New! Find-It-In-Front Dr. Pinball Section

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GOLDENEYE

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☆ NEW ☆ FIND-IT-IN-FRONT: DR. PINBALL SECTION ☆ NEW ☆

The key technical data from various parts of the manual was extracted and combined into the "Find-It-In-Front: Dr. Pinball Section." This new section will assist the technician in locating important technical information needed to troubleshoot the machine. To get into the **Portals™ Service Menu:**

Step 1
Enter the **Portals™ Service Menu** by pushing the **Black "BEGIN TEST" Button.**

Step 2
Move through the menus by pushing the **Red "LEFT"** or **Green "RIGHT" Buttons.**

Note: Pushing the **Left** or **Right Flipper Buttons** operates in the same way.

Step 3
Select or activate icons by pushing the **Black "ENTER" Button.**

Note: Pushing the **Start Button** operates in the same way.

IMPORTANT
Ensure the Playfield Power Interlock Switch (Located inside Coin Door Left) is pulled out. ***This is required for Coil and Flashlamp Testing.***

We are introducing in our **Portals™ Service Menu** a new icon and diagnostic aid called Dr. Pinball (Flow Chart Menus). This is a feature that will allow the operator/technician to utilize the power of the micro-processor assisting in troubleshooting a problem with the machine.

☆ ☆ ☆ ☆ HOW IT WORKS ☆ ☆ ☆ ☆

First, the operator/technician must enter the Service Mode (for a complete description of the **Portals™ Service Menu** and **ICONS** see Section 3, Chapter 1). To get into the Service Menu Mode: • Power-up game (if not already) & open the Coin Door. • On the Coin Door is the Portals™ Service Switch Set (**Red**, **Green** & **Black Buttons**). Push down the **Black "BEGIN TEST" Button**. Looking at the Video Display you will momentarily see the introductory screen "Service Menu" with a satellite flying from right to left pulling a banner "Portals™ © 1996 SEGA PINBALL, INC.," followed by the **MAIN MENU**.

While in the **MAIN MENU**, select the "DIAG" *Icon*, then select the Cross "DR." *Icon*. This will bring you (the operator / technician) into **DR. PINBALL** (Flow Chart Menus) which offers you a choice of four sub-menus: Flipper "DR.," Coil "DR.," Switch "DR." and Lamp "DR." *Icons*. Selecting a particular sub-menu will give you a choice of which specific Flipper, Coil, Switch or Lamp circuit needs to be diagnosed. The display will now ask a question or give a procedure to follow such as "Does the lamp turn on?" or "Check bridge rectifier BR-20, if short replace." When Dr. Pinball asks a question or request a procedure the Dr. will expect a response such as "no" or "yes" (see below examples of the mini-icons which will prompt the operator). You the operator/technician must respond by using your **Flipper Buttons** to "SELECT" a mini-icon and the **Start Button** to "ENTER" your selection.

Note:
The "Portals" service switches located on the coin door can also be used to select and enter mini-icons. In switch test this is required since flipper and start switches are part of the test.

From the Main Menu In Portals™ GO TO DIAGNOSTICS MENU →

From the Diagnostics Menu GO TO DR. PINBALL →

From the Dr. Pinball Menu GO TO FLIPPER, COIL, SWITCH OR LAMP FLOW CHARTS

The following are the mini-icons with explanations for the Dr. Pinball Sub-Menus:

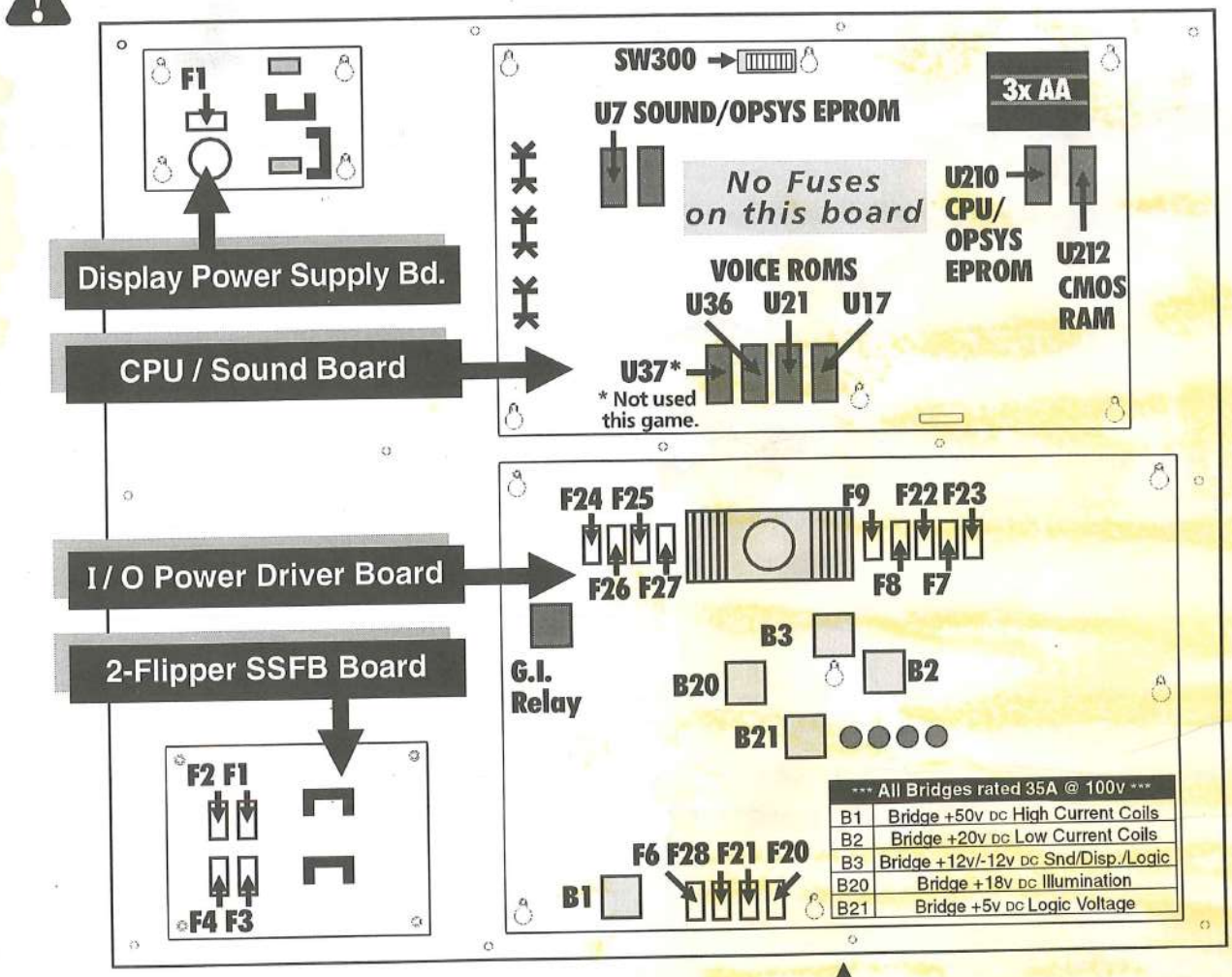
➦ Select a Coil, Lamp, Switch or Flipper to diagnose with "-" or "+" Icon; Then "RUN." ("QUIT" exits Portals completely.)

➦ Seen when question is being asked on the Display. "END" lets you select a new item to test; "PREV" goes back to previous question. (Help "?" is still under construction.)

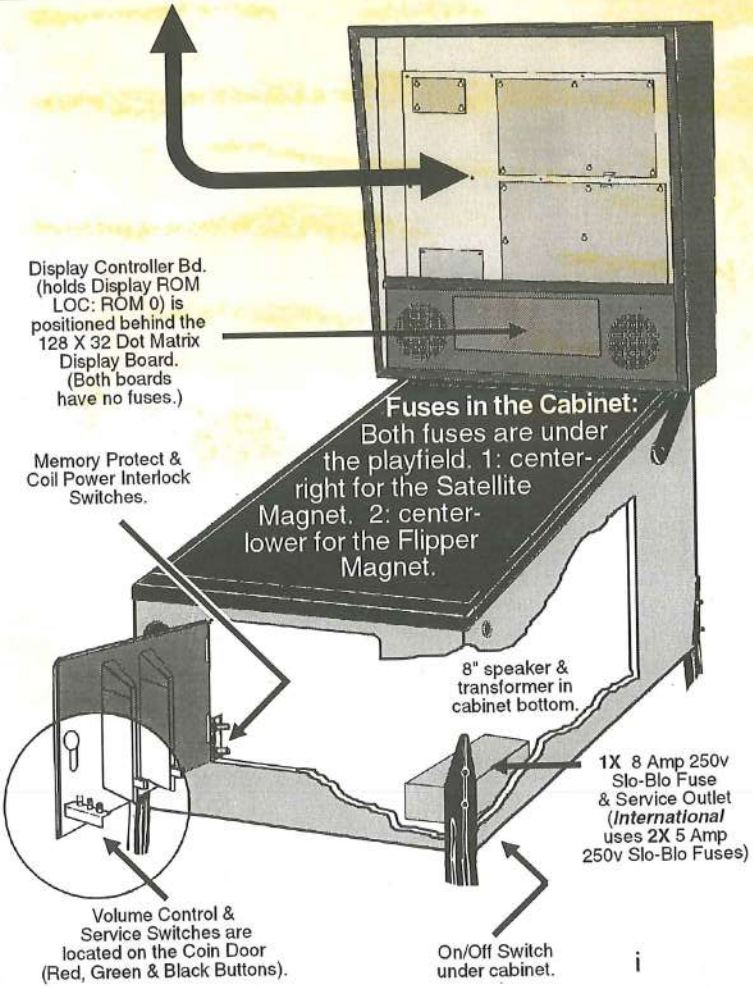
➦ Seen when diagnosis is given. "PREV" lets you go back.

➦ In Coil Flow Chart Menu, lets you pulse the coil. "NO," "YES," "END," "PREV," "QUIT" all work the same.

NEW BACKBOX LAYOUT, FUSE & RELAY LOCATIONS



QUICK REFERENCE FUSE CHART	
Backbox Fuses DISPLAY POWER SUPPLY BOARD	
F1	3/4A 250v Slo-Blo 90v DC High Voltage Display
2-FLIPPER SSFB BOARD	
F1	3A 250v Slo-Blo 50v DC Output (all fuses) Lower Right Flipper
F2	3A 250v Slo-Blo 9v AC Holding
F3	3A 250v Slo-Blo 50v DC Output Lower Left Flipper
F4	3A 250v Slo-Blo 9v AC Holding
I / O POWER DRIVER BOARD	
F6	7A 250v Slo-Blo 50v DC Primary High Power Coils & Flippers
F7	5A 250v Slo-Blo 20v DC Low Power Coils
F8	5A 250v Slo-Blo 12v DC Logic Power
F9	5A 250v Slo-Blo 12v DC Logic Power
F20	Not Used
F21	3A 250v Slo-Blo 50v DC Coils
F22	8A 250v Slo-Blo 18v DC Controlled Lamps
F23	4A 250v Slo-Blo 5v DC Logic
F24	5A 250v Slo-Blo 6.3v AC G.I. Lamp Insert Left
F25	5A 250v Slo-Blo 6.3v AC G.I. Lamp Lower Half Playfield
F26	5A 250v Slo-Blo 6.3v AC G.I. Lamp Insert Right & Coin Door
F27	5A 250v Slo-Blo 6.3v AC G.I. Lamp Upper Half Playfield
F28	3A 250v Slo-Blo 24v AC Special Relay/Motors (24v Motor)
Cabinet Fuses SERVICE (AC) OUTLET BOX (CABINET BOTTOM)	
Main Fuse Line: 1X 8A 250v Slo-Blo (Int'l) 2X 5A 250v Slo-Blo	
OTHER	
n/a	3A 250v Slo-Blo 50v DC Satellite Magnet
n/a	3A 250v Slo-Blo 50v DC Flipper Magnet



INSTALL ⑤ BALLS! GOLDENEYE is a ⑤-Ball Game!

✻ DIAGNOSTIC AIDS ✻

The *display reads* "OPERATOR ALERT..." — A message displayed during Game Mode or Power-Up to alert the operator of a problem.

OPERATOR ALERT works by monitoring any *switch activated coil* that has the potential to trap a ball when disabled (e.g. in the Auto Launch, Scoop, Eject, etc.). If this assembly has a closed switch indicating a ball is stuck or the switch is *stuck closed*, the **CPU Board** will activate the coil ten times. If the switch remains closed, the game will display a message indicating there is a problem (e.g. "**OPERATOR ALERT AUTOLAUNCH NOT WORKING**"). This not only warns the operator of a problem immediately, but indicates exactly where the operator should look to resolve it.

The *display flashes* "OPEN THE COIN DOOR" — This indicates that CMOS RAM memory (CPU Loc. U212) has been corrupted.

This is caused by either failure in memory (e.g. batteries are dead or faulty **RAM**) or upon installation of updated version of code. Opening the Coin Door will initiate a Factory Restore, by opening the Memory Protect Switch. Check battery voltage at **CMOS RAM** with power off.

CPU DIP SWITCH SETTINGS, LOC. SW300 CPU/SOUND BOARD

GOLDENEYE: CUSTOM FACTORY ADJUSTMENTS BY COUNTRY*

From the Main Menu In Portals™ GO TO DIAGNOSTICS MENU

From the Diagnostics Menu GO TO SWITCH MENU

From the Switch Menu GO TO DIP SWITCH TEST

*All countries not noted below use the "USA CPU Country Setting"

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
USA *	ON								
	OFF	●	●	●	●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
AUSTRIA	ON	●							
	OFF		●	●	●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
BELGIUM	ON		●						
	OFF	●		●	●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
CANADA	ON	●	●						
	OFF			●	●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
ENGLAND	ON	●		●					
	OFF		●		●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
FRANCE	ON		●	●					
	OFF	●			●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
GERMANY	ON	●	●	●					
	OFF				●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
HOLLAND (DUTCH) & NETHERLANDS	ON			●					
	OFF	●	●		●	●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
ITALY	ON				●				
	OFF	●	●	●		●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
JAPAN	ON	●			●				
	OFF		●	●		●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
NORWAY	ON		●		●				
	OFF	●		●		●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
SWEDEN	ON	●	●		●				
	OFF			●		●	●	●	●

CPU COUNTRY SETTING:	Pos.	1	2	3	4	5	6	7	8
SWITZERLAND	ON			●	●				
	OFF	●	●			●	●	●	●

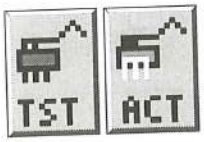
GOLDNEN EYE ROM (EPROM/MASKED) SUMMARY TABLE

I.C. NAME	TYPE	BOARD NAME	LOC.	PART №
Game ROM	1MB	CPU / Sound Board	U210	965-0214-42
Voice Masked ROM 1	4MB	CPU / Sound Board	U17	965-0215-42
Voice Masked ROM 2	4MB	CPU / Sound Board	U21	965-0216-42
Voice Masked ROM 3	Not Used	CPU / Sound Board	U36	Not Used
Voice Masked ROM 4	Not Used	CPU / Sound Board	U37	Not Used
Sound EPROM	512K	CPU / Sound Board	U7	965-0217-42
Display EPROM	4MB	Display Controller Bd.	ROM Ø	965-0218-42
Display EPROM	Not Used	Display Controller Bd.	ROM 3	Not Used

NEW!

From the Main Menu In Portals™ GO TO DIAGNOSTICS MENU

From the Diagnostics Menu GO TO SWITCH MENU



From the Switch Menu GO TO SWITCH OR ACTIVE SWITCH TEST

From the Switch Menu GO TO DEDICATED SWITCH TEST

SWITCH MATRIX GRID & DEDICATED SWITCHES

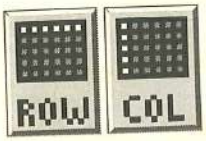
Column (Drive) / Row (Return)	1 Q1 GRN-BRN CN5-1	2 Q2 GRN-RED CN5-3	3 Q3 GRN-ORG CN5-4	4 Q4 GRN-YEL CN5-5	5 Q5 GRN-BLK CN5-6	6 Q6 GRN-BLU CN5-7	7 Q7 GRN-VIO CN5-8	8 Q8 GRN-GRY CN5-9
1 WHT-BRN CN7-9	PLUMB BOB TILT 1	GUN TRIGGER 9	RIGHT RAMP EXIT 17	4-BANK S-U BOT (BOTTOM) 25	2-BANK S-U BOT 33	LEFT TURBO BUMPER 41	LEFT RE-TURN LANE LOWER 49	LEFT OUTLANE 57
2 WHT-RED CN7-8	4TH COIN SLOT 2	5-BALL TROUGH #1 (LEFT) 10	CENTER RAMP EXIT 18	4-BANK S-U B/M (BOT. MID.) 26	2-BANK S-U TOP 34	BOTTOM TURBO BUMPER 42	SCOOP 50	RIGHT OUTLANE 58
3 WHT-ORG CN7-7	START BUTTON 3	5-BALL TROUGH #2 11	RIGHT RAMP ENTER 19	4-BANK S-U T/M (TOP MID.) 27	NOT USED 35	RIGHT TURBO BUMPER 43	RIGHT TOP LANE 51	LEFT RE-TURN LANE UPPER 59
4 WHT-YEL CN7-6	RIGHT COIN SLOT 4	5-BALL TROUGH #3 12	SATELLITE HOME 20	4-BANK S-U TOP 28	NOT USED 36	5-BANK S-U TOP 44	MIDDLE TOP LANE 52	RIGHT RETURN LANE 60
5 WHT-GRN CN7-5	CENTER COIN SLOT / DBA 5	5-BALL TROUGH #4 13	NOT USED 21	NOT USED 29	NOT USED 37	5-BANK S-U T/M (TOP MID.) 45	LEFT TOP LANE 53	LEFT SLINGSHOT 61
6 WHT-BLU CN7-3	LEFT COIN SLOT 6	5-BALL TROUGH #5 (RIGHT) 14	NOT USED 22	CENTER RAMP S-U LEFT 30	NOT USED 38	5-BANK S-U MID 46	CENTER RAMP ENTER 54	RIGHT SLINGSHOT 62
7 WHT-VIO CN7-2	SLAM TILT 7	5-BALL TROUGH VUK OPTO 15	SATELLITE MAGNET BOARD 23	CENTER RAMP S-U RIGHT 31	CENTER STAND-UP 39	5-BANK S-U B/M (BOT. MID.) 47	SHOOTER LANE EXIT 55	LT FLIPPER BUTTON VIA Q7 (ON SSFB) 63
8 WHT-GRY CN7-1	NOT USED 8	SHOOTER LANE 16	FLIPPER MAGNET BOARD 24	LEFT RAMP EXIT 32	LEFT RAMP ENTER 40	5-BANK S-U BOT (BOTTOM) 48	TANK KICK BIG 56	RT FLIPPER BUTTON VIA Q5 (ON SSFB) 64

GND / IC U206 INPUTS	Ground BLK CN6-1
1 GRY-BRN CN6-2	NOT USED DS-1
2 GRY-RED CN6-3	NOT USED DS-2
3 GRY-ORG CN6-4	NOT USED DS-3
4 GRY-YEL CN6-6	NOT USED DS-4
5 GRY-GRN CN6-7	NOT USED DS-5
6 GRY-BLU CN6-8	Normal: Volume In Test: Left RED BUTTON DS-6
7 GRY-VIO CN6-9	Normal: Service Credits In Test: Right GRN BUTTON DS-7
8 GRY-BLK CN6-10	Normal: Begin Test In Test: Enter BLK BUTTON DS-8

From the Diagnostics Menu GO TO LAMP MENU

From the Lamp Menu GO TO SINGLE LAMP TEST

From the Lamp Menu GO TO TEST ALL LAMPS



From the Lamp Menu GO TO ROW OR COLUMN TEST

LAMP MATRIX GRID

Column (18v) / Row (GND)	1: U10 YEL-BRN J13-9	2: U11 YEL-RED J13-8	3: U12 YEL-ORG J13-7	4: U13 YEL-BLK J13-6	5: U14 YEL-GRN J13-5	6: U15 YEL-BLU J13-4	7: U16 YEL-VIO J13-3	8: U17 YEL-GRY J13-1
1: Q33 RED-BRN J12-1	XENIA EXTRA BALL SQUEEZE #555 Bulb 1	SEND SPIKE (GRID) #555 Bulb 2	TRAIN/TANK CRASH #555 Bulb 3	NERVE GAS PLANT (GRID) #555 Bulb 4	SPELL GOLDENEYE #555 Bulb 5	Q'S PEN GRENADE #555 Bulb 6	SHOOT OUT (GRID) #555 Bulb 7	007 TOP LANES (GRID) #555 Bulb 8
2: Q34 RED-BLK J12-2	NOT USED 9	EJECT OR DIE (RIGHT) #44 Bulb 10	RIGHT RE-TURN LANE #555 Bulb 11	LEFT RE-TURN LANE #44 Bulb 12	SHOOT AGAIN #44 Bulb 13	SATELLITE (LIFT RAMP) #44 Bulb 14	GOLDENEYE (GRID) #44 Bulb 15	SATELLITE HURRY-UP #555 Bulb 16
3: Q35 RED-ORG J12-3	007 ENCOUNTER #44 Bulb 17	MYSTERY #44 Bulb 18	LEFT TURBO BUMPER #555 Bulb 19	RIGHT RAMP ARROW #555 Bulb 20	RIGHT RAMP SEND SPIKE #555 Bulb 21	RIGHT RAMP TRAIN&TANK #555 Bulb 22	DISARM PEN #555 Bulb 23	ARM PEN #555 Bulb 24
4: Q36 RED-YEL J12-4	CENTER RAMP S-U LEFT #555 Bulb 25	CENTER RAMP S-U RIGHT #555 Bulb 26	BOTTOM TURBO BUMPER #555 Bulb 27	EXTRA BALL #44 Bulb 28	EJECT BUTTON #44 Bulb 29	LEFT TOP LANE (**0**)07 #555 Bulb 30	MIDDLE TOP LANE 0(**0**)7 #555 Bulb 31	RIGHT TOP LANE 00(**7**) #555 Bulb 32
5: Q37 RED-GRN J12-5	EJECT OR DIE (LEFT) #44 Bulb 33	TANK MULTIBALL #555 Bulb 34	LEFT RAMP TRAIN&TANK #555 Bulb 35	LEFT RAMP SATELLITE #555 Bulb 36	NERVE GAS PLANT (RAMP) #555 Bulb 37	CTR. RAMP SEND SPIKE #555 Bulb 38	CTR. RAMP ARROW #555 Bulb 39	NOT USED 40
6: Q38 RED-BLU J12-6	RIGHT TURBO BUMPER #555 Bulb 41	SCOOP ARROW #44 Bulb 42	LEFT RAMP ARROW #555 Bulb 43	COLLECT BONUS #555 Bulb 44	4-BANK S-U TOP #555 Bulb 45	SHOOTOUT 4-BANK #555 Bulb 46	4-BANK S-U M/B #555 Bulb 47	4-BANK S-U BOT #555 Bulb 48
7: Q39 RED-VIO J12-8	HELICOPTER #555 Bulb 49	VIRTUAL LOCK LEFT #555 Bulb 50	VIRTUAL LOCK RIGHT #555 Bulb 51	5-BANK S-U BOT #555 Bulb 52	5-BANK S-U M/T #555 Bulb 53	5-BANK S-U MID #555 Bulb 54	INCREASE SATELLITE... #555 Bulb 55	5-BANK S-U TOP #555 Bulb 56
8: Q40 RED-GRY J12-9	START BUTTON #44 Bulb 57	BEHIND CEN-TER TARGET #44 Bulb 58	ABOVE CEN-TER TARGET #44 Bulb 59	LOCK 1 #555 Bulb 60	LOCK 2 #555 Bulb 61	RIGHT OUT-LANE SPECIAL #555 Bulb 62	LEFT OUT-LANE SPECIAL #44 Bulb 63	NOT USED 64
9: Q41 RED-WHT J12-10	100 MILLION #555 Bulb 65	75 MILLION #555 Bulb 66	50 MILLION #555 Bulb 67	25 MILLION #555 Bulb 68	HELICOPTER SPOTLIGHT #44 Bulb 69	NOT USED 70	NOT USED 71	GOLDEN-EY(**E**) #44 Bulb 72
10: Q42 RED J12-11	(**G**)OLDEN-EYE #44 Bulb 73	G(**O**)LDEN-EYE #44 Bulb 74	GO(**L**)DEN-EYE #44 Bulb 75	GOL(**D**)EN-EYE #44 Bulb 76	GOLD(**E**)N-EYE #44 Bulb 77	GOLDE(**N**)-EYE #44 Bulb 78	GOLDEN-(**E**)YE #44 Bulb 79	GOLDEN-E(**Y**)E #44 Bulb 80

From the Main Menu in Portals™ GO TO DIAGNOSTICS MENU

From the Diagnostics Menu GO TO COIL MENU

From the Coil Menu GO TO COIL TEST

From the Coil Menu GO TO CYCLING COILS

COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#1	TROUGH UP-KICKER	Q1	I/O Pwr. Drvr.	BRN-BLK	J8-P1	YEL-VIO	J10-P4/5	50v	24-940 090-5036-01
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v	24-940 090-5036-01
#3	NOT USED / SPARE	Q3	I/O Pwr. Drvr.		J8-P4				N/A
#4	SCOOP	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	YEL-VIO	J10-P4/5	50v	23-800 090-5001-01
#5	NOT USED / SPARE	Q5	I/O Pwr. Drvr.		J8-P6				N/A
#6	NOT USED / SPARE	Q6	I/O Pwr. Drvr.		J8-P7				N/A
#7	NOT USED / SPARE	Q7	I/O Pwr. Drvr.		J8-P8				N/A
#8	(EUROPEAN TOKEN DISPENSER)	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v	N/A

High Current Coils Group 2		Drive Trans-istor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#9	LEFT TURBO BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#10	BOTTOM TURBO BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#11	RIGHT TURBO BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#12	LEFT SLINGSHOT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#13	RIGHT SLINGSHOT	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#14	TANK KICK BIG	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	YEL-VIO	J10-P4/5	50v	23-800 090-5001-01
#15	LEFT FLIPPER ENABLE	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	GRY-YEL	SSFB CN2-P1/2	50v	22-1080 090-5032-00
#16	RIGHT FLIPPER ENABLE	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	BLU-YEL	SSFB CN2-P1/2	50v	22-1080 090-5032-00

Low Current Coils Group 1		Drive Trans-istor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#17	5-BALL TROUGH LOCK BALL	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v	25-1240 090-5034-00
#18	UP-DOWN RAMP	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v	27-1500 090-5004-00
#19	NOT USED / SPARE	Q19	I/O Pwr. Drvr.		J7-P4				N/A
#20	SATELLITE LAUNCH RAMP	Q20	I/O Pwr. Drvr.	VIO-YEL	J7-P6	BRN	J7-P1	20v	27-1500 090-5004-00
#21	SATELLITE MOTOR RELAY	Q21	I/O Pwr. Drvr.	VIO-GRN	J7-P7	BRN	J7-P1	20v	24V DC 10A DPDT
#22	TRAP DOOR	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v	27-1500 090-5004-00
#23	NOT USED / SPARE	Q23	I/O Pwr. Drvr.		J7-P9				N/A
#24	(OPTIONAL COIN METER)	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	BRN	J16-P7	5v	5v Meter (If required)

From the Main Menu in Portals™ GO TO DIAGNOSTICS MENU →

From the Diagnostics Menu GO TO COIL MENU →

From the Coil Menu GO TO COIL TEST →

From the Coil Menu GO TO CYCLING COILS

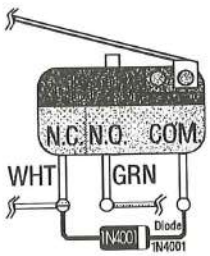
Coils Detailed Chart Table Continued

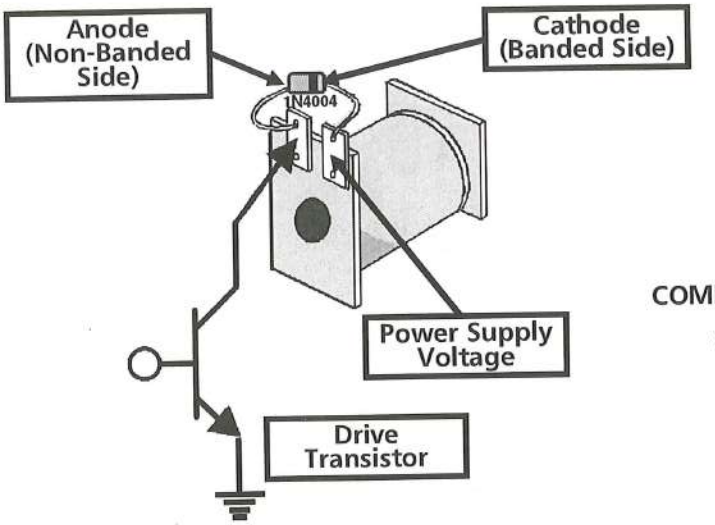
Flash Lamps (FLAMP)			Drive Transistor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Bulb Type
#1	Bottom L&R	X2	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#2	GOLDENEYE	X1	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X2								
#3	4-Bank	X2	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#4	Satellite	X2	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v	4X #89 165-5000-89
	Backbox Insert	X2								
#5	Lower Right Playfield	X2	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v	4X #89 165-5000-89
	Backbox Insert	X2								
#6	Backbox Insert	X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v	1X #89 165-5000-89
#7	Backpanel	X2	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#8	Upper Right Backpanel	X2	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	ORG	J6-P10	20v	4X #89 165-5000-89
	Backbox Insert	X1								

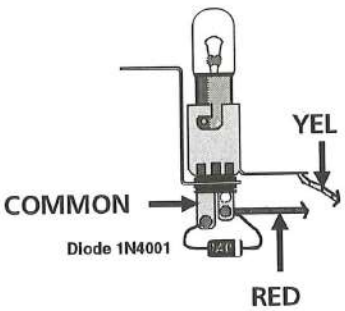
The following is not part of Coil Test but is included for additional information (See Magnet Tests in Sec. 3, Chp. 2):

Aux. Data Line			Driver Ouput Board LOC: Under Playfield	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
n/a	Satellite Magnet		Magnet Processor/ Driver Board	BLUE	J3-P1	YEL-VIO	J1-P1,-2	50v	22-600 090-5042-01
n/a	Flipper Magnet		Magnet Processor/ Driver Board	WHT-BRN	J2-P3	YEL-VIO	J1-P1, -2	50v	22-600 090-5042-01

TYPICAL SWITCH, COIL & LAMP WIRING







POWER REQUIREMENTS

This game ***must be connected to a properly grounded outlet to reduce shock hazard*** & insure proper game operation. See Sec. 5, Chp. 3, Cabinet Schematics & Troubleshooting (XFRMR Power Wiring Diagram), for transformer connections required for **Normal**, **High**, and **Low Line** conditions.

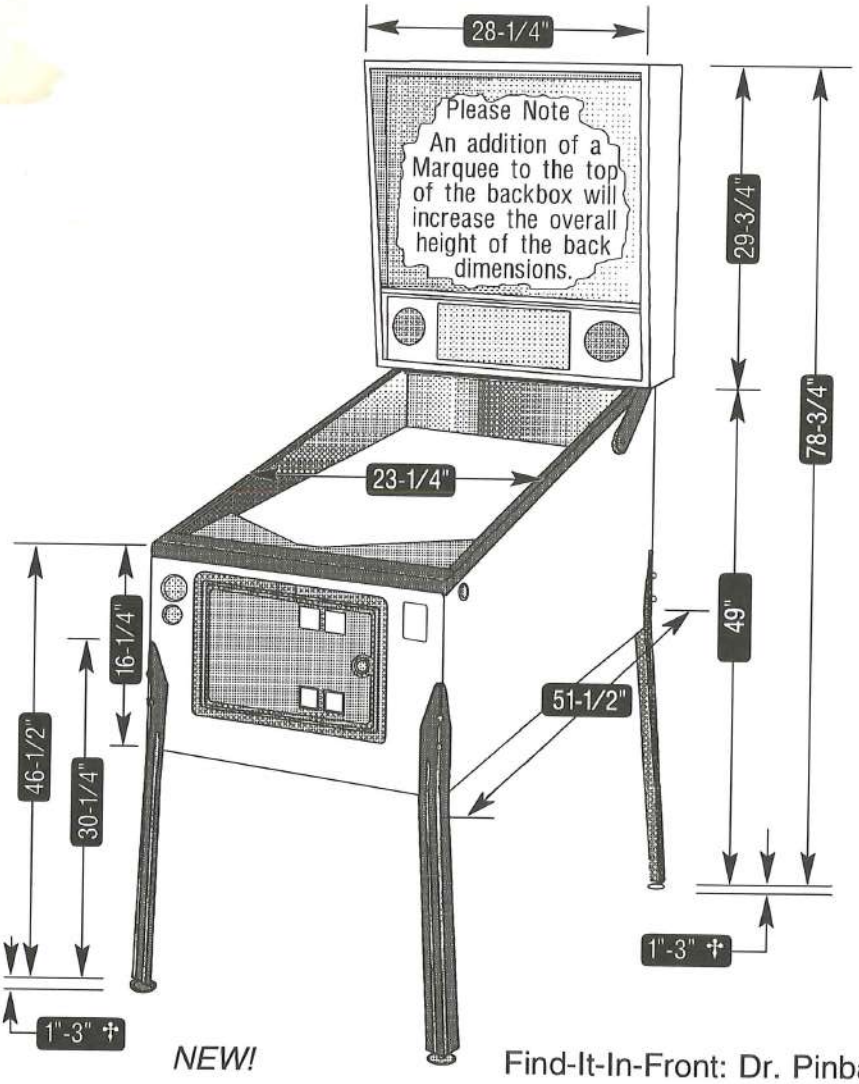
Normal Line:	**110v AC - 125v AC @ 60Hz**	
Domestic uses an 8AMP 250v Slo-Blo Fuse.	**AVG OPERATION**	**MAX OPERATION**
	CURRENT: **2.8AMP**	CURRENT: **8AMP**
	WATTAGE: **329W**	WATTAGE: **940W**
High Line:	**218v AC - 240v AC @ 50Hz**	
Export uses 2 X 5AMP 250v Slo-Blo Fuses. (*England & Hong Kong use an 8AMP 250v S/B Fuse.)	**AVG OPERATION**	**MAX OPERATION**
	CURRENT: **1.8AMP**	CURRENT: **5AMP** | **8AMP*** (England & Hong Kong use an 8A F.)
	WATTAGE: **412W**	WATTAGE: **1145W** | **1832W***
Low Line:	**95v AC - 108v AC @ 50Hz / 60Hz**	
Export Japan Only uses an 8AMP 250v Slo-Blo Fuse.	**AVG OPERATION**	**MAX OPERATION**
	CURRENT: **2.6AMP**	CURRENT: **8AMP**
	WATTAGE: **264W**	WATTAGE: **812W**

TRANSPORTATION

To reduce the possibility of damage, observe the following precautions whenever transporting the game. Lower the backbox and secure it to the cabinet. Remove the legs and secure the game within the transporting vehicle. Reference Section 1, Chapter 1, Game Set-Up for assembly (for disassembly reverse instruction order).

OVERALL DIMENSIONS †

Shipping Crate Dimensions	
Height:	55½"
Width:	30½"
Length:	31"
Weight:	250lbs. (+/- 10lbs.)



† **Note:** The Leg Levelers can add up to two (2) inches to the overall height of the front & back dimensions.

The cabinet is designed to give a 6.5° pitch with the Leg Levelers turned all the way in.

007 GOLDENEYE 007

Table of Contents

SEE SECTIONS 3 & 5, TABLE OF CONTENTS, FOR DETAILS OF THAT SECTION AND IT'S CHAPTERS.

in memory of
and dedicated to

Jack Bushell

Game Set-Up

Game Assembly Procedures

(Refer to the Illustrations on the inside front cover and pages ii & 2)

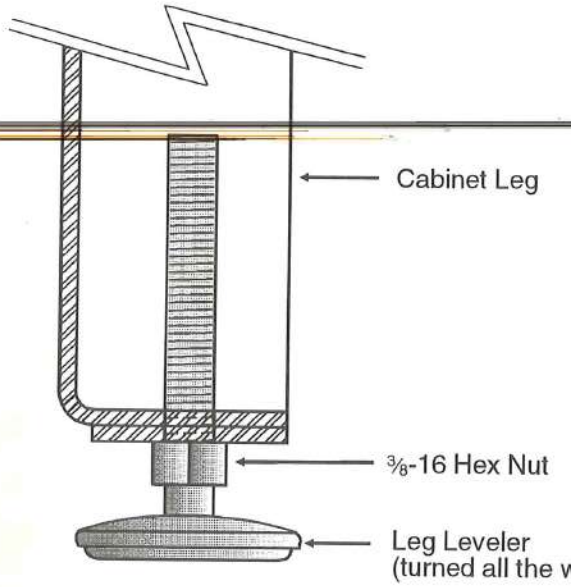
1. Open the top of the carton and lay it on its side with the bottom of the cabinet down. Using the plastic banding strip as a handle, slide the game out of the carton.
2. Remove all packing material. 4 cabinet legs & levelers (attached) are in the corner packing material of the crate. A large Allen Wrench (use for securing the backbox) is inserted and taped to the rear of the cabinet. Miscellaneous parts are in the cash box.
3. Support rear of cabinet and attach rear legs using two leg bolts for each leg.
4. Support front of cabinet and attach front legs using two leg bolts for each leg.
5. While assuring that no cables are being pinched, carefully raise the backbox and secure it in its upright position with the Allen Wrench in the hole in the back of the cabinet and rotating the wrench 270° (¾ turn).
6. Remove the backbox keys from the playfield glass, unlock and carefully remove the backglass. Set the backglass aside. Undo latch on the Backbox Light Insert and slowly swing open (can be removed).
7. Check all connectors in the backbox for loose wire terminations. Reseat any loose wire by pushing in on the terminal. Push on all connectors plugged into the CPU/Sound Board, I/O Power Driver Board, Display Power Supply Board, and 2- (or 3-) Solid State Flipper Board to check that they are properly seated.
8. Check that all fuses are seated properly.
9. Carefully remove the playfield glass and set it aside.
10. Remove all shipping tie downs, shipping blocks, packing foam, shipping instruction pages, etc. (if any). ***READ ALL PRINTED INFORMATION!*** Shipping instructions, labels and/or decals describe warnings, cautions, and/or important information specific to the game.
11. Raise the playfield and support it, by lifting the Stay Arm on the Right Side of the Cabinet and placing the notched end into the hole on the under playfield. See the illustration "Easy Access Service System" opposite this page.
12. Check all cabinet cables and playfield Lamp Boards connector terminations.
13. Remove the Plumb Bob tilt from the parts package and install on the pendulum wire on the inside left of the cabinet. See Section 4, Chapter 1, Parts Identification & Location.
14. Lower the playfield and ensure game is level side-to-side by adjusting Leg Levelers, if required. See the illustration "Leg Leveler Adjustment" opposite this page.
15. With the Leg Levelers turned all the way in, the game pitch is 6.5°; depending on the condition of the floor, adjust the Leg Levelers as required.

The playfield incline affects difficulty of play. Use the recommended incline; Game difficulty is best varied using game adjustments.

16. Check the plumb tilt and adjust as required.
17. If desired, perform any self tests at this time. See Section 3, Chapter 1, Portals™ Service Menu Introduction, and Chapter 2, Diagnostics, for instructions on how to enter "Begin Play Test" and "Game Specific" to test components on the game.
18. Slowly swing Backbox Light Insert closed and secure latch. Carefully reinstall and lock the backglass.
19. **INSTALL 5 BALLS** on the playfield near the outhole and carefully reinstall the playfield glass. (Amount of balls are always specified on decal attached to the lock down assembly.)
20. If desired, make Game Pricing (Standard and/or Custom) and Add-A-Ball, Novelty, or X-Ball Play adjustments at this time. See Section 3, Chapter 4, Adjustments, for instructions on how to enter adjustments. Follow instructions in the tables provided in the manual for suggestions of customizing changes.

Leg Leveler Adjustment

This cabinet is designed to automatically have a 6.5° pitch without any Leg Leveler adjustment!



STEP 1

Assemble all (4) legs and levelers as shown in the diagram. Be sure the leveler is turned all the way in.

STEP 2

Attach leg assemblies to cabinet with leg bolts provided.

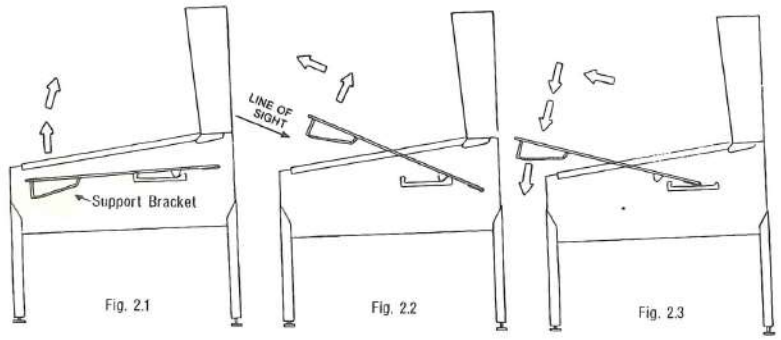
YOUR PLAYFIELD PITCH IS NOW AT 6.5° AS REQUIRED FOR PROPER GAME PLAY!

STEP 3

Verify 6.5° pitch. Minor adjustment(s) may be necessary depending on the location floor being level.

For custom adjustment greater than 6.5° can be acheived by turning out the rear leg leveler(s), however, it is not recommended.

Easy Access Service System

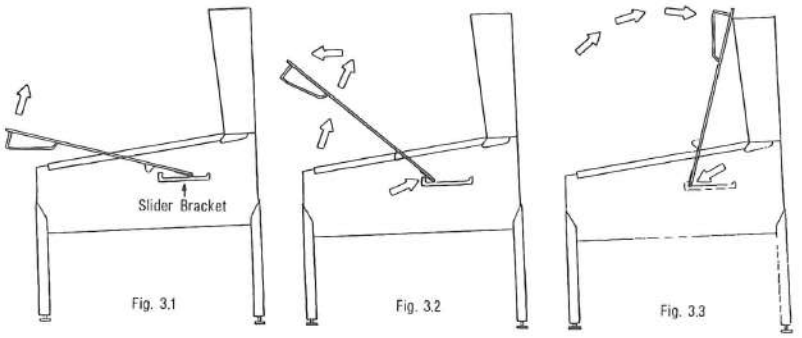


Service Position 1

This position is useful to service:

Trough Switches, Connectors at back of cabinet, Cleaning the Playfield, etc.

Lift the playfield ***using the left and right ball guides*** upward (Fig. 2.1) until the playfield support brackets can be seen to clear cabinet front (Fig. 2.2). At this time, pull playfield toward the front of the cabinet, checking that the mechanical components clears the cabinet front (Fig. 2.3). Then rest the playfield on the support brackets at the front channel of cabinet. ***Reverse procedure when service is complete.***



Service Position 2

This position is useful to service:

All Playfield Bottom Components, Cabinet Components, etc.

With the playfield at rest (Fig. 3.1), hold sides of playfield and pull toward the front of the cabinet (approx. 6" to 8"), until resistance is felt from the slider brackets located on either side of the cabinet (Fig. 3.2). At this time, swivel playfield toward the backbox, then rest on top edge of the backbox. ***Reverse procedure when service is complete.***

Game Operation & Features

Start of Game Features

Starting a Normal Game

Insert coin(s), the game generates a sound for the first coin & for each subsequent coin(s) with the display indicating the number of credit(s) posted. Press the **START BUTTON** and a start-up sound is produced, and the posted credit(s) are reduced by one. The display awaits choice from player 1 to select **REGULAR GAME** rules or **NOVICE GAME** rules with the *flipper buttons*. If the player *does not select rules*, the game will default to ***Regular Rules***. After selection (or time-out default to Regular Game) subsequent players can be added (**up to 6 can play!**) by pressing the **START BUTTON** before the end of ball 1. **Note 1:** The subsequent players will play the same game (Novice or Regular) determined by Player's 1 choice. **Note 2:** This feature can be adjusted with Adj. ##, Name of Adjustment. Default is **On**. Set to **Off** to turn off this feature.

The display now indicates the player or # of players selected from the total depressions of the **START BUTTON**. The display indicates the ball in play, and a ball is served to the *Shooter Lane*. An introduction is shown followed by Skill Shot Graphics. Pressing the **START BUTTON** after ball 1 of any player will start a new game (if credits are available), ***but only*** if the **START BUTTON** is depressed for 2-3 seconds. This delay is to avoid accidental "re-starts" of a game. (Note: Any ½ credit remaining during game play after the end of ball 1, or power down, will be eliminated.)

Starting Team Play (Doubles!)

Team Play is a four player game. The totals for players 1 & 3 (Team 1) and players 2 & 4 (Team 2) are displayed individually as well as the combined score for both teams. Team Play does not work with less than or more than 4 players. 1-, 2-, 3-, 5- & 6-Player games, the individual scores are shown.

Starting League/Tournmanent Play

After credit is posted, while holding in the **LEFT FLIPPER BUTTON**, press the **START BUTTON**. League Play has now begun. The differences between Normal Game Play and League/Tournament Play are: There is no "auto-percentaging" (awarding extra balls, specials, etc. to players with very low scores on the second or third ball). Mystery Features are awarded in a set order rather than random in Normal Game Play. Percentage Game Features are not automatically advanced as they are for the Regular Play Features.

Starting Pinball Wizard Play

After credit is posted, while holding in the **RIGHT FLIPPER BUTTON**, press the **START BUTTON**. Pinball Wizard Play has now begun. The same as League/Tournament Play, but ooooooh! so much gosh darn harder!

During Game Features

Video Mode

Our games feature elaborate video modes and video graphics. Don't forget to watch the display for hints or feature demonstrations. The video modes require the player to play on-screen. When in video mode, the ball-in-play is "held" (usually in a Scoop, Eject Saucer or lock of some sort). The interactive video play requires the player to use the flipper buttons to play the mode.

Feature Mode & Combination Shots

Features are lit on the playfield and started by completing certain play shots (e.g. completion of target banks, orbit(s), ramp(s) and/or any combination of the shots). Combination shots (combos) are a series of shots completed in many different variations. For example, a shot to the Ramp with the ball being returned to the Left Inlane then immediately shot to the Orbit of the playfield returning to a Flipper and then shot to another Ramp is a hard combo shot worthy of many points. These combinations vary per game. For feature modes & combos certain points or awards are given after completion. Watch the Video Display for feature details, etc.

Multiball

Multiball is started after completion of certain Feature Modes or may be a mode itself depending on game rules and play. Multiball may vary with the amount of balls used in Multiball depending on game style. Typically, if Multiball play was short, a "restart" option is given. Watch the Video Display for instructions on the restart.

Replay Feature

Replay awards are given as the player exceeds a High Score Level during game play. This can be adjusted with Adjustment 3, Replay Awards (Default=**CREDIT**, adjustable). Players exceeding the High Score Levels can receive a **CREDIT**, an **EXTRA BALL**, or **SPECIAL**. Adjust to **NONE** if a replay award is not desired.

End of Game Features

Game Endings

When all player(s) have played all balls (including any Extra Ball Buyin's), the game ends. If power is interupted during the course of a game, it will end that game (***see Starting a Normal Game***). Depending on the number of tilts set (Default=2, adjustable), or prolonged closure of the Plumb Bob Tilt Switch, tilts the ball in play. Closure of the Slam Tilt Switch on the coin door ends the current game(s).

Match Feature

At the end of each ball, earned bonuses are collected. At the end of the last ball of a game (including any extra balls, if applicable), earned bonuses are collected, then the system produces a random 2-digit number (a multiple of 10; 00 to 90). Matching the last two digits of the player's score with this number awards a credit. In Adj. 11, Match Percentage (Default=**7%**, adjustable) can be changed from 0-10%. Changing the percentage to **0%** displays the "Match Animation" at the end of the game, however, will never match (to award a credit). Changing this adjustment to **OFF** will not display the "Match Animation" nor award a credit.

Entering Initials

If player achieved a new high score in any of the 3 categories (Regular, Novice or Wizard), the player may enter his/her initials. To enter your initials, use the left & right flipper buttons to choose letter or character as seen on the Visual Display. Hitting the Start Button locks the letter or character in. Procede with the 2nd & 3rd letter. The game then proceeds into the game-over mode and then to the attract mode. A custom message (adjustable) can be displayed during the attract mode.

Manual Percentaging

This game is equipped with Manual Percentage Adjustment. As previously with our games, you can either set operator adjustments for a replay percent or you can set a fixed replay score. See Section 3, Chapter 4, Adjustments, Adjustment 1 & 2.

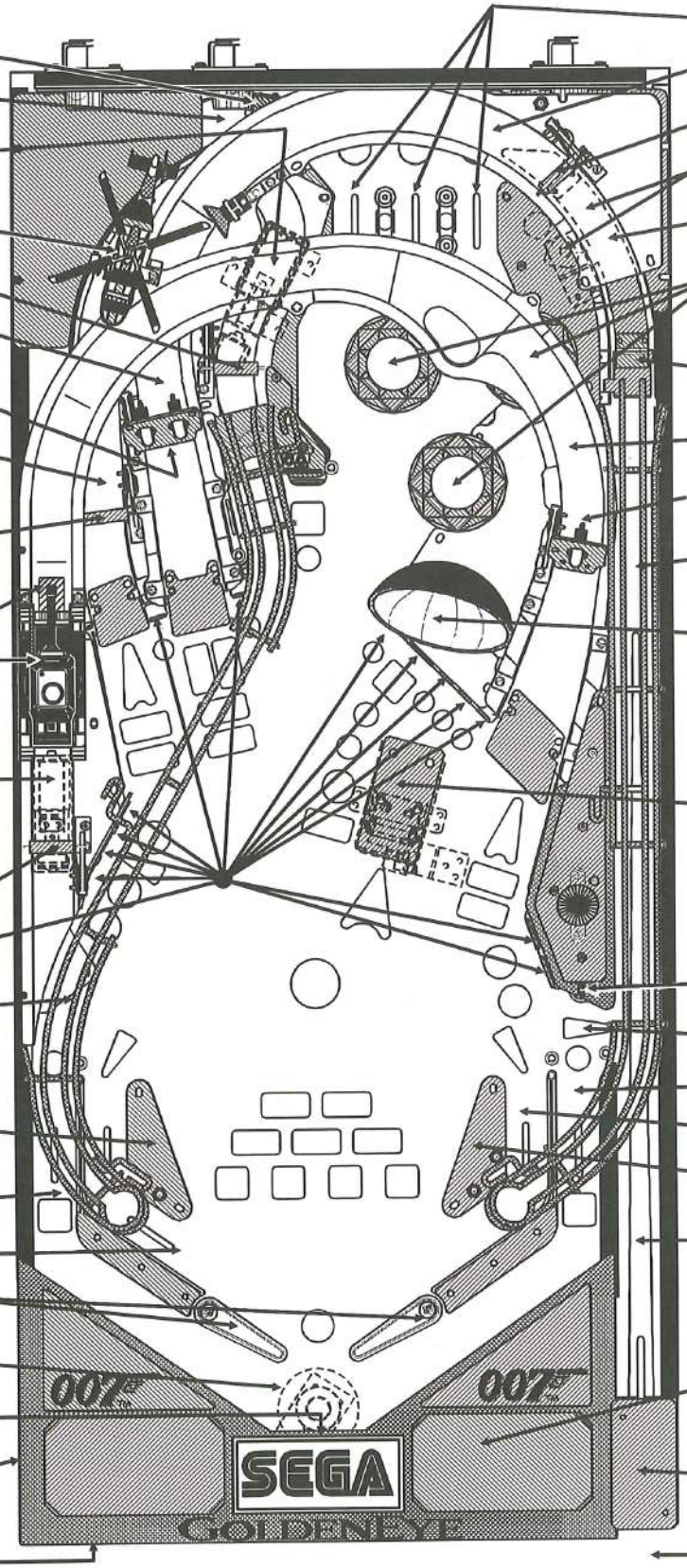
If you set operator adjustments for a particular replay percent, the game will compute a recommended score to keep the game at that replay percentage. If a change is recommended and the game coin door is opened, the display will indicate if the replay is too high or low and make a sound to alert the operator. By pressing the start button, the score to beat will be changed to a more correct level. If you close the coin door or enter the **Portals™ Service Menu**, no score change will be made.

You may choose to ignore the recommended change; for example, you may not think last week's players were the usual crowd. Just close the door and the message will disappear without altering the existing level. Or you may choose to make a different score to beat adjustment; this is done by utilizing Adj. 2, Replay Levels.

GOLDENEYE Game Rules

Overview

Below is the **GOLDENEYE** Playfield with all of its component locations indicated (for details on these parts, see Section 4). Read over the components below to help in understanding the effects of the game rules. The rules are numbered and divided into four groups: **Single Ball Play**, **Multiball & Jackpots**, **Grid Features**, and **Q's Game Rule Notes**.



1-Way Gate

Left Orbit

Power Scoop/Kick Big
Get to this scoop under the Left Ramp Exit.

Helicopter

Lt. Ramp Exit Sw. Gate

Center Enter Plastic Ramp

Center Ramp Entrance Gate

Left Enter Plastic Ramp

Lt. Ramp Entrance Sw. Gate

Tank & Trap Door

Tank Kick Big (after the ball drops through the trap door, the ball is shot into the left orbit)

Rt. Ramp Exit Sw. Gate

Stand-Up Targets

Left Ramp Exit Wire Ramp (to Left Return Lane)

Left Slingshot

Left Outlane

Left Return Lane

Left & Right Flippers

Flipper Magnet (Under Playfield between flippers)

Outhole (Center) Drain

Bottom Plastic Arch

Start (Credit) Button

Top Lanes (007)

Center Enter Plastic Ramp

Center Ramp Exit Switch

Up/Down Plunger & Ramp

Right Orbit (under above)

Pop Bumpers

Up/Down Ramp Exit Switch Gate

Right Enter Plastic Ramp

Right Ramp Entrance Gate

Center Ramp Exit Wire Ramp (to Right Return Lane)

Satellite Dish & Magnet and Motor

Satellite Launch Ramp and Plunger

Adjustable Post

"Sneak-In" Shooter Lane

Right Outlane

Right Return Lane

Right Slingshot

Shooter Lane (ball is shot by gun into the Right Orbit under the Wire Ramp & Up/Down Ramp to Top Lanes.

5-Ball Trough, Lock Ball and Trough VUK (Under the arch)

Auto Launch (Under the arch)

Gun (Not Shown)

GOLDENEYE Game Rules

Instruction Card

Below is a copy of the game instruction card which is included with every game. If this card is lost or damaged, simply copy this page and cut out the instruction card as a temporary replacement until a new card is ordered. (Suggestion: Copy & cut along the dotted line and fold in the center. This will keep the "copy" sturdy.)

Copy & Cut

Pierce Brosnan as 007 | Sean Bean as 006 | Izabella Scorupco as Natalya | Famke Janssen as Xenia | Gottfried John as Ourumov

Alan Cummings as Boris | Desmond Llewelyn as Q | Robbie Coltraine as Valentine | Samantha Bond as Moneypenny | Judy Dench as M

Fold — Fold

GOLDENEYE

SATELLITE MULTIBALL: Shoot center target to light locks at center ramp. After scoring two locks, shoot left ramp to raise satellite ramp - then shoot the satellite dish for 5 Ball Multiball.

TANK MULTIBALL: Shooting center target after two locks, lights the right ramp for 3 Ball Multiball.

007 ENCOUNTERS: Shoot center hole when lit to start flashing feature.

BEGINNERS' GUIDE TO SEGA PINBALLS:

- SELECT NOVICE RULES FOR GUARANTEED PLAY TIME.
- TO SCORE MORE, SHOOT WHAT'S FLASHING!
- PLAY MULTIBALL AS OFTEN AS POSSIBLE!
- GLANCE AT DOT DISPLAY DURING GAME!

 755-5142-00

The remainder of this chapter are the detailed GOLDENEYE Game Rules. Please read through for a better understanding of the operation of this game. Some game rules, point values and/or features may change as production continues. The changes, if any, will be describe in manual addendums, if warranted. Please note, that some adjustments (see Section 3, Chapter 4, Adjustments) are designed to customize game play, (i.e. making it harder or easier as players get more familiar with the game).

Code revisions and updates may change as production continues. Code updates will be made available to distributors via ROM, diskette or modem. Changes, if any, will be described with the code updates. See the end of this manual for "Appendix A - Pinball Game Firmware Table," for the latest revision code for all games prior to this game.

See the end of this manual for "Glossary of Terms," for words or acronymns you may not understand. If an acronym or expression is not in this glossary, please call our Technical Support Department, so we may add it in the next game manual. Any other suggestions or comments are always welcome!

001 GAME RULES SELECT:

Select **REGULAR GAME** rules or **NOVICE GAME** rules with the *flipper buttons*. If the player *does not select rules*, the game will default to ***Regular Rules***. *(Note: Subsequent players will play the game style chosen by player 1.)*

NOVICE GAME rules give the player a guaranteed minimum game time - ***if the ball drains before this time is up, it will be returned to the player***. When the ball drains after time is up, the game ends.

002 TOP LANES:

Complete the *Top Lanes* **0 0 7** to advance bonus multiplier. Completing the Top Lanes also awards the "*007 Top Lanes*" lamp in the grid (see Rule 016F).

003 GUN TARGETS AND SHOOTOUT:

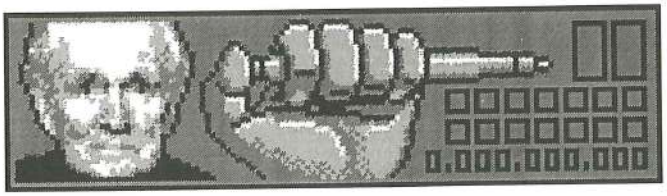
Completing the three **Blue Gun Targets** (*left 4-Bank*) lights the **Yellow Target** in the *left 4-Bank* for **Shootout Video Mode**. When the lit **Yellow Target** is hit, the player must grab the gun and shoot the soldiers in the *Video Display*. Sucessful completion of the *Shootout* awards the "*Shootout*" lamp in the grid (see Rule 016F) and lights **EJECT OR DIE** (see the next rule) at outlanes.

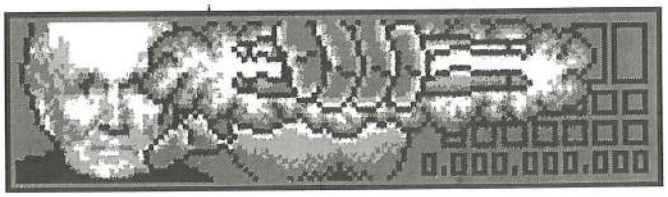
004 EJECT OR DIE:

When the *Outlanes* are lit for **EJECT OR DIE** and the *Outlane Switch* is scored, the ball is grabbed by the *Flipper Magnet* and thrown back into play! The player has a small amount of time to shoot the **Center "*Eject Button*" Target**. If the player shoots the *target* before time runs out, 20M is awarded. If time runs out before the *target* is shot, the ball ends (this is an operator adjustable feature, see Section 3, Chapter 4).

005 GUARD TARGETS:

Completing the 6 **Guard Targets** (4 in *Right 5-Bank* + 2 *Ramp Stand-Up Targets*) gives the value shown below the "*Increase Satellite Value*" **Target** (*Square White Stand-Up in Right 5-Bank*). Hitting that *target* cycles the *Guard Bank Value* from 25M -> 50M -> 75M -> 100M -> 25M -> et cetera.





006 ARM PEN/ DISARM PEN:

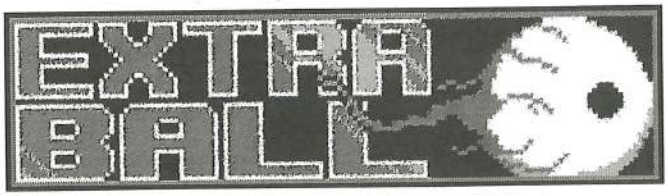
Shooting the *Right 2-Bank* 3 times when **"ARM PEN"** is lit starts the **"*Q PEN GRENADE*" Feature**. Shooting the *Right 2-Bank* three more times while **"DISARM PEN"** is lit awards the **"Q'S PEN GRENADE" Lamp** in the grid (see Rule 016F).

007 RAMP FEATURES:

Shooting *Ramps* and *Ramp Combos* award the player letters in **G-O-L-D-E-N-E-Y-E** (lamps below DMD). When completed, a *3-Way Hurry-Up* starts, with each *Ramp* at 50M and counting down. If all three *Ramps* are completed before time runs out, there is a short amount of time to shoot the **Satellite Dish** to double the *Hurry-Up* points. Completing **G-O-L-D-E-N-E-Y-E** also awards the **"*Spell Goldeneye*" Lamp** in the grid (see Rule 016F).

008 MYSTERY AWARD:

During *Single Ball Play* the **Right Inlane** lights the **Ball Eject (Scoop)** for a *Mystery Award*. Awards include points, *Extra Balls*, *Special Lit*, and *Multiball*.



009 EXTRA BALL:

Shoot **Center Target** when ***"EXTRA BALL"*** is flashing to earn an **Extra Ball**. **EXTRA BALL** is lit during • **XENIA EXTRA BALL SQUEEZE**, from • **MYSTERY**, and • **VIA PERCENTAGING**.

010 OUTLANES SPECIAL :

Lit **Outlanes** score a ***Special***. A ***Special*** is lit from • **MYSTERY** or • **VIA PERCENTAGING**.

MULTIBALL & JACKPOTS

011 GETTING TO MULTIBALL READY:

For **MULTIBALL READY** one must score two **Virtual Locks**. When flashing, the ***Center Target*** will light the **Center Ramp** for a *Lock*, and the **Center Ramp** will then collect *Locks*. Subsequent **Multiballs** may require hitting the ***Center Target*** multiple times to light one *Lock*.

012 STARTING MULTIBALL:

See Rules 012A, Satellite Multiball Start, 012B, Tank Multiball Start and 012C, Multiball Restart, for the different ways Multiball is started.

012 A SATELLITE MULTIBALL START:

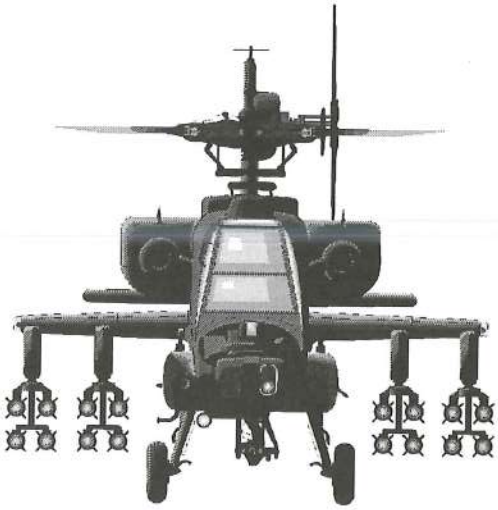
When **SATELLITE MULTIBALL** is ready, shots to the *Left Ramp* raise the *Satellite Up/Down Ramp* when the ball hits the *Lower Left Inlane Switch*. If the player sucessfully shoots the *Satellite* (ball captured by magnet), four balls will be ejected from the trough while the captured ball remains on the magnet in the *Satellite*.

012 B TANK MULTIBALL START:

When **SATELLITE MULTIBALL** is ready, hitting the *Center target* once will light the *Right Ramp* for **TANK MULTIBALL**. Shooting the *Center Target* a second time will also light the **Ball Eject** for **TANK MULTIBALL** via **MYSTERY**. **TANK MULTIBALL** is a **3-Ball Multiball**. **TANK MULTIBALL** may be **ABORTED** by pulling the **Gun Trigger** during **Tank Multiball Start**.

012 C MULTIBALL RESTART:

If the player scores **NO *Jackpots*** during **Multiball**, the player may ***Restart Multiball*** by shooting the *Right Ramp* before time runs out. If **Multiball** is restarted, the player gets a **2-Ball TANK MULTIBALL**.



013 REGULAR MULTIBALL JACKPOTS

At the beginning of **TANK MULTIBALL** and **SATELLITE MULTIBALL**, the three *Ramps* and the *Ball Eject* are lit for **Jackpots** (*Flashing Arrows*). If none of the **Guard Targets** are struck, the *Jackpot Value* is 10M. The first **Guard Target** hit advances the *Jackpot Value* to 25M. Subsequent hits cycle the *Jackpot Value* from 25M -> 50M -> 75M ->100M ->25M -> et cetera. In **TANK MULTIBALL** only the *Jackpot Value* is reset to 25M after **Jackpot** is scored.

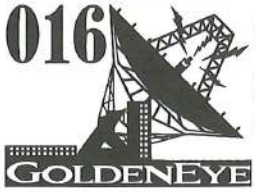
014 SATELLITE JACKPOT/ CAPTURED BALL:

In **SATELLITE MULTIBALL** 4-Balls are ejected from the trough while 1-Ball remains on the **Satellite**. If 3 of the 4-Balls drain before the 4 *Multiball Jackpots* are scored, the ball is released from the **Satellite** and the player continues to play **Multiball**. If the player scores all four **Jackpots** before 3 of the 4-Balls drain, shooting the *Left* or *Right Ramp* will raise the *Satellite Up/Down Ramp*. Knocking the *Captured Ball* off the **Satellite** then awards a **SATELLITE JACKPOT**. If this **Jackpot** is scored, **Super Jackpot** is then lit. If the player fails to score this **Jackpot** and drains one ball, the *Captured Ball* is released and **Super Jackpot** is then lit.

015 SUPER JACKPOT:

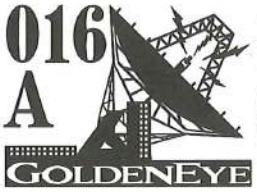
After a **SATELLITE JACKPOT**, one ball draining during ***Satellite jackpot Ready***, or completing four **Jackpots** in **TANK MULTIBALL**, a ***Roving Super Jackpot*** is lit. This **Jackpot** moves between the three *Ramps* and the *Ball Eject*. If this **Jackpot** is scored then **Multiball** starts over with 4 **Regular Jackpots** ready to be scored.

GRID FEATURES



007 ENCOUNTER

Shooting the **Scoop** when lit starts one of 5 **007 Encounters**.



XENIA EXTRA BALL SQUEEZE:

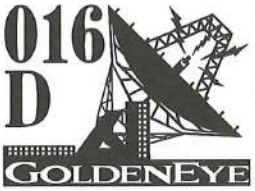
Shoot the *Center Target* before time runs out to earn an **Extra Ball**.

SATELLITE HURRY-UP:

Shoot the **Satellite** to score a *Hurry-Up Value* before it reaches a set minimum value. Shoot the *Left* or *Right Ramps* to raises the *Satellite Up/Down Ramp* for a shot at the **Satellite Dish.**

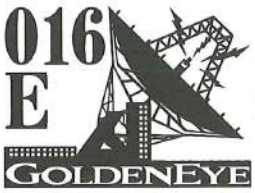
NERVE GAS PLANT:

Complete the six **Guard Targets** then shoot the *Center Ramp* to escape.



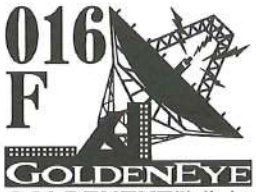
TRAIN/TANK CRASH:

2-Ball Multiball - shoot flashing *Ramp* (alternates between *Left Ramp* and *Right Ramp*) for **Jackpots**.



SEND SPIKE:

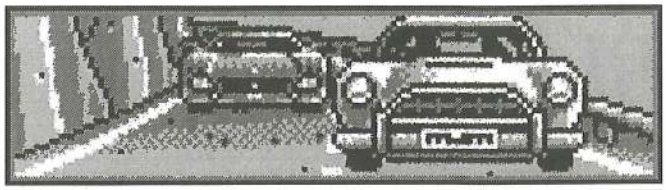
Shoot 6 *Center* or *Right Ramps* to complete feature.

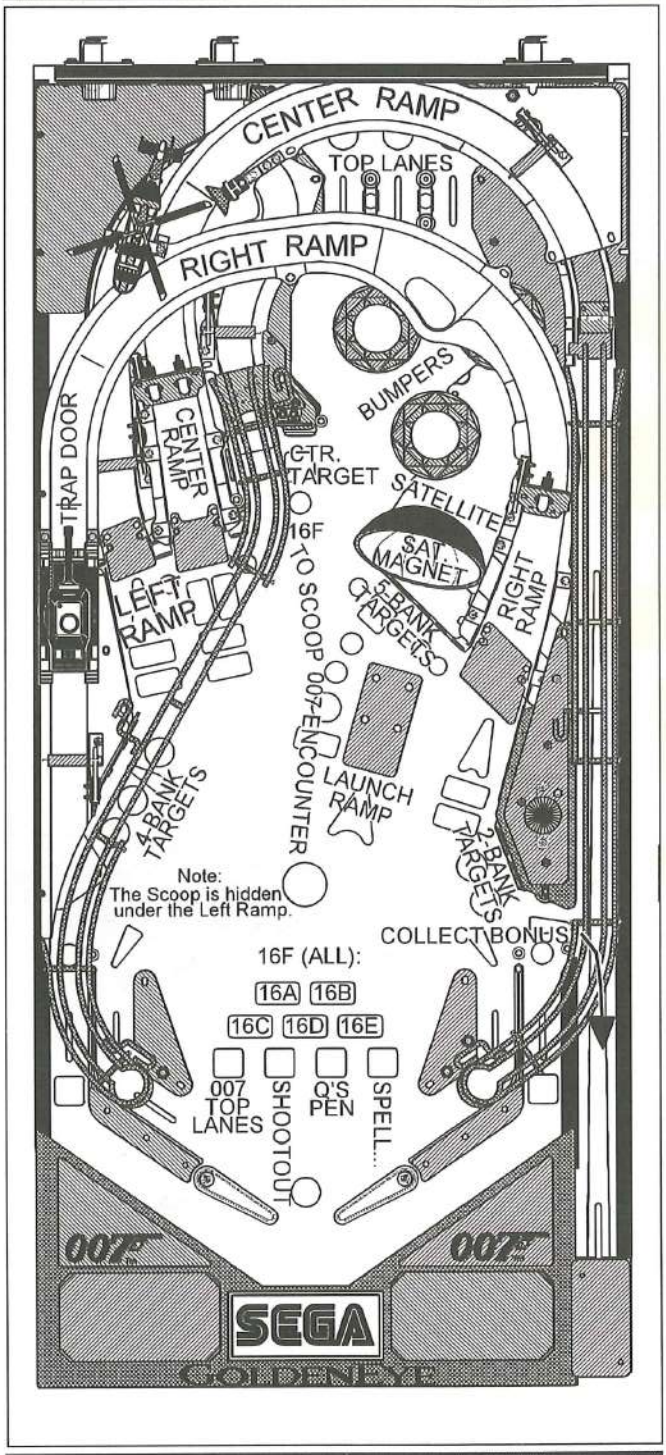


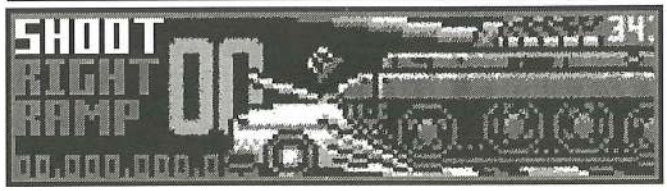
GOLDENEYE

Completing the grid (the above ***5 Features*** plus ***"007 TOP LANES"***, **"SHOOTOUT"**, **"Q's PEN GRENADE"**, and **"SPELL GOLDENEYE"**) lights **007 Encounter** (entrance to Scoop) for — **G O L D E N E Y E** . When lit, shoot the **SCOOP** to start. During this ***Multiball Mode***, all *Ramps* score **Jackpots** and reaching switch closure plateaus adds additional balls into play and increases switch value. This feature ends when the player loses all balls but 1 (then returns to *Single Ball Play*).

PLAYFIELD SHOT MAP







Section 2 | Rules

Q's GAME RULE NOTES

Q1 COMBINATION SHOTS:

GOLDENEYE features several Multi-Way Combos. These Combo Shots involve natural sequences of key shots in the game. Several undocumented difficult combos may also be present.

Q2 END OF BALL BONUS CALCULATION:

The **BONUS** is calculated as the sum of (1M + 1M X Ramp Shots) X BonusX (Bonus Multiplier Level Reached). If the player scores 10M or more in *Bonus* a *Special Bonus Screen* appears in the DMD.

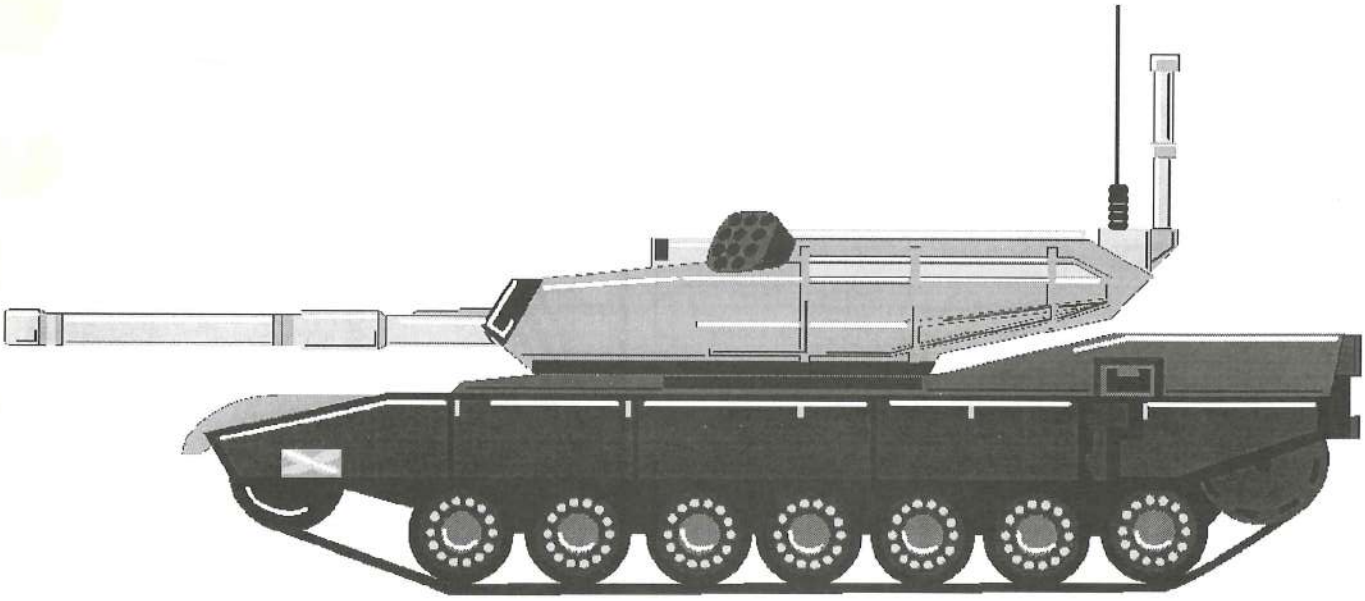
Q's GAME RULE NOTES

Q3 SPECIAL COLLECT BONUS:

When a ball falls back into the **Shooter Lane** from the **Right Outlane** area when **COLLECT BONUS** is lit, a **SNEAK IN VALUE** equal to the **BONUS** earned thus far is awarded!

Q4 COVERT OPERATION WARNING!

Just like any covert operation, rules and point values are subject to change without notice. ***Call Q!***



Portals™ Service Menu Introduction

Section 3
Table of Contents

Bullet Notes:

• From Main Menu, Level 1.
•• From the Sub-Menu, Level 2.
••• From the Sub-Menu, Level 3.
¤ Added Information/Instruction.

Service Switch Set (Red, Green & Black Buttons) Access & Use

Open Coin Door and view Service Switch Set (see figures below). The Memory Protect Switch is now disabled; when changing adjustments, leave the coin door open, so changes can be made. **Please ensure the Playfield Power Interlock Switch is pulled out for Coil and Flashlamp testing (this is required).**

❶ *Entering* **Portals™ Service Menu** *(will not operate in Volume Mode):*

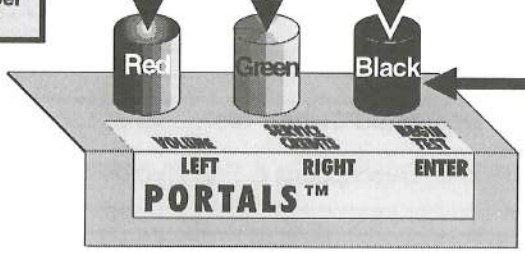
Step 2
Move through the menus by pushing the **Red "LEFT"** or **Green "RIGHT" Buttons.**

Note: Pushing the **Left** or **Right Flipper Buttons** operates in the same way.

