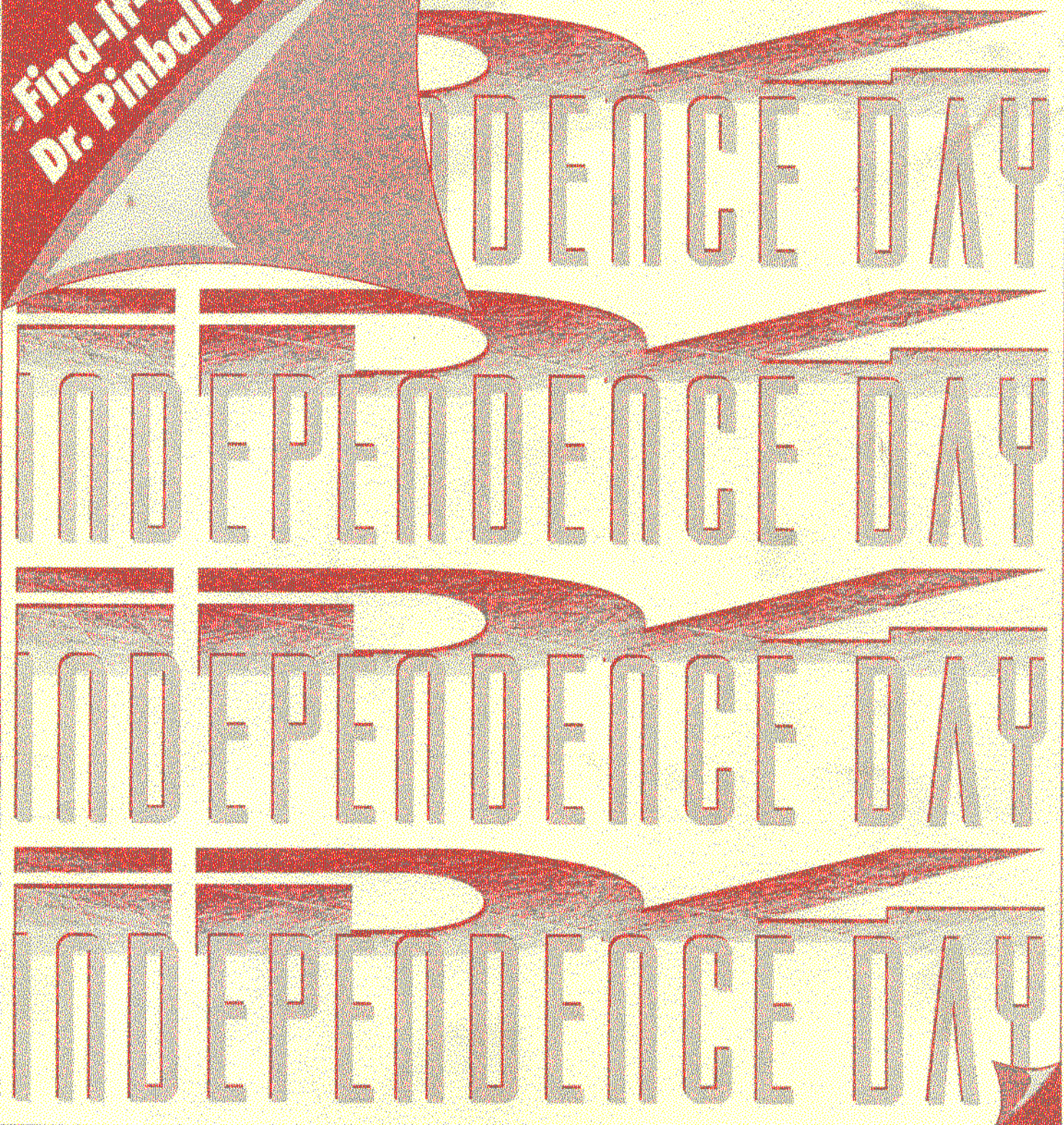


Find-It-In-Front
Dr. Pinball Section

SEGATM
PINBALL, INC.



JOE BLACKWELL
Technical Support
Manager

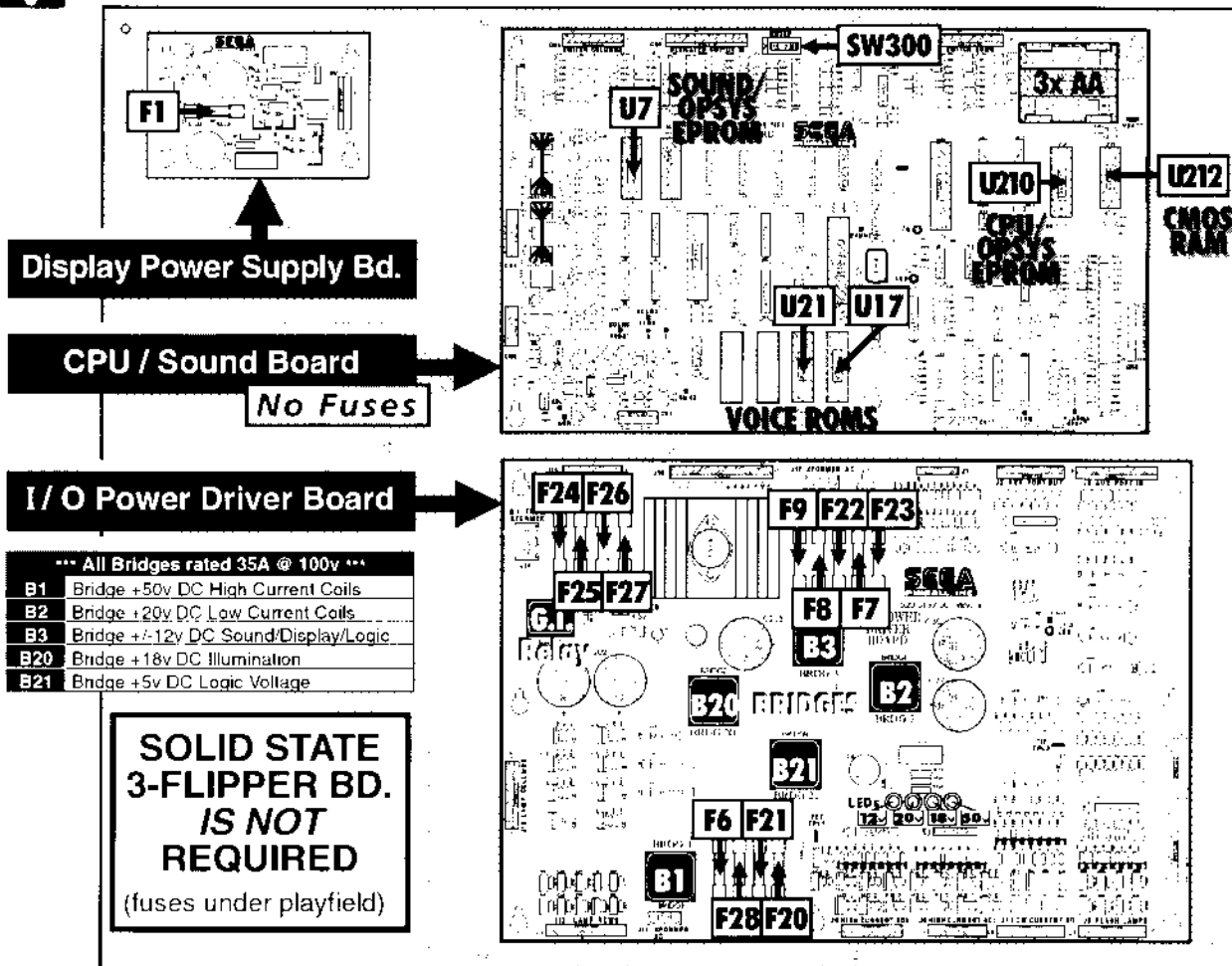
ERIC WINSTON
Technical Support
Engineer

TED KILPIN
Technical Support
Engineer

JAY ALFER
Tech. Documentation
Administrator



NEW BACKBOX LAYOUT, FUSE & RELAY LOCATIONS



*** All Bridges rated 35A @ 100v ***

B1	Bridge +50v DC High Current Coils
B2	Bridge +20v DC Low Current Coils
B3	Bridge +/-12v DC Sound/Display/Logic
B20	Bridge +18v DC Illumination
B21	Bridge +5v DC Logic Voltage

**SOLID STATE
3-FLIPPER BD.
IS NOT
REQUIRED**
(fuses under playfield)

INDEPENDENCE DAY

QUICK REFERENCE FUSE CHART

Backbox Fuses DISPLAY POWER SUPPLY BOARD

F1	¼A 250v S.B.	90v DC	High Voltage Display
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I/O POWER DRIVER BOARD

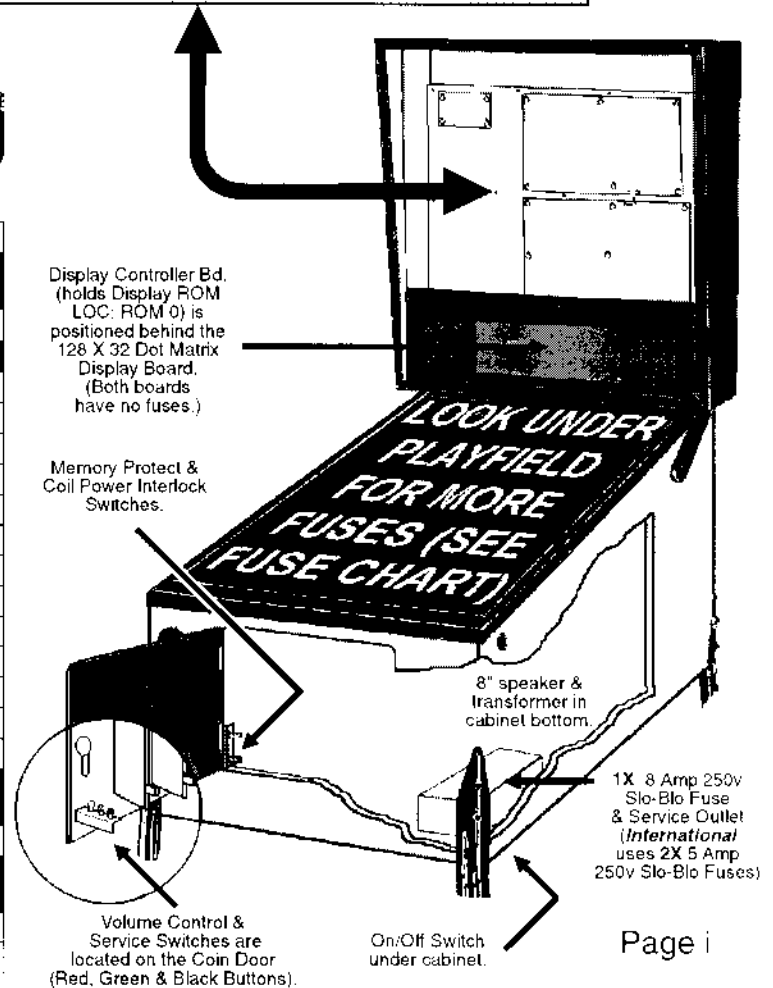
F6	7A 250v S.B.	50v DC	Primary High Power Coils/Flippers
F7	5A 250v S.B.	20v DC	Low Power Coils
F8	5A 250v S.B.	12v DC	Logic Power
F9	5A 250v S.B.	12v DC	Logic Power
F20	3A 250v S.B.	50v DC	Not Used / Spare
F21	3A 250v S.B.	50v DC	Coils
F22	8A 250v S.B.	18v DC	Controlled Lamps
F23	4A 250v S.B.	5v DC	Logic
F24	5A 250v S.B.	6.3v AC	G.I. Lamp Top Left Playfield (P/F)
F25	5A 250v S.B.	6.3v AC	G.I. Lamp Bottom Middle Left P/F
F26	5A 250v S.B.	6.3v AC	G.I. Lamp Rt. Side P/F & Coin Door
F27	5A 250v S.B.	6.3v AC	G.I. Lamp Top Right Playfield
F28	3A 250v S.B.	24v AC	Not Used / Spare

Cabinet Fuses SERVICE (AC) OUTLET BOX (CABINET BOTTOM)

Main Fuse Line: 1X 8A 250v S.B. (Int'l) 2X 5A 250v S.B.

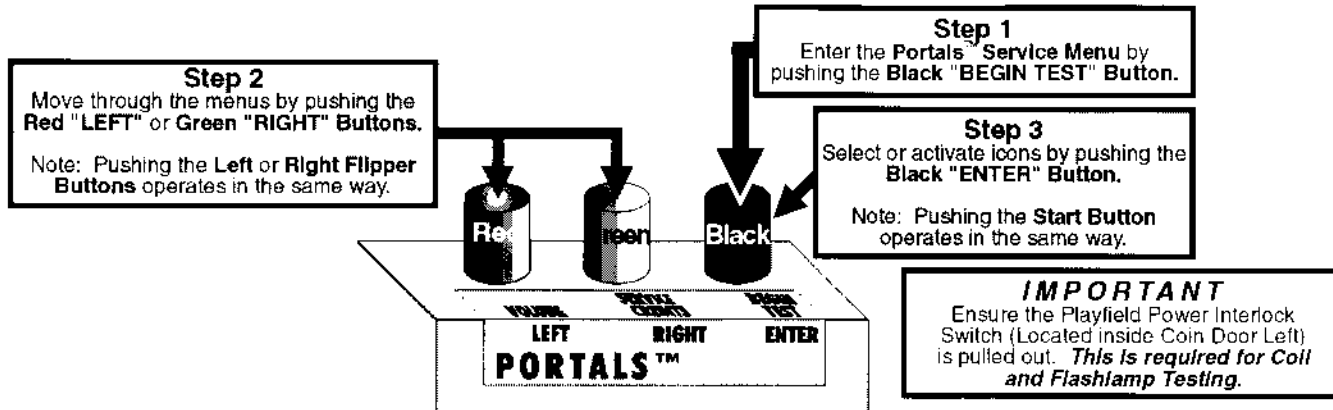
Under Playfield Fuses BY FLIPPER ASSEMBLIES

n/a	3A 250v S.B.	50v DC	Output Upr./Lwr. Rt. Flippers
n/a	3A 250v S.B.	50v DC	Output Left Flipper



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

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**:



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.

