock No. 8013	240-8-44
3	Cabinet Bracket	307-3-11
4	Top Hold Down Bracket	324-03-0900
5	Playfield Catch Bracket	307-3-34
6	45° Hinge Plate Brace R.H.	307-3-37
7	45° Hinge Plate Brace L.H.	307-3-36

CREDIT SWITCH Assembly No. 264-1-182

5-D

SWITCH BLADES
235-73-149

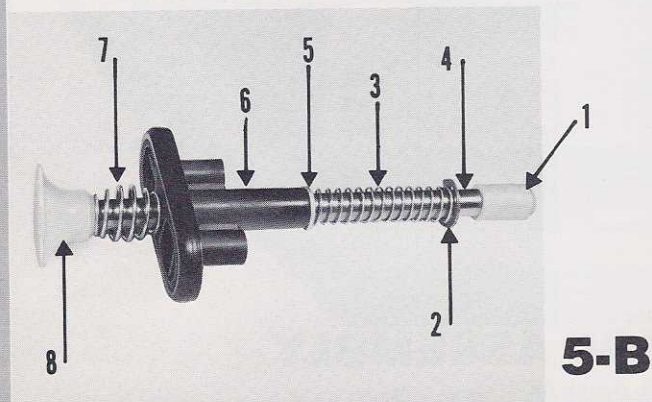
SWITCH BLADE
264-73-3

CREDIT SWITCH
BRACKET
264-3-116

BALL PLUNGER ASSEMBLY

Assembly No. 307-1-16

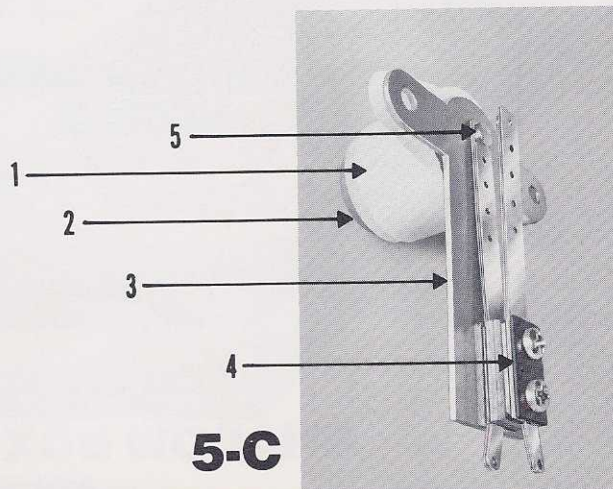
LOCATION	DESCRIPTION	PART No.
1	Shooter tip	264-8-46
2	"E" ring (#5133-37)	10270006
3	Propeller spring	307-8-1
4	Plunger rod	307-2-1
5	Washer	10190035
6	Guide-plunger rod	264-5-33
7	Shock spring	264-8-7
8	Plunger knob	264-5-66



FLIPPER ACTIVATOR SWITCH

Assembly No. 292-1-44

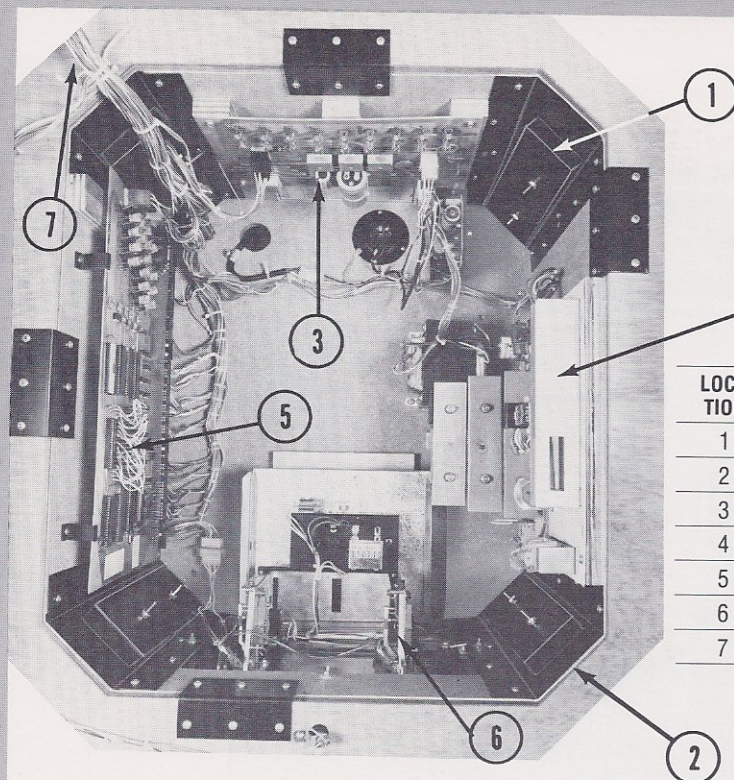
LOCATION	DESCRIPTION	PART No.
1	Button cover flipper switch	264-5-35
2	Red plastic button	264-5-36
3	Mounting plate	264-3-60
4	Tension plate	235-73-58
5	Flipper push button switch	264-71-75



6.0

LOWER CABINET

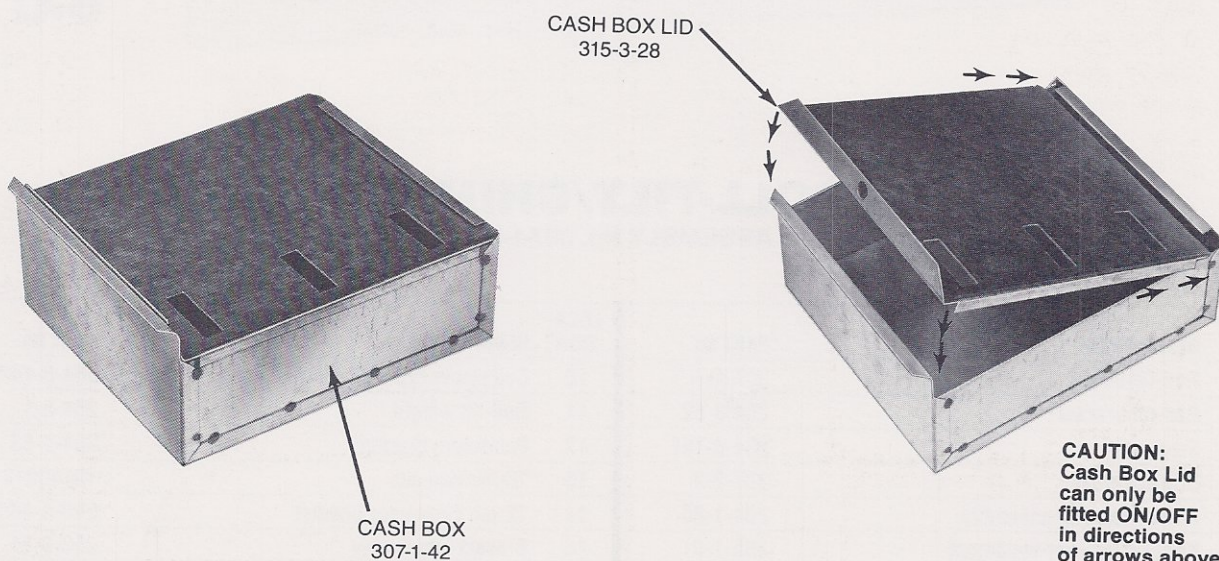
ASSEMBLY No. 324-01-2100



LOCATION	DESCRIPTION	PART No.
1	Cabinet Leg Extension	324-03-1400
2	Lower Cabinet Corner Brace	324-03-0600
3	Power Supply	324-01-1000
4	Roll-Tilt/Chime Assembly	307-1-57
5	Computer Control Logic Board	307-1-17
6	Coin Door Assembly (Double)	315-1-54
7	Playfield Main Harness	324-12-0100