Step 1
Enter the **Portals™ Service Menu** by pushing the **Black "BEGIN TEST" Button.**

Step 3
Select or activate icons by pushing the **Black "ENTER" Button.**

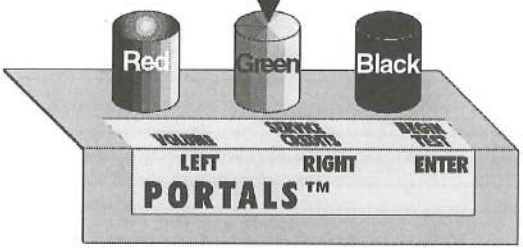
Note: Pushing the **Start Button** operates in the same way.

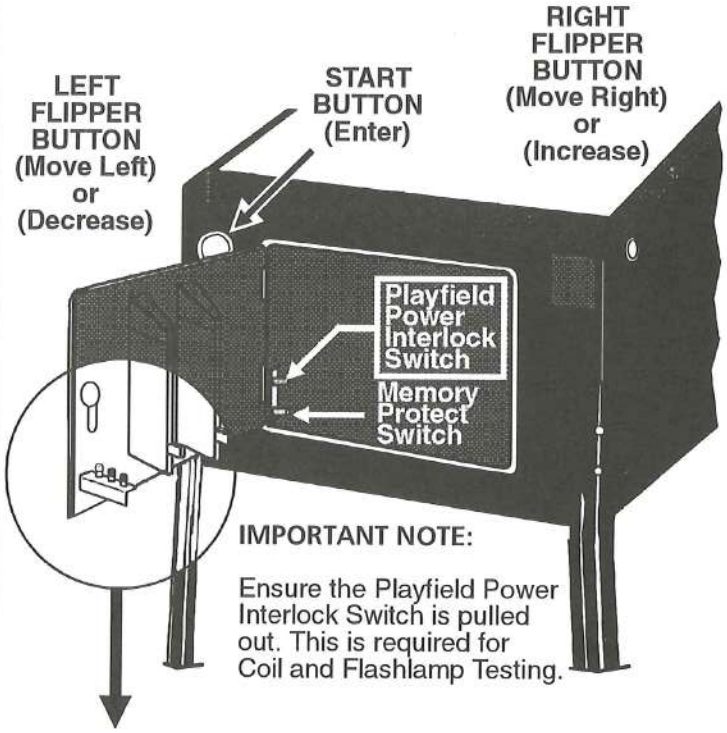


❷ *Adding* **Service Credits** *(will not operate in Service or Volume Modes):*

Step 1
Receive service credits by pushing the **Green "SERVICE CREDITS" Button.**

This button allows the technician to add Service Credits without adding any counts to the Coin Audits. Up to 30 credits can be applied.



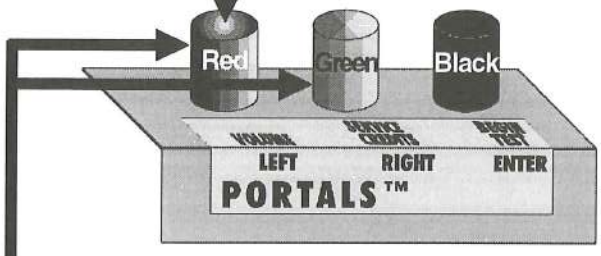


IMPORTANT NOTE:

Ensure the Playfield Power Interlock Switch is pulled out. This is required for Coil and Flashlamp Testing.

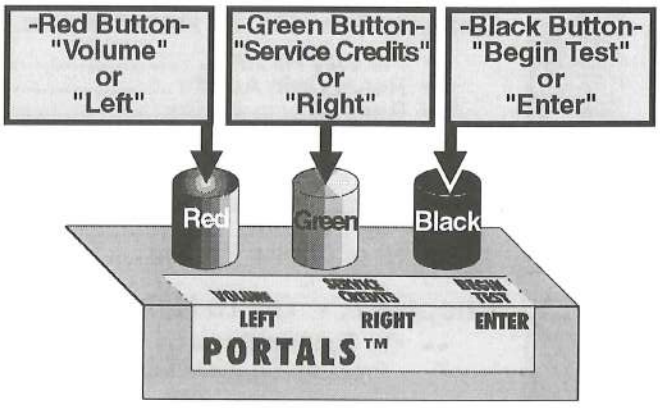
❸ *Entering the* **Volume Menu** *(will not operate in Service Mode):*

Step 1
Enter the **Volume Menu** by pushing the **Red "VOLUME" Button.**



Step 2
* ***Decrease*** volume by pushing the **Red "LEFT" Button.**
* ***Increase*** volume by pushing the **Green "RIGHT" Button.**

Note: Pushing the **Left** or **Right Flipper Buttons** operates in the same way. Once adjustments are made, this menu will automatically exit in a few seconds.



How to Use This Section

This section will cover all functions available in the **Portals™ Service Menu** in a *Step-By-Step* process. This section is divided into chapters which coincide with the **MAIN MENU**. The following pages in this chapter will instruct the operator on how to move through the menus. It's simple, easy and fun to use!

To get into the Service Menu Mode: • Power-up game (if not already) & open the Coin Door. • On the Coin Door is the Service Switch Set (**Red**, **Green** & **Black Buttons**). Push down the **Black "BEGIN TEST" Button**.

Looking at the Video Display you will momentarily see the introductory screen "Service Menu" with a satellite flying from right to left pulling a banner "Portals™ © 1995 SEGA PINBALL, INC.", followed by the **MAIN MENU**:

The Coin Door may be closed for security, however, please note with the Coin Door closed, the game's ***MEMORY PROTECT*** is enabled; ***meaning any changes that are made will be not be written to memory***. If changing adjustments is required, ensure the Coin Door is open.

Use the **Red "LEFT" & Green "RIGHT" Buttons** (or **Left** & **Right Flipper Buttons**) to move the selected **ICON** left or right, and the **Black "ENTER" Button** (or **Start Button**) to activate the selected **ICON**. The use of the Service Switch Set (**Red**, **Green**, & **Black Buttons**) *is required* in Switch Test or Active Switch Test, as the **Start & Flipper Buttons** are a part of this test.

For diagnostic purposes, be sure the ***Playfield Power Interlock Switch*** is pulled out so ***Playfield Power*** is not disabled.

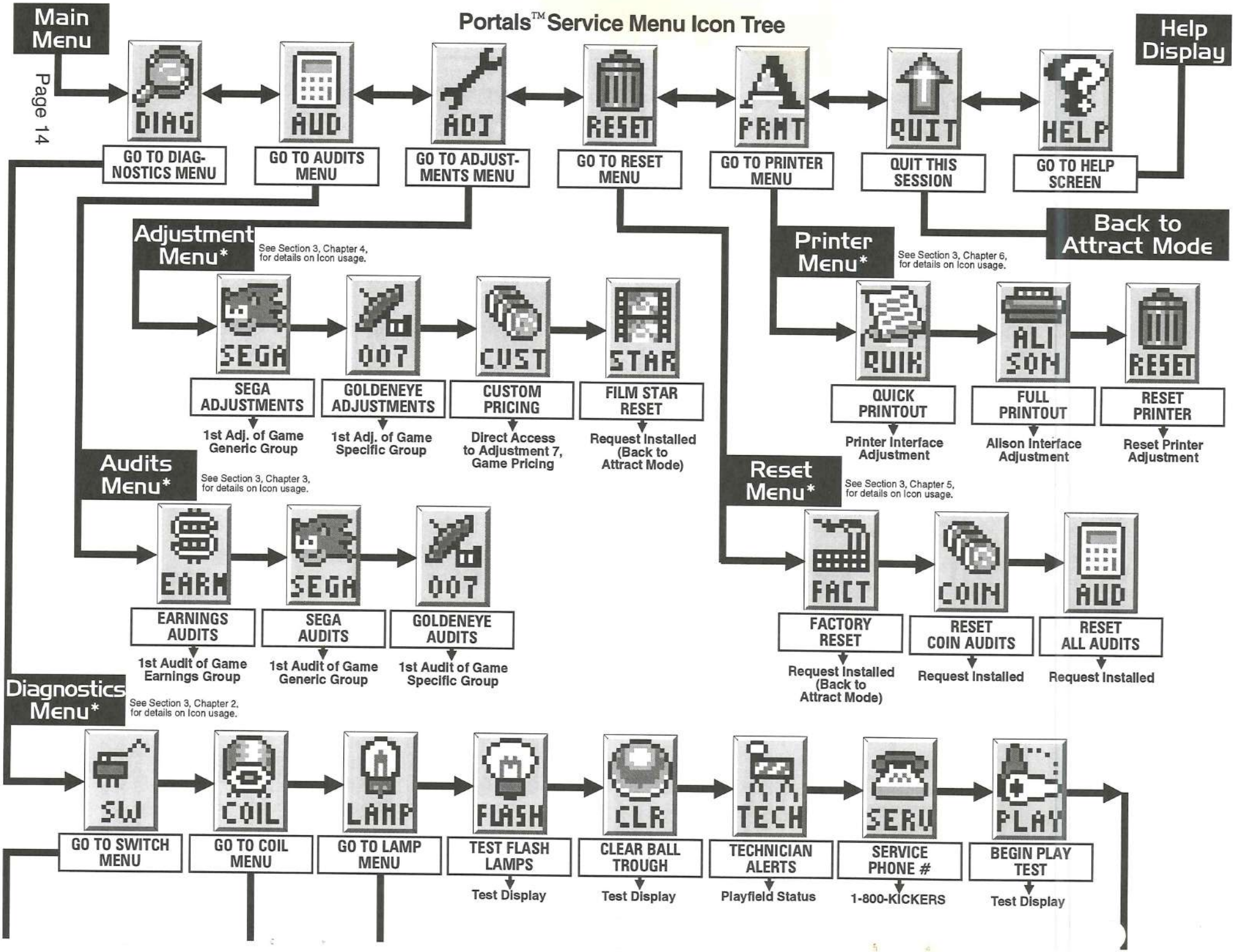
The **MAIN MENU** now appears with the "DIAG" *Icon* (**DIAGNOSTICS MENU**) flashing:

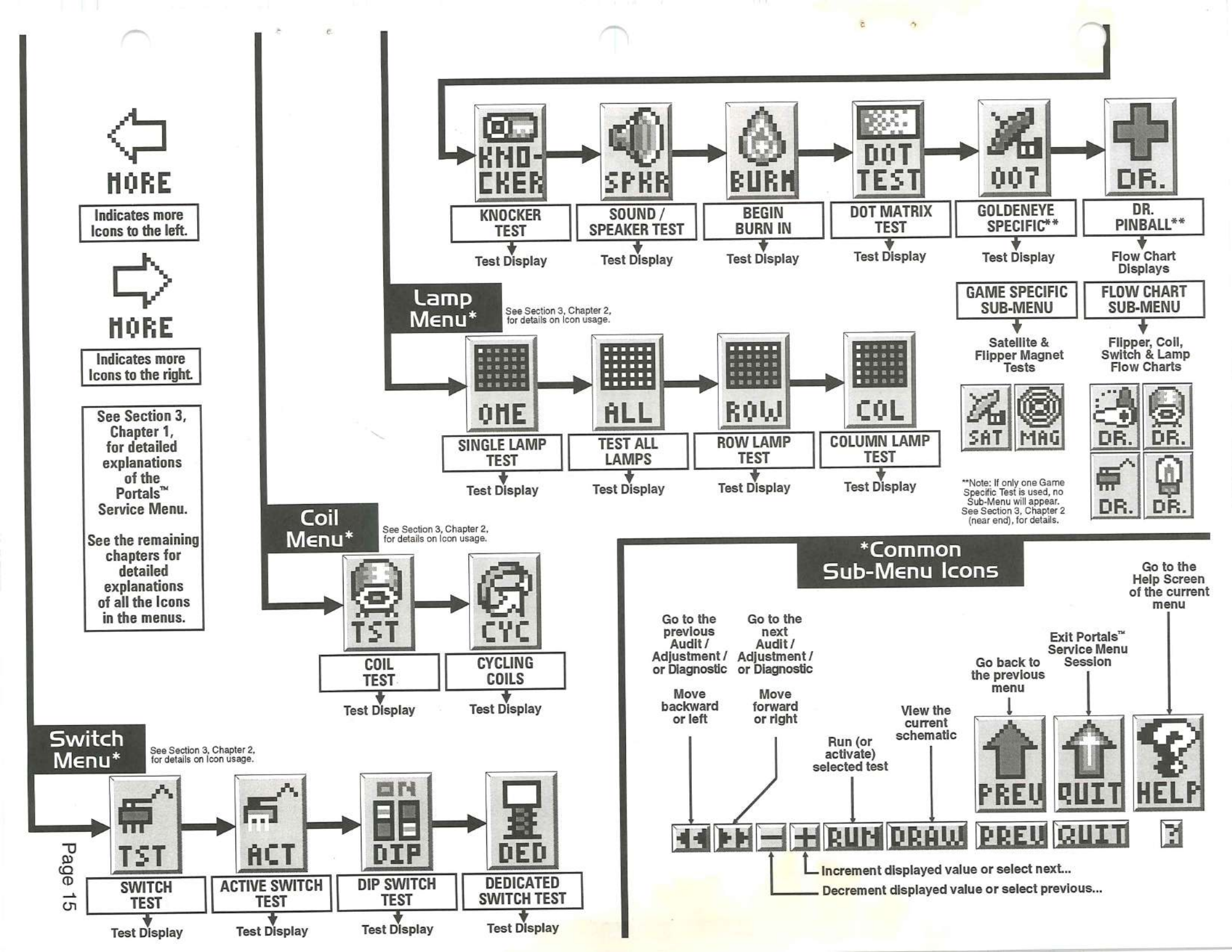
As the operator views the Menu Screen(s), the ⇦ MORE ⇨ MORE symbols indicates that there are more *Icons* to select in each direction. The *Icon* selected will blink. Pushing the **Black "ENTER" Button** (or **Start Button**) will select the *Icon* and the Menu Screen will change to the menu selected. Select the **"PREV"** *Icons* to move backwards through the menu levels. Select the **"QUIT"** *Icon* to completely exit the Service Mode.

View the **Portals™ Service Menu Icon Tree** on the next pages for a complete overview of all menus used in this system. View the last chapter (HELP) if more information is required. Selecting the "QUIT" *Icon* with the **Red "LEFT" or Green "RIGHT" Buttons** (or either **Flipper Button**), then pressing the **Black "ENTER" Button** (or **Start Button**) will exit the Service Mode. This applies to the large and small "QUIT" *Icons*.

The **chapters** in this **section**, which coincide with the **MAIN MENU**, will also provide more detailed information which could not fit in the display. Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.

Portals™ Service Menu Icon Tree




MORE
Indicates more Icons to the left.
MORE
Indicates more Icons to the right.
See Section 3, Chapter 1, for detailed explanations of the Portals™ Service Menu.
See the remaining chapters for detailed explanations of all the Icons in the menus.
KNO-CKER
KNOCKER TEST
Test Display
SPKR
SOUND / SPEAKER TEST
Test Display
BURN
BEGIN BURN IN
Test Display
DOT TEST
DOT MATRIX TEST
Test Display
007
GOLDENEYE SPECIFIC**
Test Display
DR.
DR. PINBALL**
Flow Chart Displays
GAME SPECIFIC SUB-MENU
Satellite & Flipper Magnet Tests
SAT
MAG
FLOW CHART SUB-MENU
Flipper, Coil, Switch & Lamp Flow Charts
DR.
DR.
DR.
DR.
**Note: If only one Game Specific Test is used, no Sub-Menu will appear. See Section 3, Chapter 2 (near end), for details.
Lamp Menu*
See Section 3, Chapter 2, for details on Icon usage.
ONE
SINGLE LAMP TEST
Test Display
ALL
TEST ALL LAMPS
Test Display
ROW
ROW LAMP TEST
Test Display
COL
COLUMN LAMP TEST
Test Display
Coil Menu*
See Section 3, Chapter 2, for details on Icon usage.
TST
COIL TEST
Test Display
CYC
CYCLING COILS
Test Display
Switch Menu*
See Section 3, Chapter 2, for details on Icon usage.
TST
SWITCH TEST
Test Display
ACT
ACTIVE SWITCH TEST
Test Display
ON
DIP
DIP SWITCH TEST
Test Display
DED
DEDICATED SWITCH TEST
Test Display
*Common Sub-Menu Icons
Go to the previous Audit / Adjustment / or Diagnostic
Go to the next Audit / Adjustment / or Diagnostic
Move backward or left
Move forward or right
Run (or activate) selected test
View the current schematic
Go back to the previous menu
Exit Portals™ Service Menu Session
Go to the Help Screen of the current menu
PREV
QUIT
HELP
RUN
DRAW
PREV
QUIT
Increment displayed value or select next...
Decrement displayed value or select previous...

Portals™ Service Menu Example

This example will demonstrate activation of *Icons* in the **DIAGNOSTICS MENU**. The example will show activation of the "SW" *Icon* (**GO TO SWITCH MENU**). In this menu, the switches can be tested individually and also all active switches can be tested. Use the same technique to access all the *Icons* in the **Portals™ Service Menu**. Follow **Portals™ Service Menu Icon Tree** on the previous pages as a guide to help navigate through the entire system (Also, go to the chapter in this manual explaining the icon(s) selected.).

If the display is in any other menu other than the **MAIN MENU**, use the **Red "LEFT" & Green "RIGHT" Buttons** to select the "PREV" *Icon* and press the **Black "ENTER" Button** to activate the **ICON** thus moving back to the previous menu. Do so until **MAIN MENU** appears.

Chapters 2 through 7 will cover all menu items within the **Portals™ Service Menu**. The *Icon* is shown preceding the text. Find the *Icon* in the **Portals™ Service Menu** by navigating with the **Red** or **Green Buttons**. Each chapter started is from the **MAIN MENU**. Within the chapter, the sub-menu's will be covered sequentially with their explanation & function. If the operator *"gets lost"*, select and activate the "PREV" *Icon* until the display indicates **MAIN MENU**. For more help, see Chapter 7.

The "MORE" *symbols* are indicating that *"more icons"* are available which don't appear in the display and which way to move the selection to view the *Icons*.

Important Note:

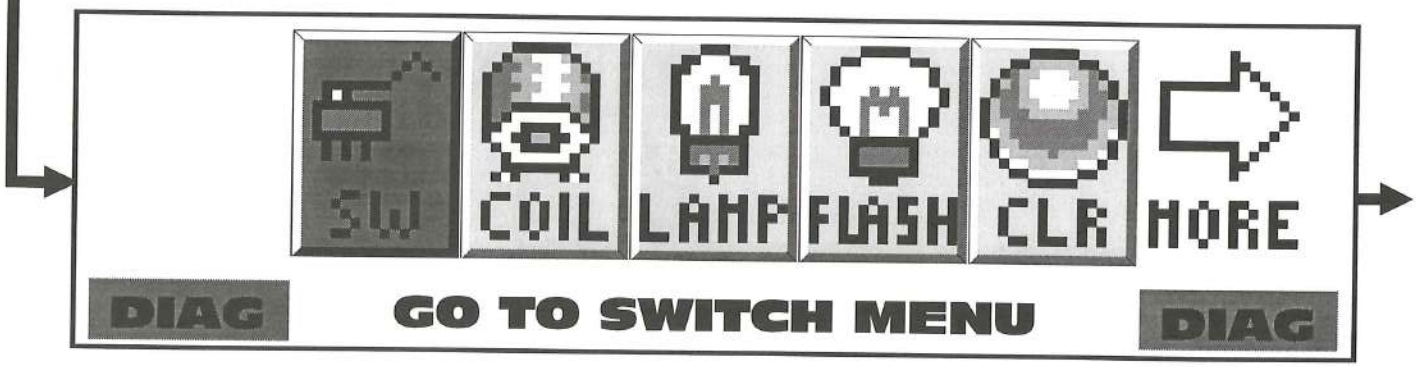
Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. ***If no Icons appear in the display because of a testing function or special display (e.g. Help, Schematic Display, etc.), press any service button to exit to the previous menu or sub-menu.***

Selecting & activating the "QUIT" *Icon* from any display will exit the *Service Session.*

Selecting & activating the "HELP" *Icon* will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

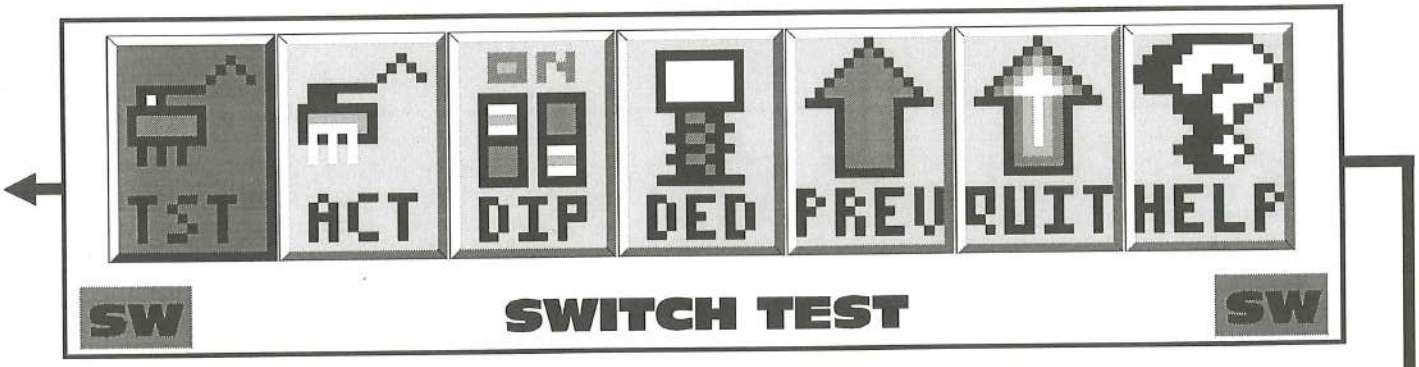
Example: From the **MAIN MENU**, use the **Red "LEFT"** or **Green "RIGHT" Buttons** to select the "DIAG" *Icon* (**GO TO DIAGNOSTICS MENU**).

Press the **Black "ENTER" Button** to activate this **ICON**. This will bring up the **DIAGNOSTICS MENU**.

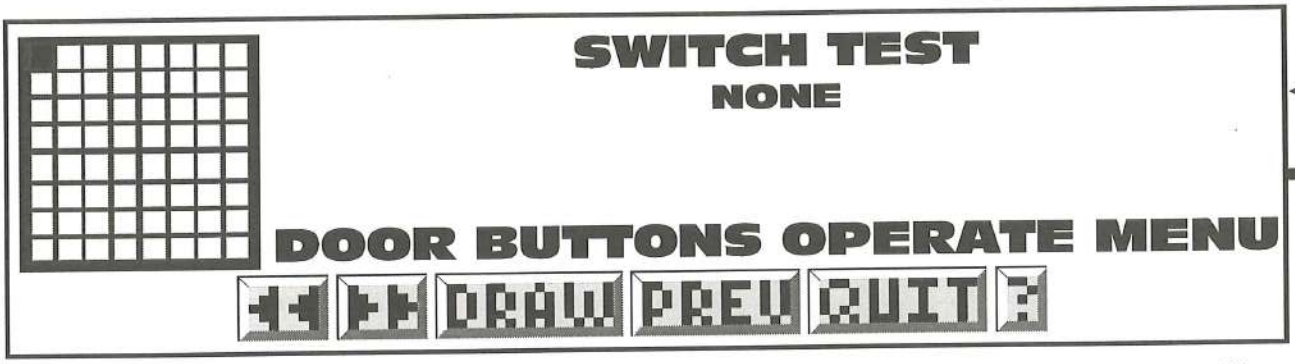


The **DIAGNOSTICS MENU** now appears with the "SW" *Icon* (**GO TO SWITCH MENU**) flashing. Press the **Black Button** to *activate* this icon. This will bring up the **SWITCH TEST MENU**.

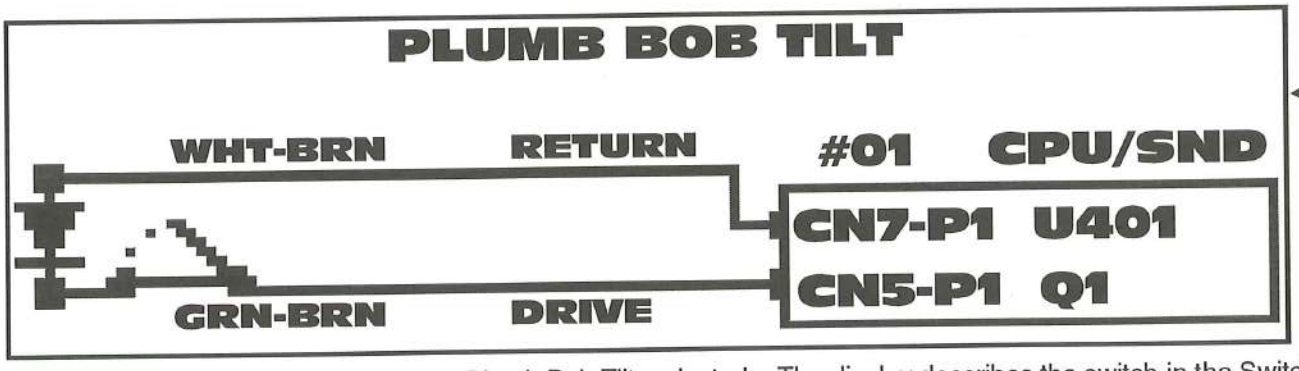
The **SWITCH TEST MENU** now appears with the "TST" *Icon* (**SWITCH TEST**) flashing:
Press the **Black "ENTER" Button** to *activate* this icon. This will bring up the **Switch Test Display**.



The **Switch Test Display** now appears.



All switches can be tested one at a time (When possible, use a pinball to close any playfield switches; rolling the ball at Stand-Up Targets or over/under switches is suggested. Use finger for all non-playfield switches.) As each switch is closed, the respective Switch Matrix Grid Position (1-64) will be lit. To view the schematic for the switch selected, press the **Red** or **Green Buttons** to select the "DRAW" *Icon*. Press the **Black Button** to *activate* this icon. This will bring up the **Switch Schematic Display** for the switch being closed.



An example is shown with Switch #01, Plumb Bob Tilt, selected. The display describes the switch in the Switch Matrix which includes the name of the switch, the Return (Row) Wire and the Drive (Column) Wire, drive transistor, the part number (not shown in the above example) and the "Pin-Outs" from the CPU/Sound Board.

While in Switch or Active Switch Tests, the **Flipper & Start Buttons** are deactivated. Use the **Red "LEFT"**, **Green "RIGHT"** and/or **Black "ENTER" Buttons** to select and activate the **"MINI-ICONS"** at the bottom of the display. In Switch Test, if the "Left Arrow" or "Right Arrow" *Icon* is activated, the display will go to the previous tests (Active, Dip & Dedicated Switch Tests). Use the **Red** or **Green Buttons** to change the selected **ICON** to "PREV"*Icon*. Press the **Black "ENTER" Button** to go to the previous menu.

Note:
In **Dedicated Switch Test**, the **Flipper & Start Buttons** are to be used instead of the **Red**, **Green** & **Black Service Buttons**, as these buttons are deactivated for this test.

Exit out of the sub-menu by activating the big "PREV" *Icon* in the menu. This will bring up the **DIAGNOSTICS MENU**. The Switch Test Session is now complete. See the next page about exiting the **Portals™ Service Menu**.

Exiting the Portals™ Service Menu

All *Icons* will be covered in the chapters of this section with the exception of the "QUIT" *Icon*, in the **MAIN MENU**. Both the large and small *Icons* if selected and activated, will exit the user from the **Portals™ Service Menu**. The display will return back to the **ATTRACT MODE**! To re-enter the **Portals™ Service Menu** follow the instructions at the beginning of this chapter.

If more help is required, see Chapter 7 of this section, and view the various help displays in the game.

Your Notes

Go To Diagnostics Menu

Special Note: If the ***display flashes*** **"OPEN THE COIN DOOR"** the game is indicating that memory has been corrupted. This is caused be either failure in memory (e.g. batteries are dead and/or faulty **RAM**) or upon installation of updated version of game code. Opening the Coin Door will initiate a *Factory Restore*, by opening the ***Memory Protect Switch***. Check battery voltage at **CMOS RAM** with the power off.

Overview

The **Portals™ Service Menu System** provides tests for sounds, display, lamps, switches and coils. Each feature may be tested manually or automatically after entering the **Portals™ Service Menu** (see Chapter 1 of this section). Select the "DIAG" *Icon* from the **MAIN MENU** to go to the **DIAGNOSTICS MENU**. The automatic tests (e.g. Cycling Coils, Flash Lamps, etc.) may be used for a quick verification of automatic test functions and the manual tests (Begin Play Test, Single Lamp/All/Row/Column Tests, etc.) may be used for troubleshooting.

During game play, activation of switches and operation of coils with associated switches are monitored. If the CPU Board does not detect a switch transition ("Stuck Open" / "Stuck Closed") for 50 games, it is considered faulty. When operation of a coil should close or open a switch and does not, the coil is considered faulty. In the Attract Mode, faulty switches and coils (if any) are reported (Select the "TECH" *Icon*, Technician Alerts, from the **DIAGNOSTICS MENU**). Note that reporting of an unused switch does not constitute a problem and that a bad coil could mean that the associated switch requires adjustment.

GO TO DIAGNOSTICS MENU

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "DIAG" *Icon* in the **MAIN MENU** with either **Flipper** or **Red "LEFT"** & **Green "Right" Buttons** (upon entry of the **Portals™ Service Menu**, the system defaults with the selection of the "DIAG" *Icon* flashing) and press the **Start** or **Black "ENTER" Buttons**. The **DIAGNOSTICS MENU** appears.

The "MORE" *symbols* are indicating that *"more icons"* are available which don't appear in the display and which way to move the selection to view the *Icons*.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. If no *Icons* appear in the display because of a testing function or special display (e.g. "Help"), press any button to exit.

Selecting & activating the "HELP" *Icon* from any display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

Selecting & activating the "QUIT" *Icon* from any display will exit the Service Session.

In Diagnostics, selecting & activating the "-" or "+" *Icons* moves test forwards/backwards. Selecting & activating the "RUN" *Icon* repeats the test on the coil or flash lamp left off at. Selecting & activating the "ARROW" *Icons* moves between tests in the sub-menu. Selecting & activating the "DRAW" *Icon* will show the schematic for that switch or coil.

Some tests require navigation through the menu(s) and selection of the *Icons* with the **Red "LEFT", Green "RIGHT"** and **Black "ENTER" Buttons**. This is required is Switch and Active Switch Tests, as the **Flipper** and **Start Buttons** are a part of the test.

In Coil Test, ensure the **Power Interlock Switch** is pulled out. (See ***Access & Use*** of Chapter 1 of this section for the location.) If the switch is not pulled out, the coils and flash lamps cannot be tested (32v DC and 50v DC are disabled). Closing the Coin Door will automatically reset this switch. Coils and Flash Lamps are checked manually in Coil Test. To automatically check coils, go to Cycling Coils from the **COIL TEST MENU**. To automatically check flash lamps, go to Flash Lamp Test, from the **DIAGNOSTICS MENU**.

GO TO SWITCH MENU

From the **DIAGNOSTICS MENU**, select the "SW" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Switches are configured in an 8 x 8 Matrix of Columns (Switch Drives) and Rows (Switch Returns) with up to 64 switches possible. The Switch Test Menu consists of four parts: Switch Test, Active Switches, Dip Switch Test and Dedicated Switch Test.

Note: The Flipper & Start Buttons are deactived during Switch Tests.

Switch Test

To initiate, from the **SWITCH MENU**, select the "TST" *Icon* with the **Red** or **Green Button** & press the **Black Button**. In Switch Test, close each switch and observe the display. The display will describe the switch in the Switch Matrix, which includes the switch name, Return (Row) Wire, Drive (Column) Wire, Part Nº, and the "Pin-Outs" from the CPU/SOUND Board. When the switch is released, the information of the last switch closed will remain in the display until another switch is closed or the test is exited. To view the switch schematic, select the mini "DRAW" *Icon* with the **Red** or **Green Button** & press the **Black Button**.

Active Switch Test

To initiate, from the **SWITCH MENU**, select the "ACT" *Icon* with either **Red** or **Green Button** & press the **Black Button**. If still in a previous test, select the "PREV" *Icon* to return to Switch Menu or selecting either of the "ARROW" *Icons* will move through the tests. If any switches are stuck closed (or made from the presence of a pinball), the display sequences through the switch names, Return (Row) Wire, Drive (Column) Wire, drive transistor, Part Nº, and the "Pin-Outs" from the CPU/SOUND Board. This cycle continues until all switches are cleared or until the test is exited.

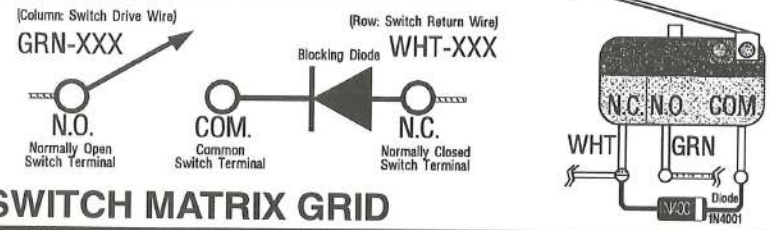
Dip Switch Test

To initiate, from the **SWITCH MENU**, select the "DIP" *Icon* with either **Red** or **Green Button** & press the **Black Button**. The display will indicate the Dip Switch Positions & the country setting the game is set to (e.g. USA, Germany, England, etc.). *See the "Find-It-In Front: Dr. Pinball Section" for Dip Switch Settings.*

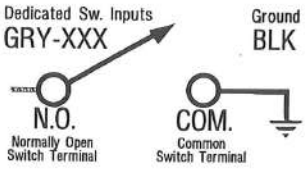
Dedicated Switch Test

To initiate, from the **SWITCH MENU**, select the "DED" *Icon* with either **Flipper Button** & press the **Start Button** (The service switches are deactivated during this test.). The display will describe the switch which includes the switch name, Return (Row) Wire, Column Wire, Part Nº, and the "Pin-Outs" from the CPU/SOUND Board.

Typical Switch Schematic & Side View



Dedicated Switch Schematic



SWITCH MATRIX GRID

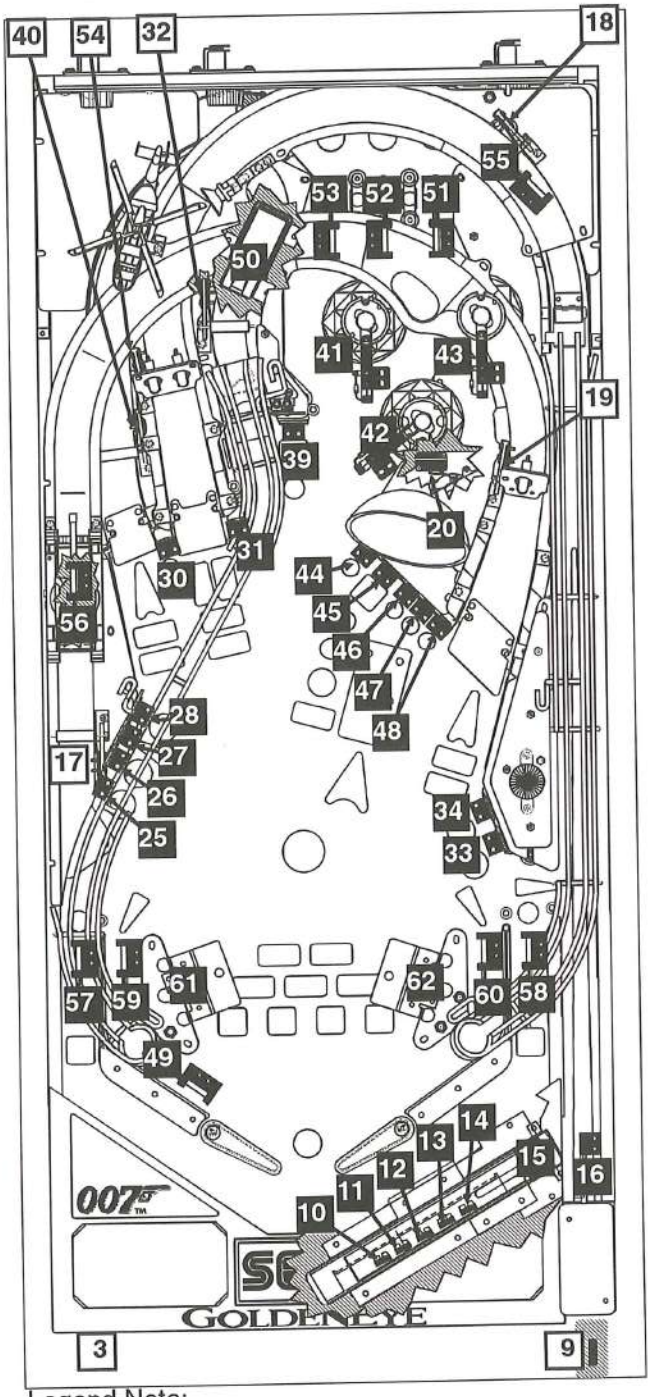
Column (Drive) / Row (Return)	1 Q1 GRN-BRN CN5-1	2 Q2 GRN-RED CN5-3	3 Q3 GRN-ORG CN5-4	4 Q4 GRN-YEL CN5-5	5 Q5 GRN-BLK CN5-6	6 Q6 GRN-BLU CN5-7	7 Q7 GRN-VIO CN5-8	8 Q8 GRN-GRY CN5-9
1 WHT-BRN CN7-9	PLUMB BOB TILT 1	GUN TRIGGER 9	RIGHT RAMP EXIT 17	4-BANK S-U BOT (BOTTOM) 25	2-BANK S-U BOT 33	LEFT TURBO BUMPER 41	LEFT RE-TURN LANE LOWER 49	LEFT OUTLANE 57
2 WHT-RED CN7-8	4TH COIN SLOT 2	5-BALL TROUGH #1 (LEFT) 10	CENTER RAMP EXIT 18	4-BANK S-U B/M (BOT. MID.) 26	2-BANK S-U TOP 34	BOTTOM TURBO BUMPER 42	SCOOP 50	RIGHT OUTLANE 58
3 WHT-ORG CN7-7	START BUTTON 3	5-BALL TROUGH #2 11	RIGHT RAMP ENTER 19	4-BANK S-U T/M (TOP MID.) 27	NOT USED 35	RIGHT TURBO BUMPER 43	RIGHT TOP LANE 51	LEFT RE-TURN LANE UPPER 59
4 WHT-YEL CN7-6	RIGHT COIN SLOT 4	5-BALL TROUGH #3 12	SATELLITE HOME 20	4-BANK S-U TOP 28	NOT USED 36	5-BANK S-U TOP 44	MIDDLE TOP LANE 52	RIGHT RETURN LANE 60
5 WHT-GRN CN7-5	CENTER COIN SLOT / DBA 5	5-BALL TROUGH #4 13	NOT USED 21	NOT USED 29	NOT USED 37	5-BANK S-U T/M (TOP MID.) 45	LEFT TOP LANE 53	LEFT SLINGSHOT 61
6 WHT-BLU CN7-3	LEFT COIN SLOT 6	5-BALL TROUGH #5 (RIGHT) 14	NOT USED 22	CENTER RAMP S-U LEFT 30	NOT USED 38	5-BANK S-U MID 46	CENTER RAMP ENTER 54	RIGHT SLINGSHOT 62
7 WHT-VIO CN7-2	SLAM TILT 7	5-BALL TROUGH VUK OPTO 15	SATELLITE MAGNET BOARD 23	CENTER RAMP S-U RIGHT 31	CENTER STAND-UP 39	5-BANK S-U B/M (BOT. MID.) 47	SHOOTER LANE EXIT 55	LT FLIPPER BUTTON VIA Q7 (ON SSFB) 63
8 WHT-GRY CN7-1	NOT USED 8	SHOOTER LANE 16	FLIPPER MAGNET BOARD 24	LEFT RAMP EXIT 32	LEFT RAMP ENTER 40	5-BANK S-U BOT (BOTTOM) 48	TANK KICK BIG 56	RT FLIPPER BUTTON VIA Q5 (ON SSFB) 64

Dedicated Switches

GND IC U206 INPUTS	Ground BLK CN6-1
1 GRY-BRN CN6-2	NOT USED DS-1
2 GRY-RED CN6-3	NOT USED DS-2
3 GRY-ORG CN6-4	NOT USED DS-3
4 GRY-YEL CN6-6	NOT USED DS-4
5 GRY-GRN CN6-7	NOT USED DS-5
6 GRY-BLU CN6-8	Normal: Volume In Test: Left RED BUTTON DS-6
7 GRY-VIO CN6-9	Normal: Service Credits In Test: Right GRN BUTTON DS-7
8 GRY-BLK CN6-10	Normal: Begin Test In Test: Enter BLK BUTTON DS-8

Switch Matrix Descriptions with Part Numbers and Locations †

The switch locations correspond with the Switch Nº in the table below and the Switch Maxtrix Grid.



Legend Note:

□ = Switches mounted above playfield.

■ = Switches mounted below playfield.

The following switches are located in the cabinet and are not noted in the diagram above:

1 2 3 4 5 6 7

The following switches are not used:

8 21 22 29 35 36 37 38

Sw. Nº	Col. Nº	Row Nº	Switch Matrix Description	Part Nº
1	1	1	* PLUMB BOB TILT (See Section 4, Chapter 1)	
2	1	2	* 4TH COIN SLOT (On Coin Door)	
3	1	3	START BUTTON (Left of Coin Door) RED	500-5026-07
4	1	4	* RIGHT COIN SLOT (On Coin Door)	180-5024-00
5	1	5	* CENTER COIN SLOT / DBA	180-5024-00
6	1	6	* LEFT COIN SLOT (On Coin Door)	180-5024-00
7	1	7	* SLAM TILT	180-5022-00
8	1	8	**NOT USED**	
9	2	1	GUN TRIGGER	180-5111-00
10	2	2	5-BALL TROUGH #1 (LEFT)	180-5119-00
11	2	3	5-BALL TROUGH #2	180-5119-00
12	2	4	5-BALL TROUGH #3	180-5119-00
13	2	5	5-BALL TROUGH #4	180-5119-00
14	2	6	5-BALL TROUGH #5 (RIGHT)	180-5119-00
15	2	7	#5-BALL TROUGH VUK OPTO (TRANS) (REC)	520-5124-00 520-5125-00
16	2	8	SHOOTER LANE	180-5100-00
17	3	1	RIGHT RAMP EXIT	180-5087-00
18	3	2	CENTER RAMP EXIT	180-5087-00
19	3	3	RIGHT RAMP ENTER	180-5087-00
20	3	4	SATELLITE HOME	180-5052-00
21	3	5	**NOT USED**	
22	3	6	**NOT USED**	
23	3	7	SATELLITE MAGNET BOARD	See Magnet Board Layout
24	3	8	FLIPPER MAGNET BOARD	
25	4	1	4-BANK STAND-UP BOTTOM (Blue)	515-5162-05
26	4	2	4-BANK S-U BOTTOM MIDDLE (Blue)	515-5162-05
27	4	3	4-BANK STAND-UP TOP MIDDLE (Yellow)	515-5967-06
28	4	4	4-BANK STAND-UP TO (Blue)	515-5162-05
29	4	5	**NOT USED**	
30	4	6	CENTER RAMP STAND-UP LEFT (Green)	515-5967-04
31	4	7	CENTER RAMP S-U RIGHT (Green)	515-5967-04
32	4	8	LEFT RAMP EXIT	180-5087-00
33	5	1	2-BANK STAND-UP BOTTOM (Blue)	515-5162-05
34	5	2	2-BANK STAND-UP TOP (White)	515-5162-08
35	5	3	**NOT USED**	
36	5	4	**NOT USED**	
37	5	5	**NOT USED**	
38	5	6	**NOT USED**	
39	5	7	CENTER STAND-UP (Clear)	500-6075-01
40	5	8	LEFT RAMP ENTER	180-5087-00
41	6	1	LEFT TURBO BUMPER	180-5015-03
42	6	2	BOTTOM TURBO BUMPER	180-5015-03
43	6	3	RIGHT TURBO BUMPER	180-5015-03
44	6	4	5-BANK STAND-UP TOP (Green)	515-5162-04
45	6	5	5-BANK STAND-UP TOP MIDDLE (White)	515-5967-08
46	6	6	5-BANK STAND-UP MIDDLE (Green)	515-5162-04
47	6	7	5-BANK S-U BOTTOM MIDDLE (Green)	515-5162-04
48	6	8	5-BANK STAND-UP BOTTOM (Green)	515-5162-04
49	7	1	LEFT RETURN LANE LOWER	500-5706-00
50	7	2	SCOOP	180-5057-00
51	7	3	RIGHT TOP LANE	500-5707-00
52	7	4	MIDDLE TOP LANE	500-5707-00
53	7	5	LEFT TOP LANE	500-5706-00
54	7	6	CENTER RAMP ENTER	180-5087-00
55	7	7	SHOOTER LANE EXIT	500-5707-00
56	7	8	TANK KICK BIG	500-5707-00
57	8	1	LEFT OUTLANE	500-5707-00
58	8	2	RIGHT OUTLANE	500-5707-00
59	8	3	LEFT RETURN LANE UPPER	500-5707-00
60	8	4	RIGHT RETURN LANE	500-5707-00
61	8	5	LEFT SLINGSHOT	180-5054-00
62	8	6	RIGHT SLINGSHOT	180-5054-00
63	8	7	* LEFT FLIPPER POWER SWITCH BUTTON VIA Q7 ON THE SSFB	180-5122-00
64	8	8	* RIGHT FLIPPER POWER SWITCH BUTTON VIA Q5 ON THE SSFB	180-5122-00

GO TO COIL MENU

From the **DIAGNOSTICS MENU**, select the "COIL" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The coils are listed in groups. The first 2 groups are the High Current Coils. The next group is the Low Current Coils. The next group is the Flash Lamps. The remaining coils are special coils. These coils are listed in a Coils Detailed Chart Table following the Playfield Coil & Flash Lamp Locations.

Coil Test

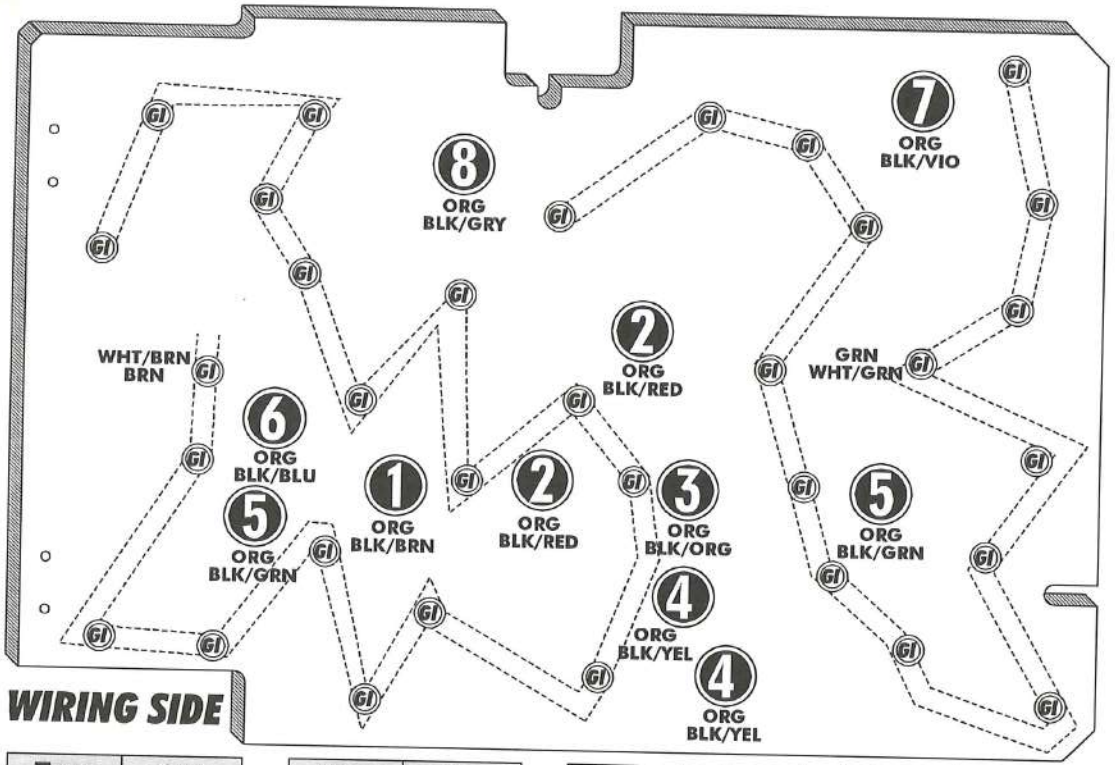
To initiate, from the **COIL MENU**, select the "TST" *Icon* with either **Red** or **Green Button** and press the **Black Button**. Ensure the **Power Interlock Switch** is pulled out. Select either the "-" or "+" *Icons*. Start with the "+" *Icon* to start the manual Coil Test from #1 (The test runs through Coils: 1-24; Flashlamp: 1-8). Press the **Black Button** on the "+" *Icon*, as each coil is selected, the display will describe the coil or flash lamp name with the corresponding number, the wire with colors, the "Pin-Outs" from the I/O Power Driver Board, the coil voltage and gauge-turns (e.g. 23-800). Press the **Black Button** again to move forward in the test. To test and view a particular coil or flash lamp, select the "RUN" *Icon* and press the **Black Button**. Each time the **Black Button** is pushed, the coil or flash lamp will fire on the playfield and/or backbox, with the display indicating the coil or flash lamp information. Continue with the same procedure to run through the entire test.

Cycling Coil Test

To initiate, from the **COIL MENU**, select the "CYC" *Icon* with either **Red** or **Green Button** and press the **Black Button**.. If still in a previous test, select the "PREV" *Icon* to return to Coil Menu or selecting either of the "ARROW" *Icons* will move to Cycling Coil Test (selecting again will return to Coil Test). The test pulses each regular coil or flash lamp sequentially (cycling) on the playfield and backbox. The display indicates "CYCLING COILS."

Backbox Insert Flash Lamp Locations

Below are the flash lamp locations in the Backbox Insert (General Illumination (**GIs**) Lamps are also shown for reference). The flash lamp locations correspond with the coil numbers as seen in the Coil Test. The table below indicates the numbers for the flash lamps in the backbox. See the next page for flash lamps on the playfield.



GI = General Illumination

#44 Bulb (Bayonet) 165-5000-44

#44 Bulb uses 2-Lug Socket (077-5000-00).

 # = Flash Lamp (FLAMP)

#89 Bulb (Bayonet) 165-5000-89

#89 Bulb uses a Stand-Up Short Socket (077-5101-00).

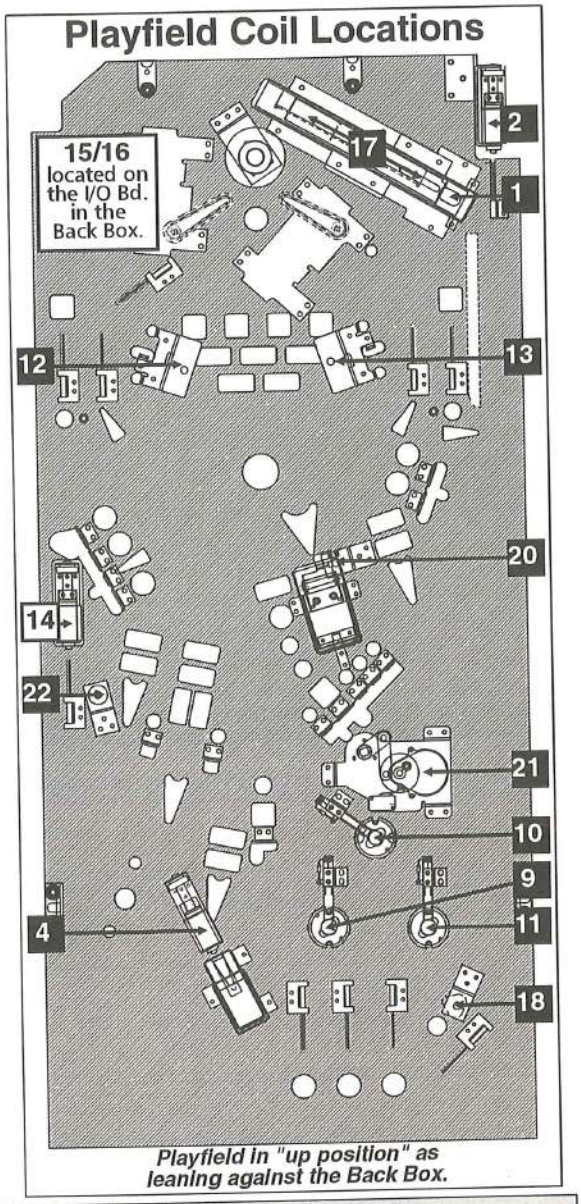
Type	Qty.
FLAMP 1	Insert X1
FLAMP 2	Insert X2

Type	Qty.
FLAMP 3	Insert X1
FLAMP 4	Insert X2

Type	Qty.
FLAMP 5	Insert X2
FLAMP 6	Insert X1

Type	Qty.
FLAMP 7	Insert X1
FLAMP 8	Insert X1

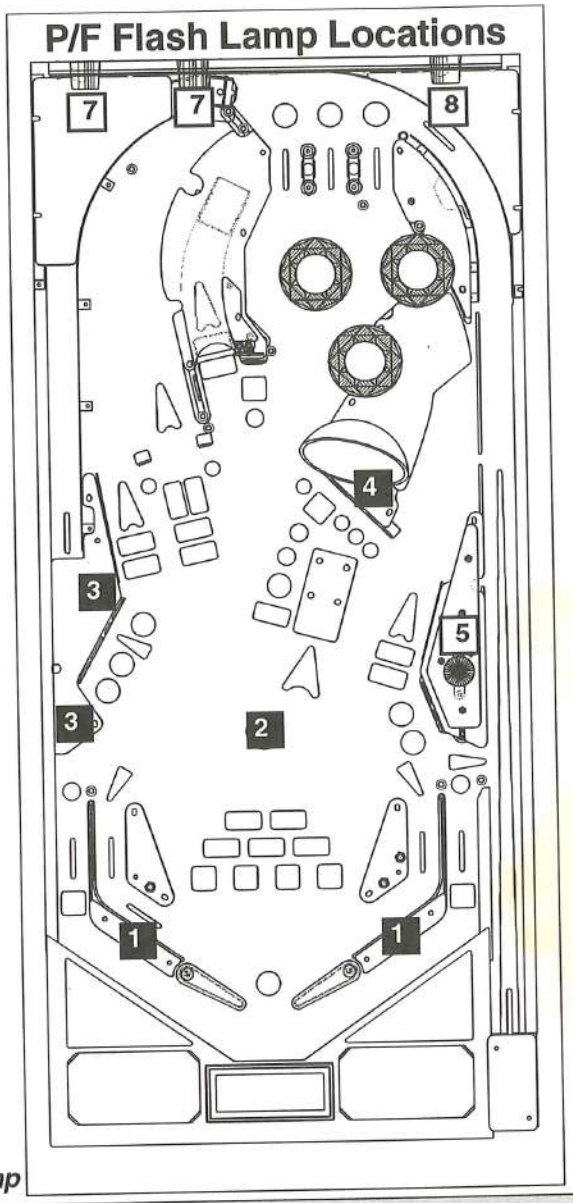
Playfield Coil Locations



Playfield in "up position" as leaning against the Back Box.

Type	Coil Description
COIL 1	TROUGH UP-KICKER (VUK) (24-940)
COIL 2	AUTO LAUNCH 50V (24-940)
COIL 3	NOT USED / SPARE
COIL 4	SCOOP (23-800)
COIL 5	NOT USED / SPARE
COIL 6	NOT USED / SPARE
COIL 7	NOT USED / SPARE
COIL 8	(EUROPEAN TOKEN DISPENSER)
COIL 9	LEFT TURBO BUMPER (26-1200)
COIL 10	BOTTOM TURBO BUMPER (26-1200)
COIL 11	RIGHT TURBO BUMPER (26-1200)
COIL 12	LEFT SLINGSHOT (26-1200)
COIL 13	RIGHT SLINGSHOT (26-1200)
COIL 14	TANK KICK BIG (23-800)
COIL 15	LEFT FLIPPER ENABLE
COIL 16	RIGHT FLIPPER ENABLE
COIL 17	5-BALL TROUGH LOCK BALL (25-1240)
COIL 18	UP-DOWN RAMP (27-1500)
COIL 19	NOT USED / SPARE
COIL 20	SATELLITE LAUNCH RAMP (27-1500)
COIL 21	SATELLITE MOTOR RELAY
COIL 22	TRAP DOOR (27-1500)
COIL 23	NOT USED / SPARE
COIL 24	(OPTIONAL COIN METER)

P/F Flash Lamp Locations



Flash Lamp (FLAMP)

#89 Bulb
(Bayonet)
165-5000-89

#906 Bulb
(Wedge Base)
165-5004-00

Type	Flash Lamps Description & Qty.
FLAMP 1	BOTTOM L&R X2, INSERT X1
FLAMP 2	GOLDENEYE X1, INSERT X2
FLAMP 3	4-BANK X2, INSERT X1
FLAMP 4	SATELLITE X2, INSERT X2
FLAMP 5	LWR. RIGHT P/F X2, INSERT X2
FLAMP 6	INSERT X1
FLAMP 7	BACKPANEL X2, INSERT X1
FLAMP 8	UPR. RT. X2, BACKPANEL X1, INSERT X1

See previous pg. for Backbox Insert Flash Lamp Locations.

Legend Note:

□ = Coils or Flash Lamps mounted above playfield.

■ = Coils or Flash Lamps mounted below playfield.

The following coils are not used:

3 5 6 7 8 19 23 24

COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Transistor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#1	TROUGH UP-KICKER	Q1	I/O Pwr. Drvr.	BRN-BLK	J8-P1	YEL-VIO	J10-P4/5	50v	24-940 090-5036-01
#2	AUTO LAUNCH	Q2	I/O Pwr. Drvr.	BRN-RED	J8-P3	YEL-VIO	J10-P4/5	50v	24-940 090-5036-01
#3	NOT USED / SPARE	Q3	I/O Pwr. Drvr.		J8-P4				N/A
#4	SCOOP	Q4	I/O Pwr. Drvr.	BRN-YEL	J8-P5	YEL-VIO	J10-P4/5	50v	23-800 090-5001-01
#5	NOT USED / SPARE	Q5	I/O Pwr. Drvr.		J8-P6				N/A
#6	NOT USED / SPARE	Q6	I/O Pwr. Drvr.		J8-P7				N/A
#7	NOT USED / SPARE	Q7	I/O Pwr. Drvr.		J8-P8				N/A
#8	(EUROPEAN TOKEN DISPENSER)	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v	N/A

High Current Coils Group 2		Drive Transistor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#9	LEFT TURBO BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#10	BOTTOM TURBO BUMPER	Q10	I/O Pwr. Drvr.	BLU-RED	J9-P2	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#11	RIGHT TURBO BUMPER	Q11	I/O Pwr. Drvr.	BLU-ORG	J9-P4	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#12	LEFT SLINGSHOT	Q12	I/O Pwr. Drvr.	BLU-YEL	J9-P5	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#13	RIGHT SLINGSHOT	Q13	I/O Pwr. Drvr.	BLU-GRN	J9-P6	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#14	TANK KICK BIG	Q14	I/O Pwr. Drvr.	BLU-BLK	J9-P7	YEL-VIO	J10-P4/5	50v	23-800 090-5001-01
#15	LEFT FLIPPER ENABLE	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	GRY-YEL	SSFB CN2-P1/2	50v	22-1080 090-5032-00
#16	RIGHT FLIPPER ENABLE	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	BLU-YEL	SSFB CN2-P1/2	50v	22-1080 090-5032-00

Low Current Coils Group 1		Drive Transistor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
#17	5-BALL TROUGH LOCK BALL	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v	25-1240 090-5034-00
#18	UP-DOWN RAMP	Q18	I/O Pwr. Drvr.	VIO-RED	J7-P3	BRN	J7-P1	20v	27-1500 090-5004-00
#19	NOT USED / SPARE	Q19	I/O Pwr. Drvr.		J7-P4				N/A
#20	SATELLITE LAUNCH RAMP	Q20	I/O Pwr. Drvr.	VIO-YEL	J7-P6	BRN	J7-P1	20v	27-1500 090-5004-00
#21	SATELLITE MOTOR RELAY	Q21	I/O Pwr. Drvr.	VIO-GRN	J7-P7	BRN	J7-P1	20v	24V DC 10A DPDT
#22	TRAP DOOR	Q22	I/O Pwr. Drvr.	VIO-BLU	J7-P8	BRN	J7-P1	20v	27-1500 090-5004-00
#23	NOT USED / SPARE	Q23	I/O Pwr. Drvr.		J7-P9				N/A
#24	(OPTIONAL COIN METER)	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	BRN	J16-P7	5v	5v Meter (If required)

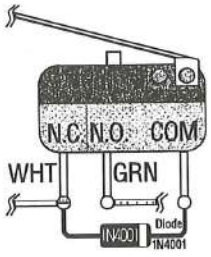
Coils Detailed Chart Table Continued

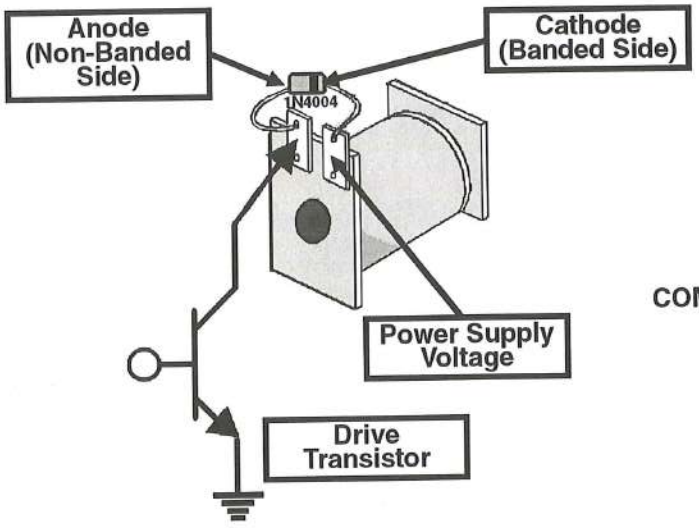
Flash Lamps (FLAMP)			Drive Transistor (D.T.)	Driver Ouput Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Bulb Type
#1	Bottom L&R	X2	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#2	GOLDENEYE	X1	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X2								
#3	4-Bank	X2	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#4	Satellite	X2	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v	4X #89 165-5000-89
	Backbox Insert	X2								
#5	Lower Right Playfield	X2	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v	4X #89 165-5000-89
	Backbox Insert	X2								
#6	Backbox Insert	X1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v	1X #89 165-5000-89
#7	Backpanel	X2	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	ORG	J6-P10	20v	3X #89 165-5000-89
	Backbox Insert	X1								
#8	Upper Right	X2	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	ORG	J6-P10	20v	4X #89 165-5000-89
	Backpanel	X1								
	Backbox Insert	X1								

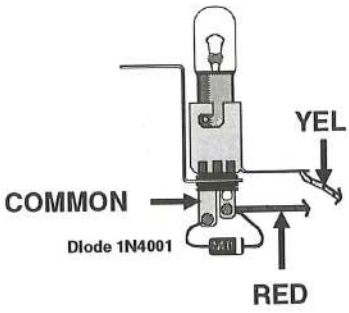
The following is not part of Coil Test but is included for additional information (See Magnet Tests in Sec. 3, Chp. 2):

Aux. Data Line			Driver Ouput Board LOC: Under Playfield	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connnection	Power Voltage	Coil GA/Turn
n/a	Satellite Magnet		Magnet Processor/ Driver Board	BLUE	J3-P1	YEL-VIO	J1-P1,-2	50v	22-600 090-5042-01
n/a	Flipper Magnet		Magnet Processor/ Driver Board	WHT-BRN	J2-P3	YEL-VIO	J1-P1, -2	50v	22-600 090-5042-01

TYPICAL SWITCH, COIL & LAMP WIRING







GO TO LAMP MENU

From the **DIAGNOSTICS MENU**, select the "LAMP" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Controlled lamps are configured in and 8 x 10 Matrix of Columns (Lamp Drives) and Rows (Lamp Returns) with up to 80 lamps possible. The Lamp Test Menu consists of four parts: Single Lamp Test, Test All Lamps, Row Lamp Test and Column Lamp Test.

Single Lamp Test

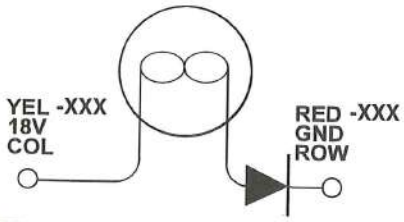
To initiate, from the **LAMP MENU**, select the "ONE" *Icon* with either **Red** or **Green Button** and press the **Black Button**. Select either the "-" or "+" *Icons*. Start with the "+" *Icon* to start the manual Lamp Test from Column 1, Row 1, Switch 1. Press the **Black Button** on the "+" *Icon*, as each lamp is selected, the lamp will light at it's location on the playfield as well as the display, indicating the Lamp Matrix Grid position, lamp name with the corresponding number, Return (Row) Wire & Color, Drive (Column) Wire & Color, and associated drive transistors. Press the **Black Button** again to move forward in the test. To test and view a particular lamp, select the "RUN" *Icon* and press the **Black Button**. Each time the **Black Button** is pushed, the lamp will light-up on the playfield, with the display indicating the lamp information. Continue with the same procedure to run through the entire test.

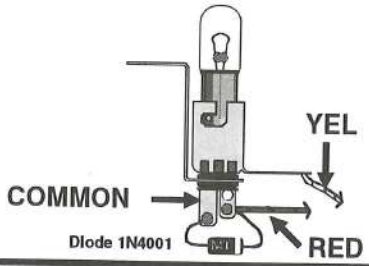
Test All Lamps

To initiate, from the **LAMP MENU**, select the "ALL" *Icon* with either **Red** or **Green Button** and press the **Black Button**. If still in Single Lamp Test (or any 1 of the 4 tests), select the "PREV" *Icon* to return to Lamp Menu or selecting either of the "ARROW" *Icons* will move through the tests, keep activating until Test All Lamps is displayed. The display will indicate "ALL LAMPS ON" and the lamps on the playfield will be lit, alternating between the rows in the Lamp Matrix.

Continued on the next page with Row & Column Lamp Tests.

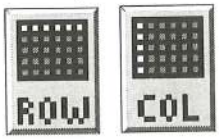
Typical Lamp Schematic & Side View





LAMP MATRIX GRID

Row (GND) \ Column (18v)	1: U10 YEL-BRN J13-9	2: U11 YEL-RED J13-8	3: U12 YEL-ORG J13-7	4: U13 YEL-BLK J13-6	5: U14 YEL-GRN J13-5	6: U15 YEL-BLU J13-4	7: U16 YEL-VIO J13-3	8: U17 YEL-GRY J13-1
1: Q33 RED-BRN J12-1	XENIA EXTRA BALL SQUEEZE #555 Bulb 1	SEND SPIKE (GRID) #555 Bulb 2	TRAIN/TANK CRASH #555 Bulb 3	NERVE GAS PLANT (GRID) #555 Bulb 4	SPELL GOLDENEYE #555 Bulb 5	Q'S PEN GRENADE #555 Bulb 6	SHOOT OUT (GRID) #555 Bulb 7	007 TOP LANES (GRID) #555 Bulb 8
2: Q34 RED-BLK J12-2	NOT USED 9	EJECT OR DIE (RIGHT) #44 Bulb 10	RIGHT RE-TURN LANE #555 Bulb 11	LEFT RE-TURN LANE #44 Bulb 12	SHOOT AGAIN #44 Bulb 13	SATELLITE (LIFT RAMP) #44 Bulb 14	GOLDENEYE (GRID) #44 Bulb 15	SATELLITE HURRY-UP #555 Bulb 16
3: Q35 RED-ORG J12-3	007 ENCOUNTER #44 Bulb 17	MYSTERY #44 Bulb 18	LEFT TURBO BUMPER #555 Bulb 19	RIGHT RAMP ARROW #555 Bulb 20	RIGHT RAMP SEND SPIKE #555 Bulb 21	RIGHT RAMP TRAIN&TANK #555 Bulb 22	DISARM PEN #555 Bulb 23	ARM PEN #555 Bulb 24
4: Q36 RED-YEL J12-4	CENTER RAMP S-U LEFT #555 Bulb 25	CENTER RAMP S-U RIGHT #555 Bulb 26	BOTTOM TURBO BUMPER #555 Bulb 27	EXTRA BALL #44 Bulb 28	EJECT BUTTON #44 Bulb 29	LEFT TOP LANE (**0**)07 #555 Bulb 30	MIDDLE TOP LANE 0(**0**)7 #555 Bulb 31	RIGHT TOP LANE 00(**7**) #555 Bulb 32
5: Q37 RED-GRN J12-5	EJECT OR DIE (LEFT) #44 Bulb 33	TANK MULTIBALL #555 Bulb 34	LEFT RAMP TRAIN&TANK #555 Bulb 35	LEFT RAMP SATELLITE #555 Bulb 36	NERVE GAS PLANT (RAMP) #555 Bulb 37	CTR. RAMP SEND SPIKE #555 Bulb 38	CTR. RAMP ARROW #555 Bulb 39	NOT USED 40
6: Q38 RED-BLU J12-6	RIGHT TURBO BUMPER #555 Bulb 41	SCOOP ARROW #44 Bulb 42	LEFT RAMP ARROW #555 Bulb 43	COLLECT BONUS #555 Bulb 44	4-BANK S-U TOP #555 Bulb 45	SHOOTOUT 4-BANK #555 Bulb 46	4-BANK S-U M/B #555 Bulb 47	4-BANK S-U BOT #555 Bulb 48
7: Q39 RED-VIO J12-8	HELICOPTER #555 Bulb 49	VIRTUAL LOCK LEFT #555 Bulb 50	VIRTUAL LOCK RIGHT #555 Bulb 51	5-BANK S-U BOT #555 Bulb 52	5-BANK S-U M/T #555 Bulb 53	5-BANK S-U MID #555 Bulb 54	INCREASE SATELLITE... #555 Bulb 55	5-BANK S-U TOP #555 Bulb 56
8: Q40 RED-GRY J12-9	START BUTTON #44 Bulb 57	BEHIND CEN-TER TARGET #44 Bulb 58	ABOVE CEN-TER TARGET #44 Bulb 59	LOCK 1 #555 Bulb 60	LOCK 2 #555 Bulb 61	RIGHT OUT-LANE SPECIAL #555 Bulb 62	LEFT OUT-LANE SPECIAL #44 Bulb 63	NOT USED 64
9: Q41 RED-WHT J12-10	100 MILLION #555 Bulb 65	75 MILLION #555 Bulb 66	50 MILLION #555 Bulb 67	25 MILLION #555 Bulb 68	HELICOPTER SPOTLIGHT #44 Bulb 69	NOT USED 70	NOT USED 71	GOLDEN-EY(**E**) #44 Bulb 72
10: Q42 RED J12-11	(**G**)OLDEN-EYE #44 Bulb 73	G(**O**)LDEN-EYE #44 Bulb 74	GO(**L**)DEN-EYE #44 Bulb 75	GOL(**D**)EN-EYE #44 Bulb 76	GOLD(**E**)N-EYE #44 Bulb 77	GOLDE(**N**)-EYE #44 Bulb 78	GOLDEN-(**E**)YE #44 Bulb 79	GOLDEN-E(**Y**)E #44 Bulb 80



Row and Column Lamp Tests

To initiate, from the **LAMP MENU**, select the "COL" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black Button**. If still in a previous test, select the "PREV" *Icon* to return to Lamp Menu or selecting either of the "ARROW" *Icons* will move through the tests, keep activating until Row or Column Lamp Test (whichever desired) is displayed. In this test, each set of lamps in each row or column of the Lamp Matrix (respective to each test) will light-up on the playfield and is indicated in the display.

Lamp Matrix Location

The lamp locations correspond with the Lamp Number in the Lamp Maxtrix Grid on the previous page.

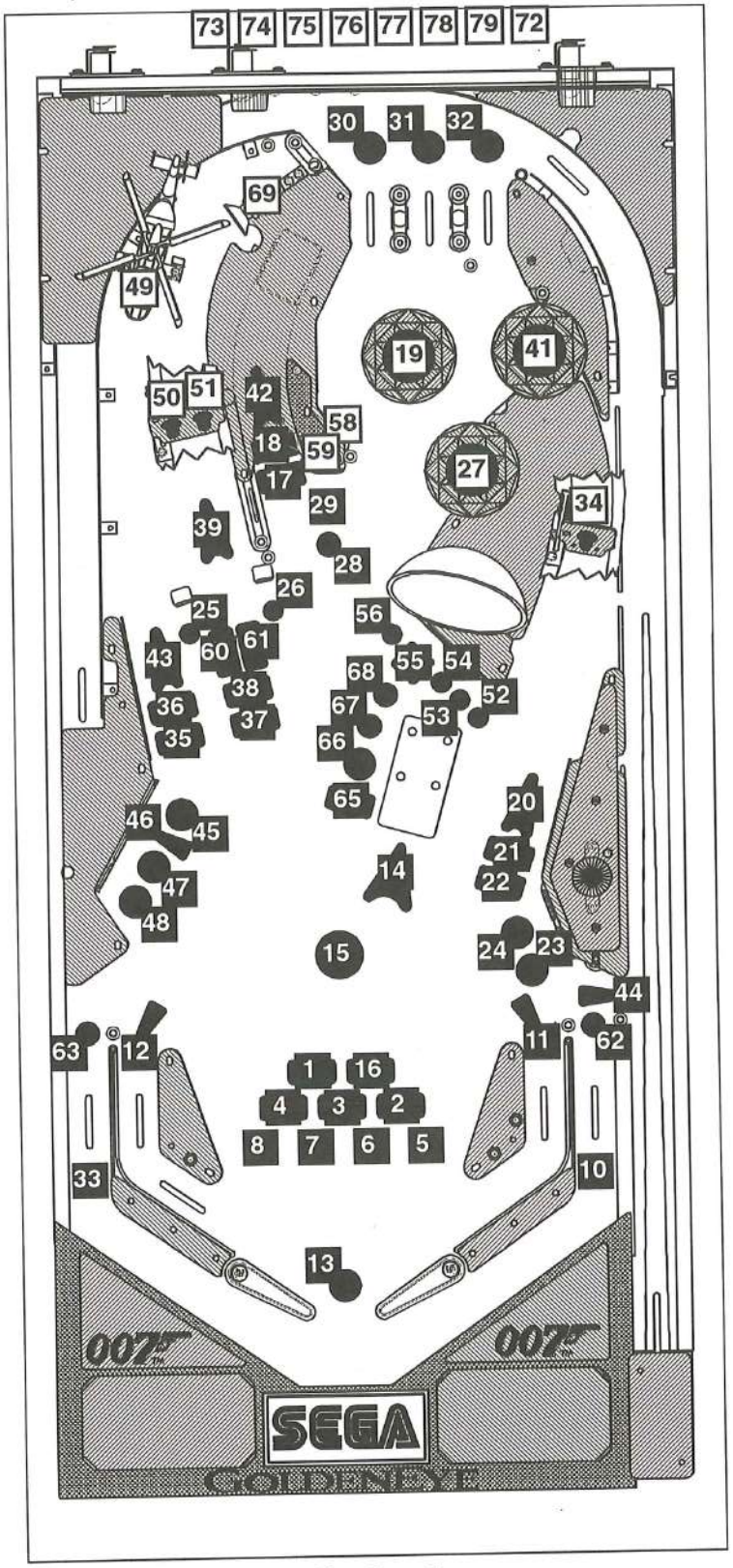
Legend Note:

□ = Lamps mounted above playfield.

■ = Lamps mounted below playfield.

The following Lamps are not used:

9 40 64 70 71



The following Bulb is used on the Light Boards, Bumpers, & Ramp Signs:

#555 Bulb (Wedge)
165-5002-00

The following Bulb is used in the remainder of the matrix:

#44 Bulb (Bayonet)
165-5000-44

TEST FLASH LAMPS

From the **DIAGNOSTICS MENU**, select the "FLASH" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the display will indicated "CYCLING FLASHERS" and all the flash lamps will cycle continuously until the test is exited. This test is allows the technician to easily spot any burned-out bulbs and replace them.

