

CAPCOM
COIN-OP, INC.

FLIPPERS FOOTBALL



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OPERATORS MANUAL
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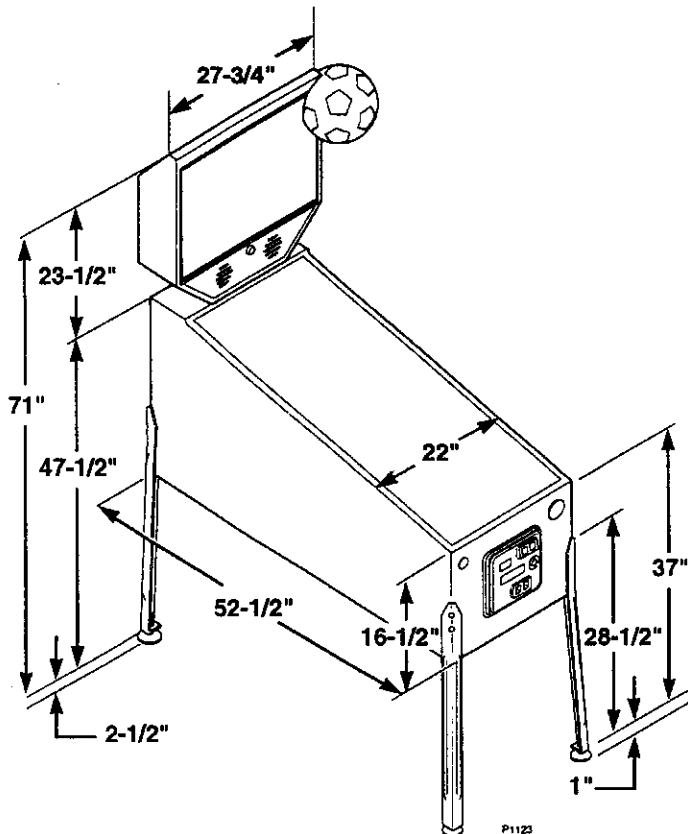


JIM ALEXANDER
ILLUSTRATIONS

GAME SPECIFICATIONS

CHARACTERISTIC	DESCRIPTION
ELECTRICAL INPUT RATINGS	100 to 115V AC 50/60HZ 8 AMPS 200 to 230V AC 50/60HZ 5 AMPS
CIRCUIT PROTECTION	Slow-Blo fuses, Varistor Surge Protection, IEC-Type Grounded Receptacle
SHIPPING CARTON INFORMATION	Height: 55-1/2"(1.41m) Width: 30-1/2"(0.77m) Depth: 30-1/2"(.77m) Weight: 255 Pounds (115.66Kg)
PRODUCT APPROVALS	FCC, Part 15, Class A Digital Device (Pending) CE Marking (Pending)
AUDIO SYSTEM	MPEG Digital Sound Processing
DISPLAY	256 X 64 Character, Hi-Resolution Dot Matrix
COIN DOOR	Standard: 2 Coin Acceptors Optional: Additional 2 Coin Acceptor or Bill Acceptor
OPERATOR ADJUSTABLES	Audio: Volume Control, Sound Effects Visual: Standard or Custom Display Messages Coinage: U. S. Standard; Custom Configuration for Foreign Currencies Play Mode: Player vs Player, Player vs Machine, Team vs Team, Free Play, Tournament, and Game Difficulty Level Game Play: Replay Percentage, Match Credits, Game Restart Password Protection: 3 Levels of Security
SPECIAL SOFTWARE FEATURES	•183 Individual Audits •11 Self-Test Modes •Adjustable Flipper Strength •6 Internal Diagnostic Levels •Automated Software Troubleshooting

CABINET DIMENSIONS



NOTE:

DIMENSIONS DO NOT INCLUDE CABINET AND BACKBOX PROTRUSIONS, SUCH AS THE BALL SHOOTER, COIN DOOR, FLIPPER BUTTONS, OR SOCCER BALL.

“GOAL GETTERS” CONTEST (SPECIAL TOURNAMENT MODE)

FLIPPER FOOTBALL™ has a special tournament mode called “GOAL GETTERS”. This feature is intended for league and championship play. GOAL GETTERS will save a profile of each of the top five players (initials, birthdate, cumulative score). Additionally, the game software stores an additional 495 player profiles (initials and score), for a total of up to 500 different players!

The top five players’ scoring is easily accessible for viewing by activating a cabinet-mounted key switch. These GOAL GETTERS are also displayed during attract mode, along with the most recent five players as well as the other 495 entrants.

• TO ACTIVATE THIS FEATURE

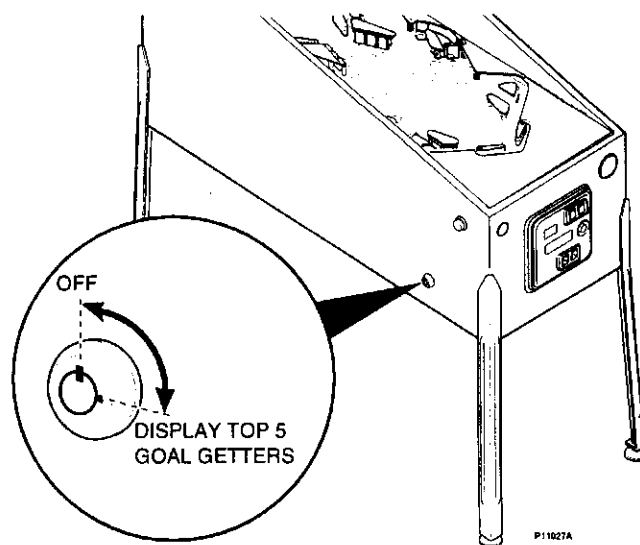
To activate this feature, open the coin door and look to the dot matrix for a display of the Menu System. By using either flipper button, scroll through the menu until you reach “B. ADJUSTMENTS”. Press the Start button and again scroll until “B2.01 GAME” is displayed, as shown below:



To select this feature, press the start button and then either flipper button to display “YES”. To enter into memory, press the Start button again. To exit and return to the game, close the coin door. After the first game has been played, each player will then be asked to enter their initials and birthday.

• TO QUICKLY ACCESS INFORMATION ON THE TOP 5 GOAL GETTERS

The top five GOAL GETTERS can be displayed and/or cleared, at any time, by using the key switch located on the left side of the cabinet, as shown below:



When the key is turned to the right, the dot matrix will display the following screen:

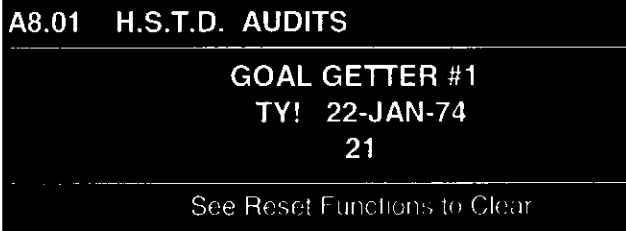


If a new contest is beginning, the operator can choose to clear the previous GOAL GETTERS by pressing the Start button. This action clears the previous contest as well as remove all 500 players from the High Score To Date (H.S.T.D.) audits.

• TO ACCESS PLAYER INFORMATION THROUGH GAME SOFTWARE

GOAL GETTERS information is also found in the audits section of the Menu System under A8: H.S.T.D., starting with Audit A8.01, as shown below:

All of the H.S.T.D. audits can be cleared by scrolling through the Menu System and selecting D4: CLEAR HSTD. After pressing the Start button, the following screen appears:



Information about GOAL GETTERS #2 - #5 can be obtained by scrolling Audits A8.02 through A8.05. Additional H.S.T.D. player information (scores and initials) is also found in Audits A8.06 through A8.15, as follows:

Pressing the Start button again clears the Audits table of all entries above and below the HSTD First Score and HSTD Last Score, as set in B1: Standard Adjustments.

See the Operators Manual for further information on adjustments to this game.

<u>AUDIT REF.</u>	<u>AUDIT DESCRIPTION</u>
A8.01	GOAL GETTER #1
A8.02	GOAL GETTER #2
A8.03	GOAL GETTER #3
A8.04	GOAL GETTER #4
A8.05	GOAL GETTER #5
A8.06	HSTD CHAMPION
A8.07	HSTD 1
A8.08	HSTD 2
A8.09	HSTD 3
A8.10	HSTD 4
A8.11	BUYIN HSTD 1
A8.12	BUYIN HSTD 2
A8.13	BUYIN HSTD 3
A8.14	BUYIN HSTD 4
A8.15	BUYIN HSTD 5

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PACKING LIST

The following parts are included in the packing box of the game container. Some parts are required for assembly of the game while others are included as spare parts. If any part(s) are missing, contact your local Capcom® distributor.

ITEM	QTY	PART NUMBER
ASSEMBLY, COVER, CASHBOX, 3 SLOT	1	A-00143-1
ASSEMBLY, SOCCER BALL	1	A-00809
BALL, 1-1/16"D, STEEL	1	BL00103
CORD, LINE	1	*SEE NOTE
LEVELER, LEG, 3/8-16 X 3.0"	4	MS00101-1
PLUMB BOB, TILT	1	MS00102-1
WIRE, PLUMB BOB	1	MS00105-1
CLIP, RETAINER, PLUMB BOB	1	MS00165
PLATE, COVER, LINE CORD	1	MT00325
NUT, 3/8-16 HEX REGULAR	8	NT00100-13
CASHBOX	1	PL00238
BUSHING, SPLIT, 0.453"ID, NYLON .625"D MOUNTING .125 "T MAX	1	PL00259-05
CARD, BUSINESS REPLY	1	PM00117
SCREW, MACHINE 8-32 X 1.0 PPH SEMS ZINC	2	SC00101-08
SCREW, THUMB 3/8-16 X 1-1/2 WITH SHOULDER, ZINC	2	SC00154-12
SCREW, SELF TAPPING, #8 X 3/4 TORX TYPE AB ZINC	2	SC00181-06
WASHER, FLAT #3/8 1.00"OD .078"T	2	WS00100-12
WASHER, LOCK #3/8 EXT. TOOTH	2	WS00104-15
**BAG, SPARE PARTS	1	A-00486-PB11

*NOTE: There are several types of line cords available. If this item is missing, contact your Capcom® distributor with the model number of your game.

**INCLUDED IN THE SPARE PARTS BAG:

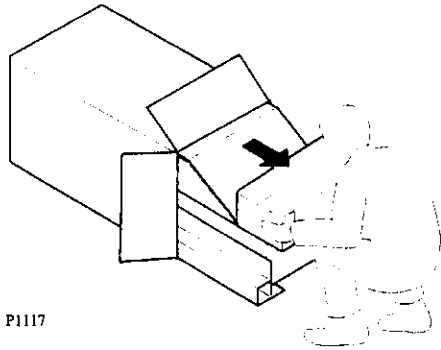
ITEM	QTY	PART NUMBER
ASSEMBLY, PLUNGER/LINK, FIBER	1	A-00386-1
COIL, 23 800T	1	CL00109
DIODE, 1N4004	1	DI00100
FUSE, 3 AMP SLO-BLO	1	FS00100-03
FUSE, 4 AMP SLO-BLO	1	FS00100-04
FUSE, 5 AMP SLO-BLO	1	FS00100-05
FUSE, 7 AMP SLO-BLO	1	FS00100-07
FUSE, 8 AMP SLO-BLO	1	FS00100-08
FUSE, 10 AMP SLO-BLO	1	FS00100-10
LAMP, #555 6.3V WEDGE T-3 1/4	2	LP00100
LAMP, #89 13V S.C. BAY G-6	1	LP00103
LAMP, #44 6.3V MINI BAY T-3 1/4	1	LP00104
LINK, FLIPPER PLUNGER	1	PL00202-1
TARGET, DROP (WHITE)	1	PL00325-W
FILTER, LAMP, T 3-1/4, TRANSPARENT RED	1	RB00116-RT
SPRING, EXT, 0.250 X .440 .016"D WIRE	1	SG00117

SECTION 1

INSTALLATION & SETUP

INSTALLATION INSTRUCTIONS

1) Two or more people should lay the carton on its side. Slide game and packing materials out from carton (see Figure 1). Open the parts box.

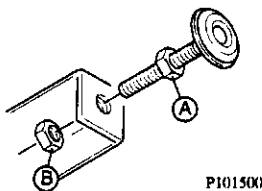


P1117

FIGURE 1: REMOVING GAME AND PARTS BOX

2) Check loose parts against packing list. Report any damaged or missing parts.

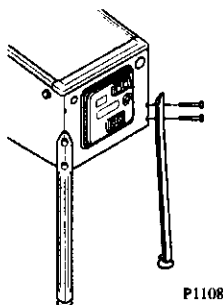
3) Install one hex nut (A) half-way up on each leveler. Then insert levelers into each leg and turn until they contact the stop nut. Using a second nut (B), thread onto each leveler from inside the leg and tighten (see Figure 2).



P101500

FIGURE 2: INSTALLING LEVELER ON LEG

4) Carefully lift the front of the cabinet and place on a sturdy support. Attach the front legs using two acorn-head bolts. Tighten bolts firmly (see Figure 3).



P1108

FIGURE 3: INSTALLING LEGS ON CABINET

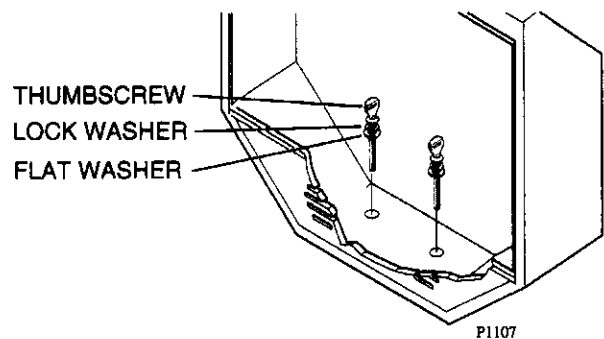
5) Carefully lift the rear of the cabinet, place on a sturdy support, and attach the legs using the supplied bolts. Tighten firmly.

6) At the rear of the cabinet, connect AC line cord to receptacle. Install cover plate, bushing, and screws.

7) Using two or more people lift the game and move to intended play area. Do not slide legs on floor.

8) Insert key into the lock at the bottom of the backbox and turn fully clockwise. Lift up on backglass and swing out towards front of game. CAREFULLY remove backglass and set aside.

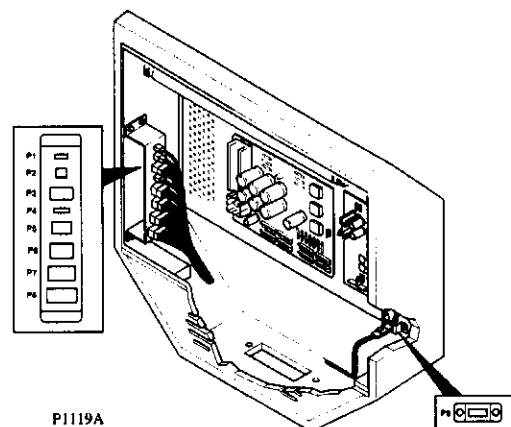
9) Lift backbox up on top of cabinet. Attach lock washer and flat washer to thumb screw and fasten to cabinet tee nuts (see figure 4). Tighten firmly.



P1107

FIGURE 4: INSTALLING BACKBOX LOCKING HARDWARE

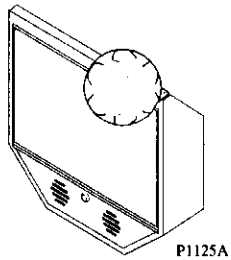
10) Make all backbox wire connections (P1 through P9) (see figure 5).



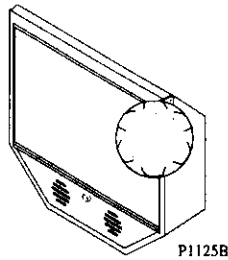
P1119A

FIGURE 5: BACKBOX WIRING INSTALLATION

11) Install display ball. Place the display ball on the backbox and choose mounting location "A" or "B", as shown below (see Figure 6A and 6B).



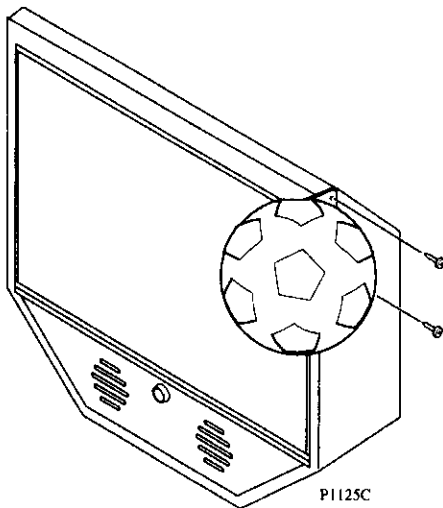
P1125A



P1125B

FIGURE 6A: POSITION "A" FIGURE 6B: POSITION "B"

Find the two (2) #8 self tapping torx screws, included in the parts bag. Start the screws into the soccer ball at the "dimple" locations. Fasten the soccer ball mounting plate to the backbox. (see Figure 6C).



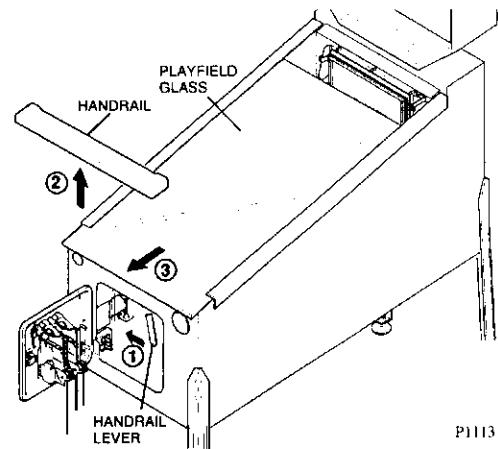
P1125C

FIGURE 6C: INSTALLING SOCCER BALL TO BACKBOX

12) Check that all fuses, connectors, lamps, and wire harnesses are fully seated. Tighten any loose fasteners snugly. Do not overtighten.

13) Re-install the backglass and lock the backbox.

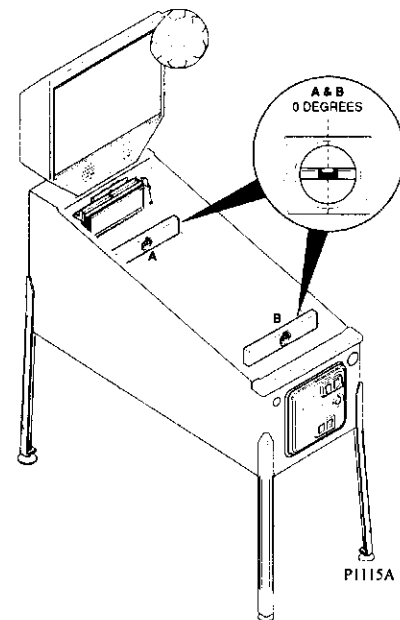
14) Open the coin door. Locate lock lever and pull towards center of cabinet; remove handrail and set aside. Remove playfield glass by sliding down and out of armor guides. CAREFULLY set glass aside (see Figure 7).



P1113

FIGURE 7: REMOVING PLAYFIELD GLASS

15) Place a level in position "A" on the playfield (see Figure 8). Adjust the rear leg levelers, as required, to obtain zero degree (0°) balance. Move the level to position "B" and repeat front & rear adjustments until cabinet appears level. **DO NOT** tighten leveler nuts firmly at this stage; an additional adjustment is required.



P1115A

FIGURE 8: CABINET LEVELING

16) Lift playfield straight-up until it reaches the locked position. Verify that solenoids, connectors, lamps, and harnesses are fully seated. Tighten any loose fasteners snugly. Do not overtighten.

17) Locate plumb bob parts. Insert hook wire into tapered end of lead weight. Insert retaining ring on to hook wire by sliding hook wire through holes on retaining ring. Raise wire & weight up into bottom tilt bracket and hang from top bracket (see Figure 9).

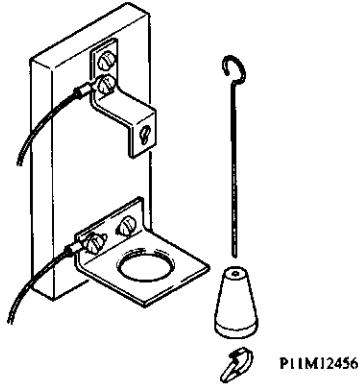


FIGURE 9: PLUMB BOB TILT ASSEMBLY

18) Lower the playfield into the cabinet. Ensure that cables are not pinched when playfield is seated.

19) Place a level or protractor on the playfield surface (see Figure 10). Adjust front and/or rear leg levelers to obtain a 6-1/2° incline. Tighten leg leveler nuts firmly.

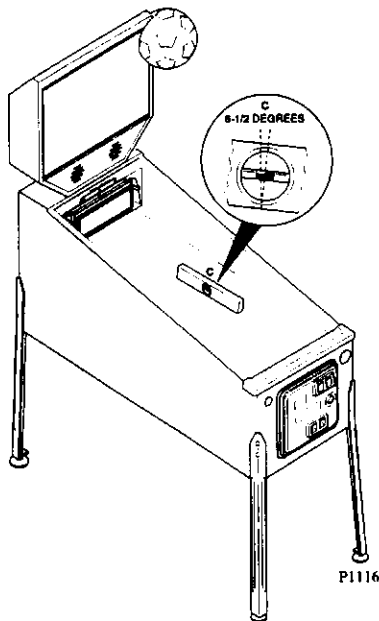


FIGURE 10: PLAYFIELD LEVELING

20) Connect AC line cord to power outlet. Route cord away from foot traffic. Turn the game power ON (switch is under cabinet near right front leg).

21) Open the coin door. Dot matrix display will show the system menu. Follow directions in this manual for changing factory settings.

22) Refer to the TROUBLESHOOTING GUIDE section of the manual for assistance in locating faults, clearing errors, etc.

23) Upon completion, system menu should report "FOUND: 0 ERRORS, 0 INFO" to indicate the game is ready for use.

24) Install one ball to the playfield.

25) Clean both sides of playfield glass. Install glass. Install handrail. Ensure that lever snaps in and locks.

26) Close the coin door. Insert currency or tokens as necessary. Press the START button. Game should begin.

27) Open coin door and retrieve currency or tokens. Set custom messages, difficulty, pricing, replays, etc.

28) Reset all counters to zero. Close and lock coin door. Ensure that the backbox is locked.

FLIPPER FOOTBALL begins!

SECTION 2

GAME RULES

PLAYFIELD FEATURES

5-BANK DROP TARGETS (GOALIE)

LEFT OUTER ORBIT

LEFT UPPER INNER ORBIT

UPPER LEFT EJECT SAUCER

LEFT LOWER INNER ORBIT

UPPER LEFT FLIPPER

LEFT 3-BANK DROP TARGETS

LEFT SLINGSHOT

LEFT SPINNER

"OUT OF BOUNDS" EJECT SAUCER

LEFT OUTER LANE DIVIDER

LEFT INNER LANE DIVIDER

BOTTOM LEFT FLIPPER

OPPONENTS GOAL

RIGHT OUTER ORBIT

UPPER RIGHT EJECT SAUCER

"FREE KICK"

"PENALTY KICK"

STAR BUMPERS

"HIT THE REF" STAND-UP TARGET

UPPER RIGHT FLIPPER

RIGHT 3-BANK DROP TARGETS

RIGHT SLINGSHOT

RIGHT SPINNER

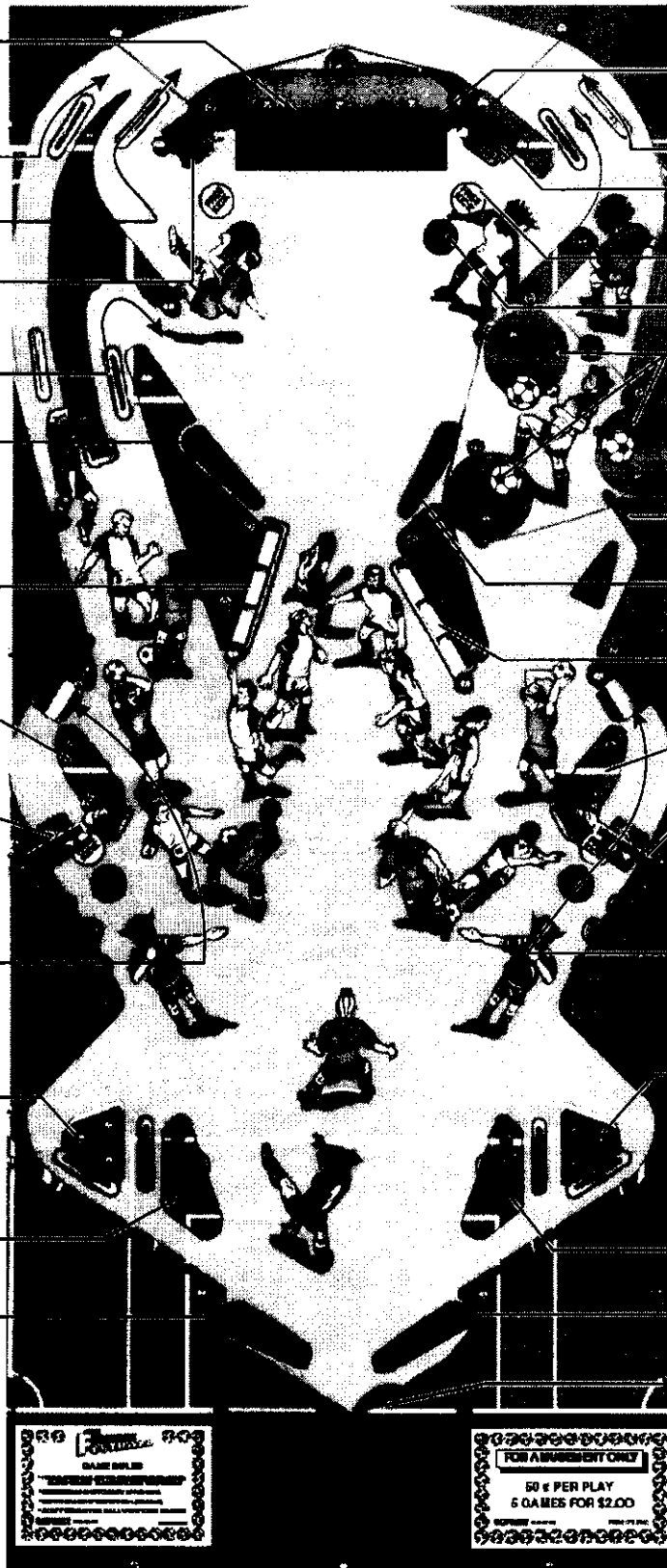
"PENALTY KICK" EJECT SAUCER

RIGHT OUTER LANE DIVIDER

RIGHT INNER LANE DIVIDER

BOTTOM RIGHT FLIPPER

YOUR GOAL (DRAIN)



P1126

GAME RULES

- 1 to 6 players can join in the following timed modes:
 - Player vs Game
 - Player vs Player
 - Team vs Team
- Score goals by kicking the ball into the opponents' goal (top of playfield) .
- Opponent scores each time the ball drains into your goal (lower goal).
- Don't touch ball with your hands!

NOTE: The following "Feature Shots" do not add time to the clock nor add to the scoring of the game. They do, however, offer an advantage to the player in engaging the spectators and making *easier* goals.

HIT THE REF: Making the "Hit the Ref" standup target upsets the official, but the player shouldn't worry because no penalties are assessed.

OUT OF BOUNDS: Time is momentarily suspended when a ball enters the lower eject saucers *without* first passing through the spinners.

BURN THE GOALIE: When a ball enters the lower eject saucers after having passed through the spinners AND the 5-bank drop target has 0 or 1 targets dropped, then the 5-bank drop targets are reset, the center target is dropped, and the 5-bank drop targets are frozen until a switch is hit or a goal is scored

FREE KICK: When a ball enters the upper eject saucers or contacts the lower eject saucers after first passing through the spinners AND 3 targets have been made on the 5-bank drop target or 2 non-adjacent targets are down on the 3-bank drop targets, then the 5-bank drop target is frozen until a switch is hit or a goal is scored.

PENALTY KICK: Same as "Free Kick" with the exception that there must be at least 4 or 5 targets down. The targets remain down until a switch is hit or a goal is scored or the operator-adjustable penalty kick time runs out.

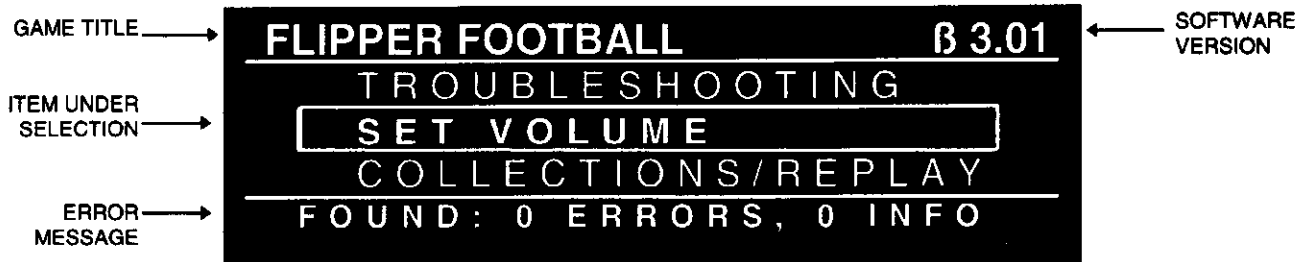
SECTION 3

MENU SYSTEM

MENU SYSTEM

The menu system is started when the coin door is opened. When the coin door is closed, the game will return to the Attract mode. If a game is in progress when the coin door is opened, the game will be restored when the coin door is closed again unless an adjustment (except volume or service credit adjustment) is made or a diagnostic function is performed.

When the coin door is opened, the dot matrix display typically shows the following Main Menu:



The Main Menu displays the number of ERRORS or problems that were found during game play or while in the Attract Mode. ERRORS are major problems, such as non-operative switches, that should be repaired/replaced before game play is resumed. INFO items are minor problems, such as burned-out lamps, that need repair/replacement during the next regular maintenance cycle.

The menu system is controlled by the use of the left & right flipper buttons and the Start button. Pressing these button(s) will result in the following menu actions:

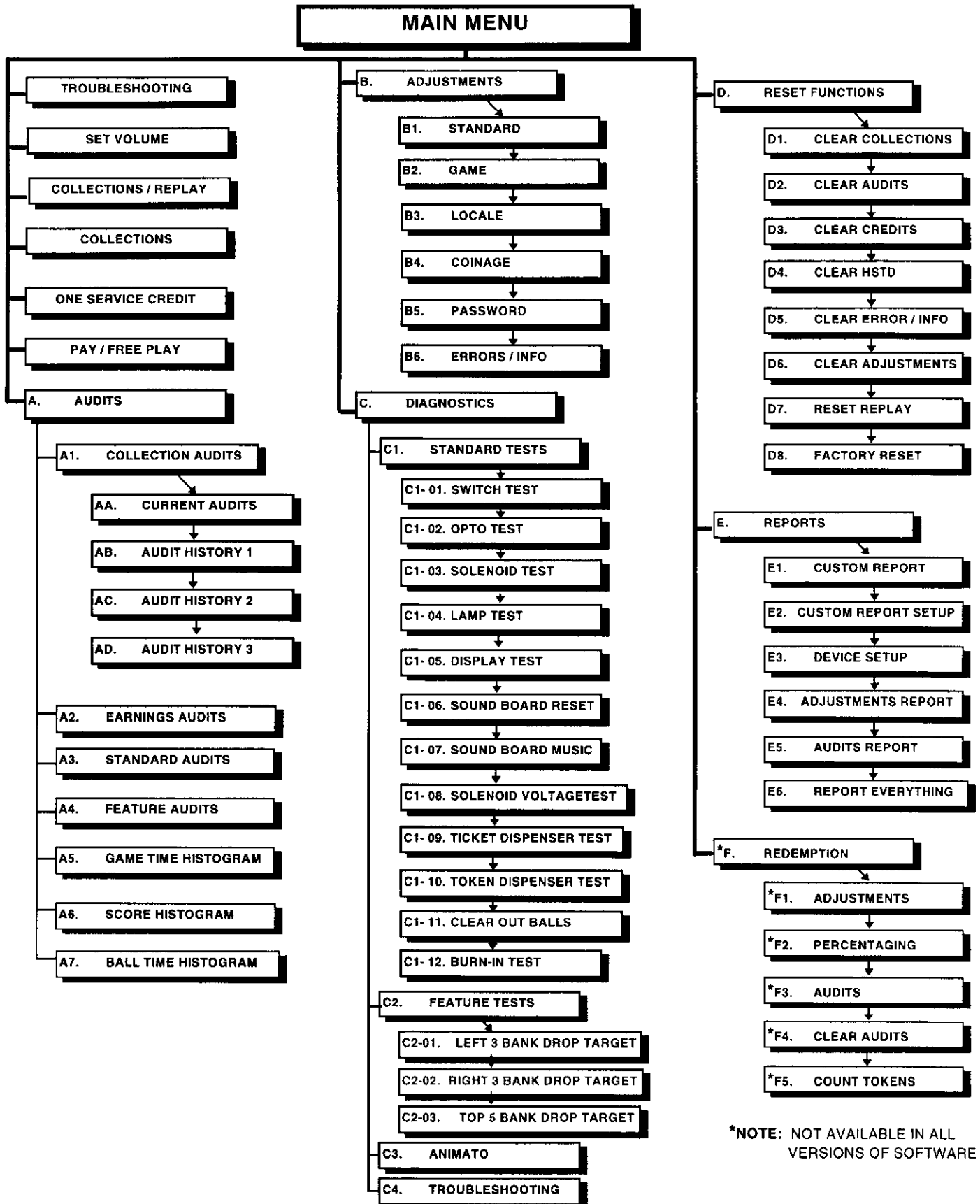
- | | |
|--|--|
| 1) Right Flipper button | increment, or move to the next field |
| 2) Left Flipper button | decrement, or move to the previous field |
| 3) Left & Right Flipper buttons together | cancel, back-up, or restore the original setting |
| 4) Start button | accept, enter, or keep new setting |

If the game has been in operation for some period of time, the operator may notice that the following Reset Replay Menu appears *before* the Main Menu:



The operator can elect to accept the suggested replay score, by pushing the start button, or ignore the change in score by pushing both flipper buttons simultaneously. This action will return the system to the Main Menu (additional information regarding Replay credits and scores can be found in the *B1 : Standard Adjustments* section of this manual).

The Menu System consists of the following menus and sub-menus:



*NOTE: NOT AVAILABLE IN ALL VERSIONS OF SOFTWARE

MAIN MENU FUNCTIONS

- TROUBLESHOOTING:** Use this menu to start troubleshooting the game's electrical components.
NOTE: Troubleshooting can also be accessed through the *DIAGNOSTICS* Menu.
- SET VOLUME:** Plays a test tune so that the game volume can be adjusted.
- COLLECTIONS/REPLAY:** Allows the operator to scroll through recent collections audits. The operator may optionally clear the audits and adjust the replay score to meet the target replay percentage (see Adjustment B1:04A, "Replay Percentage").
- COLLECTIONS:** Same as *COLLECTIONS/REPLAY*, except the replay score is **not** adjusted when the collections audits are cleared.
- ONE SERVICE CREDIT:** Issues one service credit to the game.
- PAY / FREE PLAY:** Set the game mode to Pay-to-Play (disables Adjustment B1:10, *Free Play*) or to continuous Free Play (enables Adjustment B1:10, *Free Play*).
- A. AUDITS:** Allows the operator to retrieve the games' earnings and performance information.
- B. ADJUSTMENTS:** Operator adjustables are available for *STANDARD*, *GAME*, *LOCALE*, *COINAGE*, *PASSWORD*, and *ERRORS/INFO*.
- C. DIAGNOSTICS:** Use *STANDARD TESTS*, *FEATURE TESTS*, and *TROUBLESHOOTING* to perform in-depth, automated testing of electrical and mechanical components.
- D. RESET FUNCTIONS:** Allows the operator to individually clear certain *AUDITS* and *ADJUSTMENTS* data or elect to re-configure the game to the original factory settings.
- E. REPORTS:** Allows the operator to output *AUDIT* and *ADJUSTMENTS* data to a serial communications device, such as a printer or laptop computer.
- F. REDEMPTION** Allows the pinball game to be configured as a Redemption game (not available in all versions of software). Tickets or tokens are dispensed when a preset score is achieved by the player.