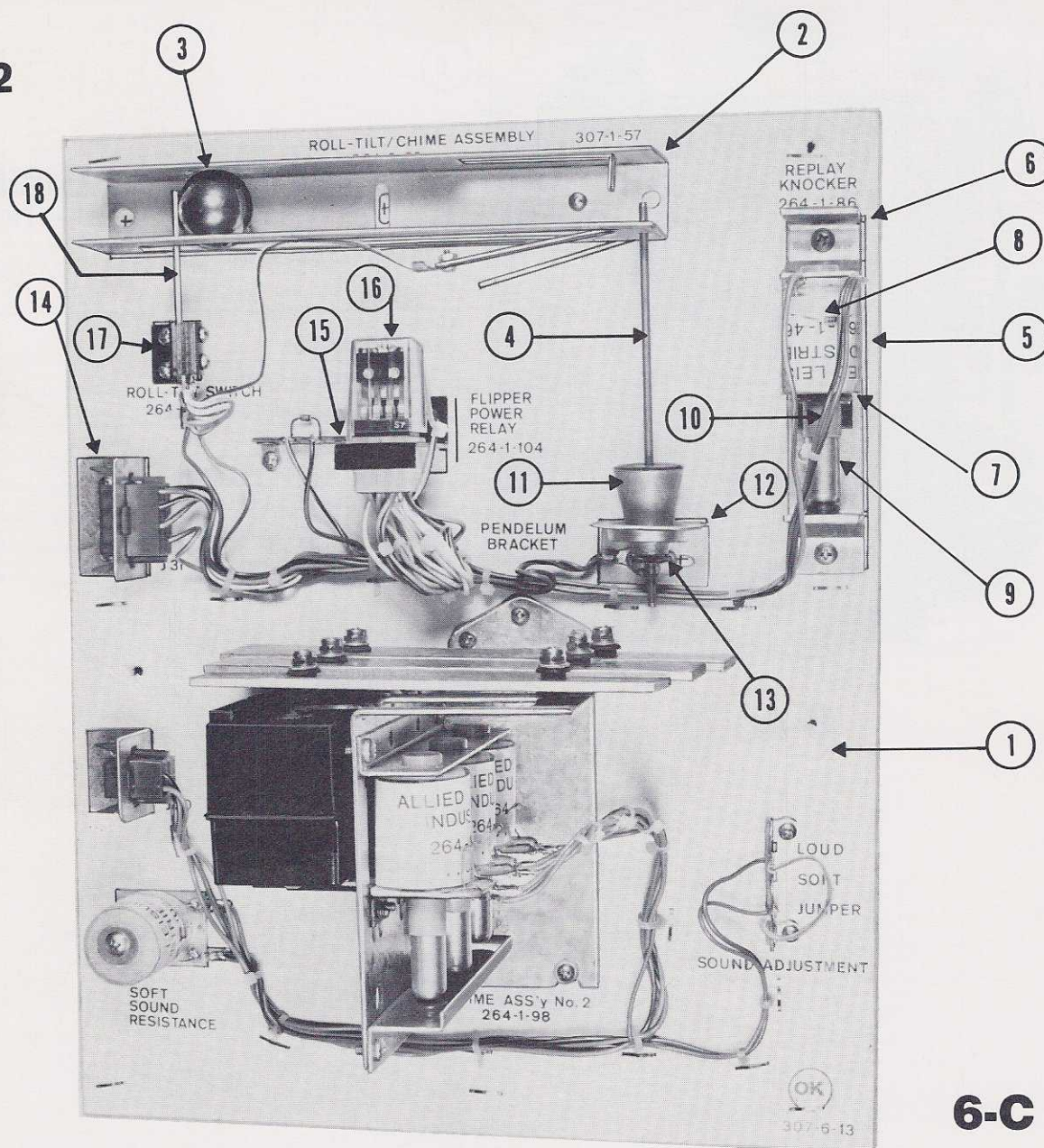
6-A

CASH BOX



6-B

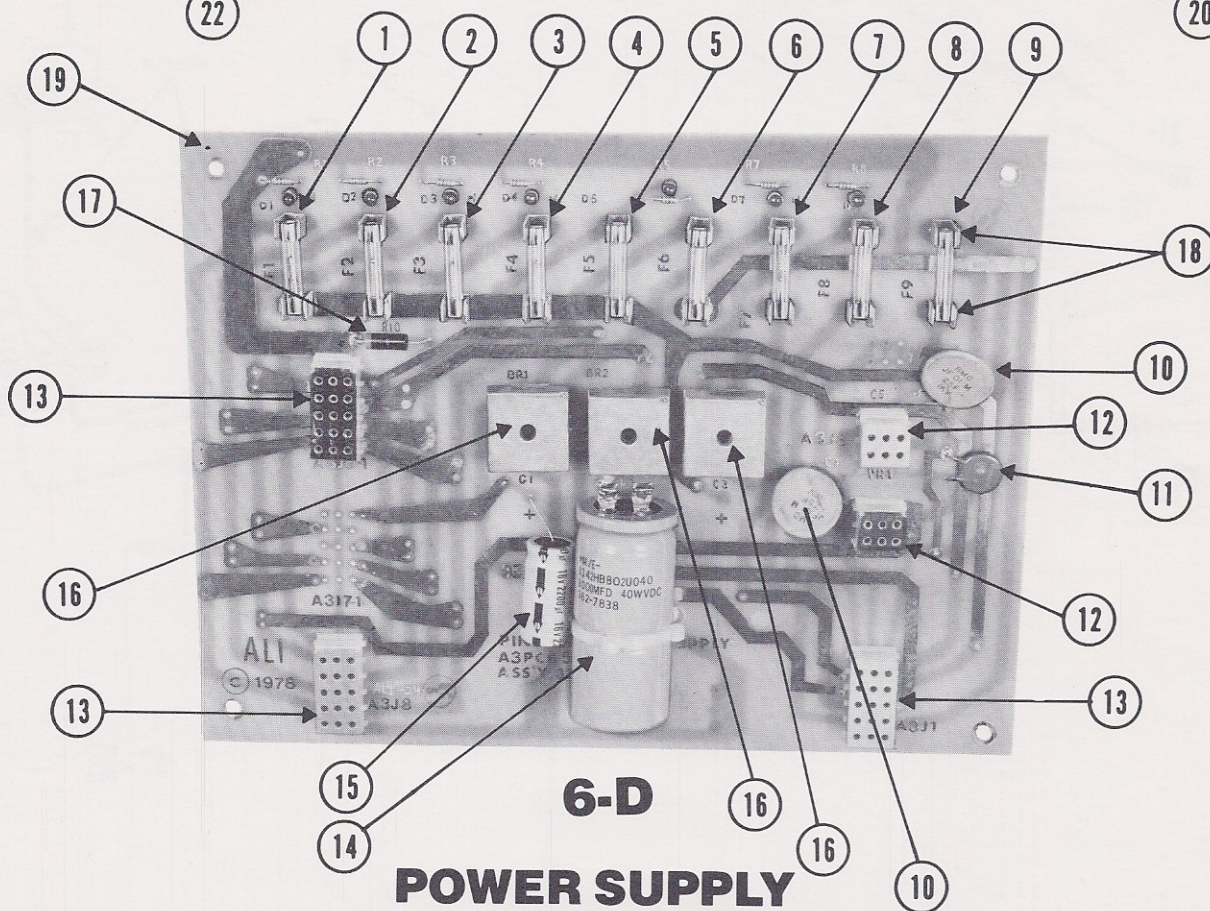
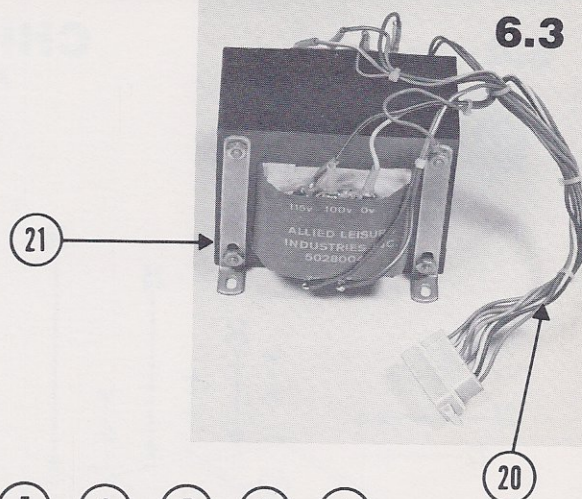
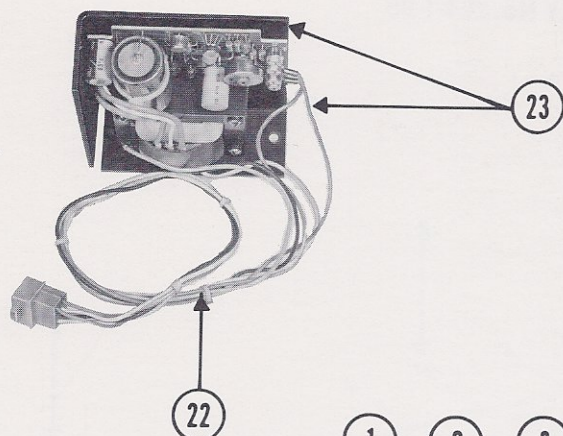
6.2



6-C

ROLL-TILT/CHIME ASSEMBLY No. 307-1-57

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	Roll-tilt board	307-4-1	10	Coil sleeve type "B" 2.705" long	264-8-142
2	Roll-tilt bracket	264-3-62	11	Roll-tilt weight	264-5-1
3	Steel ball	264-8-141	12	Pendulum bracket	264-3-63
4	Rod alignment	307-2-2	13	Tinnerman clip	10130018
5	Replay knocker assembly	264-1-86	14	12-pin connector bracket	240-3-169
6	Knocker bracket-weldment	235-1-91	15	Bracket small relay	250-3-11
7	Solenoid bracket #2	264-3-53	16	Relay assembly	264-1-104
8	Coil and diode assembly	264-1-46	17	Bracket switch holder	307-3-2
9	Solenoid plunger assembly type "D"	235-1-45	18	Switch assembly roll-tilt	264-71-113