CLEAR BALL TROUGH

From the **DIAGNOSTICS MENU**, select the "CLR" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. This is provided to allow the technician a simple method of removing the balls from the trough and also, to test functionality of the trough, ensuring proper trough operation. After selecting this *Icon* the display will show a graphic of the ball trough with balls in the trough with it's corresponding switch number. Select the "RUN" *Icon* to eject the ball in the first position. Simultaneously, the display and the playfield will eject the ball to the Trough Up-Kicker, eject from the Trough Up-Kicker into the Shooter Lane and will be ejected onto the playfield where the technician can easily retrieve the pinball or allow the ball(s) to re-enter the trough to continue Clear Ball Trough Test.
(⚠ Caution: Continuous use of this test may overheat the Trough Up-Kicker Coil.)

TECHNICIANS ALERTS

From the **DIAGNOSTICS MENU**, select the "TECH" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the display will indicate if there are any faulty switches (i.e., switches that are normally closed but remain open or open switches that have not been closed (activated) in 50 games.)

SERVICE PHONE

From the **DIAGNOSTICS MENU**, select the "SERV" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the display will indicate a phone number to call if technical assistance is required.

BEGIN PLAY TEST

From the **DIAGNOSTICS MENU**, select the "PLAY" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the technician can test certain play functions to insure all switch activated coils function without entering game play. For example, by rolling the ball over the left outlane switch, the Laser Kick should fire. If it kicks to early or too late, the switch actuator should be adjusted to compensate for this error. If it fails to fire, use the Switch Test or Coil Test to help determine the cause of the failure. During this function, similar tests may be performed on the Vertical Up-Kickers, Ejects, Pop Bumpers, etc. in the game. For unique Play Test functions, select the "GAME SPECIFIC" *Icon* in the **DIAGNOSTICS MENU**.

KNOCKER TEST

From the **DIAGNOSTICS MENU**, select the "KNOCKER" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The "Knocker" is sounded.

SOUND/SPEAKER TEST

From the **DIAGNOSTICS MENU**, select the "SPKR" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The BSMT 2000 Sound System produces true digital stereo sound on the Left & Right Speakers (Backbox) and *"Mono"* on the Center Speaker (Bottom of Cabinet). After selecting this *Icon*, select the "-" or "+" *Icons* and press the **Black "ENTER" Button** to activate the first test. Repeat to visually see & hear all tests. Select the "RUN" *Icon* to activate the test chosen without moving to the next test.

During Sound Tests, the display shows the sound board circuit under test and the corresponding sounds. The sound functions allow verification that all channels are functioning properly & that the speaker connections are correct. (Refer to the game manual for detailed testing procedures).

Speaker Phase Testing

Connections to each of the three speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other two, bass frequencies will not be produced properly and the overall sound quality will be poor.

Continued

To test for proper speaker phasing, use the sound test to cycle through the Left, Center, and Right Sine functions. If the Center Sine produces more volume and bass than the Left and Right Sines, the speakers are connected properly. If it produces the same or less, one speaker is connected improperly. To isolate and correct reversed speaker connections, one of two methods may be used.

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the single-color wire (BLK, YEL or RED) is connected to the negative (-) terminal.

2. Disconnect the speaker output connector from the CPU / Sound Board and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers. Make sure the positive battery terminal is connected to the positive lead (CN4- Pin 1, 3 or 6) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

Auto / Manual Tests	Sounds Produced
Left Speaker	Left Sine
Both Left & Right Speakers	Center Sine
Right Speaker	Right Sine
Voice Masked ROM 1 (Loc. U17)	Speech Pattern 1

Auto / Manual Tests	Sounds Produced
Voice Masked ROM 2 (Loc. U21)	Speech Pattern 2
Voice Masked ROM 3 (Loc. U36)	Not Used
Voice Masked ROM 4 (Loc. U37)	Not Used
Sound/OPSYS EPROM (Loc. U7)	Level 1-3 (Music Test)

BEGIN BURN IN

From the **DIAGNOSTICS MENU**, select the "BURN" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the Begin Burn-In Test will start. At this stage the game will exercise all CPU I/O Functions (Dot Matrix Display Test, Coil Testing, Lamp Testing, Sound, etc.). This is provided to constantly exercise sounds, coils, etc... Cumulative Burn-In minutes will be displayed. To reset Burn-In minutes to 00, select the "RESET" *Icon* in the **MAIN MENU** and select the "FACT" *Icon* (Factory Reset). See Chapter 5, Go To Reset Menu, of this section.

DOT MATRIX TEST

From the **DIAGNOSTICS MENU**, select the "DOT TEST" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the Dot Matrix Display Test immediately begins. The display will immediately illuminate and cycle for one pass of each test continuously for each of the following tests (Pressing any button will exit the test and return to **DIAGNOSTICS MENU**.):

1. Illuminates 1 vertical column of dots, turning it off & illuminating the next column, until each column has been individually lit, while the other columns are off.
2. Illuminates 1 horizontal row of dots, turning it off & illuminating the next row, until each row has been individually lit, while the other rows are off.
3. Illuminates all the dots, except for one column from left to right.
4. Illuminates all the dots except for one row from top to bottom.
5. Illuminates every other dot lit, in both the rows and columns.
6. Illuminates all dots at 30%, 70% & 100% brightness.

Dot Matrix Display Explained

The display utilizes a Micro-Processor Control Board mounted in piggyback fashion to the Dot Matrix Display Driver Board. The purpose behind this board is to provide more information (128 X 32 Dots) to the operator as well as displaying graphics to the player.

The board is controlled by a 6809E Microprocessor and its personality ROM (Unique to the Game). It receives Data, Reset & Clock Information from the CPU/Sound Board via the ribbon cable and sends back multiple Status and Busy Signals to the CPU. This is to insure synchronized communication between the CPU and the Display Controller Board. The Drivers for the rows and columns are provided on 5 surface mounted integrated circuits on the Dot Matrix Display Driver Board.

GOLDENEYE SPECIFIC

From the **DIAGNOSTICS MENU**, select the "007" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. After selecting this *Icon* the technician can test and adjust any game specific function(s) from the sub-menu. Similar to "BEGIN PLAY TEST," this menu is used to test the game specific features. The features are the Satellite and Magnet Tests.

Satellite Test

To initiate, from the **GOLDENEYE SPECIFIC MENU**, select the "SAT" *Icon* with either the **Red** or **Green Button** and press the **Black Button**. In Satellite Test the motor will already be running and the magnet "capture mode" will be enabled for a few seconds at which time it will go into "hold mode." This allows you to do a play test by gently tossing a ball into the parabolic dish of the satellite. Press the **Start Button** at any time and the motor and magnet turn off for a few seconds and start over in "capture mode" again. The motor on this mechanism is controlled by a relay driven by Q21 on the I/O Power Driver Bd. The display will also indicate the status of the Satellite Home Switch (Sw. 20) and the Satellite Magnet Switch (Sw. 23) which is transistor Q1 acting as a switch on the Magnet Processor Board. Q1 is switched on by U1 when it senses a ball in the satellite due to a change in the inductance of the magnet coil.

Flipper Magnet Test

To initiate, from the **GOLDENEYE SPECIFIC MENU**, select the "MAG" *Icon* with either the **Red** or **Green Button** and press the **Black Button**. In Magnet Test, press the **Start Button** to operate the Magnet by the flippers. The display will also indicate the status of the Flipper Magnet Switch (Sw. 24) which is transistor Q2 acting as a switch on the Magnet Processor Board. Q2 is switched on by U1 when it senses a ball above the magnet due to a change in the inductance of the magnet coil.

DR. PINBALL (FLOW CHART MENUS)

To initiate, from the **DIAGNOSTICS MENU**, select the Cross "DR." *Icon* with either the **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. This will bring you (the operator / technician) into **DR. PINBALL** (Flow Chart Menus) which offers you a choice of four sub-menus: Flipper "DR.," Coil "DR.," Switch "DR." and Lamp "DR." *Icons*. Selecting a particular sub-menu will give you a choice of which specific Flipper, Coil, Switch or Lamp circuit needs to be diagnosed. The display will now ask a question or give a procedure to follow such as "Does the lamp turn on?" or "Check bridge rectifier BR-20, if short replace." When Dr. Pinball asks a question or request a procedure the Dr. will expect a response such as "no" or "yes" (see below examples of the mini-icons which will prompt the operator). You the operator/technician must respond by using your **Flipper Buttons** to "SELECT" a mini-icon and the **Start Button** to "ENTER" your selection.

The following are the mini-icons with explanations for the Dr. Pinball Sub-Menus to follow:

➦ Select a Coil, Lamp, Switch or Flipper to diagnose with "-" or "+" Icon; Then "RUN." ("QUIT" exits Portals completely.)

➦ Seen when question is being asked on the Display. "END" lets you select a new item to test; "PREV" goes back to previous question. (Help "?" is still under construction.)

➦ Seen when diagnosis is given. "PREV" lets you go back.

➦ In Coil Flow Chart Menu, lets you pulse the coil. "NO," "YES," "END," "PREV," "QUIT" all work the same.

Flipper Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Flipper "DR." *Icon* with either the **Red** or **Green Button** and press the **Black Button**. This is the Flipper Flow Chart. Follow the questions, answering by using the mini-icons in the display.

Coil Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Coil "DR." *Icon* with either the **Red** or **Green Button** and press the **Black Button**. This is the Coil Flow Chart. Follow the questions, answering by using the mini-icons in the display.

Switch Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Switch "DR." *Icon* with either the **Red** or **Green Button** and press the **Black Button**. This is the Switch Flow Chart. Follow the questions, answering by using the mini-icons in the display.

Lamp Flow Chart

To initiate, from the **DR. PINBALL MENU**, select the Lamp "DR." *Icon* with either the **Red** or **Green Button** and press the **Black Button**. This is the Lamp Flow Chart. Follow the questions, answering by using the mini-icons in the display.

Your Notes

GOLDENEYE
GAME AUDIT TABLE

Photocopy for Field Audit Tracking Performance (Use blank column to fill-in game audit information.)

EARNINGS AUDITS 1-12

	Audit Name	Fill-In
1	TOTAL PAID CREDITS	
2	FREE GAME PERCENTAGE	
3	AVERAGE BALL TIME	
4	AVERAGE GAME TIME	
5	COINS THRU LEFT SLOT	
6	COINS THRU RIGHT SLOT	
7	COINS THRU CENTER SLOT	
8	COINS THRU 4TH SLOT	
9	TOTAL COINS	
10	TOTAL EARNINGS	
11	METER CLICKS	
12	SOFTWARE METER	

SEGA AUDITS 13-46

	Audit Name	Fill-In
13	TOTAL BALLS PLAYED	
14	TOTAL EXTRA BALLS	
15	EXTRA BALL PERCENT	
16	REPLAY 1 AWARDS	
17	REPLAY 2+ AWARDS	
18	TOTAL REPLAYS	
19	REPLAY PERCENT	
20	TOTAL SPECIALS	
21	SPECIAL PERCENT	
22	TOTAL MATCHES	
23	HIGH SCORE AWARDS	
24	HIGH SCORE PERCENT	
25	TOTAL FREE PLAYS	
26	TOTAL PLAYS	
27	0.0M—99.9M SCORES	
28	100.0M—199.9M SCORES	
29	200.0M—399.9M SCORES	
30	400.0M—799.9M SCORES	
31	800.0M—1.19B SCORES	
32	1.2B+ SCORES	
33	AVERAGE SCORES	
34	SERVICE CREDITS	
35	PROPRIETARY	
36	PROPRIETARY	
37	PROPRIETARY	
38	TOTAL BUYIN GAMES	
39	EXTRA BALL BUYINS	
40	E.B. BUYIN REPLAYS	
41	EXTRA BALL BUYIN HSTDS	
42	LEFT DRAINS	
43	CENTER DRAINS	
44	RIGHT DRAINS	
45	SLAM TILTS	
46	TOTAL BALLS SAVED	

GOLDENEYE AUDITS 47-90

	Audit Name	Fill-In
47	L STAND-UPS COMPLETE	
48	SHOOTOUT LIT	
49	SHOOTOUT COMPLETE	
50	R STAND-UPS COMPLETE	
51	TANK EJECT SHOTS	
52	SCOOP SHOTS	
53	RIGHT RAMP SHOTS	
54	CENTER RAMP SHOTS	
55	LEFT RAMP SHOTS	
56	EJECT TARGET SHOTS	
57	GOLDENEYE LETTERS	
58	GOLDENEY COMPLETED	
59	007 ENCOUNTERS	
60	MULTIBALL READY	
61	TANK MULTIBALL READY	
62	SCOOP MULTIBALL READY	
63	SATELLITE MULTIBALL	
64	TANK MULTIBALL	
65	TANK MBALL VIA SCOOP	
66	TANK MULTIBALL ABORT	
67	MBALL RESTART LIT	
68	MBALL RESTART AWARDED	
69	MULTIBALL JACKPOTS	
70	SUPER JACKPOTS	
71	SATELLITE JACKPOTS	
72	VIDEO MODE	
73	XENIA EXTRA BALLS	
74	GOLDENEYE	
75	POP BUMPER VISITS	
76	EJECT OR DIE LIT	
77	EJECT OR DIE STARTED	
78	EJECT OR DIE DEATH	
79	LEFT FLIPPER USED	
80	RIGHT FLIPPER USED	
81	PROPRIETARY	
82	TOTAL REGULAR PLAYS	
83	AVG. REGULAR GAME TIME	
84	REGULAR GAME MBALLS	
85	REGULAR GAME REPLAYS	
86	TOTAL NOVICE PLAYS	
87	AVG. NOVICE GAME TIME	
88	NOVICE GAME MBALLS	
89	NOVICE GAME REPLAYS	
90	AVG. NOVICE BALL SAVES	

CPU Version:	
Display Version:	
Replay Level Score:	

Date Audited:	
Audited By:	
Location:	

Go To Audits Menu

Overview

The **Portals™ Service Menu System** provides 90 Audit Functions for accounting purposes and for evaluation of game difficulty adjustments. The Audit Functions are split into 3 groups. The first group, Earnings Audits, are the first 12 most-used audits. The second group, Sega Audits, are the game play generic audits (13-46). The last group, Goldeneye Audits, are the game play specific audits (47-90). Each group may be viewed manually after entering the **Portals™ Service Menu** (see Chapter 1, Introduction, of this section). All audits can be viewed at a glance with the **Game Audit Table** provided on the previous page.

GO TO AUDITS MENU

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "AUD" *Icon* in the **MAIN MENU** with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The **AUDITS MENU** appears.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. If no *Icons* appear in the display because of a testing function or special display (e.g. "Help"), press any button to exit.

Selecting & activating the "QUIT" *Icon* from any display will exit the Service Session.

Selecting & activating the "HELP" *Icon* from any display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

Selecting & activating the "ARROW" *Icons* selects the next or previous audit in the group.

EARNINGS AUDITS (1-12)

From the **AUDITS MENU**, select the "EARN" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Select and activate the "RIGHT ARROW" *Icon* to view the 1st audit in this group. Continue to select either of the "ARROW" *Icons* to view each audit one at a time. The display will describe the audit number, the audit name, and the audit total or value. The current audit will remain in the display until the next audit is chosen or when the sub-menu is exited.

Au. Nº	Audit Name	Audit Definition
Au. 1	Total Paid Credits	Provides the total number of paid credits.
Au. 2	Free Game Percentage	This percentage is derived from dividing Audit 25, Total Free Plays, by Audit 26, Total Plays.
Au. 3	Average Ball Time	In seconds, the average ball time is derived from the total play time divided by Audit 13, Total Balls Played.
Au. 4	Average Game Time	The average game time is expressed in minutes and seconds.
Au. 5	Coins Thru Left Slot	Provides the total amount of coins registered through the left slot.
Au. 6	Coins Thru Right Slot	Provides the total amount of coins registered through the right slot.
Au. 7	Coins Thru Center Slot	Provides the total amount of coins registered through the center slot.
Au. 8	Coins Thru 4th Slot	Provides the total amount of coins registered through the fourth slot.
Au. 9	Total Coins	Provides the total amount of coins registered through all the slots.
Au. 10	Total Earnings	The total cash value accumulated since the last *Factory Restore* occurred (see Chapter 5, Go to Reset Menu, of this section).
Au. 11	Meter Clicks	Provides the total number of money clicks accumulated. (Based on the country's lowest coin denomination used for the game credit.)
Au. 12	Software Meter	Provides the continuing total of Meter Clicks. This audit cannot be reset; the display shows the constant addition of Meter Clicks.

SEGA AUDITS (13-46)

From the **AUDITS MENU**, select the "SEGA" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Select and activate the "RIGHT ARROW" *Icon* to view the 1st audit in this group. Continue to select either of the "ARROW" *Icons* to view each audit one at a time. The display will describe the audit number, the audit name, and the audit total or value. The current audit will remain in the display until the next audit is chosen or when the sub-menu is exited.

Au. Nº	Audit Name	Audit Definition
Au. 13	Total Balls Played	Provides the total of regular and extra balls.
Au. 14	Total Extra Balls	Provides the total number of extra balls awarded.
Au. 15	Extra Balls Percent	This percentage is derived from dividing Audit 14, Total Extra Balls, by Audit 26, Total Plays.
Au. 16	Replay 1 Awards	Provides the total awards (credit, extra ball, or audit) for level 1.
Au. 17	Replay 2+ Awards	Provides the total awards (credit, extra ball, or audit) for level(s) 2 or higher.
Au. 18	Total Replays	Provides the total awards (credits, extra balls, or audit only) for exceeding replay score levels.
Au. 19	Replay Percent	The replay total awards for exceeding replay score levels. This percentage is derived from dividing Audit 18, Total Replays, by Audit 26, Total Plays.
Au.20	Total Specials	Provides the total awards (credits, extra balls, or scores) for making specials.
Au. 21	Special Percent	This percentage is derived from dividing Audit 20, Total Specials, by Audit 26, Total Plays.
Au. 22	Total Matches	Provides the total credits awarded for matching the last two digits of the score with the system-generated Match Number at the end of the game. Percentage of match credits is adjustable from 0% to 10% by Ad. 11, Match Percentage, if enabled. (See Chapter 4, Go to Adjustments Menu, of this section.)
Au. 23	High Score Awards	Provides the total credits awarded for exceeding the High-Score-To-Date scores.
Au. 24	High Score Percent	This percentage is derived from dividing Audit 23, High Score Awards, by Audit 26, Total Plays.
Au. 25	Total Free Plays	Provides the total free credits for replays, High-Score-To-Date, Specials, and Match.
Au. 26	Total Plays	This total is derived by adding the sum of Audit 1, Total Paid Credits, and Audit 25, Total Free Plays. Note that free credits are not recorded in the Audit until they are actually used.
Au. 27	0.0M—99.9M Scores	Provides the total number of games the Player's final score was between 0 and 99,999,990 points.
Au. 28	100.0M—199.9M Scores	Provides the total number of games the Player's final score was between 100,000,000 and 199,999,990 points.
Au. 29	200.0M—399.9M Scores	Provides the total number of games the Player's final score was between 200,000,000 and 399,999,990 points.
Au. 30	400.0M—799.9M Scores	Provides the total number of games the Player's final score was between 400,000,000 and 799,999,990 points.
Au. 31	800.0M—1.19B Scores	Provides the total number of games the Player's final score was between 800,000,000 and 1,199,999,990 points.
Au. 32	1.2B+ Scores	Provides the total number of games the Player's final score was over 1,200,000,000 points.
Au. 33	Average Scores	This total is derived from adding the Final Score of each game to a table and dividing this sum by Audit 26, Total Plays.

Sega Audits Continued.

Audit Name		Audit Definition
Au. 34	Service Credits	Provides the total number of Service credits added to the game. (See Chapter 1, Introduction [*Access & Use*] for instructions on how to receive Service Credits.)
Au. 35, 36, 37	Proprietary	Provides information to the game designer to aid in design development (not for consumer use).
Au. 38	Total Buyin Games	Provides the number of times a player utilized the Buyin Feature. The Buyin Feature is adjustable using Ad. 34, Buyin Type. (See Chapter 4, Go to Adjustments Menu, of this section.)
Au. 39	Extra Ball Buyins	Provides the total number of times the Extra Ball Buyin Feature was used. The Extra Ball Buyin Feature is adjustable using Ad. 34, Buyin Type. (See Chapter 4, Go to Adjustments Menu, of this section.)
Au. 40	E.B. Buyin Replays	Provides the total number of replay awards that resulted from the use of Audit 39, Total Extra Ball Buyins.
Au. 41	Extra Ball Buyin HSTDS	Provides the total number of times in which use of the Extra Ball Buyin Feature resulted from beating the High-Score-To-Date (HSTD).
Au. 42	Left Drains	Provides the number of times the ball drained out the left drain.
Au. 43	Center Drains	Provides the number of times the ball drained out the center drain.
Au. 44	Right Drains	Provides the number of times the ball drained out the right drain.
Au. 45	Slam Tilts	Provides the number of times the Slam Tilt switch was activated.
Au. 46	Total Balls Saved	Provides the total number of times the Total Balls Saved Feature was used. This feature is enabled at the start of each ball and is disabled as soon as the ball makes contact with 5 game switches or allocated time expired.

GOLDENEYE AUDITS (47-90)

From the **AUDITS MENU**, select the "007" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Select and activate the "RIGHT ARROW" *Icon* to view the 1st audit in this group. Continue to select either of the "ARROW" *Icons* to view each audit one at a time. The display will describe the audit number, the audit name, and the audit total or value. The current audit will remain in the display until the next audit is chosen or when the sub-menu is exited.

Au. №	Audit Name	Audit Definition
Au. 47	L Stand-Ups Complete	Provides the total number of times the Left Stand-Up Targets were completed as a set.
Au. 48	Shootout Lit	Provides the total number of times the Shootout Lit Mode was lit.
Au. 49	Shootout Complete	Provides the total number of times the Shootout Video Mode was completed.
Au. 50	R Stand-Ups Complete	Provides the total number of times the Right Stand-Up Targets were completed as a set.
Au. 51	Tank Eject Shots	Provides the total number of times the ball went through the Trap Door via the Right Ramp and was ejected to the Top Lanes or Shooter Lane.
Au. 52	Scoop Shots	Provides the total number of times the ball was ejected from the Scoop.
Au. 53	Right Ramp Shots	Provides the total number of times the ball entered and exited the Right Ramp (not through the Trap Door).
Au. 54	Center Ramp Shots	Provides the total number of times the ball entered and exited the Center Ramp.
Au. 55	Left Ramp Shots	Provides the total number of times the ball entered and exited the Left Ramp.

Goldeneye Audits Continued.

	Audit Name	Audit Definition
Au. 56	Eject Target Shots	Provides the number of times the ball shot hit the Eject Target.
Au. 57	Goldeneye Letters	Provides the number of times the Goldeneye Letters were collected.
Au. 58	Goldeneye Completed	Provides the number of times the Goldeneye Feature was completed.
Au. 59	007 Encounters	Provides the number of times the 007 Encounters Feature was completed.
Au. 60	Multiball Ready	Provides the number of times Regular Multiball was ready to be collected.
Au. 61	Tank Multiball Ready	Provides the number of times the Tank Multiball was ready to be collected using the Right Ramp via the Trap Door.
Au. 62	Scoop Multiball Ready	Provides the number of times Scoop Multiball was ready to be collected using the Scoop.
Au. 63	Satellite Multiball	Provides the number of times Satellite Multiball was ready to be collected using the Satellite.
Au. 64	Tank Multiball	Provides the number of times Tank Multiball was completed.
Au. 65	Tank MBall via Scoop	Provides the number of times Tank Multiball was completed via the Scoop.
Au. 66	Tank Multiball Abort	Provides the number of times Tank Multiball was aborted using the Gun Trigger.
Au. 67	MBall Restart Lit	Provides the number of times Multiball Restart was lit.
Au. 68	MBall Restart Awarded	Provides the number of times Multiball Restart was collected.
Au. 69	Multiball Jackpots	Provides the number of times Jackpots were collected during Multiball.
Au. 70	Super Jackpots	Provides the number of times Super Jackpots were collected during Multiball.
Au. 71	Satellite Jackpots	Provides the number of times Jackpots were collected during Multiball via the Satellite.
Au. 72	Video Mode	Provides the number of times the Video Mode was played.
Au. 73	Xenia Extra Balls	Provides the number of times Xenia Extra Balls were awarded.
Au. 74	Goldeneye	Provides the number of times the Goldeneye Final Feature was played.
Au. 75	Pop Bumper Visits	Provides the number of times the ball entered the Pop Bumpers. Multiple hits on the bumpers count as one visit until any other switch is closed.
Au. 76	Eject or Die Lit	Provides the number of times the Eject or Die Feature was lit.
Au. 77	Eject or Die Started	Provides the number of times the Eject or Die Feature was started.
Au. 78	Eject or Die Death	Provides the number of times the Eject or Die Feature resulted in death.
Au. 79	Left Flipper Used	Provides the number of times the Left Flipper was activated.
Au. 80	Right Flipper Used	Provides the number of times the Right Flipper was activated.
Au. 81	Proprietary	Provides information to the game designer to aid in design development (not for consumer use).
Au. 82	Total Regular Plays	Provides the total Regular Games were played.
Au. 83	Avg. Regular Game Time	Provides the average game time of Regular played games.
Au. 84	Regular Game MBalls	Provides the number of times Multiballs were played in a Regular Game.
Au. 85	Regular Game Replays	Provides the number of times replays were awarded in a Regular Game.
Au. 86	Total Novice Plays	Provides the total Novice Games were played.

Goldeneye Audits Continued.

Audit Name		Audit Definition
Au. 87	**Avg. Novice Game Time**	Provides the average game time of Novice played games.
Au. 88	**Novice Game MBalls**	Provides the number of times Multiballs were played in a Novice Game.
Au. 89	**Novice Game Replays**	Provides the number of times replays were awarded in a Novice Game.
Au. 90	**Avg. Novice Ball Saves**	Provides the average number of times the Feature "Ball Save" (Freeze) was used to maintain the ball time criteria for a Novice Game.

Audit Note: 1st Way to Reset Audits

To reset audits, from the **MAIN MENU**, select the "ADJ" *Icon*. See Chapter 4, Go to Adjustments Menu, of this section.

Select the "SEGA" *Icon*, from the **ADJUSTMENT MENU**, and advance to Adj. 8, Reset Coin Audits, with the "RIGHT ARROW" *Icon*. Select the "+" *Icon* to change setting to **YES**. When enabled, the *Coin Audits* (5-11) will be reset to zero.

Advance to Adj. 9, Reset Game Audits, with the "RIGHT ARROW" *Icon*. Select the "+" *Icon* to change setting to **YES**. When enabled, *all the audits* will be reset to zero, except for the *Coin Audits* (5-11) and Audit 12, Software Meter (the only audit which cannot be reset to zero).

Audit Note: 2nd Way to Reset Audits

To reset audits, from the **MAIN MENU**, select the "RESET" *Icon*. See Chapter 5, Go to Reset Menu, of this section.

Selection of the "COIN" *Icon*, from the **RESET MENU**, will reset the *Coin Audits* (5-11) to zero.

Selection of the "AUD" *Icon*, from the **RESET MENU**, will reset all audits to zero, except for the *Coin Audits* (5-11) and Audit 12, Software Meter (the only audit which cannot be reset to zero).

GOLDENEYE
GAME ADJUSTMENT TABLE

007

Some adjustments have a "Drop-Down" Table where further customization is required.

SEGA ADJUSTMENTS 1-43

	Adjustment Name	Factory Setting		Adjustment Name	Factory Setting
1	REPLAYS: FIXED/MANUAL *"Drop-Down"*	10%	23	DEFAULT HIGH SCORE #3	1,950,000,000
2	REPLAY LEVELS *"Drop-Down"*	1	24	DEFAULT HIGH SCORE #4	1,800,000,000
3	REPLAY AWARD	CREDIT	25	DEFAULT HIGH SCORE #5	1,650,000,000
4	FREE GAME LIMIT	5	26	DEFAULT HIGH SCORE #6	1,500,000,000
5	EXTRA BALL LIMIT	3	27	HSTD RESET COUNT	2,000
6	GAME DIFFICULTY *"Drop-Down"*	MODERATE	28	FREE PLAY	NO
7	GAME PRICING *"Drop-Down"*	USA7	29	CUSTOM MESSAGE	ON
8	RESET COIN AUDITS	NO	30	ATTRACT MODE MUSIC	ON
9	RESET GAME AUDITS	NO	31	FLASH LAMP POWER	NORMAL
10	RESET HIGH SCORES	NO	32	COIL PULSE POWER	NORMAL
11	MATCH PERCENTAGE	9%	33	MINIMUM GAME TIME	OFF
12	BALLS PER GAME	3	34	BUYIN TYPE	OFF
13	TILT WARNINGS	1	35	EXTRA BALL BUYIN COUNT	1
14	REPLAY BOOST	YES	36	GAME RESTART	YES
15	CREDIT LIMIT	30	37	EXTRA BALL PERCENTAGE	25%
16	ALLOW HIGH SCORES	YES	38	BILL VALIDATOR	NO
17	HIGH SCORE #1 AWARDS	3	39	TOURNAMENT MODE	NONE
18	HIGH SCORE #2 AWARDS	1	40	EUROPEAN TOKEN DISPENSER	OFF
19	HIGH SCORE #3 AWARDS	0	41	SPECIAL MEMORY	YES
20	HIGH SCORE #4 AWARDS	0	42	LOCATION ID	00
21	DEFAULT HIGH SCORE #1	2,400,000,000	43	GAME ID	00
22	DEFAULT HIGH SCORE #2	2,100,000,000			

GOLDENEYE ADJUSTMENTS 44-51

	Adjustment Name	Factory Setting		Adjustment Name	Factory Setting
44	MBALL RESTART	MODERATE	51	NOVICE MODE ENABLED	YES
45	EXTRA BALL MEMORY	ON			
46	LOCK BALL CRITERION	MODERATE			
47	"DIE" KILLS FLIPPERS	YES			
48	SATELLITE ENABLED	YES			
49	RIGHT RAMP FEEDS POPS	NO			
50	GUN ENABLED IN SHOOTOUT	YES			

Go To Adjustments Menu

Overview

The **Portals™ Service Menu System** provides 51 Adjustment Functions to vary game difficulty or customize (i.e. adjusting High Score Levels, the number of balls per game, Extra Ball Buyin, Game Pricing, Default High Scores, etc.). The Adjustment Functions are split into 2 groups. The first group, Sega Adjustments, are the game play generic adjustments (1-43). The second group, Goldeneye Adjustments, are the game play specific adjustments (44-51). Each group may be viewed manually after entering the **Portals™ Service Menu** (see Chapter 1, Introduction, of this section). All adjustments can be viewed at a glance with the **Game Adjustment Table** provided on the previous page. If a value is changed, the display will indicate **REQUEST INSTALLED**.

GO TO ADJUSTMENTS MENU

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "ADJ" *Icon* in the **MAIN MENU** with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The **ADJUSTMENTS MENU** appears.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. If no *Icons* appear in the display because of a testing function or special display (e.g. "Help"), press any button to exit.

Selecting & activating the "HELP" *Icon* from any display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

Selecting & activating the "QUIT" *Icon* from any display will exit the Service Session.

In Adjustments, selecting & activating the "-" *Icon* decrements the value setting. Selecting & activating the "+" *Icon* increments the value setting.

Selecting & activating the "ARROW" *Icons* selects the next or previous adj. in the group.

SEGA ADJUSTMENTS (1-43)

From the **ADJUSTMENTS MENU**, select the "SEGA" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Select and activate the "RIGHT ARROW" *Icon* to view the 1st adjustment in this group. Continue to select either of the "ARROW" *Icons* to view each adjustment one at a time. Select either the "-" or "+" *Icons* to change the value, if desired. The display will describe the adjustment number, the adjustment name, and the adjustment total or value. The current adjustment will remain in the display until the next adjustment is chosen or when the sub-menu is exited.

Adj. Nº	Adjustment Name	Adjustment Definition
Adj. 1	Replays: Fixed / Manual	Adjust for percentage of awards for Replay Levels (1% through 50%). Lower the automatic value to 0% and the display will indicated Fixed. Replays may be adjusted either for fixed levels or for a system-adjusted manual percentage of replay awards. Four levels may be selected. Adjustments allow awarding of a credit or an extra ball as each level is exceeded. With the manual percentage feature, if the actual replay percentage is higher or lower than that desired, the game computes new recommended manual percentage score(s). When the coin door is subsequently opened the player displays indicate the recommended level and a sound is made to alert the operator of a potential change. This new level is entered into adjustments simply by pressing the **Black "ENTER" Button**. (If the coin door is closed or the operator enters the Portals™ Service Menu, the replay level is not changed.)
Adj. 2	Replay Levels	Adjust the number of replay levels to be active (1 to 4). Once the number of Replay Levels has been selected, a "Drop-Down" Table appears showing Replay Level 1. Adjust Replay Level 1 between 100M - 9.99B. Adjust Replay Level 2, 3 and/or 4 respectively.

Sega Adjustments Continued.

Adjustment Name		Adjustment Definition
Adj. 3	**Replay Award**	Set for replays to award: **CREDIT, EXTRA BALL, NONE** or **SPECIAL** (When score threshold is achieved, a Playfield Special is lit.)
Adj. 4	**Free Game Limit**	Adjust the max. # of free games that may be accumulated per game; **0 - 9**.
Adj. 5	**Extra Ball Limit**	Adjust the max. # of extra balls that may be accumulated per game; **1 - 9** or **OFF**.
Adj. 6	**Game Difficulty**	Set to **EXTRA EASY, EASY, MODERATE, HARD** or **EXTRA HARD.** *(Note: Additional game features which are not adjusted may also change when adjusting this adjustment; see below table.)* Default is **MODERATE**. Any one of the ***INSTALL*** settings (in a "Drop-Down" Table) for this adjustment may be activated to automatically select settings for multiple adjustments affecting game difficulty. Select and activate the "-" or "+" *Icons* to choose the difficulty level required. After activation, the individual adjustments may be readjusted, if desired. Refer to the **Install Adjustment Table** below for details.

Adjustments which change when set to:	Adj. 6 Extra Easy	Adj. 6 Easy	Adj. 6 Moderate	Adj. 6 Hard	Adj. 6 Extra Hard
(44) MBall Restart	EXTRA EASY	EASY	EASY	HARD	EXTRA HARD
(45) Extra Ball Memory	ON	ON	ON	ON	OFF
(46) Lock Ball Criterion	EXTRA EASY	EASY	EASY	HARD	EXTRA HARD
(47) "Die" Kills Flippers	NO	NO	YES	YES	YES

Play Rules: Novelty & 5-Ball, plus Add-A-Ball Settings

The following three combinations are recommended for situations where local laws restrict certain game features regarding the use of replays or the number of balls per game:

Novelty Play Rules - Set to establish recommended settings for no free play or extra balls:

Adj.	*Adjustment Name*	*Setting*	*Adj.*	*Adjustment Name*	*Setting*
1	Replays: Fixed/Manual	Fixed	5	Extra Ball Limit	00
2	Replay Levels	None	11	Match Percentage	Off
3	Replay Award	None	17	High Score #1 Awards	3
4	Free Game Limit	00	18	High Score #2 Awards	1

5-Ball Play Rules - Set to establish recommended settings for 5-ball play:

Adj.	Adjustment Name	*Setting*	*Adj.*	Adjustment Name	*Setting*
1	Replays: Fixed/Manual	07%	5	Extra Ball Limit	3
2	Replay Levels	1	11	Match Percentage	4
3	Replay Award	Credit	12	Balls Per Game	5
4	Free Game Limit	5	17	High Score #1 Awards	3
			18	High Score #2 Awards	1

Add-A-Ball Settings-To disable awarding of credits and provide awards with an extra ball:

Adj.	*Adjustment Name*	*Setting*	*Adj.*	*Adjustment Name*	*Setting*
3	Replay Award	Extra Ball	16	Allow High Scores	No
4	Free Game Limit	00	17-20	High Score #1 - #4 Awards	00
11	Match Percentage	Off			

Adjustment Name	Adjustment Definition
Adj. 7 Game Pricing	There are two methods available for coin switch programming: Standard & Custom. Standard pricing uses a single adjustment as seen in the first display. See the Standard Pricing Table. If "Custom" is selected, a "Drop-Down" Table appears. Select a pricing scheme shown in the **Custom Pricing Table** as seen below.

With Adjustment 7 set to **CUSTOM** operating the Enter Button again initiates a drop down menu representing coin switch pulses for the left, right, center and fourth coin slots. The prescribed the number of pulses are required for one credit. For example, if *Left Coin Pulses,* was set to 02 and *Coin Switch Pulses Required for 1 Credit*, to 01 a coin in the left slot would produce two credits. Further, if *Left Coin Pulses,* was set to 01 and *Coin Switch Pulses Required for 1 Credit*, to 02, two coins in the left slot would be required for one credit.

Coin Switch Pulses Required for Bonus Credit may be set to post bonus credits when a minimum amount of coins are inserted at one time. For example, if *Left Coin Pulses* was set to 01, *Coin Switch Pulses Required for 1 Credit* to 01 and *Coin Switch Pulses Required for Bonus Credit* to 04, one credit would be posted for each of the first three coins in the left slot and two credits for the fourth coin.

Standard/Custom Pricing - Set for the desired pricing scheme from the Standard Pricing Table as indicated on the dot matrix display. For Custom Pricing, set to **CUSTOM**. When set to **CUSTOM**, the following adjustments are utilized to tailor each individual coin chute.

Left Coin Switch Pulses - Set the number of pulses registered for closure of the left coin switch; **00** to **99**.

Right Coin Switch Pulses - Set the number of pulses registered for closure of the right coin switch; **00** to **99**.

Center Coin Switch Pulses - Set the number of pulses registered for closure of the center coin switch; **00** to **99**.

4th Coin Switch Pulses - Set the number of pulses registered for closure of the fourth coin switch; **00** to **99**.

Coin Switch Pulses Required for 1 Credit - Set the number of coin switch pulses required to post one credit; **00** to **99**.

Coin Switch Pulses Required for Bonus Credit - Set the number of coin switch pulses required to award the 1st bonus credit(s); **00** to **99**.

Coin Switch Pulses Required for 2nd Bonus Credit - Set the number of coin switch pulses required to award the 2nd bonus credit; **00** to **99**.

Credits awarded for 1st Bonus - Set the number of credits awarded for achieving the first Bonus level; **00** to **99**.

Custom Pricing Table

Coin Mechs					Adjustments							
Left	Right	Center	4th	*Plays/Coins*	Left Pulses	Right Pulses	Mid Pulses	4th Pulses	Pulses /Credit	Pulses /Bonus	Pulses /2nd Bonus	Credit /1st Bonus
25¢	25¢	$1.00	N/U	1/25¢ 3/50¢ 1/25¢ 5/$1.00 1/25¢ 6/$1.00	01 01 05	01 01 05	04 04 20	00 00 00	01 01 04	02 04 20	00 00 00	01 01 01
5*SCH*	10*SCH*	10*SCH*	N/U	1/10 S 1/10 S 4/30 S	01 04	02 08	02 08	00 00	02 06	00 00	00 00	00 00
10*p*	£1	50*p*	20*p*	1/30*p* 2/50*p* 5/£1 1/50*p* 3/£1 1/30*p* 4/£1	01 01 01	15 15 12	06 05 05	02 02 02	03 05 03	00 00 00	00 00 00	00 00 00
20¢	$1.00	N/U	N/U	1/60¢ 2/$1.00	01	05	00	00	03	05	00	01

Standard Pricing Table

on the next page.

Standard Pricing Table

Adj. 7 Standard Pricing Select	Coin Mechanisms				Pricing Scheme Explained *Number of "Plays" for Price Amount Shown*			
	Left 1st Slot	Center 2nd Slot	Right 3rd Slot	Right 4th Slot				
USA 1	25¢	$1	25¢		1/25¢			
USA 2	25¢	$1	25¢		1/50¢	2/75¢	3/$1	
USA 3	25¢	$1	25¢		1/50¢			
USA 4	25¢		25¢		1/50¢			
USA 5	25¢	$1	25¢		1/50¢	5/$2		
USA 6	25¢	$1	25¢		1/50¢	2/'4X25¢'	3/$1(bill) ← Used to promote the Bill Validator	
USA 7 ★	25¢	$1	25¢		1/50¢	4/$1.50	6/$2	
Austria	5S	10S	10S		1/10S	2/15S	3/20S	
Australia	20¢	$A 1	$A 2		1/$A 1	2/$A 2		
Australia 2	20¢	$A 1	$A 2		1/$A 1	2/$A 2		
Belgium	5 BF	20 BF	50 BF		1/20 BF	3/50 BF		
Canada	25¢	25¢	Can$ 1		1/50¢	2/75¢	3/Can$ 1	
Denmark 1	1DKr	5 DKr	10 DKr	20 DKr	1/3 DKr	2/5 DKr		
Denmark 2	1DKr	5 DKr	10 DKr	20 DKr	1/2 DKr	3/5 DKr	7/10 DKr	
Finland	1Fmk	5Fmk			1/5Fmk	4/10Fmk		
France 1 ★	1 Fr	5 Fr	10 Fr	20 Fr	1/3 Fr	2/5 Fr	5/10 Fr	11/20 Fr
France 2	1 Fr	5 Fr	10 Fr	20 Fr	1/5 Fr	3/10 Fr	7/20 Fr	
France 3	1 Fr	5 Fr	10 Fr	20 Fr	1/3 Fr	2/5 Fr	4/10 Fr	9/20 Fr
Germany 1	1DM	2DM	5DM		1/1 DM	5/5DM		
Germany 2	1DM	2DM	5DM		1/1DM	6/5DM		
Germany 3 ★	1DM	2DM	5DM		1/2DM	2/3DM	3/4DM6	6/6DM
Greece	50Dr		100Dr		1/50Dr	3/100Dr		
Holland (See Netherlands)								
Hungary	10 Ft	10 Ft	20 Ft		1/20 Ft	3/40 Ft		
Italy 1	500 Lit		500 Lit		1/500 Lit			
Italy 2	500 Lit		500 Lit		1/1000 Lit	3/2000 Lit		
Japan			100¥		1/100¥	3/200¥		
Korea	100Won		100Won		1/100Won			
Netherlands 1	1 Fls.	1 Fls.	2.5 Fls.		1/1Fls.	3/2.5 Fls.		
Netherlands 2 ★	1 Fls.	2.5 Fls.	5 Fls.		1/1Fls.	3/2.5 Fls.	6/5 Fls.	
New Zealand 1	$NZ 1		$NZ 2		1/$NZ 1	2/$NZ 2		
New Zealand 2	$NZ 1		$NZ 2		1/$NZ 1	3/$NZ 2		
Norway 1	10 NKr	5 NKr	20 NKr		2/10 NKr	1/5 NKr	4/20 NKr	
Norway 2	10 NKr	5 NKr	20 NKr		1/10 NKr	3/20 NKr		
Spain	100Pts		500Pts		1/100Pts	6/500Pts		
Sweden	1 SKr	5 SKr	10 SKr		1/10 SKr	2/15 SKr	3/20 SKr	
Switzerland 1 ★	1 SwF	2 SwF	5 SwF		1/1 SwF	6/5 SwF		
Switzerland 2	1 SwF	2 SwF	5 SwF		1/1 SwF	3/2 SwF	9/5 SwF	
UK 1	10p	50p	1£	20p	1/50p	3/1£		
UK 2	10p	50p	1£	20p	1/40p	3/1£		
UK 3 ★	10p	50p	1£	20p	1/50p			
Yugoslavia	5 Din		5 Din		1/5 Din			

★ ***Default Factory Setting***

Sega Adjustments Continued.

Adjustment Name		Adjustment Definition
Adj. 8	**Reset Coin Audits**	Default is **NO**. Select the "+" *Icon* to change to **YES**. ⚠ When enabled, all *Coin Audits* (Audits 5-11), will be reset to zero.
Adj. 9	**Reset Game Audits**	Default is **NO**. Select the "+" *Icon* to change to **YES**. ⚠ When enabled, all audits will be reset to zero, except for the *Coin Audits* (Audits 5-11) and Audit 12, Software Meter (the only audit which cannot be reset to zero).
Adj. 10	**Reset High Scores**	When enabled (set to YES) the High Score Levels and associated initials will be restored to the backup settings when the "+" *Icon* is selected and activated.
Adj. 11	**Match Percentage**	Set Match percent from **00%** to **10%** or **OFF**. At **00**% the match display occurs at the end of the game but never awards a credit.
Adj. 12	**Balls Per Game**	Adjust the number of balls per game; **2** to **5**. Default is **3**.
Adj. 13	**Tilt Warnings**	Adjust the number of plumb bob tilt switch closures before the ball in play is tilted; **1**, **2**, **3** or **OFF.**
Adj. 14	**Replay Boost**	Set to **YES** or **NO**. When set to **YES**, exceeding a replay will set a temporary replay level for each time a replay level is surpassed. This new level will equal the previous replay level (when the replay was awarded) plus 50 Million for each following game, until the replays have all been played. At this time the previous level is resumed.
Adj. 15	**Credit Limit**	Adjust the maximum number of credits that may be posted; **4** to **50**. Default is **30**.

Note: There are 4 of the 6 High Score Levels with associated player initials that are displayed during the attract mode. This provides a High-Score-To-Date feature. When players exceed these levels, the player initials may be entered to replace the previous ones. These levels may be adjusted to award credits and to be reset to backup values after a selected number of games.

Adj. 16	**Allow High Scores**	Set to enable (set to **YES**) or disable the four high score levels by setting to zero.
Adj. 17	**High Score #1 Awards**	Adjust the number of awards (**0** to **4**) awarded for exceeding level 1 (the highest of the four levels).
Adj. 18	**High Score #2 Awards**	Adjust the number of awards (**0** to **3**) awarded for exceeding level 2.
Adj. 19	**High Score #3 Awards**	Adjust the number of awards (**0** to **2**) awarded for exceeding level 3.
Adj. 20	**High Score #4 Awards**	Adjust the number of awards (**0** to **1**) awarded for exceeding level 4.
Adj. 21-26	**Default High Score #1 - #6**	Adjust the score level to which the world record, (level 1) (the highest of the four levels) may be altered. This adjustment is not affected by Adj. 27, HSTD Reset Count. Adjust the backup score to which levels **2 - 6** may be reset, respectively.
Adj. 27	**HSTD Reset Count**	**HSTD** (**H**igh **S**core **T**o **D**ate). Adjust the number of games between automatic resets of high score levels to backup settings and ball time averager adjustments; **100** to **9,900** or **OFF** (no reset or adjustment). Default is **2,000**.
Adj. 28	**Free Play**	When set to **YES**, no coins are required for games.
Adj. 29	**Custom Message**	Set to **ON** or **OFF**. When set to **ON**, this function is used to establish a custom message periodically displayed during the attract mode. Set the feature to **CHANGE** selecting the "+" *Icon* The letter A is indicated in the first position in the display. Vary the letter by operating the left and right flippers. With the desired letter indicated, depress the **Start Button** to lock in the letter and advance to the next character. Repeat this procedure until the desired message is completed in the display.
Adj. 30	**Attract Mode Music**	Set to **ON** or **OFF**. When set to **ON**, attraction music is played between games.

Adjustment Name		Adjustment Definition
Adj. 31	Flash Lamp Power	Set to **NORMAL**, **DIM** or **OFF**. When set to **NORMAL** the flash lamps are active, when **DIM** the flash lamps impulse power is reduced by **25%** and when **OFF** the flash lamps will not flash.
Adj. 32	Coil Pulse Power	Set to **NORMAL, HARD** or **SOFT**. When **HARD** the coil pulse power is ***increased*** by **12.5%** of the normal pulse rate. When set to **SOFT** the coil pulse power is ***decreased*** by **12.5%** of the normal pulse rate. These adjustments are provided to compensate for Low Line or High Line voltage conditions where the solenoids appear to kicking too weak or too hard. Adjust as required.
Adj. 33	Minimum Game Time	Default is **OFF**. Set between **0:01 - 8:59** for minimum game time. If the last ball in play drains prior to what the game time is set for, another ball will be served into the shooter lane and normal play will continue. Subsequent balls will continue to do be served into the shooter lane if the last ball still drains prior to and up until minimum game time is satisfied.
Adj. 34	Buyin Type	Set to **Extra Ball Buyin**. When set to **EXTRA BALL**, the game is set to Extra Ball Buyin. When set to **FEATURE,** the game is set to Game (Feature) Buyin. Set to **OFF** to make Buyin Type inoperative.
Adj. 35	Extra Ball Buyin Count	**1**, **0** or **UNLIMITED**. Default is **1**. Allows the operator to adjust the number of Extra Ball Buyins allowed after normal game play. Review Section 2, Chapter 1, Game Operations & Features for details.
Adj. 36	Game Restart	Set to **YES** or **NO**. When set to **YES**, a new game may be started during any ball after the first ball is completed (if credits are available). (Note-Pressing start during the first ball will add additional players.) When set to **NO**, the game disables the **Start Button** after the first ball until the final ball is in play. Review Section 2, Chapter 1, Game Operations & Features for details.
Adj. 37	Extra Ball Percentage	Set from **0** to **50**. Allows the operator to adjust how frequently the Extra Ball feature is made available to the player.
Adj. 38	Bill Validator	Set to **YES** or **NO**. When set to **YES ,** the display, in game attract mode, will show an "*Insert Bill Animation*". When set to **NO,** the display, in game attract mode will show "*Insert Coin Animation*".
Adj. 39	Tournament Mode	Set to **NONE, PINBALL EXPO, IFPA-PAPA** or **HOME**. Tournament Mode determines the default conditions to quickly prepare a game for tournament play. When this setting is changed all audits will be reset and all adjustments will be initiated to the particular style selected. The game will then return to game over attract mode, as if a Factory Reset had been performed. **NONE** - Same as a Factory Reset conditions. **IFPA**-Straight 50¢ play, no replay, no Extra Ball, no High Scores, 2 Tilt Warnings and No Match. **PINBALL EXPO-PAPA-** Same as **IFPA** settings except Free Play is enabled. **HOME**-Sets game for Free Play, extra ball play, no replay, **10%** Match & Extra Ball percent **30%**.
Adj. 40	European Token Dispenser	Set to **ON** or **OFF**. When set to **ON**, the operator can enable the "knocker" cable in the cabinet to drive an external device without the game giving a replay.
Adj. 41	Special Memory	Set to **YES** or **NO**. When set to **YES**, the lit 'Special' light will be retained in memory from ball to ball for the same player. When set to **NO**, the lit 'Special' light will go out at the end of each ball.
Adj. 42	Location ID	**00** to **9999**. Allows the operator to assign a location identification number to the audit print-out sheet. (Will not be affected by Factory Reset.) See Chp. 5, Go to Reset Menu & Chp. 6, Go to Printer Menu, of this section for more details on Factory Reset & Printing.
Adj. 43	Game ID	**00** to **9999**. Allows the operator to assign a game identification number to the audit print-out sheet. (Will not be affected by Factory Reset.) See Chp. 5, Go to Reset Menu & Chp. 6, Go to Printer Menu, of this section for more details on Factory Reset & Printing.

GOLDENEYE ADJUSTMENTS (44-51)

From the **ADJUSTMENTS MENU**, select the "007" *Icon* with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. Select and activate the "RIGHT ARROW" *Icon* to view the 1st adjustment in this group. Continue to select either of the "ARROW" *Icons* to view each adjustment one at a time. Select either the "-" or "+" *Icons* to change the value, if desired. The display will describe the adjustment number, the adjustment name, and the adjustment total or value. The current adjustment will remain in the display until the next adjustment is chosen or when the sub-menu is exited.

Adj. Nº	Adjustment Name	Adjustment Definition
Adj. 44	**MBall Restart**	Set to **EXEASY, EASY, MODERATE, HARD** or **EXHARD**. Default is **EASY**. Determines how Multiball can restart.
Adj. 45	**Extra Ball Memory**	Set to **ON** or **OFF**. Default is **ON**. When set to **ON**, the lit 'Extra Ball' light will be retained in memory from ball to ball for the same player. When set to **OFF**, the lit 'Extra Ball' light will go out at the end of each ball.
Adj. 46	**Lock Ball Criterion**	Set to **EXEASY, EASY, MODERATE, HARD** or **EXHARD**. Default is **MODERATE**. Determines how the Lock Ball Feature is played.
Adj. 47	**"Die" Kills Flippers**	Set to **YES** or **NO**. Default is **Yes**. When set to **YES** in the Eject or Die Feature, if the player fails to complete, the game kills the flippers and ends that ball (much like "tilting").
Adj. 48	**Satellite Enabled**	Set to **YES** or **NO**. Default is **Yes**. When set to **YES**, the Satellite functions (motor & magnet) are enabled. When set to **NO**, these functions are turned off. Use this adjustment in the event the Satellite fails, so game play can continue until the Satellite is repaired or replaced.
Adj. 49	**Right Ramp Feeds Pops**	Set to **YES** or **NO**. Default is **No**. When set to **YES**, in Single Ball Play, the ball shot to the Right Ramp will automatically be diverted through the trap door under the tank, ejected into the orbit around to the Shooter Lane, with the Auto Ball Launch then firing the ball back into the Pop Bumper area. When set to **NO**, the ball is diverted into the trap door according to Standard Game Rules.
Adj. 50	**Gun Enabled In Shootout**	Set to **YES** or **NO**. Default is **Yes**. When set to **YES**, the Auto Ball Launch will fire in the Shootout Video Mode.
Adj. 51	**Novice Mode Enabled**	Set to **YES** or **NO**. Default is **Yes**. When set to **YES**, before game play, the player can choose Novice Play (a 1-Ball Game with a guaranteed play time). When set to **NO**, this feature is turned off, and defaults to Regular Game Play.

Custom Pricing

To go directly to Adjustment 7, Game Pricing, from the **ADJUSTMENT MENU**, select the "CUST" *Icon* either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. See details of this adjustment (Adj. 7) earlier in this chapter.

Film Star Reset

To reset the game with special settings (not the normal Factory Setting), from the **ADJUSTMENT MENU**, select the "STAR" *Icon* either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. This setting is determined to be ideal for the home environment. See Chapter 5, Go to Reset Menu, of this section, to change to factory defaults if changes made are not desired.

Adjustment Note: Resetting Adjustments

To reset adjustments, from the **MAIN MENU** select the "RESET" *Icon*. See Chapter 5, Go to Reset Menu, of this section.

Selection of the "FACT" *Icon*, from the **RESET MENU**, will reset all adjustments to the *Factory Settings* (except for Proprietary Adjustments). The display will return to the **Attract Mode**. To perform any other functions, the system must be entered again by pressing the **Black "BEGIN TEST" Button** on the coin door (see Chapter 1, Introduction, of this section).

Adjustment Note: Printing Game Information

To print audits, from the **MAIN MENU** select the "PRNT" *Icon*. See Chapter 6, Go to Printer Menu, of this section (special equipment required).

Selection of the "QUIK" *Icon*, from the **PRINTER MENU**, will start a quick print.

Selection of the "ALISON" *Icon*, from the **PRINTER MENU**, will start a Full Printout (Downloads to a PC).

Selection of the "RESET" *Icon*, from the **PRINTER MENU**, will reset the total Nº of copies value to zero.

Your Notes

Go To Reset Menu

Overview

The **Portals™ Service Menu System** provides three (3) functions to reset adjustments and/or audits back to the *Factory Setting*. See Chapter 3, Go to Audits Menu, and Chapter 4, Go to Adjustments Menu, for the Game Audits & Adjustments Information. If a Factory Reset is performed, the Service Session is exited and returns to the Attract Mode. If reset of Coin or Game Audits is performed, the display will indicate **REQUEST INSTALLED** and return to the **RESET MENU**. Please note that once reset, all customized settings are lost! Certain audits and adjustments however cannot be reset (refer to the details below).

GO TO RESET MENU

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "RESET" *Icon* in the **MAIN MENU** with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The **RESET MENU** appears.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icon*.

Selecting & activating the "QUIT" *Icon* from the display will exit the Service Session.

Selecting & activating the "HELP" *Icon* from the display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

FACTORY RESET

From the **RESET MENU**, select the "FACT" *Icon* with either **Red** or **Green Button** and press the **Black Button**. ⚠ All adjustments will be reset to *Factory Settings* (except for Proprietary Adjustments). The display will indicate **REQUEST INSTALLED** and exit the Service Session. See Chapter 4, Go to Adjustments Menu, of this section, for the *Factory Settings* in the **Game Adjustment Table**.

RESET COIN AUDITS

From the **RESET MENU**, select the "COIN" *Icon* with either **Red** or **Green Button** and press the **Black Button**. ⚠ All Coin Audits (See **Fig. 1**) will be reset to Factory Settings. The display will indicate **REQUEST INSTALLED** and return to the **RESET MENU**. Coin Audits can also be reset from the **ADJUSTMENTS MENU**, **SEGA ADJUSTMENT 8**. See Chapter 4, Go to Adjustments Menu, of this section. After selecting this *Icon*, all of the ***Coin Audits (5-11)*** are reset to zero.

RESET GAME AUDITS

From the **RESET MENU**, select the "AUD" *Icon* with either **Red** or **Green Button** and press the **Black Button**. ⚠ All Game Audits (See **Fig. 2**) will be reset to Factory Settings. The display will indicate **REQUEST INSTALLED** and return to the **RESET MENU**. Game Audits can also be reset from the **ADJUSTMENTS MENU**, **SEGA ADJUSTMENT 9**. See Chapter 4, Go to Adjustments Menu, of this section. After selecting this *Icon*, all of the ***Audits*** are reset to zero, except for the Coin Audits (Audits 5-11) and Audit 12, Software Meter. Audit 12 is the only audit which cannot be reset.

Fig. 1

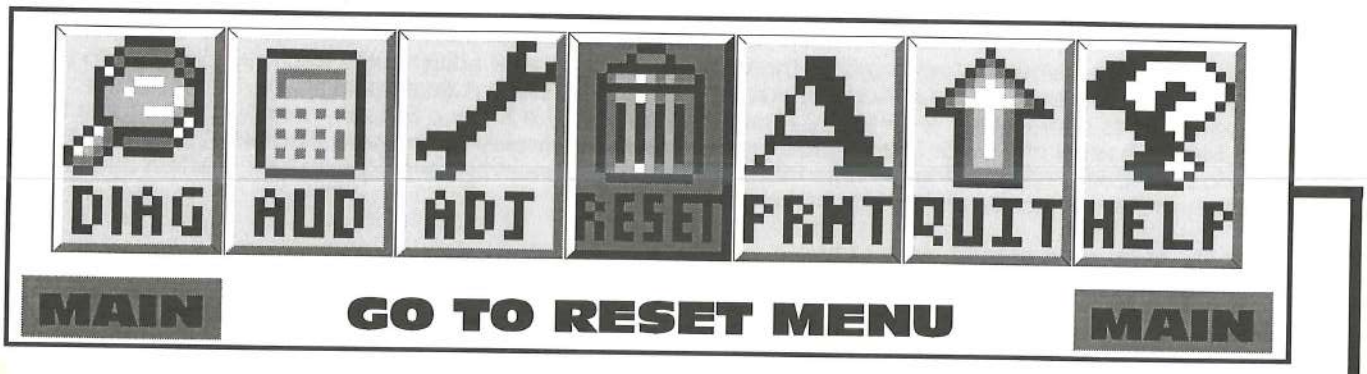
• Reset Coin Audits	
Earnings Audits (Coin Audits Only 5-11)	
Au. №	Description
1-4	The first 4 Audits in the game.
5	Coins Thru Left Slot
6	Coins Thru Right Slot
7	Coins Thru Center Slot
8	Coins Thru 4th Slot
9	Total Coins
10	Total Earnings
11	Meter Clicks
12	Software Meter
13 +	The remainder of the Audits.

Fig. 2

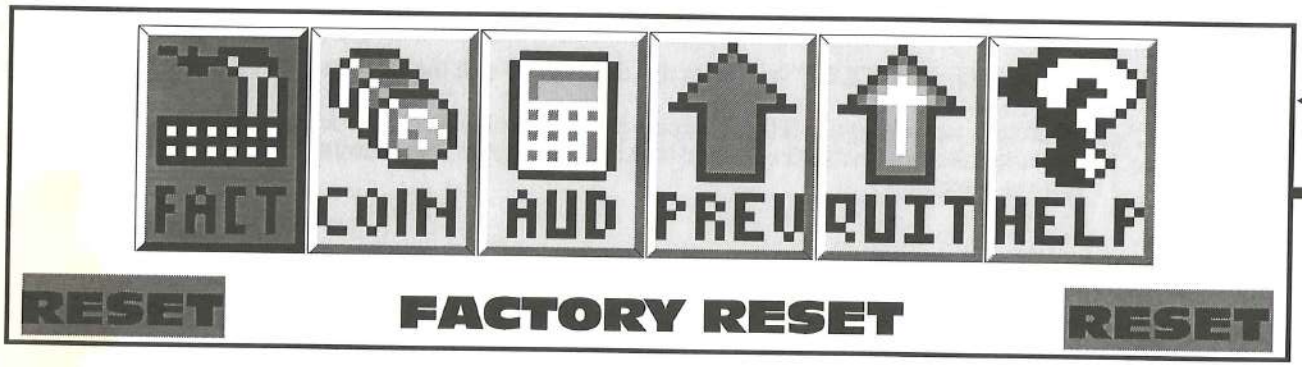
• Reset Game Audits	
Earnings (1-4), Generic/Specific Audits (13+)	
Au. №	Description
1-4	The first 4 Audits in the game.
5	Coins Thru Left Slot
6	Coins Thru Right Slot
7	Coins Thru Center Slot
8	Coins Thru 4th Slot
9	Total Coins
10	Total Earnings
11	Meter Clicks
12	Software Meter
13 +	The remainder of the Audits.

Example:

From the **MAIN MENU**, use the **Red** or **Green Buttons** to select the "RESET" *Icon* (**GO TO RESET MENU**).



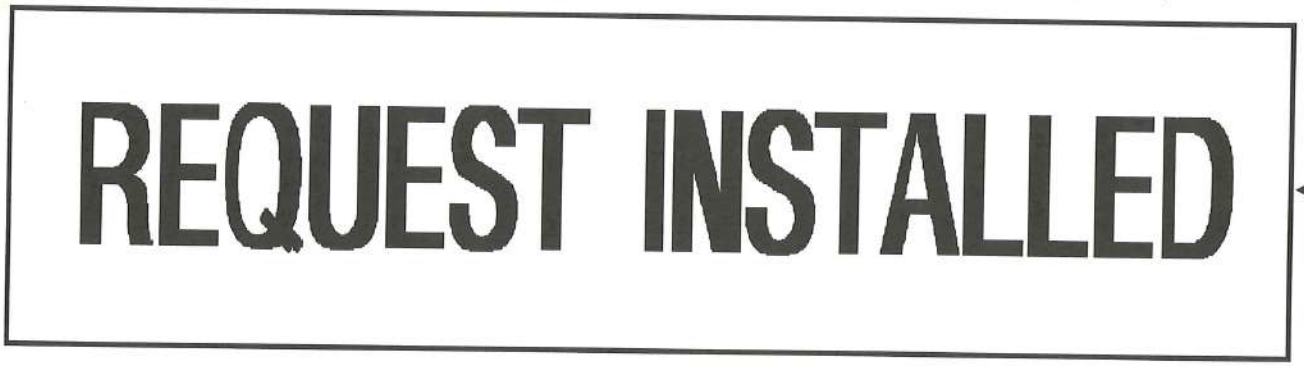
Press the **Black Button** to activate this **ICON**. This will bring up the **RESET MENU**.



The **RESET MENU** now appears with the "FACT" *Icon* (**FACTORY RESET**) flashing:

CAUTION: IF CUSTOMIZED SETTINGS ARE MADE TO THE GAME, DO NOT PRESS THE START BUTTON OR THESE SETTINGS WILL BE LOST!

Press the **Black Button** to activate this icon. This will reset all adjustments back to *Factory Settings*.



The **REQUEST INSTALLED** now appears momentarily and the *Service Session* is automatically exited with the display returning to the **ATTRACT MODE**.

If the "COIN" or "AUD" *Icons* are chosen and activated, the affected audits (see previous page) will be reset, the display will indicate **REQUEST INSTALLED** and return to the **RESET MENU**.

Go To Printer Menu

Overview

☞ SPECIAL EQUIPMENT IS REQUIRED FOR THIS MENU

The **Portals™ Service Menu System** provides 3 Adjustment Functions to print information on a "Hand-Held" printer, download game information to a Laptop PC or clear the printout count. A printer interface board, hand-held printer and/or a special software program is required to run this menu. Entering this menu and selection/activation of the *Icons* without this equipment/software will not affect the game.

GO TO PRINTER MENU

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "PRNT" *Icon* in the **MAIN MENU** with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The **PRINTER MENU** appears.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. If no *Icons* appear in the display because of a testing function or special display (e.g. "Help"), press any button to exit.

Selecting & activating the "HELP" *Icon* from any display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

Selecting & activating the "QUIT" *Icon* from any display will exit the Service Session.

In printer adjustments, selecting & activating the "-" or "+" *Icons* is necessary to start a printout or download.

Selecting & activating the "ARROW" *Icons* selects the next /previous *Icon* in the sub-menu.

QUICK PRINTOUT ADJUSTMENT (55) (Printer Interface)

From the **PRINTER MENU**, select the "QUIK" *Icon* with either **Red** or **Green Button** and press the **Black Button**. Select the "+" *Icon* and press the **Black Button** to start the printout. Only the Earnings Audits can be printed out to a "Hand-Held" Printer.

FULL PRINTOUT ADJUSTMENT (56) (Alison Interface)

From the **PRINTER MENU**, select the "ALISON" *Icon* with either **Red** or **Green Button** and press the **Black Button**. Select the "+" *Icon* and press the **Black Button** to start the download. A special software program and a Lap Top PC is required. All game audits (Earnings, Sega & Game Specific) can be retrieved.

Nº OF COPIES PRINTED ADJUSTMENT (57)

From the **PRINTER MENU**, select the "RESET" *Icon* with either **Red** or **Green Button** and press the **Black Button**. Select the "+" *Icon* and press the **Black Button** to start the clear the "Nº of copies printed" count total.

PORTALS™ SERVICE MENU

PROBLEM/SOLUTION TABLE

Use this table for a quick simple solution(s) guide. For more technical assistance view Section 5.

PROBLEM	SOLUTION
Will not enter the Service Mode after depressing the **Black "BEGIN TEST" Button**.	• Check the Service Switch(es) for loose connections or bad Ground. • Check the assoicated wiring harness to/from the CPU Board Connector CN14. • Check CPU Board, possibly failed.
Service Buttons (**Red, Green** and **Black**) are nonfunctional.	• Check the Service Switches for poor connections or broken wires.
The display blanks out.	• Check the Dot Matrix Display for loose wiring harness connections. • Check Bridge Rectifier 3 & 8 Amp Slo Blo Fuse. Refer to the Game Manual.
Icons "*scroll*" along continuously in the **MAIN MENU**.	• If the Service Switch Set and/or the Coin Door was replaced, ensure the Locking Mechanism on the **Green Button** is removed. If the Green Button "clicks" and locks into an up/down position, the Green Button has this lock switch. Remove it. (Ref. to Service Bulletin #74.)
The **Start** and **Flipper Buttons** do not select or activate *Icons* in the **SWITCH TEST MENU**.	• This is normal. These switches are deactivated, as they are a part of the Switch Test. Use the **Red "LEFT" or Green "RIGHT" & Black "ENTER" Buttons** in this Sub-Menu (See Chapter 1).
Some *Icons* appear non-functional in the **PRINTER MENU(S)**.	• If no printing equipment is connected, the "-" *Icon*, "+" *Icon* and "RUN" *Icon* will appear not to function (See Chapter 5).
Some *Icons* appear non-functional in the **GAME SPECIFIC MENU** under the **DIAGNOSTICS MENU**.	• If there is no other test under this Menu, the "Left Arrow" & "Right Arrow" *Icons* will appear not to function. The remaining *Icons* should function as normal. Note: If there is no Game Specific Special Test, the "GAME SPECIFIC" *Icon* will not invoke another display.
The display returns to the **ATTRACT MODE** exiting the Service Session from the **FACTORY RESET MENU**.	• This is normal. After a **FACTORY RESET**, the Service Session is automatically exited (See Chapter 4).
In **COIL TEST MENU**, the coils and flashlamps ***do not*** fire after activating the "RUN" *Icon*.	• Ensure the **POWER INTERLOCK SWITCH** (See figure on front inside cover) ***is pulled out***.
Can't move selection of *Icon* with the **Left** and/or **Right Flipper Buttons**.	• Check the **Flipper Buttons** for loose connections or bad Ground and refer to the Game Manual Flipper Troubleshooting Flowchart.
In **Portals™ Service Menu**, the volume cannot be adjusted with the Red or Green Buttons.	• The Volume adjustment can only be made when the Service Menu is exited. The **Volume Mode** is entered by pressing the **Red "VOLUME" Button**. Then use the **Red** or **Green Button** to increase/decrease volume. (Red "LEFT" decrements; Green "RIGHT" increments.)

Go To Help Screen

Overview

The **Portals™ Service Menu System** provides help screens in each display (except if the display is in a testing mode). Each screen is basic and some terms may vary. At the beginning of each chapter in this section, *Icons* are shown and described to give detail of the particular function of the individual *Icons*. The table on the previous page was designed to help answer some questions of situations which may arise.

GO TO HELP SCREEN

With the game in the Attract Mode, open the Coin Door and press the **Black "BEGIN TEST" Button**. Select the "HELP" *Icon* in the **MAIN MENU** with either **Red "LEFT"** or **Green "RIGHT" Button** and press the **Black "ENTER" Button**. The **HELP SCREEN** appears cycling through the different icon usages pertinent to that menu level.

MENU HELP SCREEN
USE THE RED OR GREEN BUTTONS TO CHANGE THE SELECTED ICON. PRESS THE BLACK BUTTON TO ACTIVATE THE SELECTED ICON. THE FLIPPER & START BUTTONS FUNCTION IN THE SAME WAY.

Important Notes:

Exit any sub-menu and return to the **MAIN MENU** by selecting & activating the "PREV" *Icons*. If no *Icons* appear in the display because of a testing function or special display (e.g. "Help"), press any button to exit.

Selecting & activating the "HELP" *Icon* from any display will show a help screen. (An explanation of each *Mini-Icon* at that level will cycle continuously until any active button is pressed.)

Selecting & activating the "QUIT" *Icon* from any display will exit the Service Session.

These "Mini-Icons" vary in functionality depending in what sub-menu they are used. Refer to the beginning of each chapter in this section for the function they serve in that menu or select the "HELP" *Icons* in the display where the *Icon* in question is being used.

Review Chapter 1, Introduction, on how to enter the **Portals™ Service Menu**. The chapter outlines the entire **Portals™ Service Menu**. View the **Icon Tree** in this manual which describes the names and menu descriptions of each *Icon*. View the display, after selecting and activating either of the "HELP" or "?" *Icons*.

Review Chapter 2, Go to Diagnostics Menu, to find all the tests needed to troubleshooting the game.

Review Chapter 3, Go to Audits Menu, and Chapter 4, Go to Adjustments Menu, to gather play information and to customize the game to vary difficulty of play or to change functions of the game.

Review Chapter 5, Go to Reset Menu, to reset audits and adjustments to Factory Settings.

Review Chapter 6, Go to Printer Menu, to start downloading or printing functions. Special equipment is required for this function.

This concludes the **Portals™ Service Menu**. Review the Table of Contents at the beginning of this manual, and the detailed Table of Contents for Section 3 to quickly find the information required. The remainder of the sections in this manual will cover all the parts in this game and provide helpful information to aide in trouble- shooting. If questions still arise after reading this section completely, call our Technical Support Department.

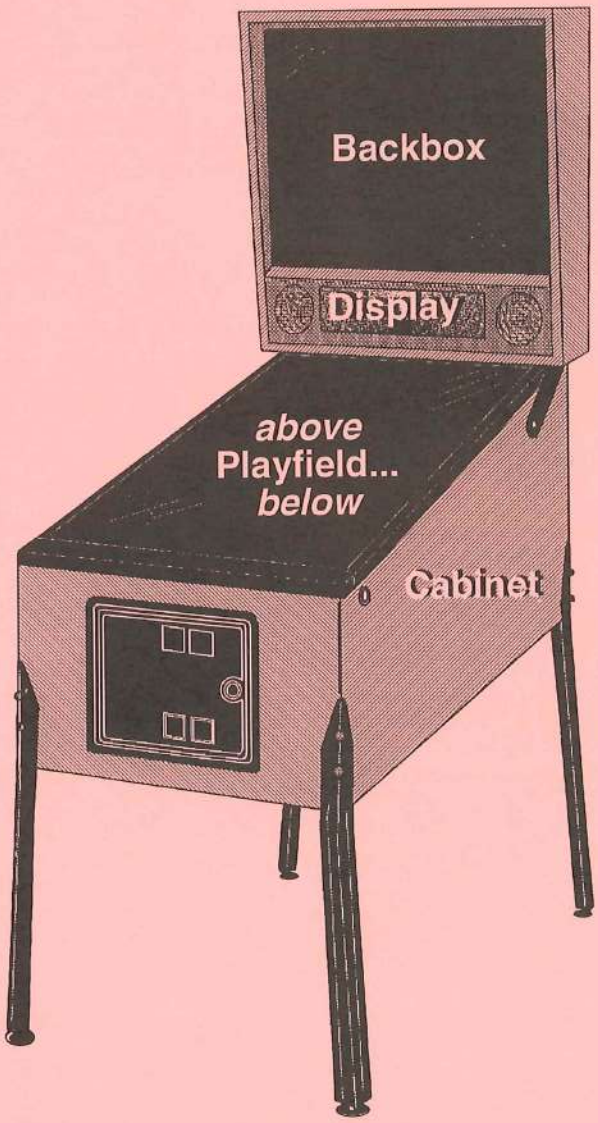
Your Help Notes:

Parts Identifcation & Location (The Pink Pages)

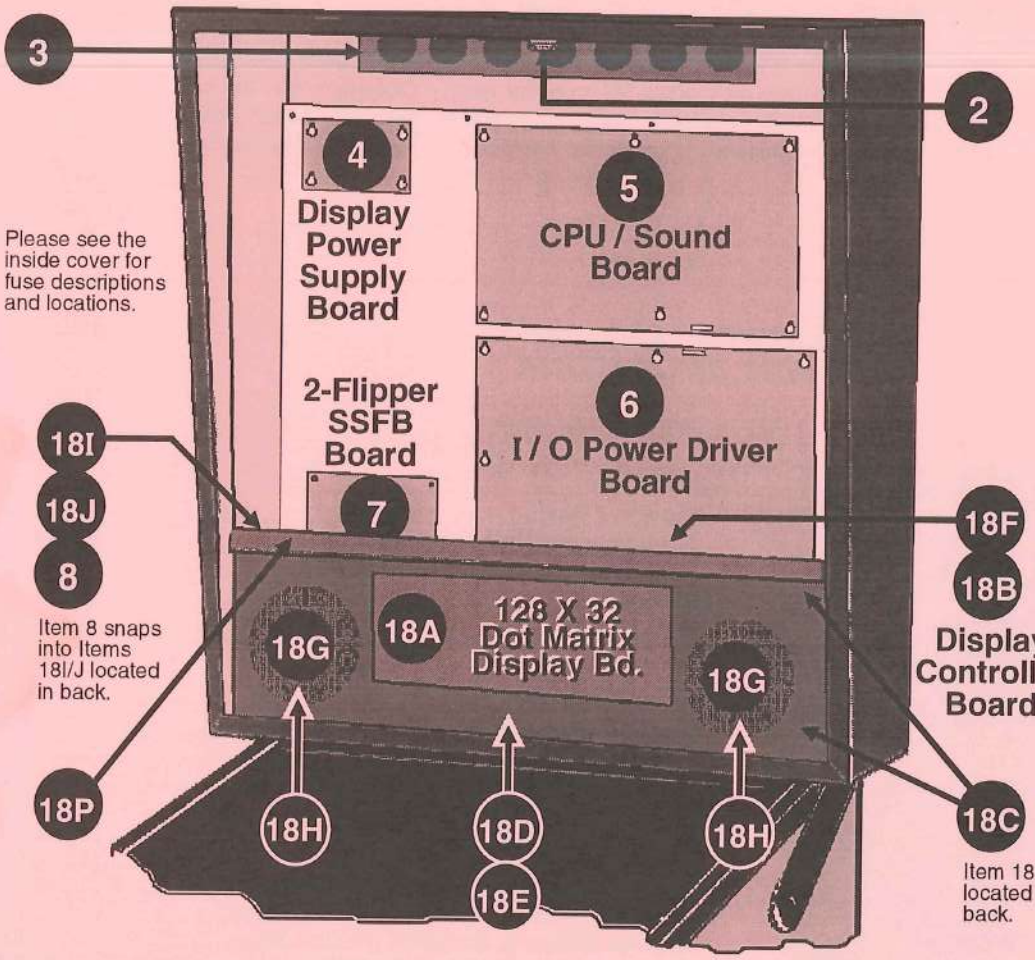
Overview

This section provides the part numbers and locations of the elements in the pinball game. The parts are arranged in basically four groups: Backbox, Cabinet, Above and Below Playfield. (Some parts may be considered both above & below the playfield. The part will be grouped where it is predominant.) Generic parts which may change as production continues (quantity and/or size) are listed together. The quantity indicates if that part is used in this game. Since quantity changes *may occur*, an item indicating "0" may be used. Compare the item which needs to be replaced with the drawings provided. The posts, sockets, bulbs and rubber rings are drawn actual size. Some parts which are complex (made up of numerous parts) will be noted in detail in Chapter 2, Assembly Drawings.