AUDITS DATA TABLE

REF	AUDIT #	DESCRIPTION	TOTALS	PERCENTAGES	AVERAGE PER GAME
A1 : COLLECTION AUDITS					
1	A1:AA:01	CURRENT : RECENT EARNINGS			
2	A1:AA:02	CURRENT : RECENT 1ST COIN CHUTE		% OF RECENT COINS	
3	A1:AA:03	CURRENT : RECENT 2ND COIN CHUTE		% OF RECENT COINS	
4	A1:AA:04	CURRENT : RECENT 3RD COIN CHUTE		% OF RECENT COINS	
5	A1:AA:05	CURRENT : RECENT 4TH COIN CHUTE		% OF RECENT COINS	
6	A1:AA:06	CURRENT : RECENT CREDITS			
7	A1:AA:07	CURRENT : RECENT COIN CREDITS		% OF RECENT CREDITS	
8	A1:AA:08	CURRENT : RECENT SERVICE CREDITS		% OF RECENT CREDITS	
9	A1:AA:09	CURRENT : RECENT FREE CREDITS		% OF RECENT CREDITS	
10	A1:AA:10	CURRENT : RECENT TOURNT CREDITS		% OF RECENT CREDITS	
11	A1:AA:11	NOT USED			
12	A1:AA:12	CURRENT : RECENT BUYINS		% OF RECENT CREDITS	
13	A1:AA:13	CURRENT : RECENT BALL TIME			
14	A1:AA:14	CURRENT : RECENT AVERAGE SCORE			
15	A1:AB:01	HISTORY 1 : RECENT EARNINGS			
16	A1:AB:02	HISTORY 1 : RECENT 1ST COIN CHUTE			
17	A1:AB:03	HISTORY 1 : RECENT 2ND COIN CHUTE			
18	A1:AB:04	HISTORY 1 : RECENT 3RD COIN CHUTE			
19	A1:AB:05	HISTORY 1 : RECENT 4TH COIN CHUTE			
20	A1:AB:06	HISTORY 1 : RECENT EARNINGS			
21	A1:AB:07	HISTORY 1 : RECENT COIN CREDITS			
22	A1:AB:08	HISTORY 1 : RECENT SERVICE CREDITS			
23	A1:AB:09	HISTORY 1 : RECENT FREE CREDITS			
24	A1:AB:10	HISTORY 1 : RECENT TOURNT CREDITS			
25	A1:AB:11	NOT USED			
26	A1:AB:12	HISTORY 1 : RECENT BUYINS			
27	A1:AB:13	HISTORY 1 : RECENT BALL TIME			
28	A1:AB:14	HISTORY 1 : RECENT AVERAGE SCORE			
29	A1:AC:01	HISTORY 2 : RECENT EARNINGS			
30	A1:AC:02	HISTORY 2 : RECENT 1ST COIN CHUTE			
31	A1:AC:03	HISTORY 2 : RECENT 2ND COIN CHUTE			
32	A1:AC:04	HISTORY 2 : RECENT 3RD COIN CHUTE			
33	A1:AC:05	HISTORY 2 : RECENT 4TH COIN CHUTE			
34	A1:AC:06	HISTORY 2 : RECENT EARNINGS			
35	A1:AC:07	HISTORY 2 : RECENT COIN CREDITS			
36	A1:AC:08	HISTORY 2 : RECENT SERVICE CREDITS			
37	A1:AC:09	HISTORY 2 : RECENT FREE CREDITS			
38	A1:AC:10	HISTORY 2 : RECENT TOURNMT CREDITS			
39	A1:AC:11	NOT USED			
40	A1:AC:12	HISTORY 2 : RECENT BUYINS			
41	A1:AC:13	HISTORY 2 : RECENT BALL TIME			
42	A1:AC:14	HISTORY 2 : RECENT AVERAGE SCORE			
43	A1:AD:01	HISTORY 3 : RECENT EARNINGS			
44	A1:AD:02	HISTORY 3 : RECENT 1ST COIN CHUTE			
45	A1:AD:03	HISTORY 3 : RECENT 2ND COIN CHUTE			
46	A1:AD:04	HISTORY 3 : RECENT 3RD COIN CHUTE			
47	A1:AD:05	HISTORY 3 : RECENT 4TH COIN CHUTE			
48	A1:AD:06	HISTORY 3 : RECENT EARNINGS			
49	A1:AD:07	HISTORY 3 : RECENT COIN CREDITS			
50	A1:AD:08	HISTORY 3 : RECENT SERVICE CREDITS			
51	A1:AD:09	HISTORY 3 : RECENT FREE CREDITS			
52	A1:AD:10	HISTORY 3 : RECENT TOURNT CREDITS			
53	A1:AD:11	NOT USED			
54	A1:AD:12	HISTORY 3 : RECENT BUYINS			
55	A1:AD:13	HISTORY 3 : RECENT BALL TIME			
56	A1:AD:14	HISTORY 3 : RECENT AVERAGE SCORE			
A2 : EARNINGS AUDITS					
57	A2:01	TOTAL EARNINGS			
58	A2:02	TOTAL 1ST COIN CHUTE		% OF TOTAL COINS	
59	A2:03	TOTAL 2ND COIN CHUTE		% OF TOTAL COINS	
60	A2:04	TOTAL 3RD COIN CHUTE		% OF TOTAL COINS	
61	A2:05	TOTAL 4TH COIN CHUTE		% OF TOTAL COINS	
62	A2:06	TOTAL CREDITS			
63	A2:07	TOTAL COIN CREDITS		% OF TOTAL CREDITS	
64	A2:08	TOTAL SERVICE CREDITS		% OF TOTAL CREDITS	
65	A2:09	TOTAL FREE CREDITS		% OF TOTAL CREDITS	
66	A2:10	TOTAL TOURNAMENT CREDITS		% OF TOTAL CREDITS	

AUDITS DATA TABLE (continued)

REF	AUDIT #	DESCRIPTION	TOTALS			PERCENTAGES	AVERAGE PER GAME
A2 : EARNINGS AUDITS (CONTINUED)							
67	A2:11	NOT USED					
68	A2:12	TOTAL BUYINS			% OF TOTAL CREDITS		
69	A2:13	TOTAL BALL TIME					
70	A2:14	TOTAL AVERAGE SCORE					
A3 : STANDARD AUDITS							
71	A3:01	AVERAGE BALL TIME	HRS	MIN	SEC		
72	A3:02	1 PLAYER GAMES				% OF ALL GAMES	
73	A3:03	2 PLAYER GAMES				% OF ALL GAMES	
74	A3:04	3 PLAYER GAMES				% OF ALL GAMES	
75	A3:05	4 PLAYER GAMES				% OF ALL GAMES	
76	A3:06	5 PLAYER GAMES				% OF ALL GAMES	
77	A3:07	6 PLAYER GAMES				% OF ALL GAMES	
78	A3:08	TOTAL STARTED CREDITS					
79	A3:09	TOTAL FINISHED CREDITS					
80	A3:10	REPLAY AWARDS				% OF GAMES	
81	A3:11	TOTAL STARTED BALLS					
82	A3:12	TOTAL FINISHED BALLS					
83	A3:13	MATCH AWARDS				% OF GAMES	
84	A3:14	NOT USED					
85	A3:15	NOT USED					
86	A3:16	NOT USED					
87	A3:17	NOT USED					
88	A3:18	GOAL DRAINS				% OF ALL DRAINS	
89	A3:19	CENTER DRAINS				% OF ALL DRAINS	
90	A3:20	TILTS					
91	A3:21	SLAM TILTS					
92	A3:22	HSTD CHAMPION AWARDS				% OF GAMES	
93	A3:23	HSTD AWARDS					
94	A3:24	BUY-IN 1					
95	A3:25	BUY-IN 2					
96	A3:26	BUY-IN 3 +					
97	A3:27	HSTD RESET COUNT					
98	A3:28	TOTAL TIME ON	DAYS	HRS	MIN	SEC	
99	A3:29	TOTAL GAME TIME		HRS	MIN	SEC	
100	A3:30	AVERAGE GAME TIME		HRS	MIN	SEC	
101	A3:31	TOTAL BURN-IN TIME		HRS	MIN	SEC	
102	A3:32	TOTAL TICKETS					
103	A3:33	TOTAL TOKENS					
104	A3:34	CURRENT REPLAY					
105	A3:35	CURRENT CREDITS					
106	A3:36	VOLUME					
A4 : FEATURE AUDITS							
107	A4:01	BURN THE GOALIE ENABLED				% OF GAMES	
108	A4:02	GOALIE BURNED				% GOALIE ENABLED	
109	A4:03	CORNER KICK ENABLED				% OF GAMES	
110	A4:04	CORNER KICK COMPLETED				% C. KICK ENABLED	
111	A4:05	FREE KICK ENABLED				% OF GAMES	
112	A4:06	FREE KICK COMPLETED				% F. KICK ENABLED	
113	A4:07	PENALTY KICK ENABLED				% OF GAMES	
114	A4:08	PENALTY KICK COMPLETED				% P. KICK ENABLED	
115	A4:09	REF CHASED				% OF GAMES	
116	A4:10	REF BEAT-UP				% OF GAMES	
A5 : GAME TIME HISTOGRAM							
117	A5	GAME TIME HISTOGRAM 0.0 - 0.9 MINS					
118	A5	GAME TIME HISTOGRAM 1.0 - 1.9 MINS					
119	A5	GAME TIME HISTOGRAM 2.0 - 2.9 MINS					
120	A5	GAME TIME HISTOGRAM 3.0 - 3.9 MINS					
121	A5	GAME TIME HISTOGRAM 4.0 - 4.9 MINS					
122	A5	GAME TIME HISTOGRAM 5.0 - 5.9 MINS					
123	A5	GAME TIME HISTOGRAM 6.0 - 6.9 MINS					
124	A5	GAME TIME HISTOGRAM 7.0 - 7.9 MINS					
125	A5	GAME TIME HISTOGRAM 8.0 - 8.9 MINS					
126	A5	GAME TIME HISTOGRAM 9.0 - 9.9 MINS					
127	A5	GAME TIME HISTOGRAM 10.0 - 10.9 MINS					
128	A5	GAME TIME HISTOGRAM 11.0 - 11.9 MINS					
129	A5	GAME TIME HISTOGRAM 12+ MINS					

AUDITS DATA TABLE (continued)

REF	AUDIT #	DESCRIPTION	TOTALS	PERCENTAGES	AVERAGE PER GAME
A6: SCORE HISTOGRAM					
130	A6	SCORE HISTOGRAM 0 - 0 POINTS			
131	A6	SCORE HISTOGRAM 1 - 1 POINTS			
132	A6	SCORE HISTOGRAM 2 - 2 POINTS			
133	A6	SCORE HISTOGRAM 3 - 3 POINTS			
134	A6	SCORE HISTOGRAM 4 - 4 POINTS			
135	A6	SCORE HISTOGRAM 5 - 5 POINTS			
136	A6	SCORE HISTOGRAM 6 - 6 POINTS			
137	A6	SCORE HISTOGRAM 7 - 7 POINTS			
138	A6	SCORE HISTOGRAM 8 - 8 POINTS			
139	A6	SCORE HISTOGRAM 9 - 9 POINTS			
140	A6	SCORE HISTOGRAM 10 - 14 POINTS			
141	A6	SCORE HISTOGRAM 15 - 19 POINTS			
142	A6	SCORE HISTOGRAM 20 - 24 POINTS			
143	A6	SCORE HISTOGRAM 25 - 29 POINTS			
144	A6	SCORE HISTOGRAM 30 - 34 POINTS			
145	A6	SCORE HISTOGRAM 35 - 39 POINTS			
146	A6	SCORE HISTOGRAM 40 - 44 POINTS			
147	A6	SCORE HISTOGRAM 45 - 49 POINTS			
148	A6	SCORE HISTOGRAM 50 - 99 POINTS			
149	A6	SCORE HISTOGRAM 100 - 149 POINTS			
150	A6	SCORE HISTOGRAM 150 - 199 POINTS			
151	A6	SCORE HISTOGRAM 200 - 249 POINTS			
152	A6	SCORE HISTOGRAM 250 - 299 POINTS			
153	A6	SCORE HISTOGRAM 300 - 399 POINTS			
154	A6	SCORE HISTOGRAM 400 - 499 POINTS			
155	A6	SCORE HISTOGRAM 500 + POINTS			
A7: BALL TIME HISTOGRAM					
147	A7	BALL TIME HISTOGRAM 0 - 9 SECS			
148	A7	BALL TIME HISTOGRAM 10 - 19 SECS			
149	A7	BALL TIME HISTOGRAM 20 - 29 SECS			
150	A7	BALL TIME HISTOGRAM 30 - 39 SECS			
151	A7	BALL TIME HISTOGRAM 40 - 49 SECS			
152	A7	BALL TIME HISTOGRAM 50 - 59 SECS			
153	A7	BALL TIME HISTOGRAM 60 - 69 SECS			
154	A7	BALL TIME HISTOGRAM 70 - 79 SECS			
155	A7	BALL TIME HISTOGRAM 80 - 89 SECS			
156	A7	BALL TIME HISTOGRAM 90 - 99 SECS			
157	A7	BALL TIME HISTOGRAM 100 - 109 SECS			
158	A7	BALL TIME HISTOGRAM 110 - 119 SECS			
159	A7	BALL TIME HISTOGRAM 120 - 129 SECS			
160	A7	BALL TIME HISTOGRAM 130 - 139 SECS			
161	A7	BALL TIME HISTOGRAM 140 - 149 SECS			
162	A7	BALL TIME HISTOGRAM 150 - 159 SECS			
163	A7	BALL TIME HISTOGRAM 160 - 169 SECS			
164	A7	BALL TIME HISTOGRAM 170 - 179 SECS			
165	A7	BALL TIME HISTOGRAM 180 - 189 SECS			
166	A7	BALL TIME HISTOGRAM 190 - 199 SECS			
167	A7	BALL TIME HISTOGRAM 200 - 209 SECS			
168	A7	BALL TIME HISTOGRAM 210+ SECS			
A8: H.S.T.D. AUDITS					
169	A8:01	GOAL GETTER #1		(INITIALS & BIRTHDATE)	(ACCUM. SCORE)
170	A8:02	GOAL GETTER #2		(INITIALS & BIRTHDATE)	(ACCUM. SCORE)
171	A8:03	GOAL GETTER #3		(INITIALS & BIRTHDATE)	(ACCUM. SCORE)
172	A8:04	GOAL GETTER #4		(INITIALS & BIRTHDATE)	(ACCUM. SCORE)
173	A8:05	GOAL GETTER #5		(INITIALS & BIRTHDATE)	(ACCUM. SCORE)
174	A8:06	HSTD CHAMPION		(SCORE & INITIALS)	
175	A8:07	HSTD 1)		(SCORE & INITIALS)	
176	A8:08	HSTD 2)		(SCORE & INITIALS)	
177	A8:09	HSTD 3)		(SCORE & INITIALS)	
178	A8:10	HSTD 4)		(SCORE & INITIALS)	
179	A8:11	BUYIN CHAMPION		(SCORE & INITIALS)	
180	A8:12	BUYIN HSTD 1)		(SCORE & INITIALS)	
181	A8:13	BUYIN HSTD 2)		(SCORE & INITIALS)	
182	A8:14	BUYIN HSTD 3)		(SCORE & INITIALS)	
183	A8:15	BUYIN HSTD 4)		(SCORE & INITIALS)	

B. ADJUSTMENTS

B1: STANDARD ADJUSTMENTS

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B1-01	NOT USED	NOT USED	NOT USED	NOT USED
B1-07	TILT WARNINGS	0 - 10	2	THE NUMBER OF TIMES THE GAME CAN "TILT" BEFORE ENDING THE CURRENT BALL IN PLAY.
B1-03	ATTRACT MODE SOUNDS	YES, NO	NO	SELECT WHETHER SOUNDS & MUSIC ARE PLAYED DURING ATTRACT MODE.
B1-04+	ALLOW REPLAY	YES, NO	YES	SELECT WHETHER REPLAY CREDITS ARE AWARDED. IF YES IS SELECTED, ADDITIONAL REPLAY ADJUSTMENTS CAN BE SET (SEE B1-04A,B,C,D).
B1-04A	REPLAY PERCENT	1 - 99 %	10%	THE "IDEAL" PERCENTAGE OF GAMES THAT RECEIVE A REPLAY. THIS VALUE IS THEN USED TO SUGGEST ACTUAL REPLAY SCORE VALUES ONCE A HISTORY OF GAME SCORES IS ACCUMULATED.
B1-04B	REPLAY START SCORE	0 - 42,000,000,000	10	THE INITIAL SCORE AT WHICH A REPLAY CREDIT IS AWARDED.
B1-04C	ALLOW REPLAY BUMP	YES, NO	NO	SELECT WHETHER THE REPLAY START SCORE IS TEMPORARILY INCREMENTED WHEN REPLAY IS AWARDED. THE REPLAY START SCORE IS RETURNED TO ITS' NORMAL VALUE AFTER ALL FREE CREDITS HAVE BEEN EXHAUSTED
B1-04D	REPLAY INDICATOR	ON, OFF	OFF	WHEN SET TO ON, AN INDICATOR (♣) APPEARS IN EACH CORNER OF THE DISPLAY DURING ATTRACT MODE (REPLAY AT...) TO SHOW A NEW REPLAY VALUE HAS BEEN REACHED (SEE B1-04A).
B1-04E	REPLAY CREDITS TO AWARD	0 TO 255	0 CREDITS	SETS THE AMOUNT OF CREDITS FOR EACH REPLAY THAT IS AWARDED.
B1-04F	REPLAY BALLS TO AWARD	0 TO 255	0 BALLS	SETS THE AMOUNT OF BALL(S) FOR EACH REPLAY THAT IS AWARDED.
B1-04G	REPLAY TICKETS TO AWARD	0 TO 255	0 TICKETS	SETS THE AMOUNT OF TICKET(S) FOR EACH REPLAY THAT IS AWARDED.
B1-04H	REPLAY TOKENS TO AWARD	0 TO 255	0 TOKENS	SETS THE AMOUNT OF TOKEN(S) FOR EACH REPLAY THAT IS AWARDED.
B1-04I	REPLAY POINTS TO AWARD	0 TO 42,949,672,950	0 POINTS	SETS THE AMOUNT OF POINT(S) FOR EACH REPLAY THAT IS AWARDED.
B1-04J	COIN DOOR REPLAY	ON, OFF	ON	WHEN SET TO ON, THE OPERATOR WILL BE PROMPTED (WHEN OPENING THE COIN DOOR) TO CHANGE THE REPLAY SCORE IN ORDER TO SATISFY THE REPLAY PERCENT (B1-04A). NOTE: THE MENU SYSTEM IS INTERRUPTED UNTIL THIS PROMPT IS ANSWERED
B1-05+	ALLOW HSTD	YES, NO	YES	SELECT WHETHER THE HIGH SCORE TO DATE FEATURE IS ENABLED. IF YES IS SELECTED, ADDITIONAL HSTD ADJUSTMENTS CAN BE SET (SEE B1-05A,B,C,D).
B1-05A	HSTD FIRST SCORE	0 - 42,949,672,950	25	THE HIGHEST SCORE WRITTEN TO THE HSTD TABLE AFTER THE TABLE IS CLEARED BY THE RESET FUNCTION (D4). THE GAME WILL AUTOMATICALLY GENERATE SCORES BETWEEN THE HSTD FIRST SCORE AND THE HSTD LAST SCORE TO FILL-IN MIDDLE ENTRIES IN THE TABLE.
B1-05B	HSTD LAST SCORE	0 - 42,949,672,950	6	THE LOWEST SCORE WRITTEN TO THE HSTD TABLE AFTER THE TABLE IS CLEARED BY THE RESET FUNCTION (D4). THE GAME WILL AUTOMATICALLY GENERATE SCORES BETWEEN THE HSTD FIRST SCORE AND THE HSTD LAST SCORE TO FILL-IN MIDDLE ENTRIES IN THE TABLE.
B1-05C	CREDITS FOR GRAND CHAMP	0 - 255 CREDITS	1 CREDIT	THE NUMBER OF CREDITS AWARDED FOR EXCEEDING THE GRAND CHAMP.

B1: STANDARD ADJUSTMENTS (CONTINUED)

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B1-05D	TICKETS FOR GRAND CHAMP	0 - 255 CREDITS	0 CREDITS	THE NUMBER OF TICKETS AWARDED FOR EXCEEDING THE <i>GRAND CHAMP</i> .
B1-05E	TOKENS FOR GRAND CHAMP	0 - 255 CREDITS	0 CREDITS	THE NUMBER OF TOKENS AWARDED FOR EXCEEDING THE <i>GRAND CHAMP</i> .
B1-05F	CREDITS FOR #1-4 SCORES	0 - 255 CREDITS	1 CREDIT	THE NUMBER OF CREDITS AWARDED FOR EXCEEDING THE #1 -#4 HIGH SCORES.
B1-05G	TICKETS FOR #1-4 SCORES	0 - 255 CREDITS	0 TICKETS	THE NUMBER OF <i>TICKET(S)</i> AWARDED FOR EXCEEDING THE #1 -#4 HIGH SCORES.
B1-05H	TOKENS FOR #1-4 SCORES	0 - 255 CREDITS	0 TOKENS	THE NUMBER OF <i>TOKEN(S)</i> AWARDED FOR EXCEEDING THE #1 -#4 HIGH SCORES.
B1-05I	GAMES TILL RESET HSTD	0 - 10,000	250	SET THE NUMBER OF GAMES REQUIRED TO RESET THE HSTD TABLE (EXCLUDES NEW OR RECENT ENTRIES).
B1-06+	MATCH PERCENT	0 - 95%	0%	THE PERCENTAGE OF GAMES THAT AWARD A MATCH CREDIT AT THE END OF THE GAME.
B1-06A	MATCH CREDITS TO AWARD	0 - 255 CREDITS	1 CREDIT	SET THE NUMBER OF <i>CREDIT(S)</i> REQUIRED FOR A MATCH SCORE.
B1-06B	MATCH TICKETS TO AWARD	0 - 255 TICKETS	0 TICKETS	SET THE NUMBER OF <i>TICKET(S)</i> REQUIRED FOR A MATCH SCORE.
B1-06C	MATCH TOKENS TO AWARD	0 - 255 TOKENS	0 TOKENS	SET THE NUMBER OF <i>TOKEN(S)</i> REQUIRED FOR A MATCH SCORE.
B1-07+	NOT USED	NOT USED	NOT USED	NOT USED
B1-07A	NOT USED	NOT USED	NOT USED	NOT USED
B1-07B	NOT USED	NOT USED	NOT USED	NOT USED
B1-07C	NOT USED	NOT USED	NOT USED	NOT USED
B1-07D	NOT USED	NOT USED	NOT USED	NOT USED
B1-07E	NOT USED	NOT USED	NOT USED	NOT USED
B1-08+	NOT USED	NOT USED	NOT USED	NOT USED
B1-08A	NOT USED	NOT USED	NOT USED	NOT USED
B1-08B	NOT USED	NOT USED	NOT USED	NOT USED
B1-08C	NOT USED	NOT USED	NOT USED	NOT USED
B1-08D	NOT USED	NOT USED	NOT USED	NOT USED
B1-08E	NOT USED	NOT USED	NOT USED	NOT USED
B1-9	SET GAME LOCATION	0 - 99,999	0	A TRACKING NUMBER USED TO INDICATE THE PHYSICAL LOCATION OF A GAME.
B1-10	SET MACHINE ID	0 - 99,999	0	ASSIGN A SECONDARY ID TO A GAME WHERE MULTIPLE GAMES MAY EXIST IN THE SAME LOCATION.
B1-11	FREE PLAY	YES, NO	NO	ENABLES / DISABLES <i>FREE PLAY</i> MODE. ALSO CONTROLS THE MAIN MENU SETTINGS FOR <i>PAY-TO-PLAY</i> AND <i>FREE PLAY</i> .
B1-12	PLAY MODE	NORMAL, TOURNAMENT XBALL ON, TOURNAMENT XBALL OFF,	NORMAL	SELECT <i>NORMAL</i> OR <i>TOURNAMENT</i> MODE. <i>TOURNAMENT</i> MODE EQUALIZES THE SCORING OF CERTAIN FEATURES IN MULTI-PLAYER GAMES. <i>TOURNAMENT XBALL ON</i> ENABLES THE EXTRA BALL FEATURE; <i>TOURNAMENT XBALL OFF</i> DISABLES THE EXTRA BALL FEATURE.
B1-13	SOL.(ENOID) VOLTAGE PERCENT	0 - 90%	10%	SELECT THE PERCENTAGE OF SOLENOID VOLTAGE REGULATION (FOR DISPLAY PURPOSES ONLY). DOES NOT ACTIVELY REGULATE THE GAMES' SOLENOIDS.
B1-14	SHOW MESSAGE OF THE DAY	YES, NO, VIEW/EDIT	NO	SELECT A MESSAGE FOR DISPLAY DURING ATTRACT MODE. THIS MESSAGE MAY BE CUSTOMIZED BY CHOOSING <i>VIEW/EDIT</i> .
B1-15	SERVICE MESSAGE	YES, NO, VIEW/EDIT	NO	SELECT A "FOR SERVICE, CALL..." MESSAGE TO APPEAR WHEN THE COIN DOOR IS OPENED AND THE GAME HAS DETECTED ERRORS. THIS MESSAGE MAY BE CUSTOMIZED BY CHOOSING <i>VIEW/EDIT</i> .
B1-16+	CHANGE FLIPPER STRENGTH	YES, NO	NO	SELECT YES TO CHANGE THE RELATIVE STRENGTH OF THE FLIPPER COILS.
B1-16A	L. FLIPPER STRENGTH	4/32 TO 32/32	20/32	SET THE STRENGTH OF THE LEFT FLIPPER. FOR EXAMPLE, A SETTING OF 24/32 REPRESENTS 3/4 STRENGTH. MAY BE USED TO ADJUST THE AMOUNT OF BALL TRAVEL WHEN PLAYFIELD PITCH IS CHANGED.
B1-16B	R. FLIPPER STRENGTH	4/42 TO 32/32	20/32	SET THE STRENGTH OF THE RIGHT FLIPPER.
B1-16C	L. UPR. FLIPPER STRENGTH	4/42 TO 32/32	18/32	SET THE STRENGTH OF THE LEFT UPPER FLIPPER.

B1: STANDARD ADJUSTMENTS (CONTINUED)

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B1-16D	R. UPR. FLIPPER STRENGTH	4/42 TO 32/32	20/32	SET THE STRENGTH OF THE RIGHT UPPER FLIPPER.
B1-17+	TICKET DISPENSER	NONE STANDARD TICKET	NONE	<p>SELECT THE TYPE OF TICKET DISPENSER (IF INSTALLED ON THE GAME). AFTER <i>TICKET DISPENSER</i> IS ENTERED, AUDIT A3:31, <i>TOTAL TICKETS</i>, IS INCREMENTED AND THE TICKET MOTOR DRIVE IS PULSED</p> <p>TICKET DISPENSERS CURRENTLY SUPPORTED:</p> <ol style="list-style-type: none"> 1) DELTRONICS, MODEL 1275; 2) COIN CONTROLS, MODEL CTD10. <p>NOTE: AFTER SERVICING AN "OUT OF TICKETS" CONDITION OR A DISPENSER JAM, YOU CAN EITHER:</p> <p>A) <i>CONTINUE</i> DISPENSING TICKETS FROM THE GAME-IN-PROGRESS BY CLOSING THE COIN DOOR, OR</p> <p>B) <i>CLEAR</i> DISPENSER MEMORY BY INTERRUPTING POWER TO THE GAME (OFF, THEN ON).</p>
B1-17A	BUYIN TICKETS	0 - 255	0	SELECT THE NUMBER OF TICKETS TO BE DISPENSED FOR EACH <i>BUYIN</i> DURING THE CURRENT GAME.
B1-17B	GAME OVER TICKETS	0 - 255	0	SELECT THE NUMBER OF TICKETS TO BE DISPENSED WHEN THE CURRENT GAME HAS ENDED.
B1-18+	TOKEN DISPENSER	NONE <i>BALLYWULFF</i> DISPENSER <i>COIN CONTROLS</i> DISPENSER <i>COIN CONTROLS</i> COMPACT HOPPER (RED DISC) <i>COIN CONTROLS</i> COMPACT HOPPER (PURPLE OR GREEN DISCS) <i>COIN CONTROLS</i> COMPACT HOPPER (GRAY, BLACK, BROWN, OR BLUE DISCS) <i>COIN CONTROLS</i> COMPACT HOPPER (5 AWP DISC USED IN ITALY) <i>ROMSTAR</i> CD95A <i>ASAHI</i> CD-200 THROUGH CD-1300	NONE	<p>SELECT THE TYPE OF TOKEN DISPENSER (IF INSTALLED ON THE GAME). AFTER <i>TOKEN DISPENSER</i> IS ENTERED, AUDIT A3:32, <i>TOTAL TOKENS</i>, IS INCREMENTED AND THE TOKEN METER DRIVE IS PULSED</p> <p>NOTE: AFTER SERVICING AN "OUT OF TOKENS" CONDITION OR A DISPENSER JAM, YOU CAN EITHER:</p> <p>A) <i>CONTINUE</i> DISPENSING TOKENS FROM THE GAME-IN-PROGRESS BY CLOSING THE COIN DOOR, OR</p> <p>B) <i>CLEAR</i> DISPENSER MEMORY BY INTERRUPTING POWER TO THE GAME (OFF, THEN ON).</p>
B1-18A	BUYIN TOKENS	0 - 255	0	SET THE NUMBER OF TOKENS TO BE DISPENSED FOR EACH <i>BUYIN</i> DURING THE CURRENT GAME.
B1-18B	GAME OVER TOKENS	0 - 255	0	SET THE NUMBER OF TOKENS TO BE DISPENSED WHEN THE CURRENT GAME HAS ENDED.
B1-18C	DISPENSE 1 AT A TIME	YES, NO	NO	SELECT A SLOWER MOTOR SPEED AT WHICH TOKENS ARE DISPENSED ONE-AT-A-TIME (USED ONLY FOR COIN CONTROL'S COMPACT HOPPER.

B2: GAME ADJUSTMENTS

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B2-01	ALLOW GOAL GETTER'S CONTEST	YES, NO	NO	SELECT WHETHER THE GAME ALLOWS FOR A CONTEST THAT ACCUMULATES PLAYER SCORING AT THE END OF A GAME. EVERY PLAYER IS PROMPTED TO ENTER THEIR INITIALS AND BIRTHDATE. THE TOP 5 PLAYERS INITIALS, BIRTHDATE, AND SCORE ARE DISPLAYED DURING ATTRACT MODE AND ARE STORED IN AUDIT A8: GOAL GETTERS. NOTE: PRIOR TO EACH CONTEST, THE RESET HIGH SCORE KEYSWITCH (LOCATED ON THE OUTSIDE OF THE CABINET) MUST BE TURNED "ON" AND THE START BUTTON PRESSED. THIS ACTION WILL ERASE ALL PREVIOUS SCORES.
B2-02	PLAYER SELECTS TEAM NAME	YES, NO	NO	ALLOWS CURRENT PLAYER TO SELECT THE NAME OF EACH TEAM FROM A PRE-DEFINED LIST. NOTE: IF CUSTOM TEAM NAMES IS SET TO "YES", THESE NAMES ARE ALSO ADDED TO THE LIST.
B2-03	CUSTOM TEAM NAMES	YES, NO, VIEW/EDIT	NO	USE "YES" TO SELECT THE TEAM NAMES FROM THE VIEW/EDIT MENU. SELECT "VIEW/EDIT" TO SEE OR CHANGE THE TEAM NAMES. SELECTING "NO" DISPLAYS TEAM NAMES OF HUMAN/MACHINE, FOR 1 PLAYER GAMES, AND HOME/VISITOR FOR MULTI-PLAYER GAMES.
B2-04	ENABLE FOUL LANGUAGE	YES, NO	NO	SELECT WHETHER THE SPEECH OF THE "REF" CAN INCLUDE PROFANE LANGUAGE.
B2-05	GAME TIMER (SEC)	10 - 300	150 SECONDS	SETS THE TIME PERIOD PER ONE CREDIT.
B2-06	TIMER SPEED (MILISEC)	500 - 2,000	1000 MILISECONDS	SETS THE COUNTDOWN INTERVAL PERIOD OF THE CLOCK.
B2-07	PENALTY KICK TIMER (MILISEC)	500 - 10,000	5000 MILISECONDS	SETS THE AMOUNT OF TIME THAT THE 5-BANK DROP TARGET(S) REMAIN "DOWN" WHEN HIT DURING A PENALTY KICK.
B2-08	DRAIN VALID TIME (MILISEC)	500 - 15,000	3000 MILISECONDS	SETS THE AMOUNT OF TIME ADDED TO THE CLOCK DURING A SPECTACULAR SAVE. SIMILAR TO THE "QUICK DRAIN" FEATURE ON CONVENTIONAL PINBALL GAMES, TIME IS ADDED TO THE CLOCK INSTEAD OF A BALL RETURNED TO THE PLAYER.
B2-09	GOAL RESET TIME (MILISEC)	500 - 5,000	1100 MILISECONDS	SETS THE AMOUNT OF TIME THAT THE 5-BANK DROP TARGET(S) REMAIN DOWN BEFORE RESETTING.
B2-10	GOAL ADD TIME (MILISEC)	100 - 1,000	350 MILISECONDS	SETS THE AMOUNT OF TIME THAT IS ADDED TO THE GOAL RESET TIME WHEN CERTAIN PLAYFIELD FEATURES (SWITCHES) ARE ACTIVATED.
B2-11	TILT PENALTY TIME	0% - 99%	33%	SETS THE PERCENTAGE OF TIME THAT IS SUBTRACTED FROM THE TIMER WHEN A TILT OCCURS. FOR EXAMPLE, IF A PLAYER "TILTS" WITH 1 MINUTE REMAINING IN THE GAME, THEN 33% OF 1 MINUTE IS SUBTRACTED, OR 20 SECONDS.
B2-12	HALF TIME	PER GAME, PER PLAYER, NONE	PER GAME	SETS THE OCCURENCE OF A HALF TIME EVENT WHEN THE GAME TIMER HAS REACHED HALF OF THE ALLOTTED TIME. PER GAME SETS ONE HALF-TIME PER GAME, PER PLAYER SETS A HALF TIME FOR EACH PLAYER, AND NONE DISABLES THE HALF TIME EVENT FROM THE GAME.
B2-13	HALF TIME MESSAGE ALLOWED?	YES, NO, VIEW/EDIT	NO	YES SELECTS A CUSTOM MESSAGE FOR DISPLAY DURING HALF TIME BREAKS AND ATTRACK MODE. VIEW/EDIT PERMITS OPERATOR CUSTOMIZATION OF THE MESSAGE.

B3: LOCALE ADJUSTMENTS

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B3-01	COUNTRY	UNITED STATES, FRANCE, GERMANY 1,2,3, SPAIN, MEXICO CANADA (ENGLISH), CANADA (FRENCH), SWITZERLAND 1,2,3; ITALY 1,2, UNITED KINGDOM, NETHERLANDS, GREECE 1,2,3 HONG KONG, MALAYASIA, BRAZIL 1,2 SWEDEN 1,2 AUSTRALIA JAPAN	UNITED STATES	SETS THE COUNTRY LOCATION OF THE GAME. THIS SETTING CONTROLS NUMBERS, TIMES, DATES, AND MONETARY VALUES SHOWN ON THE DOT MATRIX DISPLAY. THIS OPTION WILL ALSO CHANGE THE SETTINGS FOR B3-02 AND B3-03.
B3-02	TEXT LANGUAGE	ENGLISH, FRENCH, GERMAN, SPANISH, JAPANESE, DUTCH, PORTUGUESE	ENGLISH	SETS THE LANGUAGE USED FOR TEXT SHOWN ON THE DOT MATRIX DISPLAY.
B3-03	SPEECH LANGUAGE	ENGLISH, FRENCH, GERMAN, SPANISH, ITALIAN, DUTCH, PORTUGUESE NOTE: TEXT AND SPEECH LANGUAGES IN BOLD ARE NOT CURRENTLY IMPLEMENTED.	ENGLISH	SETS THE LANGUAGE USED IN SOUND EFFECTS.
B3-04	TIME SEPERATOR	<:, <:, </>, <->	<:;>	SELECT THE SEPERATOR SYMBOL USED FOR DISPLAYING TIME (e.g.. 12:00:00).
B3-05	CURRENCY SYMBOL	\$, TOK, COIN, F, DM, PTS., FR., L, £, G, DR, KR	\$	SELECT THE SYMBOL FOR CURRENCY.
B3-06	CURRENCY SYMBOL POSITION	\$9.99, 9.99\$, \$ 9.99, 9.99 \$	\$9.99	SELECT THE DISPLAY POSITION OF THE CURRENCY SYMBOL..
B3-07	CURRENCY DIGITS	0, 1, 2	2	SET THE NUMBER OF DIGITS TO THE RIGHT OF THE DECIMAL POINT.
B3-08	DECIMAL POINT	<.>, <,>	<.>	SELECT THE DECIMAL SYMBOL USED FOR DISPLAYING CURRENCY.
B3-09	THOUSAND SEPERATOR	<,>, <.>,<,>, <.>	<.>	SELECT THE SYMBOL USED FOR SEPERATING MULTIPLES OF 1000 (THOUSANDTHS, MILLIONS, BILLIONS)

B4: COINAGE ADJUSTMENTS

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B4-01+	CONFIGURE COINAGE TO	1 GAME / 1 COIN 1 GAME / 2 COINS 1 GAME / 3 COINS 2 GAMES / 1 COIN 1/1 3/2 GAMES/COINS 1/2 3/4 GAMES/COINS 1/2 2/3 3/4 1/2 2/4 3/6 5/8 USA, 50c, 5/\$2.00 USA, 50c, 2/75c 3/\$1.00 USA 50c, 3/\$1.00 FR 3/1 5/2 10/5 20/11 FR 5/1 10/3 20/7 FR 3/1 5/2 10/4 20/9 GERMAN 1/2 2/3 3/4 5/5 GERMAN 1/2 2/3 3/4 4/5 GERMAN 1/1 6/5 SPAIN, 1/100 6/500 U. K., 3/L1 U. K., 1/50p SWISS, 1/1 2/2 6/5	SET ACCORDING TO COUNTRY DEFAULT	SETS THE RATIO OF NUMBER OF CREDITS (GAMES) TO THE NUMBER OF COINS. SELECT THE CUSTOM PRICING FEATURE AND CHOOSE UP TO FOUR SEPARATE COIN/CREDIT CONFIGURATIONS.

B4: COINAGE ADJUSTMENTS (CONTINUED)

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B4-01+ (CONT.)	CONFIGURE COINAGE TO	SWISS, 1/1 3/2 8/5 SWISS, 1/1 ITALY 1/2X500L 3/4X500L ITALY 1/500L ITALY 1/2X500L HOLL. 1/1G 3/2.5G 6/5G GREECE 1/100Dr. GREECE 1/200Dr. 2/300 GREECE 1/100Dr. 2/150 SWEDEN 1/10Kr. 2/15 3/20 SWEDEN 1/5Kr. 2/10 5/20 AUSTRALIA 1/\$1 3/2 JAPAN 1/100YEN 3/200YEN CUSTOM PRICING	SET ACCORDING TO COUNTRY DEFAULT	SETS THE RATIO OF NUMBER OF CREDITS (GAMES) TO THE NUMBER OF COINS. SELECT THE CUSTOM PRICING FEATURE AND CHOOSE UP TO FOUR SEPARATE COIN/CREDIT CONFIGURATIONS.
B4-01A	PRICING #1	(0 TO 65,635) CREDIT PER (0 TO \$655.35)	1 CREDIT / \$0.50	THE FIRST PRICING LEVEL FOR THE GAME. NOTE: ALL GAME PRICING SETTINGS MUST CORRESPOND TO THE PRICING CARD INFORMATION.
B4-01B	PRICING #2	(0 TO 65,635) CREDITS PER (0 TO \$655.35)	5 CREDITS / \$2.00	THE SECOND PRICING LEVEL FOR THE GAME.
B4-01C	PRICING #3	(0 TO 65,635) CREDITS PER (0 TO \$655.35)	0 CREDITS / \$0.00	THE THIRD PRICING LEVEL FOR THE GAME.
B4-01D	PRICING #4	(0 TO 65,635) CREDITS PER (0 TO \$655.35)	0 CREDITS / \$0.00	THE FOURTH PRICING LEVEL FOR THE GAME.
B4-02+	COIN DOOR TYPE	CUSTOM ALL CHUTE UNITS 1 COIN USA 25-25 USA 25 W/MULTIPULSE DBV FRANCE ELEC1-5-10-20 FRANCE MECH 5-10 GERMANY ELEC 1-2-5 GERMANY MECH 1-2-5 UK ELEC L1-50-20-10 ITALY MECH 500-500 N.Z. MECH 1-2 SPAIN MECH 100-500 JAPAN MECH 100-100 JAPAN MECH 100 PORT MECH 100-200 GREECE MECH 50-100 HUNGARY MECH 20-20 AUSTRIA MECH 5-10-10 AUSTRIA MECH 5-10 KOREA MECH 100-100 HONG KONG MECH 1-2 SWISS MECH 1-2-5 SWISS MECH 1-5 SWISS MECH 1-1-1 HOLLAND MECH 1-1 HOLLAND MECH 1-2,5-5 CANADA MECH .25-1 CANADA MECH .25-.25-1 NORWAY MECH 5-10 NORWAY MECH 10-5-20 NORWAY ELEC 5-10-20 DENMARK ELEC 1-5-10-20 AUSTRALIA MECH .20-1 AUSTRALIA MECH 1-2 AUSTRALIA ELEC .20-1-2-M1 FINLAND ELEC 1-5 FINLAND ELEC 5-1 BELGIUM MECH 20-20 BELGIUM ELEC 5-20-50 SWEDEN ELEC 1-5-10 SINGAPORE MECH 1-1 ITALY ELEC 500	SET ACCORDING TO COUNTRY DEFAULT	SETS THE COIN DOOR TYPE AND THE COIN UNITS FOR EACH CHUTE. SELECT CUSTOM FOR INDIVIDUAL DOOR TYPE CONFIGURATIONS AND CHUTE UNITS (SEE B4-02A THRU B4-02I).

B4: COINAGE ADJUSTMENTS (CONTINUED)

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B4-02A	1ST COIN CHUTE VALUE	0 - 65,535	SET ACCORDING TO COUNTRY DEFAULT	THE VALUE OF COIN(S) USED FOR THE 1ST CHUTE.
B4-02B	2ND COIN CHUTE VALUE	0 - 65,535	SET ACCORDING TO COUNTRY DEFAULT	THE VALUE OF COIN(S) USED FOR THE 2ND CHUTE.
B4-02C	3RD COIN CHUTE VALUE	0 - 65,535	SET ACCORDING TO COUNTRY DEFAULT	THE VALUE OF COIN(S) USED FOR THE 3RD CHUTE.
B4-02D	4TH COIN CHUTE VALUE	0 - 65,535	SET ACCORDING TO COUNTRY DEFAULT	THE VALUE OF COIN(S) UNITS USED FOR THE 4TH CHUTE.
B4-02E	CHUTE 1 TYPE	MECHANICAL, ELECTRICAL	MECHANICAL	SELECT THE CHUTE TYPE.
B4-02F	CHUTE 2 TYPE	MECHANICAL, ELECTRICAL	MECHANICAL	SELECT THE CHUTE TYPE.
B4-02G	CHUTE 3 TYPE	MECHANICAL, ELECTRICAL	MECHANICAL	SELECT THE CHUTE TYPE.
B4-02H	CHUTE 4 TYPE	MECHANICAL, ELECTRICAL	MECHANICAL	SELECT THE CHUTE TYPE.
B4-02I	COIN METER VALUE	0 - 65,535	SET ACCORDING TO COUNTRY DEFAULT	SELECT THE VALUE OF COIN(S) THAT IS EQUIVALENT TO ONE PULSE OF THE SOFTWARE-CONTROLLED COIN METER #5 (NOT CURRENTLY IMPLEMENTED IN HARDWARE).
B4-02J	CURRENCY UNITS	CURRENT LOCALE, TOKEN, COIN	CURRENT LOCALE	SELECT THE CURRENCY SYMBOL THAT APPEARS ON THE DISPLAY (DOES NOT AFFECT PRICING TABLES).
B4-02K	MAXIMUM CREDITS	1 - 99	20	SETS THE MAXIMUM NUMBER OF CREDITS ALLOWED DURING A GAME.
B4-02L	ENABLE CREDIT BONUSSES	YES, NO	NO	ALLOW MULTIPLE COINS (YES) OR SINGLE COINS (NO) TO BE USED IN CALCULATING CREDIT BONUSSES. EX. GAME PRICING IS ONE TOKEN PER PLAY, 2 TOKENS FOR 3 PLAYS. IF YES IS SELECTED, THE SECOND TOKEN WILL GIVE 3 CREDITS; IF NO, THE SECOND TOKEN WILL YIELD 2 CREDITS.
B4-02M	SHOW CREDIT FRACTIONS	YES, NO	YES	DISPLAY FRACTIONAL CREDITS AS COINS ARE INSERTED (TYPICALLY USED IN COUNTRIES WHERE ONE COIN RESULTS IN LESS THAN ONE CREDIT).
B4-03+	ALLOW BUY-IN	YES, NO	YES	SELECT WHETHER BUY-INS ARE ALLOWED DURING THE GAME (UNLIMITED).
B4-03A	BUY-IN CREDITS	1/255 TO 255 CREDITS	1 CREDIT	DETERMINES THE NUMBER OF BUY-IN CREDITS REQUIRED TO CONTINUE THE GAME. EX. A GAME REQUIRES 50¢, OR ONE CREDIT, TO START. BUY-INS CAN NOW BE SET AT <i>LESS OR MORE</i> THAN THE ONE CREDIT REQUIREMENT, PERHAPS A 1/2 CREDIT (25¢).
B4-03B	MAXIMUM BUY-INS	0 - 99	10	SETS THE MAXIMUM NUMBER OF BUY-INS ALLOWED DURING A GAME.
B4-03C	ONLY BUY-IN IF A TIE?	YES, NO	NO	PERMITS THE USE OF BUY-INS <i>ONLY</i> IN THE EVENT OF A TIE SCORE AT THE END OF A GAME. NOTE: IF A TEAM GAME RESULTS IN A TIE, ALL PLAYERS MUST BUY-IN.