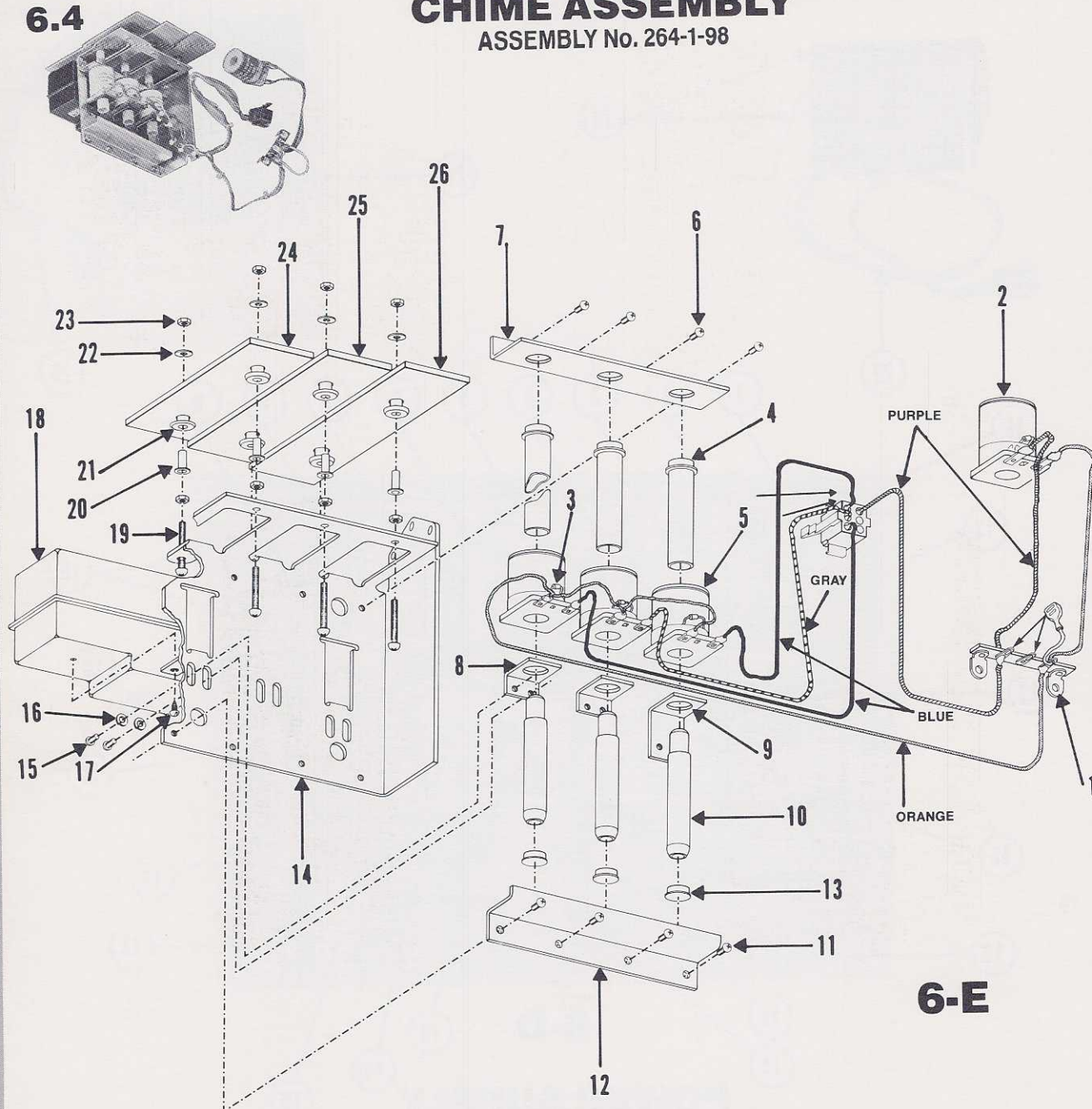
6-D **POWER SUPPLY** ASSEMBLY No. 324-01-1000

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	F1 2 ASB Flipper Coil Group 34 VDC	—	13	15 Pin Female PCB Header Connector	50150059
2	F2 2 ASB 9-OHM Coil Group 34 VDC	—	14	8000 MFD/40V Capacitor	50060016
3	F3 1¼ ASB 110-OHM Coil Group 34 VDC	—	15	2200 MFD/16V Capacitor	50060058
4	F4 1¼ ASB Cabinet Coil Group 34 VDC	—	16	25 Amp 100L Bridge Rectifier	50100031
5	F5 8 ANB AC Lamp 6.3 VAC and 34 VDC	—	17	820 OHM 2-watt Resistor	50030050
6	F6 8 ANB AC Lamp Return 6.3 VAC and 34 VDC	—	18	Fuse Cips (18 per board)	50230014
7	F7 2 ASB LED Displays 6 VDC	—	19	Pinball Power Supply PCB	50213240
8	F8 4 ANB DC Lamps 7 VDC	—	20	Harness for Transformer	324-12-0200
9	F9 4 ANB AC Line 115 VAC	—	21	Transformer	50280047
10	.01 MFD/1KV Ceramic Disc Capacitor	50040004	22	Harness for 5V Power Supply	324-12-0400
11	V130 LA 10 A GE Mov. Varistor	50270065	23	5V Power Supply	50270064
12	6 Pin Female PCB Header Connector	50150068			

6.4

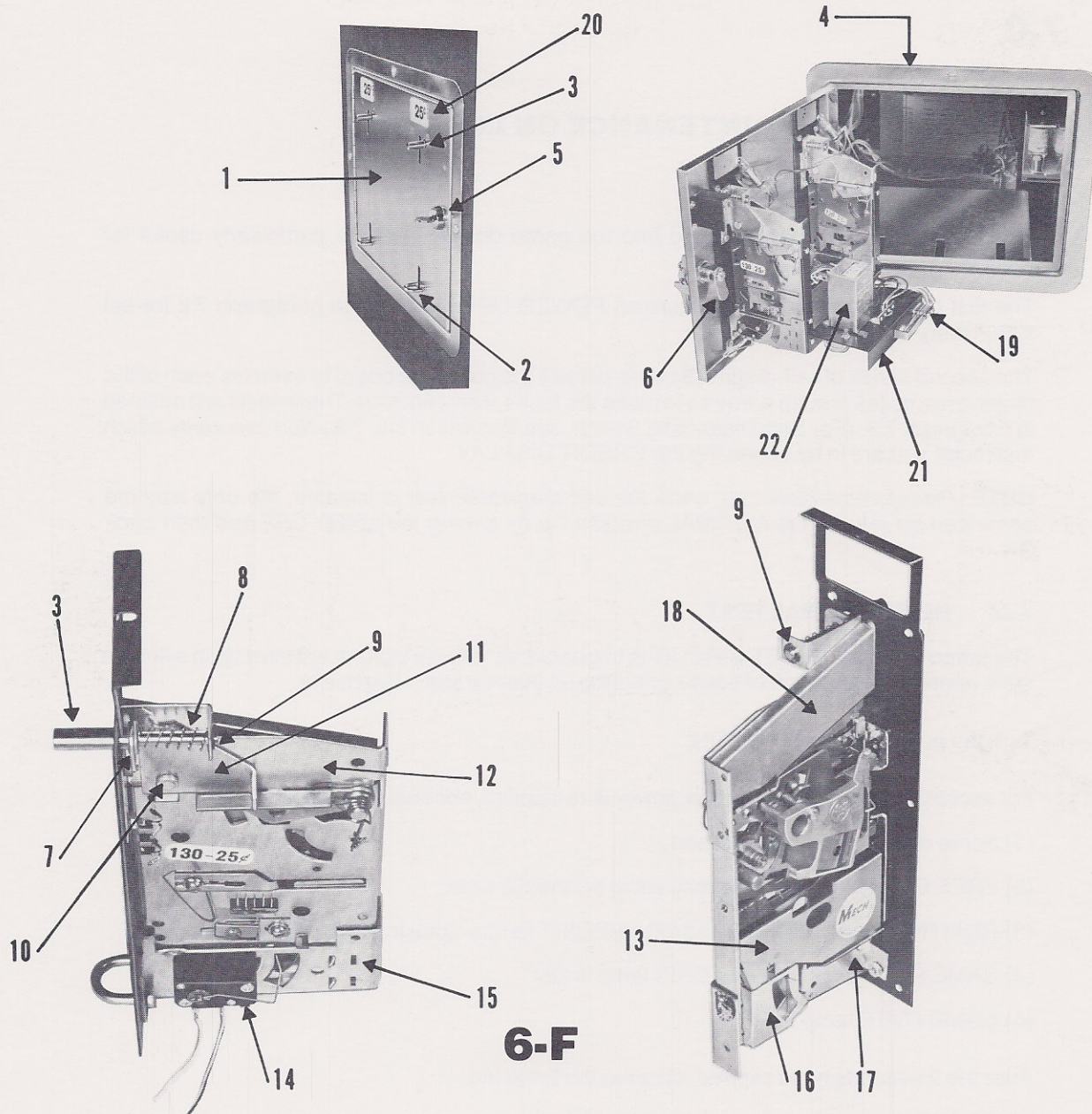
CHIME ASSEMBLY

ASSEMBLY No. 264-1-98



6-E

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	3-lug terminal strip	50220003	14	Chime bracket	264-3-101
2	1152 coil assembly	264-1-102	15	No. 6-32 x 5/16" Phillips P.H.M.S.	10010031
3	2-amp diode	50100010	16	Lock Washer #6 split	10200001
4	Coil sleeve	264-8-142	17	No. 6 x 1/2" Phillips P.H.S.M.S.	10040025
5	Coil	264-1-102	18	Chime sound box assembly	264-1-141
6	No. 8-32 x 1/4" Phillips P.H.M.S.	10010035	19	No. 6-32 x 1" Phillips P.H.M.S.	10010106
7	Bracket coil	264-3-103	20	Eyelet brass	10260002
8	Solenoid brkt #2	264-3-53	21	Grommet rubber	292-8-1
9	Solenoid brkt #3	264-3-110	22	Washer 3/16" ID 7/16" OD x 1/32" thick	10190029
10	Solenoid plunger Type "D"	235-1-45	23	6-32 fiber lock nut	10140003
11	No. 8-32 x 1/4" Phillips P.H.M.S.	10010035	24	Chime Bar "A"	264-3-113
12	Brkt solenoid plunger stop	264-10-59	25	Chime Bar "B"	264-3-114
13	Rubber pads	235-8-68	26	Chime Bar "C"	264-3-115