Section 4, Chapter 1 Table of Contents



Backbox - General Parts



Please see the inside cover for fuse descriptions and locations.

Item 8 snaps into Items 18I/J located in back.

Item 18B is located behind 18A. Item 18F is located between Items 18B & 18A.

Item 18C is located in back.

Removal of...:

Insert (Item 9):
(Not Shown)

- Undo latch (Item 10) & swing completely open.
- Disconnect wire harness.
- Push up insert until female hinges (Item 12) are freed from male hinges (Item 11).
- Reverse procedure to reinstall.

Speaker Panel (Item 18):

- On the upper left of the panel, push down on the Push Button Release Assy.(Item 18I) releasing the Lock Pin (Item 8) & swing back.
- Disconnect wire harness.
- Lift out right side of panel/hinges (18C) from the backbox..
- Reverse procedure to reinstall.

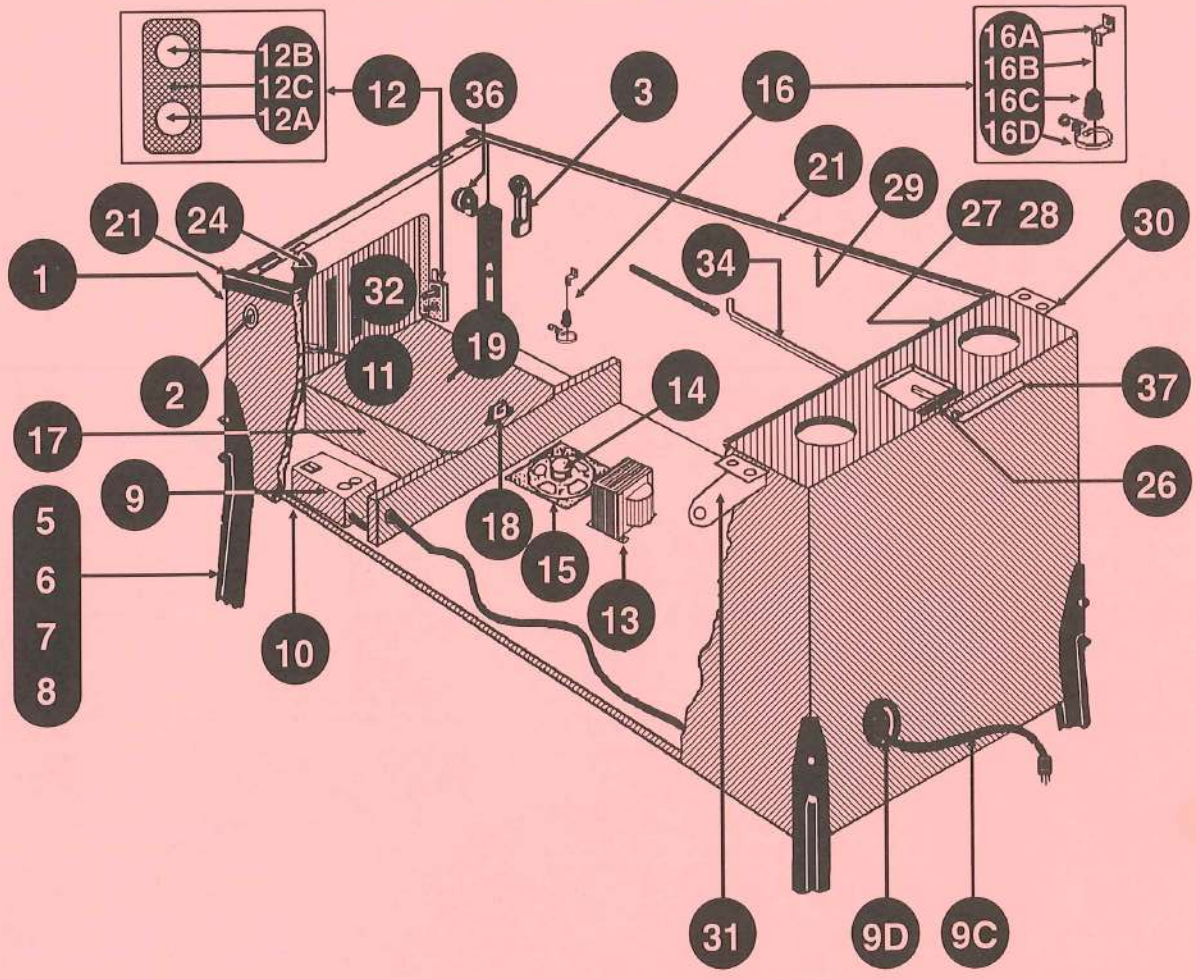
Nº	Part Name	SPI Part Nº
1	Backbox Header (Not Used)	— - — - —
2	Back Box Lock	355-5008-00
3	7-Vent Hole Grill 2½" x 18"	545-5072-02
4	Display Power Supply Board †	520-5138-00
5	CPU / Sound (2 X 4MB) Board †	520-5136-42
6	I / O Power Driver Board †	520-5137-00
7	2-Flipper SSFB Board	520-5080-00
8	Lock Pin / Lock Pin Bracket Assy.	500-5916-01
ORDERING ABOVE (ITEM 8) ASSEMBLY PART Nº WILL INCLUDE:		
—	Lock Pin	530-5397-00
—	Lock Pin Bracket	535-7564-00
—	3/8" - 24 Jam Nut (Qty. 2)	240-5319-00
9 *	Goldeneye Backbox Light Insert Assy. *	505-6003-42-42
10 *	Lights Insert Slide Latch Special *	535-7554-00
11 *	Lights Insert Hinge Male (Qty. 2) *	390-5014-01
12 *	Lights Insert Hinge Female (Qty. 2) *	390-5014-00
13 *	Backglass Clear 26½" x 19¾" *	660-5018-00
14 *	Goldeneye Backglass Artwork *	830-5242-00
15 *	Plastic Extrusion 26 7/16" *	545-5018-08
16 *	18¾" Plastic Extrusion * (Qty. 2)	545-5018-09
17 *	Glass Channel 26 7/16" *	545-5021-02

Nº	Part Name	SPI Part Nº
18	Goldeneye Speaker Panel Assembly	500-5995-00-42
ORDERING ABOVE (ITEM 18) ASSEMBLY PART Nº WILL INCLUDE:		
A	128 X 32 Dot Matrix Display Bd. ††	520-5052-00
B	Display Controller Board †	520-5055-01
C	Panel Hinge (Female) (Qty. 2)	390-5026-00
D	Speaker Panel (Hinged)	525-5365-03
E	Goldeneye Speaker Plexi w/Artwork	830-5643-00
F	Static Shield	535-6437-00
G	Speakers 4X4 Quam 89-9572 (Qty. 2)	031-5004-00
H	Goldeneye Speaker Grill w/Artwork (Qty. 2)	830-5644-00
I	Push Button Release Assembly	515-6481-00
J	Push Button Release Bracket	535-7582-00
K *	7/16" X ¼" Self-Adhesive Foam 2.6 Ft.	626-5026-00
L *	Ground Straps X.XX". (replace "-XX" with the inches required; e.g. 4" = "-04", etc.)	600-5006-XX
M *	3-Lug Stand-Up Long Socket (Qty. 9)	077-5009-00
N *	#44 Bulb (Qty. 9)	165-5000-44
O *	Sq. Light Covers. (See Color Chart at end of Sec. 4, Chp. 2 & replace the "-XX" w/the number.)	550-5019-XX
P	Top Channel Glass Retainer	545-5452-02
19 *	Ribbon Cable, 14-Pin * (Display Controller Bd. to Dot Matrix Display Bd.)	036-5260-00
20 *	Ribbon Cable, 20-Pin * (CPU/Sound Bd. to I/O Power Driver Board)	036-5000-04
21 *	Ribbon Cable, 26-Pin * (CPU/Sound Bd. to Display Controller Board)	036-5001-00
22 *	Fuse Description Decal	820-6152-42

Note: An asterisk (*) indicates items are not noted in the pictorial.

† When ordering PC Boards with ROMS, please specify the Game.
†† Indicate Manufacturer.

Cabinet - General Parts

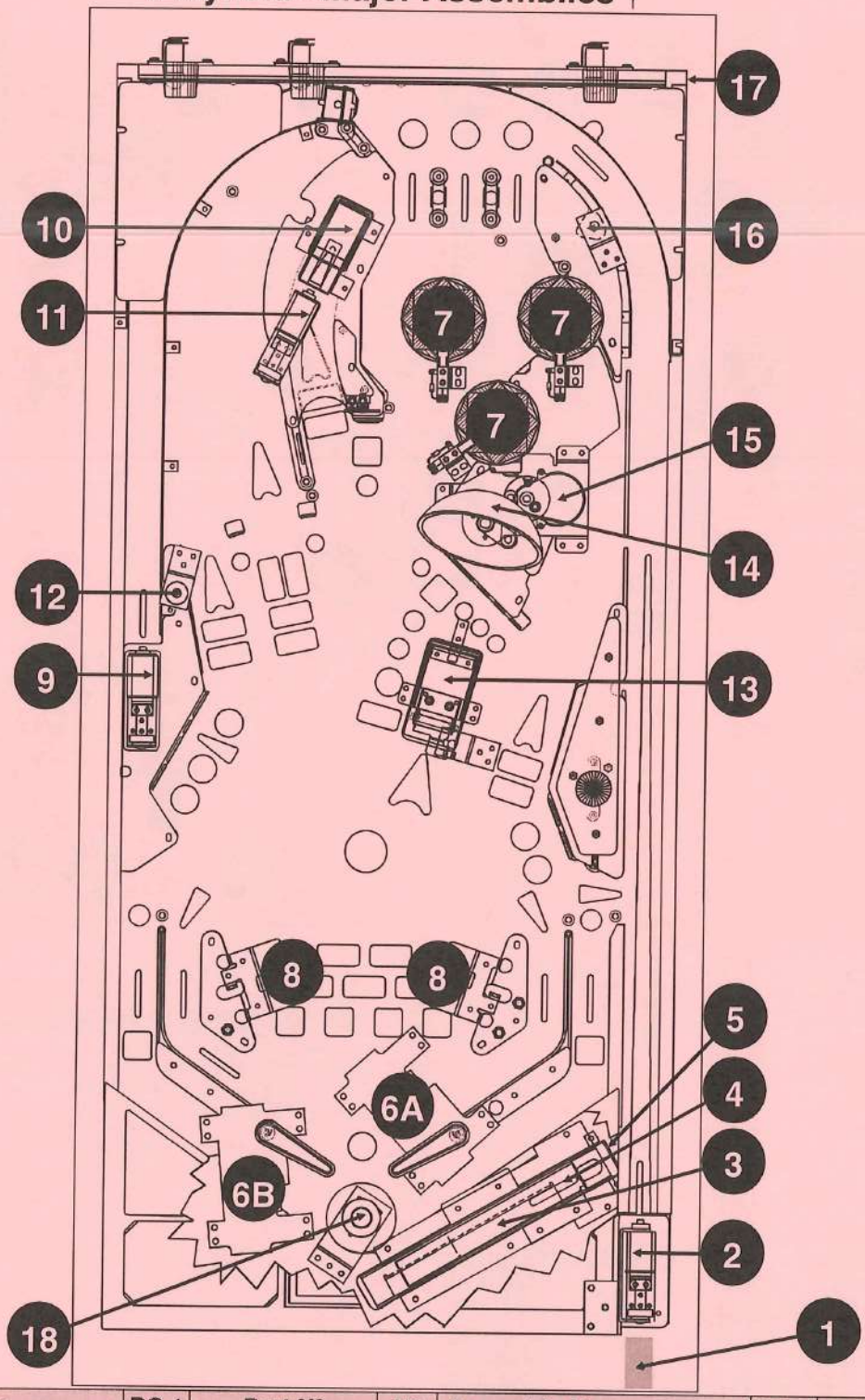


Nº	Part Name	SPI Part Nº
1	"007" Gun Assy. (See Sec. 4, Chp. 2)	500-5698-01
2	Flipper Button Assembly Red (Qty. 2)	500-5026-32
3	Flipper Power Switch, Left	180-5122-00
4 *	Flipper Power Switch, Right *	180-5122-00
5	Leg (Black) (Qty. 4)	535-5020-50
6	Leg Bolt 3/8"-16 x 2 1/2" Hex 5/8" Hd. (Qty. 8)	231-5001-01
7	Leg Bolt Back Plate (Qty. 4)	535-5703-00
8	Leg Leveler 3/8" - 16 X 3" (Qty. 4)	500-5017-00
9	Power Box Sub-Assembly	515-5360-00
ORDERING ABOVE (ITEM 9) SUB-ASSY. PART Nº WILL INCLUDE:		
9A	Power Box	535-5932-00
9B	Service Outlet (US)	180-5008-01
9C	Line Cord 10' ROJ 3" Max.	034-5000-10
9D	Recessed Cup for Line Cord	545-5122-00
9E	Line Filter	150-5000-00
9F	Varistor TNR159211KM	150-5001-00
9G	Fuse 8 Amp (Domestic)	200-5000-05
9H	Fuse Holder	205-5001-00
9I	Power Box Decal	820-6123-00
10	Power Sw. DPST Toggle (Under Cab.)	180-5001-00
11	Service Switch Set (RED, GRN, BLK BUTTONS)	180-5012-03
12	Dual Switch Assembly	500-5808-00
ORDERING ABOVE (ITEM 13) ASSEMBLY PART Nº WILL INCLUDE:		
12A	Memory Protect Switch	180-5000-00
12B	Interlock Switch	180-5136-00
12C	Bracket	535-6958-00
13	Transformer	010-5011-00
14	Speaker - Round - 8" ø	031-5005-00
15	Speaker Grill 7" x 7"	535-6830-00

Nº	Part Name	SPI Part Nº
16	Plumb Bob Tilt Assembly	500-5023-00
ORDERING ABOVE (ITEM 16) ASSEMBLY PART Nº WILL INCLUDE:		
16A	Tilt Hanger Bracket	535-5221-00
16B	Tilt Hanger Wire (Attached to "16A")	535-5319-00
16C	Tilt Plumb Bob (Attached to "16B")	535-5029-00
16D	Tilt Contact Wire	535-7563-01
17	Cash Box Plastic Bottom	545-5090-00
18	Cash Box Lock Bracket (wire)	535-7562-00
19	Cash Box Cover (Validator)	535-5013-03
20 *	Playfield Glass (T.P.) 21" x 43" *	660-5001-00
21	Side Armor - Left & Right	535-7297-00
24	Front Molding Lockdown Assembly	500-5020-01
25 *	Front Molding - Black *	500-5757-01-00
26	#1 Roto Lock Male, (Female -02) *	355-5006-01
27	Rear Plastic Ext. Playfield Glass 20 3/8"	545-5038-00
28	Mounting Foam Rubber for Ext.	626-5001-00
29	Plastic Channel Left & Right	545-5017-00
30	Backbox Hinge Left	515-5987-00
31	Backbox Hinge Right	515-5987-01
32	Coin Door (with Validator) USA only	500-5018-171
33 *	Slide & Pivot Support Bracket Right *	535-5989-00
34	Slide & Pivot Support Bracket Left	535-5990-00
35 *	Playfield Support Bar (Stay Arm) *	535-5019-00
36	Start Button Switch Assembly (Orange)	500-5728-07
37	Hex Key Allen Wrench 5/16"	777-0001-00

Note: An asterisk (*) indicates items are not noted in the above pictorial.

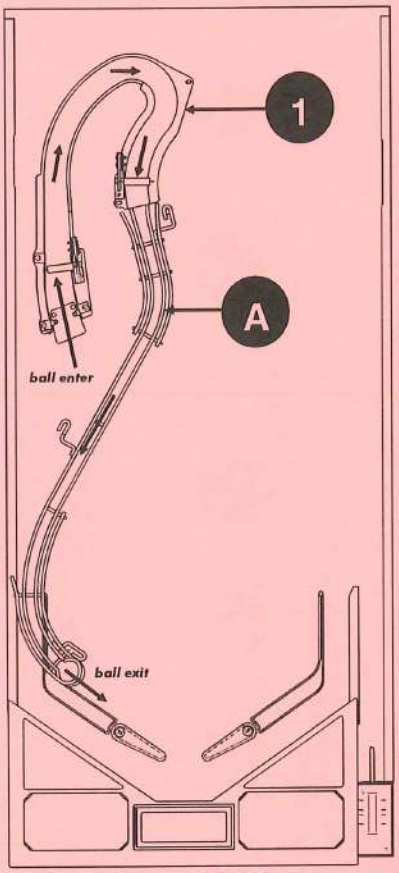
Playfield - Major Assemblies †

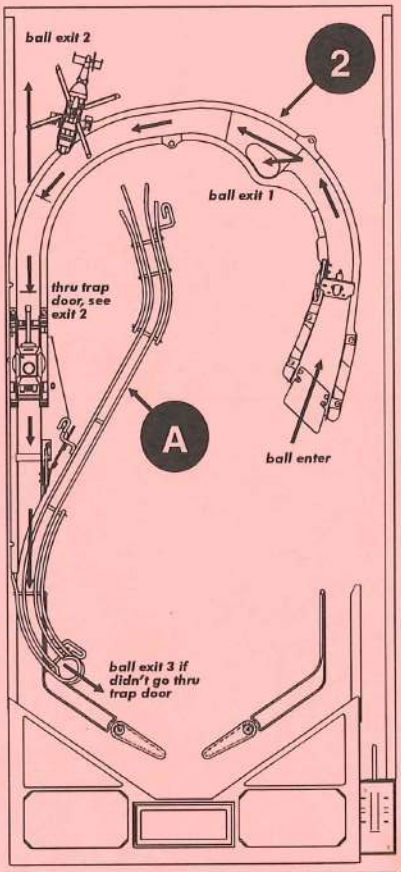


Nº	Assembly Name	PG.†	Part Nº	Nº	Assembly Name	PG.†	Part Nº
1 *	"007" Gun Assembly	pg 70	500-5698-01	10	Power Scoop Assembly	pg 76	500-5862-00-42
2	Auto Ball Launch Assembly	pg 70	500-5477-01-42	11	Kick Big Assembly	pg 76	500-5862-00-42
3	5-Ball Trough Assembly	pg 71	500-5989-15-42	12	Tank Trap Door Plunger Assy.	pg 77	500-5940-01-42
4	Lock Ball Assembly	pg 71	500-5684-01	13	Satellite Launch Ramp Assembly	pg 77	500-6004-00-42
5	Ball Trough Enter/Exit Scoop Assy.	pg 71	533-7329-01	14	Satellite Assembly	pg 78	500-6000-00-42
6A	Flipper Assembly, Lower Right	pg 72	500-5944-02	15	Satellite Motor Base Assembly	pg 79	500-5982-00-42
6B	Flipper Assembly, Lower Left	pg 73	500-5944-12	16	Up-Down Metal Ramp Plunger Assy.	pg 80	500-6058-00-42
7	Turbo Bumper Assemblies (Qty. 3)	pg 74	See Sec. 4, Chp. 2	17	Back Panel Assembly	pg 85	500-6001-00-42
8	Slingshot Assemblies (Qty. 2)	pg 75	500-5849-01	18	Between Flipper Magnet Assy.	pg 85	See Sec. 4, Chp. 2
9	Tank Kick Big Assembly	pg 75	500-5862-02-42	Note: An asterisk (*) indicates items are either in / on the cabinet.			

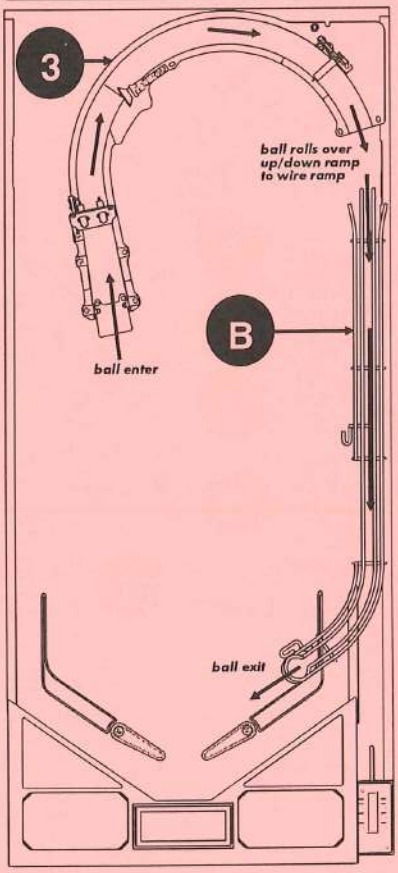
† See Section 4, Chapter 2, Assembly Drawings (with indicated page #) to identify the components of each assembly above.

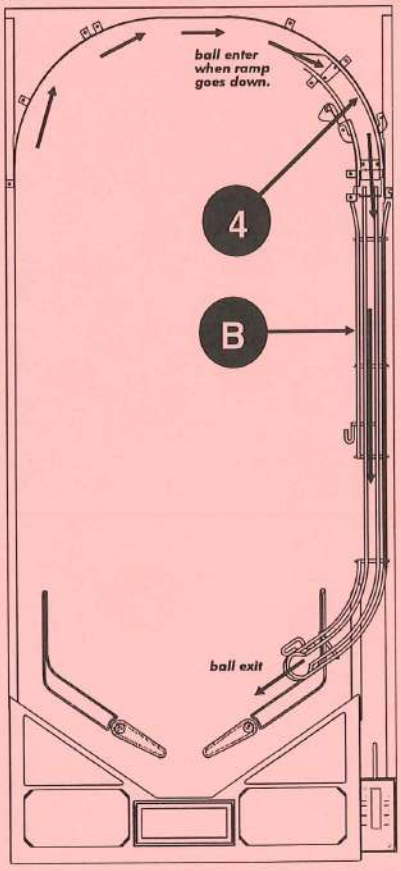
Playfield - Ramps †





Item A, Center/Left Return Wire Ramp, is shown with the Plastic Ramps for ball exit paths & is not a part Items 1 & 2.



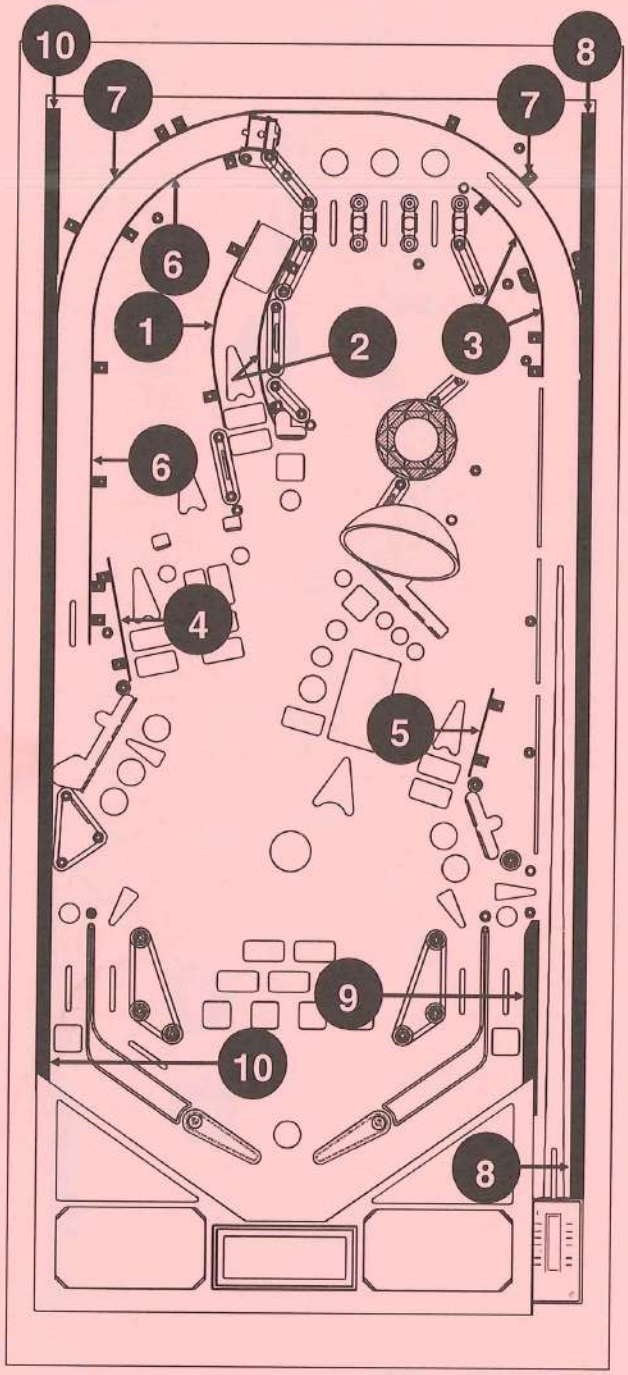


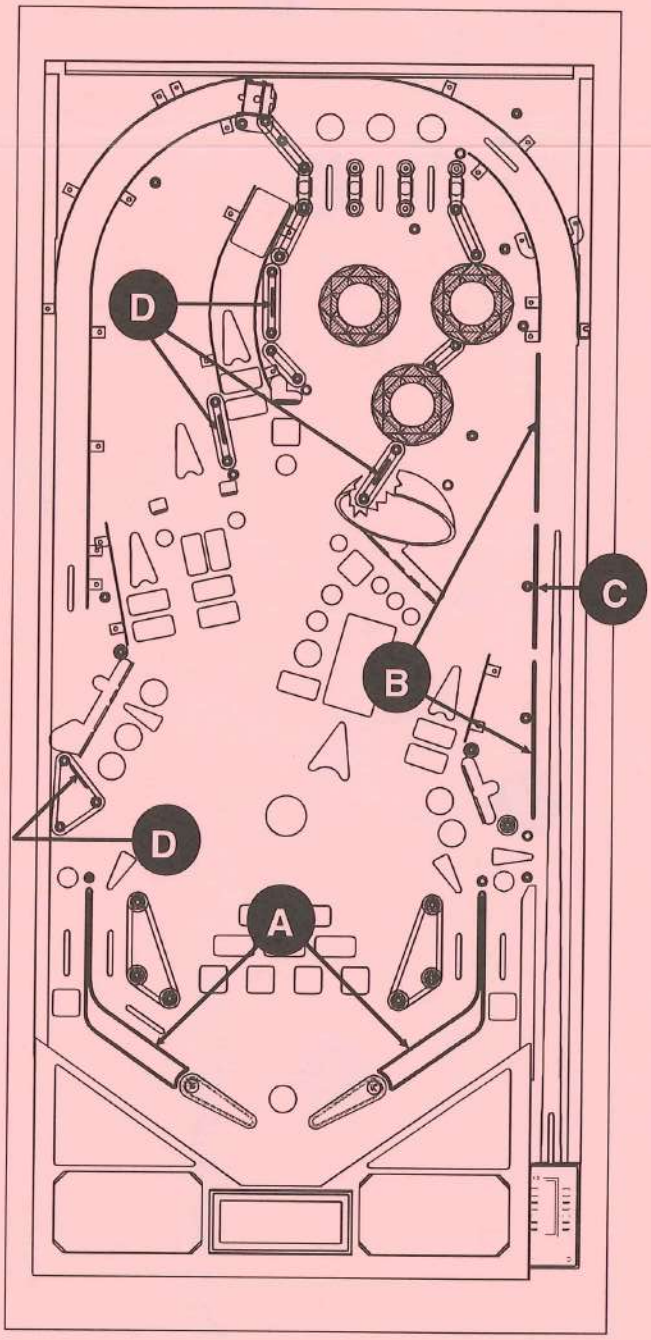
Item B, Right Return Wire Ramp, is shown with the Ramps for ball exit paths & is not a part Items 3 & 4.

Nº	Ramp Name	PG.†	Part Nº	Nº	Ramp Name	PG.†	Part Nº
1	Left Plastic Ramp Assembly	pg 81	500-5997-00-42	4	Up-Down Metal Ramp & Flat Rail Assy.	pg 80	500-6052-00-42
2	Right Plastic Ramp Assembly	pg 82	500-5998-00-42	A	Center/Left Return Wire Ramp	n/a	515-6335-00
3	Center Plastic Ramp Assembly	pg 84	500-5999-00-42	B	Right Return Wire Ramp	n/a	515-6336-01

† See Sec. 4, Chp. 2, Assy. Drawings, for details of Items 1-4.

Playfield - Rails and Ball Guides

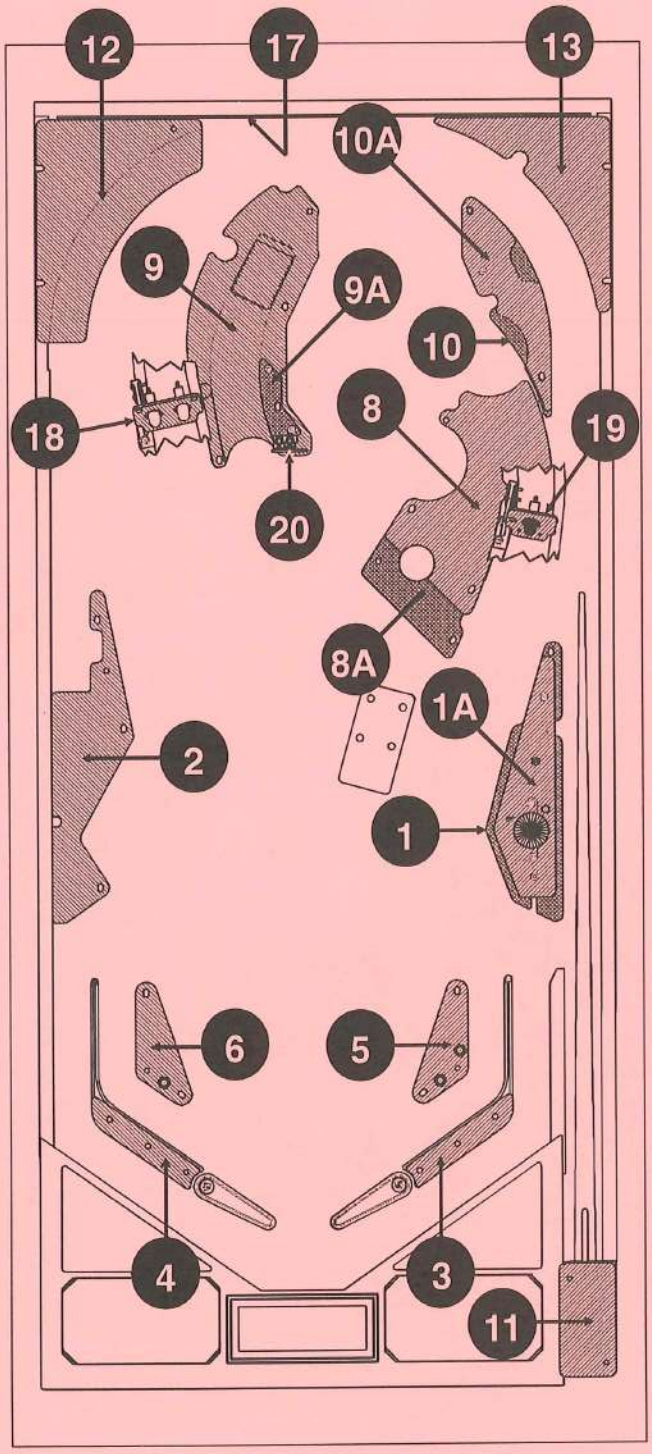




№	Rail Name	SPI Part №
1	Flat Metal Rail To Scoop Left Side	535-7366-00
2	Flat Metal Rail To Scoop Right Side	535-7367-00
3	Flat Metal Rail Right Inner Loop (Orbit)	535-7368-02
4	Flat Metal Rail over 4-Bank Left Side	535-7583-00
5	Flat Metal Rail over 2-Bank Right Side	535-7526-00
6	Flat Metal Rail Left Inner Loop (Orbit)	515-6311-00
7	Flat Metal Rail Outer Loop (w/no parts)	515-6310-02
8	Wood Rail Right Side	525-5411-00
9	Wood Rail (Short) Right Outlane	525-5413-00
10	Wood Rail Left Side	525-5412-00

№	Ball Guides / Wire Forms Name	SPI Part №
A	Return Lane Ball Guide Long Clear (Qty. 2)	550-5037-01
B	Ball Guide Rail 5-3/4" (Qty. 2)	535-5356-00
C	Ball Guide Rail 4-1/2"	535-5356-14
D	1" Wire Form (Qty. 4)	535-5300-05

Playfield - Butyrate, Decals and Mylar



Nº	Screened/Clear Butyrate Name	SPI Part Nº
	Butyrate Sheet Screened/Clear (1-22)	830-5482-XX

Note: To order entire sheet use above number with "-XX"; for individual pieces replace the "-XX" with appropriate number.
Attention: Individual pieces may not be available.

1	Playfield Right Side	830-5482-01
1A	Playfield Right Side Upper Level	830-5482-01A
2	Playfield Left Side	830-5482-02
3	Right Return Lane	830-5482-03
4	Left Return Lane	830-5482-04
5	Right Slingshot	830-5482-05
6	Left Slingshot	830-5482-06
7 *	Key Chain Style A *	830-5482-07
8	Under Satellite Back	830-5482-08
8A	Under Satellite Front	830-5482-08A
9	Center Plastic Ramp	830-5482-09
9A	Center Plastic Ramp Upper Level	830-5482-09A
10	Top Right Pop Bumper	830-5482-10
10A	Top Right Pop Bumper Upper Level	830-5482-10A
11	Bottom Arch Shooter Lane Cover	830-5482-11
12	Playfield Top Left Corner	830-5482-12
13	Playfield Top Right Corner	830-5482-13
14 *	Key Chain Style B *	830-5482-14
15 *	Key Chain Style C *	830-5482-15
16 *	Cabinet Back Protect *	830-5482-16
17	Back Panel Protect	830-5482-17
18	"Lock Ball" Sign	830-5482-18
19	"Tank Multiball" Sign	830-5482-19
20	"007 Center Target" Sign	830-5482-20
21	Not Used	— - — - —
22 *	Ramp Cover (Right Ramp) *	830-5482-22

The following last 2-digits were not used on 830-5482-XX: -21
Note: An asterisk (*) indicates items are not noted in the pictorial.

Nº	Decal Name	SPI Part Nº
D1 *	Complete Decal Sheel for GoldenEye	820-6132-XX

Note: To order entire sheet use above number with "-XX";
Attention: Individual decals may not be available.

Some main decals are: -01 Center Ramp; -02, -03, -13 Pop Bumpers; -04 Satellite Launch Ramp; -05 Right Ramp; -07 Arch Center; -09 Arch Left; -11 Arch Right; -20 "007" Sign; -22 Left Flipper Bat; -23 Right Flipper Bat; all decals note the 2-digit number on the decal.

Nº	Mylar Name	SPI Part Nº
M1 *	Mylar Sheet Complete for GoldenEye	820-5853-XX

Note: To order entire sheet use above number with "-XX"; for individual pieces replace the "-XX" with -00 for Pop Bumper Area; -02 for Satellite Launch Ramp Area (-01 is an extra circular piece)

M2 *	Mylar Carriage Bolt Covers (Qty. 2)	820-5041-00
M3 *	Mylar Pad-Return Lane Ball Drop (Qty. 2)	820-5815-00
M4 *	Mylar Slingshot Protect (Qty. 2)	820-5821-00

Playfield - General Parts

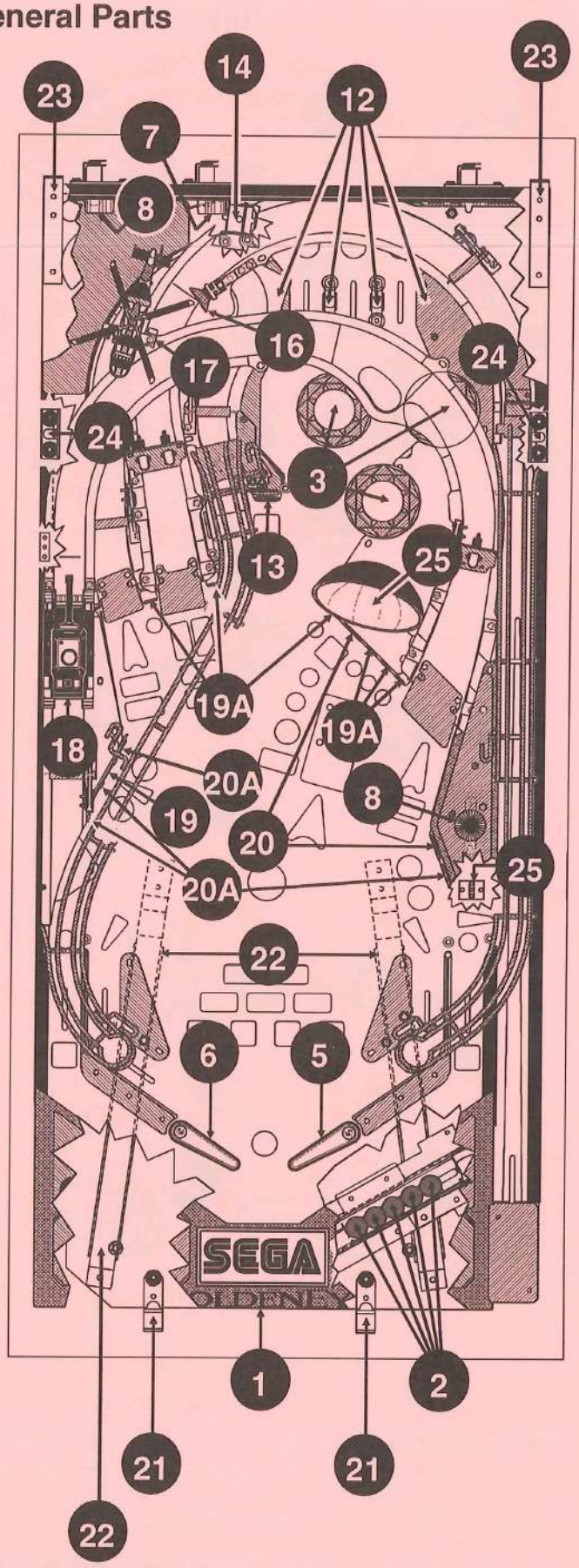
№	Above Playfield Part Name	SPI Part №
1	Bottom Arch Assembly (Plastic)	500-6005-00-42
ORDERING ABOVE (ITEM 1) ASSEMBLY PART № WILL INCLUDE:		
	Bottom Arch (Plain) #6 X 3/8" PPH (Qty. 3) Bottom Arch Shooter Lane Cover	545-5302-07 232-5000-00 830-5482-11
2	1 1/16" Steel Balls (Qty. 5)	260-5000-00
3	Pop Bumper Cap Red (Qty. 3)	550-5057-02
5	Right Flipper & Shaft Assy. White with Sonic the Hedgehog™ Logo	515-5133-01-03
6	Left Flipper & Shaft Assembly White with Sonic the Hedgehog™ Logo	515-5133-01-04
7	Mini-Mars Light Cover Red (Qty. 2)	550-5031-02
8	Mini-Mars Light Cover Yellow (Qty. 2)	550-5031-06
9 *	Rubber Light Cover Green (Qty. 3) *	545-5014-04
10 *	Rubber Light Cover Yellow (Qty. 1) *	545-5014-06
11 *	Rubber Light Cover Orange (Qty. 2) *	545-5014-07
12	Top Lane Mini-Hoods Red (Qty. 4)	550-5061-02
13	Module Stand-Up Target Clear	500-6075-00
14	1-Way Ball Gate & Mtg. Brkt. Assembly	500-6071-00-42
ORDERING ABOVE (ITEM 14) ASSY. PART № WILL INCLUDE:		
	1-Way Ball Gate Mounting Bracket 1-Way Ball Gate Flap 1-Way Ball Gate Rebound Hinge	535-7656-00 535-7668-00 535-5372-03
15	Satellite Dish - Screened	545-5627-04
Note: The above item is part of the Satellite Assy., 500-6000-00-42, a Major Assembly. See Section 4, Chapter 2, for balance of items.		
16	Spot Light Reflector	545-5409-01
Note: The above item is a part of the Center Plastic Ramp Assy., 500-5999-00-42, a Major Assembly. See Section 4, Chapter 2, for balance of items (or any other items attached to the ramp).		
17	Helicopter	545-5672-00
18	Tank	545-5673-00
Note: The above items are a part of the Right Plastic Ramp Assy., 500-5998-00-42 a Major Assembly. See Section 4, Chapter 2, for balance of items (or any other items attached to the ramp).		
19	Narrow Rect. Yellow Stand-Up Target	500-5857-06
19A	Narrow Rect. Green S-U Target (Qty. 6)	500-5857-04
20	1" Sq. White Stand-Up Target (Qty. 2)	500-5232-08
20A	1" Sq. Blue Stand-Up Target (Qty. 4)	500-5232-05
Note: See Section 4, Chapter 2, (last page) for balance of items of above Target Assemblies.		

№	Below Playfield Part Name	SPI Part №
21	Playfield Hanging Bracket (Qty. 2)	535-5216-03
22	Playfield Support Slide Bracket (Qty. 2)	535-6862-02
23	Edge Slide Bracket (Qty. 2)	535-5988-00
24	Pivot Pin Bracket Assembly (Qty. 2)	500-5329-00
ORDERING ABOVE (ITEM 25) ASSY. PART № ***WILL NOT*** INCLUDE:		
	Pivot Bracket Screws (Qty. 4) T-Nuts (Qty. 4)	237-5907-00 240-5101-00
25	Outlane Adjustable Post Plate	535-5091-00

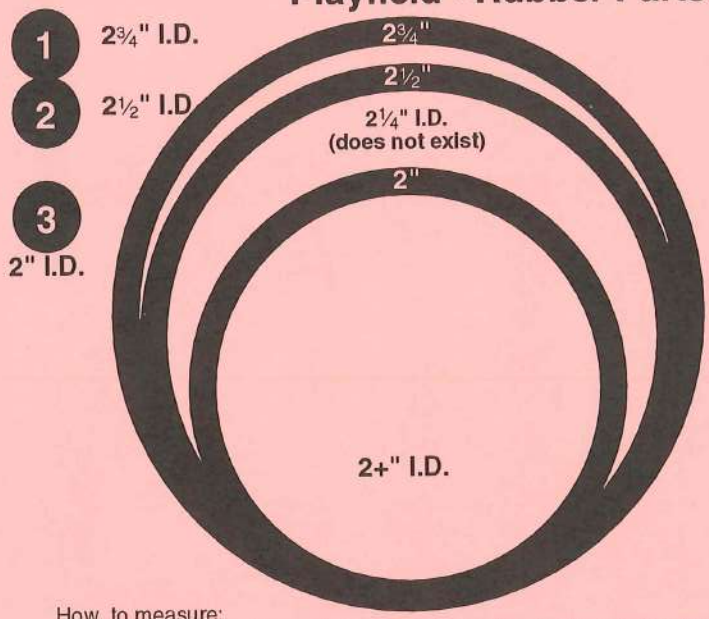
№	The Playfield	SPI Part №
P1 *	Playfield Screened (No Parts) *	830-5142-00
P2 *	Playfield Complete with all Parts *	505-6004-42-42

Note: An asterisk (*) indicates item is not noted in the illustration.

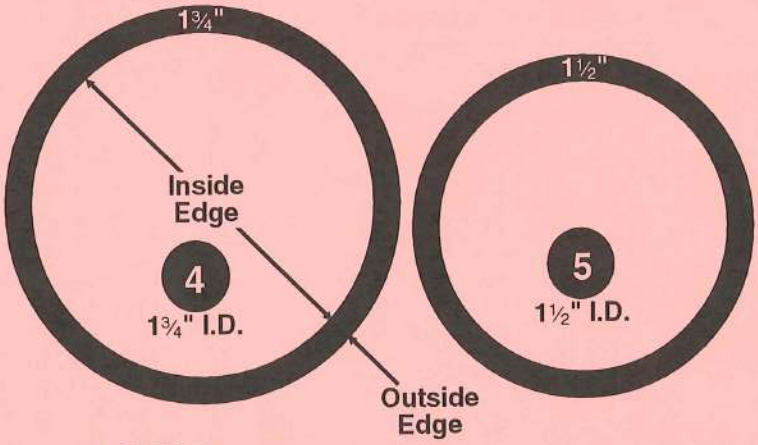
For rubber parts, metal & plastic posts, sockets & bulbs, see the following pages in this chapter. Also see Sec. 4, Chp. 2 for Assy. breakdowns of parts.

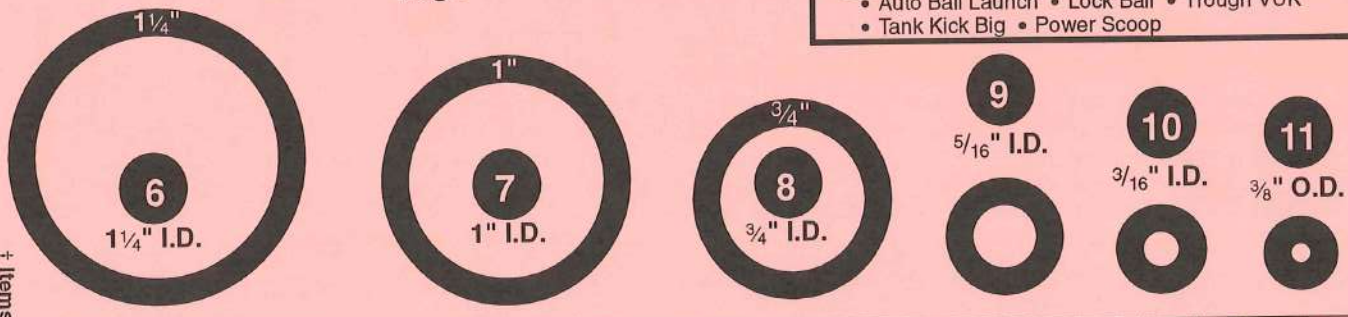


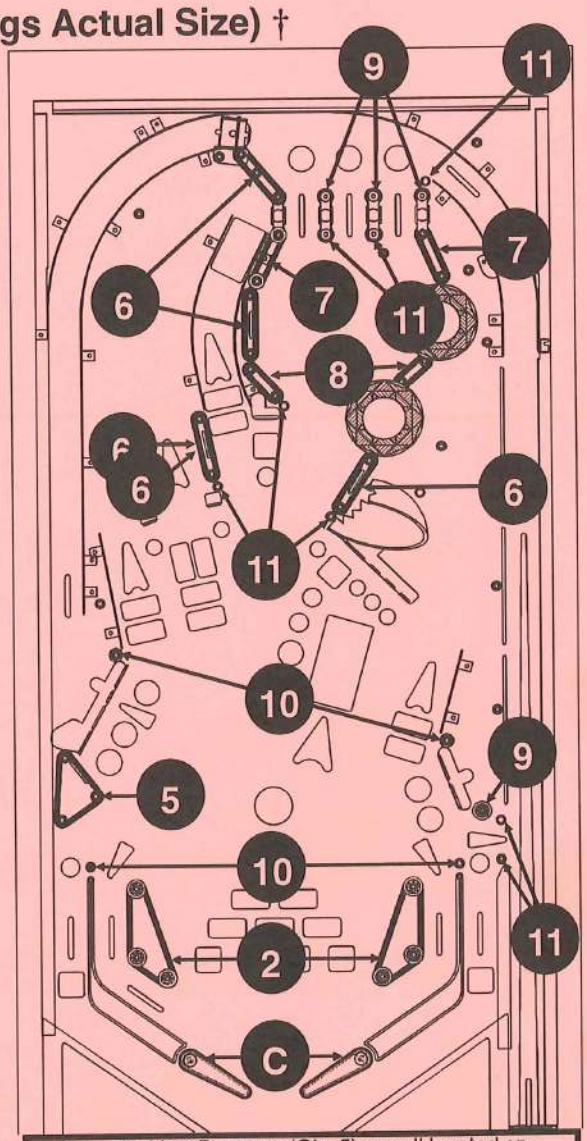
Playfield - Rubber Parts (Rings Actual Size) †



How to measure:
Lay ring over circle of closest size. *If you see the outside edge of the circle,* ***move to one ring smaller.*** With the ***correct size you will see the inside edge*** of the circle around the inside of the rubber ring.
Please note: The rings will ***s t r e t c h*** with use. Always go to the size smaller. (I.D.=Inside Diameter; O.D.=Outside Diameter)





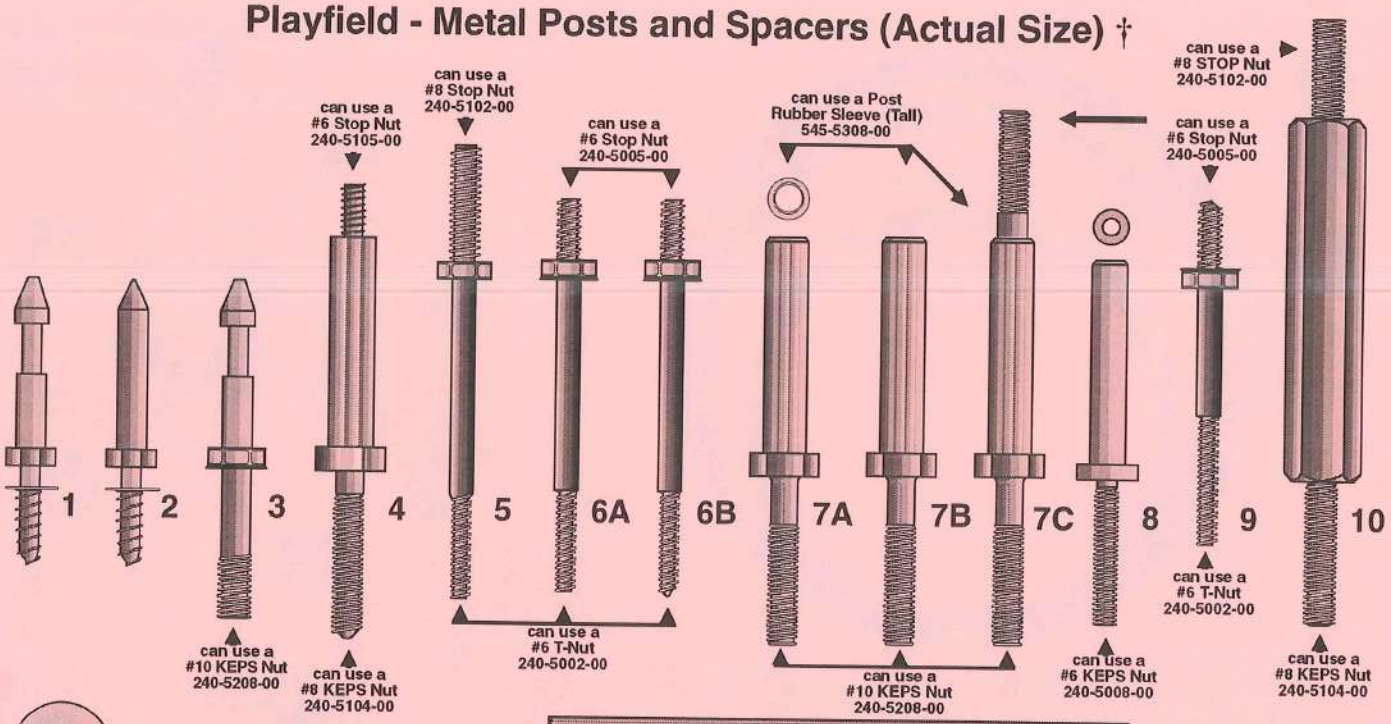


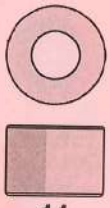
D — Rubber Bumpers (Qty. 5) are all located on the following assemblies:
- Auto Ball Launch • Lock Ball • Trough VUK
- Tank Kick Big • Power Scoop

† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

№	Rubber Part Name	QTY.	Part №
A	Rubber Bushing (Small)	0	545-5192-00
B	Small Flipper Rubber Ring	0	545-5207-00
C	Large Flipper Rubber Ring	2	545-5277-00
D	Rubber Bumper (Grommet)	5	545-5105-00
E	Bumper Post Rubber	0	545-5009-00
F	Post Rubber (Sleeve Short)	0	545-5151-00
G	Post Rubber (Sleeve Tall)	0	545-5308-00
1	2¾" I.D. Black Rubber Ring	0	545-5348-20
2	2½" I.D. Black Rubber Ring	2	545-5348-09
3	2" I.D. Black Rubber Ring	0	545-5348-08
4	1¾" I.D. Black Rubber Ring	0	545-5348-21
5	1½" I.D. Black Rubber Ring	1	545-5348-07
6	1¼" I.D. Black Rubber Ring	5	545-5348-06
7	1" I.D. Black Rubber Ring	2	545-5348-05
8	¾" I.D. Black Rubber Ring	2	545-5348-04
9	5/16" I.D. Black Rubber Ring	4	545-5348-02
10	3/16" I.D. Black Rubber Ring	4	545-5348-01
11	3/8" O.D. Black Rubber Ring	8	545-5348-19
12	3" I.D. BLK Rubber Ring (Not Shown)	0	545-5348-10

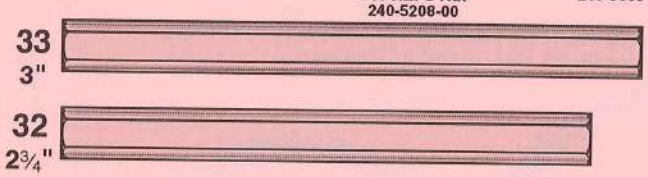
Playfield - Metal Posts and Spacers (Actual Size) †





34* 35*

* Item 34, 4", & Item 35, 4-5/16", is not used in this game. Use back cover ruler for measurement.



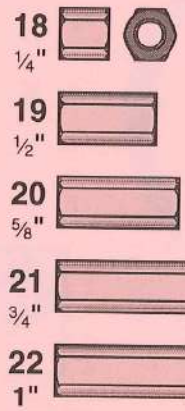
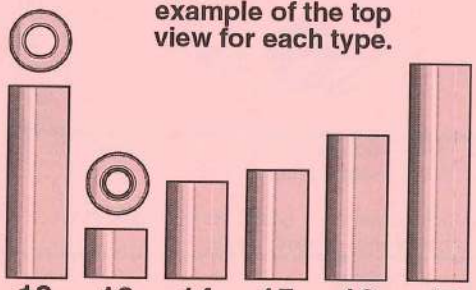
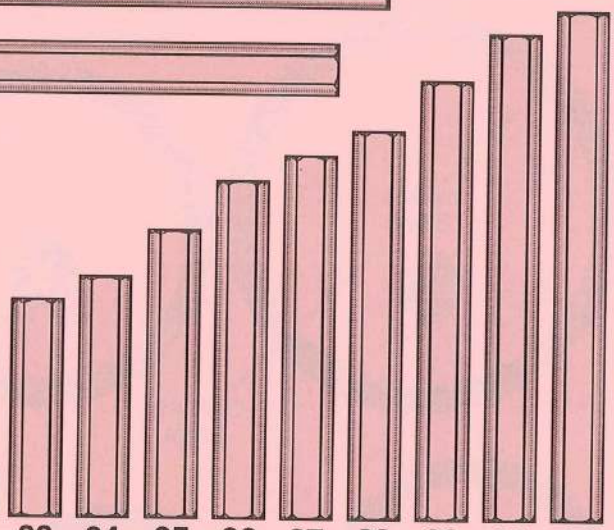


Illustration Note: **Tapped Posts and Spacers show one example of the top view for each type.**



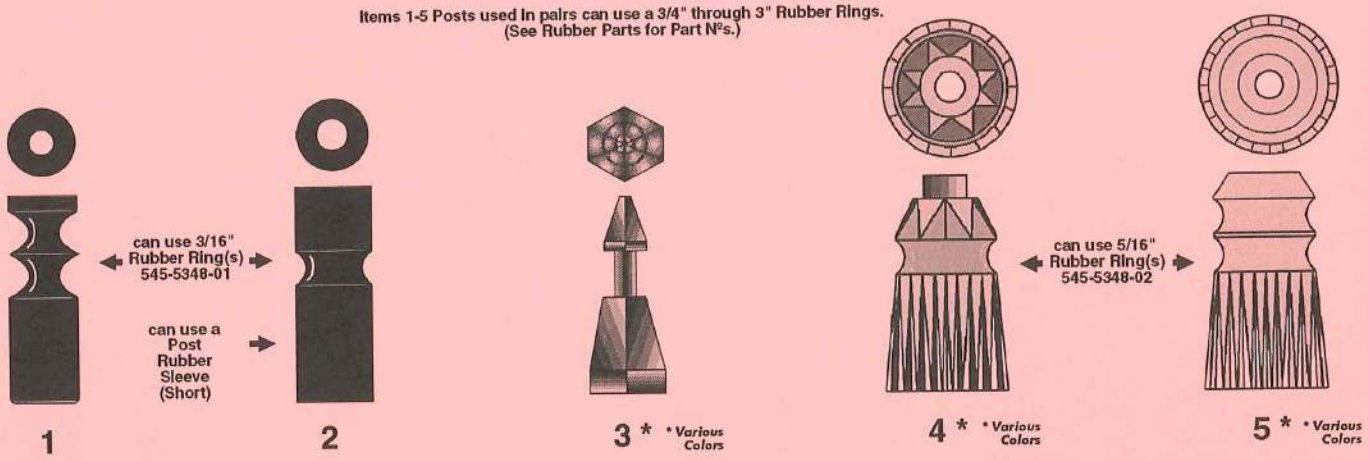


№	Metal Post/Spacer Name	QTY.	Part №	№	Metal Post/Spacer Name	QTY.	Part №
1	Mini-Post-Wood Threaded	3	530-5004-00	17	Spacer 1⅛" Lg. X 5/16" X .144 I.D.	5	254-5014-02
2	Mini-Post-Wood Thd. No Cut-Away	0	530-5004-01	18	Spacer ¼" Hex Tapped 6-32	1	254-5008-00
3	Mini-Post-Machine Threaded	5	530-5005-00	19	Spacer ½" Hex Tapped 6-32	8	254-5008-03
4	Bumper Post -Machine Threaded	0	530-5007-00	20	Spacer ⅝" Hex Tapped 6-32	1	254-5008-02
5	Post Fastening Screw Lg. #8-32 Top	4	530-5008-00	21	Spacer ¾" Hex Tapped 6-32	1	254-5008-04
6A	Post Machine Screw #6-32 Top	17	530-5012-02	22	Spacer 1" Hex Tapped 6-32	0	254-5008-06
6B	Post Wood Screw #6-32 Top	1	530-5010-02	23	Spacer 1⅛" Hex Tap. 6-32	0	254-5008-17
7A	Bumper Post Hex Base #8-32 Tap.	2	530-5332-01	24	Spacer 1¼" Hex Tapped 6-32	2	254-5008-11
7B	Bumper Post Hex Base Untapped	0	530-5332-00	25	Spacer 1½" Hex Tapped 6-32	1	254-5008-09
7C	Bumper Post Hex Base w/#8-32 Male	0	530-5332-02	26	Spacer 1¾" Hex Tapped 6-32	0	254-5008-10
8	Bumper Post 6-32 Tapped	0	530-5127-00	27	Spacer 1⅞" Hex Tapped 6-32	0	254-5008-20
9	Post Machine Screw	0	530-5263-01	28	Spacer 2" Hex Tapped 6-32	2	254-5008-07
10	Mini-Playfield Support	0	530-5285-00	29	Spacer 2¼" Hex Tapped 6-32	1	254-5008-18
11	Spacer Backbox Hinge	2	530-5099-00	30	Spacer 2½" Hex Tapped 6-32	1	254-5008-16
12	Spacer 1" Lg Metal 5/16" X .144 I.D.	0	254-5001-00	31	Spacer 2⅝" Hex Tapped 6-32	0	254-5008-08
13	Spacer ¼" Long X 5/16" X .144 I.D.	3	254-5014-03	32	Spacer 2¾" Hex Tapped 6-32	1	254-5008-15
14	Spacer ½" Long X 5/16" X .144 I.D.	5	254-5014-00	33	Spacer 3" Hex Tapped 6-32	0	254-5008-14
15	Spacer 9/16" Long X 5/16" X .144 I.D.	0	254-5014-04	34	Spacer 4" Hex Tap. 6-32 (Not Shown)	0	254-5008-21
16	Spacer ¾" Long X 5/16" X .144 I.D.	0	254-5014-01	35	Hex Spcr. 45/16" X .144 I.D. (Not Shown)	0	254-5018-00

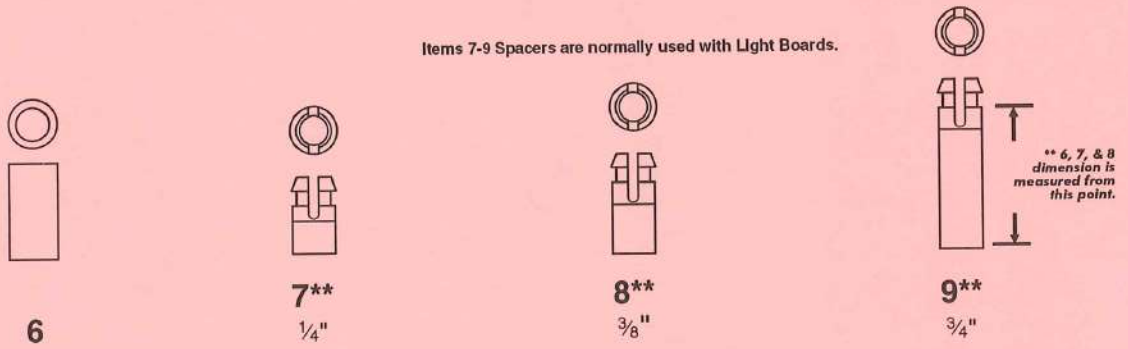
† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

Playfield - Plastic Posts and Spacers (Actual Size) †

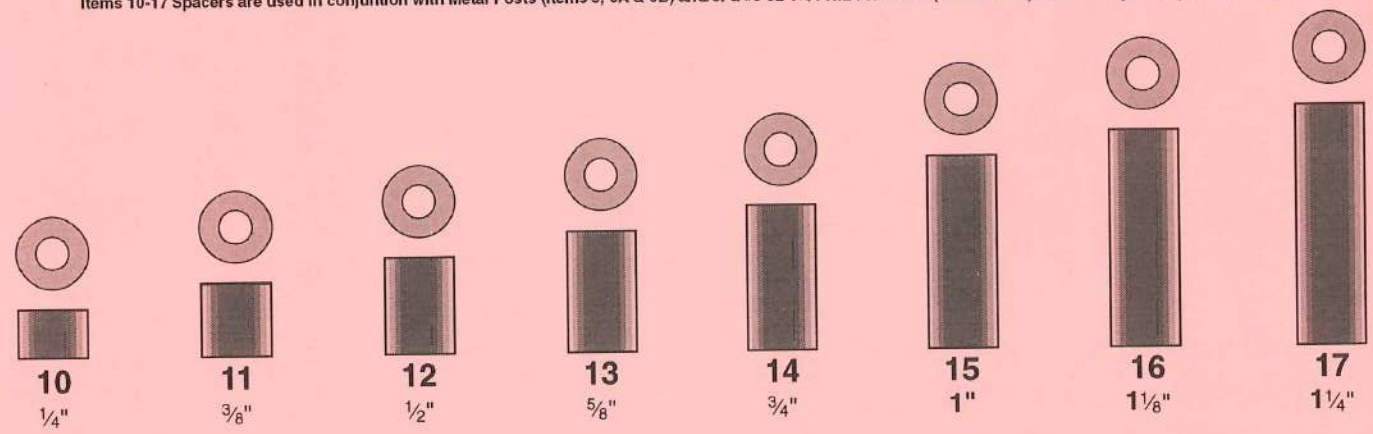
Items 1-5 Posts used in pairs can use a 3/4" through 3" Rubber Rings.
(See Rubber Parts for Part Nºs.)



Items 7-9 Spacers are normally used with Light Boards.



Items 10-17 Spacers are used in conjuntion with Metal Posts (Items 5, 6A & 6B) and/or a #6-32 1¾ PHIL PH Screw (237-5511-00) with #6 Stop Nuts (240-5005-00).



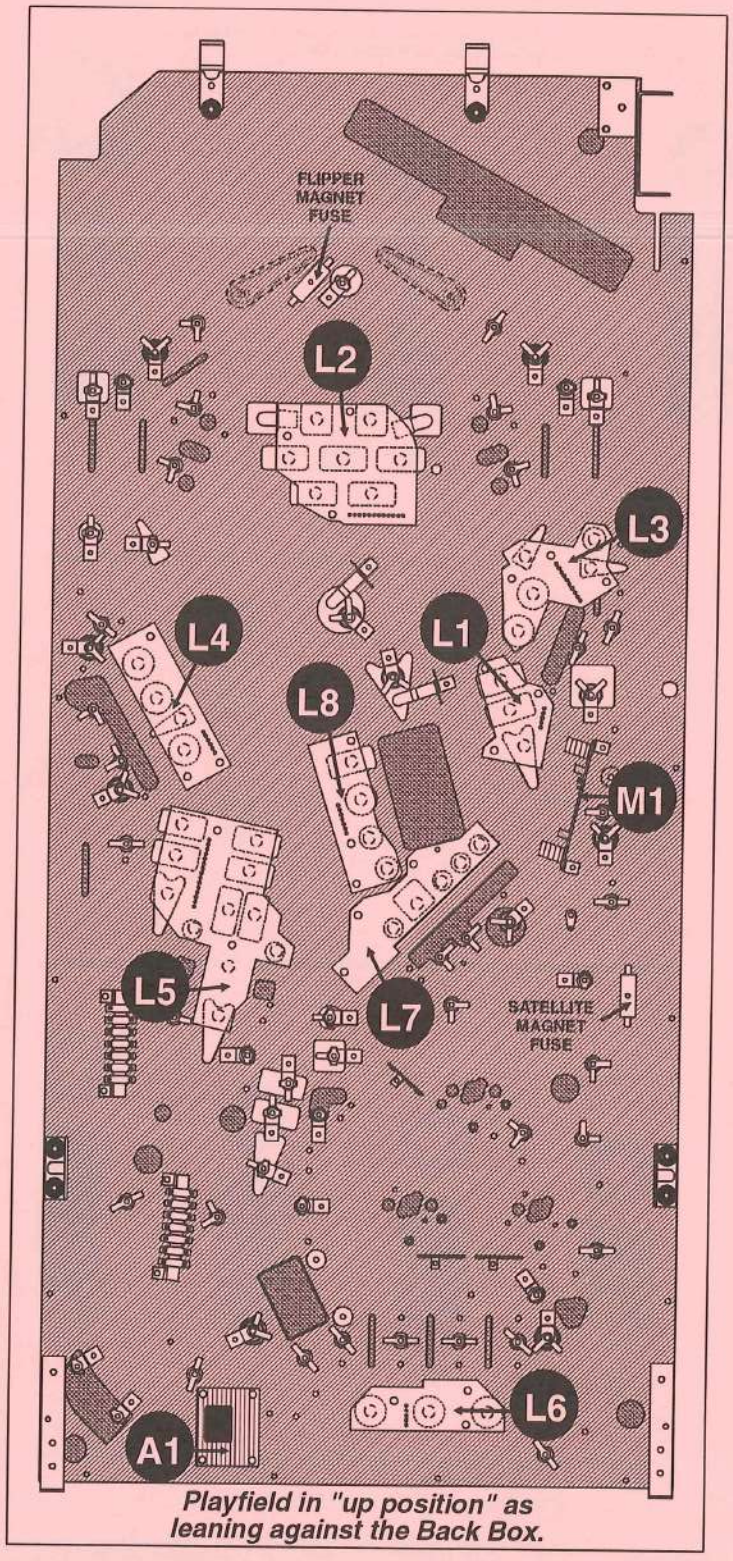
* Items 3, 4 & 5 (Jewel Posts) come in various colors, see the Plastic Part Color Chart at the end of Section 4, Chapter 2. Replace the last 2-digits with desired color replacement.

** Items 7, 8 & 9 (Light Board Spacers) dimensions are measured from bottom to just under cut-away (see pictorials above).

† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

Nº	Plastic Post/Spacer Name	QTY.	Part Nº	Nº	Plastic Post/Spacer Name	QTY.	Part Nº
1	Stand-Off Double Groove 1-1/16"	2	530-5102-01	10	Spacer 1/4" Plastic 3/8" (Gray)	0	254-5000-02
2	Plastic Post (Black)	0	550-5059-00	11	Spacer 3/8" Plastic 3/8" (Gray)	0	254-5000-12
3 *	Mini-Jewel Post Clear	4	550-5052-01	12	Spacer 1/2" Plastic (Gray) 3/8"	0	254-5000-01
4 *	Small Jewel Post Clear	7	550-5034-01	13	Spacer 5/8" Plastic 3/8" (Gray)	0	254-5000-14
5 *	Double Rubber Jewel Post	0	545-5209-XX	14	Spacer 3/4" Plastic 3/8" (Gray)	3	254-5000-07
6	Spacer 1/2" Plstc. Narrow (White) 3/8"	0	254-5000-03	15	Spacer 1" Plastic 3/8" (Gray)	0	254-5000-04
7 **	Spacer 1/4" Plastic Slf. Rtn. SRS6-4-01	4	254-5007-02	16	Spacer 1 1/8" Plastic 3/8" (Gray)	1	254-5000-06
8 **	Spacer 3/8" Plastic Slf. Rtn. SRS6-6-01	28	254-5007-01	17	Spacer 1 1/4" Plastic 3/8" (Gray)	0	254-5000-05
9 **	Spacer 3/4" Plastic Slf. Rtn. SRS6-12-01	0	254-5007-03				

Playfield - Light Boards, Magnet Processor (X2)/Driver Bd., Aux. Relay Bd. †



Playfield in "up position" as leaning against the Back Box.

Note:
#555 Bulbs are used on the Light Boards; see the next page for bulb and socket part numbers.

№	Board Name	SPI Part №
	GoldenEye Light Boards (01-08)	520-5128-XX
L1	GoldenEye Light Board 1	520-5128-01
L2	GoldenEye Light Board 2	520-5128-02
L3	GoldenEye Light Board 3	520-5128-03
L4	GoldenEye Light Board 4	520-5128-04
L5	GoldenEye Light Board 5	520-5128-05
L6	GoldenEye Light Board 6	520-5128-06
L7	GoldenEye Light Board 7	520-5128-07
L8	GoldenEye Light Board 8	520-5128-08
A1	Aux. Relay Board	520-5010-00
M1	Magnet Processor (X2) / Driver Board	520-5143-00

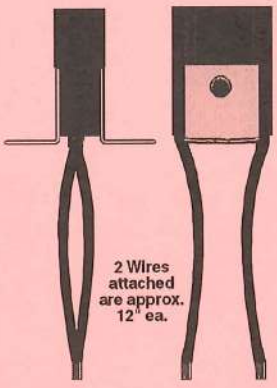
Note: To order all 8 pieces (01-08) use above number with "-XX"; for individual pieces replace the "-XX" with appropriate number.
Attention: Individual pieces may not be available.

Playfield - Wedge Base Type Bulbs and Sockets (Actual Size) †

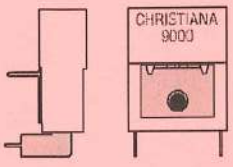
A
#555

1
This socket is normally used on Lamp Boards to position bulbs vertically. (Use w/#555 & #906 Bulbs.)

2
This socket is normally used in Pop Bumpers. (Use #555 Bulbs only.)

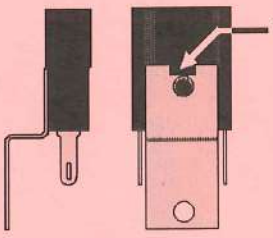


3
This socket is normally used on Lamp Boards to position bulbs horizontally. (Use w/#555 & #906 Bulbs.)

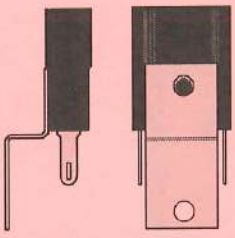


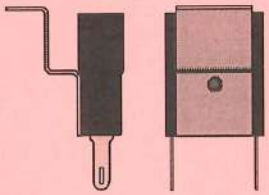
Replacement Note:
Socket color may be either black or white

4
This socket is normally used with Reflectors.

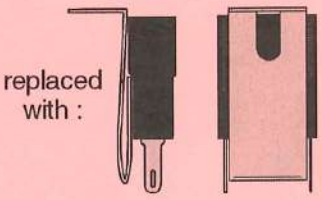


5

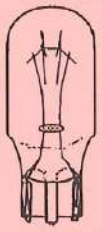




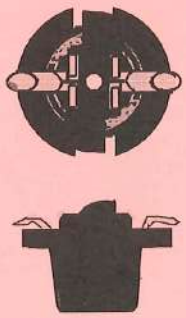
6



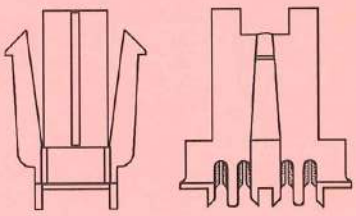
B
#906



7
This socket is sometimes used in conjunction with Mini-Mars or special Butyrate assemblies.



8
This socket was used with an alternate insert using Insulation Displacement Connection vs. a Soldered-On Connection.



C
Neon

This Neon Bulb is used with Motor Assemblies for voltage spike suppression.