B5 : PASSWORD

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B5-01+	PASSWORD	OFF, ON, CHANGE	OFF	SETS THE PASSWORD USED BY THE OPERATOR. SELECT CHANGE FOR A NEW OR REVISED PASSWORD; SELECT ON TO SET ADDITIONAL PASSWORD PROTECTION (SEE B5-01A,B). CAUTION: IF THE PASSWORD HAS BEEN

B5 : PASSWORD (CONTINUED)

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B5-01A	HIDE EARNINGS	YES, NO	NO	ALLOW EARNINGS INFO (AUDITS MENU) TO APPEAR/NOT APPEAR ON THE DOT MATRIX DISPLAY.
B5-01B	PROTECT ADJUSTMENTS	YES, NO	NO	SELECT YES TO PROTECT OPERATOR-SET ADJUSTMENTS FROM RESET (SEE D8: FACTORY RESET).
B5-01C	PROTECT AUDITS	YES, NO	NO	SELECT YES TO PROTECT OPERATOR-SET AUDITS FROM RESET (SEE D8: FACTORY RESET).

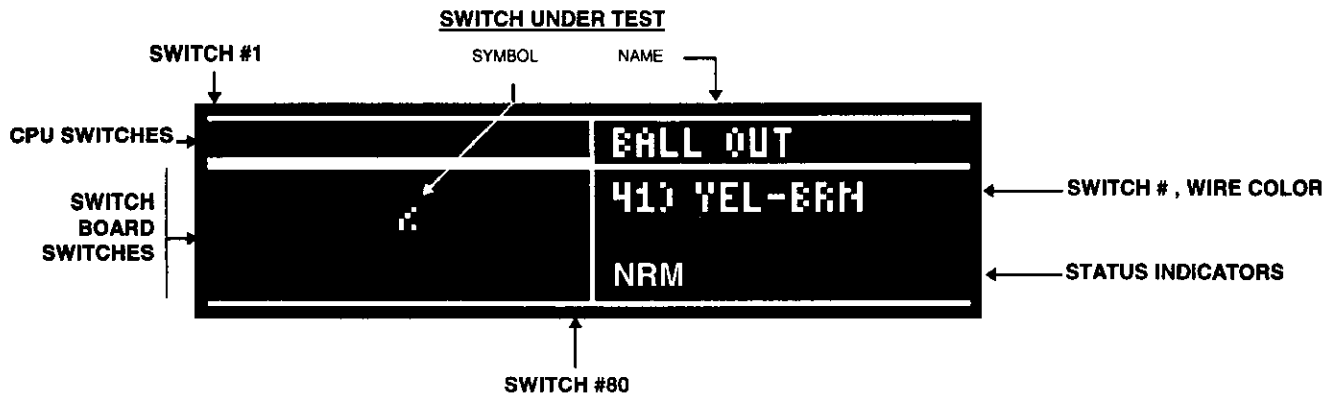
B6 : ERRORS/INFO

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
B6-01	SWITCH ERRORS	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE ERROR MESSAGES ON-THE SCREEN DISPLAY.
B6-02	SWITCH INFO MSG	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE INFO MESSAGES ON-THE SCREEN DISPLAY.
B6-03	SOLENOID ERRORS	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE ERROR MESSAGES ON-THE SCREEN DISPLAY.
B6-04	SOLENOID INFO MSG	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE INFO MESSAGES ON-THE SCREEN DISPLAY.
B6-05	LAMP ERRORS	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE ERROR MESSAGES ON-THE SCREEN DISPLAY.
B6-06	LAMP INFO MSG	REPORT ALL, DISABLE MOMENTARIES, DISABLE ALL	REPORT ALL	SETS THE OPTION TO DISPLAY OR HIDE INFO MESSAGES ON THE SCREEN DISPLAY.

C. DIAGNOSTICS

C1: STANDARD TESTS

C1-01 : SWITCH TEST

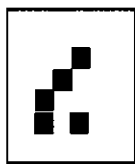


The Switch Test displays a graphical representation of all switches, indicating which switches are seen as open and which are seen as closed. Also shown is information about the switch under test (name, number, wire color and status indicators). The status indicators, when highlighted, show:

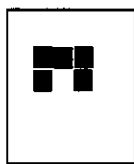
NRM - Normal operation; no problems are detected.

DEAD Indicates when a switch has not been activated in past games.

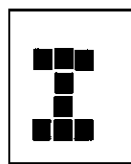
The Switch icons are:



OPEN SWITCH



CLOSED SWITCH



OPTO WITH VERTICAL
BEAM OF LIGHT



OPTO WITHOUT
BEAM OF LIGHT
(BLOCKED OPTO)

NOTE: If a status indicator is blinking, it is indicative of a problem area.

C1- 02 : OPTO TEST

The Opto Test is used to verify opto operation by blinking the controlled lamps and flashers. The dot matrix display screen is similar to the Switch Test (C1-01) above, however, when selected, the following screen appears:



Open the backbox and remove connector J15 from the Power Board. Then, when verifying each opto, check that the opto icon does NOT have a vertical line (representing a “triggered” receiver condition). In this case, make sure that all balls are secure in a ball holding device (since infrared light can be reflected off the game ball) and re-test. If the opto continues to fail this test, repair/replace as required.

NOTE: Reconnect J15 at the Power Board after completing this test.

C1- 03 : SOLENOID TEST**CAUTION**

THE FOLLOWING TEST SHOULD BE PERFORMED ONLY BY QUALIFIED SERVICE PERSONNEL.
TO START THE TEST, THE COIN DOOR MUST BE OPEN AND THE STEM OF THE 50V INTERLOCK SWITCH MUST BE PULLED-OUT (ENABLED).

The Solenoid Test will test solenoids, motors, and flashers on the game. The screen displays information on the name of the device, a representative icon for the device, wire colors, driver board connector & pin number, power board wire color, and status indicators (NRM, OFF). For each test, the device will be energized and the icon will pulse.

The status indicators, when highlighted, represent the following conditions:

- | | |
|-------------|--|
| NRM | Normal operation; no problems are detected; |
| OFF | A short circuit is detected. The device may be in a cooling-down period and will automatically enable itself after reaching the proper operating temperature; |
| OFF? | Momentary short circuit (e.g. at some point the device had been detected as shorted, although it may be fine now). This is a good way to detect intermittent problems. |

Use the flipper buttons to cycle from solenoid-to-solenoid. Press both flipper buttons to exit the Solenoid Test.

NOTE: If an indicator is blinking, there is a software-detected problem with this device.

C1- 04 : LAMP TEST



The Lamp Test will start all game lamps flashing. The flippers can then be used to get detailed information about any individual lamp. This information includes the lamp name and number, row and column information from the lamp matrix, its' wire colors, and an icon indicating whether the lamp is active.

The lamp's indicators report:

NRM = If BRIGHT, no electrical problems have been detected.

CONN = If this indicator is BRIGHT, an electrical connection is detected. If this indicator is dim, there is a break in the wiring to the lamp.

CONN? = At some point the device had been detected as not connected, although it may be fine now. This is a good way to find intermittent problems.

ROW.OFF = A row driver is disabled from a ROW or BULB short circuit -- The device was shorted and is now inactive (may be in a 15 second cool-down period).

ROW.OFF? = Indicates a momentary row short. At some point the device had been detected as shorted, although it may be fine now. This is a good way to find intermittent problems.

COLUMN = A column driver can be overheated and thermally shutdown, most likely from a column short-to-ground or an entire column without lamps (i.e. loose or disconnected column wire at the driver board or burned-out lamps).

COLUMN? = Indicates a momentary column problem. At some point the device had a column problem, although it may be fine now. This is a good way to find intermittent problems.

ADDITIONAL NOTE: If an indicator is blinking, this is the problem area. Use the flippers to cycle from lamp to lamp. Press both flipper buttons to exit the Lamp Test.

ADDITIONAL NOTES ON LAMP INDICATORS:

CONN: A bright indicator shows that at least 1 bulb is connected and is lit. For 2 bulbs at a single location, both bulbs must be burned-out (or disconnected) before this indicator is made bright.

SERVICE TIP : Fix column problems *BEFORE* using this indicator to troubleshoot bulb problems.

ROW.OFF: A bright indicator reflects the drive is cooling from an unknown voltage short on the row side of a column/row matrix OR a short across the bulb. The "?" after this indicator helps to isolate either a bulb short or a row short. If all or multiple "?" are on the same row of the same matrix, then this would tend to indicate a row-short-to-power supply. **Row-shorts-to-ground are not detectable** (the only symptom is that all the bulbs in a particular row are extremely bright). If there is only one "?" in a row, then most likely a short exists at the bulb, socket, or terminals.

COLUMN: A bright indicator usually reflects a thermally-shutdown column driver caused by a short-to-ground condition, or all lamps in the column are burned-out, or a loose/broken column wire. A column shorted to a power source (i.e. any 50 volt supply) usually just burns-out all the bulbs in the column or blows a fuse.

WARNING: TO AVOID RISK OF PERSONAL INJURY, DO NOT TOUCH A COLUMN DRIVER DURING A THERMAL SHUTDOWN.

C1- 05 : DISPLAY TEST

The Display Test can assist the operator in checking the dot matrix display for proper illumination of individual pixel elements. It has six continuous test modes that move across the display:

- 1) A light diagonal bar illuminated against a dark background;
- 2) A light vertical bar illuminated against a dark background;
- 3) A light horizontal bar illuminated against a dark background;
- 4) A dark vertical bar illuminated against a light background;
- 5) A dark horizontal bar illuminated against a light background;
- 6) An intensity checker.

In the first five modes, use the flipper buttons to move the bar across the display. If you hold either flipper button "in" continuously, you will notice that the bar will run off the screen and the display will show the next (or previous) mode. The start button can be used at any time to change the intensity of the bar from normal to medium, dim, and off.

The sixth mode will light every pixel to full intensity. Pressing the flipper button will change the intensity to medium, dim, and off. After the sixth mode, the test cycles back to the first mode.

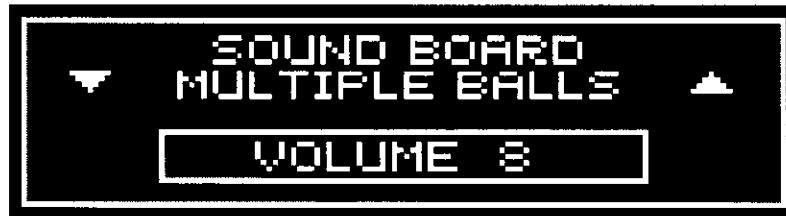
Press both flippers to exit the Display Test.

C1- 06 : SOUND BOARD RESET



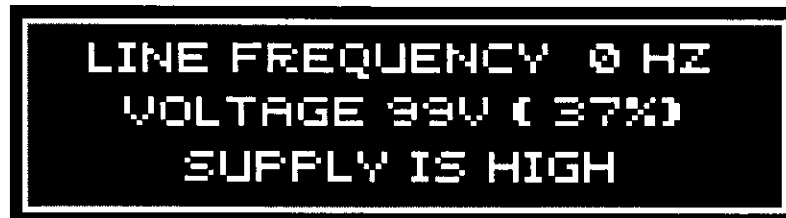
The Sound Board Test resets the sound board and causes it to report its powerup status. Press the start button to restart the test.

C1- 07 : SOUND BOARD MUSIC TEST



The Sound Board Music Test plays several samples of music which fully tests the capabilities of the sound board hardware. The selection of the tune and its' volume level can be changed by the use of the flippers and start button.

C1- 08 : SOL(ENOID) VOLTAGE



This test will measure and display signal strength from the power board (connector J3) to the CPU board (connector J2). The zero cross detection circuit should report the correct non-zero line frequency (top line of display) for this location . The second line of the display reports the flipper's 50 Volt A/D converter voltage to within ± 2 volts along with the current percent tolerance.

CAUTION: If any of the following conditions exist, the message "CHECK 50V INTERLOCK SW." will be displayed:

- 1) the 50V coin door interlock switch is not disabled (the stem is pushed-in instead of pulled-out);
- 2) the 50V fuse (F6) on the Power Board is blown;
- 3) the connection from the Power Board to the CPU is disconnected;
- 4) a power circuit or cabling is not operating properly.

Since the solenoid voltage is unregulated and unloaded at the time of this particular test, this measurement is an excellent indicator of the actual line voltage. The bottom line can display:

"SUPPLY WITHIN 10%" (10% is user-selected in Adjustment B1-13)
"SUPPLY IS HIGH"
"SUPPLY IS LOW"

The normal range of tolerance for the line voltage (not solenoid voltage) is -15% to +10%, for example, 120VAC can measure between 102VAC to 132VAC. The solenoid voltage is dependent upon the line voltage, and the transformer "taps" convert certain line voltages to a nominal non-loaded solenoid voltage of about 76 Volts. If your game is not within the 10% range, you might consider re-tapping the transformer to a high-line or low-line tap (depending if your solenoid voltage is high or low). The extra "cushion" of 5% (for the -15% tolerance) is highly recommended for temporary low- line conditions.

C1- 09 : TICKET DISPENSER TEST

NOTE: Before performing this test, return to the Menu System, Standard Adjustment B1-17+, *TICKET DISPENSER*, and verify that the installed dispenser is configured properly. Ticket audit totals are not affected by this test.

Tickets should be loaded and ready to dispense. This test will check the operation of the ticket dispenser motor, notch switch, and meter. The status of the notch switch is indicated on the display by *SW16*) *NOTCH*. If it appears bright, the switch is closed; dim, and the switch is open.

When the test starts, the motor will try to dispense a ticket and increment the ticket meter. If successful, the message "DISPENSED" will appear on the display; if unsuccessful, an "ERROR" is reported to the display. Possible "ERROR" conditions are discussed in the Troubleshooting section of this manual. This test can be repeated at any time by pressing the "START" button.

NOTE: After servicing an "Out of Tickets" condition or a dispenser jam, you can either:

a) *Continue* dispensing tickets from the game-in-progress by closing the coin door, or

b) Clear dispenser memory by interrupting power to the game (*turn game off, close coin door, then turn game on*).

C1- 10 : TOKEN DISPENSER TEST

NOTE: Before performing this test, return to the Menu System, Standard Adjustment B1-18+, *TOKEN DISPENSER*, and verify that the installed dispenser is configured properly. Token audit totals are not affected by this test.

Tokens should be loaded and ready to dispense. This test will activate the dispenser solenoid and pulse the meter. The test will also monitor up to 2 additional token switches (when needed), Switch 15 (TOKEN EXIT) and Switch 13 (TOKEN EXTRA). On the Asahi card dispenser, TOKEN EXIT is renamed READY. The status of the switch under test is indicated on the display. If it appears bright, the switch is closed; dim, and the switch is open.

The operator must confirm that the actual number of tokens dispensed agrees with the number of test(s) performed (one token per test). This test will typically display a successful "DISPENSED" (no "ERROR" will be reported) since most dispenser solenoids lack provision for feedback circuitry (switches).

NOTE 1: For dispensers that are equipped with switch feedback, the test message "ERROR" will be reported to the display. Possible "ERROR" conditions are discussed in the Troubleshooting section of this manual. This test can be repeated at any time by pressing the "START" button. Also, a "WAITING" message can appear for devices that require manual removal of the prize.

NOTE 2: After servicing an "Out of Tokens" condition or a dispenser jam, you can either:
a) *Continue* dispensing tokens from the game-in-progress by closing the coin door, or
b) *Clear* dispenser memory by interrupting power to the game (off, then on).



CAUTION

THE FOLLOWING TEST SHOULD BE PERFORMED ONLY BY QUALIFIED SERVICE PERSONNEL.
TO START THE TEST, THE COIN DOOR MUST BE OPEN AND THE STEM OF THE 50V INTERLOCK SWITCH MUST BE PULLED-OUT (ENABLED).

C1- 11 : CLEAR OUT BALLS

This test will eject the ball present in the game trough. It highlights (on the display) the trough switch when activated.

**CHECK 50V INTERLOCK SWITCH
TROUGH 1**

If this test is started with no ball present in the trough or re-tested after a previous attempt, the message "BALL TROUGH IS NOW EMPTY" will be displayed. Also, if the game is unable to eject a ball from the trough, the message "BALL TROUGH PROBLEM SUSPECTED" will be displayed.

C1- 12 : BURN-IN TEST



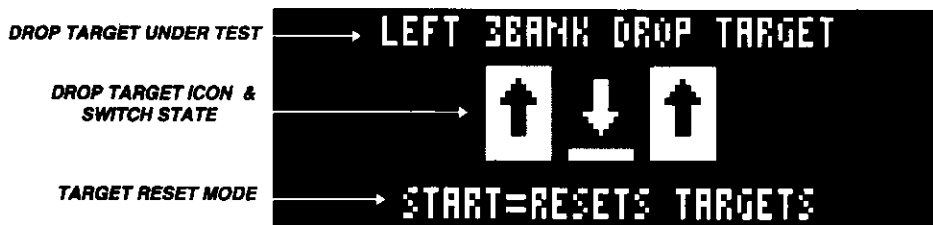
The Burn-In Test energizes all of the machine hardware in a sequenced pattern. All the solenoids are fired, motors run, and lamps flashed. The dot matrix display and sound system are also activated as well. This test is primarily intended for factory use to assure that all electronic and mechanical features are operating when the game leaves the factory.

To end the Burn-In test, press both flipper buttons at any time. Also, see the *Audit* section for the total cumulative time that Burn-In Tests have been run on the game.

C2: FEATURE TESTS

NOTE: *The following tests are performed with the playfield glass removed.*

- C2 - 01 : LEFT 3 BANK DROP TARGET (Playfield location - middle left)
- C2 - 02 : RIGHT 3 BANK DROP TARGET (Playfield location - middle right)
- C2 - 03 : TOP 5 BANK DROP TARGET (Playfield location - In front of goal)



The Drop Target test checks the response of each switch when its' target is "dropped" (switch closed) or "reset" (switch opened). You can check the response of each switch to actual game conditions, such as prolonged closure (waiting until all targets are dropped), or loose/damaged wiring connections caused by excessive cabinet vibration.

This test is active when the above screen is displayed. To verify the response of any drop target, use a game ball and strike the drop target with normal game-play force. For example, in the above screen, the

middle target was dropped and the resulting target icon is shown collapsed. This indicates that the target switch is closing properly.

•You can change the *Target Reset Mode* by pressing the left or right flipper buttons. This mode cycles between:

START = RESETS TARGETS

This mode resets the targets, at any time, when the *START* button is pressed;

ONLY START = RESETS TARGETS

In this mode, the reset pulse is disabled. When one or more targets are “dropped”, the *ONLY* method of resetting the targets is to press the *START* button. This permits the operator to slam/shake the cabinet (with the targets down) to see if any false triggering occurs by the target switches. This diagnostic will help determine if the switch is defective or the switch wiring is loose or partially connected.

Note 1: When the targets are reset, a certain amount of switch bounce occurs. This results in a momentary “flicker” of the target icon while the target switch is “opened”.

Note 2: Retries are inhibited during this test.

•To cancel or exit this test, press both flipper buttons simultaneously.

C3: ANIMATO (ANIMATION)

This test simply allows you to view some of the animations used in the game. It's the visual equivalent of standard test C1-07, Sound Board Music. In the title screen, the left and right flippers allow you to step from one animation display to the next. The title of the animation is displayed, as are the number of frames and the frame rate in frames per second (FPS). Press the start button to view the animation under selection.

While the animation is running, the following commands are available:

START BUTTON: Pause the animation, or resume playback at normal speed if the animation is already paused.

LEFT FLIPPER: Toggle the frame number on and off. When on, the frame number appears in the lower right-hand corner of the display.

RIGHT FLIPPER: Pause the animation, and step through each frame individually.

BOTH FLIPPERS: Quit to the title screen.

From the title screen, press both flippers again to return to the diagnostic menu.

C4: TROUBLESHOOTING

The Troubleshooting diagnostic is a shortcut tool to get to the games' troublespots as quickly and conveniently as possible. This diagnostic scans all the games' switches (SW), solenoids (SOL), lamps (LP), and "smart" game devices (GAME) for problems and presents a summary of what was found, as shown below:

```

TRUBLESHOOTING
ERR:  0 - SW   0 - SOL   8 - LP   0 - GAME
INFO:  1 - SW   0 - SOL   0 - LP   0 - GAME
▼ CYCLE TESTS ▲  BOTH FLIPPERS CANCEL
  
```

For example, the above screen reports ERRor conditions with 8 lamps and INFOrmation results about 1 switch. Use the flipper buttons to automatically step to the appropriate test for each reported condition. The tests used in this diagnostic are described in detail in section *C1, Standard Tests*, and *C2, Feature Tests*.

NOTE 1: The troubleshooting diagnostic continuously gathers and updates information in real time. A sound is made when any of this information changes. This allows the operator to make repairs or find loose connections in the game and check his/her results by viewing the display.

NOTE 2: GAME errors and information are not used in *FLIPPER FOOTBALL™*.

There are two categories of troubleshooting, Errors and Information. *Errors* are considered important to game play and should be fixed at the earliest opportunity. *Information* messages (for example, a lamp behind the backglass is burned-out) are considered less critical and can be serviced as part of a routine maintenance schedule. Errors and Information messages can also be selectively disabled from viewing by *Adjustment B6, Errors/Info*. Additionally, all Errors and Information messages can be cleared by the reset function *D5, Clear Errors/Info*.

NOTE 3: Refer to *Section C1, Standard Tests, C1-01 through C1-04* and *C2, Feature Tests*, for more information on indicator status and troubleshooting tips.

NOTE 4: Individual momentaries for a lamp, switch, or solenoid are always "forgotten" when you cycle through each individual test.

D. RESET FUNCTIONS

*D1: CLEAR COLLECTIONS

This function clears all Collection Audits (A1) and moves all Histories down one level in the collections history log (Example: Current audits become History 1 audits, History 1 audits become History 2 audits, etc.).

*D2: CLEAR AUDITS

This action clears all other audits, from A2: Earnings Audits to A7: Ball Time Histogram.

D3: CLEAR CREDITS

Reset the Credits counter to zero.

D4: CLEAR HIGH SCORE TO DATE (HSTD)

Used to reset the game's HSTD table based on the settings in Adjustments B1-05A: HSTD High Score and B1-05B: HSTD Last Score.

D5: CLEAR ERRORS/INFO

Clears all troubleshooting errors and info. Always use this after repair or replacement of PC boards.

*D6: CLEAR ADJUSTMENTS

Returns all B: Adjustments(6) to their factory-set defaults (A: Audits are not affected by this function).

D7: RESET REPLAY

Resets the replay score to meet the target replay percentage (see Adjustment B1-04A: Replay Percent).

D8: FACTORY RESET

Clears ALL audits and adjustments information and returns the game to the original factory default settings. The operator is prompted to select a country for which the locale, language, and coin door adjustments are set (default country is the *United States*, Adjustment B3-01).

***NOTE:** WHEN PASSWORD-PROTECTED, THESE FUNCTIONS WILL NOT CLEAR
(SEE SECTION B5 , *PASSWORD*)

E. REPORTS

THEORY OF OPERATION

The Reports utility permits the operator the ability to “dump” all *Audits* and *Adjustments* data to a serial communications device, such as a printer or a laptop computer. A Report can be generated using one of the following methods:

1) Automatically, via the “Hot Plug” (“energized” serial port). When the “Hot Plug” method is used, the system software will automatically detect the presence of the printer when the coin door is opened and the printer cable is connected to the serial port of the Interface PCB. The Report will then start printing. The progress of the print job will be shown on the dot matrix display, along with any error messages. When a “Hot Plug” print job is successfully completed, all current audits data will be cleared, replay award levels reset, and the printout counter will be incremented. The operator must close the coin door and re-open it again to generate another “Hot Plug” Report.

2) Manually, through the Menu System using *E1: Custom Report* The operator can also elect to disable the “Hot Plug” method of reporting (see *E3-01B: Hotplug Custom Report*), and configure the printer/computer for mode of operation, communications protocol, and customization features of the report. When a “Custom” print job is successfully completed, the printout counter will be incremented and audits data and replay award levels will also be cleared/reset unless the operator elects otherwise (see *E2-01,02: Clear Collections, Reset Replay*).

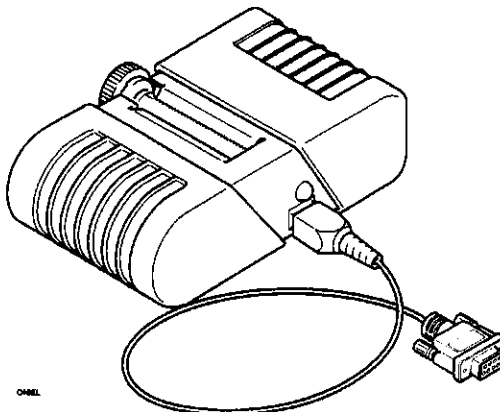
CAUTION: The “Hot Plug” (serial port) is active when the coin door is opened. For a *Custom Report*, the printer plug must NOT be inserted in the serial port until *E1: Custom Report* is selected and the START button is pushed. Any attempt to generate a *Report* prior to this sequence will always result in a “Hot Plug” *Report*.

PRINTERS and COMPUTERS CURRENTLY SUPPORTED:

- O'Neil microFlash Receipt Printer;
- NSM Datapoint 3000 Printer/Recorder;
- Citizen Dot-Matrix Printer, Models IDP 560 or 562;
- Any serial printer supporting an ASCII format;
- Any desktop/laptop computer capable of supporting an ASCII format.

PRINTER/COMPUTER CONFIGURATION AND INSTALLATION

I. O'Neil microFlash Receipt Printer



NOTE: If your game is not equipped with a printer interface PCB, contact your local CAPCOM® distributor for Field Kit K-008-2. Install all necessary hardware and cables using the enclosed instructions.

1) Using the O'Neil Configuration Utility, open to the following sub-menus and configure the printer for the following settings:

a. *Communication Parameters-*

PORT = COM1;
 BAUD RATE = 19200;
 DATA BITS = 8;
 PARITY = NONE;
 HANDSHAKING = XON/XOFF.

b. *Printer Options -*

BEEPER = ON;
 TIME-OUT = 10 SECONDS;
 INFRARED CRC = OFF.

c. *Paper, Fonts, and Graphics Options -*

SET PER USER REQUIREMENTS.

2) Configure the games' *Reports* software as follows:

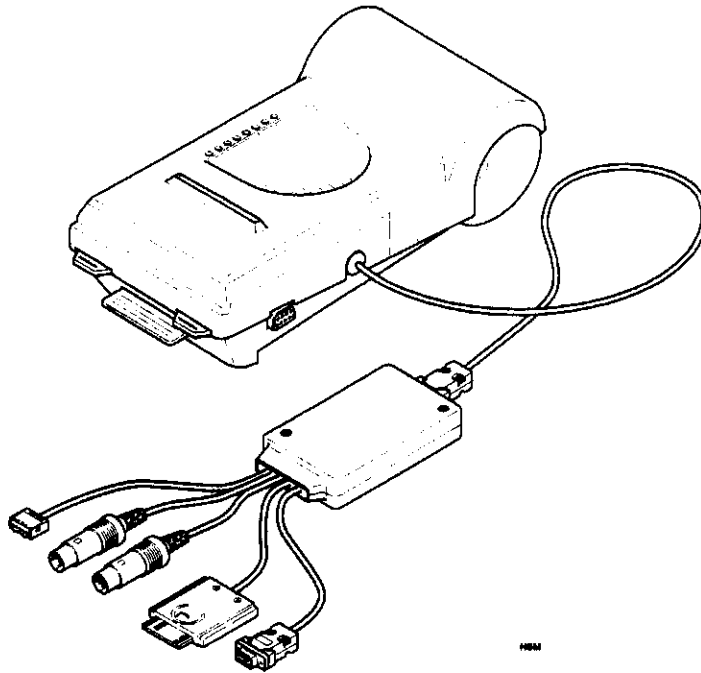
E3 - 01+: Select O'NEIL MICROFLASH;

E2 -01 thru 17: Select per user requirements for a *Custom Report* (optional).

3) Determine the method of generating the Report. For a "Hot Plug" Report, connect the DB9 female connector (supplied with the printer) to the DB9 male connector now located on the switch bracket inside the coin door. The *Report* will start printing after this connection is made. The *Report* can be repeated, if necessary, by removing the cable, closing and re-opening the coin door, and re-installing the printer cable to the serial port.

4) For a *Custom Report*, scroll through the Menu System to E1 : *Custom Report*. Press the START button and install the printer cable to the serial port. The Custom Report will now begin printing. Remove the printer cable when the print job is finished and close the coin door.

II. NSM Datapoint 3000 Printer



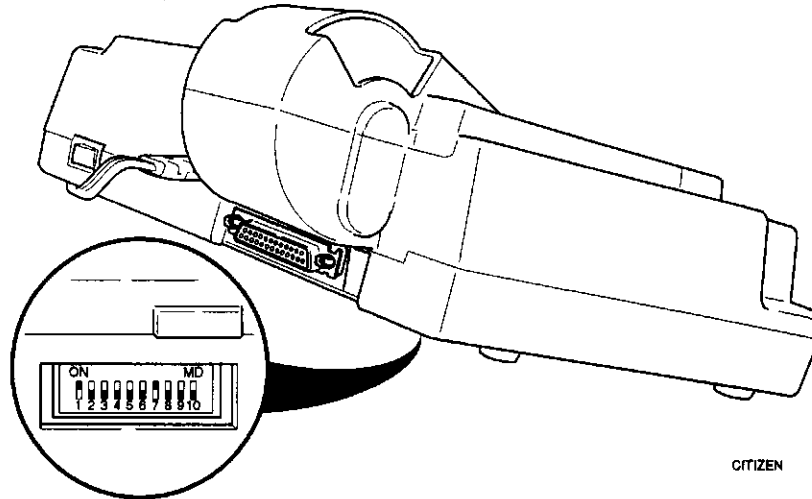
NOTE: If your game is not equipped with a printer interface PCB, contact your local CAPCOM® distributor for Field Kit K-008-5. Install all necessary hardware and cables using the enclosed instructions.

- 1) Configure the games' *Reports* software as follows:
 - E3 - 01+: Select NSM DATAPRINTER, PRINT;
 - E2 -01 thru 17: Select per user requirements for a *Custom Report* (optional).
- 2) Check that the NSM Memory Card is fully inserted into its' slot.
- 3) Determine the method of generating the Report. For a "Hot Plug" Report, connect the DB9 female connector (supplied with the printer) to the DB9 male connector now located on the switch bracket inside the coin door. The Report should start printing automatically. The *Report* will start printing after this connection is made. The *Report* can be repeated, if necessary, by removing the cable, closing and re-opening the coin door, and re-installing the printer cable to the serial port.
- 4) For a *Custom Report*, scroll through the Menu System to *E1 : Custom Report*. Press the START button and install the printer cable to the serial port . The Custom Report will now begin printing. Remove the printer cable when the print job is finished and close the coin door.

III. NSM Datapoint 3000 Recorder

Same as the NSM Datapoint 3000 Printer above except that the printer is configured through *Reports* software as a memory storage device. The *Reports* data is saved to the NSM memory card and downloaded to a computer through the use of NSM-compatible software, such as DATACONTACT 3000©. You must configure the games' *REPORTS* software, in section E3 - 01+, for **NSM DATAPRINTER, SAVE**. Follow the above NSM Printer steps 2 through 4 to capture a *Report* to the memory card.

IV. Citizen Dot-Matrix Printer, Models IDP 560 or 562



NOTE: If your game is not equipped with a printer interface PCB, contact your local CAPCOM® distributor for Field Kit K-008-2. Install all necessary hardware and cables using the enclosed instructions.

1) Set the printer's DIP switches as follows:

DIP SWITCH #									
1	2	3	4	5	6	7	8	9	10
ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF

2) Configure the games' *Reports* software as follows:

E3 - 01+: Select CITIZEN 560/562;

E2 -01 thru 17: Select per user requirements for a *Custom Report* (optional).

3) Determine the method of generating the Report. For a "Hot Plug" Report, obtain a standard serial printer cable (purchase locally) with DB25 male/ DB9 female connector leads. Connect the DB25 male connector to the printer I/O port and attach the DB9 female connector to the male connector now located on the switch bracket inside the coin door. The Report should start printing automatically. The *Report* will start printing after this connection is made. The *Report* can be repeated, if necessary, by removing the cable, closing and re-opening the coin door, and re-installing the printer cable to the serial port.

4) For a *Custom Report*, scroll through the Menu System to *E1 : Custom Report*. Press the START button and install the printer cable (as described above) to the serial port. The Custom Report will now begin printing. Remove the printer cable when the print job is finished and close the coin door.

V. Generic ASCII

NOTE: If your game is not equipped with a printer interface PCB, contact your local CAPCOM® distributor for Field Kit K-008-2. Install all necessary hardware and cables using the enclosed instructions.

1) Set the printer/computer serial port to receive data in the following format:

BAUD RATE = 19200;	STOP BIT(S) = 1;
DATA BITS = 8;	FLOW CONTROL (HANDSHAKING) = CTS and/or
PARITY = NONE;	XON/XOFF

2) Configure the games' REPORTS software as follows:

E3 - 01+: Select GENERIC ASCII;
E3 - 02+: Select DELIMITED if data is used for importation into a spreadsheet program, such as Microsoft® Excel.
E2 - 01 thru 17: Select per user requirements for a *Custom Report* (optional).

3a) For a printer, determine the method of generating the Report. For a "Hot Plug" Report, obtain a standard serial printer cable (purchase locally) with DB25 male/ DB9 female connector leads. Connect the DB25 male connector to the printer I/O port and attach the DB9 female connector to the male connector now located on the switch bracket inside the coin door. The Report should start printing after this connection is made. The *Report* can be repeated, if necessary, by removing the cable, closing and re-opening the coin door, and re-installing the printer cable to the serial port.

For a *Custom Report*, scroll through the Menu System to *E1 : Custom Report*. Press the START button and install the printer cable to the serial port. The Custom Report will now begin printing. Remove the printer cable when print job is finished and close the coin door.

3b) For computers, the pinball game is configured as a data terminal device (DTE) and the receiver is assumed to be a communications device (DCE). This configuration normally requires the use of a null modem cable with DB9 female and DB9/DB25 female terminations. Connect the DB9/DB25 female connector to the computer serial port (COM1 or COM2).

Prepare the computer to receive the ASCII text by opening to a serial port (modem) capture program, such as PROCOMM PLUS® or Microsoft® Windows TERMINAL (look under Program Manager, Accessories Group). Scroll through the Menu System to *E1 : Custom Report*. and press the START button. Connect the DB9 female connector to the male connector now located on the switch bracket inside the coin door. The Report should begin downloading to the computer terminal. Remove the printer/computer cable when the job is finished and close the coin door.

E1: Custom Report

The *Custom Report* is an operator-defined report which will be generated according to the settings defined in *E2: Custom Report Setup*. For printing a *Custom Report*, the operator must scroll through the Menu System to *E1 : Custom Report* and press the START button. The printer cable should now be connected to the serial port. The *Custom Report* will begin printing. Remove the printer cable when the print the job is finished and close the coin door.

E2 Custom Report Setup

This menu is used to configure the *Custom Report*. Each device, as described in *Printer/Computer Configuration and Installation*, is pre-configured according to the settings in *E3-01: Install Device*. The user can also customize the Report according to the following table:

REF.	NAME	RANGE	INSTALLED DEVICE SETTINGS					DESCRIPTION
			O'NEIL	NBM-PRINT	NBM-SAVE	CITIZEN	GENERIC	
E2-01	CLEAR COLLECTIONS	NO, LEAVE COLLECTIONS YES, WHILE PRINTING	YES	YES	YES	YES	YES	SELECT WHETHER <i>CURRENT AUDITS</i> SHOULD BE CLEARED AFTER THE PRINT JOB IS COMPLETE.
E2-02	RESET REPLAY	NO, LEAVE REPLAY YES, WHILE PRINTING	YES	YES	YES	YES	YES	SELECT WHETHER <i>REPLAY AWARDS</i> SHOULD BE CLEARED AFTER THE PRINT JOB IS COMPLETE.
E2-03+	COLLECTION AUDITS	YES, NO	YES	NO	NO	YES	YES	SELECT WHETHER <i>COLLECTION AUDITS</i> SHOULD APPEAR ON THE REPORT. IF YES, EACH <i>COLLECTION AUDIT</i> IS SELECTED INDIVIDUALLY (E3-03A THROUGH E3-03D) FOR THE REPORT.
E2-03A	CURRENT AUDITS	YES, NO	YES	NO	NO	YES	YES	SHOULD <i>CURRENT AUDITS</i> APPEAR ON THE REPORT?
E2-03B	AUDIT HISTORY 1	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>AUDIT HISTORY 1</i> APPEAR ON THE REPORT?
E2-03C	AUDIT HISTORY 2	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>AUDIT HISTORY 2</i> APPEAR ON THE REPORT?
E2-03D	AUDIT HISTORY 3	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>AUDIT HISTORY 3</i> APPEAR ON THE REPORT?
E2-04	EARNINGS AUDITS	YES, NO	YES	NO	NO	YES	YES	SHOULD <i>EARNINGS AUDITS</i> APPEAR ON THE REPORT?
E2-05	STANDARD AUDITS	YES, NO	YES	NO	NO	YES	YES	SHOULD <i>STANDARD AUDITS</i> APPEAR ON THE REPORT?
E2-06	FEATURE AUDITS	YES, NO	YES	NO	NO	YES	YES	SHOULD <i>FEATURE AUDITS</i> APPEAR ON THE REPORT?
E2-07	STANDARD ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>STANDARD ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-08	GAME ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>GAME ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-09	LOCALE ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>LOCALE ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-10	PASSWORD ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>PASSWORD ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-11	ERROR/INFO ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>ERROR/INFO ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-12	COINAGE ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>COINAGE ADJUSTMENTS</i> APPEAR ON THE REPORT?
E2-13	REPORT SETTINGS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>REPORT SETTINGS</i> APPEAR ON THE REPORT?
E2-14	DEVICE SETTINGS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>DEVICE SETTINGS</i> APPEAR ON THE REPORT?
E2-15	GAME TIME HISTOGRAMS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>GAME TIME HISTOGRAMS</i> APPEAR ON THE REPORT?
E2-16	SCORE HISTOGRAMS	YES, NO	NO	NO	NO	NO	NO	SHOULD <i>SCORE HISTOGRAMS</i> APPEAR ON THE REPORT?
E2-17	BALL TIME HISTOGRAMS	YES, NO	YES	NO	NO	YES	YES	SHOULD <i>BALL TIME HISTOGRAMS</i> APPEAR ON THE REPORT?

REF.	NAME	RANGE	INSTALLED DEVICE SETTINGS					DESCRIPTION
			O'NEIL	NSM-PRINT	NSM-SAVE	CITIZEN	GENERIC	
E2-18	TROUBLESHOOTING DATA	YES, NO	Y	N	N	Y	Y	SELECT WHETHER TROUBLESHOOTING DATA SHOULD APPEAR ON THE REPORT.
E2-19	SOL. VOLTAGE	YES, NO	Y	N	N	Y	Y	SELECT WHETHER SOL. VOLTAGE SHOULD APPEAR ON THE REPORT.
E2-20	SOUND BOARD RESET	YES, NO	N	N	N	N	N	SELECT WHETHER SOUND BOARDS RESET SHOULD APPEAR ON THE REPORT.
E2-21	HSTD AUDITS	YES, NO	Y	N	N	Y	Y	SELECT WHETHER HSTD AUDITS SHOULD APPEAR ON THE REPORT.
*E2-22	REDEMPTION ADJUSTMENTS	YES, NO	NO	NO	NO	NO	NO	SELECT WHETHER REDEMPTION ADJUSTMENTS (F1) SHOULD APPEAR ON THE REPORT.
*E2-23	REDEMPTION PERCENTAGING	YES, NO	NO	NO	NO	NO	NO	SELECT WHETHER REDEMPTION PERCENTAGING (F2) SHOULD APPEAR ON THE REPORT.
*E2-24	REDEMPTION AUDITS	YES, NO	NO	NO	NO	NO	NO	SELECT WHETHER REDEMPTION AUDITS (F3) SHOULD APPEAR ON THE REPORT.