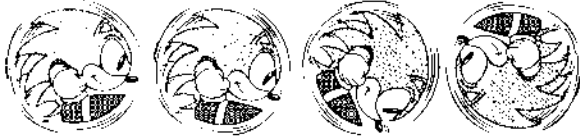
Note: The "Portals" service switches located on the coin door can also be used to select and enter mini-icons. In switch test this is required since flipper and start switches are part of the test.



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 select the "RUN" Icon to activate the choice. "PREV" goes back to previous question. "QUIT" exits Portals completely.
- Seen when question is being asked on the Display. Select "YES" or "NO" to answer question given. "END" lets you select a new item to test.
- Seen when diagnosis is given. Select any Icon for your next step.
- In Coil Flow Chart Menu, select "PULSE" to pulse the coil selected.

INSTALL 4 BALLS!



INDEPENDENCE DAY

Is a 4-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

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
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 (UK)	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
USA *	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	●		●	●	●	●	●	●

ROM SUMMARY TABLE

I.C. NAME	TYPE	BOARD NAME	LOC.	PART N°
Game ROM	1MB	CPU / Sound Board	U210	965-0224-45
Voice ROM 1	4MB	CPU / Sound Board	U17	965-0225-45
Voice ROM 2	4MB	CPU / Sound Board	U21	965-0226-45
Voice ROM 3	Not Used	CPU / Sound Board	U36	Not Used
Voice ROM 4	Not Used	CPU / Sound Board	U37	Not Used
Sound EPROM	512K	CPU / Sound Board	U7	965-0227-45
Display EPROM	4MB	Display Controller Bd.	ROM 0	965-0228-45
Display EPROM	Not Used	Display Controller Bd.	ROM 3	Not Used



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)	1 Q1 GRN-BRN CN5-P1	2 Q2 GRN-RED CN5-P3	3 Q3 GRN-ORG CN5-P4	4 Q4 GRN-YEL CN5-P5	5 Q5 GRN-BLK CN5-P6	6 Q6 GRN-BLU CN5-P7	7 Q7 GRN-VIO CN5-P8	8 Q8 GRN-GRY CN5-P9
1 U400 WHT-BRN CN7-P9	NOT USED	MINI- LOOP	NOT USED	MINI- LOOP S-U	AREA 51 3-BANK TOP	SUPER VUK ENTER SIDE	LEFT TURBO BUMPER	LEFT OUTLANE
2 U400 WHT-RED CN7-P8	4TH COIN SLOT	NOT USED	LEFT RAMP ENTER	NOT USED	AREA 51 3-BANK MID	ALIEN HEAD OPTO	BOTTOM TURBO BUMPER	LEFT RETURN LANE
3 U400 WHT-ORG CN7-P7	6TH COIN SLOT	4-BALL TROUGH #1 (LEFT)	LEFT RAMP EXIT	CENTER RAMP S-U	HURRY-UP 3-BANK TOP	HEAD UNDER- TROUGH REAR	TOP TURBO BUMPER	LEFT SLINGSHOT
4 U400 WHT-YEL CN7-P6	RIGHT COIN SLOT	4-BALL TROUGH #2	CENTER RAMP ENTER	RIGHT RAMP S-U LEFT	HURRY-UP 3-BANK MID	SUPER VUK	SERVO OPEN/ CLOSE	RIGHT OUTLANE
5 U401 WHT-GRN CN7-P5	CENTER COIN SLOT /DEA	4-BALL TROUGH #3	CENTER RAMP EXIT	RIGHT RAMP S-U RIGHT	LEFT ORBIT BOTTOM	SUPER VUK ENTER FRONT	LAUNCH BUTTON	RIGHT RETURN LANE
6 U401 WHT-BLU CN7-P3	LEFT COIN SLOT	4-BALL TROUGH #4 (RIGHT)	RIGHT RAMP ENTER	LEFT TOP LANE	LEFT ORBIT TOP	HEAD UNDER- TROUGH FRONT	START BUTTON	RIGHT SLINGSHOT
7 U401 WHT-VIO CN7-P2	5TH COIN SLOT	4-BALL TROUGH VUK OPTO	RIGHT RAMP EXIT	MIDDLE TOP LANE	RIGHT ORBIT TOP	AREA 51 3-BANK BOT	SLAM TILT	NOT USED
8 U401 WHT-GRY CN7-P1	NOT USED	SHOOTER LANE	SUPER JACKPOT S-U	RIGHT TOP LANE	RIGHT ORBIT BOTTOM	HURRY-UP 3-BANK BOT	PLUMB BOB TILT	NOT USED

GND IC U206 INPUTS	Ground BLK CN6-P1, -P11
1 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON DS-1
2 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S. (End-of-Stroke) DS-2
3 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON DS-3
4 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S. (End-of-Stroke) DS-4
5 NOT USED CN6-P7	#5 UPPER FLIPPER BUTTON DS-5
6 GRY-BLU CN6-P8	#6 VOLUME (RF) BUTTON (Normal) (In Test) LEFT DS-6
7 GRY-VIO CN6-P9	#7 SELV. CHLD. (GREEN) BUTTON (Normal) (In Test) RIGHT DS-7
8 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK) BUTTON (Normal) (In Test) ENTER DS-8



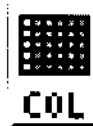
From the Diagnostics
Menu
GO TO LAMP
MENU



From the Lamp
Menu
GO TO SINGLE
LAMP TEST



From the Lamp
Menu
GO TO TEST
ALL LAMPS



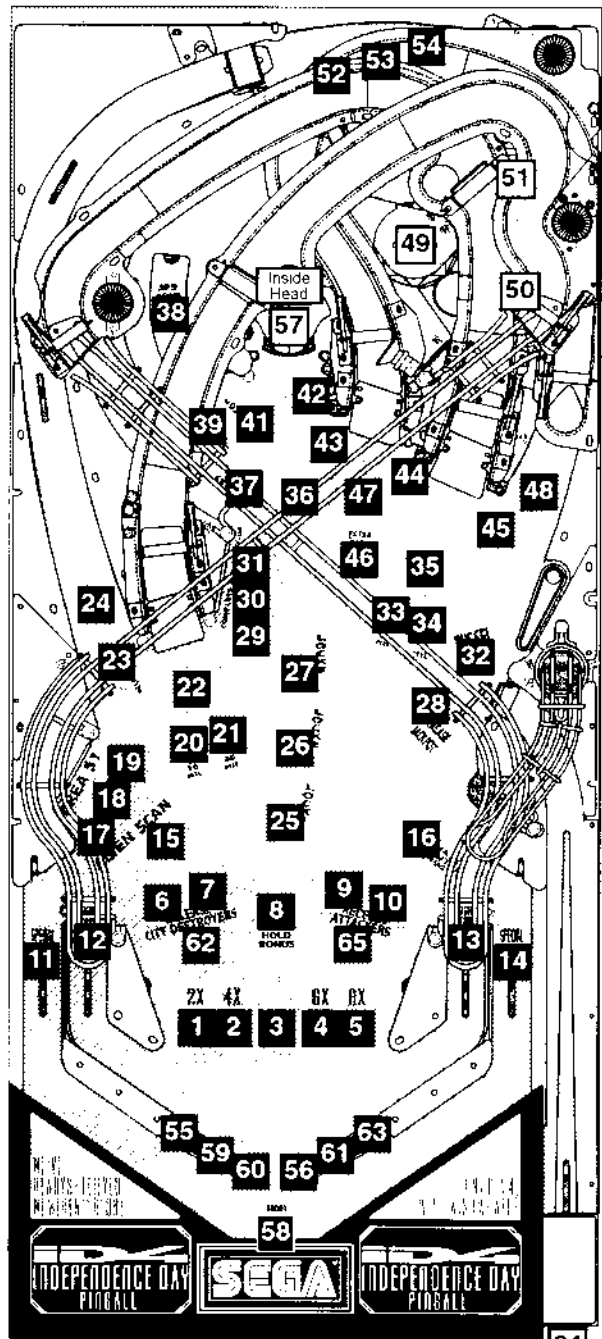
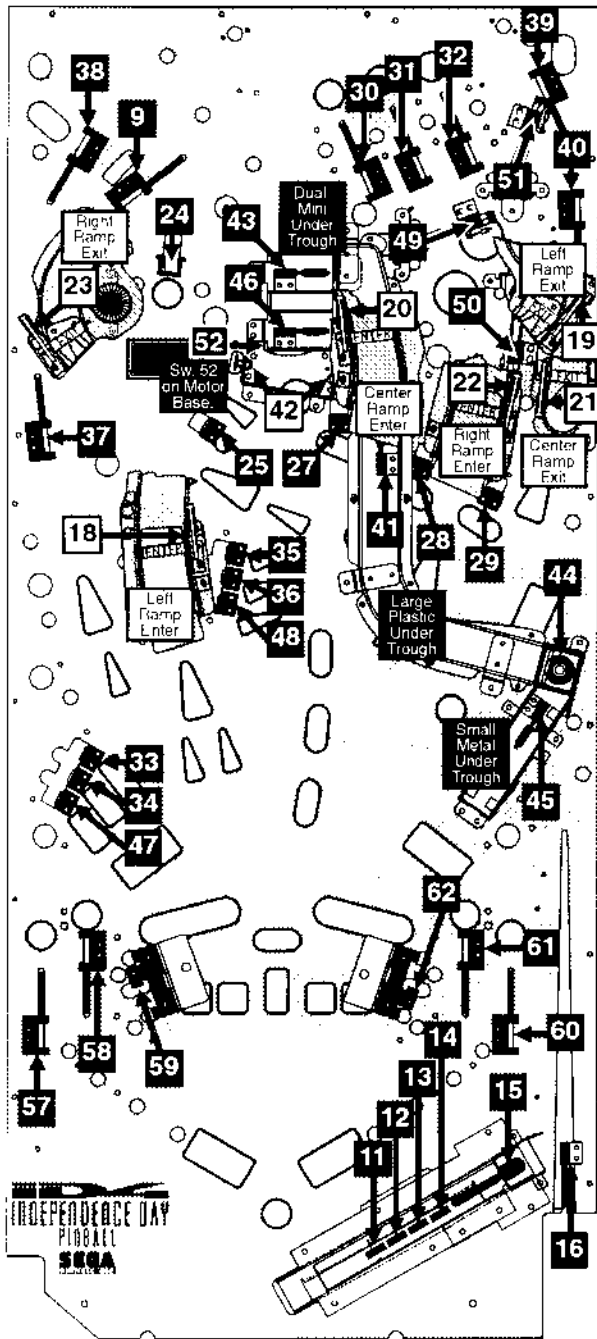
From the Lamp
Menu
GO TO ROW OR
COLUMN TEST