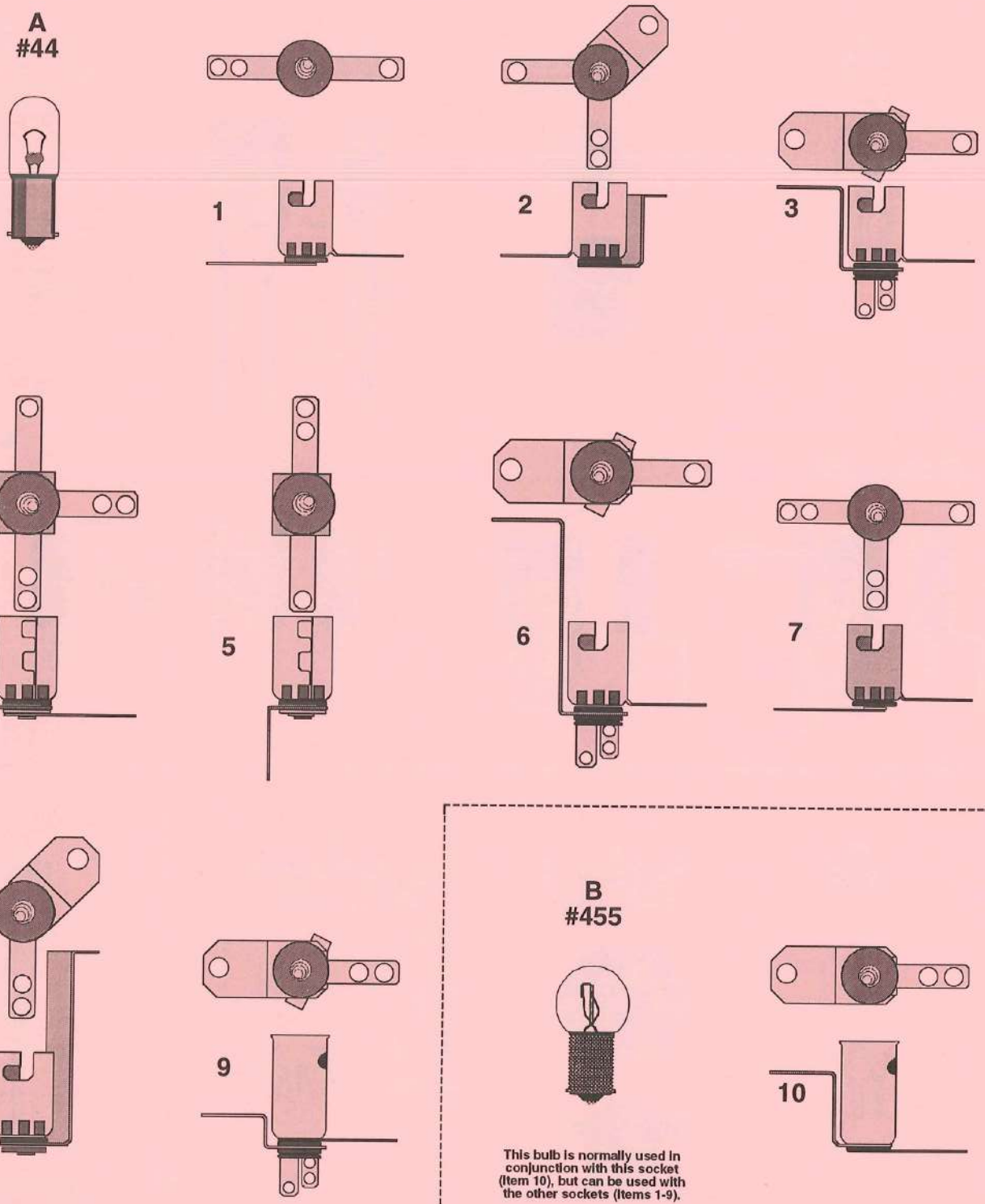
№	Bulb & Socket Name	QTY.	Part №
A	#555 Wedge Base Bulb	54	165-5002-00
1	555 Wedge Base Socket	42	077-5007-00
2	Turbo Pop Bumper Socket	3	077-5206-00
3	Lamp Board Laydown Wedge Base	2	077-5207-00
4	Laydown Wedge Base L/R Black	3	077-5026-01
5	Laydown Wedge Base Black	0	077-5026-00
6	Wedge Offset Brckt. Socket 2-Styles	4	077-5029-00

№	Bulb & Socket Name	QTY.	Part №
B	#906 Wedge Base Bulb	0	165-5004-00
7	906 Wedge Base Socket	0	077-5016-00
8	555/906 IDC Wedge Socket	0	077-5110-00

№	Bulb Name (used w/motors)	QTY.	Part №
C	Neon NE-2 Bulb	1	165-5021-00

† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

Playfield - Bayonet Type Bulbs and Sockets (Actual Size) †

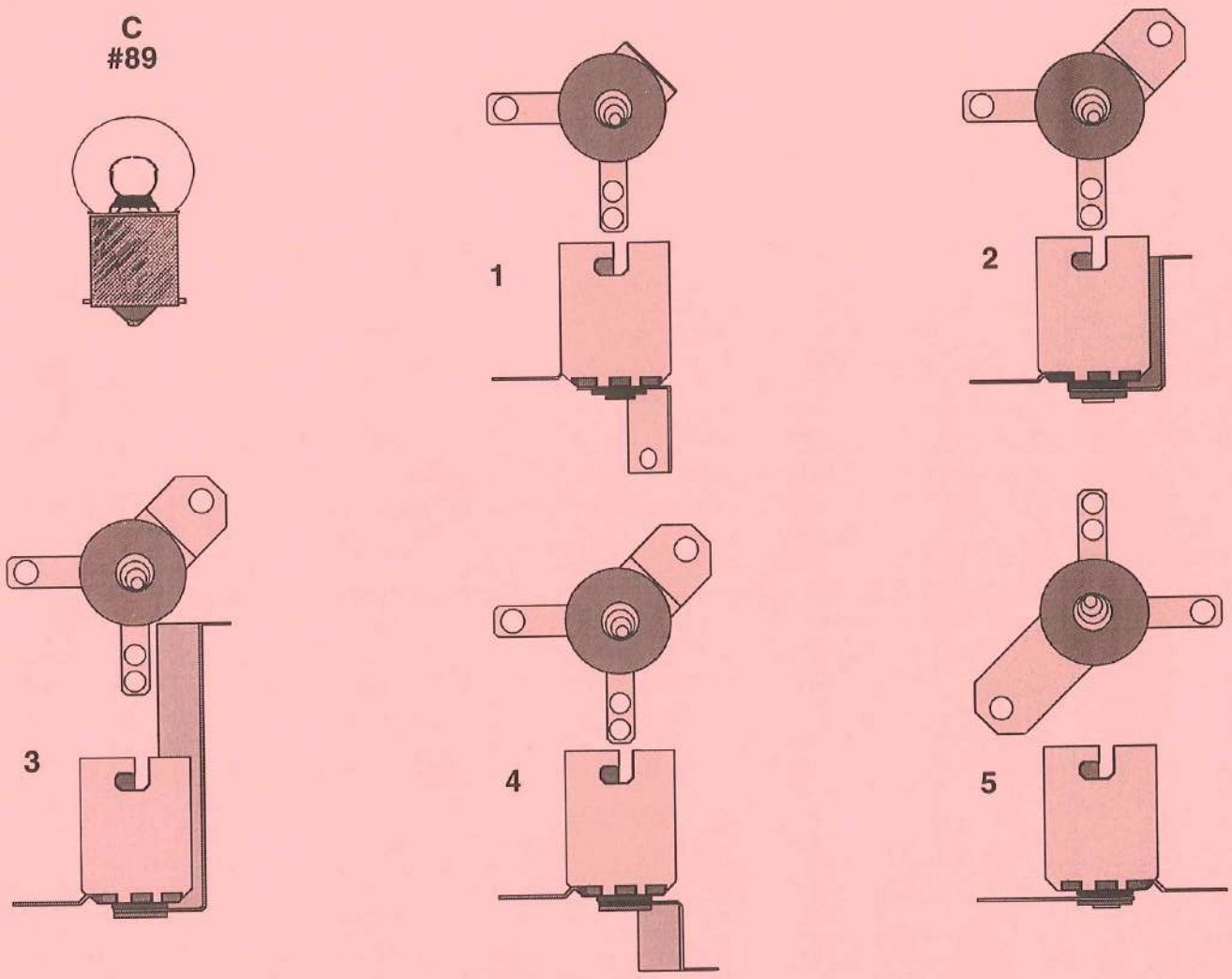


This bulb is normally used in conjunction with this socket (Item 10), but can be used with the other sockets (Items 1-9).

Nº	Bulb & Socket Name	QTY.	Part Nº
A	#44 Bulb	96	165-5000-44
1	2-Lug Staple Down Socket	66	077-5000-00
2	2-Lug Stand-Up Short Socket	8	077-5002-00
3	3-Lug Stand-Up Short Socket	0	077-5008-00
4	3-Lug Laydown Socket	2	077-5006-00
5	2-Lug Laydown Socket	0	077-5003-00
6	3-Lug Stand-Up Long Socket	19	077-5009-00
7	3-Lug Staple Down Socket	0	077-5001-00
8	2-Lug Stand-Up Long Socket	0	077-5005-00
9	3-Lug Stand-Up Long Shell Socket	1	077-5013-00
B	#455 Twinkle Bulb	0	165-5003-00
10	1-Lug Stand-Up Long Shell Socket	0	077-5012-00

† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

Playfield - Large Bayonet Type Bulbs and Sockets (Actual Size) †



† Items with Ø Qty. are not used in this game. Size and/or quantities may change during production.

№	Bulb & Socket Name	QTY.	Part №	№	Bulb & Socket Name	QTY.	Part №
C	#89 Bulb	29	165-5000-89	3	2 Lugs Stand-Up Long Socket	2	077-5102-00
1	Laydown Standard Socket	0	077-5100-00	4	Stand-Up Socket Rev. Short	0	077-5103-00
2	2-Lug Stand-Up Short Socket	27	077-5101-00	5	Straight Leg Socket	0	077-5107-00

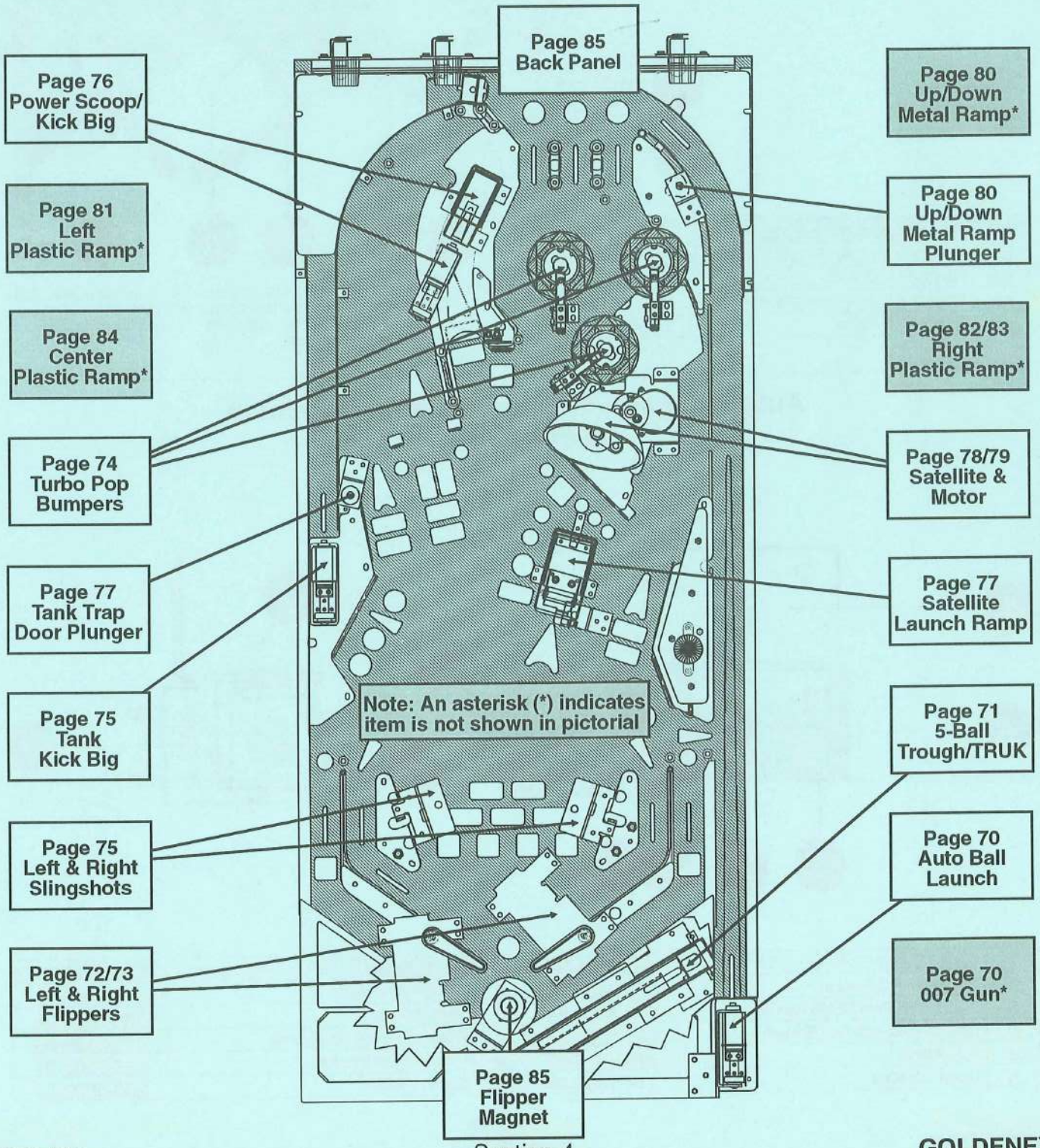
Parts Order Checklist Notes

Date Ordered	Part №	Qty.	Description	Date Received

Assembly Drawings (The Blue Pages)

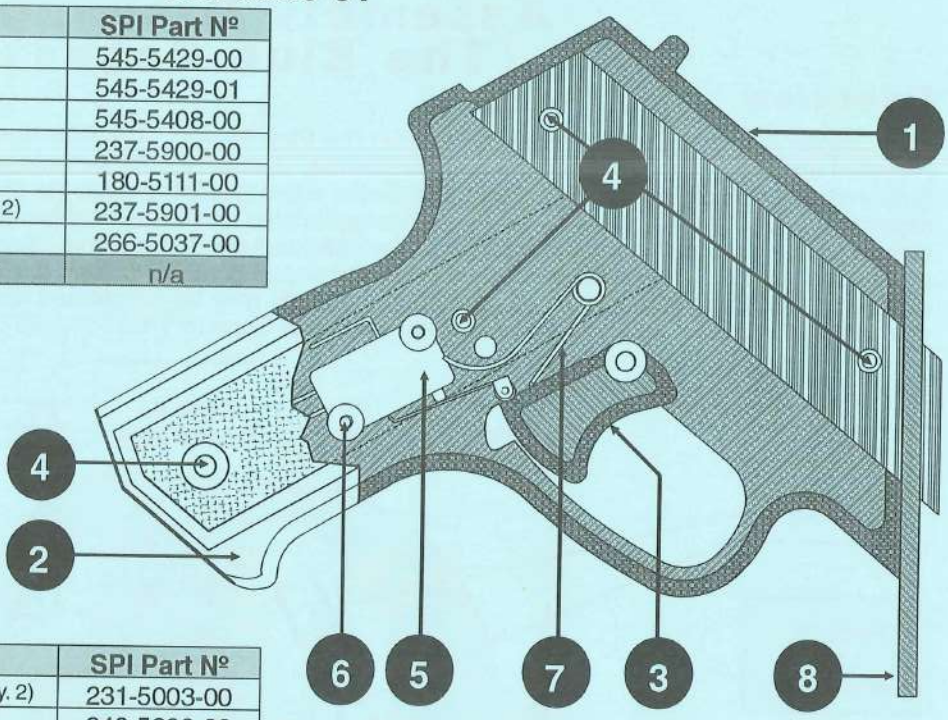
Overview

This chapter expands Chapter 1 of this section (The Pink Pages). The Part Numbers for all Major Assemblies are provided and can be ordered as a complete assembly (exception: Turbo Bumper Parts). Each assembly is broken down, describing the individual parts and/or sub-assemblies (with the part numbers) which can be ordered separately. Where multiple parts are riveted or assembled as sub-assemblies the sub-assembly needs to be ordered. The drawings show the location of the individual parts. Note that minor changes may be made during production (e.g. coil size, addition or deletion of minor parts). Always verify the part to be replaced with the part number and/or description as noted. Replacement parts may be substituted with revised parts which may have a different part number. Any questions, call our Technical Support 1-800-542-5377 USA/Canada or 708-345-7700.



"007" Gun Assembly
500-5698-01

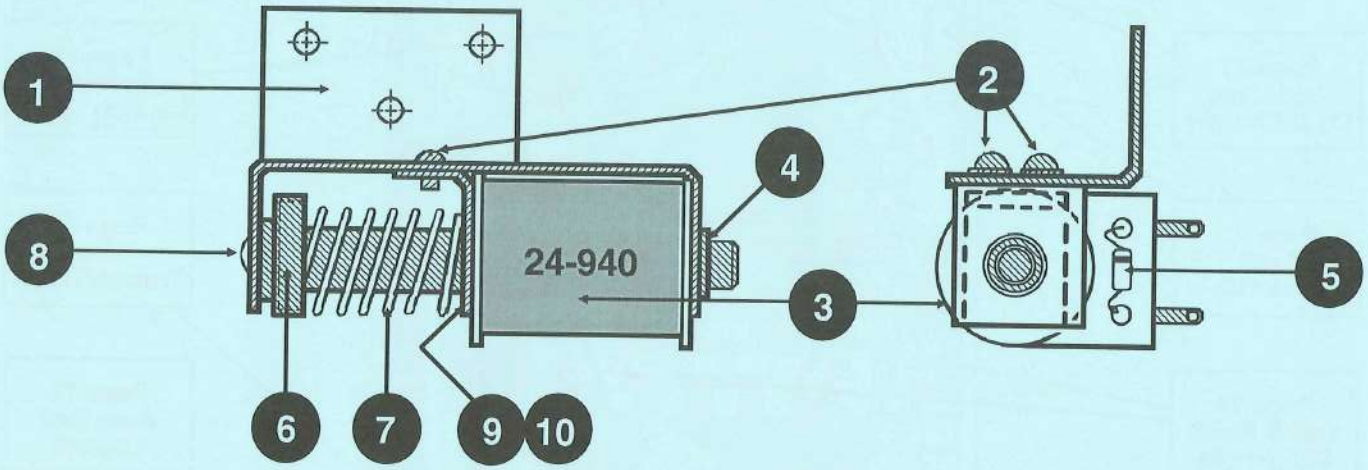
№	Part Name	SPI Part №
1	Gun Handle Left (Molded)	545-5429-00
2	Gun Handle Right (Molded)	545-5429-01
3	Trigger	545-5408-00
4	#8-32 X 1/2 Screw (Gun) (Qty. 4)	237-5900-00
5	Micro Switch	180-5111-00
6	#4-40 X 9/16 Screw (Switch) (Qty. 2)	237-5901-00
7	Spring (Switch)	266-5037-00
8 *	Mounting Plate Welded Assembly *	n/a



№	Associated Part Name	SPI Part №
n/a	1/4-20 X 1-1/4 Crrg. Bolt Sq. Neck (Qty. 2)	231-5003-00
n/a	Flange Nut (Qty. 4)	240-5300-00
n/a	Split Lock Washer 1/4 (Qty. 4)	244-5000-00
n/a	Gun Switch Cable	036-5390-01

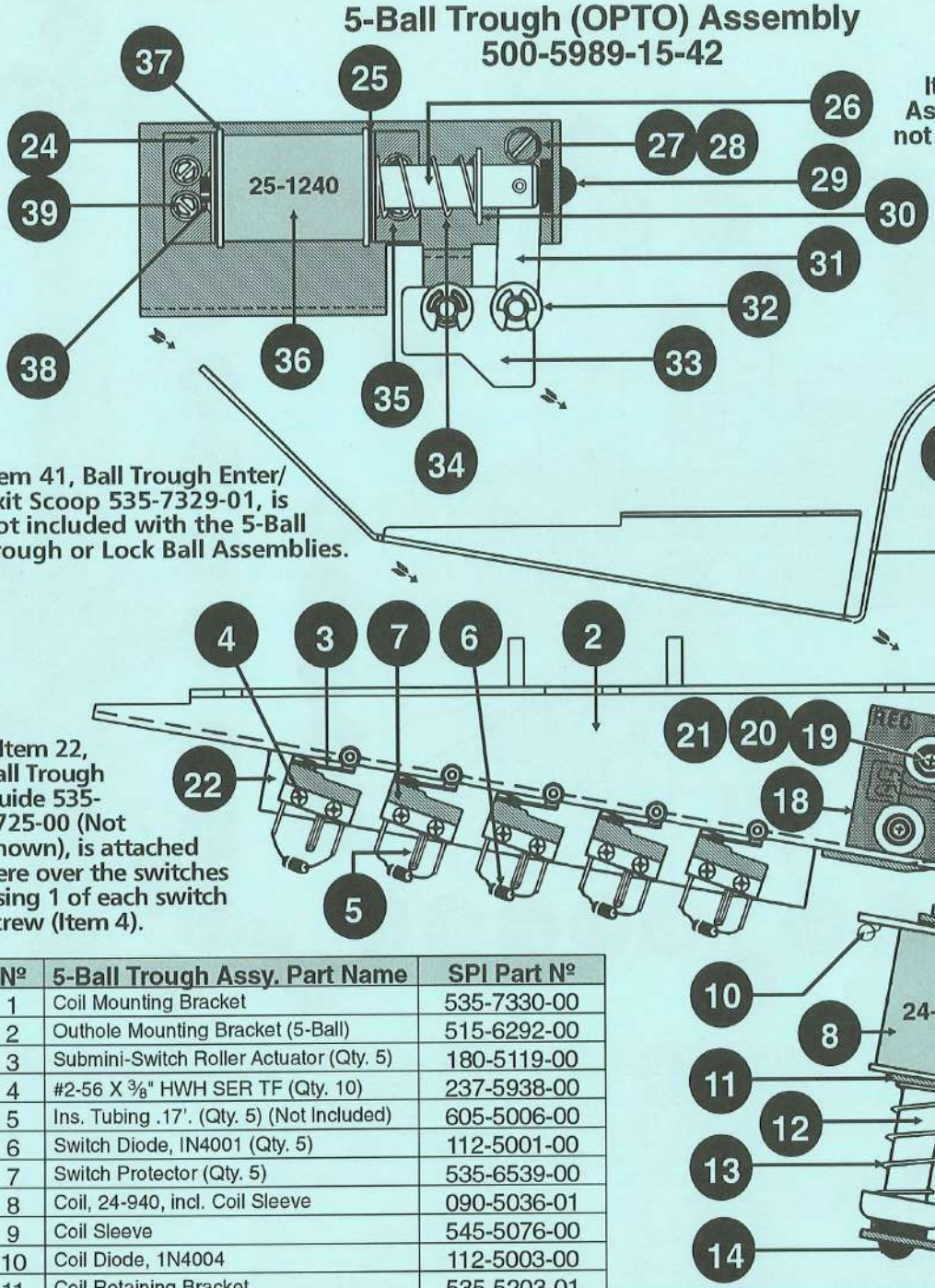
Note: The above Item 8 cannot be ordered. If replacement of this piece is required, the entire assembly (500-5698-01) must be ordered. See Associated Part Names for mounting hardware (not shown).

Auto Ball Launch (Shooter Lane) Assembly
500-5477-01-42



№	Part Name	SPI Part №	№	Part Name	SPI Part №
1	Coil Mounting Bracket	535-6385-00	6	Plunger Assembly	515-5000-02
2	8-32 X 1/4" PPH SEMS (Qty. 2)	232-5300-04	7	Relay Spring	266-5020-00
3	Coil, 24-940, incl. Coil Sleeve	090-5036-01	8	Rubber Bumper (Grommet)	545-5105-00
4	Coil Sleeve	545-5076-00	9	Coil Retainer Bracket	535-5203-01
5	Diode, 1N4004	112-5003-00	10	Spring Washer	266-5002-00

5-Ball Trough (OPTO) Assembly
500-5989-15-42



Items 24-40, Lock Ball Assembly 500-5684-01, is not included with the 5-Ball Trough Assembly.

Item 41, Ball Trough Enter/ Exit Scoop 535-7329-01, is not included with the 5-Ball Trough or Lock Ball Assemblies.

* Item 22, Ball Trough Guide 535-7725-00 (Not Shown), is attached here over the switches using 1 of each switch screw (Item 4).

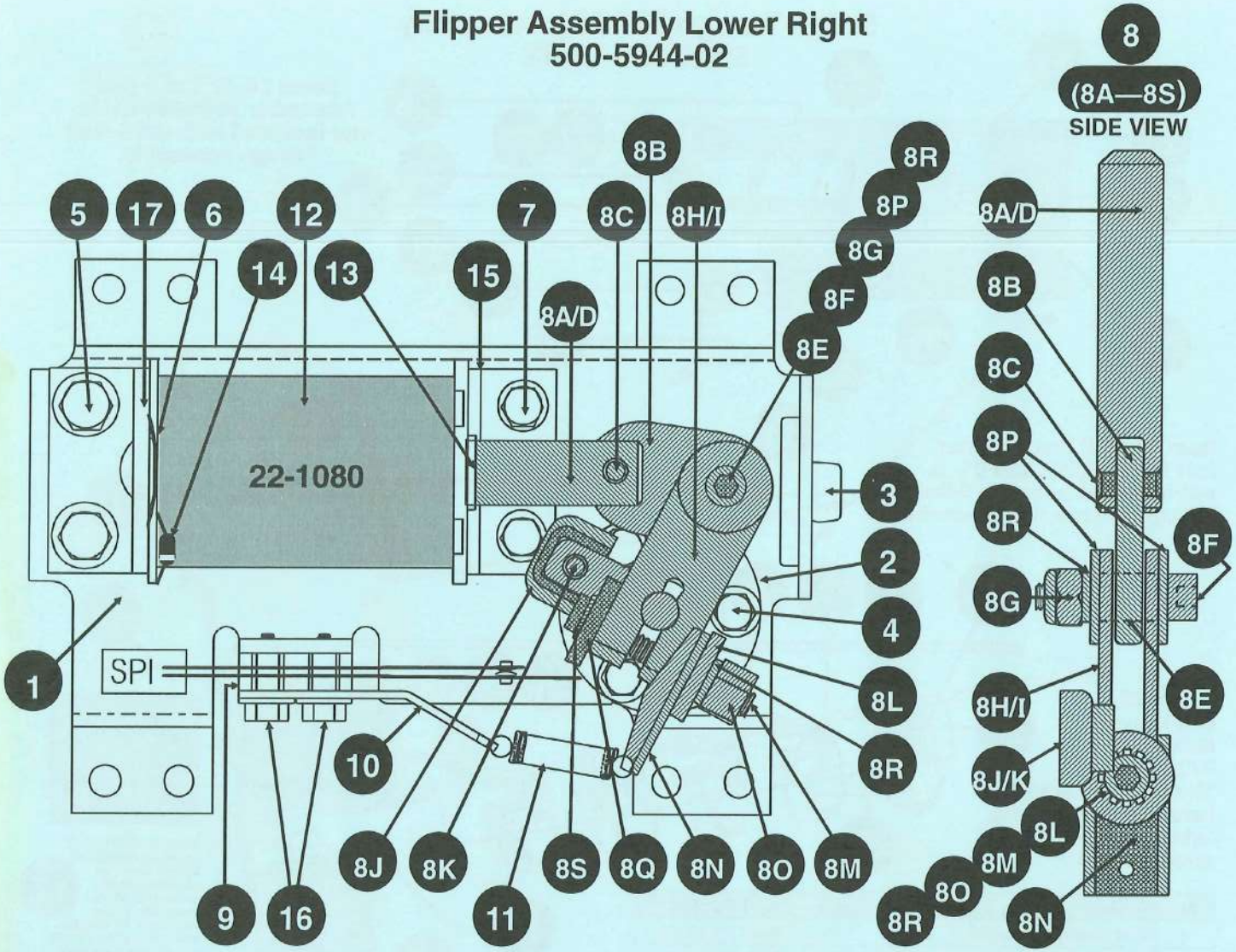
Item 17, OPTO TRANS Board (Transmitter) 520-5124-00, is mounted on the other side of the assembly, in line with Item 18, REC Bd. (Receiver) 520-5125-00, using same hardware.

Nº	5-Ball Trough Assy. Part Name	SPI Part Nº
1	Coil Mounting Bracket	535-7330-00
2	Outhole Mounting Bracket (5-Ball)	515-6292-00
3	Submini-Switch Roller Actuator (Qty. 5)	180-5119-00
4	#2-56 X 3/8" HWH SER TF (Qty. 10)	237-5938-00
5	Ins. Tubing .17'. (Qty. 5) (Not Included)	605-5006-00
6	Switch Diode, IN4001 (Qty. 5)	112-5001-00
7	Switch Protector (Qty. 5)	535-6539-00
8	Coil, 24-940, incl. Coil Sleeve	090-5036-01
9	Coil Sleeve	545-5076-00
10	Coil Diode, 1N4004	112-5003-00
11	Coil Retaining Bracket	535-5203-01
12	Plunger Assembly	515-5941-01
13	Compression Spring	266-5020-00
14	Rubber Bumper (Grommet)	545-5105-00
15	#8-32 X .25" HWH SER MS (Qty. 2)	237-5964-00
16	#8-32 X 3/8 HWH TF (Qty. 4)	237-5967-00
17	OPTO Transmitter (TRANS) Board	520-5124-00
18	OPTO Receiver (REC) Board	520-5125-00
19	OPTO PCB Tube Spacer (Qty. 6)	530-5308-02
20	OPTO PCB Rubber Grommet (Qty. 6)	545-5518-00
21	#6-32 X 5/8" HWH TF (Qty. 6)	237-5928-00
22 *	Trough Ball Guide (Not Shown)	535-7725-00
23 *	Ball Trough Wire Harness (Not Shown)	036-5386-05

Nº	Lock Ball Assembly Part Name	SPI Part Nº
24	Core Stop Assembly	515-5088-00
25	Lock Ball Bracket Assembly	515-5817-01
26	Plunger ø7/16" X 2.25" LG	530-5250-01
27	Plastic Spacer	545-5400-00
28	#8-32 PPH X 1" LG	232-5606-00
29	Rubber Bumper (Grommet)	545-5105-00
30	Retaining Ring 7/16" ø Shaft	270-5005-00
31	Link, Lock Ball	545-5058-00
32	Retaining Ring, 1/4" ø (Qty. 2)	270-5002-00
33	Lock Ball Cam Assembly	515-5815-01
34	Compression Spring	266-5000-00
35	Coil Retaining Bracket	535-6658-00
36	Coil, 25-1240, incl. Coil Sleeve	090-5034-00
37	Coil Sleeve	545-5411-00
38	Coil Diode, 1N4004	112-5003-00
39	#6-32 HWH TC X .38 LG (Qty. 4)	237-5898-00
40 *	Lock Ball Wiring Harness (Not Shown)	036-5301-01
41	Ball Trough Enter/Exit Scoop	535-7329-01

Note: An asterisk (*) indicates item is not depicted in pictorial.

Flipper Assembly Lower Right
500-5944-02



Nº	Part Name	SPI Part Nº
1	Flipper Base	535-7275-00
2	Flipper Bushing	545-5594-00
3	Deflector Pad (Bumper)	545-5428-00
4	#6-32 X .38" Lg. HWH TF SERR (Qty.3)	237-5910-01
5	#10-32 X .38" Lg. HWH TF SERR (Qty. 2)	237-5961-00
6	Spring Washer	269-5002-00
7	#8-32 X .38 Lg. HWH TF (Qty. 2)	237-5967-00
8	Plunger, Link & Pawl Sub-Assembly	515-6518-00
ORDERING ABOVE (ITEM 8) SUB-ASSY. PART Nº WILL INCLUDE:		
8A	Flipper Plunger/Link Assembly (ordering A includes B-D)	515-6304-01
8B	Flipper Link	545-5611-00
8C	Spirol Pin ø.156 X 1/2" Lg.	251-5015-00
8D	Flipper Plunger with Flat	530-5349-01
8E	Extended Flipper Bushing	530-5139-01
8F	#10-32 X 7/8" Lg. SOC HD	237-5966-00
8G	#10-32 Nylon Stop Nut	240-5203-00
8H	Pawl (Mounting Link) Sub-Assembly	515-6305-00
8I	Pawl (Mounting Link) *only*	535-7271-00
8J	Switch Actuator	545-5612-00
8K	Rivet 1/8" ø X 1/4" Lg.	249-5003-00
8L	Washer .105" THK .203" I.D. X .63" O.D.	242-5039-00
8M	#10-32 SOC HD X 1.25" Lg. (Qty. 2)	237-5950-00
8N	Return Bracket	535-7353-00
8O	#10-32 X 9/32" Long 3/8" Hex Nut	240-5209-00
8P	Wshr. .06" THK (same I.D./O.D.) (Qty. 2)	242-5038-00
8Q	Washer .105" THK .203" I.D. X .63" O.D.	242-5039-01
8R	#10-32 Split Lock Washer (Qty. 2)	244-5003-00
8S	#10 Star Washer	246-5002-00

Nº	Part Name	SPI Part Nº
9	Power (End of Stroke) Switch	180-5149-00
10	Switch Plate/Spring Return Bracket	535-7354-00
11	Flipper Return Spring	265-5035-00
12	Coil 22-1080 (YEL-GRN) incl. Coil Sleeve	090-5032-00
13	Coil Sleeve	545-5388-00
14	Coil Diode, 1N4004	112-5003-00
15	Coil Support Bracket	535-7356-00
16	#6-32 X .63" HWH TF (Qty.2)	237-5928-00
17	Coil Stop Sub-Assembly (w/ø.093" Hole)	515-6308-01
ORDERING ABOVE (ITEM 17) SUB-ASSY. PART Nº WILL INCLUDE:		
—	Coil Stop with Hole	530-5350-00
—	Shading Ring	530-5123-00
—	Coil Stop Bracket	535-7355-00

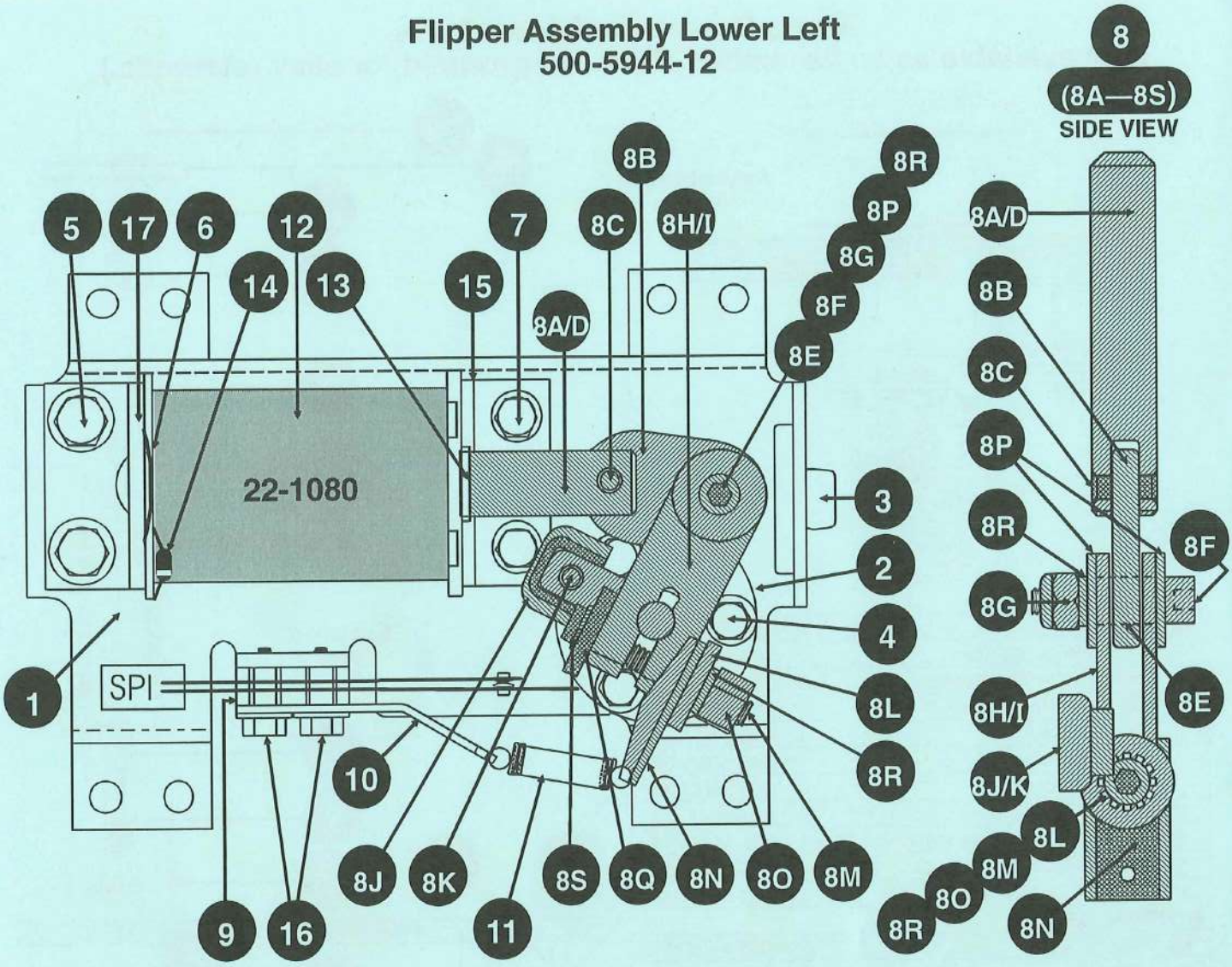
IMPORTANT: When replacing Item 8B, Flipper Link, we advise replacing with entire Item 8A, Flipper Plunger/ Link Assembly due to overall wear & tear.

****** Check all other components and replace as required. ******

ASSOCIATED PART(S) NOT INCLUDED WITH THE ABOVE ASSEMBLY

Nº	Associated Part Name	SPI Part Nº
n/a	Right Flipper Bat & Shaft Assy. Color: WHITE W/SONIC THE HEDGEHOG™ LOGO	515-5133-01-03
n/a	Right Flipper Bat Decal	820-6132-23

Flipper Assembly Lower Left
500-5944-12



Nº	Part Name	SPI Part Nº
1	Flipper Base	535-7275-01
2	Flipper Bushing	545-5594-00
3	Deflector Pad (Bumper)	545-5428-00
4	#6-32 X .38" Lg. HWH TF SERR (Qty.3)	237-5910-01
5	#10-32 X .38" Lg. HWH TF SERR (Qty. 2)	237-5961-00
6	Spring Washer	269-5002-00
7	#8-32 X .38 Lg. HWH TF (Qty. 2)	237-5967-00
8	Plunger, Link & Pawl Sub-Assembly	515-6518-01
ORDERING ABOVE (ITEM 8) SUB-ASSY. PART Nº WILL INCLUDE:		
8A	Flipper Plunger/Link Assembly (ordering A includes B-D)	515-6304-01
8B	Flipper Link	545-5611-00
8C	Spirol Pin ø.156 X 1/2" Lg.	251-5015-00
8D	Flipper Plunger with Flat	530-5349-01
8E	Extended Flipper Bushing	530-5139-01
8F	#10-32 X 7/8" Lg. SOC HD	237-5966-00
8G	#10-32 Nylon Stop Nut	240-5203-00
8H	Pawl (Mounting Link) Sub-Assembly	515-6305-01
8I	Pawl (Mounting Link) *only*	535-7271-01
8J	Switch Actuator	545-5612-00
8K	Rivet 1/8" ø X 1/4" Lg.	249-5003-00
8L	Washer .105" THK .203" I.D. X .63" O.D.	242-5039-00
8M	#10-32 SOC HD X 1.25" Lg. (Qty. 2)	237-5950-00
8N	Return Bracket	535-7353-00
8O	#10-32 X 9/32" Long 3/8" Hex Nut	240-5209-00
8P	Wshr. .06" THK (same I.D./O.D.) (Qty. 2)	242-5038-00
8Q	Washer .105" THK .203" I.D. X .63" O.D.	242-5039-01
8R	#10-32 Split Lock Washer (Qty. 2)	244-5003-00
8S	#10 Star Washer	246-5002-00

Nº	Part Name	SPI Part Nº
9	Power (End of Stroke) Switch	180-5149-00
10	Switch Plate/Spring Return Bracket	535-7354-00
11	Flipper Return Spring	265-5035-00
12	Coil 22-1080 (YEL-GRN) incl. Coil Sleeve	090-5032-00
13	Coil Sleeve	545-5388-00
14	Coil Diode, 1N4004	112-5003-00
15	Coil Support Bracket	535-7356-00
16	#6-32 X .63" HWH TF (Qty.2)	237-5928-00
17	Coil Stop Sub-Assembly (w/ø.093" Hole)	515-6308-01
ORDERING ABOVE (ITEM 17) SUB-ASSY. PART Nº WILL INCLUDE:		
—	Coil Stop with Hole	530-5350-00
—	Shading Ring	530-5123-00
—	Coil Stop Bracket	535-7355-00

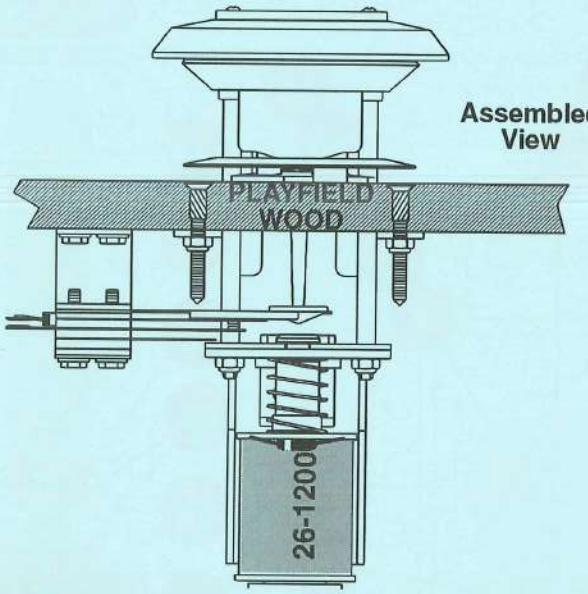
IMPORTANT: When replacing Item 8B, Flipper Link, we advise replacing with entire Item 8A, Flipper Plunger/ Link Assembly due to overall wear & tear.

****** Check all other components and replace as required. ******

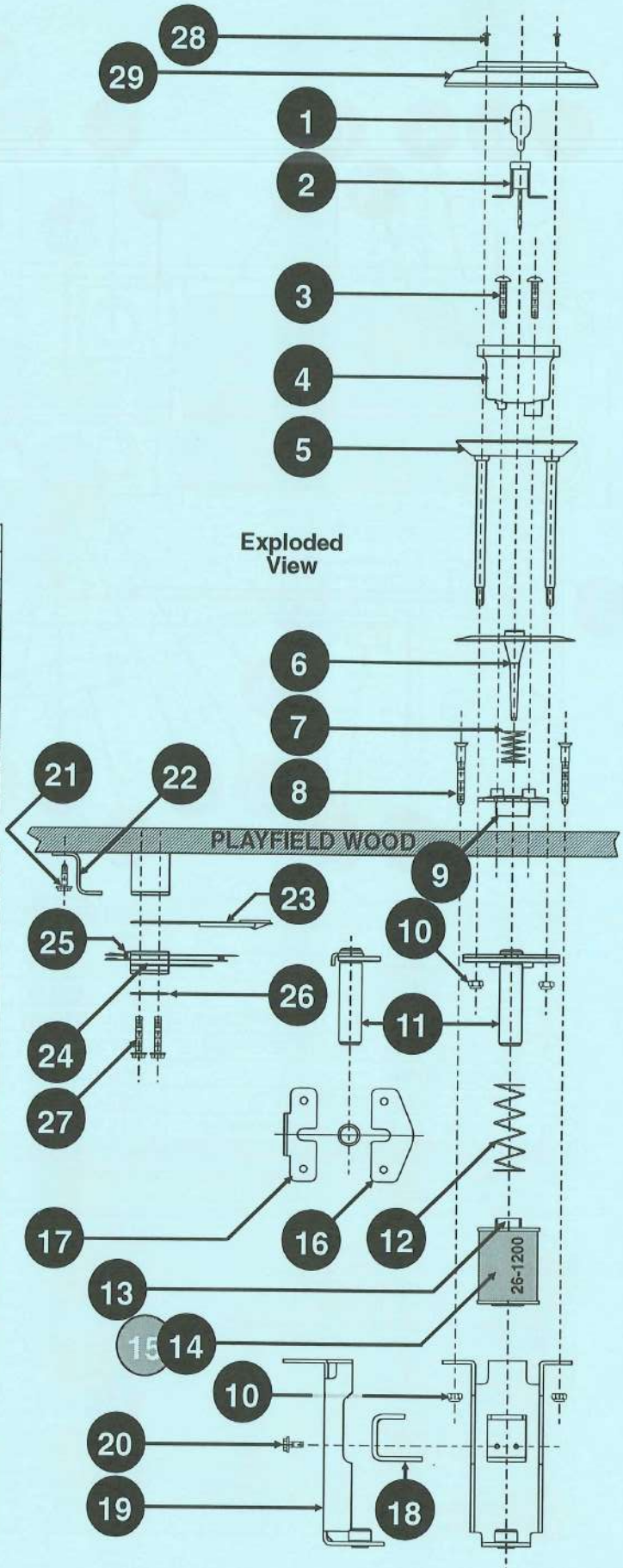
ASSOCIATED PART(S) NOT INCLUDED WITH THE ABOVE ASSEMBLY

Nº	Associated Part Name	SPI Part Nº
n/a	Left Flipper Bat & Shaft Assy. Color: WHITE W/SONIC THE HEDGEHOG™ LOGO	515-5133-01-04
n/a	Left Flipper Bat Decal	820-6132-22

Turbo Bumper Individual Parts
(Not available as an assembly. Parts are grouped for easy reference.)



Assembled View



Exploded View

TOP GROUP

Nº	Part Name	SPI Part Nº
1	#555 Wedge Base Bulb	165-5002-00
2	#555 Wedge Base Socket	077-5206-00
3	#5 X 7/8" PH RH (AB) (Qty. 2)	237-5826-00
4	Bumper Body	545-5197-00
5	Ring Assembly	515-5085-00
6	Bumper Skirt	545-5607-00
7	Bumper Skirt Spring	266-5048-00
8	#6-32 X 1-3/16" Spiral Shank (Qty. 3)	237-5957-00
9	Bumper Base	545-5195-00
10	#6-32 Nylon Stop Nut (Qty. 5)	240-5005-00

BOTTOM GROUP

Nº	Part Name	SPI Part Nº
11	Plunger	530-5348-00
12	Coil Spring	266-5047-00
13	Coil Sleeve	545-5031-00
14	Coil 26-1200, incl. Coil Sleeve	090-5044-00
15	Coil Diode, 1N4004 (Not Shown)	112-5003-00
16	Fiber Yoke	545-5609-00
17	Metal Yoke	535-7346-00
18	Metal Yoke Stop	535-7347-00
19	Coil Bracket Sub-Assembly	515-5939-00
20	#6-32 X 1/4" HWHTF (SERR) (Qty. 2)	237-5952-00

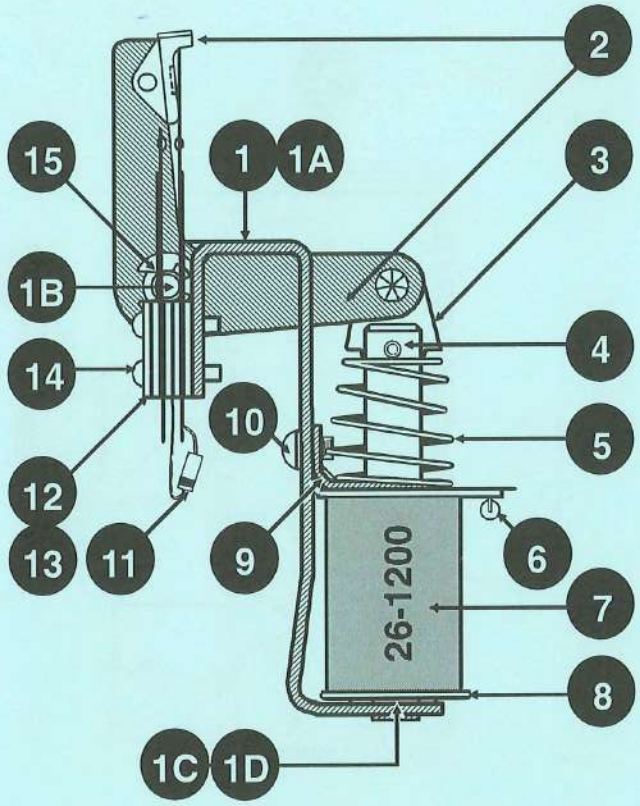
SWITCH GROUP

Nº	Part Name	SPI Part Nº
21	#6 X 1/2" HWH (AB) (Qty. 2)	234-5001-02
22	Switch Bracket	535-7342-00
23	Spoon Switch Actuator	545-5610-01
24	Stack Switch	180-5015-03
25	Switch Diode, 1N4001	112-5001-00
26	Switch Plate	535-7344-00
27	#6-32 X 3/4" HWHMS (SERR) (Qty. 2)	237-5958-00

ASSOCIATED GROUP

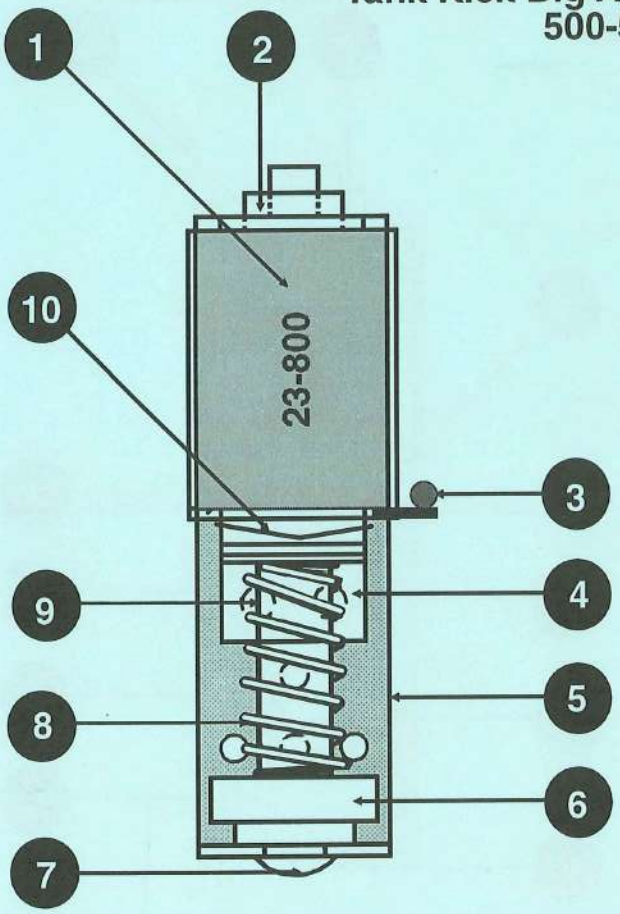
Nº	Part Name	SPI Part Nº
28	#4 X 3/4" PH RH (T25) (Qty. 2)	237-5873-00
29	Plastic Bumper Cap Cover Red (Qty. 3)	550-5057-02

Slingshot Assemblies (Left & Right)
500-5849-01



Nº	Part Name	SPI Part Nº
1	Slingshot Bracket Assembly	515-5339-01
ORDERING ABOVE (ITEM 1) SUB-ASSY. PART Nº WILL INCLUDE:		
A	Slingshot Bracket	535-5919-01
B	Hinge Stud	530-5034-01
C	Armature Stop	530-5017-01
D	Shading Ring	530-5307-00
2	Arm & Tip Assembly	515-5340-01
3	Armature Link	545-5062-00
4	Plunger & Link Assembly	515-5338-00
5	Compression Spring	266-5020-00
6	Coil Diode, 1N4004	112-5003-00
7	Coil 26-1200, incl. Coil Sleeve	090-5044-00
8	Coil Sleeve	545-5031-00
9	Coil Retaining Bracket	535-5203-03
10	#8-32 X 1/4" Screw (Qty. 2)	232-5300-00
11	Switch Diode, 1N4001	112-5001-00
12	Slingshot Switch (Qty. 2)	180-5054-00
13	Tension Switch Plate (Qty. 2)	535-7344-00
14	#6-32 X 3/4" HWH (SER) Zinc (Qty. 4)	237-5958-00
15	Retaining Ring 1/4" ø (Qty. 2)	270-5002-00

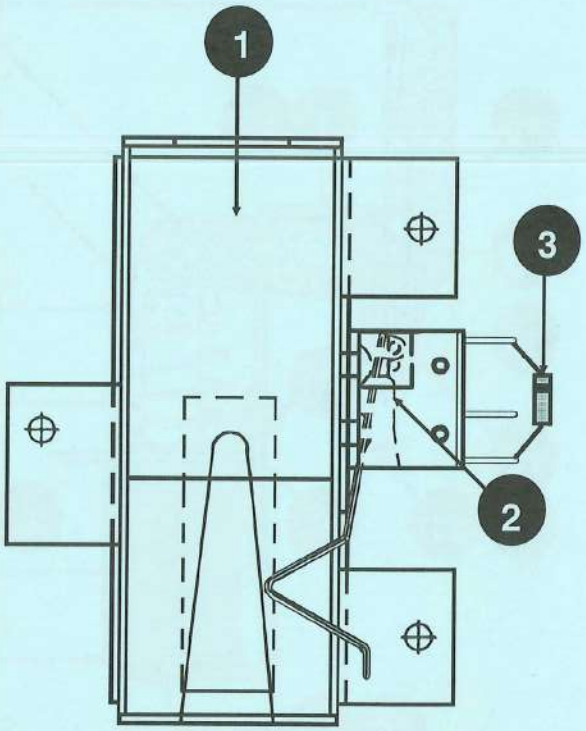
Tank Kick Big Assembly (Under Tank)
500-5862-02-42



Nº	Part Name	SPI Part Nº
1	Coil 23-800, incl. Coil Sleeve	090-5001-01
2	Coil Sleeve	545-5076-00
3	Diode, 1N4004	112-5003-00
4	Coil Retainer Bracket	535-5203-01
5	Frame	535-6730-00
6	Plunger Assembly	515-5000-02
7	Rubber Grommet	545-5105-00
8	Spring	266-5020-00
9	8-32 X ¼ SEMS (Qty. 2)	232-5300-04
10	Spring Washer	269-5002-00

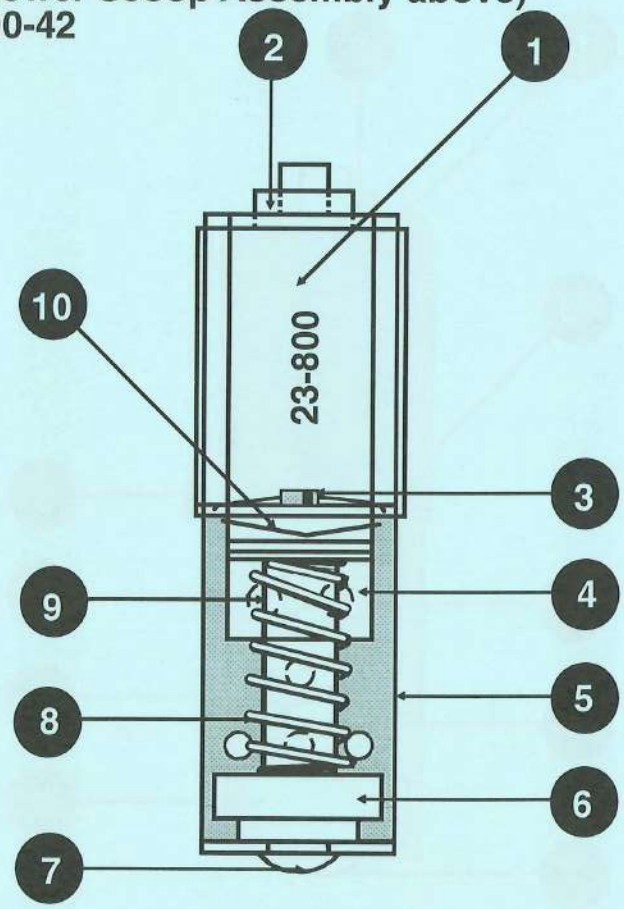
Power Scoop Assembly (Operates with Kick Big Assembly below)
500-5809-00-42

Please Note:
The Power Scoop & Kick Big Asemblies work in conjunction with each other but are separate assemblies.



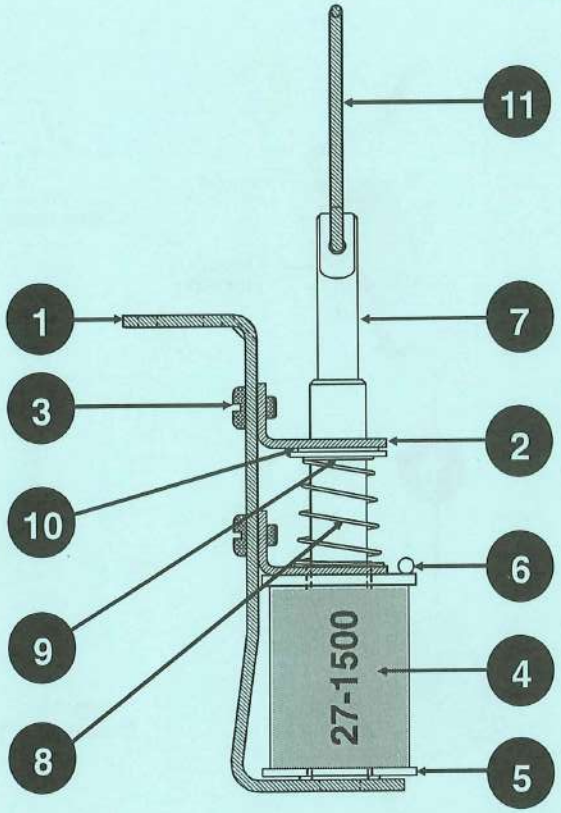
Nº	Part Name	SPI Part Nº
1	Power Scoop Weld Assembly	515-6022-00
2	Micro Switch	180-5057-00
	Switch Protect Plate	535-6539-00
	#2 Lockwasher (Qty. 2)	244-5001-00
	#2-56 Hex Nut (Qty. 2)	240-5301-00
	Micro Switch Bracket	535-6173-00
	#2-56 PHMS (Qty. 2)	237-5937-00
	#6-32 PPH (Qty. 2)	232-5200-00
3	Diode 1N4004	112-5003-00

Kick Big Assembly (Operates with Power Scoop Assembly above)
500-5862-00-42



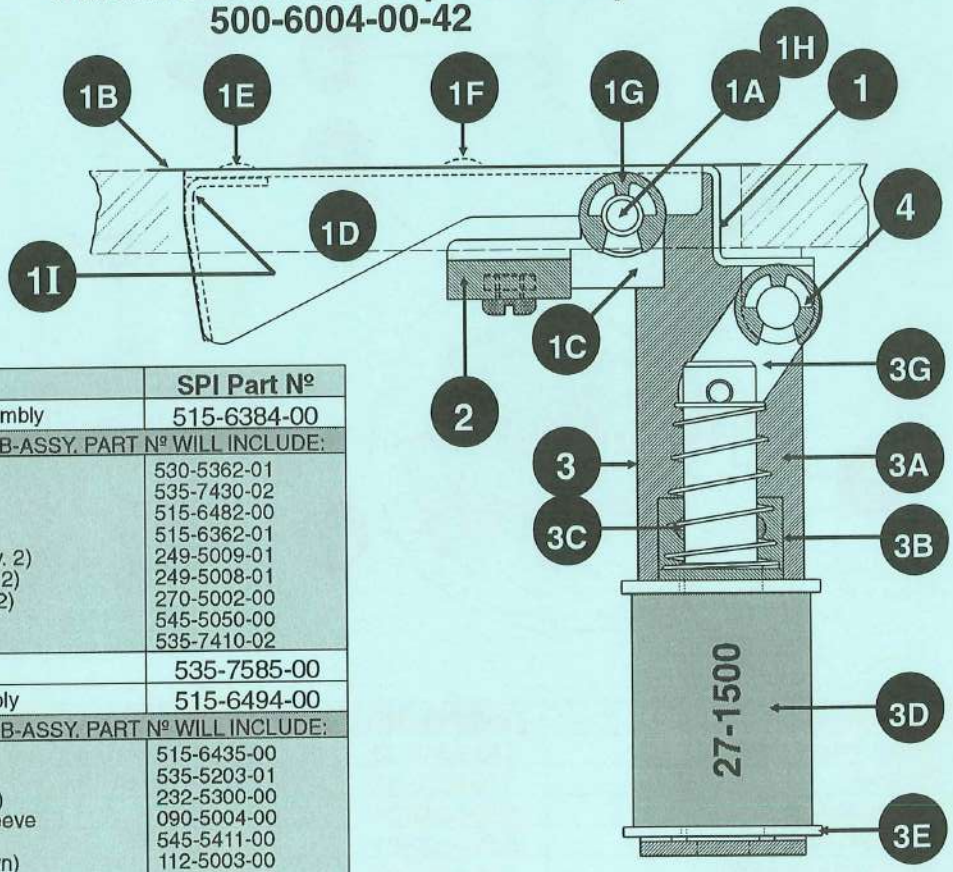
Nº	Part Name	SPI Part Nº
1	Coil 23-800, incl. Coil Sleeve	090-5001-01
2	Coil Sleeve	545-5076-00
3	Diode, 1N4004	112-5003-00
4	Coil Retainer Bracket	535-5203-01
5	Frame	535-6730-00
6	Plunger Assembly	515-5000-02
7	Rubber Grommet	545-5105-00
8	Spring	266-5020-00
9	8-32 X ¼ PPH (Qty. 2)	232-5300-00
10	Spring Washer	269-5002-00

Tank Trap Door Plunger Assy. (Operates Trap Door under Tank/Rt. Ramp)
500-5940-01-42



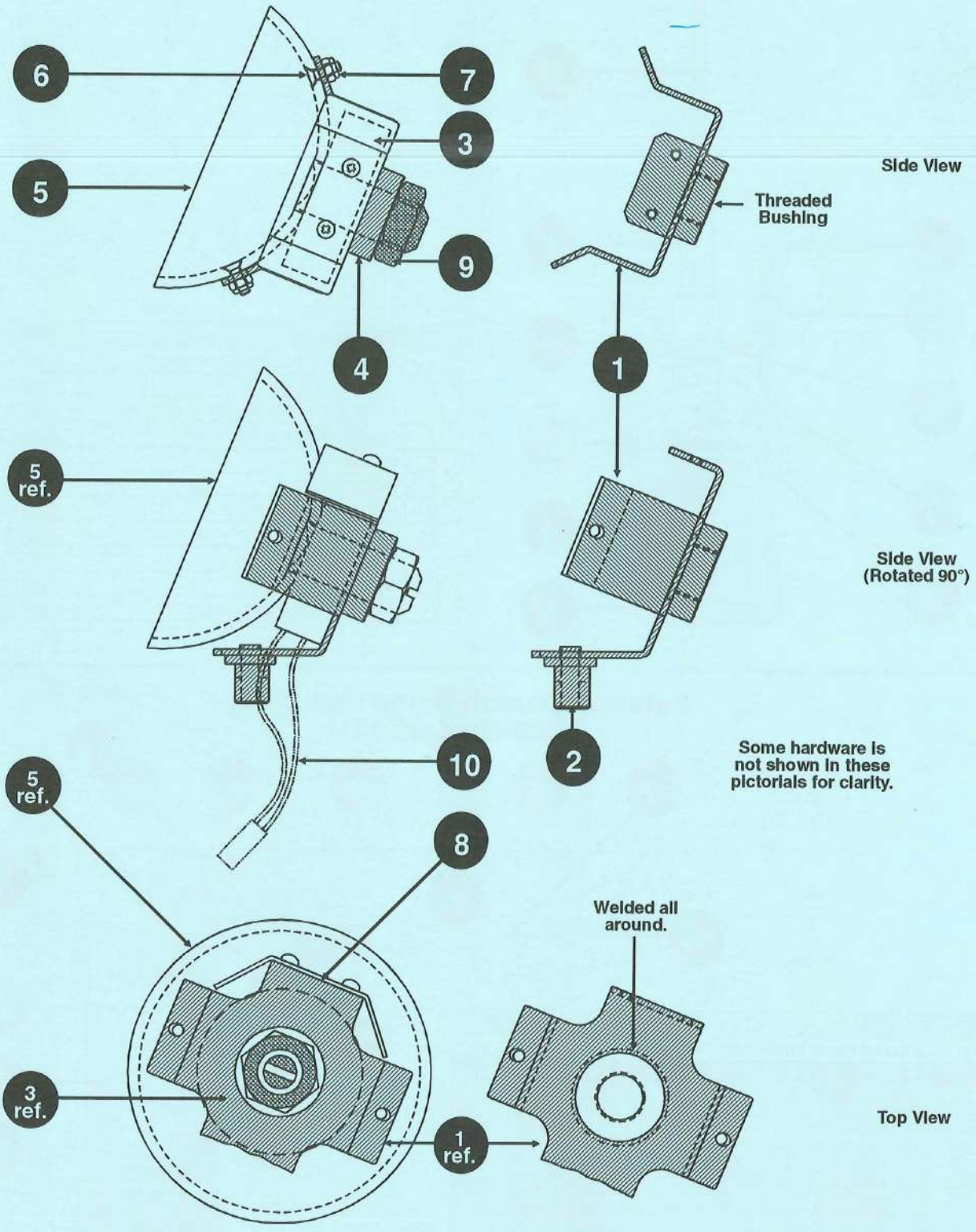
Nº	Part Name	SPI Part Nº
1	Bracket & Armature Stop Assembly	515-6435-00
2	Coil Retainer (Qty. 2)	535-5203-01
3	#8-32 X 1/4 PPH MS SEMS (Qty. 4)	232-5300-00
4	Coil 27-1500, incl. Coil Sleeve	090-5004-00
5	Coil Sleeve	545-5411-00
6	Diode, 1N4004	112-5003-00
7	Plunger Sub-Assembly	515-6483-00
8	Comp. Spring	266-5020-00
9	Retaining Ring 7/16 ø	270-5005-00
10	Nyliner 7/16 ø	545-5418-00
11	Trap Door (Diverter) Wire	535-7565-00

Satellite Launch Ramp Assembly
500-6004-00-42



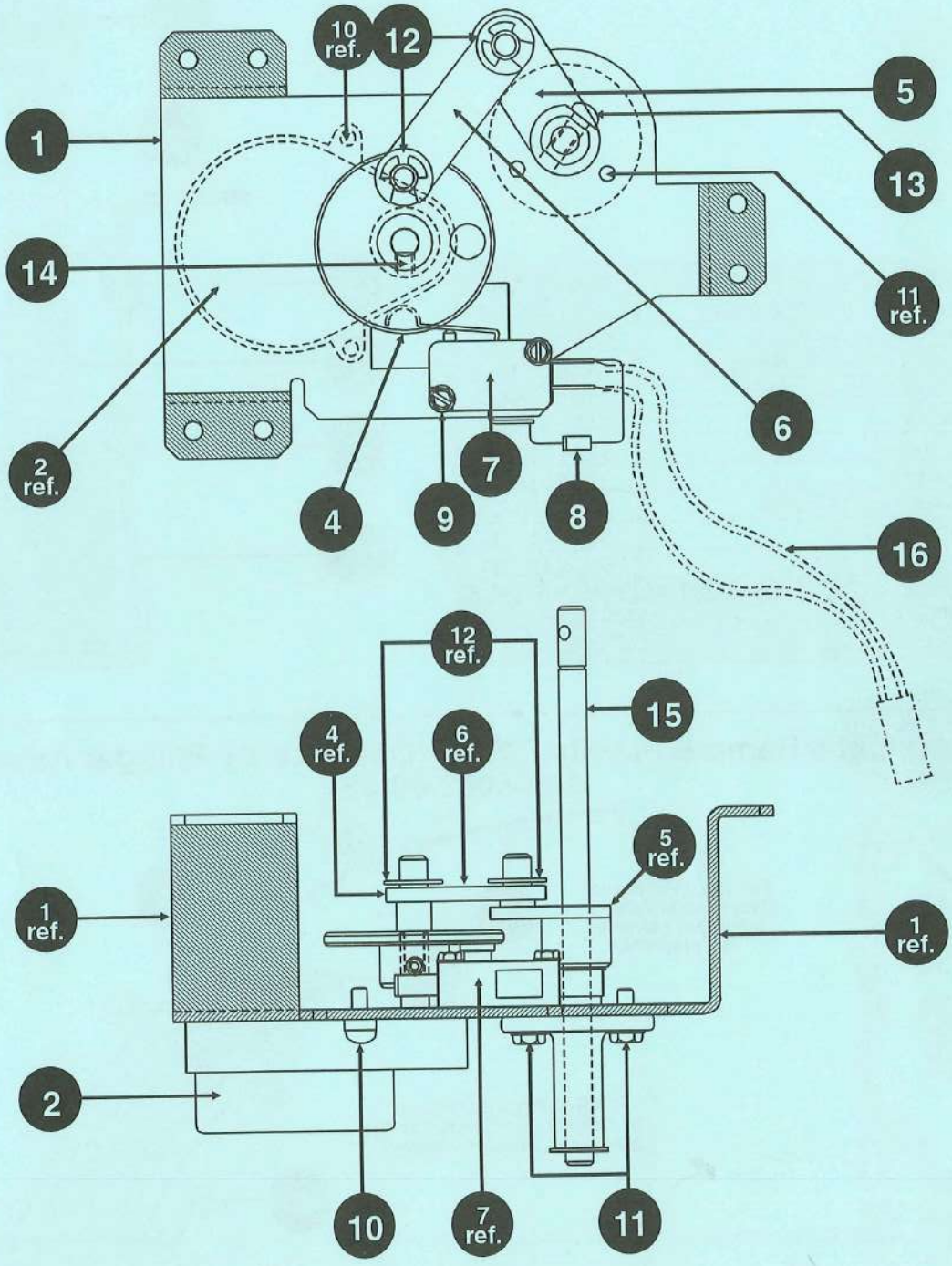
Nº	Part Name	SPI Part Nº
1	Up-Down Ramp Sub-Assembly	515-6384-00
ORDERING ABOVE (ITEM 1) SUB-ASSY. PART Nº WILL INCLUDE:		
1A	Lift Ramp Shaft	530-5362-01
1B	Skill Shot Flap	535-7430-02
1C	Pivot Bracket	515-6482-00
1D	Lift Ramp Floor	515-6362-01
1E	Rivet 1/8 ø X 5/32 Lg. (Qty. 2)	249-5009-01
1F	Rivet 1/8 ø X 1/8 Lg. (Qty. 2)	249-5008-01
1G	Retaining Ring 1/4ø (Qty. 2)	270-5002-00
1H	Nyliner 1/4 (Qty. 2)	545-5050-00
1I	Deflector Plate	535-7410-02
2	Bracket	535-7585-00
3	Lift Ramp Plunger Assembly	515-6494-00
ORDERING ABOVE (ITEM 3) SUB-ASSY. PART Nº WILL INCLUDE:		
3A	Bracket	515-6435-00
3B	Coil Retaining Bracket	535-5203-01
3C	#8-32 X 1/4 SEMS (Qty. 2)	232-5300-00
3D	Coil 27-1500, incl. Coil Sleeve	090-5004-00
3E	Coil Sleeve	545-5411-00
3F	Diode, 1N4004 (Not Shown)	112-5003-00
3G	Plunger & Link Assembly	515-6493-00
4	Retaining Ring 1/4ø	270-5002-00

Satellite Assembly (Operated by the Satellite Motor Base Assy.)
500-6000-00-42



№	Part Name	SPI Part №	№	Part Name	SPI Part №
1	Magnet Bracket Assembly	515-6342-03	6	#6-32 X 1/2 PFH MS (Qty. 2)	237-5918-00
2	Pivot Hub	530-5359-01	7	#6-32 Nylon Nut (Qty. 2)	240-5203-00
3	Magnet (22-600)	090-5042-01	8	Cover Plate	535-7674-00
4	Threaded Core Plug	530-5320-01	9	3/4-16 Hex Nut	240-5315-00
5	Satellite Dish (Screened)	545-5627-04			

Satellite Motor Base Assembly (Operates the Satellite Assy.)
500-5982-00-42

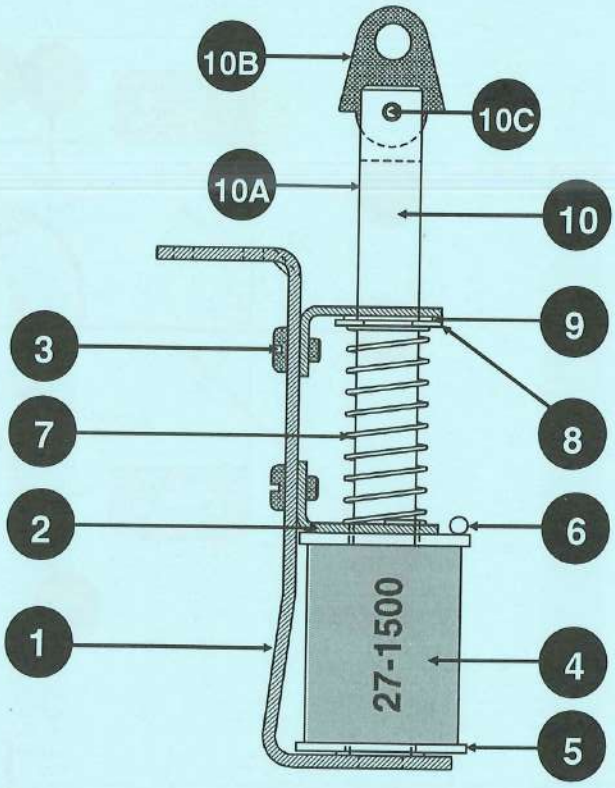


Nº	Part Name	SPI Part Nº
1	Motor Mounting Bracket	535-7389-02
2	Motor (24v AC 6 RPM) Assembly	515-6528-00
ORDERING ABOVE (ITEM 2) SUB-ASSY. PART Nº WILL INCLUDE:		
2A	Neon Bulb (Not Shown)	165-5021-00
2B	Capacitor .1 MFD 500V Disc (Not Shown)	130-5000-00
3	Flipper Bushing	545-5594-00
4	Cam Bushing Assembly	515-6334-01
5	Crank Arm Assembly	515-6333-01
6	Cam Link	535-7393-01
7	Switch (Motor Cam)	180-5052-00

Nº	Part Name	SPI Part Nº
8	Diode, 1N4001	112-5001-00
9	#4-40 X 5/8 HWH MS (SERR) (Qty. 2)	237-5945-00
10	#6-32 X 3/8 PPH MS (SEMS) (Qty. 2)	232-5201-00
11	#6-32 X 3/8 HHW MS (Qty. 3)	237-5910-00
12	Retaining Ring 1/4 Shaft (Qty. 4)	270-5002-00
13	#8-32 X 1/2 PPH MS	237-5602-00
14	#8-32 X 3/8 Set Screw (Cup Point)	237-5839-00
15	Pivot Mounting Shaft	530-5358-02
16	Cable Wire Harness (Sw. 20 Home)	036-5390-18

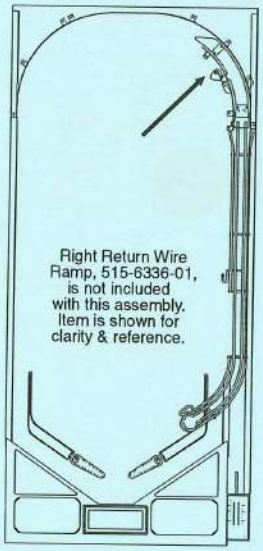
*Operation Note: The **bulb** (Item 2A) is used for spike suppression and the **capacitor** (Item 2B) is used to eliminate line noise.*

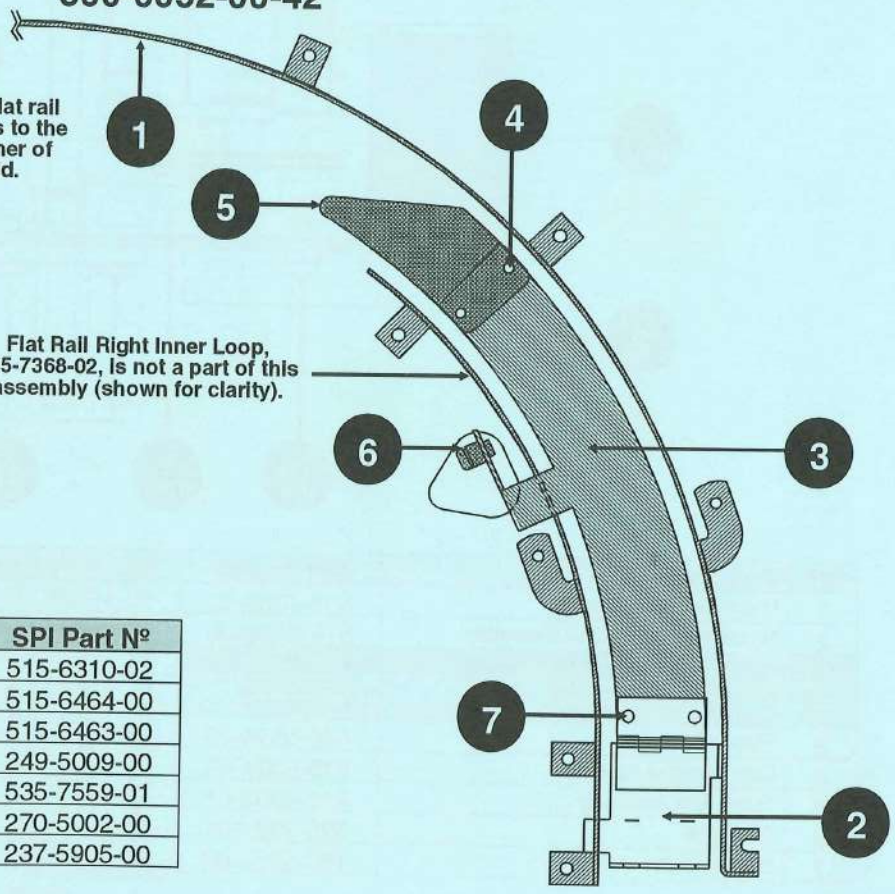
Up-Down Metal Ramp Plunger Assy. (Operates Up-Down Ramp below)
500-6058-00-42