6-F

COIN DOOR ASSEMBLY (Double)

ASSEMBLY No. 315-1-54

LOCATION	DESCRIPTION	PART No.	LOCATION	DESCRIPTION	PART No.
1	Coin Door	315-3-24	12	Coin Rejector Track Mtg Brkt	307-3-26
2	Coin Return Guard	307-2-6	13	Coin Acceptor (25c)	235-8-516
3	Coin Rejector Button	307-2-5	14	Cherry Switch SPDT (E-51)	50130003
4	Coin Door Frame	315-3-26	15	Coin Switch Plate	307-3-23
5	Fortlock	235-8-45	16	Coin Switch Guide	307-3-24
6	Lock Tongue	264-3-152	17	Coin Rejector Cup	307-3-22
7	Nylon Washer	307-5-2	18	Coin Track	307-3-25
8	Compression Spring	307-8-12	19	Slam Switch	288-1-19
9	"E" Ring (#5133-12)	10270001	20	25c Plastic Insert	235-6-21
10	Rivet Coin Reject Assembly	307-2-4	21	Coin Counter Bracket	315-3-9
11	Coin Reject Lever	307-3-27	22	Coin Counter Assembly	315-1-69

7.0

7.0 ROUTINE MAINTENANCE ON LOCATION

7.1 INTRODUCTION

Self-test routines are programmed into the game design, and are particularly useful for routine maintenance.

The first test is automatic and occurs on POWER-UP as outlined in paragraph 7.2 (re-set signal test).

The second series of self-diagnostic tests causes the computer board to exercise each of the major assemblies in such a way as to make the faults, if any, obvious. These tests are outlined in paragraph 7.3. (For Self-Diagnostic Switch, see illustration No. 7-A). You can verify which test mode you are in by observing the CREDIT DISPLAY.

NOTE: *Please remember that, once the self-diagnostic test is initiated, the only way the game can be returned to NORMAL operation is by turning the power OFF and then back ON.*

7.2 RE-SET SIGNAL TEST

The purpose of the RE-SET CIRCUIT is to guarantee that the system will start up in a known state upon the application of power or during an intense static discharge.

Turn the power OFF and then ON.

For approximately 2 seconds after power is re-applied, observe the following:

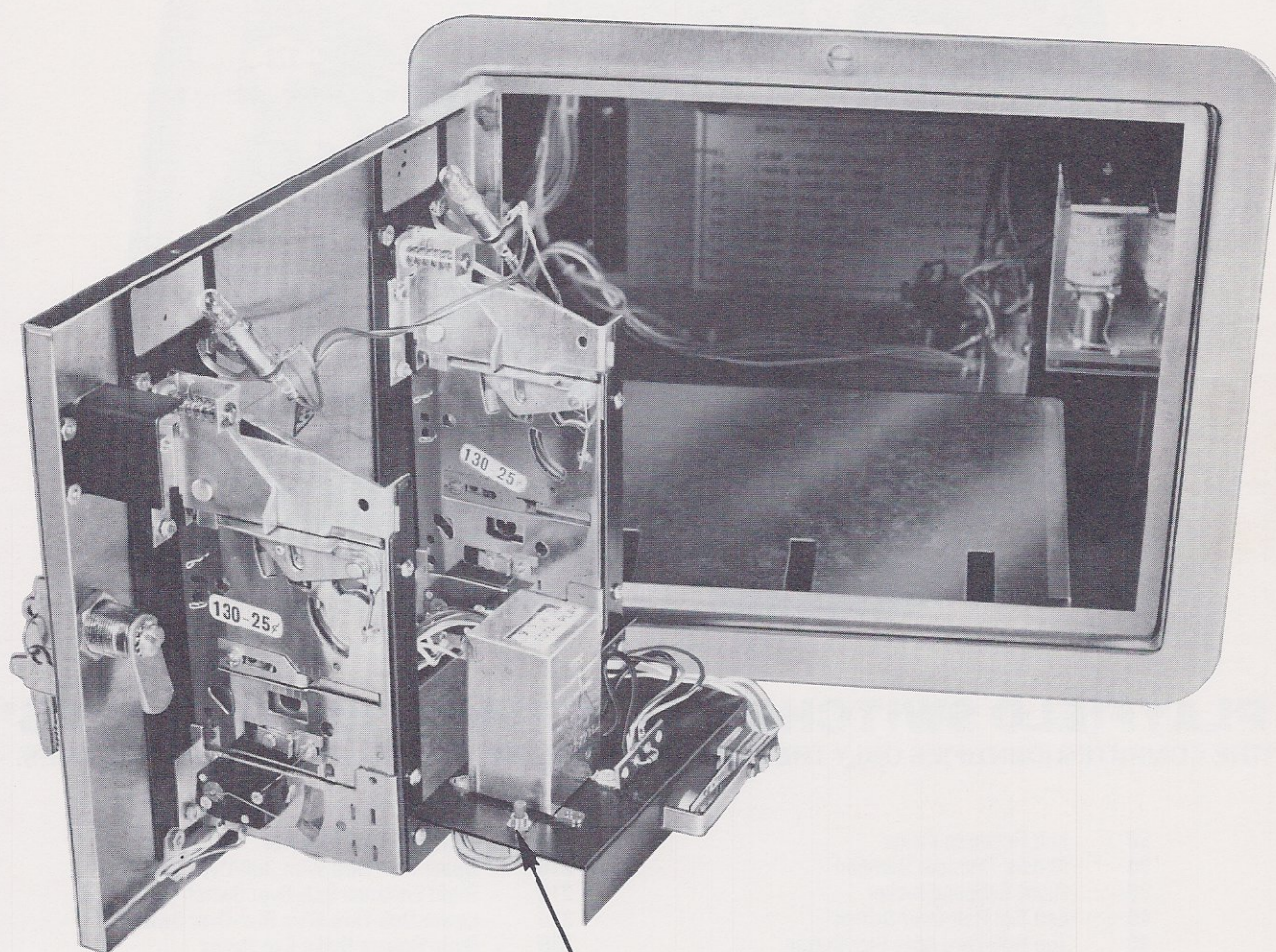
- (1) Score displays are extinguished.
- (2) FREE GAME credit display may show erroneous data.
- (3) Right REBOUND KICKER and left 10-POINT lamps close to the FLIPPERS are OUT.
- (4) SAME PLAYER SHOOT AGAIN lamp is ON.
- (5) GAME OVER lamp is OFF.

After the 2 seconds have expired, observe the following:

- (1) SCORE displays re-light and re-set to all 0's.
- (2) FREE GAME credit display lamps light and re-set to 00.
- (3) GAME OVER lamp flashes.
- (4) REBOUND KICKER and 10-POINT lamps come ON.
- (5) SAME PLAYER SHOOT AGAIN lamp goes OFF.
- (6) No COILS (solenoids) should energize at this time.