LAMP MATRIX GRID

Column (18V)	1: U17 YEL-BRN J13-P9	2: U16 YEL-RED J13-P8	3: U15 YEL-ORG J13-P7	4: U14 YEL-BLK J13-P6	5: U13 YEL-GRN J13-P5	6: U12 YEL-BLU J13-P4	7: U11 YEL-VIO J13-P3	8: U10 YEL-GRY J13-P1
1: Q33 RED-BRN J12-P1	2X #555 Bulb 1	4X #555 Bulb 2	10X #555 Bulb 3	6X #555 Bulb 4	8X #555 Bulb 5	RELEASE CITY DESTROYERS #555 Bulb 6	RELEASE CITY DESTROYERS #555 Bulb 7	HOLD BONUS #44 Bulb 8
2: Q34 RED-BLK J12-P2	RELEASE ATTACKERS #555 Bulb 9	RELEASE ATTACKERS #555 Bulb 10	SPECIAL (LEFT) #44 Bulb 11	LIGHT COM- BO (LEFT) #44 Bulb 12	LIGHT COM- BO (RIGHT) #44 Bulb 13	SPECIAL (RIGHT) #44 Bulb 14	ALIEN SCAN #555 Bulb 15	INITIATE COM- PUTER VIRUS #44 Bulb 16
3: Q35 RED-ORG J12-P3	AREA 51 3-BANK BOT #555 Bulb 17	AREA 51 3-BANK MID #555 Bulb 18	AREA 51 3-BANK TOP #555 Bulb 19	LEFT RAMP 10 MIL #555 Bulb 20	LEFT RAMP 20 MIL #555 Bulb 21	LEFT RAMP ARROW #555 Bulb 22	F-18 HURRY-UP #44 Bulb 23	LEFT ORBIT ARROW #44 Bulb 24
4: Q36 RED-YEL J12-P4	LOCK 1 #555 Bulb 25	LOCK 2 #555 Bulb 26	LOCK 3 #555 Bulb 27	INCREASE JACKPOT #555 Bulb 28	HURRY-UP 3-BANK BOT #555 Bulb 29	HURRY-UP 3-BANK MID #555 Bulb 30	HURRY-UP 3-BANK TOP #555 Bulb 31	RUSSELL #555 Bulb 32
5: Q37 RED-GRN J12-P5	RIGHT RAMP 10 MIL #555 Bulb 33	RIGHT RAMP 20 MIL #555 Bulb 34	RIGHT RAMP ARROW #44 Bulb 35	MINI-LOOP ARROW #555 Bulb 36	AREA 51 ARROW #555 Bulb 37	SUPER JACKPOT #44 Bulb 38	MINI-LOOP STAND-UP #555 Bulb 39	NOT USED #44 Bulb 40
6: Q38 RED-BLU J12-P6	COMBO #555 Bulb 41	ALIEN HEAD CIRCLE #555 Bulb 42	CENTER RAMP S-U #555 Bulb 43	RIGHT RAMP S-U LEFT #555 Bulb 44	RIGHT RAMP S-U RIGHT #44 Bulb 45	EXTRA BALL #555 Bulb 46	CENTER RAMP ARROW #555 Bulb 47	RIGHT ORBIT #44 Bulb 48
7: Q39 RED-VIO J12-P8	LEFT TURBO BUMPER #555 Bulb 49	BOTTOM TUR- BO BUMPER #555 Bulb 50	RIGHT TUR- BO BUMPER #555 Bulb 51	LEFT TOP LANE #44 Bulb 52	MIDDLE TOP LANE #44 Bulb 53	RIGHT TOP LANE #44 Bulb 54	LEFT FLIPPER #44 Bulb 55	RIGHT FLIPPER #44 Bulb 56
8: Q40 RED-GRY J12-P9	ALIEN EYES #44 Bulb 57	SHOOT AGAIN #44 Bulb 58	LEFT FLIPPER #44 Bulb 59	LEFT FLIPPER #44 Bulb 60	RIGHT FLIPPER #44 Bulb 61	RELEASE CITY DESTROYERS #555 Bulb 62	RIGHT FLIPPER #44 Bulb 63	LAUNCH BUTTON #44 Bulb 64
9: Q41 RED-WHT J12-P10	RELEASE ATTACKERS #555 Bulb 65	NOT USED #66	NOT USED #67	NOT USED #68	NOT USED #69	NOT USED #70	NOT USED #71	NOT USED #72
10: Q42 NOT USED J12-P11	NOT USED #73	NOT USED #74	NOT USED #75	NOT USED #76	NOT USED #77	NOT USED #78	NOT USED #79	NOT USED #80

SWITCH MATRIX GRID LOCATIONS

LAMP MATRIX GRID LOCATIONS

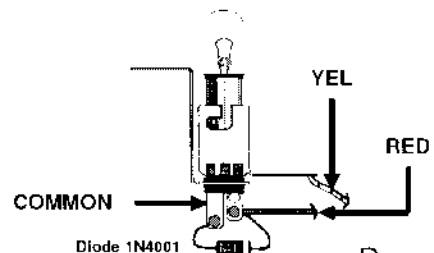
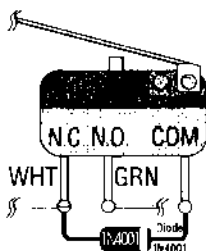
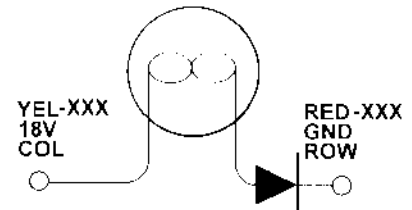
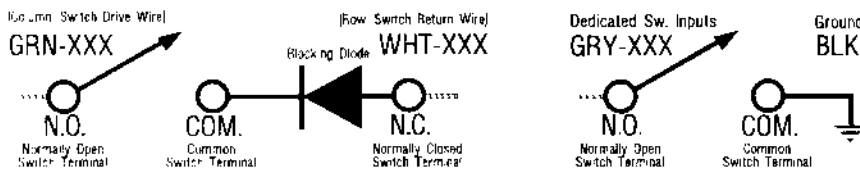


Legend Note: = Switches/Lamps mounted above playfield. = Switches/Lamps mounted below the playfield.

TYPICAL SWITCH SCHEMATIC

DEDICATED SWITCH SCHEMATIC

TYPICAL LAMP SCHEMATIC





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 Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#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	23-700 090-5022-01
#3	SUPER VUK	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	YEL-VIO	J10-P4/5	50v	23-800 090-5001-01
#4	NOT USED / SPARE	Q4	I/O Pwr. Drvr.						
#5	NOT USED / SPARE	Q5	I/O Pwr. Drvr.						
#6	FLASH BOTTOM-LT*2	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	ORG	J6-P10	20v	#89 165-5000-69
#7	FLASH LT*1 RT-RAMP*1	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	ORG	J6-P10	20v	#89 165-5000-69
#8	EUROPEAN TOKEN DISPENSER	Q8	I/O Pwr. Drvr.	BRN-GRY	J8-P9	YEL-VIO	J10-P4/5	50v	N/A

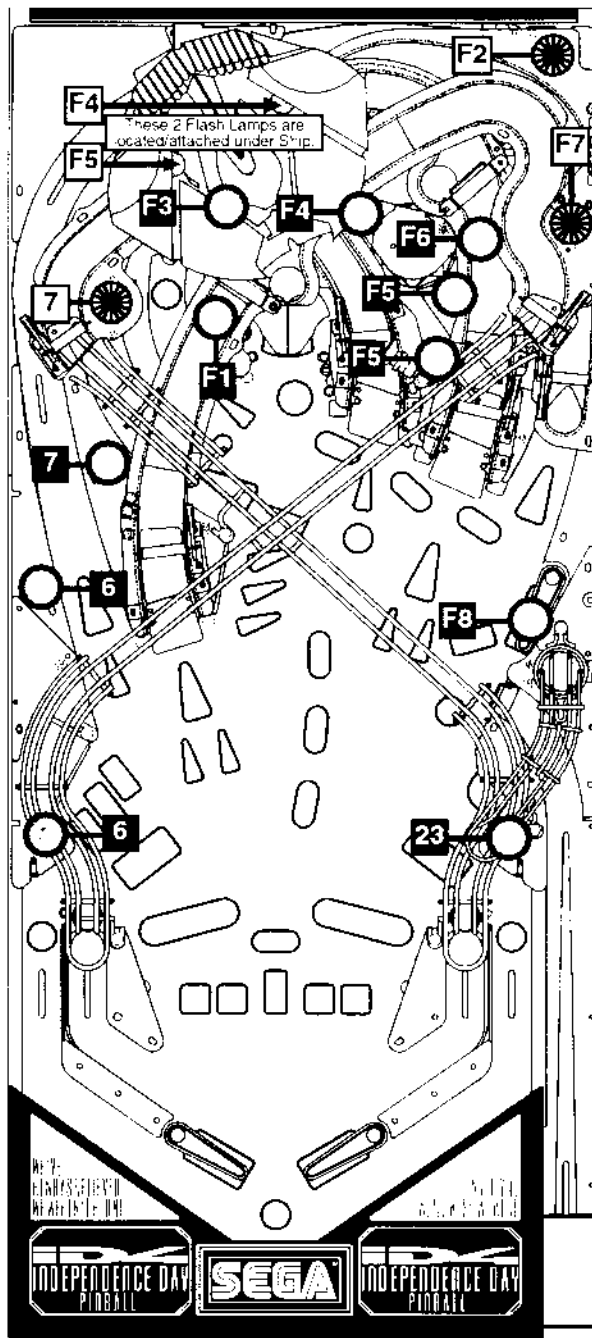
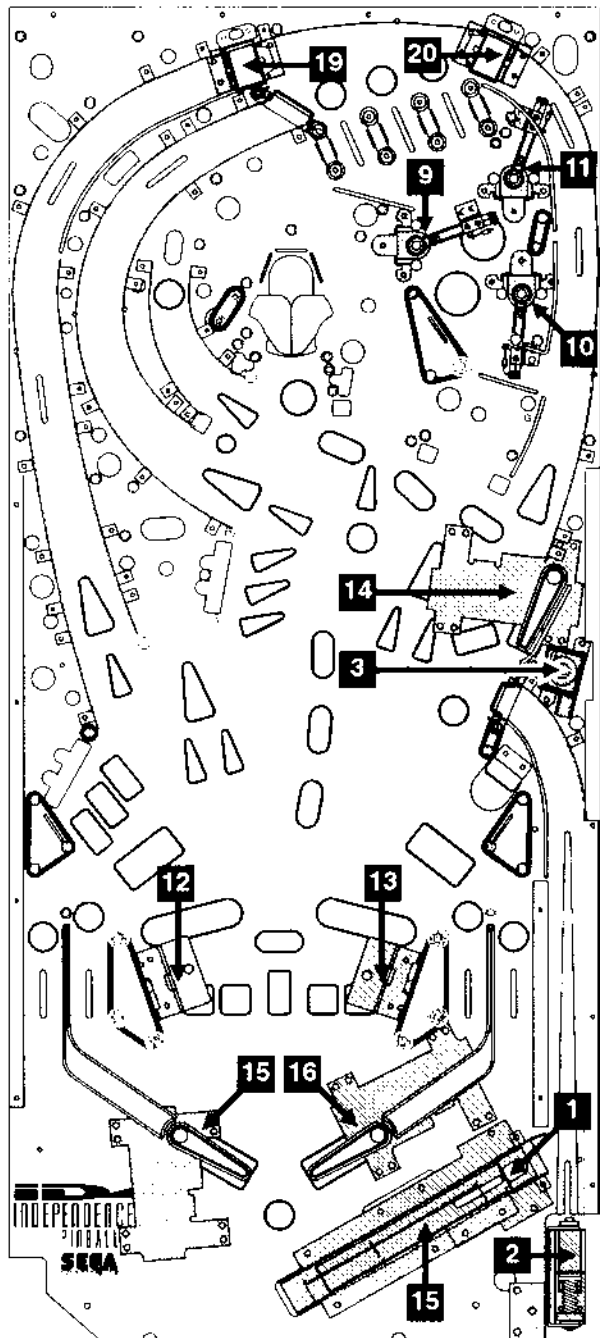
High Current Coils Group 2		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#9	LEFT TURBO BUMPER	Q9	I/O Pwr. Drvr.	BLU-BRN	J9-P1	YEL-VIO	J10-P4/5	50v	26-1200 090-5044-00
#10	BOTTOM 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	UPPER FLIPPER (50v RED/YEL)	Q14	I/O Pwr. Drvr.	BLK-YEL	J9-P7	RED-YEL BLU-YEL	J10-P1/2	50v	23-900 090-5029-00
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v	22-1080 090-5032-00
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v	22-1080 090-5032-00

Low Current Coils Group 1		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#17	4-BALL TROUGH LOCK BALL	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v	24-940 090-5036-00
#18	NOT USED / SPARE	Q18	I/O Pwr. Drvr.						
#19	LEFT CONTROL GATE	Q19	I/O Pwr. Drvr.	VIO-ORG	J7-P4	BRN	J7-P1	20v	32-1800 090-5031-00
#20	RIGHT CONTROL GATE	Q20	I/O Pwr. Drvr.	VIO-YEL	J7-P6	BRN	J7-P1	20v	32-1800 090-5031-00
#21	NOT USED / SPARE	Q21	I/O Pwr. Drvr.						
#22	NOT USED / SPARE	Q22	I/O Pwr. Drvr.						
#23	FLASH BOTTOM-RT*1	Q23	I/O Pwr. Drvr.	VIO-BLK	J7-P9	ORG	J6-P10	20v	#89 165-5000-69
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v	5v Meter (If Required)

Flash Lamps (FLASH)		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Bulb Type
#F1	FLASH MID PLAYFIELD*1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v	#89 165-5000-69
#F2	FLASH CENTER RAMP*1	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v	#89 165-5000-69
#F3	FLASH TOP-LT PLAYFIELD*1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v	#89 165-5000-69
#F4	FLASH SHIP*1 POPS*1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v	#906 / #89 165-5004-00
#F5	FLASH SHIP*1 POPS*2	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v	#906 / #89 165-5004-00
#F6	FLASH POPS*1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v	#89 165-5000-69
#F7	FLASH LEFT RAMP*1	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	ORG	J6-P10	20v	#89 165-5000-69
#F8	FLASH UPPER RT FLIPPER *1	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	ORG	J6-P10	20v	#89 165-5000-69