Nº	Part Name	SPI Part Nº
1	Bracket & Armature Stop Assembly	515-6435-00
2	Coil Retainer Bracket (Qty. 2)	535-5203-01
3	#8-32 X 1/4 PPH MS SEMS (Qty. 4)	232-5300-00
4	Coil 27-1500, incl. Coil Sleeve	090-5004-00
5	Coil Sleeve	545-5411-00
6	Diode, 1N4004	112-5003-00
7	Comp. Spring	266-5034-01
8	Retaining Ring 7/16 ø Shaft	270-5005-00
9	Nyliner 7/16 ø Shaft	545-5418-00
10	Plunger & Link Assembly	515-6492-00
ORDERING ABOVE (ITEM 10) SUB-ASSY. PART Nº WILL INCLUDE:		
10A Lift Ramp Plunger		530-5385-00
10B Link		545-5293-00
10C 1/8 X 5/8 Lg. Roll Pin		251-5008-00

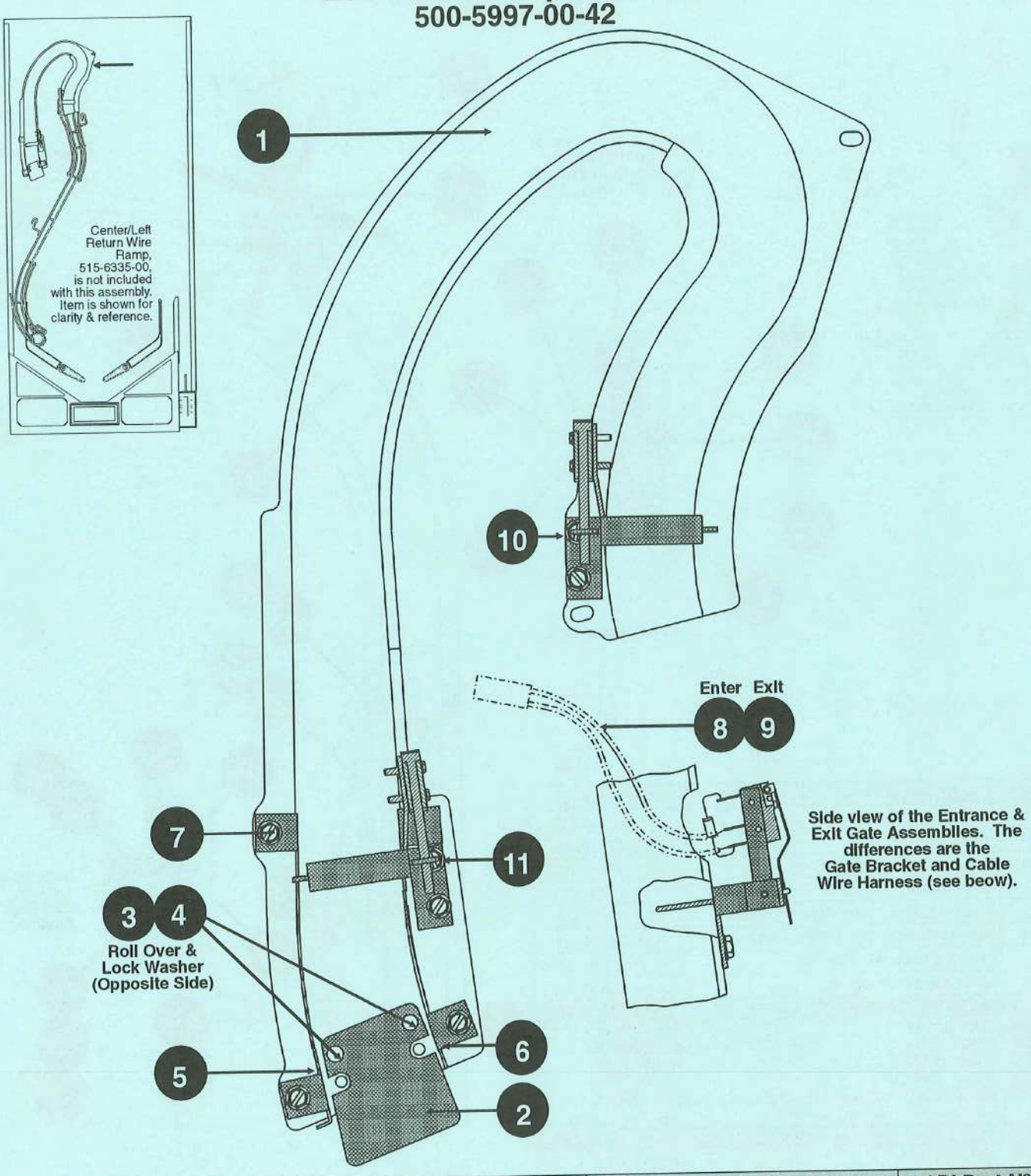
Up-Down Metal Ramp & Flat Rail Assy. (Operated by Plunger Assy. above)
500-6052-00-42





Nº	Part Name	SPI Part Nº
1	Flat Metal Rail Outer Loop (w/ no parts)	515-6310-02
2	Platform Assembly	515-6464-00
3	Ramp Floor Assembly	515-6463-00
4	Rivet 1/8 ø X 5/32 Lg. (Qty. 2)	249-5009-00
5	Ramp Flap	535-7559-01
6	Retaining Ring 1/4 ø	270-5002-00
7	#8-32 X 1/2 HWH MS (SEMS) (Qty. 2)	237-5905-00

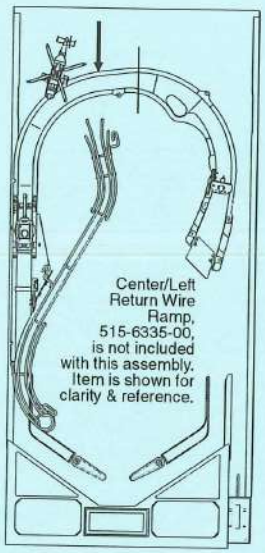
Left Plastic Ramp Assembly
500-5997-00-42

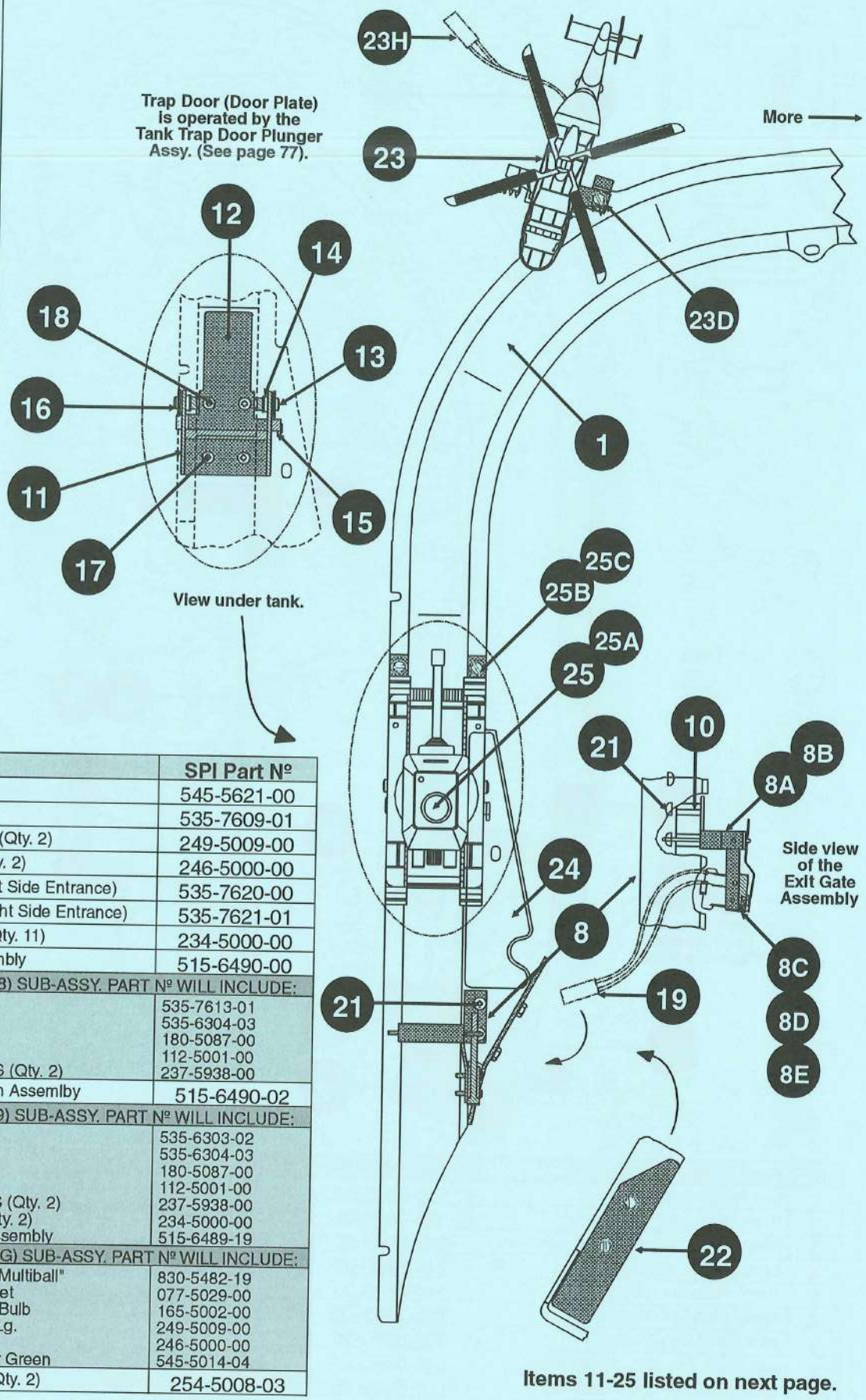


Nº	Part Name	SPI Part Nº
1	Left Plastic Ramp	545-5615-00
2	Ramp Flap (#3)	535-7608-01
3	Rivet 1/8 ø X 5/32 Lg.	249-5009-00
4	Lock Washer #6 (Qty. 2)	246-5000-00
5	Ramp Protector (Left Side)	535-7618-00
6	Ramp Protector (Right Side)	535-7619-00
7	#6 X 3/8 HWH AB (Qty. 8)	234-5000-00
8	Left Ramp Entrance Cable Assembly	036-5390-04
9	Left Ramp Exit Cable Assembly	036-5390-06

Nº	Part Name	SPI Part Nº
10	Exit Gate Sub-Assembly	515-6490-00
ORDERING ABOVE (ITEM 10) SUB-ASSY. PART Nº WILL INCLUDE:		
10A	Gate Bracket	535-7613-01
10B	Wire Form	535-6304-03
10C	Micro Switch	180-5087-00
10D	Diode, 1N4001	112-5001-00
10E	#2-56 X 3/8 HWH MS (Qty. 2)	237-5938-00
11	Entrance Gate Sub-Assembly	515-6490-01
ORDERING ABOVE (ITEM 11) SUB-ASSY. PART Nº WILL INCLUDE:		
11A	Gate Bracket	535-7613-02
11B-E	Identical to 10B-10E	See 10B - 10E

Right Plastic Ramp Assembly
500-5998-00-42



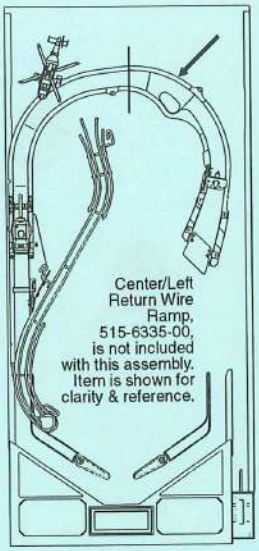


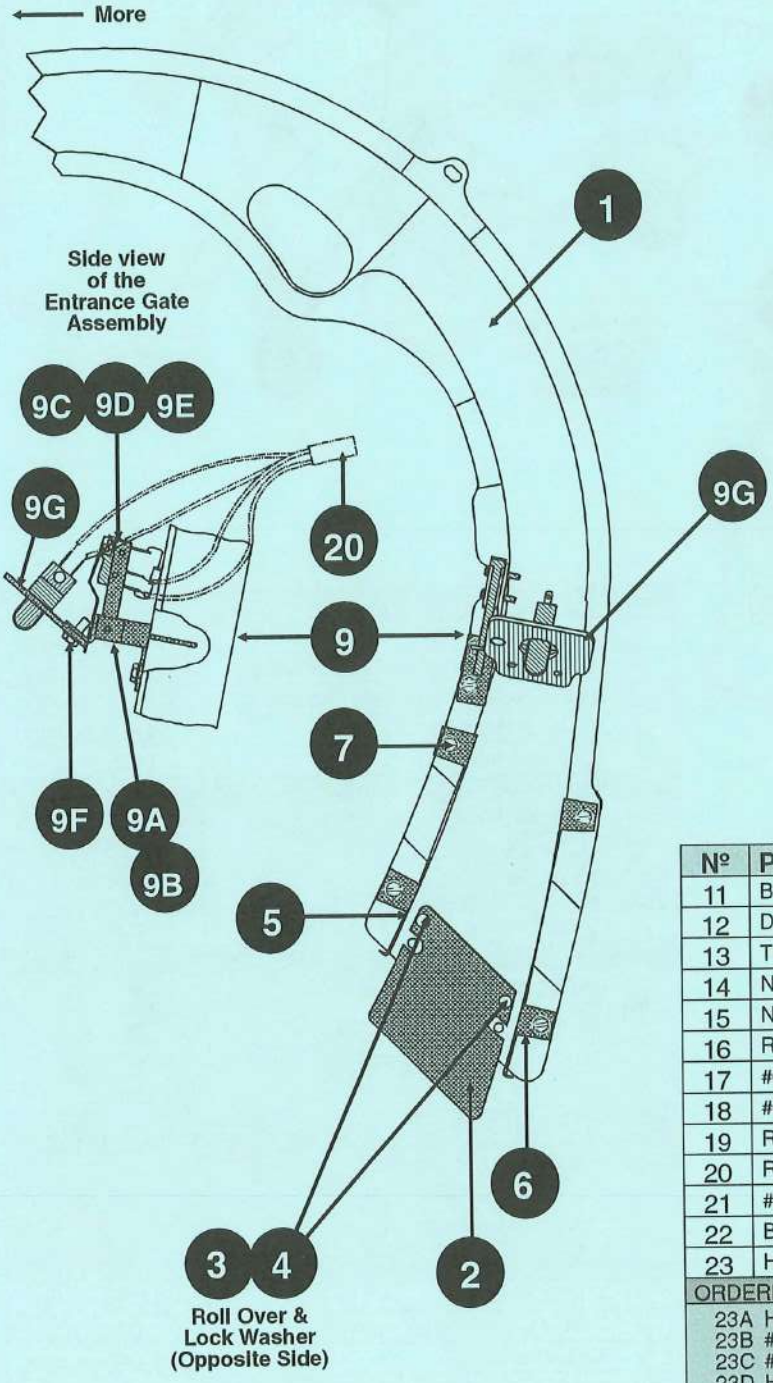
View under tank.

Nº	Part Name	SPI Part Nº
1	Right Plastic Ramp	545-5621-00
2	Ramp Flap (#1)	535-7609-01
3	Rivet 1/8 ø 5/32 Lg. (Qty. 2)	249-5009-00
4	Lock Washer #6 (Qty. 2)	246-5000-00
5	Ramp Protector (Left Side Entrance)	535-7620-00
6	Ramp Protector (Right Side Entrance)	535-7621-01
7	#6 X 3/8 HWH AB (Qty. 11)	234-5000-00
8	Exit Gate Sub-Assembly	515-6490-00
ORDERING ABOVE (ITEM 8) SUB-ASSY. PART Nº WILL INCLUDE:		
8A	Gate Bracket	535-7613-01
8B	Wire Form	535-6304-03
8C	Micro Switch	180-5087-00
8D	Diode, 1N4001	112-5001-00
8E	#2-56 X 3/8 HWH MS (Qty. 2)	237-5938-00
9	Entrance Gate & Sign Assemlby	515-6490-02
ORDERING ABOVE (ITEM 9) SUB-ASSY. PART Nº WILL INCLUDE:		
9A	Gate Bracket	535-6303-02
9B	Wire Form	535-6304-03
9C	Micro Switch	180-5087-00
9D	Diode, 1N4001	112-5001-00
9E	#2-56 X 3/8 HWH MS (Qty. 2)	237-5938-00
9F	#6 X 3/8 HWH AB (Qty. 2)	234-5000-00
9G	Butyrate Sign Sub-Assembly	515-6489-19
ORDERING ABOVE (ITEM 9G) SUB-ASSY. PART Nº WILL INCLUDE:		
	Butyrate -19 "Tank Multiball"	830-5482-19
	Wedge Offset Socket	077-5029-00
	#555 Wedge Base Bulb	165-5002-00
	Rivet 1/8 ø X 5/32 Lg.	249-5009-00
	Lock Washer #6	246-5000-00
	Rubber Light Cover Green	545-5014-04
10	Hex Spacer 1/2 Lg. (Qty. 2)	254-5008-03

Items 11-25 listed on next page.

Right Plastic Ramp Assembly Continued
500-5998-00-42

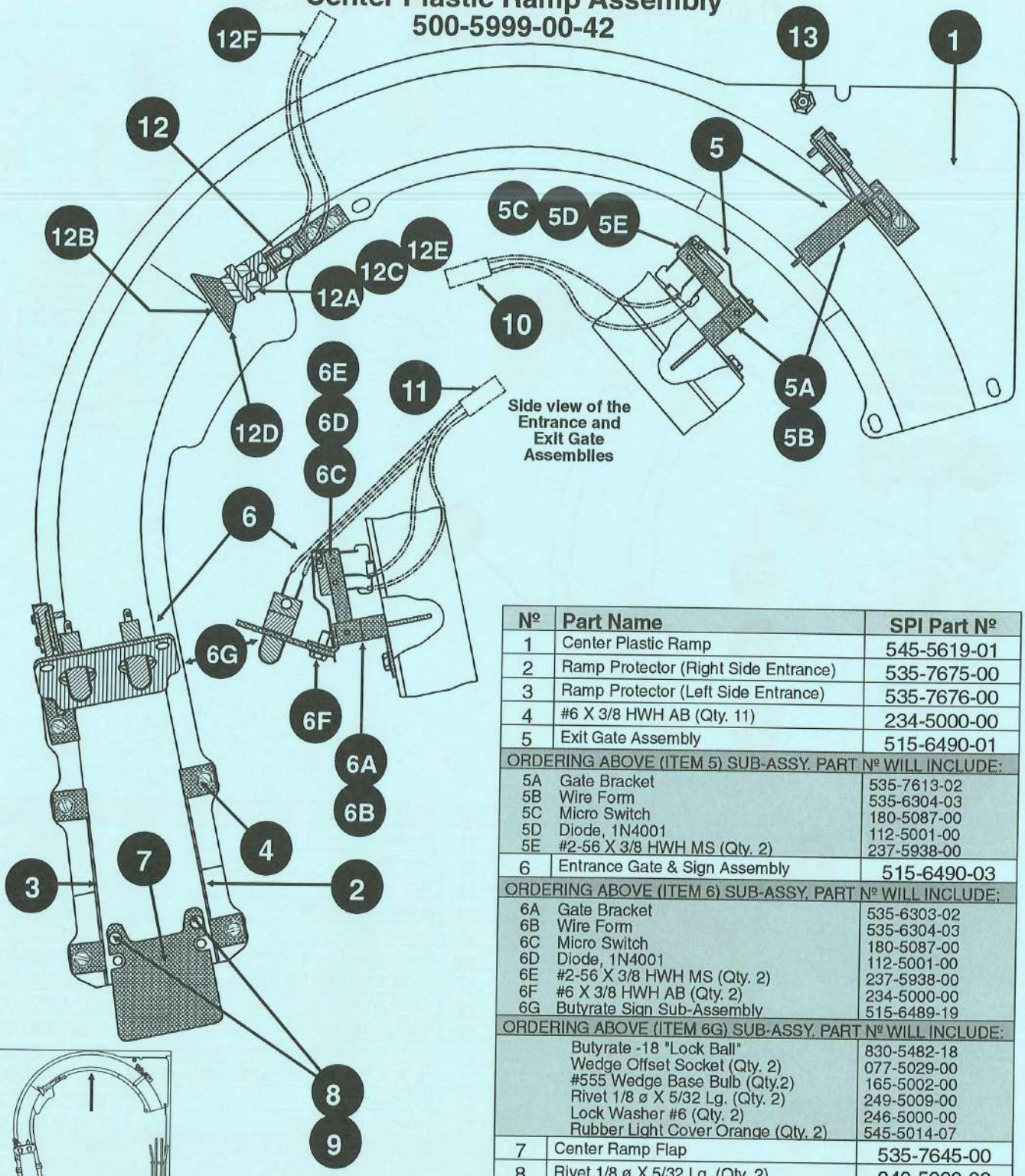


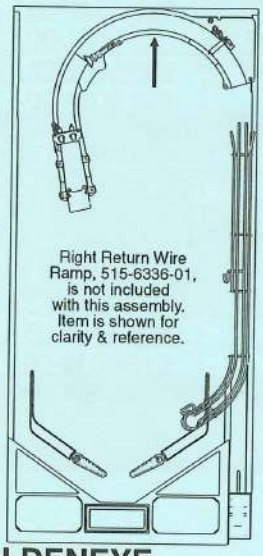


Nº	Part Name	SPI Part Nº
11	Bracket	535-7587-00
12	Door Plate	535-7588-00
13	Trap Door Shaft	530-5395-00
14	Nyliner 1/4 (Qty. 2)	545-5050-00
15	Nyliner 1/8	545-5335-00
16	Retaining Ring 1/4 Shaft (Qty. 2)	270-5002-00
17	#6-32 X 3/8 PFH MS (Qty. 2)	237-5850-00
18	#6-32 X 1/4 PFH MS (Qty. 2)	237-5853-00
19	Right Ramp Exit Cable Assembly	036-5390-07
20	Right Ramp Entrance Cable Assembly	036-5390-03
21	#6-32 X 3/8 PPH MS (SEMS) (Qty. 4)	232-5201-00
22	Butyrate (Clear)	830-5482-22
23	Helicopter Assembly	500-6074-00
ORDERING ABOVE (ITEM 23) ASSEMBLY PART Nº WILL INCLUDE:		
23A	Helicopter	545-5672-00
23B	#6-32 X .50 PPH Center Screw	232-5202-00
23C	#6-32 X .38 PPH Back Screw	232-5000-02
23D	Helicopter Bracket	535-7647-00
23E	Laydown Wedge Base L/R Black Socket	077-5026-01
23F	#555 Wedge Base Bulb	165-5002-00
23G	Rubber Light Cover Green	545-5014-04
23H	Cable Harness	036-5390-14
24	Right Ramp Decal	820-6151-05
25	Tank Sub-Assembly	515-6519-00
ORDERING ABOVE (ITEM 25) SUB-ASSY. PART Nº WILL INCLUDE:		
25A	Tank	545-5673-00
25B	Tank Bracket (Qty. 2)	535-7673-00
25C	#6 X .38 HWH (Qty. 2)	243-5000-00

Items 1-10 listed on previous page.

Center Plastic Ramp Assembly
500-5999-00-42

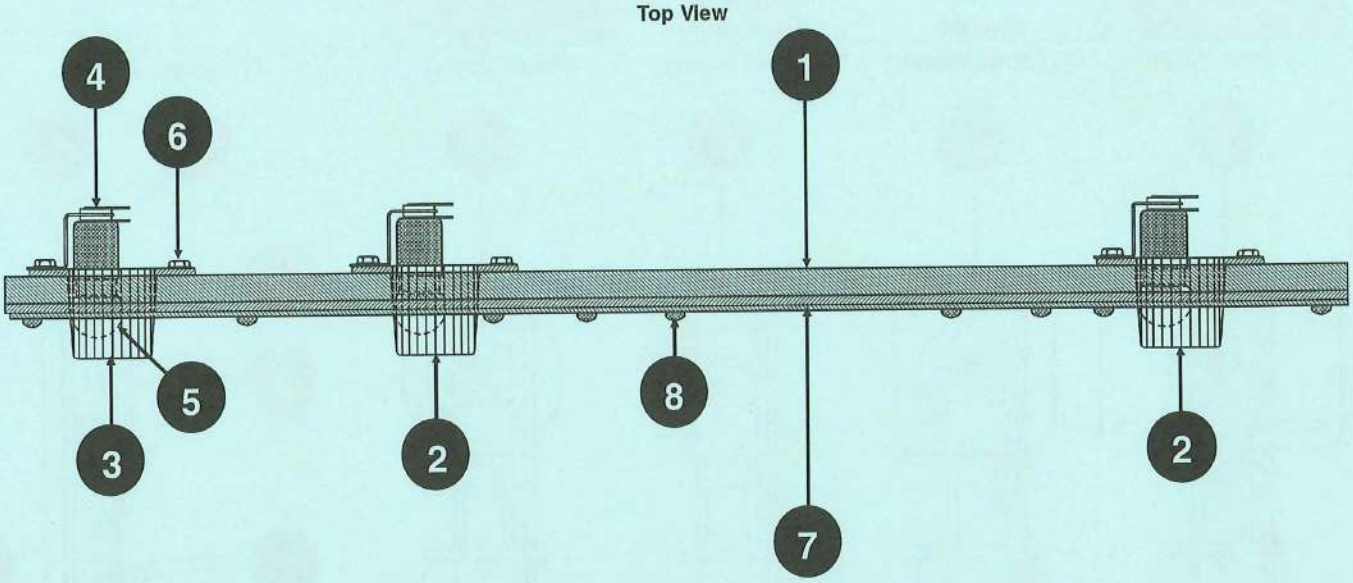




Nº	Part Name	SPI Part Nº
1	Center Plastic Ramp	545-5619-01
2	Ramp Protector (Right Side Entrance)	535-7675-00
3	Ramp Protector (Left Side Entrance)	535-7676-00
4	#6 X 3/8 HWH AB (Qty. 11)	234-5000-00
5	Exit Gate Assembly	515-6490-01
ORDERING ABOVE (ITEM 5) SUB-ASSY. PART Nº WILL INCLUDE:		
5A	Gate Bracket	535-7613-02
5B	Wire Form	535-6304-03
5C	Micro Switch	180-5087-00
5D	Diode, 1N4001	112-5001-00
5E	#2-56 X 3/8 HWH MS (Qty. 2)	237-5938-00
6	Entrance Gate & Sign Assembly	515-6490-03
ORDERING ABOVE (ITEM 6) SUB-ASSY. PART Nº WILL INCLUDE:		
6A	Gate Bracket	535-6303-02
6B	Wire Form	535-6304-03
6C	Micro Switch	180-5087-00
6D	Diode, 1N4001	112-5001-00
6E	#2-56 X 3/8 HWH MS (Qty. 2)	237-5938-00
6F	#6 X 3/8 HWH AB (Qty. 2)	234-5000-00
6G	Butyrate Sign Sub-Assembly	515-6489-19
ORDERING ABOVE (ITEM 6G) SUB-ASSY. PART Nº WILL INCLUDE:		
	Butyrate -18 "Lock Ball"	830-5482-18
	Wedge Offset Socket (Qty. 2)	077-5029-00
	#555 Wedge Base Bulb (Qty.2)	165-5002-00
	Rivet 1/8 ø X 5/32 Lg. (Qty. 2)	249-5009-00
	Lock Washer #6 (Qty. 2)	246-5000-00
	Rubber Light Cover Orange (Qty. 2)	545-5014-07
7	Center Ramp Flap	535-7645-00
8	Rivet 1/8 ø X 5/32 Lg. (Qty. 2)	249-5009-00
9	Lock Washer #6	246-5000-00
10	Center Ramp Exit Cable Assembly	036-5390-02
11	Center Ramp Entrance Cable Assembly	036-5390-05
12	Spot Light Assembly	500-5818-02
ORDERING ABOVE (ITEM 12) ASSEMBLY PART Nº WILL INCLUDE:		
12A	Laydown Wedge Base L/R Black Socket	077-5026-01
12B	#555 Wedge Base Bulb	165-5002-00
12C	Rivet 1/8 ø X 1/8 Lg. (Nickel)	249-5008-00
12D	Reflector	545-5409-01
12E	#6 X 3/8 HWH AB	234-5000-00
12F	Cable Harness	036-5390-10
13	Mini-Jewel Post Clear	550-5052-01

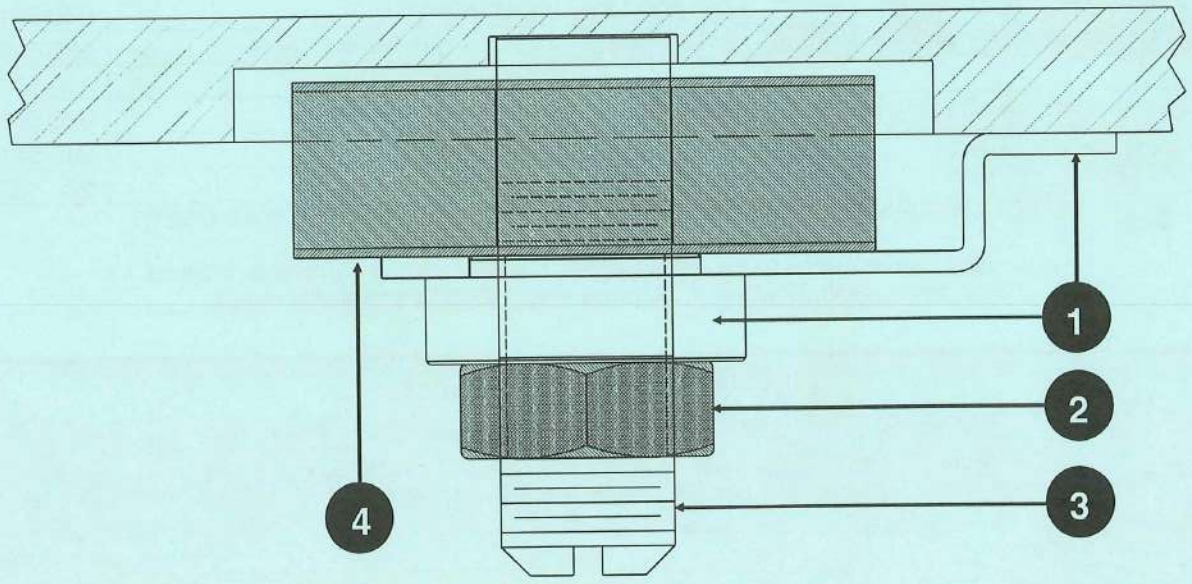
Back Panel Assembly
500-6001-00-42

Top View



Nº	Part Name	SPI Part Nº	Nº	Part Name	SPI Part Nº
1	Back Panel - GOLDENEYE Plain	525-5393-01	5	#89 Bayonet Bulb	165-5000-89
2	Mini-Mars Light Cover Red (Qty. 2)	550-5031-02	6	#6 X 3/8 HWH AB (Qty. 6)	234-5000-00
3	Mini-Mars Light Cover Yellow	550-5031-06	7	Butyrate -17 Back Panel Screened	830-5482-17
4	Stand-Up, Short Socket (Qty. 3)	077-5101-00	8	#6 X 1/2 PPH A (Qty. 11)	237-5805-00

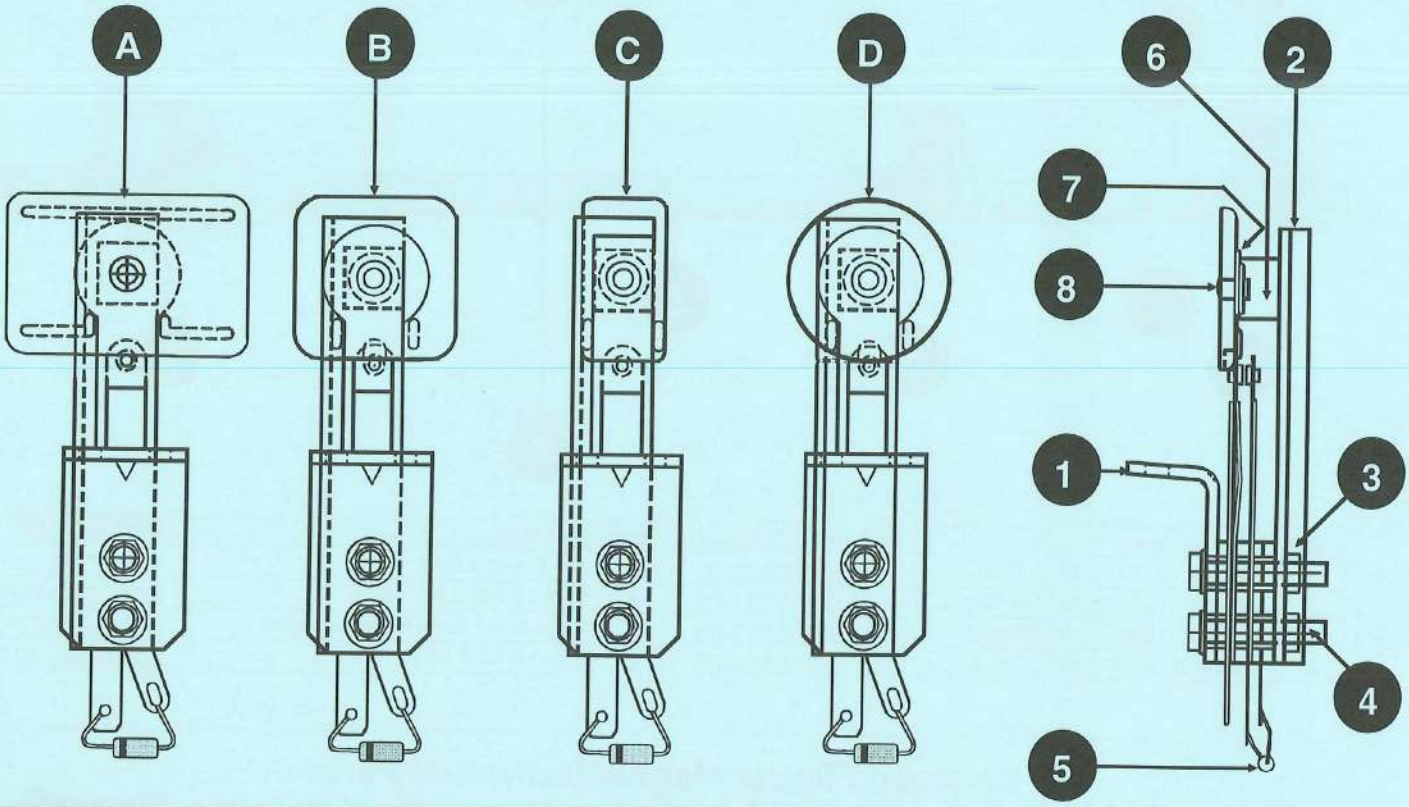
Between Flipper Magnet Individual Parts
(Not available as an assembly. Located under playfield between flippers)



Nº	Part Name	SPI Part Nº	Nº	Part Name	SPI Part Nº
1	Welded Bracket Assembly	515-6141-00	3	Threaded Core	530-5320-00
2	3/4-16 Hex Nut	240-5315-00	4	Magnet (22-600)	090-5042-00

Stand-Up Target Assemblies: †

500-5321-XX 1" X 1-1/2" Rectangle	500-5232-XX 1" Square	500-5857-XX Narrow Rectangle	500-5835-XX 1" Round	All
(Front View)	(Front View)	(Front View)	(Front View)	(Side View)



Nº	Switch & Target Name	QTY.	Part Nº
A	Sw. & Target Assy. 1" X 1½" Rect. (Flat)	0	515-6027-XX
B	Switch & Target Assembly 1" Square (Flat)	6	515-5162-XX
C	Sw. & Target Assy. Narrow Rectangle (Flat)	7	515-5967-XX
D	Switch & Target Assembly 1" Round (Flat)	0	515-5966-XX

† Items with a Ø quantity are not used in this game. The following are the color breakdowns for items B & C (replace the "-XX"):
B: X2 **"-08, WHT"**, X4 **"-05, BLU"**
C: X1 **"-06, YEL"**, X6 **"-04, GRN"**

Nº	Part Names for A, B, C & D	Part Nº
1	Mounting Bracket	535-6896-00
2	Switch Back Plate	535-6452-00
3	6-32 Nyloc	240-5010-00
4	6-32 X ¾ HWH Ser. (Type C) (Qty. 2)	237-5958-00
5	Switch Diode, 1N4001	112-5001-00
6	Foam Pad	626-5029-00
7	Washer 5/16"	242-5017-00
8	Rivet 1/8" ø X 3/16"	249-5001-00

NOTE: THIS GAME ONLY, AN ADDITIONAL SPECIAL TARGET WAS USED:
Module Stand-Up Target Clear, 500-6075-01
Please Note: Individual parts are not available. The whole assembly must be ordered.
See this section, Chapter 1, General Parts, for location of this target.

Plastic Part Color Chart

(As applicable for all parts which are available in various colors.)
The "-XX" should be replaced with the following 2-Digit Number for the color desired:

-01:	Clear	-06:	Yellow	-11:	Flourescent Green
-02:	Red	-07:	Orange	-12:	Flourescent Blue
-03:	Amber	-08:	White	-13:	Teal Green
-04:	Green	-09:	Purple	-14:	Gray
-05:	Blue	-10:	Flourescent Orange	-15:	Luminescent

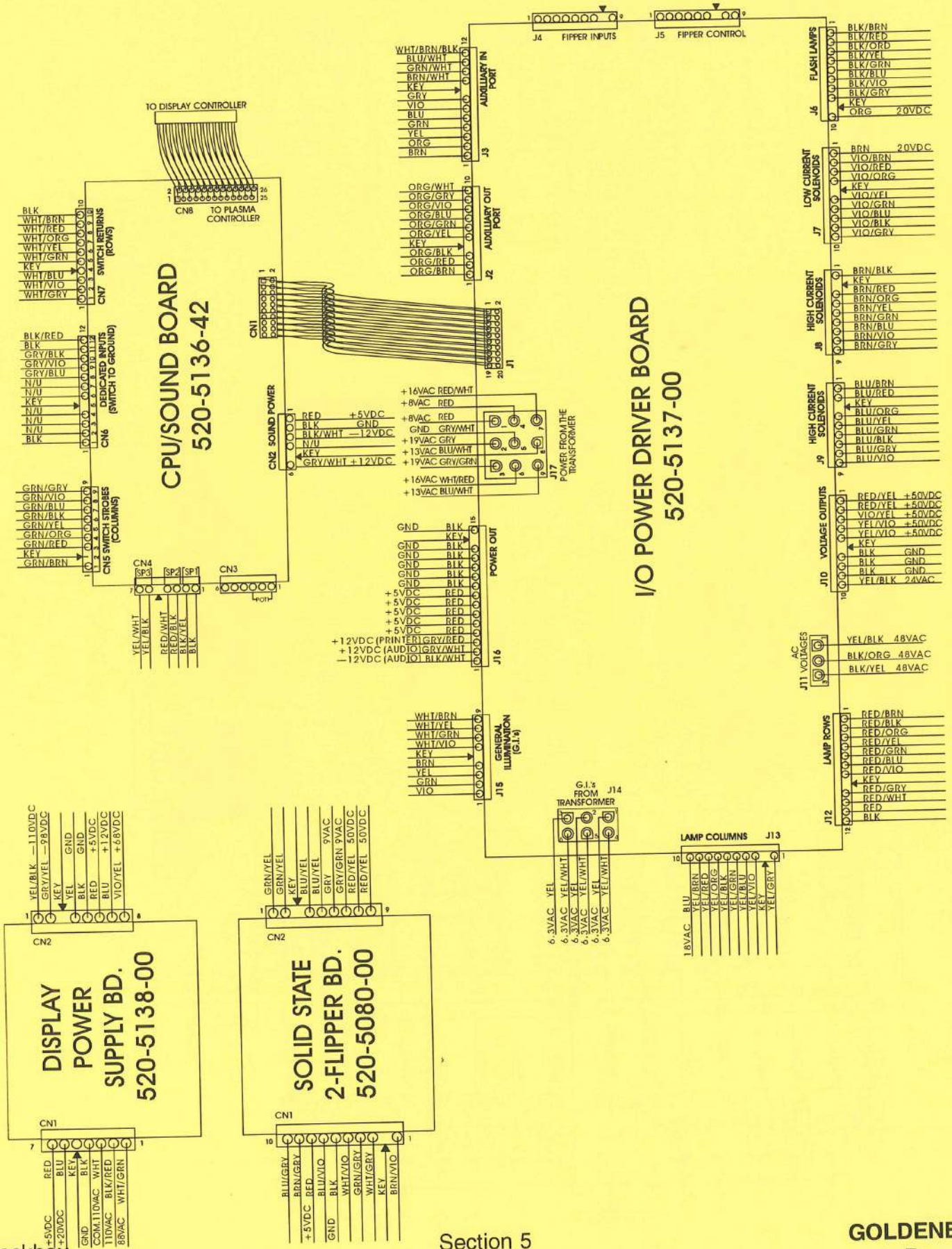
Schematics & Troubleshooting

Section 5
Table of Contents

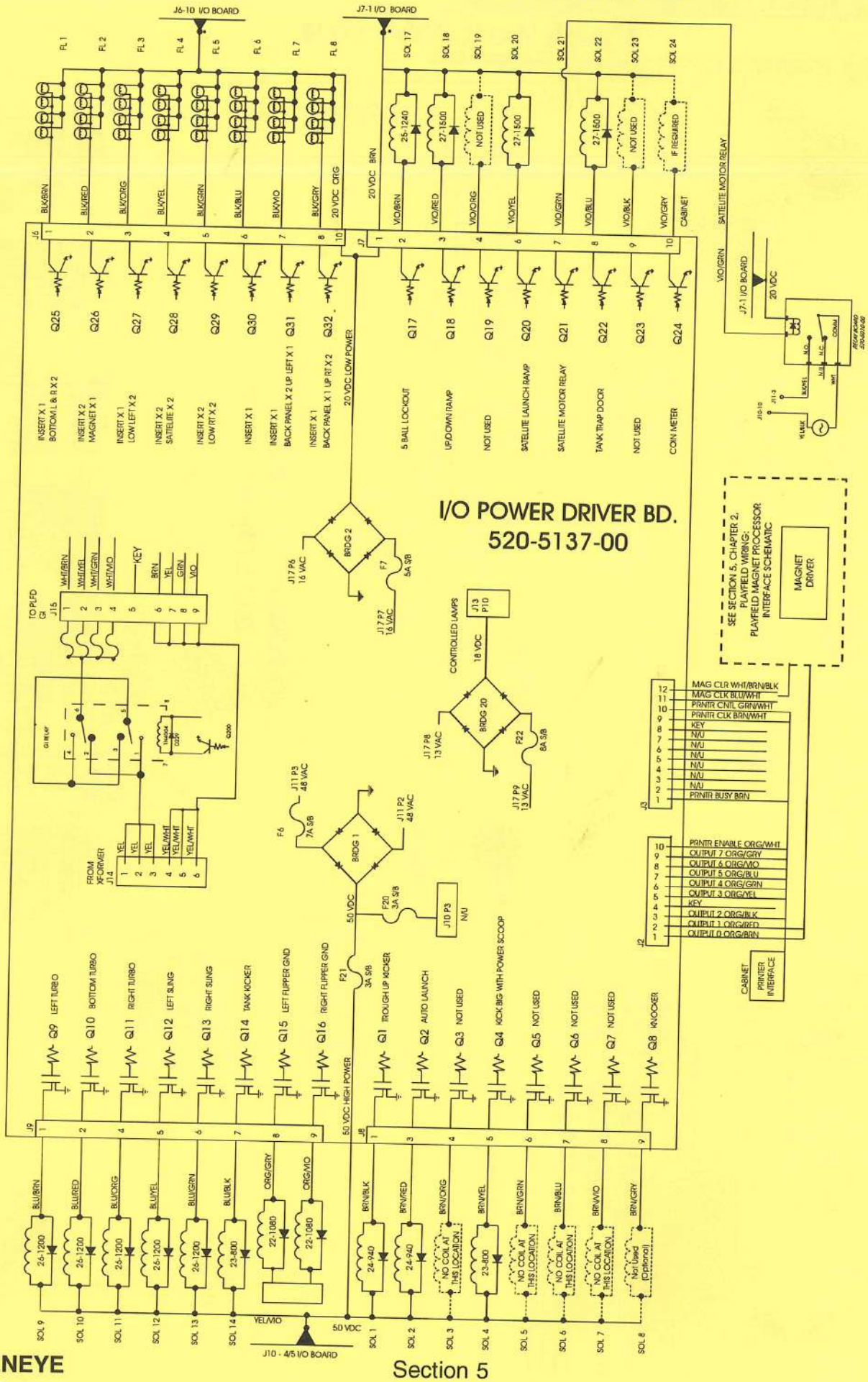
Your Notes

Backbox Wiring

Backbox Board Layout Wiring Diagram

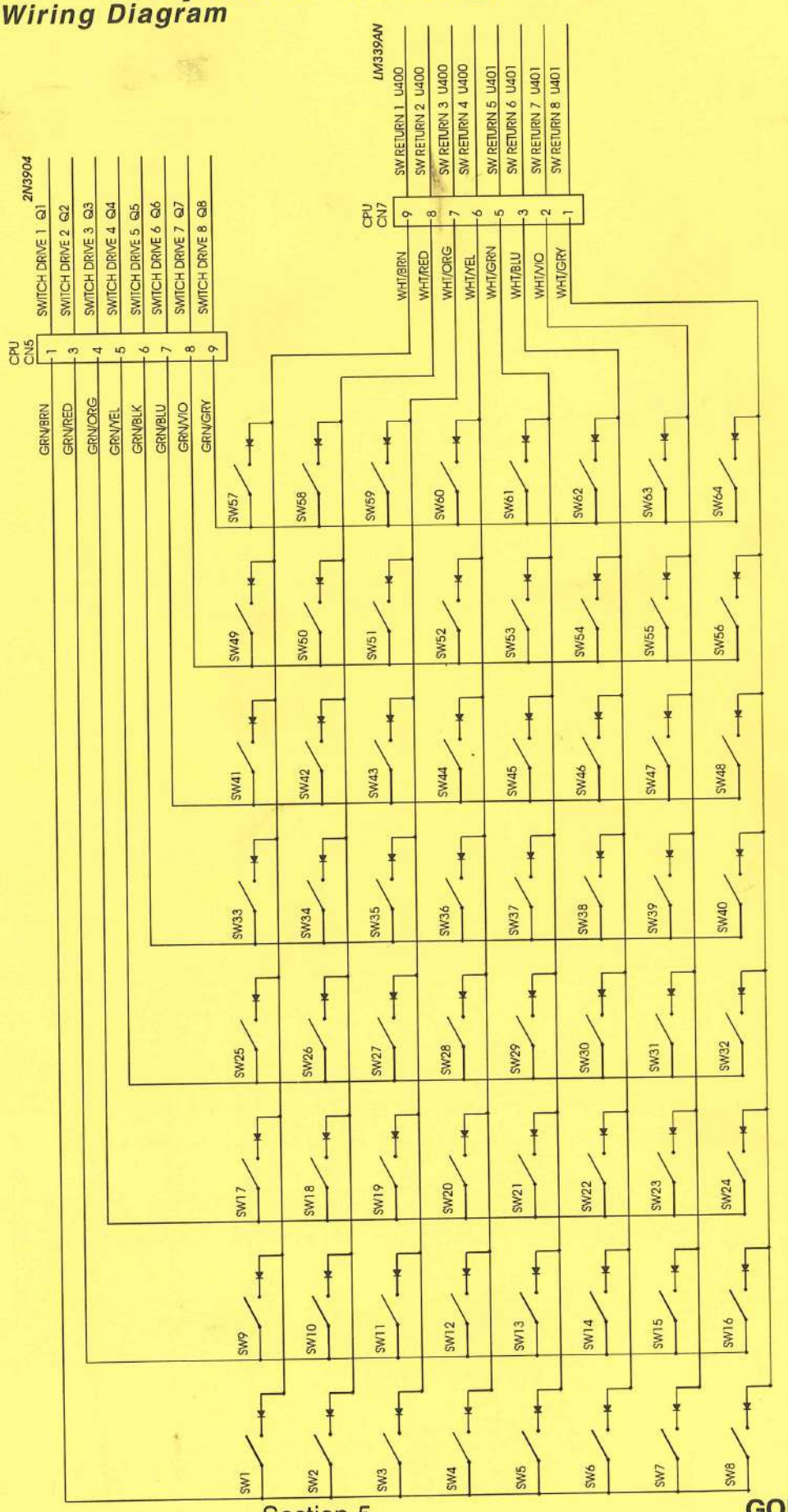


Backbox I/O Power Driver Board Detailed Wiring Diagram

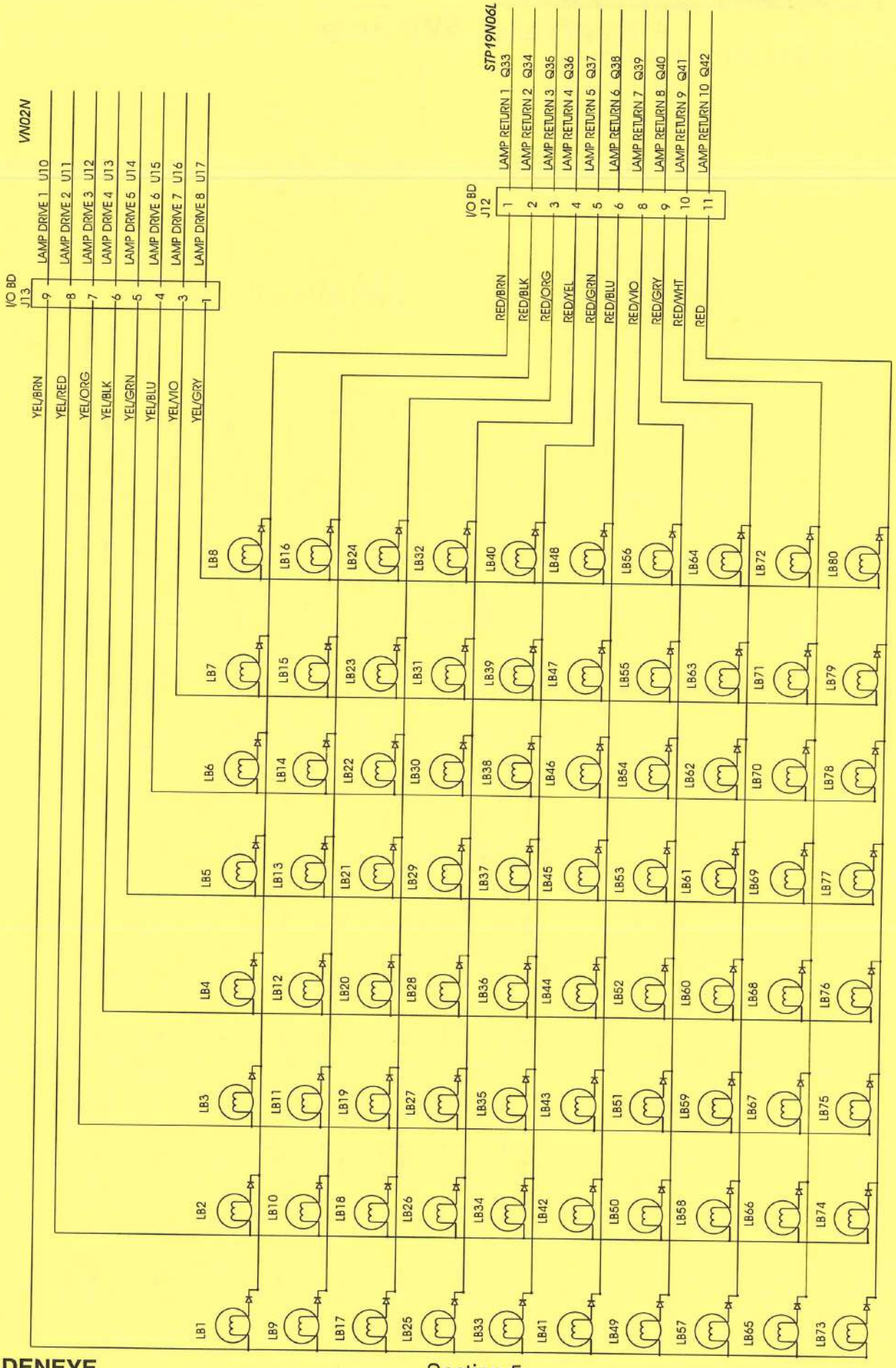


Playfield Wiring

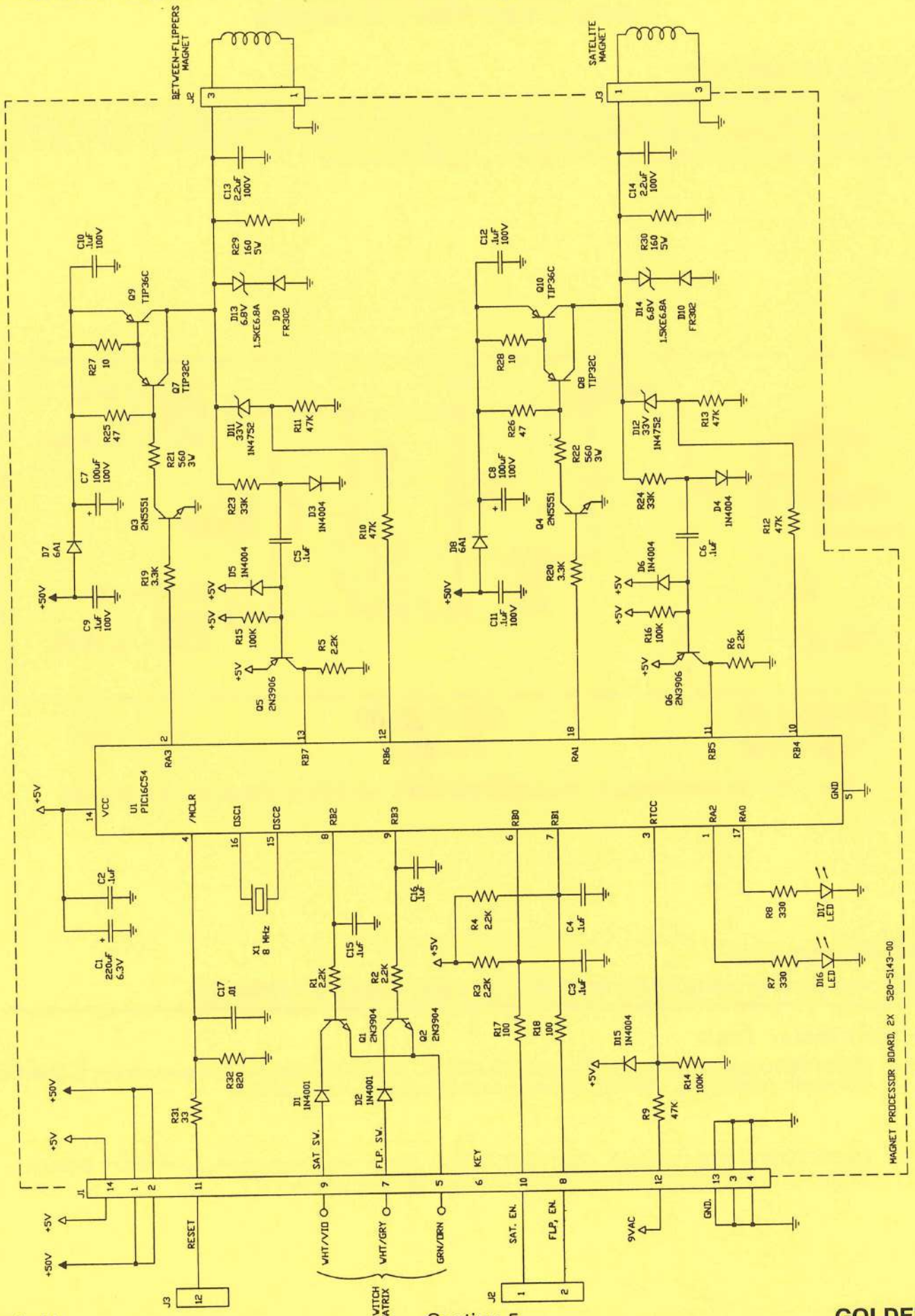
Playfield Switch Wiring Diagram



Playfield Lamp Wiring Diagram



Playfield Magnet Processor / Driver Diagram

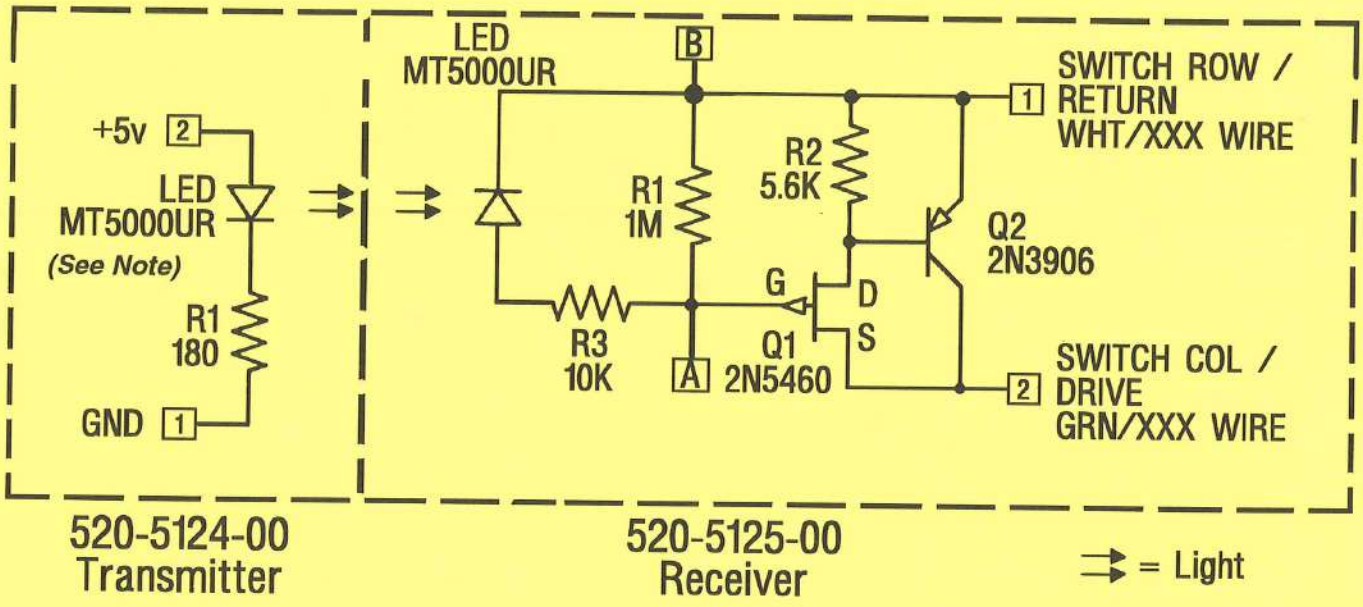


Trough Up-Kicker OPTO
Theory of Operation & Schematic

Theory of Operation

As light from the Transmitter falls on the Receiver LED, it generates a Positive Bias Voltage (0.7v to 1.5v) which is applied to the gate of **Q1**, turning **Q1** off. When **Q1** is held off, no current flows through **Q2**'s Base, the transistor is off acting as an *OPEN SWITCH*. When the light is interrupted (*BLOCKED*) **R1** bleeds the gate voltage off of **Q1** allowing it to conduct, switching **Q2** on, which acts as a *CLOSED SWITCH*.

Fig. 1



Note: The SPI Part Number for the LED MT5000UR is 165-5100-00 (Radio Shack is 276-087).

Troubleshooting

(The following tests indicate normal operating conditions)

1. Volt Meter Test:

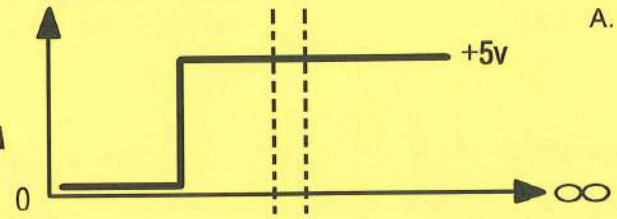
A. **OPEN OPTO** (Light Falling on LED) = *SWITCH OPEN*. Place meter leads across points **A** and **B** (Refer to Schematic Drawing Fig. 1 above). It should read approximately 0.8 - 1.2v DC.

B. **CLOSED OPTO** (Light Blocked) = *SWITCH CLOSED*. Place meter leads across points **A** and **B** (Refer to Schematic Drawing Fig. 1 above). It should read approximately 0.0 - 0.1v DC.

Troubleshooting Continued

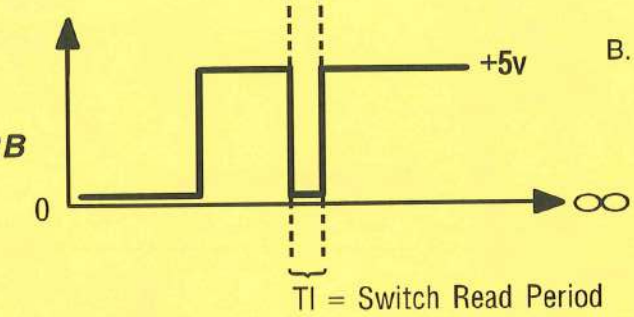
2. Oscilloscope Test:

Fig. 2A



A. **OPEN OPTO** (Light Falling on LED) = *SWITCH OPEN*. Place Scope lead at **Pin-1** of OPTO Rec. Bd. with Scope Grounded. (See Fig. 1). The Scope should display a **STEADY +5v** as shown in Fig. 2A, Wave Form Diagram.

Fig. 2B

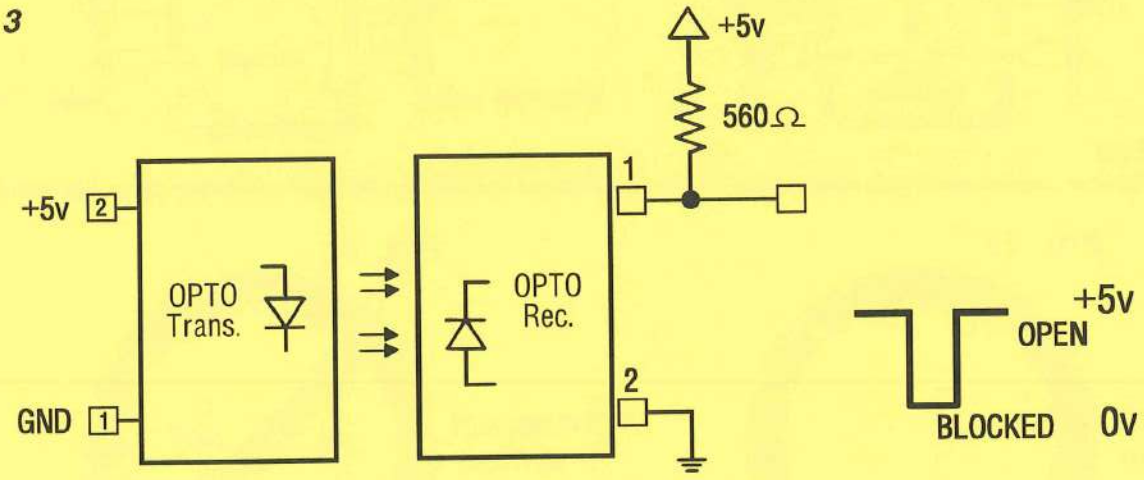


B. **CLOSED OPTO** (Light Blocked) = *SWITCH CLOSED*. Place Scope lead at **Pin-1** of OPTO Rec. Bd. with Scope Grounded. (See Fig. 1). The Scope should display a **PULSE STREAM** indicating **Q2** has switched "On" as shown in Fig. 2B, Wave Form Diagram. This is your Switch Drive Pulse.

3. Bench Test (See Fig. 3 Below):

Disconnect the OPTO Transmitter / Receiver Board from the circuit. Connect one side of a 560W Pull-up Resistor to **Pin-1** of the OPTO Receiver Bd. and the other side of the resistor to a 5v DC source. Connect **Pin-2** to Ground. Connect a +5v DC source to **Pin-1** of the Transmitter and GND to **Pin-2**. Align with the Receiver OPTO approximately 3" distance. Using your Volt-Meter or an Oscilloscope, monitor **Pin-1** while *BLOCKING* and *UN-BLOCKING* the ***BEAM*** from the Transmitter. The output will be approximately +5v DC when the ***BEAM*** is *not BLOCKED* and approximately 0 volts when the ***BEAM*** is *BLOCKED*.

Fig. 3

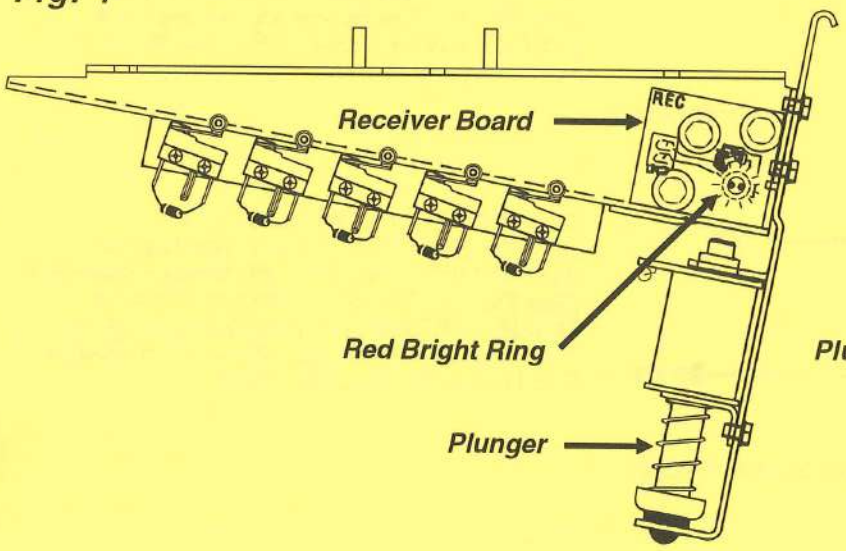


Single Trough OPTO Alignment / Test

When a working OPTO is installed and connected in a game, the transmitter should light when the power is switched on. With the playfield in Service Position #1 (playfield pulled forward resting on the playfield support brackets) and the game on, the light should show up as a "RED BRIGHT RING" through the back of the Receiver Board around the Receiver LED (See Fig. 1). With the game in Switch Test Mode, lifting the Trough Plunger with a fingertip should block the Beam and cause the Switch Positon to trigger (See Fig. 2). View Fig. 3a & 3b for a sectional view of the Light Path (note alignment) and what happens as a ball breaks the light beam.

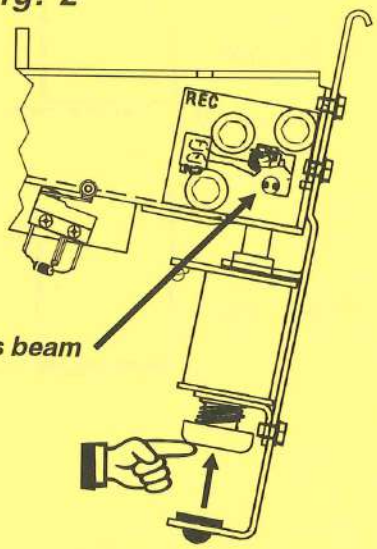
View facing trough (with playfield in Service Position #1)

Fig. 1



Lift plunger to check switch as shown.

Fig. 2



Sectional view from right

Fig. 3a

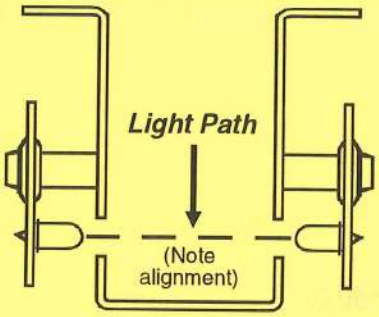
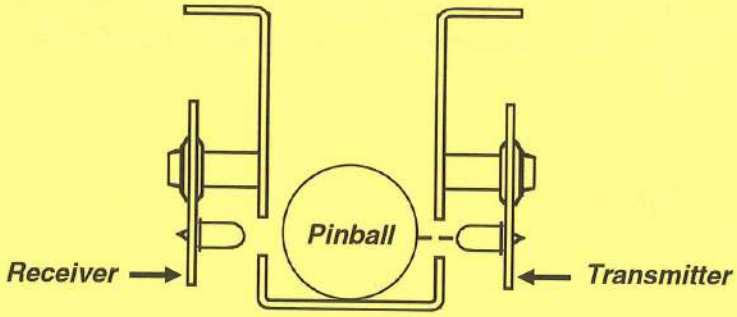


Fig. 3b



IMPORTANT

If replacement of LED is required, insure that is mounted correctly before and after soldering (See Fig. 4a & 4b).

Fig. 4a

Correct Position

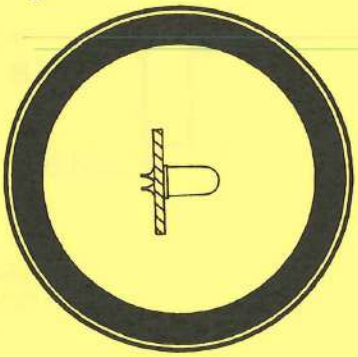
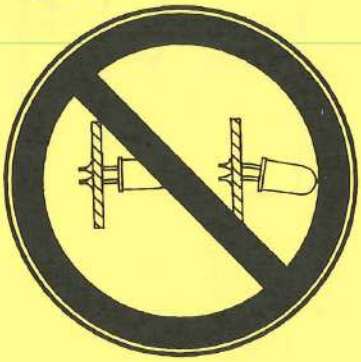


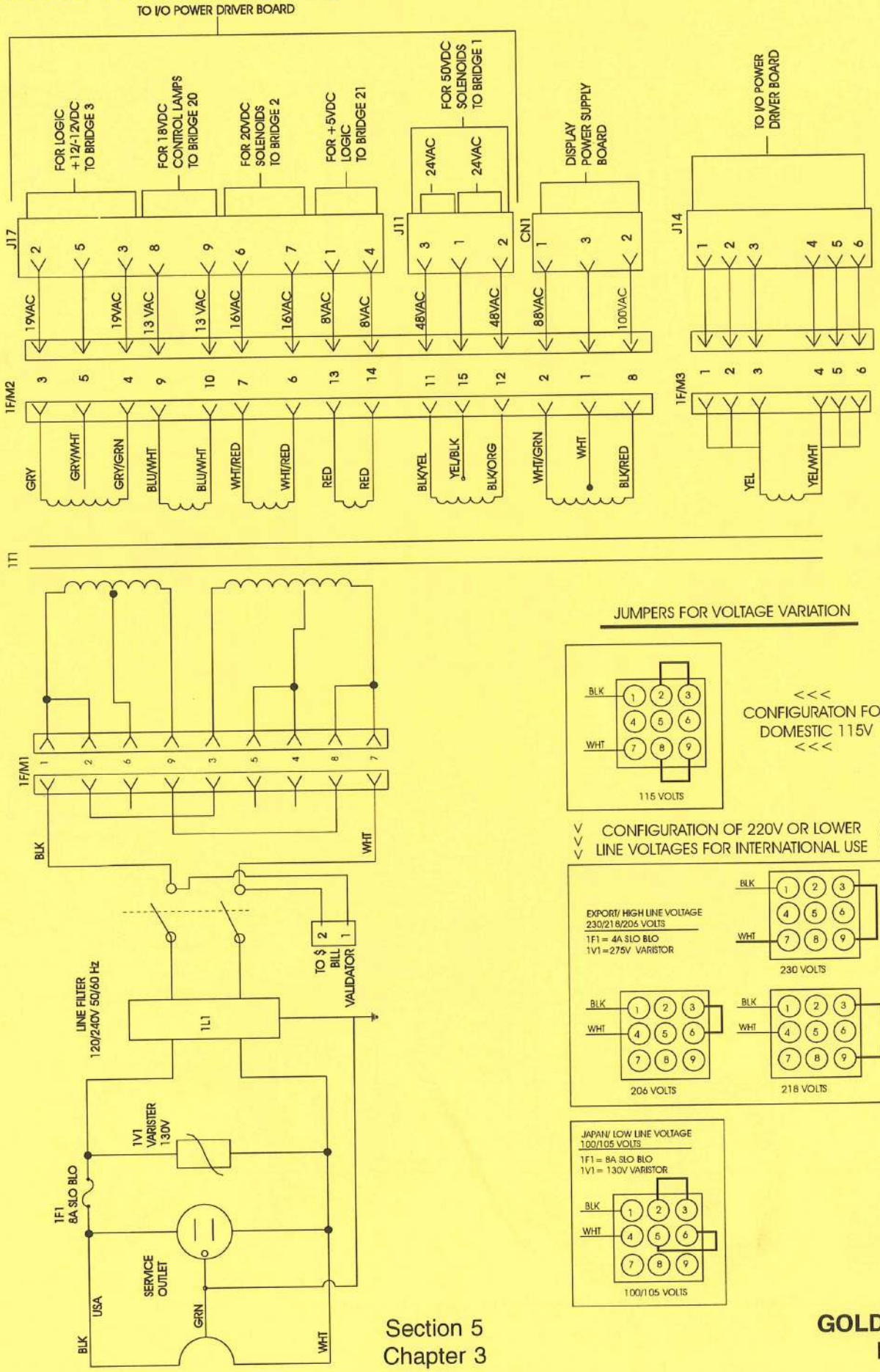
Fig. 4b

Incorrect Position



Cabinet Wiring

Transformer Power Wiring Diagram

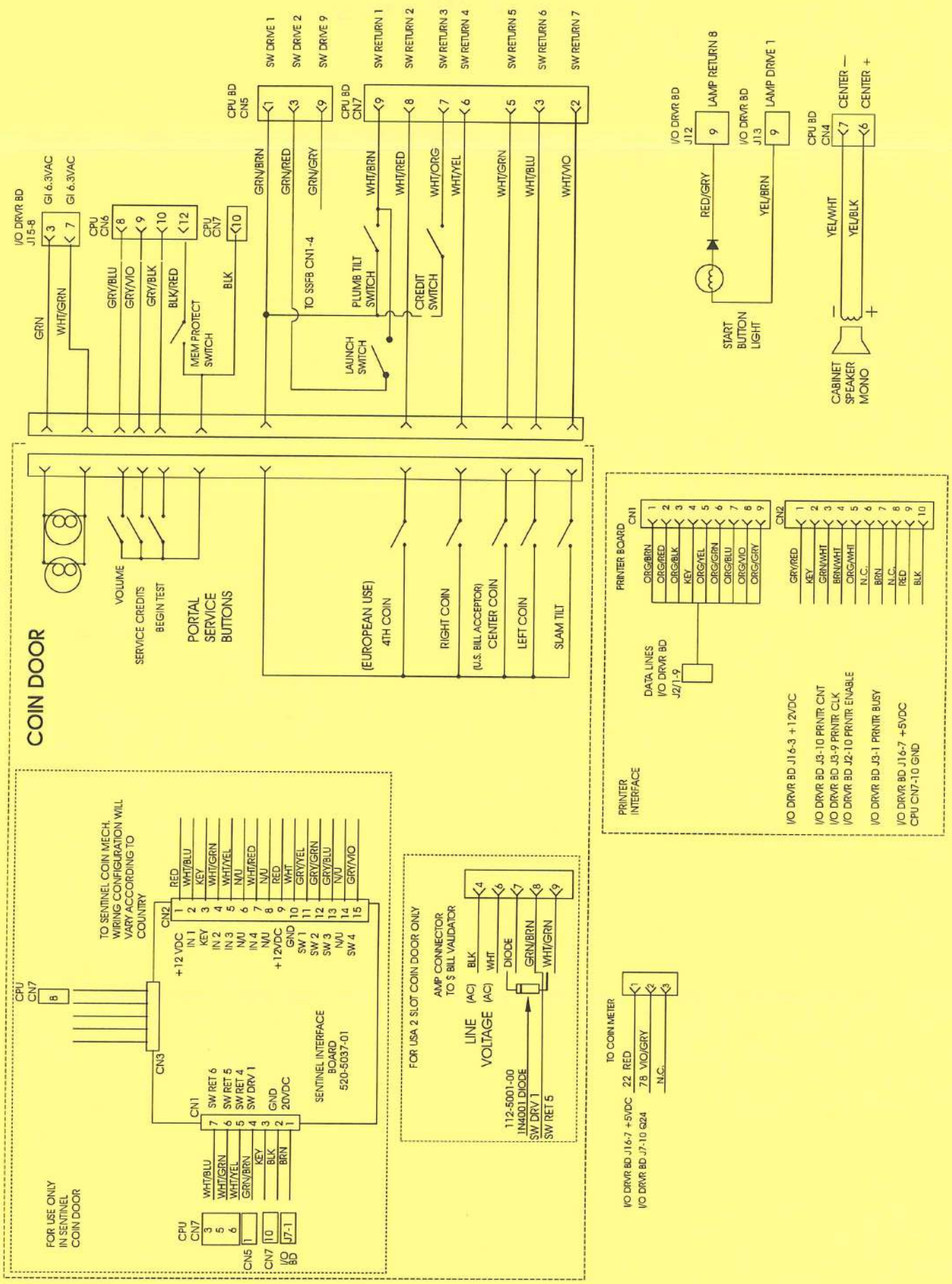


JUMPERS FOR VOLTAGE VARIATION

<<< CONFIGURATON FOR DOMESTIC 115V <<<

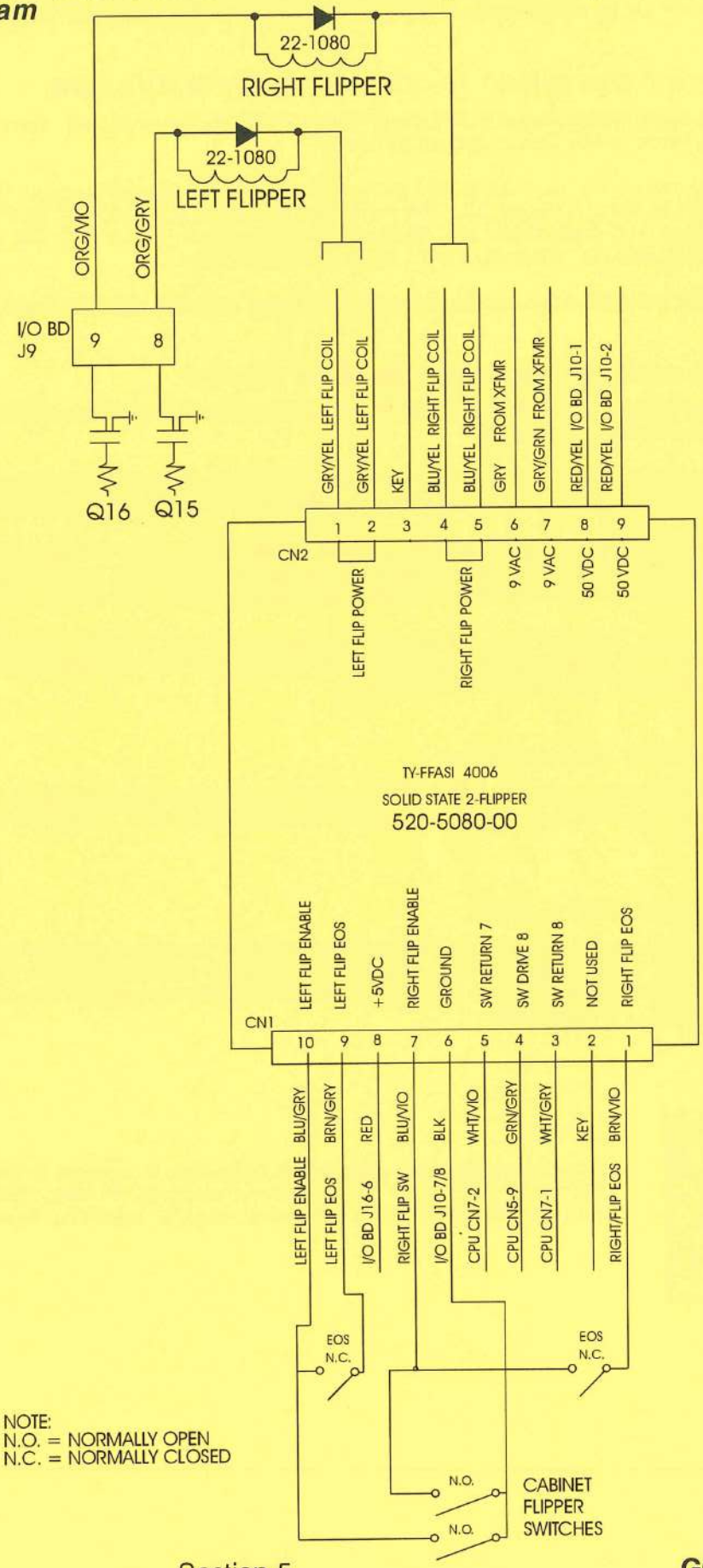
V V V CONFIGURATION OF 220V OR LOWER LINE VOLTAGES FOR INTERNATIONAL USE V V V

Cabinet/Coin Door Wiring Diagram



Printed Circuit Boards (PCBs)

2-Flipper Wiring Diagram



NOTE:
N.O. = NORMALLY OPEN
N.C. = NORMALLY CLOSED

New Solid State Flipper Board

We have redesigned our **Solid State Flipper Board (SSFB)** so that a misadjustment or failure of the **End-of-Stroke (EOS) Switch** will not affect the operation of the flippers. The flippers will still work! The **EOS Switch** is strictly an added feature, not a functional part of the circuit (see EOS Switch Theory of Operation).