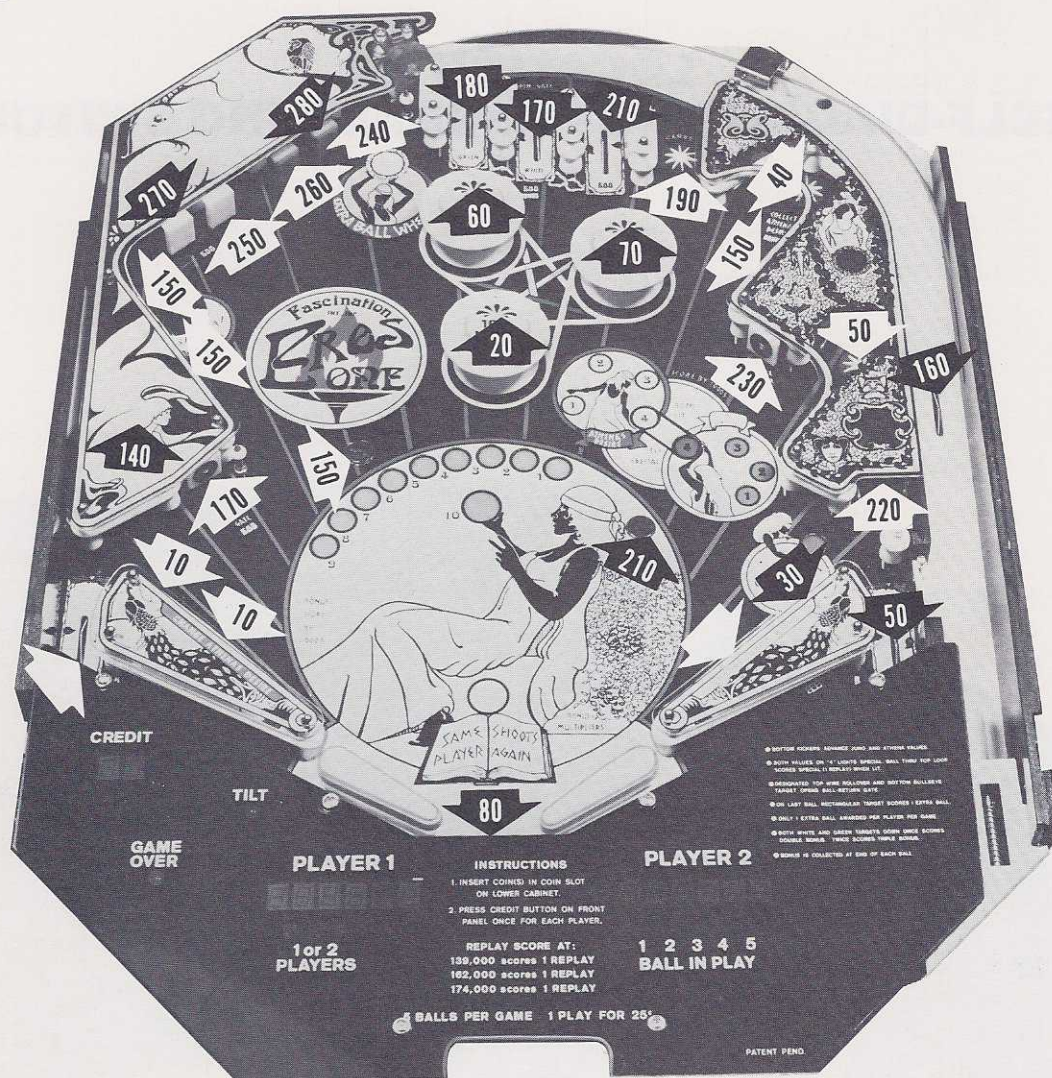
In the event that the game does not re-set as outlined above, please refer to paragraph 8.1.

LOCATION OF SELF-DIAGNOSTIC PROGRAMMING SWITCH



7-A

**SELF-DIAGNOSTIC
SWITCH**



PLAYFIELD SWITCHES IDENTIFICATION NUMBERS*

*THE COMPUTER IDENTIFIES ONLY THE NUMBERS INSIDE THE ARROWS LOCATING THE SWITCHES.

10	Left Rebound Kicker	190	Entrance Star Roll-Over
20	Middle Thumper Bumper	210	Upper Roll-Thru Wire Roll-Over Switch
30	Right Rebound Kicker	210	Right Entrance Roll-Over Switch
40	Left Exit Roll-Over Switch	220	Lower Roll-Thru Wire Roll-Over Switch
40	Top Roll-Thru Alley Star Button	230	Right Square Bull's-Eye Target
50	Right Exit Roll-Over Switch	240	Rectangular Bull's-Eye Target
50	Lower Roll-Thru Alley Star Button	250	Upper White Drop Target
60	Left Thumper Bumper	260	Lower Green Drop Target
70	Right Thumper Bumper	270	Lower White Drop Target
80	Outhole Kicker	280	Upper Green Drop Target
140	Special When Lit	310†	Tilt Switch
150	10-pts Rail Switches	320†	Credit Switch
160	Ball in Play Switch	330†	Slam Switch
170	Lower Left Bull's-Eye Target	340†	Coin Switch No. 1
170	Middle Entrance Roll-Over Switch	350†	Coin Switch No. 2
180	Left Entrance Wire Roll-Over	360†	Coin Switch No. 3

†Not shown in illustration 7-B.

7.3 SELF-DIAGNOSTIC TESTS

7.3.1 TEST MODE ONE (Credit & Score LED's)

To initiate this test, remove the ball from the OUT-HOLE and press the Self-Diagnostic switch (see illustration No. 7-A). Both SCORE DISPLAY and CREDIT DISPLAY LED's should sequence from 0 through 9, and repeat.

NOTE: *The first digit on the right side of both SCORE DISPLAYS will always be zero.*

7.3.2 TEST MODE TWO (Stuck Switch and Switch Verification Test)

(a) Press CREDIT button for 5 seconds (see illustration No. 7-A).

(1) Game credit display shows "02."

(2) Left side score display will show the number of any switch that is closed.

(b) Momentarily press each switch to verify recognition by the computer. . . switch number will be displayed on Score Display No. 1.

7.3.3 TEST MODE THREE (Vibration Test)

(a) Press the test switch for 2 seconds. The game credit display should now show "03."

(b) Tap very lightly the surface of the PLAYFIELD.

If there are any switches not correctly adjusted (gap too close), the number of such switch will be displayed and latched in score unit No. 1. Make the necessary adjustments as per paragraph 8.5. To unlatch the number from the score display, press the GAME START button.

7.3.4 TEST MODE FOUR (Lamps Test "A")

Press the test switch for 2 seconds. . . credit display now shows "04." Ignore any numbers on the score display. The THUMPER BUMPER lamps and background lamps should be lit through this test. The following lamps also should be lit:

- (a) EXTRA BALL WHEN LIT.
- (b) JUNO's WISH 1, 2, 3 and 4.
- (c) ATHENA's DESIRE 1.
- (d) SPECIAL WHEN LIT.
- (e) EXTRA BALL WHEN LIT.

NOTE: *Ignore GAME OVER lamp.*

7.3.5 TEST MODE FIVE (Lamps Test "B")

Press the GAME START button for 2 seconds. . . CREDIT DISPLAY now shows "05." Please observe what happens:

These lamps should be lit:

- (a) ATHENA's DESIRE 1, 2, 3 and 4.
- (b) 10,000 BONUS lamp, DOUBLE BONUS lamp and TRIPLE BONUS lamp.

NOTE: *THUMPER BUMPER and SLING-SHOT lights are OUT at this point.*

7.3.6 TEST MODE SIX (LED's and Lamps Test "A")

Press the CREDIT button for 2 seconds. . . CREDIT DISPLAY now shows "06." These lamps should be lit:

- (a) SAME PLAYER SHOOT'S AGAIN (on older machines, this reads "SAME PLAYER ENCORES").
- (b) BALL IN PLAY LED 1, 2, 3, 4 and 5.

NOTE: *THUMPER BUMPER and SLING-SHOT lights come ON.*

7.3.7 TEST MODE SEVEN (LED's and Lamps Test "B")

Press the CREDIT button for 2 seconds ... credit display now shows "07." The following should happen.

PLAYERS 1 and 2 LED's ON.

NOTE: *In this MODE all score displays should extinguish.*

7.3.8 TEST MODE EIGHT (Lamps Test "C")

Press the CREDIT button for 2 seconds ... credit display now shows "08." The following should happen:

- (a) The BONUS lamps count down from 9,000 to 1,000. (The 10,000 lamp was tested in MODE FIVE.)
- (b) The GAME OVER lamp flashes after the 1,000 BONUS lamp.
- (c) The TILT lamp flashes after the GAME OVER lamps.

NOTE: *Refer to paragraph 8.3 for trouble-shooting instructions on the lamp.*

7.3.9 TEST MODE NINE (Coils Test)

Press the CREDIT button for 5 seconds ... credit display now shows "09." Ignore the score displays during this test. The coils (solenoids) should energize in the following sequence:

- (a) Left REBOUND KICKER and upper white DROP TARGET.
- (b) Middle THUMPER BUMPER and lower green DROP TARGET.
- (c) Right REBOUND KICKER and lower white DROP TARGET.
- (d) Upper green DROP TARGET.
- (e) Left THUMPER BUMPER.
- (f) Right THUMPER BUMPER.
- (g) HOLE KICKER.
- (h) 1,000-point CHIME (low tone).
- (i) 100-point CHIME (middle tone).
- (j) 10-point CHIME (high tone).
- (k) REPLAY KNOCKER.
- (l) FREE BALL (FLAG) GATE.

NOTES: (1) *FLIPPER buttons must be held IN for FLIPPER coils to energize immediately after REPLAY KNOCKER.*

(2) *If coils do not function properly, refer to paragraph 8.4.*

7.3.10 TEST MODE TEN (Combination Test)

This test is used primarily for preliminary wear testing procedure at the factory, but can be used as a method of testing newly installed logic board.

Press CREDIT button for 10 seconds. The CREDIT DISPLAY should now display "0c."

8.0 TROUBLE-SHOOTING GUIDE

Never EXPERIMENT with any mechanism! Improper adjustment or makeshift repair will only cause either serious damage to other parts of the machine or repeated failure of the part.