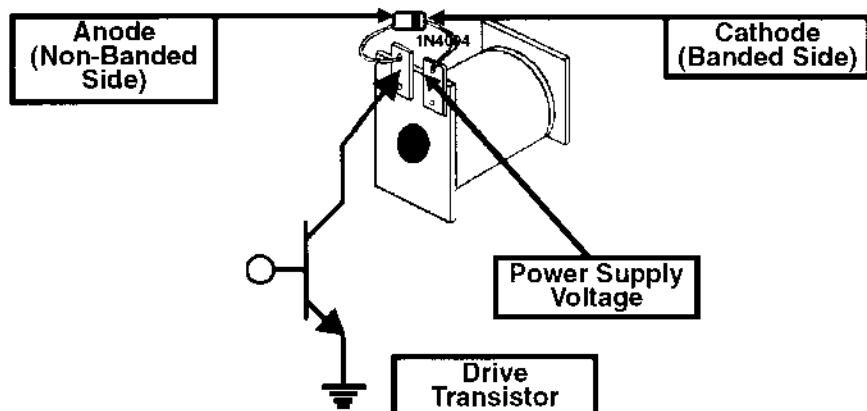
COIL LOCATIONS

FLASH LAMP LOCATIONS

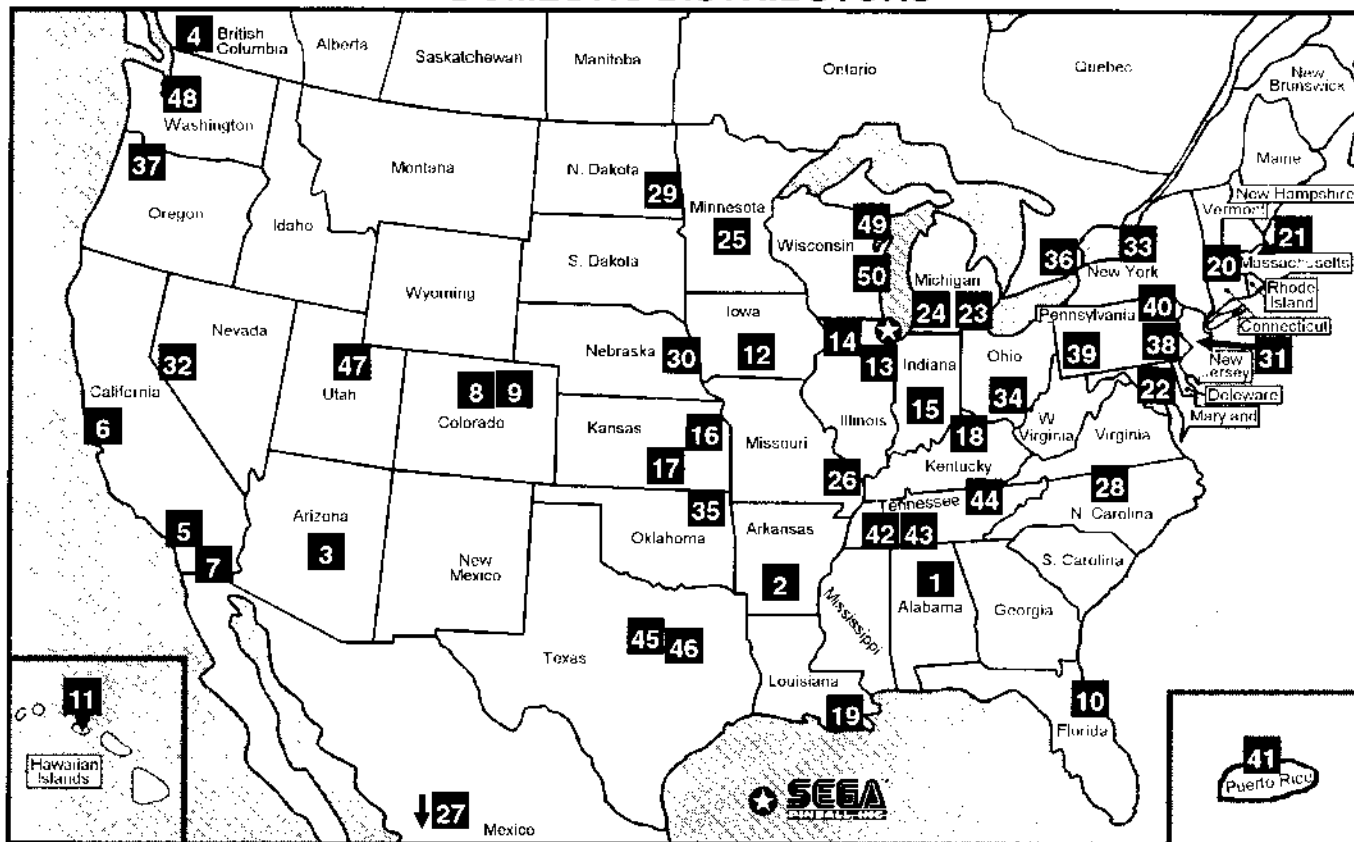


Legend Note: = Coil/Flash Lamp mounted above playfield. = Coil/Flash Lamp mounted below the playfield. = Bulb goes through hole in the playfield. = Bulb is under playfield insert. = Bulb under Mini-Mar (Light Cover).

TYPICAL COIL WIRING



DOMESTIC DISTRIBUTORS



#	STATE/PROVINCE AND CITY	NAME	PHONE	#	STATE/PROVINCE AND CITY	NAME	PHONE
1	AL Birmingham	Birmingham Vending	205-324-7526	26	MO St. Louis	J. & J. Distributing	314-645-3393
2	AR N. Little Rock	Godwin Distributing	501-753-1138	27	MX Col. Napoles	James Industries	011 525 543 1174
3	AZ Phoenix	Betson Pacific	602-233-0190	28	NC Archdal	Operators Distributing	910-884-5714
4	BC Burnaby (Can.)	Can. Coin Machine	604-420-4008	29	ND Fargo	M.H. Associates, Inc.	701-282-7877
5	CA Buena Park	Betson Pacific	714-228-7500	30	NE Omaha	Greater American Dist.	402-553-2812
6	CA S. San Francisco	Betson Pacific	415-952-4220	31	NJ Springfield	Mondial Int'l. Dist.	201-467-9700
7	CA San Diego	Betson Pacific	619-459-0871	32	NV Reno	Reno Game Sales	702-829-2080
8	CO Denver	Col. Game Exchange	303-893-4300	33	NY Rochester	Mondial Dist.	716-586-1100
9	CO Denver	Mountain Coin	303-427-2133	34	OH Cincinnati	Atlas Distributing	513-771-1909
10	FL Orlando	Birmingham Vending	407-425-1505	35	OK Tulsa	Galaxy Distributing, Co.	918-835-1166
11	HI Ewa Beach	50th State Coin Op.	808-682-4561	36	ON Rexdale (Can.)	New Way Sales	416-674-8000
12	IA Des Moines	Greater American Dist.	515-244-2828	37	OR Portland	American Coin	503-233-7000
13	IL Chicago	Atlas Distributing	312-276-5005	38	PA Bensalem	Mondial Int'l. Dist.	215-638-1122
14	IL Inverness	James Industries	708-358-8000	39	PA Pittsburgh	Mondial Int'l. Dist.	412-881-8804
15	IN Indianapolis	J. & J. Distributing	317-899-2530	40	PA Wilkes-Barre	Roth Novelty	717-824-9994
16	KS Lenexa	Bird Distributing	913-888-8877	41	PR Carolina	James Industnes	809-253-7149
17	KS Wichita	United Distributing	316-263-6181	42	TN Memphis	Games Sales Co., Inc.	901-525-8351
18	KY Louisville	Kentucky Coin Machine	502-966-5266	43	TN Memphis	Green G.A.M.E.S.	901-353-1000
19	LA Metairie	New Orleans Novelty	504-888-3500	44	TN Nashville	Sammons-Pennington	615-244-3020
20	MA E. Long Meadow	Gekay Sales	413-525-2700	45	TX Dallas	Commercial Music	214-741-6381
21	MA Norwood	Mondial Int'l. Dist.	617-769-9966	46	TX Corsicana	Master Sales	903-874-4740
22	MD Baltimore	Automated Services	410-646-4100	47	UT Salt Lake City	Struve Distributing	801-328-1636
23	MI Farmington Hills	Atlas Distributing	810-615-1703	48	WA Seattle	American Coin	206-764-9020
24	MI Wyoming	Atlas Distributing	616-241-1472	49	WI Menomonee Falls	Pioneer Sales & Svc.	414-781-1420
25	MN Bloomington	Hanson Distributing	612-884-6604	50	WI Green Bay	Pioneer Sales & Svc.	414-468-5200

For Parts and Service, call your local distributor. The numbered locations are general areas. View table and map for corresponding numbered distributor. If your state/province does not have a distributor, call the nearest state/province. Distributors and phone numbers are subject to change. Call Sega Pinball, Inc. Technical Support with any questions or if your distributor cannot help you, at 1-800-542-5377 (1-708-345-7700).

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. If the last Game Specific Adjustment, Novice Mode Enabled, is changed to **YES** (Default = **NO**), 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.

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/Tournament 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

This game features a Video Mode opening Skill Shot. The video modes require the player to play on-screen. The interactive video play requires the player to use the flipper buttons to play the mode. Also, don't forget to watch the display for hints or feature demonstrations.

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 interrupted 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. Proceed 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.



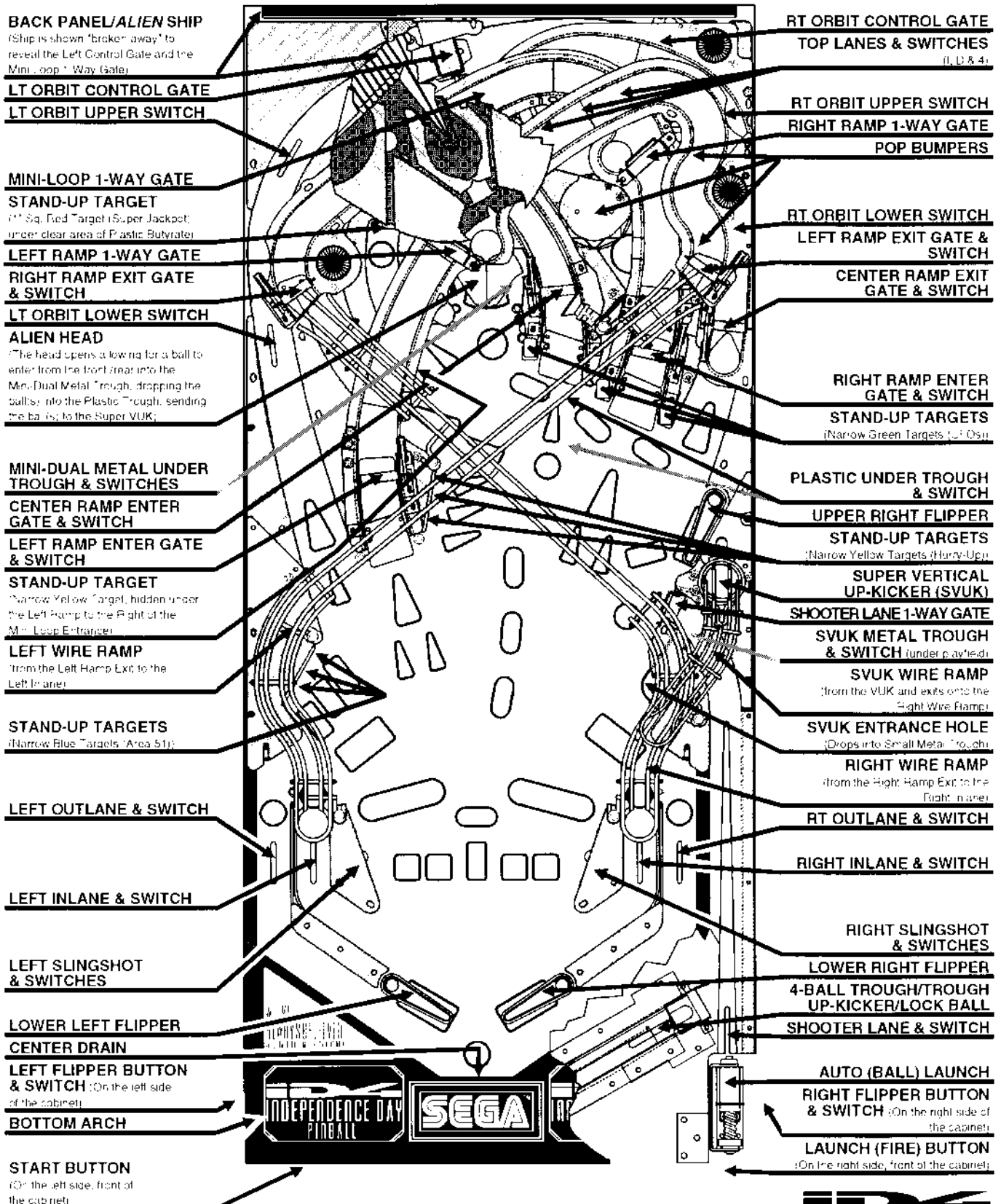
The Cast —



ID4: Independence Day Game Rules

Overview

Below is the ID4 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, ID4 Features, Playfield Shot Map** and **ID4 Rule Notes**.



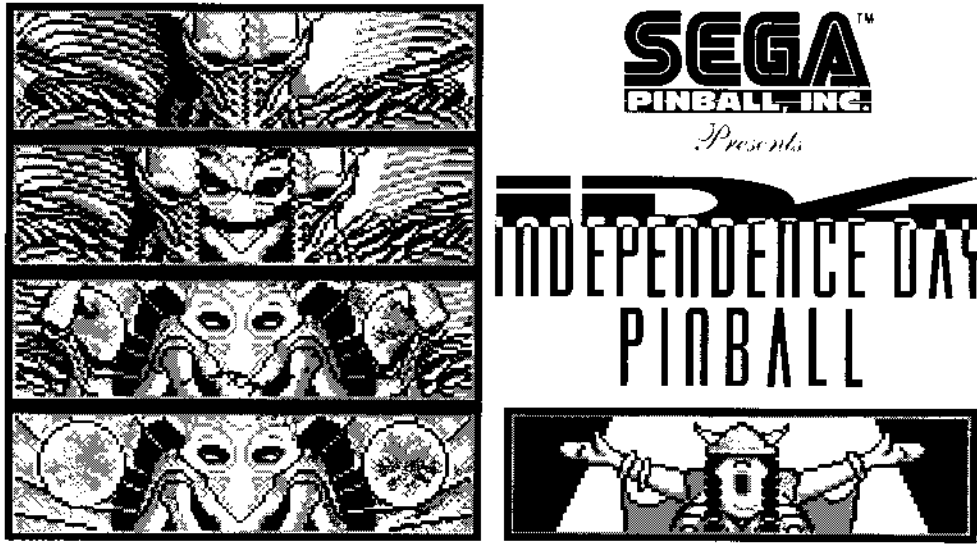
Section 2 | Rules

ID4: Independence Day 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



Fold

Fold

INDEPENDENCE DAY

- 1 Lock balls in the *Alien Head* to start **MULTIBALL**, shoot flashing lights for **JACKPOT**.
- 2 Shoot the *Middle Ramp* for **EXTRA BALL**.
- 3 Shoot the *Left and Right Ramps* to start **RED ALERT**.
- 4 Shoot the *Hole* to **INITIATE COMPUTER VIRUS**.
- 5 Complete the *F-18 Stand-Up Targets* for **HURRY-UP** at the *Left Orbit*.
- 6 Complete the *Area 51 Stand-Up Targets* to light **ALIEN SCAN**, then shoot the same *target bank* for award.
- 7 Shoot *Loops when lit* for **COMBOS**. Collect the **COMBO JACKPOT** at the target when lit.