* NOTE: NOT AVAILABLE IN ALL VERSIONS OF SOFTWARE

E3: Device Setup

This menu is used to configure the serial communications between the game and the output device. Each device, as described in *Printer/Computer Configuration and Installation*, is pre-configured at the factory according to the country setting of the game (see *B3 : Locale Adjustments*). In the chart below, the County Settings are described as follows:

- I - used as the factory default for the U.S. and all other countries other than France and Germany;
- II - used as the factory default for Germany;
- III - optional configuration (not used as the factory default for any specific country);
- IV - used as the factory default for France;
- V - optional configuration (not used as the factory default for any specific country).

The user can also customize a device according to the following table:

REF.	NAME	RANGE	COUNTRY SETTING					DESCRIPTION
			I.	II.	III.	IV.	V.	
E3-01+	INSTALL DEVICE	CUSTOM GENERIC ASCII O'NEIL MICROFLASH NSM DATAPRINTER, PRINT NSM DATAPRINTER, SAVE CITIZEN 56Q/56Z	O'NEIL	NSM- PRINT	NSM- SAVE	CITIZEN	GENERIC	SELECT THE TYPE OF DEVICE CONNECTED TO THE SERIAL PORT. IF CUSTOM IS SELECTED, ADDITIONAL PRINTER SETTINGS (E3-01A THROUGH E3-01K) MUST BE SELECTED.
E3-01A	DEVICE TYPE	GENERIC ASCII O'NEIL MICROFLASH NSM DATAPRINTER CITIZEN 56Q/56Z	O'NEIL	NSM-	NSM-	CITIZEN	GENERIC	SELECT THE TYPE OF DEVICE CONNECTED TO THE SERIAL PORT.
E3-01B	HOTPLUG CUSTOM REPORT	YES, NO	YES	YES	YES	YES	YES	SELECT WHETHER TO ENABLE (YES) OR DISABLE (NO) CUSTOM REPORTS FROM THE MAIN MENU.
E3-01C	HOTPLUG QUERY	NONE 3 ASCII NULLS ASCII DC1	3 ASCII NULLS	NONE	NONE	ASCII DC1	NONE	SELECT THE INITIALIZATION STRING FOR YOUR PRINTER AFTER THE CONNECTION IS MADE ACTIVE.
E3-01D	HOT PLUG RESPONSE	NONE CTS ACTIVE DSR ACTIVE	CTS	CTS	CTS	CTS	CTS	SELECT WHETHER A HARDWARE HANDSHAKE IS REQUIRED.
E3-01E	SAVE REPORT	YES, NO	NO	NO	YES	NO	NO	SELECT WHETHER TO SAVE THE REPORT TO PRINTER MEMORY (IF SO EQUIPPED).

REF.	NAME	RANGE	COUNTRY SETTING					DESCRIPTION
			I.	II.	III.	IV.	V.	
E3-01F	BAUD RATE	300, 600, 1200, 2400, 4800, 9600, 19200	19200	9600	9600	9600	19200	SELECT THE BAUD RATE OF THE SERIAL PORT. NOTE: ONLY 8N1 (8-BIT, NO PARITY, 1 STOP BIT) IS SUPPORTED.
E3-01G	END OF LINE	CR, LF, CR & LF	CR & LF	CR & LF	CR & LF	CR & LF	CR & LF	SELECT THE END OF LINE (EOL) ASCII CHARACTERS TO BE USED: CR- CARRIAGE RETURN LF-LINE FEED
E3-01H	CHARACTERS PER LINE	24 TO 80	42	24	24	40	80	SELECT THE MAXIMUM NUMBER OF CHARACTERS PER LINE OF PRINT.
E3-01I	RS232 CTS HANDSHAKE	YES, NO	NO	NO	YES	YES	YES	SELECT WHETHER A RS232 CTS HANDSHAKE IS REQUIRED BY THE PRINTER DEVICE.
E3-01J	XON/XOFF HANDSHAKE	YES, NO	YES	NO	NO	NO	YES	SELECT WHETHER AN ASCII HANDSHAKE (XON/XOFF) IS REQUIRED BY THE PRINTER DEVICE.
E3-01K	RS232 DSR HANDSHAKE	YES, NO	NO	NO	NO	NO	NO	SELECT WHETHER A RS232 DSR HANDSHAKE IS REQUIRED BY THE PRINTER DEVICE.
E3-01L	EOL/CTS HANDSHAKE	YES, NO	NO	YES	NO	NO	NO	SELECT WHETHER A COMBINATION OF EOL & CTS SIGNALS ARE REQUIRED BY THE PRINTER DEVICE.
E3-02+	OUTPUT FORMAT	FORMATTED, DELIMITED	FORM.	FORM.	FORM.	FORM.	FORM.	SELECT THE FORMAT FOR DATA OUTPUT. <i>DELIMITED</i> (TEXT) OUTPUT WILL GENERALLY BE CAPTURED BY A TERMINAL SOFTWARE PACKAGE AND IMPORTED INTO A SPREADSHEET APPLICATION. IF <i>DELIMITED</i> IS CHOSEN, ADDITIONAL CRITERIA (E3-02 A,B) MUST BE SELECTED. <i>FORMATTED</i> DATA IS IN A PRINTER-READY, READABLE USER FORMAT, SUCH AS SEEN ON A RECEIPT
E3-02A	DELIMITER	TAB SPACE COMMA SEMI-COLON	TAB	TAB	TAB	TAB	TAB	SELECT THE DELIMITER TO BE INSERTED BETWEEN THE 3 FIELDS (TITLE, VALUE, PERCENTAGE) OF THE REPORT.
E3-02B	TEXT QUALIFIER	DOUBLE QUOTE SINGLE QUOTE	DOUBL	DOUBL	DOUBL	DOUBL	DOUBL	SPECIFY THE BEGINNING AND ENDING CHARACTER OF A FIELD.

E4: Adjustments Report

Generates a complete listing of ALL of the games' adjustments information. Any sensitive adjustments which are password-protected will not be shown on the report (only the title of the adjustment will appear with the message "PASSWORD PROTECTED"). This report can only be generated through the Menu System (see *E2-01: Custom Report*).

E5: Audits Report

Generates a complete listing of ALL of the games' audit information. Any sensitive audits which are password protected will not be shown on the report (only the title of the audit will appear with the message "PASSWORD PROTECTED"). This report can only be generated through the Menu System (see *E2-01: Custom Report*).

E6: Report Everything

Generates a complete listing of ALL of the games' information. This is equivalent to setting "YES" to all settings in E2: Custom Report Setup.

STATUS MESSAGES

NOTE: All of the following Status Messages are shown on the dot matrix display and do not appear on the printed report:

- 1) **PLEASE DISCONNECT PRINTER** - This message appears after an automatic report has been completed using the "Hot Plug" method.
- 2) **SEARCHING FOR PRINTER...** - This message appears at the beginning of each print job.
- 3) **ONE MOMENT, PRINTING <type>** - This message appears during a print job where <type> is the title or the section currently being printed.
- 4) **ONE MOMENT, PRINTING ALL ADJUSTMENTS, <type>** - This message appears during the Adjustments Report where <type> is the title of the section currently being printed.
- 5) **ONE MOMENT, PRINTING ALL AUDITS, <type>** - This message appears during the Audits Report where <type> is the title of the section currently being printed.
- 6) **ONE MOMENT, PRINTING CUSTOM REPORT, <type>** - This message appears during the Custom Report where <type> is the title of the section currently being printed.
- 7) **PRINT JOB COMPLETE** - This message appears after the completion of the current print job.
- 8) **PRINT JOB CANCELED** - This message appears when the operator cancels a print job in progress by pressing both flippers simultaneously.
- 9) **RESET COLLECTION AUDITS COMPLETE** - This message appears after the *COLLECTIONS* Audits have been cleared.
- 10) **RESET REPLAY PERCENTAGE COMPLETE** - This message appears after the replay setting has been changed to the recommended settings.

ERROR MESSAGES

NOTE: All of the following Error Messages are shown on the dot matrix display and do not appear on the printed report:

- 1) **ERROR: PRINTER NOT RESPONDING, CHECK CONNECTION AND TRY AGAIN** - This message appears after a print job is activated and the system is not able to detect the presence of a printer device. Check the printer cable for a loose connection and verify that it is the correct type of serial cable.
- 2) **ERROR: PRINT JOB INTERRUPTED, CHECK PRINTER AND TRY AGAIN** - This message will appear during a print job if the printer cable becomes disconnected, the printer goes off-line or runs out of paper, or an undetermined error occurs.

- 3) **PLEASE DISCONNECT PRINTER** - This message will appear after one of the above error messages was previously displayed and the re-connection attempt was unsuccessful. You must unplug the printer cable to remove the message from the display and return to the System Menu.

F. REDEMPTION

(NOT AVAILABLE IN ALL VERSIONS OF SOFTWARE)

DESCRIPTION

The Redemption Menu is used in configuring the game for a redemption mode of operation when the game is equipped with an optional ticket or token dispenser. The redemption mode has five levels of scoring, payout, mechanism selection (ticket and/or token dispenser), and percentaging. The number and type of prizes (tickets, tokens, free credits, extra balls) that are awarded are operator adjustable and can be set for increasing levels of scoring difficulty. Prizes are awarded incrementally during the game after each scoring level is reached by the player. The player must also score within a preset time limit. After the timer expires, the current game will continue but the dispenser is disabled and prizes are no longer awarded.

F1 : ADJUSTMENTS

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
F1-01+	REDEMPTION MODE	ON, OFF	OFF	SELECT WHETHER GAME OPERATES IN REDEMPTION MODE (ON).
F1-01A	SCORE 1	0 - 42,000,000	50,000,000	SET THE FIRST LEVEL OF SCORING THAT WILL DISPENSE A PRIZE(S).
F1-01B	PAYOUT 1	0 - 100	1	SET THE AMOUNT OF PRIZE(S) TO BE AWARDED WHEN REACHING A LEVEL 1 SCORE.
F1-01C	MECHANISM 1	TOKEN, TICKET, CREDIT, XBALL	TOKEN	SELECT THE TYPE OF AWARD TO BE ISSUED WHEN REACHING A LEVEL 1 SCORE.
F1-01D	PERCENTAGE 1	1 - 99	40	SET THE "IDEAL" PERCENTAGE OF GAMES THAT SHOULD REACH A LEVEL 1 SCORE. WHEN A HISTORY OF GAME SCORES HAS BEEN ACCUMULATED, THIS PERCENTAGE WILL THEN BE USED IN DETERMINING A "SUGGESTED" LEVEL 1 SCORE (SEE F2, PERCENTAGING).
F1-01E	SCORE 2	0 - 42,000,000	100,000,000	SET THE SECOND LEVEL OF SCORING THAT WILL DISPENSE A PRIZE(S).
F1-01F	PAYOUT 2	0 - 100	3	SET THE AMOUNT OF PRIZE(S) TO BE AWARDED WHEN REACHING A LEVEL 2 SCORE.
F1-01G	MECHANISM 2	TOKEN, TICKET, CREDIT, XBALL	TOKEN	SELECT THE TYPE OF AWARD TO BE ISSUED WHEN REACHING A LEVEL 2 SCORE.
F1-01H	PERCENTAGE 2	1 - 99	20	SET THE "IDEAL" PERCENTAGE OF GAMES THAT SHOULD REACH A LEVEL 2 SCORE. WHEN A HISTORY OF GAME SCORES HAS BEEN ACCUMULATED, THIS PERCENTAGE WILL THEN BE USED IN DETERMINING A "SUGGESTED" LEVEL 2 SCORE (SEE F2, PERCENTAGING).
F1-01I	SCORE 3	0 - 42,000,000	200,000,000	SET THE THIRD LEVEL OF SCORING THAT WILL DISPENSE A PRIZE(S).
F1-01J	PAYOUT 3	0 - 100	6	SET THE AMOUNT OF PRIZE(S) TO BE AWARDED WHEN REACHING A LEVEL 3 SCORE.
F1-01K	MECHANISM 3	TOKEN, TICKET, CREDIT, XBALL	TOKEN	SELECT THE TYPE OF AWARD TO BE ISSUED WHEN REACHING A LEVEL 3 SCORE.

AUDIT REF.	AUDIT NAME	RANGE	FACTORY SETTING	DESCRIPTION
F1-01L	PERCENTAGE 3	1 - 99	10	SET THE "IDEAL" PERCENTAGE OF GAMES THAT SHOULD REACH A LEVEL 3 SCORE. WHEN A HISTORY OF GAME SCORES HAS BEEN ACCUMULATED, THIS PERCENTAGE WILL THEN BE USED IN DETERMINING A "SUGGESTED" LEVEL 3 SCORE (SEE F2, PERCENTAGING).
F1-01M	SCORE 4	0 - 42,000,000	300,000,000	SET THE FOURTH LEVEL OF SCORING THAT WILL DISPENSE A PRIZE(S).
F1-01N	PAYOUT 4	0 - 100	10	SET THE AMOUNT OF PRIZE(S) TO BE AWARDED WHEN REACHING A LEVEL 4 SCORE.
F1-01O	MECHANISM 4	TOKEN, TICKET, CREDIT, XBALL	TOKEN	SELECT THE TYPE OF AWARD TO BE ISSUED WHEN REACHING A LEVEL 4 SCORE.
F1-01P	PERCENTAGE 4	1 - 99	5	SET THE "IDEAL" PERCENTAGE OF GAMES THAT SHOULD REACH A LEVEL 4 SCORE. WHEN A HISTORY OF GAME SCORES HAS BEEN ACCUMULATED, THIS PERCENTAGE WILL THEN BE USED IN DETERMINING A "SUGGESTED" LEVEL 4 SCORE (SEE F2, PERCENTAGING).
F1-01Q	SCORE 5	0 - 42,000,000	400,000,000	SET THE FIFTH LEVEL OF SCORING THAT WILL DISPENSE A PRIZE(S).
F1-01R	PAYOUT 5	0 - 100	1	SET THE AMOUNT OF PRIZE(S) TO BE AWARDED WHEN REACHING A LEVEL 5 SCORE.
F1-01S	MECHANISM 5	TOKEN, TICKET, CREDIT, XBALL	TICKET	SELECT THE TYPE OF AWARD TO BE ISSUED WHEN REACHING A LEVEL 5 SCORE.
F1-01T	PERCENTAGE 5	1 - 99	1	SET THE "IDEAL" PERCENTAGE OF GAMES TO REACH LEVEL 5 SCORING. WHEN A HISTORY OF GAME SCORES HAS BEEN ACCUMULATED, THIS PERCENTAGE WILL THEN BE USED IN DETERMINING A "SUGGESTED" LEVEL 5 SCORE (SEE F2, PERCENTAGING).
F1-01U	TIMER	10 - 300	200	SET THE AMOUNT OF "TICKS" ALLOWED FOR REACHING SCORING LEVELS 1 - 5. WHEN THE TIMER EXPIRES, THE GAME CONTINUES BUT THE REDEMPTION FEATURE IS DISABLED FOR EXAMPLE, 200 "TICKS" ARE EQUIVALENT TO 200 MILLISECONDS, OR ABOUT 1/5 OF A SECOND.
F1-01V	TIMER MILLISEC	500 - 2,000 ms	1000 ms	SET THE AMOUNT OF TIME PER "TICK" AT WHICH THE TIMER COUNTS DOWN.

F2 : PERCENTAGING

The Percentaging menu suggests to the operator a recommended scoring level that will better approximate the "target replay" percentage as set forth in F1, *Adjustments*. When selected, the following screen appears:



To accept the recommended new score level, press the START button. To cycle through the remaining score levels, press either FLIPPER button. To cancel, back-up, or restore the original setting, press both FLIPPER buttons simultaneously.

F3 : AUDITS

The Audits menu will display awards information accumulated from previous games. A sample Audits screen is shown:



To cycle through the remaining award levels, press either FLIPPER button. To cancel or back-up to a previous menu, press both FLIPPER buttons simultaneously.

F4 : CLEAR AUDITS

Clears Totals and Percentaging values from the above F3, *AUDITS*.

F5 : COUNT TOKENS

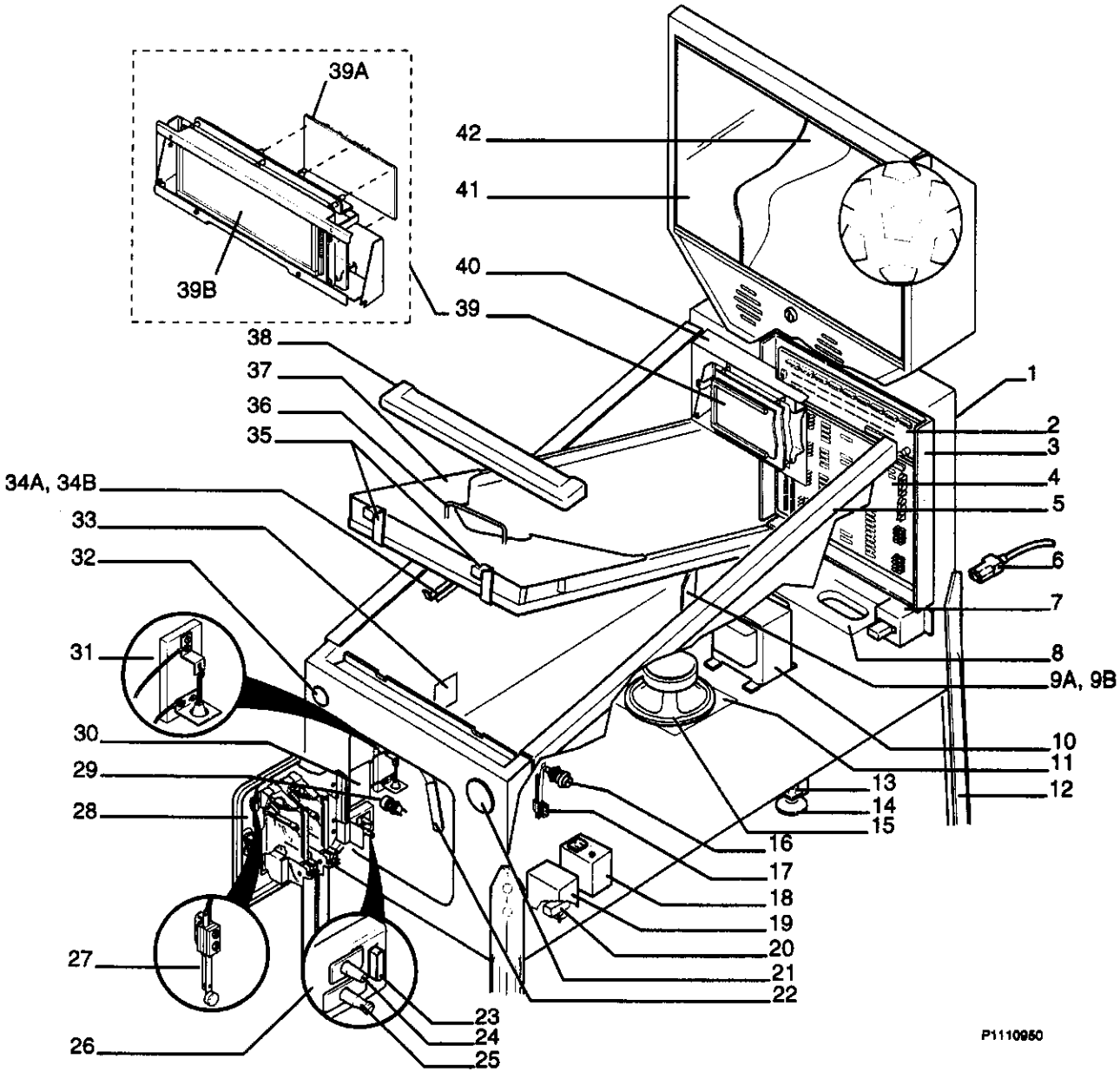
NOTE: This test is intended only for token dispensers equipped with a token switch. **Prior to starting this test, remove all existing tokens from the collection drawer (bin) in order to prevent a backup of tokens into the dispenser mechanism.**

This utility will start emptying the token dispenser of its' remaining tokens while counting each token as it exits. The token count will be continually displayed to the screen.

SECTION 4

COMPONENT PARTS IDENTIFICATION

CABINET PARTS IDENTIFICATION



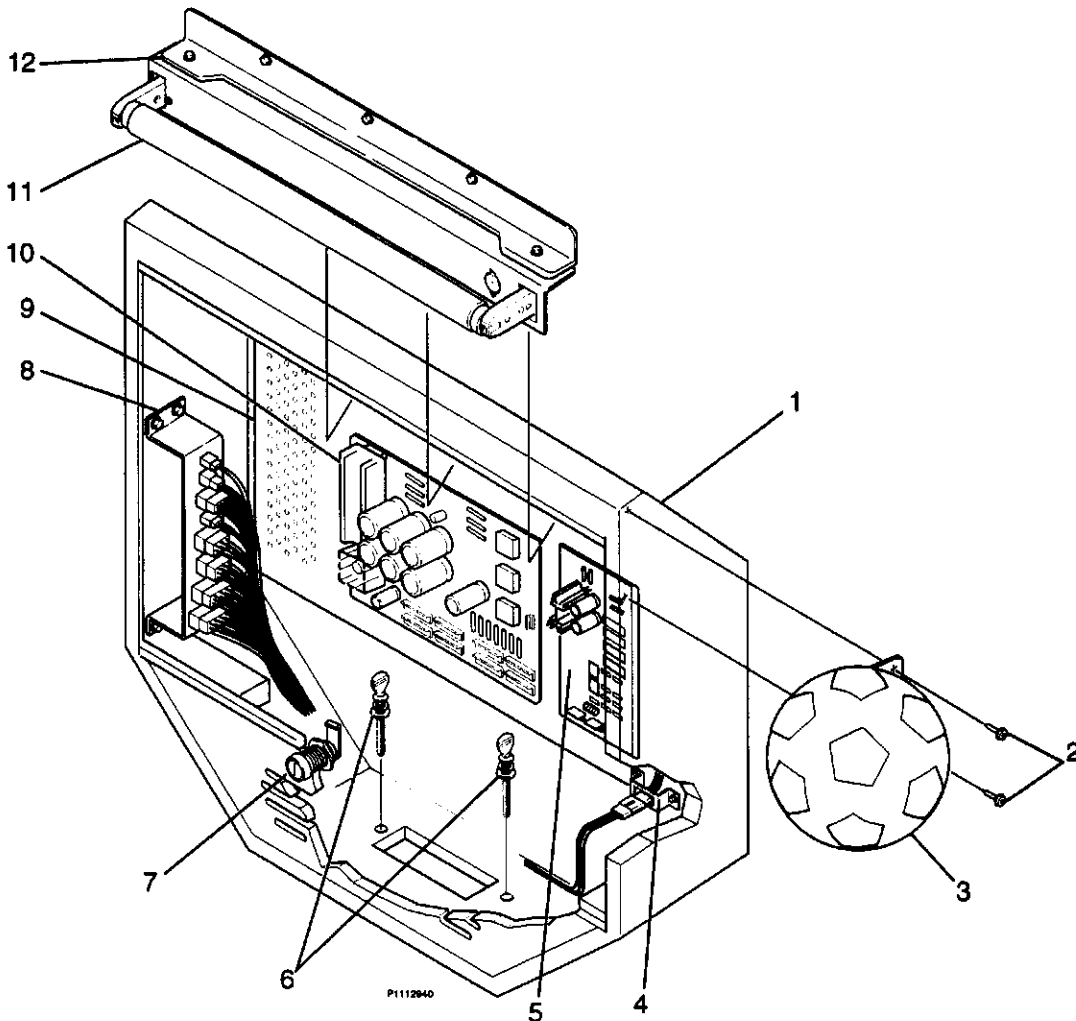
P1110950

CABINET PARTS LIST

Ref.	Part Number	Description
1	WD00166-PB11	CABINET, WITH ARTWORK
2	A0015302	ASSEMBLY, PCB, SWITCH
3	A-00675	ASSEMBLY, PLATE, PCB'S, CARRIAGE SYSTEM
4	A0015106	ASSEMBLY, PCB, DRIVER
5	MT00163-BK	ARMOR, SIDE, BLACK
6	LC0010*	LINE CORD
7	LF00102	FILTER, LINE, 120/250V, 10.0A
8	PL00310	GRILLE, VENT, 10 X 16
9A	A-00351-L	ASSEMBLY, ARM, PLAYFIELD LIFT, LEFT
9B	A-00820	ASSEMBLY, ARM-RIGHT, PLAYFIELD LIFT
10	XF00106	TRANSFORMER
11	PL00173	GRILLE, SPEAKER, 7 1/2"
12	MT00231-BK	LEG, 28 1/2"L, BLACK
13	NT00100-13	NUT, 3/8-16 HEX REGULAR
14	MS00101-1	LEVELER, LEG, 3/8-16X 3.0"
15	SP00101	SPEAKER, 8.0", 4 OHM, 20 WATT
16	PL00178-R	PUSHBUTTON, 1 9/16, RED
17	A-00455	ASSEMBLY, SWITCH & CABLE, FLIPPER BUTTON SINGLE
18	A-00640-*	ASSEMBLY, CHASSIS, SERVICE
19	A-00641	ASSEMBLY, COVER, ON/OFF SWITCH
20	SW00110	SWITCH, TOGGLE, DPST 20A 277VAC .250" QUICK CONNECT
21	SW00100-01	SWITCH, ASSEMBLY, PINBALL ROUND, 1 3/4"D RED
22	A-00125-2	ASSEMBLY, LOCK, HANDRAIL
23	C-00198	CABLE, PRINTER / METER PCB
24	SW00132	SWITCH, MOMENTARY, SPDT, PANEL MOUNTING, 0.1 AMPS, 125 VAC
25	SW00119	SWITCH, INTERLOCK, PANEL MOUNTING
26	MT00321-2	BRACKET, SWITCH, INTERRUPT, 3-POSITION WITH PRINTER CONNECTOR
27	SW00121	SWITCH, LEAF, ANTI-SLAM
28	*	DOOR, COIN
29	SW00152-1	SWITCH, KEY, TOURNAMENT MODE
30	A0019501	ASSEMBLY, PCB, PRINTER / METER / T.D.
31	A-00065-1	ASSEMBLY, TILT, PLUMB BOB, WITH CABLE
32	SW00130	SWITCH, START BUTTON
33	A0016900	ASSEMBLY, PCB, DIODE
34A	MT00357-L	RAIL-LEFT, CABINET, PLAYFIELD LIFT
34B	MT00357-R	RAIL-RIGHT, CABINET, PLAYFIELD LIFT
35	MT00162-2	BRACKET, HANGER. PLAYFIELD
36	SM00256	GOAL POST
37	A-00807	ASSEMBLY, PLASTIC ARCH & MYLAR
38	A-00124	ASSEMBLY, HANDRAIL, BLACK
39	A-00668-PB11	ASSEMBLY, BACKBOARD, PLAYFIELD
39A	A0024900	ASSEMBLY, PCB, CPU SYSTEM, WITH DAUGHTER BOARD
39B	DP00100	DISPLAY, DOT MATRIX, 256 X 64 HI-RES
40	MT00177-BK	BRACKET, GLASS. PLAYFIELD REAR, BLACK
41	GL00107	GLASS, TEMPERED, 26-1/8 X 16-3/8 X 1/8 (BACKBOX)
----	GL00102	GLASS, TEMPERED, 21 X 43 X 3/16 (PLAYFIELD) (NOT SHOWN)
42	AW00219	FILM, BACKGLASS

*Note: When ordering for service, please indicate model number of game.

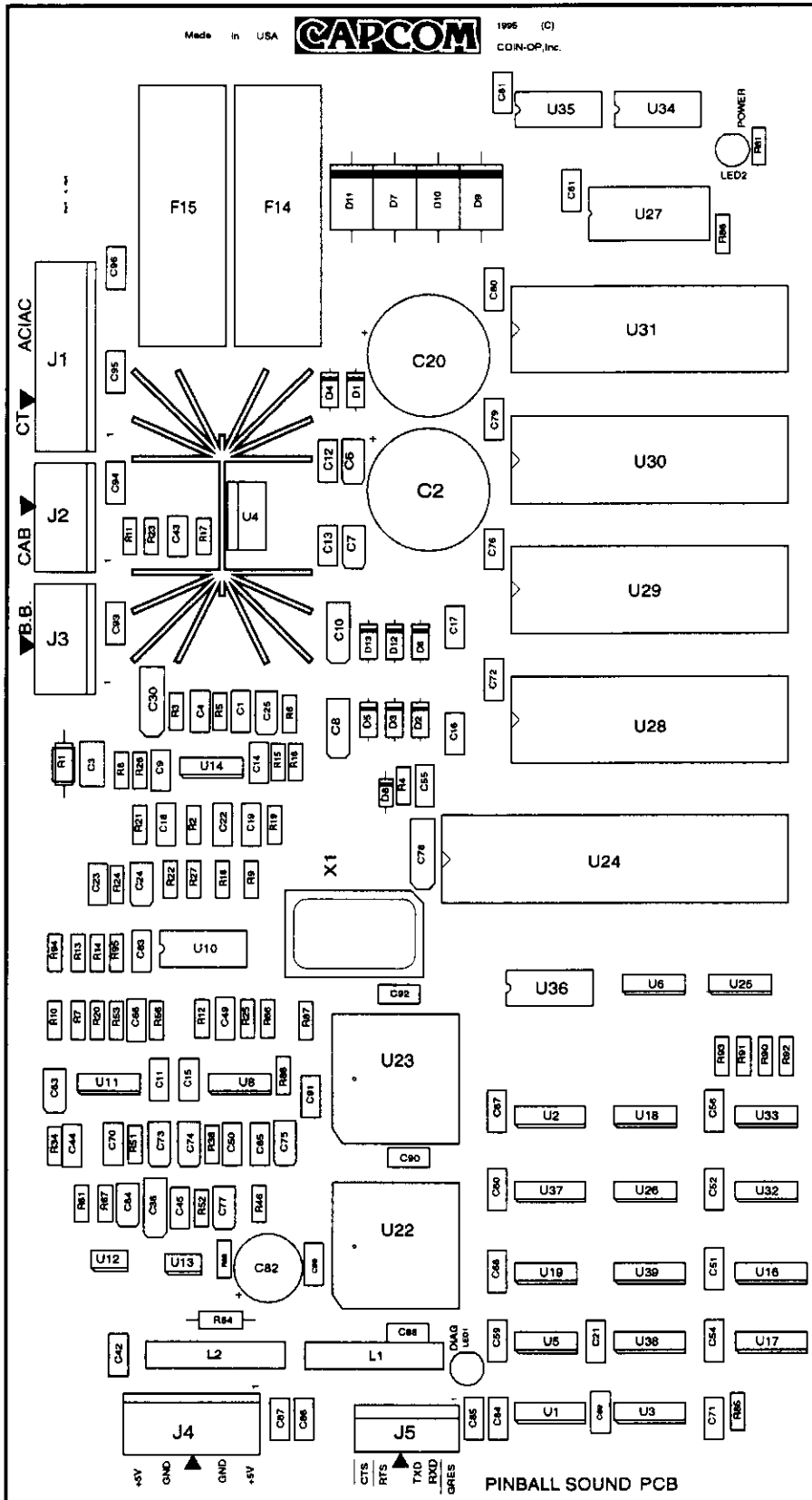
BACKBOX PARTS IDENTIFICATION



Ref.	Part Number	Description
1	WD00167-PB11	BACKBOX WITH ARTWORK
2	SC00181-06	SCREW, SELF TAPPING, #8 3/4 TORX TYPE AB ZINC
3	A-00809	ASSEMBLY, BALL DISPLAY
4	MT00675	BRACKET, GROUND
*5	A0015004	ASSEMBLY, PCB, SOUND
6	SC00154-12	SCREW, THUMB, 3/8-16 X 1-1/2 WITH SHOULDER ZC
7	LK00101	CYLINDER, LOCK
8	MT00667	BRACKET, CONNECTORS
9	MT00618	PLATE, MOUNTING, PCB'S, MINI
10	A0015205	ASSEMBLY, PCB, POWER SUPPLY
11	LP00105	LAMP, FLUORESCENT, 18"
12	A-00624	ASSEMBLY, LAMP, COMPLETE

* Note: ROMs must be ordered separately.

SOUND BOARD



SOUND BOARD ASSEMBLY A0015004 PARTS LIST

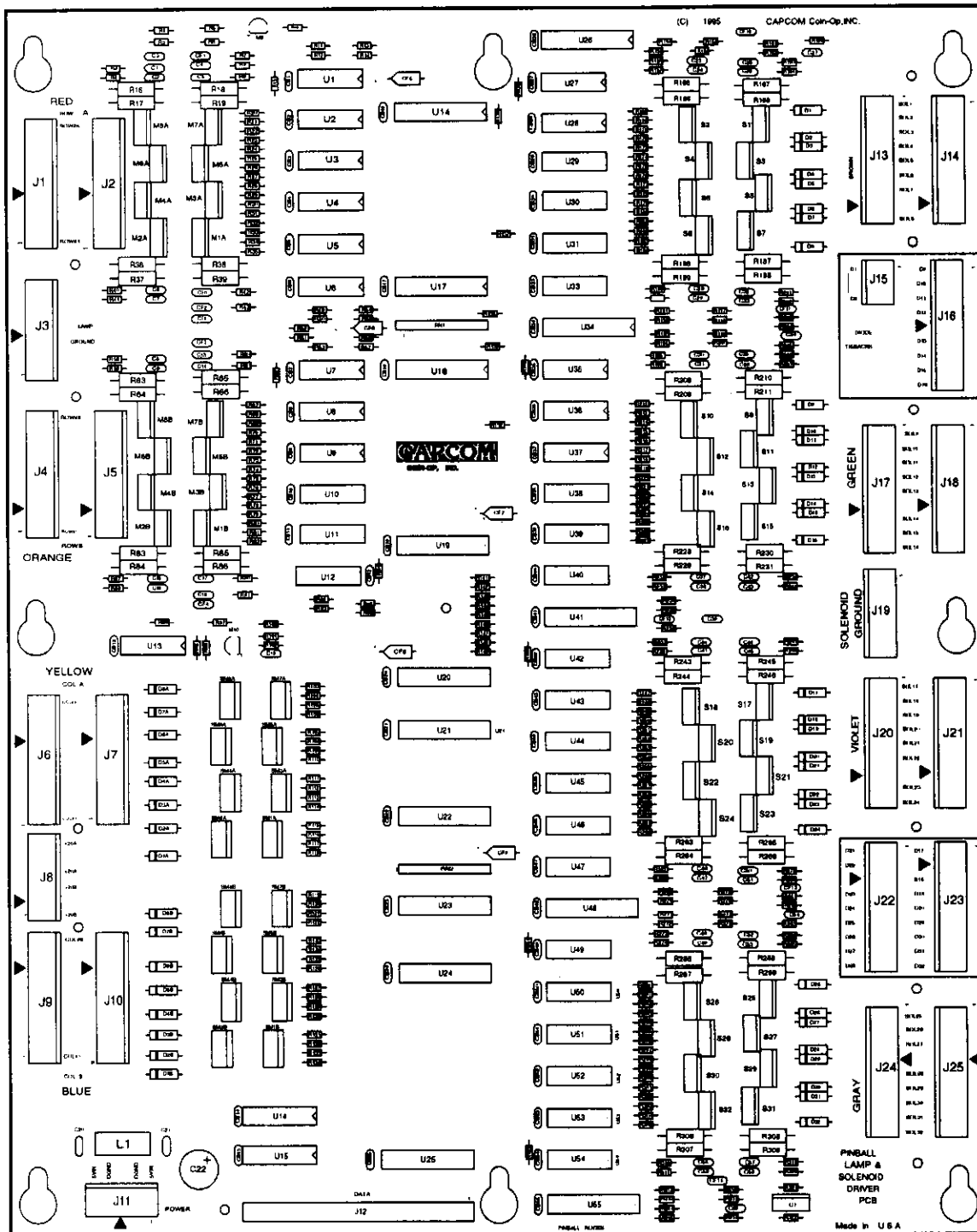
DES.	DESCRIPTION	PART NUMBER
C1,C4	CAP CER 100V .001UF 10% SMT 1206	CP00055-SMT
C2,C20	CAP ELECT 25V 4700UF 20% RAD	CP00020
C3	CAP CER 50V .22UF 20% SMT 1210	CP00051-SMT
C6-7,C24, C63-64, C73- 75,C77	CAP TANT 35V 1.0UF 10% SMT	CP00059-SMT
C8,C10,C38	CAP TANT 25V 4.7UF 20% SMT	CP00050-SMT
C9,C11-17, C21,C42,C45 C55,C56,C59 C60,C61,C67 C68,C69,C71 C72,C76,C79 C80,C81,C83 C88-C96	CAP CER 50V .1UF 10% SMT 1206	CP00056-SMT
C18	CAP CER 100V .022UF 20% SMT 1206	CP00052-SMT
C19,C22,C44 C50,C65,C70	CAP CER 50V .033UF 5% SMT 1206	CP00061-SMT
C23,C49,C66	CAP CER 100V 3300PF 20% SMT 1206	CP00064-SMT
C25	CAP TANT 50V .15UF 10% AX SMT	CP00073-SMT
C30,C78	CAP TANT 16V 22UF 20% SMT	CP00045-SMT
C43	NOT USED	-----
C82	CAP ELECT 16V 470UF -10%, +50% RAD	CP00054
C84-87	CAP CER 100V 100PF 10% SMT 1206	CP00058-SMT
D1-6,D12-13	DIODE 1N4004 RECT 1.0A 400VR	DI00100
D7,D9-11	DIODE 1N5402 RECT 3.0A 200VR	DI00106
D8	DIODE 1N4148 SW 200MA 75VR	DI00104
F14,F15	FUSE SLO BLO 2.0A 250V 3AG	FS00100-02
F14-F15	FUSE HLDR 3AG PC MTG	FS00101
J1	CONN HDR .156 STR 7-PIN LOCK	CN00100-07
J2,J3	CONN HDR .156 STR 4-PIN LOCK	CN00100-04
J4	CONN HDR .156 STR 5-PIN LOCK	CN00100-05
J5	CONN HDR .100 STR 6-PIN LOCK	CN00104-06
L1-2	IND CHOKE 4.7UH 3A AX	IN00100
LED1-2	LED LTL4201 RED 20MA T-1 70°	DI00105
R1	RES CF 1/4W 5% 1 OHM	RS00100-23
R2	RES CF 1/8W 5% 100 OHM SMT 1206	RS00102-01S
R3,R5	RES CF 1/8W 5% 12K OHM SMT 1206	RS00102-15S
R4,R85	RES CF 1/8W 5% 1K OHM SMT 1206	RS00102-02S
R6,R17	RES CF 1/8W 5% 22K OHM SMT 1206	RS00102-18S
R7,R20,R88	RES CF 1/8W 5% 3.3K OHM SMT 1206	RS00102-12S
R8-9,R11	RES CF 1/8W 5% 680 OHM SMT 1206	RS00102-06S
R10,R12,R25 R53,R56,R66 R86,R90-R93	RES CF 1/8W 5% 10K OHM SMT 1206	RS00102-05S
R13-14	RES CF 1/8W 5% 27K OHM SMT 1206	RS00102-21S
R15	RES CF 1/8W 5% 47K OHM SMT 1206	RS00102-17S

DES.	DESCRIPTION	PART NUMBER
R16	RES CF 1/8W 5% 39K OHM SMT 1206	RS00102-16S
R18-19, R21-22	NOT USED	-----
R23	NOT USED	-----
R24,R26-27	RES CF 1/8W 5% 4.7K OHM SMT 1206	RS00102-13S
R34,R38, R46R51	RES CF 1/8W 5% 1.2K OHM SMT 1206	RS00102-09S
R52,R61, R67-68	RES CF 1/8W 5% 11K OHM SMT 1206	RS00102-20S
R81	RES CF 1/8W 5% 270 OHM SMT 1206	RS00102-07S
R84	RES CF 1/4W 5% 0 OHM	RS00100-10
R87	RES CF 1/8W 5% 33 OHM SMT 1206	RS00102-14S
R94,R95	RES CF 1/8W 5% 2.2K OHM SMT 1206	RS00102-23S
U1,U3	IC 74LS112 DUAL J-K F/F SMT	IC00093-SMT
U2,U37	IC 74LS165 8-BIT SHIFT REGISTER SMT	IC00089-SMT
U4	HEATSINK TO-220 529902B025	HS00107
U4	IC TDA2030A 18W HI-FI AMP	IC00056
U5,U32	IC 74HC74 DUAL D-TYPE F/F SMT	IC00087-SMT
U6	IC 74LS74 DUAL D-TYPE FF SMT	IC00042-SMT
U8,U11,U14	IC TLO84 OPERATIONAL AMP SMT	IC00037-SMT
U10	IC X9241U QUAD E2POT 50K SMT	IC00061-SSMT
U12-13	IC TDA1545 16-BIT DAC SMT	IC00091-SMT
U16-17, U38-39	IC 74LS161 4-BIT SYN BIN CTR SMT	IC00083-SMT
U18-19	IC 74LS04 HEX INVERTER SMT	IC00048-SMT
U22-23	IC TMS320AV120 MPEG AUDIO DECODER SMT	IC00086-SMT
U24	SOCKET 40-PIN DIP	SK00112-40
U24	ROM, MASKED, "U24" 80C52	A-00566-U24
U25-26	IC 74LS08 QUAD 2-IN AND GATE SMT	IC00088-SMT
U27	IC SRAM32KX8 SMT	IC00090-SMT
U28-31	ROM SOCKET 32PIN600	SK00112-32
*U28	ROM, MASKED	A-00729-U28
*U29	ROM, MASKED	A-00729-U29
*U30	EPROM, PROGRAMMED	A-00729-U30
*U31	EPROM, PROGRAMMED	A-00729-U31
U33	IC 74LS00 QUAD 2-IN NAND GATE SMT	IC00084-SMT
U34-36	IC 74LS373 OCT D-TYPE LATCH SMT	IC00092-SMT
X1	CLOCK OSCILLATOR 24MHZ	OS00101
----	NUT, 4-40 KEPS HEX	NT00101-04
----	MACHINE SCREW 4-40 X 3/8 PPH SEMS ZC	SC00120-03
----	SUPPORT, PCB, TEARDROP, 5/16"H	PL00287-05

NOTE: C57 & 58 ARE REPLACED WITH JUMPER WIRES.