To properly service/repair this machine in a minimum time, it is necessary to isolate the problem to a specific circuit. A system of logical elimination will reduce the number of possible trouble spots. . . the self-diagnostic tests (refer to paragraphs under 7.3) built into this game are designed particularly to expedite location of problems.

In many situations, attempting to play the game and observing the results may be helpful. . . also careful reasoning along with reference to the schematic may determine the cause of the problem.

A visual inspection of the components in a suspected area may often save time. Always look for a possible loose wire, a bad connection at a plug or socket, or a broken/unhooked spring.

8.1 RE-SET CIRCUIT

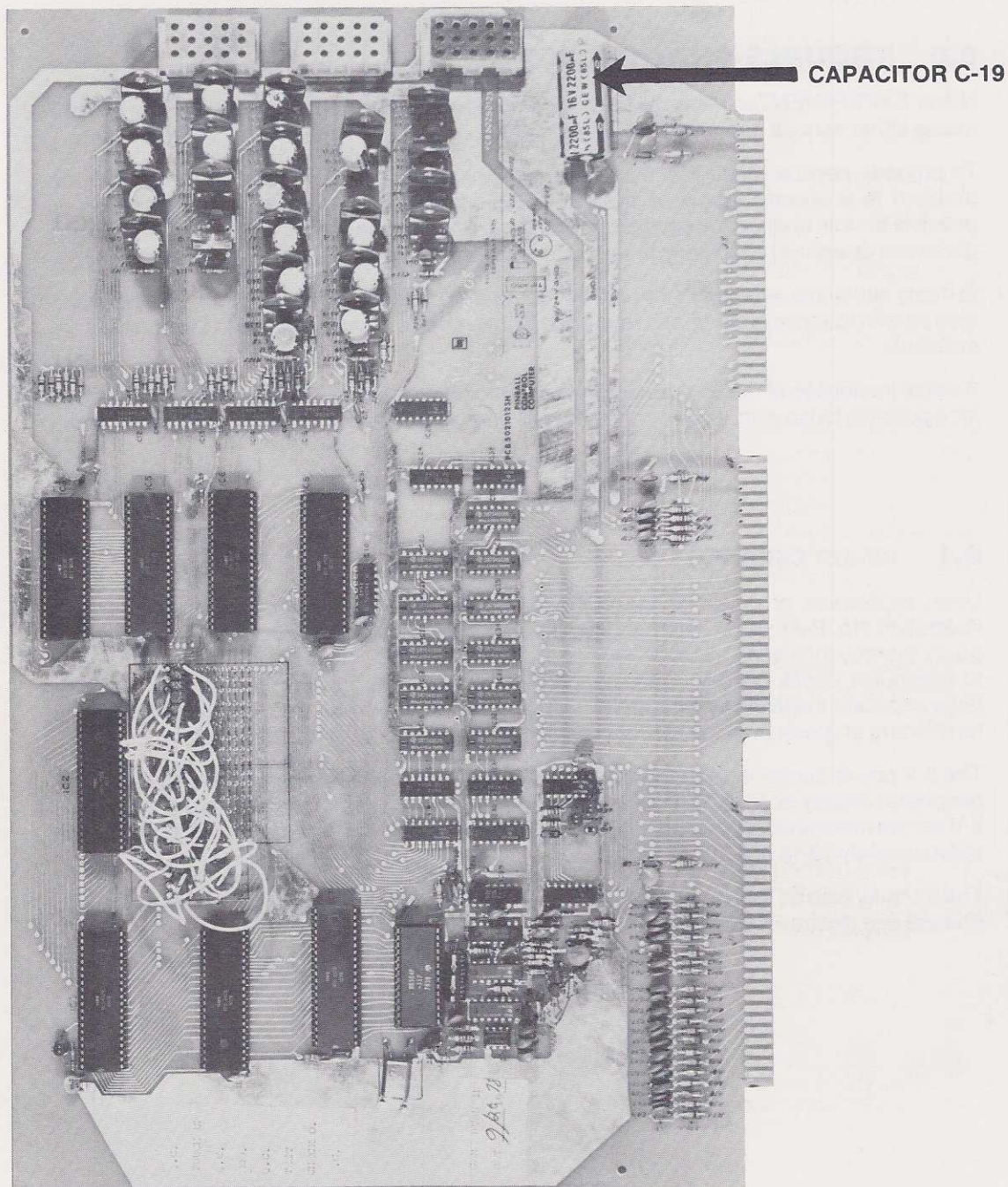
Upon application of power to the game, LED No. 1 on the main computer board (see illustration No. 8-A) should momentarily light for approximately 2 seconds and then extinguish, thereby indicating a proper re-set condition. If this LED does not come ON, or refuses to extinguish, check the 5-V power supply. If the computer board has 5-V across C-19 (the large capacitor in the lower right-hand corner. . . see illustration No. 8-B) and LED No. 1 is not functioning properly, then the malfunction is the re-set circuitry on the main board.

The 5-V power supply is used to supply regulated 5-V power to the computer board and the peripheral display boards. This circuit should regulate between 4.8 VDC and 5.2 VDC. This 5-V can be measured across the 8,000 mfd output capacitor. The input capacitor should have approximately 13-14 VDC.

The 5-V may also be measured across C-19, the 2,200 mfd capacitor on the computer board. (Please see illustration No. 8-B.)

8.1 COMPUTER CONTROL LOGIC BOARD

ASSEMBLY No. 307-1-17



8-A

8.2 DISPLAYS

ALWAYS DISCONNECT power BEFORE removing or replacing any printed circuit board.

8.2.1 SCORE DISPLAY (illustration No. 8-B)

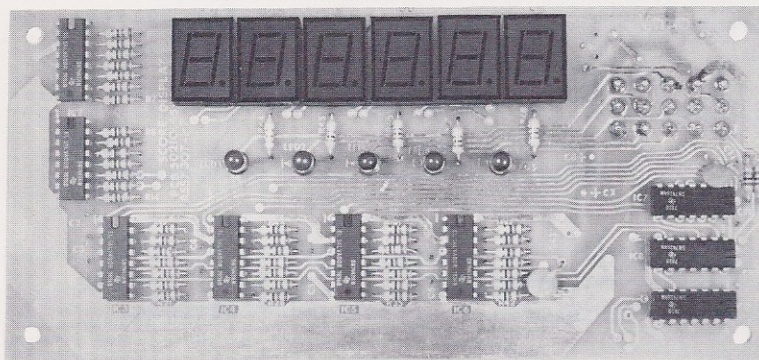
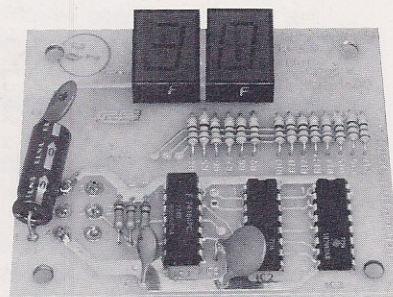
The best way to test for the proper score unit function is in the Self-Diagnostic Test procedure. If a score unit is suspected, it can be interchanged with another unit known to be good.

The following signals are necessary to light the score display:

- (1) 4.8-5.2 VDC
- (2) 7.8 VDC
- (3) Proper score blanking (LED No. 4 on the main computer board should be momentarily flashing).
- (4) Proper data from the computer board (LED No. 3 should be momentarily flashing).
- (5) Proper score clock signal.

A quick way to check for score blanking is to check LED No. 4 on the main computer board. LED No. 4 should be ON during power re-set, and should momentarily blink whenever score unit No. 1 is updated or blanked out. If you are uncertain about whether the problem of the score units being continually extinguished is due to a bad blanking signal, then you should perform the following:

- (1) Remove game power.
- (2) Completely remove the computer board.
- (3) Re-apply game power. If the score unit now lights, then the faulty blanking signal is due to a bad computer board.

**8-B****8-C**

8.2.2 CREDIT DISPLAY

The operation of the CREDIT display board (see illustration No. 8-C) is identical to that of the SCORE unit with the exception that the CREDIT unit does not require a blanking signal.

TO REMOVE the SCORE or CREDIT displays, you should proceed as follows:

- (1) Remove the score glass.
- (2) Unscrew the respective mounting screws.
- (3) Separate the connectors and remove the unit.

8.3 LAMPS

The background lamps, such as ENTRANCE GATE lamps, with the exception of the REBOUND KICKER lamps, are in normal circuit operating on 6 VAC as shown on the schematic.

All lamps tested in the self-diagnostic mode are driven from the main computer board. All of these lamps have one side tied to +7.8 VDC.

The other side of each lamp is switched by the computer board to system ground.

If, during the self-diagnostics, a lamp malfunctions, the socket should be checked with a known-good lamp.

If none of the lamps light during the self-diagnostics test, then trouble-shoot the +7.8 VDC power supply.

If the main computer board is suspected, a quick test to check the continuity of a particular lamp circuit is as follows:

- (1) Remove game power.
- (2) Completely remove the main computer board.
- (3) Re-apply game power.

REMEMBER: The only function the computer board performs when turning on a lamp is to supply system ground. Thus, if you take a jumper from system ground to the output pin from the computer board which connects to the lamp, the lamp should light if the harness and power supply are working properly.