Note to Beginners: To score better, shoot at ((FLASHING SHOTS))
Be sure to **LOOK UP** at the Dot Display for instructions when possible.

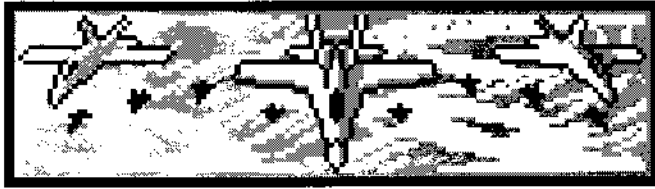
Sega Pinball, Inc.™ & © 1996 ID4: Independence Day™ & © 1996 20th Century Fox Film Corp. All Rights Reserved. Part N° 755-5081-00 USA

The remainder of this chapter are the detailed ID4 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 acronyms 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!

SINGLE BALL PLAY



TOP LANES

Complete the **Top Lanes** to advance the *Bonus Multiplier*.



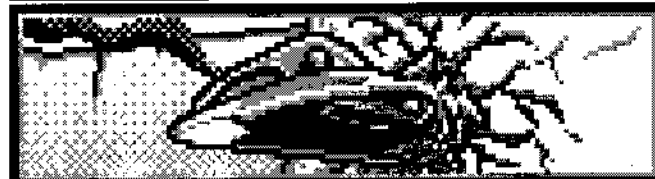
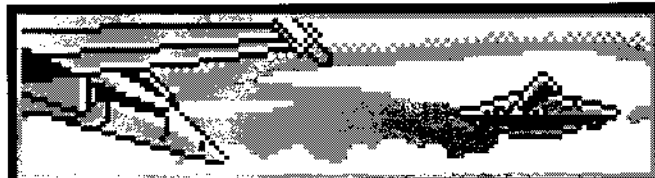
POP BUMPERS

At the beginning of the ball, **Pop Bumpers** score 250K per hit - shooting an unlit **Orbit** increases this value by 50K, with a maximum value of 1M per hit.



F-18 HURRY-UP

In addition to scoring points, each **Pop Bumper** hit adds to the *F-18 Hurry-Up Value* - the same number of points that the **Pop Bumper** scores is added to the *Hurry-Up Value*, which has a base value of 20M. To start the *F-18 Hurry-Up* complete the **3-Bank Targets** in the center of the playfield. When the *Hurry-Up* starts, the accumulated value counts down and the **Left Orbit F-18 Lamp** flashes. If the player shoots the **Left Orbit** before time runs out (the countdown ends at 10M), the value locks in and is scored. Then for a period of time, the **Left Orbit** scores the locked in value.



Playfield Overview
& Game Rules

SINGLE BALL PLAY



RAMP TARGETS

Complete the **Ramp Stand-Up Targets** for increasing *Attacker Millions*.



ALIEN TARGETS/ALIEN SCAN

Complete the **Area 51 (left) 3-Bank Targets** to light *Alien Scan* - then shoot the **3-Bank** one more time for the *Alien Scan Award*. Awards include *Area 51 Multiball Ready*, *Hold Bonus*, *Add Bonus X*, *50M*, *Extra Ball Lit*, *Special Lit*, etc.

MULTIBALL



AREA 51 MULTIBALL

Shooting the **Mini-Loop** when *Area 51 is lit* will start **Area 51 Multiball**. Initially 2 balls are released, and the **Mini-Loop** scores **Jackpots**. Shooting flashing **Targets** during this **Multiball** will add 1 ball into play, and shooting *lit Targets* will increase the **Jackpot Value** by 1M per hit. **Targets** do not flash when there are no balls in the **Trough** to add.



LOCKING BALLS

To start **Multiball**, the player must **Lock 3-Balls** inside the **Alien Head** at the center of the playfield. When the **Lamp** in front of the is **Alien Head** flashing, one more *hit* will open the **Alien Head** - when the **Lamp** is solid, more than one *hit* is needed to open the **Alien Head**. Shooting the *ball inside the head* when it is open will score a **Lock** (Note: **Locks** may be scored from the **OPTO** in front of the head) - when **3-Locks** are complete, **Multiball** begins.

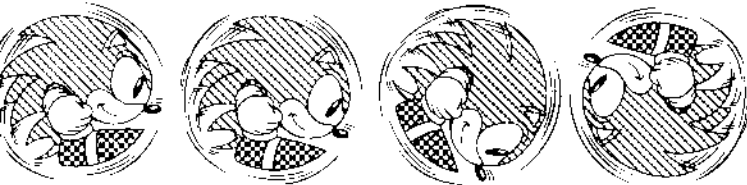
MULTIBALL & JACKPOTS



ADDING BALLS

When the player completes the **2 Double Jackpots** for the 1st time in a **Multiball**, the **Alien Targets** will flash - hitting each **Target** when flashing will put an **additional ball** into play. Each **Target** will add one ball and then the associated lamp will shut off. **Lamps** will be solid rather than flashing if there are no balls in the **Trough** to add.

Section 2 | Rules



JACKPOTS



LOOP COMBOS/COMBO JACKPOT

When the **Light Combo Inlane Inserts** are lit, a ball rolling through the **Inlane** lights the **opposite Orbit** for a **Loop Combo Shot**. The 1st **Loop Combo Shot** each ball scores 5M, the second 6M, etc., with a cap of 10M per shot. This value is also added to the **Combo Jackpot Value** - collected by shooting the **Combo Target** when flashing. The maximum **Combo Jackpot** is 99M, and it resets at the start of each ball.

JACKPOTS



SINGLE JACKPOT/INCREASE JACKPOT

At the start of **Multiball** the **Alien Head** opening is lit for a **Jackpot** - the **Jackpot** starts at a base value and may be increased by 5M for every shot to the **Right Orbit**. Increase **Jackpot Value** is only lit when the **Single Jackpot** is lit. Scoring the **Single Jackpot** advances the player to the **Double Jackpots**...



DOUBLE JACKPOT

2 Double Jackpots are lit, 1 at the **Left Orbit** and 1 at the **Right Orbit**. Each **Jackpot** is twice the value of the **Single Jackpot** previously scored - these **Jackpot Values** may not be increased during this round. Scoring **both Double Jackpots** advances the player to the **Triple Jackpots**...



TRIPLE JACKPOT

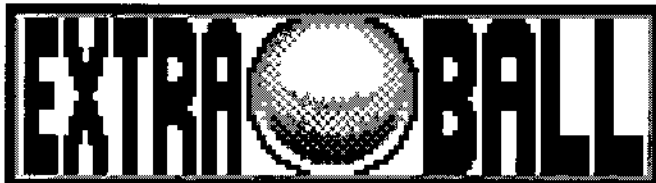
3 Triple Jackpots are lit, 1 at each **Ramp**. Each **Jackpot** is three times the value of the **Single Jackpot** - these **Jackpot Values** may not be increased during this round. Scoring all three **Triple Jackpots** lights the **Super Jackpot**.



SUPER JACKPOT

Shoot the **Super Jackpot Target** (at end of lane just to the left of the **Alien Head**) to collect **Super Jackpot**. The **Super Jackpot Value** is four times the **Single Jackpot Value** previously scored. After the **Super Jackpot** is scored the **Multiball** sequence starts over with **Single Jackpot** and increase **Jackpot Value** available. (Note: Increases in the **Jackpot Value** are held throughout the **Multiball** - but the **Jackpot Value** resets when **Multiball** is over - e.g., increases during the **1st Multiball** do not carry over to the **2nd Multiball**, and so on...)





14 CENTER RAMP/EXTRA BALL
Each shot to the **Center Ramp** awards 1 Alien - scoring a percentaged number of Aliens will light the **Ramp** for **Extra Ball**. **Extra Ball** may also be lit through percentaging or from **Alien Scan**. After the **1st Extra Ball** is collected, scoring subsequent Aliens will award points at various thresholds.

15 LT. & RT. RAMPS/RED ALERT
At game start a shot to the **Left** or **Right Ramp** will score 5M and light the **10m Arrow** in front of that **Ramp**. The next shot to the **Ramp** will score 10M and light the **20m Arrow**. The 3rd shot will score 20M and "complete" the **Ramp** - both the **10M** and **20M Lamps** will be on. Completing both **Ramps** starts **Red Alert**, a timed feature where each **Ramp** scores 50M per shot. To start **Red Alert** a 2nd time in a game, more shots will be necessary, and on extra hard settings the flashing arrows will back up over time.

16 COMPUTER VIRUS
Shots to the **Right Hole** score a letter of **V I R U S** when lit. Completing **V I R U S** starts the **Computer Virus Feature** - the player must shoot the **Right Orbit** to destroy the **Alien Ship** for **B I G Points**.



17 MINI-LOOP
Sucessive shots around the **Mini-Loop** score 5M, 10M, 15M, 20M, 25M, 30M, 30M, 30M. Percentaging may also allow an **Extra Ball** to be lit if consecutive **Mini-Loop** shots are made.

18 UNLIT COMBO TARGET
Each shot to this **Target** kills an Alien on the **Display** — kill all Aliens to reveal Award behind them (a Hold Bonus or 50M).

19 SINGLE STAND-UP TARGET
Each shot to this **Target** scores Millions, plus spots a **Top Lane Light** (I, D or 4).

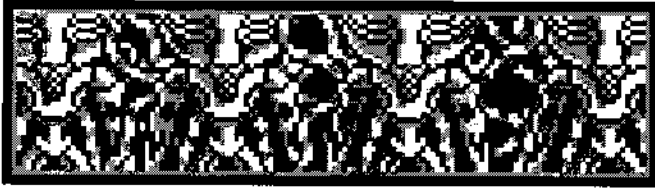
20 SKILL SHOT (VIDEO MODE)
At the beginning of each ball is the Skill Shot. Hit the **Launch Button** [FIRE]...don't be hasty, wait until the **Alien Ship** is in your sights!

21 HIDDEN FEATURES
ID4 features several **Hidden Features!** These rules may include difficult **Combo Shots**, **Sneakins**, etc.

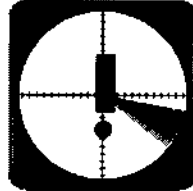
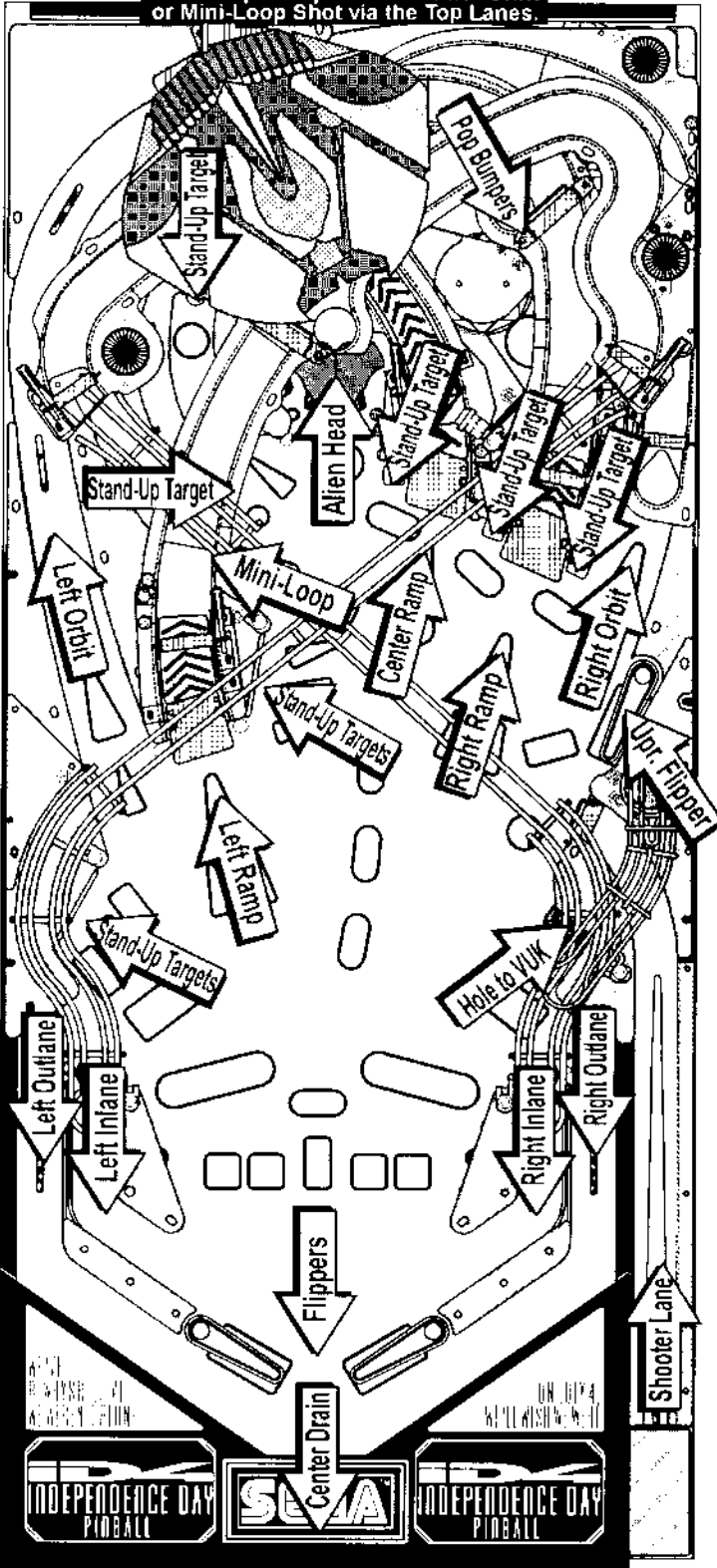
22 END OF BALL BONUS
The **BONUS (calculation)** is awarded based on the number of **Balls Locked**, **Ramp Shots**, **Loop Shots**, **Target Hits**, **Feature Completions** and the **Bonus Multiplier**. The **BONUS** can be carried over from ball to ball via **BONUS HOLD**.