Theory of Operation for the Solid State Flippers

The Solid State Flipper Board is a Multiple Flipper Solenoid Driver Circuit. Each solenoid driver circuit contains a One Shot Timer, a 50V Driver, and an 8V Driver.

Looking at one circuit, Schmidt NAND gates U1A, U1b, and U1D make up the One Shot Timer. The timer length is controlled by R10, R33 and C2. The output of the timer is gated at U1C with the buffered switch input from Q6. The output of U1C controls the 50V driver circuit consisting of Q4, Q1, Q2, Q3, and D1. As long as the flipper button is activated, Q6 will keep the 8V driver circuit, SR1, on.

The 50 volts provides the actuation power to the flipper solenoid while the 8 volts provides the holding power.

Theory of Operation for the EOS Switch

The **End of Stroke (EOS) Switch** used in our flipper circuit is a Gold Peened Contact, Blade Switch Assembly, mounted on the flipper assembly.

Electrically, it is connected in series with the Cabinet Flipper Switch and the Flipper EOS input on the Solid State Flipper Board (SSFB) connector CN1 which enables the 50 Volt DC Drive Circuit.

Refering to the Flipper Wiring Diagram, one side of the Flipper Cabinet Switch is connected to ground (BLK-Wire), the other side (BLU-VIO Wire) is connected to the flipper switch input on the SSFB Connector CN1 which enables your 9 Volt DC holding voltage and is connected in series to the EOS switch which is a normally closed switch.

The function of the EOS Switch is to prevent the flipper bat from being knocked back by a high velocity shot on the playfield. If while holding the flipper in the up position, the bat is moved back 1/16" or more, the EOS Switch will close giving the coil another 50 Volt pulse.

EOS Switch Adjustment

The switch contacts should be adjusted so that when the solenoid is energized, the contacts stay closed for almost the full travel of the plunger. The contacts should open 1/16" before the plunger bottoms out or reaches maximum travel.

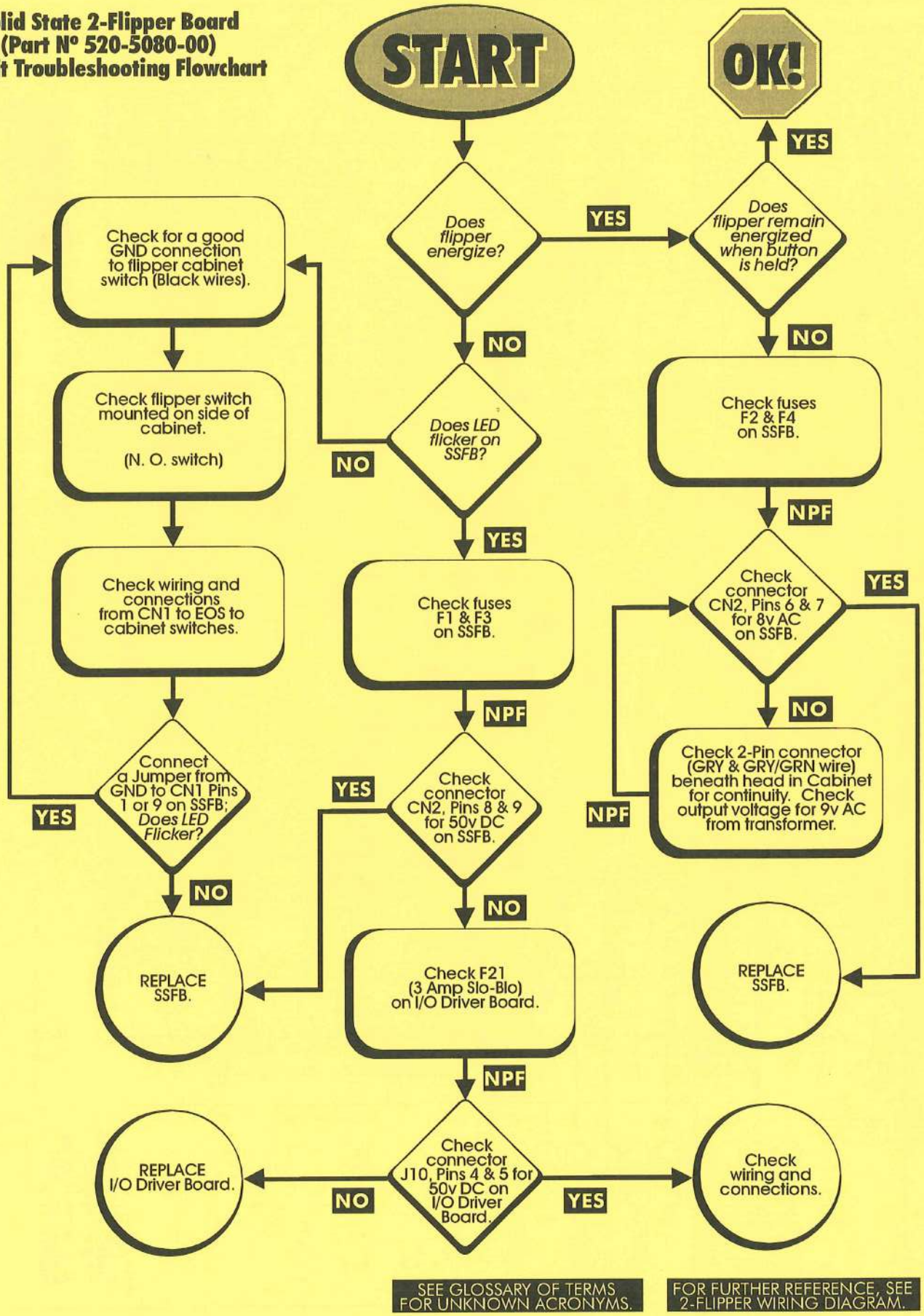
Troubleshooting Tips

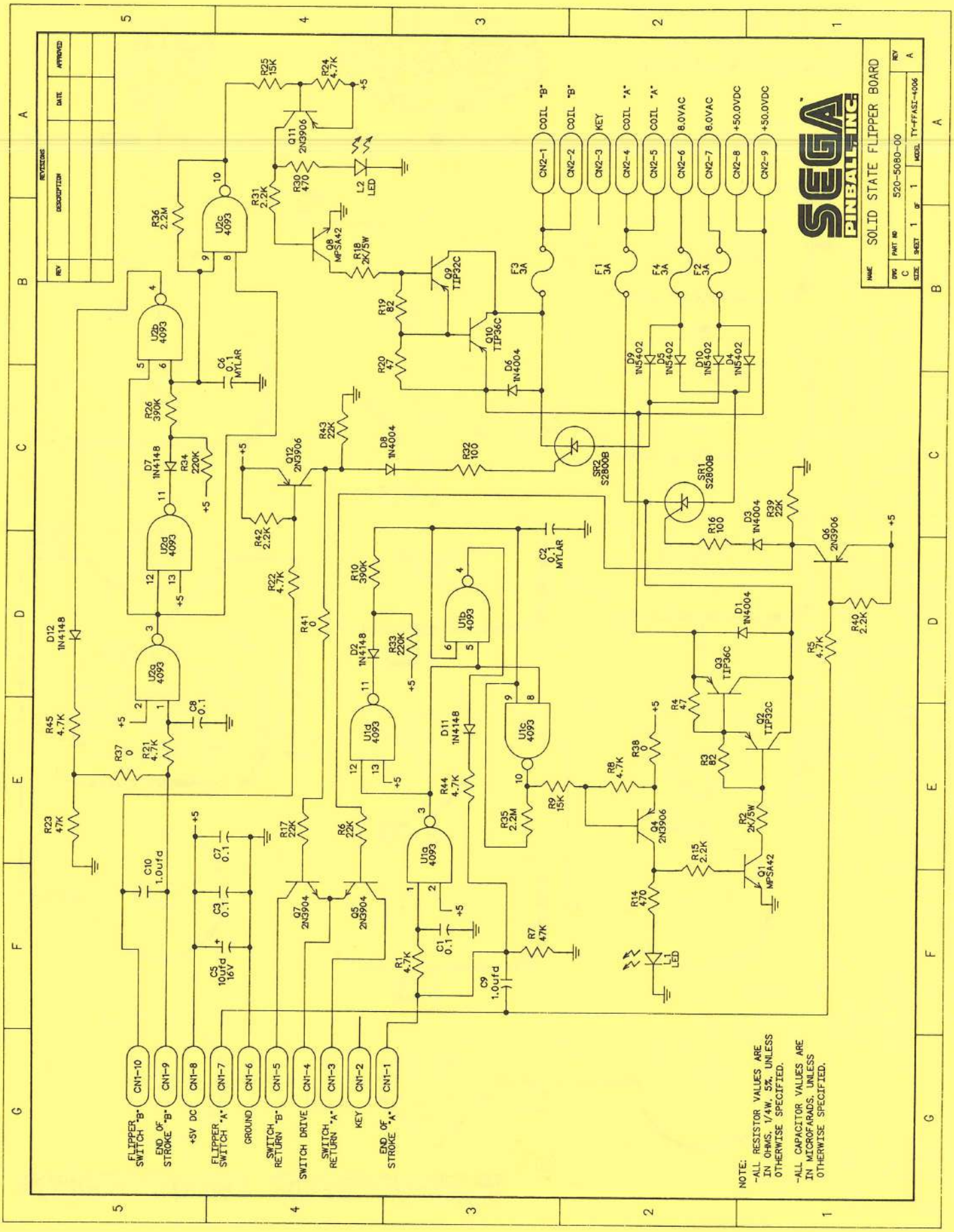
The only indication of a problem you will have is the player complaining that when the flipper bat is being held in the up position, a high velocity shot from one of the playfield solenoids causes the ball to hit the flipper bat and physically knock it back. This will not occur if the EOS Switch is working. Check switch for alignment and continuity, replace if necessary.

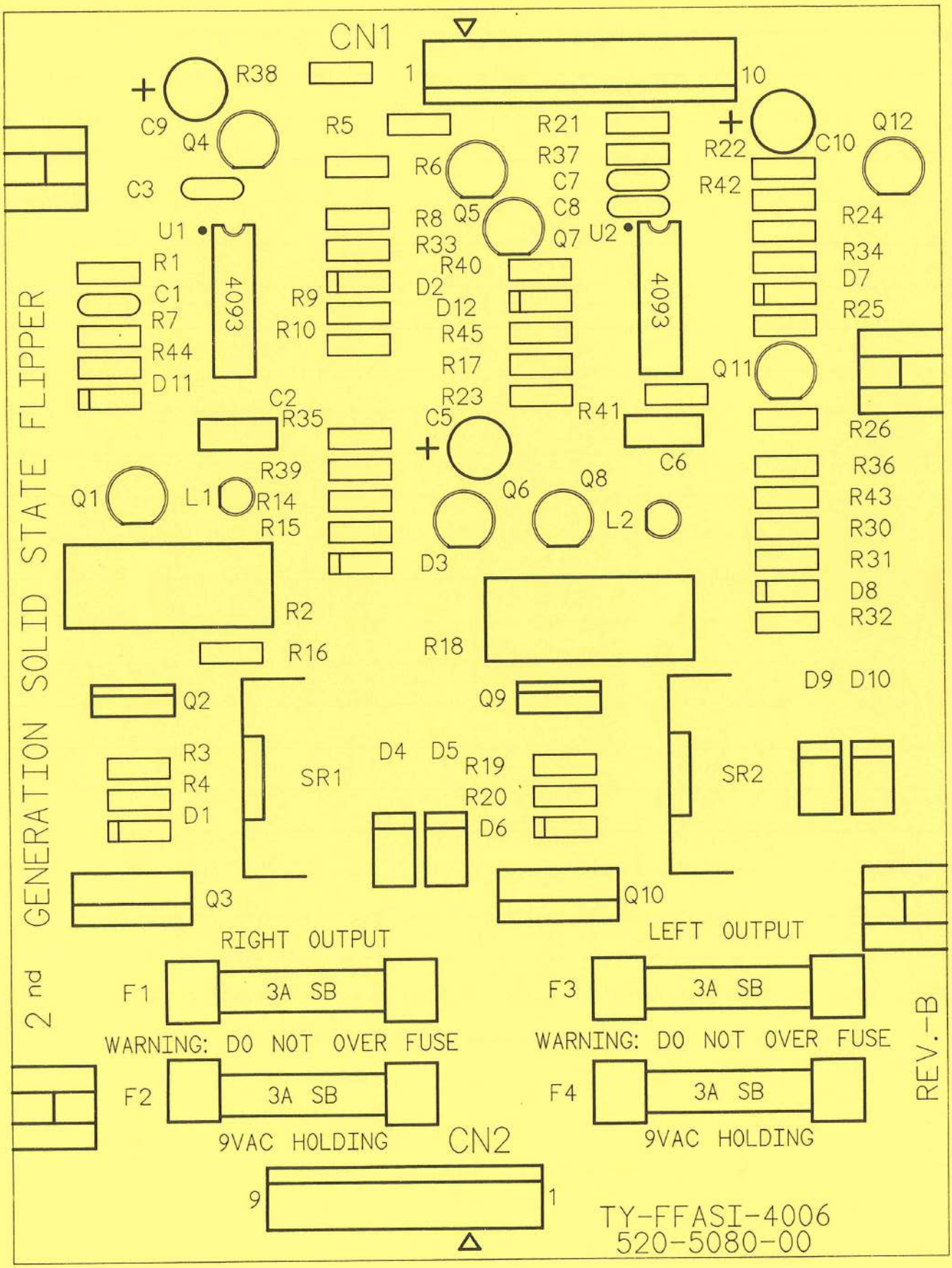
Note:

See the inside cover and the end of Section 3, Chapter 2, Diagnostics, for information on the Dr. Pinball option through the **Portals™ Service Menu** for additional information and help through an additional flow chart.

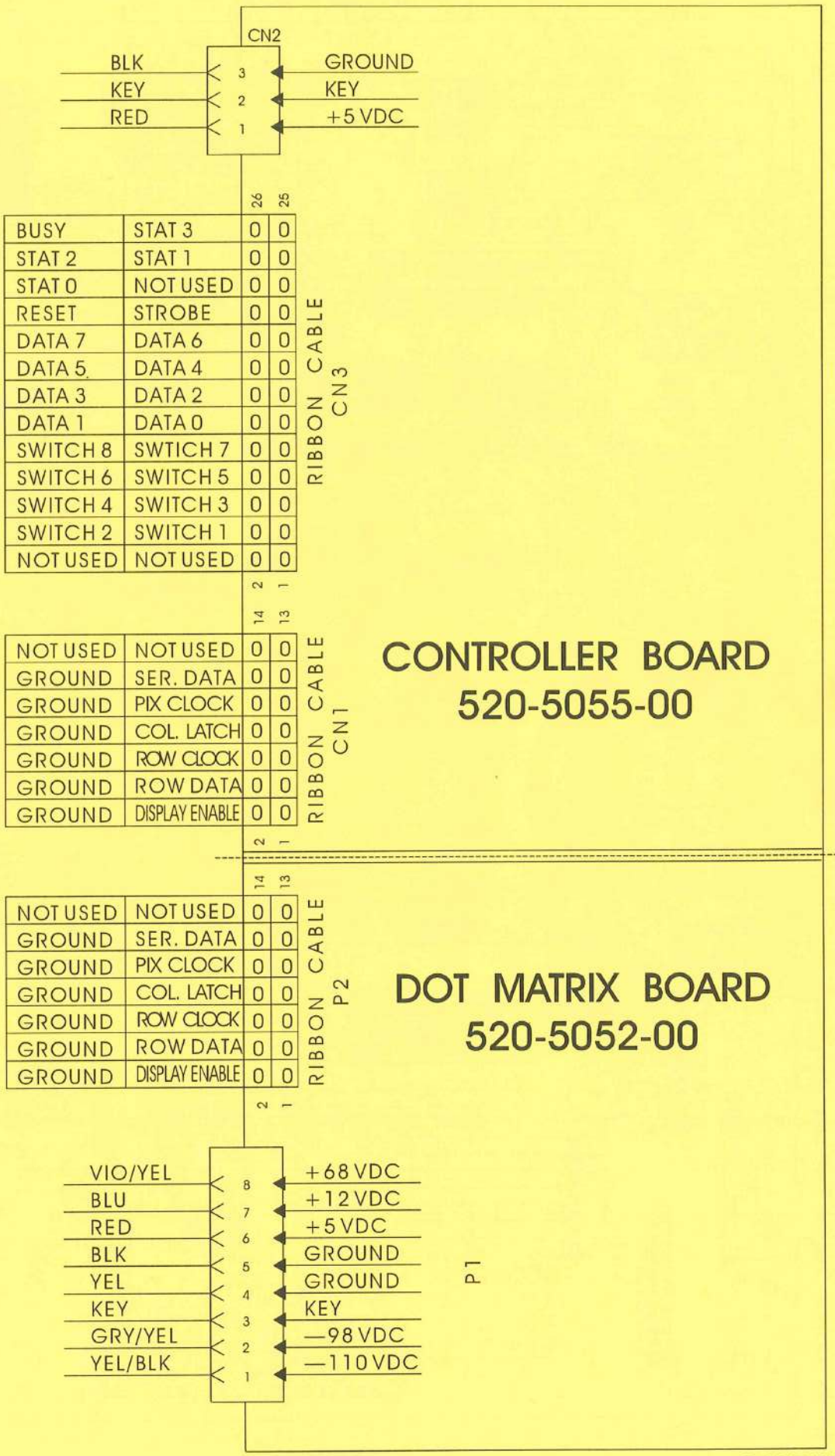
Solid State 2-Flipper Board (Part N° 520-5080-00) Circuit Troubleshooting Flowchart



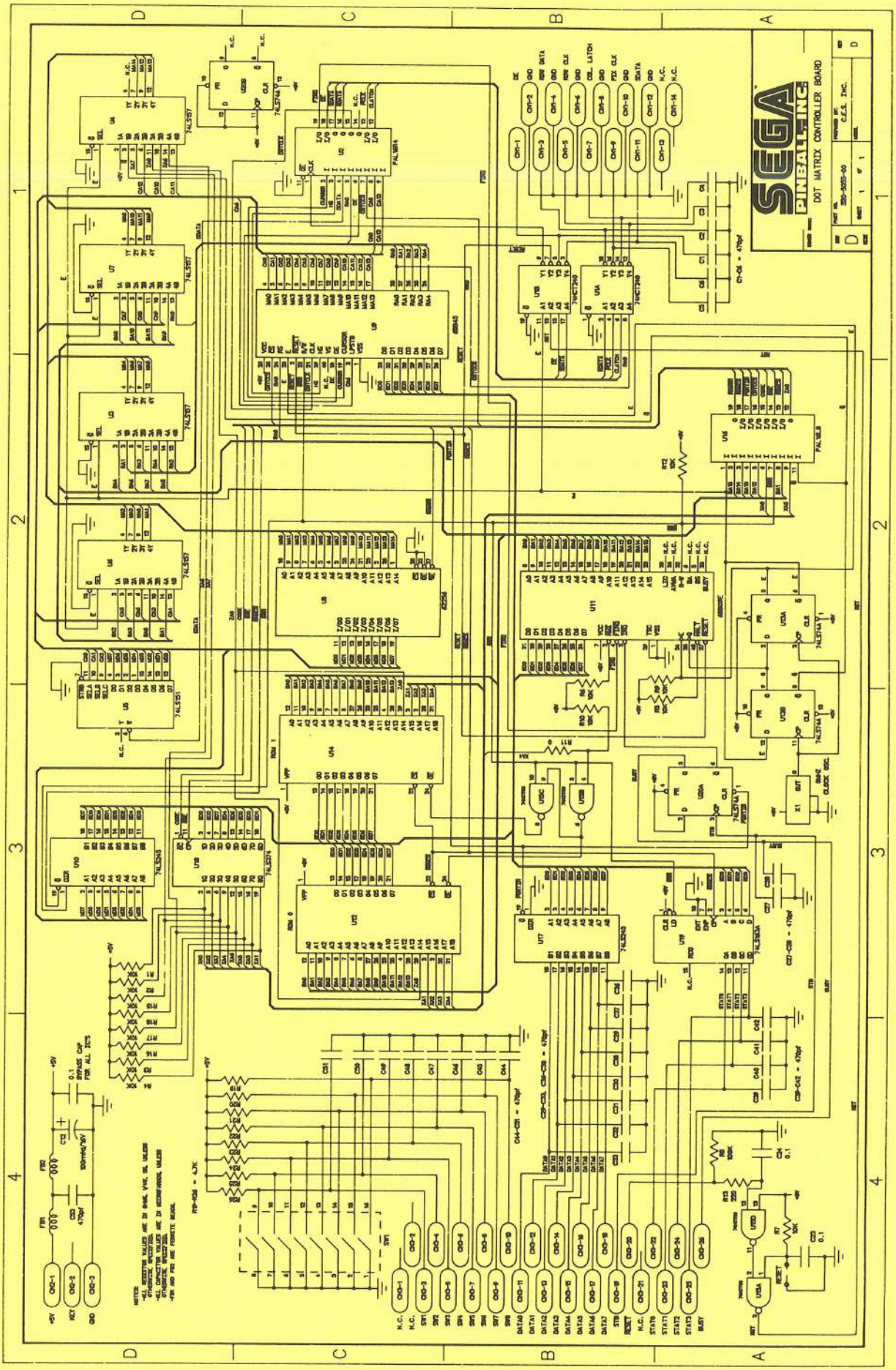

SEGA PINBALL INC
SOLID STATE FLIPPER BOARD
PART NO 520-5080-00
MODEL TY-FFASI-4006
SHEET 1 OF 1
SIZE C
REV A
CN2-1 COIL "B"
CN2-2 COIL "B"
CN2-3 KEY
CN2-4 COIL "A"
CN2-5 COIL "A"
CN2-6 8.0VAC
CN2-7 8.0VAC
CN2-8 +50.0VDC
CN2-9 +50.0VDC
CN1-10 FLIPPER SWITCH "B"
CN1-9 END OF STROKE "B"
CN1-8 +5V DC
CN1-7 FLIPPER SWITCH "A"
CN1-6 GROUND
CN1-5 SWITCH RETURN "B"
CN1-4 SWITCH DRIVE
CN1-3 SWITCH RETURN "A"
CN1-2 KEY
CN1-1 END OF STROKE "A"
NOTE:
-ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
-ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.


CN1
1
10
R38
C9
Q4
C3
R5
R6
R8
Q5
R33
R40
D2
D12
R45
R17
R23
C5
R21
R37
C7
C8
Q7
U2
4093
R22
C10
Q12
R42
R24
R34
D7
R25
Q11
R26
R36
R43
R30
R31
D8
R32
C6
R41
U1
R1
C1
R7
R44
D11
4093
R9
R10
C2
R35
R39
Q1
L1
R14
R15
R2
R16
Q6
Q8
L2
D3
R18
Q2
R3
R4
D1
SR1
D4
D5
R19
R20
D6
Q9
SR2
D9
D10
Q3
Q10
RIGHT OUTPUT
LEFT OUTPUT
F1
3A SB
F3
3A SB
WARNING: DO NOT OVER FUSE
WARNING: DO NOT OVER FUSE
F2
3A SB
F4
3A SB
9VAC HOLDING
9VAC HOLDING
CN2
9
1
2 nd GENERATION SOLID STATE FLIPPER
REV.-B
TY-FFASI-4006
520-5080-00

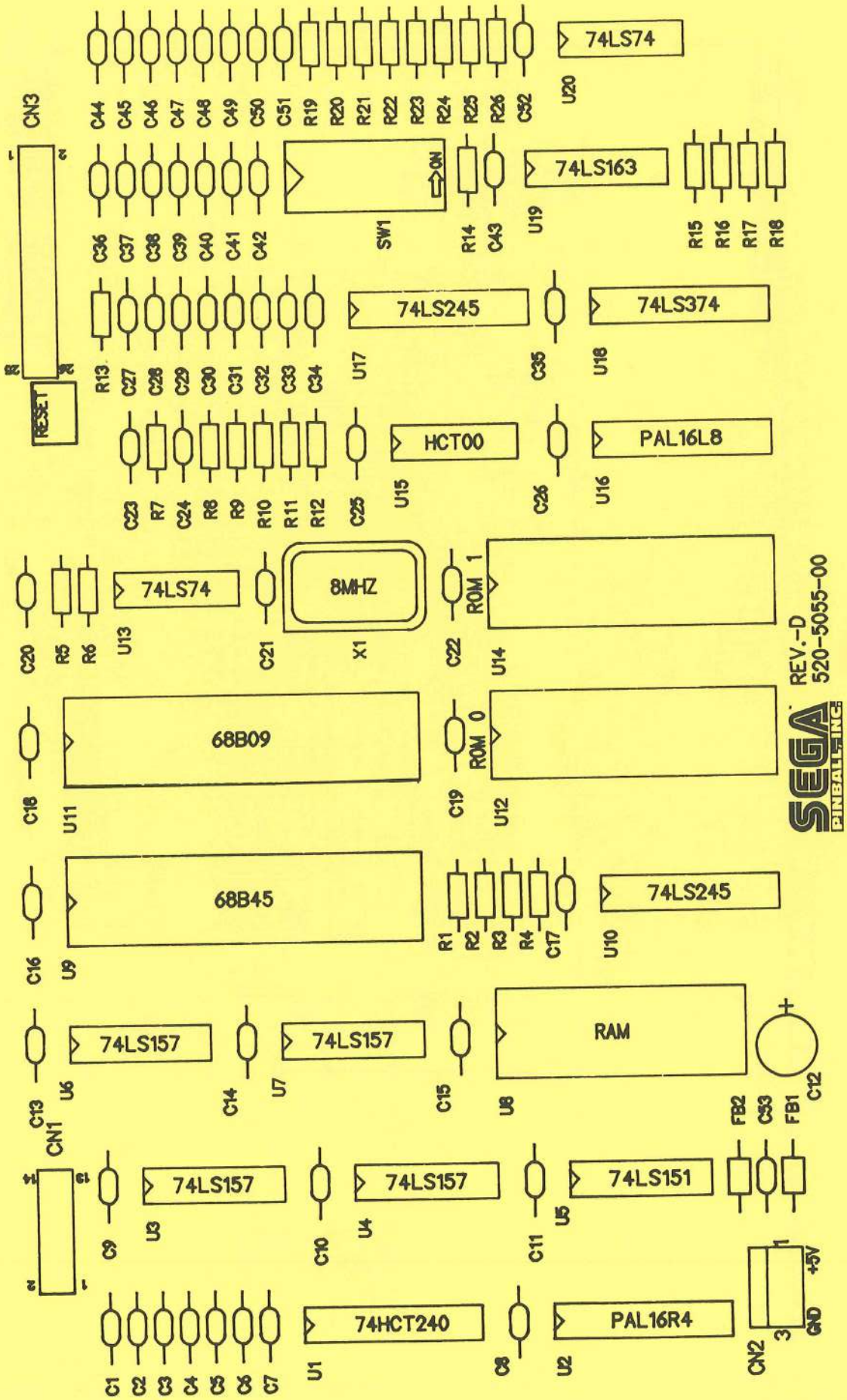
Your Notes

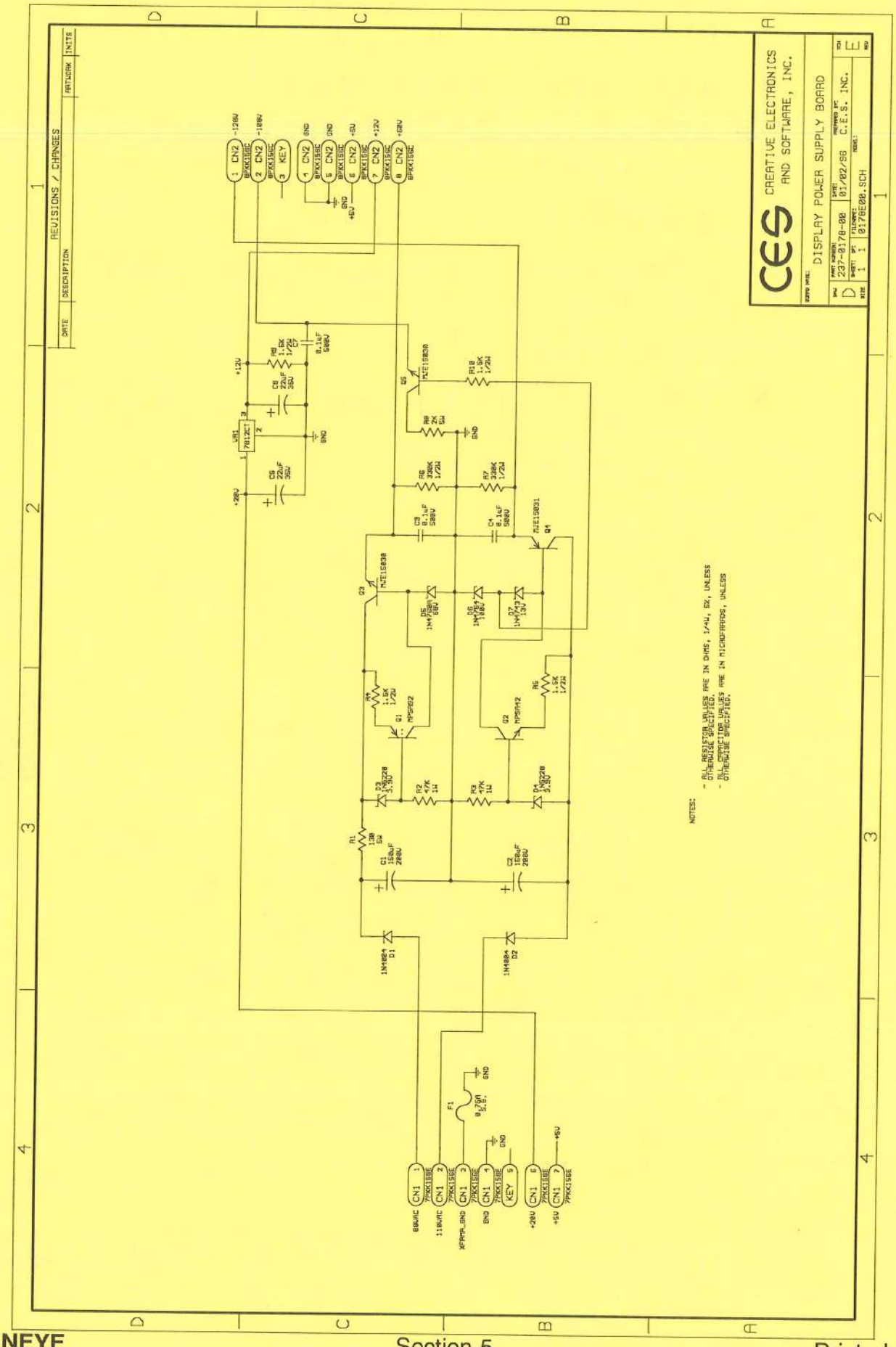

CN2
BLK
KEY
RED
3
2
1
GROUND
KEY
+5 VDC
26
25
BUSY
STAT 3
STAT 2
STAT 1
STAT 0
NOT USED
RESET
STROBE
DATA 7
DATA 6
DATA 5
DATA 4
DATA 3
DATA 2
DATA 1
DATA 0
SWITCH 8
SWTICH 7
SWITCH 6
SWITCH 5
SWITCH 4
SWITCH 3
SWITCH 2
SWITCH 1
NOT USED
NOT USED
RIBBON CABLE CN3
2
1
14
13
NOT USED
NOT USED
GROUND
SER. DATA
GROUND
PIX CLOCK
GROUND
COL. LATCH
GROUND
ROW CLOCK
GROUND
ROW DATA
GROUND
DISPLAY ENABLE
RIBBON CABLE CN1
CONTROLLER BOARD
520-5055-00
2
1
14
13
NOT USED
NOT USED
GROUND
SER. DATA
GROUND
PIX CLOCK
GROUND
COL. LATCH
GROUND
ROW CLOCK
GROUND
ROW DATA
GROUND
DISPLAY ENABLE
RIBBON CABLE P2
DOT MATRIX BOARD
520-5052-00
2
1
VIO/YEL
BLU
RED
BLK
YEL
KEY
GRY/YEL
YEL/BLK
8
7
6
5
4
3
2
1
+68 VDC
+12 VDC
+5 VDC
GROUND
GROUND
KEY
—98 VDC
—110 VDC
P1

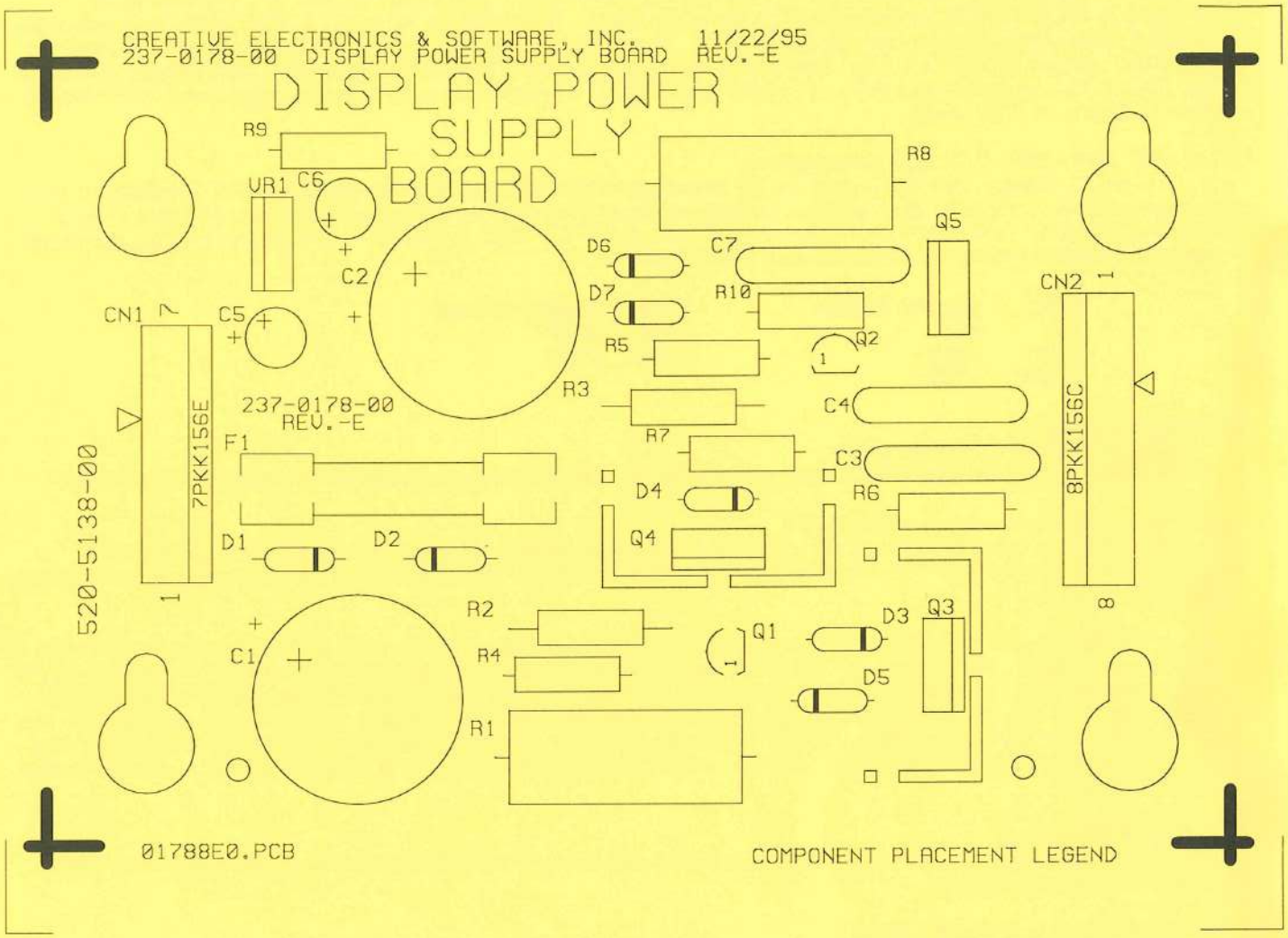
Display Controller Board Schematic



Display Controller Board Component Layout




CES
CREATIVE ELECTRONICS AND SOFTWARE, INC.
DISPLAY POWER SUPPLY BOARD
237-0178-00
01/02/96
C.E.S. INC.
81786E00.SCH
REVISIONS / CHANGES
DATE
DESCRIPTION
ARTWORK
INITS
NOTES:
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.



ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
1	1	Note:	F1	S.B. 0.5A
2	2		Q3 Q4	HEATSINKS - AAVID #563002
3	2	Part Numbers	C2 C1	200V 150uF RADIAL LYTIC
4	4	are not yet	R10 R9 R5 R4	1/2W 1.5K
5	2	yet availalbe.	R7 R6	1/2W 330K
6	2		R2 R3	1W 47K
7	1		R1	5W 130
8	1		R8	5W 2K
9	2		D3 D4	3.9V 5228
10	1		D5	68V 4760A
11	1		D6	100V 4764
12	1		D7	13V 4743
13	1		Q1	MPSA92
14	1		Q2	MPSA42
15	3		C3 C4 C7	500V 0.1uF CERAMIC DISK
16	1		Q4	MJE15031
17	2		Q3 Q5	MJE15030
18	2		C5 C6	25V 22uF RADIAL LYTIC
19	1		VR1	7812CT
20	1		CN2	8pkk156 (PIN3=KEY)
21	2		D1 D2	1N4004
22	1		CN1	7PKK156E (PIN5=KEY)
23	2		Q3 Q4	6/32 KEY NUT
24	2		Q3 Q4	6/32 X 3/8 SCREW
25	2		F1	FUSECLIPS

5V Supply:
An AC voltage of approximately 9V comes into the board at [J17-(1-4)] this AC voltage is then full-wave rectified by bridge BRDG 21 and filtered by capacitor C203. The resulting voltage is 11VDC which is inserted into a linear voltage regulator for the output of 5VDC. This 5V regulated voltage can be adjusted by potentiometer R116 the voltage should be set to 5.00V. Besides powering the I/O Board the regulated 5 volts supplies power to the CPU & Sound Board Gas Plasma Display and Plasma Controller Board. Power for these devices comes off the I/O Board on [J16-(4-8)].

+5 +12 +50V +18V +20V LED Indicators:
These DC voltages are derived on the I/O board by rectification and filtering. Each has a LED indicating that power is being supplied to each of these voltage sources. The -12V supply comes from the same transformer winding as the +12V thus it does not have a led indicator. ** Note that the +50V &+20V power sources are turned off by the interlock switches when the coin door is open.

LED	Supply Voltage	LED	Supply Voltage
L2	+5	L200	+20V
L201	+50V	L202	+18V
L203	+12V		

Reset Circuitry:
The I/O will reset in three cases:
1. The CPU is in reset. The CPU's reset signal is fed into the I/O through connector J1 and forces the I/O into reset.
2. The 5V supply has fallen bellow 4.75V.
3. The watchdog is not being fed by the scanning of the light matrix. More specifically pin 19 of U6 must be toggling once every 50ms to prevent the watchdog from resetting. The scanning of the light matrix is controlled by the CPU through J1.

LED L204 shows the reset state of the I/O board. If this LED is not lit either the 5VDC is below 4.75V or the CPU board is holding the I/O in reset. If the LED is flashing this means that the watchdog is not being feed by the CPU board and the I/O is oscillating into and out of reset. If the LED is continuously on the board is out of reset and communication from the CPU to the lamp matrix is confirmed. Testpoint Blanking is the actual reset signal on the I/O Board. A low voltage indicates that it is in reset this will turn off all Solenoid drivers Flash Lamps Lamp Matrix Drivers Auxiliary Outputs and Flipper Outputs. A high voltage indicates that it is out of reset and normal operation can take place.

Address Decoding:
All Address decoding is done by two 74LS138 (1 of 8 decoder). Both of these must be in operation for the I/O Board to function properly.

Solenoid Drivers & Flash Lamps:
J8 & J9 are high side drivers for driving solenoids and other heavy loads. Each connector has its own buffer driving 8 drivers. J8 & J9 consist of MOSFET drivers 20N10L which can easily & safely be tested by clipping one end of a clip-lead to test point FET TPL1 and then the other to the corresponding gate resistor R1-R16 (see note 1). This will apply 3.4V to the gate of the MOSFET transistor thus switching it on. J7 & J6 each are a bank of 8 low side driver for driving lamps or other lower current solenoids. They use a bipolar power transistor TIP122 which can also be tested by using test point TIP TPL3 and the corresponding resistors R17-R32 (see note 1).

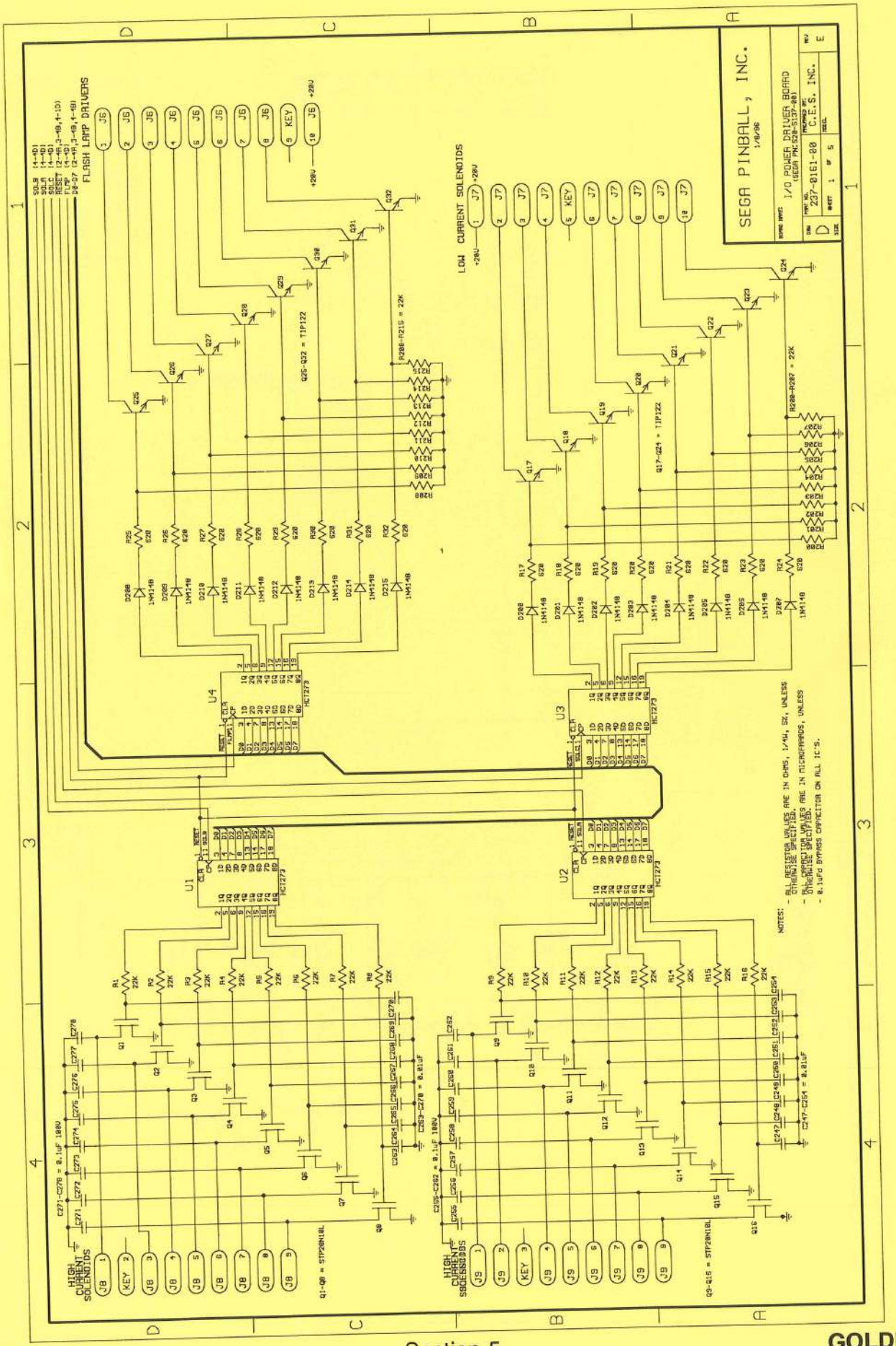
Note 1 * Clip on the resistor side with the white stripe.
** R1 controls Q1 and R2 controls Q etc...

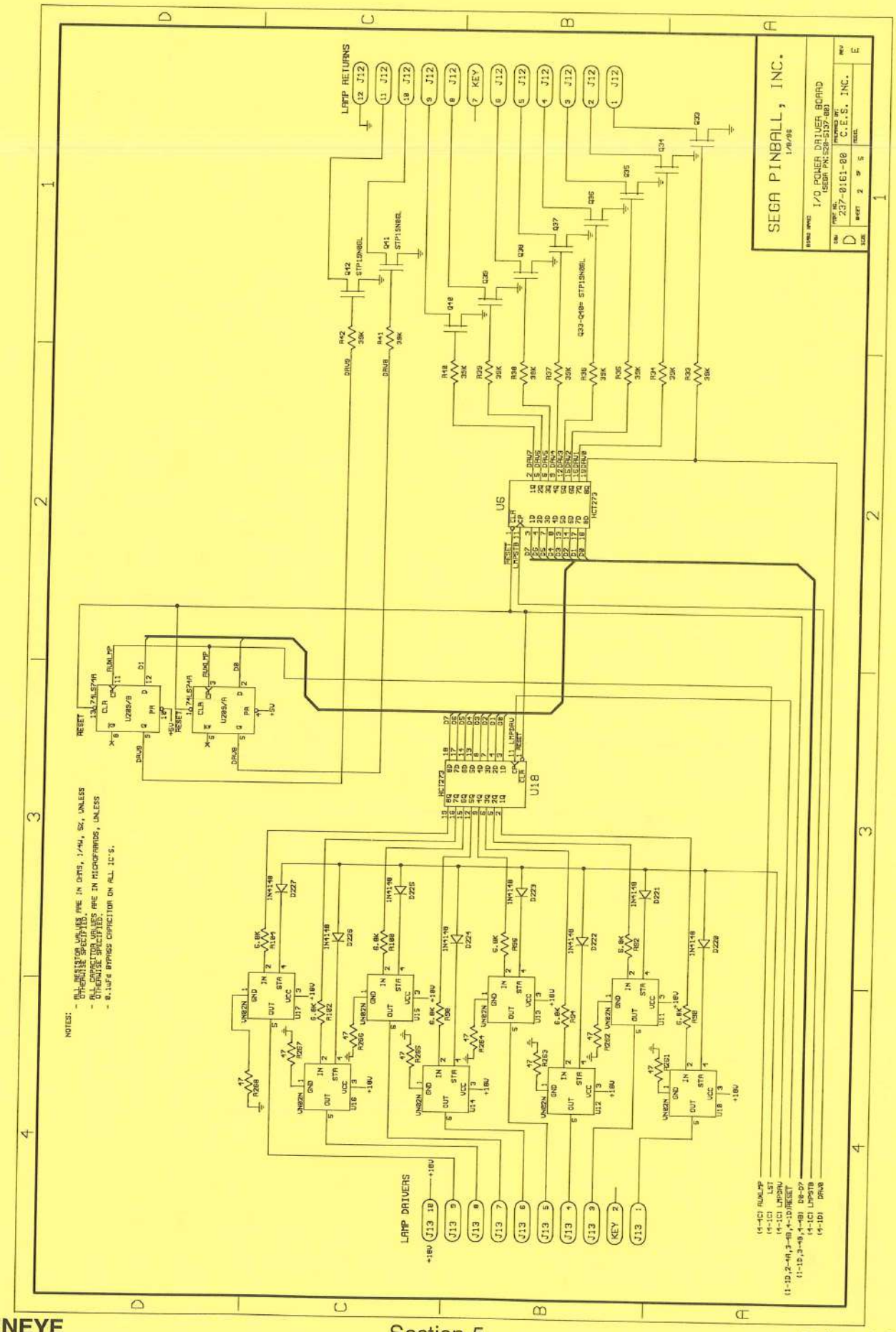
Auxiliary In & Out:
J2 8 CMOS Outputs sometimes used for a printer interface.
J3 8 CMOS Inputs general purpose inputs.

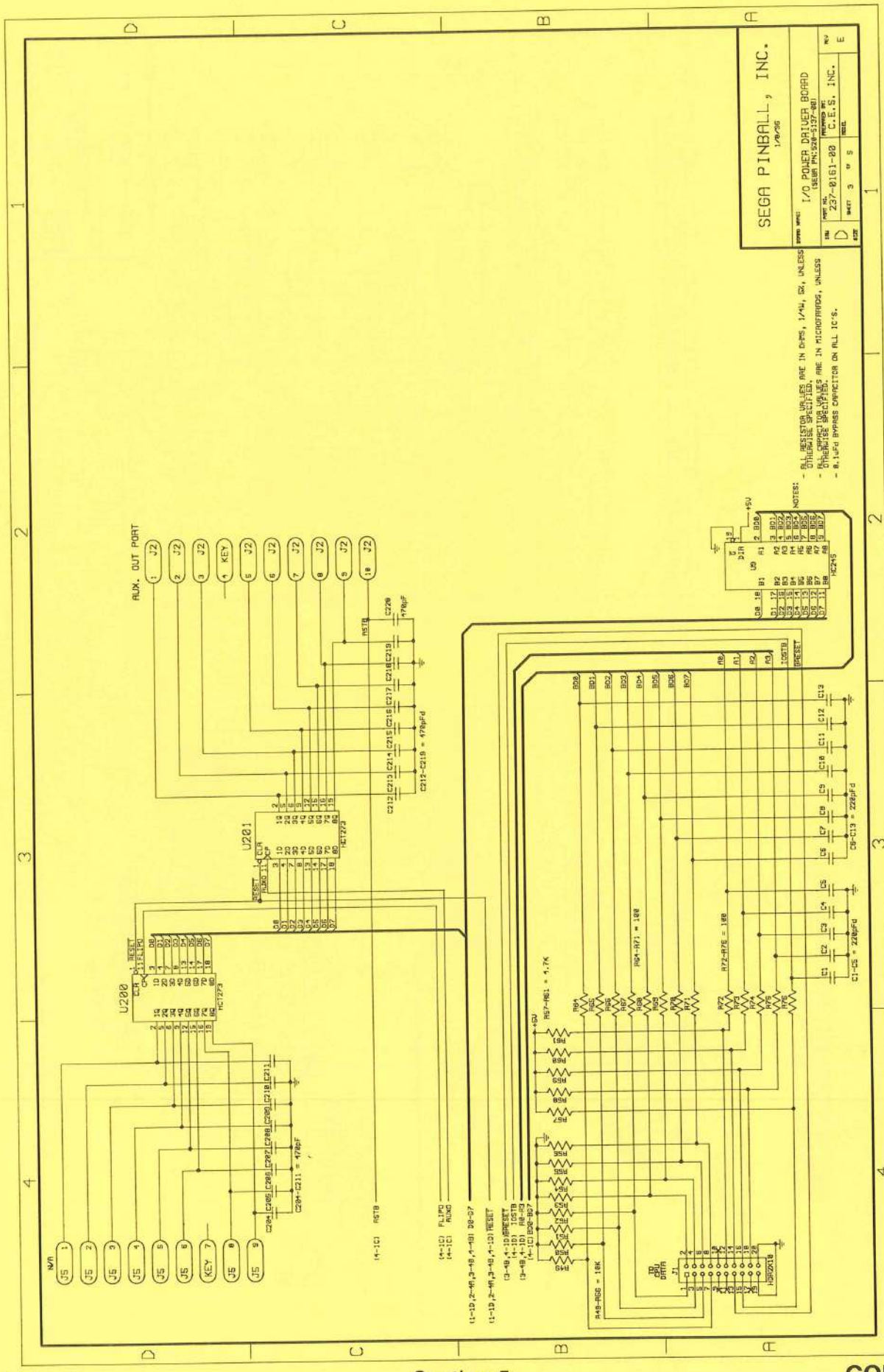
Lamp Matrix:
J12 has 10 low side drivers for the lamp strobes which consist of 19N06L MOSFETS. Only one lamp strobe should be low at any time. Again the scanning of the lamp strobes keeps the I/O from resetting. J13 has 8 high side drivers with each having a status indicator. All the status indicators are logically 'OR'ed together and fed back to the CPU. The status can identify open loads (for example open lamp filaments or intermittent connections) and short circuits. These drivers are also short-circuit protected.

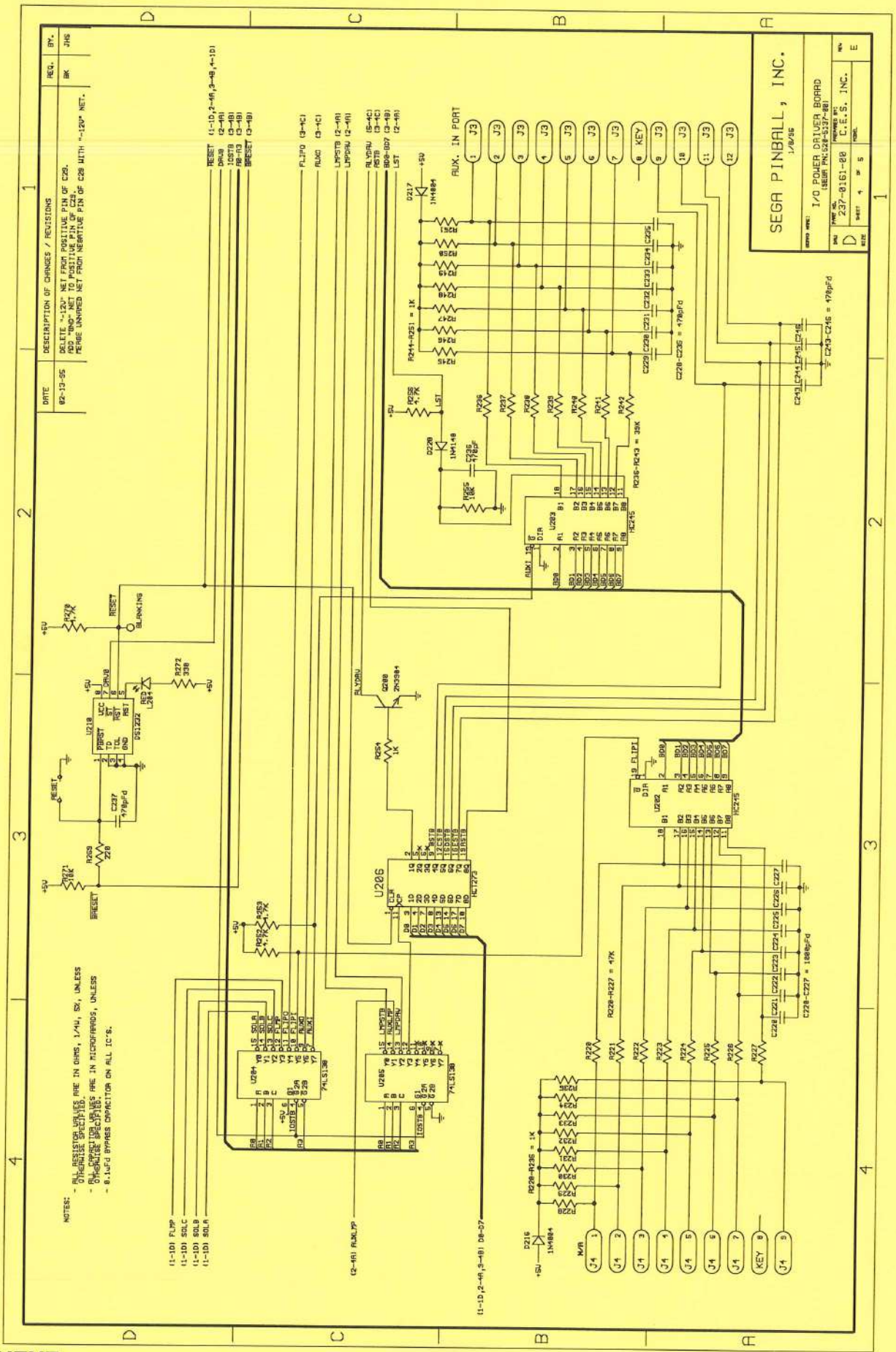
General Illumination (G.I.) Lights:
J15 has 6VAC switched on and off by a relay on the I/O Board. The relay is controlled by Q200 which supplies power to the 24V coil winding to activate the relay. There are 4 taps on J15 each fused at 5A for this 6VAC source.

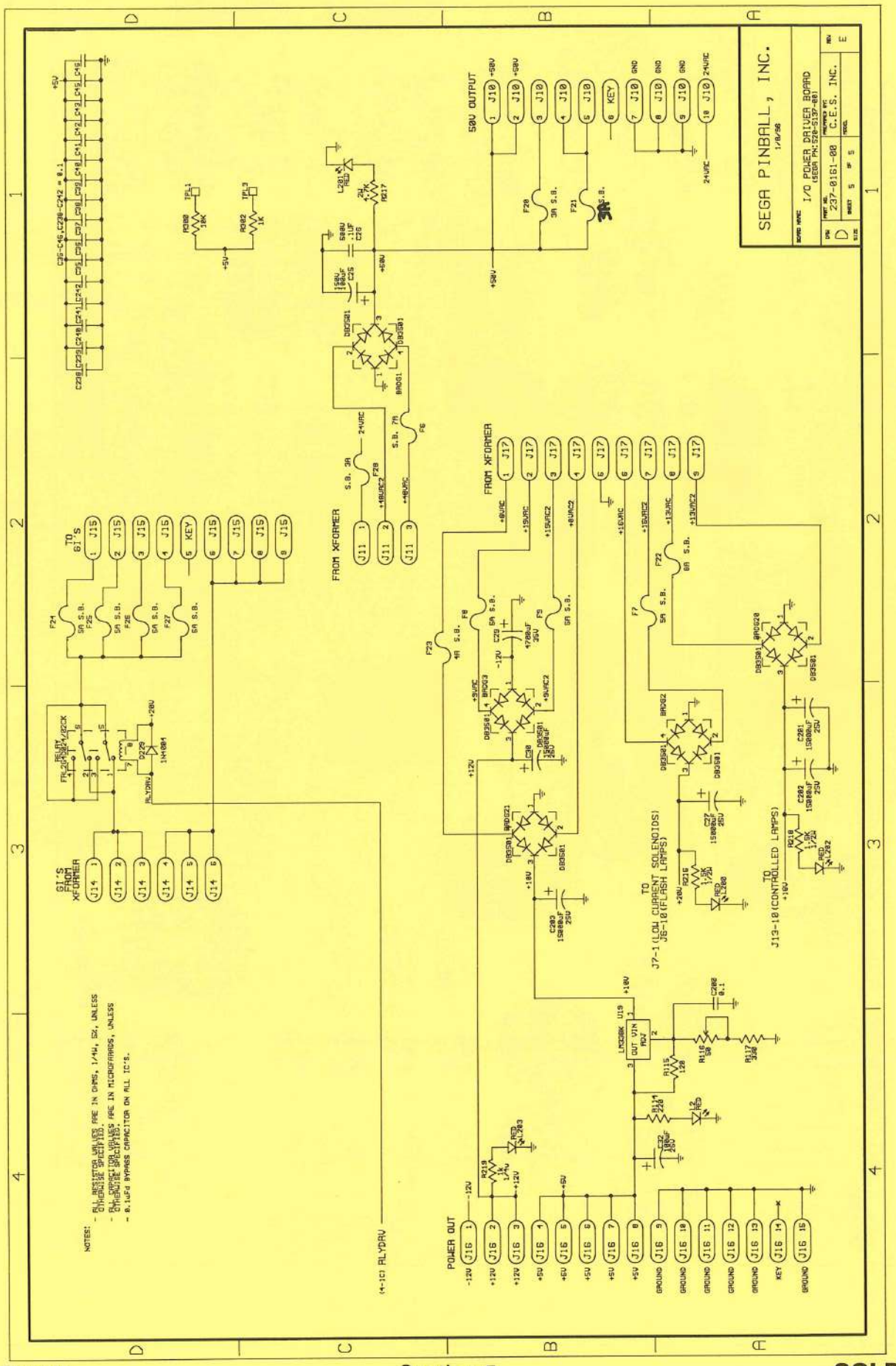
I/O Power Driver Board Schematic (Sheet 1 of 5)



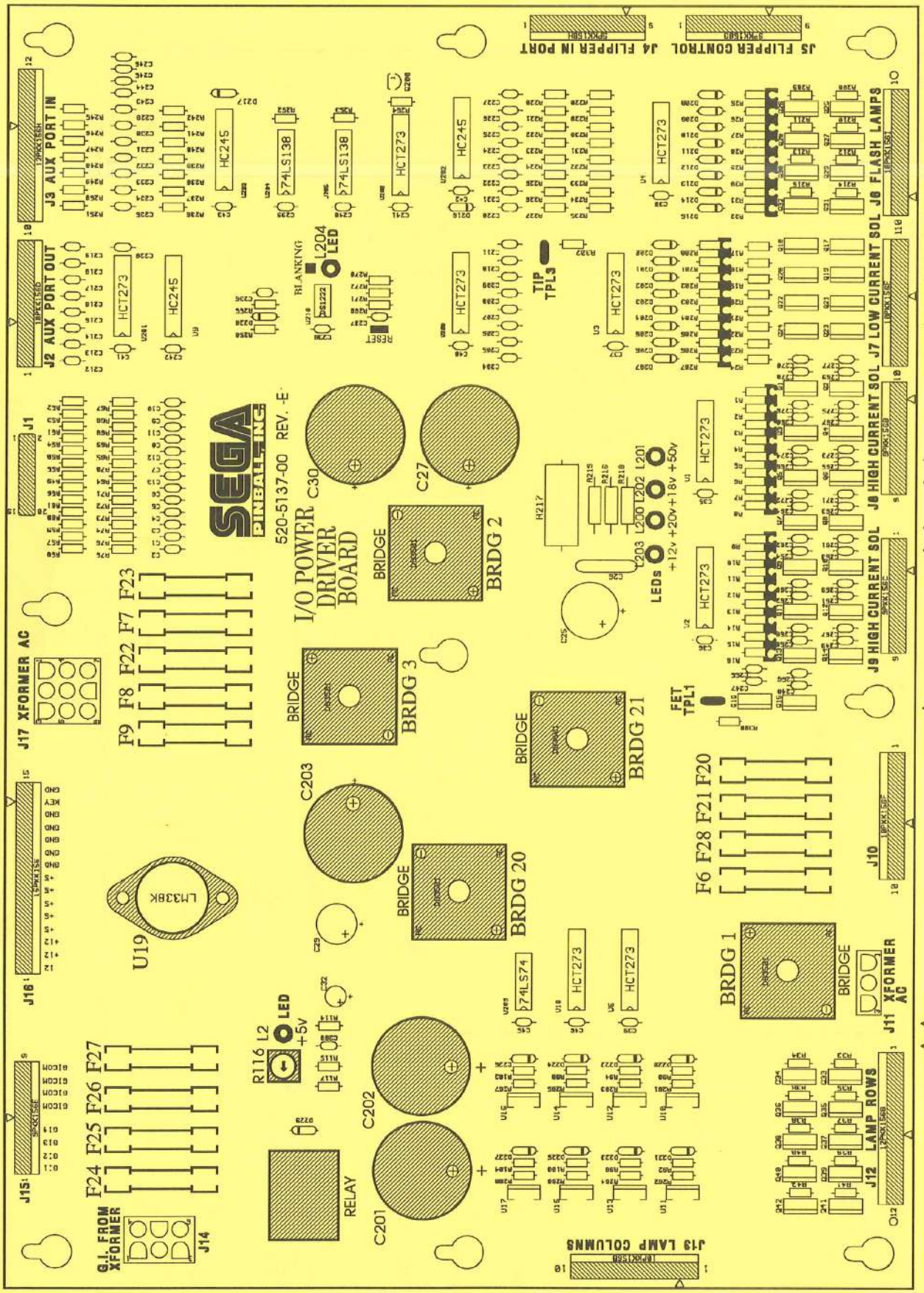

SEGA PINBALL, INC.
I/O POWER DRIVER BOARD
(SEGA PN:520-5137-00)
237-0161-00
C.E.S. INC.
LAMP RETURNS
LAMP DRIVERS
U6
U18
NOTES:
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
- 0.1uF BYPASS CAPACITOR ON ALL IC'S.


SEGA PINBALL, INC.
I/O POWER DRIVER BOARD
PART NO. 237-0161-00
SHEET 3 OF 5
AUX. OUT PORT
U200
U201
HC273
HC245
RESET
FLIPPO
AUXO
KEY
+5V
NOTES:
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
- 0.1uFd BYPASS CAPACITOR ON ALL IC'S.


SEGA PINBALL, INC.
I/O POWER DRIVER BOARD
(SEGA PN:520-5197-00)
C.E.S. INC.
237-0161-00
DESCRIPTION OF CHANGES / REVISIONS
DELETE "-12V" NET FROM POSITIVE PIN OF C29.
ADD "GND" NET TO POSITIVE PIN OF C29.
MERGE UNNAMED NET FROM NEGATIVE PIN OF C29 WITH "-12V" NET.
AUX. IN PORT
NOTES:
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
- 0.1uFd BYPASS CAPACITOR ON ALL IC'S.


SEGA PINBALL, INC.
I/O POWER DRIVER BOARD
SEGA PN:520-5139-01
237-0161-00
C.E.S. INC.
50V OUTPUT
FROM XFORMER
TO GI'S
GI'S FROM XFORMER
TO J7-1(LOW CURRENT SOLENOIDS) J8-18(FLASH LAMPS)
TO J13-18(CONTROLLED LAMPS)
POWER OUT
NOTES:
- ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%, UNLESS OTHERWISE SPECIFIED.
- ALL CAPACITOR VALUES ARE IN MICROFARADS, UNLESS OTHERWISE SPECIFIED.
- 0.1uFd BYPASS CAPACITOR ON ALL IC'S.

I/O Power Driver Board Component Layout



I/O Power Driver Board Parts

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
1	16	Note: Part Numbers are not yet available.	C260 C259 C258 C257 C256 C278 C271 C255 C261 C262 C277 C276 C275 C274 C273 C272	100V 104 (0.1uF)
2	30		C204 C206 C207 C208 C209 C210 C211 C235 C234 C228 C229 C230 C231 C232 C233 C219 C217 C216 C215 C214 C212 C213 C237 C218 C236 C205 C243 C245 C246 C244	471 (470pF)
3	16		C263 C264 C265 C270 C269 C268 C267 C266 C247 C254 C253 C252 C251 C250 C249 C248	103 (0.01uF)
4	13		C7 C8 C9 C10 C11 C12 C13 C1 C2 C3 C4 C5 C6	221 (220pF)
5	8		C227 C226 C220 C221 C222 C223 C224 C225	102 (0.001uF)
6	17		C35 C36 C37 C38 C39 C40 C41 C42 C43 C45 C46 C200 C239 C238 C240 C241 C242	104 (0.1uF)
7	16		Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q16 Q15 Q14 Q13 Q12 Q11 Q10 Q9	20N10L
8	32		R2 R3 R4 R5 R6 R7 R8 R16 R15 R14 R13 R12 R11 R10 R9 R200 R201R202 R203 R204 R205 R206 R207 R215 R214 R213 R212 R211 R210 R209 R208 R1	22K
9	16		R17 R32 R18 R19 R20 R21 R22 R23 R24 R31 R30 R29 R28 R27 R26 R25	620
10	17		R237 R236 R40 R39 R38 R37 R36 R35 R34 R33 R238 R239 R240 R241 R242 R42 R41	39K
11	13		R64 R72 R73 R74 R75 R76 R71 R70 R69 R68 R67 R66 R65	100
12	8		R90 R92 R94 R96 R98 R100 R102 R104	6.8K
13	1		R115	120
14	8		R221 R220 R222 R223 R224 R225 R226 R227	47K
15	17		R254 R248 R249 R250 R251 R232 R246 R247 R245 R233 R234 R235 R230 R231 R228 R229 R302	1K
16	8		R262 R261 R263 R264 R265 R266 R267 R268	47
17	2		R269 R114	220
18	9		R57 R58 R59 R60 R61R252 R253 R256 R270 R49	4.7K
19	11		R271 R56 R55 R54 R53 R52 R51 R50 R255 R300	10K
20	2		R117 R272	330
21	9		U6 U4 U18 U2 U1 U200 U3 U201 U206	HCT273
22	1		RESET	DO NOT STUFF
23	1		R219	1/4W 1K
24	2		R218 R216	1/2W 1.5K
25	8		F24 F25 F26 F27 F8 F9 F7 F21	S.B. 5A
26	1		F6	S.B. 7A
27	1		F23	S.B. 4A
28	1		F22	S.B. 8A
29	2		F20 F28	S.B. 3A
30	1		J15	9PKK156 (PIN 5=KEY)
31	1		J16	15PKK156
32	1		U210	DS1232
33	1		Q200	2N3904
34	1		C32	25V 100uF RADIAL LYTIC
35	1		J1	20 PIN 0.1 DUAL ROW HEADER
36	2		U202 U203	HC245
37	10		Q41 Q33 Q34 Q35 Q36 Q37 Q38 Q39 Q40 Q42	19N06L
38	6		L203 L202 L204 L200 L2 L201	RED LED
39	1		J2	10PKK156 (PIN 4=KEY)
40	1		R116	50 OHM POT
41	16		Q23 Q22 Q21 Q20 Q19 Q18 Q26 Q27 Q28 Q29 Q30 Q31 Q32 Q17 Q25 Q24	TIP122
42	1		C25	150V 100uF RADIAL LYTIC
43	1		U9	74LS245
44	1		C29	35V 4700uF RADIAL LYTIC
45	1		RELAY	FRL264D024/02CK RELAY
46	1		J5	9PKK156 (PIN 7=KEY)
47	1		U209	74LS74
48	1		J4	9PKK156 (PIN 8=KEY)
49	2		U204 U205	74LS138
50	1		C26	500V .1UF CERAMIC DISK
51	1		U19	LM338K
52	5		BRDG20 BRDG3 BRDG1 BRDG2 BRDG21	DB3501
53	5		C202 C203 C201 C30 C27	25V 15000uF RADIAL LYTIC
54	25		D208 D225 D226 D221D220 D223 D227 D224 D222 D200 D201 D202 D203 D204 D205 D206 D207 D209 D210 D211 D212 D213 D214 D215 D228	1N4148
55	3		D217 D216 D229	1N4004
56	2		TPL3 TPL1	TEST POINT LOOPS
57	1		J7	10PKK156 (PIN 5=KEY)
58	1		J6	10PKK156 (PIN 9=KEY)
59	8		U17 U16 U15 U14 U13 U12 U11 U10	VN02N
60	1		J11	10-84-4030 (3 PIN MOLEX)
61	1		J12	12PKK156 (PIN 7=KEY)
62	1		J17	10-84-4090 (9 PIN MOLEX)
63	1		BLANKING	TEST POINT - DO NOT STUFF
64	1		R217	2W 4.7K SANDBAR
65	1		J13	10PKK156 (PIN 2=KEY)
66	1		J14	10-84-4060 (6 PIN MOLEX)
67	1		J10	10PKK156 (PIN 6=KEY)
68	1		J3	12PKK156 (PIN 8=KEY)
69	1		J9	9PKK156 (PIN 3=KEY)
70	1		J8	9PKK156 (PIN 2=KEY)
71	26			FUSECLIPS
72	1		U19	HEATSINK

CPU Section:

The CPU is a 68B09E (U209) with up to 8Mbytes of CPU code space (U210). The CPU code is bank selected by the use of U211and each bank consists of 16Kbytes. 8Kbytes of RAM (U212) is available to the CPU. The RAM is battery backed and has a write protected area. Battery back up is accomplished by 3-AA Cells which have a test point VB to check the battery voltage status. The write protected area consists of 512 Bytes used for storing game settings. This section of RAM can only be written to when the coin door is open. The coin door switch comes into the CPU on CN6-12 and is fed into the address decoding PAL U213. When this memory protect signal is low writes to the protected RAM area are prohibited. Address decoding for the system is accomplished by one PAL U213 and one 1-of-8 decoder U214.