WARNING: Do NOT do this unless the computer board is removed!

Refer to the game schematic to get proper pin connections. If the suspected circuit functions properly, then the fault is on the computer board.

The GAME OVER, TILT and REBOUND KICKER lamps all have one side tied to +7.8 VDC. The other side of the lamp is switched to system ground through a circuit similar to that which drives the coils... if suspected, these lamps can be tested in the same manner as above.

8.4 COILS

All of the coils in the game (including the FLIPPER power relay located on the ROLL/TILT assembly) have one side tied to +32 VDC. The computer board switches these coils to system ground to complete the circuit thus energizing the coil.

If a coil driver on the computer board is suspected, a quick test of the remaining circuitry is performed as follows:

- (1) Remove system power.
- (2) Completely remove main computer board.
- (3) Re-apply power.

REMEMBER: The only function the computer board performs when turning on a coil is to supply system ground. Thus, if you take a jumper from system ground to the output pin from the computer board which connects to the coil, the coil should energize if the circuit is working properly.

WARNING: Do NOT do this unless the computer board has been completely removed from the game!

8.5 SWITCH ADJUSTMENTS

NOTE: *Before cleaning or adjusting switch assemblies, be sure to remove power from the game.*

All switch assemblies on the game contain basically the following: leaf springs, contacts, spacers and insulators.

Some leaf springs have contacts and others do not. The leaf springs without contacts are the ones used for adjusting the separation between those that do ... for which the special CONTACT ADJUSTER must be used.

Before attempting to adjust a switch assembly, be sure that the screws used to hold the assembly to the mounting surface are tight. If not, tighten the screw closer to the contact first. This will prevent the assembly from being secured in a manner that would cause the leaf springs to fan out.

Unless instructed otherwise in this manual, contacts should be adjusted for approximately 1/16" in the OPEN position and 1/64" follow through in the CLOSED position.

The contacts are plated to resist corrosion and, except for the FLIPPER ACTIVATOR switches, should not be filed or sanded. Such action would damage the finish, thereby causing corrosion. The contacts should be dry and free of dust and dirt. The proper way to clean the contacts is by placing an absorbent piece of paper between them, close them, and then gently slide out the paper. This may be repeated if necessary until the contacts are clean.

Tarnish on the flipper activator switches can be removed with a contact file followed by a burnishing tool.

All contacts should be cleaned or adjusted ONLY when they are found to be the source of game malfunction. If a switch is suspected of not performing its function, please refer to the SELF-DIAGNOSTIC TEST MODE TWO (paragraph 7.3.2) to verify switch recognition by the computer board.

Severely pitted contacts must be replaced as an assembly.

8.5 CONTACT ADJUSTMENT

The CONTACT ADJUSTER (see illustration No. 8-D) is vital for proper switch adjustment. We do stress, however, that improper or over-use of the tool can cause fatigue or eventual breakage of switch blades.

Before attempting to adjust a switch, be sure that such adjustment is necessary by first going to the SELF-DIAGNOSTIC TEST MODE TWO (paragraph 7.3.2) to determine whether or not the switch is being recognized by the computer board.

If it is NOT being recognized, then clean the contacts and go back to SELF-DIAGNOSTIC MODE TWO. If the switch is still not being recognized, then insert the contact adjuster in approximately the same location as shown in illustration No. 8-D. Apply only a small amount of pressure!

CAUTION: It is very important not to over-bend the switch blade in the attempt to adjust it properly.

After the adjustment has been made, then go back to SELF-DIAGNOSTIC TEST MODE TWO. When you are satisfied that the switch is being recognized, then proceed to SELF-DIAGNOSTIC TEST MODE THREE (paragraph 7.3.3) to verify that the contacts are not too close.

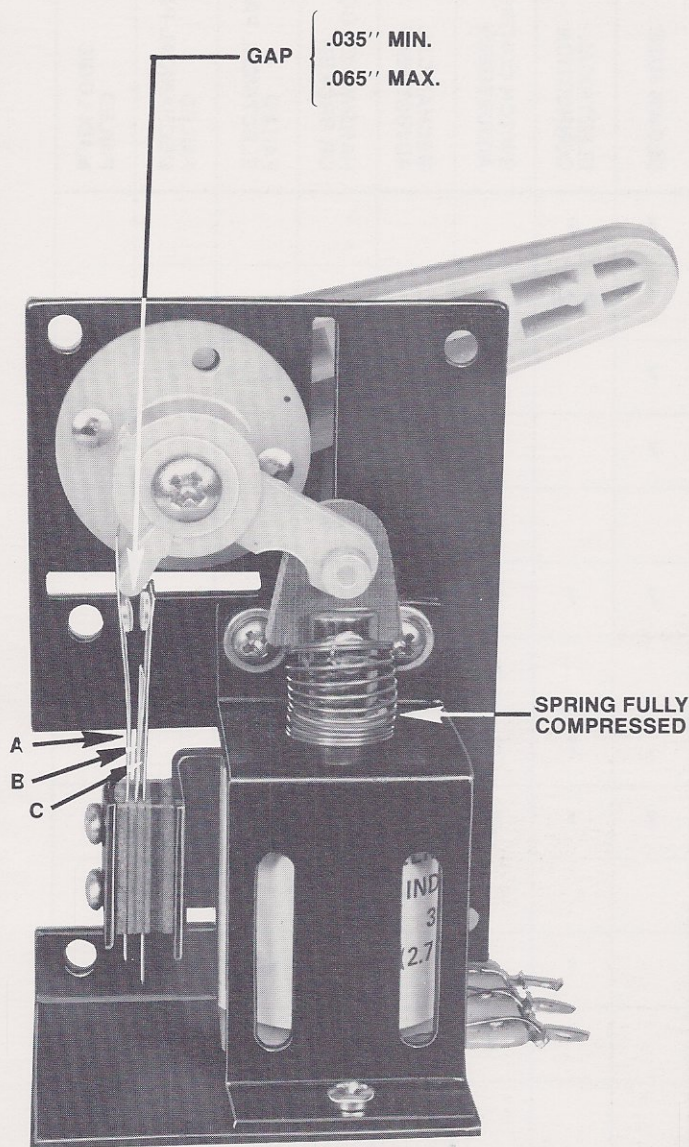
8-D

CONTACT
ADJUSTER



FLIPPER SWITCH CONTACTS

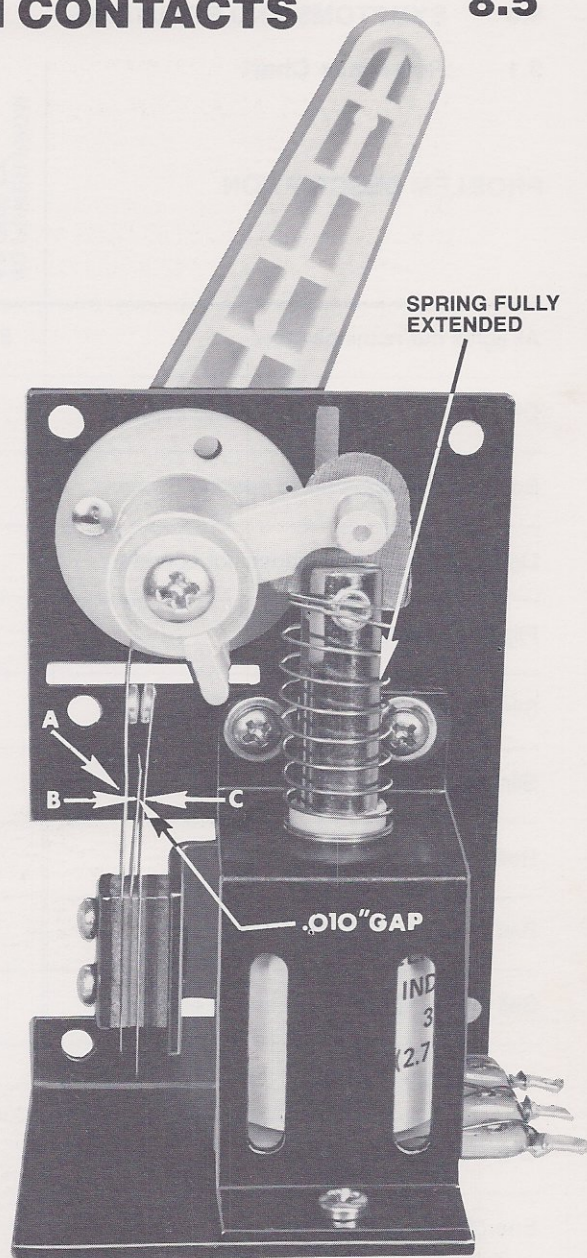
8.5



8-E

IN OPEN POSITION

The proper adjustment of flipper switch with contacts in the "OPEN POSITION" is to have Blade "A" and "C" having a minimum gap of .035" and a maximum gap of .065". This is accomplished by having Blade "B" touching Blade "C," thus preventing Blade "C" from moving, at desired gap.



8-F

IN CLOSED POSITION

The proper adjustment of flipper switch with contacts in the "CLOSED POSITION" is by having:

Blade "A" straight up (vertical).