*NOTE: Game ROM's are not included with A0015004: must be purchased separately.

DRIVER BOARD



DRIVER BOARD ASSEMBLY A0015106 PARTS LIST

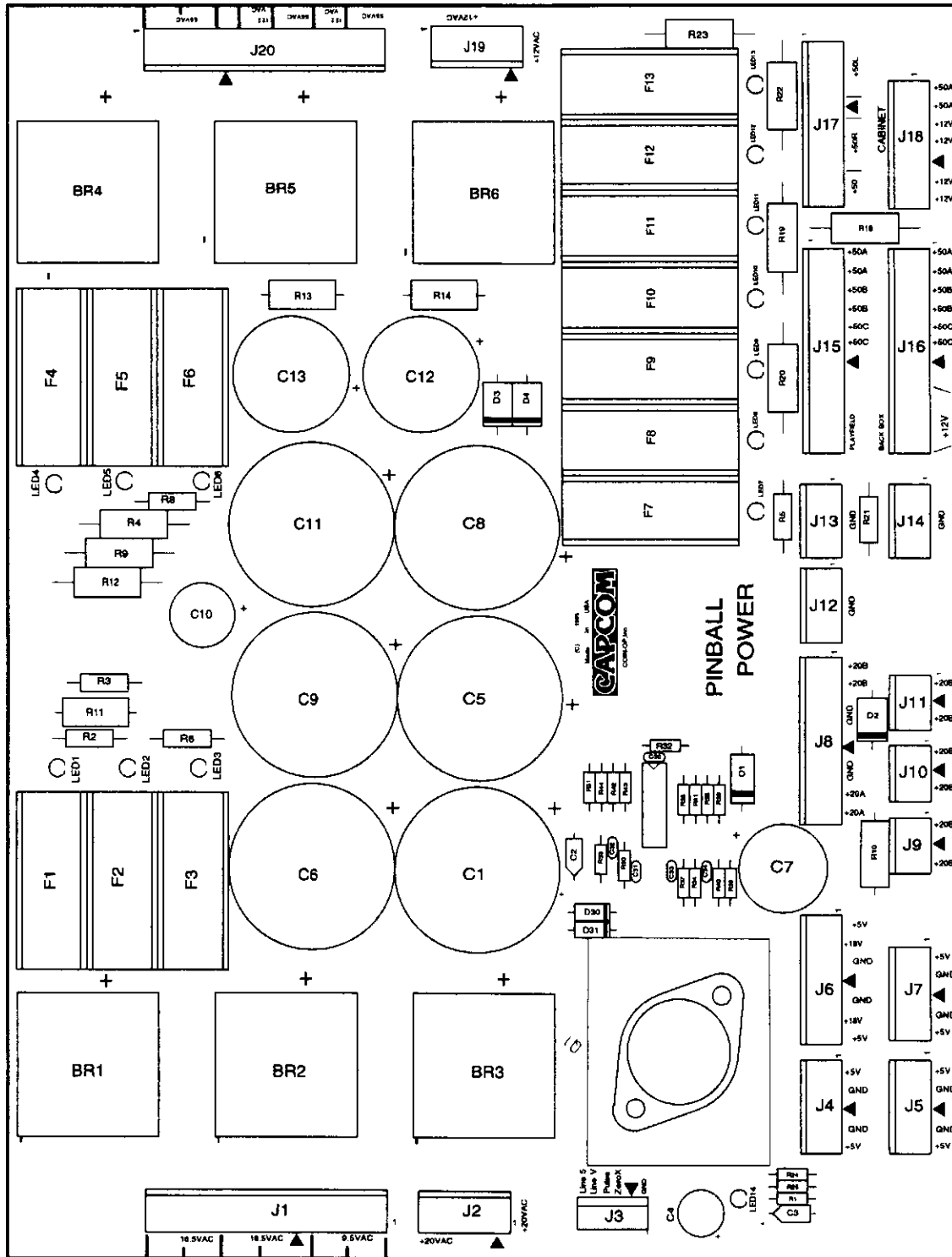
DES.	DESCRIPTION	PART NUMBER
C1-11,C13-19, C23-59	CAP CER 50V .22UF 20% AX	CP00024
C20-21	CAP CER 50V 100P 10% AX	CP00068
C22	CAP ELECT 16V 470UF -10%, +50% RAD	CP00054
CB14-26,CB34, CB41,CB48,CB55	CAP CER 50V .01UF 10% AX	CP00048
CB1-13, CB27-31, CB33, CB35-40, CB42-47, CB49-54	CAP CER 50V .001UF 10% AX	CP00049
CF1-4,CF10-14	CAP CER 50V .01UF 10% AX	CP00048
CF5-9	CAP TANT 35V 1.0UF 5% AX	CP00012
DI-32,D1A-D8A, D1B-D8B	DIODE 1N4004 RECTIFIED 1.0A 400VR	DI00100
J1-2,J4-7,J9-10, J13-14,J16-18, J20-25	CONN HDR .156 STR 9-PIN LOCK	CN00100-09
J3	CONN HDR .156 STR 7-PIN LOCK	CN00100-07
J8,J19	CONN HDR .156 STR 6-PIN LOCK	CN00100-06
J11	CONN HDR .156 STR 5-PIN LOCK	CN00100-05
J12	CONN HDR .100 STR 50-PIN 2X25	CN00101-50
J15	CONN HDR .156 STR 3-PIN LOCK	CN00100-03
L1	IND 4.7UH 3.4A 15% AX	IN00100
M1A-M8A, M1B-M8B,S1-32	TRANS STP20N10L MOSFET N-CH	TR00101
M9-10	TRANS 2N7000 MOSFET N-CH	TR00109
Q1	TRANS TIP102 NPN	TR00102
R1,R100	RES MF 1/4W 1% 200 OHM	RS00113-11
R2,R101,R162, R204,R235, R282,R317	RES MF 1/4W 1% 7.50K OHM	RS00113-08
R3-4,R8-9, R40-43,R58-61, R87-88,R90-91	RES CF 1/4W 5% 680 OHM	RS00100-13
R5,R97	RES MF 1/4W 1% 270 OHM	RS00113-12
R6,R15,R62,R94, R102,R135,R140, R150-151,R153, R160,R205,R236, R283,R318	RES CF 1/4W 5% 100 OHM	RS00100-02

DES.	DESCRIPTION	PART NUMBER
R7,R21,R23,R25, R27,R29,R31,R33, R35,R51,R68,R70, R72,R74,R76, R78,R80,R82,R89, R98,R136-139, R141,R152,R169, R172-173,R176-177, R180-181,R184, R212,R215-216, R219-220, R223-224,R227, R247,R250-251, R254-255,R258-259, R262,R290, R293-294, R297-298, R301-302, R305, RR321-322	RES CF 1/4W 5% 4.7K OHM	RS00100-26
R10,R99	RES CF 1/4W 5% 330 OHM	RS00100-12
R11-14,R49-50, R52-57,R92-93, R95-96,R104, R106,R108,R110, R112,R114,R116, R118,R120,R122, R124,R126,R128, R130,R132,R134, R142-149,R154-155, R158-159,R191-194, R197-200,R269-272, R275-278,R312-315	RES CF 1/4W 5% 10K OHM	RS00100-07
R16-19,R36-39, R63-66,R83-86, R165-168,R185-188, R208-211,R228-231, R243-246,R263-266, R286-289, R306-309	RES CF 1W 5% .020 OHM	RS00112-01
R20,R22,R24,R26, R28,R30,R32,R34, R67,R69,R71,R73, R75,R77,R79,R81, R170-171,R174-175, R178-179,R182-183, R213-214,R217-218, R221-222,R225-226, R248-249,R252-253, R256-257,R260-261, R291-292,R295-296, R299-300, R303-304	RES CF 1/4W 5% 750 OHM	RS00100-42

DRIVER BOARD ASSEMBLY A0015106 PARTS LIST (CONT.)

DES.	DESCRIPTION	PART NUMBER
R103,R105,R107 R109,R111,R113 R115,R117,R119 R121,R123,R125 R127,R131,R133	RES CF 1/4W 5% 1K OHM	RS00100-05
R156-157,R163-164, R189-190,R195-196, R201-202,R206-207, R232-233,R237-242, R267-268,R273-274, R279-280,R284-285, R310-311,R319-320	RES CF 1/4W 5% 56 OHM	RS00100-41
R161,R203,R234, R281,R316	RES MF 1/4W 1% 470 OHM	RS00113-06
RN1-2	RES SIP 10K X 9R 2% BUSSED	RS00104
SM1A-SM8A, SM1B-SM8B	TRANS VN02N MOSFET RELAY	TR00105
U1,U6-7,U12, U27, U33,U35,U40, U42, U47,U49,U54	IC LM339 VOLTAGE COMPARATOR	IC00036
U2-5,U8-11, U13, U28-31,U36-39, U43-46,U50-53	IC 74LS74 DUAL D-TYPE FF	IC00042
U14-15	IC 74LS138 3 OF 8 LINE DECODER	IC00047
U16-20,U22,U24-26, U34,U41,U48,U55	IC 74LS244 OCT BFFR/LINE DR	IC00057
U21,U23	IC 74LS273 OCTAL D-TYPE FF	IC00041
----	CIRCUIT BOARD SUPPORT	PL00287-05

POWER BOARD



POWER BOARD ASSEMBLY A0015205 PARTS LIST

DES.	DESCRIPTION	PART NUMBER
BR1-6	RECT MB352W BRIDGE 35A 200V	+ *DI00101
C1,C5-6, C8-9,C11	CAP ELECT 35V 15000UF 20% RAD	CP00065
C2-3	CAP TANT 35V 1.0UF 5% AX	CP00012
C4	CAP ELECT 10V 470UF 20% RAD	CP00016
C10	CAP ELECT 100V 100UF 20% RAD	CP00011-01
C12-13	CAP ELECT 100V 2200UF 20% RAD	CP00046
C30	CAP CER 50V .1UF 10% AX	CP00019
C31	CAP CER 50V .033UF 5% AX	CP00047
C32	CAP CER 50V .01UF 10% AX	CP00048
C33-34	CAP CER 100V .001UF 10% AX	CP00066
D1	JUMPER, 23 GAUGE OR HIGHER	----
D2-4	DIODE IN5402 RECT 3.0A 200VR	DI00106
D30-31	DIODE IN4004 RECT 1.0A 400VR	DI00100
F1-2,6	FUSE SLO-BLO 10.0A 32V 3AG	FS00100-10
F3	FUSE SLO-BLO 7.0A 250V 3AG	FS00100-07
F4	FUSE SLO-BLO 8.0A 250V 3AG	FS00100-08
F5,F7-8	FUSE SLO-BLO 3.0A 250V 3AG	FS00100-03
F9-13	FUSE SLO-BLO 4.0A 250V 3AG	FS00100-04
FH1-13	FUSE HLDR 3AG PC MTG	FS00101
**HS1	HEAT SINK TO-3 HEAVY DUTY 2"	*HS00106
J1,J20	CONN HDR .156 STR 13-PIN LOCK	CN00100-13
J2,J4-5, J7,J19	CONN HDR .156 STR 5-PIN LOCK	CN00100-05
J3	CONN HDR .100 STR 6-PIN LOCK	CN00104-06
J6,J18	CONN HDR .156 STR 7-PIN LOCK	CN00100-07
J8,J17	CONN HDR .156 STR 9 PIN LOCK	CN00100-09
J9-11	CONN HDR .156 STR 3 PIN LOCK	CN00100-03
J12-14	CONN HDR .156 STR 4-PIN LOCK	CN00100-04
J15-16	CONN HDR .156 STR 11-PIN LOCK	CN00100-11
LED1-14	LED LTL4201 RED 20MA T-1 70°	DI00105

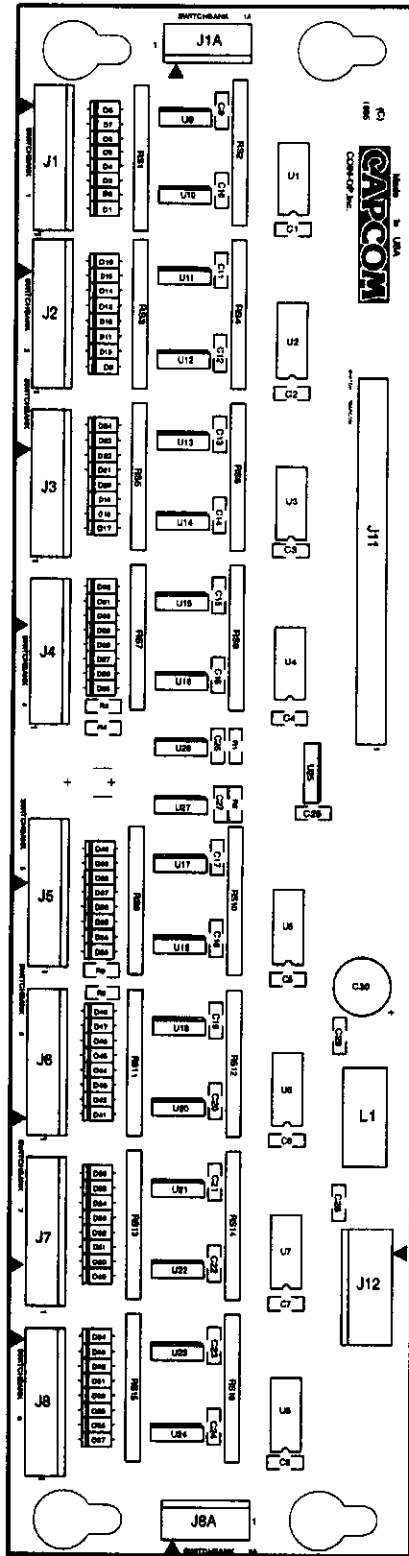
DES.	DESCRIPTION	PART NUMBER
Q1	VOLT REG 5A LOW DROP ADJ	*VR00100
R1	RES CF 1/4W 5% 330 OHM	RS00100-12
R2-3	RES CF 1/2W 5% 1.5K OHM	RS00101-09
R4,R9,R18- 20,R22-23	RES MOF 2W 5% 5.6K OHM	RS00114
R6	RES CF 1/4W 5% 820 OHM	RS00100-30
R8,R21,R5	RES CF 1/8W 5% 1.2K OHM	RS00102-11
R10-11	RES MOF 2W 5% 620 OHM	RS00114-01
R12,R14	RES MOF 2W 5% 6.2K OHM	RS00114-02
R13	RES MOF 2W 5% 270 OHM	RS00114-03
R24	RES MF 1/4W 1% 121 OHM	RS00113-01
R25	RES MF 1/4W 1% 374 OHM	RS00113
R30,R42-43	RES MF 1/4W 1% 11K OHM	RS00113-02
R31	RES MF 1/4W 1% 56.2K OHM	RS00113-10
R32,R36, R44	RES CF 1/4W 5% 3.3K OHM	RS00100-27
R34-35, R37,R39-40	RES CF 1/4W 5% 10K OHM	RS00100-07
R33	RES MF 1/4W 1% 2K OHM	RS00113-03
R38	RES CF 1/4W 5% 27K OHM	RS00100-40
R41	RES CF 1/4W 5% 1K OHM	RS00100-05
U30	IC LM339 VOLTAGE COMPARATOR	IC00036
----	CAP ELECT 35V 4700UF 20% RAD	CP00035
----	HEAT SINK 1.5 X 4.5 EXTRUSION	*HS00105
----	MACHINE SCREW 6-32 X 1/2 PPH SEMS ZC	SC00100-04
----	MACHINE SCREW 6-32 X 3/4 PPH SEMS ZC	SC00100-06
----	SCREW, MACHINE 10-32 X 3/4 PPH SEMS ZC	SC00102-06
---	NUT 6-32 HEX KEPS	NT00101-06
----	CIRCUIT BOARD SUPPORT	PL00287-05

* NOTE: Heat sink compound should be applied to ALL heat sink/semi-conductor surfaces.

**NOTE: HS1 is the heatsink for Q1.
HS2 is the heatsink for BR1, BR2, and BR3.

+ NOTE: Spacing between the bottom of the bridge and the PCB shall be 1/4".

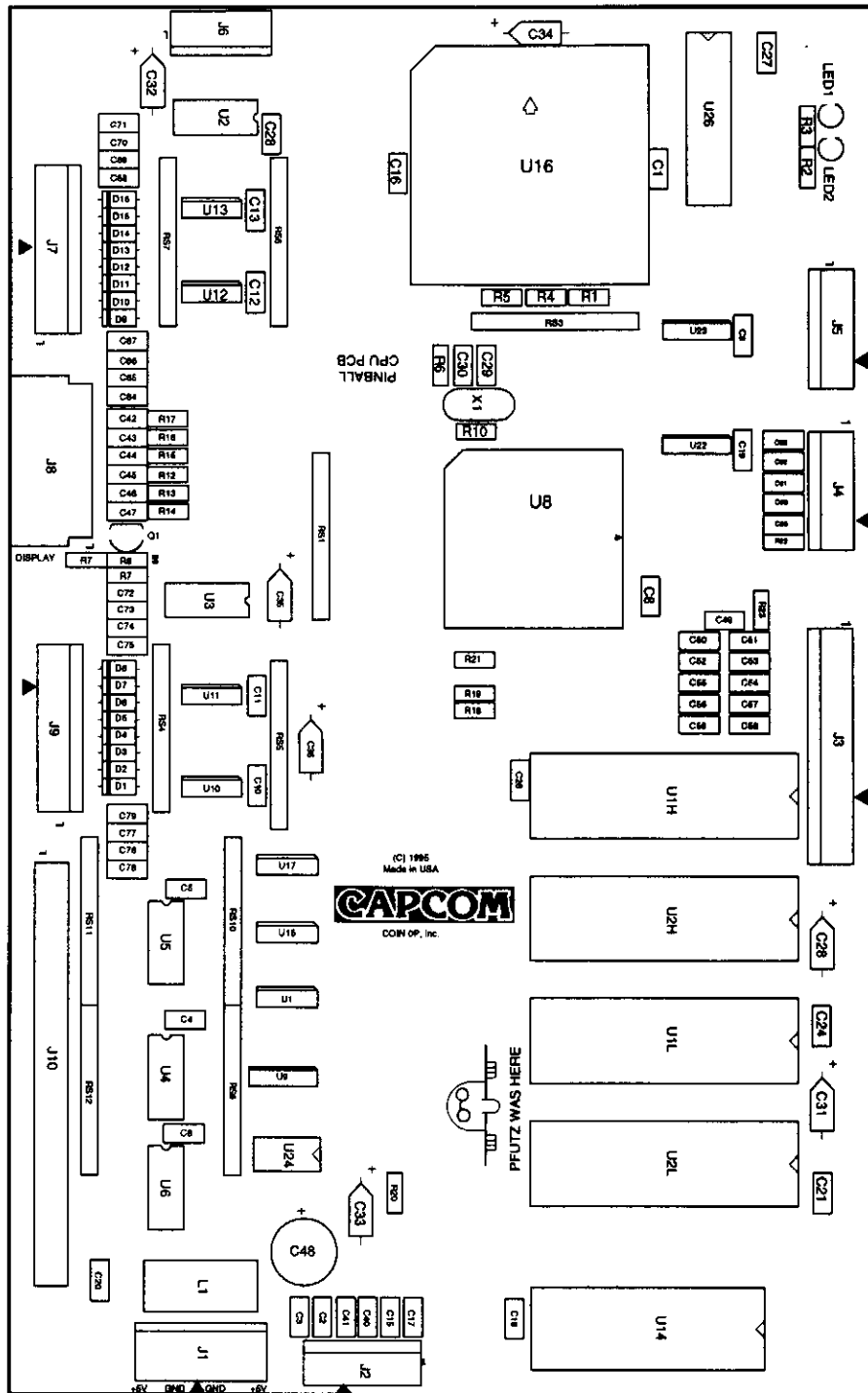
SWITCH BOARD



SWITCH BOARD ASSEMBLY A0015302 PARTS LIST

DES.	DESCRIPTION	PART NUMBER
C1-8, C25	CAP CER 50V 0.01UF 10% SMT 1206	CP00048-SMT
C9-24, C26-27	CAP CER 50V 0.001UF 10% SMT	CP00049-SMT
C28-29	CAP CER 50V 100P 10% SMT 1206	CP00068-SMT
C30	CAP ELECT 16V 470UF - 10%, +50% RAD	CP00054
D1-64	DIODE 1N4148 SW 200MA 75VR	DI00104
J1-8	CONN HDR .100 STR 10-PIN LOCK	CN00104-10
J11	CONN HDR .100 STR 50-PIN 2X25	CN00101-50
J12	CONN HDR .156 STR 5-PIN LOCK	CN00100-05
J1A,J8A-1	CONN HDR .100 STR 6-PIN LOCK	CN00104-06
L1	IND 4.7UH 3.4A 15% AX	IN00100
R1-2,R4, R6	RES CF 1/8W 5% 3.3K OHM SMT 1206	RS00102-12S
R3,R5	RES CF 1/8W 5% 620 OHM SMT 1206	RS00102-24S
RS1,RS3, RS5,RS7, RS9, RS11, RS13,RS15	RES SIP 2.2K X 9R 2% BUSSED	RS00103
RS2,RS4, RS6,RS8, RS10,RS12 RS14,RS16	RES SIP 10K X 9R 2% BUSSED	RS00104
U1-8	IC 74LS245 OCT BUS TRANSCEIVER SMT	IC00044-SMT
U9-24	IC LM339 VOLTAGE COMPARATOR SMT	IC00036-SMT
U25	IC 74LS138 3 OF 8 LINE DECODER SMT	IC00047-SMT
U26	IC 74LS74 DUAL D-TYPE FF SMT	IC00042-SMT
U27	IC 74LS126 QUAD 3-STATE BUFFER SMT	IC00099-SMT

CPU BOARD



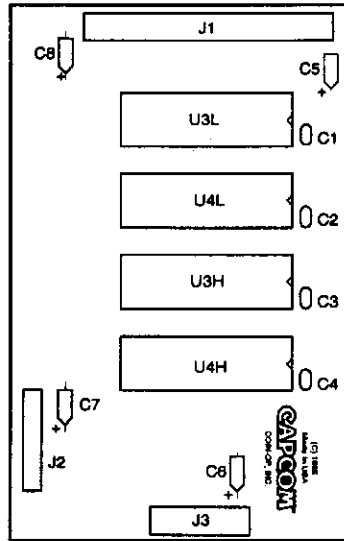
CPU BOARD ASSEMBLY A0024900 PARTS LIST

DES.	DESCRIPTION	PART NUMBER
C1,C8,C16, C18,C20-21, C24,C26-27	CAP CER 50V .1UF 10% SMT 1206	CP00056-SMT
C2-6, C9, C19,C23	CAP CER 50V .01UF 10% SMT 1206	CP00048-SMT
C10-13	CAP CER 50V .001UF 10% SMT 1206	CP00055-SMT
C15,C17, C40-41, C49-80	CAP CER 100V 100PF 10% SMT 1206	CP00058-SMT
C28,C31-36	CAP TANT 35V 1.0UF 5% AX	CP00012
C29-30, C42-47	CAP CER 100V 10PF 10% SMT 1206	CP00017-SMT
C48	CAP ELECT 16V 470UF -10%, +50% RAD	CP00054
D1-16	DIODE 1N4148 SW 200MA 75VR	DI00104
J1	CONN HDR .156 STR 5-PIN LOCK	CN00100-05
J2,J4-5	CONN HDR .100 STR 7-PIN LOCK	CN00104-07
J3	CONN HDR .100 STR 14-PIN LOCK	CN00104-14
J6	CONN HDR .100 STR 6-PIN LOCK	CN00104-06
J7,J9	CONN HDR .100 STR 10-PIN LOCK	CN00104-10
J8	CONN HDR .100 R/A 14-PIN 2X7	CN00137-14
J10	CONN HDR .100 STR 50-PIN 2X25	CN00101-50
J12	SOCKET PCB I/C 12-PIN 1 X 12	SK00118-12
J11	SOCKET PCB I/C 16-PIN 2 X 8	SK00119-46
J12	SOCKET PCB I/C 46-PIN 2 X 23	SK00119-16
L1	IND 4.7UH 3.4A 15% AX	IN00100
LED1-2	LED LTL4201 RED 20MA T-1 70°	DI00105
Q1	TRANS 2N3904 NPN G.P. AMP	TR00106
R1,R10	RES CF 1/8W 5% 33 OHM SMT 1206	RS00102-14S
R2-3	RES CF 1/8W 5% 270 OHM SMT 1206	RS00102-7S
R4-6	RES CF 1/8W 5% 4.7K OHM SMT 1206	RS00102-13S

DES.	DESCRIPTION	PART NUMBER
R7	RES CF 1/8W 5% 2.7K OHM SMT 1206	RS00102-08S
R8-9	RES CF 1/8W 5% 1.2K OHM SMT 1206	RS00102-09S
R12-17	RES CF 1/8W 5% 100 OHM SMT 1206	RS00102-01S
R18-21	RES CF 1/8W 5% 3.3K OHM SMT 1206	RS00102-12S
R22-23	RES CF 1/8W 5% 10K OHM SMT 1206	RS00102-05S
RS1,RS3	RES SIP 4.7K X 9R 2% BUSSED	RS00111
RS4,RS7	RES SIP 2.2K X 9R 2% BUSSED	RS00103
RS5-6, RS9-12	RES SIP 10K X 9R 2% BUSSED	RS00104
*U1H	EPROM, BOOT & IMAGES	A-00731-U1H
*U1L	EPROM, BOOT & IMAGES	A-00731-U1L
*U2H	EPROM, IMAGES	A-00731-U2H
*U2L	EPROM, IMAGES	A-00731-U2L
U1H,U1L, U2H,U2L-1	SOCKET IC DIP (ICT) 32-PIN	SK00112-32
U1	IC 74LS02 QUAD NOR SMT	IC00098-SMT
U2-6	IC 74LS245 OCT BUS TRANSCEIVER SMT	IC00044-SMT
U8	IC XC68306 MPU 16-BIT	IC00046
U9	IC 74LF139 DUAL 2-4 DECODER SMT	IC00117-SMT
U10-13	IC LM339 VOLTAGE COMPARATOR SMT	IC00036-SMT
U14	IC SRAM 8K X 8 100NS BAT	IC00035
U15	IC 74LS14 HEX SCHMITT TRIG SMT	IC00063-SMT
U16	SOCKET IC 84-PIN PLCC	SK00101-84
U_16-1	DISPLAY CONTROLLER II	IC00119
U17	IC 74LS74 DUAL D-TYPE FF SMT	IC00042-SMT
U22-23	IC 74LS257 QUAD 2-IN MUX SMT	IC00045-SMT
U24	IC MAX699 RESET CHIP	IC00097
U25	IC DRAM 256K X 16 100NS	IC00074-SMT
X1	CRYSTAL 16.67 MHZ	CR00103
X-1	INSULATOR CRYSTAL	CR00103-1

*NOTE: EPROM's are not included; must be purchased separately.

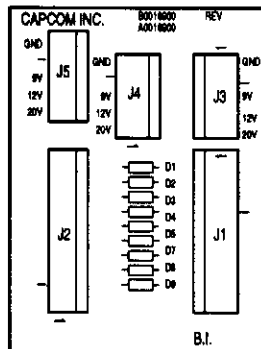
CPU DAUGHTER BOARD ASSEMBLY A0024800



DES.	DESCRIPTION	PART NUMBER
C1-4	CAP CER 50V .1UF 10% AX	CP00019
C5-8	CAP TANT 35V 1.0 UF 5% AX	CP00012
J1	CONN HDR .680 46-PIN 2 X 23	CN00152-46
J2	CONN HDR .680 12-PIN	CN00151-12
J3	CONN HDR .680 16-PIN 2 X 8	CN00152-16
U3H, U3L, U4L, U4H	SOCKET IC DIP (ICT) 32-PIN	SK00112-32
*U3H	EPROM, GAME & IMAGES	A-00731-U3H
*U3L	EPROM, GAME & IMAGES	A-00731-U3L
*U4H	EPROM, IMAGES	A-00731-U4H
*U4L	EPROM, IMAGES	A-00731-U4L

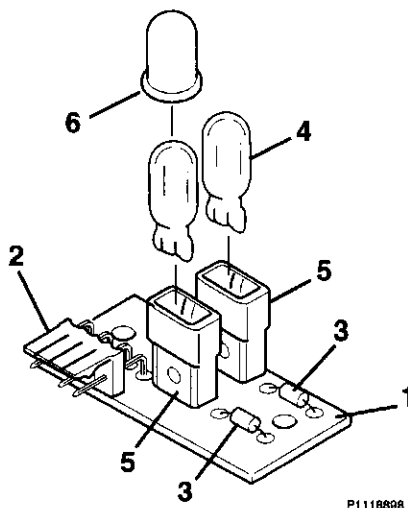
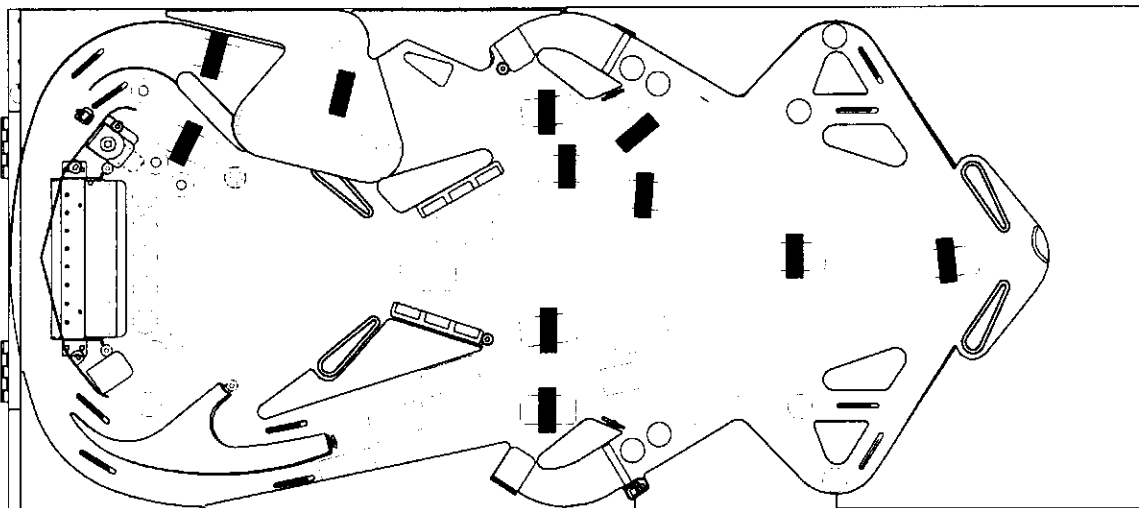
*NOTE: EPROM's are not included; must be purchased separately.

DIODE BOARD A0016900



DES.	DESCRIPTION	PART NUMBER
D1-9	DIODE 1N4004 RECT 1.0A 400VR	DI00100
J1-2	CONN HDR .156 STR 9-PIN LOCK	CN00100-09
J3-5	CONN HDR .156 STR 5-PIN LOCK	CN00100-05

LAMP BOARD IDENTIFICATION



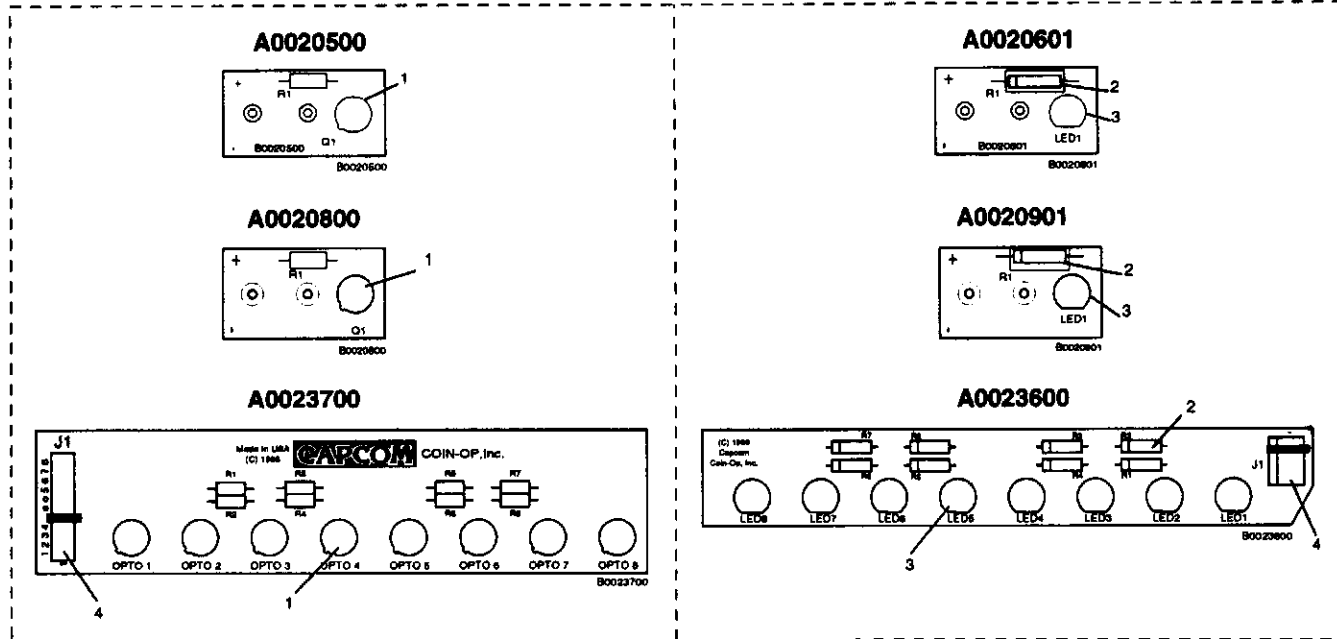
Ref.	Description	Part Number
	ASSEMBLY, PCB, LAMP, 2 LAMP X .500 <i>consists of the following parts:</i>	A0023800
1	PCB, LAMP, 2 LAMP X 0.500	B0023801
2	CONNECTOR HEADER .156 R/A 4-PIN LOCK	CN00103-04
3	DIODE, 1N4004 RECT 1.0A 400VR	DI00100
4	LAMP, #555 6.3V WEDGET-3 1/4	LP00100
5	SOCKET, LAMP WEDGE WITHOUT BRACKET T-3 1/4, T-5	SK00104
*6	FILTER, LAMP, T 3-1/4, TRANSPARENT RED	RB00116-RT

*Note: Reference only- not included in assembly shown. Must be ordered separately.