A watchdog is used to monitor the CPU and the 5V supply. If the 5V supply is below 4.75 the watchdog will hold the CPU board & I/O board in reset. The watchdog must be fed at a rate of 250ms or faster. The signal used to feed the watchdog comes from the EPROM bank select signal used to load U211. The CPU has a timer interrupt used as a heartbeat for the system this signal comes from counter U2. The clock for this counter is the CPU Q clock. Clearing the timer interrupt is done by reading the DIP switch. The timer interrupt can be observed at test point FIRQ. In normal operation "FIRQ" should be toggling at a rate of 976Hz.

The I/O interface CN1 is buffered by 2 HC245 chips. The CPU's reset line is buffered by Q10 and fed over to the I/O through CN1. An I/O strobe signal is feed through CN1-15 and is used to notify the I/O that a valid address is being sent.

Switches:

The switch-matrix consists of 8 2N3904 transistors which pull one of eight stobes low to activate a single column of switches. The switch return signals are fed into CN7 and are highly filtered and compared to a 2.5V reference voltage. The switch return voltage must be below 2.5V to make a valid switch closer. If false switches are appearing check that none of the 2N3904 transistors are permanently pulling the strobe line low. Only one strobe from CN5 should be low at any time. CN6 is a dedicated bank of input switches. Switches connected to CN6 are connected to ground instead of a strobe and may be read at any time.

Plasma Interface:

The data path for communication to and from the plasma controller is 8bits wide. There are separate input and output busses. The input bus from the plasma controller to the CPU comes in on [CN8-(3-10)] and is fed into U200 for input to the CPU's data bus. Data going out to the controller comes from the CPU's data bus through U201 and onto [CN8-(11-18)]. Status back from the plasma comes in on [CN8-(22-26)]and is fed into U202 for input to the CPU's data bus. Two control signals that go out to the plasma controller are PRES (Plasma Reset) and PSTB (Plasma Strobe). Plasma Reset is software controllable through U216/B and also has a test point "Plasma Reset". The Plasma Strobe signal to the controller is generated from U216/A and is used to latch data into the plasma controller.

Sound Section:

The audio section consists of a BSMT sound chip U9 Sound EPROMs (U17 U21 U36 U37) 68B09E U6 and Sound Code EPROM U7. The BSMT latches sound EPROM addresses in U13 & U12 for output to the Sound EPROMs. Sound Data from the EPROMs is read through U19 to the BSMT. The EPROMs are bank selected by U22. When the BSMT has sound data to be played out to the speakers it loads 16 bits into a 16 bit shift register made up of U24 & U23. The data stream from the shift register is serially shifted into a stereo 16 bit Digital to Analog Converter (DAC). When the system is operating properly the ws(word select) input of the DAC will be toggling. The ws input is used to latch the right and left channel sound data into the DAC. If the ws line is not oscillating no analog signal will come out of the DAC. The DAC outputs are a controlled current source. These outputs are converted to a voltage by an operational amplifier U30 to form the analog signal. Test points AOR and AOL are the outputs of the operational amplifier. These outputs are then fed directly into three power amplifiers (TDA2030A) or optionally into an analog volume control chip U35 for a potentiometer volume control. The analog section has its own +5V & -5V derived from VR1 & VR2. These separate supply voltages are for the DAC U26 Operational Amplifier U30 and analog volume control U35.

Sound calls are made from the CPU's 68B09E U200 to the sound section by latching data into U5. The sound section's CPU 68BO9E (U6) reads in this data and handles the interfacing to the BSMT.

Other Test Points:

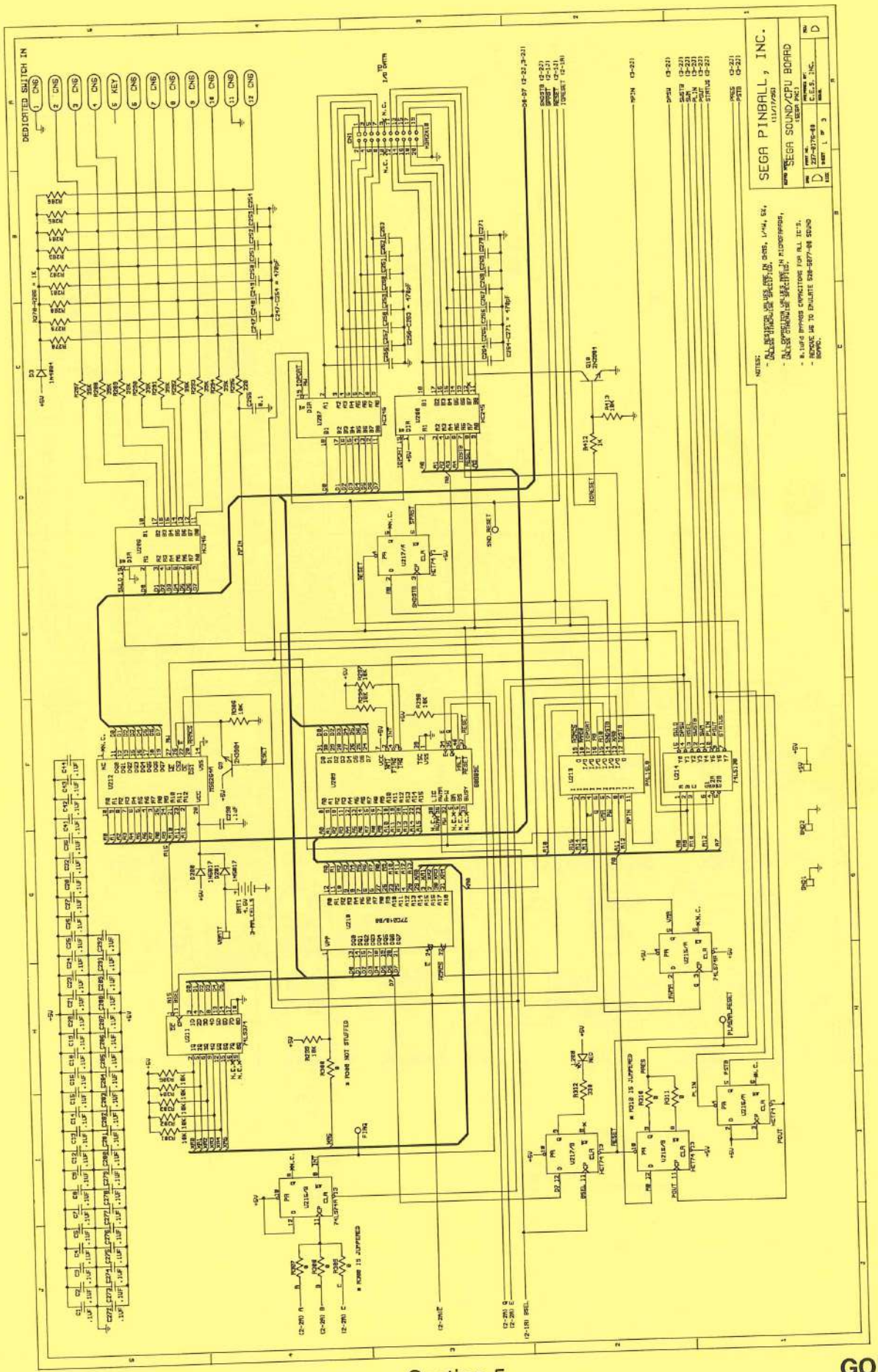
E & Q - The CPU signals for both 68B09E processors. Should be at 2Mhz with Q leading E by 500 nsec.

24Mhz - The oscillator used for the BSMT & derivation of E & Q.

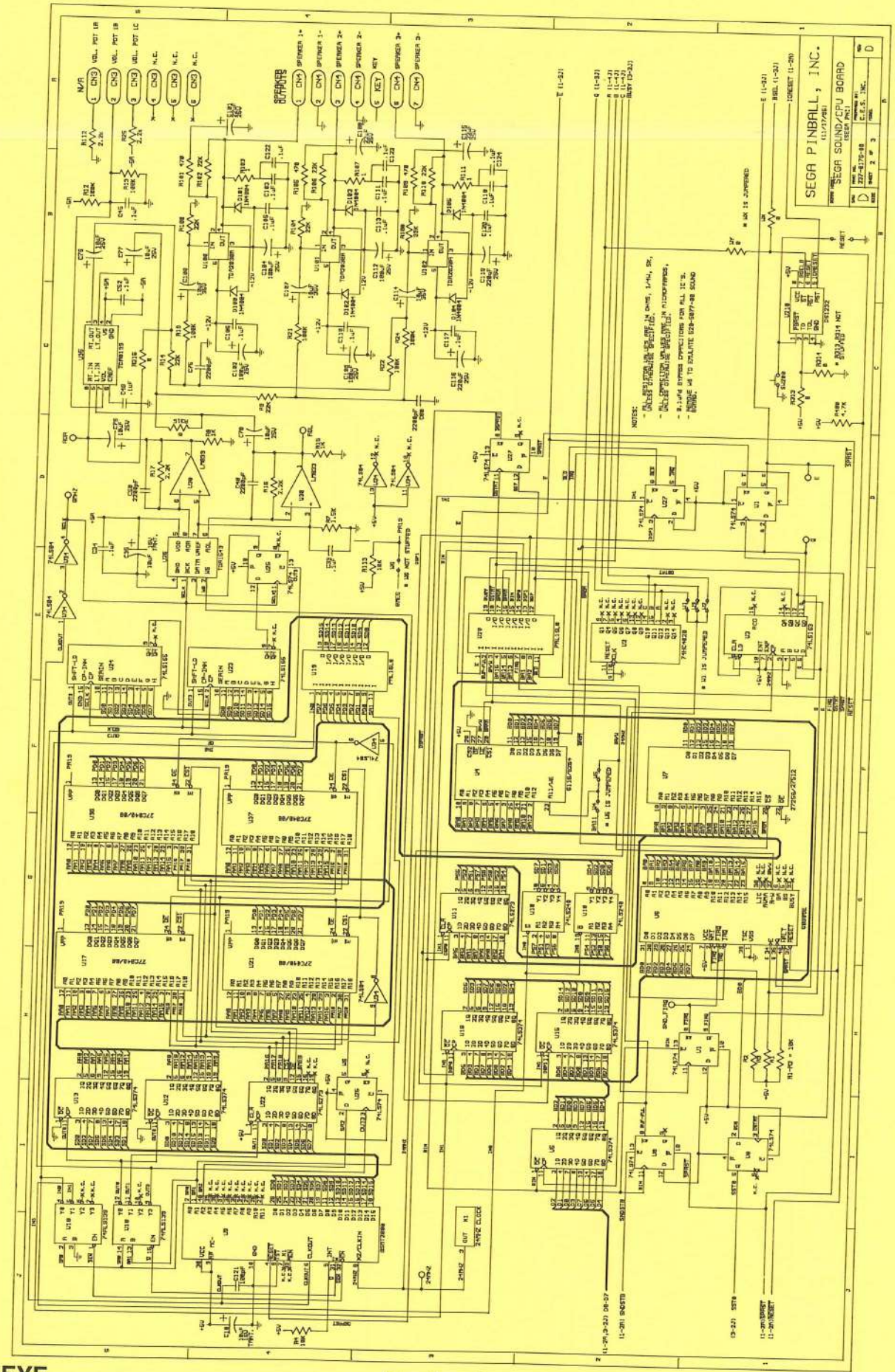
SND-FIRQ - The sound sections CPU interupt.

6Mhz - This clock is generated internally on the BSMT and is used for shifting the data samples into th DAC.

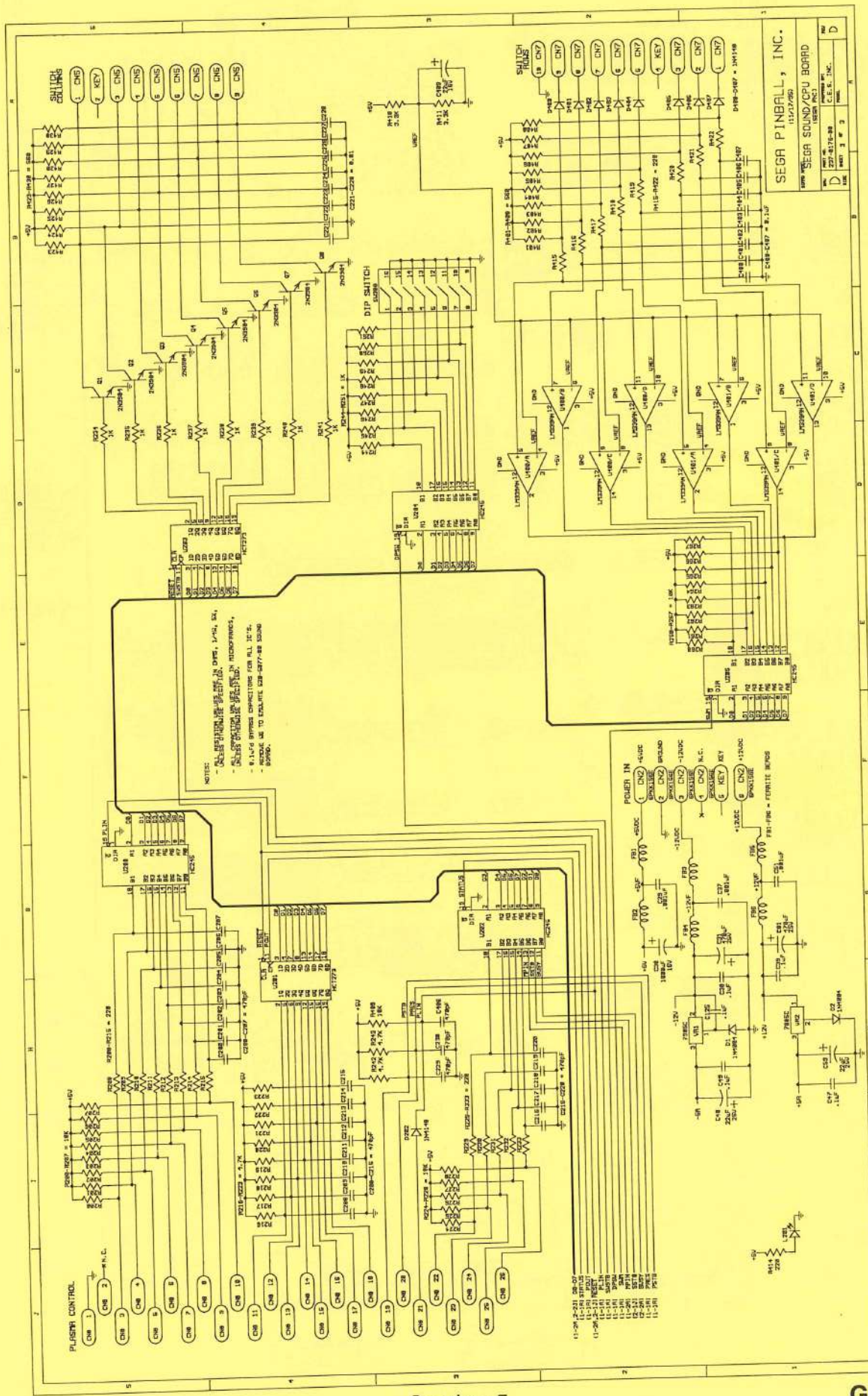
CPU/Sound Board Schematic (Sheet 1 of 3)



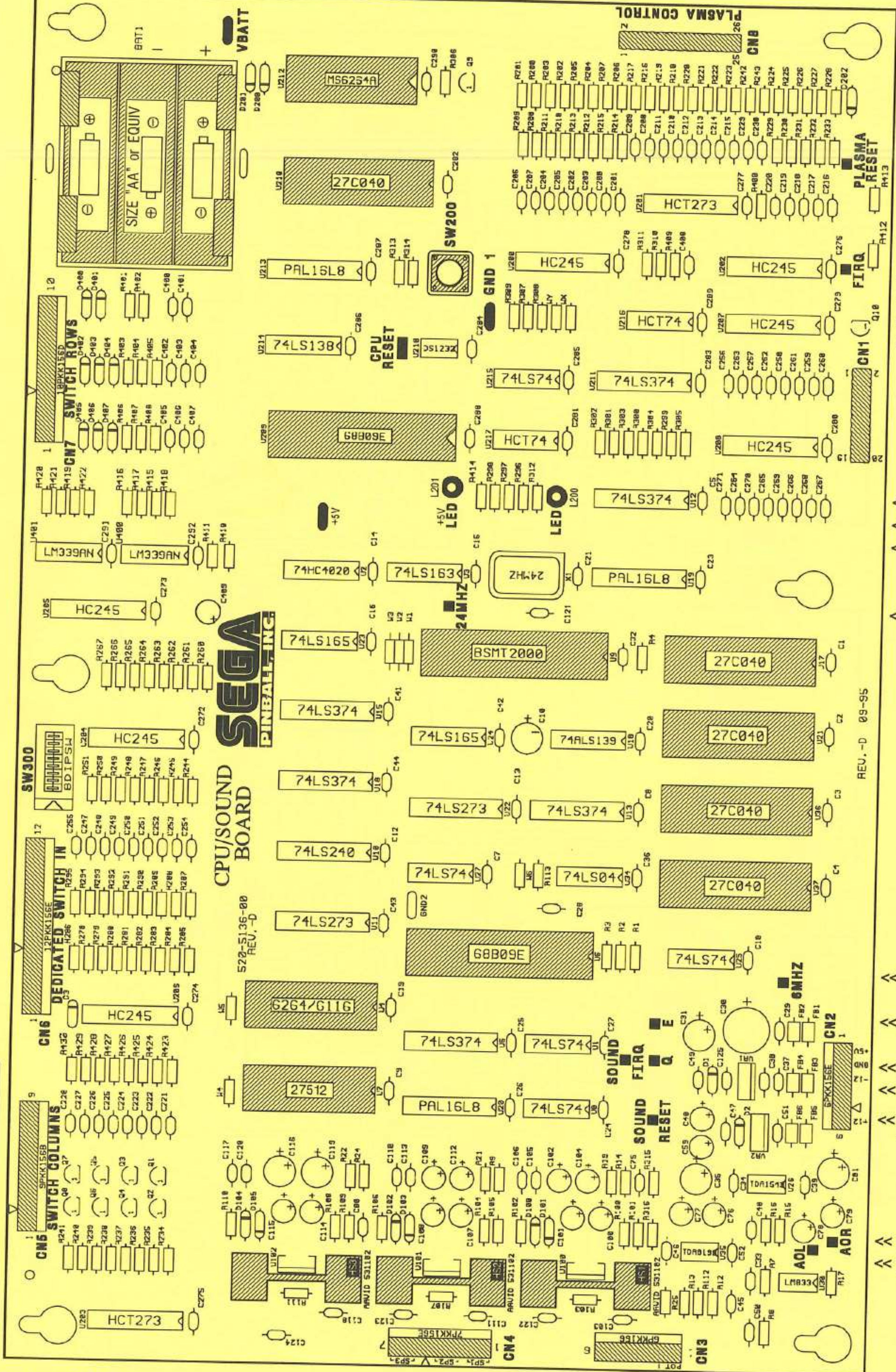
CPU/Sound Board Schematic (Sheet 2 of 3)



CPU/Sound Board Schematic (Sheet 3 of 3)



CPU/Sound Board Component Layout



TEST POINTS:

- << VBATT
- << PLASMA RESET
- << FIRQ
- << SW200 POT
- << GROUND 1
- << CPU RESET
- << L201 LED+5v
- << L200 LED
- << +5v
- << 24 Mhz
- << 6 Mhz
- << E
- << SOUND FIRQ
- << Q
- << SOUND RESET
- << AOR
- << AOL

Section 5 | PCBs

CPU/Sound Board Parts

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
1	1	Note:	VR2	7805
2	6		R13 R24 R21 R12 R19 R22	100K
3	3	Part Numbers	R111 R103 R107	1
4	46	are not yet available.	R4 R3 R2 R1 R113 R306 R301 R302 R303 R305 R304 R299 R296 R298 R297 R247 R248 R249 R251 R250 R246 R245 R244 R266 R267 R265 R264 R263 R228 R227 R226 R225 R224 R200 R201 R202 R203 R204 R205 R206 R207 R262 R261 R260 R409 R413	10K
5	7		R14 R104 R110 R102 R100 R106 R9	22K
6	20		R15 R8 R241 R240 R239 R238 R237 R236 R235 R234 R278 R279 R280 R281 R282 R283 R285 R286 R284 R412	1K
7	4		R25 R17 R16 R112	2.2K
8	1		R7	1.5K
9	3		R105 R101 R109	R470
10	9		R108 R294 R293 R292 R291 R290 R289 R288 R287	39K
11	1		R312	330
12	12		R311 R310 R307 R309 R308 R300 R313 R316 R315 R314 WX WY	0
13	23		R295 R229 R230 R231 R232 R233 R215 R214 R213 R212 R211 R210 R209 R208 R414 R422 R421 R420 R419 R418 R417 R416 R415	220
14	11		R223 R222 R221 R220 R219 R218 R217 R216 R243 R242 R400	4.7K
15	16		R408 R407 R406 R405 R404 R403 R402 R401 R430 R429 R428 R427 R426 R425 R424 R423	560
16	2		R411 R410	3.3K
17	1		U3	74LS163
18	1		U7	27512
19	1		CN4	7PKK156 (PIN5=KEY)
20	1		RESET	DO NOT STUFF
21	5		U37 U36 U21 U17 U210	27C040
22	2		U24 U23	74LS165
23	4		C76 C78 C79 C77	25V 10uF RADIAL LYTIC
24	5		C59 C101 C108 C115 C40	25V 22uF RADIAL LYTIC
25	3		C100 C107 C114	35V 10uF RADIAL LYTIC
26	4		C102 C104 C109 C112	25V 100uF RADIAL LYTIC
27	1		C409	16V 22uF RADILA LYTIC
28	1		U35	TDA1899
29	1		C30	16V 1000uF RADIAL LYTIC
30	1		U34	74LS04
31	1		U18	74ALS139
32	6		U16 U12 U13 U15 U211U5	74LS374
33	1		U2	74HC4020
34	1		U10	74LS240
35	6		W2 W3 W1 W4 W5 W6	0
36	2		C81 C31	25V 470uF RADIAL LYTIC
37	2		C10 C35	16V 10uF RADIAL TANT.
38	2		C116 C119	25V 220uF RADIAL LYTIC
39	1		CN2	6PKK156 (PIN 5=KEY)
40	1		X1	24MHZ
41	1		U9	TMS32010
42	3		U19 U20 U213	PAL16L8
43	5		U27 U1 U25 U8 U215	74LS74
44	3		C29 C37 C51	102 (0.001uF)
45	81		C2 C12 C13 C14 C15 C20 C1 C42 C24 C32 C28 C43 C16 C103 C23 C27 C52 C36 C21 C26 C39 C47 C105 C120 C44 C46 C34 C25 C4 C19 C8 C41 C49 C3 C33 C9 C38 C18 C106 C45 C7 C118 C110 C122 C124 C113 C123 C5 C117 C111 C125 C290 C289 C288 C287 C286 C285 C284 C283 C282 C281 C280 C279 C278 C277 C276 C275 C273 C272 C255 C274 C292 C291 C407 C406 C405 C404 C400 C403 C401 C402	104 (0.1uF)
46	1		C121	101 (100pF)
47	4		C48 C50 C75 C80	222 (0.0022uF)
48	48		C270 C269 C268 C267 C271 C265 C266 C262 C261 C260 C259 C263 C256 C257 C258 C249 C248 C247 C254 C250 C251 C252 C220 C219 C218 C217 C216 C215 C213 C212 C211 C210 C209 C208 C200 C201 C202 C203 C205 C206 C207 C230 C229 C253 C214 C204 C264 C408	471 (470pF)
49	8		C221 C222 C223 C225 C226 C227 C228 C224	103 (0.01uF)
50	1		CN3	6PKK156
51	1		U30	LM833
52	2		U22 U11	74LS273
53	9		D1 D100 D2 D103 D104 D101 D105 D102 D3	1N4004
54	2		D201 D200	1N5817
55	9		D407 D406 D405 D404 D403 D402 D401 D400 D202	1N4148
56	6		FB6 FB4 FB5 FB2 FB1 FB3	FB
57	1		VR1	7905
58	3		U102 U100 U101	TDA2030V
59	1		U26	TDA1543
60	1		SW200	B3F4000

THIS PARTS LIST IS CONTINUED ON THE NEXT PAGE.

CPU/Sound Board Parts Continued

ITEM	QTY	PART NUMBER	REF-DESIGNATOR	DESCRIPTION
61	1	Note:	L200	RED LED
62	1		L201	RED LED
63	2	Part Numbers	U217 U216	HCT74
64	1	are not yet	U214	74LS138
65	1	available.	U212	MS6264A
66	1		U209 U6	68B09E
67	1		BAT1 BATTERY HOLDER	3-AA CELLS 4.5V
68	1		CN1	20 PIN 0.1 HEADER
69	10		6MHZ AOR Q AOL 24MHZ	TEST POINTS - DO NOT STUFF
70	10		Q9 Q3 Q4 Q5 Q6 Q7 Q8 Q1 Q2 Q10	2N3904
71	1		CN5	9PKK156 (PIN 2=KEY)
72	2		U201 U203	HCT273
73	7		U207 U206 U202 U200 U205 U208 U204	HC245
74	1		U218	DS1232
75	1		CN8	26 PIN 0.1 HEADER
76	1		CN7	10PKK156 (PIN 4=KEY)
77	4		VBATT +5V GND2 GND1	TEST POINT LOOPS
78	1		CN6	12PKK156 (PIN 5=KEY)
79	1		SW300	8 PIN DIPSWITCH
80	2		U401 U400	LM339AN
81	1		U4	6264
82	3		U100 U101 U102	AAVID 531102

Your Notes

Appendixes A through H

Appendix
Table of Contents

APPENDIX A
Pinball Game Firmware Table

EPROM	Chip Size	Part Nº	Ver.	Loc.	Raw Part Nº
Laser War					
CPU	(256K)	965-0004-00		C5	960-5007-00
Sound (Old)	(256K)	965-0005-00		J5	960-5007-00
Sound (Old)	(256K)	965-0006-00		J6	960-5007-00
Sound (Old)	(256K)	965-0007-00		J7	960-5007-00
		- OR -			
Sound	(256K)	965-0008-00		7F	960-5007-00
Sound 1	(512K)	965-0009-00		6F	960-7001-02
Sound 2	(512K)	965-0010-00		4F	960-7001-02
Secret Service					
CPU	(256K)	965-0011-00	A-6	B5	960-5007-00
CPU	(256K)	965-0012-00	A-6	C5	960-5007-00
Voice 1	(512K)	965-0014-00		6F	960-7001-02
Voice 2	(512K)	965-0015-00		4F	960-7001-02
Sound	(256K)	965-0013-00		7F	960-5007-00
Torpedo Alley					
CPU	(256K)	965-0016-00	A02-1	B5	960-5007-00
CPU	(256K)	965-0017-00	A02-1	C5	960-5007-00
Voice 1	(512K)	965-0019-00		6F	960-7001-02
Voice 2	(512K)	965-0020-00		4F	960-7001-02
Sound	(256K)	965-0018-00		7F	960-5007-00
Time Machine					
CPU	(256K)	965-0021-00	A02-3	B5	960-5007-00
CPU	(256K)	965-0022-00	A02-3	C5	960-5007-00
Voice 1	(512K)	965-0024-00		6F	960-7001-02
Voice 2	(512K)	965-0025-00		4F	960-7001-02
Sound	(256K)	965-0023-00		7F	960-5007-00
Playboy 35th Anniversary					
CPU	(256K)	965-0046-00	A02-3	B5	960-5007-00
CPU	(256K)	965-0047-00	A02-3	C5	960-5007-00
Voice 1	(512K)	965-0049-00		6F	960-7001-02
Voice 2	(512K)	965-0050-00		4F	960-7001-02
Sound	(256K)	965-0048-00		7F	960-5007-00
ABC Monday Night Football					
CPU	(256K)	965-0031-00	A02-7	B5	960-5007-00
CPU	(256K)	965-0032-00	A02-7	C5	960-5007-00
Voice 1	(512K)	965-0034-00		6F	960-7001-02
Voice 2	(512K)	965-0035-00		4F	960-7001-02
Sound	(256K)	965-0033-00		7F	960-5007-00
Robocop					
CPU	(256K)	965-0036-00	A03-4	B5	960-5007-00
CPU	(256K)	965-0037-00	A03-4	C5	960-5007-00
Voice 1	(512K)	965-0039-00		6F	960-7001-02
Voice 2	(512K)	965-0040-00		4F	960-7001-02
Sound	(256K)	965-0038-00		7F	960-5007-00
Phantom of the Opera					
CPU	(256K)	965-0026-00	A03-2	B5	960-5007-00
CPU	(256K)	965-0027-00	A03-2	C5	960-5007-00
Voice 1	(512K)	965-0029-00		6F	960-7001-02
Voice 2	(512K)	965-0030-00		4F	960-7001-02
Sound	(256K)	965-0028-00		7F	960-5007-00
Back to the Future					
CPU	(256K)	965-0041-00	SA-2	B5	960-5007-00
CPU	(256K)	965-0042-00	SA-2	C5	960-5007-00
Voice 1	(512K)	965-0044-00		6F	960-7001-02
Voice 2	(512K)	965-0045-00		4F	960-7001-02
Sound	(256K)	965-0043-00		7F	960-5007-00
The Simpsons					
CPU	(256K)	965-0051-00	A02-7	B5	960-5007-00
CPU	(256K)	965-0052-00	A02-7	C5	960-5007-00
Voice 1	(512K)	965-0054-00		6F	960-7001-02
Voice 2	(512K)	965-0055-00		4F	960-7001-02
Sound	(256K)	965-0053-00		7F	960-5007-00
Checkpoint					
CPU	(256K)	965-0056-00	A1-7	B5	960-5007-00
CPU	(256K)	965-0134-00	A1-7	C5	960-5007-00
Voice 1	(1M)	965-0057-00		F7	960-5009-00
Voice 2	(1M)	965-0058-00		F5	960-5009-00
Sound	(256K)	965-0059-00		F4	960-5007-00
Display	(512K)	965-0060-00	CP80	U8	960-7001-02
Teenage Mutant Ninja Turtles					
CPU	(256K)	965-0061-00	A1.04	B5	960-5007-00
CPU	(256K)	965-0062-00	A1.04	C5	960-5007-00
Voice 1	(1M)	965-0063-00		F5/6	960-5009-00
Voice 2	(1M)	965-0064-00		F4/5	960-5009-00
Sound	(256K)	965-0065-00		F7	960-5007-00
Display	(512K)	965-0066-00		U8	960-7001-02
Batman					
CPU	(128K)	965-0067-00	A1.06	B5	960-5006-00
CPU	(256K)	965-0135-00	A1.06	C5	960-5007-00
Voice 1	(2M)	965-0068-00		U17	960-5010-00
Voice 2	(1M)	965-0069-00		U21	960-5009-00
Sound	(256K)	965-0070-00		U7	960-5007-00
Display	(1M)	965-0071-00	A1.02	U8	960-5009-00
Star Trek 25th Anniversary					
CPU	(512K)	965-0072-00	A2.00	B5	960-7001-02
Voice 1	(2M)	965-0073-00		U17	960-5010-00
Voice 2	(2M)	965-0074-00		U21	960-5010-00
Sound	(256K)	965-0075-00		U7	960-5007-00
Display	(1M)	965-0076-00	A1.09	U8	960-5009-00
Hook					
CPU	(512K)	965-0077-00	A4.08	C5	960-7001-02
Voice 1	(2M)	965-0078-00		U17	960-5010-00
Voice 2	(2M)	965-0079-00		U21	960-5010-00
Sound	(256K)	965-0080-00		U7	960-5007-00
Display	(1M)	965-0081-00	A4.01	U8	960-5009-00
Lethal Weapon 3					
CPU	(512K)	965-0082-00	A2.07	C5	960-7001-02
Voice 1	(2M)	965-0083-00		U17	960-5010-00
Voice 2	(2M)	965-0084-00		U21	960-5010-00
Sound	(256K)	965-0085-00		U7	960-5007-00
Display	(2M)	965-0086-00		ROM 1	960-5010-00
Display	(2M)	965-0087-00		ROM 2	960-5010-00
Display	(4M)	965-0087-04	A2.06	ROM 0	960-5015-00
Star Wars					
CPU	(512K)	965-0119-00	A1.03	C5	960-7001-02
Voice 0	(4M)	965-0132-00		U17	960-5015-00
Voice 1	(2M)	965-0133-00		U21	960-5010-00
Sound	(256K)	965-0131-00		U7	960-5007-00
Display	(2M)	965-0120-00	A1.04	ROM 0	960-5010-00
Display	(2M)	965-0121-00	A1.04	ROM 1	960-5010-00
	(Used on Display PCB 520-5055-00)				
		-OR-			
Display	(4M)	965-0122-00	A1.05	ROM 0	960-5015-00
	(Used on Display PCB 520-5055-01)				
Rocky & Bullwinkle & Friends					
CPU	(512K)	965-0138-00	A1.30	C5	960-7001-02
Voice 0	(4M)	965-0139-00		U17	960-5015-00
Voice 1	(2M)	965-0140-00		U21	960-5010-00
Sound	(256K)	965-0141-00		U7	960-5007-00
Display	(4M)	965-0142-00	A1.30	ROM 0	960-5015-00
Jurassic Park					
CPU	(512K)	965-0143-00	A5.10	C5	960-7001-02
Voice 0	(4M)	965-0144-00		U17	960-5015-00
Voice 1	(2M)	965-0145-00		U21	960-5010-00
Sound	(256K)	965-0146-00		U7	960-5007-00
Display	(4M)	965-0147-00	A5.10	ROM 0	960-5015-00
Last Action Hero					
CPU	(512K)	965-0148-00	A1.12	C5	960-7001-02
Voice 0	(4M)	965-0149-00		U17	960-5015-00
Voice 1	(2M)	965-0150-00		U21	960-5010-00
Sound	(256K)	965-0151-00		U7	960-5007-00
Display	(4M)	965-0152-00	A1.06	ROM 0	960-5015-00
Tales from the Crypt					
CPU	(512K)	965-0157-00	A3.00	C5	960-7001-02
Voice 0	(4M)	965-0158-00		U17	960-5015-00
Voice 1	(2M)	965-0159-00		U21	960-5010-00
Sound	(256K)	965-0160-00		U7	960-5007-00
Display	(4M)	965-0161-00	A3.00	ROM 0	960-5015-00

Table Notes:
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The version stated is USA. If there is a question of what revision number any particular ROM is and the next game manual(s) are not available, call our Technical Support Department.

Table continued on the next page.

APPENDIX A
Pinball Game Firmware Table

EPROM	Chip Size	Part Nº	Ver.	Loc.	Raw Part Nº
The Who's Tommy					
CPU	(512K)	965-0162-00	A4.00	C5	960-7001-02
Voice 1	(4M)	965-0165-00		U17	960-5015-00
Voice 2	(4M)	965-0166-00		U21	960-5015-00
Voice 3	(4M)	965-0167-00		U36	960-5015-00
Voice 4	(4M)	965-0168-00		U37	960-5015-00
Sound	(512K)	965-0164-00		U7	960-7001-02
Display	(4M)	965-0163-00	A4.00	ROM 0	960-5015-00
WWF Royal Rumble					
CPU	(512K)	965-0169-00	A1.06	C5	960-7001-02
Voice 1	(4M)	965-0172-00		U17	960-5015-00
Voice 2	(4M)	965-0173-00		U21	960-5015-00
Voice 3	(4M)	965-0174-00		U36	960-5015-00
Sound	(512K)	965-0171-00		U7	960-7001-02
Display	(4M)	965-0170-00	A1.02	ROM 0	960-5015-00
Guns N' Roses					
CPU	(512K)	965-0175-00	A3.00	C5	960-7001-02
Voice 1	(4M)	965-0178-00		U17	960-5015-00
Voice 2	(4M)	965-0179-00		U21	960-5015-00
Voice 3	(4M)	965-0180-00		U36	960-5015-00
Voice 4	(4M)	965-0181-00		U37	960-5015-00
Sound	(512K)	965-0177-00		U7	960-7001-02
Display	(4M)	965-0176-00	A3.00	ROM 0	960-5015-00
Maverick					
CPU	(512K)	965-0182-00	A4.04	C5	960-7001-02
Voice 1	(4M)	965-0186-00		U17	960-5015-00
Voice 2	(4M)	965-0187-00		U21	960-5015-00
Voice 3	(4M)	965-0187-01		U36	960-5015-00
Sound	(512K)	965-0185-00		U7	960-7001-02
Display*	(4M)	965-0183-00	A4.01	ROM 0	960-5015-00
Display*	(4M)	965-0184-00	A4.01	ROM 3	960-5015-00
Mary Shelley's Frankenstein					
CPU	(512K)	965-0188-00	A1.03	C5	960-7001-02
Voice 1	(4M)	965-0192-00		U17	960-5015-00
Voice 2	(4M)	965-0193-00		U21	960-5015-00
Voice 3	(4M)	965-0194-00		U36	960-5015-00
Sound	(512K)	965-0191-00		U7	960-7001-02
Display*	(4M)	965-0189-00	A1.03	ROM 0	960-5015-00
Display*	(4M)	965-0190-00	A1.03	ROM 3	960-5015-00
Baywatch					
CPU	(512K)	965-0195-00	A4.01	C5	960-7001-02
Voice 1	(4M)	965-0196-00		U17	960-5015-00
Voice 2	(4M)	965-0197-00		U21	960-5015-00
Voice 3	(Correction Note: 2M/U36 was not used in this game.)				
Sound	(512K)	965-0199-00		U7	960-7001-02
Display*	(4M)	965-0200-00	A4.01	ROM 0	960-5015-00
Display*	(4M)	965-0201-00	A4.01	ROM 3	960-5015-00
Batman Forever					
CPU	(512K)	965-0202-00	A3.02	C5	960-7001-02
Voice 1	(4M)	965-0203-00		U17	960-5015-00
Voice 2	(4M)	965-0204-00		U21	960-5015-00
Sound	(512K)	965-0205-00		U7	960-7001-02
Display*	(4M)	965-0206-00	A3.00	ROM 0	960-5015-00
Display*	(4M)	965-0207-00	A3.00	ROM 3	960-5015-00

New Board System Starts Here

ROM	Chip Size	Part Nº	Ver.	Loc.	Raw Part Nº
Apollo 13					
CPU / Sound Board:					
Game ROM	(1M)	965-0208-00	A4.00	U210	960-5009-00
Voice 1	(4M)	965-0209-00		U17	n/a (masked)
Voice 2	(4M)	965-0210-00		U21	n/a (masked)
Voice 3	(4M)	965-0211-00		U36	n/a (masked)
Sound	(512K)	965-0212-00		U7	960-7001-02
Display Controller Board:					
Display	(4M)	965-0213-00	A4.01	ROM 0	960-5015-00

ROM	Chip Size	Part Nº	Ver.	Loc.	Raw Part Nº
Golden Eye					
CPU / Sound Board:					
Game ROM	(1M)	965-0214-42	IN PRODUCTION	U210	960-5009-00
Voice 1	(4M)	965-0215-42		U17	n/a (masked)
Voice 2	(4M)	965-0216-42		U21	n/a (masked)
Sound	(512K)	965-0217-42		U7	960-7001-02
Display Controller Board:					
Display	(4M)	965-0218-42		ROM 0	960-5015-00

*** Note: Display EPROMS (4M) for Maverick thru Batman Forever require an access time of 120 Nsec or faster.**

Table Notes:
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APPENDIX B
Semi-Conductors / Integrated Circuits / Relays Cross-Reference Table

Table 1 Diodes	Source №	SEGA PINBALL™ Part №	NTE №	ECG №	Radio Shack ® Part №	RCA ® Part №
Rectification, Blocking and/or Dampening						
Diode	1N4001	112-5001-00	NTE552	ECG552	- — - — -	SK9000
Diode	1N4004	112-5003-00	NTE116	ECG116	276-1103	SK3312
Diode	1N5401	112-0056-00	NTE5801	ECG5801	276-1143	SK9004
Diode	1N5404	112-5004-00	NTE5804	ECG5804	276-1144	SK9007

Table 2 Diodes	Source №	SEGA PINBALL™ Part №	NTE №	ECG №	Radio Shack ® Part №	RCA ® Part №
Zener						
Diode	1N4742A 12v	112-0061-00	NTE142A	ECG142A	276-563	SK12V
Diode	1N4760B 68v	112-0062-00	NTE5092A	ECG5092A	- — - — -	SK68V
Diode	1N4764 100v	112-0049-00	NTE5096A	ECG5096A	- — - — -	SK100V
Diode	1N5228 3.9v	112-0053-00	NTE5007A	ECG5007A	- — - — -	SK3A9
Diode	1N5234B 6.2v	112-0047-00	NTE5013A	ECG5013A	276-561	SK6A2
Diode	1N5379 110v	112-0072-00	NTE5157	ECG5157	- — - — -	SK110X

Table 3 Bridge Rectifiers	Source №	SEGA PINBALL™ Part №	Comments
Bridge Rectifier	CM3501	112-0052-00	35 Amp @ 100v P.I.V.
Bridge Rectifier	MDA2501	112-0054-00	25 Amp @ 100v P.I.V.
Bridge Rectifier	MDA3502	112-0057-00	35 Amp @ 200v P.I.V.

Table 4 Transistors	Source №	SEGA PINBALL™ Part №	NTE №	ECG №	Radio Shack ® Part №	RCA ® Part №
Transistor	2N4401	- — - — -	NTE85	ECG85	276-2009	SK3124A
Transistor	2N5060, SCR	110-0074-00	NTE5400	ECG5400	276-1067	SK3950
Transistor	2N5401	110-0078-00	NTE288	ECG288	- — - — -	SK3434
Transistor	2N6427	110-0070-00	NTE48	ECG48	- — - — -	SK4906
Transistor	MJE15031	110-0103-00	NTE375	ECG375	- — - — -	SK9118
Transistor	MJE340	110-0071-00	NTE157	ECG157	- — - — -	SK3747
Transistor	MJE350	110-0072-00	NTE374	ECG374	- — - — -	SK9042
Transistor	MPSA92	110-0100-00	NTE288	ECG278	- — - — -	SK3434
Transistor	MPSA42	110-0082-00	NTE287	ECG287	- — - — -	SK3232
Transistor	NPN, 2N3904	110-0069-00	NTE85	ECG85	276-2009	SK3124A
Transistor	NPN, TIP122	110-0067-00	NTE261	ECG261	276-2068	SK3896
Transistor	PNP, TIP42	110-0068-00	NTE332	ECG332	- — - — -	SK9236
Transistor	TIP32C	110-0071-00	NTE292	ECG292	- — - — -	SK3441
Transistor	TIP36C	110-0077-00	NTE393	ECG393	- — - — -	SK3961

Table 5 Relays	Source №	SEGA PINBALL™ Part №	Comments
PPB Relay	FRL264 P024/02CK	190-5002-00	24v DC 10 Amp DPDT
Power Supply Relay	FRL264 P024/02CK	190-5003-00	24v DC 10 Amp DPDT
CPU Relay	- — - — -	190-5001-00	6v DC 5 Amp 4 Pole

APPENDIX C
CPU Jumper Table

Game Name	Game Mfg. Date and Manual PN	CPU Ver.	EPROM Position	Jumpers Installed	Jumpers Removed
1. Laser War	MAY 87 780-5001-00	1	5C	J4 J6a J7a	J5 J6 J7b
		2	5B, 5C	J4 J5a J6a	J5 J5b J6b
2. Secret Service	MAR 88 780-5002-00	2	5B, 5C	J4	J5
3. Torpedo Alley	AUG 88 780-5003-00	2	5B, 5C	J4	J5
4. Time Machine	DEC 88 780-5004-00	2	5B, 5C	J4	J5
5. Playboy 35th Anniversary	MAY 89 780-5005-00	2	5B, 5C	J4	J5
6. ABC Monday Night Football	SEP 89 780-5007-00	2	5B, 5C	J4	J5
7. Robocop	NOV 89 780-5006-00	2	5B, 5C	J4	J5
8. Phantom of the Opera	JAN 90 780-5008-00	2	5B, 5C	J4	J5
9. Back to the Future	JUN 90 780-5009-00	3	5B, 5C	J4	J5
10. The Simpsons	SEP 90 780-5012-00	3	5B, 5C	J4	J5
11. Checkpoint	FEB 91 780-5010-00	3	5B, 5C	J4	J5
12. Teenage Mutant Ninja Turtles	MAY 91 780-5017-00	3	5B, 5C	J4	J5
13. Batman	JUL 91 780-5011-00	3	5B, 5C	J4	J5
14. Star Trek 25th Anniversary	OCT 91 780-5014-00	3	5C	J5	J4
15. Hook	JAN 92 780-5019-00	3	5C	J5	J4
16. Lethal Weapon 3	JUN 92 780-5026-00	3	5C	J5	J4
17. Star Wars	OCT 92 780-5024-00	3	5C	J5	J4
18. Rocky & Bull-winkle & Friends	FEB 93 780-5022-00	3	5C	J5	J4
19. Jurassic Park	APR 93 780-5020-00	3	5C	J5	J4
20. Last Action Hero	AUG 93 780-5027-00	3	5C	J5	J4
21. Tales from the Crypt	NOV 93 780-5018-00	3	5C	J5	J4
22. The Who's Tommy	FEB 94 780-5028-00	3	5C	J5	J4
23. WWF Royal Rumble	MAY 94 780-5023-00	3	5C	J5	J4
24. Guns N' Roses	JUL 94 780-5029-00	3	5C	J5	J4
25. Maverick	SEP 94 780-5031-00	3	5C	J5	J4
26. Mary Shelley's Frankenstein	DEC 94 780-5036-00	3	5C	J5	J4
27. Baywatch	MAR 95 780-5033-00	3	5C	J5	J4
28. Batman Forever	JUL 95 780-5038-00	3	5C	J5	J4

Game Name	Game Mfg. Date and Manual PN	CPU Ver.	ROM Position	Jumpers Installed	Jumpers Removed
29. Apollo 13	NOV 95 780-5044-00	—	U210	n / a	n / a
30. Golden Eye	FEB 96 780-5042-00	—	U210	n / a	n / a

† Additional Information for Installed / Removed Jumpers (List 1-28 only):

Board Combinations with **ROM** at Location **5C** (Game 1, Ver1) **Installed** J1b, J3, J4, J6a, **J7a** & J8 **Removed** J1a, J2, J5, **J6** & **J7b**

Board Combinations w/ **ROM** at Locations **5B, 5C** (Game 1, Ver2) **Installed** J1b, J3, J4, **J5a, J6a, J7b** & J8 **Removed** J1a, J2, J5, **J5b, J6b,** & **J7a**

Board Combinations w/ **ROM** at Locations **5B, 5C** (Games 2-12, Ver2/3) **Installed** J1b, J3, **J4, J5b, J6b,** J7b & J8 **Removed** J1a, J2, **J5, J5a, J6a** & J7a

Board Combinations with **ROM** at Locations **5C** (Games 14+, Ver3) **Installed** J1b, J3, **J5,** J5b, J6b, J7b & J8 **Removed** J1a, J2, **J4,** J5a, J6a & J7a

* Version 1 has a 2K RAM which is a 24-pin IC in Position 5D; Versions 2 & 3 have a 8K RAM which is a 28-PIN IC in Position 5D.

APPENDIX D
Board Type Table

Game Name	Flipper	Sound	Power Supply	Display X-Digit
Laser War	NO FLIPPER BOARD (NFB) 2-Flipper	***initial:*** 520-5002-00 ***replaced with:*** 520-5002-02 520-5002-01 was not used.	520-5000-00	Master: 520-5004-00 plus: 7 Digit Alpha/Numeric 520-5005-00 (Qty. 2) 7 Digit Numeric 520-5006-00 (Qty. 2) 4 Digit Numeric 520-5007-00
Secret Service	NFB 3-Flipper	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Torpedo Alley	NFB 3-Flipper	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Time Machine	NFB 2-Flipper	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
Playboy 35th Anniversary	520-5033-00 2-Flip. (for 100 games)	520-5002-02	520-5000-00	520-5014-01 7 Digit Alpha/Numeric Combined
ABC Monday Night Football	520-5033-00 2-Flip. (for 100 games)	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Robocop	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Phantom of the Opera	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
Back to the Future	520-5033-00 2-Flipper	520-5002-02	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined
The Simpsons	520-5033-00 2-Flipper	520-5002-03	520-5000-00	520-5030-00 16 Digit Alpha/Numeric Combined

Game Name	Flipper	Sound	Power Supply	Dot Matrix Display	Display Controller
Checkpoint	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16	Not Used
Teenage Mutant Ninja Turtles	520-5033-00 2-Flipper	520-5002-03	520-5047-00	520-5042-00 128 X 16	Not Used
Batman	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16	Not Used
Star Trek 25th Anniversary	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16	Not Used
Hook	520-5033-00 2-Flipper	520-5050-01	520-5047-00	520-5042-00 128 X 16	Not Used
Lethal Weapon 3	520-5033-00 2-Flipper	520-5050-01	520-5047-01	520-5052-00 128 X 32	520-5055-00
Star Wars	520-5033-00 2-Flipper	520-5050-02	520-5047-01	520-5052-00 128 X 32	520-5055-00
Rocky & Bullwinkle & Friends	520-5033-00 2-Flipper	520-5050-02	520-5047-01	520-5052-00 128 X 32	520-5055-00
Jurassic Park	520-5076-00 3-Flipper	520-5050-02	520-5047-02	520-5052-00 128 X 32	520-5055-00
Last Action Hero	520-5070-00 2-Flipper	520-5050-03	520-5047-02	520-5052-00 128 X 32	520-5055-00
Tales from the Crypt	520-5076-00 3-Flipper	520-5050-03	520-5047-02	520-5052-00 128 X 32	520-5055-01
The Who's Tommy	520-5076-00 3-Flipper	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01
WWF Royal Rumble	520-5070-00 (Qty. 2) 4-Flipper (2X2)	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01

Table continued on the next page.

APPENDIX D
Board Type Table

Game Name	Flipper	Sound	Power Supply	Dot Matrix Display	Display Controller
Guns N' Roses	520-5076-00 3-Flipper	520-5077-00	520-5047-02	520-5052-00 128 X 32	520-5055-01
Maverick	520-5076-00 3-Flipper	520-5050-03	520-5047-03	520-5075-00 192 X 64	520-5092-01
Mary Shelley's Frankenstein	520-5076-00 3-Flipper	520-5077-00	520-5047-03	520-5075-00 192 X 64	520-5092-01
Baywatch	520-5080-00 (Qty. 2) 4-Flipper (2X2)	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01
Batman Forever	520-5076-00 3-Flipper	520-5126-02	520-5047-03	520-5075-00 192 X 64	520-5092-01

NEW BOARD SYSTEM

Game Name	Flipper	I/O Power Driver	CPU / Sound	Display Power Supply	Dot Matrix Display	Display Controller
Apollo 13	520-5070-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01
Golden Eye	520-5070-00 2-Flipper	520-5137-00	520-5136-00	520-5138-00	520-5052-00 128 X 32	520-5055-01

APPENDIX E
Generic Coil Cross-Reference Guide

SEGA PINBALL™ Part Nº	Gauge-Turns	SEGA PINBALL™ Part Nº	Gauge-Turns	SEGA PINBALL™ Part Nº	Gauge-Turns	SEGA PINBALL™ Part Nº	Gauge-Turns
090-5000-00	22-700	090-5011-00	22-750	090-5020-00	Not Used	090-5030-00	23-1100
090-5001-00	23-800	090-5012-00	26-800	090-5020-01	21-900	090-5032-00	22-1080
090-5001-01	23-800	090-5013-00	23-700	090-5020-02	22-900	090-5034-00	25-1240
090-5002-00	24-900	090-5014-00	23-600	090-5020-10	21-900	090-5036-00	24-940
090-5003-00	27-1300	090-5015-00	27-1400	090-5020-20	22-900	090-5036-01	24-940
090-5004-00	27-1500	090-5016-00	29-2000	090-5020-30	23-900	090-5037-03	23½-765
090-5005-00	23-840	090-5017-00	22-500	090-5021-00	20-400		
090-5006-00	23-800	090-5018-00	23-800	090-5022-00	23-700	090-5041-00	25-1800
090-5008-00	23-1200	090-5019-00	23-750	090-5023-00	22-600	090-5046-00	28-1050
				090-5025-00	24-1570		

Flipper Coil Table

Game Name	Flipper: **Lower Right** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Lower Left** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Upper Right** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Upper Left** SEGA PINBALL™ Part Nº w/Ga.-Turns
Laser Wars	090-5011-00 22-750/30-2600	SAME AS LOWER RIGHT	Not Used	Not Used
Secret Service	090-5006-00 23-620/30-2600	SAME AS LOWER RIGHT	SAME AS LOWER RIGHT	Not Used
Torpedo Alley	090-5013-00 23-700/30-2600	090-5011-00 22-750/30-2600	090-5012-00 26-800	Not Used
Time Machine	090-5011-00 22-750/30-2600	SAME AS LOWER RIGHT	Not Used	Not Used
Playboy 35th Anniversary †	090-5020-02 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
ABC Monday Night Football †	090-5020-02 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
Robocop	090-5020-20 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
Phantom of the Opera	090-5020-20 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
Back to the Future	090-5020-20 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
The Simpsons	090-5020-20 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
Checkpoint	090-5020-20 22-900	SAME AS LOWER RIGHT	Not Used	Not Used
Teenage Mutant Ninja Turtles	090-5020-30 23-900	SAME AS LOWER RIGHT	Not Used	Not Used
Batman	090-5020-30 23-900	SAME AS LOWER RIGHT	Not Used	Not Used
Star Trek 25th Anniversary	090-5020-30 23-900	SAME AS LOWER RIGHT	Not Used	Not Used
Hook	090-5020-30 23-900	090-5030-00 23-1100	Not Used	Not Used
Lethal Weapon 3	090-5030-00 23-1100	SAME AS LOWER RIGHT	Not Used	Not Used
Star Wars	090-5032-00 22-1080	SAME AS LOWER RIGHT	Not Used	Not Used

† A very small % of these games used a 090-5020-20 coil which used a proto-type Solid State Flipper System. The two types of coils both are 22-900 coils; the only difference being the addition of the 1N5404 Diode on the (-02) coils which was used in the Deger Design.

Table continued on the next page.

APPENDIX E
Flipper Coil Table

Game Name	Flipper: **Lower Right** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Lower Left** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Upper Right** SEGA PINBALL™ Part Nº w/Ga.-Turns	Flipper: **Upper Left** SEGA PINBALL™ Part Nº w/Ga.-Turns
Rocky & Bullwinkle & Friends	090-5020-30 23-900	**SAME AS LOWER RIGHT**	Not Used	Not Used
Jurassic Park	090-5020-30 23-900	**SAME AS LOWER RIGHT**	090-5030-00 23-1100	Not Used
Last Action Hero	090-5020-30 23-900	**SAME AS LOWER RIGHT**	Not Used	Not Used
Tales from the Crypt	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	090-5041-00 25-1800	Not Used
The Who's Tommy	090-5020-30 23-900	**SAME AS LOWER RIGHT**	Not Used	090-5041-00 25-1800
WWF Royal Rumble	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	090-5041-00 25-1800	**SAME AS UPPER RIGHT**
Guns N' Roses	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	Not Used	090-5030-00 23-1100
Maverick	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	090-5032-00 22-1080	Not Used
Mary Shelley's Frankenstein	090-5030-00 23-1100	**SAME AS LOWER RIGHT**	090-5030-00 23-1100	Not Used
Baywatch	090-5020-30 23-900	090-5030-00 23-1100	**SAME AS LOWER LEFT**	090-5025-00 24-1570
Batman Forever	090-5020-20 22-900	090-5032-00 22-1080	090-5020-30 23-900	Not Used
Apollo 13	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	Not Used	Not Used
Golden Eye	090-5032-00 22-1080	**SAME AS LOWER RIGHT**	Not Used	Not Used

APPENDIX F
Motor Specification Table

Game Name	Function	Specifications	Part Nº
Laser Wars Secret Service Torpedo Alley Time Machine Playboy 35th Anniversary	No motors were used on the games listed on the shaded lines.		
ABC Monday Night Football	Goal Post Up/Down	Motor 24v A.C. 60 RPM CW	515-5222-00
Robocop			
Phantom of the Opera	Organ Up/Down	Bowman Motor 24v 60hz 3W 11 RPM CCW	515-5256-00
Back to the Future The Simpsons			
Checkpoint	Shaker	Johnson Motor (Vibrator)	041-5002-00
	Mag Wheel (in Backbox)	Motor D.C. (KEN)	041-5005-00
Teenage Mutant Ninja Turtles	Spinning Pizza Ball Deflector	Gear Motor 24v A.C. 325 RPM CW	515-5397-00
Batman	Bar Target Up/Down	Bowman Motor 24v 60hz 3W 11 RPM CCW	515-5256-00
Star Trek 25th Anniversary	Swinging Target	Bowman Motor 24v 22½ RPM	515-5534-00
	Transporter F/X	Gear Motor 24v A.C. 3.5 RPM	500-5421-00
	Cooling Fan for Transporter F/X	4½" Motor 12v	041-5014-00
Hook			
Lethal Weapon 3	Spinning Light	Motor 2.5v A.C. 4000 RPM CCW	041-5017-00
Star Wars	Bar Target Up/Down	Bowman Motor 24v 60hz 3W 11 RPM CCW	515-5256-00
	R2D2 Robot Movement	Bowman Motor 24v A.C. 22½ RPM CW	515-5571-00
	Death Star Rotation	Bowman "G" Motor 24v A.C. 60hz 6 RPM CW	515-5570-00
Rocky & Bullwinkle & Friends	Nell Log "Cutting Blade" Movement	Autotrol Model E Motor 24v 60hz 4W 3 RMP CCW	041-5023-00
Jurassic Park	Shaker	Johnson Motor Vibrator	041-5002-00
	T-Rex Left/Right Movement	Multi Motor 5v D.C.	041-5025-00
	T-Rex Up/Down Movement	Bowman Motor 24v 11 RPM CW	041-5026-00

Table Continued on the next page.

APPENDIX F
Motor Specification Table

Game Name	Function	Specifications	Part №
Last Action Hero	Crane Left/Right Movement	Multi Prod. #3312 Motor OSC 12v D.C.	041-5027-00
	Shaker	Motor Vibrator	041-5029-00
Tales from the Crypt	Shaker	Motor Vibrator	041-5029-00
	Tombstone Up/Down	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
The Who's Tommy	Mirror Up/Down	Bowman Motor 24v A.C. 6 RPM CCW	515-5900-00
	Flipper Blinders	Servo Motor	041-5032-00
	Spinning Airplane Propellers	Motor D.C.	041-5033-00
WWF Royal Rumble	Shaker	Motor Vibrator	041-5029-00
Guns N' Roses			
Maverick, The Movie	Turning Paddle Wheel	Motor 24v A.C. 10 RPM	041-5036-00
Mary Shelley's Frankenstein	Creature Head Left/Right Movement	Servo Motor	041-5032-00
Baywatch			
Batman Forever	Cannon Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
Apollo 13	Rocket Up/Down Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CCW	515-6383-00
	Moon Unit Up/Down Movement	Multi Motor 24v A.C. 50/60Hz 3W 6 RPM CCW	515-6487-00
	Shaker	Motor Vibrator	041-5029-00
Golden Eye	Satellite Left/Right Movement	Bowman Motor 24v A.C. 60Hz 3W 6 RPM CW	515-6528-00

APPENDIX G
Part Number Prefix Classification Codes

I. **ELECTRICAL SOURCE AND ENERGY AND SIGNAL CONVERTERS**
- 010- Transformers
- 031- Speakers
- 090- Solenoids

II. **CONDUCTORS, CONNECTORS AND INSULATORS**
- 034- Line Cords
- 036- Cable and Harness Assemblies
- 041- Motors
- 045- Connectors (All Types)
- 077- Lamp Sockets

III. **CIRCUITS AND CIRCUIT ELEMENTS**
- 100- ICs
- 110- Transistors
- 112- Diodes
- 121- Resistors
- 123- Resistors (Variable & Adjustable)
- 125- CAPS
- 140- Crystals
- 165- Light Bulbs
- 180- Switches
- 190- Relays

IV. **BOLTS, SCREWS, NUTS, AND WASHERS**
- 231- Bolts
- 232- Screws (Pan Head)
- 234- Screws (HXW)
- 237- Screws (Misc.)
- 240- Nuts (Misc.)
- 242- Washers (Flat, Round)
- 244- Washers (Split Lock)
- 246- Washers (Lockers, External Tooth)

V. **MECHANICAL COMPONENTS**
- 249- Rivets
- 251- Pins (Dowel)
- 254- Stand-Offs, Spacers and Shims
- 260- Steel Ball
- 265- Springs (Extension)
- 266- Springs (Compression)
- 269- Springs (Washers - Belleville, Wave)
- 280- Grommets and Bushing

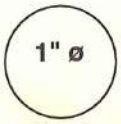
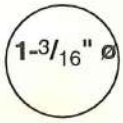
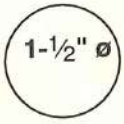
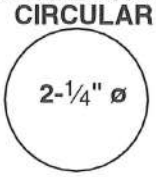
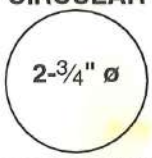
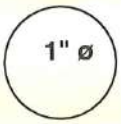
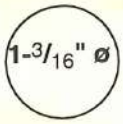
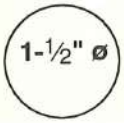
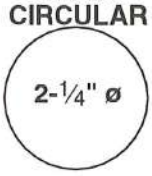
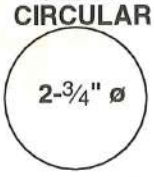
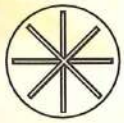
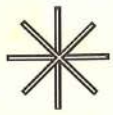
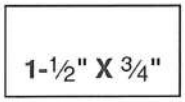
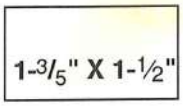
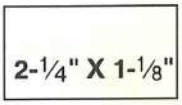
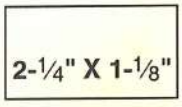
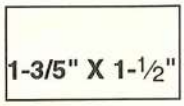
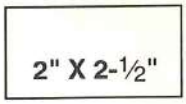
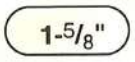
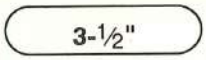
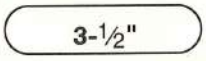
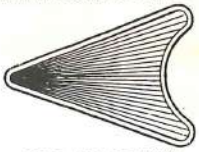
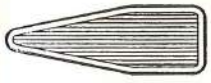
VI. **HANDLES, LOCKS, CATCHES & LATCHES, KEYS & HINGES**
- 355- Handles, Locks, Catches & Latches and Keys
- 390- Hinges

VII. **FABRICATED PARTS (IN-HOUSE ASSEMBLIES)**
- 500- End Product (Systems and Models)
- 515- Sub-Assemblies
- 520- P.C. Boards
- 522- Display Glass
- 525- Wood Parts
- 530- Screw Machined Parts
- 535- Fabricated Parts
- 545- Molded (Extruded) Parts (Rubber Rings, Molded Plastic)
- 550- Molded (Inserts)

VIII. **BULK MATERIALS**
- 600- Braided Ground Wire
- 601- Stranded Wire
- 602- Ribbon Cable
- 605- Sleeving (Shrink Tubing)
- 626- Foam Rubber

IX. **MISCELLANEOUS**
- 705- Packing & Shipping Items
- 820- Decals and Labels (Sets & Misc.)
- 820- Butyrate
- 900- Game Posters
- 960- EPROM (Raw Part)
- 965- EPROM (Programmed Part)

APPENDIX H
Playfield Inserts (Plastic Light Covers)

Patterns: STARBURST  STIPPLE 	STARBURST CIRCULAR  550-5000-XX	STARBURST CIRCULAR  550-5001-XX	STARBURST CIRCULAR  550-5002-XX	STARBURST CIRCULAR  550-5003-XX	STARBURST CIRCULAR  550-5004-XX
STARBURST CIRCULAR  550-5005-XX	STARBURST CIRCULAR  550-5006-XX	PLAIN CIRCULAR  550-5007-XX	PLAIN CIRCULAR  550-5008-XX	PLAIN CIRCULAR  550-5009-XX	PLAIN CIRCULAR  550-5010-XX
PLAIN CIRCULAR  550-5011-XX	PLAIN CIRCULAR  550-5012-XX	STIPPLE CIRCULAR  550-5048-XX	STIPPLE 1" SQUARE  550-5019-XX	ROLLOVER BUTTON BASE  550-5026-XX	WHITE STAR *(only in white)*  545-5015-00
STIPPLE RECTANGULAR  550-5018-XX	STIPPLE RECTANGULAR  550-5051-XX	STARBURST RECTANGULAR  550-5044-XX	PLAIN RECTANGULAR  550-5049-XX	PLAIN RECTANGULAR  550-5050-XX	PLAIN RECTANGULAR  550-5063-XX
STARBURST MINI SHIELD  550-5024-XX	STARBURST LARGE SHIELD  550-5025-XX	MINI HOT DOG  550-5020-XX	BEVEL HOT DOG  550-5021-XX	PLAIN HOT DOG  550-5022-XX	BANANA  550-5023-XX
STARBURST ARROW-SHORT  550-5013-XX	STARBURST ARROW-LARGE  550-5014-XX	STARBURST ARROW-HEAD  550-5015-XX	STARBURST BULLET  550-5016-XX	STARBURST TRIANGLE  550-5017-XX	

Note: The shapes and sizes shown above are not to scale. Some shapes may no longer be available in every color.

Plastic Part Color Chart (As applicable for all parts which can come in various colors.):
The "-XX" should be replaced with the following 2-digit number for the color desired.

-01:	CLEAR	-06:	YELLOW	-11	FLUORESCENT GREEN
-02:	RED	-07:	ORANGE	-12	FLUORESCENT BLUE
-03:	AMBER	-08:	WHITE	-13	TEAL GREEN
-04:	GREEN	-09:	PURPLE	-14	GRAY
-05:	BLUE	-10	FLUORESCENT ORANGE	-15	*NEW:* LUMINESCENT

GLOSSARY OF TERMS

A	Followed after a number means "Amp." or Ampage in an expression relating to an electrical object. e.g. 8A (eight amps).
AC	Acronym: Alternating Current.
Adj.	Abbreviation: Adjustment(s).
A.L.I.S.O.N. Interface	See Section 3, Chapter 6.
Au.	Abbreviation: Audit(s).
BOT	Abbreviation: Bottom.
Bridge Rectifier	A configuration of a diode that allows current to flow in one direction producing both positive and negative pulsating DC Voltages.
COLOR CODING	See Appendix H, Color Chart (Bottom) or Section 4, Chapter (last page).
Combination (Combo)	[Shot]. Any variable pinball shot(s) made succesively.
CMOS	Short for COSMOS (Complementary Symmetry M.O.S.); Complementary Metal-Oxide Semi-Conductor.
CT	Abbreviation: Center.
DC	Abbreviation: Direct Current.
DT	Abbreviation: Drop Target(s).
EB	Acronym: Extra Ball.
Eject	Playfield surface device to kick ball back into play.
EPROM	Acronym: Erasable Programmable Read Only Memory. Can be erased using UV Light and re-programmed.
e.g.	Abbreviation: Latin- Exempli gratia. For Example.
EOS	Acronym: End-of-Stroke.
G.I.	Abbreviation: General Illumination (Lamps).
IC	Acronym: Integrated Circuit (As in after 24-Pin IC)
i.e.	Abbreviation: Latin- Id est. That is.
LT	Abbreviation: Left.
Laser Kick	A coil/plunger used above the playfield to kick pinball back into play.
LED	Light emitting diode.
Loop	[Shot] Continuously up a ramp and back to the flipper.
Lwr.	Abbreviation: Lower.
Orbit	[Shot] From the left or right flipper around the back rail of the playfield back to the flipper.
MB	Acronym: Magnet Board.
M-BALL or MBALL	Abbreviation: Multiball™.
MID	Abbreviation: Middle
Non-Reflexive	See Reflexive.
No. or Nº or #	Abbreviation: Number
NPF	Acronym: No Problem Found.
N.C. or NC	Abbreviation: Normally Closed.
N.O. or NO	Abbreviation: Normally Open.
PCB	Acronym: Printed Circuit Board
PIA LED	Acronym: Peripheral Interface Adapter. This is a diagnostic LED on the CPU; it should not be lit during normal operation of a pinball game.
Plumb Bob Tilt	Weight on Tilt Assembly.
Pop(s)	Another term for Turbo Bumper(s).
PPB	Playfield Power Board (Generic Term to describe Acronym with no true definition).
PSB	Acronym: Power Supply Board

GLOSSARY OF TERMS

P/F	Abbreviation: Playfield
RAM	Acronym: Random Access Memory. RAM **can** store input instructions and supply output information.
RED	Abbreviation: Red.
Reflexive/Non-Reflexive (Relating to CPU Boards)	**Reflexive**—Solenoid Drive Transistor is enabled directly by a switch closure on the solenoid assembly (Ver. 1/2). **Non-Reflexive**—Solenoid Drive Transistor is enabled by the CPU after reading a switch closure in the Switch Matrix (Ver. 3). Also note: All CPU Boards are backwards compatible (e.g. Jurassic Park/Ver. 3 to Time Machine/ Ver. 2). Swapping a Ver. 2 Board to a Ver. 3 is not possible due to the special solenoids section (i.e. Slingshots, Turbo Bumpers, etc.) changing from REFLEXIVE to NON-REFLEXIVE on Ver. 3 Boards.
Relay	An automatic switch operated by current in a coil.
ROM	Aconym: Read Only Memory. ROM **cannot** store input instructions but can supply output information. ROM can be programmed only once.
RT	Abbreviation: Right.
RO	Abbreviation: Rollover (switches).
Saucer	See Eject.
Scoop	A hole into the playfield. A metal scoop is in place to guide the ball into the kick-back under the playfield.
Slam Tilt	A switch which closes when the game is slammed into or the Coin Door is slammed shut. Depending on adjustable settings, will cancel game in play when the number of closures required is sufficed.
SMB	Acronym: Shaker Motor Board.
Solenoid	A coil used for Electro Magnetic devices such as relays, flippers, slingshots, etc.
SSFB	Acronym: Solid State Flipper Board.
STEP	Refers to the service switches on the coin door.
S-U	Abbreviation: Stand-Up (targets).
TM	Acronym: Trademark
Transfer	[Shot] Maneuvering the ball in play from one flipper to the other. With flipper in the up position and the ball cradled by that flipper one would activate the flipper button in a quick repetive manner to bounce the ball to the other side. Skilled players can rebound the ball off the slingshot.
TTL	Acronym: Transistor-Transistor Logic
Upr.	Abbreviation: Upper.
V or v	Abbreviation: Volt(s).
Ver.	Abbreviation: Version.
VUK	Acronym: Vertical Up-Kicker.
X	Acronym: "Times" A multiplier.
Zener Diode	A semi-conductor diode used for voltage regulation. Application depends on reverse break-down voltage.

GLOSSARY OF TERMS

SEGA PINBALL, INC. LIMITED WARRANTY

SEGA PINBALL, INC., ("SELLER") WARRANTS ONLY TO THE INITIAL PURCHASER OF ITS PRODUCTS THAT THE ITEMS LISTED BELOW ARE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE FOR THE WARRANTY PERIOD SPECIFIED:

PRINTED CIRCUIT BOARDS (GAME LOGIC) 60 DAYS

NO OTHER PARTS OF SELLER'S PRODUCT ARE WARRANTED.

WARRANTY PERIODS ARE EFFECTIVE FROM THE INITIAL DATE OF SHIPMENT FROM SELLER TO ITS AUTHORIZED DISTRIBUTORS.

SELLER'S SOLE LIABILITY SHALL BE, AT ITS OPTION, TO REPAIR OR REPLACE PRODUCTS WHICH ARE RETURNED TO SELLER DURING THE WARRANTY PERIODS SPECIFIED, PROVIDED:

1. SELLER IS NOTIFIED PROMPTLY UPON DISCOVERY BY PURCHASER THAT STATED PRODUCTS ARE DEFECTIVE.

2. SUCH PRODUCTS ARE PROPERLY PACKAGED AND THEN RETURNED FREIGHT PREPAID, TO SELLER'S PLANT.

THIS WARRANTY DOES NOT APPLY TO ANY PARTS DAMAGED DURING SHIPMENT AND/OR DUE TO IMPROPER HANDLING, OR DUE TO IMPROPER INSTALLATION OR USAGE, OR ALTERATION. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY ANTICIPATED PROFITS, LOSS OF PROFITS, LOSS OF USE, ACCIDENTAL OR CONSEQUENTIAL DAMAGES OR ANY OTHER LOSSES INCURRED BY THE CUSTOMER IN CONNECTION WITH THE PURCHASE OF A SEGA PINBALL, INC. PRODUCT.

WARRANTY DISCLAIMER

EXCEPT AS SPECIFICALLY PROVIDED IN A WRITTEN CONTRACT BETWEEN SELLER AND PURCHASER, THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

CAUTIONS, WARNINGS & NOTICES

Caution

FOR SAFETY AND RELIABILITY, SUBSTITUTE PARTS AND EQUIPMENT MODIFICATIONS ARE NOT RECOMMENDED (AND MAY VOID ANY WARRANTIES). USE OF NON-SEGA PINBALL INC. PARTS OR MODIFICATIONS OF GAME CIRCUITRY, MAY ADVERSELY AFFECT GAME PLAY, OR MAY CAUSE INJURIES. TRANSPORT PINBALL GAMES WITH HINGED BACKBOX DOWN ONLY! ALWAYS TAKE GREAT CARE WHEN SERVICING ANY GAME. ALWAYS DISCONNECT THE LINE VOLTAGE BEFORE SERVICING. SOME PARTS MAY STILL HOLD CURRENT WHEN UNPLUGGED. ALWAYS READ THE SERVICE MANUAL BEFORE REPLACING OR SERVICING COMPONENTS.

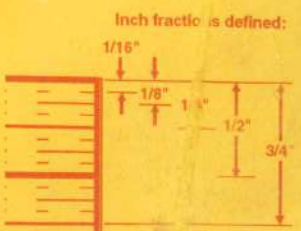
SUBSTITUIONS OF PARTS OR EQUIPMENT MODIFICATIONS MAY VOID FCC TYPE ACCEPTANCE.

Warning

THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY, AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

RF INTERFERENCE NOTICE, CABLE HARNESS PLACEMENTS AND GROUND STRAP ROUTING ON THIS GAME HAVE BEEN DESIGNED TO KEEP RF RADIATION AND CONDUCTION WITHIN LEVELS ACCEPTED BY THE FCC RULES. TO MAINTAIN THESE LEVELS, REPOSITION HARNESSES AND RECONNECT GROUND STRAPS TO THEIR ORIGINAL PLACEMENTS, IF THEY BECOME DISCONNECTED DURING MAINTENANCE.

Notices



Standard U.S. 9 Inch Ruler (From the top to the bottm edge is 11")

ALTHOUGH EVERY EFFORT IS PUT INTO MAKING THIS MANUAL (AND ALL OTHER DOCUMENTS RELATING TO THIS PRODUCT) ACCURATE AND COMPLETE, PLAYFIELD COMPONENTS, FEATURES, RULES, PROGRAMMING AND OPERATION ARE SUBJECT TO CHANGE WITH OR WITHOUT NOTICE.

IF YOU HAVE ANY QUESTIONS, NEED TECHNICAL ADVICE OR HAVE COMMENTS, CALL US TOLL-FREE (USA or CANADA) AT 1-800-KICKERS (542-5377) OR (708) 345-7700.

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CE

Games shipped factory direct to Europe from Sega Pinball, Inc. are CE approved and will have an "E" prefix attached to the Serial Number.