PLAYFIELD SHOT MAP

ID4 RULE NOTES

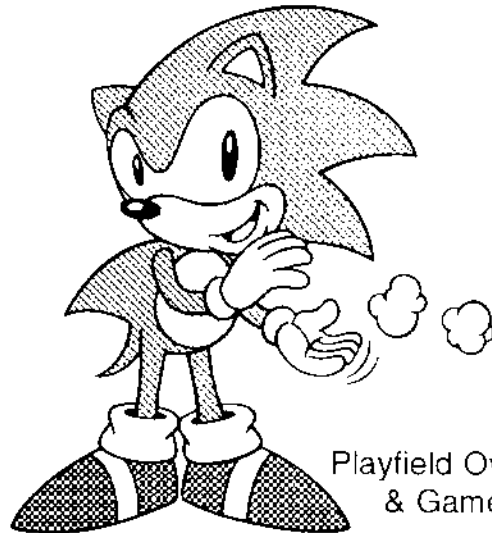
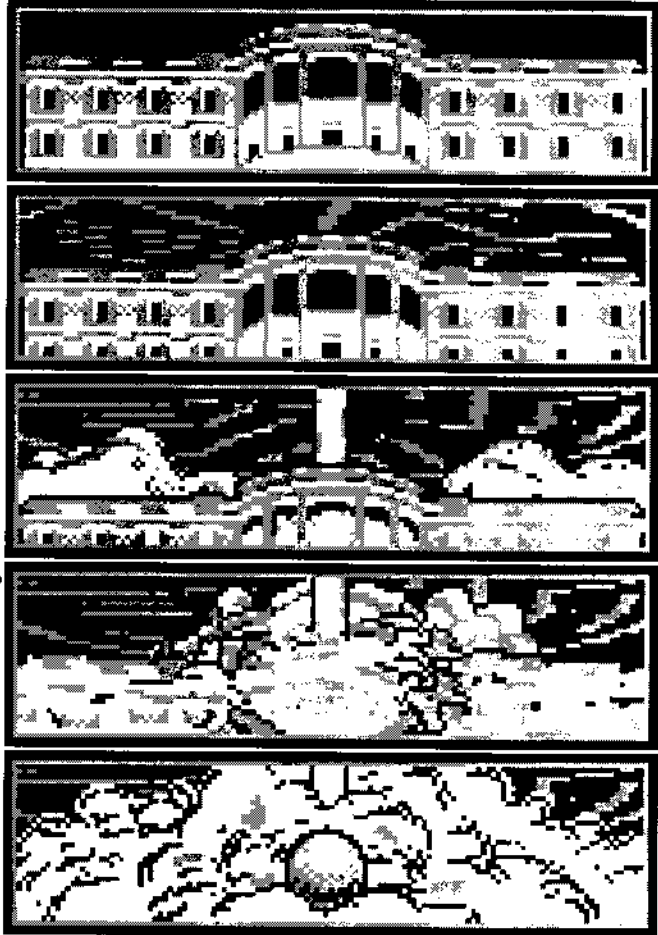


Enter Pop Bumpers from either Orbit or Mini-Loop Shot via the Top Lanes.



INDEPENDENCE DAY NOTE

To keep the world from being destroyed, all rules & point values are subject to change without notice. Seek shelter!



Section 2 | Rules

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 by 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 "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.)



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 in 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 three parts: Switch Test, Active Switches, and Dedicated Switch Test.
Note: The Flipper & Start Buttons are deactivated 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 N^o, 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

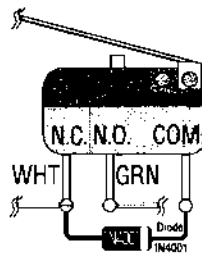
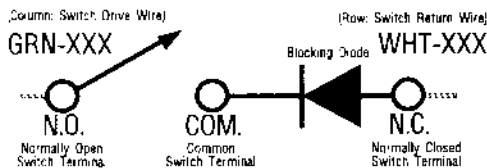
To initiate, from the **SWITCH MENU**, select the "ACT" *Icon* with either **Red or Green Button** & press the **Black Button**. If still in a previous test, select the "PREV" *Icon* to return to Switch Menu or selecting either of the "ARROW" *Icons* will move through the tests. If any switches are stuck 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 N^o, and the "Pin-Outs" from the CPU/SOUND Board. This cycle continues until all switches are cleared or until the test is exited.



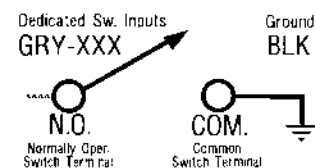
Dedicated Switch Test

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, Drive (Column) Wire, Part N^o, and the "Pin-Outs" from the CPU/SOUND Board.

Typical Switch Schematic & Side View



Dedicated Switch Schematic



SWITCH MATRIX GRID

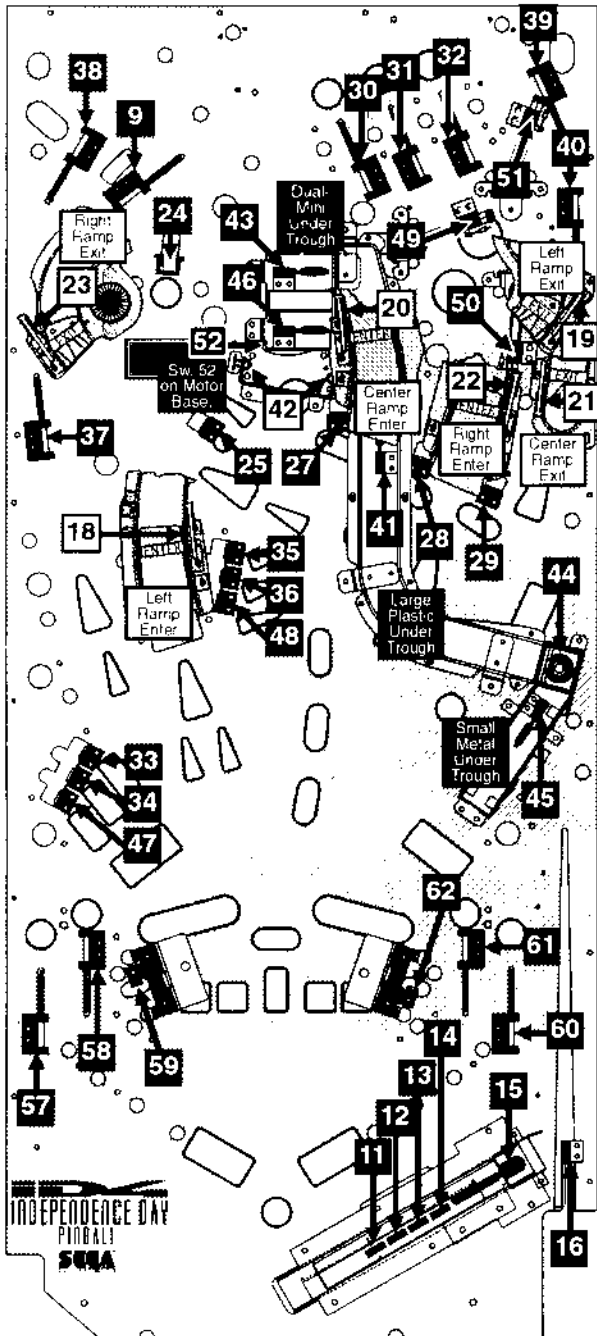
Column (Drive)	1 Q1 GRN-BRN CN5-P1	2 Q2 GRN-RED CN5-P3	3 Q3 GRN-ORG CN5-P4	4 Q4 GRN-YEL CN5-P5	5 Q5 GRN-BLK CN5-P6	6 Q6 GRN-BLU CN5-P7	7 Q7 GRN-VIO CN5-P8	8 Q8 GRN-GRY CN5-P9
Row (Return)	1 U400 WHT-BRN CN7-P9 NOT USED	MINI-LOOP	NOT USED	MINI-LOOP S-U	AREA 51 3-BANK TOP	SUPER VUK ENTER SIDE	LEFT TURBO BUMPER	LEFT OUTLANE
2 U400 WHT-RED CN7-P8 4TH COIN SLOT	NOT USED	LEFT RAMP ENTER	NOT USED	AREA 51 3-BANK MID	ALIEN HEAD OPTO	BOTTOM TURBO BUMPER	LEFT RETURN LANE	
3 U400 WHT-ORG CN7-P7 6TH COIN SLOT	4-BALL TROUGH #1 (LEFT)	LEFT RAMP EXIT	CENTER RAMP S-U	HURRY-UP 3-BANK TOP	HEAD UNDER-TROUGH REAR	TOP TURBO BUMPER	LEFT SLINGSHOT	
4 U400 WHT-YEL CN7-P6 RIGHT COIN SLOT	4-BALL TROUGH #2	CENTER RAMP ENTER	RIGHT RAMP S-U LEFT	HURRY UP 3-BANK MID	SUPER VUK	SERV OPEN / CLOSE	RIGHT OUTLANE	
5 U401 WHT-GRN CN7-P5 CENTER COIN SLOT / OBA	4-BALL TROUGH #3	CENTER RAMP EXIT	RIGHT RAMP S-U RIGHT	LEFT ORBIT BOTTOM	SUPER VUK ENTER FRONT	LAUNCH BUTTON	RIGHT RETURN LANE	
6 U401 WHT-BLU CN7-P3 LEFT COIN SLOT	4-BALL TROUGH #4 (RIGHT)	RIGHT RAMP ENTER	LEFT TOP LANE	LEFT ORBIT TOP	HEAD UNDER-TROUGH FRONT	START BUTTON	RIGHT SLINGSHOT	
7 U401 WHT-VIO CN7-P2 5TH COIN SLOT	4-BALL TROUGH VUK OPTO	RIGHT RAMP EXIT	MIDDLE TOP LANE	RIGHT ORBIT TOP	AREA 51 3-BANK BOT	SLAM TILT	NOT USED	
8 U401 WHT-GRY CN7-P1 NOT USED	SHOOTER LANE	SUPER JACKPOT S-U	RIGHT TOP LANE	RIGHT ORBIT BOTTOM	HURRY-UP 3-BANK BOT	PLUMB BOB TILT	NOT USED	

Dedicated Switches

IC U206 INPUTS	GND	Ground BLK CN6-P1, -P11
1 GRY-BRN CN6-P2	#1 LEFT FLIPPER BUTTON	DS-1
2 GRY-RED CN6-P3	#2 LEFT FLIPPER E.O.S. (End-of-Stroke)	DS-2
3 GRY-ORG CN6-P4	#3 RIGHT FLIPPER BUTTON	DS-3
4 GRY-YEL CN6-P6	#4 RIGHT FLIPPER E.O.S. (End-of-Stroke)	DS-4
5 GRY-GRN CN6-P7	#5 UPPER FLIPPER BUTTON	DS-5
6 GRY-BLU CN6-P8	#6 VOLUME (RED BUTTON) (Normal: In Test: LEFT)	DS-6
7 GRY-VIO CN6-P9	#7 SERV. CTRL. (GREEN BUTTON) (Normal: In Test: RIGHT)	DS-7
8 GRY-BLK CN6-P10	#8 BEGIN TEST (BLACK BUTTON) (Normal: In Test: ENTER)	DS-8

Switch Matrix Descriptions with Part Numbers and Locations †

The switch locations correspond with the Switch N° in the table below and the Switch Matrix 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:

2 3 4 5 6 7 54 55 56

The following switches are not used:

1 8 10 17 26 63 64

TAKE NOTE: For Ded. Switch Part N°s see Sec. 4, Chp. 1, Cabinet - General Parts or Chp. 2, Flipper Assy.