PLAYFIELD OPTOS

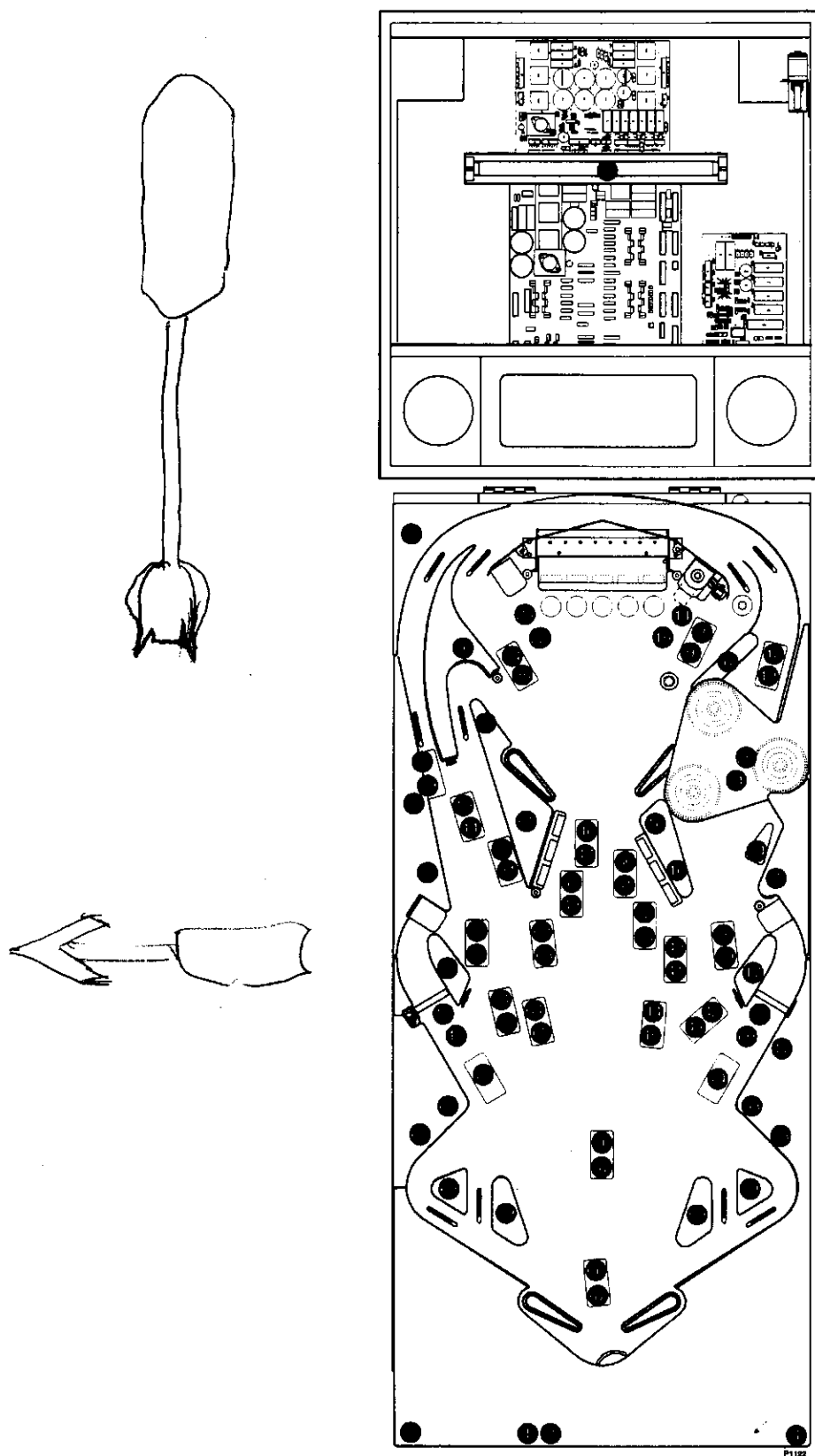
RECEIVERS

TRANSMITTERS



No.	Description	Component Part Number	Opto Board Assembly Part Number & Component Quantity					
			A0020500	A0020601	A0020800	A0020901	A0023700	A0023600
1	TRANSISTOR 21T313 NPN PHOTO	TR00104	1		1		8	
2	IRED 21E187 100MA T-1 3/4	DI00103		1		1		8
3	RES CARBON FILM 1W 5% 330 OHM	RS00112-04		1		1		
3	RES METAL OXIDE FILM 1W 5% 330 OHM	RS00119-02						8
4	CONNECTOR HEADER .100 STRAIGHT 11-PIN LOCK	CN00104-11					1	
4	CONNECTOR HEADER .100 STRAIGHT 4-PIN LOCK	CN00104-04						1




LOCATION OF CABINET, PLAYFIELD, & BACKBOX LAMPS



CABINET, PLAYFIELD, & BACKBOX LAMPS

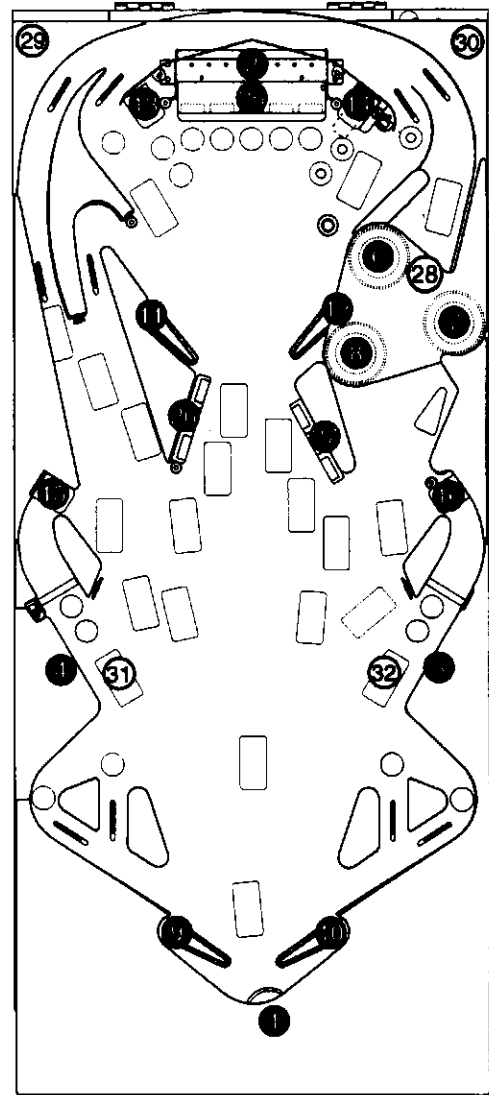
REF	SOFTWARE TEST REFERENCE C1-04	WIRE COLOR		BULB	PART NUMBER
		COLUMN	ROW		
1	11A COIN DOOR 1&2	RED/BRN	YEL/BRN	259	LP00113
2	12A COIN DOOR 3&4	RED/BLK	YEL/BRN	259	LP00113
3	13A START	RED/ORG	YEL/BRN	555	LP00100
4	14A KICK BUTTON	RED/YEL	YEL/BRN	555	LP00100
	15A-22A NOT USED	----	----	----	----
5	23A GI L. UPPER 7	RED/ORG	YEL/RED	44	LP00104
	24A- 88A NOT USED	----	----	----	----
6	11B GI RIGHT UPPER 3-4	ORG/BRN	BLU/BRN	44	LP00104
7	12B GI UPPER 1-2	ORG/RED	BLU/BRN	44	LP00104
8	13B DEFENSE 2 RED	ORG/BLK	BLU/BRN	555	LP00100
9	14B DEFENSE 2 WHITE	ORG/YEL	BLU/BRN	555	LP00100
10	15B OFFENSE 9 RED	ORG/GRN	BLU/BRN	555	LP00100
11	16B OFFENSE 9 WHITE	ORG/BLU	BLU/BRN	555	LP00100
12	17B LEFT SPINNER TOP	ORG/VIO	BLU/BRN	44	LP00104
13	18B LEFT SPINNER BOTTOM	ORG/GRY	BLU/BRN	44	LP00104
14	21B RIGHT UPPER EJECT TOP	ORG/BRN	BLU/RED	44	LP00104
15	22B RIGHT UPPER EJECT BOTTOM	ORG/RED	BLU/RED	44	LP00104
16	23B GI RIGHT DROP 1-2	ORG/BLK	BLU/RED	44	LP00104
17	24B GI RIGHT LOWER 5-6	ORG/YEL	BLU/RED	44	LP00104
18	25B OFFENSE 7 RED	ORG/GRN	BLU/RED	555	LP00100
19	26B OFFENSE 7 WHITE	ORG/BLU	BLU/RED	555	LP00100
20	27B OFFENSE 11 WHITE	ORG/VIO	BLU/RED	555	LP00100
21	28B OFFENSE 11 RED	ORG/GRY	BLU/RED	555	LP00100
22	31B LEFT UPPER EJECT TOP	ORG/BRN	BLU/ORG	44	LP00104
23	32B LEFT UPPER EJECT BOTTOM	ORG/RED	BLU/ORG	44	LP00104
24	33B OFFENSE 10 RED	ORG/BLK	BLU/ORG	555	LP00100
25	34B OFFENSE 10 WHITE	ORG/YEL	BLU/ORG	555	LP00100
26	35B GI LEFT UPPER 5-6	ORG/GRN	BLU/ORG	44	LP00104
27	36B GI LEFT UPPER 3-4	ORG/BLU	BLU/ORG	44	LP00104
28	37B DEFENSE 3 WHITE	ORG/VIO	BLU/ORG	555	LP00100
29	38B DEFENSE 3 WHITE	ORG/GRY	BLU/ORG	555	LP00100
30	41B OFFENSE 8 RED	ORG/BRN	BLU/YEL	555	LP00100
31	42B OFFENSE 8 WHITE	ORG/RED	BLU/YEL	555	LP00100
32	43B OFFENSE 5 RED	ORG/BLK	BLU/YEL	555	LP00100
33	44B OFFENSE 5 WHITE	ORG/YEL	BLU/YEL	555	LP00100
34	45B DEFENSE 10 RED	ORG/GRN	BLU/YEL	555	LP00100
35	46B DEFENSE 10 WHITE	ORG/BLU	BLU/YEL	555	LP00100
36	47B GI LEFT UPPER 1-2	ORG/VIO	BLU/YEL	44	LP00104
37	48B GI LEFT LOWER 5-6	ORG/GRY	BLU/YEL	44	LP00104
38	51B OFFENSE 6 RED	ORG/BRN	BLU/GRN	555	LP00100
39	52B OFFENSE 6 WHITE	ORG/RED	BLU/GRN	555	LP00100
40	53B DEFENSE 9 RED	ORG/BLK	BLU/GRN	555	LP00100
41	54B DEFENSE 9 WHITE	ORG/YEL	BLU/GRN	555	LP00100

REF	SOFTWARE TEST REFERENCE C1-04	WIRE COLOR		BULB	PART NUMBER
		COLUMN	ROW		
42	55B DEFENSE 11 RED	ORG/GRN	BLU/GRN	555	LP00100
43	56B DEFENSE 11 WHITE	ORG/BLU	BLU/GRN	555	LP00100
44	57B OFFENSE 4 RED	ORG/VIO	BLU/GRN	555	LP00100
45	58B OFFENSE 4 WHITE	ORG/GRY	BLU/GRN	555	LP00100
46	61B DEFENSE 4 WHITE	ORG/BRN	BLU/BLK	555	LP00100
47	62B DEFENSE 4 RED	ORG/RED	BLU/BLK	555	LP00100
48	63B DEFENSE 6 RED	ORG/BLK	BLU/BLK	555	LP00100
49	64B DEFENSE 6 WHITE	ORG/YEL	BLU/BLK	555	LP00100
50	65B DEFENSE 5 WHITE	ORG/GRN	BLU/BLK	555	LP00100
51	66B DEFENSE 5 RED	ORG/BLU	BLU/BLK	555	LP00100
52	67B DEFENSE 7 RED	ORG/VIO	BLU/BLK	555	LP00100
53	68B DEFENSE 7 WHITE	ORG/GRY	BLU/BLK	555	LP00100
54	71B RIGHT UPPER 'ARROW	ORG/BRN	BLU/VIO	44	LP00104
55	72B RIGHT SPINNER TOP	ORG/RED	BLU/VIO	44	LP00104
56	73B OFFENSE 2 RED	ORG/BLK	BLU/VIO	555	LP00100
57	74B OFFENSE 2 WHITE	ORG/YEL	BLU/VIO	555	LP00100
58	75B GI RIGHT LOWER 3-4	ORG/GRN	BLU/VIO	44	LP00104
59	76B GI RIGHT 1-2	ORG/BLU	BLU/VIO	44	LP00104
60	77B RIGHT SPINNER BOTTOM	ORG/VIO	BLU/VIO	44	LP00104
61	78B GI LEFT DROP 1	ORG/GRY	BLU/VIO	44	LP00104
62	81B DEFENSE 8 RED	ORG/BRN	BLU/GRY	555	LP00100
63	82B DEFENSE 8 WHITE	ORG/RED	BLU/GRY	555	LP00100
64	83B OFFENSE 3 RED	ORG/BLK	BLU/GRY	555	LP00100
65	84B OFFENSE 3 WHITE	ORG/YEL	BLU/GRY	555	LP00100
66	85B OFFENSE 1 RED	ORG/GRN	BLU/GRY	555	LP00100
67	86B OFFENSE 1 WHITE	ORG/BLU	BLU/GRY	555	LP00100
68	87B GI RIGHT LOWER 3-4	ORG/VIO	BLU/GRY	44	LP00104
69	88B GI RIGHT LOWER 1-2	ORG/GRY	BLU/GRY	44	LP00104
70	89B OFFENSE 11 RED	ORG/BLK	BLU/GRY	555	LP00100

 = CABINET LAMPS
 = PLAYFIELD LAMPS
 = BACKBOX LAMPS

LOCATION OF SOLENOIDS, AND FLASHERS

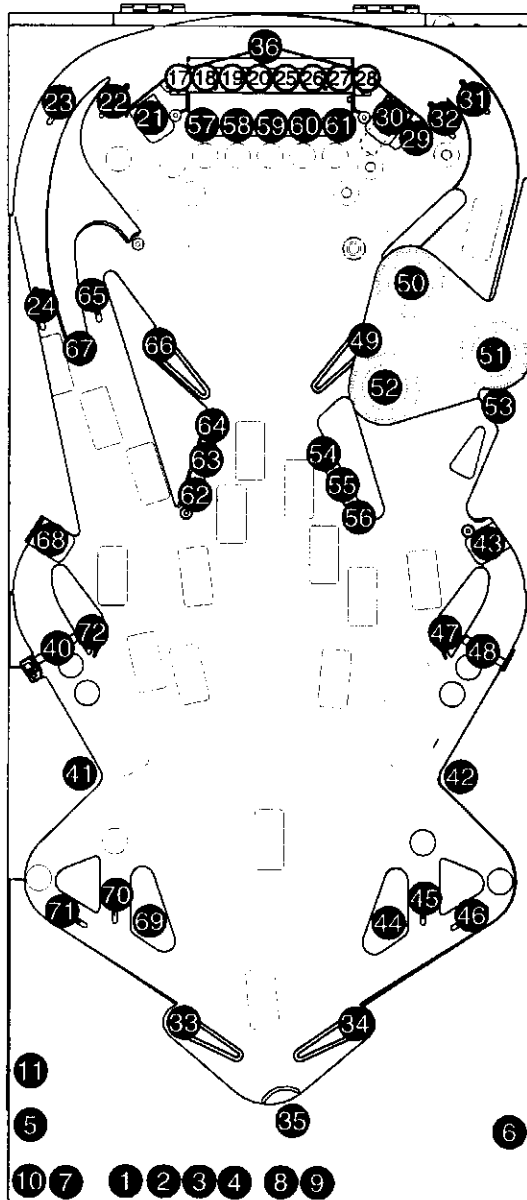
REF	DESCRIPTION	PART NUMBER
1	BALL SHOOTER	CL00113
2	KNOCK DOWN	CL00114
3	UNUSED	-----
4	LEFT SLINGSHOT	CL00109
5	RIGHT SLINGSHOT	CL00109
6	STAR BUMPER TOP	CL00109
7	STAR BUMPER MIDDLE	CL00109
8	STAR BUMPER LOWER	CL00109
9	LEFT FLIPPER	CL00111
10	RIGHT FLIPPER	CL00111
11	UPPER LEFT FLIPPER	CL00111
12	UPPER RIGHT FLIPPER	CL00111
13	UPPER LEFT EJECT	CL00109
14	UPPER RIGHT EJECT	CL00109
15	LEFT MIDDLE EJECT	CL00109
16	RIGHT MIDDLE EJECT	CL00109
17	UNUSED	-----
18	UNUSED	-----
19	UNUSED	-----
20	UNUSED	-----
21	UNUSED	-----
22	UNUSED	-----
22	UNUSED	-----
23	UNUSED	-----
24	UNUSED	-----
25	5 BANK DROP	CL00109
26	LEFT 3 BANK DROP	CL00109
27	RIGHT 3 BANK DROP	CL00109
28	STAR BUMPER FLASHER	LP00103
29	LEFT UPPER FLASHER	LP00103
30	RIGHT UPPER FLASHER	LP00103
31	LEFT CENTER FLASHER	LP00103
32	RIGHT CENTER FLASHER	LP00103



P1121A

LOCATION OF SWITCHES & OPTOS DETECTORS

REF. NO.	DESCRIPTION	SWITCH PART NUMBER
*1	COIN DOOR-CHUTE 1	**
*2	COIN DOOR-CHUTE 2	**
*3	COIN DOOR-CHUTE 3	**
*4	COIN DOOR-CHUTE 4	**
*5	LEFT FLIPPER BUTTON	SW00127
*6	RIGHT FLIPPER BUTTON	SW00127
*7	"START" BUTTON	SW00130
*8	COIN DOOR OPEN (MODE)	SW00132
*9	COIN DOOR - SLAM TILT	SW00121
*10	TILT BOB	A-00065-1
11	TOURN. MODE ON/OFF	SW00152-1
12	KICKER SWITCH	SW00100-01
13-16	NOT USED	



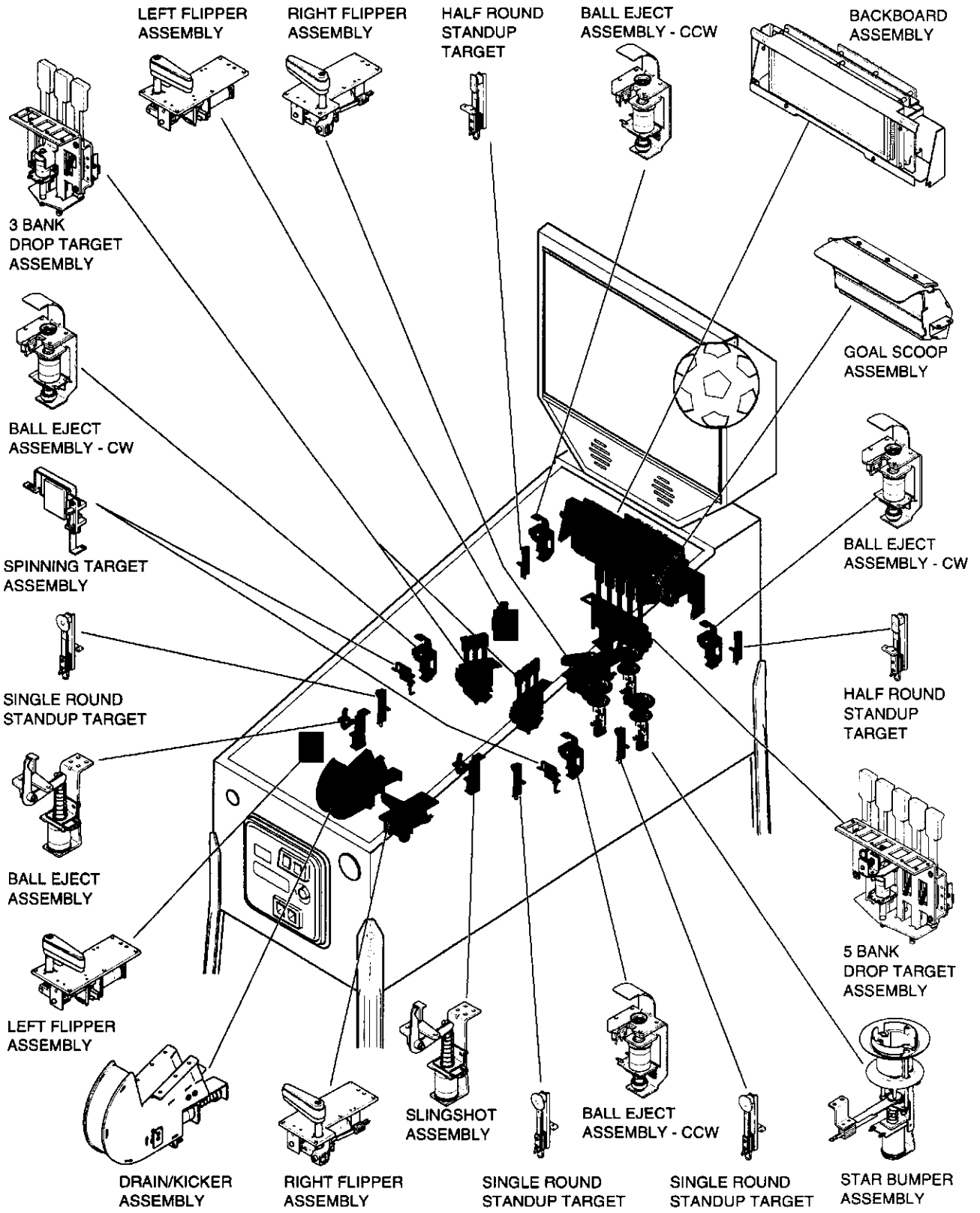
P1120950

REF. NO.	DESCRIPTION	SWITCH PART NUMBER	OPTO RECEIVER P/N	OPTO XMTR. P/N
17	GOAL 1 LEFT		A0023700	A0023600
18	GOAL 3		A0023700	A0023600
19	GOAL 5		A0023700	A0023600
20	GOAL 7		A0023700	A0023600
21	LEFT UPPER EJECT	SW00118		
22	LEFT INNER LOOP	SW00111		
23	LEFT OUTER LOOP	SW00111		
24	LEFT LOOP ENTRY	SW00111		
25	GOAL 2		A0023700	A0023600
26	GOAL 4		A0023700	A0023600
27	GOAL 6		A0023700	A0023600
28	GOAL 8 RIGHT		A0023700	A0023600
29	RIGHT TOP TARGET	A-00330-W		
30	RIGHT UPPER EJECT	SW00118		
31	RIGHT OUTER LOOP	SW00111		
32	RIGHT INNER LOOP	SW00111		
33	LEFT FLIPPER E.O.S.	SW00127		
34	RIGHT FLIPPER E.O.S.	SW00127		
35	BALL TROUGH		A0020500	A0020601
36	TROUGH RETURN		A0020800	A0020901
37-39	NOT USED			
40	LEFT SPINNER		A-00665	
41	LEFT SLINGSHOT	SW00138		
42	RIGHT SLINGSHOT	SW00138		
43	RIGHT LOWER EJECT	SW00118		
44	R. LOWER 10 POINT	SW00138		
45	RIGHT INNER LANE	SW00111		
46	RIGHT OUTER LANE	SW00111		
47	R. BOTTOM TARGET	A-00215-W		
48	RIGHT SPINNER		A-00665	
49	E.O.S. RIGHT UPPER	SW00127		
50	TOP BUMPER	SW00126		
51	MID BUMPER	SW00126		
52	BOTTOM BUMPER	SW00126		
53	RIGHT MID TARGET	A-00215-R		
54	RIGHT 3 BANK LEFT	SW00106		
55	R. 3 BANK CENTER	SW00106		
56	RIGHT 3 BANK RIGHT	SW00106		
57	5 BANK LEFT OUTER	SW00106		
58	5 BANK LEFT INNER	SW00106		
59	5 BANK CENTER	SW00106		
60	5 BANK RIGHT INNER	SW00106		
61	5 BANK RIGHT OUTER	SW00106		
62	LEFT 3 BANK LEFT	SW00106		
63	LEFT 3 BANK CENTER	SW00106		
64	LEFT 3 BANK RIGHT	SW00106		
65	MID FIELDER	SW00111		
66	E.O.S. LEFT FLIPPER	SW00127		
67	LEFT TOP TARGET	A-00330-W		
68	LEFT LOWER EJECT	SW00118		
69	LEFT LOWER 10 POINT	SW00138		
70	LEFT INNER LANE	SW00111		
71	LEFT OUTER LANE	SW00111		
72	L. BOTTOM TARGET	A-00215-W		

*Note: Switch is located in cabinet.

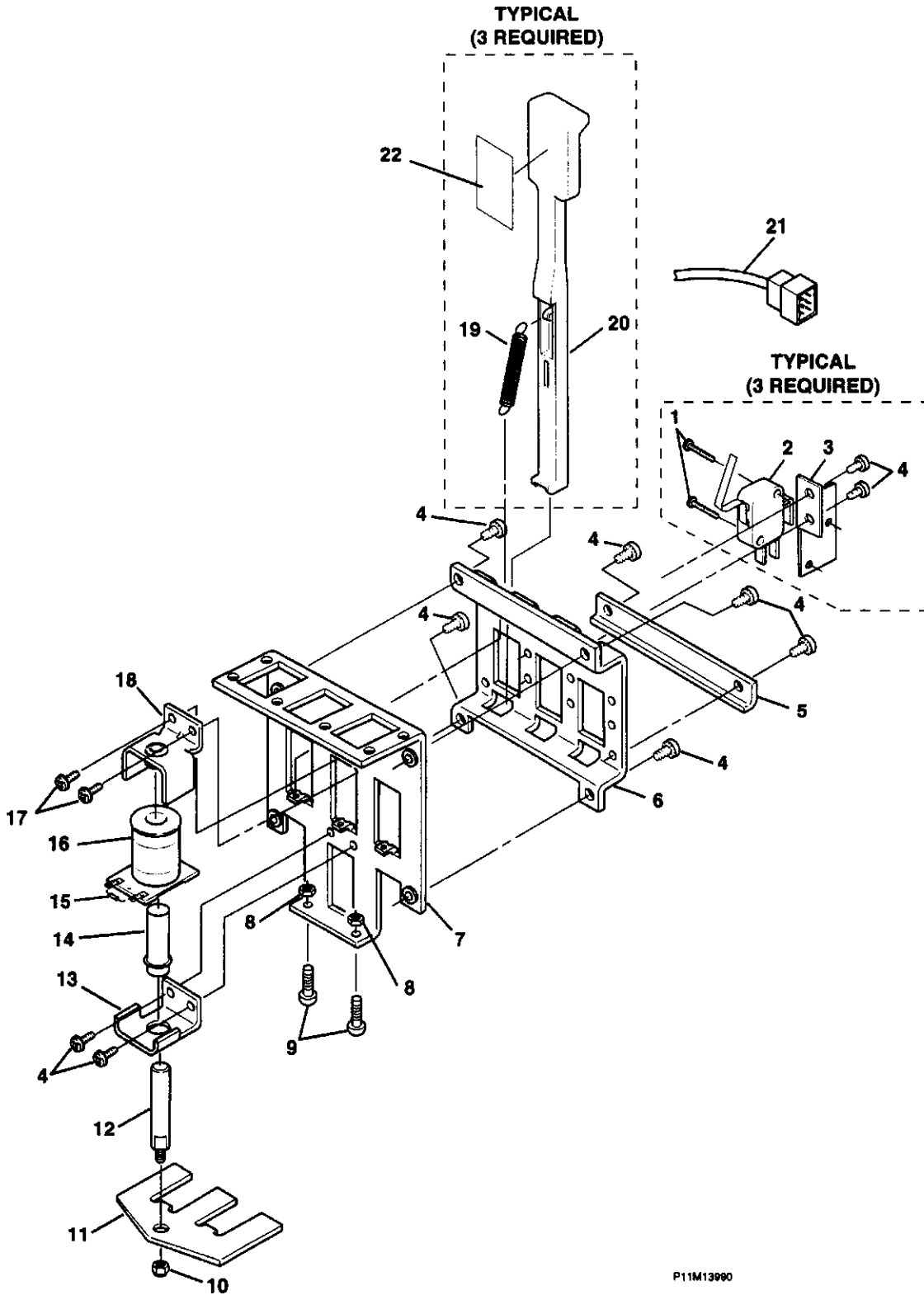
**Note: Not serviced separately.

PLAYFIELD MECHANISMS



P11M09

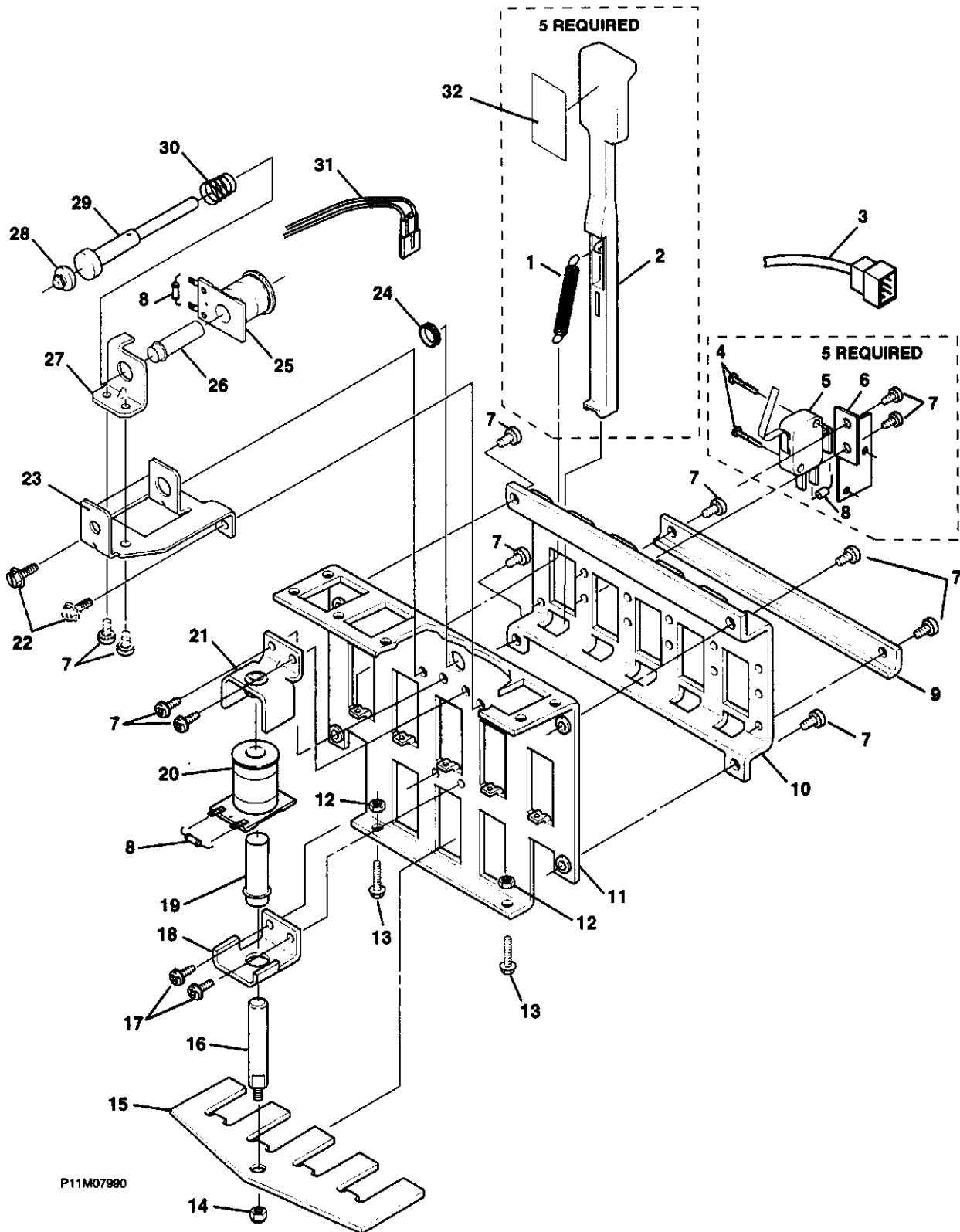
THREE BANK DROP TARGET ASSEMBLY



P11M13990

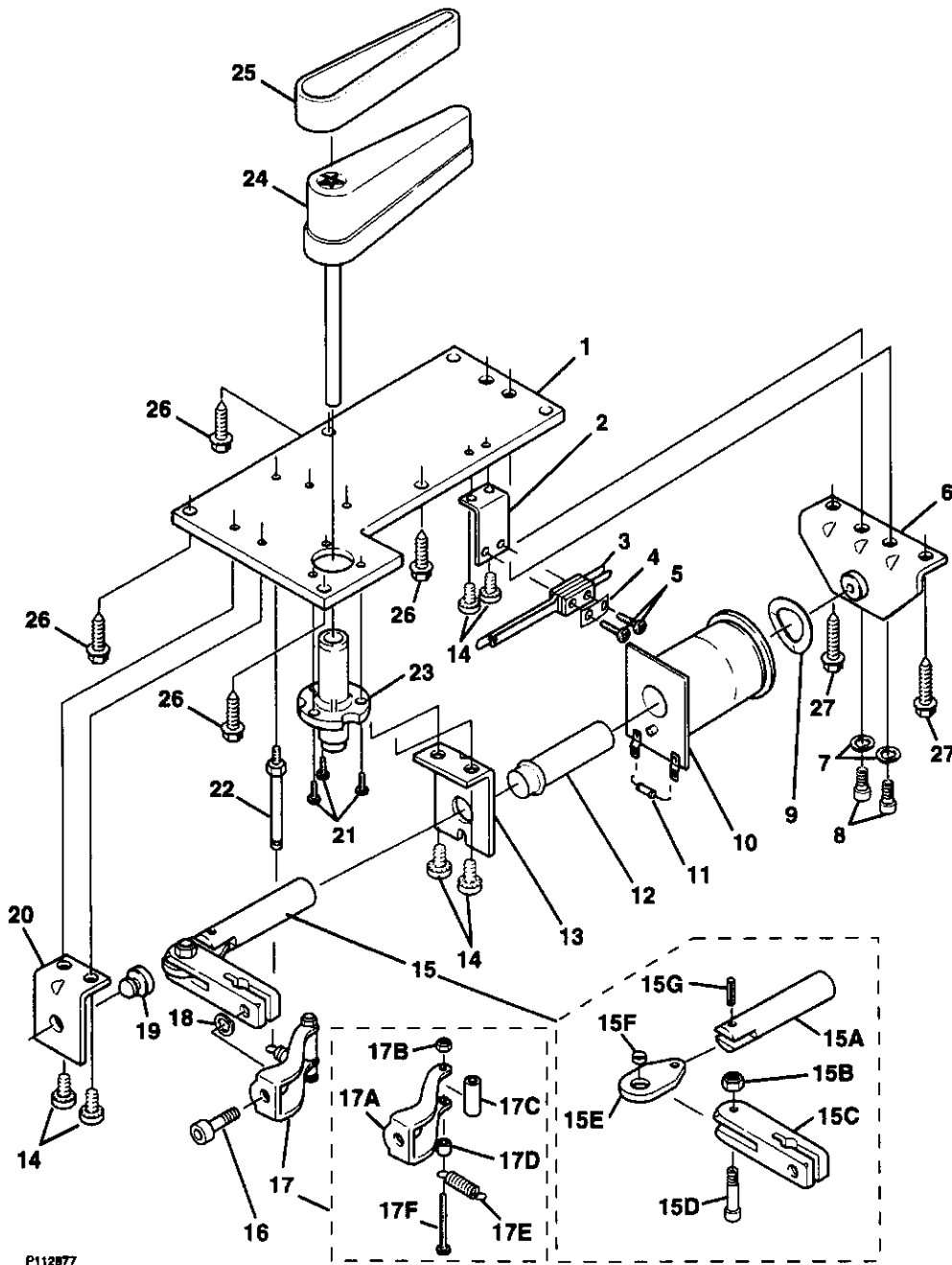
THREE BANK TARGET ASSEMBLY			
No.	Part Number	Description	Req.
	A-00153	ASSEMBLY, 3 BANK DROP TARGET <i>consists of the following parts:</i>	
1	SC00120-05	SCREW, MACHINE, 4-40 X 5/8 PPH SEMS ZC	6
2	SW00106	SWITCH, MICRO, WITH ACTUATOR	3
3	MT00212	BRACKET, SWITCH	3
4	SC00101-02	SCREW, MACHINE, 8-32 X 1/4 PPH SEMS ZC	14
5	MT00210	BRACKET, RETAINER	1
6	MT00213	BRACKET, GUIDE	1
7	A-00158	ASSEMBLY, SUB, MAIN BRACKET	1
8	NT00104-08	NUT, 8-32 STOP NYLON INS ZC	2
9	SC00146-05	SCREW, MACHINE, 8-32 X 5/8 PPH ZC	2
10	NT00104-11	NUT, 10-32 STOP NYLON INS ZC	1
11	MT00209	PLATE, LIFTER	1
12	SM00118-01	PLUNGER WITH STUD, 2.487"L	1
13	MT00208	BRACKET, COIL MOUNTING	1
14	PL00133-03	SLEEVE, COIL, 2.094"L WITH .188 EXT	1
15	DI00100	DIODE, 1N4004 RECTIFIER 1.0A 400VR	1
16	CL00109	COIL, 800T #23	1
17	SC00102-03	SCREW, MACHINE, 10-32 X 3/8 PPH SEMS ZC	2
18	A-00159	ASSEMBLY, BRACKET, PLUNGER STOP	1
19	SG00117	SPRING, EXT., .250 X .440 .016"D WIRE	3
20	PL00325-W	TARGET, DROP, WHITE	3
21	C-00239	CABLE	1
22	AW00222-4	DECAL, DROP TARGET	3

FIVE BANK DROP TARGET ASSEMBLY



FIVE BANK DROP TARGET ASSEMBLY			
No.	Part Number	Description	Req.
	A-00720	ASSEMBLY, DROP TARGET, 5 BANK WITH KICKER <i>consists of the following parts:</i>	
1	SG00117	SPRING, EXT., 0.250 X .440 .016"D WIRE	5
2	PL00325-W	TARGET, DROP, WHITE	5
3	C-00241	CABLE	1
4	SC00120-05	SCREW, MACHINE 4-40 X 5/8 PPH SEMS ZC	10
5	SW00106	SWITCH, MICRO, WITH ACTUATOR, 3 LUG	5
6	MT00212	BRACKET, SWITCH	5
7	SC00101-02	SCREW, MACHINE 8-32 X 1/4 PPH SEMS ZC	20
8	DI00100	DIODE, 1N4004 RECTIFIER 1.0A 400VR	1
9	MT00219	BRACKET, RETAINER	1
10	MT00220	BRACKET, GUIDE	1
11	A-00161-1	ASSEMBLY, SUB, BRACKET, MAIN,	1
12	NT00104-08	NUT, 8-32 STOP NYLON INS ZC	2
13	SC00118-05	SCREW, MACHINE, 8-32 X 5/8 SLHWH ZC	2
14	NT00104-11	NUT, 10-32 STOP NYLON INS ZC	1
15	MT00218	PLATE, LIFTER	1
16	SM00118-01	PLUNGER, WITH STUD, 2.487"L	1
17	SC00102-03	SCREW, MACHINE 10-32 X 3/8 PPH SEMS ZC	2
18	MT00208	BRACKET, COIL MOUNTING	1
19	PL00133-03	SLEEVE, COIL, 2.094"L WITH .188"EXT	1
20	CL00109	COIL, 800T #23	1
21	A-00159	ASSEMBLY, SUB, BRACKET, PLUNGER STOP	1
22	SC00177-03	SCREW, THREAD ROLLING 8-32 X 3/8 SLHWH ZC	2
23	MT00665	BRACKET, MOUNTING COIL, KICKER	1
24	PL00127-07	NYLINER, 1/4"D SHAFT, 0.078"L	1
25	CL00114	COIL, 1050T #28 MINI	1
26	PL00361-01	SLEEVE, COIL, 1.88"L WITH .125"EXT	1
27	MT00666	BRACKET, COIL RETAINING, .500 8-32 X.625	1
28	RB00110	BUTTON, BUMPER, 5/8"D 1/8"H 14GA .078"T MATERIAL	1
29	A-00719	ASSEMBLY, PLUNGER & TIP, WITH STOP	1
30	SG00130	SPRING, COMP, 0.380 X .750L	1
31	C-00171	CABLE, KNOCKER	1
32	AW00222-4	DECAL, DROP TARGET	5

FLIPPER ASSEMBLIES



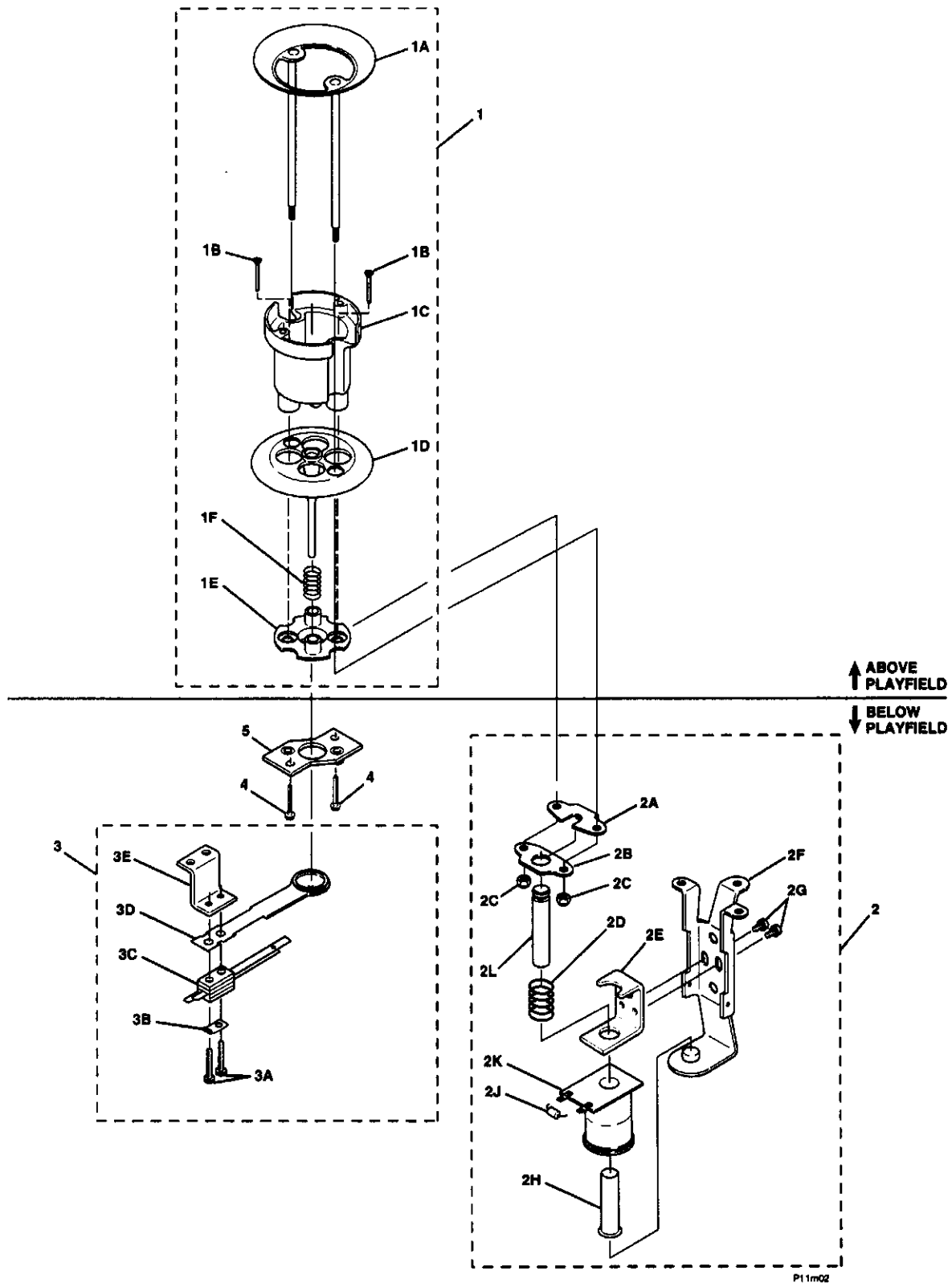
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FLIPPER ASSEMBLIES				
Ref.	Part Number	Description	Quantity Required	
			Upper & Lower Left Flipper	Upper & Lower Right Flipper
	A-00155-L	ASSEMBLY, UPPER & LOWER LEFT FLIPPER		
	A-00155-R	ASSEMBLY, UPPER & LOWER RIGHT FLIPPER		
		<i>left and right assemblies consist of the following parts:</i>		
1	MT00388	BASE PLATE	1	1
2	MT00392	BRACKET, SWITCH MOUNTING	1	1
3	SW00127	SWITCH, LEAF	1	1
4	MT00461-1	PLATE, SWITCH	1	1
5	SC00100-05	SCREW, MACHINE, 6-32 X 5/8 PPH SEMS ZC	2	2
6	A-00378-1	ASSEMBLY, BRACKET, COIL STOP	1	1
7	WS00102-17	WASHER, LOCK 1/4 SPLIT	2	2
8	SC00169-03	SCREW, CAP, 1/4-20 X 3/8 SH ALLOY, BLACK	2	2
9	WS00107-02	WASHER, SPRING	1	1
10	CL00111	COIL 1100T #22	1	1
11	DI00100	DIODE, 1N4004 1.0A 400 VR	1	1
12	PL00132-05	SLEEVE, COIL 2.218 L	1	1
13	MT00390	BRACKET, COIL RETAINING	1	1
14	SC00101-02	SCREW, MACHINE, 8-32 X 1/4 PPH SEMS ZC	6	6
15	A-00429-1L	ASSEMBLY, PLUNGER/LINK/CLAMP- LEFT	1	
15	A-00429-1R	ASSEMBLY, PLUNGER/LINK/CLAMP- RIGHT		1
		<i>left and right assemblies consist of the following parts:</i>		
15A	SM00183	PLUNGER	1	1
15B	NT00104-11	NUT, 10-32 STOP, NYLON ZC	1	1
15C	MT00394	CLAMP, SHAFT	1	1
15D	SC00135-06	SCREW, CAP, 10-32 X 3/4 SH ALLOY ZC	1	1
15E	PL00202-1	LINK, PLUNGER	1	1
15F	SM00184	BUSHING, PLUNGER LINK	1	1
15G	RP00102-01	PIN, ROLL 5/32 X 3/8	1	1
16	SC00135-05	SCREW, CAP, 10-32 X 5/8 SH ALLOY ZC	1	1
17	A-00425-2L	ASSEMBLY, ACTUATOR- LEFT	1	
17	A-00425-2R	ASSEMBLY, ACTUATOR- RIGHT		1
		<i>left and right assemblies consist of the following parts:</i>		
17A	MT00393-2	BRACKET, SPRING MOUNTING	1	1
17B	NT00109-04	NUT, 4-40 STOP, NYLON ZC, THIN	1	1
17C	PL00288-1	BUSHING, ROLLER	1	1
17D	SM00225	BUSHING, SPRING, EOS	1	1
17E	SG00111	SPRING, EXT., .240 X .834" L	1	1
17F	SC00171-27	SCREW, MACHINE, 4-40 X 1 1/16 PPH ZC	1	1
18	WS00102-10	WASHER, LOCK #10 SPLIT	1	1
19	RB00103	BUMPER, BUTTON 5/8 D X 1/8 H	1	1
20	MT00389	BRACKET, PLUNGER SUPPORT	1	1
21	SC00100-26	SCREW, MACHINE, 6-32X 5/16 PPH SEMS ZC	3	3
22	SM00191	POST, SPRING MOUNTING	1	1
23	PL00264-1	BUSHING, FLIPPER	1	1
*24	A-00217-**	ASSEMBLY, FLIPPER BAT, 3.0"	1	1
*25	RB00114-**	RUBBER RING, 1-1/2" ID 1/2"W	1	1
*26	SC00119-05	SCREW, SELF TAPPING #8 X 5/8 SHWH "AB" ZC	4	4
*27	SC00119-06	SCREW, SELF TAPPING #8 X 3/4 SHWH "AB" ZC	2	2

*NOTE: Reference only- not included in assemblies shown. Must be ordered separately.