Blade "C" being bent from Blade "A."

Blades "B" and "C" having a minimum gap of .010"

9.0 SYMPTOMS AND SOLUTIONS

9.1 Reference Chart

PROBLEM DESCRIPTION

	NO POWER FROM AC OUTLET	BLOWN FUSE	ELECTRICAL CONNECTION	SWITCH CONTACT ADJUSTMENT	MECHANICAL ADJUSTMENT	HARDWARE LOOSE OR BROKEN	FAILED ELECTRICAL PART	FAILED MECHANICAL PART	FAILED MAIN LOGIC
All lights out/nothing works	6	7	8						
One Push Button fails to operate Flippers			9,10	5					
Both Push Buttons fail to operate Flippers		7		5			12,11	9	
Lights on but machine does not operate		7							14
Flippers work poorly				5	24	17		25	
Sling-Shot Kicker does not work		7	1	13			12		
Sling-Shot Kicker works poorly				13	24	17		25	
Rollovers do not work			1	13					
Ball Out-Hole Kicker does not work		7	1	13			12		
Ball Out-Hole Kicker not strong enough					18	17			
Single Lamp out			1				15,16		
One Flipper weak				4					
Energizing Flipper blows fuse							3		
Energizing Thumper, Sling-Shot, Out-Hole Kicker, Replay Kicker, etc. blows fuse							2		
Drop Target does not score			1	13					
1 Drop Target does not return			1	13	24	17	12		
"No Double Bonus" All Drop Targets do not return			1	13					
Thumper Bumper does not score			1	13					
Thumper Bumper action slow				13	24	17		25	
Thumper Bumper stays on and then shuts off for the rest of the game				13					

PROBLEM DESCRIPTION	NO POWER FROM AC OUTLET	BLOWN FUSE	ELECTRICAL CONNECTION	SWITCH CONTACT ADJUSTMENT	MECHANICAL ADJUSTMENT	HARDWARE LOOSE OR BROKEN	FAILED ELECTRICAL PART	FAILED MECHANICAL PART	FAILED MAIN LOGIC
Thumper Bumper does not energize but scores			1				12		
Gate does not open				13					
Gate does not close			1	13			12		
500 & 1000 Pt. Targets do not work			1	13					
Replay Klocker does not sound			21				12		
Score does not stop flashing			1	13					
Line-Em-Up does not advance during game			21						
Line-Em-Up does not work at game over			19		19				
Does not give replay for high score			19		19				
Does not give replay for Line-Em-Up			19		19				
Does not accept coin									
Credits do not count down to start new game			1	13					23
Gives wrong number of credits			19		19				
Accepts coin but does not give credit			1		20				
Credit display not lit		7							
Score Unit will not score			21				22		
Score Unit changes score intermittently							22		
Score Unit Display not lit			21						
All Score Units not lit		7	21						

9.2 SOLUTIONS TO PROBLEMS IN REFERENCE CHART

- 1** When trouble-shooting a problem dealing with switch contact or electrical connection, always begin by going to TEST MODE TWO (paragraph 7.3.2). In this way the machine itself can tell if it is seeing a switch closure. Check solder joints at switch or lamp socket. Check each connector in harness making sure that it is firmly connected. Remove P.C. Board from game, and check for residue at each contact along edge, especially the contact which pertains to the particular problem.

It is important to note that, if a switch gets stuck during game play, it may impair any or all other functions of the game. Do NOT mistake this for a bad connection in the other switches.

REMEMBER: Identify the stuck switch by using TEST MODE TWO, paragraph 7.3.2!

- 2** A diode is located on each solenoid. If the diode is shorted, then a fuse will blow when the solenoid is activated. Be careful to observe polarity.
- 3** A terminal strip containing two diodes is located adjacent to each flipper. If either diode is shorted, then a fuse will blow upon actuating the flipper. Replace both diodes, and be careful to observe polarity.
- 4** Located on each flipper assembly is a switch which should be closed until the end of the flipper stroke. When the flipper reaches the top of its stroke, this switch opens to approximately 1/32" (see illustration No. 4-C).

Clean contacts if necessary. Check all solder joints on flippers and terminal strip.

- 5** Flipper button should close contacts firmly. Clean and adjust contacts as described in paragraph 8.5.
- 6** AC cord should be firmly inserted in wall. Verify that wall outlet is good by connecting another appliance in its place.
- 7** Verify all fuses in power supply are good.
- 8** All connectors on power supply should be firmly connected.
- 9** All connectors in harness should be firmly connected.
- 10** Check all solder connections on switch.
- 11** Check flipper power relay by going to TEST MODE NINE (paragraph 7.3.9). It should energize periodically. If it does not, and is good, the problem is either No. 1 or No. 12.

9.2 SOLUTIONS TO PROBLEMS IN REFERENCE CHART (Continued)

- 12** Located on Main Logic Board is a section of drivers. All solenoids (except flippers), flipper power relay, coin counter and one set of four DC lamps are activated by one of these drivers. Each driver is turned on as follows:

The pulse coming from one line of an output port on a MOS IC goes into an inverter. When it goes low, the inverter output goes high and turns on a small transistor (6531 or 4400) through a 270 resistor. This transistor in turn drives a larger transistor (tip 3055).

When this transistor turns ON, its collector goes from approximately 32 VDC to .6 VDC, and thus drives its load (solenoid).

NOTE: *When a tip 3055 burns out, it is usually caused by overloading. Often the cause is a diode short-out. This condition should ALWAYS be corrected first.*

ALWAYS replace both 6531 and tip 3055 when one fails.

- 13** Switch contacts should be normally OPEN and set at approximately 1/32". Contacts should be cleaned and adjusted as outlined in paragraph 8.5.
- 14** Go to discussion on re-set circuitry in paragraph 8.1.
- 15** Go to discussion on lamps in paragraph 8.3.
- 16** Check to see if bulb is good by placing it in a known good location.
- 17** After prolonged use, screws may work themselves loose. Tighten where necessary.
- 18** Solenoid (coil) mounting bracket should form 90-degree angle with PLAYFIELD. Adjust if bent. Spring tension on plunger should be only enough to hold plunger up.
- Too much tension will result in ball not reaching shooter. Kicker should be aligned so that ball rolls straight up alley to shooter.
- 19** Check jumpers in program section of computer board as shown in illustration No. 2-A.
- 20** Coin switch should be activated fully by coin. Verify by going to TEST MODE THREE...drop a coin in several times.
- 21** Check each connector in harness making sure that it is firmly connected. Remove P.C. Board from game, check for residue at each contact along edge, especially the contact that pertains to your particular problem. Clean residue.
- 22** Exchange position of score unit to see if the unit itself is bad. Replace as necessary.
- 23** On the back of P.C. Board are jumper wires that directly affect the performance of the credit switch. They should be thoroughly checked in order to be sure that they are not shorting out any other connections...also be sure that they are firmly connected.
- 24** Each solenoid has a plunger, sleeve and spring as shown in illustration No. 4-B. This area should be free from dust, dirt or anything that might prohibit free movement.
- 25** Plunger and sleeve should be checked periodically for wear. After prolonged use, it may be necessary to replace one or both.

10.0

10.0 HOW TO KEEP YOUR MACHINE LOOKING NEW

PLAYBOARD on the game has an improved finish with excellent wearing qualities.

WARNING: Do NOT, under any circumstances, clean the board with water, water-and-soap solutions, or abrasive-containing cleaners.

Water will weaken the adherence of the paint to the board, and abrasives will shorten the life of the board by many thousands of plays. A wax cleaner with negligible abrasive contents used lightly but frequently will extend the life of the board to its full capabilities.

NOTE: *When waxing the Playfield, try to avoid getting wax into the "Star Roll-Overs" ... a wax build-up will cause the Roll-Over button to stick.*

The SCORE GLASS is made from plexiglass, which is extremely easy to mar or damage. The writing on the surface is painted on... DO NOT USE ANY ALCOHOL-BASED SOLUTION to clean the surface! We recommend a soft water-dampened cloth used lightly only when necessary.

The CABINET is covered almost entirely with formica. Do NOT use any furniture polish that contains OIL. Such polish would cause a "build-up," which would detract from the appearance of this machine.

To take care of the glass which covers the PLAYFIELD, you may use any good glass cleaner.

Do NOT use silicone spray or similar lubricants except as recommended in this manual for specific areas.

ORDER FORM

Order # _____

DATE ORDERED _____

CUSTOMER _____

DATE NEEDED _____

NAME _____

ADDRESS _____

SHIP VIA _____

SHIP TO _____

METHOD OF PAYMENT _____

ITEM	PART NUMBER	DESCRIPTION	QUANTITY	GAME SERIAL NO.
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

[illegible]

ORDER FORM

Order # _____

DATE ORDERED _____

CUSTOMER _____

DATE NEEDED _____

NAME _____

ADDRESS _____

SHIP VIA _____

SHIP TO _____

METHOD OF PAYMENT _____

ITEM	PART NUMBER	DESCRIPTION	QUANTITY	GAME SERIAL NO.
1				
2				
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CUSTOMER COMMENTS AND RECOMMENDATIONS

[illegible]