Sw. N°	Col. N°	Row N°	Switch Matrix Description	Part N°
Note: The ¥ Coin Switch (for Japan) is 180-5091-00				
1	1	1	NOT USED	-----
2*	1	2	4TH COIN SLOT (On Coin Door)	-----
3*	1	3	6TH COIN SLOT (FUTURE USE)	-----
4*	1	4	RIGHT COIN SLOT (On Coin Door, USA)	-----
5*	1	5	CENTER COIN SLOT / DBA (USA)	180-5024-00
6*	1	6	LEFT COIN SLOT (On Coin Door) (USA)	-----
7*	1	7	5TH COIN SLOT (FUTURE USE)	-----
8	1	8	NOT USED	-----
9	2	1	MINI-LOOP	500-5707-00
10	2	2	NOT USED	-----
11	2	3	4-BALL TROUGH #1 (LEFT)	-----
12	2	4	4-BALL TROUGH #2	180-5119-00
13	2	5	4-BALL TROUGH #3	-----
14	2	6	4-BALL TROUGH #4 (RIGHT)	-----
15	2	7	4-BALL TROUGH VUK OPTO	TRANS REC 520-5124-00 520-5125-00
16	2	8	SHOOTER LANE	180-5100-01
17	3	1	NOT USED	-----
18	3	2	LEFT RAMP ENTER	-----
19	3	3	LEFT RAMP EXIT	-----
20	3	4	CENTER RAMP ENTER	180-5087-00
21	3	5	CENTER RAMP EXIT	-----
22	3	6	RIGHT RAMP ENTER	-----
23	3	7	RIGHT RAMP EXIT	-----
24	3	8	SUPER JACKPOT S-U	500-5232-02
25	4	1	MINI-LOOP S-U	500-5857-06
26	4	2	NOT USED	-----
27	4	3	CENTER RAMP S-U	-----
28	4	4	RIGHT RAMP S-U LEFT	500-5857-04
29	4	5	RIGHT RAMP S-U RIGHT	-----
30	4	6	LEFT TOP LANE	500-5706-00
31	4	7	MIDDLE TOP LANE	500-5707-00
32	4	8	RIGHT TOP LANE	-----
33	5	1	AREA 51 3-BANK TOP	500-5857-06
34	5	2	AREA 51 3-BANK MID	-----
35	5	3	HURRY-UP 3-BANK TOP	500-5857-05
36	5	4	HURRY-UP 3-BANK MID	-----
37	5	5	LEFT ORBIT BOTTOM	-----
38	5	6	LEFT ORBIT TOP	500-5707-00
39	5	7	RIGHT ORBIT TOP	-----
40	5	8	RIGHT ORBIT BOTTOM	500-5706-00
41	6	1	SUPER VUK ENTER SIDE	180-5057-00
42	6	2	ALIEN HEAD OPTO	TRANS REC 520-5082-00 520-5083-00
43	6	3	HEAD UNDER TROUGH REAR	180-5057-00
44	6	4	SUPER VUK	180-5116-00
45	6	5	SUPER VUK ENTER FRONT	-----
46	6	6	HEAD UNDER TROUGH FRONT	180-5057-00
47	6	7	AREA 51 3-BANK BOT	500-5857-06
48	6	8	HURRY-UP 3-BANK BOT	500-5857-05
49	7	4	LEFT TURBO BUMPER	-----
50	7	2	BOTTOM TURBO BUMPER	180-5015-03
51	7	3	RIGHT TURBO BUMPER	-----
52	7	4	SERVO OPEN / CLOSE (On Motor Base)	180-5119-00
53	7	5	LAUNCH BUTTON	500-6121-06
54*	7	6	START BUTTON	500-6090-02
55*	7	7	SLAM TILT (On Coin Door)	180-5022-00
56*	7	8	PLUMB BOB TILT	HANGER CONTACT 535-5319-00 535-7563-01
57	8	1	LEFT OUTLANE	500-5707-00
58	8	2	LEFT RETURN LANE	-----
59	8	3	LEFT SLINGSHOT	180-5054-00
60	8	4	RIGHT OUTLANE	500-5707-00
61	8	5	RIGHT RETURN LANE	-----
62	8	6	RIGHT SLINGSHOT	180-5054-00
63	8	7	NOT USED	-----
64	8	8	NOT USED	-----

Section 3 | Diags.



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.



Single 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 and Flash Lamps F1-F8; some Flash Lamps may be positioned within Coils 1-24.). 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.

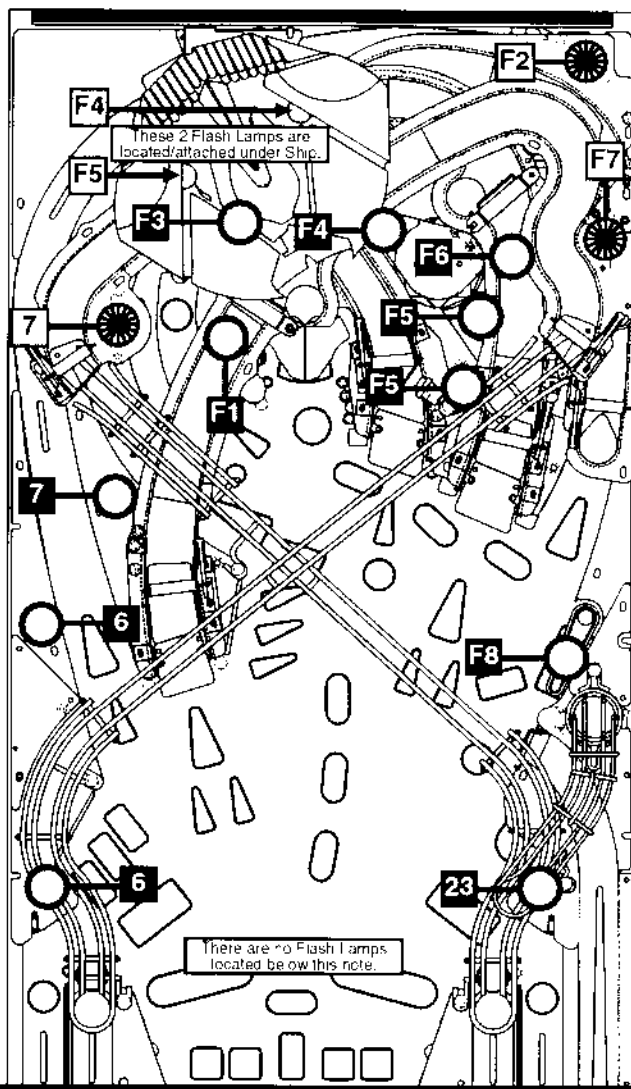


Cycling Coil Test

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."

Playfield Flash Lamp Locations

Type	Description
#6 FLASH	BOTTOM-LT*2
#7 FLASH	LT*1 RT-RAMP*1
#23 FLASH	BOTTOM-RT*1
#F1 FLASH	MID PLAYFIELD*1
#F2 FLASH	CENTER RAMP*1
#F3 FLASH	TOP-LT PLAYFIELD*1
#F4 FLASH	SHIP*1 POPS*1
#F5 FLASH	SHIP*1 POPS*2
#F6 FLASH	POPS*1
#F7 FLASH	LEFT RAMP*1
#F8 FLASH	UPPER RT FLIPPER*1



Legend Note:

□ = Flash Lamps mounted above playfield.

■ = Flash Lamps mounted below playfield.

Spots Actual Location:

○ = Bulb goes through hole in the playfield.

○ = Bulb is under playfield insert.

⊙ = Bulb under Mini-Mar (Light Cover).

The following bulbs are used for Flash Lamps (The two [2] #906 Bulbs are used under the Alien Ship Assembly):

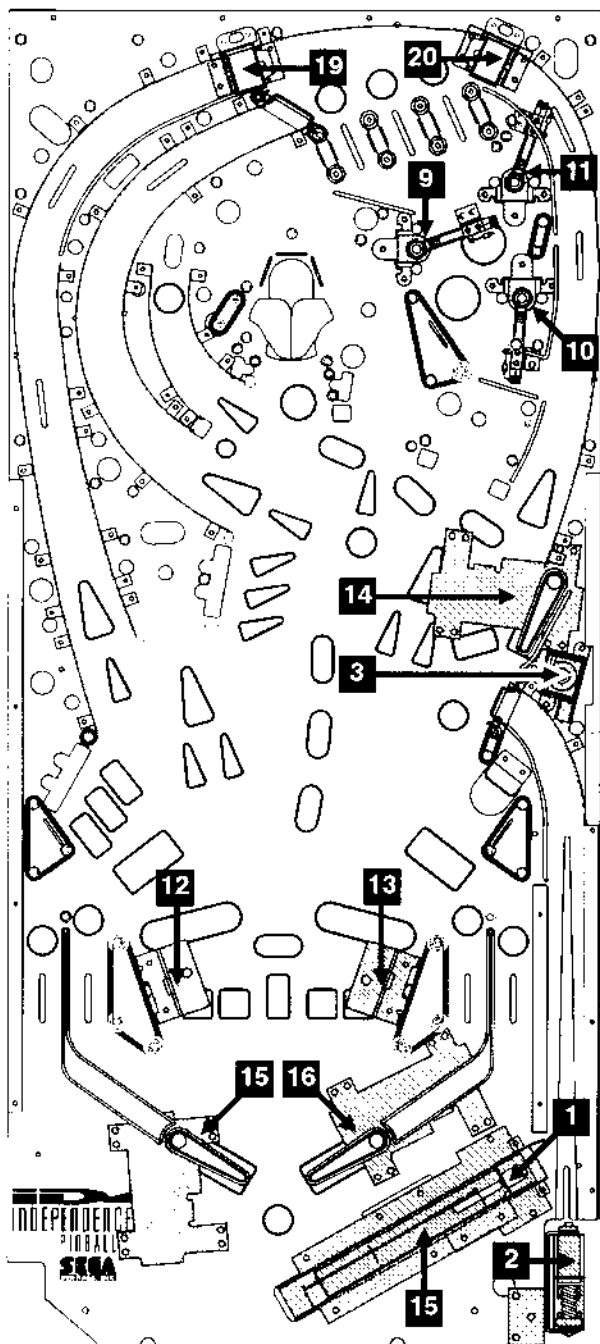


#89 Bulb (Bayonet)
165-5000-89



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

Playfield Coil Locations



Type	Coil Description
COIL 1	TROUGH UP-KICKER (VUK) (24-940)
COIL 2	AUTO LAUNCH 50V (23-700)
COIL 3	SUPER VUK (23-800)
COIL 4	NOT USED / SPARE
COIL 5	NOT USED / SPARE
COIL 6	FLASH BOTTOM-LT*1 (See previous page)
COIL 7	FLASH LT*1 RT-RAMP*1 (See previous page)
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	UPPER FLIPPER [50v RED/YEL] (23-900)
COIL 15	LEFT FLIPPER [50v RED/YEL] (22-1080)
COIL 16	RIGHT FLIPPER [50v RED/YEL] (22-1080)
COIL 17	4-BALL TROUGH LOCK BALL (24-940)
COIL 18	NOT USED / SPARE
COIL 19	LEFT CONTROL GATE (32-1800)
COIL 20	RIGHT CONTROL GATE (32-1800)
COIL 21	NOT USED / SPARE
COIL 22	NOT USED / SPARE
COIL 23	FLASH BOTTOM RT*1 (See previous page)
COIL 24	(OPTIONAL COIN METER)

Legend Note:

□ = Coils mounted above playfield (*No Coils are mounted above the playfield in this game.*)

■ = Coils mounted below playfield.

The following coils are not used:

4 5 18 21 22

The following coils are optional:

8 24

COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#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	23-700 090-5022-01
#3	SUPER VUK	Q3	I/O Pwr. Drvr.	BRN-ORG	J8-P4	YEL-VIO	J10-P4/5	50v	23-800 090-5001-C1
#4	NOT USED / SPARE	Q4	I/O Pwr. Drvr.						
#5	NOT USED / SPARE	Q5	I/O Pwr. Drvr.						
#6	FLASH BOTTOM-LT*2	Q6	I/O Pwr. Drvr.	BRN-BLU	J8-P7	ORG	J6-P10	20v	#89 165-5000-89
#7	FLASH LT*1 RT-RAMP*1	Q7	I/O Pwr. Drvr.	BRN-VIO	J8-P8	ORG	J6-P10	20v	#89 165-5000-89
#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 Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#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	UPPER FLIPPER (50v RED/YEL)	Q14	I/O Pwr. Drvr.	BLK-YEL	J9-P7	RED-YEL BLU-YEL	J10-P1/2	50v	23-900 090-5020-50
#15	LEFT FLIPPER (50v RED/YEL)	Q15	I/O Pwr. Drvr.	ORG-GRY	J9-P8	RED-YEL GRY-YEL	J10-P1/2	50v	22-1080 090-5032-00
#16	RIGHT FLIPPER (50v RED/YEL)	Q16	I/O Pwr. Drvr.	ORG-VIO	J9-P9	RED-YEL BLU-YEL	J10-P1/2	50v	22-1080 090-5032-00