**NOTE: A-00217-Y is used for top right and left flippers with RB00114-BK ring. A-00217-BK is used for bottom left and right flippers with RB00114-Y ring.

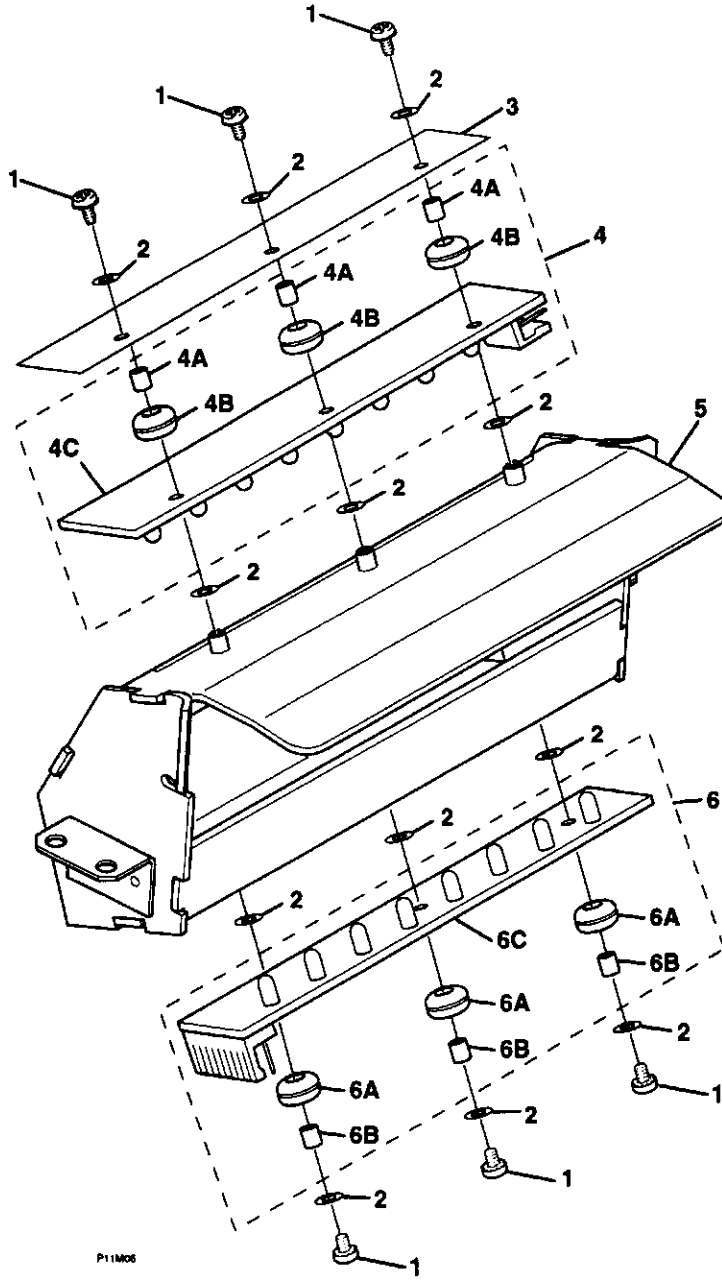
STAR BUMPER ASSEMBLY



STAR BUMPER ASSEMBLY			
No.	Part Number	Description	Req.
1	A-00376-R	ASSEMBLY, STAR BUMPER, RED <i>consists of the following parts:</i>	1
1A	A-00374	ASSEMBLY, RING, STAR BUMPER	1
*1B	SC00117-09	SCREW, MACHINE, 4-40 X 1 1/8 PFH ZC	2
1C	PL00265	BODY	1
1D	PL00229-R	SKIRT, RED	1
1E	PL00261	WAFER	1
1F	SG00115	SPRING, 6 TURNS	1
2	A-00375	ASSEMBLY, COIL & BRACKET, STAR BUMPER <i>consists of the following parts:</i>	1
2A	MT00379	PLUNGER, LINK, METAL	1
2B	FB00104	PLUNGER, LINK, FIBER	1
*2C	NT00104-06	NUT, 6-32 STOP NYLON INS ZC	2
2D	SG00114	SPRING, 5 TURNS	1
2E	MT00380	BRACKET, COIL RETAINING	1
2F	A-00373	ASSEMBLY, SUB, COIL BRACKET	1
2G	SC00131-02	SCREW, MACHINE, 6-32 X 1/4 SLHWH ZC	2
2H	PL00132-01	SLEEVE, COIL, 1.745L	1
2J	DI00100	DIODE, 1N4004 RECTIFIER 1.0A 400VR	1
2K	CL00109	COIL, 800T #23	1
2L	SM00179	PLUNGER	1
3	A-00381	ASSEMBLY, SWITCH, STAR BUMPER <i>consists of the following parts:</i>	1
3A	SC00100-05	SCREW, MACHINE, 6-32 X 5/8 PPH SEMS ZC	2
3B	MT00461-1	PLATE, SWITCH	1
3C	SW00126	SWITCH, LEAF	1
3D	PL00263	ACTUATOR, LEAF SWITCH	1
3E	MT00384	BRACKET, SWITCH MOUNTING	1
4	SC00121-04	SCREW, WOOD #6 X 1/2	2
5	A-00648	PLATE, SUPPORT	1

*NOTE: REFERENCE ONLY - NOT INCLUDED IN ASSEMBLIES SHOWN. MUST BE ORDERED SEPARATELY.

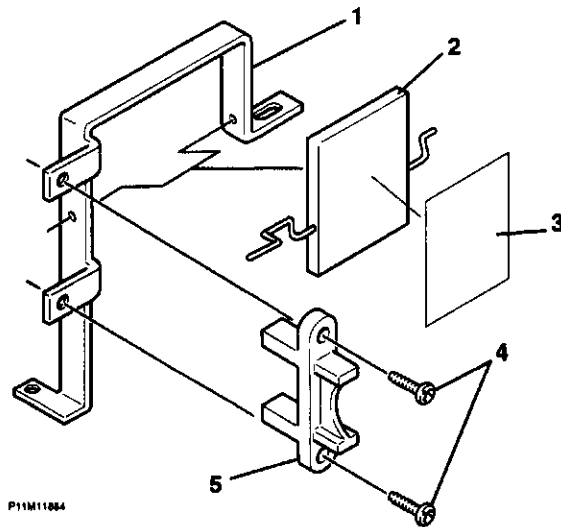
GOAL ASSEMBLY



GOAL ASSEMBLY			
No.	Part Number	Description	Req.
	A-00710	ASSEMBLY, GOAL <i>consists of the following parts:</i>	
1	SC00175-02	SCREW, MACHINE 4-40 X 1/4 PPH SEMS/INT ZC	6
2	WS00100-02	WASHER, FLAT #4 .280"OD .026"T	12
3	FB00110	SHIELD, LIGHT, OPTO	1
4	A-00812	ASSEMBLY, SUB, OPTO, TOP, 8-POSITION <i>consists of the following parts:</i>	
4A	SM00258	SPACER .125"ID .167"LG	3
4B	RB00128	GROMMET, .156"ID .240" HOLE	3
4C	* A0023600	ASSEMBLY, PCB, OPTO, 8-POSITION, TRANSMITTER	1
5	A-00699	ASSEMBLY, BODY	1
6	A-00813	ASSEMBLY, SUB, OPTO, BOTTOM, 8-POSITION <i>consists of the following parts:</i>	
6A	RB00128	GROMMET, .156"ID .240" HOLE	3
6B	SM00258	SPACER .125"ID .167"LG	3
6C	* A0023700	ASSEMBLY, PCB, OPTO, 8-POSITION, RECEIVER	1

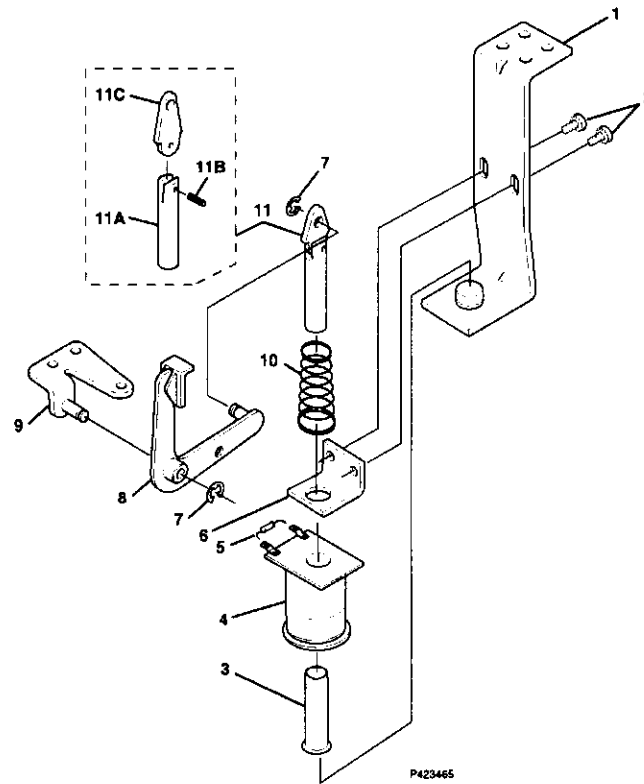
* SEE PAGE 4-20 FOR PCB COMPONENT BREAKDOWN

SPINNING TARGET ASSEMBLY



SPINNING TARGET ASSEMBLY			
No.	Part Number	Description	Req.
	A-00169-2	ASSEMBLY, SPINNING TARGET, OPTO <i>consists of the following parts:</i>	
1	MT00225-1	BRACKET	1
2	A-00170-1	ASSEMBLY, BODY, 1.125"	1
3	AW00222-3	DECAL, SPINNING TARGET	2
4	SC00175-02	SCREW, MACHINE 4-40 X 1/4 PPH SEMS/INT ZC	2
5	A-00665	ASSEMBLY, SWITCH, OPTO, .375" GAP, WITH CONNECTOR	1

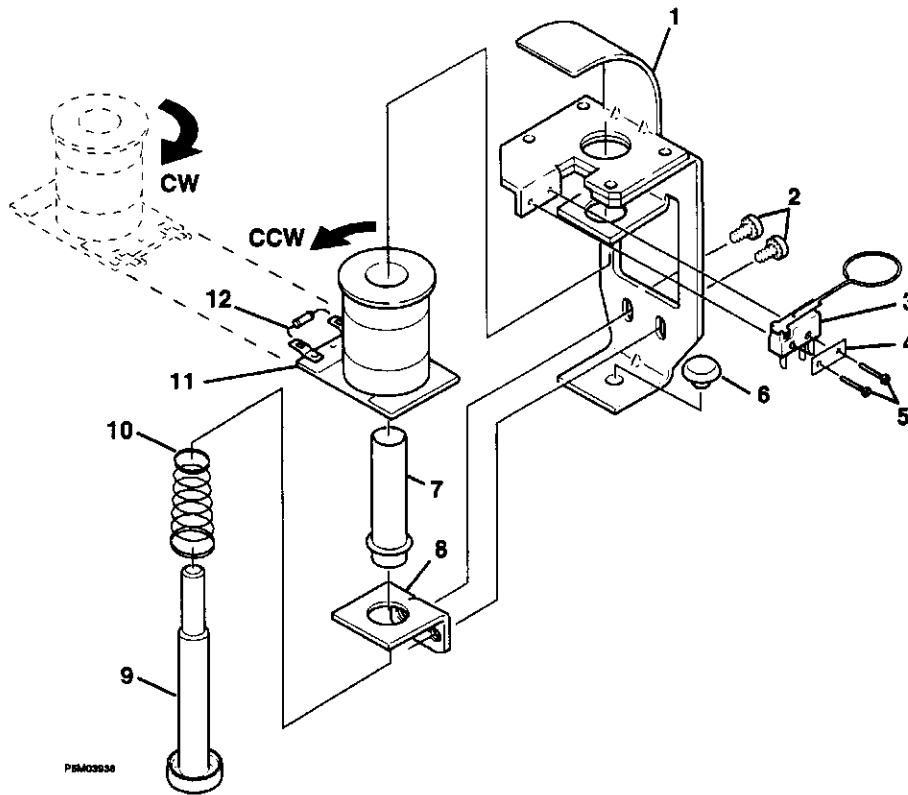
SLINGSHOT ASSEMBLY



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SLINGSHOT ASSEMBLY			
No.	Part Number	Description	Req.
	A-00540-1	ASSEMBLY, SLINGSHOT, STANDARD <i>consists of the following parts:</i>	
1	A-00537	ASSEMBLY, BRACKET, COIL MOUNTING, SLINGSHOT	1
2	SC00101-02	SCREW, MACHINE, 8-32 X 1/4 PPH SEMS ZC	2
3	PL00132-01	SLEEVE, COIL, 1.745L	1
4	CL00109	COIL, 800T #23	1
5	DI00100	DIODE, 1N4004 RECTIFIER 1.0A 400VR	1
6	MT00136-01	BRACKET, COIL RETAINING	1
7	RR00100-25	E-RING, EXT., .250D SHAFT	1
8	A-00328	ASSEMBLY, ARM, SLINGSHOT	1
9	A-00538	ASSEMBLY, BRACKET, PIVOT, SLINGSHOT ARM	1
10	SG00105	SPRING, COMP, .700 X 1.625 CONICAL	1
11	A-00329	ASSEMBLY, PLUNGER/LINK <i>consists of the following parts:</i>	1
11A	SM00113-06	PLUNGER, CLEVIS 2.000L	1
11B	RP00100-06	PIN, ROLL 1/8 X 5/8	1
11C	PL00246	LINK, PLUNGER	1

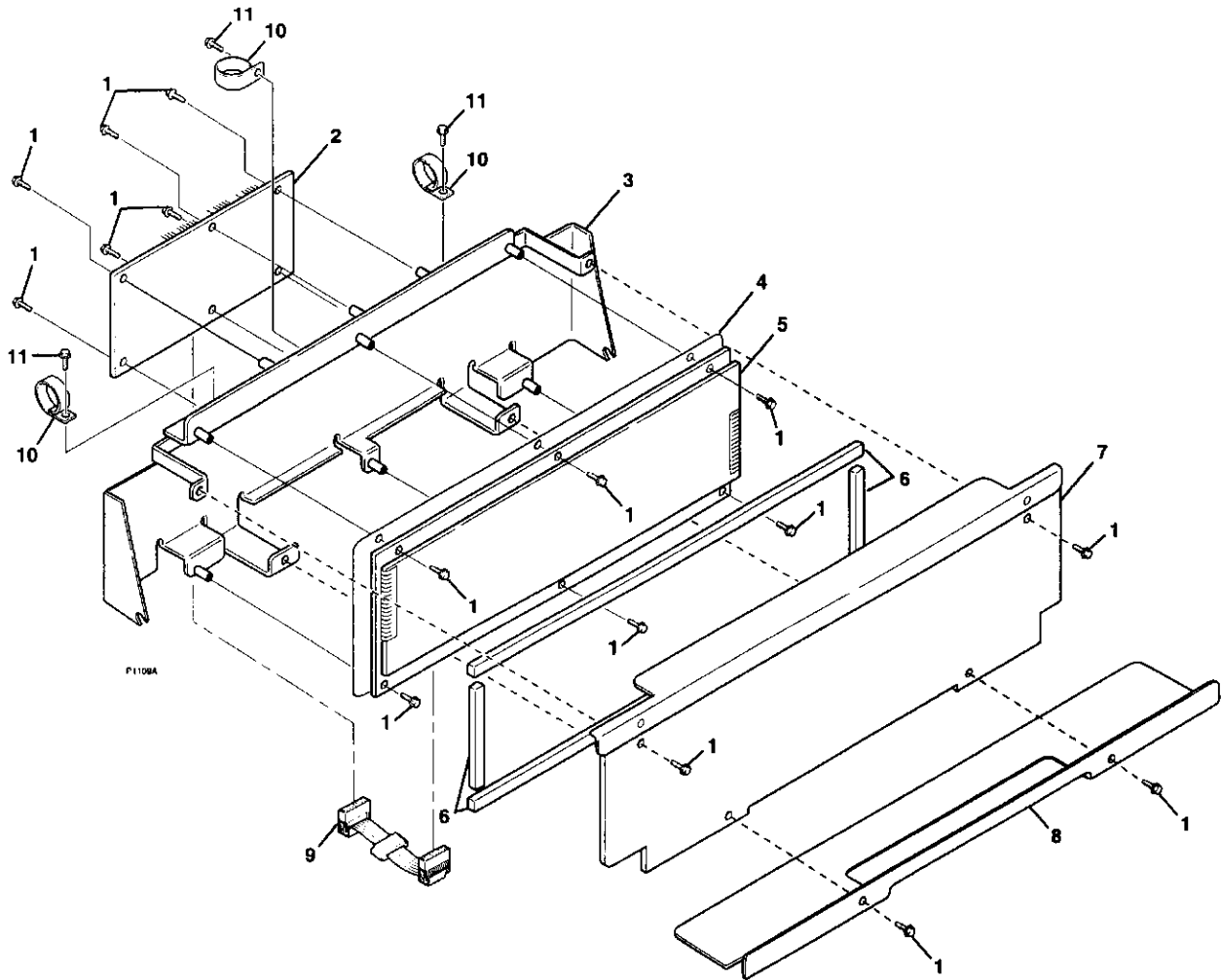
SINGLE BALL EJECTOR ASSEMBLY



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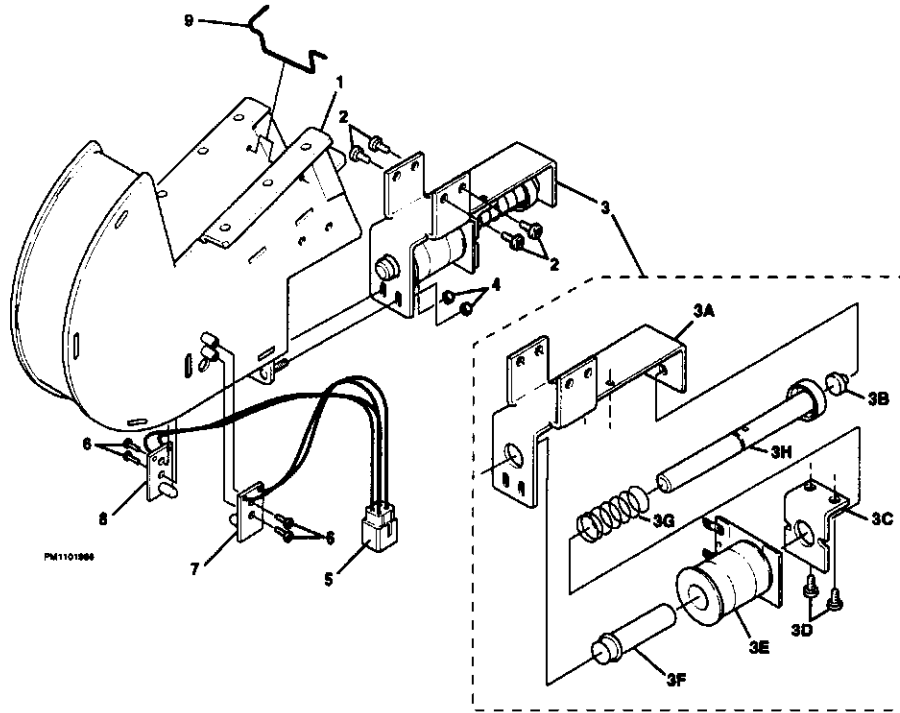
SINGLE BALL EJECTOR ASSEMBLY			
No.	Part Number	Description	Req.
	A-00547-1	ASSEMBLY, BALL EJECTOR, CLOCKWISE (CW)	
	A-00547-2	ASSEMBLY, BALL EJECTOR, COUNTERCLOCKWISE (CCW)	
		<i>both assemblies consist of the following parts:</i>	
1	A-00546	ASSEMBLY, SCOOP	1
2	SC00101-02	SCREW, MACHINE, 8-32 X .25L PHP SEMS	2
3	SW00139	SWITCH, MICRO, WITH ACTUATOR	1
4	MT00491	PLATE, SWITCH, #4 X .375	1
5	SC00157-04	SCREW, MACHINE, 2-56 X .50L PHP SEMS ZC	2
6	RB00110	GROMMET, RUBBER 5/8D X 1/8H	1
7	PL00133-02	SLEEVE, COIL, 1.656L WITH .188" EXTENSION	1
8	MT00136	BRACKET, COIL RETAINING	1
9	A-00147	ASSEMBLY, PLUNGER & TIP	1
10	SG00131	SPRING, COMP., 0.63 X 1.0, .018 CONICAL	1
11	CL00109	COIL, 800T #23	1
12	DI00100	DIODE 1N4004 RECT 1.0A 400VR	1

PLAYFIELD BACKBOARD ASSEMBLY



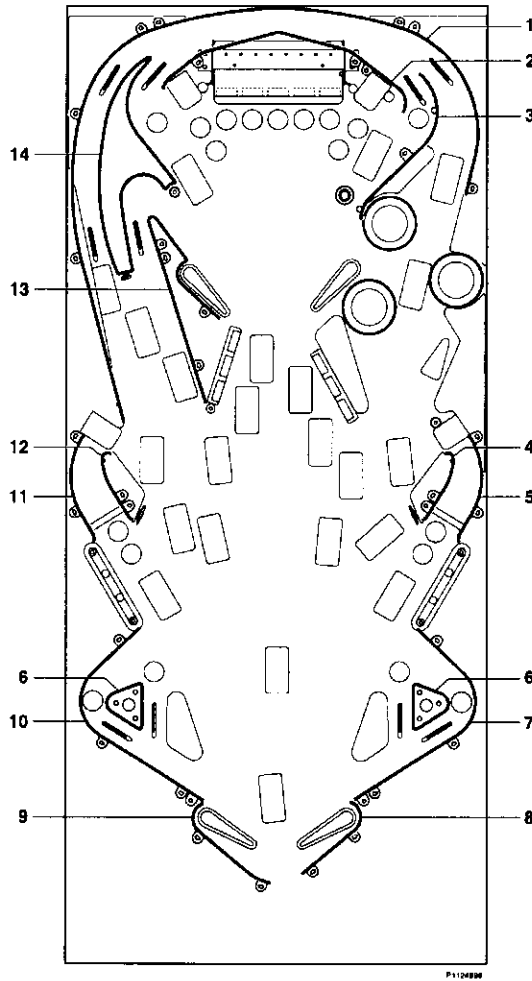
PLAYFIELD BACKBOARD ASSEMBLY			
No.	Part Number	Description	Req.
	A-00668-PB11	ASSEMBLY, BACKBOARD, PLAYFIELD <i>consists of the following parts:</i>	
1	SC00131-05	SCREW, MACHINE 6-32 X 5/8 SLHWH ZC	16
2	A-0024900-PB11	ASSEMBLY, PCB, CPU, WITH EXT	1
3	A-00661	ASSEMBLY, BRACKET, MOUNTING, DISPLAY, PLAYFIELD	1
4	MS00184	GROUND BOARD, DISPLAY	1
5	DP00100	DISPLAY, 12.75 X 4.25, ORANGE, DALE WITH POWER SUPPLY	1
6	MS00117	TAPE, FOAM, 1/2W X 1/4T WITH ADHESIVE	23"
7	A-00674-PB11	ASSEMBLY, COVER/SHIELD, DISPLAY	1
8	MT00608	SHIELD, DISPLAY	1
9	RC00100-025	CABLE, RIBBON, 14-PIN 2.5" WITH FERRITE SUPPRESSER	1
10	CC00100-03	CLAMP, CABLE, 3/8 #10 MOUNTING	3
11	SC00177-03	SCREW, THREAD ROLLING, 8-32 X 3/8 SLHWH ZC	3

DRAIN / KICKER ASSEMBLY



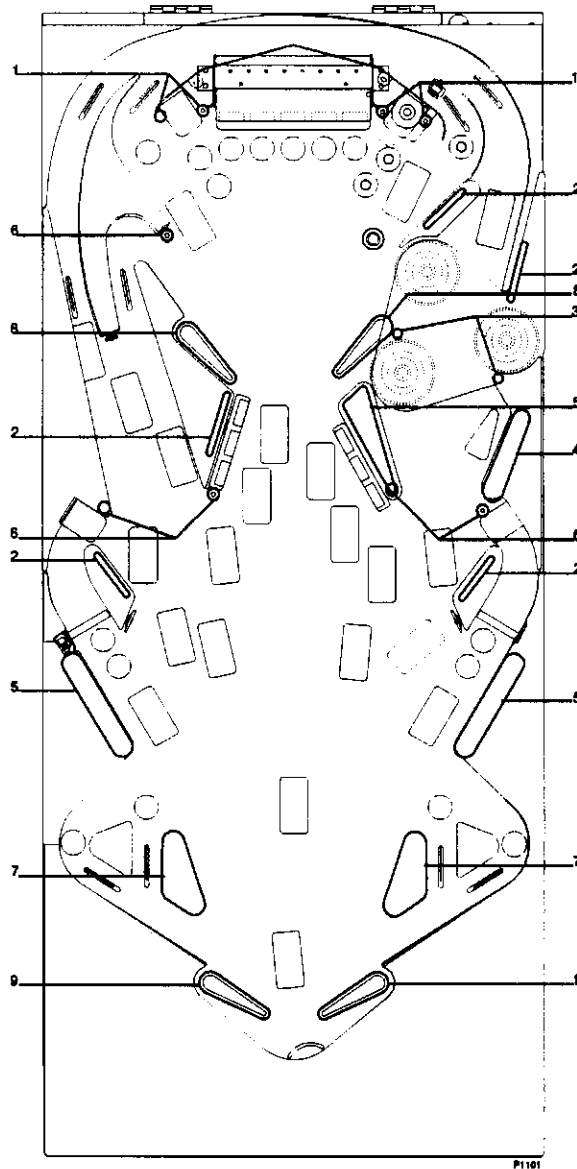
DRAIN / KICKER ASSEMBLY			
No.	Part Number	Description	Req.
	A-00709	ASSEMBLY, DRAIN/KICKER <i>consists of the following parts:</i>	
1	A-00695	ASSEMBLY, BODY	1
2	SC00101-02	SCREW, MACHINE 8-32 X 1/4 PPH SEMS ZC	4
3	A-00676	ASSEMBLY, POPPER <i>consists of the following parts:</i>	1
3A	MT00647	BRACKET, MAIN	1
3B	RB00103	BUMPER, BUTTON, 5/8"D 1/8"H	1
3C	MT00648	BRACKET, COIL RETAINING, .750 #8 X .875	1
3D	SC00101-02	SCREW, MACHINE 8-32 X 1/4 PPH SEMS ZC	2
3E	CL00113	COIL, 900T #22, LARGE BOBBIN	1
3F	PL00133-04	SLEEVE, COIL, 2.270"L W/ .188"EXT	1
3G	SG00132	SPRING, COMP, 0.50 X 2.38, 0.019 CONICAL	1
3H	A-00696	ASSEMBLY, PLUNGER	1
4	NT00104-08	NUT, 8-32 STOP NYLON INS ZC	2
5	C-00237-04	CABLE, OPTO'S, SINGLE, 4"	1
6	SC00175-02	SCREW, MACHINE 4-40 X 1/4 PPH SEMS/INT ZC	4
7	A0020601	ASSEMBLY, OPTO, SINGLE, TRANSMITTER, DUAL MOUNTING	1
8	A0020500	ASSEMBLY, OPTO, SINGLE, RECEIVER, DUAL MOUNTING W/O SHROUD	1
9	WF00147	WIREFORM, BALL GATE	1

PLAYFIELD BALL GUIDES



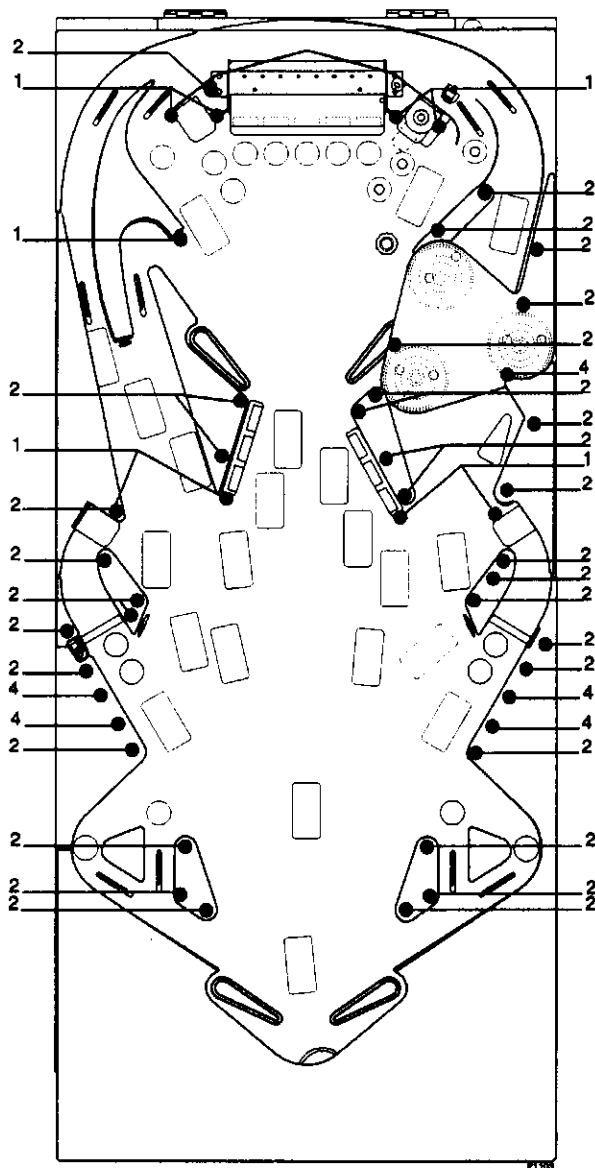
No.	Part Number	Description
1	A-00697	ASSEMBLY, BALL GUIDE, ORBIT
2	MT00639	BALL GUIDE, REAR
3	A-00698	ASSEMBLY, BALL GUIDE, UPPER - RIGHT
4	A-00705-R	ASSEMBLY, BALL GUIDE, MIDDLE - RIGHT, SMALL
5	MT00642-R	BALL GUIDE, MIDDLE - RIGHT
6	MT00646	BALL GUIDE, PLATE, LOWER
7	MT00644-R	BALL GUIDE, LOWER - RIGHT
8	MT00645-R	BALL GUIDE, FLIPPER - RIGHT
9	MT00645-L	BALL GUIDE, FLIPPER - LEFT
10	MT00644-L	BALL GUIDE, LOWER - LEFT
11	MT00642-L	BALL GUIDE, MIDDLE- LEFT
12	A-00705-L	ASSEMBLY, BALL GUIDE, MIDDLE - LEFT, SMALL
13	MT00641	BALL GUIDE, FLIPPER, UPPER
14	MT00640	BALL GUIDE, PLATE, UPPER - LEFT

PLAYFIELD RUBBERS



No.	Part Number	Description
1	RB00113	BUMPER, 1/4"D 7/16"OD 1.0"L, BLACK
2	RB00108-07	RUBBER RING, 1-1/4"ID, BLACK
3	RB00117-01	BUMPER, MINI-POST, 3/8"OD, BLACK
4	RB00108-09	RUBBER RING, 2.0"ID, BLACK
5	RB00108-10	RUBBER RING, 2-1/2"ID, BLACK
6	RB00105	BUMPER, 1/2"OD, 260"ID, 7/8"L, BLACK
7	RB00108-08	RUBBER RING, 1-1/2"ID, BLACK
8	RB00114-BK	RUBBER RING, 1-1/2"ID, 1/2"W, BLACK
9	RB00114-Y	RUBBER RING, 1-1/2"ID, 1/2"W, YELLOW

PLAYFIELD POSTS



No.	Part Number	Description
1	SM00145-04	STANDOFF, HEX, M-F, 1.580, 1/2 X 1/2
2	PL00164-N	POST, SINGLE, 1.000, #8 HOLE, CLEAR
3	SM00151	POST, BUMPER, MINI, #8, WASHER

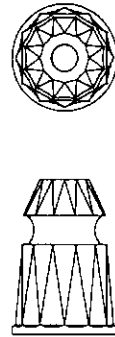
PLAYFIELD POST IDENTIFICATION



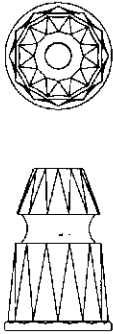
PL00164-COLOR (1.000" H)



PL00172-COLOR (1.000" H)



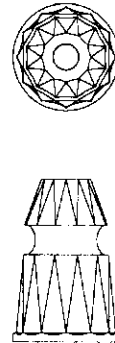
PL00197-COLOR (1.000" H)



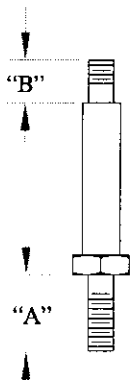
PL00198-COLOR (1.188" H)



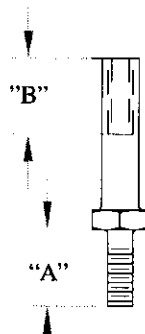
PL00200-COLOR (1.000" H)



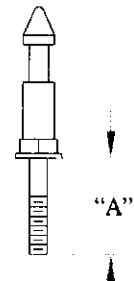
PL00304-COLOR (1.063" H)



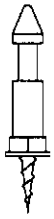
SM00144-		
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-02	.50	.50



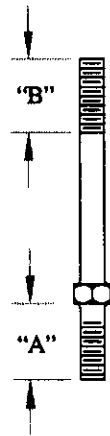
SM00145-		
DASH #	"A"	"B"
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-02	.50	0
-03	1.25	0
-04	.875	.50
-05	.875	0



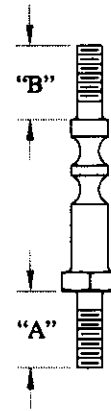
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-02	.75



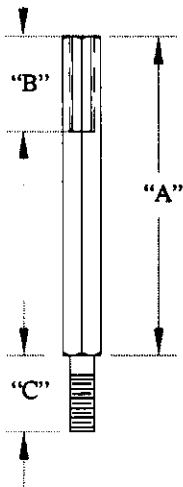
SM00151



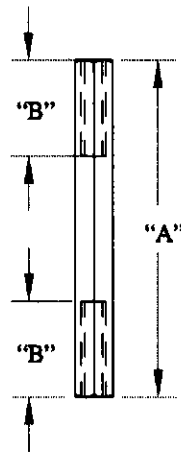
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DASH #	"A"	"B"
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-02	.50	.50
-03	.375	.50
-04	.875	.50
-05	.750	.50



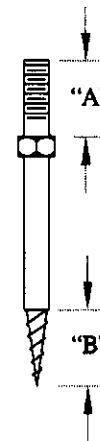
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-02	.50	.50



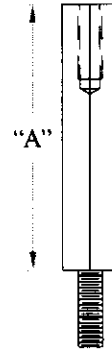
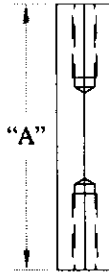
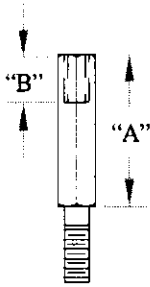
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-02	1.65	.50	.50
-03	5.19	.50	.50
-04	1.82	.50	.50
-05	1.58	.50	.50
-06	1.46	.50	.50
-07	1.36	.50	.625
-08	1.245	.50	.50
-09	3.607	.50	.50
-10	3.93	.50	.50
-11	3.264	.50	.50
-12	1.36	.50	.75



SM00155- (1/4" HEX)		
DASH #	"A"	"B"
-01	.612	.612
-02	1.36	.50
-03	1.65	.50
-04	1.06	.38



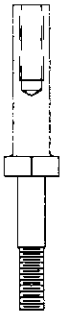
SM00176- (1/4" HEX)		
DASH #	"A"	"B"
-01	1.00	.50
-02	.50	.50
-03	.375	.50
-04	.75	.50



SM00229- (1/4" HEX) (6-32)		
DASH #	"A"	"B"
-01	.250	.130/.150
-02	.375	.250
-03	.500	.375
-04	.625	.375
-05	.750	.375
-06	.875	.375
-07	1.00	.375

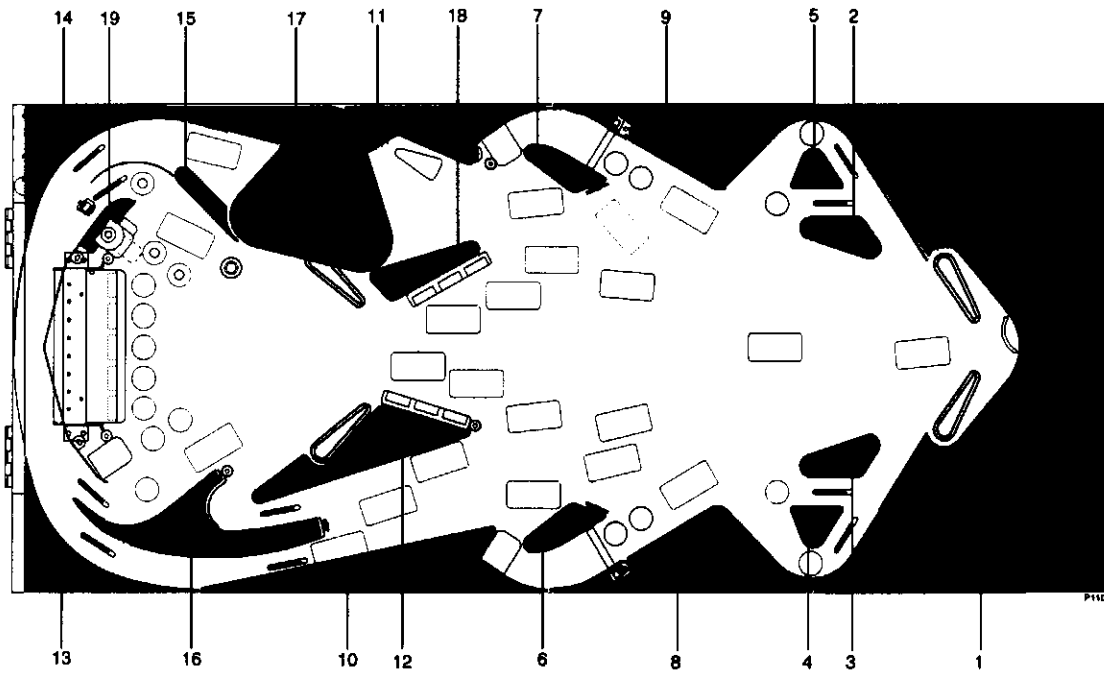
SM00235- (3/8" HEX)	
DASH #	"A"
-01	.544 +.01/-.00
-02	4.94 +.00/-.01
-03	2.68 +.01/-.00
-04	2.62 +.00/-.01
-05	2.50 +.00/-.01

SM00236- (3/8" HEX)	
DASH #	"A"
-01	3.85 +.01/-.00
-02	2.66 +.01/-.00



SM00237

PLAYFIELD PLASTICS



1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	

PLAYFIELD PLASTICS PARTS LIST

No.	Part Number	Description	Req.
1	AW00221-1	PLASTIC, ARCH	1
2	AW00221-2	PLASTIC, RIGHT LANE INNER DIVIDER	1
3	AW00221-3	PLASTIC, LEFT LANE INNER DIVIDER	1
4	AW00221-4	PLASTIC, LEFT LANE OUTER DIVIDER	1
5	AW00221-5	PLASTIC, RIGHT LANE OUTER DIVIDER	1
6	AW00221-6	PLASTIC, LEFT SPINNER	1
7	AW00221-7	PLASTIC, RIGHT SPINNER	1
8	AW00221-8	PLASTIC, LEFT SLINGSHOT	1
9	AW00221-9	PLASTIC, RIGHT SLINGSHOT	1
10	AW00221-10	PLASTIC, LOWER LEFT ORBIT	1
11	AW00221-11	PLASTIC, LOWER-RIGHT STAR BUMPER	1
12	AW00221-12	PLASTIC, LEFT 3-BANK	1
13	AW00221-13	PLASTIC, UPPER LEFT ORBIT	1
14	AW00221-14	PLASTIC, UPPER-RIGHT ORBIT	1
15	AW00221-15	PLASTIC, UPPER-LEFT STAR BUMPER	1
16	AW00221-16	PLASTIC, INNER LEFT ORBIT	1
17	AW00221-17	PLASTIC, STAR BUMPER COVER	1
18	AW00221-18	PLASTIC, RIGHT 3-BANK	1
19	AW00221-19	PLASTIC, RIGHT 5-BANK	1

SECTION 5

TROUBLESHOOTING GUIDE

TROUBLESHOOTING GUIDE

POWER-UP PROBLEMS

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Game Is Completely Dead -No Lights, No Sound, No Pushbuttons, No Display	Main Power Switch not set to ON position.	1. Set Main Power Switch to the ON position. (Switch located under cabinet near right front leg.)
	Broken Plug or Power Cord.	1. Inspect Cord and Plug for defects and repair or replace the entire cord set. 2. Check Plug for loose wires and tighten as required.
	No AC Power.	1. Connect Plug to AC power outlet. 2. Check building circuit breakers or fuses. 3. Check Power Transformer, Line Filter assemblies.
	Main Power Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check Power Transformer, Line Filter assemblies. (Fuse located inside cabinet near right front leg.)
	Low Voltage AC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check Low Voltage DC Power rectifiers. (Fuse located inside backbox on top circuit board.)
	Low Voltage DC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check Low Voltage DC Voltage Regulator.
	Low Voltage DC Wiring Harness unplugged or damaged.	1. Check Low Voltage DC Wiring Harness Connectors. 2. Test Low Voltage DC Wiring Harness for continuity.
Game set up for incorrect AC Line Voltage.	1. Check Power Transformer Line Voltage Wiring (Connector located near transformer in cabinet.)	
Game Accepts Currency Or Tokens, But Does Not Start.	Acceptor Mechanism not seated fully on its own mounting bracket.	1. Open Coin Door and check each Acceptor by hand to ensure proper mounting. Ensure that each of the release latches is in the closed and locked position. 2. Check for switch activation when known good token or currency is inserted into Acceptor. Adjust switch or carefully bend lever to improve alignment if necessary.
	Faulty or intermittent Coin Door Wiring Harness connections.	1. Open coin door to enter System Menu, then select <i>Standard Tests</i> and go to the <i>Switches</i> routine. Check each device independently to locate trouble. 2. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area.
Game Accepts Currency Or Tokens And Gives Players Instructions, But Does Not Produce A Ball To Begin Play.	High Voltage DC Power disabled.	1. Open coin door to enter System Menu, then select <i>Standard Tests</i> and go to <i>Voltage</i> to look for Check Interlock report. Pull out on switch actuator to reset. (Interlock Switch is located at left side of Coin Door.) 2. Switch damaged or broken. Replace Interlock Switch. (NOTE: The Switch routine will not test this switch!)
	High Voltage AC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check High Voltage DC Power rectifiers.
	High Voltage DC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check High Voltage DC Power filter capacitor.
	High Voltage DC Wiring Harness unplugged or damaged.	1. Check all High Voltage DC Power Wiring Connectors. 2. Check High Voltage DC Wiring Harness for continuity.

COIN DOOR PROBLEMS

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Game Will Not Start When Coins, Bills, Tokens, Etc. Are Inserted Into Acceptors.	Coin Door Wiring Harness unplugged or damaged.	1. Check Coin Door Wiring Harness Connectors. 2. Test Coin Door Wiring Harness for continuity.
	Acceptor Mechanism is jammed.	1. Open Coin Door, unlatch and remove Acceptor Mechanism, inspect and clear currency path as needed. 2. Object in cabinet blocking currency at Cash Box.
	Acceptor not level.	1. Repair or replace Coin Door if bent or damaged. 2. Adjust Game using internal Bubble Level.
	Cash Box filled to maximum capacity.	1. Check Cash Box for presence of counterfeit currency. 2. Remove currency from game more frequently.
	Acceptor Switch defective.	1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch activation does not change the Dead report then there is an electrical problem.
	Acceptor Assembly defective.	1. Clean and lubricate Acceptor Mechanism following specific manufacturer's detailed instructions. 2. Substitute known good Acceptor to verify that problem is not external to Acceptor.
Acceptor Mechanism Rejects Known Good Currency, Tokens, Etc.	Dirt or Debris in Acceptor Mechanism.	1. Open Coin Door, unlatch and remove Acceptor Mechanism, inspect and clear currency path as needed 2. Clean and lubricate Acceptor Mechanism following specific manufacturer's detailed instructions.
	Acceptor Mechanism out of adjustment.	1. Ensure that all removable parts are installed correctly and fully seated against the chassis of the Acceptor. 2. Clean and adjust Acceptor Mechanism following specific manufacturer's detailed instructions.
	Acceptor Mechanism defective.	1. Substitute known good unit to verify that problem is not external to Acceptor. 2. Repair or replace Acceptor assembly.
External Acceptor Indicators (Pricing, Flashing Arrows, Etc.) Not Illuminated.	No DC Power to indicator circuits.	1. Check Coin Door Wiring Connectors. 2. Test Coin Door Wiring Harness for continuity.
	Defective indicator lamp.	1. Go to System Menu and perform Lamp Test. 2. Substitute known good lamp to verify that problem is not external to Acceptor.
Acceptor Takes Known Good Currency But Game Will Not Start Or Continue.	Acceptor Switch out of adjustment.	1. Go to System Menu and perform Switch Test. 2. Clean and adjust Acceptor Switch following specific manufacturer's detailed instructions.
	Acceptor Switch defective.	1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch activation does not change the Dead report then there is an electrical problem. 2. Substitute known good switch to verify that problem is not external to Acceptor.

DOT MATRIX DISPLAY PROBLEMS

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Game Plays But Message Center (Dot Matrix Display) Is Completely Blank.	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
	Display Power Harness unplugged or damaged.	1. Check Display Power Wiring Harness Connectors. 2. Test Display Power Wiring Harness for continuity.
	Display Power AC Fuse defective.	1. Replace fuse with another of exact same type. 2. Check Display Power DC rectifiers, decoupling diode. (Fuse located inside backbox on top circuit board.)
	Display Board Assembly defective.	1. Check if any dot matrix display pixels are illuminated. 2. Inspect display glass for cracks, chips, darkened areas.
	Display Power Supply Board Assembly defective.	1. Test Display Power Supply diodes, transformer, caps. 2. Check Display Power Supply Switching Regulator IC.
Game Plays But Part Of Message Center Is Blank Or Illuminated All The Time.	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
	Display Board Assembly defective.	1. Inspect display glass for cracks, chips, darkened areas. 2. Check soldered connections between glass panel and printed circuit board, and resolder using minimum heat.
Random Patterns On Message Center (Some Images May Be Correct While Others Are Corrupted).	Incorrect Display Program.	1. Game or Image Memory IC installed in wrong order. 2. Music or Voice Memory IC installed on Processor Board Assembly (i.e., right chip, wrong socket). 3. Display or Game Memory IC defective. 4. Custom Control (FPGA) IC defective. 5. Microprocessor (MPU) IC defective.
	Display Board Assembly defective.	1. Open Coin Door to enter System Menu, then select Standard Tests and go to the Display routine. Check each pixel independently to locate trouble.
Checkerboard Pattern On Message Center (Display Never Changes).	No Display Program.	1. Game or Image Memory IC removed from socket. 2. Game or Image Memory IC defective.
Messages Appear Normal, Then Display Locks Up In The Same Place Every Time.	Corrupt Display Program.	1. Bent, broken, shorted pins on Memory IC. 2. Game or Image Memory IC defective.
Message Center Always In Game Menu And Troubleshooting Mode; Will Not Return To Game Play.	Coin Door open.	1. Close and lock Coin Door to go to normal game play.
	Mode Switch defective.	1. Switch Mounting Bracket bent, loose, or missing. 2. Mode Switch Wiring Harness may be faulty.
	Dirty or intermittent Mode circuit connection.	1. Check Mode Switch Wiring Harness Connectors. 2. Check Mode Switch Wiring Harness for continuity.
Game Will Not Retain Audit Information Or Custom Settings When Turned OFF. (An Error Message May Be Displayed).	Memory Back Up Battery or Memory IC defective.	1. Set Main Power Switch to the OFF position for one minute, then restore power to game. If RAM ERROR message appears, replace Processor Board Assembly. NOTE: The battery is integrated onto the Memory IC; it cannot be repaired or replaced separately.

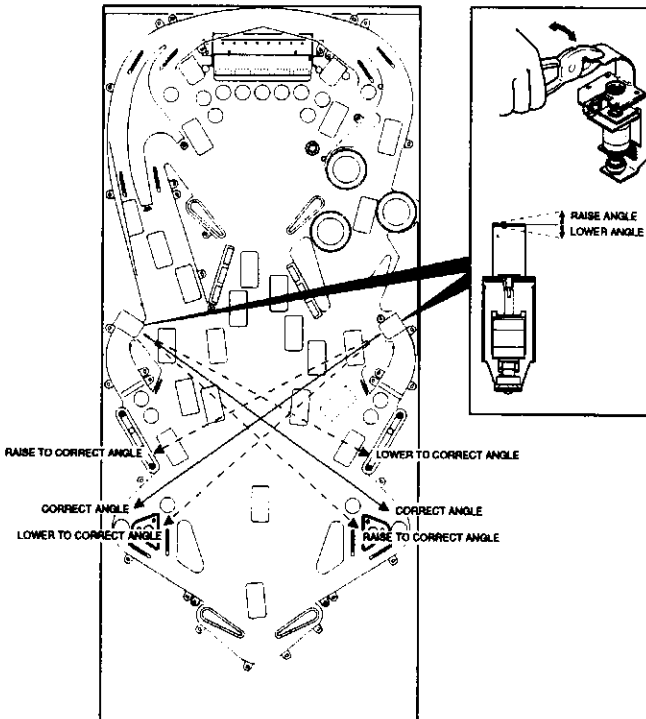
SOUND PROBLEMS

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Game Plays But No Sound Is Heard At Any Time.	Volume set to zero loudness.	1. Open Coin Door to enter System Menu, then select SET VOLUME from the menu and use Flipper Buttons to adjust the sound to a comfortable loudness.
	Loudspeaker Wiring Harness unplugged or damaged.	1. Check Loudspeaker Wiring Connectors. 2. Test Loudspeaker Wiring Harness for continuity.
	Audio Power AC Fuse defective.	1. Replace fuse with another of exact same type. 2. Check Audio Power DC rectifiers. (Fuse located inside backbox on right side circuit board.)
	Faulty Loudspeaker.	1. Test Loudspeaker for continuity. 2. Check Loudspeaker for voice coil binding.
	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
	Sound Board Assembly defective.	1. Verify that the Light Emitting Diodes are functional. 2. Check Spike Protection Diodes, Audio Amplifier IC.
Game Plays But Sound Is Limited To Hum (Low Frequency Buzzing Noise) From Loudspeaker.	Audio Power AC Fuse defective.	1. Replace fuse with another of exact same type. 2. Check Audio Power DC rectifiers, Filter Capacitors. (Fuse located inside backbox on right side circuit board.)
	Sound Board Assembly defective.	1. Check Audio Amplifier IC.
Weak Or Distorted Sound From Loudspeaker.	Faulty Loudspeaker.	1. Check Loudspeaker for torn paper, liquid spills, etc. 2. Inspect speaker housing for loose screws, dirt or debris.
	Dirty or intermittent audio connections.	1. Carefully unplug and reseat each loudspeaker wire. 2. Check Loudspeaker Wiring Harness for continuity.
Little Or No High Frequency (Treble), Muffled Or Distant Sound Quality.	Loudspeaker disconnected.	1. Check Loudspeaker Wiring Harness for continuity.
Little Or No Low Frequency (Bass), Weak Or Hollow Sound Quality.	Loudspeaker disconnected or wired out of phase.	1. Connectors are reversed. 2. Check Loudspeaker Wiring Harnesses for continuity.
Unintelligible Voice Messages, Strange Noises, Unrecognizable Music.	Incorrect Sound Program.	1. Music or Voice Memory ICs installed in wrong order. 2. Display or Game Memory ICs installed on audio board. 3. Defective Voice or Music Memory IC.
Continuous Medium Pitch Tone (Middle Frequency).	No Sound Program (1khz Self Test Tone is active).	1. Music or Voice Memory ICs removed from sockets. 2. Defective Music or Voice Memory IC.

PLAYFIELD PROBLEMS - MECHANICAL

SYMPTOM	PROBABLE CAUSE	PROBABLE SOLUTION
Game Plays But One Or More Balls Continually Stick In One Area Of The Playfield.	Build up of dirt or debris.	1. Clean the playfield to remove any spills or sticky substances. Check for depressions on playfield surface. 2. Replace cracked cabinet glass or other sources of leaks.
	Loose screws cause parts to shift out of alignment.	1. Reposition parts and retighten screws firmly. 2. Apply removable threadlocking adhesive to fasteners.
	Damaged or broken guides, troughs, forms, etc.	1. Cracked or deformed items should be replaced. 2. Broken joints may be brazed or welded as a repair.
	Binding trip lever on position detection switch.	1. Move wiring harness out of lever path. 2. Loosen mounting screws and adjust switch position. 3. Carefully bend trip lever to improve alignment. 4. Repair or replace detection switch.
	Insufficient solenoid force to eject ball from assembly.	1. Clean and lubricate assembly linkages, bearings, etc. 2. Ensure that correct solenoid return spring is installed. 3. Open Coin Door to enter System Menu, then select Standard Tests and go to Sol. Volts to look for Low Voltage report. Check Power Transformer Line Voltage Wiring. (Connector located near transformer in cabinet.) 4. Check playfield angle using a protractor or level.
Game Plays OK But Balls Hit Hard And Bounce Too Much.	Excessive solenoid force.	1. Rubber bumper button damaged or missing from one or more solenoid assemblies. 2. Ensure that correct solenoid return spring is installed. 3. Open Coin Door to enter System Menu, then select Standard Tests and go to Sol. Volts to look for Hi Voltage report. Check Power Transformer Line Voltage Wiring. (Connector located near transformer in cabinet.) 4. Check playfield angle using a protractor or level.
Premature Breakage Of Posts, Targets, Buttons, Or Other Plastic Parts.	Aftermarket replacement parts installed during previous game repair.	1. Use only new <i>factory</i> parts and assemblies for repairs. Other parts may fit and function but they will not last. 2. Fasteners tightened excessively, cracking parts during installation. Do not use too much force when tightening.
One Or More Balls Are Missing When The Game Is Started Or In Play	Mechanical part failure or poor alignment (ball dropped in cabinet, stuck somewhere on the playfield, etc.)	1. Game will automatically initiate its own "ball search" by cycling through each solenoid and motor assembly a few times to dislodge a ball stuck on the playfield. 2. After an unsuccessful attempt at freeing a missing ball, the game will resume operation with fewer balls. A game will continue with only one ball.
	Ball removed from game or placed in cabinet during service.	1. Locate missing ball in cabinet and return to playfield. Game will accept ball and return to normal operation. 2. Check your pockets!
Ball Trough Is Inoperative (Jams, Not Able To Eject A Ball For The Shooter, Etc.)	Binding trip lever on position detection switch.	1. Check harness for wires caught in lever path. Relocate wires so they can not get into switch lever path again. 2. Loosen mounting screws and adjust switch position. Carefully bend lever to improve alignment if necessary. 3. Repair or replace detection switch.
	Loose part caught in Ball Trough Assembly.	1. Remove Bottom Arch from playfield to expose the interior of the Ball Trough Assembly. Extract loose part and realign as necessary to restore proper operation. 2. Reinstall Bottom Arch and loose part onto playfield.

PLAYFIELD PROBLEMS - MECHANICAL (CONT.)

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
<p>Tilt Or Slam Switches Are Stuck, Causing Constant Game Tilt</p>	<p>An item in the cabinet is pressing against the switch, causing a false Tilt or Slam indication.</p>	<p>1. Open Coin Door to enter System Menu, then select Standard Tests and go to the Switches routine. Check each device independently to locate trouble. 2. Look for objects that can touch either switch when the Coin Door would be in its closed and locked position.</p>
	<p>Loose part caught in mechanism.</p>	<p>1. Check Tilt Switch Assembly for loose thumbscrew on weight or hookwire separated from hanger bracket. 2. Make sure that playfield bottom assemblies do not contact either switch. Realign and tighten fasteners.</p>
<p>Ball Is Ejected From Lower Saucer(s), But Does Not Make Outer Lane(s) On First Attempt.</p>	<p>Incorrect alignment of ball ejector "scoop"</p>	<p>1) For the lower left ejector, use a pair of pliers to adjust the angle of "scoop" by raising (clockwise twisting) or lowering (counterclockwise twisting) to obtain correct ball path. 2) For the lower right ejector, adjust angle of "scoop" by raising (counterclockwise twisting) or lowering (clockwise twisting) to obtain correct ball path.</p> 

PLAYFIELD PROBLEMS - SOLENOIDS

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
<p>Solenoids Firing Randomly, Sometimes Two At One Time.</p>	<p>Faulty or intermittent solenoid connections.</p>	<p>1. Open coin door to enter System Menu, then select Standard Tests and go to the Solenoids routine. Check each device independently to locate trouble. 2. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area. 3. Damaged or missing diodes on solenoid coils. 4. Test Communication Wiring Harness for continuity.</p>

PLAYFIELD PROBLEMS - SOLENOIDS (CONT.)

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
Solenoids Firing Randomly, Sometimes Two At One Time.	Driver Board Assembly defective.	1. Damaged or missing diodes on Driver Board Assembly. Repair or replace Driver Board Assembly.
Flippers Respond Too Slowly Or Do Not Reset Quickly.	Flipper Assembly binding or defective.	1. Clean and lubricate assembly linkages, bearings, etc. 2. Ensure that correct solenoid return spring is installed. 3. Open coin door to enter System Menu, then select Standard Tests and go to the Solenoids routine. Check each device independently to locate trouble.
None Of The Solenoids Work.	High Voltage DC Power disabled.	1. Open coin door to enter System Menu, then select Standard Tests and go to Voltage to look for Check Interlock report. Pull out on switch actuator to reset. (Interlock Switch is located at left side of Coin Door.) 2. Switch damaged or broken. Replace Interlock Switch. (NOTE: The Switch routine will not test this switch!)
	High Voltage AC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check High Voltage DC Power rectifiers.
	High Voltage DC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check High Voltage DC Power filter capacitor.
	High Voltage DC Wiring Harness unplugged or damaged.	1. Check all High Voltage DC Power Wiring Connectors. 2. Check High Voltage DC Wiring Harness for continuity.
None Of The Solenoids Work.	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
	Driver Board Assembly defective.	1. Check Low Voltage DC Power filter capacitor and coil.
Game Plays But A Small Group Of Solenoids Do Not Operate.	Solenoid Assembly Wiring Harness unplugged or damaged.	1. Check Solenoid Assembly Wiring Harness Connectors. 2. Test Solenoid Assembly Wiring Harnesses for continuity.
	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
One Or More Solenoids, Lamps, Or Motors Is Always On When Main Power Is ON.	Cross connection between two DC Voltage sources.	1. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area.
	Driver Board Assembly defective.	1. Check Smart Solid State Relays (Power IC devices).
Solenoids Repeatedly Burn Out.	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.

PLAYFIELD PROBLEMS - SWITCHES

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
Premature Failure Of A Few Switches, Causing Irregular Scoring Or Inability To Complete All Steps In Game.	Excessive solenoid force.	1. Use only new factory parts and assemblies for repairs. Other parts may fit and function but they will not last. 2. Fasteners tightened excessively, cracking parts during installation. Do not use too much force when tightening. 3. Open Coin Door to enter System Menu, then select Standard Tests and go to Sol. Volts to look for Hi Voltage report. Check Power Transformer Line Voltage Wiring. (Connector located near transformer in cabinet.) 4. Check playfield angle using built-in bubble level.

PLAYFIELD PROBLEMS - SWITCHES (CONT.)

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
Switches Firing Randomly, Sometimes Two At One Time.	Faulty or intermittent switch connections.	<ol style="list-style-type: none"> 1. Open coin door to enter System Menu, then select Standard Tests and go to the Switches routine. Check each device independently to locate trouble. 2. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area. 3. Test Communication Wiring Harness for continuity.
Too Many Or Not Enough Tilt Or Slam Detections.	Incorrect switch adjustment.	<ol style="list-style-type: none"> 1. Slam Switch caught on clothing or cash box and bent. Refer to Slam Switch Sensitivity Adjustment instructions. 2. Tilt Switch caught on wiring or aligned incorrectly. Refer to Tilt Switch Sensitivity Adjustment instructions.
A Standard Switch Has Not Been Activated In Several Games.	Players are concentrating on other shots or not skilled enough to activate switch.	1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch activation changes the report to OK then players are the cause of this condition.
	Switch defective.	1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch activation does not change the Dead report then there is an electrical problem.
An Optical Switch Has Not Been Activated In Several Games.	External light leakage is enough to prevent normal activation of switch.	<ol style="list-style-type: none"> 1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch path blockage changes the report to OK then leakage is the cause of this condition. 2. Check for missing light shields or misalignment.
	Switch defective.	<ol style="list-style-type: none"> 1. Open Coin Door to enter System Menu, then select Standard Tests and go to Switches to look for Dead reports. If manual switch activation does not change the Dead report then there is an electrical problem. 2. Ensure that Optodetector Board Assembly is oriented properly
	Faulty or intermittent switch connections.	<ol style="list-style-type: none"> 1. Open Coin Door to enter System Menu, then select Standard Tests and go to the Switches routine. Check each device independently to locate trouble. 2. Look for pinched or cut wires where harness touches moving parts. Repair or reroute wires away from area.
None Of The Switches Work.	Low Voltage DC Wiring Harness unplugged or damaged.	<ol style="list-style-type: none"> 1. Check Low Voltage DC Power Wiring Connectors. 2. Test Low Voltage DC Wiring Harness for continuity.
	System Communication failure.	<ol style="list-style-type: none"> 1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
	Switch Board Assembly defective.	<ol style="list-style-type: none"> 1. Check Low Voltage DC Power filter capacitor and coil. 2. Repair or replace Switch Board Assembly.
System Menu Is Not Displayed When Opening Coin Door.	Cabinet Switch Wiring Harness unplugged or damaged.	<ol style="list-style-type: none"> 1. Check Cabinet Switch Wiring Harness Connectors. 2. Test Cabinet Switch Wiring Harness for continuity.
	Switch defective.	<ol style="list-style-type: none"> 1. Temporarily jumper switch to get into System Menu. 2. Test System Menu Switch for continuity.
	Processor Board Assembly defective.	1. Check signal diodes for rectification and leakage.

PLAYFIELD & BACKBOX PROBLEMS - ILLUMINATION

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
Premature Burn Out Of Many Lamps (Bulbs May Or May Not Appear Excessively Bright).	Higher than normal line voltage or excessive temperature stresses bulbs.	1. Open coin door to enter System Menu, then select Standard Tests and go to Sol. Volts to look for Hi Line report. Check Power Transformer Line Voltage Wiring. (Connector located near transformer in cabinet.) 2. Move game away from sources of heat such as heat registers and high intensity lighting. Ensure that air flows freely around cabinet and backbox ventilation holes.
	Incorrect bulbs used as a replacement during a previous game repair.	1. Use only new factory parts and assemblies for repairs. Other parts may fit and function but they will not last.
Lamps Firing Randomly, Sometimes Two At One Time.	Faulty or intermittent lamp connections.	1. Open coin door to enter System Menu, then select Standard Tests and go to the Lamps routine. Check each device independently to locate trouble. NOTE: Some lamps are wired in pairs; refer to Lamp Matrix charts. 2. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area. 3. Damaged or missing diodes on lamp sockets. 4. Test Communication Wiring Harness for continuity.
	Driver Board Assembly defective.	1. Damaged or missing diodes on Driver Board Assembly. Repair or replace Driver Board Assembly.
	Medium Voltage DC Wiring Harness unplugged or damaged.	1. Check Medium Voltage DC Wiring Harness Connectors. 2. Test Medium Voltage DC Wiring Harness for continuity.
Game Plays But About Half Of The Lamps Are Not Illuminated.	Medium Voltage AC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check Medium Voltage DC Power rectifiers.
	Medium Voltage DC Fuse defective.	1. Replace fuse with another of the exact same type. 2. Check Medium Voltage DC Power filter capacitor.
Game Plays But A Small Group Of Lamps Are Not Illuminated.	Lamp Matrix Row or Column Wiring Harness unplugged or damaged.	1. Check Lamp Matrix Wiring Harness Connectors. 2. Test Lamp Matrix Wiring Harnesses for continuity.
	System Communication failure.	1. Check Communication Wiring Harness Connectors. 2. Test Communication Wiring Harness for continuity.
Game Plays But A Small Group Of Lamps Are Constantly Illuminated.	One Lamp Matrix Row or Column stuck ON (continuously powered).	1. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area.
	Driver Board Assembly defective.	1. Check Smart Solid State Relays (Power IC devices). 2. Check Field Effect Transistors (Power Transistors).
One Or More Lamps Very Dim But Still Illuminated.	Incorrect bulbs used as a replacement during a previous game repair.	1. Use only new factory parts and assemblies for repairs. Other parts may fit and function but they will not last.
	Blackened glass, weak or old bulb filament, etc.	1. Replace bulb with another of the exact same type. 2. Test lamp diode for rectification and leakage.
Several Lamps Illuminate When Only One Or Two Should Be On ("Phantom" Effect).	Lamp Matrix defective.	1. Open coin door to enter System Menu, then select Standard Tests and go to Lamps routine. Check each device independently to locate trouble. 2. Test lamp diode for rectification and leakage.
	Lamp Wiring Harness damaged.	1. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area.

PLAYFIELD & BACKBOX PROBLEMS - ILLUMINATION (CONT.)

SYMPTOM	PROBABLE CAUSE	POSSIBLE SOLUTION
One Or More Large Lamps ("Flashers") Are Constantly Illuminated.	Lamp Wiring Harness damaged.	1. Look for pinched or cut wires where harness touches moving parts. Repair and reroute wires away from area.
	Driver Board Assembly defective.	1. Check Field Effect Transistors (Power Transistors). 2. Test lamp diode for rectification and leakage.

SECTION 6

FACTORY/FIELD KIT INSTALLATION INSTRUCTIONS

**NOTE: THIS INSTRUCTION IS REPRINTED FROM TECHNICAL
SERVICE BULLETIN 95-015b**

DATE: APRIL 1, 1996
SUBJECT: COIN SWITCH ACTIVATED MECHANICAL COIN METER
TO: ALL DISTRIBUTORS
GAME: ALL PINBALL GAMES
AFFECTS S/N's: ALL SERIAL NUMBERS

NOTE: 95-015b SERVICE BULLETIN SUPERSEDES 95-015 AND 95-015a.

PARTS NEEDED:

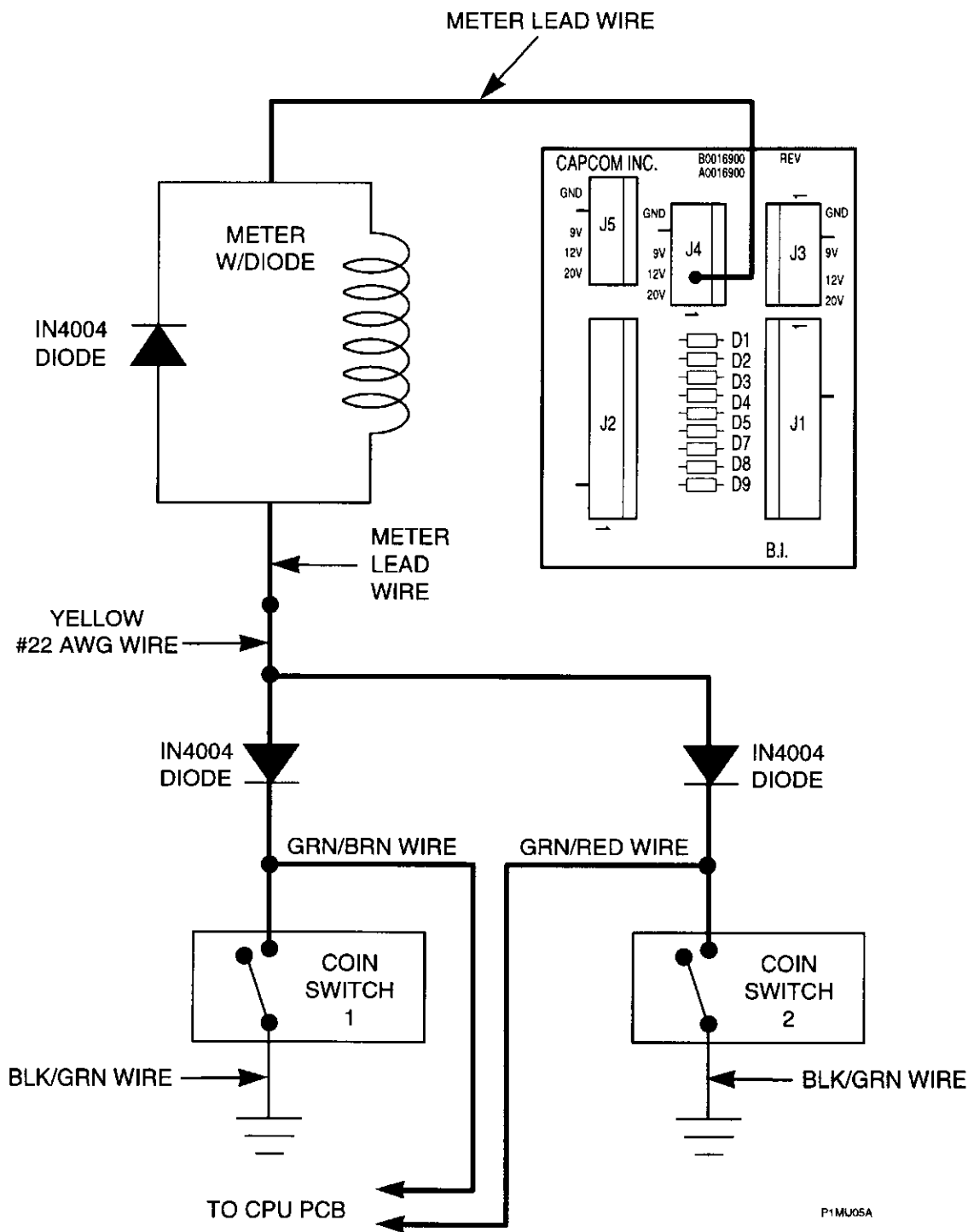
- 1 6-DIGIT, NON-RESETTABLE METER, CAPCOM P/N CT00100
RATED AT 12 VDC, WITH A 1N4004 CLAMPING DIODE
- 1 .156, 22 AWG, 5 PIN INSULATION DISPLACEMENT CONNECTOR
- 1 #22 AWG YELLOW WIRE, 48" LONG
- 2 1N4004 DIODE
- 15 CABLE TIES
- 3 1" PIECES OF HEAT SHRINK TUBING

TOOLS REQUIRED:

SOLDERING IRON
.156 IDC INSERTION TOOL
WIRE CUTTERS

INSTALLATION INSTRUCTIONS:

- * INSERT THE POSITIVE LEAD OF THE METER INTO PIN 2 OF A 5 PIN CONNECTOR. CONNECT THIS TO J4 OF THE DIODE PCB. THIS WILL SUPPLY YOUR +12VDC.
- * CONNECT THE OTHER SIDE OF THE METER TO THE 48" YELLOW WIRE. THIS IS DONE BY SOLDERING THE TWO WIRES TOGETHER. USE A PEACE OF HEAT SHRINK TUBING TO COVER THE SOLDER JOINT.
- * RUN THE WIRE WITH THE HARNESS WHICH IS LOCATED ON THE BOTTOM LEFT SIDE OF THE CABINET. USE CABLE TIES TO HOLD THE YELLOW WIRE TO THE EXISTING HARNESS. ROUTE THE WIRE UP TO THE COIN SWITCHES.
- * SOLDER THE CATHODE SIDE OF ONE OF THE 1N4004 DIODES TO THE NORMALLY OPEN LUG OF COIN SWITCH 1. REPEAT THIS STEP FOR COIN SWITCH 2.
- * SOLDER THE YELLOW WIRE TO THE ANODES OF THE DIODES JUST ATTACHED TO THE COIN SWITCHES. USE HEAT SHRINK TUBING TO COVER THE SOLDER JOINTS AT THE ANODES OF EACH DIODE.
- * MOUNT THE METER ON THE INSIDE OF THE LOWER CABINET, TO THE LEFT SIDE OF THE CASH BOX, ON THE WOOD PORTION JUST BEHIND THE CASH BOX.
- * SEE WIRING ILLUSTRATION ON page 2.



FUSE INFORMATION

LOCATION	COMPONENT	REF.	FUSE TYPE	CAPCOM® P/N
CABINET	POWER DRIVER BOARD	F1	SLO-BLO 7.0A 250V 3AG	FS00100-07
CABINET	POWER DRIVER BOARD	F2-F3	SLO-BLO 10.0A 250V 3AG	FS00100-10
CABINET	POWER DRIVER BOARD	F4-F6	SLO-BLO 3.0A 250V 3AG	FS00100-03
CABINET	POWER DRIVER BOARD	F7-10	SLO-BLO 4.0A 250V 3AG	FS00100-04
BACKBOX	SOUND BOARD	F14-F15	SLO-BLO 3.0A 250V 3AG	FS00100-03
*CABINET	LINE FUSE	-----	SLO-BLO 8.0A 250V 3AG	FS00100-08
**CABINET	LINE FUSE	-----	SLO-BLO 5.0 A 250V 3AG	FS00100-05

* NOTE: FOR GAMES CONFIGURED FOR 100V AC OR 115V AC SOURCE VOLTAGES.

** NOTE: FOR GAMES CONFIGURED FOR 200V AC, 215V AC, OR 230V AC SOURCE VOLTAGES.

QUICK REFERENCE GUIDE TO PROGRAMMED MEMORY

COMPONENT	DESIGNATOR	FUNCTION	CAPCOM® P/N
SOUND BOARD	U24 (40 PIN)	MICROCONTROLLER 87C52	A-00566-U24
SOUND BOARD	U28 (32 PIN)	MUSIC / SOUND / SPEECH	A-00729-U28
SOUND BOARD	U29 (32 PIN)	MUSIC / SOUND / SPEECH	A-00729-U29
SOUND BOARD	U30 (32 PIN)	MUSIC / SOUND / SPEECH	A-00729-U30
SOUND BOARD	U31 (32 PIN)	MUSIC / SOUND / SPEECH	A-00729-U31
CPU BOARD	U1H (32 PIN)	BOOT, IMAGES	A-00731-U1H
CPU BOARD	U1L (32 PIN)	BOOT, IMAGES	A-00731-U1L
CPU BOARD	U2H (32 PIN)	IMAGES FOR GAME	A-00731-U2H
CPU BOARD	U2L (32 PIN)	IMAGES FOR GAME	A-00731-U2L
CPU BOARD	U3H (32 PIN)	GAME, IMAGES	A-00731-U3H
CPU BOARD	U3L (32 PIN)	GAME, IMAGES	A-00731-U3L
CPU BOARD	U4H (32 PIN)	IMAGES	A-00731-U4H
CPU BOARD	U4L (32 PIN)	IMAGES	A-00731-U4L

LAMP MATRIX "A"

Column Row	Column 1 J7.1 YEL/BRN	Column 2 J7.2 YEL/RED	Column 3 J7.3 YEL/ORG	Column 4 J7.4 YEL/BLK	Column 5 J7.5 YEL/GRN	Column 6 J7.7 YEL/BLU	Column 7 J7.8 YEL/VIO	Column 8 J7.9 YEL/GRY
Row 1 J2.1 RED/BRN		(9) Unused	(17) Unused	(25) Unused	(33) Unused	(41) Unused	(49) Unused	(57) Unused
Row 2 J2.2 RED/BLK		(10) Unused	(18) Unused	(26) Unused	(34) Unused	(42) Unused	(50) Unused	(58) Unused
Row 3 J2.3 RED/ORG		(11) GI Left Upper 7	(19) Unused	(27) Unused	(35) Unused	(43) Unused	(51) Unused	(59) Unused
Row 4 J2.5 RED/YEL		(12) Unused	(20) Unused	(28) Unused	(36) Unused	(44) Unused	(52) Unused	(60) Unused
Row 5 J2.6 RED/GRN	(5) Unused	(13) Unused	(21) Unused	(29) Unused	(37) Unused	(45) Unused	(53) Unused	(61) Unused
Row 6 J2.7 RED/BLU	(6) Unused	(14) Unused	(22) Unused	(30) Unused	(38) Unused	(46) Unused	(54) Unused	(62) Unused
Row 7 J2.8 RED/VIO	(7) Unused	(15) Unused	(23) Unused	(31) Unused	(39) Unused	(47) Unused	(55) Unused	(63) Unused
Row 8 J2.9 RED/GRY	(8) Unused	(16) Unused	(24) Unused	(32) Unused	(40) Unused	(48) Unused	(56) Unused	(64) Unused

LAMP MATRIX "B"

Column Row	Column 1 J9.1 BLU/BRN	Column 2 J9.2 BLU/RED	Column 3 J9.3 BLU/ORG	Column 4 J9.4 BLU/YEL	Column 5 J9.5 BLU/GRN	Column 6 J9.6 BLU/BLK	Column 7 J9.8 BLU/VIO	Column 8 J9.9 BLU/GRY
Row 1 J4.1 ORG/BRN	(65) GI Right Upper 3-4	(73) Right Upper Eject Top	(81) Left Upper Eject Top	(89) Offense 8 Red	(97) Offense 6 Red	(105) Defense 4 White	(113) Right Upper Arrow	(121) Defense 8 Red
Row 2 J4.2 ORG/RED	(66) GI Upper 1-2	(74) Right Upper Eject Bottom	(82) Left Upper Eject Bottom	(90) Offense 8 White	(98) Offense 6 White	(106) Defense 4 Red	(114) Right Spinner Top	(122) Defense 8 White
Row 3 J4.4 ORG/BLK	(67) Defense 2 Red	(75) GI Right Drop 1-2	(83) Offense 10 Red	(91) Offense 5 Red	(99) Offense 9 Red	(107) Defense 6 Red	(115) Offense 2 Red	(123) Offense 3 Red
Row 4 J4.5 ORG/YEL	(68) Defense 2 White	(76) GI Right Lower 5-6	(84) Offense 10 White	(92) Offense 5 White	(100) Offense 9 White	(108) Defense 6 White	(116) Offense 2 White	(124) Offense 3 White
Row 5 J4.6 ORG/GRN	(69) Offense 9 Red	(77) Offense 7 Red	(85) GI Left Upper 5-6	(93) Defense 10 Red	(101) Defense 11 Red	(109) Defense 5 White	(117) GI Right Lower 3-4	(125) Offense 1 Red
Row 6 J4.7 ORG/BLU	(70) Offense 9 White	(78) Offense 7 White	(86) GI Left Upper 3-4	(94) Defense 10 White	(102) Defense 11 White	(110) Defense 5 Red	(118) GI Right 1-2	(126) Offense 1 White
Row 7 J4.8 ORG/VIO	(71) Left Spinner Top	(79) Offense 11 White	(87) Defense 3 Red	(95) GI Left Upper 1-2	(103) Offense 4 Red	(111) Defense 7 Red	(119) Rt. Spinner Bottom	(127) GI Right Lower 3-4
Row 8 J4.9 ORG/GRY	(72) Left Spinner Bottom	(80) Offense 11 Red	(88) Defames 3 White	(96) GI Left Upper 5-6	(104) Offense 4 White	(112) Defense 7 White	(120) GI Left Drop 1	(128) GI Right Lower 1-2

Cabinet

Playfield

NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FBI



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