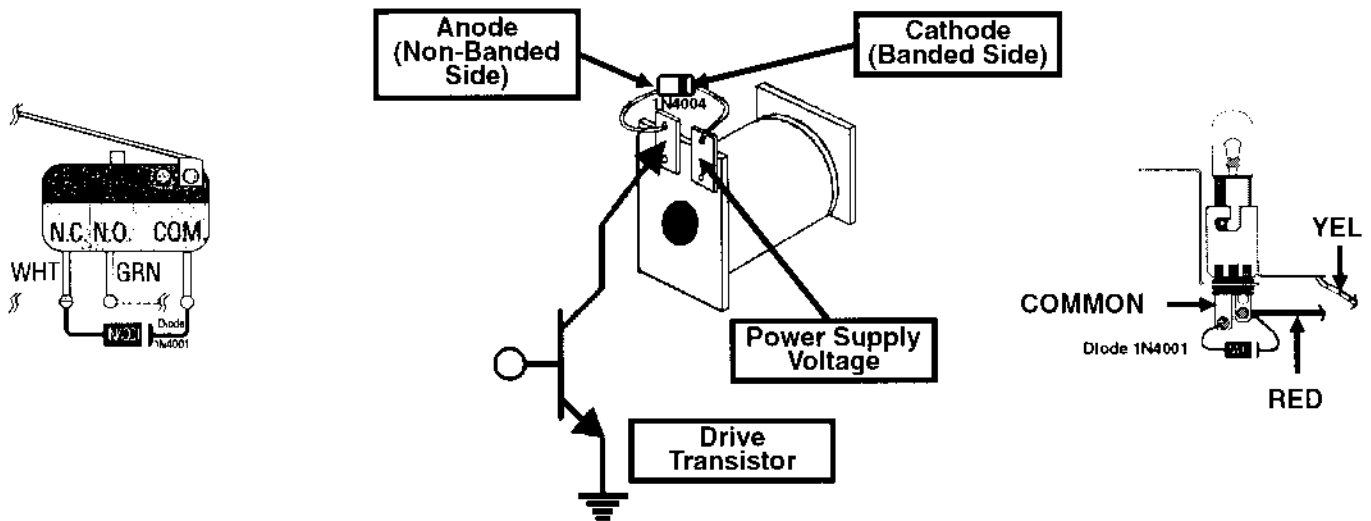
Low Current Coils Group 1		Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Coil GA/Turn or Bulb Type
#17	4-BALL TROUGH LOCK BALL	Q17	I/O Pwr. Drvr.	VIO-BRN	J7-P2	BRN	J7-P1	20v	24-940 090-5036-00
#18	NOT USED / SPARE	Q18	I/O Pwr. Drvr.						
#19	LEFT CONTROL GATE	Q19	I/O Pwr. Drvr.	VIO-ORG	J7-P4	BRN	J7-P1	20v	32-1800 090-5031-00
#20	RIGHT CONTROL GATE	Q20	I/O Pwr. Drvr.	VIO-YEL	J7-P6	BRN	J7-P1	20v	32-1800 090-5031-00
#21	NOT USED / SPARE	Q21	I/O Pwr. Drvr.						
#22	NOT USED / SPARE	Q22	I/O Pwr. Drvr.						
#23	FLASH BOTTOM-RT*1	Q23	I/O Pwr. Drvr.	VIO-BLK	J7-P9	ORG	J6-P10	20v	#89 165-5000-89
#24	OPTIONAL COIN METER	Q24	I/O Pwr. Drvr.	VIO-GRY	J7-P10	RED	J16-P7	5v	5v Meter (If Required)

Coils Detailed Chart Table

Flash Lamps (FLASH)	Drive Transistor (D.T.)	Driver Output Board	D.T. Control Line Color	D.T. Control Line Connect	Power Line Color	Power Line Connection	Power Voltage	Bulb Type
#F1 FLASH MID PLAYFIELD*1	Q25	I/O Pwr. Drvr.	BLK-BRN	J6-P1	ORG	J6-P10	20v	#89 165-5000-89
#F2 FLASHCENTER RAMP*1	Q26	I/O Pwr. Drvr.	BLK-RED	J6-P2	ORG	J6-P10	20v	#89 165-5000-89
#F3 FLASH TOP-LT PLAYFIELD*1	Q27	I/O Pwr. Drvr.	BLK-ORG	J6-P3	ORG	J6-P10	20v	#89 165-5000-89
#F4 FLASH SHIP*1 POPS*1	Q28	I/O Pwr. Drvr.	BLK-YEL	J6-P4	ORG	J6-P10	20v	#906 / #89 165-5004-00
#F5 FLASH SHIP*1 POPS*2	Q29	I/O Pwr. Drvr.	BLK-GRN	J6-P5	ORG	J6-P10	20v	#906 / #89 165-5004-00
#F6 FLASH POPS*1	Q30	I/O Pwr. Drvr.	BLK-BLU	J6-P6	ORG	J6-P10	20v	#89 165-5000-89
#F7 FLASH LEFT RAMP*1	Q31	I/O Pwr. Drvr.	BLK-VIO	J6-P7	ORG	J6-P10	20v	#89 165-5000-89
#F8 FLASH UPPER RT FLIPPER *1	Q32	I/O Pwr. Drvr.	BLK-GRY	J6-P8	ORG	J6-P10	20v	#89 165-5000-89

Section 3 | Diags.

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 an 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 its 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.

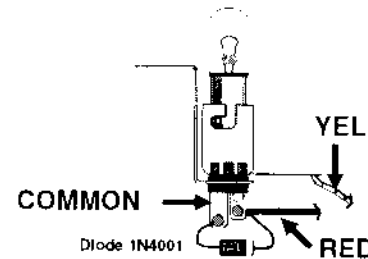
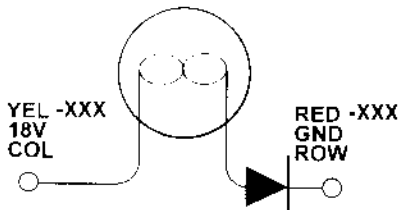


Test All Lamps

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.

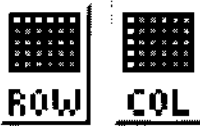
Typical Lamp Schematic & Side View



LAMP MATRIX GRID

Column (18v)	1: U17 YEL-BRN J13-P9	2: U16 YEL-RED J13-P8	3: U15 YEL-ORG J13-P7	4: U14 YEL-BLK J13-P6	5: U13 YEL-GRN J13-P5	6: U12 YEL-BLU J13-P4	7: U11 YEL-VIO J13-P3	8: U10 YEL-GRY J13-P1
1: Q33 RED-BRN J12-P1	2X #555 Bulb 1	4X #555 Bulb 2	10X #555 Bulb 3	6X #555 Bulb 4	8X #555 Bulb 5	RELEASE CITY DESTROYERS #555 Bulb 6	RELEASE CITY DESTROYERS #555 Bulb 7	HOLD BONUS #44 Bulb 8
2: Q34 RED-BLK J12-P2	RELEASE ATTACKERS #555 Bulb 9	RELEASE ATTACKERS #555 Bulb 10	SPECIAL (LEFT) #44 Bulb 11	LIGHT COM-BO (LEFT) #44 Bulb 12	LIGHT COM-BO (RIGHT) #44 Bulb 13	SPECIAL (RIGHT) #44 Bulb 14	ALIEN SCAN #555 Bulb 15	INITIATE COMPUTER VIRUS #44 Bulb 16
3: Q35 RED-ORG J12-P3	AREA 51 3-BANK BOT #555 Bulb 17	AREA 51 3-BANK MID #555 Bulb 18	AREA 51 3-BANK TOP #555 Bulb 19	LEFT RAMP 10 MIL #555 Bulb 20	LEFT RAMP 20 MIL #555 Bulb 21	LEFT RAMP ARROW #555 Bulb 22	F-18 HURRY-UP #44 Bulb 23	LEFT ORBIT ARROW #44 Bulb 24
4: Q36 RED-YEL J12-P4	LOCK 1 #555 Bulb 25	LOCK 2 #555 Bulb 26	LOCK 3 #555 Bulb 27	INCREASE JACKPOT #555 Bulb 28	HURRY-UP 3-BANK BOT #555 Bulb 29	HURRY-UP 3-BANK MID #555 Bulb 30	HURRY-UP 3-BANK TOP #555 Bulb 31	RUSSELL #555 Bulb 32
5: Q37 RED-GRN J12-P5	RIGHT RAMP 10 MIL #555 Bulb 33	RIGHT RAMP 20 MIL #555 Bulb 34	RIGHT RAMP ARROW #44 Bulb 35	MINI-LOOP ARROW #555 Bulb 36	AREA 51 ARROW #555 Bulb 37	SUPER JACKPOT #44 Bulb 38	MINI-LOOP STAND-UP #555 Bulb 39	NOT USED #44 Bulb 40
6: Q38 RED-BLU J12-P6	COMBO #555 Bulb 41	ALIEN HEAD CIRCLE #555 Bulb 42	CENTER RAMP S-U #555 Bulb 43	RIGHT RAMP S-U LEFT #555 Bulb 44	RIGHT RAMP S-U RIGHT #44 Bulb 45	EXTRA BALL #555 Bulb 46	CENTER RAMP ARROW #555 Bulb 47	RIGHT ORBIT #44 Bulb 48
7: Q39 RED-VIO J12-P8	LEFT TURBO BUMPER #555 Bulb 49	BOTTOM TURBO BUMPER #555 Bulb 50	RIGHT TURBO BUMPER #555 Bulb 51	LEFT TOP LANE #44 Bulb 52	MIDDLE TOP LANE #44 Bulb 53	RIGHT TOP LANE #44 Bulb 54	LEFT FLIPPER #44 Bulb 55	RIGHT FLIPPER #44 Bulb 56
8: Q40 RED-GRY J12-P9	ALIEN EYES #44 Bulb 57	SHOOT AGAIN #44 Bulb 58	LEFT FLIPPER #44 Bulb 59	LEFT FLIPPER #44 Bulb 60	RIGHT FLIPPER #44 Bulb 61	RELEASE CITY DESTROYERS #555 Bulb 62	RIGHT FLIPPER #44 Bulb 63	LAUNCH BUTTON #44 Bulb 64
9: Q41 RED-WHT J12-P10	RELEASE ATTACKERS #555 Bulb 65	NOT USED #44 Bulb 66	NOT USED #44 Bulb 67	NOT USED #44 Bulb 68	NOT USED #44 Bulb 69	NOT USED #44 Bulb 70	NOT USED #44 Bulb 71	NOT USED #44 Bulb 72
10: Q42 NOT USED J12-P11	NOT USED #44 Bulb 73	NOT USED #44 Bulb 74	NOT USED #44 Bulb 75	NOT USED #44 Bulb 76	NOT USED #44 Bulb 77	NOT USED #44 Bulb 78	NOT USED #44 Bulb 79	NOT USED #44 Bulb 80

Section 3 | Diags.





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

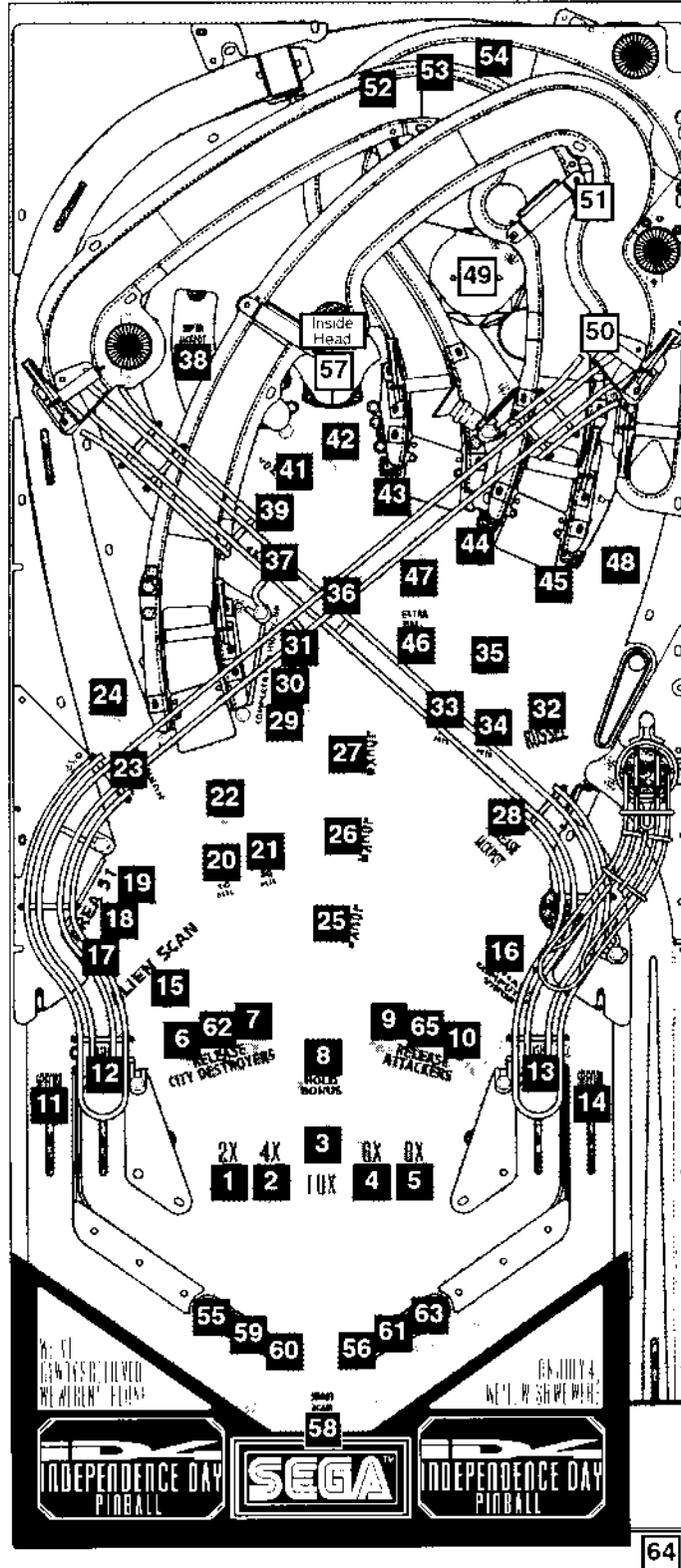
The lamp locations correspond with the Lamp Number in the Lamp Matrix Grid on the previous page.

Legend Note:

-  = Lamps mounted above playfield.
-  = Lamps mounted below playfield.

The following Lamps are not used:

40	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80



The following Bulb is used on the Light Boards and Pop Bumpers:



#555 Bulb (Wedge)
165-5002-00

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



#44 Bulb (Bayonet)
165-5000-44